



Issue 1

BT's response to:

“Second consultation on assessment of future mobile competition and proposals for the award of 800MHz and 2.6GHz spectrum and related issues”

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Executive Summary

1. BT welcomes this further consultation on the arrangements for the auction of these important mobile spectrum bands. We share Ofcom's objective to see these bands made available for use as soon as possible and with emphasis on the need to promote innovation and competition. We are grateful that Ofcom has now addressed some of the points that BT made in response to the first consultation and are pleased to provide our views on these latest revised consultation proposals.
2. BT accepts Ofcom's approach of promoting national network competition by ensuring that four national wholesalers can obtain sufficient spectrum in the auction. However, we consider that Ofcom should clarify, within the licences, that these may be varied in future to include wholesale access obligations, if necessary to promote competition. Ofcom should also commit to formally review the situation soon after the auction and again 2-3 years later.
3. BT agrees with Ofcom's view that sub-national networks using low power shared 2.6GHz paired spectrum will enable new entrants to bring innovation and further competition to the UK market. We agree that spectrum should be reserved to encourage this and ensure that the benefits of additional competition are secured. We urge Ofcom to provide sufficient bandwidth nationwide to enable such applications to flourish, with multiple operators able to provide the highest speed services to consumers that can be supported by widely available backhaul solutions. Accordingly we propose that 2x15MHz would be appropriate as a compromise between the amount of 2x10MHz that Ofcom appears to recognise to be insufficient and the bandwidth of 2x20MHz that Ofcom suggests is not proportionate. We further suggest that the number of low power licences and power levels could be further optimised along the lines of BT's response to the previous consultation and welcome Ofcom's willingness to consider any views on these from other players. The location of low power spectrum within the band also needs further consideration.
4. BT disagrees with Ofcom's proposed coverage obligation on one of the 800MHz licensees on several grounds, mostly arising from Ofcom's apparent intention to attempt to specify a requirement in terms of providing high speed mobile broadband inside premises. As currently framed the consultation proposals would be incompatible with EU State Aid rules. Furthermore, we consider they are problematic and inappropriate from several other important perspectives. They are not proportional and have the potential to distort competition. Also, there is a lack of clarity on the requirements and it would be difficult to verify whether the required coverage is achieved. If Ofcom decides that any coverage obligation is needed (which we doubt), this should be defined and verified in terms of an outdoor coverage requirement (this need not prevent indoor coverage provision on a normal commercial basis).
5. BT sees merits in Ofcom's suggestion that unused spectrum could be licenced concurrently for use by other operators, but feels that further consideration is needed to establish how this could be achieved sooner than Ofcom has so far described.
6. BT is generally in agreement with the revised rules in relation to the auction process.

7. BT has some doubts as to the suitability of the additional method for determining market value of spectrum based on the auction bids, but notes that this and other options will anyway be considered further after the auction.

BT's response to "Second consultation on assessment of future mobile competition and proposals for the award of 800MHz and 2.6GHz spectrum and related issues"

1 Introduction

BT is pleased to submit this response to Ofcom's 2nd consultation on assessment of future mobile competition and proposals for the award of the 800/2600MHz bands and related issues.

We are grateful that Ofcom's latest proposals have resolved a number of points that BT raised in its response to the first consultation and we look forward to Ofcom's final decisions on these and other matters. The revised proposals in this 2nd consultation do nevertheless include a number of points on which BT has substantive comments to provide and there are some important aspects where we would urge Ofcom to modify its plans.

In section 2 we provide an overview of BT's position and summarise the main outstanding areas of concern for us in the latest consultation proposals. In section 3 we answer the specific questions that Ofcom has posed. Finally, in section 4 we address a point for which there is no specific consultation question but where BT would like to provide its views.

2 Overview of BT views on the latest consultation proposals

BT continues to support the award of the 800/2600MHz (and possibly 1800MHz) spectrum at the earliest opportunity, in a manner that promotes innovation and competition.

Low power 2.6 GHz provision

We agree with Ofcom's view that competition will be promoted by reserving shared low power 2.6GHz paired spectrum suitable for new entrants to use for sub-national networks.

We particularly welcome Ofcom's proposal to guarantee that new entrants will be able to acquire such licenses, which is important if Ofcom is to promote competition and innovation. We maintain our previous view that the number of such licences and power levels could be further optimised and we recommend that more than 2x10MHz is reserved nationwide. We propose that a reservation of 2x15 MHz bandwidth for shared low power use is a reasonable compromise that becomes possible with Ofcom's new proposal to award 2.6GHz in 5MHz, rather than 10 MHz, paired blocks.

Inappropriate coverage obligation on 800MHz licensee

The proposed coverage obligations on one 800MHz licence and the means of financing them remain an area of particular concern from several perspectives. First and foremost, the reduced bid price that would result from the coverage obligation is a grant of State Aid to the winning bidder. The aid is the difference between the bid price that would have won the licence under normal conditions and the lower price that in fact wins the licence. This subsidy is financed from State resources – the State is depriving itself of an amount that it would otherwise have received. Under the EU State aid rules, the UK must notify to, and receive approval from, the European Commission for the grant of the licence at the lower price before it makes that grant. This is known as the "Standstill Obligation". There would be an infringement of the EU State aid rules if the Standstill Obligation were not observed and this would allow third parties to bring claims in national courts and to make complaints to the European Commission. These actions might ultimately result in the UK having to recover the subsidy.

As currently framed, the auction revenues would be substantially reduced, and state aid granted, because of the coverage obligation for mobile broadband provision to locations that, by the target date of 2017, will already be served by fixed networks (a minimum 2Mbit/s downlink service to 100% of UK premises is already in procurement, partly funded by national and local Government). Little additional consumer benefit would therefore be generated from the huge additional costs of the operator that wins the relevant 800MHz licence if it has an obligation to deliver mobile broadband inside buildings in areas where competing services are already available. It makes better sense, and it is a legal requirement, to procure subsidised in-building broadband coverage in a technology neutral manner and only in areas where no operator, irrespective of technology, will invest its own money in delivering affordable broadband services. Unused spectrum can be used for this purpose in these areas if a wireless solution is appropriate.

BT doubts, in any event, that the use of the subsidy by the winning bidder to achieve the 2Mbit/s indoor coverage obligation in areas that are not covered by the commercial deployment of mobile operators will be approved by the European Commission for reasons explained in detail in our response to Question 5.1.

In the case of indoor mobile broadband use, devices such as smartphones and PCs can run the same applications, whether using either mobile broadband or fixed broadband (with WiFi). In many cases the consumer may not even be aware of which connectivity is in use and the mobile and fixed broadband services are effectively substitutes.

The proposed coverage obligations on one 800MHz licence also betray a lack of clarity of the requirement and there would be practical difficulties to enforce it. As mentioned, there are also material concerns over the proportionality of the proposals and their anti-competitive effect, particularly in the context of other policy initiatives for broadband provision.

Other aspects

Our views on other aspects of the auction are included in answers to the consultation questions given below.

3 Answers to the consultation questions

Question 4.1: Do you agree with our assessment of the competition concerns relating to national wholesale competition that could arise if the auction took place with no measures to promote competition? Please state your reasons for your views.

BT acknowledges the complexity of the issue and notes that Ofcom's view has now significantly changed compared with previous consultations in relation to the importance of a national wholesaler having access to low frequency spectrum.

We agree that the various dimensions of concerns around wholesale access capability that Ofcom is seeking to address are valid ones. We also accept Ofcom's position of addressing concerns around future competitive provision of mobile services, including wholesale access, by seeking to ensure there are four competing national wholesale competitors. That said, we continue to have reservations as expressed in response to the previous consultation as to whether this will prove sufficient in the longer term, and how the issue of wholesale access will be addressed if the outcome is not as Ofcom anticipates. We note that with the trend to consolidation and sharing of infrastructure, four spectrum winners does not necessarily equate to four fully competing networks.

We therefore continue to recommend that Ofcom considers whether a provision is appropriate within the auctioned licences, to clarify that changes to the licence may be introduced in future to include regulated wholesale access requirements if Ofcom deems this necessary to address competition concerns (without the agreement of the licensee, but after consultation and in accordance with relevant European and national law).

We would also suggest that Ofcom carry out a review following the spectrum award to ascertain whether all potential competition concerns have been addressed and to assure stakeholders that the outcomes provide for full competition. It may indeed be appropriate for an initial review to take place shortly after the spectrum award, with a further review some 2-3 years later.

We note Ofcom's conclusions about the various packages that each existing operator already has and what new packages would be needed to ensure that four wholesale competitors will be maintained in a future LTE environment. We have no issues with the analysis, other than to note that whilst the existing operator holdings and the various spectrum portfolios may be able to deliver similar or sufficient services by four credible national competitors, the network costs would be different when working at different frequencies and these would be reflected in spectrum values. Therefore, in order that there is no distortion of competition, it seems appropriate that the spectrum values across all the bands used for national wholesale services should be at market rates, both auction and non-auction bands, which we understand is anyway what Ofcom intends.

Question 4.2: Do you agree that option 4 should be adopted to promote national wholesale competition? Please state the reasons for your views.

In the absence of regulated wholesale access requirements BT agrees that some other measure is needed to promote national wholesale competition. Of the seven options that Ofcom has identified BT agrees that Option 4 is suitable (safeguard caps and a minimum spectrum portfolio). We understand that the total cap of 1x105MHz will include all existing 900/1800/2100MHz paired holdings plus any new paired and unpaired spectrum awarded in the auction (including low power spectrum). The unpaired spectrum to be awarded would be counted as equivalent to half its bandwidth paired. Guaranteeing access to a 4th operator or new entrant to a minimum portfolio of spectrum to promote national competition is consistent with Ofcom's plan to reserve low power spectrum for new entrants for sub-national competitors.

Question 4.3: Do you agree that the portfolios in group 2 (middle portfolios) of option 4 are likely to be most appropriate and proportionate implementation of this option?

We have noted the addendum to the consultation paper in which Ofcom has helpfully clarified how the minimum portfolios may be affected by the possible sale of the 1800MHz spectrum by EE in advance of the auction. That addendum asks whether it is sufficient for operators other than Vodafone, EE and Telefonica to hold, in combination, the minimum portfolio needed for a 4th wholesale competitor (case 1), or whether it is instead necessary for a single other operator to hold in its own right one of the minimum portfolios intended for a 4th wholesale competitor (case 2). Our opinion on this question is that Case 2 seems more relevant if Ofcom aims to ensure that four players have sufficient network capacity to cover their own traffic as well as wholesale traffic and to also have suitable coverage (at least if Ofcom deems that Group 2 portfolios are appropriate). We note that if Ofcom decided that Group 1 portfolios are sufficient then the issue as to whether Case 1

or case 2 is appropriate does not arise as there would already be a 4th player holding a minimum portfolio if 1800 MHz is sold ahead of the auction.

On the question of which Group of minimum spectrum portfolios is most suitable, this can be looked at in terms of what is ideal for a 4th operator as well as what is necessary given that larger packages can be secured by competitive bidding. Also the fact that opting-in to accept any one of a set of a larger minimum packages could (depending on reserve prices) be expensive and, by committing to accept any one of a group that Ofcom determines from analysis of the auction bids against a criterion of which combination generates most revenue, may leave an operator less flexibility than if it had not opted-in and had instead just bid competitively to secure a particular one of the minimum portfolios. On balance we think that Group 3 (larger portfolios) would not be appropriate. Group 2 (medium portfolios) could be appropriate, although unless Ofcom excludes H3G from bidding for a low power 2.6GHz licence it seems that these mostly offer little more than Group 1 (smaller portfolios) since, with multiple 2.6GHz low power licences available, it may be relatively easy for the 4th Operator (H3G or a new entrant) to anyway win one of these in addition to the minimum portfolio of Group 1. We note that the consultation document is not explicit as to whether the low power 2.6GHz spectrum counts towards the minimum portfolio.

Question 4.4: Do you believe that geographically split licences for a particular block of 2.6 GHz spectrum between standard power use and lower power use is likely to create significant additional benefits for consumers?

It is in the urban areas rather than the rural areas where it is more likely that there will be several low power operators in the same location and hence it is the urban areas where additional low power shared spectrum would be most useful, primarily to help manage interference between low power licensees and also to take benefit of availability of high speed backhaul. Ofcom's proposal is to increase the 2x10MHz reserved for low power to 2x20 MHz in the rural areas, which would not address the locations where there are likely to be multiple operators. It is however true that the extra low power spectrum in rural areas would be useful for serving customers as a broadband delivery solution. However, on balance we think that it would be preferable and simpler if the 2x10 MHz reserved low power spectrum is increased to 2x15MHz reserved spectrum on a national basis, available for urban applications as well as rural broadband solutions. This alternative option avoids more complicated geographic sharing options, including the need to deal with boundary issues.

Question 4.5: Please provide your views including the reasons for them on which options you believe should be taken in relation to promoting low power shared use of 2.6 GHz spectrum.

BT is of the firm view that Ofcom's provisional conclusion is correct and that Option A – reservation of shared 2.6GHz paired low power spectrum – is the appropriate solution. Our reasons for supporting this option of reserving spectrum have been made in previous submissions and we agree with Ofcom's reasons for reaching this view. Indeed, we consider this to be essential if Ofcom is serious about promoting competition and innovation. However, whilst we agree that spectrum should be reserved for low power use, we contend that the quantity should be increased to 2x15MHz, rather than just 2x10MHz, for reasons explained elsewhere (see Q. 4.4 and 6.2).

We appreciate that Ofcom has noted that BT's proposals made in response to the first consultation relating to subdividing the shared low power licences into two power categories (with different

number of licences available for each) have merit and are still under active consideration. We continue to advocate this as a preferred approach, as we think it will maximise the efficiency of use of the spectrum by encouraging investment in low power solutions without diminishing the benefits to consumers.

We further believe that there is a good case to exclusively reserve the low power 2.6GHz spectrum for new entrants. MNOs with high power spectrum can operate small cells on the same frequency. For LTE this can be relatively easily achieved as part of a single network in accordance with the latest standards and hence existing players would not have the same incentives to coordinate and cooperate in use of low power spectrum as new entrants and to reach agreement with other players on these aspects. If Ofcom were to take up BT's suggestion of two categories of low power licence then we acknowledge that there would be no reason not to open the lowest power licences to all players.

We see some value in enabling low power bidders to jointly contend against a high power bidder for an extra 2x5MHz but, as explained elsewhere, have a strong preference that instead Ofcom increases the reserved low power spectrum to 2x15MHz. Combining bids raises concerns as to whether one low power licensee may disproportionately carry the costs of the benefits to the other low power licensees. Also, if it is acknowledged that 2x15MHz is needed by new entrants, the correct amount of spectrum should be reserved for this in the same way as Ofcom proposes to guarantee the necessary minimum spectrum package needed for a 4th national operator.

Question 5.1: Do you have any comments on the proposal to include a coverage obligation in at least one of the 800 MHz licences, and the proposed extent of such a coverage obligation?

In our response to the first consultation we expressed concerns over the proposed obligation for the holder of one 2x5MHz licence to provide 2Mbit/s indoors with 90% probability to 95% population. We highlighted that this quantity of spectrum would have very limited capacity to support multiple users and were concerned that focusing the obligation on indoor use was inappropriate because other solutions would be more economically efficient. The coverage obligation is in effect an indirect subsidy of mobile broadband in areas where roll-out is not commercially justified and this will be reflected in reduced auction revenues. We noted that a transparent and technology neutral competitive procurement of broadband would be a better approach and that any unused 800MHz spectrum (or other spectrum) should be made available if required for the solution.

Ofcom's latest proposals address some of BT's points, but overall are even less satisfactory than the earlier proposals. Our principal concerns are that (i) the proposals amount to the grant of unlawful State aid; (ii) the proposed obligations are not proportionate; (iii) the proposed obligations will lead to a distortion of competition; (iv) they are unclearly specified; and (v) the proposed obligations will be hard to verify. It is for these five reasons that BT does not support the inclusion of any coverage obligation on the winners of auction licences if it is expressed as a specific coverage target for inside buildings.

The proposals amount to the grant of unlawful State aid

The proposed coverage obligations on one 800MHz licence and the means of financing them remain an area of particular concern from several perspectives. First and foremost, the reduced bid price that would result from the coverage obligation is a grant of State Aid to the winning bidder. The aid is the difference between the bid price that would have won the licence under normal conditions and the lower price that in fact wins the licence. This subsidy is financed from State resources – the

State is depriving itself of an amount that it would otherwise have received. Under the EU State aid rules, the UK must notify to, and receive approval from, the European Commission for the grant of the licence at the lower price before it makes that grant. This is known as the “Standstill Obligation”. There would be an infringement of the EU State aid rules if the Standstill Obligation were not observed and this would allow third parties to bring claims in national courts and to make complaints to the European Commission. These actions might ultimately result in the UK having to recover the subsidy.

As currently framed, the auction revenues would be substantially reduced, and state aid granted, because of the coverage obligation for mobile broadband provision to locations that, by the target date of 2017, will already be served by fixed networks (a minimum 2Mbit/s downlink service to 100% of UK premises is already in procurement, partly funded by national and local Government). Little additional consumer benefit would therefore be generated from the huge additional costs of the operator that wins the relevant 800MHz licence if it has an obligation to deliver mobile broadband inside buildings in areas where competing services are already available. It makes better sense, and it is a legal requirement, to procure subsidised in-building broadband coverage in a technology neutral manner and only in areas where no operator, irrespective of technology, will invest its own money in delivering affordable broadband services. Unused spectrum can be used for this purpose in these areas if a wireless solution is appropriate.

BT doubts, in any event, that the use of the subsidy by the winning bidder to achieve the 2Mbit/s indoor coverage obligation in areas that are not covered by the commercial deployment of mobile operators will be approved by the European Commission. This is because by the target date of 2017 those areas will already be covered by multiple ISPs offering 2Mbps services indoors at market rates either in reliance on BDUK or private sector funded infrastructure. According to the EU State aid rules, public funding cannot be used to duplicate broadband services, irrespective of the technology used to deliver them, where, as here, there will be no market failure. To avoid duplication, the public sector is required to carry out a detailed mapping exercise to identify the ‘white areas’ in which no operator using any technology will invest in affordable broadband and where, therefore, subsidies can be granted. No such exercise has been carried out here. Moreover, the European Commission’s guidelines on State aid and the rapid deployment of broadband networks, which apply to all technologies, emphasise that EU Member States should not favour one technology over another¹. Here the UK is seeking to favour mobile technology.

The coverage obligation is not proportionate

Aside from the question of whether the potential obligations are sufficiently clearly defined and are verifiable (see later), BT is concerned that they would not be proportionate in terms of the benefits that arise from the obligation when compared with the costs. Article 9(1) of the Framework Directive requires that:

“... [Member States] shall *ensure that spectrum allocation used for electronic communications services and issuing general authorisations or individual rights of use of such radio frequencies by*

¹[2009] OJ C235/7 at paragraph 51(d): “Given that broadband services can be delivered on a host of network infrastructures based on wireline (xDSL, cable), wireless (Wi-Fi, WiMAX), satellite and mobile technologies, Member States should not favour any particular technology or network platform unless they can show that there is an objective justification for this”. The Commission goes on to say that “only in one case [in Sardinia] has the Commission so far accepted the justified use of a specific technological solution”

competent national authorities are based on objective, transparent, non-discriminatory and proportionate criteria”.

The cost of extending mobile coverage beyond where mobile coverage (but not other broadband coverage) is commercially viable will be reflected in reduced auction revenue as the bidder taking the coverage obligation will factor into his bid the cost of extending mobile coverage to areas where there is no business case to do so. This would include the extra capital expenditure to extend the mobile coverage, as well as consideration of the on-going operational expenditure to run networks (at a loss) in locations where revenues do not cover costs. Given the fact that fixed broadband at a minimum downlink speed of 2Mbit/s is to be available to 100% of premises (partly funded by national and local Government) as an existing Government policy goal, the MNO with the extended coverage obligation may expect to attract only a fraction of customers in these areas. In effect an extensive mobile coverage obligation for mobile data service in premises will mean that the Government would, in effect, subsidise two solutions in some areas. The first by direct subsidy of solutions procured within a competitive process, the second by indirect subsidy paid for by an MNO and reflected in reduced auction revenue. As mentioned, such duplication with State funds is unlawful under the EU State aid rules as is the lack of proportion between the additional benefits (if any) and the cost of achieving those benefits.

The consultation (paragraph 5.35) notes that Vodafone has indicated to Parliament that the cost of extending coverage from 95% population to 98% population is £200m. The Real Wireless study² gives figures from Rory Stewart MP (p. 6) for the same coverage extension as £215m for a worst-case projection, and from 3UK at £100m for the extra sites to move from 97% indoor coverage that would be achieved by equipping their existing sites with 800MHz, to instead achieve 98%. However, we have been unable to deduce from results in the Real Wireless report what the additional costs are for moving to 98% UK national coverage, since the report only considers four UK study regions.

If we conservatively take a figure of £200m to extend from 95% to 98% population coverage, we calculate that this represents about £256 indirect subsidy per extra covered household, only a fraction of which will take the mobile service. Take-up is never 100%, so if only 1/3 of these extra 3% of households use the mobile service for indoor mobile broadband that equates to £768 per household. Furthermore, it is not apparent that any of these estimates included the on-going costs of running mobile networks at a loss in these commercially unprofitable areas, and hence the true cost of the coverage obligation would be even greater.

Given that the cost of coverage rises disproportionately higher as mobile coverage extends closer to 100%, it is clear that the cost of the 98% coverage obligation, or an obligation benchmarked to 2G voice coverage, represents very large costs for high speed mobile data provision to replicate an equivalent service available on fixed networks indoors and is therefore not a proportionate regulatory measure which for that very reason would not receive approval from the EU Commission under State aid rules. We therefore believe that Ofcom should not introduce a coverage obligation.

The obligation will lead to a distortion of competition

As outlined above, an obligation focused on extending indoor mobile broadband coverage to areas where equivalent indoor mobile broadband is delivered by fixed networks (commercially funded in

²“Technical analysis of the cost of extending an 800 MHz mobile broadband coverage obligation for the United Kingdom”, <http://stakeholders.ofcom.org.uk/binaries/consultations/award-800mhz/annexes/real-wireless-cost-analysis.pdf>

some cases, subsidised in others) is a distortion of competition and a waste of public funds. From a consumer's perspective the same applications can run on a device whether it is connected to mobile broadband or to fixed broadband (with WiFi). In paragraph 5.20 Ofcom acknowledges the substitutability of fixed and mobile broadband solutions. We invite Ofcom to carefully consider this aspect when considering what coverage obligation, if any, is appropriate for the mobile auction licences and when considering whether any obligation should be referenced to outdoors or indoor signal levels or service availability.

The obligation is unclearly specified

It is unclear what the obligation to provide "4G mobile data" service (as stated in Q5.2) means. Section 1.3 implies that by "4G" Ofcom refers to "high quality data services". BT believes that a specific data rate available at a given percentage of locations where population lives or geographic areas, measured at locations outdoors, would be a much clearer and more predictable and verifiable metric. It is also unclear to BT whether Ofcom intends to require that new technology must be deployed everywhere (to deliver 4G) or just to the extent needed to extend and improve existing 3G data services.

Ofcom's potential coverage obligation (designated Approach A) based on a relatively straightforward 98% population coverage requirement is not clearly described, but we infer from the narrative that precedes the provisional conclusion of section 5.34 that this may relate to indoor coverage of 2Mbit/s downlink. It is unclear where inside the buildings located where 98% of population lives this data rate must be available, with what probability and what type of devices.

Ofcom's preferred coverage obligation (Approach B), based on a requirement to provide high speed data services to match existing 2G voice coverage (of combined networks) and areas in which MIP infrastructure is capable of supporting a 4G mobile data service, is not a clear definition of coverage obligation, not least since the locations where existing 2G voice coverage is available are not published. Ofcom has not said whether it is indoor or outdoor 2G voice coverage that must be replicated. If it is outdoor voice coverage that is to be replicated with outdoor high speed data services then, according to Ofcom's Infrastructure report, which we understand was based on a 2G received signal strength prediction of -92dBm, the target would be c.99.9% of population plus whatever the MIP infrastructure can support. If the target 2G signal strength is different (BDUK in a recent consultation paper put forward substantially different figures) the coverage obligation will change substantially. We therefore also find the Approach B obligation to be very unclear.

Ofcom suggests (para 5.57) that an indoor coverage obligation can be met by the licensee choosing to provide customers with window ledge CPE that routes to mobile devices in the home, rather than providing sufficient signal to directly serve indoor devices. This being the case, it would be better to just state what coverage level is required outside the building. In fact, if the windowsill CPE is not provided, then the indoor coverage obligation is technically not met (and perhaps not required). This all serves to reinforce the view that the requirement Ofcom is suggesting (Approach A or B) is very unclear in terms of what is required and how it could possibly be verified.

The obligation will be hard to verify

BT is unclear how Ofcom would verify whether either of the preferred possible coverage obligations (once clarified) could be verified. Approach A is difficult if *indoor* coverage is specified. Approach B is subjective since the coverage locations and signal level to be used as a reference for defining those locations are unknown.

Question 5.2: Do you have any comments on which of the two approaches proposed for the specification of such an obligation would be preferable: Approach A, which would require the licensee to provide a 4G mobile data service to an area within which at least 98% of the UK population lives; or Approach B, which would require the licensee to provide the specified mobile data service with coverage comparable to the combined mobile voice coverage of today's 2G networks and in addition to provide the same service with coverage comparable to that of the additional mobile voice coverage achieved through the MIP, in those areas where MIP infrastructure is capable of supporting a 4G mobile data service?

As explained above neither solution is appropriate in BT's view. If any coverage obligation is necessary, then of the two proposals, we think that a variation of Approach A may be preferable. However, the obligation should not prescribe indoor signal levels but should focus on coverage of locations where a certain percentage of population is located. The percentage should be carefully considered to ensure that it is proportionate, taking into account other solutions, including existing and planned fixed line and satellite solutions.

If Ofcom does decide to link the auction licence conditions to the Government's Mobile Infrastructure Programme (MIP) being run through BDUK, it would make sense for Ofcom to wait until the MIP requirements are decided. At this point the location of the mobile "not spot" areas and the MIP sites are unknown, it is also unclear whether the mobile operators will commit to use these for data services. If they do commit to equip the sites with 3G it is unclear to BT why an obligation to use them for 4G is needed.

Question 5.3: Do you have any comments on our assessment that it is unlikely to be proportionate to impose such a coverage obligation on more than one licensee?

Yes, BT agrees that if any obligation is necessary it need only attach to one licensee.

Question 5.4: Do you have any views on the costs and benefits of a wholesale access obligation on the licensee with the coverage obligation in respect to those areas beyond existing 2G mobile voice coverage?

We are unclear as to how "those areas beyond existing 2G mobile coverage" will be identified and why wholesale access obligations are being considered only for these particular areas. If Ofcom follows its preferred Approach B, then by definition, "those areas beyond existing 2G mobile coverage" would be the MIP funded sites and any other areas with no existing 2G service. It's hard to see why wholesale access should be mandated where an operator voluntarily goes beyond the coverage obligation, but in the case of the MIP sites(which will be a sub-set of "those areas beyond existing 2G mobile coverage") there may be some logic to require this.

Question 5.5: Do you have any comments on the possibility that we may in certain limited circumstances consider granting concurrent licences as set out in paragraphs 5.88 to 5.93?

We support this measure and would advocate that unused spectrum, which may have little value to the main licensee in geographic areas beyond where it is economically viable to extend their network coverage, should be made available to parties that may be in a position to use it (e.g. for a

different purpose and/or where another party has access to a subsidy that may enable networks to be deployed in areas that would not otherwise be economically served).

We have doubts about the proposed criterion of a party refusing to trade: in reality this could be circumvented by demanding an unreasonable price, rather than an outright refusal to trade.

The proposed period of at least 5 years before Ofcom would consider issuing concurrent licences for areas where spectrum is unused would imply a time frame of 2018 or later, which is beyond the period in which the Government aims to ensure that 100% of households are provided with a minimum of 2Mbit/s downlink speed broadband. The time scale is also incompatible with the Government's proposed Mobile Infrastructure Programme.

One solution could be for Ofcom to specify that where licensees do not commit to use their spectrum on any MIP sites that are established, then this spectrum may be concurrently licenced to any party that BDUK may appoint to operate equipment from the relevant sites. That party would need to coordinate use of the frequencies with the operator concerned and provide a wholesale access (active RAN) service.

More widely, Ofcom could require auction licensees, or indeed any licensees, to declare any areas where they do not plan to provide mobile services using the spectrum for which they are licensed. Where spectrum remains unused and not declared by the licensee to be available for concurrent licensing, AIP could be charged for that spectrum to incentivise efficient use or to encourage early declaration that it is not needed by the licensee. For those areas that are declared as not required, Ofcom could exercise the option to issue concurrent licences.

Question 6.1: Do you agree with our revised proposals for the packaging of the 800 MHz band? Please state the reasons for your preference.

BT agrees with the two options for 800MHz band packaging that Ofcom has identified. A 2x10MHz lot for a licence with coverage obligations and 2x5MHz lots for the remainder gives appropriate flexibility. If Ofcom does not include a coverage obligation then all lots could be 2x5MHz.

Subsequent to the release of the consultation proposals Ofcom has indicated that the cost of funding MitCo is to be shared by all of the 800MHz licensees, hence it appears that Option 1 could be sufficient and Option 2 would not be needed.

Question 6.2: Do you agree with our revised proposals for the packaging of the 2.6 GHz band? Please state the reasons for your views.

Lot sizes

BT agrees with the proposals to use 2x5MHz lots for the standard power paired portion of the band and to award the unpaired spectrum in 5MHz lots.

Concerning the suggestion that a single low power unpaired 5 MHz lot should be available (which would necessarily have restricted usage rights) we have no opinion.

Amount of reserved spectrum for shared low power use

As discussed above, now that 2x5MHz paired blocks are proposed (instead of 2x10MHz), we believe that Ofcom should consider a new option of reserving **2x15MHz** for shared low power use. This would represent a compromise between reserving 2x20MHz (which Ofcom considers not to be proportionate) and 2x10MHz (which BT considers to be sub-optimum). Ofcom had previously acknowledged that more than 2x10MHz may be appropriate and therefore considered extending this with a hybrid option of sharing between high power and low power use. In this latest consultation Ofcom is considering whether an additional 2x10MHz of spectrum could be available for low power use on a geographical basis (i.e. in rural areas). We would suggest that a compromise solution of 2x15MHz of spectrum reserved for low power use would be a good solution and would remove the need for either of these more complicated sharing schemes. Ofcom may not have previously considered this compromise option because the 2.6GHz paired Lots were previously to be in 2x10MHz blocks, rather than 2x5MHz blocks that Ofcom now proposes.

The main benefits of extending the reserved low power shared spectrum from 2x10MHz to the larger amount of 2x15 MHz would be in terms of enabling higher speed services (c. 1.5x speed) and the better management of interference between different operator networks. For example, one effective technique is to, on a very local basis where required, divide the available spectrum between the operators. Hence a bandwidth of 2x15MHz would effectively enable three operators to each utilise 2x5MHz, which would still deliver reasonable speeds. According to industry information³, the realistic peak downlink data rate of a 2x5MHz LTE cell with a 2T2R MIMO configuration and 5/6 error rate coding is 29 Mbps, so 2x15MHz would enable 3 operators to deploy in a location with this bandwidth or a single operator to provide a peak data rate of 87 Mbps. Even for small cells where users may be positioned close to the base station, in practice the average rates will generally be less than these peak values. Thus, higher peak and average cell throughput available with a 2x15MHz bandwidth will provide more capacity and support a better consumer experience. Importantly, it would be compatible with available backhaul speeds, for example BT's superfast broadband products that will be widely available at downlink speeds of up to 80Mbit/s (FTTC) or higher (FTTP).

In our response to the first consultation we provided our proposals on the number of low power shared licences and suggested that two categories of such shared licences may be appropriate. We are pleased to see that Ofcom sees merit in these suggestions and has invited comments from other stakeholders. We continue to advocate our previous proposals on these aspects.

The location of the low power reserved spectrum lot within the band was examined in the Technical Licence Conditions (TLC) consultation and a location towards the middle of the band was examined. We consider that this would be preferable to the default of locating the low power lot at the top of the band as Ofcom has shown in the band plan illustration. This is because additional filter requirements to suppress spurious emissions to a sufficiently low level to minimise coordination constraints with radars will be more feasible to implement in the case of a relatively low number of high power base stations than in a relatively large number of relatively low power and low cost base stations.

³<http://business.motorola.com/experiencelte/lte-depth.html>

Question 7.1: Do you agree with our revised proposals for the number of eligibility points that should attach to each lot? Please state the reasons for your views.

BT has no comments on the revised proposals for eligibility points.

Question 7.2: Do you have any comments on the proposed auction rules as explained in section 7, Annex 11 and Annex 12? Please state the reasons for your views.

A bar on bids that cannot win because of a competition measure

Ofcom has addressed the point that BT made in response to the earlier consultation in relation to the possibility that an opted-in bidder might distort the auction by submitting bids that it knows cannot win because of a competition measure. Under the new rules, Ofcom has decided to limit bids to only those that can win. This occurs before the first primary bids round and the permissible package list remains the same throughout the principal stage. The measure will prevent strategic bids where there is only a single opted-in bidder. Where there is more than one opted-in bidder each bidder would presumably have a relaxed list of permissible bids (i.e. the same as other bidders) and all parties would be aware that there is potential to win other bids inconsistent with the Minimum Wholesale Packages. It should be clarified that where there is more than one opted-in bidder, then the list of bids is relaxed. If the measure prevents opted-in bidders from bidding on alternative packages then this may be inefficient and this could discourage bidders to opt-in.

Changes to the rules on information revelation

We consider that revealing the number of opted-in bidders prior to the 1st primary bids round is a sensible measure by Ofcom. Under the old rules, bidders would not know if there are any spectrum reservations in place as the primary bids round draws to a close, and therefore whether the final round bids could in fact be accommodated within the supply (given the spectrum is reserved for the winning opted-in bidder). Revealing the information at least informs all bidders whether or not the reserved spectrum is likely to form part of the final outcome.

Another impact of the old rules was that, where bidders were opted-in that didn't bid in the final primary bids round, there would be still be excess demand in the final round, making the final bids less certain for all other bidders going into the supplementary bids round. Simply revealing the existence of opted-in bidders at the start of the auction only partially alleviates this uncertainty for other bidders. We note that the scheme of competition credits is designed to remove the remaining uncertainty.

Competition credits and the updated stopping rule

BT agrees that the introduction of competition credits and the updated rules for stopping the primary bidding rounds are potentially useful because these may reduce uncertainty at the end of the Primary bids rounds.

Changes to the activity rule

BT agrees that the revised proposals seem reasonable.

General approach to joint bidding

BT has no comments on these proposals.

Two options for second price calculation

BT has no comments on Ofcom's approach to the options for determining second prices.

Question 8.1: Do you have any comments on the Additional Spectrum Methodology as one of several sources of information for estimating the full market value of spectrum?

We are unclear whether the additional methodology is intended to remove the incentive for ALF payers to discount their auction bids, or whether it is to derive higher market values from analysis of bids than the market value indicated by the auction result. In any case we have doubts whether the methodology would be suitable as it may not be possible to disregard just one operator's bids (who would be affected in terms of their bid's impact on their ALF) and look at the bids of all other operators in the way proposed. This is because, unless the auction unexpectedly generates a large number of new entrants, most, if not all, of the bidders will each have the same existing spectrum subject to ALF (e.g. Vodafone and O2 and EE all hold 1800MHz, O2 and Vodafone both hold 900 MHz) and may therefore simultaneously discount their bids. In other words, as an example, assessing Vodafone's bid for a quantity of 800MHz spectrum, while neglecting the bids by O2, will not help in determining what O2's valuation would have been if its 800MHz bids did not affect the 900MHz ALF. This is because, unless the intent is to have different fees for different operators with retained spectrum in the same band, the amounts bid by the operator will still affect its charges for retained spectrum. We therefore doubt that the proposed additional methodology will be useful as there is unlikely to be sufficient bid information from parties that are not affected by ALF on their existing holdings.

We also wonder whether spectrum caps could constrain the bids and this could distort the analysis of the hypothetical scenario of extra spectrum being available? Finally, the additional methodology would also seem to be centred around marginal spectrum values which may be different to the full value (e.g. the value of 15MHz of contiguous spectrum at 800MHz (as a proxy for 900MHz) may not be the same as 3 times the difference in value of 20MHz relative to 15MHz where 3 bidders might have hypothetically been able to win an extra 5MHz each). This is because if operators wanted 10MHz carriers at 800MHz the value of an extra 5 MHz may be limited.

Question 8.2: Do you have any comments on our updated thinking on estimating full market value for the purpose of revising ALF as set out in this section and Annex 13?

Other than our reservation in relation to the additional methodology explained in response to Q8.1, we have no comments on Ofcom's proposed approach to implementing the Government's directions on setting licence fees for existing mobile spectrum holdings at 900 and 1800 MHz.

Question A7.1: We would welcome comments on any aspect of the data, assumptions and modelling methodology we have used in our technical analysis, in particular our approach to serving users in a range of both easier and harder to serve locations.

BT has no comments on Ofcom's technical analysis.

Question A7.2: *We would welcome any additional information, in particular from current operators, on the choice of parameters making up our 'Min var and 'Max var' cases.*

BT has no comments on this matter.

Question A8.1: *Do you agree with our assessment of when Everything Everywhere, Vodafone and Telefónica are likely to be able to reform their existing 2G spectrum? In particular, do you agree with our views on the importance of user devices and the likely availability and take-up of devices that use different technologies and bands? Please state the reasons for your views, including if appropriate your views on handset roadmaps and the practical constraints which apply to those roadmaps.*

BT has no comments on the analysis that Ofcom has provided and agrees that the scenarios described seem plausible. We acknowledge however that the operators concerned may be better placed to respond to this question.

4 Other matters

Radar coordination requirements

We have noted that Ofcom is considering coordination requirements with 2.6 GHz radars using parameters that were presented at a workshop held in February 2012. We have looked at the likely constraints that the coordination requirements may be placed on 2.6 GHz mobile systems.

Our analysis suggests that once the radars have been modified with additional filters, the limiting factor that may determine required separation distances between mobile systems and the radar installations is the proposed PFD limit in the radar band at the radar sites of $-136\text{dBm/m}^2/\text{MHz}$. Certainly this appears to be the case if it were assumed that mobile systems would have spurious emission levels at the limit of the proposed out of block emission mask of -45dBm/MHz . We are not aware that this PFD value of $-136\text{dBm/m}^2/\text{MHz}$ has been subject to previous consultation and we would welcome further clarification of how this value has been determined. Given the potential constraints that the proposed coordination requirements may place on mobile systems in the 2.6 GHz band it is important that this matter is carefully considered and the consequences of the coordination requirements are clearly understood and are minimised to the extent possible. For example, it would be appropriate to use actual spectrum emission levels of real equipment for coordination calculations.