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Award of 1492-1517 MHz spectrum for mobile services

Consultation on Ofcom's proposals

BT's response to Ofcom's consultation issued on 4 February 2025

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BT Group

Contents

Executive summary

1. BT is pleased to provide its views on Ofcom's proposals to auction the upper block of the 1.4 GHz band (1492-1517 MHz) for 4G and 5G mobile use. **This is a positive step in addressing the future spectrum requirements for UK mobile networks**. However, this does not replace the need for other additional low and mid-band spectrum for the longer term, including for future 6G for which the 600MHz and U6GHz bands will be particularly important. Without a credible future mobile spectrum roadmap there is disconnect between Ofcom's objectives as set out to Government on better quality mobile and actions that will actually support achievement of this goal.
2. The 1492-1517MHz band has been harmonised in Europe for supplementary downlink (SDL) use, so will need to be paired with other spectrum, to be used for that purpose. It will bring benefits to UK consumers once it is brought into use, particularly to extend capacity of coverage in places not easily covered by higher frequencies, such as indoors and in rural areas. BT considers **it is important that the spectrum is made available as soon as possible** to maximise the benefits that can be generated from its use.
3. The value and benefits derived from **this spectrum will be substantially affected by the coordination zones** for mobile base station deployments around UK ports and airports. We present evidence that these zones correspond to where a high proportion of our total mobile traffic occurs and where the spectrum is most needed.
4. Whilst the need to avoid interference to mobile satellite services is understood, Ofcom is right that the poor receiver characteristics of these terminals needs to be addressed promptly, or the risks of interference must be accepted. Given this issue has been known and discussed for some time, and that improved receivers are available, **five years is in BT's view a reasonable period to allow before risk of receiving higher levels of interference must be accepted** and the coordination requirements for mobile base stations are relaxed. A substantially longer period would seriously diminish the value of the spectrum for mobile and the benefits it could deliver to consumers.
5. BT agrees that **the spectrum should be awarded as a tradable indefinite licence with a 20- year initial term**. The technical licence conditions seem reasonable, although the restriction to the power of the uppermost 5MHz should be open to review in future.
6. Our preliminary views on the auction design are that **the spectrum should be awarded as a single 25 MHz lot using a second price rule sealed bid auction**. We welcome Ofcom's plan to look at possible competition measures that may be needed. We will give our definitive views on the auction design proposals within one month of publication of any spectrum trades that may be announced following the Vodafone/Three merger, as agreed with Ofcom[1].

[1] Email from [redacted] to [redacted] dated 10 April 2025.

1 Introduction

BT welcomes Ofcom's proposals[2] to auction the upper block of the 1.4 GHz band (1492-1517 MHz) for 4G and 5G mobile use.

Before addressing the specific consultation proposals, we discuss in **section 2** the timing of this consultation given the changes in spectrum holdings and market structure as a result of the Vodafone/Three merger.

In **section 3** we reiterate our previously communicated concerns over the lack of a longer term spectrum roadmap for mobile in relation to additional low band and mid band spectrum needed to handle longer term mobile traffic growth and to support future 6G deployment.

In **section 4** we respond to Ofcom's proposals on the level and duration of the protection to be afforded to mobile satellite terminals and in **section 5** we address the proposed coordination of mobile base station deployments.

In **section 6** we provide our views on the proposed technical and non-technical licence conditions.

In **section 7** give our preliminary views on the details of the proposed auction design, noting that our definitive position will be provided in a further response to the relevant consultation questions that Ofcom has agreed to receive within a month of when the details of any proposed post-merger spectrum trades are published.

Finally in **section 8** we discuss the possible next steps, including our preferred timing of the eventual award.

2 Relevant market developments

The timing of the publication of the consultation and the original deadline for response placed stakeholders, especially BT, in a difficult position. This is because the merger of Vodafone and Three will affect how mobile spectrum bands are controlled and configured (including in the current 1400 MHz assignments) and because further (presently unknown) changes to spectrum holdings are to be announced post-merger in the form of trades, which could include existing 1400 MHz band assignments.

We appreciate that Ofcom extended the original deadline for response until a period after the publication of the final CMA decision on the Vodafone/Three merger, and subsequently has also allowed a further month from when post-merger trades are published for BT to respond to the auction design questions. These time extensions are welcome as they allow us time to

[2] https://www.ofcom.org.uk/siteassets/resources/documents/consultations/category-1-10-weeks/269383-call-for-input-making-more-spectrum-in-the-1.4-ghz-band-available-for-mobile-services/associated-documents/consultation-award-of-1492-1517-mhz-spectrum-for-mobile-services.pdf

assimilate implications of any relevant trades. We have provided some preliminary views on the auction design questions in this response and may take up the option to respond further or differently after the detail of any relevant spectrum trades is known.

We note that Ofcom is yet to publish a competition assessment for this proposed 1400 MHz SDL spectrum award and consult on possible measures to be included in the design of the award to promote competition. We note this could also have a bearing on the final auction design, including bid options and limits to spectrum holdings.

BT believes that a competition assessment should evaluate operator shares of both spectrum and mobile capacity in low band, as well as the potential risk to competition from significantly unbalanced positions following the auction. Additionally, Ofcom should consider the impact of cost differences between operators in deploying 1400 MHz when factoring in likely bid outcomes and scenarios. BT may comment further when responding to the auction design questions and Ofcom's competition assessment.

3 Future mobile spectrum roadmap

The proposed award of 1400 MHz SDL spectrum, in a time frame yet to be announced, is in principle welcome. Also, the forthcoming award of mmWave spectrum is scheduled for October 2025. However, BT remains concerned with the absence of a coherent future longer-term mobile spectrum roadmap, and the negative impact this will have on future mobile network investments, including eventual introduction of 6G.

Ofcom set out in its letter to Minister Bryant[3], 'the amount of data that people use is changing' implying that either signal strengths and / or mobile capacity needs to be improved to deliver on customers' mobile expectation. Ofcom reinforced this point in its letter to the Chancellor[4] that 'there is clearly a question about where further investment by all operators may be required to provide reliable mobile coverage… where it is still not adequate'. These are the reasons Ofcom gives for revising its mobile coverage maps and information, but without providing any policy proposals on how improved reliability and quality will be delivered.

In the face of low to no revenue growth in mobile, and increasingly tight returns, Ofcom must consider how further spectrum release, including a longer term and holistic roadmap, can contribute to delivering better mobile experiences for consumers. More of the right spectrum is one of the crucial inputs to efficient delivery of the mobile customers need, underpinning the UK's future economic growth, and to maximise benefits for businesses and consumers.

Both 1400 MHz spectrum and mmWave, have clear technical limitations and are not sufficient to meet future needs. The mmWave ecosystem is immature, the coverage achievable in these frequencies is very limited, and the licences to be offered have only a 15-year duration, with no indication they would be extended. The 1400 MHz SDL spectrum, which is the subject of the

[3] Letter from Dame Melanie Dawes to Minister of State, 31 October 2024
[4] Open letter How Ofcom contributes to UK growth

present consultation, will have very significant exclusion zones that coincide with high traffic areas, and may only be relaxed after many years.

In this context, the current use of the 3.8-4.2 GHz band, and its absence from a future UK mobile spectrum roadmap, is a clear example of inefficiency.

The proposals for upper 6 GHz, to which we will respond in due course, are problematic. For example, they do not support 6G requirements, given the limited bandwidths being discussed for mobile priority in urban areas; they imply potential limitations on power levels to enable sharing with Wi-Fi, without demonstrated net benefits; and by running ahead of EU harmonisation, raise concerns over possible interference between mobile and Wi-Fi, to the detriment of consumers. The U6 GHz band should form a key element of the future UK mobile spectrum roadmap, to enable the UK to bring benefits of future 6G to consumers, provided the spectrum is made available in a way that gives MNOs necessary incentives to invest (e.g. sufficient available bandwidths and suitable maximum power levels).

In the longer term, possible availability of 600 MHz (or wider) UHF spectrum for mobile is a welcome prospect, but it is not yet clear if and when this spectrum will be re-purposed for mobile. Early clarity on Ofcom's stance on pursuing a path towards primary allocation to mobile in the ITU, and harmonisation for mobile in CEPT, would be welcome.

A mobile spectrum roadmap that includes 3.8-4.2 GHz, U6 GHz and 600 MHz, amongst other bands already in preparation, would put the UK on the front foot in improving mobile networks and the experience of UK consumers and businesses.

4 Protection of MSS terminals

BT recognises that Ofcom must appropriately address the legacy situation, whereby mobile satellite service (MSS) receivers in the adjacent band, have poorer filtering than is readily achievable today, leaving them vulnerable to possible interference (e.g. if mobile base stations are authorised in the adjacent band). There is a need to incentivise improvements to the MSS terminals deployed, and to appropriately balance the risks of interference to MSS terminals, against the need to achieve efficient use of the adjacent spectrum band for mobile.

Ofcom's analysis of the situation is comprehensive. We broadly support the conclusions reached and the proposals made for protection of MSS terminals. Our answers to the relevant consultation questions are provided below.

Question 1:

Do you agree with our proposal that 'Phase 1' protections would be required to avoid the potential for significant disruption at ports and airports?

In the response to the earlier Call for Inputs (CFI)[5], BT questioned whether ports need to be protected given the good coverage available from terrestrial mobile networks and the

[5] BT response to October 2023 CFI - https://www.ofcom.org.uk/siteassets/resources/documents/consultations/category-1-10-weeks/269383-call-for-input-making-more-spectrum-in-the-1.4-ghz-band-available-for-mobile-services/responses/bt-ee

precedent in at least one other European country (Denmark) of only protecting airports. Ofcom has outlined the reasons why some MSS use needs to be protected for ships in and near ports. The requirement to protect is arguably tenuous but we agree that, provided the transition from phase 1 to phase 2 protection levels is short, it may be appropriate to proceed as Ofcom proposes. A clear timetable should help incentivise users of MSS receivers to upgrade their equipment, if they want to be sufficiently protected from interference.

We similarly agree with Ofcom's conclusions in relation to phase 1 protections around airports, for a suitably short period.

Question 2:

Do you agree with the list of airports we propose to protect, in Annex A8?

BT agrees that if airports are to be protected, for a suitably short period, the list Ofcom has provided is appropriate.

Question 3:

Do you have any comments on the two options we have proposed for the ports which would require protection, noting the further detail (and requests for specific evidence) in Annex A7?

We consider that if ports are to be protected (for a suitably short period), then only the major ports listed in the consultation document should be included (i.e. Option 1), not the minor ports or the entire coastline. To extend protection beyond major ports would not be proportionate, given the impact and risk of any interference, compared to the benefits that would be lost if mobile deployments had to be excluded from so many large areas.

Question 4:

Do you agree with our preference to reduce these restrictions to 'Phase 2' levels over a shorter timeline than the natural lifecycle of the terminals?

Yes, BT believes it is reasonable to only give protection to legacy MSS terminals with poor filtering for a period within which it may be reasonably expected that they can be upgraded or replaced, so they are compatible with the efficient harmonised use of the adjacent band by mobile networks. Given the compatibility issue has been known for several years, and the delays already incurred in organising the award of this extended 1400 MHz band for mobile, a further 5-year period before the degree of protection is reduced, should be sufficient to enable any critical MSS operations to be upgraded to user terminals compliant with the latest standards.

Question 5:

Taking into account the further detail in Annexes A7 and A8, please provide any evidence:

• that a shorter period, around five years, for the relevant receivers to be replaced or upgraded is not technically or practically feasible; or

BT has no comments/evidence on this point

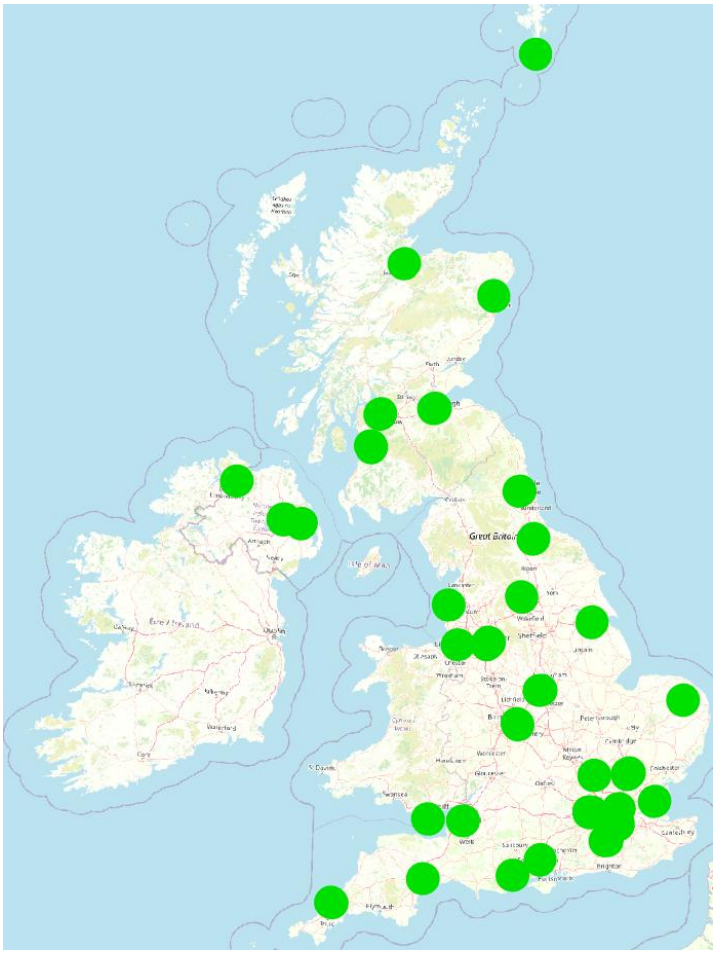
• of the impact that a longer period of up to 20 years may have on the ability of MNOs to use the spectrum and the benefits to consumers and citizens that would be foregone.

BT is concerned that the large potential exclusion zones (coordination areas) around the numerous airports and ports during Phase 1 in aggregate represent a large portion of UK geography. Even if just airports are considered, those cover a large proportion of the UK, as illustrated in Figure 1 below.

Moreover, those areas generally coincide with the busiest locations served by the terrestrial mobile networks, i.e. locations where operators would have greatest need to deploy the 1400 MHz SDL spectrum. If a longer period than 5 years were allowed, that would significantly reduce the value of this spectrum to mobile operators and negatively impact the quality of mobile services to consumers in those areas.

We understand that the coordination areas do not entirely preclude the possibility of mobile deployments within those areas, but successful coordination is likely to require significant limitations to the configuration of the mobile network, such as pointing base station antennas away from the ports and airports, beam down tilt, and reduced base transmit power. The net effect will to be to make mobile coverage in these areas much more costly and negatively impact MNOs' willingness to invest, and thus consumers.

Figure 1 : Coordination areas around airports in Phase 1



In Figure 2 we show the Airports and Ports (Phase 2) coordination areas. There is a small degree of overlap between these areas, but they are largely distinct.

Figure 2 : Coordination areas around the Airports and Ports (Phase 2)

We have undertaken some analysis to understand what proportion of total network download traffic is associated with mobile base stations located within the proposed coordination zones (around the major airports and ports). The results are shown in Table 1 below.

Table 1 : Estimated impact of coordination /exclusion zones on mobile network deployments

Coordination/exclusion area	Percent of UK Geography	Percent of BT/EE's total UK mobile downlink traffic
Ofcom's proposed Phase 1 coordination zones polygons around the major airports (Ofcom's shape files)	14.3%	55%
Ofcom's proposed Phase 2 coordination zone polygons around the major airports (Ofcom's shape files)	0.35%	1.69%
Ofcom's proposed Phase 2 coordination zone polygons around the major ports (Ofcom's shape files)	0.73%	5.59%
Ofcom's Phase 2 exclusion zone polygons at airports and ports (Ofcom's shape files) combined.	1.07%	7.24%

To further analyse the practical and cost impacts of the proposed Phase 1 coordination zones it would be necessary to undertake coordination of 1400 MHz SDL base stations around example airport and port locations and assessing what mitigation measures would be required, for example when considering existing base station sites, Unfortunately within the constraints of the timescales of this consultation and responding to several other parallel Ofcom spectrum consultations we were unable to undertake and include this work within this response. Ofcom might like to consider such analysis in its own further work.

Question 6:

Do you agree with our proposal not to put in place restrictions on IMT use of this spectrum to protect: (a) land terminals; (b) potential future uses of the 1.5 GHz spectrum; or (c) PMSE users. In this regard, we particularly welcome:

• any evidence that Inmarsat's land terminals are used for the operation of critical national infrastructure or safety purposes;

• any evidence that it is not technically or practically feasible to replace Inmarsat land terminals, including through alternative solutions or upgrades; and

• any evidence on the impact of protecting land terminals on the ability of mobile network operators ("MNOs") to use the spectrum and the benefits to consumers and citizens that may be foregone.

Protection of land terminals, even if practical (which is doubtful given that mobile satellite service terminals may move or be used in motion), would further seriously impact the ability to utilise the 1400MHz SDL band by mobile networks. There is no evidence that mobile use would lead to interference and, if it did, there are other methods of communication available. We therefore agree with Ofcom's proposal not to protect land base MSS terminals.

As regards future MSS services, these should be designed from the outset to be immune from interference from adjacent band mobile networks use, and no special protection measures are appropriate.

We also agree with Ofcom's proposal to not place restrictions on PMSE/Telemetry use, for the reasons Ofcom outlines in the consultation.

BT does not have evidence on whether Inmarsat's terminals are for critical national infrastructure or for safety purposes, nor any evidence that it would be infeasible to replace or upgrade terminals.

Question 7:

Are you able to provide any evidence on the likelihood of audio links suffering interference from IMT use of 1492-1517 MHz?

BT is not able to provide evidence on the likelihood of audio links suffering interference from IMT use of 1492-1517 MHz.

5 Coordination of mobile deployments

If and where MSS terminals are to be afforded protection from interference, the appropriate method of coordination of mobile base station deployments, is an important consideration. The administrative effort should be kept to the minimum necessary to achieve sufficiently accurate results, and the mobile networks should have maximum flexibility to meet the agreed protection criteria for MSS receivers. We broadly agree with Ofcom's proposed approach, and our comments on the details are given in our responses to the consultation questions below.

Question 8:

Do you agree with our proposed approach to coordination?

Yes, we agree with Ofcom's proposed approach.

Question 9:

Do you agree with our proposal to define PFD limited zones as complex polygons? Would defining them as a set of points, rather than an entire boundary, make coordination calculations easier for licensees?

In practice, the coordination calculation would likely need to be undertaken considering various points within the PFD limited zone, rather than at every point along the boundary, and would be limited by the resolution of the terrain and clutter databases used with the propagation model. Defining the PFD limited zones as a set of points, could therefore be helpful.

Ofcom has set out various options for how coordination *areas* are defined and mentions that it is interested in views on the 4 options set out in paragraphs 5.56 – 5.69 of the consultation .

Ofcom does not favour the fourth option of providing the list of relevant grid points to define coordination areas, on the basis that this would involve an unworkable number of grid points. However, we note that, in practice, we would probably need to generate a list of grid points within the defined complex polygons to then check if a proposed base station location falls within these polygon areas. We don't think, therefore, the fact that a large number of grid points are contained in the coordination zones, is in itself a reason not to provide these.

Question 10:

Do you agree with our provisional view that not defining coordination zones around ports may be simpler for licensees than complying with multiple different coordination zones, particularly while Phase 1 PFD limits are in place?

Ofcom's explanation for prescribing the Phase 1 coordination areas for airports, but leaving licensees to themselves decide coordination zones around ports, seems to be because the coordination areas for ports are larger and may overlap. We see that leaving coordination areas to licensees could make sense if, for example, a range of base station power levels may be considered, such that the coordination zones would change in different circumstances. But it is unclear to us, why because in the case of ports the coordination areas are large and may overlap, Ofcom should not define these coordination zones, if it is proposing to do so for the airports.

Question 11:

Do you have any feedback on the coordination procedures (as set out in Annex A10) or the specific parameters proposed?

The coordination procedure proposed seems reasonable.

Question 12:

How difficult would you find it to comply with our proposed coordination requirements? In particular, we are interested in information from potential licensees on how the proposed coordination zones would affect their deployment processes and decisions.

The coordination requirements are onerous, particularly since they are likely to apply to a large proportion of the areas, where there is likely to be a potential requirement to deploy base stations. Over time, as we move to Phase 2, this burden would lessen considerably, but the

requirement to use the band could be well before Phase 2 . In addition, the likely necessary measures to achieve successful coordination, in terms of constraints to the technical characteristics of base stations, could also be onerous and would generate additional costs (e.g. more base stations and lower power or limitations to sector antenna pointing of base stations). This will reduce the value of the spectrum and negatively impact investment decisions and consumers. It is therefore important that Ofcom minimises the protection criteria (and hence coordination areas) to the extent possible and as early as possible.

See also our response to Question 5 above.

Question 13:

Do you have any comments on our proposal that licensees should carry out their own coordination, on the basis of coordination parameters set by Ofcom?

We agree that this is the most practical and flexible solution from an operational perspective, even though the co-ordination requirements themselves lead to additional initial and ongoing costs for licensees.

6 Licence conditions

6.1 Technical licence conditions

Question 14:

Do you have any comments on our proposed technical licence conditions?

We welcome that Ofcom are proposing to align out of block emissions to relevant ECC Decisions, as it is very important that UK MNOs can procure network equipment produced for the wider European market, avoiding national equipment variants. The technical licence conditions must include full clarity of this alignment and not unintentionally leave some aspects open to interpretation (e.g. 'per cell' vs 'per antenna'). Further, there appears to be some editorial inconsistency between the EIRP emanating from radio equipment in 1427-1482 MHz between two of the referenced documents. In Annex 12 (IR2068, Table 3.3, final row) the relevant figure is 9 dBm Maximum mean out-of-band EIRP, whereas in Annex 9 (Draft Licence, Schedule 1, Section 13, first row) this is stated as -9 dBm. We believe that the +9 dBm figure, as stated in Annex 12, should be the correct one. The unit of bandwidth is also missing the Annex 12 Table 3.3.

The tighter in-band transmit power limit in the top 5MHz of the award band, together with the tighter PFD limit for MSS protection, are very constraining from a mobile network perspective. We note that Ofcom rejects the arguments, made at the CFI stage, that the power should not be constrained, given it is the protection criterion for the MSS that is ultimately relevant. Ofcom's reasoning is that coordination areas would become very large if the in band power were not constrained, and its proposal is consistent with the limits in the relevant EC Decision. However, that approach could unnecessarily limit the power transmitted in the top 5MHz, where deployments are outside the coordination areas. We therefore welcome Ofcom's

indication that it would consider increasing the in-band power in the top 5 MHz in future, if it does not do so before the award.

6.2 Non-technical licence conditions

Question 15:

Do you have any comments on the non-technical licence conditions that we propose to include in the award licences?

BT supports the proposed conditions. In particular, we welcome the indefinite licence duration with a 20-year initial term, consistent with other mobile licences (except the proposed mmWave award).

7 Auction design

Noting that Ofcom has allowed further time for responses to the auction design questions, beyond the (extended) closing date of the rest of the consultation, please treat the below response as preliminary. We reserve the right to update or amend it in any further submission we may make a head of the extended responses deadline applicable to these three consultation questions.

Question 16:

Do you have any comments on the proposed format for the auction?

BT supports the use of a single sealed bid second price auction format as Ofcom proposes.

As we explain in our response to Question 17 below, we believe the spectrum should be awarded as a single 25MHz lot.

Question 17:

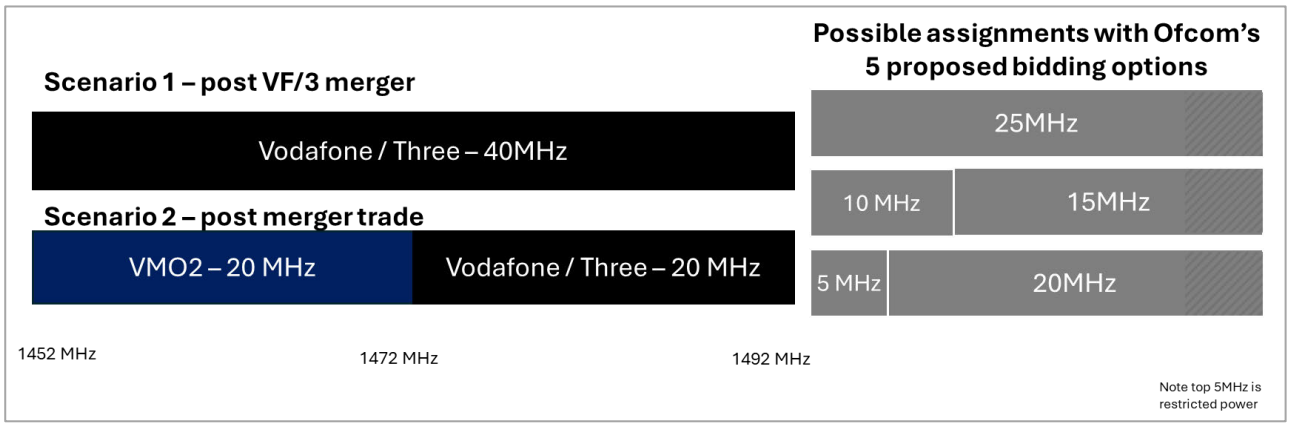
Do you have any comments on the proposed bidding options for the auction? Do you believe we have excluded any bidding options which would be worth identifying?

As we have set out in Section 2 above, the imminent change in market structure and (as yet undisclosed) planned subsequent spectrum trades, make it difficult to answer this question definitively from BT's perspective. These developments could affect how the spectrum should be packaged, as well as being relevant to the competition assessment that Ofcom intends to undertake.

Our preliminary position on the bidding options set out below could change when there is further clarity on those issues.

Ofcom is considering 5 bidding options which correspond to three possible arrangements of assignments in the award band. These, together with the two possible existing spectrum holding scenarios that seem most likely, are illustrated in Table 2 below.

Table 2 : Possible band scenarios pre and post award



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Question 18:

Do you have any comments on our proposed information policy or reserve price?

Information policy

We agree with Ofcom's proposed information policy, apart from publication of non-winning bids. We believe such bids should remain confidential as their disclosure could undermine reaching commercial trading agreements, and disclose commercially sensitive information.

Reserve price

BT considers that a reserve price of £0.5m per 5MHz would be sufficient to meet Ofcom's objectives. The proposed £1m per 5MHz would match the 700MHz SDL auction outcome and would be higher than some of the international benchmarks Ofcom shows in Figure 8.2 of the consultation. We further observe that in Figure 8.2, Ofcom has inflated past auction benchmarks to 2026 prices. As we explained in our response to Ofcom's December 2024 consultation on ALFs for the 1800MHz and 2100MHz band[6], there is strong evidence that past auction values have declined in both nominal and real terms and, therefore, inflating these by CPI as Ofcom has done, is inappropriate.

8 Proposed next steps

Question 19:

Do you have any other comments on the proposals or analysis set out in this consultation document?

The consultation does not provide any guidance on the timetable for this proposed spectrum award. It would be helpful if Ofcom could give an early indication of the timetable and next steps. Considering the timing of the mmWave award, we propose that the 1400 MHz SDL award should not take place before summer 2026.

We note that Ofcom is yet to complete a competition assessment and consult on possible measures required to promote competition. This is an important step given recent changes to UK market structure, and the intended post-merger spectrum trades.

[6] BT response to Ofcom's consultation on 1800MHz and 2100MHz licence fees, 7 March 2025 https://www.ofcom.org.uk/siteassets/resources/documents/consultations/category-1-10-weeks/consultation-review-of-annual-licence-fees/responses-december/bt.pdf

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