

**TELEFÓNICA UK LIMITED RESPONSE TO:**

**“Variation of UK Broadband’s Spectrum Access Licence for 3.6 GHz Spectrum”**

**8 August 2018**

## I. INTRODUCTION

1. Telefónica UK Limited (“Telefónica”) welcomes the opportunity to respond to Ofcom’s consultation on Variation of UK Broadband’s Spectrum Access Licence for 3.6 GHz Spectrum<sup>1</sup> (“UKB 2018 Consultation”). The proposal in that Consultation is highly significant because it will have implications for the future use of the entire 3.4-3.8 GHz band, which will be the pioneer band for 5G rollout in the UK.
2. Telefónica strongly objects to the package of changes put forward by UK Broadband (UKB) and its parent company H3G. As a package, the proposals represent a very poor outcome for the United Kingdom. The terms of the variation transparently benefit one mobile operator (and its customers) at the expense of all other operators and consumers. They are contrary to UK Government’s goal of establishing the United Kingdom as a “*world leader in the development of 5G mobile networks and services.*”<sup>2</sup> The changes are also wrong in law, as they are inconsistent with Ofcom’s statutory duties, including its obligations to promote competition and the efficient use of spectrum.
3. Ofcom’s framework for analysing the proposed package of changes is, in our view, flawed in three fundamental ways. First, Ofcom fails to recognise that although H3G/UKB packages its request as a “variation”, it is in fact asking for is an award of spectrum at 3600-3605 MHz together in addition to a licence variation for its existing shared spectrum; this has important implications for Ofcom’s regulatory duties. Second, Ofcom fails to consider any options other than H3G/UKB’s demand and the status quo. Third, Ofcom ignores the incentives that the proposed changes will create for H3G/UKB to engage in strategic behaviour which is adverse to the broader interests of the United Kingdom. We address the flaws in Ofcom’s analytical framework in section 2 below.
4. Not all elements of the proposal are wrong. We support the general concept of “realigning” existing holdings to free up spectrum for 5G use. We also agree that UKB surrendering spectrum is a minimal precondition for it being granted a variation of its 3.6 GHz licence and access to spectrum contiguous with its 3.4 GHz holdings. However, the proposal to consolidate UKB holdings in isolation from a broader realignment of the entire 3.4-3.8 GHz band is unacceptable. Ofcom should also

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<sup>1</sup> <https://www.ofcom.org.uk/consultations-and-statements/category-2/variation-uk-broadbands-spectrum-access-licence-3.6-ghz>

<sup>2</sup> Department for Digital, Culture, Media & Sport (DCMS), Next Generation Mobile Technologies: An update to the 5G strategy for the UK, December 2017, p4.

consult on whether it is appropriate for UKB to have any of its 3.6 GHz spectrum renewed and, if it is, how much spectrum it should return given the limited nature of its original property rights and Ofcom's statutory duty to ensure that spectrum is used efficiently.

5. Telefónica's view is that a pre-auction award and licence variation should enable H3G to secure contiguous spectrum across all its holdings in the 3.4-3.8 GHz band, not just its upper 3.4 GHz holdings and 3.6 GHz holdings. The award and variation must also pave the way for all other operators to secure contiguous spectrum in the 3.4-3.8 GHz band. This could be achieved through a realignment of all long-term holdings in the band as part of the assignment round following the auction of 3.6 GHz spectrum. H3G should be obliged to sign up to such a realignment as the minimum price of Ofcom granting any new spectrum and varying the UKB licence to enable exclusive use (and so permit 5G deployment). Other holders of 3.4 GHz spectrum (i.e. BT, Telefónica and Vodafone) should also be obliged to commit to realignment as a condition of participation in the auction. Without such a realignment, it will likely be infeasible for any operator other than H3G to obtain a contiguous block of more than 50 MHz. For the reasons we set out in this paper, an outcome where only one operator has a large block of contiguous spectrum would not be an efficient allocation of the available spectrum and may raise long-term concerns about competition in the downstream market.
6. UKB, which was originally a fixed wireless provider, shares the 3.6 GHz band on a first-come-first-served (FCFS) basis with other registered users coordinated through Ofcom. In addition to the proposal to grant an entirely new right to use radio frequencies at 3600-3605 MHz, the licence variation would allow UKB's parent company H3G to convert 80 MHz of its 84 MHz holdings to exclusive use spectrum for mobile use, while other users must vacate the band. This is an exceptionally generous offer to H3G, which will realise a large windfall gain from the variation, and sets a new precedent for spectrum liberalisation within a shared band. Ofcom should not simply wave this proposal through without considering the implications for trading and liberalisation in other shared use bands. It should also spell out exactly why it thinks UKB should receive a licence for 80 MHz on a future exclusive use basis when it originally acquired a shared use licence for 84 MHz and has only deployed services to a small geographic area from London to Swindon.
7. One potential conclusion of such an analysis is that UKB should not be permitted to renew its 3.6 GHz spectrum, given the expected change in use. We recognise, however, that this is unlikely to be the best outcome for the United Kingdom, as H3G

may then insist on a 5-year notice period to discontinue its low-value UKB service. A more pragmatic approach would be for Ofcom to assume that a shared use licence of the type granted to UKB is equivalent to owning a proportion of the spectrum, e.g. about 50% of the spectrum. On spectrum management grounds, the ideal approach would be for Ofcom to require UKB to surrender 44 MHz of spectrum in return for the licence variation to exclusive use. This would mean that up to 160 MHz of 3.6 GHz spectrum could be made available in the auction. Under this scenario, with band realignment, H3G would still have 100 MHz of contiguous spectrum in the 3.4-3.8 GHz band, an amount sufficient to launch a maximum sized 5G carrier. It could also bid for more spectrum in the auction. Furthermore, there would now be sufficient spectrum for all four UK carriers to secure contiguous blocks of 80-100 MHz of spectrum – a potentially ideal scenario for the development of 5G services.

8. In this context, we consider that Ofcom’s impact assessment is inadequate and must be revisited. In addition to the three flaws in Ofcom’s analysis identified above, there are two main deficiencies in Ofcom’s analysis:
  1. **Failure to consider the entire 5G band.** Ofcom’s assessment narrowly focuses on 3.6-3.8 GHz instead of considering the 400 MHz from 3.4-3.8 GHz band as a single band. This approach is inconsistent with the reality of how the spectrum will be deployed for 5G and how other European regulators are approaching assignment of these frequencies. It is akin to failing to define the market correctly in a competition case.
  2. **Failure to consider the proportionality of the windfall gains associated with the licence variation.** Ofcom fails to consider whether the windfall gains it proposes to grant to H3G are proportionate and in the interests of the efficient use of spectrum. There is nothing wrong in principle with trading and change of use of spectrum resulting in windfall gains for spectrum rights holders; this may be in the broader interests of society if it leads to more efficient use of spectrum. However, potential gains should be consistent with the strength of the associated property rights. UKB has a shared access licence but it is being treated as if it holds a right to exclusive use. This is a bad deal for the taxpayer, which should be sharing any windfall from conversion of this spectrum to exclusive use. Ofcom should also not make an offer of variation without clarifying its approach to setting administrative incentive pricing (AIP) for all UKB holdings across the 3.4-3.8 GHz band.
9. These deficiencies lead directly to a series of mistakes in Ofcom’s analysis:

- a) Ofcom recognises that there could be benefits to H3G from having a contiguous block of 100 MHz. If this is true, then there must also be benefits to other operators from being able to establish large contiguous blocks, something that is precluded by Ofcom's proposal unless H3G also agrees to relocate its holdings. These potential lost benefits are ignored in Ofcom's assessment.
  - b) Ofcom mistakenly concludes that the variation is consistent with promoting the efficient use of spectrum. If one considers the 3.6 GHz band in isolation (as Ofcom does), this finding appears plausible as it will allow for more usable spectrum to be sold in the auction. However, when one considers that H3G would then be positioned to block all operators from securing a contiguous block of greater than 50 MHz for 5G, it is obvious that this outcome will not promote efficient use of spectrum across the wider 3.4-3.8 GHz band. It compares poorly to a counterfactual of whole band realignment, where up to four operators may secure contiguous holdings of 80 MHz or more.
  - c) Ofcom is wrong to conclude that the variation raises no long-term competition concerns. The variation as proposed would likely lead to a situation where only one operator (H3G) has a contiguous block of spectrum of more than 50 MHz. In the future, it may or may not be the case that other operators will be able to replicate H3G's advantage in 5G through inter- or intra-band carrier aggregation. The technology is not sufficiently developed for Ofcom or anyone else to draw a definitive conclusion. It is also possible that future technology evolutions require larger contiguous blocks, with the result that a single holder of a larger block has a unique competitive advantage. Ofcom should not be taking a risk on long-term competition, when there is an alternative approach (realignment) that could allow all operators to secure larger blocks of contiguous spectrum now.
10. The proposed award of new rights of use to H3G/UKB at 3600-3605 MHz fails to meet the requirements of Article 7 of the Authorisation Directive, as we explain in section II below. The proposal also fails all four of the legal tests identified by Ofcom:
1. It is not **objectively justifiable** because there is an obviously better approach available to Ofcom, namely requiring H3G to (a) return more frequencies, so that more spectrum can be included in the auction; and (b) participate in a

realignment of the entire 3.4-3.8 GHz band that enables multiple operators to secure large contiguous blocks for 5G.

2. It is **discriminatory** against all mobile operators (and their customers) other than H3G, as it (a) creates a situation where only H3G has access to a large block of contiguous spectrum; and (b) makes it possible for H3G to block all other operators from replicating its position.
  3. It is not **proportionate** as the variation would grant a huge windfall gain to H3G that is not commensurate with its property rights. Moreover, the efficiency benefits are inferior to those that could be achieved if whole band realignment was required.
  4. It is not **transparent** as Ofcom fails to consider the broader context of the 3.4-3.8 GHz band, and the potential economic impact of all operators other than H3G being blocked from securing larger contiguous blocks for 5G.
11. H3G has told Ofcom that it reserves the right to refuse its consent to a variation that includes only some and not all the elements requested. Ofcom should not make the mistake of assuming that H3G's "opening offer", as set out in UKB's application, is its best offer; nor should Ofcom allow itself to be bullied into accepting a variation that is manifestly not the best approach for replanning the wider 3.4-3.8 GHz band for 5G use. Ofcom is in the driving seat: if H3G will not accept a reasonable compromise (involving whole band realignment and the return of more spectrum), then Ofcom should call H3G's bluff and give 5 years notice that it will revoke its entire licence.
12. We recognise that disagreement over the terms of the UKB licence variation has the potential to delay the award of 3.6 GHz spectrum. We do not agree, however, that supporting the proposal offers a path of least resistance to an early auction, given that it is so obviously inconsistent with Ofcom's statutory duties. The whole award process would be delayed if the matter is subject to litigation. In the unlikely event that the variation is approved, H3G would then have an incentive, and arguably an obligation to its shareholders, to delay the 3.6 GHz auction so as to prolong its advantage in total 5G holdings and delay future payments of AIP based on the auction price outcome.
13. A much better approach would be for Ofcom to side now with the long-term interests of the UK economy, citizens and consumers and require H3G to accept a reasonable set of terms. In the unlikely event that H3G did not accept such an offer, Ofcom could

still proceed with selling all the 3.6 GHz spectrum, but with a requirement for new licensees to accommodate UKB's operations in its existing (limited) geographic footprint for a period of five years.

14. In the following sections, we provide further analysis in support of our position:

- In Section II, we identify three fundamental flaws in Ofcom's analytical framework.
- In Section III, we explore the potential benefits to an operator from having larger contiguous blocks of spectrum for 5G.
- In Section IV, we show that operators in most other European countries are set to secure large contiguous blocks of spectrum, with the implication that the proposed variation may impede the development of 5G in the UK relative to the rest of Europe.
- In Section V, we show how the UK could achieve an outcome of having up to four operators with large contiguous 5G holdings through realignment of existing holdings in the 3.4-3.8 GHz band.
- In Section VI, we argue that H3G's proposal to return just 4 MHz of spectrum is too little and explain why Ofcom has an obligation to ask for more.
- In Section VII, we show that the proposed variation fails to fulfil Ofcom's statutory duties with respect to efficient use of spectrum and promotion of long-term competition, and is contrary to its legal duties.

## II. FUNDAMENTAL FLAWS IN OFCOM'S ANALYTICAL FRAMEWORK

15. We consider that Ofcom's analytical framework, as set out in the UKB 2018 Consultation, is flawed in three fundamental ways.
16. First, Ofcom fails to recognise that its proposed "variation" of UKB's licence would in fact involve the award to H3G (via its subsidiary) of 5 MHz of valuable 5G spectrum in the frequency range 3600 MHz to 3605 MHz.
17. Ofcom proceeds on the basis that this is no more than an application for a licence variation, such that the key provisions of the EU legislative framework are Articles 6 and 14 of the Authorisation Directive ("AD"; see §§3.4, 3.5, 3.7, 3.8 and 4.74); as Article 6.1 refers to Article 9 of the Framework Directive ("FD"), Ofcom presumably accepts that that article is engaged also. Ofcom thus appears to assume that its decision involves balancing its general regulatory objectives (§§4.2-4.4), subject to meeting the legal tests in Article 6 AD and Article 9 FD (§4.74).
18. However, the proposed licence "variation" would give H3G/UKB a right to use radio frequencies in the range 3600 MHz to 3605 MHz which it does not currently enjoy. This would be no mere Article 14 AD variation; it would be an award of rights to use radio frequencies (which rights are limited in number). Ofcom's obligations under Article 7 AD are therefore engaged. That means that, among other things, in selecting the operator to which the award the spectrum, Ofcom must use 'selection criteria which must be objective, transparent, non-discriminatory and proportionate' and which give due weight to the achievement of the Article 8 FD objectives (Art. 7.3 AD). In particular, Ofcom must consider whether it is appropriate to gift the 3600-3605 MHz band to H3G at H3G's request without any form of comparative or competitive selection procedure or any opportunity for other operators to bid for that spectrum.
19. This is no mere technical point. The 5 MHz in question is no doubt valuable to H3G, because it would allow H3G to create a 100 MHz spectrum block from UKB's spectrum holdings. [§<] Consistent with its general approach, Ofcom would need to satisfy itself that it is awarding the spectrum to the person who values it the most.
20. The fact that H3G/UKB, in return for an award of rights to use these 5 MHz of spectrum, is willing to surrender rights of use to use other spectrum is immaterial to

the question whether Article 7 AD is engaged. What is proposed is to award new rights of use for the 5 MHz.

21. At present Ofcom gives no thought at all to whether its proposed selection criteria for the award of these 5 MHz of spectrum meet the requirements of Article 7 AD. They do not. Essentially, the sole criterion which Ofcom proposes to employ in deciding to award the spectrum to H3G/UKB to the exclusion of other operators is that H3G/UKB has asked for it. That is indefensible. In particular, no opportunity has been given to other operators to apply for the rights (Article 7.2 AD) and Ofcom's selection criterion lacks any objective basis and is discriminatory (Article 7.3 AD).
22. Ofcom's proposed award of the spectrum to H3G/UKB would also involve departing from Ofcom's ordinary approach of allocating spectrum via an auction. Cf. Ofcom's 11 July 2017 Statement on the 3.4 GHz auction at §1.11:

*'Our general approach to awarding spectrum in circumstances where - as here - demand is likely to be greater than the amount of spectrum available, is to allow the market to determine the best allocation, often through means of an auction. This is because the operator with the highest value for the spectrum will normally be the one most likely to use the frequencies to deliver the services consumers most want'.*

23. Ofcom cannot lawfully award H3G/UKB this spectrum without complying with the requirements of Article 7. We respectfully consider that had Ofcom turned its mind to those requirements, it would have appreciated that its proposed award is plainly inappropriate.
24. The second fundamental flaw in Ofcom's analytical framework is the assumption that there are only two outcomes for appraisal: (A) a future auction following the variation requested by H3G/UKB or (B) a future auction on the basis of the status quo. Ofcom reasons that as in its view option A is preferable to option B, it should grant the variation request. Leaving aside the fact that Ofcom's view as to the relative merits of options A and B is unjustifiable (for reasons we explain below), Ofcom's approach wrongly excludes any consideration of other options for managing and awarding the spectrum. An obvious example is that H3G/UKB may be prepared to consent to an arrangement whereby, in return for the award of 5 MHz at 3600-3605 MHz plus the variation of their licence to grant them the exclusive use they require for 5G technology, they surrender a greater quantity of spectrum at the upper end of their holding into the auction. Ofcom cannot assume that the value attributed by H3G/UKB to the 5 MHz and the crucial licence variation is limited to that suggested by their

licence variation application – which Ofcom should treat as an “opening gambit” rather than a final offer.

25. A further option to which Ofcom ought to give consideration is the broader reconfiguration of the fragmented 3.4-3.8 GHz band so as to ensure the most efficient auction outcome. We set out detailed proposals in this regard below.
  
26. Thirdly, Ofcom’s analysis contains no recognition whatever of the very substantial incentive towards strategic behaviour in relation to the auction which granting the “variation” would create for H3G. If H3G/UKB were to be gifted a 100 MHz contiguous holding of 5G spectrum in advance of any auction, which would be the effect of Ofcom’s proposal, it would be strongly incentivised (i) to bid strategically in the auction to the extent that it is permitted to participate notwithstanding its existing spectrum assets, (ii) to challenge any attempt by Ofcom to control such strategic behaviour by the imposition of a spectrum cap and (iii) otherwise to engage in strategic litigation with the effect of delaying the auction. Such concerns about strategic behaviour are valid, as demonstrated by the experience of the recent PSSR award; they are invariably taken into account by Ofcom in its approach to spectrum awards; and it is inexplicable that they have been ignored by Ofcom here.

### III. POTENTIAL BENEFITS ASSOCIATED WITH LARGER CONTIGUOUS BLOCKS OF SPECTRUM FOR 5G

27. It is an accepted fact that, for the foreseeable future, it will be preferable for operators to have access to larger blocks of spectrum in the 3.4-3.8 GHz band for 5G deployment. Current standards allow for deployment of 5G carriers using blocks of 40, 50, 60, 80 or 100 MHz. Larger blocks support higher capacity and speeds, as well as offering network efficiency and deployment cost benefits.
28. The scale of benefits associated with having a larger contiguous block (say 100 MHz) for 5G compared to having equivalent but fragmented bandwidth is uncertain. In the short term, there are definite technical advantages which other operators (especially those with limited 4G holdings in other bands) will not be able to replicate. However, it may be several years before these advantages can be translated into a significant commercial differentiator in the downstream market. In the longer term, the scope for commercial gains is greater, but it is uncertain whether technology change will reduce or enhance the importance of having larger contiguous blocks.
29. Ofcom's analysis reflects this uncertainty but is inconsistent in how it assesses the implications. On the one hand, one of the justifications that Ofcom offers for permitting the variation is the potential for H3G's customers to benefit from enhanced services and network efficiencies associated with larger contiguous blocks.<sup>3</sup> On the other hand, Ofcom assumes that any costs associated with denying other operators from being able to aggregate larger blocks must be small and will not endure. The credibility of Ofcom's position rests on its assertion that technological developments (such as carrier aggregation) will erode the advantages associated with having contiguous spectrum. However, Ofcom does not have any special knowledge regarding how 5G technology will develop. Accordingly, it should not be making policy based on wishful thinking that technology will solve any problems it creates by embracing a variation that prolongs fragmentation of the 3.4-3.8 GHz band.
30. In this section, we present evidence that:
  1. The licence variation as requested means that H3G would likely be the only operator who can acquire a contiguous block of 100 MHz in the 3.4 – 3.8 GHz band.

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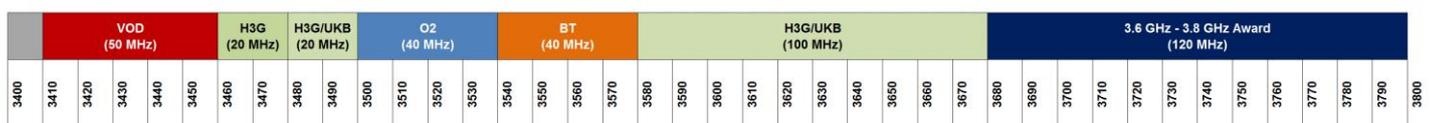
<sup>3</sup> Ofcom, *Variation of UK Broadband's Spectrum Access Licence for 3.6 GHz spectrum*, § 4.17-4.28.

2. H3G would be the only operator able to exploit fully the benefits (speed, capacity and latency) associated with 5G and supporting network infrastructure, such as higher order MIMO, available from 2019.
  3. The extent to which other operators would be able to address this imbalance through technology (such as carrier aggregation), and the costs associated with such approaches, are uncertain.
  4. The imbalance could persist in the long term if no suitable alternative spectrum can be brought to market.
31. Ofcom’s approach is obviously wrong because there is an alternative approach (band reconfiguration) that could allow H3G to benefit from contiguous spectrum AND allow other operators to do so as well. In this case, arguments about whether or not technological change will nullify the benefits of having larger blocks are no longer material, as every UK operator will have the potential to realise such benefits.

**The variation would position H3G to be the only operator with contiguous spectrum in the main 5G band**

32. If the variation is enacted, H3G will have access to 140 MHz of spectrum in the 3.4-3.8 GHz band, in two blocks of 40 MHz and 100 MHz. The proposed frequency positions of these blocks are shown in Figure 1. The placement of these blocks precludes other operators from acquiring contiguous holdings across the 3.4-3.8 GHz band, as any new spectrum acquired in the 3.6 GHz auction will not be contiguous with their recently acquired holdings in the 3.4 GHz band.

*Figure 1: Proposed 3.4 – 3.8 GHz frequency positions under UKB Proposal*



33. In theory, other operators do have alternative paths (independent of H3G) to acquire larger blocks of contiguous spectrum:
1. A single operator (subject to spectrum caps) could acquire up to 120 MHz of 3.6 GHz spectrum. However, it is unlikely that any operator would be willing

or able to pay the price necessary to acquire a significantly larger holding than its rivals.

2. After the award of 3.6 GHz, there may be mutually beneficial trading arrangements that enable BT, Telefónica and/or Vodafone to improve their position. However, even if the 3.6 GHz auction produces such an outcome, H3G's band position will limit the size of such blocks, and would almost certainly leave one or more operators with non-contiguous holdings.
34. In theory, band realignment could also be achieved through a secondary market transaction involving H3G. However, in a scenario where Ofcom has given H3G/UKB a 100 MHz contiguous holding (by a combination of award of 5 MHz and licence variation), such a transaction is very unlikely to be enacted, for the following reasons:
1. H3G has strong incentives to refuse to engage in discussions with other operators. It presumably anticipates a commercial advantage from being the only operator with a larger block of contiguous 5G spectrum and has an incentive to prolong this advantage for as long as possible.
  2. Even if H3G was willing to engage with other operators, it would expect to be paid to move, and its payment demands may be a significant proportion of the benefits to other operators from acquiring a larger contiguous block. Aside from the fairness issue of H3G being able to extract a windfall gain from exploiting its position in the band plan, it is likely that operators will struggle to agree a price for a benefit of potentially large but uncertain scale.
  3. An efficient realignment may require all four operators moving their existing holdings. Such a transaction would be particularly hard to negotiate, as it requires identifying deal terms acceptable to four parties, all of which will have different interests. It is more plausible that H3G might reach an agreement with a single operator, but this may involve permanently blocking the other two operators from securing contiguous spectrum.
35. In conclusion, Ofcom's proposal would make it most unlikely that an efficient realignment of 3.4-3.8 GHz could be achieved without further regulatory intervention. Telefónica's view is that this licence award and variation request provides a one-off opportunity for Ofcom to incentivise H3G to engage in a common-sense realignment of the band. Rather than granting H3G/UKB's application in its current form, Ofcom

should take that opportunity. This is the only path that is likely to lead to all operators and their customers having the opportunity to benefit from having larger contiguous holdings for 5G.

36. H3G's dealings with Ofcom and other parties in relation to these bands give us little hope that it will accept a common-sense realignment unless Ofcom takes appropriate action now:

1. Ofcom should consider how H3G acquired this spectrum in the first place: through an opaque arrangement between two Hong Kong-based entities with close family connections. The spectrum was never offered on the open market despite its obvious high value to other operators. Ofcom can therefore have no confidence that the current allocation of the spectrum is efficient.
2. H3G has repeatedly tried to erect barriers to other operators acquiring contiguous spectrum in the 3.4-3.8 GHz band:
  - It delayed the PSSR auction through litigation; H3G's case was found to be wholly without merit.
  - It reversed UKB's previous willingness to realign its 3.4 GHz holdings in a manner that would have allowed UKB to make its own 3.4 GHz holdings contiguous AND guarantee contiguous spectrum within the 3.4 GHz award for all other operators.<sup>4</sup> This led Ofcom to change the auction rules.
  - It has now requested a licence variation that would give it a block of 100 MHz for 5G and establish a barrier to other operators acquiring contiguous spectrum.

37. It should be obvious to Ofcom that H3G's behaviour is strategic, narrowly focused on its own interests to the detriment of all other operators and their subscribers. Ofcom can and must stand up to H3G, offering it a deal that allows it to realise the intrinsic

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<sup>4</sup> UKB, *UK Broadband Limited's response to Ofcom's consultation on a proposed variation of its 3.4GHz Licence*, July 2014, pg. 5.

UKB writes, "We note Ofcom's decision not to proceed at the present time with its proposal in the October 2013 consultation to consolidate UKB's spectrum into a contiguous block. We confirm that we remain willing to relocate one or both of our spectrum blocks within the band at any point up until the award of the 3.4 GHz PSSR spectrum and that **our business plan has been tested to take account of the additional network costs this would entail** (as detailed in our earlier submissions)." [Emphasis added]

benefits of having contiguous spectrum for 5G but not the strategic benefits of blocking competitors.

**There are material advantages associated with having large contiguous blocks of up to 100 MHz**

38. The first major benefits of 5G will be to increase system capacity and individual device throughput. 5G-NR in higher bands will complement the existing LTE infrastructure. There will not be a separate 5G network at the beginning of the 5G era. Instead, devices will establish a connection with the LTE network first. If a 5G carrier in a higher band is available and the device indicates support for dual connectivity, the eNB (LTE) will then communicate to the gNB (5G) to establish a connection with the device and start offloading data onto the 5G carrier.
39. Manufacturers are developing 5G radios which use large contiguous blocks of up to 100 MHz in higher bands. The 3.4-3.8 GHz range will be the first band where this technology will become available. Although 5G can be deployed using smaller bandwidths (current standards support 40, 50, 60, 80 and 100 MHz carriers), there are advantages from larger blocks with regards to capacity and higher speeds.
40. In its “Strategic Spectrum Roadmap towards 5G for Europe”, the RSPG urges member states to make available 3.4-3.8 GHz spectrum in large contiguous blocks to support rollout of 5G:

*“The RSPG is of the opinion that the availability of the primary 5G band 3.4- 3.8 GHz in Europe, will be key for the success of 5G in Europe. Member States should consider appropriate measures to defragment this band in time for authorising sufficiently large blocks of spectrum by 2020.”<sup>5</sup>*

41. In the ECC Report 287 draft, CEPT concludes that

*“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).*

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<sup>5</sup> Radio Spectrum Policy Group, *Strategic Spectrum Roadmap towards 5G for Europe*, 30 January 2018

*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 results 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 designed to inherently leverage wideband TDD deployments and massive MIMO.”<sup>6</sup>*

42. The CEPT report highlights the key aim of initial 5G deployments: make available extra capacity to the LTE network in higher bands in which large contiguous bandwidth is available. We expect this dual-connectivity setup to dominate early 5G deployments. This involves one or more carriers in the existing LTE bands bundled together using carrier aggregation (CA) and a large contiguous 5G carrier with up to 100 MHz of bandwidth for extra capacity.
43. It is not a focus of 5G NR to reduce any of the existing inefficiencies from CA, such as power consumption, as its LTE implementation will continue to create control overhead. It is possible that at some point the control overhead can be reduced further with 5G and that in the long term the advantages of larger blocks might largely be replicated through aggregation of multiple smaller blocks. However, this may not be a priority for manufacturers given the trend across Europe for operators to acquire unfragmented larger blocks of 3.4-3.8 GHz spectrum (see Section IV).
44. Even if this happens, CA in the 3.4-3.8 GHz will likely first focus on linking this band with paired spectrum in the 1800, 2100 and 2600 MHz bands, where most operators in Europe have multiple blocks of 20 MHz or more which can be deployed for the dual connectivity setup discussed above. In the future, equipment may also allow operators to use the same bands interchangeably for 4G and 5G. This is good news for BT, which through merger and advantageous auction rules, has established a lead in all these bands, but may place Telefónica and Vodafone at a significant disadvantage. For example, BT could use CA across a 2x20 MHz carrier in 1800 MHz, a 2x20 MHz in 2.6 GHz and dual connectivity to access an additional 40 MHz 5G carrier in the 3.4-3.8 GHz range. This would provide substantial capacity, but still

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<sup>6</sup> CEPT, *ECC Report 287* (draft), p.38. [Emphasis added]. Accessed 23 July 2018; available at: <https://cept.org/ecc/tools-and-services/ecc-consultation>

less than H3G's potential setup with 2x10 MHz in 1800 MHz, 2x10 MHz in 2100 MHz and dual connectivity to access 100 MHz in the 3.4-3.8 GHz range.

45. There are further benefits to a large contiguous 5G carrier that cannot be replicated with 5G CA:

- It avoids the additional control overhead necessary to run CA that reduces the capacity available to users.
- A major benefit of 5G NR comes from the larger contiguous blocks of spectrum supported by the standard versus LTE (up to a 100MHz carrier for 5G NR versus a maximum of 20MHz for LTE). 5G NR is able to avoid the guard bands included in the defined bandwidth of LTE carriers (approx. 10% of the bandwidth is dedicated to guard bands in LTE). A 100MHz made up of five 20MHz LTE carriers would imply  $\square$ 10MHz of spectrum wasted in guard bands while a contiguous 100MHz 5G NR carrier would only leave  $\square$ 2MHz (even less depending on the filtering) in guard bands. This is a factor of five improvement in reducing lost capacity. In contrast, CA setup in 5G NR would necessarily include more guard bands (already defined in the number of resources associated with the carrier bandwidth and configuration) and thus less capacity.
- The costs of deploying higher-order MIMO technologies will be more efficient and cheaper in the 3.4-3.8 GHz band than in the traditional LTE bands. This is because the antennas for this band are significantly smaller than those needed for the traditional LTE bands. The TDD band plan also allows for easier implementation. Higher-order MIMO will be a key technology for 5G to increase the spectral efficiency and the capacity, and we expect large economies of scale to drive down prices for 5G equipment with this technology.
- Non-contiguous spectrum assignments in the 3.4–3.8 GHz band may require (depending on the separation between carriers and manufacturers specifications) the implementation of several radio units, thus increasing the costs of network deployment and reducing the efficiencies of 5G for the operators with non-contiguous spectrum.
- Massive MIMO technologies require the use of active antenna systems that have the radio frequency equipment included in the antenna. If non-contiguous blocks of spectrum would require several such antennas, this will significantly increase costs of deployment, thus discouraging roll out. In some locations, roll-out of non-contiguous may even be unfeasible owing to space limitations for the antennas.

- If, as expected, most countries in Europe adopt a contiguous assignment band plan for 3.4-3.8 GHz, there will be less need for manufacturers to develop solutions for the usage of fragmented spectrum in this band. Special filtering and configurations should be included in 3GPP standardization that are not currently considered. Currently carrier aggregation for this band is only considered in later releases of the standard and the combinations under study only include those allowing carriers above the maximum 100MHz.
- On the device side, the limitation of RF resources would necessarily reduce the performance of the device under further fragmented spectrum. This is currently the case for 1Gbps smartphones using 4x4 MIMO. This would imply that an operator with fragmented spectrum will not be able to produce the same speeds for the users even if it has the same amount of spectrum in the band.
- Higher-order MIMO technologies can be deployed much more efficiently in higher frequency mobile bands and precisely in TDD bands. Deploying this type of technology in the traditional LTE bands (FDD and lower frequency bands) would be costlier as it requires more complexity in antennas and filters as well as in the devices.
- The user experience may be considerably worse on 5G and LTE networks with further carrier aggregation as these will drain batteries more quickly than if the handset was connected to a single contiguous carrier in the 3.4–3.8 GHz band.

**Ofcom cannot rely on technology to address the imbalance between operators with and without larger 5G carriers**

46. As Ofcom points out in the consultation document,<sup>7</sup> there are currently no plans for intra-band carrier aggregation for the 3.4-3.8 GHz band. The initial aim for 5G deployment will be to provide additional capacity through large contiguous carriers in higher bands. Hence, even if BT, Telefónica and Vodafone acquire additional spectrum in the 3.6-3.8 GHz band, they are unlikely be able to aggregate this with the spectrum they already hold in 3.4-3.6 GHz band any time soon.

47. The development of intra-band CA technology for this band will be driven by demand. As we explain in Section IV, most operators in Europe will have access to contiguous holdings in this band and CEPT is actively pushing member states to defragment the

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<sup>7</sup> Ofcom, *Variation of UK Broadband's Spectrum Access Licence for 3.6 GHz spectrum*, §4.45.

3.4-3.8 GHz band, so there may be little or no demand in other countries for this type of technology. This has significant implications for the development of 5G in the UK, as the lack of intra-band CA would mean that other operators would not be able to replicate H3G's position even if they acquire two blocks of 40 MHz or more across the wider band.

48. It is expected that equipment and handsets that support large bandwidths in the 3.4-3.8 GHz band will come to market in 2019.<sup>8</sup> If Ofcom varies H3G's licence as requested, H3G will be the only company in the UK which will be able to make full use of this developing ecosystem. It is incredibly risky for Ofcom to rely on technology that may take years to come to market to redress this imbalance between operators that will emerge starting in 2019. This might be an acceptable approach if it was simply the case that there was not enough spectrum for more than one operator to acquire a larger contiguous block. However, the reality is that – with band realignment – all four operators could have this benefit.

**The imbalance could persist in the long term if no suitable alternative spectrum becomes available**

49. Ofcom expects H3G's advantage to disappear in the long term as LTE is replaced by 5G. This, however, is many years away. Even then, it is likely that large contiguous carriers will play an important role in providing capacity efficiently. Indeed, if access to larger contiguous blocks become the norm for operators in Europe and beyond, the next evolution of 5G and associated network architecture may be predicated on operators having them. This could leave operators without larger contiguous blocks in a perilous position. For this reason, as we explain in Section VII, Ofcom is wrong to conclude that there are no long-term competition concerns associated with an approach that may lead to only one UK operator having contiguous spectrum.
50. H3G's advantage could alternatively be nullified by Ofcom making available other spectrum bands in which operators can acquire larger contiguous blocks. Ofcom does have plans to repurpose spectrum at 28 GHz for mobile, but millimetre wave spectrum is best suited for small cell and backhaul deployment, and is unlikely to ever be a close substitute for 3.4-3.8 GHz, which can be deployed at the microcell level. A better bet could be the 3.8-4.2 GHz band, which has been identified as potential extension band for 5G. However, this spectrum is encumbered and may not be made available on an exclusive basis, so is unlikely to be suitable for mobile operators. The value of this

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<sup>8</sup> PTS, May 2018. *Preliminary study prior to future assignment of frequencies for 5G.*

spectrum will also depend on the emergence of a common European ecosystem, something that Ofcom cannot control.

51. In conclusion, given the timescales and uncertainty associated with release of new bands, it is not prudent for Ofcom to rely on this as a way of addressing long-term concerns created by the fragmentation of 3.4-3.8 GHz spectrum. Ofcom should address the issue of fragmentation now, and not simply hope that future developments over which it limited influence will resolve long-term concerns.

#### IV. ACCESS TO CONTIGUOUS BLOCKS OF 80 MHZ OR MORE WILL BE THE NORM ACROSS EUROPE

52. Regulators across Europe have recognised the potential benefits of having multiple operators access contiguous blocks of at least 80 MHz or more across the 3.4-3.8 GHz band. In this section, we present a survey of nine Western European countries that have already announced plans for allocating this spectrum to mobile. Table 1 presents an overview of our findings. Table 2 provides more detail regarding the policies adopted in each country.

53. The survey demonstrates that most regulators to date, with the peculiar exception of Ofcom, have embraced two concepts:

1. 3.4-3.8 GHz should be treated as a single, harmonised band; and
2. The regulator should prioritise allocation mechanisms that allow multiple operators to secure contiguous blocks of at least 80 MHz.

*Table 1: Approach to 3.4-3.8 GHz allocation in Western European countries*

Country	Allocation Year	3.4-3.8 GHz awarded as a single category?	Priority given to promoting access to contiguous blocks of 80 MHz or more?	Spectrum limits include 3.4-3.6 GHz and 3.6-3.8 GHz?
Austria <sup>1</sup>	2019	?	✓	✓
Finland	2018	✓	✓	✓
Germany	2019	✓	✓	? <sup>2</sup>
Ireland	2017	✓	✓	✓
Italy	2018	X	✓ <sup>3</sup>	✓
Spain	2018	X	? <sup>4</sup>	✓
Sweden	2020-2023	✓	✓	? <sup>2</sup>
Switzerland	2019	✓	✓	✓
UK (current proposal)	2018 (3.4 GHz) 2020 (3.6 GHz)	X	X	? <sup>2</sup>

**Notes:** <sup>1</sup> Austria has not made a final decision on whether to award the 3.4 and 3.6 GHz bands as a single category or two categories. <sup>2</sup> Germany, Sweden and the UK have not yet announced whether there will be spectrum caps focused on the 3.4-3.8 GHz band as a whole. <sup>3</sup> Italy is only offering sufficient spectrum at 3.6 GHz to support two operators with contiguous 80 MHz spectrum blocks. <sup>4</sup> Telefonía anticipates that the Spanish Ministry will reorganise the entire band following the conclusion of the 3.6 GHz auction, but there are no formal plans for band reconfiguration.

54. Five out of eight countries have awarded or plan to award the 3.4-3.8 GHz band as a single harmonised band. By implication, all these regulators believe that the value of spectrum at 3.4 GHz and 3.6 GHz is sufficiently similar that they can be treated as a single category of lot in an auction. Austria may also follow this approach but has not made a final decision on its auction design. Like the UK, both Spain and Italy have sold / will sell 3.6 GHz spectrum in a separate award from 3.4 GHz. However, this approach is dictated by past allocations. The fact that both countries have embraced spectrum caps that link 3.4 GHz and 3.6 GHz implies that they consider the bands to be closely related.
55. In all countries except the UK and Italy, the regulator has embraced an approach that ensures that three or more operators have the opportunity to acquire at least 80 MHz of contiguous spectrum in the 3.4-3.8 GHz band. In Italy, where availability of this spectrum is constrained by legacy decisions on allocation of 3.4-3.6 GHz, the government has defined spectrum lots in a way that will ensure that a minimum of two mobile operators will acquire 80 MHz of contiguous spectrum in the 3.6-3.8 GHz sub-band. Thus, the UK may be the only country in Western Europe where the likely outcome from spectrum awards is that only one operator will have access to a contiguous block of 80-100 MHz.
56. Most countries have also adopted a common spectrum cap specific to the combined 3.4-3.8 GHz band (and no country surveyed has yet ruled this out). This indicates that they perceive there be unique benefits associated with access to this band, owing to its pioneer 5G status. Ofcom should also consider such a cap, in addition to its cap on all holdings of usable mobile spectrum below 4 GHz.
57. The problem of fragmentation of the 3.4-3.8 GHz band is not unique to the United Kingdom; it is a recognised regulatory issue across Europe. The European Communications Committee (“ECC”) has acknowledged the importance of the defragmentation of the band, and has drafted a report to guide regulatory institutions. One of the goals stated in the draft of CEPT Report 287 is the “availability of around 100 MHz of contiguous spectrum per licensee.”<sup>9</sup> Our survey shows that many European countries have already addressed this problem through band clearance. Telefónica expects Spain to follow with a reconfiguration of holdings following the

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<sup>9</sup> CEPT, *Report 287* (draft), p.34. Accessed 23 July, 2018.; available at: <https://cept.org/ecc/tools-and-services/ecc-consultation>

completion of the 3.6 GHz band award in July 2018. Unless Ofcom embraces such a plan, the UK may be left almost alone in having a highly fragmented band plan.

58. Telefónica believes that Ofcom has a duty to act on reconfiguring the 3.4-3.8 GHz band. This is necessary both to fulfil its obligations under UK and European law to promote efficient use of spectrum, and to align itself with Government policy that the UK should be a leader in 5G services.

59. The Department for Culture, Media, and Sport (DCMS) has stated that:

*“being at the forefront of the development and deployment of 5G networks will help the UK digital sector compete in global markets for a range of products and services; enhance UK capabilities at home and overseas, and help attract inward investment.”<sup>10</sup>*

and the Minister has said:

*“We also want to be a world leader in the next generation of mobile technology, 5G, with deployment to the majority of the country by 2027 so that UK consumers and businesses can take early advantage of the benefits.”<sup>11</sup>*

60. How can the UK be at the forefront of 5G development if Ofcom embraces a policy that prevents three out of four national mobile operators, together accounting for over 80% of mobile consumers, from securing larger contiguous blocks of 5G spectrum? How can the UK expect to be a priority location for inward investment linked to 5G if other European countries have more operators that are capable of optimally exploiting 5G technology? Unless Ofcom embraces reconfiguration of the 3.4-3.8 GHz, it will expose the United Kingdom to becoming the 5G laggard across Western Europe.

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<sup>10</sup> DCMS, *Next Generation Mobile Technologies: A 5G Strategy for the UK*. March 2017, pg. 23; available at: <https://www.gov.uk/government/publications/next-generation-mobile-technologies-a-5g-strategy-for-the-uk>

<sup>11</sup> DCMS, July 2018, *Future Telecoms Infrastructure Review*, Ministerial Forward.

Table 2: Upcoming and completed allocations of 3.4-3.8 GHz in Western Europe

Country	Year of award	Description
Austria	2019 (Consultation completed)	<p>Austria completed a consultation on the award procedure for the 3.4-3.8 GHz band in November 2017, and the final auction rules are expected to be released in July or August 2018. One focus of the consultation was whether 3.4-3.6 GHz and 3.6-3.8 GHz should be auctioned as one or two categories. The RTR released a summary of stakeholder statements<sup>12</sup>, and proponents of one category focused on the evolution of the band's use for 5G, while proponents of two categories focused on differences in the availability of current equipment in the two bands and the impact on incumbents.</p> <p>The proposed spectrum caps do not distinguish between the 3.4-3.6 GHz and the 3.6-3.8 GHz band, and the tightest cap proposed by the RTR is set at 100 MHz. Based on the consultation and responses, we expect that all three mobile operators in Austria will have the opportunity to acquire at least 80 MHz to 100 MHz of contiguous spectrum in the 3.4-3.8 GHz band.</p>
Finland	2018 (Allocation rules released)	<p>FICORA released the tender for licences in the 3410-3800 MHz band in July 2018 and the auction begins in August 2018.<sup>13</sup> There are three contiguous 130 MHz licences available. Each tender participant is limited to acquire one licence.</p> <p>All three mobile operators will have the opportunity to acquire one of the three licences available that consists of a contiguous block of 130 MHz.</p>
Germany	2019	<p>Following a public consultation, Bundesnetzagentur released its decision on the rules for the allocation on the 3.4-3.8 GHz band on 14 May 2018.<sup>14</sup> All 400 MHz of the band will be allocated on a</p>

<sup>12</sup> RTR, *Summary of Statements: Submitted for the Consultation on the 3.4-3.8 GHz Award Procedure* (English translation), November 2017; available at: <https://www.rtr.at/en/inf/Konsult5GAuktion2018>

<sup>13</sup> Tender and associated documents can be found on the FICORA website at <https://www.viestintavirasto.fi/en/spectrum/radiospectrumuse/spectrumbauction.html>

<sup>14</sup> Bundesnetzagentur, *5G award – decisions I & II* (English translation), May 2018; available at [https://www.bundesnetzagentur.de/EN/Areas/Telecommunications/Companies/FrequencyManagement/ElectronicCommunicationsServices/ElectronicCommunicationServices\\_node.html](https://www.bundesnetzagentur.de/EN/Areas/Telecommunications/Companies/FrequencyManagement/ElectronicCommunicationsServices/ElectronicCommunicationServices_node.html)

Country	Year of award	Description
	(Allocation rules released)	<p>TDD basis. 300 MHz is available on a nationwide basis and 100 MHz will be available on a regional basis.</p> <p>Throughout the document, the usability of the spectrum for 5G is stressed. The decision points to CEPT Report 67 that specifies that up to 100 MHz per operator should be introduced. Consultation responses supported contiguous spectrum and Bundesnetzagentur wrote, “5G would need sufficient bandwidth in this range [3.4-3.8 GHz] in order to best utilise the benefits of the band.”<sup>15</sup></p> <p>Bundesnetzagentur’s decision opens the opportunity for all three mobile operators in Germany to acquire a contiguous block of 80 to 100 MHz in the band.</p>
Ireland	2017 (Completed)	<p>Ireland’s <i>3.6 GHz Band Spectrum Award</i> was completed in April 2017.<sup>16</sup> There was a total of 350 MHz of spectrum available in the award that included 3410-3435 MHz (“A Type”) and 3475-3800 MHz (“B Type”) split into 9 regions across Ireland. The 40 MHz gap between the A Type and the B Type accounted for the protection of incumbent use for state services.</p> <p>A Type blocks were awarded in a single block of 25 MHz, while the 325 MHz of B Type blocks were awarded in 5 MHz lots.</p> <p>Assignment stage rules not only ensured contiguous spectrum for operators within the B Type, but also sought to minimise non-continuity between each of the 9 regions across Ireland.</p> <p>All three mobile operators in Ireland secured between 80 MHz and 105 MHz in all regions.</p>
Italy	2018 (Consultation completed)	<p>Italian regulator, Agcom, released <i>Delibera No. 231/18/CONS</i> detailing plans to auction the 3.6-3.8 GHz band. An auction is expected in the second half of 2018 or early 2019. Owing to incumbent licences in the 3.4-3.6 GHz band that were extended to the end of 2029, there will only be 200 MHz available at auction.</p>

<sup>15</sup> *Ibid.* pg. 11.

<sup>16</sup> Public documents in relation to the *3.6 GHz Band Spectrum Award* in Ireland can be found on Comreg’s website at <https://www.comreg.ie/industry/radio-spectrum/spectrum-awards/3-6ghz-band-spectrum-award/>

Country	Year of award	Description
		<p>Citing the importance of large contiguous blocks for 5G, Agcom chose to include 2 blocks of 80 MHz each and 2 blocks of 20 MHz. This approach will guarantee that exactly two operators (there are four mobile operators in Italy, including new entrant Iliad) will secure 80 to 100 MHz of contiguous spectrum.</p> <p>Although Agcom decided to extend incumbent licences in the 3.4-3.6 sub-band, it has partially recognised 3.4-3.8 GHz as one harmonised band with the implementation of a spectrum cap across the entire band. Agcom set a cap of 100 MHz within the entire 3.4-3.8 GHz evaluated on a regional basis.</p>
Spain	2018 (Allocation ongoing)	<p>The auction for 200 MHz in the 3.6-3.8 GHz band took place in July 2018, with winning bidders guaranteed contiguous spectrum within the sub-band. Three of the four mobile operators already owned 40 MHz in the 3.4-3.6 GHz band. For legacy reasons, this spectrum (as well as 40 MHz used by the Spanish Defence Ministry), is allocated on a paired basis with 100 MHz duplex spacing.</p> <p>A spectrum cap of 120 MHz was applied across both current holdings in the 3.4-3.6 GHz band and spectrum included in the auction.<sup>17</sup> This reflects official recognition of the unique role of the wider 3.4-3.8 GHz band in 5G deployment.</p> <p>All four mobile operators participated in the auction: Vodafone, the only operator without any holdings at 3.4 GHz, won 90 MHz; Orange won 60 MHz (to add to its existing 40 MHz); and Telefónica won 50 MHz (to add to its existing 40 MHz). Mas Movil did not win any spectrum, but has since acquired 40 MHz in the secondary market (to add to its existing 40 MHz).</p> <p>The Spanish Ministry has stated officially that they will reorganise the entire band following the conclusion of the 3.6 GHz auction, but there are no concrete plans as yet. Telefónica anticipates that such a plan will be developed prior to the launch of 5G services. We therefore expect that, in due course, all four operators will have access to contiguous blocks of 80-100 MHz for 5G.</p>

<sup>17</sup> Auction rules can be found in *Boletín Oficial Del Estado: Orden ETU/531/2018*, 25 May 2018.

Country	Year of award	Description
Sweden	2020-2023 (Consultation completed)	<p>There is uncertainty in Sweden on the availability of the 3.4-3.8 GHz band owing to band fragmentation and incumbent licences. Despite the challenges, respondents to a PTS consultation had, “<i>a shared view...of a need for 80-100 MHz of bandwidth or more per actor in the 3.4-3.8 GHz band.</i>”<sup>18</sup> PTS concluded that 300 MHz will be assigned on a national basis and 100 MHz will be assigned on a regional basis, similar to the German allocation plans. We note that the PTS has recognised the 3.4-3.8 GHz band as a single band, despite having legacy licences.</p> <p>Although the timing of the award of the 3.4-3.8 GHz band is uncertain, the outline of the award procedure released by the PTS will give all three operators the opportunity to acquire at least 80-100 MHz of contiguous spectrum.</p>
Switzerland	2019 (Allocation rules released)	<p>Ofcom (Switzerland) recently released the invitation to tender for a multi-band award, including spectrum in the 3.5-3.8 GHz range (“the 3.5 GHz band”). The spectrum will be available as a single category of 20 MHz blocks with contiguity guaranteed. The auction is scheduled to start in early 2019.<sup>19</sup></p> <p>A spectrum cap of 120 MHz specific to the 3.5 GHz band has been proposed by the competition authority, ComCom. Consequently, all three mobile operators will have the opportunity to secure contiguous blocks of up to 120 MHz in the band. In the case that only the three MNOs participate (as was the case in the Swiss 4G auction), then each operator would be certain to win at least 60 MHz contiguous.</p>

<sup>18</sup> PTS, *Preliminary study prior to future assignment of frequencies for 5G*, 3 May 2018, pg. 15; available at: <https://pts.se/en/news/radio/2018/preliminary-study-of-future-assignment-of-frequencies-for-5g-deployment2/>

<sup>19</sup> Tender documents can be found on the OFCOM (Switzerland) website at <https://www.bakom.admin.ch/bakom/en/homepage/frequencies-and-antennas/award-of-mobile-telephony-frequencies/starting-signal-for-new-award-of-mobile-radio-frequencies.html>

## V. WITH BAND REALIGNMENT, UK COULD HAVE UP TO FOUR OPERATORS WITH CONTIGUOUS BLOCKS OF 80 MHZ OR MORE

61. In this section, we show that reconfiguration of the 3.4-3.8 GHz band is a realistic process, provided Ofcom puts in place the necessary building blocks. Those building blocks include imposing appropriate conditions on H3G in return for the UKB licence variation and on all operators than participate in the forthcoming 3.6-3.8 GHz award. Importantly, the proposal we put forward would offer benefits to all operators, not just to H3G. Ofcom should commit to such a process as soon as possible, so that operators can plan accordingly when planning equipment purchases for 5G.

62. We propose the following process:

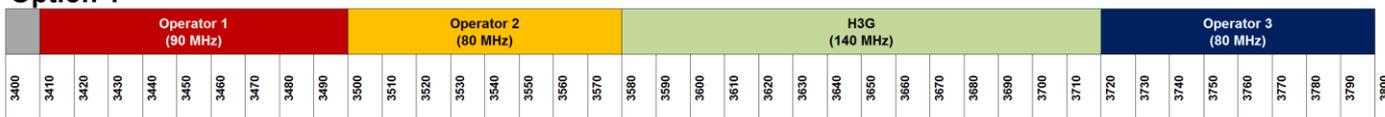
1. **UKB licence variation.** As a condition of any variation of its licence for 3.6 GHz spectrum to permit exclusive 5G use, H3G should be required to include all spectrum that it retains in the assignment stage of the 3.6 GHz auction.
2. **700 MHz and 3.6 GHz auction participation.** As a condition of participation in the next UK auction (for 700 MHz and 3.6 GHz), all operators with holdings in the 3.4 GHz bands should be required to also include this spectrum in the assignment stage of the 3.6 GHz auction. An operator that declined to submit their spectrum should be precluded from bidding in this auction.
3. **Refund of 3.4 GHz assignment fees.** In the 2018 auction, the assignment round for the 3.4 GHz spectrum resulted in both Three and BT paying for preferred frequency placements. These fees should be refunded given that Three and BT may be required to relocate from the frequencies they won.
4. **Contiguous spectrum guarantee.** All spectrum awarded in the allocation stage of the 3.6 GHz auction should be sold on a generic basis, as was the case with the 3.4 GHz auction. In the assignment stage, all participants should (if feasible) be guaranteed contiguous spectrum within the entire 3.4-3.8 GHz band. This can be guaranteed if all four UK operators participate in the auction.
5. **Special conditions.** The rules for the assignment round could be tweaked to take account of special circumstances. For example:
  - UKB's proposed 9-month transition plan could be incorporated into this plan.
  - Subject to the contiguous spectrum guarantee, assignment options could be constrained to minimise the extent to which UKB is required to move position in the band.

- In case there is a bidder that ends the auction with only 3.4 GHz spectrum or only acquires new spectrum, such a bidder could be guaranteed placement in the 3.4 GHz and 3.6 GHz sub-bands respectively.

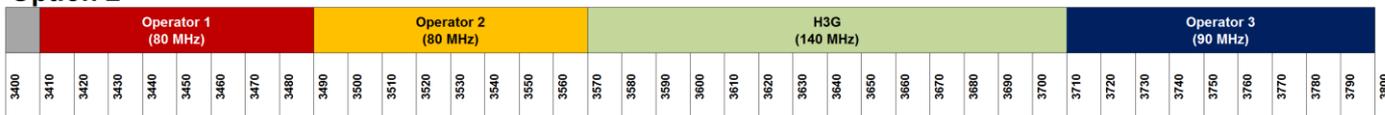
63. As an example, suppose that the 3.6 GHz auction was completed with H3G having 140 MHz spectrum, and an 80:80:90 MHz split between the three other operators. As illustrated in Figure 2, there are two ways that the 3.4-3.6 GHz band could be reconfigured that minimise the need for H3G to move within the band (and many more options if a more flexible approach to H3G’s position is adopted). Each plan results in four operators having continuous blocks of 80 MHz or more. In contrast, without reconfiguration, only one operator, H3G, would have contiguous spectrum.

Figure 2: Reconfiguration options to minimise the need for H3G to move

**Option 1**



**Option 2**



64. Such reconfigurations have repeatedly been implemented in other countries, in particular those where spectrum rights expire. For example, the 1800 MHz band has been reconfigured in a large number of European countries, including Ireland<sup>20</sup>, Switzerland,<sup>21</sup> and Germany<sup>22</sup> so as to support contiguous spectrum for 4G and future

<sup>20</sup> In the Irish auction in 2012, operators bid for two time slices in the 1800 MHz band. The first covered the period up until expiry of the old GSM licences whereas the second period covered the new 15-year licence period. Operators were required to move their assignment after the end of the first period.

<sup>21</sup> The Swiss regulator, OFCOM, reallocated all spectrum in the 1800 MHz after expiry of the old GSM licences. The assignment stage did not include any measures to ensure that the new holdings in the band would overlap with the old ones so a reconfiguration was necessary when the old licences expired.

<http://www.news.admin.ch/NSBSubscriber/message/attachments/26004.pdf>

<sup>22</sup> BNetzA reallocated spectrum in the 1800 MHz band in an auction in 2015. The new holdings in the band differed considerably from the existing holdings which meant that a reconfiguration of the band was necessary.

5G services. Experience from these countries shows that reconfiguration is fairly straightforward with modern equipment. We welcome the fact that Ofcom provides greater continuity in property rights for mobile spectrum but this should not come at the cost of abandoning any flexibility for operators to reconfigure their holdings to deploy new technologies when this is clearly in the national interest.

65. Reconfiguration of the 3.4-3.8 GHz band in the UK should not be controversial. If we consider intrinsic value only, it should be in the interest of all operators, including H3G, as well as in the national interest. No operator has yet deployed mobile equipment in these bands. A soft 5G launch of 5G services will not happen until late 2018 and, according to the GSMA<sup>23</sup>, full commercial launch will not happen until 2020, with widespread rollout not until 2025. Consequently, now is the ideal time to reconfigure the band, before operators start investment in equipment that tie them to specific frequency ranges within the band. If Ofcom misses this window to reconfigure, it will be much harder to do so later because H3G will have a stronger claim that moving would be disruptive to its network.
66. From an intrinsic value perspective it is difficult to understand why H3G has repeatedly taken positions that are hostile to band reconfiguration. Such a process would allow it to link its 3.4 GHz and 3.6 GHz holdings in a contiguous block, giving it greater contiguous bandwidth and more options for the future. The inescapable conclusion is that H3G anticipates a strategic advantage from its current placement because it hopes to block rivals from acquiring contiguous spectrum. The proposed licence variation would cement this advantage for H3G, giving it access to a 100 MHz block and a non-contiguous 40 MHz block that limits scope for its rivals to gain contiguous spectrum.
67. We find it odd that Ofcom is reluctant to propose a plan to reconfigure the entire 3.4-3.8 GHz band. We recognise that Ofcom previously explored options to reconfigure the 900 MHz and 1800 MHz bands, and decided not to proceed owing to objections from incumbent operators. However, this is not a relevant precedent for Ofcom's approach to 3.4-3.8 GHz, for two reasons. Firstly, these were established bands where operators had extensive deployments of legacy 2G services, and the frequencies were the basis of the relevant operators' network grids. This contrasts with 3.4-3.8 GHz, a new band for mobile where no operator has yet deployed any 4G or 5G services. Secondly, with the transition to 4G and 5G, radio equipment is more flexible meaning

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<sup>23</sup> GSMA, *Mobile Economy 2018*, pg. 18; available at: <https://www.gsma.com/mobileeconomy/>

that even once equipment is deployed, it is now less burdensome to shift frequencies with the frequency range of associated radios.

68. In conclusion, band realignment is feasible. It will not impose meaningful costs on any operator and would bring benefits for all. Most importantly, enabling all operators to secure larger contiguous blocks would bring benefits for consumers on all networks and help position the UK to be a leader in 5G services. If H3G opposes a plan that is so obviously in the national interest, the only logical explanation is that it anticipates strategic benefits from blocking rivals from securing larger contiguous blocks. In turn, this would cast further doubt on Ofcom's questionable conclusion that there are no competition or efficiency concerns associated with it's the proposed licence variation.

## VI. UKB SHOULD BE REQUIRED TO RETURN MORE SPECTRUM

69. UK Broadband is only offering to return 4 MHz out of a total of 84 MHz. This – together with the proposed realignment of UKB’s remaining holdings – will enable Ofcom to award an additional 9 MHz of spectrum in the 3.6 GHz auction on a contiguous basis with other available spectrum. Telefónica questions whether this is fair return for the UK taxpayer given the limited nature of the property rights associated with UKB’s 3.6 GHz licence and the benefits that will flow to H3G from this licence variation. Ofcom should also not be proposing such a variation without clarifying related issues, such as the level of AIP that will be associated with H3G’s holdings across the 3.4-3.8 GHz band, and what approach Ofcom will adopt with respect to spectrum caps for the forthcoming 3.4.6 GHz award.

### **UKB has limited spectrum rights in the 3.6 GHz band and should not be allowed to retain 80 MHz**

70. UKB’s current licence at 3.6-3.8 GHz is not for exclusive use but is shared with other users (fixed links and satellite earth stations) on a first come first served (FCFS) geographic use basis. As stated by Ofcom:

*“When UK Broadband seeks a new deployment, it must submit technical information about that base station to Ofcom. We use that information to assess whether the new base station is likely to undermine benchmark spectrum quality for existing satellite earth stations and fixed links, using the principles set out in Ofcom’s coordination guidelines. UK Broadband is not permitted to deploy new base stations unless the application is passed by the coordination process.”<sup>24</sup>*

71. In practice, UKB has only deployed base stations across a modest geographic area in and around London, Reading and Swindon using spectrum in the 3605 MHz to 3689 MHz range. Ofcom has already initiated a process to clear the band of other users. It now proposes to vary the terms of UKB’s licence so it is more suitable for mobile use. This would appear to be a large windfall gain for UKB’s owner, H3G.

72. UK Broadband should be compelled to return more spectrum or even be treated like other legacy users, given the shared use nature of its licence. If more spectrum was handed back to the regulator for the future award, this would allow operators to bid

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<sup>24</sup> Ofcom, *Statement and Consultation, Improving consumer access to mobile services at 3.6GHz to 3.8GHz*, §4.13, 28 July 2017.

for more spectrum and would likely to result in a more efficient distribution of spectrum.

73. It is acknowledged that the traditional policy approach in the UK has been to permit licence holders of spectrum subsequently designated for mobile use, to keep the spectrum and use it for mobile. This was the case with both the 1400 MHz (L-band) spectrum originally held by Qualcomm and the 3.4 GHz spectrum held by UKB. However, there was an important distinction, in that these were licences awarded by auction for exclusive use of the licensee. In the present case, the band is shared with fixed links and satellite users. Accordingly, those other bands do not necessarily provide a precedent for this case.
74. Ofcom has not explained why UK Broadband deserves special treatment, as compared to fixed links and satellite users, taking into account:
- its roll out has been very limited;
  - UKB has owned the spectrum since 2010 but has not taken up the option to expand its footprint under the FCFS regime;
  - H3G, UKB's new owner, apparently plans to wind down the UKB business and transfer the spectrum to alternative mobile use; and
  - Ofcom has the right to terminate UKB's licence at 3.6 GHz with five years notice.
75. Telefónica believes that Ofcom should properly have consulted on a full range of clearance options, including:
- a) Treating UKB like other users and clearing them completely from the band;
  - b) Treating UKB as special case, allowed to keep 80 MHz (as proposed in the 2018 UKB Consultation); and
  - c) An intermediate case, under which UK Broadband is allowed to convert a proportion of its spectrum (e.g. 40 MHz) reflecting its limited property rights.
76. Based on precedent of treatment of other FCFS users (i.e. fixed link and satellite users), option (a) would appear to be the most logical and fairest approach. It would result in the most spectrum being awarded in the forthcoming auction and it is likely to provide for a more efficient distribution of spectrum. Telefónica recognises that H3G would likely insist on five years' notice of licence revocation in this case. This need not delay the 3.6 GHz auction, but it would complicate it, as there would be a five-year delay in availability of 84 MHz of spectrum in the London, Reading and Swindon areas. Thus, this option, while fair, may not be in the best interest of UK consumers.

77. Accordingly, option (c) may be a more pragmatic choice. In return for allowing H3G to vary its licence and retain indefinite access rights to 3.6 GHz spectrum, it should return a proportion of the spectrum and agree to a broader band realignment. If the alternative is licence revocation (option a), H3G would have a strong incentive to accept any deal that left it with access to a sufficient amount of spectrum. If it refused the option, Ofcom could then proceed with auctioning the spectrum, subject to the five-year delay in availability of spectrum in UKB's footprint.
78. This begs the question what is the appropriate volume of spectrum for H3G to return, given the lack of precedent for a licensee in its position to be allowed such a licence variation. From a spectrum management perspective, the appropriate amount is 44 MHz. This would leave H3G with access to 100 MHz of spectrum, the maximum required for 5G for the foreseeable future, so it has much to gain from accepting a deal. More importantly, this would mean that 160 MHz could be sold in auction, sufficient for all four operators to bid for and potentially acquire 90-100 MHz for 5G. H3G's claim that it has a superior business case for more than 100 MHz of spectrum could then be market tested in the auction, with H3G allowed to compete subject to an appropriate band-specific spectrum cap (e.g. 140 MHz).
79. By comparison, option (b), as proposed by H3G, seems by far the worst option, given Ofcom's statutory duties. It is most unlikely to result in an efficient allocation and assignment of spectrum rights, as H3G would be retaining more than 100 MHz and be positioned to block other operators from acquiring larger contiguous blocks. There would also be no opportunity to test in the market whether the most efficient distribution of spectrum is for four operators to acquire 90-100 MHz. This approach would also deprive taxpayers of revenues from the sale of the spectrum (although this may be partially addressed through imposition of appropriate AIP on H3G's holdings). Finally, it sets an undesirable precedent for future clearance of other bands where shared users have access on a FCFS basis, encouraging such users to assert exaggerated property rights and promoting holdout problems.

**Ofcom must announce definitive plans with respect to applying AIP on legacy holdings in the 3.4-3.8 GHz band**

80. Ofcom has not yet announced how it will apply administrative incentive pricing (AIP) to UKB's legacy holdings in the 3.4 GHz band, despite the fact that its initial 15-year licence expired in July 2018. Given that other operators have paid large lump payments for spectrum in this band, it is important that H3G's legacy 3.4 GHz is

transitioned to AIP immediately. We presume this AIP will directly reflect the prices in the 2018 auction, especially as H3G was the marginal bidder who set those prices.

81. Similarly, as part of this licence variation, Ofcom should provide a definitive proposal for applying increased fees for UKB's residual holdings in the 3.6 GHz band. In the 2018 UKB consultation, Ofcom proposes that fees be linked to the outcome of the auction.<sup>25</sup> We agree that the 3.6 GHz auction prices will ultimately be the best benchmark for AIP for these holdings. However, Ofcom does not need to wait for the 3.6 GHz auction to happen before revising the fees, as there is already an excellent benchmark for the lump sum value of this spectrum: the 3.4 GHz award, where H3G set the price for all operators. If H3G's licence variation is implemented before the 3.6 GHz auction, then it should be required to pay appropriate fees from the point of variation.
82. Delaying the imposition of fees commensurate with the value of spectrum is bad policy for multiple reasons:
  1. It is discriminatory against other operators who have already paid the market price for 3.4 GHz spectrum and will have to do the same again for 3.6 GHz spectrum.
  2. It delays the introduction of an increased incentive for H3G to consider trading surplus spectrum. It also needlessly denies revenues to the taxpayer given that there is an obvious benchmark from the 3.4 GHz award that Ofcom could use to set the price.
  3. It strengthens the incentive on H3G to try to delay the 3.6 GHz auction. Any delay would not just extend H3G's advantage in 5G deployment but also delay the date when H3G has to pay full fees.

**Ofcom should provide guidance on its approach to spectrum caps for 3.6 GHz before proceeding with any licence variation**

83. Ofcom should not be proposing this variation without clarifying Ofcom's views on H3G's potential participation in the 3.6 GHz auction. If the variation is implemented as proposed, H3G would have more spectrum in the core 5G band than any other

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<sup>25</sup> Ofcom, *Variation of UK Broadband's Spectrum Access Licence for 3.6 GHz spectrum*, §5.4.

operator. In these circumstances, it should not be allowed to bid for any more spectrum at 3.4-3.8 GHz.

84. Telefónica requests that Ofcom set a band-specific cap across 3.4-3.8 GHz that is not higher than 140 MHz (we would prefer 120 MHz). This cap should be introduced alongside the established cap of 37% on usable mobile spectrum.

85. A 3.4-3.8 GHz band-specific cap is necessary for the following reasons:

1. To prevent bidders from exercising strategic value associated with blocking rivals from enhancing their 5G capacity.
2. To promote outcomes in which all four operators are likely to acquire substantial 5G holdings.
3. To prevent H3G from threatening to price drive at 3.6 GHz in an attempt to improve its bidding position in other bands (such as 700 MHz).

## VII. THE PROPOSED VARIATION AND AWARD IS INCONSISTENT WITH OFCOM'S STATUTORY DUTIES

86. Through its application, UKB is proposing that Ofcom awards it the 3600-3605 MHz spectrum block. Ofcom has mistakenly interpreted this as a licence variation request. It has consequently failed to meet the requirements of Article 7 of the Authorisation Directive:

- Ofcom has not invited other applications for the 3600-3605 MHz block; and
- Ofcom has failed to use selection criteria that are objective and non-discriminatory.

87. In relation to that part of UK Broadband's proposal properly regarded as a variation application, the most relevant statutory duties are:

- Section 3 of the Wireless Telegraphy Act 2006 ("2006 Act"), which includes obligations to promote:
  - efficient use of spectrum;
  - Competition; and
  - Benefits for citizens and consumers
- Article 6 of the EU Authorisation Directive 2002/20/EC, which requires that decisions with regards to licence variations are:
  - Objectively justified
  - Non-discriminatory
  - Proportionate; and
  - Transparent.

88. The analytical framework Ofcom proposes (in paragraphs 4.2 – 4.4) appears reasonable, given Ofcom's statutory requirements. However, Ofcom's narrow focus on the 3.6–3.8 GHz band means it fails to consider the broader impact on users in the 3.4-3.8 GHz band and the mobile market as a whole. As a result, Ofcom's assessment (in Section 4 of the consultation document) of three of the criteria under the 2006 Act is, we believe, inadequate. It also fails to meet its obligations under EU law.

### **Failure to promote most efficient use of 3.4-3.8 GHz spectrum**

89. Ofcom's Impact Assessment narrowly focuses on the efficiency benefits in the 3.6-3.8 GHz band. We accept that the proposed variation would improve the situation in this sub-band as it makes available a slither of additional spectrum for other operators

and ensures H3G's holdings are contiguous in this sub-band. However, this ignores, the large gains that could be achieved by incorporating a requirement in the variation to reconfigure the entire 3.4-3.8 GHz band after the auction. This would guarantee that all operators can link their holdings in both sub-bands and secure access to large contiguous blocks for 5G. It would also ensure that H3G cannot block such a reconfiguration.

90. There are no disadvantages in terms of efficiency from adding this requirement to the licence variation. The costs associated with a reconfiguration are likely minimal for H3G because (a) it intends to reconfigure how it will use its holdings anyway; and (b) it has not yet deployed any equipment for 5G. In addition, even if the entire band is reconfigured, H3G and its subscribers would still get the full benefits of large contiguous blocks, while other operators and their subscribers could do so, too. This is therefore obviously a better solution with respect to efficient use of spectrum and Ofcom should embrace it based on its statutory duties.
91. Ofcom's proposal to allow H3G to keep almost all of its 3.6 GHz holdings is also contrary to both its duties and the government's 5G goals. The largest carrier size for 5G will be 100 MHz. Accordingly, H3G is unlikely to be the most efficient user of any spectrum in excess of 100 MHz. Its intrinsic value for holdings above 100 MHz are likely modest and smaller than the value to other operators seeking to increase holdings up to 100 MHz. It may, however, have a large strategic value associated with blocking other operators from the chance to match its holdings.
92. Given the shared use nature of UKB's 3.6 GHz holdings, Ofcom should not consider itself under any obligation to allow H3G to convert all this spectrum to 5G mobile use. A better approach would be for H3G to hand back at least 44 MHz, which could then be sold at auction, so as to establish the most efficient user. Unless Ofcom takes such action, it can have no confidence that the spectrum will be used in the most efficient manner, given (a) the opaque nature of the transaction in which H3G obtained the spectrum; and (b) H3G's refusal to relocate spectrum in the 3.4 GHz band which we view as a strategic move to make it harder for rival operators to access contiguous spectrum.
93. As a general point, Telefónica is concerned that Ofcom to date has not put enough weight on its duty to secure the most efficient use of the spectrum. It is important that Ofcom recognises that the market, through primary allocations and trading, cannot always be relied on to produce the optimal outcome. Interventions by the regulator to nudge the market in the right direction or to close off obviously bad outcomes are

sometimes required. This is one of those instances, as the existence of transaction costs and strategic effects should raise real concerns that the market, left to its own devices, will not be able to support an efficient re-planning of the band.

94. Intervention to promote realignment of the 3.4-3.8 GHz band to promote the efficient use of spectrum for 5G would be proportionate and can be objectively justified according to Government policy, as set out by the DCMS:

*“Under measures introduced by the Digital Economy Act 2017, the Government can set out its strategic priorities in relation to spectrum management, which Ofcom must take account of in exercising its regulatory functions. The Government has two key strategic priorities for the 3.6 – 3.8 GHz band – first, to ensure the most efficient use of the spectrum and, second, to facilitate access to spectrum to support the availability of new 5G services and applications, thus promoting dynamic efficiency and innovation.”<sup>26</sup> [emphasis added]*

#### **Failure to promote long-term competition**

95. The analysis of the impact on competition fails to consider at all the likelihood that H3G would be incentivised to prevent future attempts to re-plan the 3.4-3.8 GHz range, and, in so doing, perpetuate the competitive advantage granted to it by the licence variation request. In Telefónica UK’s view, this is a glaring omission.
96. There appears to be a limitation in Ofcom’s reasoning. It accepts that greater spectrum contiguity for H3G would produce benefits for H3G and its customers, but then fails to consider that other operators might similarly want to achieve greater spectrum contiguity (indeed, para 4.50 appears to suggest that contiguous spectrum is not particularly desirable for H3G’s competitors, at all).
97. Ofcom may be correct in its assessment that any short-term competitive advantage for H3G from having a larger contiguous block may be modest, for the following reasons:
1. 5G is still in development and most applications used by consumers do not yet need the high speeds associated with 100 MHz blocks.
  2. Although H3G would gain a marketing advantage in 5G versus all other operators (as EE did with 4G), this will be limited because all other operators have enough spectrum to launch 5G, albeit with smaller carriers, less capacity and lower headline speeds.

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<sup>26</sup> DCMS, July 2018, *Future Telecoms Infrastructure Review*, para 212.

98. However, its assessment of the risks to long-term competition is inadequate:

1. There are real technological and cost advantages from have larger blocks of contiguous spectrum, as described in Section II. These are likely to become more important over time. Future evolutions of 5G technology could place even greater weight on large contiguous blocks.
2. The ability of operators, especially Telefónica and Vodafone, to replicate the advantages of H3G's larger contiguous block through carrier aggregation is uncertain. Ofcom appears to treat this as a given when in fact this is entirely unknown.
3. In other European countries, regulators are taking steps to ensure that multiple operators (typically at least three) have access for blocks of 80-100 MHz for 5G. As this will be the norm across Europe, manufacturers will prioritize equipment for such configurations.

99. There is a real risk that the licence variation, as proposed, will result in a situation where H3G is the only operator with access to a larger contiguous 5G block for the foreseeable future. Over time, this could become a significant competitive advantage that H3G may leverage to expand its market share, reduce churn and charge a premium to consumers who value the greatest benefits form 5G. Other operators may not be able to replicate these advantages and/or may face significantly higher costs to do so.

100. If the situation was that there was only enough spectrum for one operator to have a wider contiguous block, then it may be acceptable for Ofcom to allow this situation now and intervene later if a competition problem emerged. However, that is not the situation. There is enough spectrum in the 3.4-3.8 GHz band for up to four operators to access wider contiguous bands of 80 MHz or more. Therefore, it would be reckless for Ofcom to adopt an ex-post competition strategy when it could act ex-ante without imposing any meaningful costs on H3G.

101. Absent hard evidence from H3G that it would be harmed by having to move holdings (which we are confident does not exist), any opposition from H3G to reconfiguration implies that it expects (or at least hopes for) long-term anti-competitive benefits from blocking rivals. Accordingly, Ofcom must insist that H3G participates in band reconfiguration in return for the licence variation.

### Failure to promote benefits to citizens and consumers

102. This analysis is similarly deficient; Ofcom does not consider the benefits for consumers and citizens of spectrum contiguity in the broader sense (i.e. in relation to the 3.4-3.8 GHz band). Without band realignment, there is a substantial risk that only subscribers to H3G's network will realise the benefits of larger blocks of contiguous spectrum for 5G. Subscribers to other networks may not be able to realise the same benefits.
103. In a new paper on future telecoms infrastructure in the UK, DCMS specifically recognises the importance of operators having access to wide bands for 5G:

*“The Government recognises that operators have a preference for national licences and that **wide spectrum holdings will be needed to provide high quality 5G services.**”<sup>27</sup> [emphasis added]*
104. A situation where only a small proportion of UK mobile users have access to the highest level of 5G services possible with wider bands is contrary to the government's objectives to be a leader in 5G in Europe. Given that there is an alternative, with band realignment, where all networks could have the potential to utilise larger bandwidths, Ofcom's proposal is obviously not in the best interests of UK citizens.

### Objectives under EU law

105. Ofcom's impact assessment in relation to its duties under EU law is inadequate. Its analysis is only superficially accurate when applied narrowly to the 3.6-3.8 GHz band. However, it should consider the 3.4-3.8 GHz range as one 5G band, as is the case according to 3GPP standards.
106. When considering the entire band, Ofcom's proposed licence variation fails on all four grounds:
  1. It is **not objectively justifiable** because there is an obviously better approach available to Ofcom, as we have set out in Section V of this submission). Namely, Ofcom should require H3G to participate in a realignment of the entire 3.4-3.8 GHz band that enables multiple operators to secure large contiguous blocks for 5G and not just H3G.

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<sup>27</sup> DCMS, July 2018, *Future Telecoms Infrastructure Review*, para 222.

2. It is **discriminatory** against all mobile operators (and their subscribers) other than H3G, as it (a) creates a situation where only H3G has access to a large block of contiguous spectrum ready for 5G deployment; and (b) makes it possible for H3G to block all other operators from replicating its position. As we have discussed in Section III, the proposed licence variation would position H3G as the only network in the UK with a spectrum portfolio suitable to exploit fully the technological advancement of 5G. It is unclear at this point when or even whether other operators will be able to match H3G using technologies such as carrier aggregation.
3. It is not **proportionate** as the variation would grant a huge windfall gain to H3G that is not commensurate with its property rights. Moreover, the efficiency benefits are inferior to those that could be achieved if all operators were required to realign their holdings in the entire 3.4-3.8 GHz band.
4. It is not **transparent** as Ofcom fails to consider the broader context of the 3.4-3.8 GHz band, and the potential economic impact of all operators other than H3G being blocked from securing larger contiguous blocks for 5G.