

## Vodafone / CK Hutchison JOINT VENTURE MERGER INQUIRY

### BT's RESPONSE TO THE CMA's ISSUES STATEMENT PUBLISHED 2 MAY 2024

#### Section 1: Executive Summary

- The proposed deal will create a Merged Entity with a disproportionate share of capacity and spectrum, unprecedented in UK and Western European mobile markets, which will substantially lessen competition and deter investment (the Asymmetry Concern).
- In addition, BT agrees with the CMA's Phase 1 conclusion that the Merged Entity's participation in MBNL will result in lower levels of investment arising from its access to commercially sensitive information (CSI) relating to BT's investment plans (the MBNL CSI Concern).
- Thirdly, BT also agrees with the CMA's Phase 1 conclusion that the Merger will result in direct harm to BT's ability to compete, through the Merged Entity's participation in MBNL (the MBNL Frustration Concern).
- Whilst each of these three concerns is significant in and of itself, their combination exacerbates the adverse impact the Merger will have on competition in UK mobile markets and, ultimately, UK consumers.
- BT welcomes the CMA's conclusions on the MBNL CSI Concern and the MBNL Frustration Concern at Phase 1 and its intention to further investigate these concerns at Phase 2. However, BT considers that the CMA's Phase 2 investigation must also consider carefully the Asymmetry Concern, i.e. the direct impact that the Merged Entity's capacity and spectrum asymmetry will have on rivals' (and therefore on the Merged Entity's) incentives to invest.
- BT agrees with the CMA's conclusions at Phase 1 that the Merging Parties' claimed efficiencies appear to be unsubstantiated, are not incremental to today's market outcomes (even if realised), and will not be passed on to UK consumers in the form of lower prices or greater investment.
- Overall, BT believes that the combination of extreme capacity and spectrum asymmetry arising from the Merger, along with the unprecedented access that the Merged Entity will have to BT's (as well as to VMO2's) strategic investment plans, and the Merged Entity's ability and incentive to disrupt the effective functioning of MBNL, will give rise to a substantial lessening of competition in UK mobile telecoms markets, ultimately resulting in higher prices, poorer network quality, and reduced incentives to invest – all to the detriment of UK consumers.

- 1.1. BT<sup>1</sup> welcomes the opportunity to respond to the CMA's issues statement in respect of its Phase 2 investigation of the Merger (the Issues Statement). Defined terms in this response have the same meaning as set out in the Issues Statement unless otherwise indicated.

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<sup>1</sup> References in this response to BT include BT Group including its brands EE, BT and Plusnet.

- 1.2. BT agrees with the CMA's findings in its Phase 1 Decision that the Merger raises serious competition concerns and, if completed, would lead to an SLC, to the detriment of UK consumers and the UK mobile telecommunications sector as a whole.
- 1.3. BT has already submitted its views on the Merger in response to the CMA's preliminary and Phase 1 invitations to comment (ITC), information requests and on calls with the CMA. BT does not repeat the detail of those submissions in this response. Instead, this submission responds directly to a number of important points raised by the CMA in the Issues Statement.
- 1.4. BT's concerns principally arise from three key issues: firstly, the Merged Entity's disproportionate share of UK mobile capacity and spectrum (the Asymmetry Concern); secondly, its access to commercially sensitive information of BT through its participation in MBNL (the MBNL CSI Concern); and, thirdly, the severe disruption to the MBNL network sharing arrangement that would result from the Merged Entity's changed incentives compared with those of Three pre-Merger (the MBNL Frustration Concern). Whilst each of those is a significant concern in and of itself, their combination exacerbates the adverse impact the Merger will have on competition in UK mobile markets.

**BT considers the CMA should expand its investigation to cover concerns resulting from the Merged Entity's disproportionate share of UK mobile network capacity and spectrum**

- 1.5. BT notes the CMA's intention (as set out at paragraph 30 of the Issues Statement) to "*consider the Parties and their key rivals' competitive incentives and strategies, the closeness of competition between the Parties, the strength of the competitive constraints exerted by their rivals, and the impact of the Merger on these alternative constraints*". As part of this assessment, BT believes that it will be critical for the CMA to assess the impact that the stark capacity and spectrum asymmetries arising from the Merger will have on competitors' incentives to undertake major network investment programmes.
- 1.6. In this context, the Merger will create a combined entity with a dominant - c.61% - share of UK mobile network capacity (i.e. spectrum and cell sites combined), resulting in a capacity asymmetry between the Merged Entity and the remaining players that is well in excess of current or past levels and unprecedented in UK and Western European mobile markets. As a result, the Merged Entity would be able to credibly threaten to deploy capacity strategically to undermine the business case and therefore reduce the incentive for rivals to invest in their respective mobile networks. Knowing this, the Merged Entity is likely to withhold rather than invest in deploying its own capacity, potentially resulting in levels of investment, innovation and quality materially lower than would be the case absent the Merger.
- 1.7. In its Phase 1 Decision, the CMA highlights several concerns regarding the Merger's potential impact on competition, including that, rather than spurring greater levels of investments within the industry (as suggested by the Merging Parties), the Merger could negatively impact competition by reducing the incentives of the Merged Entity to compete aggressively, and in turn reduce the competitive pressure faced by other operators, leading to higher retail mobile prices and MNOs investing less in network quality.<sup>2</sup> These concerns echo issues raised by Ofcom in other processes, where it has noted that significant spectrum asymmetries (such as those that would be created in this case) can distort market outcomes and potentially harm investment incentives. In its 2018 spectrum auction statement, Ofcom was concerned these sorts of competition issues would arise when a capacity leader had

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<sup>2</sup> Phase 1 Decision, paragraphs 15(a)(iii) and 343.

more than two-times the average capacity of its competitors. By contrast, the Merger would result in the Merged Entity having almost three times the capacity of the next largest MNO (BT).

- 1.8. Importantly, given the extreme size of the capacity asymmetry created by the Merger, the Merged Entity would not need to 'hoard' all – or even almost all – of its excess capacity for this chilling effect on investment to arise; it is very possible that, in the short run at least, the Merged Entity may be able to deploy a proportion of that excess capacity in improving some services for some of its customers, while at the same time retaining a sufficiently large share of capacity to credibly deter rival MNOs from making investments that would have otherwise been commercially viable absent the Merger. For this reason, BT believes that the Merger will result in lower levels of investment overall – and therefore poorer levels of network quality for UK mobile customers – than would have been the case in the counterfactual.
- 1.9. BT considers that this Asymmetry Concern should be carefully assessed in the CMA's more detailed Phase 2 review. Moreover, BT considers that concerns related to the Merged Entity's disproportionately large share of overall capacity also extend to specific key spectrum bands, where the Merged Entity would hold 67% of 3.5GHz capacity (key to deployment of high capacity 5G services according to the CMA) and nearly 70% of low band capacity (key to existing indoor and wide area coverage in 4G and 5G and for industry verticals, road and rail coverage and future IoT applications).<sup>3</sup>
- 1.10. This Asymmetry Concern is set out in more detail in Section 2 of this response (see, in particular, Figures 2.2, 2.3, 2.4 and 2.6).

**BT agrees with the CMA's Phase 1 conclusion that the Merged Entity's access to BT CSI through its participation in MBNL will likely result in lower levels of investment**

- 1.11. As noted at paragraph 41 of the Issues Statement, in its Phase 1 Decision, the CMA found that *"the Merger gives rise to a realistic prospect of an SLC as a result of anti-competitive effects in the supply of retail mobile telecommunications services to end consumers and wholesale mobile services in the UK arising from the sharing of commercially sensitive information through the Merged Entity's participation in both network sharing arrangements."* The CMA's concerns in this respect (again, as summarised in the Issues Statement) are based on the following key elements:
  - a. Given its position in both network sharing arrangements, the Merged Entity may have significant visibility as to the network upgrades and/or launch of new technologies planned by BT and VMO2.
  - b. While safeguards in place may provide some protection, the Merged Entity could breach these safeguards, and there is scope for information sharing without the safeguards being breached.
  - c. The Merged Entity could take into account information it accesses regarding network investments planned by the other MNOs when deciding how to time and target its own investments, and in particular, could cancel or delay previous roll-out plans on the basis of information it receives regarding competing MNOs' roll-out plans. Put

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<sup>3</sup> For the calculation of low band shares (of spectrum and capacity) BT's 20 MHz of 700 MHz SDL is excluded on the basis that there is no device ecosystem for which this spectrum is usable.

simply, if the Merged Entity becomes aware that both rivals are unlikely to make certain investments, it would no longer need to do so.

- d. In addition, BT's and VMO2's incentives to invest may also be reduced and/or they may seek to rely less on network sharing arrangements, which could lead to less or slower network deployment and higher costs.

1.12. BT agrees with the CMA's finding in its Phase 1 Decision that *"there is a risk that by getting access to information on network investments planned by the only other MNOs, the Merged Entity could decide how to time and target its own investments. This may reduce or postpone investments by the Merged Entity and the other MNOs compared to the scenario absent the Merger"*.<sup>4</sup>

1.13. In this context, the CMA's Phase 1 Decision offers three connected scenarios where the Merger will likely result in reduced levels of investment due to the Merged Entity's participation in both UK network sharing arrangements.

- a. First, BT believes that the scenario set out in paragraph 746(a) of the Phase 1 Decision is not only plausible, but an economically rationale strategy for the Merged Entity to pursue. Specifically, following the Merger, the Merged Entity will indeed be able to deduce whether or not BT will have 5G SA roll-out plans in a particular area and (where it doesn't) would be incentivised to cancel or delay any previous plans of VUK to roll out its own 5G SA investments in response, resulting in lower levels of investment as compared to the counterfactual.
- b. Second, BT agrees with the CMA's finding at paragraph 746(b) of the Phase 1 Decision that *"BTEE and VMO2's incentives to invest may also be reduced as a result of a loss or deterioration of their respective first mover advantages. Indeed, if BTEE and VMO2 know that the Merged Entity can use information in relation to their investment plans to develop its own investment plans, this may weaken their incentive to invest in the first place and/or they may seek to rely less on network sharing arrangements which could lead to slower network deployment and higher costs"*.<sup>5</sup> As discussed in more detail below, BT believes that, in combination with the unprecedented levels of spectrum asymmetry arising from the Merger, this will result in a material reduction in investment in UK mobile telecoms networks as compared to the counterfactual.
- c. Finally, BT agrees with the CMA's Phase 1 conclusion that *"Knowing that its competitors may have reduced incentives to invest as a result of the increased information sharing, the Merged Entity might respond in turn by reducing its own investment plans"*.<sup>6</sup>

1.14. While BT agrees with the CMA's conclusions at Phase 1 in respect of the Merger's adverse impact on investment incentives, it respectfully submits that the CMA's Phase 2 assessment should consider carefully the risk that the MBNL CSI Concern in combination with the Asymmetry Concern will have a compounded effect on those adverse incentives.

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<sup>4</sup> Phase 1 Decision, paragraphs 746.

<sup>5</sup> Phase 1 Decision, paragraph 746(b).

<sup>6</sup> Phase 1 Decision, paragraph 746(c).

**BT agrees with the CMA's Phase 1 conclusion that the Merger will also likely result in direct harm to BT's ability to compete through the Merged Entity's participation in MBNL**

1.15. The Issues Statement makes clear that, as part of the CMA's Phase 2 investigation into the

horizontal unilateral effects arising from the Merger, the CMA will assess whether "*the Merged Entity may have the ability and incentive to disrupt the effective functioning of the network sharing agreements which could have the effect of limiting the constraint exerted by BTEE and VMO2*".<sup>7</sup> BT agrees that this should be an important element in the CMA's Phase 2 assessment of horizontal unilateral effects.

1.16. In this context, BT notes the detailed investigation conducted by the CMA at Phase 1 into whether, following the Merger:

- a. the Merged Entity would have the ability to use its participation in MBNL to disrupt the effective functioning of the network sharing arrangement;
- b. the Merged Entity would have the incentive to do so; and
- c. the disruption to the effective functioning of MBNL would have the effect of limiting the competitive constraint exerted by BT.

1.17. That investigation found that:

- a. for the purposes of determining the Merged Entity's ability to harm the effective functioning of MBNL and thereby limit the competitive constraint from BT, no material weight should be placed on protections available to BT under the relevant MBNL contracts;
- b. those contracts may not in any case protect against all the mechanisms through which MBNL's effective functioning could be harmed;
- c. the contracts are complex, subject to technological change and may need to be renegotiated to accommodate for changes in the purpose and scope of the network sharing arrangement;
- d. contractual enforcement is often expensive and time-consuming, and it may not be worthwhile for BT to take on the risk of enforcing the MBNL contractual arrangements;
- e. BT will remain reliant on Three's co-operation in MBNL through the life of the network sharing arrangement, which may act as an additional disincentive to enforce any contractual protections; and
- f. the Merged Entity would be incentivised to interpret the MBNL contractual arrangements in the way which is most favourable to its own interests, including where this would harm the effective functioning of MBNL.<sup>8</sup>

1.18. BT agrees with these findings and with the CMA's conclusion that the Merged Entity would have several potential mechanisms for harm, including that it could limit or block the funding of MBNL and that it could block and/or delay upgrades via MBNL. Indeed, BT notes that these are not new concerns; the European Commission's (EC) 2016 decision to prohibit the proposed Hutchison 3G UK/Telefonica UK transaction was underpinned by concerns (on

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<sup>7</sup> Issues Statement, paragraph 32(c)(ii).

<sup>8</sup> Phase 1 Decision, paragraph 454.

the part of both the EC and CMA) about the deal's impact on UK network sharing arrangements.

- 1.19. The CMA also concluded in its Phase 1 Decision that the Merged Entity may have an incentive to use its participation in MBNL to disrupt the effective functioning of the network sharing arrangements, including because of the competitive benefits that would accrue to the Merged Entity by limiting the competitive constraint from BT (in addition to direct financial benefits from reducing funding of MBNL, and from the ability to redirect time, investment and resources towards alternative commercial priorities). BT agrees with this conclusion. In BT's view, the Merged Entity will have drastically reduced incentives compared with Three to invest in MBNL or, more generally, engage co-operatively with BT on matters essential to MBNL's proper functioning. As the CMA acknowledged, at paragraph 490 of the Phase 1 Decision, the Merged Entity will be well-placed to benefit from a less effective MBNL, leading to a degraded BT mobile offer:

*“A degradation in the quality of BTEE's network, resulting from disruption to the effective functioning of the MBNL network sharing arrangement, could therefore lead to a reduction in the competitive constraint exerted by BTEE and a proportion of BTEE's customers switching to the Merged Entity, particularly if the Merged Entity's network was of significantly higher quality. The Merged Entity may recapture more customers because of its greater retail presence.”*

- 1.20. In response to the Phase 1 ITC, BT has provided the CMA with examples of how this MBNL Frustration Concern changed incentives could play out in practice, and how it would impact network quality and costs to the detriment of consumers. This analysis demonstrates that these scenarios could result in total network capacity shortfall of up to [X]% compared with BT's pre-Merger forecast position, and generate additional costs with a net present value (NPV) of £[X] - at least part of which would ultimately have to be borne by consumers through further reduced network quality and/or higher prices.<sup>9</sup>
- 1.21. In this context, BT notes that the Merging Parties have stated (both to the CMA and in public announcements) that network quality will be improved for their customers following the Merger as more spectrum is deployed on their combined network than is the case today. By contrast, however, the CMA's Phase 1 investigation concluded that “...while any one-off increase in capacity from the Merger may enable the Merged Entity to improve its offering (eg by increasing quality), this also needs to be set against the effect of the loss of competition, set out in the CMA's competitive assessment above, which may enable the Merged Entity to increase its prices, therefore having the opposite effect to that claimed by the Parties.” [CMA Phase 1 Decision, at paragraph 829]. BT agrees with this assessment. Importantly, for the reasons set out in detail in this response, the Merger will result in lower levels of investment and competition – and therefore poorer levels of network quality for UK mobile customers - than would have been the case in the counterfactual even if some customers of the Merged Entity may get access to (e.g.) faster download speeds in absolute terms than is the case today.
- 1.22. While it is possible that BT would be able to take actions to partially mitigate these impacts, as the CMA found in its Phase 1 investigation the extent to which it could do so is highly uncertain, and such actions would be costly and time-consuming.<sup>10</sup> Even with these partial

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<sup>9</sup> Annexes 1 and 2, Phase 1 ITC response.

<sup>10</sup> Phase 1 Decision, paragraph 503.

mitigations, harm would in any event be expected to remain very substantial. Consistent with the CMA's conclusions at Phase 1, BT expects that its future competitiveness will be reduced relative to the counterfactual as a result of this MBNL Frustration Concern, and agrees with the CMA that *"in the context of a concentrated post-Merger market structure with only three MNOs able to fully compete on network quality, the significance of this reduction in competitiveness is heightened..."*.<sup>11</sup>

1.23. These are again important concerns which BT respectfully submits should be considered carefully by the CMA in its Phase 2 assessment.

#### **Additional evidence provided with this response**

1.24. Further detail and evidence regarding each of the three separate concerns outlined above is set out in the remainder of this response. This should be read in conjunction with information already provided by BT to the CMA.<sup>12</sup>

- **Section 2** provides further detail and evidence in relation to the Asymmetry Concern. In particular, it sets out the Merged Entity's disproportionately large share of capacity and specific key spectrum bands, and consequential adverse effects on investment incentives and consumer outcomes.
- **Section 3** provides further detail and evidence as to the MBNL CSI Concern and (separately) the MBNL Frustration Concern. In particular, it sets out the Merger's adverse impact on BT's ability to compete by virtue of the Merged Entity's participation in MBNL (due to both access to CSI of, and misaligned incentives with, BT).

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<sup>11</sup> Phase 1 Decision, paragraph 504.

<sup>12</sup> Preliminary & P1 ITC responses (1.11.23, 9.2.24); calls (5.10.23, 11.10.23, 23.10.23, 11.1.24); RF11 (24.11.23; 22.2.24); RF12 (22.12.23); RF13 (19.1.24; 1&7.2.24); RF14 (31.1.24); Competitor questionnaire (26.1.24; 2.2.24); RF11 P2 (22&23.4.24, 29.4.24); s.109 response (26.4.24, 8&9.5.24); RF12 P2 (to be submitted 17.5.24).

## Section 2: BT's concerns around the Merged Entity's disproportionately large share of capacity

2.1. BT has previously set out how the Merger's impact on capacity will harm competition, including in Annex 3 of the Phase 1 ITC response. This Section 2 should be read in conjunction with BT's previous submissions.

### **We see two additional competition concerns to those identified by the CMA, related to overall capacity asymmetry and limited competition in services requiring low-band spectrum**

2.2. The Issues Statement notes that the CMA's Phase 1 review found the Merger "may lead to higher retail mobile prices for consumers and businesses, and MNOs investing less in network quality",<sup>13</sup> and that the "Merged Entity may have incentives to raise prices or degrade non-price aspects of its offerings (including by reducing network investment)".<sup>14</sup> In this context, BT notes and agrees with the concerns identified by the CMA as to "the impact of the Merged Entity's participation in both network sharing arrangements on MNOs' collective incentives to invest and compete".<sup>15</sup> BT's views in relation to this concern are set out in more detail at Section 3 below.

2.3. However, BT also believes the Merger is likely to have direct and material adverse impacts on:

- a. MNOs' collective incentives to invest as a result of the unprecedented levels of spectrum and capacity asymmetry that it will bring about (defined in this submission as the Asymmetry Concern).
- b. Consumer outcomes and quality as a result of ineffective competition in services supported by low-band spectrum (defined in this submission as the Low-Band Concerns).

2.4. BT notes that the CMA's Phase 1 Decision acknowledges that the Merged Entity will benefit from a significant one-off increase in spectrum and capacity as a result of the Merger. BT's own internal analysis supports this view – as illustrated below this analysis suggests the Merged Entity will hold upwards of 61% of total capacity. The Merged Entity's share of capacity in certain key spectrum bands will be even higher.

2.5. BT agrees with the CMA's Phase 1 conclusion that the likely outcome of the Merger is that, rather than being deployed for the benefit of UK consumers, the Merged Entity would be incentivised to reserve at least some significant portion of its greatly enlarged capacity.

2.6. BT agrees with the CMA that a world posited by the Merging Parties in which rivals react to the Merger by increasing investments in their own network (or reducing price) is farfetched given:

- a. The CMA's concern regarding the Merged Entity's incentives to hoard spare capacity.
- b. The associated impact that this may have on rivals – notably, dampening (rather than enhancing) incentives to invest in the UK mobile sector.
- c. Competition risks associated with the Asymmetry Concern and the important technical limitations BT faces in going beyond its existing plans to upgrade its

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<sup>13</sup> Issues Statement, paragraph 31.

<sup>14</sup> Issues Statement, paragraph 32(a).

<sup>15</sup> Issues Statement, paragraph 39.



enhanced Mobile Broadband offering, in particular 4G (and non-SA 5G) capacity in places where people live, work and travel.

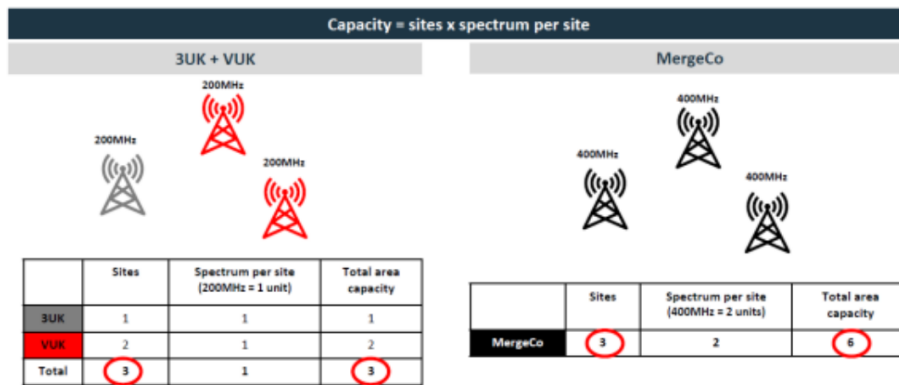
- 2.7. Given the lack of clarity in relation to the Merging Parties' plans, [8]. BT considers that concerns regarding reduced investments are real and should be considered carefully by the CMA.

## Part 1: Capacity asymmetry limits MNOs' collective incentive to invest

### The Merger will lead to major spectrum and capacity asymmetries

- 2.8. BT notes the Merging Parties have submitted to the CMA that "by combining spectrum and assets [(sites)] in a single network, the Merger would (i) deliver a large one-off multiplicative increase in network capacity."<sup>16</sup> We agree with the Merging Parties' analysis and illustrative example in Figure 2.1 below (replicated from figure 11 in the CMA's Phase 1 Decision) that finds a large multiplicative (and unprecedented) capacity increase post-Merger.

**Figure 2.1**



Source: FMN, Figure 24.8.

Source CMA Phase 1 Decision, Figure 11

- 2.9. However, BT also agrees with the findings of the CMA's Phase 1 investigation that this increase in capacity does not translate into rivalry enhancing efficiencies or consumer benefits.<sup>17</sup> Rather, BT considers that this unprecedented asymmetry in capacity will harm competition in the mobile sector to the detriment of customers.
- 2.10. Ofcom's concerns regarding asymmetries in overall spectrum are "driven by the relationship between spectrum shares and the ability to provide capacity" – Ofcom notes that its 37% of overall spectrum threshold is the level of spectrum asymmetry where "competition concerns about asymmetry in relation to capacity and average speeds may generally arise".<sup>18</sup> It also acknowledges that while MNOs can increase network capacity in different ways, alternatives to the deployment of additional spectrum (for example, network densification) generally take longer to implement and are more expensive and technically challenging. Spectrum availability is therefore a key constraint on an MNO's capacity, especially when

<sup>16</sup> Phase 1 Decision, paragraph 798.

<sup>17</sup> Phase 1 Decision, paragraph 22.

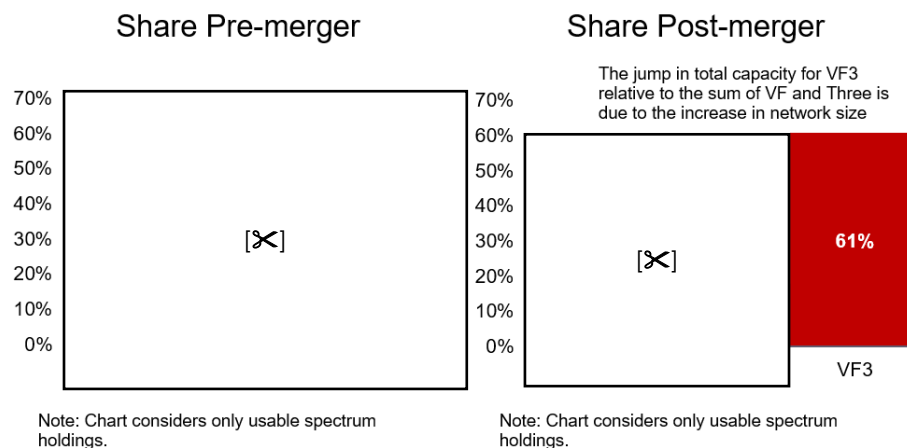
<sup>18</sup> [Statement: Award of the 700 MHz and 3.6-3.8 GHz spectrum bands \(ofcom.org.uk\)](https://www.ofcom.gov.uk/consult/condocs/statement/statement-award-of-the-700-mhz-and-3.6-3.8-ghz-spectrum-bands/), paragraphs 4.103 and 4.81.

data traffic growth is significant. For this reason, if the distribution of spectrum between MNOs becomes very asymmetric, the market could develop in a way that reduces competition.<sup>19</sup> For Ofcom, network capacity is the competition issue, and spectrum the lever to regulate it.

2.11. BT has undertaken its own analysis of the likely spectrum and capacity asymmetries that will arise as a result of the Merger. The results are presented below. In particular, Figure 2.2 shows that:

- Currently, there is a modest asymmetry in spectrum, with BT holding 32% of overall spectrum and other MNOs holding between 22% and 24% each. However, there is a much smaller difference in overall capacity (spectrum and sites) between competitors given their different estate of mobile sites – with the smallest capacity MNO ([X]) holding 23% of capacity and the highest capacity MNO ([Y]) holding 27%.
- The Merger will change this situation fundamentally. The Merged Entity will hold 46% of overall spectrum and, combined with its significantly increased physical sites network, around 61% of total mobile capacity, almost three times more than the next largest MNO (BT).

**Figure 2.2: Share of total downlink capacity, pre-Merger and post-Merger<sup>20</sup>**



[X]

2.12. Moreover, the Merger will lead to major asymmetries in capacity for specific spectrum bands, including 3.5 GHz and low band spectrum individually as shown in Figures 2.3 and 2.4. The Merged Entity will have:

- c.60% of mid band capacity. Mid-band spectrum includes the 3.5 GHz range<sup>21</sup>, a key spectrum band that supports massive MIMO technologies, which deliver 5G services and applications that require very high peak and average speeds. These services

<sup>19</sup> *Ibid*, paragraph 4.29 and Ofcom's Statement on the Award of the 2.3 and 3.4 GHz spectrum bands, paragraph 6.27.

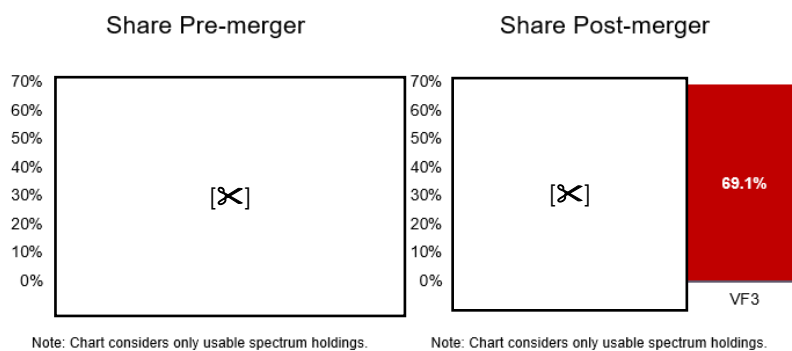
<sup>20</sup> As a simplifying assumption, this chart assumes the number of sites (Points of Presence) before the 2018 spectrum auction is the same as that in December 2023.

<sup>21</sup> Throughout this document: (i) "mid-band spectrum" refers to spectrum holdings at 1,800 MHz, 2.1 GHz, 2.3 GHz, 2.6 GHz FDD, 2.6 GHz TDD and 3.5 GHz (i.e. 1,800 MHz up to and including 3.5 GHz), and (ii) the "3.5 GHz range" and "3.4-3.8 GHz" are interchangeably terms that refer to spectrum holdings at 3.4 GHz up to and including 3.8 GHz.

include eMBB, 5G private networks for industries, augmented and virtual reality, critical medical applications. In the 3.5 GHz range specifically, the Merged Entity will have nearly 67% of overall capacity post-Merger; and

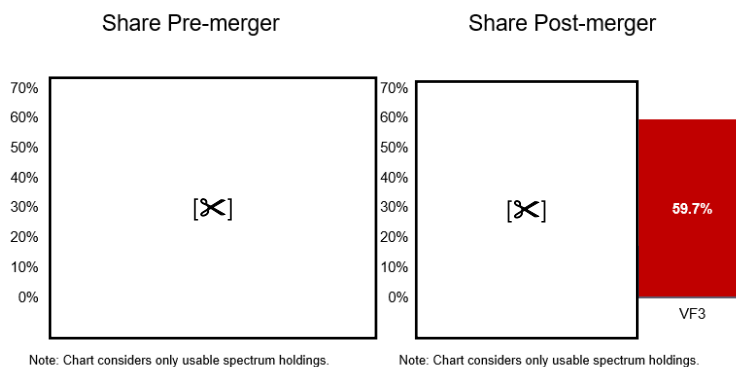
- c.70% of low band capacity<sup>22</sup>. Low band is key to existing indoor and wide area coverage in 4G and 5G and for industry verticals, road and rail coverage. It is necessary to enable connectivity deep indoors as well as seamless connectivity between the indoors and outdoors. The industry verticals low band is key to supporting for example smart cities and agricultural use cases. Annex 1 sets out further detail on these bands and mobile services.

**Figure 2.3: Share of low-band downlink capacity pre-Merger and post-Merger (including 1.4 GHz as low-band spectrum)**



Source: [Redacted]

**Figure 2.4: Share of mid-band (1800 MHz – 3.5 GHz) downlink capacity pre-Merger and post-Merger<sup>23</sup>**



<sup>22</sup> BT, like Ofcom (see paragraph 5.296 of Ofcom's 700 MHz auction consultation quoted at paragraph A1.6 of this response), believes 1.4 GHz spectrum is low-band spectrum, because it is functionally equivalent to sub-1GHz spectrum. Low band spectrum including 700 MHz, 800 MHz, 900 MHz and 1400 MHz is deployed to provide a mobile coverage service in wide (including rural) areas and (deep) indoor environments and they have similar power requirements to propagate over longer distances and through buildings. If, as BT believes is correct, the 1.4 GHz band is considered low-band spectrum, then the Merged Entity will have close to 70% of usable low-band capacity. If 1.4GHz is not defined as low-band, the Merged Entity's share of low-band capacity would be 54%. For the calculation of low band shares (of spectrum and capacity) BT's 20 MHz of 700 MHz SDL is excluded on the basis that there is no device ecosystem for which this spectrum is usable.

<sup>23</sup> The share of mid-band downlink capacity considers spectrum holdings at 1800 MHz, 2.1 GHz, 2.3 GHz, 2.6 GHz FDD, 2.6 GHz TDD and 3.5 GHz, resulting in VF3's 59.7% share. If only 3.5 GHz holdings are considered VF3's share of downlink capacity would be 67%.

Source: [X]

## **Ofcom and other international policymakers have acknowledged spectrum asymmetries weaken competition**

- 2.13. In past spectrum auction competition assessments, Ofcom has identified excessive spectrum asymmetry as a specific competition risk. For instance, Ofcom states: “We consider that using additional spectrum is an important way of adding capacity, and have assessed that, if the distribution of spectrum between MNOs becomes very asymmetric, the market could develop in a way that reduces competition for some services or customers (even if there remain four credible MNOs). And because competition is influenced by a relative comparison of one MNO to its rivals, it is appropriate to consider the share of total mobile spectrum to which an MNO has access (rather than just the absolute amount of spectrum).”<sup>24</sup>
- 2.14. In its 2017 Statement on the Award of the 2.3 and 3.4 GHz spectrum bands<sup>25</sup>, and its 2020 Statement on the Award of the 700 MHz and 3.6-3.8 GHz spectrum bands<sup>26</sup>, Ofcom imposed spectrum caps as a result of its competition assessments. In setting this policy, Ofcom was concerned competition may be weakened absent such intervention, due to significant spectrum asymmetries. In particular, Ofcom expressed concerns relating to excessive or highly asymmetric spectrum shares giving an MNO the ability to act strategically, for instance:
- An MNO with a high spectrum share may be able to credibly threaten rivals with aggressive price cuts, if they attempted to compete more effectively by offering lower prices or making investments. The threat of such a response from the spectrum-advantaged MNO could soften competition by deterring its rivals from seeking to compete more aggressively in the first place.<sup>27</sup>
  - An MNO with a high relative share of spectrum could launch new services ahead of its rivals whilst leaving its other services unaffected. Its rivals on the other hand may be forced to re-purpose existing deployments, potentially reducing legacy services. While customers may initially benefit from the availability of new services, competition could suffer in the long term.
  - Ofcom considered that a spectrum asymmetry resulting from the player with the largest share of spectrum (then BT) acquiring significant spectrum at the auction would have led to a trade-off between the weakening of competition from such an asymmetry, and benefits to consumers from the largest spectrum holder’s use of the spectrum. In such a trade-off, Ofcom found it unlikely that the largest spectrum holder would have used the relevant spectrum in a way that is more attractive to consumers, compared to how the spectrum would have been used by MNOs with smaller spectrum shares.<sup>28</sup>
  - An MNO with a very high share of spectrum could engage in spectrum hoarding, making little use of newly acquired spectrum, whereas other MNOs with smaller shares

<sup>24</sup> Ofcom’s Statement on the Award of the 2.3 and 3.4 GHz spectrum band, paragraph 6.27.

<sup>25</sup> [https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0022/103819/Statement-Award-of-the-2.3-and-3.4-GHz-spectrum-bands-Competition-issues-and-auction-regulations.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0022/103819/Statement-Award-of-the-2.3-and-3.4-GHz-spectrum-bands-Competition-issues-and-auction-regulations.pdf).

<sup>26</sup> See Ofcom’s Statement on the Award of the 700 MHz and 3.6-3.8 GHz spectrum bands, available at

[https://www.ofcom.org.uk/\\_data/assets/pdf\\_file/0020/192413/statement-award-700mhz-3.6-3.8ghz-spectrum.pdf](https://www.ofcom.org.uk/_data/assets/pdf_file/0020/192413/statement-award-700mhz-3.6-3.8ghz-spectrum.pdf)

<sup>27</sup> Ofcom’s Statement on the Award of the 2.3 and 3.4 GHz spectrum band, paragraph 6.34.

<sup>28</sup> *Ibid*, paragraph 6.61

of spectrum may have incentives to use it more productively (and compete more effectively as a result).<sup>29</sup>

2.15. Ofcom also noted that MNOs with a smaller spectrum holding may not be able to compete effectively with the spectrum-advantaged MNO:

- Ofcom noted that “as mobile data use continues to grow and MNOs need to continue to add capacity to be able to compete strongly”, MNOs with smaller shares of useable spectrum would be unable to deploy additional capacity as cost-effectively as the operator with the highest share, given that they may need to make costly investments to expand sites in order to increase capacity (while the spectrum-advantaged MNO could expand capacity more easily and cheaply, by deploying additional spectrum).<sup>30</sup>
- Ofcom noted that there was a risk that MNOs with smaller spectrum shares could face difficulties in deploying sufficient capacity to provide average speeds that would allow them to compete effectively. MNOs with relatively small spectrum shares could end up competing less strongly as a result, especially for specific customer segments where they have a disadvantage due to lower capacity available to them, e.g. customers who value consistently high data speeds, which could result in increased prices for consumers in those segments.<sup>31</sup>

2.16. Both BT and Three appealed Ofcom’s decision on spectrum caps and asymmetries. The High Court found in favour of Ofcom, and in its 2018 decision noted the potential effect of surplus capacity on competition, concluding that “the bottom line is that if BT/EE were to hold surplus capacity this would facilitate it in pursuing anticompetitive behaviour, should it decide to do so.”<sup>32</sup>

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<sup>29</sup> *Ibid.*, paragraph 6.38

<sup>30</sup> *Ibid.*, paragraph 6.57.

<sup>31</sup> [Award of the 2.3 and 3.4 GHz spectrum bands \(ofcom.org.uk\)](https://www.ofcom.gov.uk/consult/condocs/2017/20170426/201704260300.pdf), paragraph 4.76

<sup>32</sup> Case No: CO/4042/2017 and CO/4260/2017, [Hutchison 3G UK -v- OFCOM \(judiciary.uk\)](https://www.judiciary.uk/cases/appellate/civil/civil-appeals/communications/Hutchison-3G-UK-v-Ofcom/), paragraphs 179-180.

### **Box 2.1: International experience: caps applied to limit harm from highly asymmetric spectrum and capacity shares**

In addition to the UK's experience of spectrum and competition authorities imposing spectrum caps, excessive spectrum asymmetry is considered to be a competition risk in comparable countries including across Europe.

In some European countries (e.g. Italy, Portugal), spectrum cap rules are applied at auction whereas others define long-term rules (Belgium, France, The Netherlands and Spain). Regardless of the specific approach, a common concern relates to excessive spectrum and capacity asymmetry as a competition risk in relation to:

- overall spectrum
- functionally equivalent bands (e.g. low band and mid band)
- individual bands (including 3.4 - 3.8 GHz)

These concerns extend to relative spectrum holdings between the largest MNO and smaller MNOs and the need for caps to limit harm to competition (fairness) and innovation - considerations relevant to Ofcom's own assessments concerning acceptable ranges in relative shares (compared to the largest MNO). For example:

- In **The Netherlands**, the regulator ACM stated: "A necessary precondition for effective competition is for each of the three current providers that have their own mobile networks to acquire the frequencies they need in order to continue competing effectively. That is why we recommend making sure that a frequency allocation that is **too unfair** will not be able to occur" (9 April 2019).
- In **Spain**, the Ministry of Economic Affairs and Digital Transformation stated: "The new limits on the maximum allowed spectrum (spectrum caps) per operator contribute to the strength and sustainability of a key sector for **driving innovation** and promoting the inclusive digitalisation of society and companies, as well as for accelerating ecological transition and strengthening industrial ecosystems and the competitiveness and strategic autonomy of Europe and Spain" (21 March 2023)

BT has not undertaken a detailed assessment of the rationale for caps observed across Europe. However, BT considers concerns in relation to relative holdings (similar to concerns expressed by Ofcom in the recent 2018 and 2021 auctions) are likely to be relevant to setting caps.

Source: Cullen International, *Spectrum Caps Report 2024, Europe Spectrum database (May 2024)* (subscription service).<sup>33</sup>

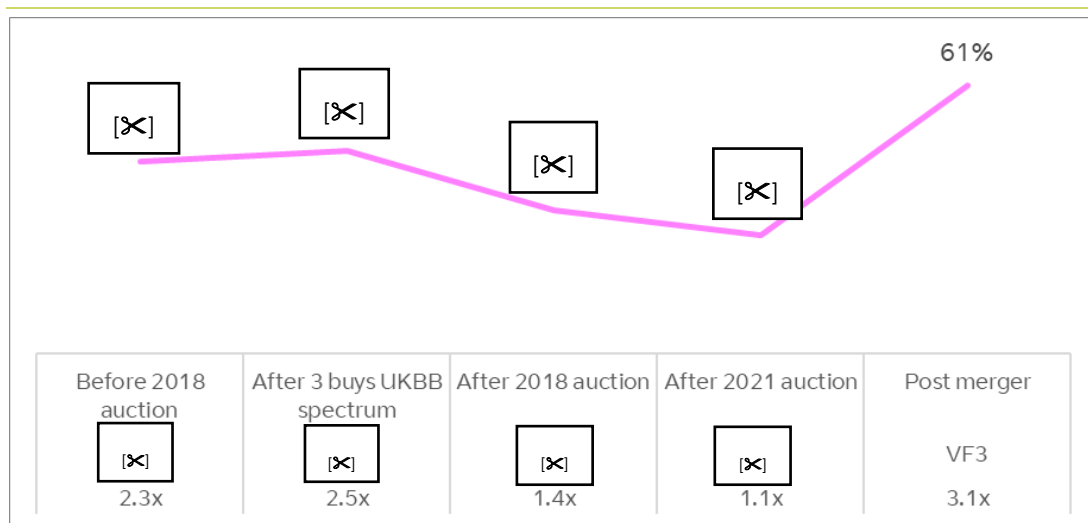
### **This Merger would result in materially more asymmetry than Ofcom has previously considered acceptable**

2.17. While spectrum asymmetry is important, it is only one of three key inputs to network capacity, alongside sites and technology. The concerns raised by the Merger, however, are significantly greater than those resulting from a spectrum asymmetry alone, because the Merger would create asymmetry in two of these three key inputs, spectrum and sites.

<sup>33</sup> [Spectrum Database \[cullen-international.com\]](https://www.cullen-international.com)

2.18. Today, all MNOs have a broadly similar number of cell sites available to them, which when taken together with each MNO's spectrum holdings and other assets (including IT), result in only a small difference in capacity between the largest and smallest MNO (around 4 p.p., 27% being the highest and 23% the lowest, as shown above). This limited difference in overall capacity has prevailed despite a degree of asymmetry in spectrum shares. The degree of capacity asymmetry has been reducing over time (Figure 2.5) as a direct result of Ofcom's competition assessments and policy interventions, and subsequent commercial decisions on spectrum auctions by the MNOs.

**Figure 2.5: Largest share of downlink capacity provider over time (line) and multiple over the average capacity holding of rival MNOs<sup>34 35</sup>**



Source: [X]

2.19. Post-Merger, the Merged Entity would increase its physical infrastructure by one fifth<sup>36</sup> and its overall spectrum share to 46%.<sup>37</sup> As a result, the Merged Entity will have around 61% of total mobile capacity.<sup>38</sup>

2.20. In assessing spectrum asymmetries, Ofcom considered that a market leader with twice as much as the average of its rivals would result in detrimental effects on competition (Ofcom, 2020).<sup>39</sup> By contrast, this Merger, if allowed to go ahead in its proposed form, will result in the Merged Entity having almost three times the capacity of the next largest rival (BT).

<sup>34</sup> For simplicity, this chart assumes that after the acquisition of UKBB all of Three's 124 MHz spectrum holdings at 3.5 GHz would have been usable for mobile services, but we understand that potentially only 120 MHz would have been usable in practice.

<sup>35</sup> Between the penultimate data point (After 2021 auction) and final data point (Post-merger) EE sold 15 MHz of 2.6 GHz TDD to VMO2. While these were captured as 15 MHz owned by EE in the penultimate data point, they are captured as 20 MHz owned by VMO2 in the final data point given that the 5 MHz that previously had to be used as a guard band became usable to VMO2.

<sup>36</sup> Parliamentary Select Committee on VF/3 17 October 2023. The Merged Entity will have a deduplicated network with 26,000 sites (vs current individual MNOs 18-20,000 sites).

<sup>37</sup> As set out in BT preliminary and P1 ITC responses BT estimates the Merged Entity will have 46% share of total available spectrum based on all immediately and future usable mobile spectrum. This includes all mobile spectrum bands i.e. from 700MHz to 3.6GHz, both uplink and downlink frequencies. Conservatively, we include BT's 20MHz of 700MHz SDL, which is not usable at the moment because there is no supporting device or equipment ecosystem, but we expect will become usable in 3-5 years' time. We exclude the 1.9GHz TDD as well as the low power portion of the 2.6GHz unpaired band as they cannot be used at full/standard power (and hence are less useful for reaching customers).

<sup>38</sup> [X]

<sup>39</sup> "In a four-player market... the MNO with 40% of overall spectrum therefore has twice as much as the average of its rivals. We consider... detrimental effects on competition outlined above may arise at this level of asymmetry". See Ofcom's Statement on the Award of the 700 MHz and 3.6-3.8 GHz spectrum bands, available at [https://www.ofcom.org.uk/data/assets/pdf\\_file/0020/192413/statement-award-700mhz-3.6-3.8ghz-spectrum.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0020/192413/statement-award-700mhz-3.6-3.8ghz-spectrum.pdf), paragraph 4.76.

- 2.21. The types of competition concerns set out by Ofcom and the High Court in relation to spectrum asymmetry, as detailed above, are therefore also raised by the Merger in relation to capacity asymmetry, and spare capacity, and to a much more significant extent. BT considers it important that the CMA investigates them in the context of its assessment of the Merger impact on markets as they are today and on a forward-looking basis.
- 2.22. The negative effects on competition are particularly concerning because they would likely persist for a long period of time (absent intervention by the CMA). In its previous spectrum cap policy decisions, Ofcom noted that asymmetries persisting into the longer term were more concerning than short-term asymmetries, as it currently does not have “any firm plans to award further low frequency or mid frequency spectrum” in the medium term.<sup>40</sup> The same remains true today - Ofcom currently has no plans for future spectrum auctions in comparable bands (i.e., low or mid-band).<sup>41</sup> As such, the Merger threatens a capacity asymmetry which is not only larger than the capacity asymmetry Ofcom considered acceptable in the context of the 2018 auction, but also longer-lasting, thereby raising much more significant competition concerns.
- 2.23. BT respectfully submits that the CMA should consider the above concerns carefully as part of its Phase 2 investigation.

#### **Capacity asymmetry post-Merger risks stifling investment by BT and others**

- 2.24. BT's primary concern is that significant capacity asymmetry changes the business case for investments. BT notes that the CMA has provisionally concluded that the Merged Entity will not deploy its capacity to the benefit of consumers but instead is likely to “hoard” that capacity. In such a world BT and VM02 would be faced with a rival that could quickly react to any attempt to make sunk long-term investments to improve their network quality by deploying its own capacity.
- 2.25. The costs associated with making that capacity available to customers will be significantly lower for the Merged Entity than for its rivals and it will be able to do so more rapidly. For example, this is will be the case where:
- a. The Merged Entity can deploy existing (spare) spectrum on sites more rapidly than its competitors where they need to invest in new sites.<sup>42</sup> By comparison for BT, the cost of deploying a new macro cell site is estimated at £[X], and would take around [X] months, while existing site upgrades for deploying low band spectrum cost between £[X] and £[X] for a typical macro-site.
  - b. The Merged Entity would be able to, for example for technology deployed in the 3.5 GHz range, turn on its combined capacity at existing sites remotely in a very short space of time (potentially overnight). This is because the majority of 3 GHz equipment deployed today can support up to 200 MHz of spectrum capacity. This would compare to the situation of its rivals who would need to deploy massive MiMO antennae on existing sites (typically more complex and expensive than macro-site upgrade for low band spectrum deployments referred to in the paragraph above).

<sup>40</sup> *Ibid*, paragraph 4.33.

<sup>41</sup> The U1.4 GHz auction planned for 2025 will only make available 25 MHz and therefore will not have a significant impact on overall spectrum holdings. We have excluded the upcoming mmWave auction as these bands have significantly different propagation characteristics i.e. very high capacity over short distances. The mmWave band will not be awarded as national licences (unlike sub mmWave bands).

<sup>42</sup> This also reinforces BT's MBNL concerns because MNBL harms would scupper BTs ability to upgrade existing sites, with the only option outside MBNL being the build of new sites.



- 2.26. Today, BT and VM02 may have a reasonable expectation of capturing significant numbers of customers by investing to improve their network quality. However, after the Merger the prospects of such gains are far less likely. Even assuming the Merged Entity will not have a 'foot in both [network sharing] camps', it will be able to deploy its capacity at significantly lower cost and more rapidly relative to its remaining rivals. The effect is that the business case for such investments becomes significantly worse.<sup>43</sup>
- 2.27. An example of how the Merged Entity could act strategically to deter investment by its rivals is set out in Box 2.2 below.

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<sup>43</sup> BT further notes that the incentives for the Merging Parties to invest would also be curtailed post-Merger in this scenario. The CMA has provisionally concluded that the Merged Entity is unlikely to incur the costs associated with deploying its spectrum productively following the Merger. Its incentives to do so are even weaker in the event that it faces a reduced threat of investment from rivals post-Merger. The risk is that this further strengthens the incentive of the Merged Entity to sit on spare capacity as a strategic threat to rivals, rather than using it to drive its network quality up in the absence of investment from rivals. See e.g. Phase 1 Decision, paragraphs 15(a)(iii), 343, 445.

## Box 2.2: BT's specific concerns regarding mid band spectrum

BT is concerned that the Merged Entity will have an incentive to strategically withhold mid-band capacity to deter competitors from investing to improve high (peak) speeds and capacity. This concerns both network assets (massive MIMO) and IT (network slicing). Strategically holding back capacity will enable the Merged Entity to wield a credible threat to quickly and relatively costless 'switch on' mid-band capacity in response to rivals' attempts to invest.

**Annex 1** (section headed "3.4-3.8 GHz") sets out further details on how 3.4-3.8 GHz is deployed, use cases, and constraints that exist today and options to respond competitively.

When a business case is brought to the BT Investment Board for approval, it requires setting out the likely returns to investment. The net cash flow will typically be based on assumptions about cost, revenue, and anticipated market share. The latter is in particular a function of the capabilities of BT's competitors, and the timeframe in which they are able to deploy them. As regards investment timeframe and cost, upgrading sites to deploy 3.4-3.8 GHz spectrum requires significant and complex site upgrades using massive MIMO antennas. [REDACTED]

The Merged Entity will have an unprecedented c. 60% capacity share of mid band (see **Figure 2.2**) and nearly 67% of 3.5 GHz capacity. The CMA has noted these bands are critical for 5G. The Merged Entity will have limited costs of flooding the market. From day one they will benefit from the combined parties' existing and already deployed mid-band 5G capacity. Specifically this is likely to include 2 x 100 MHz holdings of 3.4-3.8 GHz which requires remote configuration only to deploy capacity for end users, with no new radio equipment or site visit needed. These newer radios will support 2 x 100 MHz carriers (likely to be the majority of the radios in the Vodafone and Three networks because of the swap of the older Huawei equipment).

The ability of the Merged Entity to hoard capacity and then to deploy it quickly and at low cost will tend to (i) limit the possibility of any first mover advantage by BT (thus limiting take-up), and (ii) increase the risk that rivals will, mid-way through BT's investment phase, move to release incremental capacity to the market, neutralising BT's returns. Market uncertainty is routinely considered in business cases of this sort. If the above is true also for other rivals of the Merging Parties, they also will be equally deterred.

If the above market dynamics were to play out in this way, the Merged Entity will have a lesser, not stronger incentive to invest in such new use cases post-Merger. Examples of relevant 5G use cases include:

[REDACTED]

**eMBB (Urban / Dense Urban areas):** Mid-band spectrum is also required to support very high data rates or traffic densities by the 5G system. Key scenarios address different service areas: urban and rural areas, office and home, and special deployments (e.g. massive gatherings, broadcast, residential, and high-speed vehicles).

## How would BT respond to this new competitive dynamic?

2.28. BT has delivered significant investments in its network and, absent the Merger, plans for this to continue, notwithstanding significant challenges on expected financial returns to investment in its mobile network.

- For example, in 2018 the BT Investment Board approved a £[REDACTED].<sup>44</sup>

<sup>44</sup> See BT's response to RF12 P2 Q8.

- MTP2023 projected £[X].<sup>45</sup>

- 2.29. In a world where the Merged Entity sits on a large block of undeployed capacity, BT's prospects of achieving commercial success from significant investment in its network will be greatly reduced as compared to the counterfactual. This is because the Merged Entity could simply release large amounts of spectrum at low cost and in a short space of time (compared to rivals as a competitive response to defeat any commercial advantage that BT rivals would have had a realistic prospect to gain from that investment pre-Merger. This, in turn, reduces the expected return from that possible investment. In effect, the Merger replaces the uncertainty over competitive outcomes, which gives every market participant the chance to gain a first mover advantage in key competitive dimensions with much greater certainty: post-Merger, the prospect of achieving competitive differentiation through incremental investment as a reward for a risky investment will be greatly diminished. The implication is that BT is less likely to justify a business case for such investments going forward.
- 2.30. [X]
- 2.31. [X]<sup>46</sup>
- 2.32. [X]
- 2.33. Should the Merger go ahead in its proposed form, for the reasons set out above the resulting unprecedented capacity asymmetry is likely to worsen the expected risk adjusted financial profile of BT's mobile network investments [X]. Moreover, this impact will be compounded by the adverse effects arising from the MBNL Frustration Concern and the MBNL CSI Concern (both discussed in more detail below).
- 2.34. As it is not yet known what the Merging Parties intend to do, [X].
- 2.35. BT respectfully submits that the Asymmetry Concerns should form a core element of the CMA's Phase 2 review.

## PART 2: Limited competition in low-band services

- 2.36. BT understands that the Merging Parties have indicated that they will continue to be effectively constrained by rivals across the full suite of services that they offer and that, following the Merger, customers will benefit from increased capacity, improved services and greater innovation. BT considers that there are important facts that the CMA should take into account during its Phase 2 investigation which are relevant to its assessment of these questions.

### **Ofcom has previously identified capacity constraints or shortfalls as a potential source of competition concerns**

- 2.37. As set out above, Ofcom has previously noted the risk that MNOs with smaller spectrum shares could face difficulties in deploying sufficient capacity to provide average speeds that would allow them to compete effectively. MNOs with relatively small spectrum shares could end up competing less strongly as a result, especially for specific customer segments

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<sup>45</sup> See BT's response, dated 25 January 2024, to the CMA competitor questionnaire.

<sup>46</sup> [X] see also BT's response to RF12 P2 Q8.

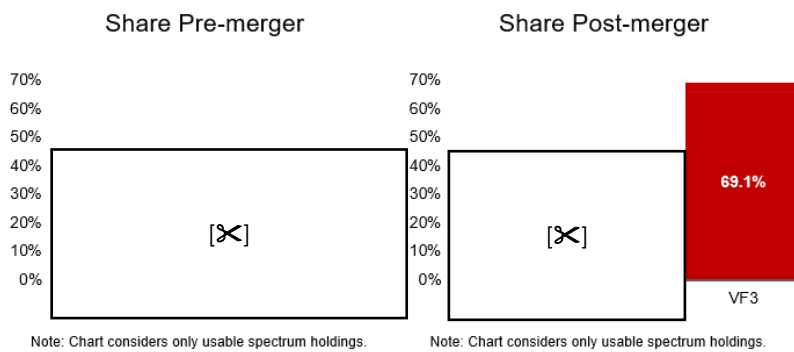
where they have a relative disadvantage due to lower capacity available to them, e.g. customers who value consistently high data speeds, which could result in increased prices for consumers in those segments.<sup>47</sup>

- 2.38. Concerns regarding a smaller MNO's ability to compete for new services were relevant in the Orange T-Mobile 2010 merger where the EC was concerned the new entity would be the only MNO in the UK able to offer Long Term Evolution (LTE) technology (i.e. 4G) at the best possible speeds within the medium term. The EC accepted remedies to divest a quarter of the combined LTE spectrum (2 x 15 MHz) at the 1800 MHz level.<sup>48</sup>
- 2.39. Furthermore, in the 2013 spectrum auction, Ofcom was sufficiently concerned by the risk of a player with insufficient spectrum (at that point Three with 13% share of spectrum) not being able to effectively compete with rivals with more spectrum (and hence capacity).

**[X] low band capacity [X]**

2.40. [X].<sup>49</sup>

**Figure 2.6: Share of low-band downlink capacity pre-Merger and post-Merger (including 1.4 GHz as low-band spectrum)**



Source: [X]

2.41. [X].

**[X]**

2.42. [X] Low-band spectrum suffers from capacity issues (notwithstanding the potential availability of other spectrum bands) because it uniquely serves customers where other bands cannot reach. Between [X]% (depending on whether sites are located in urban or rural areas) of mobile data traffic is carried uniquely by low-band spectrum; when that capacity is exhausted it is typically either impractical and/or prohibitively expensive to attempt to upgrade capacity to serve the same customer use cases with mid or high band spectrum. [X] (see Annex 1 section headed "low band" including Figure A1.2). It is for this very reason that low-band spectrum is priced higher in competitive spectrum auctions.

2.43. **In-building solutions or densification (more sites) for more urban areas are problematic:** Low band spectrum is used to provide indoor coverage in urban areas. Were that low band spectrum to become constrained for any given MNO, to continue to provide in-building

<sup>47</sup> Award of the 2.3 and 3.4 GHz spectrum bands (ofcom.org.uk), paragraph 4.76.

<sup>48</sup> M.5650 - T-MOBILE / ORANGE (europa.eu) (2010).

<sup>49</sup> Based on 1.4GHz being defined as low band spectrum, as per Ofcom's public position – see Annex 1 paragraph A1.6.

coverage that MNO would need to consider either in-building technical alternatives to low-band spectrum or otherwise attempt to densify its low band network in that area. However, both alternatives are problematic. In particular, those solutions are significantly more expensive to provide equivalent coverage compared to using low band spectrum as part of a network with typical densification levels. [X] Moreover, landlords may well refuse to grant the access needed to deploy them. As for building additional macro sites, this would lead to technical interference limiting its use to improve customer experience. As a result, [X].

- 2.44. Finally, a [X] low band frequency sector will be delivering service uniquely to many buildings, for instance, in the basement of the first building, the lift in the next and the lobby of a building further away. It is not commercially viable in these cases to install in-building solutions in all these buildings and in many, even if it were, the landlord may not grant access. Densifying the network to make up for a shortage of low-band spectrum is particularly difficult when it comes to rural and indoor locations. Building new sites or adding further low-band spectrum to additional existing sites increases the overlap in low-band spectrum outdoors and to a lesser extent indoor. This, in turn, increases same band interference which reduces signal quality (SINR Signal-to-Interference-plus-Noise Ratio), consequently reducing the available capacity in that frequency. Overall, [X].
- 2.45. **Densification in rural areas face difficult economics given customer densities:** In rural areas, where interference is less of an issue, it may be easier from a technical perspective to densify and maintain signal quality. However, on top of planning constraints and commercial considerations (i.e. the high costs and long lead times associated with new macro sites), densifying low-band spectrum with new sites does not have a viable business case in rural areas. This is because of the small number of customers served in the footprint: there will be no return on investment for adding capacity through densification to a site that is already not commercially viable.
- 2.46. **Ofcom has no plans for significant further low-band spectrum release.** The most likely candidate band in future is 600Mhz spectrum, currently used for Digital Terrestrial TV. This use case is anticipated to run until at least the mid-2034<sup>50</sup>.

### **Implications for competition**

- 2.47. For the reasons set out above, [X].
- 2.48. For example, without nationwide coverage of a single low band frequency [X]. The concern in this case is that the Merged Entity will face weak competition following the Merger which will result in worse, not better, outcomes for consumers.
- 2.49. In its Phase 1 Decision, the CMA noted that, whilst any one-off increase in capacity from the Merger may enable the Merged Entity to improve its offering (e.g. by increasing quality), this needs to be set against the effect of the loss of competition, which may enable the Merged Entity to increase its prices, therefore having the opposite effect to that claimed by the Parties (para 829).
- 2.50. The concerns identified by the CMA in its Phase 1 Decision in this respect will be exacerbated [X].

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<sup>50</sup> Julia Lopez addresses the Digital Television Group summit - GOV.UK ([www.gov.uk](http://www.gov.uk))

## Section 3: BT's concerns about the Merger's adverse impact on levels of investment in mobile markets and on BT's ability to compete as a result of the Merged Entity's participation in MBNL

3.1. This Section 3 should be read in conjunction with BT's previous submissions. It expands on BT's concerns about the Merged Entity's participation in two network sharing arrangements and is organised into three parts:

- **Part 1:** MBNL is a successful network sharing arrangement that produces significant benefits to competition and consumers
- **Part 2:** Concerns about the impact of the Merged Entity's participation in the two network sharing arrangements in the UK on levels of investment because of access to CSI (defined in this submission as the MBNL CSI Concern)
- **Part 3:** Concerns about direct harm to BT's ability to compete as a result of the Merged Entity's participation in MBNL (defined in this submission as the MBNL Frustration Concern)

### Part 1: MBNL is a successful network sharing arrangement that produces significant benefits to UK competition and consumers

3.2. MBNL has been a highly successful joint venture, providing BT with a higher quality network and greater geographic coverage than it would have had without this network sharing arrangement. The network sharing arrangement has reduced costs and, at the same time, given BT the flexibility and certainty to invest and innovate. Since its creation in 2007, BT (including its predecessor companies) has been highly dependent on MBNL in delivering these results and competition has been stronger and consumers better off as a result. As acknowledged by the CMA: "Although... the scope of MBNL has narrowed over time...MBNL plays an important role in determining BTEE's overall network quality."<sup>51</sup>

### The European Commission has acknowledged the benefits of network sharing for UK consumers

3.3. As recognised by the European Commission in its 2016 decision to prohibit the proposed Hutchison 3G UK/Telefonica UK transaction:

*"In general, the Commission considers that **network sharing can have pro-competitive effects by achieving cost synergies** in the deployment and operation of mobile networks which in turn can enable MNOs to achieve **better coverage and higher network quality, promoting effective competition and thereby benefiting consumers and society as a whole.**" (paragraph 1229) (emphasis added)*

*"For all MNOs in the United Kingdom, their current network sharing agreement is the only way to benefit from sharing certain cost with a partner while deploying and maintaining a network capable to supply **high quality mobile network services to their customers**" (paragraph 1238) (emphasis added)*

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<sup>51</sup> Phase 1 Decision, paragraph 501.

- 3.4. More recently, in the European Commission's Guidelines of 1 June 2023 on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements (paragraph 60):

*"The Commission recognises that NSAs can provide benefits in terms of **cost reductions and improvements in quality and choice**. For example, reductions in the cost of rollout and maintenance may benefit consumers in the form of **lower prices or more investment** in infrastructure. Likewise, the faster roll-out of new networks and technologies, wider coverage or denser network grids can lead to **improvements in the quality of services and to a wider variety of products and services**. NSAs may also allow the emergence of competition that would not otherwise exist. The Commission has also found that NSAs enable mobile telecommunications network operators to gain access to larger, more efficient networks, without the need for consolidation through mergers." (emphasis added)*

**The European Commission's statements remain valid today, as the CMA has recognised**

- 3.5. These statements are still true today, as reflected in the CMA's own horizontal guidelines (CMA184) which included guidance substantially similar to the EU guidelines cited above, noting in particular that:

*"NSAs can provide potential benefits in terms of cost reductions and improvements in quality and choice. Cost reductions, for example related to rollout and maintenance, may benefit consumers in terms of lower prices, or more investment in infrastructure. Consumers may also benefit from better quality of services or a wider variety of products and services, which can stem, for example, from faster roll-out of new networks and technologies, wider coverage or denser network grids. Mobile infrastructure sharing may also allow the emergence of competition that would not otherwise exist. Mobile telecommunications network operators can benefit from large efficient networks by entering into NSAs without the need for consolidation through mergers..." (paragraph 5.141) (emphasis supplied)*

- 3.6. It is BT's view that, absent the Merger, consumers would have continued to benefit from the MBNL JV to the extent that cost savings would have continued to be achieved and passed on to consumers in the form of better coverage and higher network quality.
- 3.7. In addition, [X].
- 3.8. BT provides below examples of consumer benefits from network sharing. BT considers that those benefits would not have materialised (at all or to the same extent) without a well-functioning MBNL network sharing arrangement.

**The MBNL network sharing arrangement has given rise to improvements in network quality and capacity**

- 3.9. MBNL has enabled BT and Three to deploy 3G, 4G and 5G infrastructure across the UK as well as delivering essential shared estate maintenance and improvement which has improved the longevity of the sites and futureproofed them for new technology developments. [X].

- 3.10. As acknowledged by the CMA, network quality is a key dimension of competition between MNOs and is of fundamental importance to consumers.<sup>52</sup>
- 3.11. Material impediments to an MNO's ability to improve and update its network, thus maintaining and improving its network quality are, as the Phase 1 Decision acknowledges, likely to have a significant adverse impact on MNO competitiveness and consumer welfare.
- 3.12. The shared network remains central to BT's plans in this area. As set out in BT's response to RFI2 Phase 2, BT has an average [X] month rolling demand on c. [X] shared sites at present and [X].
- 3.13. For the reasons set out in **Part 2** of this Section, the Merger is likely to reduce levels of investment by MNOs and for the reasons set out in **Part 3**, the Merger is also likely to reduce the ability of BT to compete with the Merged Entity. BT expects that the cumulative effect of these changes will be that the consumer benefits that the MBNL network sharing arrangement currently delivers will be unlikely to continue to materialise post-Merger.

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<sup>52</sup> Phase 1 Decision, paragraph 490.



## Part 2: Concerns about the impact of the Merged Entity's participation in the two network sharing arrangements in the UK on levels of investment (the MBNL CSI Concern)

- 3.14. BT agrees with the CMA's Phase 1 conclusion that the Merged Entity's participation in MBNL will likely result in lower levels of investment. As noted at paragraph 41 of the Issues Statement, in its Phase 1 Decision, the CMA found that *"the Merger gives rise to a realistic prospect of an SLC as a result of anti-competitive effects in the supply of retail mobile telecommunications services to end consumers and wholesale mobile services in the UK arising from the sharing of commercially sensitive information through the Merged Entity's participation in both network sharing arrangements."*
- 3.15. At paragraph 42 of the Issues Statement, the CMA notes the issues that it will consider in its Phase 2 assessment when investigating this theory of harm. The rest of this section takes each of these issues in turn.

### **Extent of information that would be shared with, and how it is or could be used by, the Merged Entity to inform investment decisions**

- 3.16. BT agrees with the CMA's conclusion in its Phase 1 Decision that the Merged Entity's position in both network sharing arrangements may afford it significant visibility as to the network upgrades and/or launch of new technologies planned by BT and VMO2.<sup>53</sup>
- 3.17. As BT has previously noted to the CMA, the information shared via MBNL could potentially, on its own or in combination with other information, amount to commercially sensitive information which could be relied upon by the Merged Entity in making its commercial decisions.
- 3.18. As will be further set out in BT's response to Phase 2 RFI 2 (Q9 and 11), one example of how information could be used is via [X]. However, if the Merged Entity was so incentivised, it could use these outputs in combination with other data available to develop a view of BT's plans.

### **Extent of safeguards in place which limit information sharing via network sharing arrangements may mitigate any concerns**

- 3.19. BT agrees with the CMA's Phase 1 Decision that, notwithstanding the information protocols that are in place, the Merged Entity may gain access to commercially sensitive information.<sup>54</sup>
- 3.20. BT has previously explained why the terms of the contracts governing MBNL are insufficient to ensure the proper functioning of the network sharing arrangement without aligned incentives (Annexes 1, 2 and 4 of BT's Phase 1 ITC response).
- 3.21. As set out in BT's response to Q9 and 11 of Phase2 RFI2, in accordance with current Information Sharing Protocols:
- [X]
  - [X]
  - [X]

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<sup>53</sup> Phase 1 Decision, paragraph 734.

<sup>54</sup> Phase 1 Decision, paragraphs 15(c) and 723.

3.22. BT's concern is that because the Merged Entity would participate in both network sharing arrangements, its priorities and incentives will change and that, in combination with the data the Merged Entity may be able to access via its participation in the CTIL network sharing arrangement, the Merged Entity will have sufficient information of both its competitors' plans to influence decisions about timing and target of its own investments.

3.23. If Three either intentionally or negligently breached the terms of the agreements, [X].

**Extent to which sharing of CSI could impact the Merged Entity's and its rival's incentives to invest**

3.24. BT agrees with the CMA's conclusions in its Phase 1 Decision that, given the three plausible (and economically rational) scenarios outlined by the CMA in that decision, the Merger will reduce MNOs' incentives to invest. BT also respectfully submits that the CMA's Phase 2 assessment should consider carefully the risk that the combination of the Merged Entity's dominant mobile network capacity holdings, along with its access to BT's CSI through participation in MBNL, will have a compound effect on those adverse incentives.

**Importance of network quality as a dimension of competition**

3.25. BT refers the CMA to its response to Question 4 of the Phase 2 RF12 (to be submitted on 17 May 2024), which provides an overview of the importance of network quality as a dimension of competition.

### Part 3: Concerns about direct harm to BT's ability to compete as a result of the Merged Entity's participation in MBNL (the MBNL Frustration Concern)

3.26. The Issues Statement makes clear that, as part of the CMA's Phase 2 investigation into the

horizontal unilateral effects arising from the Merger, the CMA will assess whether “the Merged Entity may have the ability and incentive to disrupt the effective functioning of the network sharing agreements which could have the effect of limiting the constraint exerted by BTEE and VMO2”.<sup>55</sup> BT agrees that this should be an important element in the CMA's Phase 2 assessment of horizontal unilateral effects. In this Part, BT provides more information on:

- a. the Merged Entity's ability to use its participation in MBNL to disrupt the effective functioning of the network sharing arrangement;
- b. the Merged Entity's incentives to do so; and
- c. the effect this would have on the BT's ability to compete.

#### **The Merged Entity's ability to disrupt the effective functioning of MBNL**

3.27. The CMA's Phase 1 Decision notes that the CMA does not believe that material weight should be placed on protections available to BT under MBNL contractual arrangements: “The CMA recognises that the MBNL contractual arrangements set out certain governance arrangements as well as responsibilities of the shareholders to one another and to MBNL. However, the CMA believes that, in practice, the Merged Entity's behaviour may be influenced by its incentives and the competitive conditions in the market. For the purposes of determining the Merged Entity's ability to harm the effective functioning of MBNL and thereby limit the constraint from BTEE, **the CMA does not believe that material weight should be placed on protections available to BTEE under these contracts**, in line with the approach set out in the CMA's Merger Assessment Guidelines.” (paragraph 454) (emphasis added)

3.28. The importance of an alignment of interests and mutual dependence between network sharing partners, and the insufficiency of contractual protections, had previously been acknowledged in the European Commission's prohibition decision of the proposed Three/02 merger (paragraphs 1235-1241):

“...Therefore, mutual co-dependence not only facilitates cooperation and compromise, it is a fundamental design principle of network sharing arrangements... Both current network sharing arrangements in the United Kingdom have been based upon a certain degree of alignment of interests... This alignment of interests and mutual dependence is likely to be disrupted in both network sharing arrangements following the Transaction... **contractual protections by themselves are insufficient to ensure a proper functioning of a network sharing arrangement.**” (emphasis added)

3.29. In its Phase 1 Decision, the CMA considers that there are several reasons for the insufficiency of contractual protections, and BT agrees with each of these.

3.30. As recognised in the CMA's Phase 1 Decision, the contracts may not protect against all the mechanisms through which MBNL's effective functioning may be harmed.<sup>56</sup>

<sup>55</sup> Issues Statement, paragraph 32(c)(ii).

<sup>56</sup> Phase 1 Decision, paragraph 454.

- 3.31. The contractual relationship between BT and Three in relation to MBNL and their shared network is, in part, [X]. BT notes, in particular, that:
- a. [X].
  - b. As the CMA notes in its Phase 1 Decision “*the Merged Entity could avoid any risk of contract breach while making financial savings by refusing to any future additions to MBNL funding*” (paragraph 487) and that “*Merged Entity may have an additional incentive to seek these savings, or to otherwise reduce the time or resources that it invests in MBNL, in order to redirect this time, resource and investment towards alternative post-Merger commercial priorities.*” (paragraph 488).
  - c. The CMA also identified other means by which the Merged Entity could disrupt the effective functioning of MBNL while meeting its contractual obligations (see, for example paragraph 491 of the CMA’s Phase 1 Decision, which identified a confidential example).
  - d. Even where there are contractual provisions and processes in place, some of which have been updated in more recent years, these were agreed based upon the current operators sharing and the BAU activity that would be expected from that arrangement. Had a merger and network integration programme been contemplated then those terms would not have been agreed as they would not provide the appropriate protections.
  - e. Under the MBNL agreements, [X].
- 3.32. To provide a few examples of the important role of good faith discussions in the proper functioning of MBNL:
- [X]
  - [X]
- 3.33. [X]

**Box 3.1:** [X]  
[X]

- 3.34. [X] it shows that in circumstances of divergent interests and incentives, resolving practical issues between Three and BT over the shared network are likely to be protracted to leave BT no practical means to force resolution, risking poor outcomes for BT’s customers.
- 3.35. The CMA’s Phase 1 investigation found that the MBNL agreements are complex, subject to technological change and may need to be renegotiated to accommodate for changes in the purpose and scope of the network sharing arrangement.<sup>57</sup> As the operation of a network sharing joint venture is complex and ever changing, even where process or principles are documented these can quickly become out of sync with the practical

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<sup>57</sup> Phase 1 Decision, paragraph 454.

operations, meaning they often end up not being fit for purpose and in practice exceptions and alternative arrangements are agreed. For example, [X].

3.36. [X].

3.37. The CMA's Phase 1 Decision concluded that contractual enforcement is often expensive and time-consuming and that it may not be worthwhile for BT to take on the risk of enforcing the MBNL contractual arrangements. It also noted that BT will remain reliant on Three's co-operation in MBNL through the life of the network sharing arrangement, which may act as an additional disincentive to enforce any contractual protections.<sup>58</sup> BT agrees.

3.38. If Three stopped collaborating with BT (and either proactively sought to disrupt the proper functioning of the MBNL contractual arrangements, or simply refused to engage, given its alternative in CTIL) [X]. For those reasons, that process cannot offer any meaningful disincentive to Three should it otherwise be incentivised to disengage or take an approach which would disrupt the proper functioning of MBNL and the shared network.

3.39. [X]. As the CMA will be aware, it can often be difficult to obtain interim court orders requiring parties to take particular steps (such as would inevitably be required in a dispute regarding MBNL), meaning that very little comfort can be taken from this right to go to court if Three refuses to engage with the joint venture on an urgent operational issue.

3.40. Long-running, expensive, and time-consuming litigation is then the only remedy that BT would have - but it does not offer any solution to the ongoing operational challenges facing MBNL and the Shared Network. Litigation will take at least one to two years to reach judgment, excluding the risk of appeal. However, there is no mechanism to resolve a deadlock during litigation, so there is a real risk of significant disruption and distraction in the operation of MBNL during this process and consequent risk of material detriment to the quality of network used by BT's customers.

3.41. BT also notes that specific remedies in the MBNL contractual arrangements do not de-risk frustration/harms. One of the material concerns BT has raised is [X]:

a. [X]

b. [X]

c. [X]

3.42. [X]

### **The Merged Entity's incentives to disrupt the effective functioning of MBNL**

3.43. The CMA also concluded in its Phase 1 Decision that the Merged Entity may have an incentive to use its participation in MBNL to disrupt the effective functioning of the network sharing arrangements, including because of the competitive benefits that would accrue to the Merged Entity by limiting the competitive constraint by BT (in addition to direct financial benefits from reducing funding of MBNL, and from the ability to redirect time, investment and resources towards alternative commercial priorities). BT agrees with this conclusion. In BT's view, the Merged Entity will have drastically reduced incentives compared with Three to invest in MBNL or, more generally, engage co-operatively with BT on matters essential to MBNL's proper functioning. As the CMA acknowledged, at paragraph 490 of the Phase 1

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<sup>58</sup> Phase 1 Decision, paragraph 454.

Decision, the Merged Entity will be well-placed to benefit from a less effective MBNL leading to a degraded BT mobile offer.

**The effect that the Merged Entity's disruption of the effective functioning of MBNL would have on BT's ability to compete**

- 3.44. BT has provided the CMA with evidence on the impact that the Merged Entity could have, including their impact on network quality and costs.
- 3.45. In particular, BT's response to the CMA's Phase 1 ITC set out a number of scenarios that illustrate the Merged Entity's changed incentives in relation to network sharing (compared with those of Three pre-Merger):<sup>59</sup>
- [X]
  - [X]
  - [X]
  - [X]
  - [X]
  - [X]
- 3.46. BT's response to the Phase 1 ITC provided the CMA with examples of how changed incentives could play out in practice, and how they would impact network quality and costs to the detriment of consumers. This analysis demonstrates that these scenarios could result in total network capacity shortfall of up to [X]% compared with BT's pre-Merger forecast position, and additional costs with a net present value (NPV) of £[X] - at least part of which would ultimately have to be borne by consumers through further reduced network quality and/or higher prices.<sup>60</sup>
- 3.47. BT notes that the Phase 1 Decision has reflected these concerns,<sup>61</sup> and now proceeds to provide additional evidence in relation to some of these scenarios.
- 3.48. In relation to the scenario where the Merged Entity would [X], BT notes, in addition to the information in its previous submissions, that:
- [X]BT's 1,800 MHz spectrum licence contains obligations to maintain coverage of the UK geography, UK nations and roads at certain levels. As of June 2024, BT (at [X]%) exceeds the coverage obligation of 88% of the UK geography but is below the higher obligation set for 2027 (90%) and which will be achieved via Government-funded sites.<sup>62</sup> Failure to maintain coverage, could result in fines of up to 10% of relevant (i.e. UK mobile) turnover, and/or loss of the licence.
  - BT's need to maintain coverage is more acute than the Merged Entity would have. While Vodafone and Three also have coverage obligations in their individual licences, Vodafone has announced that the Merged Entity's coverage would exceed those coverage obligations "from day one", beating immediately both the 88% obligation currently in force, and the 90% coverage obligation that comes into force in 2027. As stated by Vodafone: "... An improved network performance is expected from day

<sup>59</sup> Section 2 to Phase 1 ITC response.

<sup>60</sup> Section 3 to BT's Response to the Phase 1 ITC.

<sup>61</sup> Phase 1 Decision, paragraphs 455-465.

<sup>62</sup> See [BT's 1,800 MHz spectrum licence](#),

one. Customers will benefit from improved network speeds and reduction in network congestions. Customers of Vodafone UK and Three UK will also benefit from an increase in coverage, exceeding the Government's 2027 targets..."<sup>63</sup> Therefore, it is evident that the Merged Entity would not have the same need to maintain coverage as BT as firstly Vodafone claims the Merged Entity would immediately exceed its coverage obligations and, secondly, the Merged Entity would have a far greater pool of sites on which to draw on to replace coverage with a combined grid of around 26,000 radio sites (far denser than Three's and Vodafone's current separate grids with c. 18,500 sites each).

- As a result, [REDACTED].
- Currently, [REDACTED].

3.49. [REDACTED]:

- [REDACTED]<sup>64</sup>
- [REDACTED]
- [REDACTED]

3.50. While it is possible that BT would be able to take actions to partially mitigate these impacts, BT agrees with the CMA's conclusions in its Phase 1 decision that the extent to which it could do so is highly uncertain and, would be costly and time-consuming. As acknowledged by the CMA (Phase 1 Decision, paragraphs 503-504):

*"BTEE has some alternatives which could offset the impact of any disruption to the effective functioning of MBNL, but that these may be **costly and/or time-consuming**. For example: (a) BTEE may be able to make up for some of the shortfall in funding at its own expense (but may be limited in some key aspects by needing 3UK's approval for spend on shared assets); and (b) BTEE could build its own unilateral sites and/or deploy on existing third-party owned infrastructure (however there is a long lead time associated with acquiring, planning and building new RAN sites)." (emphasis added)*

*"Although its scope has reduced, MBNL still undertakes significant activities on behalf of its shareholders and accounts for a material proportion of BTEE's network spend. While BTEE has some alternatives to avoid the impact of the disruption to the network sharing arrangement, these may be **costly and/or time-consuming**. The effect may be a lessening of BTEE's ability to maintain/improve its network quality in the future and/or BTEE may face higher costs. This may lead to a reduction in BTEE's future competitiveness relative to the counterfactual. ...the CMA believes that quality is an important parameter of competition in the supply of retail mobile services and of wholesale mobile services, alongside other factors including price. Further, the Parties submitted that quality is a critically important parameter of competition in their claims about the efficiencies and customer benefits they submit will result from the Merger. In the context of a concentrated post-Merger market structure with only three MNOs able to fully compete on network quality, the significance of this reduction in competitiveness is heightened, particularly in light of the evidence the CMA has*

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<sup>63</sup> See Vodafone press release "[Merger of Vodafone UK and Three UK to create one of Europe's leading 5G networks](#)", dated 14 June 2023.

<sup>64</sup> [REDACTED]

*observed about the significance of BTEE's network quality to its competitive positioning."*





## Annex 1: The need for specific key spectrum bands to compete effectively for mobile services

A1.1 In this Annex we explain the importance of low band (up to and including 1,400 MHz) and 3.4-3.8 GHz spectrum bands, respectively, to compete for mobile services. We note that the CMA has also recognised the importance of different spectrum bands to compete.<sup>65</sup>

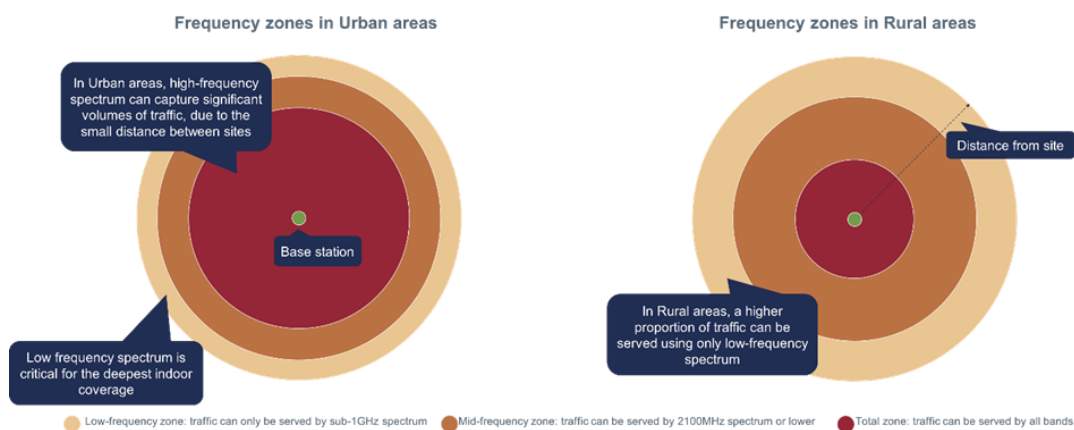
A1.2 We also illustrate why incremental spectrum in specific bands can help compensate for asymmetry in sites: expanding capacity by deploying more spectrum is more likely to be feasible technically and economically than building additional sites.

### Low band

#### Low band has unique propagation characteristics

A1.3 Low band has unique propagation characteristics that make it essential for the provision of mobile services that offer a good customer experience. In mobile networks, low band uniquely serves a proportion of customers where other frequencies do not propagate. This is because lower band frequencies can better penetrate obstacles (e.g. walls, windows, etc.) in urban areas and travel longer distances generally unimpeded by obstacles in rural areas, as illustrated by the light-coloured circumferences in Figure A1.1.

**Figure A1.1: Frequency zones in Urban areas and Rural areas**<sup>66</sup>



Source: BT Internal analysis

#### Low band frequency spectrum is needed to offer a good customer experience

A1.4 A consistent and reliable mobile service offering a good customer experience relies upon deep indoor coverage and wide and rural area coverage. [X]. Accordingly, the ability to offer coverage indoors, including in shallow and deep indoor environments, as well as on commuter corridors, is critical to ensuring a reliable and consistent mobile service.

<sup>65</sup> Phase 1 Decision, paragraph 100-103.

<sup>66</sup> Frequency zones are specific frequency bands or ranges which – according to their propagation characteristics, bandwidth availability, and specific applications – are allocated for various types of communication purposes.

A1.5 Specifically low band is essential for providing a consistent and reliable mobile service for the following key reasons:

- **Deep indoor coverage is critical to providing a good consumer experience.** Low band spectrum provides improved in-building coverage as lower frequencies are better able to penetrate obstacles, walls, windows etc. In built-up urban areas, navigating multiple obstructions is challenging, so even before getting to a particular building 1800 MHz spectrum may have been blocked by other obstacles which low band spectrum can penetrate through.
- **Gaps in indoor coverage and areas with very low indoor capacity are very acutely felt by customers.** This is because such coverage issues are not transient (like capacity during the busy hour) and therefore are felt each time a customer enter those areas. It is the repetitive nature of the customer experience that causes customer frustration – for instance a data session dropping each time a customer enters a lift or on part of a commute to work. [X]
- **A lack of capacity in low band leads to operators restricting the coverage to protect the customer experience.** [X]
- **Service continuity matters for rapidly moving customers.** Customers on the move (e.g. commuters on trains) moving between the coverage of two different base stations must complete a handover procedure to maintain the service (e.g. data session). The handover procedure requires the device to send measurements to the network and receive configuration and acknowledgement from the network. The time during which a handover can be performed is a result of the speed the user is travelling and the distance over which the device can measure the coverage of both base stations. Because the distance over which low band can be measured is greater it performs better for service continuity.

#### **1400 MHz is functionally equivalent to other low band spectrum**

A1.6 Since 2018 Ofcom has defined 1.4 GHz as low band spectrum. For instance, Ofcom states:<sup>67</sup>

*"5.296 In this award, we are awarding 700 MHz spectrum, which is better at covering large areas and penetrating into buildings than spectrum at higher frequencies. In addition to 700 MHz spectrum, we also consider 1400 MHz downlink-only spectrum along with sub-1 GHz spectrum in the pool of low frequency spectrum."*

A1.7 We agree with Ofcom that 1.4 GHz SDL spectrum is functionally equivalent to sub 1 GHz spectrum because:

A1.8 1400 MHz SDL spectrum provides downlink only and needs to be paired with other low band spectrum.

A1.9 Due to the higher power licenced for 1.4 GHz (3 dB, which in laymen's terms, means twice the power) compared to mid band, it is much better suited to be paired with low band frequencies as the coverage available due to higher power is similar to low band frequencies.

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<sup>67</sup> Consultation: Award of the 700 MHz and 3.6-3.8 GHz spectrum bands (ofcom.org.uk)

A1.10 We note the CMA's Phase 1 Decision has excluded 1.4 GHz Supplementary Down Link (SDL) spectrum from low band and, instead, included it in mid band.<sup>68</sup> BT respectfully suggests that the CMA should align its definition of low band with Ofcom's by including 1.4 GHz SDL in low band. This approach would help the CMA to better identify potential negative impacts of the Merger [X].

**Sufficient 4G spectrum in specific low bands is needed for MNOs to compete effectively in the provision of 4G mobile services**

A1.11 [X].

A1.12 [X].

A1.13 [X].

A1.14 [X]<sup>69</sup>

**Figure A1.2: [X]**

[X]

A1.15 Furthermore, BT has [X]. This is largely rural. Greater numbers of the population will be impacted than suggested by these figures [X]. Some regions have an even bigger disparity e.g. Northern Ireland – where only [X]% of the population is covered by 1800 MHz.

eMBB

A1.16 In relation to eMBB, [X]

**Table A1.1: 4G/5G NSA handsets will make up a significant proportion of all handsets up to and beyond 2029**

		Mar-21	Mar-22	Mar-23	Mar-24	Mar-25	Mar-26	Mar-27	Mar-28	Mar-29
5G SA Capable (attached to any RAN)	Total 5G Devices - 30 Day active base	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]	[X]
	Low scenario					[X]	[X]	[X]	[X]	[X]
	Base scenario					[X]	[X]	[X]	[X]	[X]
	High scenario					[X]	[X]	[X]	[X]	[X]

Source: BT Internal forecast

A1.17 This is relevant because [X], meaning that 800 MHz providing coverage for 4G/5G NSA rural and 4G/5G NSA indoor will play an important role in providing mobile services for years to come (i.e. over [X]m (out of [X]m) handsets will still require 800 MHz up to 2029. Consumers are holding onto their devices (smartphones) longer than ever 3-4 years now vs 1-2 years 5years ago. This means that [X].

NB-IoT

<sup>68</sup> Phase 1 Decision, Figure 2 page 29.

<sup>69</sup> [X]

A1.18 Narrow band-IoT (NB-IoT) services are many and varied. Two popular NB-IoT applications include:

- **Remote asset tracking** — Businesses can use NB-IoT to remotely trace, track, and monitor assets and receive status updates.
- **Smart metering** monitoring of resource consumption, such as energy, water, gas, etc., through modern metering devices connected to the Internet via IoT technology. Low band improves the power performance of devices and the coverage footprint for IoT applications.

A1.19 Without nationwide coverage of a single low band frequency [X].

**There are few viable alternatives for low band to provide MBB and NB IoT services**

A1.20 BT's concerns are particularly acute with respect to [X].

A1.21 [X]. Between [X]% (depending on site type urban or rural) of site traffic is carried uniquely by the low-band and when that capacity is exhausted capacity upgrades are either impractical or prohibitively expensive. It is for this reason that low-band spectrum is priced higher in competitive spectrum auctions.

A1.22 [X].

A1.23 [X].

A1.24 Consequently BT today [X].

A1.25 [X].

- [X].
- [X].
- [X].

**Sufficient 5G spectrum in specific low bands is needed for MNOs to compete effectively in the provision of 5G mobile services**

A1.26 [X]. Table A1.2 below illustrates the forecast outdoor penetration of 5G SA:

**Table A1.2: BT's indicative 5G SA Outdoor Population Coverage evolution – BT Internal**

	FY23/24	FY24/25	FY25/26	FY26/27	FY27/28	FY28/29
Indicative 5G SA Outdoor Pop Coverage %		[X]%	[X]%	[X]%	[X]%	[X]%

Source: BT internal forecast

- **mMTC** (massive Machine Type Communications) 5G services (e.g. scalable connectivity for an increasing number of IoT devices for smart cities) will require better (deep) indoor coverage and performance in wide areas.
- **ultra-reliable, low-latency communications (URLLC) services** – deployed on 5G SA networks enabling new use cases in industrial settings, where high volume, high reliability and flexibility is a necessity (e.g. remote surgery, cloud gaming). URLLC require resources to be provided from multiple radio sites to a single device as in joint transmission co-ordinated multipath (JT-CoMP). This requires appropriate overlapping

coverage from multiple sites. This cannot be economically delivered in-building or outside of dense urban areas without 700 MHz or alternatives (900 & 1400 MHz).

- **Smart transport road and rail services** - will be met significantly better with more 700 MHz spectrum especially high reliability services for highly mobile transport (e.g. connected and autonomous vehicles and advanced passenger use cases and connected trains and passenger).

A1.27 Deploying additional low-band for 5G services costs significantly less incrementally than densifying our midband networks and is the only viable option to meet the anticipated greater demand for 5G bandwidth

- [X].

A1.28 Densifying midband has a far higher marginal cost of deployment and is not a viable alternative:

- **Investment in mMTC or URLLC** will come as the customer demand and industry develops. These technologies will mainly be focussed on, but not exclusive to, mid band spectrum. [X]. Both rely on global wide telecoms industry development. mMTC is a 3GPP R.17 feature which is not yet developed. Similarly, URLLC even though it started in R.16 which is currently live.
- **Digital roads** Midband spectrum densification is costly and can only partially mitigate the asymmetry in low band capacity with continued poor performance in trains and cars.

## 3.4 – 3.8 GHz

### **3.4 – 3.8 GHz spectrum is ideally suited to high capacity/high throughput services because it has higher bandwidth and spectrum efficiency compared to other bands**

A1.29 3.4 – 3.8 spectrum has higher bandwidth because, by virtue of being Time Division Duplexing (TDD) spectrum,<sup>70</sup> it allows mobile networks to be dimensioned to account for the fact that most mobile data traffic is in the downlink (i.e. from the base station towards the customer device). For example, 3 GHz spectrum in the UK has a 3:1 ratio, meaning that for each 3 time periods allocated to downlink transmission, 1 time period is allocated to uplink transmission.

A1.30 3.4 – 3.8 GHz spectrum has higher spectrum efficiency because it is uniquely suited to take advantage of Massive Multiple Input Multiple Output (MIMO) technology that is not currently suitable for other bands. This gives 3.4 – 3.8 GHz spectrum a much higher spectrum efficiency as illustrated in Table A1.3 below.

<sup>70</sup> TDD is a method used to handle two-way communication between mobile devices and base stations whereby both uplink/upstream transmission (from the mobile device to the base station) and downlink/downstream transmission (from the base station to the mobile device) occur over the same spectrum frequency band at alternative times. The allocation between uplink and downlink takes place in real time. This is in contrast to Frequency Division Duplexing (FDD), which is a method whereby both uplink/upstream transmission and downlink/downstream transmission occur over separate spectrum frequency bands at the same time.

**Table A1.3: [X]**

[X]

A1.31 Because of this high spectrum efficiency (almost 3x more spectrally efficient than lower frequency bands) and large bandwidth (390 MHz), 3.4 – 3.8 GHz spectrum can deliver sustained high throughput service to a wide coverage area. It is important to understand that spectrum capacity and propagation are combined to create a service footprint. For example, [X].

**3.4 – 3.8 GHz spectrum is needed for MNOs to compete effectively in the provision of high capacity/high throughput services**

A1.32 Many new services that have been standardised for 5G will come to market in the near future. BT has 80 MHz of 3.4- 3.8 GHz which is split into two non-contiguous allocations of 40 MHz. In contrast the Merged Entity will have 2 x 100 MHz holdings of 3.4-3.8 GHz and can deploy this capacity overnight by remote configuration only i.e. no new radio equipment or site visit would be needed for the Merged Entity to deploy all 200 MHz. We understand that newer radios deployed will support 2 x 100 MHz carriers (this will likely be the majority of the radios in the Vodafone and Three networks because of the swap-out of the older Huawei equipment).

A1.33 BT has included below a few examples of these high capacity/high throughput services.

**Non-Public Networks (5G Private Networks) for Industries**

A1.34 These networks are characterised by a high density of high throughput / low latency applications (e.g. Digital Vision, AGVs, Robotics, UAVs, etc.) which, in turn, demand a high capacity/throughput network.

A1.35 Licenced spectrum in 3.5GHz range is required to deliver an economically viable platform for many wider deployment areas – e.g. ports, airports, power stations, transport and logistics hubs - which cannot be served with Ofcom shared access licenced spectrum as this is restricted to small cell deployments. The proportionally higher uplink requirements equate to large contiguous spectrum bandwidth deployments, best suited to the 3GHz range.

**Unmanned Aerial Vehicle (UAV) – Telemetry and Broadcast**

A1.36 Real time camera broadcast requires high throughput and low latency. Similarly, drone delivery corridors and local geographic deployments for enterprises (e.g. for monitoring, inspection, and delivery in ports) will drive a requirement for support for a density of high throughput devices delivering business critical operations.

**Vehicle-to-everything (V2X) – Telemetry and data exchange**

A1.37 Vehicles platooning enables vehicles to dynamically form a group travelling together. All vehicles in the platoon receive periodic data from the leading vehicle, to carry on platoon operations. This information allows the distance between vehicles to become extremely small, i.e. the gap distance translated to time can be very low (sub second). Platooning applications allow the vehicles following to be autonomously driven.

**Augmented Reality (AR) / Virtual Reality (VR) / Extended Reality (XR)**

A1.38 To support AR/ VR / XR environments with low motion-to-photon capabilities, the 5G system shall support: (i) motion-to-photon latency in the range of 7milliseconds (ms) to 15ms, while

maintaining the required resolution of up to 8k, giving user data rate of up to 1Gbit/s and (ii) motion-to-sound delay of < 20 ms. Cloud/Edge/Split Rendering in particular requires very low latency and high bandwidth to enable XR services for industry applications.

### **Critical Medical Applications**

- A1.39 The 5G system is expected to meet the service requirements for critical medical applications where critical medical applications denote medical devices and applications involved in the delivery of care for patient's survival.
- A1.40 These applications include high quality medical imaging and augmented reality systems located in hybrid operating rooms, in remote healthcare facilities or ambulances. Video and imaging applications have extremely high bandwidth requirements and while compression may be used to mitigate that in certain use cases, it often degrades the picture to the extent onward processing required by some applications is compromised. Other applications may include controlling both local or remote robotic diagnosis or surgery systems.

### **Video, imaging and audio for Audio-Visual (AV) production applications**

- A1.41 Audio-Visual (AV) production includes television and radio studios, live news-gathering, sports events, music festivals, etc. Typically, numerous wireless devices (e.g. microphones, in-ear monitoring systems or cameras), are used. In the future, the wireless communication service for such devices is expected to be provided by a 5G system.
- A1.42 As is the case with Critical Medical Applications (described above), video and imaging applications for AV production have extremely high bandwidth requirements and while compression may be used to mitigate that in certain user cases, it often degrades the picture to the extent onward processing required by some applications is compromised.

### **Mobile Metaverse Services**

- A1.43 Mobile metaverse services refer to a shared perceived set of interactive spaces that can be persistent. The term metaverse has been used in various ways to refer to the broader implications of AR and VR. The Metaverse in diverse sectors evokes several possible user experiences, products and services that can emerge once AR and VR become commonly available and find application in work, leisure and other activities.

### **Macro – Urban / Dense Urban eMBB**

- A1.44 The European Telecommunications Standards Institute (ETSI) has identified several scenarios that would require the support of very high data rates or traffic densities by the 5G system. The scenarios address different service areas: urban and rural areas, office and home, and special deployments (e.g. massive gatherings, broadcast, residential, and high-speed vehicles). Table A1.4 captures Performance requirements for high data rate and traffic density scenarios developed by the ETSI.

**Table A1.4: Performance requirements for high data rate and traffic density scenarios**

	Scenario	Experienced data rate (DL)	Experienced data rate (UL)	Area traffic capacity (DL)	Area traffic capacity (UL)	Overall user density	Activity factor	UE speed	Coverage
1	Urban macro	50 Mbit/s	25 Mbit/s	100 Gbit/s/km <sup>2</sup> (note 4)	50 Gbit/s/km <sup>2</sup> (note 4)	10 000/km <sup>2</sup>	20 %	Pedestrians and users in vehicles (up to 120 km/h)	Full network (note 1)
2	Rural macro	50 Mbit/s	25 Mbit/s	1 Gbit/s/km <sup>2</sup> (note 4)	500 Mbit/s/km <sup>2</sup> (note 4)	100/km <sup>2</sup>	20 %	Pedestrians and users in vehicles (up to 120 km/h)	Full network (note 1)
3	Indoor hotspot	1 Gbit/s	500 Mbit/s	15 Tbit/s/km <sup>2</sup>	2 Tbit/s/km <sup>2</sup>	250 000/km <sup>2</sup>	note 2	Pedestrians	Office and residential (note 2) (note 3)
4	Broadband access in a crowd	25 Mbit/s	50 Mbit/s	[3,75] Tbit/s/km <sup>2</sup>	[7,5] Tbit/s/km <sup>2</sup>	[500 000]/km <sup>2</sup>	30 %	Pedestrians	Confined area
5	Dense urban	300 Mbit/s	50 Mbit/s	750 Gbit/s/km <sup>2</sup> (note 4)	125 Gbit/s/km <sup>2</sup> (note 4)	25 000/km <sup>2</sup>	10 %	Pedestrians and users in vehicles (up to 60 km/h)	Downtown (note 1)
6	Broadcast-like services	Maximum 200 Mbit/s (per TV channel)	N/A or modest (e.g. 500 kbit/s per user)	N/A	N/A	[15] TV channels of [20 Mbit/s] on one carrier	N/A	Stationary users, pedestrians and users in vehicles (up to 500 km/h)	Full network (note 1)
7	High-speed train	50 Mbit/s	25 Mbit/s	15 Gbit/s/train	7,5 Gbit/s/train	1 000/train	30 %	Users in trains (up to 500 km/h)	Along railways (note 1)
8	High-speed vehicle	50 Mbit/s	25 Mbit/s	[100] Gbit/s/km <sup>2</sup>	[50] Gbit/s/km <sup>2</sup>	4 000/km <sup>2</sup>	50 %	Users in vehicles (up to 250 km/h)	Along roads (note 1)
9	Airplanes connectivity	15 Mbit/s	7,5 Mbit/s	1,2 Gbit/s/plane	600 Mbit/s/plane	400/plane	20 %	Users in airplanes (up to 1 000 km/h)	(note 1)
<p>NOTE 1: For users in vehicles, the UE can be connected to the network directly, or via an on-board moving base station.            NOTE 2: A certain traffic mix is assumed; only some users use services that require the highest data rates [2].            NOTE 3: For interactive audio and video services, for example, virtual meetings, the required two-way end-to-end latency (UL and DL) is 2-4 ms while the corresponding experienced data rate needs to be up to 8K 3D video [300 Mbit/s] in uplink and downlink.            NOTE 4: These values are derived based on overall user density. Detailed information can be found in [10].            NOTE 5: All the values in this table are targeted values and not strict requirements.</p>									

Source: [ETSI TS 122 261 V17.12.0 \(2024-01\)](#)

**There are few alternatives for 3.4 – 3.8 GHz spectrum**

A1.45 There are few viable alternatives for high-speed capacity over 3.4-3.8 GHz for eMBB and new 5G services and applications that BT could adopt to effectively compete against the Merged Entity.

- Lower frequency bands are not suitable as they do not support massive MIMO and therefore cannot offer the same spectral efficiency and peak speeds and data throughput. Lower frequency bands also lack sufficient bandwidth.
- As explained in the previous section densification using small cells is expensive and [X].

A1.46 Deploying more 3.4-3.8 GHz spectrum costs significantly less incrementally than densification [X].