

Robert Emson
Floor 3
Spectrum Group
Riverside House
2A Southwark Bridge Road
London SE1 9HA

By email

30th January 2017

Dear Robert

Ofcom's Consultation "Award of the 2.3 and 3.4 GHz spectrum bands: Competition issues and auction regulations"

Introduction and Summary

1. The PSSR award comes at a critical moment in the development of the UK mobile market. It offers Ofcom an important opportunity to further its statutory duties by putting spectrum to the most efficient use and delivering the highest possible value to society. Telefónica UK Limited ("**02**") supports Ofcom's proposed variant to Option B combined with Option C (subject to suggested refinements to those options).
2. If Ofcom is to serve its statutory duties, it must ensure there remain four credible MNOs, as it rightly recognises. The design of the award impacts directly upon that goal. Ofcom's current proposals are a serious threat to it, and in particular, [X].
3. Ofcom also risks hindering the timely development of 5G. 02 is already committing substantial resources to ensure that the benefits of both advanced 4G and 5G are realised by our customers as soon as possible. The optimal route to the development of 5G is rapid availability of 3.4GHz for 4G which will evolve to 5G. The proposed award risks undermining that development.
4. Ofcom is right to focus on competition concerns in the design of the auction, but 02 is concerned that it has failed to have proper regard to the potential for huge losses in static welfare for consumers. Customer demand for mobile data is growing rapidly at a Compound Annual Growth Rate in the region of 40%. [X].

5. This is not due to an overall shortage of spectrum. Instead, it is driven by an imbalance of spectrum holdings which is unprecedented internationally: [X], both BT/EE and Vodafone are warehousing unused spectrum.
6. O2 welcomes Ofcom's recognition that the PSSR award gives rise to the potential for serious competition problems. It is right to do so: there is a real risk that the award will exacerbate the present position. Both BT/EE and Vodafone have powerful incentives for strategic bidding that would do nothing to serve Ofcom's statutory duties. It would lead to more warehousing of spectrum, more inefficiency, and the demise of a credible four MNO market. That is to the detriment not just of MNOs and their customers but to the UK mobile market, and the economy of the United Kingdom as a whole.
7. O2 accordingly strongly welcomes Ofcom's proposal to intervene in order to mitigate these risks. Its proposed solution, however, does not go far enough. It is based on a serious underestimate of the risks posed to a credible four MNO market arising out of the current imbalances of spectrum.
8. The proposed solution (Option A) would have the welcome effect of preventing BT/EE from obtaining yet more immediately useable spectrum. It would, however, fail to address the very serious risk that Vodafone – which already has more spectrum than it needs for at least the next four years – would bid strategically to [X] weaken rivalry from O2 and H3G. As Ofcom recognises, Vodafone would have powerful incentives to do so.
9. It also fails to address the situation beyond the “transitional period” identified by Ofcom, until the 3.4 GHz spectrum comes into use. The reality is that *even with an award of 2.3GHz spectrum* [X]. As Ofcom itself recognises, further spectrum is not likely to be available until mid-2020 (CD 5A.5.12). [X]. (The medium term period could indeed be longer if MNOs who already have large holdings seek to delay further release.)
10. Thus, if BT/EE and/or Vodafone are given the opportunity to dominate the award of 3.4 GHz spectrum, severe damage to consumers and competition is likely to follow, and the future of a four MNO market will be undermined. For this reason, O2 urges Ofcom to adopt one of its proposed variants of Option B alongside Option C (calculated excluding spectrum which will not be useable until after the deployment of 3.4 GHz).
11. O2's reasons and evidence are presented in the attached report by NERA Economic Consulting entitled “*The case for spectrum caps that support efficient and pro-*

competitive outcomes in the award of PSSR spectrum" ("**NERA**"), to which reference should be made in full (and which is summarised in its executive summary). In this letter I highlight how NERA's analysis supports O2's answers to Ofcom's consultation questions.

Question 1: Do you agree that we have identified the right competition concerns?

12. Yes, Ofcom has identified the correct concerns (the risk of asymmetry, the risk of losing four credible MNOs and the risk of strategic bidding) although, as shall be explained, Ofcom has underestimated the severity of those concerns, the time period during which they will be present and the potential impact on consumer welfare.

Question 2: Do you agree with our assessment and provisional conclusions in respect to:

Competition Concern 1: Asymmetric spectrum shares weakening competition

13. It is contrary to Ofcom's statutory objectives for two operators to warehouse unused spectrum [§<]. Plainly it is inefficient [§<] and others sit on large volumes of unused spectrum (NERA section 3.2). Whilst this issue is particularly severe in the case of BT/EE, which is using only 40 MHz of its 115 MHz 2.6 GHz spectrum (plus an additional 30 MHz in a tiny proportion of the country) (CD §5.37), Vodafone is also only just starting to deploy its 2x20 MHz of paired 2.6 GHz spectrum and has yet to make use of its 20 MHz of unpaired spectrum (CD §5.60).
14. The severity of spectrum asymmetry in the UK is wholly exceptional by international standards; see NERA section 4.
15. The current asymmetry is not simply the product of effective competition. It is an anomaly brought about in part because of the decisions of merger control authorities which have led to the circumvention of Ofcom's existing spectrum cap:
 - (i) Spectrum holdings following the BT/EE merger exceed earlier Ofcom caps and are out of line with European norms. In approving the merger, the CMA had been reassured that the concentration in spectrum holdings could be remedied by Ofcom in future spectrum awards (NERA section 3.1);
 - (ii) In the 4G auction, despite acting rationally, O2 was outbid (NERA section 3.2). The UK is alone in highly asymmetric outcomes coming to pass from auctions (NERA section 4.2). Ofcom rightly recognises that auctions should be designed to secure that bidders should not feel they would have bid differently when they see the final result (CD §2.23), yet the design of the 4G auction did not prevent that outcome.

16. O2 accepts that strict symmetry in spectrum holdings is not necessary; indeed, as Ofcom argue, a degree of variation may support pro-competitive differentiation between networks. However, as explained below, the huge imbalances which exist in the UK market [36].
17. The proposed auction design risks exacerbating that situation yet further. O2 accordingly welcomes Ofcom's recognition of the serious risk to competition which arises by reason of asymmetry in immediately useable spectrum which should be addressed in the design of this auction.
18. O2's further concern is that Ofcom has not appreciated that an award of 2.3 GHz spectrum alone is insufficient [36]. As NERA have demonstrated, an award of 2.3 GHz is helpful in the immediate term but [36] before any other spectrum becomes available: this is "*the second transitional period*" identified by NERA (see section 7.2). The award of 3.4 GHz in this auction [36]. This is why O2 considers some restrictions on the ability of BT/EE and Vodafone to obtain both 2.3 GHz and 3.4 GHz spectrum are necessary to fulfil Ofcom's statutory duties.

Competition Concern 1(i) risk of very asymmetric overall spectrum shares

19. Ofcom rightly accepts that "*very asymmetric spectrum allocations are possible immediately after the auction*" and that "[s]uch asymmetric distributions of spectrum would normally raise significant competition concerns": CD §4.38.
20. Ofcom's reason for having only a limited concern about competition being weakened due to distribution of *overall* spectrum holdings is that it considers that other spectrum will be available in time to address the asymmetry and the significant competition concerns which they raise (CD §4.54).
21. The reality, as demonstrated in NERA section 7.2, is that such further releases will likely not happen until a gap of at least two years after 3.4 GHz becomes available for use, by which time [36].
22. This means that 3.4 GHz will become an essential resource to add incremental 4G capacity from 2019 (NERA section 7.2). Indeed, as NERA explain, MNOs will initially deploy 4G solutions in the 3.4-3.6 GHz band, possibly upgrading them to 4G/5G operation at some point (NERA section 6.1). This is why Ofcom is wrong to conclude

that [X], such opportunities will arise, in respect of 700 MHz and 3.6-3.8 GHz (CD §4.156).

23. There is, in any event, a striking inconsistency in the CD as to Ofcom's confidence as to the timing and nature of such awards. Elsewhere, it casts doubt upon it, for example, in dismissing Option C at §5.76 (excluding 3.6 – 3.8 GHz spectrum when considering the level of cap to be considered because "*there is more uncertainty about whether the 3.6-3.8 GHz spectrum will be useable in the same timeframe as the 3.4 GHz and 700 MHz spectrum*"). Further Ofcom notes at CD Fig 4.2 that 3.6–3.8 GHz spectrum may be subject to "*restrictions on use and no decision*" has yet been taken to make it available (see also §A5.18). There are clearance timescales for both 700MHz and 3.6-3.8 GHz which affect the timing of availability.
24. The reality is that however certain the further awards of spectrum may be, they provide no answer at all to the competition concerns that Ofcom itself has rightly identified and which arise immediately and in the medium term.

Competition Concern 1(ii): risk of very asymmetric holdings of immediately useable spectrum

25. Ofcom finds provisionally that "*there is a significant risk that competition could be weaker during [the] transitional period if there are increasingly asymmetric spectrum holdings*". Ofcom expressly recognises that absent an award of 2.3 GHz in this auction, [X] (CD §4.81, 4.84, 4.180).
26. O2 agrees, although it considers this is an understatement and underestimates the duration of the period of risk.
27. Like Ofcom (CD §4.115) O2 considers that sufficient data capacity is the critical component for credibility. It is the critical dimension in driving consumer welfare creation through spectrum use. [X]. As NERA's figure 22 demonstrates, absent an award of spectrum, BT/EE and Vodafone would not experience network quality issues until around 2022, [X]. Thus, there is immediate consumer detriment arising as a result of the asymmetric allocation of spectrum; an immediate consumer harm. As explained below under Competition Concern 2, referring to NERA section 5, [X].
28. There is accordingly a potential for huge consumer welfare losses if the PSSR auction does not give O2 a sufficient opportunity to obtain sufficient spectrum [X] in Ofcom's transitional period (and indeed, beyond it, into NERAs "second transitional period"). NERA has calculated that more than £5 billion of consumer welfare is at risk over the next six years if [X]. In the assessment of competition concerns, Ofcom has failed to have proper regard to these considerations. Plainly, the efficient

allocation of spectrum minimises welfare losses, and allocations [X] will therefore result in significant consumer welfare losses for consumers (NERA section 7.3).

29. O2 is of course not asking Ofcom to guarantee it an award of spectrum, but rather to prevent strategic bidding by MNOs who are already warehousing competition and whose bids, if successful, could only lead to inefficient outcomes and further consumer detriment.
30. There is also a serious threat to competition. Although Ofcom is right to note that O2 has maintained a strong market position thus far despite the asymmetrical holdings [X]. Indeed, O2 is already taking steps to optimise traffic that will [X] and H3G is increasing its prices for large data users (NERA section 7.5 and Figure 28). Ofcom's concern expressed about asymmetry leading operators to compete less strongly for certain customer segments (CD §4.79) is already a reality. Without action on spectrum allocation, there will inevitably be a softening of price competition, including price increases for high-end data services (caused by market bifurcation).
31. The present weakness gives Vodafone and BT/EE significant strong strategic incentives (discussed further below) to keep O2 out of spectrum [X]. The strategic investment value is so high that, if crystallised in bids, it could lead to Vodafone and or BT/EE inefficiently blocking O2 from winning spectrum at both 2.3 GHz and 3.4GHz.

Competition Concern 1(iii) (the risk of very asymmetric shares of 3.4 GHz spectrum)

32. It will be apparent from the above that O2 considers Ofcom's provisional view that it need only give low weight to concerns about asymmetry in 3.4 GHz, is wrong. [X] (NERA section 7.3).
33. 5G will almost certainly be designed as an evolution of 4G, rather than an outright replacement (NERA section 6). So Ofcom is wrong to treat the 3.4 GHz band as somehow distinct from other 4G capacity bands; see NERA section 7.4. Unfettered

access to the 3.4GHz band gives other MNOs the opportunity to foreclose O2 from this band. This would lead to [X].

34. Ofcom's legitimate concern to secure the development of 5G would be best served by addressing the capacity constraints in the provision of 4G. Ofcom seems to expect that 5G will be important in enhancing network capacity and that the PSSR award should be crafted to facilitate its emergence. However, 5G is likely to differ in its form and its method of introduction compared to previous generations: the optimal route to deploying 5G is, almost certainly, via rapid availability of 3.4 GHz for 4G solutions which can subsequently evolve to 5G. Many of the broader opportunities that are associated with 5G, such as network function virtualisation and Internet of Things (IoT) support, will be delivered first as part of 4G evolutions before 5G radio technology arrives.
35. Ofcom provisionally decided against imposing restrictions on the amount of 3.4 GHz spectrum which BT/EE and Vodafone can obtain on the basis that 5G deployment might need 100MHz carrier bandwidths. However, the consumer demand for associated data rates does not yet exist, the same consumer speeds could be achieved with carrier aggregation of 20MHz channels and equipment to utilise broad channels will not be available until after 2020. In addition there are other viable routes to delivering 100MHz carriers after an auction, such as spectrum sharing or spectrum swaps.
36. The best way to support development of 5G is to prioritise use of PSSR spectrum to alleviate 4G capacity constraints, and policy should not be distorted to accommodate the unrealistic idea that a single carrier might launch an early 5G network using a large block of 3.4 GHz spectrum. Indeed, the possibility that BT/EE could further increase its spectrum share by buying a large block of 3.4 GHz is a potential long-term barrier to the development of 5G. Thus, Ofcom's approach is both self-defeating and disproportionate.

Competition Concern 2: the threat to four credible MNOs

37. Ofcom and the EU Commission are committed to a four MNO solution. O2 hoped to address [X] through a merger. The merger was blocked because of this commitment.
38. [X], absent an award of 2.3 GHz and 3.4 GHz spectrum. Rate of subscriber share to spectrum share is an indication of capacity constraint: O2 has the worst ratio, worldwide (NERA section 4.1). As explained above, [X]
39. Ofcom's core reason for the conclusion that low weight can be given to the risk of loss of O2 as a credible MNO in the transition period is that: (i) the transition period is short (and at the end of it there will be more spectrum available) and (ii) O2 is doing

well commercially (§4.147). Point (i) has been considered above. As to point (ii) commercially, [§].

40. O2's commercial success to date despite its poor spectrum endowment is explained by:
 - (i) O2's average customer data having lagged behind others: a position which will come to an end given the rate of growth of data use on O2's network (NERA section 5.1);
 - (ii) [§]; and
 - (iii) [§].
41. O2 should not be disadvantaged [§] (compare Ofcom's treatment of Vodafone, discussed under Option B below).
42. In the period up to mid-2020 (ie. Ofcom's transitional period and NERA's second transitional period), it is clear that [§].
43. Even if (which is not the case) there are viable alternatives to spectrum in the longer term and despite the prospect of more spectrum becoming available post 2020, such that an operator who had lost sufficient capacity to meet demand might regain it, that does not mean that [§]. As Ofcom accept, there is a real risk that the competition effects of even a temporary loss of capacity can endure into the long term (CD §§4.94). This is demonstrated by an example from the Australian market (NERA 7.5.1).
44. As to the longer term, Ofcom's conclusion that there are credible technical alternatives to spectrum available to O2 to a considerable extent [§] (NERA section 5). NERA has set out O2's position out in detail and O2 are keen to meet with Ofcom

to understand Ofcom's reasons for believing that there are credible technical alternatives.

45. Further, Ofcom's view that a range of 10-15% spectrum is sufficient to support a credible competitor is not one which is viable from a long term perspective. It is not supported by international comparisons. In every one of these cases there are special circumstances by reason of which the MNOs are either viable despite having such low shares or failing (NERA section 4.3). They provide no support for the view that an MNO in the position of O2 can remain credible at such levels.

Question 3: Do you agree we have identified the right options to address our competition concerns?

46. Ofcom has identified a suitable range of Options for consideration, particularly because Ofcom makes clear that it will consider variants to those Options.

Question 4: Do you agree with our assessment of the options we have identified for promoting competition in the auction? If not, please describe what measures you consider would be appropriate, providing as much evidence as possible to support your preferred approach?

47. For the reasons already given, it is imperative that Ofcom sets rules for the award which will serve to avoid outcomes from the auction which are obviously undesirable, for O2, for the UK mobile market and for UK consumers. Those rules must serve to ensure that the PSSR spectrum is not inefficiently warehoused, and thus prevented from being deployed in a way that gives rise to immediate benefits for consumer welfare and competition.
48. Ofcom has rightly identified some possible options which would prevent these outcomes.
49. Whilst O2 considers a stronger form of intervention would better serve the interests of efficiency and consumers, it supports Options B and C and has suggested certain variants on those options below.

Option A

50. O2 welcomes the recognition that action is required to address the asymmetry in immediately useable spectrum.
51. Ofcom claims Option A would address Competition Concern 1(ii) (asymmetry in immediately useable spectrum holdings), but in reality it addresses just one side of the coin, namely the scale of BT/EE. And in any event, even with this cap in place, BT/EE will end up with 42% of usable spectrum, well above the cap of 37%

previously adopted by Ofcom, and representing only a modest reduction in BT/EE's current share of 45%.

52. Whilst O2 would strongly welcome *at least* this step, it does not go far enough.
53. As Ofcom rightly recognises, this option would increase the risk of strategic bidding by Vodafone. This is a real concern for reasons explained further under Option B. As a result:
- (i) Option A does nothing to address the risk of asymmetry in immediately useable spectrum increasing under the auction by Vodafone acquiring all of the immediately useable spectrum;
 - (ii) So Option A does not effectively address Ofcom's principal Competition Concern (indeed, Ofcom recognises it could be addressed more effectively by a cap which bites on Vodafone; see CD §5.55);
 - (iii) Moreover, the consequences permitted by Option A are inconsistent with Ofcom's commitment to a 4 MNO solution. Ofcom recognises that absent an award of 2.3 GHz in this auction, [§<] and that an impact on competition in the transition period may be hard to unwind (CD §§4.93-4.96). As already noted, this understates the true position. [§<]. But Option A does nothing to secure that operators with smaller holdings will acquire *any* immediately useable spectrum;
 - (iv) Moreover, as explained above, 2.3 GHz spectrum is [§<] and accordingly some further measures are required to ensure that BT/EE and Vodafone do not block O2 from obtaining some 3.4 GHz spectrum.

Option B

54. For these reasons, O2 supports Option B, and in particular the variant of Option B identified at CD §5.52 ie a 20 MHz cap on Vodafone (in conjunction with an overall cap; see Option C below).
55. Such a cap could be implemented in a number of ways, as suggested in NERA section 8 (Option B), ie: a cap of 180 MHz on usable spectrum in the first transitional period (as defined by NERA) or a 37% cap on usable spectrum in that period and a precautionary cap of 20 MHz per bidder.
56. Some limitation on Vodafone (as well as BT/EE) obtaining 2.3 GHz is necessary for the auction design to effectively address Ofcom's principal competition concern:

- (i) Option A only addresses the risk of a “big BT/EE”, not of wider asymmetry in immediately useable spectrum (see above);
- (ii) Vodafone's incentive to prevent O2 or H3G from obtaining 2.3 GHz is strong enough to succeed even if some of the benefits of blocking O2 and/or H3G will be enjoyed by BT/EE (NERA section 7.5). Indeed, Ofcom acknowledges that Vodafone's incentive to strategically bid would be increased under Option A (CD §§5.39-5.44). Ofcom's reasons for discounting the risk of that incentive are weak: as Ofcom also recognise Vodafone has a lower subscriber/spectrum ratio, so is well placed to Hoover up customers [§<] (CD §5.43). If this recognised risk of strategic investment were to materialise under Option A (as Ofcom acknowledges it might), Ofcom would have failed to address *any* of the competition concerns.

57. Ofcom's reasoning for placing no constraints on Vodafone's ability to bid for 2.3GHz (CD §§5.59-5.63) is insufficient:

- (i) First, the argument that Vodafone would be “prevented from reducing the gap” with BT/EE (§§5.59) suggests Ofcom wishes to encourage a strong Vodafone to compete with a big BT/EE. But that is inconsistent with the concern to preserve a market with 4 credible MNOs. Under Option A, the UK market could be left (and if Vodafone acted under its strong strategic incentives, would be left) with two operators with large holdings and two MNOs hovering around or below Ofcom's threshold of credibility. The competition concern that Ofcom is seeking to address is that BT/EE has too much spectrum for the purposes of enabling a long term 4 MNO market, not that Vodafone should be allowed to get bigger;
- (ii) In any event, even if Ofcom is concerned to have a strong Vodafone to meet a strong BT/EE, Vodafone does not need to win 2.3 GHz spectrum to compete strongly with BT/EE (NERA section 7.1)¹
- (iii) Second, Ofcom (CD §5.63) raises a concern that 3.4 GHz might not be sufficient for Vodafone's needs (saying that using 3.4 GHz may be costly, and it might need more spectrum before it is useable). That is also wrong. 3.4 GHz will be reasonably substitutable for 2.3 GHz when it becomes useable; see NERA section 5;

¹ Vodafone can catch up with BT/EE's installed capacity by using the full 2x20 MHz carrier in the paired 2.6 GHz band and the 20 MHz carrier in the unpaired 2.6 GHz band which it has not yet deployed commercially. Once it deployed these two carriers it will have access to another 20 MHz supplemental downlink carrier in 1.4 GHz band which will become useable in the next 2 to 3 years. In terms of headline speed, Vodafone can catch up with BT/EE from re-farming and 1400 MHz.

- (iv) Third, Ofcom notes that Vodafone's falling market share – while O2 and H3G have gained market share - might be remedied by more spectrum (§5.62). It has made no attempt to analyse the reasons for Vodafone's failings. Were Ofcom to rely on this reasoning, it would be treating O2 differently to Vodafone without justification. Indeed, determining policy on the basis that it would make Vodafone more effective if it had more spectrum, when it has failed to be as effective as O2 despite having vastly more spectrum, would be perverse:
 - (a) O2 has (despite its small spectrum share) to date managed to absorb gains in market share through [§<];
 - (b) Vodafone has, for reasons which are unexplained, but which plainly are not a lack of spectrum, lost market share;
 - (c) Ofcom recognises [§<] but allows Vodafone to deny O2 that spectrum on the basis that it might make Vodafone more effective.

- 58. Limiting Vodafone to the possibility of bidding for 20 MHz of 2.3 GHz (a variant to Option B) is proportionate and would also address Ofcom's expressed concern that Vodafone may need more spectrum (which, as explained above, O2 considers ought not to be a concern).
- 59. As to Ofcom's concern that O2 and H3G would strategically reduce demand, this would only be an issue if this led to an inefficient outcome. [§<] and maximise consumer welfare. If Ofcom has other concerns, such as the price being too low, then it could alternatively raise the reserve price for 2.3 GHz or adopt a threshold price approach, as described at CD §5.115 (see NERA section 8.1).

Option C

- 60. Holdings above the level of the cap proposed under Option C have circumvented Ofcom's cap from 2013 by virtue of the BT/EE merger. As explained above, Ofcom has a unique mandate to ensure the efficient allocation of spectrum and, when clearing the BT/EE merger, the CMA plainly expected Ofcom to deal with concerns about asymmetry in the future.

61. Ofcom rightly recognises that there is a case for a cap on overall spectrum holdings. However, as explained above, Ofcom has failed to recognise that the cap is necessary to ensure that [§<].
62. O2 supports Option C (combined with the variant to Option B, discussed above).
63. However, O2 is concerned that the inclusion of 700 MHz in the calculation of the 37% cap is inappropriate because 700 MHz will not be available for some years after 3.4 GHz; see NERA section 8.2. In practice, this artificially inflates the cap for the short and medium term. A cap which excluded 700 MHz would limit BT/EE to acquiring no more than 55 MHz and Vodafone to 130 MHz in the 3.4 GHz band.
64. O2 considers that a cap of 35% would more effectively address the competition concerns identified by Ofcom. A cap of 37% leaves open the possibility that BT/EE and Vodafone could acquire all or most of the 3.4 GHz auction, which is, for the reasons explained by NERA, not an efficient outcome; see NERA sections 7.3 and 7.5. A 35% cap would make such an outcome less likely. However O2 recognises that 37% is consistent with Ofcom's previous approach to spectrum allocation.
65. Ofcom at CD §5.94 recognises that the case for Option C would be stronger if: (i) if the 3.6 - 3.8 GHz spectrum was likely to be useable materially later than the 3.4 GHz spectrum and if (ii) there were evidence that having large blocks of 3.4 GHz spectrum was unlikely to be important for 5G services. NERA has provided evidence of both points; see NERA sections 6 and 7.2 respectively.
66. As to timing, it is clear that 3.6 - 3.8 GHz is likely to be available materially later than 3.4 GHz and accordingly, on Ofcom's own rationale at CD §5.94, there is a case for intervention.
67. Ofcom raises the possibility that large 100 MHz blocks of spectrum *may* be required for 5G (CD §5.74) and a cap would constrain BT/EE to 85 MHz. Ofcom's reasons for considering that no cap should be imposed in order to avoid adverse effects on the development of 5G are incorrect:
 - (i) First, broad channel bandwidths are not needed for 5G (NERA section 6.3);
 - (ii) Secondly, as Ofcom recognises, BT/EE would in any event be able to secure block of 85MHz as a result of the auction on the basis of Ofcom's proposed Option C: CD §5.88. Ofcom acknowledges that it is not a "large risk" that this would be insufficient.

- (iii) Thirdly, even if a larger block was needed, that could be addressed through spectrum trading or other measures (NERA section 6.3). In this scenario, BT/EE would only need to sell a small holding before the auction if it considered it needed 100 MHz for 5G. The cap could stimulate spectrum trading. Although it has not been a success story to date, where there is a powerful enough incentive to trade – and 5G may create that incentive - spectrum trading will emerge.
- 68. As explained above, O2 is a key supporter of, and investor in 5G. O2 considers that the best way to support development of 5G is to prioritise use of PSSR spectrum to alleviate 4G capacity constraints (as explained in paragraphs 33 to 36 above). Ofcom's suggested approach carries the risk of potential long term barriers to the development of 5G. In particular if BT/EE manages to maintain or enhance its advantageous spectrum position through this auction, then its incentive to launch 5G will be reduced, not least because it already enjoys a 4G network speed advantage (see also NERA 7.4).
- 69. Moreover, it would be disproportionate to permit the further warehousing of spectrum by BT/EE just in case it proves desirable for 5G at the expense of making that spectrum available [X], (and for 5G as soon as possible, as part of a 4G/5G ecosystem).

Options D and E

- 70. Although O2 sees merit in these options it does not suggest that they are adopted; see NERA section 8. Those options may be seen as radical and overly interventionist and could accordingly lead to delay in the award of spectrum [X]

Question 5: Do you have any further comments on our proposals on competition measures?

- 71. O2 considers that access to immediately useable spectrum should be granted as soon as possible.

Question 6: Do you agree with our revised proposal on the withdrawal of bids in the auction?

- 72. Ofcom's proposed amendments to the withdrawal rules, as described at CD §6.1-6.48, place further limits on the scope for withdrawals, and as such reinforce the deterrent to strategic bidding. We agree with Ofcom that only bidders with partial standing high bids should be allowed to withdraw demand, as the circumstances

under which a bidder might have a rationale based on intrinsic value to withdraw any other bid from a band are remote (see NERA section 8.1).

Conclusion

- 73. For the above reasons, O2 would welcome Ofcom's variant to Option B combined with Option C (with the exclusion of 700 MHz from the calculation of the cap).
- 74. As mentioned above O2 is willing to meet with Ofcom to further understand its reasons for reaching the provisional view that there are credible technical alternatives to spectrum [X].

Yours sincerely

Lawrence Wardle
Director of Regulatory Affairs