Vodafone response to Ofcom Business Connectivity Market Review

Part one – market assessment

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Non – Confidential Version

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1 Executive summary

1.1 We share the vision of a competitive business connectivity market, however:

1.1.1 Ofcom's ambition to deliver competing enterprise fibre networks that will over-build the Openreach network at scale is not realistic given Openreach's decade long headstart in UK enterprise fibre deployment and the high costs of connecting individual business premises to alternative fibre networks;

1.1.2 The business connectivity market is materially different from the residential market. In the residential market fibre penetration is very low and there is a need for large-scale replacement of the copper network. By contrast, most UK enterprise premises are already served by Openreach fibre;

1.1.3 Another critical difference is the propensity to switch. The barriers to switching in the enterprise market are extremely high. Ofcom's analysis on switching propensity does not reflect real-world evdence;

1.1.4 In light of this market situation, higher prices and a refreshed Duct & Pole Access (DPA) remedy will not promote competition or stimulate fibre build;

1.1.5 Competition and innovation in this market would be best be served by opening up access to Dark Fibre where it exists, and encouraging new fibre build where it doesn't. As well as being a more efficient use of existing fibre assets, this would enable the swift and competitive deployment of 5G that the UK needs, and bring much-needed competition to the enterprise market;

1.1.6 Ofcom's proposals for its CI price control are wrong and are not supported by evidence. They will simply deliver a cash windfall for BT;

1.1.7 Ofcom characterises its approach as focused on "stability". In fact the opposite is true. ✂

1.1.8 As this is an unusually short review period, Ofcom should take extra care to ensure that it regulates rigorously and in line with its statutory duties.

A Mature UK Business Fibre Market – with historic regulatory support for Openreach

1.2 Ofcom's historic support for the Openreach enterprise connectivity model has encouraged Communication Providers (CPs) to invest in connecting to the Openreach network at its deepest point, locating kit in BT exchanges and using Openreach as a strategic access provider to overcome the practical and economic barriers associated with digging to connect to individual business premises.

1.3 The Ofcom-endorsed 2014 changes to Openreach's Excess Construction Charge (ECC) pricing structure (which smooths costs over a wide pool of connections), together with the critical mass of connections ordered over the Openreach network (not least from guaranteed orders from BT's own business), has given Openreach an entrenched and unmatched scale and cost advantage that no

rational investor would seek to challenge given the mature state of the enterprise fibre market. It is therefore unsurprising that, for enterprise customers, no market entry at scale is planned in the years ahead – a point recognised in the evidence Ofcom present in the consultation.

Barriers to Switching in Business Connectivity

1.4 All the evidence shows that there is a significant reluctance amongst Business Connectivity customers to switch access circuit providers, prompted largely by a fear of disruption and the mission critical nature of connectivity to businesses. Customers will only consider switching provider if they can justify the risk to save enough money to cover the switching costs and materially reduce operational costs in the future. Customers typically also require a "switching premium" to compensate for the risks associated with switching, such as downtime. These factors have not been properly taken into account by Ofcom.

1.5 With market sentiment loaded against switching and no remedies proposed to address this, any scale investment in new infrastructure by other CPs is likely to be left under-utilised and unable to produce a return for investors.

Procurement in a national market

1.6 Ofcom has failed to take account of the fact that procurement in the business connectivity market is not conducted in a local, site by site context. Instead, purchasing is typically carried out at a national market level in aggregate. Enterprises are looking for a provider that can offer a full range of services, nationwide. As a result, contracts are priced at a national rather than a local level. ✂.

The cost to businesses of securing fibre

1.7 Unlike in the consumer market, where token connection fees are paid, enterprise customers typically bear charges which better reflect the true cost of the connection – these take the form of significant upfront connection charges and, where applicable, excess construction fees. Once they have incurred this cost to secure a fibre connection to their premises, they are understandably reluctant to pay again for another fibre connection that offers similar functionality.

BT's enduring Market Power

1.8 Ofcom's presentation of the share of new connections in 2017 highlights clearly that Openreach has a dominant presence in all the geographies it serves. Even in Central London, viewed as the UK's most competitive area for enterprise connectivity, Openreach service share was 70%, significantly above presumption of dominance levels. This underlines the fact that the presence of alternative infrastructure within a location is not in itself sufficient to demonstrate either the establishment of competition or the future prospect of it.

Network Economics and the role of Duct & Pole Access

1.9 A revised Duct and Pole remedy, while helpful in delivering fibre to the minority of remaining enterprise locations where it is absent altogether, will not promote fibre build in areas where

Openreach fibre exists already. By Ofcom's own admission it is unlikely to make a material difference over the review period being considered, with Ofcom's own forecasts rightly predicting a very modest role for DPA. To believe that this remedy will make a meaningful difference to competition in this market would be a grave error. The remedy also fails to free CPs from a level of dependency on the Openreach network.

1.10 Ofcom's dig distance model does not rely on evidence from an alternative provider actually carrying out network extensions and therefore contains a number of assumptions that do not hold true and omits a number of costs that are necessarily incurred. The result is that the usefulness of Duct and Pole as a remedy is significantly overstated and the economic challenge faced by alternative providers seeking to extend their own networks to reach customer sites is significantly understated. When properly calculated, the true economic distances for network extensions highlight the enduring dominant position of the Openreach network in enterprise access connectivity.

1.11 The market circumstances of higher prices that Ofcom is seeking to create to incentivise self-build has existed, to a greater extent, in the recent past. It proved unsuccessful in stimulating any new market investment or entry. Openreach returns in business connectivity have been significant for a prolonged period, even at a time when its service levels were at an all-time low. Openreach service failure and excess returns during the previous market review period weren't enough to entice others to invest in the market due to the very significant and enduring economic and switching barriers that exist. Likewise, the failure of the initial alternative enterprise network investors in the 1990s and early 2000s to deliver sustainable returns to justify the initial capex has been ignored in Ofcom's analysis. Ofcom's failure to consider this real life market experience, due to its incompatibility with the theory of competing enterprise fibre networks, serves to undermine the integrity of what is being proposed. In short, there is zero evidence that Ofcom's policy of moving away from cost based regulated prices and artificially inflating Openreach's prices will lead to greater investment in enterprise networks. The reality is just the opposite.

Higher Prices harm UK Business but fail to incentivise build

1.12 Taken together, Ofcom's proposals fail to address BT's dominance. Given the rising demand for bandwidth and falling unit costs as equipment prices fall, they serve to reward Openreach with an unmerited cash windfall. These proposals leave consumers of enterprise connectivity vulnerable to higher prices in a market where there are enduring and significant barriers to entry and switching. They will not entice new entrants into a mature market for UK business fibre. If these proposals are enacted, business consumers will be paying more over a prolonged period without the medium or long term consolation of increased competitive intensity caused by market entry. Such an outcome would leave business consumers with no redress while benefiting only BT and its shareholders. Ofcom has not even attempted a cost/benefit analysis of these effects.

1.13 Ofcom presided over the 2013-2016 Business Connectivity Charge control that resulted in BT earning significant excess returns. This was because Ofcom's predictions on both costs and volumes diverged

materially from reality. This caused UK businesses to pay significantly higher prices over that period. In that market review, Ofcom did not set out to create an outcome where consumers were over-charged, it occurred as a result of a series of errors and misjudgments around Ofcom's charge control modeling. What is proposed for the period 2019 – 2021 does however represent the deliberate decision of the regulator to set aside its obligations to UK business consumers and subject them to higher prices, without a clear attempt to quantify the possibility, if any, of securing scale alternative infrastructure deployment in enterprise networks; a probability which is, based on all the evidence presented, likely to to be very low indeed (and quite possibly no higher than the counterfactual).

Cost effective Backhaul is essential for competitive 5G

1.14 The most disturbing aspect of these proposals is in the irreparable damage that will occur to the deployment of 5G and competition within that market. With higher bandwidth needed for existing and new mobile sites to support 5G within the review period, ✂

1.15 Mobile backhaul represents a separate economic market, with distinct market characteristics. 5G deployment is about to enter a critical phase and the backhaul needs of this market must be addressed as a matter of urgency. Ofcom's BCMR proposals fail to do this and do not honour the assurances Ofcom gave to the Competition and Markets Authority at the point of the BT/EE acquisition.

Securing the right Remedies

1.16 Given the extent of our concerns with these proposals, we believe Ofcom should take time to reconsider its overall approach and provide regulatory certainty for the lacuna period while it does so. A new set of proposals is needed that will safeguard the business consumer interest, protect competitive 5G roll out and recognise the very different market characteristics of the mature business connectivity fibre market, from the needs of residential users to replace copper with fibre.

1.17 This means Ofcom should:

1.17.1 Introduce a more comprehensive Dark Fibre remedy for the mobile backhaul market, to tackle Openreach's ability to distort the bandwidth market through its artificial bandwidth gradient. This will deliver the intensive backhaul bandwidth needed in the 5G market;

1.17.2 Introduce a more comprehensive Dark Fibre remedy for the UK enterprise market, to fuel service competition and innovation. This will provide an efficient means for consumers to access competitive offerings without stranding existing fibre assets;

1.17.3 Maintain active price regulation for all active services including 10Gbit/s to ensure pricing for these services does not diverge from cost over the two-year review period;

1.17.4 Progress with a Duct and Pole remedy to ensure that where fibre is not already in place, CPs have the means necessary to extend their networks in the most efficient way possible, using the extensive Openreach duct network to do so on cost based terms – but noting that the

impact of this remedy in enterprise markets will be material only in areas which currently have no fibre;

1.17.5 Progress with initiatives to improve business switching, consulting on a range of potential new initiatives to ensure the process is more straightforward for customers and helps to overcome concerns around possible service interruption and the costs of parallel running;

1.17.6 Ensure Quality of Service minimum standards are maintained for all areas where SMP has been found.

1.18 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 while freeing UK businesses and mobile providers from the constraints of Openreach service specifications and artificial bandwidth gradients. A Dark Fibre remedy is the only realistic and viable means for delivering lasting benefit to end-users as well as promoting retail competition and sustainable investment through greater levels of innovation in otherwise mature business connectivity markets. It is complementary to an enhanced duct and pole remedy, which is likely to be directed at new sites. Dark Fibre is a proportionate remedy, being both efficient and practical to implement. Without Dark Fibre, we can expect UK businesses and mobile providers to be constrained by the limitations of the Openreach active service portfolio, which will curtail the UK's ultimate potential as a digital economy. This holds true both for enterprise and for mobile backhaul markets.

2 The Challenge of Business Connectivity

Importance to the UK Economy

2.1 A well-functioning business connectivity market is vital to the wellbeing of the UK economy. The business connectivity market has a direct link to the success and productivity of UK enterprises. It is also a key enabler for the transition to a digital world for UK consumers, having grown in strategic importance as we progress to cloud based solutions where data is stored remotely and better connectivity is required to retrieve it in real time, and as fixed and mobile demand for bandwidth continues to grow at pace. The true measure of the market's importance to the UK economy is not represented by the £2BN+ of direct revenues generated annually, but by the hundreds of billions of pounds of commerce that it underpins and the range of vital public services it directly supports, from the NHS and blue light services, through to education, local and central government and the UK defense sector. Business connectivity services are the unseen, but vital, network that link businesses to each other, support consumer interactions and act as the circulatory system for a large part of the UK's fixed broadband and mobile infrastructure.

2.2 Demand for business connectivity is growing and as an industry we must rise to the challenge to deliver the service and bandwidth needs of our customers. Over the next two years, the backhaul provided through the business connectivity market will have a crucial role in underpinning a competitive and geographically spread 5G offering in the UK, representing perhaps the business connectivity market's biggest challenge so far. Mobile bandwidth demand to existing cell sites is expected to increase significantly to support 5G devices and the increased functionality that follows, with a large number of new cell sites to follow. Government and Ofcom's timescales for 5G deployment are ambitious, fueled in part by the economic enticement that 5G connectivity can offer, boosting innovation and productivity and helping to improve the UK's prospects within the global economy.

Market Failure

2.3 Our own market experience and Ofcom's analysis illustrates clearly that there are persistent levels of market failure within the UK's Business Connectivity Market, with Openreach dominating wholesale supply in all the geographies where it operates. Since the first wholesale regulated products were introduced in 2001, the regulatory model has taken a BT centric approach, encouraging other CPs to design their own networks around BT service locations and serving exchanges. While this has helped providers buy shorter access circuits from Openreach, it has resulted in BT being able to secure the lion's share of wholesale demand, allowing it to build out and fund, through charges (in the form of connection and excess construction charges) to industry, a business focused fibre ethernet network that dominates supply today.

2.4 This latest Ofcom Business Connectivity Market review is a massive step-change to Ofcom's previous regulatory approach, proposing to move to a model which has the aim of encouraging more self-build

by abandoning CPI-X charge controls in favour of a higher priced wholesale environment, with only light touch safeguard caps in place. It is proposing a number of High Network Reach locations, where less regulation will apply, and a reformed duct and pole remedy, with the aim of assisting self-build. If this model had been proposed in 2001 or even 2004, when the first Ethernet services were introduced, it may well have resulted in very different outcomes today, with BT holding on to a much smaller proportion of the business connectivity market. However, Openreach now has an unassailable lead in the market, with a cost base that can't be replicated by its competitors.

Barriers to making use of alternative infrastructure

2.5 BT's market position has become entrenched, with fibre assets to more than 75% of UK Business Connectivity premises. At this scale BT is significantly ahead of its nearest competitors, being many times larger than its nearest rivals. Substantial economic barriers to extending alternative networks to business customers exist and there are clear business buying behaviours which work in BT's favour and discourage the use of alternative networks. Any transition to a business connectivity market with more focus on infrastructure competition, if it occurs at all, will be slow and gradual. While an enhanced Duct and Pole remedy may be useful and might assist in reducing a proportion of the economic barriers that exist, it does not overcome them for the large majority of customer connections. It would be irresponsible to believe Duct and Pole can be transformational when Openreach's business fibre position is so entrenched, cemented in over a decade of Ofcom policy. It will take a number of years for Duct and Pole to make even a modest impact on the shape of the market.

2.6 As well as the very significant economic barriers to extending networks, there are very fundamental concerns around the reluctance of business customers to switch infrastructure suppliers that need to be overcome if we are to see competition flourish. The very negative business consumer perception around switching suppliers identified by Ofcom through the Cartesian report have existed for a number of years. The Openreach service crisis, now at an end, has left a legacy of mistrust and created an even greater reluctance amongst business consumers to switch.

2.7 There is also a desire among enterprise customers to seek connectivity from just one provider. In a market where connectivity to multiple sites is procured together, this plays straight into BT's hands given its geographic dominance. Ofcom must not turn a blind eye to these concerns and behaviours. Reluctance to switch is impairing the functioning of the market and exacerbating the level of market failure we see today. Ofcom has quite properly taken the issue of consumer switching seriously in the residential sector, however it is yet to properly acknowledge the problem in business connectivity. Left unaddressed, it means that even if new infrastructure is deployed, there is little likelihood that it will be properly exploited by business users.

Acknowledging existing Fibre assets in the Business Connecting Market

2.8 Ofcom's approach to encouraging more infrastructure investment by alternative providers appears to be rooted in the consumer market. However, the consumer market is at a stage in development

where fibre penetration is low and there are opportunities for others to invest and gain first mover advantage, overtaking Openreach's legacy copper network. This opportunity doesn't exist in the Business Connectivity Market. This means a different, more nuanced approach is required to tackle the market failure and enable operators to compete. An approach that allows CPs to make the best use of their own infrastructure assets – and is realistic about the economics of deploying a fibre network over an existing one – is the most effective way to deliver retail competition, while encouraging less dependency on Openreach in the future. This approach will also enable 5G to be rolled out quickly and in a more cost-effective manner, while ensuring that BT isn't able to use its own in-house backhaul resources to give EE a 5G competitive advantage.

2.9 The market conditions – higher leased line prices than would otherwise prevail – that Ofcom is seeking to create have existed previously in the recent past, and have failed to stimulate investment and rebalance competition in the market. BT's returns in the Business Connectivity market for a successive number of years were staggering. In 2014/15 alone BT made excess returns of £352M from regulated Business Connectivity services, representing a nearly 24% return on capital during a period where charge controls were in force and aiming to align charges with cost. These sustained returns prompted Ofcom to take the unusual step of introducing immediate starting charge adjustments. Even with these levels of excessive profits (earned over a period where Openreach service quality was in crisis – forcing Ofcom to intervene to stabilise standards), there was no material market entry.

2.10 ✂.

2.11 As the owner of the second largest enterprise network in the UK after BT's (formed by the amalgamation of the fixed networks of Cable & Wireless, Energis, THUS and Your Communications) ✂.

2.12 The reality is that Openreach's decade long business fibre headstart will serve to undermine Ofcom's policy aspirations for this market. The most likely outcome of the proposed policy shift will be UK businesses and public sector customers paying more for connectivity than they have for a number of years, with no discernible benefits to infrastructure competition materialising.

A Regulatory Approach to Support UK Business & Competitive 5G Deployment

2.13 All the evidence available suggests that Ofcom's proposals as they stand will fail to address the levels of market failure identified and will be insufficient to safeguard the interests of UK business. Most alarmingly, not only will competition be compromised in business connectivity, but there is a material risk that 5G roll-out will be slowed down and that the nascent 5G market will be imbalanced from the outset in favour of EE.

2.14 Delivering 5G in a market that makes use of active products with uncontrolled costs is not sustainable as MNOs seek to upgrade bandwidth. The competitive dynamics in the mobile market today are different compared with the 4G roll out – for a start, EE was an independent business when 4G was launched, but now it will be able to secure backhaul in-house, with no cash outflow for BT Group. 5G is also more bandwidth hungry than 4G, with greater need for fibre and backhaul costs representing

a larger share of the cost base. Without a Dark Fibre remedy to empower mobile backhaul for other providers, the 5G market risks being compromised before it has begun.

2.15 Ofcom need to reconsider their approach carefully to ensure it is robust and adequately addresses both the causes and symptoms of market failure within the UK business connectivity market. The difference in fibre availability when compared with the residential market is stark, as is the under-developed regulatory model for improving switching between infrastructure providers. What is clear from all the evidence presented by Ofcom is that the presence of alternative infrastructure in the vicinity of a customer site is in itself insufficient to demonstrate competition or even the potential for future competition. BT's dominance will not be addressed by these proposals due to a number of concerns:

2.15.1 **The reluctance of end users to switch infrastructure providers in the market:** This is a significant problem and Ofcom's own evidence indicates that even experienced business connectivity customers avoid switching. This is more than just an unfortunate perception. Business customers have very real concerns that act as a significant deterrent to greater alternative infrastructure usage. Ofcom has proposed no remedies to address this.

2.15.2 **The very limited scope for market entry in a mature business fibre market**: Past practical market experience has demonstrated that even in an environment where BT has been able to overcharge business customers significant sums for business connectivity, market entry was not forthcoming. In the absence of active service pricing remedies or a wider scoped Dark Fibre remedy that would allow retail suppliers to break free from Openreach's artificial bandwidth gradients, business consumers will not be protected from BT's SMP.

2.15.3 **The high bandwidth needs of MNOs for 5G roll-out:** The rapid, nationwide roll-out of 5G and establishment of a competitive 5G market risks being compromised due to Ofcom's failure to recognise the bandwidth needs of MNOs that aren't part of BT Group. These proposals gift EE an unfair competitive advantage in mobile backhaul that will damage competition for consumers, slowing the pace and spread of 5G in the UK as EE's competitors are constrained in securing their own backhaul needs.

2.15.4 **Failure to align prices with cost:** In the absence of a Dark Fibre remedy, Ofcom's policy direction is to raise pricing in the hope that this might encourage duplicate network investment, along with the proposed DPA remedy. This is expected to cost UK tax payers and business customers who buy Business Connectivity Services around £200M more than the status quo (keeping pricing aligned to cost in an active charge control).

2.15.5 **The limitations of Duct and Pole Access as a remedy:** The cost assumptions used by Ofcom in their analysis of the Duct and Pole product contain errors and overstate the benefits of using Duct and Pole. This is in part because the figures used by Ofcom are unrealistic and miss key costs, and as a result, they overestimate the level of competitive constraint that arises from alternative infrastructure. Overconfidence in an unproven Duct and Pole remedy

risks compromising competition in the short term. This is even apparent in Central London, the location where Ofcom cite the highest level of competitive supply, but where Openreach secured over ~70% of new orders in 2017.

2.15.6 **Barriers to alternative network use:** Ofcom proposals seek to define markets through a measure of the ability of rival networks to extend and connect customer sites. It is apparent from Ofcom's own evidence that competition in the market is not shaped at all by the ability for networks to be extended to reach customer sites, with rivals' network extensions making up just 2% of the connectivity in 2017. Market competition is enabled by something not at all considered by Ofcom – historic installed connectivity, where network capex is already sunk.

2.15.7 **The economics of overbuild**: The economics of duplicating BT's existing fibre has not been properly understood. It would make no commercial sense in many cases to replicate fibre that already exists. This is particularly true for mobile backhaul, where there is only ever likely to be one customer at that location (the MNO). Having paid connection and excess construction charges to reach that location, MNOs are unlikely to pay again for a fresh dig and in so doing stranding the existing fibre asset.

2.16 We urge Ofcom to pursue a course that encourages rather than inhibits further infrastructure competition in business connectivity, and which provides the necessary remedies to equip the market to deliver for business consumers in the near term – in particular, this means tackling the urgent UK infrastructure requirements of 5G. This means Ofcom should:

2.16.1 Introduce a more comprehensive Dark Fibre remedy for both mobile backhaul and enterprise access. This would tackle Openreach's ability to distort the bandwidth market and end artificial bandwidth gradients, fueling retail competition, service innovation and the efficient use of electronics to reduce costs. An appropriately priced Dark Fibre solution would deliver for 5G and avoid discouraging efficient alternative infrastructure build. As a minimum, dark fibre should be available at all existing Business Connectivity sites (including mobile sites) where Openreach active fibre services are in situ.

2.16.2 Maintain active price regulation for all active services including 10Gbit/s to ensure pricing for these services doesn't diverge from cost over the two-year review period;

2.16.3 Progress with a Duct and Pole remedy to ensure that where fibre is not already in place, CPs have the means necessary to extend their networks in the most efficient way possible, using the extensive Openreach duct network to do so on cost based terms;

2.16.4 Progress with initiatives to improve business switching, consulting on a range of potential new initiatives to ensure the process is more straightforward for customers and helps to overcome concerns around possible service interruption and the costs of parallel running;

2.16.5 Ensure that regulation of backhaul enables CPs to properly replace Openreach and BT Enterprise, with an ability to provide a functionally equivalent service that also enables the minimisation of the use of the Openreach network as part of the regulation's design and before regulation is removed;

2.16.6 Set accommodation services regulation in recognition of its cross market function and fully enables economies of cost and scope that would be open to Openreach and BT Enterprise.

2.16.7 Ensure Quality of Service minimum standards are maintained for all areas where SMP has been found. There remains a significant risk that any resource constraints faced by Openreach will result in poor service experience for business customers where no QoS standards are in place, with the competitive constraint from alternative infrastructure competition too weak to make a difference to Openreach behaviour in locations where QoS minimum standards are not maintained.

2.17 While this final BCMR only lasts for 24 months, as the forerunner to Ofcom's regulation beyond 2021 it sets a course for the decade ahead. It is essential that Ofcom takes into account the mature fibre characteristics of the business connectivity market and the growing appetite for bandwidth that Ofcom has highlighted.

Ofcom's duty to regulate for today

2.18 Ofcom has a very clear duty to regulate based on the market conditions faced today by business consumers. While it is only right to encourage efficient market entry, it must not do so at the expense of compromising the long term welfare of business customers. To ignore the substantial fibre assets held by Openreach, the very significant barriers to switching, and the impact on the nascent 5G market of allowing EE to use in-sourced backhaul – which involves no BT Group cash outflow, all without a balancing Dark Fibre remedy – risks damaging competition in both the business connectivity market and the UK mobile market.

2.19 We want Ofcom to reach a conclusion to this market review that is robust and addresses market failure issues for existing and future business connectivity customers and sites. An outcome that offers competitive solutions for fibre users today – and makes the best use of those existing fibre assets while encouraging more build to new sites – strikes the right balance and will keep the UK's 5G aspirations on track.

2.20 Ofcom has made a series of other legal errors which are set out in more detail in section 4.

3 Market Context

Vodafone's place in the business connectivity market

3.1 Vodafone is a significant player in the UK business connectivity market, with decades of experience as a major supplier to UK enterprises and the public sector through our substantial fixed line business. We are the second largest provider of business connectivity to the UK enterprise sector. We are also

a major purchaser of connectivity in our own right, securing backhaul to our own mobile sites throughout the length and breadth of the United Kingdom. Although we are significant player, with decades of market experience, we are a distant second, with BT's market presence many times larger.

3.2 Since the last BCMR we have invested in technology that has allowed us to better understand and map our network as well as the connectivity choices open to us when we seek to connect a customer or one of our own sites. We now have better insight into the economics of connecting and extending our network and a greater understanding of the decision making process undertaken by our customers when considering to switch or pay for a new connection.

3.3 These new insights have helped us to prepare this response, enabling us to better anticipate how much of a difference new remedies will or won't make, and better understand the impact where remedies are softened or removed altogether. In a market where demand is growing rapidly, but barriers to infrastructure competition remain high, it is important for us to understand when existing network assets can be viably used and where the duplication of fibre is uneconomic.

The investment history and climate in UK business connectivity

3.4 The business connectivity market is responsible for the majority of the UK's existing fibre assets. Although UK fibre penetration is less than 6%, that fibre is largely concentrated in the business connectivity market, where the167,000 large enterprises that Ofcom sees as being served by the BCMR market have fibre to their sites where and when they wish.

3.5 A number of business focused telecommunication companies entered the market in the 1990s and early 2000s. Cable & Wireless, Energis, THUS, Your Communications, Torch, MCI-Worldcom, Global Crossing, COLT and Fibrenet all started to compete against BT for enterprise business, investing in new fibre networks to do so. The networks were focused on major UK cities, with trunk connections between these locations. With the exception of COLT, all these businesses have been subject to some form of takeover, asset sale or financial restructuring, prompted in most cases by an inability to sustain their original business models, taking account of the very large sunk costs incurred in laying down enterprise fibre networks.

3.6 While the fibre assets of these businesses remain in situ, they remain under-utilised and struggle to compete against the scale, cost base and ubiquity of Openreach's fibre ethernet network. COLT's relative success can largely be explained by its modest network footprint, which is concentrated in an area with a large number of high value clients within the City of London and Docklands, serving a niche of very specific demand and international clients with a limited London site presence. Virgin were a later entrant to the market, scaling up their market participation after financial restructuring which saw the original cable bondholders and investors lose out. In the context of the Business Connectivity Market, Virgin have focused on seeking to connect business customers who are in proximity to their traditional residential cable footprint.

3.7 In 2001, following intervention from Oftel, BT launched its first wholesale business connectivity services, Partial Private Circuits (PPCs). Prior to that, other CPs wishing to use BT tail circuits to connect

clients had to buy retail services. In 2004, again after regulatory intervention[1], BT launched Wholesale ethernet services. The ubiquity of BT's network, its ability to aggregate demand from a range of retail buyers (including all BT lines of business) and its incumbency advantages in connecting buildings, allowing it to connect premises with the least amount of disruption – including greater certainty around excess construction costs – has allowed it to cement its dominance in the business connectivity market. This dominance is also evident in the mobile backhaul market, where BT's market share is in the range 80-90%[2], with BT able to use volume discount schemes and long term purchasing commitments to secure most industry demand, even in locations where alternative supply options might be present. The acquisition of EE by BT in 2016 has allowed BT to tighten its grip on the mobile backhaul market yet further.

3.8 The structure of the industry has resulted in other retail providers of business connectivity funding BT's network expansion. By our calculations, over £500M[3] has been paid by industry to Openreach in the form of Excess Construction and Connection charges to fund Openreach's business fibre footprint over the past decade. This wealth transfer from other retail providers to BT has left the alternative business connectivity networks established in the 1990s/2000s underutilised, as the cost of connecting new customers to these alternative networks remains prohibitive in comparison. This has left alternative investors ultimately unable to capture the market share necessary to justify their initial investment, even over a prolonged period when active service pricing was high.

3.9 The Openreach products sold into the wholesale market have been structured and priced based on BT's network and service architecture. This requires CPs to backhaul to BT exchanges and rent space inside those BT exchanges to serve customers in order to consume Openreach access products at the lowest regulated prices. Securing the lowest wholesale cost is essential if CPs are able to stand a chance of competing against BT lines of business in the retail market. This focus on Openreach service architecture has resulted in CPs directing their more recent investments into connecting BT exchanges and renting co-location space to lower their wholesale cost base.

3.10 The need for BT's network rivals to divert their funds – towards interconnecting to multiple BT exchanges and paying excess construction charges and connection fees to Openreach – came at the expense of investing in their own networks. Even where alternative infrastructure was available, a number of significant obstacles prevented it from being used at the scale needed to justify the cost of the original investment. Two decades later, these obstacles remain unaddressed and include:

3.10.1 Business Connectivity procurement – business connectivity is mostly procured by business customers on a national basis. Local buying is rare.

[1] https://www.ofcom.org.uk/about-ofcom/latest/bulletins/competition-bulletins/all-closed-cases/cw_656
[2] https://assets.publishing.service.gov.uk/media/558a835ded915d1592000001/BT-EE_full_text_decision.pdf [102]
[3] Taken from BT's Current Cost Financial Statements which recorded ECC payments of ~£50M in 2014/15 & 2015/16 and £70M in 2016/17 - £500M is a conservative extrapolation over the past decade.

3.10.2 Lack of connected premises – The cost, time delay and disruption caused by civil works to extend the existing duct/network to new business customers, even when that customer is in close proximity, has deterred greater alternative network usage. After the contractors have left the scene during the initial roll out phase, the cost of getting them back to connect up individual premises at a later date is often prohibitive, especially if the building already has an existing Openreach fibre connection. Ofcom's modelling work – while welcome in principle – unfortunately demonstrates that it has not understood the scale of this issue: see part 2 section 4. Customers are rightly unwilling to pay a large second connection charge, when they have previously paid one to Openreach indirectly. With a copper to fibre scenario, the benefits of a new delivery technology are immediately apparent. However, this is not the case for a fibre to fibre switch. Ofcom does not appear to have understood or taken account of this.

3.10.3 Openreach's ability to aggregate demand from multiple CPs (including uncontestably BT lines of business) – This enables Openreach to achieve aggregation efficiencies that cannot be matched, as the density of business connectivity customers is lower than it is in the consumer market. ith a critical mass of orders in each area (secured from BT and other CPs), in most cases Openreach has the lowest cost to serve.

3.10.4 Risks and reluctance to switch – Business customers by necessity are risk adverse. This reflects the critical nature of many of these services and the overall importance of connectivity to the financial wellbeing of their businesses, as constant connectivity is a necessity to trade. Consequently, there is far more reluctance to switch supplier than in the consumer market, where the risk is one mostly of inconvenience rather than direct financial loss. The Openreach ethernet service crisis has magnified these consumer concerns.

3.10.5 Significant price reductions are necessary if customers are to switch from an Openreach-based service. Ofcom has assumed that "price matching" is good enough, but this leads to fundamental mistakes in Ofcom's contestability analysis.

3.11 Today, 20 years after that significant wave of initial investment, Openreach's market position appears as dominant as ever. Even the presence of rival infrastructure has failed to reduce Openreach's market share in a material way – Openreach has a very high share of 2017 business connectivity new customer orders in every part of the United Kingdom:

3.11.1 In the Central London Area, viewed as the most competitive part of the market, BT attracted between 61-70% of new customer connections, approximately three times as many as their nearest rivals COLT;

3.11.2 In metro areas and the areas of High Network Reach where there are multiple networks present, BT recorded a service share of **over 50%**[4];

3.11.3 In locations where BT and one other CP had infrastructure, BT's 2017 service share was between **61%-70%** of new orders;

3.11.4 In areas where BT is considered the only provider, with limited presence of other CPs, BT's share was recorded at **81% - 90%**[5];

3.11.5 Alternative providers dug for **just 5%**[6] of all new connections provided in 2017, irrespective of the bandwidth;

3.11.6 Openreach had existing duct connections to **81-90%** of its 2017 new customer ends;

3.11.7 ✂.

3.12 Market share is not the only determinant of dominance. However, persistently high market shares – at these very elevated levels – are highly instructive. Ofcom should assume dominance above 50%[7]. Market shares at the levels indicated above will require some very serious, well-founded explanation if Ofcom is not to find SMP; the consultation does not contain such a level of explanation.

3.13 In fact, there is strong evidence to suggest that the presence of alternative infrastructure in itself is not a guarantee that the competitive intensity in the wholesale market will increase due to the continued presence of these very significant barriers on the functioning of the market, which act individually and in aggregate, to discourage the use of alternative infrastructure. This is even true in situations where alternative networks have been deployed and those costs are sunk. Unless ways are found to overcome these barriers, then any amount of new network investment – even aided by an enhanced duct and pole remedy – is unlikely to have a material impact on competition in the business connectivity market, which has very distinct barriers to alternative network utilisation from the residential market.

3.14 Crucially, Ofcom fails to grapple properly with the implications of BT's continuing high market share. It does not consider the obvious implication that this points to errors in its contestability analysis.

3.15 The presence of enduring barriers has had a direct influence on the investment sentiment in the market, with Ofcom's research identifying significant reluctance to invest in new fibre assets aimed exclusively at the business connectivity market. Ofcom highlight that the industry only expects some minor overspill benefits from planned residential fibre building[8], with no evidence of any material new business connectivity-focused investment planned for the UK. In a market saturated with Openreach fibre and with enduring barriers to the use of existing alternative networks, this is perhaps unsurprising.

[4] See BCMR 6.83
[5] See BCMR 6.46
[6] Page 69 of Annex to Consulation
[7] See Case C-62/86 AKZO Chemie v Commission [2003] ECR II-3275 para
[8] See BCMR 6.70 – 6.72

The Impact of Excess Construction Charges (ECC) cost smoothing on the market

3.16 The existing Excess Construction Charge model allows the first £2800 of Excess Construction Charges to be included within the Openreach connection cost (Openreach is given headroom for this cost within its charge control cost stack, with £722 per circuit allocated to cover inclusive ECCs). Any costs arising over and above this are met by the ordering CP (and their customer). This has provided considerable certainty within the planning and purchasing process for business connectivity, taking most customers outside of the scope of additional ECCs. It allows quotes to be confirmed quickly and customers to proceed with certainty. Prior to this ECC regime being implemented, the probability of incurring an ECC on an Openreach order was 33% with an average charge billed of £4400.

3.17 Indeed, even those customers who do end up paying ECCs (whose cost of circuit delivery is in excess of £2800) are benefiting from an Openreach wide approach that sees an element of smoothing in the costs (£722 of cost contribution from the connect charge allows the customer to incur up to £2800 of costs before additional ECCs apply) with customers effectively cross subsidising each other, thus supporting market wide certainty for Openreach customers. The ability to provide near instant certainty has brought considerable benefits to Openreach. As connection volumes on the Openreach network have increased, so too have the number of connected buildings, increasing the reach of the network and therefore reducing the instances of future ECCs when new orders arise in the same or adjacent locations. This cycle of improved certainty and reduced likelihood of additional ECCs helps when customers are provisioned, making the on-boarding journey far less problematic. In the last two years alone, all the new connections to the Openreach network have contributed an enormous £78M into the general Openreach fund to reduce average fibre construction and duct construction for customers using the Openreach network.

3.18 However, it has made it much harder for CPs not using Openreach infrastructure to compete. Dig distances for using non-Openreach supply options tend to be longer, increasing the cost of excess construction charges. With no ECC smoothing and fewer aggregation of demand benefits (as a result of a far lower volume of orders processed), it means customers end up with much larger upfront costs if they choose to avoid Openreach. The instant certainty Openreach can offer is contrasted with the time required by other CPs to survey and then quote, which customers often aren't prepared to endure.

3.19 While the Openreach ECC regime has brought certainty and cost control to business customers, it has created a new barrier that other infrastructure providers must overcome if they are to attract new connections. This makes it less likely that that non-Openreach supply options will be selected, even where a shorter dig is required.

Market Characteristic: Reluctance to Switch infrastructure supplier or migrate to new forms of access

3.20 Cartesian's report for Ofcom[9] highlighted that "*Provisioning of fixed connectivity services was one of the major concerns for a large number of interviewees* [business connectivity customers] with a great deal of anxiety around the potential for delays caused by *construction, civils, blocked ducts and wayleaves issues, as well as the inability to plan and manage these events."* In contrast, once in situ, business connectivity products have a strong reputation for reliability and dependability. Ofcom published a survey by BDRC in 2016 that identified the importance of price, quality of service and resilience, but also the existing relationship with the incumbent supplier. Two thirds (66%) of respondents had not switched supplier in the last 5 years, suggesting a low switching rate of just 6.8% per annum.

3.21 For a procurement manager to risk disrupting his or her business, there needs to be a very compelling reason to authorise a switch of supplier/underlying infrastructure. This means for alternative providers to win market share from BT's retail lines of business, they have to price their products at a much lower level than BT or offer something genuinely innovative. Matching or even slightly undercutting the BT price with a similar offering is not enough to motivate customers to switch and justify the risk of disruption, given their very real anxieties about the potential risks associated with making the switch. Openreach's recent ethernet service crisis has exacerbated those fears.

3.22 Even when customers are staying with the same supplier, but the access circuit is being replaced or adjusted, it can be a very resource intensive process for both the customer and the CP, with the entire process requiring significant co-ordination and project planning to fit in with both the customer and CPs needs. For tail optimisation – for example, moving to a shorter Openreach access tail or on-net circuit, or migrating to the latest generation of Ethernet Circuit – an extensive process needs to be undertaken.

3.23 In a Tail Replacement (overbuilding an existing circuit): typically, this occurs when shifting from one technology to another, and involves a new circuit route with both old and new services running in parallel for a time. There needs to be sufficient space and power in all locations to parallel run, and agreement on when the cut over will occur – often out of hours, with customer support on site to reboot dependent systems.

3.24 In a Tail Shortening, you are not replacing the existing tail, but instead looking to shorten it to achieve a reduction in distance and cost. Commonly known as a B End shift, the circuit will be moved to a closer serving exchange. An outage is often required and again the work needs to be fully coordinated with the customer on a circuit by circuit basis.

3.25 There are substantial commercial and operational considerations which make these activities costly and complex:

[9] Cartesian: Business Connectivity Market Assessment – A report for Ofcom 2018 (Page 48)

3.25.1 The costs involved in circuit shift represent considerable expense for the customer and the CP, with significant operational issues to manage. It often means co-ordination between the retail CP, the wholesale provider (typically Openreach) and the customer, with the physical presence of all three at the time the cut over is made. Aligning valuable resources and investing customer time, normally within a 3-hour window, can be challenging and requires dedicated project management support to co-ordinate. This can be even more challenging when the customer site is remote/unmanaged or if technical resources are not based at the location, requiring travel.

3.25.2 There are requirements for customer agreed outage times – in many cases CPs cannot force a customer to take an outage of their service and this must be done at a mutually agreeable time. Customers have the ability to cancel outage windows up to 24 hours prior to outage without charge, leading to the standing down and potential idle time for resources.

3.25.3 There may be very specific safeguards built into the customers' connectivity needs that need to be taken into account. For example, 'separacy', the requirement for geospatial or full carrier diversity, ensures that the new routes have no single point of failure and the main and back up circuits follow entirely different paths.

3.25.4 Sometimes a customer is unable to accommodate an outage of no more than a few minutes (or less), so full parallel running for a prolonged period is needed to ensure that the service can cut over and be sustained (with a resilient fall back in place). This often means running two circuits for 45 days or more (a cease cannot be confirmed until the replacement service is up and running). In the most sensitive cases, dual running can last over 12 months with much of the time spent awaiting agreed customer outage dates. This adds significantly to the costs.

3.26 Any systems change is likely to be disruptive and there is a higher switching risk with systems upgrades, so they are often avoided or delayed. From a CP perspective, putting customers through this additional operational headache raises concerns of churn. CPs try to keep customer disruption to a minimum and avoid changes to underlying infrastructure. If customers sense disruption is inevitable, they may seek to avoid the change or use it as an opportunity to retender (as a network change is likely under both the status quo and new supplier scenarios). There is also a finite amount of industry resource available to carry out such work (in terms of skilled staff and engineering resource). The Openreach service crisis from 2012–2016 is a stark reminder of the consequences that can occur where too many engineering tasks are placed on a limited pool of industry resource.

Meeting the Challenges of 5G Deployment

3.27 The business connectivity market's biggest challenge yet lies in the immediate future – ensuring sufficient backhaul to support 5G. Upgrades to existing sites are due to commence during 2019, and this will mean upgrading capacity to existing mobile cell sites (either upgrading existing fibre or moving off microwave links to fibre) and getting fibre to new sites.

3.28 To accommodate 5G at existing fibred 4G sites, where MNOs have already paid to connect – these sites are often in locations where the MNOs are the only customers, with no alternative re-use – and in the absence of a Dark Fibre remedy, MNOs will either have to pay for active service price bandwidth re-grade fees, or build out or buy alternative fibre infrastructure at considerable expense. The latter approach would not make any commercial sense given the costs MNOs have made in connecting with their current supplier. It would also be inefficient from an asset utilisation perspective, as the previous fibre resource would be left unused and in most cases could not be redeployed for any other purpose.

3.29 In its evidence to the Competition and Market Authority, Ofcom emphasised the importance of a Dark Fibre remedy to resolve concerns over mobile backhaul. With BT noted as supplying approximately 80–90% of all ethernet-based fibre mobile backhaul (i.e. including third party suppliers and self-supply) in the UK, it was said to be essential that Ofcom had a remedy to combat the potential anti-competitive impact that a merged BT / EE could have on the market. In the absence of an effective Dark Fibre remedy, BT's ownership of EE could allow BT to leverage its market power into the competitive mobile market, distorting the competition which to date has driven technology investments, by further reducing investment incentives in the UK mobile sector.

Raising the cost of Connectivity

3.30 In the absence of a Dark Fibre remedy, Ofcom's policy direction is to no longer attempt to align wholesale pricing with cost, in the hope that this might encourage duplicate network investment, supported in part by the proposed DPA remedy. This approach is expected to cost UK tax payers and business customers who buy Business Connectivity Services around £200M more than the status quo (keeping pricing aligned to cost in an active charge control). It is hard to square this with Ofcom's statutory duties under the 2003 Act.

3.31 This is a real cost paid by UK tax payers and businesses to fund this Ofcom policy shift. BT are the clear beneficiaries. Ofcom's own evidence highlights the lack of any direct investment in business connectivity in the years ahead, with all new industry investment focused on the consumer market and the replacement of copper. Without any prospect of greater competitive constraint in the future, it is unclear why business customers should pay more.

3.32 In every sense Dark Fibre is the more efficient remedy. It provides the benefits of infrastructure competition (service quality, pricing and innovation), without the harm of raising pricing and the inefficiency of duplicating infrastructure. It also doesn't deter efficient fibre build in locations where no fibre presently exists.

3.33 The risks of pursuing a regulatory policy whose only tool is DPA – which is unproven and far less effective for deployment when fibre is already present – are very significant. In 2024, UK business and public sector customers could end up having paid higher prices with little if any infrastructure uplift as a result. In Spain for example, we've seen DPA used extensively in the residential market, but the business connectivity market remains under the control of the incumbent.

4 Legal framework

4.1 In this section we explain:

4.1.1 The broad outline of the legal framework under which Ofcom should conduct this review

4.1.2 How Ofcom's duties consist primarily in reviewing the competitive conditions during the review period

4.1.3 Ofcom's legal duty to put in place remedies that properly address the competition conditions to be expected over the period of the review

4.1.4 Ofcom's approach to the legal issues is related to specific practical problems in Ofcom's approach in the consultation including (without limitation):

- Ofcom places significant weight on the possibility of network build – which simply cannot be successful in reducing the above dominance levels of market share that BT holds – without reference to the demand for multi-site, cross geography connectivity;
- Ofcom says that is has prioritised regulatory stability when in fact it departs from the recognised approach of setting cost based charge controls, without any real justification;
- Ofcom fails to put in place a widespread Dark Fibre remedy, even though Ofcom has identified it as a suitable passive input which would quickly enable the market to respond to BT's above dominance levels of market power.

The legal framework for a market review

4.2 The process for market reviews is, at high level, very straightforward. National Regulatory Authorities – of which Ofcom is one – are fortunate in that the statutory framework (essentially European Directives as enshrined in UK law) set out a clear process for them to follow and prescribe a limited maximum set of matters which they are required to look at. Section 79 of the 2003 Act explicitly requires Ofcom to take due account of any applicable European Guidelines; on top of which, the Directives of the electronic communications framework apply and the UK statute must be read in a manner which is consistent with them by virtue of Factortame II principles.

The appropriate period for a market review

4.3 Ofcom plans a review period which will be at most two years[10]. This is anomalous. The telecoms framework specifies three years as the norm; indeed, Ofcom, in the 2016 BCMR decision, said this:

'Every three years, Ofcom conducts a review of competition in the provision of leased lines in the UK." [11]

4.4 Ofcom themselves are planning a 5-year cycle going forward[12]; in other sectors, at least five years tends to be the norm[13]; and there are plenty of longer periods. For example, the "RIIO" controls set by Ofgem – in work that is now recognized as leading the state-of-the-art – tend to use an 8-year period.

4.5 We know that Ofcom has settled on a short period for reasons, essentially, of administrative convenience – so that it can line up this review with the WLA review.

"By 2021, we intend to implement a consolidated review of residential and business telecoms markets and physical infrastructure. Before then, we are taking certain steps to both facilitate our new consolidated review and to implement certain key elements of our strategy more quickly..."[14]

4.6 Administrative convenience aside, however, Ofcom provide little or no substantive justification for using a 2-year period. This is curious because, as recognized by other UK regulators and indeed by Ofcom itself, the period of any review makes a real substantive difference. The choice of review period therefore needs to be made carefully and be supported by good, valid reasons for the choice of review period. Normally the decisive factors would include:

4.6.1 the cycle for any changes in competitive conditions,

4.6.2 the need for certainty on investment returns (including typical cycles for return on investment in the industry in question);

4.6.3 the benefits in smoothing the effects of any atypical fluctuations in – for example – cost of capital.

4.7 These are recognised by other regulators (which, like Ofcom, have typically been cautious of extending price control periods for purely administrative reasons). For example:

4.7.1 RIIO: in its decision of October 2010 Ofgem selected an 8-year period and explained that it represented a move away from short-termism; enhanced regulatory certainty; and encouraged long-term investment planning

[10] See para 1.8; also footnote 400: "Year one of the market review period commences upon publication of the final statement and ends on 31 March 2020. Year two runs from 1 April 2020 to 31 March 2021."
[11] Ofcom BCMR constualtion, 15 May 2015, accessible here: https://www.ofcom.org.uk/consultations-and-statements/category-1/business-connectivity-market-review-2016
[12] OFCOM'S SUBMISSIONS TO EC REVIEW PENDING EC ELECTRONIC COMMS CODE: https://www.ofcom.org.uk/__data/assets/pdf_file/0028/92917/Ofcom-response-Commission-consultation-9-December-2015.pdf
[13] For example, Ofwat is setting new 5-year controls for the water sector from 2020.
[14] Para 1.4, Consultation

4.7.2 Water: in PR19 Ofwat has recognised that longer-term controls are necessary for infrastructure businesses to plan properly and in order to realise efficiency gains

4.7.3 Heathrow: although the CAA has extended the Q6 price control, this has been done carefully and has involved recalibration of the original cap, rather than just blindly keeping prices flat. It's also worth noting that the driver here was truly exceptional, i.e. the need to set the next full control to take account of the building of a new runway. Nothing so significant is at issue in the current consultation.

4.8 A short period could in theory have substantive advantages. However, most regulators, including Ofcom, have taken the view that the benefits of short periods are outweighed by the advantages of longer periods. All other things being equal, you would expect there to be a particularly good reason to opt for a short period. This is especially true for network industries where investment is needed, as is the case in telecoms; in the energy sector, Ofgem has noted the need for investment in the shift to low-carbon.

4.9 In principle, administrative convenience – in this case, the desire to align two different market review exercises – can be a valid factor for a regulator to take into account when setting a review period. However, it is hard to see how an administrative reason could legitimately be the decisive or only factor taken into account when the review period is set, which does appear to the case here. And crucially, where a regulator does take the decision to set a short control for reasons which are essentially administrative, you would expect the regulator to go out of its way to ensure that its broader statutory responsibilities were not compromised, especially in an environment where investment is expected to be needed, as is the case in telecoms as we move to FTTP networks.

4.10 In short the two-year period is:

4.10.1 unusual ;

4.10.2 at odds with regulatory best practice; and

4.10.3 has not been properly justified, appearing to be a function of pure administrative convenience, and settled without any consideration of the choice of review period in light of Ofcom's statutory duties. This appears to be a clear reviewable error.

4.11 What practical impact does the short review period have on this decision? It is clear that the review period has of itself been the direct driver of some of Ofcom's substantive decisions. For example, in paragraph 1.25, in a summary section in which Ofcom discusses its decision on Dark Fibre, Ofcom says this:

"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. "

4.12 This is important because Dark Fibre is a remedy which is needed now, in particular for 5G roll-out. It is not good enough for Ofcom to put it off until 2021 on the basis that it is more convenient to do a two-year review at the moment.

4.13 This wayward starting point is compounded by two further errors.

4.14 First, Ofcom's thinking appears to be heavily influenced by what it expects to happen after 2021 – the executive summary alone contains no less than seven references to what Ofcom plans then. In fact, as a matter of law, having selected a two-year period, Ofcom should then look at that two-year period and not at what might or might not happen thereafter. The best, most concise statement of this is, helpfully enough, provided by the Court of Appeal (giving voice in English law to what is required under the EC Framework):

"Ofcom must consider how matters can be expected to develop over the period leading up to the next market review.[15]

4.15 This matters because Ofcom has chosen not to find SMP in certain key markets because it enthusiatically predicts certain things after its intended 2021 review. This, again, is a clear legal error.

4.16 This point is reinforced by the EC's recommendation on SMP Analysis[16] which says this:

"NRAs should take into account existing market conditions as well as expected or foreseeable market developments over the course of the next review period in the absence of regulation based on significant market power; this is known as a Modified Greenfield Approach...

If the underlying retail market(s) is (are) prospectively competitive under the Modified Greenfield Approach, the NRA should conclude that regulation is no longer needed at wholesale level[17]*.*

4.17 This is completely clear: the forward look should be based on the period covered by the next review – in this case, up to 2021 – and absent SMP regulation. What Ofcom is proposing is exactly the opposite of this: it proposes to take account developments in SMP regulation outside the relevant period.

4.18 Second, Ofcom treats the shorter review period as giving rise to a duty to "provide certainty and stability":

"We have also taken account of the need to provide certainty and stability over this shorter two-year period, in advance of our combined review of wholesale network regulation."[18]

[15] TalkTalk Telecom Group plc v Office of Communications [2013] EWCA Civ 1318
[16] European Commission's Guidelines on market analysis and the assessment of significant market power under the EU regulatory framework for electronic communications networks and services (Text with EEA relevance) (2018/C 159/01)

[17] European Commission's 2018 SMP Guidelines: (2018/C 159/01)
[18] For the record, Vodafone disagrees that Ofcom's proposals provide certainty or stability; if anything, the contrary (as set out in further detail within this response) . The rest of this section is without prejudice to that position.

4.19 This is clearly a case of the cart going before the horse. Certainty and stability may be valid substantive considerations in their own right, but for Ofcom to settle on a review period for administrative reasons and then prioritise particular substantive goals as a result is simply the wrong way round.

4.20 This is particularly so when other key statutory goals are apparently jeopoardised. For example, in part 3 section 6 of this response we explain that Ofcom has decided to hand BT a windfall gain of some £230m over two years in pursuit of "certainty and stability". It is very hard indeed to reconcile this with Ofcom's principal statutory duty (under section 3(1) of the 2003 Act) to further the interests of consumers, including businesses, because those consumers are unlikely to be interested in paying £230m in higher charges.

4.21 We note in this context that even if stability were a valid priority, Ofcom has not in fact promoted stability at all. Rather, as we explain elsewhere in this document, Ofcom's proposals represent a series of radical departures from its established practices.

4.22 Even if administrative convenience were a valid reason for setting a review period, it is not an answer to substantive questions in the review exercise itself. Those are separate questions which need their own answers. To put it another way, Ofcom's choice about the review period is just that – a choice. If Ofcom then compromises its substantive reasoning to accommodate the review period, it is committing a two-fold error:

4.22.1 First, the choice of review period having been made, Ofcom then treats it as a constraint on its substantive powers when in fact the period could easily be changed; and

4.22.2 Second, it is making the substantive question the servant of the administrative question when, of course, it should be the other way round. The whole point of the exercise – which is the exercise of a statutory duty – is to produce the correct substantive answer.

4.23 In short, a whole series of substantive questions in the review are begged because of an administrative decision taken outside the review.

4.24 To be clear, the answer to this is not necessarily to lengthen the review period, but rather to implement the correct remedies based on competitive conditions during the review period.

Other legal errors

4.25 The preceding paragraphs of this section deal with some fundamental errors in Ofcom's approach to this review. Many of the points above, and in the body of this consultation response, are errors which could render Ofcom's decision susceptible to legal challenge. In addition, we would highlight the following points:

4.25.1 Failure to consult in a manner which is transparent: in many crucial areas, Ofcom relies on information which is redacted. The reasons for redaction are not always clear'; but in any

event, it will not be possible for stakeholders to comment properly. We have written to Ofcom about this separately[19] and the contents of that letter should be read into this response in full.

4.25.2 Significant errors and omissions in the original consultation document meant that it was not possible to understand key parts of Ofcom's proposals until very late in the day. In particular, in the draft SMP conditions issued with the consultation, it was clear that Ofcom was proposing a Dark Fibre remedy which would allow CPs to connect their own sites to a "BT Only" BT exchange building. But in an email issued on 20 December, Ofcom cast doubt on that, and in fact only clarified exactly what was meant following a further email exchange in January 2019.

a. Failure to define a separate market for mobile backhaul, see part 2 section 2:

b. Failure to calibrate the CI charge control properly, see part 3 section 5;

4.26 For the avoidance of doubt, where we argue for a particular course of action which Ofcom decides not to take, that should be taken as a formal request for the purposes of section 192(7)(b) of the 2003 Act.

[19] Letter from Emma Reynolds to Jonathan Oxley,11 January 2019.

Vodafone response to the Ofcom Business Connectivity Market Review

Part 2

18th January 2019

Non Confidential Version

Contents

1. Product market definition

1.1 This section addresses our views on Ofcom's product market definitions. In summary:

1.1.1 We agree with Ofcom that there is a single product market for CI Access services at all bandwidths (for enterprise customers), which includes Ethernet and WDM services. As a rival infrastructure owner we confirm are able to use our own fibre to customer sites to provide connectivity for the full range of bandwidths from 10/100Mbit/s upwards.

1.1.2 We are of the view that the CI Access market also includes a further number of services - CCTV, Street Access and Broadcast Services – which are provided over a fibre point to point line. We believe these services have wrongly been excluded from Ofcom's analysis.

1.1.3 We agree that EFM, SDSL and ADSL do not form part of the CI Access market. These services are not direct substitutes for CI Access services, having different service characteristics and meeting different customers' needs.

1.1.4 We do not agree that mobile backhaul is part of the CI Access Market. Rather, it forms its own economic market – see section 2 of this Volume.

1.2 The following sections follow the format of the consultation questions that Ofcom has posed.

Question 4.1: Do you agree with our proposed approach to product market definition? Please provide evidence to support your views.

1.3 To answer this question, we look at supply and demand side substitution and the relevant services that fall within the CI Access market.

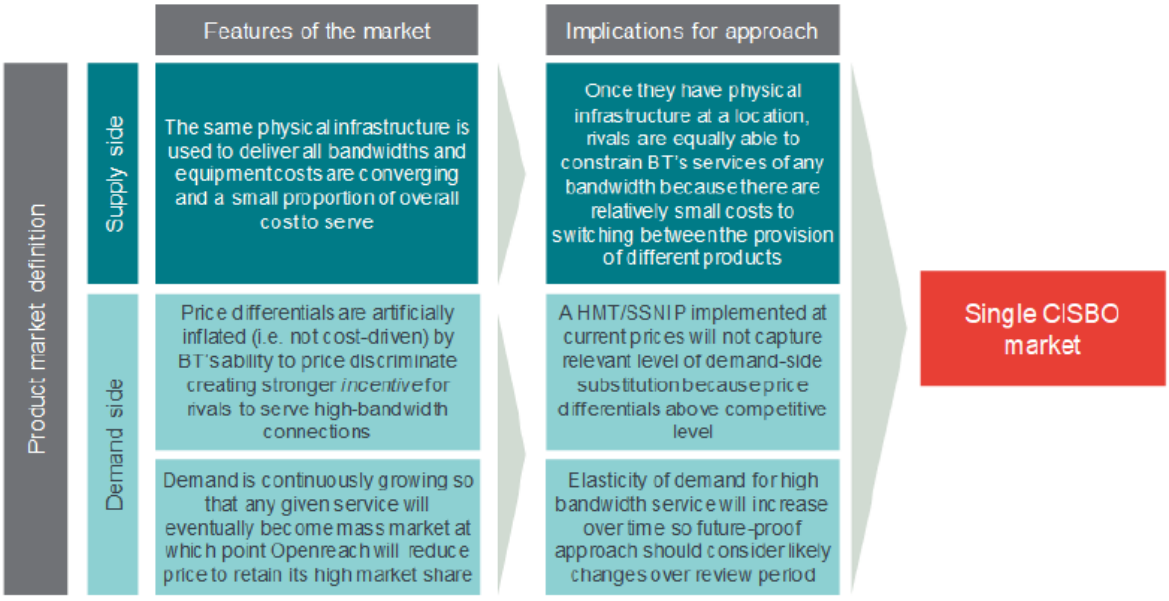
A single bandwidth market

1.4 We agree with Ofcom's finding that there is a single bandwidth market for CI Access services, which includes all bandwidths for Ethernet and WDM services. To arrive at this position Ofcom has evaluated both supply and demand side substitution.

1.5 Frontier Economics was commissioned in early 2018 by Vodafone to consider the approach to market definition given the circumstances of the market[1]. Ofcom and Frontier agree that the same fibre can be used to provide all CI Access bandwidths, and therefore greater weight needs to be attributed to supply side characteristics in the market assessment. The table below sets out the approach recommended by Frontier.

[1] https://www.ofcom.org.uk/__data/assets/pdf_file/0023/124736/frontier-market-definition-cisbo-services.pdf

Figure 2 Summary of conclusions for market definition approach



Source: Frontier

Demand side substitution

1.6 Ofcom market data evidence shows that 80% of demand is for 10/100Mbit/s services, while a further 15% of demand is for 1Gbit/s and 5% of demand for 10Gbit/s and higher. The demand for 1Gbit/s and 10Gbit/s has risen since 2016, with users of lower bandwidths progressing up to higher bandwidths.

1.7 Ofcom has identified, and our experience bears out that in the Business Connectivity Market (BCM) there are contractual limitations on customers immediately switching in response to price changes, and that the switching would take place over time, typically over three years. We agree with Ofcom's simpler approach which does not include cash flow discounting and agree it would not materially affect any results.

1.8 Ofcom faces some difficulty in judging demand side substitution between 1Gbit/s and 10Gbit/s (higher) bandwidths for a number of reasons.

1.9 The absolute number of customers substituting between 1Gbit/s and 10Gbit/s is presently far lower than the number of customers substituting between 100Mbit/s and 1Gbit/s, providing a smaller body of evidence.

1.10 The prices in the market for these services are not set at true market prices. 1Gbit/s service charging has been subject to regulatory rigor and successive charge controls, while 10Gbit/s pricing remains far higher than the FAC (fully allocated cost) as it has fallen outside the scope of the regulatory charge control regime. The lack of a cost based charge control and alternative network competition has permitted Openreach to maintain the pricing of very high bandwidth services substantially above 1Gbit/s services and materially above the costs of providing the service.

1.11 In a competitive market the bandwidth pricing gradient that Openreach applies, i.e. the difference in price between 1GBit/s services and 10Gbit/s services, would not be sustainable. If pricing were more reflective of underlying cost it would encourage a flatter retail pricing structure, with a greater proportion of customers switching from 1Gbit/s to 10Gbit/s and enjoying the advantages of higher network speeds.

1.12 Frontier Economics was commissioned to consider the approach to market definition given the circumstances of the market[2]. Frontier states

"Any demand-side analysis needs to recognise the distortion to current prices resulting from BT's price discrimination. Current switching rates for higher bandwidth services are lower than they would be under competitive pricing because the high price premium on services above 1Gbit/s means only the most inelastic consumers purchase them. If prices were at the competitive level, the price gradient would be flatter and a proportion of those customers who current take 1Gbit/s would take the 10Gbit/s bandwidth service. These customers would clearly switch to 1Gbit/s services in response to prices increases (as they currently use the 1Gbit/s services due to the pricing differential). Hence this is no break in the chain of substitution at competitive prices. This is reinforced by dynamic effects where successive Ethernet standards are introduced at higher bandwidths as premium services but due to a combination of increased demand and costs converging, every successive generation of Ethernet will become a mainstream service."

1.13 In conclusion there is a limit to the extent of evidence that can be drawn from demand side substitution when conducting a SSNIP test. This is due to the lack of competition in the supply of these products, and the very different approaches that have been taken to regulating and pricing the products. This has led to an artificial, commercially driven rather than cost related pricing gradient between the services being imposed by the dominant market player.

Supply side substitution

1.14 In seeking to evaluate supply side substitution between CI Access bandwidths, Ofcom considers the comparability of the network and components required to serve CI Access bandwidth services and their associated costs.

1.15 Once fibre has been installed, the cost difference of serving different bandwidths is simply the difference in the cost of the equipment needed to light the required bandwidth. Absent the equipment that lights the fibre, there is no cost difference in providing the fibre and facilities that support the bandwidth. In the past, the costs of very high bandwidth service equipment have been substantially more expensive than other bandwidth equipment, due to the more limited demand for this capacity. As Ofcom recognises, very high bandwidth volumes are now growing exponentially, with the same equipment being used for both end customers and backhaul connectivity. This growth

[2] https://www.ofcom.org.uk/__data/assets/pdf_file/0023/124736/frontier-market-definition-cisbo-services.pdf

in global demand has seen unit costs fall, and these will continue to fall, closing the cost differential between supplying services of differing bandwidths.

1.16 Within its report Frontier writes

" *ll CISBO services (ie all bandwidths) are delivered using a common infrastructure (fibre) and the costs of deploying fibre to the premise makes up the majority of the cost of service customers. The other material, but generally smaller cost is the cost of the active equipment used to light the fibre."*

1.17 Ofcom also finds it to be true that serving differing bandwidths have substantial costs in common. Table 3.9 shows that for a 1Gbit/s service, infrastructure costs (the fibre and duct) make up 97.1% of the cost base for a 100 metre installation. This compares to 10Gbit/s pricing (at uncompetitive price levels) having infrastructure costs of 88.9% to 92.3% therefore there is only between 8.2% and 4.8% cost difference between the supply of 1Gbit/s and 10Gbit/s.

1.18 Ofcom considers that CPs could seamlessly switch to different bandwidths once they connect the customer site. We have reviewed our 2017 connection data and concluded that our own fibre to customer sites can be used to provide the full bandwidth range 10Mbit/s to 100Gbit/s.

1.19 Our 2017 connection data also demonstrates:

1.19.1 how we are able to provide 10Gbit/s services to connected buildings as we do for all other bandwidths, illustrating that 10Gbit/s is in the same market at 100Mbit/s,

1.19.2 how we can use our duct facilities to lay new fibre to provide 10Gbit/s bandwidths, as we do for all other bandwidths, illustrating that 10Gbit/s is in the same market at 100Mbit/s,

1.19.3 how we can extend our network to lay new duct and fibre to provide 10Gbit/s bandwidths, as is the case for other bandwidths, illustrating that 10Gbit/s is in the same market at 100Mbit/s.

1.20 Our connection data for 2017 shows:

1.20.1 ✂

1.20.2 ✂

1.21 Following a detailed consideration of the evidence presented by Ofcom on the market at large and taking account of our own direct market experience we concur with Ofcom's view that a single bandwidth market exists.

1.22 We discuss the challenges faced by suppliers when new fibre is required to be installed in section 5 of this document. We do not consider this has any bearing on the conclusion that all CI bandwidths fall within a single market.

Inclusion of all relevant services

1.23 We consider that there are further services that are part of the CI Access market and that should be included within the market analysis but which have been omitted without explanation by Ofcom.

1.24 Ofcom has excluded, without explanation, CCTV, Street Access and Broadcast services. CCTV and Broadcast services are provided via point to point fibre and they are connectivity services offered under the connectivity services contract that Openreach makes available to industry in compliance with its obligation to provide a reference offer for BCM services:

"The Connectivity Services contractual information available below applies to the following Ethernet Services products[3]:

Ethernet Access Direct (EAD)

Ethernet Backhaul Direct (EBD)

Bulk Transport Link (BTL)

Wholesale Ethernet Services (WES)

Wholesale End To End Ethernet Service (WEES)

Backhaul Extension Services (BES)

Backhaul Network Services (BNS)

Cablelink

Openreach Network Backhaul Services (ONBS)

Broadcast Access

CCTV Access

Optical Spectrum Services

Street Access"

1.25 The Openreach website lists CCTV under the Ethernet services category. The service summary reads as follows:

"*CCTV Access*

CCTV Access provides high quality video connections between remote CCTV camera locations and a central CCTV control room. Potential applications include security and safety monitoring, help and information points (such as roadside assistance), public transport route monitoring, road congestion monitoring and access control.

Key benefits:

High quality video provides clearer images for better subject identification and greater usability

[3] https://www.openreach.co.uk/orpg/home/products/ethernetservices/contracts/contracts.do

Camera operators can communicate with and listen to people at the remote CCTV location

Connects multiple cameras located at multiple sites to a central control room

Enables simple integration with existing systems to avoid having to invest in new equipment

Circuits can be re-graded to support up to eight video channels without the need for additional access fibre."

Source: Openreach:
https://www.openreach.co.uk/orpg/home/products/ethernetservices/specialistaccessservices/cctvaccess/cctvaccess.do

1.26 Similarly, the Openreach website lists Broadcast services under the Ethernet services category. The service summary reads as follows:

Broadcast Access

Broadcast Access delivers video broadcast connectivity over our fibre network using recognised video transmission standards. It supports video conferencing, video transmission for popular live events and the streaming of video and media content to TV studios or post-production locations. Circuits can be provided to both permanent locations and mobile Outside Broadcast (OB) units throughout the UK.

Key benefits:

Seamless integration with television, media and production companies' existing video equipment or networks

Reach remote locations across the country

Media content can be transported simultaneously from different stages, proceedings, games or locations

Fast content sharing through high bandwidth Point-to-Point service

Helps reduce travel requirements and carbon footprint by enabling videoconferencing.

Source: Openreach:
https://www.openreach.co.uk/orpg/home/products/ethernetservices/specialistaccessservices/broadcastaccess/broadcastaccess.do

Street Access

Our standard Street Access product delivers bandwidth from a local exchange to terminating units in remote street furniture, such as lampposts or street cabinets. Once in place you can connect low-powered radio transmitters and provide wireless networks in urban areas, public information points - such as cinema listings and parking information - connectivity at popular events and remote telemetry such as traffic congestion monitoring.

Key benefits:

Delivers reliable 100Mbps bandwidth to outdoor environments

NTE that is tough enough to withstand a wide range of temperature and weather conditions

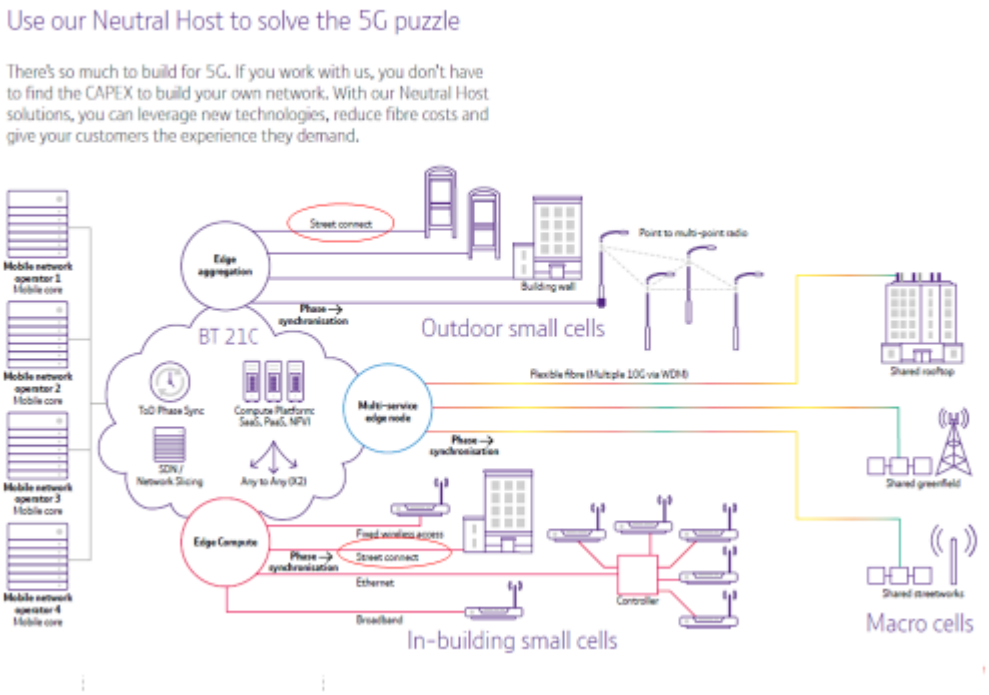
Delivers connectivity 'on the go' and enables wireless network coverage in urban areas

Offers robust wireless connectivity at popular events such sports and music festivals.

A 1Gbps Street Access product is also available. This is most suitable for use on temporary events such as exhibitions, and outside broadcasts. It consists of a remote NTE which is housed within a customer's mobile vehicle and connected via an armoured fibre cable to the customer's street cabinet for the duration of an event. The ability to terminate in a customer's mobile vehicle instead of street furniture makes it even more flexible.

Source: Openreach: https://www.openreach.co.uk/orpg/home/products/ethernetservices/specialistaccessservices/streetaccess/streetaccess.do

1.27 A more recent description of the Street Access product is provided by BT Enterprise, as shown in the diagram below (which we have highlighted with red circles), and offers customers 1Gbit/s connection between an exchange and a phone box. Street Access can be used by Mobile Small Cells.



Source: BT Enterprise

1.28 The pricing for these three services can be found in the Ethernet services price list. The exclusion of these relevant CI Access Services is given no explanation by Ofcom. The materiality of the exclusion of these services from the analysis is not discussed.

EFM, SDSL and ADSL are not part of the CI Access market

1.29 We concur with Ofcom's findings that EFM, SDSL and ADSL do not form part of the CI Access market and are not product substitutes for CI Access services. EFM, SDSL and ASDL do not offer the bandwidth or service quality comparable to CI Access services.

1.30 Frontier agrees with Ofcom findings

"*Ethernet services can also be delivered over Openreach's legacy copper access network using EFM (Ethernet First Mile) technology which utilises multiple bonded copper pairs. However, the nature of the legacy copper access network means that the bandwidth is often limited and dependent on the characteristics of the copper loops used and EFM services will be affected by higher rate of faults on Openreach's copper access network compared to fibre networks…Our view is that EFM should not be included in the market for CISBO services as it is based on a different underlying infrastructure and one cannot extend the supply-side arguments. Similarly, differences in quality of service offered are likely to limit demand side switching even where the prices of comparable bandwidths reflect incremental costs*."

Question 4.2 Do you agree with our proposed CI Access Product market definition? Please provide evidence to support your views.

1.31 We agree that Ofcom finds a single bandwidth market. We consider that the market includes CCTV, Broadcast and Street Access services.

1.32 We do not agree that the CI Access market includes mobile backhaul services. Instead we find that mobile backhaul services form their own economic market. This is evidenced in the following section.

2. Mobile backhaul: a separate economic market

2.1 In this section we explain that MNOs are distinct from general Enterprise customers, with MNO backhaul forming a separate economic market. This is because mobile backhaul has fundamentally different supply and demand side characteristics from the enterprise bandwidth market. Mobile backhaul particularly needs regulatory remedies that address the current demand to make 5G services available.

2.2 In relation to the demand side:

2.2.1 The mobile backhaul market contains a very limited number of purchasers who have a very large and very specific connectivity demand. During the period of this market review MNOs will be upgrading bandwidth capabilities to many of their mast sites, as 4G traffic flow exceeds existing backhaul capacity and to prepare for 5G traffic demand.

2.2.2 The product demanded by MNOs to meet their connectivity needs is different to Enterprise CI Access demand, as MNOs have the knowledge, capability and desire to manage their own networks, unlike most Enterprise customers. MNOs require Dark Fibre connectivity to deliver the full benefits of 4G and 5G services, rather than active Ethernet services.

2.2.3 MNOs have a particular urgent need for Dark Fibre due to the timing of the 5G rollout, which is already underway, and to make full use of the recently-awarded spectrum, a £350m investment for Vodafone, designed to directly benefit of customers. This is a crucial factor in the forward-looking assessment which the legal framework requires.

2.2.4 Ofcom commits a fundamental error with its contention that there is a single market because (Ofcom says) MNOs use the same "products" as Enterprise customers. This is merely a function of the products which regulation requires BT to sell.

2.3 In relation to the supply side:

2.3.1 Ofcom's analysis of geographic markets for enterprise customers relies on prospects of market entry upstream, which are much less likely to happen for mobile backhaul. There is no economic rationale for duplicate fibre services being installed at a mobile base station, as the redundant supplier / fibre cannot be redeployed to another customer in the same way as it could for an Enterprise customer – e.g. to another Enterprise customer at a future date or another Enterprise customer on a different floor of the building.

2.3.2 ✂

2.3.3 As well as being "single customer", mobile mast sites are much more likely to be geographically remote, meaning that prospective suppliers need even greater connectivity coverage than they would require to supply the average Enterprise customer..

2.3.4 Ofcom has previously identified to the Competition and Markets Authority that mobile competition needs to be supported by Dark Fibre as general Dark Fibre availability would address the economies of scale that are open to EE as part of BT .

BT/EE merger

2.4 The CMA based its BT/EE merger decision on the understanding that a number of input risks to MNOs would be addressed through protection provided by regulatory remedies including cost based charge controls, access to Dark Fibre and the regulated QoS regime. These regulatory protections are still needed to ensure the competition risks identified by the CMA do not emerge.

2.5 We note that Ofcom deals specifically with this question in Annex 9 to the consultation. However, Annex 9 is only seven pages long, is largely based on unsupported assertion[4] and misses key points - it does not mention 5G at all. In addition, the key data in Annex 9 is redacted. It is therefore not possible for Vodafone, a major stakeholder when it comes to the analysis on mobile backhaul, to respond properly to this Annex. This is a breach of fundamental requirements for proper consultation. As we have explained to Ofcom in separate correspondence[5], consultees – of which Vodafone in this context is a prime example – have a right:

2.5.1 to know the facts on which Ofcom is relying in order to be able to correct errors[6]; and

2.5.2 to understand the full case which is being made by Ofcom, including the underlying data, so that they can understand and comment on whether the conclusions Ofcom draws from them are correct[7].

Ofcom review

2.6 Ofcom's analysis of the mobile backhaul market is set out over seven pages within Annex 9. Ofcom identifies that MNO's:

2.6.1 Are significant buyers of leased lines;

2.6.2 Require these leased lines across a wide geographic area;

2.6.3 Use the connection from a base station to a point of aggregation in the mobile operator's network;

2.6.4 Have different purchasing requirements to that of Enterprise customers;

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[4] For example, Ofcom says that "We also note that even if were to define a separate market for this customer group the resultant SMP assessment would be similar to enterprise customers". There is no basis for this assertion; no reasoning behind it; no recognition of the fact that there would be likely to be SMP in different geographic areas if the product market were different; and no recognition that a separate market definition might well imply different remedies.

[5] Letter from Emma Reynolds to Jonathan Oxley, 11 January 2019. This response should be read as if that letter were set out here *in extenso*.

[6] See, for example, R (Devon County Council) v. Secretary of State for Communities and Local Govt, 2010 EWHC 1456 [Admin] (2011) LGR 64

[7] See, for example, R (JL & AT Baird) v. Environment Agency [2011] EWHC 939 (Admin): the point made here is decision-makers should not expect to be omniscient. Others will be in a better place to offer views on the facts – as, almost certainly Vodafone is here – it has direct knowledge of the facts, whereas Ofcom relies on information gathered from others.

2.6.5 Have higher bandwidth growth demands than the Enterprise market. In enterprise bandwidth demand has increased by 25%, and mobile backhaul needs have grown in line with mobile users bandwidth growth, which has increased by 40% in 2017[8]. This trend toward higher mobile bandwidth growth is expected to accelerate as the market moves toward 5G;

2.6.6 BT has a very high market share of Ethernet circuits sold to MNOs and this applies across all geographies. This means that MNOs will have paid ECCs to establish BT's presence and dominance;

2.6.7 The market for MNO backhaul is very small from the perspective of number of suppliers and customers, with BT having a far higher share than any other operator and there being only four national mobile wholesale operators (and *de facto* fewer, once mast joint ventures are allowed for). EE is now part of BT. Telefonica, Three and Vodafone buy from a smaller number of suppliers (BT and ✂

2.6.8 Any potential cost savings from greater competition and substitution of some circuits would be quickly dwarfed by the management costs.

2.7 We would add to the list of differences between MNOs and Enterprise customers that Ofcom identifies with the following:

2.7.1 Unlike Enterprise customers that connect to the cloud or create a LAN or WAN, MNOs use leased lines to connect to their own core network. MNOs typically have the skill and capability to run their own networks. EE is now part of BT and Vodafone has purchased Cable & Wireless, so expertise extends to fixed networks .

2.7.2 MNOs have a demand for Dark Fibre and do not wish to purchase active services. Vodafone submitted the Dark Fibre SOR to Openreach in October 2013. EE, 02, Three and VF were / are all part of the Passive Access Group set up to lobby for Dark Fibre and duct access facilities. MNOs purchase the same circuits as Enterprise customers *because this is the only choice they are given*, rather than because it is the service they actually want or need. Ofcom makes a fundamental error in assuming that the products which MNOs are forced to buy (because regulation only mandates active services) are those which they want to buy. In a properly functioning market MNO would be supplied with Dark Fibre. This is a situation in which Ofcom should look at the market absent regulation, and not at what is purchased today in a situation where market power is being addressed through a prescribed set of remedies that only extend as far as the supply of active services. Ofcom should instead consider what a well functioning, competitive market might look like (akin to the modified greenfield approach), where demand for purchasers is satisfied by their first preference products, instead of the last resort regulated service offerings consumed today.

[8] As per Ofcom's Connected Nations 2017 findings

2.7.3 BT has an extensive network across the UK. It also has an incumbency advantage, with its fibre facilities in place to the majority of base station sites. We do not believe that there are geographies in the UK which have different competitive conditions to the general UK outlook. There is no location differentiated pricing by suppliers that would indicate differences in competition across the UK. The primary off-net suppliers of mobile backhaul are BT and Virgin. ✂

2.7.4 It is not efficient to replace existing fibre to base stations as this renders one set of duplicate infrastructure redundant. Base stations do not typically have nearby additional customers to whom redundant fibre can be reused, as is the case for Enterprises in multi tenanted buildings or more dense central business districts. A policy which incentivises fibre build where fibre already exists and will then become redundant seems particularly perverse given the UK's huge gap in fibre to the premise in the consumer market. Fibre investment should be focused on locations where it doesn't already exist, and where there is a real prospect of competition.

2.7.5 MNO demand is typically six times the size of an extra large Enterprise customer.

2.7.6 The geographic spread of MNO high capacity demand is not a feature of the enterprise market. MNOs typically require high capacity links to rural and urban areas to support 4/5G coverage on key transport links: a typical operator will support ✂ masts, and this will only increase with 5G small cell rollout. The public policy objective of extending geographic coverage will increase these demands still further.

2.7.7 MNOs have an immediate need to resolve their capacity demand to support 5G. This is a real-time requirement as 5G is being rolled out in the lifetime of this review. This demand cannot remain unmet in the hope that new rival infrastructure providers slowly extend network to more geographic areas. Mobile backhaul for the current macro network will not provide opportunity for new network entrants to use mobile demand as an anchor tenant in support of more generalized network extension due to timing issues and the demand for connectivity to support 5G now, rather than in the future. Opportunities will be restricted to additional small cell locations which will be needed at a later stage. The timing of demand for 5G connectivity will limit severely the extent of the mobile backhaul market that can be opened up to greater rival infrastructure competition. Having spent £350Million on spectrum, Vodafone cannot wait for the prospective arrival of competing rival networks prior to deploying its 5G network. Ofcom will be fully aware that 5G rollout and trialing has started and will continue apace in 2019. This timeframe is the appropriate measure of available network competition for mobile backhaul, rather than a longer term future view.

2.8 We consider that the market for mobile backhaul is economically distinct to CI Access and continues to diverge further from it, due to the very near term demand for very high bandwidth capacity to a large number of sites which only a very limited number of suppliers (BT ✂ have the capability to meet. If more infrastructure competition does emerge, it will arrive too late for 5G demand,

compromising the economics and retail competition of the 5G market. On this basis we do not agree that demand between Enterprises and MNOs is homogenous, and we evidence that Ofcom's market analysis for CI Access services does not capture the reality for MNO service provision.

2.9 We do not consider that the products demanded by Enterprise customers and MNOs are the same. In the following section we set out the reasons why direct access to fibre backhaul is preferable for effective 5G networks, and why the usage of active Ethernet services would not fulfil the requirements in many cases.

2.10 Virgin has an extensive existing network and it is limited in the extent it can compete with BT. There is no evidence that new network would be able to overcome the barriers which Virgin has faced. Where new sites are added as part of 5G densification there could be scope for competition to those new fibre unserved sites. However, densification will not happen at scale until after the current review period.

2.11 5G networks will see a step change in both the volume of backhaul links, and the capacity and performance requirements of those links. As will be explained in this paper, both aspects demand flexibility and capability that active Ethernet services are unable to deliver

2.12 In the following sections we set out in greater detail the distinction in demand for mobile backhaul compared to generic CI Access.

Synchronisation

2.13 5G networks rely on the usage of Time Division Duplex (TDD) radio access technologies, which in contrast to Frequency Division Duplex (FDD) technologies, utilise the same frequencies for both downlink from the mast to the handset and uplink in the reverse direction. Uplink and downlink are separated by using particular timeslots. For this to happen, there needs to be in addition to frequency, phase and time synchronisation of all parts of the network, indeed between networks (where there is no synchronisation between networks, there must be significant guard bands between individual operator networks which leads to valuable spectrum going unused).

2.14 3G and 4G networks have sync accuracy requirements of +/-1.5µs, and this remains the case for baseline 5G-NR capability. However, 5G architectures utilising fronthaul could demand accuracy of around +/-260ns, and in the extreme, capabilities such as Observed Time Difference of Arrival (OTDOA) could require accuracy as tight as 100ns.

2.15 In general, synchronisation has been achieved by either using a central clock source which is then conveyed via the backhaul network, or by RAN equipment synchronising using GPS. This latter approach becomes less suitable for 5G architectures, because it implies that RAN equipment is outdoors. In many uses cases this will not be the case, for example IoT services where factories must be flooded with 5G coverage, or when serving high footfall locations such as shopping centres.

2.16 Typical Ethernet services are capable of carrying synchronisation via SyncE technology, for Phase and Time synchronisation new hardware support is necessary. However, the usage of active technologies

puts the mobile operator at the mercy of the architectures adopted by the Ethernet service provider as to whether the tight sync accuracy requirements can be achieved. In contrast, where the mobile operator has direct access to the fibre, it is they who are in control of the architecture, hence the latency of the backhaul network, so they are the ones who govern the customer experience.

Bandwidth and transmission architecture flexibility

2.17 5G networks will require very high bandwidth to individual mast locations. Transmission architecture will intensify this – whilst on a logical basis masts are arranged on a star formation from the network core, on a practicable/physical level the masts are connected to aggregation nodes – typically BT exchanges – which are connected in rings or arcs between core sites. In some instances, there will be daisy chains of mast sites from aggregation nodes (typically either small cell sites connected via macro sites, or for smaller/inaccessible macro sites, usage of microwave connectivity to get to a macro site served by fibre). This means the transmission capacity required to and between aggregation nodes, and in some cases mast sites, will need to be sufficient to accommodate multiple macro sites' traffic.

2.18 Data consumption is growing by 50%+ per year, and improved RAN performance could accelerate this growth (demand expands to meet supply) – individual sites will need multiple gigabit links, and in some cases 10Gbps+.

2.19 Where the mobile operator has control of the fibre, they can increase the backhaul bandwidth by associating additional line cards. This creates a capex model whereby the incremental capex of increasing the bandwidth is relatively lower than the initial deployment, and the operational cost does not vary substantially with bandwidth. In comparison, for active services, whilst the unit price typically drops as bandwidth increases, this is not to the degree of self-supply, and active services fundamentally remain an operational cost model.

2.20 Further, with an active service the 5G network operator is limited to the capabilities, bandwidths and operational processes offered by the provider of the transmission network, rather than being in control of their own network holistically.

5G network architecture flexibility

2.21 5G networks go hand-in-hand with Network Function Virtualisation (NFV), in particular in deploying cloud-RAN solutions optimised for small cells. It would be a significant risk to deploy such architectures if the performance was determined by that of a third party transmission network (particularly one operated by a competitor). If transmission performance degrades in a cloud-RAN architecture, the result isn't just degraded performance (as would be the case for impaired backhaul): the mast could cease to process traffic at all.

Deployment of new cell sites

2.22 If a mobile operator is in direct control of the fibre, then it allows expedited introduction of new masts. For example, the new site can be served via microwave from an existing mast site, whether on a permanent or temporary basis. Backhaul to the new site would be via microwave to the existing site,

then utilising a separate wavelength on the fibre to provide connectivity to the core. In contrast, if the existing site was served by an active transmission product, it would be necessary to either share backhaul capacity between the existing and new site, or to purchase additional backhaul capacity from that existing site with the cost and deployment timelines associated with the involvement of third parties.

Private networks and network slicing

2.23 A key component of 5G will be the ability to carry out network slicing, with individual slices being assigned to particular users or groups of users, each associated with their own quality of service characteristics.

2.24 Direct access to fibre opens up the option of network slices being given their own dedicated fibre resource (wavelength), with the quality of service within that wavelength being individually managed. Whilst managed Ethernet provides some rudimentary capability, a 5G network operator would be limited to those QoS classifications supported by the underlying transport provider. In contrast, accessing the fibre allows full flexibility of QoS.

2.25 The above sections set out the very different and sophisticated requirements that MNO customers have compared to Enterprise customers. The needs of Enterprises and MNOs has not converged. The reality is the opposite, with different demand characteristics and very specific supply characteristics.

BT/EE merger reliance on regulatory conditions

2.26 Quite recently the CMA considered the role of regulation, specifically the importance of regulation, in preventing input foreclosure as part of its decision to clear the BT/EE merger. This examination considered a number of facts:

2.26.1 Mobile backhaul being subject to an Ofcom charge control so that prices could not be increased.

2.26.2 The CMA thought there was exposure from the BT/EE integration for purchasers of BT / Openreach mobile backhaul, but considered that the regulatory remedy of cost based Ethernet regulation was capable of addressing these concerns. Ofcom has not considered or addressed this concern within its proposals. Ofcom will no longer be imposing cost based regulation for mobile backhaul. Furthermore, for 10Gbit/s Ofcom doesn't propose to assess how far removed charges are from costs or to address the difference.

2.26.3 Ofcom should reconsider its proposals to ensure that they continue to provide the protection that the CMA assumed in its decision making.

2.26.4 Quality of service discrimination is overseen by Ofcom.

2.26.5 The CMA considered that there could be exposure from BT/EE integration for purchasers of BT/Openreach mobile backhaul, but considered that the regulatory remedy for minimum quality of service standards were capable for addressing these concerns. Ofcom now proposes, despite BT having SMP in HNR areas of 60% - 70% market share, not to impose minimum regulated quality of service standards.

2.26.6 Ofcom should reconsider its proposals to ensure that they continue to provide the protection that the CMA assumed in its decision making.

2.27 These matters go entirely unaddressed by Ofcom in its consideration of MNO backhaul.

Ofcom evidence to BT/EE merger hearing

2.28 Ofcom set out in its evidence to the Phase 2 merger phase that it believed that an integrated BT/EE may have the incentive to discriminate in favour of its downstream divisions and that Ofcom impose regulation to address such concerns. At the time in 2015, Ofcom believed that current and future (the upcoming 2016 regime) proposed regulation applied to BT would limit BT's ability to discriminate over price, quality and innovation in the provision of leased lines.

2.29 Specifically Ofcom stated that the availability of Dark Fibre would have the ability to limit any potential attempts to discriminate over product innovation in mobile backhaul[9]. Ofcom also considered that the introduction of regulated access to Dark Fibre would increase MNOs' ability to innovate and develop new backhaul technologies. Ofcom said:

"Dark Fibre remedies would provide MNOs with more control of the underlying infrastructure, offering a greater potential for innovation compared to current active remedies."

2.30 In addition to the Dark Fibre remedy Ofcom also put in place a cost based charge control and a bandwidth sub cap at each individual bandwidth to limit gaming and therefore to ensure that certain users of bandwidth where not discriminated against.

2.31 The market situation since 2016 has not improved. Ofcom's market statistics illustrate that BT's market share has grown over the period across every geography. This is illustrated below by comparing the market data that formed the 2016 decision and the market data presented in this current consultation:

[9] Para 1.27 https://assets.publishing.service.gov.uk/media/55cc79abe5274a547300002f/Ofcom_Phase_2_submission.pdf

Table: BT geographic market share over time

Geograhic market	BCMR 2016 Up to inc 1Gbit/s	BCMR 2018 Up to inc 1Gbit/s	BCMR 2016 Above 1Gbit/s	BCMR 2018 Above 1Gbit/s
CLA	47% (bigger WECLA)	61% - 70%	Not significant to register (bigger WECLA)	21% - 30%
HNR	NA	61% - 70%	NA	51% - 60%
Rest of UK	57%	71% - 90%	29%	51% - 70%

Source: Vodafone using Ofcom consultation data

2.32 Ofcom's decision in this BCMR needs to continue to put in place regulatory mechanisms that address the ongoing ability of an integrated BT/EE to discriminate in favour of its downstream divisions. This analysis and related regulatory remdies required to address it are missing from the regime proposals.

Summary

2.33 A typical approach to product market definition would apply the hypothetical monopolist test to establish the set of products within the market. Starting with a core product, would a small but significant non-transitory increase in pricing by a hypothetical monopolist for that product be profitable? Or would it lose sufficient business to make the price increase unprofitable?

2.34 This can be difficult to do in regulated markets generally – which, by definition, do not typically look like markets with anything approaching normal competitive conditions. The implication of this is that an analytical approach which works well in – say – mergers will not work well in regulated markets.

2.35 This means that market definition in regulated markets tends to look at competitive conditions more broadly. In fact, the hypothetical monopolist test is only a means to and end, and only part of the market definition exercise in any situation. So this broader look is not an unusual approach.

2.36 Other tools, such as the modified greenfield approach, have been adopted to ensure that analysis is not distorted by the presence of regulation. Another example of reasoning adopted to ensure that market definition is not distorted by the presence of unusual market conditions is the cellophane fallacy. The cellophane fallacy tells us that when a monopolist's price has been raised far above competitive levels, its products appear to attract substitutes even though the apparently competing products are not legitimate substitutes. To put it another way, mere artefacts of market power must not be allowed to distort market definition.

2.37 All this is uncontroversial, and it highlights the need for the analysis to remain undistracted by the fact that there is currently no viable Dark Fibre mobile backhaul product in the market. For the avoidance of doubt, though, if Vodafone were buying Dark Fibre, it is highly unlikely that Vodafone would be prepared to switch from a properly-specified mobile backhaul product to an enterprise product simply to save itself a 10% SSNIP. The differences between the two would be too great.

3 Geographic market definition – Part I

3.1 In this section we explain our view on the geographic markets for the products under review. In summary we find that:

3.1.1 One national market for CI Access exists. The market demand and supply for connectivity services is national in scope (including London), despite variations in the numbers of rivals in some geographies. There is no evidence that additional rivals in geographies have led to separate geographic markets emerging for service demand or service supply.

3.1.2 No geographic pricing exists. Operators do not offer different prices regionally to customers, in fact doing so would be of little use to customers who generally require national coverage. Instead, rival competitors use their network, which in the case of most CPs is largely a sunk asset, long since written off, to reduce the national price they can offer.

3.1.3 Retail competition is enabled by access to cost based wholesale fibre in situ**.** Competition in the national supply of business connectivity market services is enabled by the existence and leverage of rival network connections *already in place* to customers. New network extension accounted for only 9% of connectivity on rival networks during 2017. 91% of rival network connectivity was achieved via the reuse of fibre services already installed.

3.1.4 In this section we also highlight why Ofcom's approach is flawed, lacking in evidence, and disconnected to the reality of the commercial environment in this market. Specifically we explain that:

3.1.5 No evidence of a competitive constraint from rival network build in any geography exists. The geographic market analysis is based on the premise that competition in the business connectivity market arises from rival networks extending their networks to new customer sites. However, none of the evidence provided by Ofcom supports this conclusion. In fact the evidence strongly contradicts this.

3.1.6 Retail competition would diminish absent cost based wholesale fibre regulation. Competitors would not be able to win business in wholesale or retail markets if they frequently incurred and frequently needed to recover the costs of extending new fibre to customer buildings. ✂ Openreach's lead in connected buildings, built on the back of over a decade of regulatory support for their national ethernet network, is now unassailable, with all other providers rendered subscale as a result.

3.1.7 Ofcom's proposals are not evidence based. Ofcom's proposals lack consideration of the extensive empirical evidence of how rivals use their networks to compete in the market and are based on an erroneous economic cost model which fails to quantify the true costs of serving customers with new fibre and or new ducts. For completeness this model is reviewed in detail and updated with real life actual data in the next section.

3.2 The following sections respond to the questions that Ofcom poses regarding its approach to geographic market analysis.

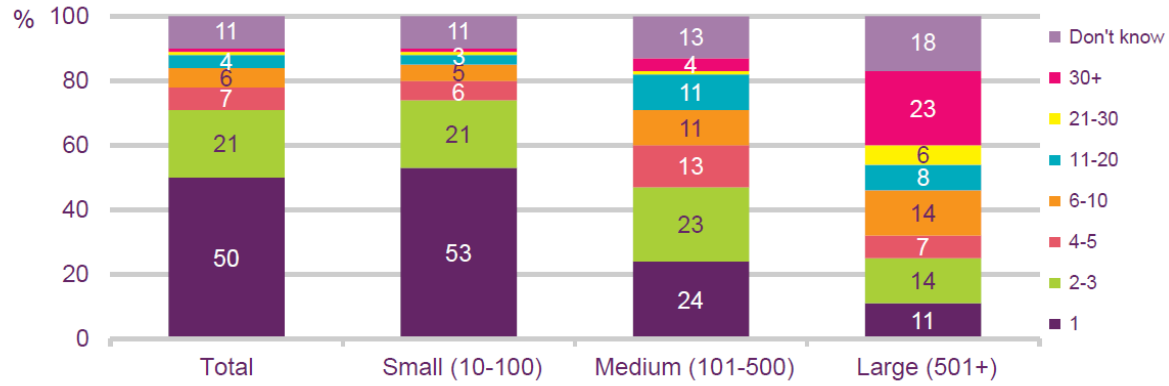
Question 5.1 Do you agree with our proposed approach to geographic market analysis for CI access? Please provide evidence to support your views.

3.3 The SMP guidelines state that the starting point for any analysis for market definition should be an assessment of the relevant retail markets, taking into consideration demand and supply side substitution from the end users' perspective for the period of the review. The guidelines go on to say that 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 behavior of the service providers concerned. There are two main competitive constraints to consider in the market – demand side and supply side.

3.4 For a geographic area to be defined separately from other areas, a similar approach to identifying competitive conditions at the retail level is followed. It is necessary to show that the competitive conditions are sufficiently different (such as the prices offered differing from other areas or a higher number of competitors tendering for a customer's business), and can be clearly distinguished from the competitive conditions in other areas. The review perspective is whether absent any upstream regulatory intervention, there is a risk of consumer harm in the retail market due to a lack of competition.

3.5 To analyse the market properly it is therefore necessary to understand the demand of the retail customers. Business connectivity market services are generally procured by larger enterprises to connect a number of sites that they have distributed around the UK to one another and / or to the internet. Our experience of the market is that the retail market demand is typically national. In 2016 Ofcom's researchers BDRC found that the market is characterised by a need to obtain connectivity to a range of sites for the majority of Enterprises with approximately 74% to 89% medium to large customers having multi site demand. This is shown in the chart below. One would expect Ofcom's starting point consequently to be centred around the demand for multi-site cross geography connectivity as required by the majority of the market.

Figure 5.10 Number of sites connected by BCS circuits/connections



Base: All respondents with BCS (Total n=615; Small n=191; Medium n=229; Large n=195)

Source: BDRC report BCMR 2016

3.6 Ofcom has failed to consider the nature of the retail demand and fundamentally misunderstood the manner and amount of competitive derived from rival (ie non-BT) infrastructure and this leads it to draw conclusions which are incorrect. In the rest of this section we explain why.

3.7 When looking at the supply side substitution available, Ofcom needs to consider the entrenched market economics that have been in place over time and how that has led to Openreach infrastructure being deployed and extended, as well as the challenges faced by alternative providers in extending use of their own infrastructure.

3.8 The key issue is an understanding that the economics of network build have evolved since telecommunication liberalisation which started back in the 1980s and continued through the 1990s and into the early 2000s with a number of rival infrastructure companies entering the market during this period. Many companies entered the market with their own rival network build in these early days of competition when the price of connectivity was extremely high and fibre was in its infancy. These investors built core trunk routes and metropolitan rings around large cities. Since this time the costs of network deployment have remained largely constant, while service prices have fallen dramatically radically, reducing the economics of duplicate network build.

3.9 It is the legacy of those networks, built when the economics was more favourable (although ultimately still challenging even at that time) that Ofcom is now evaluating when it looks at supply side substitution.

3.10 Over time the ability to be able to serve the needs of enterprises that required connectivity across tens and hundreds of sites became too challenging for rivals, and regulation was refocused to enable the purchase of wholesale inputs from Openreach.

3.11 As we discuss in the market context section, very few of these original rival infrastructure companies exist today in their original form, as the challenges of both installing rival network facilities and being

competitive in the market proved to be too great.[10] With hindsight, it is highly likely that the original investors in these networks would not have chosen to invest their money in this infrastructure as the original business case ambition for these networks did not materialise.

3.12 Large enterprise customers and MNOs that typically demand leased lines require these services to be supplied to sites that are spread throughout the UK. Therefore to be a player in the market, nationwide accessibility of customer sites is essential. It is the case that no scale market exists for either the supply or demand of services within distinct, limted geographic areas. 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). Consequently the market demand is for national service provision so that any locations where a customer has a site can be connected to the network.

3.13 The national market applies also for London. Connectivity within central London is provided predominantly in conjunction with a requirement for connectivity to other geographies within the UK, leading to a the view that the market for demand is national in scope. The manner in which rivals derive benefit from their pre-installed duct and fibre connectivity to buildings in the CLA is by using this connectivity to reduce costs in serving the wider UK geography, as they do with owned connections in any other parts of the UK. There is no evidence of differentiated pricing in the CLA.

3.14 A proportion of connectivity in the CLA falls into a wider, specialised market for international connectivity. This is where a multi-national organisation has a requirement to connect single sites in the CLA to locations outside the UK (typically in other global financial centres) and to key UK back office locations at high capacity. This market is distinct to the market for UK service provision.

3.15 Single site connectivity in the CLA is less frequently required.

3.16 Suppliers need to have the ability to provide services on a national basis to meet UK wide demand. The inability for suppliers to meet that demand economically led to the introduction of wholesale leased lines regulation.

3.16.1 Over time and in response to regulation such as wholesale PPCs, wholesale Ethernet, Local Access Ethernet (as put forward in the previous telecoms strategic review) and the ECC fund, rival infrastructure providers refocused to deploy new infrastructure for fewer installation scenarios. This was prompted by the deteriorating economics of deployment and focused on service areas with specific requirements such as meeting customers' demands for diversity, resilience or to meet the demand of services that Openreach did not cater for – very low latency and very high bandwidths. Some rivals, as encouraged by regulation at the time, focused their investment on bringing their networks closer to the BT exchange, investing in managing and designing their own backhaul aggregation networks (using own and leased fibre).

[10] See part 3 section 2 market context

3.16.2 There is an ongoing benefit to infrastructure owners of that sunk, historic infrastructure in the ground and connected to customer premises. It is not, however, the advantage that Ofcom identifies which is for rivals to extend their infrastructure to additional customer premises. Rival sunk infrastructure instead plays a role in lowering the overall costs incurred when supplying a customer with wide ranging geographical site requirements.

3.16.3 Ofcom fails to acknowledge that it is the sunk investment in a rival's historic infrastructure inventory that assists owners of that infrastructure to compete in retail markets. Vodafone is BT's largest rival in the Enterprise connectivity market due to Vodafone's ownership of the Enterprise focused infrastructure built by Cable & Wireless, Energis, THUS and YourCommunications, which each invested in speculative network in the 1990s and early 2000s to specifically target Enterprise customers. Notably the second largest rival is Virgin which is in a similar situation, having sunk and subsequently written off network assets from multiple predecessor businesses, before emerging from financial restructuring.

3.16.4 ✂

3.16.5 Rivals gain competitive advantage from reuse of sunk assets when tendering for new business where a reasonable proportion of the sites already have duct and fibre to the buildings. With a connected site with fibre already installed to the building, and ideally to the customer floor, the costs of landlord wayleaves and traffic management are entirely avoided.

3.16.6 Rivals gain some advantage (although far less than fibre in situ) from having duct to a building which needs to be incremented with a fibre splice and/or internal fibre cabling, both internal and external fibre cabling.

3.16.7 ✂

3.16.8 ✂ in Bristol, but rather, will look at the total tender price and the total cost offered to connect the required sites in a tender with the relevant service wrap.

3.16.9 The competitive benefit derived from customer premises already connected with fibre is illustrated in the table below. ✂

3.17 The above table clearly identifies the true advantage that is derived from owning a rival network. When a connection is already largely in situ, the smallest of the additional costs (out of all of the cost categories) applies to provide the service. The table is based on data from the largest rival competitor to BT in the market. The data shows the real life functioning of the market.

3.18 In terms of supply side substitution, this evidence shows that there is very limited scope for a rival infrastructure owner to substitute the connectivity of a service that is not already fully on-net to the customer on their network.

3.19 In summary the evidence demonstrates that:

3.19.1 The primary advantage of rival infrastructure comes when a customer's demand can be fully served by pre-existing fibre facilities. We can see in 2017, where we were able to use our rival infrastructure, that the most likely scenario for our on-net utilisation was in the case of situations that fall outside of the scope of Ofcom's economic cost model.

3.19.2 A secondary advantage that infrastructure ownership (where existing civils are in place to a building) provides is that the infrastructure owner faces lower cost augmentation of facilities as the high cost of new civil infrastructure can be avoided. However, this advantage is limited in today's economic situation. ✂

3.19.3 The final advantage (which is the area where Ofcom places its entire focus) is the benefit of having extensive rival infrastructure that can be extended to serve a new customer site. Ofcom data shows that this type of advantage is the least used connectivity solution deployed by service providers.

3.19.4 The greater the proportion of on-net footprint / connected buildings that a service provider has for a tender (which will be across a range of geographies), the greater the ability they have to price at an overall competitive level. The benefits of the rival network is therefore felt not geographically, but nationwide.

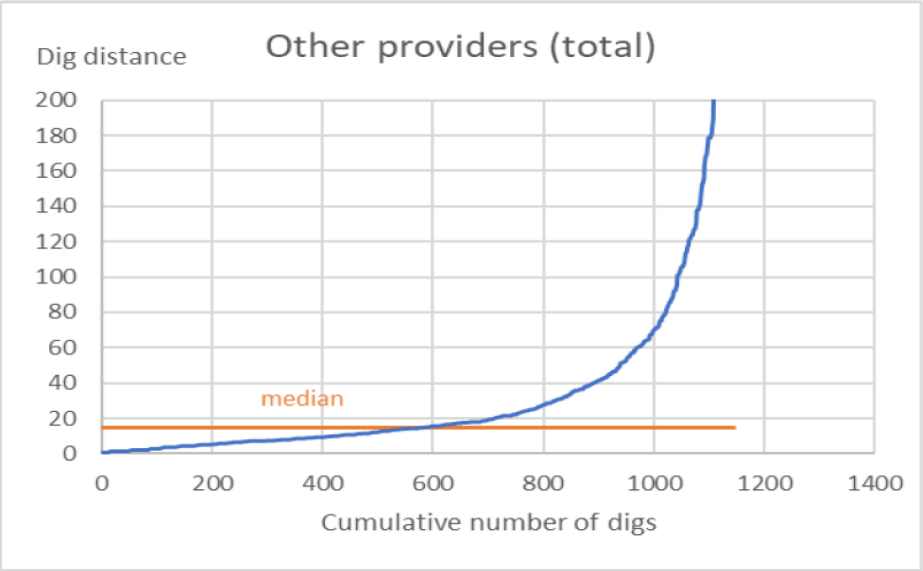
3.20 Ofcom's analysis follows a very different approach to geographic market analysis. Ofcom's approach has no correlation with our experience of operating in the market. Ofcom has correctly identified that a number of geographies have greater numbers of rival networks. However, as we set out above, Ofcom has not correctly identified how rivals use these networks today or are likely to use these networks during the lifetime of the review in order to compete in the given geography. 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. Despite this Ofcom almost exclusively relies upon the existence of rival networks as the indicator of market competition and geographic market existence.

3.21 The data collected by Ofcom from rival infrastructure owners provides very clear evidence that owners of rival networks use these networks without any extension in 95% of cases [11]. Ofcom states "*Openreach's rivals were unlikely to build to connect customers' sites that were not already connected to their network.*[12]" It is therefore clear that rivals extend their network in the minority of cases. The data collected and presented by Ofcom shows that new network extension accounted for only 5% of rival onnet connectivity.

3.22 The chart that Ofcom provides at A11.6 illustrates that of 63,000 circuits installed in 2017, circa 1180 were installed via a rival new duct network extension.

[11] Ofcom states they only built 5% of connections of the connections not already connected to their networks
[12] Bullet 3 page 61 Annex

Other providers (total)



Source: Ofcom

3.23 It is therefore contradictory (to the extensive market evidence collected about the behavior of rival infrastructure providers when connecting customers to their rival networks) to formulate a geographic market analysis which centres on brand new network extension which is shown to occur in a very small proportion of cases.

3.24 A market related analysis would focus upon the real life factors within the business connectivity market, which identifies that services are generally provided for a single customer for their sites across a range of geographies.

Ofcom's approach

3.25 Putting aside our view that geographic market analysis, based on the potential for network extension, is entirely erroneous as service demand and service supply demonstrate a national market, we have carefully assessed the approach which Ofcom has used. Our findings illustrate the belief that rivals will extend their networks is not supported by the economics. We cover this in detail in the coming sections. For completeness we have also set out further issues with Ofcom's approach in Annex 1, although our primary position is that Ofcom's analysis should not have proceeded in this manner.

3.26 Ofcom has sought information about the physical presence of rivals networks. Ofcom supplements the data about the physical networks with a cost model that it has constructed to understand how networks can be extended. In the next section we review this model in detail and populate the model with our actual data to demonstrate that even if Ofcom's methodology were coherent, it does not support Ofcom's conclusions.

Conclusion

3.27 The approach followed by Ofcom does not:

3.27.1 Correctly identify the competitive benefit derived from owning rival infrastructure to customer sites. The reality is that rivals use sunk on-net infrastructure to lower overall costs incurred in competing for a tender and offer a reduced national tender price rather than a specific geographic price;

3.27.2 Represent the real life experience evidenced in the market;

3.27.3 Provide an analytical basis relevant to the review period;

3.28 The result is that Ofcom falsely concludes that BCM geographies with higher levels of rivals see greater competition and lower prices in those geographies, whereas the benefit is actually distributed nationally.

3.29 Vodafone cannot agree with the results of Ofcom's analysis. Primarily, we find no basis for setting market boundaries on the prospect of network extension when this is not what happens in practice – and the cost evidence does not support Ofcom's conclusion.

4 Geographic market definition -Part II

4.1 In this section we address the economic dig model. Vodafone agrees in principle with Ofcom's creation of a dig distance model, notwithstanding our comments in the previous section. It is right that Ofcom should try to understand the economics of network extension properly. We know from our own business practice that when we decide whether to extend our network to reach a new customer, we compare the costs of extending our network to the most economical alternative means of supplying the customer without incurring the cost of digging. A model of this type, therefore, should be a central piece of evidence in Ofcom's decision.

Ofcom's economic dig distance model and the use of it to understand the competitive conditions in different geographic areas

4.2 Unfortunately, there are serious errors in Ofcom's modelling which render it inappropriate as a tool in decision-making.

4.3 When we compare our 2017 connectivity for network extension and our wholesale purchasing from a supplier with better / in situ connectivity, we can see that ✂ of cases the most cost effective alternative is to purchase a regulated service from Openreach. Therefore, we agree with the approach taken by Ofcom to produce a cost model that compares the cost of extending our own network with the price we would pay for the equivalent Openreach service.

4.4 The typical cost of digging and laying fibre varies depending on location, which reflects a range of cost variables such as the material being dug, surface type (e.g. block paving has higher reinstatement costs), wayleave costs, construction permits (including lane closures, parking bay suspensions, etc.), restrictions on the time of works (higher labour rate for night work), traffic management, and contract (construction firms offer volume discounts).

4.5 We do agree that it is right for Ofcom to build its own model in principle, and consider it a positive development in ascertaining an evidence based network buffer for rival network extension evaluation. However, at the moment the model contains clear errors. It is essential that the model needs to include the actual evidenced costs that operators incur. Whilst we understand why Ofcom has based its costs on Openreach's Excessive Construction Charge price list, this is not the relevant evidence that the model should be based on. If the purpose of the model is to assess the costs to operators of extending their network, versus Openreach supply of active services, then the relevant evidence for the costs of network extension are an alternative operator's costs. Likewise, the relevant evidence for the costs of alternative active services to be modelled, as Ofcom has used, is Openreach's actual regulated charges for these services.

4.6 In this section we will provide details of our costs to extend our network, update Ofcom's assumptions with our actual evidence, and provide an updated economic radial dig distance table, similar to

Ofcom's table shown in the annex to the consultation[13]. Ofcom's radial dig distance table seeks to identify the distance from their network that an operator would build given the economics of extending their network vs. procuring Openreach active circuits. We will also update Ofcom's modelled leased line services and key revenue assumptions table[14] as it currently included outdated BT active service prices.

4.7 This section is set out as follows:

4.7.1 The most cost effective alternative to network extension. We will update Ofcom's table with the current relevant alternative BT active product prices and replace Ofcom's outdated table. This update reduces the price of the most cost effective alternative to **approximately £6,000 on a non-discounted basis.**

4.7.2 The actual cost of network extension for alternative network operators to Openreach. We will update Ofcom's cost modelling assumptions with our actual data, which adds significant costs into the model, some of which Ofcom mentioned as relevant costs incurred in extending a rival network yet did not include in their model, and some of which Ofcom appear to have erroneously omitted from consideration. ✂

4.7.3 The most relevant modelling sensitivities. Ofcom produces a range of modelling sensitivities. From our actual evidence of how we assess the build/buy decision we highlight the most relevant sensitivity which is the same as Ofcom's most relevant sensitivity.

4.7.4 ✂

(1)The most cost effective alternative to network extension

4.8 As discussed above the most cost effective alternative to network extension in over ✂ of cases is to procure Openreach active Ethernet services. The table below includes Openreach's current prices for these services. Considering Ofcom has proposed a CPI-CPI charge control for these services, we consider these to be the most appropriate prices over the coming review period (for the purposes of this modelling exercise). Ofcom's prices quoted in the consultation are now outdated and will not be relevant for the review period.

Table: Openreach's current Ethernet prices, used as the most cost effective alternative to network extension

Service	Connection (one-off)	Rental (annual)
EAD LA 100 Mbit/s	1,850	1,374
EAD LA 1 Gbit/s	1,850	1,620

[13] Table A10.6, the BCMR consultation
[14] Table A10.1, the BCMR consultation

EAD LA 10 Gbit/s	5,565	4,146

Source: Openreach price list

4.9 As Ofcom discusses in the consultation[15] and our data supports, the typical contract length for business connectivity service contracts is three years. We make build or buy decisions based on costs over the duration of the contract and therefore we consider, in line with Ofcom's assumptions, assessing costs over a three-year period to be appropriate.

4.10 We also consider that the most appropriate service to consider is the most widely sold service which will have the highest volumes in the marketplace. This represents the 'typical' service a business will procure and we consider that this will provide the best basis for the purpose of a market review model. For the period of this review period that service is 100Mbits/s.

4.11 Using the information above, this means that the cost today of the most cost effective alternative to network extension is a connection charge of £1,850 and three annual rental charges of £1,374 which on a non-discounted basis produces a cost of £5,972, which for ease we will round to £6,000 (although it's worth noting that this represents an over-estimation of costs as the annual rental in years two and three should be discounted).

(2) The actual cost of network extension for alternative (to Openreach) network operators

4.12 We understand the purpose of this model is to calculate the costs to an alternative provider of extending its network to serve customers in this market. In 2017 we carried out over ✂ to enterprise customers and as the second largest retailer in this market, we consider our data to be very relevant and robust. We are very well placed to evaluate the actual cost of network extension as we have comprehensive actual data of this activity for 2017, the period that most of Ofcom's market review data relates to.

4.13 We have updated Ofcom's model in two ways. **First, through looking at our historic network extension work for 2017 we have discovered an oversight in the way Ofcom calculated a minimum network extension cost.** In effect Ofcom have overlooked the fact that all network extension work, regardless of distance, has a minimum cost element below which no contractors / field force staff will arrive on site. **Second we have revised Ofcom's estimates of the actual costs incurred in light of our actual evidence** and we have revised some of **Ofcom's modelling assumptions that do not reflect our evidence.**

Including a minimum network extension costs into the modelling process

4.14 We have compared Ofcom's model with our actual 2017 costs for network extensions. In carrying out this comparison we have discovered a number of costs missing, but also that the minimum cost the model produces does not reflect the minimum cost that we pay for any network extension regardless of length. Our actual data reflects the fact that there is a minimum cost in carrying out any network

[15] Para A10.20, the BCMR consultation

extension, and in fact carrying out a pure cable extension of up to 250 meters incurs the same network extension costs as a one-meter network extension. This concept of a minimum charge for manual physical construction based activities is very common. For example, for tiling a bathroom a tradesman may charge £5 per tile, however if a customer required just one tile to be put up it is unlikely that a tradesman would come out and mount one tile and charge only £5.

4.15 The reason for Ofcom's oversight is associated with the source of their actual input data. All of Ofcom's modelling cost assumptions are based on Openreach's excess construction charges (ECC) price list. This price list is precisely that 'excess' i.e. the price list over and above the standard connection charge which includes the minimum cost element. Every new Openreach Ethernet connection requested includes an allowance of £722 which is put into a central 'Openreach network extension pot', sometimes this allowance is not spent because no Openreach extension work is required, however in some cases (estimated at between 25%-10%) it is used to extend Openreach's network reach and supply of fibre in the network. Thus the first £2,800 of any Openreach network extension is funded from this pot, only when the extension work costs more than £2,800 are the ECC price list used by Openreach to charge operators for additional work. This price list is charged in addition to the £2,800.

4.16 Although Ofcom have discussed this threshold charge and balancing charge in the consultation document,[16] Ofcom have completely overlooked the £2,800 charge or what we would term the minimum network extension labour cost in this modelling exercise. This is a fundamental error of fact which renders Ofcom's decision liable to challenge following the principles in Bubb v Wandsworth[17] and Begum v Tower Hamlets[18].

4.17 To highlight the significance of this charge, that Ofcom term 'the balancing charge'[19], over the last three years the table below [20]shows how much retail operators have contributed to extending Openreach's network. As part of the connection charge retail operators have contributed between 2015 and 2017 £72million which flows into the Openreach 'minimum network extension pot' this will be used in cases where Openreach has to extend its network until the £2,800 cost threshold is exceeded. When this cost is exceeded the ECC price list is used, this is what Ofcom have based their model on.

Table: Openreach's Excess contruction charges

	2015	2016	2017
Excess (over £2,800) build ECC price list	30.5	26.5	40.2
Connection (included) ECC	18.7	25.7	28

[16] BCMR consultation section 3.70
[17] 2011 EWCA Civ 1285
[18] 2003 UKHL 5
[19] BCMR, section 3.72
[20] Based on BT's RFS

Total	**49.2**	**52.2**	**68.2**

Source: BT's regulated financial statements,
https://www.btplc.com/Thegroup/Policyandregulation/Governance/Financialstatements/index.htm

4.18 There are a number of ways this minimum network extension labour cost could be included in the model, we have used our actual 2017 data and the actual minimum prices we pay to have network extension work carried out. However, to exclude it altogether as Ofcom has, is clearly incorrect. The effect of this is that any costs for network extension that are produced by the model that are below this minimum level should be disregarded. This is further explained below when we discuss the model sensitivities.

Actual modelled costs and modelling methodology

4.19 As discussed above, Vodafone have noticed that Ofcom did not include all the costs associated with network extension work that they discuss in their consultation in their actual cost model. We have reviewed the consultation and the annexes and can find no reason why this is the case. Ofcom state that:[21]

"The typical cost of digging and laying fibre varies depending on location, which reflects a range of cost variables such as the material being dug, surface type (e.g. block paving has higher reinstatement costs), wayleave costs, construction permits (including lane closures, parking bay suspensions, etc.), restrictions on the time of works (higher labour rate for night work), traffic management, and contract (construction firms offer volume discounts)."

4.20 However, when Vodafone reviewed the model we found that wayleave costs, construction permits, and traffic management costs are all missing. The table below details the fixed and variable costs of network extension, comparing Ofcom's assumptions and Vodafone's evidenced assumptions.

Table: Ofcom's current modelling cost assumptions based on Openreach's ECC price list and Vodafone's assumptions based on dig evidence from 2017

Cost Category	Cost type	Frequency	Ofcom's estimate	✂
Minimum labour charge	Fixed	One-off		✂
Survey	Fixed	One-off per survey	£ 245	✂
Traffic Management	Fixed	One-off	£ -	✂
Wayleaves	Fixed	One-off		✂

[21] Para A10.5, the BCMR consultation

In-building wiring	Fixed	One-off		✂
Blown fibre tubing	Variable	per metre	£ 3.83	✂
Blown fibre	Variable	per metre	£ 1.74	✂
Duct under a footway	Variable	per metre	£ 63.25	✂
Duct under a carriage way	Variable	per metre	£ 116.07	✂
New footway box	Variable	per footway box	£ 855.23	✂
Break through external wall(s)	Variable	per break	£ 220.83	✂
Blockage clearance (initial)	Variable	per blockage	£ 536.52	✂

Source: Ofcom's dig distance model and Vodafone internal data

Minimum labour charge for any network extension work

4.21 As discussed above, this model excludes consideration of minimum labour charges that are included in all network builds. ✂ The amount is actually very similar to the allowance that the Openreach connection charge allows for before charging additional items from the ECC price list, £2,800. No network extension work can be carried out for less than this amount, Ofcom's model currently uses a per meter assumption for laying cable, digging duct and a number of other activities and the methodology in the model would allow for a minimum labour charge of £5 which is clearly not in line with reality. ✂

Survey

4.22 In their model Ofcom have included a cost of £244.53 for a survey to be carried out for each network extension. We actually incur survey costs and network extension design costs, these total ✂. The evidence that supports this is our suppliers price list and evidence from our network extension activities that includes us actually incurring these charges. These costs are included in the model as fixed costs and are incurred with every network extension.

Traffic Management

4.23 When we carry out network extension activities we generally have to incur traffic management costs. These are the costs incurred for managing the traffic (with traffic lights and barriers etc.) around the network extension.

4.24 As discussed our network extensions are carried out under contract with our third party supplier. We have reviewed their records to the degree that is possible and found that in 2017 ✂ of network extensions that required civil (actual digging) work required traffic management. Our budgeted amount for traffic management included in customer quotes is ✂ We recognise that not all network extensions require the incurrence of traffic management costs, however as our evidence shows we do incur traffic management costs in many cases. We therefore consider an evidence based approach would average these costs and include a fixed cost of ✂ in each network extension.

Wayleaves

4.25 When we extend our network we require permission in the form of a formal Consent or landlord Wayleave. Our evidence from the past two years suggests that the average legal and administration cost for securing wayleaves is ✂ and that we incur these costs ✂ of the time that we carry out network extension activities. For the other network extensions, dependent on the property arrangement in place, we simply need consent from the tenant or landlord and this does not incur significant costs. We therefore include in our version of Ofcom's model a fixed cost of ✂, this being the average wayleave cost per network extension.

In-building access wiring

4.26 When we carry out a network extension in order to extend our network to a customer premise, or where we reuse existing duct and fibre to a building but need to serve a customer on a different floor of the building we incur an in-building wiring cost. This is the cost for the supply and installation of wiring within the actual building or premise. When we carry out this activity as part of a network extension it is difficult to identify this cost individually as the cost is captured in aggregate, and includes the fibre pull to the network flexibility point, fibre across the duct and fibre inside the building. However, we also carry out this activity individually in cases where we extend our network only within a building. We have based our estimate of these costs on our actual 2017 data.

4.27 In 2017 we carried out ✂ network extensions to reach enterprise business customers. ✂

4.27.1 ✂

4.27.2 ✂

4.27.3 ✂

4.28 We have also considered how often this cost would individually occur, i.e. is it likely that even in cases where we have a building connected we will incur additional costs due to the fact that we have to extend our network within that building to serve additional customers. We estimate, using actual data, that of the ✂ This means that even in cases where our network is connected to a premise, there is a ✂ chance that we need to incur significant additional network extension costs of, on average, ✂ because even though our network is connected to the building, the building is multi-tenanted and requires further in-building cabling work. In addition, even in cases where a connected building is not multi-tenanted we may have to renew the in-building cabling due to internal re-construction work. Even when we don't require additional in-building wiring costs we still incur an external testing charge of ✂

4.29 This is contrary to Ofcom's assumption throughout its market review consultation that operators with 'connected buildings' incur no additional network extension costs to serve the customer in that building.

Blown fibre tubing

4.30 ✂

Blown fibre

4.31 ✂

Duct under a footway

4.32 ✂ Duct under a carriage way

4.33 ✂

New footway box

4.34 ✂

Break through external wall(s) at the customer premise

4.35 ✂

Ancillary activity - Blockage clearance (initial) - per blockage

4.36 ✂

Ethernet Electronics equipment and installation Annual depreciation per circuit (£) 100Mbit/s

4.37 As recognised by Ofcom, when operators extend their network and utilise their own network they require active equipment on the end of the fibre in order to provide Ethernet services. Ofcom have estimated this based on Openreach's cost in their regulated financial statements and multiplied this by the useful life of the equipment i.e. five years.

4.38 We assume that this five-year cost is included in the three-year assessment period in line with Ofcom's assumption that all costs of network extension should be considered over the typical customer contract length, which is three years.

4.39 Equipment costs vary considerably depending on supplier, volume, use, and purchasing power, we have not changed Ofcom's modelling assumption and also included the same costs as Ofcom.

Cost modelling methodology assumptions

4.40 In Ofcom's dig distance cost model there are a number of assumptions relating to how network operators would extend their network and the characteristics of that work. The table below shows the assumptions Ofcom have used and then Vodafone's modelling assumptions which are based on evidence of our build activities in 2017.

Table: Ofcom's modelling methodology assumptions and Vodafone's assumptions based on dig evidence from 2017

Other model assumptions	Ofcom's Estimate	✂
Survey	1 per build	✂
New footway box	each 100m	✂
Break through external wall(s) at the customer premise	1	✂
Ancillary activity - Blockage clearance (initial) - per blockage	low	✂
The proportion of the duct that runs under a footway (only when a new duct is needed)	0.9	✂
The proportion of the duct that runs under a carriage way (only when a new duct is needed)	0.1	✂
Route distance in metres	231	✂
Length of Lead-in duct in metres	25	✂
Number of entries per joint box	2	✂
Radial dig distance:	1.4	✂

Source: Ofcom's dig distance model and Vodafone internal data

Survey

4.41 ✂

New footway box

4.42 ✂

The proportion of the duct that runs under a footway /carriageway (when new duct is needed)

4.43 ✂

Modelling sensitivities

4.44 Ofcom modelled a number of scenarios to assess the impact of different options. However, they also highlight the most important and relevant sensitivities. We will focus on these and limit the comparison of our results to Ofcom's for only these sensitivities. It is possible given the information we have provided to run all of Ofcom's sensitivities using our assumptions.

4.45 The table below is a copy of Ofcom table[22] and it shows the minimum economic dig distance that operators would dig to (i.e. extend their network to) given the modelling assumptions Ofcom have

[22] Table A10.6, the BCMR consultation

used. As discussed by Ofcom and above we will focus on the three-year payback option as this is how operators make build/buy decisions, and we will focus on the EAD LA 100Mbit/s product as this is the Ethernet product procured by the mass market and will remain to be over this review period. We will also not consider the 'duct connected with tubing' scenario as in our experience this option is never present. Therefore, we will focus on the two highlighted numbers below, but as mentioned above given the level of information we have provided it is possible to run all the other scenarios with our more relevant data.

Table: Ofcom's table reproduced from their consultation showing the Economic radial dig distances (metres)

Service	Duct connected with tubing	Duct connected without tubing	Network extension(new duct required)
	3-year payback		
EAD LA 100Mbit/s	**1,598**	**429**	**27**
EAD LA 1Gbit/s	**2,294**	**616**	**43**
EAD LA 10Gbit/s	**4,849**	**1,302**	**95**
	5-year payback		
EAD LA 100Mbit/s	**2,433**	**653**	**47**
EAD LA 1Gbit/s	**3,395**	**911**	**69**
EAD LA 10Gbit/s	**5,887**	**1,580**	**4**

Source: Ofcom's dig distance model results

4.47 As mentioned above we will focus on the 'duct connected without tubing', which is potentially equivalent to us using our empty duct or in the future BT's PIA product and the 'network extension (new duct required)' scenarios which is where we are required to build new duct routing. Using Ofcom's assumptions this shows that where we are required to build out our own network we will do so if we are 27 metres away from the customer, and where we can use existing ducts to lay our fibre we will do so if the fibre is 429 meters away from the customer's premises.

4.48 Below we show the results using our assumptions, we have populated Ofcom's model with our assumptions and replicated their table. ✂

4.49 ✂

The 'Duct connected without tubing option' as a proxy for Openreach's duct and pole access product

4.50 We have additionally considered the 'Duct connected without tubing option' and considered whether there would be any additional costs when using, instead of our own ducts, BT's duct and pole regulatory remedy which is due to be available next April. This is somewhat speculative, because the final contractual conditions are not finalised and there are many questions remaining from operators

regarding costs, conditions and availability. That said, we do nevertheless consider that we would have to incur a number of additional costs if, instead of using our duct, we used Openreach's duct and pole remedy. These costs are list below:

(a) Product on-boarding costs

(b) Purchasing, planning and time requesting access from BT

(c) Additional network extension costs from our network into BT's ducts and poles which are likely to include a minimum labour element, a Wayleave cost, and potentially traffic management costs.

4.51 We therefore conclude that the centre column in the above tables cannot simply be used as a proxy for using BT's proposed regulated duct and pole access product, because a number of significant additional costs are incurred when using this product that are not included or considered in Ofcom's version or in our version of the dig distance cost model. However this column does include all of the fixed costs that we added into the model to reflect the costs of network extensions using new ducts, i.e. traffic management and landlord Wayleave costs, because even if using BT's duct and pole remedy reduces in some cases the need for these at the customer connection end, it is likely that they are required at the end where we break into BT's duct and connect it to our duct network.

Implications of our modelling conclusions

4.52 ✂

4.53 To further expand and explain this conclusion it is worth considering the model inputs and conclusions in detail. As discussed in section [1], the most cost effective alternative to network extension, the non-discounted cost of the mass market 100Mbit/s product over three years is approximately £6,000.

4.54 If we consider this against the fixed costs of any network extension, it is clear to see why network extension is rarely economically viable for this market. This is the area where Ofcom's model is deficient, as it underestimates the fixed costs of network extension. Network extension is an activity that requires detailed planning, field force / contractor attendance on site, disruption to roads and pavement, and the labour intensive tasks of laying fibre and potentially digging holes. Network extensions are not to be undertaken lightly and are often far from straightforward. The table below summarises the fixed costs involves in any network extension; these are explained above in more detail. ✂

4.55 We consider from the table above that the fixed costs associated with any network extension totals ✂

4.56 ✂

4.57 ✂

4.58 To be clear, while we hope and expect that these submissions will inform Ofcom's decision, this is not enough on its own. It is incumbent on Ofcom to gather market-wide data about the costs of network

extensions and to build a genuinely representative model, taking proper account of the comments we have made and that broad data set.

5 Switching barriers

5.1 In this section we discuss the nature of customer switching within the business connectivity market which Ofcom provides clear and consistent evidence about in the two research projects it has conducted on the matter. The manner in which customers demand service – increasingly from a single supplier[23] – to provide connectivity to sites over multiple geographies and for long contract periods of typically three years is highly relevant to competition in this market. When a competitor can meet customer expectations for a national service on appropriate contract terms, they still need to persuade the customer to switch and overcome the barriers to switching.

5.2 We find that switching will most likely occur when:

5.2.1 A customer is undertaking a technology refresh which causes unavoidable business disruption of its accord;

5.2.2 A customer is forced by their supplier to upgrade end of life connectivity and again is forced to face business disruption;

5.2.3 A customer can achieve significant cost savings from the change which outweigh the business risk of the disruption;

5.3 From our assessment of the research that Ofcom has conducted, ✂ it is clear that customers are wary of switching and customers lack an environment that facilitates increased levels of market switching.

BDRC 2016 research

5.4 Ofcom commissioned BDRC in 2016[24] to find out about customers' switching behaviour in relation to business connectivity services. The following key findings are highlighted by BDRC:

5.4.1 87% of customers were satisfied with their service provider;

5.4.2 85% of Enterprises, regardless of their size, review value for money and quality of service of their connectivity service every 2 to 3 years;

5.4.3 60%[25] Enterprises then go to formal tender of their services;

5.4.4 ~30% of businesses changed their supplier but ~51% of customers decided to stay with the existing supplier as they were already connected to the network and ~20% changed the technology / service underpinning their business connectivity service;

[23] BDRC finds this to be ~70% of the market
[24] https://www.ofcom.org.uk/__data/assets/pdf_file/0026/57491/bcmr_2014_report-bdrc.pdf

[25] 3 out of 5

5.4.5 Of the customers who switched supplier 60% received lower service charges from their new supplier and 40% reduced their own costs of using the service;

5.4.6 66% of those questioned had not switched in the last 5 years.

5.5 BDRC concludes that cost reductions appears to be the dominant driver when changing supplier.

Cartesian 2018

5.6 For the 2018 BCMR Ofcom has supplemented the previous research with new research from Cartesian[26]. Cartesian found for Ofcom that:

5.6.1 Customers prefer to have a single supplier for their services e.g. a single supplier for data and a single supplier for fixed voice, or a single provider for all communications services. Some customers prefer a single supplier across all services including mobile as this will save costs. A minority save more costs by unbundling over the top services;

5.6.2 Service provisioning has the following issues; long lead times, uncertain delivery timescales and delay, Customers consider the provisioning process requires a complete overhaul with quicker installation times being the result.

5.6.3 Enterprises identify three key concerns:

5.6.3.1 The timescales that are associated with Wayleaves although it was accepted that this matter is outside of the supplier's control;

5.6.3.2 A lack of transparency and communication of the installation process, with customers having to proactively seek information rather than receive information;

5.6.3.3 A lack of seamlessness in the migration process, which requires a customer to cease and re-provide a service which in practice requires a make before break with parallel running to avoid a site outage. Customers consider that this could be avoided by re-using the old fibre in situ for the new service supply;

5.6.3.4 The high cost of leased lines switching is identified as a clear barrier to customers switching retail provider, with customers finding the cost and complexity to be a significant barrier to switching. Customers report that an impact assessment is usually performed prior to any decision, comparing the cost savings offered by the potential new provider against that actual migration costs (need for additional resources, parallel running of circuits during the migration, etc), large business are shown to be more open to switching provided that the business case was favourable.

5.7 The evidence around switching across the two research projects is consistent and shows that customers are motivated to switch supplier when doing so will save them money.

[26] https://www.ofcom.org.uk/__data/assets/pdf_file/0009/113112/cartesian-business-connectivity-market-assessment.pdf

5.8 The Enterprise will weigh up the ongoing rental costs savings against the overall costs of change that are associated with switching. The overall costs of the change and the reduced ongoing rental will need to be lower than remaining with the current supplier.

5.9 Circa half of the customers that evaluate the option of switching decide not to do so.

5.10 Market switching and competition within the market could be increased if the provisioning process could be improved, allowing the new supplier to offer a compelling low cost service.

5.11 Customers question why switching suppliers cannot be facilitated by fibre reuse which would remove many of the provisioning issues.

5.12 It is clear that there are a number of significant issues which collectively contribute to a customer's reluctance to switch. The reluctance is having an adverse impact on the overall functioning of the market. We would expect that Ofcom's remedies would take into account the problems that Enterprise customers identify as a barrier to them benefitting from competition in the market place.

6 SMP findings

6.1 In this section we review the market conditions against the competition indicators set out in the SMP Guidelines and we find that:

6.1.1 All market indicators demonstrate that BT has SMP UK wide;

6.1.2 BT's market share in every geography is above dominance levels;

6.1.3 BT's market share has risen across all analysed segments since Ofcom's last market review;

6.1.4 BT has demonstrated it can leverage its market share in fibre into very high bandwidth services since the last review period.

6.2 Ofcom fails to recognise that competition in the business connectivity market relies predominantly on the availability of fibre provisioned to customer buildings in the past when the economics of laying fibre were more favourable and business fibre penetration was more limited.

6.3 Only Openreach is able to install fibre cost effectively today. This is not just by virtue of its extensive duct network. It is also due to the shared economics of provisioning for BT downstream (with its high market share) and the ECC fund which smooths out and distributes across all customer the costs of network extension.

6.4 Ofcom is unable to identify evidence of variations in geographic competition as rivals do not obtain localised benefit from a geographic presence – they cater to the demand of Enterprise businesses that typically have multi site, national demand. There are no geographical demand areas and consequently there are no geographical supply areas. Rival networks' preexisting connected buildings help to reduce the cost of connecting multiple sites and enable them to compete for nationwide tenders The benefits of connected buildings across the HNR can consequently be felt nationwide, rather than HNRs themselves seeing lower / differentiated pricing.

Competition indicators

6.5 In the summary table below we assess the competition indicators with the evidence available to us and Ofcom from the consultation document and the data that we have provided to Ofcom as part of our information request returns.

Table: Competitive indicators across the different geographic markets

	BT only	BT +1	HNR	CLA	Single UK market
Market shares and market trends – across all bandwidths	BT 2017 81- 90% Above dominance levels	BT 2017 61 – 70% Above dominance levels	BT 2017 61 – 70% Above dominance levels	BT 2017 61 -70% Above dominance levels	BT 2017 71 – 80%
	Share have risen: UK less WECLA in 2016 57%		Shares have risen: 2016 data for temp regime 52%	Shares have risen: WECLA 2016 47%	Shares have risen: 2016 30- 57%
Control of infrastructure not easily duplicated	BT ubiquitous network BT high vol of connected sites Rival trunk routes may pass by Typical dig distances were 18 meters.	BT ubiquitous network BT high vol of connected sites Rival trunk route may pass by One other CP may have duct and connected sites Typical dig distances were 14 meters .	BT ubiquitous network BT high vol of connected sites Numerous rival duct networks Buildings served with competing fibre services. Installed when historic economics were better. Typical dig distances were 9 meters	BT ubiquitous network BT high vol of connected sites Numerous rival duct networks Buildings served with competing fibre services. Installed when historic economics were better. Typical dig distances were 10 meters.	BT ubiquitous network BT high vol of connected sites Varying levels of rival duct networks. Customer demand for multi-site connectivity across the UK. 5% of rival connectivity provided by building new rival duct or 2% of total connectivity demand in 2017
✂	✂		✂	✂	✂

Economies of scale and scope	UK wide BT increases market share points between reviews.	BT increases market share points by 9 – 18% between review periods.	BT increases market share in the most competitive segment VHB from 12% in 2016 statement to 21 – 30% in 2017. Overall across bandwidths BT increases market share by 14 – 23% share points between review periods.	There is clear evidence that BT is remonopolising as a result of its unique economies of scale and scope. Having been slow to enter the Very High Bandwidth service provision that had tended to competition. It is quickly winning high share.
	BT prices uniformly across all geographies. BT has put in place special offers. OSA connection offer 4/16 – 3/18 excluding Flex Zones OSA spread connection offer 4/16 – 3/18 all UK 1G 36 month special offer 5/16 – 3/17 CLA only EBD 1G connection offer 7/16 – 3/17 all UK EAD 100M Chelsea TE 10/16 – 3/17 Chelsea TE only EAD 1G connection offer 10/17 – 3/17 – 9/17 all UK EAD 1G connection offer 5/18 – 3/19 Flex zone			As there is no geography demand or supply market pricing offered is national in scope and not geographically varied.
Barriers to entry and expansion	Survey evidence suggest that the majority of large firms use a single supplier for their leased lines. In BDRC 2016 56% and in BDRC 2015 66%. BT faces lower costs as it does not have to engage / manage multiple suppliers for network connectivity. Managing 3rd party suppliers can be complex and potentially influenced by whether the 3rd party supplier is also a downstream competitor. Customers face switching costs when switching supplier, new circuit provisioning is problematic, majority of customers are fibre served with modern fibre which meets their needs therefore will only switch following service issues, or if costs meet the criteria of an impact assessment. BDRC 2016 study shows that 51% of customers choose their existing supplier for their new service as they were already provisioned with that network.			

	BDRC 2016 study showed that 2/3 of customers had not switched in the last 5 years. Of 63,000 connections in 2017 we estimate that only 4% across industry (BT and CPs) were installed via new duct. Removing BT would make this estimate less than 2%. ✂				
Absence of potential competition	Only BT's network exists at or close to customer premises.	A competitor exists but indicators of competition such as variable pricing do not exist. Virgin price follow BT and have higher ECCs reflective of its network being further away.	Where a building is pre connected with fibre by a rival there is a competitive alternative to that building but national service demand means this does not translate in geographical competition variation. A competitor exists but indicators of competition such as variable pricing do not exist. ✂ If near but not connected higher ECCs reflective of its network being further away result in higher TOC making Openreach cheaper. Cities result in higher traffic management costs.	Where a building is pre connected with fibre by a rival there is a competitive alternative to that building but national service demand means this does not translate in geographical competition variation. A competitor exists but indicators of competition such as variable pricing do not exist. ✂ If near but not connected higher ECCs reflective of its network being further away result in higher TOC making Openreach cheaper. Cities result in higher traffic management costs.	The requirement of customers to obtain service to sites that range across geographies restricts that ability of geographical markets forming. Where a supplier cannot meet the site scope he cannot tender for the business.

	Rival networks present very little prospect of increases in rival network competition. Of 63,000 connections in 2017 less than ~1180 where new rival network extensions.
Absence of or low countervailing buying power	Countervailing buying power is limited by switching barriers and high switching costs. As customers are more likely to have moved from legacy PPC and WES/BES to their modern service there needs to be substantial price savings to offset switching costs that arise within the supply chain. We commission Cartesian to understand this is detail.

Source: Vodafone analysis of Ofcom provided data and own data provided to Ofcom

6.6 A full consideration of the indicators of competition reveals minimal difference between the proposed separate markets, indicating that we are correct in our assessment that there is no evidence in support of separate markets existing and business connectivity is a UK wide market.

6.7 Based on the evidence, it is not evident why Ofcom has concluded that BT does not have SMP in the CLA. Even if the CLA did exist as a separate market it is clear that BT would have SMP in that market.

6.8 Ofcom finds that BT has a high market share of new connections for 2017 compared to rivals.

6.9 Ofcom is wrong in its view that the higher levels of network density in the CLA results in greater competition in the London area. As we set out earlier, customers have a demand for service provision across geographies. A London site will simply be one of many sites to be connected. The question a customer asks is not how many networks are in reach of its London site, but which competitor can serve its entire geographic scope of sites.

6.10 Ofcom is wrong in its view regarding barriers to entry and economic of scale and scope with respect to the CLA. As we set out earlier, the networks that Ofcom are assessing were in the most part constructed when the economics were far better. The current situation for network build is highly challenging, except for the very highest bandwidths over very short distances. Even the favourable economics of very highest bandwidths at short distances could change overnight if BT modifies its current 10Gbit/s pricing to set the prices it levies closer to its real costs rather than the inflated above cost–orientated prices it offers to the market today.

6.11 Ofcom is wrong that greater business density in the CLA will lead to higher prospects of network build. London faces the highest network construction costs in the UK, if anything it is more challenging than the rest of the UK. The need for landlord Wayleaves means that buildings cannot be connected preemptively or in a programmed rollout. Rival network owners connect sites when they win a customer contract and therefore need to add sites ad hoc.

6.12 Ofcom is wrong that Openreach offers pricing discounts in Flexzones in such a manner that it is apparent that different commercial /competition conditions exist in the CLA. At present Openreach offers a connection discount for 1Gbit/s circuits. Similar discounts have applied through the UK:

- OSA connection offer 4/16 – 3/18 excluding Flex Zones

- OSA spread connection offer 4/16 – 3/18 all UK
- 1G 36 month special offer 5/16 – 3/17 CLA only
- EBD 1G connection offer 7/16 – 3/17 all UK
- EAD 100M Chelsea TE 10/16 – 3/17 Chelsea TE only
- EAD 1G connection offer 10/17 – 3/17 – 9/17 all UK
- EAD 1G connection offer 5/18 – 3/19 Flex zone

6.13 We do not agree that the is evidence of pricing differentiation between the CLA and the rest of the UK.

Vodafone response to Ofcom's Business Connectivity Market Review:

Part 3 – Remedies

18th January 2019

Non Confidential Version

Contents

1. CI Inter-exchange connectivity

1.1 In this section we explain that:

1.1.1 The transmission of traffic from different geographic areas to core network is critical for effective competition in the range of downstream markets. It is essential that this backhaul transmission does not become a bottleneck. Ofcom proposes to redetermine the market for backhaul aggregation connectivity, focusing on categorising all exchanges into competitive groupings which are based on the *number* of rival fibre network providers present.

1.1.2 Evaluating the level or prospect of competition simply at the level of rival numbers over-simplifies the requirements of service providers, putting at risk the capability of service providers to construct the properly routed and separated resilient networks that are necessary in a world reliant on access to the internet. Not being able to do this would put them at a disadvantage to BT lines of business.

1.1.3 Ofcom has overstated the number of competitive exchanges. Of the 545 exchanges that Ofcom finds competitive we agree that 278 are competitive. We disagree with the finding for a further ✂ and find these not to be competitive. A further ✂ need more detailed analysis before they can be declared competitive.

1.1.4 Ofcom's very limited proposed Dark Fibre remedy is unnecessarily BT service centric and should instead enable backhaul aggregation connectivity without restriction. Ofcom's consultation document text does not match its verbal explanation of its proposals.

1.2 The approach taken by Ofcom is a clear and obvious breach of the legal requirements of:

1.2.1 technological neutrality[1] - because the approach, in tying regulation to BT's network topography, favours its network over the more modern networks of its rivals;

1.2.2 non-discrimination – by pegging regulation to BT's network design and disregarding that of other CPs, Ofcom disadvantages them with material negative consequences, thus breaching the requirement of section 47(2)(b) of the 2003 Act, which prohibits undue discrimination; and

1.2.3 equal treatment – as a principle of administrative law.

[1] This European principle is given expression in section 4(6) of the 2003 Act, which is "requirement to take account of the desirability of OFCOM's carrying out their functions in a manner which, so far as practicable, does not favour (a) one form of electronic communications network, electronic communications service or associated facility; or (b) one means of providing or making available such a network, service or facility, over another."

Background

1.3 Previous regulation for exchange backhaul has been built up from the competitive conditions that applied in the past for the supply of legacy PPC trunk services and the level of competition of conveyance between particular trunk network routes. In 2016, Ofcom sought to incorporate modern day exchange backhaul within the regime and to include above 1Gbit/s bandwidth service provision. Ultimately the 2016 decision to regulate above 1Gbit/s failed to come about.

1.4 Establishing the correct regulation of exchange backhaul is particularly pertinent now as backhaul bandwidth, if not properly regulated, will constrain the market, squeezing the ability of rivals to compete effectively with BT. ✂ Ofcom's proposals consequently come at an important time, and it is opportune for Ofcom to establish the correct regulatory approach for these services in relation to current and future requirements.

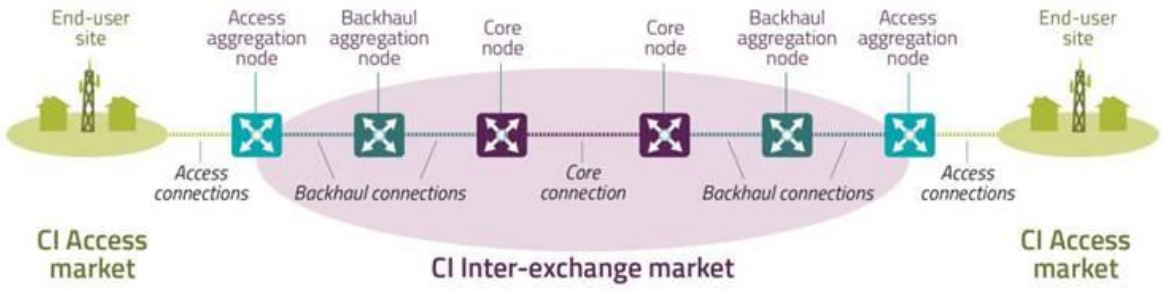
1.5 Backhaul demands can vary between market participants and it is important that Ofcom recognises the range of requirements and how requirements differ between BT and rival CPs. To be able to properly understand and regulate, Ofcom needs to immerse itself in some quite substantial detail.

Responses to questions

Question 7.1 Do you agree with our assessment of inter-exchange connectivity? Please provide evidence to support your views.

1.6 In section 3 of the consultation, Ofcom explains the function of inter-exchange connectivity to be the backhaul connections between access and backhaul nodes and from a backhaul node to a core node, commonly referred to as backhaul segments. Ofcom provides the following diagram:

Figure 1.2: Illustration of CI Access and CI Inter-exchange connectivity



Source: Ofcom

1.7 The Telecoms Strategy Review first drew out the distinction between two types of circuits: access circuits terminating at the local exchange, and backhaul circuits that were typically of higher bandwidth and passed access traffic aggregated at the BT exchange onward to the CP's core network. Openreach responded to this demand by providing EAD, EBD and OSA style variants that can be purchased by CPs between BT exchanges and from BT exchanges to CPs' network points.

1.8 CPs use backhaul connectivity to design a backhaul aggregation that meets the needs of the services they sell to businesses and consumers and to use their own network infrastructure in place of BT's by moving traffic from the BT network to the CP network at the most opportune and soonest possible location. The regulation of exchange backhaul has to date covered both the conveyance between BT exchanges and from the BT exchange to the CP core node and should continue to do so.

MNO exchange backhaul

1.9 Historically MNOs have purchased managed mobile backhaul from BT Enterprise. This included links from cell sites to the BT exchange and then onward exchange backhaul aggregation to core MNO handover points.

1.10 ✂ The differences between managed and unmanaged mobile backhaul are covered extensively in the CMA documents concerning the BT/EE merger. ✂

1.11 The backhaul aggregation network is dimensioned with adequate bandwidth to convey all of the backhaul aggregation services that we have at a BT exchange ✂

1.12 Mobile connectivity is very important to users of mobile services, ✂. Due to the very high importance of the services, our backhaul aggregation network has been designed to be as physically resilient as possible, so that in the event of failure the smallest number of customers are impacted.

1.13 Exchanges are connected with dual fibre that leaves the exchange "meet me chamber(s)" on completely physically separated routes, thereby providing assurance that if one of the routes is affected by a service outage that the second route can continue to function and ensure that services remain online for our users. ✂

✂

1.14 Ofcom's market analysis and remedy proposals lean toward a historic view of backhaul aggregation connectivity where point to point LLU backhaul provided very little service resilience for users in the event of backhaul connectivity failure.

1.15 It may be that Ofcom believes that all CPs house their core network (as BT downstream does) at the BT exchange building. If so, this is not correct, and in any event there is no evidence that Ofcom has understood and taken account of this crucial factor. ✂

1.16 The sustainability of non-fully resilient backhaul aggregation services long term is doubtful, as users rely heavily on connected applications and expect that service providers have installed networks that limit service failure to minimum numbers of users and for very limited time periods – seconds rather than minutes or hours.

1.17 To achieve this high level of network resilience requires each exchange to have properly route diverse suppliers. Ofcom has not considered this requirement at all. This is why Ofcom will find that despite

there being competing fibre networks at BT exchanges that Openreach continues to provide necessary service provision between and from exchanges. Evaluation of the market on a simple number basis ie how many rivals can be found with fibre at the exchange fails to understand the market demand and market supply issues.

1.18 As the demand for BT exchange backhaul can be between BT exchanges and between a BT exchange and a CP's network potentially using two physically diverse supply routes, the assessment of supply and demand is far more detailed than presented by Ofcom. The analysis required is more than a "number of rivals" assessment.

1.19 We do not think it would be onerous to properly conduct an assessment to determine the availability of competitively route diverse competition at exchanges. This would involve an assessment of the exact fibre routes that CPs have into exchanges. This analysis would show the ability of a CP to bypass the BT network due to the availability of adequate alternative rival networks. From our knowledge of exchange connectivity we find that Ofcom's current headcount analysis fails to capture the capability of rival networks ability to entirely replace the BT network. Of the 545 exchanges that Ofcom deems to be competitive we find from our direct experience:

1.19.1 Chelsea exchange has closed and therefore should not be on the list, giving a starting point of 544 rather than 545

1.19.2 ✂ exchanges do have adequate rival infrastructure to enable BT to be bypassed, and in terms of our demand, are competitive

1.19.3 ✂ exchanges do not have adequate rival infrastructure and we continue to purchase from BT in order to meet the network resilience requirements

1.19.4 A further ✂ of the 545 require further analysis to determine their competitive status as Vodafone cannot verify rival infrastructure capability to provide adequate resilience, since we have not undertaken that analysis for these exchanges to date[2].

1.20 A further aspect that Ofcom does not present any detail on is the manner in which wholesalers of exchange backhaul are able to compete with BT on particular routes. It is not evident that wholesalers of backhaul connectivity offer a competitive alternative for all the routes that are demanded by purchasers of such services. In particular, where the connectivity is requested between two BT exchanges rather than between a BT exchange and a CP's network site, it is doubtful that a rival infrastructure would have network in place of as short a distance and efficient routing as BT/ Openreach. Connectivity is priced on the basis of distance and therefore it is unlikely that a rival would be cost competitive with BT/Openreach for connectivity between two BT exchanges. Ofcom does not provide any evidence that such connectivity directly between exchanges is competitive.

[2] We provide an annex setting out which exchanges of the 544 we regard as competitive or otherwise

1.21 The importance of resilience from the BT exchange to the CP's core is clear. If we look at a few examples we can see that route resilience is normal for exchanges that are important aggregation interpoints. BT downstream is able to secure route resilience from Openreach when creating backhaul for itself or backhaul that it sells as part of its managed mobile backhaul ✂

✂

1.22 These maps show BT downstream business have the capability to obtain physical route separacy at exchanges when designing their services. This route separacy is put to use as can be found in BT's product literature. If one looks at the OSA Product Description Manual Resilience Option 2 (RO2) the following information is found:

"Consists of two OSA FSP3000, OSA FSP3000 FC or OSA XG210 FC bearers delivered using diversely routed paths between common or different customer sites (i.e common A and B ends, common A or B end, different A and B ends). These will form the primary and secondary paths of a resilient circuit pair. If there's a failure on the primary circuit, traffic must be switched to the secondary routed circuit. The responsibility for optical protection switching between the two routes is your or your customer's responsibility on end user equipment. "

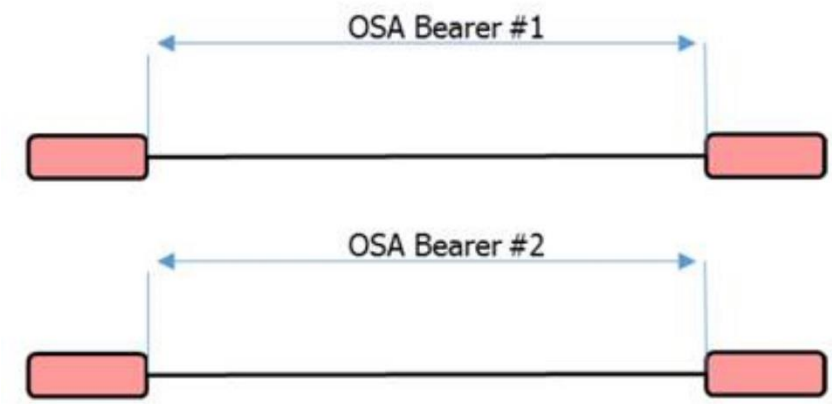


Figure 11: Resilience Option 2

Source : BT

1.23 At exchanges where BT has the option of using route separacy to deploy its services, in order to compete equivalently CPs will need to be able to offer the same level of service quality[3].

[3] We acknowledge in a minority of rural exchanges full route diversity into the exchange may not exist

1.24 When we design a network we do so with route resilience in mind. The following diagram illustrates how this is achieved for a proportion of our backhaul that falls within Ofcom's BT only exchange geography:

✂

✂

✂

1.25 ✂

1.26 ✂

1.27 ✂

1.28 ✂

1.29 ✂

1.30 ✂

1.31 We conclude that Ofcom has not correctly assessed the market for Inter-exchange connectivity as a result of failing to properly understand the demand for the service and how it is supplied.

Question 7.2 Do you agree with the proposed market definition? Please provide evidence to support your views.

Competing CI inter exchange seeks to replace managed service provision from BT Enterprise

1.32 We consider that Ofcom's market analysis approach and resulting market definition fails to properly consider the service requirements of users of backhaul aggregation services. Ofcom does not consider the connectivity that a CP is seeking to build. Prior to the development of our own network we purchased these backhaul services from BT Enterprise and therefore seek to replicate the quality and performance of that service. There is no value in building our own network if the result is a lower quality, less resilient network.

1.33 It is therefore necessary to understand how the BT Enterprise network functions. BT Enterprise has circa 1900 Tier 1 exchanges that aggregate to an inner core of 106 exchanges known as Metro Nodes (also known as Openreach Handoff Points), with a central core of circa 20 network points. BT Enterprise connect the Tier 1 exchanges to the Metro Nodes using Arcs or dual homed connections (Single exchange diversely connected to two different Metro Nodes). This is possible by utilising the physically separate duct that Openreach has at primary exchange buildings.

1.34 In order to be able to cease purchasing from BT Enterprise while maintaining the same service quality, it is necessary to replicate the diverse and dual home connections. Due to BT Enterprise solely using a subset of BT Exchanges for their aggregation and core architecture, that uses underlying

infrastructure and connectivity products provided by Openreach to connect their overlaid BT 21st Century Network, a key difference that CPs would face in replicating the BT Enterprise design is the requirement to leave a BT exchange acting as aggregation and to connect to the CP core.

1.35 This analysis is critical to understanding whether competing rival networks are able to provide on competitive terms the inputs needs for rival backhaul aggregation networks to compete head to head with the capability of BT Enterprise.

A single bandwidth market

1.36 We agree that there is a single market for bandwidth.

Assessment of rival infrastructure to provide all inputs needed to compete with BT Enterprise

1.37 When it comes to assessing the extent of competition, however, Ofcom does not give any consideration to the service quality that backhaul aggregation networks increasingly need to achieve. It is quite possible that BT Enterprise and Vodafone at present lead the standard on resilient network service quality due to the fact that the backhaul aggregation networks created by them support higher importance mobile connectivity. We do not consider that over the longer term it will be viable for providers of broadband services to have insufficiently resilient backhaul aggregation within their network configuration.

1.38 Ofcom concludes that of 5,573 exchanges that 5,028 have only a single or two suppliers and therefore fail to be competitive. 545 exchanges are found to have a number of rival networks situated at them. Whether the rivals at the 545 represent a competitive constraint upon one another is not given proper consideration. Ofcom does not present any information as to purchases from Openreach at these exchanges or consider why, in a market which by definition appears competitive, Openreach continues to be a key provider of bandwidth services.

Question 7.3 Do you consider that our list of BT exchanges for de-regulation is correct? Please provide evidence to support your views.

1.39 We do not consider that the full list of 545 exchanges are fully competitive with competing suppliers able to provide the inputs sought.

1.40 It is not evident that wholesalers of backhaul connectivity offer a competitive alternative for all the routes that are demanded by purchasers of such services. In particular where the connectivity is requested between two BT exchanges rather than between a BT exchange and a CP's network site it is doubtful that a rival infrastructure would have network in place of as short a distance and as efficient routing as BT/Openreach. Connectivity is priced on the basis of distance and therefore it is unlikely that a rival would be cost competitive with BT/Openreach for connectivity between two BT exchanges. Ofcom does not provide any evidence that such connectivity directly between exchanges is competitive.

1.41 Of the 545 exchanges that Ofcom deems to be competitive we find from our direct experience:

1.41.1 Chelsea exchange has closed and therefore should not be on the list giving a starting point of 544 rather than 545

1.41.2 ✂ exchanges do have adequate rival infrastructure to enable BT to be bypassed and are fully competitive

1.41.3 ✂ exchanges do not have adequate rival infrastructure and we continue to purchase from BT in order to meet the network resilience requirements

1.41.4 A further ✂ of the 545 require further analysis to determine their competitive status as Vodafone cannot verify the rival infrastructure capability to provide adequate resilience, since we have not undertaken that analysis for these exchanges to date

1.42 We set out in an accompanying excel workbook the exchanges that fall into each of the groupings that we identify above.

Question 7.4 Do you agree with our list of Principle Core Operators (PCOs)? Please provide evidence to support your views.

1.43 We disagree that the key characteristic is simply the number of rival fibre networks at an exchange but the ability of the rival networks to provide the required level of physically diverse network infrastructure which will depend on the manner in which rival networks have been built up to the exchange building / appropriate meeting point. As a consequence we do not consider that the PCO approach is sufficient as the sole test of competitiveness. PCO presence at an exchange should trigger a further layer of analysis to determine the competitive impact the PCO have in reducing the market power that BT holds at a given exchange and the required routes from that exchange.

1.44 We consider the simplistic approach to the analysis that Ofcom has undertaken will provide considerable risk to the future availability of adequate and cost effective backhaul aggregations services that will jeopardise the construction of appropriately resilience networks needed to support UK consumers of many services.

1.45 This BCMR is looking at how to regulate Openreach Connectivity, but fails to identify the use of the network by downstream BT Enterprise. The way in which DFA, DPA and Active Services are defined all play to the BT group network architecture strengths of exclusively using BT Exchanges. BT businesses will consume Openreach exclusively and scale and resiliently build their network to provide enterprise, broadband and Mobile services (to MNOs including themselves). As their Exchanges are already connected via Openreach, if they wanted to flip to using DFA in the BT Only or DPA in the BT Plus locations that would be plausible, unlike the CPs that have to work out in both cases where to interconnect and meet with Openreach in order to reach their own Cores for the BT-CP connectivity.

Conclusion

1.46 It is necessary to determine whether rival infrastructure providers are able to supply the required route diverse service needed to support a critical application backhaul aggregation network. Ofcom fails to take this into account and thereby risks making service providers trade away service quality resilience in order to provide an affordable service to consumers.

Data centre competition

1.47 Vodafone have now established that Ofcom are proposing to deregulate a further 836 data centres, compared to the 64 deregulated in the last 2016 BCMR. This became apparent on 19th December when Ofcom published a revised list of deregulated data centres, but was not apparent from the initial consultation. This is a significant change in Ofcom's scale of regulation in this area in a market that has seen minimal development since the last 2016 BCMR. Vodafone have had little time to consider this, and from reviewing Ofcom's consultation it appears the published detail is very light, 25 lines of text occupying less than one page of the consultation document. There is no annex setting out further detail of the data centre analysis undertaken by Ofcom. As such the proposal lacks the rigour and detail to enable us to respond in a meaningful manner.

1.48 It would appear that Ofcom has simply determined that a data centre which is not owned by a CP must have competitive characteristics without undertaking any analysis on the required conditions that would result in access to a data centre being competitive or whether all of the 900 data centres have similar conditions.

1.49 Data centres have requirements for route resilience similar to that which we have described above for exchange backhaul route resilience. The analysis needs to consider the precise route taken by rival providers. We find that BT SIN 516v3po explains that Openreach "connects data centres with diversely routed external fibres leaving the node by at least two separate cable entry points. This means it is possible to route two wavelengths diversely across the 21CN optical core network between any two 21 CN core/metro nodes and or Data Centres[1]" A competitive evaluation needs to determine whether rivals can completely bypass the BT network while competing effectively.

1.50 A data centre is more similar to a multiple occupancy Enterprise Access site than it is to a backhaul site. As with Enterprise access connectivity, availablility to the site will vary and it is simply not possible to imply that connectivity to each and every site – or indeed sufficient numbers of data centres to

[1] https://www.btplc.com/SINet/SINs/pdf/516v3p0.pdf

obtain an average – is sufficient to be able to determine that all data centres generically have competitive conditions.

1.51 Our experience of data centres is that market connectivity conditions vary in their competitiveness between sites. It is our view that Ofcom has not appreciated or sought to measure BT's market power in the supply of services to data centres.

1.52 We consider that data centres can be segmented in to smaller data centres which are in the CI Access Market for whom demand and supply conditions are like any other Enterprise site location.

1.53 The second segment of data centres is the data centre set that Ofcom examined in 2016 which identified the larger data centres in operation and which operated more like exchange backhaul with the aggregation of services at the data centre.

1.54 Ofcom's conclusion deviates from the analysis that it has undertaken under its s135 where 410 data centres were considered with this number being extended to 900 in these proposals.

1.55 Of the data centres which Ofcom reviewed under S135 Vodafone has direct on-net connectivity to ✂ separate data centres. At ✂ of these data centres we purchase offnet connectivity in order to provide the service resilience/characteristic demanded by the end customer. Customers prefer to purchase their connectivity from a single supplier including the diverse routing in order for that routing to be assured to be separate as the supplier will be have direct knowledge of both routes and can assure this. It is not clear whether Ofcom has sufficiently satisfied itself that competition to these sites could continue absent regulation and that we would be able to competitively procure the off net connectivity that we currently use to serve these customers.

1.56 An ✂ of the data centres which we provide service to (✂in the S135) use entirely offnet connectivity. It is not clear whether Ofcom has sufficiently satisfied itself that competition to these sites could continue absent regulation and that we would be able to competitively procure the offnet connectivity that we currently use to serve these customers.

1.57 ✂of the data centres ✂ in the S135 do not have services provided by Vodafone. It is not clear whether Ofcom has sufficiently evidenced to determine whether this is as a result of a lack of potential competition to these data centres or what the exact circumstances for our lack of presence at these sites is.

1.58 Our experience of operating in this market place is that BT has SMP in the provision of services to data centres. This is evidenced by BT being able to behave in a unique manner due to the power it has in this market place. BT is able to exert its market power when it seeks to provide access to customers in data centres that Vodafone actually owns. All other CP suppliers to customers in our data centres pay to co-locate their equipment in our data centres. BT is currently refusing to pay us to co-locate its equipment, knowing that customers who could not access BT's services would relocate their data centres elsewhere as a result. This situation is not reciprocated and when we co-locate in BT's data centres we are required to pay for this facility.

2. Duct and pole – part 1

2.1 In this section we provide an overview of how we consider the FTTP/H networks will be deployed and how the unrestricted duct and pole remedy would be used. Our experience of FTTP network build in other countries and our experience of being the UK largest business connectivity rival to BT give rise to our firm views that:

2.1.1 FTTP build will not present a credible scale alternative network to the current existing networks and will not lead to a step change in demand or supply to enterprises requiring high bandwidth leased lines connectivity;

2.1.2 The maturity of the leased lines market means that where fibre is already in situ overbuild will continue at the margins as it does today. The costs of overbuild will mean that companies using or forced to use this connectivity method will not be able to effectively compete with BT businesses that have access to the Openreach fibre which has been installed under earlier regulatory regimes;

2.1.3 Unrestricted ducts' most useful application will be to serve sites that do not already have fibre serving them

2.1.4 Due to the maturity of the leased lines markets and BT's retail market power, as well as BT's access to existing Openreach fibre when competing in retail markets, duct and pole can only be a complementary remedy rather than a substitutory remedy

2.2 Ofcom sets out that it believes new networks that may be built using BT's duct network will have an effect on competitive levels in the business connectivity market.

2.2.1 Ofcom does not provide any detail or any evidence of how this will occur in practice. It is necessary to consider the new networks are being built.

2.2.2 The primary stated aim of the network builders is to install new fibre to residential premises to meet the extreme lack of such fibre in the UK.

2.2.3 The secondary purpose for one of the prospective network builders, which is also regarded as a possible business case enabler, is the provision of replacement leased lines to premises which already have fibre.

2.2.4 It is also necessary to consider if new network builders will face improved economics to those faced by rival network infrastructure owners who already have networks today. We find no evidence of a likely improvement in the economics for the future, nor do we find that these networks have the prospect of increasing competition in the mature business connectivity market.

2.3 There is therefore no justification for adjusting the approach to business connectivity regulation in the hope that network build will follow, when there is no evidence or indication to suggest that it will. On

the contrary: Ofcom should not treat DPA as being likely to have an effect in the markets considered by the BCMR during the period of this review.

FTTP network competition and high bandwidth leased lines competition

2.4 In this section we draw on our expertise of rollout of FTTP networks in other countries.

2.5 We show the typical method used to deploy residential FTTP networks and the method by which business leased line customers are connected, highlighting the differences between the two and different cost economics of each deployment method.

2.6 We consider the difference in costs of installing business sites with leased lines during FTTP rollout and the costs of returning post FTTP to add an incremental leased lines business site. This identifies that the cost of the fibre installation crew and the fibre splicing contractors, together with landlord way leaves and traffic management, lead to very high costs which are rarely justified given the lower Openreach cost base. Adding individual leased lines for business premises is a very high cost activity. Retrofitting business connectivity after initial network deployment is expensive with the task in hand not differing to the connectivity of such customers to the business focussed networks that are in existence today.

2.7 We review how leased lines market share has not changed for Telefonica in Spain following FTTH network rollout.

Rollout of FTTH networks

2.8 In the current and future digital world, higher home bandwidth demand requires the upgrading of legacy copper communications infrastructure into a higher capacity fibre one. Countries throughout the world are at varying stages of this network upgrade. In the UK some locations have been earmarked for new FTTH networks. The business plans of these investors vary from a more rural focus, a tight geographic focus, to a more wide-ranging ambition from both Openreach and CityFibre.

2.9 In the following section we explain how the build is undertaken using our experience in a variety of markets throughout Europe.

2.10 The key focus of these investments is prodominantly residential areas. In the following section we discuss the standard approach to network deployment.

Designing the network

2.11 The pre-design process is:

2.11.1 Gather the details of the properties in the area which the network intends to serve. The locations and types of buildings are important (e.g. single dwelling unit (SDU), multiple dwelling unit (MDU), offices, factory, school etc), to correctly dimension the initial fibre deployment. Add any geodemographic data if desired, such as income markers, degree of home ownership, student area etc.

2.11.2 Group the properties into cells of ✂.

2.11.3 These cabinets are linked with a feeder duct route to connect them to the serving POPs for the area. The route should be designed for growth, allowing future cables to be installed without need to remove current cables first, and for resilience, allowing physical route robustness back to the POPs and minimising the impact of fibre or duct breaks.

2.11.4 The cables in the feeder routes are sized to cover the desired market segments – if FTTH, then driven by residential houses; if Enterprise only, driven by SMEs and businesses; if mobile backhaul, then cellsites.

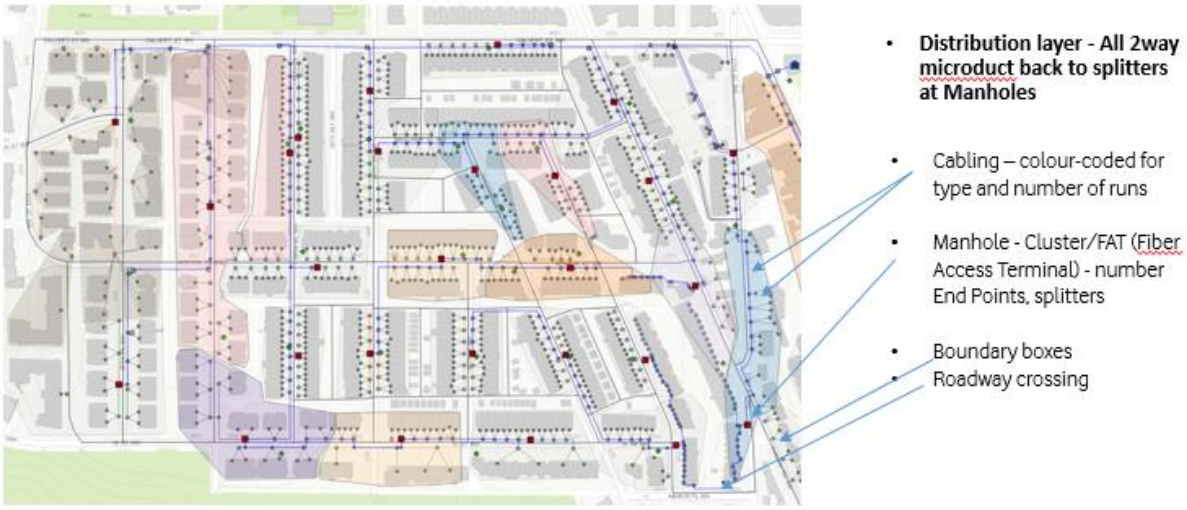
2.11.5 Cables will also need to allow spare fibres for maintenance.

2.11.6 The cabinets can be locations for PON splitters, or straight 1-1 patching, and may be supplemented by smaller fibre housings closer to the end points, which are used to group clusters of houses or businesses.

2.11.7 The area by area build to locate feeder routes into the clusters and cells produces a design similar to that below. ✂

2.12 The next layer of detail is the design to the premises themselves. For example, below is a suburban design showing the build needed along each side of a street to access each property. The design choice is to leave boundary boxes for every pair of properties, running fibre back to a Fibre Access Terminal for the cluster, in a manhole local to the street. In this case, the GPON splitters are installed at the manhole, with fibres from the Boundary boxes spliced in advance to ports on the splitters.

✂



Source: https://fiberplanit.com/_new-fiberplanit/wp-content/uploads/2017/10/image2017-10-18_11-8-45.png

2.13 This means the build phase for passing the homes has gone to the boundary of every property, leaving to a later stage the homes' connection phase to extend from the property boundary to the in-house location.

2.14 At the feeder layer design stage, adding small extra runs of duct allows for robustness to be added, closing off gaps in the network and allowing more flexibility for the build sequencing to feed fibre from either end of a loop.

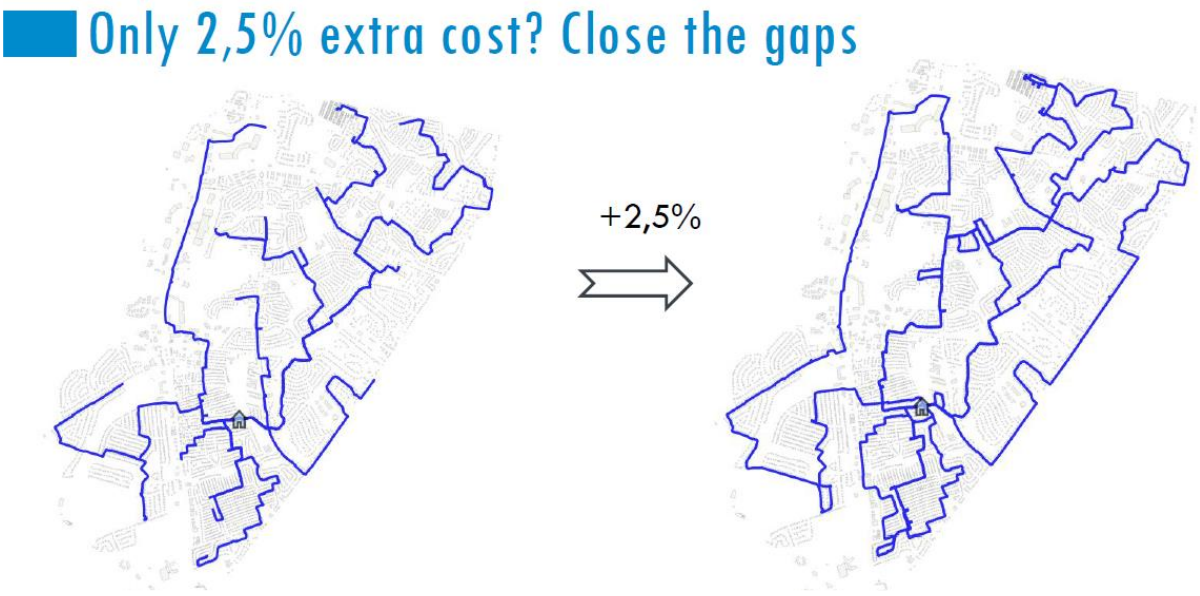


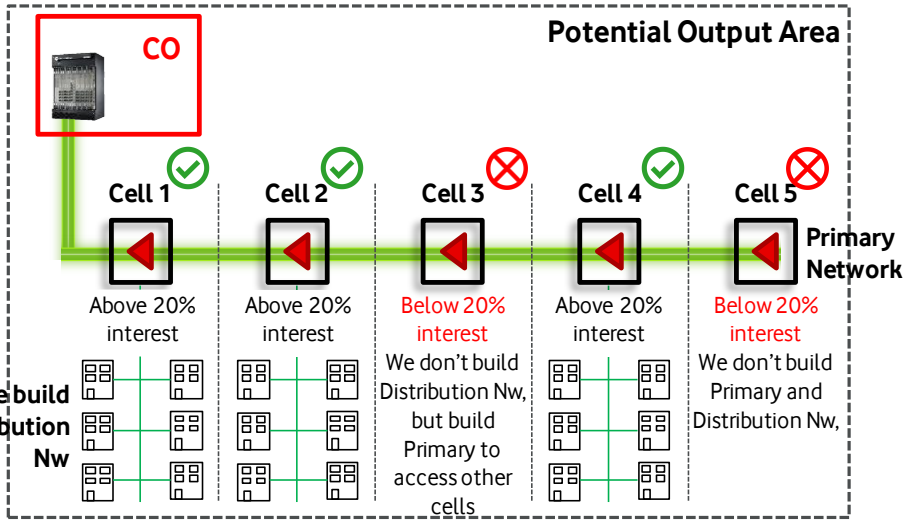
Figure 1, Influencing factors on your FTTx architecture comsof session1-final-180220103547

2.15 If the drops to the homes can be completed using aerial fibre from poles, then design options can look at whether to do direct drops to homes, or allow drops to be strung along between several poles, minimising the number of Homes Passed access points to build, but increasing the Homes Connected work and materials. This increases the proportion of premise that are passed quickly but passes more of the costs to the connection of customers that sign up to service provision with the network.

Scenarios

Figure 2,Influencing factors on your FTTx architecture comsof session1-final-180220103547

2.16 Deciding which areas to build can be driven by possible interest from customers, or a marketing view on ease of sales given the geodemographic factors. This can lead to prioritisation of build for the lowest level "capillary" ducts, skipping the areas with least interest when putting the feeder route through, but with access left for future spurs and development.



2.17 This same approach can be used for the single purpose network which can expand to create a converged network – whether FTTH adding Enterprise, or mobile backhaul adding Enterprise and FTTH. To date the approach driven by cost economics has been the building of a connectivity ring around the areas a provider wishes to serve – a metropolitan ring or a business park ring and thereby extending network to the area in preparation for connection to a customer site to be added when a customer is won and brought onto the network. As such spurs from the ring to the enterprise premise are incrementally added once an enterprise service has been won.

2.18 When planning for expansion for further services or service type the CP can pre-install additional fibres in the main cables from the Central Office/POP, as incremental cost of cable is much lower than installing a second cable afterwards. Today a provider of leased lines service may have to pull additional fibre from a point further in the network beyond the network flexibility point to serve a new customer requirement. The choice of how much spare fibre to install is up to the CP and will determine whether further cable needs to be pulled to meet customer demand.

2.19 Splicing locations in the network can be sized for the whole cable size, but only the necessary splices are made at day one – in which case a subsequent connection requires opening of the splicing locations along the route to join the fibres together. This is again how enterprise service provision occurs today.

Using the network

2.20 For FTTH networks, the aim is to pass homes while minimising the work for connecting each additional new end customer and providing better certainty for delivery to a target timescale when an order is taken. Costs to build out to the boundary of every property may be prohibitive, or impossible if there is a permission problem gaining access to private land, or restrictions on digging or flying aerial cable.

2.21 Similarly, Enterprise focused networks aim to build to business parks or office blocks, leaving as little work to be done to connect as practical. Initial build may be done around the business park if permission from the owner is obtained. When connecting sites that are ultimately won, additional costs to bring the connectivity from the ring to the customer site are incurred. We discuss this in the section on the cost model and duct and pole in Part 2 section 3.

2.22 In some cases, deferred deployment may be used – the plans are worked on an agreed with the relevant parties for the Build/Homes Passed stage, but work not done until the first order is received. This first order (and subsequent ones within roughly the same time frame) will require more feeder or distribution network build to reach the customers, but once built, future customer connections are in normal lead times.

2.23 Deferred build can speed initial build through an area, as more time in the initial phases is spent covering routes in more areas, just not as deeply as the full plan entails. It also risks a change in circumstances, causing problems in deploying the deferred network.

Connecting a home on FTTH

2.24 Making the "last drop" connection once the primary network is built will be limited to running fibre from the building to the boundary box or Fibre Access Terminal, making a splice if need be, or plugging up to a connector left during the Homes Passed phase and installing the home fibre connection and the Active equipment – usually an Optical Network Terminal (ONT).

Connecting an Enterprise or Mobile site

2.25 Similar work to create a route in duct or aerial fibre is needed, from the last boundary box nearest the site, and fibre work to connect to the installed network. If using PON to deliver the service, then the

fibres from the end point can be connected to the splitter. If point-to-point, the fibre path from POP to end point needs to be connected along the route at the flexibility points.

2.26 Diverse routes for resilience lead to more activity in the fibre network, to avoid any pinch points on fibre routes or duct being shared in common. We discuss the cost involved in the sections on the cost model and duct and pole in Part 2 section 4.

Customer connection teams are not shared between residential and buisness

2.27 While new builders of networks will have common network components, these components will separate to serve predominantly residential areas and predominantly business areas. There will also be operational differences, particularly in the connections teams installing residential or business connections.

2.28 The feeder network that runs from POPs to Cabinets is typically built at a lower depth in the ground to be more protected, while drops and distribution to homes may be shallower, and done using individual ducts within multiway bundles. Enterprise connections may require feeder depth construction to minimise hits from civil construction carried out by others. The pre-design stage may have identified the routes where Home connections should also have a spare duct buried lower to prepare for the enterprise and cell-site connections (or vice versa, where home access ducts or miniducts should be planned to intercept the enterprise build).

2.29 FTTH installation is usually sub-contracted out, due to the volumes of installations to fulfil the orders, and the skill sets for installing and commissioning home gateway and set-top boxes, for example.

2.30 Enterprise connections will usually be made by a different more specialised team and we discuss in the section on duct on pole the teams for civil construction, teams for cable laying and the splice contractors. In addition to these teams, there will be enterprise field engineers dedicated to meeting the stricter requirements of Enterprise service installation.

2.31 In summary, new networks being built today will have the ability to lay a proportion of the service installation required to serve residential and enterprise customers in a cost efficient manner. That said, laying the network to serve maximum customer numbers and market segments will substantially raise the cost of the network rollout.

2.32 The detail beneath the rollout plans which identifies the exact approach to the network build is important to understand the true scope needed to serve customers and premises competitively.

2.32.1 Builders have the choice of either creating dense network build in the network passing build stage and incurring more upfront costs, or they can achive achieve overall coverage more quickly and defer costs to the point at which individual customer connections are made.

2.32.2 Builders have the choice of adding the fibre capacity to serve additional markets. This could raise costs, some of which may be irrecoverable, in the event that they are not successful in penetrating maturer markets.

2.33 Frontier has estimated that the cost of installing a single FTTH network to every UK consumer could amount to £20.3BN or £32BN in the case of duplicate networks[4]. Frontier does not calculate the costs in relation to installing competing fibre networks to all business premises.

2.34 Ofcom has looked at the business models of fibre providers and the interrelationship between FTTH and leased lines. CityFibre is identified as a provider that has stated a need to improve the FTTH business case by obtaining a leased lines anchor tenant – an enterprise customer such as an MNO or local authority, whose enterprise service build (via installation, excess construction charges and rental charges) offsets the costs of CityFibre bringing its spine network to a new town. CityFibre has shown a historic pipeline of this approach, connecting a number of council and NHS projects in this manner. In our view however we do not consider that network builders will have success in finding anchor tenants as suggested:

2.34.1 Enterprise and MNO service demand timelines would need to align exactly with the network builders' time line.

2.34.2 We know that Enterprise customers tend to purchase 3 year contracts and therefore do not change underlying connectivity outside of this timescale.

2.34.3 We know that MNOs have demand at this very moment to secure connectivity for their 5G rollout and therefore need networks that are available now rather than in the long term future.

2.34.4 We know that switching costs are substantial and that switching at the end of a contract needs to be supported by a switch to a service provider with far lower costs to offset the costs of change.

2.35 It is our view that the anchor tenant model is predominantly likely to be successful in the case where an enterprise customer is using legacy technology and can offset the switching costs (see Part 2 section 5) against the requirement to move away from legacy services that are becoming end of life and move to higher bandwidth service provision (more likely to be required at this time). As time progresses there are fewer and fewer customers that remain on legacy service provision which are required to have been transferred to modern service provision over the coming 12 month period. We illustrate this in the chart below:

Product	Supplier	✂
WES/BES/WEES	Openreach	✂
Sub 2MB PPC	BT ENTERPRISE	✂
Sub 2MB RBS	BT ENTERPRISE	✂
Analogue	BT ENTERPRISE	✂
Sub 2MB RPC	BT ENTERPRISE	✂

[4] https://www.frontier-economics.com/media/1139/20180723_future-telecoms-infrastructure-review-annex-a_frontier.pdf

>/= 2MB PPC	BT ENTERPRISE	✂
>/= 2MB RPC	BT ENTERPRISE	✂
>/= 2MB RBS	BT ENTERPRISE	✂
WES & BES 2.5G & 10G	Openreach	✂

2.36 Newer market participants will be unaware of the high switching cost barriers and the need for an overall high on-net footprint in order to price competitively across a national demand for leased lines services. Competing for leased lines service provision is highly challenging and even more so in 2019/20 when customers lack the imperative to move service provider as they are on a modern service with upgradable service features (100M to 1G upgrade).

2.37 The manner in which new networks and new competitors can make inroads into mature markets with high switching barriers can be evidenced from markets which are ahead of the UK in terms of the new network deployment.

Spain

2.37 If we look to a market place that is ahead of the UK we can evaluate the degree to which market share of the incumbent supply has changed following the FTTH build. In our view the analysis of Spain affirms our views that FTTH deployment which in the main is targeted to bring up to date fibre broadband to residential premises does not result in a change to the competition of leased lines service provisision. The high costs of physically installing incremental business premises, with high bandwidth leased lines, continues to provide the greatest advantage to the player that had a high leased lines circuit penetration prior to the roll out of new FTTH networks – the market incumbent.

Telefonica (Movistar)	2013	2014	2015	2016
Circuits revenue market share	78.5%	82%	75%	78%

Source: calculated from http://data.cnmc.es/datagraph/jsp/inf_anual.jsp

3. Duct and pole remedy – part 2

3.1 In this section we consider the economics of unrestricted DPA using Ofcom's network extension model and applying the reuse of existing duct within the model to have costs similar to duct and pole.

3.1.1 The benefits from DPA are greatest in non-fibre areas. Ofcom found in the BCMR 2016 that: "*The benefits specific to duct access are likely to be the greatest where there is little or no fibre, particularly in the mass market. However, most customers of fibre leased lines are larger businesses and public sector clients, and BT currently serves them with fibre leased lines throughout the UK*". DPA therefore has limited application for leased lines service provision where fibre is already in situ to the customer.

3.1.2 That competition in this market is driven by existing fibre, not new build. Competition in the BCM is based around the existence and leverage of connections *already in place* to customers. A very low proportion of rival service installations are made by either extending networks through the construction of new duct and fibre facilities or by augmenting duct with new external fibre (and internal fibre).

3.1.3 The availability of cost based Wholesale products drive this market, not new fibre network extensions. ✂

3.1.4 In most cases DPA is not economically viable in this market. The economics of DPA for single site installations are challenging. Our cost model concludes that DPA may have the potential to replace some supply for a subset of the total market. ✂ Critically this analysis of the economics holds true only while BT chooses to keep its prices substantially above cost.

3.1.5 FTTH will not help drive competition. The nature of the BCM contracts means that FTTH rival networks will not displace the high costs of installing adhoc and incremental Enterprise sites onto the network via their FTTH network infrastructure, therefore FTTH rival networks will not bring greater competition to the business connectivity market. Furthermore, as BCM demand is national in scope, limited regional presence will not facilitate the ability to compete in the national market place.

DPA cannot change business connectivity competition

3.2 Ofcom's consultation contains a number of misunderstandings as to how the business connectivity market works. Regulation is put in place to support retail markets and prevent the need for retail regulation. Business connectivity customers are large Enterprise customers that have a demand for connectivity across regionally diverse sites. Suppliers therefore require a national footprint in order to compete effectively for these customers.

3.3 We explain in Part 2 section 3 that rivals to BT are able to win business when they are able to reuse pre-existing network connections (built when network economics were better in the past) as part of

their customer tender. We find that where we wholesale to other market players that these market players seek connectivity that is already in situ as a primary choice.

3.4 ✂

3.5 A small market niche existed for a time for new entrant suppliers of very high bandwidth services that entered the market at the early stages of development to build fibre that did not already exist and provide a service that Openreach was not yet offering, The market conditions that enabled this new build have now been removed. BT is focused on supplying this now growing market, a market which now makes up 5% of bandwidth demand. BT's extensive fibre footprint can be used to serve this market at the lowest cost.

3.6 Ofcom's analysis focuses on the ability of CPs to be able to match the Openreach cost rather than beat it. This would not enable rival CPs to win business. We discuss in Part 2 section 5 the substantial switching costs and switching barriers that are in place for Enterprise customers. In an environment where the best the alternative retailer can hope to achieve is a price match with BT, enticing a customer to face the switching barriers and costs will be unsuccessful. For this reason, in the business connectivity market where fibre penetration is very high and a minority of circuits remain to be migrated from legacy provision to modern EAD provision, DPA will prove unsuccessful in changing the levels of market competition.

3.7 Ofcom has collected extensive information from market participants. This information includes:

3.7.1 the number of pre-connected fibre buildings that a service provider has;

3.7.2 the methods by which a rival connects customers; for example:

3.7.3 the proportion of customers connected as a quick win (where duct, external fibre, potentially internal fibre and even service providing equipment are already in situ) versus the addition of new external fibre and internal fibre to existing duct facilities – which would be akin to the DPA remedy, and

3.7.4 the building of entirely new network extensions to new customer sites.

3.8 Ofcom illustrates that just 5% of rival network connectivity in 2017 or circa 2% of total market connectivity in 2017 is entirely new rival network extensions. Ofcom does not provide the data to illustrate the proportion of rival network connectivity that is achieved by a rival infrastructure owner augmenting existing duct facilities.

3.9 Our own data shows that this accounted for 5% of our on-net connectivity in 2017. Further analysis shows the average costs (contained in the data provided to Ofcom under S135) of bringing fibre to the network flex point, alongside the existing duct facility and into the building to the customer's floor within a multiple occupancy building. We can see that these costs are very substantial and explain why we have circuits from Openreach to buildings which we have connected with our own duct or to

buildings very close to our connected buildings. Our data shows that the costs of laying fibre into existing ducts would only make economic sense at the very highest bandwidth service provision.

3.10 The table below is taken from part 2 section 4 and shows that extending our network, even using duct and pole access, will only ever be economically viable for bandwidths above 1G/bits. However this is only due to Openreach's current pricing, which as Ofcom confirms is above cost. Additionally, Openreach's 10G/bits pricing has dropped by 50% in the last year, therefore any network operator putting a business case together for extending their network is entirely dependent on trying to forecast BT's future pricing of 10G/bits circuits which has been shown to be very uncertain.

Table: Vodafone's table populated with Vodafone's actual data showing the Economic radial dig distances (metres)

✂

4. Dark Fibre

4.1 In this section we set out that Dark Fibre is the optimal remedy for the business connectivity market. Dark Fibre is the only solution that that can address BT's market power and bring greater competition to the market. In the current market context it is the remedy that fits most comfortably with Ofcom's statutory duties.

4.1.1 To date competition in business connectivity has been enabled by wholesale active regulation. Ofcom has protected the market from BT's SMP by placing specific cost based price regulation on wholesale products.

4.1.2 Due to the change in service demand and the inability to correctly capture service costs, Openreach continuously outperformed charge controls and significant excessive profitability has been endemic, with no corresponding benefit in network investment by Openreach. In addition, network innovation was squarely in the hands of Openreach, as other operators could not alter the characteristics of the active regulated services.

4.1.3 High fibre penetration means little gain from further network build; Openreach has very high fibre presence to Enterprise buildings (and customer floors), with +75% of customers able to achieve a quick fibre service activation with Openreach.

4.1.4 Openreach's business fibre reach and entrenched position is driven by past regulation. Openreach's position in the Enterprise fibre has been supported by past regulation and the Ofcom endorsed excess construction fund which has been paid into by all customers/suppliers to cover a variety of costs: the full material and labour costs of new duct, fibre extensions that are internal and external to the premises, traffic management charges and landlord wayleaves.

4.1.5 High fibre penetration increases barriers to switching; where customers are connected with modern fibre services, potentially with futureproof bandwidth (100Mbit/s with path to 1Gbit/s upgrade), incentives to switch supplier will be quashed with costs to do so heavily outweighing the cost savings that could be offered for new services. Why would customers pay again for a new fibre connection when they have already incurred this expense?

4.1.6 Dark Fibre is technically and economically an enabler for 5G services. In the case of mobile backhaul there is now increasing urgency to make networks 5G ready[5] and this urgency is best facilitated by upgrading existing fibre connections. Unlike multi-tenanted enterprise buildings, fibre at cell sites cannot be reused to serve other customers at the site or in the building.

[5] https://www.gov.uk/government/publications/next-generation-mobile-technologies-a-5g-strategy-for-the-uk

4.1.7 Dark Fibre solves all of the above issues. The proposed remedies however perpetuate these issues – a reliance on duct and pole introduces higher barriers to competing in the business connectivity market and provides BT downstream the opportunity to gain further market share beyond its current 60% retail market share.

Dark Fibre has been and still is the right remedy in this market

4.2 We remind Ofcom in Annex 2 of its recent views of the benefits of Dark Fibre for the business connectivity market. Until Spring 2018 – following the CAT decision which required Ofcom to reconsider its approach to bandwidth market definition – Ofcom considered that Dark Fibre was the correct remedy to address BT's market power in at least 1Gbit/s and below connectivity demand for most of the UK. Ofcom has also now reconsidered its approach to market definition and found that a single market for leased lines fibre does indeed exist. The updated and corrected market analysis deals with the concerns raised by the CAT and enables the implementation of the Dark Fibre remedy across that product market.

4.3 A broader, more effective Dark Fibre remedy is clearly justified as a regulatory remedy for the business connectivity market for the period 2019 – 2021 given:

4.3.1.1 Ofcom's previous analysis that Dark Fibre would work to address BT's market power, enabling greater competition in business connectivity;

4.3.1.2 Ofcom's misunderstanding about the impact of DPA including unrestricted DPA; and

4.3.1.3 In relation to mobile backaul, Ofcom's errors in relation to the differences between the market for mobile backhaul and that for enterprise circuits[6].

4.4 When setting market remedies Ofcom have to assess how good each of the prospective remedies are at achieving Ofcom's strategic goals:

4.4.1 Active products do absolutely nothing for Ofcom's strategic goals, in fact they work against them because they eliminate network innovation possibilities and are highly unsuitable for such things as 5G backhaul.

4.4.2 Dark Fibre products, (limited to BCMR because no LLU type product is available for GEA) does meet Ofcom's objectives for network innovation. Any impact that access to Dark Fibre has on new fibre roll-out will be limited to this market where fibre penetration is extremely high.

[6] Even if mobile backhaul sits in the same market as enterprise connections in a formal sense, the characteristics of the customer base, the supply side economics and the different product requirements are such that a separate set of remedies, including Dark Fibre, are required.

4.4.3 Duct and poles access could provide network innovation if it made network extension viable in this market, but it is not economically viable as shown in section 3 and thus is not a valid option within the next review period.

4.5 Dark Fibre and Duct and Pole could be complementary remedies. With Duct and Pole, unfibred Business Connectivity customers stand a greater chance of securing a non-Openreach connection. However, those customers with existing Openreach fibre – and for whom another fibre connection is not economically viable – will be able to benefit from innovation and better priced competition by using Dark Fibre.

4.6 When reviewing the manner in which each remedy will work to address the existing competition problem and fulfill the policy objective to bring fibre to customers who cannot secure access to fibre today, it is difficult to square Ofcom's decision on Dark Fibre with its statutory obligations. It is clear that bandwidth demands and the need for flexibility are likely to mean that BT's active product set, while important, will be of diminishing use. DPA will be of limited effect during the period of this review; even after this review, it is likely to be of minimal used in the markets covered by the BCMR except in areas which currently have no fibre at all. Dark Fibre fills the regulatory remedy gap in several ways. It has key advantages over active products when it comes to mobile backhaul, as set out elsewhere in this response. It also meets Ofcom's statutory duties because it will be likely to result in lower charges for end-users, meeting Ofcom's primary duties in section 3(1)(b).

4.6.1 Furthermore, it will promote competition in accordance with section 1(4)(b).

4.6.2 More generally, it is surprising that Ofcom has not sought to explain how its assessment of the different remedies it has considered perform against the relevant statutory duties, or to show a cost benefit analysis of each of them as required by section 7 of the Act. It is not enough for Ofcom to say that the whole document constitutes a section 7 assessment. What is clearly required is separate, dedicated analysis of the costs and benefits of each proposal. This is what is done by other regulators, and no reason is given for this departure from regulatory best practice.

Conclusion

4.7 BT's market power is best addressed by competitors in the market having stable and clear long term pricing. It is our view this is best facilitated by the introduction of a UK-wide, cost-oriented Dark Fibre remedy:

4.7.1 This will enable competitors to offer customers contracts knowing clearly their cost base over the entire customer contract – 3 year period.

4.7.2 Competitors will be able to develop new services that they can offer on their own fibre and over BT fibre, as services are no longer constrained by BT active equipment. Today it is not worthwhile innovating for services that are limited to own fibre connected sites.

4.7.3 Competitors will still be able to extend their own networks to meet specific customer demand and in situations where this remains economic, such as service sites not already connected by fibre.

5. General remedies

5.1 In this section we respond to the questions that Ofcom asks about the generic remedies it proposes to impose. Ofcom is required to set remedies that reflect current competition concerns and remedy those concerns for the period of the review. Ofcom has failed to do this:

5.1.1 Ofcom seeks to take account of the future potential of unrestricted DPA, while it sets remedies, which by its own admission is highly unlikely to be a material consideration within the period under review.

5.1.2 Ofcom's choice of remedies selection is compromised by its ideological desire to promote network based competition without any assessment of the ability of this strategy to be effective in a mature market with high fibre penetration, which is distinct from the residential market where copper prevails. This failure to differentiate market circumstances results in Ofcom reaching conclusions which don't stand up to scrunity based on prevailing market circumstances.

5.1.3 Ofcom has failed to show that its policy will ever provide users of business connectivity services future benefit that will offset the higher prices they will endure due to Ofcom's choices.

5.1.4 Ofcom fails to show that its proposals to leave Openreach with excessive revenues is an appropriate decision that is in the interest of the UK's business consumers.

5.1.5 Ofcom's failure to offer a Dark Fibre remedy beyond connectivity between BT only exchanges contradicts the evidence it provided to the Competition and Markets Authority in the BT/EE acquisition process.

5.1.6 Ofcom does not provide adequate evidence for not imposing the Dark Fibre remedy in BT+1 exchanges or exchanges/routes from exchanges where rival infrastructure is not an effective constraint on BT's market power.

5.1.7 Ofcom does not provide any evidence for not imposing DFA for CI Access BT only area

5.1.8 Ofcom does not provide adequate evidence for not imposing DFA for CI Access BT+ areas, HNR or CLA

Question 10.1 Do you agree with our proposed approach to remedies? Please provide reasons and evidence in support of your views.

5.2 Ofcom concludes that BT has SMP for CI Access services at all bandwidths in all parts of the UK excluding CLA and Hull. Ofcom concludes that BT has SMP for CI interexchange connectivity at all bandwidths at non- competitive BT exchanges. It is expected that Ofcom will set remedies in light of the SMP findings that Ofcom has concluded will prevail durng the period of the review.

5.3 However Ofcom has departed from the standard approach to setting remedies. Ofcom explains that the SMP remedies proposed are both to address its competition concerns and to take account of Ofcom's strategy to promote investment and competition, as set out most recently in Ofcom's July 2018 Strategic Policy Position. The July 2018 document is a 34 page document setting out ambitions to change the direction of competition, basing it on rival network competiton rather than service based competition across a range of markets for the period after 2021. The policy paper does not undertake an assessment of the likely success of the ambition by market or the speed at which changes to competition might be experienced in individual markets. The detailed consultation is due to be held during 2019 and 2020 following the conclusion of the BCMR. The outcome and industry views on the proposals are not yet known.

5.4 No evidence found within the BCMR consultation, the PIMR consultation or the July Strategy Statement identifies facts to either suggest or confirm that the unrestricted DPA product can intensify competition levels across the business connectivity market beyond the levels existing today. Concerning the period of the forthcoming review for which remedies are to be set, Ofcom estimates that between 1,000 and 5,000 circuits *might* be installed using DPA over the period. This is between 0.8% and 4% of connection demand for the period and therefore materially low. Ofcom does not provide any detail to substantiate the estimates that it has derived and therefore it is not possible to assess the accuracy of these very low levels.

5.5 There are numerous reasons why Ofcom is in error in including unrestricted DPA in its decision making process for this BCMR:

5.5.1 Unrestricted DPA is a proposal subject to consultation, and consequently not yet cleared through the regulatory decision making process.[7]

5.5.2 Assuming an affirmation decision on unrestricted DPA is made, it is not yet clear whether any legal challenges will be made. Following the withdrawal of Ofcom's previous remedy of DFA in the last BCMR, CPs not presently using DPA will not rush headlong into incurring substantial costs of onboarding a product at risk of appeal.

5.5.3 CP readiness (for those not using the current variant) in terms of budget for onboarding and time within the development work stack will not have been allocated. In July Ofcom set expectations that this product would not be available before 2020.

5.5.4 Ofcom has not undertaken any (public) detailed evaluation of the likely impact of unrestricted DPA in the business connectivity, in particular to offer a short term change (in this review or even the next) to competitive dynamics within BCM service provision.

5.5.5 Ofcom states that unrestricted access to BT's ducts and poles will make it cheaper and easier for competitors to build new networks, although Ofcom does not reveal the difference in cost

[7] In a previous decision Ofcom accounted for the making of the restricted DPA remedy and subsequently changed its mind.

for serving typical BCM customers in this way and whether the cost difference is enough to give unrestricted DPA enough competitive impact.

5.6 Ofcom's economic dig distance and cost analysis model (correctly populated with factual cost data relevant to alternative CPs) could be adapted to identify the real role that unrestricted DPA brings. Ofcom has made a substantial start with the model and we provide more detail on the costs that are relevant for inclusion to make this model appropriate for its purpose. We believe Ofcom has been overly optimistic over the economic reach of DPA in business connectivity. More realistic assumptions will result in a significantly reduced usage case for the remedy.

5.7 Ofcom does not consider the impact that DPA has had in business connectivity markets in countries with more mature DPA rollout. We show Spain has seen no change in market share levels.

5.8 Ofcom has not considered the differences between the WLA and BCM market which will mean that the demand for services and the pace of service demand will substantially differ. Vodafone has commissioned Frontier Economics to undertake a study to understand how WLA and BCM markets differ.

5.9 Frontier finds:

5.9.1 Rollout of competiting networks for BCM service has been conflated with WLA service rollout out

5.9.2 Openreach is already dominant in the provision of BCM fibre services, whereas WLA fibre services are yet to be rolled out

5.9.3 There are very different switching costs and benefits between the BCM and WLA markets. BCM customers have fibre, most probably at this time the latest version of EAD, whereas WLA customers currently lack the product and would see material benefits in obtaining access to the product.

6.10 In its report (found in the Annex) Frontier states:

> "*At present, operators in the downstream enterprise market, such as providers of managed networks services or systems integrators, largely rely on Openreach as a wholesale provider. As a result, a large share of the addressable business market is already connected to Openreach's fibre network. This is shown by Ofcom's evidence "BT's ubiquitous network gives it an advantage over other operators as it will more often have a physical infrastructure connection (fibre or duct) to customer sites. Our analysis shows that BT had existing duct connections to [*][*]% 81-90% of its 2017 new customer ends in the UK excluding the Hull Area, compared to 45% across all rivals, collectively. We note that [*][*]% of BT's 2017 new customer ends were fibre connected compared to less than 45% for rivals (we were unable*

to estimate the exact figure for rivals due to data limitations).”[8] Further, Vodafone has found that approximately ✂ of the time when it orders a new Openreach fibre circuit, there is already a fibre connection in place at those premises.

This means the benefits of switching to other access providers is far more limited than in the residential sector where competitors can offer improved bandwidth and quality of service compared to households’ legacy copper based connections.

Openreach’s dominance in the corporate market has led to a large quantity of sunk costs, both by customers paying excess construction charges (ECCs) to Openreach to extend leased line fibre to business customer premises and operators investing in backhaul built out to BT exchanges, in order to use the most economic regulated wholesale products. These sunk costs form a barrier for alternative providers to move to self-supply (i.e. extending networks or moving hubs outside of BT exchanges), and a barrier to switching from customers who will be unwilling to bear the customer specific costs (equivalent to ECCs) to replicate existing infrastructure. This is in addition to relatively high switching costs for alternative providers relative to many residential users due to the need to negotiate building access with landlords and the high potential costs of any downtime for mission critical applications.

These high switching costs (and relatively low switching benefits) impact on the appropriate regulatory approach. We find that:

Regulatory policy needs to reflect that this market for enterprise fibre is mature, with many corporate sites already connected over full fibre networks. This means that the potential long term gains to these customers from roll out of full fibre networks is far less than for customers still using copper networks and as such, the dynamics of any regulatory trade-off between short term losses and long term gains differs from mass market customers. A ‘one size fits all’ approach to regulation of mass market and corporate services is therefore unlikely to be optimal;

By the middle of the next decade regulated unrestricted access to Openreach’s duct and pole infrastructure may increase the competitiveness of the enterprise market by allowing competing providers (CPs) to compete over more of the value chain. However, the time to roll out competing networks and the nature of the market means that this is unlikely to adequately constrain Openreach’s market power across the UK in the next two market review periods;

Existing regulation has been effective in the most recent years in constraining Openreach’s ability to set the level of prices (following a period where returns on these services were at an excessive level despite charge controls), and has allowed for increased competition at the

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[8] Paragraph 6.23 https://www.ofcom.org.uk/__data/assets/pdf_file/0025/124729/bcmr-2018-volume-1.pdf. We note that whilst a number of these figures are redacted, Ofcom will be aware of the precise values.

retail level. A regulated Dark Fibre access product would allow competition to further develop by opening up more of the value chain to competition."

6..11 Ofcom's remedies simply fail to take account of any of these very pertinent considerations and appear to be based on unevidenced, unquantified, speculation.

6.12 Ofcom's proposed remedies are intended to bridge into Ofcom's yet to be consulted upon regime of 2021 onwards. Remedies based on future market conditions that cannot be foretold at this point will result in an ineffective and unstable regime for business connectivity services between 2019 and 2021.

6.13 The remedies proposed for the period 2019–21 (a crucial period for the UK economy and business community) bring unnecessary uncertainty and risk, harming the levels of existing competition during the period. Ofcom's focus on opening the door to wider rival investment appears to be without consideration of competition and competitors in the marketplace today. While improvements in competition should be welcomed, this should not be at the risk of less overall market competition

Question 11.1 Do you agree with the general remedies that we propose? Please provide reasons and evidence in support of your views.

6.14 The general suite of regulatory remedies has been applied to the business connectivity market for good reason for a succession of review periods. The market conditions continue to require the full suite of remedies. We set out our views as to why the remedies and the manner in which the remedies have been imposed previously remain relevant and should continue to apply, along with a general Dark Fibre remedy, in our earlier response to the market definition, geographic market analysis and the SMP analysis.

Question 12.1 Do you agree with the aims and effect of our proposed Dark Fibre remedy? Please provide evidence to support your views.

6.15 As we set out in the section in CI exchange connectivity (in Section 1 of this document) we consider that the Dark Fibre remedy that Ofcom has proposed should apply to the connection between exchanges as well as between exchanges and a CP's network/building within the area in an adjoining BT plus one or competitive area.

6.16 Furthermore we consider there is clear rationale for a far more widespread Dark Fibre remedy to address the competition issues and competition situation for the provision of mobile backhaul. We explain this in the section on mobile backhaul being a separate market found in Part 2 section 2. Mobile backhaul has a unique demand for Dark Fibre which has not been properly analysed or concluded. BT has SMP in the provision of fibre services to cell sites across the UK.

6.17 We consider that only Dark Fibre can facilate greater competition within Enterprise connectivity. We have explained that network extension fails to be economic in light of BT's current position, with extremely high levels of fibre presence to customer premises – see Part 2 section 3 and 4. Nationally

available Dark Fibre to enterprise locations is required to drive new service innovation and create greater opportunities for customers to consider switching, and lower switching costs. Once a customer has a modern fibre connection their connectivity becomes entrenched and as a consequence new network build will fail to be subsidised by high bandwidth leased lines connectivity as Ofcom suggests might be the case. There is no recent evidence that new entrants can be widely successful in replacing Openreach's network for such connections as these networks are built. The majority of examples of success in winning such connections came at a time at which the customer was switching from legacy service provision to modern service provision.

Question 12.2 Do you agree with our proposed scope of the remedy? Please provide evidence to support your views.

6.18 Ofcom largely imposes the regular suite of remedies for which the benefits are well known and well documented previous business connectivity market decisions. We restrict our comments to the areas where this business connectivity proposals diverge from the past.

Consistency of remedies

6.19 Ofcom has proposed to require a remedy of Dark Fibre for CI interexchange connectivity BT only exchanges. The proposal for a cost based Dark Fibre remedy which Ofcom sets out would significantly reduce backhaul costs and therefore promote competition where there are no or insufficient competitive networks. Ofcom highlights the DFA brings the following benefits:

6.19.1 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;

6.19.2 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 than they can currently.
- Dark Fibre replicates many of the benefits for network operators of owning their own network,

6.19.3 These benefits would in turn allow the provider to better compete on price, service quality and product offering in downstream markets.

6.20 We propose that BT be required to provide access to Dark Fibre in areas where we are confident that network competition is unlikely to develop as a result of DPA in the medium to long term.

6.21 Frontier states that

"*Allowing passive access at different levels may be complementary rather than a substitute for other forms of network access. However, the case for DPA enabling greater competition over more of the value chain in a mature market such as the enterprise market is unproven, the full benefits of DPA will*

take an extremely long time to be delivered and it is likely that significant parts of the country will not be covered by a multitude of competing networks even when full fibre roll out has completed."

6.22 The high switching costs for enterprise customers, alongside the more limited incremental quality benefits from switching (compared to mass market customers moving from copper to fibre) may significantly limit the ability of DPA to act as a significant constraint in the enterprise market.

6.23 In the last BCMR, Ofcom required that Openreach provide both passive access (DFA) and active products (EAD). The case for an effective DFA remedy remains strong:

6.23.1 DFA overcomes many of the switching costs associated with infrastructure based competition by using existing sunk assets and building access, thus potentially delivering benefits to end users more quickly;

6.23.2 DFA allows CPs to compete over almost half of the cost base of an EAD LA circuit (i.e. the active, non-fibre elements) as shown in charge control section that follows below;

6.23.3 DFA can be implemented relatively quickly by CPs as CPs are already present in the exchanges that serve the majority of high quality customers and switching costs are relatively low as the existing fibre can be reused for existing Openreach customers. This is in contrast to DPA where any benefits would rely on fibre roll out, which would take many years to materialise;

6.23.4 DFA allows more efficient network deployment by wholesale operators without the constraints or need to duplicate Openreach active equipment; and

6.23.5 There is little evidence that DFA will reduce allocative efficiency or adversely affect investment. If prices are set consistent with the recovery of passive costs in active products, this should ensure appropriate build or buy decisions (active prices may move into line with DFA pricing).

Question 12.3 What scope do you expect to have for cost savings as a result of the proposed Dark Fibre remedy? How large do you expect any cost savings to be? Please provide evidence to support your views.

6.24 A properly defined Dark Fibre remedy has the scope to create cost savings, improve customer service quality and improve the reach and availability of a number of downstream services. Vodafone has a converged backhaul network which transports connectivity for mobile, bandband and Enterprise customers.

6.25 In the event that Ofcom imposes Dark Fibre for BT exchange only to BT exchange ✂ connections that in time could be provided as qualifying DFA circuits. We discuss in section 1 of this document why Ofcom has incorrectly defined the functioning of the CI inter exchange connectivity market.

Question 12.4 How many orders for Dark Fibre would you envisage placing during the two-year review period? Please provide evidence to support your views.

6.26 ✂

Question 12.5 Do you agree with our proposed timeline for Dark Fibre implementation? Please provide evidence to support your views.

6.27 We agree the timescales are reasonable.

Question 13.1 Do you agree with the specific network access remedies that we propose for CI services at all bandwidths connectivity markets? Please provide evidence to support your views.

6.28 We discuss our view on the charging framework, and quality of service remedy application, in specific sections later in this document. Please refer to these sections.

6. Charge control

6.1 In this section we have considered the appropriateness of Ofcom's proposed charge control remedies against Ofcom's duties, as set out in the Communications Act, taking into account Ofcom's strategic objectives, as set out in the consultation document. We have considered the impact of the proposed remedies on the market, considering both the costs and benefits for business connectivity consumers in the United Kingdom.

6.2 This section is set out as follows:

- Ofcom's duties in SMP markets
- The impact of Ofcom's proposals
- The benefits of Ofcom's proposals
- Vodafone's proposals
- Inter-exchange Dark Fibre charge control

6.3 This section will show; that Ofcom have not, in line with their duties, sufficiently considered the impact of their proposed remedies on business users in this market, there has been a failure to quantify the degree and extent of the windfall gain that will accrue to Openreach as a result of Ofcom's proposals, and Ofcom have failed to quantify the benefits (if any) that will flow to end business users in this market as a result of the additional cost burden imposed them through a failure to introduce a CPI-X charge control on services where BT has SMP.

Ofcom's duties in these SMP markets

6.4 In section Part 1 section 4 above we explain how Ofcom has subordinated its substantive statutory duties to an administrative consideration. While it may be open to Ofcom to take account of that consideration, it cannot override the rest of Ofcom's statutory duties. In essence if the proposals in this consultation are implemented a timetabling issue will lead to consumers paying more for these business services.

6.5 The error is repeated, directly, in Volume 2 of the Consultation. Ofcom says:[9]

"in developing our package of remedies (including pricing remedies), a key objective is to ensure certainty and regulatory stability for consumers and telecoms providers in the relatively short period up to April 2021.... We are placing the greatest weight on price stability and regulatory certainty over other factors we take into account when setting charge controls."

[9] BCMR consultation (para 2.5 of volume 2):

6.6 This is clearly wrong. The right approach is for Ofcom to look at its substantive duties and balance those when deciding how to set the control. The key duties are likely to be those set out in 2.3 of Volume 2, which directly map the requirements of section 88(1)(b) of the 2003 Act:

6.7 Promoting efficiency: consistent with price cap orthodoxy over at least the last 20 years, this should mean a control based on inflation plus or minus X, based on efficiently incurred costs.

6.8 Promoting sustainable competition: in the term of the review (is the relevant period), this is likely overwhelmingly to mean a properly constructed active price control. This duty is reinforced by section 4 (7) of the 2003 Act.

6.9 To act in the interest of end-users (including businesses) – in fact, to confer the greatest possible benefit on them: this will tend towards mandating lower prices, all else being equal. To put it another way: it is inconceivable that this requirement can be met by opting for a control for reasons of administrative convenience which will result in overpayments of hundreds of millions of pounds. This consideration is reinforced by Ofcom's principal duty in section 3(1)(b) of the 2003 Act.

6.10 To avoid doubt: Ofcom's desire to have a short, two-year review, does not displace these statutory requirements.

6.11 Ofcom states that it considers that the risk of over-recovery is outweighed by the benefits from price stability. However, it does not explain why or attempt to quantify this effect. This is an absolutely pivotal piece of thinking which is clearly captured by the requirement in section 7 of the 2003 Act that Ofcom conduct a cost/benefit analysis. It has not met that requirement.

6.12 In short: the level of reasoning accompanying Ofcom's choices is so slight that this of itself is likely to be a reviewable error. It is also clear that Ofcom has chosen, effectively, to displace its statutory obligations with an administrative choice, which is a straight abdication of the duties imposed on it by Parliament.

Question 2.1 Do you agree with the proposed form of charge controls? Please provide evidence to support your views:

6.13 We have explained in Part 2 sections 1, 2, 3 and 5 that BT is clearly shown by Ofcom to have SMP in business connectivity markets in most of the UK landmass for business connectivity products. This has been the case since this market was first reviewed by Ofcom and remedies imposed back in 2004. In fact over that period and during the transition from PPC products to Ethernet product, BT's market share and dominance has remained firm. There are a range of reasons why BT's market power has endured. The reasons for this has been explained earlier in this document, however difficulties around customer switching, the limited reach of rival networks and the cost burden of extending those networks has had a significant bearing, as has the difficulty that system integrators have experienced in piecing together different wholesale networks to address retail demand. In addition, consumption by BT's own lines of business (BT Global Services, BT Enterprise and now EE) represents a significant

portion of the retail market that is uncontestable by rival networks. This aids BT's scale and aggregation efficiencies, making the economics of infrastructure competition challenging.

6.14 There is no evidence that BT's dominance in this market will change in any way over this review period, and there is no evidence that FTTH investment will provide any meaningful constraint on BT's behaviour or pricing. To safeguard the interest of Business Connectivity customers, it is necessary for Ofcom to establish strong and meaningful remedies that constrain BT's conduct in the market, preventing it from exploiting its SMP. This is particularly true where bandwidth demand is growing and business consumers need to consume more Business Connectivity bandwidth to keep pace with demand. Businesses have enjoyed the positive aspects of regulation over the past 5 to 10 years where prices have reduced in line with the costs incurred by BT. This has led to annual price reductions of over 10% each year, which has in part offset their costs as their volume demand increases.

6.15 Ofcom's overall objective when setting charge controls is to address an SMP finding, as prescribed by the Act. It is required to set such conditions as appear appropriate for the purposes of promoting efficiency, promoting sustainable competition, and conferring the greatest possible benefit on the end-users of public electronic communication services.[10]

6.16 Although this description of Ofcom objectives is not specific or overly prescriptive it is very clear that in markets where one operator has SMP, Ofcom has a duty to ensure goods and services provided by the SMP operator are provided in a way that is 'efficient' and 'confers the greatest possible benefit for consumers'.

6.17 Ofcom have clearly identified that BT has significant market power for the majority of business connectivity services in the majority of geographies in this market, and as a result has both the incentive and ability to distort competition, make excessive profits, and act in a way that is damaging to the market, consumers, and other operators.

6.18 Clearly in deciding what regulatory tools to use to address dominance in this market there are a range of regulatory options, and in selecting the individual or suite of remedies Ofcom must strike a balance, and in doing so they must carry out an impact/cost benefit analysis to explain and justify their selected approach.

6.19 Ofcom explain that[11]

"In our Strategic Policy Position, we set out how we plan to reform the way in which we carry out competition assessments in telecoms markets to further support network investment in the long term. In 2021 we will, for the first time, align our reviews of business and residential markets. We also said we would look to vary our regulation by geography depending on the level of competitive intensity.

[10] Para. 2.3, the BCMR consultation https://www.ofcom.org.uk/__data/assets/pdf_file/0022/124726/llcc-bcmr-2018-volume-2.pdf
[11] Para 2.7, the BCMR consultation

At this stage, the path that future prices might take under our revised approach is not clear. With greater geographic differentiation in our regulation, and given the short timescale of this review, we are placing the greatest weight on price stability and regulatory certainty over other factors we take into account when setting charge controls. In this period of transition to a new regulatory regime, a key objective is to promote certainty for investors in full-fibre networks and the benefits that full-fibre investment brings through competition at more levels of the value chain. While our focus is on maintaining price stability, we also have regard to balancing the potential benefits to customers from having prices more tightly aligned to costs, with ensuring BT has a fair opportunity to recover efficiently incurred costs "

6.20 It is not clear at all to Vodafone what this means and how this justifies Ofcom's proposed suite of SMP remedies. What Ofcom is doing after 2021 is interesting, however it is not directly relevant to the regulatory remedies Ofcom select to solve the SMP it has identified in this market for the period 2019-2021. Ofcom go on to state that they are uncertain of how this market and prices will develop in this review period, and therefore state, "*we are placing the greatest weight on price stability and regulatory certainty" and develop this further to explain "we also have regard to balancing the potential benefits to customers from having prices more tightly aligned to costs, with ensuring BT has a fair opportunity to recover efficiently incurred costs "*

6.21 In summary Ofcom place the most weight on "price stability" and regulatory certainty. Other factors are downgraded to become a standalone balancing act between the interests of consumers and the opportunity for BT to recover its costs. In fact those latter considerations are not materially in tension here – it is established Ofcom practice to set a price control which achieves both objectives. But in any event they seem to be largely discounted here. There appears to be no serious attempt to set a price control which even acknowledges the benefits to end users in lower prices.

6.22 Rather, what Ofcom have proposed caps and safeguard caps with wide ranging baskets that both allow BT to increase all product prices by at least 7%-CPI, and make additional excessive returns well above their WACC. Specifically, what Ofcom have proposed is detailed below; it clearly does not address BT's SMP or the wider strategic objectives that Ofcom have set out for this market.

6.23 In summary in answering Ofcom's question we consider that the proposed form of charge controls in this market does not address the SMP Ofcom have found. We consider that it is imperative that Ofcom provide the evidence that these proposals will address the SMP identified and ensure that the remedies confer the greatest possible benefit on the end-users in this market.

6.24 In contrast, in 2016[12] when Ofcom reviewed this market and the market dynamics and level of market investment was very similar to the situation we see today, Ofcom imposed strict cost based CPI-X charge controls for all product markets where BT was found to have SMP. This is starkly different from what Ofcom is currently proposing for this market in this consultation. Ofcom is not proposing any

[12] BCMR 2016, https://www.ofcom.org.uk/__data/assets/pdf_file/0015/72303/bcmr-final-statement-volume-one.pdf

cost based charge controls even in the markets that were subject to previous CPI-X cost based charge controls. Ofcom is also proposing no price based regulation whatsoever for legacy PPC products even though BT still has SMP. This represents a significant change from today where PPC products are strictly charge controlled to cost in order to safeguard the interest of business consumers and the public sector who make use of these services.

6.25 In 2016 Ofcom had a very similar set of issues to address in this market and Ofcom stated:[13]

"*Additional legal requirements also need to be satisfied depending on the SMP obligation in question. For example, where we propose an obligation to provide third parties with network access, we must take into account factors including the feasibility of the network access, the technical and economic viability of creating networks that would make the network access unnecessary, the investment of the network operator who is required to provide access, and the need to secure effective competition in the long term.*"

6.26 It is clear that Ofcom took account of investment in alternative networks, the economic viability of creating networks, and the importance of effective competition in the long term when deciding to impose cost based charge controls on all products in this market for which BT was found to have SMP in 2016. In addition to this, Ofcom also set in place regulation for access to BT's Dark Fibre.

6.27 Vodafone considers that the market, the operators within the market, the end product users, and the needs of the market have not changed since Ofcom's 2016 BCMR decision and therefore does not understand why Ofcom's approach to remedies where SMP is found is so drastically changed. We highlight again the need for a full impact assessment to understand how these drastically different SMP remedies will impact the market and in particular end business users.

The impact of Ofcom's proposals

6.28 Ofcom does not – contrary to its duties in section 7 of the Act – make any serious attempt to assess the impact of its proposals; any analysis, so far as it goes, is perfunctory and flawed. In this section, therefore, we explain the likely impacts.

6.29 First, the set of proposed remedies are wholly inappropriate to address the concerns we highlight above. Ofcom is proposing to hand BT potentially **£230million in excessive profits**, which will be funded by UK business customers that Ofcom should be protecting. In summary Ofcom is proposing that BT can overcharge UK businesses and make excessive profits to the tune of £230million from the following products:

(A) No regulation on legacy TISBO low bandwidth circuits, with a non-legally binding promise from BT not to increase prices more than 10% per year (CPI+8%). Considering the revenues in BT's regulatory

[13] BCMR 2016, Para 2.61, https://www.ofcom.org.uk/__data/assets/pdf_file/0015/72303/bcmr-final-statement-volume-one.pdf

financial statements[14] this could deliver an additional £15million of profits to BT's each year for the next two years. Additional £30million excess

(B) No cost based regulation on the mass market product low bandwidth CISBO (Ethernet up to 1G), which according to Ofcom's assumption could result in additional excess profits for BT of up to £135million using Ofcom's 'high assumptions' which as we will show below, are actually much closer to reality than Ofcom's unrealistic and in some cases contradictory low assumption option. Additional £135million excess

(C) No cost based regulation on the rapidly growing high bandwidth CISBO product which is of high importance for UK business development (Ethernet above 1G). Ofcom do not quantify the impact or additional excessive profits for BT as a result of not charge controlling this product, but as we explain below this could provide BT with an additional £65million excess

6.30 In the paragraphs below we expand on each of these products the overcharge that Ofcom is proposing to allow Openreach. Within this we also analyse the assumptions used by Ofcom to update the old 2016 Ethernet charge control model and derive some of these overcharges.

No regulation on legacy TISBO low bandwidth circuits

6.31 At the time of the last charge control on this products, Ofcom imposed a cost based charge control of CPI-3.5% on these products. As explained in section 8 below BT still sell this product and we have a number of businesses for which transition from this product will be slow and costly. As per BT's latest published regulatory financial statements[15] the TI service basket attracted revenues in excess of £150million and a return on capital employed in-excess of 10%, well above the regulated WACC.

6.32 Customers have a strong incentive to transition from this product: the service, quality, and pricing is all better with Ethernet services. However, there are other customer specific reasons why transition will be slow and painful, with specific latency and system requirements more suited to legacy services. With significant capex for new equipment and systems before migration to Ethernet is possible.

6.33 Giving BT regulatory and pricing freedom in a market where they have SMP will inevitably lead to excessive returns, amongst other things. We understand that BT have offered, in a non-legally binding way, not to increase the price of these services by more than 8%+CPI. Vodafone is puzzled as to why Ofcom would consider it appropriate to allow BT to increase the price of these legacy services for which the service offered is being reduced and the costs actually incurred by BT are ever dwindling. The asset used in supply are fully sunk, the call center and customer services are being scaled back, and the quality of the service offered has reduced.

6.34 We have estimated the additional returns BT would enjoy from increasing the prices by 10% per year for the next two years as £30million, this relates to a 10% increase in revenue over the current levels.

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[14] Annex 8.3.1, https://btplc.com/Thegroup/Policyandregulation/Governance/Financialstatements/index.htm
[15] BT RFS

Considering in year two prices could be increased by another 10% we consider this amount factors in the potential reduction in volumes over the period.

6.35 Vodafone considers that Ofcom's proposal for tackling SMP for these products by doing nothing and at best relying on BT's goodwill to stick to their non-legally binding promise, which is nevertheless detrimental to the market, to be wholly inappropriate. Regulatory certainty, consistency and predictability is very important especially in slow changing markets where change is difficult to achieve. Ofcom's last charge control for these products was a cost based price reducing control. Jumping from this to no price regulation whatsoever is neither rational, justified, nor sensible in this market.

No cost based regulation on the mass market product low bandwidth CISBO (Ethernet below1G).

Question 3.1 Do you agree with each of our proposals in relation to the design of charge controls for active services at 1Gbit/s and below? Please provide evidence to support your views.

6.36 Ofcom have proposed to cap 'basket' prices at CPI-CPI and allow Openreach to increase the price of individual services by approximately 7% (CPI+5%). Over the period of this control the volumes demanded for services will naturally increase in line with increasing bandwidth requirements: Ofcom estimates this at between 20-25% per year[16]. Therefore, a UK business, mobile operator requiring backhauling of mobile data traffic, school, or government agency could see its demand for leased line capacity will increase by 20-25% per year, and in line with Ofcom's regulation Openreach could increase the price by 7% (due to the pricing freedom a wide basket price control allows). Therefore, the typical UK business could effectively see a 30% increase in their annual lease line costs, 20-25% derived from their increased capacity requirements and up to 7% from the pricing freedom offered by Ofcom through their price control design. This is a regulatory remedy implemented by Ofcom to meet its regulatory objective of "*price stability and regulatory certainty*".

6.37 For the last six years these services have been subject to annual charge control reductions of RPI-11.5% from 2013-2016, and CPI-13.5% from 2016 to present, with an additional significate starting charge adjustment in 2016. This is because as the volumes of these services grow, BT's profitability grows massively. In fact, even with these very significant annual price cuts, BT has made excessive profits for these products of £798 million between 2015 to the present.

6.38 The actual providers of this excessive profitability to BT are UK business, and over the period each business in the UK has contributed to enable this level of excessive profitability.

6.39 Nevertheless, Ofcom have after weighting up their regulatory duties considered it appropriate to gift BT further excessive profits, as shown below. Unlike for VHB services or legacy PPC services Ofcom have for up to 1G Ethernet services attempted to quantify the excess that BT could enjoy from their approach to remedies and provided a huge potential range from no excess at all to over £130million.

[16] Para 1.6, the BCMR consultation https://www.ofcom.org.uk/__data/assets/pdf_file/0025/124729/bcmr-2018-volume-1.pdf

However, Vodafone can show, when applying sensible assumptions to Ofcom's modelling, that it is highly likely that this excess will be very near the high range of Ofcom's range over the two-year control period.

Ofcom's charge control conclusion:

6.40 Ofcom's charge control implies that BT is likely to make either excessive returns of £135million or under-recover costs of up to £10million. The range is not sufficient to make any reasonable conclusion as to the effects of Ofcom's proposed remedy and falls significantly short of the level of accuracy Ofcom usually adopt when evaluating the impact of remedies.

6.41 To reach this range, Ofcom assumes different assumptions, although it is not 100% transparent how Ofcom produce this range and they have not detailed all the assumptions or inputs into their model. We can evaluate the main assumptions that Ofcom have adopted.

Parameter	Low-cost assumption	High-cost assumption
Volumes	Higher exogenous growth Greater demand for higher bandwidth services Low impact of PIA	Lower exogenous growth Greater demand for lower-bandwidth services High impact of PIA
Efficiency	Opex: 7.0% Capex: 6.0%	Opex: 4.0% Capex: 3.0%
WACC	7.0%	9.0%

Volume modelling assumption:

6.42 In the very beginning of their document Ofcom quote demand for the services in this market growing by 20-25%, clearly this is a generic market view but for the products that form the basis of this market, i.e. these products for which the use and volumes are the greatest, it is sensible to assume that growth volumes would be broadly in-line with these high level market assumptions.

6.43 It is unclear from the graphs presented by Ofcom in the consultation[17] what annual growth their low and high assumptions include, however it seems from graph A18.5 that Ofcom have assumed total annual growth between 2018 and 2021 of between 3% and 11%. Although it is very difficult to ascertain Ofcom's assumptions from the graphs it does appear to Vodafone that any 'high assumption' of growth in the industry that quotes annual growth figures of 11% and 5% respectively for 2018/19

[17] Annex 18, the BCMR consultation

to 2019/20 and 2019/20 to 2020/21 to be very far from the potential high growth that the industry is likely to experience. In fact, all of Vodafone's data points to growth figures closer to Ofcom's quoted growth figures of between 20-25%.

	2018/2019	2019/2020	2020/21
Low Volumes	275,000	290,000	300,000
Low Annual growth		5%	3%
High Volume	280,000	310,000	325,000
High Annual growth		11%	5%

Source: Ofcom's consultation figures A18.4 and A18.5 figures estimated

6.44 It is not surprising that Ofcom's growth figures are very low, because Ofcom rely exclusively on BT's forecast and BT are very aware that low forecast volume growth ensures any charge controlled modelled scenario produces less revenue and more costs. Ofcom should as a matter of course cross-check any volume forecasts across industry and with submissions made by industry throughout the consultation process. In the 2013 – 2016 charge control, Ofcom's failure to robustly check volume forecast contributed massively to BT's excess returns over the period, resulting in UK businesses paying significantly more for their connectivity as a result. Ofcom have a duty to ensure that there is no recurrence of this lack of oversight.

6.45 We provided a forecast to Ofcom regarding the number of circuits we predict we will procure from BT and other suppliers over the next five years. The table below summarises the annual growth year-on-year that was included in this forecast. The table below clearly shows that Ofcom's assumptions of BT's volume growth is very much out of line with the volumes other operators expect to procure from Openreach.

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6.46 Given the above, we consider at the very least that Ofcom's high volume growth assumption is the reasonable sensitivity to select, although we do consider that actual growth is highly likely to be even higher than this and therefore Ofcom's 'high' volume growth assumption is a conservative estimate.

Efficiency modelling assumption:

6.47 Ofcom explain in their consultation that their efficiency assumptions are based on four information sources, these are detailed below:

6.47.1 Regulatory accounting information based on Openreach's historic component costs, this produces an efficiency rate of 7.9%

6.47.2 BT divisional management accounting information both historical and forecast, this produces an efficiency rate of 5.7% historically and 5.1% forecast.

6.47.3 Information originated outside of BT but provided by Openreach to Ofcom, it is unclear what this indicated but Ofcom state that "the costs from which made up a very small portion of our cost based pool"[18]. Therefore, we conclude this evidence is less relevant.

6.47.4 Other public information about BT's cost performance, although Ofcom provide no details of what these are or indeed what efficiency rate they indicate.

6.48 In summary, we have two information sources that Ofcom say they place 'relatively high weight on'. One indicating 7.9% and the other indicating 5.4% (average of 5.7% historical and 5.1% forecast). This would appear to be a reasonable range for Ofcom to assume in their modelling assumptions; 5.4%, to 7.9%. However, it appears that Ofcom have assumed a range of 4% to 7% which does not seem to be evidence based. Given the choice between an assumption of 4% and 7% as presented in Ofcom's analysis we consider 7% to be a reasonable sensitivity given the evidence available. Conversely, we consider that 4% is highly irrelevant and appears to be a randomly selected figure.

WACC modelling assumption:

6.49 Ofcom provide a range for the calculated WACC of between 7% and 9%. However, Ofcom also calculate a precise value of 8% in the consultation. Given the vague nature of Ofcom's modelling and the huge range of possibilities that their modelling output produces, Vodafone considers it more appropriate for Ofcom – at the very least in cases where it has more accurate data – to use that data.

6.50 Due to the fact that Ofcom have not used their modelling exercise to set the prices of business connectivity services we make no comment on the calculation of BT's weighted average cost of capital or the disaggregation of that figure and the assumption that "other UK Telecoms" provides the most accurate assessment of the actual WACC of these services.

Ofcom's higher range from their charge control should be considered most relevant:

6.51 As explained above, we consider that of the three main assumptions Ofcom have chosen to discuss in this consultation, all assumptions assume a lower range that with only brief analysis can be shown to be highly unlikely. Most importantly the volume growth assumption, which has a huge impact on the modelled level of excessive profits, seems – even at the higher assumed level – to be significantly lower than the growth you would expect in this market.

6.52 We therefore consider it reasonable to at least assume that, over the review period, Openreach will make excessive profits from Ofcom's proposed policy in Ethernet service below 1G of £135million.

[18] Footnote 270, the BCMR consultation

Other charge controlled services – accommodation, ECCs and TRCs

Question 3.3 Do you agree with each of our proposals in relation to the design of charge controls for accommodation services, ECCs and TRCs? Please provide evidence to support your views.

6.53 Vodafone disagree with Ofcom's general approach to the review of regulation on these important charge controlled services. Ofcom's approach to the charge controlling of these products places most weight on ensuring regulatory pricing stability in[19] 'this period of transition'. Vodafone considers that Ofcom should instead focus on the period to which this review relates and ensure the best outcomes for business consumers and the industry in this period, rather than looking towards some speculative future period.

6.54 Ofcom's proposals regarding excess construction charges seem to simply roll-over the existing regulation with little or no analysis or cross checking. As Ofcom discuss in their consultation it was in 2014 that the threshold charge, the maximum amount of network extension work that could be carried out within the allowance was established. This was determined by placing a limit (£2,800) on the costs incurred by BT when they performed the network extension above which the ECC price list would be charged. Ofcom also in 2014 established the balancing charge, the amount in addition to the connection charge that could be added onto the price of every connection to cover the threshold charge. The purpose of the direction was to ensure BT was 'revenue-neutral', meaning that the actual costs incurred by BT matched the sum of the additional amounts charged on each connection.

6.55 However, the issue Vodafone has is that this charge, the balancing charge, has increased by over 30% since Ofcom's direction was issued, see table below. Looking at the Ethernet connections in 2017 and 2018[20] it appears they have not changed and amount to approximately 40,000 each year. This multiplied by the excess construction charge of 2014 relate to £22 million, however at BT's inflated current charge, this relates to nearly £30 million. This is contrary to what logic would indicate. If BT were rolling out more business fibre to premises each year, then as each year passes you would imagine that the instances where BT need to roll-out additional fibre network extensions would reduce as their business fibre footprint increases.

[19] BCMR consultation paragraph 3.80
[20] BT's regulated financial accounts 2018, https://www.btplc.com/Thegroup/Policyandregulation/Governance/Financialstatements/index.htm

Table: Openreach's excess construction charge fixed fee price list

Feature	Note	Operative date	Until	Fixed fee per circuit £ Exc VAT
Excess Construction Charge - Fixed Fee	Note 23	01/06/2014	30/04/2016	548.00
Excess Construction Charge - Fixed Fee	Note 23	01/05/2016	30/06/2017	663.50
Excess Construction Charge - Fixed Fee	Note 23	01/07/2017	30/09/2018	656.00
Excess Construction Charge - Fixed Fee	Note 23	01/10/2018		722.0

Source: Openreach's pricelist

6.56 Vodafone request that Ofcom gather data as to the number of network extensions that have been performed in 2014 to 2018. If this figure, as a percentage of all new connections, has increased, then it is understandable that the fixed fee excess construction charge has increased. However, if the percentage of connections that require network extensions has not increased, then this indicates that BT is simply allocating more costs to network extension compared to what it previously did, and this would not be a valid justification to increase the fixed fee charge. We are surprised that Ofcom have not already performed this exercise as part of this market review, to ensure that BT's prices are in line with its 2014 direction.

No cost based regulation on the rapidly growing high bandwidth CISBO product which is of high importance for UK business development (Ethernet above 1G).

Question 3.2 Do you agree with each of our proposals in relation to the design of charge controls for active VHB services? Please provide evidence to support your views.

6.57 We estimate very soon our annual demand for 10G circuits will be at least v✂ According to Ofcom's annex 16 the incremental cost of active 10G equipment over 1G is £510. If we generously estimate the annual FAC to BT of delivering a 1G circuit is £1,990, then we assume the total FAC for BT to deliver a 10G circuit is £2,500. BT are currently charging approximately £5,000 for annual rental of 10G circuits, thus making excessive returns of £2,500 per circuit sold. If we multiply our expected demand by the excess BT earns on each circuit, this means that BT will enjoy ✂

6.58 Although this is a simple calculation we consider it indicative of the excess BT is likely to make and we note that Ofcom have not completed any impact assessment of their proposed approach to remedies for these products and have not carried out any cost modelling. Therefore, we find that Ofcom's proposal is wholly inadequate and lacks any attempt at even understanding the scale of the issue

Ofcom is attempting to address. This represents a failure of Ofcom's primary duty to safeguard the interest of business consumers and protect retail market competition.

The benefits of Ofcom's proposals

6.59 Ofcom has attempted to quantify the impact of its proposed regulatory remedies on business users in this market. However as we explain above this exercise is extremely limited, does not include legacy PPC products or above 1G products, and uses unrealistic assumptions to calculate a huge range for the impact of its proposed remedies on below 1G Ethernet products.

6.60 Notwithstanding the above Ofcom acknowledge[21] that:

"*....is therefore most likely to result in higher prices than would a cost-based control to align with FAC"*

6.61 Vodafone agrees with Ofcom that its proposals will result in higher prices for business users as mentioned above we consider that these proposals will result in businesses paying considerably higher prices, yet Ofcom have only analysed products in one part of the market rather than in all products for which BT has SMP. The question that remains unanswered – because Ofcom have not performed an impact assessment – is what the offsetting benefits of their proposed remedies are. It is clear that business will pay more, but it is very unclear what benefits businesses will gain from this in the review period or indeed the future. The only possible indications of any future benefits for businesses are the hints Ofcom make regarding some future benefit that might be delivered through their 2021 review. Ofcom state:

"a key objective is to ensure certainty and regulatory stability for consumers and telecoms providers in the relatively short period up to April 2021. In our Strategic Policy Position, we set out how we plan to reform the way in which we carry out competition assessments in telecoms markets to further support network investment in the long term. In 2021 we will, for the first time, align our reviews of business and residential markets. We also said we would look to vary our regulation by geography depending on the level of competitive intensity. At this stage, the path that future prices might take under our revised approach is not clear."

6.61 We consider it Ofcom's duty to carried out a full impact assessment of its proposed remedies in a market where SMP is found. We also consider that by imposing a remedy that "ensures certainty and stability" without carrying out a full impact assessment in a market where SMP is found, Ofcom is being irresponsible and falling short of preforming their regulatory duties.

[21] Paragraph A18.6, the BCMR consultation

Vodafone's proposals

Question 5.1 Do you agree with each of our proposals in relation to the implementation of charge controls? Please provide evidence to support your views.

6.62 Vodafone understands that this review period is shorter than the usual three-year period, we also acknowledge that by the time Ofcom have actually competed this review it is likely to be shorter than the two year proposed timeframe due to delays in Ofcom publishing its final statement for this review, however we don't consider this is justification to conduct an inadequate market review process.

6.63 Ofcom have carried out a full cost model for legacy TISBO low bandwidth circuits in all of the previous market reviews and imposed a full cost based CPI-X charge control on BT's supply of these products. Whilst we understand these are now legacy products in the market for which demand is reducing, the remaining customers on these products have significant switching costs and will take some time to migrate. We will incur additional costs in migrating these customers to Ethernet platforms and it will take time, resources, and customer incentives to complete the migrations.

6.64 In this period, we consider it wholly unreasonable that we additionally incur increased charges from BT, from which we have no certainty, no regulatory protection and no control. Any excess charged by BT is without any cost justification. Ofcom's proposals will result in a direct transfer of wealth from operators to BT. The size of the transfer is entirely dependent on BT and will go directly to their bottom line profits.

6.65 We consider it far more appropriate, especially considering Ofcom's focus on market stability and certainty that Ofcom impose a safeguard cap of CPI-CPI. These are products that have been charge controlled for some time, they are products for which costs are sunk and for which BT has spares 'laying around' (and a growing spares bank, as circuits are decommissioned). Therefore, the current pricing levels are likely to be reasonable near to costs (indeed the last charge control was relatively small CPI-3.5%). This proposal with the appropriate sign posting will ensure market stability and certainty, the continued transition of customers from these products, and not enable BT to benefit from additional unnecessary profits that they can generate as a direct result of their SMP.

6.66 Low bandwidth CISBO (Ethernet up to 1G) products are currently the mass market product that the majority of businesses consume. Ofcom's calculations, which as explained above largely focus on unrealistic assumptions, indicate their proposed remedy could result in additional excess profits for BT of up to £135million over the review period. There is no viable cost effective alternative to this product. ✂ The Dark Fibre product is currently extremely limited to BT exchange only backhaul and as explained in section 1 this is a fraction of our leased line circuits.

6.67 Therefore, through their proposed remedies for these products, Ofcom have disconnected the prices from the costs, subjected business users to increased prices as their demand naturally increases, proposed no viable alternative regulatory solution, and provided BT with additional excessive returns of up to £135million. Given the SMP finding and the requirements of businesses as explained in Part 2 section 3, we consider it far more appropriate that Dark Fibre is made available. This will provide

operators and businesses with a viable alternative, allowing them to innovate and break away from BT's artificial bandwidth pricing gradients.

6.68 No analysis, charge control model, or assessment of the rapidly growing high bandwidth CISBO products (Ethernet above 1G), which is of high importance for the development of UK business, has been carried out by Ofcom. We have discussed above the excessive profits that BT will enjoy as a result of this, yet business have no choice, no alternative product, and no way to mitigate the increased costs they will suffer as a result of mounting bandwidth charges as their capacity demands naturally increase.

6.69 Ofcom is falling considerable short of the expectations of UK businesses. We suggest that Ofcom carry out a full impact assessment of the impact to UK businesses and the excess they will pay to Openreach as a result of this proposed remedy in a market where BT is found to have SMP. We also suggest as explained in section 4 that making Dark Fibre extensively available would provide businesses with a viable alternative and would enable businesses to increase their capacity demands without incurring huge artificially hyper-inflated active product prices from Openreach.

Inter-exchange Dark Fibre charge control

Question 4.1 Do you agree with our proposals in relation to the design of a charge control for inter-exchange Dark Fibre? Please provide evidence to support your views.

6.70 In section 1 of this document we explain why the scope and potential benefit of this product is so limited ✂. However, for completeness we respond to the design and details of Ofcom calculated charge control price below.

6.71 Vodafone agrees with Ofcom's approach to base the charge control prices of Dark Fibre on BT's fully allocated costs within their regulated financial statements. This is the most practical and transparent option and is in line with Ofcom's 'usual' method for calculating Openreach wholesale charges. We also agree with Ofcom's design of the Dark Fibre charges, basing them on the existing Ethernet type charges, connections, annual rental, and distance related main link charges. We also understand the difficulties with utilising a basket type approach as is used for Ethernet services, because there is no prior year revenue weights as this is a new product. We agree with Ofcom's approach to set maximum prices and believe this is the simplest method, and provides users of the end product with the most certainty as to prices, which is very important in the early adoption years.

6.72 Vodafone understands that Ofcom have divided the cost stack that is used to calculate the price of the Dark Fibre product in three parts; the first (element A) being passive Ethernet costs sourced from BT's regulated financial statements, the second (element B) being Ethernet costs that are shared between passive and active services, and the third (element C) being incremental passive costs that are required specifically to provide passive services (that are not currently incurred by BT as they do not provide the services). Below we comment on different elements of costs:

Element A passive Ethernet costs sourced from BT's RFS: We agree with Ofcom's classification of passive costs; we do consider that Dark Fibre circuits would incur a similar level of the following costs when compared to active Ethernet services; Main links, routing and record, Fibre and excess construction charges.

Element B shared Ethernet costs sourced from BT's RFS: Due to the limited amount of data remaining in the consultation it is difficult to accurately assess whether Ofcom's approach is reasonable and an equitable amount of shared active and passive costs has been allocated to passive services. However, it does seem that Ofcom has been very reliant on BT data which straight away raises a flag, as does their generous allocation to passive services, which seems contrary to our understanding of active and passive costs. All of the costs included in this category with the exception of the Ofcom administration charge, i.e. systems and development, service centre, and sales product management costs are all costs that are primarily driven by the complexity and nature of active products. Dark Fibre is a completely vanilla product, basically an empty fibre with nothing in it, carrying nothing procured by operators with extensive network knowledge and technical ability. Active products are very different, highly tailored products offering a specific service with specific operational characteristics with actual service (data carriage) guarantee procured by anybody including end-user customers. The idea that passive services would consume anywhere like the same level of these costs as active services is not in line with our understanding of the cost drivers of these services. We suggest Ofcom request data from other operators, not just BT, and establish a more balanced approach to the allocation of costs between passive and active services.

Element C incremental passive costs:

6.73 It seems from Ofcom's consultation in particular annex 20 that the two most signifcant of these costs are the patch panel costs and the initial testing costs:

- Patch Panel costs: at the time of the previous Dark Fibre reference offer – which was produced by Openreach as a result of the 2016 Ofcom consultation in collaboration with other CPs – the cost of a patch panel connected to another operator's site was produced and the cost of a patch panel at a BT exchange was produced. It would seem wholly appropriate for Ofcom to now use the previous calculated cost for installing a patch panel at a BT exchange, because this Dark Fibre remedy only includes connections at BT exchanges. It is not wholly clear what Ofcom has done due to the redactions in annex 20, however if they have used a blended patch panel rate that includes estimated costs of installation at an operator's premises this is not in line with the proposed remedy, likewise if they have now added additional costs to Openreach's previous cost estimates this is also questionable as the underlining cost drivers have not changed in the last two years.
- Initial testing costs: the initial testing process, which includes engineers travelling from one site to another to put testing equipment in place and then retrieve it, does seem to be a very laborious, time consuming process. When this was calculated as part of the previous reference

offer a number of CPs had concerns regarding the level of this cost. However, the remedy that is now being proposed includes connections only going to BT exchanges, therefore we consider that this process should be quicker, smoother, and less time consuming as well as including some economies of scale that would mean that all the engineering travel might not be required.

7. Quality of service proposals

7.1 In this section we explain:

7.1.1 Customer confidence in supplier switching relies upon robust and successful provisioning processes. When provisioning quality levels fall, customers for whom the business case might otherwise prove positive are likely to reduce their propensity to switch supplier, impacting overall levels of competition in the market.

7.1.2 We agree that quality of service regulation is justified and proportionate and that it is necessary for Ofcom to put in place minimum standard floor that must be attained along with KPI reporting to provide transparency of the attainment against the regime.

7.1.3 We agree that the levels of the floors proposed strike an appropriate balance between having sufficiently robust floors and the costs of keeping service quality at those levels.

7.1.4 We consider that SLGs at current levels remain appropriate for the period of this review.

7.1.5 We do not consider there are appropriately evidenced grounds for disapplying the minimum standards regime to HNR/metro areas or WDM services.

Responses to questions

Question 15.1 Do you agree with our proposals regarding the application of QoS standards, KPI, SLAs and SLGs over the period of this review? Please provide evidence to support your views.

7.2 Poor levels of quality of service, in particular for provisioning, have direct consequences for competition in the market. Ofcom's study undertaken by Cartesian identifies that provisioning process of new services, where this requires a change to the underlying circuit, cause significant concern for customers. Customers identify that new circuit provisioning is painful. Once a circuit is installed and classified as 'in life', having passed testing, customer satisfaction is at high levels, with in life service quality regarded to be high.

7.3 The circuit provisioning concern covers both service provision by Openreach and alternative rival networks. Rival networks have particular and additional challenges when building network extensions to connect customers which customers do recognise.

7.4 While the Openreach Ethernet service crisis is now over, it inflicted considerable pain on business customers and other CPs. It is clear that customer experience from that period has had a lasting impact on their behaviour, with anxieties around switching at elevated levels. The speed at which Openreach's provisioning function decended into chaos, their initial denials of a systemic crisis and their failure to implement urgent fixes on the processes were a surprise to many. When news of the crisis reached Ofcom there was little Ofcom could do, as the market review remedies had been set.

7.5 At the time of the service crisis Openreach were undertaking a significant fibre to the cabinet upgrade, diverting their field force to this task. Ethernet customers ended up paying the price, with appalling levels of service. With Openreach announcing limited FTTH roll out, there are concerns that unless adequate safeguards are retained, Ethernet provisioning will once again descend into chaos. The reality is that customers who have switched service provider, transitioned from legacy service provision or upgraded bandwidth will mostly likely have experienced delay/extended installation periods, poor communication regarding updates to their service and a lack of direct information from their service provider. We take a look below at the years of poor service performance. Naturally these experiences make customers wary of change and there continues to be a wash over effect of past poor performance impacting switching today.

Time period	Issues
Spring 2012:	High-level decisions taken within BT to reorganise Openreach centralising planning and reducing headcount to deliver 'efficiency' savings[22]
Summer 2012:	Openreach planning & headcount changes introduced and service crisis ensues
Autumn 2012:	Industry is slow to react, assured by Openreach that problems are temporary and will be resolved quickly
Spring 2013:	Openreach continues to struggle with lack of resource, growing order-book and the additional strain on NGA delivery. Get well plans are introduced, but without additional resourcing or unwinding of previous changes, they fail.
Summer 2013:	Growing industry disquiet at length of service crisis. CPs facing the wrath of their customers are escalating issues to Openreach, but still no senior management ownership of the issue.
Autumn 2013	CPs escalate concerns to Ofcom, who are being informed simultaneously by Openreach that things are under control. Recovery plans continue to fail and Ofcom (informed by direct industry feedback) begin asking Openreach management tough questions. This results in Openreach senior team acknowledging for the first time that there is a wider problem that needs to be resolved.
Winter 2013/14:	Openreach trumpets EMP upgrade as the solution to the problem, asking CPs to get behind it. CP concern that EMP is too far away and too big a leap – request to focus on fixing current processes.

[22] Slide 9: http://www.btplc.com/Sharesandperformance/Quarterlyresults/PDFdownloads/q413_slides_update_part2.pdf £39M of cost saving where made with huge knock impact for service for years to come

Spring 2014:	With OTA oversight there is continuing tension between Openreach and Industry around EMP Vs. fixing current processes. Eventually Openreach commit to do both, with DoJ the solution proposed by Openreach, after request to re-order SLG payments is proposed by industry (but then rejected by Openreach). Recovery plans continue to fail. New Openreach CEO takes criticism on the chin and acknowledges failures and promises new resources (unwinding previous cuts).
Summer 2014:	Tensions high, with DoJ Openreach team unpicking what is required and where things appear to be going wrong. Very apparent that Openreach have underestimated the scale of the task. Innovations like Clarity are delayed and EMP work stack takes a back seat for the first time.
Autumn 2014:	Further recovery plans have failed, DoJ trial delayed. Scale of Deemed Consent/date management issues significant. It becomes apparent that despite the good intention of the Openreach team, the lack of clearly understood internal processes, lack of joined up delivery within various Openreach teams and the limitations resulting from the use of third party contractors limits the ability of Openreach to make positive change.
Winter 2014/5:	DoJ trial delayed further as full extent of the task becomes apparent. Trial scope is modified to make it more achievable to deliver. EMP is no longer on the agenda as DoJ and date management discussions dominate. Clarity is available, but only in pull format.
Spring 2015:	Only 53% of our orders with Openreach are delivered on time. Scaled back trial finally commences in April 2015. Deemed Consent usage rules still not fully agreed. New Openreach resource is finally coming through, but service crisis continues. April 2015 – Collaborative Service Improvement Eight Point Plan – further recovery initiative to focus on main points of inefficiency and improve delivery.
April 2016	The Ofcom new minimum service standard regime starts, reflecting that performance to CDD has been at 70% of orders.
April 2017	80% orders to CDDs minimum standard is met.
April 2018	85% orders to CDD minimum standard is met.

Source: Vodafone

QOS SMP remedy

7.6 We consider that where there is SMP that this is clear rationale and justification for the application of regulated QoS. Ofcom has concluded that BT has SMP in CI Access services at all bandwidths in the UK excluding the CLA and Hull and in non-competitive CI inter exchanges. Ofcom proposes the

current quality regime continues forward into the upcoming two year review period. We support the minimum standards as set out and consider that Ofcom has struck an appropriate balance between setting adequately robust floors alongside the associated costs of maintaining the floors. It remains appropriate that the minimum floors are supported by both a SLG framework to compensate for failure and a penalty regime that address breaches by Openreach regarding the floors. We compare the current framework to the future framework below:

CLA application – no SMP	Not applicable	Not applicable
HNR areas - SMP	Applied as listed	Proposed not to apply
Rest of UK - SMP	Applied as listed	Proposed to apply as listed
Mean time to provide across orders	No more than 40 WD	No more than 38 WDs
Upper centile for provisions	No more than 3% of provisions delivered in 118 WD	Y1 no more than 3% delivered in more than 138 WD Y2 no more than 3% delivered in more than 130 WD
Certainty % of orders competed on or before initial CDD	88%	Y1 85% Y2 88%
Certainty cross link max mean period of the iCCD	No more than 55 WD	No more than 53 WD
% of faults repaired	With 5 hrs 94%	Within SLA 94%
Lower centile for provisions	>40% delivered ≤ 29 days	Not proposed

7.7 Despite finding BT to have SMP in Metro and HNR areas and for the WDM bandwidths Ofcom has not imposed QoS obligations but will apply KPI reporting to these areas. We have concern that disapplying the minimum floors will result in a lack of protection from BT's SMP. Ofcom has found BT's SMP in Metro/HNR areas and WDM sufficiently concerning to result in the application of a range of other regulatory remedies:

7.7.1 The requirement to provide network access on reasonable request is justified for metro and HNR areas to prevent margin squeezing or otherwise anticompetitive behavior in setting prices. Ofcom recognises the risk that a vertically integrated operator may have incentives to put pressure on competitors by modifying pricing to their disadvantage.

7.7.2 The requirement to provide new forms of network access is justified, as without regulation, vertically integrated operators have the ability to favour their own downstream business over third parties including the handling of requests for new forms of access.

7.7.3 The requirement to not unduly discriminate including EOI is justified to prevent BT from engaging in discriminatory practices that could adversely affect competition and ultimately cause detriment to citizens and consumers.

7.7.4 The requirements of transparency are justified to assist the monitoring of potential anti-competitive behavior and to give visibility to the terms and conditions on which other providers can purchase wholesale services.

7.7.5 The requirements to notify charges, terms and conditions are justified on the basis that providers have sufficient time to plan for service changes and have advance knowledge of changes.

7.7.6 The requirement to notify changes to technical information is justified so that CPs have sufficient time to respond to technical changes that may affect them and so that CP can make effective use of products provided.

7.7.7 The requirements for financial reporting, cost accounting and accounting separation are justified to give access to necessary information to support the monitoring of effectiveness of pricing remedies and to provide public information aids to ensure compliance with SMP obligations.

7.8 With respect to the QoS remedy Ofcom explains that in light of its provisional assessment that BT has SMP in business connectivity markets identified (CI Access except CLA and Hull and CI interexchange non-competitive exchanges) Ofcom is concerned that in the absence of appropriate ex ante regulation Openreach would have the ability and the incentive to provide sub-optimal QoS to the detriment of downstream leased line providers and end users. The poor performance that pertained prior to 2016 in the absence of specific QoS standards supports this view. Where a provider has SMP in a market, as we propose is the case for BT in the markets for leased lines, 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.

7.9 Ofcom has found that BT has 61% - 70%[23] market share in HNR areas including Metro areas for low bandwidth services, which make up 95% of the market demand. Its weakest SMP findings are for Birmingham and Edinburgh, which for low bandwidths services show BT to have a market share of 51% to 60%.

7.10 For very high bandwidth services including WDM services Ofcom finds that BT has a market share of 51% - 60% in HNR and metro areas. This is the same level of market share as shown for BT + 1 areas, which also have a market share of 51% to 60%. We consider Ofcom's data for 2017 to be the optimal data set for understanding competition levels at this very time. Previously Ofcom focused on market share across the entire inventory base which has built up over 25 years of telecommunications

[23] Data taken from Table A12.15 of the consultation document

liberalisation. The inventory in total therefore conceals the level of competition at a given time period, whereas data from the preceding year is far more insightful as to the exact functioning of competition at the present time. Standard competition law and SMP presumption assumes that market share over 40% identifies a dominant position in the market. Ofcom has found that BT has market share levels well in excess of 40% for HNR and metro areas, with 61% - 70% and 51% to 60% for very high bandwidth including WDM services.

7.11 Ofcom has yet to offer any data that demonstrates that market shares at the levels found for HNR, Metro area or WDM services should not be concerning and would not result in the dominant provider exerting its power to affect the quality of service provided while favouring its vertically integrated operations. Ofcom does not consider the impact on competition in the market and any adverse affect that would arise from the lack of QoS remedies. In our view Ofcom's generic concerns apply and there is reasonable cause given BT's dominance to expect Openreach to exploit its ability and the incentives to provide sub-optimal QoS to the detriment of downstream leased line providers and end users. The poor performance that pertained prior to 2016 in the absence of specific QoS standards supports this view. 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.

7.12 Ofcom's rationale for not imposing the QoS remedy rests with concerns that the imposition of QoS standards might restrict the potential for other competing providers to invest in offering alternative services, including competing on quality of service. Ofcom does not provide any evidence from possible rival network providers to support this view.

7.13 Ofcom sets out that given the greater prospects of competition in these areas, Openreach has less incentive to allow its quality of service to deteriorate. We consider that Ofcom has grossly overstated the prospects for increased rival competition in these areas, in particular for the period of this review for which Ofcom is imposing this regulation. We have explained in Part 2 section 4 the errors with Ofcom's economic network extension cost model and consequential errors with dig distances and identification of HNR / Metro areas. Ofcom has identified areas that contain rival network infrastructure more so than other areas of the UK, but Ofcom has also identified that in 2017 these areas do not experience non SMP levels of competition. Ofcom has not provided any evidence as to how competition levels will change for the period of this review for which it is setting SMP remedies in light of the SMP findings for the review period.

7.14 Ofcom does not provide any explanation as to why quality of service obligations impact the prospects of competition more than remedies to: provide network access on reasonable request; requirements relating to requests for new forms of network access; requirements not to discriminate unduly including EOI; requirements to publish a reference offer; requirements to notify charges, terms and conditions; requirements to notify technical information; cost accounting and accounting separation.

7.15 On a practical level it is not identified how this half / part in / part out regulated regime will operate. The services sold in the HNR geographies and WDM bandwidths as SMP services will fall under the regulated contract and therefore constrain the ability of either Openreach or CPs to act commercially pertaining to the quality of service offered, leaving customers/users in a worse position than customers/users of services in the unregulated CLA.

SLA/ G regime

7.16 The proceeding years have included much discussion over the SLAs that are adhered to during the provisioning process and the SLGs that are paid upon failure to meet the provisioning timescales. CPs have sought to address the SLA failing in order to obtain better information on order progress as this information is demanded by the end customer. The Cartesian study identified customer concerns that suppliers were providing inadequate service update information to explain progress or delays. These information flow issues have been worked through and partially resolved.

7.17 During the periods of exceptionally poor service provision the costs of SLG payments to Openreach have naturally increased. Openreach faced a choice of continuing to pay high SLGs or to improve service provision to reduce the level of SLGs owed. Openreach sought an alternative method which would instead decrease its SLG exposure in poor service periods by simply cutting the level of the overall SLG payment. We regard SLGs as a powerful incentive mechanism to ensure that service provision remains on track. After not being able to take the easy course to SLG cost minimisation (SLG reduction) Openreach has been directed to instead make service improvements to minimise SLG costs.

7.18 SLG compensation is a cost that is ultimately borne by CPs, as it is a component cost of the charge control calculation. While SLGs within the charge control are calculated on the basis of one month's rental per day late, it remains appropriate for the SLG payment to be set at this level.

7.19 As Ofcom has identified, Openreach wishes to make modifications to the provisioning process. These changes are likely to be concluded and enacted by the time of the next regulatory framework for these services in 2021. Consequently, it would be appropriate for Ofcom to consider both the SLG levels and the charge control SLG cost component together during the cost modelling at that time.

7.20 At this present time there is little clarity to exactly what Openreach's proposals will do to effect current processes or the time in which either Openreach or CPs will be ready to adopt them. Until the new processes are being used and properly bedded in, it is impossible to determine the consequences on costs for dealing with service failure.

Comments on the KPI regime

Proposal type	KPI	Proposal and rationale	VF Comment	Agree/Disagree
Amend	KPI (x) – Monitoring the percentile time to provide the tail extremities	To reduce the scope of this KPI from reporting various percentiles of completed orders (95th to 99.5th) to the percentile of completed orders as defined by the level of the Upper Percentile QoS standard (which we have proposed above is 3% – therefore the corresponding percentile required is 97th)		Agree
Amend	KPI (xii) – Order validation	To amend the reporting of this KPI from being based on when an order is closed to when an order is accepted/validated, thereby making the metric more relevant to current performance	an improved metric	Agree
Amend	KPI (xiv) – Performance in issuing initial contractual delivery dates	To amend the reporting of this KPI from being based on the month an order is closed, to being based on the month the iCDD on an order is issued. This will make the metric more relevant to current performance	an improved metric	Agree
Amend	KPI (xxvi) – Monitoring traffic management Deemed Consent applications	To move from measuring the average proportion of time to provide that relates to traffic management notices (among orders that are subject to traffic management notices), to the proportion of all orders subject to traffic	an improved metric	Agree

		management Deemed Consent codes, and the average number of days delay where a traffic management Deemed Consent code has been applied. This will better measure the complexity of orders		
Amend	KPI (xxvii) – Monitoring wayleave Deemed Consent applications	To move from measuring the average proportion of time to provide that relates to wayleave applications (among orders that are subject to wayleaves applications), to the proportion of all orders subject to wayleave Deemed Consent codes, and the average number of days delay where a wayleave Deemed Consent code has been applied. This will better measure the complexity of orders	an improved metric	Agree
Remove	KPI (v) – Monitoring the time to provide lower percentile performance	To remove as the 'Time to provide lower percentile limit' KPI is sufficient to monitor this issue and we do not consider it necessary for Openreach to provide us with additional detail regarding its performance in delivering easier orders		Agree
Remove	KPI (vi) – Monitoring the time to provide lower percentile composition	To remove as the 'Time to provide lower percentile limit' KPI is sufficient to monitor this issue and we do not consider it necessary for Openreach to provide us		Agree

		with additional detail regarding its performance in delivering easier orders		
Remove	KPI (xi) – Monitoring the composition of the tail extremities	To remove as this information is obtainable from other metrics		Agree
Remove	KPI (xiii) – Monitoring the order validation tails	To remove as the 'Order validation' KPI is sufficient to monitor this issue and we do not require additional detail regarding order validation tails		Agree
Remove	KPI (xv) – Performance against the final contractual delivery date	To remove as we do not think the information is useful in monitoring Openreach's QoS in light of our focus on improving certainty for the initial CDD	Whilst we agree the focus is definitely on iCDD this should not be removed to provide an appropriate check	Disagree
Remove	KPI (xvii) – Average number of changes to contractual delivery dates	To remove as our focus is on Openreach's performance in regard to the length of delays (which is provided by the KPI average delay due to CDD changes), rather than the number of changes to the CDD	This is a good KPI as a warning signal if more DC is being applied in different instances. Measuring the average delay may give a false impression performance is good but Openreach is applying more DC, just in smaller portions	Disagree
Remove	KPI (xx) – New orders	To remove as this information is obtainable from other metrics		Agree
Remove	KPI (xxi) – Orders completed	To remove as this information is obtainable from other metrics		Agree

Remove	KPI (xxii) – Volume of faults	To remove as this information is obtainable from other metrics		Agree
Remove	KPI (xxiii) – Cablelink mean time to provide	To remove given our proposed reporting criteria for KPIs below now includes separate splits for Cablelink in regard to the areas of the UK where we find SMP		Agree
Remove	KPI (xxiv) – Order volume forecast from CPs	To remove as we do not think the information is useful in monitoring Openreach's QoS (this KPI was originally introduced in light of comments from Openreach that it needed forecasts from telecoms providers to allow it to plan for orders, but not all telecoms providers provided forecasts and the quality of forecasts received were mixed)		Agree
Remove	KPI (xxv) – Order volume forecast by the dominant provider	To remove as this was previously intended to compare Openreach's forecasts to forecasts that Openreach received from other telecoms providers. As we are proposing to remove the KPI on monitoring order volume forecasts from other telecoms providers, we will no longer need this metric which acts as a base comparison	Required to address industry issues regarding the view of Openreach's forecast	Disagree

Create	New KPI – Monitoring the tail (open work stack)	While it is still useful to have a KPI on monitoring the tail of more complex orders in regard to past performance (i.e. orders completed/closed), allowing continuity and historical trend of the current metric (as labelled KPI (ix) above), it would also be beneficial to monitor the equivalent metric but based on the current work stack. This will make the metric more relevant to current performance and hence more useful to telecoms providers	an improved metric	Agree
Create	New KPI – Mean time to issue the iCDD	We propose a new KPI to provide us with more information about the performance of Openreach in issuing the iCDD, by providing the mean time to issue the iCDD	This is definitely needed in light of planning issues	Agree

8. Interconnection and accommodation

8.1 In this section we explain:

8.1.1 That we agree that interconnection and accommodation services are critical to facilitate the purchase of services that are collected at the BT exchange and aggregated for onward transmission back to the CP's network.

8.1.2 Interconnection and accommodation services are an anomaly in that they support service provision across a range of markets: BCM Enterprise access, BCM mobile backhaul and WLA broadband markets.

8.1.3 The accommodation space that Vodafone purchased is a shared resource that provides aggregation of a number of access services, ideally within a single exchange area, and aggregates these traffic types which are then onward conveyed across our converged backhaul network. The economics of the access locate space and of our converged backhaul is reliant upon the ability to bring all traffic types together.

Background

8.2 The Openreach website provides information on Access Locate within the LLU section of its pages. The product is described as follows:

> 9. Access Locate lets you buy Points of Presence (PoP) from the Local Loop Unbundling Co-Mingling Portfolio or convert your current Co-Mingling space in order to install equipment for other products.
>
> 10. **Key benefits:**
>
> 11. Install other products such as:
> 11.1 Wholesale Extension Services (WES) / WES Local Access.
> 11.2 Backhaul Extension Services (BES) aggregation.
> 11.3 Openreach Network Backhaul Services (ONBS).
> 11.4 Broadcast Access.
> 11.5 Street Access.
> 11.6 Next Generation Access (NGA) Handover Port Connectivity Link.
> 11.7 Any new future connectivity services products that we develop.
> 12. Make more flexible use of the space at the MDF site/s[24].
> 13. It is therefore evident that today the Access Locate product is used in the support of a number of regulated access markets: BCM Enterprise access, BCM mobile backhaul and the WLA broadband markets.

8.3 Ofcom proposes in the PIMR consultation that DPA is provided with necessary ancillary services: "*We propose that BT should be required to provide such PIA ancillary services as may be reasonably necessary for such use of PIA, including as a minimum: power, PIA co-location, PIA-co-mingling (the provision of space and the ability to house equipment in a BT telephone exchange or equivalent), PIA*

[24] https://www.openreach.co.uk/orpg/home/products/llu/accesslocate/accesslocate.do

Site Access (access to equipment that the telecoms provider has in a BT telephone exchange or equivalent) and PIA database Access."

8.4 That would add DPA/PIA to the list of available uses for access locate.

Response to question

Question 14.1 Do you agree with the specific remedies for interconnection and accommodation that we propose? Please provide evidence to support your views.

8.5 Accommodation services are purchased by CPs in order to house their equipment which aggregates a range of access services purchased from Openreach. The aggregated traffic is onward routed in a converged manner across a converged backhaul network. The economics of the access locate space purchased from Openreach, the aggregation equipment purchased by the CP and housed in the accommodation space and the onward converged backhaul of the aggregated access traffic streams back to the CP network rely upon the ability of the CP to appropriately collect this traffic at the BT exchange.

8.6 Accommodation services (access locate) is therefore not particular to the business connectivity market and cannot be treated in isolation within the business connectivity. Ofcom concludes that accommodation services are required to be supplied in support of CI Access services with the exception of the CLA.

8.7 Ofcom proposes that accommodation services are not provided in the CLA due to its finding of no SMP in the CLA. Ofcom does not however give consideration of how the accommodation space is used more widely and that accommodation space while regulated for convenience in the BCM acts as a necessary ancillary service in other regulated markets.

8.8 The markets for Broadband and DPA are national in scope and therefore the access locate/ accommodation remedy needs to be national in scope.

8.9 The economics to support cost effective backhaul network for broadband and DPA rely upon the economies of scope and scale derived from the inclusion of EAD LA and mobile backhaul traffic.

8.10 We have reviewed ✂ which may serve the CLA area. We ✂ which purchase accommodation services / access locate[25]. We can identify that ✂

8.11 ✂

8.12 Accomodation services are cross market and the availability of appropriate space impacts the ability of the interexchange market from properly functioning.

[25] with the CLA and the exchanges that support connectivity of CLA service provision as Ofcom does not provide detail of exactly what is meant

9. Traditional interface

9.1 In this section we address the questions that Ofcom poses regarding TI service regulation going forward:

9.1.1 Ofcom should continue to regulate TI services for the period 2019 – 2021

9.1.2 We propose that Ofcom puts in place a safeguard cap which prevents the prices for these services rising.

Question 8.1: Do you agree with our proposal not to regulate the low bandwidth TI service market on the basis that it no longer fulfils the three-criteria test set out in the EC recommendation? Please provide evidence to support your views?

9.2 We believe it is a mistake to remove TI regulation overnight and that Ofcom should put in place a transitional regime for this two-year review period, implementing a CPI-CPI charging cap and providing advance notice of a date for the formal removal of regulation for TI services in 2021. Ofcom's cliff-edge approach here is at odds with its standard practice; for example, Ofcom have taken a graduated approach to ISDN de-regulation, with a withdrawal of regulation happening after a notice period and impacting new supply only. A similar graduated approach is need in the TI market. There is still SMP here, and remedies are appropriate.

9.3 ✂

9.4 If regulation is removed overnight, BT will be free to raise the price of PPCs significantly, harming other CPs in the process. They will also be able to discriminate in favour of their own lines of business. Their ability to raise prices without consequence, the lack of alternatives and the ability to harm competition in the short term underlines the extent of market power in this legacy, but important market. Retaining a CPI-CPI cap and announcing a regulatory withdrawal date in 2021 will provide an opportunity for CPs to give notice to customers and manage them through the provisioning journey to Ethernet based solutions.

9.5 Business Customers and their CPs are already preoccupied with complex migrations related to the closure of the sub-2Mbit/s private circuit estate and other services that have been earmarked as end of life by BT.

Product	Supplier	Regulation	✂
OSA FSP2000	Openreach	Withdrawn	✂
WES/BES/WEES	Openreach	Proposed unregulated	✂
Sub 2MB PPC	BT ENTERPRISE	Unregulated	✂
Sub 2MB RBS	BT ENTERPRISE	Unregulated	✂
Analogue	BT ENTERPRISE	Unregulated	✂
Sub 2MB RPC	BT ENTERPRISE	Unregulated	✂
WLR3	Openreach	Regulated	✂
WES & BES 2.5G & 10G	Openreach	Proposed unregulated	✂

9.6 Adding more migrations while these migrations are ongoing will create resource constraints for end customers, BT and other CPs. A more graduated approach to removing regulation is needed to help end users make the transition to new services.

9.7 There is overwhelming evidence of BT SMP in the market and while it might be considered disproportionate due to falling volumes to impose a full CPI-X charge control, the circuit numbers will continue to be of a reasonable volume to warrant protection via an effective safeguard to protect the consumer interest. We believe there is sufficient evidence, including a clear public interest incentive, to introduce a CPI-CPI cap for an interim period and to prevent BT discriminating in favour of its own lines of business.

Continued Importance of PPCs

9.8 Today PPCs continue to remain an important feature of the UK's business connectivity market, providing a reliable and valued connectivity solution for a sizable minority of customers. PPCs, primarily provisioned over copper, are accessible on a nationwide basis. They have a reputation for reliability, having been unaffected by the Ethernet QoS crisis, and they support blue light services and critical national infrastructure.

9.9 There are a number of reasons why a customer may choose to consume a PPC service. It is only right that adequate notice is given to those customers if regulation is to be removed. A forced moved now, on the back of sudden regulatory removal, may result in end users incurring unnecessary costs and create provisioning issues for Openreach. A premature switch to Ethernet may drive unnecessary costs, necessitating the need for a full IT refresh that is not required at this point in time. Specialist consumers of PPCs (who require diverse routing and dedicated paths) may struggle to find affordable ethernet alternatives in the short term, with more leased line innovation needed to accommodate them.

The Future of PPCs 2019 - 2022

9.10 Like BT, Vodafone has no plans to cease providing traditional leased lines, recognizing that they remain an important feature of the market. We believe that most customers who have the option of reverting to FTTC based solutions have already made that journey, having already had the financial incentive to do so. The remaining PPC customers are therefore less likely to have simple cost reduction migration capabilities as the migration options available to them will all include other switching costs within their respective businesses.

9.11 We firmly believe customer should be given 24 months' notice of the regulatory underpinning being removed, giving them to time to plan sensible migration routes to new services and to co-ordinate this within planned IT project to minimise expense. The alternative option of regulatory removal and price rises only benefits BT.

9.12 Today BT's PPC business remains viable, sustainable and highly profitable (BT made **17% ROCE** from PPCs in 2016/17, generating **£23M of excess returns** in the process). Given that BT's PPC assets were written down long ago and spare availability is good (as individual services are gradually decommissioned), it is crucial that PPC consumers are not faced with rising costs and exploited in some misguided attempt to create a financial incentive to migrate.

10. Consultation summing up

10.1 We share Ofcom's desire to develop a more competitive business connectivity market in the United Kingdom. This is critical given the wide societal and economic benefits that the market delivers to UK businesses, the public sector and ultimately UK consumers. With 5G roll out underway and bandwidth demands increasing rapidly on all fronts, connectivity has never been more important.

10.2 Our own significant market experience and the evidence presented by Ofcom as part of the consultation leads us to conclude that:

10.2.1 Enterprise customers and MNOs have very different demand characteristics. This means they should be treated as separate economic markets.

10.2.2 There is a single national bandwidth market for fibre leased lines. Once fibre is installed to a site, it can be adjusted to provide any bandwidth through a simple kit or settings change.

10.2.3 The market is mature, with high levels of fibre penetration. The vast majority of customers that want fibre to their sites are able to get it already.

10.2.4 The presence of alternative infrastructure focused at serving the enterprise market in some urban clusters has not lead to the creation of geographic markets. Instead the market is shaped by demand factors, with Enterprise customers requiring a provider that can serve multiple sites across the country under a single contract. This results in a national market being maintained, with geographically spread sites being tendered together. To be successful in this market, it is necessary to provide services nationally.

10.2.5 Enterprise customers demonstrate a great reluctance to switch their underlying network, being fearful of the possibility of disruption. They are only really prepared to consider switching when they are refreshing their IT estate (something which happens infrequently), or if they can generate material savings on future rental costs that justify the risk of a switch. This reluctance to switch is hampering the functioning of the market, making it less likely that alternative networks will be utilised.

10.2.6 The costs to alternative infrastructure providers of connecting customer sites using their own fibre (via new duct installation or reusing existing duct installations) are significant, and more often than not uneconomic when contrasted against the cost of using Openreach's mature enterprise fibre network. As a consequence, on-net alternative connectivity for new connections is only used in a very small minority of cases.

10.3 This evidence clearly demonstrates the challenge that Ofcom faces in seeking to increase competition in the business connectivity market and reduce the overall adverse impact of BT's market power, which allows it to maintain artificial bandwidth pricing gradients and stifle wider innovation.

10.4 Ofcom has proposed a set of remedies that it believes will help counter BT's market power by seeking to encourage alternative infrastructure build with a view to removing reliance on Openreach.

10.5 However, we are firmly of the view that this approach will not succeed due to the fact that:

10.5.1 To connect customers, BT does not incur the same costs as its competitors. The Openreach network is already present in the vast majority of enterprise and mobile locations, with Communication Providers and their customers having already paid substantial installation fees.

10.5.2 A refreshed Duct and Pole remedy, while helpful for connecting new sites with fibre, is not likely to assist Communication Providers connect fibre to sites already served by fibre due to the economic barriers that remain.

10.5.3 By no longer aligning prices to cost, BT will be able to generate excess returns - estimated at £230M in this review period - from the sale of Openreach active services.

10.5.4 The prospect of scale market entry is limited in a mature fibre enterprise market. Openreach has built up substantial incumbency advantages in the enterprise fibre, undermining the financial viability of scale alternative investment in this part of the market.

10.5.5 There is no certainty around what prices will look like after this 2-year market review has concluded. This is highly destabilising in a market where 3 year contracts are the norm.

10.6 The only realistic way to appropriately address the market failure that exists and preserve build incentives for connecting entirely new sites is to introduce a cost based Dark Fibre remedy. This remedy would:

10.6.1 Enable the roll-out of 5G networks over the coming 2-year period. Without Dark Fibre, this roll-out will be constrained by the high cost of bandwidth and the UK's 5G ambitions will be held back.

10.6.2 Enable Business Connectivity users to access more innovative, flexible and cost effective services than they can today.

10.6.3 Reduce both the cost and disruption of switching, allowing reuse of existing fibre and removing the need for additional installation and excess construction costs.

10.6.4 Create long term certainty for Communication Providers, and in turn their customers, over its cost base, as a cost orientated Dark Fibre product and price would not change over the long term.

10.6.5 Help ensure efficient, sustainable investments decisions are made around new alternative enterprise fibre deployment, as a result of Openreach Dark Fibre pricing being independent from any kind of artificial bandwidth gradient and therefore immune from targeted strategic pricing gaming by Openreach to destabilise alternative investment.