TELEFÓNICA UK LIMITED RESPONSE TO:

"Award of the 700 MHz and 3.6-3.8 GHz spectrum bands"

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I. EXECUTIVE SUMMARY

1. Telefónica UK Limited ("Telefónica") welcomes the opportunity to respond to Ofcom's consultation on Award of the 700 MHz and 3.6-3.8 GHz spectrum bands[1] ("the Consultation").

2. The Government has clearly set out its ambitions for 5G in the UK. In its Future Telecoms Infrastructure Review[2], for example, it stated:

> "*…we want the UK to be a world leader in 5G to take early advantage of this new technology…*
>
> *The Government's strategic priority is to promote investment and innovation in 5G to ensure services and applications are widely available to the benefit of consumers and the UK economy….*
>
> *The mobile network operators will be central to 5G's successful delivery…*
>
> *The roll out of 5G will require significant investment by mobile network operators and other players in all network domains, including spectrum, radio access network infrastructure, fibre backhaul and core networks…*"

3. Accordingly, it is difficult to overstate the importance of the issue subject of the Consultation: how to carry out the award of 200 MHz of low and mid frequency spectrum, earmarked for the delivery of 5G services.

4. Ofcom proposes the following main objectives of the award at §1.3 in the Consultation:

   - improving mobile coverage;
   - ensuring efficient allocation of spectrum;
   - sustaining strong competition in mobile markets; and
   - ensuring the timely availability of spectrum.

5. Telefónica considers that the efficient allocation of spectrum and the maintenance of strong competition in mobile markets are properly Ofcom's principal objectives in the award. Whilst improving mobile coverage is a desirable outcome, there are other and more effective means of achieving that than through this spectrum auction. And whilst ensuring that spectrum is available in a timely manner is undoubtedly important, it is clearly subordinate to Ofcom's duties as regards spectrum efficiency and promoting competition.

[1] Award of the 700 MHz and 3.6-3.8 GHz spectrum bands, Ofcom. 18 December 2018: https://www.ofcom.org.uk/__data/assets/pdf_file/0019/130726/Award-of-the-700-MHz-and-3.6-3.8-GHz-spectrum-bands.pdf

[2] Future Telecoms Infrastructure Review, Department for Digital, Culture, Media & Sport. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/732496/Future_Telecoms_Infrastructure_Review.pdf

6. As this response explains, Telefónica believes that Ofcom's proposals will not meet these principal objectives[3]. Further, as we set out in detail in this response and in the attached report from NERA, there are other arrangements that would be better designed to fulfil Ofcom's and the Government's aspirations.

Auction design

7. Telefónica disagrees with the proposal to award 700 MHz and 3.6 GHz spectrum in a single stage combinatorial clock auction (CCA), because that approach provides greater scope for strategic bidding, compared to a Simultaneous Multi-Round Ascending (SMRA) auction. There would be a significant risk that the spectrum would be awarded inefficiently, contrary to Ofcom's statutory duty and its stated objective for this award.

8. The two spectrum bands are not substitutable and Ofcom's rationale for including them in the same bidding stage would seem to be motivated by its proposal to award the coverage lots.

9. Telefónica disagrees with Ofcom's approach on coverage (as we set out below) but, regardless, there is no need to proceed with a harmful CCA for the award of 3.6 GHz spectrum; separating this award into different stages, allocating 3.6 GHz spectrum first using an SMRA and a second stage CCA for 700MHz, would enable Ofcom to subsidise coverage lots through the proceeds of the award (if it chooses to) using a positive price constraint across both stages. This would minimise the risk of an inefficient distribution of 3.6 GHz spectrum being perversely driven by the need to have sufficient spectrum in the award to cover the costs of the obligations Ofcom proposes. The NERA report that accompanies this response sets out in detail two alternative schemes that we commend to Ofcom.

Defragmentation

10. Telefónica disagrees strongly with Ofcom's proposed approach on defragmentation. In its recent decision on UK Broadband's licence variation, Ofcom insisted that shifting spectrum frequencies in a licence did not amount to an award. Ofcom must be consistent and apply its own logic in this auction, in order to ensure that all operators secure defragmentation, for the benefit of UK consumers.

11. In any event, given the obvious concerns regarding discontiguity, it is essential that Ofcom creates an award process which facilitates the defragmentation of the 3.4-3.8GHz band. Failure to do so risks reducing the value that 5G promises to unlock to UK consumers and businesses, contrary to the Government's objective of the UK being a global leader in 5G.

12. Within the context of the award of 3.6 GHz, there are three main steps that Ofcom could take to make it more likely that the award outcome facilitates rather than forecloses defragmentation. Firstly, as we set out above, it is important that 3.6 GHz is sold in a separate stage of the award, so as to remove the risk that the outcome is distorted by

[3] For the avoidance of doubt, Telefonica's view is that Ofcom's proposals will not meet the objectives as set out in the Consultation

strategic bidding across bands and coverage lots. Secondly, as we set out below, Ofcom should introduce precautionary caps that reduce significantly options for strategic bidding, especially price driving. The most effective cap would be a 140 MHz on holdings across the 3.4-3.8 GHz range, [✂]. Finally, Ofcom must act to create a set of rules for the assignment stage that enables trades and avoids operators being held to ransom by their peers. We set out proposals for the assignment round in this response.

Broad approach on improving mobile coverage

13. Telefónica believes that the most efficient and effective way of improving mobile coverage is through an industry arrangement such that:

    - in areas in which fewer than all operators provide coverage (Partial Not Spots), passive infrastructure is shared; and
    - in areas where there is no mobile coverage (Total Not Spots), a single rural network is built, funded by the public purse.

14. Telefónica's modelling suggests that, under this approach, geographic coverage by all MNOs could reach 90% at minimal expense to the public purse. As Ofcom is aware, the four mobile operators are discussing this initiative at the moment.

15. This initiative contrasts with Ofcom's proposal set out in the Consultation, which is designed to fund the expansion of two mobile networks to reach 90% geographic coverage at a total cost to the taxpayer of up to £700m. In Telefónica's view, this would not represent good value for money for the taxpayer. [✂] To compound the problem, a winner of a coverage lot is unlikely to participate in an industry scheme to increase coverage, generally. Therefore, Ofcom's proposed approach is counter-productive.

16. Telefónica believes that the policy prescription is clear: Ofcom and Government should encourage operators to develop their proposals. Once a plan has been formulated, an appropriate enforcement mechanism could be imposed to ensure that the coverage objectives are met. Pursuing coverage obligations in parallel through the auction would be unnecessary. Further, it is likely to be undesirable, to the extent that any operator that secures such a coverage obligation is likely to be less incentivised to participate in a cross-industry scheme (in order to perpetuate a perceived commercial advantage).

Concerns about Ofcom's specific coverage proposals

17. Telefónica has a number of concerns about Ofcom's specific proposals for the coverage lots.

18. Firstly, we think that Ofcom has under-estimated the cost to most operators of complying with the proposed coverage obligation. There are two main issues:

    - Ofcom has over-estimated the level of coverage it assumes most operators will achieve, absent coverage obligations. So the coverage "gap" operators would need to fill is bigger than Ofcom thinks; and

- Ofcom has under-estimated the number of sites that operators would need to build to achieve incremental increases in their coverage.

19. [✂] We think this would represent terrible value for money for the taxpayer.

20. There is a related problem with the suggested method of assessing compliance with the coverage obligation. Ofcom is proposing to calibrate its approach by reference to an individual operator's (subjective) assessment of its own coverage. This would mean that an operator which over-estimates its own coverage would not be required to meet Ofcom's 90% geographic coverage obligation. Instead, the obligation would be reduced by the difference between the operator's assessment of its own coverage, and Ofcom's assessment of its coverage. In this way, an operator that has over-estimated its own coverage would (perversely) be rewarded because it would not need to roll-out its network as extensively as an identical operator (which had not over-estimated its own coverage), in order to comply with Ofcom's geographic coverage obligation. As such an operator would face lower costs to comply, awarding the coverage lots in this way would appear to be arbitrary, biased and unfair. There would be clear (and perverse) discrimination against operators that do not over-estimate their own coverage. We think that such a scheme would be inconsistent with Ofcom's statutory duties.

Spectrum caps

21. There are some obviously inefficient spectrum distribution outcomes that might result from this award, which Ofcom can and should prevent by the adoption of precautionary spectrum caps in both the 700 MHz and 3.6 GHz bands (in addition to the 37% overall cap which Ofcom proposes).

22. Restricting bidders to no more than 80 MHz of 3.6 GHz spectrum and 40 MHz of 700 MHz spectrum would prevent some undesirable outcomes whilst still permitting operators to bid for spectrum in accordance with their intrinsic demand.

23. Telefonica believes that a cap of 140 MHz for spectrum in the 3.4 -3.8 GHz bands would also be appropriate, [✂] We do not think that H3G, which would be prevented for acquiring any more 3.6 GHz spectrum by such a cap, would be prevented from pursuing any realistic, legitimate, commercial objective.

24. These caps will be most effective if implemented alongside our other recommendations for the auction design, at a minimum revisiting Ofcom's ALF proposals for 3.4 GHz [✂].

25. In Telefonica's view, these caps would represent only a very modest regulatory intervention.

Conclusion

26. Ofcom will appreciate that the stakes are high for this spectrum award. There is little prospect of significantly more low- and mid-band spectrum to award in the future. Accordingly, if Ofcom gets this auction wrong, and the UK ends up with lop-sided spectrum distribution as a result of strategic bidding, jeopardising both competition in the mobile market and the country's 5G ambitions, the dye will be cast. Correcting that mistake will be neither easy nor quick.

27. Consequently, Ofcom should think very carefully about how it proceeds from here. Telefónica would like to play a constructive role in helping Ofcom determine the correct approach to awarding this spectrum and we would be happy to discuss our concerns and our proposals in more depth over the coming weeks and months.

II. OFCOM POLICY FOR THIS AWARD AND LEGAL FRAMEWORK

28. Ofcom's main objectives are set out with clarity at §1.3 in the Consultation:

    - improving mobile coverage;
    - ensuring efficient allocation of spectrum;
    - sustaining strong competition in mobile markets; and
    - ensuring the timely availability of spectrum.

29. As is clear under UK and European law, Ofcom has a primary duty to deliver an efficient pro-competitive allocation of spectrum, so efficiency and competition should be recognized as the primary objectives for this award.

30. Telefónica agrees that timely availability of the spectrum is also important, but Ofcom should not rush into an award with an approach that could compromise the primary goal of an efficient allocation of spectrum and the maintenance of competition in mobile markets. A short delay in the auction would be much less disruptive than pushing ahead with an award format that fails to deliver an efficient, pro-competitive outcome.

31. Telefónica shares Ofcom's view that improving mobile coverage is an important policy goal. However, this is a general policy goal rather than one specifically associated with the forthcoming spectrum release.

32. Given the propagation characteristics of the 700 MHz band, we recognise that there is logic in exploring whether the award of that band can be used to enhance coverage. However, this must not be at the expense of Ofcom's primary duty: an efficient, pro-competitive allocation of the 700 MHz spectrum.

33. However, there is no logic in linking the 3.6 GHz band to coverage obligations, because the propagation characteristics of that spectrum mean that it is not suitable for providing large scale coverage. Indeed, when Ofcom considered coverage in the context of the PSSR award, it explicitly ruled out associating any coverage obligations with 3.4 GHz, for that reason. While it may be acceptable to repurpose revenues from selling this spectrum to support coverage, this would need to be done in a way that does not distort the allocation of spectrum that is crucial to the government's 5G goals. A multi-stage allocation process, with 3.6 GHz sold first in a separate stage – as proposed in the attached NERA report – is the only way that this could be done[4].

34. There is an important objective missing in Ofcom's list, namely the Government's ambition for the UK to be a leader in 5G. The efficient allocation of the entire 3.4-3.8 GHz band is the key to this goal. As we explain below, this objective will not be achieved unless the current fragmentation of the band is addressed. Thus, defragmentation of the band should be a priority for this award. As we explain in Section V, Ofcom has both the legal powers and policy tools to make this happen.

[4] For the avoidance of doubt, Telefonica's view is that the industry initiative designed to improve coverage represents the most efficient and effective means of achieving that policy goal and is preferable to coverage obligations in this award.

III. COVERAGE OBLIGATIONS

35. Telefonica supports Ofcom's ambition to expand geographic and premises coverage across the four nations. As Ofcom recognises, there is no commercial case for individual operators to expand geographic coverage much beyond current levels. Therefore, in order to realise the societal benefits of expanded coverage, it will be necessary to use public funds to assist this roll out. Ofcom's proposed solution is to use the forthcoming spectrum auction to repurpose revenues to subsidise up to two operators that commit to obligations to expand coverage.

36. However, in our view, this approach has a number of flaws:

- **Ofcom's approach would not maximize societal benefits.** [✂]. Customers on other networks would not benefit. Ofcom's approach would also require the public to subsidise the construction of two network expansions, which may substantially overlap. Conversely, a single rural network that can be accessed by all four network operators would be a much better approach and would require a smaller public subsidy.
- **Ofcom has under-estimated both the number of sites and costs required to extend landmass coverage.** We believe that Ofcom has over-estimated the existing level of landmass coverage. It has also over-estimated the coverage of Telefonica's competitor networks (relative to Telefonica's coverage) because, we believe, other operators have used less conservative models to estimate their own coverage. This in turn has led Ofcom to under-estimate the number of new sites that would need to be deployed in order to meet its proposed coverage obligations. In order to correct for this, Ofcom and the operators should stand behind a single, accurate and objective model for predicting coverage. Ofcom has also made unreliably optimistic assumptions about the incremental costs of building new sites, necessary to increase coverage. [✂]
- **The process would provide a unique benefit to BT.** As the current owner of the ESN contract, BT starts the process with a significant advantage in landmass coverage over its rivals. If BT wins a coverage obligation, the public would, in effect, be paying twice to expand BT's geographic network coverage. This is a poor use of public funds, and risks distorting the auction outcome, as BT may leverage the advantage to try to win more spectrum in the auction than it would otherwise have done without the presence of the coverage lots in the award.
- **Ofcom's approach to coverage obligation compliance is unrealistic.** Ofcom's timeframe for roll-out is very tight, especially given that operators will be starting from a lower base than currently assumed by Ofcom. Given the high risk of unexpected delays when deploying sites in difficult terrain, it would be risky for operators to sign up to this timetable. Ofcom's compliance methodology also lacks a fair basis for comparing operators, and risks creating incentives for operators to exaggerate their coverage today so as to reduce their compliance costs tomorrow.

37. Based on its analysis, Telefonica believes that using the auction to allocate funding to deliver coverage obligations in the way Ofcom proposes would not be a good use of public money. Ofcom should instead work with operators and the Government to

promote collaboration in building a single rural network (SRN) that all operators can access[5]. Ring-fencing revenues from the auction to fund coverage obligations for the SRN could be an important part of this and would represent a far more efficient and effective use of public money. Further, Ofcom's current proposals risk undermining the incentives for the collaboration necessary to deliver greater mobile coverage in the most cost effective manner.

38. In the following paragraphs, we provide more explanation as to how we reached these conclusions.

Expanding coverage is the correct ambition, but the coverage obligations would provide limited additional social benefit

39. Telefonica acknowledges that current mobile coverage may not be socially optimal and agrees that there would be benefit in further expansion. We also agree with Ofcom that many unserved areas would be unprofitable to invest in, on a standalone basis, and that alternative funding would be needed to support expansion in these areas.

40. Telefonica demonstrated its commitment to extend coverage when it acquired the coverage obligation attached to 2x10MHz of 800 MHz in the 2013 auction. It subsequently expanded its total mobile coverage to 98% of the UK population. This was a commercially viable investment, and one that likely incentivized Telefonica's competitors to pursue similar coverage goals. In our view, however, Ofcom's new obligations would not have the same incentive effect on operators that do not win the coverage lots, because the commercial case for expanded geographic coverage is far too weak for individual operators to increase coverage without financial aid.

41. Telefonica agrees with Ofcom that deploying sites in areas with lower population density may be unprofitable, and as such there are limited incentives for operators to provide coverage in these areas. As all operators have limited funds available, those that spend on coverage in these areas risk diverting investment away from towns/cities where improving network capacity and rolling out next generation technology is likely to be more profitable and more effective in maximising consumer welfare.

42. As coverage in these areas is unsuitable for stand-alone investment, public subsidy and cross-industry collaboration are, in Telefonica's view, essential to enable operators to invest in increased coverage. In the auction, the proposed negative cost of the coverage obligation is an implicit subsidy which may enable one or two operators to expand coverage to current partial/total not-spots.

43. Telefonica agrees with Ofcom that "*Consumer benefits would be greatest if new coverage was available to customers of all operators*".[6] However, Ofcom's proposed coverage obligations risk ***limiting*** the benefits of increased coverage to customers of a maximum of two networks. Operators which do not acquire the coverage obligation will not receive the implicit subsidy from the auction and would likely never expand coverage into these areas, as this would remain unprofitable. Competition is unlikely to drive such

[5] Ofcom is aware that mobile operators are discussing this initiative at the moment.

[6] Ofcom, Advice to Government, δ1.15, available at: https://www.ofcom.org.uk/phones-telecoms-and-internet/coverage/advice-government-improving-mobile-coverage

investment, as there are too few households in these locations to provide sufficient incentive.

44. We agree with Ofcom that a great deal of frustration is felt by customers as they move through geographic areas with poor coverage [δ4.15]. However, restricting the benefit of increased coverage to the customers of a maximum of two operators would limit the benefit to consumers. As Ofcom acknowledges, differences in geographic coverage associated with the coverage obligations are unlikely to drive any significant switching of customers between networks [δ4.97]. We agree with Ofcom that consumers lack perfect information and so do not necessarily know which operator has the best coverage for the area in which they live and even less so in the areas that they may pass through [δ4.16]. As such, it is essential that Ofcom considers policy proposals that maximise the number of operators able to expand coverage.

Cross-industry collaboration is a better solution to improving geographic coverage

45. Ofcom has advised the Government that there are a number of levers that can be used to improve coverage:[7]

    - Public subsidy to fund further rollout of coverage;
    - Rural wholesale access: allowing consumers to use one another's networks in rural areas where their own network lacks coverage;
    - Infrastructure sharing between operators; and
    - Further easing of planning barriers or other cost reduction measures.

46. Ofcom characterises these tools as means of expanding coverage beyond that which would be realised under its proposed coverage obligations. However, Telefonica believes that they are simply different means of achieving the same end. Furthermore, Telefonica believes that infrastructure sharing between operators would be the best route to improve mobile coverage. It is superior to the current proposal because it would benefit customers of all operators, thereby maximising consumer benefit and social welfare.

47. Broader cross-industry collaboration and infrastructure sharing would mean that the same volume of public subsidy could go further, as the cost of increasing coverage, per operator, would lower. Telefonica is confident the total subsidy proposed as part of the upcoming auction could be used to increase coverage provided by *all* operators, *beyond* the proposed obligation of 90%.

48. Telefonica is currently working with Ofcom and the other mobile operators on a plan to build a 'Single Rural Network' to tackle Partial Not-Spots (PNS) and Total Not-Spots (TNS). We believe this would deliver better value for money for the taxpayer (compared to Ofcom's proposals), as well as ensuring that the promise of better coverage is not restricted to a limited number of consumers.

49. Tacking Partial Not-Spots could be achieved by operators agreeing to make each other's sites available on a "one-for-one" basis. Each operator would be allowed to install its active infrastructure on the others' sites. Ofcom notes that 66% of the UK already

[7] Ofcom, Advice to Government, δ1.11.

receives a good service from all four MNOs [δ4.7]. Using high-level assumptions[8], we estimate that cross-industry collaboration would provide a fast and cost-effective route for all operators to increase their respective landmass coverage by 8%. Further negotiations could support increasing coverage beyond this level, up to the 91% of landmass that currently receives coverage from at least one operator.

50. Total Not-Spots could similarly be better addressed through cross-industry collaboration, with operators working together to build new sites. This approach could be used to expand coverage to a significant portion of the 9% of landmass in the UK currently without any coverage [δA11.77][9].

51. These approaches are clearly more efficient than having operators expand coverage independently, as the cost of sites shared between four operators would substantially increase the landmass area where it is economically viable to build. Telefonica believes that this is realistically the only way to achieve the Government manifesto commitment to reach 95% coverage by 2022.

52. As Ofcom itself recognises in its Advice to Government:

> *"Public subsidy could be direct (e.g. public procurement); or indirect (e.g. coverage obligations in new spectrum licences). There is an argument that direct subsidies are generally likely to be more efficient than indirect subsidies as they are less likely to distort operators' behaviour and incentives."*[10]

Telefonica agrees with this assessment. Further, there is also a risk that the Ofcom's coverage obligations would serve to *prevent* additional mobile coverage. This is because an operator that acquires a coverage obligation is unlikely to be incentivised to collaborate with other operators seeking to expand their own coverage and that have not themselves received a subsidy.

53. An SRN would have the effect of increasing coverage beyond Ofcom's proposed obligations, being more cost effective for any operator to deploy and thus reducing the amount of investment that would need to be diverted from other investments (i.e. in densification/capacity 5G in cities), thereby boosting total consumer welfare.

Self-reporting has meant current coverage modelling assumptions are inconsistent, leading to the wrong counterfactual

54. Ofcom has proposed two coverage lots, each with the following obligations *[δ1.6]*:

> *"a) provide a good quality mobile service outdoors in at least 90% of the UK landmass, including at least 90% of England, 90% of Northern Ireland, 74% of Scotland and 83% of Wales;*

[8] Assuming each % of landmass contains the same volume of sites; 66% of landmass has coverage from all operators and individual operators (other than BT) have 74% landmass coverage, this suggests that 8% growth in landmass coverage could be achieved from sharing access to sites

[9] To meet the Government's target of 95% geographic coverage, for example.

[10] Ofcom, Advice to Government, δ1.21.

b) provide good quality service outdoors for at least 140,000 premises to which it currently does not provide good coverage; and

c) deploy at least 500 new wide area mobile sites."

55. In developing these targets, Ofcom says that it has attempted to balance the costs of mobile coverage with the social benefits: "*Our revised analysis suggests that a geographic coverage obligation set at 90% of the UK landmass is likely to deliver social benefits which would be at least as large as the underlying costs*." [δ4.51]

56. However, we believe the assumptions behind setting these are flawed because Ofcom has:

- set the wrong starting point for measuring landmass coverage; and
- under-estimated the total number of sites required to reach the 90% coverage target.

Once Ofcom's analysis is corrected, the social benefits will be found not to exceed the underlying costs.

57. Ofcom has forecast the volume of sites required to reach 90% landmass coverage against a counterfactual of operators starting with a landmass coverage of 80% by June 2019 [δA14.7]. [✂]

58. It would appear that this divergence in assessment originates from Ofcom's Connected Nations report. An extract is copied at Table 1, below. Telefonica believes that the coverage levels reported significantly over-estimate actual landmass coverage.

Table 1: Estimates for existing coverage by operator, as published by Ofcom

	Voice Coverage			4G Data Coverage		
	Landmass	Outdoor premises	Indoor premises	Landmass	Outdoor premises	Indoor premises
BT/EE	85.0%	99.4%	95.8%	84.4%	99.1%	88.4%
O2	90.4%	99.8%	99.1%	74.4%	98.9%	94.8%
H3G	84.8%	99.5%	95.9%	78.4%	98.6%	89.4%
Vodafone	90.4%	99.8%	98.6%	78.6%	99.0%	93.7%

Source: Ofcom Connected Nations 2018

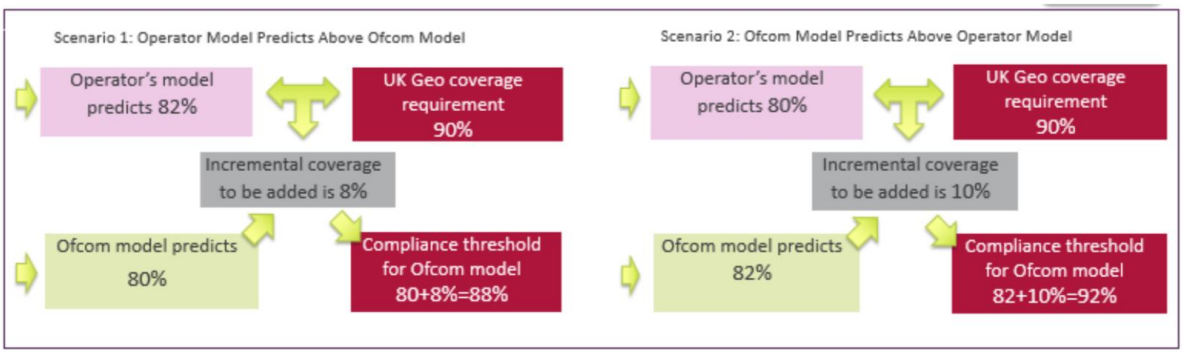
59. Our understanding is that operators provided an assessment of their own levels of coverage to Ofcom, for the purpose of compiling the Connected Nations report. For the reasons we explain below, we believe that the other operators have used less conservative coverage models than Telefonica's, when estimating landmass coverage [✂]

Seeking to rely on operators' inconsistent coverage models to formulate coverage obligations would constitute a breach of Ofcom's statutory duties

60. Using operators' self-reported coverage estimates under Ofcom's proposed coverage obligations creates a perverse incentive on operators that do decide to bid, to use misleading, less-conservative coverage models, with the effect of reducing the network rollout necessary to comply with the coverage obligations. This in turn creates a bias – an operator which over-estimates its coverage is more likely to bid for (and win) a coverage lot compared to an identical operator which doesn't.

61. Ofcom is proposing to allow operators to measure their own coverage and then compare their estimate against Ofcom's model. Compliance with the coverage obligation would then be calibrated by reference to the difference between the two estimates. This process is illustrated in **Error! Reference source not found.**[11].

Figure 1: Illustration of Ofcom's process for establishing the compliance threshold in Ofcom's model, as taken from the Coverage Obligation consultation



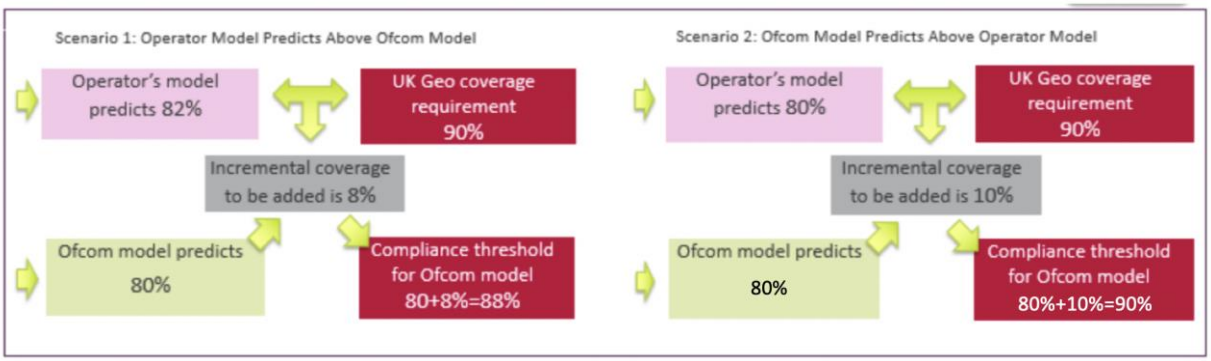
62. We are concerned that Ofcom's proposed approach to assessing compliance with the coverage obligation would generate inefficient, arbitrary and unfair outcomes, because it would incentivise operators to over-estimate their current coverage in order to reduce the requirements for meeting the obligation.

63. Consider a scenario, depicted in **Error! Reference source not found.** 2, in which two operators (Operator 1 and Operator 2) share exactly the same sites and spectrum portfolio and, therefore, provide identical coverage. Further assume that one operator uses different modelling parameters which over-estimate its expected total coverage. Say Operator 1 is using a more optimistic coverage assessment model that predicts it provides 82% coverage. The other operator (Operator 2), with more realistic parameters predicts that it provides 80% coverage. Ofcom's modelling predicts that both operators'

[11] Taken from Coverage obligations in the 700 MHz and 3.6-3.8 GHz spectrum award Ofcom's approach to verifying compliance, Ofcom 31 January 2019. See: https://www.ofcom.org.uk/__data/assets/pdf_file/0022/135157/Consultation-Coverage-obligations-in-the-700-MHz-and-3.6-3.8-GHz-spectrum-award-Ofcoms-approach-to-verifying-compliance.pdf

coverage is 80%. According to the logic laid out in Figure 1, and repeated in Figure 2, Operator 1 would be required to reach 88% coverage in order to comply with the coverage obligation, whereas Operator 2 would be required to reach 90%. Operator 1 would win the coverage lot, because it would face lower costs in reaching 88%. This appears to Telefonica to be a completely arbitrary and unfair means of allocating coverage lots.

Figure 2: Ofcom's process for establishing the compliance threshold (as in Figure 1), with adjusted inputs



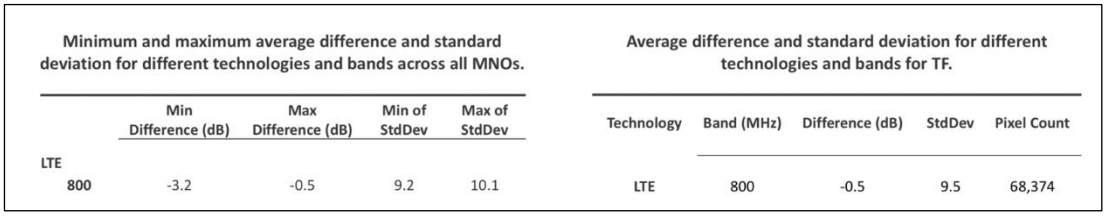
64. Telefonica will respond to Ofcom's consultation on coverage methodology in due course. For now, we note that Ofcom's proposed approach to assessing compliance is arbitrary, not objective, risks leading to the inefficient distribution of spectrum, would provide consumers with misleading information about levels of coverage and appears to be inconsistent with Ofcom's statutory duties.

65. Telefonica strongly recommends that Ofcom works with operators to agree a single, common and objective coverage assessment model for all operators. This should be done in advance of any award of coverage obligations so that each operator can then be baselined using one model, with clarity over what will be required of them to meet the coverage obligation.

Telefonica's coverage modelling accuracy is high, relative to its competitors, and Ofcom risks misleading itself by relying on unrealistic coverage estimates

66. Telefonica has a track record of being more accurate than other UK operators when predicting coverage. This is illustrated by Ofcom's own drive test analysis of coverage, shown in Figure 3, which found that Telefonica's predicted and coverage in the 800 MHz band was the most accurate out of all the MNOs, with a difference of only -0.5dB. The least accurate operator had a difference of -3.2dB. This is a significant difference; we calculate that a -3dB difference modelled on our current network would result in a predicted coverage level of [✂], or [✂] on our current modelled coverage.

Figure 3: Accuracy of operator coverage claims based on Ofcom drive tests



Minimum and maximum average difference and standard deviation for different technologies and bands across all MNOs.

	Min Difference (dB)	Max Difference (dB)	Min of StdDev	Max of StdDev
LTE 800	-3.2	-0.5	9.2	10.1

Average difference and standard deviation for different technologies and bands for TF.

Technology	Band (MHz)	Difference (dB)	StdDev	Pixel Count
LTE	800	-0.5	9.5	68,374

Source: Ofcom, Statistical comparison of MNO predictions with field measurements for different technologies and bands

67. As mentioned above, Telefonica believes that Ofcom and the operators need to collaborate and agree a common and realistic model for estimating coverage for the purposes of this auction. This would help to provide a more accurate level of coverage; and one which would reflect the coverage consumers actually experience. It would also create an objective starting position for Ofcom to assess the costs of increasing mobile coverage.

68. Ofcom also believes that each of the operators will reach 82% coverage in the long-term. Telefonica does not recognise this level of coverage as a realistic 'end-state'. Our own modelling suggests that the maximum landmass coverage that we will achieve if investing on a commercial (unsubsidised basis) is [✂].

69. [✂] In other words, Ofcom has under-estimated the number of sites required to deliver its 90% coverage target.

70. Telefonica has gained considerable expertise in designing and measuring network performance and we would welcome the opportunity to share this with Ofcom in reviewing the approach to improving mobile coverage.

Ofcom has under-estimated the number of sites required to increase landmass coverage

71. We note that, in the consultation, Ofcom increased its estimate of sites needed to reach 90% landmass from 500-700 sites up to 500-1000 sites (compared to its previous assessment), based on a baseline of 82% landmass coverage [δ4.110]. We believe this to be still too few sites, both because Ofcom has over-estimated the starting point and because it has not considered the difficulty of providing coverage in these more remote rural environments.

72. Ofcom forecasts the number of sites required to go from 80% to 90% coverage to be 600-1,100 and from 84%-90% to be 300-700 [δA14.8]. Further, Ofcom expects operators to require 100 sites to expand coverage from 80%-82%. This suggests that Ofcom would model the total sites required to grow from 82% to 84% as 200-300 sites.

73. Telefonica has modelled the number of sites it believes would be required to expand coverage to various levels. In Table 2, below, we present our results as comparators to Ofcom's quoted site volume estimates.

74. Column A-D summarises Ofcom's results. Columns A and B summarise Ofcom's estimated minimum and maximum total sites required to grow coverage from 80%-82%, 82%-84% and 84%-90% (100, 200-300 and 300-700, respectively). Columns C and D

summarise Ofcom's forecast minimum and maximum cumulative total sites required to build from 80%. This covers building from 80%-82%, 80%-84% and 80%-90% (100, 300-400 and 600-1,100 sites, respectively).

75. Similarly, Column E covers Telefonica's forecast site requirements to grow coverage from 80%-82%, 82%-84% and 84%-90% [✂]. Column F summarises the cumulative total sites required to build from 80%. We forecast that expanding landmass coverage from 80%-82%, 80%-84% and 80%-90%, would require [✂], respectively.

Table 2: Summary of Ofcom's proposed site volume requirements for growing landmass coverage, and a comparison to Telefonica's own forecasts

	Ofcom				Telefonica	
	(A) Min total sites required	(B) Max total sites required	(C) Cumulative min sites required from 80%	(D) Cumulative max sites required from 80%	(E) Total sites required	(F) Cumulative sites required from 80%
80%-82%	100	100	100	100	[✂]	[✂]
82%-84%	200	300	300	400	[✂]	[✂]
84%-90%	300	700	600	1,100	[✂]	[✂]

76. If we consider the data in columns A, B and E in Table 2, and divide these site requirements by the total number of percentage points of coverage growth in each row, we can estimate an average number of sites required per percentage point, starting at different levels, as forecast by Ofcom (columns A and B) and Telefonica (column E). Table 3 summarises the results of this analysis.

Table 3: Summary of Ofcom's proposed site volume requirements for growing landmass coverage, and a comparison to Telefonica's own forecasts, split by percentage points

	Ofcom		Telefonica UK
	(A) Min sites required per percentage point	(B) Max sites required per percentage point	(E) Sites required per percentage point
80%-81%	50	50	[✂]
81%-82%	50	50	[✂]
82%-83%	100	150	[✂]
83%-84%	100	150	[✂]
84%-85%	50	117	[✂]
85%-86%	50	117	[✂]
86%-87%	50	117	[✂]
87%-88%	50	117	[✂]
88%-89%	50	117	[✂]
89%-90%	50	117	[✂]

77. Ofcom forecasts that to expand coverage from 80%- 82% would require 100 sites, which implies that, on average. 50 sites would be required to expand coverage from 80%- 81% and 50 sites to expand coverage from 81%- 82%. Ofcom's forecast then suggests that it would take 100-150 sites to expand coverage from 82%- 83% and another 100-150 from 83% to 84%. Finally, Ofcom's forecast suggests that would take 50-117 sites to grow coverage from 84%- 85%, and each percentage point thereafter.

78. By comparison, Telefonica forecasts that it would require [✂] sites to grow coverage from 80%-81%, and another [✂] for each percentage point up to 84%. Telefonica forecasts that it would require [✂] sites to expand coverage from 84%-85%, and then another [✂] sites for each percentage point up to 90%.

79. Telefonica's assessment is based on its significant expertise, rooted in operating its UK network. We are convinced of the validity of our results. We attach our modelling with this response.

80. We believe that the total number of sites required to build more coverage should grow as coverage levels grow. This aligns with Ofcom's projection that the number of required sites will grow from 50 between 81%-82% coverage to 100-150 between 82%-83%. However, Telefonica does not agree with Ofcom that this number should fall again to 50-

117 for 84-85% and each percentage point thereafter to 90%, as implied by Ofcom's numbers. In other words, the principle of diminishing marginal returns applies to increasing mobile coverage[12]; it doesn't mysteriously cease to apply from 84% mobile coverage.

81. Had Ofcom not incorrectly forecast that the required additional number of sites to increase incremental coverage falls beyond 84% coverage and, instead, maintained an assumption of 100-150 sites per percentage point between 84%-90%, it would have projected that the total number of sites required to expand coverage from 80% to 90% was 900-1,300 sites.[13] We think this is a more realistic assessment, but still too low. Based on our experience of operating our UK network, we think it more likely that the number of sites required for each percentage point grows as coverage levels grow. As seen in Table 2, our own forecast is that [✂] sites will be required to expand coverage from 80% to 90%.

82. In addition, as we set out above, we also believe that Ofcom has incorrectly set its counterfactual at 80% by June 2019. [✂].

83. We forecast that it would require [✂] sites to expand coverage from [✂] to [✂]. This is a cost that Telefonica plans to make in the long-term. As such, we agree with Ofcom that this can be partially discounted from the counterfactual for considering the coverage obligation. However, it should be noted that, under Ofcom's proposed obligation, these sites must also be built in the timeframe required as part of the coverage obligation, thus raising further concerns about the feasibility of deployment.

Ofcom has under-estimated the cost of complying with the coverage obligation

84. There are significant risks to any operator accepting a coverage obligation. Some of these have been partially addressed in Ofcom's cost analysis, but ultimately an operator will need to consider the risk that meeting the obligation may be significantly more expensive and take longer than high level modelling suggests.

85. Meeting Ofcom's requirement would mean deploying into remote and sometimes extreme geographies that Telefonica has found in practice to be far more difficult and expensive to deploy, compared to other site builds:

- Risks begin in the planning stage, where planning models are designed and optimised against typical deployment scenarios, and may carry assumptions that do not hold, for example, in mountainous areas.
- Costs for build, transmission and power are then likely to be higher than average. We have assumed some uplift in our modelling, as has Ofcom, but at this stage there is a risk that costs will escalate as deployment moves into the hardest areas.
- Once a site is built, it is possible that more maintenance will be required during the 20-year window than we would expect. Sites in extreme environments may need

[12] Because the terrain becomes increasingly difficult to cover, limiting the extent of coverage that can be achieved with each site.
[13] Lower range becomes (50x2 + 8x100) = 900; Upper range becomes (50x2 + 8x150) = 1,300.

more frequent, more expensive maintenance visits than implied by a historical view of costs in current networks.

86. There are other risks that are common to any network planning exercise of this scale. Real world deployment will be less efficient than a model's optimised site placement. Furthermore, local communities may object to new mast locations, leading to a less efficient, more costly or time-consuming alternatives.

[✂]

87. Taking the above into account, we believe that Ofcom has under-estimated the total cost to provide 90% landmass coverage. Assuming an average 20-year NPV cost per site of £395,000[14] and [✂] sites required to increase coverage from a level of [✂] to 90%, the total cost to meet the coverage obligation would be [✂]

88. [✂].

89. [✂].

90. [✂].

Ofcom's current proposal will likely result in public funds being inefficiently allocated to BT
[✂]

91. BT is at an explicit advantage relative to other operators in bidding for the coverage obligation because of its starting coverage level and expected access to ESN sites.

92. We agree with Ofcom that:

> "*if BT/EE won one of the proposed obligations, it would deliver a smaller incremental increase in geographic coverage compared to other operators. This could suggest it would deliver a lower social benefit in comparison to the other operators, as the smaller incremental increase in coverage would benefit a smaller number of additional consumers in total*." [δA11.115]

93. However, we disagree with Ofcom's assessment that the 140,000 premises requirement (or the 500 new site requirement) will lead to an equalising effect across operators in terms of the social benefit delivered [δA11.116]. Ofcom suggests the premises requirement equalising effect is two-fold:

> "*It would ensure that the minimum incremental increase in outdoor premises coverage delivered is the same regardless of which operator delivers the obligation; and*
>
> *While BT/EE would deliver a smaller incremental increase in geographic coverage in getting to 90%, BT/EE is more likely than the other operators to cover at least some premises in total not-spots in order to meet the premises requirement, where the*

[14] Which is Ofcom's assumption. See §4.110. Telefonica considers it likely that sites needed to extend coverage in more remote areas would be more costly

benefits of extending coverage are higher per direct beneficiary (although the total number of beneficiaries may be smaller).” [δA11.117]

94. We disagree with both of these points. Although the proposal provides that 140,000 premises would be delivered by any operator, it ignores that operators other than BT will likely need to deliver to more than 140,000 premises in order to meet the geographic requirement. As such, they would provide a greater level of social benefit than BT. Secondly, Ofcom itself suggests that BT can reach the 90% landmass coverage required by building only in locations which are Partial Not-Spots:

    “We estimate that any one operator could achieve 91% geographic coverage by just rolling out in existing partial not-spots.” [δA11.77]

95. This coverage will likely include 140,000 new premises. Therefore, the social benefit per direct beneficiary will not be greater than if another operator delivered it. Rather, the social benefit from each of Telefonica, Vodafone or H3G providing additional coverage would be greater than the benefit provided by BT. Ofcom has failed to develop a proposal which creates equal amounts of social benefit regardless of the operator that wins the obligation lots.

96. Given BT’s higher baseline coverage, it will have a lower cost to provide coverage than the other operators. The negative coverage obligation price will therefore if BT bids for a coverage lot, the price of that lot will always close at a point which provides BT with a greater level of excess subsidy (negative price of the obligation minus costs) than the other operators. This would be, essentially, a windfall profit at the public expense.

97. [✂]

98. Ofcom’s assessment of cost differentials within the mobile industry[15] is cursory and is no basis on which to determine how coverage obligations are to be allocated. Instead, a thorough, quantitative assessment is required.

[✂]

Given the requirement to build from below Ofcom’s assumed counterfactual, the proposed timeframe for compliance is insufficient

99. Ofcom proposed that the coverage obligation requirements must be met within four years. Telefonica has reviewed its own speed of deployment in rural and remote areas and concluded that four years is insufficient.

100. We begin by considering the feasibility to deploy the 500-1,000 sites Ofcom currently forecast to be required to meet the obligation. Our current run-rate for new sites is about [✂] sites per month[16]. This would imply that 500-1,000 sites could be met in the proposed timeframe. However, this may not be a representative run rate for deploying rural coverage sites. Our experience deploying in the Scottish Highlands and Islands has been that we deployed only about [✂] per month while pursuing our 2013 98%

[15] §4.120 – 4.124 refer

[16] In addition to the time required to plan site builds, which can take 12-18 months

population coverage obligation. Applying this as a proxy implies that it would require more than [✂] years to deploy 500 sites, and more than [✂] years to deploy 1,000.

101. A shorter timeframe to build would mean that operators would need to consider planning for more sites than required, in recognition of the risk that some will not be deliverable within the timeframe (owing to site location agreement issues, unsuitable deployment sites, issues over planning permission, etc.). This would increase costs, resulting in a cost per site more than Ofcom's assumption of £395,000.

102. [✂]. As each operator would need to build up to 82% and then keep building to 90% in order to meet the obligation, as we set out above, the total number of sites would exceed Ofcom's estimate of 500-1,000 sites. We estimate that Telefonica would need an incremental [✂] sites just to reach 82% coverage, and then a further [✂] sites to get from 82% to 90%. Thus, in total, Telefonica would need to build around [✂] sites to meet the coverage obligation. Starting immediately (which is unrealistic) and delivering at an average rate of [✂] sites deployed per month implies that it would take at least [✂] years to deploy all of the sites.

103. [✂]

IV. COMPETITION ASSESMENT

104. Telefónica welcomes Ofcom's continued commitment to the 37% overall cap, consistent with its decision in the PSSR award. Ofcom successfully defended this position in the courts against an appeal by H3G and so maintaining the same cap is both justified and important for stakeholder confidence in consistent decision making. The 37% cap is not, however, by itself a sufficient measure to fulfil Ofcom's obligations to promote an efficient pro-competitive auction outcome. In this section, we make the case for additional "precautionary caps" which would provide a further level of protection against undesirable strategic bidding in the auction and bad auction outcomes.

105. As illustrated in

106. Table 2, the current distribution of mobile spectrum between operators in the UK is highly asymmetric, both in general and in specific segments. Ofcom recognises that significant spectrum asymmetry is a potential threat to downstream competition. It should also recognise that such asymmetries create an imbalance between bidders in an auction, creating increased risk for players with lower holdings and opening up strategic options for bidders who may not need additional spectrum in particular bands.

Table 4: UK MNOs % share of usable spectrum by type

	Low band Sub-1.5 GHz (all)	**Lower mid-band (4G*) 1500-3000 MHz**	**Upper mid band (5G*) 3000-5000 MHz**	**All usable mobile spectrum**
BT / EE	6%	51%	15%	32%
H3G	18%	12%	52%	25%
Telefónica	32%	15%	15%	18%
Vodafone	44%	21%	19%	25%
Available (MHz)	169.6	477	270	916.6

*Source: NERA report (Annex A). Notes: Based on MNO holdings and available spectrum in 700, 800, 900, 1400, 1800, 2100, 2300, 2600, 3400 and 3600 MHz bands. The same bands as identified in Section 5 of the Ofcom consultation. Percentages may not add up to 100% due to rounding. * Distinction between 4G and 5G spectrum is relevant for the launch of 5G services.*

107. The four operators will not enter the auction on a level playing field. BT has a general advantage in spectrum and with respect to the coverage obligation (owing to the ESN contract), which it may be able to leverage to win more than its efficient share. H3G has a big advantage in 5G capacity spectrum. As NERA show in their report, [✂]. Vodafone is in the opposite position, having a very strong position in low band spectrum (below 1.5 MHz) but requiring more 5G spectrum [✂]

108. In a report accompanying this submission, NERA makes a helpful distinction between "competition caps" and "precautionary caps":

- ***Competition caps*** *– these are caps designed to support broader policy goals in relation to competition in the downstream market, for example Ofcom's 37% cap on holdings of usable mobile spectrum with the aim of preserving a 4-player market*; and
- "***Precautionary caps*** *– these are caps set in the context of a specific award that are designed to eliminate extreme outcomes, such as one or two bidders acquiring a disproportionate share of all the newly available spectrum and/or blocking one or more rivals from a key band."*

109. In the consultation, Ofcom sets out its framework for assessing whether competition measures in the award are both warranted and then, if required, appropriate and proportionate. Before describing that framework, Ofcom limits the scope of competition remedies to ones which try to "*address post-auction distributions of spectrum holdings that could weaken future competition in the mobile market*" [δ5.28]. Thus, it only considers the case for competition caps and ignores the case for precautionary caps.

110. In the past we have seen competition remedies such as: overall spectrum caps, spectrum floors (minimum spectrum reserved for specific classes of bidders) and band specific caps. What the 2013 award demonstrates is that the competition measures themselves can affect how bids are made in an auction. [✂]

111. Consequently, Ofcom should also have regard to how any competition remedy (or lack of) might lead to positive or negative consequences in the conduct of the auction itself. In the following paragraphs, we make the case for additional precautionary caps, designed to prevent certain highly asymmetric allocation outcomes and close off options for strategic bidding. These are the same caps proposed by NERA in their report.

112. Specifically, we make the case that, in order to comply with its primary duty in this award to secure optimal spectrum, Ofcom must implement:

- the 37% total cap as proposed;
- a 40 MHz cap across the two 700 MHz bands, which should ensure a minimum of two winning bidders;
- a 80 MHz cap for 3.6 GHz spectrum available in the auction, which should ensure a minimum of two winning bidders; and
- a 140MHz cap on total spectrum ownership in the 3.4-3.8 GHz band as this is the only way to comply with its duty to secure the optimal use of spectrum.

113. These caps will be most effective if implemented alongside our other recommendations for the auction design, as set out in Section VI, including:

- revisiting Ofcom's ALF proposals for 3.4 GHz [✂]; and
- allocating 3.6 GHz in a separate bidding stage from 700 MHz, but within the same auction, and using an SMRA format to award 3.6 GHz.

The threshold for intervention

114. Ofcom sets out its threshold for intervening to preserve the level of competition in the mobile market in the consultation [δ5.19]. Ofcom states its concerns should an existing MNO no longer be credible following the award of spectrum in this auction.

> *"If the number of MNOs were to decrease from four to three, <u>any</u> resulting weakening of competition could be long lasting and difficult to reverse, as new entrants might face high barriers to entry even if competition was not working as well for consumers, such as through higher prices or less innovation."* (our emphasis)

115. The consultation continues by being more precise in discriminating between the elimination of a competitor ("*there ceasing to be four credible MNOs as a result of the auction*") versus "*the likelihood of very asymmetric mobile spectrum shares weakening competition (even if there are four credible MNOs).*" [δ5.72]. Ofcom concludes that elimination of an MNO is unlikely but believes that the strength of competition is the important factor at issue here.

General comments on the use of caps to safeguard competition

116. In the consultation, Ofcom discusses how an auction might lead to negative consequences for consumers if bidding based on strategic value (for example from damaging or blocking rivals) dominated over bidding based on the intrinsic value of spectrum to the firm [δ5.45 onwards].

117. Ofcom states that:

> *"In line with our duties, we want to allocate spectrum in a way that leads to an efficient use of this scarce resource and promotes competition. We consider that auctioning the spectrum is generally the best way to achieve this."* [δ5.45 onwards]
>
> and
>
> *"Where the bidding is based on strategic value, there is generally no trade off and the outcome is likely to be harmful for consumers."* [δ 5.49]

118. In some cases, it may be hard to determine ex ante whether a bidder is likely to have the incentives to bid strategically. We understand that Ofcom might have concerns that using any competition measure could constrain a bidder's ability to bid based solely on intrinsic value. However, Ofcom fails to consider the likelihood that any bid options eliminated by precautionary caps will be relevant for either the efficient allocation or price determination. Eliminating bid options that are likely irrelevant has a low cost, but may have a substantial upside if this closes off the potential for strategic bidding that could prevent the auction delivering an efficient outcome and fair pricing.

119. Analysis in the NERA report [✂] We also show that there is no plausible risk that any meaningful competition measure relating to 3.4-3.6 GHz would have the negative effect of restricting H3G's acquisition of further spectrum if its demand were based solely on intrinsic value.

The persistence of competition effects is also important

120. Ofcom identifies that it needs to secure outcomes in this award that secure competition for the long term:

> *"In general, we are also more concerned about significant asymmetries that persist in the medium to longer term than in the very short term, particularly as we do not currently have any plans to award further low frequency and mid frequency spectrum in the medium term."* [δ5.81]

121. Having regard for competition in the short-run, as it will affect competition in the long run, was a central pillar of Ofcom's reasoning in the 2018 PSSR award, specifically around spectrum caps.

122. In its analysis for the PSSR award, Ofcom focussed on ensuring that there was adequate competition in three different temporal periods (short, medium and long). Ofcom set specific remedies to address preserving competition in the short run, in the PSSR Statement[17], so as to secure competition in the long run:

> *"… it is not only the number of competitors that matters – the strength of competition between those MNOs is also important."*[18]

123. Ofcom continues at in the PSSR Statement:

> *"We consider that although retaining four credible MNOs is an important contributor to competition, it does not, on its own, guarantee that the market is as competitive as it might be. Even if there are four credible MNOs, competition could be weaker as a result of a very asymmetric distribution of spectrum because some operators may struggle to compete strongly across certain services, for certain customer segments, or temporarily over some period of time."*[19] (our emphasis)

124. By contrast, in this auction Ofcom appears to trust to luck, technological progress, the passage of time or uncertainties over use cases to solve any issue that could have a meaningful impact on competition in the market as a whole or for a specific set of customers.

125. The risk of regulatory failure is very high in circumstances where one market participant (H3G) already has a large contiguous block of spectrum for 5G that none of its competitors can replicate without H3G's co-operation. At worst, consumers would have to wait five years for 100 MHz based competitive MBB services, if Ofcom were to fall back to serving H3G with 5 years' notice on its existing licences in order to discharge its spectrum management duties. Ofcom should keep in mind that H3G has already

[17] Award of the 2.3 and 3.4 GHz spectrum bands Competition issues and Auction Regulations, Ofcom 11 July 2017. See: 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

[18] δ6.12

[19] δ6.13

demonstrated its willingness to undertake litigation that was unsuccessful but nevertheless delayed spectrum coming to the market for use by competitors.

126. Ofcom itself accepts that it would find it very hard to undo this regulatory failure should it arise [δ5.81]. Telefónica finds Ofcom's current approach to addressing this risk as alarming, given what is at stake – four-player competition for the long run. Ofcom must ensure that four player competition exists at all times, in all market segments, for all relevant services.

127. Ofcom must ensure that after the auction takes place there is effective competition for 5G services. It does not have the luxury of hoping that technological developments of the passage of time will allow alternative solutions to be accessible by competitors to H3G. Four-player competition at the network level must be secured in the short as well as the long term.

Asymmetry in 5G spectrum

128. In the consultation, Ofcom accepts that a substantial asymmetric holding of 3.4-3.8GHz spectrum could cause competition concerns:

> *"Given H3G's large current holdings of 3.4-3.8 GHz (140 MHz), significant asymmetry in the band could arise if it acquired a large portion of the remaining 120 MHz in this auction. It could end up with around two thirds of the spectrum in the band."* [δ5.236]
>
> *"Nonetheless, for this to be a concern there would need to be evidence that large holdings of this band would give an advantage that cannot be matched with holdings of any other band."* [δ5.237]

129. Ofcom already has the evidence for this, in the form of CEPT report ECC287, completed in October 2018, which highlights the importance of all operators having access to contiguous bandwidth of up to 100 MHz. We are surprised that this report is not even referenced in this consultation.

130. In Ofcom's most recent International Spectrum Stakeholders Briefing of 20th December, Ofcom introduced the final version of this report in its briefing slides as follows :

> *"ECC Report 287 on the defragmentation of the band 3400-3800 MHz - complements the activities on 5G for the band 3400-3800 MHz. <u>The major changes to Annex 1 on the benefits of large blocks and contiguous spectrum.</u>"* (our emphasis)

131. The key paragraphs of the report are as follows:

> *"2.3 IMPORTANCE OF TIMELY AVAILABILITY OF WIDE CONTIGUOUS SPECTRUM FOR 5G*
>
> *3GPP plans to complete 5G Release 15 in June 2018, thus equipment is expected to be available in 2018. Provision of 5G services supporting channel bandwidth up to 100 MHz, based on 3GPP R15 standard, could be enabled by the end of 2018, if sufficient contiguous spectrum is made available to enable operation of MFCN with wide channel bandwidth. As well as sufficient contiguous spectrum, actual deployment also depends on many other technical and commercial aspects for the operators.*
>
> *It is important for licensees to have access to large contiguous channels, supporting a variety of applications with high data rates and/or low latency and improved user experience. In the interest of technology neutrality, this band should also allow for smaller bandwidths in multiples of 5 MHz if there is market demand for such applications on a national basis – as shown in recent awards in this band.*
>
> *Administrations should allow for the availability of large contiguous blocks of spectrum and should consider prompt action if problems arise resulting from fragmented usage of the 3400-3800 MHz band to enable timely 5G rollout."* (our emphasis)

132. The actions of Ofcom need to be "prompt" – to secure competition in the short term, such that there is a vibrant four player market for all 5G services. CEPT believes that fragmentation at 3.4-3.8 GHz will delay rollout of these services.

133. Moving onto the new Annex 1 highlighted by Ofcom at the ISSB meeting:

> *"A1.1 5G-NR IS DESIGNED FOR LARGE BANDWIDTHS*
>
> *By design, 5G NR will optimally support wideband operation, allowing operators to take full advantage of larger allocations of contiguous spectrum to increase peak rates and user experience, with manageable terminal complexity and minimal power consumption (e.g. without requiring carrier aggregation in case of New Radio).*
>
> *5G NR on large bandwidths will reduce terminal front end complexity and power consumption, compared to LTE using multiple 5 to 20 MHz carrier aggregations to exploit a similar large bandwidth. Wideband carriers and flexibility in sub-carrier spacing result in an efficient RF front-end for NR, and in addition baseband processing with improved power consumption per Mbit/s and per MHz. LTE can use Carrier Aggregation to aggregate multiple 20 MHz channels, but as the number of channels to be aggregated increases, LTE will become less efficient than a 5G-NR system which is designed to inherently leverage wideband TDD deployments and massive MIMO.*
>
> *5G NR will also bring the ability to "multiplex" new forward compatible services with limited impact on eMBB capacity needs, and the ability to deliver simultaneous wireless backhauling and front-hauling capabilities to 5G NR base station. A wide bandwidth channel will significantly facilitate the use of these capabilities and therefore contribute to the faster introduction of new services.*

Finally, it is worth noting that the key element for successful deployment of massive MIMO and active antennas is the availability of large contiguous bandwidths, as this will enable absolute gains from massive MIMO to support new usages related to eMBB." (our emphasis)

134. Please see section V below on defragmentation of the 3.4-3.8 GHz band, in particular paras 156-160, regarding the performance and cost impacts of large contiguous bandwidths not being made available

The focus of strategic behaviour is obvious

135. [✂]

136. As we show in Section VI and articulated in more detail in the NERA report, Ofcom's proposed CCA design as currently constructed invites strategic bidding. There is therefore a compelling case to introduce a 140 MHz cap at 3.4-3.8 GHz [✂].

A 140MHz 3.4-3.8GHz cap would not distort the outcome of the award

137. There is little risk that imposing a cap of 140 MHz would distort the outcome of the auction. This is because H3G's intrinsic demand for additional spectrum (if it has any at the reserve price) will almost certainly be less that the incremental demand of the other three bidders for increasing their holdings up to 100 MHz.[20] Thus, it is highly unlikely that H3G's bids for any spectrum at 3.6 GHz would be relevant for setting efficient prices, and even less likely they would feature in an efficient outcome. On the contrary, [✂]

138. Our argument that Ofcom can reasonably expect that H3G has low intrinsic value for increasing its 3.6 GHz holdings is reinforced by:

- an analysis of H3G's behaviour in the PSSR award; and
- an analysis of outcomes in other European auctions.

139. In the PSSR award, H3G exhibited a lower willingness to pay for additional spectrum than all other bidders, acquiring only 20 MHz when others acquired between 40 MHz and 80 MHz each. Given that all bidders will have anticipated the availability of further 3.6 GHz spectrum in their bids, this outcome implies a low likelihood that H3G would have value for further spectrum. Moreover, since the PSSR award, much of the uncertainty over the future usability of H3G's spectrum acquired from UKB has been removed, increasing the value of its 3.6GHz spectrum and consequently further weakening the marginal value to H3G of acquiring further 3.6GHz spectrum.

140. In all other European awards of 3.4-3.8 GHz held to date, where the full band (i.e. 300 MHz or more) has been released, no operator has secured a position of more than 140 MHz and no operator has secured less than 80 MHz. The norm in competitive auctions is from 80-100 MHz. This is illustrated in Table 5. We note, in particular, that in Austria

[20] Ofcom is aware of H3G's letter to Telefonica of 14 February 2019 regarding "the possibility of spectrum trading in the 3.4-3.8 GHz band"

and Ireland, H3G's sister companies acquired only 100 MHz each, and were apparently outbid by regional FWA players for incremental bandwidth in excess of this amount.

Table 5: 3.4 – 3.8 GHz holdings by operator in European countries that have released 300 MHz or more for mobile use

Operator	Country	3.4-3.8 GHz holdings
A1 Telekom	Austria	100 to 140 MHz*
Hutchison Drei	Austria	100 MHz
T-Mobile	Austria	110 MHz
DNA Plc	Finland	130 MHz
Elisa Corporation	Finland	130 MHz
Telia Finland Oyj	Finland	130 MHz
Meteor Mobile Communications Ltd	Ireland	80 to 85 MHz[+]
Three Ireland (Hutchison) Ltd	Ireland	100 MHz
Vodafone Ireland Ltd	Ireland	85 to 105 MHz[º]
Orange Espagne S.A.U.	Spain	100 MHz
Telefónica Móviles España S.A.U.	Spain	90 MHz
MásMóvil Ibercom, S.A.	Spain	80 MHz
Vodafone España S.A.U.	Spain	90 MHz
Salt	Switzerland	80 MHz
Sunrise	Switzerland	100 MHz
Swisscom	Switzerland	120 MHz

Source: Regulator documents

Notes: The maximum holdings by country per MNO are highlighted pink, and the minimum holdings are highlighted blue.

* A1 Telekom's holdings vary by region, from a maximum of 140 MHz (Vienna urban area) to 100 MHz (in Upper Austria, City of Salzburg, Province Salzburg, and Styria).

[+] Meteor Mobile Communications Ltd holdings vary by region, from a minimum of 80 MHz in rural areas to a maximum of 85 MHz in urban areas.

[º] Vodafone Ireland's holdings vary by region, from a minimum of 85 MHz in rural areas to a maximum of 105 MHz in urban areas.

141. Therefore, Ofcom should have no concerns that, based on intrinsic valuations, H3G would win any more 3.4-3.8GHz spectrum. The net impact on H3G of the cap is nil [✂], as it demonstrably does not have the intrinsic valuations to justify further spectrum purchase. The cap is required to safeguard competition in 5G with H3G, removing the ability for H3G to bid strategically.

142. We note that in several places in the consultation, Ofcom expresses the hope that spectrum trading could solve regulatory failures in this process. If the 140MHz cap were

set only for this auction then it would be open to H3G to swap spectrum at the margins after the auction, if this were profitable to do so.

A 140MHz 3.4-3.8GHz cap could also reduce risks and inefficiencies in the CCA proposed by Ofcom

143. It is worth recalling Ofcom's duties at this point:

> *"Our [Ofcom's] main duty in relation to our spectrum management functions is to secure optimal use of the spectrum." [δ2.38]* (our emphasis)

144. The word secure is very important as it flows from the relevant legislation; s3(2) of the Communications Act 2003:

> *"(2) The things which, by virtue of subsection (1), OFCOM are required to secure in the carrying out of their functions include, in particular, each of the following—*
>
> *(a) the optimal use for wireless telegraphy of the electro-magnetic spectrum;"* (our emphasis)

145. At [7.82] Ofcom states that CCAs are prone to price driving strategies, specifically where a bidder can bid with virtual impunity on large amounts of spectrum it does not wish to win and has no real prospect of winning, just to place opportunity cost on opponents:

> *"….bidders may have more of an incentive to submit price driving bids in a CCA, compared to an SMRA. In part, this is because a bidder's final price in a CCA is unaffected by its own non-winning bids. In contrast, if a bidder submits bids for a larger number of lots than desired in an SMRA, and wins a smaller amount of lots, then they may increase their own final prices."*

146. This risk is particularly relevant to the 3.6 GHz auction, for the reasons explained at length in the NERA report.

147. Ofcom's current proposals for 3.4GHz ALF [✂]. As we show above, it has no need for that spectrum nor does it have the intrinsic valuations to justify bidding.

148. In Telefónica's response to the ALF consultation, we highlight the inconsistency in the ALF proposal with Ofcom's stated desire [✂]. Stakeholders expect and will ensure consistent decision making by Ofcom.

149. So far, Ofcom has set up this auction and the linked decision on ALF to [✂]

150. Setting up the award in this way is at odds with Ofcom's stated intention for its proposed CCA design:

> *"We want to incentivise straightforward bidding as this promotes the optimal use of spectrum."* [δ7.151]

151. This of course should read "secure the optimal use of spectrum" in line with the statute. Ofcom does not have the luxury of nudging bidders to behave properly; it must **secure** that its auction design delivers the optimal use of the spectrum.

152. One of Ofcom's key objectives for this auction is to ensure that bidders place bids in a straightforward manner that makes for efficient price discovery. Ofcom recognises this in the consultation when discussing the desirability of straightforward bidding:

> *"….participants in the auction should have confidence in the fairness of the process and the final outcome. To achieve our objectives, we seek to incentivise straightforward bidding and to allow bidders to express their preferences as bidding progresses……"* (our emphasis) [δ 7.8]

153. As we state above, given that there is no plausible scenario in which H3G's intrinsic marginal valuations in this band are above those of its competitors, [✂]

V. DEFRAGMENTATION OF THE 3.4-3.8 GHZ BAND

Defragmentation of the 3.4-3.8 GHz band is crucial to unlock the promise of 5G in the UK

154. Defragmentation of the 3.4-3.8 GHz band should be a policy priority for Ofcom as it enables operators to fully deliver on the promise of 5G. Ofcom appears to agree with us in the Consultation that the best outcome for UK consumers would be to defragment the band and that at least 80MHz of contiguous spectrum is desirable for 5G [δ6.3]. Unless it takes concrete measures to encourage and, if necessary, oblige operators to defragment the band, Ofcom risks an outcome in which only a subset of operators can offer the best 5G services, whereas in other countries in Europe, all network operators will typically have this advantage. Put differently, failure to defragment the band risks condemning the UK to the 5G slow lane.

155. Defragmentation of the 3.4-3.8GHz band is particularly important because of the requirements of 5G. Without this, the UK risks missing out of some of the potential of 5G. A likely outcome of failing to tackle the defragmentation would be delays to future 5G use cases, such as Industry 4.0, IoT etc., and lower speeds for the average consumer. As such, it is crucial that Ofcom sets up this award process in such a way as to facilitate operators being able to trade and achieve contiguity.

156. Evidence over the issues caused by defragmentation was provided in our response to the consultation regarding the variation of UK Broadband's spectrum.[21] We summarise some of this evidence here:

a) Reduced performance of 5G networks:

- Smaller bandwidths would drastically lower the feasible peak throughputs experienced by consumers. Consumers have been promised faster connectivity – forcing operators to use smaller carriers will prevent improvements in customer experience and risks damaging consumer sentiment towards 5G. Carrier aggregation may (eventually) be able to partially mitigate this, but the majority of the UK population may not benefit as devices will either be more expensive (inter-band CA) or not available (intra-band CA).
- Smaller carriers may result in capacity loss of up to 15%, even when both carriers are deployed on a site. 5G has long promised the potential for consumers to use their phones more as network capacities grow. Operators with fragmented spectrum may not be able to offer a comparable allowance, or they may be forced into allowing customer experience to degrade owing to congestion. Either of these outcomes is inefficient and would limit consumer welfare.
- Equipment manufacturers are currently offering Massive MIMO products with 100MHz to 200 MHz bandwidths on their roadmaps. Discontiguous spectrum will require larger, specialist bandwidth equipment which will likely be delivered later by equipment manufacturers, if at all. We are particularly concerned that

[21] https://www.ofcom.org.uk/consultations-and-statements/category-2/variation-uk-broadbands-spectrum-access-licence-3.6-ghz

as almost every country in Europe appears to moving to ensure all their operators have contiguous 5G spectrum, there will not be a strong market for equipment for operators with discontiguous bandwidth within the 3.4-3.8 GHz band. Discontiguity therefore risks delaying the benefits of 5G to consumers and increasing the costs of providing this later. Telefonica believes that this would be entirely inconsistent with the Government's aspirations for 5G.

- As equipment manufacturers release new features to improve network performance, these will be released first for equipment with 100MHz or 200MHz bandwidths. As such, consumers and businesses using the networks of operators with discontiguous spectrum may miss out on the benefits of these enhanced features. These new features will also be the foundational 5G capabilities that allow for the development of new, innovative, use cases and allow the UK to realise the benefits of 5G.

b) Higher costs of deployment, limiting total deployment potential:

- Operators with discontiguous spectrum will have higher costs, and their cost to deploy per site will be higher than an operator with contiguous spectrum. Operators with limited budgets may need to limit the volume of 5G sites deployed in order to meet specific financial constraints.
- Specialist equipment for discontiguous spectrum will inherently be more expensive because manufacturers will be delivering a bespoke product. We believe the majority of operators in the rest of Europe and worldwide will hold contiguous spectrum in this band.
- Until specialist, larger bandwidth products become available, operators will need to deploy two active antennas per sector to use both discontiguous carriers. As well as the major cost impact, many sites will not have sufficient space to support the extra antenna. Operators therefore risk buying spectrum that they are unable to use, which will negatively impact the value they attribute to this spectrum. 5G may fail to deliver the promised performance benefits to consumers because operators are physically unable to build the equipment. A solution may be to build a new site for the equipment to be built on, but this is both uneconomically expensive and often infeasible given limited locations for site deployment in dense urban locations. The investment may also be wasted if the opportunity to trade for contiguous spectrum (perhaps as a result of government intervention after the downside become more clear) follows later.

157. We agree with Ofcom that some of these issues may be a symptom of early stage 5G technology [δ6.10]. However, operators who hold discontiguous spectrum with a large bandwidth separation risk being unable to use all of their spectrum on a single antenna even in the long term. We agree with Ofcom that 200MHz bandwidth active antenna equipment is likely to appear soon (Ofcom suggests with a year) as it is currently on vendor roadmaps [δA7.48]. Ofcom suggests that 300MHz equipment will eventually become available. We agree this will likely happen but it is important to recognise that: (a) this is not on any major equipment manufacturers current roadmaps and (b) the equipment's release will be far later than that of 100MHz or 200MHz IBW equipment.

Ofcom suggests the equipment will be available in the "near-future" [δA7.48], but that is not a satisfactory timescale for operators with 5G deployment plans starting in 2019. We also agree with Ofcom that 400MHz active antenna systems are unlikely to ever become available owing to the filtering requirements [δA7.48]. As such, it is essential that Ofcom acts to prevent scenarios where operators end up with >300MHz gaps between their spectrum, and strongly advisable that it finds ways to prevent outcomes with >200MHz gaps.

158. Intra-band carrier aggregation in theory may allow for operators to use all of their acquired 3.4-3.8 GHz spectrum. We agree with Ofcom's assessment that intra-band carrier aggregation is not yet specified in the 5G standards and is unlikely to be supported in early 5G devices [δA7.46]. This means that operators with discontiguous spectrum may not be able to unlock the full benefit of 5G for many years.

159. Inter-band carrier aggregation may provide the capability for some speed benefits at an earlier stage than intra-band carrier aggregation. However, we note that there are many limitations to this:

- Devices which can use inter-band carrier aggregation may be limited to high end, expensive devices – this risks isolating the benefit of 5G to a limited number of individuals and would fails to deliver the promise of 5G to the mass-market.
- Operators may have a limited volume of spectrum that could be used for inter-band carrier aggregation. Telefonica notes that in Release 15, the spectrum Telefonica bought at the last auction (40MHz of 2.3GHz) has not been standardised for aggregation. This would prevent us from being able to use this spectrum in earlier deployments. Owing to the exceptional asymmetry in holding of mid-band spectrum in the UK, it is even more important than in other countries that Ofcom acts on defragmentation, because the intra-band solutions available elsewhere may not be possible for some operators in the UK.

160. Whilst some technical issues may dissipate in the long-term, Telefonica believes that the UK benefits most if operators are incentivised to deploy 5G equipment immediately. With the potential discontiguity issues, this would mean operators spending considerable investment on equipment that will not be refreshed for a considerable time and thus would not provide UK consumers with the full benefits of 5G in the near-term.

Creating an efficient assignment round is crucial in this auction

161. Given the obvious concerns regarding discontiguity, it is essential that Ofcom creates an award process which facilitates the defragmentation of the 3.4-3.8GHz band. Failure to do so risks reducing the value that 5G promises to unlock to UK consumers and businesses, contrary to the Government's objective of the UK being a global leader in 5G.

162. Within the context of the award of 3.6 GHz, there are three main steps that Ofcom could take to make it more likely that the award outcome facilitates rather than forecloses defragmentation. Firstly, it is important that 3.6 GHz is sold in a separate stage of the award, so as to remove the risk that the outcome is distorted by strategic bidding across bands and coverage lots (see discussion in Section VI). Secondly, Ofcom should introduce precautionary caps that eliminate options for strategic bidding, especially price driving.

The most effective cap would be a 140 MHz on holdings across the 3.4-3.8 GHz range, [✂] (see Section IV). Finally, Ofcom must act to create a set of rules for the assignment stage that enables trades and avoids operators being held to ransom by their peers. We focus on the assignment stage in this section.

163. We are pleased Ofcom recognise that there will be benefits from defragmenting the band, and that Ofcom says it will "*look favourably on any trades which supported defragmentation of the band*" [δ6.39]. We urge Ofcom to go a step further and make clear that it would not look favourably on trades that would defragment the band for only a subset of operators if these appear to be designed to exclude other operators whose spectrum could also be defragmented at low cost to all involved.

164. We strongly object to Ofcom's default approach of using its standard second price sealed bid auction for the assignment of 3.6 GHz. As NERA point out in their report, this format was developed to assign frequencies to winning bidders in situations where the value differences between assignment options are modest, for example because there are small differences in the vulnerability of specific frequencies to interference. It was not designed to cope with situations where intrinsic value differences between underlying frequencies are likely to be dwarfed by the strategic value of securing or blocking options to trade spectrum so as to secure contiguous blocks.

165. If Ofcom proceeds with the current approach, it risks an inefficient outcome where operators are unable to trade or are incentivised to bid for suboptimal positions:

- Under the current structure of assignment round, no operator has any guarantee that they can achieve contiguity with the operator they would like to be next to, so as to facilitate an efficient trade. They will not know if their potential partner has secured a suitable quantity of spectrum and they will have no visibility regarding that partner's preference for frequency positions. Operators will be able to identify certain options that are more likely to be adjacent to a partner. However, the likely result is that potential trading partners will end up competing for the same position. Worse, other operators that could benefits from blocking trades also can identify these locations, so may submit bids based on the strategic value of breaking apart potential trading partners. In these circumstances, whether an assignment bidding round might produce an efficient solution that facilitates full band defragmentation would be a matter of chance.
- Under the proposed assignment structure, operators winning spectrum in the principal stage can only have certainty that bidding for the bottom block in the assignment round will mean that they will be next to H3G – as such, operators contiguous with H3G (all existing 3.4GHz holders) may bid large values for this certainty, even if there other possible assignment outcomes that would actually benefit them more. This will distort the bidding process and could lead to one operator paying a large amount of money purely as an entry ticket to negotiations with H3G to engage in an exclusive defragmentation deal.
- This lack of certainty and the risk of bidding for inefficient locations under a single-round, sealed bid structure may mean that operators may be unwilling and unable to bid their full value for particular locations. The reality is that assignment value will be contingent on adjacencies and on operators' willingness to trade. Operators

will obviously differ in their risk perspective. This increases the likelihood that the outcome is random and bares no real relation to intrinsic value.

- Finally, it is quite likely that the assignment round produces an outcome in which one or two operators pay heavily for band positions that enable them to trade. Operators will expect a return on this investment, and this may make them much less amenable to negotiating a broader defragmentation, as opposed to deals that exclude rivals. Already, Ofcom's decision to run an assignment round for 3.4 GHz has become just such a barrier, as it led to H3G and BT paying substantial amounts for specific frequency locations, based on bids that were likely based on enhancing their options for future spectrum trades, rather than any real differences in the underlying value of the frequencies.

166. In its attached report, NERA argues that the best way to defragment the band would either be full band reassignment (i.e. an assignment round that includes all 3.4-3.8 GHz holdings) or industry consensus on a series of trades that would give all operators contiguous holdings. They point out the costs for operators of moving frequencies within the band are small, and there is currently a unique window to achieve defragmentation before operators make substantial investments in deploying 5G kit at specific frequencies ranges. NERA highlights a number of examples of regulators in other countries successfully working with industry to facilitate defragmentation of spectrum bands. This includes an example in the United States, where the property rights associated with spectrum are arguably stronger than in any other jurisdiction. For an example closer to home, Ofcom could look to Spain, where we are advised by Telefonica Group colleagues that the regulator will shortly announce an industry-wide plan to defragment their 3.4-3.8 GHz band. Telefonica Spain anticipates being an enthusiastic participant in this plan.

Ofcom needs to be consistent and insist that bidders consent to a variation of frequencies as a condition of entry into the auction

167. The main barrier to a negotiated solution to defragmentation appears to be the position of H3G's existing holdings. [✂].

168. However, as NERA point out in their Report at §5.4, there is a simple way to seek to mitigation against the risks posed by the fragmentation of the 3.4-3.8 GHz band: to require bidders, as a condition of entry into the auction, to consent to variation of the frequency ranges of any existing spectrum licences they may hold for the band to ensure an efficient distribution of holdings once the auction is completed.

169. In Ofcom's recent decision to vary H3G's UK Broadband 3.6 GHz licence, dated 14 December 2018, Ofcom took a very similar approach.

170. In that Decision, Ofcom reasoned that the variation of H3G's UK Broadband licence so as to move the lower limit down from 3605 MHz to 3689 MHz and the upper limit down from 3689 MHz to 3680 MHz did not involve the award of any rights to use radio frequencies, but was a swap of spectrum with the same technical characteristics (§4.167). That swap was desirable, in Ofcom's view, because among other things it gave

H3G a 100 MHz contiguous block of spectrum without a less usable 5 MHz block in the middle; [✂] Ofcom preferred a solution which decreased fragmentation (a solution which was of course to H3G's advantage).

171. The same reasoning applies to post-auction variation of existing licences. To require an existing licensee to consent to such a variation in order to bid in the award is not to require them to consent to surrendering any spectrum, but to consent to a swap of spectrum with the same technical characteristics. To adopt the metaphor of the 3.4-3.8 GHz band as a shared bookshelf: Ofcom would not be requiring bidders to give up the books they already own on that shelf, but to agree that those books can be rearranged in a sensible pattern on the shelf once the auction has been completed.

172. We urge Ofcom to impose a requirement of this nature as a condition for entering the auction. It is, on Ofcom's own reasoning in the UK Broadband variation decision, consistent with Ofcom powers; and there is no question of depriving existing licensees of existing rights to use radio frequencies. H3G, as the existing licensee in the 3.4-3.8 GHz band, could not justifiably complain, having been the beneficiary of such an approach in the UK Broadband decision. And it would be wholly unfair and inconsistent with Ofcom's duties of regulatory consistency and non-discrimination for Ofcom to do otherwise. Having allocated to H3G a crucial 5 MHz holding at 3600-5 MHz in the interests of defragmentation, on the grounds that that allocation involved a shift in H3G's existing holding rather than any award of new rights, Ofcom must adopt the same approach in this auction, to seek to ensure that other operators also benefit from contiguous holdings.

173. Moreover, in the same way that Ofcom has proposed to use revenues from this auction to support coverage obligations, it could use them to offer compensation for the (minimal) costs of moving frequencies and (where appropriate) refund of 3.4 GHz assignment round fees from the PSSR auction.

174. Without prejudice to that, there are specific measures that Ofcom could adopt with respect to the assignment round, to make defragmentation more likely.

175. Firstly, we support Ofcom's Option 1, to "*Restrict the assignment of any bidder who wins a small amount of spectrum to either the top or the bottom of the band*":

- We suggest that Ofcom ensures that in the scenario where H3G wins any 3.6 GHz that these frequencies are placed adjacent to its existing holdings. Any other assignment would be obviously inefficient. [✂].
- In the unlikely event that a bidder without any existing 3.4-3.8 GHz spectrum acquires a small amount of spectrum, Telefonica believes that the most efficient location for them would be at the top of the band. Such a rule would prevent speculators from being able to target spectrum in the middle of the band and extract rent from the industry in return for participating in defragmentation. This rule also reduces the likelihood that an existing license holder could be left with spectrum spread over a bandwidth greater than 300MHz (i.e. greater than the bandwidth that Ofcom expect to ever be possible to carry on an active antenna). We believe that

such a rule would be harmless to a new operator that is buying the spectrum with an actual intention of deployment.

176. We also support Option 2, which would make provision for "*Bidders* [to] *agree their assignments on a commercial basis, as a possible alternative to the assignment stage*":

- Telefonica believes that a period for negotiation between allocation and assignment would provide the best opportunity for defragmentation of the band [δ6.52]. This approach is much more likely to produce an efficient outcome than a blind assignment stage in which bidders are submitting bids based on the hope rather than certainty of positioning themselves for future trades. It would allow operators to test the appetite of other operators for specific swaps and provide the environment to expedite defragmentation of the band.
- [✂] As such, Ofcom should allow for a scenario where some, but not all, of the principal stage winners want to enter the negotiation round. For example, as NERA propose in their report, Ofcom should allow for a possibility that two or more operators reach an agreement in the negotiation round, such that their combination of spectrum in the principal stage spectrum is considered as a single block in the assignment round.
- We believe a negotiation window of 2 weeks would be sufficient to reach an outcome (and this could be cut short if agreement is reached between all operators earlier). This would not result in any meaningful delay in deployment of the new spectrum.

177. Ofcom's Option 3: "*Contingent bidding in the assignment stage*", merits further exploration as a back-up option if industry negotiation fails:

- It is apparent that operators may place high value on having certainty about the operators located in adjacent spectrum, so as to facilitate trades. Allowing bidders to bid contingent on their position relative to others may therefore facilitate a more efficient bid set. In order to do this in an assignment round, not only it is crucial to be able to bid to be next to a specific bidder, but also to be able to bid on the full layout of the band. Even when having contiguity with a potential swap partner, certain locations within the band will be more valuable than others. This is due to the possible divergent incentives of the two swap partners. Full contingent bidding of this sort could only be implemented effectively in an assignment round where bidders bid on the full arrangement of the band, as opposed to only their location within in. This could be done by considering the full (likely limited) range of options for the possible band maps and having operators bid for their preferred full assignments. For example, if two bidders won lots, there would be 2 possible assignment options; if there were three winners there would be 6 options; If there were four winners there would be 24 options, and so on.
- Telefonica believes that this approach is less likely to produce an efficient outcome that having a negotiation period (Option 2). However, having a version of this approach as a back-up option if industry negotiation fails may provide an incentive for operators (or at least a subset of operators) to reach productive agreements in the negotiation round.

- This approach is rather novel, and Ofcom would need to think very carefully about the rules, so as to minimise the risk that the outcome is distorted by strategic, rent-seeking behaviour. Ofcom must also consider the fact that bidders would still be bidding for options to conclude trades with no certainty that the trades would follow, so valuations for bid options would be inherently uncertain (albeit less so than under Ofcom's standard assignment round rules).

178. If Ofcom is unwilling to properly address the issue of defragmentation then it may be that a large proportion of the value of 3.6 GHz spectrum is driven by each bidder's location in the band and the ability to swap with other bidders. In these circumstances, a single-round sealed bid round may be insufficient as it would create excessive risk for bidders. The assignment round itself would need to facilitate price discovery that did not happen in the principal stage, implying a multiple round format. This would make the assignment round process more complex than the principal stage, suggesting to us that Ofcom needs to grasp the nettle of securing band defragmentation, whether through industry negotiation or a full-band reassignment.

179. For further discussion of the options available to Ofcom to improve the assignment round, we refer you to the relevant section of the NERA report.

VI. AUCTION DESIGN

180. Telefonica strongly objects to Ofcom's proposal to award 700 MHz and 3.5 GHz together in a multi-band auction using the combinatorial clock auction (CCA) format. Auction design should be as simple as possible subject to fulfilling obligations. Ofcom design is needlessly complex, generates unnecessary risk for bidders and fails to address obvious concerns about asymmetries between the bidders. It exposes bidders to unacceptable risk of high and asymmetric prices, and an inefficient auction outcome. There are other approaches that can better fulfil Ofcom's objectives for the award and would not expose potential efficient winners of prime spectrum to bad outcomes.

181. The prime objective for this award is to secure an efficient pro-competitive allocation of 3.6 GHz and 700 MHz spectrum. Any other objectives, including distributing funds to support an extension of geographic coverage, must be secondary to this prime objective. An efficient, pro-competitive auction outcome will almost certainly involve a further reduction in asymmetry in spectrum holdings, building on Ofcom's successful award of 2.3 and 3.4 GHz spectrum in 2018.

182. [✂]. As such, our objectives and Ofcom's objectives for the auction should be aligned. We should both want an auction that encourages straightforward bidding based on intrinsic valuations. We believe that comments we set out below are all consistent with Ofcom's objectives for the award.

Auction format

183. Telefonica has no confidence in the ability of Ofcom's proposed multi-band CCA design to deliver an efficient auction outcome:

- We fear that Ofcom's format will encourage aggressive bidding tactics, [✂]
- There is a significant likelihood that this format will require bidders to make large bids, well above true market value, to secure preferred packages. [✂] The result may be an inefficient allocation that fails to address or even worsens spectrum asymmetries.

184. These are not abstract concerns. [✂]

185. It was the use of the CCA format in a multi-band setting that led directly to this outcome. [✂]

186. The big loser of the 2013 auction was not a mobile operator, but rather UK mobile users and society more generally. [✂] (meanwhile, BT/EE conspicuously failed to deploy all of the 2.5 GHz spectrum that they acquired). Consumers in general lost out [✂] Other operators may also have taken their 'eye off the ball' because they thought their spectrum advantage would translate into a bigger advantage in the market than eventuated.

187. We hoped that Ofcom had learned from this experience when it embraced an SMRA format for the PSSR award. That award produced an outcome that – unlike 2013 – is easy to rationalize on efficiency grounds: it diminished asymmetries and put spectrum

into the hands of operators that most obviously needed it. This success can be attributed directly to the format which produced a competitive process, with good price discovery and reasonably straightforward bidding. [✂]

188. [✂]

[✂]

Alternative auction structures

189. Given our staunch opposition to the proposal to award 700 MHz and 3.6 GHz in a multi-band CCA, we commissioned the economic consultancy NERA to explore alternative formats that could fulfil Ofcom's objectives for this award. The auctions team at NERA have exceptional experience on this topic, having supported governments and bidders worldwide in more than 40 spectrum auctions over the last 10 years. Their report is attached as Annex A to this response.

190. NERA agreed with us that a multi-band CCA is not a good format for this award:

> "*We find that Ofcom has overstated some of the disadvantages of the SMRA, while understating the disadvantages of the CCA. In particular, Ofcom has failed to appreciate the vulnerability of its proposed CCA design to extreme outcomes that could exacerbate asymmetry in spectrum allocation. We conclude that the CCA should not be used to award 3.6 GHz. The CCA could work in a more limited context for awarding coverage obligations together with 700 MHz*."

191. They highlight multiple risks associated with using a CCA for this award:

> *"The CCA is higher risk* [compared to the SMRA] *for Ofcom and for bidders, has greater scope for strategic behaviour, and is more likely to produce inefficient outcomes. In particular, multi-band auctions using the CCA format are vulnerable to extreme outcomes that conflict with pre-auction expectations and are hard to relate to allocative efficiency. This is a particularly risky approach if – as in the UK – existing spectrum allocations are highly asymmetric and there is an expectation that the auction should address this.*
>
> *The CCA is particularly susceptible to price driving, especially where bidders have predictable asymmetric demands (e.g. as the case at 3.4 GHz* [✂]. *Price-driving can damage competition in the auction and may lead to auction outcomes that reduce competition in the mobile market.*
>
> *Budget-constrained bidders do not have a mechanism in a CCA to measure the risk of bidding to value. With a multi-band award, even bidders with high budgets could find themselves unable to express their full values* [✂] *This may lead to inefficient outcomes with 'unhappy' budget-constrained bidders – contrary to the core principle. Smaller-scale CCAs (e.g. an auction for 700 MHz and coverage only) are less vulnerable to this risk because budgets are less likely to be breached."*

192. NERA propose two alternative formats:

1. **Two-stage allocation:** A separate bidding stage for 3.6 GHz using an SMRA format; followed by smaller-scale CCA for 700 MHz and coverage obligations but taking into revenues from the 3.6 GHz auction stage in the positive price constraint.
2. **Three-stage allocation.** A 3.6 GHz allocation stage (SMRA); followed by a 700 MHz allocation stage (SMRA); and finally, a coverage obligation allocation stage (second price sealed bid). We propose a voucher mechanism that would enable all bidders to compete for the coverage obligations while avoiding the any requirement for Ofcom to make subsidy payments.

193. Both approaches described by NERA would be acceptable to Telefonica. We prefer the fully sequential option B, but we recognise that option A may be easier for Ofcom, given it is a relatively modest departure from its current proposal. Telefonica would prefer that a CCA is not used for any stage of this award process, [✂]

194. For us, the two most important aspects of NERA's approaches are that:

- **The sale of 3.6 GHz is separated from 700 MHz within the same award process**. These two bands are not closely linked (they are neither substitutes nor strong complements) and selling them in the same bidding stage invites strategic bidding that could distort the final allocation. The scale of a combined auction also increases risk for bidders unnecessarily.
- **An SMRA rather than CCA is used to sell 3.6 GHz.** The same arguments that led Ofcom to adopt at SMRA for the PSSR band obviously apply to this band too. Moreover, the UK's 5G future is closely tied to the successful allocation of remaining 3.6 GHz spectrum. Ofcom should not risk using a format that may encourage aggressive bidding and could produce a very asymmetric outcome. There is also no obvious rationale for using a format that could charge operators different prices for acquiring 3.6 GHz spectrum.

195. We note that Ofcom has not provided any strong rationale for selling 700 MHz and 3.6 GHz together in the same auction. The proposal to sell them in the same allocation stage seems to be driven by convenience and a desire to take advantage of the combined revenues to cover the costs of the coverage obligations. These are not good reasons given the same benefits without the costs could be achieved by selling them in separate allocation stages in the same award. Selling them separately would also be more in line with the European norm: in a survey of 21 EU countries that have announced plans or held auctions for 700 MHz and 3.6 GHz, we identified 16 that decided to sell the bands separately and only 5 that will sell them jointly.[22] To date, the UK is the only country to propose a combines award using a CCA format.

Coverage obligations

196. We support the general principle that funds raised in spectrum auctions can be repurposed to fund an expansion of mobile networks to geographic areas that would otherwise not be served. Ofcom's proposal to sell coverage obligations that are separate from spectrum blocks is clever, and a significant improvement on its previous plan to

[22] Survey undertaken by Telefonica Group Spectrum Team in February 2019 using data from Sources: GSMAi, Telegeography, PolicyTracker and Cullen.

bundle spectrum and coverage. Unfortunately, as previously discussed, we do not think that Ofcom's plan will work as the maximum subsidy available to a single operator is too small to cover the costs of the require rollout.

197. [✂] Unlike other operators, BT may have a commercial case to acquire an obligation because it is already being paid to extend the ESN to some of the same territory. In effect, Ofcom's format will offer BT a double subsidy. This is not just unfair but it threatens to undermine the efficiency of the auction. BT may able to leverage its unique strength in coverage to grab not just the subsidy but a larger quantity of spectrum in the auction than it would in an efficient approach. Given that BT already has a lot more spectrum than any other operator, this should be a big concern.

198. Telefonica's preference is that coverage is addressed outside the auction via an operator agreement to build a single rural network. A single network in non-commercial areas would be cheaper to build (thus requiring less overall subsidy) and would allow all customers of UK operators to benefits from the extension of mobile services. If Ofcom still wants to pursue coverage obligations in the auction, then it should rethink the design of the obligations. It could, for example, allow two operators to form consortium to build a network together and/or break up the obligations into smaller regions, so as to make them more accessible. Such flexibility could be achieved without distorting the award of spectrum if the obligations are sold in a separate auction stage as proposed under NERA's option B.

Spectrum caps

199. Spectrum caps are the most powerful tool available to Ofcom to eliminate extreme allocation outcomes that would almost certainly be inefficient, and likely only possible because bidders are not competing based on intrinsic values. In their report, NERA say that if Ofcom proceeds with its proposal to use a multi-band CCA, it would be reckless not to impose precautionary caps that preclude extreme outcomes and limit scope for overbidding. They say that if Ofcom is not willing to implement such caps, then it must switch to an SMRA format so as to reduce the risk that the auction produces an extreme allocation outcome. We strongly agree. Ideally, Ofcom should use both an SMRA and precautionary spectrum caps.

200. In their report, NERA make a distinction between precautionary caps, which are specific to an award and designed to eliminate extreme outcomes that are unlikely to be efficient, and competition-based caps, which are designed to preclude outcomes that would generate obvious competition concerns in the downstream market. Ofcom's 37% cap works as a competition cap but it imposes only minimal constraints on bidders, and leaves open the possibility that the auction produces strange outcomes that significant increase spectrum asymmetry, either generally or in specific frequency types. Ofcom needs to take a fresh look at the case for additional, precautionary caps, which we believe is exceptionally strong for this award.

201. NERA has proposed three precautionary spectrum caps in addition to Ofcom's 37% general cap:

- band-specific caps of 80 MHz cap at 3.6 GHz band and 40 MHz at 700 MHz (paired + SDL), so as to ensure a minimum of two winners in every band; and
- a 140 MHz cap on holdings of spectrum in the wider 3.4-3.8 GHz band, so as to prevent undue concentration of core 5G spectrum in the hands of one operator.

202. The band-specific caps offer obvious benefits to everyone (intending to bid non-strategically) and should not be controversial. They are symmetric across all bidders. They would not impose a meaningful constraint on any bidder that is following a value-based bid strategy. We agree with NERA that there is no plausible business case based on intrinsic value in which a single bidder would win more than 40 MHz at 700 MHz or 80 MHz at 3.6 GHz, given the needs of other operators, so the likelihood that such caps preclude an efficient outcome is minimal. The caps are pro-competitive as they will ensure that the auction produces at least two winners at 3.6 GHz and two winners at 700 MHz. They should also discourage strategic bidding for large packages[✂]

203. The 140 MHz cap across the wider 3.4-3.8 GHz band may more controversial, as it would constrain one operator, H3G, more than the others. We understand that Ofcom is reluctant to constrain H3G when BT has more spectrum overall. However, Ofcom also presents arguments that de facto imply that it agrees with us that H3G has no obvious business case to acquire more spectrum. Ofcom should be more worried about the auction failing to deliver an efficient distribution to bidders who need more 5G spectrum than about closing off hypothetical scenarios where H3G need twice as much 5G spectrum as everyone else. A precautionary cap that stops H3G from increasing its already huge holdings in the core 5G band reduces the risk of a bad auction outcome [✂]

204. Ofcom has an objective to "*enable the industry to provide services with greater capacity … and to pave the way for companies to take advantage of new wireless technologies, including 5G*." It is widely recognised right now that every operator requires a strong position in 5G spectrum. H3G has that position already, whereas other operators may need to acquire more spectrum in this auction to be competitive. The current belief in the industry is that operators ideally require 80-100 MHz of contiguous spectrum. [✂] Ofcom has the power to prevent such outcomes with a simple precautionary cap of 140 MHz per operator.

ALF for 3.4 GHz and 3.6 GHz spectrum

205. In our response to the consultation on ALF for H3G's holdings in the 3.4 GHz and 3.6 GHz bands, we made the case that it would be unlawful for Ofcom not to retain an option to revisit fees after the 3.6 GHz auction. Ofcom has previously said that the price of 3.6 GHz spectrum in the next auction is a relevant – indeed, Ofcom appears to agree with TUK, the *'best'* – benchmark for ALF. Not only that, but in its decision to vary H3G's UKB licence on 14 December 2018, Ofcom awarded H3G new rights of use at 3600-3605 MHz, which are of strategic importance and which would otherwise have been available in the 3.6 GHz auction, on the basis that these would be priced in light of the results of that auction and were a simple "swap" for spectrum that would be released into the auction.

206. Given the delay in the auction, we agreed that ALF should be applied on H3G before the auction, based on the 3.4 GHz result. Nevertheless, this is not a good reason to ignore a forthcoming benchmark that will be exceptionally relevant. Ofcom must expressly

preserve an option to revise ALF if the auction produces a price outcome that is materially higher or lower than the 3.4 GHz price. To do otherwise (i) could lead to a situation in which H3G is paying a price well above or below market value, and (ii) would destroy the foundations of Ofcom's argument that the award of 3600-3605 MHz to H3G is compliant with the Authorisation Directive, giving grounds for challenging that award also.

207. Ofcom has a statutory duty not to discriminate between operators. Granting spectrum to H3G at a price lower than that paid by other operators – especially in a situation where it has larger, non-fragmented holdings than other operators that are better suited for optimal 5G deployment – would be discriminatory, in breach of Ofcom's statutory duty. Similarly, closing off the option to revisit fees after the 3.6 GHz award could mean an even larger discount for H3G going forward. This, in our view, is bad policy, contradicts what Ofcom has said it would do, previously, and would be contrary to Ofcom's statutory duties to ensure an efficient allocation of spectrum (which, according to Ofcom, requires setting ALF at market value in this band) and ensure regulation is not discriminatory.

208. If Ofcom adopts its proposed fee methodology and rules out any revision to ALFs following the 3.6 GHz auction, [✂]

209. We recognise that the potential for ALF to be linked to the auction outcome may also create a demand reduction incentive for H3G. However, this is not so different to the position of other bidders within the auction who must consider the risk that demanding too much could drive their own price. Moreover, H3G already has 140 MHz, so it is rather unlikely that measures that may encourage it to bid less aggressively could affect the efficient outcome or price. [✂].

Lot sizes and eligibility points

210. In their report, NERA supports the proposal to package 700 MHZ paired in 2x5 MHz lots but proposes that Ofcom consider larger lot sizes for 3.6 GHz and 700 MHz SDL, more aligned with likely use cases. Specifically, they propose selling 3.6 GHz as 12 blocks of 10 MHz, not 24 blocks of 5 MHz, and 700 MHz SDL as two blocks of 10 MHz. Telefonica supports these changes. The choice of small blocks appears to be driven by the use of a CCA, but we do not need the flexibility to bid on smaller lots, and larger lots would work better if Ofcom switches to an SMRA.

211. Along with a change in lot structure, we recommend that Ofcom review its approach to eligibility points within the 700 MHz band. We propose a 1:1 eligibility points ratio in the 700 MHz band between 2x5 MHz paired lots and 10 MHz SDL lots. This would allow bidders to switch between these lots based on capacity. To the extent these bands are substitutes, which they may be once the price difference becomes large enough, this will be on a MHz basis. Any other ratio risks impeding efficient switching. There is no sensible points ratio between 3.6 GHz and 700 MHz, as these bands are not substitutes and should not be sold in the same auction stage.

Reserve prices and deposits

212. Telefonica's view is that reserve prices should be set well below the expected market price, so as to minimise any risk that spectrum goes unsold inefficiently and allow room for price discovery in an auction. For this award, we recognise Ofcom is selling spectrum in two bands that have obviously high value – 3.6 GHz and 700 MHz paired – for which there are readily available UK and European benchmarks. It is appropriate for Ofcom to take this information into account when setting reserve prices.

213. Telefonica would be comfortable with any level of reserve prices for 3.6 GHz and 700 MHz paired within the ranges proposed by Ofcom. For the avoidance of doubt, our expectation is that all spectrum in these bands would sell at these prices. We would still prefer prices at the lower end of Ofcom's range, so as to create more room for price disovery. However, we would also accept prices at the upper end if Ofcom deems this necessary to underpin revenues in the unlikely event of a low competition scenario. In particular, if Ofcom is concerned about incentives for demand reduction reducing revenues if an SMRA format is used, then the correct response is to adopt more robust reserve prices rather than switch to a format that may encourage more aggressive bidding behaviour.

214. The 700 MHz SDL is a special case, as there is no established ecosystem for this band. In the long term, it could be valuable but only if it is integrated into a majority of handsets. The value of this band is thus very uncertain and may be influenced by developments in the run up to the auction. Accordingly, we support Ofcom's proposal to set a low but non-trivial reserve price for this band and allow the market great freedom to set the price.

215. We support Ofcom's proposals to require substantial deposits and that it retains an option to ask for increases in deposits during the auction if appropriate.

Information policy

216. Information policy during an auction matters, both with respect to the information revealed directly to bidders and the information that can be inferred from this. Bidders in auctions for mobile spectrum typically have a substantial common value component. Relative outcomes between operators also matter. Accordingly, price discovery is very important, both to help bidders solidify their valuations and support internal approval processes.

217. Telefonica's general preference is for transparency. For example, we support Ofcom's policy of identifying all bidders (and their backers) before an auction and publishing all auction data after the award. It is also important that bidders receive information about the level of demand after each round of the auction. However, we recognise that there may sometimes be a trade-off between releasing information about bids made during an auction, so to promote price discovery, and restricting some information so as to foreclose options for strategic behaviour. Given the extreme asymmetry in spectrum holdings in the UK prior to the last auction, this was a relevant concern, and led us to support Ofcom's decision to publish round-by-round aggregate demand data as a range for each band.

218. More generally, it is important for governance that the auction process provides bidders with good information about the spectrum they could win and the price they could pay if the auction were to close in any particular round. This was the case for the 2.3 and 3.4 GHz auction, where winning bidders won their final round bids at the prevailing prices. In contrast, a major drawback of the CCA is that bidders may go into the supplementary round with little certainty regarding the package they might win and the price they might pay.

219. We are concerned that Ofcom thinks it can use information policy as an effective tool to mitigate strategic behaviour, such as price driving, in a CCA. This is not true. The only ways to stop such behaviour are to impose spectrum caps that eliminate such bids, or switch to an SMRA format that leaves bidders exposed to winning a subset of their strategic bids.

220. As NERA argue in their paper, restricting information policy would make more sense in an SMRA than a CCA:

> "*… Ofcom should not fool itself that tinkering with information rules will substantially lower the risks of strategic bidding. They are not a meaningful substitute for precautionary spectrum caps as a safeguard against a multi-band CCA producing extreme allocation outcomes that exacerbate spectrum asymmetry.*
>
> *In the context of a CCA, we are unconvinced that Ofcom's proposed limits on information are even helpful. They would do nothing to reduce incentives for price driving on large packages. They will also increase uncertainty for bidders about their ability to secure their final price outcome: while this may (helpfully) discourage price setting behaviour, it may also (unhelpfully) make life more difficult for bidders with budget constraints*…
>
> *…If Ofcom's ambition with these changes to information policy is to discourage unduly aggressive bidding, then it would be better off separating the sales of 3.6 GHz and 700 MHz, and using an SMRA instead of a CCA. Ofcom's proposal to only reveal demand in units of 20 MHz would make more sense in the context of an SMRA, as it may deter demand reduction at the margins*."

221. For these reasons, we oppose Ofcom's proposals to obscure aggregate demand data in the clock rounds of a CCA. For an SMRA, we prefer aggregate demand data is published in full, but restrictions similar to those used for the PSSR award would also be acceptable.

Other allocation stage auction rules

222. For other comments on the detailed auction rules, as set out in the "Notice of Ofcom's proposal to make regulations for the award of the 700 MHz and 3.6-3.8 GHz spectrum bands", we refer Ofcom to Section 7 of the NERA report. We note, in particular, NERA's suggestion that Ofcom drop the use of chain bids and revert instead to more standard revealed preference rules. This seems to us to be a good example of Ofcom not following its own advice that auction design should be as simple as possible. Should Ofcom proceed with a complex CCA (and we expect that it will not given the many problems with this approach that we have highlighted), we reserve the right to challenge other

aspects of the detailed rules, once we have had time to explore them further in the context of this award.

Assignment stage

223. Our views on the assignment round for the 3.6 GHz band are set out in the previous section on defragmenting the 3.4-3.8 GHz. In short, we do not believe that Ofcom's standard sealed bid second price format will work in this instance, because value differences between bid options are too large, and will likely reflect the value of strategic options to trade or block trades associated with defragmenting the band. Ofcom needs to rethink its entire approach with the objective of securing an assignment outcome that enables all operators to provide the highest quality 5G services to their customers as soon as possible.

224. For the two 700 MHz bands, we agree that Ofcom should implement its standard sealed bid format for the assignment round. We support the modest changes proposed by NERA in their report which would prioritise contiguity across the bands in case there is a bidder (or bidders) that win spectrum in both bands.

ANNEX A

Answers to specific questions

Question 1: (Section 4) Do you agree with our proposals on the coverage obligations as set out in this section? Please give reasons supported by evidence for your views.

No, we do not agree with Ofcom's proposals on coverage obligations, for the reasons set out in section 3 of this response.

Question 2: (Section 5) Do you agree that we have identified the correct competition concerns?

The potential concerns set out in paragraph 5.72 are sufficiently broad.

Question 3: (Section 5) Do you agree with our assessment of these competition concerns, and our proposed measure for addressing them? Please give reasons supported by evidence for your views.

No, for the reasons set out in section 4 of this response. In addition to the overall 37% cap, Ofcom should set precautionary caps for both frequencies in the auction and an overall cap of 140 MHz in the 3.4-3.8 GHz band. These would be modest regulatory interventions.

Question 4: (Section 6) Do you agree with our proposal to proceed with a conventional assignment stage?

No, for the reasons set out in section 5 of this response. In Telefonica's view, Ofcom should create an assignment process that will deliver defragmentation in the 3.4-3.8 GHz spectrum band. It has the power to do this. Failure to use that power would result in the sub-optimal allocation of spectrum (in breach of Ofcom's statutory duties), would not be in consumers' interests and would put the UK at a disadvantage, in stark contrast to the Government's 5G strategy.

Question 5: (Section 7) Do you agree with our proposal to use a CCA design for this award?

No, Telefonica strongly objects to Ofcom's proposal to award 700 MHz and 3.6 GHz together in a multi-band auction using the CCA format.

Question 6: (Section 7) Do you have any comments on the proposed detailed rules for our CCA design?

Section 6 of this response sets out Telefonica's specific concerns in relation to the proposed use of the CCA.

Question 7: (Section 8) Do you agree with our proposed approach to coexistence in the 700 MHz band?

We refer Ofcom to DMSL's response, on behalf of its shareholders

ANNEX B: NERA REPORT ON AUCTION FORMAT FOR THE AWARD OF THE 700 MHZ AND 3.6-3.8 GHZ SPECTRUM BANDS