

Promoting competition and investment in fibre networks: review of the physical infrastructure and business connectivity markets

Volume 2: market analysis, SMP findings, and remedies
for the Business Connectivity Market Review (BCMR)

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NOTIFICATION TO THE EUROPEAN COMMISSION

Draft Statement

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1. Introduction

- 1.1 In this volume we set out the findings of our review of wholesale leased line services, known as the Business Connectivity Market Review (BCMR). The review assesses competition for wholesale leased lines throughout the UK up to April 2021. Where we find an operator to have market power, we impose remedies that address our competition concerns, protect consumers, and promote competition.
- 1.2 We have explained in Volume 1 the broader context for this review, that we must set out how the business connectivity market will be regulated now, in a way that addresses BT's market power over the next two years, and reflects the wider strategy of securing network investment by promoting competition to deliver long-term consumer benefits.
- 1.3 Consumer demand for data-hungry services, business demand for secure, high-speed connections, and the rollout of new 5G mobile networks all increase the need for investment in our telecoms infrastructure. This demand, facilitated by our work to make it cheaper and easier to build new networks, provides a potential long-term solution to our competition concerns in markets where BT has significant market power (SMP). New multi-service fibre networks will help to meet the needs of consumers, businesses and the telecoms providers that serve them.
- 1.4 In this review we have imposed regulation that reflects competition in the geographic markets identified. We have relaxed regulation in areas where BT faces competition from two or more rival networks. In areas where BT faces competition from fewer than two rivals, we have imposed regulation that provides protection for customers who rely on wholesale inputs from BT and, in line with our strategy to promote competition from rival networks, gives investors confidence to make long-term commitments.
- 1.5 In setting prices, we have considered maintaining incentives for rivals to invest in new networks, and protecting BT customers from excessive prices. By capping prices at current levels, we have addressed both our immediate concern that BT could charge excessive prices and our longer term goal of promoting competition.

Our key decisions and conclusions are:

We have defined two product markets for contemporary interface (CI) services (connections over fibre typically using an Ethernet interface):

- CI Access services, which are the connections to end-user business sites (such as office buildings or mobile base stations); and
- CI Inter-exchange connectivity services, which consists of the connections between BT exchanges in different geographic areas (such as between towns and cities).

For each of these we have identified a single product market covering all bandwidths.

In the CI Access services market, we identify separate geographic markets, based on network competition. We have concluded that BT has SMP in CI Access services in each of the geographic markets we have identified across the UK, except in the Central London Area (CLA) and the Hull Area.

In the CI Inter-exchange connectivity services markets, we have decided that BT has SMP at its exchanges where it faces competition from fewer than two other operators.

We have decided to remove all regulation from legacy traditional interface (TI) services.

This overview is a simplified high-level summary only. The decisions we have taken, and our reasoning are set out in the full document.

The key remedies we are imposing in these markets are:

For CI Access services:

- In areas where BT faces competition from two or more rivals, we are imposing minimal price controls and removing standards for quality of service.
- In areas with limited competition (BT Only or BT+1 competitor), we are keeping prices flat and have strict standards for quality of service at all bandwidths.

In the CI Inter-exchange connectivity markets:

- At exchanges where BT faces competition from fewer than two competitors, we are keeping prices flat and have strict standards for quality of service at all bandwidths.
- At exchanges where BT faces no competition and there are no rival networks close by, we require BT to provide access to dark fibre at cost.¹

This overview is a simplified high-level summary only. The decisions we have taken, and our reasoning are set out in the full document.

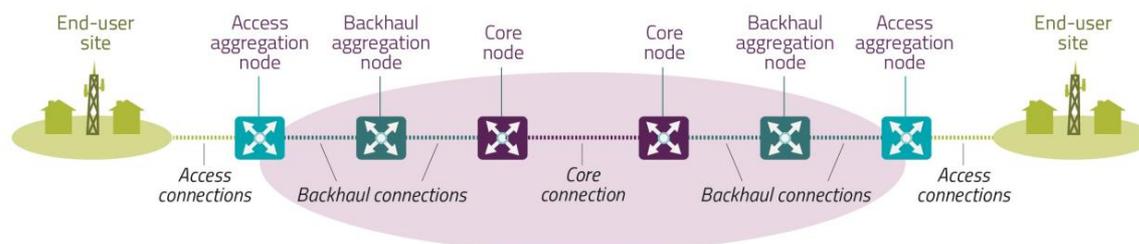
- 1.6 In the Hull Area, where KCOM is the incumbent, we have found KCOM has SMP for wholesale services, but no longer has market power for retail services. So, we are withdrawing all retail-level regulation, but maintaining wholesale regulation.

¹ Dark fibre is where a fibre has no electronics attached to 'light' the fibre for data transmission i.e. it is passive.

Our market analysis

1.7 In this review, we differentiate between the services BT provides to connect end-user sites (CI Access services), and the core and backhaul services that connect between its exchanges (CI Inter-exchange connectivity services) as illustrated in Figure 1.1.

Figure 1.1: Access, backhaul, and core connectivity



CI Access services

1.8 Once a supplier has connected its network to a customer site (such as an office), it can offer services at any bandwidth and can change between providing different bandwidths quickly and at minimal cost. We therefore find a single product market at all bandwidths for CI Access services.

1.9 To understand how competition varies geographically we have divided the UK into areas based on the number of competing networks. We categorise the areas as:

- BT Only;
- BT+1 competitor; and
- BT+2 or more competitors – high network reach (HNR) areas

1.10 We have analysed the high network reach areas in particular detail.

1.11 The potential for competition increases the more networks a customer has close to their premises. However, while in theory it is profitable for BT's rivals to dig short distances to connect new customers, in practice they rarely do so. We find that it is only in the CLA that rivals use their own networks to a large extent. Although BT has a relatively high market share in the CLA, we expect these widespread rival networks to impose a competitive constraint on BT. The unrestricted passive infrastructure access remedy we have imposed will further enhance their ability to do so.² We find that effective competition in the CI Access services market is limited to the CLA and that BT has SMP in the rest of the UK, excluding the Hull Area.

² See Volume 1, the Passive Infrastructure Market Review (PIMR).

CI Inter-exchange connectivity services

- 1.12 To use wholesale access remedies (whether for home broadband or for leased lines), telecoms providers need to connect their own networks to BT exchanges. This connectivity is critical to the effectiveness of our remedies in the CI Access services market.
- 1.13 BT has almost 5,600 local exchanges and faces competition from fewer than two competitors at around 5,000 of these. As a result of our analysis, we have concluded that BT has SMP at these locations.

Legacy services

- 1.14 The market for low bandwidth (up to 8 Mbit/s) legacy traditional interface (TI) leased lines is declining rapidly. We have decided that regulation is no longer justified for these services and we are deregulating low bandwidth TI services throughout the UK, including the Hull Area.

Our remedies

- 1.15 Access-based competition, which has been the focus of our previous reviews, has been successful in driving retail competition but it can only go so far and depends on continuous regulation of an incumbent monopolist. Given the ongoing investment in new fibre infrastructure, we think our new approach will deliver greater benefits for consumers, by providing a potential long-term solution to our competition concerns. The remedies we impose in this review must ensure that competing providers can have confidence in the investments they have already made and have planned, and will continue to build their own networks where it is economic to do so rather than buying wholesale services from BT. These remedies are summarised in Table 1.2 and described in more detail below.

Reducing regulation where there is more competition

- 1.16 Our geographic analysis for CI Access services shows there are places outside the Central London Area where BT faces competition from two or more rivals. These high network reach areas include parts of Birmingham, Bristol, Edinburgh, Glasgow, Leeds and Manchester.
- 1.17 While we find that BT has SMP in these areas, we think the extent of competition from rival networks justifies lighter regulation. We have not imposed a charge control or quality of service standards for BT's wholesale services in these areas, to give BT's rivals a stronger incentive to build their own networks, enabled by access to BT's ducts and poles.

Protecting customers where network competition is unlikely

- 1.18 Where BT does not face competition from two or more rivals, the prospects for short-term competition are low, although this may change as duct and pole access becomes established. In these areas, we have fixed current prices for active services to protect

customers from excessive prices, while giving BT's rivals confidence in their current and planned investments.

- 1.19 Fixing prices at current levels also addresses our specific competition concerns for services at speeds over 1 Gbit/s. We expect demand for these services to continue to grow as networks expand and data consumption increases – including mobile networks increasing their capacity to facilitate 5G rollout. We are concerned that BT might selectively increase prices for services over 1 Gbit/s where competition is weak or non-existent, and reduce prices to give it a competitive edge in areas where competition is more likely to emerge.

Dark fibre for inter-exchange connectivity

- 1.20 We are imposing unrestricted passive infrastructure access to the Openreach network, which we expect will enable network-based competition in a significant proportion of the UK to emerge over time.
- 1.21 There are some areas where duct and pole access is unlikely to have a material impact on competition. In the BCMR, we have focused on inter-exchange connectivity routes from the circa 3,700 exchanges where BT faces no competition from rival operators and there are no rival networks within 100m, making network extensions unlikely. Rival networks are too far from these exchanges to make it economically viable to serve them, even with duct and pole access. This means telecoms providers who purchase wholesale access services from these exchanges have no choice but to use BT as their supplier. Given the low likelihood of network competition, we are imposing a requirement for dark fibre at cost for inter-exchange circuits that connect to these locations.
- 1.22 We have decided not to extend the requirement for dark fibre further in this review, to allow the market to develop in areas where we think our unrestricted duct and pole access proposals will stimulate investment in new networks.
- 1.23 Nonetheless, it is likely there will be other areas where duct and pole access will not lead to greater network competition. In 2021, when we conduct our wide-ranging review, we will assess additional areas where dark fibre may be an appropriate remedy.

Continuing controls over quality of service

- 1.24 In our view, the regulation we put in place in 2016 is working, and Openreach's progress is encouraging. However, it is too early to relax or withdraw quality of service regulation. Performance can and should continue to improve, and we are imposing regulation that broadly maintains the current regulated quality standards for the next review period.

Amendments following consultation

- 1.25 For the most part we have decided to impose the remedies we proposed in our consultation. However, we have made the following changes as a result of the consultation:

- We have refined the scope of our dark fibre remedy (see Section 12). BT will not be required to provide dark fibre from 566 BT Only exchanges with a rival network within 100m. We have also provided guidance on appropriate distance limits.
- We have changed the timeframe for the implementation of our dark fibre remedy. We have decided to require a ‘soft launch’ of dark fibre no later than six weeks after the conditions of this statement come into force, with a ‘full launch’ by 1 January 2020 (see Section 12 and Annex 17).
- We have refined the scope of our interconnection remedies. BT will no longer be required to provide “Customer Sited Handover” for new circuits, but must maintain it for existing circuits (see Section 14).
- We have made a small change to the requirements relating to notification of changes to charges, terms and conditions of network access (see Section 11).
- We have made small changes to our quality of service requirements (see Section 15).

Table 1.2: High level summary of our proposed remedies

Level of competition	CI Inter-exchange connectivity markets			CI Access services market			
	BT Only	BT+1 other	BT+2 or more	BT Only	BT+1 other	BT+2 or more (HNR areas)	
						Outside CLA	CLA
Active services at all bandwidths	Cap at current prices QoS standards		None	Cap at current prices QoS standards		Fair pricing	None
Dark fibre⁽¹⁾	Price at cost QoS standards ⁽²⁾	None	None	None	None	None	None

(1) From BT Only exchanges, where no rival network is within 100m. (2) From April 2020.

2. Background

2.1 In this section we:

- summarise the current regulation in business connectivity markets, and explain how the Competition Appeal Tribunal's (Tribunal) findings in relation to market definition in our 2016 review have informed the approach we have taken in our analysis; and
- explain the market review process and legal framework, and address stakeholder comments on our approach.

Summary of existing regulation

2.2 Our last review of the business connectivity markets concluded in 2016 (2016 BCMR Statement).³

2.3 We defined a single product market for contemporary interface symmetric broadband origination (CISBO, or CI) services of all bandwidths, on the basis that a chain of substitution linked all such services, and that they can all be provided using the same physical access infrastructure. This market excluded certain lines connecting BT exchanges and carrier neutral data centres, which we referred to in 2016 BCMR as the 'CI core'.⁴

2.4 A key implication of our product market finding was that the degree of choice of alternative infrastructure was the main determinant of the effectiveness of competition in the supply of CI services in a given area. We used detailed data on the location of telecoms network infrastructure to examine competitive conditions by geography. This allowed us to distinguish between areas with different competitive conditions.

2.5 Based on the differences in competitive conditions between geographic areas, we defined four distinct geographic markets: the Central London Area (CLA), the London Periphery, the Hull Area and the Rest of the UK (RoUK).

2.6 We found:

- that no telecoms provider had SMP in the provision of retail leased lines outside of the Hull Area;
- that no telecoms provider had SMP in the CLA, and removed existing regulation in that area;
- that the extent of competition in the CI core had increased, and deregulated a number of BT exchanges and carrier neutral data centres accordingly;
- that BT had SMP in the wholesale CI services market in the London Periphery and in the RoUK. In those markets, we imposed a package of remedies on BT including a requirement to provide dark fibre access;⁵ and

³ Ofcom, 2016. *Business Connectivity Market Review* [accessed 20 May 2019].

⁴ Our current assessment of the equivalent of the CI core can be found in our discussion of inter-exchange connectivity, which is found in Section 7.

⁵ See Section 3.

- that KCOM had SMP in the CI services market in the Hull Area at both the retail and wholesale levels, and imposed appropriate remedies.

2.7 We defined a separate product market for traditional interface (TI) services, as we had in previous reviews, because we found there was little prospect of competitive entry in the provision of these legacy products, as volumes were declining. We defined two geographic markets for TI: the UK excluding the Hull Area, and the Hull Area. We deregulated very low bandwidth (below 2 Mbit/s) retail TI leased lines in the UK excluding the Hull Area, and wholesale TI services over 8 Mbit/s in the UK and in the Hull Area.

Appeal

2.8 BT appealed on various issues related to the 2016 BCMR market definition and remedies. The Tribunal heard BT's appeal in relation to market definition. The Tribunal handed down its judgment on 10 November 2017 (BCMR Judgment), in which it concluded that Ofcom had erred in:

- (1) concluding that it was appropriate to define a single product market for CISBO services of all bandwidths on the basis of a chain of substitution;
- (2) concluding that the RoUK comprises a single geographic market; and
- (3) its determination of the boundary between the competitive core segments and the terminating segments of BT's network.⁶

2.9 The Tribunal set out at paragraphs 465-479 of the BCMR Judgment a summary of its findings in relation to market definition.

2.10 The Tribunal did not substitute its own findings in relation to any of the above matters, and the matters were therefore remitted to us for reconsideration (Remitted Matters).

2.11 Our decisions as set out in this document deal with the Remitted Matters. In particular, in Sections 4, 5 and 7 we have set out our approach to market definition in light of the Tribunal's findings in the BCMR Judgment.

Regulation currently in place

2.12 Following the BCMR Judgment, we imposed temporary regulation in business connectivity markets (Temporary Conditions) to safeguard competition and protect the interests of consumers until we had completed our new analysis.⁷ At the same time we revoked existing regulation where it was impacted by the BCMR Judgment.⁸

2.13 We also consulted on proposals to impose, for the same period, a limited dark fibre remedy restricted to bandwidths of up to and including 1 Gbit/s (2017 Dark Fibre

⁶ Competition Appeal Tribunal, 2017, [CAT 25](#) [accessed 20 May 2019].

⁷ Ofcom, 2017. [Business Connectivity Markets: Temporary SMP conditions in relation to business connectivity services](#) [accessed 20 May 2019].

⁸ Ofcom, 2017. [Business Connectivity Market Review 2016: Revocation of certain measures imposed in the business connectivity markets](#) [accessed 20 May 2019].

Consultation).⁹ We confirmed in April 2018 that in light of stakeholder responses we would not impose a temporary dark fibre remedy for the period until March 2019.¹⁰

- 2.14 The Temporary Conditions expired on 31 March 2019. There is therefore no regulation in the markets we define in this document, except in the Hull Area and in the wholesale TI services markets, which were unaffected by the BCMR Judgment and where regulation therefore remains as implemented in the 2016 BCMR.
- 2.15 In February 2019 Openreach made the following voluntary commitments in respect of the period between the expiry of the Temporary Conditions and new regulation coming into place:
- to provide network access on fair and reasonable terms, not to unduly discriminate against a particular customer in relation to the provision of network access, to supply network access on an Equivalence of Inputs basis, to maintain a published Reference Offer, and to notify any changes to terms and conditions on the same basis as it has done to date under the BCMR 2017 Temporary Conditions regulation;
 - to maintain flat pricing for the lacuna period; and
 - to continue to provide Ofcom with monthly KPI reports (and publish KPI reports on a quarterly basis if required) and to discuss these with Ofcom if requested.¹¹

Regulatory framework

- 2.16 The regulatory framework for market reviews is set out in UK legislation and is transposed from five EU Directives. These Directives impose a number of obligations on relevant regulatory authorities, such as Ofcom, one of which is to carry out periodic reviews of certain electronic communications markets.¹² This market review process is carried out in three stages:
- identifying and defining relevant markets;
 - assessing whether the markets are effectively competitive, which involves assessing whether any operator has SMP in any of the relevant markets; and
 - where SMP is found, assessing the appropriate remedies, based on the nature of the competition problems identified in the relevant markets.
- 2.17 We set out the applicable regulatory framework in Annex 1. We set out our approach to product market definition, geographic market definition and SMP assessment in the CI Access services market in Sections 4, 5 and 6 respectively. We set out our approach to market definition and SMP in the CI Inter-exchange connectivity markets in Sections 7 and

⁹ Ofcom, 2017. [Dark Fibre Consultation: Consultation on adding dark fibre to the remedies for business connectivity markets](#) [accessed 20 May 2019].

¹⁰ Ofcom, 2018. [Statement on adding dark fibre to the temporary remedies for business connectivity markets](#) [accessed 20 May 2019].

¹¹ Openreach, 2019. [Industry update: Openreach voluntary commitments in respect of the BCMR lacuna period](#) [accessed 20 May 2019].

¹² We set out the applicable regulatory framework and the approach to market definition and SMP assessment in more detail in Sections 4, 5 and 6.

8 respectively. We set out our approach to market definition and SMP in the Hull Area in Section 9.

- 2.18 When defining markets, making SMP determinations and imposing regulatory obligations, we must satisfy various legal tests, take account of certain European Commission and BEREC publications and act in accordance with our statutory duties. We explain in Sections 11, 12, 13, 14, 15, 16 and Volume 3, Section 5 (with respect to our proposed charge controls) why we consider that our regulation satisfies the relevant legal tests, is consistent with our statutory duties, and how we have taken account of relevant publications.

Forward look

- 2.19 Market reviews look ahead to how competitive conditions may change in the future. In our July 2018 Strategic Policy Position, we set out our aim to adopt a new approach to regulation of residential and business markets in April 2021. Therefore, for the purposes of this review, as we proposed in our consultation, we consider the period up to 31 March 2021. Our analysis in this document reflects the characteristics of the retail and wholesale markets and the factors likely to influence their competitive development over the period, and the decisions stakeholders make with regard to long term investments that will extend beyond this period.
- 2.20 The prospective nature of our assessment over this period means that we are required to gather a range of evidence to assess actual market conditions as well as to produce forecasts that we consider will appropriately reflect developments over time. Where appropriate, we have exercised our regulatory judgement to reach decisions on the evidence before us with a view, ultimately, to addressing the competition concerns we identify to further the interests of citizens and consumers in these markets.

Stakeholder responses

- 2.21 A number of stakeholders disagreed with our decision to conduct a two-year review. Vodafone noted that market reviews typically cover a three-year period¹³, and said we had not justified conducting our review over a two-year period.¹⁴ Vodafone noted that other regulators have adopted longer review periods where appropriate.¹⁵ Gamma considered that a two-year review would create a period of regulatory uncertainty.¹⁶
- 2.22 Vodafone also said that the two-year period had influenced some of our proposals, for example the scope of our proposed dark fibre access remedy, as did UKCTA¹⁷. Vodafone said that Ofcom was proposing to take into account developments in SMP regulation

¹³ Vodafone's response to the 2018 BCMR Consultation, part 1, paragraph 4.3.

¹⁴ Vodafone's response to the 2018 BCMR Consultation, part 1, paragraph 4.6, 4.9, 4.19.

¹⁵ Vodafone's response to the 2018 BCMR Consultation, part 1, paragraph 4.7.

¹⁶ Gamma's response to the 2018 PIMR and 2018 BCMR Consultations, page 3.

¹⁷ Vodafone's response to the 2018 BCMR Consultation, part 1, paragraph 4.11 and UKCTA's response to the 2018 BCMR Consultation, paragraph 32.

outside the relevant period¹⁸, while PAG said we had prejudged the outcome of our separate PIMR consultation.¹⁹ TalkTalk said that it would be unlawful for Ofcom to base regulation in the BCMR on regulation it expects to set after the current review period.²⁰

Our reasoning and decisions

- 2.23 Under section 84A(3) and (7)(b) of the Communications Act 2003 (the Act) Ofcom must review market identifications and market power determinations “within” three years. This reflects Article 16(6) of the Framework Directive, which provides that NRAs should carry out an analysis of the relevant market “within” three years of the adoption of a previous measure relating to that market. Neither of these provisions prohibits Ofcom from conducting a review less than three years after the previous review.
- 2.24 Our reasons for adopting a shortened review period are set out in our consultation²¹ and our July 2018 Strategy Document.²² In short, we are conducting a review looking at the period to 31 March 2021 as we intend that the next market review, which will look at residential and business markets at the same time, will take effect from April 2021. We do not consider the approach taken by other regulators is relevant in the context of the specific regime set out in the Act and the specific circumstances of this review.
- 2.25 Having decided to conduct a review up to April 2021, our market approach is consistent with the EC SMP Guidelines. These say that NRAs will conduct an evaluation of the market over the “relevant period”, which is “the one between the end of the ongoing review and the end of the next market review”.²³ In this case, therefore, we are required to evaluate the market up to April 2021.
- 2.26 Our regulation is based on market dynamics up to April 2021, which are in turn partly affected by the way stakeholders make long-term decisions about investments which will last beyond this period. We therefore need to be aware of the influence decisions we make for this review period have on stakeholders’ long-term plans, and how that in turn will affect their response to regulation in this period.
- 2.27 Furthermore, as required by the modified greenfield approach, we have taken into account the availability of unrestricted access to BT’s ducts and poles over the period. This is discussed in Annex 6 and reflected in our analysis as set out at Sections 4 to 8. We have not based our decisions on what regulation we may impose in 2021, as TalkTalk and Vodafone argued. Rather, our remedies are aimed at addressing the competition concerns we have within this review period, as explained in Section 10.

¹⁸ Vodafone’s response to the 2018 BCMR Consultation, part 1, paragraph 4.14-4.17.

¹⁹ PAG’s response to the 2018 BCMR consultation paragraph 8.

²⁰ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 1.15-1.18, 3.13, 4.41 and 5.53. We provide a further response to TalkTalk’s argument that we failed to consult on our proposals and have prejudged our future regulation in Section 10.

²¹ Ofcom, 2018. [Consultation: Business connectivity market review](#) (2018 BCMR Consultation), Volume 1, Section 1 [accessed 20 May 2019].

²² Ofcom, 2018. [Regulatory certainty to support investment in full fibre broadband](#), paragraph 6.7 [accessed 20 May 2019].

²³ EC SMP Guidelines, paragraph 14.

Impact assessment and equality impact assessment

Impact assessment and consultation

- 2.28 The analysis presented in the 2018 BCMR Consultation, including its annexes, constituted an impact assessment for the purposes of section 7 of the Act.
- 2.29 Impact assessments provide a valuable way of assessing the options for regulation and showing why the chosen option was preferred. They form part of best practice policy-making. This is reflected in section 7 of the Act, which means that, generally, we have to carry out impact assessments in cases where our conclusions would be likely to have a significant effect on businesses or the general public, or where there is a major change in Ofcom's activities. As a matter of policy Ofcom is committed to carrying out impact assessments in relation to the great majority of our policy decisions.

Stakeholder responses

- 2.30 Vodafone commented that Ofcom had failed to consult in a transparent manner, citing redactions in our consultation, and our update published on 19 December 2018, in which we clarified the scope of our proposed dark fibre remedy.²⁴

Our reasoning and decisions

- 2.31 Section 7(4) of the Act requires Ofcom to carry out an impact assessment which sets out how the performance of our duties is furthered by, or in relation to, what we propose. Section 7(5) provides that an impact assessment may take such form as Ofcom considers appropriate. We consider that our consultation satisfies these provisions. In particular, where we set out our proposed remedies in Sections 11-16, we explained under the heading “Legal Tests” how those proposals meet our duties under sections 3 and 4 of the Act.
- 2.32 Under Section 393 of the Act, Ofcom is prohibited from disclosing information with respect to a business and obtained in exercise of certain statutory powers. An exception exists where disclosure is made for the purpose of facilitating the carrying out by Ofcom of their functions. Our consultations are required to be adequate and fair, and this includes providing sufficient information and reasoning to support our proposals to permit intelligent consideration and response to our consultations. We consider that it was not necessary for us to disclose the redacted confidential information in order for respondents to understand and respond to our market review proposals.
- 2.33 As we recognised in our update of 19 December 2018, there was an inconsistency between our proposals as set out in our consultation document, and the draft legal instrument. Our update made it clear that our proposals were as set out in the consultation document. We consider this provided stakeholders with the clarity needed to respond to our consultation.

²⁴ Vodafone’s response to the 2018 BCMR Consultation, part 1, paragraph 4.25; part 2, paragraph 2.5.

We have corrected this inconsistency in the legal instrument at Annex 26 of this document.²⁵

Equality impact assessment (EIA)

- 2.34 Annex 24 sets out our EIA for this market review. We are required by statute to assess the potential impact of all our functions, policies, projects and practices on equality. We have a general duty under the 2010 Equality Act to advance equality of opportunity in relation to age, disability, sex, gender reassignment, pregnancy and maternity, race, religion or belief, and sexual orientation. EIAs also assist us in making sure that we are meeting our principal duty of furthering the interests of citizens and consumers regardless of their background or identity.
- 2.35 It is not apparent to us that the outcome of our review is likely to have any particular impact on equality. More generally, we do not envisage the impact of any outcome to be to the detriment of any group of society. Nor do we consider it necessary to carry out separate EIAs in relation to race or sex equality or equality schemes under the Northern Ireland and Disability Equality Schemes.

Next steps

- 2.36 While we refer to this document as a ‘statement’, it is a draft statement. Under Article 7 of the Framework Directive Ofcom is required, following completion of the domestic consultation process, to notify the European Commission, BEREC, and other national regulatory authorities, of our final proposals for our market analysis and remedies. There is a one-month period for these organisations to provide their comments to Ofcom. Subject to any comments we receive, we therefore intend to publish our final statement before the end of June 2019.

²⁵ Schedule 3, Part 3, Condition 2.2.

3. Market context

3.1 In this section, we provide an introduction to business connectivity networks covering:

- a general overview of network structures;
- the main applications of business connectivity services including a brief review of the leased line supply chain;
- the main types of products used to provide business connectivity; and
- the underlying cost drivers associated with providing leased lines.

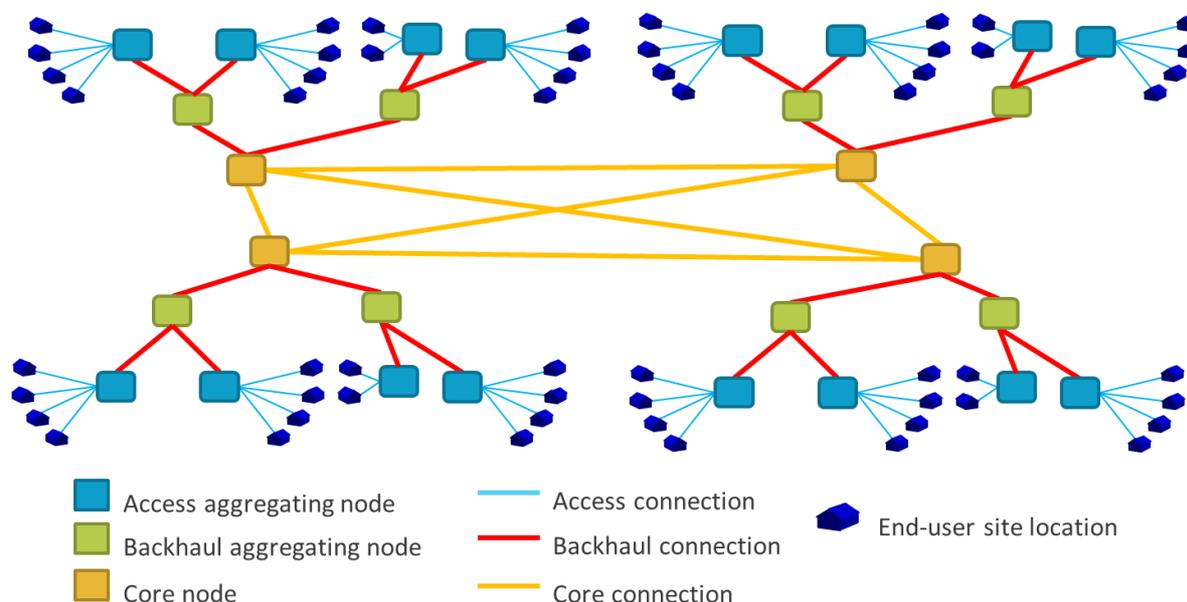
3.2 We then set out some of the features of how the business connectivity market works, including market trends and future demand by customer type.

Introduction to business connectivity

Introduction to networks

3.3 A telecoms network provides the services that enable end-users to exchange information, routing its telecoms services through its network nodes²⁶ and connections between them. The nodes are often located in buildings such as BT exchanges, switching centres, data centres, and telecoms providers' buildings. Figure 3.1 sets out how the nodes and connections are logically arranged in a typical network.

Figure 3.1: Illustration of logical arrangement of a telecoms network²⁷



²⁶ Nodes and connections in this context are considered to be combinations of electronic and optical equipment. Buildings or sites in this context house the nodes.

²⁷ In some cases, not illustrated in Figure 3.1, access sites may be connected directly to another end-user access site.

- 3.4 Each end-user site is connected to one of the network’s access aggregation nodes.²⁸ This is referred to as the ‘access connection’. Each access node is connected to at least one core node, either directly or indirectly, via a backhaul aggregating node²⁹ using a backhaul connection.³⁰ Core nodes are typically connected to each other to form what is known as a core network.³¹ In general, there are more access nodes than backhaul nodes and more backhaul nodes than core nodes.
- 3.5 This structure is common to the networks used to provide most voice and data telecoms services – such as PSTN, mobile, broadband, and leased lines. These networks differ in scale (numbers of each type of node), the number of stages of access and backhaul aggregation (zero, one or more than one) and the structure of the core.
- 3.6 Access aggregation nodes are generally placed where customers are grouped most closely and can be easily reached (such as the centre of cities, towns, and villages) and are used to connect customer access connections to the network. Backhaul connections (and nodes) have higher capacity as they aggregate traffic from multiple access nodes and can act as the point of connection between access nodes which can be many kilometres apart.
- 3.7 Core connections (and nodes) may transport more telecoms services due to aggregation of backhaul traffic and generally have higher capacity than backhaul connections (and nodes). Core nodes are typically located in a city of significant population within the geographic area covered by the network. Core nodes typically route (or switch) traffic between other core nodes, and act as points of connection to other networks.
- 3.8 Most locations or sites housing core nodes also contain backhaul and access aggregating nodes (also referred to as simply backhaul and access nodes), the latter for serving the area immediately surrounding the site.³² We refer to a site housing a core node as a ‘core site’. Similarly, a site containing a backhaul node may also contain one or more access nodes to provide connectivity to the surrounding area. These sites with backhaul aggregation nodes are sometimes referred to as a ‘backhaul exchange’. More remote network sites may only contain an access node.
- 3.9 To enable communication between different networks³³, networks are interconnected between designated nodes. The network-to-network interconnect may be at a site (point of handover) where both networks are present, such as at a BT exchange or a data centre,

²⁸ Access aggregating nodes aggregate the traffic from access connections and may also be referred to as access nodes. The access connection may be transmitted over radio, fibre, or copper.

²⁹ Backhaul aggregating nodes may also be referred to as backhaul, aggregating, or metro nodes. A backhaul aggregating node multiplexes the backhaul connections (or data traffic flows) onto a common bearer in a way that maintains the individual identity of each aggregated backhaul connection.

³⁰ Access or aggregating (backhaul) nodes may be connected to two or more core nodes to create a resilient network by providing alternative routing in the event of failure of a core node or backhaul connection.

³¹ Core nodes are used to route or switch traffic between other core nodes. They are sometimes further divided into a hierarchy of outer core edge nodes and inner core nodes. Most core nodes have duplicate connections between them to provide resilience in the event of a failure in the network equipment or connection.

³² Aggregation nodes (access, backhaul, and core) can be sited in, for example, a telecoms provider’s operational building, in a BT exchange, or in a data centre. Some sites may have more than one type of aggregation node at the same location.

³³ For example, between two different business users, or between a business user and a serving computer such as a web server in a data centre, or simply between two network operators.

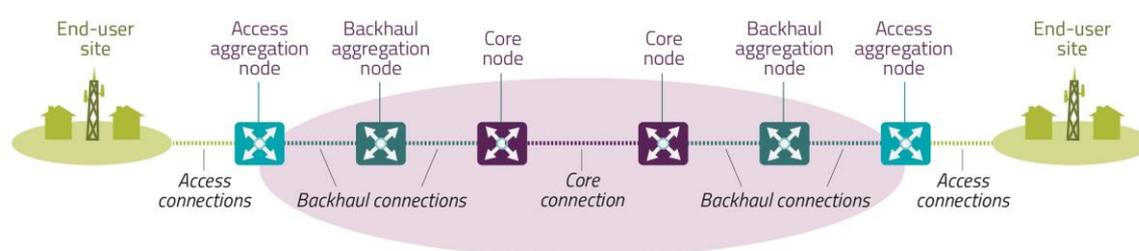
or via a dedicated point-to-point connection between two network sites where the interconnection or handovers takes place.³⁴

Access, backhaul, and core connectivity

3.10 Access, backhaul, and core connections have different functions and are illustrated in the Figure 3.2 below:

- access connections are typically between end-user sites and an access aggregation node or, in some cases, between customer sites;³⁵
- backhaul connections are between access and backhaul nodes, between backhaul nodes (not shown), and from a backhaul aggregation node to a core node;³⁶ and
- core connections are between core nodes.

Figure 3.2: Access, backhaul, and core connectivity



3.11 Demand for access services comes from end-users, with a dedicated connection to each end-user site. These can also be referred to as terminating segments.³⁷ Competition for these CI access services, including, for example, the potential for rival suppliers to extend their fibre networks to end-user sites, is covered in more detail in Sections 4 to 6.

3.12 Demand for backhaul and core services comes from telecoms providers that need to carry aggregated traffic between BT exchanges, data centres and telecoms provider network nodes. These connections can also be referred to as trunk segments. We have looked at competitive conditions for these services in Sections 7 to 8, and in particular, at backhaul and core services between BT exchanges which we refer to as CI inter-exchange connectivity.

³⁴ Openreach provides products to connect between nodes within a BT exchange (Internal Cablelink) and to connect to other networks nearby (External Cablelink).

³⁵ Some networks have small access aggregation nodes between the end-user site and the access aggregation site (such as cabinets with FTTC DSLAMs or a mobile base station with a fixed connection with then uses microwave to connect to additional base stations) or as part of a 'daisy chain' (such as cabinets as part of a ring within the cable access network). We have treated these examples as a part of the access network and not inter-exchange backhaul connections.

³⁶ Note that in our SMP Conditions we use the term "Backhaul Segment" which is defined as "connecting one operational building of the Dominant Provider to another operational building of the Dominant Provider" and which may include both backhaul and core connections as described in this section. We use this term in the course of defining the scope of our specific active remedies and reflecting our decisions (Section 13). See also Annex 26, Schedule 1, Part 2 and Part 3, Condition 2.

³⁷ Terminating and trunk segments are covered in more detail in Section 7.

Data centres

- 3.13 Data centres are secure buildings that house computing facilities for cloud-based services such as data storage, application hosting, and data processing. Data centres typically house network nodes which can include core and backhaul aggregation and traffic routing functionality as well as being used for interconnection to other networks.
- 3.14 Data centres can have multiple tenants and may be owned and operated by telecoms providers or run by third-party providers, in the latter case they are known as ‘carrier neutral data centres’.
- 3.15 Most data centres require reliable high-capacity connections, often to a number of different telecoms providers, to support a large number of telecoms services and to support multiple end customers across multiple end user sites.
- 3.16 Some data centres may be owned by a single customer, such as a large enterprise, providing services over a virtual private network at their own customer site rather than in a network operator’s operational building. We discuss this more in Section 7.

Business connectivity services and their main applications

- 3.17 This review focuses on high quality point-to-point business connectivity services between two or more locations. These services tend to be symmetric (the capacity is the same in both directions), uncontended (the capacity is guaranteed and not subject to reduction by the presence of other telecoms services), and typically, dedicated. These are different from other services such as consumer and business broadband connections which tend to be asymmetric and contended. In this decision we refer to these high-quality business connectivity services as leased lines.³⁸
- 3.18 Broadly, leased lines (“LL” in the diagram below) are used to provide:
- business end-to-end connectivity;
 - business access connectivity to virtual private networks (VPNs), the internet and cloud computing;
 - mobile network connectivity (often referred to as mobile backhaul); and
 - broadband network connectivity (often referred to as fixed broadband backhaul).

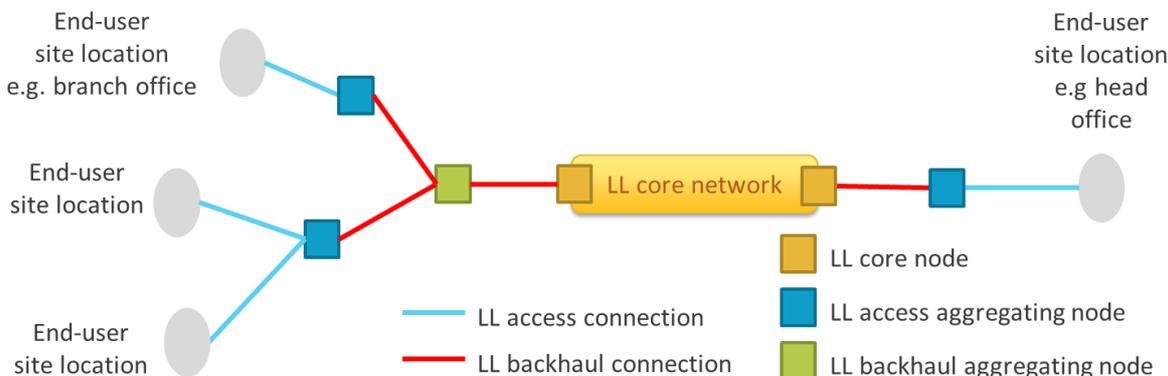
Business end-to-end connectivity

- 3.19 Traditionally, businesses have used leased lines to connect their sites, and sometimes to connect with other businesses, using dedicated connections. A typical end-to-end connectivity arrangement is illustrated in Figure 3.3. This model is becoming less common

³⁸ They are also known as private circuits.

as it is superseded by VPNs³⁹ which include connectivity to internet-based services and to outsourced cloud computing services.⁴⁰

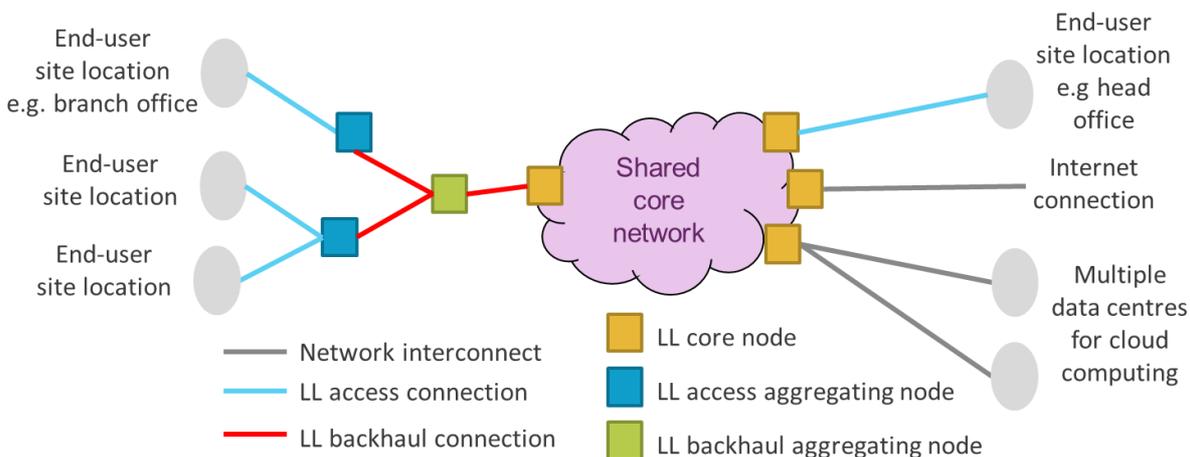
Figure 3.3: Business end-to-end connectivity



Business access connectivity (VPN, internet and cloud computing access)

3.20 Leased lines often provide the connections between business sites and network nodes that give access to services including VPNs, cloud computing, and the internet. Leased lines enable telecoms providers and system integrators to construct the networks that deliver these services. VPNs allow the networks to be tailored to meet particular customers’ needs which may vary in terms of capacity requirements, IT requirements, geographic locations, and number of sites. This is illustrated in Figure 3.4.

Figure 3.4: Business access connectivity (VPN, internet & cloud computing)



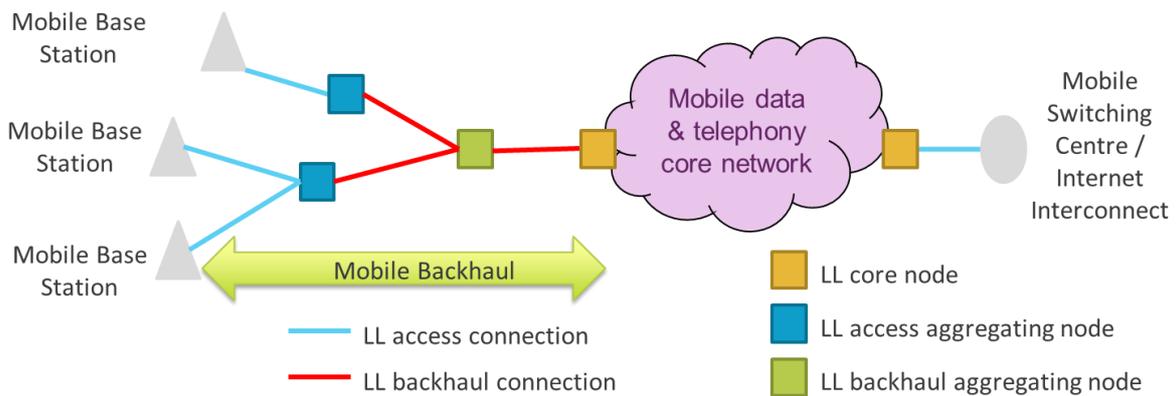
³⁹ Virtual private networks (VPNs) are networks that provide any-to-any connection between multiple sites (not just point-to-point). They are private to the customer, unlike the internet which is public. They are provided using communications equipment that is shared between a number of business customers and normally located in a telecoms provider’s or systems integrator’s premises or a data centre.

⁴⁰ Cloud computing is computing capacity, distributed across a number of data centres, that is connected by either a business VPN or networks provided by the data centre operators.

Mobile network connectivity

3.21 Mobile network operators (MNOs) use leased lines to connect their base stations⁴¹, using access and backhaul connections, to their core network nodes. The term ‘mobile backhaul’ is often used to refer to the combination of access and backhaul connections between the mobile base station and the mobile core node. MNOs may also use leased lines to provide connectivity between their core sites to construct the networks used to support mobile services including access to the internet and other networks. This is illustrated in Figure 3.5.

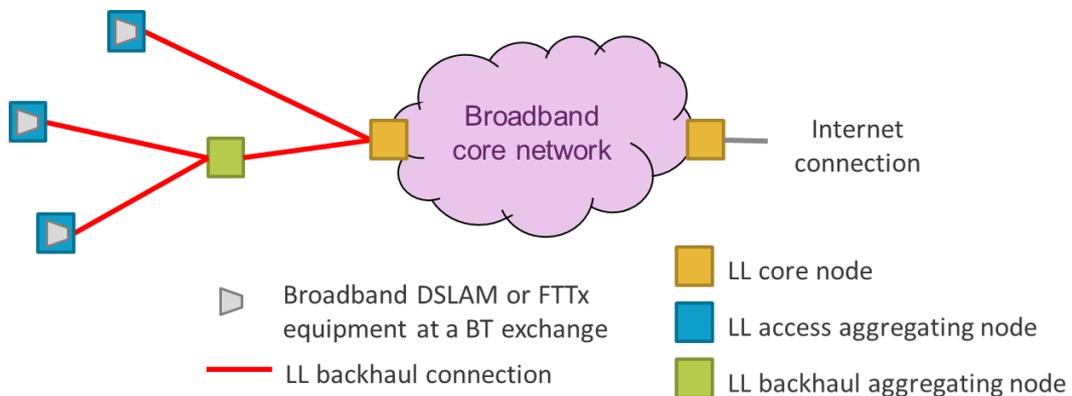
Figure 3.5: Mobile network connectivity



Broadband network connectivity

3.22 Fixed broadband operators can build their own broadband networks using leased lines for backhaul and core connectivity, together with access connections owned and operated by BT. In this case, they will site their equipment to connect to BT’s access network (i.e. their access aggregating node) at a BT local exchange. Alternatively, an operator may choose to build their own access connections (for example Virgin Media’s network). A fuller description of a broadband network can be found in Ofcom’s 2018 WBA Statement.⁴²

Figure 3.6: Broadband network connectivity



⁴¹ These are the radio masts that provide the communications between the mobile handset and the fixed mobile network.

⁴² Ofcom, 2018. [Wholesale Broadband Access Market Review 2018 Final Statement](#), pages 7-8 [accessed 20 May 2019].

3.23 Fixed broadband operators use leased lines to connect from their access nodes within BT local exchanges to their backhaul and core network nodes. These network connections are referred to as ‘fixed broadband backhaul’. Fixed broadband operators will also connect to the internet at suitable locations to provide an end-to-end broadband service. This is illustrated in Figure 3.6.

Leased line supply chain

3.24 To understand how businesses are using telecoms services, we commissioned research from Cartesian (2018 Cartesian report).⁴³ As part of the research, Cartesian provided an overview of the retail supply chain.⁴⁴ The 2018 Cartesian report identified several categories of telecoms providers that use leased lines to provide connectivity at the retail level:

- **Network operators** use their own networks to provide end-to-end network connectivity services to customers. BT, Vodafone, and Virgin Media provide these services using their own extensive networks which include access, backhaul and core. Some fixed broadband operators, such as Sky and TalkTalk, have significant backhaul and core infrastructure, but no access network. Other operators, such as Colt and CityFibre, have significant access networks in some areas, but less extensive backhaul and core infrastructure.
- **Network aggregators** buy services from network operators to offer their customers (who are typically value-added resellers) end-to-end to network connectivity.
- **Systems integrators and value added resellers** purchase network connectivity services from network operators or aggregators and resell them to end customers. These may be bundled with other computing services such as data storage and applications. The services are tailored to the customer’s needs and may range from just connectivity through to complete managed IT solutions.

Types of leased lines used for point-to-point connections

3.25 Point-to-point leased lines typically provide connections between network sites containing network nodes, and from an access node to an end-user site (such as a business site or mobile base station), or directly between two end-user sites. For connections between network nodes, the fixed capacity may often be shared between different end-users and applications. These point-to-point connections are the building blocks used to deliver end-end business services of the types described previously⁴⁵. These point-to-point circuits are typically provided over fibre (or less commonly copper) which can be buried directly in the

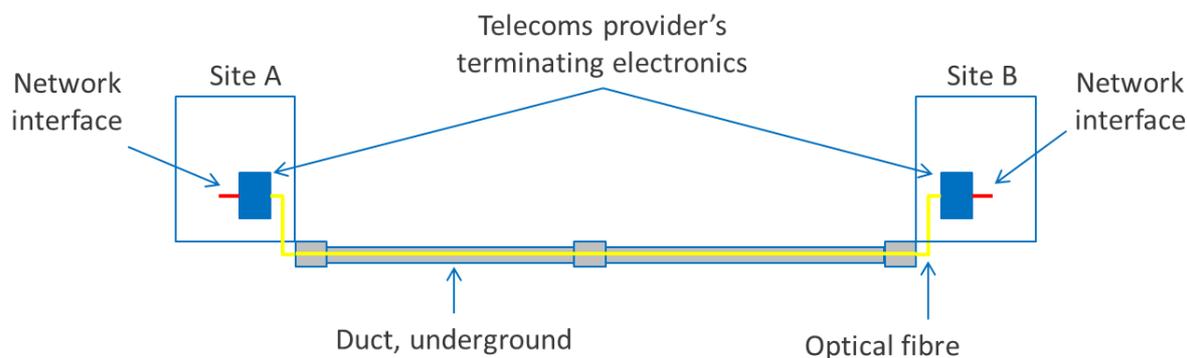
⁴³ Ofcom, 2018. [Cartesian Business Connectivity Market Assessment](#) (2018 Cartesian Report) [accessed 20 May 2019].

⁴⁴ 2018 Cartesian report, pages 14-15.

⁴⁵ This clarification has been added to be clear that we are looking at point-to-point circuits which can be used to form part of a leased line network, although it can also be used as a standalone leased line connecting between two end-user sites. This is to address Openreach’s concerns set out in Openreach’s response to the 2018 BCMR Consultation, Annex D, paragraphs 11-13.

ground, carried overhead, or run as a multi-strand cable inside a duct as illustrated in Figure 3.7.

Figure 3.7: Structure of a typical point-to-point leased line⁴⁶



- 3.26 These point-to-point circuits can be provided with or without active electronics. A circuit without active electronics is often referred to as a passive connection (such as dark fibre, which we discuss below).
- 3.27 The different elements making up the point-to-point connection may be supplied by different telecoms providers. One may provide the duct, another may provide the fibre and a third may add the electronics to light the fibre. Vertically integrated operators may provide all three layers.
- 3.28 In the following paragraphs we describe the following types of point-to-point leased lines⁴⁷:
- Ethernet;
 - Wavelength division multiplex (WDM);
 - Dark fibre (also known as optical fibre);
 - Ethernet in the first mile (EFM); and
 - Traditional interface (TI).

Ethernet

- 3.29 Contemporary Interface (CI) point-to-point leased lines are generally based on Ethernet standards and are specified by bandwidth (e.g. 100 Mbit/s, 1 Gbit/s, or 10 Gbit/s).⁴⁸ Ethernet leased lines are typically delivered over fibre, able to reach 70km or more over a single fibre. Changing the bandwidth involves changing, or reconfiguring, the electronics at both ends.

⁴⁶ The route between two points in a network can be referred to interchangeably as circuits or connections.

⁴⁷ We describe Openreach products, where available, as a useful reference point. Similar products may be available from other telecoms providers.

⁴⁸ Ethernet as a technology is described by a set of standards (e.g. 802.3) organised by the Institute of Electrical and Electronics Engineers (IEEE). More information can be found at the IEEE website <http://standards.ieee.org/index.html> [accessed 20 May 2019].

- 3.30 Openreach currently offers two Ethernet-based product sets which can be used for point-to-point connections:⁴⁹
- Ethernet Access Direct (EAD) which supports Ethernet connections from 10 Mbit/s to 10 Gbit/s; and
 - Ethernet Backhaul Direct (EBD) which supports Ethernet connections, mainly at 1 Gbit/s and 10 Gbit/s, and is available between BT's larger exchanges.

Wavelength division multiplex (WDM) leased lines

- 3.31 WDM is a technology that can support multiple wavelengths (from 16 for a simple system and potentially up to 320) over one or two fibres, with one circuit per wavelength. The bandwidth for each wavelength is typically 10 Gbit/s, but can go as high as 400 Gbit/s. Once the first circuit is installed, additional circuits can be added quickly without the need to add more fibres. The high bandwidths and scalability of WDM leased lines make them particularly suited for high capacity routes, for example, between core nodes, to data centres, and for higher capacity backhaul connections.
- 3.32 Openreach offers two main product families based on WDM:
- Optical Spectrum Access (OSA) which can operate up to 35km with a 70km extended reach variant; and
 - OSA Filter Connect, which allows customers, apart from the first WDM circuit, to supply their own electronics to light additional wavelengths. The first WDM circuit uses Openreach electronics with a standard CI interface (e.g. Ethernet) to provide end-to-end monitoring. There is also an Ethernet only variant⁵⁰ (10 Gbit/s or 20 Gbit/s) suitable for installation in outside cabinets.

Dark fibre

- 3.33 Dark fibre is a passive optical fibre connection between two sites (called passive because there is no powered equipment at either end to light the fibre). This contrasts with an active connection which includes electronics at either end of the fibre connection.
- 3.34 Dark fibre providers install and sell fibre to connect between two sites, with the purchaser of the dark fibre adding the active electronics to provide point-to-point business connectivity services such as Ethernet or WDM.
- 3.35 Openreach's product portfolio does not currently include dark fibre for either access or backhaul.⁵¹

EFM

- 3.36 EFM is based on technology standards that allow telecoms providers to run Ethernet over a copper pair or multiple bonded pairs to connect to a customer. In the UK, telecoms

⁴⁹ EAD and EBD replaced wholesale extension services (WES) (which is used for access), wholesale end-to-end services (WEES) and backhaul extension services (BES).

⁵⁰ Openreach published a product briefing on 20 June 2018.

⁵¹ Openreach, 2019. [Pricing page for the Openreach product portfolio](#) [accessed 20 May 2019].

providers using EFM most commonly lease BT's copper local loops to connect customer premises to the nearest BT local serving exchange. These access circuits are then aggregated and form part of an end-to-end network service (e.g. VPNs, internet access and cloud computing) which include core and backhaul network connections.

- 3.37 The copper pair provides uncontended, dedicated, and symmetric connectivity to the customer with an Ethernet interface. However, the use of copper for the access connection means that the EFM circuits faces greater distance and bandwidth limitations than fibre. The signal diminishes the further the customer is from the exchange, which in turn affects the speed of a connection that can reliably be offered. Speeds are typically 20-30 Mbit/s when connected to six copper pairs.
- 3.38 The availability of EFM is typically limited to larger exchanges where business site density is higher. They cannot be used for backhaul or core connections due to low or non-availability of copper pairs on these routes and because of the long distances. In general, EFM has superseded legacy SDSL⁵² services which operate over a single copper pair.

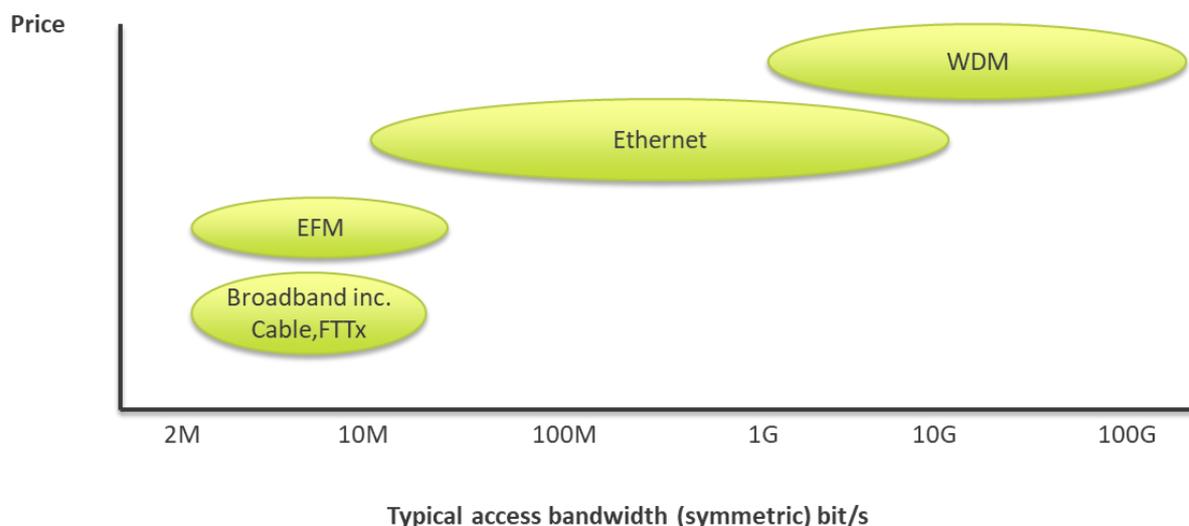
TI

- 3.39 TI leased lines use legacy technology to provide analogue and digital services. In the past these were the most common types of leased line in use in the UK, but their volume is now in sustained decline (see Section 17 and Figure 3.10). There are two broad types of TI connection:
- Analogue interface leased lines: These are commonly used for voice transmission, for example between business sites. They are also used for low bandwidth data transmission. For access, these are nearly always delivered over copper.
 - Digital interface leased lines based on legacy TDM (time division multiplexing) technology. BT no longer supplies TI connections below 2 Mbit/s. The most common speed of TI access connections is 2 Mbit/s and these are typically delivered over copper. For backhaul and core connections, which are typically delivered over fibre, common variants are 34 Mbit/s, 155 Mbit/s, and 622 Mbit/s.

Different products and services suited to different applications

- 3.40 Figure 3.8 provides a stylised depiction of the different services comparing relative price to the range of symmetric bandwidths a product can typically support.
- 3.41 Leased lines are significantly more expensive than asymmetric copper or fibre based broadband services but can also offer significantly more capacity. The cheapest symmetric Ethernet access leased line services are based on EFM.

⁵² SDSL, or symmetric digital subscriber line, is a symmetric version of a residential broadband service, usually over a single copper pair.

Figure 3.8: Stylised summary of the main CI service types by bandwidth⁵³ and price

The cost of providing a leased line

- 3.42 To provide active or passive leased lines, the telecoms provider needs a connection to the customer's premises. For an active point to point connection, a telecoms provider also needs to provide electronics to connect to each end of the fibre (see Figure 3.7).
- 3.43 The physical infrastructure (i.e. the duct and optical fibre) accounts for a large proportion of the initial cost of providing a leased line: our estimates suggest more than 90% (see Table 3.9). Once physical infrastructure is built its costs are sunk, largely fixed, and do not vary depending on the bandwidth of the connection.
- 3.44 Table 3.9 shows how costs of an Ethernet point to point leased line service vary by speed and by connection length. It shows our estimates for two different speeds (Ethernet 1 Gbit/s and 10 Gbit/s) and for two different connection lengths (100m and 1km). These costs are indicative of costs in an urban area. Costs in a rural area would be much less, where per metre costs of digging are lower. These costs also assume that only one connection is supplied, rather than multiple circuits which could reduce the cost per connection. Nonetheless, the table shows that the costs of the physical infrastructure are high as a proportion of the overall cost.
- 3.45 The cost of the physical infrastructure increases with the length of the connection but is essentially independent of the type of service. On the other hand, the cost of electronic equipment can vary depending on the type of service.
- 3.46 Table 3.9 also shows that:
- the cost of extending the geographic reach of the network is significant even at short distances and increases with the length of the connection. For example, it costs around £10k to extend the network for 100m, which goes up to £85k for 1km; and

⁵³ For broadband, the diagram uses the upstream speed as a proxy for the maximum symmetric speed available e.g. a 20 Mbit/s upstream, 80 Mbit/s downstream product could be used as the basis for a 20 Mbit/s symmetric product.

- the cost differential for providing different services is relatively low.

Table 3.9: Costs of providing point to point leased line services

Cost Component (£)	Ethernet 1 Gbit/s		Ethernet 10 Gbit/s	
	0.1km	1km	0.1km	1km
Electronic equipment and installation⁵⁴	285	285	795 to 1,193 [X]	795 to 1,193 [X]
Physical infrastructure⁵⁵	9.6K	84K	9.6K	84K
Total cost	9.9K	84.2K	10.4 to 10.8 [X]	84.7 to 85.2 [X]
Proportion of infrastructure cost %	97.1%	99.7%	88.9% to 92.3% [X]%	98.6% to 99.1% [X]%

Source: Ofcom analysis of publicly available data (Openreach's ECCs) and information from BT's 2017/18 RFS (See Annex 10, Indicative dig distance cost model, for further detail).

Market trends, outlook, and approach

Volume and bandwidth trends

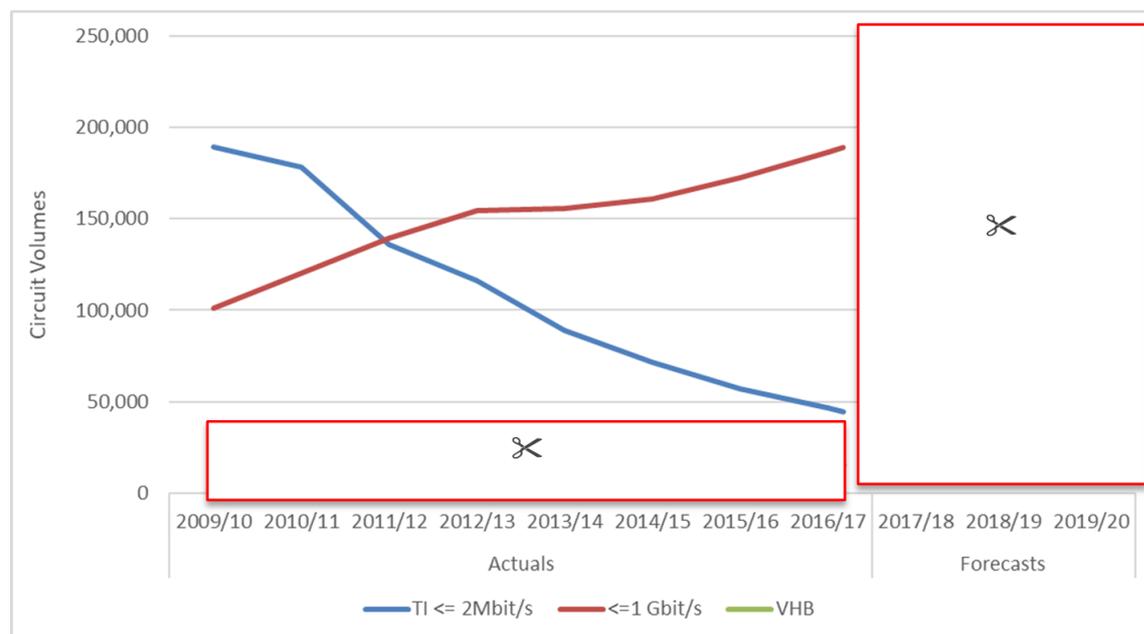
- 3.47 Ethernet services account for the majority of installed leased line circuits in the UK. The number of TI circuits has declined rapidly, as shown in Figure 3.10, and is expected to continue to decline over the review period.
- 3.48 Total demand for Ethernet and WDM services has increased since the last review and demand for these products is forecast to increase over this period.
- 3.49 Demand for 10 Mbit/s connections has declined as the product becomes redundant and bandwidth requirements increase. BT prices 10 Mbit/s almost identically to 100 Mbit/s services, and provides it using the same equipment as a 100 Mbit/s service.⁵⁶ 100 Mbit/s and to some extent 1 Gbit/s are viewed as entry level speeds.
- 3.50 Very high bandwidth circuits (VHB) i.e. circuits with a bandwidth over 1 Gbit/s, make up a relatively small proportion of leased lines compared to circuits at 1 Gbit/s and below, but forecasts indicate the use of VHB services is expected to increase over time.

⁵⁴ Ethernet electronics equipment and installation is based on Openreach's annual depreciation of the unit FAC for Ethernet Electronics Capital cost for EAD LA 1 Gbit/s and EAD 10 Gbit/s services and it includes the cost of the equipment and its installation at both ends of a connection.

⁵⁵ Physical infrastructure costs are based on Openreach's Excess Construction Charges (survey, blown fibre tubing, blown fibre, duct under a footway, duct under a carriageway, new footway box, and breaking/drilling through external wall).

⁵⁶ The electronics for 10 Mbit/s and 100 Mbit/s are the same, using 'autosensing' to select the correct transmission speed.

Figure 3.10: Growth in TI and CI leased line services [✂]



Source: Actuals based on Ofcom analysis of BT's RFS volumes for rental TI and CI services at 1 Gbit/s and below.⁵⁷ Forecasts based on Ofcom analysis of Openreach forecasts for rental CI services and BT forecasts for rental TI services in response to Q)11 of the 1st LLCC s.135 notice dated 2 March 2018.

Market outlook

- 3.51 Demand for online services, mobile data and business demand for increased productivity and new applications have driven an increase in the capacity of UK networks, growing by around 20-25% per annum over recent years.⁵⁸ This is within the range of a 2017 industry forecast by Cisco which indicated an increase in global IP traffic by a factor of three between 2016 and 2021, at a rate of 24% per annum.⁵⁹
- 3.52 For the 2018 Cartesian report, which considered how UK large businesses (also referred to as enterprises by Cartesian) are using telecoms services, Cartesian asked businesses how they saw their needs evolving over the next five years. Cartesian also interviewed some telecoms providers and mobile network operators.
- 3.53 The main trends by type of customer are summarised below:
- **Business customers:** Fixed connectivity is regarded as a critical telecoms service for business. Businesses think network resilience is increasingly important. Businesses expect their demand for data to increase over the next five years, driven by, for example, the move of applications to the cloud and an increased use of video.

⁵⁷ The TI circuit end volumes reported in BT's Regulatory Financial Statements (RFS) have been divided by two to provide an estimate for an end-to-end circuit to allow a comparison with CI circuits which are reported as an end-to-end circuit. BT, 2018. *Regulatory Financial Statements 2018* [accessed 20 May 2019].

⁵⁸ Ofcom estimate based on 2017 leased line circuit volumes, circuit bandwidths, and historical circuit inventory volumes.

⁵⁹ Cisco, June 2017. *VNI Complete Forecasts Highlights* [accessed 21 May 2019].

- **Mobile network operators:** The amount of mobile data we use is growing, increasing by 50% p.a., on average, between 2012 and 2017.⁶⁰ As this trend continues, demand for higher bandwidth backhaul is expected to grow. 5G is the next generation of mobile technology and was the overarching focus of the interviews Cartesian conducted with mobile operators. It is expected to deliver faster and better mobile broadband, and to enable more revolutionary uses in sectors such as manufacturing, transport and healthcare. Mobile network operators (MNOs) are expected to upgrade bandwidth at many existing sites over the next five years to meet the increase in demand for mobile data on 4G and 5G networks. The rollout of 5G is already beginning, with trials of 5G technology already planned or underway⁶¹, and with MNOs focusing on the upgrading of existing cell sites within major cities first.⁶²
- **Telecoms providers such as fixed broadband providers:** The increase in data demand from end-users such as businesses, mobile users, and residential broadband means that telecoms service providers forecast their bandwidth requirements for backhaul and other inter-exchange circuits will also increase. An increase in demand for superfast broadband (and ultrafast broadband as it is rolled out) from business and residential customers is likely to lead to a concentration of demand for higher bandwidth backhaul and core leased lines, including the ~1150 BT exchanges that are capable of delivering superfast and ultrafast broadband.

3.54 This is a dynamic market undergoing a period of significant change spurred by developments in the enterprise market with the move to cloud-based computing, the mobile market with increased demand for data and the rollout of 5G, and in the residential fixed broadband market where scale rollout of ultrafast broadband (including full fibre) is getting underway.

3.55 As outlined, these changes are driving increased demand for high capacity lines. The way in which this demand will be met is also changing. Increasingly a wide range of services will be delivered over a common underlying fibre infrastructure – ultrafast broadband to households and small businesses; leased lines to larger businesses; and ‘backhaul’ for mobile operators who use fixed broadband lines to transmit data between mobile sites. These multi-service networks are being built and configured in new and innovative ways. As set out in our introduction to this volume and in Section 10, these trends have informed our approach to the regulation of business connectivity markets.

⁶⁰ Ofcom, August 2018. [Communications Market Report 2018](#) [accessed 20 May 2019] and [CMR 2018 Interactive report data: Telecoms](#) [accessed 20 May 2019].

⁶¹ ISPreview.co.uk, 2018. [EE UK Switches On First Live Trial of 5G Mobile Tech in Canary Wharf](#) [accessed 20 May 2019]

⁶² A fuller description of MNOs’ expected rollout is described in Annex 9.

4. CI Access: product market definition

4.16 In Section 3 of Volume 2, we explained the distinction between access, backhaul, and core and how they are used to provide different types of end-to-end network connectivity services. In this section we set out our product market definition for CI Access services. Our analysis of the market for CI Inter-exchange connectivity, covering backhaul and core, is set out in Section 7 of Volume 2.

4.17 Our conclusions can be summarised as follows:

- we define a single market for CI Access services at all bandwidths, which includes all wholesale fibre-based Ethernet and WDM services;⁶³
- we include dark fibre used to supply or self-supply CI Access services in the product market; and
- we exclude business-grade connectivity services provided over EFM, as well as symmetric and asymmetric broadband, from the product market.

4.18 We have undertaken a market definition exercise, assessing demand- and supply-side substitution, by applying the Small but Significant Non-transitory Increase in Price (SSNIP) test (or ‘hypothetical monopolist’ test). As set out below, our findings are primarily underpinned by our analysis of supply-side substitution.

4.19 Openreach offers leased lines at different bandwidths. The physical product is similar in all cases: a fibre point-to-point line, which differs only in the equipment on either end. Some types of equipment can be used to supply a range of bandwidths, though Openreach moderates the available bandwidth which differentiates the products it offers and allows it to set different price points. We take into account the ability of providers to switch between bandwidths, without incurring significant additional costs or risks, once they connect a customer to their network with a fibre point-to-point connection and find a single product market covering all bandwidths.

4.20 In reaching our conclusions, we have considered whether leased lines purchased by mobile network operators (for the purposes of providing mobile backhaul) should be included in the same market as enterprise access circuits. The key question we have analysed in this respect is whether there are significant differences in competitive conditions in the supply of mobile backhaul compared to other services in the CI Access market that would lead to it being a separate market. Our analysis is set out in Annex 9 of Volume 2 and indicates that, although there are some differences between purchasers of mobile backhaul and enterprise customers, in both cases, competition is determined by the presence of rival networks to the customer site. On that basis, competitive conditions at particular locations are largely the same whether the end customer is a mobile network operator or an enterprise customer. We have therefore decided not to define a separate market for mobile backhaul services.

⁶³ We set out a description of these services in Section 3 of Volume 2.

- 4.21 In this section, we present our analysis and findings for CI Access services in the following order:
- summary of stakeholder responses to our consultation proposals;
 - approach to product market definition;
 - assessment of demand-side substitution;
 - assessment of supply-side substitution; and
 - conclusion on CI Access product market definition.
- 4.22 We set out further detail on specific aspects of our analysis of product market definition for CI Access services in the following annexes of Volume 2: demand-side substitution (Annex 8) and assessment of mobile backhaul (Annex 9).

Summary of stakeholder responses

- 4.23 Overall 15 consultation respondents⁶⁴ commented on our proposed CI Access services product market definition.
- 4.24 As set out in more detail below, the main comments were in relation to our proposal for a single market for CI Access services at all bandwidths. Openreach and BT Group were the only stakeholders that disagreed with our proposal. Their main argument was that there are clear differences in competitive conditions between services at 1 Gbit/s and below, and VHB; Virgin Media's view was that there is little risk in defining a single market; and all other stakeholders who commented agreed with our proposal.
- 4.25 The comments made were mainly in relation to our proposed approach to product market definition, our assessment of demand-side substitution and our assessment of supply-side substitution. We summarise these comments below in turn.
- 4.26 We also received comments on our proposed market definition for mobile backhaul. The main comments were that mobile backhaul services should be defined as a separate product market rather than as within the CI Access services market. We set out and consider these comments in in Annex 9 of Volume 2.

Our approach to product market definition

- 4.27 Most stakeholders had no comments on our approach in relation to the use of SSNIP tests, the services proposed to be in scope, the relationship between wholesale and retail markets, and our application of the modified greenfield approach (MGA).
- 4.28 However, a few stakeholders did comment on aspects of our approach:

⁶⁴ BT Group, CityFibre, Colt, Gamma, Hyperoptic, IIG, Openreach, Sorrento Networks, SSE, TalkTalk, UKCTA, Virgin Media, Vodafone, Zayo, and [redacted].

- IIG⁶⁵, Openreach⁶⁶, SSE⁶⁷ and TalkTalk⁶⁸ agreed with our use of SSNIP tests as the conceptual framework. However, Openreach argued that we have assumed it is “acting as a quasi-monopolist” by providing products other than the focal product itself.⁶⁹
- Vodafone argued that Ofcom had excluded CCTV, Street Access and Broadcast services from the CI Access market, without an explanation of the materiality of these services.⁷⁰
- Openreach agreed that “it is not formally necessary to define retail markets”, although argued that by doing so, linkages between wholesale and retail markets and issues such as bandwidth breaks could be better addressed.⁷¹
- TalkTalk commented that our adoption of the MGA is appropriate in their view.⁷² However, Openreach argued that under the MGA, Ofcom should have distinguished between services offered commercially and those offered under regulation.⁷³ Openreach also argued that the MGA should have been applied in our market definition analysis considering unrestricted PIA in the wider context.⁷⁴

Our assessment of demand-side substitution

- 4.29 Some stakeholders commented on our assessment of demand-side substitution. We summarise these comments in more detail in Annex 8 of Volume 2. The main comments were in relation to our approach to demand-side substitution, our SSNIP analysis and findings.
- 4.30 The following stakeholders commented on our approach to demand-side substitution and our SSNIP analysis:
- Openreach argued that it is not clear why Ofcom is relying on calculations of critical loss.⁷⁵ It also argued that the focal products are elements of a much wider network which has not been considered as part of our demand-side substitution analysis.⁷⁶
 - Vodafone acknowledged that evidence for demand-side substitution is limited because 10 Gbit/s prices are not set at the competitive level.⁷⁷

⁶⁵ The IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.2. The IIG is a collective of alternative infrastructure providers who have built, own and operate high-speed electronic communications networks within the UK. Its members are CityFibre, euNetworks and Zayo.

⁶⁶ Openreach’s response to the 2018 BCMR Consultation, page 82, paragraph 6.

⁶⁷ SSE’s response to the 2018 BCMR Consultation, page 1.

⁶⁸ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.8.

⁶⁹ Openreach’s response to the 2018 BCMR Consultation, page 82, paragraph 8.

⁷⁰ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 1.24.

⁷¹ Openreach’s response to the 2018 BCMR Consultation, page 84, paragraph 19.

⁷² TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.9.

⁷³ Openreach’s response to the 2018 BCMR Consultation, page 83, paragraph 13.

⁷⁴ Openreach’s response to the 2018 BCMR Consultation, page 81, paragraph 5.

⁷⁵ Openreach’s response to the 2018 BCMR Consultation, page 86, paragraph 30.

⁷⁶ Openreach’s response to the 2018 BCMR Consultation, page 85, paragraph 24.

⁷⁷ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraphs 1.9-1.10.

- TalkTalk argued that our approach to demand-side substitution is “flawed” and for VHB services, subject to a “form of cellophane fallacy”, as our SSNIP analysis is based on existing market prices rather than competitive prices.⁷⁸
- Both TalkTalk⁷⁹ and Openreach⁸⁰ argued that Ofcom had not undertaken the SSNIP analysis based on competitive prices for VHB services.

4.31 The following stakeholders commented on our SSNIP findings:

- The IIG⁸¹ and Openreach⁸² agreed with our finding that 10 Mbit/s is constrained by 100 Mbit/s.
- Openreach disagreed with our finding that 100 Mbit/s is constrained by 1 Gbit/s.⁸³
- The IIG agreed with our findings that 10 Gbit/s is unlikely to defeat a SSNIP at 1 Gbit/s.⁸⁴ Openreach argued there is a break between 1 Gbit/s and 10 Gbit/s.⁸⁵
- The IIG⁸⁶, TalkTalk⁸⁷ and Vodafone⁸⁸ agreed that asymmetric broadband and EFM do not impose a competitive constraint on our focal products.
- Openreach disagreed that EFM should be excluded as the service continues to provide a constraint for 10 Mbit/s services.⁸⁹
- SSE suggested that FTTP (asymmetric broadband) should be included in future market definitions as it is a viable substitute for services at 1 Gbit/s and below.⁹⁰ BT Group also pointed out that services at 1 Gbit/s and below are increasingly becoming competitive at the wholesale level from FTTP providers.⁹¹
- The IIG agreed that dark fibre is not likely to impose a constraint on low bandwidth services, however noted their members have seen that “some wholesale customers of VHB circuits are more likely to use dark fibre as a substitute”.⁹² Openreach argued that the relevance of dark fibre entry is not obvious as Ofcom does not consider it “in the context of the relevant timeframe”.⁹³

Our assessment of supply-side substitution

4.32 Most stakeholders that commented agreed with our approach and conclusions on supply-side substitution, where suppliers are already connected and where suppliers do not have an existing connection.

⁷⁸ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.14.

⁷⁹ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.14.

⁸⁰ Openreach’s response to the 2018 BCMR Consultation, page 87, paragraph 34.

⁸¹ The IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.3.1.

⁸² Openreach’s response to the 2018 BCMR Consultation, page 86, paragraph 31.

⁸³ Openreach’s response to the 2018 BCMR Consultation, page 86, paragraph 31.

⁸⁴ The IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.3.1.

⁸⁵ Openreach’s response to the 2018 BCMR Consultation, page 86, paragraph 34.

⁸⁶ The IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.3.3.

⁸⁷ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.22-2.31.

⁸⁸ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 1.1.3.

⁸⁹ Openreach’s response to the 2018 BCMR Consultation, page 82, paragraph 5.

⁹⁰ SSE’s response to the 2018 BCMR Consultation, page 2.

⁹¹ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 3.19-3.22.

⁹² The IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.3.3.

⁹³ Openreach’s response to the 2018 BCMR Consultation, page 95, paragraph 78.

- 4.33 The following stakeholders agreed with our assessment of supply-side substitution:
- CityFibre⁹⁴, euNetworks⁹⁵, TalkTalk⁹⁶, Three⁹⁷, SSE⁹⁸, UKCTA⁹⁹, Vodafone¹⁰⁰ and Zayo¹⁰¹ agreed that on the supply side, there is a single product market for CI Access services at all bandwidths.
 - IIG commented that “supply-side substitution between CI Access circuits has the level of effectiveness and immediacy noted by the EC”.¹⁰² Similarly, Vodafone commented that “greater weight needs to be attributed to supply-side substitution”.¹⁰³
 - TalkTalk¹⁰⁴ and Vodafone¹⁰⁵ agreed that there are no barriers preventing providers from switching from supplying 1 Gbit/s to 10 Gbit/s services.
 - Three¹⁰⁶ and UKCTA¹⁰⁷ agreed that where suppliers do not already have an existing connection, the propensity to dig does not vary by bandwidth.
- 4.34 Virgin Media noted that there are still differences in competitiveness between 1 Gbit/s and VHB services, which Ofcom must acknowledge, “although these may not be sufficient to justify a separate market” for VHB services. Based on our SMP analysis for VHB as a separate market, Virgin Media concluded “there is little risk in defining a single market”.¹⁰⁸
- 4.35 BT Group and Openreach disagreed with our assessment of supply-side substitution. BT Group argued that there are clear differences in competitive conditions between services at 1 Gbit/s and below, and VHB services.¹⁰⁹ Based on our analysis, BT pointed out that Openreach is prepared to dig twice as far to serve VHB customers than for low bandwidth customers.¹¹⁰
- 4.36 Openreach argued that where suppliers are already present, Ofcom is mistaken to assume this is supply-side substitution. It considers that only suppliers not active in the product market can be considered for what Openreach terms ‘supply-side entry’ under EC guidelines¹¹¹ and therefore, Openreach disagreed with our single product market proposal. It argued that:

⁹⁴ The IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.2.1 on behalf of CityFibre, euNetworks and Zayo.

⁹⁵ The IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.2.1 on behalf of CityFibre, euNetworks and Zayo.

⁹⁶ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.12.

⁹⁷ Three’s response to the 2018 BCMR Consultation, paragraph 9.1.

⁹⁸ SSE’s response to the 2018 BCMR Consultation, page 2.

⁹⁹ UKCTA’s response to the 2018 BCMR Consultation, paragraph 8.

¹⁰⁰ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 1.4.

¹⁰¹ The IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.2.1 on behalf of CityFibre, euNetworks and Zayo.

¹⁰² The IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.4.1.

¹⁰³ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 1.5.

¹⁰⁴ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.19.

¹⁰⁵ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 1.18.

¹⁰⁶ Three’s response to the 2018 BCMR Consultation, paragraph 9.2.

¹⁰⁷ UKCTA’s response to the 2018 BCMR Consultation, paragraph 8.

¹⁰⁸ Virgin Media’s response to the 2018 BCMR Consultation, page 6.

¹⁰⁹ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 3.10-3.11.

¹¹⁰ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 3.3.

¹¹¹ Openreach’s response to the 2018 BCMR Consultation, page 93, paragraph 67.

- For there to be ‘supply-side entry’, the supplier has to be in a distinct market and able to expand at relatively low cost.¹¹²
- Providers that are supplying services already identified as demand-side substitutes are not relevant to supply-side substitution, as this would be a scenario of “double counting” as “Ofcom set out in the 2013 and 2016 BCMR Statements.”¹¹³

4.37 Openreach argued that where suppliers do not have existing connections, there is no support for a single product market.¹¹⁴ It argued that:

- Ofcom has to demonstrate that suppliers can expand their networks within the timeframe of the SSNIP itself;¹¹⁵
- it is not enough to assess whether or not the cost of extending networks is similar across all bandwidths, and we have ignored revenue and timeframe;¹¹⁶ and
- our analysis on actual dig distances and customer inconvenience are irrelevant in the context of a hypothetical monopolist test¹¹⁷, and suggest that all bandwidths are not of similar interest to suppliers, and that there is a clear break between 100 Mbit/s and 1 Gbit/s, as well as 1 Gbit/s and 10 Gbit/s.¹¹⁸

4.38 We consider stakeholder comments in more detail below, with the exception of some comments in relation to our assessment of demand-side substitution, which we consider in more detail in Annex 8 of Volume 2.

Our approach to product market definition

SSNIP test as our conceptual framework

4.39 The main purpose of the product market definition is to identify the competitive constraints on each of the CI Access services provided by BT over the Openreach network. In the context of CI Access services, the focus is on whether the supply of a circuit at one bandwidth is a competitive constraint on the supply of another circuit at a different bandwidth, such that they should be considered as part of the same relevant market when assessing whether BT has SMP.

4.40 The EC SMP Guidelines identify two main sources of competitive constraints: demand- and supply-side substitution.

“The extent to which the supply of a product or the provision of a service in a given geographical area constitutes a relevant market depends on the existence of competitive constraints on the price-setting behaviour of the service provider(s) concerned. There are two main competitive constraints to consider in assessing the behaviour of undertakings in

¹¹² Openreach’s response to the 2018 BCMR Consultation, page 93, paragraph 62.

¹¹³ Openreach’s response to the 2018 BCMR Consultation, page 92, paragraph 61.

¹¹⁴ Openreach’s response to the 2018 BCMR Consultation, page 92, paragraph 57.

¹¹⁵ Openreach’s response to the 2018 BCMR Consultation, page 94, paragraph 70.

¹¹⁶ Openreach’s response to the 2018 BCMR Consultation, page 93, paragraph 68.

¹¹⁷ Openreach’s response to the 2018 BCMR Consultation, page 94, paragraphs 74-75.

¹¹⁸ Openreach’s response to the 2018 BCMR Consultation, page 94, paragraph 72.

the market; (i) demand-side; and (ii) supply-side substitution. A third source of competitive constraint on an operator's behaviour — to be considered not at the stage of market definition but when assessing whether a market is effectively competitive within the meaning of Directive 2002/21/EC — is the existence of potential competition.”¹¹⁹

- 4.41 The small but significant non-transitory increase in price (SSNIP) test is a well-established approach for assessing these constraints. It starts by selecting a suitable focal product and asks whether a hypothetical monopolist would be able to profitably impose a SSNIP above the competitive price level on that focal product. From the demand side, the question is whether the number of customers switching to an alternative product would be enough to render the SSNIP unprofitable, in which case the relevant market should be expanded to include the candidate substitute. From the supply side, the question is whether suppliers would switch production of a good (other than the focal product) to produce the focal product in the short-term and without incurring significant additional costs, and render the SSNIP unprofitable.¹²⁰
- 4.42 This approach is consistent with the EC SMP Guidelines which state that:
- “One possible way of assessing the existence of any demand and supply-side substitution is to apply the so-called ‘hypothetical monopolist’ or SSNIP test. Under this test, an NRA should ask what would happen if there were a small but significant and non-transitory increase in the price of a given product or service, assuming that the prices of all other products or services remain constant ... While the significance of a relative price increase will depend on each individual case NRAs should consider customer (consumer or undertaking) reactions to a small but non-transitory price increase of between 5 to 10%. Customer responses will help determine whether substitutable products exist and, if so, where the boundaries of the relevant product market should be delineated.”¹²¹
- 4.43 In response to our consultation, the IIG¹²², Openreach¹²³, SSE¹²⁴ and TalkTalk¹²⁵ were the only stakeholders to comment on our approach of using the SSNIP test and all agreed with our approach. We received no objections and therefore use the SSNIP test as our conceptual framework.

¹¹⁹ EC, 2018. [*Guidelines on market analysis and the assessment of significant market power under the EU regulatory framework for electronic communications networks and services*](#) (2018/C 159/01), paragraph 27 [accessed 20 May 2019].

¹²⁰ Where there is more than one candidate substitute, the process is more complex. The market definition exercise would start in this case with the closest candidate substitute and if the SSNIP test suggests that substitution to this substitute would render the SSNIP unprofitable the focal product would be expanded to include the initial focal product and the candidate substitute. A second SSNIP test would then be applied with the new focal product and the next closest candidate substitute. This would be done until the set of products is such that a SSNIP would become profitable.

¹²¹ EC SMP Guidelines, paragraph 29.

¹²² IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.2.

¹²³ Openreach's response to the 2018 BCMR Consultation, page 82, paragraph 6.

¹²⁴ SSE's response to the 2018 BCMR Consultation, page 1.

¹²⁵ TalkTalk's response to the 2018 BCMR Consultation, paragraph 2.8.

Competition is primarily determined by the presence of rival infrastructure

- 4.44 Competition in the supply of CI Access services arises from the potential for rival suppliers to extend their fibre networks to BT’s customers.
- 4.45 Where they are already connected to the customer, rival suppliers can offer the full suite of bandwidths relatively quickly and at little incremental cost, thus constraining BT’s CI Access services from the supply side.¹²⁶
- 4.46 Unless customers are connected to multiple networks¹²⁷, the competitive constraint from supply-side substitution will depend on the presence of nearby rival networks. This is because a supplier with a network that is closer to the customer has a significant cost advantage over one that is further away. Customers may also face greater inconvenience if choosing to switch to suppliers located further away, due to the duration and uncertainty of the time taken for the supplier to extend its network.¹²⁸
- 4.47 Our analysis therefore considers whether the ability and incentive for operators to build out from their network to connect a customer in response to a SSNIP differs substantially between different CI Access services, such that the nature of competition (on the supply side) also differs and hence points towards narrower markets.

Services in scope

- 4.48 The starting point of our market definition exercise is wholesale fibre leased lines supplied by BT over the Openreach network. These services include fibre-based Ethernet and WDM services of different bandwidths used to connect to customer sites. We refer to these services as CI Access services.
- 4.49 We have examined whether CI Access services of different bandwidths are sufficiently close substitutes to one another such that they should be considered in the same product market.
- 4.50 In addition, we have investigated whether other access services, such as dark fibre, asymmetric broadband and EFM, should be considered in the same product market as CI Access services.¹²⁹

¹²⁶ Openreach argued that bandwidth upgrades do not constitute supply-side entry. We consider this argument further below.

¹²⁷ The majority of customers are not connected to multiple networks.

¹²⁸ No stakeholders objected to our view that where suppliers are not already connected, supply-side substitution will depend on the proximity of nearby rival networks.

¹²⁹ Note that in the 2016 BCMR we excluded leased lines used for specialist applications such as CCTV, Broadcast and Street Access from the CI market. Vodafone argued that Ofcom had excluded CCTV, Street Access and Broadcast services without consideration for the materiality of these services (Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 1.24). However, we remain of the view that these circuits are not viable substitutes for fibre leased lines, as they either use a different interface to traditional CI Access services or are priced at a significant premium. We have thus excluded these services from the proposed product market. Based on 2017 access connections, these services combined account for only a small number of circuits, so excluding them has no influence on our SMP findings. While we are aware that the deployment of 5G may see a rise in the use of street access services, we do not expect there to be a significant increase

- 4.51 We set out our analysis of substitution to leased lines provided over microwave links in Annex 9 of Volume 2.

Relationship between wholesale and retail markets

- 4.52 Although this is a review of wholesale services, the relationship between wholesale and retail markets is important in our assessment. Demand for wholesale products derives from demand for retail services, so demand-side substitution between wholesale products will partly arise from indirect constraints from retail markets.¹³⁰
- 4.53 It is not necessary to formally define retail markets to define wholesale markets, provided that wholesale market definition takes into account any indirect constraints that exist.¹³¹ For instance, when identifying the products to which wholesale customers would move in response to a SSNIP, we have taken into account the bandwidth needs of customers at the retail level, rather than the bandwidth of the wholesale circuits that are used to satisfy such bandwidth needs.
- 4.54 Our proposed approach to retail and wholesale market definition is consistent with the relevant EC Guidelines.

Modified greenfield approach

- 4.55 When carrying out our market definition analysis we have applied the modified greenfield approach (MGA). Our analysis below is therefore conducted in relation to a hypothetical scenario in which there are no *ex ante* SMP remedies in the reference market(s), but *ex ante* SMP remedies in other markets continue to apply.¹³²
- 4.56 For example, we assume that remedies imposed in the wholesale local access (WLA) market apply and that therefore BT is required to provide LLU, VULA and PIA (mixed

during this review period. In response to a statutory information request (BCMR s.135-23), MNOs have indicated they will mainly use [3x] for their access connections.

¹³⁰ Indirect constraints arise because a wholesale price increase is likely to be passed on to the retail level, which may result in end customers switching to goods which do not require the wholesale input. If such retail substitution would be sufficient to limit the ability of a wholesale operator to profitably impose a SSNIP, then an indirect constraint exists. Such indirect constraints might lead to wholesale products being included in the same relevant market even if those products do not constrain each other directly at the wholesale level.

¹³¹ In their response, Openreach agreed with our view that it is not formally necessary to define retail markets, however, it argued that doing so can address issues such as bandwidth breaks. Also, Openreach argued that we had given no consideration for switching or upgrade costs (an increase in the capacity of access circuits will require an increase in the capacity of their core network) on the wholesale or retail level (Openreach's response to the 2018 BCMR Consultation, page 84, paragraph 20). However, our analysis here is focused only on CI Access services and we consider switching decisions when determining our relevant assessment period as part of our demand-side substitution analysis in Annex 8 of Volume 2.

¹³² Openreach argued we have assumed Ethernet services to be our focal product, but that under the modified greenfield approach, it is essential to distinguish between what is offered commercially from what is offered as a result of regulation. Absent regulation, Openreach suggest they would have preferred to "offer different technical and/or commercial solutions" (Openreach's response to the 2018 BCMR Consultation, page 83, paragraphs 13-14). First, we note that the presence of regulation does not prevent Openreach from offering such solutions. In fact, CI Access services at 1 Gbit/s and below were deregulated in the 2016 BCMR in the CLA, however even in the absence of regulation, Openreach continued to supply those products. Also, our approach is consistent with EC Guidelines, which do not prevent the use of a product offered under regulation as our focal product.

usage).¹³³ Similarly, we assume that remedies imposed in the PIMR market apply and that therefore BT is required to provide unrestricted access to its ducts and poles no later than one month after the publication of this Statement.¹³⁴

Definition of product markets in our legal instrument

4.57 Openreach commented that the names of the product markets we proposed to identify should have been defined in our draft legal instrument.¹³⁵ This is not our usual approach. Typically, the market definition chapters of our statement set out the services which we consider to fall within the markets we identify, while the legal instrument only includes the name of the identified product markets. We see no reason to depart from this approach in this review. Where we consider it necessary to require BT to provide specific services we define these separately (e.g. in our legal instrument we define “Ethernet Services” and “WDM Services”). To the extent that Openreach’s comment formed part of a wider concern about the scope of our proposed dark fibre remedy, we have addressed this in Section 12 of Volume 2.

Assessment of demand-side substitution

- 4.58 Demand-side substitution arises when customers switch to alternative products in response to changes in their relative prices. The analysis of demand-side substitution considers how this switching would affect the profitability of a hypothetical monopolist of a certain product (i.e. the focal product) attempting a SSNIP.
- 4.59 When conducting the SSNIP test, the hypothetical monopolist is assumed to produce and sell only the focal product and not any other products.¹³⁶ This means that any sales lost by customers switching to other products are a loss to the hypothetical monopolist. This implicitly assumes that the current prices are set based on existing demand-side constraints.
- 4.60 However, in CI Access this does not always reflect reality as the main demand substitute for an Openreach leased line is typically another Openreach leased line of a different bandwidth.¹³⁷ According to internal documents, Openreach sets charges to maximise

¹³³ One practical implication of this approach is that EFM-based services can be included in our assessment, even though telecoms providers require access to BT’s regulated WLA products to be able to supply such services.

¹³⁴ In their response, Openreach argued that Ofcom had not applied the MGA in the wider context of DPA. However, we note that this does not have any implications for the services we consider and therefore, our assessment overall.

¹³⁵ Openreach’s response to the 2018 PIMR Consultation, paragraphs 80-81, pages 18-19.

¹³⁶ Bailey, D & John, LE (eds), 2018. *Bellamy & Child European Union Law of Competition*. Eighth Edition, Oxford: Oxford University Press.

¹³⁷ Openreach argued that Ofcom appears to assume that Openreach is acting as a quasi-monopolist through the provision of products other than the focal product itself (Openreach’s response to the 2018 BCMR Consultation, page 82, paragraph 8). However, our intention is to explain how the SSNIP analysis is undertaken in the context of CI Access services. Openreach also claim that we have been inconsistent with our arguments in the appeal of the 2016 BCMR that “the Hypothetical Monopolist should be assumed to produce only the focal product” (Openreach’s response to the 2018 BCMR Consultation, page 82, paragraph 7). We agree that when applying the SSNIP test, the hypothetical monopolist should be assumed to produce only the focal product. However, we consider it valid to note that current prices may reflect profit-maximisation across a portfolio rather than demand-side substitution to an external constraint.

profits across bandwidths, taking into account that in the event of a price increase for a given bandwidth, many of the switching customers would switch to an Openreach leased line of a different bandwidth, such that Openreach would ‘recapture’ many of the diverted sales.¹³⁸ This is in contrast to instances where the demand-side substitute is offered by rivals and the incumbent firm loses the diverted sales. The existence of this portfolio effect is captured in supply-side substitution.

- 4.61 In conducting a SSNIP test, there is the additional complication that prices for CI Access services of 1 Gbit/s and below are charge controlled while those for services over 1 Gbit/s (which we refer to as very high bandwidth or VHB services) are not. As noted in Section 6 and Annex 14 of Volume 2, the evidence indicates that BT would have market power in a market for VHB services considered on a standalone basis, so prices on these services may be distorted. This is supported by the high profit margin BT earns on VHB services, for which we estimate BT currently charges significantly above FAC (see Figure A7.2).
- 4.62 The EC SMP Guidelines state that “The SSNIP test can, however, not be applied, if the price level or other market parameters are not at competitive level, as such analysis would be liable to the so-called cellophane fallacy. NRAs faced with such difficulties could rely on other criteria for assessing the substitution, such as functionality of service, technical characteristics etc”.¹³⁹
- 4.63 Therefore, existing price differentials between bandwidths may not be a reflection of demand-side constraints differing across bandwidths. Moreover, the SSNIP test may not capture the full extent of these constraints. However, we consider that demand-side substitution is important for assessing the constraints that alternative connectivity services such as EFM and asymmetric broadband may impose on CI Access services. Consequently, we set out a demand-side substitution analysis below, while a more detailed analysis considering stakeholder responses is presented in Annex 8 of Volume 2.

Our approach to demand-side substitution

- 4.64 We have assessed demand-side substitution by applying a SSNIP test to the following focal products which account for 99%¹⁴⁰ of Openreach’s leased lines, in terms of volume:
- 10 Mbit/s;

¹³⁸ Openreach’s internal documents submitted in response to question 4 of the 8th BCMR s.135 notice (dated 20 April 2018) suggest that it seeks to maximise returns across its portfolio of products (see document entitled “New pricing and product launches for VHB portfolio”, pages 3 and 19-20, and slide deck entitled “Product Proposals: Ethernet & Optical Response to Dark Fibre”, slide 7). This implies that Openreach takes into account the impact of price changes on bandwidth substitution. The closest substitute for an Openreach VHB service will often be an Openreach service at a lower bandwidth, such that customers who choose not to purchase an Openreach VHB service due to high charges may instead purchase a different Openreach service. As the sale is ‘recaptured’ by Openreach, high charges for VHB services may have maximised profits across the portfolio with little relationship to underlying costs. While this price discrimination may be profit-maximising, it means that caution should be applied when drawing conclusions on market definition based on prevailing charges.

¹³⁹ EC Staff Working Document on the EC SMP Guidelines (SWD(2018) 124), page 11, http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=51927 [accessed 30 October 2018].

¹⁴⁰ Openreach response to question A of the 1st BCMR s.135 notice dated 18 January 2018.

- 100 Mbit/s;
- 1 Gbit/s; and
- 10 Gbit/s.

4.65 For each of these focal products we have assessed the likely amount of switching (in response to a SSNIP) to a range of candidate substitutes and have ascertained whether this would exceed the critical loss that would render a SSNIP unprofitable. Table 4.1 shows the critical loss thresholds we have used for each focal product which are underpinned by the evidence regarding Openreach margins presented in Annex 8 of Volume 2.¹⁴¹ The switching threshold refers to the amount of volume that would need to switch from the focal product in the event of a 10% SSNIP for the price rise to be unprofitable. This threshold ranges from just [redacted]% for the high margin 10 Gbit/s product, to [redacted]% for 10-100 Mbit/s circuits.

Table 4.1: Critical loss threshold

Focal product	Proportion of customers required to switch
10 Mbit/s	[redacted]%
100 Mbit/s	[redacted]%
1 Gbit/s	[redacted]%
10 Gbit/s	[redacted]%

Source: Ofcom analysis based on Openreach data (see Annex 8 of Volume 2).

4.66 In assessing the likely amount of switching we have considered what the competitive price benchmark should be for each focal product. As prices for lower bandwidths are regulated, we consider that they represent a reasonable proxy for “the competitive level”.¹⁴² The EC SMP Guidelines state that “where a product or service is already offered at a regulated, cost-based price, a regulated price will be assumed to be set at competitive levels and should be taken as the starting point for the hypothetical monopolist test.”¹⁴³

4.67 For 10 Gbit/s services, which are not currently subject to price controls, it is not possible to directly identify competitive prices, but we consider these are likely to be below current price levels. We take this into account in our assessment below.

SSNIP analysis

4.68 For most leased lines, the main demand-side substitute is another leased line of a different bandwidth. The bandwidth differential between these services tends to be substantial as

¹⁴¹ Openreach argued that it is not clear why Ofcom is relying on calculations of critical loss (Openreach’s response to the 2018 BCMR Consultation, page 86, paragraph 30). We consider this comment in Annex 8 of Volume 2.

¹⁴² We acknowledge that lower bandwidth CI services have been regulated as part of a basket and therefore BT has some flexibility to depart from costs for some services within the basket. However, we consider that this flexibility is limited and, therefore, we are of the view that current prices are a reasonable proxy for “the competitive level”.

¹⁴³ EC SMP Guidelines, paragraph 31.

leased lines are typically offered in bandwidth differential multiples of 10. However, the price differential between these services is not always significant (and in some cases equal to zero), particularly for bandwidths of 1 Gbit/s and below. Consequently, a 10% price rise could sometimes mean that customers would save costs, and get the benefit of a substantial bandwidth boost, by switching to a higher bandwidth service.

- 4.69 Our analysis therefore indicates that for low bandwidth services of 1 Gbit/s and below, where charges are fairly constant across bandwidths (see Figure A7.2), a SSNIP is likely to be defeated by substitution to the next higher bandwidth service, suggesting there is a wider market encompassing bandwidths 1 Gbit/s and below.
- 4.70 This may not be the case for substitution between 1 Gbit/s and 10 Gbit/s where price differentials remain high, even after a 10% price rise on 1 Gbit/s. This price differential suggests a bandwidth break between 1 Gbit/s and 10 Gbit/s, though this may be influenced by current high VHB prices. TalkTalk argued that our approach to demand-side substitution for VHB services is subject to a “form of cellophane fallacy”, as our SSNIP analysis is based on existing market prices rather than competitive prices.¹⁴⁴ In any case, even if price differentials were to reflect cost differentials in a competitive market, we consider that cost differentials between 1 Gbit/s and 10 Gbit/s (see Annex 7 of Volume 2) are such that substitution to 10 Gbit/s may not be sufficient to defeat a SSNIP on 1 Gbit/s. For example, as at March 2017, we estimated that EAD 1 Gbit/s prices were 32% above FAC and those for EAD 10 Gbit/s were [32-45]% 100-150% above FAC.¹⁴⁵ However, we note this differential has reduced significantly since April 2018, when BT reduced EAD 10 Gbit/s charges by nearly 40%. Over time, as demand for bandwidth increases and costs fall, prices for higher bandwidth products tend to reduce and become more cost reflective. This means the competitive constraint imposed by 10 Gbit/s on 1 Gbit/s may increase in the future. Therefore, we find the evidence ambiguous with respect to the presence of a separate VHB market from the demand side.
- 4.71 Our analysis also indicates that EFM¹⁴⁶ and asymmetric broadband services are unlikely to sufficiently constrain CI Access services to consider them in the same product market, even when considering substitution from 100 Mbit/s which is arguably a closer substitute to EFM and asymmetric broadband than higher bandwidths. Openreach argued that EFM should not have been excluded, as the service continues to provide a constraint for 10 Mbit/s services, despite a fall in the total number of EFM circuits.¹⁴⁷ However, IIG¹⁴⁸, TalkTalk¹⁴⁹ and Vodafone¹⁵⁰ agreed that EFM services are not part of the relevant market. This is consistent with the results from the 2018 Cartesian report indicating that businesses

¹⁴⁴ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.14.

¹⁴⁵ Ofcom analysis based on BT’s 2016/17 RFS and Openreach’s price list as at March 2017.

¹⁴⁶ Our analysis of EFM substitution also applies to substitution to business grade connectivity provided over symmetric broadband services using SDSL technologies, which is the legacy version of EFM. We have not referred to these technologies explicitly in our analysis as these have been largely superseded by EFM.

¹⁴⁷ Openreach’s response to the 2018 BCMR Consultation, page 82, paragraph 5.

¹⁴⁸ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.3.3.

¹⁴⁹ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.25.

¹⁵⁰ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 1.29.

perceive “copper-based circuits (EFM) [...] to be less reliable” than fibre leased lines.¹⁵¹ EFM services are largely considered legacy services and telecoms providers are expecting to replace them with FTTC/FTTP based services in the longer term.¹⁵²

- 4.72 In relation to asymmetric broadband, upload speeds are dependent on the technology used. For example, for FTTC based services, the maximum upload speed that can be delivered is 20 Mbit/s. However, with the ongoing and future rollout of ultrafast technologies like FTTP higher upload speeds will be available, and therefore asymmetric broadband may become more of a substitute for CI Access services in the future. SSE suggested that FTTP should be included in future market definitions as it is a viable substitute for services at 1 Gbit/s and below.¹⁵³ BT Group also pointed out that services at 1 Gbit/s and below are increasingly becoming competitive at the wholesale level from FTTP providers.¹⁵⁴
- 4.73 While we acknowledge that ongoing and future FTTP deployments will narrow the speed gap between asymmetric broadband and CI Access services, we remain of the view that take up of FTTP is likely to be low amongst CI Access customers. First, leased lines are high quality point-to-point connectivity services that tend to be symmetric (i.e. the capacity is the same in both directions) and uncontended (i.e. the capacity is guaranteed and not subject to reduction). Therefore, we consider that asymmetric broadband remains a weak substitute for CI Access services due to its quality limitations. Second, we expect the coverage of FTTP is likely to be limited for businesses over the course of this review period. This is further supported by our engagement with telecoms providers which suggests that FTTP rollout will have little impact on the demand for leased lines over the course of this market review period.¹⁵⁵
- 4.74 We have also assessed whether dark fibre is a close demand-side substitute for CI Access services. Our analysis indicates that dark fibre is unlikely to sufficiently constrain low bandwidth CI Access services of 1 Gbit/s and below to consider them in the same product market. This is supported by consumer research¹⁵⁶ indicating that only a minority of low bandwidth customers (3% to 8%) consider dark fibre as an alternative service, with the vast majority of respondents saying they would not consider dark fibre either because they prefer a third party to manage the services or due to issues over cost and availability.¹⁵⁷

¹⁵¹ s-12Ofcom, 2018. *Cartesian Business Connectivity Market Assessment*.

https://www.ofcom.org.uk/data/assets/pdf_file/0009/113112/cartesian-business-connectivity-market-assessment.pdf [accessed 22 May 2019].

¹⁵² [S&C] responses to BCMR s.135 notices.

¹⁵³ SSE’s response to the 2018 BCMR Consultation, page 2.

¹⁵⁴ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 3.22.

¹⁵⁵ TalkTalk response to Question 1 of the 6th BCMR s.135 notice dated 20 April 2018; BT response to Question 1 of the 6th BCMR s.135 notice dated 20 April 2018, “PIR and Inflight Review”, p. 4; and Vodafone response to Question 1 of the 6th BCMR s.135 notice dated 20 April 2018.

¹⁵⁶ Ofcom, 2016. *Ofcom Business Connectivity Market Review: High bandwidth connections* (2016 BDRC study), Figure 34a and 34b. https://www.ofcom.org.uk/data/assets/pdf_file/0020/32069/bdrc_ci_survey.pdf [accessed 30 October 2018].

¹⁵⁷ 2016 BCMR Statement, paragraph 4.284.

Consistent with this position, IIG in its response agreed that dark fibre is not likely to impose a constraint on lower bandwidth services.¹⁵⁸

4.75 The evidence is less clear-cut for VHB services, as the survey results indicate that a larger percentage of customers (20%) consider dark fibre as an alternative service, while pricing data suggests that dark fibre prices are more attractive against VHB charges (see Annex 8 of Volume 2). However, ‘considering dark fibre as an alternative service’ is not the same as ‘switching to dark fibre in response to a SSNIP’, so the survey results are at best ambiguous on whether a sufficient number of VHB customers ([>]%) or more) would switch to dark fibre in the event of a SSNIP. Nevertheless, IIG in their response suggested that its members “have seen evidence that some wholesale customers of VHB circuits are more likely to use dark fibre as a substitute”.¹⁵⁹

4.76 In summary, our demand-side substitution analysis indicates that:

- 10 Mbit/s services are constrained by 100 Mbit/s services;
- 100 Mbit/s services are constrained by 1 Gbit/s services;
- there is a possible break between 1 Gbit/s and VHB services, although the evidence is ambiguous;
- EFM and asymmetric broadband services are not close demand substitutes for CI Access services; and
- dark fibre is not a close demand substitute for low bandwidth CI Access services (1 Gbit/s and below) but could be one for VHB services.

Assessment of supply-side substitution

Our approach to supply-side substitution

4.77 Supply-side substitution considers whether competing telecoms providers would be able to switch to supply the focal product in the short term, such that they would impose a constraining effect on the prices of CI Access services at different bandwidths.¹⁶⁰

4.78 Therefore, we assess supply-side substitution using the SSNIP framework. We consider whether a telecoms provider supplying other CI bandwidths would respond to an increase in the price of the focal product bandwidth by supplying the focal product. Therefore, supply-side substitution identifies those providers that can profitably supply a customer in response to a SSNIP (i.e. the competitor set available for that customer).

4.79 In its response, Openreach referred to guidance from the Competition Commission which states that “the boundaries of the relevant product market are generally determined by reference to demand-side substitution alone. However, there are circumstances where

¹⁵⁸ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.3.3.

¹⁵⁹ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.3.3. We consider their comment further in Annex 8 of Volume 2.

¹⁶⁰ TalkTalk argued that we should have considered supply-side substitution between CI Access and CI Inter-exchange connectivity services (TalkTalk’s response to the 2018 BCMR Consultation, paragraph). We consider their argument in Volume 2, Section 7.

Authorities may aggregate several narrow relevant markets into one broader one on the basis of considerations about the response of suppliers to changes in price”.¹⁶¹ Openreach consider this means it would be exceptional for supply-side entry to support a wider product market.¹⁶²

- 4.80 We acknowledge that in many cases markets will be defined principally on the basis of demand-side substitution as, in those cases, supply-side substitution is not sufficiently immediate to render a SSNIP unprofitable. However, supply-side substitution is widely acknowledged to be a component on the HMT and does have relevance in appropriate circumstances. As noted in the EC SMP Guidelines supply-side substitutability may be taken into account in “situations in which its effects are equivalent to those of demand-side substitution in terms of effectiveness and immediacy”.¹⁶³ We believe this is the case with CI Access services, as once the fibre connection is in place, it can be used to provide the full range of leased line services in the immediate term, with the only change being the equipment installed at the circuit ends (and in some cases, even this is not necessary).
- 4.81 In response to our consultation, IIG agreed that “supply-side substitution between CI Access circuits has the level of effectiveness and immediacy noted by the EC”.¹⁶⁴ Also, TalkTalk¹⁶⁵ and Vodafone¹⁶⁶ confirmed that there are no barriers to operators providing different bandwidths as the underlying infrastructure is the same. Based on this, we remain of the view that leased line providers are able to supply and switch between bandwidths relatively quickly and at low cost.
- 4.82 The extent to which there is supply-side substitution will depend on which providers have networks close enough to the customer site to provide the service relatively quickly and at low cost. Below, we first consider the case of supply-side substitution when providers are already connected to a customer site, before then considering the implications if providers need to extend their network.

Where suppliers are already connected, there is supply-side substitution between CI Access services

- 4.83 As already mentioned, leased lines of different types are delivered over the same physical network infrastructure. Once the fibre connection is in place, it can be used to provide the full range of leased line services. The only difference between different services is the electronic equipment installed at the circuit ends, and in some cases, the same equipment can be used to provide different leased line bandwidths.

¹⁶¹ Openreach’s response to the 2018 BCMR Consultation, page 92, paragraph 58

¹⁶² Openreach’s response to the 2018 BCMR Consultation, page 92, paragraph 59.

¹⁶³ European Commission *Notice on Market Definition*, paragraph 20. [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31997Y1209\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31997Y1209(01)&from=EN) [accessed 1 May 2019].

¹⁶⁴ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.4.1 and 4.4.2.

¹⁶⁵ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.19.

¹⁶⁶ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 1.15.

- 4.84 Openreach argued that where a supplier is already connected, and providing a service that has been assessed as a potential competitive constraint on the demand-side, bandwidth upgrades do not constitute what it terms ‘supply-side entry’ under EC Guidelines.¹⁶⁷ Instead, Openreach argued that only suppliers coming from a distinct market and able to expand at a low cost to provide the focal product can be considered supply-side entrants.¹⁶⁸
- 4.85 We do not think this is correct. There is no requirement that supply-side substitution must come from a supplier not active in the product market. The EC Notice on Market Definition states that “when suppliers market a wide range of qualities of a product, not necessarily substitutable for customers, the different qualities could be grouped into one product market, provided suppliers can offer and sell the qualities quickly and without incurring significant costs”.¹⁶⁹ The Notice uses the example of paper production: although different qualities of paper may not be demand-side substitutes, production can be adjusted to provide the different qualities quickly and with negligible costs. This example illustrates that the supplier may already be active in the product market and that whether the substitute products are demand-side substitutes is not relevant. As demand-side and supply-side substitution are assessed separately, it is possible for a product to be both a demand-side and supply-side substitute without double-counting; the key issue is whether the substitution is sufficiently strong in either dimension to render a SSNIP unprofitable.¹⁷⁰

There is supply-side substitution where the same equipment is used

- 4.86 In some cases, the same equipment is used to provide different leased line bandwidths. For example, Openreach provides the following services using the same equipment:
- Ethernet services at 10 Mbit/s and 100 Mbit/s;¹⁷¹
 - Ethernet services at 100 Mbit/s and 1 Gbit/s (new connections since April 2017);¹⁷²
 - Ethernet 10 Gbit/s and some WDM services (the XG2010 variant of OSA Filter Connect).¹⁷³
- 4.87 Virgin Media uses the same equipment to provide [X] services.¹⁷⁴

¹⁶⁷ Openreach’s response to the 2018 BCMR Consultation, page 93, paragraph 62-67.

¹⁶⁸ Openreach’s response to the 2018 BCMR Consultation, page 93, paragraph 62.

¹⁶⁹ Details of the criteria for supply-side substitution were provided in the European Commission *Notice on Market Definition*, paragraph 21-22. [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31997Y1209\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31997Y1209(01)&from=EN) [accessed 30 October 2018].

¹⁷⁰ Openreach point out that we identified the risk of double counting in the 2013 and 2016 BCMR, and therefore our current approach is inconsistent with past approaches (Openreach’s response to the 2018 BCMR Consultation, page 92 and 03, paragraph 61-65). The change in approach since the BCMR 2016 reflects our reconsideration of our approach following the judgement of the Tribunal.

¹⁷¹ 2016 BCMR Statement, paragraph 4.130.

¹⁷² Openreach’s response to question 5 of the 8th BCMR s.135 notice dated 20 April 2018, see document entitled “Leased Line Charge Control Ethernet Prices for April 2018”, dated 26 February 2018, page 3.

¹⁷³ Openreach’s response to question 4 of the 8th BCMR s.135 notice dated 20 April 2018, see document entitled “New pricing and product launches for VHB portfolio”, page 10. Note that “all variants of OSA Filter Connect require temperature-hardened optics and a filter, which are not used in providing 10G EAD services”.

¹⁷⁴ Notes from meeting between Ofcom and Virgin Media on 3 May 2018.

- 4.88 The provider can switch between the services supplied over the same equipment by adjusting a module in the equipment. This means that in the event of a SSNIP on a particular bandwidth e.g. 1 Gbit/s, providers of 100 Mbit/s services could quickly adjust the equipment to offer a 1 Gbit/s service with negligible cost, thereby rendering the SSNIP unprofitable.
- 4.89 Our conclusion is that it is clear that there is supply-side substitution between CI Access services supplied over the same equipment. In particular, we consider that there will be supply-side substitution between Ethernet services at 10 Mbit/s, 100 Mbit/s and 1 Gbit/s, such that in the event of a SSNIP on any of these bandwidths, suppliers of other bandwidths would reconfigure their equipment to offer the focal product quickly and with negligible cost.
- 4.90 A similar conclusion can be reached between Ethernet services at 10 Gbit/s and WDM services, as well as across WDM services of different bandwidths, which share the same equipment.¹⁷⁵ For example, in the event of a SSNIP on WDM services, a supplier of 10 Gbit/s could quickly adjust the equipment to provide some WDM services (e.g. single fibre OSA Filter Connect) at negligible cost.¹⁷⁶

Suppliers of one bandwidth can quickly start offering another bandwidth by changing equipment

- 4.91 In some cases, suppliers need to use different equipment to provide leased lines of different bandwidths. For example, Ethernet services at 1 Gbit/s and 10 Gbit/s are likely to have different equipment at both ends of the circuit. We consider that in this case there is also supply-side substitution as, in the event of a SSNIP on 10 Gbit/s services, a provider of 1 Gbit/s could quickly offer 10 Gbit/s services at minimal cost. [X] indicated that approximately [X].¹⁷⁷
- 4.92 A provider of a 1 Gbit/s Ethernet service would need to purchase different equipment to start providing a 10Gbit/s Ethernet service. The equipment for different bandwidths is readily available on a global market such that any operator capable of supplying a 1 Gbit/s circuit can readily offer a 10 Gbit/s circuit by purchasing and installing different end equipment. The same engineers who install 1 Gbit/s equipment are also able to install 10 Gbit/s equipment (and vice versa) such that no significant costs or risks are involved in offering the different bandwidths. In support, TalkTalk in its response confirmed that there are no barriers for operators that switch between providing 1 Gbit/s and 10 Gbit/s as the “same underlying infrastructure, systems and processes are used”.¹⁷⁸ As a result, most

¹⁷⁵ Openreach claimed that our understanding in terms of upgrades is not correct at all points, particularly between Ethernet services at 10 Gbit/s and WDM services (Openreach’s response to the 2018 BCMR Consultation, page 92, paragraph 60). However, Openreach did not provide any clarification. Our understanding is that the same equipment can be used to provide 10 Gbit/s and some WDM services. Regardless, our view is that there will be supply-side substitution between CI Access services whether or not provided over the same equipment. We set out our reasoning for this further below.

¹⁷⁶ Openreach’s response to 8th BCMR s.135 notice dated 18 April 2018, see document entitled “New pricing and product launches for VHB portfolio”, page 10.

¹⁷⁷ [X] response to the 2018 BCMR Consultation, [X].

¹⁷⁸ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.19.

suppliers offer and sell the full range of CI Access services and no significant investments are required to start offering additional bandwidths. Moreover, the cost of equipment typically accounts for a very small proportion (less than 10%) of the overall cost of providing a leased line¹⁷⁹, and according to TalkTalk¹⁸⁰, “are marginal to demand rather than fixed, so do not act as a barrier to entry.”

- 4.93 Based on the above, we consider that where telecoms providers are already connected to a customer site, there will be supply-side substitution between CI Access services provided either over the same or different equipment.

Where suppliers do not have an existing connection, competitive conditions do not differ by bandwidth

- 4.94 In practice, not all suppliers have an existing connection to the customer so for supply-side substitution to occur in those circumstances, a supplier may need to extend its network to provide a leased line service.¹⁸¹
- 4.95 Our assessment considers whether there is a sufficiently similar ability and incentive for operators to build out from their network to provide different bandwidths. If suppliers would react similarly across bandwidths in response to a SSNIP, these bandwidths can be combined into a single market.
- 4.96 The ability of a firm to supply a particular customer depends on the proximity of its network to that customer. A supplier with a network that is closer to the customer has a significant cost advantage over one that is further away. Customers may also face greater inconvenience if choosing to switch to suppliers located further away, due to the duration and uncertainty of the time taken for the supplier to extend its network. However, where significant dig distances are required this creates challenges in supplying all bandwidths. We have identified no significant differences in the technical requirements or costs in extending a network to supply one bandwidth or another (i.e. a supplier that is capable of supplying 1 Gbit/s is equally able to supply 10 Gbit/s).¹⁸² Accordingly, on the supply side, we would expect competitive conditions to be the same across all products.
- 4.97 There are some suggestions that in practice some suppliers have been prepared to extend their networks different distances for higher bandwidth products. We have therefore also considered whether the distance over which operators would be able to compete to supply a customer in the event of a SSNIP (by the incumbent supplier) varies by bandwidth.

¹⁷⁹ We set out our analysis of these costs in Table 3.9. This analysis shows that infrastructure costs represent between 97.1% and 99.7% for 1 Gbit/s services and between [3<] and [3<]% for 10 Gbit/s services.

¹⁸⁰ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.19.

¹⁸¹ The purpose of our assessment is to identify the relevant constraints on the supply side for CI Access services. In its response, Openreach argued that we should consider the implications of sunk costs for supply-side entry, especially if considered as part of our SMP analysis. However, our view is that such factors should be restricted to our SMP analysis where we assess the strength of relevant constraints.

¹⁸² As established above, the cost of equipment tends to have a very small contribution to the overall cost of supplying leased line services.

4.98 We consider the following evidence to assess whether the incentives of suppliers to connect to customers differ by bandwidth¹⁸³:

- evidence on the indicative dig distance for different bandwidths based on the revenues of different CI Access services and the costs of extending networks;
- evidence on how inconvenience to customers varies by distance; and
- evidence on actual digging behaviour by providers of CI Access services.

4.99 By considering the evidence above, we examine the incentives of suppliers in both a hypothetical and non-hypothetical context.

The indicative dig distance for different bandwidths

4.100 We have estimated the distance over which suppliers would find it profitable to extend their network for each CI Access service given current price levels. We compare the incremental revenues (assuming current price levels) to the incremental costs derived from supplying different services. This is based on Openreach's costs and current wholesale charges.¹⁸⁴ Our analysis is set out in detail in Annex 10 of Volume 2 which contains the results of our indicative dig cost model.

4.101 The results are based on a set of assumptions for costs (including, among others, the type of terrain), which reflect average costs in more urban areas. However, costs are likely to vary to some extent in practice and thus it may be profitable to dig further in areas where digging costs are lower. As these factors are unlikely to correlate with bandwidth requirements the assumptions are useful for a comparison across bandwidths.¹⁸⁵

4.102 Table 4.2 presents a summary of the results. It shows the indicative dig distances¹⁸⁶ for Ethernet services at 100 Mbit/s, 1 Gbit/s, and 10 Gbit/s.¹⁸⁷ We present the results for different payback periods.

¹⁸³ Openreach argued that it is not enough to assess whether or not the cost of extending networks is similar across all bandwidths, but we should also assess whether the revenue and timeframe associated with a supplier extending its network varies across bandwidths (Openreach's response to the 2018 BCMR Consultation, page 93, paragraph 68). However, we do implicitly consider revenue (price of services) through examining indicative dig distances and timeframe by looking at the inconvenience faced by customers from waiting to be connected by a supplier. Openreach also argued that to the extent that customers are inconvenienced, this indicates that supply-side entry is much less likely (Openreach's response to the 2018 BCMR Consultation, page 94, paragraph 75). However, the question we are trying to answer through this assessment is not whether supply-side entry is likely but whether the incentives of suppliers to extend their networks to connect to customers varies across bandwidths.

¹⁸⁴ Incremental revenues include connection and rental charges based on Openreach's price list for EAD LA circuits. Incremental costs include passive costs (i.e. costs of extending the physical infrastructure) and active costs (i.e. costs of the electronic equipment). Passive costs are based on Openreach's Excess Construction Charges (ECCs).

¹⁸⁵ However, the model is indicative only. As set out in Annex 10, we note that the actual cost of network extension for any given site may be higher than the estimates of our indicative dig cost model and therefore, leading to shorter break-even distances.

¹⁸⁶ These distances shown have been converted from actual route distances to radial (straight-line) distances.

¹⁸⁷ We do not include the indicative dig distances for 10 Mbit/s services as they are broadly similar to 100 Mbit/s given that the wholesale charges and the equipment costs for both services are almost identical.

Table 4.2: Indicative dig distance for different CI Access services (metres)

Payback period	100 Mbit/s	1 Gbit/s	10 Gbit/s
3 years	27	34	94
5 years	46	55	119

Source: Ofcom analysis set out in Annex 10 of Volume 2.

- 4.103 This shows that, based on October 2018 charges, the maximum indicative dig distance for VHB services is significantly longer than for lower bandwidth services. For example, for a typical three-year payback period, the maximum indicative dig distances for 100 Mbit/s and 1 Gbit/s are 27m and 34m respectively, while for 10 Gbit/s is 94m. At current charges, a supplier of a VHB service would not necessarily be willing to provide lower bandwidths, as it would find it profitable to provide a VHB connection over a greater distance than would be profitable to provide lower bandwidths.
- 4.104 BT Group argued that our evidence on indicative dig distances points towards a competitive VHB market.¹⁸⁸ Similarly, Openreach argued that our evidence suggests that not all bandwidths are of similar interest for suppliers to dig to and that even the differences in dig distances between 100 Mbit/s and 1 Gbit/s are considerable.¹⁸⁹ However, the longer indicative distances for VHB are likely to be distorted by BT's high VHB charges where, even after its recent reduction (of nearly 40%) in wholesale charges in April 2018, it earns substantially higher returns than for other CI Access services. Therefore, caution should be taken when drawing conclusion on these distances for market definition purposes. In fact, our analysis suggests that [\gg]¹⁹⁰. We also acknowledge the differences between 100 Mbit/s and 1 Gbit/s but note that the distances are indicative only and therefore, we also examine evidence on customer inconvenience and actual digging behaviour further below.

Evidence on customer inconvenience

- 4.105 Our indicative dig distance analysis above may overstate the distance over which telecoms providers are able to compete. This is because digging to connect a customer is a time-consuming activity which delays the provision of the service and places a supplier at a competitive disadvantage.
- 4.106 The length of the delay is sometimes outside the control of the telecoms provider as it can be subject to factors such as site owners agreeing wayleaves in a timely manner. This is in contrast to a situation where the customer site is already connected and thus the service could be readily available to the customer. As customers attach some value to the time to connect, networks which are further away from the customer site would be disadvantaged against the incumbent supplier.

¹⁸⁸ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 3.3.

¹⁸⁹ Openreach's response to the 2018 BCMR Consultation, page 94, paragraph 72.

¹⁹⁰ [\gg].

- 4.107 Evidence set out in Annex 11 of Volume 2 suggests that digging results in a provision time, for CI Access services, of [X] working days (on average). This is [X] than the mean time to provide for all orders ([X] working days on average), and for fibre-connected orders ([X] working days on average).¹⁹¹ Also, based on Openreach’s 2017 new connections, we find that the lead times increase as the distance (dig or fibre blown) of the connection increases.
- 4.108 Consumer research suggests these service delays represent an inconvenience for customers. The 2016 BDRC study, which we commissioned for the 2016 BCMR, found that a majority of respondents (51%) choose their existing supplier because they are already connected to its network.¹⁹² It also found that the most frequent obstacle found by respondents who said that they experienced problems when migrating to an alternative service was ‘time taken to deliver service/long delay in installation’. This is consistent with the results from the Cartesian 2018 report which indicate that service delays are the key problem facing leased line customers.
- 4.109 The evidence therefore suggests that CI Access customers may not be prepared to wait long enough for their service to be up and running for them to consider moving to a new supplier that would have to dig. This impacts the supply of leased lines at all bandwidths and thus may reduce the extent to which dig distances vary by bandwidth in practice.

Evidence on actual digging behaviour

- 4.110 In the following paragraphs, we explain that competition based on extending networks to compete with Openreach for specific leased line customers is not a significant feature of the market. This means that any possible differences in the propensity to extend networks further for some bandwidths have little impact in practice.
- 4.111 Evidence on actual digging behaviour, set out in detail at Annex 11 of Volume 2, shows that telecoms providers rarely extend their networks to supply leased lines at any bandwidth.¹⁹³ For example, only approximately [X]% of [X].¹⁹⁴ Based on data submitted by telecoms providers, we estimate that suppliers (other than Openreach) dug for 5% of all new connections provided in 2017 irrespective of the bandwidth provided.¹⁹⁵ For low bandwidth services (1 Gbit/s and below), most new connections were either provided using a third-party network (52%) or were already fibre connected or required fibre work but no duct work (44%). For VHB, the majority of new connections were already fibre connected (80%) and most of the remainder were provided using a third-party network (18%).

¹⁹¹

See Annex 11, “Evidence on the impact of network extensions on the extent of lead time”.

¹⁹² BDRC 2016 study, Figures 23 and 24.

¹⁹³ We also note that for 1 Gbit/s and below services, telecoms providers are often faced with a decision to either extend their own network or buy wholesale services from Openreach on regulated terms (or sometimes on commercial terms from networks other than Openreach). The latter to some extent may act as a disincentive for telecom providers to extend their own networks.

¹⁹⁴ [X].

¹⁹⁵ These connections include leased line and dark fibre connections.

- 4.112 Where a telecoms provider is not fibre connected, the data indicates the propensity to dig is low and is similar across bandwidths, with just 3% of new connections involving duct work both for 1 Gbit/s and below connections and VHB connections.¹⁹⁶ The low propensity to dig could be partly due to the disadvantage faced by a supplier who needs to extend its network compared to one who is already connected. So, although we may in theory expect telecoms providers to dig more often for higher value customers, this disadvantage means that telecoms providers may not dig at all in practice (irrespective of the bandwidth provided), particularly if one supplier is already connected to the customer site.
- 4.113 When telecoms providers do dig, the dig distance is similar across all bandwidths: while the actual median dig distance is 14m for bandwidths of 1 Gbit/s and below, this is 13m for VHB services. However, this data covers very few digs (just 17 in the case of VHB in 2017), so little weight can be placed on the data given the small number of digs.

We find that competitive constraints do not vary by bandwidth

- 4.114 Openreach argued that our evidence on indicative dig distances shows that not all customer sites/bandwidths are valued the same.¹⁹⁷ It said our considerations of customer inconvenience and actual dig distances are not relevant under the hypothetical monopolist test, and if anything, the former suggests that no operator will expand as both they and the customer will not find it worthwhile.¹⁹⁸
- 4.115 We consider indicative dig distances, customer inconvenience and actual dig distances to examine whether the competitive constraints are likely to vary by bandwidth. In summary:
- The maximum indicative dig distance for VHB is longer than for low bandwidth services and likely to be distorted by BT's high VHB charges.
 - Nevertheless, a supplier digging to connect a customer is a time-consuming activity and consumers may not be prepared to wait long enough. This is likely to be true for all bandwidths and, therefore, may reduce the extent to which dig distances vary by bandwidth in practice. Therefore, the actual dig distance for VHB Access circuits is likely to be much shorter than the estimated indicative dig distances.
 - This is consistent with evidence on actual digging behaviour, which shows that telecoms providers rarely extend their networks to supply leased lines at any bandwidth and that even when they do, distances are low for all bandwidths.

We define a single market for CI Access services at all bandwidths

- 4.116 Based on our analysis above, we consider that different bandwidths are supply-side substitutes where a telecoms provider has an existing connection to the customer, such that a hypothetical monopolist of a given bandwidth would not be able to profitably impose a SSNIP. Where telecoms providers do not have an existing connection, the

¹⁹⁶ Excludes dark fibre connections for which information about the bandwidth provided over these connections was not available.

¹⁹⁷ Openreach's response to the 2018 BCMR Consultation, page 94, paragraph 72.

¹⁹⁸ Openreach's response to the 2018 BCMR Consultation, page 94, paragraphs 69 and 75.

evidence indicates that their ability to supply in response to a SSNIP does not differ by bandwidth, therefore pointing at similar competitive conditions across all bandwidths.

- 4.117 We recognise that if some leased lines have particularly higher prices and margins, it may be more profitable for a provider to extend its network to supply those lines than to extend its network to supply less profitable lines. However, these higher prices could be themselves a reflection of BT's market power where Openreach has not been constrained by price regulation, so the higher dig distances may not necessarily be a reflection of any fundamental difference in supply-side conditions. As mentioned, evidence on actual digging primarily shows that digging occurs very rarely and that when it does, distances are low for all bandwidths. This is consistent with competitive conditions being similar across all bandwidths.
- 4.118 Based on this evidence, we consider leased line suppliers are equally able to supply all bandwidths and to switch between them at low cost and quickly, pointing to a single market on the supply side. We therefore conclude that all bandwidths are in a single market.

Dark fibre substitution

- 4.119 The provision of dark fibre differs only from the supply of CI Access services in that the equipment is installed and managed by the customer itself, or another supplier, rather than by the infrastructure provider.
- 4.120 To assess the supply-side constraints imposed by dark fibre on CI Access services, we have applied a similar approach to our analysis above. Namely, we have considered whether, in response to a SSNIP, dark fibre suppliers could start supplying CI Access services in the short term and without incurring significant additional costs, and whether the ability and incentives to do this change depending on the bandwidth.

Dark fibre is a close supply-side substitute when customers are already fibre connected

- 4.121 When already connected to the customer site, a dark fibre provider would need to purchase and install equipment at both ends of the circuit to start supplying CI Access services to end customers. The dark fibre provider would also need to maintain and manage this equipment.
- 4.122 If the dark fibre provider does not already sell active services, then it is possible that the cost involved in starting to install and maintain equipment may be such that it would not be profitable to start providing CI Access services in response to a SSNIP. However, as the main dark fibre providers (e.g. CityFibre, Zayo, euNetworks and Colt) all supply both dark fibre and CI Access services, we consider that they would be able to provide CI Access services sufficiently quickly and at minimal cost in the event of a SSNIP.¹⁹⁹

¹⁹⁹ For the same reasons as set out in our approach to supply-side substitution, for where suppliers are already connected. We also note that telecoms providers could purchase dark fibre and use it to provide active services in the event of a SSNIP.

4.123 This is supported by evidence set out in Annex 14 of Volume 2, which suggests that CityFibre’s dark fibre service competes for CI Access customers of all bandwidths.²⁰⁰ It is further supported by evidence from price data submitted by telecoms providers which indicates that dark fibre prices are competitive against the range of CI Access services, even after accounting for the costs of equipment (see Annex 8 of Volume 2). IIG agreed that its members (CityFibre, Zayo and euNetworks) could easily offer CI Access services in response to a SSNIP but pointed out that the ease of switching should not be exaggerated as there are fixed costs involved.²⁰¹ Openreach also agreed that dark fibre is a likely competitor for CI Access customers at all bandwidths, where the customer is already fibre connected.²⁰²

Where suppliers are not already connected, dark fibre providers are equally able to supply CI Access services as other CI Access suppliers

4.124 Where it is not already connected to the customer site, the dark fibre provider needs to extend its network to start supplying CI Access services. As set out above, a telecoms provider would only extend its network if it is profitable to do so. The further the dark fibre provider needs to dig, the less profitable it is to connect the customer. Given that dark fibre providers could start supplying CI Access services sufficiently quickly and at a minimal cost, we consider that the same indicative dig distance analysis conducted for CI Access services applies for dark fibre.

4.125 Therefore, where its network is close enough to the customer site, we consider that a dark fibre supplier would place as strong a supply-side constraint on the provision of CI Access services as any other CI Access supplier and would be similar for all bandwidths. For this reason, we conclude that dark fibre, when used to supply or self-supply CI Access services, is in the same product market as CI Access services.

Conclusion on CI Access product market definition

4.126 We conclude that there is a single market for CI Access services at all bandwidths, which includes all wholesale fibre-based Ethernet and WDM services used to connect end customers to fibre networks.

4.127 This market includes dark fibre used to self-supply or supply CI Access services but excludes business grade connectivity services provided over EFM, as well as symmetric and asymmetric broadband.

²⁰⁰ 2016 BCMR Statement, paragraph A20.80.

²⁰¹ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.4.3.

²⁰² Openreach’s response to the 2018 BCMR Consultation, page 95, paragraph 77.

5. CI Access: geographic market definition

- 5.1 This section sets out our assessment of the relevant geographic markets for CI Access services. In defining geographic markets, we aim to identify areas in which the conditions of competition are sufficiently homogeneous, and which can be distinguished from neighbouring areas in which the prevailing conditions of competition are significantly different.²⁰³
- 5.2 We identify variations in competitive conditions between different geographic areas based on the presence of rival infrastructure, as we consider that this is the main factor determining the prevailing conditions of competition in a given location.²⁰⁴ Therefore, we analyse network presence, which we assess by determining the number of rival networks within a specific distance (the buffer distance) of customer sites, across the UK and group together areas with similar levels of rival infrastructure. Where we identify areas with at least two rival infrastructure networks present, we conduct further analysis to determine whether competitive conditions within those areas are homogeneous. We refer to these as High Network Reach (HNR) areas.
- 5.3 Based on our analysis, we define the following relevant geographic markets:
- BT Only areas;
 - BT+1 areas;
 - the Central London Area (CLA);
 - High Network Reach areas of each of Birmingham, Bristol, Edinburgh, Glasgow, Leeds and Manchester (Metro Areas);
 - all other High Network Reach areas (taken together); and
 - the Hull Area.
- 5.4 This section is structured as follows:
- we summarise stakeholder responses to our proposed geographic market definition;
 - we set out our approach to geographic market definition;
 - we present the methodology for undertaking our network reach analysis; and
 - we present our geographic assessment.

Summary of stakeholder responses to consultation proposals

- 5.5 Overall, 18 consultation respondents commented on our proposed geographic market definition.²⁰⁵ Some stakeholders agreed with the geographic markets defined, for example:

²⁰³ EC SMP Guidelines, paragraph 48.

²⁰⁴ We use the term 'presence' to refer to when a network is sufficiently close that it can serve the customer on request or is already connected to a customer. In the consultation we referred to this as 'proximity'. We have used the term 'presence' to capture the fact that the 'buffer distance' is not only measuring the distance that rivals would extend their network to serve a customer, but also how accurately we can measure when rivals are present.

²⁰⁵ BDUK, BT Group, CityFibre, Colt, Gamma, Hyperoptic, IIG, INCA, KCOM, Openreach, Sorrento Networks, SSE, TalkTalk, UKCTA, Virgin Media, Vodafone, Zayo, and [redacted].

- Virgin “agrees with Ofcom that BT Only, BT+1 and HNR areas should be treated as separate geographic markets for the purpose of regulation” and “consider[s] that all three areas have distinct competitive characteristics”²⁰⁶; and
- SSE “agree[s] with the geographic markets that Ofcom have identified for CI Access services”.²⁰⁷

5.6 TalkTalk argued that “if Ofcom corrects the assumptions used to define geographic markets (e.g. buffer distance, network coverage threshold) this will change the size of each economic market”.²⁰⁸ However, TalkTalk broadly agreed with the defined geographic markets into which we grouped postcode sectors.²⁰⁹

5.7 The main comments made by stakeholders were in relation to our overall approach to geographic market definition, the parameters underlying the network reach analysis and the CLA boundary.

Comments on overall approach

5.8 The majority of respondents either agreed or did not raise concerns in relation to our proposed approach. Some stakeholders were in general agreement with our approach, their comments on specific parameters notwithstanding, for example:

- IIG “broadly agrees with Ofcom’s approach to geographic market definition based on the presence of operators in a given geographic area”²¹⁰;
- Virgin “agree[s] with Ofcom’s approach to define 11 geographic markets”²¹¹;
- Zayo “considers that Ofcom’s approach has been thorough and that the resulting product and geographic markets proposed are a reasonable representation of the competition conditions in the UK for CI access services”²¹²; and
- Sorrento Networks was “in general agreement”.²¹³

5.9 Vodafone²¹⁴ argued for a national market for CI Access. It considered that competition is at a national scale due to customers’ needs to connect multiple sites across the UK, arguing that “when a customer seeks supply for their connectivity needs, this is typically on the basis of the entire need for their business (not just one site within it)”.²¹⁵

²⁰⁶ Virgin Media’s response to the 2018 BCMR Consultation, page 8.

²⁰⁷ SSE’s response to the 2018 BCMR Consultation, page 3.

²⁰⁸ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.88.

²⁰⁹ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 2.89-2.96.

²¹⁰ IIG’s response to the 018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.5.1.

²¹¹ Virgin Media’s response to the 2018 BCMR Consultation, page 8.

²¹² Zayo’s response to the 2018 BCMR and 2018 BT RFR Consultations, page 5, paragraph 3.1.7.

²¹³ Sorrento Networks’ response to the 2018 BCMR Consultation, pages 2-3.

²¹⁴ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraphs 3.1.1, 3.25.

²¹⁵ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 3.12.

- 5.10 Vodafone²¹⁶, UKCTA²¹⁷, [S&K]²¹⁸ and Hyperoptic²¹⁹ disagreed that proximity to rival networks imposes a competitive constraint on incumbent providers:
- Vodafone argued that “it is clear that the presence of alternative infrastructure on its own is not a sufficient indicator of a competitive market or an independently functioning geographic market”;²²⁰ and
 - UKCTA argued that “if a customer does not already have connections from multiple suppliers *in situ*, then the customer will not benefit from rival network infrastructure”.²²¹
- 5.11 BT Group argued that we failed to account for unrestricted PIA in our approach as it “will materially increase CPs’ ability and incentive to deploy fibre”²²², and that taking this into account by “using an appropriate buffer distance would likely result in many more postcode sectors being classified as HNR areas”.²²³

Comments on network reach analysis

- 5.12 The majority of comments we received from stakeholders were in relation to the network reach analysis. Some stakeholders disagreed with at least one of the proposed parameters.²²⁴

Comments on customer sites and rival network

- 5.13 In the 2018 BCMR Consultation we used a database from Market Location to identify those business customers likely to use leased lines combined with mobile base stations that currently use leased lines, assuming that each of these were located at the centre of their postcodes.²²⁵ We measured the extent of rival network infrastructure presence based on the distance from a customer site to an operator’s duct and/or flexibility points.²²⁶
- 5.14 In relation to customer sites, Openreach²²⁷ disagreed with the use of the database of large business sites instead of actual circuit connections data in the network reach analysis, while TalkTalk²²⁸ said a higher degree of precision in their actual locations instead of postcode centroids should have been obtained.

²¹⁶ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraphs 3.1.5, 3.20, 3.28-3.29.

²¹⁷ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 12-14.

²¹⁸ [S&K].

²¹⁹ Hyperoptic’s response to the 2018 BCMR Consultation, page 3-4.

²²⁰ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 3.20.

²²¹ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 12.

²²² BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 3.32, 3.43-3.44.

²²³ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, Annex 1, paragraphs 16 and 81.

²²⁴ BT Group, Gamma, IIG, INCA, Openreach, SSE, TalkTalk, UKCTA, Virgin Media, Zayo, and [S&K].

²²⁵ 2018 BCMR Consultation, paragraphs 5.12-5.13.

²²⁶ 2018 BCMR Consultation, paragraphs 5.14-5.15.

²²⁷ Openreach’s response to the 2018 BCMR Consultation, Annex E, paragraphs 4-17.

²²⁸ TalkTalk letter to Ofcom on 26 March 2019, https://www.ofcom.org.uk/data/assets/pdf_file/0025/143647/talk-talk-supplementary-submission-dig-distance-estimation.pdf [accessed 22 May 2019].

5.15 In relation to rival networks, some stakeholders raised concerns related to the competitive constraints from rival networks:

- TalkTalk²²⁹ and Gamma²³⁰ considered that competitive conditions will differ depending on which operator/s is/are nearby. TalkTalk suggested including only operators with significant UK-wide presence in the analysis by defining a competitor set.
- [S<] argued that “[S<]” and “[S<]”.²³¹
- Hyperoptic argued that “there are additional factors beyond the mere presence of rival infrastructure that have prohibited switching to date that should be given due consideration in determining the prevailing conditions of competition within a geography”.²³²

Comments on the proposed 50m buffer distance

5.16 In 2018 BCMR Consultation we proposed using a 50m buffer distance in our network reach analysis to assess the presence of rival network infrastructure in relation to customer sites.²³³

5.17 SSE agreed that “using a buffer distance of 50m from an operator’s duct is a sensible approach”.²³⁴ However, Openreach²³⁵ and Virgin²³⁶ argued that the buffer distance is too short, while Vodafone²³⁷, TalkTalk²³⁸ and [S<]²³⁹ argued that it is too long.

5.18 Their main arguments for a longer or shorter buffer distance can be summarised as follows:

- Results of the cost model: The majority of stakeholders generally supported the use of the dig distance cost model as an evidence-based approach to inform the buffer distance. However, Openreach²⁴⁰ and Virgin²⁴¹ considered that the model supports a buffer distance of at least 100m while Vodafone²⁴² argued that the model overestimates dig distances and actual network extensions are below the 50m radial distance;

²²⁹ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 2.80-2.82.

²³⁰ Gamma’s response to the 2018 PIMR and 2018 BCMR Consultations, page 4-5.

²³¹ [S<].

²³² Hyperoptic’s response to the 2018 BCMR Consultation, pages 3-4.

²³³ 2018 BCMR Consultation, paragraphs 5.21-5.22.

²³⁴ SSE’s response to the 2018 BCMR Consultation, page 3.

²³⁵ Openreach’s response to the 2018 BCMR Consultation, Annex E, paragraph 28, 46.

²³⁶ Virgin Media’s response to the 2018 BCMR Consultation, page 7.

²³⁷ Vodafone’s response to the 2018 BCMR Consultation, paragraphs 1.2.

²³⁸ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 2.55-2.710.

²³⁹ [S<].

²⁴⁰ Openreach’s response to the 2018 BCMR Consultation, Annex E, paragraph 28, 46.

²⁴¹ Virgin Media’s response to the 2018 BCMR Consultation, page 7.

²⁴² Vodafone’s response to the 2018 BCMR Consultation, Annex 1, paragraphs 1.3-1.9, 1.24.

- Evidence on actual dig distances: TalkTalk²⁴³ and [3<] ²⁴⁴ argued that evidence on actual dig distances supports shorter dig distances²⁴⁵; and
- Measurement inaccuracies: Openreach²⁴⁶ argued that 50m is too short to account for the measurement inaccuracies in the network reach analysis, such as the assumption that a customer site is located at its postcode centroid, while TalkTalk²⁴⁷ argued that increasing the buffer distance to 50m to account for modelling error was inappropriate.

5.19 TalkTalk considered that buffer distances for the CLA should be considered independently to the rest of the UK due to higher construction costs in the CLA.²⁴⁸

Comments on the proposed coverage threshold of 65%

5.20 In 2018 BCMR Consultation we proposed a network coverage threshold of 65%; that is, a postcode sector will be found to have rival network(s) present if rival network(s) are able to supply more than 65% of large business sites and mobile base stations in that postcode sector.²⁴⁹

5.21 Openreach²⁵⁰ argued that our proposed coverage threshold of 65% was too high, while others (Vodafone²⁵¹, TalkTalk²⁵², Zayo²⁵³, Cityfibre²⁵⁴, IIG²⁵⁵ and INCA²⁵⁶) considered it to be too low.

5.22 Openreach²⁵⁷ argued for a 50% threshold to counterbalance the measurement inaccuracies with the network reach analysis.

5.23 TalkTalk²⁵⁸ and Vodafone²⁵⁹ disagreed with our proposed use of the 65% threshold, with TalkTalk arguing that it was a repetition of a figure used in Ofcom's 2008 WBA market review.²⁶⁰ TalkTalk²⁶¹ suggested a threshold above 70% and Vodafone²⁶² suggested a 100%

²⁴³ TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.55-2.710.

²⁴⁴ [3<].

²⁴⁵ TalkTalk asserted we chose the 50m distance without considering shorter buffer distances, evidenced by the lack of sensitivity shorter than 25m. In paragraph 5.80 below and in Annex 13, we present a sensitivity for a buffer distance of 25m.

²⁴⁶ Openreach's response to the 2018 BCMR Consultation, Annex E, paragraphs 28, 33, 46.

²⁴⁷ TalkTalk letter to Ofcom of 26 March 2019, https://www.ofcom.org.uk/data/assets/pdf_file/0025/143647/talk-talk-supplementary-submission-dig-distance-estimation.pdf [accessed 22 May 2019].

²⁴⁸ TalkTalk's response to the 2018 BCMR Consultation, paragraph 2.117.

²⁴⁹ 2018 BCMR Consultation, paragraph 5.24.

²⁵⁰ Openreach's response to the 2018 BCMR Consultation, Annex E, paragraphs 37, 42.

²⁵¹ Vodafone's response to the 2018 BCMR Consultation, Annex 1, paragraphs 1.10-1.12.

²⁵² TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.73-2.79.

²⁵³ Zayo's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraphs 3.1.11 – 3.1.17.

²⁵⁴ CityFibre's response to the 2018 PIMR Consultation, paragraphs 4.3.1 - 4.3.5.

²⁵⁵ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 4.5.12-4.5.15.

²⁵⁶ INCA's response to the 2018 BCMR Consultation, page 2.

²⁵⁷ Openreach's response to the 2018 BCMR Consultation, Annex E, paragraph 42.

²⁵⁸ TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.76, 2.78.

²⁵⁹ Vodafone's response to the 2018 BCMR Consultation, Annex 1, paragraphs 1.10-1.12.

²⁶⁰ See 2008 WBA Statement, paragraph 4.45.

²⁶¹ TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.79.

²⁶² Vodafone's response to the 2018 BCMR Consultation, Annex 1, paragraph 1.12.

sensitivity is needed to understand the implications of the threshold. The other stakeholders suggested 90%²⁶³ and considered that a 65% threshold does not represent an area of sufficiently homogeneous competitive conditions and/or that there is a risk of under regulation by incorrectly overestimating the degree of competition.

Comments on aggregation unit (using postcode sectors)

- 5.24 In 2018 BCMR Consultation we aggregated the results of the network reach analysis, carried out at a postcode level, into postcode sectors.²⁶⁴
- 5.25 While TalkTalk “generally agreed[d] with Ofcom’s use of postcode sectors as the appropriate geographic unit”²⁶⁵, it still considered they “may not be sufficiently granular since this approach finds no SMP where no constraint exists”.²⁶⁶ Openreach agreed with our use of postcode sectors in Central London as they “are probably small enough that the competitive conditions are similar”²⁶⁷, but argued that “outside ‘super urban’ areas, postcode areas are significantly larger and will include areas where there is limited network competition due to limited demand”.²⁶⁸

Comments on CLA boundary

- 5.26 In 2018 BCMR Consultation we proposed the CLA, as defined in 2016 BCMR, as a separate geographic market to the rest of the UK, considering that competitive conditions within HNR areas in the CLA are sufficiently different from other HNR areas.²⁶⁹
- 5.27 Virgin²⁷⁰ and SSE²⁷¹ agreed with the CLA definition, while TalkTalk²⁷² agreed that the CLA is a distinct geographic market to the rest of the UK.²⁷³
- 5.28 Openreach²⁷⁴ argued we have not provided evidence that the boundary of the CLA remains correct.²⁷⁵
- 5.29 We explain how we have taken into account stakeholders’ arguments and evidence under the relevant sub-headings below. First, to provide context for our response, we have set

²⁶³ Stakeholders argue that we used a 90% threshold in the 2016 BCMR.

²⁶⁴ 2018 BCMR Consultation, paragraph 5.23.

²⁶⁵ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.83.

²⁶⁶ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.83.

²⁶⁷ Openreach’s response to the 2018 BCMR Consultation, Annex E, paragraph 46.

²⁶⁸ Openreach’s response to the 2018 BCMR Consultation, Annex E, paragraph 46.

²⁶⁹ 2018 BCMR Consultation, paragraph 5.48.

²⁷⁰ Virgin Media’s response to the 2018 BCMR Consultation, page 8.

²⁷¹ SSE’s response to the 2018 BCMR Consultation, answer to question 5.2.

²⁷² TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.94.

²⁷³ Sorrento Networks was in general agreement with the geographic markets we defined.

²⁷⁴ Openreach’s response to the 2018 BCMR Consultation, Annex E, paragraphs 47-51.

²⁷⁵ In addition, Openreach argued that we have not been clear in how the Boundary Test was applied in this review to define the CLA (Openreach’s response to the 2018 BCMR Consultation, Annex E, paragraphs 49). However, we note that we have not used the Boundary Test and there is no reference to it in the 2018 BCMR Consultation. Vodafone also considered that we are wrong to define CLA as a separate market as a single national market exists (Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraphs 3.13-3.15). We address this as part of our response to Vodafone’s argument on defining a market.

our further explanation on our approach to geographic market definition, the choice of the buffer distance, and defining the CLA as a separate market.

Approach to geographic market definition

Purpose of geographic market definition

- 5.30 The purpose of market definition (in its product and geographic dimensions) is to structure and inform the assessment of whether a particular market is characterised by effective competition or should be subject to *ex ante* regulation. This is consistent with the EU regulatory framework, which recognises that market definition is not an end in itself but is a prerequisite for assessing the degree of an undertaking's market power.²⁷⁶ After specifying which services should be included within the relevant product market boundaries, we determine the geographic scope of the market.
- 5.31 As part of this exercise, the purpose of geographic market definition is to define areas with similar competitive conditions. It identifies the areas in which competitive conditions are sufficiently homogeneous, and distinct from other areas in which the conditions of competition are significantly different.²⁷⁷ The ultimate aim of this exercise is that the strength of competitive constraints in different geographic areas can be accurately measured in an assessment of SMP, thereby ensuring that any regulation is targeted to areas where competition is not effective.
- 5.32 It is important to bear in mind that geographic areas do not need to be perfectly homogeneous. This is consistent with the view of the BEREC Common Position on geographical aspects of market analysis:
- “In order to group geographical units, there is no need for competitive conditions to be perfectly homogeneous across all geographical areas included within one market.
- Areas should be aggregated so that competitive conditions within a market are sufficiently homogeneous whereas competitive conditions differ between markets with potential effects on either the SMP finding or the identified competition problems.”²⁷⁸

²⁷⁶ “It should be recognised that the objective of market definition is not an end in itself, but part of a process, namely assessing the degree of an undertaking's market power.” EC SMP Guidelines, fn 19.

“In this regard, it is important for NRAs to bear in mind the purpose of market definition, which is not an end in itself but a means to undertaking an analysis of competitive conditions, for the purposes of determining whether *ex ante* regulation is required or not.” EU Commission, explanatory note, page 21 paragraph 4.

“The overall objective of defining a market in both its product and geographic dimension is to identify those actual and potential competitors of the undertaking(s) potentially holding SMP, [...] As a result, the definition of the relevant market is the prerequisite for assessing whether a particular market is characterised by effective competition or should be subject to *ex ante* regulation [...]” EU Commission, explanatory note, page 7.

²⁷⁷ See for example, EC SMP Guidelines, paragraph 48. “According to established case-law, the relevant geographic market comprises an area in which the undertakings concerned are involved in the supply and demand of the relevant products or services, in which the conditions of competition are sufficiently homogeneous, and which can be distinguished from neighbouring areas in which the prevailing conditions of competition are significantly different. Areas in which the conditions of competition are heterogeneous do not constitute a uniform market.”

²⁷⁸ BEREC Common Position on geographic aspects of market analysis (definition and remedies),

https://berec.europa.eu/eng/document_register/subject_matter/berec/regulatory_best_practices/common_approaches

5.33 It is also important to note that geographic market definition examines whether competitive constraints are similar, but the strength of those constraints is examined in the SMP assessment. In other words, defining an area as a distinct geographic market does not determine whether or not there is SMP in that area, nor does it necessarily mean that the SMP finding will be different from neighbouring geographic areas. For example, this is recognised in the ERG Common Position, 2008:

“The analysis of the homogeneity of competitive conditions will already include some elements of the SMP analysis. However, for means of geographic market definition, the goal is not to investigate the market power of a particular operator (or particular operators), but to make an assessment of significant differences in competitive conditions across geographic areas.”²⁷⁹

We adopt a modified greenfield approach

5.34 When carrying out our market definition analysis we have applied the modified greenfield approach. That is, the analysis below is conducted in relation to a hypothetical scenario in which there are no *ex ante* SMP remedies in the reference market(s), but *ex ante* SMP remedies in other markets continue to apply.

5.35 For example, we assume that remedies imposed in the PIMR market apply and that therefore BT is required to provide unrestricted access to its ducts and poles (i.e. the unrestricted PIA remedy)²⁸⁰ no later than one month after the conditions of this Statement come into force.²⁸¹

We identify variations in competitive conditions based on the presence of rival infrastructure

5.36 On a strict demand and supply basis, each customer site constitutes its own geographic market. On the demand-side, a customer requiring connection to a particular business site or mobile base station would not find connection to an alternative site as a substitute. On the supply-side, a network operator connecting one site could not easily divert that connection to a different site in response to a SSNIP.

5.37 However, it is neither practicable nor meaningful to analyse each customer location. First, there are hundreds of thousands of customer locations, and it would be unmanageable to find separate geographic markets and remedies for each. Second, individual geographic

[positions/4439-berec-common-position-on-geographic-aspects-of-market-analysis-definition-and-remedies](#) [accessed 22 May 2019], paragraphs 128-129.

²⁷⁹ ERG Common Position on Geographic Aspects of Market Analysis (definition and remedies), https://berec.europa.eu/doc/publications/erg_08_20_final_cp_geog_aspects_081016.pdf [accessed 22 May 2019], page 21.

²⁸⁰ The term “unrestricted PIA” we are using in this statement is equivalent to the terms “unrestricted DPA” and “uDPA” which we used in the November 2018 BCMR Consultation. We have decided to use a different terminology now to distinguish between the concept of having access to BT’s ducts and poles (DPA) from the PIMR remedy that requires BT to offer a product to provide access to its ducts and poles (PIA).

²⁸¹ We assess the potential impact of unrestricted PIA on buffer distances under the network reach analysis below.

markets will not produce meaningful results for the SMP assessment. If each customer site were assessed as a separate market, there would be 100% service shares in each geographic market.²⁸²

- 5.38 In order to make our analysis tractable, we aggregate areas which face similar competitive conditions. We consider that the most important factor affecting competition is the presence of rival infrastructure. Customer sites will be most competitive where there are multiple networks connected (or able to connect) to that customer and least competitive where there is only one network.
- 5.39 Vodafone²⁸³ and UKCTA²⁸⁴ disagreed that proximity to rival networks was evidence of variation in competitive conditions, arguing that retail competition is driven by networks already connected to customer sites, not network extension.
- 5.40 In order to analyse presence, we need to measure where networks are in relation to customer sites, and how close networks need to be in order to compete for a customer connection. We do not have reliable data showing where existing fibre connections are²⁸⁵, so we rely on data about operators' networks combined with the location of business sites.²⁸⁶ Moreover, even if we had perfect data on all fibre connections, it would not tell us about competitive conditions for a new site, where either no operators are present or where an operator would need to extend its network to supply a connection. We therefore also need to assess how far operators are likely to extend their networks to serve a new customer.
- 5.41 Vodafone²⁸⁷ argued that a national market exists because demand and supply of leased lines is on a national scale, and that to be a player in the market, national network coverage is essential. We do not agree with Vodafone that to compete in the market an operator needs a national footprint. Colt, in London, is an example of a network with a localised geographic footprint which is highly successful in winning customers in that area. Although some retail customers may require national connections and prefer a single network supplier, those suppliers often source wholesale physical connections from a variety of networks, and tend to evaluate provision of leased lines on a site-by-site basis,

²⁸² An exception to this would be when customers are served by multiple providers for resilience purposes.

²⁸³ Vodafone's response to the 2018 BCMR Consultation, part 2, paragraphs 3.1.1-3.1.6, 3.12-3.16.

²⁸⁴ UKCTA's response to the 2018 BCMR Consultation, paragraphs 12-14.

²⁸⁵ This information was requested from stakeholders under our statutory information gathering powers, however we consider it unusable as stakeholders were not able to provide an accurate list of buildings that were connected by fibre.

²⁸⁶ We believe these measures are reasonable given the data limitations and our purpose.

²⁸⁷ Vodafone's response to the 2018 BCMR Consultation, part 2, paragraphs 3.1.1-3.1.6, 3.12-3.16.

not nationally.^{288,289} Therefore, even if demand from retail customers was solely for multi-site, national connectivity, this does not lead to national markets at a wholesale level.²⁹⁰

5.42 Therefore, we consider that the presence of rival infrastructure is the key factor determining the competitive conditions in the provision of leased lines.

Our approach to using a network reach analysis

5.43 To define the geographic markets based on the presence of rival infrastructure we follow these steps:

- we measure the presence of rival infrastructure within a given radial distance (the buffer distance) of each large business site and mobile base station in the UK. We refer to this as network reach analysis;
- we calculate the distribution of rival infrastructure across the large business sites and mobile base stations in each postcode sector in the UK;
- we group together postcode sectors with similar levels of rival infrastructure; and
- we examine in more detail areas with high presence of rival infrastructure, corresponding to the presence of at least two sufficiently close rival networks (HNR areas).

5.44 It is important to bear in mind that aggregating different geographic areas based on the presence of rival infrastructure is a complicated exercise. It is necessary to make pragmatic decisions to conduct any geographic analysis of this nature. For example:

- it is difficult to draw a clear line between areas of competitive pressure, as there exists a continuum of competitive conditions;
- we must determine an appropriate level of aggregation to produce tractable and meaningful markets; that is, precise enough to capture significant variations in competitive pressure but also broad enough so as to not result in unnecessary micro-analysis that does not assist the broader exercise of identifying market power; and
- we must make a judgement on the appropriate measure of network presence, reflecting both the distance a rival must be located to pose a difference in competitive conditions, and how accurately we can measure this distance.

5.45 Reflecting this objective, we expand on the approach we have adopted in our network reach analysis below, laying out our assumptions and methodology in detail.

²⁸⁸ In a meeting of 1 March 2018, Vodafone explained that when considering how to supply a Vodafone unconnected location, they compared the cost on a site-by-site basis based on their own network, that of Virgin and Openreach. While choices are made site-by-site, it is in tandem necessary to ensure that over the entire range of sites that the connectivity costs are achieved which can match or improve upon other competitors' costs. This is necessary in order to be price-competitive over the entire range of sites across the UK for which the connectivity is sought.

²⁸⁹ eir is another example of a leased line provider which evaluates supply to sites on a site-by-site basis, using a combination of their own network and rival networks to provide leased line services and uses multiple different wholesale providers. eir uses leased lines from BT/Openreach, Virgin Media, its own network, Vodafone and TalkTalk. eir's response to QA1 of the BCMR s.135-19 Notice.

²⁹⁰ On the demand side, leased line customers may also demand services from multiple networks for other reasons including cost and resilience requirements.

Network reach analysis

- 5.46 The network reach analysis calculates, for each postcode sector in the UK, the number of telecoms providers supplying leased lines other than BT that have network within the buffer distance of the large business sites and mobile base stations in that postcode sector. This allows us to identify postcode sectors that are likely to have sufficiently homogeneous conditions of competition.
- 5.47 This analysis uses a number of parameters which we explain below. We then explain how we aggregate postcode sectors into geographic markets based on similarity of competitive conditions.

Customer sites (business sites and mobile base stations)

- 5.48 As in the 2016 BCMR, we analyse network reach using a database from Market Location.²⁹¹ We base our analysis on the sites of businesses and government sites with 250 or more employees nationally. In total, this database contains the locations of over 164 thousand sites including businesses, schools, councils, hospitals and other public sector organisations. Another approach would be to use sites with existing leased line connections (i.e. leased line inventory data) instead of business sites data, but we are unable to due to data quality concerns.²⁹² We could potentially use new connections data, but there are insufficient volumes to use as an effective weight in our network reach analysis due to the geographic granularity required (see Annex 12).²⁹³ Neither dataset would capture new sites which required leased lines. We have therefore combined the Market Location business site database with mobile base stations that currently use leased lines (totalling over 26 thousand) which we identify from MNO leased line inventory data.²⁹⁴ The MNO inventory data is not affected by the same data quality issues as the leased line inventory data. We consider this combined set of business sites and mobile base stations data is a reasonable proxy for the location of customers likely to purchase leased lines.²⁹⁵
- 5.49 Openreach argued that large business sites are not representative of leased line demand²⁹⁶, presenting a few examples of businesses with more than 250 employees nationally who do not require CI Access services. We recognise that the data on large business sites used for our network reach analysis will contain businesses such as these. However, there will be other businesses that do not meet the 250 or more employees threshold that do require

²⁹¹ We have recently obtained an update to this database, see Annex 12.

²⁹² See Annex 12 where we discuss the quality issues with the leased line inventory data.

²⁹³ This contrasts with our service share analysis which is calculated over larger geographic areas, so the smaller volumes in the new connections data are sufficient.

²⁹⁴ Stakeholder responses to questions A1 and A2 of the 5th BCMR s.135 notice.

²⁹⁵ We considered instead basing the analysis on the location of new connections in 2017. However, due to these being fewer than the number of large business sites and mobile base stations, this created issues having too few observations per postcode sector.

²⁹⁶ Openreach's response to the 2018 BCMR Consultation, Annex E, paragraph 5.

leased lines. We consider that large business sites are a reasonable proxy for those businesses that demand leased lines.²⁹⁷

- 5.50 To calculate network reach for a large business site or mobile base station, we need to measure its location. We assume that business sites and mobile base stations are located at the centroid of their postcode (this is the mean grid reference of all postal delivery points in that postcode).²⁹⁸ This is because with the data available we can only identify mobile base station locations with reference to the postcode. The business site data did provide full addresses. TalkTalk²⁹⁹ suggested we use a tool (such as Google Maps) to locate offices with a higher degree of precision using its own head office by way of illustration. As noted above, our network reach analysis already takes account of 164 thousand business locations. It would not be practicable to individually convert these addresses into coordinates for such a large number of sites. Moreover, we note that even this would not provide an accurate measure of the exact distance as we do not know where in a building the fibre entry point is. There would be a significantly increased burden in having to conduct such an analysis and we have no reason to believe it would result in a materially different result.
- 5.51 The use of postcode centroids, as TalkTalk³⁰⁰ argued, could result in a measurement inaccuracy in larger postcodes with large business sites and mobile base stations located further away from the centroid. However, in most cases this will not have a significant impact on the results of the network reach analysis, as the area covered by a postcode tends to be small in densely populated and business regions.³⁰¹ We also consider that our selected buffer distance of 50m (see below), as well as our use of a threshold of 65% of sites, is conservative and so accounts for this potential for measurement inaccuracy.

Rival networks

- 5.52 Our network reach analysis measures the extent of networks other than BT, which we term rival networks. We assume BT's network is ubiquitous (outside the Hull Area), so we are interested in distinguishing between areas where there are differences in the extent of competition from rival networks.
- 5.53 We measure the extent of a network based on the location of an operator's duct or flexibility points (whichever is closer). We consider that distance to an operator's duct and network infrastructure is the most appropriate measure of network reach as most of the costs of network extension relate to the cost of constructing new duct to the customer site.

²⁹⁷ The Tribunal did not rule against this approach (see paragraph 421 of the [BCMR Judgment](#)).

²⁹⁸ The Tribunal did not rule against this approach (see paragraph 426 of the [BCMR Judgment](#)).

²⁹⁹ TalkTalk letter to Ofcom of 26 March 2019, https://www.ofcom.org.uk/data/assets/pdf_file/0025/143647/talk-talk-supplementary-submission-dig-distance-estimation.pdf [accessed 22 May 2019].

³⁰⁰ TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.66-2.70.

³⁰¹ Densely populated and business regions are the focus of our analysis as they are the areas more likely to be effectively competitive or have the potential to become so within this review period.

- 5.54 TalkTalk and Gamma argued that we ought to take into account the difference in competitive constraints that different rival operators will impose on BT when defining geographic markets.³⁰² Zayo³⁰³ considered that the presence of rival network does not mean that a rival is ‘established’ in that area. Hyperoptic³⁰⁴ raised concerns that presence of a rival network did not impose a competitive constraint on BT due to significant switching costs, BT’s advantages of owning a ubiquitous network and multiple suppliers leading to difficulties with fault diagnosis. [S&C] also raised concerns around the competitive constraints arising from nearby rival infrastructure.
- 5.55 In addition, TalkTalk³⁰⁵ suggested that we should only consider a subset of rival telecoms providers, specifically those with 5-10% coverage of businesses nationally, since only these rivals will be able to constrain BT. TalkTalk contrasted our approach with our IEC analysis in which only PCOs are considered to place a competitive constraint on BT.
- 5.56 We disagree with TalkTalk and other stakeholders on both points. At the geographic market definition stage, we do not attempt to evaluate the differing strengths of competitive constraints imposed by different operators as we consider this forms part of the SMP assessment.³⁰⁶ Networks exist to serve customers, and a natural starting point for the geographic market analysis is to focus on the presence of rival infrastructure to customers. However, in our SMP assessment in Section 6, we recognise that not all suppliers with networks located nearby would be equally able to compete with BT, therefore, we look at other indicators to add depth to our analysis.³⁰⁷
- 5.57 In the IEC market, we use a presence based PCO test, as the wholesale supplier needs to be able to offer connectivity between exchanges, so a minimum amount of network infrastructure is needed in order to be able to supply such a service.³⁰⁸ For the purposes of our geographic market assessment in the CI Access market, however, we consider any rival telecoms provider that can supply a business or mobile base station places a competitive constraint on BT.

Buffer distance

- 5.58 The first step in analysing network reach is to define the measured distance over which rival networks are likely to be sufficiently close to competitively serve customers. We refer to this as the “buffer distance”.

³⁰² TalkTalk said that implicitly assuming that a very small leased line operator imposes the same constraint as a major provider such as Virgin Media is inappropriate and incorrect. Gamma hypothesised that a postcode sector where BT and Virgin Media were only present would be a distinctly different competitive dynamic to a postcode sector where Vodafone and Gamma were only present.

³⁰³ Zayo’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 3.1.14.

³⁰⁴ Hyperoptic’s response to the 2018 BCMR Consultation, page 4.

³⁰⁵ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 2.80-2.82.

³⁰⁶ Leased line operators with a relatively small footprint (e.g. Colt) have had success and it would be inappropriate to exclude them from the analysis.

³⁰⁷ See Section 6, *Our interpretation of the infrastructure indicators*.

³⁰⁸ See Section 7, paragraph 7.54.

- 5.59 The buffer distance reflects networks that are already connected to a customer site as well as those that are nearby and may consider a bespoke network extension to serve the customer. When a network is already connected to a customer site, it is clear that it can serve the customer. However, we are limited in our ability to accurately detect this in our business sites data as we know when networks are present in an area but not whether they are already connected.³⁰⁹ Where networks are not already connected to a customer site, there are limits to how precisely we can measure the distance a network would need to extend to serve a particular customer site.
- 5.60 To determine the buffer distance, we first assess the distance of network extensions to customer sites before considering our ability to measure this. Taking the two factors together, we have decided to use 50m as an appropriate basis for measuring the competitive distance, as explained below.

Evidence suggests that bespoke network extensions are likely to be shorter than 50m

- 5.61 In order to derive an appropriate buffer distance for use in our network reach analysis, we have considered the evidence on the distance for which operators are likely to extend their networks. We assess this based on our indicative analysis of the evidence on the cost of network extension; the actual time taken to connect a customer site; and the evidence on the frequency and actual dig distance for 2017 connections.

Cost of network extension

- 5.62 Annex 10 contains the results of our indicative dig cost model. This model estimates the break-even distance for network extensions based on Openreach's construction costs and some assumptions about the activity required. This model is indicative, as in practice the actual activities required will vary from site to site and by provider. It is also possible that other operators may require different activities (e.g. they may require wayleaves more frequently) and/or face different construction costs. As set out in Annex 10, we therefore agree with Vodafone that the actual cost of network extension for any given site may be higher than the estimates of the model, which would lead to correspondingly shorter break-even distances.
- 5.63 The results of our dig cost model therefore need to be treated with caution. Nonetheless, they provide a useful indication of the typical costs involved in extending a network and how these compare to purchasing a wholesale product. Using a typical three year payback period, the indicative model suggests that telecoms providers would not find it profitable to dig further than 27m radial distance for a 100 Mbit/s circuit and 34m radial distance for a 1 Gbit/s circuit. For VHB services, our modelling of the economic dig distance suggests that telecoms providers could find it profitable to dig up to 94m radial distance at current prices.³¹⁰

³⁰⁹ Our business sites data identifies the location and number of employees for each business, however it does not identify if a business has a leased line connection.

³¹⁰ The breakeven distance increases with the payback period used. For a 5 year period, the breakeven distance is 46m for a 100Mbit/s circuit, 55m for a 1 Gbit/s circuit and 119m for a VHB circuit. See "Indicative radial dig distances" table in Annex 10.

Time taken to provide

- 5.64 The results of the dig cost model consider only the potential costs of network extension and do not take into account other factors that affect the ability to compete for a customer. In particular, a provider that needs to extend its network to serve a customer faces longer and more uncertain lead times than a provider which is already connected, placing them at a competitive disadvantage.
- 5.65 The evidence on the importance and impact of time to provide is set out in Annex 11. This evidence shows that lead times are important to customers; that the need for network extensions leads to significant increases in the time taken and variability of lead times; and that the lead time increases with the distance of network extension required. In particular:
- The 2016 BDRC study and the 2018 Cartesian study indicate that one of the main factors in choosing a provider was whether there was an existing connection to the premises. These surveys also indicated that customers considered long and uncertain lead times to be obstacles.
 - Evidence from Openreach indicated that network extension involving duct work increased the mean time to provide to [X] on average. This is compared to [X] days on average for a connection with existing duct and fibre present and [X] days on average for all orders. See Figure 5.1 below.

Figure 5.11: MTTP in working days by order type for CI Access circuits

[X]

Source: Ofcom analysis of Openreach's response to the 1st and 21st BCMR s.135 notices.

- 5.66 The scale of this advantage increases with the length of network extension that is required. Figure A11.3 broadly indicates that where digging is required, the effect of wayleaves and/or traffic management is more pronounced than where only blowing fibre is required or a connection already exists, significantly increasing mean time to provide.

Actual digging behaviour

- 5.67 Annex 11 contains our analysis of telecoms providers' actual digging behaviour in 2017. This evidence shows that network extensions by rival operators are infrequent and where they do occur they tend to be short. Neither the likelihood of network extension, nor the median distance of network extension differed materially between VHB and lower bandwidth circuits.
- 5.68 The evidence on the frequency of rivals' extending their networks shows that network extensions in 2017 were infrequent. Where telecoms providers (other than Openreach)³¹¹ did not have an existing connection to the customer site, they chose to buy from a wholesale leased line supplier the vast majority of the time, only extending their network in [X]% of cases (see Annex 11).
- 5.69 The evidence on actual digging behaviour for circuits at all bandwidths shows that network extensions are short, as shown in Table 5.2. When VHB and lower bandwidth circuits are

³¹¹ Build vs buy providers (i.e. [X]).

considered separately, network extensions are short for both. See Annex 11 for an analysis of digging behaviour.

Table 5.12: Mean and median actual dig distances for Openreach and rival networks, in metres³¹²

	All Bandwidths		VHB		LB	
	Median	Mean	Median	Mean	Median	Mean
Openreach	[redacted] (0-25)	[redacted]	[redacted]	[redacted]	[redacted]11]	[redacted]55]
Rival networks	14	[redacted]	[redacted]	[redacted]	[redacted]14]	[redacted]28]

Source: Ofcom digging analysis based on stakeholder responses to the 1st BCMR s.135 notice. See Annex 11.

Conclusion on actual network extensions

- 5.70 In summary, all the evidence taken together suggests that the actual distance from which operators are likely to extend network is likely to be much shorter than 50m. While the indicative cost dig model could suggest 50m may be appropriate, this is only indicative and does not account for the time taken to provide a circuit, which suggests much shorter distances. This is consistent with evidence on actual digging behaviour for circuits at all bandwidths where we find that network extensions are infrequent and median dig distances were less than 25m.
- 5.71 Therefore, we agree with Vodafone, TalkTalk and [redacted]³¹³ that actual distances for network extensions are likely to be shorter than 50m³¹⁴ and disagree with Openreach and Virgin that the dig model supports dig distances at 100m. We also note that the indicative dig cost model is only one of several pieces of evidence we consider. While it helps to inform our view, it is not the only factor in determining network extensions.

Unrestricted PIA is unlikely to have a material impact on bespoke network extensions

- 5.72 We agree with BT Group that unrestricted PIA may have an impact on the strength of competition faced by BT in the CLA and HNR areas in the rest of the UK over this review period.³¹⁵ We have therefore considered the impact of unrestricted PIA on the buffer distance over this review period.
- 5.73 We set out our views on the likely impact of unrestricted PIA on leased line services over this review period in Annex 6. In summary, our view is that:
- Telecoms providers' ability to access BT's ducts and poles on regulated terms and combine them with their own network to reach final customers will reduce the cost and time taken for network extensions.

³¹² We consider median rather than mean provides a better indication as to how close operators need to be to impose a meaningful constraint (see Annex 11)

³¹³ [redacted].

³¹⁴ TalkTalk consider that the appropriate dig distance ought to be calculated under the SSNIP framework. However, due to measurement issues, if we were to directly use actual dig distances as the buffer distance, the results would not reflect the competitive conditions in the postcode.

³¹⁵ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 3.32. 3.43-3.44.

- Unrestricted PIA could be used by rivals over time for three types of network extensions which could impact on leased lines: mass network rollout, infill, and bespoke network extensions.³¹⁶
- This impact on costs and time to supply under each of these scenarios is likely to vary, particularly in the short term.

5.74 Our analysis of the buffer distance looks at bespoke network extensions, as it considers the likelihood of an operator extending its network for a specific order. We do not expect significant use of unrestricted PIA for such bespoke network extensions during this review period. As set out in Annex 6, although telecoms providers may use unrestricted PIA to fulfil individual orders, evidence suggests that they will remain at a significant disadvantage for these types of connections in this review period compared to a provider which is already fibre-connected, and that operators are likely to prioritise using unrestricted PIA for mass rollout and network in fill rather than individual extensions.

5.75 Therefore, we do not consider that the availability of unrestricted PIA will have a material impact on the length of the buffer distance over this review period.

50m is an appropriate buffer distance due to measurement considerations³¹⁷

5.76 As the distances for network extension are potentially very short, this raises questions as to how precise we are in measuring the distance from networks to customer sites. As mentioned earlier we cannot precisely measure the distance between customer sites (business site or mobile base station) and networks due to the following data limitations:

- we cannot detect when a business site is already connected to a network; and
- we cannot precisely measure the distance that telecoms providers would need to extend their networks to reach prospective sites as it would not be practicable to extract the precise coordinate location of the customer site from the business sites data, and we do not know the points on a site where a network could connect.

5.77 We agree with Openreach that the choice of the buffer distance needs to take into account the potential measurement inaccuracies. The assumptions we make in the network reach analysis need to produce a reasonable proxy for network reach. If we use a buffer distance that is too low the results are prone to finding a false negative, and we would find that customer sites could not connect to rival networks when in practice they could or even may already be connected. If we use a buffer distance that is too high the results are prone to finding a false positive, and we would find that customer sites could connect to rival networks when in actuality they may not be able to connect to any networks.

³¹⁶ Under a mass network rollout, the network is constructed to pass multiple premises, with the final connection only made once an order has been received. Under infill deployment, telecoms providers would fill gaps between areas where they already have network coverage. Bespoke network extensions involve providing a single extension to connect a premise in cases where existing network does not currently 'pass' or is not near to the premise.

³¹⁷ We note that Virgin Media suggested conducting sensitivity analyses for buffer distances of 150m and 200m. We do not consider this appropriate given the evidence on actual network extensions. [Virgin Media's response to the 2018 BCMR Consultation, page 7].

5.78 Therefore, we reflect these measurement inaccuracies in our choice of the buffer distance. We consider that the data limitations set out above mean that we cannot accurately measure very short distances (e.g. 20m or below) due to an increased likelihood of not capturing rival network presence.

5.79 In contrast to Openreach, TalkTalk³¹⁸ argued that we should ignore measurement inaccuracies in our choice of buffer distance as they claim we are equally likely to overstate and understate the actual distance. However, we consider that we are more likely to overstate distances between customer sites and networks because:

- sites that are already connected to networks (in other words, there is a 0m actual distance between the large business site/mobile base station and the network) will likely have a positive distance in our model. This is because we do not know when buildings are fibre connected and instead measure from the postcode centroid to the network³¹⁹;
- if the postcode centroid is the exact location of the business site, we may still overstate the distance to the closest network. This is because networks do not build to the centre of customer sites, but to the outside edge of the site. Our distance may overestimate because we do not know precisely where on the building site the network can be connected; and
- if large structures or landmarks cover the postcode centroid, we may not find network infrastructure in the immediate area surrounding the postcode centroid, even if the building is fibre connected. An example of this can be found in the CLA with the presence of large structures/landmarks (see Annex 12).

5.80 We have assessed a 25m buffer distance and we do not consider it appropriate for the following reasons:

- the 25m buffer distance would cover only a small proportion (22%) of the median area of a postcode in the UK.³²⁰ This means that, for an average sized postcode, we would find low network reach even when a building is connected to a rival network, and so would not measure true competitive conditions. In comparison, the 50m buffer distance covers 89% of the median area of a postcode in the UK and 100% in urban areas; and
- in urban areas where postcodes are smaller, the use of a very short buffer distance raises different measurement issues as large buildings can have radii greater than 25m. Using a 25m buffer distance, we would find almost half of CLA (139 out of 298) postcodes not to be high network reach, despite the widespread presence of rival network. This reflects the large size of structures in the CLA.

³¹⁸ TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.56.

³¹⁹ While we did request this information, the availability of data was patchy and of poor quality so we could not reliably use this in our analysis.

³²⁰ In practice, this proportion may be smaller as postcodes can be non-uniform in shape. This is based on the median area of a postcode in the UK compared to the area of a circle with a 25m radius.

Postcode sector as a measurement unit

- 5.81 We analyse the number of rivals within the buffer distance of large business sites and mobile base stations in each of the UK's c. 1.7 million postcodes. We aggregate these sites into postcode sectors to find the proportion of large business sites and mobile base stations that are within the buffer distance of a certain number of rivals.
- 5.82 Openreach³²¹ argued that postcode sectors are not sufficiently granular, although postcode sectors in central London are probably granular enough. TalkTalk³²² argued postcode sectors are sufficiently granular, with the exception of central London. We disagree with both Openreach and TalkTalk. While analysing postcodes rather than postcode sectors would be more granular, to analyse such a large number of postcodes (c. 1.7 million) would not be practicable. Analysing postcode districts (c. 3 thousand) is much more practicable but we consider they do not provide the required level of granularity for our geographic market assessment, especially in more competitive areas. We consider that postcode sectors (c. 10 thousand) provide an appropriate balance between practicality and granularity. We note that the Tribunal stated that "practicality is an important consideration when conducting a geographic market analysis" and did not rule against the use of postcode sectors in the 2016 BCMR Statement.³²³

Network coverage threshold

- 5.83 In the 2018 BCMR Consultation we proposed using a network coverage threshold of 65% in our network reach analysis; that is, we took 65% as the proportion of large business sites and mobile base stations that needed to be within the 50m buffer distance in order to be considered covered by rival networks. We recognise that our WBA market review Statements use a coverage threshold of 65%³²⁴, which TalkTalk³²⁵ and Vodafone³²⁶ argue was replicated without justification.
- 5.84 In light of these responses to the consultation, we have further considered the appropriate network coverage threshold for use in our network reach analysis.
- 5.85 We do not consider that 100% of sites within the 50m buffer distance would be an appropriate threshold for our analysis to determine that a postcode sector is covered by rival network(s). This is because:
- Markets do not need to be perfectly homogeneous, only sufficiently homogeneous and different to neighbouring areas. 100% coverage threshold would imply perfect homogeneity however this would lead unnecessarily small and narrow markets.
 - As mentioned above, large business sites are a proxy for those businesses that demand leased lines. Not all large business sites require leased lines, and there will

³²¹ Openreach's response to the 2018 BCMR Consultation, Annex E, paragraphs 46.

³²² TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.83.

³²³ See paragraph 425 of the [BCMR Judgment](#).

³²⁴ See 2018 WBA Statement, paragraph 4.68.

³²⁵ TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.76, 2.78.

³²⁶ Vodafone's response to the 2018 BCMR Consultation, Annex 1, paragraphs 1.10-1.12.

be business sites not considered large business sites that do require leased lines. A requirement for very high coverage could exclude postcode sectors where there is competitive supply for all customers that require them but include postcode sectors where there is less competitive supply to customers that do not require them.

- The assumption we have adopted for the purposes of the network reach analysis that large business sites and mobile base stations are located at the postcode centroid tends to understate network reach due to measurement inaccuracies.

5.86 In light of this, our judgement is that any significantly high coverage threshold would overstate the conditions required for alternative operators to exercise a competitive constraint on BT. Stakeholders, including Vodafone³²⁷, TalkTalk³²⁸, Zayo³²⁹, CityFibre³³⁰, IIG³³¹ and INCA³³², suggested alternative coverage thresholds of up to 90%, which we consider too high a threshold for the reasons stated above.³³³

5.87 Openreach³³⁴ also suggested alternative coverage thresholds of as low as 50%, which we consider too low a threshold to represent an area of sufficiently homogeneous competitive conditions. While we recognise Openreach's argument that the threshold should be lower to accommodate for measurement inaccuracy³³⁵, the degree of measurement inaccuracy is already factored into the choice of the 65% threshold.

5.88 We consider that a threshold that is too low would fail to represent an area of sufficiently homogeneous competitive conditions, while a threshold that is too high would overstate the conditions required for rivals to place a competitive constraint on BT. We recognise that between these is a range of reasonable network coverage thresholds. We consider that a threshold of 65% falls within this reasonable range, which we recognise as a threshold also used in our WBA market reviews³³⁶, and in the absence of compelling reasons to select a different threshold we have adopted this figure as an appropriate network coverage threshold for the purposes of our analysis.³³⁷

³²⁷ Vodafone's response to the 2018 BCMR Consultation, Annex 1, paragraphs 1.10-1.12.

³²⁸ TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.73-2.79.

³²⁹ Zayo's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraphs 3.1.11 – 3.1.17.

³³⁰ CityFibre's response to the 2018 PIMR Consultation, paragraphs 4.3.1 - 4.3.5.

³³¹ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 4.5.12-4.5.15.

³³² INCA's response to the 2018 BCMR Consultation, page 2.

³³³ We note for one of the boundary tests in the 2016 BCMR a threshold of 90% was used in conjunction with a 100m buffer distance and the presence of four rival networks on average, as opposed to the 50m buffer distance used in this market review and the test used in isolation. This was in addition to the separate boundary test requiring the presence of five rival networks within 100m on average, with either of the boundary tests required to be met for a pass.

³³⁴ Openreach's response to the 2018 BCMR Consultation, Annex E, paragraphs 37, 42.

³³⁵ Openreach's response to the 2018 BCMR Consultation, Annex E, paragraphs 37, 42.

³³⁶ See 2010 WBA Statement, paragraph 4.68.

³³⁷ We have examined the use of other thresholds with results found in Annex 13. Changes in the coverage threshold result in changes to the size of geographic markets. As expected, an increase in the coverage threshold would lead to a decrease in the size of HNR markets and vice versa. We note even if we were to change the coverage threshold, this may not directly impact our findings of SMP in HNR areas, with the exception of the CLA, as well as in BT+1 and BT Only areas, as we find BT service shares are consistently high for these sensitivities.

Aggregation of postcode sectors into geographic markets

5.89 Given that there are approximately ten thousand postcode sectors in the UK, it is not practicable for us to conclude on whether BT has SMP in each individual postcode sector as a geographic market. Therefore, we have sought to aggregate postcode sectors into groups where competitive conditions are similar. This is consistent with the BEREC Common Position, which states that:

a) “[the] number of geographic units will depend on the circumstances of the case, however, as experience shows, the number will usually be significant and may even go up to several thousands. Although it would theoretically be possible to make a separate SMP analysis for each of these units, it is likely to be more appropriate and more practical to aggregate units according to the homogeneity of competitive conditions, consistent with the SMP Guidelines”.³³⁸

5.90 As an initial step, we have grouped postcode sectors according to the results of the network reach analysis. We identify the group of postcode sectors not covered by any rival networks as distinct from those covered by one rival network, two rival networks and so on for each additional rival network. We have then carried out sensitivity analysis around the thresholds used to differentiate between these groups.

5.91 We consider other indicators of competition to further assess where competitive conditions may differ within and between these groups. This assessment is informed by a closer analysis of whether the presence of rival networks differs between areas. Where competitive conditions across groups are sufficiently similar, we have combined them into a single geographic market. The results of this analysis are set out in the remainder of this section.

³³⁸ BEREC, 2012. BEREC common position on best practice in remedies imposed as a consequence of a position of significant market power in the relevant markets for wholesale leased lines (BoR (12) 126), paragraph 91. https://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/1096-revised-berec-common-position-on-best-pr_0.pdf [accessed 14 May 2019].

Geographic market assessment

Application of the network reach analysis

Figure 5.13: Map of network reach in the UK



Source: Ofcom network reach analysis

- 5.92 The results of our network reach analysis are shown in Figure 5.3. This shows that most of the UK has very limited coverage by networks other than BT and that areas with high presence of rival infrastructure are concentrated in major metropolitan areas.
- 5.93 Table 5.4 illustrates that almost three-fifths of the postcode sectors in the UK can be categorised as BT Only areas, meaning that less than 65% of the large business sites and mobile base stations in those postcode sectors have a rival network within reach.³³⁹ Over a third of postcode sectors have just one rival network within reach of large business sites and mobile base stations, and only 6% of postcode sectors have two or more rival networks within reach of large business sites and mobile base stations. However, the last

³³⁹ This also includes postcode sectors where exactly 65% of businesses have a network within reach.

of these categories (i.e. HNR areas) accounted for 19% of all CI Access circuit ends connected in 2017.

Table 5.14: Network reach in the UK excluding the Hull Area

Network	Postcode sectors		Large business sites and mobile base stations		Customer ends connected in 2017	
	Number	Share**	Number	Share**	Number	Share**
BT Only*	5,906	59%	85,789	54%	30,747	48%
BT+1 rival network	3,489	35%	62,250	39%	21,038	33%
HNR areas	579	6%	9,667	6%	11,810	19%
Total UK excl. the Hull Area	9,974	100%	157,706	100%	63,595	100%

Source: Ofcom network reach and circuit data analysis

*Defined as postcode sectors where no more than 65% of large business sites and mobile base stations have a rival network to BT within 50m

**Percentages presented in this table may not add up to exactly 100% due to rounding

Decision that the Hull Area constitutes a distinct geographic market

5.94 BT has minimal network presence in the Hull Area where KCOM is the historic incumbent. We therefore consider that the competitive conditions in the Hull Area are sufficiently distinct from the rest of the UK to constitute a separate geographic market. This is consistent with our long-standing position on competition in the Hull Area. Our assessment of business connectivity markets in the Hull Area is set out in Section 9.

Decision that BT Only areas constitute a distinct geographic market

5.95 We consider that postcode sectors where less than or equal to 65% of businesses and mobile base stations have a rival network to BT within the 50m buffer distance (BT Only areas) are likely to have competitive conditions which are sufficiently homogeneous and different from postcode sectors which have rival networks to be considered a distinct geographic market. Customers in BT Only areas will have little or no choice and are mainly dependent on BT. Our analysis has found that on average a customer connected in 2017 in these areas is 1.1km from the nearest rival network, indicating almost total reliance on BT.³⁴⁰

³⁴⁰ This excludes six postcode sectors classified as BT Only which are in the CLA, which we have decided to include in the CLA geographic market. The total number of postcode sectors in the BT Only geographic market is thus 5,906.

Table 5.15: Average distance of the closest rival networks to customers connected in 2017 in different network reach areas

Network	Average distance from customer sites to		
	Closest rival network	2 nd closest rival network	3 rd closest rival network
BT Only*	1.1km	2.6km	4.8km
BT+1 rival network	58m	0.3km	0.9km
HNR areas	21m	39m	94m

Ofcom network reach and circuit data analysis

**Defined as postcode sectors where no more than 65% of large business sites and mobile base stations have a rival network to BT within 50m*

Decision that BT+1 areas constitute a distinct geographic market

- 5.96 We consider that postcode sectors where more than 65% of large businesses and mobile base stations are within 50m of just one rival network to BT (BT+1 areas) are likely to have competitive conditions which are sufficiently homogeneous and different from postcode sectors with either fewer or more rival networks to constitute a separate market. This is supported by Table 5.5, which shows that the distance to the closest rival network is much shorter than in BT Only areas, but much longer than in BT+2 or more areas.
- 5.97 In BT+1 areas, more than 65% of large businesses and mobile base stations will have access to a sufficiently proximate alternative to BT. However, the 58m average distance to the closest rival indicates that many business customers would not have such an alternative and that very few would have more than one alternative to BT. This is materially different to BT+2 or more areas, where more than 65% of businesses and mobile base stations have two rival networks within a potentially viable supply distance and where some customers may face active competition from three suppliers or more. We therefore consider that competitive conditions in BT+1 areas are sufficiently distinct from BT Only areas and from areas with two or more rival networks to constitute a separate geographic market.³⁴¹

Analysis of High Network Reach areas

- 5.98 We consider that High Network Reach postcode sectors (i.e. postcode sectors with at least two rival networks present) may have the potential to support effective competition. We have therefore examined these HNR postcode sectors in more detail. In total we have identified 579 HNR postcode sectors, but we consider that a sector-by-sector analysis would be impractical given this number. Therefore, we assess whether competitive conditions are sufficiently homogeneous to consider all of them as a single geographic market, or whether some of them constitute distinct geographic markets. In doing so we consider factors which are likely to influence competitive conditions, namely the level of

³⁴¹ This excludes 17 postcode sectors classified as BT+1 which are in the CLA, which we have decided to include in the CLA geographic market. The total number of postcode sectors in the BT+1 geographic market is thus 3,489.

demand as measured by the number of new connections and the extent and the presence of rival networks.

5.99 This assessment of HNR areas involves the following steps:

- a) City clustering: We group together HNR postcode sectors in cities into clusters. As part of this analysis, we breakdown London into the CLA and non-CLA postcode sectors (our starting point is the CLA boundary as defined in 2016 BCMR);
- b) City cluster assessment: We assess the size of the customer base in the CLA and each of the city clusters, finding that the top six³⁴² are sufficiently different to warrant more detailed consideration compared with all other HNR areas;
- c) Decision that the Central London Area constitutes a distinct geographic market: First, we compare the HNR postcode sectors in the CLA with those in the rest of London and the UK, showing that the conditions of competition are sufficiently different which indicates a separate geographic market. We then consider if the CLA boundary should be expanded to include HNR postcode sectors contiguous with the CLA boundary, or shrunk to exclude non-HNR postcode sectors within the CLA boundary, deciding to maintain the same CLA boundary as defined in 2016 BCMR; and
- d) Decision that High Network Reach areas in each of Birmingham, Bristol, Edinburgh, Glasgow, Leeds, Manchester and the Rest of the UK constitute separate geographic markets: We compare city clusters with all other HNR areas to determine whether they are sufficiently similar to be grouped together. While the evidence is mixed, we take a conservative approach and decide to identify each of the largest city clusters as separate geographic markets.

City clusters

5.100 Postcode sectors with two or more rival networks tend to be clustered in cities. Within each metropolitan area, most of these postcode sectors are clustered together. As competitive conditions within nearby High Network Reach postcode sectors are likely to be similar (as the same telecoms providers' networks may extend across neighbouring postcode sectors), in our analysis we have grouped together the High Network Reach postcode sectors within metropolitan areas.³⁴³

5.101 The most significant of these clusters is in London³⁴⁴, which accounts for over half of all High Network Reach postcode sectors. In 2017, more than seven in ten new circuits connected within HNR areas were in London.

³⁴² Ranked by volume of 2017 new connections.

³⁴³ This grouping has been conducted using the postcode area, defined by the first one or two letters the postcode. For example, postcode sectors beginning with M are considered to be in Manchester, whereas those beginning with EH are considered to be in Edinburgh. We have identified postcode sectors in London as those beginning with E, EC, N, NW, SE, SW, W and WC.

³⁴⁴ We have calculated London based on postcodes beginning with N, S, E and W.

5.102 In the 2016 BCMR, we defined a distinct market for the Central London Area (CLA). The CLA broadly corresponds to the Central Activities Zone defined by the Greater London Authority as London’s business centre, accounting for a third of London’s jobs and 10% of the UK’s economic output.³⁴⁵ For regulatory consistency we use the CLA, as defined in the 2016 BCMR, as a starting point in determining whether it remains appropriate to define the CLA as a distinct geographic market. Openreach³⁴⁶ argued that we have not justified why we are keeping the same CLA boundary as in 2016. We recognise that the CLA is comprised of both HNR and non-HNR postcode sectors³⁴⁷, and expand below upon our considerations on whether to update the CLA boundary to reflect this. We have looked in more detail at whether competitive conditions are homogeneous between the CLA and other High Network Reach areas across London, and have expanded on our methodology for defining the CLA as a separate market.

City cluster assessment

5.103 Table 5.6 shows the High Network Reach postcode sectors by metropolitan area, ordered by the number of new CI Access connections in 2017. After London, the next three largest clusters each accounted for approximately 600 large business sites and mobile base stations (about 6% of the large business sites and mobile base stations in High Network Reach areas) and more than 400 new connections in 2017 (about 4% of the new connections in 2017 in High Network Reach areas), after which the number of large business sites, mobile base stations and new connections declines rapidly. Nevertheless, we consider that the six largest clusters after London constitute sufficiently material numbers of connections to merit a detailed assessment and to calculate meaningful service shares. We thus consider separately the CLA, the rest of London and each of the other six largest clusters. We then consider all other High Network Reach postcode sectors as a single grouping.³⁴⁸

³⁴⁵ Greater London Authority, 2018. *Central Activities Zone*. <https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/planning-guidance-and-practice-notes/central-activities-zone> [accessed 14 May 2019].

³⁴⁶ Openreach’s response to the 2018 BCMR Consultation, Annex E, paragraphs 47.

³⁴⁷ All but 23 of the 275 postcode sectors in the CLA are classified as High Network Reach in the present analysis. Six postcode sectors are currently classified as BT Only and 17 postcode sectors are currently classified as BT+1. They are included in the results presented earlier for the BT Only and BT+1 areas, respectively.

³⁴⁸ We do not consider it practical to subdivide further as the number of connections in these other areas becomes too small to draw meaningful conclusions.

Table 5.16: High Network Reach areas by metropolitan area

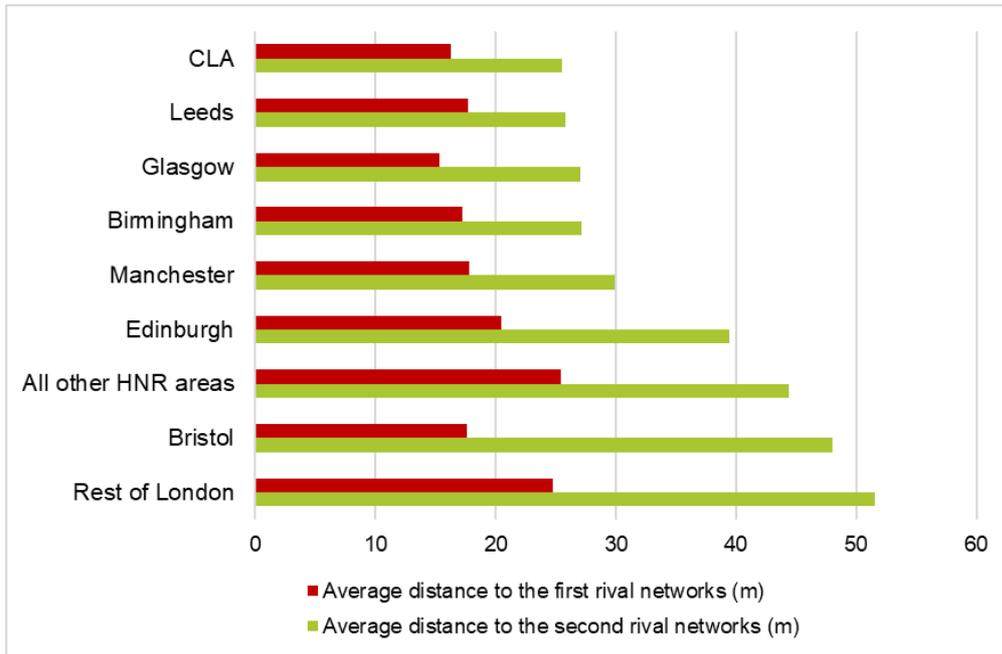
Area	HNR postcode sectors		Large business sites and mobile base stations		Customer ends connected in 2017	
	Number	Share*	Number	Share*	Number	Share*
London, of which:	307	53%	4,977	51%	8,380	71%
<i>CLA</i>	275	47%	4,229	44%	7,838	66%
<i>Rest of London</i>	32	6%	748	8%	542	5%
Edinburgh	21	4%	604	6%	466	4%
Manchester	34	6%	608	6%	479	4%
Glasgow	20	3%	601	6%	424	4%
Leeds	14	2%	410	4%	326	3%
Bristol	10	2%	301	3%	279	2%
Birmingham	10	2%	359	4%	282	2%
Liverpool	28	5%	242	3%	189	2%
Sheffield	7	1%	243	3%	133	1%
Nottingham	7	1%	201	2%	139	1%
Reading	7	1%	103	1%	115	1%
All other HNR areas	114	20%	1,018	11%	598	5%
Total HNR areas	579	100%	9,667	100%	11,810	100%

Source: Ofcom network reach and circuit data analysis

*Percentages presented in this table may not add up to exactly 100% due to rounding

5.104 Figure 5.7 shows the average distance of rival networks to customers connected in 2017 in those areas. This shows shorter average distances to the first and second closest rivals to customers connected in 2017 in the CLA and four largest cluster cities (Glasgow, Leeds, Birmingham, and Manchester) than the other HNR areas, indicating higher levels of competition in these areas. The Rest of London and all other HNR areas have longer average distances to the first rival network than the two other largest cluster cities (Edinburgh and Bristol), indicating lower levels of competition.

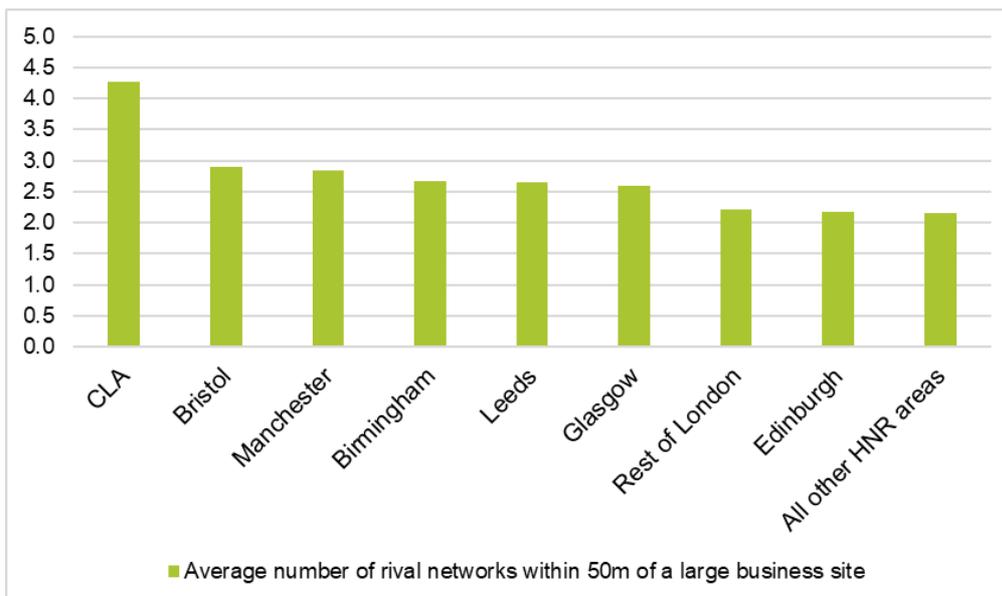
Figure 5.17: Average distance of the closest rival networks to customers connected in 2017 in High Network Reach area groupings



Source: Ofcom network reach analysis

5.105 Figure 5.8 shows the number of rival networks within 50m of the average large business site or mobile base station in each of the city clusters and all other High Network Reach areas. This indicates that a large business site or mobile base station in the CLA has, on average, almost two more rival networks within 50m than other areas of the UK.

Figure 5.18: Average number of rival networks within 50m of a large business site or mobile base station in High Network Reach area groupings



Source: Ofcom network reach analysis

Decision that the Central London Area constitutes a distinct geographic market

- 5.106 We have used the CLA boundary³⁴⁹ (as defined in the 2016 BCMR) as a starting point in determining whether it constitutes a separate geographic market as this area was previously identified as competitive³⁵⁰ and is currently deregulated.³⁵¹ This approach is simply the starting point before we consider whether the CLA boundary should be expanded and/or shrunk based on a detailed assessment.
- 5.107 We recognise that the CLA is predominantly made up of High Network Reach postcode sectors (275 postcode sectors). There are also 23 postcode sectors in the CLA that are classified as either BT Only (six postcode sectors) or BT+1 (17 postcode sectors). They are contiguous to and/or in some cases surrounded by High Network Reach postcode sectors.³⁵² Our analysis indicates that there are 32 High Network Reach postcode sectors, which are scattered across the rest of London. Of those, 17 postcode sectors are contiguous to the CLA boundary.³⁵³
- 5.108 As part of our assessment of whether particular HNR areas may constitute separate geographic markets, we have examined all HNR areas in London (including those within the CLA as defined in 2016) to assess whether competitive conditions are sufficiently homogeneous with HNR areas in the rest of London and the six largest cluster cities. In assessing this:
- we consider whether competitive conditions are sufficiently homogeneous between the HNR areas in each of the following: CLA, rest of London and other areas in the UK; and
 - we consider whether to expand or shrink the CLA boundary by looking in more detail at competitive conditions in a subset of the High Network Reach postcode sectors in the rest of London, namely those that are outside the CLA but are contiguous to the CLA boundary.
- 5.109 The results are summarised in Table 5.9.

³⁴⁹ See Annex 12.

³⁵⁰ See 2016 BCMR Statement.

³⁵¹ Openreach questioned the application of the Boundary Test, which was used in the 2016 BCMR. To clarify, we have not repeated the Boundary Test analysis in this market review. We have examined the CLA area in detail, using the set of postcode sectors as defined in the 2016 BCMR.

³⁵² These are: E14 2, E1W 3, EC1A 1, EC1A 7, EC2Y 8, EC4V 3, NW1 2, NW1 5, SW1A 1, SW1P 4, SW1W 9, W14 8, W1G 7, W1H 5, W1J 0, W1U 8, W2 1, W6 7, WC1B 3, WC1N 1, WC1N 3 and WC2R 2.

³⁵³ These are: E1 5, E14 6, E14 8, E1W 1, N1 9, NW1 8, NW1 9, NW5 2, SE1 2, SE1 7, SE1 8, SW1V 2, SW3 6, SW7 3, SW7 4, W11 2 and W11 3.

Table 5.19: Comparison of High Network Reach areas in each of the CLA, rest of London, postcode sectors contiguous to the CLA and other areas in the UK

	HNR in CLA	HNR in London outside CLA **	17 HNR postcode sectors adjacent to CLA boundary	All other HNR areas
Average number of rival networks within 50m*	4.3	2.2	2.3	2.4
Average distance of customers connected in 2017 to:				
Closest rival network	16m	25m	21m	20m
2 nd closest rival network	26m	52m	57m	37m
3 rd closest rival network	34m	130m	91m	89m
4 th closest rival network	47m	299m	123m	224m

Source: Ofcom Network Reach Analysis

*Defined as the average number of rival networks within 50m buffer distance of large business sites and mobile base stations

**HNR in London outside CLA includes the 17 HNR postcode sectors adjacent to the CLA boundary

- 5.110 First, the results show that competitive conditions within HNR areas in the CLA are sufficiently different from those in other HNR areas to constitute a separate geographic market. This is based on the markedly greater network presence in HNR areas in the CLA:
- in the HNR areas in the CLA, large business sites and mobile base stations have on average between four and five rival networks within 50m, compared with two to three rival networks within 50m in High Network Reach postcodes in the rest of London and in other High Network Reach areas in the UK; and
 - proximity to rival networks in the HNR areas in the CLA is materially higher than in High Network Reach postcode sectors in the rest of London and High Network Reach areas in the UK.
- 5.111 Second, results show that High Network Reach postcode sectors in the rest of London (i.e. outside the CLA) are not sufficiently distinct from HNR areas in the rest of the UK to constitute a separate geographic market. Therefore, we group these together with HNR areas in the rest of the UK for the purposes of our analysis.
- 5.112 We have considered whether to expand the CLA boundary by looking at the High Network Reach postcode sectors contiguous to the CLA. Results for the 17 High Network Reach postcode sectors contiguous to the CLA still are sufficiently distinct from HNR areas in the CLA and are more similar to other HNR areas in the UK. As a result, our view is that it is appropriate to group them together with HNR areas in the rest of the UK rather than to expand the boundary of the CLA.
- 5.113 We have also considered whether to shrink the CLA boundary. We looked into whether to include the 23 postcode sectors now classified by our network reach analysis as BT Only or BT+1 in the same market as the High Network Reach postcode sectors in the CLA (i.e. define a single market for the CLA).

- 5.114 We have decided to continue to include them in the CLA given the small number of these postcode sectors and in light of evidence suggesting that the low network reach results are likely to be an anomaly due to specific features of the CLA rather than being genuinely low network reach sectors.³⁵⁴ This has the added benefit of regulatory consistency, as the CLA has been deregulated in previous market reviews, and we do not consider it appropriate to risk re-regulating these postcode sectors and then de-regulating them again in the future.
- 5.115 To summarise, we consider that the CLA (as defined in 2016 BCMR) constitutes a distinct geographic market. Openreach³⁵⁵ argued that we have not justified why we are keeping the same CLA boundary as in 2016. We considered expanding the boundary of the CLA to include contiguous High Network Reach postcode sectors but based on evidence view these postcode sectors sufficiently distinct to those in the CLA. We considered shrinking the boundary of the CLA to exclude those postcode sectors that were classified as BT Only or BT+1, but we have decided to continue to include them in the CLA due to evidence suggesting that low network reach results are anomalous.

Decision that High Network Reach areas in each of Birmingham, Bristol, Edinburgh, Glasgow, Leeds, Manchester and the Rest of the UK constitute separate geographic markets

- 5.116 In relation to the other metropolitan areas, we find that the evidence is mixed. As shown in Table 5.10, each of these city clusters has between two and three networks within 50m of the large businesses and mobile base stations, which is marginally higher than in High Network Reach areas in the rest of the UK. However, each of the city clusters has a first and a second rival operator located somewhat closer than in the other High Network Reach areas in the rest of the UK, though this is most pronounced in Glasgow.³⁵⁶
- 5.117 The decision as to whether competitive conditions are sufficiently homogeneous inevitably involves a degree of judgement. In the case of the CLA, it is clear that there is significantly greater presence of rival networks than in other High Network Reach areas. The distinction between the metropolitan areas and the High Network Reach areas in the rest of the UK is less clear-cut as in some measures (number of rival networks) they appear reasonably similar to each other and to other High Network Reach areas in the rest of the UK, though there are some differences (proximity of those rival networks to businesses), and some differences between different metropolitan areas.
- 5.118 On balance, we have decided to adopt a conservative approach and to treat each of these metropolitan areas as a separate geographic market, distinct from both the CLA and from the High Network Reach areas in the rest of the UK.

³⁵⁴ We set out our analysis and reasoning in Annex 12. We have examined these 23 sectors in detail, which suggests that the majority of these sectors are an anomaly and are not genuinely low network reach sectors.

³⁵⁵ Openreach's response to the 2018 BCMR Consultation, Annex E, paragraphs 47.

³⁵⁶ We have also undertaken a sensitivity as to whether there are sub-clusters of greater network competition within these High Network Reach areas, which may be more similar to the CLA. In summary, we find that the only metropolitan areas with a material number of clusters with three or more operators within 50m are in Manchester and Glasgow. However, we note that BT's share is the same in BT+3 areas as in BT+2, suggesting that our SMP assessment would be unchanged if we were to use a higher network reach threshold.

Table 5.20: High Network Reach areas in the CLA, top six metropolitan areas and the rest of the UK excluding the Hull Area

Area	Number (share*) of postcode sectors	Number (share*) of customer ends connected in 2017	Average distance (m) of customers connected in 2017 to			Average network reach**
			Closest rival network	2 nd closest rival network	3 rd closest rival network	
CLA	275 (47%)	7,838 (66%)	16	26	34	4.3
Edinburgh	21 (4%)	466 (4%)	20	39	135	2.2
Manchester	34 (6%)	479 (4%)	18	30	55	2.8
Glasgow	20 (3%)	424 (4%)	15	27	60	2.6
Leeds	14 (2%)	326 (3%)	18	26	41	2.7
Bristol	10 (2%)	279 (2%)	18	48	81	2.9
Birmingham	10 (2%)	282 (2%)	17	27	51	2.7
Rest of the UK excl. the Hull Area	195 (34%)	1,716 (15%)	25	47	122	2.2

Source: Ofcom network reach and circuit data analysis

*Percentages presented in this table may not add up to exactly 100% due to rounding.

**Defined as the average number of rival networks within 50m buffer distance of large business sites and mobile base stations

Geographic markets for CI Access Services

5.119 We therefore have decided to define the following geographic markets for CI Access services:

- BT Only areas;
- BT+1 areas;
- the Central London Area;
- High Network Reach areas of each of Birmingham, Bristol, Edinburgh, Glasgow, Leeds and Manchester (Metro Areas);
- all other High Network Reach areas (taken together); and
- the Hull Area.

5.120 Our Legal instruments set out a list of postcode sectors constituting the above geographic markets (Annex 26, Schedule 7) and Schedule 6 sets out rules for the classification of postcode sectors not captured in Schedule 7.

6. CI Access: SMP findings

- 6.1 This section presents our market power assessment for the relevant product and geographic markets defined in Sections 4 and 5. Specifically, we examine whether any provider has significant market power (SMP) in the supply of CI Access services in each of the geographic markets defined in the UK outside the Hull Area.³⁵⁷
- 6.2 We have concluded that BT has SMP in the supply of CI Access services in the whole of the UK, except for the Central London Area (CLA) and the Hull Area.³⁵⁸ That is, we have found BT has SMP in the following geographic markets:
- BT Only areas in the UK;
 - BT+1 areas in the UK;
 - each of the Metro Areas³⁵⁹; and
 - High Network Reach areas in the rest of the UK.³⁶⁰
- 6.3 The CLA is different from other geographic markets because of the strength of competitive constraints based on the high density of rival infrastructure, and the likely strengthening of those constraints based on the impact of the unrestricted PIA remedy.
- 6.4 We set out our analysis and findings for the CI Access markets in the following order:
- we summarise stakeholder responses to our proposed SMP assessment and SMP findings for CI Access services;
 - we explain our approach to the SMP assessment;
 - we set out the SMP assessment for each geographic market; and
 - we summarise our conclusions on SMP for CI Access services in the relevant geographic markets.

Stakeholder responses to our proposed SMP assessment and SMP findings for CI Access services in the BCMR Consultation

- 6.5 We summarise stakeholder responses in two broad areas: comments on our proposed approach to the SMP assessment, and comments on our proposed SMP findings. We have reflected our consideration of stakeholder responses in our reasoning below.

Stakeholder comments on our proposed SMP assessment

Our proposal on reflecting unrestricted PIA in the SMP assessment

³⁵⁷ The SMP assessment for CI Access services in the Hull Area is set out separately in Section 9.

³⁵⁸ For completeness we have conducted a separate SMP assessment looking at a nominal market for VHB services, which is set out in Annex 14. We have concluded that even if VHB circuits were to be identified as a separate product market, we would find that BT had SMP in VHB circuits in the whole of the UK except the CLA and Hull Area.

³⁵⁹ Defined as High Network Reach postcode sectors in each of Birmingham, Bristol, Edinburgh, Glasgow, Leeds and Manchester.

³⁶⁰ Defined as High Network Reach postcode sectors outside the CLA, Metro Areas and the Hull Area.

6.6 We proposed that “usage of a duct access remedy is unlikely to be in widespread use in the relevant geographic markets within the period of this review and therefore unlikely to lead to effective competition by 2021”.³⁶¹ Hence, we did not adjust our proposed SMP findings to reflect the availability of unrestricted PIA.

6.7 Three stakeholders broadly agreed with our proposal (IIG, TalkTalk, and Vodafone). For instance:

- Vodafone agreed that unrestricted PIA is unlikely to make a material difference over the review period being considered, and that to believe this remedy will make a meaningful difference to competition in this market would be a “grave error”³⁶²;
- IIG mentioned that it supports our approach of not taking into account unrestricted PIA as it is not in place and may not be in place should the PIMR consultation find market conditions that substantially change our consultation’s finding³⁶³; and
- in the context of our proposed SMP finding for CI Access services in BT Only and BT+1 areas, TalkTalk agreed that unrestricted PIA will not be introduced soon enough to have a material impact during the period.³⁶⁴

6.8 BT Group and Openreach disagreed with our view, at the time, that widespread use of unrestricted PIA within this review period is unlikely, and the effect on competition will be limited. For instance:

- BT Group encouraged us to undertake our SMP analysis again, taking unrestricted PIA into account and using more appropriate indicators of market power. BT Group argued that doing this would lead us to find SMP in fewer areas³⁶⁵; and
- in the context of our approach to SMP in the CI inter-exchange connectivity market, Openreach argued that we did not consider a true modified greenfield scenario where the current build vs buy decisions have led to current presence based on regulated access remedies, and suggested that we had not addressed the implication of unrestricted PIA.³⁶⁶

Our proposal to use 2017 new customer ends data to calculate service shares

6.9 We proposed to measure service shares based on 2017 new customer ends and considered this to be a reasonable measure for a forward-looking assessment of SMP. We did not use inventory service shares due to data limitations.³⁶⁷

³⁶¹ 2018 BCMR Consultation, paragraph 6.74.

³⁶² Vodafone’s response to the 2018 BCMR Consultation, part 1, paragraph 1.9.

³⁶³ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 5.1.5.

³⁶⁴ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.108.

³⁶⁵ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 3.48.

³⁶⁶ Openreach’s response to the 2018 BCMR Consultation, page 39, paragraph 30.

³⁶⁷ Annex 12 discusses these data limitations in detail.

6.10 Some stakeholders considered that the 2017 new customer ends data provide a reasonable measure of service shares (SSE³⁶⁸, TalkTalk³⁶⁹, UKCTA³⁷⁰, and Zayo³⁷¹). TalkTalk, UKCTA and Zayo further considered that 2017 new customer ends is a better measure than inventory service shares. They mentioned that:

- service shares of 2017 new customer ends are “a more relevant measure of competitive strength” than service shares of the full inventory of connections. This is because “New customer share better reflects the competitive dynamics in the industry from time to time, as long contract periods and customer inertia means that it is likely to take many years for customer bases to adjust to changed competitive conditions. Therefore, even if Ofcom were able to obtain accurate estimates of customer inventories (see §6.18), these data would be inferior to using new circuit service shares.” (TalkTalk)³⁷²;
- the most appropriate market share measure is the share of new connections, rather than the stock of existing connections, since this better reflects prevailing competitive conditions (UKCTA)³⁷³; and
- the new connections data used by Ofcom to calculate service shares is more appropriate than the full inventory data (Zayo).³⁷⁴

6.11 IIG did not disagree with the use of 2017 new customer ends data to calculate service shares. However, it argued that using the full inventory of connections would provide a more robust measure of market shares.³⁷⁵

6.12 Openreach considered that using 2017 new customer ends data is wrong. More specifically, Openreach argued that:

- we should have calculated service shares in all areas on the basis of the full inventory of connections as we do in the Hull Area, where Virgin Media is a minor player. Openreach assumed that we used the inventory in the Hull Area because this is the superior measure of service shares³⁷⁶;
- we failed to provide evidence that 2017 new customer ends data are a plausible basis for forecasting future competitive conditions, which they would expect, given this approach is a departure from any previous market reviews³⁷⁷;

³⁶⁸ SSE’s response to the 2018 BCMR Consultation, response to question 6.1.

³⁶⁹ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.101.

³⁷⁰ UKCTA’s response to the 2018 BCMR Consultation, paragraph 19.

³⁷¹ Zayo’s confidential response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 3.1.18, and Zayo’s non-confidential response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 3.1.19.

³⁷² TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.101.

³⁷³ UKCTA’s response to the 2018 BCMR Consultation, paragraph 19.

³⁷⁴ Zayo’s confidential response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 3.1.18, and Zayo’s non-confidential response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 3.1.19.

³⁷⁵ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 5.1.4. IIG have also encouraged us to ensure that the full inventory data is available from all relevant parties for the 2021 all access market review. Openreach made a similar point with regards to the availability of inventory data for the 2021 review (Openreach’s response to the BCMR 2018 Consultation, page 111, paragraph 20).

³⁷⁶ Openreach’s response to the 2018 BCMR Consultation, page 7, paragraph 14; and page 110, paragraph 10.

³⁷⁷ Openreach’s response to the 2018 BCMR Consultation, page 109, paragraph 9.

- using service shares for a single year is not representative as “for many large customers of Openreach the installed circuits in 2017 will likely have been tendered in previous years in any case and as such contracts tend to be irregular or ‘lumpy’”;³⁷⁸ and
- using 2017 new customer ends leads to an overstatement of its service shares.³⁷⁹

6.13 BT Group noted Openreach’s concerns about the use of 2017 new customer ends data. They also said that with the introduction of unrestricted PIA the full inventory of connections “is a less reliable indicator of Openreach’s future market power than it has been in past market reviews”.³⁸⁰

Our proposals on other SMP criteria used in our assessment

6.14 Openreach largely agreed with our view on economies of scale and scope, barriers to entry, and countervailing buyer power. However, it emphasised that Virgin Media can likely acquire the same benefits of economies of scale and sunk costs on its network. They also added that countervailing buyer power is highly relevant in the backhaul sectors including in particular in areas of High Network Reach for large-value contracts (e.g. MNOs).³⁸¹ It did not provide evidence to support this claim.

6.15 TalkTalk agreed with “substantial elements of Ofcom’s approach to SMP assessment...”, including that we should undertake a forward-looking assessment, adopt a modified greenfield approach, and consider the SMP criteria in the round (albeit that TalkTalk disagreed that we had actually adopted this approach in practice).³⁸² However, TalkTalk argued that there are a number of “aspects of the market” that could lead Openreach to have market power even at market shares below 50%. TalkTalk said:

- we considered (fully or partially) some of these aspects of the market (i.e. the advantage from a ubiquitous network, the advantage of scale and scope, high barriers to entry due to large sunk costs, high switching costs, and the lack of countervailing buyer power even for a customer of the scale of TalkTalk); and
- we overlooked other aspects of the market (i.e. [S<], and vertical integration in the industry).³⁸³

6.16 Vodafone supported our approach to consider the SMP criteria (e.g. market shares, infrastructure indicators, etc.) in the round. Vodafone also commented on various aspects

³⁷⁸ Openreach’s response to the 2018 BCMR Consultation, page 110, paragraph 15; and page 111, footnote 167.

³⁷⁹ Openreach’s response to the 2018 BCMR Consultation, pages 110-111, paragraphs 11 and 15-19.

³⁸⁰ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 3.47. They consider that full inventory of connections is a less reliable indicator for market power in this review period because “If Openreach’s SMP reflects its advantages resulting from its control of physical infrastructure, then DPA [unrestricted PIA] will remove the ability to gain competitive advantage from this control”.

³⁸¹ Openreach’s response to the 2018 BCMR Consultation, page 115, paragraphs 37-39.

³⁸² TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.99.

³⁸³ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 2.102-2.106.

of our SMP assessment, particularly the risks of switching and reluctance of customers to switch providers for business connectivity.³⁸⁴

Stakeholder comments on our proposed SMP findings³⁸⁵

Our proposal to find SMP in BT Only and BT+1 areas

- 6.17 Nearly all stakeholders who commented agreed with our consultation position that BT has SMP in BT Only and BT+1 areas (CityFibre³⁸⁶, Three³⁸⁷, IIG³⁸⁸, Openreach³⁸⁹, SSE³⁹⁰, TalkTalk³⁹¹, Virgin Media³⁹², Vodafone³⁹³, Zayo³⁹⁴, and [X]³⁹⁵).

Our proposal to find SMP in the Metro Areas and High Network Reach areas in the rest of the UK

- 6.18 Most stakeholders agreed with our consultation position that BT has SMP in each of the Metro Areas and High Network Reach areas in the rest of the UK (CityFibre³⁹⁶, Gamma³⁹⁷, Three³⁹⁸, IIG³⁹⁹, SSE⁴⁰⁰, TalkTalk⁴⁰¹, Virgin Media⁴⁰², Vodafone⁴⁰³, Zayo⁴⁰⁴, and [X]⁴⁰⁵).
- 6.19 On the other hand, BT Group and Openreach disagreed. BT Group said that even before considering the impact of unrestricted PIA we had not made the case that BT has SMP in the Metro Areas.⁴⁰⁶ Openreach argued that “Based on the level of competition and dig distances, the conclusion of SMP [...] is ambiguous...”.⁴⁰⁷ Openreach and BT Group mainly argued against our interpretation of the evidence on infrastructure presence, as we discuss below.

³⁸⁴ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 6.5-6.6, and Vodafone’s response to the 2018 BCMR Consultation (regulatory policy requirements report), pages 6-9, sections 1.1-1.2.

³⁸⁵ In response to the 2018 BCMR Consultation, some stakeholders (e.g. Openreach and TalkTalk) raised points that could *indirectly* have implications for our SMP assessment and/or findings. We address these points in Section 5 (Geographic market definition), Annex 6 (Unrestricted PIA), Annex 10 (Indicative dig distance cost model), Annex 12 (Approach to data processing), and Annex 14 (Hypothetical SMP assessment for VHB CI Access circuits).

³⁸⁶ CityFibre’s response, dated 18/01/2019, to the 2018 BCMR Consultation, paragraph 2.1.5.

³⁸⁷ Three’s response to the 2018 BCMR Consultation, paragraph 10.1.

³⁸⁸ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 1.2.6 and 5.1.7.

³⁸⁹ Openreach’s response to the 2018 BCMR Consultation, page 108, paragraph 1.

³⁹⁰ SSE’s response to the 2018 BCMR Consultation, response to question 6.2.

³⁹¹ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.108.

³⁹² Virgin Media’s response to the 2018 BCMR Consultation, response to question 6.2.

³⁹³ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 6.1.

³⁹⁴ Zayo’s confidential response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 3.1.18, and Zayo’s non-confidential response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 3.1.19.

³⁹⁵ [X] response to the 2018 BCMR Consultation, response to question 6.1.

³⁹⁶ CityFibre’s response, dated 18/01/2019, to the 2018 BCMR Consultation, paragraph 2.1.5.

³⁹⁷ Gamma’s response to the 2018 BCMR Consultation, page 17.

³⁹⁸ Three’s response to the 2018 BCMR Consultation, paragraph 10.2.

³⁹⁹ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 1.2.6 and 5.1.7.

⁴⁰⁰ SSE’s response to the 2018 BCMR Consultation, response to question 6.2.

⁴⁰¹ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.109.

⁴⁰² Virgin Media’s response to the 2018 BCMR Consultation, response to question 6.2.

⁴⁰³ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 6.1.

⁴⁰⁴ Zayo’s confidential response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 3.1.18, and Zayo’s non-confidential response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 3.1.19.

⁴⁰⁵ [X] response to the 2018 BCMR Consultation, response to question 6.1.

⁴⁰⁶ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, chapter 3, paragraphs 3.1 and 3.27.

⁴⁰⁷ Openreach’s response to the 2018 BCMR Consultation, pages 117-118, paragraphs 54-61 (quote from paragraph 55).

Our proposal to find no SMP in the CLA

6.20 Most stakeholders agreed with our consultation position that BT has no SMP in the CLA (CityFibre⁴⁰⁸, Colt⁴⁰⁹, Three⁴¹⁰, IIG⁴¹¹, Openreach⁴¹², SSE⁴¹³, Virgin Media⁴¹⁴, Hyperoptic⁴¹⁵ and Zayo⁴¹⁶). For instance:

- Colt considered that our proposed finding in the CLA is reasonable as particular features in the CLA (i.e. the density and value of the market, low barriers to entry, and prices substantially below those prevailing elsewhere in the UK) give a reasonable basis for rebutting the presumption that a provider with a market share above 50% has SMP.⁴¹⁷
- Hyperoptic said it did not dispute Ofcom’s findings in respect of SMP but “would urge a deeper review on the actual constraining effects on [Openreach] of competing infrastructure within the CLA.”⁴¹⁸

6.21 On the other hand, PAG⁴¹⁹, TalkTalk⁴²⁰, UKCTA⁴²¹, and Vodafone⁴²² disagreed with our proposal. PAG⁴²³, TalkTalk⁴²⁴, UKCTA⁴²⁵, Vodafone⁴²⁶, and [S<] ⁴²⁷ argued that we had failed to demonstrate that the presumption of dominance associated with market shares above 50% is rebutted based on factors other than market shares.

6.22 Vodafone said that it is not evident why we concluded BT does not have SMP in the CLA. In particular, Vodafone argued:

- BT’s market shares in the CLA are above dominance levels and have risen since 2016;
- we are wrong to consider higher levels of network density in the CLA result in greater competition because customers have a demand for service provision across geographies;⁴²⁸ and

⁴⁰⁸ CityFibre’s response, dated 18/01/2019, to the 2018 BCMR Consultation, paragraph 2.1.5.

⁴⁰⁹ Colt’s response to the 2018 PIMR and 2018 BCMR Consultations, page 1.

⁴¹⁰ Three’s response to the 2018 BCMR Consultation, paragraph 10.3.

⁴¹¹ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 1.2.6 and 5.1.7.

⁴¹² Openreach’s response to the 2018 BCMR Consultation, page 108, paragraph 1; page 117, paragraph 53; and page 118, paragraph 62.

⁴¹³ SSE’s response to the 2018 BCMR Consultation, response to question 6.2.

⁴¹⁴ Virgin Media’s response to the 2018 BCMR Consultation, response to question 6.2.

⁴¹⁵ Hyperoptic’s response to the 2018 BCMR Consultation, page 6.

⁴¹⁶ Zayo’s confidential response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 3.1.18, and Zayo’s non-confidential response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 3.1.19.

⁴¹⁷ Colt’s response to the 2018 PIMR and 2018 BCMR Consultations, page 1.

⁴¹⁸ Hyperoptic’s response to the 2018 BCMR Consultation, page 6.

⁴¹⁹ PAG’s response to the 2018 BCMR consultation, paragraph 10.

⁴²⁰ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 1.21.

⁴²¹ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 19-21.

⁴²² Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 6.7.

⁴²³ PAG’s response to the 2018 BCMR Consultation, paragraph 10.

⁴²⁴ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 1.21 and 2.111-2.122.

⁴²⁵ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 19-21.

⁴²⁶ Vodafone’s response to the 2018 BCMR Consultation, part 1, paragraph 3.12.

⁴²⁷ [S<] response to the 2018 BCMR Consultation, response to question 6.1.

⁴²⁸ We address this point in Section 5 (geographic market definition).

- our view on barriers to entry and economies of scale and scope in the CLA is wrong because we have understated the economic challenge of network extensions (“except for the very highest bandwidths over very short distances”). Similarly, Vodafone mentioned that London faces the highest network construction costs in the UK and, hence, if anything it is more challenging than the rest of the UK.^{429 430}

Approach to SMP assessment

- 6.23 SMP is defined in the Act as being equivalent to the competition law concept of dominance, that is, a position of economic strength affording a telecoms provider the power to behave to an appreciable extent independently of competitors, customers and ultimately consumers.
- 6.24 In this section we set out our approach to the SMP assessment in light of stakeholder comments. The only change in our approach to SMP assessment from our consultation position is with regards to our view of the potential impact of the unrestricted PIA remedy on our assessment.

Our assessment is forward-looking

- 6.25 We conduct an SMP assessment for each relevant market to see whether or not *ex ante* regulation is necessary over the timeframe of this review. Hence, our SMP assessment is forward-looking and considers whether markets could be prospectively competitive and thus whether any lack of competition may be temporary. We take into account expected or foreseeable market developments over this market review period.
- 6.26 As set out in Section 2, this market review covers the period to 31 March 2021.

We adopt a modified greenfield approach⁴³¹

- 6.27 Similar to our market definition analysis, we apply the modified greenfield approach. The SMP assessment assumes that there is no *ex ante* regulation arising from a finding of SMP within the relevant market in question, but *ex ante* SMP remedies in other markets continue to apply.
- 6.28 For example, we assume that remedies imposed in the PIMR market apply and that therefore BT is required to provide unrestricted access to its ducts and poles (i.e. the unrestricted PIA remedy) everywhere in the UK no later than one month from the date of publication of the statement.

⁴²⁹ We address this point in Annex 10 (Indicative dig cost model).

⁴³⁰ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraphs 6.5-6.13.

⁴³¹ We address Openreach’s view that our SMP assessment did not follow a modified greenfield approach below when we set out our finding that BT has SMP in each of the Metro Areas and in the High Network Reach areas in the rest of UK.

We consider evidence on different SMP criteria in the round

- 6.29 The EC SMP Guidelines set out a non-exhaustive list of criteria to be considered in an SMP assessment, and state that a dominant position may derive from a combination of these criteria, which taken separately may not necessarily be determinative.⁴³² Evidence on the most relevant SMP criteria should be considered in the round, and findings should not be based on an assessment of a single criterion.
- 6.30 In our assessment of competition in the relevant market, we have had regard to the criteria for assessing SMP set out in the EC SMP Guidelines. We consider that the following criteria are particularly relevant to the assessment of SMP in CI Access markets:
- market shares and market share trends;
 - control of infrastructure not easily duplicated;
 - economies of scale and scope;
 - barriers to entry and expansion;
 - absence of potential competition; and
 - absence of or low countervailing buyer power.
- 6.31 We take into consideration the potential impact of unrestricted PIA on BT's market power over this review period under our assessment of potential competition.
- 6.32 Hyperoptic strongly disagreed with what it considered to be the focus on the presence of rival infrastructure as the main factor determining the prevailing conditions of competition in a given location.⁴³³ We consider that the presence of rival infrastructure is indeed an important factor in determining competitive conditions and, hence, we reflect it in our market analysis. However, we are of the view that we have also given adequate consideration to other factors (e.g. service shares and barriers to switching) by considering all the evidence in the round.
- 6.33 We set out our approach to assessing each criterion in turn in the following sub-sections.

Market shares⁴³⁴

Role of service shares

- 6.34 The EC SMP Guidelines note that when assessing the market power of an undertaking it is important to consider market shares.⁴³⁵ Market shares – and trends in market shares – are a measure of the outcome of competition, and as such, can provide an indication of how

⁴³² EC SMP Guidelines, paragraph 58.

⁴³³ Hyperoptic's response to the 2018 BCMR Consultation, pages 3-6.

⁴³⁴ TalkTalk indicated that there is no evidence that BT's market share and, hence, market power has been diminishing over time (TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.102-2.106). Similarly, Vodafone argued BT's market shares in the CLA have risen since 2016 (Vodafone's response to the 2018 BCMR Consultation, paragraph 6.1.3). As set out below under section "We cannot present reliable estimates based on circuit inventory", in 2016 BCMR the inventory of connections suffered from methodological issues. Notwithstanding, the market shares we present in this statement are not comparable to those we presented in the 2016 BCMR statement because we followed different methodologies and because the geographic markets are not the same (with the exception of the CLA).

⁴³⁵ EC SMP Guidelines, paragraph 54.

competitive a market has been in the past, and is now. Where an undertaking has a persistently large market share, this usually points to impediments to effective competition being present. Where impediments, as in many cases, do not change over time, market shares can be a good indicator of competitive conditions in the future.

6.35 For example, the EC SMP Guidelines mention that:

“When considering the market power of an undertaking it is important to consider the market share of the undertaking (48) and its competitors as well as constraints exercised by potential competitors in the medium term. Market shares can provide a useful first indication for the NRAs of the market structure and of relative importance of the various operators active on the market. However, the Commission will interpret market shares in the light of the relevant market conditions, and in particular of the dynamics of the market and of the extent to which products are differentiated (49).”⁴³⁶

6.36 We regard the following from the EC SMP Guidelines of particular relevance⁴³⁷:

- very large market shares in excess of 50% are in themselves evidence of a dominant position, save in exceptional circumstances;
- dominance concerns can also arise at lower shares depending on the difference between the market shares of the undertaking in question and that of its competitors; and
- if market share is high but below the 50% threshold, NRAs should rely on other key structural market features to assess SMP.⁴³⁸

We present service shares based on new customer ends connected in 2017

6.37 We present service shares for BT and rival operators for each geographic market. Broadly, the greater the number of rivals that have managed to attain a material share of supply, the stronger is the indication that the intensity of competition is greater.

6.38 Our analysis is based on the data obtained using our statutory information gathering powers from operators on the new connections they sold in 2017.⁴³⁹ We estimate service shares based on the new CI customer ends connected in 2017 and our approach is explained in Annex 12.⁴⁴⁰ For brevity, we refer to this as ‘2017 new customer ends’ when presenting the results in this section. The data include connections provided to new customers including circuits provided when customers upgrade their bandwidth requirement.

⁴³⁶ EC SMP Guidelines, paragraph 54.

⁴³⁷ EC SMP Guidelines, paragraphs 53-57.

⁴³⁸ The EC SMP Guidelines state that the European Commission’s experience is that market shares of less than 40% means that dominance is not likely. Explanatory note to the EC SMP Guidelines (SWD(2018) 124), page 23, http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=51927 [accessed 30 October 2018].

⁴³⁹ Telecoms providers’ responses to the 1st BCMR s.135 notice. The data includes detailed information for each new connection such as the location of both ends of the circuit, interface and bandwidth sold and whether the circuit was provided on-net or off-net. Annex 12 describes the data gathered and the data cleaning process undertaken to calculate the service shares.

⁴⁴⁰ Customer ends refer to leased lines circuit ends terminating at customer premises.

- 6.39 We consider service shares of 2017 new customer ends to be a reasonable measure for a forward-looking assessment of SMP. While service shares of the circuit inventory may be a more complete measure of past competitive conditions, new connections focus on the most recent activity and so are likely to better reflect future market dynamics. In addition, the number of 2017 new customer ends is large enough to provide meaningful service shares across the different geographic markets. The data contains around 63k customer ends in the UK excluding the Hull Area, the majority of which are in BT Only and BT+1 areas. The CLA, the Metro Areas combined and High Network Reach areas in the rest of the UK each have more than 1,700 customer ends. This is a large enough sample to produce statistically robust results.⁴⁴¹
- 6.40 We disagree with Openreach's view that we have provided no evidence that 2017 new customer ends data are a plausible basis for forecasting future competitive conditions.⁴⁴² As set out earlier, the EC Guidelines recognise the importance of considering service share trends in dynamic markets. We consider this to be consistent with our view that the most recent activity may better reflect competition going forward. We have also considered whether in practice 2017 new customer ends can produce robust results based on the sample size. Furthermore, as we set out in Annex 12, we consider the reliability of the circuit inventory data is limited.

We cannot present reliable estimates based on circuit inventory

- 6.41 We cannot present reliable estimates of service shares and service share trends based on circuit inventory due to data limitations. We obtained this data from operators using our statutory information gathering powers. However, we found serious issues with Virgin Media's inventory data that have rendered its data unreliable (explained in Annex 12).⁴⁴³ As the second largest infrastructure network in the UK after BT, Virgin Media's data is key to our ability to reliably estimate service shares.
- 6.42 We disagree with Openreach's view that we should have calculated service shares in all areas on the basis of the full inventory of connections. In the absence of the data issues described in Annex 12, we would have presented service shares of CI Access circuits based on inventory data as a primary measure.⁴⁴⁴ We would also have looked at new connections data as they would inform our view on market trends, which is also relevant to a forward-looking assessment.

⁴⁴¹ The number of 2017 new customer ends in each of the Metro Areas is between 279 and 479 ends. Openreach's service shares are consistently above 56% in each area (i.e. our finding will not be sensitive to small changes in service share results). In light of this evidence, we disagree with Openreach's view that the number of 2017 connections is too small to support any conclusions and that a slight biasing of the records could have a significant impact on the shares in a particular Metro area.

⁴⁴² Openreach's response to the 2018 BCMR Consultation, page 109, paragraph 9.

⁴⁴³ The issues identified also applied to the Virgin Media circuit inventory data we used to estimate service shares for 2016 BCMR. We consider that the issues with the data and how we adjusted for missing data in our previous review are likely to have contributed to overstating Virgin Media's service share and consequently understating that of BT, particularly for VHB services where circuit volumes are small. See Annex 12 for more details.

⁴⁴⁴ Considering service shares based on 2017 new customer ends is particularly relevant for VHB circuits as described in Annex 14.

- 6.43 Notwithstanding our reservations on circuit inventory data, we also present inventory service shares as a sensitivity. Even though they are likely to understate BT’s service shares, BT’s service share in each geographic market defined is consistent with an SMP finding.
- 6.44 We recognise BT Group’s argument that inventory service shares may be a less reliable indicator of Openreach’s future market power than it has been in past market reviews due to the introduction of unrestricted PIA.⁴⁴⁵ We consider that this may also apply to new connections service shares and we take it into account in our assessment of potential competition and our final SMP findings.

We consider the data on 2017 new customer ends to be reliable

- 6.45 We recognise the risk that 2017 new customer ends may be a less reliable indicator of market power if certain operators have carried out an abnormal volume of activity in 2017. However, from our discussions with stakeholders and from the responses to the 2018 BCMR Consultation we have no evidence to believe that this is the case. In particular, we have investigated Openreach’s arguments that 2017 new customer ends overstate its service shares. We discuss below each of the points raised by Openreach in this area.
- 6.46 Openreach indicated that “a good proportion” of the volume of its 2017 new customer ends does not represent new demand but churn from one retail telecoms provider on the Openreach network to another retail provider on the same network and, hence, we have overstated its service shares.⁴⁴⁶
- 6.47 Churn between customers on the Openreach network should be reflected in service shares as this constitutes new sales for the retail provider when they had to make a decision as to which network to use – their own, that of Openreach or another wholesale provider. The fact that a high proportion were churn within the Openreach network provides valuable information about both Openreach’s past and current market position.
- 6.48 Openreach argued that its 2017 new customer ends volume was around 6.5% higher due to the circuit backlog where Openreach completed orders in 2017 that had been placed in earlier years.⁴⁴⁷
- 6.49 We recognise that Openreach’s volumes may be slightly higher in 2017 due to a backlog of orders. However, we do not think these orders should be removed from service shares as they represent circuits delivered in 2017 and customers did not switch to alternate suppliers despite in some cases long delays in delivery. Moreover, any increase in volumes would not have a material impact on BT’s service shares, which will still be broadly the same if we were to remove those circuits.⁴⁴⁸

⁴⁴⁵ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, chapter 3, paragraph 3.47.

⁴⁴⁶ Openreach’s response to the 2018 BCMR Consultation, page 110, paragraph 11.

⁴⁴⁷ Openreach’s response to the 2018 BCMR Consultation, page 110, paragraph 15.

⁴⁴⁸ For example, we have estimated that between [x] % (in the UK as a whole) and [x] % (in Glasgow) of the volume of Openreach 2017 new customer ends data were indeed placed in years prior to 2017 (i.e. they were part of the backlog). Removing these backlog orders from Openreach’s volume of 2017 new customer ends implies a reduction in Openreach’s service shares of 2017 new customer ends of between [x] percentage points in Leeds (from [x] % to [x] %) and [x] %

- 6.50 Openreach stated that its 2017 new customer ends data included migrations (i.e. upgrades and regrades), whereas it suspected that the equivalent data from other providers would not and, hence, Openreach’s service shares of 2017 new customer ends would be overstated.⁴⁴⁹ We have investigated this point and confirmed that the 2017 new customer ends data from all providers include migrations.
- 6.51 We also disagree with Openreach that using service shares for a single year is not representative due to lumpy or irregular contracts.⁴⁵⁰ There were over 60,000 orders in 2017, which is a sufficiently large sample to ease lumpy contracts. In addition, we would expect some large and irregular contracts in each year and Openreach has not provided any examples of contracts which may have this distorting effect. In addition, shares of 2017 new customer ends are likely to be closely related to shares based on the total volume of circuits inventory, as they include upgrades (and regrades) and circuits are upgraded on a regular basis. Our analysis of Openreach’s data indicates that new connections make up [redacted] 21-30% of the total volume of actively provided circuits as of December 2017.

Control of infrastructure not easily duplicated

BT has a significant advantage from being closer to customer sites

- 6.52 BT has by far the largest and the only ubiquitous network in the UK. Virgin Media owns and operates the largest physical network out of BT’s rivals. Other operators have built fibre networks to gain some coverage of business areas (e.g. Vodafone, Colt, [redacted], CityFibre and Zayo). These networks have typically been built in areas with high densities of potential business users (most notably in central London but also in some other large cities) and on aggregated trunk routes between major population centres (see Section 5).
- 6.53 BT’s ubiquitous network gives it an advantage over other operators as it will more often have a physical infrastructure connection to customer sites. Our analysis shows that BT had existing duct connections to [redacted] 81-90% of its 2017 new customer ends in the UK excluding the Hull Area, compared to 46% across all rivals, collectively.⁴⁵¹ Vodafone mentioned that [redacted].⁴⁵² We were unable to estimate the exact figure for rivals due to data limitations.
- 6.54 BT has a significant cost advantage when it is fibre- or duct-connected while rivals are not. If BT has an existing fibre connection to the customer, the incremental infrastructure cost of connecting to that customer is negligible. If BT only has a duct connection, it will incur a relatively low incremental cost when it provides new fibre connections, often by laying fibre in duct which already reaches the customer site. The incremental cost will vary

percentage points in Glasgow (from [redacted] to [redacted]) in Openreach’s service share. We have classified an order as being in the backlog if it was placed and acknowledged before our regulation in BCMR 2016 began (i.e. 1 May 2016). This includes both orders that were taking longer than they should have and had been in Openreach’s ‘workstack’ for some time (the “backlog”), as well as orders that had been placed just before 1 May 2016, so will overstate the size of the backlog.

⁴⁴⁹ Openreach’s response to the 2018 BCMR Consultation, page 110, paragraph 15.

⁴⁵⁰ Openreach’s response to the 2018 BCMR Consultation, page 110, paragraph 15; and page 111, footnote 167.

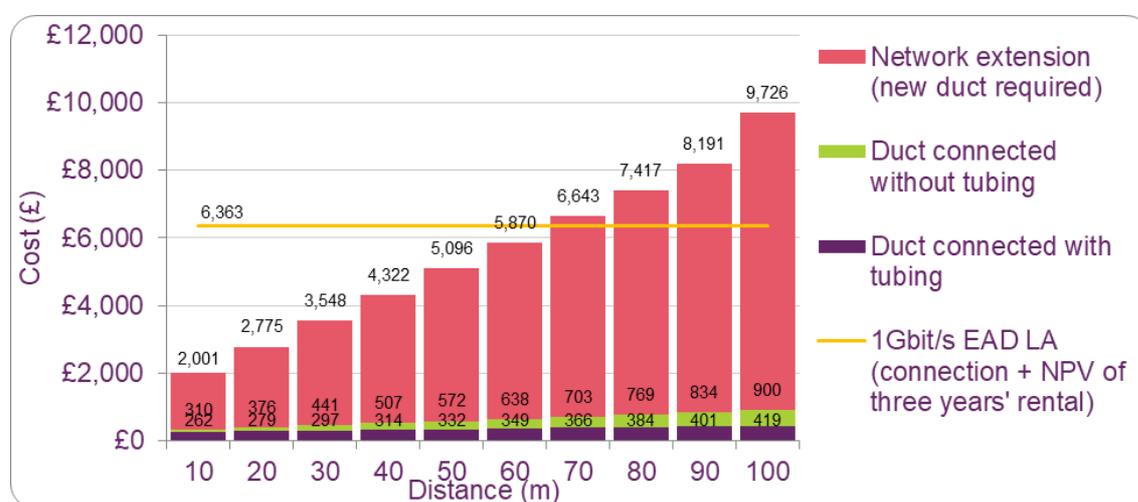
⁴⁵¹ The analysis and findings are set out in Annex 11.

⁴⁵² Vodafone’s response the 2018 BCMR Consultation, part 1, paragraph 3.11.7.

depending on whether the telecoms provider just needs to blow fibre through the duct or also needs to add fibre tubing.⁴⁵³ On the other hand, rivals will incur significant additional costs, even if they need to dig short distances.⁴⁵⁴

6.55 We assess the scale of this advantage by comparing the indicative cost of physically connecting a customer under different scenarios.⁴⁵⁵ Our analysis is set out in detail in Annex 10. The analysis is based on Openreach’s costs for the physical infrastructure required to extend its network.⁴⁵⁶ When a provider is duct-connected, the incremental cost will vary depending on whether the telecoms provider has fibre tubing. When the provider has no physical connection to the site and needs to extend its network, the main incremental costs will be digging to install duct in the ground. The results are summarised in Figure 6.1.

Figure 6.1: Infrastructure costs for different distance scenarios



Source: Ofcom analysis. Physical infrastructure costs are based on Openreach’s ECCs and price of 1 Gbit/s EAD LA is based on Openreach’s list price as of May 2019.⁴⁵⁷

6.56 These results show that BT will have a significant cost advantage even at short dig distances. We estimate that for a network extension of 10m BT will have a cost advantage of approximately £1,700.⁴⁵⁸ This cost advantage is around one-quarter of the revenue of a

⁴⁵³ As part of our discussion on network extensions, in Annex 10 we set out what we mean by “blow fibre through the duct or also needs to add fibre tubing”.

⁴⁵⁴ Even if all operators are not duct-connected (including BT), BT may still have a cost advantage if it is closer to the customer site due to lower costs of network extensions.

⁴⁵⁵ This excludes equipment costs as it does not affect our analysis.

⁴⁵⁶ We recognise that rivals’ costs may be different from Openreach’s (they are likely to be higher e.g. as Openreach may benefit from bulk discounts). However, we consider that Openreach’s costs are a reasonable proxy for rivals’ costs for this analysis. This is because we are interested in the scale of costs incurred for network extensions rather than a precise quantification of that cost.

⁴⁵⁷ We include ECCs on survey, blown fibre tubing, blown fibre, digging a duct under a footway, digging a duct under a carriage way, new footway box, break through external wall(s) at the customer premises. See Annex 10 for more details.

⁴⁵⁸ This is calculated by comparing a cost of £262 for BT (as it is usually duct-connected with tubing) against a cost of £2,001 for a rival, which would probably need to extend its network to reach the customer.

three-year contract for a 1 Gbit/s EAD LA circuit (£6,363).⁴⁵⁹ The scale of the advantage increases with the length of network extension (e.g. 1km network extensions cost around £86,000 compared to around £7,000 if the provider is duct-connected with no fibre tubing). BT’s advantage will also be higher when it has an existing fibre connection to the customer site as it will incur minimal cost (as set out above, [redacted]).

6.57 In addition to this cost advantage, BT will also be better placed to compete due to customer convenience. When BT is fibre-connected it can readily serve the customer. Where it is duct-connected the time taken to supply a customer will be much shorter compared to the time taken if a network extension is required. As explained in Section 4, digging increases the time to supply a customer, hence, networks which are further away from the customer site are at a disadvantage to BT.⁴⁶⁰

6.58 This is supported by the evidence set out in Annex 11. In summary, this evidence shows that:

- on average, duct activity can increase the time to supply a leased line to [redacted] working days. This is [redacted] than the mean time to provide for all orders ([redacted] working days on average), and for fibre-connected orders ([redacted] working days on average); and
- leased line users consider lead times and certainty about delivery dates are an important factor when choosing a supplier. The BDRC 2016 study found that a majority of respondents (51%) choose their existing supplier because they are already connected to its network.⁴⁶¹ It also found that for respondents who said that they experienced problems when migrating to an alternative service, the most frequent obstacle was ‘time taken to deliver service/long delay in installation’.⁴⁶² This is consistent with the results from the Cartesian 2018 study which indicate that service delays are the key problem faced by leased line customers.⁴⁶³

6.59 With regards to TalkTalk’s view that [redacted],⁴⁶⁴ we are of the view that these costs are indeed difficult to capture. However, we consider that the BDRC study is a reasonable way to do so.

Likely impact of unrestricted PIA remedy

6.60 We set out our views on the likely impact of unrestricted PIA on leased line services over this review period in Annex 6. In summary, our view is that:

⁴⁵⁹ Ofcom analysis based on Openreach prices for EAD Local Access as of October 2018 (where £6,363 = £1,850 connection + £4,513 NPV rental over three years). Rental charges have been discounted using a 7.9% factor.

⁴⁶⁰ The competitive advantage due to customer inconvenience is less clear cut when all suppliers are not connected. The time to supply is not necessarily proportionate to the dig distance required.

⁴⁶¹ 2016 BDRC study, Figures 23 and 24.

⁴⁶² Virgin Media cautioned “the overreliance on this [BDRC] data given the extremely small sample size, both overall, and in relation to sub-categories of customer... Virgin Media considers that the information presented in the survey should not be regarded as significant or conclusive of any trend in itself.” (Virgin’s response to the 2018 BCMR Consultation, response to question 6.1 and 6.2). We are conscious of the limitations of the BDRC data and are of the view that we do not overrely on it by considering it as just one piece of evidence on BT’s advantage from proximity.

⁴⁶³ 2018 Cartesian study, page 7.

⁴⁶⁴ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 2.102-2.106.

- Telecoms providers' ability to access BT's ducts and poles on regulated terms and combine them with their own network to reach final customers will reduce the cost and time taken for network extensions.
- Unrestricted PIA is likely to be used by rivals for three types of network extensions which could impact on leased lines: mass network rollout, infill, and bespoke network extensions.⁴⁶⁵
- This impact on costs and time to supply under each of these scenarios is likely to vary, particularly in the short term.

6.61 We expect that the main impact of unrestricted PIA will be to encourage network deployment in the form of mass network rollout and infill extensions rather than bespoke network extensions. This, combined with the time it is likely to take for providers to commence service supplied using unrestricted PIA, means that its impact in this review period is most likely to be most pronounced in areas with higher network density already:

- While mass rollout could begin in this review period in any area, its main competition impact is likely to be beyond the timeframe of this review period given the time it takes to plan and build the network from scratch (even with unrestricted PIA);
- We consider that unrestricted PIA could have its greatest impact in this review period for network infill, by virtue of existing network nearby, which means the time to supply will be shorter. Network infill is relevant for areas with existing network density; and
- We consider that bespoke network extensions will be limited. As set out in Annex 6, bespoke network extensions are resource and time-intensive and unlikely to occur at scale. They are particularly unlikely to be material in BT Only areas given the longer distances to rival network.

6.62 Therefore, we agree with BT Group that the availability of unrestricted PIA may have an impact on the strength of competition faced by BT in the CLA and other HNR areas over this review period. This is because network infill extensions are likely to be a particular feature in the CLA and HNR areas. This means that, as a result of unrestricted PIA, BT's advantage from having control of infrastructure and being closer to customer sites is likely to be lessened in the CLA and HNR areas.

Infrastructure indicators used to assess proximity of rival infrastructure to customer sites⁴⁶⁶

6.63 The magnitude of BT's competitive advantage and the strength of competition it faces in a given area will depend on the proximity of rival networks to customer sites. Therefore, we consider four infrastructure indicators in the SMP assessment:

⁴⁶⁵ Under a mass network rollout, the network is constructed to pass multiple premises, with the final connection only made once an order has been received. Under infill deployment, telecoms providers would fill gaps between areas where they already have network coverage. Bespoke network extensions involve providing a single extension to connect a premise in cases where existing network does not currently 'pass' or is not near to the premise.

⁴⁶⁶ All distances measured by the infrastructure indicators are radial distances. In particular, Annex 12 sets out how we measure the distances used in the Network Reach analysis and distance to nearest rivals and Annex 11 sets out our analysis of distances dug by telecoms providers in 2017.

- Average number of rivals within 50m of business sites (network reach): As set out in Section 5, this provides a useful indication of the degree of rival infrastructure available close to customer sites in a particular geographic area, and hence is a good starting point for assessing areas with existing or potential for infrastructure-based competition.⁴⁶⁷ It calculates, for each postcode sector in the UK, the number of operators other than BT that have network within a certain distance of the business sites in that postcode sector.⁴⁶⁸
- Proportion of businesses with X rival networks within 50m: Network Reach captures the average degree of choice across an area. Looking at the proportion of business sites within an area that are covered by a specified number of rival networks is one means of adding depth to the analysis.
- Proportion of 2017 new customer ends with existing duct connections: The intensity of competition will vary depending on the extent to which BT already has existing duct to customer sites compared to its rivals. For each operator, we estimate the proportion of 2017 new customer ends which were provided on-net (i.e. using their own network) without undertaking any duct work. The analysis is set out in detail in Annex 11.⁴⁶⁹
- Average distance from business sites to nearest rivals. Where rivals are not connected, the intensity of competition not only depends on the number of rival networks within 50m, but also on how close they are to the customer site. Therefore, looking at how close rivals are to average business sites adds depth to our assessment.

6.64 We present our views on the potential impact of unrestricted PIA under our assessment of potential competition. As set out earlier and in Section 5 we do not expect the availability of unrestricted PIA to have a material impact on bespoke network extensions (i.e. individual connections to reach a give customer site) over this review period.

Our interpretation of the infrastructure indicators

6.65 The infrastructure indicators inform our views on the strength of competition from providers with network sufficiently close to a customer's site. Each indicator provides a useful means of summarising the degree of rival infrastructure in a particular area, but it does not give a comprehensive picture of the extent of rival network coverage on its own.

6.66 We consider that 50m is a useful indicator for identifying the potential for competition from local rival networks in CI Access services. However, not all suppliers with networks located within this distance would be equally able to compete with BT. As explained earlier in this section, suppliers within this distance may still be at a material competitive

⁴⁶⁷ For more details on the assumptions and calculations underlying the network reach analysis see Section 5 and Annex 12.

⁴⁶⁸ We have carried out sensitivity analysis on the assumptions for the different parameters used in the network reach analysis in Annex 13. We find that changes in these parameters would not have a material impact on our SMP findings.

⁴⁶⁹ Our analysis is based on the 2017 data for new connections of CI Access obtained from telecoms providers in responses to the 1st BCMR s.135 notice.

disadvantage to BT if their network is located further away from the customer while BT has an existing connection.

6.67 In addition, it is necessary that BT faces competition for most customers in a given geographic market for it to be effectively competitive. One reason is that, in an unregulated market, there would be scope for a telecoms provider with SMP to exploit pockets of market power through bespoke pricing.

6.68 Finally, a greater number of rival networks is likely to lead to a greater degree of competitive constraint on BT. We consider that fewer than two rivals is insufficient to act as a potentially effective competitive constraint on BT.

Economies of scale and scope⁴⁷⁰

6.69 A large proportion of costs associated with providing leased lines are incurred in developing (and maintaining) the part of the infrastructure that connects to sites, i.e. access links. Some of these costs will only be incremental to the individual site (final lead-in duct), while others can be shared among several sites in the same area (distribution and spine ducts).⁴⁷¹

6.70 Against this backdrop, economies of scale and scope may strengthen BT's advantage from its ubiquitous network. The presence of high fixed costs can give rise to economies of scale because average fixed costs necessarily fall as volumes of a service increase. The presence of common costs can give rise to economies of scope with the average fixed cost decreasing in the total volumes of services in the group supplied.

6.71 The materiality of BT's advantage from economies of scale and scope in a given geographic market will depend on the extent to which rivals in a given area use their networks to serve a broadly similar scale of leased line customers (economies of scale) or residential broadband customers (economies of scope). We recognise the importance of economies of scope and, as set out in Section 1, we want to enable more fibre investment by alternative network operators and Openreach alike to deliver multi-service networks.

Barriers to entry and expansion and absence of potential competition

6.72 We consider that an incumbent operator can maintain its strong position in the market if there are high barriers to entry and limited prospects for potential competition.

6.73 The EC SMP Guidelines mentions that "An SMP finding depends on an assessment of the ease of market entry".⁴⁷² We consider the following factors particularly relevant to our assessment:

⁴⁷⁰ We define economies of scale as circumstances in which the unit cost falls as volumes of the same service increase, and economies of scope as circumstances where the unit cost falls as volumes of a different service increase.

⁴⁷¹ Distribution/spine networks provide duct coverage in a local area, typically running past customer sites in anticipation of future connections. Lead-in ducts provide the final link between the customer building and the distribution/spine network.

⁴⁷² EC SMP Guidelines, paragraph 59.

- The existence of high sunk costs. This is consistent with the OFT’s guidelines on the assessment of market power, which explain that:
“Sunk costs might give an incumbent a strategic advantage over potential entrants. Suppose an incumbent has already made sunk investments necessary to produce in a market while an otherwise identical new entrant has not. In this case, even if the incumbent charges a price at which entry would be profitable (if the price remained the same following entry), entry may not occur. This would be the case if the entrant does not expect the post-entry price to be high enough to justify incurring the sunk costs of entry”.⁴⁷³
- High switching costs: Existing customers may incur – or anticipate incurring – costs when switching to another supplier, which they would not incur when continuing to purchase from their current supplier. This will hinder the ability of rivals to compete for existing customers.
- BT’s network footprint: We assess whether BT’s national coverage, due to its ubiquitous network, is likely to raise significant impediments to its rivals when competing for multi-site contracts. We also consider whether any other advantages may arise from BT’s ubiquitous network.

6.74 We assess the prospects for potential competition by reviewing evidence on potential network expansion by telecoms providers. Competition is more likely to increase where there have been actual announcements of plans to enter and/or expand by rivals.

6.75 We consider that network expansion plans over the market review period (i.e. until 31 March 2021) are relevant to our SMP assessment. We asked fixed operators to tell us about their future investment plans using our statutory information gathering powers.⁴⁷⁴

Potential impact of unrestricted PIA remedy

6.76 We agree with BT Group that the availability of unrestricted PIA may have an impact on the strength of competition faced by BT in some areas. Therefore, we have revisited our approach to the SMP assessment in light of this.

6.77 Annex 6 sets out our view on the impact of unrestricted PIA on wholesale business connectivity markets over the period of this market review, including CI Access services. In summary, we consider that over this review period unrestricted PIA is likely to have some impact on the competitive constraints faced by BT in the CLA and to a lesser extent, HNR areas but not a material impact in BT Only and BT+1 areas.

6.78 We reflect this in our SMP assessment for each geographic market below.

⁴⁷³ OFT, 2004. *Assessment of market power* (OFT 415), paragraph 5.10.

<https://www.gov.uk/government/publications/assessment-of-market-power> [accessed 30 October 2018].

⁴⁷⁴ 1st BCMR s.135 notice, Q.C3.

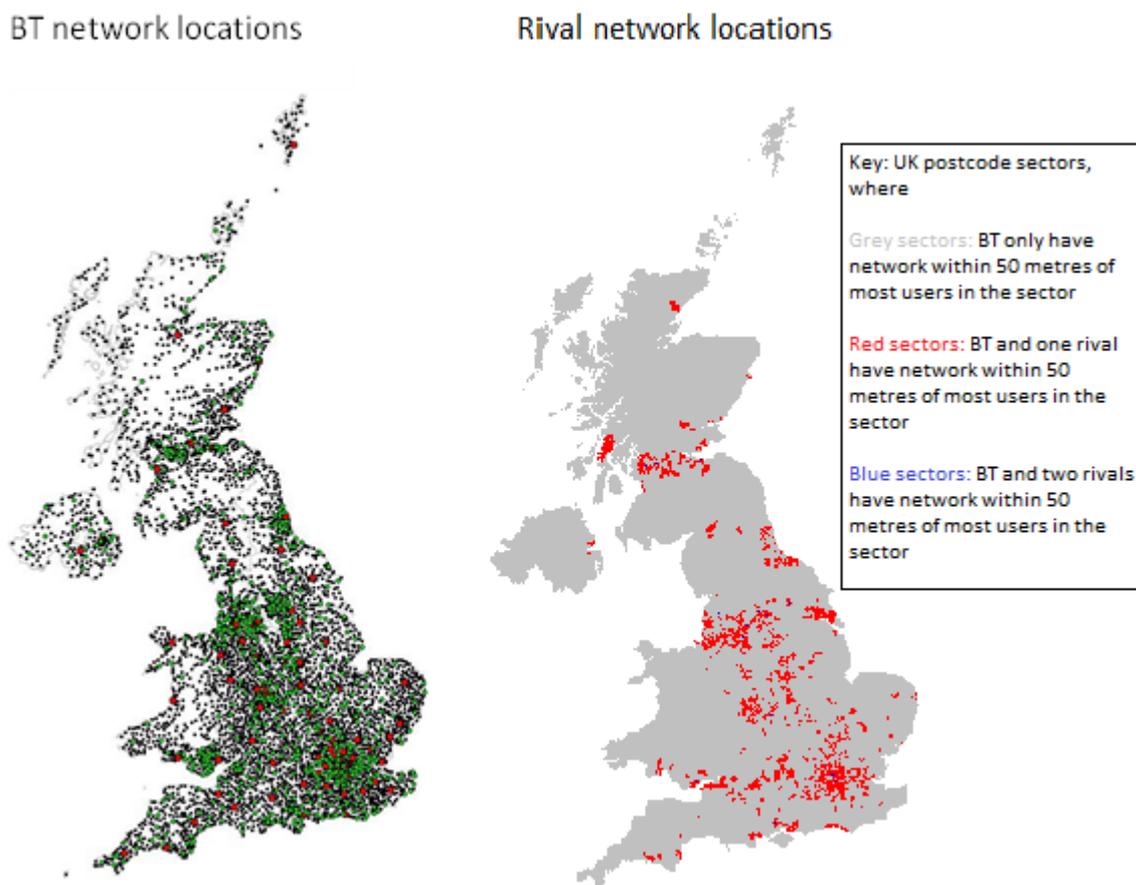
Countervailing buyer power

- 6.79 We consider that customers would have a degree of buyer power where they purchase large volumes and have a credible threat to switch supplier or to meet requirements through self-supply. CI Access customers may have sufficient countervailing buyer power if there is availability of another source of supply (another supplier or self-supply) and their purchase volumes are material. Both of these requirements need to be met cumulatively.

Finding that BT has SMP in BT Only and BT+1 areas

- 6.80 We have considered whether BT has SMP in BT Only and BT+1 areas. The BT Only market is made up of postcode sectors where less than 65% of large business sites have a rival network to BT within 50m. BT+1 is made up of postcode sectors where more than 65% of large business sites have only one rival network to BT within 50m. To avoid repetition we discuss both markets together. However, we present results for each market separately.
- 6.81 Figure 6.2 shows the locations of BT Only and BT+1 postcode sectors. It maps BT's network locations across the UK (on the left) to rivals' network presence (on the right), which is based on the network reach results. This shows that BT has an extensive network of ducts across the UK, while rival infrastructure is patchy and concentrated around some geographic areas.

Figure 6.2: BT and rival’s network locations in the UK (excluding Hull Area)



Source: Ofcom analysis. BT’s network locations from 2016 BCMR Statement and include 5,600 local exchanges (black dots), 1,100 higher tier Access Serving Nodes (green dots), and 107 Openreach Handover Points (red dots). Rival network locations is based on Ofcom’s network reach analysis (See Section 5 and Annex 12).

6.82 As set out in Section 5, the BT Only market accounts for over half of the postcode sectors in the UK (5,906 postcode sectors) and the BT+1 market accounts for a further one-third of postcode sectors in the UK (3,489 postcode sectors). We estimate that the BT Only market accounts for 48% of 2017 new customer ends (30k customer ends) and that BT+1 areas account for 33% of 2017 new customer ends (21k customer ends).

Very high BT market share of 2017 new customer ends in both markets

6.83 BT has a very high share of 2017 new customer ends sold in BT Only and BT+1 markets. We estimate BT’s share to be [X]% 81 - 90% and [X]%, 61-70% respectively. The shares of its largest rival (Virgin Media) are materially lower, at [[X]% 11-20% and [[X]% 21-30% respectively.

6.84 This is broadly consistent with the sensitivity analysis we carried out by estimating service shares based on circuit inventories. Notwithstanding that our estimates are likely to materially understate BT’s service shares and overestimate Virgin Media’s shares, BT still has a high share of over 50% in BT Only and BT+1 markets ([X]% 71-80% and [X]%

51-60% respectively), while Virgin Media's share is materially lower, at [redacted]% 11-20% and [redacted]% 31-40% respectively.

- 6.85 According to the EC SMP Guidelines, a share in excess of 50% is itself evidence of a dominant position, save in exceptional circumstances.

Limited presence of rival infrastructure

- 6.86 Infrastructure indicators show that there is very limited rival infrastructure in the BT Only and BT+1 geographic markets. This supports the view that BT faces very limited infrastructure-based competition in those markets. The results are summarised in Table 6.3 overleaf.
- 6.87 The table shows that, on average, there are less than two rivals within 50m of a business site in both markets. A small proportion of business sites have access to two or more rival networks within 50m (3.7% in BT Only and 15.0% in BT+1).
- 6.88 Our analysis suggests that rivals will usually need to dig very long distances to connect a customer site. Rivals, on average, had existing duct connections for a smaller proportion of customer ends they connected in 2017 compared to BT. In addition, rival networks are typically more than 50m away from a customer site. On average, the closest rival network to a business site is more than 1km away in BT Only areas and 63m away in BT+1 areas. Rivals are unlikely to dig such long distance due to the high cost of network extensions.⁴⁷⁵
- 6.89 This is supported by rivals' behaviour in 2017 in both markets. Rivals in BT Only and BT+1 areas, on average, chose to build in less than 15% of their 2017 new customer ends where they did not already have an existing duct connection and the median distance dug was short (less than 25m).
- 6.90 We note that the proportion of Virgin Media's 2017 new customer ends with existing duct connections is significantly higher than the average across all rivals ([redacted]% 51%-60% and [redacted]% 81%-90% in BT Only and BT+1, respectively). This reflects that Virgin Media is the second largest provider with physical infrastructure network in the UK after BT, hence has existing duct connections to more premises compared to other rivals. It can also partially reflect that our calculation may overstate Virgin Media's estimates of duct connections.⁴⁷⁶

⁴⁷⁵ For example, a network extension of 1km costs £86k and for 60m costs around £6,000. (See Figure 6.1).

⁴⁷⁶ Where a telecoms provider indicated that a circuit was provided on-net but did not indicate whether it involved digging, we assumed that the customer ends had existing duct in place. For a significant majority of Virgin Media's on-net circuits there is no information on whether they had to dig to connect the customer.

Table 6.3: Infrastructure indicators in BT Only and BT+1 markets

Infrastructure indicator		BT Only	BT+1
Average number of rival networks within 50m		0.3	1.0
Proportion of businesses with X rival networks within 50m ⁴⁷⁷	X=0	76.9%	15.5%
	X=1	19.4%	69.5%
	X=2	3.0%	12.3%
	X=3	0.5%	2.1%
	X=4 or more	0.2%	0.5%
Average distance to the nearest three rival networks for 2017 connections	1 st	1.1km	0.063km
	2 nd	2.6km	0.33km
	3 rd	4.8km	0.86km
Openreach's proportion of 2017 new customer ends already duct connected		[<] (81%-90%)	[<] (81%-90%)
Rivals' breakdown of 2017 new customer ends ⁴⁷⁸	Customer ends	[<]	[<]
	On-net duct connected	29%	51%
	On-net dig	4%	6%
	Off-net	65%	42%
Rivals' build vs. buy ⁴⁷⁹		6%	12%
Median radial distance dug in 2017 (m)	Openreach	[<] (0-25)	[<] (0-25)
	Rivals	19	13

Source: Ofcom's network reach analysis and circuit data analysis. Annex 12 provides a more detailed description and explanation of the analysis undertaken.

6.91 Our estimates suggest that Virgin Media's proportion of new customer ends with existing duct connections is not materially lower than BT in the BT+1 market. We do not consider that this undermines our view that BT has a competitive advantage from being closer to customer sites. Notwithstanding our concerns around potentially overstating Virgin Media's estimates, they are likely to reflect Virgin Media's incumbency advantage when competing for customers within their network reach rather than competing for new customers in locations that are not close to their network. This is supported by BT's ability to win a materially higher proportion of the 2017 new customer ends indicating BT's more extensive network (see service share analysis above). In addition, Virgin Media purchased a large proportion of its off-net sales in 2017 from Openreach, which further indicates BT's competitive advantage.

⁴⁷⁷ Results may not add to 100% due to rounding.

⁴⁷⁸ 'On-net duct connected' is where a telecoms provider has existing duct in place to the customer site, but fibre may need to be installed. 'On-net dig' is where a telecoms provider extends their network by building new duct. 'Off-net' is where an active wholesale leased line product is purchased from another provider to reach the customer. Further information may be found in Annex 11.

⁴⁷⁹ We determine rivals 'build' (on-net dig) as a percentage of rivals 'build' (on-net dig) plus rivals 'buy' (off-net) in relation to the supply of a leased line to a customer's site outside their existing network reach. Further information may be found in Annex 11.

- 6.92 Second, even if we assume that Virgin Media’s network was as extensive as BT’s in the BT+1 market, the potential for infrastructure competition from a single provider will not be sufficient to effectively constrain BT.
- 6.93 In reality, Virgin Media does not have a nationwide presence as BT does. This places Virgin Media at a disadvantage when bidding for multi-site contracts. This disadvantage is compounded by the fact that Virgin Media is less likely than BT to be the incumbent and, hence, is more likely to be at a competitive disadvantage when competing for customers.
- 6.94 In addition, we note that in markets where BT publishes its prices, Virgin Media has the incentive to compete by just undercutting BT’s prices slightly. This is not consistent with vigorous competition in a market with no SMP.

Economies of scale and scope

- 6.95 The pattern of infrastructure presence in BT Only and BT+1 markets means that BT will have a significant cost advantage over its smaller rivals, given the existence of economies of scale and scope.
- 6.96 We consider that BT will have economies of scale as it can split its fixed costs across a larger number of CI Access users. For example,
- Costs of access links: some will be shared among a larger number of customers at the same site (final lead-in duct) – though this situation is more likely to arise in High Network Reach areas, where multi-occupancy buildings are likely to be more prevalent, than in BT Only and BT+1 areas – and others will be shared by many customers in the same area (distribution and spine ducts).
 - Inter-exchange costs: lowest unit costs are usually achieved by purchasing the highest capacity circuit and then filling it, but only BT may have sufficient traffic to do this on some routes. The greater the number of services using an inter-exchange circuit, the lower the unit cost of that circuit.
 - Other costs: BT will purchase greater volumes of wholesale leased line equipment, hence, it may be able to negotiate lower equipment prices than providers supplying lower volumes.
- 6.97 We consider that BT will also have an advantage from economies of scope as it can recover common costs from a much larger base of business and residential customers.⁴⁸⁰ This is reflected in BT’s high shares of CI Access customers (shown above) and its high share of WLA customers (of around 80%).⁴⁸¹

⁴⁸⁰ Common costs relating to development of physical infrastructure are particularly significant in fixed telecommunications markets as telecoms providers can use the same infrastructure to supply a range of fixed telecommunications services, including leased lines.

⁴⁸¹ Ofcom, 2018. *Wholesale Local Access Market Review: Statement* (2018 WLA Statement), paragraph 4.27. <https://www.ofcom.org.uk/consultations-and-statements/category-1/wholesale-local-access-market-review> [accessed 30 October 2018].

Barriers to entry and expansion

6.98 Overall, we consider that there are high barriers to entry and expansion, which make it more difficult for rivals to BT to compete for the supply of CI Access services.

High sunk cost is a barrier to entry

6.99 Entry barriers are high because a significant part of the costs of supplying wholesale leased lines are likely to be regarded as sunk costs. The costs of extending network infrastructure to connect to sites are largely sunk as the physical network built cannot be transferred to another location if it is no longer required at the original site. In our view, the asymmetry between BT as an incumbent provider which has already incurred sunk costs in creating these networks, and potential entrants which have not, gives rise to barriers to entry.

6.100 As set out earlier, where rivals use an unrestricted PIA remedy this will reduce the cost of network extensions and hence BT's advantage. Over this review period, this is likely to be for network infill in the CLA and other High Network Reach areas.

Switching costs

6.101 We consider that there are also some costs of switching supplier that may act as an entry barrier that will place rivals at a disadvantage to BT, which has a very high share of this market.

6.102 The 2016 BDRC survey suggests that switching costs may be significant for some customers. Survey respondents were read a list of potential reasons for choosing their current supplier.⁴⁸² While the most commonly selected reasons were price, quality and resilience, results also suggest that existing relationships with a supplier play an important role. The majority of respondents cited good contacts at the current supplier (58%) and that the supplier understands their business (52%) as important criteria when choosing their provider.

6.103 In addition, the survey found that around two-thirds of respondents had not switched supplier in the last five years:⁴⁸³

- Of those that did switch suppliers almost three in five (58%) said that they found the switch to be (very or fairly) easy while 14% found it “neither easy nor difficult” and 23% found it “not very easy or not at all easy”. Just under one-third of those who had switched (31%) said that they had not incurred costs associated with switching supplier. However, among those that specified a figure, switching costs ranged from £1,000 to £25,000 – with £3,500 as the average.
- Of those who didn't switch suppliers, 44% said that they did not switch supplier because they were happy with their current service. Respondents also mentioned some barriers to switching. 13% said that they did not switch because of the cost of

⁴⁸² 2016 BDRC study, page 34.

⁴⁸³ 2016 BDRC study, pages 52 -55.

breaking their existing contract, 11% said they did not switch because it would have been too difficult or “too much hassle”.

BT’s network footprint – national coverage

- 6.104 Survey evidence suggests that the majority of large firms use a single supplier for their leased line services. For example, in the 2016 BDRC survey, 56% of respondents indicated that they use a single supplier. In an earlier survey (2015 BDRC), 66% of respondents said that they used a single supplier.
- 6.105 For multi-site contracts, suppliers may provide some circuits on-net and others off-net depending on the locations of the sites. For example, if some of the circuits are in locations where the telecoms provider does not have a nearby network (and it will be very expensive to extend the network to the customer sites) the provider may choose to supply the circuits by buying a wholesale product from another operator.
- 6.106 BT may also have an advantage in serving multi-site contracts if customers place value on knowing that a single provider supplies the physical infrastructure for the whole contract or a large part of it.
- 6.107 In addition, in the absence of wholesale regulation, BT may be the only provider able to supply multi-site contracts. In such a scenario BT would have no obligation to supply wholesale access services and may refuse to offer wholesale products to its rivals, or do so only on disadvantageous terms. This would hinder rivals’ ability to compete for a multi-site contract if the customer wants a single supplier.
- 6.108 Even if the customer is willing to deal with multiple suppliers, BT may still have an advantage. BT can leverage its market power in uncompetitive areas to competitive areas if it refuses to sell the circuits in uncompetitive areas (where the customer has no alternative supplier choice) unless the customer buys the whole contract from BT.

Other advantages from BT’s ubiquitous network

- 6.109 We consider that there are a number of other reasons why BT benefits from its more extensive network which makes it harder for other telecoms providers to win customers from BT:
- BT is less reliant on third-party supply: this reduces the possibility of interoperability issues occurring, contributes to a greater level of control over network equipment, can improve network security, and removes the need to negotiate wholesale supply arrangements with third party suppliers which may be complex and potentially influenced by whether the third-party supplier is also a downstream competitor.
 - Route diversity: Physically separate routes are required to provide a service which is resilient to faults in network infrastructure. Some users seeking high availability may value such routes. We consider BT’s extensive network infrastructure may give it greater scope to connect a customer site to two separate access points. Hence, it would be easier for BT to offer and build diverse physical routes.

Absence of potential competition

- 6.110 We consider that there are no prospects of potential competition that can effectively constrain BT in BT Only and BT+1 geographic markets by 31 March 2021.⁴⁸⁴ This is already reflected in the limited availability of existing rival infrastructure.
- 6.111 We reviewed responses from telecoms providers on their future network expansion plans over the next five years. Overall, market developments are relatively limited and will not affect the level of competition in the BT Only and BT+1 markets over this review period.
- 6.112 The majority of responses indicated extension plans that are on a very small scale or related to core networks.⁴⁸⁵ The main network expansion plans that may affect the CI Access market by 2023 are by [X] and CityFibre. They are targeting residential services; however, they may still benefit business customers:
- [X]
 - CityFibre said that its announced partnership with Vodafone drives the expansion of the network to cover approximately 1m homes with consumer FTTH and as a side effect create a dense business network as well. The plans are announced for two cities (Milton Keynes and Aberdeen) and it expects to announce a further 10-11 cities to make up the remainder of the 1m homes.
- 6.113 In contrast, [X].
- 6.114 As mentioned in Annex 6, we expect that some mass rollout and infill network extensions are likely to occur in BT Only and BT+1 areas, but it is difficult to predict exactly where, and it is unlikely to be on a material scale in this review period. Bespoke network extensions are also likely to occur but on a small scale given the time delay and resources involved.

Countervailing buyer power

- 6.115 We consider that there is insufficient countervailing buyer power to constrain BT's position as a supplier of CI Access services. This is because most businesses will have no or limited choice of supplier in BT Only and BT+1 geographic markets. Hence, customers cannot make a credible threat to switch volumes from BT to alternative suppliers.⁴⁸⁶

Conclusion that BT has SMP in BT Only and BT+1 geographic markets

- 6.116 Based on evidence in the round and having considered stakeholder responses to the 2018 BCMR Consultation, we have concluded that BT has SMP in the provision of CI Access circuits in the BT Only and BT+1 geographic markets.

⁴⁸⁴ As set out above, we consider that network expansion plans until 2021 are relevant to our assessment of potential competition.

⁴⁸⁵ Fixed operators' future investment plans (responses to 1st BCMR s.135 notice).

⁴⁸⁶ While Openreach agreed with our SMP findings for BT+1 areas, they argued that there will be many informed purchasers in BT+1 areas well capable of exerting significant countervailing buyer power (Openreach's response to the 2018 BCMR Consultation, page 117, paragraph 52). However, they have not provided any evidence to support their view.

- 6.117 This is driven by BT's very high service shares in both markets being [8<] (over 60%) of 2017 new customer ends, which supports an SMP finding. According to the EC SMP Guidelines, a share in excess of 50% is itself evidence of a dominant position, save in exceptional circumstances.
- 6.118 This finding is further supported by the very limited availability of rival infrastructure close to customer sites, high barriers to entry and expansion and the limited prospects for potential competition even in the presence of an unrestricted PIA remedy.⁴⁸⁷

Finding that BT has SMP in each of the Metro Areas and in the High Network Reach areas in the rest of UK

- 6.119 We have considered whether BT has SMP in each of the six Metro Areas that we have identified for further analysis and in the High Network Reach areas in the rest of the UK. To avoid repetition we present our analysis for those geographic markets together. However, we show results for each market separately.
- 6.120 The Metro Areas are defined as High Network Reach postcode sectors in each of Birmingham, Bristol, Edinburgh, Glasgow, Leeds and Manchester. High Network Reach areas in the rest of UK are High Network Reach postcode sectors outside the CLA, Metro Areas and the Hull Area.
- 6.121 Those geographic markets account for 3% of all postcode sectors in the UK excluding the Hull Area and account for 6% of 2017 new customer ends. Figure 6.4 shows a map of those geographic markets.

⁴⁸⁷ On average, there are less than two rivals within 50m of mobile sites in both markets (0.2 in BT Only and 1 in BT+1).

Figure 6.4: Map of High Network Reach areas in the UK (excluding the Hull Area)



Source: Ofcom network reach analysis. High Network Reach areas in the Metro areas are green dots and those in the rest of the UK are purple dots. The CLA is in red dots. We added green circles around the High Network Reach areas in the Metro Areas to be able to distinguish them.

Very high BT market share of 2017 new customer ends

6.123 Figure 6.5 shows that BT has a very high share of the 2017 new customer ends in each of the Metro Areas and the High Network Reach areas in the rest of the UK. BT's share is [X]% (over 50%) in each of those markets, which is above the threshold for presumed dominance (50%). The next largest rival ([Y]) has a significantly lower share of [Z]% (less than 40%) in any of the markets.

Figure 6.5: Service shares in Metro Areas and High Network Reach in the rest of UK

[X]

Source: Ofcom circuit data analysis

6.124 This is broadly consistent with the sensitivity analysis we carried out by estimating service shares based on circuit inventories. Notwithstanding that our estimates are likely to understate BT's service shares and overstate Virgin Media's shares, BT still has a high share of [X] % (over 40%) in each of the Metro Areas and the High Network Reach areas in the rest of the UK. On the other hand, Virgin Media's share is [Z]% (less than 40%) in each of the geographic markets defined.

Presence of rival infrastructure

6.125 High Network Reach areas in the rest of the UK and the Metro Areas are made up of postcode sectors with some rival infrastructure in proximity to customer sites.⁴⁸⁸ Therefore, there is likely to be some level of infrastructure-based competition in most parts of these areas. This is reflected in the network reach figure which is between 2.1 and 2.8 across those markets.

⁴⁸⁸ These are postcode sectors where at least 65% of businesses have two or more rival networks within 50m.

Table 6.6: Infrastructure indicators in BT Metro Areas and High Network Reach areas in rest of UK

Infrastructure Indicator		HNR in rest of UK	Metro Combined	Bristol	Birmingham	Edinburgh	Glasgow	Leeds	Manchester
Average number of rival networks within 50m		2	3	3	3	2	3	3	3
Proportion of businesses with X rival networks within 50m ⁴⁸⁹	X=0	5%	4%	3%	8%	4%	2%	3%	4%
	X=1	15%	9%	7%	10%	14%	7%	7%	5%
	X=2	50%	38%	24%	25%	49%	46%	32%	40%
	X=3	22%	29%	44%	27%	26%	28%	40%	19%
	X=4	4%	13%	8%	22%	6%	10%	13%	18%
	X=5	2%	6%	12%	6%	0%	4%	4%	10%
Average distance to the nearest three rival networks	1 st	25m	18m	18m	17m	20m	15m	18m	18m
	2 nd	47m	33m	48m	27m	39m	27m	26m	30m
	3 rd	122m	73m	81m	51m	135m	60m	41m	55m
Openreach's proportion of 2017 new customer ends already duct connected		[X] (91-100%)	[X] (91-100%)	[X] (91-100%)	[X] (91-100%)	[X] (91-100%)	[X] (91-100%)	[X] (91-100%)	[X] (91-100%)
Rivals' breakdown of 2017 new customer ends ⁴⁷⁸	Customer ends	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]
	On-net duct connected	54%	58%	50%	66%	59%	59%	54%	61%
	On-net dig	6%	11%	15%	3%	17%	13%	15%	2%
	Off-net	39%	30%	35%	31%	24%	28%	30%	36%
Rivals' build vs. buy ⁴⁷⁹		14%	27%	30%	9%	42%	32%	33%	6%
Median radial distance dug in 2017 (m)	Openreach	[X] (0-25)	[X] (0-25)	[X] (0-25)	[X] (0-25)	[X] (0-25)	[X] (0-25)	[X] (0-25)	[X] (0-25)
	Rivals	10	11	9	10	19	14	7	6

Source: Ofcom's network reach analysis and circuit data analysis. Annex 12 provides a more detailed description and explanation of the analysis undertaken.

6.126 Our analysis shows that where rival infrastructure is present, BT will be significantly closer to customer sites, which gives it a significant competitive advantage over rivals. This is shown by the infrastructure indicators presented in Table 6.6.

⁴⁸⁹ Results may not add to 100% due to rounding.

6.127 Below we present our interpretation of the results and then set out why we reject the challenges raised by Openreach on how we interpret the results.

Our interpretation of the results

- 6.128 Evidence for High Network Reach areas in the rest of the UK suggests that for a large proportion of users BT will be duct-connected while rivals will need to extend their networks to connect the customer. This view is based on the following evidence:
- BT had duct in place when connecting over 90% of 2017 new customer ends, while rivals, on average, had duct for just over half their new connections;
 - a significant minority (20%) of businesses have fewer than two rivals within 50m; and
 - on average, the closest rival to BT is 25m away from business sites. While it would generally be economic to dig that far, rivals may be at a significant disadvantage when competing with BT for some customers (as set out earlier). The next closest rival is just below 50m away on average.
- 6.129 We consider that BT's competitive advantage from being duct-connected will hinder rivals' ability to compete effectively. This is reflected in how rivals chose to supply new customer ends in 2017. On average, when rivals were not connected, they chose to dig for 14% of the new connections and the median dig distance was very short (10m). We consider that this evidence significantly undermines BT Group's claim that the fact that 87% of sites in the combined Metro Areas are within 50m of two or more rival infrastructure providers indicates that these areas are effectively competitive.⁴⁹⁰ We note that unrestricted PIA will become available during this review period, but as we set out in Annex 6, the use of this remedy at scale is not going to be extensive enough during this review period to sufficiently remove BT's competitive advantage from being duct connected.
- 6.130 The same findings apply for each of the six Metro Areas. While the six Metro Areas do appear to be somewhat more competitive than the High Network Reach Areas in the rest of the UK, our view is that rival networks remain at a significant disadvantage that hinders their ability to compete effectively with BT during this review period.
- 6.131 To illustrate this, we discuss the results for Manchester, which is the largest Metro Area and the one where rival infrastructure is closest to customer sites. Compared to other Metro Areas it has higher network reach and shorter distances to nearest rivals. Manchester also has a high proportion of businesses with two or more rivals within 50m.
- 6.132 We consider that rivals in Manchester will still be at a significant disadvantage compared to BT during this review period. BT is unlikely to face effective infrastructure-based competition for the majority of customers during this review period. This view is based on the following:
- On average, the distance to the nearest two rival networks is below 50m; however, they may not always be willing to dig to a customer site as explained above.

⁴⁹⁰ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, chapter 3, paragraph 3.27.

- On average, rivals connected [§<] customer ends in 2017, of which 39% did not have existing duct (significantly lower than BT). This is further exacerbated by the fact that BT has a higher proportion of 2017 new customer ends. Therefore, in absolute terms, BT has significantly more customers where it has duct connections already in place.
- In choosing how to supply customer ends with no existing duct, on average, rivals provided them off-net. This reflects BT’s advantage as it is cheaper to buy a wholesale product from Openreach. It may also reflect difficulties in obtaining permissions to dig as no digs occurred at all.
- A significant minority (9%) of businesses have limited access to rival infrastructure i.e. have less than two rivals within 50m.⁴⁹¹

6.133 We note that the proportion of Virgin Media’s 2017 new customer ends with existing duct connections is significantly higher than the average across all rivals ([§<] 81-90% in the High Network Reach areas in the rest of the UK and in Metro Areas combined,⁴⁹² respectively). Even though our estimates suggest that Virgin Media’s proportion of new customer ends with existing duct connections is not materially lower than BT in the Metro Areas combined, this does not undermine our view that BT has a competitive advantage from being closer to customer sites and does not face effective infrastructure-based competition for the same reasons set out above for the BT+1 market.

We reject the arguments raised by Openreach

6.134 We disagree with Openreach’s concerns around our interpretation of the results. They mainly consider that⁴⁹³:

- A large proportion of customers have on average two networks within 50m and we failed to provide evidence on the true limitations to digging to support our view that they may not always dig to a site. We have collected evidence on digging (see Annexes 10 and 11) that we consider to be informative about the true limitations to digging. As set out above, this evidence suggests that not all suppliers located within 50m would be equally able to compete with BT.
- *Our analysis of on-net connections has no direct relevance to potential competition.* However, this is an indication of the extent to which providers are fibre- or duct-connected, which will affect their ability to compete for customers. As mentioned above, being fibre- or duct-connected constitutes a significant competitive advantage vis-à-vis providers who are not.
- The analysis of off-net connections using BT’s network does not follow a modified greenfield approach and is driven by regulation on active services. We disagree as we are of the view that in the absence of regulation, BT would have been likely to provide these services. In other words, rivals choice to buy rather than build reflects BT’s advantage.

⁴⁹¹ Openreach disagreed that 9% is a significant or meaningful proportion. We note that this is not the sole evidence underlying our view.

⁴⁹² The number of customer ends is too small to draw any meaningful conclusions for each Metro Area separately.

⁴⁹³ Openreach’s response to the 2018 BCMR Consultation, page 108, paragraph 1 and pages 117-118, paragraphs 53-61

Economies of scale and scope

- 6.135 BT is the largest supplier of leased lines and is likely to have a cost advantage over its smaller rivals given the existence of economies of scale and scope. This is for the same reasons discussed in our analysis above for BT Only and BT+1 markets.

Barriers to entry and expansion

- 6.136 Similar to our analysis for BT Only and BT+1, we consider that there are high barriers to entry and expansion.

Prospects of potential competition

- 6.137 The evidence we gathered on network expansion plans does not suggest that it will affect the prospects for potential competition in the Metro Areas or High Network Reach areas in the rest of the UK. This evidence does not reflect the impact of the unrestricted PIA remedy.
- 6.138 However, as mentioned in Annex 6, we expect that the unrestricted PIA remedy may have some impact on network expansions in some areas. Infill network extensions are likely to take place in some, but probably not all, the Metro Areas and High Network Reach areas in the rest of the UK. However, at this stage it is difficult to identify exactly where it will be deployed, as rollout plans are likely to change and develop during the period.

Countervailing buyer power

- 6.139 We consider that there is insufficient countervailing buyer power to constrain BT's position as a supplier of CI Access services. Even if some customers may have options to choose between alternative suppliers, the volume of their purchases will not be sufficiently material to exert effective countervailing power.
- 6.140 Our data shows that Openreach's largest customer is BT's downstream divisions and the ratio of internal/total sales is [X]% 40-50%.⁴⁹⁴
- 6.141 Apart from BT's downstream retail divisions – and possibly MNOs – we do not consider there are customers whose volumes are large enough for them to exert buyer power.⁴⁹⁵ Although MNOs purchase large volumes of circuits, we do not consider that they have sufficient buyer power to constrain BT. The need to provide national coverage means that many of those circuits are in areas with limited rival infrastructure such that rival suppliers face high costs in extending their network to meet the MNO's requirements. This limits the ability of the MNOs to use their large volume requirements to obtain competitive prices from BT.

⁴⁹⁴ Openreach's response to the 1st BCMR s.135 notice.

⁴⁹⁵ We note that even where a customer purchases significant volumes, this does not necessarily imply that this customer has material countervailing buyer power. For example, if a significant proportion of a customer's volumes can only be purchased from one supplier (as only that supplier has network in that area) this would weaken the customer's, and strengthen the supplier's, bargaining position.

- 6.142 BT's involvement upstream and downstream, if anything, reduces its incentives to offer (selective) discounts to competitors of its downstream divisions. Offering discounts would only intensify downstream competition, possibly reducing margins earned and volumes sold by BT's downstream divisions.
- 6.143 Even if some purchasers were able to exercise buyer power effectively, this is unlikely to benefit customers without buyer power. Where BT is able to offer selective discounts to purchasers with buyer power, those without buyer power would not benefit, and in fact, would likely face higher prices. Where BT is not able to offer lower prices only to purchasers with (potential) buyer power, it will be less inclined to decrease prices in response to the threat of a single purchaser.

Conclusion that BT has SMP in High Network Reach areas in the rest of UK and each of the Metro Areas

- 6.144 Based on evidence in the round and having considered stakeholder responses to the 2018 BCMR Consultation, we have concluded that BT has SMP in the markets for CI Access services in High Network Reach Areas in the rest of the UK and in each of the Metro Areas.
- 6.145 We disagree with BT Group and Openreach that the evidence on rival infrastructure presence does not support our finding.⁴⁹⁶ We consider all the evidence on SMP criteria in the round and so these are just one of several factors in our assessment.⁴⁹⁷
- 6.146 Our SMP findings are supported by BT's high service share (83%, over 50% of 2017 new customer ends in each of those geographic markets), evidence on BT's competitive advantage from being closer to a significant proportion of customer sites, BT's economies of scale and scope and high barriers to entry and expansion.
- 6.147 However, we consider that the SMP finding in these areas is finely balanced in light of the evidence on the presence of rival networks and the availability of the unrestricted PIA remedy. While some network providers in some areas may use PIA to fill gaps in their network, there are uncertainties around exactly where the remedy will be deployed. Therefore, we consider it more appropriate to reflect this in our remedy assessment.

Finding that BT has no SMP in the CLA

- 6.148 As shown in Section 5, postcode sectors with two or more rival networks tend to form clusters around cities and the CLA is by far the most significant cluster. The CLA on its own accounts for 47% of all High Network Reach postcode sectors and about 63% of the 2017 new customer ends are in High Network Reach areas.

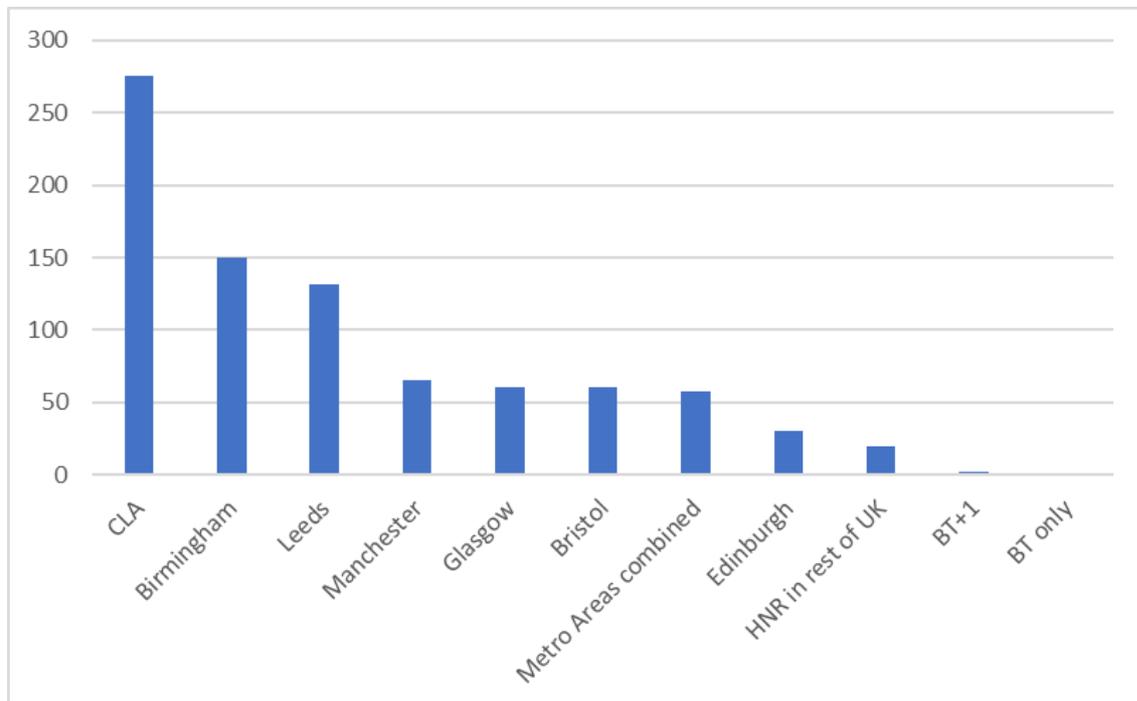
⁴⁹⁶ Openreach's response to the 2018 BCMR Consultation, page 108, paragraph 1 and pages 117-118, paragraphs 53-61; and BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, chapter 3, paragraphs 3.27.

⁴⁹⁷ BT Group also claims that the level of competition in Metro Areas combined is similar to the CLA because broadly the same proportion of customer sites (c. 90%) are within 50m of two or more rival networks. This is misleading because the right metric to look at for comparison is the proportion of customer sites within 50m of 4 or more rival networks. This reflects the much higher density of rival infrastructure in the CLA. See BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, chapter 3, paragraphs 3.27.

6.149 The CLA has a significantly higher density of CI Access customers compared to any other geographic market. This is shown in Figure 6.7, which displays the number of 2017 new customer ends per square km in each of the geographic markets.

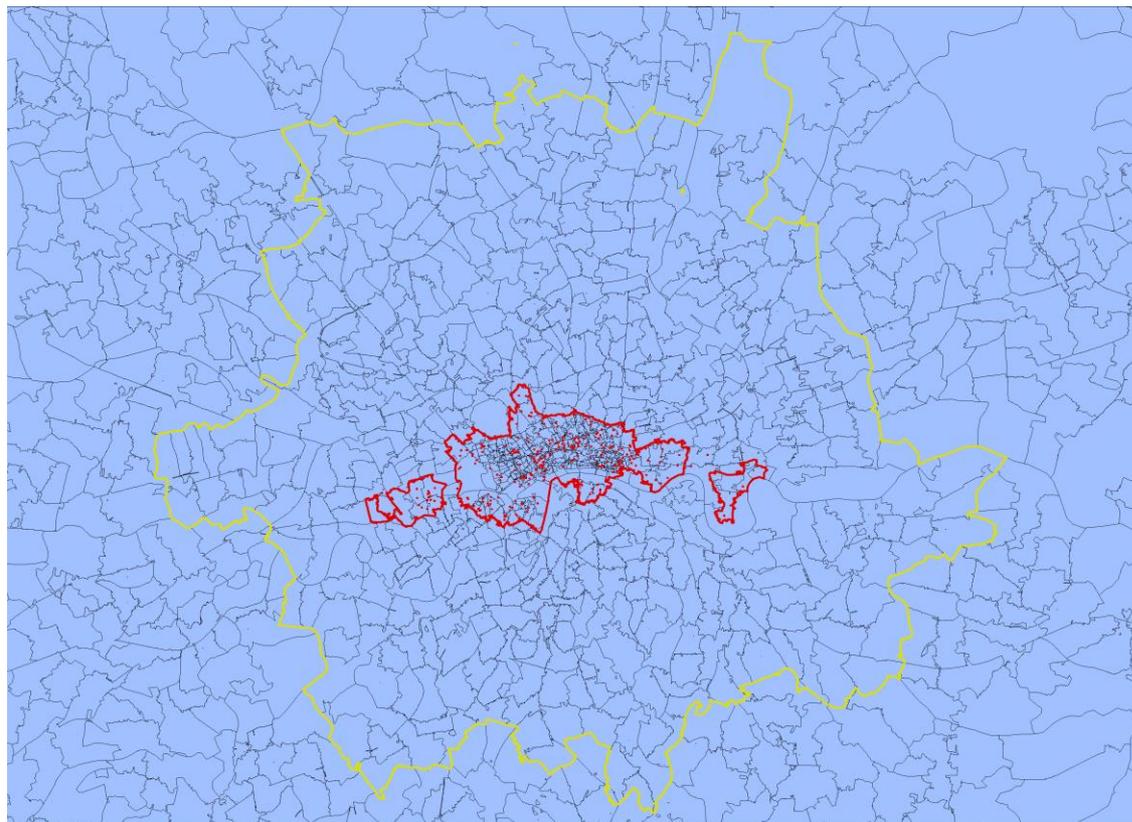
6.150 Figure 6.8 shows a map of the postcode sectors in and around the CLA.

Figure 6.7: New 2017 CI Access customer density (2017 new customer ends/km²)



Source: Ofcom analysis.

Figure 6.8: Map of CLA postcode sectors



Source: Ofcom network reach analysis. Red line shows the CLA boundary and yellow line shows London Boundary.

High BT market share of 2017 new customer ends

6.151 BT has a high share of 2017 new customer ends in the CLA compared to its rivals. BT's share is [X]% 61-70% followed by Colt with a share of [X]% 21-30%. Compared to other geographic markets, BT's next largest rival managed to win a relatively higher proportion of business.

6.152 This is broadly consistent with the sensitivity analysis we carried out by estimating service shares based on circuit inventories. BT's share in the CLA is [X]% 51-60% followed by Colt with a share of [X]% 11-20%. Our concerns regarding the reliability of circuit inventory data apply to a lesser extent in the CLA compared to other geographic markets due to the relatively limited presence of Virgin Media.

Extensive presence of rival infrastructure

6.153 Unlike the rest of the UK, there is very extensive infrastructure present in a large number of postcode sectors in the CLA. This reflects the significant density of businesses with 230 new customer ends per year per square kilometre in 2017. This is compared to less than 150 in any of the other geographic markets (see Figure 6.7 above).

- 6.154 The greater density of rival infrastructure in the CLA indicates that BT is likely to be constrained by competition in the CLA, despite its high service shares. Our analysis shows far greater presence of rival infrastructure in the CLA than in other geographic areas.
- 6.155 Table 6.9 presents results for the infrastructure indicators in the CLA. We also present the results for High Network Reach areas in the rest of UK for ease of reference.

Table 6.9: Infrastructure indicators for High Network Reach areas

Infrastructure indicator		CLA	HNR in rest of UK
Average number of rival networks within 50m		4.3	2.2
Proportion of businesses with X rival networks within 50m ⁴⁷⁷	X=0	4%	5%
	X=1	6%	15%
	X=2	9%	50%
	X=3	17%	22%
	X=4	18%	4%
	X=5	17%	2%
	X=6	14%	1%
	X=7	10%	
	X=8	3%	
X=9	1%		
Average distance to the nearest three rival networks	1 st	16m	25m
	2 nd	26m	47m
	3 rd	34m	122m
	4 th	47m	338m
Openreach's proportion of 2017 new customer ends already duct connected		[] (91%-100%)	[] (91%-100%)
Rivals' breakdown of 2017 new customer ends ⁴⁷⁸	Customer ends	[]	[]
	On-net duct connected	76%	54%
	On-net digging	3%	6%
Rivals' build vs. buy ⁴⁷⁹	Off-net	21%	39%
		11%	14%
Median radial distance dug in 2017 (m)	Openreach	[] (0m-25m)	[] (0m-25m)
	Rivals	10m	9m

Source: Ofcom's network reach analysis and circuit data analysis. Annex 12 provides a more detailed description and explanation of the analysis undertaken.

- 6.156 Customers in the CLA have on average 4.3 rival networks within 50m compared to 2.2 rival networks within 50m in the other High Network Reach areas and 2.8 in Manchester (among the highest of the Metro Areas). 90% of customers in the CLA have at least two rivals to BT within 50m, including 64% who have four or more rivals. The proportion of customers with four or more rivals is significantly higher than any of the other High

Network Reach areas.⁴⁹⁸ This shows that BT faces competition from significantly more rivals in the CLA than in other geographic markets.

- 6.157 While BT may still have some competitive advantage over rivals where it is already duct-connected, the extent is much less than in other parts of the UK. The average distances to the nearest four rivals range between 16m and 47m in the CLA. This compares to 25m and 338m in the other High Network Reach areas in the rest of the UK and 18m and 105m in Manchester. Shorter dig distances combined with the higher customer density mean that on average the degree of competitive advantage is much less. In addition, where rivals are already duct-connected, BT is unlikely to have a material competitive advantage. BT's rivals had duct connections already in place for 76% of CI Access customers they connected in the CLA in 2017. While this is still below BT, the difference is less marked compared to existing duct connectivity of BT's rivals in any other geographic market. We expect that BT's competitive advantage would be further reduced by the impact of unrestricted PIA.
- 6.158 BT's lower competitive advantage is reflected in the lower proportion of off-net sales as a share of total rivals' sales in 2017. Rivals sold 21% of 2017 new customer ends off-net compared to 39% in High Network Reach areas in the rest of UK and 36% in Manchester.⁴⁹⁹
- 6.159 Overall, the density of rival infrastructure indicates that the vast majority of (potential) users of CI Access services are likely to have competitive alternatives available to them in the event that BT raised its prices or otherwise offered poor terms of supply, preventing such a price increase. This is especially in the presence of unrestricted PIA remedy as set out below.

Barriers to entry and economies of scale and scope

- 6.160 We do not consider that barriers to entry and expansion, or economies of scale and scope, are likely to hinder rivals' ability to compete with BT. While entry still requires significant costs to be sunk, and economies of scale and scope in the provision of CI Access services exist as they do elsewhere, the number and density of businesses and users of CI Access services means these are of much reduced significance for competition in the CLA.
- 6.161 While rivals with existing infrastructure would face some costs when extending their networks to a new customer site, the close proximity of their infrastructure to many (potential) users of CI Access services (as demonstrated above) suggests that these barriers are unlikely to be prohibitive, especially in the presence of the unrestricted PIA remedy, as the distance they would need to extend their networks to is, in general, significantly lower than elsewhere in the UK.

Prospects of potential competition

⁴⁹⁸ For example, in High Network Reach in the rest of the UK, 80% of customers have at least two rivals to BT within 50m, of which only 8% have four or more rivals. This is compared to 90% and 31% respectively in Manchester.

⁴⁹⁹ We note that where rivals did not have duct connections the proportion of 2017 new customer ends they dug to is lower in the CLA compared to the Metro Areas. This is likely to be due to the higher proportion of duct connections already in place in the CLA (i.e. the rivals have already dug to a large proportion of circuits in the past). This view is supported by the overall low share of off-net sales in the CLA.

6.162 We consider the availability of unrestricted PIA and structural features in the CLA are likely to support telecoms providers' ability to compete for provision of CI Access services in the CLA. As set out in Annex 6, we expect that at least some rivals may deploy infill network extensions using the unrestricted PIA remedy in the CLA given the high number of networks already present and high business density.

Market developments since deregulation

6.163 CI Access services at 1 Gbit/s and below were deregulated in the 2016 BCMR in the CLA. Deregulation included removing the obligation to provide network access on reasonable request and the wholesale charge control on those services.

6.164 Post deregulation, Openreach continued to supply those products. In addition, it offers price discounts on them in Openreach's Flexzone areas which include the CLA (in addition to Birmingham, Glasgow and Leeds). This means that the effective price in the CLA is lower than the price in other regulated areas. We estimate that CLA prices are 8% lower for EAD 100 Mbit/s services and 10% lower for EAD 1 Gbit/s services.⁵⁰⁰ This is consistent with these areas being more competitive than regulated areas, but does not necessarily show this as it could alternatively reflect other factors, such as lower average costs in these areas arising from higher business density. As a result, we put less weight on this evidence.⁵⁰¹

Conclusion that BT has no SMP in the CLA

6.165 Based on the evidence above, we conclude that BT does not have SMP in the provision of CI Access circuits in the CLA.

6.166 BT has service shares of [§<] 61-70% of 2017 new customer ends in the CLA. In terms of service shares based on circuit inventory, BT's share is also above 50%.⁵⁰² While on both measures this is above the 50% level at which dominance can be presumed (subject to other factors), this is somewhat lower than the service shares in other geographic markets, including the other High Network Reach areas outside the CLA.

⁵⁰⁰ This is based on an annualised three-year TCO. To derive the discount we compared the discounted TCO against the undiscounted TCO for EAD 100 Mbit/s and EAD 1 Gbit/s services. Openreach discounts can be found here: <https://www.openreach.co.uk/orpg/home/products/pricing/loadProductPrices.do?data=CHwaDmuSf84idOYbWK2Y39pyYQJW58IELJ3a1hFsXScqDWWqEbA2PDIT5Y2OhxKv> [accessed 10 May 2019].

⁵⁰¹ Vodafone argued that we were wrong to consider that Openreach offers pricing discounts in Flexzones in such a manner that it is apparent that different commercial / competition conditions exist in the CLA (Vodafone's response to the 2018 BCMR Consultation, part 2, paragraphs 6.5-6.13). We are not of the view that these pricing discounts necessarily reflect different competitive conditions in the CLA. Discounts could alternatively reflect other factors, such as lower average costs in these areas arising from higher business density. Similarly, TalkTalk mentioned that profitability in the CLA is higher than elsewhere in the UK (TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.118-2.120). As a result, we put less weight on this evidence.

⁵⁰² Unlike the other geographic markets, we do not have major concerns around the reliability of BT's inventory service shares in the CLA due to the more limited presence of Virgin Media.

- 6.167 We disagree with PAG⁵⁰³, TalkTalk⁵⁰⁴, and UKCTA⁵⁰⁵ that we have failed to demonstrate that the presumption of dominance is rebutted in the CLA given that service shares are above 50%.⁵⁰⁶ Our finding of no SMP in the CLA is based on our assessment of other SMP criteria in addition to market shares.
- 6.168 The key distinguishing feature of the CLA is that we expect that over this review period there is likely to be sufficient infrastructure in the CLA so as to exert strong competitive constraints on BT for the following two reasons:
- the density of rival infrastructure in the CLA is an order of magnitude greater than all other areas, reflecting a long history of competitors building leased line networks to serve the financial sector and other businesses with high leased line demand in the CLA; and
 - some rivals may deploy infill network extensions during this review period using the unrestricted PIA remedy in the CLA given the high number of networks already present and high customer density. In the situations where BT may continue to have a competitive advantage, we expect that the use of unrestricted PIA would significantly reduce this advantage.
- 6.169 While BT accounts for a high share of leased line sales in the CLA we consider that this dense network of rival infrastructure is sufficient to act as an effective competitive constraint on BT. This is consistent with BT Group’s view about the likely impact of unrestricted PIA on service shares going forward.⁵⁰⁷

Conclusions

- 6.170 We conclude that, for the period of this review, BT has SMP in the supply of CI Access services in the UK, excluding the CLA and the Hull Area.⁵⁰⁸

⁵⁰³ PAG’s response to the 2018 BCMR consultation, paragraph 10.

⁵⁰⁴ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 1.21.

⁵⁰⁵ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 19-21.

⁵⁰⁶ PAG, TalkTalk, and UKCTA also argued that the fact that there is greater network density and weaker market power in the CLA than elsewhere in the UK says nothing about whether BT has SMP in the CLA but merely indicates that BT’s market share is less in London than elsewhere in the UK. On the contrary, the figures from FY16 show Openreach was earning a ROCE of c.50% in the CLA. We agree that a lower service share or higher density in itself is not evidence of “no SMP” but this is not the evidence underlying our finding in the CLA.

⁵⁰⁷ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 3.48.

⁵⁰⁸ The SMP assessment for CI Access services in the Hull Area is set out separately in Section 9.

7. CI IEC: market definition

- 7.1 In Section 3, we explained the distinction between access, backhaul, and core and how they are used to provide different types of end-to-end network connectivity services. In this section, we set out how we have undertaken our market definition for CI Inter-exchange connectivity services.
- 7.2 In summary, we have concluded that there is a single product market for CI Inter-exchange services at all bandwidths and each BT exchange is its own geographic market.
- 7.3 In this section we:
- note our consultation position;
 - detail consultation responses;
 - explain what inter-exchange connectivity is and why we examine competitive conditions at BT exchanges;
 - describe the market context;
 - set out the regulatory context; and
 - define the relevant product and geographic market definitions for CI Inter-exchange connectivity services.
- 7.4 We set out our assessment of SMP in the markets for CI Inter-exchange connectivity services in Section 8.

Background

Our proposals

- 7.5 The explanatory notes to the 2014 EC Recommendation, which we are required to take into account in our market analysis, state that a clear distinction between the terminating and trunk segment of leased lines is important as the market for wholesale trunk segments of leased lines is not on the list of markets susceptible to *ex ante* regulation (it was removed in 2007).
- 7.6 It is noted that most EU member states have deregulated these trunk segments and that there is a presumption that trunk segments are replicable on a national scale – in effect this is an assumption that these segments are effectively competitive. The explanatory notes confirm, however, that national regulatory authorities may find that certain trunk segments fulfil the three criteria test and so do warrant regulation in the particular circumstances of that member state.
- 7.7 In our consultation we proposed to distinguish between terminating segments of leased lines and trunk segments. For these purposes, terminating segments are the routes between an end-user site and the first point of aggregation in a network (these can also be referred to as access connections). Trunk segments are the routes between points of

aggregation (i.e. network nodes, BT exchanges and most data centres) and are typically made up of backhaul and core connections (see Section 3 for more detail on networks).

7.8 Under our proposals:

- We categorised links from data centres and telecoms providers' network nodes as trunk segments. We deemed the presumption that such links are competitive to hold, and therefore that *ex ante* regulation should not apply on these routes.
- We also categorised links between BT exchanges – whether used as backhaul or core – as trunk segments. We provisionally found that for some of these routes the presumption that they are competitive might not hold and that this required closer review through an SMP assessment.

7.9 We note, that when undertaking our assessment, we need to ascertain if there is a reasonable basis on which to conclude that the presumption that routes are competitive does not hold in some cases. Where the presumption may not hold, we need to look carefully at the competitive conditions at each end of the route (e.g. the competitive conditions at a BT exchange). This is because if one end of the route is not competitive, then the route itself would not be competitive. Hence, with regard to trunk segments between BT exchanges we look at the competitive conditions at the exchanges at either end of the route.

7.10 In undertaking our market definition exercise, we provisionally identified a single product market for CI Inter-exchange connectivity services at all bandwidths and proposed that each BT exchange was its own geographic market.

Stakeholder comments

7.11 Below is a summary of stakeholder responses to our consultation. We have considered all responses in reaching our conclusions.

Market and regulatory context

7.12 Openreach thought that we should not apply regulation to trunk segments.⁵⁰⁹ Openreach also argued that network topology does not help with defining market boundaries.⁵¹⁰

7.13 Openreach further argued that we had not clearly defined the relationship between CI Inter-exchange connectivity services, trunk and core, and had not been clear enough what circuits were included in CI Inter-exchange connectivity services and what was in the scope of the “wider set of trunk connections”.⁵¹¹ BT Group noted that additional clarification on our market definition would be helpful.⁵¹²

⁵⁰⁹ Openreach's response to the 2018 BCMR Consultation, page 11, paragraph 33.

⁵¹⁰ Openreach's response to the 2018 BCMR Consultation, Annex A, page 36, paragraph 12.

⁵¹¹ Openreach's response to the 2018 BCMR Consultation, page 12, paragraph 34.

⁵¹² BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, Annexes, page 29, paragraph 3.23.

Presumption of competition

- 7.14 Vodafone considered that regulation to date has covered links between BT exchanges and telecoms provider network nodes and should continue to do so.⁵¹³ The implication of Vodafone’s argument is, that if connectivity was removed between BT exchanges and Vodafone network nodes, it would result in significant reconfiguration and associated costs in order to achieve an equivalent level of resilience.⁵¹⁴
- 7.15 Openreach agreed that links to all data centres should be deregulated.⁵¹⁵ [S&K] also agreed that carrier neutral data centres are generally competitive.⁵¹⁶
- 7.16 Vodafone considered the proposed deregulation of links to data centres to be significant. It argued that our proposals did not include sufficient information to enable it to respond in a meaningful way. It also argued that we had not considered whether the competitive conditions at data centres might vary. In addition, it noted that some smaller data centres are not used for backhaul and should be part of the CI Access market (e.g. corporate hub data centres).⁵¹⁷
- 7.17 TalkTalk thought that we should not remove regulation on links to carrier neutral data centres. It argued that we had not provided evidence of competitive conditions in data centres; and had not considered whether data centres with different levels of presence should face different regulatory treatment. It considered that we should have assessed BT’s pricing or profitability for circuits from carrier neutral data centres. Finally, it noted that all market share data was redacted, making it difficult for respondents to comment on BT’s market share in these routes.⁵¹⁸
- 7.18 Openreach considered that we had defined the market too narrowly and that limiting our market definition exercise to its network, “results in a bias towards Openreach being found to have SMP”.⁵¹⁹

Market definition exercise

- 7.19 Virgin Media⁵²⁰, SSE⁵²¹ and IIG⁵²² were all supportive of our approach to assessing CI Inter-exchange connectivity services.

⁵¹³ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 1.8.

⁵¹⁴ Vodafone’s confidential response to the 2018 BCMR Consultation, part 3, 1.27, 1.31-1.35. We address Vodafone’s point more fully in Section 14, in the sub-section on interconnection remedies.

⁵¹⁵ Openreach’s response to the 2018 BCMR Consultation, page 4, paragraph 2.

⁵¹⁶ [S&K] response to the 2018 BCMR Consultation, page 5.

⁵¹⁷ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraphs 1.7 to 1.58.

⁵¹⁸ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.144.

⁵¹⁹ Openreach’s response to the 2018 BCMR Consultation, page 12, paragraph 35.

⁵²⁰ Virgin Media’s response to the 2018 BCMR Consultation, page 10.

⁵²¹ SSE’s response to the 2018 BCMR Consultation, page 5.

⁵²² IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, page 18.

- 7.20 Openreach argued that we did not consider a true modified greenfield approach (MGA) scenario, “where the current build versus buy decisions have led to current presence based on regulated access remedies”.⁵²³
- 7.21 Openreach also questioned whether we needed to define a separate market for CI Inter-exchange connectivity, while TalkTalk asked us to test whether CI Access and CI Inter-exchange connectivity were part of the same market.⁵²⁴

Product and geographic market

- 7.22 IIG, SSE⁵²⁵, TalkTalk⁵²⁶, Three⁵²⁷ and Vodafone⁵²⁸ agreed with our CI Inter-exchange connectivity services product market definition.
- 7.23 IIG agreed that demand-side substitution is likely to be weak and asymmetric. It also argued that supply-side substitution is strong enough to make a SSNIP unprofitable, although it felt that using a SSNIP was unnecessary (as 1 Gbit/s and 10 Gbit/s links are used for the same purpose) and we placed too much emphasis on it.
- 7.24 IIG agreed that we should focus on 1 Gbit/s and 10 Gbit/s speeds, as lower bandwidths are not suitable for backhaul circuits. It also agreed that 1 Gbit/s is not a competitive constraint on 10 Gbit/s lines.⁵²⁹
- 7.25 TalkTalk agreed that presence in exchanges is relevant for defining geographic markets and presence at one exchange is not a substitute for presence at another exchange.⁵³⁰ Openreach welcomed our removal of the TAN concept⁵³¹ and our proposal to treat each BT exchange as its own market.⁵³² IIG did not object to our geographic market definition and noted that one exchange is not a substitute for another. It did however note that we could have collated exchanges with homogeneous competitive conditions into distinct markets, as we have done in CI Access.⁵³³

⁵²³ Openreach’s response to the 2018 BCMR Consultation, Annex E, page 101, paragraph 24.

⁵²⁴ Openreach’s response to the 2018 BCMR Consultation, Annex A, page 35, paragraph 11; TalkTalk’s response to the 2018 BCMR Consultation, paragraph 1.21.

⁵²⁵ SSE’s response to the 2018 BCMR Consultation, page 5.

⁵²⁶ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.126.

⁵²⁷ Three’s response to the 2018 BCMR Consultation, paragraph 1.8.

⁵²⁸ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 1.36.

⁵²⁹ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 6.1.1-6.1.3.

⁵³⁰ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.127.

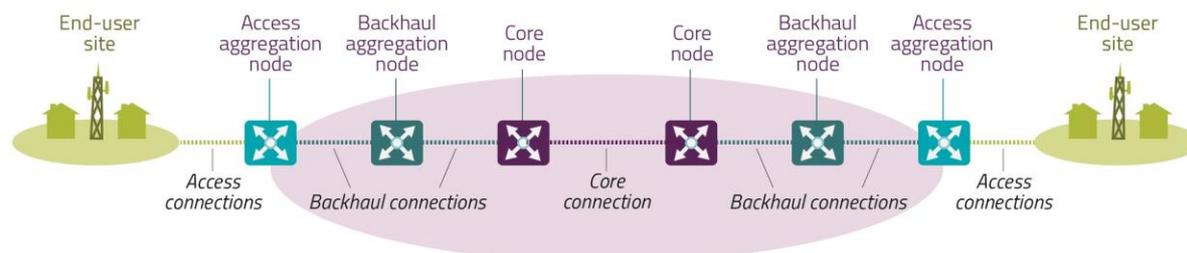
⁵³¹ In the 2009 and 2013 BCMR, we identified 56 Trunk Aggregation Nodes (TANs) that marked the boundary between the competitive core and terminating segments. To define the TANs, we identified 84 appropriate Openreach Handover Points (OHPs) and then grouped them into multi-exchange TANs and single BT exchanges.

⁵³² Openreach’s response to the 2018 BCMR Consultation, Annex A, page 35, paragraphs 6 and 10.

⁵³³ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 6.1.4.

Market context

Figure 7.10 Access, backhaul, and core connectivity



7.26 Figure 7.11 above shows the different constituent parts of an end-to-end leased line, which we describe in the following paragraphs. This is set out in more detail in Section 3.

7.27 Access connections are circuits between an end user site and the first point of aggregation where traffic from multiple circuits can be combined for onward routing over a single circuit carrying the aggregated traffic.⁵³⁴ Points of aggregation, or aggregation nodes, are typically sited at telecoms provider network buildings, BT exchanges, and most data centres.⁵³⁵

7.28 Noting Openreach’s request for additional clarity, backhaul and core connections are circuits between points of aggregation. Backhaul and core circuits typically have greater capacity than access circuits, i.e. higher bandwidth, because they carry aggregated traffic. They can be used to carry a range of services such as voice and data for both residential and business customers. Core circuits typically transport even more communications services and therefore have greater capacity than backhaul circuits.

7.29 BT exchanges are used to locate network aggregation nodes (access, backhaul, and core) and can be used as interconnection points between networks. Other telecoms providers need access to BT exchanges to be able to use some of BT’s wholesale access services or to locate their own network aggregation equipment.

Regulatory context

Background

7.30 The Explanatory Note to the 2014 EC Recommendation explains that there is a clear difference, and NRAs should distinguish between, terminating and trunk segments.

“What constitutes precisely a terminating segment of a leased line will depend on the network topology specific to a particular Member State. Most Member States have defined terminating segments of leased lines as the part between end-users’

⁵³⁴ We note that there are instances where access circuits can pass through nodes where they are not aggregated.

⁵³⁵ See discussion below on how some data centres are not used as points of aggregation and therefore should not be considered as part of the Trunk segment.

premises and the closest exchange of a service provider. **However, a clear distinction between the terminating and trunk segment is important as the market for wholesale trunk segments of leased lines has been removed from the list of markets susceptible to *ex ante* regulation in the 2007 Recommendation.**

Nowadays, almost all Member States have deregulated this wholesale market for trunk segments. Therefore, the presumption that trunk segments are replicable on a national scale remains valid. Consequently, NRAs should not revisit their analysis of trunk segments of leased lines where these have been previously found to be effectively competitive. This assumption does not exclude, however, that individual NRAs might find that certain trunk routes fulfil the three criteria and thus warrant *ex ante* regulation.”⁵³⁶ (emphasis added)

- 7.31 As discussed above, reflecting the terminology used in the 2014 EC Recommendation in the context of the networks supporting business connectivity in the UK, we consider that terminating segments are circuits between an end user site and the first point of aggregation (this point of aggregation could be a telecoms provider’s network node, data centre or BT exchange)⁵³⁷, whereas trunk segments are circuits between points of aggregation. Trunk segments are therefore comprised of circuits carrying aggregated traffic between telecoms provider network nodes, BT exchanges and most data centres.
- 7.32 Vodafone noted that some smaller data centres have the characteristics of customer sites and that circuits from these data centres should therefore be considered to form part of the CI Access market.⁵³⁸ We agree with Vodafone that data centres that are not used for aggregation and onward routing (such as “corporate hub” data centres) are part of the CI Access market and should be treated the same as customer sites.⁵³⁹ We note that in terms of materiality, the number of these links appear to be declining.⁵⁴⁰
- 7.33 Our approach to define CI Access services as terminating segments is a change from the approach taken in the 2016 BCMR Statement. In the 2016 BCMR Statement, we treated all circuits between BT exchanges as terminating segments if they were not identified as competitive in our CI core assessment.⁵⁴¹ In this decision, we treat all connections between BT exchanges as trunk segments. Openreach argued our market analysis was not well aligned to how core networks work.⁵⁴² However, we consider our approach better reflects the market context and how we see the market operating, which is outlined above.

⁵³⁶ Explanatory Note to the 2014 EC Recommendation, pages 49-50.

⁵³⁷ We note, that for this review, we have found the terminating segment to consist of CI Access services.

⁵³⁸ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 1.46.

⁵³⁹ In our view, it will be practical for Openreach to work with its customers to confirm whether or not a data centre is used as a point of aggregation/for on-ward routing.

⁵⁴⁰ These corporate data centres are used primarily for processing, storing and providing appropriate access to company data. We note during a meeting with Equinix on 28 March 2019 that it noted that the number of these corporate data centres are declining as companies are increasingly outsourcing these services to data centre companies and/or large cloud based operators: Equinix’s response to BCMR s.135-26 Notice.

⁵⁴¹ This included links between exchanges and carrier neutral data centres where one end of the link was deemed uncompetitive.

⁵⁴² Openreach’s response to the 2018 BCMR Consultation, page 11, paragraph 33.

Presumption that trunk segments are competitive

7.34 In 2007, the European Commission removed the market for wholesale trunk segments of leased lines from its list of recommended markets. Our starting position is therefore that all trunk segments (i.e. circuits carrying aggregated traffic between points of aggregation including network nodes, BT exchanges and most data centres) can be presumed to be competitive. However, as the explanatory notes to the 2014 EC Recommendation states, there may be some connections that are amenable to *ex ante* regulation. Therefore, we have looked at each type of connection in turn.

Network nodes

7.35 We consider the presumption of competitiveness is appropriate for telecoms providers' network nodes for three main reasons. First, we expect most connections between two non-BT network nodes (e.g. two Virgin Media network nodes) to be self-provides. Second, telecoms providers can choose where they locate their own network nodes and therefore we would expect the availability of backhaul from these locations would be a major consideration in such decisions.⁵⁴³ Third, these sites tend to be fewer in number and be more valuable than individual access sites. As such, we would expect there to be more competition to provide connectivity to them.⁵⁴⁴

7.36 We therefore consider it is appropriate to presume that all connections to telecoms provider network nodes are competitive.

7.37 However, we have considered Vodafone's arguments that the removal of regulation from BT exchanges to telecom providers' network nodes may result in significant reconfiguration costs and potentially poorer resilience resulting in worse customer outcomes.⁵⁴⁵ We think these arguments can be equally applied to links between BT exchanges and data centres. We do not consider this affects our assessment that these connections can be presumed competitive in this forward-looking review period.⁵⁴⁶

Data centres

7.38 We consider the presumption of competitiveness is also appropriate for connections to data centres (excluding those data centres that are not used as points of aggregation) for the following reasons:⁵⁴⁷

⁵⁴³ We note, following Vodafone's comments, that there may be costs associated with the removal of a regulated service for an existing circuit to these sites, both in terms of lower resilience and possible reconfiguration of equipment. We consider this point in more detail in Section 14 on the scope of our interconnection remedy.

⁵⁴⁴ To address BT Group's question, we are treating all downstream network nodes in the same way (i.e. inclusive of EE and BT Enterprise). These nodes are being used for downstream businesses, separate to the Openreach network, and hence do not have the same characteristics (e.g. ubiquity of service). Please see, BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, Annexes, page 29, paragraph 3.22-4.

⁵⁴⁵ Vodafone's Confidential response to the 2018 BCMR Consultation, part 3, paragraphs 1.27, 1.31-1.35.

⁵⁴⁶ We recognize that some customers have purchased circuits between BT exchanges and their network nodes using customer site handover. We discuss interconnection further in Section 14.

⁵⁴⁷ We note separately, that some evidence obtained from telecoms providers using our statutory information gathering powers also indicates some anecdotal support for the presumption of competition for connections from data centres. For example, Interoute noted that it [3<]. Six Degrees also added that it [3<]. See, Interoute response dated 16 May 2018 to

- In general, in the UK, data centres are located in areas well served by alternative networks.⁵⁴⁸ This is because, telecoms providers have flexibility as to which data centre they connect into. The choice is not location dependent because unlike BT exchanges, telecoms providers do not need access to a specific data centre to serve the local access area. This means that a connection into one data centre is broadly substitutable for a connection to another data centre.
- Moreover, for telecoms providers, the cost of connecting to a data centre is an important consideration, when deciding which data centre to connect to. Therefore, telecoms providers are likely to choose data centres that are close to a number of alternative networks, as this should result in a competitively priced service.
- BT's share of supply of circuits to all data centres, and carrier neutral data centres specifically, is not indicative of dominance [redacted] (i.e. 20-30% for all data centres and 10-20% for carrier neutral data centres only).⁵⁴⁹ We further note that there are two other providers with similar shares: Colt [redacted] 21-30% and VM [redacted] 21-30% have significant shares in all data centres, and a number of other providers with not insubstantial service shares for example, SSE [redacted] 0-10%, euNetworks [redacted] 0-10%, Interoute [redacted] 0-10%, and [redacted].⁵⁵⁰
- When considering the distribution of service shares for individual carrier neutral and carrier owned data centres, we find that BT's supply of circuits is below [redacted].⁵⁵¹
- Even where BT's share is higher at an individual data centre, we consider there to be constraints on its pricing. Customers tend to have choice as to which data centres to connect to, which imposes an indirect constraint on BT. If the price of connectivity to the data centre was to increase and was passed on by BT to customers of a carrier neutral DC, they might choose to switch to another provider which is already connected. Alternatively, if BT is the only supplier at a data centre, customers could switch to an alternative carrier neutral DC (subject to the costs of doing so). Furthermore, given data centres tend to be located in areas where rivals are present, the data centre might seek additional telecoms providers to connect in (as the price increase – and likely high capacity demand – could increase incentives to connect).

7.39 TalkTalk argued that we should undertake pricing or profitability analysis to conclude that services to data centres are competitive⁵⁵², but did not specify exactly what kind of analysis we should conduct or provide evidence of a lack of competition. Given that these circuits are not on the list of recommended markets and the reasons set out above, we do not consider additional analysis necessary.

the BCMR s.135-3 Notice and Six Degrees response dated 10 May 2018 to the BCMR s.135-3 Notice. In s.135-3, we asked a number of telecoms providers about their experiences of wholesaling services from non-Openreach network providers into data centres and BT exchanges.

⁵⁴⁸ We note that some data centres may locate in more remote areas with less alternative networks nearby. Location will be an important consideration in the business case and the choice of a remote site may be driven by specific needs (e.g. security).

⁵⁴⁹ Ofcom's analysis of stakeholder responses to the 1st BCMR s.135 notice.

⁵⁵⁰ These calculations are based on our 2017 connections data.

⁵⁵¹ Ofcom's analysis of stakeholder responses to the 1st BCMR s.135 notice.

⁵⁵² TalkTalk's response to the 2018 BCMR Consultation, paragraph 2.144.

7.40 We therefore consider it is appropriate to presume that all connections to data centres which are used as points of aggregation (including such BT owned data centres) are competitive.⁵⁵³

BT exchanges

7.41 Unlike data centres and network nodes, we consider that the presumption of competitiveness may not be appropriate for some routes between BT exchanges, and so they may warrant *ex ante* regulation. We therefore consider it necessary to analyse in more detail this sub-set of trunk connections.

7.42 Operators need access to BT exchanges to be able to use wholesale access remedies which have been imposed to address BT's SMP in various markets. For example, fixed broadband operators purchase regulated access services based on LLU and VULA, served from BT exchanges, where they have equipment co-located to aggregate broadband traffic. BT has over 5,000 exchanges, many of which are located in areas where few or no other telecoms providers have network, so there is no or limited choice of providers to backhaul this aggregated broadband traffic to their core network. Sky and TalkTalk are the largest broadband operators using LLU and VULA products with presence at [X] exchanges, respectively.⁵⁵⁴ A significant proportion of Sky's ([X]%) and TalkTalk's ([X]%), backhaul circuits connect directly from one BT exchange to another.⁵⁵⁵

7.43 Therefore, CI Inter-exchange connectivity services are necessary to enable our access regulation to work. If BT has SMP in certain links between BT exchanges, and these were to remain unregulated, this could undermine our access remedies by leaving a regulatory gap between access and competitive backhaul provision. As a result, we have carried out further analysis to assess the degree of competition on these routes.

7.44 In relation to Openreach's argument that we should not regulate trunk segments, we note that our approach is consistent with the EC Recommendation, which says that some trunk routes may be susceptible to *ex ante* regulation. As detailed above, the Explanatory Note to the 2014 EC Recommendation notes that, "this assumption⁵⁵⁶ does not exclude, however, that individual NRAs might find that certain trunk routes fulfil the three criteria and thus warrant *ex ante* regulation".⁵⁵⁷

7.45 In its consultation response, Openreach also argued that our market analysis is too narrow, potentially increasing the possibility of BT being found to have SMP. However, we consider it is appropriate to undertake a more detailed assessment of competition in connections between BT exchanges (and not to/from data centres or network nodes) for the reasons

⁵⁵³ We note, that post consultation, we published a list of data centres. This is a list of data centres we are aware of. It is unlikely that the list will be completely comprehensive but should be a reasonable indication of data centres in the UK.

⁵⁵⁴ Responses to part B, s.135-5 Notice dated 14 February 2018. We note that these calculations treat multiple MDF IDs that are co-located in the same building as one exchange. Treating each MDF ID separately would increase these figures to [X].

⁵⁵⁵ Ofcom analysis, based on response to part A, s.135-5 Notice dated 14 February 2018.

⁵⁵⁶ The assumption being that we should not revisit analysis of trunk segments where these have been previously found to be effectively competitive.

⁵⁵⁷ Explanatory Note to the 2014 EC Recommendation, pages 49-50.

set out above. We consider the constraints on BT, as well as the three criteria test, in Section 8.

Market definition

Modified Greenfield Approach

- 7.46 When carrying out our market definition analysis we have applied the Modified Greenfield Approach. The analysis below is therefore conducted in relation to a hypothetical scenario in which there are no *ex ante* SMP remedies in the reference market(s), but *ex ante* SMP remedies in other markets continue to apply. In this instance this means that there are no regulated products available between BT exchanges, but we assume remedies are imposed in the CI Access markets, as well as that the remedies in the PIMR (Volume 1) and wholesale local access (WLA) market apply (meaning BT is required to provide LLU, VULA and unrestricted PIA).
- 7.47 As noted above, Openreach argued that we did not consider a true Modified Greenfield Approach (MGA) scenario⁵⁵⁸, and instead our assessment should be conducted in the absence of Access remedies. This is because in its view the current presence at BT exchanges reflects regulated access remedies, and in their absence, providers would have had to extend their own networks further.
- 7.48 While we tend to agree that in the absence of Openreach regulated products telecoms providers would have had to dig more to offer services, we do not consider this affects our forward-looking assessment under the MGA. We consider that the purpose of the MGA is to avoid the circularity of not finding SMP, if there is no SMP as a result of the remedies we have imposed. As such, it is appropriate to assess the market in the absence of inter-exchange remedies, but in the presence of remedies in other markets (e.g. PIA, CI Access) in this review period.
- 7.49 In any event, we do not consider this potential for network extension in the absence of Access remedies affects our market definition. In particular, we do not reflect current presence in our market definition (we define each BT exchange as a separate geographic market), but in our forward looking SMP assessment (see Section 8). While increased build could occur in the absence of regulation (since prices would be much higher), we consider barriers to entry remain material such that any impact on SMP would be limited for the reasons set out in Section 8 (where we assess the constraints on BT).

Separate CI Inter-exchange connectivity services market

- 7.50 Openreach argued that our market analysis was not well aligned to how core networks work⁵⁵⁹ and network topology does not help with defining market boundaries.⁵⁶⁰ Openreach questioned whether we needed to define a separate market for CI Inter-

⁵⁵⁸ Openreach's response to the 2018 BCMR Consultation, Annex E, page 101, paragraph 24.

⁵⁵⁹ Openreach's response to the 2018 BCMR Consultation, page 11, paragraph 33.

⁵⁶⁰ Openreach's response to the 2018 BCMR Consultation, Annex A, page 36, paragraph 12.

- exchange connectivity services and TalkTalk argued that we should test whether CI Inter-exchange connectivity services and CI Access services are in the same market.
- 7.51 We consider that our approach is consistent with the EC Recommendation and is a better reflection of the distinct competitive conditions in CI Access and CI Inter-exchange connectivity services.
- 7.52 We continue to consider CI Inter-exchange connectivity services to be a separate market to CI Access services. CI Access services provide a dedicated single link service to a point of aggregation, whereas CI Inter-exchange connectivity services provide a service between points of aggregation (BT exchanges), which include providing connections between access areas.
- 7.53 The different purpose of the service leads to a difference in competitive conditions compared to access circuits. Whereas access circuits are limited to individual business (and mobile) demand, CI Inter-exchange circuits combine the demand of consumers (primarily residential broadband), businesses and mobile operators. In addition, the bandwidths of circuits are higher, reflecting the aggregation of customer demand. This means that competition can be higher than at access sites, reflecting the higher value of the site. This is reflected in the fact that we find no SMP at several hundred BT exchanges.
- 7.54 The difference in competitive conditions means that a different competitive analysis is appropriate for inter-exchange circuits. Our access analysis assesses competition in a particular location based on the presence of networks in that postcode sector as a whole. As there are many fewer BT exchanges than access customer sites, an analysis based on the level of competition at individual exchanges, rather than postcode sectors, is tractable. This means that we can find no SMP at an exchange even if we find SMP for access circuits in the postcode sector where the exchange is located.
- 7.55 We focus on BT exchanges as these are the handover points for our access remedies, whether for residential products (LLU or GEA) or for business products (e.g. EAD leased lines). This distinguishes BT exchanges from other network nodes and makes the availability of competitive service from these exchanges particularly important for the viability of our wholesale access remedies.
- 7.56 Our analysis for CI Inter-exchange connectivity services is based on circuits between exchanges rather than exchanges themselves, although for the sake of tractability we assess the competitiveness of individual exchanges in order to proxy the competitiveness of circuits from that exchange. Put simply, an exchange where only BT provides backhaul products means that telecom providers who purchase access remedies from that exchange are also dependent on BT for backhaul. Conversely if several operators are providing backhaul services from an exchange, then it is probable that routes from that exchange are competitive as different backhaul routes can be substitutes for each other. This ability to assess the competitiveness of exchanges rather than every individual route aids the tractability of analysis.
- 7.57 The need for connections between exchanges means that not all CI Access services providers are able to provide a CI Inter-exchange connectivity service. As noted in Section

- 8, only eight telecoms providers offer a sufficient degree of backhaul network (i.e. to be connected to a sufficient number of exchanges) to provide a competitive constraint on Openreach’s provision of CI Inter-exchange connectivity services.⁵⁶¹
- 7.58 We also note having separate markets for access and inter-exchange is consistent with the EC approach which considers there to be a clear difference between terminating and trunk segments which NRAs should distinguish between (as described above).
- 7.59 Our approach differs from that in BCMR 2016 where we defined terminating segments as including aggregated circuits between uncompetitive BT exchanges. This meant that LLU backhaul circuits between uncompetitive BT exchanges were considered as a terminating segment even though they had no customer ends. The competitive conditions for these circuits were not reflected in our network reach analysis, and also made it challenging to have consistent service shares, as we based service shares on customer ends and LLU backhaul circuits had no customer ends. We consider that the approach in this Statement of treating access and inter-exchange circuits as separate markets better reflects the differences in competitive conditions.
- 7.60 In relation to TalkTalk’s comment, a supplier of CI Access services to a particular site cannot, without incurring significant cost, switch to supply CI Inter-exchange connectivity services as it would need to build a sufficient backhaul network to do so. Therefore, we do not consider there to be supply side substitution between these markets, and there is a separate market for CI Inter-exchange connectivity services.

Product market definition

- 7.61 The main purpose of the product market definition is to identify the competitive constraints on each of the CI Inter-exchange connectivity services provided by BT over the Openreach network. To define the product market for CI Inter-exchange connectivity services, like our product market definition assessment for CI Access services, we have followed the SSNIP test as our conceptual approach (see Section 4 for an explanation of the SSNIP test).⁵⁶²
- 7.62 Our focus is on whether the supply of a circuit at one bandwidth is a competitive constraint on the supply of another circuit at a different bandwidth, such that they should be considered part of the same relevant market when assessing SMP. The starting point of our market definition exercise is wholesale fibre leased lines supplied by BT over the Openreach network.⁵⁶³
- 7.63 We consider demand- and supply-side substitution below, although we consider the latter is the primary source of competitive constraint, for the reasons explained below

⁵⁶¹ See our definition of Principal Core Operator (PCOs) in Section 8.

⁵⁶² We note that the IIG considered there was no requirement to undertake a SNNIP test. We think there is some merit in its argument; but we have undertaken a SSNIP for completeness.

⁵⁶³ BT uses EAD and EBD products of various bandwidths, as well as OSA products, to provide links between BT exchanges. Other providers offer equivalent services. These various bandwidth products are the focal products for CI Inter-exchange connectivity services. EAD, EBD and OSA products are discussed in Section 3.

Demand-side substitution

- 7.64 Demand-side substitution arises when customers switch to alternative products in response to changes in their relative prices. The key question is whether the number of customers switching to an alternative product would be enough to render the SSNIP unprofitable for a hypothetical monopolist, in which case the relevant market should be expanded to include the candidate substitute.
- 7.65 The vast majority of connections between BT exchanges are at 1 Gbit/s and above. We therefore start with 1 Gbit/s between BT exchanges as our focal product. A SSNIP on 1 Gbit/s reduces the price differential with 10 Gbit/s and may induce some degree of switching. For example, a telecoms provider noted that it would be willing to move from 1 Gbit/s to 10 Gbit/s, but only where this allows it to minimise costs to meet bandwidth requirements.⁵⁶⁴ This indicates that telecoms providers are willing to upgrade where it is cost efficient to do so.
- 7.66 From a demand-side perspective it is ambiguous whether a SSNIP on 1 Gbit/s would result in a sufficient number of customers switching to 10 Gbit/s to render a SSNIP unprofitable. Analysis of the pricing comparisons between 1 Gbit/s after a SSNIP and 10 Gbit/s suggests that customers would find it cheaper to purchase or continue using a 1 Gbit/s circuit than upgrade to 10 Gbit/s. We consider that the price differentials are such that it is unlikely a significant number of 1 Gbit/s customers would switch to 10 Gbit/s in response to a SSNIP. However, these price differentials may be distorted by BT's relatively high (and unregulated) prices for 10 Gbit/s circuits.
- 7.67 We consider that a 10 Gbit/s customer has purchased that circuit because they need or expect to need that bandwidth, so would be unlikely to downgrade to a 1 Gbit/s circuit in response to a SSNIP. Hence, a SSNIP on 10 Gbit/s is unlikely to result in a sufficient number of customers switching to a lower bandwidth to render a SSNIP on 10 Gbit/s unprofitable.⁵⁶⁵
- 7.68 Therefore, our analysis suggests that demand-side substitution between 1 Gbit/s and 10 Gbit/s is likely to be weak, and asymmetric at a minimum.
- 7.69 As discussed in Section 4⁵⁶⁶, dark fibre is not a close demand-side substitute for low bandwidth CI Access services; but it could be one for VHB CI Access services. We consider that the same view holds for CI Inter-exchange services, noting that VHB services are a greater proportion of CI Inter-exchange demand.

⁵⁶⁴ [X].

⁵⁶⁵ Annex 8 contains our analysis of critical loss in the context of CI Access. This analysis is analogous to the demand-side analysis described in this section.

⁵⁶⁶ Also in Section 4, we explain that other technologies (e.g. EFM, asymmetric broadband) are unlikely to sufficiently constrain CI Access services. As CI Inter-exchange connectivity services carry more traffic, at higher bandwidths and quality, these technologies are an even weaker constraint and we do not consider them part of the same product market.

Supply-side substitution

- 7.70 Supply-side substitution considers whether suppliers of a service can switch production from our 1 Gbit/s focal product to services with a different bandwidth in routes between exchanges in the short term and without incurring significant additional costs to render a SSNIP unprofitable for a hypothetical monopolist.⁵⁶⁷
- 7.71 As set out in Section 3, different types of CI leased lines are delivered over the same physical network infrastructure. Where a telecoms provider is already connected to the BT exchange, it can offer a full suite of bandwidths relatively quickly and at little incremental cost, constraining a hypothetical monopolist of a given bandwidth from the supply side. For some circuits the difference between different bandwidth leased line services are the electronics installed at the circuit ends (e.g. 1 Gbit/s compared to 10 Gbit/s EAD circuits). In some cases (e.g. EBD), the same equipment is used to supply 1 Gbit/s and 10 Gbit/s.⁵⁶⁸ In the event of a SSNIP on 1 Gbit/s, a supplier of 10 Gbit/s could offer 1 Gbit/s quickly and with minimal cost and vice versa. A similar conclusion can be reached between Ethernet services at 10 Gbit/s and WDM (i.e. OSA) services, as well as across WDM services of different bandwidths.
- 7.72 We also consider that a similar conclusion could also be reached for dark fibre. A dark fibre provider already connected to the BT exchange would be able to start supplying CI Inter-exchange connectivity services by purchasing and installing equipment at each end of the circuit.⁵⁶⁹ We therefore consider that dark fibre providers would be able to provide CI Access services sufficiently quickly and at minimal cost in the event of a SSNIP.
- 7.73 Therefore, we consider different bandwidths and dark fibre to be supply-side substitutes where a telecoms provider has an existing connection to the BT exchange such that a hypothetical monopolist of a given bandwidth would not be able to profitably impose a SSNIP.⁵⁷⁰

Geographic market definition

- 7.74 We do not consider that connections to one exchange are a substitute for connections to another exchange. We also think that connectivity from another location (e.g. close to an exchange) is not a close enough substitute to be part of the markets we define. This is because, in both cases, telecoms providers need to be present at a specific exchange to use

⁵⁶⁷ We note above, in addressing TalkTalk's point, that we do not consider supply side substitution to occur between CI Inter-exchange connectivity services and CI Access services.

⁵⁶⁸ Some network equipment simply requires a change in the laser module to change line speed, and the number of circuits supported can be increased using pluggable equipment modules.

⁵⁶⁹ If the dark fibre provider does not already sell active services, then it is possible that the cost involved in starting to install and maintain equipment may be such that it would not be profitable to start providing CI Inter-exchange services in response to a SSNIP. However, the main dark fibre providers (e.g. CityFibre, Colt and Virgin Media) all supply both dark fibre and active CI Inter-exchange services.

⁵⁷⁰ We consider new entry in Section 8 and in the scope of our dark fibre remedy (see Section 12).

access remedies in the corresponding access area and therefore require onward connectivity from that exchange.

- 7.75 In addition, the conditions of competition can vary at each BT exchange, depending on presence of rival networks.
- 7.76 We note that competition conditions vary on a route-by-route basis. However, it is not practical to assess competition conditions for each CI Inter-exchange connectivity circuit. Therefore, we define each BT exchange as a distinct geographic market.⁵⁷¹
- 7.77 In CI Access, due to the very large number of customer locations, we aggregate customer locations into broader candidate geographic markets with similar competitive conditions to undertake our assessment. To address the IIG's comment, as the number of exchange locations is much fewer, we do not do this aggregation.

Conclusion on CI Inter-exchange connectivity services market definition

- 7.78 We have defined a separate product market for CI Inter-exchange connectivity services consisting of all CI Inter-exchange services at all bandwidths on the basis of supply-side substitution; and each individual BT exchange as a distinct geographic market.
- 7.79 In BT's and Openreach's responses, they requested additional clarity on what circuits are in the CI Inter-exchange connectivity market and what falls within the wider trunk segments. Below is a table detailing the different circuits included.
- 7.80 To address BT's and Openreach's request for additional clarity, Table 7.2 details what connections are included in the CI Inter-exchange connectivity services market and what connections are included in trunk segments.

⁵⁷¹ As noted in Section 8, our approach to SMP leads us to defining which routes are, and are not, competitive based on the rules we apply to each end of the route.

Table 7.12 – Clarificatory table

Type of route ⁵⁷²	In the CI Inter-exchange connectivity services markets	Trunk segments
BT exchange to BT exchange. ⁵⁷³	Yes	Yes
BT exchange to telecoms provider network node.	No	Yes
BT exchange to data centre. ⁵⁷⁴	No	Yes
Telecoms provider network node to telecoms provider network node.	No	Yes
Telecoms provider network node to data centre.	No	Yes
Data centre to data centre.	No	Yes

⁵⁷² We note that in all instances, this is inclusive of the carrying of aggregated traffic between points of aggregation.

⁵⁷³ We note that not all routes between BT exchanges will be found to have SMP and hence the CI Inter-exchange connectivity services market is comprised of a sub-set of non-competitive routes between BT exchanges.

⁵⁷⁴ We note that this excludes data centres that are not used for aggregation and onward routing purposes. Those data centres sit in CI Access services.

8. CI IEC: SMP findings and application of the three criteria test

- 8.1 This section sets out our market power assessment in the CI Inter-exchange connectivity services markets. It should be read in conjunction with Section 7, which sets out our market definition and Annex 15, which explains how we undertook our assessment of presence at BT exchanges.
- 8.2 In the 2018 BCMR Consultation we proposed that the direct and indirect presence of Principal Core Operators (PCOs) at BT exchanges should be the focus of our SMP assessment.⁵⁷⁵
- 8.3 Based on our analysis, we proposed that BT has SMP at BT Only and BT+1 exchanges. We did not consider that BT has SMP at BT+2 or more exchanges. We therefore proposed that all routes between two BT+2 or more exchanges are competitive. We applied the three criteria test and proposed that CI IEC services from BT Only and BT + 1 exchanges are amenable to *ex ante* regulation and, given the proposed SMP finding, should be regulated.
- 8.4 In summary, and in line with our consultation proposals, we have concluded that BT has SMP at its exchanges where only BT, or BT plus one Principal Core Operator (PCO),⁵⁷⁶ are present (directly or indirectly), and that, on the basis of the three-criteria test, routes from these BT exchanges are susceptible to *ex ante* regulation. We have concluded that BT does not have SMP where there are two or more PCOs present.
- 8.5 There are currently 5,573 BT exchanges, of which the vast majority are not competitive (as shown in Table 8.1). We have concluded that routes between the 571 BT exchanges where there are two or more PCOs present will not be regulated.⁵⁷⁷ All other routes between BT exchanges will be regulated.

Table 8.1 Number of BT exchanges by PCO presence

	BT Only	BT+1	BT+2 or more	Total
BT exchanges	4,269	733	571	5,573

⁵⁷⁵ A direct connection is where a PCO is present with network equipment at a BT exchange and is purchasing an External Cablelink variant to connect into its own network. An indirect connection is where a customer (not necessarily a PCO, e.g. TalkTalk) is present at an exchange and purchasing an External Cablelink variant to connect into a PCO's network. In this case, the PCO, who is selling a service to the customer (e.g. TalkTalk) will often not have network equipment at the BT exchange.

⁵⁷⁶ As explained below, to be classified a PCO, a telecoms provider needs to own its own fibre network, have a substantial footprint, and have capacity to offer wholesale inter-exchange connectivity.

⁵⁷⁷ This is where both ends of the circuit terminate at a BT exchange where there are two or more PCOs present. Any routes that begin and/or end at a BT Only or BT+1 exchange are not competitive. Routes that begin at a BT exchange and end at a location that is not a BT exchange are not part of this market as discussed in Section 7.

8.6 In this section we:

- detail consultation responses on the various areas of our proposed analysis;
- consider possible indicators of market power and conclude which are relevant for our assessment;
- specify a list of PCOs, which are network operators that we consider provide a competitive constraint on BT’s provision of CI Inter-exchange connectivity services;
- consider two alternative methodologies to assess SMP proposed by respondents to our consultation and conclude that our proposed approach is appropriate;
- undertake a market power assessment to establish at which BT exchanges BT has SMP, and at which it does not; and
- decide to apply regulation to non-competitive CI Inter-exchange connectivity services on the basis of the three-criteria test.

Stakeholder comments

Approach to SMP assessment

8.7 Below is a summary of stakeholder responses to our consultation. We have considered all responses in reaching our conclusions.

8.8 A number of stakeholders broadly agreed with our proposed approach.⁵⁷⁸ However, [X], Virgin Media, Hyperoptic, Openreach, Three, TalkTalk and Vodafone all expressed some reservations about aspects of our approach, as set out in the following paragraphs.

Indicators of SMP

8.9 Although Openreach broadly agreed with our approach to SMP designation, it noted that we had not undertaken an assessment of market shares. It claimed that this meant that “the feasibility of telecoms providers to move traffic between BT buildings via alternative providers of backhaul has not been tested even as indirect constraints”.⁵⁷⁹

8.10 Some respondents thought a SMP test based on PCO presence was insufficient. Three noted that BT is the only ‘PCO’ present at 78% of its exchanges, so other operators only offer a weak constraint on a national basis.⁵⁸⁰ Hyperoptic said we should also consider the ubiquity of Openreach’s network and the cost to a provider of adding an additional CI inter-exchange connectivity service supplier.⁵⁸¹ [X] noted that the mere presence of an alternative PCO at an exchange does not necessarily imply that competitive fibre-based

⁵⁷⁸ Openreach’s response to the 2018 BCMR Consultation, page 39, paragraph 30; SSE’s response to the 2018 BCMR Consultation, page 5; IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, page 18; Virgin Media’s response to the 2018 BCMR Consultation, page 10.

⁵⁷⁹ Openreach’s response to the 2018 BCMR Consultation, page 34, paragraph 4.

⁵⁸⁰ Three’s response to the 2018 BCMR Consultation, paragraph 2.6.

⁵⁸¹ Hyperoptic’s response to the 2018 BCMR Consultation, pages 3-5.

- products are available from that exchange.⁵⁸² Vodafone also thought only resilient presence would impose a sufficient constraint on BT.⁵⁸³
- 8.11 Openreach⁵⁸⁴ and Virgin Media⁵⁸⁵ agreed with our proposal to treat direct and indirect connections the same, and both as sufficient constraints on Openreach’s provision of CI inter-exchange connectivity services. However, Three thought that we had not explained why we had deviated from our approach in the Temporary Conditions, where we treated direct and indirect connections differently.⁵⁸⁶
- 8.12 BT Group, Openreach and Virgin Media considered that in addition to presence we should consider networks that are close to, but not present at exchanges as a constraint. Openreach said we should have taken into account the distance that alternative networks would need to extend their network to connect to each exchange and not just look at “average” distances. It noted that this could result in a change in SMP designation for some exchanges, with 300 BT Only exchanges where a non-Openreach network is within 600m.⁵⁸⁷
- 8.13 Openreach believed our network reach analysis was inaccurate. It noted that, at BT+2 exchanges, a median distance between the exchange and the PCOs networks of 35m suggests that in many cases the calculated distance is an over-estimate.⁵⁸⁸ Virgin Media argued that we had not sufficiently considered the prospect of new connections: it said that if there was an expression of interest, it could connect [§<]. It added that currently, digs to a hundred metres (and more) are ‘economically viable’.⁵⁸⁹
- 8.14 Relatedly, BT Group argued that if we accounted for unrestricted PIA, it would allow telecoms providers to economically address demand ten times further away from their existing networks than when they need to build their own infrastructure. Moreover, it stated that the lack of consideration of unrestricted PIA, in a forward-looking assessment of markets, is a significant error and imposing regulation where it is not required could interfere with infrastructure competition.⁵⁹⁰

⁵⁸² [§<] Confidential response to the 2018 BCMR Consultation page 5.

⁵⁸³ We address Vodafone’s comments more fully in the sub-section on alternative methods for assessing SMP. See, Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 1.43.

⁵⁸⁴ Openreach’s response to the 2018 BCMR Consultation, page 39, paragraph 33.

⁵⁸⁵ Virgin Media’s response to the 2018 BCMR Consultation, page 10.

⁵⁸⁶ Three’s response to the 2018 BCMR Consultation, paragraph 3.3.

⁵⁸⁷ Openreach’s response to the 2018 BCMR Consultation, page 12, paragraph 36.

⁵⁸⁸ This distance is not zero for two reasons. First, our network reach analysis has some measurement inaccuracies as discussed in Section 5. Second, in many cases, rival network is not at the BT exchange but is located outside and uses external Cablelink to connect with the PCO’s network. We note that following updated data from telecoms providers, and a data cleaning exercise where we removed some outliers, and the mean distance declined. Please see, Openreach’s response to the 2018 BCMR Consultation, page 40, paragraph 46.

⁵⁸⁹ Virgin Media’s response to the 2018 BCMR Consultation, pages 10-11.

⁵⁹⁰ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 1.13 and 3.5.

Principal Core Operators (PCOs)

- 8.15 [X]⁵⁹¹, Openreach, IIG, SSE, TalkTalk and Virgin Media all broadly agreed with our proposed approach of using PCOs to assess SMP. IIG, for example, noted that only substantial firms can provide sufficient constraint for sustainable competition.
- 8.16 Virgin Media agreed with its inclusion on the list of PCOs.⁵⁹² SSE agreed that CenturyLink, CityFibre, Colt, Virgin Media and Zayo are telecoms providers offering CI inter-exchange connectivity services.⁵⁹³ IIG agreed that our list of PCOs was correct.⁵⁹⁴
- 8.17 TalkTalk broadly agreed with the proposed approach, but it questioned whether all the providers in our proposed list of PCOs are genuine competitors that can constrain BT. TalkTalk noted that [X]. It thought that its experience would be similar for other major buyers. It further added that if an operator is not willing to wholesale, it should not be on the list.⁵⁹⁵
- 8.18 Three noted that if providers only offered services from a limited number of exchanges, this would not provide an effective constraint on BT's market power since BT is aware it will not lose access customers at a significant number of exchanges.⁵⁹⁶

SMP assessment methodologies

- 8.19 TalkTalk argued that our test should be based on routes between exchanges and not presence at exchanges. TalkTalk thought that our test assumes that if a PCO is present at an exchange then the PCO should be a competitor to Openreach on all routes from that exchange. TalkTalk argued that only if a provider is present at both ends of a route should it be considered a competitive constraint on Openreach for that route. TalkTalk estimated this would mean we would need to define between 10-12K separate markets.⁵⁹⁷
- 8.20 Vodafone thought that using the number of rivals at an exchange to test SMP is an oversimplification.⁵⁹⁸ Vodafone argued that this is because it does not account for the rival's ability to provide a properly routed, resilient network.⁵⁹⁹ Moreover, where the rival is unable to provide a resilient network, it offers a weaker constraint on Openreach. Vodafone thought that it would not be onerous to conduct an assessment of the

⁵⁹¹ [X].

⁵⁹² Virgin Media's response to the 2018 BCMR Consultation, page 10.

⁵⁹³ SSE's response to the 2018 BCMR Consultation, page 6.

⁵⁹⁴ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 6.1.5-6.1.6.

⁵⁹⁵ TalkTalk's Confidential response to the 2018 BCMR Consultation, [X].

⁵⁹⁶ Three's response to the 2018 BCMR Consultation, paragraph 2.5.

⁵⁹⁷ TalkTalk's response to the 2018 BCMR Consultation, paragraphs 2.133-2.135.

⁵⁹⁸ Vodafone's response to the 2018 BCMR Consultation, part 3, paragraph 1.17-1.18.

⁵⁹⁹ It is our understanding, from Vodafone's response, that it means two physically separate routes exiting from the exchange. See for example, paragraphs 1.18-19, part 3 of Vodafone's response.

availability of diversely routed alternatives at exchanges using exact fibre routes that telecoms providers have into exchanges.^{600 601}

Proposed SMP findings

BT Only

- 8.21 SSE, TalkTalk, Three and IIG agreed that BT has SMP at BT Only exchanges. Three agreed that these exchanges are not prospectively competitive as it would not be economic for PCOs to extend their networks to these exchanges.⁶⁰² Openreach also agreed that regulation was needed at BT Only exchanges.⁶⁰³
- 8.22 Openreach and BT Group also questioned why we looked at “average” distances between a BT Only exchange building and the nearest PCO network. They argued this approach might lead to the regulation of potentially competitive exchanges and we that should look at the characteristics of each individual BT Only exchange.⁶⁰⁴

BT+1

- 8.23 SSE, TalkTalk, Three and IIG all agreed that Openreach has SMP at BT+1 exchanges.⁶⁰⁵ IIG agreed that two firms in a market does not constitute effective competition.⁶⁰⁶ Three agreed that vertically integrated PCOs would favour their downstream arms and doubted that PCOs would extend their networks to these BT+1 exchanges.⁶⁰⁷
- 8.24 Openreach disagreed that BT has SMP at BT+1 exchanges, arguing that the possibility of collusion was not the right basis on which to apply *ex ante* regulation. It said it did not have the ability or incentive to collude in this market and no evidence had been presented of such behaviour. In addition, it argued that even if it did have the ability and incentive to collude, the correct regulatory response would be a joint finding of SMP. Openreach added

⁶⁰⁰ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraphs 1.19 and 1.35-1.36.

⁶⁰¹ Vodafone also argued (Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 1.2) that our approach to SMP and remedies in the CI Inter-exchange connectivity market represented a breach by Ofcom of the legal requirements of technological neutrality, non-discrimination and equal treatment as a principle of administrative law. As we discuss in Section 7, the explanatory note to the 2014 EC Recommendation says that it is important to distinguish between trunk and terminating segments. It also says that the distinction between trunk and terminating segments will “depend on the network topology specific to a particular Member State”. Given that BT is the incumbent provider in the UK, and therefore the likely target of any regulation we set, it is appropriate to take its network topology into account. It is not clear how we have unduly favoured one form of electronic communications network in contravention of section 4(6) of the Act, unduly discriminated against particular persons in contravention of section 47(2)(b) of the Act, or failed to treat persons equally. In any event, section 87 requires us, where we determine that a person has SMP in an identified services market, to set SMP in respect of the network provided or associated facilities made available by that person (see sub-s (1) and (12)). Therefore, we are required to specifically take BT’s network into account when imposing regulation on it.

⁶⁰² Three’s response to the 2018 BCMR Consultation, paragraph 2.1.

⁶⁰³ Openreach’s response to the 2018 BCMR Consultation, page 34, paragraph 2. We note Openreach argued that some BT Only exchanges are NGA handover points, which will be long term aggregation points for access, and in the absence of a dark fibre remedy could attract alternative network build. We deal with this point in Section 12.

⁶⁰⁴ Openreach’s response to the 2018 BCMR Consultation, page 12, paragraph 36; BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.14.

⁶⁰⁵ Although we note that TalkTalk’s agreement was on the basis of its own SMP methodology (i.e. the same operator at both ends of a route). TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.140.

⁶⁰⁶ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 6.1.5.

⁶⁰⁷ Three’s response to the 2018 BCMR Consultation, paragraph 2.1.

that service shares suggest that Virgin Media and other PCOs have been more successful than BT at BT+1 exchanges, and so at these exchanges, it would be better to look at the likelihood of Openreach winning contracts to determine market power. It thought that it cannot be correct to always attribute Openreach with market power if it is less successful at these exchanges. Openreach further argued that we should have considered extension at BT+1 exchanges, given the median distance to a second network is 334m and the economic dig distance for a single 10 Gbit/s circuit over five years is 120m (and network operators would dig further for CI inter-exchange connectivity services).⁶⁰⁸

- 8.25 Virgin Media also disagreed with the SMP finding in BT+1 exchanges where it is the non-Openreach PCO at the exchange. Virgin Media stated that its customers will buy connections from BT+1 exchanges as part of a larger contract which also includes BT+2 or more exchanges. It argued that the inclusion of BT+2 or more exchanges in the contract will mean it needs to price at a competitive level across all areas to secure the contract.⁶⁰⁹

BT+2 or more

- 8.26 TalkTalk thought BT has SMP at BT+2 exchanges, even if the same operator is at both ends. TalkTalk concluded the evidence presented was not sufficient to make a no SMP finding. It also noted that, in the past, in other markets, Ofcom has found moving from four to three competitors insufficient for competition.⁶¹⁰
- 8.27 Three thought that our rationale for finding that routes between BT+2 exchanges are competitive was not persuasive and lacked evidence. It argued we had failed to consider access seekers' need for ubiquity. It added that we did not explain why the threshold could not be three or four PCOs and why we think competitive conditions are the same in BT+2 and BT+3 exchanges. It further noted that in its experience, when tendering for a contract, there is not a number of bids it aims to receive, and when there are three bids, this does not ensure a competitive price. Three noted that what is important is whether the responses are relevant (e.g. covering multiple exchanges) and that, where possible, there is a choice of operators.⁶¹¹
- 8.28 Openreach welcomed the adoption of the criterion of BT+2 as indicative of effective competition in backhaul and the delineation of a core network boundary.⁶¹² Virgin Media also agreed that BT+2 exchanges are competitive.⁶¹³ The IIG argued that no firm is likely to have SMP where three operators are present (inclusive of BT) and detailed some evidence in support of that finding.⁶¹⁴

⁶⁰⁸ Openreach's response to the 2018 BCMR Consultation, page 40, paragraphs 41-45.

⁶⁰⁹ Virgin Media's response to the 2018 BCMR Consultation, pages 10-13. We note that Virgin Media argued that even if we conclude BT has SMP in BT+1 exchanges, they should not be considered the same as BT Only exchanges and the remedies should be very different. We discuss our remedies for CI inter-exchange connectivity services in Section 12 and Section 13.

⁶¹⁰ TalkTalk's response to the 2018 BCMR Consultation, paragraph 2.141.

⁶¹¹ Three's response to the 2018 BCMR Consultation, paragraphs 3.4-3.8.

⁶¹² Openreach's response to the 2018 BCMR Consultation, page 35, paragraph 6.

⁶¹³ Virgin Media's response to the 2018 BCMR Consultation, page 12.

⁶¹⁴ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 6.1.5. In its response, IIG noted papers by Xiao and Orazem (2011).

8.29 SSE also agreed with our no SMP finding at BT+2 exchanges. It noted that it is currently building out to a number of exchanges, inclusive of 150 we are planning to deregulate, and is able to find alternatives to Openreach at these exchanges.⁶¹⁵

SMP assessment

Our approach to assessment of SMP and main conclusions

- 8.30 We apply two tests to determine whether it is appropriate to regulate CI inter-exchange connectivity services at BT exchanges:
- an assessment of which BT exchanges are susceptible to *ex ante* regulation, using the three-criteria test set out in the 2014 EC Recommendation⁶¹⁶; and
 - an assessment at which BT exchanges there is a provider with SMP.
- 8.31 The 2014 EC Recommendation notes that the three-criteria test and the SMP assessment may make use of similar indicators.⁶¹⁷ We consider that it is convenient as a matter of presentation to set out our SMP assessment first, before turning to the three-criteria test. We note that both tests need to be satisfied to impose regulation.
- 8.32 As set out below, to assess SMP, we have taken the following steps:
- considered possible indicators for assessing competitive constraints;
 - considered whether to undertake a comprehensive assessment of market shares to inform our SMP assessment and decided not to;
 - decided to focus our SMP assessment on the presence of alternative infrastructure providers at a BT exchange (actively providing a service);
 - considered whether indirectly and directly present operators should be treated the same and concluded they should;
 - considered the possible effect of network operators that are close to but not connected to exchanges. We have concluded, even taking into account unrestricted PIA, that they will not affect our SMP finding over the course of this review⁶¹⁸;
 - defined a list of infrastructure providers that we consider provide a competitive constraint on BT;
 - considered whether to use an alternative methodology to assess SMP and concluded that our proposed assessment based on PCO presence is appropriate;
 - conducted an SMP assessment at all BT exchanges and concluded that BT has SMP at BT Only and BT+1 exchanges, but it does not have SMP at BT+2 or more exchanges;
 - considered how to treat exchanges with multiple MDF IDs within one exchange building; and

⁶¹⁵ SSE's response to the 2018 BCMR Consultation, page 6.

⁶¹⁶ EC, 2014. *Recommendation on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services* (2014/710/EU). <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32014H0710> [accessed 22 May 2019].

⁶¹⁷ 2014 EC Recommendation, paragraph 11.

⁶¹⁸ Although it does not affect our SMP assessment, we have considered the possible effect of these networks in the scope of our dark fibre remedy.

- considered whether we should re-regulate exchanges found competitive at the temporary conditions and how to treat exchanges that are part of the competitive core that do not pass the BT+2 threshold.

Indicators of SMP

8.33 The objective of our assessment is to identify which connections between BT exchanges are not competitive. To meet this objective, we have considered different possible indicators of SMP.

Market shares

8.34 Typically, we will look at market shares as a possible indicator of SMP, and one approach that we have considered is to calculate estimates of BT's share of CI inter-exchange connectivity services.

8.35 There are a number of problems associated with calculating market shares in this case. We have identified four specific issues which make market shares a less valuable indicator:

- Sales of inter-exchange connectivity are “lumpy” with one telecoms provider typically using just one provider for backhaul from a given exchange for an extended period of time, even when several are available.
- Once equipment is installed a PCO can quickly increase supply or service an additional customer at minimal cost. Combined with the “lumpy” nature of sales, this can mean that a low share of supply by an existing PCO may give a misleading picture of the competitive constraint it imposes. Once a network operator is present at an exchange it provides a competitive constraint on Openreach prices even where it only has a small share of current sales. Conversely, even where a non-BT provider has a high market share at any individual exchange, this would not necessarily be an indicator of SMP, given BT's other competitive advantages (in particular its ubiquitous network).
- There are limitations to telecoms providers' circuit data. Their core and backhaul circuit data is often incomplete, because they do not routinely collect the necessary data.⁶¹⁹ In particular, we note that if we were to rely on telecoms provider circuit inventory as the basis of this analysis we know there would be biases, due to the errors in Virgin Media's inventory dataset.⁶²⁰ This means that any calculation of service shares would be likely to be inaccurate.
- Terms such as access, backhaul, core and CI inter-exchange connectivity are regulatory constructs; they do not correspond to the underlying technology or reflect agreed industry standards. Operators build their networks differently and some do not clearly

⁶¹⁹ See 2015 BCMR Consultation, paragraph 4.197; 2016 BCMR Statement, Annex 15, paragraphs 15.30 and 15.125. Both at: <https://www.ofcom.org.uk/consultations-and-statements/category-1/business-connectivity-market-review-2016> [accessed 30 October 2018].

⁶²⁰ If we were to use new connections as the basis for this analysis, although the data would be more accurate; due to the maturity of the CI Inter-exchange connectivity services market and small sample size (we note there were only approximately [3<] external Cablelink sales in 2017 on a base of approximately [3<] circuits), it is unclear what useful conclusions could be drawn from this data.

distinguish between these terms.⁶²¹ Hence, it would be difficult to ensure that we treated each operator's network on a like-for-like basis.⁶²²

- 8.36 We have looked at shares of supply for TalkTalk and Sky at BT Only, BT+1 and BT+2 or more exchanges (see below). We note that this analysis has been informative at a high level and the indicative findings are supportive of our approach of using presence. However, we consider that with approximately 5,600 BT exchanges, of which roughly 1,300 have at least one PCO present, trying to calculate service shares for the entire market would be a substantial and onerous task, and would not yield a more meaningful or materially different result than an assessment based on presence.

Presence

- 8.37 We used presence of rival networks at BT exchanges as a proxy for competitive conditions between BT exchanges in the 2016 BCMR Statement. We continue to consider presence to be the best available indicator of competitive conditions in CI Inter-exchange connectivity.⁶²³
- 8.38 We note that BT has a number of competitive advantages over other telecoms providers in this market. Unlike other providers, it is present at all BT exchanges, so it is able to provide CI Inter-exchange connectivity services quickly. Its ubiquitous network also allows it to provide services at low incremental cost. Moreover, its greater route network, route diversity and lower reliance on other telecoms providers for CI Inter-exchange connectivity services offer it additional competitive benefits.
- 8.39 Given this context, we consider that in order for other providers to effectively compete with BT, they also need to be present at BT exchanges. This is because, if they are not present, they are not able to supply a range of CI inter-exchange connectivity services quickly. As noted in the 2018 Cartesian Report, when it comes to purchasing fibre services, delay is an important consideration for telecoms providers.⁶²⁴ Moreover, if they are not connected to and supplying CI inter-exchange connectivity services from BT exchanges, they will face significant costs and delays in connecting (discussed in more detail below). These costs will depend on the individual circumstances but will generally increase with the distance from the BT exchange.
- 8.40 Therefore, we think it appropriate that the presence of competitors at BT exchanges should be a focus of our assessment of competitive conditions.

⁶²¹ 2015 BCMR Consultation – Annexes, page 288.

⁶²² 2015 BCMR Consultation – Annexes, page 278.

⁶²³ We similarly note that in CI Access, presence of rival infrastructure is the most important factor affecting competition. However, we do not have reliable data showing where existing fibre connections are.

⁶²⁴ Cartesian, 2018. Business Connectivity Market Assessment (non-confidential version), paragraphs 7.25-7.

https://www.ofcom.org.uk/_data/assets/pdf_file/0009/113112/cartesian-business-connectivity-market-assessment.pdf [accessed 22 May 2019].

8.41 In terms of assessing “presence”, we have focused on network operators actively providing a CI inter-exchange connectivity service at a BT exchange. As part of our enquiries we became aware of instances where a telecoms provider network was outside a BT exchange, but no inter-exchange service was provided as the equipment is unused, legacy or redundant. The vast majority of these instances relate to redundant [redacted]. While it may be possible that some unused/redundant network could be reused at relatively low cost/speed, it may equally require additional work to make it operational again (which would weaken the competitive constraint it provides).⁶²⁵ We cannot practically identify the viability of unused/redundant network to provide a service that would constrain BT. Even if we could, it would be disproportionate to investigate this for every exchange.⁶²⁶ Therefore, we only consider operators that are actively providing a service at the exchange as “present”.⁶²⁷ Those operators that are nearby are considered in our assessment of network reach and taken into account in the scope of our remedies.

Direct and Indirect presence

8.42 There are two types of presence where a network operator is actively providing CI inter-exchange connectivity service from an exchange; direct⁶²⁸ and indirect⁶²⁹ presence. It is important to consider how we should treat these different types of presence in our SMP assessment. Direct presence is where a network operator is present with network equipment at a BT exchange and is purchasing an External Cablelink⁶³⁰ variant to connect into its own network. Indirect presence⁶³¹ is where a customer (not necessarily a network operator, e.g. TalkTalk) is present at an exchange and purchasing an External Cablelink variant often to connect into a network operator’s network. In this case, the network operator, who is selling a service to the customer (e.g. TalkTalk) will often not have network equipment at the BT exchange.

8.43 We have considered whether there is any reason to treat network operators that are directly present at BT exchanges differently to those that are indirectly present.⁶³² To do

⁶²⁵ [redacted].

⁶²⁶ Our analysis indicated that there were four telecoms providers that continue to purchase external Cablelink variants but do not use them, [redacted]. Some confirmed that the external Cablelink variants were not used to provide an inter-exchange connectivity service and had not been cancelled because the cost involved (e.g. engineer time, cease charge) was significantly greater than the nominal rental charge. In three instances, there were a very small number of purchases involved [redacted].

⁶²⁷ Below, we discuss further which network operators impose a competitive constraint on BT’s provision of CI Inter-exchange connectivity services.

⁶²⁸ Otherwise referred to as a direct connection.

⁶²⁹ Otherwise referred to as an indirect connection.

⁶³⁰ An External Cablelink variant is a fibre cable connection which can be used to link other telecoms providers’ equipment at a location within a BT exchange to an external Openreach footway box close to but just outside the BT exchange.

⁶³¹ Otherwise referred to as an indirect connection.

⁶³² In the 2016 BCMR Statement, we considered that an indirect connection might provide a weaker competitive constraint on BT, because although the PCO outside the BT exchange may have been able to offer a rival backhaul service in some instances, we were concerned that it might provide less of a constraint than an operator directly purchasing interconnect services at an exchange. We were particularly concerned that indirectly connected PCOs might lack the network and/or capacity to provide wholesale interexchange connectivity services at these locations (2016 BCMR Statement – Annexes 14 to 25, paragraphs 15.71-77).

this, we used our statutory information gathering powers⁶³³ to ask buyers of wholesale leased line services whether they use indirect connections to receive wholesale leased line CI inter-exchange connectivity services, or to receive a single circuit or other non-inter-exchange connectivity service.⁶³⁴

- 8.44 We found that telecoms providers purchasing External Cablelink variants are doing so to connect to a network operator’s network to receive an inter-exchange connectivity service. Specifically, we found that 99% of purchases were for an inter-exchange connectivity service. This is consistent with our findings from the largest purchasers of wholesale leased line services through indirect means, i.e. Sky [redacted]%, TalkTalk [redacted]% and Vodafone [redacted]%.⁶³⁵ This indicates that where a telecoms provider connects into a network operator’s network indirectly, the network operator’s backhaul/core network should pass outside the BT exchange.
- 8.45 We also analysed the wholesaling activities of Virgin Media, the largest provider of indirect inter-exchange connectivity services, to find out how many telecoms providers it was wholesaling to on an exchange-by-exchange basis. We found that it was not uncommon for it to provide inter-exchange connectivity services to two or more telecoms providers from outside BT exchanges (at 47% of BT exchanges where Virgin Media was indirectly present it served at least two telecoms providers with wholesale inter-exchange connectivity). This suggests that the network available outside a BT exchange, when a network operator is providing an inter-exchange connectivity service indirectly, is capable of supporting multiple wholesale customers.
- 8.46 Moreover, evidence from Virgin Media suggests that instances where indirect connections go straight into another telecoms provider’s core nodes, instead of through its own core network, are rare. It said that in the vast majority of instances traffic will go from outside a BT exchange directly into its core network. Virgin Media further explained that given the cost of digging, this was a rational decision from an economic and commercial perspective.⁶³⁶
- 8.47 In cases where a network operator has provided dark fibre for another telecoms provider from outside a BT exchange, given the high costs of installation, network operators will typically provide enough fibre for the anticipated level of demand over the life of the infrastructure. We therefore expect additional fibre capacity to be available to wholesale to other telecoms providers [redacted].⁶³⁷
- 8.48 Three argued we should treat direct and indirect connections differently. We consider the above analysis explains why we have decided to treat direct and indirect connections as sufficient constraints on Openreach. We further note that in its response, Three did not

⁶³³ s135-3 notice dated 13 April 2018.

⁶³⁴ There may be cases where a telecoms provider receives a single circuit or other non inter-exchange connectivity service from a PCO outside a BT exchange, but the PCO in question is still able to provide an inter-exchange connectivity service outside that exchange. Therefore, our results are likely to underestimate the percentage of exchanges where an interexchange connectivity service could be provided.

⁶³⁵ s135-3 notice dated 13 April 2018.

⁶³⁶ Meeting with Virgin Media on 25 May 2018.

⁶³⁷ [redacted].

present any arguments or evidence to suggest that direct and indirect connections should be treated differently. We note that both Openreach and Virgin Media agreed with our proposal to treat direct and indirect connections as sufficient constraints on Openreach.

8.49 In conclusion, we have decided to treat indirect connections in the same manner as direct connections for the purpose of assessing presence.

Network reach

8.50 We recognise that where there are networks close to BT exchanges, but which are not currently connected, the network provider may have an incentive to supply services from that exchange.⁶³⁸ As noted in Virgin Media's and Openreach's responses, this could provide a competitive constraint on BT's provision of CI Inter-exchange connectivity services. Therefore, it is important to consider whether networks close to an exchange but not connected are a useful indicator of SMP and if so how to take them into account.

8.51 In general, we would expect the barriers to entry to be lower (and therefore the incentives to build greater) the shorter the distance the network operators existing network is from the BT exchange. Such entry (actual or potential) could provide a constraint on BT at exchanges where rival network is sufficiently close. However, we consider BT's competitive advantages (e.g. ubiquitous network) result in significant cost and time advantages over operators looking to extend their networks to a particular exchange.

8.52 In relation to this, we make the following observations:

- While the costs of digging depend on distance, costs can still be material for relatively short distances. A 10m network extension that requires new duct could cost approximately £[redacted], whilst this cost increases to more than £[redacted] for an extension of 100m.⁶³⁹
- Any kind of network build takes time, requiring planning (including potential traffic management and wayleaves) as well as the installation time. We note, for example, BT was able to supply a new CI Inter-exchange connectivity circuit in approximately [redacted] 21-30 working days in 2017 where it already had fibre in place or approximately [redacted] 41-50 days when it had duct and only needed to blow fibre. This compares to an average time to provide of [redacted] 111-120 working days for a CI Access circuit in 2017 where new duct was required.⁶⁴⁰ We consider that time to supply by networks which are nearby will be longer (and in some cases significantly more so) than for BT.

⁶³⁸ In many instances, the PCO would need to build to the exchange in order to supply the exchange.

⁶³⁹ See Figure 6.1 in Annex 6.

Note that BT may still be required to carry out some duct work on IEC circuits (i.e. replacing damaged duct), but PCOs are likely to have to carry out much more duct work (and incur a larger cost) as a result of needing to dig to connect to an exchange.

⁶⁴⁰ See paragraph 6.26 in Annex 6. We consider a CI Access circuit is a relevant comparator for provision by a rival operator since we would expect PCOs to extend their network from an existing node near to a BT exchange. This means dig distances and locations could be more comparable to a CI Access circuit than a complete inter-exchange circuit between two exchanges. These figures are a result of Ofcom analysis.

- While unrestricted PIA could potentially reduce the cost and time of network extensions, we do not expect it to facilitate a material increase in CI Inter-exchange connectivity build in this review period for the reasons set out in Annex 6.

8.53 As a result, we think that networks which are close to BT exchanges but are not currently connected provide a materially weaker constraint than those which are present at an exchange. Therefore, we consider network reach in our SMP assessment, but place less weight on this than on presence. We have also considered network reach in the scope of our remedies.

8.54 Therefore, in line with our consultation position, we have decided to focus our SMP assessment on presence.

Principal Core Operators (PCOs)

8.55 Having concluded that presence will be the focus of our assessment, it is important to note that not all telecoms providers will necessarily be able to compete in the provision of CI inter-exchange connectivity services. Therefore, as a matter of the presence test, we think it is important to only reflect those operators which provide a genuine competitive constraint on BT. We refer to these providers as Principal Core Operators (PCOs).

8.56 In the 2016 BCMR Statement, we defined PCOs as “a subset of telecoms providers that have substantial core infrastructure and the capacity to provide wholesale leased lines to other telecoms providers.”⁶⁴¹

8.57 We consider that the definition of PCOs remains broadly appropriate. We therefore need to identify telecoms providers that:

- own their own network infrastructure;
- have a substantial footprint; and
- have the capacity to offer a wholesale inter-exchange connectivity service to other telecoms providers.⁶⁴²

8.58 In our judgement these criteria are appropriate as they are indicative of clear demand from the exchange and an ability to supply backhaul services in competition with BT. For example, if an infrastructure provider has some presence, but does not have the capacity to offer a wholesale service because it has an insufficient footprint, we do not think it would provide a sufficient competitive constraint on BT and so should be excluded from the list of PCOs.

⁶⁴¹ Ofcom, 2016 BCMR Statement – Annexes 14 to 25, page 36.

⁶⁴² For our definition of PCOs to be appropriate, it is important to include the requirement that their footprint be substantial at BT exchanges. This is because evidence from telecoms providers suggests that BT has inherent advantages in exchanges, in particular the scope of its network and diversity. PCOs, as we have defined them, should provide an effective constraint on BT when they are present. We note for example that [3<] but does not consider its presence sufficient to allow it to provide a competitive CI inter-exchange connectivity service offer from BT exchanges.

- 8.59 Using these criteria, we need to determine which providers meet the requirements to be considered PCOs. Since our 2016 BCMR Statement⁶⁴³, there have been developments in the market.⁶⁴⁴ To enable us to compile an accurate list of PCOs, which both captures the characteristics noted above and reflects these developments in the market, we sent a statutory information request to relevant telecoms providers.⁶⁴⁵
- 8.60 On the basis of this evidence, we proposed that the following providers are now PCOs: CenturyLink (previously Level3⁶⁴⁶), CityFibre⁶⁴⁷, Colt, eir, SSE (previously referred to as Neos⁶⁴⁸), Virgin Media, Vodafone, and Zayo.⁶⁴⁹
- 8.61 A number of respondents agreed with the list or certain entries on the list.⁶⁵⁰ Both [redacted]⁶⁵¹ and Three questioned the accuracy of the list of PCOs but they did not indicate which telecoms providers should not be on the list and none of the proposed PCOs indicated that they should be excluded from the list.
- 8.62 We do not agree with Three that a PCO needs to have a ubiquitous network in order to compete with Openreach.⁶⁵² We note that TalkTalk questioned whether all the providers in our proposed list of PCOs were genuine competitors that can constrain BT. However, we disagree and consider that all PCOs provide a genuine competitive constraint. We note that multi-provider arrangements are common and there are many examples where telecoms providers are buying CI inter-exchange connectivity services from multiple PCOs. For example, TalkTalk purchases circuits from [redacted].
- 8.63 Therefore, we have concluded the following telecoms providers are PCOs as proposed in our consultation: CenturyLink, CityFibre, Colt, eir, SSE, Virgin Media, Vodafone, and Zayo.

Alternative methodologies for assessing SMP

- 8.64 We have also considered different methodologies suggested by respondents for identifying which connections between BT exchanges are not competitive.

⁶⁴³ In which we thought: Colt, Interoute, KCOM, Level3, Neos, Verizon, Virgin Media and Vodafone were PCOs.

⁶⁴⁴ CityFibre acquired KCOM's assets, and we are aware of other developments, such as Zayo's purchase of Geo in July 2014 and CityFibre's acquisition of Entanet in July 2017.

⁶⁴⁵ s135-3 notice dated 13 April 2018. In this response, we asked the main network operators and leased line buyers about their activities at or just outside BT exchanges and at data centres. We also asked them about the competitive conditions at BT exchanges and data centres and their future plans for network expansion over the next few years.

⁶⁴⁶ In November 2017, CenturyLink completed its acquisition of Level3.

⁶⁴⁷ In December 2015, CityFibre acquired much of KCOM's national communications infrastructure (excluding Hull and East Yorkshire).

⁶⁴⁸ SSE bought Neos in 2003. In previous market reviews, we have referred to it as Neos. In this market review, we have referred to it as SSE.

⁶⁴⁹ We note that [redacted].

⁶⁵⁰ See, for example IIG's, SSE's or Virgin Media's consultation responses. We note Virgin Media was supportive of its inclusion and made no comment on others inclusion on the list.

⁶⁵¹ [redacted].

⁶⁵² Three's response to the 2018 BCMR Consultation, paragraphs 2.2.

Consideration of TalkTalk’s approach to assessing SMP

- 8.65 TalkTalk proposed a “route by route” methodology for our assessment of SMP in CI Inter-exchange connectivity services.
- 8.66 We think that this methodology would be a substantial and onerous task for both the regulator and telecoms providers. It is also unclear that it would necessarily provide better results than those achieved through a methodology based on PCO presence. Specifically:
- TalkTalk estimated that we would need to create between 10-12K markets⁶⁵³, as compared to BT’s c.5600 exchanges which we look at to undertake a PCO presence test;⁶⁵⁴
 - As we would need to look at competitive conditions on a route by route basis, this would materially increase the volume of data required from telecoms providers and the administrative burden to cross-check the information provided⁶⁵⁵; and
 - We also question whether a detailed route by route assessment would lead to a materially different outcome. For CI Inter-exchange connectivity services, the key concern is the ability to get from a non-competitive BT exchange to an exchange where there is competitive backhaul provision. By assessing the competitive conditions at each exchange, we get a view of the competitiveness of routes by identifying those which start at a non-competitive exchange (i.e. where BT has SMP). Then for the purposes of imposing remedies we set regulation on each route based on the least competitive end, meaning it is in effect an analysis of routes without assessing each one individually. By contrast, shares on a route by route basis may not be particularly meaningful as they do not capture potential competition nor the extent to which individual routes can be substitutable.⁶⁵⁶

Consideration of Vodafone’s approach to assessing SMP

- 8.67 Vodafone broadly agreed that an approach based on presence was appropriate. However, it considered the use of PCOs at an exchange an oversimplification, which did not account for its ability to provide a resilient network at the exchange. Vodafone thought that it

⁶⁵³ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.130.

⁶⁵⁴ We note, that in terms of the number of exchanges we look at in more detail, this is limited to 1,300 exchanges where one or more PCO is present. Where no PCO presence is identified, there is no additional analysis required to identify the specific PCO(s) at the exchange in question.

⁶⁵⁵ This could be particularly challenging, when we consider the varying degrees of detail held and different formats of data owned by the different telecoms providers. We would also be dependent on the use of the telecoms provider circuit inventory, which would introduce known errors into our analysis. For example, [X]. In addition, if we were to assess, as TalkTalk suggests, “new routes where there is no current inter-exchange link, but one is planned” (see paragraph 2.135 of its response), we would need to define what is meant by a “new route” (e.g. would it need to be Board approved), collate and synthesise this information from all of the PCOs and ensure all information was treated on a like for like basis.

⁶⁵⁶ We also disagree with TalkTalk’s view that having different PCOs at different ends of a route means that there will not be competitive provision of IEC services between these exchanges. This is because, as noted here, routes can be substitutes, and if an exchange is competitive we expect providers will be able to secure competitive connectivity to any other exchange, even if this is routed differently from the Openreach network configuration (TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 2.121, 128-130, 132).

would not be too onerous to undertake an assessment on the basis of “resilient” presence at an exchange.⁶⁵⁷

8.68 We have considered applying Vodafone’s “resilient” presence methodology to assess SMP. This test would involve requiring significantly more granular information on PCO presence at BT’s exchanges. We would need to know, for each PCO, at each exchange at which it is present, how many routes are leaving the exchange on its network and whether those routes are diverse. We note that Vodafone has attempted to undertake this exercise.⁶⁵⁸ However, we think that this approach would be a more complex and onerous test, and it is unclear to us whether we could complete it accurately given limitations of PCO data.

8.69 In any case, we do not agree with Vodafone that the absence of a “resilient” connection at an exchange prevents a PCO from providing a competitive constraint on Openreach’s provision of CI Inter-exchange connectivity services. Specifically:

- Not all PCO presence at BT exchanges need to be equally resilient. For network operators there is a choice to be made between lower risk of outage (due to higher resilience) against increased cost. Depending on specific circumstances, it may be economic and/or more important to have greater resilience at some exchanges (e.g. those carrying greater traffic) than others.⁶⁵⁹
- We accept that there may be some exchanges where PCOs offer no route diversity (either at the exchange or further out). However, it is unclear to us that this would not provide a sufficient competitive constraint on Openreach. When telecoms providers purchase a CI inter-exchange connectivity service, there are a number of telecoms providers that are willing to have slightly less resilient routes for lower cost. For example, [X].⁶⁶⁰

8.70 In addition, we note the following practical considerations with assessing resilience:

- A network may be considered resilient even though it does not have resilient routes out of a specific BT exchange. It is possible to achieve a slightly lower degree of resilience, for example, by having resilient routes at a point away from the exchange. Given that not all networks are built to achieve resilience from the exchange, if we wanted to test the resilience of PCOs’ networks, we would need to do so holistically. We think this would be onerous both for us and for PCOs to undertake this task.⁶⁶¹
- We further note that in Vodafone’s response, it states that resilience is an important consideration when building its fibre networks.⁶⁶² To the extent this is the case, we

⁶⁵⁷ It is our understanding, from Vodafone’s response, that it means two physically separate routes exiting from the exchange. See for example, paragraphs 1.18-19 in Vodafone’s response.

⁶⁵⁸ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 1.19.

⁶⁵⁹ We note, for example, that Openreach does not have resilient routes on all exchanges at the periphery of its network.

⁶⁶⁰ Comment from [X].

⁶⁶¹ This would mean, for example, that each PCO would need to provide detailed information on the configuration of its fibre network and how resilience is achieved. This information would need to be provided in a consistent format to enable us to efficiently process the data. Each PCO would then need to explain this information to us. We would also need to agree a common measure of reliability to compare different network configurations. This would not account for further checks or cross checks in the event we uncovered inconsistencies or errors in the information provided.

⁶⁶² Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 1.24.

would expect resilience to also be an important consideration for other PCOs too, such that they will build their networks to achieve a sufficient degree of resilience for their needs. This brings into question how much additional insight can be achieved from analysing resilience when weighed up against the additional administrative burden.⁶⁶³

Conclusion on approach to assessing SMP

- 8.71 We have considered whether to use market shares as an indicator of SMP. As outlined above, there are a number of practical constraints, which make the calculation of market shares challenging and would reduce the value of market share analysis in this market. We also think that market shares are less informative as once a network operator is present at an exchange it provides a competitive constraint even if its share of current sales is low. We have therefore not undertaken a comprehensive review of market shares at BT exchanges.⁶⁶⁴
- 8.72 We consider presence to be the best available indicator of competitive conditions in CI inter-exchange connectivity. We have therefore focussed our SMP assessment on presence. We consider that direct and indirect presence are both sufficient constraints on BT and should be treated the same.
- 8.73 Networks close to but not connected to a BT exchange provide some constraint, but we consider it to be significantly weaker than presence. Nevertheless, we do recognise there is some constraint which is reflected in our SMP assessment and the scope of our remedies.
- 8.74 We think that it is appropriate that any presence test should be based on network operators that provide a competitive constraint on BT. We therefore think that only PCO presence should be considered a constraint.
- 8.75 We have considered two alternative methodologies to assess SMP raised by stakeholders in response to the consultation. We think TalkTalk's route by route methodology to be complex and likely to introduce errors into the SMP assessment, for limited (if any) improvements to our understanding of the market. We also think Vodafone's methodology is more complex and onerous than a PCO presence test. We also do not believe its underlying premise (i.e. that network providers need to be able to provide resilient links at all BT exchanges in order to provide a competitive constraint on Openreach CI Inter-exchange connectivity services) to be correct.

⁶⁶³ This is not to say that all networks will be equally resilient. There will be a degree of variance. However, it is our judgement that the likely variance in resilience (and the insights this would provide) do not justify the additional administrative burden.

⁶⁶⁴ We note, we have looked at Sky and TalkTalk market shares at BT Only, BT+1 and BT+2 exchanges as we consider the analysis helpful at a high level.

8.76 We note that in the 2016 BCMR Statement, we used presence of PCO⁶⁶⁵ networks at BT exchanges as a proxy for competitive conditions between BT exchanges.⁶⁶⁶ We note that the approach is robust and well understood by telecoms providers. We also think it is a proportionate methodology for assessing SMP in CI Inter-exchange connectivity services. Therefore, we have decided to focus our SMP assessment on the presence of PCO networks at BT exchanges.

BT exchanges at which BT has SMP

8.77 Having decided to focus our SMP assessment on PCO presence, we now consider where BT has SMP. We note that each BT exchange is its own market and we assess the level of presence at each BT exchange. For the purpose of our SMP assessment we group these markets into:

- BT Only exchanges;
- BT+1 exchanges; and
- BT+2 or more exchanges.

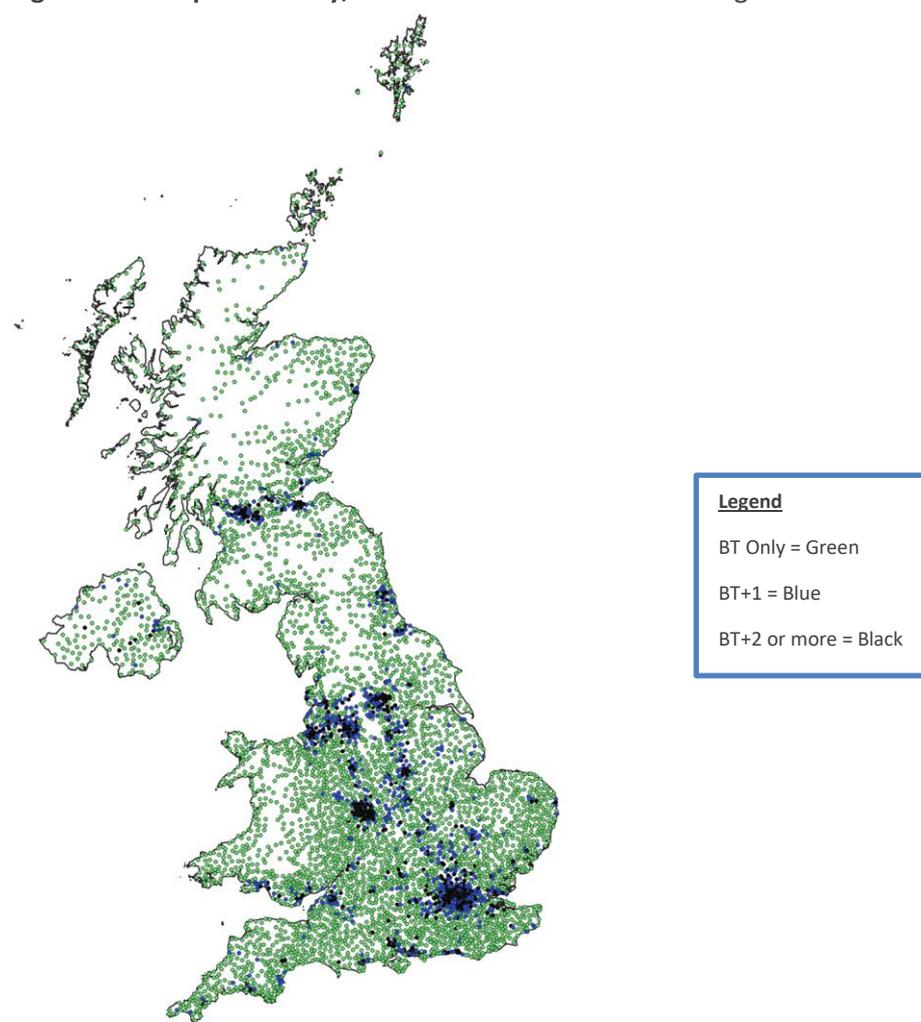
8.78 As part of this assessment, we also take into account barriers to entry, economies of scale, and countervailing buyer power, where relevant.

8.79 Figure 8.2 illustrates where each of these exchanges are located.

⁶⁶⁵ We continue to consider the number of resellers (these are telecoms providers that do not own fibre but use another infrastructure provider's fibre to sell services to other telecoms providers) present at a BT exchange a poor proxy for competition, as the constraint is much weaker and ultimately dependent on the number of PCOs present at that exchange.

⁶⁶⁶ We consider that presence at exchanges allows you to get a view of the competitiveness of routes. Our approach allows us to measure presence at each exchange, but when we apply it, we set regulation on each route based on the least competitive end. It is therefore, effectively an analysis of routes.

Figure 8.13 Map of BT Only, BT+1 and BT+2 or more exchanges



Source: Ofcom analysis

BT has SMP at BT Only exchanges

8.80 Potential customers should be able to seek competitive bids for CI inter-exchange connectivity services from PCOs that are present at BT exchanges. However, with only one provider present (i.e. BT), there is a *de facto* monopoly at the BT exchange.⁶⁶⁷ In addition, given users of regulated access (leased lines and/or residential broadband) products from BT Only exchanges are reliant on BT for CI inter-exchange connectivity services from that exchange in order to supply those end customers, we would not expect them to hold countervailing buyer power. No respondents disagreed with our proposal that BT has SMP in BT Only exchanges.

8.81 If barriers to entry at BT Only exchanges were low, there might still be a constraint on BT. However, there are significant sunk costs involved for a new entrant to build an inter-exchange connectivity network, as this would require investment in fibre networks and

⁶⁶⁷ We have based our classification primarily on data from telecoms providers in response to formal information requests. We have updated the map since Consultation.

network extensions over long distances. In addition, BT has significant economies of scale in the provision of inter-exchange connectivity services. Its ubiquitous network gives it a number of advantages over a new entrant, including diversity, availability, limited interoperability issues (as it does not need to rely on other networks) and network coverage. We further note that to compete with BT, the entrant would need to build a sufficiently large footprint in the UK.

8.82 That said, we recognise that the barriers to entry in BT Only exchanges may be lower for PCO networks which are nearby but not currently connected and providing a CI inter-exchange connectivity service. To this end, we have considered whether the potential for extensions of such networks provides a sufficient constraint to affect this SMP analysis in this review period. The strength of constraint will likely depend on the demand/revenue available at the exchange, the specific costs which would be incurred, and the time it would take to provide (particularly relative to an Openreach service). In this regard we make the following observations:

- Demand is generally lower at BT Only exchanges. As illustrated by Figure 8.14, most BT Only exchanges are found in more remote or rural areas. Openreach supplies an average of [3<]. As such, the contestable backhaul revenues are generally relatively low at BT Only exchanges (although those BT Only exchanges which are NGA handover points have higher demand). This will weaken incentives to build to these exchanges in this review period.
- There are substantial distances between BT Only exchanges and the nearest PCO networks and so build costs are likely to be material (as discussed in Annex 6). The nearest PCO network is on average 5.8km away, with a median distance of 2.7km. The second nearest PCO network is on average 12.2km away, with a median distance of 5.9km. The build costs associated with digging such distances are therefore likely to be a material barrier to entry, particularly when combined with the limited demand explained above and given BT is already generally connected.⁶⁶⁸ In addition, we note that even if one PCO was to dig to the exchange, it may still not be sufficient to change our SMP assessment, as discussed in the following sub-section.
- Given these distances, we would expect the time for a PCO to provide an active CI inter-exchange connectivity service from a BT Only exchange where they are not already present is likely to be material (particularly compared to BT who is already generally connected to each exchange). By way of illustration, as noted in paragraph 8.52, the average time to provide a CI Access circuit in 2017 was [3<] days where new duct was required.⁶⁴⁰ By comparison, the time for Openreach to provide a CI inter-exchange connectivity service where it already had fibre in place (i.e. no duct or fibre work was required) was approximately [3<] days. This difference is likely to weaken the constraint from nearby networks, as the additional time to supply may be a barrier for some prospective consumers even if the demand and supply conditions would otherwise support build.

⁶⁶⁸ We discuss the general relationship between distance and costs in Annex 6.

- 8.83 As a result, in the vast majority of cases, the constraints imposed by PCOs on BT Only exchanges are weak. We recognise that the availability of unrestricted PIA may reduce the cost and time barriers to entry (particularly in the long term), however as set out in Annex 6, we do not expect this to have a material impact in this review period. Therefore, we expect these barriers to entry to remain material.
- 8.84 We note BT’s argument that we should look at each BT Only exchange building on its own, in preference to looking at average distances from all BT Only exchanges. While we acknowledge that, all things being equal, the shorter the distance to the exchange the stronger the constraint, we note that BT is currently the only operator present at these exchanges and any rival (even if relatively nearby) is at a significant competitive disadvantage in terms of cost and time to supply.⁶⁶⁹ We therefore think that BT has SMP at BT Only exchanges throughout this review period. Nonetheless, we acknowledge that some BT Only exchanges may have the potential to be served by rival networks in future and take this into account in the scope of our remedies.⁶⁷⁰

BT has SMP at BT + 1 exchanges

- 8.85 While there are two operators competing for customers in BT+1 exchanges, choice of supplier is still very limited.
- 8.86 We note that there is evidence of telecoms providers using non-Openreach PCOs from BT+1 exchanges. For example, Sky indicates that it purchases [redacted] to connect to and from BT+1 exchanges⁶⁷¹ [redacted], indicating less reliance on circuits to and from BT+1 exchanges compared to exchanges where only BT is present. TalkTalk [redacted].
- 8.87 However, although this likely indicates a greater constraint on BT than on routes from BT Only exchanges, we consider this constraint is still insufficient to support a “no SMP” finding for the reasons outlined below.
- 8.88 In a market in which one of the two suppliers publishes its prices, the other provider has the ability and incentive to either just match or slightly undercut its prices. This would lead to a weakening of competitive pressure. Evidence [redacted].⁶⁷² In addition, [redacted].⁶⁷³
- 8.89 Suppliers of wholesale services at BT+1 exchanges are also the major competitors of many of the main purchasers in the retail market (for example Virgin Media is the PCO with most presence at exchanges, and also competes with Sky and TalkTalk in the retail broadband market downstream). Higher backhaul costs for downstream competitors of a wholesale supplier could translate into a competitive advantage at the retail level for that wholesale supplier. This further incentivises price matching and dampens competitive pressure.

⁶⁶⁹ Of course, other factors are important, such as the revenues available from the exchange.

⁶⁷⁰ See Section 12 for the discussion on the scope of our dark fibre remedy.

⁶⁷¹ Based on connecting to and from a BT+1 exchange to a BT+1 or BT+2 or more.

⁶⁷² [redacted].

⁶⁷³ Meeting with [redacted].

- 8.90 In its response, Openreach noted that Virgin Media has been more successful than it at certain BT+1 exchanges. We do not consider this changes our SMP findings. This is because as discussed above, market shares are less meaningful in this context. Even if Virgin Media (or indeed any other PCO) has greater market share at any particular BT exchange, it does not have BT's competitive advantages (e.g. its ubiquitous network).⁶⁷⁴
- 8.91 As with BT Only exchanges above, we have considered the barriers to entry for nearby network, and whether they may pose a constraint on BT in this review period. We note that the demand is likely to be higher and the distances to the second network are shorter than at BT Only exchanges. The distance to the nearest second network is 1.3km on average, with a median distance of 334m, and so the costs and average time to provide could be lower compared to BT Only exchanges (given the shorter distances).^{675,676} However, there remain material costs associated with these distances, and time to provide is also still likely to be a barrier (particularly as BT is already generally connected to each exchange), as discussed in Annex 6. We recognise that the availability of unrestricted PIA may reduce the cost and time barriers to entry (particularly in the long term), however as set out in Annex 6, we do not expect this to have a material impact in this review period. Therefore, for similar reasons with BT Only exchanges, we would not expect to observe material extension of networks to BT+1 exchanges in this review period, and so we would expect BT to retain a material competitive advantage at these exchanges.
- 8.92 We note Virgin Media's argument that we should find BT+1 exchanges competitive when Virgin Media is the other PCO present. As outlined above, we do not consider two competitors are enough, whether the additional competitor is Virgin Media or any other PCO.
- 8.93 We also disagree with Virgin Media's argument that the inclusion of a number of BT+2 exchanges in a contract should result in competitive pricing across the contract. While in principle there might be some countervailing buyer power for sufficiently large contracts and two providers to negotiate with, we still think this is limited given price publication and the material number of exchanges with limited competitors. In particular, it is not clear to us, from the perspective of a telecoms provider procuring a range of CI inter-exchange connectivity services, how competition along some of the routes constrains pricing elsewhere. For example, if a telecoms provider purchasing CI inter-exchange connectivity services wants connectivity on one competitive route and four non-competitive routes (all BT+1 where Virgin Media is the plus 1), the telecoms provider only has alternatives to Virgin Media/BT on one route. So, while that route is competitively priced, there are limited incentives for Virgin Media to competitively price the other routes. It is true that the average price might be lower if there are a large proportion of competitive routes, but

⁶⁷⁴ We note above the practical difficulties and other issues associated with undertaking a comprehensive assessment of market shares in this market.

⁶⁷⁵ We discuss the general relationship between distance and i) time to provide and ii) costs in Annex 6.

⁶⁷⁶ As with BT Only exchanges, we accept that the exact constraint on BT at BT+1 exchanges will vary by exchange. However, because the remedies applied at routes from BT+1 exchanges do not have a material risk of affecting rival investment, we have not reviewed the application of the remedy on an exchange by exchange basis. Please see Annex 6 for a more detailed explanation.

there is nothing preventing Virgin Media from pricing just below the BT price on every route where there is no competition.

8.94 These reasons lead us to conclude that BT has SMP in BT exchanges where BT and one other PCO is present (BT+1).

BT does not have SMP at BT + 2 or more exchanges

8.95 At BT exchanges where BT and at least two other PCOs are present, customers have more choice of supplier which is likely to lead to more competition. Indeed, there is evidence to suggest that BT faces more competitive pressure where more PCOs are present. In an internal document, Openreach notes [redacted].⁶⁷⁷

8.96 We consider that there is likely to be greater competitive pressure in BT+2 exchanges for a number of reasons.

8.97 First, BT's competitive advantages are likely to be less material where there are two or more PCOs present. This is because customers are likely to have a greater choice of supplier who can meet their specific needs in a timely and cost-effective way.

8.98 Second, the incentive to match (or slightly undercut) prices due to one of the suppliers publishing its prices is significantly weaker when there is a third competitor. In this scenario, the existence of a third provider at an exchange makes it much harder for the other providers to win business by simply matching or slightly undercutting the published price. This is because the winning bid does not only need to slightly undercut the BT price, but also must offer a better bid than the additional competitor.⁶⁷⁸ As a result, the competitive constraint is stronger.

8.99 Evidence submitted by Virgin Media during the appeal of the 2016 BCMR, supports this view, suggesting that customers typically seek three bids to obtain a competitive price.⁶⁷⁹

8.100 Third, even though some telecoms providers are still using Openreach for a significant percentage of their connectivity needs between BT+2 or more exchanges, others are multi-sourcing. This suggests that BT faces a competitive constraint on these routes. Indeed, even where some providers are still buying a material volume from Openreach, the fact that multi-sourcing of a large portion of circuits is feasible and at these exchanges a provider has the choice of three or more PCOs suggests this is likely to be more of a business decision than indicative of BT having market power. Evidence supplied by [redacted]. This contrasts with [redacted].

8.101 We disagree with TalkTalk⁶⁸⁰ and Three⁶⁸¹ that we have presented insufficient evidence to conclude that BT does not have SMP at BT+2 exchanges, for the reasons set out above. In

⁶⁷⁷ BT internal documents, [redacted].

⁶⁷⁸ We also note that the 'lumpy' nature of demand and the many instances where telecoms providers sign long-term contracts for CI inter-exchange connectivity services may also make co-ordination more difficult and less viable with three providers.

⁶⁷⁹ See [redacted].

⁶⁸⁰ TalkTalk's response to the 2018 BCMR Consultation, paragraph 2.141.

⁶⁸¹ Three's response to the 2018 BCMR Consultation, paragraphs 3.4.

addition, we note that neither TalkTalk nor Three presented material evidence to suggest that BT has SMP at BT+2 exchanges. We recognise competitive conditions are likely to be a continuum but based on the evidence available to us we are of the view that on balance, BT does not have SMP in BT+2 exchanges.

- 8.102 We further question on what basis we would practically construct the pricing of a “hypothetically fully competitive exchange” as suggested by TalkTalk and how this construct could be used to define the point at which BT no longer has SMP.⁶⁸²
- 8.103 We note Three’s proposition that we have failed to show that competitive conditions in BT+2 exchanges are the same as BT+3 exchanges.⁶⁸³ Our objective is to determine where BT does not have SMP, and we think it does not at BT+2 or more exchanges for the reasons set out above. This being the case, it is not necessary for us to further consider whether the competition conditions are the same at BT+2 and BT+3 exchanges or whether there are differences in the competitive conditions at these two sets of exchanges.
- 8.104 We agree with Three that it is important for bids to be relevant⁶⁸⁴ and where possible include a choice of operators.⁶⁸⁵ Indeed, we think that limiting our assessment of presence to PCOs which meet the criteria set out above is consistent with this idea of bids being ‘relevant’. However, we consider the above suggests that three bids provide a material constraint on prices and note that Virgin Media supported our finding that BT+2 is sufficient for effective competition (and the IIG⁶⁸⁶, SSE⁶⁸⁷ provided evidence to support that conclusion). Three did not present information to show that when there are three bidders the prices are not competitive, nor did it suggest an alternative methodology for assessing what should be considered competitive.
- 8.105 Finally, while TalkTalk is correct that in mobile markets we considered that moving from four to three competitors would result in a significant lessening of competition, the context is very different so that a comparison cannot reasonably be drawn. We note that, in our review of competition in mobile we were looking at the reduction of competitors from four to three in the retail market. Here we are considering the application of *ex ante* regulation on the basis of an assessment of SMP.
- 8.106 Having reviewed the evidence, we conclude that BT does not have SMP in BT+2 exchanges.

Treatment of multiple MDF IDs within one exchange building

- 8.107 Openreach noted that in our consultation, we used Main Distribution Frame identifiers (MDF IDs)⁶⁸⁸ as references to BT exchanges. However, it stated that the MDF ID relates to a

⁶⁸² TalkTalk’s response to the 2018 BCMR Consultation, paragraph 2.141.

⁶⁸³ Three’s response to the 2018 BCMR Consultation, paragraphs 1.4.

⁶⁸⁴ We understand that this means the bid meets the requirements set out in its tender, including covering the required exchanges.

⁶⁸⁵ Three’s response to the 2018 BCMR Consultation, paragraphs 3.8.

⁶⁸⁶ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 6.1.5.

⁶⁸⁷ SSE’s response to the 2018 BCMR Consultation, page 6.

⁶⁸⁸ An MDF is a point in the BT exchange where cables from outside can be connected to the exchange equipment. An MDF ID, identifies the specific local area served by that MDF (e.g. LCBOL (Bolton), LWEHG (Egham)).

MDF in a BT exchange and there are some instances where there are more than one MDF in an exchange building.⁶⁸⁹ We understand that without further clarity, there might be some ambiguity as to the SMP findings for these exchanges. For example, in an exchange building with two MDF IDs, one indicative of BT Only and the other indicative of BT+3, without further guidance, it would not be clear whether regulation should apply.

- 8.108 We first looked at the materiality of the problem. We found that the issue was not material, with six exchanges with multiple MDF IDs and only three where the multiple MDF IDs in the exchange have different SMP findings.
- 8.109 We then sought to understand why there may be multiple MDF IDs in a single exchange building. We found that it occurred following an exchange closure. In these cases, the MDF in the closed exchange is moved to a “gaining” exchange building.
- 8.110 We asked Openreach to confirm what happens to the fibre connections from non-BT networks in the closed exchange, when the MDF is moved to the “gaining” exchange. If the fibres at the old exchange are ceased then clearly they will not impose a competitive constraint on Openreach in the “gaining” exchange building.
- 8.111 In Openreach’s response⁶⁹⁰, it explained that in some cases the fibre is ceased and in others it is not. It added that no exchange closure/re-parenting programme is exactly the same and each will be subject to its own unique characteristics.
- 8.112 Therefore, given the limited materiality in this review and the uncertainty as to whether the MDF IDs from closed exchanges still include the original fibre connections, we think a proportionate approach is to use the “gaining” exchange’s MDF ID measure of presence as the indicator of BT’s SMP. We also consider this a simple and transparent way to assess SMP for these exchanges, which in line with our SMP assessment which focusses on presence.
- 8.113 We note, that in the future, this issue could become more material as BT reduces its exchange footprint. At that point, we can review the appropriateness of this methodology if necessary.

Finding of SMP in exchanges deregulated in the Temporary Conditions or part of the competitive core

- 8.114 BT argued that we should not re-regulate exchanges from the competitive core⁶⁹¹ or those we found competitive in the Temporary Conditions.⁶⁹² It argued that if we did this, it would result in problems for BT and its customers. For example, it would cause [X] and require BT to re-engineer parts of its core network to consume Openreach inputs⁶⁹³, which would

⁶⁸⁹ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, Annex 3, paragraph 3.18.

⁶⁹⁰ Email sent to Ofcom from Openreach on 4 April: Openreach’s response to BCMR s.135-26 Notice.

⁶⁹¹ A description of the competitive core is found in 2018 BCMR Consultation, paragraphs 7.16-18.

⁶⁹² 2018 BCMR Consultation, paragraph 7.19.

⁶⁹³ This is because of the EOI requirement.

add costs⁶⁹⁴ and [£<]. It would also reduce the “long term service availability for certain parts of the UK”.⁶⁹⁵ It added that, given the costs involved, where work had begun on building connectivity to exchanges that were deregulated at the Temporary Conditions, these circuits should be exempted from the proposed re-regulation. It further noted that in the past, we have given BT an exemption from EOI requirements for its core nodes that did not fall within the deregulated competitive core market. BT suggested we follow a similar approach for this review, which would not disadvantage other telecoms providers.⁶⁹⁶

- 8.115 We consider that it is appropriate to apply the BT+2 threshold to all BT exchanges. This is consistent with applying a simple and transparent methodology to our assessment of SMP in the inter-exchange connectivity services market. We discuss the appropriateness of applying an EOI requirement to these exchanges in Section 11.

Summary of SMP assessment

- 8.116 Having concluded on a list of PCOs, we think that direct and indirect connections both provide a sufficient constraint on BT and therefore should be treated in the same manner. We also think that as long as PCOs have the capacity to wholesale, they impose a competitive constraint on BT.
- 8.117 We have decided that BT has SMP for CI inter-exchange connectivity services at BT exchanges where it is the only provider of inter-exchange connectivity (BT Only) or where there is only one rival PCO present (BT+1). We have concluded that BT does not have SMP for CI inter-exchange connectivity at BT exchanges where two more rival PCOs are present (BT+2 or more). This means that routes between BT+2 or more exchanges are competitive and all other routes between BT exchanges are not competitive. Below, we apply the three-criteria test to those which are not competitive.
- 8.118 We have decided to apply the BT+2 threshold to all BT exchanges.⁶⁹⁷ This leads to some changes to current regulation, which is summarised in the table at the end of this section and set out in full at Schedule 8 of our legal instrument.

Application of the three-criteria test

Background

- 8.119 The three-criteria test is used to assess whether a particular market not listed in the 2014 EC Recommendation is susceptible to *ex ante* regulation.

⁶⁹⁴ BT’s response to BCMR s.135-26 Notice: in an email sent from BT Group to Ofcom on 22 February 2019, BT estimated, on the basis of certain assumptions, that costs could vary from £[<]m (based on connection charges and annual rental costs).

⁶⁹⁵ BT Group’s Confidential response to the 2018 PIMR and 2018 BCMR Consultations, Annex 3, paragraphs 3.11.

⁶⁹⁶ BT Group’s Confidential response to the 2018 PIMR and 2018 BCMR Consultations, Annex 3, paragraphs 3.1-3.14.

⁶⁹⁷ Though as noted above, in some exchanges BT downstream will be exempt from EOI requirements.

- 8.120 As the trunk segment of leased lines is not on the list of recommended wholesale markets, we have used the three-criteria test to assess whether it is appropriate to apply *ex ante* regulation to the BT exchanges in the CI Inter-exchange connectivity market.
- 8.121 As noted in the 2014 EC Recommendation, the three criteria are:
- the presence of high and non-transitory barriers to entry. These may be of a structural, legal or regulatory nature;
 - a market structure which does not tend towards effective competition within the relevant time horizon. The application of this criterion involves examining the state of competition behind the barriers to entry;
 - the insufficiency of competition law alone to adequately address the market failure(s) concerned.
- 8.122 As we noted above, we can only impose regulation in circumstances where we find SMP *and* where all three criteria are satisfied. Therefore, we take as our starting point the BT exchanges at which we have found SMP and consider whether these satisfy the three-criteria test. This is consistent with the approach set out in the 2014 EC Recommendation, which states that “NRAs might find that certain trunk routes fulfil the three criteria and thus warrant *ex ante* regulation”.⁶⁹⁸

High and non-transitory barriers to entry

- 8.123 The Explanatory Note to the 2014 EC Recommendation details what the European Commission considers are relevant factors to assess whether a market has high barriers to entry.
- 8.124 As set out above, we consider that BT Only and BT+1 exchanges exhibit high and non-transitory barriers to entry. Specifically, there are significant structural barriers to new entry. There are significant sunk costs involved to a new entrant wanting to build an inter-exchange connectivity network, as this would require investment in fibre networks and digging over large distances, as explained above. Even where alternative networks are ‘nearby’, extending this network to BT Only and BT+1 exchanges is likely to involve material costs and time. In addition, BT has significant economies of scale in the provision of inter-exchange connectivity. Its large and deep network gives it a number of advantages over a new entrant, including diversity, availability and network coverage. We further note that to compete with BT, the entrant would need to build a sufficiently large footprint in the UK. We note that some existing telecoms providers consider they are unable to provide a competitive offer to customers from BT exchanges.⁶⁹⁹
- 8.125 In Annex 6 we explain that, while we recognise that unrestricted PIA could reduce these barriers to entry such that a rival is willing to invest and build to some of these exchanges, we consider that bespoke network extensions for this purpose are likely to be costly,

⁶⁹⁸ Explanatory Note to the 2014 EC Recommendation, page 50.

⁶⁹⁹ In response to s135-3, [3<].

complex and involve delay; and that there is significant uncertainty as to the likelihood of these exchanges being connected by infill extensions.

- 8.126 These same barriers were similar in previous reviews, and we see no clear evidence that underlying conditions are likely to change significantly over this review period (even in the presence of unrestricted PIA, as we explain in Annex 6). We are not aware of any prospective entrants to the BT Only and BT+1 exchanges that would impose a significant competitive constraint on BT.

A market structure which does not tend towards effective competition

- 8.127 We consider that the BT Only and BT+1 exchanges we have identified will not, in the absence of regulation, tend towards effective competition in the foreseeable future.

- 8.128 As we set out above, BT's market power is significant and entrenched. The extent of BT's market power has not materially changed since the last market review. Currently, 191 BT exchanges are not regulated out of approximately 5,600 BT exchanges across the UK. In this market review, on the basis of a different competitive threshold, we have decided that 571 BT exchanges should not be regulated. However, we do not consider that this increase in the number of competitive exchanges is evidence that that CI inter-exchange connectivity as a whole is becoming more competitive. Rather, this increase in the number of competitive exchanges, as compared with the Temporary Conditions, is a result of the following:

- We have lowered the threshold for finding that an exchange is competitive. Under the Temporary Conditions, an exchange was considered competitive if BT+3 or more PCOs (either directly or indirectly connected) were present; and/or if BT+2 directly connected PCOs were present. Now, our threshold for finding an exchange competitive is BT+2 (either directly or indirectly connected) PCOs are present. This means that exchanges with two indirectly connected PCOs, or with one indirectly connected PCO and one directly connected PCO, are now considered competitive. Our reasons for changing this threshold are explained above.
- We have identified a significant number of additional exchanges at which Vodafone is present with its fibre and able to provide inter-exchange connectivity services. Previously, we were not aware that [X]. This substantially increased the number of exchanges where we considered Vodafone to be present at consultation from [X] BT exchanges to [X] BT exchanges. and substantially increased the number of exchanges at which BT+2 PCOs were considered present at consultation from [X] BT exchanges to 545 BT exchanges. Since consultation, we have carried out further analysis which has increased the number of exchanges where Vodafone is present to [X] and increased the number of exchanges at which BT+2 PCOs are present to 571.⁷⁰⁰

⁷⁰⁰ As explained in Annex 15, there are other reasons, beyond Vodafone's presence at exchanges, that has led to an increase in the number of exchanges found to have BT+2 or more PCOs present.

8.129 As detailed in Annex 6, and set out above, we do not consider the introduction of unrestricted PIA will sufficiently change competitive conditions in CI Inter-exchange connectivity over the course of this review.

8.130 We are also not aware of additional factors that may materially reduce the barriers to entry we have identified. For instance, we are not aware of any technological developments that will change competitive conditions in this market in the foreseeable future.

Insufficiency of competition law

8.131 In this market, we consider that barriers to entry will persist and it will not tend towards competition within the relevant time horizon. We therefore turn to the question of whether competition law alone is sufficient to address market failures at the relevant BT exchanges.

8.132 Our main concerns in relation to BT Only and BT+1 exchanges are as follows:

- the importance of CI Inter-exchange connectivity services at these exchanges to the state of competition in CI Access;
- the risk of excessive pricing of CI Inter-exchange connectivity services which could result in high prices for end-users; and
- that it is unlikely that competitors will build to these sites.

8.133 We do not consider *ex post* competition law would be sufficient to address these concerns, for the following reasons:

- Given that it is unlikely that competitors will build to these exchanges, we consider some form of network access obligation – which is not an available remedy under competition law – is required to ensure effective competition;
- the need for timely and efficient intervention to avoid adverse effects on those providing services in the CI Inter-exchange connectivity and CI Access markets as well as the end-users of leased lines;
- if BT engaged in the behaviour mentioned above, there could be long-term or irreversible damage to competition in the markets;
- *ex ante* regulation provides clarity and certainty to BT and to other providers of leased lines; and
- the response to anti-competitive behaviour may not be sufficient to prevent harm in certain circumstances.

8.134 For these reasons, in this instance, we consider that competition law would not be sufficient by itself to address concerns in BT Only and BT+1 exchanges and therefore *ex ante* regulation is necessary to maintain effective competition.

Conclusion

8.135 We consider that the BT exchanges in which BT has SMP pass the three-criteria test and therefore are susceptible to *ex ante* regulation. We therefore have decided to regulate these BT exchanges.

Conclusions

- 8.136 We have decided that BT has SMP at:
- BT exchanges where only BT is present (BT Only), of which there are 4,269; and
 - BT exchanges where only BT and one other PCO are present (BT+1), of which there are 733.
- 8.137 We have concluded that BT does not have SMP at BT exchanges where there are two or more PCOs present (BT+2 or more). Therefore, 571 BT exchanges are not characterised by SMP.⁷⁰¹ This means that routes between BT+2 or more exchanges are competitive and will not be regulated and all other routes between BT exchanges are not competitive and will face regulation.
- 8.138 A full list of BT Only, BT+1 and BT+2 or more exchanges can be found at Schedule 8 of our legal instrument.
- 8.139 We have decided that, on the basis of the three-criteria test, those exchanges at which BT has SMP are susceptible to *ex ante* regulation.
- 8.140 In our legal instrument we have defined two broad markets for the purpose of imposing regulation.⁷⁰² Those markets are:
- The market for CI Inter-exchange connectivity between two BT+2 or more exchanges (in which we do not find SMP). In our legal instrument we refer to this as the ‘Wholesale market for CI Inter-exchange Connectivity Services along Competitive IEC Routes’; and
 - The market for CI Inter-exchange connectivity between all other exchanges in the UK (in which we find SMP). In our legal instrument we refer to this as the ‘Wholesale market for CI Inter-exchange Connectivity along Non-competitive IEC Routes’.

⁷⁰¹ Given the large number of BT exchanges, we find it convenient to identify those sites we in which we do not find SMP.

⁷⁰² In effect, these two markets aggregate BT exchanges in which competitive conditions are sufficiently homogeneous.

9. Assessment of markets in the Hull Area

- 9.1 In this section we set out our assessment of the wholesale and retail leased lines markets in the Hull Area, including our SMP findings.
- 9.2 In the 2018 BCMR Consultation we proposed to find a wholesale market for CI Access services at all bandwidths and a retail market for CI Services at all bandwidths.⁷⁰³ We proposed that that KCOM has SMP in the supply of CI Access services at all bandwidths at the wholesale level. We proposed that KCOM no longer has SMP at the retail level, and that regulation of the retail market is therefore no longer required.
- 9.3 We also proposed to identify a wholesale market for low bandwidth (up to and including 8 Mbit/s) TI services and a retail market for low bandwidth TI services. However, as in the rest of the UK (as discussed in Section 17), we proposed that *ex ante* regulation of TI services in the Hull Area is no longer justified, and remaining *ex ante* regulation of TI services in the Hull Area should be removed.
- 9.4 We received three responses to our consultation that commented about markets in the Hull Area. These were from KCOM, [X], and [X].
- KCOM agreed with our analysis and proposed findings in relation to the wholesale market for CI Services at all bandwidths – specifically that it continues to hold SMP in this market. KCOM also agreed with our proposal to deregulate the retail market for CI Services at all bandwidths in the Hull Area. Finally, KCOM agreed with our proposal to deregulate wholesale and retail low bandwidth TI services in the Hull Area.
 - [X] and [X] both agreed with our provisional conclusion that KCOM has SMP in the CI wholesale market.
 - [X] questioned whether some of the analysis that underpinned our analysis of the retail CI market is sufficient to justify our conclusion to deregulate downstream services. They also advocated a more phased approach to deregulation of TI services to protect consumers.
 - [X] also agreed with the proposal to de-regulate all CI Services at retail level and to de-regulate TI services at both retail and wholesale level. They also noted that, in both cases, it may be too premature to do so now.
- 9.5 In light of KCOM’s market share and other evidence concerning KCOM’s position in the supply of both retail and wholesale CI Services in the Hull Area, we have found that:
- KCOM has SMP in the supply of CI Access services at all bandwidths at the wholesale level;
 - regulation of the retail market for CI Services at all bandwidths in the Hull Area is no longer justified and will be removed.

⁷⁰³ An overview of the regulation in place as a result of the 2016 BCMR can be found in the 2018 BCMR Consultation

9.6 As in the rest of the UK, we have decided that *ex ante* regulation of wholesale and retail TI services in the Hull Area is no longer justified, and we will remove remaining *ex ante* regulation in these markets.

Assessment of competition in wholesale markets for CI Access services at all bandwidths ⁷⁰⁴

Our proposals

9.7 In the 2018 BCMR Consultation, we proposed to:

- find a wholesale market for CI Access services at all bandwidths for CI Services at all bandwidths in the Hull Area; and
- find that KCOM has SMP in the supply of CI Access services at all bandwidths at the wholesale level.

Stakeholder responses

9.8 KCOM, [X], and [X] all commented on our proposed assessment of competition in the wholesale market for CI Access services. All supported the proposal to find a wholesale market for CI Access services at all bandwidths in the Hull Area. They also agreed that KCOM has SMP in the supply of CI Access services at all bandwidths at the wholesale level.

Our reasoning and decisions: product market definition

9.9 We consider that our decision regarding wholesale product market definition, as set out in Section 4, is appropriate for the Hull Area. In particular:

- we define a market for CI Access services at all bandwidths. For the reasons set out in Section 4, we think that there is a single product market reflecting supply-side substitution.
- we consider that EFM and asymmetric broadband do not sufficiently constrain the prices of CI Access services to include them in the same market.

9.10 Stakeholder comments on our approach to product market definition in the rest of the UK are addressed in Section 4. We did not receive any comments on this issue relating specifically to the Hull Area. We therefore conclude that our product market definition is also appropriate for the Hull Area.

⁷⁰⁴ When undertaking our analysis of the Hull Area in the 2013 BCMR, we started by defining retail markets in the absence of wholesale regulation, then repeated the same analysis for the upstream wholesale markets. In the 2016 BCMR, we explained that we were starting with wholesale market definition because this allowed us to present the analysis only once, instead of repeating it.

We have followed this simplified presentation of our market definition analysis for the Hull Area in this BCMR. We start by defining the wholesale market(s). Then we define retail market(s) taking into consideration the wholesale market regulations. We assume the level of wholesale regulation is the same as that imposed by the 2016 BCMR Statement. This is the same approach we have used in other market reviews and is consistent with the EC SMP Guidelines.

- 9.11 We considered whether to define a separate market for CI Inter-exchange connectivity in the Hull Area, similar to our approach for the rest of the UK (see Section 7).⁷⁰⁵ It remains our view that the small size of the Hull Area means that demand for connectivity between KCOM exchanges is likely to be very low. Telecoms providers are unlikely to require a network of backhaul and core connectivity within the Hull Area. For example, a telecoms provider may serve its customers through a single point of presence in the Hull Area and then backhaul the traffic to another network node outside the Hull Area.
- 9.12 Given the likely limited demand for CI inter-exchange connectivity in the Hull Area, we proposed not to define a separate market and undertake a separate SMP assessment for those services.
- 9.13 KCOM agreed that it was unnecessary to define a separate inter-exchange market within the Hull Area given the market size and likely demand for point to point backhaul and core connections.⁷⁰⁶ [X] also agreed with the proposed approach.⁷⁰⁷ We did not receive any other views or evidence from stakeholders on this issue and accordingly have decided not to define a separate market for CI Inter-exchange connectivity in the Hull Area.

Our reasoning and decisions: geographic market definition

- 9.14 As in previous market reviews, we define the Hull Area as a distinct geographic market. KCOM (and not BT) is the telecoms provider with the most extensive coverage and greatest installed customer base in the Hull Area, indicating a clear difference in competitive conditions from the rest of the UK.
- 9.15 We did not receive any stakeholder responses on this issue.
- 9.16 We have decided to retain the boundaries of the Hull Area as delineated in our other market reviews.⁷⁰⁸

Our reasoning and decisions: SMP in wholesale market

- 9.17 In the 2018 BCMR Consultation, we proposed to find that KCOM has SMP in the market for CI Access services at all bandwidths in the Hull Area, and said we did not expect KCOM's position in this market to change over the course of the review period.
- 9.18 KCOM, [X], and [Y] all agreed with this proposal.
- 9.19 In this section we set out the factors relevant to our SMP assessment.

⁷⁰⁵ As set out in Section 3, inter-exchange connectivity consists of backhaul and core connections. As a result of data aggregation, backhaul circuits transport more communications services and have greater capacity, i.e. higher bandwidth, than access circuits.

⁷⁰⁶ KCOM's response to the 2018 BCMR Consultation, paragraph 3.8.

⁷⁰⁷ [X]

⁷⁰⁸ These boundaries follow the definition of the Licensed Area in the licence granted on 30 November 1987 by the Secretary of State under section 7 of the Telecommunications Act 1984 to Kingston upon Hull City Council and KCOM Group plc.

Market share and market share trends

9.20 Table 9.1 presents distribution of telecoms provider shares based on CI Access circuits as of December 2017. Annex 12 explains the approach followed in estimating market shares based on customer ends.⁷⁰⁹

Table 9.1: Market shares for wholesale CI Access services at all bandwidths in the Hull Area

Telecom provider	Market share
KCOM	[X]%
CityFibre	[X]%
Vodafone	[X]%
Openreach	[X]%
Virgin	[X]%
MS3	[X]%
CenturyLink	[X]%
Verizon	[X]%
Total Volumes	[X] (100%)

Source: Ofcom circuit data analysis based on responses to 1st and 5th BCMR s.135 Notice. Annex 12 provides a more detailed description and explanation of the analysis undertaken.

9.21 Based on our analysis of provider data obtained in response to statutory information requests, KCOM maintains a high share of [X]% (60-70%) in the market for wholesale CI Access services at all bandwidths.⁷¹⁰ KCOM's high share gives rise to a strong presumption that KCOM has SMP, corroborating the evidence regarding the limited presence of rival infrastructure described below.

9.22 In the 2016 BCMR, we found KCOM to have a share of over 95% in the wholesale market for CI Services at all bandwidths. Our latest analysis of market shares suggests that CityFibre and other telecoms providers have substantially increased their share of the sale of wholesale services in the Hull Area and now account for c.[X]% (30-40%) of the market. However, in our view, the incursions by other telecoms providers are not yet on a scale sufficient to suggest that KCOM now faces, or will face over the review period, effective competition. In particular, we note that KCOM's service share of new connections is higher than its share of the inventory, though lower than what we found in 2016 and that Cityfibre has a much more limited customer base than that of KCOM. This suggests that wholesale competition is not yet firmly established in Hull. We also note that, save in

⁷⁰⁹ Customer ends refer to leased lines circuit ends terminating at customer premises.

⁷¹⁰ For the Hull area, our primary measure of service shares is the inventory data. This is in contrast to the rest of the UK where we use 2017 connections. There are two reasons for this difference. First, Virgin Media has a very limited presence in Hull, so inventory service shares do not face the same issues of reliability as in the rest of the UK. Second, the Hull area is small, so a single year's data may be affected by 'lumpy' sales in a way that all UK would not be.

exceptional circumstances, a market share in excess of 50% is evidence of the existence of a dominant position.⁷¹¹

Control of infrastructure not easily duplicated

- 9.23 We explain in Section 6 why network infrastructure, in our view, is the main determinant of competition for supply of CI Access services, as telecoms providers require network in the proximity of a site to compete for supply of CI Access services to that site. We also note that the presence of rival infrastructure is an indicator of differences in competitive conditions, with more potential for competition in areas with greater presence of rival infrastructure.
- 9.24 KCOM's duct network is ubiquitous in the Hull Area. Because of its extensive network infrastructure KCOM can supply wholesale CI Access services to almost any site in the Hull Area relatively quickly and without incurring substantial costs in extending its network.
- 9.25 We do not consider that other telecoms providers have the ability or incentive to duplicate the scale of KCOM's network infrastructure in the Hull Area. The costs of developing such an extensive network infrastructure would be very significant. With KCOM already having developed its extensive infrastructure and having largely sunk the costs of doing so, other telecoms providers would unlikely be able to recover their investment costs. The small number of potential customers in this market makes it unviable in contrast to the rest of the UK.
- 9.26 Evidence based on our network reach analysis shows that the presence and depth of rival infrastructure is limited in the Hull Area. Table 9.2 presents six competitive indicators indicating the presence and depth of rival networks in the Hull Area. For a detailed explanation of each indicator, see Section 6.

⁷¹¹ EC SMP Guidelines, paragraph 55.

Table 9.2: Competitive indicators for the Hull Area

Description	Category	Value
Average number of rival networks within*	50 metres	0.22
	100 metres	0.49
Proportion of businesses in areas where X+ other telecoms providers are located within buffer distance of 50 metres (100 metres)	1+ other telecoms providers	20% (36%)
	2+ other telecoms providers	2% (12%)
	3+ other telecoms providers	0% (1%)
Average radial (route) distance to nearest rivals (metres)	First	250 (350)
	Second	816 (1,143)
	Third	1,878 (2,629)
Number of postcode sectors (out of 59) where on average there is at least one other telecoms provider within the given distance of a business **	25m	1
	50m	1
	100m	6
Number of customer ends and proportion (X%) by means indicated ⁷¹²	<u>KCOM</u>	[<]
	On-net duct connected	([<]%)
	<u>Rivals</u>	15
	On-net duct connected	(19%)
	On-net dig	(25%)
	Off-net	(56%)
	Rivals build v buy ⁷¹³	31%
Median radial distance dug in 2017 (metres)	<u>KCOM</u>	[<]
	<u>Rivals</u>	59.6

Source: Ofcom's network reach analysis and circuit data analysis based on 1st and 5th BCMR s.135 Notice.

* Average network reach concerns the average number of other telecoms providers with a flexibility point within the buffer distance (50m and 100m) of businesses. Determined at postcode sector level.

** We determine the network reach value of a postcode sector as the average number of other telecoms providers with a flexibility point within the given distance of business sites located in that sector. Network reach

⁷¹² 'On-net duct connected' is where a telecoms provider has existing duct in place to the customer site, but fibre may need to be installed. 'On-net dig' is where a telecoms provider extends their network by building new duct. 'Off-net' is where an active wholesale leased line product is purchased from another provider to reach the customer. Further information may be found in Annex 11.

⁷¹³ We determine rivals 'build' (on-net dig) as a percentage of rivals 'build' (on-net dig) plus rivals 'buy' (off-net) in relation to the supply of a leased line to a customer's site outside their existing network reach. Further information may be found in Annex 11.

values provide an estimate of presence of rival infrastructure. Annex 12 provides a more detailed description and explanation of the network reach analysis undertaken.

- 9.27 The competitive indicators in Table 9.2 show, in our view, that KCOM enjoys substantial advantages as a result of its infrastructure, because:
- the average number of points of presence of other networks within 50m and 100m of businesses within the Hull Area, i.e. 0.22 and 0.49 respectively, is too low for effective competition;
 - less than 5% of businesses in the Hull Area have two or more other telecoms providers within 50m, rising to only 12% within 100m, which is too low for effective competition;
 - the average distances from a business to the nearest points of presence of other networks are too large for effective competition;
 - there are no postcode sectors with the potential to be competitive (i.e. at least two rivals within 50m) and only one sector where businesses on average have at least one rival telecoms provider within 50m;
 - KCOM has connected [X] % of customer ends using its own existing duct whereas rivals were only able to provide 19% of customer ends using their own duct, digging new duct for 25% of orders and purchasing wholesale connections from other telecoms providers for the remaining 56% of orders; and
 - the median distance dug by KCOM for new duct was substantially lower at [X] metres compared to its rivals at 59.6 metres.

Barriers to entry and recent network extension insufficient to change KCOM's position for this review

9.28 As explained in Section 6, sunk costs and switching costs can give rise to barriers to entry and expansion in wholesale leased lines markets. The large asymmetry between KCOM and other telecoms providers – in terms of the presence and coverage of their networks and installed customer base – suggests that such barriers are likely to be present in the Hull Area.

- 9.29 Some telecoms providers have started extending their networks into the Hull Area:
- MS3 has extended its network in the Hull Area.⁷¹⁴ Our analysis of rival infrastructure shows that MS3's extension of infrastructure has been limited, and the service share analysis we carried out indicates that MS3 supplies a very limited number of leased lines. Furthermore, we understand MS3's primary focus to be the provision of business broadband (asymmetric) services rather than leased lines.
 - BT now has a fully operational multi-service edge node at its Anson Exchange in the centre of Hull which enables BT to provide Ethernet services to sites in the Hull Area,

⁷¹⁴ MS3 website, <http://www.ms-3.co.uk/pages/about-us.html> [accessed 30 October 2018].

using a combination of its own infrastructure and regulated wholesale products purchased from KCOM.⁷¹⁵ However, we understand that [redacted].⁷¹⁶

- CityFibre now has about [redacted]% of the wholesale leased line market in the Hull Area shared by [redacted] customers of which [redacted], [redacted] and [redacted], account for about [redacted]% of CityFibre’s sales in the Hull Area.⁷¹⁷ We also understand that CityFibre’s network, which could be used to provide competitive access services, covers only part of the Hull Area.⁷¹⁸

9.30 These recent network extensions improve the potential for competition in the markets for wholesale leased lines in the Hull Area and there may be longer-term prospects for competition in the wholesale market. KCOM recognised the longer-term potential for competition in the Hull Area CI market in its consultation response:

“It is entirely conceivable that these investments increase the near-term competitive constraints placed on KCOM in the provision of wholesale CI Access services through competing network expansion.”⁷¹⁹

9.31 We remain of the view that the presence of a single scale entrant (CityFibre) in addition to the incumbent operator will not be sufficient for effective competition in the market for CI Access services, for the reasons set out in Section 6.

9.32 Therefore, we do not consider that these or other potential investments will be sufficient for competition for CI Access services to become effective over the review period. We consider that KCOM will continue to derive an advantage from its control over its more extensive network in the Hull Area over the review period. In other words, despite the network extensions, KCOM will remain the only telecoms provider with a duct network that extends to most sites in the Hull Area. It will be the only telecoms provider with network infrastructure close enough to customers’ sites to be a realistic supplier in most cases as evidenced by the contents of Table 9.2 and our analysis as set out in Sections 4-6.

Economies of scale and scope

9.33 We also set out in Section 6 why, in our view, economies of scale and scope arise in wholesale leased lines markets. We consider that KCOM derives a material advantage from the scale and scope of its operations in wholesale markets for fixed telecommunications services – including leased lines – in the Hull Area. The scale and scope of KCOM’s operations are a degree greater than those of any other telecoms provider in the Hull Area.

9.34 KCOM is not large when compared to BT. The scale and scope of BT’s operations outside the Hull Area may lower the costs it incurs, relative to KCOM’s, in providing leased lines.

⁷¹⁵ 2016 BCMR Statement, paragraph 6.51.

⁷¹⁶ Email dialogue between Openreach and Ofcom dated 8 June 2018. [redacted]

⁷¹⁷ Ofcom analysis of CityFibre response to 1st BCMR s.135 notice.

⁷¹⁸ A map of CityFibre’s network in the Hull Area has been published in a number of sources including, for example, the Hull Daily Mail.

⁷¹⁹ KCOM’s response to the 2018 BCMR Consultation, paragraph 3.12

However, we do not consider that this benefit offsets the advantages KCOM derives from the greater scale and scope of its infrastructure in the Hull Area.

External constraints

9.35 Some users might be prepared to switch to services, such as asymmetric broadband, which are outside wholesale markets for CI Access services, in response to a rise in the relative price of leased lines.⁷²⁰ However, as KCOM is the only telecoms provider with an extensive network in the Hull Area, we do not consider that such external constraints materially affect our assessment of KCOM's SMP.⁷²¹

Countervailing buyer power

9.36 We do not consider that countervailing buyer power is likely to effectively constrain KCOM. As explained in Section 6, effective buyer power requires purchasers to have a credible threat to meet requirements through another source of supply. However, the limited presence of rival infrastructure in the Hull Area, as evidenced in Tables 9.2 and 9.3 above, implies that purchasers of leased lines in the Hull Area will typically have no more than one other alternative telecoms provider with network infrastructure within a reasonable distance of their site. This means that another source of supply will frequently not be available.

Prospects for competition

9.37 The total demand for and value of CI leased lines services in the Hull Area are small in comparison to those in other parts of the UK, making it an apparently relatively unattractive location for other telecoms providers to make significant investments in infrastructure. However, in light of the recent investments by CityFibre and others noted above, the longer-term prospects for competition in wholesale markets for leased lines in the Hull Area appear somewhat better than in the past.

9.38 While the prospects for competition have improved, our view remains that these recent investments or other potential investments will be insufficient for competition for wholesale CI Access services to become effective during the review period.

Conclusion on SMP assessment

9.39 We have set out above our review of the wholesale market for CI Access services in the Hull Area. We show that, in our view:

- KCOM's market share is high;

⁷²⁰ A product forms a distinct market if, in the event of a SSNIP, switching to other products would not be sufficient to make that SSNIP unprofitable. However, even if a SSNIP would be profitable, the possibility that substitution to products outside the market has some, though lesser, constraining influence on prices remains.

⁷²¹ KCOM is regulated in various other fixed telecommunications markets. However, and despite this, external constraints by their nature tend to be relatively weak, while constraints from competition within wholesale leased line markets in the Hull Area are also weak.

- KCOM enjoys substantial advantages compared to other telecoms providers in the Hull Area as a result of its infrastructure; and
- while prospects for competition in the market in the Hull Area may be somewhat better than in the past we do not believe competition will become effective during this review period.

9.40 Having considered the facts set out above, and having had the opportunity to review the consultation responses relevant to this matter, we conclude that KCOM has SMP in the wholesale market for CI Access services in the Hull Area.

Retail CI services in the Hull Area

Our proposals

9.41 In the 2018 BCMR Consultation, we considered that the retail market for CI Services at all bandwidths in the Hull Area no longer satisfies the three-criteria test and therefore it is no longer susceptible to *ex ante* regulation. Consequently, we proposed withdrawing existing retail regulation in the Hull Area.

Responses to our consultation

9.42 KCOM agreed with our assessment and our proposal to withdraw retail regulation in the Hull Area.

9.43 [X] disagreed with our proposal to deregulate the Hull Area retail market for leased lines explaining: “[X]”. They then went on to list tables comparing Openreach and KCOM’s pricing. In light of this difference in pricing, [X] questioned our finding that KCOM’s service share was less than 40%.

9.44 [X] suggested that deregulation in the Hull Area may be premature.

Background

9.45 In the 2016 BCMR we found that, unlike in the rest of the UK, the availability of regulated wholesale products had not been sufficient to allow effective competition in the supply of retail leased lines in the Hull Area.⁷²² We therefore identified a retail market for CI Services in the Hull Area in which KCOM had SMP.

9.46 As set out in Annex 5, the 2014 EC Recommendation has listed a number of markets as being susceptible to *ex ante* regulation. Retail leased lines are not listed in the 2014 EC Recommendation as a market in which *ex ante* regulation may be required.

9.47 However, the 2014 EC Recommendation recognises that there are situations where it may be appropriate to impose *ex ante* regulatory obligations according to national circumstances.⁷²³ To assess whether it is appropriate to impose such obligations in a market

⁷²² 2016 BCMR Statement, paragraph 6.3.

⁷²³ This must be done in accordance with the principles of competition law and taking utmost account of the 2014 EC Recommendation and EC SMP Guidelines.

not listed, the 2014 EC Recommendation sets out the following three criteria which must all be met (the three-criteria test) if *ex ante* regulation is to be imposed:

- the presence of high and non-transitory barriers to entry. These may be of a structural, legal or regulatory nature;
- a market structure which does not tend towards effective competition within the relevant time horizon. The application of this criterion involves examining the state of infrastructure-based competition and barriers to entry; and
- the application of competition law alone is insufficient to adequately address the identified market failure(s).⁷²⁴

9.48 Therefore, in the 2016 BCMR it was necessary to show that the retail CI Services market satisfied the three-criteria test to impose regulation.

9.49 Where we have made a market power determination in relation to a market, we are required to review our finding.⁷²⁵

9.50 We first consider whether our market definition remains appropriate. We then consider whether the retail market for CI Services at all bandwidths in the Hull Area remains susceptible to *ex ante* regulation. We have found that it does not, on the basis that it no longer satisfies the three-criteria test.

Our decision on market definition

9.51 Our retail market definition assumes the presence of wholesale SMP regulation. That is, we assume KCOM provides access to its leased line products for the wholesale market for CI Access services on regulated terms. The availability of KCOM's wholesale products implies that other telecoms providers can use these wholesale products to compete for the provision of retail leased lines.

9.52 Consistent with our wholesale market definition for CI Access services, we consider there is a single product market at all bandwidths at the retail level on the supply side:

- retail providers are equally able to supply any bandwidth where customers are already fibre connected, and the incentive to do so is similar across all bandwidths at competitive prices;
- where customers are not fibre connected, retail providers need to ask KCOM to extend its network to the customer site or build their own network if they are vertically integrated. We consider that the ability and incentive to do this is sufficiently similar across all bandwidths at competitive prices to aggregate all bandwidths into a single market. This is supported by KCOM's retail service share being below 40% and being similar across all bandwidths.

9.53 As established in Section 4, we consider that supply-side substitution is more relevant than demand-side substitution for market definition purposes in this case. This is because demand-side substitution does not account for the fact that a leased line customer

⁷²⁴ 2014 EC Recommendation, Recital 19.

⁷²⁵ Section 84A(3) of the Act.

switching from a KCOM leased line to another KCOM leased line of a different bandwidth would be ‘recaptured’ by KCOM.

- 9.54 For the reasons set out above we have found that there is that there is a single retail market for CI Services at all bandwidths in the Hull Area.

Application of the three-criteria test to the retail market for CI Access services at all bandwidths

- 9.55 Having established the boundaries of the relevant market we now consider whether this market continues to satisfy the three-criteria test, noting that all three criteria need to be satisfied to impose regulation.

There are no longer high structural barriers to entry

- 9.56 In the presence of wholesale SMP regulation, we consider that the barriers to entry are significantly lower at the retail level than at the wholesale level. This is demonstrated by a number of telecoms providers using a combination of their own and KCOM’s wholesale access products to compete for leased line customers, with [X]% [30-40%] of retail CI service volumes being supplied by rival telecoms providers infrastructure (Table 9.1).
- 9.57 In addition, CityFibre’s recent entry into the market, and the fact that it has quickly won a significant share of it at both the retail and wholesale level (around [X]%), is consistent with a market exhibiting low barriers to entry.

The structure of this market is now tending towards effective competition within the relevant time horizon

- 9.58 Since our last review in 2016, KCOM’s market share has dropped significantly following the entry of CityFibre. We estimate that KCOM’s retail market share is now [X]% [less than 40%] followed by BT, CityFibre and Virgin Media with retail shares of [X]%, [X]%, and [X]% respectively.⁷²⁶ We consider that this market structure is consistent with a market in which there is effective competition, where no single telecoms provider has SMP.
- 9.59 We note [X] comment that KCOM’s list prices may be significantly higher than Openreach’s for equivalent products. While noting this point, the evidence clearly points to a market structure where there is effective competition, and no single telecoms provider has SMP. As noted above, regulation in this market can only be maintained if the three-criteria test is satisfied. We have found that it is not, given that KCOM’s retail market share is now below 40%, which suggests that it would no longer have SMP in any case. There may be reasons to explain differences in nominal prices, but this would not provide a basis for continuing regulation.⁷²⁷

⁷²⁶ Ofcom circuit data analysis based on responses to 1st BCMR s.135 Notice.

⁷²⁷ The disparity in prices may be due, in part, to differences in the pricing structures. KCOM rental charges generally look high because they have a fixed charge which includes the inter-exchange component whereas Openreach charges main-links per km.

Our decision on removing retail regulation

9.60 Noting KCOM’s low market share and CityFibre’s network expansion into the Hull Area, we consider that the retail market for CI Services at all bandwidths in the Hull Area no longer satisfies the three-criteria test and therefore it is no longer susceptible to *ex ante* regulation. Based on the analysis set out above, we have decided to withdraw existing retail regulation in the Hull Area.

Assessment of the low bandwidth traditional interface (TI) markets in the Hull Area

Our proposals

9.61 In the 2018 BCMR Consultation, we proposed that:

- low bandwidth wholesale and retail TI services in the Hull Area constitute separate markets for the period of this review; and
- *ex ante* regulation is no longer justified for low bandwidth wholesale and retail TI services in the Hull Area and all remaining *ex ante* regulation that applies to KCOM in this market should be removed.

Responses to our consultation

9.62 KCOM agreed with our assessment on product market definition and with our proposal to deregulate both wholesale and retail TI low bandwidth services in the Hull Area.

9.63 [X] suggested that Ofcom should protect the consumers of legacy TI services by ensuring there is a phased deregulation, and that revenues for any deregulated product are clearly shown in regulated accounts.

9.64 [X] agreed with deregulation of the market in Hull but felt that it might be premature as although there has been some competitive entry in to the market, it has yet to have a significant impact for consumers.

Background

9.65 In the 2016 BCMR Statement, we identified separate retail and wholesale markets for low bandwidth TI services in the Hull Area.

9.66 We noted that while users were switching from TI to modern alternatives, the process of migration would not be affected by modest changes in relative price. We therefore continued to find a distinct product market for TI services.

9.67 We concluded that KCOM had SMP in the wholesale market for low bandwidth TI services in the Hull Area and imposed appropriate remedies. We further concluded that despite the availability of KCOM’s wholesale products on regulated terms, wholesale SMP regulation

would not be sufficient to sustain effective competition in retail markets⁷²⁸, and imposed appropriate remedies at the retail level.

Market Developments

- 9.68 Demand for TI services is in decline. As discussed in Section 17 in relation to the UK excluding the Hull Area, almost all new demand for leased lines services is met by more modern alternatives. We have no reason to believe that the same does not apply to the Hull Area. As TI circuits are a legacy service, we do not expect significant new demand, new entry or competition within the TI segment.
- 9.69 Volumes of KCOM TI circuits have declined and continue to decline in the Hull Area. The number of KCOM wholesale leased lines has declined at circa 5% per annum while the number of KCOM retail leased lines has declined approximately in the range of 30% to 50% per annum. Tables 9.3 and 9.4 respectively show the number of wholesale and retail lines since 2016.
- 9.70 [REDACTED].⁷²⁹ This reflects some comments made by stakeholders on the TI market elsewhere in the UK, as discussed in Section 17.

Table 9.3 Number of KCOM wholesale low bandwidth TI leased lines

Period	Number of circuits	Reduction
2016	[REDACTED]	
2017	[REDACTED]	6%
2018	[REDACTED]	4%

Source: Ofcom analysis of data extracted from 2016 BCMR and Price Transparency Reports 2018 and 2017 (revised).

Table 9.4 Number of KCOM retail low bandwidth TI leased lines

Period	Number of circuits	Reduction
2016	[REDACTED]	
2017	[REDACTED]	52%
2018	[REDACTED]	31%

Source: Ofcom analysis of data extracted from 2016 BCMR and Price Transparency Reports 2018 and 2017 (revised).

- 9.71 Demand for low bandwidth TI circuits in the Hull Area is influenced by changes in the rest of the UK. Our analysis shows that [REDACTED]%, circa 60% to 80%, of KCOM's wholesale TI leased lines are for circuits where one end terminates outside the Hull Area.⁷³⁰ Consequently, we

⁷²⁸ 2016 BCMR Statement, paragraph 6.87.

⁷²⁹ Ofcom notes of meeting with KCOM on 24 April 2018.

⁷³⁰ Ofcom analysis of price transparency reports provided by KCOM in response to SMP conditions imposed in the 2016 BCMR.

expect that a [§] of the circuits delivered from the KCOM TI platform (by KCOM and other providers) will disappear as migration to Ethernet in the rest of the UK continues.

Our reasoning and decisions: TI product markets

9.72 In Section 17, we explain that we used the SSNIP test to assess demand-side constraints on wholesale low bandwidth TI services. We considered a range of evidence to inform our SSNIP analysis including:

- prices for low bandwidth TI services and Ethernet; and
- qualitative factors of low bandwidth TI services and alternatives.

9.73 We consider these same factors to inform our assessment of wholesale and retail product markets in the Hull Area.

Pricing

9.74 In Section 17, we showed that, in the UK excluding the Hull Area, the gap between prices of low bandwidth TI services and those of equivalent Ethernet-based circuits has narrowed as the latter have fallen rapidly.

9.75 In its response, KCOM said that as this trend continues and expects prices for its TI services to increase in the near future, and notes that it is currently in the process of reviewing its pricing structure for TI services. KCOM has said that falling numbers of service connections are driving increased unit operating costs.⁷³¹ This reflects comments made by BT as set out in Section at paragraph 17.27.

9.76 As in the rest of the UK, we expect this may prompt additional switching in the Hull Area once the cost of alternatives and the cost of change is commercially favourable compared to an increasingly more expensive and less reliable TI service.

Qualitative factors

9.77 In Section 17, we note that, in the UK excluding the Hull Area, many users of low bandwidth TI remain satisfied with the level of service they receive and are not inclined to switch, and that the timing of any switch will typically occur at their own pace, with it often being delayed up to the point where end-user equipment or applications come to the end of their life. KCOM has told us that its experience of customers is the same. We have also not identified any factors that would make consumers in the Hull Area different.

9.78 In Section 17, we also consider why users of low bandwidth TI might be reluctant to switch to modern alternatives, even in the case of a SSNIP. Recent engagement with industry identified that the level of switching would be influenced by barriers such as cost or timing; and there may be perceived reliability and versatility of modern alternatives compared to low bandwidth TI services.

⁷³¹ KCOM's response to 2018 BCMR Consultation, paragraph 3.18.

- 9.79 Some customers stay with TI unless they are changing network provider or implementing an IT upgrade. Switching to Ethernet alternatives would likely drive additional costs when existing equipment was delivering well.
- 9.80 Many customers choose to remain on low bandwidth TI services because they perceive that Partial Private Circuits (PPCs) best suit their business needs and are wary as to whether modern alternatives could match these needs. In particular, we noted that some consumers may consider TI services to be more reliable than Ethernet-based substitutes. However, we noted that this should be considered in context, and that users of these services will increasingly be exposed to higher levels of risk (increasing unreliability) as the legacy TI platform ages.
- 9.81 KCOM told us that the platform and services it delivers are currently reliable and able to manage any spares and support issues. KCOM also highlighted its dependence on a substantial number of circuits they provide and support where one end terminates outside the Hull Area. KCOM told us that while it has [X].

Conclusion on product markets

- 9.82 As in the rest of the UK, we consider that the evidence suggests that currently in the Hull Area:
- there are conflicting views about the ability of more modern services to substitute for the full range of low bandwidth TI services but, based on the evidence available to us, we consider that these modern services are a viable alternative, have sufficient coverage to serve the majority of users, and will increasingly be available at a price and service point appropriate for current users of low bandwidth TI services. Therefore, in the event of a SSNIP we are likely to see some additional switching;
 - however, although the number of low bandwidth TI services users is declining, the remaining low bandwidth TI users are likely to be those who are most satisfied with the level of service they receive and thus least inclined to switch, even in the event of a SSNIP; and
 - in the absence of any strong external factor encouraging migration, many of these users will continue to switch at their own pace, with that typically being where end-user equipment or applications come to the end of their life.
 - although the number of low bandwidth TI services users is declining, the remaining low bandwidth TI users are likely to be those who are most satisfied with the level of service they receive and thus least inclined to switch, even in the event of a SSNIP;
 - in the absence of any strong external factor encouraging migration, many of these users will continue to switch at their own pace, with that typically being where end-user equipment or applications come to the end of their life; and
 - modern alternatives represent a viable technical alternative for the majority of TI users that may not yet be commercially attractive, especially when the cost of change, including users end equipment, is included.

9.83 We therefore conclude that the evidence suggests that a separate product market for low bandwidth TI services is likely to be present for the period of this review in wholesale and retail product markets.

Conclusion on geographic market

9.84 We have concluded that there are distinct wholesale and retail markets for TI services in the Hull Area for the same reasons that we identify a geographic market in the Hull Area for CI Services, namely that KCOM (and not BT) is the telecoms provider with the most extensive coverage and greatest installed customer base in the Hull Area, indicating a clear difference in competitive conditions from the rest of the UK.

Conclusion on market definition

9.85 We have concluded that, as in the rest of the UK, there will remain a distinct market in the Hull Area for low bandwidth TI services for the period of this review. Beyond the period of this review, however, there are clear dynamics between markets that suggest that effective competition arising from other markets will be reached in the foreseeable future.

9.86 Having set out our findings in relation to the relevant market we have then considered whether this declining market remains susceptible to *ex ante* regulation during the relevant period. We do this via the three-criteria test.

Three-criteria test

9.87 The market for wholesale high-quality access provided at a fixed location (which we refer to as wholesale leased lines, including TI leased lines) is listed in the 2014 EC Recommendation as a market in which *ex ante* regulation may be warranted.⁷³² However, the 2014 EC Recommendation also recognises that there may be situations where it may be appropriate not to impose *ex ante* regulatory obligations according to national circumstances.⁷³³ To assess whether it is appropriate to impose *ex ante* regulation in a market listed, we use the three-criteria test.

9.88 Retail leased lines are not listed in the 2014 EC Recommendation as a market in which *ex ante* regulation may be warranted. As we currently regulate the market for retail low bandwidth TI leased lines in the Hull Area, we use the three-criteria test to assess whether continued regulation of this market is appropriate.

9.89 For simplicity of presentation, our analysis considers the wholesale and retail levels together.

9.90 The principles which are relevant to the application of the three-criteria test to TI services are set out in Section 17, and we do not discuss them here.

9.91 Our reasoning as to why we have reached the conclusion that the markets for TI services in the Hull Area do not satisfy the three-criteria test are similar to those set out in Section 17

⁷³² 2016 BCMR Statement, Volume 1, paragraph 5.26.

⁷³³ 2016 BCMR Statement, Volume 1, paragraph 5.26.

with respect to the wholesale TI services market in the UK (excluding Hull) covered by this review.

Our reasoning and final decision – tendency towards effective competition

- 9.92 As in the rest of the UK, our analysis suggests that low bandwidth TI services in the Hull Area is becoming an unsustainable legacy technology with declining numbers of customers, no material new demand and no comparable reduction in operating costs. Moreover, modern alternatives exist in the form of CI Services that can satisfy the demand for the functionality provided by these services and are where the focus of competition now lies.
- 9.93 KCOM has not announced formal plans to close the TI platform. However, KCOM has told us it [X].⁷³⁴
- 9.94 Within this context we did not consider it appropriate that regulation should stifle the timely and managed migration away from low bandwidth TI services to more modern platforms.
- 9.95 While we do not consider the evidence suggests that the low bandwidth TI services are in the same market as CI Access services in the Hull Area over the period of the review, we believe the migration from low bandwidth TI services to other markets will accelerate as the announced closure of the BT platform gathers pace and affects those KCOM circuits that interconnect locations in the Hull Area with locations in the rest of the UK.
- 9.96 Our analysis in relation to the UK excluding the Hull Area suggests that low bandwidth TI services is an increasingly unsustainable legacy technology with few customers and declining demand, and we have no reason to consider that the same does not apply within the Hull Area in the foreseeable future.
- 9.97 We consider that the technological and price convergence, driven by the increasing costs of low bandwidth TI, outlined above, will continue within the period of the review and in the foreseeable future. This means that the market for CI Services will increasingly constrain the market for low bandwidth TI services. We therefore believe that there are dynamics which indicate that the market will tend towards effective competition in the absence of *ex ante* regulation. KCOM's ability to exploit its market power in these rapidly diminishing legacy markets will therefore diminish.
- 9.98 As we think there is a market structure which does not tend towards effective competition within the period of the review, but there are dynamics in the market within the review period which indicates that the status of effective competition will be reached in the foreseeable future, the second criterion of the three-criteria test as set out in the 2014 EC Recommendation is not satisfied.

Our reasoning and final decision – sufficiency of competition law

- 9.99 In light of the market trends identified and given the context that this is a legacy market facing ever declining volumes and the reduction in KCOM's platform consequent upon BT's

⁷³⁴ KCOM email, dated 27 July 2018, confirming statements made during telephone call on 19 July 2018.

switch-off date, we consider that *ex post* competition law is sufficient to address any competition problems that might arise in the Hull market. We consider that the need for extensive or frequent and timely intervention is no longer indispensable in this declining market, and indeed, could be counterproductive if it disincentivises efficient migration to modern networks. Further, we consider the risk of market failures (such as excessive pricing) emerging is limited given the availability of alternatives mentioned above. Consequently, it would be disproportionate to impose *ex ante* regulation. The market therefore does not satisfy the third criterion of the three-criteria test.

- 9.100 In deregulating this market, we have considered the EC SMP Guidelines⁷³⁵ and an EC SMP working paper⁷³⁶, both of which emphasise the need for NRAs to prevent the perpetuation of a “cycle of captivity” by defining ever smaller markets, and instead encourage migration and the switch-off of legacy network technology. It would therefore be disproportionate for us to continue to regulate the low bandwidth TI services market going forwards.

Conclusion

- 9.101 Considering the analysis set out above, and applying our regulatory judgement, we have concluded that the cumulative three-criteria test as set out in the 2014 EC Recommendation is no longer satisfied in relation to the low bandwidth TI wholesale and retail markets.
- 9.102 We note [§<] and [§<] suggestion that deregulation should be phased over a longer time period. However, having reached this conclusion, we consider that it would not be appropriate to impose *ex ante* regulation on any person in relation to the low bandwidth TI services market in the Hull Area. We therefore plan to revoke all conditions imposed on KCOM in these markets.

⁷³⁵ EC SMP Guidelines, paragraph 45.

⁷³⁶ EC SMP Guidelines, page 19.

10. Approach to remedies

- 10.1 In Sections 4 to 8, we set out our approach to market definition and finding that BT has SMP in the following markets:
- CI Access services at all bandwidths in all parts of the UK⁷³⁷ excluding the Central London Area and Hull Area, which we discuss in Section 6; and
 - CI Inter-exchange connectivity services at all bandwidths at non-competitive BT exchanges, which we discuss in Section 8.
- 10.2 In this section, we explain the competition concerns for this review period that we have identified as a result of our competition assessment. We then set out the approach we have taken in designing our remedies to address the competition concerns identified. Our approach takes into account our strategy to promote network-based competition, in line with our duties, by securing investment in fibre networks. We also take into account our decision to require BT to provide unrestricted Passive Infrastructure Access (PIA), the details of which are set out in Volume 1 of this statement.
- 10.3 We subsequently set out in more detail our decisions on dark fibre access, regulation of active services and quality of service requirements. Finally, we discuss the insufficiency of competition law to address our competition concerns, and take into account the Commitments in respect of the independence of Openreach.
- 10.4 Our remedies for BT are set out in detail in Sections 11 to 15. Our approach and remedies for KCOM in the Hull Area are set out in Section 16.

Competition concerns in business connectivity markets

- 10.5 In light of our finding that BT has SMP in the business connectivity markets identified above, we are concerned that, in the absence of appropriate *ex ante* regulation:
- BT would have the incentive and ability to refuse to provide access to its network or not provide access on terms that would secure efficient investment and innovation, both in the relevant wholesale markets and the related downstream retail markets;
 - BT would have the incentive and ability to favour its downstream retail businesses to the detriment of its competitors in the relevant retail markets, by both price and non-price discrimination;
 - BT would have the incentive and ability to fix and maintain some or all of its prices at an excessively high level or engage in a price squeeze;
 - BT would have the incentive to increase prices in areas with limited or no competition, to subsidise price reductions in more competitive areas (or where it considers rivals may build); and
 - BT may not have sufficient incentives to continuously deliver an adequate level of service quality in the provision and repair of wholesale services and this will impact

⁷³⁷ In Section 5, we defined a number of geographic markets for CI Access services. In Section 6, we found BT to have SMP in the Metro Areas; all other High Network Reach areas; BT+1 areas; and BT Only areas.

detrimentally on all downstream providers of leased lines, including BT’s retail businesses, which would be to the detriment of consumers.

10.6 Openreach was the only respondent to comment on our competition concerns. It said that we had not set out a specific competition concern that would be addressed by our proposed dark fibre remedy, and that the general concerns listed above do not support the case for dark fibre.⁷³⁸ As we discuss in more detail below, in areas where investment is unlikely, dark fibre is a more effective way of addressing our competition concerns than active remedies alone.

10.7 In the sections that follow, we set out why we consider that each of our remedies will help to address the competition concerns we have identified. As set out in Article 8(4) of the Access Directive, our package of *ex ante* remedies must be based on the nature of the competition problems identified and must be proportionate and justified in light of the objectives laid down in Article 8 of the Framework Directive. This section, together with the sections that follow, explains why we consider this is the case.

Summary of approach

Our proposals

10.8 In our consultation, we explained that in this review we were continuing our work to promote network-based competition, in line with our duties, by securing investment in fibre networks. We said that we would do this by implementing the following principles in our approach to regulation:

- promoting network-based competition, by targeting our regulation upstream to passive network infrastructure;
- removing regulation where competitive conditions allow; and
- protecting consumers by regulating where necessary.

10.9 We explained that our approach to remedies is designed to address our competition concerns and reflect differences in competitive conditions between different areas, which we expected to evolve further under our proposals to require BT to provide unrestricted PIA.

10.10 We proposed a package of remedies based on our proposed approach, as summarised in Table 10.1.

⁷³⁸ Openreach’s response to the 2018 BCMR Consultation, page 13, paragraph 9.

Table 10.1: High level summary of our proposed remedies

Level of competition	CI Inter-exchange connectivity markets			CI Access services market			
	BT Only	BT+1 other	BT+2 or more	BT Only	BT+1 other	BT+2 or more (HNR areas)	
						Outside CLA	CLA
Active services at all bandwidths	Cap at current prices QoS standards		None	Cap at current prices QoS standards		Fair pricing	None
Dark fibre⁽¹⁾	Price at cost QoS standards ⁽²⁾	None	None	None	None	None	None

Note: (1) From BT Only exchanges, where no rival network is within 100m (2) For dark fibre from April 2020

Stakeholder comments

10.11 A number of respondents expressed broad support for our overall approach to remedies, even where they disagreed with specific elements of our proposed remedies. Only a few respondents commented explicitly to argue against our overall approach to remedies:

- **Vodafone** urged us to reconsider our approach to remedies, suggesting that the “very different market characteristics of the mature business connectivity fibre market” necessitate a different approach to remedies in the business sector. It argued for a different set of remedies to safeguard business consumers’ interests, protect competitive 5G rollout and recognise the differences between business connectivity and residential fibre markets. In its view, our proposals would not entice new entrants into a mature market for business fibre.⁷³⁹ Vodafone also argued that it was inappropriate for us to take our unrestricted PIA remedy into account in our remedies design.⁷⁴⁰
- **TalkTalk** argued that our approach, which it characterised as “weak regulation and high prices” will not stimulate investment or benefit consumers.⁷⁴¹ TalkTalk⁷⁴² and UKCTA⁷⁴³ also argued that we had proposed certain decisions in order to “align” with the regulation we expect to impose in 2021, and therefore had pre-judged that future regulation and failed to adequately consult on our proposals.

⁷³⁹ Vodafone’s response to the 2018 BCMR Consultation, part 1, paragraph 1.1, paragraph 1.16-1.17.

⁷⁴⁰ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 5.5.

⁷⁴¹ TalkTalk’s response to the 2018 BCMR Consultation, section 1 and section 3.

⁷⁴² TalkTalk’s response to the 2018 BCMR Consultation, section 4, paragraph 4.59 and section 5, paragraph 5.43.

⁷⁴³ UKCTA’s response to the 2018 BCMR Consultation, paragraph 32.

- **Telefónica** argued that we had not taken into account the impact of our proposed approach to remedies on the rollout of 5G networks.⁷⁴⁴

Our reasoning and decisions

- 10.12 We have designed a suite of remedies which we consider will address the competition concerns we have identified in this review period. The approach we have adopted reflects our view that, in the context of these markets, greater benefits for consumers will be delivered by promoting network-based competition. Access-based competition, which has been the focus of our previous reviews, has been successful in driving retail competition but it can only go so far and depends on continuous regulation of an incumbent monopolist. Given the ongoing investment in fibre infrastructure, we think our new approach will deliver greater benefits for consumers, by providing a potential long-term solution to our competition concerns. In volume 1 we have imposed unrestricted duct and pole access, which will make it faster and cheaper for operators to roll out competing networks. The remedies we impose in this review must ensure that competing providers can have confidence in the investments they have already made and have planned, and will continue to build their own networks where it is economic to do so rather than buying wholesale services from BT.
- 10.13 Our approach to remedies is intended to support investment in the development of new networks, promoting competition at the network level, while providing protection to access seekers. That protection for access seekers applies both in areas where network-based competition will take time to develop and where it is less likely to emerge in the longer term. While unrestricted PIA provides a path towards deregulation of downstream services in the future, in this review period we are imposing regulation in downstream business connectivity markets that will protect access seekers, including a price cap at current prices which we consider to be reasonably close to costs.
- 10.14 We disagree with Vodafone's assessment. In addition to the potential impact of unrestricted PIA on investment in the business connectivity markets (which we discuss in Annex 6), the following factors suggest there are opportunities for further investment in these markets:
- Our analysis of 2017 new connections (see Annex 11) shows that 10% of new connections were network extensions, meaning new duct was required to connect a building.
 - Demand for business connectivity services is not static. Demand for Ethernet services has increased since the last review and is forecast to increase over the review period. Even where business premises are already connected to fibre, capacity requirements are increasing, with demand for VHB circuits forecast to increase over the review period (see Section 3).

⁷⁴⁴ Telefónica's response to the 2018 BCMR Consultation, paragraphs 9-11.

- Investors in full-fibre networks are offering a range of services to different types of consumers over common underlying fibre infrastructure: ultrafast broadband to residential and business consumers, enterprise leased lines, and MNO backhaul. [3<].⁷⁴⁵

- 10.15 Consistent with our strategy, the scope and intensity of the regulation we are imposing varies according to the level of competition (actual or expected) in a given area. We also take account of upstream regulation (particularly unrestricted PIA) when setting our remedies in line with the modified greenfield approach.⁷⁴⁶
- 10.16 As set out in Section 5, we have concluded that BT does not have market power in the CI Access services market in the Central London Area (CLA), where many operators have substantial network presence, and we expect unrestricted PIA is likely to further increase competition. Therefore, we are not imposing regulation in the supply of CI Access services in the CLA.⁷⁴⁷
- 10.17 In other parts of the CI Access services market in the UK excluding the Hull Area, and in the CI Inter-exchange connectivity markets at BT exchanges where BT is the only provider or where only one PCO is present, we have concluded that BT has SMP.
- 10.18 We have decided to impose the package of remedies we proposed in our consultation, with some minor adjustments.⁷⁴⁸
- 10.19 Our analysis suggests that unrestricted PIA will have an impact on competition by facilitating mass rollout of FTTP connections, network infill, and on a smaller scale, some bespoke network extensions (see Annex 6). We consider that infill is particularly likely to be a feature in HNR areas of the CI Access services market, as well as in the CLA.
- 10.20 We are therefore imposing lighter remedies in HNR areas in the rest of the UK to reflect existing and greater expected future levels of competition. Specifically, in these areas BT is not subject to quality of service standards and is only subject to a fair and reasonable pricing requirement (as opposed to a charge control).
- 10.21 In areas where BT currently faces no or limited competition – BT Only and BT+1 areas of the CI Access services market and routes from BT Only and BT+1 exchanges in the CI Inter-exchange connectivity market – unrestricted PIA may in future enable a greater level of competition. Based on announced plans from commercial providers and planned government interventions (such as the Scottish Government’s R100 programme) we expect that investment in the build of new networks and infill of existing networks will continue and increase over the review period. However, it remains to be seen how far providers will get with their plans over the review period (to April 2021) and where they will prioritise their build. In these areas we are imposing remedies including a requirement

⁷⁴⁵ [3<].

⁷⁴⁶ The modified greenfield approach is explained and applied in our market definition analysis at Sections 4 and 5.

⁷⁴⁷ As explained in Section 14, BT is required to make ancillary services available at any exchange where regulated products are available, which includes exchanges in the CLA where CI Inter-exchange connectivity services are regulated.

⁷⁴⁸ As set out in Section 1, we have made changes to: the scope of our dark fibre remedy (see Section 12), the timeframe for the implementation of dark fibre (see Section 12), the scope of our interconnection remedies (see Section 14), notification requirements (see Section 11) and quality of service requirements (see Section 15).

to provide active services, supported by appropriate price controls and quality of service standards to protect customers from the effects of BT's market power. This regulation is designed in a way which remains consistent with our objective of incentivising rival investment so as not to deter entry where it is feasible, while still protecting access seekers.

- 10.22 In parts of the business connectivity market where we think competition is least likely to develop – for inter-exchange routes from certain exchanges where BT is the only provider – we are also requiring BT to provide dark fibre access, subject to a cost-based charge control. As there is unlikely to be competition on these routes (despite the availability of unrestricted PIA), dark fibre poses a limited risk to investment, and is therefore our preferred remedy in line with our preference to regulate as far upstream as possible in order to promote greater choice and facilitate downstream competition. In our recent consultation on regulation for 2021 and beyond, we signalled that the scope of the dark fibre remedy may evolve in future as the potential for competition to emerge in access markets is established with greater certainty.⁷⁴⁹
- 10.23 We consider that TalkTalk and Vodafone's comments misrepresent our proposed approach to remedies and specifically to pricing. Our approach to pricing is consistent with our overall approach to remedies, which is to adopt remedies that address our competition concerns, reflecting different competitive conditions in different areas, in accordance with our duties and consistent with our objective of promoting network-based competition by incentivising investment. While an alternative regulatory approach could be to drive lower wholesale prices in this review period (which would potentially benefit access-based competition), we consider that in the longer term, where there is scope for network-based competition, our approach will deliver better outcomes for consumers. For example, IIG, CityFibre and Zayo highlighted that modern resilient ring-based fibre networks built by rival investors could offer substantial additional benefits to customers.⁷⁵⁰ As we have outlined above, our analysis suggests that further investment in the business connectivity markets is likely to occur during the period of the review enabled by unrestricted PIA and supported by the package of remedies we are putting in place in this review.
- 10.24 We disagree with TalkTalk's argument that we failed to consult on our proposals and have prejudged our future regulation. We have taken decisions which reflect our judgement of the appropriate and proportionate remedies necessary over this review period, but which reflect the longer term period over which network-based competition is likely to grow. For the reasons we have given, we have put more weight on promoting competition in line with our strategy, and in accordance with our duties. Our principal duty requires us "to further the interests of consumers, where appropriate by promoting competition"⁷⁵¹, having regard to (among other things) "the desirability of encouraging investment and

⁷⁴⁹ Ofcom, 2019, Promoting competition and investment in fibre networks

https://www.ofcom.org.uk/_data/assets/pdf_file/0021/142572/promoting-competition-investment-overview-of-plans.pdf [accessed 22 May 2019].

⁷⁵⁰ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.4.1-7.4.4.

⁷⁵¹ Communications Act 2003, s 3(1)(b).

innovation”.⁷⁵² We also consider that our approach is consistent with the policy objectives and regulatory principles of the EU Framework Directive.⁷⁵³

10.25 In summary, in light of our SMP findings (set out in Sections 6 and 8) and our competition concerns, we have decided to impose on BT:

- A requirement to provide cost-based access to dark fibre, limited to inter-exchange connectivity from certain BT Only exchanges.⁷⁵⁴
- A requirement to provide active services in all markets in which we find BT has SMP.
- In HNR Areas of the CI Access services market, a fair and reasonable charging requirement for active services, and in all other areas where we find BT has SMP, a price cap on active services at current prices.
- Quality of service obligations which vary by market, with lighter obligations (KPI reporting and SLAs/SLGs only) in HNR Areas of the CI Access services market.

10.26 In the rest of this section we set out in more detail our decisions on dark fibre access, the regulation of active services, and quality of service requirements. Finally, we discuss the insufficiency of competition law to address our competition concerns and take into account the Commitments in respect of the independence of Openreach. The full detail of our remedies is set out in Sections 11 to 15.

10.27 Telefónica and Vodafone both urged us to reflect, in our remedies design, the potential impact of our decisions on 5G rollout. We do this in Annex 9.

Dark fibre

Our proposals

10.28 We consulted on proposals to require BT to provide access to dark fibre, subject to a cost-based charge control. Our proposal was to limit the remedy to areas where we consider that network competition is unlikely to develop in the medium to long term, even with the availability of unrestricted PIA. Our analysis suggested that these areas were limited to inter-exchange connectivity from BT exchanges where BT is the only operator present.

10.29 We did not propose to require BT to provide access to dark fibre in the CI Access services market, given the greater potential for competition to emerge, particularly as a result of unrestricted PIA.

⁷⁵² Communications Act 2003, s 4(d).

⁷⁵³ Article 8 of the Framework Directive (policy objectives and regulatory principles) lists at sub-paragraph (5) the things that national regulatory authorities should do in pursuit of the policy objectives underpinning the EU framework. This includes (among other things):

- a) Promoting regulatory predictability by ensuring a consistent regulatory approach over appropriate review periods;
- b) Safeguarding competition to the benefit of consumers and promoting, where appropriate, infrastructure-based competition;
- c) Promoting efficient investment and new and enhanced infrastructure;
- d) Taking account of varying geographic conditions of competition in the member state.

⁷⁵⁴ As explained in further detail at Section 12, we have changed the scope of our dark fibre remedy since consultation.

Stakeholder comments

- 10.30 Access seekers were in favour of the introduction of a dark fibre remedy but generally wanted to see its application extended. TalkTalk⁷⁵⁵, SSE⁷⁵⁶, and Sky⁷⁵⁷ argued that it should be extended to all exchanges in where BT has been found to have SMP in the provision of inter-exchange connectivity (BT Only and BT+1 exchanges). Three argued that it should be extended to all exchanges, but agreed that the imposition of the remedy in the CI Inter-exchange connectivity services markets should be prioritised over imposing it in the CI Access services market in this review period.⁷⁵⁸ Other access seekers argued that our dark fibre remedy should be extended into the CI Access services market. For example, Telefónica⁷⁵⁹ argued that the dark fibre remedy should be expanded into the CI Access services market to support the rollout of 5G, while Vodafone argued for dark fibre in the CI Access services market would benefit both MNOs and enterprise customers.⁷⁶⁰ TalkTalk also stated that we should conduct an appropriately detailed impact assessment of the alternative options for the scope of dark fibre remedy, which it argued we had not done.⁷⁶¹
- 10.31 Network builders were generally opposed to the introduction of a dark fibre remedy, with BT Group⁷⁶², Virgin Media⁷⁶³, CityFibre⁷⁶⁴, Zayo⁷⁶⁵, and IIG⁷⁶⁶ arguing that we should wait until the impact of our unrestricted PIA remedy is evident and only impose dark fibre where competition does not emerge. BT Group considered, for example, that we should implement unrestricted PIA and then “let the market dynamic play out” – arguing that intervening in advance of this would distort choices.⁷⁶⁷ Similarly, CityFibre said that while it is not opposed to the dark fibre remedy in principle, it should not be introduced at the same time as unrestricted PIA, but only when and where the most upstream remedy has proven ineffective.⁷⁶⁸ Openreach argued that we had overstated the benefits of our proposed dark fibre remedy and understated the risks (in particular, that there would be low demand for the remedy), and that we had not taken into account the impact of PIA or OSA Filter Connect.⁷⁶⁹

⁷⁵⁵ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 4.70-4.72. TalkTalk also argued that dark fibre was a better remedy than actives at paragraphs 4.14-4.38, 4.55-4.59.

⁷⁵⁶ SSE’s response to the 2018 BCMR Consultation, page 11.

⁷⁵⁷ Sky’s response to the 2018 BCMR Consultation, paragraphs 5, 16.

⁷⁵⁸ Three’s response to the 2018 BCMR Consultation, paragraphs 1.1 and 4.1.

⁷⁵⁹ Telefónica’s response to the 2018 BCMR Consultation, page 6 paragraph 25.

⁷⁶⁰ Vodafone’s response to the 2018 BCMR Consultation, part 1, 1.18; part 3, paragraph 4.1.6.

⁷⁶¹ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 1.10.

⁷⁶² BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.18.

⁷⁶³ Virgin Media’s response to the 2018 BCMR Consultation, page 16.

⁷⁶⁴ CityFibre’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.1.3.

⁷⁶⁵ Zayo’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.2-4.1.16.

⁷⁶⁶ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, section 7.3.

⁷⁶⁷ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.18.

⁷⁶⁸ CityFibre’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraphs 7.1.2-3.

⁷⁶⁹ Openreach’s response to the 2018 BCMR Consultation, page 5, paragraph 6, and page 16, paragraph 60-61.

10.32 Respondents to our consultation provided a range of views on our proposed cost-based approach to setting the dark fibre charge control. Three⁷⁷⁰ and Vodafone⁷⁷¹ agreed with our proposals for a cost-based approach to pricing. Openreach disagreed with our proposed pricing approach, arguing that we had set prices below the commercial level.⁷⁷² Some competing dark fibre providers such as CityFibre⁷⁷³, Zayo⁷⁷⁴ and IIG⁷⁷⁵, argued that we should set prices higher, benchmarking them against competitors' costs rather than BT's to make more revenue available, and thereby increase incentives for competitors.

Our reasoning and decisions

10.33 We have decided to introduce a requirement for BT to provide access to dark fibre on reasonable request for inter-exchange connectivity circuits from certain BT Only exchanges.⁷⁷⁶ We have also decided to impose a cost-based charge control for dark fibre. Our detailed reasoning and response to stakeholder comments is set out in Section 12.

Approach to the scope of our dark fibre remedy

10.34 Our dark fibre remedy is designed to complement unrestricted PIA, by enabling competitive business connectivity services provision in areas where network-based competition is unlikely to emerge. Imposing a dark fibre remedy in areas where network-based competition may emerge risks disincentivising investment, so we have decided to impose it only where we are confident that competitive investment is unlikely to occur.

10.35 A number of infrastructure builders argued that we should wait and assess the impact of unrestricted PIA before imposing a dark fibre remedy. We have considered the impact of unrestricted PIA on investment and competition in all the markets we have identified in this review, including potential different use cases (mass network rollout, network infill and bespoke network extensions). This analysis is set out in full at Annex 6. We have taken the findings of this analysis into account in our market analysis and in the design of our remedies package. We therefore disagree that it is necessary or appropriate to await the longer-term outcome of our unrestricted PIA remedy in order to put in place an appropriately scoped dark fibre remedy.

10.36 TalkTalk argued that we should have done an impact assessment for our proposals on the scope of dark fibre. We have set out in this section and in Section 12 how we reached our decisions on the scope of the dark fibre remedy (including why we have imposed it for some circuits and not others), and why we consider that this approach is appropriate for this review period.

⁷⁷⁰ Three's response to the 2018 BCMR Consultation, paragraphs 6.1-6.6.

⁷⁷¹ Vodafone's response to the 2018 BCMR Consultation, part 3, paragraph 6.71.

⁷⁷² Openreach's response to the 2018 BCMR Consultation, page, paragraph

⁷⁷³ CityFibre's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.2.

⁷⁷⁴ Zayo's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 4.1.17- 4.1.21.

⁷⁷⁵ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.3.12.

⁷⁷⁶ We have excluded BT Only exchanges which are within 100m of an alternative network, as discussed in Section 12.

The benefits of our dark fibre remedy

- 10.37 Dark fibre offers a range of benefits, such as choice and flexibility for telecoms providers which would allow them to better compete on price, service quality and product offerings in downstream markets.⁷⁷⁷ We consider that, where we have chosen to impose it, our dark fibre remedy is the best way of addressing our competition concerns, in particular our concern that BT would have the incentive and ability to refuse to provide access to its network, or not provide access on terms that would secure efficient investment and innovation.
- 10.38 We consider that a dark fibre remedy in inter-exchange connectivity will, alongside other remedies, help to reduce or remove barriers to network expansion and promote access competition in areas where BT has SMP. We expect that our dark fibre remedy on uncompetitive inter-exchange connectivity routes will significantly reduce backhaul costs (through lower backhaul prices and reduced duplication of equipment). It will therefore promote competition not only in the provision of backhaul between exchanges where there are no competing networks, but also, as backhaul costs are a consideration when building new access networks, will reduce barriers to infrastructure build in marginal areas of the access markets.
- 10.39 While most respondents to our consultation agreed that dark fibre would deliver these benefits, Openreach and BT Group disagreed, arguing that we had overstated the potential benefits of dark fibre in the inter-exchange connectivity markets (in particular relating to cost reductions and their impact on investment in building access networks) and understated the benefits of Openreach's existing OSA Filter Connect product.⁷⁷⁸ We have set out the benefits and risks of our dark fibre remedy and the evidence for them in Section 12. We have also explained in that section why we consider that, although OSA Filter Connect delivers additional flexibility over other active services, it does not replicate all of the benefits of dark fibre.

Dark fibre for CI Inter-exchange connectivity services

- 10.40 We have considered the scope of a dark fibre access remedy for inter-exchange connectivity, and what would best promote competition in light of our focus on network-based competition and taking into account the impact of our unrestricted PIA remedy. A dark fibre remedy for inter-exchange connectivity at all exchanges where BT has SMP would have the potential to reduce costs for telecoms providers in the short term. However, there is a risk that, on routes where there is currently some backhaul competition or where there is likely to be backhaul competition in the future, it would negatively affect current and future network investments and undermine our objective to stimulate competition higher up the value chain.

⁷⁷⁷ These are set out in detail at Section 12.

⁷⁷⁸ Openreach's response to the 2018 BCMR Consultation, page 16, paragraph 60-61; and BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 5.26-5.29.

- 10.41 As discussed above, in some areas we do not expect network competition to develop, even with unrestricted PIA available. We consider this will likely be the case at BT Only exchanges, which are usually located in more remote areas with lower population/premises density (meaning less revenue is likely to be available) and where rival networks are further away (the median distance of the nearest PCO network is 2.7km from the exchange),⁷⁷⁹ making it less attractive for operators to connect. In these areas, network providers would be required to undertake a bespoke network extension to connect their network to an exchange.⁷⁸⁰ As we have explained in Annex 6, we expect that unrestricted PIA will not have much impact on the business case for bespoke network extensions in this review period because, although using the remedy will make these connections cheaper, they will still involve long lead times and be resource intensive in the majority of cases.
- 10.42 Openreach,⁷⁸¹ BT Group,⁷⁸² Virgin Media⁷⁸³, and IIG⁷⁸⁴ all argued that there are some BT Only exchanges with close rival network infrastructure to BT Only exchanges such that network extension to connect to the exchange would be viable. They argued that in line with our proposed approach of encouraging infrastructure-based competition, dark fibre should not be available from these exchanges.
- 10.43 In response to these comments, we have further analysed variations in the incentives to connect to BT Only exchanges, which we set out in detail in Section 12. Our analysis found some BT Only exchanges where incentives to connect are higher than average, due to lower costs of connecting (because of the proximity of rival network infrastructure). As set out in Section 12, in line with our objective to limit our dark fibre remedy to where investment is unlikely, we have refined our remedy and decided to impose dark fibre access only at certain BT Only exchanges that are not within 100m of an alternative network.
- 10.44 Some respondents argued that the scope of dark fibre remedy for inter-exchange connectivity should be wider. In scoping our remedy, we have carefully considered the potential for investment (including the impact of unrestricted PIA) in each part of the market and the impact that putting in place a dark fibre remedy would have on current and future investment decisions.
- 10.45 Rival networks are much closer to BT+1 exchanges and these exchanges tend to be closer to urban areas, meaning they are more attractive to connect to. We think unrestricted PIA will make it more viable for rivals to connect to these exchanges. While we have found BT to have SMP at BT+1 exchanges, we think these stronger investment incentives (in combination with our broader package of remedies) are sufficient to protect customers,

⁷⁷⁹ See Section 8.

⁷⁸⁰ We define bespoke network extensions as dedicated, single site installations (see Annex 6). There is also the potential that some infill use of unrestricted PIA would involve connecting exchanges. However, as there is only one BT Only exchange in an HNR area this is not a material concern.

⁷⁸¹ Openreach's response to the 2018 BCMR Consultation, page 13, paragraph 43.

⁷⁸² BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.15.

⁷⁸³ Virgin Media's response to the 2018 BCMR Consultation, page 17.

⁷⁸⁴ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.3.4.

and therefore do not consider dark fibre necessary is in these areas. On the contrary, extending the scope of dark fibre to include BT+1 exchanges may risk deterring rival network operators from connecting to these exchanges and developing their backhaul networks.

- 10.46 We have therefore concluded that the dark fibre remedy will apply only to inter-exchange routes from certain BT Only exchanges (those that are not within 100m of an alternative network).

Dark fibre for CI Access services

- 10.47 We are not imposing dark fibre in the CI Access services market in this review. This reflects our decision to impose the unrestricted PIA remedy and is in line with our objective to stimulate competition higher up the value chain in rival infrastructure in the light of the dynamic benefits which that will bring. Current and future investments in network infrastructure, including those using unrestricted PIA, will take time to develop and we consider that our objectives are most appropriately and proportionately served by the establishment of that remedy. Imposing access to dark fibre (in addition to unrestricted PIA) in those areas subject to competitive investment or potential future competitive investment could negatively affect current and future network investments and therefore impact the effectiveness of the upstream remedy. As we note below, we are undertaking further work now looking at appropriate wholesale regulation for our 2021 review, which will examine this issue in detail.

- 10.48 Vodafone⁷⁸⁵ and TalkTalk⁷⁸⁶ argued that competition based on dark fibre access would be the best approach for the CI Access services market. In particular, TalkTalk argued that “the appropriate and pro-consumer approach in this BCMR would be to impose DFA [dark fibre] in the entire CI Access BT+0 market and then withdraw (or not reimpose) DFA in 2021 in those parts where such withdrawal was justified.”⁷⁸⁷ TalkTalk also argued that we could mitigate the risk to investment by pricing a dark fibre remedy in HNR areas above cost.⁷⁸⁸ Vodafone argued that “a fit for purpose dark fibre remedy is the obvious solution to address Openreach’s dominance, promote retail market competition and ensure a competitive 5G market”. It further argued that dark fibre is a complementary remedy to unrestricted PIA remedy because PIA use will likely be directed to new sites.⁷⁸⁹

- 10.49 Our competition concern is that, absent regulation, BT would have the incentive and ability to refuse to provide access to its network or not provide access on terms that would secure efficient investment and innovation. We consider that, in non-competitive areas, a dark fibre remedy is the best way to provide access which secures efficient investment and innovation. Active remedies alone in these areas would not fully address our competition concern.

⁷⁸⁵ Vodafone’s response to the 2018 BCMR Consultation, part 1, paragraphs 1.1.5 and 1.18.

⁷⁸⁶ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 1.10, 4.4.

⁷⁸⁷ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 4.43.

⁷⁸⁸ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 4.61.

⁷⁸⁹ Vodafone’s response to the 2018 BCMR Consultation, part 1, paragraph 1.18

- 10.50 Within this review period we expect that investments in new networks that are already underway will continue, investments that have been announced will commence, and new investments will be planned. However, we do not know at this stage what these new networks will look like as innovative new architectures such as fibre rings are already starting to emerge. In addition, we expect that investment will prove to be viable in some areas of the CI Access service market, but not others.⁷⁹⁰ However, we do not yet know where those areas are. In areas where there is the potential for network-based competition to emerge in the future, which may include some BT Only areas of the CI Access services market, our view is that the most appropriate and proportionate remedy to secure investment and innovation is unrestricted PIA. As explained above, we consider that network competition will lead to the best outcomes for consumers.
- 10.51 A dark fibre remedy may have a role in the CI Access services market in future periods, once the unrestricted PIA remedy is established and when there is greater clarity on those areas with the potential for competitive network-based investment. However, imposing a broader dark fibre remedy at this point would be factored into network plans and affect incentives to invest in new networks and/or use unrestricted PIA. In contrast, in inter-exchange connectivity, we are more certain that investment is unlikely to be viable to certain BT Only exchanges and, as such, have decided that dark fibre is appropriate in those circumstances.
- 10.52 We recognise that some areas in this market may not see rival network deployment, even in the long term. In those areas dark fibre has the potential to deliver additional benefits over active remedies. However, we have not yet concluded an analysis of network competition and innovation in the CI Access services market enabled by unrestricted PIA, and where that competition will emerge. We are doing so now as part of our 2021 review of the market for wholesale fixed telecommunications, which is currently underway and is considering the need for wholesale regulation depending on where there are competing networks or where competing networks have a good prospect of emerging. The outcome of our 2021 review may expand the dark fibre remedy further as we develop our evidence base on where competition is likely to emerge.
- 10.53 We disagree with TalkTalk's suggestion that we should impose a dark fibre remedy in this market and later withdraw it as competition emerges. To do this would delay or prevent viable investment which would not be in the interests of consumers. Furthermore, imposing and then withdrawing a remedy in such a short space of time would potentially be costly and disruptive to BT and to the operators that take up these services. Therefore, we do not consider that it would be appropriate or proportionate to impose regulation in such circumstances.
- 10.54 As outlined above, Vodafone considered that the market for leased lines is mature and did not think that infrastructure investment is likely to occur, in particular because the barriers to switching are high.⁷⁹¹ We recognise that for existing connections in this market there are

⁷⁹⁰ See Annex 6.

⁷⁹¹ Vodafone's response to the 2018 BCMR Consultation, part 2, section 5.

barriers to switching, which we discuss in Section 6, in particular service disruption and time to provide. However, as we set out above we do not agree with Vodafone’s assessment of the likelihood of investment in this market. We consider that the benefits that dark fibre may have in supporting wholesale competition for existing Ethernet connections, are outweighed by the benefits of investment, infrastructure competition and innovation which are supported by the unrestricted PIA remedy.

- 10.55 Telefónica⁷⁹² and Vodafone⁷⁹³ argued for dark fibre in the CI Access services market to support the rollout of 5G. We have considered these arguments in detail at Annex 9 as part of our analysis of whether mobile backhaul should be a separate market. Our view is that dark fibre is not essential for 5G rollout during this review period and that the imposition of dark fibre in areas where there may be competitive build with unrestricted PIA would risk undermining investment (including in the provision of mobile backhaul).

Approach to pricing

- 10.56 We have decided to impose a cost-based charge control for dark fibre services set with reference to the relevant costs of BT’s underlying passive infrastructure necessary for connections between exchanges. Charges will be substantially lower than current charges for active products used for inter-exchange circuits. These pricing arrangements are likely to mean that it is cost effective to use regulated dark fibre where available for most bandwidths for inter-exchange connections, rather than purchasing regulated active products.
- 10.57 As set out above, we are concerned that in the absence of regulation, BT would have the ability and incentive to fix and maintain its prices at an excessively high level. This includes its prices for any dark fibre access product. This would be likely to result in little or no take-up of the new dark fibre remedy. As such, we consider it appropriate to impose a charge control for dark fibre in this review.
- 10.58 Competing dark fibre providers argued that we should set the price for dark fibre above cost to incentivise investment from Openreach’s competitors. However, because we are only imposing dark fibre access in areas where there is no existing competition and where competition is unlikely to emerge in future, we consider that allowing a price premium to incentivise investment (as suggested by competing dark fibre providers) would not be appropriate.

⁷⁹² Telefónica’s response to the 2018 BCMR Consultation, paragraph 9-11.

⁷⁹³ Vodafone’s response to the 2018 BCMR Consultation, part 2, paragraph 2.2.2.

Downstream remedies: regulation of active services

Our proposals

- 10.59 We proposed to require BT to provide network access to the following specific active products in all markets where we proposed that BT has SMP:
- Ethernet circuits at 1 Gbit/s and below; and
 - Ethernet and WDM circuits at bandwidths over 1 Gbit/s.
- 10.60 Our proposed price controls for active services varied by geographic market depending on the degree of competition. Specifically:
- in markets with no or limited competition, we proposed to apply a price cap at current prices and quality of service standards; and
 - where there is more competition, we proposed a ‘fair and reasonable’ pricing obligation and no quality of service standards.

Stakeholder responses

- 10.61 Our proposals for active remedies were broadly supported by Virgin Media⁷⁹⁴, SSE⁷⁹⁵, and Sorrento Networks.⁷⁹⁶ Others considered our approach to be flawed on the basis that we had overestimated or, on the contrary, underestimated the level of competition in our market assessments, for example:
- In line with their view that we had underestimated the level of competition and prospective competition (enabled by unrestricted PIA), BT Group⁷⁹⁷ and Openreach⁷⁹⁸ argued that we should relax our regulation to give Openreach enough commercial flexibility to respond to competition, particularly in the VHB segment in HNR areas. Openreach argued that our remedies should strike the right balance between mitigating the risks we identified and supporting the development of competition and competitive outcomes. They acknowledge that our charge control proposals, in particular not proposing a cost-based charge control, was reflective of this balance.⁷⁹⁹
 - Competitors to BT and Openreach, such as Telefónica⁸⁰⁰ and UKCTA⁸⁰¹, expressed concern that we had proposed a lighter approach to active remedies in areas we deemed more competitive, arguing that this would leave access seekers without other remedies before alternatives to BT were available to them.

⁷⁹⁴ Virgin Media’s response to the 2018 PIMR Consultation, page 19.

⁷⁹⁵ SSE’s response to the 2018 BCMR Consultation, response to Q 13.1.

⁷⁹⁶ Sorrento Networks’ response to the 2018 BCMR Consultation, page 10.

⁷⁹⁷ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 4.12–4.15.

⁷⁹⁸ Openreach’s response to the 2018 BCMR Consultation, section 4, page 28, paragraph 132.

⁷⁹⁹ Openreach’s response to the 2018 BCMR Consultation, section 4 page 29, paragraph 137.

⁸⁰⁰ Telefónica’s response to the 2018 BCMR Consultation, page, response to Q 10.1.

⁸⁰¹ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 15-17.

- 10.62 Although supportive of our overall approach, CityFibre expressed concern that competition issues it has identified in markets further downstream were not being addressed citing BT's dominance in the provision of mobile backhaul as an example.⁸⁰²
- 10.63 A number of stakeholders such as Virgin Media⁸⁰³, SSE⁸⁰⁴ and Three⁸⁰⁵ were broadly in favour of our approach to pricing for active remedies. In particular, IIG⁸⁰⁶, Zayo⁸⁰⁷ and CityFibre⁸⁰⁸ supported our approach to pricing, noting that it would result in longer-term dynamic benefits from infrastructure-based competition as opposed to seeking short-term static benefits from price reductions. Three noted that although it is in its short-term interests for active services to be cost-reflective, it supported our approach as being consistent with the long-term aim of incentivising deployment of alternative infrastructure.⁸⁰⁹
- 10.64 [X]⁸¹⁰, UKCTA⁸¹¹, Telefónica⁸¹², TalkTalk⁸¹³, Sky⁸¹⁴, Colt⁸¹⁵, PAG⁸¹⁶, and Vodafone⁸¹⁷ disagreed with our approach and argued instead for a cost-based charge control. A range of arguments were advanced against our approach and in support of a cost-based charge control, including:
- our proposed approach would provide excess profits for BT and lead to higher prices for consumers, and that we had not properly considered the costs and benefits of this approach;
 - our proposed approach adds uncertainty because it is a change to Ofcom's usual approach; and
 - limited build and/or take up of passive remedies is expected in this review period so end customers will not benefit from additional investment incentivised by higher prices.
- 10.65 Vodafone also argued that market conditions have not changed since 2016, when Ofcom reviewed the market and imposed cost-based charge controls in all areas where BT was found to have SMP. It considered that since there has been no change in conditions, our change in approach is not justified.⁸¹⁸

⁸⁰² CityFibre's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 2.1.6 and confidential Annex 1.

⁸⁰³ Virgin Media's response to the 2018 PIMR Consultation, page 14.

⁸⁰⁴ SSE's response to the 2018 BCMR Consultation, page 14, response to question 2.1.

⁸⁰⁵ Three's response to the 2018 BCMR Consultation, paragraphs 8.2, 11.1.

⁸⁰⁶ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.4.1, 7.4.3

⁸⁰⁷ Zayo's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.22.

⁸⁰⁸ CityFibre's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraphs, 6.1.2 8.2.1-8.2.4.

⁸⁰⁹ Three's response to the 2018 BCMR Consultation, paragraph 11.3.

⁸¹⁰ [X].

⁸¹¹ UKCTA's response to the 2018 BCMR Consultation, paragraphs 22-24. UKCTA argued that ancillary services should also be subject to a cost-based charge control (paragraph 28 of UKCTA's response).

⁸¹² Telefónica's response to the 2018 BCMR Consultation, paragraph 25.

⁸¹³ TalkTalk's response to the 2018 BCMR Consultation, paragraphs 5.43-5.44.

⁸¹⁴ Sky's response to the 2018 BCMR Consultation, paragraphs 6, 18-23.

⁸¹⁵ Colt's response to the 2018 PIMR and 2018 BCMR Consultations, page 2.

⁸¹⁶ PAG's response to the 2018 BCMR Consultation, paragraphs 9, 24-25.

⁸¹⁷ Vodafone's response to the 2018 BCMR Consultation, part 1, paragraphs 1.1.6-1.1.7, and part 3, section 6.

⁸¹⁸ Vodafone's response to the 2018 BCMR Consultation, part 3, paragraphs 6.24 and 6.27

- 10.66 TalkTalk and Sky⁸¹⁹ set out a range of arguments that our proposals would not stimulate investment either in this review period or in future review periods.⁸²⁰ TalkTalk considered that the most profitable areas were already served by alternative leased line operators. It also argued that, even if our approach did stimulate additional investment in business connectivity, it would have limited consumer benefits as businesses already have access to Openreach’s nationwide fibre network, so rival investment in leased lines would not improve quality or product differentiation.⁸²¹ It further argued that our regulation weakens downstream (access-based) competition, which would in turn reduce infrastructure investment.⁸²²
- 10.67 TalkTalk,⁸²³ PAG,⁸²⁴ and Telefónica⁸²⁵ also argued that the case for a cost-based charge control on VHB services was stronger than lower bandwidth services. TalkTalk argued that, in VHB services, Openreach had exploited its SMP by pricing above the competitive level, and that a cost-based charge control would deliver greater consumer benefits since prices are currently substantially above cost. Telefónica argued for a reduction in the price of VHB (preferably to cost) in order to support the rollout of 5G networks.⁸²⁶ In contrast, Virgin Media agreed with our approach to the charge control for VHB services, noting that it is a more competitive service area and that competitive constraints on BT can be observed in downward trends in VHB pricing.⁸²⁷
- 10.68 CityFibre⁸²⁸ and Zayo⁸²⁹ expressed concern that the proposed charge control would allow BT to reduce its prices in a way that could deter competitive entry. They argued that we should impose a price floor to prevent BT from engaging in anti-competitive pricing.⁸³⁰ TalkTalk also noted that in the absence of a price floor or uniform pricing obligation, increased competition (from effective scale entry) “will change the profit-maximising price for BT, and it is likely to cut prices substantially to meet the entrant”, although in TalkTalk’s view significant competitive entry is unlikely.⁸³¹ We have addressed these comments in Section 13.
- 10.69 TalkTalk⁸³², Vodafone⁸³³, and Sky⁸³⁴ argued that we should consider how to address BT’s excess profits generated by our approach to charge controls. They suggested there was no consumer benefit from allowing BT to enjoy them as it would not incentivise rival

⁸¹⁹ Sky’s response to the 2018 BCMR Consultation, paragraph 22.

⁸²⁰ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 1.8-1.9, 3.17-3.41, 5.16-5.17

⁸²¹ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 1.11

⁸²² TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 1.6, 1.11 and 3.6.

⁸²³ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 5.38-5.42

⁸²⁴ PAG’s response to the 2018 BCMR consultation, paragraph 9.

⁸²⁵ Telefónica’s response to the 2018 BCMR Consultation, page 9, Q13.1.

⁸²⁶ Telefónica’s response to the 2018 BCMR Consultation, page 9, Q13.1.

⁸²⁷ Virgin Media’s response to the 2018 PIMR Consultation, page 21.

⁸²⁸ CityFibre’s response to the 2018 BCMR and 2018 BT RFR Consultations, pages 13 – 21 paragraph 9.2.1.

⁸²⁹ Zayo’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, section 5, page 13- 18.

⁸³⁰ CityFibre’s response to the 2018 BCMR and 2018 BT RFR Consultations, pages 17 – 19, paragraphs 9.2 – 9.2.13.

⁸³¹ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 3.35.

⁸³² TalkTalk’s response to the 2018 BCMR Consultation, paragraph 5.5.1.

⁸³³ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraphs 6.29 and 6.62 – 6.68.

⁸³⁴ Sky’s response to the 2018 BCMR Consultation, paragraph 19.

investment. TalkTalk argued that we should ensure excess profit is used to generate consumer benefits, for example by reducing the prices of other regulated products.⁸³⁵

10.70 TalkTalk further argued that our proposed change of approach from a cost-based charge control to flat pricing would reduce, rather than increase, levels of certainty and stability in leased line regulation.⁸³⁶ However, other respondents such as SSE⁸³⁷ agreed that our approach would allow for pricing stability.

10.71 A number of providers expressed concerns about our approach to remedies, in particular the charge control, in HNR areas. Telefónica argued against our proposal to have lighter regulation in HNR areas, noting that it relies heavily on Openreach-supplied active services throughout the UK.⁸³⁸ UKCTA⁸³⁹ and Telefónica⁸⁴⁰ also argued that we should impose a cost-based charge control in all areas of the CI Access services market in which BT has SMP. Colt⁸⁴¹ argued that our approach of keeping prices flat relies excessively on prospective competition enabled by unrestricted PIA. It argues that the “relaxation” of price controls on active products is premature. Three⁸⁴² argued we should extend our proposed safeguard cap into HNR areas. Similarly, and related to their concern about our market analysis, CityFibre⁸⁴³, IIG⁸⁴⁴ and Zayo⁸⁴⁵ expressed concerns about premature deregulation in this area and in particular about the lack of a charge control in HNR areas.

Our reasoning and decisions

10.72 We have decided to impose regulation of active services as set out in our consultation. Our decision is set out in further detail in Section 13.

10.73 We have also decided to impose price controls for all active services. We have set a price cap at current prices for services at all bandwidths, in all the markets in which we find BT has SMP except HNR areas of the CI Access services market, where we consider a fair and reasonable charging obligation addresses our competition concerns. Our decision to impose a fair and reasonable charging obligation in HNR areas of the CI Access market is set out in Section 11. Our decision to impose a price cap at current prices in all other markets in which BT has SMP is set out in Section 13, and the details of how we set the cap and associated basket design are set out in Volume 3.

10.74 The requirement to provide active services is designed to address the competition concerns we have identified in the business connectivity markets. Specifically, it is designed to address our concern that in the absence of *ex ante* regulation BT would have the incentive and ability to refuse to provide access to its network or not provide access on

⁸³⁵ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 5.51.

⁸³⁶ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 3.42 – 3.45.

⁸³⁷ SSE’s response to the 2018 BCMR Consultation, page 14, response to question 2.1.

⁸³⁸ Telefónica’s response to the 2018 BCMR Consultation, p 7.

⁸³⁹ UKCTA’s response to the 2018 BCMR Consultation, paragraph 27.

⁸⁴⁰ Telefónica’s response to the 2018 BCMR Consultation, paragraph 25.

⁸⁴¹ Colt’s response to the 2018 PIMR and 2018 BCMR Consultations, page 2.

⁸⁴² Three’s response to the 2018 BCMR Consultation, paragraphs 12.1 – 12.4.

⁸⁴³ CityFibre’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 2.1.6.

⁸⁴⁴ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 7.5.3 - 7.5.4.

⁸⁴⁵ Zayo’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraphs 4.1.34 – 4.1.36.

terms that would secure efficient investment and innovation, both in the relevant wholesale markets and the related downstream retail markets.

10.75 We disagree with TalkTalk’s assessment that our approach will weaken downstream competition. Our active remedies are designed to protect access seekers from the effects of BT’s market power. Access seekers in the business connectivity market are dependent on BT’s wholesale services:

- to compete in downstream markets for business connectivity services; and
- to connect between BT exchanges in order to access competitive backhaul.

10.76 We expect that our strategy will result in the emergence of greater competition over the review period and beyond as providers build and invest in new networks. Our active remedies will ensure that access seekers are still able to purchase the services they rely on while this competition develops enabled by our passive remedies (unrestricted PIA and dark fibre).

10.77 As discussed earlier in this section, our active remedies vary by market depending on the degree of competition. We distinguish between:

- those parts of the CI Access services market where there is some competition but where we nevertheless consider BT has SMP, namely the Metro Areas and other High Network Reach areas;
- those parts of the CI Access services market where there is limited or no current infrastructure competition (BT Only and BT+1 areas); and
- the CI Inter-exchange connectivity market, at all exchanges where BT has SMP (BT Only and BT+1).

10.78 In those areas of the CI Access services market where there is already some competition (and where we expect unrestricted PIA may be used for infill during the review period), we have imposed the following lighter remedies:

- a requirement to provide network access at fair and reasonable charges, rather than a charge control; and
- a requirement to report on actual performance through quality of service KPIs, but we are not setting quality of service standards.

10.79 We consider that, in the context of the competition that already exists or which we expect to develop over the period of the review (the threat of which also provides a constraint on BT even before it materialises), these remedies are sufficient to address our competition concerns.

10.80 Where there is currently limited or no competition, we consider more regulation – including stronger price controls – is needed to address the competition concerns we have identified. We are also retaining quality of service standards as well as KPI reporting of actual performance against those standards.

Our approach to pricing incentivises investment in line with our strategy

- 10.81 When designing our remedies, we balance a range of considerations and duties, some of which may point in different directions. The approach we take to remedies depends on specific circumstances in the market. In this review, as explained above, we are working to promote network-based competition, in line with our duties, by securing investment in fibre networks. We are also providing an appropriate level of protection for access seekers who rely on wholesale products from Openreach.
- 10.82 Where we are imposing a price cap, this will apply to active services at all bandwidths. However, as we explained in our consultation, our approach to pricing reflects the specific concerns we have relating to services at different bandwidths. For services at 1 Gbit/s and below, we are prioritising investor confidence in current and planned investments over the static benefits of keeping prices tightly aligned to costs, while ensuring BT cannot use its market power to set excessive prices. For VHB services, our approach addresses the same trade-off and addresses the risk that BT would increase prices in areas with limited or no competition to fund price reductions in more competitive areas (or where it considers rivals may build). This concern is borne out by Openreach’s response to our consultation where it argued that in order to compete in the market for high bandwidth services it needed the flexibility to define solutions including varying pricing by geographic area.⁸⁴⁶ As we explain in Section 13, while some differentiation may be reasonable (e.g. to reflect cost differences), we would be concerned if price cuts in more competitive areas were funded by higher prices in less competitive areas. We have deliberately imposed regulations which restrict Openreach’s ability and incentive to price strategically in this way.
- 10.83 TalkTalk and Vodafone argued for a cost-based charge control, on the basis that there would be immediate harm to consumers if prices were higher. However, we do not consider that a cost-based charge control would lead to a better outcome for consumers. While consumers may gain in the short term by paying lower prices, we consider their interests are best served in the long term by network-based competition and the dynamic price, innovation and quality of service benefits it can bring. Contrary to TalkTalk’s views, we consider these benefits arise even where comparable leased line services are already available from Openreach.
- 10.84 In the wholesale local access market, we successfully encouraged investment in standard broadband with a pricing strategy that allowed new entrants to compete with BT. This approach resulted in widespread investment in MPF equipment, and flourishing retail competition. Consumers benefitted from lower prices, improved choice and innovation. In contrast, continuing to reduce prices in line with BT’s costs risks impeding the development of such infrastructure-based competition, by undermining investments which have occurred to date (based on current price levels) as well as incentives for further investment. For example, our analysis suggests that incentives to undertake network extensions, measured as the distance that providers are willing to build networks to

⁸⁴⁶ Openreach response to 2018 BCMR Consultation, paragraphs 20-27, pages 8-9.

connect to a new site⁸⁴⁷ are limited (see Annex 11 for our analysis). Bringing the price of active products down to tightly reflect BT's costs would reduce them further, particularly given that rival infrastructure builders may in some circumstances have higher costs than Openreach.

- 10.85 We recognise that there are a number of factors that can affect investment incentives (as noted by TalkTalk) and that pricing is only one of these. However, in determining the appropriate regulation for this one factor (pricing), it is important it is set consistently with providing incentives for investment. Our strategy places greater emphasis on investor confidence in current and planned investments. Regulating prices tightly to BT's costs would not be consistent with this objective. This inconsistency would harm investor confidence.
- 10.86 In addition, the impact of unrestricted PIA on BT's volumes is currently uncertain, but to the extent rival investment increases there could be an impact on BT's costs. As such, it is also uncertain what a cost-based price path could look like in the medium term, and this variability and uncertainty can also weaken incentives for investment.
- 10.87 Instead, we think flat pricing of active remedies provides a sufficient degree of protection for access-based competition and good incentives for alternative infrastructure investment. This is because our approach provides certainty and stability in prices over this review period which is important for incentives for rival investment; we do not agree with TalkTalk that our approach reduces certainty and stability. It also provides scope for some prices which include an additional margin over and above BT's costs, which may further help facilitate rival investment. For these reasons, overall, we disagree with TalkTalk's view that our approach is unlikely to lead to increased investment in leased lines relative to a cost-based approach. In line with the strategy we set out in 2016, our approach has changed from previous market reviews, and we are now putting more weight on promoting network-based competition.⁸⁴⁸
- 10.88 Our approach also provides important protection for consumers as networks are built and greater competition emerges. It prevents an increase in price levels for these services overall (subject to sub-basket caps for individual services).
- 10.89 Furthermore, in relation to 1 Gbit/s and below services, we note these were subject to cost-based charge controls until 31 March 2019, so our approach is unlikely to result in prices for these services that are significantly out of line with cost overall. This is supported by our charge control cost modelling which places our approach within the illustrative range of outcomes under a cost-based approach.
- 10.90 We consider it would be inappropriate to bring prices for VHB services down to cost as argued by TalkTalk, PAG, and Telefónica. This would reduce the ability for operators to compete for these high-value connections and for the increasing number of new customers of these high capacity services. The potential to win high value services can be

⁸⁴⁷ In 2017 close to 80% of network extensions involved a distance of 50 metres or less.

⁸⁴⁸ Ofcom, 2016, Strategic Review of Digital Communications

https://www.ofcom.org.uk/data/assets/pdf_file/0016/50416/dcr-statement.pdf [accessed 22 May 2019].

important in supporting investment. In addition, the introduction of unrestricted PIA will enable competition and incentivise investment, the threat of which we expect will provide some further constraint on prices in this market (even where actual take up is limited within the review period).

- 10.91 We consider that the risk of over-recovery articulated by Vodafone and TalkTalk is outweighed by the risk posed by over-regulation, which could undermine competition and rival investment, and the material consumer benefits this investment has the potential to deliver. This is particularly true given that our analysis suggests any over-recovery from 1Gbit/s and below active services (which make up the majority of leased lines) would be relatively limited over the short duration of this review.⁸⁴⁹ Therefore, on balance, we think it is the proportionate approach to implement a price control which provides reasonable protection for consumers while limiting risk to investment incentives.
- 10.92 We disagree with TalkTalk’s suggestion that “excess profit” should be used to reduce the prices of other regulated products. Our approach in setting charge controls is to ensure that prices are at an appropriate level, based on our objectives in the markets in question. Adjusting the prices of other products as suggested by TalkTalk would have implications for markets outside the scope of this review.
- 10.93 Some stakeholders such as Vodafone⁸⁵⁰, Sky⁸⁵¹, TalkTalk⁸⁵², UKCTA⁸⁵³, and PAG⁸⁵⁴ also argued that we should have done a Cost Benefit Analysis on our pricing proposals. Vodafone also argued that we were incorrect to place greatest weight on price stability and regulatory certainty, and the right approach was to balance our substantive duties.⁸⁵⁵ We have set out in this section how we reached our decisions on appropriate price controls in the business connectivity markets, and why we consider that the benefits of our approach outweigh the cost of possible higher prices in the short term. In the context of this review, we do not consider that a fully costed CBA would yield meaningful results beyond the analysis we have already conducted. In Volume 3 we assess the broad implications of our pricing approach to 1 Gbit/s and below services and estimate a range of outcomes from some loss to BT to an over-recovery of costs, with modest over-recovery being the more likely outcome. However, we have also noted a number of cost impacts on Openreach that we have not specifically modelled that will reduce this estimate further.
- 10.94 Our experience from other markets shows that investment and the introduction of upstream competition from where it exists at a point in time leads to substantial consumer benefits in terms of lower prices, choice and innovation, the latter two being inherently hard to quantify. Furthermore, we would need to make extensive assumptions on how to transpose our experience from other markets to business connectivity in terms of the

⁸⁴⁹ Annex 18 of Volume 3 sets out our approach to modelling costs of active services at 1 Gbit/s and below.

⁸⁵⁰ Vodafone’s response to the 2018 BCMR Consultation, part 1, paragraph 1.12, and part 3, paragraph 6.58.

⁸⁵¹ Sky’s response to the 2018 BCMR Consultation, paragraph 21.

⁸⁵² TalkTalk’s response to the 2018 BCMR Consultation, paragraph 3.11.

⁸⁵³ UKCTA’s response to the 2018 BCMR Consultation, paragraph 15.

⁸⁵⁴ PAG’s response to the 2018 BCMR consultation, paragraph 24.

⁸⁵⁵ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraphs 6.5-6.10

timescale and benefits of this investment, particularly as business and residential services continue to merge.

- 10.95 As we have explained above, our regulation strikes a balance between maximising incentives to invest and limiting the short-term pricing impacts on BT's customers. We consider that by keeping prices flat we have addressed our competition concern that BT could charge excessive prices, and our longer-term goal of promoting network competition. Those operators that are investing in building their own networks support our approach.
- 10.96 This balance reflects our duties, which include furthering the interests of consumers in relevant markets, where appropriate by promoting competition, as well as the regulatory objectives reflected in the EU regulatory framework. We consider our remedies are consistent with our statutory duties. For example, we believe our price cap at current prices creates the conditions for competition to increase (which ultimately benefits consumers) and ensures that competition is effective and fair (by preventing BT from raising prices in areas where it faces less competition).
- 10.97 Our proposed remedies must satisfy certain legal tests, including that they be objectively justifiable, proportionate, transparent, and (in respect of price controls) that they are appropriate for promoting sustainable competition and conferring the greatest possible benefits on end-users. In Section 11 (with respect to fair and reasonable charging) and Volume 3 (with respect to the charge control at current prices) we have set out how our pricing decisions meet these tests in detail. For the reasons set out above we did not consider it necessary or proportionate to do a fully quantified CBA.
- 10.98 We address CityFibre's comments about downstream effects of BT's market power in mobile backhaul services in Annex 9 and its more general concern about the competitive outcomes from the structure of Openreach below.

Quality of service

Proposals

- 10.99 In our consultation we proposed to set obligations requiring BT to:
- Meet certain standards for provisioning and repair (similar to the standards we set in the 2016 BCMR with a few limited changes).
 - Provide data in relation to specified Key Performance Indicators (KPIs).
- 10.100 We proposed to vary the level of QoS regulation by geographic market – applying QoS standards in the CI Access services market in BT Only and BT+1 areas, and in the CI Inter-exchange connectivity markets on routes from BT Only and BT+1 exchanges. Dark fibre was included in the scope of our proposed QoS obligation from 1 April 2020 (the start of the second year of the review). We proposed not to apply QoS standards in more competitive areas.
- 10.101 We also proposed that Openreach should continue to be required to have certain SLAs and SLGs for provision and repair of Ethernet services.

Stakeholder comments

10.102 A small number of respondents commented on our overall approach to QoS standards. Openreach argued that it would not be proportionate to continue to tighten the targets as it argued that its customers are happy with current performance and are unlikely to want to pay for further improvements.⁸⁵⁶ TalkTalk⁸⁵⁷ and Vodafone⁸⁵⁸ supported our overall approach with the exception of our proposal not to impose QoS standards in HNR areas.⁸⁵⁹ TalkTalk also opposed our proposal to drop certain SLG obligations. The CWU argued that QoS performance by Openreach can and should continue to improve, and noted the importance of ensuring that Openreach had sufficient resources available to support improved service levels.⁸⁶⁰

Our reasoning and decisions

- 10.103 Our decisions on QoS remedies remain broadly the same as our consultation proposals, although we have made some changes in light of consultation responses and new evidence. These decisions and our reasoning are set out in detail in Section 15.
- 10.104 To address the competition concern that, in the absence of *ex ante* regulation, Openreach would have incentives to degrade QoS for Ethernet provisioning and repair, we first imposed QoS standards on Ethernet in 2016.
- 10.105 As part of this review, we have decided to put in place a package of QoS remedies, including QoS standards on provisioning and repair, similar to the framework developed in the 2016 BCMR and re-imposed in the Temporary Conditions. Openreach's provisioning performance has improved significantly since 2016, and we consider that maintenance of this better service, alongside further improvement on the certainty of delivery dates and in the handling of the most complex 'tail' orders, will meet business customer needs and expectations. We have also included dark fibre in the scope of our QoS obligation from 1 April 2020 (the start of the second year of the review).
- 10.106 We are also enhancing the transparency of Openreach's performance through a revised suite of KPIs and updating our requirements on Service Level Agreements and Guarantees.

Insufficiency of national and EU competition law

10.107 Under Article 8(2) of the Access Directive, where we designate an operator as having SMP in a specific market, we are required to impose remedies. However, in considering the imposition of remedies, we take into account the potential application of competition law. To do this we have considered whether competition law, in particular the rules prohibiting

⁸⁵⁶ Openreach's response to the 2018 BCMR Consultation (quality of service), page 6, paragraph 8, page 7, paragraph 14.

⁸⁵⁷ TalkTalk's response to the 2018 BCMR Consultation, paragraph 6.3.

⁸⁵⁸ Vodafone's response to the 2018 BCMR Consultation, part 3, paragraph 7.6.

⁸⁵⁹ Our response to this point is set out in Section 15.

⁸⁶⁰ CWU's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 9-12.

the abuse of a dominant position, would be effective in responding to the competition concerns identified above.

- 10.108 First, we have taken account of the fact that the products in the wholesale markets we have identified are inputs into other downstream markets. Appropriate *ex ante* intervention at the upstream level can promote effective competition in downstream markets. It can also facilitate the emergence of effective competition at the upstream level itself. Competition law, insofar as is relevant, prohibits the abuse of a dominant position – it does not seek to promote competition, which is one of the aims of our package of *ex ante* remedies.
- 10.109 Second, the requirement to address the competition problems in each of the markets in which we find SMP means imposing an interconnected and complex package of remedies, including provisions to ensure that they remain effective for the duration of the review period.
- 10.110 Third, we consider it is important to provide sufficient certainty about the rules applying to the dominant provider in the wholesale leased lines markets. We consider this certainty is best achieved through *ex ante* regulation. *Ex ante* regulation will also allow for timely intervention by us proactively enforcing the conditions and, if necessary, by parties bringing regulatory disputes to us for swift resolution.
- 10.111 We have therefore concluded that, in the current and expected circumstances of the relevant leased lines markets over the review period, competition law alone would be insufficient to address the competition problems we have identified. We explain in our assessment of our individual remedy proposals where we consider there are particular additional relevant points relating to the sufficiency of competition law.

Openreach separation and BT's Commitments

- 10.112 On 10 March 2017, BT notified Ofcom of voluntary commitments (the Commitments) to reform Openreach under section 89C of the Communications Act 2003 (Notification).⁸⁶¹ These Commitments meant Openreach would become a distinct company with its own staff, management, purpose and strategy. On 31 October 2018, we released BT from its 2015 Undertakings, in accordance with our July 2017 decision⁸⁶², as the new Commitments were fully in place. We consider that the new arrangements provide Openreach with significantly more independence to take its own decisions about the strategic direction and operation of the network, acting with a clear focus on the equal treatment of all its customers, not just the needs of BT Group.
- 10.113 We said in our July 2017 Statement that the Commitments are (like the Undertakings before them) designed to operate alongside Ofcom's regulation of BT's SMP in individual product markets and that we would therefore consider the effect, if any, of the new

⁸⁶¹ BT 2017, Proposals agreed with Ofcom. <https://www.btplc.com/UKDigitalFuture/Agreed/index.htm> [accessed 30 October 2018].

⁸⁶² Ofcom, 2017. [*Delivering a more independent Openreach*](#) (July 2017 Statement), [accessed 12 May 2019].

arrangements (as set out in the Commitments) on our SMP regulation as part of our market reviews.⁸⁶³

- 10.114 We have considered our competition concerns and imposed remedies in relation to the business connectivity markets, taking into account the Commitments. We have found that BT has SMP in certain markets for CI Inter-exchange connectivity and CI Access services which are important inputs for telecoms providers downstream. BT and Openreach remain in common ownership and BT retains control over the capital expenditure decisions and pricing of its products that exist outside of Openreach. While the Commitments increase the independence of Openreach and require equal treatment of its customers, BT (as a whole) retains the incentive and ability to favour its downstream divisions. We therefore consider that appropriate and proportionate SMP regulation will complement BT's Commitments, as it did in the case of the 2005 Undertakings that preceded them. The detailed regulatory decisions that follow in this document reflect this position.
- 10.115 Zayo⁸⁶⁴ and City Fibre raised concerns that Openreach may become the provider of PIA, dark fibre, and active inter-exchange connectivity circuits all in the same market and the same geographic areas. In particular, it argued that if Openreach is selling dark fibre or active services in competition with its own customers it has incentives to discriminate against those firms (the same incentives that Separation was designed to address).⁸⁶⁵
- 10.116 We have addressed Zayo's and CityFibre's general concern about the structure of Openreach in Volume 1.⁸⁶⁶ We recognise these stakeholders' concerns about incentives to discriminate within Openreach. This is why we have put in place no undue discrimination and Equivalence of Inputs obligations, which are designed to prevent such discrimination in the provision of network access. These obligations are set out in Section 11.

⁸⁶³ July 2017 Statement, paragraphs 7.11-7.15.

⁸⁶⁴ Zayo's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 4.1.4 – 4.1.8

⁸⁶⁵ CityFibre's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.1.4.

⁸⁶⁶ Volume 1, Section 3.

11. General remedies

- 11.1 This section sets out our general remedies for the markets in which we have identified BT as having SMP, which are:
- CI Access services at all bandwidths in the UK excluding the Central London Area and the Hull Area, which we discuss in Section 6;⁸⁶⁷ and
 - CI Inter-exchange circuits at all bandwidths at non-competitive BT exchanges, which we discuss in Section 7.
- 11.2 By general remedies, we mean the key remedy of requiring BT to provide network access, and other remedies that support and make network access effective. The general remedies being imposed are designed to address the competition concerns that we have identified in our market analysis associated with our SMP findings, as discussed in our Approach to remedies in Section 10.
- 11.3 The general remedies we have decided to impose are those we proposed in our consultation and apply in all the markets in which we have identified BT as having SMP. They are:⁸⁶⁸
- Requirement to provide network access on reasonable request;
 - Requirements relating to requests for new forms of network access;
 - Requirement not to discriminate unduly including equivalence of inputs (EOI);⁸⁶⁹
 - Requirement to publish a Reference Offer;
 - Requirement to notify technical information;
 - Cost accounting; and
 - Accounting separation.
- 11.4 Stakeholders were generally supportive of our approach⁸⁷⁰, but raised the following issues which we address in this section:
- TalkTalk⁸⁷¹ expressed concern that in HNR areas, ancillary services are only subject to a fair and reasonable charges obligation, and argued the guidance on fair and reasonable charges may be insufficient given ancillary services are not bought on a standalone basis;

⁸⁶⁷ In Section 5 we defined a number of geographic markets for CI Access services. In Section 6 we found BT to have SMP in the supply of CI Access services in the UK, excluding the CLA and the Hull Area.

⁸⁶⁸ Network access is defined in section 151(3) of the Act as including interconnection services and/or any services or facilities that would enable another provider to provide electronic communications services or electronic communications networks. Therefore, a requirement to provide network access would include any ancillary services as may be reasonably necessary for a third party to use the services. Consequently, the remedies we have imposed in this section would also apply to the accommodation and interconnection services that BT provides in connection with wholesale services in each of these markets. We propose additional remedies for accommodation and interconnection services in Section 14.

⁸⁶⁹ Under an EOI requirement, the inputs available to all providers (including the SMP provider's own downstream divisions) are provided on an equivalent basis.

⁸⁷⁰ Responses to 2018 PIMR and BCMR Consultations from: BT Group, paragraphs 4.2 and 4.10; CityFibre, paragraph 2.1.5; Colt; CWU; IIG, section 7, page 19; Openreach, section 4, pages 28-33; Sorrento Networks, page 8; SSE, page 8; TalkTalk, section 7; Virgin Media, page 15; Vodafone, section 3, paragraph 6.14; Zayo, paragraph 3.1.3.

⁸⁷¹ TalkTalk response to 2018 BCMR Consultation, paragraph 7.2.

- TalkTalk⁸⁷² argued that migration charges for active products should be regulated within the charge control to prevent providers becoming stranded with lower bandwidth services and argued fair and reasonable charges obligation offered little protection from excessive charges;
- [X] ⁸⁷³ questioned our assessment of Openreach’s improved performance managing its Statement of Requirements (SoRs) process, and it argued that regulations need to be effective in relation to requests for new forms of network access as risks of undue delay remain;
- TalkTalk⁸⁷⁴ argued that our proposed EOI requirements are not strong enough in relation to the provision of access to dark fibre in that they are not supported by a ‘must-use’ requirement on downstream BT;
- BT Group⁸⁷⁵ and Openreach⁸⁷⁶ argued that our proposed EOI requirements are unjustified and/or disproportionate when applied in HNR areas based on levels of competition for VHB connections in those markets;
- SSE⁸⁷⁷ submitted that the notification periods in relation to Openreach introducing and subsequently extending Special Offers needed to be consistent (set at 28 days) and the provisions ought to prevent BT gaining an advantage through use of Special Offers during the notification period in relation to a competitive bid process.

11.5 For each general remedy, we set out below our consultation proposals, a summary of the key stakeholder responses, and our reasoning and decisions.

Requirement to provide network access on reasonable request

Our proposals

- 11.6 We proposed an SMP condition requiring BT to provide network access where a third party reasonably requests it.
- 11.7 The proposed obligation included a requirement to provide such network access on fair and reasonable terms and conditions, and at fair and reasonable charges except where a charge control or basis of charges obligation applies.⁸⁷⁸ The proposed fair and reasonable charging element would apply differently in different areas, to reflect variations in competitive conditions. In HNR areas of the CI Access market, we said a fair and reasonable charging obligation alone is sufficient to address our competition concerns. In other areas of the CI Access market, and in the CI Inter-exchange connectivity market at exchanges where BT has SMP, we said that the fair and reasonable charges obligation would provide a

⁸⁷² TalkTalk response to 2018 BCMR Consultation, paragraph 7.5.

⁸⁷³ [X] confidential response to 2018 BCMR Consultation, [X].

⁸⁷⁴ TalkTalk response to 2018 BCMR Consultation, paragraph 4.78-4.80.

⁸⁷⁵ BT Group’s response to 2018 BCMR Consultation, paragraph 1.16

⁸⁷⁶ Openreach response to 2018 BCMR Consultation, pages 7-8, paragraph 17

⁸⁷⁷ SSE’s response to 2018 BCMR Consultation, page 8

⁸⁷⁸ We propose that some ECC charges are subject to a basis of charges obligation. See Section 13.

backstop for new services that are introduced after the start of a charge control, or where a charge control expires.

- 11.8 We proposed that our general remedies would also apply to accommodation and interconnection services, for dark fibre access as well as active services.

Stakeholder responses

- 11.9 Stakeholders who commented on this issue broadly supported the proposed remedy.⁸⁷⁹
- 11.10 TalkTalk indicated there was a clear need for an effective remedy for provision of access on reasonable request.⁸⁸⁰ It acknowledged regulations are effective where there is a charge control, and highlighted for the areas where the charge control does not apply that the fair and reasonable charge obligation is necessary.
- 11.11 TalkTalk noted we had proposed the same fair and reasonable charge obligations for network access and for ancillary services. TalkTalk stated “whilst this might be adequate for products such as EAD rental charges which account for a large part of an end user charge, they are not useful in respect of ancillary charges which are not charged separately and instead make up a small part of the overall costs of a circuit (e.g. cablelink charges, multicast charges).”⁸⁸¹ TalkTalk suggested further protection against excessive charges could be achieved with guidance relating to fair and reasonable charges for ancillary services based on FAC.⁸⁸²
- 11.12 BT Group⁸⁸³ and Openreach⁸⁸⁴ both acknowledged the need for a network access obligation on reasonable request and emphasised the need for such an obligation to be targeted at protecting customer interests. BT Group stated the regulations need to “ensure that Openreach can compete fairly as competition ramps up” to facilitate competition in downstream markets.⁸⁸⁵

Our reasoning and decisions

- 11.13 We have decided to impose on BT a requirement to provide network access on reasonable request, as proposed in our consultation. This obligation is appropriate and proportionate in relation to BT’s market power in each of the business connectivity markets. It will facilitate and encourage access to BT’s networks and therefore promote competition to the benefit of consumers.
- 11.14 As our market analysis in previous sections shows, the level of investment required by a third party to replicate BT’s network and build sufficiently large networks to compete, and

⁸⁷⁹ Responses to 2018 PIMR and BCMR Consultations from: BT Group, paragraphs 4.2 and 4.10; Cityfibre, paragraph 2.1.5; Colt; CWU; IIG, section 7, page 19; Openreach, section 4, pages 28-33; Sorrento Networks, page 8; SSE, page 8; TalkTalk, section 7; Virgin Media, page 15; Vodafone, section 3, paragraph 6.14; Zayo, paragraph 3.1.3.

⁸⁸⁰ TalkTalk response to 2018 BCMR Consultation, section 7

⁸⁸¹ TalkTalk response to 2018 BCMR Consultation, paragraph 7.2

⁸⁸² TalkTalk confidential response to 2018 BCMR Consultation, paragraph 7.2 (partially redacted)

⁸⁸³ BT Group response to 2018 BCMR Consultation, section 4

⁸⁸⁴ Openreach response to 2018 BCMR Consultation, section 4, page 29, paragraph 136

⁸⁸⁵ BT Group response to 2018 BCMR Consultation, paragraph 4.6

the time it would take to do this, are significant barriers to entry. To allow development of diverse and innovative network infrastructure, it is our view that dominant providers must make network access available to third parties on reasonable request. This is fundamental to promoting competition in downstream markets. We consider that, in the absence of such a requirement, BT would have the incentive and ability to refuse access at the wholesale level thereby favouring its own retail operations. This would hinder sustainable competition in the corresponding downstream markets, ultimately against the end-user's interests.

- 11.15 We consider that for each market in which we find BT to have SMP there is a risk that BT might fix or maintain some or all of its prices for network access at an excessively high level or impose a price squeeze in relation to such access so as to have adverse consequences for consumers.
- 11.16 In the CI Access services market, in the HNR areas including Metro Areas, given that the relatively greater degree of and scope for competition in these areas means that a charge control would not be appropriate, we believe a fair and reasonable charging obligation is sufficient to address our competition concern.
- 11.17 In the markets where we have decided to impose charge controls in the form of a cap at current prices, there is a residual risk that in the absence of a charge control – i.e. for new services that are introduced after the start of a charge control, or where a charge control expires – BT's market power would give it the ability and incentive to impose a margin squeeze or set excessively high prices.⁸⁸⁶ We have decided to impose a fair and reasonable charging obligation to act as a backstop in these markets.
- 11.18 Our general position is that we would interpret this fair and reasonable pricing obligation to mean that BT should not set prices that result in a price squeeze under *ex post* competition law. We would therefore adopt an approach to the evaluation of costs and margins consistent with the margin squeeze test. This provision would enable us to intervene more quickly where charges are not fair and reasonable than if we relied solely on *ex post* competition law.
- 11.19 We have decided this SMP condition will include the power for Ofcom to make directions in order that we can secure the supply of services and, where appropriate, fairness and reasonableness in the terms, conditions and charges for providing third parties with network access. The condition requires BT to comply with any such direction(s), so any contravention of a direction would constitute a contravention of the condition itself and could therefore be subject to enforcement action.
- 11.20 In addition to this general network access remedy, we have decided to impose specific access remedies as explained in Sections 12 and 13.
- 11.21 We have decided to adopt our proposals that our general remedies will also apply to interconnection and accommodation services, for dark fibre as well as active services. Consequently, BT will be required to meet reasonable requests for accommodation and

⁸⁸⁶ These considerations are applicable to ancillary services and associated charges.

interconnection services under the general network access obligation that we are imposing for each of these markets.

- 11.22 In response to TalkTalk’s concerns⁸⁸⁷ relating to an effective access remedy associated with ancillary services, including appropriate pricing arrangements in areas where our charge control does not apply, we have considered the possibility of adopting guidance relating to FAC. However, a margin as low as 10-20%⁸⁸⁸ may not be appropriate in all circumstances given the levels of competition that have been identified in such areas leading to a decision not to apply a charge control. Any guidance based on FAC yet offering wider flexibility to reflect levels of competition may be counter-productive and not address TalkTalk’s concerns.
- 11.23 In more competitive markets, we do not consider it would be appropriate to impose a charge control on ancillary services in isolation, where we have concluded that a charge control for active services themselves is not necessary. For clarity as to fair and reasonable charges, our position is that such pricing for ancillary services would be assessed based on analogous charges identified for regulated products (such as Cablelink charges and Synchronous Ethernet (SyncE) functionality), taking account of any clear reasons to deviate from prices applicable under a charge control.
- 11.24 This guidance applies in relation to any migration charges attached to products as an ancillary service to respond to TalkTalk’s concerns relating to excessive charges preventing providers from switching from lower bandwidth products to other services⁸⁸⁹ as prices and / or business strategies vary over time.

The BEREC Common Position

- 11.25 We have taken utmost account of the BEREC Common Position in reaching our decisions discussed above, including BP5 and BP36 which appear to us to be particularly relevant in this context.⁸⁹⁰ We consider that our decision is consistent with the best practice set out in the BEREC Common Position.

Conclusion

- 11.26 In order to implement these decisions, we set SMP Condition 1 published at Annex 26.⁸⁹¹ Section 87(1) of the Act, provides that, where we have made a determination that a person (here BT) has SMP in an identified services market, we shall set such SMP conditions authorised by that section as we consider appropriate to apply to that dominant provider in respect of the relevant network or relevant facilities and apply those conditions to that person.

⁸⁸⁷ TalkTalk’s confidential response to 2018 BCMR Consultation, paragraph 7.2

⁸⁸⁸ As suggested within TalkTalk’s confidential response to 2018 BCMR Consultation, paragraph 7.2

⁸⁸⁹ Other services such as higher bandwidth services

⁸⁹⁰ BEREC, 2012, *BEREC common position on best practice in remedies imposed as a consequence of a position of significant market power in the relevant markets for wholesale leased lines* (BoR (12) 126) [accessed 22 May 2019].

⁸⁹¹ Schedule 3, Part 3.

- 11.27 Section 87(3) of the Act authorises Ofcom to set SMP services conditions requiring the dominant provider to provide such network access as Ofcom may from time to time direct. These conditions may, pursuant to Section 87(5), include provision for securing fairness and reasonableness in the way in which requests for network access are made and responded to and for securing that the obligations in the conditions are complied with within periods and at times required by or under the conditions. Section 87(9) of the Act also authorises SMP services conditions imposing on the dominant provider such rules as they may make in relation to matters connected with the provision of network access about the recovery of cost and cost orientation, subject to the conditions of Section 88 being satisfied.
- 11.28 In determining which conditions are authorised by Section 87(3) we must take into account, in particular, the factors set out in Section 87(4). In reaching our decision that BT should be subject to a requirement to provide network access on reasonable request, we have taken all these six factors into account. In particular, as set out in Section 10, we expect that our strategy will result in the emergence of greater competition over the review period and beyond as providers build and invest in new networks. However, we do not expect competition to develop quickly enough and on sufficient scale to affect our SMP finding in this review period. Therefore, we consider active remedies are necessary to ensure that access seekers are still able to purchase the services they rely on while this competition develops enabled by our passive remedies (unrestricted PIA and dark fibre). We consider this requirement is necessary for securing effective competition, including economically efficient infrastructure-based competition, in the long term.
- 11.29 The requirement for BT to only meet reasonable network access requests also ensures that due account is taken of the technical and economic viability of installing and using other facilities, the feasibility of the proposed network access, and of the investment made by BT initially in providing the network. For this reason, we consider that the requirement is proportionate.

Requests for new forms of network access

Our proposals

- 11.30 We proposed to re-introduce a requirement covering requests for new forms of network access, which aligned the 2019 BCMR requirements with those that currently apply in the WLA market. This was based on observed improvements in the time taken by Openreach to respond to and implement SoR requests, industry discussion of SoR issues, and improvements introduced by Openreach around the SoR process.⁸⁹² This proposal took account of stakeholder feedback in relation to the WLA consultation, as set out in the 2018 WLA Statement.

⁸⁹² 2018 WLA Statement, paragraphs 6.55-6.59.

11.31 Our proposals did not provide prescriptive timescales for managing requests for new forms of network access, which we recognised would give Openreach some flexibility when managing such requests through the SoR process. We stated that our ongoing monitoring of Openreach would equip us to review any issues that arise with the SoR process.⁸⁹³

Stakeholder responses

11.32 Stakeholders were generally supportive of the condition relating to requests for new forms of network access.⁸⁹⁴ No respondent to our consultation opposed the approach we proposed in relation to timescales for responding to new requests. However, [redacted]⁸⁹⁵ considered that timescales remained too long for both rejections of requests and delivery of accepted requests.

11.33 [redacted] suggested the dashboard⁸⁹⁶ supplied by Openreach could be improved further so realistic performance metrics can be analysed.⁸⁹⁷ It argued this would lead to greater accountability for Openreach and greater protection against discrimination based on Openreach's responsiveness to requests from providers other than downstream BT.

Our reasoning and decisions

11.34 We have decided to impose this condition as proposed in our consultation. We remain of the view that a requirement to have a process by which BT must address requests for new forms of network access is an appropriate and proportionate *ex ante* measure to complement the general network access requirement discussed above. It will support the network access and non-discrimination obligations in the processing of requests for new network access.

11.35 Vertically integrated telecoms providers have the ability and incentive to favour their own downstream business over third-party telecoms providers by differentiating on price or terms and conditions. Where a telecoms provider has SMP at the upstream level, such discrimination can harm competition in downstream markets. One form of discrimination is in relation to the handling of requests for new types of network access. This has the potential to distort competition at the retail level by placing third-party telecoms providers at a disadvantage compared with the downstream retail business of the vertically integrated provider with SMP. We consider BT is in this position in each of the markets in which we have found it to have SMP.

⁸⁹³ Ofcom, 2018. *Progress on delivering a more independent Openreach*.

https://www.ofcom.org.uk/data/assets/pdf_file/0019/114814/openreach-implementation-report-2018.pdf [accessed 30 October 2018].

⁸⁹⁴ Responses to 2018 PIMR and BCMR Consultations from: BT Group, paragraphs 4.2 and 4.10; Cityfibre, paragraph 2.1.5; Colt; CWU; IIG, section 7, page 19; Openreach, section 4, pages 28-33; Sorrento Networks, page 8; SSE, page 8; TalkTalk, section 7; Virgin Media, page 15; Vodafone, section 3, paragraph 6.14; Zayo, paragraph 3.1.3.

⁸⁹⁵ [redacted]'s confidential response to 2018 BCMR Consultation, [redacted].

⁸⁹⁶ The dashboard sets out information relating to ongoing and recently completed Statement of Requirements (SoRs) requests presented by Openreach to stakeholders to assist with tracking progress and providing transparency around Openreach activities.

⁸⁹⁷ [redacted]'s confidential response to 2018 BCMR Consultation, [redacted].

- 11.36 In particular, we have decided to impose a condition requiring BT to publish guidelines in relation to requests for new forms of network access (which must provide for BT to respond to these requests in a reasonable amount of time, have clear and transparent criteria to assess requests and to set out clear reasons for rejecting requests) and providing for power of direction to allow Ofcom to direct BT to make amendments to those guidelines.
- 11.37 We note [X]’s concerns about the timeliness and quality of outcomes from the SoR process. We note that the SoR process has recently been revised to include a high level of scrutiny by Openreach governance.⁸⁹⁸ We expect that Openreach will undertake this process more independently and transparently than before separation. Following the separation of Openreach from BT, the new arrangements are intended to provide Openreach with more independence to take its own decisions.⁸⁹⁹
- 11.38 While we do not yet have a large body of evidence to inform our view of the updated SoR process, we will continue to monitor the SoR process in terms of quality of outcomes and non-discrimination and are prepared to use direction powers if necessary to remedy any concerns we might have.
- 11.39 We consider the requirement we are imposing is proportionate because it only goes as far as is necessary to address our concerns. Rather than specifying the exact process that BT must follow, the condition we are imposing allows BT to implement its own process within certain parameters, and allows scope for industry to be involved in agreeing improvements. It also aligns with the process currently in place in the WLA market.

The BEREC Common Position

- 11.40 We have taken utmost account of the BEREC Common Position including BP6 which appears to us to be particularly relevant in this context. We consider that our decision is consistent with the best practice set out in the BEREC Common Position.

Conclusion

- 11.41 In order to implement this decision, we will set SMP Condition 1 (published at Annex 26).⁹⁰⁰ Section 87(5) allows Ofcom to implement SMP services conditions securing fairness and reasonableness in the way in which requests for network access are made and responded to, and for securing that the obligations in the conditions are complied with within periods and at the times required by or under the conditions.
- 11.42 In adopting this condition, we have also taken into account the factors set out in section 87(4) of the Act. In particular, we consider that the SMP condition specifying how BT

⁸⁹⁸ See Openreach response to 2018 BCMR Consultation, page 32, paragraph 149; update announced by Openreach on 5 March 2018:

<https://www.openreach.co.uk/orpg/home/updates/briefings/generalbriefings/generalbriefingsarticles/gen01018.do>

⁸⁹⁹ Ofcom, 15 November 2018, *Delivering a more independent Openreach – Interim monitoring update*, https://www.ofcom.org.uk/data/assets/pdf_file/0034/126799/Delivering-a-more-independent-Openreach-Interim-monitoring-update.pdf [accessed 22 May 2019].

⁹⁰⁰ Schedule 3, Part 3.

should handle requests for new network access is required to ensure that BT does not discriminate in favour of its own downstream business. The condition achieves this by:

- requiring BT to publish reasonable guidelines specifying the required content and form of requests for new network access and how they will be handled;
- requiring BT to provide sufficient technical information to enable other providers to draft product specifications that are efficient, and which satisfy the reasonable requirements; and
- specifying a set of principles, including the need for reasonable timescales at each stage of the process and that changes to the guidelines are made only after they are agreed between BT and other providers.

No undue discrimination and equivalence of inputs basis (EOI)

Our proposals

- 11.43 Given that we proposed to impose on BT a requirement to provide network access, we proposed a no undue discrimination obligation as a complementary remedy, principally to prevent BT from discriminating in favour of its own downstream operations and to ensure that competing providers are placed in an equivalent position. The proposed condition applies to all services, including dark fibre as well as active circuits, in the wholesale leased lines markets in which we proposed BT has SMP.
- 11.44 For wholesale leased lines markets, we considered there is an incentive, and ability, for BT to engage in discriminatory practices to include provision of services using different processes or systems for product development, delivery, maintenance and repair. Therefore, we also proposed to impose on BT an EOI requirement. However, this did not require BT to offer wholesale WDM circuits on a fully EOI basis given the varied take up and use of such technology already seen in the markets.
- 11.45 While we proposed the EOI requirement should apply to BT when providing access to dark fibre in the inter-exchange connectivity market, we proposed BT would not be required to consume a dark fibre product in providing active services (a “must-use” requirement).

Stakeholder responses

- 11.46 Stakeholders were generally supportive of our proposed no undue discrimination obligation.⁹⁰¹

⁹⁰¹ Responses to 2018 PIMR and BCMR Consultations from: BT Group, paragraphs 4.2 and 4.10; Cityfibre, paragraph 2.1.5; Colt; CWU; IIG, section 7, page 19; Openreach, section 4, pages 28-33; Sorrento Networks, page 8; SSE, page 8; TalkTalk, section 7; Virgin Media, page 15; Vodafone, section 3, paragraph 6.14; Zayo, paragraph 3.1.3.

Proposed EOI requirement

- 11.47 IIG⁹⁰², CityFibre⁹⁰³, and Zayo⁹⁰⁴ supported EOI requirements to make sure any no undue discrimination obligation is effective. These stakeholders indicated a concern that in some markets BT retains flexibility to engage in anti-competitive behaviour.
- 11.48 BT Group⁹⁰⁵ and Openreach⁹⁰⁶ argued that it is unreasonable to apply EOI requirements to VHB services⁹⁰⁷ and in locations where there is the prospect of increased competition during the review period, i.e. in HNR areas including the Metro Areas.
- 11.49 BT Group⁹⁰⁸ argued that in the VHB segment and in HNR areas Openreach does not have the incentive to favour its downstream businesses and the combination of fair and reasonable terms with the undue discrimination obligation is sufficient to mitigate the risks posed by BT's SMP. BT Group suggested that the EOI requirement would limit Openreach's ability to respond to customer needs or adapt products to suit market segments. BT Group⁹⁰⁹ suggested two possible alternatives: removing the EOI requirement entirely; or limiting the legal instrument to the provision of services to downstream divisions.
- 11.50 Openreach⁹¹⁰ argued that EOI requirements restrict its ability to compete on an equal footing with other infrastructure providers, which may result in market inefficiencies and poor customer service. It supported this position by arguing that competition between Openreach and "new active network providers" may not affect competition between downstream BT Group businesses and other retail providers. Openreach particularly noted that customers invite bids for high bandwidth services "under specific terms (e.g. relating to long term certainty of pricing and/or specific service requirements in specific geographic locations"; and that it wanted "the freedom to develop solutions ... without the risk that EOI would be interpreted in a way that triggers requirements to supply that same solution to any customer in any geographic area".

Request for exclusions to EOI requirement at certain BT exchanges

- 11.51 As discussed in Section 8, where our SMP findings lead to a small number of previously deregulated exchanges falling within a regulated market, BT Group argued that EOI requirements would place disproportionate demands on downstream BT to modify current circuit configurations.

⁹⁰² IIG's response to 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, sections 7 and 13.

⁹⁰³ Cityfibre response to 2018 PIMR and BCMR Consultations, section 7.

⁹⁰⁴ Zayo response to 2018 PIMR and BCMR Consultations, section 4.

⁹⁰⁵ BT Group response to 2018 BCMR Consultation, paragraph 1.16.

⁹⁰⁶ Openreach response to 2018 BCMR Consultation, pages 7-8, paragraph 17.

⁹⁰⁷ This is in the alternative to their arguments that VHB services do not justify regulation given likelihood of competition in these market segments.

⁹⁰⁸ BT Group response to 2018 BCMR Consultation, paragraph 4.16.

⁹⁰⁹ BT Group response to 2018 BCMR Consultation, paragraph 4.18.

⁹¹⁰ Openreach response to 2018 BCMR Consultation, pages 8-9, paragraphs 20-27.

Must-use requirement for dark fibre

- 11.52 TalkTalk raised the same concerns it highlighted in relation to BCMR 2016’s DFA remedy⁹¹¹, namely that, in the absence of a ‘must-use’ requirement for DFA, there is a risk of fibre elements being degraded over time where these are allocated for provision of dark fibre.⁹¹²
- 11.53 TalkTalk stated a must-use requirement is critical since it creates strong incentives on Openreach to ensure that the wholesale product is fit for purpose and removes potential anti-competitive discrimination. Without a must-use obligation, it argued, BT has strong incentives to delay and degrade DFA in order to hamper its competitors. It argued a must-use obligation has been the critical foundation for ensuring the success of major regulated products and the same logic applies for DFA.

Our reasoning and decisions

- 11.54 For the reasons set out below, we have decided to impose a no undue discrimination obligation and EOI requirement in the relevant markets to address BT’s market power. The aim of this remedy is to ensure that competitors, and hence consumers, are not disadvantaged by BT discriminating unduly in favour of its own downstream activities or between different competing providers. The no undue discrimination obligation and EOI requirement will apply in respect of both active and dark fibre network access, subject to the following exceptions relating to EOI requirements:
- no must-use requirement: we will not require BT to consume a dark fibre product when providing active services;
 - a general exemption which makes clear that EOI does not apply to network access which BT was providing, but was not required to provide on an EOI basis, as at 30 March 2019;⁹¹³
 - an exemption for wholesale WDM circuits;
 - an exemption for accommodation services, other than in relation to space and power; and
 - an exemption for such provision of network access as to which Ofcom consents.

No undue discrimination

- 11.55 A non-discrimination obligation is intended as a complementary remedy to the network access obligation, principally to prevent the dominant provider from discriminating in favour of its own downstream operations and to ensure that competing providers are placed in an equivalent position. Without such an obligation, the dominant provider is incentivised to provide the requested wholesale network access service on terms and conditions that discriminate in favour of its own downstream operations. For example, BT may decide to charge its competing providers more than the amount charged to its own downstream units or it might provide the same services but within different delivery

⁹¹¹ See 2016 BCMR Statement, Volume 1, Section 9, paragraphs 9.61-9.66.

⁹¹² TalkTalk’s response to 2018 BCMR Consultation, paragraph 4.78-4.80.

⁹¹³ 30 March 2019 was the day before the 2017 Temporary Conditions expired.

timescales. Both these behaviours could have an adverse effect on competition. Therefore, we have decided to put in place a no undue discrimination obligation covering all services and applicable in all SMP markets.

EOI

- 11.56 Non-discrimination can have different forms of implementation. A strict form of non-discrimination – i.e. a complete prohibition of discrimination – would result in the SMP operator providing exactly the same products and services to all providers (including its own downstream operations) on the same timescales, terms and conditions (including price and service levels), by means of the same systems and processes and by providing the same information. Essentially, the inputs available to all providers (including the SMP provider’s own downstream operations) would be provided on a truly equivalent basis, an arrangement which has become known as equivalence of inputs (EOI). An EOI requirement removes any degree of discretion.
- 11.57 A less strict implementation of non-discrimination may allow for flexibility and result in a more practical and cost-effective implementation of wholesale inputs in cases where it is economically justified.
- 11.58 Services provided in these markets are key inputs that enable competition downstream and requiring BT to provide wholesale inputs on an EOI basis will prevent it from engaging in discriminatory practices that could adversely affect competition and ultimately cause detriment to citizens and consumers. Prohibiting undue discrimination while stopping short of EOI could result in BT providing competitors with a different set of products to those it provides to itself. This could include the use of different processes and systems for product development, delivery, maintenance and repair. While this might not be unduly discriminatory (depending on the precise circumstances), it would fall short of true equivalence and could undermine effective competition.
- 11.59 BT Group raised concerns relating to those exchanges identified as non-competitive exchanges in our assessment of the market for inter-exchange connectivity services that are not presently regulated.⁹¹⁴ BT Group said that the re-application of EOI on services that BT already supplies at those exchanges would result in significant network reconfiguration involving added costs and potential delays. In separate correspondence, BT noted that [X].⁹¹⁵ BT Group asked for an equivalent exemption to be reinstated in this review.
- 11.60 Our remedies are designed to address the competition concerns identified in this review resulting from our SMP findings across relevant markets. However, our decision relating to an EOI requirement acknowledges it would be disproportionate where it would involve BT identifying and re-engineering existing network infrastructure. Therefore, we have decided to impose an EOI requirement in all markets covering all services (subject to the exemptions identified), but it will not apply retrospectively, by which we mean that BT is

⁹¹⁴ We note that the number of exchanges affected is small. We have only decided to re-regulate 8 exchanges from the competitive core and 9 exchanges from the Temporary Conditions - see Section 8

⁹¹⁵ BT email to Ofcom, 18 February 2018; see also BT Group’s Confidential response to the 2018 PIMR and 2018 BCMR Consultations, Annex 3, paragraphs 3.1-3.14.

not required to apply EOI to network access that it was providing, but which it was not required to provide on an EOI basis, as at 30 March 2019 (being the date before the Temporary Conditions expired). This means that Openreach will not need to incur costs to reconfigure its network at the exchanges, but where new network access is requested at those exchanges it will need to be done on an EOI basis. This is achieved by the exemption contained in SMP Condition [4.2(c)]. We do not consider that it is necessary to maintain in addition a specific exemption for backhaul segments as BT requests.

- 11.61 Our decision to not apply EOI obligations retrospectively means that where investment has already taken place because of previous deregulation, BT is not expected to identify and re-engineer existing network infrastructure. However, future requests for network access across all relevant markets must be managed on an EOI basis. This is consistent with our approach taken in relation to EOI requirements imposed in previous market reviews.⁹¹⁶
- 11.62 This position is already reflected in the SMP Conditions set out in our 2018 BCMR Consultation, which included an exemption for “network access which the Dominant Provider was providing but was not required to provide on an EOI basis as at [*the day immediately prior to the date on which this Condition enters into force*]”.⁹¹⁷ In light of this, there is no need for an additional specific exemption within the legal instrument.
- 11.63 In respect of HNR Areas of the CI Access market (including the Metro Areas), and VHB services in all markets, which BT and Openreach argued should not be subject to EOI requirements, we find the incentives for BT to discriminate are consistent, and the impact of such discrimination potentially greater, meaning there is no justification to vary the no undue discrimination obligation dependent on any prospective improvements in competition in these areas.
- 11.64 In relation to Openreach’s argument that it should be permitted to introduce geographically differentiated pricing, in particular for VHB services and where competition is stronger, we discuss this further in Section 13. While some differentiation may be reasonable (e.g. to reflect cost differences), there is a risk that BT could price strategically by increasing prices in less competitive areas to subsidise price reductions in more competitive areas (or where it considers rivals may build).⁹¹⁸ Such strategic behaviour may not fit with our policy objectives of promoting investment and protecting consumers.
- 11.65 We note Openreach’s argument that how it competes with other alternative network access providers will not impact downstream competition. This focuses on direct impact from such competition. However, if Openreach relies on any flexibility afforded in the absence of an EOI requirement in prospectively competitive areas it is doing so to the detriment of alternative network providers who rely on wholesale revenues to recoup

⁹¹⁶ See 2013 BCMR Statement, paragraph 12.201

⁹¹⁷ See Annex 26, Schedule 3, Part 3, Condition 4. We have amended the condition we consulted on by replacing “[*the day immediately prior to the date on which this Condition enters into force*]” with “30 March 2019”, being the date before the Temporary Conditions expired. This is because, since 31 March 2019, there is no regulation in place requiring BT to provide network access on an EOI basis. We would preserve this situation if we set the SMP condition we consulted on, which is not our intention.

⁹¹⁸ 2018 BCMR Consultation, paragraph 10.36.

investment costs. For this reason, the absence of an EOI requirement is likely to affect downstream markets and the expansion of competing infrastructure markets.

WDM services

- 11.66 As stated in our consultation⁹¹⁹, telecoms providers may wish to provide leased lines using a combination of their own networks and WDM services from Openreach, using non-standard WDM interfaces to facilitate interconnection. BT's downstream operations, however, may be more likely to use WDM services from Openreach to deliver end-to-end services without interconnection, and would therefore use WDM services with standard interfaces.
- 11.67 We have decided to impose a condition (like the condition we imposed in the 2016 BCMR) that is designed to address BT's ability to discriminate by specifying that in the case of WDM circuits provided to other telecoms providers, which differ from those provided by BT to itself only in relation to the interfaces used, BT is required:
- to provide such services on the basis of EOI in all respects other than price; and
 - not to discriminate unduly between the prices it charges. This means that the difference in price between the variants of the same product should be no greater than the difference between their long-run incremental costs.
- 11.68 We have decided these additional requirements are necessary as the EOI requirement alone is likely to have a limited effect because BT may have no need to consume WDM services with non-standard interfaces.

No must-use requirement for dark fibre

- 11.69 As we did in our 2016 BCMR Statement, we recognise the concerns that TalkTalk has raised in relation to potential degradation of fibre elements used for network access to dark fibre. However, for the reasons set out below, we find that the remedies package we are imposing in this review continues to mitigate against such risks, meaning a must-use requirement for DFA is unnecessary. Furthermore, we consider the practical implications for Openreach of such a requirement would mean such regulation would be disproportionate.
- 11.70 The following factors mitigate against the risk of degradation of fibre elements used for network access to dark fibre:
- the no undue discrimination obligation, which applies between users of BT's fibre network whether it is used in relation to an active product or a DFA product, as well as being applicable between downstream BT operations and other providers using the same fibre products supplied by Openreach; and
 - a requirement to provide KPIs for DFA alongside those set for actives (see Section 15), which could rely on the same fibre given the DFA remedy design is based on EAD products.

⁹¹⁹ 2018 BCMR Consultation, paragraphs 11.54 to 11.55.

- 11.71 When assessing whether such a requirement is reasonable and proportionate, we have considered the impact on DFA rollout where other providers are placing orders in a similar timeframe to Openreach undertaking activities necessary to consume dark fibre in its provision of active services. It is likely a must-use requirement on BT would undermine the effectiveness of the DFA remedy during this two-year review period by increasing volumes of DFA orders unnecessarily and slow take-up of the remedy by other providers.
- 11.72 Finally, even in the absence of a must-use requirement, it is likely that downstream BT will consider opportunities to use DFA where it sees benefit to do so in order to compete on a level playing field with other providers.

The BEREC Common Position

- 11.73 We have taken utmost account of the BEREC Common Position in formulating our proposals, including BP8, BP10 and BP10a which appear to us to be particularly relevant in this context. We consider that our decision is consistent with the best practice set out in the BEREC Common Position.

Conclusion

- 11.74 In order to implement this decision, we have decided to set SMP Conditions 3 and 4, published at Annex 26.⁹²⁰ Section 87(6)(a) of the Act authorises the setting of an SMP services condition requiring the dominant provider not to discriminate unduly against particular persons, or against a particular description of persons, in relation to matters connected with the provision of network access.
- 11.75 Section 87(6) implements into UK law Article 10 of the Access Directive. Article 10(1) provides that a national regulatory authority may: “impose obligations of non-discrimination, in relation to interconnection and/or access”.
- 11.76 Article 10(2) further provides:
- “[o]bligations of non-discrimination shall ensure, in particular, that the operator applies equivalent conditions in equivalent circumstances to other undertakings providing equivalent services, and provides services and information to others under the same conditions and of the same quality as it provides for its own services, or those of its subsidiaries or partners”.

⁹²⁰ Schedule 3, Part 3.

- 11.77 We consider that the requirements we have decided to set are proportionate because:
- they only seek to prevent **undue** discrimination;
 - we have explained why we consider a more onerous form of non-discrimination obligation (EOI) is necessary; and
 - we have also explained why we consider the EOI requirement goes no further than is necessary – namely, it does not extend to wholesale WDM circuits or require BT to consume a dark fibre product when providing active services; and
 - we have included a set of exemptions which mean that the requirement to provide network access on an EOI basis is limited to where it is necessary to address our competition concerns.

Transparency

- 11.78 We proposed the following obligations, which are collectively designed to improve transparency when network access is provided:
- a requirement to publish a Reference Offer;
 - a requirement to notify changes to charges, terms and conditions in advance; and
 - a requirement to notify changes to technical information in advance.
- 11.79 Stakeholders were supportive of these proposals and we have decided to impose them as set out below.

Requirement to publish a Reference Offer (RO)⁹²¹

Our proposals

- 11.80 We considered that the requirement to publish ROs imposed in previous market reviews has been effective in meeting the aims of the regulation detailed above. Therefore, we proposed that BT should be required to publish a RO for wholesale network access products in each of the wholesale markets in which we provisionally found BT to have SMP.

Stakeholder responses

- 11.81 Stakeholders supported our proposals relating to an appropriate condition requiring publication of ROs.⁹²²
- 11.82 Openreach⁹²³ highlighted that the proposed condition did not include any reference to an implementation period in which a RO for wholesale network access products could be reviewed, agreed with customers and amended prior to publication.

⁹²¹ We set out minimum requirements for BT's Reference Offer for dark fibre access at BT Only exchanges in Section 12; and impose relevant requirements for dark fibre in Annex 26, Schedule 3, Part 3, Conditions 5.3 and 5.6.

⁹²² Responses to 2018 PIMR and BCMR Consultations from: BT Group, paragraphs 4.2 and 4.10; Cityfibre, paragraph 2.1.5; Colt; CWU; IIG, section 7, page 19; Openreach, section 4, pages 28-33; Sorrento Networks, page 8; SSE, page 8; TalkTalk, section 7; Virgin Media, page 15; Vodafone, section 3, paragraph 6.14; Zayo, paragraph 3.1.3.

⁹²³ Openreach response to 2018 BCMR Consultation, page 32, paragraph 150

Our reasoning and decisions

- 11.83 A requirement to publish a RO has two main purposes:
- to assist transparency for the monitoring of potential anti-competitive behaviour; and
 - to give visibility to the terms and conditions on which other providers can purchase wholesale services, thereby equipping other providers to form effective network development strategies, as well as encouraging competition.
- 11.84 We have decided to impose a condition requiring BT to publish a RO, which includes specified information (set out below) and sets out how the RO should be published. The condition prohibits BT from departing from the charges, terms and conditions in the RO and requires it to comply with any directions we may make from time to time under the condition.
- 11.85 The published RO must set out a number of matters at a minimum. These include:⁹²⁴
- a description of the services on offer including technical characteristics and operational processes for service establishment, ordering and repair;
 - the locations of points of network access and the technical standards for network access;
 - conditions for access to ancillary and supplementary services associated with the network access, including operational support systems and databases etc;
 - contractual terms and conditions, including dispute resolution and contract negotiation/renegotiation arrangements;
 - charges, terms and payment procedures;
 - service level agreements and service level guarantees; and
 - to the extent that BT uses the service in a different manner to providers or uses similar services, BT is required to publish a RO in relation to those services.
- 11.86 We consider this information is the minimum necessary to allow providers to make informed decisions about competing in downstream markets.
- 11.87 As we discuss in more detail in Section 15, we have decided to set out detailed obligations concerning SLAs and SLGs for wholesale Ethernet services in the RO condition.⁹²⁵ This is consistent with our approach in other markets, for example WLA. We set out the following obligations:
- an obligation to have SLAs and SLGs for completion of the provision of service;
 - an obligation to have SLAs and SLGs for fault repair;
 - an obligation to pay SLGs proactively; and
 - a requirement that any SLG compensation shall be without prejudice to the rights of either party to claim for additional losses.

⁹²⁴ A comprehensive list of requirements can be found in Annex 26, Schedule 3, Part 3, Condition 5.

⁹²⁵ These proposed obligations do not apply to wholesale WDM circuits. Proposed quality of service remedies for all services are discussed in Section 15.

- 11.88 The publication of a Reference Offer helps to ensure stability in markets as, without it, incentives to invest might be undermined and market entry less likely. It also allows for potentially quicker negotiations, reduces the likelihood of disputes and gives confidence to those purchasing wholesale services that they are being supplied on non-discriminatory terms. Without this, market entry might be deterred to the detriment of the long-term development of competition and hence consumers.
- 11.89 We consider that imposing a requirement to publish a RO is necessary to achieve our aims in each of these wholesale markets where we find BT has SMP. This remedy complements the network access and non-discrimination requirements discussed above.
- 11.90 We set out in Section 12 specific requirements included in the condition in relation to BT’s RO for dark fibre.

Timing of RO publication

- 11.91 We agree with Openreach that it would be difficult to update and publish a Reference Offer for new network access on the date the condition enters into force. However, we consider our proposed condition addresses this difficulty.
- 11.92 The proposed condition aligns with that imposed in the WLA and WBA Market Reviews. For network access BT is providing as at the date the condition enters into force, BT is required to publish a Reference Offer on that same date. BT will already have a RO published for such network access. For any further network access provided after that date, BT is required to update and publish the Reference Offer “as soon as reasonably practicable”.⁹²⁶ Therefore, the condition permits a Reference Offer for further network access to be published at a later date, allowing for review, engagement and amendment.
- 11.93 For these reasons, we have decided to impose the condition we set out in our consultation.⁹²⁷

The BEREC Common Position

- 11.94 We have taken utmost account of the BEREC Common Position including BP16, BP22 and BP23 which appear to us to be particularly relevant in this context. We consider that our proposals are consistent with the best practice set out in the BEREC Common Position.

Conclusion

- 11.95 To implement this decision, we will set SMP Condition 5, published in Annex 26.⁹²⁸ Section 87(6)(c) of the Act authorises the setting of SMP services conditions requiring the dominant provider to publish, in such a manner as Ofcom may direct, the terms and conditions on which it is willing to enter into an access contract. Section 87(6)(d) also permits the setting of SMP services conditions requiring the dominant provider to include specified terms and conditions in an access contract. Finally, section 87(6)(e) permits the

⁹²⁶ See Annex 26, Schedule 3, Part 3, Condition 5.5.

⁹²⁷ See Section 12 and Annex 17 for our decisions in respect of negotiation and publication of a RO for dark fibre access.

⁹²⁸ Schedule 3, Part 3.

setting of SMP services conditions requiring the dominant provider to make such modifications to the reference offer as may be directed from time to time.

- 11.96 Article 9(4) of the Access Directive requires that where network access obligations are imposed, national regulatory authorities shall ensure the publication of a RO containing at least the elements set out in Annex II to that Directive. We are satisfied that this requirement is met.

Notification of changes to charges, terms and conditions

Our proposals

- 11.97 We proposed to reimpose the obligation on BT to notify changes to its charges, terms and conditions. We proposed that the following notification periods should continue to apply:
- 28 days' notice for prices, terms and conditions relating to new service introductions;
 - 28 days' notice for price reductions and associated conditions (for example, conditions applied to special offers); and
 - 90 days' notice for all other changes to prices terms and conditions.
- 11.98 We also proposed certain requirements relating to the amendment and extension of Special Offers, in order to align with the 2018 WLA.

Stakeholder responses

- 11.99 Stakeholders generally supported our proposal to impose a condition setting out timescales for notification of changes to charges, terms and conditions.
- 11.100 SSE⁹²⁹ submitted that BT might act anti-competitively when using Special Offers and that allowing extensions to Special Offers at current or lower prices and current terms and conditions with a notification period of 'next working day' may be detrimental to other providers in competitive bid scenarios. SSE suggested a 28-day notification period should apply in such scenarios and that Openreach should not be permitted to use new Special Offers for competitive, time sensitive bid submissions during a 28-day notification period.

Our reasoning and decisions

- 11.101 We have decided to impose the condition consulted upon (subject to a minor amendment discussed below). This will align the relevant SMP condition in the business connectivity markets with those in place in other markets.
- 11.102 Our decision as to appropriate timescales for notification has been reached with consideration of the following relevant factors:
- in relation to the 90-day period for changes to existing services, the investment required to use wholesale leased line services remains significant and complex, suggesting a shorter period would not be appropriate;

⁹²⁹ SSE's response to 2018 BCMR Consultation, page 8.

- wholesale leased line services support multiple downstream services. This means that telecoms providers will need to assess the impact of any changes downstream. Typically, this might involve modelling the impact of the new charges on the cost of providing downstream services, securing internal approval for a pricing revision and notifying customers (which may be subject to a minimum notice period);
- too short a notification period would risk that telecoms providers would have insufficient time to react to changes to wholesale terms and could, for instance, be left financially exposed by changes to wholesale charges;
- based on the factors above, we consider 90 days is the minimum period necessary to allow competing providers to plan for changes to existing network access; and
- there should be no risk of financial exposure for telecoms providers when charges are reduced, so a 28-day notification period is appropriate.

11.103 Further, in the 2018 WLA Statement we amended the SMP condition with respect to extensions and amendments to Special Offers.⁹³⁰ We considered these amendments were necessary to make it easier for Openreach to amend and extend Special Offers. These are summarised in Table 11.1 below.

Table 11.1: Summary of amendments to the Special Offer

Amendment	Amendment concerns	Notification period
If Openreach wants to extend a Special Offer at the current SO price or lower price and current T&Cs	Prices and T&Cs	Next working day
If Openreach wants to extend a Special Offer on current T&Cs at a price above the initial Special Offer price but below the standard price	Prices	28 days
If Openreach wants to extend a special offer on updated T&Cs or amend T&Cs of existing Special Offer, irrespective of price	T&Cs	28 days

11.104 We have decided to mirror these amendments in business connectivity markets, as proposed in our consultation.⁹³¹

11.105 Notification of changes to charges at the wholesale level has two aims: assisting transparency for the monitoring of potential anti-competitive behaviour and giving advance warning of charge changes to competing providers who buy wholesale access services. The latter aim ensures that competing providers have sufficient time to plan for such changes, as they may want to restructure the prices of their downstream offerings in response to charge changes at the wholesale level. Notification of changes therefore helps

⁹³⁰ 2018 WLA Statement, paragraphs 6.184-5.

⁹³¹ Openreach noted that we had not included a definition of “Working Day” in our legal instrument. We have inserted a definition of “Working Day” which mirrors that used in our quality of service direction. See Annex 26, Schedule 3, Part 2.

to ensure stability in markets, without which incentives to invest might be undermined and market entry made more difficult.

- 11.106 There may be some disadvantages to advance notification, particularly in markets where there is some competition. It can lead to a ‘chilling’ effect where other providers follow BT’s prices rather than act dynamically to set competitive prices. In HNR areas of the CI Access services market, while competition is more likely, it has not yet developed to the degree that we think such a chilling effect would occur. Rather, by having access to BT’s prices, and knowing when they will change, rivals know the level of risk they can take in bidding for contracts. We do not consider, on balance, that this consideration undermines the rationale for imposing a notification of charges condition.
- 11.107 In certain circumstances it may also be appropriate to require the notification of changes to terms and conditions, where this will also ensure transparency and provide advance warning of changes, to allow competing providers sufficient time to plan for them. Again, this assists in providing stability in markets, without which incentives to invest might be undermined and market entry made more difficult.
- 11.108 This remedy complements the network access and non-discrimination requirements on dominant providers to address the competition concerns arising from a position of SMP in wholesale leased lines markets.
- 11.109 While we note the concerns raised by SSE⁹³² in relation to Openreach potentially using Special Offers, including the extension of such Special Offers, in order to win a competitive bidding process or aid the bidding activities of downstream BT, we have decided to retain the proposed notification periods (which are consistent with requirements in other markets such as WLA).
- 11.110 We consider that other regulations are sufficient to mitigate the risk identified by SSE without altering the relevant notification period beyond “next working day”. One risk associated with pricing variations during competitive bidding processes, including any relevant Special Offers, involves downstream BT gaining advanced notice of any extension to Special Offers. Extending the notification timeframe does not remove this risk – It can only provide additional time for other providers to react depending on the circumstances.
- 11.111 We consider the transparency requirements associated with the use of Special Offers act as a deterrent from such pricing activities intended to disrupt competitive bidding processes. We would consider any specific pricing arrangements, including use of Special Offers, designed to favour downstream BT or Openreach in any way would be in contravention of the no undue discrimination obligation.⁹³³ Furthermore, the Commitments made by BT Plc. relating to the separation of Openreach are intended to prevent inappropriate information sharing⁹³⁴, which would include advance notification of any extension or variation of terms linked to a Special Offer.

⁹³² SSE’s response to 2018 BCMR Consultation, page 8.

⁹³³ See Annex 26, Schedule 3, Part 3, Condition 3.2.

⁹³⁴ Ofcom, June 2018, [Progress on delivering a more independent Openreach](#), Section 3 [accessed 22 May 2019].

11.112 While we are not aware of any examples of misuse of this provision, we will carefully consider, and where appropriate investigate, any evidence of non-compliance. This evidence could come from a range of sources, such as information submitted by our stakeholders, our regular review of BT's Regulatory Financial Statements, information gathered as part of our market reviews, and/or through use of our investigatory powers.

Minor amendment with regard to the content of an Access Charge Change Notice

11.113 We have decided to make a minor amendment to the condition consulted upon. This relates to the content of an Access Charge Change Notice.

11.114 In the WLA market, the SMP condition governing notifications of changes to charges, terms and conditions requires an Access Charge Change Notice to include the following four matters:

- a) a description of the network access in question;
- b) a reference to the location in the Dominant Provider's current Reference Offer of the terms and conditions associated with the provision of that network access;
- c) the current and proposed new charge and/or current and proposed new terms and conditions (as the case may be); and
- d) the date on which, or the period for which, the WLA Access Change will take effect (effective date).

11.115 The proposed SMP condition in the 2018 PIMR Consultation (which we have decided to impose as set out in Volume 1 Section 4) also included these four matters.

11.116 However, the SMP condition we proposed in our BCMR consultation omitted matter (c) in the above list. We have decided to include this requirement in the SMP condition we are imposing because it is important for an Access Charge Change Notice to set out the current and proposed charges, terms and conditions; and in order to align with equivalent requirements in other markets. Given that the purpose of Access Charge Change Notices is to set out changes to charges, terms and conditions, we do not expect this to be an onerous requirement.

The BEREC Common Position

11.117 We consider that the proposed condition is consistent with the BEREC Common Position, including the remedies falling under objectives BP16 and BP17.

Conclusion

- 11.118 To implement this decision, we will set SMP Condition 6 as published in Annex 26.⁹³⁵ Section 87(6)(b) of the Act authorises the setting of SMP services conditions which require a dominant provider to publish, for the purpose of securing transparency, all such information in such manner as Ofcom may direct. Section 87(6)(c) also permits the setting of SMP services conditions requiring the dominant provider to publish the terms and conditions on which he is willing to enter into an access contract.

Notification of changes to technical information

Our proposals

- 11.119 We consider that the requirement to notify technical information is necessary to give other telecoms providers an opportunity to consider how to respond to changes and allow sufficient time to prepare for them. Therefore, we proposed to reimpose the requirement in this market review.

Stakeholder responses

- 11.120 Stakeholders provided no objections to our proposals relating to an appropriate condition setting out timescales for notification of changes to technical information.

Our reasoning and decisions

- 11.121 We are imposing a condition which requires the notification of new technical information within a reasonable time period, but not less than 90 days in advance of providing new wholesale services or amending existing technical terms and conditions. We consider that 90 days is the minimum time that competing providers need to modify their networks to support a new or changed technical interface, or to support a new point of access or network configuration.
- 11.122 The requirement to give notification within a reasonable time period may mean that a period of notification in excess of 90 days may also be appropriate in certain circumstances. For example, if BT were to make a major change to its technical terms and conditions, a period of more than the 90 day minimum might be necessary to enable competing providers sufficient time to prepare without disruption and detriment to their businesses and customers.
- 11.123 The aim of this condition is to ensure that telecoms providers have sufficient time to respond to technical changes that may affect them. For example, a telecoms provider may need to introduce new equipment, or modify existing equipment or systems, to support a new or changed technical interface. Similarly, a telecoms provider may need to make changes to its network to support changes in the points of network access or configuration.

⁹³⁵ Schedule 3, Part 3.

- 11.124 We consider that this condition is important in each of the markets in which we consider that BT has SMP, as it ensures that telecoms providers who compete in downstream markets are able to make effective use of wholesale services provided by BT. Technical information includes new or amended technical characteristics, including information on network configuration, locations of the points of network access and technical standards (including any usage restrictions and other security issues).
- 11.125 In the 2018 WLA Statement⁹³⁶ we noted that the one exception to the 90 day minimum is in relation to amendments to technical specifications that are developed and agreed through NICC Standards Limited (NICC). NICC is a technical forum in which BT and other telecoms providers participate. Telecoms providers are likely to be aware of NICC specifications due to their participation in the forum. We therefore did not consider it necessary to impose a 90-day notice period where BT proposes to adopt an amended NICC specification. However, we considered that BT should provide notification of changes based on the NICC standard. We have decided to mirror this amendment in business connectivity markets.
- 11.126 We consider that the requirement to notify technical information only requires information that other telecoms providers would need to know and that the notification periods are the minimum required to allow changes to be reflected in downstream offers.

The BEREC Common Position

- 11.127 We consider that the proposed condition is consistent with the BEREC Common Position, including the remedies falling under objectives BP16 and BP17.

Conclusion

- 11.128 To give effect to this decision we will set SMP Condition 8, published at Annex 16.⁹³⁷ Section 87(6)(b) of the Act authorises the setting of SMP services conditions which require a dominant provider to publish, in such manner as Ofcom may direct, all such information, for the purpose of securing transparency. Section 87(6)(c) also permits the setting of SMP services conditions requiring the dominant provider to publish the terms and conditions on which he is willing to enter into an access contract.

Regulatory financial reporting

- 11.129 In the following sub-sections, we explain our decision to reimpose cost accounting and accounting separation obligations on BT in the markets in which we find it has SMP. We will implement these obligations by way of a single SMP Condition.
- 11.130 Consistent with our approach in the 2016 BCMR, and in subsequent market reviews in other markets (WLA and WBA), we are proposing to adopt the form of condition first set

⁹³⁶ 2018 WLA Statement, paragraph 6.196.

⁹³⁷ Schedule 3, Part 3.

out in our 2014 Regulatory Financial Reporting Statement.⁹³⁸ This has the benefit of ensuring a consistent approach to regulatory financial reporting across the markets in which BT is regulated.

- 11.131 The accounting separation and cost accounting obligations are underpinned by detailed requirements for regulatory financial reporting which specify what information we require BT to prepare and provide in the markets in which it has SMP. These are imposed via a suite of directions issued under the SMP condition. We set out proposals for updating these detailed reporting requirements in our 2018 BT Regulatory Financial Reporting Consultation. This included specific proposals for financial reporting in respect of business connectivity markets identified as a result of this market review. We plan to publish a statement setting out our decisions with respect to these detailed reporting requirements in the business connectivity markets shortly.

Cost accounting

Our proposals

- 11.132 We proposed to re-impose the cost accounting requirements on BT in both wholesale leased lines markets.

Stakeholder responses

- 11.133 Stakeholders did not comment on our proposals for cost accounting measures in response to the 2018 BCMR Consultation. Stakeholders have engaged with our 2018 BT Regulatory Financial Reporting Consultation on specific directions relating to cost accounting, which are reliant on the adoption of our proposed condition.

Our reasoning and decisions

- 11.134 We have decided to re-impose the cost accounting requirements on BT in each of the wholesale leased lines markets in which we have determined that it has SMP. We consider that this obligation is necessary to ensure the appropriate maintenance of accounts to monitor BT's activities with regard to the pricing remedies we propose in the relevant markets.
- 11.135 Recital 2 of the 2005 Recommendation on accounting separation and cost accounting systems⁹³⁹ states that the purpose of imposing accounting separation and cost accounting obligations is “to make transactions between operators more transparent and/or to determine the actual costs of services provided”. Also, paragraph 2 of Point 1 of the 2005 Recommendation states that “the purpose of imposing an obligation to implement a cost

⁹³⁸ Ofcom, 2014. *Regulatory Financial Reporting – Statement* ('2014 Regulatory Financial Reporting Statement'). https://www.ofcom.org.uk/data/assets/pdf_file/0025/78460/financial-reporting-statement-may14.pdf [accessed 22 May 2019].

⁹³⁹ Commission Recommendation of 19 September 2005 on accounting separation and cost accounting systems under the regulatory framework for electronic communications, 2005/698/EC. https://www.ofcom.org.uk/data/assets/pdf_file/0020/112475/wla-statement-vol-1.pdf [accessed 22 May 2019].

accounting system is to ensure that fair, objective and transparent criteria are followed by notified operators in allocating their costs to services in situations where they are subject to obligations for price controls or cost-oriented prices.”

11.136 Cost accounting obligations require the dominant provider to maintain a cost accounting system (a set of processes and systems) to capture the costs, revenues, assets and liabilities associated with the provision of services and to attribute them in a fair, objective and transparent manner to individual services in order that the costs of individual services may be determined. The imposition of cost accounting obligations on BT is an important means of ensuring that:

- we have the necessary information to support the monitoring of the effectiveness of pricing remedies, in particular to ensure that the pricing remedies we impose continue to address the competition problems identified and to enable our timely intervention should such intervention ultimately be needed;
- wholesale costs are attributed across the wholesale markets (and the individual services within them) in a consistent manner. This mitigates in particular against the risk of double recovery of costs or that costs might be loaded onto particular products or markets;
- publication (i.e. reporting) of cost accounting information aids transparency, providing reasonable confidence to stakeholders about compliance with SMP obligations, allowing stakeholders to monitor compliance and more generally enabling stakeholders to make better informed contributions to the development of the regulatory framework; and
- BT records all the information necessary for the purposes listed above, at the time that relevant transactions occur, on an ongoing basis. Absent such a requirement, there is a strong possibility that the necessary information would not be available when it is required and in the necessary form and manner.

11.137 We consider that our requirements with respect to cost accounting are proportionate in that they require no more than is necessary to monitor BT’s activities with regard to the pricing remedies we have imposed; and are aligned with similar remedies in other markets.

The BEREC Common Position

11.138 We consider that the proposed condition is consistent with the BEREC Common Position, including the remedies falling under objectives BP30 to BP37.

Conclusion

11.139 To give effect to our decision we will set SMP Condition 11 published at Annex 26.⁹⁴⁰ Section 87(9) to (11) (subject to section 88) of the Act authorises Ofcom to impose appropriate cost accounting obligations on dominant providers, in respect of the provision of network access, the use of the relevant network and the availability of relevant facilities. Cost accounting rules may be made in relation to fair and reasonable charges, charge

⁹⁴⁰ Schedule 3, Part 3.

controls, the recovery of costs and basis of charges obligations. Section 87(6)(b) of the Act also allows Ofcom to impose a condition requiring the dominant provider to publish information to secure transparency, including accounting information.

Accounting separation

Our proposals

11.140 We proposed to re-impose the cost accounting requirements on BT in both wholesale leased lines markets.

Stakeholder responses

11.141 Stakeholders did not comment on our proposals for accounting separation measures in response to the 2018 BCMR Consultation. Stakeholders have engaged with our 2018 BT Regulatory Financial Reporting Consultation on specific directions relating to accounting separation, which are reliant on the adoption of our proposed condition.

Our reasoning and decisions

11.142 We have decided to re-impose the accounting separation obligation on BT in each of the wholesale leased lines markets in which we propose that it has SMP. We consider that this obligation is necessary to monitor BT's activities with regard to its non-discrimination obligations.

11.143 The SMP conditions and directions that we refer to in relation to 'cost accounting' above also apply to the accounting separation obligations. We have decided to impose those SMP conditions and directions in continuation of previous regulatory standards.

11.144 Paragraph 3 of Point 1 of the 2005 Recommendation states that "the purpose of imposing an obligation regarding accounting separation is to provide a higher level of detail of information than that derived from the statutory financial statements of the notified operator, to reflect as closely as possible the performance of parts of the notified operator's business as if they had operated as separate businesses, and in the case of vertically integrated undertakings, to prevent discrimination in favour of their own activities and to prevent unfair cross-subsidy".

11.145 In the 2014 Regulatory Reporting Statement we considered the purposes of regulatory reporting, which is supported by the imposition of an accounting separation obligation. In that statement we said that regulatory reporting "should provide us with the information necessary to make informed regulatory decisions, monitor compliance with SMP conditions, ensure that those SMP conditions continue to address the underlying competition issues and investigate potential breaches of SMP conditions and anti-competitive practices". In addition, we said that it "should provide reasonable confidence to stakeholders that the SMP provider has complied with its SMP conditions and add credibility to the Regulatory Financial Reporting Regime". We consider that our proposal to

impose an accounting separation obligation, together with a cost accounting obligation, will help to ensure that these regulatory reporting objectives are met.

- 11.146 The accounting separation obligation requires BT to account separately for internal and external sales, which allows Ofcom and other providers to monitor the activities of the party subject to regulations to ensure that it does not discriminate unduly in favour of its own downstream businesses. This helps ensure competition develops fairly, which ultimately benefits consumers. We consider this is the least onerous obligation necessary to ensure a mechanism to allow us and third parties to monitor potentially discriminatory behaviour by BT.

The BEREC Common Position

- 11.147 We consider that the condition is consistent with the BEREC Common Position, including the remedies falling under objectives BP30 to BP37.

Conclusion

- 11.148 To give effect to this decision we will set SMP Condition 11, published at Annex 26.⁹⁴¹ Sections 87(7) and 87(8) of the Act authorise Ofcom to impose appropriate accounting separation obligations on a dominant provider in respect of the provision of network access, the use of the relevant network and the availability of relevant facilities. That is to say, the dominant provider may be required to maintain a separation for accounting purposes between such different matters relating to network access or the availability of relevant facilities. Section 87(6)(b) of the Act also allows Ofcom to impose a condition requiring the dominant provider to publish information to secure transparency, including accounting information.

Legal tests

Section 47 tests

- 11.149 When imposing SMP obligations, we need to demonstrate that the obligations in question are based on the nature of the problem identified, proportionate and justified in light of the policy objectives as set out in Article 8 of the Framework Directive. We consider that each of the conditions we have decided to impose satisfy the tests set out in section 47 of the Act, namely that the obligation is:
- a) objectively justifiable in relation to the networks, services or facilities to which it relates;
 - b) not such as to discriminate unduly against particular persons or against a particular description of persons;
 - c) proportionate to what the condition or modification is intended to achieve; and
 - d) transparent in relation to what is intended to be achieved.

⁹⁴¹ Schedule 3, Part 3.

Objectively justified

11.150 We consider that each of the SMP conditions we have decided to impose is objectively justifiable. The remedies that we have decided to impose are designed to address the competition concerns that we have identified in our market analysis associated with a finding of SMP. Given our conclusion that BT has SMP in certain markets, we have identified the competition concern that BT would have the incentive and ability to favour its own downstream business over rivals in the relevant downstream markets, distorting competition in these markets, which is ultimately against the interests of consumers. Therefore, in the absence of a requirement to provide network access, supported by associated obligations, BT could refuse or impede access at the wholesale level thereby favouring its own retail operations, or it could provide access on less favourable terms and conditions compared to those obtained by its downstream business. We explain above why each obligation we are imposing is objectively justified in the context of the markets in which we have found BT to have SMP.

Not such as to discriminate unduly

11.151 We consider that each of the conditions does not discriminate unduly. The conditions are imposed on BT, which is the only provider which we have found to have SMP in the relevant markets (excluding Hull). The conditions are designed to address BT's position in the market.

Proportionate

11.152 We consider that each of the conditions is proportionate to what those conditions are intended to achieve. In each case, we are imposing an obligation on BT that: is effective to achieve our aim; is no more onerous than is required to achieve that aim; and does not produce adverse effects which are disproportionate to our aim. We explain why we consider each proposed remedy is proportionate above.

Transparent

11.153 We consider that each of the conditions is transparent in relation to what is intended to be achieved. The text of the conditions was consulted on and is published in Annex 26, Schedule 3 and the operation of those conditions is aided by our explanations in this document. We consider it is clear that our intention is to ensure that BT provides access to networks to facilitate effective competition, and that all the remedies set out above support this objective.

Section 88 tests

11.154 In this chapter we have set out our decisions to impose a fair and reasonable charges obligation and to impose regulatory financial reporting requirements. These decisions are authorised by Section 87(9).

11.155 Before setting conditions falling within section 87(9) we are required to ensure that the condition satisfies the tests set out in section 88 of the Act. Section 88 of the Act states that Ofcom should not set an SMP condition falling within section 87(9), except where:

- a) it appears from the market analysis that there is a relevant risk of adverse effects arising from price distortion (sub-s (a)),⁹⁴² and
- b) it also appears that the setting of the condition is appropriate for:
 - i) promoting efficiency;
 - ii) promoting sustainable competition; and
 - iii) conferring the greatest possible benefits on the end-users of public electronic communications services (sub-s (b)).

11.156 Under section 88(2) of the Act, when setting an SMP condition falling within section 87(9), we must take account of the extent of the investment in the matters to which the condition relates of BT.

Fair and reasonable charges obligation

11.157 We consider that our decision to impose a fair and reasonable pricing obligation satisfies these tests⁹⁴³:

- a) In relation to the Section 88(1)(a) test, as we have explained above, our competition concerns vary according to variations in competitive conditions. In the CI Access services market, in the Metro Areas and HNR areas, in the absence of price regulation requiring prices to be fair and reasonable, BT would have the ability and incentive to set wholesale and retail prices in a way that could damage downstream competition. In the parts of the market where we are also proposing charge controls, BT would additionally have the ability and incentive to set excessively high prices where no charge control applies. This applies equally in the markets where we have decided to impose a charge control, in the event that the charge control is not in effect e.g. where a charge control expires.
- b) In relation to the Section 88(1)(b) test, we consider that a fair and reasonable charges obligation will prevent BT from setting charges that impact other providers' ability to compete with BT in downstream markets and so will support the aim of promoting improved efficiency. We also consider that the provision of network access on fair and reasonable terms will promote sustainable competition by ensuring that other telecoms providers can effectively compete downstream. We consider this to be the appropriate approach for the purposes of conferring the greatest benefits on customers of downstream services.

⁹⁴² For the purposes of section 88 there is a relevant risk of adverse effects arising from price distortion if the dominant provider might (a) so fix and maintain some or all of his prices at an excessively high level, or (b) so impose a price squeeze, as to have adverse consequences for end-users of public electronic communications services.

⁹⁴³ We explain in Volume 3, Section 5 why we consider that our charge control conditions satisfy the tests set out in section 88.

- c) In relation to the Section 88(2) test, we believe that fair and reasonable charges will allow BT's costs to be taken into account and will also provide for common cost recovery. This condition is therefore an appropriate basis upon which to control BT's prices.

Regulatory financial reporting

- 11.158 We consider that our regulatory financial reporting requirements satisfy the Section 88 tests because, as explained above, they facilitate the monitoring and enforcement of our pricing requirements.

Our duties

- 11.159 We consider that our decision to impose a network access obligation is consistent with our duties under sections 3 and 4 of the Act. We consider that the imposition of a network access obligation promotes competition in relation to the provision of electronic communications networks and services, ensuring the provision of network access and service interoperability for the purposes of securing efficient and sustainable competition and the maximum benefit for end-users. This is because the imposition of the obligation will ensure that BT offers the wholesale products required by other providers to compete effectively in the downstream markets. In respect of the other remedies we have decided to impose:
- a) The "Requests for new forms of network access" condition is aimed at promoting competition in downstream markets, by ensuring that access seekers are able to make requests for new forms of network access based on an agreed SoR process.
 - b) The "No undue discrimination including equivalence of inputs (EOI)" condition is aimed at promoting competition and securing efficient and sustainable competition for the maximum benefits for consumers by preventing BT from leveraging its SMP into downstream markets.
 - c) The "Reference offer" condition is aimed at facilitating service interoperability and allowing providers to make informed decisions about future entry into the relevant market. Further, the obligation will enable buyers to adjust their downstream offerings in competition with BT in response to changes in BT's terms and conditions. Finally, the obligation will make it easier for Ofcom and other providers in the relevant market to monitor any instances of discrimination.
 - d) The "Notification of changes to charges, terms and conditions" and "Notification of changes to technical information" conditions are aimed at promoting competition and securing efficient and sustainable competition for the maximum benefit of consumers, by ensuring that providers have the necessary information about changes to terms, conditions, charges and technical information sufficiently in advance to allow them to make informed decisions about competing in downstream markets.
 - e) The "Regulatory Financial Reporting" condition (which encompasses "Cost accounting" and "Accounting separation" requirements) promotes competition and ensures the provision of network access and service interoperability for the purpose of securing efficient and sustainable competition and the maximum benefit for consumers because

the imposition of the obligation will ensure that other obligations designed to curb potentially damaging leverage of market power – including imposing a price squeeze and setting prices at excessive levels – can be effectively monitored and enforced.

- 11.160 In imposing these remedies, we have had regard in particular to the desirability of: promoting competition in relevant markets, of encouraging investment and innovation in relevant markets and of encouraging the availability and use of high speed data transfer services throughout the UK. In performing our duties, we have also had regard to the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed.
- 11.161 We also consider that our remedies are consistent with our duty to act in accordance with the six community requirements set out in section 4 of the Act, in particular:
- the first Community requirement to promote competition;
 - the third Community requirement to promote the interests of all persons who are citizens of the EU;
 - the fourth Community requirement to take account of the desirability of Ofcom’s carrying out of its functions in a manner which, so far as practicable, does not favour one form of or means of providing electronic communications networks, services or associated facilities over another (i.e. to be technologically neutral); and
 - the fifth Community requirement to encourage the provision of network access for the purpose of securing efficiency and sustainable competition, efficient investment and innovation and the maximum benefit of persons who are customers of communications providers and of persons who make associated facilities available.
- 11.162 Specifically, we believe that our decision to impose a network access obligation is consistent with the fifth Community requirement. The obligation has the purpose of securing efficient and sustainable competition in the markets for electronic communications networks and services by helping to ensure that other providers can continue to compete effectively in the downstream retail markets by using wholesale products offered by BT.
- 11.163 In analysing markets in Sections 4 to 8, and imposing these remedies, we have taken due account of all applicable guidelines and recommendations which have been issued or made by the European Commission in pursuance of the provisions of an EU instrument and which relate to market identification and analysis or the determination of what constitutes significant market power in accordance with section 79 of the Act. In developing our remedies we have taken due account of all applicable recommendations issued by the European Commission under Article 19(1) of the Framework Directive in accordance with our duties under section 4A of the Act. In each case, pursuant to Article 3(3) of Regulation (EC) No 1211/2009, we have also taken the utmost account of any relevant opinion, recommendation, guidelines, advice or regulatory practice adopted by the Body of European Regulators for Electronic Communications (BEREC). Where relevant, we explain in Sections 4-8, 10, 12-15 and this Section how we have taken account of these instruments.

12. Specific dark fibre remedy for inter-exchange connectivity

- 12.1 We have decided to introduce a requirement for BT to provide access to dark fibre, on reasonable request, for inter-exchange connectivity circuits from certain BT Only exchanges.
- 12.2 In Section 10 we explained that a dark fibre remedy in inter-exchange connectivity could significantly reduce costs and, in areas where investment is unlikely, is a more effective way of addressing our competition concerns than active remedies alone. It could therefore promote competition, not only in the provision of connectivity between exchanges where there are no or insufficient competitive networks but also by acting as an enabler for infrastructure build in marginal access areas, as backhaul and core costs are a consideration when building new access networks. We therefore consider that a dark fibre remedy for circuits used to provide inter-exchange connectivity will assist with the reduction or removal of barriers to network expansion and promote competition in markets where BT has SMP. We expect material take-up of dark fibre over this review period.
- 12.3 Having considered stakeholder responses to our proposals, we have decided to restrict the scope of dark fibre from our consultation position, so that it is only available from BT Only exchanges with no rival networks close by.⁹⁴⁴ This ensures that the scope of the remedy is in line with our objective of minimising the risks to investment incentives while making dark fibre available where investment is unlikely to occur.
- 12.4 Consistent with our consultation proposals, we have decided that the dark fibre product design should be closely aligned to active services. In recognition of potential risks to competitive core networks, we provide clarity on BT's obligations which re-emphasises the stated purpose of the dark fibre access obligation and seeks to mitigate these risks.
- 12.5 We have revised the implementation timeline for dark fibre access, and decided to require a 'soft launch' of dark fibre no later than six weeks after the BCMR conditions⁹⁴⁵ come into force, and full launch by 1 January 2020.
- 12.6 We have decided to impose a cost-based charge control for dark fibre services, set with reference to the relevant costs of BT's underlying passive infrastructure necessary for connections between exchanges. Charges will vary according to the length of the circuit.
- 12.7 Charges will be substantially lower than current charges for active products used for inter-exchange circuits. The pricing arrangements are likely to mean that it is cost effective to use regulated dark fibre where available for most bandwidths for inter-exchange connections, rather than purchasing regulated active products.

⁹⁴⁴ As discussed below, we define "close by" as BT exchanges where our network analysis shows at least one rival PCO (Principal Core Operator) network is within 100m of the exchange.

⁹⁴⁵ Annex 26, Schedule 3, Part 3.

12.8 In this section we set out:

- the benefits and risks associated with introducing dark fibre and expected take-up of the remedy;
- the scope of the remedy;
- the design of the remedy, minimum requirements for the Reference Offer and the timeline for implementation; and
- the approach to pricing.

Decision to impose a dark fibre access remedy

Our proposals

12.9 In our consultation, we set out our view that access to dark fibre in CI inter-exchange connectivity would provide users with a more flexible input to their downstream services. We considered this could deliver several benefits, which we discuss in detail in this section:

- users would be able to choose their own electronic equipment, enabling them to deliver services that better suit their needs and the needs of their customers;
- users would be able to make efficient decisions on bandwidth upgrades based on the underlying costs of upgrades;
- users would be able to eliminate inefficient active equipment duplication; and
- users would potentially be able to deliver improvements more quickly.

12.10 We proposed that these benefits would in turn allow telecoms providers to better compete on price, service quality, and product offering in downstream markets. As backhaul costs are a consideration when building new access networks, this could also reduce barriers to infrastructure build in marginal areas of the access markets.

12.11 We also described potential adverse consequences, and considered whether the dark fibre remedy had the potential to:

- weaken incentives of rival telecoms providers to invest in backhaul or core network and services;
- have an adverse impact on economic efficiency as a result of erosion of the bandwidth gradient;
- result in stranded assets for BT;
- create incentives for telecoms providers to arbitrage by using dark fibre for short distances and active services for longer connections; or
- result in an increase in faults or make it harder to detect and repair faults.

12.12 In general, we considered these risks to be low and mitigated through the design of the remedy.

12.13 We also set out our view on take-up of the remedy. Based on likely cost savings, current active circuit volumes and indications from telecoms providers, we provisionally concluded that a material volume of dark fibre circuits would be purchased over this review period.

- 12.14 Overall, we considered that considerable benefits would arise from the introduction of dark fibre between BT exchanges, and that these benefits outweighed the risks, which could be mitigated by limiting the scope and design of the remedy as discussed below.

Responses to our consultation

- 12.15 Twelve respondents agreed that our proposal would deliver benefits, broadly, as we described in our consultation. These respondents noted that dark fibre in inter-exchange connectivity had the potential to provide lower cost connectivity, with scope for efficiencies and greater choice over how services are delivered.⁹⁴⁶ Many of these respondents also agreed that OSA Filter Connect⁹⁴⁷ would not deliver the same benefits as dark fibre.⁹⁴⁸
- 12.16 CityFibre⁹⁴⁹ and Zayo⁹⁵⁰ recognised the merits of dark fibre in principle but (as discussed in Section 10), along with IIG,⁹⁵¹ did not think dark fibre should be introduced until we have assessed the impact of unrestricted PIA.
- 12.17 Openreach⁹⁵² and BT Group⁹⁵³ argued that we had overstated the benefits of dark fibre and that these would not be significant. They argued that cost savings were likely to be small, that there would not be any material product innovation, and that the recently-introduced OSA Filter Connect product would deliver many of the benefits of dark fibre, making dark fibre unnecessary.
- 12.18 TalkTalk,⁹⁵⁴ Three⁹⁵⁵, and Vodafone⁹⁵⁶ generally agreed with our consultation position that the risks of dark fibre would not be substantial. In some cases, TalkTalk and Three argued that the risks were lower than we had assessed. For example, TalkTalk argued we should have no concern about disrupting the bandwidth gradient or distance-based arbitrage.
- 12.19 Seven respondents⁹⁵⁷ argued that dark fibre presented a material risk to investment and would disincentivise network build. Openreach⁹⁵⁸ and BT Group⁹⁵⁹ also expressed concerns that the effect on the bandwidth gradient for active services would have an impact on efficient cost recovery.

⁹⁴⁶ BUUK, Colt, Gigaclear, Hyperoptic, PAG, Sky, Sorento, SSE, TalkTalk, Three, UKCTA and Vodafone.

⁹⁴⁷ A wave division multiplexing (WDM) technology as described in Section 3.

⁹⁴⁸ Gigaclear, SSE, Three and TalkTalk.

⁹⁴⁹ CityFibre's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraphs 7.1.2-7.1.14.

⁹⁵⁰ Zayo's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraphs 4.1.2-4.1.16.

⁹⁵¹ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, section 7.3.

⁹⁵² Openreach's response to the 2018 BCMR Consultation, page 16, paragraphs 60-61.

⁹⁵³ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.29.

⁹⁵⁴ TalkTalk's response to the 2018 BCMR Consultation, paragraph 4.7.

⁹⁵⁵ Three's response to the 2018 BCMR Consultation, paragraphs 5.3-5.5.

⁹⁵⁶ Vodafone's response to the 2018 BCMR Consultation, part 3, paragraph 6.23.

⁹⁵⁷ BT Group, CityFibre, CWU, IIG, Openreach, Virgin Media and Zayo.

⁹⁵⁸ Openreach's response to the 2018 BCMR Consultation, page 16, paragraphs 73-113.

⁹⁵⁹ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.35.

- 12.20 Openreach argued take-up would be limited to a subset of exchanges and much of this demand would be short-lived due to future exchange closures.⁹⁶⁰ However, six stakeholders⁹⁶¹ indicated plans to use dark fibre over this review period.

Assessment of the benefits of dark fibre

- 12.21 Dark fibre is a passive optical fibre connection between two sites and is so called because there is no equipment at either end to light the fibre. This contrasts with an active connection which includes electronics at either end of the fibre connection. Dark fibre providers install and sell optical fibre to connect between two sites, with the purchaser of the dark fibre adding the active electronics to provide point-to-point business connectivity services. BT does not currently offer dark fibre.
- 12.22 Openreach only offers active CI inter-exchange connectivity services. The characteristics of the service are determined by choices made by Openreach and developments negotiated with the industry as a whole. Access to dark fibre in inter-exchange connectivity will provide users with a more flexible input to downstream services. We remain of the view that this will deliver several benefits due to the choice of active equipment, more efficient decisions on bandwidth upgrades, less equipment duplication, and faster implementation of service improvements.
- 12.23 These benefits will in turn allow telecoms providers to better compete on price, service quality, and product offering in downstream markets. As backhaul costs are a consideration when building new access networks, this could also reduce barriers to infrastructure build in marginal areas of access markets.

Dark fibre provides choice over active equipment

- 12.24 Under the current set of active remedies, Openreach chooses the electronic equipment – together with the functionality and features of this equipment – that is made available to deliver the active part of a leased line service between two points.
- 12.25 Dark fibre will let customers choose their own electronic equipment. This enables them to select the equipment, functions and features that best fit their needs and the needs of customers of their downstream services. Where this differs from the equipment and features provided by Openreach, dark fibre users will have greater flexibility to make these changes quickly.
- 12.26 Openreach⁹⁶² and BT Group⁹⁶³ argued that innovation from choice of equipment would be low as transmission equipment is standardised globally. BT Group also argued that we had ignored arguments that it had made, in witness statements in the appeal of the 2016 BCMR, that the scope for innovation is limited to the functionality of the electronics.

⁹⁶⁰ Openreach's response to the 2018 BCMR Consultation, page 15, paragraphs 52-58.

⁹⁶¹ TalkTalk, [redacted], [redacted], [redacted], and [redacted].

⁹⁶² Openreach's response to the 2018 BCMR Consultation, annex B, paragraphs 48-49.

⁹⁶³ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 5.29-5.32.

- 12.27 We agree that the introduction of dark fibre is unlikely to lead to innovation in the electronic equipment available in the global marketplace. We also agree that the scope for innovation is limited to the functionality of the electronics used to deliver services. However, we think such innovation still has value in, for example, the equipment software management functionality and features.
- 12.28 Respondents were divided on the scope of innovation. BT Group cited our expectation that telecoms providers would replicate and replace the functions of Openreach’s electronic equipment, arguing this suggested no significant innovation or service differentiation. It also argued that we had ignored other arguments that it had made in the appeal of the 2016 BCMR, specifically that differences in interfaces are unlikely and there is a low likelihood that dark fibre offers greater flexibility to differentiate commercial models.⁹⁶⁴
- 12.29 In contrast, TalkTalk (a major potential user of dark fibre) agreed with our view of the benefits for operators of choosing their own equipment.⁹⁶⁵ In particular, it highlighted that innovation resulted not just from deploying new technologies but also developing new services and product differentiation, providing a range of examples.⁹⁶⁶ TalkTalk also discussed the potential to achieve cost savings from using different equipment suppliers. SSE,⁹⁶⁷ [SSE]⁹⁶⁸, and Gigaclear⁹⁶⁹ noted that Openreach active products restrict the choice of service features. For example, Gigaclear highlighted that Openreach active services prevent it from utilising a Dense Wavelength Division Multiplexing (DWDM) solution, which it would require to enable a viable point-to-point FTTP solution.
- 12.30 We think that this evidence from potential users of dark fibre shows that the choice of electronic equipment could allow telecoms providers to better differentiate their services, and Openreach active products restrict the equipment and features that can be employed to some extent. While we anticipate that telecoms providers will replicate the functions of Openreach’s electronics, they are not limited to implementing these functions in the same way as Openreach does for active services nor to implementing additional features. Respondents have identified specific examples where dark fibre would allow them to differentiate their services in this way. We do not consider that these benefits rely on innovation in global electronics standards, as they can be achieved by making different choices from the equipment available in the global market.
- 12.31 In addition, changes to service features could be implemented more quickly with dark fibre. With active services, any new service feature developed by Openreach (even if it is developed at the specific request of a sole provider) must be offered to all customers at the same time and on the same terms under BT’s no undue discrimination obligation. However, the process of debating and negotiating development requirements with Openreach and with other telecoms providers may introduce additional development

⁹⁶⁴ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.31.

⁹⁶⁵ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 4.4.

⁹⁶⁶ These included differentiation on the basis of: speeds, packages, latency, features, pricing structures, quality, and lower costs.

⁹⁶⁷ SSE’s response to the 2018 BCMR Consultation, page 9.

⁹⁶⁸ [SSE].

⁹⁶⁹ Gigaclear’s response to the 2018 BCMR Consultation, page 2.

time, costs or uncertainties. This may mean that certain service features are not economic to develop across the industry but could be economic for a single provider to deploy.

- 12.32 Openreach’s response referenced the Statement of Requirements process and said we made no suggestion in the consultation of failing on Openreach’s side. It suggested that this meant dark fibre would not deliver improvements over active products, as this process provided an effective means for new service features to be proposed and developed for active products. Openreach also argued that there is no potential ‘easy’ service innovation in inter-exchange connectivity, and that speed of upgrade was not a material issue as networks are planned in advance in any case.⁹⁷⁰
- 12.33 Our views on the benefits of dark fibre are not driven by a perception that BT has failed to meet its obligations under the requests for new forms of network access obligation (which we discuss in Section 11) in respect of active services. Dark fibre allows users to independently select and deploy service feature changes based on their assessment of needs. This also allows them to avoid any delays or costs that could be inherent in even an efficient collective approach to agreeing changes to active services. In addition, it provides stronger incentives for telecoms providers to make such changes, as they can gain first mover advantages and tailor solutions to their needs.
- 12.34 As discussed in the consultation, we recognise that the extent to which these benefits can be realised may be limited by the scope of this dark fibre remedy. Under our proposals, dark fibre would not be available for connectivity between all exchanges, nor in the CI Access services market, and we recognise that realising the full benefits of alternative solutions may require control over active equipment across the network. If telecoms providers deliver downstream services using Openreach active products in the CI Access services market, then these could set the service features for that downstream product and may limit the extent to which dark fibre could enable changes to overall service features. However, this is not a reason to deny telecoms providers the opportunity to take advantage of this flexibility if it can be used to their advantage.

Cost of upgrading would reflect the underlying cost

- 12.35 As discussed in Section 3 and Annex 7, bandwidth demand is growing rapidly. This means that telecoms providers need to increase bandwidth in their backhaul networks to maintain a good service to end users and will have to upgrade the bandwidth of existing inter-exchange circuits.
- 12.36 BT Group⁹⁷¹ argued that there was little evidence of increases in backhaul demand for the circuits in question (i.e. those from BT Only exchanges). However, we expect this increasing bandwidth demand to lead to increasing inter-exchange connectivity requirements at exchanges where there is a concentration of access products – for example the 1100 NGA

⁹⁷⁰ Openreach’s response to the 2018 BCMR Consultation, annex B, paragraphs 50-53.

⁹⁷¹ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 5.29-5.32.

handover exchanges. A substantial proportion of these (346) are BT Only exchanges.⁹⁷² In consultation responses, MNOs⁹⁷³ and Sky⁹⁷⁴ (a large residential broadband provider) highlighted an increasing need for capacity between exchanges as part of their networks. These operators have networks covering a wide geographic area, including BT Only exchanges.

- 12.37 When using Openreach active products, to upgrade bandwidth, users must migrate to a higher bandwidth product or purchase an additional circuit of the same bandwidth. Openreach's charges have historically followed a bandwidth gradient, which has been greater than equipment cost differentials alone, particularly for VHB services (which have historically not been regulated).
- 12.38 This means that the incremental price of upgrading bandwidth is generally greater than the incremental cost of equipment needed to deliver higher bandwidth (particularly from 1 Gbit/s to 10 Gbit/s or higher) and that Openreach's margins are significantly higher on VHB circuits. This may lead to telecoms providers not upgrading when it would be efficient for them to do so based on the underlying costs. For example, our analysis in Annex 7 indicates that over a three-year period the unit FAC differential between an EAD 10 Gbit/s and 1 Gbit/s service is £1,558, but the unit price differential is £3,854.⁹⁷⁵
- 12.39 Dark fibre pricing is independent of bandwidth, and telecoms providers will have access to the full capacity of their equipment connected to the fibre. Telecoms providers may also use dark fibre as a means of aggregating circuits. For example, rather than purchasing two EAD 10 Gbit/s circuits, they may purchase a single dark fibre circuit and add equipment to enable aggregation. As a result, the incremental cost to telecoms providers of upgrading bandwidth will reflect just the incremental costs of the equipment required to deliver higher bandwidth or aggregate circuits, which in some cases may be zero (or close to zero). This lowers the cost of upgrading bandwidth and ensures more efficient upgrade decisions based on true incremental costs.
- 12.40 As telecoms providers face the true incremental cost of upgrading, they may be more likely to upgrade inter-exchange connectivity capacity earlier than when faced with a price premium, potentially relieving constraints or allowing them to offer faster services to downstream access customers in mobile, broadband and business connectivity. This generates a direct benefit for downstream customers.
- 12.41 BT Group argued that it was not clear that current pricing was constraining demand or altering upgrade decisions.⁹⁷⁶ In our view, as a general principle, prices in line with costs

⁹⁷² We note that this figure may be a slight underestimate as we were only able to classify 1,016 exchanges as being an NGA handover point.

⁹⁷³ Three's response to the 2018 BCMR Consultation, paragraph 1.3; Vodafone's response to the 2018 BCMR Consultation, part 3, paragraph 1.1.1 and part 2, paragraph 2.17.

⁹⁷⁴ Sky's response to the 2018 BCMR Consultation, paragraph 8.

⁹⁷⁵ Ofcom analysis based on BT's 2016/17 RFS and Openreach prices as at April 2018. Costs and prices are stated on a Total Cost of Ownership (TCO) basis and includes rental, connection and main link charges. Connection costs are spread over a three-year period and discounted using a 7.9% WACC. For main link costs we have assumed 5km link distance. See Figure A7.2.

⁹⁷⁶ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.31.

expand output and therefore static efficiency. This will lead to more efficient decisions, as an operator may be willing to pay the cost differential to upgrade but would not have paid a higher price premium.

- 12.42 Further, other respondents highlighted examples of the need for increasing backhaul capacity and the benefits arising from upgrades reflecting underlying costs. Three noted that decoupling costs from capacity was particularly important to mobile operators in the context of expected increases in network traffic due to 5G.⁹⁷⁷ TalkTalk noted the ability to offer customers flexible and low-priced bandwidth upgrades in smaller increments.⁹⁷⁸
- 12.43 Separately, Openreach⁹⁷⁹ and BT Group⁹⁸⁰ argued that pricing with a bandwidth gradient brings substantial countervailing efficiency benefits that dark fibre risks eroding. We discuss these risks in the sub-section below, but do not consider that they are significant.
- 12.44 We note the benefits described above could also be achieved through regulating active services to an appropriate standard of cost. However, there are additional benefits to dark fibre such as reducing inefficient duplication and enabling new service features to be introduced more easily and quickly. We set these out in the next two sub-sections.

Inefficient equipment duplication reduced

- 12.45 Dark fibre also gives rise to lower overall costs as it reduces the overall amount of equipment employed compared to the current use of active products. These benefits could not be achieved through the regulation of active services alone.
- 12.46 These equipment savings will occur where telecoms providers would have installed their own electronic equipment at the ends of a circuit when using active products, and this equipment would have duplicated the functionality of Openreach electronics installed as part of the active service. Figure 12.1 illustrates this equipment use scenario. Where this is the case, the use of dark fibre will mean that equipment can be consolidated and therefore savings can be made – both in terms of the cost of the equipment and the associated need for space and power to operate it.
- 12.47 Respondents did not dispute that telecoms providers generally deploy their own electronic equipment alongside Openreach equipment when using an active service. They do this to provide additional control over the service (for example better monitoring capabilities, traffic and circuit aggregation functionality, downstream service features, and/or onward routing of the connection). If using inter-exchange connectivity, telecoms providers are highly likely to have equipment in the exchanges at each end of the circuit to perform other functions (such as offering access services from those exchanges or the onward routing of traffic). In many cases, the equipment used by telecoms providers in BT exchanges can be configured to replicate and replace the functions of Openreach's

⁹⁷⁷ Three's response to the 2018 BCMR Consultation, paragraph 4.11.

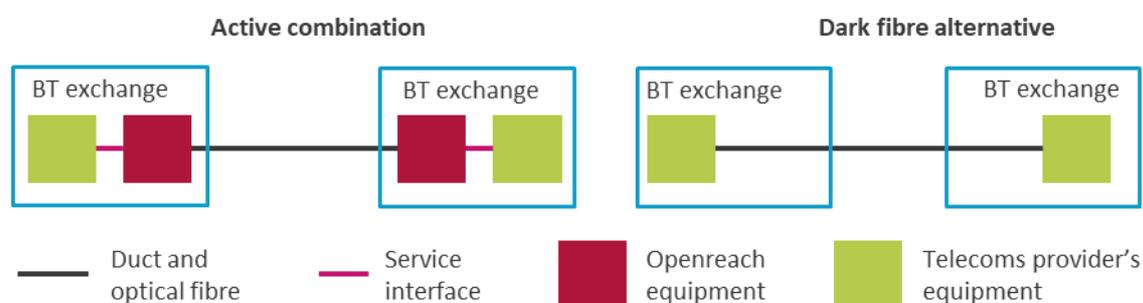
⁹⁷⁸ TalkTalk's response to the 2018 BCMR Consultation, paragraph 4.4.

⁹⁷⁹ Openreach's response to the 2018 BCMR Consultation, annex B, paragraphs 73-81.

⁹⁸⁰ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.35.

electronic equipment. In its consultation response, SSE⁹⁸¹ noted that it already installs its own equipment in exchange sites, which is designed to work with dark fibre. Respondents to our 2017 Dark Fibre Consultation also noted that their approach to using active services would lead to significant equipment savings if using dark fibre instead.⁹⁸²

Figure 12.1: Change in equipment used for active and dark fibre inter-exchange circuits



Source: Ofcom.

- 12.48 Accordingly, we consider that dark fibre provides the potential for reduced equipment duplication in many cases, and therefore there will be efficiency benefits. The scale of these benefits will depend on the proportion of electronics costs in Openreach active services, how easily telecoms providers can replicate the functionality of Openreach equipment (and associated costs) in different scenarios, and whether the absence of Openreach equipment introduces any countervailing costs.
- 12.49 Openreach argued that we had not computed an estimate of the equipment savings, and that we should have done so based on avoidable costs.⁹⁸³ BT Group did not dispute that some savings may be available by changing equipment configurations in some cases but argued we had not shown the benefits to be material.⁹⁸⁴
- 12.50 The available savings from reduced equipment duplication will vary dependent on the specific scenario. Factors such as the existing active service equipment configurations, the bandwidth of the circuit in question and whether the circuit is new or existing will affect the level of cost savings. We have not sought to model each individual instance of potential savings. However, in general, Openreach electronic components are a material proportion of the costs of active services and dark fibre will allow telecoms providers to take advantage of these savings where they arise. As an illustration, electronics comprise approximately £573 (23%) of the costs allocated to an Openreach EAD 1 Gbit/s circuit.⁹⁸⁵ We acknowledge that these costs include an allocation of common costs. However, as Openreach's consultation response notes, £391 of this cost is installed equipment (and therefore an incremental cost).⁹⁸⁶ We therefore consider this is indicative evidence that a

⁹⁸¹ SSE's response to the 2018 BCMR Consultation, page 9.

⁹⁸² Sky, TalkTalk, [3], and [3] responses to 2017 Dark Fibre Consultation.

⁹⁸³ Openreach's response to the 2018 BCMR Consultation, annex B, paragraphs 11 and 60.

⁹⁸⁴ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.31.

⁹⁸⁵ BT 2018 Regulatory Financial Statements, page 41, excluding main link costs.

⁹⁸⁶ Openreach's response to the 2018 BCMR Consultation, annex B, paragraph 60.

material proportion of the costs of an active service could be avoided where dark fibre is provided.

- 12.51 Several respondents agreed that dark fibre would create scope for cost savings. Three⁹⁸⁷ gave an illustration of the substantial cost savings that can be achieved using dark fibre, [§]. While a user of a dark fibre service may incur some additional costs to provide the equivalent of an active service, we do not think these are likely to be of sufficient scale to account for this full cost difference. [§]⁹⁸⁸ also considered the cost savings of using dark fibre with active DWDM equipment would be transformational versus the purchase of individual EAD services. Hyperoptic noted that it uses dark fibre for backhaul on a commercial basis, and this provides material savings over the cost of an EAD product (circa 40%).⁹⁸⁹ TalkTalk⁹⁹⁰ and SSE⁹⁹¹ noted general agreement with our consultation position that dark fibre provides cost savings through elimination of inefficient equipment duplication.
- 12.52 Openreach argued that our discussion on whether telecoms providers' equipment could replicate the functionality of Openreach equipment did not distinguish between 'transport' and 'switching and routing' equipment. It said that this meant that a provider's equipment in an exchange may not necessarily be able to replicate Openreach's functionality.⁹⁹² Our understanding is that equipment that can perform both functions is readily available, though in cases where it is not we acknowledge that cost savings may be smaller as telecoms providers may have to invest in additional equipment.
- 12.53 Openreach also explained that its equipment, which would be removed, facilitates Openreach operational processes and operational performance and reduces overall operations costs.⁹⁹³ BT Group supported Openreach's comments.⁹⁹⁴ Telecoms providers may need to invest in systems and processes to manage services provided over dark fibre. This might also include recruitment of a field force to install and maintain equipment. However, we consider that the prospective users of dark fibre in inter-exchange connectivity are likely to have existing equipment in place, in which case they would already have this capability and require minimal additional investment. We discuss the potential impacts of dark fibre on faults and repairs below.
- 12.54 In general, we acknowledge that the potential savings available from reduced equipment duplication will differ from case to case. However, in many cases, there will be an opportunity to reduce the overall amount of equipment required to deliver a service and therefore a potential for cost savings. Incentives to use dark fibre will be stronger where these savings are greater.

⁹⁸⁷ Three's response to the 2018 BCMR Consultation, paragraph 4.12.

⁹⁸⁸ [§].

⁹⁸⁹ Hyperoptic's response to the 2018 BCMR Consultation, page 7.

⁹⁹⁰ TalkTalk's response to the 2018 BCMR Consultation, paragraph 4.3.

⁹⁹¹ SSE's response to the 2018 BCMR Consultation, page 9.

⁹⁹² Openreach's response to the 2018 BCMR Consultation, Annex B, paragraphs 62-65.

⁹⁹³ Openreach's response to the 2018 BCMR Consultation, Annex B, paragraph 54.

⁹⁹⁴ BT Group's response to the 2018 BCMR Consultation, paragraph 5.31.

OSA Filter Connect does not replicate all the benefits of dark fibre

- 12.55 Openreach launched OSA Filter Connect in 2018. This WDM product, which includes an active 10 Gbit/s circuit managed by Openreach for fault management, provides flexibility for telecoms providers to add their own equipment to other wavelength channels and provides lower-cost bandwidth upgrades through the addition of additional channels.
- 12.56 Openreach argued that OSA Filter Connect delivers the benefits we have claimed for dark fibre and could allow users to sell services between exchanges on a wholesale basis at very low marginal cost. Openreach argued this would act as an effective competitive constraint, meaning dark fibre is not necessary.⁹⁹⁵ BT Group also argued that the benefits from dark fibre were not significantly greater than those available with OSA Filter Connect.⁹⁹⁶ Virgin Media agreed with this statement, arguing that: “If there are already sufficient active products available to the market, then there is no need to introduce a new dark fibre remedy”.⁹⁹⁷
- 12.57 We recognise that OSA Filter Connect provides additional flexibility over other active services, and therefore may deliver some of the benefits of dark fibre described above. At the same time, it is a managed service, meaning telecoms providers may not have to invest in the same systems and processes as they would for dark fibre.
- 12.58 However, OSA Filter Connect does not replicate all the benefits of dark fibre. As the base product includes a 10 Gbit/s active circuit, there may still be limits on the features that can be deployed. For example, Gigaclear noted this would prevent it from using a DWDM solution.⁹⁹⁸ There may also be equipment duplication, and hence scope for some cost savings if dark fibre was used instead. TalkTalk argued that if there are benefits to the managed and monitored service then Openreach should offer a monitored variant of dark fibre and allow telecoms providers to choose what suits their needs.
- 12.59 In addition, the product’s cost base means that it is more expensive than an equivalent active product or dark fibre-based product for bandwidths of 10 Gbit/s and below. Therefore, it would likely only be suitable for those with requirements for bandwidth over 10 Gbit/s. TalkTalk agreed, stating that the starting configuration of WDM equipment and an active 10 Gbit/s wavelength could represent unnecessary gold plating if a user’s current and future requirements were not greater than 10 Gbit/s. If the user used the 10 Gbit/s active wavelength then they would not be able to benefit from flexibility in the active layer, and if they didn’t use this channel and instead used another to gain flexibility the equipment used to provide the active channel would be wasted.⁹⁹⁹
- 12.60 Openreach said we had ignored that the price difference between OSA Filter Connect and a 10 Gbit/s EAD is due to a higher connection charge which reflects the additional cost of

⁹⁹⁵ Openreach’s response to the 2018 BCMR Consultation, Annex B, paragraphs 45-47.

⁹⁹⁶ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 5.33-5.34.

⁹⁹⁷ Virgin Media’s response to the 2018 BCMR Consultation, page 17.

⁹⁹⁸ Gigaclear’s response to the 2018 BCMR Consultation, page 2.

⁹⁹⁹ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 4.8.

filters installed to allow provision of bandwidths above 10 Gbit/s. Openreach argued customers could choose a 10 Gbit/s EAD if they never intended to go above that bandwidth in future, and OSA Filter Connect if they did want the potential for higher bandwidths. Openreach argued that a telecoms provider installing dark fibre would face the same choice of whether or not to install a filter (and so incur additional costs), to allow flexibility for future increases in bandwidth.¹⁰⁰⁰

- 12.61 We note that prices for 10 Gbit/s active products and OSA Filter Connect are substantially above cost, meaning that in this comparison both options are significantly more expensive than an equivalent service using regulated dark fibre, as TalkTalk noted.¹⁰⁰¹
- 12.62 Dark fibre will allow users to choose the most appropriate solution for their needs, taking account of the additional flexibility of dark fibre and the greater management of OSA Filter Connect. It will also put downward pressure on the price of OSA Filter Connect, as alternative telecoms providers could offer competing services to OSA Filter Connect using dark fibre as a component. Alternative providers could also use dark fibre to compete on other dimensions such as quality or product offering, and so may encourage Openreach to make improvements to the OSA Filter Connect product. For this reason, we do not require Openreach to offer a monitored variant of dark fibre, though it is open to Openreach to develop such a product. This fits with our general preference to regulate as far upstream as possible in order to promote greater choice and facilitate downstream competition – in this case dark fibre could allow competition between OSA Filter Connect and other services using dark fibre as an input.

Pass through of benefits to consumers

- 12.63 Inter-exchange connectivity is an important component of downstream broadband, mobile, and leased line services. The benefits of dark fibre, outlined above, mean that dark fibre is likely to significantly reduce these costs. Where telecoms providers face capacity constraints due to the currently high cost of upgrading bandwidth, dark fibre could relieve these constraints. This directly benefits consumers through improvements in the quality of their service and potential for lower costs to be passed on to consumers. This could also act as an enabler for investment in access areas by reducing the cost of inter-exchange connectivity. For example, access investment in a densely populated conurbation in a rural location could be economic, but the current high cost of inter-exchange connectivity could make it uneconomic to provide services to that area.
- 12.64 Openreach argued that it was unclear which potential access markets could benefit from additional investment as a result of the dark fibre remedy. Openreach noted that it supplies business access circuits irrespective of location (subject to ECCs) and there was no suggestion that MNOs required cheap backhaul to roll out 5G services. Openreach also said

¹⁰⁰⁰ Openreach's response to the 2018 BCMR Consultation, Annex B, paragraphs 69-70.

¹⁰⁰¹ TalkTalk's response to the 2018 BCMR Consultation, paragraph 4.8.

that we had not provided evidence of the extent to which lower cost backhaul might incentivise marginal infrastructure build in consumer broadband.¹⁰⁰²

12.65 In contrast, several stakeholders, including mobile network operators, highlighted their increasing demand for backhaul and current constraints which dark fibre could alleviate.

- Sky noted that its demand for backhaul was growing as its broadband customers consumed more data, and that inter-exchange dark fibre would allow it to increase its backhaul capacity more efficiently;¹⁰⁰³
- Three noted the increase in mobile backhaul capacity requirements between exchanges with the rollout of 5G, and the potential for dark fibre to reduce the costs of this;¹⁰⁰⁴
- Vodafone noted the importance of backhaul transmission and ensuring this does not become a bottleneck. For example, Vodafone described the need for high bandwidth transmission capacity between aggregation nodes (typically BT exchanges) to accommodate 5G;¹⁰⁰⁵ and
- Gigaclear highlighted the benefits of dark fibre in reducing the cost of backhaul to facilitate investment in access areas.¹⁰⁰⁶

12.66 Openreach argued that the impact of dark fibre from BT Only exchanges would be small. It said that many BT Only exchanges serve few premises and few leased lines. Of the BT Only exchanges which it considered serve a sizable level of access demand, it estimated that just a third were in potentially competitive areas, and therefore dark fibre could only be relevant to investment decisions affecting around 9% of UK premises.¹⁰⁰⁷

12.67 We have not assessed the accuracy of Openreach's estimates. However, we note that to the extent they are correct, this evidence conforms with our expectations of the potential impact of dark fibre. In areas where competitive backhaul is available, or further investment in backhaul is likely, dark fibre is not necessary to enable access infrastructure investment. In some other areas, access investment is unlikely to be economic even if lower cost backhaul is available. However, as Openreach's estimate highlights, there are a material proportion of premises in areas where access investment could be economic, where there is currently no competitive supply of backhaul, and prospects for this to emerge in future are limited. This could create a bottleneck and give Openreach market power that it could use to frustrate infrastructure competition in these areas. Relieving this bottleneck would deliver benefits to many end consumers by enabling greater investment in access networks.

12.68 BT Group also argued that it was questionable that the reductions in cost from dark fibre would be sufficient to change build decisions.¹⁰⁰⁸ [X]. We consider that BT's estimate of

¹⁰⁰² Openreach's response to the 2018 BCMR Consultation, Annex B, paragraphs 45-47.

¹⁰⁰³ Sky's response to the 2018 BCMR Consultation, paragraph 8.

¹⁰⁰⁴ Three's response to the 2018 BCMR Consultation, paragraph 1.3.

¹⁰⁰⁵ Vodafone's response to the 2018 BCMR Consultation, part 3, paragraph 1.1.1 and part 2, paragraph 2.17.

¹⁰⁰⁶ Gigaclear's response to the 2018 BCMR Consultation, page 2.

¹⁰⁰⁷ Openreach's response to the 2018 BCMR Consultation, Annex B, paragraphs 118-127.

¹⁰⁰⁸ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.26.

potential cost savings is material, and likely to be sufficient to influence build decisions in marginal cases.

- 12.69 Openreach also noted that the gains from dark fibre were dependent on telecoms providers passing the lower cost of inter-exchange connectivity through to retail consumers.¹⁰⁰⁹ Openreach argued that this was unlikely to occur.
- 12.70 The pass through of cost savings is uncertain. However, given the competitiveness of downstream retail markets, we think it is reasonable to expect some proportion of cost savings to be passed through to consumers. In any case, where dark fibre relieves capacity constraints, the benefits of this are directly passed onto consumers through higher quality services even without a price change.

Assessment of risks of dark fibre

12.71 In this sub-section we set out our assessment of the potential adverse consequences that could arise as a result of the introduction of dark fibre. We consider whether the dark fibre remedy has the potential to:

- weaken incentives of rival providers to invest in backhaul or core network and services;
- have an adverse impact on economic efficiency as a result of erosion of the bandwidth gradient;
- lead to inefficient decisions in downstream network structures;
- result in stranded assets for BT;
- create incentives for telecoms providers to arbitrage by using dark fibre for short distances and EBD for longer connections; or
- result in an increase in faults or make it harder to detect and repair faults.

Impact on incentives to invest

12.72 We have considered carefully the likely impact on rival investment. We recognise that there is a risk that dark fibre could deter competitors from connecting to BT exchanges to provide backhaul or core services and so undermine the provision of services based on competing network infrastructure. Openreach,¹⁰¹⁰ BT Group,¹⁰¹¹ Virgin Media,¹⁰¹² IIG,¹⁰¹³ CityFibre¹⁰¹⁴, and Zayo¹⁰¹⁵ all expressed concerns that dark fibre could deter investment to connect to any exchange where it is available. We consider and address these risks below (under the heading Scope of dark fibre), where we explain our decision to limit the scope of the remedy to routes from BT Only exchanges where the nearest rival PCO network is more than 100m away.

¹⁰⁰⁹ Openreach's response to the 2018 BCMR Consultation, Annex B, paragraphs 92-97.

¹⁰¹⁰ Openreach's response to the 2018 BCMR Consultation, page 10, paragraph 30.

¹⁰¹¹ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 5.7-5.9, 5.14-5.15.

¹⁰¹² Virgin Media's response to the 2018 BCMR Consultation, page 16.

¹⁰¹³ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.3.4.

¹⁰¹⁴ CityFibre's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.1.11.

¹⁰¹⁵ Zayo's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.10.

- 12.73 Openreach¹⁰¹⁶ and Virgin Media¹⁰¹⁷ also argued that dark fibre could undermine competitive routes by allowing telecoms providers to bypass these using dark fibre via non-competitive exchanges. We discuss this issue below, where we explain that in our view it is reasonable for Openreach to take steps to address such concerns, provided these do not unduly restrict circuit configurations. This, combined with the limited scope of the remedy, reduces the potential for dark fibre to be used to bypass competitive routes and so reduces the risk that existing investments or future incentives to invest in competitive routes would be materially undermined.
- 12.74 Limiting the scope of the remedy to exchanges where network-based competition is least likely, and allowing rules to mitigate the risk of bypass for competitive routes, means that the impact on rival investment is likely to be small.

Impact on efficient cost recovery

- 12.75 BT has a large amount of fixed and common costs and needs to make sufficient revenue to allow for their recovery. We have historically provided Openreach with flexibility to set prices for individual products, which has resulted in it pricing according to a bandwidth gradient.¹⁰¹⁸ Openreach¹⁰¹⁹ and BT Group¹⁰²⁰ argued that this allows a more efficient recovery of these fixed and common costs, and this improves allocative efficiency.
- 12.76 As discussed above, the introduction of a regulated dark fibre product is likely to reduce Openreach's ability to price its active services above cost, particularly for VHB services for inter-exchange routes where dark fibre is available. As such, it is likely to erode the existing bandwidth gradient. Alternatively, if Openreach does not adjust its prices, then it could see increased switching from active services to dark fibre.
- 12.77 We acknowledge that in theory a bandwidth gradient can allow a more efficient recovery of common costs relative to a flat pricing structure. This could be the case if a greater share of fixed or common costs were recovered from products with more inelastic demand. To the extent low bandwidth consumers are more price sensitive, total output could be expanded if higher prices for high bandwidth circuits allowed lower prices for low bandwidths.
- 12.78 However, this is not what currently happens. Openreach's prices for circuits 1 Gbit/s and below were subject to a charge control under the Temporary Conditions. That control was set with reference to projections of BT's costs, the base year for which included an

¹⁰¹⁶ Openreach's response to the 2018 BCMR Consultation, Annex B, paragraph 138.

¹⁰¹⁷ Virgin Media's response to the 2018 BCMR Consultation, page 18.

¹⁰¹⁸ BT needs to make sufficient profit to cover its costs. This includes covering its common costs, i.e. indirect costs such as overheads that cannot be attributed to the supply of a specific product. The most (allocatively) efficient way to recover these costs is for BT to charge prices that are sufficiently high to recover common costs, but that are structured in a way that allows as many customers as possible to buy leased lines. This could mean charging higher prices to customers with higher willingness to pay, usually those purchasing higher bandwidths, and lower prices to customers with a lower willingness to pay. This type of pricing structure is known as a bandwidth gradient.

¹⁰¹⁹ Openreach's response to the 2018 BCMR Consultation, page 10, paragraph 59.

¹⁰²⁰ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.35.

attribution of fixed and common costs that had only a weak link to bandwidth costs.¹⁰²¹ Higher costs for VHB circuits – such as the cost of the electronics – had a small impact on the amount of common costs allocated to lower bandwidth products. Our analysis shows that BT has generally priced to the cap allowed within leased lines charge controls.¹⁰²² BT has therefore recovered its costs without the need for enhanced contributions from VHB services.

- 12.79 Therefore, high VHB prices and margins are not facilitating materially lower prices or common cost recovery for lower bandwidth services, and so it is not clear that BT’s bandwidth gradient is materially expanding the availability of these services. Indeed, if dark fibre led to a reduction in VHB prices (or sales), BT would still recover its costs without an increase in prices for lower bandwidth services. In consultation responses, TalkTalk¹⁰²³ and Three¹⁰²⁴ agreed with this analysis. This reduction in VHB prices could enhance allocative efficiency if it leads to an expansion in output from higher consumption of VHB services.
- 12.80 Openreach also argues that past Ofcom statements (in Colt’s appeal of the 2013 BCMR, and in the 2016 BCMR) supported the principle of allowing market participants to determine the structure of tariffs and the benefits of a bandwidth gradient.¹⁰²⁵ However, we note that these comments were in the context of the flexibility to set prices within an overall basket set to cost. In this scenario, where Openreach sets prices for some products above cost, the basket control would require it to price other products below cost and, depending how this is done, might generate allocative efficiency benefits. This is not analogous to the current situation where 1 Gbit/s services are charge controlled but VHB is unregulated, as there is no regulatory link between prices for VHB and 1 Gbit/s and below services.
- 12.81 Therefore, we do not consider that the dark fibre remedy we have decided to impose is likely to result in an adverse impact on allocative efficiency through a reduction in total sales due to higher prices for lower bandwidth products. Lower bandwidth services already

¹⁰²¹ BT’s prices for lower bandwidth products were controlled under the Temporary Conditions. These controls reflect attributions of costs some of which do not vary by bandwidth – for example the costs of passive components such as duct and fibre and some common costs such as Systems development, Ethernet Monitoring platform and accommodation costs. Some costs (Ofcom Admin Fee, Openreach Sales Product Management and Revenue Receivables) are allocated based on revenue, so that lower VHB prices would reduce the share allocated to VHB, but these costs only account for a small proportion of total costs (less than 2% of the total costs allocated to an EAD 1 Gbit/s circuit, for example). Ethernet Electronics (which include overheads) are allocated based on the relative price of the electronics used to provide the service, so higher bandwidth circuits with more expensive electronics will be allocated a higher share of these overheads. See BT’s 2018 Regulatory Financial Statements, <https://www.btplc.com/Thegroup/Policyandregulation/Governance/Financialstatements/2018/RegulatoryFinancialStatements2018.pdf> [accessed 22 May 2019] and BT’s Accounting Methodology Document, https://www.btplc.com/Thegroup/Policyandregulation/Governance/Financialstatements/2018/AMD_2017-18.pdf [accessed 22 May 2019].

¹⁰²² In 2016/17, BT priced to the cap for the CISBO basket. In the period December 2017-March 2018 (the first period of reporting under the Temporary Conditions), BT reduced prices by 1% more than required by the charge control. However, BT’s 2018 Regulatory Financial Statements indicate that its return on capital was 10%, broadly in line with the cost of capital set at the time of the last charge control.

¹⁰²³ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 4.7.

¹⁰²⁴ Three’s response to the 2018 BCMR Consultation, paragraph 5.5.

¹⁰²⁵ Openreach’s response to the 2018 BCMR Consultation, Annex B, paragraphs 73-81.

recover costs, so a reduction in the price of VHB services does not need to be offset by an increase in lower bandwidth prices.

- 12.82 There is also significant evidence to suggest that the bandwidth gradient is already flattening and has limited impact on expanding total sales:
- in its internal documents Openreach notes “[<]”.¹⁰²⁶ This view is consistent with BT’s latest announced price reductions from October 2018, where it reduced the price of 1 Gbit/s but left the price of 100 Mbit/s unchanged;
 - Figure A7.3 shows that, over time, Openreach’s Ethernet prices are declining and the price gap across bandwidths is narrowing. The latest pricing announcement taking effect from 1 October 2018 resulted in a price differential of less than 10% between 100Mbit/s and 1 Gbit/s, down from 23%;¹⁰²⁷ and
 - Openreach has launched the new OSA Filter Connect product. In its internal documents Openreach notes that OSA Filter Connect [<]¹⁰²⁸. It notes that part of the reason for introducing the new product is to remain competitive, address new market opportunities and meet the needs of its customers.
- 12.83 In its consultation response Openreach pointed out that the bandwidth gradient has not been reducing between 1 Gbit/s and 10 Gbit/s.¹⁰²⁹ In our view this is likely to reflect the fact that 1 Gbit/s circuits are subject to a charge control and 10 Gbit/s circuits are not, rather than any inherent efficiency gains from maintaining this differential.
- 12.84 Therefore, we do not consider that the dark fibre remedy will have an adverse impact on economic efficiency or BT’s ability to recover appropriately incurred costs. It is more likely that it will improve economic (allocative) efficiency by bringing prices closer to costs (and therefore expanding overall output), particularly for VHB services.

Impact on downstream network structures

- 12.85 In its consultation response, Openreach argued that regulated dark fibre creates inefficiencies through the impact it has on telecoms providers’ choice of downstream network structure.¹⁰³⁰ We understand Openreach’s concern to be that the regulated price of dark fibre does not reflect the true marginal cost of fibre which gives rise to two potential issues related to a hypothetical vertically integrated monopoly:
- incentives for inefficient downstream network architectures which reduce overall productive efficiency (e.g. “fibre-lean” network architectures that deploy relatively

¹⁰²⁶ Openreach response to Question 4 of the BCMR s.135-8 Notice, document entitled “Leased Lines Charge Control Ethernet Prices for April 2018”, dated 26 February 2018, page 2.

¹⁰²⁷ Prices are calculated on a Total Cost of Ownership (TCO) basis and include rental, connection and main link charges (see [Openreach EAD price list](#) [accessed 25 September 2018]). Based on an annual rental price of £1,698 for EAD 100Mbit/s pre and post 1 October 2018 and £2,460 for EAD 1000Mbit/s pre 1 October 2018 and £1,944 post 1 October 2018. Connection charges are the same for both products, spread over a three-year period and discounted using a 9% WACC. For main link charges, we assume a 5km link distance. [accessed 25 September 2018].

¹⁰²⁸ Openreach response to Question 4 of the BCMR s.135-8 Notice, document entitled “New pricing and product launches for VHB portfolio”, dated 22 January 2018, page 2.

¹⁰²⁹ Openreach’s response to the 2018 BCMR Consultation, Annex B, paragraphs 92-97.

¹⁰³⁰ Openreach’s response to the 2018 BCMR Consultation, Annex B, paragraphs 82-91.

few fibre strands on a given route and make greater use of electronics to aggregate traffic); and

- incentives for inefficient aggregation, which could affect Openreach’s ability to recover its costs. We discuss this second concern in the sub-section below on ‘Stranded assets for BT’.

12.86 As discussed below, our approach to pricing dark fibre is to use a cost basis, which does not vary with bandwidth or fibre utilisation on a given route. Given BT’s cost structure, allocated fixed and common costs will dominate the price of dark fibre. However, the marginal cost of fibre is either very low (if a route has existing spare fibre) or very high (if no spare fibre is available meaning Openreach would need to lay additional fibre).

12.87 Therefore, as a result of our approach to pricing, telecoms providers may prefer to choose network configurations that use less fibre and more electronics, relative to a hypothetical vertically integrated operator making decisions on the basis of marginal cost. Openreach argues that this is less efficient as it results in the use of additional electronics rather than the use of fibre for which a large proportion of costs are sunk. In Openreach’s view, a “fibre-rich” network is more efficient than a “fibre-lean” one.

12.88 It is difficult to be definitive on the most efficient network structure, and this will also depend on operators’ objectives. Trade-offs involved in network design are affected by a range of factors. Some of these relate to marginal cost, but also relevant are underlying demand (which is increasing in capacity terms), distance, reliability, availability and resilience. As Openreach notes, marginal costs (and therefore efficient network structure) could vary on a route-by-route basis. The marginal cost of fibre is not necessarily low. This is only the case if we assume that installed fibre is treated as sunk with excess supply. Given there is a finite amount of unused fibre on a given route, the use of spare fibre has an opportunity cost due to the change in future optionality and the increased likelihood of a need for subsequent investment in expanding capacity. Therefore, the marginal cost of using an additional fibre should account for this.

12.89 Openreach¹⁰³¹ acknowledged that multiplexing may be a good solution where existing fibre is exhausted. Therefore, it is not clear that even a vertically integrated operator will always avoid multiplexing as it depends on specifics in relation to the route in question – such as the availability of spare fibre and future expectations of demand for fibre on that route.

12.90 Further, a vertically integrated operator is not necessarily the right benchmark for determining efficient network structures. Openreach’s example is purely hypothetical, and it is not clear how this relates to its current network design. The current model of regulation is based on upstream wholesale regulation, requiring access to Openreach’s network to enable downstream competition. A vertically integrated supplier might make decisions on network structure based on marginal costs, but there would be a range of other issues associated with this model of regulation. These include risks of

¹⁰³¹ Openreach’s response to the 2018 BCMR Consultation, Annex B, paragraph 109.

X-inefficiency,¹⁰³² incentives to favour integrated downstream businesses over rivals and regulatory gaming.

- 12.91 It is not clear that dark fibre will materially shift telecoms providers towards adopting fibre-lean network structures relative to the current situation. In our view, the relevant counterfactual, in areas where dark fibre would be introduced, is a provider buying active services. We do not expect rival network build on these routes, therefore pricing of dark fibre does not have a material impact on incentives to use unrestricted PIA (and construct a “fibre-rich” network).
- 12.92 Under this counterfactual, there are already incentives to use less fibre and more electronics (as discussed below), so additional aggregation opportunities created by dark fibre are likely to be limited. Routes from BT Only exchanges typically have few circuits, giving little potential for aggregation to have a substantial effect on the average number of circuits per route. In addition, telecoms providers tend to aggregate traffic using active services and are incentivised to do so by the pricing of active products. Therefore, there is likely to be limited scope for additional aggregation. Further, BT itself aggregates traffic rather than using a “fibre-rich” approach, for example, in providing EBD services.
- 12.93 In any case, even if dark fibre led to a material shift to a more “fibre-lean” network structure, there would be offsetting productive efficiency benefits. For example, aggregation could allow the replacement of several sets of electronics with a single set (albeit likely at higher unit cost), on top of the benefits of reduced equipment duplication discussed above. Aggregation could also alleviate risks of fibre exhaustion by reducing the number of fibres in use on a given route. At a time where demand for capacity is growing, aggregation capabilities could bring efficiencies, for example, by allowing easier bandwidth upgrades. Further, dark fibre exposes more of the value chain to competition, which could drive further productive efficiencies as discussed above.
- 12.94 Therefore, even if it is the case that a fibre-rich network design is more efficient, the incremental impact of dark fibre on achieving this is limited when compared to the current set of active products, and the overall net effect on productive efficiency is unclear.
- 12.95 In any case, Openreach’s arguments imply that dark fibre should be priced at its marginal cost to achieve a “fibre-rich” network. This implied marginal cost pricing approach is unlikely to be desirable as:
- Short-run marginal cost is not likely to be an appropriate basis for setting regulated charges as these need to account for fixed, sunk, and common costs, such as the cost of installing or replacing fibre.
 - Pricing at marginal cost could create a different set of issues associated with telecoms providers’ incentives. For example, dark fibre users might be incentivised to overconsume “spare” dark fibre so that competing telecoms providers have to pay the high incremental cost of installing new fibre.

¹⁰³² Inefficiency due to lack of competitive pressure.

- 12.96 In summary, we do not think that Openreach’s concerns about downstream network structures represent a material risk. If this were to become an issue in the future, then we could consider changes to our approach to pricing to account for this.
- 12.97 Separately, IIG¹⁰³³ (supported by CityFibre¹⁰³⁴ and Zayo¹⁰³⁵) was concerned that dark fibre would entrench BT’s network architecture, as compared to unrestricted PIA which would give operators the flexibility to deploy more efficient network structures. In our view, if such alternative architectures are beneficial then telecoms providers can opt to deploy these using PIA rather than purchasing dark fibre.

Stranded assets for BT

- 12.98 There is a risk that the availability of a regulated dark fibre product will mean that investment in infrastructure that BT has made may become obsolete or cannot be used. If such stranded assets are not appropriately taken into account in setting the price for BT’s other services, this could lead to perceived regulatory instability or uncertainty which could reduce BT’s incentives to invest in infrastructure in the future.
- 12.99 The risk of stranded assets could come from two sources:
- the active layer or electronics: as these will no longer be included in dark fibre services that replace active services; or
 - fibres: to the extent that telecoms providers have a greater incentive to aggregate leading to reduced fibre utilisation on a given route.
- 12.100 In general, we consider that the risk of stranded assets is low. The main passive infrastructure, such as existing ducts, would continue to be used in the provision of the dark fibre remedy.
- 12.101 Electronics have a comparatively shorter lifespan compared to passive infrastructure and the cost of electronics is small relative to the cost of passive infrastructure (see Section 3). We expect BT to recover the majority of its circuit-specific costs across the contract period and therefore consider the risk of stranded electronics to be very low.
- 12.102 Dark fibre may result in additional aggregation opportunities which could cause some fibre to become stranded if it cannot be reused to provide an additional dark fibre circuit or another active service. As set out above, aggregation is an important benefit where it allows for more efficient upgrading of bandwidth. However, we also note that there are already strong incentives to aggregate. For example, a telecoms provider requiring more than 10 Gbit/s already has an incentive to upgrade to OSA Filter Connect rather than purchase a second active circuit. Therefore, we consider that the additional incentives to aggregate due to the introduction of dark fibre are small, and any incremental stranded fibre is likely to be small.

¹⁰³³ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraphs 7.3.15-7.3.18.

¹⁰³⁴ CityFibre’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.1.14.

¹⁰³⁵ Zayo’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.16.

- 12.103 Openreach expressed concern that telecoms providers will order dark fibre before ceasing their existing active services, and that this would lead to Openreach having to lay new fibre which is then redundant when the active services are ceased.¹⁰³⁶ As this would only occur on routes with exhausted (or near-exhausted) fibre, we think this risk is likely to be small,¹⁰³⁷ and in any case creates an incentive for Openreach to provide suitable cost based migration products.
- 12.104 In any case, to the extent that some stranding of BT’s assets does occur, this is accounted for in our approach to price controls. Our modelling shows that, even in high scenarios for dark fibre, migration does not result in risks to cost recovery. Further, to the extent that dark fibre leads to a material change in fibre utilisation, this would be reflected in BT’s cost base and subsequent regulatory accounts and could be taken into account in future charge controls.

Incentives to arbitrage

- 12.105 The dark fibre remedy will be priced on a per kilometre basis (as set out in Volume 3). As EBD circuits are not, there may be incentives for customers to use dark fibre for relatively shorter connections and EBD for longer ones. If the costs of providing circuits are higher over longer distances but the price does not vary, and the typical EBD circuit increases in length as a result of dark fibre, there is a risk that BT would not be able to recover its costs.
- 12.106 We do not consider that this is a material risk. Our analysis suggests that the dark fibre remedy would almost always be more cost effective than an EBD 10 Gbit/s¹⁰³⁸ service, so there is no incentive to arbitrage at current EBD 10 Gbit/s prices. Instead, telecoms providers will purchase dark fibre for all distances where it is available. The distance at which the cheapest EBD 1 Gbit/s circuit would be more cost effective than a dark fibre circuit is likely to be substantially greater than the average EBD inter-exchange circuit. The long break-even distance means only a small proportion of 1 Gbit/s EBD inter-exchange circuits are likely to be affected.
- 12.107 Furthermore, EBD circuits currently account for [X]% of inter-exchange circuits from BT Only exchanges, of which 1 Gbit/s account for [X]%.¹⁰³⁹ Even if BT were to alter its pricing structure the impact is likely to be very limited. TalkTalk agreed that this should not be a point of concern, noting that if Openreach restructures its pricing it will be encouraged to set a cost structure more closely aligned to economic costs.¹⁰⁴⁰

¹⁰³⁶ Openreach’s response to the 2018 BCMR Consultation, Annex B, paragraph 110.

¹⁰³⁷ Openreach indicated there are currently just 130 routes with no spare fibre, out of all routes between 5,575 exchanges. ‘BCMR 2019: meeting between Openreach and Ofcom on the intended scope of the proposed Dark Fibre remedy for inter-exchange connectivity’ – December 2018: Openreach’s response to BCMR s.135-26 Notice.

¹⁰³⁸ For Band A, Band B and Band C circuits.

¹⁰³⁹ Ofcom analysis of Openreach response to Questions A1 and A2 of the BCMR s.135-1 Notice.

¹⁰⁴⁰ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 4.7.

- 12.108 In its consultation response, Openreach set out that EBD is based on legacy high-cost technology.¹⁰⁴¹ In our view, this means that overall it is likely to be more efficient for telecoms providers to replace EBD with dark fibre and modern electronics in any case.
- 12.109 The dark fibre charge control is based only on main link costs, whereas EAD pricing includes a fixed rental charge for local ends based on average local end utilisation. This is payable even if the EAD circuit does not use these local ends, as is the case in an inter-exchange circuit. [redacted].¹⁰⁴²

Fault frequency, detection and repair

- 12.110 In general, the overall causes of fibre faults in inter-exchange connectivity circuits will be similar whether they use active or dark fibre products as an input. However, where dark fibre allows a reduction in the total equipment used to deliver the service, there will be fewer points of failure and hence this should entail a lower frequency of faults overall. Dark fibre will therefore provide more reliable services and potentially reduce costs, through associated reductions in required repairs. For example, TalkTalk has estimated that [redacted]% of faults occur in the active layer.¹⁰⁴³
- 12.111 The fault detection and repair processes for dark fibre would differ from those for active services because telecoms providers other than Openreach would be operating the network equipment that facilitates monitoring and fault diagnosis. Openreach argued that there is no simple way for telecoms providers to replicate its faults processes as equipment will not be connected to the Openreach operations centre.¹⁰⁴⁴ However, we see no reason why telecoms providers should not be able to develop repair processes that perform at least as well with dark fibre as with Openreach wholesale active circuits. Repairs (except repairs to Openreach's fibre) would also be within the purchasing provider's control.
- 12.112 The concentration of remote monitoring and remote diagnoses with the purchasing provider could also reduce costs, by reducing the need for the provider to co-ordinate with Openreach if a fault does not relate to Openreach fibre.
- 12.113 In general, purchasers of dark fibre would have strong commercial incentives to manage faults effectively and coordinate with Openreach. TalkTalk noted that dark fibre gives incentives for telecoms providers to innovate in providing a lower fault rate or more rapid repair of faults. Openreach previously published a final reference offer for dark fibre, which included a description of the fault repair process agreed with providers. This provides a means for coordination between Openreach and providers which can help to improve repair times.
- 12.114 There may be a risk that telecoms providers could be incentivised to call out Openreach engineers when faults are detected without first identifying whether or not the fault is with their own equipment. We think that Openreach can also incentivise providers to make

¹⁰⁴¹ Openreach's response to the 2018 BCMR Consultation, Annex B, paragraph 67.

¹⁰⁴² [redacted].

¹⁰⁴³ [redacted].

¹⁰⁴⁴ Openreach's response to the 2018 BCMR Consultation, Annex B, paragraph 54.

efficient decisions on repair through an appropriate callout charge where a fault is incorrectly diagnosed, which is known as a Right When Tested (RWT) charge. Openreach argued that this will not have a material impact on the rate of RWT events and that the number of difficult or disputed faults would rise.¹⁰⁴⁵ We consider that providers would be appropriately incentivised when faced with RWT charges, and these charges allow Openreach to recover its costs associated with these events in any case. We discuss this further in Annex 20.

- 12.115 In summary, there are likely to be benefits from the dark fibre remedy in the form of lower overall fault rates and potentially reduced costs associated with fault reduction and repair. If potential dark fibre users had concerns about differences in fault detection or repair they would be able to choose an active service in this review period as an alternative if this better suited their needs.

Take-up of dark fibre in inter-exchange connectivity

- 12.116 The benefits of dark fibre will be proportional to the take-up of the remedy. We expect telecoms providers will use dark fibre over active products for inter-exchange connectivity where they are able to realise the benefits discussed above – cost savings and/or increased flexibility and control. However, we recognise that dark fibre orders may take time to ramp up following launch as providers seek to test their use of dark fibre and adopt a cautious approach until SLAs and SLGs are in place.
- 12.117 We also expect dark fibre take-up to vary based on the type of active product that would have been used absent a dark fibre remedy, and hence the available savings from the use of dark fibre. In general, EAD circuits are likely to be straightforward to replace with dark fibre and provide clear cost savings due to the lower price of dark fibre and reduced equipment duplication.¹⁰⁴⁶ These make up the majority [8<] of current Openreach sales from BT Only exchanges.¹⁰⁴⁷ Other product types, such as OSA or EBD, make up a minority of current Openreach sales from BT Only exchanges. For these, the cost savings from migration to dark fibre are less certain due to the potential need for telecoms providers to add additional equipment to replicate the service provided by Openreach.
- 12.118 Respondents to our consultation highlighted the benefits of dark fibre for their operations if available for use in inter-exchange connectivity. Several respondents provided information on their specific plans to use dark fibre within the scope proposed in the consultation. These included:
- TalkTalk stated their intention to consume dark fibre the majority of cases where there is a choice between dark fibre and an active Ethernet circuit. It expected over time to substantially reduce Ethernet demand for backhaul and transition backhaul

¹⁰⁴⁵ Openreach's response to the 2018 BCMR Consultation, Annex B, paragraphs 57-58.

¹⁰⁴⁶ We consider this is likely to hold even where providers incur additional costs due to non-domestic rates.

¹⁰⁴⁷ Ofcom analysis of Openreach response to Questions A1 and A2 of the BCMR s.135-1 Notice.

demand to dark fibre circuits, though minimum contract terms for existing circuits may introduce a time delay;¹⁰⁴⁸

- Vodafone noted that it had [X] connections that could qualify as dark fibre circuits, and it expected to order [X] dark fibre circuits in the first year of the remedy;¹⁰⁴⁹
- SSE indicated plans to purchase circa [X] circuits over the next [X] months;¹⁰⁵⁰
- Three indicated that the inter-exchange remedy for dark fibre had limited usefulness in its current form, though it identified a few instances of potential orders in the short term, and more in the medium term;¹⁰⁵¹
- In participating in the Scottish R100 Superfast Broadband programme Gigaclear identified “critical inter-exchange infrastructure that could deliver substantial delivery savings and an accelerated rollout schedule if a dark fibre remedy was available for use by alternative operators;¹⁰⁵² and
- Sorrento indicated plans for “significant” dark fibre orders.¹⁰⁵³

12.119 Openreach argued that many BT Only exchanges have no presence from WBA primary operators, and few leased lines.¹⁰⁵⁴ Openreach¹⁰⁵⁵ and BT Group¹⁰⁵⁶ also noted planned consolidation of exchanges to 1100 NGA handover points, and argued that this would limit take-up at exchanges that could be closed in future (or prevent the closure of these exchanges as planned by incentivising further investment in LLU services).

12.120 We acknowledge that the nature of inter-exchange connectivity demand and potential future exchange rationalisation will mean that demand for dark fibre will vary across BT Only exchanges. However, there are 346 NGA handover exchanges which are BT Only, where there is currently no alternative provider of inter-exchange connectivity. We therefore anticipate substantial and enduring demand for dark fibre from these exchanges in particular. Though these represent a small proportion of all BT Only exchanges in number, they are a much larger proportion of inter-exchange connectivity demand. For example, across all BT Only exchanges, Openreach supplies an average of [X] circuits per exchange compared to an average of [X] circuits at NGA BT Only exchanges.¹⁰⁵⁷ Given this, we believe NGA exchanges are likely to remain strategically important in the provision of access services for the foreseeable future.

12.121 Regarding other BT Only exchanges, telecoms providers are free to make their own decisions about whether or not to purchase dark fibre, based on the benefits to them and in the knowledge of potential future exchange closures and continued migration of consumer broadband to fibre products driven by retail market trends.

¹⁰⁴⁸ [X].

¹⁰⁴⁹ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 6.25.

¹⁰⁵⁰ [X].

¹⁰⁵¹ Three’s response to the 2018 BCMR Consultation, paragraph 4.15.

¹⁰⁵² Gigaclear’s response to the 2018 BCMR Consultation, page 2.

¹⁰⁵³ Sorrento Networks’ response to the 2018 BCMR Consultation, page 9.

¹⁰⁵⁴ Openreach’s response to the 2018 BCMR Consultation, Annex B, paragraph 124.

¹⁰⁵⁵ Openreach’s response to the 2018 BCMR Consultation, Annex B, paragraphs 165-166.

¹⁰⁵⁶ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 5.23-5.24.

¹⁰⁵⁷ Ofcom analysis of Openreach response to Questions A1 and A2 of the BCMR s.135-1 Notice.

12.122 Based on current active sales and responses to our consultation, there are incentives to purchase and use dark fibre for inter-exchange connectivity in a number of cases. We recognise that initial demand may take time to ramp up, and therefore the speed of take-up is uncertain. Nevertheless, we expect a material volume of dark fibre circuits to be purchased over this review period.

Conclusions

12.123 We have set out the benefits of introducing dark fibre for inter-exchange connectivity. The main benefits are:

- users can choose their own electronic equipment, enabling them to deliver services that better suit their needs and the needs of their customers;
- users can make efficient decisions on bandwidth upgrades based on the underlying costs of upgrades;
- users can eliminate inefficient active equipment duplication resulting in lower costs to telecoms providers; and
- users could deliver improvements more quickly than they can currently.

12.124 These benefits will allow telecoms providers to better compete on price, service quality, and product offering in downstream markets and act as an enabler for infrastructure build in marginal access areas.

12.125 We have also explained that the benefits are likely to be proportional to take-up of dark fibre. While we recognise that there is some uncertainty about the extent of take-up over the review period, we think there are strong incentives for telecoms providers to use dark fibre for a substantial proportion of inter-exchange circuits where it is available, and several providers have indicated firm plans to place dark fibre orders in this review period.

12.126 We have also considered the potential risks associated with implementing a dark fibre remedy. Overall, we think these risks are limited, and/or can be materially reduced through the design of the remedy. More specifically:

- we have explained that we do not think there is evidence to suggest that a flattening of the bandwidth gradient will have an adverse impact on economic efficiency. In fact, we think the remedy is likely to place downward pressure on the price of VHB circuits resulting in prices closer to cost, which would improve efficiency;
- we have considered whether the dark fibre remedy would result in an under-recovery of costs for BT. The factors we have considered include whether our decision results in inefficient choices of network structure, stranded assets for BT or incentives for telecoms providers to arbitrage using dark fibre for relatively shorter connections and EBD for longer connections. We have assessed these issues and explained that we consider the risk to be very low;
- we have explained that rather than increase faults, we would likely expect benefits from the dark fibre remedy in the form of lower fault rates and potentially reduced costs associated with fault reduction and repair; and
- we recognise that there is a risk that the dark fibre remedy could deter competitors from connecting to BT exchanges to provide backhaul or core services. We have

decided to limit dark fibre to routes from BT Only exchanges where the nearest rival PCO network is more than 100m away to ensure this risk is small (see “Scope of the remedy” sub-section below).

- 12.127 Overall, we consider there are considerable benefits that would arise from the introduction of dark fibre between exchanges that outweigh the limited risks that we have described above.

Scope of dark fibre

Our proposals

- 12.128 We proposed a requirement that BT make dark fibre available on routes from all of the BT Only exchanges identified in our market analysis, where network-based competition is least likely. We considered extending the scope of dark fibre to include routes from BT+1 exchanges.¹⁰⁵⁸ However, we considered that a broader scope risked deterring rival network operators from connecting to these exchanges and developing their own backhaul networks, especially following the introduction of the proposed unrestricted PIA remedy.

Stakeholder responses

- 12.129 Eleven respondents¹⁰⁵⁹ argued that the scope of dark fibre should be wider and include more exchanges, to enable greater take up and therefore higher total benefits. Openreach¹⁰⁶⁰ and BT Group¹⁰⁶¹ argued dark fibre should not be introduced anywhere. As discussed in Section 10, IIG,¹⁰⁶² CityFibre¹⁰⁶³ and Zayo¹⁰⁶⁴ argued that dark fibre should not be made available yet. Virgin Media argued that dark fibre should not be made available at BT Only exchanges where any rival PCO networks are close and therefore could invest to connect to the exchange.¹⁰⁶⁵

Our reasoning on scope of dark fibre

- 12.130 Dark fibre replicates many of the benefits for network operators of owning their own network. The more attractive it is to buy dark fibre, the less likely operators are likely to roll out their own network. This can include rolling out network using BT’s ducts and pole infrastructure.
- 12.131 In determining the appropriate scope of the dark fibre remedy in this review period we have placed significant weight on the impact of the remedy on rival investment, in line with our strategy to promote network-based competition (as set out in Section 10). In

¹⁰⁵⁸ This would consist of routes from BT+1 to BT+1 or BT+2 exchanges, as routes from BT+0 to BT+1 exchanges are included in our proposals to make dark fibre available from BT Only exchanges.

¹⁰⁵⁹ Colt, Hyperoptic, PAG, Sky, Sorrento Networks, SSE, TalkTalk, Three, UKCTA, Vodafone and [3].

¹⁰⁶⁰ Openreach’s response to the 2018 BCMR Consultation, page 5, paragraph 6.

¹⁰⁶¹ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.3.

¹⁰⁶² IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.3.2.

¹⁰⁶³ CityFibre’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.1.10.

¹⁰⁶⁴ Zayo’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.12.

¹⁰⁶⁵ Virgin Media’s response to the 2018 BCMR Consultation, page 17.

Volume 1, we set out our decision to introduce unrestricted access to BT’s ducts and poles which will make it cheaper and easier for competitors to build new networks. Where dark fibre is available, it is likely to be more attractive than active services, particularly for higher bandwidth services. Accordingly, dark fibre is likely to increase incentives for telecoms providers to purchase access to BT’s network rather than building competing infrastructure. Given our strategy, and the potential impact of dark fibre on investment incentives, we are cautious about the scope of the dark fibre remedy. For now, we are taking a conservative approach and therefore consider dark fibre is currently only appropriate where material rival investment is very unlikely. We explain our decision to not impose dark fibre in the CI Access services market in Section 10.

12.132 To determine the appropriate scope of our remedy, we have considered the potential for investment in backhaul or core connectivity in the different parts of the market where we have concluded that BT has SMP (i.e. routes from BT Only and BT+1 exchanges). Our consultation proposed to implement a dark fibre access remedy on all routes from BT Only exchanges. In the light of responses to our proposals submitted by respondents to the consultation, we have given further consideration to the potential impact on investment of a dark fibre remedy at BT Only exchanges where rival infrastructure is close. We have decided to limit the scope of dark fibre to BT Only exchanges where the nearest rival PCO network is more than 100m away, to mitigate these risks.

12.133 As the remedy will only apply to routes from BT Only exchanges without close rival infrastructure, there will be no impact on existing investment undertaken by other Principal Core Operators (PCOs). However, it could still have an impact on future investment by PCOs with network further from an exchange, as it would lead to lower prices for services between BT exchanges and thereby deter rivals from:

- connecting to a BT exchange to provide backhaul services; and/or
- investing in competing routes to backhaul traffic.

12.134 We have therefore mitigated risks to rival investment by restricting the scope of dark fibre and we consider remaining risks to be very low.

12.135 In the following paragraphs we set out our analysis of the potential risks to investment and explain our decision to limit the scope of the dark fibre remedy to BT Only exchanges where the nearest rival PCO network is more than 100m away.

Incentives to connect to an exchange or build competing routes

12.136 We consider that there are three key factors that influence a telecoms provider to connect to a BT exchange or build competing routes to provide alternative backhaul infrastructure:

- The cost of extending network to connect to an exchange or provide alternative backhaul routes. This is likely to be based on the distance a provider would need to extend its network. In general, the longer this distance, the higher the cost, and the less likely that provider would connect to an exchange.
- Demand for backhaul. The higher the demand for backhaul at a given exchange or in a given area the more incentive a telecoms provider has to extend its network to

provide backhaul services. The higher demand means that it is more likely to be able to win some business away from BT or from the other PCOs present at the exchange or a PCO providing backhaul services in the area.

- The value of circuits. BT's pricing according to a bandwidth gradient means that higher bandwidth circuits are priced higher compared to lower bandwidth services. This makes winning higher bandwidth contracts more lucrative because the cost of extending network is the same regardless of the bandwidths supplied. Therefore, at exchanges or areas where there is likely to be more demand for higher bandwidths, the incentive to extend network is likely to be higher.

12.137 In these sub-sections, we consider these factors in relation to BT Only and BT+1 exchanges.

BT Only exchanges

12.138 In general, it is likely to be more costly to connect to a BT Only exchange than other exchanges. BT Only exchanges are typically located in rural areas with low residential and business population density (see Figure 8.2). As described in Section 8, our analysis shows that the average distance a single rival network would need to extend to connect to an exchange is 5.8km (with a median distance of 2.7km) and the average distance from an exchange to a second rival is over 12km (median 5.9km). These distances are very long, and it is highly unlikely to be economic to extend network to many of these exchanges, even using the unrestricted PIA remedy.¹⁰⁶⁶

12.139 It is also likely to be more costly to provide a competing route in areas served by BT Only exchanges. 96% of BT Only exchanges are located in BT Only areas, as defined by our geographic market definition for CI Access. This means it is more likely that a PCO would have limited or no network in the area, and so it would be very costly to dig to extend the network over long distances to provide a competing backhaul route. Just one BT Only exchange out of 4,269 is located in a BT+2 access area, as defined by our geographic market definition for access (i.e. CLA, Metro Areas and other HNR areas). For these reasons, the remedy we proposed in our consultation applied to all BT Only exchanges.

12.140 Openreach,¹⁰⁶⁷ BT Group,¹⁰⁶⁸ Virgin Media¹⁰⁶⁹, and IIG¹⁰⁷⁰ all argued that there are some BT Only exchanges with close rival network infrastructure such that network extension to connect to the exchange would be viable. Virgin Media considered there are a significant number of exchanges where it would be economic to extend its network should demand arise. It identified [redacted] exchanges which we had classified as BT Only in our consultation, where it had network within [redacted]m. Openreach estimated there were around 300 BT Only exchanges within 600m of an alternative network.¹⁰⁷¹

¹⁰⁶⁶ Extension to a BT Only exchange may be more economic if the exchange was covered by a mass rollout for other reasons using unrestricted PIA. However, BT Only exchanges are typically in areas with fewer potential customers. In addition, access network build would not necessarily lead to the provision of competitive backhaul.

¹⁰⁶⁷ Openreach's response to the 2018 BCMR Consultation, page 13, paragraph 43.

¹⁰⁶⁸ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraph 5.15.

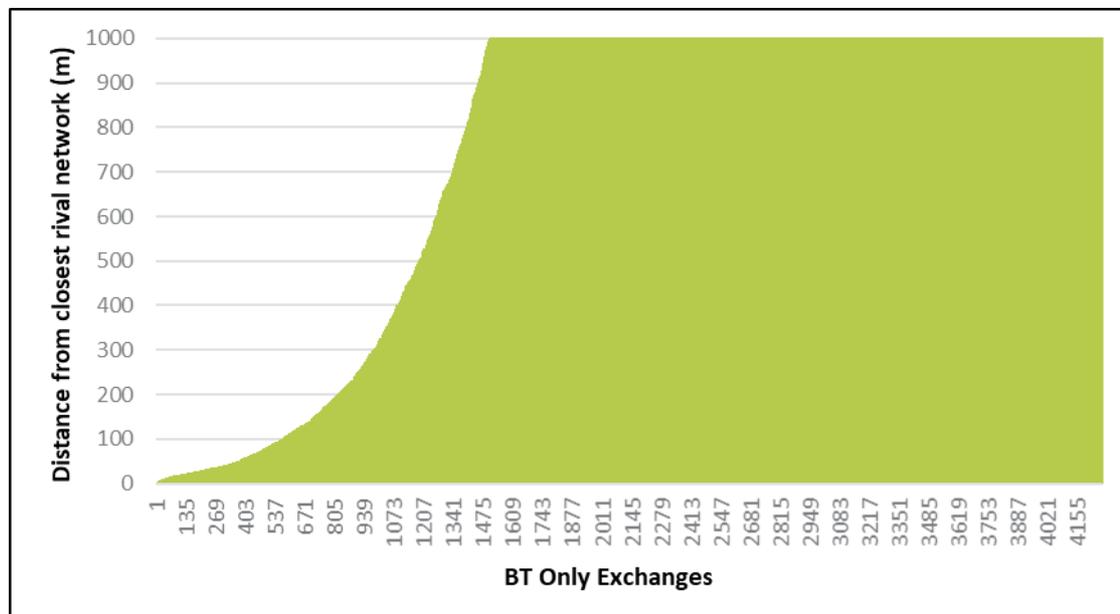
¹⁰⁶⁹ Virgin Media's response to the 2018 BCMR Consultation, page 17.

¹⁰⁷⁰ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.3.4.

¹⁰⁷¹ Openreach's response to the 2018 BCMR Consultation, page 13, paragraph 43.

12.141 In response to these comments, we undertook further analysis of the distances between rival networks and BT exchanges. This indicates that there is a wide range of distances between BT Only exchanges and the closest rival network.

Figure 12.2: Distribution of distances between BT Only exchanges and closest rival networks¹⁰⁷²



12.142 All other things being equal, operators are more likely to be willing to extend their network when closer to the exchange. This analysis shows that a minority of BT Only exchanges have rival networks close by: 566 within 100m¹⁰⁷³ and 981 within 300m.

12.143 For the majority of BT Only exchanges, distances are such that it is unlikely to be economic to extend networks to connect to these exchanges. However, for a material minority of BT Only exchanges, the cost of connecting is likely to be lower and therefore could be economic if sufficient revenues were available from backhaul services in the area.

12.144 In general, available revenues are likely to be lower at BT Only exchanges. Demand for inter-exchange connectivity from BT Only exchanges is lower than at BT+1 and BT+2 exchanges. For example, at BT Only exchanges Openreach supplies an average of [X] circuits per exchange compared to [Y] circuits per BT+1 exchange and [Z] circuits per BT+2 exchange.¹⁰⁷⁴ We note that it is unlikely for an operator to be able to win all of the circuits at a given exchange (especially where one end of the circuit is located at another BT Only exchange), however the difference in available revenues between the different types of exchange is still significant. These figures also underestimate the demand for leased lines at BT+1 and BT+2 exchanges because they only account for circuits that Openreach supplies and not those supplied by other PCOs.

¹⁰⁷² We have used the coordinates of exchanges and rival network points to calculate the distances between them. For presentational purposes we have truncated the y-axis at 1000m. In reality, there are many exchanges which are much further than 1000m from the closest rival network.

¹⁰⁷³ This includes the one BT Only exchange that is located in a HNR area.

¹⁰⁷⁴ Ofcom analysis of Openreach response to Questions A1 and A2 of the BCMR s.135-1 Notice.

- 12.145 This demonstrates that BT Only exchanges are often located in areas where there is limited demand for backhaul. They are also likely to be located in or close to areas where BT is the only supplier of access leased lines. As demand for backhaul is limited there are less likely to be incentives for a PCO to extend its network and provide alternative routes that compete with BT backhaul.
- 12.146 Demand for inter-exchange connectivity is generally higher at NGA handover exchanges where BT's FTTC residential broadband products are handed over. Openreach supplies an average of [X] circuits per BT Only NGA handover exchange.¹⁰⁷⁵
- 12.147 This analysis shows that a rival operator could generally expect to win fewer circuits if investing to compete with connectivity from a BT Only exchange, which would make this investment less attractive. However, there is a sub-set of BT Only exchanges where backhaul demand is higher, and therefore likely to be more attractive investment opportunities.
- 12.148 In general, the value of a given circuit is likely to be somewhat lower at BT Only exchanges. Our analysis shows [X]% of circuits purchased from Openreach at BT Only exchanges are 1 Gbit/s and below and [X]% are VHB circuits. In comparison, at BT+1 exchanges [X]% of circuits purchased from BT are 1 Gbit/s and below and [X]% are VHB circuits and at BT+2 exchanges [X]% and [X]% respectively. We also consider it likely that already-connected rivals at BT+1 and BT+2 exchanges are likely to be supplying a higher proportion of VHB circuits because BT's higher prices for VHB circuits mean there is more scope to undercut BT for these circuits.
- 12.149 There are exceptions to this general trend. For instance, at BT Only NGA handover exchanges, [X]% are 1Gbit/s and below and [X]% are VHB circuits.¹⁰⁷⁶
- 12.150 There may be an increase in demand for backhaul circuits and for higher bandwidths, in line with the general trend. However, we would expect this increase to be concentrated at BT+1 and BT+2 exchanges. For example, consumers are increasingly switching to superfast broadband, though this is only relevant for the 10% of BT Only exchanges that act as NGA handover points. Sky's illustrative forecasts showed that, from 2018 to 2021, [X].¹⁰⁷⁷
- 12.151 This analysis demonstrates that per-circuit revenues from BT Only exchanges are, on average, likely to be lower than from other exchanges. Again, there is likely to be a sub-set of BT Only exchanges where potential revenues are greater and so investment incentives are stronger.
- 12.152 In general, incentives to connect to BT Only exchanges or provide competing backhaul routes are likely to be weaker than for BT+1 and BT+2 exchanges. Distances – and therefore costs – are higher, demand is lower, and circuits tend to be of lower capacity and therefore of lower value. There is, therefore, a low risk that dark fibre could undermine investment incentives at BT Only exchanges.

¹⁰⁷⁵ Ofcom analysis of Openreach response to Questions A1 and A2 of the BCMR s.135-1 Notice.

¹⁰⁷⁶ Ofcom analysis of Openreach response to Questions A1 and A2 of the BCMR s.135-1 Notice.

¹⁰⁷⁷ [X].

12.153 However, there are some BT Only exchanges where incentives to connect are higher. This could be because of lower costs to supply due to shorter distances, higher potential revenue due to greater demand or higher value circuits, or a combination of these factors.

BT+1 exchanges

12.154 In general, the costs of connecting to a BT+1 exchange are lower. At these exchanges, by definition, one rival PCO is already connected, and therefore there is existing rival investment in these areas. Our analysis shows that the mean straight-line distance that the nearest rival, currently not already connected to the exchange, would need to extend its network to connect is 1.3km, and the median distance is 334m. This shows that rival networks are closer than for BT Only exchanges. Extending network such distances is expensive and a barrier to entry. However, it is possible that as demand for backhaul and bandwidth increases some PCOs might connect to some exchanges over the medium to longer term, particularly as unrestricted PIA could reduce the barriers to entry. We consider this is most likely where the distances between existing network nodes and BT exchanges are shorter now that they have the option of using unrestricted PIA.

12.155 As BT+1 exchanges are located in more urban areas, a PCO may not need to significantly extend its network to develop competing backhaul routes.

12.156 In addition, the available revenues from investment are likely to be greater than at typical BT Only exchanges. At BT+1 exchanges there is greater demand for backhaul circuits compared to BT Only exchanges, though not as high as BT+2 exchanges. The evidence also shows greater demand for higher bandwidth products compared to BT Only exchanges and therefore the potential value of circuits may be higher (see above). This higher demand and potential revenue are also likely to make investment in competing backhaul routes more attractive in these areas than in areas served by BT Only exchanges.

12.157 The evidence above indicates that the economic incentives to connect to a BT+1 exchange or to provide competing backhaul services in this area are generally greater than those for a BT+0 exchange. On average, costs are lower and potential revenues are higher.¹⁰⁷⁸ We therefore consider that there is a higher risk at BT+1 exchanges that dark fibre could undermine existing and deter future rival investment. As noted in Annex 6, the unrestricted PIA remedy will significantly reduce the cost of network build and therefore improve the economic viability of rivals extending their networks. However, it will take time to have an impact, and where such extensions may take place remains uncertain at this time. We will review the mix of our remedies as investment plans materialise.

Decision to limit the remedy to routes from BT Only exchanges with no close rival networks

12.158 As discussed in our consultation, we consider that requiring dark fibre from BT+1 exchanges would potentially undermine existing rival investment and risk deterring rival

¹⁰⁷⁸ We note Sky's comment that revenues available at BT+1 exchanges may fall over time, due to general price attrition in VHB leased lines and the need for new competitors to offer a discount. However, we consider that this does not alter our assessment that potential revenues at BT+1 exchanges will generally be greater than those at BT Only exchanges (Sky's response to the 2018 BCMR Consultation, paragraphs 13-15).

network operators from connecting to BT+1 exchanges and developing their backhaul networks, especially following the introduction of the unrestricted PIA remedy. Accordingly, as proposed in our consultation, and in light of our overall approach to remedies as set out in Section 10, we have decided to exclude BT+1 exchanges from the scope of the dark fibre remedy.

- 12.159 In our consultation, we proposed that our dark fibre remedy would be limited to circuits from BT Only exchanges. As noted above, some stakeholders argued that some BT Only exchanges have rival infrastructure sufficiently close that network extensions to connect to the exchange would be viable. In response, we analysed the incentives to connect to these exchanges or provide competing backhaul services from these areas in greater detail.
- 12.160 In light of the above analysis we have refined our consultation position to include a distance-based exclusion for the use of dark fibre at a BT Only exchange. As discussed, the incentives to connect to a BT Only exchange are strongest where rival networks are close and there is material demand for backhaul. Accordingly, applying a distance-based exclusion ensures that dark fibre would not be made available at the BT Only exchanges where there is a material possibility of rival investment.
- 12.161 Our objective is to reduce the risks to rival investment from the introduction of the dark fibre remedy, while ensuring the benefits of dark fibre can be realised where investment is unlikely. We recognise that it is difficult to precisely identify a single distance below which investment to connect to that exchange would be economic. As discussed above, other factors such as backhaul demand and circuit value are also relevant, and decisions on whether to invest in connecting to an exchange will be made on a case by case basis. Setting any such distance-based exclusion is an approximation. In making a judgement on the appropriate distance we take into account a range of factors. These include:
- the costs of network extension,
 - the potential impact of unrestricted PIA,
 - proximity of other potential customers to the exchange, and
 - the availability of External Cablelink.
- 12.162 We discuss these factors in more detail below.
- 12.163 As noted in Annex 6, the costs of network extension are high even over relatively short distances. Time delay is also a significant factor. Our analysis on network extensions and lead times in the access market suggests that the Mean Time to Provide (MTTP) – i.e. the average number of working days excluding customer delay that it takes Openreach to complete an order – is significantly higher for orders that involve duct work (around [X] working days) compared to [X] working days where Openreach had existing duct but no fibre and [X] working days where Openreach had a fibre connection to a building).¹⁰⁷⁹ Rivals considering extending their network to BT Only exchanges would have to undertake

¹⁰⁷⁹ This evidence is based on information about the time it takes Openreach to provide different types of leased line Ethernet orders (all orders, orders with duct work, and 'quick wins'), and the relationship between time-to-provide and dig distance. We collected this information from Openreach via our s.135 powers (see Annex 11 for further details). Based on Ofcom analysis of stakeholder responses to BCMR s.135-21 Notice.

duct work (with larger distances requiring more duct work). The longer lead times associated with this may be a factor in deterring rivals from digging out to these exchanges, as long and uncertain lead times may make it harder for rivals to win the contracts of operators currently served by BT at these exchanges.

- 12.164 As also noted in Annex 6, we do not believe that take up of unrestricted PIA will have a significant impact on the incentives of rival providers to extend their networks to BT Only exchanges over this review period. When using unrestricted PIA for a bespoke network extension some build is still likely to be required, as some work will be needed to join the two networks together. In addition, when using unrestricted PIA for the first time a telecoms provider will need to install cabling in BT's duct. As noted in Annex 6, this can involve significant works and associated wayleaves and traffic management, resulting in additional delay. We therefore consider that the distance used to limit the scope of dark fibre should not be increased as a result of the implementation of the unrestricted PIA remedy.
- 12.165 In general, the evidence on the costs and time delay of network extension suggests that investment to connect BT Only exchanges is potentially viable only where limited network extension is required. Therefore, in our judgement, a relatively short distance-based exclusion is likely to be appropriate when determining which BT Only exchanges are excluded from the dark fibre remedy.
- 12.166 Rivals that have network infrastructure very close to a BT Only exchange may find it easier to extend their network by using the Openreach External Cablelink product. In order to connect to the exchange they have to dig to a handover point near to the exchange and purchase an External Cablelink. The maximum distance that External Cablelink can be used over is 100m, and so telecoms providers within this distance may be able to connect to an exchange more easily.¹⁰⁸⁰
- 12.167 Nonetheless, dependent on exactly where the handover point is located, rivals may still need to extend their network (and incur the associated costs) in order to use Cablelink. For example, there may be a situation where a rival has network infrastructure 100m from an exchange, but is only 5m from the handover point, in which case they need only to dig 5m and purchase a Cablelink product from Openreach to start supplying backhaul from that exchange. This means that where a rival PCO network is within 100m of an exchange there is at least the potential that it could be connected to the exchange at particularly low cost. On the other hand, if a rival was 20m from an exchange, but the nearest handover point was 60m away on the other side of the exchange, they would have to dig 80m in order to start supplying backhaul from that exchange.
- 12.168 Exchanges which are beyond the Cablelink distance limit will require operators to dig up until at least the 100m boundary of the exchange (where Cablelink can be used) and possibly much further dependent on the exact location of the nearest handover point.

¹⁰⁸⁰ [3<].

Connections to these exchanges are likely to be less attractive propositions to rivals due to the higher costs of digging that must be incurred.

- 12.169 When deciding whether to invest to connect to an exchange, operators are also likely to take in to account the potential to extend their supply to other customers and thus gain additional revenue alongside that from connecting to the exchange. If additional revenue was available, then providers might be willing to extend their network further. This might suggest a longer distance-based exclusion would be appropriate. However, the scope for these benefits when connecting to a BT Only exchange is likely to be low given the more rural location of BT Only exchanges as discussed above. We therefore consider potential additional revenue is unlikely to have a material influence on these investment decisions. We therefore do not to account for this when setting a distance-based exclusion.
- 12.170 Considering the above reasons, we have decided that the dark fibre obligation will apply only on routes from BT Only exchanges where the nearest rival PCO network is more than 100m away.¹⁰⁸¹ We recognise this is a judgement, but consider this is a reasonable approximation.
- 12.171 This decision takes into account the costs and time delay of network extension which we consider are likely to deter investment over longer distances. This also recognises that it is likely to be easier and cheaper for rivals to connect where their existing network is within the 100m limit of the External Cablelink product.
- 12.172 A shorter distance would not give us sufficient confidence that we have captured all exchanges where rival networks are located very close to the External Cablelink handover point and so able to connect at low cost. We note that even a 100m limit could require network extension over a material distance. However, we consider operators may be willing to undertake this given the potential backhaul revenues available from an exchange, which in general are greater than those available from providing a single access circuit and in particular greater at NGA handover exchanges.
- 12.173 In our judgement, a 100m distance-based exclusion ensures that dark fibre is not available at the BT Only exchanges where incentives to invest are likely to be strongest. We consider this approach balances the importance of providing an effective remedy which will lower backhaul costs for operators, while still encouraging network investment in areas where this is likely to be feasible.
- 12.174 We note that this threshold of 100m is also in line with [redacted].¹⁰⁸²
- 12.175 There are 4,269 BT Only exchanges in total, and our analysis has found that 566 of these are within 100m of a rival PCO network. In applying this distance-based exclusion, the total number of exchanges from which BT is required to provide access to dark fibre is therefore 3,703.¹⁰⁸³

¹⁰⁸¹ In order to distinguish between the BT Only exchanges from which BT must provide dark fibre and those which are exempt, we have labelled the former category “BT Only DF” in the list of exchanges appearing at Annex 26, Schedule 8.

¹⁰⁸² [redacted].

¹⁰⁸³ [redacted].

- 12.176 Out of the 4,269 BT Only exchanges, 346 are NGA handover points. Our analysis has found that 75 of these are within 100m of a rival PCO network. In applying this distance-based exclusion, the total number of NGA handover points for which BT is required to provide access to dark fibre is 271.
- 12.177 Dark fibre will therefore still be available at a material number of exchanges (66% of all BT exchanges), including a subset of those exchanges where backhaul demand is high, but it would be very costly for rival networks to connect. This is where dark fibre is likely to provide the greatest benefit. At the same time, the distance limit means that our approach excludes BT Only exchanges where there is greater potential for rival investment in backhaul.

Other comments on the scope of the dark fibre remedy

- 12.178 Openreach suggested that we should consider only making dark fibre available for connections between BT Only non-NGA exchanges and their parent NGA exchanges,¹⁰⁸⁴ thus further incentivising build to BT Only NGA exchanges.¹⁰⁸⁵ Our analysis shows that a substantial number of these BT Only NGA exchanges are a considerable distance from rival networks, we consider that investment to connect these exchanges is unlikely. As these are important exchanges for backhaul traffic, the absence of both competitive alternatives and dark fibre could create a bottleneck at a material number of strategic exchanges.
- 12.179 IIG,¹⁰⁸⁶ CityFibre¹⁰⁸⁷ and Zayo¹⁰⁸⁸ requested clarity on the scope of the remedy if a rival PCO creates a new connection to an exchange where dark fibre is available during this review period. To clarify, our SMP findings in this decision are set for this review period, so dark fibre would remain available at these exchanges even if a PCO connected their network. We do not consider that it would be proportionate to maintain an “up to date” list of the number of PCOs present at each exchange and/or vary the scope of the remedy further during the review period.
- 12.180 For the avoidance of doubt, we are requiring BT to provide dark fibre only for routes from a BT Only exchange, which is further than 100m from an alternative network, to any other BT exchange. Dark fibre will not be available for circuits terminating at customer sites, network nodes or data centres which, as discussed in Section 7, are not within the CI Inter-exchange connectivity market.
- 12.181 A number of stakeholders commented that the scope of our proposed dark fibre remedy was unclear in the draft legal instrument, or that the scope was inconsistent as between the body of our consultation and the draft legal instrument.¹⁰⁸⁹ In our consultation we

¹⁰⁸⁴ Which could be BT Only, BT+1 or BT+2.

¹⁰⁸⁵ Openreach’s response to the 2018 BCMR Consultation, Annex B, paragraphs 154-160.

¹⁰⁸⁶ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.3.5.

¹⁰⁸⁷ CityFibre’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.1.12.

¹⁰⁸⁸ Zayo’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.11.

¹⁰⁸⁹ Vodafone’s response to the 2018 BCMR Consultation, part 1, paragraph 4.25.2; part 3, paragraph 1.1.4; PAG’s response to the 2018 BCMR consultation, paragraphs 18-21; Openreach’s response to the 2018 BCMR Consultation, page 6,

clearly stated that our proposed dark fibre remedy was limited to inter-exchange connectivity routes from BT Only exchanges¹⁰⁹⁰ i.e. routes from BT Only exchanges to other BT exchanges. However, the SMP condition imposing the dark fibre remedy¹⁰⁹¹ appeared to require BT to provide dark fibre on routes connecting a BT exchange and an “operational building of a Third Party”.¹⁰⁹² This had the effect of widening the scope of the dark fibre remedy beyond what was intended.

12.182 We became aware of this issue during the consultation period and published a clarification on 19 December 2018.¹⁰⁹³

12.183 We have corrected this inconsistency in our SMP conditions¹⁰⁹⁴ by expressly limiting the dark fibre remedy to:

- The CI Inter-exchange connectivity market (which we refer to in our SMP conditions as the “Wholesale market for CI Inter-exchange Connectivity services along Non-competitive IEC Routes”); and
- routes connecting a BT Only exchange¹⁰⁹⁵ and another BT exchange.

12.184 Openreach further commented that the term “Dark Fibre Access” in the draft legal instrument was unclear because the dark fibre remedy applies in the CI Inter-exchange connectivity market rather than the CI Access services market.¹⁰⁹⁶ We do not consider any amendments to be necessary. The word “Access” in the term “Dark Fibre Access” refers to network access (i.e. the making available of a service) rather than the CI Access services market. Furthermore, we have been clear that the dark fibre remedy is limited to the CI Inter-exchange connectivity market and we consider this is sufficient to address any confusion arising from the use of the word “Access”.

Dark fibre remedy design and implementation

Our proposals

12.185 Our consultation proposed that the design of the dark fibre remedy should take our previous proposals for dark fibre as a starting point. We considered that the technical, operational and commercial aspects of BT’s current offer of wholesale Ethernet services (in particular EAD and EAD Local Access) should be used as a benchmark for establishing the arrangements applicable to dark fibre. Unlike our previous proposals for dark fibre, our

paragraphs 6(d) and 9; pages 17-19, paragraphs 70-84; TalkTalk’s response to the 2018 BCMR Consultation, paragraph 4.74.

¹⁰⁹⁰ 2018 BCMR Consultation, Volume 1, paragraphs 10.21, 12.1 and 12.72.

¹⁰⁹¹ 2018 BCMR Consultation, Annex 23, Schedule 1, Condition 2.1(c).

¹⁰⁹² See definition of “Backhaul Segment”, 2018 BCMR Consultation, Annex 23, Schedule 1, Part 2.

¹⁰⁹³ Ofcom, 2018. [Update 19 December 2018: corrections and clarifications](#) [accessed 4 May 2019].

¹⁰⁹⁴ See Annex 26, Schedule 3, Part 3, Condition 2.2.

¹⁰⁹⁵ Excluding those BT Only exchanges where the nearest rival PCO network is less than 100m away, which are exempt from the dark fibre remedy as set out above.

¹⁰⁹⁶ Openreach’s response to the 2018 BCMR Consultation (leased lines charge control), page 38, paragraph 154.

proposal did not include a requirement for distance limits. The consultation set out minimum requirements for a reference offer based on these design proposals.

12.186 We proposed that BT provide access to dark fibre with non-pricing design elements based on EAD fibre circuits to ensure a smooth implementation of the remedy no later than one month of the BCMR conditions entering into force. We set out our proposed implementation timeline in Annex 17 to the 2018 BCMR Consultation, as follows¹⁰⁹⁷:

- BT required to publish a Reference Offer (RO) no later than one month after the BCMR conditions enter into force;
- BT and industry to negotiate SLAs and SLGs in line with the RO, to come into force three months after the BCMR conditions enter into force;
- BT to start providing access to dark fibre no later than one month of after the BCMR conditions enter into force; and
- Quality of Service standards to come into effect in year two of the market review (i.e. from 1 April 2020), with reporting requirements to come into effect immediately from launch.

12.187 In establishing this proposed timeline, we considered both the dark fibre product development that had been undertaken as part of BCMR 2016 implementation and responses to our 2017 Dark Fibre Consultation.

12.188 As stated in our 2018 BCMR Consultation, the dark fibre remedy we proposed is much closer to the remedy originally imposed in the 2016 BCMR, given that there will not be the same usage restriction as proposed in the 2017 Dark Fibre Consultation, and we submitted there will be no need to develop further processes around monitoring. We argued, as a result, there would be no need for many of the preparatory activities envisaged by Openreach in its response to the 2017 Dark Fibre Consultation, such as the need for extra training or further industry negotiations around the RO.¹⁰⁹⁸

Stakeholder responses

12.189 Openreach requested clarity on the anchor product for the remedy, and whether alignment was expected with EAD products. Openreach also considered that the timeline was unreasonably short given parity with EAD would not be possible within our proposed timeframe.¹⁰⁹⁹

12.190 Openreach suggested that the current EAD radial distance limit was also relevant and appropriate for dark fibre, on the grounds of quality assurance and product safety as this

¹⁰⁹⁷ See Table A17.1 in 2018 BCMR Consultation, Volume 1.

¹⁰⁹⁸ 2018 BCMR Consultation, Volume 1, paragraphs A17.11 and A17.13.

¹⁰⁹⁹ Openreach's response to the 2018 BCMR Consultation, Annex C, paragraphs 12-15.

aligned with their testing capabilities and laser safety requirements¹¹⁰⁰. IIG,¹¹⁰¹ CityFibre¹¹⁰² and Zayo¹¹⁰³ argued that a distance limit was appropriate as it would not be technically feasible to operate dark fibre over very long distances. They argued a distance limit comparable to EAD would be appropriate. Other telecoms providers, such as SSE, agreed that the need for regulations to determine a distance limit has fallen away. SSE suggested that route configurations would be arranged based on telecoms providers' use of dark fibre and the equipment it selected for lighting the circuits.¹¹⁰⁴ However, they did not contradict Openreach's position relating to EAD distance limits.

- 12.191 Openreach suggested that removing distance limits would open up the prospect of industry seeking additional changes to the RO.¹¹⁰⁵ This could lead to protracted negotiations causing a delay to implementation of the remedy. If those negotiations resulted in other telecoms providers having the freedom to use equipment other than Class 1M lasers¹¹⁰⁶, Openreach employees would need to be re-trained, which would have implications for the implementation timetable.
- 12.192 Openreach argued that in the absence of a distance limit, and due to BT Only exchanges being located near clusters of more competitive BT exchanges, there was a risk of dark fibre being used in place of core connectivity over competitive routes, undermining the investment strategies of BT and other network operators. This would occur where two competitive exchanges were interconnected via a BT Only exchange located nearby or along the route between those exchanges. Virgin Media also argued that dark fibre should not be used as "pseudo-trunk connectivity to carry traffic long distances in order to avoid backhaul charges."¹¹⁰⁷
- 12.193 Openreach proposed a set of principles to restrict the use of the DFA remedy in alignment with its view of our stated purpose. It sought to restrict the DFA remedy to those requests to expand an IEC network to BT Only exchanges relied upon by the customer for provision of access services local to that exchange. This included prescriptive principles relating to fibre usage and circuit configurations based on 'parent-child' exchange arrangements whereby each exchange was given a designated "parent" based on fibre routing.¹¹⁰⁸ BT Group supported Openreach's proposals.¹¹⁰⁹

¹¹⁰⁰ Openreach also commented on the EAD route distance limit of 86km it sets out within relevant RO yet this does not appear in our regulations – it is adopted for safety reasons: see Openreach's response to the 2018 BCMR Consultation, Annex C, paragraphs 17-18. See also Openreach's response to BCMR s.135-26, presentation on dark fibre implementation dated 25 February 2019.

¹¹⁰¹ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.3.14.

¹¹⁰² CityFibre's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.1.14.

¹¹⁰³ Zayo's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.16.

¹¹⁰⁴ SSE's response to the 2018 BCMR Consultation, page 10.

¹¹⁰⁵ Openreach's response to the 2018 BCMR Consultation, Annex C, paragraph 10.

¹¹⁰⁶ Appropriate distance limits for Ethernet products are determined based on technical specification of equipment used to light fibre routes. Removing the distance limits or extending them affects the choice of equipment used by other telecoms providers. If stronger lasers are used either for any dark fibre circuit or for longer distance dark fibre circuits, Openreach staff will need training for safe activities, including repairs, relating to such equipment.

¹¹⁰⁷ Virgin Media's response to the 2018 BCMR Consultation, page 18.

¹¹⁰⁸ Openreach's response to 2018 BCMR Consultation, pages 19-20, paragraphs 86-87; Openreach's response to BCMR s.135-26 Notice, slides presented at meeting dated 3 January 2019, page 5.

¹¹⁰⁹ BT Group's response to the 2018 BCMR Consultation, paragraph 5.13.

12.194 Openreach also considered the concept of “reasonable access” and how it might respond to requests for connections where fibre was unavailable. Openreach considered four possible scenarios and its proposed responses in each case, set out in the following Table 12.3:

Table 12.3: Fibre availability scenarios submitted by Openreach

Fibre availability	Openreach’s proposed response to a request for access to dark fibre
There is fibre with spare capacity	No restrictions.
There is no direct duct between two BT exchanges	Openreach should be required to consider whether there are alternative routes via other exchanges. ¹¹¹⁰ There should be no obligation to build new duct and fibre as this would require Openreach to extend its network.
There is duct between two BT exchanges with capacity, but there is no fibre	Where there is no fibre network between BT exchanges, no dark fibre network access obligation should apply since no fibre network exists. Telecoms providers can deploy their own fibre networks using PIA remedy.
There is duct with capacity, but fibre is fully used (i.e. there is no spare fibre)	Telecoms providers can deploy their own fibre networks using unrestricted PIA and so it would not be reasonable to require Openreach to deploy additional fibre instead.

Source: Openreach¹¹¹¹

12.195 We also received a number of comments relating to our proposed dark fibre implementation timeline:

- SSE stated that providers seeking network access will be ready to take up DFA within the proposed timeline¹¹¹², highlighting familiarity with ‘own-use’ services¹¹¹³ based on the provision of dark fibre services by other suppliers of fibre networks;
- Openreach argued a lack of clarity as to the anchor product, to which parity was required when providing a DFA product, would cause delays to implementation,¹¹¹⁴ and said we would either need to provide clarity in the statement or allow a longer implementation timeline to agree the new product specifications;

¹¹¹⁰ See Openreach’s response to 2018 BCMR Consultation, pages 19-20, paragraphs 86-87; and Openreach’s response to BCMR s.135-26 Notice, [3<]: Openreach state such an obligation should be restricted to [3<].

¹¹¹¹ Openreach’s response to the 2018 BCMR Consultation, Annex C, paragraph 16.

¹¹¹² SSE’s response to the 2018 BCMR Consultation, answer to Q.12.5, page 11.

¹¹¹³ This phrase is used by SSE to refer to dark fibre services, which involve providers other than the incumbent using their own equipment to light the fibre supplied as part of the incumbent’s network.

¹¹¹⁴ Openreach’s response to the 2018 BCMR Consultation, Annex C, paragraphs 12-15, page 77.

- Openreach¹¹¹⁵ and Virgin Media¹¹¹⁶ stated they needed adequate time for negotiations of the RO, in light of potential changes required to align the RO with the scope of the DFA remedy, and one month was not sufficient; and
- Openreach submitted that its systems need to be developed to achieve parity between EAD services and the proposed DFA remedy, and that they could not achieve this within the proposed timeline for launch of the DFA remedy.¹¹¹⁷

Our reasoning and decisions

12.196 We have decided to impose a DFA remedy based on the design consulted on, with the following amendments that we discuss in more detail throughout this section:

- to achieve parity with wholesale active EAD products, as consulted on, we provide guidance on the appropriate use of a 45km radial distance limit and the 86km route distance limit associated with EAD services;
- to mitigate risks to competitive core infrastructure based on the circuit configurations from BT Only exchanges to any other BT exchange, we provide guidance on RO provisions relating to fibre usage reflecting the purpose behind the DFA remedy; and
- to assist with the smooth implementation of the DFA remedy, we provide guidance on what the reasonable access obligation means where fibre resources are scarce or otherwise not available on direct routes between a BT Only exchange and another BT exchange.

12.197 We have decided to adopt a two stage implementation process for the DFA remedy to make sure dark fibre access is available early in this review period while recognising more time is required for Openreach to undertake necessary systems developments to achieve the required parity between DFA and other EAD products. The timeline is set out below and discussed in detail in Annex 17.

Design of the dark fibre remedy

12.198 Our decision on design is intended to allow for smooth adoption of dark fibre across this review period consistent with the requirement that it be provided on reasonable request. An appropriate starting point is the remedy design previously conceived for disaggregated access and backhaul segments, as set out in the 2016 BCMR Statement¹¹¹⁸ and 2017 Dark Fibre Consultation.

12.199 We remain of the view that the technical, operational (provisioning and repair) and commercial aspects of BT's current offer of wholesale Ethernet services (in particular EAD and EAD Local Access) should be used as a benchmark for establishing the arrangements applicable to dark fibre. Openreach's EAD products provide a range of connectivity options which fulfil telecoms providers' access and backhaul requirements, and BT's processes for

¹¹¹⁵ Openreach's response to the 2018 BCMR Consultation, Annex C, paragraphs 8-11

¹¹¹⁶ Virgin Media's response to the 2018 BCMR Consultation, page 18

¹¹¹⁷ Openreach's response to the 2018 BCMR Consultation, Annex C, paragraphs 12-15

¹¹¹⁸ See Section 9 paragraphs 9.34-9.36 and Annex 22, 2016 BCMR Statement.

providing those active products should therefore be capable of adaptation to allow for the provision of dark fibre. We recognise that the operation of BT's dark fibre products would differ from Ethernet products in some respects.

- 12.200 BT's wholesale Ethernet products are the main products that BT currently supplies for a range of services spread across lower bandwidths and some VHB circuits. In view of our design objective for the dark fibre remedy, we therefore consider that they are also a suitable benchmark for a dark fibre product across multiple markets, including for provision of inter-exchange connectivity across all bandwidths.
- 12.201 Following the 2016 BCMR Statement, BT developed its dark fibre product modelled on its Ethernet products, in collaboration with telecoms providers and the Office of the Telecommunications Adjudicator (OTA2), although it has not been implemented to date.
- 12.202 In the rest of this section we discuss the key design aspects of the dark fibre remedy we are imposing and explain where our decisions differ from the remedy we imposed in the 2016 BCMR Statement and our consultation proposals. The non-price design aspects of the dark fibre remedy are summarised in Table 12.4:

Table 12.4: Summary of non-price design aspects of dark fibre

Design aspect	Approach
Circuit configurations	BT to provide dark fibre segments from BT Only exchanges where the nearest rival PCO network is more than 100m away. ¹¹¹⁹
Parity with active wholesale products	Dark fibre product comparable to the fibre elements of the corresponding active wholesale products (i.e. EAD100). Guidance given as to the use of distance limits.
Arrangements concerning provision of new infrastructure	The same provisioning arrangements should apply for both the active and dark fibre remedies, and the existing charging arrangements for network extensions in relation to active services would provide the most suitable solution for dark fibre.
One or two fibre circuits	BT to provide one and two fibre circuits.
Provisioning, repair and service migration processes	The provisioning, repair and service migration processes which were developed by BT in collaboration with industry for the dark fibre remedy imposed in the 2016 BCMR Statement should be suitable for the dark fibre remedy. These are specified in BT's 2017 dark fibre Reference Offer (RO). ¹¹²⁰
Interconnection and accommodation services	The interconnection and accommodation remedies for active wholesale products will also apply to dark fibre.

Circuit configurations and mitigating risks to competitive core infrastructure

- 12.203 To ensure that purchasers of dark fibre are not at a competitive disadvantage to purchasers of active wholesale services, we consider that telecoms providers should be able to obtain dark fibre circuits in similar configurations to BT's current range of active services. To achieve this, we are imposing an obligation requiring BT to provide dark fibre segments for inter-exchange connectivity as set out in Section 7 and the "Scope of dark fibre" section above.
- 12.204 This is intended to allow providers to develop networks involving dark fibre solutions for inter-exchange connectivity, alongside wholesale access arrangements in new locations, that may replicate network designs in areas which are already more competitive.
- 12.205 We recognise the risks described by Openreach, i.e. that the proposed scope of our remedy, the location of BT Only exchanges, and the absence of distance limits, could potentially allow users of dark fibre to bypass competitive routes between exchanges by

¹¹¹⁹ While we require dark fibre access based on the same circuit configurations as consulted on (i.e. from BT Only exchanges to any other BT exchange), we have considered what measures are appropriate to mitigate risks to competitive core. We expect the EAD radial distance limit of 45km to apply in most cases, which will offer some mitigation, and the RO will include provisions emphasising the purpose of dark fibre when establishing interexchange connectivity to BT Only exchanges where the nearest rival PCO network is more than 100m away.

¹¹²⁰ BT's dark fibre Reference Offer as per [Openreach's dark fibre product description](#). [Accessed 5 May 2019].

using dark fibre circuits on alternative routes via BT Only exchanges. Any such issues undermining competitive core infrastructure will not be observed until orders are placed by other telecoms providers. We note that reasonable steps taken by Openreach in line with our guidance on distance limits are likely to reduce the scale of this issue relative to our consultation proposals.

- 12.206 In order to allow an assessment of the risks when orders are placed, the RO will need to reflect the DFA remedy design and the following guidance sets out what provisions may be appropriate to reflect the purpose of this remedy.
- 12.207 The DFA remedy is designed to provide users with cost effective inter-exchange connectivity from BT exchanges where no alternative providers are present, or nearby, to exchanges where competitive inter-exchange connectivity is available. In accordance with this objective, requests for inter-exchange connectivity to BT Only exchanges may be reasonable where the requesting telecoms provider is present (or intends to become present) for the purpose of providing wholesale access to businesses from that exchange. Where the requesting telecoms provider has no such presence or intention, a request is likely to be unreasonable unless there is a clear purpose for establishing the route using DFA which requires the telecoms provider to be present at that exchange (e.g. for the aggregation of non-leased line access circuits).
- 12.208 However, there is a risk that any RO provisions could overly restrict take up of the DFA product. Other providers must be free to configure their networks without undue restriction. Neither the regulator nor another provider can impose circuit configurations onto any specific provider's network. In discussions with Openreach, we considered its proposals went further than is necessary by suggesting circuit configurations should be linked to Openreach's own NGA strategy.¹¹²¹ The RO should avoid terms that could restrict other telecoms providers to using specific pre-selected routes from BT Only exchanges to the nearest or otherwise convenient BT exchange.¹¹²² Such provisions are disproportionate when considering the restrictions that they would place on other providers who seek to use dark fibre and not consistent with the requirement that access to dark fibre be provided on reasonable request.

Parity with active wholesale products

- 12.209 We are requiring BT to ensure that its dark fibre product is comparable to the optical elements of the corresponding wholesale active services. BT will be required to ensure that dark fibre circuits are provided in the same manner, using the same systems and processes and within the same or a shorter period of time, save in respect of objectively justifiable differences. This ensures that purchasers of dark fibre are not at a competitive disadvantage to purchasers of active wholesale services. As discussed below and in Annex 17, this also provides for smooth implementation of the remedy. We acknowledge

¹¹²¹ See Openreach's response to 2018 BCMR Consultation, pages 19-20, paragraphs 86-87; Openreach's response to BCMR s.135-26 Notice, slides from meeting dated 3 January 2019, page 5.

¹¹²² This includes reference to [§<].

that Openreach may not be able to achieve full parity with EAD products at the time of the ‘soft launch’ of dark fibre, but we expect parity to be achieved by full launch.

- 12.210 Openreach suggested that we should introduce a distance limit for dark fibre, for reasons of quality assurance and product safety.¹¹²³ We have decided that in the majority of cases it is appropriate for dark fibre to have a 45km radial distance limit in line with EAD products.¹¹²⁴ We recognise that this will support the timely implementation of the remedy, as discussed below. It will also ensure that Openreach can deliver the product safely and with sufficient quality assurance, as existing training, safety and testing procedures will not need to change.
- 12.211 However, given the radial distance limit is used as a proxy for route distances based on the technology used to light dark fibre, we have decided that regulation should not stipulate such a radial distance in absolute terms. Where the radial distance limit of 45km does not reflect route distances of up to 86km (applied for the safe use of EAD services), it should not be relied upon to prevent take up of dark fibre for inter-exchange connectivity. While the 45km radial distance limit may be useful when considering systems developments and the initial filtering of DFA orders, Openreach must take steps to ensure dark fibre can be used for routes not exceeding the 86km route distance limit but greater than the 45km radial distance used for EAD services.
- 12.212 We note Openreach’s submission relating to the requirement in our legal instrument that dark fibre be provided in accordance with the same systems and processes as Ethernet services or WDM services. Openreach stated different systems and processes were used for each and clarity was needed when developing the DFA remedy.¹¹²⁵ In our consultation we stipulated the requirement for single or dual fibre circuits to be made available when providing dark fibre access.¹¹²⁶ While the DFA remedy is modelled on Ethernet products, we have decided not to unduly restrict other telecoms providers in relation to the equipment used to light fibre circuits. For this reason, we consider it appropriate to retain reference to Ethernet or WDM services in relation to the systems and processes used to provide dark fibre access (though we would expect Ethernet systems and processes to be used in the majority of cases). This is in line with the equivalent SMP Condition imposed alongside the 2016 BCMR Statement.¹¹²⁷

Arrangements concerning provision of new infrastructure

- 12.213 We impose a reasonable access to dark fibre obligation on BT. However, we envisage that there are circumstances where the lack of fibre infrastructure along particular routes may lead to disproportionate demands by a third-party provider for Openreach to dig additional

¹¹²³ Openreach’s response to the 2018 BCMR Consultation, Annex C, paragraphs 17-18.

¹¹²⁴ In order to implement this decision we have amended SMP Condition 2.2 at Annex 26, Schedule 3, Part 3.

¹¹²⁵ Openreach’s response to 2018 BCMR Consultation, page 21, paragraph 96.

¹¹²⁶ 2018 BCMR Consultation, Volume 1, Section 12, paragraph 12.108; our decision is set out below at paragraph 12.221

¹¹²⁷ See Annex 35 to 2016 BCMR Statement, SMP Condition 2.1(c).

- duct to form new routes between existing BT exchanges. Openreach considered this as one of four possible scenarios relating to fibre availability (see Table 12.3).
- 12.214 It is our view that a request for DFA should be considered as reasonable in three out of the four scenarios put forward by Openreach i.e. it would not be disproportionate for Openreach to lay fibre along duct already present¹¹²⁸ or offer alternative routes as appropriate.
- 12.215 We consider that a request would be unreasonable if it required Openreach to dig additional duct to form a new direct route. However, Openreach should consider all alternative options, recognising our guidance on distance limits as set out above. If the radial and route distances permit a route via other BT exchanges, this alternative route should be offered to the requesting provider.
- 12.216 Such alternative routes should be considered even where it would involve Openreach laying additional fibre within available duct between exchanges. Other providers may also consider their options under the PIA remedy in addition to any alternative route Openreach presents under this DFA remedy.
- 12.217 Sorrento Networks highlighted in its response a specific example of a route configuration where there is no direct route between two BT Only exchanges and where a circuit would need to pass through two competitive BT exchanges on its alternative route (A-B-C-D).¹¹²⁹
- 12.218 When considering Sorrento Networks' response, we looked at the following scenario: a provider seeks DFA from BT Only exchange A to competitive BT exchange C, and there is no direct route between exchanges. An alternative route may be provided passing through competitive BT exchange B (A-B-C).
- 12.219 We find that in the scenarios set out above it is up to Openreach to determine an appropriate alternative route in response to the original request for DFA between exchanges. Any alternative route must be cost effective for the requesting provider, meaning Openreach must consider the shortest, most direct available route to achieve the requested inter-exchange connectivity. In some scenarios, this may involve laying new fibre within available duct space. In the second scenario, where the requesting provider does not have presence at BT exchange B, such a request for DFA from A to C is reasonable, subject to our guidance on distance limits set out above.
- 12.220 To restrict network configurations involving routes from BT Only exchanges, as suggested by Openreach, would be unreasonable and lead to regulations dictating how other providers designed their networks. We consider this would prevent the DFA remedy achieving its objectives and undermine the potential benefits of dark fibre access discussed earlier in this section. Furthermore, we consider this guidance, along with the guidance

¹¹²⁸ We note there may be hypothetical scenarios, some of which have already been set out in responses to our consultation, that indicate significant costs would be incurred to fulfil a request. We do not consider it appropriate to stipulate regulatory rules in every case and ultimately it is a matter for industry to resolve, with the backstop of a dispute to Ofcom if necessary.

¹¹²⁹ Sorrento Networks' response to 2018 BCMR Consultation, pages 7-8.

associated with EAD route distance limits that are applicable for safety reasons, offer sufficient mitigation against the risks to competitive core infrastructure and investments.

One or two fibre circuits

12.221 To ensure that purchasers of dark fibre are not at a competitive disadvantage to purchasers of active wholesale services, we consider that telecoms providers should be able to obtain dark fibre circuits in similar configurations to BT's current range of active services. On this basis, we have decided to require BT to provide one or two fibre circuits.

Provisioning and repair processes

12.222 The provisioning, repair and service migration processes were developed by BT in collaboration with telecoms providers during the implementation process for the dark fibre remedy imposed in the 2016 BCMR Statement. The processes were specified in BT's dark fibre Reference Offer.

12.223 The provisioning processes for the dark fibre product that BT has developed are the same as those of the corresponding active products in most respects. The main differences are that BT would not provide active equipment, and would undertake a precision test to measure circuit performance parameters.

12.224 The fault repair processes are necessarily different to the corresponding active products because telecoms providers, rather than BT, would be operating the network equipment which facilitates monitoring and fault diagnosis. Telecoms providers are therefore required to take greater responsibility for dispatch of BT technicians to repair fibre faults. BT has proposed to levy a Right When Tested (RWT) charge for abortive fault repair visits above a threshold judged to be consistent with efficient remote fault diagnosis.

12.225 We consider this approach to be sensible, although we are concerned that in the absence of price control regulation BT would have the ability and incentive to set excessive charges for RWT, which would potentially deter take-up of the dark fibre remedy.

Other ancillary services

12.226 As noted above, the general network access requirement requires BT to provide certain ancillary services that we consider are particularly important for ensuring take-up of the dark fibre remedy, as set out in the following paragraphs.

12.227 As set out in Section 14, we consider that telecoms providers will require interconnection and accommodation services to use the dark fibre remedy effectively. As previously discussed, we expect the dark fibre and active wholesale products to be very similar. We also expect that dark fibre would be used for the same purposes as active wholesale products and in the same configurations. We therefore conclude that the interconnection and accommodation remedies will also apply to dark fibre access.

12.228 We consider that BT should not charge for Excess Construction Charges (ECCs) as part of its provision of dark fibre services for inter-exchange connectivity. As such, we do not include the costs of ECCs in our estimates of the costs of the inter-exchange dark fibre connection.

This is because, for most inter-exchange dark fibre circuits, little (if any) extra construction work will be required as, typically, the infrastructure is already in place. This is in line with the practice for EAD circuits where there are no ECCs levied on main link segments.¹¹³⁰ We note that the overall charge control provides sufficient opportunity for Openreach to recover these costs. Our detailed decisions and the supporting rationale are set out in Annex 20.

- 12.229 We consider that BT may impose Time Related Charges (TRCs) in relation to dark fibre services. We see no reason, with the exception of RWT, that the prices charged for these services are not the same as charged for active TRCs.¹¹³¹ Therefore, we have decided that, for all TRCs that are imposed in relation to dark fibre services, the charges should be the same as those imposed for active TRCs, with the exception of RWT.
- 12.230 In addition to RWT charges, there is one additional ancillary service that we consider third parties will need to make effective use of the dark fibre remedy. This is a cessation charge which is applied to customers when they cease use of dark fibre.
- 12.231 BT incurs costs when completing RWT and cessation activities as both require engineering call-outs (unlike active circuits, dark fibre circuits cannot be ceased remotely). We think it is acceptable for BT to recover these costs through charges to their wholesale customers. As it is not clear how often these charges are likely to be incurred, we consider it is appropriate for BT to charge providers on a per-occasion basis rather than recover costs through rental and connection charges across all providers.¹¹³²
- 12.232 As noted above, we think that Openreach can incentivise providers, via the level of the RWT charge, to make efficient decisions on repair. However, our concerns in relation to excessive charges for RWT set out above also apply to excessive cessation charges.
- 12.233 To address this competition concern, we are imposing price controls for RWT and cessation in the form of charge controls on the per-visit charge for both. We set out the details of the price control remedy, including the relevant legal tests, in Volume 3, Section 4.

Minimum requirements for Reference Offer

- 12.234 We have decided that BT is required to publish a Reference Offer (RO) for dark fibre on the same terms set out in the 2016 BCMR Statement.¹¹³³ In particular, we require that the RO for dark fibre must set out (as a minimum) such matters as:
- a) a clear description of the services on offer including technical characteristics and operational processes for service establishment, ordering and repair;
 - b) the locations of points of network access and the technical standards for network access;
 - c) conditions for access to ancillary and supplementary services associated with the network access including operational support systems, databases, etc;

¹¹³⁰ Openreach response to question 12 of the BCMR s.135-12 Notice.

¹¹³¹ We note that the RWT service provided for active Ethernet circuits is different to that provided for dark fibre.

¹¹³² See Annex 20.

¹¹³³ 2016 BCMR Statement, Volume 1, paragraphs 9.177 to 9.182.

- d) contractual terms and conditions, including dispute resolution and contract negotiation/renegotiation arrangements;
 - e) charges, terms and payment procedures; and
 - f) SLAs and SLGs to be agreed and finalised as part of industry negotiations regarding product specification, with SLAs to enter into force no later than 6 weeks after conditions take effect and SLGs to come into force no later than 1 January 2020 on full launch of dark fibre.
- 12.235 When establishing the RO for dark fibre under Conditions 2 and 5.2, Openreach should take account of the guidance set out above relating to, first, distance limits and, second, provision of access where there is a lack of fibre infrastructure along particular routes. This will be particularly relevant when adopting technical characteristics and operational processes for service establishment, and the technical standards for network access.
- 12.236 We have also decided that the RO for dark fibre must set out an explanation of any differences between the provision of dark fibre services and the same associated services that apply to the relevant reference product. This is intended to offer transparency within the RO and help achieve parity between dark fibre access and wholesale active services. Such transparency in the RO will also assist the monitoring of anti-competitive behaviour and provide visibility to the terms and conditions on which other providers will purchase dark fibre services.

Implementation timeline

Alignment with EAD services to support DFA implementation

- 12.237 We remain of the view that a DFA remedy must be available early in this review period in order that it is effective, and we recognise alignment between EAD fibre products and the DFA remedy design facilitates a shorter implementation timeline than would be the case for a standalone product. In our consultation we pointed to areas of alignment between EAD products and the DFA remedy. However, Openreach raised some concerns that the link between the two had been reduced in the way the DFA remedy was presented.¹¹³⁴ It argued that our position was now unclear, and that the apparent removal of any distance limit from the regulated product suggested any link with EAD products was now removed.¹¹³⁵
- 12.238 Our proposals did not sever links between the DFA remedy design and the EAD fibre product origins, for which dark fibre may be used as a substitute. The link was emphasised in previous designs as a result of pricing elements also being linked to EAD products when establishing an active-minus charge control. In the 2018 BCMR and LLCC Consultations, we

¹¹³⁴ Openreach suggest the change in scope relating to a DFA remedy applicable in the IEC market only means it is forming a new product, which it refers to as the DFx product.

¹¹³⁵ Openreach response to 2018 BCMR Consultation, Annex C, page 77, paragraphs 12-15.

have looked at forming an appropriate cost-based charge control. In doing so, we have still used EAD products as a starting point.¹¹³⁶

- 12.239 Ongoing alignment with EAD services means Openreach can build on product development work undertaken up until December 2016, which was based on parity with EAD products.¹¹³⁷ While the 2016 DFA remedy was never launched, and Openreach point to a number of systems developments that will be required to implement our DFA remedy¹¹³⁸, implementation will still be quicker than if the remedy no longer had a link to EAD product specifications.
- 12.240 Openreach has indicated the adoption of a radial distance limit of 45km, would mean DFA could be launched in a shorter timeframe; however, EMP systems developments may not be complete within a month of publication of this statement. This would mean Openreach could not achieve parity with EAD products in the proposed timeframe, as it would rely on partially manual systems to take orders and such orders would have to be limited in size until an automated process was in place.¹¹³⁹

Adequate time for Reference Offer negotiations

- 12.241 We have decided to extend the period for negotiations and publication of the RO from one month to six weeks after the BCMR conditions enter into force for the following reasons.¹¹⁴⁰ Some amendments to the RO will be necessary and Openreach indicates that one month is a challenging timeframe in which to make changes and engage fully with other providers who may take up DFA during this review period. We agree that some industry engagement is needed to establish a fit-for-purpose RO.
- 12.242 Openreach points to past experience of dark fibre negotiations being lengthy and protracted. Conversely, if the RO were to be introduced with insufficient industry engagement there would be a risk of disputes.
- 12.243 When making our proposals, we considered not only the progress made in 2016 negotiations but also the agreement reached with stakeholders. In a short review period, it is not in the interests of providers who wish to use dark fibre to delay implementation of the DFA remedy. We want to ensure sufficient time is given to the process, so BT provides other parties with adequate opportunity to comment, but that negotiations are suitably framed to reduce unnecessary delay.

Launch of the DFA remedy – the two-stage implementation process

- 12.244 In response to our consultation proposals, Openreach set out, in its response, the concept of a ‘soft launch’ to indicate what was feasible shortly after publication of this statement. It suggested that it could start after July 2019 and the initial release cycle – R4100 – in which

¹¹³⁶ See 2018 BCMR Consultation, Volume 2, paragraph 4.13-4.16.

¹¹³⁷ Openreach response to 2018 BCMR Consultation, Annex C, page 77, paragraphs 12-15.

¹¹³⁸ Openreach response to 2018 BCMR Consultation, page 75.

¹¹³⁹ Openreach’s response to the BCMR s.135-26 Notice, slides from meeting dated 25 February 2019, page 4.

¹¹⁴⁰ In order to implement this decision we have amended SMP Condition 5.6(a) at Annex 26, Schedule 3, Part 3.

some of the systems developments could be actioned. Openreach indicated the soft-launch period could be used to “trial dark fibre with industry from mid-August”¹¹⁴¹.

- 12.245 In the light of these views we considered the potential either to delay the launch of DFA until Openreach has undertaken all the necessary development to achieve parity with EAD or to adopt a two-stage implementation process to give access to dark fibre sooner without full parity and with a longer timetable for full systems development.
- 12.246 We have decided to adopt a two-stage implementation process, requiring Openreach to provide access to dark fibre during a soft-launch period while the development for an automated ordering process is completed for full launch. The advantages of a soft-launch period beginning at the outset of a short review period are clear: it allows other providers to place initial orders for dark fibre within the first year, with consumers gaining a benefit from the remedy during the review period. Furthermore, by setting a clear deadline for full launch, we are giving additional time to Openreach to develop its EMP systems effectively as well as providing scope for testing and training.¹¹⁴²
- 12.247 Having considered Openreach’s proposals, we require soft launch no later than six weeks after the BCMR conditions come into force, and full launch by 1 January 2020.¹¹⁴³
- 12.248 We consider this two-stage implementation process in more detail in Annex 17 to this Statement, including our decisions on quality of service (QoS) standards and how SLAs/SLGs fit within this process.

Approach to pricing of dark fibre

Our proposals

- 12.249 We proposed that the price of dark fibre should be set using a cost-based charge control with reference to the relevant components of BT’s underlying passive infrastructure necessary for connections between exchanges. This would include the relevant forward looking incremental costs incurred by BT in providing inter-exchange dark fibre services plus some mark-up to allow for the recovery of common costs.

Responses to our consultation

- 12.250 TalkTalk,¹¹⁴⁴ Three¹¹⁴⁵ and Vodafone¹¹⁴⁶ agreed with our proposals for a cost-based approach to pricing.

¹¹⁴¹ Openreach’s response to 2018 BCMR Consultation, Annex C, page 74, paragraph 5 .

¹¹⁴² In order to implement this decision we have amended SMP Conditions 2.3-2.5 at Annex 26, Schedule 3, Part 3.

¹¹⁴³ In order to implement this decision we have amended SMP Conditions 2.3-2.5 at Annex 26, Schedule 3, Part 3.

¹¹⁴⁴ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 4.70.

¹¹⁴⁵ Three’s response to the 2018 BCMR Consultation, paragraph 6.3.

¹¹⁴⁶ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 6.71.

12.251 Virgin Media noted that, if we were imposing a charge control based on BT’s costs, it was important to ensure dark fibre only applies in truly uncompetitive areas.¹¹⁴⁷ Openreach argued an active-minus approach would be more in keeping with our overall objective of promoting network-based competition, but noted that a cost-based control delivers a similar price in this instance.¹¹⁴⁸ IIG,¹¹⁴⁹ CityFibre¹¹⁵⁰ and Zayo¹¹⁵¹ argued that we should use a Reasonably Efficient Operator (REO) approach to pricing, and so ensure sufficient economic space was available for a competitor using PIA.

12.252 More detailed responses on the dark fibre charge control are considered in Volume 3.

Our decision and reasoning on pricing of dark fibre

12.253 A price control condition is aimed at addressing BT’s ability and incentive to charge excessive prices or otherwise engage in a price squeeze. Other remedies, such as a prohibition on undue discrimination, may be also be used to restrict elements of pricing conduct.

12.254 In a competitive market, charges would be set on the basis of the commercial judgements of individual companies and could be expected to deliver cost reflective prices. However, where a provider has SMP, competition cannot be expected to provide effective constraints and *ex ante* regulation may be necessary to prevent charges from being set at an excessive level. Such intervention could also have as its objectives the aims of promoting efficiency and of allowing the development of effective competition in downstream markets.

12.255 For inter-exchange circuits between relevant sites where BT has SMP, it has an incentive and the ability to charge excessive prices. Excessive prices at the wholesale level could make it difficult for other providers to compete at the retail level with BT and may result in market exit. Excessively high wholesale charges are also likely to result in high retail prices i.e. consumers would be paying more for a service than they should expect if wholesale prices were constrained by effective competition.

Our approach to setting a charge control for the inter-exchange dark fibre remedy

12.256 In principle, we could adopt either a cost-based or active-minus approach when setting a charge control. By cost-based we mean a charge control that is set with reference to the underlying costs of providing an inter-exchange dark fibre circuit. By active-minus we mean a charge control that is set with reference to the price of an active circuit, adjusted to reflect differences in the cost of providing an inter-exchange dark fibre circuit.

¹¹⁴⁷ Virgin Media’s response to the 2018 BCMR Consultation, pages 18-19.

¹¹⁴⁸ Openreach’s response to the 2018 BCMR Consultation (LLCC), page 9, paragraph 21.

¹¹⁴⁹ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.3.12.

¹¹⁵⁰ CityFibre’s response to the 2018 PIMR Consultation, paragraph 7.2.4.

¹¹⁵¹ Zayo’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.21.

- 12.257 We have decided to set a cost-based charge control for the inter-exchange dark fibre remedy as we consider that its price should reflect its underlying costs.
- 12.258 Openreach argued that our proposed pricing was below the commercial level.¹¹⁵² IIG,¹¹⁵³ CityFibre¹¹⁵⁴ and Zayo¹¹⁵⁵ considered that [X]. They argued that we should set a dark fibre price using a reasonably efficient operator (REO) approach, assuming that the REO uses PIA. As the dark fibre remedy will only be available in areas where there is no existing competition and the likelihood of additional competition is low, even with the availability of PIA, we consider that a price premium to incentivise rival investment would be inappropriate. It would result in higher prices (and therefore static costs) for consumers, with no realistic prospect of subsequent dynamic benefits from increased competition on these routes.
- 12.259 Additionally, we have considered whether setting a price based on an active-minus approach would be appropriate to help preserve a bandwidth gradient. However, as set out above our evidence does not suggest high prices for VHB services are necessary for BT to recover its costs nor would a flattening of the bandwidth gradient have an adverse impact on economic efficiency.
- 12.260 We therefore consider a cost-based charge control with reference to the relevant costs of BT's underlying passive infrastructure necessary for connections between exchanges would be more appropriate. This would include the relevant forward-looking incremental costs incurred by BT in providing inter-exchange dark fibre services plus some mark-up to allow for the recovery of common costs.¹¹⁵⁶
- 12.261 Our detailed approach to setting the charge control on dark fibre, including choice of cost standard, estimation of relevant costs, pricing of ancillary services, and satisfaction of the applicable legal tests, is discussed in detail in Volume 3.

Legal tests

- 12.262 For the reasons below, we are satisfied that the imposition of a requirement to provide access to dark fibre on reasonable request (as described above) meets the various tests set out in the Act.
- 12.263 In light of our design of the dark fibre remedy and the assessment of the risks and benefits presented in this section, we have concluded that it would be appropriate to impose an SMP condition pursuant to section 87(3) of the Act, requiring BT to provide dark fibre access for inter-exchange connectivity from BT Only exchanges where the nearest rival PCO network is more than 100m away.

¹¹⁵² Openreach's response to the 2018 BCMR Consultation, Annex B, paragraph 113.

¹¹⁵³ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.3.9-7.3.13.

¹¹⁵⁴ CityFibre's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.2.1-7.2.4.

¹¹⁵⁵ Zayo's response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.17-4.1.21.

¹¹⁵⁶ Common costs are those which arise from the provision of a group of services, but which are not incremental to the provision of any individual service.

12.264 Section 87(3) of the Act authorises Ofcom to set SMP services conditions requiring the dominant provider to provide such network access as Ofcom may from time to time direct. These conditions may, pursuant to Section 87(5), include provision for securing fairness and reasonableness in the way in which requests for network access are made and responded to and for securing that the obligations in the conditions are complied with within periods and at times required by or under the conditions. Section 87(9) of the Act also authorises SMP services conditions imposing on the dominant provider such price controls as Ofcom may direct in relation to matters connected with the provision of network access, subject to the conditions of Section 88 being satisfied.

12.265 In imposing these conditions, we have taken into account the factors set out in section 87(4) of the Act, which are:

- the technical and economic viability (including the viability of other network access products, whether provided by the dominant provider or another person), having regard to the state of market development, of installing and using facilities that would make the proposed network access unnecessary;
- the feasibility of the provision of the proposed network access;
- the investment made by the person initially providing or making available the network or other facility in respect of which an entitlement to network access is proposed (taking account of any public investment made);
- the need to secure effective competition (including, where it appears to Ofcom to be appropriate, economically efficient infrastructure based competition) in the long term;
- any rights to intellectual property that are relevant to the proposal; and
- the desirability of securing that electronic communications services are provided that are available throughout the Member States.

12.266 In particular, we have explained above that requiring BT to provide dark fibre access has substantial benefits. We therefore expect material take-up of dark fibre over this review period. However, dark fibre access also has risks, including potentially disincentivising alternative network providers to invest in network infrastructure. We have explained above how we have minimised these risks in the scope and design of the remedy.

12.267 We consider that the conditions meet our duties under sections 3 and 4 of the Act and the Community requirements under section 4 of the Act. The obligations:

- promote and secure efficient and sustainable competition in the provision of electronic communications networks and services by ensuring that BT offers wholesale products to enable telecoms providers to compete effectively with BT in downstream markets. In particular, the obligations will promote competition in the provision of backhaul between exchanges where there are no or insufficient competitive networks; and by enabling infrastructure build in marginal access areas, as backhaul costs are a consideration when building new access networks;
- further the interests of and secure the maximum benefit for consumers. In areas where competition is unlikely to develop our dark fibre remedy will reduce backhaul costs. We expect some proportion of cost savings to be passed through to

consumers. In areas where competition is more likely to develop, we consider in the longer term consumers will derive more benefit from competitive entry, including stronger competition at the retail level. Lastly, where dark fibre relieves capacity constraints, consumers will benefit from higher quality services.

12.268 The proposed conditions are in accordance with section 47(2) as they are:

- objectively justifiable, in that they facilitate and encourage access to BT's network and therefore promote competition to the benefit of consumers;
- not unduly discriminatory, as they are only for BT and no other telecoms provider has been found to hold a position of SMP in these markets;
- proportionate, since they are targeted at addressing the market power that we find that BT holds in the relevant market; do not require it to provide access if it is not technically feasible or reasonable; and limited to areas where competition is least likely to develop; and
- transparent in that the conditions are clear in their intention to ensure that BT provides access to its networks to facilitate effective competition.

12.269 We consider our decision to impose a cost-based charge control satisfies the tests set out in section 88 of the Act. In particular, we consider that where BT has SMP it has an incentive and the ability to charge excessive prices. Excessive prices at the wholesale level could make it difficult for other providers to compete at the retail level; and may result in high retail prices borne by consumers. Further detail on the application of the section 88 tests is set out in Volume 3.

12.270 We have taken utmost account of the BEREC Common Position in preparing our proposals. We consider that our proposals are consistent with the best practice set out in the BEREC Common Position.

12.271 For the reasons set out above, we are satisfied that the obligation to require dark fibre network access and associated SMP conditions meet the relevant tests set out in the Act.

13. Specific remedies for network access: active products

- 13.1 In addition to the general network access obligation set out in Section 11, we have decided to impose on BT a specific requirement to provide network access in the form of certain active products. This requirement will apply in the markets in which we have identified BT as having SMP, which are:
- CI Access services at all bandwidths in the UK¹¹⁵⁷, excluding the Central London Area (CLA) and the Hull Area, which we discuss in Section 6; and
 - CI Inter-exchange connectivity services at all bandwidths at non-competitive BT exchanges, which we discuss in Section 8.
- 13.2 By active products, we mean products that include the provision of electronic transmission equipment for the conveyance of signals in addition to the underlying passive infrastructure and fibre.
- 13.3 The requirement to provide active products (including price controls) is designed to address the competition concerns we have identified in the business connectivity markets, as set out in Section 10, which include the risk of excessive pricing and margin squeeze.
- 13.4 The specific access remedies we have decided to impose are those we proposed in our 2018 BCMR Consultation. In all markets in which we find BT has SMP, we are imposing an obligation on BT to supply specific types of Ethernet services, including such associated facilities as are reasonably necessary for the provision of those services. For Very High Bandwidth (VHB) services, the obligation also includes WDM services.
- 13.5 In BT Only and BT+1 areas of the CI Access services market, and in the CI Inter-exchange connectivity services markets at non-competitive BT exchanges, we are imposing a charge control at current prices. Our decision to impose a charge control is explained in Section 10, and our decisions in relation to charge control design are set out in detail in Volume 3.
- 13.6 To reflect existing and greater expected future levels of competition in High Network Reach (HNR) areas of the CI Access services market, we are not imposing a charge control in the form of a price cap in these areas. Active services in HNR areas of the CI Access services market will instead be subject to a fair and reasonable charging obligation. Our decision to impose a fair and reasonable charging obligation in these areas is discussed in Section 10 and the remedy is set out in Section 11.
- 13.7 Generally, where we require BT to offer active services, we also require appropriate quality of service remedies. These remedies are explained in Section 15. To reflect existing and

¹¹⁵⁷ In Section 5, we identified a number of geographic markets for CI Access services. In Section 6, we identified BT to have SMP in BT Only areas in the UK; BT+1 areas in the UK; each of the Metro Areas (defined as HNR postcode sectors in each of Birmingham, Bristol, Edinburgh, Glasgow, Leeds and Manchester); and HNR areas in the rest of the UK (excluding the CLA and Hull Area).

greater expected future levels of competition in HNR areas of the CI Access services market, we are not setting quality of service standards in these areas.

- 13.8 Alongside the active remedies we have specified in this section, BT will be required to offer non-contestable Time-related Charges (TRCs) and Direct Excess Construction Charges (ECCs), as these services are reasonably necessary for a third party to use active products. These services will be subject to a charge control, which we set out in detail in Volume 3.
- 13.9 We set out below our consultation proposals, a summary of the key stakeholder responses, and our reasoning and decisions. Finally, we explain how we treat circuits that cross boundaries between different geographic markets.

Requirement to provide specific network access at all bandwidths

Our proposals

- 13.10 Our proposed specific access remedies obligation to provide active products was intended as a complementary remedy to the proposed general access obligations and (where applicable) to the dark fibre specific access remedy.
- 13.11 We proposed that BT should be required to provide network access to the following specific active products in all markets where we provisionally found BT to have SMP:
- Ethernet circuits at 1 Gbit/s and below; and
 - Ethernet and WDM circuits at bandwidths over 1 Gbit/s.
- 13.12 Furthermore, as we explained in our consultation¹¹⁵⁸, network access includes interconnection services and/or any services or facilities that would enable a person to make use of electronic communications services or networks. We consider that such services are reasonably necessary for a third party to use the active products specified in this section.
- 13.13 Therefore, we proposed that BT should be required to provide the following services alongside the obligation to offer network access, and that they would be subject to a charge control:
- Time Related Charges (TRCs): these are fees imposed for services such as fault repair and providing or rearranging services where the work is not covered by Openreach's standard charges.¹¹⁵⁹ The proposed obligation covered non-contestable provisioning TRCs and all other non-contestable Ethernet repair TRCs.¹¹⁶⁰

¹¹⁵⁸ 2018 BCMR Consultation, paragraph 13.20-13.28.

¹¹⁵⁹ See Openreach Price List, Time Related Charges (Including Shifts), <https://www.openreach.co.uk/org/home/products/pricing/loadProductPriceDetails.do?data=hcaYjiWegP2u2KS8FTdcOBSculM1Opem5f8dVePnh8UIMnGHsqdC0vzO163bjmh34D91D7M0q8u%2F%0AIIsgtIFAKw%3D%3D> [accessed 26 April 2019] (TRC Price List).

¹¹⁶⁰ As we set out in our detailed explanation and rationale in the 2018 BCMR Consultation (paragraphs 13.22-13.25), the EAD repair TRCs relating to Right When Tested (RWT and Customer Equipment fall outside our network access obligation as we consider these to be contestable.

- Excess Construction Charges (ECCs): these are fees imposed to recover the costs of customer-specific network construction work in association with a new connection. The proposed obligation covered Direct ECCs, i.e. activities that are carried out by Openreach (using internal direct labour and materials).

Stakeholder responses

- 13.14 Most of the stakeholders who commented on our proposed specific access remedies such as Virgin Media¹¹⁶¹, Sorrento Networks¹¹⁶², SSE¹¹⁶³ and [X]¹¹⁶⁴ were broadly in favour of our proposal to require BT to offer active services.
- 13.15 BT Group requested further clarification as to the specific routes on which BT was required to provide regulated services (particularly links to data centres).¹¹⁶⁵
- 13.16 Virgin Media also noted that is appropriate to apply different remedies to the different areas within the CI Access services market, e.g. Ofcom’s approach to specific remedies and pricing in the HNR areas, as it reflects that these are areas where competition is emerging.¹¹⁶⁶

Our reasoning and decisions

- 13.17 In Section 10, we set out our competition concerns in business connectivity markets over the period of this review. We said that while unrestricted PIA provides a path towards deregulation of downstream services in the future, in this review period we are imposing regulation in downstream business connectivity markets that will protect access seekers.
- 13.18 The requirement to provide certain active services is designed to address our competition concerns. In particular our concern that, absent regulation, BT would have the incentive and ability to refuse to provide access to its network or not provide access on terms that would secure efficient investment and innovation, both in the relevant wholesale markets and the related downstream retail markets.
- 13.19 In the CI Access services market, rival telecoms providers are currently heavily dependent on buying actives from Openreach to compete in the provision of business connectivity services downstream. Without a specific network access requirement to provide actives, BT would have an incentive to withdraw these products to weaken the competitive constraint downstream.
- 13.20 In the CI Inter-exchange connectivity services markets, inter-exchange circuits are important for connecting between BT exchanges in order to access competitive backhaul, and as an enabler of competition in the CI Access services market. BT’s wholesale products

¹¹⁶¹ Virgin Media’s response to the 2018 BCMR Consultation, page 19.

¹¹⁶² Sorrento Networks’ response to the 2018 BCMR Consultation, page 10.

¹¹⁶³ SSE’s response to the 2018 BCMR Consultation, page 11.

¹¹⁶⁴ [X].

¹¹⁶⁵ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, Annex 4, paragraph 4.1.

¹¹⁶⁶ Virgin Media’s response to the 2018 BCMR Consultation, page 19.

- have handover points at BT exchanges, and to use these network access remedies, telecoms providers need backhaul.
- 13.21 We are therefore imposing a requirement to provide active services, supported by appropriate price controls and quality of service obligations (and, as discussed in Section 12, dark fibre on certain inter-exchange routes) to protect customers from the effects of BT's market power. We are of the view that, in absence of this obligation, BT would have an incentive to withdraw or to no longer provide these products, around which telecoms providers have developed their business models.
- 13.22 BT is therefore required to provide network access to the following specific active products in all business connectivity markets in which we have concluded that BT has SMP:
- Ethernet circuits at 1 Gbit/s and below; and
 - Ethernet and WDM circuits at bandwidths over 1 Gbit/s.
- 13.23 In response to BT Group's request for further clarification as to where (on which specific routes) BT is required to provide regulated services, below we provide further guidance.
- 13.24 In the CI Access services market (excluding the CLA and the Hull Area) and in the CI Inter-exchange connectivity services markets at non-competitive BT exchanges, we have found BT to have SMP. In addressing BT's SMP, we consider (among other things) the proportionality of the remedy, and therefore our remedy is no more intrusive than necessary to achieve its intended goals. We also take account of the investment made by the person providing network access, as well as the need to secure infrastructure-based competition.
- 13.25 The CI Access services market encompasses all access circuits, including circuits between a customer site and a telecoms provider's network node or data centre. However, we only require BT to provide active products between a customer site and a BT exchange, or between two customer sites.
- 13.26 We do not consider it necessary, in the CI Access services market, to require BT to provide active products to a telecoms provider's network node or data centre. Regulated products between customer sites and exchanges, and from non-competitive exchanges to other exchanges, are sufficient to ensure that telecoms providers can access competitive alternatives for connections to network nodes or data centres. We therefore consider that these obligations on BT are proportionate to address BT's SMP in this market.¹¹⁶⁷
- 13.27 In the CI Inter-exchange connectivity services markets, we require BT to provide active products from all non-competitive BT exchanges.
- 13.28 As we set out in Section 7, we consider trunk links between BT exchanges and data centres, and between BT exchanges and network nodes, to be presumed competitive. BT is not therefore required to provide active products on these routes.

¹¹⁶⁷ In Section 14, we explain why we continue to apply Customer-Sited Handover to a small number of circuits.

- 13.29 To reflect these changes, we have amended the definition of “Access Segment” in the legal instrument, which sets the scope of the requirement to provide active services in the CI Access services market.¹¹⁶⁸ We have also amended the definition of “Backhaul Segment” in the legal instrument, which sets the scope of the requirement to provide active services in the CI Inter-exchange connectivity services markets.¹¹⁶⁹
- 13.30 We have also decided to require BT to offer non-contestable provisioning TRCs, all other non-contestable Ethernet repair TRCs, and Direct ECCs as we consider that these services are reasonably necessary for a third party to use the actives services specified above. These services will be subject to a charge control, as discussed Volume 3.

Legal tests

- 13.31 We consider that the obligation for BT to provide specific network access in the form of active products, together with such associated facilities as are reasonably necessary for the provision of network access, in the CI Inter-exchange services markets at non-competitive BT exchanges, and in the CI Access services market in the areas in which we have determined that BT has SMP, is appropriate and satisfies the legal tests set out in the Act.
- 13.32 Section 87(3) of the Act authorises Ofcom to set SMP services conditions requiring the dominant provider to provide such network access as Ofcom may from time to time direct. These conditions may, pursuant to section 87(5), include provision for securing fairness and reasonableness in the way in which requests for network access are made and responded to and for securing that the obligations in the conditions are complied with within periods and at times required by or under the conditions. Section 87(9) of the Act also authorises imposing on the dominant provider such rules as they may make in relation to matters connected with the provision of network access about the recovery of cost and cost orientation, subject to the conditions of Section 88 being satisfied.
- 13.33 In imposing this condition, we have taken into account the factors set out in section 87(4) of the Act, in particular the technical and economic viability of those services and the feasibility of their provision. We consider that this obligation will contribute to ensuring effective competition in the long term.

¹¹⁶⁸ The amendment is as follows: “‘Access Segment’ means network access providing uncontended bandwidth connecting an end user premises to:

- (a) a Local Access Node; or
- (b) an operational building of the Dominant Provider; ~~or~~
- (c) ~~an operational building of a Third party.”~~

See Annex 26, Schedule 3, Part 2 and Part 3, Condition 2.1.

¹¹⁶⁹ The amendment is as follows: “‘Backhaul Segment’ means network access providing uncontended bandwidth connecting two operational buildings of the Dominant Provider either:

- ~~(a) an operational building of the Dominant Provider to~~
- ~~(i) another operational building of the Dominant Provider; or~~
- ~~(ii) an operational building of a Third Party;~~

~~Or~~

- ~~(b) an operational building of a Third Party to~~
- ~~(i) another operational building of a Third Party; or~~
- ~~(ii) an operational building of the Dominant Provider.”~~

See Annex 26, Schedule 3, Part 2 and Part 3, Condition 2.1.

- 13.34 We have also considered our duties under section 3 and the Community requirements set out in section 4 of the Act. In particular, the obligation is aimed at encouraging network access, and thereby promoting and securing efficient and sustainable competition, and the maximum benefit of customers of telecoms providers. It will continue to enable telecoms providers to compete effectively with BT in downstream markets.
- 13.35 We consider that the obligation also satisfies the criteria set out in section 47(2) of the Act because it is:
- objectively justifiable, in that it relates to the need to ensure that competition is maintained to the benefit of consumers.
 - not unduly discriminatory, in that the obligation aims to address BT's market power in the relevant markets, in which we consider that only BT has SMP;
 - proportionate, in that the obligation is necessary, to promote efficient and sustainable competition for the maximum benefit of customers of telecoms providers; and
 - transparent, in that the obligation is clear in its intention to require BT to provide network access to certain Ethernet and WDM services to other telecoms providers and its intended operation should also be aided by our explanations in this statement.
- 13.36 For the reasons set out above, we consider that the condition is appropriate to address the competition concerns identified, in line with section 87(1) of the Act.

Consistency with EC Recommendations and the BEREC Common Position

- 13.37 We have also taken utmost account of the BEREC Common Position in arriving at our decisions, including BP1 to BP3a which appear to us to be particularly relevant in this context. We consider that our decisions are consistent with the best practice set out in the BEREC Common Position.

Price controls for active services

Our proposals

- 13.38 We proposed different price control remedies for active services in different markets.
- 13.39 In the Metro Areas and other HNR areas of the CI Access services market (excluding the CLA and Hull Area), we proposed a fair and reasonable charging obligation. We discuss this in Section 11.
- 13.40 In all other markets in which we proposed BT had SMP, we proposed a price cap at current prices.
- 13.41 We also proposed to impose a price control for ECCs and TRCs services. This is discussed in Volume 3.

Stakeholder responses

- 13.42 A number of stakeholders such as Virgin Media¹¹⁷⁰, Three¹¹⁷¹ and SSE¹¹⁷² were broadly in favour of our approach to pricing for active remedies. Other stakeholders such as CityFibre¹¹⁷³, Zayo¹¹⁷⁴ and IIG¹¹⁷⁵, while broadly in favour of our pricing approach for actives, argued for a different design.¹¹⁷⁶
- 13.43 Others such as TalkTalk¹¹⁷⁷, Vodafone¹¹⁷⁸, Telefónica¹¹⁷⁹, Sky¹¹⁸⁰, Colt¹¹⁸¹, PAG¹¹⁸² and UKCTA¹¹⁸³ disagreed with our proposal to maintain current prices, with some arguing that it would allow BT to make excessive returns, and we should therefore impose cost-based charge controls. [S&K]¹¹⁸⁴ also argued that we should impose a cost-based charge control.
- 13.44 Some stakeholders such as Three¹¹⁸⁵, UKCTA¹¹⁸⁶, Zayo¹¹⁸⁷ and Telefónica¹¹⁸⁸ argued that the charge control should be extended to cover HNR areas.
- 13.45 TalkTalk also raised a concern that absent a price floor or an obligation on BT to set uniform prices across different geographic areas, “Openreach may engage in discriminatory pricing, choosing to discount only in geographic areas where there is competition”. TalkTalk further noted that Ofcom’s remedies only reduced the incentive to price discriminate in this manner, and did not remove the incentive since it may remain profitable for Openreach to reduce prices only in competitive areas to deter competition.¹¹⁸⁹
- 13.46 Similarly, Three raised a concern that BT could set its prices in some areas to preclude market entry by prospective infrastructure providers, thereby engaging in a pricing strategy that ordinarily would be dealt with under competition law if it was predatory pricing. Three noted that Ofcom could respond by setting price floors. CityFibre¹¹⁹⁰ and Zayo¹¹⁹¹ also argued that we should impose a price floor to prevent BT from engaging in anti-competitive pricing. However, Three noted the complexities of this and suggested that

¹¹⁷⁰ Virgin Media’s response to the 2018 BCMR Consultation, page 19.

¹¹⁷¹ Three’s response to the 2018 BCMR Consultation, paragraph 11.1.

¹¹⁷² SSE’s response to the 2018 BCMR Consultation, page 13.

¹¹⁷³ CityFibre’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 8.2.

¹¹⁷⁴ Zayo’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.24 and 4.1.28.

¹¹⁷⁵ IIG’s response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations paragraph 7.4.1 and 7.4.5.

¹¹⁷⁶ This is discussed in Volume 3.

¹¹⁷⁷ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 5.4-5.5.

¹¹⁷⁸ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraphs 6.28-6.30.

¹¹⁷⁹ Telefónica’s response to the 2018 BCMR Consultation, paragraph 25 and page 8.

¹¹⁸⁰ Sky’s response to the 2018 BCMR Consultation, paragraphs 19 and 23.

¹¹⁸¹ Colt’s response to the 2018 PIMR and 2018 BCMR Consultations, page 2.

¹¹⁸² PAG’s response to the 2018 BCMR consultation, paragraphs 24-25.

¹¹⁸³ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 29-30.

¹¹⁸⁴ [S&K].

¹¹⁸⁵ Three’s response to the 2018 BCMR Consultation, paragraph 12.1.

¹¹⁸⁶ UKCTA’s response to the 2018 BCMR Consultation, paragraph 27.

¹¹⁸⁷ Zayo’s response to the 2018 BCMR and 2018 BT RFR Consultations, paragraph 4.1.36.

¹¹⁸⁸ Telefónica’s response to the 2018 BCMR Consultation, page 7.

¹¹⁸⁹ TalkTalk’s response to the 2018 BCMR Consultation, paragraphs 5.60-5.62.

¹¹⁹⁰ CityFibre’s response to the 2018 BCMR and 2018 BT RFR Consultations, pages 13 – 21, paragraph 9.2.

¹¹⁹¹ Zayo’s response to the 2018 BCMR and 2018 BT RFR Consultations, section 5, pages 13- 18.

Ofcom should instead publish broad guidance on how it might assess any claim of predatory pricing in the future, and, what the appropriate cost standard would be to use in such an assessment.¹¹⁹² Three also considered that Ofcom should actively monitor that BT does not introduce targeted price reductions to deter potentially competitive entry.¹¹⁹³

13.47 As discussed in Section 10, some stakeholders such as Vodafone¹¹⁹⁴, TalkTalk¹¹⁹⁵, UKCTA,¹¹⁹⁶ PAG¹¹⁹⁷ and Sky¹¹⁹⁸ argued that we should have done a Cost Benefit Analysis on our pricing proposals.

Our reasoning and decisions

13.48 A price control can take a variety of forms including a charge control, basis of charges obligation, and fair and reasonable charging obligation. In selecting the appropriate form of price controls, we seek to balance a number of regulatory objectives. These include, among other things:

- preventing BT from setting excessive charges for the wholesale active services that are widely used today by telecoms providers;
- promoting efficient and sustainable competition in the delivery of leased line services, including network-based competition through the adoption of passive remedies in line with Ofcom's wider strategy; and
- encouraging investment and innovation.

13.49 As noted above, our decision to impose a fair and reasonable charging obligation in HNR areas of the CI Access services market is set out in Section 11.

13.50 We set out in Section 10 why we are imposing a price cap at current prices in certain markets and why we consider this approach is better suited to achieve our regulatory objectives than a cost-based charge control. We also explain why we are not extending the price cap to HNR areas of the CI Access services market and address stakeholders' comments that our approach will permit BT to make excessive profits. We also respond in Section 10 to stakeholders' comments that we did not conduct a Cost Benefit Analysis on our price control proposals.

13.51 We remain of the view that a price control capping charges at current levels is appropriate. We set out our decisions on the specific form of price controls for active services in Volume 3. We also set out our decision on price controls for ECCs and TRCs in Volume 3, Section 5.

13.52 In response to TalkTalk, CityFibre, Zayo and Three's concerns that Openreach will target price reductions where it faces actual or potential competitive entry, we are of the view

¹¹⁹² Three's response to the 2018 BCMR Consultation, paragraphs 13.1-13.4.

¹¹⁹³ Three's response to the 2018 BCMR Consultation, paragraph 8.2.

¹¹⁹⁴ Vodafone's response to the 2018 BCMR Consultation, part 3, paragraph 6.18.

¹¹⁹⁵ TalkTalk's response to the 2018 BCMR Consultation, paragraph 3.11.

¹¹⁹⁶ UKCTA's response to the 2018 BCMR Consultation, paragraph 25.

¹¹⁹⁷ PAG's response to the 2018 BCMR consultation, paragraph 24.

¹¹⁹⁸ Sky's response to the 2018 BCMR Consultation, paragraph, 21.

that our remedies sufficiently restrict Openreach’s ability and incentives to engage in anti-competitive pricing.

- 13.53 BT’s costs of provision may not be uniform across all markets. For these reasons, BT may therefore wish to set different prices in different geographic markets. However, we consider that the imposition (and design) of price controls on BT in all markets in which we have identified BT as having SMP reduce BT’s incentive and ability to engage in strategic price discrimination across different geographic markets. In particular, while BT could reduce charges in more competitive areas, its ability to recoup lost profits from less competitive areas will be constrained by the design of the charge controls in BT Only and BT+1 areas (as discussed in Section 3 of Volume 3). Further, the fair and reasonable pricing obligation provides some additional protection from a margin squeeze (as discussed in Section 11). Therefore, we do not think the risk of price discrimination, as described by TalkTalk and Three, is likely to be a significant concern in this review period such that additional regulatory conditions (like price floors) are warranted.
- 13.54 In addition, our decision to impose on BT a requirement to provide network access on an equivalence of inputs basis (EOI) will prevent BT from discriminating in favour of its own downstream operations. In Volume 3, in particular in Section 5, we also explain our decision to maintain our position of not allowing geographic discounts to count towards compliance with the charge control.
- 13.55 In response to Three’s comment that we should provide broad guidance on how we might assess any future claim of predatory pricing for leased lines, and what the appropriate cost standard would be used in such an assessment, we are of the view that BT’s obligations, as set out in this statement, are sufficiently clear for the purposes these seek to achieve. Any claim of predatory pricing, or competition law infringement in general, would need to be assessed on the specific facts of the case. Any such assessment would be conducted in accordance with our enforcement guidelines.¹¹⁹⁹
- 13.56 In relation to Three’s comments that Ofcom should actively monitor BT so that it does not introduce targeted price reductions, as noted above, we are of the view that our remedies are sufficient to address the risk of BT engaging in such practices. In addition, our transparency obligation on BT, as discussed in Section 11, is aimed at assisting the monitoring of potential anti-competitive behaviour, and providing transparency of the terms and conditions on which other providers can purchase services.

Legal tests

- 13.57 In relation to the fair and reasonable charging requirement in the HNR areas of the CI Access services market where we find that BT has SMP, we have set out in Section 11 why we consider this remedy satisfies the relevant legal tests.

¹¹⁹⁹ Ofcom, 2017. *Enforcement guidelines for regulatory investigations*. https://www.ofcom.org.uk/data/assets/pdf_file/0015/102516/Enforcement-guidelines-for-regulatory-investigations.pdf [accessed 22 May 2019].

13.58 In relation to the charge control on actives in all other markets in which we determine that BT has SMP, as set out in this section, the detailed form of the charge control, along with the relevant legal tests, is set out in Volume 3.

Classification of circuits that cross boundaries between CI markets

Our proposals

13.59 In our consultation¹²⁰⁰, we set out the practical implementation of the proposed remedies when circuits cross boundaries between geographic markets (i.e. circuits with one end inside and one outside a regulated area).

13.60 For wholesale CI Access services (e.g. access circuits between two end-user sites or between an end-user site and a network aggregation node), we proposed that circuits should be classified as follows:

- inside the CLA only if both ends are in the CLA; or
- inside Metro Areas or other HNR areas if both ends are inside Metro Areas or other HNR areas;
- inside Metro Areas or other HNR areas if one end is inside a Metro Area or other HNR area and the other end is in the CLA; and
- inside BT Only or BT+1 areas if one or both ends are inside BT Only or BT+1 areas.

13.61 For CI Inter-exchange connectivity services, we proposed that if both ends are at exchanges where two or more Principal Core Operators are present, then we consider these routes to be competitive. All other routes between BT exchanges are not competitive.

Stakeholder responses

13.62 Gamma noted that in relation to the quality standards obligations, there is an additional level of complexity if one end of the circuit is outside of a non-regulated area.¹²⁰¹

13.63 In a meeting with Ofcom concerning quality standards reporting, Openreach requested further clarification on how circuits with one end in a BT Only area and the other end in BT+1 area would be classified.¹²⁰²

Our reasoning and decisions

13.64 We have decided to classify circuits that cross boundaries between geographic markets broadly in line with what we proposed in our consultation. Having considered comments raised by Gamma and [3<] on this, and to provide guidance for the purposes of practical implementation of remedies when circuits cross boundaries between geographic markets, we have decided the classifications listed below.

¹²⁰⁰ BCMR November 2018 Consultation, at paragraphs 13.49-13.51.

¹²⁰¹ Gamma's response to the 2018 PIMR and 2018 BCMR Consultations, pages 3, and 17-18.

¹²⁰² Openreach response to BCMR s.135-26; [3<].

- 13.65 In the CI Access services market, for wholesale end-to-end services (e.g. access circuits between two end-user sites), as proposed in our consultation, we have decided that circuits should be classified as follows:
- inside the CLA only if both ends are in the CLA;
 - inside Metro Areas or other HNR areas if both ends are inside Metro Areas or other HNR areas;
 - inside Metro Areas or other HNR areas if one end is inside a Metro Area or other HNR area and the other end is in the CLA; and
 - inside BT Only or BT+1 areas if one or both ends are inside BT Only or BT+1 areas.
- 13.66 Therefore, where such services serve end-user sites located in different geographic markets, the circuit should be classified as being in the least competitive market, where the CLA is the most competitive, followed by Metro Areas and other HNR areas, then BT+1, then BT Only. Thus, a circuit between the CLA and a BT+1 area would be classified as being in the BT+1 geographic market.
- 13.67 For CI Access services, for circuits between an end-user site and a network node, we have concluded that the classification currently in use would be more consistent with our market definition and our view of competitive conditions. We have therefore decided that circuits between an end-user site and a network node should be classified as being in the geographic market corresponding to the end-user site.
- 13.68 For CI Inter-exchange connectivity services, as explained in Section 8, we have decided that if both ends are at exchanges where two or more Principal Core Operators are present, then we consider these routes to be competitive. All other routes between BT exchanges, where at least one end is at a BT Only or a BT + 1 exchange are not competitive and so subject to the applicable SMP services conditions.

14. Specific remedies for accommodation and interconnection

- 14.1 Telecoms providers require certain ancillary services from BT to use regulated wholesale leased line services.
- 14.2 We have concluded that BT has SMP in CI Access markets, excluding the CLA and the Hull Area, and in CI Inter-exchange connectivity at BT Only and BT+1 exchanges.¹²⁰³ As a result of BT's SMP in the relevant wholesale markets, we consider it necessary to also regulate the provision of these ancillary services. This is necessary to ensure that the network access remedy is effective.
- 14.3 In Section 11 we set out our general remedies for the markets for CI Access services at all bandwidths and CI Inter-exchange circuits at all bandwidths. SMP Condition 1.4¹²⁰⁴ confirms that BT is required to provide those associated facilities as are reasonably necessary for the provision of network access. We explained that these remedies would also apply to the accommodation and interconnection services that BT is required to provide in connection with wholesale services (this is also reflected in the text of SMP Condition 1.4).
- 14.4 In this section, we set out our decisions on the regulation of accommodation and interconnection services. We consider that accommodation and interconnection are needed to allow telecoms providers to interconnect their services with BT, and therefore to ensure our remedies are effective.
- 14.5 Following consultation responses, we have refined the scope of our accommodation and interconnection remedies. In particular, we have clarified BT's requirement to provide accommodation and interconnection services in the case of exchanges in the CLA and have limited the scope of CSH that BT is required to provide so that it only applies to existing circuits.
- 14.6 We have also decided to apply price controls to some ancillary services, which are discussed in Volume 3 of this decision.

Accommodation

Background

- 14.7 Accommodation services give telecoms providers access to space and power in BT exchanges and are crucial to enable telecoms providers to interconnect with BT's network in order to use regulated products.

¹²⁰³ In Section 3, we define access connections between end-user sites and an access aggregating node site (such as a BT exchange), and this includes circuits that are aggregated at other network nodes or data centres.

¹²⁰⁴ Annex 26, Schedule 3, Part 3.

- 14.8 Openreach provides two types of regulated accommodation services: Co-mingling and Access Locate. Co-mingling is exclusively provided in support of LLU, while Access Locate¹²⁰⁵ provides accommodation for the majority of other access services supplied by Openreach, including Ethernet leased lines.
- 14.9 Openreach also provides a tie cable product in support of accommodation services called Cablelink. Cablelink has both internal and external variants. The internal variant allows a telecoms provider to connect, for example, two separate areas in the BT exchange in which the telecoms provider has installed its equipment.¹²⁰⁶ The external variant allows a telecoms provider's external fibre cable located immediately outside a BT exchange to be connected to a telecoms provider's equipment inside the exchange.¹²⁰⁷ In order for a network operator to use an external variant, it needs to get to the BT handover point (which will be within 100m of the BT exchange).
- 14.10 Cablelink is an essential element of the accommodation services that Openreach provides given that it allows a telecoms provider to connect different points of presence within a BT exchange as well as connect its presence within a BT exchange to a non-Openreach telecoms provider's fibre outside the exchange. As noted in Section 8, an operator which uses external Cablelink to connect a BT exchange to its fibre outside that exchange is able to provide backhaul services from that exchange.
- 14.11 BT was previously required to provide a number of accommodation services under the 2016 BCMR and subsequently the 2017 Temporary Conditions in the markets in which we determined it to have SMP. It was subject to an obligation to allocate accommodation space on the basis of EOI and to apply price controls for accommodation services including Cablelink.

Our proposals

- 14.12 We proposed to require BT to provide accommodation services¹²⁰⁸ in all the markets in which we proposed BT has SMP.
- 14.13 We proposed that BT should be subject to an obligation to allocate accommodation space and power on the basis of EOI. We proposed that charge controls should be applied to accommodation services, including Cablelink variants. We also proposed, that space and power, given its importance, continue to be allocated on a first come first served (FCFS) basis.
- 14.14 We further proposed that the same regulation should apply to our dark fibre remedy.

¹²⁰⁵ Specifically, Co-mingling and Access Locate, give telecoms providers space (and power) to install site-specific communications equipment in a BT exchange.

¹²⁰⁶ There are three types of internal Cablelink variants. Variant 1 connects to licenced areas within an exchange. Variant 2 connects a telecoms providers equipment in an exchange to an optical fibre frame. Variant 3 connects the telecoms provider equipment in an exchange to an external cable at the cable chamber.

¹²⁰⁷ As noted in Annex 15, there are a number of external Cablelink variants including: Cablelink External, BT Cablelink, LLU Egress – External/BT Egress – External. All variants perform the same function.

¹²⁰⁸ Inclusive of all Cablelink variants.

Stakeholder comments

- 14.15 Openreach noted that it was unclear whether BT would be required to provide Cablelink services.¹²⁰⁹ Openreach provided no further comments on our proposed accommodation remedies.¹²¹⁰
- 14.16 Virgin Media, SSE¹²¹¹, [S&K] and Vodafone all agreed that we should continue to apply regulation to accommodation.
- 14.17 Virgin Media agreed that these services are “necessary to support the provision of regulated connectivity services in areas where BT is dominant” and therefore should continue to be regulated.¹²¹²
- 14.18 SSE, [S&K] and Vodafone considered that we should extend our accommodation remedy to the CLA, where we proposed a no SMP finding.
- 14.19 SSE considered that our proposals for accommodation remedies should not be limited to markets in the same way as connectivity. It suggested that BT should be subject to an obligation to allocate accommodation space and power on the basis of EOI and should face price controls for accommodation services including Cablelink for all BT exchanges including those in the CLA.¹²¹³
- 14.20 [S&K] argued that recently, as a result of problems with its supply chain, Openreach had a “performance crisis” which affected the supply of accommodation services in central London. It further noted, if there was not an appropriate remedy, and a similar problem were to occur, “Openreach would have little incentive to resolve such matters in a timely manner. If undue delays were experienced, BT’s downstream business would perversely benefit”.¹²¹⁴
- 14.21 Vodafone noted that accommodation services are critical to facilitate the purchase of services that are collected at the BT exchange and aggregated for transmission back to its network. It added that accommodation supports services across a wide range of markets including the business connectivity markets and WLA. As this is the case, accommodation services (e.g. Access Locate) are not particular to the business connectivity markets and cannot therefore be treated in isolation. Moreover, in order to make consumption of Access Locate economic, Vodafone argued that it needed to be able to use it to bring all types of traffic together. It considered that in proposing no regulated accommodation services in the CLA, we had not considered how accommodation space is used in practice. It added that out of 30 exchanges where it purchases accommodation/Access Locate services, it can identify at least 15 sites in the CLA where it has shared services.¹²¹⁵

¹²⁰⁹ Openreach clarifications submitted to Ofcom on 29 November 2018 titled “BCMR Consultation: Legal Annex”, Issue 5.

¹²¹⁰ Openreach’s response to the 2018 BCMR Consultation, page 126.

¹²¹¹ SSE specifically noted that we should apply price controls to accommodation services.

¹²¹² Virgin Media’s response to the 2018 BCMR Consultation, page 20.

¹²¹³ SSE’s response to the 2018 BCMR Consultation, page 12.

¹²¹⁴ [S&K]’s response to the 2018 BCMR Consultation, [S&K].

¹²¹⁵ Vodafone’s response to the 2018 BCMR Consultation, part 3, page 72-74.

14.22 SSE also considered, given the importance of accommodation, that for all markets it is essential that space and power continue to be allocated on a first come first served basis.¹²¹⁶ [X] argued that the allocation of space and power on a First Come First Served (FCFS) basis without an additional measure of materiality causes significant arbitrary customer outcomes. For instance, should one telecoms provider request space in a few exchanges in any particular region (for example in support of a large public sector bid) this could frustrate the process for that telecoms provider's competitors.¹²¹⁷

Our reasoning and decisions

14.23 We have decided to require BT to provide accommodation services and to apply price controls.

14.24 Accommodation in BT exchanges is an important enabler of competition in leased lines markets. It allows telecoms providers to make use of products such as EAD and EAD Local Access and facilitates competition in other markets.

14.25 Access to space and power in BT's exchanges can be limited, and in the absence of regulation BT would have the incentive and ability to discriminate in favour of its own needs in allocating such space and providing power. We further note that BT could choose not to supply some or all of these services or charge excessive prices. As telecoms providers must purchase these services to use regulated products, this would have the same effect as refusal to supply, or excessive pricing for the main wholesale products. The absence of requirements in relation to accommodation services could thus undermine the effectiveness of other remedies in the relevant markets.

14.26 Separately, we note that [X] argued that we should apply an additional measure of materiality to the requirement on BT to provide space and power on a FCFS basis.¹²¹⁸ We do not consider this to be necessary for this review period. We are not aware of any issues arising with the current approach, and note that [X] did not provide any evidence of arbitrary customer outcomes occurring as a result of the current arrangements, nor did it indicate how a materiality constraint would address any potential harm. Finally, it did not provide an indication as to how we might set a materiality threshold. We further note SSE's support of continued application of the FCFS obligation¹²¹⁹ and note no other telecoms providers have expressed similar concerns.

14.27 We note that a number of respondents to our consultation thought that we should extend the scope of our accommodation remedies in the UK to the CLA. In this regard, we agree with Vodafone's statement that accommodation services are often not used solely for the purpose of serving a particular telecoms market. Indeed accommodation services, in the form of space, power and cooling, are often provided in support of services serving multiple telecoms markets and we note that in the 2018 WLA review, BT was found to

¹²¹⁶ SSE's response to the 2018 BCMR Consultation, page 12.

¹²¹⁷ [X]'s response to the 2018 BCMR Consultation, [X].

¹²¹⁸ [X]'s response to the 2018 BCMR Consultation, [X].

¹²¹⁹ SSE's response to the 2018 BCMR Consultation, page 12.

have SMP in the supply of wholesale local access at a fixed location in the United Kingdom excluding the Hull Area (i.e. inclusive of the CLA in that market) and was required to provide accommodation services for this market.¹²²⁰

- 14.28 In the BCMR, accommodation remedies are needed in order to make use of all the regulated products imposed in the CI Access and CI inter-exchange connectivity markets. Therefore, BT is required to make them available at any exchange where these regulated products are available. This includes exchanges in the CLA where CI Inter-exchange connectivity services are regulated (i.e. for the provision of services that start and/or end at BT Only or BT+1 exchanges).
- 14.29 Therefore, in practice, we would expect regulated accommodation services to be available at all exchanges. However, it is for BT to decide how it discharges its obligations in this respect.
- 14.30 Openreach commented that it was not clear whether BT would be required to provide Cablelink.¹²²¹ This was because our draft legal instrument specifically required BT to provide “Accommodation Services” and “Interconnection Services”; but Cablelink was not included in the definition of “Accommodation Services”. Condition 1.4 of the legal instrument¹²²² requires (as did previous legal instruments in BCMR markets) BT to provide such associated facilities as are reasonably necessary for the provision of network access, including Accommodation and Interconnection Services. Historically, Cablelink has been a regulated under this condition in support of accommodation services and we consider that it should continue to be regulated under this condition.
- 14.31 We have decided to require BT to provide accommodation services **wherever it provides a regulated service** in the following markets:
- CI Access services at all bandwidths in the UK¹²²³; and
 - CI Inter-exchange circuits at all bandwidths at all BT exchanges.
- 14.32 We have also decided to apply price controls to those services.
- 14.33 For each of the markets above, we have decided that BT should be subject to an obligation to allocate accommodation space and power on the basis of EOI and to impose price controls for accommodation services including Cablelink. We also continue to consider, given the importance of accommodation, that for these markets it is essential that space and power continue to be allocated on a first come first served (FCFS) basis. We do not think that it is necessary for this review to apply an additional materiality constraint to the FCFS obligation.

¹²²⁰ See, Ofcom, 2018. *Wholesale Local Access Market Review – Statement, Annex 23, paragraph 23.112.*

https://www.ofcom.org.uk/data/assets/pdf_file/0020/112493/wla-statement-annexes-17-27.pdf [accessed 22 May 2019]; Ofcom, 2018, *Wholesale Local Access Market Review – Statement Legal Instruments, Annex 33, Condition 2,* https://www.ofcom.org.uk/data/assets/pdf_file/0024/112488/wla-statement-annex-33.pdf [accessed 22 May 2019].

¹²²¹ Openreach clarifications submitted to Ofcom on 29 November 2018 titled “BCMR Consultation: Legal Annex”, Issue 5.

¹²²² Annex 26, Schedule 3, Part 3.

¹²²³ We note this excludes the Hull Area.

- 14.34 As explained in Section 12, we consider that telecoms providers will require accommodation services to make use of the dark fibre remedy that we have decided to apply in the CI Inter-exchange connectivity services market. These obligations also require BT to provide accommodation services where they are going to be used for to dark fibre.
- 14.35 We set out our approach to regulating the prices of accommodation services in Volume 3 of this decision.

Interconnection

Background

- 14.36 Interconnection services connect one provider's network to another's network.¹²²⁴ They are provided at a point of connection (POC) or point of handover (POH), where the interconnection occurs. Without these services, telecoms providers would not be able to interconnect their networks with BT's and hence these services are crucial for the effective application of our network access remedies.
- 14.37 BT was previously required to provide the following interconnection services in regulated business connectivity markets:
- **IBH** (in building handover), which is where Openreach provides a POC at co-location space rented by a telecoms provider in a BT exchange. This connection is without aggregation. In practice, this requires Openreach to provide its circuits to a telecom provider's Point of Presence in a BT exchange e.g. an EAD circuit could run from a customer site to the telecom provider's co-location space in the BT exchange.
 - **CSH** (customer sited handover), which involves Openreach providing a POC at the site of the interconnecting telecoms provider (requiring Openreach to extend its network to the operational building of a third party).¹²²⁵ There are two types of CSH: without aggregation and with aggregation. In the former, Openreach terminates individual circuits at the telecoms provider's site without aggregation, and is commonly used for EAD circuits. In the latter, Openreach aggregates multiple EBD services for delivery over a single interconnection link to the telecoms provider's site.¹²²⁶
- 14.38 BT was also previously subject to an obligation to meet reasonable requests for new forms of network access including interconnection services. Some interconnection services were also subject to charge controls.¹²²⁷

¹²²⁴ In practice this will mean between a dominant provider and other telecoms provider.

¹²²⁵ This includes where a third party has a point of presence in a data centre or network node, including those owned by non-Openreach BT entities (e.g. a BT Enterprise owned data centre, EE network node).

¹²²⁶ This is a BTL service. We note that the use of BTL has significantly declined over the last review and as of December 2017, there were only four links within the UK. We note that Openreach has withdrawn all BTL products from new supply. We also understand that the four links also have cease requests against them.

¹²²⁷ 2017 Temporary Conditions, page 53.

Our proposals

- 14.39 We proposed to require BT to provide in-building handover (IBH) and customer sited handover (CSH) interconnection services in all markets in which we proposed to find BT has SMP. We also proposed to apply price controls to those services. We further proposed that the same interconnection remedies should apply to dark fibre.

Stakeholder comments

- 14.40 Openreach provided no comment on our proposed interconnection remedies.¹²²⁸
- 14.41 Virgin Media, SSE¹²²⁹, [redacted]¹²³⁰ and Vodafone all agreed that we should continue to apply regulation to interconnection.
- 14.42 Virgin Media agreed that these services are “necessary to support the provision of regulated connectivity services in areas where BT is dominant” and therefore should continue to be regulated.¹²³¹
- 14.43 Vodafone noted that interconnection services are critical to facilitate the purchase of services that are collected at the BT exchange and aggregated for transmission back to its network. It added that interconnection supports services across a wide range of markets including the business connectivity markets and WLA.¹²³²
- 14.44 Vodafone also explained that telecoms providers design backhaul aggregation “to use their own network infrastructure in place of BT’s by moving traffic from the BT network to the [telecoms provider’s] network at the most opportune and soonest possible location.” It noted that “the regulation of exchange backhaul has to date covered both the conveyance between BT exchanges and from the BT exchange to the telecoms provider core node.”¹²³³ Vodafone’s response highlighted that if regulated connectivity (in this case dark fibre) was not available between BT exchanges and telecoms providers’ network nodes this could mean that networks would need to be reconfigured, leading to increased bandwidth demand and costs.¹²³⁴ Though Vodafone’s argument related to the scope of dark fibre, we consider that the same points would apply more generally to the availability of interconnection for active services between BT exchanges and network nodes or between BT exchanges and data centres.

Our reasoning and decisions

- 14.45 As described above, interconnection is crucial for the effective application of our network access remedies, and therefore in enabling competition in leased lines markets. If interconnection services were not regulated, BT would have an incentive not to supply

¹²²⁸ Openreach’s response to the 2018 BCMR Consultation, page 126.

¹²²⁹ SSE specifically noted that we should apply price controls to interconnection services.

¹²³⁰ [redacted] response to the 2018 BCMR Consultation, [redacted].

¹²³¹ Virgin Media’s response to the 2018 BCMR Consultation, page 20.

¹²³² Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 8.1.1-8.1.2.

¹²³³ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 1.8.

¹²³⁴ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 1.26-1.30.

some or all of these services or to charge excessive prices. This is particularly the case since BT does not require these services to provide its own downstream retail services. As telecoms providers must purchase interconnection services to use Openreach regulated products, this would have the same effect as refusal to supply or excessive pricing for the main wholesale products that Openreach provides. In general, it is necessary for Openreach to provide some form of interconnection service as an ancillary to all regulated products in CI Access and CI Inter-exchange connectivity services.

IBH

- 14.46 With the exception of Access circuits between two customer sites, the regulated products in CI Access and CI Inter-exchange connectivity markets terminate at BT exchanges (as set out in Section 13). Once at the exchange, it is necessary for the telecoms provider to be able to interconnect the regulated circuit with its own network in order to provide a complete service to its customers. In the vast majority of cases, the interconnection between BT's network and a telecoms provider's network takes place within the BT exchange. For this reason, IBH is essential for telecoms providers to make use of regulated services.
- 14.47 IBH facilitates the use of disaggregated access and interexchange services and facilitates competition by allowing telecoms providers with a presence within a BT exchange to expand the range of services that they provide, potentially benefiting from economies of scale and scope by providing business connectivity services, in addition to Local Loop Unbundling (LLU) based broadband and telephony services.
- 14.48 We consider that regulated IBH is required in order for our CI Access and CI Inter-exchange connectivity remedies to work. Therefore, we have decided to require BT to provide IBH interconnection in any exchange with regulated products available from it. Telecoms providers need to interconnect their network with BT's, and this ensures they are able to do so within any BT exchange where they are using regulated products.

CSH

- 14.49 CSH involves Openreach providing a POC at the site of the interconnecting telecoms provider, requiring Openreach to extend its network. It facilitates interconnection at, for example, data centres and network nodes.
- 14.50 CSH is not a common form of interconnection. There are a very small number of such circuits between BT exchanges and data centres and between BT exchanges and telecoms provider network nodes.¹²³⁵ As noted above, the vast majority of interconnection occurs at the BT exchange. Telecoms providers also frequently use external Cablelink variants to connect to non-Openreach networks outside the exchange, reducing the need for CSH.
- 14.51 In our consultation, we proposed to require BT to provide CSH (which may involve connectivity between a BT exchange and a data centre or network node) as a form of regulated interconnection service. However, in Section 7 of our consultation, we explained

¹²³⁵ We note that out of Openreach's [3<].

that we considered circuits to data centres or network nodes to be competitive. In this context, BT Group requested clarification as to which (if any) links to data centres and other telecoms provider network nodes would be regulated.¹²³⁶

- 14.52 In response to BT Group’s request for clarification, we have explained in further detail why we now consider that regulation of links between BT exchanges and network nodes or data centres is not necessary going forward, given competitive constraints for routes from competitive BT exchanges and the availability of regulated products for connections from non-competitive exchanges to competitive exchanges (see Section 7).
- 14.53 It follows from our view that links between BT exchanges and network nodes/data centres are competitive that BT should no longer be required to provide CSH for new connections. Providers seeking new interconnection can take account of this change in regulation when deciding how to configure their networks.
- 14.54 However, we recognise that, as noted by Vodafone,¹²³⁷ telecoms providers may have configured their networks based on the availability of regulated services between exchanges and network nodes or data centres and there might be detrimental effects on competition and consumers if we were to remove this regulation. We have reflected this consideration when deciding the scope of our interconnection remedies.
- 14.55 We have therefore decided in this review period to maintain the requirement for BT to provide CSH¹²³⁸ for existing circuits only, where that CSH is connecting to an exchange at which regulated services are available.¹²³⁹ While our data shows relatively few existing circuits terminate at data centres or network nodes, they are potentially important for telecoms providers in connecting their networks to Openreach’s. As illustrated by Vodafone, once a provider has configured its network and points of interconnection (reflecting regulation at that time), making changes to this configuration could lead to additional costs or disruption as providers need (or are forced) to cease some circuits and procure new ones on different routes. Therefore, the removal of regulation for existing CSH could have negative consequences for some telecoms providers and affect their ability to make effective use of regulated products and compete with BT. For example, Openreach could harm BT’s competitors by forcing them to reconfigure their networks, with associated cost and disruption.
- 14.56 As is the case for accommodation services, BT is required to provide interconnection products at all exchanges where regulated products are available. Therefore, we would expect in practice, that regulated interconnection services are available from all exchanges (with CSH only available for existing circuits). However, it is for BT to decide how it discharges its obligations in this respect.

¹²³⁶ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, Annex 3, page 29, paragraphs 3.23-4 (and footnote 49).

¹²³⁷ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 1.26-1.30.

¹²³⁸ This requires interconnection at an “operational building of a Third Party”. This includes a site where a third party has a point of presence in a data centre or network node, including those owned by non-Openreach BT entities (e.g. a BT Enterprise owned data centre, EE network node).

¹²³⁹ This is inclusive of circuit upgrades, as these will be provided on the existing fibre.

Other remedies

- 14.57 As noted above, our interconnection remedies will also apply to dark fibre circuits in the CI Inter-exchange connectivity market. However, as all dark fibre circuits will be new, and dark fibre is only available between exchanges, the IBH remedy will apply. In effect, the CSH remedy will not apply to dark fibre.
- 14.58 For each of the markets we are regulating, we have decided that BT will continue to be subject to an obligation to meet reasonable requests for new forms of network access including interconnection services, as set out in Section 11.
- 14.59 We have decided to require BT to provide certain interconnection services, and to apply price controls with respect to these services. We set out our approach to regulating the prices of interconnection services in Volume 3 of this decision.
- 14.60 The application of all of these remedies (inclusive of IBH, CSH) does not apply to the Hull Area.

Legal tests

- 14.61 For the reasons we have set out below, we are satisfied that the condition meets the various tests set out in the Act.
- 14.62 Section 87(3) of the Act authorises the setting of SMP conditions requiring the dominant provider to provide such network access as Ofcom may, from time to time, direct. These conditions may, pursuant to section 87(5), include provision for securing fairness and reasonableness in the way in which requests for network access are made and responded to and for securing that the obligations in the conditions are complied with within periods and at times required by or under the conditions.
- 14.63 Section 87(3) includes reference to conditions requiring relevant facilities to be made available. Network access is also defined in sections 151(3) and (4) of the Act so as to include interconnection services and/or any services or facilities that would enable another communications provider to provide electronic communications services or electronic communication networks. We consider that a requirement to provide network access would, therefore, include any ancillary services as may be reasonably necessary for a third party to use the services.
- 14.64 In this condition, we have also taken into account the factors set out in section 87(4) of the Act. In particular, we consider that requiring BT to provide accommodation services is needed to secure effective competition because, as noted above, telecoms providers must purchase these services to use regulated products, and thus a refusal to supply could undermine the effectiveness of our overall package of remedies.
- 14.65 We consider that this decision meets our duties under section 3 and all the Community requirements set out in section 4 of the Act. In particular, the obligations are aimed at promoting competition by ensuring that communication providers are supplied with interconnection, accommodation services that they require to use the wholesale services

BT supplies effectively, including those services provided pursuant to the remedies we have decided to apply in this review.

14.66 Sections 47 and 49 require conditions to be objectively justifiable, non-discriminatory, proportionate and transparent. The conditions are:

- objectively justifiable, in that they facilitate and encourage access to BT’s network and therefore promote competition to the benefit of consumers;
- not unduly discriminatory, as they are only for BT and no other operator has been found to hold a position of SMP in these markets;
- proportionate, in that they prevent BT from exploiting its SMP by withdrawing these interconnection and accommodation services; and
- transparent, in that the conditions are clear in their intention to ensure that BT provides access to its networks in order to facilitate effective competition.

14.67 We set out how our approach to regulating the prices of interconnection and accommodation services satisfies the applicable legal tests in Volume 3 of this decision.

The BEREC Common Position

14.68 We have also taken utmost account of the BEREC Common Position including BP7, BP7a and BP20 which appear to us to be particularly relevant in this context.

14.69 We consider that our decisions are consistent with the best practice set out in the BEREC Common Position.

15. Quality of service remedies

- 15.1 This section sets out our decisions on the quality of service (QoS) remedies for the markets in which we have identified BT as having SMP, which are:
- CI Access services at all bandwidths in all parts of the UK excluding the Central London Area and the Hull Area, which we discuss in Section 6; and
 - CI inter-exchange circuits at all bandwidths at non-competitive BT exchanges, which we discuss in Section 8.
- 15.2 We have decided to impose broadly similar remedies for QoS to those proposed in the 2018 BCMR Consultation, though we have made some changes in light of consultation responses and new evidence, and we set out our rationale for doing so below.¹²⁴⁰
- 15.3 The QoS remedies we have imposed seek to address the competition concerns we identified in Section 10, particularly the concern that, in the absence of appropriate *ex ante* regulation, BT may not have sufficient incentives to continuously deliver an adequate level of service quality in the provision and repair of wholesale services and this will impact detrimentally on all downstream providers of leased lines, including BT's retail businesses, which would be to the detriment of consumers.

Summary of decisions

- 15.4 We have decided to set a quality of service SMP condition requiring BT to comply with all such QoS standards and reporting requirements as Ofcom may from time to time direct in relation to the wholesale business connectivity markets. Pursuant to this condition, we are making:
- a direction setting QoS standards for provisioning and repair; and
 - a direction requiring Openreach to provide data in relation to specified Key Performance Indicators (KPIs).
- 15.5 It is our view that the broad QoS framework we set out in the 2016 BCMR and the Temporary Conditions has helped ensure the delivery of significant improvements in service quality for Ethernet provisioning and does not currently require major amendments. We are, however, making some changes to the levels of the QoS standards.
- 15.6 In addition to standards and KPIs, Service Level Agreements (SLAs) and Service Level Guarantees (SLGs) are the other important means we use to incentivise Openreach to provide an appropriate level of quality of service. We have decided BT should continue to be required to have certain SLAs and SLGs for provision and repair of Ethernet services. In line with the approach taken in the 2018 WLA Statement, rather than impose these obligations in a direction, we are including obligations in the condition requiring BT to publish a Reference Offer, which we discuss in Section 11.

¹²⁴⁰ We have amended the Year 2 levels for the Upper Percentile and Certainty QoS standards, and made some changes to our KPIs requirements.

QoS standards

- 15.7 We first set out a framework of QoS standards and monitoring for the business connectivity markets in the 2016 BCMR. In this review we are making limited changes to that framework.¹²⁴¹ We are, however, making some adjustments to the levels of the standards and removing one of the measures (the lower percentile limit). In particular, we expect Openreach to make some further improvements in its performance in delivering against the initial delivery dates it provides to customers (Certainty QoS standard) and in its handling of the most complex ‘tail’ orders (Upper Percentile QoS standard) by the end of the review period.
- 15.8 We are imposing QoS standards on Ethernet services in the CI Access services markets in BT Only and BT+1 areas, and in the CI Inter-exchange connectivity market, at BT exchanges where it is the only provider or where there is only one other provider present. We have decided to include dark fibre within the scope of the QoS standards in the second year of the market review period (1 April 2020 to 31 March 2021).¹²⁴² We are not imposing QoS standards in the Metro Areas or other High Network Reach areas, or on WDM circuits.

Table 15.1: QoS standards for Ethernet services

QoS standard	Year 1 QoS level ¹²⁴³	Year 2 QoS level
Mean time to provide across orders	No more than 38 working days	No more than 38 working days
Upper percentile limit for provisions	No more than 3% delivered in more than 138 working days	No more than 3% delivered in more than 133 working days
Certainty: % of orders completed on or before initial Contractual Delivery Date (iCDD)	85%	86%
Certainty Cross-Link: Maximum mean period for the iCDD	No more than 53 working days	No more than 53 working days
% of faults repaired within the SLA	At least 94% of faults repaired within the SLA	At least 94% of faults repaired within the SLA

¹²⁴¹ In the 2016 BCMR Statement we referred to QoS standards as Minimum Service Levels (MSLs) but for consistency with QoS regulation in the 2018 WLA Statement we will now refer to them as QoS standards.

¹²⁴² We are applying QoS standards to our dark fibre remedy which only applies to the CI Inter-exchange connectivity market for connections from BT Only exchanges.

¹²⁴³ As we explain further below, Year 1 of the QoS standard compliance period will run from 1 July 2019 to 31 March 2020. Year 2 runs from 1 April 2020 to 31 March 2021, and these QoS standard levels will be maintained until we complete the next market review.

KPIs

- 15.9 We are reducing the number of KPIs that Openreach is required to report on, while retaining the KPIs that we consider are most useful to us and to stakeholders. We are also amending some KPIs to ensure the information we collect from Openreach is still useful, and therefore proportionate, to our monitoring of quality of service.
- 15.10 We require the KPIs to be reported for all markets where we have found SMP and separately for the markets where we are imposing QoS standards. We are also requiring reporting of performance in relation to different products, including WDM and our new dark fibre remedy.
- 15.11 We are imposing a new reporting requirement in relation to the tail of orders that take the longest time to be installed. This is to ensure that we have a better understanding of the drivers of these delays and to encourage Openreach to focus on improving its performance in relation to all types of orders.

SLAs and SLGs

- 15.12 We originally imposed the requirement for Service Level Guarantee payments in the 2008 SLG Direction,¹²⁴⁴ which was re-imposed in subsequent market reviews. In this review we are aligning our approach with that taken in the 2018 WLA market review by including the relevant elements of the 2008 SLG Directions in BT's Reference Offer condition, including a requirement that SLG payments are made on a proactive basis by BT. The 2008 direction is therefore not being re-imposed.
- 15.13 We have provided some guidance for telecoms providers as to how we would be likely to make an assessment of the relevant factors in determining the appropriate SLA quantum. We consider that this guidance could help facilitate agreement between the parties, but if it does not, we are prepared to step in to review the issues in advance of the 2021 review.

The need for QoS regulation

- 15.14 We are concerned that, in the absence of appropriate *ex ante* regulation, in the areas we find BT to have SMP, then Openreach would have the ability and incentive to provide poor quality provisioning and repairs services, to the detriment of downstream leased line providers (including BT's downstream business) and end-users.
- 15.15 In competitive markets, QoS would be based on the commercial judgment of individual companies and in combination with other facets of the service including price and other terms, could be expected to meet the requirements of the end-user for the company to maximise sales. However, where a provider has SMP in a market, competition cannot be expected to be an effective constraint and the dominant provider could have the ability and incentive to degrade service quality to maximise its profits.

¹²⁴⁴ Ofcom, 20 March 2008, *Service level guarantees: incentivising performance* (SLG Statement), Statement and Directions, https://www.ofcom.org.uk/_data/assets/pdf_file/0020/33617/statement.pdf [accessed 22 May 2019].

15.16 We therefore consider it appropriate to impose QoS remedies to ensure Openreach maintains its service quality at standards that meet customer needs and expectations.

Openreach QoS performance

Our analysis in the consultation

15.17 In our consultation, we noted that before the imposition of QoS standards in 2016, Openreach’s performance for Ethernet provisioning was very poor. We explained that since the imposition of QoS standards, there has been a significant improvement in Openreach’s performance.

Stakeholder views

15.18 Most stakeholders agreed with our analysis and overall view of Openreach’s performance.

15.19 Vodafone agreed the Ethernet crisis was over.¹²⁴⁵ BT Group stated the last BCMR resulted in a “step change in Openreach performance”,¹²⁴⁶ and Gamma concurred,¹²⁴⁷ while both the CWU and UKCTA noted improvements since 2016.¹²⁴⁸

15.20 Openreach agreed that its performance had significantly improved on all fronts and was no longer in crisis, with telecoms providers positively noticing the difference.¹²⁴⁹ Openreach also stated that its own customer feedback, measuring Net Promoter Score (NPS), showed a net 50 NPS increase from December 2017 to December 2018.¹²⁵⁰

15.21 However, [redacted] argued [redacted].¹²⁵¹

Our assessment

15.22 Openreach’s overall QoS performance since 2016 has improved, and in some cases, there has been significant improvement since introducing the QoS standards in 2016. Notwithstanding comments from some providers seeking further improvement in performance against individual QoS standards, stakeholder comments, both in response to the 2018 BCMR Consultation, and before the consultation,¹²⁵² have recognised this improvement.

15.23 The graphs below show how performance has developed over the last few years for each of the provisioning areas where Ofcom imposed QoS standards in 2016. We also show performance in resolving repairs since 2016.¹²⁵³

¹²⁴⁵ Vodafone’s response to the 2018 BCMR Consultation (Part 3 – Remedies), paragraph 7.6.

¹²⁴⁶ BT Group’s response to the 2018 BCMR Consultation (Annex 6), page 39.

¹²⁴⁷ Gamma’s response to the 2018 BCMR Consultation, page 14.

¹²⁴⁸ UKCTA’s response to the 2018 BCMR Consultation, paragraph 38; CWU’s response to the 2018 BCMR Consultation, page 2.

¹²⁴⁹ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 4-6, 38-39.

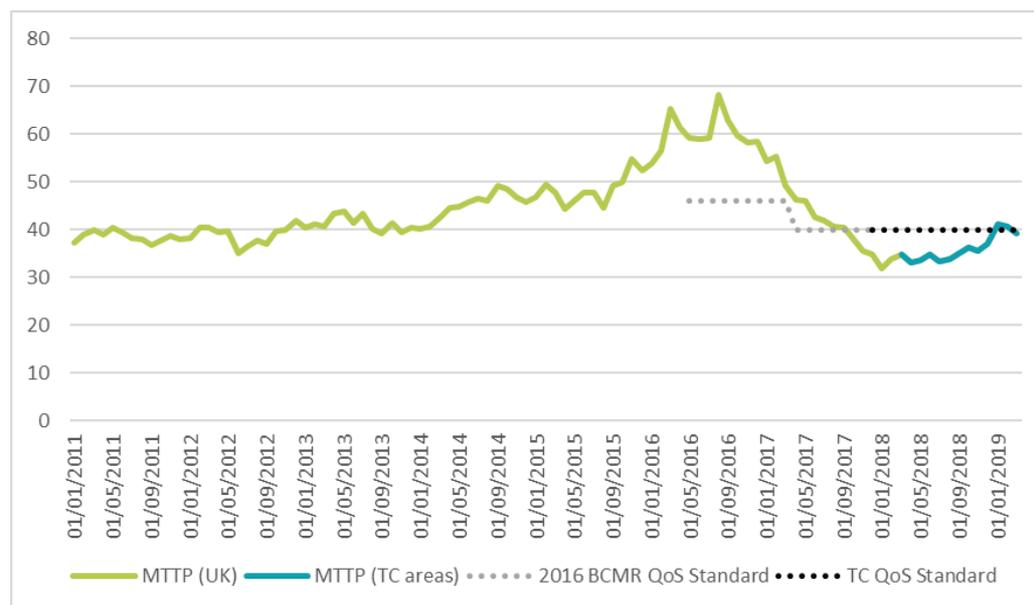
¹²⁵⁰ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 318, 322, 325 and Annex 6.

¹²⁵¹ [redacted].

¹²⁵² Ofcom, 2018 BCMR Consultation, paragraphs 15.32-15.34.

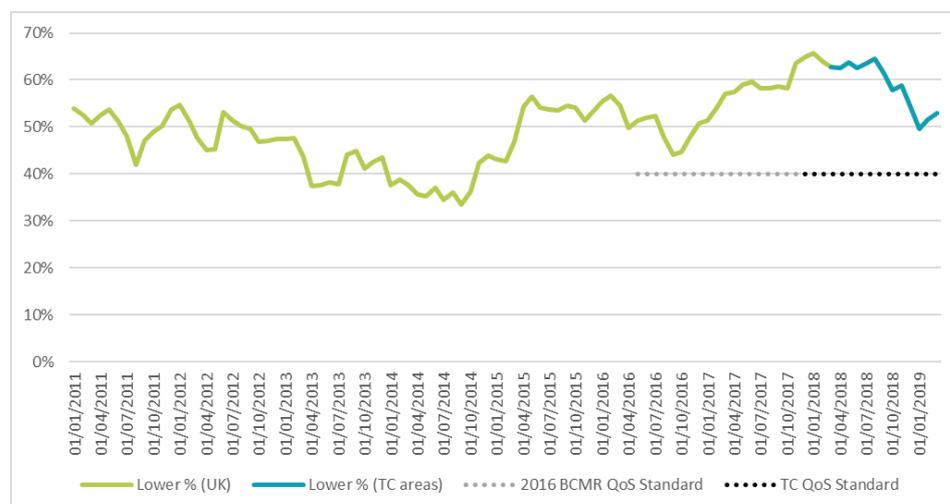
¹²⁵³ Figure 15.7 only shows performance since the 2016 BCMR due to the absence of comparable earlier data.

Figure 15.2: Mean time to provide (MTTP), in working days^{1254 1255}



Source: Ofcom analysis of 12th BCMR s.135 notice, Openreach Ethernet KPI reports, and the 10th 2016 BCMR s.135 notice.

Figure 15.3: Percentage of orders completed within 29 days (lower percentile)^{1256 1257 1258}



Source: Ofcom analysis of 12th BCMR s.135 notice, Openreach Ethernet KPI reports, and the 10th 2016 BCMR s.135 notice.

¹²⁵⁴ In this figure, MTTP performance below the Temporary Conditions QoS standard level indicates performance within the QoS Standard.

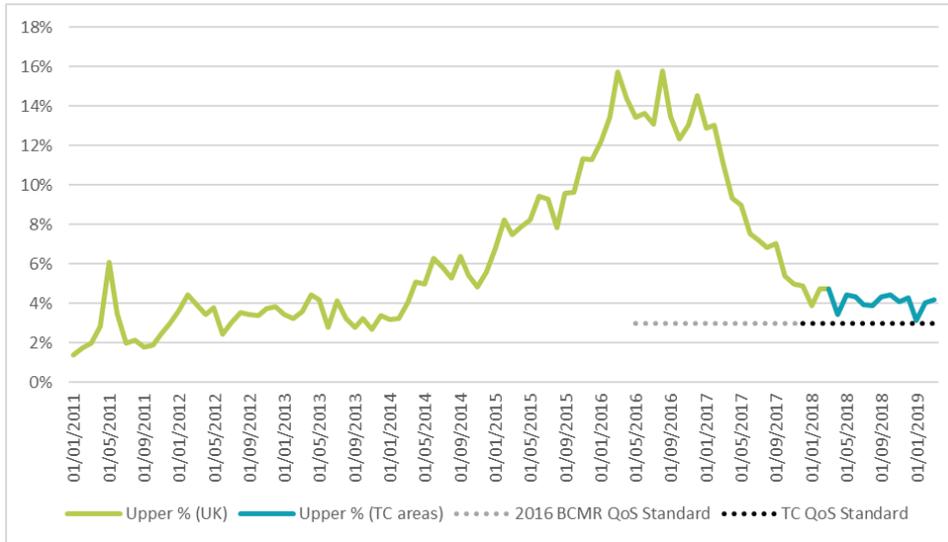
¹²⁵⁵ In this figure, the time period until March 2018 reflects performance across the whole UK, with subsequent performance reflecting those parts of the UK that are regulated under the Temporary Conditions.

¹²⁵⁶ In this figure, a percentage above the Temporary Conditions QoS standard level indicates performance within the QoS Standard.

¹²⁵⁷ In this figure, the time period until March 2018 reflects performance across the whole UK, with subsequent performance reflecting those parts of the UK that are regulated under the Temporary Conditions.

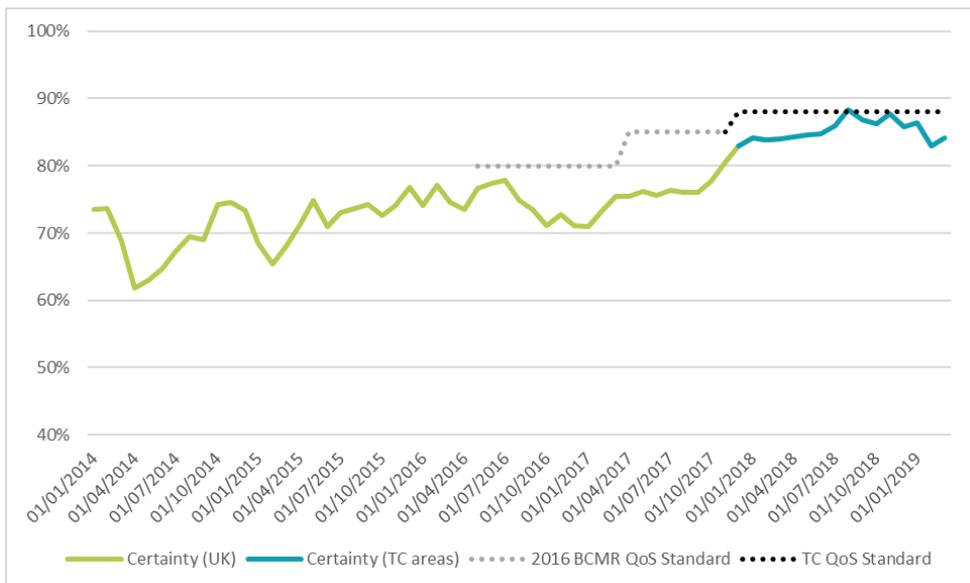
¹²⁵⁸ The lower percentile QoS standard for the financial year 2016/17 was 30 working days.

Figure 15.4: Percentage of orders not completed within 118 days (upper percentile)^{1259 1260 1261}



Source: Ofcom analysis of 12th BCMR s.135 notice, Openreach Ethernet KPI reports, and the 10th 2016 BCMR s.135 notice.

Figure 15.5: Percentage of orders completed within iCDD^{1262 1263}



Source: Ofcom analysis of 12th BCMR s.135 notice, Openreach Ethernet KPI reports, and the 10th 2016 BCMR s.135 notice.

¹²⁵⁹ In this figure, a percentage below the Temporary Conditions QoS standard level indicates performance within the QoS Standard.

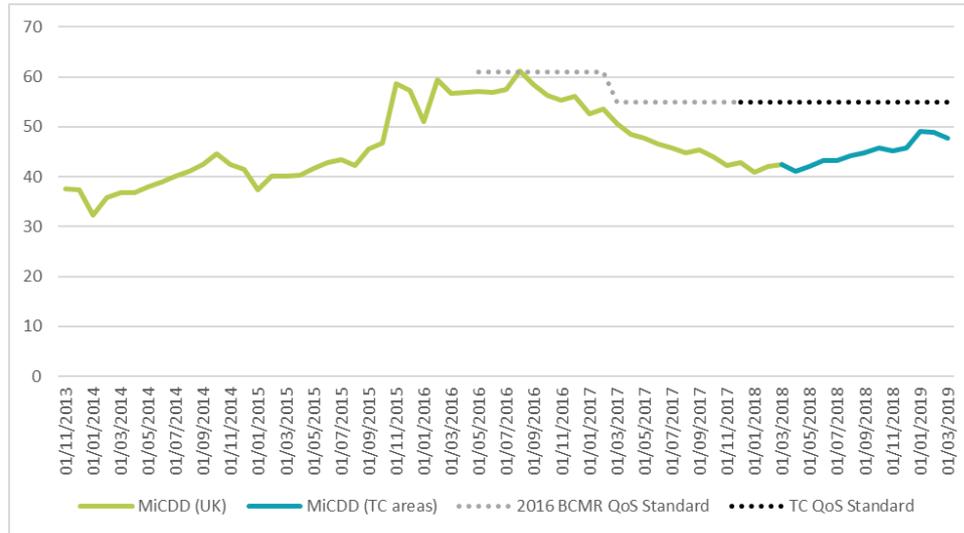
¹²⁶⁰ In this figure, the time period until March 2018 reflects performance across the whole UK, with subsequent performance reflecting those parts of the UK that are regulated under the Temporary Conditions.

¹²⁶¹ The upper percentile QoS standard for the financial year 2016/17 was 159 working days.

¹²⁶² In this figure, a percentage above the Temporary Conditions QoS standard level indicates performance within the QoS Standard.

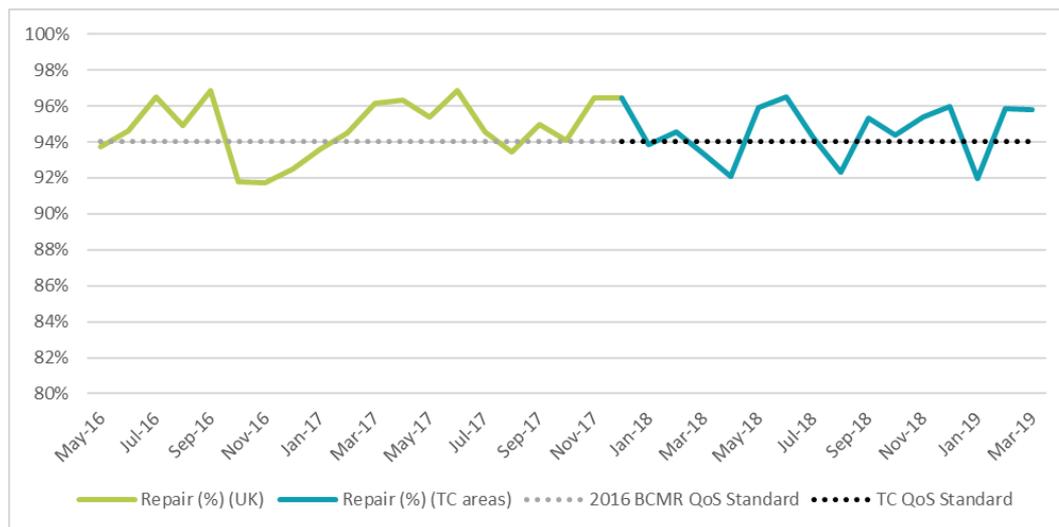
¹²⁶³ In this figure, the time period until March 2018 reflects performance across the whole UK, with subsequent performance reflecting those parts of the UK that are regulated under the Temporary Conditions.

Figure 15.6: Mean initial contractual delivery date^{1264 1265}



Source: Ofcom analysis of 12th BCMR s.135 notice, Openreach Ethernet KPI reports, and the 10th 2016 BCMR s.135 notice.

Figure 15.7: Percentage of repairs fixed within the SLA^{1266 1267}



Source: Ofcom analysis of 12th BCMR s.135 notice, Openreach Ethernet KPI reports, and the 10th 2016 BCMR s.135 notice.

15.24 Openreach’s performance in relation to some of the QoS standards – including Upper Percentile and Certainty – has shown some further improvement since we published the

¹²⁶⁴ In this figure, a mean iCDD below the Temporary Conditions QoS standard level indicates performance within the QoS Standard.

¹²⁶⁵ In this figure, the time period until March 2018 reflects performance across the whole UK, with subsequent performance reflecting those parts of the UK that are regulated under the Temporary Conditions.

¹²⁶⁶ In this figure, a percentage above the Temporary Conditions QoS standard level indicates performance within the QoS Standard.

¹²⁶⁷ In this figure, the time period until December 2017 reflects performance across the whole UK, with subsequent performance reflecting those parts of the UK that are regulated under the Temporary Conditions.

2018 BCMR Consultation, though there has been some deterioration in performance against some standards in the early months of 2019.^{1268 1269}

Table 15.8: Openreach’s QoS Standards performance during the Temporary Conditions period

QoS standard	Openreach’s performance	Temporary Conditions standard
Mean time to provide across orders	35.6 working days	40 working days
Lower percentile limit for provisions ¹²⁷⁰	60.3%	40%
Upper percentile limit for provisions ¹²⁷¹	4.2%	3%
Certainty: % of orders completed on or before initial Contractual Delivery Date (iCDD)	85.0%	88%
Certainty Cross-Link: Maximum mean period for the iCDD	44.2 working days	55 working days
% of faults repaired within the SLA	94.6%	94%

Source: Openreach Ethernet KPI reports

15.25 We have considered Openreach’s improvements in performance compared to 2016 when making our decisions below and in the context of our overall QoS regulation – namely, that the current framework is suitable. We discuss this in more detail below.

SMP condition

15.26 We have decided to reimpose the SMP condition requiring BT to comply with any QoS requirement we may direct in relation to network access provided by BT pursuant to general and specific network access obligations we have imposed. We consider it appropriate to retain the QoS framework as developed in the 2016 BCMR, the Temporary Conditions and proposed in the 2018 BCMR Consultation, as this has delivered good outcomes in terms of provisioning and fault repair performance.

15.27 Vodafone supported continued QoS regulation and UKCTA stated Ofcom should continue the progress made on QoS. Openreach supported maintenance of the current QoS

¹²⁶⁸ We understand from Openreach that performance in recent months (i.e. January to March 2019) has deteriorated relative to previous months as a result of [§<].

¹²⁶⁹ On 11 February 2019, Openreach made a commitment to maintain current quality of service for the period between our previous regulation expiring and the publication of our statement and new regulation commencing, including maintaining good levels of service, providing Ofcom with monthly KPI reports (and publishing KPI reports on a quarterly basis if required) and continuing to make SLG payments as per the existing arrangements. Openreach, 11 February 2019, Communication Update - Industry update: Openreach voluntary commitments in respect of the BCMR lacuna period, <https://openreach-comms.co.uk/t/BAK-649KJ-6FKHTQUPF8/cr.aspx> [accessed 22 May 2019].

¹²⁷⁰ The lower percentile represents the number of orders that take 29 working days or less to deliver.

¹²⁷¹ The upper percentile represents the number of orders that take more than 118 working days to deliver.

framework for this market review¹²⁷² including re-imposing the SMP Condition, noting it allows Ofcom to make changes during a market review period if required.¹²⁷³ Moreover, as highlighted above, several stakeholders attributed Openreach’s improvement in performance to Ofcom’s intervention in the previous BCMR. Openreach concurred, stating that Ofcom’s measures have been key to helping Openreach deliver good service.¹²⁷⁴

- 15.28 Openreach stated that there are several situations where Ofcom might need to intervene *ex ante*, such as tightening, increasing or reducing the QoS remedies and QoS standards.¹²⁷⁵
- 15.29 We agree that the imposition of an SMP condition requiring BT to comply with directions relating to our QoS requirements is a flexible mechanism that allows us to respond to any market developments during the review period.

QoS standards

Stakeholder responses on Ofcom’s overall approach

- 15.30 Several stakeholders commented on our overall approach to the QoS standards. Openreach agreed that QoS remains very significant to telecoms providers and end customers, but argued that it is “practically impossible” to continuously tighten targets, as there is trade-off between marginal costs and marginal benefits. Openreach noted that telecoms providers are unlikely to want to pay for further improvements if they come with greater costs and claimed that these providers are happy with current performance.¹²⁷⁶
- 15.31 Openreach also argued that we should do more to recognise the improvements it has already made (citing its own Customer Satisfaction survey results (CSAT) as evidence that telecoms providers are happy with the current performance, and thus Openreach argued that the QoS standards do not need “dialling up”) and consider whether its performance now is at the level of an efficient operator.¹²⁷⁷
- 15.32 Vodafone supported the proposed levels of our QoS standards, stating it was an appropriate balance between setting strong floors versus the costs of maintaining the floors.¹²⁷⁸
- 15.33 However, TalkTalk argued that Ofcom should continue to push Openreach on all the QoS standards, to match consumers’ increasing reliance on leased lines.¹²⁷⁹ The CWU supported

¹²⁷² Vodafone’s response to the 2018 BCMR Consultation (Part 3 – Remedies), paragraph 7.6; Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 11, 297; UKCTA response to the 2018 BCMR Consultation, paragraph 38.

¹²⁷³ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 277.

¹²⁷⁴ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 296.

¹²⁷⁵ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 279.

¹²⁷⁶ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 8, 18, 271, 296.

¹²⁷⁷ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 41, 326-7, 332 and Annex 6.

¹²⁷⁸ Vodafone’s response to the 2018 BCMR Consultation (Part 3 – Remedies), paragraph 7.6.

¹²⁷⁹ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.3.

our overall improved QoS standards, but wished to see a fundamental shift in the raising of QoS performance.¹²⁸⁰

- 15.34 Our decisions below on the individual QoS standards reflect our overall view that Openreach's QoS performance has improved significantly since 2016. We are requiring some further incremental improvements, but we do not think it would be proportionate to require a further significant increase in the levels of the standards, in light of our analysis, evidence and feedback we have received from stakeholders.¹²⁸¹
- 15.35 Openreach made a number of comments about the need for, and overall approach to, QoS regulation beyond 2021, as well as submitting benchmarking evidence on QoS regulation.¹²⁸² Whilst outside the scope of this market review, we will consider these comments alongside other stakeholder responses to our recent consultation on remedies.¹²⁸³

Mean Time to Provide

Our proposals

- 15.36 We proposed a reduction in the MTTP standard from 40 to 38 working days for the duration of the market review.

Stakeholder responses

- 15.37 Openreach, TalkTalk and Gamma agreed with our proposal.¹²⁸⁴ However, Openreach noted that the level should not be set any lower than 38 days, given the demand profile of orders may change and the possible impact of dark fibre and unrestricted PIA during the current market review period on the overall MTTP.¹²⁸⁵
- 15.38 TalkTalk supported our proposal to tighten the MTTP, but stated Ofcom should go further as Openreach were outperforming the proposed MTTP level. TalkTalk suggested it should be lowered to 36 or 37 days.¹²⁸⁶

Our reasoning and decisions

- 15.39 We continue to believe that speed of delivery is an important factor for Openreach customers. Therefore, we have decided to retain an MTTP QoS standard.

¹²⁸⁰ CWU's response to the 2018 BCMR Consultation, pages 1-3.

¹²⁸¹ Our guiding criteria for designing each of the QoS Standard levels are set out at Ofcom, 2018 BCMR Consultation, paragraph 15.54.

¹²⁸² Openreach's response to the 2018 BCMR Consultation (quality of service), paragraphs 300-309 and Annex 3 (Ethernet benchmark) and Annex 4 (Different QoS regulatory models).

¹²⁸³ Ofcom, 2019, Promoting competition and investment in fibre networks – Initial proposals – Approach to remedies, <https://www.ofcom.org.uk/consultations-and-statements/category-1/promoting-investment-competition-fibre-networks-approach-remedies> [accessed 22 May 2019].

¹²⁸⁴ Gamma's response to the 2018 BCMR Consultation, page 15; TalkTalk's response to the 2018 BCMR Consultation, paragraph 6.29; Openreach's response to the 2018 BCMR Consultation (quality of service), paragraph 113.

¹²⁸⁵ Openreach's response to the 2018 BCMR Consultation (quality of service), paragraph 116.

¹²⁸⁶ TalkTalk's response to the 2018 BCMR Consultation, paragraph 6.29.

- 15.40 Our performance data above shows Openreach has outperformed the MTTP level of 40 working days during the Temporary Conditions period, suggesting performance below that level is feasible within the next market review period. Stakeholder responses to the consultation expressed support for a reduction in the MTTP level.
- 15.41 In response to TalkTalk’s argument for a standard of 36 or 37 days, we are mindful of finding a balance between requiring further improvements from Openreach, and the possibility that the order mix may change in the next market review period (for instance, as a consequence of dark fibre or the unrestricted PIA remedy as discussed below) which could put an additional challenge on maintaining low MTTP levels. Moreover, we are also mindful that setting a significantly higher standard could require additional resources from Openreach, thereby driving up costs for end-customers.
- 15.42 We also note that during the Temporary Conditions, Openreach’s MTTP performance has fluctuated between 32.3 and 41.0 working days, and whilst Openreach has been at the lower end of this range for most of this period, our proposed MTTP level allows some flexibility for months where performance is more challenging.
- 15.43 Therefore, in light of the above reasoning, we have decided to set the MTTP level at our proposed level of 38 working days for the duration of the market review.

Upper Percentile

Our proposals

- 15.44 In the 2018 BCMR Consultation we proposed to set an Upper Percentile QoS standard requiring that no more than 3% of orders are completed in more than 138 working days (for Year 1 of the market review period) and 130 working days for 2020/21 (Year 2).

Stakeholder responses

- 15.45 Openreach highlighted improvements in its performance relative to the Upper Percentile QoS standard and claimed that it is now operating at what it believes to be efficient levels of performance. It said the Year 1 proposal, while challenging, was acceptable but strongly disagreed with the proposal for Year 2, stating it “goes beyond what is needed by the market”. It questioned whether there was further scope to make additional improvements to its wayleave or traffic management processes (factors which are often causes of delay for tail orders).¹²⁸⁷
- 15.46 In December 2018, Openreach submitted a confidential technical background report (Openreach Technical Report)¹²⁸⁸ regarding the achievability of the Upper Percentile QoS standard. In its consultation response, Openreach identified key conclusions of the Openreach Technical Report that we should take into account in setting this standard. In particular, it said that Ethernet service performance in 2011 was not an appropriate

¹²⁸⁷ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 68-69, 71-76.

¹²⁸⁸ Openreach, 12 December 2018, *A Statistical Analysis of the feasibility of meeting the Upper Percentile MSL* (confidential). Openreach provided a summary of the report as part of its non-confidential response to the BCMR Consultation (Openreach’s response to the 2018 BCMR Consultation (quality of service), Annex 1).

baseline for setting the standard, because the demand profile was atypical and hence it led to an inflated view of achievable performance. In addition, Openreach argued that order complexity was lower in 2011 than it is today. It said Ofcom should recognise the inherent uncertainty in future demand and complexity, and set a flat measure of 138 working days in both years 1 and 2.¹²⁸⁹

- 15.47 Gamma supported our proposed Upper Percentile QoS standard.¹²⁹⁰ TalkTalk¹²⁹¹ and UKCTA¹²⁹² did not support our proposals, saying we had not provided clear evidence and justification for setting a standard lower than in the 2016 BCMR. TalkTalk said we should set the standard at 118 working days or lower in both years.

Our reasoning and decisions

Performance trends

- 15.48 The Upper Percentile QoS standard¹²⁹³ is intended to protect customers whose orders fall into the tail of complex orders from excessively long lead times. The measure we set in 2016, and again in the Temporary Conditions, sought to limit the number of circuits that take over 118 working days to no more than 3% of all completed orders.
- 15.49 As shown in Figure 15.4 above, Openreach has made a significant improvement in its upper percentile performance since 2016, including further improvement since we published the 2018 BCMR Consultation. However, performance is still worse than the 118 day standard we originally set in the Temporary Conditions (which applied until 31 March 2019) and performance against the 97th percentile has averaged 136 days across the period (see Figure 15.9 below).

¹²⁸⁹ Openreach's response to the 2018 BCMR Consultation (quality of service), paragraphs, paragraphs 81-82.

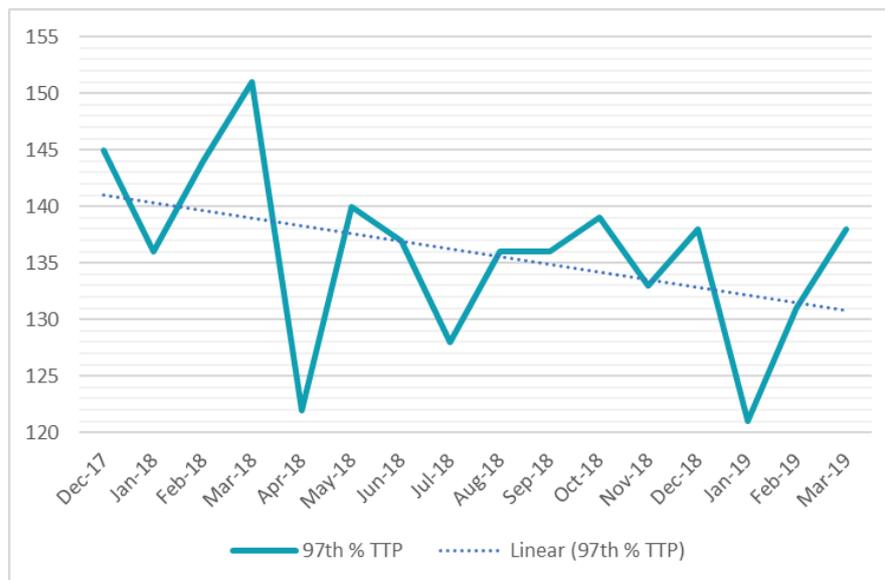
¹²⁹⁰ Gamma's response to the 2018 BCMR Consultation, page 15.

¹²⁹¹ TalkTalk's response to the 2018 BCMR Consultation, page 84-85.

¹²⁹² UKCTA response to the 2018 BCMR Consultation, page 10-11.

¹²⁹³ The upper percentile represents the number of orders that take more than 118 working days to deliver.

Figure 15.9: Time to provide tail orders

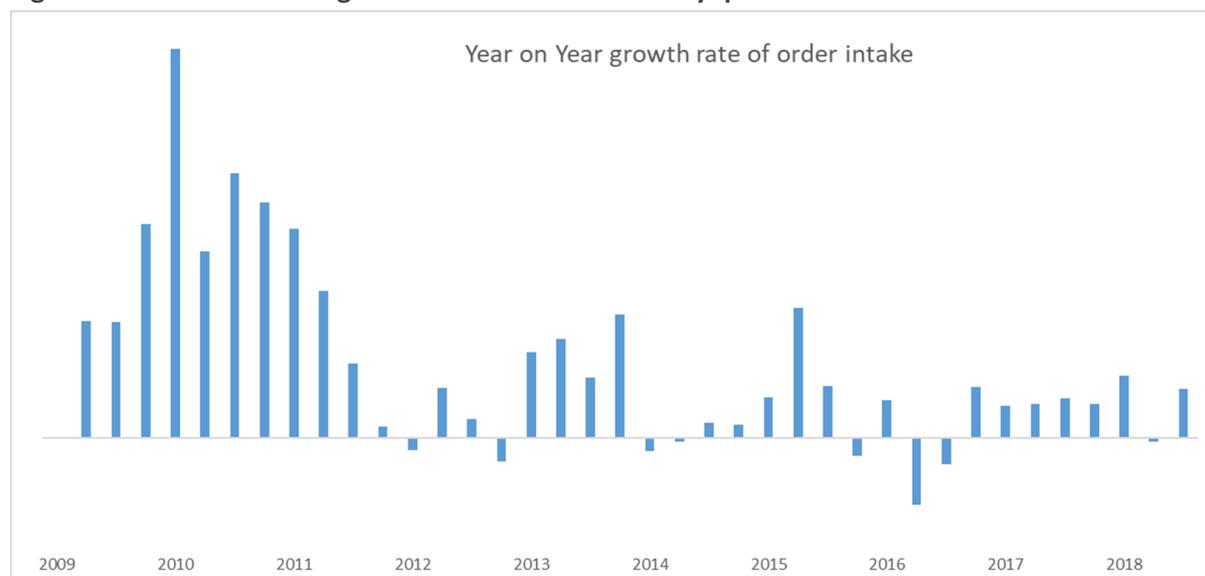


Source: Ofcom analysis of Openreach Ethernet KPI reports providing the completed order with a Time To Provide (TTP) greater than 97% of completed orders.

New evidence on achievability

15.50 The Openreach Technical Report provided new statistical analysis to support Openreach’s proposition that the profile of completed orders in 2011 (the benchmark we used when originally setting the provisioning QoS standards in the 2016 BCMR) was atypical. The Openreach Technical Report shows the significantly higher growth in order intake in the years preceding 2011 (see Figure 15.10 below) impacted positively on the ability of Openreach to meet a high performance level in completing tail orders, relative to years preceded by low (or negative) growth in orders. Openreach consider that this factor artificially lowered (and hence improved) the Upper Percentile performance by 0.75 percentage points in absolute terms in 2011.¹²⁹⁴ This is due to the way that the Upper Percentile QoS standard is designed, and the long duration of tail orders which means their order journey is more likely to cross over two compliance years (hence the lower demand in 2009 and 2010 relative to 2011 meant proportionately fewer of the orders completed in 2011 were tail orders).

¹²⁹⁴ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 82, page 22 and Annex 1, paragraphs 23-25, page 6.

Figure 15.10: Year on Year growth rate of order intake by quarter

Source: Openreach email of 3 May 2019 providing non-confidential version of Figure 12 in Openreach Technical Report, page 37.

- 15.51 We recognise that this new evidence suggests that an Upper Percentile QoS standard of 118 working days may be hard to achieve in some compliance years, depending on the demand trends in the preceding years. Our final decisions on the standard in this market review do not assume that the demand profile in 2011 was typical, and we are setting the Upper Percentile QoS standard at a less onerous level than the performance Openreach achieved in 2011.
- 15.52 Before the consultation, Openreach made representations to us¹²⁹⁵ that the number and complexity of orders within the tail is increasing and that this is making it increasingly difficult for it to achieve the Upper Percentile QoS standard. The Openreach Technical Report provided updated evidence on historic trends in circuit complexity. It analysed the propensity of complexity factors between 2011 and 2018. The report suggests that the prevalence of three of these complexity factors (rurality, wayleaves and ducts/civils) has increased over this period, though it has decreased for two of the other factors (traffic management and cabling) – see Table 15.11 below.¹²⁹⁶

¹²⁹⁵ Openreach, 20 July 2018, *Summary of Openreach's current position on Ethernet Quality of Service*, page 18.

¹²⁹⁶ Openreach, 12 December 2018, *A Statistical Analysis of the feasibility of meeting the Upper Percentile MSL*, page 5 and page 31 (table 15).

Table 15.11: Openreach view on preponderance of complexity factors

Complexity Factor	2011 completed orders	Late 2017/early 2018 completed orders	Movement
Rurality	[X]%	[X]%	Increase
Wayleaves	[X]%	[X]%	Increase
Traffic management	[X]%	[X]%	Decrease
Cabling	[X]%	[X]%	Decrease
Duct/Civils	[X]%	[X]%	Increase

Source: Openreach, 12 December 2018, *A Statistical Analysis of the feasibility of meeting the Upper Percentile MSL*, page 31 (table 15).

- 15.53 We do not consider that the Openreach Technical Report provides clear evidence to conclude that the net effect is an increased prevalence of these complexity factors since 2011. However, we do consider that it provides evidence of some volatility in the prevalence of these factors. There are limits on Openreach’s ability to control the prevalence of these complexity factors, and upon the impact they have upon TTP (for example, while Openreach can improve its management of wayleave applications they inevitably take time to process, so the incidence of wayleaves on orders is likely to increase TTP relative to orders where they do not occur). Hence, the volatility in the prevalence of complexity factors does raise some uncertainty about the achievability in future years of the performance on tail orders that Openreach achieved in 2011.

Decision on Upper Percentile QoS standard levels

- 15.54 Taking account of this new evidence from Openreach, and the performance that has been achieved during the Temporary Conditions period, we have decided to set an Upper Percentile QoS standard requiring that no more than 3% of orders are completed in more than 138 working days (for Year 1 of the compliance period)¹²⁹⁷ and 133 working days for 2020/21 (Year 2). This decision acknowledges there are challenges in setting the precise level of maximum achievability in an area where exogenous factors come into play (wayleaves and traffic management orders are an industry-wide challenge). It recognises that the prevalence of complex orders may be higher during the market review period than was the case in 2011. We have also taken account of Openreach’s new evidence that the demand profile of orders in 2011 was atypical and hence a standard of 118 days may be unachievable in some years.
- 15.55 Setting the Upper Percentile QoS standard at 3% for 138 working days in Year 1 and 133 working days in Year 2 means there can be no deterioration in Openreach performance against this measure relative to performance across the Temporary Conditions period, and

¹²⁹⁷ Year 1 of the QoS standard compliance period commences on 1 July 2019 and ends on 31 March 2020. Year 2 runs from 1 April 2020 to 31 March 2021.

will require Openreach to make further improvement by the end of the market review period. This will limit the number of customers exposed to excessively long lead times.

- 15.56 Openreach has pursued a number of performance initiatives over the last couple of years, and is planning to implement further projects in 2019/20.¹²⁹⁸ This suggests there is potential for some further improvement in Openreach’s performance against the Upper Percentile QoS standard over the period of the market review as these initiatives are further embedded. We expect Openreach to continue to strive for improvement in its performance in managing these tail orders which take a very long time to provide. Below we outline our decision requiring Openreach to submit a regular report to Ofcom on the causes of delay in provisioning tail orders.
- 15.57 We consider that based on the evidence and recent performance, that in Year 2 it is appropriate to require Openreach to provide no more than 3% of circuits in more than 133 working days (one working week quicker than the Year 1 requirement). This will require some limited improvement in performance of about 2% by 2020/21, relative to Openreach’s performance across the Temporary Conditions period, which we consider to be achievable given the maturity of the Ethernet product. Our decision reflects the need to protect the vast majority of customers from excessively long lead times, while recognising that the standards should be set at a level which is achievable.

Lower Percentile

Our proposals

- 15.58 In light of Openreach consistently outperforming the Lower Percentile QoS standard since March 2017 and our view that the MTTP QoS standard provided a sufficient constraint on Openreach continuing to complete ‘easier’ circuit orders, we proposed to not reimpose the Lower Percentile standard.

Stakeholder responses

- 15.59 Openreach supported our proposal to remove the Lower Percentile QoS standard, citing that good performance is required on easier circuit orders in order to meet the MTTP standard, and that monitoring of lower percentile performance would continue via KPIs.¹²⁹⁹
- 15.60 No other stakeholder commented on our proposed removal of the Lower Percentile standard.

¹²⁹⁸ Openreach response to 24th Notice, 29 March 2019. Improvement initiatives that may enhance performance against the Upper Percentile QoS standard include [§<].

¹²⁹⁹ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 11, 117-119.

Our decision

- 15.61 The Lower Percentile QoS standard¹³⁰⁰ was put in place to protect against the potential risk that Openreach's focus would shift exclusively to the tail of more complex orders, neglecting the easier 'quick win' circuits.
- 15.62 Openreach has been significantly out-performing this standard since March 2017, as shown above in Figure 15.3, so our concerns about Openreach's focus shifting away from easier orders have not materialised.
- 15.63 The MTTP QoS standard provides sufficient incentive for Openreach to perform against the lower percentile metric. In order to achieve the MTTP standard it is imperative that Openreach completes a significant proportion of orders as quickly as it can. Accordingly, and in line with our guiding principles to remove regulation where it is no longer functional or proportionate, we do not consider it necessary to reimpose the Lower Percentile QoS standard on Openreach. However, as set out below, we will retain a KPI which will allow us and stakeholders to continue to monitor Openreach's performance against the lower percentile.

Certainty

Our proposals

- 15.64 We proposed to maintain the Certainty QoS standard (which measures whether actual delivery dates meet the initial delivery dates provided to customers), stating that it was a key part of good quality of service.
- 15.65 We proposed to set a standard of 85% in Year 1 and 88% in Year 2. Our proposals were made on the basis that Openreach had recently consulted on changes to its contract, as part of its Reimaging Ethernet Provision (REP) initiative, which included proposals to improve its certainty performance. We stated this could facilitate further improvements in certainty, especially in Year 2. We also anticipated that Openreach would make further improvements to its planning and operational processes to enhance the accuracy of delivery dates.

Stakeholder responses

- 15.66 Openreach and Gamma agreed with our premise that certainty is very important to customers.¹³⁰¹
- 15.67 Openreach agreed with our proposed Year 1 standard but disagreed with our Year 2 standard and stated it should be kept flat at 85%.¹³⁰² Openreach said it is wrong to assume it can make further performance improvements, given it is already close to the ceiling of

¹³⁰⁰ The lower percentile represents the number of orders that take 29 working days or less to deliver.

¹³⁰¹ Openreach's response to the 2018 BCMR Consultation (quality of service), paragraph 89; Gamma's response to the 2018 BCMR Consultation, page 16.

¹³⁰² Openreach's response to the 2018 BCMR Consultation (quality of service), paragraphs 11, 47, 91.

performance and that its recent performance shows a flattening of further gains, remaining at 85%.¹³⁰³

- 15.68 Openreach argued Ofcom was wrong to set the standard based on assumed progress with REP, given the [§<] and uncertainty of implementation. Openreach noted that new processes would have to be implemented at least one quarter before Year 2 starts (i.e. by 1 Jan 2020) due to the length of Ethernet order times for there to be a benefit to the Year 2 performance.¹³⁰⁴ However, Openreach added that if Ofcom continues with its Year 2 proposal, we should state that if Openreach fails to meet the Certainty standard and REP has not been delivered in full, we would consider this in our assessment of compliance.¹³⁰⁵
- 15.69 TalkTalk and UKCTA stated Ofcom had downgraded the standard relative to our 2016 BCMR standard with little evidence to justify this.¹³⁰⁶ TalkTalk stated Openreach were already achieving 85% and had recently shown further improvements, thus arguing that the levels for Years 1 and 2 should be higher.¹³⁰⁷
- 15.70 TalkTalk stated it was inappropriate for Ofcom to base its certainty standard on whether REP will occur, and [§<].¹³⁰⁸ Gamma expressed similar concern regarding REP, stating it was doubtful how many of the REP initiatives would proceed.¹³⁰⁹

Our reasoning and decisions

The importance of certainty

- 15.71 Certainty is important to customers and overall quality of service. Businesses and other end-users of leased lines services wish to have confidence regarding the date their services will be installed. Stakeholders agreed with our view, with Gamma stating that customers value certainty over the time taken to process an order (i.e. MTTP).¹³¹⁰ As such, we have decided it is appropriate to retain a standard on certainty.
- 15.72 As highlighted in our 2018 BCMR Consultation, Openreach proposed changes to the Ethernet contract as part of its REP Consultation. Changes to the contract could give Openreach more flexibility to set bespoke initial delivery dates, which is likely to result in greater certainty to customers that Openreach will meet those delivery dates. In its REP Consultation, Openreach cited that REP could result in “an improvement in certainty through more accurate date setting resulting in 40% reduction in CDD shifts”.¹³¹¹

¹³⁰³ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 91-92, 95.

¹³⁰⁴ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 98-102.

¹³⁰⁵ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 105.

¹³⁰⁶ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.25; UKCTA response to the 2018 BCMR Consultation, paragraphs 43b, 44.

¹³⁰⁷ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.26.

¹³⁰⁸ [§<]; TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.15.

¹³⁰⁹ Gamma’s response to the 2018 BCMR Consultation, pages 15-16.

¹³¹⁰ Gamma’s response to the 2018 BCMR Consultation, page 16.

¹³¹¹ Openreach, 26 September 2018, *Re-imagining Ethernet Provision - Faster, simpler, and more responsive Ethernet Delivery* (‘Openreach REP Consultation’), Consultation document, Figure 3, page 8,

<https://www.openreach.co.uk/orpg/home/newlogin.do?smauthreason=0&target=http%3A%2F%2Fwww.openreach.co.uk>

- 15.73 Openreach’s REP initiatives went out for consultation to industry on 26 September 2018.¹³¹² The consultation stated that, whilst dependent on the feedback from telecoms providers to the consultation, Openreach “would like to begin implementation from April 2019” and that “some elements may be able to be delivered sooner as standalone items”.¹³¹³
- 15.74 At the time of publication of our 2018 BCMR Consultation, we noted that the benefits of the contract changes, via REP, were likely to take effect in the second year of our market review period. We therefore proposed a Certainty standard of 88% in Year 2.

Developments since our Consultation

- 15.75 Openreach published a summary note of REP Consultation responses to industry in February 2019,¹³¹⁴ as well as providing a shorter summary of responses to Ofcom as part of its wider 2018 BCMR Consultation response.¹³¹⁵ There was limited support for immediate implementation of REP from telecoms providers, and whilst some REP initiatives were well received by telecoms providers, other initiatives received more mixed feedback.
- 15.76 On 20 February 2019, Openreach informed industry that it intended to proceed with developing and launching its REP initiatives, and provide a new order process, but that it would keep open the current order process.¹³¹⁶ Therefore, the new REP order process would be optional for telecoms providers to place orders on. At a recent industry meeting, Openreach confirmed its approach to REP was being refined as a result of the mixed feedback from telecoms providers. Openreach also confirmed that while timetables were still being developed and refined, it expected the launch of REP to be at least nine months, and possibly 18 months, from February 2019.¹³¹⁷
- 15.77 We requested, under our statutory information gathering powers, the responses from telecoms providers to Openreach’s REP Consultation.¹³¹⁸ These responses suggest that while supportive of the wider aims of REP, Openreach’s wholesale customers had various issues with different parts of the detailed proposals, and would like further engagement with Openreach before the process changes are implemented. There was limited demand

[%2Forpg%2Fcustomerzone%2Fupdates%2Fbriefings%2Fethernet%2Feth05518.pdf&fromMasterHead=1](#) (Openreach log in required) [accessed 22 May 2019].

¹³¹² Openreach, Openreach REP Consultation.

¹³¹³ Openreach, Openreach REP Consultation, page 31.

¹³¹⁴ Openreach, 15 February 2019 (version 5.0), *Re-imagining Ethernet Provision - Industry Consultation Summary Report*, <https://www.openreach.co.uk/orgp/home/newlogin.do?smauthreason=0&target=http%3A%2F%2Fwww.openreach.co.uk%2Forpg%2Fcustomerzone%2Fupdates%2Fbriefings%2Fethernet%2Feth00819.pdf&fromMasterHead=1> (Openreach log in required) [accessed 22 May 2019].

¹³¹⁵ Openreach’s response to the 2018 BCMR Consultation (quality of service), Annex 5.

¹³¹⁶ Openreach, 21 February 2019, *ETH009/19 Re-imagining Ethernet Provision – implementation*, Openreach customer briefing, <https://www.openreach.co.uk/orgp/home/newlogin.do?smauthreason=0&target=http%3A%2F%2Fwww.openreach.co.uk%2Forpg%2Fcustomerzone%2Fupdates%2Fbriefings%2Fethernet%2Feth00919.pdf&fromMasterHead=1> (Openreach log in required) [accessed 22 May 2019].

¹³¹⁷ Openreach, 19 March 2019, Ethernet Product & Commercial Group – March 2019 meeting slides: Openreach’s response to BCMR s.135-26.

¹³¹⁸ In the interests of clarity, it is important to note that telecoms providers responses to Openreach’s REP Consultation were written and submitted to Openreach before the announcement from Openreach of a ‘twin track’ order process.

for Openreach to implement REP as soon as possible.¹³¹⁹ This has been further supported by responses to an Ofcom email to selected telecoms providers, seeking their early feedback after Openreach’s announcement to industry that it was planning to proceed with its REP initiative on a revised timeline.¹³²⁰

- 15.78 We also note stakeholders’ comments in their 2018 BCMR Consultation responses (before the updated announcement from Openreach), expressing caution over the benefits of REP, and whether it would be implemented sufficiently in this market review period to yield benefits.

Our updated analysis in light of these developments

- 15.79 Openreach’s REP Consultation suggested that some of the provisioning and process improvements proposed would start to be implemented from April 2019. Therefore, this could have facilitated a marked improvement in Openreach’s certainty performance in Year 2 of the market review period. However, as summarised above, this timetable has now been delayed, with a likely full launch of the REP order process towards the end of this market review period.
- 15.80 Moreover, there is likely to be a gap between new orders being submitted on the new REP process before there is a visible benefit in certainty performance.¹³²¹ Finally, in light of Openreach’s decision to maintain the current order process, the new REP order process is optional, and therefore the extent of take-up of orders on, and transition to, the REP order process, is unknown.
- 15.81 The new REP order process may eventually result in better performance against our QoS standards, notably the Certainty standard, but the benefits of this initiative are unlikely to occur to a significant extent in this market review period. Hence, we have decided to set the Certainty standard in Year 2 at a lower level than 88%, given the change to the anticipated timeline of the REP.
- 15.82 However, we recognise that telecoms providers, as reflected in the evidence set out above and our research,¹³²² regard performance on certainty as extremely important for them and their customers, so we have considered what increase in performance is achievable in Year 2.
- 15.83 Openreach’s performance on certainty has improved in the last two years, as shown in Figure 15.5 above, while Openreach’s performance is at 85% across the Temporary Conditions period (see Figure 15.12 below).

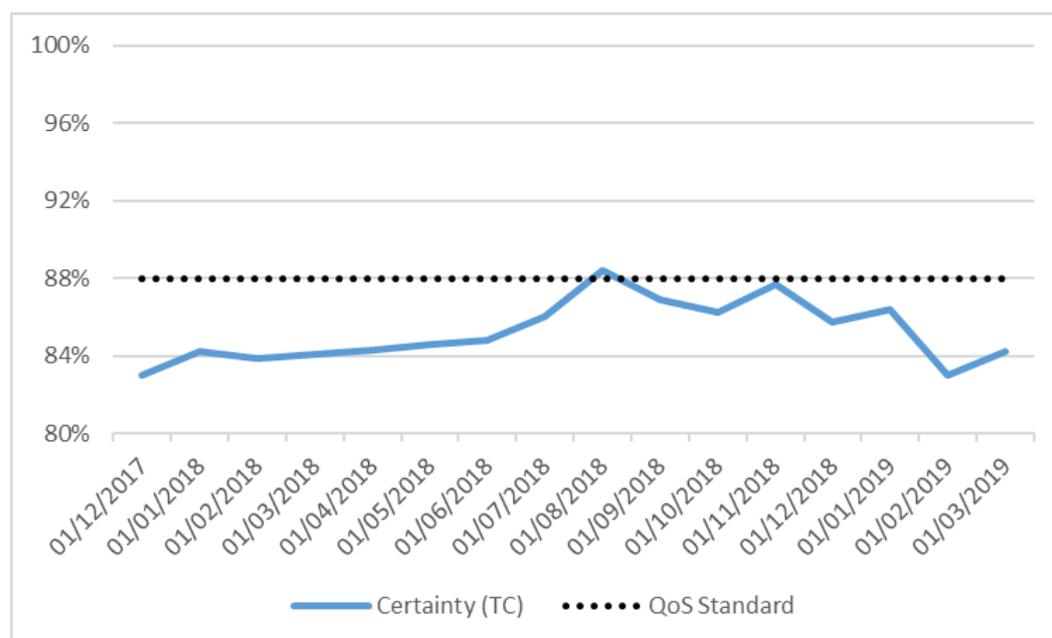
¹³¹⁹ Ofcom analysis of 25th BCMR s.135 notice, Openreach REP Consultation responses from [3<].

¹³²⁰ Ofcom emails and responses to [3<].

¹³²¹ This is due to how Ethernet orders work and the length of delivery times. Openreach cited in their response that “Our current view is that the new process would have to be implemented at least one quarter in advance of year 2 starting (i.e. by January 2020)”. Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 102.

¹³²² Ofcom, 2018 Cartesian report, pages 36-38. We also noted stakeholders attached strong importance to certainty performance in our 2018 BCMR Consultation (see Ofcom, 2018 BCMR Consultation, paragraph 15.39).

Figure 15.12: Percentage of orders completed within iCDD



Source: Ofcom analysis of 12th BCMR s.135 notice, Openreach Ethernet KPI reports, and the 10th 2016 BCMR s.135 notice.

15.84 Furthermore, Openreach has recently implemented, or is planning to implement, initiatives with the aim of enhancing its quality of service, which could yield a further benefit for certainty.¹³²³ As such, we consider that some marginal further improvement in performance against the Certainty standard should be achievable by Year 2.

15.85 Therefore, in light of all the above, we are setting the Certainty standard for Year 1 at 85% (as proposed) but setting the standard for Year 2 at 86% (reduced from our consultation proposal of 88%).

Certainty Cross-link

Our proposals

15.86 We proposed to continue imposing a standard which sets a constraint on the setting of the initial delivery date, (we refer to this as the Certainty Cross-link standard). In line with our proposal to reduce the MTTP standard from 40 to 38 working days or less, we proposed that the Certainty Cross-link standard should fall from 55 to 53 working days or less. The purpose of the Certainty Cross-link standard is to prevent Openreach from setting excessively long delivery dates (to ensure that they comply with the Certainty standard).

¹³²³ Openreach response to 24th Notice, 29 March 2019. Improvement initiatives that may enhance performance against the Certainty QoS standard include [§<].

Stakeholder responses

15.87 Openreach, TalkTalk and Gamma all supported our proposed cross-link standard of 53 days. Openreach commented that it was possibly helpful to industry in light of its REP initiative, while Gamma noted that REP could impact Openreach’s performance in relation to this standard.¹³²⁴

Our reasoning and decisions

15.88 In the Temporary Conditions, we set a standard requiring that the mean number of days to provide the circuit underlying the initial delivery date should not exceed 55 working days. This was derived by adding a ‘contingency allowance’ of 15 working days to the MTTP standard of 40 working days, to allow Openreach some limited flexibility in the setting of delivery dates given that estimation of lead times is subject to some uncertainty.¹³²⁵

15.89 We continue to consider it necessary to impose a Certainty Cross-link standard to provide a reasonable constraint on the setting of delivery dates. As discussed above, Openreach is planning to amend its current contract as part of the REP to give itself greater flexibility on the setting of delivery dates for individual orders. While this change could facilitate the setting of more achievable and accurate delivery dates, there is some risk that Openreach could game the Certainty standard by setting very long delivery dates. The Certainty Cross-link standard therefore has a particularly important role in setting a mean level limit on the length of delivery dates set by Openreach, and hence we are retaining the Certainty Cross-link standard in its current form. Given we have set a MTTP standard of 38 working days or less for the duration of this market review period, we have decided to set the Certainty Cross-link standard at 53 working days or less.

Repairs

Our proposals

15.90 We proposed to maintain a QoS standard for repairs, noting its continued importance to quality of service. We proposed to set the standard at the current level of 94% of faults fixed within the SLA (currently five hours for Ethernet services and 18 hours for dark fibre circuits, based on the dark fibre reference offer of 2016).

Stakeholder responses

15.91 TalkTalk supported our proposed Repairs standard of 94%.¹³²⁶

15.92 Openreach disagreed with our Repairs standard level, stating it was too high, and suggested it should be set between 91.5% and 93% for a number of reasons. Openreach

¹³²⁴ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 108; TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.29; Gamma’s response to the 2018 BCMR Consultation, page 16.

¹³²⁵ This figure was the result of analysis performed in the 2016 BCMR Statement (see pages 468-469).

¹³²⁶ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.29.

commented that no MBORC¹³²⁷ allowance was made, despite an increased frequency of MBORC events. It said the impact of these events can be very significant on performance (citing examples where as a result, the repairs performance has fallen to 60%) and not the fault of Openreach.¹³²⁸ In addition, Openreach estimated that the revision to the geographic area included within the scope of the QoS standards could reduce repairs performance by [redacted]%.¹³²⁹

- 15.93 Openreach also argued the Repairs standard could be too high as the introduction of an unrestricted PIA remedy and dark fibre could result in more faults occurring due to increased network interventions from other telecoms providers. Moreover, Openreach highlighted that meeting the current standard relies on continuing to receive a reasonable proportion of ‘customer clears’ and ‘electronic faults’¹³³⁰. It said this was not guaranteed in the future because all dark fibre faults are ‘fibre faults’, which typically take longer to repair. Openreach said given the uncertainty regarding order volumes and profiles we should be ready to intervene and amend the Repairs standard accordingly during the market review period.¹³³¹

Our reasoning and decisions

- 15.94 Openreach’s performance in relation to repairs of Ethernet services has generally been stable and within its SLA. We introduced a QoS standard for repairs in 2016 to mitigate the risk that repairs might be neglected if Openreach diverted resources to improve its performance in provisioning. We set the QoS standard at 94% of faults fixed within the agreed SLA, and this standard was maintained in the Temporary Conditions. Openreach’s performance on repairs has generally exceeded the standard, though not by a significant amount when assessed on an annual basis (see Figure 15.7 above).
- 15.95 We continue to regard it as appropriate to set a QoS standard for repairs, given that this is an important aspect of quality of service, and there is a risk that Openreach’s performance might deteriorate if the standard were removed. We do not consider the marginal additional challenge arising from the change in the geographic scope of the QoS standards identified by Openreach to be sufficient to revise the level of the Repairs standard, which we are maintaining at 94%. We address Openreach’s comments regarding an MBORC allowance below.
- 15.96 Concerning comments about possible changes to the order mix and profile of repairs, we do not anticipate that the introduction of the dark fibre and unrestricted PIA remedies will have a substantive impact on Openreach’s ability to meet the Repairs standard, because

¹³²⁷ MBORC, or Matters Beyond Our (i.e. Openreach’s) Reasonable Control, are usually raised when Openreach’s network has experienced serious damage caused by extreme weather, or as a result of criminal or negligent damage caused by third parties. This is discussed in more detail below.

¹³²⁸ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 129-34, 137.

¹³²⁹ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 135.

¹³³⁰ Openreach noted there are three main types of faults that make up repairs: 1) Customer clears (issues which Openreach quickly determine are not faults [redacted]); 2) Fibre faults (complex faults to repair, sometimes involving multiple engineering visits, [redacted]); 3) Electronic faults (faults with the electronic equipment [redacted]) Openreach stated that between December 2017 and November 2018, the ratio of faults was [redacted].

¹³³¹ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 136, 122-26.

the volumes are unlikely to be sufficient to impact substantively on the share/profile of Ethernet repairs as a whole. However, we recognise there is some uncertainty regarding order volumes for these remedies and the implications for active Ethernet products.

- 15.97 In regard to the possibility of more faults occurring in the future due to increased intervention in Openreach’s network from other telecoms providers (as a result of PIA and dark fibre) and possibly making the Repairs standard harder to meet, we note that Schedule 3 of the PIA reference offer sets out the requirements on telecoms providers and their sub-contractors to be suitably trained and accredited as a prerequisite to work on Openreach’s network infrastructure.¹³³² As such, we would expect this to mitigate the impact of increased intervention in Openreach’s network.
- 15.98 However, in the event that either of the aforementioned factors developed to a considerable extent and had a substantive impact on Openreach’s ability to meet the Repairs standard, we would consider them during any assessment of compliance.¹³³³
- 15.99 Therefore, we have decided to maintain the Repairs QoS standard at the current level of 94% of faults fixed within the SLA (currently five hours for Ethernet services and expected to be 18 hours for dark fibre circuits, based on the dark fibre Reference Offer of 2016).

Matters Beyond Our Reasonable Control (MBORC)¹³³⁴

Our proposals

- 15.100 We proposed to continue to incorporate MBORC into the QoS standard metrics that we set, with no additional specific allowance for MBORC events.

Stakeholder responses

- 15.101 TalkTalk and Gamma supported our proposal not to have an MBORC allowance.¹³³⁵
- 15.102 Openreach argued that an MBORC allowance is required, given that MBORC-related events have increased slightly in frequency, they are not the fault of Openreach and have a significant impact on Openreach’s performance when they occur. Openreach stated that if Ofcom did not change the proposed repair standard, then we should confirm it would discount MBORC from any future compliance investigations.

¹³³² Openreach, 1 April 2019, PIA Schedule 3: Agreement for Physical Infrastructure Access Schedule 3 – Accreditation, https://www.openreach.co.uk/org/home/products/ductandpoleaccess/contracts/contracts/downloads/New_PIA_Schedule_3_April2019.pdf [accessed 22 May 2019].

¹³³³ Openreach also raised more general concerns about the impact of the unrestricted PIA and dark fibre remedies on the QoS standards for active services, in addition to its specific concerns regarding the Repairs standard. At this stage, we do not anticipate that the order volumes and substitution impacts during this market review period are significant enough to require us to make an adjustment to our standards. However, we will monitor developments and take account of any unanticipated impacts in our compliance monitoring.

¹³³⁴ Matters Beyond Our Reasonable Control (MBORC) refer to matters beyond Openreach’s control.

¹³³⁵ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.29; Gamma’s response to the 2018 BCMR Consultation, page 17.

Our reasoning and decisions

- 15.103 MBORCs are usually raised when Openreach’s network has experienced serious damage caused by extreme weather, or as a result of criminal or negligent damage caused by third parties. The principal purpose of MBORCs is the suspension of SLG payments for the area and period covered by an active MBORC. Events leading to MBORC declarations are more likely to affect performance against the Repairs QoS standard than the provisioning standards, because of the short period (typically five hours) within which repairs should be completed.
- 15.104 We note that while weekly or monthly performance has sometimes dipped below 94%, the cumulative performance (which we use to assess compliance) has remained above 94%, at 94.6%, in the Temporary Conditions period.
- 15.105 In setting the level of the Repairs standard in the 2016 BCMR and the Temporary Conditions (the basis of the level for QoS standards for this market review), we recognised that MBORC events can have some short-term impact on Openreach’s performance and accounted for this in setting the overall level. We are taking the same approach in this review.
- 15.106 Moreover, by setting and measuring the standards over two longer periods (nine months and 12 months),¹³³⁶ rather than on a monthly basis, the impact of occasional short-term MBORC events on overall performance is reduced. Furthermore, by incorporating MBORC delays within our Repairs standard, we maintain an incentive on Openreach to react and recover as soon as possible. Introducing an allowance to exclude delays to repairs linked to events covered by MBORCs could incentivise Openreach to use MBORC declarations as a means of non-compliance for more minor issues/repairs, or generally become less rigorous in its application of MBORC management criteria.
- 15.107 It is important to note there are reasons why we imposed a fixed allowance for MBORC in regard to copper repair (as imposed by the 2014 FAMR and re-imposed by the 2018 WLA market review) and why we have not in regard to Ethernet repair. Whereas repair performance for Ethernet was quite high before the imposition of a QoS standard in 2016, and hence it was imposed to stop Openreach switching focus to improving its provisioning performance, repairs performance for copper before the imposition of a fixed allowance was very poor. Moreover, copper is affected more frequently by MBORC events (namely, weather) than Ethernet repair, and hence there is a greater justification to have a fixed allowance.
- 15.108 In light of Openreach’s repair performance over the last few years, and given we have seen no evidence to suggest that MBORC events for Ethernet will increase in frequency in the future, we believe there is no substantive basis for a cautionary MBORC allowance. If such events were to happen more frequently or more extreme events were to occur, then we consider a more appropriate response, as Openreach allude to, is to take such MBORC

¹³³⁶ As discussed and explained further below in regard to the length of the compliance period, because of the publication date of this statement, we have decided to reduce the Year 1 period of this market review from 12 to nine months.

delays into account in any compliance assessment or enforcement considerations we might open were Openreach to fail its Repairs standard.

Customer and non-customer caused delay

Our proposals

- 15.109 We proposed to continue to exclude customer caused delays from the QoS standards for provisioning activities and our compliance assessment.
- 15.110 We also proposed to continue to include all “non-customer” caused delays in the QoS standard performance measures for provision activities and our compliance assessment.

Stakeholder responses

- 15.111 Openreach and TalkTalk supported the exclusion of customer caused delay from the QoS standards,¹³³⁷ with Openreach arguing that it counts towards 60% of delays and adds time/delays to Openreach’s clock too.
- 15.112 Openreach argued that third party delays should not be “on Openreach’s clock”, as they are outside of Openreach’s control, but acknowledged this was acceptable for this (shorter) market review period providing Ofcom notes the risk of doing so (i.e. missing the QoS targets).¹³³⁸
- 15.113 Gamma noted there are industry-wide initiatives to simplify and improve traffic management and wayleave issues and stated that removing the ability of Openreach to mitigate wayleave and traffic management delays against MTTP has resulted in Openreach improving its traffic management and wayleave processes. Gamma also argued that, in regard to delay caused by wayleaves, they are best reviewed *ex post* by Ofcom when contemplating enforcement, rather than allowing an *ex ante* allowance.¹³³⁹

Our reasoning and decisions

- 15.114 In line with stakeholder responses, we do not think it appropriate to include customer caused delays in the QoS standards. Excluding customer caused delays limits the potential for Openreach’s customers to game the QoS standard measures and ensures the QoS standards and the associated KPIs focus on measuring Openreach’s performance.
- 15.115 We note stakeholders had different views as to whether to include “non-customer” caused delays in QoS standards performance and our compliance assessment. We recognise that the delivery of Ethernet orders that require network build rely on some third-party involvement (e.g. landowners and local authorities). However, the planning and management of these orders should not be regarded as entirely outside of Openreach’s control. We consider that as a network access provider Openreach should continue to face

¹³³⁷ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.29; Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 140-141.

¹³³⁸ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 80, 142.

¹³³⁹ Gamma’s response to the 2018 BCMR Consultation, page 15.

incentives to minimise non-customer caused delays in its provisioning activities. In that regard, we are pleased to see Gamma’s comments that Openreach’s processes for some issues have improved as a result of it not being able to exclude the impact of third-party caused delays, and their view that it is most appropriate to consider any such issues *ex post*. More widely, we note that recent government initiatives may result in further improvements to the wayleave process in this market review period, further mitigating the impact of this on Openreach.¹³⁴⁰

- 15.116 Therefore, we have decided to exclude customer caused delays, and include all “non-customer” caused delays, in the QoS standard performance and our compliance assessment.

Tail orders reporting requirement

Our proposals

- 15.117 We proposed that Openreach should be required to provide a quarterly report to Ofcom on the causes of delay in provisioning tail orders.

Stakeholder views

- 15.118 Openreach was supportive of our proposal of a regular tail orders report. However, it said that a half-yearly report might be appropriate given the timescales associated with Ethernet tails, and the report should balance the needs for statistical evidence with a detailed narrative. It also said the report should be signed off by the Managing Director of the unit responsible for delivering business connectivity services, rather than by Openreach’s CEO.¹³⁴¹
- 15.119 TalkTalk also supported the proposal for a tail orders reporting requirement.¹³⁴²

Our decision

- 15.120 As we have set out above, we have decided to set a standard limiting the number of circuits that take over 138 working days to complete in Year 1, and 133 working days in Year 2, to 3% of all orders. This is because we believe it important to limit the number of circuits which take a very long time to be installed. However, as things stand, once an order has exceeded the number of days specified in the Upper Percentile standard, the immediate pressure to complete and deliver the circuit is reduced.
- 15.121 We would like to better understand the reasons behind the delays to tail orders so that we are better able to protect against excessively long lead times for all customers. Presently, we have limited information regarding the drivers behind very long lead times, so we have decided to require Openreach to provide a regular tails order report to Ofcom. Specifically,

¹³⁴⁰ Department for Digital, Culture, Media and Sport, 29 October 2018, Consultation, *Ensuring tenants’ access to gigabit-capable connections*, <https://www.gov.uk/government/consultations/ensuring-tenants-access-to-gigabit-capable-connections> [accessed 22 May 2019].

¹³⁴¹ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 216-222.

¹³⁴² TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.29.

we are seeking a report with additional information about the causes of delay in provisioning circuits that exceed 138 working days in Year 1 and 133 working days in Year 2. In addition to providing valuable information on whether and how we may further incentivise better performance, this will serve as an additional focus for Openreach to ensure it is doing all that it can to understand the causes and limit the time to provide the most complex tail orders.

- 15.122 We agree with Openreach that the report should balance the need for statistical evidence with analytical narrative. We would welcome case study examples to provide insights on problematic orders (both completed and still open). This should include information about the prevalence and duration of complexity factors, and how this informs Openreach initiatives to further enhance service performance. We do not require detailed information on every tail order.
- 15.123 We have considered the appropriate frequency of the report and concluded that a six monthly reporting requirement is appropriate, given the long duration of Ethernet tail orders. The first report should be provided to Ofcom by 31 October 2019 and on a six monthly basis thereafter.
- 15.124 We would expect the report to be signed off by Openreach’s CEO or the relevant senior executive, so that engagement with the issues that affect tail orders receive sufficient interest and engagement from senior Openreach management.

Geographic scope to which QoS standards apply

Our proposals

- 15.125 We proposed to apply the QoS standards in the CI Access services market in BT Only and BT+1 areas, and in the CI Inter-exchange connectivity market at BT exchanges where we proposed that BT has SMP (BT Only and BT+1 exchanges).
- 15.126 We proposed not to impose QoS standards in the Metro Areas or other High Network Reach areas of the CI Access services market.

Stakeholder responses

- 15.127 TalkTalk, Vodafone, UKCTA, Gamma and [redacted] disagreed with our proposal not to impose QoS standards in the High Network Reach areas and argued that we should apply the standards in all areas where we find SMP. These stakeholders all raised concerns that Openreach would have an incentive and an ability to degrade service quality standards in these areas given its SMP.¹³⁴³
- 15.128 TalkTalk questioned whether the removal of QoS standards would impact on the potential for investment in new networks. TalkTalk, UKCTA and Vodafone were sceptical about the extent to which competition will develop in HNR areas, and TalkTalk said new network

¹³⁴³ Gamma’s response to the 2018 BCMR Consultation, pages 17-18; TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.13; UKCTA response to the 2018 BCMR Consultation, paragraphs 39-41; Vodafone’s response to the 2018 BCMR Consultation (Part 3 – Remedies), paragraphs 7.7-7.8; [redacted].

operators were unlikely to compete on the basis of service quality. TalkTalk, UKCTA and Vodafone also raised practical concerns regarding geographical differentiation in remedies, given that some customers have a national footprint and would expect the same levels of service quality in all parts of the country. In addition, TalkTalk argued that if Ofcom decides not to impose price regulation in the HNR areas, this would leave room for Openreach to incur any additional costs necessary to meet the QoS standards and pass these costs on to customers, hence we should impose the QoS standards.

- 15.129 Virgin Media agreed with our approach of proposing lighter remedies for the HNR areas.¹³⁴⁴ IIG said it supported the removal of quality of service regulations once two or more competitive networks are established in a location.¹³⁴⁵

Our decisions

- 15.130 In Section 6 we identify the markets where we have found that BT has SMP. In Section 10 we outline our overall approach to remedies, and explain that the scope and intensity of the regulation we are imposing varies according to the level of competition. We now consider in which of these markets we will apply the QoS standards.
- 15.131 We have decided to impose QoS standards in the CI Access services market in BT Only and BT+1 areas, and in the CI Inter-exchange connectivity market at BT exchanges where we have found that BT has SMP (BT Only and BT+1 exchanges). Stakeholders did not raise any concerns about this aspect of our consultation proposals.
- 15.132 We have considered the concerns raised by some stakeholders regarding our proposal not to impose QoS standards in the HNR areas of the CI Access services market (including Metro Areas).
- 15.133 In line with our strategy, our approach to remedies is intended to support investment in the development of new networks. We recognise that network providers may compete to some extent on quality of service. While we acknowledge that the imposition of QoS standards in HNR areas alone may not have a significant impact upon the incentives to invest, we consider that not imposing QoS standards complements our approach to the charge control in these areas. In taking a lighter approach to remedies as a whole in these areas, we are aiming to facilitate the development of competition in potentially competitive areas. We do not agree that the absence of a charge control in HNR areas is a reason to impose QoS standards, as suggested by TalkTalk. Our approach to remedies as a whole reflects our assessment of the level of competition in the markets we have identified.
- 15.134 It is our understanding that Openreach systems are prescriptive on the process steps that must be followed for an order to be completed. Therefore, in our view it is unlikely that Openreach could systematically degrade service for the subset of orders in HNR areas. Furthermore, given the greater prospects of competition in these areas, Openreach has less incentive to allow its quality of service to deteriorate. If performance were to

¹³⁴⁴ Virgin Media's response to the 2018 BCMR Consultation, pages 13-14.

¹³⁴⁵ IIG's response to the 2018 PIMR, 2018 BCMR and 2018 BT RFR Consultations, paragraph 7.2.2.

deteriorate significantly, Openreach’s wholesale customers may be more likely to switch to other networks which are present, or looking to expand, in these areas.

- 15.135 While we recognise that Openreach’s average performance in the HNR areas may differ relative to average performance in areas subject to QoS standards, it is already the case that the imposition of aggregate level QoS standards does not guarantee that individual customers will always experience the same level of service at all locations within the relevant market(s). Furthermore, we are retaining SLA and SLG requirements on BT in HNR areas, hence wholesale customers of Openreach will continue to have this protection against poor quality service for their orders.
- 15.136 We have assessed Openreach’s historic performance against QoS standards in the geographic areas in which we have decided to apply them, and we are satisfied that it is sufficiently similar to performance across the UK as a whole to suggest that it is not appropriate to require an adjustment in the QoS standards we are imposing. We note that Openreach also conducted some analysis into performance in the areas where we proposed to impose QoS standards and compared this to the areas regulated during the Temporary Conditions period. While it reported that performance was slightly worse against all measures under the new market definitions (with the exception of the Upper Percentile standard, where performance was flat), Openreach recognised these differences are relatively small. We have considered this analysis in setting our final standards, and do not consider that the differences are sufficient to require a revision.¹³⁴⁶
- 15.137 As we explain further below, we are requiring the provision of specific KPIs on Openreach’s performance against the QoS standards in the HNR areas. This will allow us to compare Openreach’s performance in these areas relative to the geographic areas where the QoS standards do apply. We have the option of amending the QoS Direction to extend the scope of the QoS standards to include HNR areas, should we observe a significant deterioration in Openreach’s performance during the market review period. On balance, we therefore consider it appropriate not to impose QoS standards in these areas.
- 15.138 We have recently published a consultation¹³⁴⁷ regarding our future approach to remedies in the wholesale fixed telecoms markets, which seeks the views of stakeholders about the appropriate approach to QoS remedies beyond 2021, including in prospectively competitive areas. We look forward to receiving responses from stakeholders to this consultation about our approach to QoS going forwards.

Products to which QoS standards apply

Our proposals

- 15.139 We proposed to impose QoS standards on services at 1 Gbit/s and below for all EAD (including EAD LA), EBD and Cablelink (and variants or replacements of these products) in

¹³⁴⁶ Openreach’s response to the 2018 BCMR Consultation (quality of service), pages 44-45.

¹³⁴⁷ Ofcom, 2019, [Promoting competition and investment in fibre networks – Initial proposals – Approach to remedies](#) [accessed 22 May 2019].

the geographic markets outlined above. We proposed this would apply to both provides and regrades of these products.

15.140 We also proposed to apply QoS standards to Ethernet services of over 1 Gbit/s but did not propose to apply QoS standards to WDM services.

15.141 Finally, we did not propose to apply the QoS standards to legacy Ethernet services such as WES, WES LA, WEES, BES etc.

Stakeholder responses

15.142 TalkTalk supported our proposals in regard to QoS standards on services at 1 Gbit/s and below. Openreach broadly agreed with our proposals for the product scope, but disagreed with our proposal to apply QoS standards to Ethernet services of over 1 Gbit/s.¹³⁴⁸

15.143 Vodafone disagreed with our proposal not to impose QoS standards on WDM services, stating it was contradictory given Ofcom had found BT with enough SMP to propose a range of other regulatory remedies and BT has a high market share when WDM services are included in HNR areas.¹³⁴⁹

Our reasoning and decisions

15.144 We have decided to impose QoS standards on services at 1 Gbit/s and below for all EAD (including EAD LA), EBD and Cablelink (and variants or replacements of these products) in the geographic markets outlined above. We will continue to apply the standards to both provides and regrades of these products. This will address our competition concern that Openreach has an incentive to offer poor quality of service in relation to these products.

15.145 We will also apply QoS standards to Ethernet services of over 1 Gbit/s. These services were included within the scope of our QoS standards first imposed in the 2016 BCMR but have not been regulated since the imposition of the Temporary Conditions. Given the historic problems with Ethernet provisioning, and our SMP finding, we consider it appropriate to include higher bandwidth Ethernet services within the QoS standards.

15.146 WDM circuits¹³⁵⁰ remain quite low in volume, though this is an expanding part of the market. We are not aware of stakeholder concerns regarding the quality of service of this product. Our analysis of Openreach's QoS performance for WDM from services December 2017 to June 2018 showed that performance for MTTP was similar to that of Ethernet (see Table 15.13).¹³⁵¹ Moreover, we understand that Openreach have previously actively promoted WDM services (in particular, the Optical Spectrum Access – Filter Connect products) to its wholesale customers, highlighting some features that it says are comparable to dark fibre. Therefore, it is unlikely that Openreach will degrade the quality

¹³⁴⁸ TalkTalk's response to the 2018 BCMR Consultation, paragraph 6.4; Openreach's response to the 2018 BCMR Consultation (quality of service), paragraph 151.

¹³⁴⁹ Vodafone's response to the 2018 BCMR Consultation (Part 3 – Remedies), paragraphs 7.7-7.8.

¹³⁵⁰ When we refer to WDM in this chapter, we are referring to Openreach's WDM products (e.g. Optical Spectrum Access, Optical Spectrum Extended Access, Optical Filter Connect, etc).

¹³⁵¹ Ofcom, 2018 BCMR Consultation, table 15.5.

of service of WDM given it is a product it is actively offering. Finally, we understand there are SLGs and SLAs on the WDM services which, while not identical, are likely to act as a constraint on Openreach deteriorating its performance on WDM.¹³⁵² Therefore, we are not applying QoS standards to WDM.

- 15.147 We are requiring the provision of KPIs for all VHB services (i.e. KPIs will include Ethernet services over 1 Gbit/s and where applicable, separating reporting on WDM) in the markets where we find SMP. This will allow us to monitor Openreach’s QoS performance in relation to WDM services, and if there were a significant deterioration in performance that was harmful to consumers, we could consider amending the QoS Direction to extend the scope of the QoS standards.
- 15.148 We are not applying the QoS standards to legacy Ethernet services such as WES, WES LA, WEES, BES etc. These products are in the process of being withdrawn and are now low in volume, so we do not consider it appropriate to impose QoS standards on them.

Table 15.13: Comparison of WDM and Ethernet QoS standards performance¹³⁵³

QoS Standard	WDM	Ethernet	Level
Mean Time To Provide	32.30	33.83	40 working days
Lower percentile limit	[X]<]%	64.09%	40%
Upper percentile limit	[X]<]%	4.29%	3%
Certainty	[X]<]%	84.48%	88%
Certainty Cross-link	[X]<]%	42.28	55 working days
Repairs	[X]<]%	94.30%	94%

Source: Openreach mandatory KPI reports and Ofcom analysis of 16th BCMR S135 notice.

Dark fibre

Our proposals

- 15.149 We proposed to impose QoS standards on inter-exchange dark fibre circuits in Year 2 of the market review.

Stakeholder responses

- 15.150 Openreach did not support the imposition of QoS standards on dark fibre because, as a new product, there is no evidence of historic poor performance and there remains a

¹³⁵² BT, 15 January 2016, Contract for Connectivity Services, Schedule 4 – Service Level Agreement, pages 4-7, https://www.openreach.co.uk/org/home/products/ethernet-services/contracts/contracts/connectivity_services_schedule_4_Issue12.pdf [accessed 22 May 2019].

¹³⁵³ This table covers the time period from December 2017 to June 2018 for WDM, and from December 2017 to August 2018 for Ethernet.

degree of uncertainty in relation to the operational performance and final processes. It also noted there would still be SLAs, SLGs and KPIs to monitor its performance.¹³⁵⁴

- 15.151 Openreach said it was particularly concerned about the introduction of a Repairs QoS standard for dark fibre. It highlighted that, of the three main types of repair for Ethernet products, ‘fibre faults’ take the longest time to fix and that for the dark fibre remedy all repairs will be fibre faults.¹³⁵⁵
- 15.152 TalkTalk¹³⁵⁶ and [3<] ¹³⁵⁷ supported our proposal to introduce QoS standards for dark fibre in Year 2. However, Three, while supporting a QoS remedy on dark fibre, argued that the QoS standards should be imposed from the outset, rather than waiting until Year 2, given the importance of dark fibre going forward and the risk that Openreach will degrade the quality of the service.¹³⁵⁸

Our reasoning and decisions

- 15.153 As we explained in Section 10, the dark fibre remedy is an intervention we consider necessary to address our competition concerns. Absent QoS standards for these circuits, Openreach would have the ability and incentive to offer poor service levels for provisioning and fault repairs for the new inter-exchange dark fibre circuits.
- 15.154 We do not agree with Openreach’s suggestion that we should wait for evidence of poor service performance before imposing QoS standards. Furthermore, Openreach has not offered a dark fibre product in the absence of regulation, and has continued to argue the remedy is inappropriate and disproportionate, which suggests it may have an incentive to offer poor QoS when it is required to provide it. There is a risk that a differential approach to QoS standards for active and dark fibre circuits in the IEC could distort the choices of access seekers.
- 15.155 We have therefore decided to impose QoS standards on dark fibre circuits,¹³⁵⁹ including them alongside the other Ethernet products covered by the QoS standards, from Year 2 of the market review.
- 15.156 We have decided not to impose QoS standards on dark fibre in Year 1, in line with our consultation proposal. We are requiring Openreach to provide dark fibre no later than six weeks after the BCMR SMP conditions come into force,¹³⁶⁰ but it will not be provided on a fully automated EMP basis for some months. We therefore consider it proportionate to allow for any initial ‘teething problems’ to be rectified as the new order and provisioning processes are put in place. It is also worth noting that QoS standards are measured on ‘closed’ or completed orders and setting QoS standards for dark fibre circuits immediately after their launch could result in a distortion of the results. Furthermore, to comply with

¹³⁵⁴ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 157-178.

¹³⁵⁵ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 173-176.

¹³⁵⁶ TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.29.

¹³⁵⁷ [3<].

¹³⁵⁸ Three’s response to the 2018 BCMR Consultation, paragraphs 7.1-7.4.

¹³⁵⁹ We are applying QoS standards to dark fibre in the CI Inter-exchange connectivity market for connections from BT Only exchanges.

¹³⁶⁰ See Annex 26, Schedule 3, Part 3.

the standards in Year 2, Openreach will need to establish good provisioning processes during the course of the first year, not least because some orders will be opened in Year 1 and closed in Year 2. Consequently, we do not agree that our approach creates a risk that Openreach will offer poor quality service in Year 1, as suggested by Three. Hence, we consider it appropriate to impose QoS standards from Year 2 only.

- 15.157 While we anticipate that some dark fibre circuits will be a conversion of existing active circuits (and therefore will be unlikely to require civil engineering work) we have decided not to set different QoS standards in Year 2 for the provisioning of dark fibre circuits, from those we are setting for active circuits. It would be difficult to determine achievable lower levels for dark fibre provisioning at this stage, given that the product has not yet become available. But we do not think dark fibre circuits should be harder on average to deliver than active circuits, so the QoS standards we are setting for active circuit levels will provide a proportionate and conservative backstop in Year 2. Given the volumes of dark fibre are likely to be considerably lower than the total volume of Ethernet circuits, we do not think their inclusion will distort the standards.
- 15.158 In relation to the Repairs QoS standard, we have decided that the performance level for dark fibre should be determined by the SLA, as is the case for active Ethernet circuits. The 2016 reference offer for dark fibre was 18 hours, so we anticipate the final Reference Offer (which will be published no later than six weeks after the BCMR SMP conditions come into force)¹³⁶¹ and SLA will set an appropriate time limit, to reflect the different profile of dark fibre repairs relative to actives (for which a limit of five hours applies). We note Openreach's comments regarding the Repairs QoS standard, but as it acknowledges, the standard has been defined in a way which sets a different performance level for actives and dark fibre.
- 15.159 Meanwhile, as we outline below, and in Annex 17, we have decided that KPI data for dark fibre circuits should be made available in Year 1 of the market review. This data should be provided from the date of the soft launch of the dark fibre product, no later than six weeks after the BCMR SMP conditions come into force.¹³⁶²

Compliance period and geographic level

Our proposals

- 15.160 We proposed annual monitoring of the QoS standards in the next market review period.
- 15.161 We also proposed to assess compliance with the QoS standards at a national level, across the geographic markets that we proposed to apply them.

Stakeholder responses

- 15.162 Openreach and TalkTalk agreed that the QoS standards and KPIs should be on an annual basis. However, Openreach argued that Ofcom should consider a single compliance period

¹³⁶¹ See Annex 26, Schedule 3, Part 3.

¹³⁶² See Annex 26, Schedule 3, Part 3.

for the whole market review period, in the event Ofcom publishes its statement late. Openreach cited longer compliance periods having been used before (i.e. the Temporary Conditions period) and said this would mitigate against the potential impact of a large number of MBORC events in a shorter Year 1 adversely impacting Openreach’s ability to meet the standards.¹³⁶³ Openreach also argued that a shorter Year 1 period reduces the normalising impact of more time on its performance and possibly result in a greater impact of volatility/uncertainty.¹³⁶⁴

15.163 Subsequent to the consultation closing, Openreach submitted a short report further arguing for a single compliance period. As well as expanding on its arguments above, Openreach argued that a single compliance period was more appropriate because:

- The relatively small order volumes in the Ethernet market (compared to the copper market) makes compliance more vulnerable to distortion.
- The possible impact of the unrestricted PIA and dark fibre remedies potentially increasing volatility in regard to complexity and demand variation.
- Where Ofcom had previously imposed single compliance periods, there had been no negative impact on Openreach’s performance.
- Modelling that Openreach submitted in its response showed that a shorter compliance period increases the likelihood of failure against the QoS standards. Specifically, Openreach’s modelling showed reducing the compliance period from 12 to nine months is equivalent to making the target harder by 0.2 days for MTTP, by 0.07% for the Upper Percentile limit (measured at 118 days), by 0.22% for Certainty and by 0.08% for Repairs.¹³⁶⁵

15.164 Openreach and TalkTalk agreed compliance should be measured on a national basis.¹³⁶⁶

Our reasoning and decisions

15.165 In our 2018 BCMR Consultation, we proposed an annual monitoring of the QoS standards. We consider annual, rather than monthly, monitoring and compliance is preferable due to low Ethernet volumes (compared to copper services), the long lead times of orders (often stretching beyond one month) and annual measures being less prone to short term peaks and troughs in demand and resourcing.

15.166 Our consultation proposals were on the basis that the first year of the market review would commence from the date of publication of the statement, so that in the event of the statement being published after 31 March 2019, Year 1 would be a shorter compliance period. Now that the statement has been published, our proposed approach means that Year 1 runs from 1 July 2019 until 31 March 2020 (i.e. nine months), followed by a full Year 2 (12 months).

¹³⁶³ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 128, 154; TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.29.

¹³⁶⁴ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 155-156.

¹³⁶⁵ Openreach, March 2019, QoS Standard compliance periods (‘Openreach QoS compliance response’), pages 1, 4.

¹³⁶⁶ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 127, 147-8; TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.29.

- 15.167 We have considered Openreach’s arguments for a single compliance period. However, we do not believe a single compliance period is preferable to two compliance periods.
- 15.168 First, we consider 21 months to be too long a period without a ‘checkpoint’ to assess compliance. If Openreach is under-performing, we would want to assess why, and take action as appropriate, earlier than at the end of a long compliance period. The length of the Year 1 period (nine months), is, we believe, of sufficient length to assess compliance. We also believe stakeholders are likely to support the increased visibility offered by two compliance periods with a checkpoint on Openreach’s performance.
- 15.169 Moreover, we note that our Year 1 QoS standards are broadly flat relative to Openreach’s performance over the Temporary Conditions period, and therefore, limited improvement is likely required from Openreach to meet these standards. Retaining a checkpoint, and two compliance periods, is important, however, as we expect to see improvement in Openreach’s performance in the second year of the market review.
- 15.170 We have considered whether removing the first quarter of a financial year (i.e. April, May and June, as is the case in the shorter Year 1 period) would have a detrimental effect on Openreach’s overall performance. Noting comments from Openreach, highlighted earlier, that repair performance could be particularly vulnerable to a shorter compliance period, and also because repairs performance has been relatively stable in recent years,¹³⁶⁷ we have used it to review Openreach’s performance broken down by quarter. As Table 15.14 below shows, we have found no conclusive evidence that quarter 1 (April, May and June) is key to Openreach’s overall annual performance in meeting the quality of service standards.

Table 15.14 – Ethernet repair performance from 2016 to 2018

Year	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Calendar Year	Financial Year
2016	<i>N/A</i>	<i>94.2%</i>	<i>96.1%</i>	<i>92.0%</i>	<i>94.0%</i>	<i>94.2%</i>
2017	94.9%	96.2%	94.3%	95.1%	95.1%	94.8%
2018	93.9%	94.8%	94.0%	95.2%	94.5%	94.7%

Source: Openreach monthly KPI reports to Ofcom, April 2016 to December 2018

Notes: Figures in italics are affected by missing monthly data. All figures before October 2017 included all CBDs and VHB. For Jan 2016 to Apr 2016, monthly data was not available as this pre-dated the last BCMR’s KPIs. For November 2017, monthly data was not available as this was before the Temporary Conditions came into effect.

- 15.171 We note Openreach’s modelling of how a shorter compliance period (of nine months) would adversely affect its ability to achieve the QoS standards. The largest of these (0.22% for Certainty), we consider to be within a margin of error boundary. Therefore, we consider the modelling that Openreach has provided is sufficient to warrant altering our QoS standards or setting a single compliance period.
- 15.172 Finally, in the event Openreach fails to meet any of the QoS standards in Year 1 of the market review period, then our compliance monitoring would assess any contributing

¹³⁶⁷ As noted above, Openreach’s performance in provisioning has significantly improved in the last few years, making it more difficult to consistently review Openreach’s performance by quarter over this period.

factors (such as a disproportionate incidence of MBORC incidents in the nine month period).

- 15.173 We have decided to assess compliance with the QoS standards at a national level, aggregated across the geographic markets that we are applying them. Given the relatively low volume of Ethernet orders (compared to copper services), we do not think it would be appropriate to apply them at geographical market or regional levels. As stakeholders recognised, doing so avoids the impact of regional spikes.

Transparency of QoS performance

- 15.174 If the business connectivity markets were fully competitive, the quality of the services provided would be based on the commercial judgement of individual companies and could be expected to meet the requirements of end-users of the services, as providers would be incentivised to meet customer requirements to maximise sales. However, where a provider has SMP, competition cannot be expected to be an effective constraint and the dominant provider could have the ability and incentive to offer inadequate quality of service to increase profitability.
- 15.175 In addition, vertically integrated SMP operators have the ability and incentive to favour their own downstream business over third party telecoms providers by differentiating on price or terms and conditions. This discrimination can also take the form of variations in quality of service (either in service provision and maintenance or in the quality of network service provided by the dominant provider to external providers compared to its own retail operations). This has the potential to distort competition at the retail level by placing third party providers at a disadvantage in terms of the services they can offer consumers to compete with the downstream retail business of the vertically integrated operator.
- 15.176 *Ex ante* regulation is therefore necessary to provide transparency about the QoS provided by the dominant provider (alongside the other QoS remedies we are imposing).
- 15.177 We consider that there are three reasons why it remains appropriate to direct BT to provide specified performance metrics:
- Given we will direct BT to comply with QoS standards in some areas, KPIs enable us to monitor BT's compliance with these standards and provide transparency of BT's compliance with these measures for both telecoms providers and end-users.
 - In areas where we do not consider specific QoS standards are necessary at present, but which may nevertheless be of potential concern to us, telecoms providers and/or end-users, KPIs provide visibility in case evidence emerges that intervention has become necessary.
 - Requiring BT to provide performance metrics broken down by BT or non-BT customer helps to address concerns regarding discriminatory conduct.
- 15.178 In light of the usefulness to Ofcom, telecoms providers, and end-users, we are imposing a direction requiring BT to provide the specified metrics.

Individual KPIs

Our proposals

15.179 We proposed to continue to direct BT to provide a comprehensive set of QoS performance statistics. We evaluated all KPIs we had required from Openreach to ensure that we are only requesting information where it adds value to Ofcom and stakeholders, and to continue to meet the obligation on Ofcom to ensure proportionality. As a result, we proposed to amend five KPIs,¹³⁶⁸ remove twelve KPIs¹³⁶⁹ and create two new KPIs.¹³⁷⁰

Stakeholder responses

15.180 Openreach welcomed the reduction in individual KPIs.¹³⁷¹

15.181 Vodafone broadly agreed with our proposals in regard to individual KPIs.¹³⁷² However, TalkTalk and Vodafone disagreed with our proposed removal of KPI (xv) ‘Performance against final contractual delivery date’. TalkTalk stated Openreach’s certainty performance needs improving before removing this KPI, and Vodafone suggested this KPI should be retained as a check on certainty.¹³⁷³

15.182 Both Vodafone and TalkTalk also disagreed with our proposed removal of KPI (xvii) ‘Average number of changes to contractual delivery dates’. Vodafone argued that it should be retained as a check that Openreach are not applying more changes/Deemed Consent applications in smaller portions. TalkTalk concurred, stating it is a useful indicator of the workload Openreach are putting on its customers.¹³⁷⁴

15.183 Vodafone also disagreed with our proposed removal of KPI (xxiv) ‘Order volume forecast by the dominant provider’, citing that this is needed to address industry issues regarding Openreach forecasts.¹³⁷⁵

15.184 BT Group stated it would like two new measures for improved visibility of an order – ‘radio silence reports’ (an update every 10 days from Openreach on the progress of an order) and a measure regarding use of the Stand-alone Survey (SAS) (as BT Group argued that if the SAS process has already been used, it is reasonable for a live order to be expediated through the order process).¹³⁷⁶

¹³⁶⁸ Ofcom, 2018 BCMR Consultation, table 15.16.

¹³⁶⁹ Ofcom, 2018 BCMR Consultation, table 15.17.

¹³⁷⁰ Ofcom, 2018 BCMR Consultation, table 15.18.

¹³⁷¹ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 205.

¹³⁷² Vodafone’s response to the 2018 BCMR Consultation (Part 3 – Remedies), pages 67-71.

¹³⁷³ Vodafone’s response to the 2018 BCMR Consultation (Part 3 – Remedies), page 69; TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.29.

¹³⁷⁴ Vodafone’s response to the 2018 BCMR Consultation (Part 3 – Remedies), page 69; TalkTalk’s response to the 2018 BCMR Consultation, paragraph 6.29.

¹³⁷⁵ Vodafone’s response to the 2018 BCMR Consultation (Part 3 – Remedies), page 70.

¹³⁷⁶ BT Group’s response to the 2018 BCMR Consultation (Annex 6), page 40.

Our reasoning and decisions

- 15.185 We note that, on the whole, there was little comment and broad support for the overall reduction of individual KPIs.
- 15.186 In regard to BT Group’s request for two additional new measures, we note that these were not expressly requested as new KPIs, but as new “standards”. Moreover, we understand that both of these measures are under consideration as part of Openreach’s REP initiative.¹³⁷⁷ Likewise, regarding Vodafone’s request to retain the KPI concerning ‘Order volume forecast by the dominant provider’, we understand the issue of forecasting is also being addressed within Openreach’s REP and the approach to forecasting may evolve as a result.
- 15.187 We note Vodafone and TalkTalk’s comments regarding the benefits of retaining the KPI concerning ‘Average number of changes to contractual delivery dates’. Having looked at the order data for the average number of changes to orders, both in recent months and by telecoms provider, we have not seen any evidence to suggest this is a current problem. Therefore, we have decided to proceed and remove this KPI.
- 15.188 In regard to stakeholder support for retaining KPI (xv) ‘Performance against final contractual delivery date’, we note that Openreach’s performance against this KPI has generally been at a high level. However, in light of stakeholder comments and given the importance of certainty of delivery dates to customers, we have decided to retain this KPI.
- 15.189 Overall, therefore, we have reduced the number of individual KPIs requested from BT, from the previous market review, from 28 to 19 individual KPIs.

Scope of KPIs

Our proposals

- 15.190 We proposed to require the provision of KPIs in all areas of the markets we proposed BT had SMP, including HNR areas where we do not propose to impose QoS standards.
- 15.191 We also proposed to require BT to provide KPIs split by the following products: EAD, EBD and Cablelink services (and variants), WDM and dark fibre (for dark fibre, we proposed this was only required in the CI Inter-exchange connectivity market).

Stakeholder responses

- 15.192 Openreach and [redacted] supported separate KPI reporting for dark fibre. [redacted] expressed a strong desire that [redacted].¹³⁷⁸

¹³⁷⁷ For instance, in regard to BT Group’s request for Stand-alone Survey orders to be processed quicker, we understand this is what Openreach are proposing to do with its overall approach of ‘modular order options’ (see Openreach, *Openreach REP Consultation*, Section 6.7)

¹³⁷⁸ [redacted].

Our reasoning and decisions

- 15.193 Where a dominant provider has been found to have SMP, there is the potential for consumer harm as the dominant provider could have the ability to offer inadequate quality of service to increase profitability. Therefore, in such areas where we have determined BT has SMP (including HNR areas), we have decided to require BT to report its performance by reference to a set of KPIs.
- 15.194 We continue to believe it is important to have KPIs split by product to allow us to monitor Openreach's performance at individual product levels, given the potential differences in the complexity for orders of these products. In this regard, we note stakeholders support for separate reporting on Dark Fibre. Moreover, whilst we are not imposing QoS standards on WDM for the reasons outlined above, separate reporting on WDM will allow us to monitor Openreach's QoS performance in relation to WDM services.
- 15.195 Therefore, we have decided to proceed with our proposals for separate KPI reporting split by the following products:
- EAD (and variants);
 - EBD (and variants);
 - Cablelink (and variants);
 - WDM services; and
 - Dark fibre.

Reporting criteria of KPIs

Our proposals

- 15.196 We proposed to continue to require BT to report on most of the KPIs for:
- all parts of the UK in which we found SMP;
 - each of the following nations/regions: Scotland; Wales; Northern Ireland; England – North; England – West and England – East;
 - each of the applicable provision categories; and
 - BT and non-BT telecoms providers' orders performance.
- 15.197 We also proposed to continue the requirement on BT to report on KPIs split for the main telecoms providers' orders performance. But we proposed to reduce this from the largest nine telecoms providers to the largest seven telecoms providers (determined by total order volumes).
- 15.198 In light of our proposal to impose QoS standards in some, but not all, geographic areas where we proposed to find SMP, we proposed to introduce a requirement to report on KPIs in QoS standards products/areas only.
- 15.199 Further, given our proposed market definition, we proposed to require BT to report on KPIs split by separate markets.
- 15.200 We proposed to continue the requirement on BT to publish a subset of KPIs on its website, and to update them on a quarterly basis. This included the QoS standard KPIs (with the

exception of the Certainty Cross-Link QoS standard KPI), and, in addition, while we proposed to remove the QoS standard for the lower percentile, we proposed that Openreach should continue to publish this as a KPI on its website. We also proposed Openreach should publish a new KPI regarding the performance of tail orders (open work stack).

- 15.201 We proposed to remove the requirement on BT to provide, if requested by a telecoms provider, the requesting telecoms provider’s individual performance on a subset of KPIs.

Stakeholders views

- 15.202 Openreach generally disagreed with the number of splits we proposed, stating they were too numerous, were “unnecessary and disproportionate” and too onerous for Openreach to produce. It also stated that this large number of splits was unlikely to be useful for Ofcom.¹³⁷⁹ Openreach suggested one way to alleviate this would be have some, or all, of the KPIs reported on a quarterly basis.¹³⁸⁰ Openreach also argued Ofcom could remove the splits by provision category (noting the lower and upper percentile metrics already exist) and split by top seven telecoms providers (noting the split of BT/non-BT already deals with concerns regarding discrimination).¹³⁸¹
- 15.203 Openreach supported our proposal to remove the right of telecoms providers to request individual KPI reports, stating telecoms providers already get a lot of information, but [redacted] disagreed, [redacted].¹³⁸²
- 15.204 Openreach agreed with our proposal to request that it publish a subset of KPIs on its website, but disagreed that this should include the ‘Monitoring the tails (open work stack)’ KPI, stating it would be better to makes this available at industry forums.¹³⁸³
- 15.205 Openreach agreed with our proposal to require KPIs to be reported on a regional basis.¹³⁸⁴
- 15.206 Openreach commented that it needs sufficient time to make the necessary changes to build and test the system required for the revised KPIs (it said our consultation proposals would take an expected [redacted] months to complete).¹³⁸⁵

Our decision

KPIs provided to Ofcom

- 15.207 As part of our duty to ensure we are proportionate in the information we request from stakeholders, and also in response to Openreach’s comments that the splits of KPI we proposed were too numerous, we have reconsidered all of the data splits, and reporting criteria of the KPIs, before making our final decisions.

¹³⁷⁹ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 12, 204, 209, 211.

¹³⁸⁰ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 214.

¹³⁸¹ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 213.

¹³⁸² [redacted]; Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 228.

¹³⁸³ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 224, 226.

¹³⁸⁴ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 150.

¹³⁸⁵ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraphs 229-231.

- 15.208 We have decided to require the provision of KPIs at regional level and broken down by each of the different CI Access services and CI Inter-exchange connectivity markets.
- 15.209 As we have decided to impose QoS standards in some but not all geographic areas in the markets where we find SMP, and on some but not all products, we have decided to maintain the requirement of the reporting of KPIs aggregated for QoS standard products/areas.
- 15.210 Openreach raised the possibility of amending some, or all, of the KPIs from monthly reporting to quarterly reporting. We do not agree with this proposition, as monthly reports enable us to maintain a regular check on Openreach's performance including reporting against the QoS standards. Furthermore, we believe amending the frequency of some, but not all, of the KPIs to quarterly reports would add complexity for Openreach and Ofcom. Therefore, we have maintained the frequency of KPI reporting to monthly reports, for all individual KPIs and reporting criteria.
- 15.211 We continue to believe it is important that BT are required to provide KPIs split in the following ways, for the reasons below.
- 15.212 In regard to our proposed requirement on BT to report on KPIs by the seven largest telecoms providers (as determined by total order volumes), we have decided that the requirement on BT to provide orders performance split by BT and non-BT customers is sufficient to monitor our concerns regarding downstream discrimination. Moreover, if an individual telecoms provider raised concerns in this regard, we retain the ability to request this data from Openreach under our formal information gathering powers. Therefore, we have decided to remove this requirement on BT.
- 15.213 We have also reconsidered whether we need all of the data points proposed in Tables 15.19 and 15.20 in our 2018 BCMR Consultation, and by all of the data splits. We have concluded that (as summarised in Table 15.15):
- we require all of the splits, for both geographic areas (i.e. UK SMP areas and QoS standards areas), for all QoS standard KPIs, to enable us to monitor how performance differs according to each of the splits. As we attach most importance to the QoS standards, Openreach's performance according to the separate data splits is of interest to us
 - we require all KPIs to be split by BT and non-BT telecoms providers. This will allow us to monitor any potential discriminatory behaviour across all checkpoints and aspects of orders.
 - we require all of the splits for the KPI 'Mean time to issue initial contractual delivery dates' for both geographic areas (UK SMP areas and QoS standards areas). This is because we understand this KPI is of particular importance to the industry, and one that we have had limited visibility about in the past.
 - for all other data points and KPI splits not mentioned above, we have decided to only request the total of the specified KPI, and where applicable, the numerator and denominator.

Table 15.15: Rationale for requested KPI splits

KPI base	Rationale
All parts of the UK in which we found SMP	In line with our SMP findings, to monitor performance in all areas where we have found SMP, including those where we have not imposed QoS standards
All parts of the UK in which QoS Standards apply	In line with our findings of where to apply QoS standards
Split by region	To identify difference in performance between regions
Split by product	To identify difference in performance between products (e.g. WDM)
Split by HNR areas ¹³⁸⁶	To enable us to monitor performance in more competitive areas where we are not imposing QoS standards
Split by market	To enable us to monitor any differences in quality of service in the markets we have defined
Split by provision categories	To identify how performance differs between more and less complex order categories
Split by BT/non-BT telecoms providers' orders performance	To identify any potential discrimination between BT and non-BT order performance

15.214 Our decision in regard to all of the above is summarised in the following tables (Tables 15.16 and 15.17).

15.215 In regard to Openreach's comments about the timescales required to implement the changes to the KPI requirements, we acknowledge there may be a delay while Openreach builds the new KPI reports required by this statement. In the event that Openreach expects that it will require additional time to build the new KPI reports, we would expect Openreach to make a request for additional time as soon as it becomes aware that extra time is required. Ofcom will then consider Openreach's request and confirm whether the request is granted and if so the amount of additional time Openreach will have to build the report to retrospectively submit previous months' performance.

Public KPIs

15.216 In regard to the publication of a small subset of KPIs (including those which relate to the performance against the QoS standards), we believe this provides transparency to end-users and other interested parties as to the performance achieved by Openreach on key aspects of service delivery – namely, how long it takes for Ethernet services to be installed, delivery date certainty and fault repair performance. Therefore, we have decided to

¹³⁸⁶ As stated below, to ensure we have comparable data of Openreach's performance in HNR areas to that of regulated areas, where KPIs are requested to be split by HNR areas, we require only QoS products to be reported (i.e. excluding WDM).

reimpose the requirement for Openreach to publish specified KPIs on its website and update them on a quarterly basis.

- 15.217 We have considered what information is most relevant and useful for industry, business customers and other stakeholders likely to be visiting Openreach’s website. We believe that it is more meaningful for them to have access to data on Openreach’s quality of service for all the geographical areas where we find BT with SMP. This would cover a larger proportion of the UK than our proposed approach in the consultation, which suggested publication of specified KPIs for QoS products in QoS standard areas. Therefore, we have decided to amend this publication requirement, and similarly, we have amended the requirement on the publication of KPIs split by region so it is on the same geographical basis (i.e. areas where we find BT has SMP).
- 15.218 While we have removed the QoS standard in regard to lower percentile, we have decided to continue to require Openreach to publish the relevant KPI to provide transparency on any performance changes in this market review. However, upon reflection of what is suitable for publication, we have decided not to require Openreach to publish its performance against the new KPI we have introduced regarding the performance of open tail orders. The visibility of the current workstack for tail orders is only likely to be of significant interest to telecoms providers, and therefore it is more appropriate for Openreach to provide this at an industry working group.
- 15.219 We have decided to remove the requirement on BT to provide, if requested by a telecoms provider, the requesting telecoms provider’s individual performance on a subset of KPIs. Openreach provides more extensive KPI reports to telecoms providers,¹³⁸⁷ and moreover, the reports required by our regulations are very rarely requested by telecoms providers. Therefore, in line with our duty to consider and ensure our regulation is proportionate, we have removed this requirement on BT.
- 15.220 In regard to the reporting of Cablelink and EBD, we are content that, for the purposes of QoS reporting, they are reported and categorised as Inter-exchange services.

¹³⁸⁷ Openreach’s response to BCMR s.135-26 Notice: since the 2018 BCMR Consultation, Openreach has provided Ofcom with a template of these monthly reports to telecoms providers. Openreach, April 2019, *BCMR QoS – KPI reporting actions: Openreach follow up actions*, page 3 and Annex 1.

Table 15.16: KPIs for UK SMP areas and their reporting criteria

Area KPI requirement	UK SMP areas				
	Total	Split by region	Split by product	Split by HNR areas ¹³⁸⁸	Num. & den.
a) Mean time to provide	Y (P)	Y (P)	Y	Y	Y*
b) Fault repair performance	Y (P)	Y (P)	Y	Y	Y
c) Delivery date certainty	Y (P)	Y (P)	Y	Y	Y
d) Time to provide (lower percentile)	Y (P)	Y (P)			Y
e) Time to provide (upper percentile)	Y (P)	Y (P)	Y	Y	Y
f) Certainty Cross-Link (mean initial contractual delivery period)	Y	Y	Y	Y	Y*
g) Monitoring the tail (closed work stack)	Y				Y
h) Monitoring the tail (open work stack)	Y				
i) Time to provide of the tail extremities	Y				Y*
j) Order validation	Y				Y
k) Mean time to issue the initial contractual delivery dates	Y	Y	Y	Y	Y
l) Performance in issuing initial contractual delivery dates	Y				Y
m) Changes to CDDs	Y				Y
n) Mean delay due to contractual delivery date changes	Y				Y*
o) Mean customer caused delay	Y				Y*
p) Monitoring traffic management Delay Code applications	Y				Y
q) Monitoring wayleave Delay Code applications	Y				Y
r) Size of the installed base	Y				
s) Performance against final CDD	Y				Y

¹³⁸⁸ By High Network Reach areas, we are referring to areas where BT faces two or more competitors, as defined by our market definition. In the interests of clarity, this is an aggregated measure of all the HNR areas.

Table 15.17: KPIs for QoS standards products in QoS standards areas and their reporting criteria

Area KPI requirement	QoS standards products in QoS standards areas				
	Total	Split by PC	Split by BT /non-BT	Split by markets	Num. & den.
a) Mean time to provide	Y	Y	Y	Y	Y*
b) Fault repair performance	Y	Y	Y	Y	Y
c) Delivery date certainty	Y	Y	Y	Y	Y
d) Time to provide (lower percentile)	Y		Y		Y
e) Time to provide (upper percentile)	Y	Y	Y	Y	Y
f) Certainty Cross-Link (mean initial contractual delivery period)	Y	*Y	Y	Y	Y*
g) Monitoring the tail (closed work stack)	Y		Y		Y
h) Monitoring the tail (open work stack)	Y		Y		
i) Time to provide of the tail extremities	Y		Y		Y*
j) Order validation	Y		Y		Y
k) Mean time to issue initial contractual delivery dates	Y	Y	Y	Y	Y
l) Performance in issuing initial contractual delivery dates	Y		Y		Y
m) Changes to CDDs	Y		Y		Y
n) Mean delay due to contractual delivery date changes	Y		Y		Y*
o) Mean customer caused delay	Y		Y		Y*
p) Monitoring traffic management Delay Code applications	Y		Y		Y
q) Monitoring wayleave Delay Code applications	Y		Y		Y
r) Size of the installed base	Y		Y		
s) Performance against final CDD	Y		Y		Y

Notes for Tables 15.16 and 15.17 are set out in the following paragraphs.

15.221 “Y” in a column means yes, the KPI is required and must be provided as indicated by the column headings in the following ways:

- “UK SMP areas” means for the following reporting criteria, the KPI should be provided for the following column headings for Ethernet, WDM and dark fibre products, for all areas of the UK where we have found BT to have SMP (i.e. excluding the CLA and Hull Area);
- “Total” means the KPI must be provided (as one figure) for the whole of the areas of the UK where we find BT to have SMP (i.e. excluding the CLA and Hull Area); and
- “Split by region” means the KPI must be provided for each of the following nations/regions: Scotland; Wales; Northern Ireland; England – North; England – West and England – East;
- “Split by product” means the KPI must be provided for each of the following products:
 - EAD (including EAD LA);
 - EBD;
 - Cablelink;
 - WDM; and
 - Dark fibre.
- “Split by HNR areas or not” means the KPI must be provided for the areas which we have determined as High Network Reach (including Metro areas) and for non-HNR SMP areas. This split should provide data for QoS standards products only (i.e. excluding WDM).

15.222 “QoS standards products in QoS Standards areas” means for the following reporting criteria, the KPI should be provided for the following column headings for Ethernet (in Year 1 and Year 2) and dark fibre products (in Year 2), for all areas of the UK where we have determined QoS standards apply:

- “Total” means the KPI must be provided (as one figure) for the areas of the UK where we determine QoS Standards apply;
- “Split by PC” means the KPI must be provided for each of the applicable provision categories;
- “Split by BT / non-BT” means the KPI must be provided separately for an aggregate of BT businesses that are downstream customers of Openreach and for an aggregate of all other telecoms providers that are downstream customers of Openreach
- “Split by markets” means the KPI must be provided for each of the following markets:
 - Non-competitive BT exchanges in the CI Inter-exchange connectivity market;
 - CI Access services market, BT Only areas; and
 - CI Access services market, BT+1 areas.

15.223 “(P)” adjacent to a Y means the KPI must be made publicly available, split according to the column heading, by means of publication on an Openreach website on a quarterly basis.

15.224 “Num. & den.” mean numerator and denominator respectively. For the average values (marked as *), we require for each month the numerator representing the sum of the product of the time values (or number of changes) and the quantities of product exhibiting

that time values (or number of changes). For the denominator we require the volume of products over which the average is taken.

Service level agreements and service level guarantees

- 15.225 As we have discussed above, SLAs and SLGs are one of the three tools we proposed to use to encourage Openreach to provide an appropriate level of quality of service.
- 15.226 SLAs set out Openreach’s commitment to provide services to an agreed quality, e.g. the target time to undertake a repair or installation. SLGs specify the level of compensation that the telecoms provider would be entitled to should the service not be provided to the quality specified in the SLA, e.g. if delivery of the service was late. They are intended to reflect a pre-estimate of the average costs to telecoms providers of breaches of the quality obligations specified in the SLAs. SLAs and SLGs are set in contracts agreed between Openreach and telecoms providers but can be influenced by regulation.
- 15.227 In the following sections, we have summarised the comments of the seven consultation respondents who commented in detail on our SLA and SLG proposals (BT Group, Gamma, Openreach, TalkTalk, UKCTA, Vodafone and [redacted]). Two other respondents Sorrento Networks¹³⁸⁹ and SSE¹³⁹⁰ said they agreed with our proposals; but did not provide detailed comments.

SLA and SLG obligations

Our proposals

- 15.228 In the 2016 BCMR and Temporary Conditions we required that BT publish a Reference Offer for its wholesale leased line products which set out its SLAs and SLGs. We also issued a direction under the quality of service SMP condition specifying the SLG compensation arrangements for the wholesale Ethernet services BT provides to its customers (the SLG Direction). The direction applied the principles established in our 2008 SLG Statement.¹³⁹¹
- 15.229 The SLG Direction requires that BT’s terms and conditions for the supply of wholesale Ethernet services include the following:
- obtain consent from the telecoms provider to set a CDD of greater than 57 days;
 - pay compensation at 100% of one month’s line rental per day up to 60 days for orders not delivered by the CDD or the Customer Requirements Date (whichever is later);
 - pay compensation at 15% of one month’s line rental per hour up to 200 hours for faults not repaired within five hours; and
 - pay SLG compensation payments proactively and without prejudice to any right of telecoms providers to claim for additional losses.

¹³⁸⁹ Sorrento Networks’ response to the 2018 BCMR Consultation, page 10.

¹³⁹⁰ SSE’s response to the 2018 BCMR Consultation, page 12.

¹³⁹¹ Ofcom, SLG Statement.

- 15.230 In line with the approach adopted in the 2017 NMR Statement¹³⁹² and the 2018 QoS Statement¹³⁹³, we proposed to remove the SLG Direction, and instead to include elements of it in BT's Reference Offer conditions applicable to wholesale Ethernet services.
- 15.231 We considered that it was no longer necessary to specify the SLAs and SLGs in as much detail as in the SLG Direction, and that a less detailed specification would reduce the risk that further amendments would be required following the conclusion of industry discussions about changes to the Ethernet provisioning processes.
- 15.232 As we note in Section 12, we also proposed that the reference offer condition for dark fibre access should include an obligation for BT to have SLAs and SLGs for the completion of the provision of service and fault repair times.

Stakeholder responses

- 15.233 Openreach¹³⁹⁴, TalkTalk¹³⁹⁵ and UKCTA¹³⁹⁶ supported our proposal to remove the SLG direction and to incorporate SLA/SLG obligations in the reference offer conditions. However, there were differing views about whether a less detailed specification of the SLAs and SLGs was appropriate.
- 15.234 Openreach said that less detailed obligations would be an important enabler for its REP proposals for provisioning process improvements. Less prescriptive obligations would enable it to implement any changes to the SLAs it might agree with telecoms providers without the need for Ofcom to first amend the SLA/SLG obligations.¹³⁹⁷ In contrast, other consultation respondents favoured the retention of more detailed SLA and SLG obligations:
- TalkTalk supported the retention of detailed SLA and SLG obligations until process changes are agreed, to avoid a regulatory lacuna which Openreach might exploit. It would also incentivise all parties to engage effectively in negotiations.¹³⁹⁸
 - UKCTA supported the retention of detailed obligations until the next market review in 2021 to let the REP process bed in. Requiring Openreach to maintain SLG payments at the current level would also prevent it acting unilaterally to harm competitors.¹³⁹⁹
 - Vodafone also supported the retention of detailed SLA and SLG obligations until the next market review in 2021, by which time there would be more clarity about the impact of the revised Ethernet provisioning process on provisioning failure costs.¹⁴⁰⁰
 - [redacted] said [redacted].¹⁴⁰¹

¹³⁹² Ofcom, 2017. *Narrowband Market Review: Statement* [accessed 21 May 2019]

¹³⁹³ Ofcom, 2018, Quality of Service for WLR, MPF and GEA: Statement, https://www.ofcom.org.uk/data/assets/pdf_file/0007/112210/statement-qos-wlr-mpf-gea2.pdf [accessed 22 May 2019].

¹³⁹⁴ Openreach's response to the 2018 BCMR Consultation (quality of service), paragraph 236.

¹³⁹⁵ TalkTalk's response to the 2018 BCMR Consultation, paragraph 6.6.

¹³⁹⁶ UKCTA's response to the 2018 BCMR Consultation, paragraph 45.

¹³⁹⁷ Openreach's response to the 2018 BCMR Consultation (quality of service), paragraphs 250 to 257.

¹³⁹⁸ TalkTalk's response to the 2018 BCMR Consultation, paragraphs 6.8 to 6.10.

¹³⁹⁹ UKCTA's response to the 2018 BCMR Consultation, paragraphs 45-46.

¹⁴⁰⁰ Vodafone's response to the 2018 BCMR Consultation (Part 3 – Remedies), paragraph 7.20.

¹⁴⁰¹ [redacted] response to the 2018 BCMR Consultation, [redacted].

15.235 Noting our intention to harmonise our approach to SLAs and SLGs with that adopted in other market reviews, Gamma asked us to clarify that Openreach should not be able to link SLG payments to forecasting accuracy, as we had in the 2017 NMR and the 2018 WLA market reviews.¹⁴⁰² [3<].¹⁴⁰³

Our reasoning and decisions

15.236 Maintaining the detailed obligations until the next market review (so that the impact of the REP process changes can be assessed) as some respondents have suggested, is not an attractive option in our view. First, the obligations would need to be amended to allow the new processes and/or revisions to the SLAs and SLGs to be implemented. We remain of the view that it is preferable to implement less detailed obligations in line with our proposals, so that any changes that are agreed could be implemented without the need for us to amend the obligations later. Second, it is unclear whether operational experience of the new processes would provide new insights about the costs incurred by telecoms providers' because of Openreach provisioning failures. Moreover, delaying consideration of SLG payments until 2021 risks losing the progress made during the recent negotiations.

15.237 Respondents' main concern is that absent detailed obligations, specifying the level of SLG payments, Openreach would be able to reduce provisioning SLG payments without telecoms providers' agreement. We consider there would be adequate protections in this regard. The current SLAs and SLGs are established in Openreach's contract. The relevant contractual agreements set limitations on the circumstances in which Openreach may change, without notice, its SLG contracts. Any other contractual changes can only be made, in accordance with the relevant contractual provisions, following negotiations between Openreach and other telecoms providers. In making any such changes Openreach would also be required to comply with its obligation to provide network access on fair and reasonable terms and conditions.

15.238 As we discuss below, the SLA/SLG negotiating principles are designed to provide a structured and open process for negotiations, that takes account of the likely imbalance in negotiating positions as between Openreach and its customers. Those principles provide for a referral to Ofcom in the event that negotiations are unsuccessful. Also, Openreach and its customers remain able to refer a dispute to Ofcom.

15.239 As we discuss in more detail below, we anticipate that Openreach may initiate a further round of industry negotiations concerning SLA/SLGs. This should provide an opportunity to review the outstanding issues, taking account of our guidance.

15.240 In conclusion, we have decided to confirm our proposal to impose less detailed obligations concerning SLAs and SLGs. We have therefore decided to include certain requirements in the reference offer condition for Ethernet services in the wholesale CI markets as proposed in the 2018 BCMR Consultation. As discussed in Section 11, those requirements are:

- an obligation to have SLAs and SLGs for completion of the provision of service;

¹⁴⁰² Gamma's response to the 2018 BCMR Consultation, page 18.

¹⁴⁰³ [3<] response to the 2018 BCMR Consultation, [3<].

- an obligation to have SLAs and SLGs for fault repair;
- an obligation to pay SLGs proactively; and
- a requirement that any SLG compensation shall be without prejudice to the rights of either party to claim for additional losses.

15.241 These changes mean that BT will no longer be required to:

- obtain consent from the telecoms provider to set a CDD of greater than 57 days;
- pay compensation at 100% of one month's line rental per day up to 60 days for orders not delivered by the CDD or the Customer Requirements Date (whichever is later); and
- pay compensation at 15% of one month's line rental per hour up to 200 hours for faults not repaired within five hours.

15.242 We have considered Gamma's concern that BT might start linking SLG payments to forecasting following the removal of the 2008 SLG Directions. In our 2008 SLG Statement we stated a general view that it is not appropriate for SLG payments to be linked to forecasting.

15.243 We note that BT's current contracts for Ethernet do not link SLG payments to forecasting. While we recognise the importance of accurate forecasting, we do not believe that linking SLGs to forecasting would be appropriate for Ethernet since in relation to areas such as repairs or the contract delivery date, forecasting bears little relevance to BT's ability to respond to changes in demand.

SLA and SLG negotiation principles

Our proposals

15.244 In our 2014 FAMR Statement¹⁴⁰⁴ and 2016 BCMR Statement, we adopted contract negotiation principles, SLA/SLG assessment criteria and negotiating behaviours to be applied to future industry negotiations in relation to SLAs/SLGs. These were among measures we put in place to ensure that BT maintains its quality of service in the supply of wholesale network access services (provided pursuant to our WLR, LLU and wholesale Ethernet leased line SMP remedies).

15.245 In the 2018 BCMR Consultation we proposed that the same principles, criteria and behaviours should continue to apply to future contract negotiations between Openreach and its customers in relation to SLAs/SLGs for the provision of wholesale Ethernet leased lines and form part of our proposed package of remedies to address the identified concerns about QoS.

Stakeholder responses

15.246 Openreach said that the OTA2 facilitated negotiation process, had generally worked well and should be retained. However, it felt that in light of experience with the Ethernet

¹⁴⁰⁴ Ofcom, 2014. [Fixed access market reviews: wholesale local access, wholesale fixed analogue exchange lines, ISDN2 and ISDN30](#) [accessed 21 May 2019].

negotiations, some adjustments to the contract negotiation principles were required to maintain their effectiveness. In particular:

- the principles should be amended to make explicit that Openreach, as well as telecoms providers, may submit proposals for negotiation in accordance with the principles;
- to mitigate the risk of telecoms providers or Openreach unreasonably prolonging negotiations, Principle 3 should be amended to make clear that contract negotiations may only be extended beyond the specified six-month period in specific circumstances; and
- in cases where negotiations have been unsuccessful, and Ofcom proposes to resolve matters, it should build on the learning from the negotiations and not start again from scratch.¹⁴⁰⁵

15.247 Gamma questioned the efficacy of the contract negotiations principles based on its experience of the Ethernet SLA/SLG negotiations. While Gamma acknowledged the facilitation role played by the OTA2, it noted that OTA2 does not have any powers to make decisions or to adjudicate, and that Ofcom had not attended any of the contract negotiation meetings and had not provided any input when negotiations reached an impasse. Gamma considered that unless Ofcom takes a more proactive role in future negotiations, the prospects for success with future negotiations are limited.¹⁴⁰⁶

Our reasoning and decisions

15.248 We remain of the view that the rationale for adopting principles for contract negotiation in previous reviews is applicable over the period of our current market reviews. Furthermore, we believe that the application of these principles and criteria has, thus far, worked well in relation to wholesale Ethernet and in relation to WLR, MPF and GEA services.

15.249 While we acknowledge Gamma's concerns about the Ethernet SLA and SLG negotiations, we do not consider the contract negotiation principles are ineffective. The principles provide for a period of industry negotiations facilitated by the OTA2, followed by a referral to Ofcom in the event that the negotiations are unsuccessful. As we discuss in more detail below, we consider that the negotiations were productive, notwithstanding the lack of agreement on certain points.

15.250 With regards to the amendments proposed by Openreach:

- we do not consider it necessary to modify the principles to make explicit that the principles apply to changes proposed by Openreach since Principle 1 already specifies that the OTA2 should facilitate all negotiations to create or change an SLA/SLG;
- we do not consider it necessary to amend Principle 3 as it already specifies that contract negotiations should not extend beyond six months. While we acknowledge that the recent negotiations were extended at the OTA2's discretion this was an

¹⁴⁰⁵ Openreach's response to the 2018 BCMR Consultation (quality of service), paragraphs 265-268.

¹⁴⁰⁶ Gamma's response to the 2018 BCMR Consultation, page 19.

exceptional case and was a decision that was taken in consultation with the parties to the negotiation and Ofcom;

- we do not consider it appropriate to amend the principles with regards to how Ofcom might resolve matters following a referral of unsuccessful negotiations by the OTA2. The principles already make clear that where an issue is referred to us and we consider that it is appropriate to intervene, our starting point would be the respective proposals and positions of each of the parties. However, the approach we adopt in any particular case would be subject to the overall requirement to adopt an outcome which best meets our statutory duties. In some cases, we may consider it appropriate to gather further information or to undertake further work.¹⁴⁰⁷

15.251 We therefore believe that the principles and criteria, modified as discussed above, should apply to future contract negotiations between Openreach and its customers in relation to SLAs/SLGs for the provision of wholesale Ethernet leased lines and form part of our package of remedies to address the QoS concerns discussed in this section.

15.252 In Annex 22, we:

- set out the reasoning for adopting contract negotiation principles and SLA/SLG assessment criteria;
- specify the relevant principles and criteria and related matters which should apply to future contract negotiations between Openreach and its customers in relation to SLAs/SLGs for the provision of wholesale Ethernet leased lines; and
- set out why we consider that it is appropriate to adopt these principles and criteria as part of the package of remedies we are imposing to address our QoS concerns in this market review.

The Ethernet SLA and SLG negotiations

15.253 Following the 2016 BCMR, in July 2016, Openreach commenced negotiations concerning changes to the SLAs and SLGs for wholesale Ethernet services. In addition to Openreach there were six participants: Gamma, TalkTalk, Vodafone and the BT downstream businesses (BT Wholesale and Ventures, BT Global Services, and BT Public Sector). The negotiations were facilitated by the OTA2 and were conducted in accordance with the SLA/SLG negotiation principles described above.

15.254 In January 2018, after consultation with Openreach and the other participants, the OTA2 notified us that the negotiations had been unsuccessful. The OTA2 concluded that given the opposing positions on certain topics, it was unlikely that further negotiations would be successful. Moreover, participants other than Openreach did not wish to reopen negotiations and two considered that Ofcom should review the role of SLGs as part of the BCMR.

15.255 A summary of the negotiations is provided in Annex 22.

¹⁴⁰⁷ See Annex 22.

Our proposals

- 15.256 In the 2018 BCMR Consultation we considered how best to proceed in light of the OTA2's referral of the negotiations to us, in accordance with the negotiation principles discussed above.
- 15.257 We considered whether it would be appropriate, in light of our duties and the broader regulatory framework, to choose between the participants' proposals for the level of the Ethernet provisioning SLGs, rather than seek to consider other alternative options in detail. We concluded that this would not be appropriate because:
- there are significant differences between the participants' estimates for some cost types and there is insufficient detail in some of their submissions to the OTA2 for us to judge which to choose;
 - the participants differ on points of principle; and
 - as discussed in more detail below, we considered that it may be useful to update some of the cost estimates.
- 15.258 We therefore considered that prior to making any changes to the level of the Ethernet provisioning SLGs, we would need to undertake a more wide-ranging review and to gather further evidence from the participants. Such an exercise would inevitably take some time, particularly as we would have to consult on any proposals we make following the review.
- 15.259 We are also mindful that in July 2018, Openreach had notified the OTA2 and other telecoms providers that it wished to negotiate changes to its Ethernet contract to support wide ranging changes to its provisioning processes.¹⁴⁰⁸ Among other things, these changes are designed to improve delivery date certainty by enabling Openreach to set more accurate contractual delivery dates from the outset, and to eliminate the use of deemed consent to amend CDDs. As part of these negotiations, Openreach also wishes to recommence negotiations on the Ethernet SLAs and SLGs.
- 15.260 We considered there was a risk that any review we might undertake could interfere with these new negotiations, as telecoms providers might wish to wait for the outcome of our review before concluding negotiations on changes to the Ethernet contract. Conversely there is a risk that the negotiations might lead to changes to the Ethernet SLAs which would need to be considered in our review.
- 15.261 We therefore decided to give guidance on the key points of disagreement about the Ethernet SLGs identified by the OTA2 with the objective of helping the participants to reach agreement during the forthcoming negotiations. Our guidance covered:
- the types of cost which should be included in the SLG calculation; and
 - the level of brand/reputational damage and delay management costs.

¹⁴⁰⁸ Openreach subsequently published a consultation on its proposals (Openreach REP Consultation, 26 September 2018).

Stakeholder responses

- 15.262 BT Group welcomed our guidance on the key points of disagreement saying that it provided much needed clarity on costs such as brand damage that had previously been in contention due to their intangible nature.¹⁴⁰⁹
- 15.263 Openreach welcomed our guidance on other participants’ estimates of their brand/reputational damage and delay management costs.¹⁴¹⁰
- 15.264 Gamma welcomed our guidance on the types of costs that should be included in the SLG calculation but disagreed with our view that brand/reputational damage arising from Ethernet provisioning failures is likely to be the exception rather than the rule. It argued that the propensity of end-users to switch suppliers, cited by us in support of this view, was not a reliable indicator. End-users are reluctant to switch suppliers because of the risk of disruption to business continuity, duplication of equipment and concurrent charges. Gamma also disagreed with our view that telecoms providers should be able to mitigate brand/reputational damage by handling delays professionally. The lack of detail provided by Openreach about delays commonly leads customers to question its ability to manage its supplier, which could be viewed as reputational damage. It believed that brand/reputational damage is significant but could be difficult to quantify and required further analysis and investigation by Ofcom.¹⁴¹¹
- 15.265 Respondents also commented on the level of the provisioning SLGs currently stipulated in the SLG Direction and the basis on which the level is set:
- Openreach provided a benchmarking study of European Ethernet SLAs and SLGs commissioned from WIK-Consult.¹⁴¹² Openreach said that the study indicated that Ethernet SLAs and SLGs imposed by Ofcom are the toughest in Europe.¹⁴¹³
 - Openreach said that its analysis of telecoms providers’ costs (conducted during the SLA/SLG negotiations) indicated that the Ethernet provisioning SLGs are set at a punitively high level, well beyond any reasonable estimate of the average pre-estimate of loss.¹⁴¹⁴
 - Openreach also considered that the SLGs are so high that they risk creating perverse incentives (for instance, “[><]”), and that changes to the SLGs are likely to require some form of regulatory intervention by Ofcom.¹⁴¹⁵
 - BT Group stated it did not believe higher SLGs were effective at improving Openreach performance, but “rather it incentivises gaming of the system” and that it was

¹⁴⁰⁹ BT Group’s response to the 2018 BCMR Consultation (Annex 6), page 40.

¹⁴¹⁰ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 238.

¹⁴¹¹ Gamma’s response to the 2018 BCMR Consultation, pages 4 and 20.

¹⁴¹² Openreach’s response to the 2018 BCMR Consultation (quality of service) (Annex 2 - QoS regulation: a comparative benchmark).

¹⁴¹³ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 233.

¹⁴¹⁴ Openreach’s response to the 2018 BCMR Consultation (quality of service), paragraph 259.

¹⁴¹⁵ Openreach’s response to the 2018 BCMR Consultation, paragraphs 261-262.

important only essential costs are included in setting them. More widely, BT Group stated that its customers prioritised service delivery over compensation.¹⁴¹⁶

- In contrast, UKCTA said that the current SLGs are fair and incentivise Openreach to provide good service. If reduced, Openreach could find it more profitable to reduce service quality.¹⁴¹⁷
- Gamma noted that provisioning SLGs had fallen substantially because of the linkage with circuit rental charges. However, telecoms providers' costs associated with Ethernet provisioning SLA failures are near constant. It therefore considered that the linkage with circuit rental charges should be abandoned and provisioning SLGs set at a fixed rate.¹⁴¹⁸
- Vodafone¹⁴¹⁹ and UKCTA¹⁴²⁰ said that Ethernet SLGs should remain at their current level since the Ethernet charge control would not be adjusted to reflect any reduction in SLGs.
- [X] said [X].¹⁴²¹

Our reasoning and decisions

- 15.266 We acknowledge that in view of the barriers to switching, BCMR 2016 research on the propensity of end-users to switch suppliers may be an imperfect indicator of brand/reputational damage in general. However, we cited this research in support of our views about the incidence of a particular form of brand/reputational damage – loss of future business. We remain of the view that the comparatively low incidence of switching supports our view that this type of brand/reputational damage is likely to be the exception rather than the rule.
- 15.267 We accept that telecoms providers' ability to manage delays professionally may be impaired, to a certain extent, by poor information from Openreach. However, we do not consider that this undermines our conclusions that generally, telecoms providers should be able to take steps to minimise reputational damage, and also that end-user businesses would normally be aware of Openreach's role in the delays.
- 15.268 We did not seek to give a definitive view about the incidence of brand/reputational damage (in the form of lost future business), but rather to question the high incidence cited by some participants to the negotiations. We remain of the view that the mitigating factors cited in our guidance suggest that such brand/reputational damage is likely to be the exception rather than the rule, and that consequently the estimates warrant further examination, with a focus on the extent to which such harm occurs in practice.
- 15.269 Having considered respondents comments, we have decided to confirm our proposed guidance without amendment. Our guidance is reproduced in Annex 22.

¹⁴¹⁶ BT Group's response to the 2018 BCMR Consultation (Annex 6), pages 39-40.

¹⁴¹⁷ UKCTA's response to the 2018 BCMR Consultation, paragraph 47.

¹⁴¹⁸ Gamma's response to the 2018 BCMR Consultation, pages 20-21.

¹⁴¹⁹ Vodafone's response to the 2018 BCMR Consultation (Part 3 – Remedies), paragraph 7.18.

¹⁴²⁰ UKCTA's response to the 2018 BCMR Consultation, paragraph 48.

¹⁴²¹ [X] response to the 2018 BCMR Consultation, [X].

- 15.270 It is evident from the consultation responses that there are differing views about the appropriate level of the provisioning SLGs. As we note in our guidance, the SLGs are a matter for negotiation and it is open to participants to agree what types of costs should be included in the SLGs and the level of the SLGs. If we were asked to set the Ethernet provisioning SLGs, our starting point would be the 2008 SLG Statement which established the first principles for SLGs. This states that when BT fails to meet agreed service levels, it should pay telecoms providers compensation which is based on a pre-estimate of an average telecoms provider's loss resulting from that failure. We remain of the view that this principle is appropriate given that Openreach's wholesale Ethernet services are SMP services. We also note that one of the key findings of the 2016 BCMR was that provisioning SLGs had not provided BT with a sufficient incentive to maintain Ethernet provisioning quality of service. We therefore consider that the QoS standards should continue to be the primary means by which Openreach is incentivised to maintain Ethernet provisioning quality of service. We discuss the rationale for the charge controls we are imposing on Ethernet services in Volume 3.
- 15.271 The OTA2's view is that the negotiations were productive even though they were ultimately unsuccessful. We support this view. Participants appear to have developed a better understanding of their costs relating to Openreach provisioning failures since the 2016 BCMR. There also appears to be a measure of agreement on the level of some types of cost.
- 15.272 Postponing further consideration of the SLGs until the next market review in 2021, as some respondents have suggested, risks losing the progress that has been made. We think this would be a pity given the amount of time and effort expended by all parties to the negotiations. Moreover, it is unclear whether operational experience of the new Ethernet processes would shed further light on the costs incurred by telecoms providers because of Openreach's provisioning failures.
- 15.273 We anticipate that Openreach may initiate a further round of industry negotiations concerning SLAs/SLGs, either in the context of negotiations about its re-imagining Ethernet proposals or separately.
- 15.274 We suggest that these negotiations should be facilitated by the OTA2 in accordance with the SLA/SLG negotiation principles, and that they should focus on the three key areas of difference in light of our guidance. Given the narrower focus, we would hope that the negotiations would not require the full six months specified in the principles.
- 15.275 If these further negotiations are again unsuccessful and are referred to us by the OTA2, we would consider how best to proceed in accordance with the negotiation principles and our guidance.
- 15.276 We consider that it would be desirable for any further negotiations to take place soon, so that the revised SLGs could be in place ahead of the next market review period commencing in 2021. In this regard, while we hope the further negotiations will be successful, we note this may not be the case and hence they could be referred to us by the OTA2. In this event, we would need time to consider those matters, and to consult on any changes to the SLGs that we may consider appropriate. Such a process would take at least

six months and would need to be concluded in advance of the next market review period. It would therefore be desirable for any further negotiations to be concluded in 2019/2020.

Impact of QoS standards on Openreach resources

Our proposals

- 15.277 In our 2018 BCMR Consultation, we stated that as we proposed a cap at current prices on Ethernet services, we believed there was no direct impact from our QoS proposals on the charge control.
- 15.278 We also stated that as the changes we were proposing to the QoS standards were limited, we believed Openreach could deliver them without significant additional costs.

Stakeholder comments

- 15.279 Stakeholders commented on the impact of our approach to the QoS standards and the implications for the charge control. Openreach commented that easier, cheaper measures to improve quality of service have already been implemented, and that further step changes in performance are not possible without significant extra costs.¹⁴²²
- 15.280 The CWU stated quality of service performance can improve, but it will depend on the ability of Openreach to fund these improvements. The CWU argued that Openreach needs to be given the chance to invest in its workforce to deliver these improvements, and Ofcom needs to reflect this through its charge control.¹⁴²³
- 15.281 UKCTA argued that an adjustment is required to the charge control to reflect what it believed were looser QoS standards, and removing standards from some markets – or Ofcom should keep the QoS standards and QoS regime the same (including SLGs).¹⁴²⁴

Our reasoning and decisions

- 15.282 Our changes to the QoS standards are relatively limited, and therefore our position remains that it is likely that Openreach can deliver them without incurring significant additional costs.
- 15.283 As discussed in section 10, we have decided to maintain our charge control proposal of a cap at current prices on active services in BT Only and BT+1 areas of the CI Access services market, and in the CI Inter-exchange connectivity market at non-competitive BT exchanges. The design of the charge control therefore leaves some room for BT to accommodate any limited increase in costs to meet our QoS standards that may materialise in this market review period.

¹⁴²² Openreach's response to the 2018 BCMR Consultation (quality of service), paragraphs 271-274.

¹⁴²³ CWU's response to the 2018 BCMR Consultation, pages 2-3.

¹⁴²⁴ UKCTA response to the 2018 BCMR Consultation, page 49.

Legal tests

- 15.284 Here, we set out why we consider that the SMP condition we set, and the directions we make in connection with it, satisfy the tests set out in the Act, and are in accordance with our legal duties. In particular, we set out why we consider:
- the SMP condition in relation to QoS standards and KPI reporting is authorised under section 87 of the Act;
 - the SMP condition fulfils the tests in section 47 of the Act;
 - the directions we are making under the SMP condition fulfils the test in section 49 of the Act;
 - both the SMP conditions and directions have been formulated in compliance with our relevant statutory duties, particularly those under sections 3 and 4 of the Act; and
 - both the SMP conditions and directions take utmost account of the EC Recommendations and the BEREC Common Position.

SMP condition

- 15.285 Section 87(3) of the Act authorises the setting of SMP conditions in relation to the provision of network access. Section 87(5) of the Act provides that such conditions may include provision for securing fairness and reasonableness in the way in which requests for network access are made and responded to, and for securing that the obligations contained in the conditions are complied with within the periods and at the times required by or under the conditions.
- 15.286 In this regard, we note that Article 12(1) of the Access Directive provides that national regulatory authorities may attach to conditions relating to network access obligations covering fairness, reasonableness and timeliness. Section 87(6)(b) of the Act also specifically authorises the setting of SMP conditions which require a dominant provider to publish, in such a manner as Ofcom may direct, all such information for the purposes of securing transparency.
- 15.287 We consider that the SMP condition will enable Ofcom to secure that network access is provided within a reasonable period and on a fair and reasonable basis.
- 15.288 We have taken into account the factors set out in section 87(4) of the Act. In particular, we consider that the imposition of a condition enabling Ofcom to set QoS standards is necessary to ensure an appropriate level of quality of service so as to secure effective competition, including economically efficient infrastructure-based competition, in the long term. The condition will also ensure that there can be an appropriate level of transparency in relation to quality of service, by requiring BT to publish such information as to the quality of its services as Ofcom may from time to time direct.
- 15.289 Section 47(2) requires conditions to be objectively justifiable, non-discriminatory, proportionate and transparent. In our view, the SMP condition is:
- Objectively justifiable. The purpose of the regulation is to ensure mandatory QoS standards in relation to some key services supporting network access, and to allow

Ofcom and the industry to monitor BT's QoS via published KPIs. In the absence of other effective incentive mechanisms, we consider regulation is necessary to secure an appropriate level of service by BT, and our regulation addresses this.

- Not unduly discriminatory. It will only apply to BT because we have identified it as the only telecoms provider having SMP in the relevant markets in the UK, excluding the CLA and the Hull Area.
- Proportionate. Having identified the need for regulation of BT's quality of service and for information to be made available about performance, we consider our condition to be the least onerous means of achieving the desired objective.
- Transparent. The clear intention of the SMP condition is to ensure that BT maintains a level of quality of service, and does not discriminate unduly, in relation to key factors of importance to customers.

15.290 We have considered our duties under section 3 of the Act. We consider that, by ensuring that BT adheres to prescribed QoS standards and transparency requirements, our condition will further the interests of citizens in relation to communications matters and further the interests of consumers in relevant markets by promoting competition.

15.291 We have considered the Community requirements set out in section 4 of the Act. We consider that these conditions will promote competition in relation to the provision of electronic communications networks and encourage the provision of network access for the purposes of securing efficient and sustainable competition in the markets for electronic communications networks and services.

Directions

15.292 We also consider that the directions meet the criteria in section 49(2) of the Act. In our view, the directions are:

- Objectively justifiable. They aim to ensure that BT provides adequate levels of QoS in relation to services in markets where BT has SMP and where we have identified a risk that QoS standards are not being maintained in the absence of regulations. For the reasons set out in this document, we consider the particular standards in the direction cover the appropriate services and are at an appropriate level in light of that aim. In relation to KPIs, transparency allows us and industry more broadly to discern any trends in performance that may require intervention, and any potential discrimination.
- Not unduly discriminatory. The directions will only apply to BT because we have identified it as the only telecoms provider having SMP in the relevant markets in the UK, excluding the CLA and the Hull Area.
- Proportionate. The directions target only those areas for which regulation is required. We consider that the directions are a proportionate means of achieving the objective of ensuring an appropriate level of service, taking into account our assessment of BT's operational capabilities, the challenges that exist in securing further improvements, and potential costs to customers and telecoms providers. In addition, they make appropriate allowance for the fact that not all provisioning

delays will be caused by issues within BT's control. In relation to transparency, we have considered whether all KPIs are required and have removed or modified some to ensure the regulatory burden imposed is no greater than is proportionate to the issues identified.

- Transparent. The clear intention of the directions is to ensure that BT maintains an appropriate level of quality of service (and transparency regarding the same) in relation to matters of importance to customers. In addition, our directions are clear in setting out the QoS standards and KPIs that we are imposing.

15.293 We consider that the directions meet our duties in the Act, including our general duties under section 3 and all the Community requirements set out in section 4 of the Act. In particular, the directions are aimed at promoting competition and securing efficient and sustainable competition for the maximum benefit of consumers by ensuring that BT provides an improved level of performance in key areas of importance to its customers. In relation to KPIs, the directions provide visibility to customers about BT's performance in services in the markets covered by the BCMR, upon which they in many cases rely.

The BEREC Common Position and EC Recommendation on non-disclosure obligations

15.294 In relation to the BEREC Common Position,¹⁴²⁵ we note in particular that it identifies, among other things, as best practice that national regulatory authorities should require SMP operators to provide a reasonable defined level of service (BP22) to address the concern that access services may not be of reasonable quality and service levels may not be comparable with those provided by the SMP operators to their own downstream businesses. We also note the objective of transparency (BP16 and 17) and reasonable quality of access product (BP24). In particular, we note that BP17 states that national regulatory authorities should require SMP operators to make certain information including KPIs publicly available and BP24 supports the imposition of KPIs as a means of monitoring SMP operators' compliance with non-discrimination obligations. We have taken utmost account of the BEREC Common Position, and particularly have reflected the aforementioned elements.

¹⁴²⁵ Revised BEREC Common Position on best practices in remedies as a consequence of a SMP position in the relevant markets for wholesale leased lines.

16. Remedies in the Hull Area

16.1 This section outlines our conclusions on what remedies are appropriate in the market for wholesale CI Access services at all bandwidths in the Hull Area, in which we have identified KCOM as having SMP (as discussed in Section 9).

16.2 In light of our finding that KCOM has SMP in the wholesale CI Access market in the Hull Area, we are concerned that, in the absence of appropriate *ex ante* regulation:

- KCOM would have the incentive and ability to refuse to provide access to its network or not provide access on terms that would secure efficient investment and innovation, both in the relevant wholesale market and the related downstream retail markets;
- KCOM would have the incentive and ability to favour its downstream retail businesses to the detriment of its competitors in the relevant retail markets, including by price and non-price discrimination; and
- KCOM would have the incentive and ability to fix and maintain some or all of its CI Access prices at an excessively high level or engage in a price squeeze.

16.3 In our consultation, we explained that in response to a provisional finding that KCOM held SMP in the market for wholesale CI Access services at all bandwidths in the Hull Area it was appropriate to propose the following remedies:

- Requirement to provide network access on reasonable request and on fair and reasonable charges, terms and conditions.
- Requirement not to discriminate unduly.
- Requirement to publish a Reference Offer (RO), including charges, terms and conditions.
- Requirement to notify changes to charges, terms and conditions.
- Requirement to notify changes to technical information.
- Requirement to produce a Pricing Transparency Report (PTR).
- Cost accounting.
- Accounting separation.

16.4 We received three responses that commented on our proposed remedies in the Hull Area. KCOM broadly welcomed the proposed remedies and provided some detailed comments which we set out below. [redacted] also broadly welcomed the remedies.¹⁴²⁶ [redacted] welcomed specific aspects of the proposed financial reporting requirements.¹⁴²⁷

16.5 Having considered stakeholders' comments, we have decided to impose the remedies as proposed in our consultation. They are substantially the same as those that currently apply to these services, with the following additions:

- a requirement for additional information in KCOM's wholesale PTR to enable us to match KCOM's prices with the specific prices set out in its RO; and

¹⁴²⁶ [redacted].

¹⁴²⁷ [redacted].

- introduction of a remedy for cost accounting.

16.6 For each remedy, we set out below our consultation proposals, a summary of the key stakeholder responses, and our reasoning and decisions.

16.7 KCOM is currently also subject to remedies in the retail market for CI leased lines in the Hull Area, and in the wholesale and retail markets for low bandwidth TI leased lines in the Hull Area. As we explain in Section 9, we consider that these markets are no longer susceptible to *ex ante* regulation and have therefore removed all remedies in these markets.

Requirement to provide network access on reasonable request

Our proposals

16.8 KCOM is currently required to provide network access on reasonable request and to provide such access as soon as it is reasonably practicable. KCOM must provide this network access on fair and reasonable terms, conditions and charges, or on such other terms, conditions and charges that we may from time to time direct. KCOM is also required to comply with any directions we may make from time to time under the condition. We proposed that this requirement continue.

Stakeholder responses

16.9 KCOM agreed with our proposal.¹⁴²⁸ No other stakeholder commented on this proposed remedy.

Our reasoning and decisions

16.10 As our market analysis set out in Section 9 shows, we do not consider that telecoms providers other than KCOM have the ability or incentive to duplicate KCOM's network infrastructure in the Hull Area. The costs of developing such an extensive network infrastructure would be very significant, and with KCOM already having developed its extensive infrastructure and largely sunk the costs of doing so, it is unlikely that other telecoms providers would be able to recover their investment costs. This is a significant barrier to entry.

16.11 In our view, an obligation requiring KCOM to make access to its network available to other telecoms providers on reasonable request is fundamental to promoting competition in downstream markets. We consider that, in the absence of such a requirement, KCOM would have both the incentive and ability to refuse access at the wholesale level, thereby favouring its own retail operations. This would hinder sustainable competition in the corresponding downstream markets, ultimately against the end-user's interests.

¹⁴²⁸ KCOM's response to the 2018 BCMR Consultation, paragraph 3.23

- 16.12 We have decided to reimpose on KCOM an SMP condition requiring it to provide network access on fair and reasonable terms and conditions where a third party reasonably requests it. We consider that the general network access obligation should be supported by an obligation to provide such network access on fair and reasonable terms and conditions.
- 16.13 As in the 2016 BCMR, we consider that this general network access obligation should be supported by an obligation to provide such network access on fair and reasonable charges. We consider that this obligation is needed to address effectively the risk that KCOM may seek to impose a margin squeeze. As in other markets, in assessing this obligation we propose adopting an approach to the evaluation of costs and margins consistent with the margin squeeze test under *ex post* competition law. We also consider that a fair and reasonable pricing obligation would serve the purpose of providing appropriate protection for other telecoms providers against excessive pricing by KCOM.
- 16.14 In assessing this obligation in relation to concerns about excessively high prices, we would consider the alignment of KCOM's charges with Openreach's, taking into account legitimate cost differences arising from KCOM's more limited scale. Our fair and reasonable charging obligation will be supported by the PTR and cost accounting conditions that enable us to see what KCOM was actually charging and how that relates to its costs.
- 16.15 The condition includes the power for us to make directions in order that we can secure the supply of services and, where appropriate, fairness and reasonableness in the terms, conditions and charges for providing third parties with network access. It also includes a requirement for KCOM to comply with any such direction, so any contravention of a direction would constitute a contravention of the condition itself and would therefore be subject to enforcement action under sections 94-104 of the Act.
- 16.16 Interconnection and accommodation services fall within the scope of the network access obligations that we are imposing on KCOM.¹⁴²⁹ KCOM is therefore required to meet reasonable requests for interconnection and accommodation services in relation to services in the wholesale CI Access market.
- 16.17 We do not consider that any requirement for specific forms of network access is warranted. We consider that opportunities for competition are currently best met by continuing to rely on a general obligation for KCOM to provide network access on reasonable request, which allows telecoms providers to request wholesale products (and associated interconnection and accommodation facilities) as and when required. This obligation allows KCOM to recover the efficiently incurred costs associated with any new product requested.

¹⁴²⁹ Network access is defined in section 151(3) and (4) of the Act and includes interconnection services or facilities that would enable other telecoms providers to provide electronic communications services or electronic communications networks. We consider that a requirement to provide network access would, therefore, include any ancillary services as may be reasonably necessary for a third party to use the services.

16.18 We are not imposing any passive remedy for network access in the Hull Area, as we do not consider that there is sufficient demand for passive remedies or wholesale services more generally in the Hull Area to warrant such an intervention. We note comments made by KCOM in their response that the ATI Regulations are currently silent on aspects of specific customers (e.g. residential versus business customers), types of products etc.¹⁴³⁰ We will consider this as part of the wider combined review of business and residential markets we plan to conclude by 2021.

The BEREK Common Position

16.19 We have taken utmost account of the BEREK Common Position, including BP5 and BP36 which appear to us to be particularly relevant in this case. We consider that our decision is consistent with the best practice set out in the BEREK Common Position.

Conclusion

16.20 In order to implement these decisions, we set SMP Condition 1.¹⁴³¹ Section 87(1) of the Communications Act 2003 (the Act), provides that, where we have made a determination that a person (here BT) has SMP in an identified services market, we shall set such SMP conditions authorised by that section as we consider appropriate to apply to that dominant provider in respect of the relevant network or relevant facilities and apply those conditions to that person.

16.21 Section 87(3) of the Act authorises us to set SMP services conditions requiring the dominant provider to provide network access as we may from time to time direct. These conditions may, pursuant to section 87(5), include provision for securing fairness and reasonableness in the way in which requests for network access are made and responded to, and for securing that the obligations in the conditions are complied with within periods and at times required by or under the conditions. Section 87(9) of the Act also authorises SMP services conditions imposing on the dominant provider price controls in relation to matters connected with the provision of network access, subject to the conditions of section 88 being satisfied.

16.22 In determining which conditions are authorised by Section 87(3), we must take into account, in particular, the factors set out in section 87(4). In reaching our decision that KCOM should be subject to a requirement to provide network access on reasonable request, we have taken all these six factors into account.

16.23 In particular, having considered the economic viability of building access networks to achieve ubiquitous coverage that would make the provision of network access unnecessary, we consider that the SMP condition is required to secure effective competition, including economically efficient infrastructure-based competition, in the long term in the wholesale CI Access market.

¹⁴³⁰ KCOM's response to the 2018 BCMR Consultation, Paragraph 3.22

¹⁴³¹ Annex 26, Schedule 4, Part 3.

- 16.24 The requirement for KCOM to meet only reasonable network access requests also ensures that due account is taken of the feasibility of providing the network access, and of the investment made by KCOM initially in providing the network. For this reason, we consider that the requirement is proportionate.

No undue discrimination

Our proposals

- 16.25 KCOM is currently prohibited from discriminating unduly in relation to the provision of network access. We proposed that this requirement should continue.

Stakeholder responses

- 16.26 Only KCOM responded on this particular issue and agreed with the proposed regulation.¹⁴³²

Our reasoning and decisions

- 16.27 We have re-imposed an SMP condition prohibiting undue discrimination.
- 16.28 A non-discrimination obligation is intended as a complementary remedy to the network access obligation, principally to prevent the dominant provider from discriminating in favour of its own downstream divisions and to ensure that competing telecoms providers are placed in an equivalent position. Without such an obligation, the dominant provider is incentivised to provide the requested wholesale network access service on terms and conditions that discriminate in favour of its own downstream divisions. For example, KCOM may decide to charge its competing providers more than the amount charged to its own downstream units or it might provide the same services but within different delivery timescales. Both these behaviours could have an adverse effect on competition.
- 16.29 Non-discrimination can have different forms of implementation. A strict form of non-discrimination – i.e. a complete prohibition of discrimination – would result in the SMP operator providing exactly the same products and services to all telecoms providers (including its own downstream divisions) on the same timescales, terms and conditions (including price and service levels), by means of the same systems and processes and by providing the same information. Essentially, the inputs available to all telecoms providers (including the SMP providers' own downstream divisions) would be provided on a truly equivalent basis, an arrangement which has become known as 'Equivalence of Inputs,' or EOI. An EOI requirement removes any degree of discretion accorded to the nature of the conduct.
- 16.30 A less strict implementation of non-discrimination – a no undue discrimination obligation – may allow for flexibility and result in a more practical and cost-effective implementation of wholesale inputs, in cases where it is economically justified. As part of this review, we have

¹⁴³² KCOM's response to the 2018 BCMR Consultation, paragraph 3.25

considered what form of non-discrimination obligation would be appropriate in the wholesale CI Access market in the Hull Area.

- 16.31 As in the 2016 BCMR, we consider that imposing an EOI requirement on KCOM would be disproportionate and unjustified in respect of the scale and competitive conditions in the wholesale CI Access market in the Hull Area. In particular, we note that there has been substantial entry by other telecoms providers and that KCOM's market share has fallen since the 2016 BCMR. We have therefore decided to re-impose an SMP condition prohibiting undue discrimination for the next BCMR period. This will ensure that there is appropriate non-discrimination protection to remedy the incentive and ability for KCOM to engage in discriminatory pricing and/or non-pricing practices.

The BEREC Common Position

- 16.32 We have taken utmost account of the BEREC Common Position in formulating our decision, including BP8, BP10 and BP10a which appear to us to be particularly relevant in this context. We consider that our decision is consistent with the best practice set out in the BEREC Common Position.

Conclusion

- 16.33 In order to implement this decision we have decided to set SMP Condition 2.¹⁴³³ Section 87(6)(a) of the Act authorises the setting of an SMP services condition requiring the dominant provider not to discriminate unduly against particular persons, or against a particular description of persons, in relation to matters connected with the provision of network access.
- 16.34 We consider that the requirement we have decided to set is proportionate because it only seeks to prevent *undue* discrimination.

Transparency

- 16.35 KCOM is currently subject to a set of obligations designed to promote transparency, reduce the risk of undue discrimination and ensure that telecoms providers are able to make effective use of its network access. These obligations are:
- Requirement to publish a Reference Offer.
 - Requirement to notify of changes to charges, terms and conditions in advance.
 - Requirement to notify of changes to technical information in advance.
- 16.36 In addition, KCOM is required to produce a Price Transparency Report (PTR) on an annual basis. We consider that in combination with other remedies this is sufficient to address our concern that, in the absence of appropriate *ex ante* regulation, KCOM would have the

¹⁴³³ Annex 26, Schedule 4, Part 3.

incentive and ability to fix and maintain some or all of its CI Access prices at an excessively high level or engage in a margin squeeze.

16.37 In the following sections, we set out our decision to impose the set of transparency remedies we proposed in our consultation.

Publication of a Reference Offer

Our proposals

16.38 KCOM is currently required to publish a Reference Offer (RO) for wholesale network access products.¹⁴³⁴ The RO must set out a number of matters at a minimum, including the terms and conditions for provisioning, technical information, service level agreements and service level guarantees, and availability of co-location. We proposed that this requirement continue.

Stakeholder responses

16.39 Only KCOM responded on this particular issue and agreed with the proposed regulation.¹⁴³⁵

Our reasoning and decisions

16.40 We have decided that KCOM should continue to be required to publish a RO for network access products in the wholesale CI Access market in the Hull Area.

16.41 In KCOM's case, a requirement to publish a RO has three main purposes:

- to assist transparency for the monitoring of potential anti-competitive behaviour;
- to give visibility to the terms and conditions on which other telecoms providers purchase wholesale services; and
- to enable the monitoring of wholesale charges, which forms part of our proposed approach to price controls in this market.

16.42 The publication of a RO helps to ensure stability in markets as, without it, incentives to invest might be undermined and market entry less likely. It allows for potentially quicker negotiations, avoid possible disputes and give confidence to those purchasing wholesale services that they are being provided on non-discriminatory terms. Without this, market entry might be deterred to the detriment of the long-term development of competition and hence customers. Moreover, in conjunction with the non-discrimination obligation, the effect of this obligation is to prevent KCOM from:

- bundling leased lines together with other non-SMP products or services i.e. making the sale of a retail leased lines conditional on the sale of another product or service, including as part of a package incorporating another product or service; and

¹⁴³⁴ In the 2016 BCMR we introduced a requirement that KCOM must publish its ROs on publicly available websites, i.e. those that do not require password access, to ensure full transparency for us and other telecoms providers.

¹⁴³⁵ KCOM's response to the 2018 BCMR Consultation, paragraph 3.27

- offering bespoke charges to secure business contracts against competition from other telecoms providers. KCOM is still permitted to offer discounts, but the terms of any such discounts have to be published in the RO and available to all customers.
- 16.43 We consider that the requirement to publish ROs imposed on KCOM in previous market reviews has been largely effective in meeting the aims of regulation detailed above. Therefore, we have decided that KCOM should continue to be required to publish a RO for network access products in the wholesale CI Access market in the Hull Area. We consider this requirement is proportionate because it requires KCOM to publish only information that we consider to be necessary to allow telecoms providers to make informed decisions about competing in downstream markets.
- 16.44 The condition requires the publication of a RO and specifies the information to be included in that RO (set out below) and how the RO should be published. The published RO must set out a number of matters at a minimum, including:
- a description of the services on offer, including technical characteristics and operational processes for service establishment, ordering and repair;
 - the locations of points of network access and the technical standards for network access;
 - conditions for access to ancillary and supplementary services associated with the network access, including operational support systems and databases, etc.;
 - contractual terms and conditions, including dispute resolution and contract negotiation/renegotiation arrangements;
 - charges, terms and payment procedures;
 - service level agreements and service level guarantees; and
 - to the extent that KCOM uses the service in a different manner to telecoms providers or uses similar services, KCOM is required to publish a RO in relation to those services.
- 16.45 We consider that imposing a requirement on KCOM to publish a RO is necessary to address our competition concerns in the wholesale CI Access market where we provisionally find KCOM to hold SMP. This remedy complements our proposals to impose network access and non-discrimination requirements on KCOM to address the competition concerns arising from its SMP in this market.
- 16.46 Furthermore, we consider that there is a risk that KCOM may set excessive prices for wholesale CI Access leased lines in the Hull Area. To mitigate this risk, we continue to consider that KCOM should be prohibited from departing from the charges, terms and conditions set out in its RO. This will better enable us to monitor KCOM's charges more effectively and benchmark them against Openreach's, as discussed elsewhere in this Section.
- 16.47 Lastly, we have decided that KCOM should be required to comply with any directions we may make from time to time under the condition.

The BEREK Common Position

16.48 In formulating these proposals, we have also taken utmost account of the BEREK Common Position, including BP16, BP22 and BP23 which appear to us to be particularly relevant in this context. We consider that our decisions are consistent with the best practice set out in the BEREK Common Position.

Conclusion

- 16.49 To implement this decision, we will set SMP Condition 3.¹⁴³⁶ Section 87(6)(c) of the Act authorises the setting of SMP services conditions requiring the dominant provider to publish, in such a manner as we may direct, the terms and conditions on which it is willing to enter into an access contract. Section 87(6)(d) also permits the setting of SMP services conditions requiring the dominant provider to include specified terms and conditions in the RO. Finally, section 87(6)(e) permits the setting of SMP services conditions requiring the dominant provider to make such modifications to the RO as may be directed from time to time.
- 16.50 Article 9(4) of the Access Directive requires that where network access obligations are imposed, national regulatory authorities shall ensure the publication of a RO containing at least the elements set out in Annex II to that Directive. We are satisfied that this requirement is met.

Requirement to produce a Pricing Transparency Report

Our proposals

- 16.51 KCOM is currently required to provide a Pricing Transparency Report (PTR) to us on an annual basis. We proposed that this requirement should continue.
- 16.52 Our analysis of KCOM's 2017 and 2018 PTRs suggested that there are a number of other pieces of information that are necessary in order for us to match each connection to a service included in KCOM's price list, and therefore to ascertain whether KCOM is charging in line with its RO charge. We therefore proposed to insert into the current condition an additional clause that requires KCOM to set out "such characteristics of each connection as required to fully determine the connection charge and annual rental charge from the KCOM price list."

Stakeholder responses

- 16.53 While KCOM agreed that while requiring an annual PTR was proportionate, it suggested there may be some challenges with the proposed changes.
- 16.54 [X] noted in its response that KCOM's wholesale prices appear to be higher than Openreach's equivalent product.

¹⁴³⁶ Annex 26, Schedule 4, Part 3.

Our reasoning and decisions

- 16.55 We remain concerned that, in the absence of appropriate *ex ante* regulation, KCOM would have the incentive and ability to fix and maintain some or all of its wholesale prices at an excessively high level or engage in a margin squeeze.
- 16.56 We have a variety of options available to address this concern, including charge controls. However, while in principle a charge control may be effective in controlling KCOM’s charges, our regulation must be proportionate, meaning we must impose the minimum necessary remedy to achieve our aim. We consider that in this case a charge control would be disproportionate to the aim of preventing excessive charges, particularly given the relatively small size of the Hull Area and the significant costs to us and KCOM that would arise in formulating a charge control.
- 16.57 In the 2016 BCMR, we decided that a proportionate approach would be to impose an obligation for KCOM to ensure that its charges are fair and reasonable and to monitor KCOM’s wholesale charges against suitable benchmarks. We said Openreach’s wholesale charges could be an appropriate benchmark.¹⁴³⁷
- 16.58 We considered that for this approach to be fully effective it was important that there was transparency about KCOM’s wholesale charges. We therefore removed KCOM’s flexibility to offer unpublished bespoke discounts by requiring it to publish its wholesale charges in its Reference Offer (RO) and not to depart from them¹⁴³⁸, and introduced a requirement that KCOM provide us with an annual Pricing Transparency Report (PTR) that details the charges it makes to its customers for the connection and annual rental of the leased line services supplied during the previous twelve months.¹⁴³⁹
- 16.59 We have decided to reimpose the condition on KCOM to produce a PTR to be sent to us on an annual basis.
- 16.60 The condition requires KCOM to include in the PTR the following information separately for each wholesale connection:
- a specification of each of the service type, interface, bandwidth and circuit orientation;
 - the amount of the connection charge;
 - the date on which the rental charge was agreed;
 - any fixed or minimum term agreed by the dominant provider and a third party in respect of the rental charge; and
 - the amount and the frequency of the rental charge.
- 16.61 As noted in the 2018 BCMR Consultation, our analysis of the wholesale charges for CI Services contained within the 2018 PTR indicates that for those services where a

¹⁴³⁷ The current requirement also applies to KCOM’s retail prices. As discussed in Section 9 we propose that KCOM no longer has SMP at the retail level.

¹⁴³⁸ Discussed further above.

¹⁴³⁹ Discussed further below.

comparison was possible, the majority of the services were consistent with KCOM's Reference Offer.¹⁴⁴⁰

16.62 However, our analysis of KCOM's 2017 and 2018 PTRs suggests that there are a number of other pieces of information that are necessary in order for us to match each connection to a service included in KCOM's price list, and therefore to ascertain whether KCOM is charging in line with its RO charges. These include:

- whether a circuit connects two customer sites or connects one customer site to a provider point of presence (POP) in the local exchange only;
- whether there is "No existing network connectivity" or "Existing Network Connectivity;"¹⁴⁴¹
- whether connections are subject to excess construction charges; and
- where a connection spans two different exchanges, which pair of exchanges are included in the connection.

16.63 We therefore proposed to insert into the current condition an additional clause that requires KCOM to set out "such characteristics of each connection as required to fully determine the connection charge and annual rental charge from the KCOM price list."

16.64 KCOM suggested in its response that there may be challenges in providing some of the additional information we had suggested would be necessary for a complete analysis of its pricing, e.g. discerning the nature of some of the connections if the end outside of the Hull area.

16.65 We are making the proposed amendment to the condition. We note KCOM's suggestion that not all of the information we have proposed may be available; and we will continue to discuss with KCOM what data will be useful to inform our analysis, and what is reasonable to provide from KCOM's perspective. However, the revised condition should provide more flexibility to focus on information that we agree with KCOM is pertinent to our analysis.

16.66 We consider the condition is proportionate because it is targeted at providing pricing transparency as a safeguard against excessive pricing and ensuring KCOM's compliance with its other SMP obligations; and is significantly less onerous than imposing a charge control, which (as discussed above) is an alternative mechanism for addressing our pricing concerns.

16.67 In response to [X]s comment, we discuss in Section 9 the differences between KCOM's and Openreach's pricing. These differences can reflect the potential for KCOM and Openreach to adopt different pricing structures for their wholesale leased lines services, reflecting differing approaches to recovering their costs (for example, the balance between connection and rental charges). However, we consider that, notwithstanding these differences, a meaningful price comparison can be produced.

¹⁴⁴⁰ 95% of the connection charges and 85% of the annual rental were within the range of KCOM RO prices, although we note that some of the connection charges and associated rentals used to derive these percentages were set before KCOM was subject to an obligation not to depart from RO charges.

¹⁴⁴¹ These are terms used in KCOM's 2018 PTR which we intend to clarify with KCOM.

The BERC Common Position

16.68 We consider that the condition is consistent with the BERC Common Position, including the remedies falling under objectives BP16 and BP17.

Conclusion

16.69 We have decided to implement our decision by imposing SMP Condition 6.¹⁴⁴² Section 87(6)(b) of the Act authorises the setting of SMP services conditions requiring the dominant provider to publish information for the purpose of securing transparency in relation to matters connected with network access to the relevant network.

Notification of changes to charges, terms and conditions

Our proposals

16.70 KCOM is currently required to give advance notice before making changes to its charges or terms and conditions for the provision of existing or new network access. We proposed that this requirement should continue with two amendments to align with the requirements in the 2018 WLA and WBA market reviews with respect to the Hull Area:

- to reduce the notice period applicable to other changes to prices, terms and conditions for existing network access from 90 days to 56 days (explained further below);
- to require KCOM to give 28 days' notice in relation to price changes relating to the end of a temporary price reduction.

Stakeholder responses

16.71 Only KCOM responded on this particular issue and agreed with the proposed regulation.¹⁴⁴³

Our reasoning and decisions

16.72 We have decided to impose the condition consulted upon (subject to the minor amendment discussed below).

16.73 Notification of changes to charges at the wholesale level has the joint purpose of assisting transparency for the monitoring of potential anti-competitive behaviour and giving advance warning of charge changes to competing telecoms providers who buy wholesale access services. The latter purpose ensures that competing telecoms providers have sufficient time to plan for such changes, as they may want to restructure the charges of their downstream offerings in response to charge changes at the wholesale level. Notification of changes therefore helps to ensure stability in markets, without which incentives to invest might be undermined and market entry made more difficult.

¹⁴⁴² Annex 26, Schedule 4, Part 3.

¹⁴⁴³ KCOM's response to the 2018 BCMR Consultation, paragraph 3.27.

- 16.74 There may be some disadvantages to advance notification, particularly in markets where there is some competition. It can lead to a ‘chilling’ effect where other telecoms providers follow KCOM’s charges rather than act dynamically to set competitive charges. We do not consider, on balance, that this consideration undermines the rationale for imposing a notification of charges condition.
- 16.75 In wholesale leased lines markets where competitors rely on the provision of wholesale access products and services to enable them to compete in downstream markets, we consider that the advantages of notifying charges are likely to outweigh any potential disadvantages.
- 16.76 It may also be appropriate to require the notification of changes to terms and conditions to allow competing telecoms providers sufficient time to plan for them. Again, this assists in providing stability in markets, without which incentives to invest might be undermined and market entry made more difficult.
- 16.77 This remedy complements the network access and non-discrimination requirements on dominant providers to address the competition concerns arising from a position of SMP in wholesale leased lines markets.
- 16.78 We have decided to slightly amend KCOM’s existing obligations to notify changes to its charges, terms and conditions. We will maintain the following notification periods:
- 28 days’ notice for charges, terms and conditions relating to new service introductions; and
 - 28 days’ notice for price reductions relating to existing network access.
- 16.79 However, we have made two amendments to align with the requirements in the 2018 WLA and WBA market reviews with respect to the Hull Area¹⁴⁴⁴:
- We have reduced the notice period applicable to other changes to prices, terms and conditions for existing network access from 90 days to 56 days. In the 2018 WLA Market Review we decided to decrease the notice period for KCOM in the WLA market from 90 days to 56 days.¹⁴⁴⁵ We noted that the market in the Hull Area is much smaller than that in the rest of the UK, and the size and complexity of BT’s and its competitors’ networks are greater than KCOM’s. In light of these factors we considered that 56 days was an appropriate notice period. We believe the same considerations apply here, and have reduced the notice period accordingly.
 - KCOM is now required to give 28 days’ notice in relation to price changes relating to the end of a temporary price reduction.¹⁴⁴⁶

¹⁴⁴⁴ Ofcom, 2018. *Wholesale Local Access and Wholesale Broadband Access Market Reviews: Review of competition in the Hull Area*, paragraphs 4.172-4.182. https://www.ofcom.org.uk/data/assets/pdf_file/0027/116991/statement-wba-competition-hull.pdf [accessed 30 October 2018].

¹⁴⁴⁵ In WBA we increased the period from 28 days to 56 days.

¹⁴⁴⁶ A temporary price means a price reduction for a particular product or service, applicable to all customers on a non-discriminatory basis, which is stated to apply for a limited and predefined period and where the price immediately on expiry of that period is no higher than the price immediately before the start of that period, i.e. a special offer. A 28-day notice period also applies to any increase in prices that may occur at the end of a special offer (where the price

16.80 In retaining these notification periods, we have considered the following relevant factors:

- wholesale leased line services support multiple downstream services. This means that telecoms providers will need to assess the impact of any changes downstream. Typically, this might involve modelling the impact of the new charges on the cost of providing downstream services, securing internal approval for a pricing revision and notifying customers (which may be subject to a minimum notice period);
- too short a notification period would risk that telecoms providers would have insufficient time to react to changes to wholesale terms and could, for instance, be left financially exposed by changes to wholesale charges. However, as mentioned above, we consider that 56 days provides sufficient notice in the context of the market in the Hull Area; and
- there should be no risk of financial exposure for telecoms providers when charges are reduced, so a 28-day notification period is appropriate.

16.81 Therefore, we consider this condition is proportionate because the required notice periods are necessary for the types of change to which they relate, but no longer.

Minor amendment with regard to the content of an Access Charge Change Notice

16.82 We have decided to make a minor amendment to the condition consulted upon. This relates to the content of an Access Charge Change Notice.

16.83 In the WLA market, the SMP condition governing notifications of changes to charges, terms and conditions requires an Access Charge Change Notice to include the following four matters:

- a) a description of the network access in question;
- b) a reference to the location in the Dominant Provider's current Reference Offer of the terms and conditions associated with the provision of that network access;
- c) the current and proposed new charge and/or current and proposed new terms and conditions (as the case may be); and
- d) the date on which, or the period for which, the WLA Access Change will take effect (effective date).

16.84 The proposed SMP condition in the Passive Infrastructure Market Review consultation (which we have decided to impose) also included these four matters.

16.85 However, the SMP condition we proposed in our BCMR consultation omitted matter (c) in the above list. We have decided to include this requirement in the SMP condition we are imposing because it is important for an Access Charge Change Notice to set out the current and proposed charge, terms and conditions; and in order to align with equivalent requirements in other markets.

immediately following the end of the special offer is no higher than the price immediately before the start of the special offer).

The BEREC Common Position

16.86 We consider that the condition is consistent with the BEREC Common Position, including the remedies falling under objectives BP16 and BP17 (“Transparency”).

Conclusion

16.87 To implement this decision we will set SMP Condition 4.¹⁴⁴⁷ Section 87(6)(b) of the Act authorises the setting of SMP services conditions which require a dominant provider to publish, in such manner as we may direct, all such information for the purpose of securing transparency. Section 87(6)(c) also permits the setting of SMP services conditions requiring the dominant provider to publish the terms and conditions on which he is willing to enter into an access contract.

Notification of changes to technical information

Our proposals

16.88 KCOM is currently required to publish, in advance, changes to technical information.¹⁴⁴⁸ This requires the notification of new technical information within a reasonable time period, but not less than 90 days in advance of providing new wholesale services or amending existing technical terms and conditions. We proposed that this requirement should continue.

Stakeholder responses

16.89 Only KCOM responded on this particular issue and agreed with the proposed regulation that is detailed below.¹⁴⁴⁹

Our reasoning and decisions

16.90 We have decided to continue to require KCOM to notify new technical information within a reasonable time period, not less than 90 days in advance of providing new wholesale services or amending existing technical terms and conditions.

16.91 The aim of this regulation is to ensure that telecoms providers have sufficient time to respond to technical changes that may affect them. For example, a telecoms provider may need to introduce new equipment, or modify existing equipment or systems, to support a new or changed technical interface. Similarly, a telecoms provider may need to make changes to its network to support changes in the points of network access or configuration.

¹⁴⁴⁷ Annex 26, Schedule 4, Part 3.

¹⁴⁴⁸ In the 2016 BCMR we introduced a requirement that KCOM must publish any technical change notice on publicly available websites, i.e. those that do not require password access, to ensure full transparency for us and other telecoms providers.

¹⁴⁴⁹ KCOM’s response to the 2018 BCMR Consultation, paragraph 3.31.

- 16.92 We consider this remedy is important in the wholesale CI Access market to ensure that telecoms providers who compete in downstream markets are able to make effective use of existing or, where applicable, new wholesale services provided by KCOM. Technical information therefore includes new or amended technical characteristics, including information on network configuration, locations of the points of network access and technical standards (including any usage restrictions and other security issues).
- 16.93 We take the view that these requirements continue to be necessary to give telecoms providers sufficient time to prepare for such changes. We therefore continue to require KCOM to notify new technical information within a reasonable time period, but not less than 90 days in advance of providing new wholesale services or amending existing technical terms and conditions.
- 16.94 We consider that 90 days is the minimum time that competing telecoms providers need to modify their network to support a new or changed technical interface, or support a new point of access or network configuration.
- 16.95 The requirement to give notification within a reasonable time period may mean that a period of notification in excess of 90 days may be appropriate in certain circumstances. For example, if KCOM was to make a major change to its technical terms and conditions, a period of more than the 90-day minimum notification period may be necessary to enable competing telecoms providers, who purchase affected wholesale services, sufficient time to prepare and support such changes without disruption and detriment to their businesses and customers.
- 16.96 In the 2018 WLA Statement we noted that the one exception to the 90 day minimum is in relation to amendments to technical specifications that are developed and agreed through NICC Standards Limited.¹⁴⁵⁰ NICC is a technical forum in which telecoms providers (including KCOM) participate. Therefore, telecoms providers are likely to be aware of NICC specifications due to their participation in the forum. We therefore did not consider it necessary to impose a 90-day notice period where BT proposes to adopt an amended NICC specification. However, we considered that BT should provide notification of changes based on the NICC standard. We have decided to mirror this amendment in the CI Access Market in the Hull Area.
- 16.97 We consider that the requirement to notify technical information only requires information that other telecoms providers would need to know and that the notification periods are the minimum required to allow changes to be reflected in downstream offers.

The BEREC Common Position

- 16.98 We consider that the new condition is consistent with the BEREC Common Position, including the remedies falling under objectives BP16 and BP17.

¹⁴⁵⁰ 2018 WLA Statement, paragraph 6.196.

Conclusion

16.99 To give effect to this decision we will set SMP Condition 5.¹⁴⁵¹ Section 87(6)(b) of the Act authorises the setting of SMP services conditions which require a dominant provider to publish, in such manner as we may direct, all such information, for the purpose of securing transparency. Section 87(6)(c) also permits the setting of SMP services conditions requiring the dominant provider to publish the terms and conditions on which he is willing to enter into an access contract.

Regulatory financial reporting

- 16.100 In the 2018 BCMR Consultation, we proposed to impose cost accounting and accounting separation obligations on KCOM in the wholesale CI Access market. This approach differs from the approach taken in the 2016 BCMR, in which we only imposed an accounting separation remedy.
- 16.101 The detailed rationale for applying each of these remedies is set out below but broadly we consider that there is a need for detailed financial information in this market to monitor the effectiveness of our proposed regulatory decisions.
- 16.102 We proposed to implement these obligations by way of a single SMP condition, which would replace the current Regulatory Financial Reporting SMP condition.¹⁴⁵²
- 16.103 The SMP condition includes the power to issue directions. The detail of our regulatory financial reporting requirements is typically set out in a suite of directions issued under the SMP condition. We issued a statement in February 2019 (2019 KCOM Regulatory Financial Reporting Statement) imposing these directions, which apply to KCOM across wholesale markets from 2018/19.¹⁴⁵³
- 16.104 At the time of our BCMR consultation [November 2018 to January 2019], these directions were still being consulted on. We therefore proposed to ‘roll over’ these directions in the form that they would be adopted in the 2019 KCOM Regulatory Financial Reporting Statement future. These directions are now in place and will be ‘rolled over’ in accordance with our consultation proposal.

¹⁴⁵¹ Annex 26, Schedule 4, Part 3.

¹⁴⁵² In previous reviews, we have imposed this condition by amending the notification annexed to the 2004 Regulatory Reporting Statement. We are proposing to revoke that notification (insofar as it applies in relation to the relevant markets) and imposing the regulatory financial reporting obligations through SMP condition 7. This accords with the approach taken in the 2018 Wholesale Local Access and Wholesale Broadband Access Market Reviews: Review of Competition in the Hull Area. For the avoidance of doubt, this does not represent a change to the substance of the relevant SMP condition; it is a structural change to the way in which the regulatory financial reporting obligations are imposed and is aimed at clarifying KCOM’s obligations.

¹⁴⁵³ Ofcom, 2018. *KCOM Regulatory Financial Reporting: Statement on new regulatory financial reporting direction covering all regulated fixed telecoms markets*. https://www.ofcom.org.uk/data/assets/pdf_file/0032/135869/Statement-Regulatory-Financial-Reporting-new-regulatory-financial-reporting-directions-for-KCOM.pdf [accessed 22 May 2019].

Accounting separation

Our proposals

16.105 KCOM is currently subject to accounting separation obligations.¹⁴⁵⁴ We proposed that these requirements should continue to apply.

Stakeholder responses

16.106 KCOM and [§<] both made reference the accounting separation proposal in their respective responses.

16.107 [§<].¹⁴⁵⁵

16.108 KCOM noted the proposal but did not provide further comments.¹⁴⁵⁶

Our reasoning and decisions

16.109 We have decided to reimpose the same accounting separation obligations that are currently imposed on KCOM in the wholesale CI Access market in which we have found KCOM has SMP.

16.110 Paragraph 3 of Point 1 of the 2005 Recommendation states that:

“the purpose of imposing an obligation regarding accounting separation is to provide a higher level of detail of information than that derived from the statutory financial statements of the notified operator, to reflect as closely as possible the performance of parts of the notified operator’s business as if they had operated as separate businesses, and in the case of vertically integrated undertakings, to prevent discrimination in favour of their own activities and to prevent unfair cross-subsidy.”

16.111 We consider that an accounting separation obligation, together with a cost accounting obligation (see below), will help to ensure this objective is met.

16.112 This obligation requires KCOM to report separately for services across the relevant market, and account separately for internal and external sales. This allows us and other telecoms providers to monitor the activities of KCOM to ensure that it does not discriminate unduly in favour of its own downstream businesses. In practice, this obligation requires KCOM to produce financial statements that reflect the performance of the regulated wholesale market as though it were a separate business.

16.113 We consider that these obligations are necessary to monitor KCOM’s activities regarding its non-discrimination obligations. For the next BCMR period, we will therefore reimpose the

¹⁴⁵⁴ These obligations are SMP conditions OB1 to OB27 and OB31 to OB33, but excluding subparagraphs (a) to (c) and (f) of SMP condition OB23, set out in the July 2004 (KCOM) Notification, but as read considering the modifications to that Notification set out in paragraph 26 of the 2016 Notification (as set out at Annex 35 Section 1 of the 2016 BCMR Statement).

¹⁴⁵⁵ [§<].

¹⁴⁵⁶ KCOM’s response to the 2018 BCMR Consultation, paragraph 3.40

same accounting separation obligations that are currently imposed on KCOM in the wholesale CI Access market in which we propose it has SMP. We consider these obligations to be proportionate because they are the least onerous obligation necessary as a mechanism to allow us and third parties to monitor potentially discriminatory behaviour by KCOM.

The BEREC Common Position

16.114 We consider that the condition is consistent with the BEREC Common Position, including the remedies falling under objectives BP30 to BP37.

Conclusion

16.115 We will implement our decision by setting SMP Condition 7.¹⁴⁵⁷ Sections 87(7) and 87(8) of the Act authorise us to impose appropriate accounting separation obligations on the dominant provider in respect of the provision of network access, the use of the relevant network and the availability of relevant facilities. That is to say, the dominant provider may be required to maintain a separation for accounting purposes between such different matters relating to network access or the availability of relevant facilities.

Cost accounting

Our proposals

16.116 We proposed to impose a cost accounting remedy on KCOM in the wholesale CI Access market in the Hull Area.

Stakeholder responses

16.117 KCOM noted the proposal in their consultation response but did not provide further comments.¹⁴⁵⁸

Our reasoning and decisions

16.118 We have decided to impose a cost accounting remedy on KCOM in the wholesale CI Access market in the Hull Area.

16.119 Recital 2 of the 2005 Recommendation states that the purpose of imposing the accounting separation and cost accounting obligations is “to make transactions between operators more transparent and/or to determine the actual costs of services provided.” Also, paragraph 2 of Point 1 of the 2005 Recommendation states that:

“The purpose of imposing an obligation to implement a cost accounting system is to ensure that fair, objective and transparent criteria are followed by notified operators in allocating

¹⁴⁵⁷ Annex 26, Schedule 4, Part 3.

¹⁴⁵⁸ KCOM’s response to the 2018 BCMR Consultation, paragraph 3.39

their costs to services in situations where they are subject to obligations for price controls or cost-oriented prices.”

16.120 The imposition of a cost accounting obligation ensures that KCOM has in place a system of rules that support the attribution of revenues and costs to services within the relevant market. It therefore supports the proposed accounting separation obligation, which requires KCOM to prepare and report financial information relating to individual services, by ensuring that the rules attributing revenues and costs to services within the relevant market are fair, objective and transparent. The cost accounting obligation is an important means of ensuring that:

- we have the necessary information to support the monitoring of the effectiveness of remedies, in particular to ensure that the pricing remedies we propose address the competition problems identified and to enable our timely intervention should such intervention ultimately be needed;
- revenues and costs are attributed across regulated markets (and the individual services within them) in a consistent manner. This mitigates the risk that costs might be unfairly loaded onto particular products or markets;
- publication (i.e. reporting) of cost accounting information aids transparency, providing reasonable confidence to stakeholders about compliance with SMP obligations, allowing stakeholders to monitor compliance and more generally enabling stakeholders to make better informed contributions to the development of the regulatory framework; and
- KCOM records all information necessary for the purposes listed above at the time that relevant transactions occur, on an ongoing basis. Absent such a requirement, there is a strong possibility that the necessary information would not be available when it is required and in the necessary form and manner.

16.121 For these reasons, we will impose a cost accounting remedy on KCOM in the wholesale CI Access market in the Hull Area. We consider that this obligation is necessary to ensure that the processes and rules used by KCOM to attribute revenues and costs to relevant services are fair, objective and transparent. We consider this obligation is proportionate in that we will require only the minimum information necessary to monitor KCOM’s pricing activities.

The BEREK Common Position

16.122 We consider that the condition is consistent with the BEREK Common Position, including the remedies falling under objectives BP30 to BP37.

Conclusion

16.123 We will give effect to this decision by setting SMP Condition 7.¹⁴⁵⁹ Section 87(9)(c) authorises conditions imposing such rules as we may make for the purposes of matters connected with the provision of network access to the relevant network, or with the availability of relevant facilities about the use of cost accounting systems. Such conditions

¹⁴⁵⁹ Annex 26, Schedule 4, Part 3.

include requiring the application of presumptions in the fixing and determination of costs and charges for the purposes of the price controls, rules and obligations imposed by virtue of that subsection (section 87(10)). Where such conditions are imposed, section 87(11) imposes a duty on us to also set an SMP condition which imposes an obligation:

- to make arrangements for a description to be made available to the public of the cost accounting system used in pursuance of that condition; and
- to include in that description details of (i) the main categories under which costs are brought into account for the purposes of that system and (ii) the rules applied for the purposes of that system with respect to the allocation of costs.

16.124 We consider that the new condition fulfils our duty under section 87(11) in that the cost accounting condition requires the publication of a description of the cost accounting system used and the main categories of cost and the cost allocation rules applied.

Legal tests

Section 47 tests

16.125 When imposing SMP obligations, we need to demonstrate that the obligations in question are based on the nature of the problem identified, proportionate and justified in light of the policy objectives as set out in Article 8 of the Framework Directive. For each of the general remedies that we have decided to impose we consider that the conditions we are proposing to impose satisfy the tests set out in section 47 of the Act, namely that the obligation is:

- a) objectively justifiable in relation to the networks, services or facilities to which it relates;
- b) not such as to discriminate unduly against particular persons or against a particular description of persons;
- c) proportionate to what the condition or modification is intended to achieve; and
- d) transparent in relation to what is intended to be achieved.

Objectively justified

16.126 We consider that each of the SMP conditions we have decided to impose is objectively justifiable. The remedies that we have decided to impose are designed to address the competition concerns that we have identified in our market analysis associated with a finding of SMP. Given our conclusion that KCOM has SMP in the CI Access market, we considered it likely that KCOM would have the incentive and ability to favour its own downstream business over rivals in the relevant downstream markets, distorting competition in these markets, which is ultimately against the interests of consumers. Therefore, in the absence of a requirement to provide network access, supported by associated obligations, KCOM could refuse or impede access at the wholesale level thereby favouring its own retail operations, or it could provide access on less favourable terms and conditions compared to those obtained by its downstream business. We explain above

why each obligation we are imposing is objectively justified in the context of the markets in which we have found KCOM to have SMP.

Not such as to discriminate unduly

16.127 We consider that each of the conditions does not discriminate unduly. The conditions are imposed on KCOM, which is the only provider which we have found to have SMP in the relevant market. The conditions are designed to address KCOM's position in the market.

Proportionate

16.128 We consider that each of the conditions is proportionate to what those conditions are intended to achieve. In each case, we are imposing an obligation on KCOM that: is effective to achieve our aim; is no more onerous than is required to achieve that aim; and does not produce adverse effects which are disproportionate to our aim. We explain why we consider each proposed remedy is proportionate above.

Transparent

16.129 We consider that each of the conditions is transparent in relation to what is intended to be achieved. The text of the conditions was consulted on and is published in Annex 26¹⁴⁶⁰ and the operation of those conditions is aided by our explanations in this document. We consider it is clear that our intention is to ensure that KCOM provides access to networks to facilitate effective competition, and that all the remedies set out above support this objective.

Section 88 tests

16.130 In this section we have set out our decisions to impose a fair and reasonable charges obligation in certain markets and to impose regulatory financial reporting requirements. These decisions are authorised by Section 87(9).

16.131 Before setting conditions falling within section 87(9) we are required to ensure that the condition satisfies the tests set out in section 88 of the Act. Section 88 of the Act states that Ofcom should not set an SMP condition falling within section 87(9), except where:

- a) it appears from the market analysis that there is a relevant risk of adverse effects arising from price distortion (sub-s (a)),¹⁴⁶¹ and
- b) it also appears that the setting of the condition is appropriate for:
 - i) promoting efficiency;
 - ii) promoting sustainable competition; and

¹⁴⁶⁰ Schedule 4.

¹⁴⁶¹ For the purposes of section 88 there is a relevant risk of adverse effects arising from price distortion if the dominant provider might (a) so fix and maintain some or all of his prices at an excessively high level, or (b) so impose a price squeeze, as to have adverse consequences for end-users of public electronic communications services.

- iii) conferring the greatest possible benefits on the end-users of public electronic communications services (sub-s (b)).

16.132 Under section 88(2) of the Act, when setting an SMP condition falling within section 87(9), we must take account of the extent of the investment in the matters to which the condition relates of KCOM.

Fair and reasonable charges obligation

16.133 We consider that our decision to impose a fair and reasonable pricing obligation satisfies these tests:

- a) In relation to the Section 88(1)(a) test, as we have explained above, our competition concerns are that, in the absence of price regulation requiring prices to be fair and reasonable, KCOM would have the ability and incentive to set excessively high prices or engage in a price squeeze.
- b) In relation to the Section 88(1)(b) test, we consider that a fair and reasonable charges obligation will prevent KCOM from setting excessively high charges or engaging in a price squeeze, both of which impact other providers' ability to compete with KCOM in downstream markets and so will support the aim of promoting improved efficiency. We also consider that the provision of network access on fair and reasonable terms will promote sustainable competition by ensuring that other telecoms providers can effectively compete downstream. We consider this to be the appropriate approach for the purposes of conferring the greatest benefits on customers of downstream services.
- a) In relation to the Section 88(2) test, we believe that fair and reasonable charges will allow KCOM's costs to be taken into account and will also provide for common cost recovery. This condition is therefore an appropriate basis upon which to control KCOM's prices.

Regulatory financial reporting

16.134 We consider that our regulatory financial reporting requirements satisfy the Section 88 tests because, as explained above, they facilitate the monitoring and enforcement of our pricing requirements.

Our duties

16.135 We consider that our decision to impose a network access obligation is consistent with our duties under sections 3 and 4 of the Act. We consider that the imposition of a network access obligation promotes competition in relation to the provision of electronic communications networks and services, ensuring the provision of network access and service interoperability for the purposes of securing efficient and sustainable competition and the maximum benefit for end-users. This is because the imposition of the obligation would ensure that KCOM offers the wholesale products required by other providers to compete effectively in the downstream markets. In respect of the other remedies we have decided to impose:

- a) The “No undue discrimination” condition is aimed at promoting competition and securing efficient and sustainable competition for the maximum benefit for customers by preventing KCOM from leveraging its SMP through discriminatory behaviour into downstream markets.
- b) The “Publication of a Reference Offer” condition will further the interests of consumers by promoting competition by: facilitating service interoperability and allowing telecoms providers to make informed decisions about future entry into the relevant market; enabling buyers to adjust their downstream offerings in competition with KCOM in response to changes in KCOM’s terms and conditions; and making it easier for Ofcom and other telecoms providers to monitor any instances of discrimination.
- c) The “Notification of changes to charges, terms and conditions” and “Notification of changes to technical information” conditions are aimed at promoting competition and securing efficient and sustainable competition for the maximum benefit of consumers, by ensuring that providers have the necessary information about changes to terms, conditions, charges and technical information sufficiently in advance to allow them to make informed decisions about competing in downstream markets.
- d) The “Pricing Transparency Report” condition is aimed at promoting competition and securing efficient and sustainable competition for the maximum benefit of consumers by enabling Ofcom to monitor KCOM’s compliance with our pricing obligations.
- e) The “Regulatory Financial Reporting” condition ensures that other obligations designed to curb potentially damaging leveraging of market power, such as undue discrimination and the setting of prices at excessive levels, can be effectively monitored and enforced.

16.136 In imposing these remedies we have had regard in particular to the desirability of: promoting competition in relevant markets, of encouraging investment and innovation in relevant markets and of encouraging the availability and use of high speed data transfer services throughout the UK. In performing our duties, we have also had regard to the principles under which regulatory activities should be transparent, accountable, proportionate, consistent and targeted only at cases in which action is needed.

16.137 We also consider that our remedies are consistent with our duty to act in accordance with the six community requirements set out in section 4 of the Act, in particular:

- the first Community requirement to promote competition;
- the third Community requirement to promote the interests of all persons who are citizens of the EU;
- the fourth Community requirement to take account of the desirability of Ofcom’s carrying out of its functions in a manner which, so far as practicable, does not favour one form of or means of providing electronic communications networks, services or associated facilities over another (i.e. to be technologically neutral); and
- the fifth Community requirement to encourage the provision of network access for the purpose of securing efficiency and sustainable competition, efficient investment and innovation and the maximum benefit of persons who are customers of communications providers and of persons who make associated facilities available.

- 16.138 Specifically, we believe that our decision to impose a network access obligation is consistent with the fifth Community requirement. The obligation has the purpose of securing efficient and sustainable competition in the markets for electronic communications networks and services by helping to ensure that other providers can continue to compete effectively in the downstream retail markets by using wholesale products offered by BT.
- 16.139 In analysing markets in Volume 2, Section 9, and imposing these remedies we have taken due account of all applicable guidelines and recommendations which have been issued or made by the European Commission in pursuance of the provisions of an EU instrument and which relate to market identification and analysis or the determination of what constitutes significant market power in accordance with section 79 of the Act. In developing our remedies we have taken due account of all applicable recommendations issued by the European Commission under Article 19(1) of the Framework Directive in accordance with our duties under section 4A of the Act. In each case, pursuant to Article 3(3) of Regulation (EC) No 1211/2009, we have also taken the utmost account of any relevant opinion, recommendation, guidelines, advice or regulatory practice adopted by the Body of European Regulators for Electronic Communications (BEREC). Where relevant, we explain in Volume 2, Sections 9 and this Section, how we have taken account of these instruments.

17. Traditional interface services

- 17.1 This section outlines our conclusions in relation to traditional interface (TI) services up to and including 8 Mbit/s (low bandwidth TI services).
- 17.2 In the 2018 BCMR Consultation, we proposed that:
- low bandwidth TI services constitute a separate market;
 - there are clear dynamics in this rapidly declining market that suggest effective competition will be reached in the foreseeable future. These dynamics include falling demand for low bandwidth TI services, BT’s decision to retire the technology upon which TI services depend by 2025, the improved availability of modern alternatives to low bandwidth TI services and the narrowing of the price gap between these modern alternatives and low bandwidth TI. We also considered BT’s voluntary commitments regarding the continued supply, maintenance and pricing of low bandwidth TI services¹⁴⁶²; and
 - *ex ante* regulation is no longer justified for these services, as given these dynamics the second criterion of the three-criteria test is not satisfied.
- 17.3 We received a number of stakeholder comments on these proposals. In summary:
- BT, Virgin Media and KCOM agreed with our proposal to deregulate low bandwidth TI services.
 - Telefónica¹⁴⁶³ and UKCTA¹⁴⁶⁴ disagreed, stating that the three-criteria test was satisfied. Both argued that alternatives to TI do not sufficiently constrain low bandwidth TI services. UKCTA added that price convergence with EAD was an insufficient basis for deregulation and that it was not possible to assert that competition will emerge over the review period.
 - Vodafone¹⁴⁶⁵, UKCTA¹⁴⁶⁶, PAG¹⁴⁶⁷ and [S&C]¹⁴⁶⁸ opposed the timing of deregulation, arguing that customers continued to require regulatory protection. In particular, UKCTA disagreed with our assessment that TI customer volumes would continue to decline.¹⁴⁶⁹
 - [S&C] and UKCTA¹⁴⁷⁰ argued that the existing charge controls should be retained. Vodafone proposed a CPI-CPI price cap from 2019 to 2021.¹⁴⁷¹

¹⁴⁶² [Letter from BT to Ofcom, 3 July 2018](#) [accessed 22 May 2019].

¹⁴⁶³ Telefónica’s response to the 2018 BCMR Consultation, page 7.

¹⁴⁶⁴ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 56-62.

¹⁴⁶⁵ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraphs 9.2, 9.11.

¹⁴⁶⁶ UKCTA’s response to the 2018 BCMR Consultation, paragraph 55.

¹⁴⁶⁷ PAG’s response to the 2018 BCMR Consultation, paragraphs 26-27.

¹⁴⁶⁸ [S&C].

¹⁴⁶⁹ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 52-53.

¹⁴⁷⁰ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 54-55

¹⁴⁷¹ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraphs 9.4 and 9.7.

- UKCTA¹⁴⁷², Vodafone¹⁴⁷³ and PAG¹⁴⁷⁴ argued deregulation would create migration problems (such as issues for telecoms providers with ‘sticky’ customers on TI), increase uncertainty, push customers into a forced migration and generate resource constraints for customers, BT and other telecoms providers. [3<] stated that BT had done little to encourage migration, instead focusing on maintaining the existing TI estate.¹⁴⁷⁵
- Telefónica¹⁴⁷⁶, UKCTA¹⁴⁷⁷ and Gamma¹⁴⁷⁸ wanted BT’s voluntary commitments with respect to TI services to be imposed as obligations on BT.

17.4 Having considered stakeholders’ responses and the evidence available to us, we conclude that:

- low bandwidth TI services constitute a separate market for the period of this review, but there are clear dynamics in this rapidly declining market that suggest effective competition will be reached in the foreseeable future; and
- neither the second nor third criterion of the three-criteria test is satisfied, and therefore *ex ante* regulation is no longer justified for these services.

17.5 This section is structured as follows:

- we set out the technical background to our discussion of TI, our previous approach to regulating TI and recent market developments;
- we define the relevant product and geographic markets;
- we consider whether *ex ante* regulation of low bandwidth TI services is justified by conducting the three-criteria test; and
- we discuss the removal of remedies in the low bandwidth services market.

Background

17.6 TI leased lines use legacy analogue and digital interfaces.¹⁴⁷⁹ There are two broad types of circuit in this category:

- analogue interface leased lines: These are commonly used for voice transmission, e.g. external extension circuits between business sites. They are also used for low-bandwidth data transmission; and
- digital interface leased lines: These are based on legacy SDH/PDH technology¹⁴⁸⁰, itself based on time-division multiplexing (TDM). They have stable and predictable

¹⁴⁷² UKCTA’s response to the 2018 BCMR Consultation, paragraph 54.

¹⁴⁷³ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraph 9.3.

¹⁴⁷⁴ PAG’s response to the 2018 BCMR Consultation, paragraph 26.

¹⁴⁷⁵ [3<].

¹⁴⁷⁶ Telefónica’s response, p. 7.

¹⁴⁷⁷ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 63-66.

¹⁴⁷⁸ Gamma’s response to the 2018 PIMR and 2018 BCMR Consultations, page 11.

¹⁴⁷⁹ TI circuits provide access connections between end-user sites and an aggregating node, as described in Section 3.

¹⁴⁸⁰ PDH (Plesiochronous Digital Hierarchy) and SDH (Synchronous Digital Hierarchy) are used for delivering TI services.

transmission characteristics, low transmission delay (latency) and low jitter (variation in transmission delay). These characteristics are important in some user applications.

- 17.7 Demand for TI services is in decline.¹⁴⁸¹ As discussed below, almost all new demand for leased lines services is met by more modern alternatives. TI services are also increasingly supported by ageing and often obsolete equipment.¹⁴⁸² This means that the risk of service outages affecting businesses is increasing.¹⁴⁸³
- 17.8 We expect that this decline will only continue, as BT has announced that it no longer plans to support TI data services beyond 2025. This is also the date when the PSTN platform is planned to be retired. This will allow the underlying legacy SDH and PDH platforms which support these and other legacy services to be retired.

Approach to TI in previous market reviews

- 17.9 We have been progressively deregulating TI services. In the 2016 BCMR Statement we concluded that for wholesale TI services operating at bandwidths above 8 Mbit/s (medium and high bandwidth TI), *ex ante* regulation was no longer appropriate as this market no longer met the three-criteria test.¹⁴⁸⁴ In reaching this conclusion we noted that:
- the installed base of high bandwidth TI circuits was low and was predicted to fall further as customers switched to Ethernet services, demonstrating that Ethernet had become a cheaper and acceptable substitute;
 - the availability of Ethernet services would provide a sufficient constraint on the prices of higher bandwidth TI circuits above 2 Mbit/s; and
 - the market failures we identified in the medium (above 8 Mbit/s up to and including 45 Mbit/s) and high (above 45 Mbit/s up to and including 155 Mbit/s) bandwidth TI markets in the 2013 BCMR, which arose from a finding of SMP and for which extensive or frequent and timely intervention was previously considered indispensable, were found to be no longer present in the 2016 BCMR.¹⁴⁸⁵
- 17.10 However, for low bandwidth TI services, we determined that users would not necessarily switch if there was a SSNIP and that BT had SMP.¹⁴⁸⁶ We also noted that:
- migration rates were not sensitive to price changes and customers remaining on these services were unlikely to be adequately protected from an operator with SMP;
 - switching costs were a barrier to switching to Ethernet – a specific concern was the cost of changing end-user equipment; and
 - some legacy and specialist applications would continue to require TI leased lines.¹⁴⁸⁷

¹⁴⁸¹ Some stakeholders disagreed that demand for TI services will continue to decline. We address this issue below.

¹⁴⁸² [§].

¹⁴⁸³ [§].

¹⁴⁸⁴ 2016 BCMR Statement, Volume 1, paragraph 5.67.

¹⁴⁸⁵ 2016 BCMR Statement, Volume 1, paragraph 5.69 - 5.70.

¹⁴⁸⁶ 2016 BCMR Statement, Volume 1, paragraph 5.35.

¹⁴⁸⁷ This was because Ethernet services could not exactly match all the characteristics of SDH/PDH services, such as latency and jitter, to the very high specification across all network load scenarios. We also noted that these differences were

- 17.11 For these services in the UK excluding the Hull Area, we retained a remedy called the Partial Private Circuits (PPC) Direction.¹⁴⁸⁸ We considered this was necessary to ameliorate the risk that BT would refuse access at the wholesale level or would offer terms that would not meet telecoms providers' requirements.¹⁴⁸⁹ Due to the low demand for new circuits, we amended the PPC Direction by (among other things) removing the requirement for forecasts for PPCs.¹⁴⁹⁰ This remedy was in addition to the general remedies that we set.¹⁴⁹¹
- 17.12 TI services were also subject to CPI-X charge control, which ended on 31 March 2019.¹⁴⁹² Current regulation of the wholesale low bandwidth TI market remains as specified in the 2016 BCMR Statement, apart from the charge control.
- 17.13 Separate to our wholesale assessment, we lifted retail regulation for very low bandwidth (VLB) retail services (below 2 Mbit/s).¹⁴⁹³ For this market we determined that *ex ante* regulation was not required as the three-criteria test was not satisfied and that:
- users could migrate to alternative services and would increasingly do so over the next three years;
 - BT was managing an orderly process of service withdrawal of VLB leased lines; and
 - further protection was to be provided by regulation of the related upstream wholesale low bandwidth TI market, which was to remain in place.¹⁴⁹⁴

Market developments

- 17.14 Since our last market review, we have observed the previously identified trends in the low bandwidth TI services market continue. These include the reduction in demand for low bandwidth TI services, the increased availability of suitable modern alternatives to low bandwidth TI services, and the falling price difference between low bandwidth TI and such alternatives. Some stakeholders commented on our analysis of these trends and we now respond to these comments.

Demand for low bandwidth TI services

- 17.15 In the 2018 BCMR Consultation, we noted that demand for low bandwidth TI services has declined rapidly and is expected to decline further over the review period (see Figure

becoming progressively less important as mainstream enterprise applications migrate to Ethernet/IP technologies and are therefore able to use Ethernet leased lines. See 2016 BCMR Statement, Volume 1, paragraph 5.31 to 5.44.

¹⁴⁸⁸ The PPC Direction was first introduced in 2002. It specifies detailed requirements for the provision and repair of PPCs and RBS backhaul including: migration arrangements (for migration of retail private circuits to PPCs); forecasting arrangements for capacity ordering; and Service Level Agreements (SLAs) including provision and repair performance targets and service level guarantee (SLG) payments.

¹⁴⁸⁹ We considered that not imposing this would allow BT to favour its own retail operations with the effect of distorting competition in the corresponding downstream markets until such a time as end-users have migrated to alternative services.

¹⁴⁹⁰ 2016 BCMR Statement, Volume 1, paragraph 11.23.

¹⁴⁹¹ Further information on the general remedies is available in section 8 of the 2016 BCMR Statement, Volume 1.

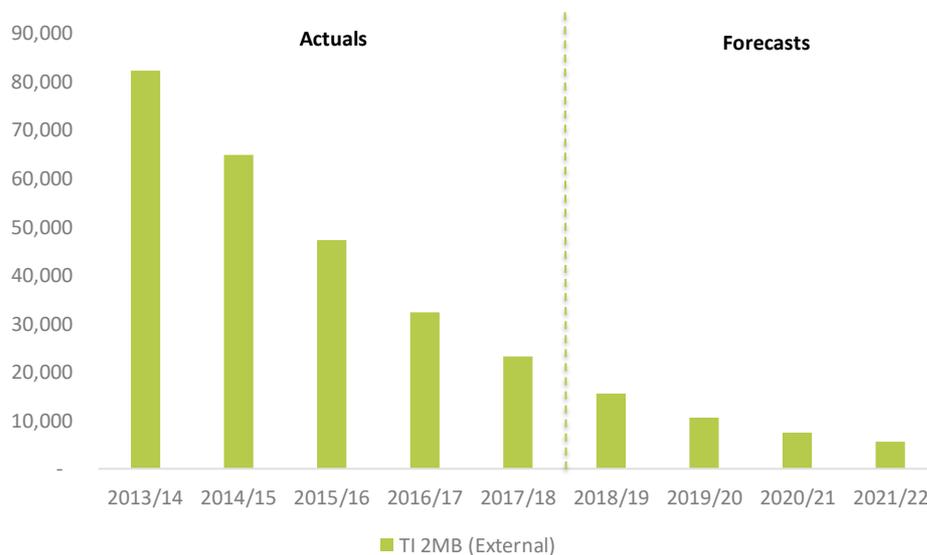
¹⁴⁹² 2016 BCMR Statement, Volume 2, pages 16-17.

¹⁴⁹³ 2016 BCMR Statement – Very low bandwidth leased lines.

¹⁴⁹⁴ 2016 BCMR Statement, Volume 1, paragraphs 5.31-5.44.

17.1).¹⁴⁹⁵ In light of BT’s decision to retire the PSTN and other legacy TDM platforms, there is unlikely to be any new demand, new entry or new competition in this market and we expect migration of existing customers to alternative products to accelerate.

Figure 17.2: Decline in low bandwidth TI services volumes



Source: BT RFS and BT response to question 11 of the LLCC 1st s.135 request notice dated 2 February 2018

17.16 This decline is supported by evidence gathered through our stakeholder engagement in early 2018. For example, BT indicated that:

- it observed decreasing demand for TDM services as customers switch to newer alternative technologies which offer lower transport costs and greater flexibility, such as Ethernet services delivered over copper and fibre; and
- businesses need to be agile and adaptable, future proofing themselves for new applications and needs. Customers are increasingly moving away from fixed end-to-end dedicated capacity to a network solution which offers greater flexibility. Newer Ethernet and IP technologies offer a wider range of access types and increased bandwidth granularity to tailor the service to users’ needs along with efficient multisite networking.¹⁴⁹⁶

¹⁴⁹⁵ Figure 17.1 actuals are based on BT’s RFS volume data for external services. As we understand that there are no BT products between 2 Mbit/s and 8 Mbit/s. This figure is based on ‘local end’ volumes data for BT’s 2 Mbit/s services.

¹⁴⁹⁶ BT’s response to BCMR s.135-26, presentation by BT, 21 February 2018, BCMR: Future of TI services and legacy networks, slide 3.

- 17.17 Verizon similarly indicated that TI volumes were falling but this had a lot to do with business closures.¹⁴⁹⁷ It also noted that where customers are moving to depends on what they need and that:
- EFM is fine for 10 Mbit/s and below if the customer is close to the exchange, but if too far away, an alternative to this service is required; and
 - FTTC is a good substitute, but coverage is constraining take up.
- 17.18 Vodafone indicated that “customers are tending to cease their use [of TI] either when they have a technology upgrade or when they churn to a new supplier”.¹⁴⁹⁸
- 17.19 Analysis carried out by Openreach in 2015 estimated that at that time a significant number of users ([X]%) ceased using legacy services rather than migrating to other services. However, of those TI users that did migrate [X]% moved to CI services, while the remainder migrated to EFM and asymmetric broadband.¹⁴⁹⁹
- 17.20 Responding to the 2018 BCMR Consultation, BT, Virgin Media and KCOM agreed that demand for low bandwidth TI services is low and falling across the UK, including in the Hull Area. KCOM stated that this was part of a “structural shift” to modern alternatives.¹⁵⁰⁰ BT agreed that demand for low bandwidth TI services has been in long-term decline as businesses switch to newer technologies. It provided evidence that TI local ends volumes declined by 16% per annum between 2008/2009 and 2017/2018, and forecast that volumes would decline by a further [X]% during this review period.¹⁵⁰¹
- 17.21 UKCTA disagreed, arguing that demand for low bandwidth TI will not continue to decline as the customer base had reached a stable “critical pool” of dependent customers.¹⁵⁰² It considered that regardless of their number, customers who do not want to switch should still be protected by regulation.¹⁵⁰³
- 17.22 UKCTA did not provide evidence to support its argument that there was now a “critical pool” of TI-dependent customers and therefore demand would remain stable going forward. We consider this is highly unlikely in light of the decline in demand to date and BT’s intention to end support for TI leased line services beyond 2025, along with other legacy TDM platforms such as PSTN, which will increase incentives to migrate over time.
- 17.23 Based on the evidence on demand for low bandwidth TI services outlined above, gathered during our stakeholder engagement through s.135 information requests¹⁵⁰⁴ and in responses to our consultation, we conclude that demand for low bandwidth TI services has declined rapidly and we expect it to continue to decline further over the coming years (as forecast by BT, see table 17.1).

¹⁴⁹⁷ Meeting with Verizon and Ofcom, 12 April 2018, Verizon comments at meeting.

¹⁴⁹⁸ Vodafone, Securing Competition & Market Growth, Line Charge Control Design Considerations 2019 -2022, Slide 6.

¹⁴⁹⁹ Openreach, Ethernet Migration Analysis Update, 30 July 2015.

¹⁵⁰⁰ KCOM’s response to the 2018 BCMR Consultation, paragraph 2.4.

¹⁵⁰¹ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, Annex 5, paragraphs 5.3-5.5.

¹⁵⁰² UKCTA non-confidential response, paragraphs 52-53.

¹⁵⁰³ UKCTA non-confidential response, paragraphs 52-53.

¹⁵⁰⁴ BT RFS data and BT response to question 11 of the LLCC 1st s.135 request notice dated 2 February 2018

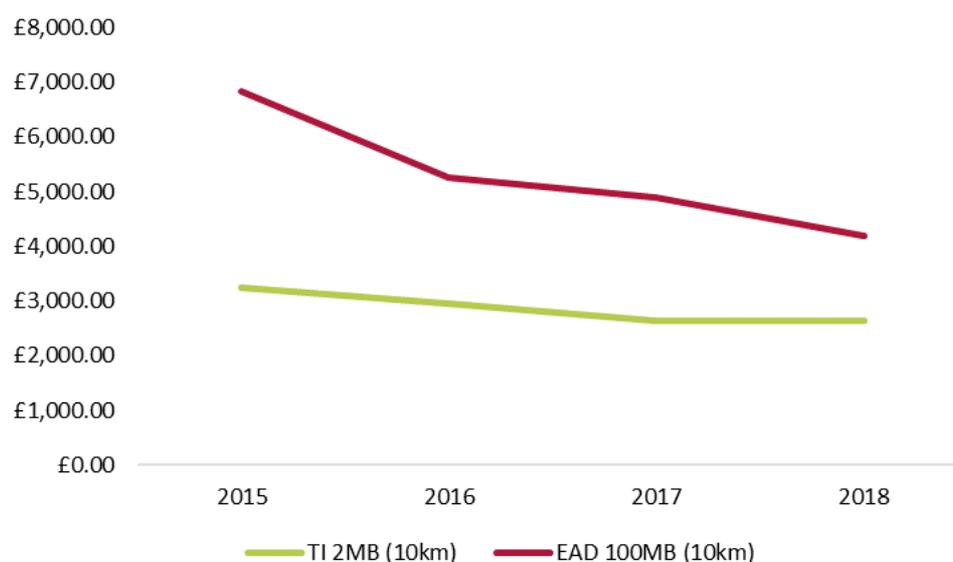
17.24 We understand that a small number of remaining end users may be reluctant to stop using TI services and we address this in our discussion on qualitative factors below.

Pricing and costs

17.25 Our pricing analysis (see Figure 17.2) shows that over the last few years, prices of TI 2 Mbit/s circuits have been relatively stable,¹⁵⁰⁵ but the gap with prices of point to point Ethernet services has narrowed as the latter have fallen rapidly.¹⁵⁰⁶ Figure 17.2 shows that the relative price difference between TI 2 Mbit/s (10km) and EAD 100 Mbit/s (10km) has dropped from 52% in 2015 to 46% in 2017 and is currently 37% (2018).¹⁵⁰⁷ Importantly, EAD 100 Mbit/s also offers 50 times the capacity, for this decreasing price differential.

17.26 We expect the narrowing of this price difference will continue, not least if prices for TI need to increase should the costs of maintaining this legacy platform be spread over a diminishing customer base (recognising that efficiency improvements in this area are unlikely). TI users would therefore have increasingly strong incentives to migrate to alternative services, particularly give the material increase in capacity it offers.

Figure 17.3: Prices for 2 Mbit/s vs. 100 Mbit/s EAD



Source: Ofcom analysis based on Openreach list prices. Prices reflect the **annualised** total cost of ownership over a three-year period. This cost includes rental and connection charges as well as Main Link charges. Connection charges are spread over the three-year period and discounted at a 7.9% rate.

17.27 BT’s response to the 2018 BCMR Consultation supported our observation that the price differential between TI and EAD was decreasing. It argued that TI costs are not falling in

¹⁵⁰⁵ We are considering prices for 2 Mbit/s only as we understand that there are no BT products between 3 and 8 Mbit/s.

¹⁵⁰⁶ Our analysis also shows that TI services at higher bandwidths are more expensive than Ethernet services (while also (typically) providing a smaller range of possible services).

¹⁵⁰⁷ We consider that these are the appropriate services to compare because EAD 100 Mbit/s is the closest substitute for a customer switching from a TI circuit for a dedicated point to point fibre service.

line with the decreases in TI local end volumes, and so it expects unit costs to rise and its return on capital employed to fall. BT's fixed costs remain high and are likely to increase further as both new equipment and relevant expertise become increasingly challenging to source. Going forward, BT anticipated that fixed costs will be shared across a diminishing customer base.¹⁵⁰⁸

17.28 KCOM observed similar dynamics. It stated that as it expects demand to shift to alternatives to TI low bandwidth services, it anticipates that prices for its TI services will increase in the near future.¹⁵⁰⁹

17.29 Based on our own analysis, we estimate that over the past three years, BT's costs per 2 Mbit/s low bandwidth local end have increased by 8% year on year, while revenues per local end have remained static. Consequently, BT's return on mean capital employed has fallen by 31%.¹⁵¹⁰

Availability of modern alternatives

17.30 In our 2018 BCMR Consultation, we considered that modern services increasingly represent a viable alternative to low bandwidth TI services and have sufficient coverage to be considered an appropriate alternative for the majority of current users of TI low bandwidth services. This observation was supported by discussions with stakeholders and demonstrated by the numbers of low bandwidth TI users that have switched to CI leased lines and other alternative products (such as FTTC and EFM) to date.

17.31 However, we recognise that some customers may be reluctant to switch away from low bandwidth TI services, primarily due to barriers to switching and perceptions of alternative services' functionality. We received several stakeholder comments on this topic. We discuss these issues further below, as we consider the potential for modern alternatives to act as a demand-side substitute for low bandwidth TI services in our product market definition exercise.

Product market

17.32 As low bandwidth TI services are the only TI service still regulated, we use low bandwidth TI services as the focal product for our market definition exercise. The main purpose of the product market definition is to identify the competitive constraints (both from the demand and supply-side) on low bandwidth TI services. Given this is a legacy product market that is in decline (and experiencing issues around equipment availability as discussed below), our focus is primarily on demand-side substitution as we do not expect additional market entry within this review period given these characteristics.

17.33 We use the SSNIP test as our conceptual framework for assessing demand-side constraints on low bandwidth TI services. We do this by considering whether a hypothetical monopolist would be able to profitably impose a SSNIP above the competitive price level

¹⁵⁰⁸ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, annex 5, paragraphs 5.10-5.13.

¹⁵⁰⁹ KCOM's response to the 2018 BCMR Consultation, paragraph 3.18.

¹⁵¹⁰ Source: [BT Regulator financial statements 2015-2018](#) [accessed 10 May 2019]

on the focal product. In the context of this review, the question we are trying to answer is whether a sufficient number of low bandwidth TI customers would switch to an alternative product in the event of a SSNIP to render the price increase unprofitable (critical loss threshold). If enough customers would switch, the relevant market should be expanded to include the alternative product. In this case, the candidate products we are considering in the SSNIP are CI Access point to point Ethernet services¹⁵¹¹.

- 17.34 We address this question in the same way as for CI Access services. Namely, we assess whether the amount of switching expected because of the SSNIP is likely to exceed the critical loss threshold.¹⁵¹² Based on cost data from BT's 2016/17 RFS, we estimate this critical loss to be 18%¹⁵¹³ for low bandwidth TI services.
- 17.35 The counterfactual for assessing the SSNIP is important in this case, given the general trend of low and declining demand for low bandwidth TI services which we expect to continue (as discussed above). We consider it would be inappropriate to reflect the forecast volume loss in our assessment of the profitability of a SSNIP as a hypothetical monopolist is already expecting to lose these circuits (i.e. in the absence of a SSNIP). Therefore, in considering a SSNIP, the key question is whether a 10% price increase would lead to material additional switching over and above that which is already expected to occur, such that it would be unprofitable.
- 17.36 In conducting the SSNIP analysis we have considered that the demand for wholesale TI services derives from demand for retail TI services. We do this by assuming that price increases at the wholesale level would be passed on to retail customers and then assessing how these customers are likely to respond to such price increases. We have also conducted our analysis in accordance with the modified greenfield approach, by which we assume there are no *ex ante* SMP remedies in place for TI services, but *ex ante* SMP remedies in other markets continue to apply.
- 17.37 The evidence we have considered to inform our SSNIP analysis includes:
- prices for low bandwidth TI services and Ethernet; and
 - qualitative factors of low bandwidth TI services and alternatives.
- 17.38 In response to the 2018 BCMR Consultation, some stakeholders disputed our analysis, namely in relation to the qualitative factors of low bandwidth TI services. These comments will be addressed in this section.

¹⁵¹¹ We start with point to point Ethernet services as we consider these to be the closest substitute to TI services. We discuss the limitations of other alternatives later in this section.

¹⁵¹² We have based this SSNIP test on regulated prices as these provide a reasonable proxy for competitive prices. See 2018 BCMR Consultation, paragraph 4.28. See also EC SMP Guidelines, paragraph 31, which state "where a product or service is already offered at a regulated, cost-based price, a regulated price will be assumed to be set at competitive levels and should be taken as the starting point for the hypothetical monopolist test".

¹⁵¹³ Ofcom analysis based on Openreach RFS data and BT volume forecasts submitted in response to question 11 of our LLCC s.135 notice dated 2 February 2018.

Pricing

- 17.39 As discussed previously in relation to developments in the low bandwidth TI services market, we have seen a narrowing in the price gap between low bandwidth TI services and more modern alternatives (as discussed above).^{1514 1515} We expect this narrowing will continue, not least if prices for TI need to increase should the costs of maintaining this legacy platform be spread over a diminishing customer base (as supported by both BT and KCOM, see above).
- 17.40 We consider that a SSNIP on low bandwidth TI services would further reduce this price differential between low bandwidth TI and EAD, and so likely encourage more incremental switching from TI to modern alternatives, where the alternative products offer the same or improved functionality. Indeed, we also note that a 100 Mbit/s service offers 50 times the capacity of a 2 Mbit/s TI, further increasing its attractiveness.¹⁵¹⁶
- 17.41 However, we note that there remains a price gap between low bandwidth TI services and modern alternatives like EAD (see Figure 17.2) - although EAD offers much higher bandwidth - and switching costs between the two services remain (see Table 17.3).

Qualitative factors relevant to demand-side substitution

- 17.42 Our SSNIP analysis in the 2018 BCMR Consultation considered that:
- those users who remain on low bandwidth TI are likely to be those who are most satisfied with the quality of service they receive and are least likely to be inclined to switch, even in the event of a SSNIP.
 - in the absence of any strong external factor encouraging migration, many of these users will continue to switch at their own pace, with that typically being where end-user equipment or applications come to the end of their life; and
 - modern services can represent a viable alternative to low bandwidth TI services, have sufficient coverage to be considered an appropriate alternative for the majority of users where coverage is important, and will increasingly be available at a price and service point appropriate for current users of low bandwidth TI services.
- 17.43 Responding to our consultation, BT noted that low bandwidth TI was becoming increasingly difficult to maintain as a reliable service as:
- SDH and PDH platform equipment was becoming obsolete, making it difficult to source spare parts¹⁵¹⁷ and leading to increased maintenance costs; and

¹⁵¹⁴ We are considering prices for 2 Mbit/s only as we understand that there are no BT products between 3 and 8 Mbit/s. Our analysis also shows that TI services at higher bandwidths are more expensive than Ethernet services (while also (typically) providing a smaller range of possible services).

¹⁵¹⁵ We consider that these are the appropriate services to compare because EAD 100 Mbit/s is the only option for a customer switching from a TI circuit for a point to point fibre service because it is widely available. Ethernet over GEA is also likely to be a suitable alternative for some customers, but unlike EAD, is not available as widely.

¹⁵¹⁶ We also note that TI is more expensive than some of the other potential substitutes which may be suitable for some customers (e.g. EFM and FTTC). See Table 17.4.

¹⁵¹⁷ This was confirmed by []< .

- it was uneconomic to train new engineers to maintain the TI network and that a majority of engineers with TI experience are approaching retirement age.¹⁵¹⁸
- 17.44 On the other hand, Telefónica argued that CI services were not a constraint on low bandwidth TI services, and UKCTA noted that Ethernet may not be a substitute to TI for all customers.¹⁵¹⁹ UKCTA argued that broadband availability (GEA-FTTC or FTTP) for businesses in the UK was too poor to make it a viable alternative, nor were FTTC and FTTP sufficiently reliable.¹⁵²⁰
- 17.45 In addition, UKCTA stated that Ofcom should have done more to seek the views of telecoms providers and their customers on their experiences of TI, particularly in relation to switching costs, as well as the costs and reliability of low bandwidth TI services.¹⁵²¹
- 17.46 In the 2016 BCMR, we noted that while most TI users are expected to eventually switch to Ethernet, some users may be reluctant to switch in the short term due to, among other factors, them placing a greater weight on particular characteristics of TI services. For example, we highlighted that Ethernet services could not exactly match all of the characteristics of TI services, such as latency and jitter, to the very high specification and across all network load scenarios – see Table 17.3.
- 17.47 We also highlighted that:
- the Explanatory Note to the 2014 EC Recommendation had indicated that carrier-grade Ethernet services were a substitute for all but the most demanding business applications;¹⁵²² and
 - survey evidence suggested that 79% of those with analogue or SDH/PDH based leased lines had no concerns about replacing them with Ethernet.¹⁵²³ The key concerns for remaining users were inadequate service level agreements (7%) and reliability (6%).
- 17.48 While we noted that a high proportion (79%) of respondents said that they had no concerns about replacing TI services with Ethernet, we recognised that this did not mean that those respondents would switch in response to a SSNIP (or indeed in any circumstances); it may be that respondents had just not thought about switching.¹⁵²⁴

¹⁵¹⁸ BT Group's response to the 2018 PIMR and 2018 BCMR Consultations, paragraphs 5.1-5.6, 5.14.

¹⁵¹⁹ Telefónica's response to the 2018 BCMR Consultation, page 7. UKCTA's response to the 2018 BCMR Consultation, paragraphs 52-53.

¹⁵²⁰ UKCTA's response to the 2018 BCMR Consultation, paragraphs 59-62.

¹⁵²¹ UKCTA's response to the 2018 BCMR Consultation, paragraphs 62 and 65.

¹⁵²² Explanatory Note to the 2014 EC Recommendation, page 49.

¹⁵²³ Ofcom, 2015. [Business Connectivity Services Review \(2015 BDRC study\)](#), [accessed 10 May 2019], quoted in 2016 BCMR Statement, Volume 1, para. 5.26.

¹⁵²⁴ Only a quarter (24%) of TI leased line users surveyed had actively considered switching to Ethernet leased lines and only around half of these (13%) said that they intended to do so at the end of their current contract while the rest (11%) had decided against it. Around a third of those that had not considered switching said they were likely to consider it in the future (35%). See 2016 BCMR Statement, Volume 1, paragraph 5.26.

Table 17.3: Comparison of key point-to-point Ethernet leased line service and SDH/PDH features

Feature	Point-to-point Ethernet	SDH/PDH
Contention	Dedicated	Dedicated
Distance limitations (fibre delivered)	Not limited	Not limited
Jitter	Low (load dependent)	Low
Latency	Low (load dependent)	Low
Resilience	High	High
Symmetry	Symmetrical	Symmetrical
Synchronisation	Networks supporting resilient synchronisation deployed, but not supported by some older carrier Ethernet services	Networks support resilient synchronisation of end-user equipment natively.

Source: Ofcom 2015 BCMR consultation

- 17.49 Since publishing the 2016 BCMR Statement we have engaged with several telecoms providers offering low bandwidth TI services, including members of UKCTA. We discussed a range of issues including some customers' continued loyalty to low bandwidth TI and the reasons for a reluctance to migrate to modern services, the suitability of such alternatives, and costs and experiences of switching. While some respondents claimed that customers were reluctant to switch from low bandwidth TI services, none supplied further evidence such as examples of services that cannot be delivered over CI.
- 17.50 Consistent with the evidence from the 2016 BCMR Statement summarised above, our engagement with the sector leading up to our 2018 BCMR Consultation suggests that:
- many users of low bandwidth TI remain satisfied with the level of service they receive and are not inclined to switch; and
 - for the users who are considering switching, the timing of any switch will typically occur at their own pace, with it often being delayed up to the point where end-user equipment or applications come to the end of their life.
- 17.51 We now consider why users of low bandwidth TI might be reluctant to switch to modern alternatives, even in the case of a SSNIP. Our recent engagement identified that the level of switching would be influenced by:
- barriers to switching, such as the cost or timing; and

- the perceived reliability and versatility of modern alternatives compared to low bandwidth TI services. For completeness, we have considered the suitability of a range of modern alternatives, and not just Ethernet.

Barriers to and timing of switching

- 17.52 Vodafone indicated that customers often stay with TI unless they are changing network provider or implementing an IT upgrade.¹⁵²⁵ It also noted that “Ethernet migration usually coincides with an IT refresh, however this ideally should be on the customers’ terms, rather than forced upon them, particularly if Communication Providers are able to offer a sustainable service”.¹⁵²⁶ Verizon highlighted the example of a customer that was not willing to move as it considered the TI service being provided was not broken and was therefore not in any rush to upgrade.¹⁵²⁷
- 17.53 This seemed largely to be for cost saving reasons. Vodafone noted that a switch to Ethernet may drive unnecessary costs, necessitating the need for a full IT refresh that is not required at this point in time, especially when there is a view that the existing kit is performing well.¹⁵²⁸
- 17.54 Other stakeholders highlighted that without an appropriate push factor – such as the announcement of platform closure – some users may retain their current service for some time. For example, the Office of the Telecommunications Adjudicator noted that if BT decided to stop supplying [giving normal notice period of two years] then that would be an inflection point – and from that point faster migration would be likely.¹⁵²⁹ Verizon similarly noted that in other sectors, both domestic and international, a firm closure date from the incumbent/regulator would facilitate migration.¹⁵³⁰

Functionality of alternatives

- 17.55 It appears that many customers choose to remain on low bandwidth TI services because they perceive that PPCs best suit their business needs and are wary as to whether modern alternatives could match these needs.
- 17.56 Vodafone noted, for example, that the reasons for this continuing loyalty for PPCs does not stem from apathy towards change, rather it is for sound practical and economic reasons, with PPCs continuing to suit their business needs more than any connectivity solution at this point in time.¹⁵³¹ It also noted (among other issues):
- PPCs are viewed as a reliable connectivity solution, being dependable and user friendly;

¹⁵²⁵ Meeting between Ofcom and Vodafone, 5 March 2018, Vodafone comments re LLCC.

¹⁵²⁶ Vodafone’s response to the 6th s.135 notice, page 12.

¹⁵²⁷ Meeting between Ofcom and [X], 12 April 2018, [X] comments.

¹⁵²⁸ Vodafone’s response to the 6th s.135 notice, page 11.

¹⁵²⁹ Meeting between Ofcom and Office of the Telecommunications Adjudicator, 16 April 2018, OTA2 comments.

¹⁵³⁰ Meeting with Ofcom and Verizon, 12 April 2018, Verizon comments.

¹⁵³¹ Vodafone’s response to the 6th s.135 notice, page 11.

- PPCs are versatile: While copper circuits ultimately limit PPC speeds, it does have the benefit of enabling PPCs to provide a flexible solution with resilience configuration choices that suit individual business needs;
- PPCs provide an end to end dedicated circuit as standard: Although Ethernet is a dedicated service, it often relies in part on aggregated routing paths, restricting or at least making diversity and separacy options either impractical or unaffordable; and
- PPCs have near universal nationwide reach and can continue to operate without major new set-up costs (thereby avoiding the need to self-build or invest in new line plant).¹⁵³²

17.57 A small number of stakeholders expressed concern with the perceived lower levels of reliability that alternative services to low bandwidth TI services often presented. For example, the Office of the Telecommunications Adjudicator noted that low bandwidth TI is useful for critical national infrastructure and that any potential disruption to communications is therefore of great concern, and for some reason the faults with IP seem to be higher.¹⁵³³ Similarly, [X] highlighted that it had moved a customer to IP, but because various payment systems did not work it had to purchase 64kbit/s PSTN. It also noted that other customers that were dealing with payment systems often had issues with IP and that there were often challenges associated with lifts, such as emergency telephone equipment.¹⁵³⁴

17.58 The ongoing reliability of low bandwidth TI services needs to be considered in the appropriate context. This is a declining legacy service that is increasingly being supported by ageing and often obsolete equipment. This means that users of these services will increasingly be exposed to higher levels of risk (increasing unreliability).

17.59 BT has, for example, indicated that it is “increasingly difficult to source network equipment based on anything other than Ethernet and IP” and that “spare cards are unavailable and parts have not been manufactured for some time”.¹⁵³⁵ BT also identified several other factors that will impact the reliability of low bandwidth TI services (and the cost to serve) in future, including:

- expertise to maintain the TDM network, which is becoming increasingly scarce;
- lack of vendor support, e.g. knowledge of equipment, equipment updates; and
- limited investment in associated management systems for older equipment.¹⁵³⁵

17.60 While some stakeholders are concerned as to the suitability of modern alternatives, other stakeholders have suggested that these concerns are diminishing and/or are no longer present. For example, BT suggests that changes in customer demand and product innovation have resulted in viable alternatives to low bandwidth TI services that have not been available in the past.¹⁵³⁶ This means that there is now a range of alternatives available

¹⁵³² [X].

¹⁵³³ Meeting with Ofcom and Office of the Telecommunications Adjudicator, 16 April 2018, OTA2 comments .

¹⁵³⁴ Meeting with Ofcom and [X] 12 April 2018, [X] comments.

¹⁵³⁵ BT’s response to BCMR s.135-26, presentation by BT, 21 February 2018, BCMR: Future of TI services and legacy networks, slide 8.

¹⁵³⁶ BT’s response to BCMR s.135-26, presentation by BT, 21 February 2018, BCMR: Future of TI services and legacy networks, slide 6.

widely across the UK, that can replicate and/or substitute for the full portfolio of TI technologies. For example:

- Ethernet services have developed to offer an evolution path for a wide range of legacy business products based on TDM technologies such as PDH and SDH;
- where there are no direct Ethernet-based substitutes, there are equivalent Ethernet-based voice and data services available; and
- GEA¹⁵³⁷ may also be a substitute for some customers/applications.

17.61 A summary of the evidence submitted by BT that supports this position is outlined in Table 17.4 overleaf.¹⁵³⁸

17.62 One telecoms provider [redacted] similarly recognised that some leased line TI users could migrate to a dedicated Ethernet product to achieve a similar deterministic routing option. However, it recognised that this would come at a cost. For example, it noted that [redacted].¹⁵³⁹

17.63 Our engagement also suggests that some of the costs previously seen when switching may be lessening due to changes in the market. For example, [redacted] its own retail dedicated Ethernet product presently has a bandwidth starting point of [redacted]bit/s (which represents a considerable jump for a site presently served via a 2 Mbit/s TI service) [redacted].¹⁵⁴⁰ [redacted] has similarly indicated that if a specific user does not want to use the full bandwidth that is potentially available through an Ethernet connection, software may be available to throttle capacity down to what a customer wants, which means that it is quite easy to upgrade via a software change (rather than hardware).¹⁵⁴¹

¹⁵³⁷ Generic Ethernet Access (GEA) generally refers to Openreach FTTP (Fibre To The Premise) and FTTC (Fibre To The Cabinet) products.

¹⁵³⁸ [BT Group response to the 2018 PIMR and 2018 BCMR consultations, annex 5, table 4.3](#). [accessed 10 May 2019]

¹⁵³⁹ [redacted].

¹⁵⁴⁰ [redacted].

¹⁵⁴¹ Comments from meeting [redacted].

Table 17.4: Comparison of service features for PPCs, Ethernet, and broadband

Service Feature	PPC ¹⁵⁴²	Point-to Point Ethernet (carrier class) ¹⁵⁴³	National Ethernet Fibre ¹⁵⁴⁴	National Ethernet EFM/GEA ¹⁵⁴⁵	Broadband Access (FTTC) ¹⁵⁴⁶	Broadband Access (FTTP) ¹⁵⁴⁷
Contention	Dedicated	Dedicated	Dedicated	Dedicated	Shared	Shared
Distance Limitations	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited	Not Limited
Service Availability	99.85%	99.93%	99.93%	99.93%	n/a	n/a
Coverage	99%	99%	99%	EFM 82% GEA 73%	73% ¹⁵⁴⁸	2.83%
Symmetry	Symmetric	Symmetric	Symmetric	Symmetric	At least 2 Mbit/s each way	At least 2 Mbit/s each way
Price	£2,800	£3,498	£[X]	£[X]	£228	£228
Connection	£2,217	£1,850 (£656)	£[X]	£[X]	£54	£104

17.64 In response to UKCTA’s comments regarding the substitutability of FTTC and FTTP, we note that, as discussed above, GEA-FTTC and FTTP are just two of many alternative services available which can (in certain scenarios) provide similar functionality to TI services. Although we consider point to point Ethernet services as the closest substitute for TI

¹⁵⁴² PPC based upon 2km [main link distance] MLD (current average MLD across installed base –15km terminating, 4km regional trunk, 2km national trunk).

¹⁵⁴³ Point to point EAD assumes 10km MLD excludes connection charge £1,925 also there is currently offer of £656 which expires 31/3/18.

¹⁵⁴⁴ National Ethernet Fibre assumes 2 Mbit/s on 100 Mbit/s Etherway LA service (3 year term free connection) using shared backhaul and core using a Virtual Private Network (VPN) architecture rather than dedicated point to point infrastructure.

¹⁵⁴⁵ EFM assumes 2Mbit/s on 3 pairs (3 year term free connection) and GEA 2Mbit/s on 80:20 Etherway.

¹⁵⁴⁶ Broadband Access typical bandwidth inclusive price is £18-20 per month -£54 connection charge not shown.

¹⁵⁴⁷ For the transition variant of FTTP with Openreach 80/20 rentals at cost of £9.95 per month. Coverage source “think broadband” for Openreach coverage. See <https://labs.thinkbroadband.com/local/uk> [accessed 22 May 2019].

¹⁵⁴⁸ We note that business coverage for superfast broadband is at least 90% for small premises ([Ofcom, Connected Nations 2018: UK Report](#), page 12) and that the 73% FTTC coverage provided by BT’s retail arm may understate FTTC availability. For example, TalkTalk business highlights 95% UK coverage ([TalkTalk, Business partners EoFTTC datasheet](#) [accessed 25 April 2019])

services, we consider FTTC and FTTP to be a reasonable substitute for some customers/applications even though coverage is currently more limited than for point to point Ethernet services (see Table 17.4). We consider that FTTC and FTTP coverage and availability, and therefore substitutability, is likely to increase going forward given growing investment in full-fibre networks and deployment announcements from established and alternative providers.¹⁵⁴⁹

Conclusions on qualitative factors

- 17.65 While, as some stakeholders have argued, customers may be reluctant to move from TI services to modern alternatives due to TI services' perceived reliability, this is a declining legacy service. BT has confirmed that it is increasingly supported by ageing and often obsolete equipment, which is becoming ever more challenging and expensive to source. In addition, those with expertise in managing the SDH and PDH platforms are now retiring.¹⁵⁵⁰ This means that users of these services will increasingly be exposed to higher levels of risk and uncertainty, which will only grow as BT moves closer to the switch-off of PSTN and other legacy TDM platforms and services.
- 17.66 As the reliability of TI services declines and the price difference with modern alternatives narrows, the rationale for remaining on TI services weakens.
- 17.67 We conclude that:
- there are conflicting views about the ability of more modern services to substitute for the full range of low bandwidth TI services but, based on the evidence available to us, we consider that these modern services are a viable alternative, have sufficient coverage to serve the majority of users, and will increasingly be available at a price and service point appropriate for current users of low bandwidth TI services. Therefore, in the event of a SSNIP we are likely to see some additional switching;
 - however, although the number of low bandwidth TI services users is declining, the remaining low bandwidth TI users are likely to be those who are least inclined to switch, even in the event of a SSNIP; and
 - in the absence of any strong external factor encouraging migration, many of these users will continue to switch at their own pace, with that typically being where end-user equipment or applications come to the end of their life.

Conclusions on product market definition

- 17.68 As set out above, we would expect an increase in switching from TI in response to a SSNIP. However, the evidence is unclear whether the loss in volumes to Ethernet services (or indeed to other modern alternatives) would be greater than 18% so as to render the SSNIP unprofitable. On balance, we have therefore adopted a conservative approach and defined a separate product market for low bandwidth TI services for the period of this review.

¹⁵⁴⁹ Ofcom, 2018. *Connected Nations 2018: UK Report*, pages 13-14.

¹⁵⁵⁰ BT Group response to the 2018 PIMR and 2018 BCMR Consultations, annex 5, paragraphs 5.7-5.9.

Geographic market

- 17.69 In the 2016 BCMR, our analysis suggested that competitive conditions were largely homogeneous across the UK (excluding the Hull Area), on the basis that BT had a very high market share (significantly greater than 50% across the UK).¹⁵⁵¹ Our updated March 2018 analysis suggests that this remained the case with BT accounting for the large majority of low bandwidth circuits.¹⁵⁵² We have no reason to believe that the geographic market has changed since 2016.
- 17.70 There were no stakeholder comments regarding our proposed geographic market definition.
- 17.71 We therefore find that any market for low bandwidth TI services will have a national scope. While we acknowledge that the amount of rival infrastructure is greater in some areas, especially in central London, we do not consider that these variations warrant definition of separate geographic markets within the UK excluding the Hull Area.

Conclusion on market definition

- 17.72 Having considered all the evidence outlined above and taken account of stakeholders' comments, we conclude that there will remain a distinct national market (excluding the Hull Area) for low bandwidth TI services for the period of this review.
- 17.73 Having set out our proposed findings in relation to the relevant market we have then considered whether this declining market remains susceptible to *ex ante* regulation during the relevant period. We do this via the three-criteria test.

The three-criteria test for low bandwidth TI services

- 17.74 When considering imposing *ex ante* regulation, we must (among other factors):
- define relevant markets appropriate to national circumstances;¹⁵⁵³
 - consider the markets that the European Commission has listed as potentially needing *ex ante* regulation, noting that the market for wholesale high-quality access provided at a fixed location (what we refer to as wholesale leased lines) is currently included in this list;¹⁵⁵⁴ and
 - recognise that the 2014 EC Recommendation indicates there may be situations where it may not be appropriate to impose *ex ante* regulation.¹⁵⁵⁵

¹⁵⁵¹ 2016 BCMR statement, paragraph 5.84 and Table 4.4 (showing BT market shares for low bandwidth TI circuits).

¹⁵⁵² 2016 BCMR and analysis of 2017 TI circuit data (using BT RFS and data provided by other telecoms providers).

¹⁵⁵³ This must be done in accordance with the principles of competition law and taking utmost account of the 2014 EC Recommendation and EC SMP Guidelines.

¹⁵⁵⁴ 2014 EC Recommendation.

¹⁵⁵⁵ 2014 EC Recommendation, Recitals 17 and 19 .

- 17.75 To assess whether it is appropriate to impose *ex ante* regulation in a market listed, the 2014 EC Recommendation sets out the following three criteria which must **all** be met (the three-criteria test) if *ex ante* regulation is to continue:
- the presence of high and non-transitory barriers to entry. These may be of a structural, legal or regulatory nature; and
 - a market structure which does not tend towards effective competition within the relevant time horizon. The application of this criterion involves examining the state of infrastructure-based and other competition behind the barriers to entry; and
 - the application of competition law alone is insufficient to adequately address the identified market failure(s).¹⁵⁵⁶

Approach

- 17.76 In conducting the three-criteria test **we have focused on the second and third criteria**. In relation to those we have considered the following applicable principles.
- 17.77 With respect to the second criterion, the 2014 EC Recommendation, Recital 15, states, with emphasis added:¹⁵⁵⁷
- “A tendency towards effective competition implies that the market will either reach the status of effective competition absent *ex ante* regulation within the period of review, **or will do so after that period provided clear evidence of positive dynamics in the market is available within the period of review**. Market dynamics may for instance be caused by technological developments, or by the **convergence of products and markets which may give rise to competitive constraints being exercised between operators active in distinct product markets.**”
- 17.78 Also, with respect to the second criterion, the 2014 EC Recommendation Explanatory Note states, with emphasis added:¹⁵⁵⁸

“... in innovation-driven markets competitive constraints often come from innovative threats from potential competitors that are not currently in the market, **and dynamic or longer-term competition can take place among firms that are, from a static perspective, not necessarily competitors in an existing market.** ... A tendency towards effective competition does not necessarily imply that the market will reach the status of effective competition within the period of review. It simply means that there is **clear evidence of dynamics in the market within the period of review which indicates that the status of effective competition will be reached in the foreseeable future** without *ex ante* regulation in the market concerned. Therefore, anticipated events must be expected within a precise timeframe **and on the basis of concrete elements** (e.g. business plans, investments made, new

¹⁵⁵⁶ 2014 EC Recommendation , Recital 11.

¹⁵⁵⁷ 2014 EC Recommendation, Recital 15.

¹⁵⁵⁸ Explanatory note to the 2014 EC Recommendation, page 10.

technologies being rolled out) rather than something which may only be theoretically possible.”

17.79 With respect to the third criterion, the 2014 EC Recommendation, Recital 16, states:

“Competition law interventions are likely to be insufficient where for instance the compliance requirements of an intervention to redress persistent market failure(s) are extensive or where frequent and/or timely intervention is indispensable. Thus, *ex ante* regulation should be considered an appropriate complement to competition law when competition law alone would not adequately address persistent market failure(s) identified.”

17.80 We have also taken into account the EC SMP Guidelines which state, with emphasis added:¹⁵⁵⁹

“Once most customers have switched to a higher performing infrastructure, a group of users may still be using the legacy technology. In this event, **NRAs should take a regulatory approach that does not unduly perpetuate the cycle of captivity** by defining overly narrow markets.”

17.81 Further, we have considered an EC SMP working paper which states, with emphasis added:¹⁵⁶⁰

“When the majority of customers have migrated to a modern, higher-performance infrastructure, leaving a captive customer-base stranded on the legacy infrastructure, as is already apparent for low-speed analogue leased lines, the chain of substitution may appear to break, and the market analysis may suggest the finding of separate markets. However, when such an issue is identified, **NRAs should take care that the regulatory approach does not perpetuate a cycle of captivity by continuing regulation of an ever smaller niche market, but rather serves to encourage migration on to modern networks and enables the ultimate switch-off of legacy networks.**”

17.82 We have also had regard to our statutory duties, which include an obligation to carry out our functions with a view to securing that regulation does not involve the imposition or maintenance of regulatory burdens that are unnecessary.¹⁵⁶¹

Analysis

Our proposals

17.83 In the 2018 BCMR Consultation, our provisional assessment was that the CI services market will increasingly constrain the low bandwidth TI services market, given that we expect the migration of low bandwidth TI service users to modern alternatives and the price

¹⁵⁵⁹ EC SMP Guidelines, paragraph 45.

¹⁵⁶⁰ EC Staff Working Document on the EC SMP Guidelines, page 19.

¹⁵⁶¹ Section 6 of the Act.

convergence between low bandwidth TI services and EAD services to continue within the period of this review and up to the point at which BT withdraws the TI platform.

- 17.84 We therefore provisionally concluded that there are dynamics in the market within this review period which indicate that effective competition will be reached in the foreseeable future and thus the second criterion of the three-criteria test as set out in the 2014 EC Recommendation is not satisfied.

Stakeholder responses

- 17.85 BT, Virgin Media and KCOM agreed with our assessment that the three-criteria test was not satisfied and that it was correct to remove *ex ante* regulation on low bandwidth TI services in this review period. This was on the basis that demand for low bandwidth TI services is low and falling across the UK as businesses are switching to newer technologies ahead of the end of the product's life planned for closure in 2025, and that the parts and expertise required to maintain the services are becoming increasingly difficult to obtain (see the discussion of the qualitative factors relevant to demand-side substitution above).

- 17.86 Telefónica and UKCTA considered that all parts of the three-criteria test were satisfied, and that *ex ante* regulation should be maintained. The main points made by these respondents were that:

- CI services are not a sufficient constraint on low bandwidth TI services, as there are insufficient alternatives to TI available and some TI customers are reluctant to migrate to modern alternatives¹⁵⁶²;
- it was impossible to assert that effective competition would emerge over the course of a two-year review period¹⁵⁶³;
- price convergence between EAD and TI was an insufficient basis on which to justify the removal of *ex ante* regulation¹⁵⁶⁴; and
- demand for low bandwidth TI will not continue to decline and customers remaining on the platform continued to require protection.¹⁵⁶⁵

- 17.87 In addition, PAG, UKCTA, Vodafone and [X] made arguments in relation to market power and the impact deregulation would have on migration. The main points raised were that:

- deregulation would lead to greater uncertainty, push customers into a forced migration and leave them with higher migration costs¹⁵⁶⁶;
- deregulation would create problems for telecoms providers with 'sticky' customers on TI¹⁵⁶⁷;

¹⁵⁶² Telefónica's response to the 2018 BCMR Consultation, page 7. UKCTA's response to the 2018 BCMR Consultation, paragraphs 52-53.

¹⁵⁶³ UKCTA's response to the 2018 BCMR Consultation, paragraph 56.

¹⁵⁶⁴ UKCTA's response to the 2018 BCMR Consultation, paragraph 57.

¹⁵⁶⁵ UKCTA's response to the 2018 BCMR Consultation, paragraphs 52-53.

¹⁵⁶⁶ UKCTA's response to the 2018 BCMR Consultation, paragraph 54.

¹⁵⁶⁷ PAG's response to the 2018 BCMR Consultation, paragraph 26.

- Vodafone argued that price increases resulting from deregulation would not necessarily incentivise migration, as increases in circuit prices at the wholesale level might not be passed down to the retail level.¹⁵⁶⁸ It also argued that deregulation could lead to more migration, creating resource constraints for customers, BT and other providers, as well as particular costs and provisioning issues for Openreach.¹⁵⁶⁹

Our reasoning and final decision – tendency towards effective competition

17.88 As discussed above, we consider that low bandwidth TI services are becoming an increasingly unsustainable legacy technology with rapidly declining numbers of customers, no material new demand, and rising unit costs.

17.89 BT has recently indicated that it does not expect to continue to support TDM data services beyond 2025. This is because the underlying SDH platform which supports TDM data services also supports PSTN and legacy broadband services and:

- legacy broadband services are in the process of being withdrawn; and
- it intends to migrate all voice services off the PSTN to an IP based platform by the end of 2025.¹⁵⁷⁰

17.90 As discussed above, the relative price difference between low bandwidth TI services and point to point Ethernet services has fallen significantly, such that EAD offers 50 times the bandwidth of a 2 Mbit/s circuit for just a 37% price premium. We anticipate this trend to continue given that unit costs will likely rise as maintenance costs increase, the fixed costs of low bandwidth TI services are recovered across a decreasing number of end-users, and given that efficiency improvements in this area are unlikely.

17.91 However, modern alternatives exist that are satisfying the demand for the functionality provided by TI services. While we do not consider the evidence suggests that low bandwidth TI services are in the same market as CI services over the period of the review, there is clear evidence of continued migration from low bandwidth TI services to other services. We note, for example, that:

- prices are converging, with the price of EAD falling significantly over recent years. While the price for low bandwidth TI services has also fallen, this has been at a much slower rate and there is scope that prices for these services may increase as volumes continue to decline;
- users of low bandwidth TI services are increasingly reliant on ageing and obsolete equipment, which means that the associated reliability and stability of the low bandwidth TI services will diminish, which will increasingly encourage users to migrate to alternative services; and

¹⁵⁶⁸ Vodafone's response to the 2018 BCMR Consultation, part 3, paragraph 9.3.

¹⁵⁶⁹ Vodafone's response to the 2018 BCMR Consultation, part 3, paragraphs 9.5-9.6.

¹⁵⁷⁰ BT letter to Ofcom, 3 July 2018. www.ofcom.org.uk/.../bt-low-bandwidth-wholesale-ti-services.pdf [accessed 22 May 2019]

- advances in technology mean that there is a range of widely available alternative services that can increasingly replicate and/or substitute for the full portfolio of TI technologies.

17.92 We expect that the technological and price convergence outlined above will continue within the period of the review and in the foreseeable future (potentially up to the point that BT withdraws the TI platform). This means that the CI services market will increasingly constrain the low bandwidth TI services market. We therefore believe that in the longer term, the market will tend towards effective competition in the absence of *ex ante* regulation. BT's ability to exploit its market power in this rapidly diminishing legacy market will therefore diminish, as will the need for extensive or frequent and timely intervention previously considered indispensable.

17.93 Telefónica and UKCTA commented that the market for low bandwidth TI services should not be deregulated because it is impossible to say that competition will emerge over the course of a two-year review period. However, the principles outlined above clearly indicate that it is not necessary for effective competition to be reached *within the review period* in order for the second criterion to fail. Rather, the second criterion could fail even if the market tends towards effective competition *after* the review period, "provided clear evidence of positive dynamics in the market is available within the period of the review";¹⁵⁷¹ and "anticipated events must be expected within a precise timeframe and on the basis of concrete elements".¹⁵⁷² We consider that the analysis presented above satisfies these tests. In short:

- there is clear evidence within this review period of continued migration and price convergence, such that we consider the market will tend towards effective competition in the foreseeable future; and
- there are "concrete events" that we anticipate taking place within a precise timeframe, namely BT's withdrawal of the PSTN and the products that depend upon it by December 2025.¹⁵⁷³ All TI services will have been withdrawn before this date.

17.94 As we conclude that there are dynamics in the market which indicate that the status of effective competition will be reached in the foreseeable future, the second criterion of the three-criteria test as set out in the 2014 EC Recommendation is not satisfied.

17.95 Within this context we do not consider it appropriate that regulation should stifle the timely and managed migration away from low bandwidth TI services to more modern platforms. We do not consider that deregulation will lead to "forced migration". Customers may remain on TI services if they wish to do so until such time as BT withdraws them in preparation for PSTN switch-off. We recognise that BT may increase its TI service prices (although it has committed to limit any increase to a maximum of CPI+8%), and customers

¹⁵⁷¹ 2014 EC Recommendation, Recital 15.

¹⁵⁷² 2014 EC Recommendation Explanatory Note, page 10.

¹⁵⁷³ See <https://www.openreach.co.uk/orgp/home/products/wlrwithdrawal/wlrwithdrawal.do> [accessed 22 May 2019]

may accelerate their migration in response. These customers will not be stranded on TI services, as there are a range of alternatives available.

- 17.96 In line with the EC SMP Guidelines and explanatory note, we consider that deregulation should encourage migration to modern networks and enable the ultimate switch-off of legacy networks.¹⁵⁷⁴ We consider that deregulation will not lead to increased uncertainty; BT has provided voluntary commitments relating to service maintenance and pricing. Deregulation should allow networks increased flexibility to plan for migration and to encourage end users to migrate.
- 17.97 Lastly, regarding Vodafone’s comment that increased migration because of deregulation could create resourcing constraints for Openreach, we note that neither Openreach nor BT Group raised this as a concern in their response. We anticipate that encouraging migration through deregulation well in advance of PSTN switch-off will have preferable provisioning outcomes as opposed to not facilitating migration and leaving end users to continue their typical behaviour of switching only where services come to the end of their lives.
- 17.98 The failure of the second criterion is sufficient to conclude that the market for low bandwidth TI services is no susceptible to *ex ante* regulation, and therefore will be deregulated. However, we have also considered whether the third criterion is satisfied in respect of this market, and have concluded this also fails for the reasons set out below.

Our reasoning and final decision – sufficiency of competition law

- 17.99 In light of the market trends identified and given the context that this is a legacy market facing ever declining volumes and an announced switch-off date, we consider that *ex post* competition law is sufficient to address any competition problems that might arise in this market. We consider that the need for extensive or frequent and timely intervention is no longer indispensable in this declining market, and indeed, could be counterproductive if it disincentivises efficient migration to modern networks. Further, we consider the risk of market failures (such as excessive pricing) emerging is limited given the availability of alternatives mentioned above. Consequently, it would be disproportionate to impose *ex ante* regulation. The market therefore does not satisfy the third criterion of the three-criteria test.
- 17.100 In deregulating this market, we have considered the EC SMP Guidelines¹⁵⁷⁵ and an EC SMP working paper¹⁵⁷⁶, both of which emphasise the need for NRAs to prevent the perpetuation of a “cycle of captivity” by defining ever smaller markets, and instead encourage migration and the switch-off of legacy network technology. It would therefore be disproportionate for us to continue to regulate the low bandwidth TI services market going forwards.

¹⁵⁷⁴ See EC SMP Guidelines, page 19.

¹⁵⁷⁵ EC SMP Guidelines, paragraph 45.

¹⁵⁷⁶ EC SMP Guidelines, page 19.

Deregulation of TI

Our proposals

17.101 In the 2018 BCMR Consultation, we provisionally concluded that the cumulative three-criteria test as set out in the 2014 EC Recommendation is no longer satisfied in relation to the low bandwidth TI market. Based on this provisional conclusion, we did not consider that these services are susceptible to *ex ante* regulation. We therefore proposed to revoke all conditions imposed on the low bandwidth TI services market (including the PPC Direction¹⁵⁷⁷ and general remedies).

17.102 We noted that in July 2018 BT wrote to us¹⁵⁷⁸, outlining its plans with respect to the ongoing availability, reliability and pricing of these legacy services:

- availability: BT is committed to supporting 2 Mbit/s and above TI services until March 2021 subject to sufficient demand. BT also noted that while it is currently reviewing its platform plans, it does not expect to support TDM services beyond 2025. If withdrawal of these services is announced, BT indicated at least three years' notice will be given and that active dialogue with customers will occur;
- reliability: BT is committed to supporting this platform on a reasonable endeavours basis to meet the service delivery and quality requirements as set out in its PPC contracts; and
- pricing: BT has provided an assurance that with volumes declining quicker than costs (as some costs will be incurred until the last circuit is removed), and in the absence of regulation, it will not increase prices by more than CPI+8% per annum.

17.103 We highlighted BT's proposals for reasons of transparency, noting that our findings on the appropriate regulatory approach for these legacy services has been made consistent with our legislative duties and is independent of BT's voluntary commitment.

17.104 Some respondents disagreed with our proposal to deregulate the low bandwidth TI services market during this review period, instead proposing the retention of the existing charge control remedy, a phased deregulation and for BT's voluntary commitments to be imposed as obligations. Below, for each of these proposals, we set out our reasoning and final conclusion.

Stakeholder responses

17.105 In relation to the existing charge control remedy:

- Vodafone argued that if we deregulated the low bandwidth TI market, BT would significantly increase PPC prices and discriminate in favour of its own lines of

¹⁵⁷⁷ In proposing this we note that the provisions within the PPC Direction are included in BT's reference offer, which is a legally binding contract on both parties. This means that if the PPC Direction were removed, BT would still be bound by the contract and would require telecoms providers' agreement to make changes to the contract.

¹⁵⁷⁸ BT letter to Ofcom, 3 July 2018.

business. It proposed a CPI-CPI price cap until 2021,¹⁵⁷⁹ arguing that deregulation of low bandwidth TI services could provide BT excess profits over the period of the review.¹⁵⁸⁰

- UKCTA argued for retention of the existing cost-based charge controls until the end of the product life. It argued that otherwise customers would face higher rental costs and higher migration costs.¹⁵⁸¹ It also said that BT’s assurance that it would not raise prices above CPI+8% showed BT’s dominance in the provision of TI.¹⁵⁸²
- [S&C] also argued for the retention of existing charge controls until all customers have transitioned to alternative services.¹⁵⁸³
- BT Group stated that it required pricing flexibility to recover its costs and better manage the transition from TI to alternative services. BT anticipates that fixed costs will be shared across a diminishing customer base, and said that although it wanted to avoid customers experiencing price shocks, it requires pricing flexibility to recover legacy network costs and manage the transition to alternative products.¹⁵⁸⁴ BT also noted that it had given assurances not to raise PPC prices by more than CPI+8% per annum.¹⁵⁸⁵

17.106 Vodafone proposed a transitional regime over the period of the review, ending with deregulation in 2021.¹⁵⁸⁶ PAG opposed deregulation but argued that if deregulation proceeded, BT should be held to a transitional arrangement as a minimum.¹⁵⁸⁷

17.107 Telefónica, UKCTA and Gamma argued for BT’s assurances to be imposed as obligations. UKCTA argued that as the assurances were not grounded in a legal or regulatory basis, they would fuel uncertainty for CPs and customers, and viewed the CPI+8% price cap as evidence of BT’s market dominance. BT Group noted that they had put forward assurances on availability, reliability and price to “provide existing TI customers with confidence in BT’s long term plans”.¹⁵⁸⁸

Our reasoning and decisions

17.108 We cannot retain existing or impose new charge controls given that the market for low bandwidth TI has not satisfied the three-criteria test. This is set out in recital 14 of the 2014 EC Recommendation, with emphasis added:¹⁵⁸⁹

“For the markets listed in the Annex, a national regulatory authority may still consider it appropriate, on the basis of specific national circumstances, to conduct

¹⁵⁷⁹ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraphs 9.4 and 9.7.

¹⁵⁸⁰ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraphs 6.29, 6.31-6.35.

¹⁵⁸¹ UKCTA’s response to the 2018 BCMR Consultation, paragraphs 54-55.

¹⁵⁸² UKCTA’s response to the 2018 BCMR Consultation, paragraph 64.

¹⁵⁸³ [S&C].

¹⁵⁸⁴ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, annex 5, paragraphs 5.10-5.13.

¹⁵⁸⁵ BT Group’s response to the 2018 PIMR and 2018 BCMR Consultations, annex 5, paragraph 5.15.

¹⁵⁸⁶ Vodafone’s response to the 2018 BCMR Consultation, part 3, paragraphs 9.2, 9.11.

¹⁵⁸⁷ PAG’s response to the 2018 BCMR Consultation, paragraphs 26-27.

¹⁵⁸⁸ BT Group’s response to the 2018 PIMR and 2018 Consultations, annex 5, paragraph 5.15.

¹⁵⁸⁹ 2014 EC Recommendations, Recital 14.

its own three-criteria test. A national regulatory authority may conclude that the three-criteria test is or is not met in the national circumstances. **If the three-criteria test is not met for a specified market listed in the Recommendation, the NRA should not impose regulatory obligations on that market.”**

- 17.109 In relation to charge controls, we may only impose price controls where the market has satisfied the three-criteria test, there has been a finding of SMP and the price controls are set to address either excessive pricing or a margin squeeze by the dominant provider.¹⁵⁹⁰
- 17.110 In any case, we consider that BT’s incentive and ability to set excessive prices is reduced by end users’ ability to migrate to alternative services. BT’s voluntary commitment in relation to pricing of low bandwidth TI services should provide additional assurances to customers.
- 17.111 Noting UKCTA’s comment that price rises of up to CPI+8% illustrate BT’s dominance in the provision of TI, we consider that given the context, some price rises may not be an indication of market failure. Rather, they may be consistent with a signal to end-users about the need to migrate to alternative services and may, at least in part, reflect cost increases. While such pricing signals will not motivate all end-users to migrate onto alternative services, we remain of the view that price rises can play a part in incentivising some end-users to migrate.
- 17.112 We also note that the provisions of the PPC Direction are included in BT’s reference offer, which is a legally binding contract on both parties. BT remains bound by the contract (for its duration) and requires telecoms providers’ agreement to make changes to the contract.
- 17.113 We cannot retain remedies, either in full or in part, to allow for a transition period as suggested by Vodafone. Remedies, including transitional remedies, may only be imposed following a finding that a provider has SMP. We have not made such a finding in this case.

Further stakeholder comments

- 17.114 This section addresses some additional points made by stakeholders in response to our proposals for low bandwidth TI services in the 2018 BCMR Consultation.
- 17.115 PAG stated that Ofcom had failed to give telecoms providers “adequate regulation notification” and had decided to deregulate without consultation.¹⁵⁹¹
- 17.116 We have followed the appropriate consultation process in preparing the 2019 BCMR Statement and in reaching the conclusion to deregulate the low bandwidth TI services market. We note that PAG’s comment was made in response to our consultation document, in which we proposed to deregulate low bandwidth TI services and invited responses to our proposals.
- 17.117 PAG also commented that Ofcom was deregulating TI leased lines services but maintaining the regulation of upstream wholesale low bandwidth TI markets.¹⁵⁹²

¹⁵⁹⁰ Communications Act 2003, Section 88.

¹⁵⁹¹ PAG’s response to the 2018 BCMR Consultation, paragraph 27.

¹⁵⁹² PAG’s response to the 2018 BCMR Consultation, paragraph 26.

17.118 PAG’s comment appears to be based on a misunderstanding. We are not maintaining regulation on any upstream wholesale low bandwidth TI services market. Recognising that this comment could relate to our decision to introduce unrestricted PIA in the PIMR, we note that telecoms providers could use unrestricted PIA to offer low bandwidth TI services, if they wished to do so.

Conclusion

17.119 In summary, we have made the following decisions:

- the wholesale market for low bandwidth TI services constitutes a separate market;
- this market does not remain susceptible to *ex ante* regulation on the basis that it no longer satisfies the three-criteria test; and
- we revoke existing regulation applying to this market.