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Hutchison 3G UK Limited

Response to

Award of available spectrum: 2500-2690MHz, 2010-2025MHz and 2290-2300MHz

Ofcom's proposals for the grant of wireless telegraphy licences to use these spectrum bands and for the method of award

NON-CONFIDENTIAL VERSION

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Executive Summary

The award of licences for use of the 2500-2690MHz, 2010-2025MHz and 2290-2300MHz spectrum bands represents an important step in the development of 3G. Mobile broadband services are at a key stage in their development, being at the start of mass take up. 3G as a technology is uniquely positioned to provide such services, being used in a highly competitive environment, already widely deployed in the UK with increasing numbers of subscribers and with equipment harmonised on an international basis (providing economies of scale). Further the 3G technology is the focus of significant innovation, creating a roadmap for developments over the next decade which will deliver yet further advances in functionality.

The 3G Expansion Bands in particular are a key future resource for the on-going development of mobile broadband. In the UK context, the 1999 Information Memorandum issued for the 2000 auction of 3G licences, provided a clear indication that there would be additional spectrum available for the future development of 3G. The 2.6GHz band or 3G Expansion Bands have been subsequently identified at CEPT level as the relevant spectrum. Ofcom has not provided sufficient reasoning or analysis to justify moving from this position. Internationally harmonised spectrum is of key importance to the development of mass mobile broadband as it reduces costs of managing interference and reduces costs through the economies of scale in equipment manufacture. Ofcom's proposals do not contain a full analysis of the costs and benefits of the UK not adopting the relevant CEPT decision to ensure the on-going protection of such international harmonisation for future 3G services.

Ofcom's statutory duties with respect to spectrum require it to have regard to the availability of spectrum, the demand for spectrum and likely future demand for spectrum. Ofcom's assessment of these issues for the 3G Expansion Bands is not comprehensive and does not take account of the future needs of 3G. Given the legitimate expectations that the 3G Expansion Bands would be available and the current position of 3G development, the timing of the proposed award is premature. Further, there are a range of significant and material regulatory uncertainties involved in holding the award this year as proposed by Ofcom. [●] Holding the award on the current timescales will therefore create additional risk for bidders [●]. Ofcom's analysis of the costs and benefits of its proposed timing for the award is partial [●]. In particular, Ofcom's analysis simply assumes that more licensees will increase competition without taking account of the dynamics of the mobile broadband market and the differences between inter and intra technology competition. Delaying the proposed award would provide time for the resolution of a number of substantive regulatory issues which would improve the efficiency of the award and a delay would better match demand and supply conditions for spectrum. Ofcom should therefore reconsider delaying the proposed award.

There are also a number of respects in which Ofcom's proposals in the consultation are not a sufficient or robust basis on which to proceed to the next stages in the award process. Further consultation and re-consideration of certain key aspects of the award (summarised below and expanded upon in the main body of this response) are required. Otherwise, the proposed award is unlikely to achieve Ofcom's stated objectives (and statutory requirements) to conduct the award in a way which promotes efficient spectrum use and competition.

Competition Issues

The Consultation does not provide sufficient reasons as to why Ofcom is no longer requiring BT, as the most significant single player in the UK telecommunications market, to adhere to accounting separation requirements between any new mobile activities and its existing activities.

H3G also believes that the workings of any "safeguard cap" (to avoid problems of anti-competitive "hoarding") require further explanation before Ofcom can reasonably decide whether such a cap should be imposed. In particular, Ofcom needs to explain how such a cap could avoid being discriminatory and its relationship to other spectrum holdings of the relevant licensee both now and in the future.

Ofcom also needs to revisit its conclusions that technology neutrality promotes competition and that there is no need to consider whether the proposed technology neutral award will impact on existing licensees and potentially undermine existing and planned 3G investments. The reasons given for the proposals in the Consultation in this regard are not convincing and H3G believes they are incorrect.

Spectrum Packaging and licence conditions

Ofcom's proposals to introduce flexibility around the amount of paired and unpaired spectrum creates significant difficulties in relation to future interference management and carry the risk of being unworkable. H3G supports the UK adoption of the band plan set out in ECC Decision (05)05.

In relation to the proposed technical licence conditions, H3G's view remains that the spectrum usage rights option is currently not sufficiently specified, based on inappropriate assumptions and, as it currently stands, unworkable. Adoption of such an approach will lead to significant difficulties in practice and potential for inefficient use of spectrum. Of the options set out in the Consultation H3G supports only the use of a spectrum mask approach, and believes that such masks should be based on the relevant 3GPP standards.

H3G's views on the appropriateness of technology neutrality have been set out to Ofcom in detail in previous responses. **[●]**

Auction format

The auction format proposed in the Consultation is novel and complex. In its current form there are significant problems with this approach which creates uncertainty and risk for potential bidders. There is a significant danger that the proposed auction will not be efficient or achieve Ofcom's stated objectives for the award. H3G believes that there is a need for re-consideration of the approach, further consultation with potential bidders and proper testing of different candidate formats. H3G has also commissioned an external review by Market Analysis of the proposed auction rules which will be provided to Ofcom separately.

Contents

1. Introduction

The 2500-2690MHz, 2010-2025MHz and 2290-2300MHz spectrum bands (collectively, the "Spectrum Bands") as a package are an important future resource for wireless broadband services in the UK. The 2500-2690MHz band (the "2.6GHz band" or the "3G Expansion Bands") in particular is an important spectrum award relating to a significant amount of spectrum whose value is determined through its internationally harmonised use for mobile broadband.

As such, Ofcom's consultation "Award of available spectrum: 2500-2690Mhz, 2010-2025MHz and 2290-2300MHz", published on 11 December 2007 (the "Consultation") represents an important step in the development of mobile broadband in the UK, which is increasingly becoming a vital input to the national economy. Hutchison 3G UK Limited ("H3G") is a leading provider of such services through its third generation ("3G") mobile network. The approach to the award of the Spectrum Bands in the Consultation raises a number of important uncertainties which need to be resolved. [●] This response sets out these concerns in more detail.

The subsequent sections in this response identify H3G's comments on the different aspects of Ofcom's specific proposals in relation to:

- timing of the award process;
- competition issues;
- the proposed licence conditions and spectrum packing; and
- the auction format.

The remainder of this introduction sets out H3G's views on the relevant background to the award, which H3G proposes Ofcom should take into account in revising its proposals, and the need for further consultation. Annexes to this response provide answers to the specific questions raised in the Consultation as appropriate and provide some comments on the Impact Assessment. H3G is also separately providing Ofcom with a paper produced by Market Analysis providing more detailed comments on Ofcom's proposed auction format.

1.1. Need for further consultation on key proposals

The extent of the relevant uncertainties over the packaging and licensing of the Spectrum Bands and the mode of their award means that H3G is unable in the time available for the Consultation to provide definitive conclusions on all of the issues raised by Ofcom. H3G suggests that substantial further consultation and discussion with relevant stakeholders is required. As such, H3G will need to make further comments as appropriate as more aspects become clear on the approach which Ofcom will take. During the period of the current consultation Ofcom has also raised a number of significant issues, in addition to the proposed award of the 3G Expansion Bands, with relevance to mobile operators. The interaction between all of these issues is not yet clear, leading to further regulatory uncertainty and a potential need for further comments. Procedurally, H3G therefore believes that Ofcom's proposed next steps are inappropriate and will not ensure an efficient award and reduce regulatory uncertainty to the minimum possible. There remain significant uncertainties, for example about the auction design and the form the proposed spectrum licences will take. These are open questions left by the Consultation. It

would therefore be inappropriate [●] for Ofcom to move straight to the issue of a final Information Memorandum as the next step in this award.[1]

Due process and proper consultation would suggest a further consultation (perhaps on a draft version of the Information Memorandum or draft conclusions which set put in detail how Ofcom proposes to close out the open questions on these awards in the Consultation) is required first. Alternatively, Ofcom could break the issues in a number of further consultations (for example, on the proposed technical licence conditions and the auction format) as it has in relation to the L-Band award. The consultation on the draft regulations for implementing this award will not be able to fulfil this function as these are issues of policy on which it is not appropriate to consult in that way.

1.2. The evolution of 3G and mobile broadband

3G is the leading mobile broadband technology. It is an established standard with a significant worldwide customer base of nearly 100 million for W-CDMA connections.[2] Building on the GSM standard (which now has significantly over 2 billion subscribers worldwide)[3], it provides a suitable platform for providing existing broadband services through a truly mobile (as opposed to nomadic) platform, as well as providing the opportunity for new types of services.

Further the 3G standard and technology is evolving rapidly, increasing its functionality and capability.

- HSDPA is already being rolled out in networks in the UK enabling data download speeds to increase immediately up to 3.6Mbps. It is expected that HSDPA will enable download speeds of up to 14.4Mbps by around 2008 in 5MHz bandwidths. [●]
- HSUPA will also enable increased upload speeds to 5.7Mbps. This will further increase 3G's ability to provide so-called Web 2.0 services, which involve greater amounts of user generated content.
- HSDPA and HSUPA Evolutions are also studied by 3GPP to increase Downlink and Uplink data rates to 28-40 Mbps and over 10 Mbps respectively in 5 MHz bandwidth.
- Multimedia Broadcast Mobile Systems ("MBMS") is a further evolution of the 3G standard, [●] which will enable data to be "multi-cast" to all users in a particular cell. This will enable popular content to be provided to multiple 3G users in a way which uses spectrum and network resource yet more efficiently.
- Discussions are already at an advanced stage in the 3G standards body (3GPP) on the "long term evolution" ("LTE") of 3G. LTE aims to provide download speeds of up to 100Mbps in 20MHz bandwidths. LTE is expected to be available by 2012 (and on current timetables, the standard will be agreed by 2008).

[1] As proposed in paragraph 10.5 of the Consultation.
[2] Source: GSMA. See also the Global Mobile Suppliers Association recent figures available at http://www.gsacom.com/gsm_3g/market_update.php4#GSM_3G_Market_Update.
[3] The 2 billion mark was passed in June 2006 (see GSMA press release at http://www.gsmworld.com/news/press_2006/press06_29.shtml). GSMA reports that the figure in 2007 is above 2.5 billion (see http://www.gsmworld.com/about/history.shtml). See also the Global Mobile Suppliers Association recent figures available at http://www.gsacom.com/gsm_3g/market_update.php4#GSM_3G_Market_Update.

- At ITU level there are also initial discussions on the evolution of 3G beyond LTE, termed IMT-Advance, which is expected to be available around 2020.

3GPP which is the most innovative standardisation body in the world has been working very hard to increase efficient use of limited mobile spectrum with new concepts i.e. MBMS HSDPA, LTE and their evolutions.

3G technology is the most advanced mobile broadband technology and as such is already providing a range of innovative new services to consumers. The mobile internet is available at broadband speeds over laptops used with HSDPA enabled data cards and handsets. Further, services such as H3G's X-Series is bringing mobile internet services (such as Voice over IP, searching of the world wide web and remote viewing of users' own TV and PC content) to the mobile handset, in a way tailored to maximise the experience of using such services through a different device. H3G services available to its customers on 3G handsets (and not just through X-Series handsets) include:

- Voice over IP through Skype;
- push email;
- mobile TV, including simulcasting of ITV1;
- a music store, with music videos and track downloads available (making H3G the second biggest on-line music store in the UK after iTunes);
- provision of games;
- user generated content services such as SeeMeTV; and
- internet search (using search engines with well established brands such as Google and Yahoo).

The list of potential applications and services which can be provided through the mobile internet and mobile handsets is increasing all the time. H3G believes that it has a leading innovative position in this area, having been the first 3G network to launch and having the largest UK 3G customer base. However, all of the five 3G networks are providing more and more of these new services, often in partnership with established internet brand names. Mobile broadband is therefore of ever increasing importance as a method of communication and data exchange. Capacity demands on mobile broadband systems will continue to increase as mobile broadband becomes established.

1.3. 3G Expansion Bands in 2000 Information Memorandum

Section 3.4.1 of the Information Memorandum for the 2000 Auction of 3G spectrum (the "1999 Information Memorandum"),[4] referred to potential future spectrum availability for 3G technologies, under the heading of "Availability of additional spectrum for 3G mobile". At that stage the current 2.6GHz band had not been identified as the 3G Extension Bands, which was a topic at the then forthcoming World Radiocommunication Conference in 2000. However, the Information Memorandum made clear the intentions and broad policy drive of the UK government:

[4] "United Kingdom Spectrum Auction, Third Generation, The Next Generation of Mobile Communications: Information Memorandum", dated 1 November 1999.

> *"Within the UK, the Government supports the identification of additional spectrum for terrestrial IMT-2000 and it is working within the ERC on proposals for suitable frequency bands. The Government would support action within the ERC to make any additional spectrum available on a harmonised basis across CEPT countries. Since IMT-2000 is a global concept, the Government will also press for harmonised use of the spectrum identified for IMT-2000 to be facilitated on a global level, through the development, after WRC-2000, of appropriate recommendations within the International Telecommunication Union Radiocommunications Sector ("ITU-R")."*[5]

While the 1999 Information Memorandum also noted that it was not possible to indicate the timing and means of allocation of this additional spectrum, it is clear that bidders in the 2000 3G spectrum licence auction could expect that additional spectrum would be available for 3G use in due course, on an internationally harmonised basis. (As discussed further below, and in previous H3G responses, the availability of spectrum on an internationally harmonised basis is a vital ingredient of developing successful mass market mobile broadband services – in particular because of the economies of scale required.)

Ofcom notes at paragraph 6.126 of the Consultation that H3G has previously argued that the 1999 Information Memorandum therefore raises certain legitimate expectations about the availability of the 3G Expansion Bands. The Consultation does not explain why Ofcom rejects this argument, but simply and baldly states that "Ofcom does not accept the argument".

[●][6]

It has been previously argued by some operators that the need for the 3G Expansion Bands for 3G networks is likely to only arkise later and therefore holding the auction before such demand arises leads to increased uncertainty over valuation for such operators and discriminates against existing 3G operators. The Consultation responds to this point in paragraph 6.125 by noting that there is demand for the spectrum from other uses and that the existing operators are free not to participate in the award. However, such an approach contradicts the expectation which arises from the 1999 Information Memorandum that this spectrum would be available for 3G use [●].

1.4. Harmonisation issues

As Ofcom is aware, H3G has set out in responses to previous consultations its view that the continued development of mobile broadband requires spectrum which is harmonised for that use on an international scale. The development and manufacture of equipment (and especially handsets and other terminals) requires the economies of scale which are simply not achievable at a national level. The development and manufacturing costs of individual pieces of wireless equipment need to be spread over larger markets in order for costs to be reduced sufficiently for mass market use of mobile broadband. Such mass market use will have a wide range of societal and consumer benefits, including significant positive network externalities.

[5] Section 3.4.1.2 of the Information Memorandum.
[6] [●]

It is clear that other major European countries are expected to use the CEPT band plan for the 2.6GHz band and will almost certainly use the band for UMTS. The European band that is being promoted for WiMax type applications is the 3.4-3.8GHz band which will be used for fixed and nomadic use rather than wide area mobility as provided by 3G networks. The UK risks being unaligned with the European approach on both counts and the costs could be significant to the UK economy.

In the alternative, fragmentation of individual spectrum bands will make harmful interference more costly to avoid, equipment more complicated and country specific (and therefore more costly and expensive) and potentially make international roaming technically harder (and therefore more costly) to implement.

Whatever form technology neutrality of spectrum licences for the Spectrum Bands takes, it should ensure that such harmonisation is achievable and take into account the costs of achieving such harmonisation through market based standards battles. The Consultation makes several references to the European process of harmonisation in relation to the 3G Expansion Bands. A minimum requirement is that any technology flexibility introduced to the 3G Expansion Bands at least be on a consistent basis (i.e. what could be termed harmonised flexibility) across Europe. Ofcom's proposals, at this stage in advance of any European decision on such issues, therefore simply serve to increase uncertainty about the level of harmonisation which will be imposed or achievable for the relevant bands. As proposed above, this provides another reason why it would be desirable for Ofcom to consult again on its proposals, once there is more certainty about the approach which European level decision makers take in relation to these bands.

1.5. The relationship between the Spectrum Bands

H3G's comments in this response focus on the 3G Expansion Bands and the 2010-2025MHz band, particularly the former. The UK specific 2290-2300MHz band is not, in H3G's current view, either a complement or a substitute for the other two bands. This is implicitly recognised by the fact that Ofcom is proposing to hold a separate auction for this band. This band may be more related to other bands such as the 1790-1805MHz band in Great Britain and more appropriately awarded in the same process as that band. Broadly, H3G does not have further comments at this stage on this band, [●]. However, H3G suggests that it would be easier for stakeholders if Ofcom properly disassociated the two auction processes and treated the 2290-2300MHz band award as a properly separate process.

The situation is different with the 2010-2025MHz band, which could be a potential substitute to the unpaired 2.6GHz spectrum or a complement to that spectrum (as recognised in the Consultation document, for example at paragraph 1.27).

2. Timing of the proposed award

In the Consultation Ofcom proposes pressing ahead with the award of the Spectrum Bands as soon as possible. As discussed elsewhere in this response (see section 1 above and section 5.2 below), this timetable does not take account of the need for additional consultation and work in a number of areas. More fundamentally, however, this approach is based on a perceived immediate demand for the spectrum which is unproven and untested (and for which the main evidence Ofcom cites is that certain operators are requesting that the award be held early). Against this, there are a range of key regulatory uncertainties, which are likely to be resolved in a relatively short timescale. These issues are significant and justify delaying the proposed award until after their resolution. Finally, as discussed above, the expectation of existing 3G licensees from the 1999 Information Memorandum was that the 3G Expansion Bands would be available on a harmonised basis for future 3G development. This also suggests delaying the award. The remainder of this section expands on these points.

2.1. Current demand for new spectrum

Other than 3G and its evolutions there is significant uncertainty about technology development paths. It is therefore unclear that there exist valid business cases for alternative mobile broadband solutions or whether alternative mobile broadband technologies which are still under development will in fact be able to deliver outputs as announced. These technologies are still at the trial stage whereas 3G is deployed. Ofcom suggests that there is significant demand for the 3G Expansion Bands on the basis of responses to previous consultations and announcements of the development of WiMax equipment, including for the 2.6GHz band. This evidence appears thin. Availability of equipment at the 2.6GHz (and other) bands for WiMax networks is not the same as actual demand based on a valid business case. Section 154(1) of the Communications Act (the "Act") requires Ofcom to consider and balance the availability of spectrum, the current demand for that spectrum and the demand that is likely to arise in future for the use of wireless telegraphy. Ofcom does not report any analysis of the extent of such demand:

- taking into account (uncertain) availability of other spectrum bands for the same uses (such as the relationship to the availability of the digital dividend and the L-Band);
- assessing the underlying sources of demand for spectrum (i.e. the extent to which there is unfulfilled retail demand for mobile broadband services) leading to demand for the spectrum; and
- comparing future potential demands for the spectrum and the availability of suitable spectrum for such demands.

In summary, the case is not proven in the Consultation that there is substantial and immediate unfulfilled demand for more spectrum for mobile broadband, which necessitates the urgency to undertake this award this year as Ofcom proposes.

[●] From a technological perspective, however, the evolutions of 3G discussed in the previous section (especially 3G LTE and IMT-Advance) could lead to a need for clean spectrum in significant blocks. [●][7]

[7] [●]

At the very least Ofcom could take a view of the total demand for spectrum for mobile multimedia and broadband services over the following years and compare that to spectrum available. Without analysing and setting out the demand for spectrum (and showing how future demands from 3G evolution will not be disadvantaged) Ofcom risks running an inefficient award and distorting any secondary trading market. Overall the evidence provided in the Consultation does not establish a convincing case for urgency in the award.

2.2. Current sources of regulatory uncertainty

In the immediate future there are a wide range of regulatory uncertainties which directly impact on the proposed award of the Spectrum Band. These include:

- the development of 2G and 3G mobile liberalisation in the UK;
- the European process for developing a decision on UMTS in the 900MHz and 1800MHz bands;
- the progress of the derogation of the GSM Directive;
- the final decisions on the introduction of ultra-wideband services in Europe;
- the resolution of the review of the European Electronic Communications Regulatory Framework, which has direct references to the need for a common approach to spectrum usage rights and spectrum trading which may cut across Ofcom's proposals;
- the World Radio Conference 2007 which has an agenda item which will directly impact on this award (agenda item 1.9);
- the border co-ordination Recommendation for UMTS has just been revised at the WGFM meeting in January 2007; the latest text is different to the previous Recommendation and administrations will need to become familiar with implementing memorandums of understanding based on the new Recommendation, which also explicitly refers to ECC Decision (05)05 – the CEPT Band Plan; and
- Frequency Co-ordination Agreements are not finalised and, if the UK use departs from the ECC Decision (05)05 plan, equitable access may be difficult to negotiate.

These issues directly impact on the appropriate form and approach to the award of the Spectrum Bands, especially the 3G Expansion Bands. Before firming up the approach to the proposed awards, Ofcom should await the resolution of these issues. Most of these are in the near future and therefore the costs of delaying the award will be far outweighed by the benefits in terms of certainty to bidders of such delay. There are therefore real costs to holding the award now before potential bidders are able to assess and comment on the award process in light of the resolution of such issues. The benefits to holding an early award identified in the Consultation are that it will enable faster development of competition and innovation (by allowing other technologies such as WiMax earlier access to the UK market). As discussed in the next section, Ofcom's analysis of these beneficial effects is incomplete and does not make a convincing case that such benefits will be significant.

As such, a simple cost benefit analysis, in H3G's view, suggests a delay of the award would be beneficial.

Ofcom's assessment of the benefits of delay in the Consultation in contrast suggests that there is a wide range of inevitable uncertainties about a number of alternative bands and that it would therefore not be appropriate to wait for certainty in relation to the current 2G bands and the harmonisation of the 3G Expansion Bands (to which most of the uncertainties identified above relate).

H3G believes that this characterisation is misleading. The 3G Expansion Bands and the existing GSM 900MHz and 1800MHz bands are [●] valuable bands for 3G mobile broadband and its future evolutions. This is because these are the bands which are most harmonised for such uses and for which relevant equipment at reasonable costs is most likely to be available. Resolution over the uncertainties currently existing over the availability of these bands and the resulting competitive positions of existing 3G licensees is crucial before holding the proposed award. There must be sufficient time for operators to analyse and assess the impact of any regulatory decisions on these issues before being required to value the 3G Expansion Bands in any auction. [●] The result of this will be an inefficient award and Ofcom not ensuring optimal use of the radio spectrum.

3. Competition issues

Paragraph 6.4 of the Consultation sets out Ofcom's objectives for the award, which are derived from Ofcom's statutory obligations in relation to spectrum management. Ofcom's principle objective is to secure optimal use of the Spectrum Bands, having regard to availability and demand for the spectrum, and the desirability of promoting efficient use, economic and other benefits arising from the use of the spectrum, development of innovative services and competition in the provision of electronic communications services. The Consultation raises two main issues in relation to the competition aspect of these objectives.

First, the Consultation briefly considers *ex ante* competition measures in two respects (in paragraphs 6.141 to 6.155), where Ofcom considers whether it would be appropriate to set up front restrictions on certain bidders (in particular, BT) or bidders in general for competition reasons.

Second, there are several references in the Consultation to the need to promote competition through allowing alternative technologies access to the band. In this regard, the Consultation argues that technology neutrality will lead to multiple platforms which increases competition and innovation, by allowing alternative technologies to provide mobile broadband services.

The remainder of this section provides some comments on each of these issues in turn.

3.1. Restrictions on specific bidders

The Consultation broadly concludes that there is no need for any specific restrictions on BT as a bidder, because:

- fixed and mobile broadband are in separate markets, limiting the ability of BT to leverage its dominance in one into the other; and
- to the extent that this will no longer be true through convergence between the markets, there are sufficient numbers of other competitors and the Enterprise Act 2002 undertakings provided by BT should be sufficient to ensure that there is no opportunity for such leverage.

H3G notes that this conclusion is in stark contrast to the approach taken to BT in relation to the 2000 3G auction, where the 1999 Information Memorandum stated:

> *"If BT held a 3G WT Act Licence in its own right there would be concerns that it might be able to act anti-competitively in the market by subsidising its 3G activities from the fixed business where it has Significant Market Power."* (Section 3.1.7.1)

The consequence of this finding in the 2000 auction was that if BT had acquired a 3G licence it would have been required to adhere to accounting separation requirements between its 3G business and the rest of its business. Ofcom has not explained specifically its reasons for changing the approach here, though implicitly the Consultation document appears to rely on the Enterprise Act 2002 undertakings accepted from BT. However, Ofcom has not explained how the separation between BT and Openreach will be sufficient to ensure that BT is not able to leverage a dominant position from the fixed market into the mobile market. [●] Openreach and the Enterprise Act 2002 undertakings were designed to deal with issues of fixed line competition and ensure the development of infrastructure competition in that

environment, when BT still controls the vast majority of local loops into customer premises. However, the opportunities for leverage between BT's existing business and any new mobile business would not be between Openreach and the rest of BT. Rather such opportunities would manifest themselves through, for example, the ability to bundle retail products and/or the terms on which other wholesale products (more relevant to mobile operators) are provided by BT Wholesale and so on. The point of accounting separation is to ensure that regulators and competitors have the information to determine whether anti-competitive activity is occurring. Where there is a dominant firm, such requirements can therefore be seen as complementary to general competition law. Indeed, it may be hard, if not impossible, to determine *ex post* whether anti-competitive activity has or has not occurred without such information requirements.

H3G therefore does not see either why there has been any change in circumstances which means that such accounting separation is no longer warranted nor why the Enterprise Act 2002 undertakings are a substitute for such requirements. [●]

3.2. Restrictions on amount of spectrum awarded to individual bidders ("Spectrum Caps")

The Consultation also raises the possibility of imposing a spectrum cap on the total amount any individual bidder can acquire in the auction process. This is to address the specific potential competition problem of "spectrum hoarding", where an individual bidder attempts to block new entry through acquiring a large block of spectrum which provides a barrier to entry to new competition and innovation.

In the form described in the Consultation, H3G does not have strong views either way on the overall desirability of such a cap. However, a number of issues not raised in the discussion in the Consultation document also need to be considered to provide appropriate regulatory certainty around the award and enable bidders properly to assess the value of the opportunity available.

- The purpose of such a cap would be to avoid market foreclosure (either full or partial) through purchase of an essential input. However, it is not clear from the discussion in the Consultation how this will relate to other spectrum holdings. [●]
- Further, the Consultation does not explain how such a safeguard would work going forward in the context of secondary trading. That is, would the cap continue to apply to any additional trades for the life of the licence or expire at some point?

H3G has previously provided its views to Ofcom that general competition law is unlikely to be sufficient to deal with all potential anti-competitive actions which may arise in relation to spectrum trading (of which a spectrum award can be considered to be a special case).[8] Previously Ofcom has indicated (in particular in its statement "Ensuring effective competition following the introduction of spectrum trading", published 29 September 2004) that it considers the main potential competition issue

[8] See, for example, H3G's response to the consultation on effective competition following the introduction of spectrum trading dated 21 July 2004, H3G's response to the "Spectrum Framework Review" consultation dated 22 February 2005 and H3G's response to the "Spectrum Framework Review: Implementation Plan" consultation, dated 24 March 2005.

which leads to a consideration of whether *ex ante* competition rules are required is spectrum hoarding.[9]

H3G, however, continues to believe that there could be other competition issues which merit specific competition provisions and believes that Ofcom should undertake a full assessment in relation to an important spectrum award on whether this is the case. A range of different behaviours could occur in relation to the proposed award which are likely to prove difficult (if not impossible) to effectively address through general competition law. [●]

Competition law is likely to be an ineffective tool for policing whether such behaviours are efficiency enhancing or anti-competitive. (The long and ongoing difficulties in reconciling intellectual property rights and anti-trust law provide a warning of the issues involved in using *ex post* competition law to deal with issues around private property rights which may be alleged to be anti-competitive.) Ofcom should consider these issues and justify in more detail why its general conclusion that *ex post* competition law is sufficient to deal with any competition issues arising in relation to secondary trading of spectrum remains an appropriate conclusion in relation to policing competition issues around a major spectrum award such as this one. H3G is not convinced that this would be the conclusion were such an analysis to be undertaken.

3.3. Technology neutrality promotes competition

The Consultation repeatedly states that making the award on a technology neutral basis will promote competition and innovation (implying that technology neutrality therefore fulfils Ofcom's objective (and statutory duty) of having regard to the desirability of promoting competition).[10] There is an implicit assumption that inter-technology competition therefore promotes competition and innovation. Ofcom, however, ignores the benefits of strong intra-technology competition and does not consider at all the effects of the proposals in the Consultation on such competition. Further, asserting that allowing multiple technologies into the spectrum bands promotes innovation omits consideration of whether those alternative technologies could be introduced (potentially more effectively) into other bands and whether there is any effect on innovation on the development of other technologies. As set out in section 1 of this response, the 3G standard is subject to significant and on-going innovation. The Consultation undertakes no analysis of the effect on such innovation of the proposals for the Spectrum Bands. H3G suggests that this is a significant omission and means that Ofcom's assumption that simply allowing alternative technologies the opportunity to use the Spectrum Bands is the best way to promote innovation is nothing more than an assumption not based on evidence or analysis. There is no analysis in the Consultation underlying this assumption, which is simply asserted.

[●]

3.4. Promotion of competition and effects on existing operators

Ofcom sets out its view in the Consultation that because existing 3G licensees are free to bid in the proposed awards and the conditions surrounding previous mobile

[9] In the "Spectrum Framework Review: Implementation Plan", published 13 January 2005, Ofcom again reported its decision to rely on "general powers under competition and other law to address any competition issues raised" in its discussion of proposed future awards in the Spectrum Bands. See, for example, paragraph 5.175 of that document.
[10] See paragraph 6.4 of the Consultation.

spectrum awards were different, it is not undue discrimination to have different licence conditions imposed on existing 2G and 3G mobile licences and the proposed licences for use of the Spectrum Bands. [11] Ofcom further "notes" a number of advantages which existing 3G licensees have[12], with the implication being that these are off setting of any advantage given to "new entrants".

H3G has the following comments on this approach as set out in the Consultation.

- Ofcom's analysis is not complete as it does not properly assess the extent to which competition is affected by licensees with a roll out obligation having to compete with operators without any such obligation. [●]
- Many of the implied countervailing benefits of existing 3G incumbents have only been achieved through significant investment [●].
- At paragraph 6.139 of the Consultation Ofcom notes that differences are only of concern to it to the extent that they create a "distortion of competition". Ofcom has not defined what it means by such a distortion. [●] Ofcom's belief that the award promotes competition has been discussed above, and Ofcom's analysis here fails to take account of inter and intra platform/technology competition as discussed above.
- Having operators compete on the basis of licences with differing terms also creates a distortion of competition through different groups of licensees having significantly different period over which to recover significant investments. [●]
- Ofcom states that if there is new entry into markets overlapping with 3G services then "this could be expected to reduce the profits that MNOs would otherwise expect to make in the absence of competition from new entrants. This is a natural consequence of competition in downstream markets which it is Ofcom's duty to promote". This analysis is incomplete and one sided. Ofcom's duty is to promote competition in respect of electronic communications services. This is not simply a matter of the number of competitors, but also concerns the strength of competition between and ability to compete of existing electronic communications providers. Such an approach does not provide any evidence of whether the overall level of competition (between existing and any potential new) providers is increased or decreased.
- [●]
- Ofcom's analysis also ignores the potential increased interference management costs imposed on existing licensees through some of the proposals in the Consultation and the increased costs through the loss of harmonisation benefits. [●]
- Ofcom has not provided consultees with visibility of any analysis which supports its conclusions that greater competition can be achieved and will increase consumer welfare. [●]

[●]

[11] These issues are considered in paragraphs 6.111 to 6.140 of the Consultation.
[12] At paragraph 6.135 of the Consultation.

4. Spectrum packaging and licence conditions

This section of this response provides comments on the proposals for packaging the 3G Expansion Bands and the associated spectrum licence conditions discussed in the Consultation. These proposals still leave substantial uncertainties and risks with potential bidders which H3G believes need to be resolved before the award proceeds. This provides further justification to H3G's view that, at minimum, another consultation and proper consideration of the concerns being expressed to Ofcom are required before Ofcom issues a final Information Memorandum for this award.

4.1. Spectrum packaging issues

As Ofcom will be aware, H3G supports the band plan for the 3G Expansion Bands in the ECC Decision (05)05. This decision provides a balance between paired and unpaired spectrum and would provide a basis on which equipment could be manufactured on a harmonised basis in this band. The additional uncertainty which Ofcom is introducing by allowing flexibility in the amount of unpaired spectrum (at the expense of paired spectrum in the band) creates a range of difficulties.

- First, it has created complications for the auction design, which H3G currently believes means that the proposed auction format is at risk of not being efficient (see section 5 of this response and the separate report from Market Analysis).
- Second, the implication of the technical licence conditions is that in fact the flexibility is effectively only one way. That is, the amount of unpaired spectrum can be increased at the expense of paired spectrum, but the reverse is not true. [●][13]
- Introducing this flexibility increases the need for guard bands between the different types of technology which is spectrally inefficient. H3G is sceptical of Ofcom's proposals that adjacency conditions can be dealt with through restricted use blocks of spectrum (see below) and expects that clear guard bands will be required in line with results from relevant ITU studies.
- Placing unpaired technologies in bands harmonised for paired usage will create significant dangers for mobile to mobile, and mobile to base station, interference in the downlink band. Dealing with this (especially in the context of technologies which roam across Europe) will increase costs and may require non-standard terminals in the UK [●];
- While H3G therefore believes that the introduction of flexibility in the amount of unpaired spectrum is undesirable, H3G agrees with Ofcom that the best way to implement such flexibility is through conversion of paired spectrum at the top of both the up and down link bands. Moving to non-standard duplex spacing would introduce significant costs to technologies in the UK using paired spectrum (and reduce the amount of paired spectrum which could be used with standard equipment by significantly more than the amount of spectrum converted to unpaired[14]).

[13] [●]
[14] For example, standard spacing would mean that lots 25 to 28 are usually paired with an uplink at lots 1 to 4. As such, converting just lots 25 to 28 to unpaired would in practice mean that lots 1 to 4 would also not be usable by a technology such as WCDMA based on standard pairings. [●]

The introduction of one way flexibility on the amount of paired and unpaired spectrum therefore means that the auction discriminates in favour of unpaired technologies. The packaging proposals and the proposed restriction transmission blocks which Ofcom is proposing to manage interference between unpaired technologies causes inefficient use of spectrum and does not completely resolve the interference issues (which would likely require guard bands).

4.2. Spectrum Usage Rights versus spectrum masks

H3G has previously provided Ofcom with its comments on the SURs approach and the problems with implementing it. In particular, see:

- H3G's letter of 13 November 2006 responding to Ofcom's information request for data on which basis to set SURs; and
- H3G's response, dated 30 June 2006, to Ofcom's consultation on SURs dated 12 April 2006.

H3G continues to believe, as set out in those submissions, that any implementation of SURs can only be achieved as part of a robust overall framework. The explanation of the proposed SURs in the Consultation is therefore incomplete and does not provide potential bidders with sufficient certainty on the legal framework in which they would be implemented. Nor is it clear how such proposals would be policed, how necessary measurements would be undertaken and how any disputes arising under such a framework would be adjudicated. An example of the importance of these issues can be seen in the proposal in the Consultation that SUR parameters will only need to be met in 50% of the locations. [●]

The Mason study, on which SURs may be determined, is incomplete and contains a number of issues that are ill-defined and not adequately addressed in the report.

For example, the analysis is focused on 5 MHz and 10 MHz channels. There is no analysis of larger channels. Given the future developments of LTE (as described in section 1 above) and related activities, 20 MHz channels must be included. Mitigation techniques are sometimes only vaguely described and the cost. Further, arrangement and the logistics of implementation (critically including what party should pay for the remedial intervention) are not addressed. This creates regulatory uncertainty over the correct valuation of the lots for potential bidders.

In other cases, for adjacent band use, the explicit and implicit assumptions made on the geographical area in which these systems are deployed, the number of deployments over a specified time, and whether the future use is expected to change significantly (particularly if growth is forecast, for example airborne use of PMSE) is of concern. Ministry of Defence use of certain bands is another area where assumptions being made are not clear.

Mason has used its own assumptions. Examples include:

- system parameters;
- density of use;
- mobile interference degradation of approximately 2% of devices for 1.4% of time; and
- how mobile-to-mobile interference can be avoided by handover to an adjacent cell(s) or another carrier.

H3G believes it is important that the assumptions used (where not stated) are shared with relevant stakeholders who are given a chance to comment. At this stage H3G reserves its position on the assumptions which are made explicit, [●].

SURs for adjacent band use has not been specified by Ofcom and if SURs are used in the Spectrum Bands then a symmetrical set of rights for all parties will be required to ensure any future negotiations between the parties are on a level playing field. Technology neutral assignments will inevitably create a far more complex interference environment and consequently makes the setting of appropriate SURs extremely difficult

H3G also notes that the SUR proposals do not take account of mobile to mobile interference (as discussed further below in relation to the proposed spectrum masks where this issue also arises).

As noted in the previous H3G responses on the issue of SURs, enforcement is a particularly difficult issue and the current proposals are not seen as being feasible. This will result in regulatory uncertainty and a more hostile interference environment with all the attendant significant costs.

In summary, the SUR proposals are not fit for purpose and H3G strongly believes that the spectrum masks approach should be used. The current SUR proposals would makes it difficult to assess the actual interference risk and make planning investment in the Spectrum Bands more uncertain and costly. Further, without further modification and provision of a proper framework for the SUR approach, Ofcom should not consider any future licence modifications to change licences to such a basis.

4.3. Comments on the proposed spectrum masks

According to H3G's calculations the spectrum emission masks proposed by Ofcom in Table 4 of the Consultation for Base Station and Table 6 of the Consultation for Mobile Station are several dBs more relaxed as compared to the spectrum emission masks specified in 3GPP TS 25.104 and TS 25.101. H3G believes that the relevant spectrum emission masks used for setting technical licence conditions for the 3G Expansion Bands should be fully compliant with 3GPP specifications.

H3G also considers that a single spectrum emission masks should be applied to base stations deployed in any blocks of the paired spectrum, including those adjacent to the unpaired spectrum. In other words the values in Table 5 of the Consultation should be the same as those specified in Table 4. The use of standard masks across the band reduces the cost of the equipment and thus the cost of delivering services.

H3G understands that the 28 dBm/MHz restriction for the spectrum emission mask of the base stations deployed in the unpaired spectrum is to reduce base station to base station interference. However the proposals in the Consultation do not provide any certainty that mobile-to-mobile interference will be controlled.

ITU-R 8F has been studying sharing between WCDMA handsets and WiMax handsets. This issue is being considered in a working group of WP 8F and is chaired by a representative from Intel. The calculations to date show clearly that the two technologies cannot coexist in adjacent bands. The separation distance required between two handsets to avoid interference can be as high as 438 metres. The separation distances required between WiMax and WCDMA handsets is summarised

in the table below.[15] This table is based on a Fixed and Nomadic WiMax application. H3G believes that the situation will be more severe in relation to a WiMax mobile application. Study of the latter has not yet been finalised in ITU-R 8F. Clearly maintaining such separations between mobile stations will not be practical in reality. This points to a need for guard bands between the technologies in a way which is not possible under Ofcom's proposals in the Consultation. The restricted use bands proposed by Ofcom will not avoid such mobile to mobile interference (for example, in relation to in-building scenarios, the lower power levels will not remove the interference).

A summary of the line-of-sight separations in metres needed to protect mobile stations and SSs using enhanced isolation values for CDMA-DS

	Fixed SS => FDD mobile station	FDD mobile station => Fixed SS	Nomadic SS => FDD mobile station	FDD mobile station => Nomadic SS
1st adjacent channel	438	390	201	179
2nd adjacent channel	183	82	65	46

The above table also shows the required separation distance of 183 meters between WiMax and WCDMA handsets in the case of 5 MHz guard band. This suggests a minimum of 10 MHz guard band could be required between WCDMA and WiMax technologies to operate reliable and high quality mobile broadband services.

4.4. Ofcom's consideration of non-technical licence conditions

The Consultation sets out Ofcom's proposals for broad non-technical licence conditions in terms of the new licences being technology neutral, tradable, with indefinite licence terms (subject to revocation on five years notice and with a minimum initial term of 20 years) and with an absence of roll out conditions. H3G has the following comments on each of these issues.

- H3G has set out its views on technology neutrality in previous responses to Ofcom. In particular, H3G's responses to the "Spectrum Framework Review" and "Spectrum Framework Review: Implementation Plan" covered these issues.[16] In relation to the 3G Expansion Bands in particular, H3G's views on the legitimate expectations of existing 3G licensees are discussed above in section 1.3. Section 4.5 below provides more detailed comments specifically on this issue. This underlies H3G's view that these Expansion Bands should be made available for 3G use as first choice.
- H3G has no further specific comments on the proposal to make the licences tradable.
- On the conditions of tenure and licence period length, H3G reserves its position on their appropriateness one way or the other. [●]

[15] This reproduces table 2.6-5 in ITU-R 8F technical report 1132 Annex 1.
[16] See footnote 8 above.

- H3G's views on the absence of roll out licence conditions and the potential distortion this will cause to competition, without any other corrective measures are set out in section 3.4 of this response above. H3G notes Ofcom's comments about the difficulties of setting roll out conditions in the face of technology neutrality. H3G believes that the application of roll out conditions or some other corrective *ex ante* requirement on certain bidders could feasibly be imposed only where the end use provides a potential distortion of competition with existing mobile broadband providers.

4.5. Ofcom's proposals for technology neutrality

One of the most fundamental policy decisions contained in the consultation is to award the Spectrum Bands on a technology and service neutral basis and not to adopt the ECC Decision (05)05 which specifies an agreed frequency band plan for the 2.6 GHz band. That band plan segments the 3G Expansion Bands into paired and unpaired spectrum based on extensive work in CEPT that took account of perceived market demand for paired and unpaired spectrum. Compatibility studies based particularly on UMTS (FDD and TDD) have been produced that demonstrate that adjacent use of these technologies is relatively benign. It is worth noting that the CEPT frequency plan assumes that any guard bands between the TDD and FDD use shall be taken from the TDD allocation. Ofcom's approach removes this assumption.

In contrast, the approach set out in the Consultation will impose regulatory uncertainty because of the less well defined or non-existent technical studies for other technologies. There is a substantial risk that equipment suppliers will need to produce special 'UK only' equipment which will mean higher costs to consumers and possibly reduced scope for roaming throughout Europe. Interoperability may be compromised unless manufacturers spend more on the handset than would be required if a pan-European solution is followed as per the CEPT band plan. Interference will be more prevalent and this will reduce network capacity – which has a direct cost to the operators, network service levels may deteriorate affecting consumer confidence in the mobile network services and cross-border interference is expected be more problematic.

These are just some of the consequences that flow from not adopting the CEPT band plan. Ofcom must provide a detailed analysis of the associated costs and benefits of adhering to the CEPT plan or using a technology neutral approach. The Consultation is too superficial on this issue and provides no evidence or analysis to show that the use of technology neutrality will provide substantial net benefits to the UK economy and its citizens and consumers.

It has long been recognised that the harmonisation of frequency bands on a regional or global basis for services that are by their nature providing mobile applications is desirable from an economic perspective and provides for greater regulatory certainty as the availability of spectrum for future development and growth of the sector is identified and made available subject to demonstrable market demand.

The process of identifying spectrum and developing standards for 3G services has a long and fruitful history of collaboration between bodies such as the CEPT, the ITU-R and 3GPP. The 3G Expansion Band is part of the detailed planning within these bodies that help to ensure that the long-term viability of 3G services is promoted by having access to spectrum as the current networks grow and capacity requirements expand. The process of identifying future spectrum for IMT is still at the heart of the

mobile sectors activities. Indeed, Ofcom is currently consulting[17] on 'The World Radiocommunication Conference 2007 (WRC-07) agenda item 1.4 which has an item that identifies further bands for IMT use.

In the consultation, Ofcom acknowledges in paragraph 2.6 that in identifying bands for IMT

> '……*there is merit in this process for particular applications. In the case of mass-market public cellular networks, the frequency bands identified become the bands that administrations around the world are most likely to make available for that application. These are the bands where high volumes of equipment are developed and the benefits of economies of scale flow from this, as well as the benefits of interoperability within and across different countries.'* and in paragraph 3.12 it is stated that *'The overriding purpose of this WRC agenda item is to identify spectrum for use throughout the world to aid industry development, international roaming and economies of scale.'*

ITU-R Working Party 8F has been studying future spectrum requirements for IMT use and has produced Report M.2078 which is the latest estimate for the spectrum requirement that IMT will require by 2020. A total of 1280 MHz is currently forecast as being required.

This illustrates the long term planning that underpins the development of 3G services. [●]

4.6. Other proposed technical licence conditions - Sitefinder

Ofcom is also proposing to "invite the holder of the licence for the Spectrum Bands to participate in providing information about their base stations for inclusion in Sitefinder where they are using one of the technologies currently covered". Such technologies are GSM, UMTS and TETRA. Assuming Ofcom continues with a technology neutral award this will lead to further discrimination against operators of such technologies compared to other bidders. Ofcom's approach to Sitefinder should be consistent across technologies.

[17] WRC-07 agenda item 1.4 – consultation on candidate bands under consideration at WRC-07 for IMT published 27th February 2007

5. Auction Design

Ofcom is proposing a novel and complex auction design, the detailed rules of which have not always been clearly specified,[18] and which is likely to create significant uncertainties for the potential bidders. H3G is not aware of any two-stage combinatorial clock auction of this type (with a subsequent assignment stage) having been used successfully elsewhere in the sale of spectrum licences, or any other products. Further, this type of auction has not even been subject to sustained testing in laboratory conditions.

As with the proposed licence conditions addressed in the previous section of this response, there are significant areas where substantive uncertainty exists and which need resolution before the award process as a whole can be properly assessed in terms of Ofcom's objectives for the award of licences for the Spectrum Bands.

The issues with the current design could potentially lead to an inefficient allocation of spectrum licences. Further work and discussion on the auction design is required. The exact format of the auction could have a significant impact on the extent to which the award will, in fact, achieve Ofcom's stated objectives in relation to promoting competition and the efficient allocation of spectrum licences. The fact that Ofcom is proposing to use a very similar auction design for the 1452-1492 spectrum band makes the argument for laboratory testing even stronger.

5.1. Current refinements required of the auction rules

H3G has commissioned Market Analysis to review the proposed rules (as set out in section 8 and Annex 8 of the Consultation). Market Analysis' comments are provided in a separate report. In summary:

- Ofcom's proposed auction format is novel and untested, and at the very least should be subjected to laboratory testing and further consultation before being implemented. Alternative and more familiar auction formats, some of which have been tested or used in practice, do not seem to have been considered in any detail;
- the activity rule for the clock stage of the auction seems to prevent bidders from substituting between paired and unpaired spectrum: it is not clear that this is efficient and the restrictions imposed on the best and final offers stage bids seem likely to exacerbate this problem;
- the best and final offers stage of the auction does not have a clearly-explained purpose, and does not even fully specify how prices are to be determined from bids; this in itself may create incentives for manipulation, and increases uncertainty for bidders, reducing the likely efficiency of the auction;
- the rules which link the clock and best and final offers stages of the auction are also not fully explained or justified, and may give rise to incentives for price manipulation and should be reconsidered; and
- the assignment stage of the auction appears to be poorly designed to achieve the stated objective of efficiently assigning particular lots to those who value them most. A more transparent bidding process should be considered given the interdependencies in valuations, and Ofcom should give further serious

[18] For instance, various descriptions of the 'second price' rule in the best and final offers stage are given in the consultation document, and these descriptions may or may not be entirely consistent with each other.

consideration to reverting to specific rather than generic lots in the clock auction stage.

The proposed auction rules in the Consultation are therefore not yet sufficiently certain to provide an efficient award process and serious consideration should still be given to alternative formats. The use of an assignment phase in the auction raises particular concerns, as bidders will be forced to try to value generic lots before knowing the actual assignment, and this will create significant uncertainty. In effect, Ofcom is assuming that aggregation risk will be eliminated through this multi-stage auction process, but the differing nature of specific lots means that such aggregation risk in fact still remains. Further consideration is required of an auction based on specific rather than generic lots.

H3G urges Ofcom to refine the auction rules to eliminate such problems and would be happy to discuss these issues with Ofcom further.

5.2. Practical approaches to refining the auction rules

Given the above, Ofcom needs to give serious consideration to further consultation on, refinement of and explanation of the proposed auction rules. H3G is concerned that nothing of this type appears to be envisaged in the next steps set out in Section 10 of the Consultation.

By contrast, the FCC in the United States has being going through a long process of consultation and testing in designing its own simultaneous, multi-round combinatorial auction.[19] At one stage, the 2000 3G spectrum licence auction was also planning to use a novel auction design: the Anglo-Dutch format. This also involved substantial discussions with relevant stakeholders through the UMTS Auction Consultation Group ("UACG") and testing of the auction format.[20] No similar provisions or consultation forum has been set up for Ofcom's proposed awards.[21]

The importance of laboratory experiments of a novel auction format are also clearly explained in a paper by the auction theorists involved in advising on the appropriate format in the 2000 auction. Professors Klemperer and Binmore state:

> *"Experimental testing in the laboratory and in computer simulations was very helpful. It helped us test our theories, but did much more than that. Experiments are much more persuasive than showing them equations, so experimental work helped get our advice accepted."*[22]

Further:

> *"Since the three stages of an Anglo-Dutch auction are quite complicated, we thought it especially important to test its efficiency in the laboratory."*[23]

Such arguments apply with equal or greater force to the format being proposed by Ofcom for the award of the Spectrum Bands, which is of significantly greater

[19] See http://wireless.fcc.gov/auctions/default.htm?job=auctions_home
[20] The UAGC's papers showing the extent of such discussions are at http://www.ofcom.org.uk/static/archive/spectrumauctions/uacg/index.htm. See for example, the papers *Auction Design (4) - UACG(99)17* and *Auction Design (3) - UACG(99)8* which discuss the testing undertaken at University College London on proposed auction formats.
[21] Periodic workshops which principally involve Ofcom presenting and explaining the proposals it has already decided to put forward for formal consultation are not a substitute for such pre-consultation discussions.
[22] See "The biggest auction ever: the sale of the British 3G telecoms licences" Economic Journal (2002) by Ken Binmore and Paul Klemperer.
[23] *Ibid.*

complexity than the Anglo-Dutch design initially proposed for the 2000 licence auction.

Proper assessment of a particular auction format ultimately depends on a precise reading of the formal rules of the auction. Auction theory in and of itself cannot precisely predict outcomes or unambiguously identify the relevant equilibria. For these reasons, best practice as noted above is to test auction formats either experimentally or through “dry runs” with potential bidders. In proposing the use of an untested auction design, it is to be expected that Ofcom would plan to provide stakeholders with draft rules for discussion, and test the operation of these rules in an experimental setting. This would allow potential problems with the approach to be identified and rectified before a “live” auction. H3G would expect that the results of such tests would also be provided to potential bidders to provide data on which to base any bidding strategies. Such a process would provide greater certainty that the auction design chosen was likely to be efficient. It would also enable different detailed auction designs to be tested against each other. This would allow a comparison, for example, of whether a combinatorial auction based on specific lots was in fact too complex, or superior to the generic lots approach proposed by Ofcom.

Without undertaking such a process, H3G believes that Ofcom has not ensured that it has provided itself with the all relevant information available on which to base its decision on which auction format is most efficient. That is, which auction format is most likely to fulfil its statutory duties and stated objectives for the award.

Annex: Response to individual consultation questions

Question 1: Do you agree with these proposals for the awards of the three bands or have any other comments on the contents of this document?

H3G believes that there are significant problems with Ofcom's current proposals and that currently Ofcom's approach will not promote the objectives for the awards. Modifications are required to timing, licence conditions and auction design as set out in the rest of this response.

Question 2: Do you agree with the analysis in section 5 or have any comments on adjacent interference issues?

As discussed in section 4 of this response, H3G believes that there are more fundamental issues with the proposed technical licence conditions which need to be resolved before adjacent interference issues can be properly assessed.

Question 3: Do you agree that Ofcom should authorise use of the spectrum bands 2500-2690 MHz, 2010-2025 MHz and 2290-2300 MHz?

See specifically section 2 of this response.

Question 4: Do you agree that awarding licences by auction would be the appropriate mechanism for authorising use of the spectrum bands 2500-2690 MHz, 2010-2025 MHz and 2290-2300 MHz?

Whether an auction is the most appropriate mechanism depends to a great extent on the exact format chosen for the auction. H3G believes that Ofcom's current proposals for the auction format need revision and further consultation (see sections 1.1 and 5.2 of this response).

Question 5: Do you agree that it is likely to be in the interests of citizens and consumers to proceed with the award of the 2.6 GHz and 2010 MHz bands as soon as practicable, rather than to delay the award pending reduction in uncertainty relating to other bands?

No, see section 2 of this response.

Question 6: Do you agree Ofcom should aim to award the bands 2500-2690 MHz, 2010-2025 MHz and 2290-2302 MHz by the end of 2007, while keeping the position on the 2.6 GHz and 2010 MHz bands under review in the light of possible developments in European regulatory fora?

See section 2 of this response.

Question 7: Do you agree with Ofcom's proposals for licence conditions (technology neutrality, tradability, conditions of tenure and absence of roll-out obligations)?

See sections 4.4 and 4.5 of this response.

Question 8: Do you have views on whether or not there should be a "safeguard" cap on the amount of spectrum that any one bidder could win in an award for the 2.6 GHz bands and, if so, do you have a view on whether 90 MHz would be an appropriate size for a safeguard cap?

H3G does not currently have strong views on the costs and benefits of such a safeguard cap as currently described by Ofcom. However, if any such cap is implemented potential bidders need significantly greater certainty on the workings of

such a cap. Further, H3G notes that such a safeguard cap does not deal with a range of other potential competition issues which are unlikely to be addressed efficiently through *ex post* competition law. See section 3.2.

Question 9: Do you agree with Ofcom's proposal to package spectrum as lots of 2 x 5 MHz for paired use and 5 MHz lots for unpaired spectrum and to allow the aggregation of lots by bidders?

See section 4.1 of this response for H3G's views on the spectrum packaging proposals.

Question 10: Do you agree with Ofcom's proposed approach to allowing the respective amounts of paired to unpaired spectrum for the band 2500-2690 MHz to be varied (maintaining the 120 MHz duplex spacing and allowing additional unpaired spectrum, if needed, at the top end of the band)?

H3G believes there are significant problems with the proposed flexibility, which result in discrimination against technologies based on paired spectrum. See section 4.1.

Question 11: Do you agree with Ofcom's proposals for a 5 MHz restricted block between FDD and TDD neighbours and between TDD and TDD neighbours and with a modified out-of-band base station mask for second adjacent 5 MHz blocks?

H3G agrees that there needs to be interference protection measures between such neighbours, but does not believe that Ofcom's proposals based on a licences with more restrictive conditions is unlikely to be sufficient to provide such interference protection. The proposals in the Consultation in this respect do not take account of mobile to mobile interference issues. Proper guard bands may well be the only solution. See section 4 of this response and section 4.3 in particular.

Question 12: Do you agree with Ofcom's proposals to award the 2010 MHz band as a single 15 MHz lot?

H3G has no specific comments at this stage in this question.

Question 13: Do you agree with Ofcom's proposals to award the 2290 MHz band as a single 10 MHz lot?

H3G has no specific comments at this stage in this question.

Question 14: Do you agree with Ofcom's proposals to combine the award of the 2.6 GHz and 2010 MHz bands and to hold the award of the 2290 MHz band separately and in advance?

Yes. Given the lack of complementarity or substitutability between these bands, H3G believes Ofcom should go further and completely separate these two awards.

Question 15: Do you agree with Ofcom's proposals for a two-stage auction design for the 2.6 GHz and 2010 MHz bands?

Ofcom's proposed auction design has significant, as yet unresolved, issues. Unless these issues are resolved there is a danger that the award process will not be efficient. H3G believes that there is a strong case for further consideration of alternative auction formats and that Ofcom needs to undertake further work in this area before concluding on any particular auction format.

Question 16: Do you agree with Ofcom proposals to award the 2290 MHz band through a second price sealed bid auction?

H3G has no specific comments at this stage in this question.

Question 17: Do you have a preference for either of the two approaches to specifying technical licence conditions?

H3G does not believe that the SUR approach to specifying licence conditions is fit for purpose, workable or provides sufficient technical and legal certainty to licence holders. As such, of the two approaches presented in the Consultation the spectrum mask approach is the only feasible one.

Question 18: Do you have any comments on the transmitter spectrum masks defined below?

See section 4.3 of this response.

Question 19: Do you have any comments on the SUR parameters defined below?

Given the wider unresolved issues with SUR approach, detailed comments on the specific parameters is impossible. Before comment on such issues is feasible, these wider issues need to be resolved. On the basis of current information, H3G does not believe that any implementation of SURs would be feasible and therefore this question is not relevant. See section 4.2 of this response.

Question 20: Do you have any comments on the SUR methodology and assumptions detailed in this annex?

Given the wider unresolved issues with SUR approach, detailed comments on the specific approach to defining SURs is impossible. See section 4.2 of this response.

Question 21: Do you have any comments on the use of the Visualyse tool as described, on the assumptions or the propagation model proposed in this annex?

Given the wider unresolved issues with SUR approach, detailed comments on the specific approach to defining SURs is impossible. See section 4.2 of this response.

Question 22: Do you have any comments on the assumptions detailed in this annex?

Given the wider unresolved issues with SUR approach, detailed comments on the specific approach to defining SURs is impossible. See section 4.2 of this response.

Annex: comments on Ofcom's impact assessment

Ofcom is required under section 7 of the Act to produce an impact assessment where Ofcom is making proposals that are likely to have a significant effect on businesses or the general public or where there is a major change in Ofcom's activities.

The proposed award of spectrum licences for the 3G Expansion Bands is the most significant award of spectrum since the 3G auction in 2000. The significance of this award is illustrated by the recent study produced for Ofcom by Europe Economics on 'the economic impact of the use of radio spectrum in the UK', published 16 November 2006. This study updates a previous Radiocommunications Authority study published in 2002. The public mobile sector accounts for approximately 50% of the estimated net economic benefits to the UK economy from all uses of the radio spectrum, which Europe Economics estimates equated to £21.8 billion in 2006.

The public mobile sector is therefore a major contributor to the UK economy. The five Mobile Network operators have invested billions of pounds in their networks and services. The public mobile sector has been one of the most dynamic sectors of the UK economy over the past decade. The 3G sector is at a critical phase in its development (as discussed in the main body of this response), 3G coverage is now extensive for more than one network and the range and price of 3G handsets is becoming competitive with 2G products, while offering greater functionality.

The impact assessment required by Section 7 of the Act for such important proposals must fully address Ofcom's statutory duties and show how the proposals are proportionate to the potential consequences to businesses and consumers. Ofcom is obliged to fully address its duties under Section 7 of the Act and should also address the wider duties under Section 3 of the Act (setting out Ofcom's general duties) and Section 4 of the Act (fulfilling community obligations).

In contrast, the Impact Assessment provided is superficial and lacks the evidential material to demonstrate that Ofcom has assessed the potential impact on different groups of businesses, citizens and consumers. The assessment is contained within just eleven pages of the consultation document. While the Mason Report and associated Ofcom report relate to these issues to some extent, both documents only address technical issues. There is no serious attempt to discuss the costs and benefits in terms of the market and economic impacts of the various options. These are important aspects which need to be considered in the analysis of the different proposals. It is instructive to compare the more detailed and forensic approach taken in the Digital Dividend Review ("DDR") consultation, published 19 December 2006. Unlike the Consultation, this latter document includes a substantially different approach to the Impact Assessment. The DDR has devoted a total of one hundred and thirty seven pages to various aspects of the Impact Assessment plus a market research study and an economic study has been made available on Ofcom's website. These studies are in addition to various technical studies commissioned by Ofcom and made publicly available.

In the DDR, the approach to the Impact Assessment is more balanced and there is much greater transparency. The starting point in the DDR is to evaluate demand for spectrum for each potential candidate use, and then to estimate the consumer and producer surpluses for these uses. Market failure is explicitly considered together with transitional issues for each candidate use. Whilst there remain issues with the detail of the Impact Assessment material presented in the DDR consultation, the approach taken and the amount of relevant, evidence based, material released for

stakeholders is of a different order to that made available in the Spectrum Bands consultation.

H3G believes that Ofcom must be consistent in its approach to such major consultation processes. Ofcom needs to provide a more detailed analysis for the Impact Assessment, comparable to that in the DDR consultation. Given the more complex competition and harmonisation issues (as discussed in the body of this response) it is possible that a proper impact assessment for the award of the 3G Expansion Bands should in fact be more detailed and more comprehensive than is required for the DDR.

H3G would therefore expect that a comprehensive and rigorous Impact Assessment would be produced for such an important award of spectrum. Such an Impact Assessment needs to include a quantitative cost benefit analysis [●].