

Everything Everywhere's Response to the Ofcom Consultation

*“Assessment of future mobile competition
and proposals for the award of 800 MHz and
2.6 GHz spectrum and related issues”*

Non-confidential version

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Foreword

There is much in Ofcom's proposal for the 800 MHz and 2.6 GHz award to commend. Ofcom has thought hard about the last few years of controversy and threatened litigation – and has come up with an innovative way forward. Not only that, its approach accepts the notion that all spectrum is not equal and that access to low frequency spectrum is a competitive necessity. Ofcom's work is the basis for a fruitful accommodation between the various existing and potential players – in the consumer interest.

But we are not there yet. While we like the overall design, there are several of Ofcom's detailed proposals which we disagree with fundamentally. For example, we would like to see a more even distribution of sub-1 GHz spectrum than Ofcom envisages – all four players should be assured of securing 2x10 MHz. We also want to see the overall spectrum cap relaxed to 2x120 MHz or preferably eliminated altogether. Other changes are also necessary and presented in the document that follows.

Over the last 10 years, Everything Everywhere's shareholders have invested £52 billion in creating this business – about 7% of total foreign investment in the UK. We want to be able to justify that investment and extend it by investing in future mobile services and mobile broadband – hence our welcome for the overall architecture of Ofcom's proposal and our desire to change it in a way that makes the case for investment. We are convinced that, if properly modified, Ofcom's proposals will deliver significant benefits to UK consumers and contribute to the prosperity of the UK.

Tom Alexander
CEO, Everything Everywhere

<i>Executive Summary</i>	3
1 <i>Inter-relationship between competition and spectrum</i>	8
1.1 <i>The importance of this decision for the UK</i>	8
1.2 <i>Ofcom is right to ensure that spectrum allocations maintain competition</i>	9
1.3 <i>The importance and meaning of being a credible national wholesaler</i>	10
2 <i>Summary of how Ofcom's proposals require change</i>	12
2.1 <i>The key changes required to Ofcom's proposals</i>	12
2.2 <i>Further concerns around Ofcom's approach</i>	13
3 <i>A credible national wholesaler requires at least 2x10 MHz of sub-1 GHz spectrum</i>	15
3.1 <i>Relative holdings of sub-1 GHz spectrum are important for competition</i>	15
3.2 <i>How big a proportion of the market cannot be addressed without sub-1 GHz spectrum?</i>	19
3.3 <i>The customer experience</i>	21
3.4 <i>Ofcom's analysis of performance with 2x5 MHz is flawed and hypothetical</i>	24
3.5 <i>Ofcom has failed to consider voice</i>	27
3.6 <i>Rural broadband</i>	28
3.7 <i>Conclusion and implications</i>	29
4 <i>An overall spectrum cap is not necessary</i>	32
4.1 <i>High frequency spectrum is not as scarce as sub-1 GHz</i>	32
4.2 <i>Everything Everywhere's bidding flexibility in the auction should not be disproportionately curtailed</i>	34
4.3 <i>A safeguard cap should not prevent Everything Everywhere from rolling out new services to compete</i>	35
4.4 <i>A safeguard cap should not prevent Everything Everywhere from serving its customers effectively</i>	36
4.5 <i>The overall cap represents double jeopardy</i>	38
5 <i>Ofcom's approach to the 2.6 GHz band does not promote efficiency</i>	43
5.1 <i>TDD spectrum should be packaged in 5 MHz lots</i>	43
5.2 <i>2x5 MHz lots in the FDD spectrum</i>	46
5.3 <i>No reservation for concurrent low-power use</i>	48
5.4 <i>Conclusion</i>	50
6 <i>Annual Licence Fees for 900 MHz and 1800 MHz spectrum licences</i>	51
6.1 <i>Setting the ALF with no direct auction benchmark</i>	52
6.2 <i>Ofcom's approach understates the value of the 900 MHz Band</i>	53
6.3 <i>Ofcom's approach overstates the value of the 1800 MHz Band</i>	55
6.4 <i>Conclusion: deriving full market value</i>	57
7 <i>Response to Consultation Questions</i>	59

Executive Summary

Introduction

Ofcom recently published its consultation document on its assessment for future mobile competition and proposals for awarding the 800 MHz and 2.6 GHz spectrum. This part of our response sets out Everything Everywhere's main reactions to Ofcom's proposals – the detail is provided in the subsequent sections. We cover the following ground:

- A view of likely developments in the mobile market and a discussion of competition's pivotal role in ensuring the mobile market remains responsive to customer needs - this is an area where we agree with Ofcom.
- An assessment of whether the mechanisms Ofcom are proposing will sustain the competitive market desired by Ofcom; this is the core of our response and our views are very different from Ofcom's.
- A brief elaboration of other issues where we disagree with Ofcom.
- Finally, a list of the specific changes to Ofcom's proposals which we would urge Ofcom to accommodate.

Likely market developments and their relationships with competition

It is clear that we are in the midst of a fundamental extension of the role of mobile devices in society. Tablets and smart phones are bringing (first of all) the internet and (secondly) video in a variety of forms onto mobile devices. In addition, we all anticipate a significant extension in the functions of mobile devices (for example, mobile devices becoming payment systems and an upsurge in machine-to-machine applications). This rapid evolution is not in question: Ofcom refers to it at length in the Consultation, the consequent explosion in data traffic has been visible for several years and there is little basis to question the forecasts of Cisco that suggest compound annual growth rates in data traffic of 90% or more over the next five years.

Looking at this growth in demand suggests the pressure on spectrum will be great. We expect that traffic growth will increase by a factor of 30 by 2020 and we find it difficult to identify how this demand can be met – given what we know now, greater efficiency of spectrum use and identifiable spare spectrum will be only partly able to satisfy this huge increase in traffic. We do however believe that a competitive market is of pivotal importance in ensuring that any gap between the underlying growth in demand and capacity is minimised or eliminated – it is competition that will produce the necessary investment and innovation.

Ofcom takes a similar view. The most fundamental tenet in Ofcom's proposals is that the presence of four wholesale providers in the market is vital to the efficient working of the mobile industry – in the consumer interest.

The notion of ensuring that four operators each has a minimum spectrum portfolio, designed by Ofcom with a view to their sustainability, is at the heart of Ofcom's proposals and is evidence of Ofcom's desire to ensure, through the auction rules, that competition

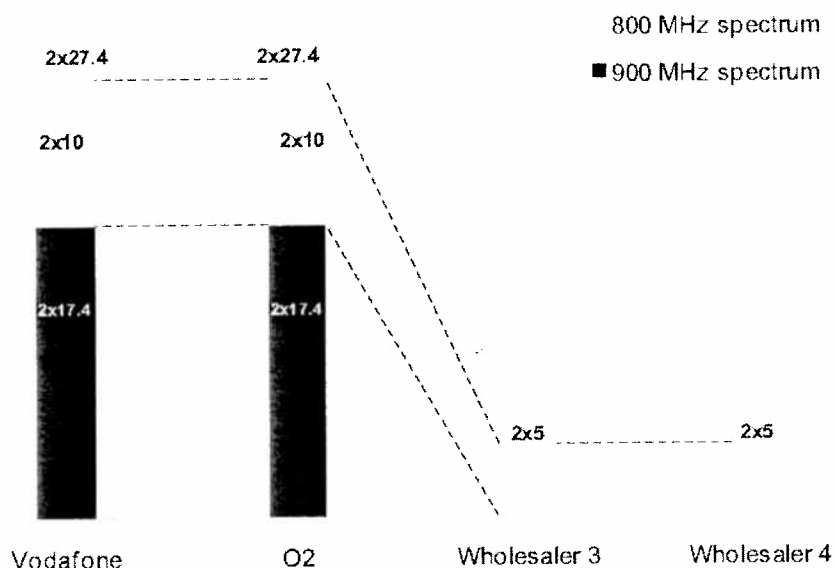
is sustained into the next phase of the market's evolution. This intention to use allocation of spectrum as a tool to ensure competition is something we fully support.

Will Ofcom's proposals deliver its aspirations?

While we applaud Ofcom's intention to create sustainable competition, we do not think the proposals, as they stand, will deliver what is necessary. The test for Ofcom's proposals should be – can they or are they likely to produce outcomes which threaten the sustainability of four competitors? Our view is that – unmodified – Ofcom's proposals may well create two healthy businesses and undermine the long term prospects of the two other holders of the minimum spectrum portfolios.

We believe this for a variety of reasons - but before going into these, two preliminary points need to be made.

First, we will be focussing on the auction outcome in which the incumbent sub-1GHz holders, Vodafone and O2, both gain 2x10 MHz of 800. This would distribute the total sub-1 GHz spectrum as follows:



While this is not the only possible outcome of the auction, it is a very real possibility and one that threatens the competitive outcome that Ofcom is aiming for.

Second, Ofcom's view, as implied in the consultation document, is that, to be viable, an operator needs a certain minimum of low frequency spectrum, and that, if it has such a minimum in combination with high frequency spectrum, it can survive, independent of what spectrum holdings others have. We believe this misunderstands the nature of the market – relative holdings of low frequency spectrum are of critical importance. The 5:1 ratio that the incumbent holders of sub-1 GHz spectrum would have in the scenario depicted above represents only a marginal levelling of the playing field and one that would have damaging consequences for sustainable competition.

To illustrate what we mean: in towns, suburbs and city centres, the holders of 2x5 MHz of sub-1 GHz spectrum would run out of capacity to deploy LTE at that frequency very quickly. Using Ofcom's planning assumptions on low network loading, [REDACTED]

[REDACTED]. In addition, the design of LTE means that as you add frequency, it becomes more efficient – so the 5:1 ratio understates very significantly the disadvantage that a holder of 2x5 MHz would experience. The effect of this is the holders of 2x5 MHz would have to rely on their higher frequencies to deliver mobile broadband. But these higher frequencies do not work as well in-building. [REDACTED]

[REDACTED] Consumers will react very negatively to this. If a watch or a calculator works only [REDACTED] of the time, you buy a new watch or calculator. Equally, many years' experience suggest customers switch away from MNOs with poor coverage. This effect will be muted but still evident in rural areas.

But the situation is worse for the holders of 2x5 MHz than is apparent even from the story outlined above. A whole set of practical deployment issues exacerbate the potential disparity between incumbent holders of sub-1 GHz spectrum and others. These are listed below:

- a) Vodafone and O2 have a head start in deploying high speed mobile broadband. O2 has already begun to deploy UMTS900 and Vodafone will do so from the summer. Developments in the HSPA technology mean that the speeds that O2 and Vodafone will get from this approximate LTE speeds. The non-incumbent winners of sub-1 GHz spectrum will not be deploying competitive services until at least 2013, a delay of over two years versus the incumbents. This is because of frequency clearance issues and because of equipment availability – either of which might cause significantly more delay than indicated here.
- b) Voice over LTE is unlikely to be available before 2014. This will mean that Vodafone and O2 offers over HSPA will look more attractive for longer. Their advantage will continue even once a voice service is available as they will be able to hand over voice in all areas.
- c) The grids of Vodafone and O2 (i.e. their network of masts) are well-suited to deployment of 800 MHz, whereas this is not the case for the other wholesalers (even if these are Everything Everywhere and H3G).
- d) Carrier aggregation – i.e. the capability to virtually combine frequencies to achieve higher speeds – is technically much easier between 800 and 900 than it is between 800 and higher frequencies. This means that the speed, coverage and capacity trade-offs, where Vodafone and O2 currently have an advantage, may change in their favour, despite the small reallocation of sub-1GHz spectrum.

We suggest addressing these issues by increasing the minimum sub-1 GHz component of the MSP to 2x10 MHz. Many of the practical problems outlined above would still apply if the sub-1 GHz component of the MSP was 2x10 MHz, rather than 2x5 MHz. But our judgement is that a higher minimum allocation combined with holdings of spectrum above 1 GHz would at least hold out the prospect for the other 2 wholesalers being able to compete in the long term. In contrast, the cumulative effect of the problems listed above combined with the possible 5:1 ratio of sub-1GHz spectrum holdings would damagingly hobble the commercial performance of the other wholesalers, with even more damaging effects on potential investment and effective competition.

Other proposals which Ofcom needs to amend

In addition to altering the design of the MSP, there are several other changes to the proposals that we believe should be made, as follows:

a) Increasing or eliminating the overall spectrum cap

We consider the spectrum cap set at the level of 2x105 MHz is wrong in concept, unfair to Everything Everywhere, would limit auction proceeds without compensating benefits and would in the end harm competition. It is wrong in concept because it values all spectrum alike, whereas (as has already been made clear and is accepted by Ofcom) there is a huge difference in the value of different frequencies. We think it unfair to Everything Everywhere for three main reasons. First, the cap affects Everything Everywhere and not others, even though Everything Everywhere's frequencies are exclusively higher frequency (and therefore these frequencies should count at a discounted rate towards the cap). Secondly, the proposed cap would constitute 'double jeopardy'. The European Commission agreed remedies with Everything Everywhere's parent companies that permitted the merger to proceed and dealt with the possible theory of harm relating to spectrum holdings. The key remedy was disposal of some of the new entity's 1800 MHz spectrum. Since the time of the merger, regulatory decisions and market developments have made Everything Everywhere's competitive position significantly weaker (for example, the freedom granted to Vodafone and O2 to deploy UMTS900 without relinquishing spectrum or any other conditions). To impose an additional constraint on Everything Everywhere at this point seems perverse and inconsistent with the Commission's decision. The third reason why we believe it to be unfair is that it has practical and highly constraining effects on Everything Everywhere's bidding strategy towards the auction which would not apply to others. Although we think the cap as proposed to be an unjust mechanism, we also believe its effects are not beneficial – it will constrain auction proceeds because Everything Everywhere will not be able to bid freely and, in addition, as we believe ourselves to be a vital part of the competitive landscape, it will harm competition with all the knock-on consequences that one would expect.

Our preference would be for Ofcom to abandon the notion of an overall spectrum cap, and to rely on competition law to ensure spectrum is distributed in a way that conforms to a competitive market. However if a safeguard were considered necessary we would also accept an increase in the cap.

b) Reducing the lot size for the 2.6 GHz auction

The 2.6 GHz auction is designed to dispose of both TDD (unpaired) and FDD (paired) spectrum. We would propose in both instances the lot sizes are reduced (to 5 MHz and 2x5 MHz respectively). The suggested reduction in the TDD lot size relates to our view that Ofcom has significantly underestimated the appeal of the TDD spectrum. China – and other Asian markets – has been developing 2.6 GHz TDD for LTE. As a result, LT-TDD is a realisable option in the UK. Given this, selling TDD as a single block makes little sense and instead it should be sold in a similar way to other blocks. With respect to the FDD spectrum, we argue that selling it in 2x10 MHz blocks makes its disposal less finely attuned to what bidders actually need, damaging their interests and auction proceeds.

c) Modifying the annual licence fees (ALF) for 1800 MHz licences

Ofcom currently proposes the ALF for 900 MHz be set by reference to the 800 MHz auction proceeds. The 900 MHz band is, however, worth more than the 800 MHz – while its propagation characteristics are similar, it has less interference, equipment for mobile broadband is immediately available and it offers other “first mover” advantages to its holders. These should be reflected in the ALF.

Ofcom also currently proposes that the 1800 MHz fee be set by reference to an arithmetic average of the per megahertz price achieved from the 800 MHz and 2.6 GHz auctions. As we do not consider the value of the 1800 MHz spectrum to be equidistant between these two blocks, this similarly seems inappropriate – in practice 1800 MHz is very similar in value to 2.6 GHz spectrum.

While there are some other Ofcom proposals which we would urge them to amend, our main concerns are those listed.

Requested changes

We would therefore request Ofcom to make the following major changes (the full list of our requested changes and concerns with Ofcom’s proposals is in the main document in Section 2):

- Increase the minimum amount of sub-1 GHz spectrum in all MSPs to 2x10 MHz (a reduction in the sub-1 GHz cap to 2x22.5 MHz from its current proposed level of 27.5 MHz would also have the desired effect).*
- Increase the overall spectrum cap to 2x120 MHz or remove it altogether.*
- Reduce the lot sizes for the 2.6 GHz auction to 5 MHz for TDD and 2x5 MHz for FDD.*
- Set the annual fee for 1800 MHz by reference to the 2.6 GHz auction prices and set the 900 MHz ALF at a level which reflects the true full market value of that band.*

1 Inter-relationship between competition and spectrum

Everything Everywhere welcomes Ofcom's consultation on its mobile competition assessment and proposals for the award of 800 MHz and 2.6 GHz spectrum.¹ The Digital Dividend and the availability of the 2.6 GHz band together represent a significant opportunity to promote investment and innovation. This spectrum will enable a wide range of new services and capabilities which will create substantial benefits to the economy and UK consumers.

Ofcom rightly recognises that strong competition is the mechanism by which these benefits can be realised for UK consumers and citizens. With indefinite licences being awarded and no further harmonised mobile spectrum available for award in the short and medium term, this auction is Ofcom's best opportunity to secure that competition. As requested by the Government, Ofcom has analysed the future competitiveness of the UK mobile sector, taking into consideration the upcoming auction of 800 MHz and 2.6 GHz spectrum. Ofcom has come to the conclusion that four national wholesalers are required and has correctly identified that an appropriate portfolio of spectrum is a critical factor for a national wholesaler to be a credible competitor. Ofcom has therefore proposed an auction format which ensures that there are at least four national wholesalers with a minimum spectrum portfolio.

Whether the minimum number of national wholesale operators to ensure competition is four or fewer,² we strongly support Ofcom's conclusion that such operators must have a balanced portfolio of spectrum including sub-1 GHz spectrum in order to compete effectively. A competitive market structure must be enabled and that should be the key aim rather than any specific number of competitors.

Everything Everywhere is also pleased that Ofcom is finally moving this auction forward as this is a significant spectrum award which will greatly enhance the ability of mobile networks to provide benefits to UK consumers. The sooner these benefits can be realised the better for the health of the sector and for what it can provide towards to the UK economy and for UK consumers. That said, we believe some amendments are necessary to Ofcom's proposals to accomplish the competition objectives. We believe that Ofcom's proposals need to be modified in this way in order to promote, inter alia, competition, investment, innovation and efficient use of spectrum. Only with such amendments will Ofcom be able to promote the interests of consumers and citizens in relation to the issues considered in the Consultation.

The main body of this response looks thematically at the key issues, and identifies necessary amendments. We then provide specific comments in response to Ofcom's questions.

1.1 The importance of this decision for the UK

Mobile technology such as the Long Term Evolution for UMTS ("LTE") and the versions of HSPA which will be available in the next five years will create a step change in the

¹ "Consultation on assessment of future mobile competition and proposals for the award of 800 MHz and 2.6 GHz spectrum and related issues" Ofcom consultation published 22 March 2011 (the "Consultation").

² Please also refer to our answer to Question 5.4 in Section 7.

functionality of mobile data services and the ability to support a wide range of new applications and types of use. One recent example of the potential of new data services is the advent of tablets, which have enabled the internet and cloud services to be used in new ways and new places

Ensuring that national wholesalers have the spectrum to enable them to roll out the next generation of mobile data networks as soon as possible will be important to UK competitiveness and the delivery of benefits to UK consumers and citizens. The 2.6 GHz band has, for many years, been identified as the resource which will provide the ability to expand the provision of mobile data services. It is the key band where LTE services are being deployed elsewhere in Europe. The Digital Dividend is also a rare opportunity to realise additional benefits from extremely valuable spectrum. The 800 MHz band offers the key benefits of sub-1 GHz spectrum, in particular allowing coverage to be provided deep indoors where users are increasingly using mobile data services.³ Further material blocks of such valuable spectrum are unlikely to become available for many years.

Thus an efficient award of this spectrum is vital for long term investment in mobile broadband, and for competition in the sector. Having the right spectrum portfolio is essential for an MNO to justify network investments and to compete in the market, and its lack conversely will have a chilling effect on investment. Thus distortions or imbalances created as a result of this process will do lasting harm to investment and competition, to the detriment of the UK consumer and citizen.

1.2 Ofcom is right to ensure that spectrum allocations maintain competition

The history of the development of mobile, and telecommunications more generally, over recent decades in Europe clearly demonstrates that competition is the best driver for innovation, efficiency and investment for the benefit of consumers. Competition is the mechanism which incentivises roll out of new technologies, as well as increasing coverage and capability of networks. This is inherent in the European Union's Electronic Communications Regulatory Framework and long recognised by Ofcom and its predecessors.

For mobile services, competition depends critically on spectrum. An operator's spectrum portfolio determines its ability to offer capacity, coverage and performance in a cost-competitive way. Thus the Consultation is correct to focus on the balance of spectrum holdings (and the terms on which operators hold licences to use those holdings) as a key driver of competition across the sector.

The relative position of different national wholesalers of mobile broadband data and voice services with respect to different amounts and frequencies of spectrum are therefore vital to ensuring healthy and robust competition. If a sub-set of operators are not able to compete effectively, then the incentives to achieve the full capability of the next generation of mobile technologies will be diminished. Over the coming years consumers will demand robust voice services, greater amounts of data per consumer and the provision of data services to an increasing range and number of devices in a wider range of locations. Meeting this demand will require a number of national wholesalers with the capacity in all locations (including deep indoors) which can only be offered cost-competitively with the right spectrum portfolio.

³ See Section 3.2

Despite the significant additional quantities of spectrum becoming available, increasing demand for such services is likely to grow even faster. Spectrum congestion is therefore highly likely to be a key challenge going forward. An efficient allocation of the spectrum assets between operators will have a two-fold benefit – it will ensure spectrum is not underutilised by an operator with an allocation disproportionate to their customer base, and (by creating the keenest competition) create the keenest incentives for all operators to innovate in their efficient use of spectrum.

As recognised in the Consultation, ensuring such an outcome requires intervention. In particular, ensuring national wholesalers have suitable spectrum portfolios with sufficient sub-1 GHz spectrum is crucial to ensuring credible competition. Ofcom's approach of introducing the Minimum Spectrum Portfolios ("MSPs") is therefore a vital and important intervention. Getting these MSPs right will ensure that national wholesalers operate within a competitive market structure. Absent an effective intervention, the current duopoly of operators with sub-1 GHz spectrum will continue, perpetuating their unmatched competitive advantage. This would harm investment incentives in next generation mobile, dull incentives to ensure data network coverage, reduce the competition to provide access to rural areas and ultimately mean less effective competition (with higher prices, lower quality and less innovation) for mobile broadband customers generally.

1.3 The importance and meaning of being a credible national wholesaler

Given the importance of ensuring competition between national wholesalers, the key concept on which most of the proposals in the Consultation rests is that of a "credible national wholesaler." What this means in practice, and what this should imply for spectrum allocations, rightly underlies all of Ofcom's proposals.

Everything Everywhere has significant concerns with the proposals relating to Ofcom's approach to assessing the minimum spectrum requirement for a credible national wholesaler.⁴ First, Ofcom appears to consider any competitor with a bare minimum of coverage and capacity to be a credible competitor. Secondly, Ofcom's hypothetical exercise to determine the least amount of 800 MHz spectrum necessary to achieve this minimum coverage is based on a simulated (and unrealistic⁵) network model. Everything Everywhere believes this materially underestimates the spectrum required to achieve this minimum.⁶

Ofcom's approach to this issue fails to reflect the true competitive dynamic between mobile broadband national wholesalers. The ability of a national wholesaler to be a sustainably credible competitor needs to be assessed in relative terms. Everything

⁴ *Everything Everywhere also has concerns with Ofcom's approach to the competition assessment and does not believe that the conclusion that four national wholesalers are required is soundly based. Ultimately what matters is that there is a competitive market structure, which is about more than simple numbers of competitors. These concerns are set out in more detail, in particular in our answers to Ofcom's consultation Questions 5.1 and 5.4 in Section 7.*

⁵ *As discussed further in Section 3.4 below and in Annex B.*

⁶ *Thus Everything Everywhere does not consider that Ofcom has robustly demonstrated that a national wholesaler with a proposed MSP would be able even to deliver this minimum coverage (see our answer to Question 6.1 and Annex F.*

Everywhere believes that the definition of a credible national wholesaler should be an operator which can effectively offer a competitive constraint on other national wholesalers.

A revised approach, which reflects this line of thinking, has material consequences for Ofcom's specification of MSPs. First, scale becomes an important issue. Mobile networks have substantial fixed costs (hence the network sharing arrangements between MNOs in the UK and elsewhere). Thus a competitor operating at low scale will be unprofitable and, if a limited spectrum holding means that it cannot grow to a profitable scale, it will be seen as an acquisition target – not a credible long term competitor. Second, in the future in-building coverage at high capacity and performance will be necessary to be a credible competitor. Regardless of other spectrum holdings, an operator that cannot deliver this will not be an effective constraint on its rivals.

Under this formulation, the benchmark which Ofcom should be considering is “what is the minimum spectrum requirement for a national wholesaler to be able to offer mobile data services with sufficient coverage, capacity and performance at a scale which provides an enduring and effective competitive constraint?”

2 Summary of how Ofcom's proposals require change

This section summarises the changes to Ofcom's base proposals which Everything Everywhere considers are necessary in order to deliver sustainable competition between credible national wholesalers. The detailed reasons why these variations in Ofcom's approach are required are set out in the remainder of this response and annexes.

The rest of this section is arranged as follows:

- *Section 2.1 sets out the most significant alterations required to Ofcom's proposed interventions, which are required for sustainable competition between credible national wholesalers to be promoted. Each of these is discussed further in the rest of the main body of this response.*
- *Section 2.2 lists a range of other areas where Everything Everywhere considers that Ofcom's approach requires amendment in order properly to achieve the goal of creating sustainable competition. These issues are raised throughout this response, some in conjunction with the most significant issues and others in responding to Ofcom's detailed consultation questions.*

2.1 The key changes required to Ofcom's proposals

2.1.1 The MSPs needs to be amended to ensure a minimum of 2x10 MHz of sub-1 GHz spectrum

Ofcom correctly identifies the particular importance of sub-1 GHz spectrum. Section 3 of this response sets out in detail the reasons why each national wholesaler needs a sufficient amount of sub-1 GHz spectrum and why this is more than 2x5 MHz. In practice each national wholesaler requires at least 2x10 MHz of sub-1 GHz spectrum and Everything Everywhere believes this is best achieved by a modified version of Ofcom's MSPs "Option 1", where operators are regarded as having enough spectrum credibly to provide quality data services if they hold at least one of the following portfolios:

- *2x10 MHz of sub-1 GHz spectrum and 2x10 MHz or more of 1800 MHz; or*
- *2x10 MHz of sub-1 GHz spectrum and 2x10 MHz or more of 2.6 GHz; or*
- *2x15 MHz or more of sub-1 GHz spectrum.*

2.1.2 The overall spectrum cap is too low

Everything Everywhere believes that there is no significant risk of asymmetric holdings of higher frequency spectrum which have the ability to impact adversely on competition. Section 4 sets out why the costs of imposing such an overall cap would exceed any potential benefits, which in practice will be low or non-existent. Further any competition effects from larger quantities of high frequency spectrum have already been addressed through the remedy imposed on Everything Everywhere as a condition of its merger approval.⁷

⁷ EU Commission Case no. Comp/M5650 T-Mobile/Orange Regulation in accordance with Regulation (EC) no. 139/2004 Merger Procedure 1/3/2010.

Everything Everywhere therefore believes that there is no justification for an overall cap, but, if a safeguard cap is retained, then it should be increased from Ofcom's current relatively low proposed level to 2x120 MHz, as suggested in Ofcom's Option 2.

2.1.3 *Current packaging of the 2.6 GHz band will not promote efficient outcomes*

Ofcom's current proposals for packaging the 2.6 GHz band will not promote efficient use of the band or competition. For the detailed reasons set out in Section 5, Everything Everywhere therefore believes that Ofcom should:

- *package the paired spectrum in 2x5 MHz lots to promote greater flexibility and hence efficiency;*
- *package the unpaired spectrum in this band in 5 MHz lots to allow for more flexible outcomes and allow the value of this band to be realised (the potential value of which Ofcom has underestimated); and*
- *not reserve any spectrum for concurrent low-powered use, the value of which Ofcom has overestimated.*

2.1.4 *The proposals for setting ALF do not reflect full market value*

Ofcom's proposed approach to setting the Annual Licence Fees ("ALF") for 900 MHz and 1800 MHz spectrum, as directed by the Government, does not follow the terms of Government's Spectrum Direction and take all relevant factors into account in determining market value. For the detailed reasons set out in Section 6 (and in response to consultation questions 10.1, 10.2 and 10.3), Ofcom should set these fees based on the price achieved at auction for 900 MHz spectrum and 1800 MHz, if such spectrum is available in the auction. Given that such benchmarks may not be available, Ofcom should as an alternative:

- *set the ALF for 900 MHz spectrum based on the auction price for 800 MHz spectrum adjusted to take account of the significant timing and practical advantages which the 900 MHz band has over the 800 MHz band;*
- *set the ALF for the 1800 MHz band based on the auction price achieved for the 2.6 GHz band (in the alternative adjust this auction price with an uplift based on the different propagation characteristics of these two bands); and*
- *use more appropriate discount factors and inflation factors to derive these ALF in practice.*

2.2 *Further concerns around Ofcom's approach*

Everything Everywhere has a range of other concerns about the approach which Ofcom has taken in the Consultation. These lead to the proposals not effectively achieving the related goals of efficient use of the valuable spectrum being made available; and robust promotion of effective and sustainable competition between national wholesalers. Many of these do not give rise to specific changes to Ofcom's proposals but require further justification and/or explanation from Ofcom before more definite views can be expressed. Our views in summary are:

- *Ofcom's competition assessment is not well founded (discussed further in our response to Consultation Questions 5.1 to 5.5);*

- *the practical implementation of differential reserve prices has not been fully explained and hence the impact of any such approach is not clear (discussed further in our response to Consultation Questions 8.9 and 9.2);*
- *the proposed coverage obligation is unlikely to be achievable for an operator with only 2x5 MHz of sub-1 GHz spectrum, hence bidding for the MSPs is likely to expose a bidder to winning a coverage obligation which cannot be delivered with the amount of spectrum it holds (discussed further in Annex F). This in turn will limit operators' ability to contribute to the achievement of the Government's Digital Agenda;*
- *the proposed information provisions to facilitate optimal spectrum use are unnecessary and potentially harmful (discussed further in our response to Consultation Question 7.3);*
- *Ofcom has still to consult on the technical licence conditions on the 800 MHz and 2.6 GHz licences, which could have an important impact on the overall proposals (especially in relation to what conditions are imposed to deal with any potential interference issues between Digital Terrestrial Television and mobile use in the 800 MHz band): Everything Everywhere naturally reserves the right to amend the views set out below depending on what Ofcom proposes (discussed further in our response to Consultation Question 8.3); and*
- *other aspects of the auction rules are also still to be finalised (for example, in relation to what information is disclosed to bidders during the auction) and Everything Everywhere will evolve its views suitably when the impact of this additional detail can reasonably be assessed (discussed further in our response to Consultation Question 9.2).*

3 A credible national wholesaler requires at least 2x10 MHz of sub-1 GHz spectrum

The particular importance of sub-1 GHz spectrum for coverage, capacity and performance means that appropriate policy interventions are required in order to maintain an effective competitive market structure between national wholesalers. Everything Everywhere is very concerned that Ofcom's current proposals, unmodified, will fail to deliver an outcome where national wholesalers with an MSP will have sufficient spectrum to compete effectively. This is because the measures that Ofcom has proposed to promote competition – the introduction of spectrum floors as well as the sub-1 GHz spectrum cap – have not been defined correctly. We are particularly concerned that Ofcom's proposed spectrum floor could well lead to two of the four national wholesalers only holding 2x5 MHz of sub-1 GHz spectrum after the auction. This is simply not enough in order to compete effectively with operators who may have 2x27.4 MHz.

The remainder of this section is concerned with why 2x5 MHz of sub-1 GHz spectrum is insufficient for a credible national wholesaler to compete sustainably. In particular it sets out:

- why there is a significant risk of asymmetric outcomes, including why there will be an incentive for the current sub-1 GHz holders to bid for as much 800 MHz spectrum as permitted;
- the extent to which sub-1 GHz spectrum is necessary to permit to address the market;
- how more than 2x5 MHz of sub-1 GHz spectrum is required to deliver a reasonable customer experience in capacity, performance and coverage terms;
- a summary of the concerns Everything Everywhere has with Ofcom's technical modelling which it has used to support its conclusions that 2x5 MHz of sub-1 GHz spectrum in the MSP is sufficient;
- why this level of sub-1 GHz spectrum would be insufficient to deliver rural broadband solutions and exclude some national wholesalers from competing to provide coverage for fixed rural not-spots;
- how Ofcom's failure to consider voice in its analysis further reinforces the need for greater amounts of sub-1 GHz spectrum in the MSPs; and
- our conclusions with alternative suggestions for Minimum Spectrum Portfolios or sub-1 GHz caps.

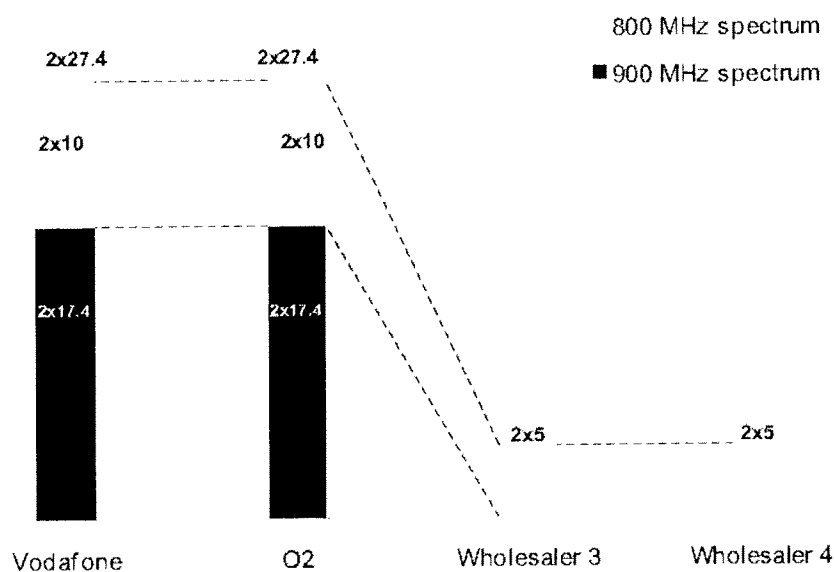
3.1 Relative holdings of sub-1 GHz spectrum are important for competition

In its competition assessment and technical analysis, Ofcom has compared absolute minimum spectrum holdings (its MSPs). However, this does not reflect the likely, post-auction competitive situation or capture the real competitive dynamics. As a result, the analysis is flawed from commercial, economic and engineering perspectives. Vodafone and O2 are highly likely to acquire high frequency spectrum in the auction (simply because their capacity requirements would place a large value on high frequency spectrum – see also Section 4.4). Hence after the auction, Everything Everywhere will be

up against competitors that have at least 2x17.4 MHz of sub-1 GHz spectrum and at least 2x30 MHz of 3G/4G spectrum. It is completely irrelevant to compare a portfolio of 2x5 MHz of sub-1 GHz and 2x20 MHz of high frequency spectrum with a holding of 2x15 MHz of sub-1 GHz spectrum as the Consultation does - that will not be the competitive reality after the auction. We urge Ofcom to consider the relative competitiveness of national wholesalers bearing in mind a range of likely auction outcomes, rather than hypothetical absolute minimum holdings and to structure the MSPs accordingly.

Promoting competition in this context requires consideration of the relative distribution of scarce resources, and ensuring that this distribution is not so asymmetric as to confer a distinct competitive advantage on certain operators. Ofcom's spectrum policy should not confer a competitive advantage on specific operators. This is not the same as saying that spectrum should be equally distributed amongst all operators. Apart from any other considerations, this would clearly not be practical in the current circumstances. Rather, the concern is to prevent extreme outcomes where business critical sub-1 GHz spectrum could be held in highly asymmetric proportions, which would be damaging to competition. We are extremely concerned that as they stand, Ofcom's proposals could lead to an outcome, where Vodafone and O2 would each have 2x27.4 MHz of sub-1 GHz spectrum and two other national wholesalers would have 2x5 MHz only. This is illustrated in Figure 1.

Figure 1: Potential, highly asymmetric distribution of critical sub-1 GHz spectrum



Such a small holding of sub-1 GHz spectrum would not allow the other two wholesalers to exert a sufficient and sustainable competitive constraint on Vodafone and O2, and would leave Vodafone and O2 with a valuable, *de facto* sub-1 GHz duopoly.

Creating sustainable and credible national wholesalers requires a consideration of realistic potential network deployments and the competitive structure of the market which would result. This is different to simply ensuring that the day after the award there is a specific number of competitors. Everything Everywhere strongly believes that a

“credible national wholesaler” should be interpreted in terms of whether it will be able to sustain its position in the market by having a competitive product with sufficient capacity to act as a realistic competitor across multiple segments. An operator which can only compete for a certain customer group will be at a long term disadvantage and ultimately is unlikely to be a sustainable competitor. The relative amounts of sub-1 GHz spectrum held by different operators therefore has a significant impact on their ability to compete with each other. This in itself creates a strong case for increasing the minimum amount of sub-1 GHz spectrum in the MSPs, or setting a tighter sub-1 GHz cap of 2x22.5 MHz.

Orange UK and T-Mobile UK historically suffered from lack of access to sub-1 GHz spectrum for their GSM network. In fact the lack of access to sub-1 GHz spectrum was a reason for the joint venture: Orange UK and T-Mobile UK both needed to have more sites than Vodafone or O2, which gave both higher unit costs. Whilst the merger has not removed the need to have more sites, it has enabled us to reach a significant scale where we can benefit from other cost synergies to counterbalance the need to operate more sites. However, it is worth noting that the higher site count of Everything Everywhere cannot be considered a competitive advantage. This is because Vodafone and O2 can, if they choose, match these site numbers via the Cornerstone joint venture agreement. This is moving into a phase of increased intensity of activity^{8,9} to deliver higher capacity, enabling any residual differences in urban site portfolios to be eliminated.

The approval of the joint venture that created EE was based on an assessment of the potential EE would have to launch 4G in 1800 MHz compared with other existing operators and in the light of current and imminent spectrum holdings and with the benefit Vodafone and O2 would have on 3G if 900MHz spectrum was liberalised in the hands of the existing holders. The proposal for 800 MHz at the time was that Vodafone and O2 would be barred from acquiring 800 MHz; and on that basis it was agreed that a suitable remedy to balance EE’s potential for 4G with Vodafone and O2’s 900 MHz spectrum, would be for EE to divest 2x15 MHz of 1800 MHz. That Vodafone and O2 may now to be allowed to bid for 800 MHz to avoid EE winning the sub-1GHz spectrum it critically needs whilst it has also been required to divest 1800 MHz spectrum, amounts to double jeopardy for EE (see also Section 4.5).

The recent liberalisation of 900 MHz for UMTS in the hands of the current licensees has extended what was a disadvantage in 2G into a distortion of competition in 3G. The licences to be awarded in the forthcoming auction are indefinite and with no further spectrum releases on the horizon for the short to medium term, the forthcoming auction will determine relative spectrum holdings for a long time to come. In essence, this auction is Ofcom’s chance of preventing the extension of the distortionary competitive advantage that Vodafone and O2 enjoy on 3G, into 4G.

[REDACTED]

⁸

http://www.mobiletoday.co.uk/News/11133/Cornerstone_to_outsource_mobile_network_infrastructure_work.aspx;

⁹

http://www.mobiletoday.co.uk/News/10133/Interview_Vodafone_and_O2_techonolgy_chiefs_on_Cornerstone_s_future.aspx

[REDACTED]

3.1.1 The risk of a de facto sub-1 GHz duopoly

We are very concerned that Vodafone and O2 could have a strategic incentive to bid for sub-1 GHz spectrum up to their maximum cap regardless of their values for such spectrum in order to prevent Everything Everywhere and Hutchison 3G UK Limited ('H3G') acquiring any significant amount of sub-1 GHz spectrum (i.e. more than 2x5 MHz). Vodafone and O2 will of course appreciate that it is important for Everything Everywhere's ability to compete to gain access to at least 2x10 MHz of 800 MHz in the forthcoming award. This creates a significant incentive for Vodafone and O2 to bid to retain the sub-1 GHz duopoly in itself. (And this has been made easier for them given the significant value they have been able to retain from early liberalisation of the 900 MHz band before any change in spectrum licence fees.)

We believe the 800 MHz assignment resulting from the German multi-band auction in 2010 demonstrates that bidders could have an incentive to bid strategically for 2x10 MHz of 800 MHz (or alternatively that 2x5 MHz of 800 MHz is not valuable to an MNO). As Ofcom is no doubt aware, the German multi-band auction ended with T-Mobile, Vodafone and Telefonica O2 each winning 2x10 MHz of 800 MHz. However, looking at market shares and existing spectrum holdings (see

Table below) and if 2x5 MHz is indeed sufficient for an MNO as Ofcom asserts, it seems quite implausible that O2's valuation for a second 2x5 MHz block of 800 MHz would be higher than E-Plus' valuation for a first 2x5 MHz block of 800 MHz. On the basis of that, one would have expected an outcome where T-Mobile and Vodafone each won 2x10 MHz of 800 MHz and O2 and E-Plus each won 2x5 MHz.

Table 1: Outcome of German 800 MHz award against market shares and 900 MHz holdings

	T-Mobile	Vodafone	O2	E-Plus
Market share (subscribers)*	31.9%	33.6%	18.8%	15.7%
900 MHz holding	2x12.4 MHz	2x12.4 MHz	2x5 MHz	2x5 MHz
800 MHz won	2x10 MHz	2x10 MHz	2x10 MHz	

*Source: Screen Digest

[REDACTED]

Hence considering the German outcome, it is of utmost importance that Ofcom acts to prevent Vodafone and O2 bidding strategically in order to block other operators from acquiring 2x10 MHz of 800 MHz.

3.2 How big a proportion of the market cannot be addressed without sub-1 GHz spectrum?

As noted by Ofcom in the Consultation,¹¹ sub-1 GHz spectrum is particularly valuable because of its superior propagation characteristics. Certain locations deep inside buildings, whether rural or urban, can simply only be reached with sub-1 GHz spectrum. Rural areas can be covered more cost effectively with sub-1 GHz spectrum. Sub-1 GHz spectrum is also relatively scarcer, and this supply restriction further increases its value compared to high frequency spectrum (see also Section 4.1). We return to the issue of rural broadband in Section 3.6. In this section we consider the importance of sub-1 GHz spectrum to customer usage deep in buildings.

[REDACTED]

This situation is expected to get worse as data traffic increases in absolute terms and as a proportion of total traffic. External research (including Ofcom's own analysis) suggests that indoor coverage is becoming increasingly important for the rapidly growing pool of data users in the UK. Current benchmarks range from 60-80% of data traffic being originated indoors, and this is forecast to grow to around 90% of traffic within five years.¹⁴ Many of these data sessions will take place deep inside buildings which can only be covered by sub-1 GHz spectrum.

[REDACTED]

However, the impact of a lack of voice and data coverage deep indoors on customer perception is much greater than [REDACTED]. The reality of customer experience is that whatever the actual proportion of calls and data sessions require sub-1 GHz, such calls and data sessions will in practice be experienced at some time by all customers. The

¹¹ Paragraphs 5.40 to 5.45 and Annex 6.

[REDACTED]

¹³ H Holma & A Toskala, "LTE for UMTS Evolution to LTE-Advanced", fig. 10.6 on p269.

¹⁴ Barclays Capital, March 2010 / Ofcom Comms Report August 2010 / Analysys Mason, December 2010.

majority of data traffic originates in urban areas. All customers living, working in or transiting urban areas need to be serviced by sub-1 GHz coverage for [REDACTED] on average of their calls and data sessions. The customer impact is therefore disproportionately larger than the [REDACTED] would suggest. This makes this low frequency band essential to provide a good (and competitive) customer experience.

Network coverage has long been a key dimension on which operators compete in the UK. External surveys consistently cite network coverage for voice services as an extremely important driver of mobile customer satisfaction.¹⁵ External research suggests that in-building coverage is a key driver of satisfaction with mobile network performance.¹⁶ This is confirmed by operators' own analysis that indicates poor in-home / in-building coverage is identified by 50% of those customers churning because of network quality.¹⁷ This is illustrated by JD Power's recent satisfaction survey that shows both Vodafone and O2 enjoying the highest levels of satisfaction for both in-building and in-home coverage.¹⁸

The advantages enjoyed by sub-1 GHz spectrum holders are not limited to the consumer market. Research into the business to business (B2B) segment conducted by Everything Everywhere in conjunction with GFK illustrates the importance of in-building (office / home) coverage as a key driver of B2B customer satisfaction and clearly illustrates the relative outperformance of sub-1 GHz spectrum holders.¹⁹ [REDACTED]

The importance of network coverage for MVNOs is illustrated by the recent defection of Gamma Telecom's MVNO business from H3G to Vodafone following complaints from Gamma's corporate customers about the quality of H3G's network coverage.²⁰

Finally, Everything Everywhere and its shareholders believe that the machine to machine (M2M) segment will show strong growth over the next few years and that this is an important new business area to develop. Analysys Mason / Yankee Group forecast that the UK M2M segment will grow at more than 30% per annum over the next five years, reaching £200m+ by 2015.²¹ With limited availability of LTE800 end-user modules and an inferior in-building data experience, Everything Everywhere will struggle to compete in this rapidly growing segment that is likely to become a key capability to service the needs of B2B customers. Without a credible M2M competency, there will be further pressure on our ability to capture a fair share of the 8% per annum data revenue growth forecast in the B2B segment.²²

¹⁵ JD Power Mobile Satisfaction Survey, May 2010 / Nokia Siemens Networks, September 2010.

¹⁶ JD Power Mobile Satisfaction Survey, May 2010 / Communications Consumer Panel, October 2009.

¹⁷ [REDACTED] / Vodafone Femtocell presentation, July 2008.

¹⁸ JD Power Mobile Satisfaction Survey, May 2010 – detailed report.

¹⁹ Everything Everywhere / GFK B2B Survey, February 2010.

²⁰ The Telegraph, 24 January 2011, "Vodafone poaches key customer from rival network 3".

²¹ Yankee Group / Analysys Mason UK M2M revenue, March 2011.

²² Analysys Mason UK B2B revenue, March 2011.

In conclusion, good coverage deep indoors is essential to maintain competitiveness to supply the vast majority of customer segments.

3.3 The customer experience

The problem of competitiveness of networks with no or very little sub-1 GHz spectrum is well illustrated by considering the competitive challenge that Everything Everywhere would face from the point of view of the customer experience. And not just with respect to current services: Ofcom has a duty to promote potential innovation and also consider relative customer experience in the longer term.

3.3.1 Performance

As devices and applications evolve, consumers will demand both high reliability of connection and improving performance in terms of the bit rates available. The varying abilities of operators to deliver these capabilities will be a key competitive differentiator.

The bands being awarded in the auction are suitable for LTE. In the longer term other bands, such as 900 MHz and 1800 MHz, will also be used to deploy LTE. The speed that customers can achieve on LTE is directly correlated with the bandwidth available, e.g. a 2x10 MHz carrier will give at least double the speed of a 2x5 MHz carrier. (See table 2 in Section 3.6) The principal benefits of the higher data rates achievable on LTE with 2x10 MHz and 2x20 MHz are not just the higher peak data rate (e.g. over 100 Mbps) but also improved typical data rates experienced by users. Such typical data rates need to be sufficient to satisfy the great majority of applications, especially video. Higher typical speeds will also be perceived by users as improved reliability of the connection.

Users will want these performance benefits wherever they are and especially in-building where most data sessions occur. This means that it will be critical for national wholesalers to have access to sufficient bandwidth in the sub-1 GHz bands and not just in the higher frequency bands.

Ofcom has based its technical LTE analysis of 2x5 MHz of 800 MHz on benchmark download speeds of 2Mbps. This is very conservative.²³ Ofcom's proposals need future proofing by considering data rates beyond the initial 2Mbps to rates of 10Mbps and above. The increased importance that customers will ascribe to performance is reflected in Cisco's latest projection of mobile connection speeds. Cisco forecasts that average mobile network connection speeds in the UK will exceed 6 Mbps by 2015.²⁴

It will be critical for a credible national wholesaler to be able to offer its customers the performance they demand in all areas including deep in-building, for which a minimum of 2x10 MHz of sub-1 GHz spectrum is needed. For operators who currently do not hold sub-1 GHz spectrum, the only way of realising a 2x10 MHz carrier is by acquiring spectrum in the 800 MHz band. Vodafone and O2 however have greater flexibility with multiple options at their disposal:

²³ We also think Ofcom is wrong that 2Mbps can be achieved (at high coverage probability) with 2x5 MHz of 800 MHz. Our analysis shows that with only 2x5 MHz of 800 MHz spectrum, the cell edge performance would drop to 1.3 Mbps. A 2x10 MHz bandwidth provides a predicted cell edge performance of 2.16 Mbps which just meets the target.

²⁴ Cisco Visual Networking Index, February 2011.

- carrier aggregation with HSPA to create carrier bandwidth of 2x10 MHz or more in the 900 MHz band (see Section 3.3.3);
- refarming of their 900 MHz spectrum directly to LTE (as planned by Net4Mobility in Sweden);
- acquisition of 2x10 MHz of 800 MHz or more in the auction; or
- carrier aggregation of spectrum in the 800 MHz and 900 MHz bands.

We explain in Annex A how the planned evolution of HSPA will see this on par with LTE and hence how Vodafone and O2 do not necessarily need to acquire any 800 MHz spectrum or deploy LTE800 in order to compete. It is notable that Vodafone and O2 were able in practice to refarm 2x5 MHz of 900 MHz spectrum rapidly following liberalisation of the GSM bands, so it may well be possible for them to refarm a further 2x5 MHz quickly allowing them to create a 2x10 MHz carrier using HSPA Dual Cell. This would put them in an unassailable position, combining good in-building coverage with high performance from 2x10 MHz of HSPA.

Suffice it to say that, if there is demand for higher speeds, Vodafone and O2 will be able to provide such higher data rates including deep indoors and in rural areas with their sub-1 GHz spectrum holdings of at least 2x17.4 MHz (and up to 2x27.4 MHz under current proposals). This would reduce competition, with Everything Everywhere (or any other national wholesalers such as H3G) being simply unable to compete on performance, with only 2x5 MHz of sub-1 GHz spectrum.

In summary, increasing demands for performance (reliability and speed) means a sub-1 GHz holding of 2x5 MHz is not future proof or even able to offer what is required today in a number of locations. In order to remain competitive vis-à-vis operators with sub-1 GHz holdings of at least 2x17.4 MHz, a national wholesaler critically needs more than 2x5 MHz.

3.3.2 Mobile data coverage and capacity

As network traffic grows, capacity from all the higher bands (1800 MHz, 2.1 GHz, and 2.6 GHz) can be combined to meet demand since coverage is broadly similar in all the higher bands. However this is not the case for the ██████ of traffic, which can only be served by the sub-1 GHz spectrum. If capacity runs out in the lower band, the high frequency spectrum cannot be used as an alternative in these areas. This makes the capacity of the low frequency band on its own critical. If the capacity of sub-1 GHz is not sufficient, the service quality will deteriorate rapidly, effectively nullifying the coverage benefits of this band.

For users who are only served by the low frequency band, e.g. users deep inside a building, if there is insufficient capacity, they will experience congestion. For many data applications, the experience of these users will be similar to a lack of coverage or connectivity. For interactive applications such as streaming, browsing or gaming, congestion can lead to time-outs and the application becoming disconnected or frozen. (iPhone users will know the feature, where the handset stops an application that is performing poorly because of poor network performance.) For the frustrated user, this has a similar impact to losing coverage. In other words, whereas voice coverage might be considered more of a binary question – the user has coverage or no coverage – coverage is a more complex concept for mobile data, inextricably linked with performance issues.

If a national wholesaler's sub-1 GHz holding relative to its total frequency holding is lower than the proportion of its traffic that is carried on the low frequency network, customers in this part of the network's coverage will experience congestion first. [REDACTED]

[REDACTED] Vodafone and O2 will not face this problem and have a relative advantage as such due to their existing large 900 MHz holdings. [REDACTED]

Ofcom suggests (A7.26) that operators could relieve congestion in the low frequency band by using WiFi access or femtocells.

Many mobile customers routinely use WiFi access especially in the home and significant levels of traffic are already carried by this means. This is well recognised by Everything Everywhere and the assessments in our response of traffic growth and capacity requirements fully take this account.

It may still be argued that the use of WiFi indoors will mitigate the disparity between operators' low spectrum holdings, in particular the lack of capacity for deep indoor users. While it is true for some customers that a significant portion of their traffic will be carried on WiFi networks, Everything Everywhere is concerned about relying on WiFi as the mainstream access solution, particularly in public places. The WiFi spectrum is unmanaged and shared amongst all users. As it becomes congested (already occurring today in many public locations) the user experience will deteriorate. Everything Everywhere has no control over traffic in this band and is therefore unable to implement mitigating strategies. There are also significant performance and commercial drawbacks relating to the overall customer experience; these include difficulties of registration on WiFi networks, the cost of roaming on 3rd party WiFi infrastructure, security concerns, customer service support, in addition to complicated billing and customer relationships.

Regarding home femtocells, Everything Everywhere agrees that they can be an effective solution for providing the private user with their own coverage and capacity. However, femtocells are unlikely to be an effective tool for capacity relief. To achieve significant capacity relief at the network level, a very high proportion of homes would need to be equipped with them. This would present major commercial, cost and logistical obstacles making it unlikely that this could ever be feasible.

Everything Everywhere believes that lack of capacity in sub-1 GHz spectrum is a critical issue that Ofcom has failed to pay sufficient attention to when defining spectrum floors. Lack of capacity in these bands would mean no coverage benefit would be achieved

3.3.3 LTE-Advanced and carrier aggregation

Our understanding is that Ofcom has failed to consider LTE-Advanced in its technical model as well as its competition assessment. We think this is a serious omission because one of the most important features of LTE-Advanced, following rapidly on the heels of

initial LTE rollouts, is carrier aggregation. This feature, standardised by 3GPP,²⁵ enables spectrum assets to be combined in the network and mobile device to create an effective 'virtual carrier' whose bandwidth equals the combined bandwidths of the different assets.

In the context of delivering an excellent and consistent typical user experience at rates meaningful to mobile users (2 Mbps or higher), one of the most interesting applications of carrier aggregation is bringing together smaller bandwidth allocations (e.g. 2x5-10 MHz) to create 2x10 to 2x20 MHz virtual carriers.

Carrier aggregation for LTE would provide Vodafone and O2, if successful in winning 2x10 MHz of 800 MHz spectrum, with the opportunity to aggregate their refarmed 900 MHz assets with 2x10 MHz of 800 MHz to readily create a virtual sub-1 GHz carrier of up to 2x20 MHz.

Similarly if Vodafone and O2 are successful in winning 2x5 MHz of 800 MHz spectrum, they can combine it with their 900 MHz spectrum to create a virtual sub-1 GHz carrier of 2x10 MHz in the short term, 2x15 MHz in the mid-term, and in a longer term perspective, a 2x20 MHz LTE carrier. That would allow excellent performance to the cell edge reaching deep indoors, unmatched by operators with no or low allocations of sub-1 GHz spectrum. The significance of this is that, if Ofcom were to accede to our request that MSPs include at least 2x10 MHz of 800MHz (or the sub-1 GHz cap reduced), Vodafone and O2 could still effectively deploy LTE in 800 and 900MHz. Constraints on their ability to acquire 800MHz therefore matters much less to them than to those who do not currently hold sub-1 GHz spectrum.

Carrier aggregation across HSPA and LTE has also been raised as a standardisation topic in 3GPP. Whilst this feature is not yet specified, there has been some clear interest in the industry, and it could be accelerated into a future release subject to renewed interest. This would allow a UMTS900 service to be aggregated with an 800 MHz LTE carrier to create a virtual high bandwidth carrier with the enhanced performance that this would bring.

In addition to the problems associated with asymmetrical allocations of sub-1 GHz spectrum listed above, the holders of 900MHz spectrum are experiencing other advantages. They are deploying HSPA at 900 MHz (today in the case of O2 and in the summer for Vodafone) and HSPA's evolution means it will offer speeds comparable to LTE. Furthermore voice over LTE may not be available when LTE800 will first become operational from 2013. These practical competitive challenges are explained in details in Annex A.

3.4 Ofcom's analysis of performance with 2x5 MHz is flawed and hypothetical

Ofcom's analysis in Annex 7 of the Consultation seeks to demonstrate approximate equivalence of mobile networks operating small allocations of sub-1 GHz spectrum plus a larger allocation of high band spectrum with mobile networks operating large allocations of sub-1 GHz spectrum.

²⁵ This is a Release 10 feature, with key enablers standardised in 2010 and specifications for initial band combinations to be completed during 2011. Further band combinations can be added according to demand within 3GPP without waiting for next full release of specifications.

Ofcom's approach to its technical analysis is overly hypothetical. Not only are the technical arguments very theoretical, with little meaning in the context of operating practical networks, they are also internally inconsistent. We further believe there are errors in Ofcom's analysis, which materially impact the results and conclusions which can appropriately be drawn. Everything Everywhere believes that, in order to correctly interpret the results of Ofcom's Annex 7, it will be necessary for Ofcom to rerun the results of the simulations taking account of these points. Ofcom's conclusion, namely that 2x5 MHz of sub-1 GHz combined with a certain holding of high frequency spectrum is sufficient to compete with larger allocations of sub-1 GHz spectrum, is invalid - even theoretically.

We explain our critique of Ofcom's technical modelling in detail in Annex B and summarise in the following two sub-sections, the points that we particularly object to:

- The network loading that Ofcom has used in its modelling is inconsistent, unrealistic and would lead to inefficient use of spectrum if carried through consistently.*
- Ofcom's 'doughnut' model approach has underestimated the relative size of low and high frequency cells and does not consider capacity correctly for users served by low frequency spectrum.*

*3.4.1 Ofcom's assumed network load is inconsistent, unrealistic - and inefficient
Ofcom concludes on the basis of its technical model that:*

"...a multi-frequency network with 2x5 MHz of sub-1 GHz spectrum and a certain amount of above-1 GHz spectrum can go a long way towards matching the coverage and maximum speed deliverable by a network with only sub-1 GHz spectrum using the same maximum number of sites. In order to achieve this however the multi-frequency network is not loaded to the same extent as the sub-1 GHz only network. This requirement for lighter loading does however mean that, all other things being equal, such multi-frequency networks will not be able to serve the same number of customers as a sub-1 GHz only network with a similar amount of spectrum and number of sites, and so will have a lower capacity."²⁶

This lighter loading for 800 MHz spectrum used by Ofcom is in fact 15%, which is completely unrealistic for a commercial deployment and represents a highly inefficient use of spectrum. What is more, the methodology for implementing this lighter loading of 15% is wrong in this context.

Ofcom uses the notion of a 'serving' cell operating at a high load, whilst the rest of the network is loaded to a lower level. By doing this, Ofcom is examining a single 'reference cell' as if that were the only cell of sufficient importance in the network to use the majority of the cell's resources (85%), whilst the rest of the (adjacent) network is somehow less important, making it acceptable to load it to 15%. This is not internally consistent, and clearly represents a theoretical construct, not a practical operating situation.

This type of approach has been used by Ofcom previously, for reasons of simplicity in defining a particular performance criterion for compliance verification. It does not

²⁶ Paragraph 5.76.

however represent the way networks are operated and loaded in practice. The policy objective which Ofcom sets in the Consultation is to ensure that four credible national wholesale operators have a sufficient spectrum portfolio – a manifestly practical objective. In this context, the simulation must reflect the reality of actual networks. This is common practice in well recognised industry simulations (3GPP). To address this internal inconsistency, it is necessary in the analysis to assume that the load on the reference cell and the wider network are the same, as this is the way a network would be planned and operated in practice.

A reduction of the reference cell's average power from 85% to 15% will more than halve the range with which an LTE800 cell can reach a customer at around 1 Mbps, and indeed with 2x5 MHz, LTE800 cannot reach 2 Mbps at all (to 90% confidence). This leads to a much smaller area and population covered by a service with a meaningful data rate than the results in Annex 7 suggest.

The low load is also far removed from the commercial reality of network operations. [REDACTED]

[REDACTED] These capacity levels are virtually unusable. There are substantial fixed costs involved in deploying an LTE800 layer and it would not make commercial sense for an operator at scale to deploy such a layer if the incremental coverage and capacity it gained was not commensurate with the increased capex. We believe that a 15% loading is below this threshold by a substantial margin.

Finally, Ofcom's suggestion that a national wholesaler should operate a 2x5 MHz carrier well below capacity (i.e. 15% load) in order to seek to deliver a comparable single user performance compared to operators with 2x15-20 MHz of sub-1 GHz spectrum, encourages highly inefficient use of spectrum. An MSP on this basis, which can only be used in a spectrally inefficient way, therefore fails to secure optimal use of for wireless telegraphy of the electro-magnetic spectrum and would lead to Ofcom failing in relation to its statutory duties.²⁷

3.4.2 The hole in the 'doughnut' and capacity for users in the doughnut
Ofcom has deployed what it calls a 'doughnut' arrangement for the multi-frequency network that it compares with a network based on a larger holding of sub-1 GHz spectrum. This means that the larger bandwidth (2x15/20 MHz) of high frequency spectrum in the 1800 MHz and 2.6 GHz bands is used to serve customers near the centre of the cell whilst the smaller holding of sub-1 GHz spectrum is used to serve customers nearer the edge of the cell.

However, Ofcom's doughnut approach does not adequately consider the uplink. The limited power in mobile devices will limit the range at which these bands can provide a sufficiently high performance (e.g. 2 Mbps) to cover effectively only a subset of the cell area. This means that the hole in the doughnut is smaller than Ofcom assumes and conversely that the doughnut itself, i.e. the area only served by sub-1 GHz, is bigger.

This is related to our next point, which is that whilst Ofcom's analysis considers briefly the overall network capacity, it has failed to take into account the capacity needed at the

²⁷ In particular, under the Communications Act 2003 ss3(2)(a) and 154(2).

edge of the coverage area.²⁸ A customer located in the doughnut requires more cell resource for the same performance: by definition, a user served by lower frequency is more likely to be further away from the cell centre than a user served by high frequency spectrum. This significantly reduces the effective capacity of the low frequency cell (by up to 50%) compared to the case where customers are distributed uniformly across the cell, exacerbating the effects described in Section 3.3.2.

In conclusion, a 2x5 MHz allocation, especially operating at low loads, will provide insufficient capacity in networks where the sub-1 GHz holding represents a low proportion of total spectrum. Hence Ofcom's conclusion on the equivalence of performance does not hold.

3.5 Ofcom has failed to consider voice

In addition to the analytical errors described above, we believe Ofcom has failed to give due consideration to mobile voice services in its competition assessment as well as its technical analysis to support the proposals for the award of 800 MHz and 2.6 GHz frequencies.

Despite the emergence of new data applications and services, Everything Everywhere believes that voice will continue to be a key driver of revenues and customer utility over the next decade. Ofcom's own analysis of the importance and attention of various media activities illustrates the high priority that all customers give to mobile voice calls.²⁹ The continued importance of voice is also illustrated by external analyst forecasts for UK mobile revenue evolution, with the consensus still anticipating voice revenues accounting for around 50% of revenues by 2015.³⁰ This agrees with Ofcom's own assertion that "mobile voice is likely to remain the majority source of revenues for mobile operators for the short to medium term".³¹

Even in markets where the adoption of data services is more advanced than the UK, voice continues to dominate revenues. In the US, where 3G penetration is significantly higher than the UK,³² mobile voice accounted for over 60% of ARPU in Q4 2010.³³ The growing penetration of smartphones and increasing data usage in the US also appears to be impacting the location of voice usage, with the percentage of calls made indoors increasing from 40% in 2003 to an average of 56% in 2011.³⁴ In Japan, which leads the world with 96%+ 3G penetration, voice accounted for over 50% of market leader NTT DoCoMo's revenues in Q4 2010.³⁵

²⁸ Ofcom notes this in footnote 9 of Annex 7.

²⁹ Ofcom Communications Market Report, August 2010, fig. 1.37.

³⁰ Yankee Group UK Forecast December 2010 / Analysys Mason UK Forecast June 2010.

³¹ Ofcom Mostly Mobile, July 2009, paragraph 3.14.

³² Ofcom International Communications Report, December 2010.

³³ Credit Suisse US Wireless Quarterly, March 2011.

³⁴ JD Power US Wireless Call Quality Survey, March 2011.

³⁵ NTT DoCoMo Calendar Q4 2010 results.

Everything Everywhere and H3G are in a unique position in Europe in that they do not have access to low frequency spectrum with which to provide a voice solution to reach deep indoors from a practical deployment of outdoor macrocellular sites. If Everything Everywhere and H3G were to win 800 MHz spectrum in the forthcoming auction, they will only be able to offer voice services to users deep indoors when there is a native voice solution on LTE. It is not expected that this will be achieved before 2014. Even then it will only be possible on compatible handsets, and it will depend on having a sufficient proportion of these in the customer base.

When a native voice solution is available on LTE800 and LTE800 smartphones have achieved a reasonable penetration, the service will naturally attract a loading of voice calls from users deep indoors. The loading will be especially marked for Everything Everywhere, due to the size of our retail and wholesale customer base. It will not be possible to steer these users onto another layer (e.g. UMTS2100 or GSM1800) as those other layers may not be available in many locations. This means that part of this 800 MHz carrier's capacity will be consumed by voice traffic, diluting in some cases significantly the capacity available for data services. For Vodafone and O2, there are options of GSM900 and UMTS900 to serve these users, leaving any 800 MHz allocation unencumbered for an enhanced data service experience.

The added loading that voice calls will put on the sub-1 GHz carrier is another reason that Ofcom's technical analysis has overestimated the performance that can be achieved by 2x5 MHz of sub-1 GHz spectrum for an operator not already meeting the MSP conditions. It is not sufficient spectrum for an operator like Everything Everywhere to be able to carry both voice and provide a competitive data service to customers who are only reached by sub-1 GHz signals.

3.6 Rural broadband

Thus far this Section 3 has focused primarily on in-building issues for mobile data services. However, LTE on low frequency spectrum has the potential to be an effective solution for delivering rural broadband.

Everything Everywhere can demonstrate that 2x5 MHz of 800 MHz will not be capable of providing sufficient performance or capacity to handle broadband traffic levels in rural broadband not-spot areas. Everything Everywhere is conducting with BT a trial of a wireless broadband solution in Cornwall. See Annex C for more details of this trial.

However, the associated speeds that could be provided are highly dependent on available spectrum:

Table 2: Impact of spectrum on not-spot performance

[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]

These results show that there is a critical difference between an allocation of 2x5 MHz and 2x10 MHz. With the larger allocation, an operator can provide 2 Mbps across the cell. The significance of 2 Mbps is that it is Broadband Delivery UK's (BDUK's) proposed minimum download speed (its requirements are to be aligned with local authority priorities, so could be higher) for projects that it supports.³⁶ In other words, with 2x10 MHz, an operator is a qualified bidder for rural broadband, and with less, it is not.

In addition to providing coverage at a given speed, the mobile site must have sufficient capacity to deliver broadband service to all the not-spots covered by that site. If not, customers in not-spots will face congestion and severely reduced performance. The step up from 2x5 MHz to 2x10 MHz also brings benefits here, reducing the number of not-spots with insufficient capacity by █ percentage points.

A key finding from the Cornwall trial is that 2x10 MHz is the minimum quantity of sub-1 GHz spectrum necessary for the commercial viability of wireless access as a solution for mobile broadband. Otherwise, the percentage of not-spots covered to the right performance level is so limited that it no longer justifies the significant investment involved.

Prior to this auction, only O2 and Vodafone have the necessary sub-1 GHz spectrum, creating a duopoly for rural broadband. If this continues, it will reduce the value for money achieved from the public funds set aside for rural broadband (administered by BDUK) as well as initiatives taken by the devolved administrations. We believe that it is crucial that after the forthcoming spectrum auction, other operators are able to compete for rural broadband projects with public funding.

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3.7 Conclusion and implications

We are very concerned that the combination of Ofcom's proposed spectrum floors and the sub-1 GHz cap could lead to a highly asymmetric distribution of business critical sub-1 GHz spectrum, whereby Vodafone and O2 each hold 2x27.4 MHz of sub-1 GHz spectrum and the remaining spectrum is divided between two other operators holding only 2x5 MHz each. 2x5 MHz is not sufficient sub-1 GHz spectrum for a credible competitive proposition, particular not if other competitors have much more sub-1 GHz spectrum. This will not provide for the four credible competitive national wholesalers that Ofcom wishes to promote. Quite possibly it will not even allow for three credible competitors because the spectrum floors could have the effect of dividing the 800 MHz into small holdings.

Such an asymmetric outcome would lead to similar outcomes as maintaining an actual sub-1 GHz duopoly. We are extremely concerned that under the current proposals,

³⁶ BDUK DRAFT Requirements – Bidders Discussion Document.

Vodafone and O2 could have an incentive to bid strategically to achieve this outcome, even if their spectrum valuations did not support this.

We estimate that [REDACTED] of traffic can only be served with sub-1 GHz spectrum and hence if Everything Everywhere did not have sufficient sub-1 GHz spectrum, its customers would experience a lack of service for [REDACTED] voice calls or data sessions on average. This is clearly not a competitive proposition, when customers of two other operators do not suffer such deficiencies.

While Ofcom's technical modelling work purports to show the equivalence of multi-frequency portfolios with 2x5 MHz of sub-1 GHz spectrum with a pure sub-1 GHz portfolio of 2x15 MHz or more, it is not based on practical network principles and contains several errors. Hence, as is, the technical model results cannot form the basis of any decisions for regulatory intervention supporting 2x5 MHz as the minimum amount of sub-1 GHz spectrum.

Everything Everywhere is committed to providing solutions for rural broadband, as illustrated by the recent launch of our LTE trial for rural broadband in Cornwall jointly with BT. The initial results show that this is not feasible on the basis of 2x5 MHz of sub-1 GHz spectrum, meaning that Ofcom's proposal could leave only Vodafone and O2 able to compete for contracts to provide rural broadband. Restricting competition in public tenders will fail to allow competition and achieve value for the money the Government is investing in rural broadband.

We strongly believe that 2x5 MHz is not sufficient sub-1 GHz spectrum: a national wholesaler needs at least 2x10 MHz of sub-1 GHz spectrum to become a sustainably credible competitor in all but very few market segments. A 2x10 MHz allocation of sub-1 GHz spectrum would not be sufficient to put Everything Everywhere on a par with Vodafone and O2 but it is sufficient to prevent a de facto sub-1 GHz duopoly. Hence regulatory intervention is warranted to achieve this and promote competition.

3.7.1 Implications

Ofcom has defined two options for a number of MSPs that they consider an operator should hold in order to be able to compete effectively as national wholesale operator. Ofcom states that it prefers its Option 1, which consists of the following MSPs:

Table 3: Ofcom's preferred proposal for Minimum Spectrum Portfolios

	Sub-1 GHz	1800 MHz	2.6 GHz	Total
a)	2x5 MHz	2x15 MHz		2x20 MHz
b)	2x5 MHz		2x20 MHz	2x25 MHz
c)	2x10 MHz	2x10 MHz		2x20 MHz
d)	2x10 MHz		2x15 MHz	2x25 MHz
e)	2x15 MHz			2x15 MHz

As we have outlined in this section, we believe that a national wholesaler critically needs at least 2x10 MHz of sub-1 GHz spectrum in order to be a credible competitor and hence we cannot support this Option 1.

As an alternative, Ofcom has listed an Option 2, which includes an additional 2x5 MHz of sub-1 GHz spectrum in each portfolio compared to the MSPs in Option 1. Whilst some of the portfolios suggested in Option 1 do not have sufficient sub-1 GHz spectrum, Option 2 does not suffer this problem. However, Option 2 effectively reserves 1800 MHz or 2.6 GHz spectrum for Vodafone and O2 (as well as for H3G), a protection that Vodafone and O2 do not need. If it was most efficient to allocate such spectrum to them, there is no risk they would not win such spectrum if not protected. In other words, there is no other potential bidder that could have an incentive and the ability within the proposed caps to block Vodafone and O2 from winning 1800 MHz or 2.6 GHz spectrum. Therefore, we believe Option 2 would be a disproportionate measure to address Ofcom's stated objective, namely to ensure that there are at least four national wholesalers with credible spectrum holdings.

In addition to our concerns in relation to sub-1 GHz spectrum, we believe that 1800 MHz and 2.6 GHz are broadly equivalent in value for future LTE use (we explain this view further in Section 6.3). Hence an MSP should include either 1800 MHz or 2.6 GHz spectrum in equivalent amounts. It is not necessary to include 2x15 MHz of 2.6 GHz as an alternative to 2x10 MHz of 1800 MHz spectrum; 2x10 MHz of 2.6 GHz is sufficient.

Therefore, we strongly encourage Ofcom to amend the MSPs in its preferred Option 1 to:

- exclude portfolios that include only 2x5 MHz of sub-1 GHz;
- acknowledge that 2.6 GHz has a similar value to 1800 MHz for LTE capacity deployments on a forward looking basis; and
- consider whether TDD spectrum should be included in the MSPs as an alternative to high frequency FDD spectrum.

In practice this would mean removing MSPs a) and b) and amending MSP d) to be equivalent in terms of spectrum quantity to c) as summarised in Table 4:

Table 4: Proposed amended Minimum Spectrum Portfolios

	Sub-1 GHz	1800 MHz	2.6 GHz	Total
c)	2x10 MHz	2x10 MHz		2x20 MHz
d')	2x10 MHz		2x10 MHz	2x20 MHz
e)	2x15 MHz			2x15 MHz

* Possibly to include TDD.

In the alternative, Everything Everywhere would accept that a tighter sub-1 GHz cap of 2x22.5 MHz would have a similar beneficial effect on competition after the auction. As such Everything Everywhere is agnostic as to which of these instruments Ofcom chooses to address its competition concerns but believes Ofcom needs to amend its proposed intervention otherwise there is a danger of embedding competitive distortions for a long time to come.

4 An overall spectrum cap is not necessary

As part of its competitive assessment, Ofcom proposes to set “safeguard” caps to guard against “longer term risks to competition from very asymmetric holdings of spectrum”.³⁷ Ofcom has put forward three proposals for an overall cap: Option 1 of a 2x105 MHz cap, Option 2 of a 2x120 MHz or Option 3, which is not to have an overall cap; and noted that its preferred option is an overall cap of 2x105 MHz.

In this section, we set out our comments on the proposed overall spectrum cap. In particular, the sub-sections below address the following points.

- Why high frequency spectrum is not as scarce as sub-1 GHz spectrum. Moreover, Ofcom’s proposed spectrum floors will ensure that there at least four national wholesalers with a minimum spectrum portfolio after the auction. As such we do not believe an overall cap is necessary.
- If a safeguard cap was imposed, it should afford Everything Everywhere the same bidding flexibility as other bidders in the auction.
- Any safeguard cap should also ensure Everything Everywhere is not disadvantaged in launching new services compared to its competitors.
- Finally, any cap should not disproportionately restrict Everything Everywhere from servicing its customer base or contradict the reasoning of the European Commission underlying its approval of the merger that created Everything Everywhere.

Everything Everywhere considers that, taken as a whole, these arrangements suggest that a safeguard cap is not in fact required and that there is little danger of asymmetric outcomes with respect to higher frequency spectrum. If Ofcom considers that a safeguard cap is required, then the proposed cap should be increased to 2x120 MHz in order to ensure that there is no discrimination against Everything Everywhere, compared to its competitors, in its ability to bid in the auction.

4.1 High frequency spectrum is not as scarce as sub-1 GHz

The forthcoming combined award releases both sub-1 GHz and high frequency spectrum suitable for mobile communications. Whilst only 2x30 MHz of sub-1 GHz spectrum will be awarded, a significant amount of high frequency spectrum will be available for award shortly:

- 2x70 MHz of paired 2.6 GHz spectrum;
- 50 MHz of unpaired 2.6 GHz spectrum, which in Ofcom’s auction design is made equivalent to 2x20 MHz - but as we argue in Section 5.1, we believe the TDD spectrum corresponds to more FDD because TDD can be tailored to the asymmetric downlink-uplink pattern of broadband data traffic; and
- 2x15 MHz of 1800 MHz which Everything Everywhere is required to divest.

³⁷ Paragraph 5.83 – 5.87.

This will add to existing spectrum already awarded and used for mobile communications, which are similar balanced towards higher frequency spectrum as exhibited in Table 5:

Table 5: Relative spectrum available sub-1 GHz vs. main high frequency bands

Sub-1 GHz spectrum	High frequency spectrum³⁸
2x30 MHz in 800 MHz	2x75 MHz of 1800 MHz
2x35 MHz in 900 MHz	2x60 MHz of 2.1 GHz spectrum
	2x70 MHz of 2.6 GHz FDD
	Min. 2x20 MHz equivalent of 2.6 GHz TDD
2x65 MHz total	2x225 MHz total

The 2x225 MHz of high frequency spectrum will be sufficient to meet immediate capacity requirements. As data traffic is forecast to grow rapidly, high frequency spectrum will become scarce too (though we note that further releases of public sector spectrum in the 2.3 GHz and 3.4 GHz bands may alleviate such scarcity). However, as is obvious from the table, relative supply very simply demonstrates that high frequency spectrum is much less scarce than sub-1 GHz spectrum.

Ofcom has introduced the concept of spectrum floors to this auction in order to ensure that there will be four national wholesalers with a minimum spectrum portfolio after the auction. We believe this is a sufficient regulatory intervention in order to promote competition and that Ofcom should focus on defining that remedy correctly as explained in Section 3. We note that the spectrum floors are very likely to ensure that a fourth licensee (other than Everything Everywhere, Vodafone and O2) wins some high frequency spectrum.³⁹ As high frequency spectrum is relatively less scarce than sub-1 GHz spectrum, we do not see there is a risk of outcomes detrimental to competition in the absence of a total spectrum cap when the spectrum floors are in place. As such we do not believe an overall cap is necessary (Ofcom's Option 3).

However, we anticipate that Ofcom will receive consultation responses from other stakeholders who will argue that that an overall spectrum cap needs to be even tighter than the most stringent of Ofcom's options in light of the amount of 1800 MHz and 2.1 GHz spectrum that Everything Everywhere holds. Such arguments would imply that there is a significant danger of disproportionate asymmetric holdings of higher frequency spectrum. Such arguments could not be supported by any proper analysis of potential spectrum holdings after the award. Arguments for a tighter overall cap, which will only impact on Everything Everywhere, are likely to be made in order to gain competitive advantage through regulatory means and create an advantage in the auction. Such an approach will have beneficial impacts for other operators, but will harm Everything Everywhere and reduce the wider benefits UK consumers will gain from the

³⁸ *In addition there is unpaired spectrum in 2.1GHz and further spectrum available in 3.4GHz.*

³⁹ *Unless in the very unlikely event that it would be more efficient to award a fourth licensee the MSP of more sub-1 GHz spectrum but no high frequency spectrum.*

award of the new spectrum. Other stakeholders would simply be trying to ensure that Everything Everywhere will not be able to launch LTE as soon as our competitors and that we may become capacity constrained on a per customer basis (and therefore less competitive) before others.⁴⁰ Arguments of this type are designed to enable market share gain at Everything Everywhere's expense.

In anticipation of those responses, we set out our view of what a "safeguard cap" means in the following sections.

4.2 Everything Everywhere's bidding flexibility in the auction should not be disproportionately curtailed

Ofcom notes about its proposed options for a cap of 2x105 MHz or 2x120 MHz:

*"These safeguard caps would still allow significant spectrum holdings, which would be unlikely to preclude national wholesalers from obtaining efficient spectrum portfolios. Therefore, whilst the benefits of the safeguard caps are uncertain, the costs are likely to be relatively small."*⁴¹

However, with Ofcom's current proposal for eligibility points, a cap of 2x105 MHz would restrict Everything Everywhere's bidding flexibility in the auction. Hence, far from being a safeguard cap, this would represent a real detrimental impact on us and cost in terms of potential inefficient spectrum allocation. We would be left unable to respond to extreme price differentials that may develop between 800 MHz and high frequency spectrum during the course of the primary rounds of the proposed auction, in a way that no other bidder is exposed.

For example, assume the four existing MNOs all preferred a package of 2x10 MHz of 800 MHz and 2x20 MHz of 2.6 GHz. Under a 2x105 MHz cap Vodafone, O2 and H3G would all be able to switch one 2x5 MHz block of 800 MHz to three 2x10 MHz blocks of 2.6 GHz and back again. Everything Everywhere would not be able to bid in this way as it would violate the overall cap.⁴² However, a cap of 2x120 MHz would enable Everything Everywhere to react similarly to relative prices throughout the auction. Moreover, a 2x120 MHz cap would allow Vodafone and O2 to switch further the remaining 800 MHz block of 2x5 MHz into 2.6 GHz (i.e. they can switch between 2x10 MHz of 800 MHz spectrum and 2.6 GHz spectrum). This would also seem to provide additional benefits for ensuring an efficient allocation of spectrum. Vodafone and O2 already have large amounts of sub-1 GHz spectrum and would therefore benefit from further flexibility in terms of expressing their demand for higher frequency spectrum. We have illustrated this step by step in Annex D.

Whilst Ofcom's approach to defining MSPs, drawing up eligibility points and setting reserve prices and licence fees acknowledges that higher frequency spectrum is less valuable than sub-1 GHz spectrum, this is ignored by treating all spectrum as equivalent under the overall cap.

⁴⁰ Assuming similar site density.

⁴¹ Paragraph 5.85 of the Consultation.

⁴² H3G would be able to switch both blocks of 800 MHz into 2.6 GHz and back again under a 2x105 MHz cap. Hence we do not consider H3G's switching possibilities further under a 2x120 MHz cap.

Table 6: Ofcom's inconsistent views of the relative value of available bands

	800 MHz	2.6 GHz	1800 MHz
Overall spectrum cap	1	1	1
Eligibility points and reserve prices	6	1	1

If Ofcom were to introduce a safeguard cap, Everything Everywhere would urge Ofcom to set this at 2x120 MHz in order to avoid limiting Everything Everywhere's bidding flexibility in the auction disproportionately. Alternatively, if Ofcom wanted to keep the cap at 2x105 MHz, it would need to change the proposed eligibility points so that Everything Everywhere was not disadvantaged.

4.3 A safeguard cap should not prevent Everything Everywhere from rolling out new services to compete

[REDACTED]

[REDACTED]

- Following the EC's competition review for the JV merger clearance,⁴³ Everything Everywhere was required to divest 2x15 MHz of 1800 MHz spectrum. The need to clear this spectrum by the agreed dates creates significant pressure on Everything Everywhere's network to provide the existing GSM service. In order to achieve this remedy, Everything Everywhere will need to reduce the spectrum over which its existing GSM traffic is carried by 16.7% by September 2013 and by a further 10% by September 2015. Overall, Everything Everywhere must carry any remaining GSM traffic on a quarter less spectrum over the next four years. The legal requirement to achieve this clearance means that it is Everything Everywhere's priority and a challenge in its own right.

[REDACTED]

⁴³ EU Commission Case no. Comp/M5650 T-Mobile/Orange Regulation in accordance with Regulation (EC) no. 139/2004 Merger Procedure 1/3/2010.

[REDACTED]

The counter-intuitive consequence of the above is that whoever acquires Everything Everywhere's divested 1800 MHz spectrum will be better placed to introduce an 1800 LTE service than Everything Everywhere itself. The acquirer will be able to introduce a 2x10 MHz LTE service from the end of 2013.

If Everything Everywhere's bidding flexibility as explained in Section 4.2 above were to be addressed through a change in the eligibility points or any other means, an overall spectrum cap of 2x105 MHz would seem to strike the balance of providing a sufficient safeguard whilst not restricting Everything Everywhere unnecessarily in acquiring new spectrum to launch LTE services rapidly in competition with other national wholesalers. However, any lower cap would severely curtail our ambitions to launch LTE at the same time as our main competitors.

4.4 A safeguard cap should not prevent Everything Everywhere from serving its customers effectively

The European Commission cleared the creation of the joint venture that formed Everything Everywhere, subject to certain commitments, with the explicit input and agreement of Ofcom.

This means that the Commission – and Ofcom – has agreed that Everything Everywhere's current market share and size of spectrum holdings is acceptable and does not represent a detriment to competition or the outcome for UK consumers. Any "safeguard" cap at a level which would imperil Everything Everywhere's ability to maintain its current market share or further reduce its proportionate spectrum holdings all else being equal, is tantamount to an additional ex post structural remedy being imposed on Everything Everywhere. We explain this further in Section 4.5 below which sets out why this represents an unacceptable double jeopardy.

Everything Everywhere considers that in deciding what is an appropriate safeguard cap, Ofcom should consider potential spectrum holdings after the award and compare the relationship between such spectrum holdings and capacity required by each operator. Viewed in these terms, the average MHz per customer can be compared across a range of feasible outcomes for spectrum holdings.

In making these comparisons Everything Everywhere has made the following conservative assumptions:

- *The operators without current access to sub-1 GHz spectrum are able to win 2x10 MHz of spectrum in the 800 MHz band (consistent with the arguments in Section 3).*
- *The remaining 800 MHz spectrum is split between Vodafone and O2 who each win 2x5 MHz.*



- *Everything Everywhere divests 2x10 MHz of 1800 MHz (which represents the short term divestment required by September 2013) and different scenarios are envisaged where other operators (Vodafone, O2 or another operator) acquire this spectrum.*
- *Consistent with Ofcom's wider approach, the 50 MHz of unpaired 2.6 GHz spectrum is considered equivalent to 2x20 MHz of paired spectrum.*
- *The 2x70 MHz of paired 2.6 GHz and 2x20 MHz of unpaired 2.6 GHz spectrum is allocated across the existing four operators such that Vodafone and O2 always have at least 2x20 MHz, H3G has 2x20 MHz; Everything Everywhere has 2x20 MHz where this is possible under the cap.*

Based on these assumptions, various scenarios can be considered involving Vodafone and O2 (or potentially H3G or another operator) winning different amounts of high frequency spectrum, assuming a 2x105 MHz cap as per Ofcom's current proposal. Comparing these spectrum amounts to the current numbers of customers (including the relevant MVNO customer bases which must be served using this spectrum) provides a range for MHz per customer as set out in table 7.

Table 7: comparison of MHz per customer assuming a 2x105 MHz cap

Considered in terms of MHz per customer – i.e. the capacity utilisation available to operators – the 2x105 MHz cap clearly does not create a situation where Everything Everywhere has abundant spectrum compared to its competitors. Rather Everything Everywhere is amongst the potentially more capacity constrained operators in these scenarios (with only O2 having to carry more customers per MHz if it wins towards the lower end of the range of 2.6 GHz spectrum available to it).⁴⁵ The relative position of each operator should be such that they have the ability to acquire sufficient spectrum such that they would not have significantly less capacity, or capacity per customer, than competitors.⁴⁶ It is then up to the workings of the competitive market whether Everything Everywhere’s market share can be eroded by other operators or increased on the basis of a level playing field by Everything Everywhere.

4.5 The overall cap represents double jeopardy

The introduction of any overall cap on spectrum holdings, and especially one at the relatively low level proposed by Ofcom, represents an additional remedy for an issue which has already been subject to a significant structural remedy. As such, the introduction of any overall spectrum cap represents a double jeopardy. What is worse, the spectrum divestment remedy imposed on Everything Everywhere as part of the joint venture clearance by the European Commission was decided upon in a context where greater interventions were envisaged with respect to the UK’s sub-1 GHz spectrum. That is, it was a remedy imposed on the assumption of greater intervention to ensure balanced

⁴⁵ It must be stressed here that Everything Everywhere would be constrained by the proposed cap to this position, whereas O2 (and even more so other operators) will be in a position to bid to ensure that they have sufficient capacity not to be at the lower end of these ranges.

⁴⁶ Clearly, this does not create an obligation on operators to acquire this amount of spectrum. Rather it is Everything Everywhere’s position that Ofcom’s policy approach should not bar any individual operator from having the opportunity to acquire sufficient spectrum to reach this position.

competition where existing 900 MHz operators were being more restricted in their sub-1 GHz holdings. Given that these additional constraints on Vodafone and O2 have not subsequently been imposed, the introduction of a second constraint on Everything Everywhere of an overall safeguard cap further upsets this competitive balance and is unjustified.

The merger of Orange and T-Mobile was approved by the European Commission on the basis of a number of commitments in order to meet any potential harm to competition arising from the merger.⁴⁷ Everything Everywhere's total holdings of 1800 MHz spectrum were seen as a potential source of competitive advantage. As a result, Everything Everywhere is required to divest 2x15 MHz of 1800 MHz spectrum by the end of September 2015. This means that any potential adverse impact on competition which may have arisen as a result of Everything Everywhere's 1800 MHz spectrum holding has already been addressed through this remedy. The fact that the proposed overall spectrum cap in the auction constrains Everything Everywhere disproportionately more than it does Vodafone, O2 and H3G in practice would subject Everything Everywhere to a further competition remedy on its spectrum holdings. This double jeopardy is unjustified on competition grounds and is inconsistent with the reasoning behind the European Commission's approval of the Orange/T-Mobile merger.

Ofcom was heavily involved in the consideration and construction of the spectrum remedies imposed in relation to this merger clearance. Its views were relied upon by the Commission which took the position that the transaction could not be cleared in phase I if Ofcom did not consider the remedies offered by Orange and T-Mobile to be sufficient with regard to the current and future competitive landscape in the mobile sector in the UK. The advice provided by Ofcom is referred to in the Decision.⁴⁸ In addition, the Commission press release explicitly stated that the Commission "cooperated closely with both the OFT and the UK's telecommunications regulator Ofcom throughout the investigation".⁴⁹

Whilst the OFT asked for a referral of the merger, it eventually withdrew its request for referral pursuant to Article 9 of the EU Merger Regulation with the explicit statement that in the light of the remedies offered by T-Mobile and Orange the joint venture will "not now have an adverse impact on competition within in the UK" since the final commitments offered would "fully address the OFT's outstanding competition concerns".⁵⁰ The OFT also noted that it worked in close consultation with Ofcom.

The regulatory situation at that time was based on the report of the Independent Spectrum Broker ("ISB") appointed by the Government. The ISB issued his report in May 2008 identifying competitive concerns as a result of the imbalance in spectrum holdings below 1 GHz. In order to address these issues quickly, the ISB proposed, as an alternative to the 900 MHz spectrum release obligation which Ofcom had previously consulted on, that O2 and Vodafone should be restricted from acquiring further crucial sub-1 GHz

⁴⁷ EU Commission Case no. Comp/M5650 T-Mobile/Orange Regulation in accordance with Regulation (EC) no. 139/2004 Merger Procedure 1/3/2010.

⁴⁸ *ibid.*

⁴⁹ European Commission press release IP/10/208, *Commission approves proposed merger between UK subsidiaries of France Telecom and Deutsche Telekom, subject to conditions*, 1 March 2010.

⁵⁰ OFT press release 23/10, *OFT satisfied with Orange / T-Mobile competition remedies*, 1 March 2010.

spectrum (the ISB Proposal).⁵¹ Under the ISB Proposal, any bid by Vodafone and O2 for 800 MHz spectrum in the future auction that was successful would have required Vodafone / O2 to relinquish into the auction an amount of 900 MHz spectrum equivalent to the amount of 800 MHz spectrum acquired. This was in order to offset any adverse competitive effects and to ensure that sub-1 GHz spectrum would not become overly concentrated in the hands of the existing 900 MHz licensees. The ISB recognised that allowing Vodafone and O2 to deploy refarmed 900 MHz spectrum before 800 MHz spectrum became available could create a significant first mover advantage. The ISB Proposal was accepted by the UK Government, which issued two consultation papers in October and December 2009.⁵² A draft spectrum direction was laid before Parliament in March 2010⁵³, but was not adopted prior to the General Election. The anticipated future situation pertaining to the auction of spectrum (in particular the form of spectrum direction which was the subject of consultation at that time) formed part of Ofcom's consideration of the merger.

In October 2010, at the request of the new Government and in the light of the new spectrum direction which the Government had proposed, Ofcom issued its advice to the UK Government on the consumer and competition issues relating to liberalisation of 900 MHz and 1800 MHz spectrum for UMTS.⁵⁴ In this document, Ofcom stated that it now considered the risk and extent of any competitive advantage for O2 or Vodafone arising from liberalisation of the 900 MHz spectrum for UMTS was low and significantly less than in Ofcom's analysis in February 2009.

The reasoning for this statement appears to be as follows: the situation had changed largely because of the formation of Everything Everywhere. Everything Everywhere (and to a lesser extent H3G) were in the strongest position in terms of network capability for providing UMTS services. They had the largest amounts of 2.1 GHz spectrum and access to the largest number of base station sites. Accordingly, Everything Everywhere and H3G would be able to improve their coverage and consequently reduce any competitive advantage that O2 or Vodafone might realise from using 900 MHz spectrum for the provision of UMTS services, albeit at potentially greater cost.⁵⁵ While a UMTS900 network deployed by O2 or Vodafone could still provide improved quality of coverage to some indoor locations when compared to what Everything Everywhere or H3G could provide with 2.1 GHz, the extent of the improved quality of coverage was relatively small because the extra sites could off-set to some extent the lack of 900 MHz spectrum. Even if there

⁵¹ *Report from the Independent Spectrum Broker: findings and policy proposals Final Report*, 12th May 2009.

⁵² *Digital Britain Final Report*, June 2009; *Consultation on a Direction to Ofcom to Implement the Wireless radio Spectrum Modernisation Programme*, October 2009 and *Supplementary Document in relation to Consultation on a Direction to Ofcom to Implement the Wireless radio Spectrum Modernisation Programme*, December 2009.

⁵³ *Draft Wireless Telegraphy Act 2006 (Directions to Ofcom) Order 2010*.

⁵⁴ *Ofcom, Advice to Government on the Consumer and Competition Issues relating to Liberalisation of 900 MHz and 1800 MHz spectrum for UMTS*, 25 October 2010.

⁵⁵ Ofcom also considered that any competitive advantage to O2 and Vodafone from liberalisation of their 900 MHz spectrum was likely to be short term, a consideration not borne out by the speedy implementation of refarming and delays in both changing annual licence fees for this spectrum and in the availability of the 800 MHz spectrum.

were advantages for O2 and Vodafone, these would not be material enough to distort competition.

Following this advice from Ofcom, the Wireless Telegraphy Act 2006 (Directions to Ofcom) Order 2010⁵⁶ was made on 20 December 2010 (the Direction), which directed Ofcom to liberalise both the 900 MHz and 1800 MHz licences to allow them to be used for UMTS (3G) without stipulating any obligation for O2 and Vodafone to release part of their 900 MHz spectrum (or placing any restrictions on the ability of O2 or Vodafone to acquire further sub-1 GHz spectrum). In January 2011, Ofcom published a statement implementing the Direction in relation to liberalisation.⁵⁷

The remedies given at the time of the merger were aimed at the avoidance of any undue competitive advantage for the merged entity. The Decision clearly demonstrates that the Commission (relying on the expertise and advice of Ofcom) compared the competitive situation with and without the formation of Everything Everywhere.⁵⁸ In the Decision⁵⁹ the network capability of the merged entity in relation to coverage was explicitly addressed, however, without any conclusion that the merged entity would enjoy a superior position in relation to network capability for providing UMTS services. There was no statement that there could be an imbalance between O2 and Vodafone - as a result of being affected either by the proposed 900 MHz release obligation which continued to be Ofcom's stated policy at the time or the alternative ISB Proposal - and the merged entity, Everything Everywhere. Nor was it felt that the UMTS holding of the merged entity gave it any advantage. The sole competitive concern in relation to spectrum holdings was the alleged advantage of the merged entity in relation to LTE1800. Furthermore, paragraph 132 of the Decision makes it clear that Ofcom / the Commission carefully considered to what extent O2 and Vodafone enjoyed an advantage regarding UMTS (i.e. from the liberalisation of the 900 MHz spectrum) vis-à-vis the merged entity with its spectrum holding.

Ofcom / the Commission analysed in detail whether there was a balance between O2 and Vodafone's UMTS advantages and the assumed advantages which Everything Everywhere would enjoy in respect of LTE. It would appear that Ofcom / the Commission rather identified that O2 and Vodafone had a market position in relation to UMTS which would be even stronger without the 900 MHz spectrum release obligation which continued to be Ofcom's stated policy at the time (or the alternative ISB Proposal).

A mere six months later, in Ofcom's view the basis of this competitive assessment pertaining to 3G services changed so significantly that there was no longer room for the assumption that O2 and Vodafone had a significant competitive advantage over Everything Everywhere and H3G. Surprisingly, for Ofcom the formation of Everything Everywhere constituted the most important fact underpinning this change of position, even though the changes of circumstances caused by the formation of Everything Everywhere had been analysed in great detail previously. This constitutes a contradiction in itself.

⁵⁶ SI 2010 /3024.

⁵⁷ Ofcom, *Statement on variation of 900 MHz and 1800 MHz Wireless Telegraphy Act Licences*, 6 January 2011.

⁵⁸ Paragraph 135-137 of the Decision.

⁵⁹ See paragraph 125.

We strongly believe that, had the advantages O2 and Vodafone received through the ability to refarm 900 MHz spectrum without any redistribution obligation or strict restriction on bidding for further sub-1 GHz spectrum been considered by Ofcom/the Commission at that time, the remedy requiring relinquishment of 2x15 MHz of 1800 MHz spectrum would not have been considered necessary. O2 and Vodafone enjoy such an advantage from 900 MHz liberalisation that Everything Everywhere's ability to deploy LTE1800 could not outweigh it.

Ofcom's advice meant that the balance which the Commission wanted to create (based on the advice of Ofcom) in relation of O2 / Vodafone's 3G and Everything Everywhere's LTE1800 positions would be destroyed if the LTE1800 related remedies for Orange and T-Mobile were to be kept unchanged. This created a double jeopardy for Everything Everywhere with effectively two remedies being imposed to deal with the same underlying issue.

Ofcom by its proposed safeguard caps and spectrum floors is now seeking to compound this position, particularly as the auction of 800 MHz spectrum has already been delayed by a further year than anticipated in March 2010. Accordingly, the period over which Vodafone and O2 will enjoy their 900 MHz spectrum advantages will increase, a further fact that Ofcom / the Commission did not take into consideration within their assessment leading to the relinquishment obligation.

In summary:

- Everything Everywhere's position in relation to 1800 MHz spectrum holdings was considered by the European Commission in the Decision and a structural remedy imposed which restored a suitable competitive balance;*
- this competitive balance was based on a less favourable position for two other significant operators (Vodafone and O2) than turned out to be the case; and*
- further restricting Everything Everywhere through an overall safeguard cap, to deal with the same competitive issue, is unwarranted and discriminatory (especially given that the competitive balance has now changed with 900 MHz spectrum having been liberalised with no further restrictions or requirements).*

5 Ofcom's approach to the 2.6 GHz band does not promote efficiency

We have a number of serious concerns in relation to the proposed packaging format for 2.6 GHz spectrum, which we outline in the following sub-sections.

5.1 TDD spectrum should be packaged in 5 MHz lots

Ofcom has proposed that the unpaired spectrum is packaged into one lot of 50 MHz (including restricted use of 5 MHz at the top and bottom of the band to manage interference between paired and unpaired use). This is based on the notion that having more than two licensees in the band – requiring another 5 MHz for separation amongst each pair – would create a risk that the amount of spectrum that is left usable to each of them is too little. Moreover, Ofcom has relied on submission that it received from 2006 to 2008 that a WiMAX entrant would need a minimum of 30 MHz.

The unpaired spectrum forms about one quarter of the 2.6 GHz spectrum available for award, and therefore represents a significant part of this important resource. Everywhere believes that Ofcom's proposals underestimate the importance of TDD. The prospects for TDD use have changed since Ofcom was last planning an auction of the 2.6 GHz band in 2008. Ofcom recognises⁶⁰ that there is considerable international support for LTE operating in unpaired spectrum (also known as TD-LTE), with a global industry initiative having been formed⁶¹, and devices becoming available in Q3-2011. However it expresses doubts⁶² about whether it will gain sufficient momentum to be truly successful. We think that Ofcom is ignoring significant evidence as to the momentum for this technology.

TD-LTE has strong support in China and India focusing on the 2.3 GHz band, with growing interest in Japan, Europe and USA focusing on the 2.6 GHz band.⁶³ In the most recent 2.6 GHz auctions in Europe (Denmark, Germany and Austria), unpaired 2.6 GHz spectrum was purchased by MNOs who are more likely to deploy TD-LTE than WiMAX (See Table 8). China Mobile is aggressively promoting this technology with the full support of their equipment makers, Huawei and ZTE.⁶⁴ In Europe, several operational launches are planned (Russia, Poland, Sweden and Denmark) with many other trials also underway (Germany).

Network equipment for TD-LTE is already available from most vendors. Multiple chipset vendors are active in the market, and early devices are available for trials, with first commercial USB/PC cards expected during 2011, and smartphones by Q3/2012. China Mobile announced at the company's 2011 shareholders' meeting, that it has reached a

⁶⁰ Paragraph 4.73.

⁶¹ <http://www.pri.newswire.com/news-releases/global-td-lte-initiative-gli-announced-to-promote-the-deployment-of-td-lte-networks-115176069.html>

⁶² Paragraph 5.79.

⁶³ See for example <http://www.totellidts.com/view.aspx?ID=161337>

⁶⁴ GSA White Paper "Evolution to LTE Report", 11 May 2011, available from www.gsacom.com/gsm_3G/info_papers.php4.

consensus with Apple that will enable China Mobile to develop an iPhone model based on TD-LTE, which will be offered in 2012. Everything Everywhere has seen a phenomenal uptake of the iPhone amongst its user base and hence we would expect a TD-LTE compatible iPhone to strongly improve the case for TD-LTE rollout. Overall, the TD-LTE ecosystem seems to be about 12 months behind LTE-FDD, but functionally, this gap should narrow as chipsets will tend to support the latest release of 3GPP standards for both technologies at the same time.

In addition to these significant ecosystem developments, TD-LTE has important technical merits compared to LTE-FDD, when applied to broadband data services which tend to be highly asymmetrical – a trend likely to continue as video traffic becomes increasingly prevalent, as we expect it will be.⁶⁵ The spectrum resources can be tailored to the uplink-downlink asymmetry of the traffic. For a resource allocation biased in favour of the downlink but able to accommodate anticipated traffic patterns, TD-LTE is expected to deliver at least a 50% increase in capacity per MHz compared to LTE-FDD.⁶⁶ 40 MHz of unpaired spectrum for TD-LTE would therefore deliver a similar data capacity to 2x30 MHz of LTE-FDD, assuming the typical asymmetry of data services.

Due to this surge of real interest in TD-LTE in recent months, and the significant data service performance benefits that TD-LTE is expected to be able to deliver per MHz compared to LTE-FDD, the 2.6 GHz unpaired spectrum is likely to attract significant multi-party interest in the auction.

Ofcom is wrong to rely on submissions that are three to five years old and based on a technology which is no longer the most likely for use in the band. As Ofcom notes, there has been no WiMAX entry in recent 2.6 GHz auctions in Europe, rather MNOs have won TDD spectrum in quantities smaller than 50 MHz. This is not necessarily to do with retaining eligibility as Ofcom asserts but may rather be a result of the maximum amount of spectrum those operators were allowed to bid for within an overall cap for FDD and TDD.

Ofcom's proposal to have a single 50 MHz TDD lot would also be out of line with the spectrum packaging used in recent auctions in Europe. Whilst two of the first three 2.6 GHz auctions conducted in 2007 to 2009 offered the TDD spectrum as one lot of 50 MHz, NRAs who have conducted 2.6 GHz auctions in 2010 or are planning to do so in 2011, have all divided the TDD centre band into two or more lots. Table 8 below provides an overview of the approach taken in other Member States:

⁶⁵ Cisco White Paper, Global Mobile Data Traffic Forecast Update 2010 – 2015, February 2011, available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf

⁶⁶ Assuming a 7:2 downlink to uplink resource ratio. For an 8:1 resource ratio, which is still expected to deliver the ratio needed to satisfy demand, the increase extends to approximately 75%.

Table 8: TDD packaging and outcomes in European auctions of 2.6 GHz spectrum

Country, year of 2.6 GHz auction	TDD packaging	Outcome
Norway, 2007	Five lots of 10 MHz; and six lots 10 MHz available for either TDD or FDD	Craig Wireless Systems won 50 MHz corresponding to the CEPT TDD centre band.
Sweden, 2008	Single lot of 50 MHz	Intel won
Finland, 2009	Single lot of 50 MHz	Pirkanmaan Verko won
Denmark, 2010	Nine lots of 5 MHz and 5 MHz restricted use guard band *	Hi3G: 25 MHz, Telia: 10 MHz, Telenor: 10 MHz
Germany, 2010	10 lots of 5 MHz	T-Mobile: 5 MHz, Vodafone: 25 MHz, O2: 10 MHz, E-Plus: 10 MHz
Austria, 2010	Nine lots of 5 MHz and 5 MHz restricted use guard band **	Telekom Austria: 25 MHz; Hi3G: 25 MHz
Netherlands, 2010	Ten lots of 5 MHz; with two 5 MHz guard bands	Unsold
Spain, 2011 (planned)	Five lots of 10 MHz	n/a
Switzerland, 2011 (planned)	Three lots of 15 MHz and 5 MHz guard band**	n/a
Portugal, 2011 (planned)	Two lots of 25 MHz	n/a

* Guard band awarded to winner of Lot 9 TDD subject to restricted use; ** Guard band granted if same winner gets Lot 1 FDD and Lot 9 TDD

In Ofcom's previous 2.6 GHz auction design, the TDD spectrum was packaged into 5 MHz lots and we would propose that this packaging is reinstated. Whilst 5 MHz may not be useable in itself, it allows the maximum granularity for bidders to construct packages of for example 20 MHz, 25 MHz or 30 MHz as they need. This should provide the greatest possible scope for an efficient assignment of this spectrum. Given that Ofcom has proposed a combinatorial auction format, offering small lots does not pose any risk that winners would be left with holdings that are too small for productive use. Bidders who only attach value to winning a greater endowment or indeed the entire 50 MHz can choose only to bid for such packages. Such bidders would have the option to only submit bids for as many TDD lots as they would need and would not in any way be exposed to winning less.

We recognise that more winners of TDD would mean that more guard bands would be necessary. Ofcom could include a similar rule to the previously proposed auction rules that TDD licensees need to provide the lowest 5 MHz block of their total holding as a guard band. With 5 MHz lots, the market will be fully capable of valuing the cost of such guard bands against 'productive' use in order to achieve the most efficient allocation of spectrum.

5 MHz lots have the additional benefit that it would allow bidders the opportunity to bid for 5 MHz of TDD spectrum in combination with FDD. This gives winners of the lower and upper most FDD blocks an opportunity to buy the adjacent 5 MHz block as a guard band in the assignment round (or subsequently in the secondary market). This could improve the value of FDD spectrum at the edges of the paired assignment and the spectrum packaging should support the auction determining whether TDD use of an FDD guard band is the most efficient use of the spectrum at the edges of the TDD assignment. We would therefore propose that there should be no minimum number of lots that a bid for TDD spectrum must contain.

Finally, Ofcom's current proposals do not include the TDD spectrum in any of the Minimum Spectrum Portfolios. The logic for this exclusion is unclear and we believe it should be considered whether the TDD spectrum should be included in the MSPs.

5.2 2x5 MHz lots in the FDD spectrum

The proposed block size of 2x10 MHz for the paired 2.6 GHz spectrum reduces the options available to bidders in the auction and precludes a number of outcomes.

Ofcom states that "it is not clear that having the option to bid for 2x15 MHz adds significant value" (paragraph 8.85). However, the uncertainty about the value of this option should be a sufficient argument to allow it – there is a distinct possibility that this could be a desirable option at given prices. The option of expressing more granular bids is particularly valuable to Everything Everywhere under the current proposal of an overall 2x105 MHz cap. We would not necessarily have 'room' under that cap to add in an extra 2x5 MHz to get to a package including 2x15 MHz or 2x25 MHz of 2.6 GHz spectrum for example. Table 9 shows three examples of packages, which would be available to Everything Everywhere to bid for under the cap but which would not be feasible for us to achieve under the current packaging proposals for paired 2.6 GHz spectrum.

Table 9: Importance of smaller 2.6 GHz FDD lots to Everything Everywhere under current cap proposal

Desired package		Total*	Necessary bid		Total*
800 MHz	2.6 GHz		800 MHz	2.6 GHz	
2x25 MHz	2x15 MHz	2x105 MHz	2x25 MHz	2x20 MHz	2x110 MHz
2x15 MHz	2x25 MHz	2x105 MHz	2x15 MHz	2x30 MHz	2x110 MHz
2x5 MHz	2x35 MHz	2x105 MHz	2x5 MHz	2x40 MHz	2x110 MHz

*assuming 2x45 MHz of 1800 MHz and 2x20 MHz of 2.1 GHz, i.e. 2x65 MHz that counts towards the overall cap

The 2x10 MHz packaging proposal is also unusual in European context where all other auctions have offered 2x5 MHz lots. While there is only one auction in which the resulting

assignments are not in multiples of 2x10 MHz (Finland), we do not believe that Ofcom has assessed the relevant bid data from all these auctions to analyse whether bids were made for 2x15 MHz, 2x25 MHz or 2x35 MHz. Table 10 below sets out the FDD packaging and outcome from the 2.6 GHz auctions conducted in other Member States so far.

Table 10: FDD packaging and outcomes in European auctions of 2.6 GHz spectrum

Country, Year of 2.6 GHz auction	FDD Packaging	Outcome
Norway, 2007	Eight lots of 2x5 MHz; and Six lots of 2x10 MHz available for either TDD or FDD	2x20 MHz: Netcom; 2x40 MHz Telenor*
Sweden, 2008	14 lots of 2x5 MHz	2x20 MHz: Tele2, Telenor, TeliaSonera; 2x10 MHz: Hi3G
Finland, 2009	14 lots of 2x5 MHz	2x20 MHz: DNA; 2x25 MHz: TeliaSonera, Elisa
Denmark, 2010	14 lots of 2x5 MHz	2x20 MHz: TDC, Telenor, Telia; 2x10 MHz: Hi3G
Germany, 2010	14 lots of 2x5 MHz	2x20 MHz: T-Mobile, Vodafone, O2; 2x10 MHz: Hi3G
Austria, 2010	14 lots of 2x5 MHz	2x20 MHz: Telekom Austria, T-Mobile, Hi3G; 2x10 MHz: Orange
Netherlands, 2010	13 lots of 2x5 MHz; with Two 5 MHz guard bands	2x20 MHz: Tele2, Ziggo; 2x10 MHz: Vodafone, KPN; 2x5 MHz: T-Mobile
Spain, 2011 (planned)	National: Four lots of 2x10 MHz, Three lots of 2x5 MHz Regional: One lot 2x10 MHz, One lot 2x5 MHz	n/a
Switzerland, 2011 (planned)	14 lots of 2x5 MHz	n/a
Portugal, 2011 (planned)	14 lots of 2x5 MHz	n/a

*with minor regional variations due to regional lot structure

We encourage Ofcom to package the FDD 2.6 GHz spectrum into 2x5 MHz lots in line with its previous proposals for a 2.6 GHz auction in 2008 and in line with the approach taken in other Member States.

If bidders do not have the option to bid for 2x15 MHz they would have to bid for 2x20 MHz in order to achieve at least 2x15 MHz of spectrum. This increases demand and hence prices and more importantly, it gives a clear risk of an inefficient allocation with fewer winners than could otherwise have been accommodated in the band. We believe that the additional complexity in terms of the winner determination and pricing computations that more lots in the 2.6 GHz category would represent, is manageable and modest – by comparison for example to the complexity introduced by Ofcom's desire to ensure a competitive outcome with the use of spectrum floors rather than simple spectrum caps.

5.3 No reservation for concurrent low-power use

Everything Everywhere believes it is unnecessary and would be inefficient to reserve FDD spectrum in the 2.6 GHz band for concurrent low-power use. Competitive wholesale and retail markets should deliver appropriate low-power infrastructure, in line with consumer demand, without disproportionate regulatory intervention of this nature.

The outcome of the DECT guard band licence auction raises great doubt as to whether the sub-national RAN operator business model that Ofcom envisages is viable, even if spectrum were reserved for such operators and awarded at the reserve price. Of the 12 DECT licences that were awarded in 2006, Everything Everywhere is only aware of three licensees who are actually using the spectrum for that purpose.⁶⁷ This would suggest that it is unlikely that there are any dynamic competition benefits over and above the amounts such potential users would reflect in their bids in the auction.

Ofcom has carefully designed a detailed auction process to ensure that there will be four national wholesalers with sufficient spectrum to be effective competitors after the auction. The Consultation suggests that these wholesalers could increase their valuation in (and bid for) outcomes where there is no competition from sub-national RAN operators.⁶⁸ This is entirely inconsistent. If a competitive national wholesale market is created or maintained due to the auction design, there will be no additional value for MNOs in bidding to avoid further competition.

This spectrum is highly valuable for high-power use. From the prices achieved in other Member States, the average UK equivalent prices would be over £60m per 2x10 MHz lot.⁶⁹ This is the potential opportunity cost of denying high-power use. Reserving any amount of spectrum would create a great risk of an inefficient assignment to concurrent low-power users when high-power users may value it more. This would particularly be the case if less than ten bidders choose to compete for the reserved spectrum. In this case, by definition, the value to UK consumers of the part of the band reserved for low-powered use would be less than the maximum available from low-powered use. In this case, high-powered use would unequivocally be a more valuable and efficient use of the band. The risk of this outcome is not sufficiently considered by Ofcom and would lead to inefficient use of the 2.6 GHz band. It is a sufficient competition measure to allow for the

⁶⁷ C&W, Mapesbury (now part of Mundio Mobile/Vectone) and Teleware.

⁶⁸ Paragraph 5.25

⁶⁹ As quoted by Ofcom in its Table 8.1 in paragraph 8.104,

aggregation of bids from concurrent low-power use (to overcome threshold risks) in order that such bids may compete collectively but directly with bids for exclusive high-power use.

Moreover, *Everything Everywhere* has serious concerns about the feasibility of Ofcom's proposals for concurrent low-power use from a technical point of view. Operators of high-power wide area networks are inherently best placed most efficiently to manage the co-ordination issues surrounding low-power deployment within the framework of single network ownership. From a purely practical point of view, it is difficult to frame rules to ensure appropriate coordination, which fully capture the different requirements. This is likely to result in resource intensive negotiation being carried out on a case by case basis.

The main challenge faced by low-power operators, clearly highlighted in the *Real Wireless* report,⁷⁰ is interference between uncoordinated deployments both in the low-power layer and with co-channel, co-geographic high-power layers. The report acknowledges the difficulty of developing appropriate licence conditions to facilitate multi operator low-power use. Any rules developed are likely to be spectrally less efficient than those an operator in sole network management could achieve with detailed co-ordinated site placement and appropriate radio system parameterisation.

The *Real Wireless* report⁷¹ attempts to mitigate the inter low-power layer problems by suggesting options with significant inefficiencies such as frequency partitioning (65% spectrum efficiency overall of a 2x10 MHz unpartitioned carrier in the 7 operator scenario). Indeed it recommends the use of a 20 MHz solution to offset the inefficiencies such an approach imposes to attempt to allow low-power multi-operator deployment. The *Real Wireless* report also suggests⁷² that low-power networks under the proposals should expect throughput degradations approximately proportionate to the number of contending access points. An operator with full network control could largely avoid these inefficiencies.

The issue of inter low-power and high-power co-channel co-geographic deployment is rightly indicated as problematic. The *Real Wireless* report in Section 4.5.2 references the work of such organisations as the *Femtocell Forum* in highlighting possible system architecture features such as the single operator X2 interface which could potentially facilitate mitigation of macro layer degradation.⁷³

Promoting efficient use of these spectrum bands and innovation⁷⁴ therefore strongly suggests that any low-powered use is coordinated. *Everything Everywhere* does not accept that there are any significant benefits to competition (which Ofcom has asserted rather than demonstrated) arising from Ofcom's proposal. Any such benefits need to be

⁷⁰ Section 1.5.3, *Low-power shared access to spectrum for mobile broadband*, *Real Wireless Ltd*, March 2011.

⁷¹ Table 7-2, *Low-power shared access to spectrum for mobile broadband*, *Real Wireless Ltd*, March 2011.

⁷² Section 1.5.1 *Low-power shared access to spectrum for mobile broadband*, *Real Wireless Ltd*, March 2011

⁷³ *Interference Management in OFDMA femtocells*, *femto forum*, white paper no. 12 March 2010, available <http://femtoforum.org/femto/pdfs01.php>

⁷⁴ As required by Ofcom's statutory duties.

set against the very real costs of this approach, both in terms of actual costs of managing interference and the opportunity costs of deploying the spectrum for a less valuable use. There is already sufficient spectrum available to operate a sub-national RAN, should this become commercially attractive in future, and Ofcom has not explained why this spectrum has failed to be exploited already if such a use is competitive and promoted competition.

5.4 Conclusion

In conclusion, Ofcom's proposals for packaging the 2.6 GHz band are not likely to achieve efficient use of this band in a number of respects. Ofcom has significantly underestimated the potential value inherent in the TDD spectrum and selling this spectrum as one lot will not allow a proper expression of bidders' valuation of this spectrum. Everything Everywhere believes that creating greater flexibility for bidders through smaller lots sizes – both in relation to the TDD 2x50 MHz spectrum and the FDD paired 2x70 MHz – would greatly increase the ability of the auction to achieve efficient outcomes. Further, using 5 MHz and 2x5 MHz lots for these sub-bands respectively would be more consistent with practice across Europe in awarding licences in the 2.6 GHz band. The relatively small increase in auction complexity would be an acceptable cost.

Ofcom has also over-estimated the benefits available from low-powered use in the 2.6 GHz band. Reserving spectrum for this use has a potentially large cost in reducing the value which can be achieved for the UK economy and UK consumers from high-powered use of this spectrum. Creating a mechanism for aggregating bids of low-powered users, so that they can bid against high-powered use, is a sufficient remedy. This is especially the case as the potential competition benefits available here are speculative compared to the very real value which this spectrum demonstrably has in a high-powered use.

6 Annual Licence Fees for 900 MHz and 1800 MHz spectrum licences

Section 10 of the Consultation sets out Ofcom's proposed approach to setting Annual Licence Fees ("ALF") for existing 900 MHz and 1800 MHz licences.⁷⁵ In summary, Ofcom is proposing that:

- 800 MHz and 900 MHz spectrum can be considered as "highly comparable" and that the 900 MHz ALF are set based on the average price per MHz of the three categories of 800 MHz lots which are not subject to material interference issues; and
- while acknowledging that the situation is more complicated in relation to the comparability of 1800 MHz with either of the bands for which licences are being auctioned, the 1800 MHz ALF should be a "simple average" of the price for the categories of 800 MHz lots used for 900 MHz prices and the average prices per MHz of lots in the 2.6 GHz FDD for high-power use category.

Everything Everywhere does not agree that these proposals on the setting of the ALF are consistent with the terms of the Direction. The Direction provided:

"5.—(1) Ofcom must revise the sums prescribed by them by regulations under Section 12 of the Act for existing 900 MHz and 1800 MHz licences after the completion of the Combined Auction so that they reflect the full market value of the frequencies in those bands.

(2) Ofcom must take all relevant factors into account in revising the sums prescribed with particular reference to the sums bid for licences in the Combined Auction."⁷⁶

Ofcom is placing too much reliance on the prices achieved in the auction for different bands, whereas the Direction requires Ofcom to "take all relevant factors into account in revising the sums prescribed with particular reference to the sums bid for licences in the Combined Auction." The prices coming out of the auction are clearly relevant benchmarks for calculating the "full market value" but, especially if there is no direct price specifically for the 900 MHz and 1800 MHz bands (as is currently envisaged in Ofcom's proposals), such benchmark prices need to be interpreted with care. The underlying different values of the different spectrum bands need to be taken into account. This needs to be both in terms of the different physical characteristics of different frequencies as well as medium term issues around the ability of operators to realise value in practice from the bands in the UK market. At least in relation to the 1800 MHz band, Everything Everywhere considers that there should be potential for released spectrum to be awarded through the auction and that this auction price should be the key benchmark for setting the ALF for retained 1800 MHz spectrum going forward.

Everything Everywhere's views on these issues are set out in more detail in our answer to the specific Consultation Questions 10.1 to 10.3 in Section 7.

⁷⁵ Annex 11 of the Consultation provides further detail.

⁷⁶ The Wireless Telegraphy Act 2006 (Directions to Ofcom) Order 2010 (the "Direction").

6.1 Setting the ALF with no direct auction benchmark

Where a direct market benchmark based on the same frequency is not available, Ofcom should therefore take into account relevant technical differences between the bands. It also needs to take into account other factors which impact on spectrum value such as device availability and penetration, interference-related issues, and national coverage obligations. In using auction values to determine an ALF, appropriate adjustments are required to take into account where such factors are different between the band auctioned and the band subject to an ALF. To be clear, such adjustments would not be based on simple averages of the value achieved by other bands at auction, but need to be based on robust analysis which is making proper like with like comparisons of the value of different frequencies to national wholesalers.

This is especially important given that Ofcom is envisaging these prices as applying for a significant period of time (until there was evidence of “significant changes in long term circumstances that suggested that the value of spectrum had varied materially”⁷⁷). These prices will therefore have a significant impact on competitive conditions and it is important that they are based on an appropriate and robust analysis of the underlying value of the spectrum bands. There are relevant differences between each of the 800 MHz, 900 MHz, 1800 MHz and 2.6 GHz bands which impact on their relative market value, which Ofcom is not currently adequately taking into account. The following subsections consider these issues in more detail. Everything Everywhere has one other more general concern with Ofcom’s approach which it strongly urges Ofcom to address. Paragraph 10.6 of the Consultation states:

“the use of the amounts bid and licence fees paid in the auction are likely to provide the most reliable basis on which we can determine the full market value of 900 MHz and 1800 MHz spectrum.”

The reference to “amounts bid” is not clear and Everything Everywhere strongly believes that there is no basis for using the level of bids to set the ALF as opposed to the licence fees actually paid. To do so would lead to the ALF distorting competition and being above the efficient price determined for other mobile broadband spectrum through the award process. This approach would also distort the incentives of bidders in the auction (at least those with existing 1800 MHz and 900 MHz licences) and so reduce the efficiency of the auction. Ofcom’s statutory duties in relation to the carrying out of its spectrum functions require it to have regard to the extent to which spectrum is available for use and the demand (and future demand) for that spectrum. This is in addition to having regard to the desirability of promoting efficient spectrum usage, innovation and competition.⁷⁸

The detailed description of Ofcom’s proposed approach to calculating the ALF simply refers to calculating the relevant average “price” per MHz. Everything Everywhere assumes that this refers to the licence fees which will actually be paid for licences awarded in the auction (and the comments below are on this basis) – that is an average base price⁷⁹ across each of the categories for the 800 MHz band and each of the categories in the 2.6 GHz bands. However, the exact meaning of these “prices” is not

⁷⁷ Paragraph A11.45 in Annex 11.

⁷⁸ Section 154 of the Communications Act 2003.

⁷⁹ As set out in Annex 10 of the Consultation.

made completely clear in the Consultation and Ofcom needs to provide formal clarification of this point.

Based on these average base prices Ofcom then sets out an approach for creating an annual licence fee. Ofcom's approach is essentially to derive an annual licence fee which when summed up on a discounted basis over the initial term of the licences will equal the average amounts paid in the auction. Given information available at this stage, Everything Everywhere does not have any comments on the broad methodology Ofcom is proposing. However, Everything Everywhere does not consider that Ofcom is proposing to use the right discount rate for this calculation. The point of discounting the payments is to ensure that the time value of money is taken into account, not to take account of commercial risk and required return of an operator. These payments should be set to ensure that the government receives the same value from a specific block of spectrum regardless of whether that revenue stream comes from an auction or from an ALF. As such, the right discount rate is the government's social time preference rate as set out in the Green Book (3.5%). Competitive neutrality here means that operators are not making a greater contribution to government revenues simply because of the method of paying for spectrum licences. Further using RPI to index these payments is inappropriate. The ALFs should be changed over time to ensure that their impact is competitively neutral and any trade offs between using additional network and additional spectrum is made are incentivised appropriately. This suggests that the ALFs should be benchmarked to a general telecoms input price index.⁸⁰

6.2 Ofcom's approach understates the value of the 900 MHz Band

The 900 MHz band has greater value than the other bands: it enjoys better equipment availability and potentially lower interference risks.⁸¹ Clearly, existing 900 MHz operators have a first mover advantage, since UMTS900 networks are already commercially deployed in the UK, and compatible handsets are already well penetrated into the UK customer base. In addition, the 900 MHz operators have had the enhanced use of their spectrum since January 2011 and have had the ability to exploit it for even longer. This has created certainty for them in network and technological roadmap planning which has not been available to other operators and which confers an additional value on the 900 MHz band.

In February 2009 Ofcom indicated that allowing 3G use of 900 MHz spectrum in the hands of the existing holders would lead to them having a significant advantage (especially in terms of network cost compared to other operators) which would create competition concerns as well as allocative efficiency concerns. At that time, Ofcom noted that the potential future availability of 800 MHz spectrum would not resolve this competitive disadvantage for an "interim" period due to the need for not just LTE800 network to be deployed but also for a significant number of customers to have LTE800 ready handsets.⁸² In October 2010, Ofcom (in its advice to Government on competition issues arising from

⁸⁰ See Everything Everywhere's answer to consultation Question 10.3 in Section 7 for more detail on the issues of the appropriate discount rate and price inflator.

⁸¹ Although Ofcom is not proposing to base the 900 MHz ALF on the lowest category of 800 MHz, which is most subject to potential interference risks with DTT, the exact impact of this issue across the whole 800 MHz is not yet clear.

⁸² Application of spectrum liberalisation and trading to the mobile sector - A further consultation, 13 February 2009 <http://stakeholders.Ofcom.org.uk/consultations/spectrumlib/>

2G spectrum liberalisation) changed its view on the need to address this issue by requiring release of 900 MHz spectrum.⁸³ This is despite a delay in the auctioning of the 800 MHz spectrum licences.

Ofcom's reasoning for this change related to changes in market circumstances, essentially arguing that the competitors to the existing 900 MHz operators were in a stronger position due to the creation of Everything Everywhere and network sharing such that it was no longer proportionate to address competition concerns through the release of spectrum. As such Ofcom felt that any competition concerns could be addressed through charging ALF at full market value and certainly that any competitors would not exit before alternative sub-1 GHz spectrum became available.⁸⁴ The logic of these earlier positions, however, requires that Ofcom address the benefits which the 900 MHz operators are currently enjoying in setting the ALF for 900 MHz spectrum licences going forward. These advantages consist of first mover advantages and the competitive advantage which UMTS900S is providing today (which Ofcom has accepted in the earlier documents referred to above can only be replicated at greater cost by other operators). Further, voice services can be provided over UMTS900 today, whereas voice over LTE in the 800 MHz band is unlikely to be available when this band can first be used (with ongoing restrictions) in late 2012. These issues need to be addressed by Ofcom as soon as possible and the relevant analysis undertaken now. From Ofcom's October 2010 position, it needs to avoid any competitive distortions from UMTS900 by assessing the ALFs to take account of these benefits as part of the current process.

The propagation characteristics of 800 MHz may be closest to 900 MHz, but market value is determined by a combination of factors, including device availability and penetration, interference-related issues, and national coverage obligations. Using 800 MHz auction prices as a benchmark to estimate the market value for 900 MHz understates the latter, given:

- The superiority of the 900 MHz spectrum in relation to the certainty its owners have of its continuing use and the fact that its liberalisation on 6 January 2011 and use by one operator announced on 18 March (and enabling it to increase its capacity in London by 50%), taken together with the delay in the availability of the 800 MHz spectrum, and the continuing uncertainty as to the technical conditions which will be imposed on its use.
- Ofcom's failure to adjust the AIP on the 900 MHz spectrum when liberalising it given the availability of equipment for UMTS900 in the market (as illustrated by O2's entry into the market and the imminence of Vodafone's entry).
- The absence of potential interference issues with DTT, impairing the average value of 800 MHz.
- The wide diffusion of 900 MHz compatible 3G devices in the market; 800 MHz cannot be fully utilised until 800 MHz-compatible technologies mature.
- The national coverage obligations proposed for amended 2.1 GHz licences can be met using UMTS900, which is far more efficient in going from 80% to 90% of

⁸³ Advice to Government on the consumer and competition issues relating to liberalisation of 900 MHz and 1800 MHz spectrum for UMTS, 25 October 2010.

⁸⁴ *ibid.* Paragraph 1.15.

population coverage, which is a potential further source of value from the 900 MHz spectrum, at least in the initial years.

- Lack of a harmonised voice over LTE service as compared to the situation with UMTS900.⁸⁵
- Delay in availability of 800 MHz spectrum, which will not be available nationally until after 2012, compared to 900 MHz spectrum which is being commercially used for UMTS services today.

Everything Everywhere urged Ofcom to amend the administrative incentive payments which O2 and Vodafone are now paying for their 900 MHz spectrum to reflect the additional value of this spectrum in its response to Ofcom's notice of proposed variation of 900 MHz and 1800 MHz Wireless Telegraphy Act licences.⁸⁶ Ofcom declined to do so at that time and does need to take into account the fact that Vodafone and O2 have benefited from the liberalisation of their licences since the beginning of 2011. *Everything Everywhere* is unable to benefit from the liberalisation of its 1800 MHz licences given the lack of UMTS1800 equipment available, understandable given the similarity in propagation characteristics of this spectrum compared with 2.1 GHz spectrum.

6.3 Ofcom's approach overstates the value of the 1800 MHz Band

Ofcom's proposal to derive an 1800 MHz ALF from an average of the prices achieved for 800 MHz licences and 2.6 GHz licences is also at odds with the reality of the value of 1800 MHz spectrum. Many of the characteristics of 1800 MHz spectrum are closer to 2.6 GHz spectrum. The relationship between cell sizes at the different frequencies is not linear as Ofcom's proposed averaging approach would imply. A simple average would therefore significantly over-value the 1800 MHz spectrum. Other auction rules (such as the calculation of eligibility points) do not assume any relationship between ability to bid for 800 MHz and the 1800 MHz spectrum.⁸⁷ The approach of using 800 MHz auction prices as any kind of benchmark for the 1800 MHz ALF is therefore neither consistent with Ofcom's other proposals for this award or justified at a technical or commercial level.

Ofcom identifies five potential approaches to deriving a value for 1800 MHz spectrum from the auction prices.⁸⁸ The first two of these are to base the 1800 MHz prices on prices derived from 2.6 GHz licences and 800 MHz licences sold in the auction "without adjustment". Ofcom believes that neither of these represents a sufficiently close substitute to 1800 MHz on the basis of their technical modelling. Annex 7 reports the results of that modelling and contains a number of graphs showing 1800 MHz to fall between these bands.

However, in concluding that the 1800 MHz spectrum is therefore equally unlike each of the bands for which licences are being sold, Ofcom has not compared like with like and

⁸⁵ See Annex A.

⁸⁶ http://stakeholders.ofcom.org.uk/binaries/consultations/900-1800mhz-wireless-telegraphy/responses/Everything_Everywhere.pdf

⁸⁷ See our answer to Question 8.8 in Section 7.

⁸⁸ See paragraph 10.16 of the Consultation and Paragraph A11.26 of Annex 11.

therefore its conclusions are seriously flawed for use in this way.⁸⁹ The loading factors in its technical modelling for different bands are very different. In assessing the underlying value of the different bands Ofcom should be comparing the use of each band on the same terms, not on the basis of Ofcom's own view of what a minimum technically feasible deployment would be across the bands (which is essentially what Annex 7 is doing). Ofcom has therefore concluded that the 1800 MHz band is sufficiently different from the 2.6 GHz band without any reliable technical basis and without demonstrating that this is material compared to any difference between the 800 MHz and 900 MHz bands where the propagation characteristics are stated to be "almost identical".

Everything Everywhere's view is that Ofcom's technical analysis is inherently unreliable as discussed in Section 3.4. But even if the different loading factors assumed were reasonable (and the so-called "doughnut" network was competitively and commercially viable) this would not be a sound basis for setting the ALFs. These should be based on comparing like network situations with like. Differences in loading or cell densities should not be taken into account here as operators will need to incur different network costs to take these into account and should not be penalised twice for less advantageous spectrum (once through the ALF and again through higher associated network costs).

Ofcom's next two options are to use 800 MHz spectrum prices with a discount or the 2.6 GHz spectrum prices with an "uplift". Ofcom dismisses these two options on the grounds that any such adjustments would be "crude" and the "challenge is to find a reliable basis for determining the uplift or discount".⁹⁰ Ofcom points to the difficulties in both "accurately estimating the difference in technical capability" and in converting this into a monetary value. Ofcom therefore concludes that the best approach is to use an even cruder approach of a "simple average" of the 800 MHz and 2.6 GHz average price per MHz. Ofcom does not explain why this explicitly simpler and cruder approach is more valid when the reason for dismissing a charge derived solely from the 2.6 GHz auction prices is based on exactly the same drawbacks.

The fact that assessing the degree to which the values of the bands is different is difficult is not a valid reason for not undertaking this analysis. Given the importance of this issue to national wholesalers and the impact it has on competitiveness - and hence competition - it is clearly proportionate and appropriate to undertake this analysis and not rely on a "simple average".




As shown in table 11, when compared on a like for like basis there is a clear relationship, based on the underlying physics of propagation between different frequencies, which demonstrates that the 1800 MHz band is far closer to the 2.6 GHz band than the 800 MHz band. This table gives the ratio of site numbers needed to provide a given service level in each band using LTE technology, relative to an 1800 MHz LTE network.⁹¹

⁸⁹ This is discussed in more detail in Section 3.4 of this response.

⁹⁰ Paragraph 10.17 and A11.28 in Annex 11.

⁹¹ See Annex E on the propagation differences between frequencies. This table is based on relative coverage areas where cell sizes are noise limited. This is the most objective measure of the different inherent physical characteristics of the different frequencies and therefore basing prices on this approach will have the most neutral effect in competition terms. Annex E also considers an interference limited approach, which does not provide a material difference with respect to the ratio between 1800 MHz and 2.6 GHz.

Table 11: Relative propagation characteristics of different frequency bands

Frequency Band	Relative Cell Area covered (LTE)
800 MHz	
1800 MHz	
2.6 GHz	

Ofcom's proposal to use a mean of 800 MHz and 2.6 GHz FDD auction prices to estimate the full market value of 1800 MHz risks overstating the latter, given that:

- The technical characteristics of the 1800 MHz band are very close to those of 2.6 GHz: as discussed above, the propagation characteristics of 1800 MHz spectrum are far closer to those of 2.6 GHz than 800 MHz. A key benefit of using 800 MHz spectrum is that it provides deep indoor coverage: 1800 MHz and 2.6 GHz provide significantly different capability than sub-1 GHz spectrum in this regard. LTE networks are already being rolled out, especially utilising the 2.6 GHz band where devices are already becoming available. 700 MHz LTE networks are also being rolled out in other regions. LTE 1800 MHz equipment and devices will undoubtedly become widely available but currently the other bands are more developed for this use.⁹² Given the need for global economies of scale this will place 1800 MHz LTE networks at a (albeit temporary) disadvantage before networks are widely rolled out in this band and economies of scale can be reached for network equipment and a suitable ecosystem and penetration of devices.
- As discussed in Section 4.2 and in our answer to Question 8.8, Ofcom's approach in other areas has not assumed the linear relationship of value across the bands. For example, the eligibility points system assumes a much closer equivalence between 1800 MHz spectrum and 2.6 GHz spectrum and explicitly does not assume it lies halfway between 2.6 GHz and 800 MHz spectrum in terms of value. Ofcom's proposals for reserve prices similarly assume significant differences between the 800 MHz band on the one hand and 2.6 GHz and 1800 MHz on the other. International benchmarks also suggest that the actual market value of 1800 MHz and 2.6 GHz are much closer.

6.4 Conclusion: deriving full market value

Any derivation of price therefore needs to take account of the fact that the characteristics of 1800 MHz propagation are so much closer to the 2.6 GHz band. Coverage – and crucially the costs of achieving that coverage – is likely to be significantly more similar between 1800 MHz and 2.6 GHz than between 1800 MHz and 800 MHz. The starting point for any technically sound derivation of the ALF should therefore be based on the different propagation characteristics of each frequency band, which is where the inherent value of such spectrum resides.

⁹² See, for example, the GSM/3G and LTE Market Update from Global Mobile Suppliers Association (3 March 2011) available from www.gsacom.com.

Given the other differences and benefits associated with sub-1 GHz spectrum, Everything Everywhere sees no justification for taking the 800 MHz average lot price into account at all in assessing the ALF for 1800 MHz. Rather, if there is no 1800 MHz auction price benchmark, it is our view that the price should be determined solely with reference to the 2.6 GHz average lot price i.e. Ofcom's option a) or, possibly, option c).

In relation to the choice between these latter two options, Everything Everywhere notes that Ofcom is prepared to consider "other elements that may affect the comparability of the frequencies" at paragraph A11.25, but appears to discount these entirely in its provisional conclusion. Everything Everywhere agrees with the principle but considers that Ofcom has not properly captured in that paragraph all of the relevant considerations. Network equipment and device availability for HSPA+ or LTE in relation to the 1800 MHz is behind the other bands. Some networks are now being rolled out in all of the bands, but the 1800 MHz band is the last of the frequencies under consideration to be used. This will therefore mean that development of an equipment eco-system and the global economies of scale which are associated with such a development will be behind that associated with other bands. This is likely to make the 1800 MHz band more costly to exploit, at least in the early deployment period.

As such, while there are significant physical similarities between the 1800 MHz and 2.6 GHz bands (albeit with a difference in their propagation characteristics, but which is not large compared to the difference between the 1800 MHz and 800 MHz bands) there are a range of factors which operate in both directions which impact on the relative values of these two bands. Many of these factors are subject to significant uncertainty. Given that they a priori work in both directions, Everything Everywhere considers it would be a reasonable approach to regulatory risk to consider that they cancel out. If Ofcom is looking for simplifying assumptions this seems a much more reasonable one to take. Everything Everywhere therefore believes that there is a strong argument on this basis for using option a).

In the alternative, if Ofcom believes that it is important to take account of the technical differences between spectrum bands, then a reasonable alternative approach would be to use option c): basing the 1800 MHz ALF on the 2.6 GHz price with a suitable adjustment. In Everything Everywhere's view the only robust technical approach to such an adjustment is to derive a factor based on the difference in propagation characteristics between the bands (as set out in Table 11 above). This is the only long term differentiator between the values derived on technical characteristics between the bands.

Everything Everywhere also believes that Ofcom should include the possibility that 1800 MHz spectrum would be sold directly in the auction. Clearly, if there is a direct benchmark market price for 1800 MHz spectrum licences, this should be used as a guide to set 1800 MHz ALFs.

7 Response to Consultation Questions

Mobile Spectrum Bands

Question 4.1: What use, if any, would you make of the top 2x10 MHz of the 800 MHz band in the second half of 2012 if it were available for use? What would be the benefits for citizen and consumers of such availability?

We are fully committed to supporting the Government's digital agenda, as indicated by our involvement in the joint trial with BT in Cornwall. [REDACTED]

[REDACTED] Subject to the level of funding available, availability of sites with Ethernet backhaul and negotiations on site access we would use the top 2x10 MHz of 800 MHz for such projects, which clearly have demonstrable benefits for citizens and consumers.} We note that in Germany following the auction with its 'reverse coverage obligation' the first customer was live with broadband only 7 months after the auction.

We would make such use of the spectrum notwithstanding the significant challenges surrounding the practical usability of the spectrum in these areas. These challenges include the following:

1. The top block of 800 MHz band, whilst further from DTT users than the other blocks, still has the capability to cause interference to DTT receivers, due to the poor filtering in these receivers. Therefore a TV interference mitigation programme would still need to be carried out, with a full public communications exercise. Undertaking such an exercise in 2012 could easily lead to public confusion when the holders of the rest of the 800 MHz spectrum, jointly or separately, then also need to go through a similar programme at a later date.
2. DTT will also not be clear in Channels 63, 64 and 68 in some areas adjacent to the proposed early availability areas, as it is prior to completion of the DSO programme in those areas. The restrictions on the use of 800 MHz in the proposed early availability areas are unknown at this stage, particularly any limitations on deployment or power. Such restrictions would affect any plans we might have.
3. This spectrum will not be available around any Olympic site until October 2012, therefore excluding parts of the London, Central, Anglia or South Eastern regions

Question 4.2: If we were to offer shared access low-power licences in some way, do you have any comments on the appropriate technical licence conditions which would apply for the different options?

Everything Everywhere believes that shared access low-power licences are unnecessary and inefficient. All the options presented offer a combination of unnecessary interference degradation and co-existence rules damaging to the end customer. Low-

power deployment and access can be more efficiently managed within the control of a single high-power operator.

Our views on this issue are set out in Section 5.3. Operators of high-power wide area networks are inherently best placed to most efficiently manage the co-ordination issues surrounding low-power deployment within the framework of single network ownership. *Everything Everywhere* has serious concerns about the feasibility of Ofcom's proposals for concurrent low-power use from a technical point of view.

In summary

- in managing interference between uncoordinated deployments, any licence condition based approach will be less effective and spectrally efficient than a coordinated deployments; and
- the proposed solutions in the *RealWireless* report⁹³ to mitigate the inter low-power layer problems leads to highly spectrally inefficient outcomes (which could largely be avoided by an operator with full network control).

Competition Assessment and Future Mobile Markets

Question 5.1: Do you agree that national wholesalers need a reasonable overall portfolio of spectrum to be credible providers of higher quality data services? In particular, do you agree that national wholesalers need some sub-1 GHz in order credibly to be able to offer higher quality data services? Please state the reasons for your views.

Everything Everywhere strongly agrees that national wholesalers do need a reasonable spectrum portfolio including sufficient sub-1 GHz spectrum in order to credibly offer higher quality data services and be able to be competitive in relation to these services. The reasons for this belief are set out in detail above. As recognised in paragraph 5.7 of Annex 6 of the Consultation, in order to compete profitably a national wholesaler will require both a sufficient overall portfolio of spectrum to have the capacity to meet future data demands as well sub-1 GHz spectrum "to offer reliable indoor coverage for data services". Whilst the question does not refer to voice services, as set out above, these are equally important and should have been considered in Ofcom's competition assessment.

A "credible provider" of higher quality data services needs to be competitive across a wide range of customer segments (including business to consumer, business to business, MVNO, developing cloud based services and machine to machine) on each of the key dimensions of network differentiation: coverage, capacity and speed.

With an increasing proportion of voice and data traffic being originated indoors, and with product and service innovation likely to drive this traffic mix even higher, sub-1 GHz spectrum is required both:

- *to address the first mover advantage currently being enjoyed by Vodafone and O2 who are refarming sub-1 GHz spectrum to offer high speed data services with unrivalled in-building coverage; and*

⁹³ Table 7-2 Lower power shared access to spectrum for mobile broadband, *Real Wireless Ltd*, March 2011

- to be able to be an on-going competitive force in relation to future data markets with a product which can compete with other operators in terms of coverage and performance at the very least with a cost differential which does not adversely affect competition.

Without access to sub-1 GHz spectrum, Ofcom's own analysis⁹⁴ suggests that the in-building coverage profiles of the existing sub-1 GHz operators cannot be replicated at reasonable cost, creating a significant competitive distortion. Ofcom's own analysis also shows that in order to provide higher performance levels more than 2x5 MHz of sub-1 GHz is required.⁹⁵ For the reasons set out in Section 3, (see especially Section 3.3) of this response, Everything Everywhere strongly believes that the amount of sub-1 GHz spectrum required for an operator to be a "credible" national wholesaler is more than 2x10 MHz. Being able to offer "reliable indoor service" (which includes the need to ensure a good customer experience, speeds which can compete with others in the market and having sufficient capacity in order to compete reliably with established sub-1 GHz operators) therefore requires this larger block of lower frequency spectrum. In assessing the credibility of such an operator Ofcom also should have taken into account the need to provide voice services as well. This is particularly relevant in the light of the continuing use of 2G services and the current lack of a voice over LTE product (see also Annex A).

Unless Ofcom can ensure that national wholesalers after the auction have access to such a spectrum portfolio (i.e. including a greater amount of sub-1 GHz spectrum) then operators such as Everything Everywhere and H3G will not be able to compete effectively with the existing sub-1 GHz operators in emerging data markets as well as voice markets. The competitive harm which would result is set out in answer to question 5.2 below.

Question 5.2: Do you agree there is a material risk of a significant reduction in the competitive pressures, at least to provide higher quality data services, in retail and wholesale markets without measures in the auction to promote competition? Please state the reasons for your views.

Everything Everywhere agrees that there is a material risk of a significant reduction in competitive pressures in retail and wholesale markets without measures in the auction to promote competition. In particular, Everything Everywhere believes that Ofcom needs to ensure that each national wholesaler has the ability to offer competitive coverage and performance with sufficient capacity in order to ensure that competition is not materially harmed. As set out in Section 3, this requires access to sufficient sub-1 GHz spectrum.

As outlined in the response to Question 5.1, Everything Everywhere believes that there is a significant risk that the existing spectrum asymmetry in the sub-1 GHz band will create significant market distortion in the future.⁹⁶

⁹⁴ Based on Ofcom's technical modelling as reported in annex 7 of the Consultation. See in particular paragraphs 5.82 of Annex 6 and paragraphs 5.42-5.44 of the main body of the Consultation.

⁹⁵ See, for example, Annex 6, paragraph 6.85 of the Consultation which summarises the technical results reported in Annex 7.

⁹⁶ Paragraph 114 of Commission decision Case No COMP/M.5650 – T-Mobile/Orange (dated 1 March 2010) also recognises the technical advantages which lower frequency spectrum can provide an operator: "...lower frequency spectrum (e.g. 900 MHz) is generally preferable to higher frequency

This distortion could be further exacerbated if future sub-1 GHz spectrum releases are concentrated in the hands of the existing sub-1 GHz licence holders who would then enjoy an unassailable advantage in terms of coverage, capacity and performance. The immediate advantage, and on-going effects of this advantage, which such operators have in relation to provision of voice services also needs to be taken into account. Ofcom action to promote competition is therefore necessary to ensure a more efficient outcome for UK consumers and citizens.

The alternative is that the advantages enjoyed by Vodafone and O2 will enable them to more effectively compete for most market segments which require reliable in building high speed data access. These operators will have an unmatched competitive advantage resulting from access to sub-1 GHz spectrum (see Section 3). These effects will be combined with significant cost disadvantages for other operators in providing a matching service where this is possible. The net result of this would be that the existing sub-1 GHz operators would have a competitive advantage in relation to key market segments (for example, business customers, M2M, cloud services and MVNO customers). These important customer groups are a source of a significant proportion of the profits available in the mobile market. If existing sub-1 GHz operators had an effective duopoly in serving these key segments, then other operators would inevitably earn lower margins on average.

Such a situation could lead to a downward competitive spiral. The disadvantaged operators would need to recover their substantial network costs from a restricted set of potential customer segments. This reduces their flexibility and ability to continue to invest to provide high quality service. This will further reinforce the advantage of the existing sub-1 GHz operators who will then also have a stronger position in relation to other market segments. They will therefore be able to leverage their strong competitive position in relation to the higher value market segments into competing for those customer groups where, at least initially, other operators would be able to compete. Over time this would lead to a serious competitive detriment which spreads beyond simply those sectors where the specific service characteristics delivered by sub-1 GHz are a key source of competitive advantage.

What is more, as discussed in Section 3, coverage is important for all customers. The nature of data use being indoors (see Section 3.2) and the need for a reliable service from a customer perception point of view means that the unmatched advantage of sub-1 GHz spectrum is required to be a credible national wholesaler (i.e. providing a competitive service to a sufficient number of customers at least to reach scale) of reliable data services. As Ofcom notes, operators need to be able to provide data services with a "sufficiently similar" speed and coverage.⁹⁷ Without this ability a similar negative spiral will result whereby the disadvantaged national wholesalers will only be able to compete by under cutting on price. At the same time, such operators without sufficient access to sub-1 GHz spectrum would also be likely to have a higher cost base (requiring more sites). The resulting lower margins will make them less able to invest to maintain competitiveness making the situation progressively worse.

spectrum (e.g. 1800 MHz or 2600 MHz) as lower frequency signals generally travel further and penetrate more deeply into buildings than do higher frequency signals".

⁹⁷ Annex 6, paragraph 6.82 of the Consultation.

These effects would occur in relation both to direct competition in the retail markets and would also feed through into the ability of operators to compete with each other to provide wholesale services. Wholesale customers are even more likely to value reliable coverage, capacity and performance as discussed in Section 3.2.⁹⁸ The European Commission has recognised the competitive importance of operators having sufficient spare capacity to provide service to wholesale MVNO customers. As such, insufficient capacity in the sub-1 GHz band, providing important in-building coverage, will hamper a national wholesaler's ability to compete for this important customer segment.⁹⁹

Everything Everywhere therefore agrees with Ofcom that national wholesalers need a "strong" spectrum portfolio in order to exert a long term competitive force. As Ofcom also recognises this will also feed into the ability of operators to be in a position to negotiate network sharing arrangements effectively.¹⁰⁰ This is simply one very important and specific example of the effects described above. Operators with a "weak" spectrum portfolio will be at a negotiating disadvantage which would further reduce their ability to compete effectively in retail and wholesale markets.

Question 5.3: Do you agree there is a risk of potentially beneficial sub-national RAN uses not developing without measures to promote competition? Please state the reasons for your views.

Everything Everywhere does not believe that the benefits of sub-national RAN use for UK consumers and citizens have been credibly demonstrated within the consultation process. There is already spectrum which can be used for sub-national RAN use should such use become commercially attractive in the future.

Please also refer to Section 5.3 and our response to Question 8.7.

Question 5.4: Do you agree with the analysis that at least four competitors are necessary to promote competition?

Having concluded that maintenance of effective competition will require measures to actively promote such competition through the auction, Ofcom then considers the degree of competition required. The argument within the Consultation is effectively that, given two sub-1 GHz operators is not sufficient, what is the number of licences required in order to ensure competition. Ofcom's proposed answer to this question is that four competitors

⁹⁸ In particular, this can be seen in relation to the example of Gamma Telecom moving its MVNO business from H3G to Vodafone (a 900 MHz operator), see footnote 20.

⁹⁹ Paragraph 69 of the Commission decision in Case No COMP/M.5650 – T-Mobile/Orange. (dated 1 March 2010): "Sufficient unused network capacity is a key prerequisite for supplying wholesale communications to MVNOs and an incentive to attract new wholesale customers. Network capacity is determined on the basis both of the frequency spectrum available, the number of sites / cells and of the number of carriers within a cell (which have a direct incidence on the number of calls that can be handled through a single cell) that transmit the radio signal between the mobile terminal equipment and the antenna."

¹⁰⁰ See, for example, paragraph 5.43 of Annex 6 of the Consultation.

is the “correct” number for sustainable UK competition. This analysis is undertaken on the basis that the identity of all four competitors is irrelevant.¹⁰¹

Everything Everywhere certainly agrees that four credible national wholesalers provide a competitive market. Ofcom confirms its earlier findings that the UK retail and wholesale markets are currently competitive with four national spectrum holders. Ofcom has previously consistently found that mobile wholesale and retail market in the UK are effectively competitive and has found no evidence to undertake a market review of the mobile access and origination market.¹⁰²

Competition therefore needs to be maintained and protected, with credible competitors owning spectrum portfolios that are sufficiently competitive across the key dimensions of coverage, capacity and performance. One measure of the competitiveness of the UK market can be seen in the returns which the sector is making. Ofcom’s own analysis, reported in the Mobile Sector Assessment (“MSA”), has shown that EBITDA for UK operators has been below European benchmarks and has been falling.¹⁰³ Looking at the return on capital employed (“ROCE”) shows a similar picture of a highly competitive industry, with UK operators’ returns being consistently below even the weighted average cost of capital (“WACC”) which Ofcom has estimated for the purposes of setting mobile termination charge controls. Everything Everywhere has previously provided Ofcom with average ROCE in the UK sector showing this.¹⁰⁴ [REDACTED]

[REDACTED] This compares with an average for European mobile operators in 2008 of [REDACTED]¹⁰⁶, which itself is low compared to many other capital intensive industries. It is also significantly below Ofcom’s estimate of the mobile sector WACC of 6.2%.¹⁰⁷

However, Everything Everywhere does not believe that Ofcom has adequately shown that competition is maintained simply by ensuring four competitors. The basis for this finding

¹⁰¹ See, for example, paragraph 6.65 of Annex 6 of the Consultation and paragraphs 1.19 and 5.70 of the main body of the Consultation.

¹⁰² See section 3 of Mobile Evolution: Ofcom’s mobile sector assessment statement. 17 December 2009 (especially paragraph 3.37).

¹⁰³ See Figures 21 and 22 (as well as surrounding text) on pages 60 and 61 of “Mostly Mobile: Ofcom’s mobile sector assessment, second consultation” published July 2009. The UK has since 2000 consistently displayed the lowest earnings when comparing the EBITDA for the top two operators in a range of European markets, suggesting a high degree of competitiveness in the market. Ofcom reproduced this Figure 22 as Figure 10 in its statement for the MSA: “Mobile Evolution: Ofcom’s mobile sector assessment. Statement” published 17 December 2009.

¹⁰⁴ See Table 1 on page 12 of Everything Everywhere’s response to Ofcom’s consultation Wholesale Mobile Voice Call Termination, dated 23 June 2010.

¹⁰⁵ O2, Vodafone, T-Mobile and Orange are included in this calculation.

¹⁰⁶ Figure 37 of GSMA European Mobile Industry Observatory 2009, http://www.gsmworld.com/our-work/public-policy/gsma_europe/mobilising/downloads/European-Mobile-Observatory-2009.pdf

¹⁰⁷ Everything Everywhere’s view is that the appropriate WACC for the purposes of setting mobile termination rate charge controls is above that used by Ofcom for these purposes. However assessed, the key point is that there is no evidence that the UK mobile sector is earning any supra-competitive returns.

is essentially a review of previous assessments and competition issues in other markets, together with reference to some academic research which suggests more competitors create more competition. Everything Everywhere does not believe that this analysis is sufficient to meet the Government's Direction or adequately to support Ofcom's findings.

- Ofcom suggests that because competition issues have been identified in some other EU mobile markets where there are three operators this is compelling evidence that three national wholesalers do not create sufficient competition.¹⁰⁸ This takes no account of any other potential differences in the market structure between the UK market (or the UK market as Ofcom might reasonably expect it to be after the auction) and the markets where competition complaints were upheld. All of these cases involved a concern over collective dominance, a finding of which is highly fact specific and depends on the interactions between competitors.¹⁰⁹ Such a finding is not simply based on the number of competitors.
- Ofcom further refers to a number of merger decisions, in particular concerning "four to three" merger situations.¹¹⁰ Ofcom's conclusion from its review of these cases is that "there may be concerns in mobile markets with only three credible competitors". This conclusion does not seem to be adequately supported by the cases they cite, two of which allowed a three player market raising no competition concerns and two of which also allowed a three player market to be created following certain remedies. By definition, such remedies would be to ensure that three credible competitors were left and therefore implies that this is feasible.
- Ofcom's use of previous fixed market regulatory findings suffers from the same failing as its use of other EU mobile markets as described above.
- The academic evidence which Ofcom cites as "a useful supplement" to the above evidence essentially makes the point that more competitors create more competition. This is relatively uncontroversial but Ofcom does not specifically relate the conditions in the current UK market to the detail of these papers in order to support a specific number of required competitors. A closer scrutiny of

¹⁰⁸ The first set of bullets in paragraph 6.25 of Annex 6 of the Consultation.

¹⁰⁹ The key test for collective dominance was established by the European Court of Justice in *Compagnie Maritime Belge Transports v Commission* (1995) 5 CMLR 198. At paragraph 41 of that decision the ECJ states that, in order to establish collective dominance it is necessary to examine "the economic links or factors which give rise to a connection between the undertakings concerned". This inevitably involves a highly fact specific analysis and consideration of more than simple numbers of competitors. From an economic perspective the same conclusion can be reached from Patrick Rey "Collective Dominance and the telecommunications Industry" Chapter 6 of *The Economics of Antitrust and Regulation in Telecommunications* ed. Buigues and Rey (2004). This paper discusses a wide range of relevant factors to be taken into account. The same clear point, that collective dominance is about more than simple numbers of competitors, can also be seen from the European Commission's Article 7 comments in relation to the Spanish case cited by Ofcom in paragraph 6.25 of Annex 6 which also makes it clear that the conclusion of collective dominance was reached as a result of detailed analysis of a range of different factors and was not simply a matter of the number of competitors or even simple market structure calculations. See CASE ES/2005/0330: Access and Call Origination on public Mobile Telephone Networks in Spain; Comments pursuant to Article 7(3) of Directive 2002/21/EC, dated 30 January 2006.

¹¹⁰ The second set of bullets in paragraph 6.25 of Annex 6.

*the key paper*¹¹¹ which Ofcom cites as academic support for the proposition that three competitors are not enough - but four are - does not in fact provide particularly strong support for Ofcom's conclusion that there should be four national wholesalers.

In relation to the final bullet it is worth considering in some detail the implications which can be drawn from the article "Counting rivals or measuring share: modelling unilateral effects for merger analysis", by Malcolm Coate (May 2011) as this is symptomatic of the approach which Ofcom has taken and illustrates how Ofcom's approach fails to provide a robust competitive analysis. Ofcom cites this paper as support for the general proposition that three competitors lead to insufficient competition whereas four will generally lead to a competitive market. A closer inspection of the aims and methodology of the paper, as well as some of its wider conclusions, suggest that Ofcom is wrong to rely on this paper in this way.

The paper starts with a general discussion of the so-called unilateral effects analysis and its history (especially in US) merger analysis. It then goes on to analyse a large number of historic merger cases in the Federal Trade Commission's ("FTC") files. As the paper itself notes this means that the cases it analyses have a natural bias towards mergers which were challenged. The quantitative analysis in the paper, on which the conclusion which Ofcom is citing relies, relates to analysing factors which led to a challenge by the FTC of a merger. The first point to note therefore is that this element of the paper is not setting out a general proposition of how many players in a market means that it is competitive (as Ofcom represents it) but rather it concerns the likelihood that a case was challenged by the FTC. That is, the paper is not saying that three players means that a market is not competitive, it is merely pointing out that of the cases in the FTC's files those which involved four to three mergers tended to be challenged. Coate finds that four to three mergers are the "marginal" case on the basis that five to four mergers in the files analysed were more likely than not to not be challenged, whereas the reverse was true for four to three.

The second point to note from this paper is that not all four to three mergers were challenged. A significant minority of the four to three cases analysed were not challenged by the FTC. This is set out in detail in Table 1 of the paper. In the total sample, there were 19 four to three cases of which around 74% were challenged.

More importantly, the third point about this analysis is that it is not concerned solely with raw numbers of competitors. Coate was particularly interested in looking at a range of other factors and their reliability as predictors of whether the FTC challenged a case. For example, he also looked at the post merger market share. Here he found the break point which suggested a case was more likely to not be challenged was 45% (of the 22 cases where post merger market share was under 45% only around 32% were challenged). This underlines the importance of looking at factors other than raw numbers of competitors. It also underlines the point that the sample being considered is biased towards those cases which were challenged (which seems reasonable as the FTC would naturally be likely to concentrate on those cases involving higher potential post merger market shares which would distort the analysis in relation to numbers of competitors).

¹¹¹ "Counting rivals or measuring share: modelling unilateral effects for merger analysis", Malcolm Coate, May 2011.

Fourth, reinforcing this point, the final sections of Coate's paper identify that a range of other factors also needed to be taken into account. These "case specific factors" led to deviations from the general rules. Where unilateral effects were rejected (which rules out simple numbers of competitors being taken into account) Coate identifies ten different categories of reasons being used to do so (across a sample of 58 cases where the file was analysed for such a reason).

On closer examination therefore, this paper does not (as Ofcom contends in paragraph 6.32 of Annex 6) find

"that generally, market [sic] with three competitors have been seen by the US Competition Authority as carrying a more significant risk to competition than markets with four competitors".

Even more importantly this paper reinforces the need to consider cases on their individual merits and that market structure is about more than simple numbers of competitors. The final sentence of the conclusion of the Coate paper is:

"Numbers, standing alone, are not always dispositive"

This is the conclusion Ofcom should have drawn from this paper.

The other academic research cited by Ofcom is, as Ofcom describes "more theoretical" and is dependent on the specific form of model assumed as Ofcom also recognises.¹¹²

In conclusion on the academic research, Ofcom has not found any academic support for their contention that effectively they can consider the competitiveness of a market based solely on the number of players (with four to three being the competitive boundary) absent undertaking a proper analysis of market structure. It is notable that the textbook measures of industry concentration (which is one traditional economic way of considering the competitiveness of an industry) are not based solely on counting numbers of firms but on measures which at least try to capture the relative size of firms.

The key issue over which Ofcom glosses in this analysis is that market structure is also important. That is, the relative strength of different competitors matters as much as their absolute number. As a simple example, a four player market with market shares of 40%, 40%, 10% and 10% would under many economic analyses be considered less competitive than a three player market with market shares of 33.3%, 33.3% and 33.3%. For example, one standard measure of market concentration (which can be considered as one proxy for competitiveness and is used as one indicator of this in relation to merger analysis¹¹³) is the Herschman-Herfindahl index ("HHI") which would rate the latter

¹¹² Also discussed in paragraph 6.32 of Annex 6 "A simple model of Imperfect Competition where 4 are few and 6 are many" Selten 1973; and "Competition Policy: a game-theoretic Perspective" Philips 1995 (the latter book provides an exposition of the Selten paper in Chapter 2).

¹¹³ The US antitrust authorities, for example, use this measure in assessing mergers as discussed in US Department of Justice and Federal Trade Commission Horizontal Merger Guidelines issued 19 August 2010 (available at <http://ftc.gov/os/2010/08/100819hmg.pdf>). It is important to note that these guidelines stress the importance of a full analysis and state that US authorities will not rely on such HHI measures: "The purpose of these thresholds is not to provide a rigid screen to separate competitively benign mergers from anticompetitive ones, although high levels of concentration do raise concerns. Rather, they provide one way to identify some mergers unlikely to raise competitive concerns and some others for which it is particularly important to examine whether other competitive factors confirm, reinforce, or counteract the potentially harmful effects of

market as more competitive.¹¹⁴ The HHI is therefore one of the leading examples of a concentration measure which attempts to compare the relative size of firms in a market as more important than simply counting competitors.

Ofcom does recognise that the number of competitors is not the be all and end all of a competition analysis. In relation to the merger cases discussed above, for example, Ofcom notes “although concerns do not arise in every case because the structure and dynamics of the markets in question are also important”.¹¹⁵ Everything Everywhere agrees with this statement. Further, in paragraph 6.27 of Annex 6 Ofcom suggest that their review of regulatory precedent in relation to fixed telecoms markets “also suggests that the detailed market structure is important”. Again Everything Everywhere agrees. However, Everything Everywhere fails to see where Ofcom has actually taken these statements into account. All of the regulatory and competition law precedents on which Ofcom relies suggest that in such markets it is important to take the market structure into account when assessing the degree of competitiveness whereas Ofcom makes a theoretical assumption which it applies to a theoretical proposed market intervention.

In relation to the merger cases, Ofcom’s approach essentially assumes that the UK market post auction would be one of those where three competitors was seen to be somehow not sufficient, without undertaking any analysis to show why this is the case. A more robust way of using these precedents would be to recognise that they require an assessment of whether the competitors post the merger were credible and strong competitors such that the market structure and dynamic factors point to the overall competitive situation being strong. In those cases where remedies were imposed in order to allow the mergers, this will have been the aim of the antitrust authorities. Similarly, this should be the aim of Ofcom’s market intervention in relation to the measures it introduces through the auction to promote competition. Under Ofcom’s approach it would logically be just as reasonable to assume that the UK is more like those markets where the structure and the dynamics of the market meant that three competitors did lead to a competitive structure post merger. Ofcom’s approach effectively ignores the relative strength of individual competitors and the importance of this in relation to whether a market is competitive.

The final example which Ofcom cites is that of the JV between Orange and T-Mobile to form Everything Everywhere where it quotes the EC decision to suggest that “only three national wholesalers in UK mobile markets would be a source of concern”.¹¹⁶ The quotation used relates to the impact which the Commission found H3G had on the

increased concentration.” (Page 19, section 5.3 of the guidelines). Such comments would apply a fortiori to simple counts of numbers of competitors.

Similarly, the European Commission “Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings” (OJ C 31, 5.2.2004, p. 5–18) discuss the use of HHI levels at paragraphs 16 to 21. They have a similar caveat to the US guidelines stating “... HHI levels, in combination with the relevant deltas, may be used as an initial indicator of the absence of competition concerns. However, they do not give rise to a presumption of either the existence or the absence of such concerns.”

¹¹⁴ The HHI for the first market is 3400 whereas the HHI for the second 3 player market is lower at 3333, on a scale where 0 is “perfect competition” and 10,000 is the index value for a monopoly.

¹¹⁵ Paragraph 6.25 of Annex 6.

¹¹⁶ See paragraphs 6.29 to 6.31 of Annex 6, especially paragraph 6.31.

market. As such this again is a fact specific example which relates to the conditions of competition at the time of the merger and not in relation to the situation which may or may not exist after any auction. Again, Ofcom makes no attempt to provide any analysis which justifies why this precedent relates to the market structure and situation it should be considering (although this example relates to mobile services in the UK, it is at a different point in time which is, by definition, once there had been a structural change in the market resulting from the spectrum auction itself and once concerns about H3G's reliance on the proposed JV had been rectified by the remedy imposed). Further, the immediately preceding paragraph to that quoted by Ofcom enforces the point that the Commission's concern related to the specific detailed circumstances of competition in the market and the particular part played by H3G rather than a simple general conclusion that three networks does not create sufficient competition:

"Moreover, 3UK is considered by several market players as an important competitive force in the UK market and to be the most innovative MNO in the market. It has played a key role in driving innovation, particularly in the data segment, and lower prices for consumers. (see paragraph 49 above in the retail market assessment) The important role of 3UK on the UK market has also been acknowledged and confirmed by Ofcom."¹¹⁷

Therefore, Everything Everywhere does not believe that Ofcom has undertaken a robust analysis to show why specifically four national wholesale competitors are required after the auction. Ofcom's key conclusion on this issue in Figure 6.1 in Annex 6 is that in relation to measures to ensure a minimum of four wholesale competitors there is "little evidence of a risk to competitive intensity." Everything Everywhere would certainly agree with this – as long as the current degree of competition is not upset through distortions arising from spectrum policy (including the forthcoming spectrum awards). However, the basis for such a conclusion should be in relation to a thorough analysis of potential market structures and the ability of different operators to compete given different spectrum holdings. Four national wholesalers had led to competitive retail and wholesale markets, prior to liberalisation of the 900 MHz spectrum, as found by the EC in their decision on the Everything Everywhere JV. The advantage in sub-1 GHz spectrum which Vodafone and O2 now have is starting to change the competitive structure of the market. The spectrum policy decisions being considered in the Consultation are therefore crucial to promoting and maintaining competition (that is, a competitive market structure going forward, not simply the number of competitors in existence immediately after the auction).

The importance of the lack of robustness of Ofcom's analysis in this area is that it then leads Ofcom to reach the wrong conclusions in relation to the measures required to ensure competition. Ofcom's approach means that it relies on a specific number of competitors rather than analysing what a competitive structure post auction would be. Emphasising the number of players rather than the extent to which they can provide a credible competitive force is where Ofcom has gone wrong.¹¹⁸ Ofcom has essentially asked the wrong question. Rather than asking whether four competitors are necessary,

¹¹⁷ Paragraph 107 of EU Commission Case no. Comp/M5650 T-Mobile/Orange Regulation in accordance with Regulation (EC) no. 139/2004 Merger Procedure 1/3/2010.

¹¹⁸ This can even be seen in the consultation questions themselves. Question 5.1 refers to spectrum portfolios required to be "credible providers of higher quality data services" but Question 5.4 drops the "credible" qualifier and simply asks whether four operators is the right number.

Ofcom should be asking what is required to ensure a competitive market structure after the auction.

Question 5.5: Do you agree that the specific measures we propose to take to ensure there are at least four holders of such spectrum portfolios are appropriate and proportionate?

Everything Everywhere strongly believes that national wholesalers need at least 2x10 MHz of sub-1 GHz spectrum in order credibly to offer higher quality data services (as discussed in Section 3 in detail). The key issue here concerns what is sufficient to ensure that a competitor can be “credible” (as discussed in Section 1). Ofcom does not in the Consultation explicitly provide its view on what this actually requires. In relation to coverage issues, Ofcom clearly states that sub-1 GHz spectrum is required in order for a competitor to be able to match coverage. By way of contrast, in relation to the other key competitive dimensions of capacity and performance, Ofcom’s approach is much vaguer. For example, in relation to capacity Ofcom states:

“We do not consider it is necessary for all national wholesalers to have the same capacity in order for there to be effective competition. Rather, all national wholesalers need to have sufficient spectrum to be able to serve a large enough customer base for them to provide a competitive constraint”¹¹⁹

Ofcom does not make any assessment of what “large enough” is or the degree of competitive constraint required.

In relation to performance, Ofcom’s analysis compares an operator with a small allocation of sub-1 GHz spectrum (e.g. 2x5 MHz) plus a larger allocation of high band spectrum with mobile networks operating large allocations of sub-1 GHz spectrum (e.g. 2x20 MHz). As discussed further in Annex B, Ofcom’s approach is highly theoretical and does not robustly show that a smaller allocation of sub-1 GHz spectrum allows an operator to be competitive (or efficient in its use of spectrum).

As such, Ofcom’s approach is entirely theoretical and based on whether an individual national wholesaler has the minimum technical requirement to offer any viable service. This appears to be Ofcom’s implicit definition of whether an individual competitor is “credible”. Such an approach does not make economic sense, and ignores whether this minimum technical level of viable service would in fact be competitive or indeed sustainable. This distinction is crucial. The relevant question is not whether a generic national wholesaler would be able, with a particular spectrum portfolio, to provide some minimum level of coverage, capacity and performance (at a cost which is not too dissimilar to the costs of other operators in the market). Rather the question Ofcom should be addressing is what minimum spectrum portfolios are required to ensure that there are sufficiently powerful competitors post the auction to provide a robustly competitive wholesale market (and hence retail market). Everything Everywhere’s view of what it means to be a credible competitor is discussed in Section 1.3.

This means that any risks that the minimum spectrum portfolio which the regulator chooses is too small cannot be said to be mitigated, as Ofcom does, through the ability of operators to bid for more spectrum or share spectrum after the award.¹²⁰ The point of the

¹¹⁹ Paragraph 6.97 of Annex 6.

¹²⁰ See, for example, paragraph 1.17 in the main consultation and, specifically on these points, paragraph 6.104 of Annex 6. We also note that Ofcom does not express a view on whether spectrum

intervention to promote competition should be to ensure that the competitors maintained are all credible. Taking into account the importance of market structure and competitive interactions (i.e. dynamic factors) rather than simply counting firms, means that “credible” needs to be interpreted as being able to compete. Therefore, suggesting that it is likely that a competitor will need to bid for more than a minimum amount or to share spectrum after the award solely in order to be competitive is tantamount to saying that the technical minimum is not sufficient for an operator to be a credible competitor.

The alternative argument which Ofcom runs in this respect can be seen in paragraph 5.96 of Annex 6, where it is argued that the difference in sub-1 GHz spectrum holdings are not “unmatchable” given that operators can add more sites at higher frequencies and that competition does not require all operators to have the same amount of capacity. Ofcom assumes that competition is not harmed “provided that wholesalers with smaller capacity still have sufficient to provide a competitive force”. At paragraph 6.74 of Annex 6, Ofcom suggests that the national wholesalers need to hold sufficient spectrum to be “financially viable” and “credible”. Despite these statements, Ofcom does not set out its analysis which shows that its proposed spectrum floors are sufficient to provide these outcomes. Ofcom’s analysis is solely concerned with the technical feasibility of networks with the minimum spectrum floor. Even though Ofcom is, in the passages quoted, recognising that the important consideration is whether a network is “sufficiently competitive” and “financially viable”, Ofcom does not provide its analysis to show why such proposals lead to this outcome which is essentially just assumed rather than proven.

When Ofcom suggests that the risk of failing to achieve the outcome of sufficient competitive national wholesalers can be mitigated by the opportunity of bidders to purchase more spectrum in the auction, this ignores the fact that existing sub-1 GHz operators will have a strong incentive to bid to ensure that any other competitors are not effective. (See Section 3.1 in this regard.) If Ofcom’s proposals are not sufficient to ensure effective and viable competitors then there is a strong danger that such strategic bidding will be successful. Ofcom’s other potential mitigation (the possibility of spectrum sharing post the award, subject to competition rules) creates a massive risk for operators who do not already own sub-1 GHz spectrum in advance of the auction. What spectrum sharing opportunities will be available, what commercial bargaining positions in relation to these opportunities will be and technological risk all point to this “mitigation” not being capable of ensuring that too low a minimum spectrum portfolio can be corrected post auction.¹²¹ One clear example of where Ofcom’s approach goes wrong in this respect are the arguments set out in relation to the potential for an operator to use the “doughnut” spectrum arrangement, where Ofcom alleges that a small amount of 800 MHz used on conjunction with larger amount of higher frequencies could match “what a national wholesaler with 2x20 MHz of 800 MHz spectrum could achieve”.¹²² Leaving aside the technical considerations on whether this doughnut approach is valid (see the discussion in Annex B), what Ofcom is doing in this type of approach is devising the very minimum

sharing would be permitted, even if commercially and technically feasible, on competition grounds.

¹²¹ *Spectrum sharing has not taken place to date because of perceived competition problems. It would only practically work in rural areas where there are less customers and this does not help solve the capacity problems which are set out above and will not solve the problem of the demand for spectrum exceeding the current supply.*

¹²² *See paragraph 6.86 of Annex 6.*

way in which a generic operator could provide some service. In considering this issue, Ofcom's technical modelling focuses on one particular aspect of capacity, coverage or performance at a time. This completely ignores what would actually be required for a real world operator in order to be competitive.

In putting forward this type of doughnut approach, for example, Ofcom does not consider whether a real world deployment of this type would be able to provide competitive speeds to sufficient customers in order to allow an operator to reach scale on an LTE network. At various points, Ofcom suggests that a credible competitor needs to have sufficient capacity in order to be a competitive constraint.¹²³ Ofcom's analysis does not follow through on this point and assess what is required for an LTE network to be at scale. Ofcom does not, for example, assess whether the "doughnut approach" would permit the provision of a service which would be able to compete with that which could be provided on a combined 800 MHz/900 MHz network (see Annex A). Rolling out an LTE network involves significant network costs which need to be recovered from sufficient customer numbers to ensure that prices can be competitive. Ofcom have undertaken no analysis to show that it is feasible for an operator to deploy a "doughnut" network which will be capable of being sufficiently competitive to acquire the necessary customer base to reach scale.¹²⁴

Given the size of the Vodafone and O2's sub-1 GHz spectrum portfolios and the competitive advantage they have gained through re-farming 900 MHz spectrum to accelerate the roll-out of high speed data services, Everything Everywhere believes that 2x10 MHz of 800 MHz spectrum is the minimum sub-1 GHz holding which operators who do not already possess licences for any of these lower frequencies will require for performance and capacity reasons to create effective and sustainable competition in the UK market.

Everything Everywhere does not therefore agree that the measures proposed by Ofcom are appropriate or sufficient to ensure a competitive market structure after the auction. It is clearly important that the measures which are taken through the auction process to promote competition are proportionate. However, they also need to be sufficient. As discussed in detail in the main body of this response (especially in Section 3) Everything Everywhere does not consider that the proposed minimum spectrum holding in the sub-1 GHz band will be sufficient for it to provide a strong competitive force in relation to the existing holders of 900 MHz spectrum. In each of the competitive dimensions of coverage, capacity and performance (see discussion in Section 3.3, Ofcom's proposed minimum of 2x5 MHz will be insufficient to ensure strong enough competition justifying a different intervention.

Further, what is clear from the technical discussions referenced above is that Ofcom cannot identify in generic and solely technical terms what the minimum required amount of spectrum should be. The degree of competition is a function of a range of factors which is not reducible simply to a number of firms. In order to ensure a competitive market, Ofcom needs to design measures which will not simply create the

¹²³ See paragraph 5.28 of the main consultation and paragraphs 5.62 and 5.96 of Annex 6.

¹²⁴ When mentioning the risks associated with its approach in this context, Ofcom simply relies on the possibility of future spectrum sharing arrangements to mitigate this potential failure (see paragraph 5.80 of the Consultation). However, this approach ignores the significant uncertainties associated with this potential mitigation, especially when operators need to take a view on future competitiveness in advance of the auction taking place.

theoretical possibility of lame duck networks unable to compete on equal terms with the existing sub-1 GHz duopoly. Rather Ofcom needs to consider actual market conditions and how these might be affected by the auction. It needs to ensure that potential competitors to Vodafone and O2 in sub-1 GHz have a realistic possibility of acquiring sufficient spectrum to be strong competitors to them.

Ofcom's lengthy and detailed competition analysis does not in fact provide any evidence that the proposed intervention will ensure that the four national wholesalers which will exist after the auction will all be viable and competitive, or that competitive conditions will be robust (especially given that the existing operators with sub-1 GHz spectrum have a significant first mover advantage). Everything Everywhere considers that the level of Ofcom's current proposed spectrum floors are therefore not sufficient, and thus inappropriate, to ensure effective and sustainable competition after the auction.

The other aspect of Ofcom's proposed measures to ensure competition is the "safeguard caps". These are not designed to ensure that there are "at least four holders" of the minimum spectrum portfolios. Rather Ofcom describes these as being to avoid overly concentrated or very asymmetric distributions of spectrum. Everything Everywhere has concerns over the levels of these caps as discussed in detail in Sections 3.1 and 4. Solely in relation to the competition issues, Everything Everywhere here notes that the caps effectively acknowledge that relative positions do matter. Ofcom is concerned to avoid asymmetric outcomes. This means that the degree of competitiveness of individual companies is acknowledged to be of some importance. What Ofcom does not make clear is on the basis of what analysis it considers that a certain degree of relative differences between competitors matters to competition, but another degree does not.

Overall, therefore, Everything Everywhere does not consider that Ofcom has sufficiently made the case that its preferred option for ensuring four national wholesalers will best deliver, or even ensure, a strong competitive market.

Question 5.6: Given the measures we propose to take to ensure four holders of spectrum portfolios sufficient credibly to provide higher speed data services, do you agree that it would not be appropriate or proportionate to introduce a regulated access condition into the mobile spectrum licences to be awarded in the combined award?

Everything Everywhere agrees with Ofcom that no ex ante access conditions (either "live" or "dormant") are required on any of the auctioned licences. Ofcom suggests that the case for a "dormant" access condition, which is triggered if specific conditions are met, is stronger but Everything Everywhere would disagree that there is a case of any strength for either approach. There are a number of reasons for this view.

First, the whole structure of the award process is designed to ensure a structurally competitive wholesale market, which negates the need for any additional measures such as access conditions to ensure a competitive wholesale market. All holders of the new licences should have an equal opportunity to have the minimum spectrum portfolio required meaning that all national wholesalers (including any new entrants through this auction) should be on an equal competitive footing in rolling out new networks to exploit these spectrum bands. Even the existence of access conditions would create a substantial distortion to commercial negotiations on providing access to other network operators (such as sub-national networks). Any such negotiations would be focused on the potential outcome of any regulatory rules which would hinder market based competitive outcomes. This would be the case regardless of whether the conditions were live or dormant, even if the exact nature of the distortion might be different. It can be argued

that dormant conditions, which involve greater uncertainty for all market participants, could in some senses have a greater distortion effect than live conditions.

Any cost plus or retail minus rule would limit the options commercial players effectively had to negotiate different approaches or structures to wholesale deals limiting the benefits of creating a competitive wholesale market in the first place. At this stage in the development of the market it is not clear how data access deals are best structured and priced. There are no examples in the market of pure data roaming deals (and a fortiori no LTE based roaming deals). Designing regulatory rules for such pricing at this stage therefore would lead to substantial risk of creating adverse distortions in such markets.

[REDACTED]

Second, as Ofcom recognises, the aim of any such access condition would be to deal with “a residual risk that markets might develop in such a way that our proposed measures would not promote competition in the manner intended.”¹²⁵ Access conditions would therefore not be a proportionate response, to deal with such a “residual” risk. As identified above, if the market is competitive they will definitely have a serious detrimental effect. As Ofcom notes in paragraph 5.95 it has alternative powers which could be used to deal with any insufficiency in the level of wholesale competition (including competition and dispute resolution powers). Reliance on these ex post powers is more proportionate and appropriate than the imposition of ex ante powers as well to deal with what is a remote risk. Everything Everywhere also notes that the existence of dormant ex ante conditions could create further complications and uncertainties which would distort the market where it is not clear whether Ofcom would “activate” such a condition or rely on pre-existing ex post powers.

We further agree with Ofcom that access conditions which are solely aimed at new entrants are not required. Given that Ofcom is ensuring a competitive wholesale market and that the retail market is already competitive, the cost-benefit analysis for such entry assistance does not stack up. Everything Everywhere strongly agrees with Ofcom that on-going entry assistance would likely distort competition and lead to inefficient outcomes.¹²⁶ An access condition which could only be used by new entrants would constitute such entry assistance.

Finally, past experience suggests that the risk of wholesale competition being insufficient is sufficiently remote to make such access conditions otiose. As long as Ofcom ensures that the wholesale market is competitive (through, for example, appropriately setting the MSPs), there should not be a need for additional measures to then require access on regulated terms. Existing levels of network competition have proved sufficient to deliver a vibrant and competitive wholesale market. Access conditions have not been required (and where they have existed have never been invoked) in order to ensure successful commercial negotiation of wholesale deals. For example:

¹²⁵ Paragraph 5.92.

¹²⁶ See paragraph 6.35.

- The UK has had a vibrant MVNO market since 1999, when Virgin Mobile entered and there are currently a wide range of MVNO operators and aggregators;
- H3G has successfully commercially negotiated national roaming deals with first O2 and subsequently Orange;
- C&W has successfully negotiated national roaming agreements with both O2 and Orange; and

Ofcom conducted a market review in relation to the mobile access and origination market in 2003 and found that the market is sufficiently competitive.¹²⁷ In its Mobile Sector Assessment Ofcom found that it had no grounds to revisit this decision and explicitly stated it saw no need for a market review on this area.¹²⁸ There is therefore no evidence to suggest that this previous finding needs to be reversed. The availability of more capacity and the structure of the award process designed to ensure competition should, if anything, increase the competitiveness of the wholesale market.

Question 5.7: Do you consider that we should take measures to design the auction to assist low-power shared use of 2.6 GHz? If so, what specific measures do you consider we should take?

Everything Everywhere considers that it may be appropriate for Ofcom to permit the aggregation of the bids of potential low-power users in order to overcome potential threshold problems so that such bids may compete in aggregate against bids for exclusive high-power use. Everything Everywhere strongly believes that any measure beyond that would be disproportionate and unjustified. See Section 5.3 and response to Question 8.6.

Mobile Coverage and Related Issues

Question 6.1: Do you have any comments on the proposal to include in one of the 800 MHz licences an obligation to serve by the end of 2017 an area in which 95% of the UK population lives, while providing a sustained downlink speed of 2Mbps with a 90% probability of indoor reception? Do you think there is another way of specifying a coverage obligation that would be preferable?

Everything Everywhere recognises the value to society of improving services to customers, and that due to commercial challenges in providing these cost effectively in some areas, a service obligation linked to operating licences can be an effective way to encourage investment. Everything Everywhere therefore regards Ofcom's proposal to include this obligation as appropriate although it does not consider that it is necessary.

Everything Everywhere welcomes Ofcom's recognition that the incremental costs of requiring significant additional site build is likely to exceed the incremental benefits of

¹²⁷ Mobile access and call origination services market: Identification and analysis of market and Determination on market power, Oftel Statement, October 2003.

¹²⁸ See section 3 of Mobile Evolution: Ofcom's mobile sector assessment. Statement. 17 December 2009 (especially paragraph 3.37).

setting a coverage obligation at a higher level than that which can be achieved on a site portfolio equivalent to today's MNOs. Everything Everywhere fully agrees with this view.

Everything Everywhere regards the parameters of the coverage obligation as very aggressive, and in fact does not believe that this performance is achievable using the designated block alone. We do not believe that a coverage obligation based on 2 Mbps is achievable within a 2x5 MHz channel due to insufficient downlink power or excessive intercell interference. With a 2x10 MHz LTE800 carrier, the intercell interference level is acceptable, and uplink power is limited in only a small proportion of cells, so it is expected that the coverage obligation based on 2 Mbps would be more likely to be achievable in practice. These issues are discussed in more detail in Annex F.

We flag that it may be difficult to measure the proposed coverage obligation and note that Ofcom is still discussing how the more straightforward 2.1 GHz obligation should be measured. We assume that this will be covered in more detail in the second technical consultation. In that regard, we particularly refer Ofcom to our comments on the SINR value compatible with the coverage obligation set out in Annex F. It is very important to have clarity in the method of assessment of compliance, to ensure that this assessment is appropriate in terms of (1) suitable accuracy – to avoid unwarranted cost of compliance, and (2) practicability – to avoid unnecessary complexity in demonstrating compliance. Aspects of the definition which are somewhat loose and require greater clarification are:

- Assumptions around device performance: the performance of a state-of-the-art device should be assumed (requires better definition)
- Technology & band
- Precise meaning of the network load

The obligation conditions should be comprehensively listed in one place, covering all parameters which will influence the cost of implementation.

Question 6.2: We would welcome views and evidence on the costs and benefits of imposing an additional coverage obligation focussed on particular geographical areas, and if such an obligation were to be imposed what might be the appropriate specification of geographic areas?

We do not consider any other coverage obligation would be appropriate, particularly given the different approaches of Ofcom and BDUK/the devolved administrations and the advantages to citizens and consumers of a solution along the lines of our LTE trial with BT. Ofcom's coverage obligation is a pure mobile obligation and Everything Everywhere considers it more appropriate and consistent with the Government's digital agenda to have a hybrid coverage obligation which is not technology limited but provides the most efficient solution and delivers the greatest benefit to citizens and consumers.

Question 6.3: Do you have any comments or evidence on whether an additional obligation should be imposed to require coverage on specific roads?

It is not clear whether Ofcom is seeking voice or data coverage on these roads. Everything Everywhere believes that using the 800 MHz licence award, and implicitly a solution based on the 800 MHz band (due to improved economics) will not effectively address the voice coverage issue. This is because first the availability of a suitable voice solution on LTE is several years away, and secondly, in order to realise the coverage improvement for the majority of customers, LTE800 device penetration will need to be

high. This is a significant further challenge, extending the timescales for effectiveness by many years.

For mobile broadband, effective coverage could be delivered more readily than voice for customers who obtain suitable data devices. Everything Everywhere believes that delivering effective coverage for all services to specific areas would be better achieved with 2G and/or 3G technology, and via alternative means which would not complicate this award process which already has many facets. There are also significant complications in specifying precise coverage target areas, which could delay the auction process. Any further delay is not in the interest of consumers and citizens.

Question 6.4: Do you have any comments on our proposal not to use the combined award to address existing not-spots?

Not-spots exist today typically in areas where the coverage gap is too small or too expensive to cover viably, or there are planning restrictions. Even where it may be possible for MNOs to find a suitable location and obtain planning permission, it is often the case that the cost of access, electricity or backhaul transmission can be prohibitive.

Everything Everywhere believes that it would be very challenging for Ofcom to gather suitably well defined information on the industry not-spots and very challenging for a potential bidder to be able to understand, in sufficient detail in a timely manner, the cost and timescale of addressing these not-spots as well as the potential revenue opportunities that could mitigate the costs.

The comments raised above regarding the delays that would be experienced by consumers in being able to take advantage of voice coverage based on LTE800 in current gaps in road coverage applies equally to these not-spots. Again, Everything Everywhere believes that delivering effective coverage for all services to specific areas would be better achieved with 2G and/or 3G technology, and via alternative means which would not complicate this award process.

Question 6.5: Do you have any comments on our proposal not to impose 'use it or sell it' obligations but to consider including an additional power to revoke during the initial term of the licences?

We agree that Ofcom should not impose 'use it or lose it' or 'use it or sell' conditions on the licences for the reasons outlined in the Consultation. As Ofcom points out, there are many reasons why spectrum may not be used at a given time.

We fully support the Government's objective to make fast broadband widely available using a range of technologies as for example demonstrated by our participation in the current Cornwall trial (see Section 3.6 and Annex C).

However, as the spectrum licences to be auctioned are technology and service neutral, the licence may be used to support business models that are not compatible with providing rural broadband services (or other public policy objective). Hence we do not believe it is reasonable or indeed necessary to include an additional power for Ofcom to revoke the licence if the licensee is not using the frequencies to provide the desired services in those areas even if compensated. Ofcom (or the Government) would be able to reach a voluntary deal with licensees if the level of funding or compensation offered was appropriate.

Non-technical Licence Conditions for 800 MHz and 2.6 GHz

Question 7.1: Do you have any comments on the proposals relating to the duration of the initial licence period, our rights to revoke the licence during this period, the charging of licence fees after the end of the initial period and our additional revocation powers following the initial period?

Everything Everywhere supports Ofcom's proposals of an initial 20 year period and indefinite licences thereafter.

As the 800 MHz spectrum will not be clear for full use until October 2013, we believe that the 20 years initial licence term should only count from 1 November 2014. The 800 MHz licences should therefore start 1 January 2013 (or when available) with the initial 20 year period ending 31 October 2033 rather than 31 December 2032.

In principle we believe the charging of additional licence fees following the initial period should be appropriate and proportionate. In practice, the suitability of this approach will of course depend critically on Ofcom setting such licence fees at the right level, appropriately reflecting market value. The proposals included in the Consultation to link licence fees for 1800 MHz to the average auction price for 800 MHz and 2.6 GHz prices demonstrate how Ofcom can get this price setting wrong (see Section 6 and the answers to Questions 10.1 and 10.2).

Question 7.2: Do you have any comments on the proposal to amend the spectrum Trading Regulations to apply to the auctioned licences in the 800 MHz and 2.6 GHz bands, to include a competition check before we consent to a spectrum trade of mobile spectrum and not to allow transfers that would increase the number of 2.6 GHz low-power licensees?

Please refer to Everything Everywhere's response to the spectrum trading consultation,¹²⁹ which made the following points.

Our only material objection was, and still is, in relation to the competition test which Ofcom intends to adopt. It notes that Ofcom intends to give to itself the power to decide whether competition is likely to be distorted in determining whether or not to consent to a trade, or to consent to a trade subject to certain conditions. Everything Everywhere does not consider that it is necessary for Ofcom to give itself such powers, in addition to the powers Ofcom already has under the Communications Act 2003 and the additional powers it will be given under the changes to the common regulatory framework.

There seems no good reason why mobile spectrum should be dealt with in any way differently to other spectrum as far as the application of competition law is concerned particularly as other spectrum can be used for mobile telephony. For these reasons we query why Ofcom is limiting the application of its possibly enhanced powers in relation to spectrum to mobile spectrum and not generally changing the Trading Regulations.

Although we do not believe that any amendments to the Trading Regulations are needed to afford Ofcom the powers to conduct a competition test, we believe that should such wording be added, it is important that it tracks UK competition law and not simply the

¹²⁹ http://stakeholders.ofcom.org.uk/binaries/consultations/trading-900-1800-2100/responses/Everything_Everywhere.pdf

Authorisation Directive. This would prevent any ambiguity as to which set of rules a competition test would follow. Any remaining such ambiguity could inhibit trading.

Please also refer to our comments on Ofcom's competition assessment, Questions 5.1 to 5.7

Question 7.3: We welcome views on the merits of the proposed approach to information provision; in particular concerning the type of information that may be helpful and any impacts that publication of information might have both on licence holders and the wider spectrum market.

Everything Everywhere strongly believes that it is not necessary for Ofcom to have any further information as to deployment of national wholesalers' networks. Ofcom has not provided any evidence to support the need for this proposal. Ofcom has recently obtained powers under the Digital Economy Act 2010¹³⁰ to report on the coverage and capacity of networks and services in the UK. This should provide all of the information Ofcom needs. To the extent more is required, for example if a local community is not obtaining services and is not aware of whether any operator provides services in that area (a situation which is unlikely to arise) then Ofcom can always seek that information in a proportionate manner. Otherwise Ofcom is collecting information which it may never need and in relation to which it will have disclosure obligations. As Everything Everywhere has pointed out any information regarding sites is currently covered under the Environmental Information Regulations 2004 and thus subject to a duty by Ofcom progressively to disclose this information.¹³¹ We, along with other licensees, have recently spent a considerable period of time having to seek exemption under regulation 12 from disclosure on security grounds of the most sensitive parts of our networks as they relate to key critical national infrastructure. We would strongly resist further disclosure which has in the past led to criminal conduct and vandalism of sites.¹³² Sufficient information already exists, in Ofcom's existing publications and in published planning proposals, without further information being sought and needlessly kept just in case it should be needed.

Spectrum Packaging Proposals for the 800 MHz and 2.6 GHz award

Question 8.1: Do you agree with the way in which we are taking account of the main factors relevant to spectrum packaging and why?

Everything Everywhere agrees that the main factors as identified by Ofcom are the relevant factors to consider for spectrum packaging.

We agree that there is unlikely to be much market interest for carriers less than 2x5 MHz for FDD spectrum. Hence lot size less than 2x5 MHz would add unnecessary complexity to the auction without any corresponding benefits. Our particular views in relation to the

¹³⁰ Now s134A of the Communications Act 2003.

¹³¹ Subject in the part to the result of the reference to the European Court of Justice in *Office of Communications v The Information Commissioner*

¹³² Including the recent theft from the O2 network which led to a high profile gap in the provision of services - <http://blog.o2.co.uk/home/2011/05/network-issues-update.html?cid=6a010535c50a83970b014e887d0962970d>

800 MHz and 2.6 GHz bands are reflected in the answers to Question 8.3 and 8.7 respectively.

It is of utmost importance that assignments are contiguous in order to allow licensees to benefit fully from LTE deployments.

We agree with the proposal to offer UK-wide lots as we do not believe that there is sufficient demand for regional lots to justify the significant increase in complexity of the auction which this would imply.

Question 8.2: Are there other factors that we should consider to develop our approach to packaging? If so which ones and why?

Subject to comments made in other parts of this response (especially Sections 4 and 5 above and the answers below), Everything Everywhere does not believe there are any other factors which need to be taken into account in determining the packaging of these spectrum bands. As set out in those sections, however, we do believe that the packaging needs to take account of the ability of different operators to bid flexibly for efficient allocations of spectrum.

Question 8.3: Do you agree with our packaging proposals for the 800 MHz band? Please give reasons for your answer.

The proposals for spectrum packaging in the 800 MHz band need to be considered in the context of the technical licence conditions and possible protection measures towards DTT, which Ofcom is still to consult on. As such, we reserve the right to comment further on spectrum packaging for 800 MHz.

Question 8.4: Do you agree with our proposal not to allow relinquishment of 900 MHz spectrum and why? Do you have any other comments regarding our packaging proposals for the 900 MHz band?

Everything Everywhere would welcome the opportunity to be able to bid for 900 MHz spectrum, and as such disagree with Ofcom's proposal not to allow relinquishment of 900 MHz spectrum.

[REDACTED]

[REDACTED]

Question 8.5: Do you agree with our proposal not to allow relinquishment of 1800 MHz spectrum and why? Do you have any other comments regarding our packaging proposals for the 1800 MHz band?

We understand Ofcom's proposal to mean that the amount of 1800 MHz spectrum that Everything Everywhere is forced to divest can be added to the auction regardless of the question of whether it should be allowed to add further 1800 MHz over and above that.

We disagree with Ofcom's proposal not to allow relinquishment of 1800 MHz spectrum (over and above Everything Everywhere's divestiture to comply with the European Commission competition remedy). Not allowing such divestiture does not promote efficient use of spectrum.

Question 8.6: Do you agree with our proposal not to make provisions to include 2.1 GHz spectrum in this auction and why?

This is unlikely to have any practical impact either way as licensees need their 2.1 GHz spectrum for capacity. Moreover the conditions for a sale (relinquishment without the ability to set a minimum price) are likely to be so unattractive that this is not a real option even if it was allowed.

Question 8.7: Which aspects of our packaging proposals for the 2.6 GHz band do you agree with and why?

Everything Everywhere agrees that Ofcom should award the 2.6 GHz according to the fixed band plan as agreed by CEPT. However, as also explained in Section 5 we disagree with Ofcom's packaging proposals for the 2.6 GHz band on the following points:

- the FDD spectrum should be packaged into lots of 2x5 MHz (see Section 5.2);
- the TDD spectrum should be split into 5 MHz lots (see Section 5.1); and
- no spectrum should be reserved for concurrent low-power use (see Section 5.3).

Our views on each of these issues is set out in detail in Section 5 and briefly summarised below.

FDD lots of 2x5 MHz:

The proposed block size of 2x10 MHz reduce bidders' flexibility potentially leading to spectrum inefficiency and is out of line with packaging and outcomes in other European jurisdictions, see Section 5.2.

TDD lots of 5 MHz:

We believe Ofcom has attached too little importance to the 2.6 GHz TDD spectrum in its proposals generally. As explained in Section 5.1 the TD-LTE ecosystem is now far more developed than when Ofcom previously planned a 2.6 GHz auction.

As explained in Section 5.1, Ofcom's current proposals are out of line with (especially more recent) packaging and outcomes in other European jurisdictions. Everything Everywhere therefore supports 5 MHz lots and believes that the auction could be used to reveal the most efficient approach to any guard bands this would require.

Everything Everywhere also believes that TDD spectrum should be included in the MSPs.

No reservation of spectrum for concurrent low-power use:

The experience from the award and subsequent use of the DECT guard band licences puts great doubt as to whether the sub-national RAN operator business model that Ofcom wants to champion is viable or adds to innovation - even if spectrum were reserved for such operators and awarded at the reserve price. Ofcom's approach is to ensure a competitive wholesale market and it is inconsistent to create additional measures which protect against national wholesalers bidding for "less competitive" outcomes. Experience from other jurisdictions underlies the high value associated with high-powered use of the band and reserving spectrum for low-powered use has a very high opportunity costs.

These points are all explained in more detail in Section 5.3.

Question 8.8: Do you agree with our proposed approach for eligibility points and why?

The proposed eligibility points highlight the relative high value of sub-1 GHz spectrum compared to higher frequency spectrum. We urge Ofcom to respect this value difference also in its proposals on:

- a) the overall spectrum cap (see Section 4); and*
- b) the methodology for deriving annual licence fees (see Section 6 of this response).*

As it stands, Ofcom's proposals on eligibility points, overall spectrum cap, Minimum Spectrum Portfolios and annual licence fees are highly inconsistent. We have summarised these inconsistencies in Table 12 below (except for the Minimum Spectrum Portfolios which imply at least six different sets of relative values, ranging from all bands being of the same relative value to 800 MHz being twice as valuable as 1800 MHz or three times as valuable as 2.6 GHz).

The proposed eligibility points value the 800 MHz spectrum six times more than 1800 MHz and 2.6 GHz spectrum. The option of higher reserve prices for 'reserved spectrum' value lower frequency spectrum at 10 times more than higher frequency spectrum. However, the proposal for an overall spectrum cap counts every MHz the same. Everything Everywhere has more 1800 MHz spectrum than Vodafone/O2 have 900 MHz in order to make up for the intrinsic higher value of 900 MHz spectrum in terms of rural and in-building coverage. This is not just a result of the merger – it was the case for Orange and T-Mobile individually compared with Vodafone or O2 prior to the merger. This means that an overall spectrum cap that counts every MHz the same will constrain Everything Everywhere disproportionately compared to either Vodafone or O2. We note that in order to avoid such discriminatory treatment, any overall safeguard cap needs to be at least 2x120 MHz, or alternatively that Ofcom must amend the proposed eligibility points in order to afford Everything Everywhere the same bidding flexibility in the auction as other bidders (see Section 4.2 and Annex D).

The proposal that 1800 MHz and 2.6 GHz should have the same number of eligibility points on a per MHz basis acknowledge that these bands are roughly of similar value. We fully appreciate that eligibility points do not need to reflect exact value differences but are an approximate measure of relative values. Nevertheless, the eligibility points are in stark contrast to Ofcom's proposal that annual licence fees for 1800 MHz should be calculated as the average of 800 MHz and 2.6 GHz. We believe that approach would clearly overvalue 1800 MHz and that Ofcom's proposal on eligibility points supports that view. On a forward looking basis, 1800 MHz is of similar value to 2.6 GHz for LTE capacity deployments not 800 MHz.

Table 12: Ofcom's inconsistent views of the relative value of available bands

	800 MHz	2.6 GHz	1800 MHz
Overall spectrum cap	1	1	1
Eligibility points and reserve prices	6	1	1
Possible reserve prices for 'reserved spectrum'	10	1	1
Proposal for annual licence fees	Most, say 6	Least, say 1	Average, i.e. 3.5

Question 8.9: Which approach to reserve prices do you think would be most appropriate to secure optimal spectrum use in the interests of citizens and consumers, and why?

Of the three proposals for setting reserve prices, we support proposal (a) which sets reserve prices at a level sufficient to cover the forecast cost of the on-going spectrum clearance programmes. Whilst this a significant departure from the approach previously adopted by Ofcom, we agree that the risks of an inefficient auction outcome are modest. To reduce the risks further, reserve prices may need to vary by block categories for the 800 MHz band, with lower reserves prices for the category suffering the greatest interference (A1) and the category with coverage and service requirements (A3) than the other 800 MHz categories.

Under Ofcom's proposal (b) to set reserves at/near market value, there would be a risk of an inefficient spectrum allocation and spectrum assets remaining unsold. We note that auction benchmark data for 800 MHz in particular is both scarce and especially noisy. Any use of external benchmarks would need to include significant provisions for error when 'translating' such benchmarks into UK context. The UK market is one of the most competitive in Europe with very low return on capital employed. As a consequence any use of benchmark values from other auctions (e.g. Sweden) must apply a significant margin of error to account for the fact that such benchmarks may not be directly relevant to the very competitive UK market.

We do not share Ofcom's general concerns that low reserve prices may invite frivolous bidding: given the likely demand for spectrum among 'serious' market participants, frivolous bids are unlikely to displace the former. Other provisions may also be introduced to deter speculative bidders from seeking to secure a Minimum Spectrum Portfolio with the sole intent of trading spectrum post-auction, such as restrictions on spectrum trades for a given period after the award.

We are especially concerned with Ofcom's (hybrid) proposal (c), in which higher reserve prices (close to full market value) apply for 'reserved spectrum', whilst lower reserve prices are set for 'unreserved spectrum'. The proposals presented in the Consultation do not include complete details as to how this would work in the proposed auction and as such we reserve the right to comment further when we have a complete set of proposals.

We have raised further questions to Ofcom about how differential reserve prices would work in practice. We have been informed that the higher reserve price for 'reserved spectrum' would not be the minimum price if 'non-reserved' spectrum sold for less. This important rule is not included in the Consultation but must clearly be included in the Statutory Instrument in due course if Ofcom were to adopt proposal (c). The absence of such a rule would clearly introduce a dilemma for prospective bidders who are eligible to compete for a Minimum Spectrum Portfolio. Whilst choosing to do so might increase the

chance of winning, it would also involve the risk of overpaying for spectrum won in the event that auction prices end up lower than the MSP reserve.

We have also been informed that if Ofcom were to adopt differential reserve prices, bidding in the primary rounds would progress according to one set of clock prices, starting at the lower reserve prices. This information is not included in the Consultation either but would seem an important element for respondents in order to understand how the auction would work in practice.

On the basis of this uncertainty, we would suggest that Ofcom introduces a single set of reserve prices for categories of lots – regardless of whether bids are placed on MSPs or in the ‘open’ auction. The introduction of differentiated reserve prices would seem to complicate the auction design and bid strategy significantly in complete contradiction to the fundamental reason for choosing the CCA.

Separately, we cannot see any logic reason why reserve prices for spectrum competition should be lower than that for ‘reserved spectrum’. If Ofcom believes that a reserve price proposed for spectrum won as part of an MSP reflects the minimum reasonable market value of said spectrum, there is no reason why reserve prices for similar spectrum subject to ‘open competition’ should sell for any less.

On the question of the appropriate level of reserve prices, Everything Everywhere believes that Ofcom must attempt to strike a balance between:

- setting reserve prices sufficiently high to deter frivolous or speculative bidders from entering the auction; whilst
- avoiding setting reserve prices so high as to eliminate return on investment for winners who compete in a UK mobile industry characterised by very low or negative return on capital employed.

Auction design rules proposals for the combined award

Question 9.1: Do you agree with our proposals for the auction design and why?

Ofcom has proposed a Combinatorial Clock Auction, which is a complex auction format. Within this complex auction format, Ofcom has added a novel, untested approach, namely the use of ‘spectrum floors’ that effectively reserve an undefined amount of spectrum for certain types of bidders. Although the Consultation fully outlines the concept, some important details are missing (see below our response to Question 9.2). We believe these details are material to understanding the impact of Ofcom’s proposals on Everything Everywhere and we reserve the right to comment further when the full proposals are published.

However, we are at this stage very clear that we disagree with certain aspects of Ofcom’s proposed auction design, namely:

- the design of the Minimum Spectrum Portfolios (MSPs) and the sub-1 GHz spectrum cap – see Section 3;
- the overall spectrum cap – see Section 4; and
- the spectrum packaging proposed for the 2.6 GHz band and the suggestion of reserving any 2.6 GHz spectrum for concurrent, low-power use – see Section 5.

We have summarised our views on the spectrum packaging for 2.6 GHz in our answer to Question 8.7. Our views on spectrum floors and caps are set out in detail as indicated in the main body of this response and summarised below.

MSPs and the sub-1 GHz cap

Ofcom concluded on the basis of its competition assessment that four credible national wholesalers are needed for a competitive market and hence it would be proportionate to introduce measures into the auction design to ensure that the post-auction spectrum holdings would support four credible national wholesalers.

We believe Ofcom's proposed MSPs are a theoretical construct and do not reflect the competitive reality and hence that Ofcom has failed to develop an appropriate response to meet its stated objective. As set out in Section 3.1, there is still a distinct danger of highly asymmetric outcomes to arise which would have adverse effects on competition.

Further, Everything Everywhere strongly believes that 2x5 MHz is not sufficient sub-1 GHz spectrum in order to compete credibly in what will be the actual market reality post-auction. This is an issue not just of coverage (rural as well as deep in-doors in more densely populated areas) but also of capacity, speed and performance as set out in Sections 3.2 and 3.3. The impact of not being able to address a certain percentage of locations will impact all customers at some point and a limited amount of sub-1 GHz spectrum would degrade customer experience. Such an outcome would also not be future proof and would provide the existing sub-1 GHz operators with a significant advantage once LTE-Advanced and Carrier Aggregation is available (see Section 3.3.3).

We are very concerned that Vodafone and O2 could have a strategic incentive to bid for sub-1 GHz spectrum up to their maximum cap regardless of their values for such spectrum in order to prevent Everything Everywhere and H3G acquiring any significant amount of sub-1 GHz spectrum (i.e. more than 2x5 MHz).

Ofcom's alternative Option 2 would be a disproportionate response to the stated objective because it effectively reserves high frequency spectrum for certain operators who do not need such protection.

Therefore, Everything Everywhere strongly encourages Ofcom to implement an amended version of its Option 1 as set out in Section 3.7, as summarised in Table 13f.

Table 13: Proposed amended Minimum Spectrum Portfolios

	<i>Sub-1 GHz</i>	<i>1800 MHz</i>	<i>2.6 GHz</i>	<i>Total</i>
c)	2x10 MHz	2x10 MHz		2x20 MHz
d')	2x10 MHz		2x10 MHz	2x20 MHz
e)	2x15 MHz			2x15 MHz

* Possibly to include TDD.

Of course a tighter sub-1 GHz spectrum cap of 2x22.5 MHz may be similar in terms of outcome for Everything Everywhere to increasing the minimum amount of 800 MHz spectrum in the MSPs to 2x10 MHz (whilst not to Vodafone and O2). As such we are agnostic as to which of these instruments Ofcom chooses to address its competition

concerns but we believe it must act or there is a danger of embedding distortions for a long time to come.

The overall spectrum cap of 2x105 MHz

Everything Everywhere believes that the overall spectrum cap of 2x105 MHz unfairly disadvantages Everything Everywhere relative to other MNOS. High frequency spectrum is not as scarce as sub-1 GHz spectrum which means there is significantly less need for such a cap (see Section 4.1).

The proposed cap of 2x105 MHz will limit Everything Everywhere's ability to bid in the auction. We would not be able to switch bids between 800 MHz and 2.6 GHz in response to extreme price differentials that may develop during the auction and retain eligibility to switch back. We would therefore propose that, if Ofcom must set a safeguard cap, it adopts its alternative proposal of an overall cap of 2x120 MHz rather than 2x105 MHz or alternatively amend the eligibility points (see Section 4.2).

Ofcom should ensure that any safeguard cap should not limit Everything Everywhere's ability to roll out LTE in a competitive timescale, which will likely require contiguous 2.6 GHz spectrum (as discussed in Section 4.3). The safeguard cap should also not be set at a level which would inhibit Everything Everywhere's ability to serve its current customer base (as discussed in Section 4.4). Such a cap would represent double jeopardy, further penalising Everything Everywhere in circumstances where an appropriate competition remedy has already been imposed by the European Commission (as discussed in detail in Section 4.5).

Question 9.2: Do you have any comments on the proposed auction rules as explained in Section 9, Annex 9 and Annex 10?

The auction rules are not complete. In particular, the following points have not been described fully:

- The information policy proposed for the auction – i.e. what information gets released when, including about bidders who have elected to compete for MSPs.
- How the differential reserve prices would work in the auction in terms of submitting bids throughout the primary round and calculating relative caps for the supplementary round.
- How base prices will be calculated in the presence of the proposed competition constraints.

We would also suggest that Ofcom considers whether a set of measures are required in order to prevent speculative entry for MSPs, for example a restriction on the trading of these licences for the first few years following the auction.

Question 9.3: Do you have any comments on how we should approach the payment of deposits and licence fees?

Ofcom should specify clearly if licence fees are subject to VAT. Otherwise we have no comments.

Revising annual licence fees for 900 MHz and 1800 MHz

Question 10.1: Do you have any comments on our proposal to use 800 MHz price information as derived from the auction to estimate the full market value of 900 MHz spectrum?

Question 10.2: Do you have any comments on our proposal to use an average of 800 MHz and 2.6 GHz price information as derived from the auction to estimate the full market value of 1800 MHz spectrum?

Combined Answer to question 10.1 and 10.2:

Everything Everywhere agrees with Ofcom's view that full market value is the price that would arise in a well functioning spectrum market, and consider that actual auction prices would provide one clear indication of this value for the spectrum assets made available during the auction. The auction values are not the only such indications of value (as recognised in the Direction: see Section 6). Further, Everything Everywhere is deeply concerned with Ofcom's apparent view that market values are constrained to deviate from auction prices in one direction only, namely upwards. Prices in a well functioning auction would necessarily reflect the prevailing commercial circumstances, as well as any regulatory provisions intended to foster an efficient and competitive mobile communications market. Full market value cannot, in our view, be dissociated from such factors. Should 900 MHz and/or 1800 MHz be available in the auction, we would therefore accept ALFs for the respective bands where these can be suitably aligned to the base prices achieved for licences auctioned in those bands.

Should 900 MHz and 1800 MHz assets be unavailable for purchase during the auction however, we consider that the approach proposed by Ofcom for estimating the full market values of these respective bands is incorrect.

For the reasons set out in Section 6.2, Ofcom's approach understates the value of the 900 MHz band, by failing to take account of a range of issues such as:

- the benefits the existing holders have had from early availability of 900 MHz spectrum, without any early adjustment to the AIP;*
- the lack of an LTE voice solution initially;*
- differential device availability between the bands; and*
- potential DTT interference issues with the 800 MHz band.*

Conversely, the proposal to set the 1800 MHz ALF as an average of 800 MHz and 2.6 GHz prices significantly overstates the full market value of 1800 MHz spectrum. The detailed reasons for this are set out in Section 6.3. In summary, Ofcom's approach (being inconsistent with their comparison of bands elsewhere in their proposals) fails to recognise that the 1800 MHz band is far closer in characteristics to the 2.6 GHz band than the 800 MHz band.

One relatively recent international benchmark in relation to the relative value between 1800 MHz and 2.6 GHz bands can be seen in the German spectrum auction held in May 2010. This generated a price of £0.023 per MHz/pop for 1800 MHz, which was almost identical to the price for 2.6 GHz. The 800 MHz spectrum commanded a price of £0.647 per MHz per pop. The mean of 800 MHz and 2.6 GHz prices realised in Germany is almost

15x the price realised for 1800 MHz. Accordingly, using the mean of 800 MHz and 2.6 GHz prices in the UK to estimate the market value of 1800 MHz risks overstating the latter by ~1500%, which would clearly be unjustifiable and disproportionate. Whilst we agree that international comparisons need to be made with care, this provides one clear market driven piece of evidence that the market value of 1800 MHz spectrum is not a simple average of 800 MHz and 2.6 GHz prices.

In conclusion, Ofcom's proposed approach would lead to significant iniquity and market distortion, by setting ALFs in 900 MHz at a discount to full market value, while setting ALFs in 1800 MHz at a very high premium to market value. The resulting financial prejudice that would arise from disparate 900 MHz and 1800 MHz holdings across the industry would distort access to capital, and the artificial cost advantage gained by certain operators relative to others would be liable to further distort competition.

Should 1800 MHz spectrum lots be unavailable during the auction, the 2.6 GHz prices would be the most appropriate proxy for 1800 MHz market value. In the alternative, Ofcom should base the ALF for 1800 MHz spectrum on the 2.6 GHz auction prices with a clear and objective adjustment based on the difference in propagation characteristics (see Section 6.4).

In using 800 MHz spectrum licence prices as a proxy for 900 MHz market value, a corresponding adjustment should be applied to reflect the lower value of 800 MHz relative to 900 MHz resulting from:

- The costs associated with DTT interference mitigation
- The lower relative utility of 800 MHz due to poor device availability and penetration in the near to medium term
- The advantage to the 900 MHz operators in being able to use that spectrum to meet the extended 2.1 GHz coverage obligation
- Delay in availability of the 800 MHz spectrum and a voice product for LTE.

Question 10.3: Do you have any comments on the proposed approach to convert lump sum amounts into annual payment?

Ofcom's proposed methodology for converting lump sum amounts into annual licence fee payments appears a reasonable approach to ensuring that the "full market value" derived from relevant benchmarks is converted neutrally into annual amounts. *Everything Everywhere* notes that the logic of the proposal to spread the relevant lump sum over the duration of the initial term of the auctioned licences should be based on the fact that any ALFs due beyond that date would be on the same basis for both 900 MHz/1800 MHz spectrum and the auctioned licences.

In paragraphs A11.37 and A11.38 Ofcom argues that the appropriate discount rate to use in this calculation is the Weighted Average Cost of Capital WACC which Ofcom has determined for its March 2011 Mobile Call Termination statement (which was 6.2%). *Everything Everywhere's* view is that Ofcom needs to revisit this WACC and assess its appropriateness for use with respect to this calculation. For example, the need to finance successful bids in the auction could change the optimal gearing of a national wholesaler.

More fundamentally, however, Ofcom has not justified the use of a national wholesaler's WACC as the appropriate discount rate. The objective of this calculation is to take account of the time value of money and ensure that operators paying for spectrum up

front through the auction pay an equivalent amount to those operators making annual payments. Put another way, the discounted value of the government's revenue stream from annual licence fee payments should be the same as the revenue it receives from the auction. In this case, the appropriate discount rate to use is the standard one used to take account of the time value of money. The standard rate used by government for such calculations is 3.5% as set out in the Green Book.¹³³ Discounting the flow of licence fee revenues based on this "social time preference rate" is the more competitively neutral approach which ensures that the time value of money is taken into account. This avoids the need to make assumptions about the returns which operators may or may not make and distort the outcome of the auction through artificial introductions of different risk profiles associated with different ways of paying for spectrum.

Everything Everywhere does not believe that using RPI (as suggested in footnote 37 of Annex 11) to inflate such ALFs to keep them constant in real terms is appropriate. Use of a general index such as the Retail Price Index could create distortions, given that the comparison is with the amount paid in the auction for an input cost. Everything Everywhere believes that a specific telecoms inflation index would be more appropriate than any general inflation index as it would link spectrum prices to the prices of the services it supports. In a competitive market this would therefore be a suitable proxy for input cost inflation and therefore the appropriate comparator to the relevant inflation faced by those winning licences in the awards process.

The only justification Ofcom gives for using RPI is that this is the index used in setting price controls (through SMP conditions). RPI is reasonable in relation to price controls as this links price controls to general changes in the value of money in the economy. This is in the context of incentivising efficient price setting on the part of operators. The aim in the present context should be to ensure that the discounted real values of ALFs is the same as that being paid up front in the auction. This is why Everything Everywhere believes that it would be more competitively neutral for any inflation measure to be based on a telecoms specific index. See also Section 6.1.

¹³³ See Chapter 5 and Annex 6 of HM Treasury The Green Book available at http://www.hm-treasury.gov.uk/green_book_complete.pdf

