Hutchison 3G UK Limited
Star House
20 Grenfell Road
Maidenhead SL6 1EH
United Kingdom

T +44(0)1628 765000
F +44(0)1628 765796
www.three.co.uk

Hutchison 3G UK Limited

Response to Ofcom's Consultation

Application of Spectrum Liberalisation and Trading to the Mobile Sector

Including Implementation of the Radio Spectrum Committee Decision on 900MHz and 1800MHz

NON-CONFIDENTIAL VERSION

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Registered Office: Hutchison House, 5 Hester Road,
Battersea, London SW11 4AN
Registered Number: 3885486 England and Wales

Executive Summary

Overview

H3G strongly disagrees with Ofcom's proposals for the liberalisation of the 900MHz and 1800MHz bands. The preferred approach in the Consultation provides preferential treatment to the four incumbent Mobile Network Operators (O2, Vodafone, Orange and T-Mobile. referred to throughout as the "incumbent MNOs") and puts H3G at a [●] disadvantage [●]. This approach is therefore discriminatory, distorts competition and is disproportionate. Further, it fails to meet the obligations imposed on Ofcom, by the 1999 Information Memorandum,

> *"to take account of potential effects on the viability of existing 2G and 3G operators and of the case for rectifying any distortions in the market caused by historic assignments".*

Ofcom's preferred approach amounts to a cross between assignment by auction and an administrative allocation. Ofcom contends it cannot administratively allocate rights yet, in substance, that is what it is doing in allowing the incumbent MNOs to retain refarmed spectrum - in an unfair, discriminatory and inconsistent manner. H3G's view is that Ofcom should either administratively allocate all additional rights of use on a fair basis (i.e. to all MNOs) or hold a clear auction in which all five MNOs have the same rights to bid.

In any event, it would be inappropriate and procedurally unfair for Ofcom to proceed without further consultation. It has not provided sufficient information on its intended approach to the proposed 900MHz auction or on how it would set AIP for any retained spectrum. It has also relied on information that is factually incorrect and incomplete undermining its reasoning in the present Consultation. Ofcom's technical modelling is also subject to significant flaws.

A further factor in favour of at least extending the Consultation is Ofcom's late provision of the "Answers to stakeholder questions relating to cost modelling" document published on 19 November 2007. The document was provided only 10 days before the closing date of the consultation and therefore too late in the consultation period for full consideration to be given to it by consultees.

Context (Section 1)

H3G entered the UK mobile market following the 3G spectrum auction in 2000 (the "2000 Auction"). H3G provides a significant competitive impetus to the development of mobile broadband, but remains a much smaller competitor and is not yet profitable (in contrast to its direct competitors).

Ofcom must have regard to the historical context and, in particular, the structure of the market established by the 2000 Auction. Ofcom must promote competition through spectrum allocations which do not, as far as is possible, distort competition nor exacerbate the existing distortions in the market by providing further significant benefits to the legacy holders of 2G spectrum [●]. H3G has delivered substantial benefits to consumers through its role as a new entrant. [●].

Mobile broadband services are increasingly important and should be a major part of the delivery of broadband services generally to UK citizens and consumers. Undermining H3G's ability to provide a competitive impetus would undermine the likelihood that mobile broadband can be an effective part of the delivery of "broadband Britain."

Ofcom's proposals are discriminatory, disproportionate and will distort competition (Section 2)

As acknowledged by Ofcom, 900MHz spectrum has certain characteristics that cannot effectively be substituted by available 3G spectrum at other frequencies. H3G will not be able to compete effectively against those that do have access to it unless it also has access on competitively neutral terms. Ofcom's proposals would give O2 and Vodafone guaranteed rights to use 900MHz spectrum for 3G. By contrast, H3G would have no more than a possibility of obtaining a single carrier in an open auction. [●]

Ofcom's preferred approach would also leave H3G with no 1800MHz spectrum and no opportunity to obtain it other than through trading with its direct competitors, who will be allowed to refarm their current holdings without restriction. Overall, Ofcom's preferred approach will leave H3G with much less 3G capacity than its competitors [●].

This disadvantage in terms of total capacity is [●] important. The impact of capacity differentials is becoming ever more important over time. Mobile broadband services are increasingly bandwidth-hungry. Having greater capacity allows an operator to offer its customers better, and cheaper, services. [●]

Ofcom's approach to auction and administrative allocation is inconsistent and unfair (Section 3)

Ofcom's proposals consist partly of administrative allocation and partly of auction. It is inconsistent and wrong for Ofcom to claim to be unable to allocate administratively cleared 900MHz carriers whilst simultaneously allocating additional rights to those with existing licences in the 900 and 1800MHz bands (both in terms of duration and scope of use).

It would, in fact, be perfectly lawful for Ofcom to administratively allocate all the additional rights created by its proposed liberalisation of the 2G spectrum. The only conditions are that it must be open, transparent and non-discriminatory in so doing: H3G considers that this would require fair distribution to each of the MNOs. The only other viable alternative would be for Ofcom to conduct a clear auction of all 900 and 1800MHz spectrum. Ofcom's analysis concluding that it would be disproportionately costly to do so is flawed since it failed to consider an obvious alternative, a full auction in 2009 with release only occurring two or three years after, that would dramatically reduce the amount of spectrum actually cleared.

Further consultation is required because of missing and inaccurate information (Section 4)

The consultation process is flawed, and further consultation will be required, as Ofcom has failed to provide sufficient information on the formula it would use to determine AIP on any retained spectrum and on the design for any proposed auction of current GSM spectrum. This information needs to be considered in any evaluation of Ofcom's preferred options and there cannot be a fully informed consultation in its absence.

Re-consideration and further consultation is also required because Ofcom has made serious factual errors that undermine its reasoning:

- Ofcom's assumptions about the likelihood of UMTS usage of the 1800MHz band and the cost of equipment for the same are based on information that is demonstrably wrong. UMTS 1800 is a real possibility and is already being implemented in Japan. There are no reasons for considering UMTS 1800 is not possible in the UK.

- Ofcom's technical assessment and modelling also includes serious errors and over-simplifications. In summary, these include failing to take account of HSPA deployment, increases of data, the price differential between combined 2G/3G handsets and 2G handsets, the varying nature of cell sites and the differing costs associated with cell sites.

Ofcom's analysis also fails to take account of the competitive effects of capacity differentials arising from asymmetric 3G spectrum allocations.

A consistent approach should be adopted to liberalisation of 2100MHz (section 5)

Ofcom should adopt an approach to 2100MHz that is consistent with its approach in 900MHz, 1800MHz and other liberalised bands. It should make the 2100MHz licences tradable and confirm the indefinite duration of the licences beyond expiry of the fixed term awarded at auction. [●]

A more appropriate approach (section 6)

H3G disagrees with Ofcom's conclusion that it cannot administratively allocate cleared spectrum. Its preferred option already involves the administrative allocation of additional rights. Ofcom can, and should, administratively allocate liberalised 900 and 1800MHz spectrum so as to provide all MNOs with broadly equal access. Any allocation must not exacerbate existing distortions in the market. To the extent that H3G cannot share equally in the benefits, then other forms of compensation may need to be considered.

Alternatively, it would also be lawful and more appropriate than the existing proposals for Ofcom to hold a clear auction of all 900MHz and 1800MHz spectrum. Such an auction would need to be held sufficiently in advance of the date for the release of the spectrum so as to minimise the cost of clearance of any spectrum won by the current licensees.

In any event, there is a need to re-consider and re-consult given the flaws identified by H3G.

Contents

1. Introduction and context

Please see Annex 1 for H3G's response to the individual Consultation Questions, which should be read together with this response as a whole.

1.1. Introduction

The current consultation “Application of Spectrum Liberalisation and Trading to the Mobile Sector Including Implementation of the Radio Spectrum Committee Decision on 900MHz and 1800MHz” (“the Consultation”)[1] follows a series of consultations conducted by Ofcom concerning the liberalisation of 900MHz and 1800MHz bands so as to permit their use for technology other than 2G (“2G spectrum liberalisation”). Consideration by Ofcom of this issue long pre-dates the discussions concerning the Radio Spectrum Committee (“RSC") Decision.

2G spectrum liberalisation was foreseen even before the 3G spectrum licence auction held in 2000 (the "2000 Auction"). It was the subject of discussion by potential bidders and representatives of the Government in the UMTS Auction Consultation Group ("UACG") and was referred to in auction documents. It was raised in subsequent discussions with legacy regulators the Radiocommunications Authority ("RA") and Office of Telecommunications ("Oftel") and has been on Ofcom's agenda since its establishment. Ofcom formally consulted on 2G spectrum liberalisation options in the "Spectrum Framework Review: Implementation Plan" published on 13 January 2005. It also held more informal follow-on discussions during 2006.

In parallel, there have been discussions and consultations concerning 2G spectrum liberalisation and related issues at the European level. The draft RSC Decision is one output from this process. It would be misleading, however, to suggest that the RSC Decision has fundamentally altered the landscape or that Ofcom might be minded to adopt a different approach but for the draft RSC Decision.

Many of the same issues arise now as arose in previous discussion of 2G spectrum liberalisation. H3G is disappointed that Ofcom's preferred approach for the 900MHz band does not involve equitable treatment of the whole band and that Ofcom proposes that there be no redistribution of 1800MHz spectrum. Rather than repeat all the submissions that H3G has made previously, both to Ofcom and to European bodies, H3G refers Ofcom to the various responses it has submitted previously. H3G also refers Ofcom to its letter of 28 September 2006. This submission is attached as Annex 2 since it was not previously in the public domain. H3G continues to believe that Ofcom needs to comply with the principles identified in that letter and does not believe that Ofcom’s current proposals sufficiently address the points raised. In H3G's view, Ofcom’s current proposals will be unduly discriminatory, disproportionate, will distort competition in the mobile market and will fail to promote efficient spectrum usage.

1.2. Historical context for 2G spectrum liberalisation

Prior to the 3G Auction, the UK mobile market was controlled by four incumbent MNOs (O2, Vodafone, Orange and T-Mobile referred to throughout as the "incumbent MNOs") who had weak incentives to accelerate investment in the roll-out and adoption of 3G technology and to compete aggressively on price. The UK Government addressed this by taking a policy decision to grant one of the 3G licences to a new entrant.

[1] Published on 20 September 2007.

The Government designed the 2000 Auction and the associated licence terms in such a way as to facilitate the entry of a new entrant, with one licence specifically reserved for a new operator. As it noted in the Information Memorandum ("IM") published in November 1999 as part of the 2000 Auction process:

> "HM Government (the "Government") is keen that New Entrants to the UK mobile market, as well as existing 2G operators, should be encouraged to take part in the Auction. The Government has taken innovative but appropriate and fair steps to provide New Entrants with the opportunity to bid for WT Act Licences and subsequently roll out 3G networks on a more equal footing with existing 2G operators." (para 1.1.1, IM)
>
> "The Government has decided to make five WT Act Licences available for auction. A five licence auction is intended to deliver the Government's objective for the efficient use of the spectrum and, in particular, will encourage market entry and sustainable competition by ensuring that at least one New Entrant can enter the UK market." (para 1.1.4, IM)

The Government sought to make the 2000 Auction attractive to new entrants by reserving the largest 3G licence for the new operator. A larger amount of spectrum was offered to the new entrant to help it overcome the disadvantage of being a new entrant. This policy decision was not in anticipation of any future 2G spectrum liberalisation decision. On the contrary, the Government gave assurances that any future decision on the 2G spectrum liberalisation would:

> "… take account of potential effects on the viability of existing 2G and 3G operators and of the case for rectifying any distortions in the market caused by historic assignments." (para 3.4.1.3, IM)

The Government did not suggest that distortions might actually be created or exacerbated by 2G spectrum liberalisation. H3G went on to bid for and win a 3G licence in reliance on these statements.

Discussions at the European level also noted the need to take account of legacy issues to ensure that any liberalisation would be fair. H3G notes, for example, the comments in the RSPG WAPECS opinion of 23 November 2005, as follows:

> "The RSPG notes that Member States have identified a number of constraints, which have the potential to limit the use of particular bands for WAPECS. These constraints include: (I) Legacy issues arising from the initial assignment of individual rights to use frequencies. The most important of these is the differing economic values of different frequency bands and categories of networks, where both are used to deliver electronic communications services. In some cases the fee for authorising the use of spectrum has been decided by the State, where the spectrum was assigned by a beauty contest or on a first-come, first served basis with a pre-determined licence fee. In other cases, the fee for authorising the use of spectrum was determined by an auction;"

Similarly, of course, Recital 16 of the RSC Decision states that:

> "Differences in the national legacy situations could result in competitive distortions. The existing regulatory framework gives Member States the tools to deal with these problems in a proportionate, non-discriminatory and objective manner, subject to Community law including the Authorisation Directive and the Framework Directive."

Clearly, it was envisaged by the RSC that measures would need to be taken to level the playing field where legacy 2G operators would acquire a significant advantage in the 3G market as a result of 2G spectrum liberalisation. Ofcom's proposed

distribution of the released spectrum makes no proper attempt to rectify the distortion [●]. Equally, failure to meet the expectations created in the 2000 Auction will undermine the credibility of future auctions, making them less efficient. Much of Ofcom's emerging spectrum policy could be undermined if the 2000 Auction commitments are not clearly honoured.

Ofcom notes in the Consultation[2] that it has taken account of the history of licensing of spectrum in its assessment and that that this history has resulted in significant differences between the existing five MNOs in terms of their current spectrum holdings. Ofcom has not, however, followed through on this statement as it has effectively created a proposal that increases the existing differential rather than rectifying it. T-Mobile and Orange, for example, will go from having two 3G carriers each to a guaranteed eight 3G carriers each[3] whilst H3G will continue to have only three. Even if, under Ofcom's preferred approach, H3G wins an additional 3G carrier in the proposed 900MHz auction it will still be at a significant disadvantage in terms of the number of 3G carriers available to it.

Ofcom's preferred approach in the Consultation can be contrasted with the approach of the RA when allocating 1800MHz spectrum. On that occasion, the RA took account of the position of all competing MNOs and awarded some 1800MHz spectrum to the existing 900MHz operators as well as to the new entrants so that holdings were broadly equivalent. H3G considers that there are no legal impediments to a similar approach and that it is both appropriate and necessary to take account of the positions of all competing MNOs.

H3G considers that it would be inconsistent with H3G's legitimate expectations, detrimental to competition in the mobile market and does not represent an efficient use of 3G spectrum resources for Ofcom not to attempt to properly rectify the existing competitive distortions. Ofcom needs to have more regard for the historical context and the Government's commitment to rectify the distortion created by legacy assignments.

1.3. H3G has fulfilled the role expected of it in stimulating take-up of 3G and increasing competition

Ofcom should take into account the positive impact of H3G on competition in the mobile sector generally and the adverse impact that would result from any 2G spectrum liberalisation treatment that benefits the incumbent MNOs substantially more than H3G, and further distorts the ability of H3G to compete with the incumbent MNOs.

3G technology is providing significant benefits to UK citizens and consumers. New services are already being enabled through 3G technology and networks are being rolled out which will enable the provision of both new and existing services in a more efficient way over the longer term. This is, to a large extent, due to the entry of H3G, as contemplated in the design of the 2000 Auction by the Government.

H3G has increased competition to the benefit of UK consumers. H3G rolled out its 3G network earlier, quicker and further than all other 3G operators. As previously noted in communications with Ofcom, H3G's entry has led to a reduction in overall retail consumer prices and driven the roll-out of 3G technology and service including innovation in the successful introduction of, *inter alia*, the delivery of music tracks and video to mobile handset, mobile instant messaging, mobile TV services[4], user

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2 Paragraphs 1.10, 7.8. of the Consultation.

3 As discussed below, it is clear beyond doubt that the technology will be available for rolling-out UMTS in the 1800MHz band. Ofcom is mistaken in its contrary assessment.

4 H3G was the first network to broadcast a live terrestrial TV channel, simulcasting ITV1 from 4 September 2006. H3G has been providing a range of Mobile TV services since at least October 2005.

generated content sharing,[5] and mobile social networking sites. For example, H3G has successfully pioneered a mobile version of the market leading Windows Live Messenger service, linking consumers to their existing Instant Messaging network on a mobile service. In August 2007 H3G launched Yahoo Messenger. Since launching this service an average of 100million messages each month have been sent and received and over a billion messages have been sent across H3G's network.[6]

H3G's customers are also increasingly using the content services provided by H3G Figures for January 2007 to September 2007 show that [●] music tracks, [●] games, [●] TV events, [●] wallpapers, pictures and ring tones have been downloaded. This is in the context of an overall registered subscriber base of around 4 million.[7]

H3G has also recently launched the innovative Skype phone. H3G has offered Skype services on its network since November 2006. The Skype phone makes the use of this service even easier with a co-branded handset with a dedicated button to make Skype calls. Skype to Skype calls and Skype instant messages sent from such handsets are included for no extra cost in the tariffs on which this handset is sold.[8] H3G also announced its Turbo HSDPA broadband product which provides an easy to use USB HSDPA modem providing mobile broadband speeds up to 2.8MBps. H3G is rapidly rolling out its HSPDA network coverage.

Not only has H3G innovated using the 3G capability to provide new services, it has also innovated commercially. H3G provides significant amounts of video content free to the customer through advertising funded services. More than one million customers (i.e. over quarter of H3G's customer base) have registered to receive content in this way.[9] H3G's mobile broadband tariffs have also provided clear simple price points for consumers, delivering significant market leading value to accompany their ease of use.[10]

Continuing innovation will require ongoing competitive pressure from H3G that is at least as strong as it has been to date. With respect to this point, Ofcom has incorrectly assumed that liberalising spectrum will automatically facilitate a rapid introduction of 3G services, and thereby competition (and innovation) in the 3G market. In fact, the reasons that 3G services have not been fully pursued by the incumbent MNOs to date are:

> (i) the very high network rollout capex to achieve 90% population coverage using the 2100MHz band;
>
> (ii) the significant cost differential between a combined 2G/3G handset and a 2G handset. With over 60% of the market at pre-pay, where subsidies are far more difficult to recover, a 3G handset presents a real market share risk to the operator who enters; and

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5 H3G launched SeeMeTV in Quarter 4 2005, which is a highly successful way for user generated video content to be published [●]. This service has now been copied by other mobile networks.

6 See H3G press release dated 26 October 2007 available at http://www.three.co.uk/news/h3gnews/pressnewsview.omp?collcid=1019745742912&cid=1193312791843&index=2

7 Hutchison Whampoa unaudited results for the six months ended 30 June 2007 states that the registered subscriber base for the 3 Irish and UK businesses was 4095 thousand at 22 August 2007. Available at http://www.hutchison-whampoa.com/upload_docs/2007/08/Corporate/1942/1942_eng.pdf

8 See H3G press release dated 29 October 2007 available at http://www.three.co.uk/news/h3gnews/pressnewsview.omp?collcid=1019745742912&cid=1193312792265&index=1

9 See H3G press release dated 18 October 2007 available at http://www.three.co.uk/news/h3gnews/pressnewsview.omp?collcid=1019745742912&cid=1192714068486&index=5

10 See H3G press release dated 12 September 2007 available at http://www.three.co.uk/news/h3gnews/pressnewsview.omp?collcid=1019745742912&cid=1189778352203&index=9

(iii) the risk of having to move existing business models from a foundation of 'caller pays' to 'subscription based' services which the move to internet and IP based services tends to drive.

The assumption that if networks can be rolled out at a lower cost then there will be an incentive to drive 3G service innovation and uptake is therefore misguided. The impetus for further roll out will come from strong and effective competition, not simply lowering one aspect of the costs of 3G roll out. Without this impetus, incumbent MNOs will face (at least short run) incentives to incur as few 3G costs as possible by delaying any roll out at all. Liberalising spectrum in the hands of the incumbent MNOs does not automatically ensure competition in the 3G mobile market where H3G's position as a competitive driver is crucial.

[●]

1.4. Next generation broadband

Mobile broadband is a key element of the future of broadband in the UK. In the context of the current debate on next generation broadband access and ensuring that the benefits of broadband are available to all UK citizens and consumers, mobile broadband plays a role both as an important complement to fixed broadband access and as an alternative technology providing such access. Mobile broadband can increasingly be used to provide alternative and more convenient forms of broadband to citizens and consumers who would not otherwise be able to access broadband services. For example, H3G's Turbo service currently provides access at speeds up to 2.8MBps with straightforward tariffs which can be used by those without a permanent address (such as students) or without access to a BT line. In future, mobile broadband will be able to provide higher speeds and could also be part of the solution to providing broadband in geographical areas where ADSL is not available as is currently happening in Ireland. Another potential future development would be the introduction of pre-paid services which would be an important part of bringing broadband to the "digitally disenfranchised".

H3G believes that it is entirely feasible that there could be up to 10 million mobile broadband subscribers within five years, and broadband speeds of 14.4MBps should be feasible using 3G technology within 2 years. H3G's mobile broadband offerings are already pioneering easy to understand tariffs and providing convenience of access to consumers.

The further development of mobile broadband, and its ability to provide both competition to fixed broadband and a valuable complementary service to fixed broadband, is reliant on the continuing development of a strong competitive landscape and investment certainty for network operators. H3G considers it is likely that, in order to reach its full potential, mobile broadband may also require some co-operation or collaboration between operators (for example, to provide service in rural areas).

The issues addressed in the Consultation are central to whether mobile broadband fulfils this promise. The existing 2G spectrum must be liberalised in such a way that existing competition in the mobile broadband sector is maintained and enhanced. H3G's position as a new entrant, committed to 3G technology, is providing a competitive stimulus to innovation in the market (both in the forms of tariffs offered to customers and technical developments). [●]

In liberalising the 900MHz and 1800MHz bands, Ofcom should take account of the importance of maintaining spectrum allocations which enable there to be five strong competitors to ensure that a strong and ubiquitous mobile broadband infrastructure can be provided for the UK. [●]

2. Ofcom's proposals are discriminatory, disproportionate and will distort competition

Ofcom's preferred approach for liberalising both the 900MHz and the 1800MHz bands is discriminatory, disproportionate and will distort competition. Ofcom will therefore fail to comply with its legal obligations if this approach is implemented.

2.1. Ofcom's legal obligations

The Framework Directive (2002/21/EC) provides that NRAs shall promote competition by inter alia ensuring that there is no distortion or restriction of competition in the electronic communications sector and by encouraging efficient use and ensuring the effective management of radio frequencies (Article 8(2)). Article 9 provides that Member States shall ensure that the allocation and assignment of radio frequencies are based on objective, transparent, non-discriminatory and proportionate criteria.

These provisions are then supplemented by the terms of the Authorisation Directive (2002/20/EC). Article 5(2) requires that rights of use to wireless spectrum be granted through open, transparent and non-discriminatory procedures. Although not referred to by Ofcom in the Consultation, Article 14(1) is also relevant. It allows amendment of rights only in "objectively justified cases" and in a proportionate manner. Grant and variation of spectrum rights is now covered in UK legislation in the Wireless Telegraphy Act 2006 ("the 2006 Act") but H3G notes that the EU legislation must take priority if there is any inconsistency.

H3G agrees that Ofcom's general duties under sections 3 and 4 of the Communications Act 2003 and section 3 of the 2006 Act are also relevant in assessing the discretion available to Ofcom and how it should exercise that discretion. H3G would particularly stress that these include obligations to promote competition[11] and to have regard to the desirability of encouraging investment and innovation[12].

Ofcom must also respect other requirements of EU and domestic law. In the present context, H3G considers that state aid laws are relevant and also legitimate expectations. Other public law requirements, such as procedural requirements, are likely to be relevant.

2.2. Ofcom has inadequately considered the requirements of non-discrimination, proportionality and the promotion of competition

The common theme running through the provisions of the Framework Directive and Authorisation Directive (and domestic laws transposing the same) is that Ofcom's actions must be non-discriminatory, proportionate, and promote competition. There is, however, little consideration of the non-discrimination requirements in the Consultation other than a one-sided discussion of proportionality and a flawed consideration of the promotion of competition.

Ofcom says that:

> "Ofcom's view as set out in section 7 is that non-discrimination means that comparable situations must not be treated differently and that different

[11] Section 3(4)(b).
[12] Section 3(4)(d).

situations must not be treated in the same way unless such treatment is objectively justified."[13]

H3G agrees with this general proposition but unfortunately there is little further consideration of discrimination in the remainder of the Consultation and the only definitive statement is in relation to 1800MHz, which H3G considers to be incorrect[14]. As discussed below, H3G considers that Ofcom's proposals are discriminatory in that they treat differently operators who are alike in material respects (i.e. they compete on the same markets) and do so without any objective justification.

The proportionality requirement is considered but only to the extent of whether any costs or detriment that would occur for the incumbent MNOs as a result of the proposed action by Ofcom would be proportionate to the objectives achieved. There is no consideration of whether Ofcom's proposed actions would have a disproportionate impact on H3G [●].

Ofcom's analysis in the Consultation concentrates significantly on the "promotion of competition" and on "efficiency". H3G agrees that these are relevant considerations, not least under section 3 of the 2006 Act, but considers that Ofcom's consideration of these factors has not properly taken into account the impact of the proposals on H3G and hence is only a partial analysis. The discriminatory treatment of H3G in fact harms competition.

[●]

2.3. Ofcom has failed to consider the relevance of capacity and asymmetric spectrum holdings

Capacity is crucially important in 3G. Mobile broadband services are increasingly bandwidth-hungry. Having greater capacity allows the option to offer more bandwidth-hungry services at lower prices. Where a large disparity exists between the amount of 3G capacity held by different operators, it is unlikely that the MNO(s) with much less capacity will be able to match the offers of those with more. This, in turn, has implications for the level of fixed costs per subscriber. If a MNO with less 3G capacity becomes less competitive, as it cannot match the offers of others, it is likely to acquire fewer subscribers with the result that there are fewer subscribers to absorb the overall fixed costs. Greater capacity also allows the incumbent MNOs to benefit more from economies of scale, which reduces operational costs per user. Higher costs per user, in turn, imply lower margins or further increased prices.

Ofcom's proposals will lead to a significantly asymmetrical outcome in spectrum holdings[●]. Refarm of 1800MHz in the hands of the incumbent MNOs provides to the other MNOs a massive advantage in terms of aggregate capacity. Orange and T-Mobile have sufficient spectrum at 1800MHz to provide six 3G carriers each at 1800MHz. This compares to the two 3G carriers each has at 2100MHz, for which each paid in the region of £4 billion. It is not evident from the Consultation that Ofcom has done any analysis of the extent to which this 1800MHz capacity is used for 2G. H3G strongly suspects that there will be plenty of spare capacity to be converted to 3G without any additional 2G migration. Further, the refarm of much of the 900MHz band in the hands of Vodafone and O2 provides a further advantage in terms of aggregate capacity to these two incumbents[15].

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13 Page 284 of the Consultation. H3G does not understand the reference to section 7, which does not address this point

14 Discussed further in Section 2.5.2 of this response.

15 More so in the medium to long term as 2G traffic continues to decrease.

The following table shows the relative paired spectrum positions of each operator in a scenario where Option A were to be adopted for both 900 and 1800MHz[16], expressing spectrum holdings in terms of equivalent 3G paired carriers.

	900MHz band	1800MHz band	2100MHz band	Total
Vodafone	3.5	1	3	7.5
O2	3.5	1	2	6.5
Orange	0	6	2	8
T-Mobile	0	6	2	8
H3G	0	0	3	3

As can be seen from this table, such a scenario would lead to H3G having less than half the available spectrum of the operator with the next smallest spectrum holding.

Ofcom's proposed approach[17], assuming that 3 900MHz paired carriers were released and that each of the eligible existing 3G operators won one of these carriers in the resulting auction would still lead to an asymmetrical outcome, as set out in the table below.

	900MHz band	1800MHz band	2100MHz band	Total
Vodafone	2	1	3	6.5
O2	2	1	2	5.5
Orange	1	6	2	9
T-Mobile	1	6	2	9
H3G	1	0	3	4

Under this scenario H3G still has significantly less 3G available spectrum than the operator with the next smallest spectrum holding and less than half of that held by Orange and T-Mobile. This is in the context of the 2000 Auction when the new entrant licence specifically ensured that H3G had the largest 3G spectrum holding.

The following table is an illustrative example, and one possibility, of how the legacy situation might be corrected taking account of the 2000 Auction outcome.

	Vodafone	O2	Orange	T-Mobile	H3G
900MHz	2.5	2.5	0	0	2
1800MHz	1	1	5	5	2
2100 MHz	3	2	2	2	3
Total Carriers	6.5	5.5	7	7	7

H3G notes that the TDD spectrum allocations have not yet been deployed for services and use of this spectrum is subject to significant interference issues which means this spectrum has not been taken into account in these comparisons.

A slightly more sophisticated approach to considering the capacity available from different spectrum holdings (and, unlike the Consultation, taking into account current evolutions of the 3G standard) makes these asymmetries even more stark. The

[16] i.e. all existing 2G spectrum is refarmed in the hands of the incumbent licensees.
[17] Option C for 900 MHz and Option A for 1800MHz.

following tables compare effective capacity of the two different sets of spectrum holdings given use of different technologies. These comparisons are done in terms of nominal "capacity units" where the available capacity from one 5MHz paired carrier using 2G technology is normalised to one. The additional efficiency of different types of 3G technology is then applied. As set out in the tables, this approach further highlights the greater effective capacity differentials (providing a more realistic comparison than the simple comparisons above of numbers of carriers).

The first table shows the effective capacity if spectrum holdings remain as they are now (i.e. if Option A is adopted for both 900 and 1800MHz).

	Without Liberalisation – 50% Voice / 50%Data				With Liberalisation – 50% Voice / 50%Data		
	GPRS or WCDMA Effective Capacity Utilisation (1)	GPRS or HSDPA Initial Deployment Effective Capacity Utilisation (1, 2)	GPRS or HSDPA Advanced Receiver Effective Capacity Utilisation (1, 3)	EDGE or HSDPA Advanced Receiver Effective Capacity Utilisation (3)	All WCDMA Effective Capacity Utilisation (1)	All HSDPA Initial Deployment Effective Capacity Utilisation (1, 2)	All HSDPA Advanced Receiver Effective Capacity Utilisation (1, 3)
Orange	52.0	70.0	90.0	101.2	88.0	160.0	240.0
O2	45.2	63.2	83.2	91.9	73.0	132.8	199.2
T-Mobile	52.0	70.0	90.0	101.2	88.0	160.0	240.0
Vodafone	56.2	83.2	113.2	121.9	84.0	152.8	229.2
H3G	33.0	60.0	90.0	90.0	33.0	60.0	90.0

The second table shows the effective capacity if Ofcom's proposed approach[18] is adopted and each of Orange, T-Mobile and H3G win one of the three carriers released by O2 and Vodafone.

	Without Liberalisation - 50% Voice, 50% Data				With Liberalisation - 50% Voice, 50% Data		
	GPRS or WCDMA Effective Capacity Utilisation (1)	GPRS or HSDPA Initial Deployment Effective Capacity Utilisation (1, 2)	GPRS or HSDPA Advanced Receiver Effective Capacity Utilisation (1, 3)	EDGE or HSDPA Advanced Receiver Effective Capacity Utilisation (3)	All WCDMA Effective Capacity Utilisation (1)	All HSDPA Initial Deployment Effective Capacity Utilisation (1, 2)	All HSDPA Advanced Receiver Effective Capacity Utilisation (1, 3)
Orange	57.0	75.0	95.0	108.1	99.0	180.0	270.0
O2	37.7	55.7	75.7	81.6	56.5	102.8	154.2
T-Mobile	57.0	75.0	95.0	108.1	99.0	180.0	270.0
Vodafone	48.7	75.7	105.7	111.6	67.5	122.8	184.2
H3G	33.0	60.0	90.0	90.0	44.0	80.0	120.0

Notes:

(1) All figures are relative to Standard 2G 5MHZ paired - 1 unit.

(2) Initial HSDPA deployment is expected to deliver 2.2 Mbps per cell

(3) HSDPA Advanced Receivers i.e. MMSE, Receive Diversity, expected to deliver 4.1 Mbps per cell

It will be apparent from the tables that the overall capacity is reasonably balanced[19] if Advanced HSDPA is used and current 2G spectrum continues to be available only

[18] Option C for 900 MHz with O2 and Vodafone releasing 2x7.5 MHz; Option A for 1800MHz.

for 2G. 2G spectrum liberalisation, however, places H3G at a massive capacity disadvantage unless there is redistribution.

Having less capacity would be particularly damaging to H3G because it would remove one of its crucial differentiators in the retail market provided to it. (H3G having previously taken advantage of the superior capacity it paid for in acquiring the larger new entrant 3G licence in the 2000 Auction). Greater capacity also allows the incumbent MNOs to benefit more from economies of scale. Disproportionate spectrum holdings (and thereby capacity) severely weakens the operator with the least capacity. Operators with greater capacity will be able to benefit from economies of scale, which reduces operational costs per user. Ultimately such operators will be able to then embark on pricing and service policies with which a weaker operator cannot compete Incumbent MNOs will be able to embark on pricing and service policies with which H3G will not be able to compete.

Ofcom has refused to accept that differences in aggregate capacity are relevant. It expresses the "initial view" in the Consultation that "it does not appear to be necessary or appropriate to equalise spectrum holdings amongst competitors in the same downstream markets."[20] Its opinion appears to be that there is no need to equalise existing holdings because H3G will be able to acquire substitute spectrum in other bands. There are, however, real problems with this reasoning:

- [●];
- Orange and T-Mobile are getting access to far more 3G-ready spectrum[●];
- 1800MHz has better propagation characteristics than all the other 3G-ready spectrum other than 900MHz and it is therefore less likely UMTS will take-off in other bands than in 1800MHz;
- the RSC Decision is likely to promote the take up of UMTS in the 900 and 1800MHz bands across Europe ahead of UMTS usage in the 2.6GHz or other bands for which there will not be equivalent designation. 900 and 1800MHz UMTS take up across Europe is also more likely because most existing MNOs already hold such spectrum and do not hold spectrum in the 2.6GHz or other candidate bands. Equipment availability and/or pricing is therefore likely to be worse in other bands;
- in any event, the incumbent MNOs get the benefit of an option value in holding 1800MHz, and for Vodafone and O2 in holding 900MHz,in that they run less risk of not holding the spectrum ; which may be next used for UMTS (or any of its future evolutions);
- [●];
- it does nothing to rectify the distortions that existed as a result of the 2G assignments prior to the 2000 Auction, the case for which it was said would be considered; and
- Ofcom has already signalled that the AIP is likely to be substantially below what H3G would have to pay for any equivalent spectrum at auction (were equivalent spectrum to be available).

Significantly, asymmetrical 3G spectrum holdings following liberalisation of the 900MHz and 1800MHz spectrum bands could also have wider competitive impacts which the Consultation also fails to take into account. As well as the effects of different levels of capacity (and hence market opportunity available to individual operators) on competition in the retail market, significantly different amounts of

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19 H3G still has less capacity but the differential is relatively small.

20 Paragraph 6.48 of the Consultation

spectrum being available for 3G use to different operators will also distort up-stream markets. Any negotiations of future network sharing arrangements, joint infrastructure usage or interoperable service platforms will be distorted by such asymmetries. [●]

2.4. Ofcom's approach to 900MHz

Ofcom's preferred approach, with respect to liberalising the 900MHz band, is discriminatory and will not serve to promote competition. This is notwithstanding the fact that Ofcom has acknowledged the technical benefits of 900MHz spectrum and has expressed the preliminary view, in agreement with H3G, that it would not be appropriate simply to allow liberalisation in the hands of the incumbent MNOs. H3G sees no justification for the inconsistent treatment of different operators with respect to 900MHz carriers and considers that Ofcom's preferred approach of a partial auction will fail to address the competitive distortion created by some mobile operators having 900MHz and some operators not having such spectrum.

[●]

2.4.1. Option C benefits the incumbent MNOs and is likely to be unduly discriminatory, disproportionate and to distort competition

O2 and Vodafone will obtain significant benefits if Ofcom proceeds with Option C. These are:

a) guaranteed access to 900MHz spectrum;

b) a potential capacity advantage;

c) a timing advantage;

d) cheaper spectrum; and

e) [●] other auctions.

(a) guaranteed access to 900MHz spectrum

O2 and Vodafone gain certainty of access to 900MHz spectrum for UMTS where others must take their chances in an auction. H3G notes that, in at least one place, Ofcom appears to suggest that not obtaining 900MHz spectrum would only give rise to a "fixed cost profit shock"[21]. H3G does not agree with this analysis. 900MHz allows far less cell sites to be used, with resulting greatly reduced opex as well as capex. [●] profit shocks are relevant to non-discrimination and proportionality.

(b) a potential capacity advantage

O2 and Vodafone also gain a potential capacity advantage in that they will each retain more 900 MHz spectrum than any other entity will be permitted to acquire in the proposed auction. This in itself may provide a capacity advantage if and to the extent that UMTS succeeds more or earlier in the 900 MHz band than in other bands. Otherwise, it contributes with the 1800 MHz holding to an increased aggregate holding [●]

(c) a timing advantage

O2 and Vodafone would also have a head start of about 1 to 2 years in their preparation for UMTS 900 roll-out. [●]

(d) cheaper spectrum

[21] See, for example, paragraph 6.15. of the Consultation

Subject to the level of AIP, O2 and Vodafone will also obtain the spectrum at a lower cost than those who must bid for it in an auction The additional costs which Vodafone and O2 might incur in clearing the relevant spectrum of current GSM use are likely to be at least matched by the additional costs which H3G will need to incur, over and above those which Vodafone and O2 will need to incur, to roll out UMTS 900.

(e) [●] other auctions

[●]

2.4.2. Ofcom has failed properly to consider the differential effect of its proposals on different operators

As a matter of principle, H3G is concerned that Ofcom may has over-simplified the analysis of the impact on competition. It appears that Ofcom has done no more than make rough estimates of the welfare loss associated with market exit by one or more existing MNOs[22]. This may be sufficient to show the possible effects of an operator not having any 900MHz spectrum, but it does not provide any useful assessment of the competitive effects of MNOs having different spectrum holdings. H3G considers that Ofcom should have looked at how asymmetric spectrum holdings (asymmetric in quantity and/or quality) could lead an MNO with less spectrum either to compromise on network quality [●] or to incur additional costs [●].

Similarly, H3G is not persuaded that Ofcom has sufficiently recognised or taken account of the differing value of refarm to each of the existing MNOs[23]. 900MHz refarm is particularly valuable to the incumbent MNOs (given their existing site portfolios) and, especially, those with existing 900MHz holdings[24].

For H3G, 900MHz could provide a very substantial cost saving on roll-out beyond its existing area of 3G coverage [●].

For operations with existing rural sites, particularly those with cell sites in use for 900MHz, there will only be the modest costs of upgrading which would be materially less than if rolling out at 2100MHz. The incumbent MNOs therefore obtain a particular benefit from 900MHz refarming, assuming they retain exclusive access to their existing cells. It does not seem that this has been taken into account in the figures, or at least not in the central case. Take Vodafone, for example. The costs of clearing any or all of its 900MHz spectrum are likely to be much less than the gains from being able to use it for 3G in many scenarios.

The wider issue with this approach to assessing the costs and benefits of refarming the 900MHz band is that it fails to consider the actual competitive impact. Ofcom's approach does not properly recognise differential cost impacts between different MNOs and who bears which costs and receives which benefits. The approach also does not take into account the benefits of greater 3G capacity to an individual MNO, as discussed at section 2.3 of this response.

Ofcom should deal with the opportunity available to each of the MNOs and ensure that legacy distortions are not exacerbated, such that each operator would be competing with the same starting position (with respect to the spectrum input provided through regulatory means). The market, rather than Ofcom, would then decide the efficient outcome. For example, trading could occur such that the incumbent 900MHz operators' cost advantage could be used to pay other operators for the right to continue to use 900MHz spectrum. It should be acknowledged that

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22 See, for example, paragraphs 11.50-11.52. of the Consultation

23 It is referred to in paragraph A7.42 of the Consultation but does not appear to have been the subject of any further consideration.

24 H3G notes, in passing, that the different 3G commercial strategies adopted may mean that Vodafone perceives there to be more value than O2.

any secondary market in 900MHz spectrum is likely to be imperfect and Ofcom's preferred approach will make it more so. The result is likely to be that spectrum will be tightly held, may be hoarded, and not necessarily sold to serious competitors. As H3G has previously pointed out to Ofcom, it should only be placing each of the five MNOs in equivalent spectrum positions in relation to 3G access to 900MHz and then negotiations in the market will find the most efficient actual use of that spectrum for 3G use. Ofcom's cost modelling approach is essentially trying to establish what that efficient position is on the basis of regulatory calculations. This is entirely at odds with Ofcom's oft stated policy of leaving such issues to the market.[25]

2.4.3. A partial auction will not be efficient

In conjunction with the 1800MHz proposals, and assuming there is no prior extension of the 2100MHz licence terms, the 900MHz auction proposal provides an advantage to T-Mobile and Orange in the proposed partial 900MHz auction. [●]

In making allocations at 900 and 1800MHz to the incumbents, Ofcom of course makes no attempt to assess whether the spectrum is in fact most efficiently held by those operators going forward and this is somewhat at odds with Ofcom's stated spectrum policy. If Ofcom is correct that its proposed partial allocations are efficient then the same result would follow from a full auction. Which begs the question why an auction should not be run.

2.5. Ofcom's approach to 1800MHz

H3G considers that Ofcom's proposal for the 1800MHz spectrum band provides substantial advantages to the incumbent MNOs and is discriminatory to H3G. H3G sees no justification for the inconsistent treatment of different 3G operators with respect to the 1800MHz spectrum or the inappropriate capacity windfall that Option A gives to the incumbent MNOs. H3G strongly disagrees with Ofcom's approach to non-discrimination.

2.5.1. Proposed Option A provides substantial advantages to the incumbent MNOs

Option A provides substantial benefits to the incumbent MNOs [●] These are as follows:

a) guaranteed and exclusive access to 1800MHz spectrum;

b) a substantial capacity advantage;

c) a timing advantage;

d) cheaper spectrum; and

e) [●].

<u>(a) guaranteed and exclusive access to 1800MHz spectrum</u>

Ofcom's proposal would give the incumbent MNOs guaranteed access to the 1800MHz band and no opportunity for access by H3G other than as a result of secondary trading. [●] Many of the same considerations that are likely to lead to a failure of trading in relation to 900MHz will also apply to the 1800MHz band. If, as anticipated, 3G capacity becomes constrained across the industry because of increasingly bandwidth-hungry services then the incentive to trade will be small, particularly if not trading provides an opportunity to limit competition.

[25] See, for example, the Spectrum Framework Review statement published in July 2005.

Although 1800MHz may not have the same inherent advantages as 900MHz, access to it may still prove to be valuable. Access provides operators with an option value whereby they bear less risk of missing out on future opportunities. It may be, for example, that 3G or another technology (or even just a particular handset) becomes popular in the 1800MHz band and not in other bands.

[●]

(b) a substantial capacity advantage

The significance of capacity has already been discussed above. It is just worth noting that the very substantial amount of capacity being refarmed in the 1800MHz band. It is the equivalent of 14 3G paired FDD carriers, more than the total amount in the 2000 Auction and equivalent to the number of FDD carriers available in Ofcom's proposed forthcoming 2.6GHz auction

(c) a timing advantage

Option A benefits the incumbent MNOs by giving them a head start in preparing for launch of 3G services outside the 2100MHz band. [●]

(d) cheaper spectrum

Subject to the level of AIP, the incumbent MNOs may obtain the capacity for less than its true value in the market [●].

(e) [●]

[●]

2.5.2. Ofcom has erred in its consideration of discrimination in respect of the 1800MHz band

H3G fundamentally disagrees with Ofcom's consideration of discrimination in respect of the 1800MHz band. Ofcom states its initial view as follows:

> "Ofcom's initial view is that this option would be non-discriminatory because only operators which hold 1800MHz spectrum could be said to be in comparable situations in respect of this option, and these operators would be treated in the same way."[26]

As with any question of discrimination, it is a question of whether the situations of different persons are comparable or different in relevant respects. Ofcom's approach appears to say that the only relevant question is whether the person does or does not already have 1800MHz spectrum.

This approach is far too narrow and ignores the context of what is being proposed. The proposal does not only affect those with 1800MHz spectrum or, indeed, only those who are involved in providing 2G services. At a minimum, all 3G operators are in a comparable situation in that they are competing on the same 3G market and for which "3G-ready" spectrum is an essential input that affects the services that can be provided and the prices at which they may be provided. Where, previously, only 2100MHz was available for 3G now it is proposed that 1800MHz will also be available but to only some of the competitors on the market.

H3G could not be clearer in its view that its position is relevant in assessing whether the proposal is discriminatory and is equally clear that the proposal does, indeed, unduly discriminate against it given the advantages provided to the incumbent MNOs and not to H3G (discussed in the next part of this response).

[26] Paragraph 8.75 of the Consultation

2.5.3. Option A will distort competition and is unduly discriminatory

Ofcom has sought to suggest that implementing Option A for 1800MHz might impose "fixed cost profit shocks" for (implicitly) H3G but would not affect competition in the market on the basis that they will not lead to market exit (because they relate to cost savings) and capital markets will be sufficiently efficient, effectively, to allow H3G to obtain additional funds to counteract the effect. H3G disagrees with this analysis given the constraints on the availability and suitability of alternative spectrum.

Ofcom's reasoning is insufficient for it to draw the conclusions it has and it has provided no evidence for its view that further funding would be available to H3G in such circumstances and that the competitive distortions created by Ofcom's preferred approach will not lead to any market exit.

Further, even if Ofcom's arguments are accepted here, they only represent a partial analysis. Ofcom has failed to undertake dynamic modelling on the impact of the distribution of 1800MHz spectrum on competition and efficiency in the market. For example, a complete analysis should involve consideration of how asymmetric spectrum holdings could impact the decisions placed on an MNO (i) with less spectrum holdings to either compromise on network quality (and thereby face consumer risks) or incur additional costs in order to effectively compete and (ii) consideration of the competition effects of some MNOs having access to superior spectrum. A windfall benefit to some competitors in the market will also, at least partly, be used to subsidise customer acquisition and retention and therefore distort the competition for retail customers still further.

Ofcom's stated view that only fixed cost profit shocks arise is also not appropriate and contradicted by other aspects of Ofcom's own analysis. Ofcom has acknowledged that use of 1800MHz will allow cheaper roll-out: this includes both the capital costs of roll-out[27] but also the reduced opex costs that will flow from having to use less cell sites to achieve the same quality and extent of coverage. Such reduced operating expenditure clearly does not only give rise to a "fixed cost profit shock".

[●]

2.5.4. Ofcom has adopted an inconsistent approach to the analysis of competition in respect of 900MHz and 1800MHz

Ofcom also dismisses the need for redistribution of 1800MHz spectrum on the basis that it is currently held by four out of the five MNOs, unlike the 900MHz spectrum that is only held by two, and that there will therefore be less competitive benefit in broadening access. This view is not, however, consistent with the analysis in relation to the 900MHz spectrum. In that case, Ofcom considers the impact of only four rather than five MNOs getting access and considers it sufficient to require release of three carriers rather than two. H3G notes that Ofcom has prepared a form of welfare analysis for 900MHz but has not done anything comparable for 1800MHz. Plurality of access to certain spectrum bands may be a necessary condition to minimise competitive distortions but it is not a sufficient condition.

H3G considers that Ofcom should have further analysed the significance of only four rather than five MNOs gaining access to 1800MHz for services other than 2G. Ofcom acknowledges that there is uncertainty as to the future use of 1800MHz (and, H3G submits, is mistaken in some of its factual analysis) so it cannot be confident that exclusion from 1800MHz will not itself be a very significant detriment for a MNO.

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[27] Ofcom provides a central estimate of a benefit of 1800MHz over 2.1GHz in securing coverage over non-core (rural) areas in the amount of approximately £250m for the whole industry. This is less than for 900MHz but still very substantial. What Ofcom does not clearly acknowledge is that most of this benefit would accrue to H3G alone since it would be the only operator without cell sites to upgrade and which might therefore select different locations based on the frequency to be used.

Ofcom should ensure that all MNOs have an equal opportunity to gain access to 1800MHz spectrum.

[●]

2.6. State aid and legitimate expectations

H3G is also surprised that Ofcom has not dealt at all with the application of state aid law to its proposals. H3G raised its concerns in this regard prominently in its previous consultation response and will not repeat here but Ofcom has only made a cursory reference to H3G's concern in an Annex[28]. Subsequent developments confirm that state aid is relevant. We note in this regard that the Court of First Instance has recently ruled (contrary to the submissions of the European Commission) that spectrum is capable of amounting to a state resource[29]. No aid was found to exist in the particular case because the measure was implemented to avoid discrimination; in the present case, however, it is H3G's view that Ofcom's preferred approach is discriminatory and will amount to state aid.

Similarly, H3G considers it unfortunate that Ofcom has given such cursory treatment to its argument that statements around the time of the 2000 Auction gave rise to certain legitimate expectations[30]. Ofcom's treatment of the issue is limited to the following comment:

> "*Ofcom has carefully reviewed statements made in relation to the potential for the 2G Licences to be refarmed or liberalised, including those made at the time of the 3G auction in 2000. Ofcom considers that no statements or representations were given at the time of that auction or at any other time which would give rise to legitimate expectations in law in relation to liberalisation of the 2G licences. Further Ofcom considers that the events at the time of the 3G auction should (in any case) in principle not be used to prevent the realisation of the benefits that would follow from the liberalisation of 2G Licences. Spectrum licensees are not entitled to expect that spectrum management regulation and policy will remain static, particularly in the light of changes to the background EU legislation."*

Ofcom does not explain why it considers that the statements made, including those in para 3.4.1.3 of the IM quoted above, are incapable in law of amounting to legitimate expectations. They were specific and directed to the narrow group of potential 3G bidders who were not also 2G licensees and fully intended to be relied on and were in fact relied on. It seems that Ofcom may recognise the vulnerability of its position given that it goes on to rely on changes in EU legislation as a justification for its different approach. H3G considers, however, that there has been no relevant change in EU legislation that was not foreseen at the time of the IM. The IM expressly refers to the possibility that a European body, the ERC, might designate 900 and 1800MHz for UMTS. The UK Government was also aware of and involved in discussions over the legislative package that ultimately resulted in the Communications Directives including the Framework Directive and Authorisation Directive. The changes in legislation were envisaged at the time of the 2000 Auction and, in light of those upcoming changes, the commitment to rectify legacy distortions was still given. Legislative change is therefore irrelevant in the analysis of any legitimate expectations arising.

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28 H3G's previous reference to it is noted in Annex 11 at page 286 of the Consultation but Ofcom offers no comment on it.

29 *Case T-475/04, Bouygues SA v. Commission* [2007] ECR 00

30 Paragraph 7.9 of the Consultation.

3. Ofcom's approach to auction and administrative allocation is inconsistent and unfair

Ofcom's approach to the liberalisation of 900MHz is highly inconsistent with the approach to 1800MHz and it is simply wrong for Ofcom to claim to be unable to administratively allocate cleared 900MHz carriers whilst simultaneously allocating additional rights to those with existing licences in the 900 and 1800MHz bands. H3G considers that it would be lawful for Ofcom to administratively allocate all the additional rights created by its proposed liberalisation of the 2G spectrum and that Ofcom's consideration of a full auction (for 900MHz) is flawed.

3.1. Ofcom has adopted an inconsistent approach to administratively allocating spectrum

Ofcom concludes in the Consultation that it would not comply with the requirements of Article 5(2) of the Authorisation Directive if it selected the operators to receive rights of use over released 900MHz spectrum and administratively allocated the rights of use to those operators[31].

It has, however, simultaneously concluded that there would be no legal objection to refarming the 1800MHz and (some of) the 900MHz spectrum in the hands of the incumbent MNOs. It will, in the process, administratively allocate at least the following new and valuable rights to the incumbent MNOs:

- rights to use the spectrum for any and all technologies (certainly including 3G) where previously only 2G use was permitted;
- extended rights of use and/or greater certainty given that the licences were previously terminable on 1 year's notice and will now be indefinite and terminable only on 5 years' notice and only for limited reasons; and
- rights to trade the spectrum resulting in the incumbent MNOs receiving valuable consideration if they cease to use the spectrum where previously they only had the option of surrender for no consideration, incentivised by the continuation of AIP payments in the meantime.

In H3G's view, Ofcom has adopted a wholly inconsistent position in these two aspects of its proposals.

Article 5(2) is not limited to the grant of new rights of use in relation to a new band of spectrum and H3G disputes Ofcom's view that "granting rights of use" can be equated in the UK with granting wireless telegraphy licences[32]. The Article refers only to "granting rights of use" generically. It must be beyond doubt that 2G spectrum liberalisation in the hands of the incumbent MNOs would "grant rights of use"[33]. Consider, for example, a hypothetical overlay auction or an auction of secondary rights of use in relation to a band. There are rights at issue for which bidders would pay valuable consideration. Presumably Ofcom would agree that Article 5(2) applies in such a situation?

H3G's position is that the "open" requirement of Article 5(2) applies in considering refarm in the hands of the incumbent MNOs just as it applies to the allocation of rights to any spectrum that is released. As discussed in the section 3.3 below, H3G

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31 Paragraph 12.18 of the Consultation. As already indicated above, H3G considers this view mistaken.

32 Paragraph 4.13 of the Consultation.

33 It is noted in this respect that one of the elements of the grant of rights of use, required under Article 5(2), is a decision on whether the rights will be tradable. Arguably, this alone shows that rights to trade cannot be granted otherwise than in accordance with Article 5(2).

does not consider that this actually prevents administrative allocation since administrative allocation can be “open” (and also transparent and non-discriminatory). If, however, Ofcom declines to accept this view then its own logic on the meaning of “open” should lead it to conclude that it must auction all new rights created by liberalisation.

3.2. There is no objective justification for the proposed variations to the incumbent MNOs' licences

H3G contends that Article 14(1) of the Authorisation Directive and section 9(7) of the 2006 Act apply to the proposed variation of the incumbent MNOs' licences in addition to Article 5(2)[34]. Article 14(1) prohibits amendment of rights except in "objectively justified cases" and in a proportionate manner. Section 9(7) permits terms only which are objectively justifiable, not unduly discriminatory, proportionate and transparent.

H3G doubts that an objectively justified case exists for the variations proposed by Ofcom in the Consultation. Insofar as Ofcom relies on the RSC Decision requirement to "make available" the spectrum for 3G, H3G disagrees with Ofcom's interpretation of its legal obligations under the RSC Decision[35]. First, there is not actually any deadline for making spectrum available for 3G use in accordance with the RSC Decision and H3G does not consider it necessary or appropriate to imply one. Second, "make available" does not mean that the holder of any licence in relation to the spectrum must be permitted to use it for 3G. It would be sufficient to meet the requirements of the RSC Decision if Ofcom indicated that any future allocation (following a surrender, voluntary or otherwise) would include 3G rights.

3.3. Administrative reallocation is a lawful option if done properly

Ofcom's objection to administrative allocation of released 900MHz spectrum is based on its view that such administrative allocation would not be "open for all potentially interested parties", as it says is required by Article 5(2) of the Authorisation Directive. As noted in section 3.1 above, this approach is inconsistent with its willingness to administratively allocate additional rights to the incumbent MNOs in both the 900 and 1800MHz bands. In any event, H3G disputes the suggestion that administrative allocation necessarily falls foul of the openness requirement in Article 5(2) or, indeed, that it necessarily falls foul of any of the requirements in Article 5(2). Its view is that an appropriate administrative (re)allocation of all 900 and 1800MHz spectrum would satisfy the requirements of Article 5(2).

Ofcom's interpretation of Article 5(2) is not consistent with the other provisions of the Authorisation Directive and its own analysis of alternative award mechanisms. Article 7(4) of the Authorisation Directive, for example, expressly recognises that rights of use may not be awarded by "competitive or comparative selection procedures". An award that does not entail any competitive or comparative selection procedure can appropriately be called an “administrative allocation”. Further, Ofcom has expressly considered the possibility of what it describes as a "beauty parade" and did not rule it out on legal grounds[36]. Although a beauty parade does involve a comparative selection procedure, it is nonetheless an administrative allocation since it is the regulator and not the market that decides who is to be awarded the rights of use.

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[34] Article 14(1) and section 9(7) apply to any variation to a licence, whether or not additional rights are thereby granted. Article 5(2) applies to any grant of additional rights, whether by way of a new licence or through a variation.

[35] Section 3 of the Consultation.

[36] Paragraphs 12.14-17 of the Consultation.

H3G notes, moreover, that ARCEP in France has undertaken administrative reallocation of 900 and 1800MHz spectrum between existing MNOs in order to even out continuing effective competition[37].

The key point is that the process for an administrative allocation must be transparent, which it surely would be if done following public consultation, and open and non-discriminatory. To be open and non-discriminatory in this context means little more than that Ofcom must act on an objective basis by reference to identified criteria rather than by reference to the identity of the proposed recipients. H3G considers that such identified criteria could reasonably consist of, or include, a requirement that any allocation reduce distortions in the mobile market existing prior to liberalisation or, at least, not increase the same. Such a criterion would not positively require an allocation to H3G in isolation but would prevent allocation to the other MNOs without a similar allocation to H3G.

H3G considers that allocation to all five existing MNOs (all of whom paid considerable licence fees for exclusive rights to 3G usage) on this basis would satisfy all the requirements of Article 5(2). An administrative allocation could be pro-competitive and a justifiable market intervention to level the playing field between the five 3G MNOs prior to spectrum liberalisation, trading and the award of the 2.6GHz band. Moreover, a relevant consideration in this regard is the commitments made in the Information Memorandum and the reliance placed on these by H3G.

In any event H3G does not see how Ofcom can rule out the possibility of administrative allocation without considering who else will realistically be interested in the spectrum, for what purposes and the possible social utility of the spectrum. Other interested parties can acquire this spectrum in a trading environment or from new awards already proposed if efficient for that to happen. H3G notes in this regard that Ofcom's analysis of the partial auction for 900MHz appears to have implicitly assumed (without justification) that an auction of three carriers would lead to all five MNOs obtaining at least one 900MHz carrier[38]. In such circumstances, it is difficult to see what realistic objections there are likely to be to administrative allocation to the same operators rather than an auction.

3.4. Clear auction is a real and proportionate option

Clear auction, insofar as it is considered in the Consultation, only appears unattractive because Ofcom has considered extreme options for the auction and has not considered a more realistic alternative. A more reasonable approach would show clear auction to be proportionate for both 900MHz and 1800MHz.

Ofcom does not include in the Consultation any significant consideration of the possibility of clear auction for the 1800MHz band. It does, however, include some brief consideration of the possibility of a clear auction for the 900MHz band. It quickly concludes that the costs of having to clear all the spectrum before holding an auction would be excessive. It does also note, however, the possibility that an auction could be held in advance of the date for clearance such that spectrum might not need to be cleared if won by an existing licensee (i.e. O2 or Vodafone). In reality, if O2 and Vodafone value this spectrum as much as Ofcom assumes, it is highly likely that they will retain some or all of the 900MHz spectrum and, subject to timing issues, would not have to clear it. Alternatively, however, if the auction results in O2 and Vodafone not retaining the entirety of the spectrum then it would seem clear that the economically most efficient result is for them to clear the spectrum. O2 and

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[37] The decision by ARCEP, in December no. 2007-0177 dated 5 July 2007, to reallocate 900 MHz and 1800MHz spectrum between existing 2G operators which at the time, were solely for 2G use.

[38] It is noted that Ofcom justifies the clearance of 3 carriers rather than 2 by looking at the welfare detriment that might flow from one MNO not getting a 900 MHz carrier.

Vodafone are in a much better position to value the spectrum to them and assess the costs of clearing it than is Ofcom i.e. they would have a considerable advantage in any auction.

When considering this possibility of an auction sometime before the date for clearance, Ofcom looks at the possibility of requiring clearance in 2010 or in 2018[39]. It concludes that the former is inadequate because the proximity of the date for clearance would actually require costly clearance steps to be taken before the auction. It concludes that the latter, release in 2018, is undesirable since it would delay liberalisation too long and result in lost welfare due to the 2100MHz rollout that would occur in the meantime.

What Ofcom does not do, however, is to consider a much more sensible alternative such as an auction in 2009 - the date proposed for the partial auction - (or, indeed, earlier) and release two or three years after (i.e. in 2011 or 2012). Compared to a partial auction in 2009 with release in 2010 (i.e. Ofcom's preferred option C for 900MHz), this option has the following advantages:

- O2 and Vodafone would have the same amount of time, or more to clear any spectrum that must be cleared (2009-2011+ compared to 2008-2010);
- O2 and Vodafone would only need to clear that amount of spectrum that the market actually considers it efficient to refarm in the hands of others;
- O2 and Vodafone may have less 2G traffic to migrate since they would be starting one year later;
- all operators would be placed on an equal footing in their preparation for UMTS 900MHz with O2 and Vodafone not having any unfair advantage over the other operators.
- there would be little impact on the time by which UMTS 900MHz networks were actually rolled out. In a partial auction scenario, H3G, Orange and T-Mobile would not safely be able to place orders for 900MHz equipment and handsets until 2009, the same date as in this scenario. O2 and Vodafone would be able to place orders earlier under a partial auction scenario but would not be able to implement until 2010. A full auction would only delay them, compared to the partial auction, by just one year; and
- it would comply with Ofcom's interpretation of the RSC Decision, by making available 900MHz spectrum for UMTS use within 5 years.

Ofcom dismisses the idea of an auction in 2015-16 with release in 2018 on the basis that it would not comply with Ofcom's interpretation of the RSC Decision, that it should be implemented within a period of 5 years, and would delay and consequently reduce the benefits of 2G spectrum liberalisation (not least because of continuing 2100MHz roll-out in the meantime). Ofcom also refers to the "inevitable uncertainties" that would arise in awarding spectrum significantly before it became available.

These are not real concerns with the proposal for an auction in 2009 and release in 2011. As already noted, the proposal would unquestionably comply with the RSC Decision and would delay implementation by a maximum of one year for just two operators. H3G doubts that there will be much impact from additional 2100MHz roll-out in the meantime.

[39] Paragraphs 13.11-13.21 of the Consultation. Ofcom acknowledges that its "early full release" approach of an auction in 2009 and release in 2010 is an extreme option provided as an illustration only: paragraph 13.11 of the Consultation.

With a clear and unambiguous date by which “new” holders of 900MHz would be entitled to have use of that spectrum (having paid, in a clear auction, what use of that spectrum from that date is worth to them), there would be an opportunity for the market to determine the “efficient” date by which the spectrum should be cleared.

Equally, H3G doubts the impact of the so-called "inevitable uncertainties" that would arise from having an auction in 2009 and release in 2011. Realistically, given the lead time for equipment orders and the time it will take to roll-out, it is unlikely operators would be in a position to do much before 2011 or 2012 if they won an auction in 2009 even if release occurred earlier.

Although the above analysis for a full auction is made in respect of 900MHz, this is due to the Consultation only considering partial auction for the 900MHz and failing to consider an auction of 1800MHz.. Given that the issues for auctioning the 900MHz spectrum are equally applicable to the 1800MHz spectrum, this analysis and therefore the option of an alternative full auction identified above would also be appropriate for the 1800MHz spectrum band.

4. Missing and inaccurate information in the Consultation

H3G considers that the Consultation has not addressed all relevant issues and has proceeded on the basis of certain factual errors. Specifically H3G considers that Ofcom has:

(1) failed to adequately consider AIP and auction design

(2) made factual errors in respect of the likelihood of UMTS usage of the 1800MHz band and the cost of the equipment; and

(3) made a number of flaws in its technical assessment and modelling to the extent that its cost/benefit conclusions are unsound.

The inadequate consideration of AIP, auction design and the factual errors in respect of use of 1800MHz are set out below. The flaws in the technical assessment and modelling are detailed in Annex 4. At a minimum, the failure to address all relevant issues and the factual errors suggest a need for re-consideration by Ofcom as well as further consultation on the same.

4.1. Inadequate consideration of AIP and auction design

H3G (through its solicitors) has written to Ofcom ahead of submitting this response to indicate its concern that Ofcom has not provided more information on its intended approach to AIP and its design of the proposed 900MHz auction[40]. H3G considers that the lack of information prevents it giving full, intelligent consideration to the proposals made by Ofcom. It is also concerned that the shortcomings may evidence a failure by Ofcom to take into account all relevant considerations. Ofcom's response to H3G's concerns[41] continues to draw a distinction between implementation and the narrowing of options without recognising that implementation issues may well affect the desirability of the options themselves and do in this particular case.

In the circumstances, H3G considers that it is artificial to consult on this basis, where the implementation details are not available or even formulated and H3G is consequently precluded from being able to meaningfully consider the proposals. Ofcom should (at a minimum) set out the principles by which they will abide in formulating the detail (specifically in respect of setting AIPs and the auction process). Ofcom should then provide the additional detailed information requested and consult further before determining its preferred options.

Ofcom's discussion of the proposed 900MHz auction implementation issues is limited to just six paragraphs[42]. H3G considers that Ofcom should have at least indicated:

- what type of auction it would propose to conduct;
- whether there would be any reserve price or minimum bid increments and, if so, what it is proposed these would be;
- what qualification criteria would apply;
- how any bidder asymmetries would be dealt with in the auction rules (and whether Ofcom considers any bidder would have a “toehold” and if so how such a toehold would be dealt with in the auction design);

[40] Letter from Baker & McKenzie LLP to Justin Moore of Ofcom dated 9 November 2007.
[41] Letter from Justine Moore of Ofcom to Baker & McKenzie LLP dated 16 November 2007.
[42] Paragraphs 12.8-12.13. of the Consultation

- what risk there is that non-MNO participants may bid up the value in the knowledge that all MNOs need access to the spectrum and how any such risk might be mitigated;
- what technical conditions would be applied to the licences to ensure that users of the spectrum for GSM, 3G and any other technologies approved under the draft RSC Decision would be able to continue their use without interference from other technologies allowed to operate in the band; and
- whether the auction is proposed to occur before or after the digital dividend review auction.

All of these factors affect the probability of H3G[43] and other MNOs gaining access to the spectrum, the amount it/they would have to pay. These considerations, in turn, must affect any assessment of the competitive and discriminatory impact of Ofcom's preferred approach and its consistency with the statements in the IM. With reference to the sixth bullet point, H3G notes that operation of WiMax technologies in the same bands would severely threaten spectral efficiency and network performance for all operators. Such technologies require extra guard bands which would result in a failure to use the spectrum efficiently. The work in international groups such as WP8F and CEPT should, in any event, be mature and referenced.

It is essential that Ofcom provide more information on all of the issues set out in the bullet points above and seek the views of interested parties before making any final decision.

Ofcom has not provided any evidence or analysis as to why an auction of 900 MHz spectrum will, in these circumstances, provide a more efficient allocation of spectrum compared to other allocation mechanisms. It does not appear to have assessed what realistic interest or demand there is in 900MHz spectrum outside existing MNOs nor what implications this may have for the suitability of its proposed mechanism. In this respect Ofcom has again failed to discharge its duties.

On AIP, Ofcom has indicated that it will review the AIP payable in the light of the 900MHz auction but has given little indication as to what this will really mean. Ofcom has provided no information on what account (if any) it will take of bids in the 2600 MHz auction or any other relevant auction, whether AIP would be uniform between operators or different for some and whether or not it is likely to be the same for 900MHz and 1800MHz. Certainly, there is nothing to allow H3G to take an informed view on the actual amounts that will be payable or how these will compare to the prices set through an auction. Previous levels of AIP have been set by reference to the opportunity cost of the spectrum (though, as Ofcom is aware H3G considers that such calculations were not appropriately applied). Taking account of any auction price will clearly mean a new methodology being applied for which there is no precedent and therefore H3G is unable to take any sensible view of what this will mean, which in turn means that the competitive and discriminatory impact of a key aspect of Ofcom's proposals is unknown. This is not a sufficient or appropriate basis for H3G to comment on the proposals.

[●]

Attempting to use AIP to nullify the benefits gained by the incumbent MNOs through refarming the 1800MHz and 900MHz spectrum is not, however, straightforward and may not even be possible. [●]

[43] [●]

4.2. Ofcom is mistaken in its factual assessment that 1800MHz is unlikely to be used for UMTS

In any event, Ofcom's assessment in respect of UMTS 1800 is factually flawed. Ofcom's position on the value of access to 1800MHz spectrum is summarised in paragraph 1.29 of the Consultation, as follows:

> "In the case of 1800MHz the position appears to be different. Ofcom's preliminary view is that the evidence does not suggest that wider access to 1800MHz spectrum would significantly promote competition or efficiency of use. It is not clear that there is a material cost advantage associated with 1800MHz that would be realised in practice, in particular due to the lack of availability and / or cost of UMTS 1800 equipment. No such equipment is being produced or planned in the medium term whereas UMTS 900MHz equipment is already being produced. Furthermore 1800MHz spectrum is currently held more widely than 900MHz spectrum, i.e. by four rather than two operators, so it is far from clear that wider access than this would have a major effect in promoting competition and efficiency of use of the spectrum." (emphasis added)

Further explanation is provided at paragraph 6.35:

> "…our analysis assumed that UMTS 1800 equipment would be available at the same cost and time as UMTS 900 equipment and these assumptions are unlikely to hold true in practice. Ofcom is currently not aware of networks being planned for UMTS 1800 and believes that equipment manufacturers are not yet developing UMTS 1800 network equipment or compatible handsets. Moreover, indications are that UMTS equipment and handsets are likely to be more costly for 1800MHz than for 900 and 2100 MHz. It is also possible that momentum could develop to use liberalised 1800MHz spectrum for the next generation of mobile technologies such as LTE, therefore UMTS 1800 might not even develop at all. In summary, differences in quality due to holdings of 1800MHz could have an impact on consumers' choice of operator and as a result competitive intensity, but the probability of this appears to be low." (emphasis added)

And in paragraphs 5.107-5.110:

> "5.107 The picture for UMTS at 1800MHz ('UMTS1800') is less clear. As with UMTS900, Ofcom understands that there are no significant technical barriers to providing network equipment and handsets at 1800MHz and the issue is rather one of there being sufficient demand to justify volume production particularly with handsets.
>
> 5.108 Regarding the demand for UMTS at 1800MHz Ofcom is not aware of any trials currently underway that involve UMTS1800. Neither are we aware of plans by European operators to deploy UMTS networks in 1800MHz spectrum, or of strong intentions to produce equipment from manufacturers. This would tend to indicate that the availability of UMTS1800 infrastructure and devices is likely to lag behind that for UMTS900 by some time and might result in offerings being more expensive initially. In particular we doubt the ability of the UK market alone to support 1800MHz equipment and handsets in sufficient volumes to provide equipment at competitive prices. Thus the use of 1800MHz for UMTS is likely to be constrained in the short to mid term by equipment availability and whether other EU countries roll out UMTS1800 networks.
>
> 5.109 The lack of momentum with UMTS1800 compared to UMTS900 is due in part to the number of MNOs in other European countries and the

distribution of 900MHz spectrum. Access to 900MHz spectrum is much more evenly distributed in other EU states with more MNOs having access to 900MHz and not many MNOs only having access to1800MHz. Hence the demand for UMTS1800 equipment is likely to lower, and the economies of scale in its production smaller, than for UMTS900. Thus UMTS1800 equipment, particularly handsets, might still be more expensive than UMTS900 or UMTS2100 even in the long term.

5.110 Ofcom's current view is that even a relatively small cost premium for UMTS1800 handsets could have a significant impact on the costs for an operator to deploy 3G at 1800MHz if they persisted in the longer term. This is because of the large number of devices involved and because ongoing handset replacement would result in a recurring cost premium being incurred (i.e. every time a customer's handset was replaced). Therefore, in practice any cost advantage that arose from savings in network infrastructure costs (due to fewer sites) could feasibly be significantly reduced or eliminated due to increased handset costs." (emphasis added)

H3G believes Ofcom has based its assessment on incorrect or partial information or has, at least, not considered the position widely enough. "UMTS 1800" is entirely feasible in the short to medium term. In conclusion, H3G disputes the conclusion reached by Ofcom regarding the prospects for UMTS 1800. There is every reason to believe that the 1800 MHz band will be used extensively for UMTS and this requires Ofcom to revisits its assumptions and the associated costs and benefits that result therein.

Generally, on this point, H3G notes that there would not have been a lot of sense, at the time when the draft RSC Decision was considered, in the RSC and its member state delegates pressing for 1800MHz to be designated for UMTS if it was not thought at that time that UMTS was likely to use the band. Further, a standard for UMTS use at 1800MHz was created some time ago by the 3G standards body, the 3GPP. H3G also notes that nearly all non-Hutchison 3G operators in Europe have access to spectrum in all three of the bands 900, 1800 and 2100 (since nearly all 3G operators were 2G operators previously). Accordingly, there are plenty of operators who may choose to pursue UMTS in the 1800MHz band in Europe. Moreover, Ofcom's proposals may in themselves prompt UMTS 1800 take-up that might not otherwise have occurred.[44]

More fundamentally, however, there is no need to make future predictions about availability of UMTS equipment in the 1800MHz band because it is actually already being rolled out in Japan[45]. H3G has obtained from the equipment manufacturer Huawei evidence that it has manufactured and deployed network equipment for UMTS in the 1800MHz band in Japan. A relevant English-language brochure is provided in Annex 4 to this response. Huawei also informs H3G that UMTS 1800 handsets are expected to follow shortly (as one would expect, given the network equipment has been rolled out). Huawei has confirmed that there would be no significant technological difficulties in making the equipment suitable for use in the EU.

[●]

In short, H3G does not understand why Ofcom believes that there are currently no UMTS 1800 trials, let alone actual network equipment in production or being deployed. Ofcom would appear to be proceeding on the basis of mistaken

[44] H3G notes in this regard that refarm in the hands of the incumbents will give T-Mobile and Orange such a large amount of 3G-ready capacity at 1800MHz that it would be most surprising if they did not choose to take advantage of it.

[45] See the Huawei document at Annex 3.

information. This realisation requires Ofcom fundamentally to reconsider its position on 1800MHz and H3G believes that Ofcom should withdraw its current proposals pending further consultation.

4.2.1. There is no reasonable basis for Ofcom's conclusions on the cost of future UMTS equipment and handsets for use in the 1800MHz band

Ofcom itself acknowledges that its view on the likely cost of UMTS 1800 equipment and handsets is not based on any technological issues but is simply a function of anticipated demand[46]. Ofcom's assessment needs reconsideration in light of the additional information provided above. As with any product, it is not the case that production costs (and resulting prices) fall linearly with increasing demand. Once a critical mass is reached, the further incremental reduction in costs for each additional unit will be small. H3G anticipates that a critical mass could be reached on the basis of demand from just a few operators. As noted by Ofcom, the technology is essentially the same regardless of frequency band and the associated extra costs are therefore low.

4.2.2. Any use of 1800MHz for Long Term Evolution ("LTE") or other successor technologies militates against Ofcom's proposed approach

In paragraph 6.35 of the Consultation, it is suggested that there is little reason to redistribute 1800MHz spectrum because it may not actually be used for UMTS 1800 but for a new technology such as Long Term Evolution ("LTE") instead. H3G's current view is that 1800 MHz will be used for UMTS. Further, even if it becomes the de-facto home for LTE H3G's considers that this is not actually a reason to hold-off on or reject redistribution but another reason why redistribution it is essential.

If 1800MHz does become the favoured spectrum for LTE or any other new technology then Ofcom's decision not to redistribute it now will grant the incumbent MNOs an additional benefit that further distorts the competitive landscape. This would not appear to be consistent with Ofcom's stance on technological neutrality or the need to "rectify distortions created by legacy assignments" or its spectrum policy generally. H3G is unclear on what basis has Ofcom decided (implicitly) that Orange and T-Mobile are the most efficient operators for this new technology without running either an auction or a beauty parade. Ofcom's proposal to allocate substantially the whole of the 1800 MHz band to these two operators is arbitrary as well disproportionate and discriminatory.

H3G notes too that LTE is actually part of the 3G standard and that it is to be anticipated that those wishing to develop it will be the same operators currently using UMTS. [●]

4.2.3. Ofcom is wrong to give the incumbent MNOs the benefit of any uncertainty as to future use

At its most basic, Ofcom's position is that it will liberalise the 1800MHz spectrum but will not require its redistribution because it does not know what the spectrum will be used for (and the competitive impact is therefore unclear).

Ofcom is giving the incumbent MNOs the benefit of the uncertainty that exists: if the spectrum is never used for anything more valuable than 2G (though most unlikely) then the incumbent MNOs will not have gained anything but nor will they have lost anything; if, on the other hand, a more valuable use does emerge (UMTS, LTE or otherwise) then the incumbent MNOs only stand to gain. [●]

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[46] Paragraphs 5.107-5.109 of the Consultation.

4.3. Ofcom's analysis of the costs and benefits of clearing 900MHz spectrum is flawed

Notwithstanding Ofcom's note that its modelling is intended only to provide an "order of magnitude" indication, H3G considers that there are certain important weaknesses and limitations. As a preliminary point, however, H3G questions whether there would be a need for any modelling at all if Ofcom were minded to go for a clear auction or equal administrative allocation to all five MNOs. Such an approach could be justified on the basis of fairness alone and would avoid the inherent uncertainties involved in the modelling. Ofcom is not as well placed as the market to form judgments on future technological development (an opinion it has previously expressed).

In terms of the figures used for costs, it is notable that by far the biggest element of cost is the additional handset subsidy assumed to be necessary to achieve accelerated 3G migration. Any change in this figure has a large impact on the forecast competitive desirability of releasing greater numbers of carriers. Ofcom has assumed that the amount of the extra subsidy will fall over time but H3G considers that Ofcom's approach to this issue is flawed. Ofcom has apparently considered it appropriate to use as a starting figure the assumed difference in price now without adjustment for the fact that any 2G spectrum liberalisation is at least three years away, which H3G does not necessarily consider right. Further, Ofcom's analytical approach fails to recognise the competitive nature of the retail market. The level of handset subsidies is determined by the difference between handset costs and the competitive retail price for handsets. Neither variable is substantially within the control of an individual operator. As such, if the costs of migration are as a result of the need to increase handset subsidies, then these costs will be borne by **all** market participants. It is therefore likely that Ofcom's estimate of these costs for the incumbent 900MHz operators is too high [47]

Further, H3G questions the extent to which it is appropriate to include the full amount of costs in the analysis. H3G has asked Ofcom about how it proposes to set AIP for any retained spectrum and part of the reason for doing this was to establish to what extent it might be discounted below auction price and whether any additional discount would be provided to O2 and Vodafone to take account of the costs of clearance. Any discount that is provided (whether just to O2 and Vodafone or generally) eliminates part of the cost that is being assessed. Also some of this cost would occur anyway without refarm as 2G operators migrate to 3G (with its greater revenue opportunities and greater spectrum efficiency). [●]

H3G also believes that the benefits of refarming the 900MHz spectrum have been underestimated, particularly the benefits that flow only to O2 and Vodafone (which might perhaps, more accurately, be considered a reduction of their costs). Ofcom, itself, acknowledges that the investment by O2 and Vodafone in an increased handset subsidy "may not be entirely wasted"[48]. ARPU is likely to increase and retention may well be improved. H3G notes that frequent handset upgrades are an existing important retention tactic and it is rightly to be assumed that offering a 3G handset may therefore be a benefit. Ofcom makes no attempt to assess the benefit to O2 and Vodafone. [●]

There are also other weaknesses in the impact assessment and modelling, as well as inadequate supporting material, the consequences of which are not absolutely clear [●]. These are detailed in Annex 4, however, in summary Ofcom's approach to technical assessment and modelling is erroneous in respect of the following:

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[47] Ofcom's modelling also does not appear to take into account that for much of the post-pay market handset subsidies are already extremely high (and in many cases total) which makes it difficult to see how subsidies could be increased in the current competitive market. Presumably this would be through a reduction in retail prices, but this will also affect all operators in the market not just the incumbent 900MHz operators.

[48] Paragraph A9.184 of the Consultation.

- underestimating the propagation and resulting physical network differences between 900MHz and 2.1GHz bands;
- neglecting to recognise that 3G networks are already implementing at HSPA 1.8MB, 3.6MB,7.2MB already leading to entirely different cell behaviour;
- neglecting to recognise that massive year on year increases of data throughput of up to 800% are occurring;
- neglecting to recognise the effect of the price differential between combined 2G/3G handsets and 3G handsets in securing 3G growth; and
- the use of an unrepresentative area for measurement and development of fundamental cell site parameters.

5. Liberalisation of the 2100MHz band

H3G agrees with the proposal to make the 2100MHz licences tradable.[49] Subject to interference and interoperability issues, such as those posed by WiMax technologies, H3G also considers that there may be merit in making the licences technology neutral At this stage. H3G does not believe this will in practice provide any significant additional benefit to the 2.1GHz licence holders and does not have strong views on the desirability of such a change in the near future.

H3G does not understand why Ofcom has failed to take the opportunity to clarify the status of the 2100MHz licences beyond their scheduled expiry date of 2021. Such an approach would be consistent with Ofcom's treatment of other licences. For 900 and 1800MHz liberalisation, Ofcom is proposing that it should be made clear that the licences will continue indefinitely subject to 5 years' notice of revocation for spectrum management purposes[50]. This is expressly intended to be consistent with other spectrum that has been liberalised, and H3G notes that other spectrum that has recently been auctioned or is presently intended for auction has been or is to be licensed on the same terms.

[●]

[49] Section 16 of the Consultation.
[50] Paragraph 1.70 of the Consultation.

6. A more appropriate approach

In this section of its response, H3G briefly summarises below its view of a more appropriate approach for Ofcom to adopt rather than the proposals on which it is currently consulting.

6.1. Administrative reassignment or full auction for 900MHz and 1800MHz

Taking account of the relevant history, principles of non-discrimination correctly applied and the competitive impact if 1800MHz is used for UMTS or any successor technology, [●] all five MNOs [should] be given an equal opportunity to gain access to the spectrum.

With respect to both 900MHz and 1800MHz, H3G believes that it would be appropriate for the spectrum to be administratively allocated (in accordance with objective, open, transparent and non-discriminatory selection criteria) to each of the existing MNOs at the same time. As discussed in section 3.3, H3G considers that it is consistent with Article 5(2) to allocate administratively all the 900 and 1800MHz carriers to the existing MNOs, provided it is done in a non-discriminatory fashion (which would involve distribution to all MNOs). [●]

As discussed in section 3.4 of this response, there is also an option for clear auction of the 900MHz band that has not been considered by Ofcom and which has very few of the disadvantages associated with the clear auction options that have been considered by Ofcom. This option for a clear auction of 900MHz would be equally applicable to 1800MHz which could also be auctioned in full. A full auction, with reference to the example set out above at section 3.4. has considerable benefits over Options A and C and would comply with Ofcom's legal obligations. As explained in sections 2.4 and 2.5 of this response, H3G does not believe that Options A and C do comply with the relevant legal obligations.

H3G does not believe that the requirements, inter alia, of non-discrimination and proportionality can be met other than by giving all MNOs broadly equivalent access to both 900MHz and 1800MHz spectrum[51].

[●]

6.2. Further consultation

Should Ofcom be minded to pursue the current approach for 1800MHz (which H3G considers inappropriate in any event) H3G invites Ofcom to reconsider the information on which it has based its decision and to re-consult. H3G cannot see how it would be appropriate for Ofcom to reach a decision on 1800MHz refarm and, given the apparent errors in Ofcom's factual assessment of the likelihood of UMTS usage, doubts the ability to reach a legally sustainable decision to liberalise the 1800MHz to the incumbent MNOs at this time. [●]

Further, if Ofcom remains minded to allow the incumbent MNOs to retain any of their current spectrum following refarm then H3G considers that Ofcom should consult on a formula for AIP and on the design of its proposed 900MHz auction before reaching a decision.

H3G is of the strong view, as it has previously stated, that it is important that the intended approach to mobile spectrum liberalisation is clear before any auction of the UMTS Expansion Bands (2.6GHz band) is held. H3G continues to hold this view and

[51] H3G is not convinced that Orange and T-Mobile have such good claims for access to 900MHz spectrum as H3G since they already have national networks at 1800MHz and can presumably use the same cell sites to establish UMTS 1800MHz national networks. They do not necessarily need 900MHz spectrum to achieve economic and efficient rural 3G coverage.

therefore, in the context of the difficulties raised by the Consultation and discussed in this response, H3G considers that Ofcom should delay the proposed 2.6GHz auction.

Annex 1: Response to individual consultation questions

The responses to the questions below should be read in conjunction with the rest of this response and subject to the same comments on the inadequacies of the consultation process.

Question 1.1 Do you have any other comments on this consultation document in addition to those made in response to the questions set out below?

Yes. Please see the discussion set out in the main body of H3G's response and previous submissions made by H3G.

Question 3.1 Do you have any comments on Ofcom's interpretation of its obligations under the forthcoming RSC Decision?

Yes. H3G disagrees with Ofcom's interpretation as to the time scale within which it must act and what it means to "make available" the spectrum for UMTS. Relevant discussion of this is included in section 3.2 of H3G's response.

Question 5.1 Do you agree that the 900MHz spectrum is likely to provide a cost advantage over higher frequencies for the provision of mobile broadband services? If so, do you believe that Ofcom's estimates of the size of that cost advantage are representative of what would realised in practice?

Yes, H3G does agree that the 900MHz spectrum is likely to provide a cost advantage over higher frequencies for the provision of mobile broadband services. H3G does not believe, however, that Ofcom has adequately assessed the size of the cost advantage or the differential impact on different MNOs. Relevant discussion of this is included in sections 2.3, 2.4 and 4.3 of H3G's response.

Question 5.2 Do you agree that the 1800MHz spectrum is unlikely in practice to provide a cost advantage over higher frequencies for the provision of mobile broadband services?

No. H3G does not agree that the 1800MHz spectrum is unlikely in practice to provide a cost advantage over higher frequencies for the provision of mobile broadband services. To the contrary, H3G considers that 1800MHz spectrum is likely to provide a cost advantage. Relevant discussion of this is included in sections 2.5 and 4.2 of H3G's response.

Question 6.1 Do you agree that if the existing distribution of the 900MHz spectrum continued post liberalisation, this would be unlikely to promote competition for the provision of mobile broadband services?

Yes. H3G considers that if the existing distribution of 900MHz spectrum continued post liberalisation it would not promote competition. Relevant discussion of this is included in sections 2.2 to 2.4 of H3G's response.

Question 6.2 Do you agree that if the existing distribution of the 900MHz spectrum continued post liberalisation, this would be unlikely to secure optimal use of the radio spectrum?

Yes. H3G considers that if the existing distribution of 900MHz spectrum continued post liberalisation it would not secure optimal use of the radio spectrum. Relevant discussion of this is included in sections 2.3 and 2.4 of H3G's response.

Question 6.3 Do you agree that if the existing distribution of the 1800MHz spectrum continued post liberalisation, this would be likely to promote competition for the provision of mobile broadband services?

No. H3G considers that if the existing distribution of the 1800MHz spectrum continued post liberalisation it would not promote competition. It would, indeed, distort competition. Relevant discussion of this is included in sections 2.2, 2.3 and 2.5 of H3G's response.

Question 6.4 Do you agree that if the existing distribution of the 1800MHz spectrum continued post liberalisation, this would be likely to secure optimal use of the radio spectrum?

No. H3G considers that if the existing distortion of the 1800MHz spectrum continued post liberalisation it would not secure optimal use of the radio spectrum. Relevant discussion of this is included in sections 2.3 and 2.5 of H3G's response.

Question 8.1 Do you agree with Ofcom's assessment of the merits of Option A (Liberalisation in the hands of the incumbents) for the implementation of the RSC Decision in respect of the 900MHz spectrum?

H3G considers that it would be inappropriate for Ofcom to liberalise the 900MHz spectrum in the hands of the incumbents. Relevant discussion of this is included in sections 2.4, 3 and 6.1 of H3G's response.

Question 8.2 Do you agree with Ofcom's assessment of the merits of Option A (Liberalisation in the hands of the incumbents) for the implementation of the RSC Decision in respect of the 1800MHz spectrum?

No. H3G considers that Ofcom's preferred approach of liberalising the 1800MHz spectrum in the hands of the incumbents is discriminatory, disproportionate and will distort competition. Relevant discussion of this is included in sections 2.5, 3 and 6.1 of H3G's response.

Question 9.1 Do you agree with Ofcom's assessment of the merits of Option B (Liberalisation in the hands of the incumbents subject to a roaming condition) for the implementation of the RSC Decision in respect of the 900MHz spectrum?

H3G agrees that liberalisation of the 900MHz spectrum in the hands of the incumbents subject to a roaming condition would not be the most appropriate approach.

Question 9.2 Do you agree with Ofcom's assessment of the merits of Option B (Liberalisation in the hands of the incumbents subject to a roaming condition) for the implementation of the RSC Decision in respect of the 1800MHz spectrum?

H3G agrees that liberalisation of the 1800MHz spectrum in the hands of the incumbents subject to a roaming condition would not be the most appropriate approach.

Question 10.1 Do you agree that in principle some form of mandatory release of 900MHz spectrum is appropriate in order to implement the RSC Decision?

Yes. H3G agrees that mandatory release of 900MHz spectrum is needed. Relevant discussion of this is included in sections 2.4, 3 and 6.1 of H3G's response

Question 10.2 Do you agree that in principle some form of mandatory release of 1800MHz spectrum is unlikely to be appropriate and that Option A is likely to be the most appropriate means to implement the RSC Decision in respect of the 1800MHz spectrum?

No. H3G considers that some form of mandatory release of 1800MHz spectrum is needed and Option A is not the most appropriate approach. Relevant discussion of this is included in sections 2.5, 3 and 6.1 of H3G's response.

Question 11.1 Do you agree with Ofcom's assessment that the version of Option C in which there is the simultaneous release of three 2 x 5 MHz blocks of 900MHz spectrum in 2010 is likely to be the most appropriate means to implement the RSC Decision in respect of the 900MHz spectrum?

No. H3G considers that full release and administrative reallocation (to all 5 MNOs equally) or auction would be more appropriate. The release of only three carriers (or less) may be sufficient if all or some of the carriers released are administratively allocated to H3G. Relevant discussion of this is included in sections 2.3, 2.4, 3, and 6.1 of H3G's response.

Question 12.1 Do you agree with Ofcom's proposal for the mechanism of release and the terms and condition for the released 900MHz spectrum?

No. H3G considers that full release and administrative reallocation (to all 5 MNOs equally) or auction would be more appropriate. Relevant discussion of this is included in section 2.4, 3 and 6.1 of H3G's response.

Question 12.2 Do you agree with Ofcom's proposal for the terms and conditions for the retained 900MHz spectrum?

No. H3G does not agree with Ofcom's approach to 900MHz. Relevant discussion of this is included in section 2.4 of H3G's response.

Question 13.1 Do you agree with Ofcom's assessment of the merits of Option D (Full Mandatory spectrum Release) for the implementation of the RSC Decision in respect of the 900MHz spectrum?

No. H3G considers that full mandatory release of 900MHz spectrum is needed. Relevant discussion of this is included in sections 2.4, 3 and 6.1 of H3G's response.

Question 14.1 Do you agree with Ofcom's proposals for the implementation of the RSC Decision in relation to the 900MHz spectrum?

No. H3G disagrees with Ofcom's interpretation of the draft RSC Decision. Reference should be made to section 3.2 of H3G's response.

Question 14.2 Do you agree with Ofcom's proposals for the implementation of the RSC Decision in relation to the 1800MHz spectrum?

No. H3G disagrees with Ofcom's interpretation of the draft RSC Decision. Reference should be made to section 3.2 of H3G's response.

Question 15.1 Do you think that Ofcom should make the 900 and 1800MHz spectrum available for systems other than GSM and UMTS? If so, for what systems, on what timescale and by what mechanism?

H3G considers that use of systems other than GSM and UMTS within the 900 and 1800MHz spectrum must only be permitted if and insofar as they do not cause interference or interoperability problems with GSM and UMTS. Relevant discussion of this is included at sections 4.1 and 5 of H3G's response.

Question 15.2: Do you believe that licences for the 900 and 1800MHz spectrum should be made tradable? If so, on what timescale and should trading be subject to any competition restrictions ?

Yes. H3G considers that provided that access to the liberalised spectrum has been achieved on an equitable, fair and non-discriminatory basis, the licences for the 900 and 1800MHz spectrum should be made tradable.

Question 16.1 Do you believe that the licences for 2100MHz should be liberalised and if so on what timescale?

Yes. H3G considers that the licences for 2100MHz should be liberalised on the same timescale as 900 and 1800MHz and subject to the same conditions (including indefinite term). Relevant discussion of this is included in section 5 of H3G's response.

Question 16.2 Do you believe that the licences for 2100MHz should be made tradable and if so on what timescale?

Yes. H3G considers that the licences for 2100MHz should be made tradable on the same timescale as 900 and 1800MHz and subject to the same conditions (including indefinite term). Relevant discussion of this is included in section 5 of H3G's response.

Annex 2: Letter of 28 September 2006

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Annex 3: Evidence of UMTS use of 1800MHz

Multi-band Solution

Requirements for Multi-band

UMTS service was launched in the core band (1920-1980 MHz/2110-2170 MHz) since 2001, with increasingly broad applications of the UMTS and a growing number of subscribers, the requirements on extended bands also started to be taken into consideration according to the frequency allocation in different regions.

- **Extended UMTS band:** Operators in some areas have its only extended UMTS band, like band IX /1800 MHz band in Japan, 850/1900 MHz band in Latin America, AWS(1710-1755MHz/ 2110-2155MHz) in USA.
- **Wider coverage:** Thanks to its lower frequency band, the required number of base station sites in 850/900 MHz band is less than 40% compared to that at 2.1 GHz for the same service (data rates) and same coverage, For example, Vodafone in Portugal, Elisa in Finland, Optus in Australia have done or are doing UMTS900 trials.
- **Network migration:** With UMTS development, more and more other system users migrate to UMTS, How to reuse existing frequency resources to protect the investment? Like in Latin America, some operators migrate from GSM850M or CDMA850M to UMTS850M.

Multi-band solution in global application

To meet operators' multi-band requirements, Huawei has been endeavoring in the UMTS extended bands field. Huawei is the first vendor to support the full frequency including 850M/900M/1700M/ 1800M/1900M/2100MHz and AWS frequency.

Huawei has provided field-proven performance in commercial or trial networks.

The first All-IP UMTS/HSPA Commercial Network in 1800M in Japan

eMobile, innovative mobile operator in Japan, selected Huawei as its partner. Huawei deploys more than 1000 UMTS1800 Distributed Node B with HSPA ready in metropolitan areas such as Sendai and Sapporo, and will support the roll out of eMobile's nationwide UMTS/HSDPA network in the upcoming years.

"Huawei is a dynamic company full of the customer driven innovative spirit. With Huawei, we are confident of having selected the right partner that can help us to lead the market in product innovation, customer service and maximizing value for customers."

---Dr. Sachio Semmoto, Chairman and CEO of eMobile

RRU in 1800MHz

Successful UMTS900M Trail in Australia OPTUS

Huawei helped OPTUS to call the industry- first Video Phone and realize HSDPA 3.6Mbps download services in UMTS900.

"This moment is a defining one in Optus' and the Australian telecommunications history – it's leading edge, an Australian first and a first for the southern hemisphere – we've just made a UMTS900 call – It' s just very exciting". These were the words from Darren Rogers, Optus' Network Strategy Manager, moments after he made the first UMTS900 call with Huawei UMTS900 solution in Wongarbon, Central West New South Wales.

Darren Rogers makes the first UMTS900 call back to Sydney to relay the news

Leading End to end multi-band solution

End to end multi-band solution to mobilize the maturity of the industry chain

Huawei provides infrastructure equipments, 2G/3G co-siting devices, terminals and RNP&RNO. When deploying extended band network, core Network & RNC can be shared. Only the radio units of Node B & the radio network planning need change.

Leading serials of Node B to meets the requirements in different regional markets and different scenarios

Leading serials of Node B support multi-band to meets the requirements in different regional markets. Like, 850/1900M for Latin America, Australia markets, 900/1800M for Europe, Asia, Africa markets, AWS for US and 1800M for Japan markets.

Both cabinet-based Node B and Distributed Node B System support multi-band solution, including 2.1/1.9G/1.8G/850M/900M for Macro Node B, 2.1G/1.9G/1.8G/850M/900M/AWS for Distributed Node B and 2.1G/1800M for iDBS.

Modular design to fast to market

Only change in Node B for the extended band Support.

For cabinet-based Node B, only new RF sub-system is different for extended band compared to UMTS2100, baseband resource and other components & resources are shared by multi-band RF sub-system.

For Distributed Node B System, BBU is the same and RRU is different for extended band compared to UMTS2100. Thank for modular design of HUAWEI Node B products which ensures the fast time to market of extended band products.

Macro NodeB

AFU and MTRU for 2.1/1.9G/1.8G/ 850M/900M

Sharing Base band resource for multi-band

DNBS

RRU for 2.1G/1.9G/1.8G/ 850M/900M/AWS

Same BBU for multi-band

iDBS

Pico RRU for 2.1G/1800M

CAT5/6

Office AP

Office AP in 2.1G

Home AP

Home AP in 2.1G

Terminal

U1205 Terminal
UMTS: 850/1900 MHz;
GSM 850/1800/1900 MHz

E870 HSUPA 2M Data card
UMTS/HSDPA
850/1900/2100MHz
GSM/GPRS/EDGE
850/900/1800/1900MHz

E660 HSDPA 7.2M Data card
UMTS/HSDPA
850/1900/2100MHz
GSM/GPRS/EDGE
850/900/1800/1900MHz

E270 HSUPA 2M USB Modem
UMTS/HSPA
850/1900/2100MHz
GSM/GPRS/EDGE
850/900/1800/1900MHz

E800 HSDPA 7.2M Data card
UMTS/HSDPA
850/1900/2100MHz
GSM/GPRS/EDGE
850/900/1800/1900MHz

Excellent technology to support co-site, co-cabinet and high performance

Co-site solution to save investment

- co-site device, Same-band Antenna Sharing Unit (SASU), can reuse existing 2G site antenna and feeder system
- SASU is applicable for both cabinet-based Node B and Distributed Node B System.
- No extra loss in the uplink, Maximum 0.6dB insertion loss in the downlink
- No impact on frequency planning for GSM & UMTS

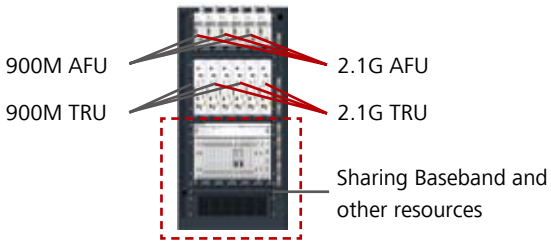
"…the Antenna Sharing Units (SASU) to enable us to combine GSM and UMTS services on the same antenna," Brendan Jones said, Radio Networks Performance Manager of Optus.

SASU to reuse existing 2G site antenna and feeder system

multi-band co-cabinet solution to reuse of site resource, rental and civil work

for example, 900M and 2.1G co-cabinet

- Largest capacity of mixed configuration, 3*2 (3*3, 3*4)configuration for each frequency band
- All the baseband module including power, transmission, Channel card is completely shared by any two frequency band



High Performance in HSPA and PA, OPEX saving

- All New generation Node Bs in extended band supporting HSDPA full performance from day 1 and hardware ready for HSUPA Phase 1
- 850M/900M/1.9G/1.8G/AWS 40W Doherty, 2carriers

HUAWEI leads the UMTS900 industry and will provide E2E commercial Total solution covering terminals, infrastructure equipments and GSM900&UMTS900 co-antenna toolkits in 1Q07. Huawei has trial tests 3G in 900MHz in SFR in France and Optus in Australia in Nov 2006.

- Field-proven ultra-coverage performance with 40W high-output Multi Carrier Power Amplifier. IN Optus test, DT calls were performed on UMTS2100 and UMTS900. UMTS2100 (voice service) cut off roughly 3-5km out. GSM900 a bit further. The UMTS900 was still very clear and went on for roughly 20km.
- Industry- firstly demonstrated Video Phone & HSDPA 3.6Mbps download services. Stable HSDPA downloads at 3.2Mbps with commercial HSDPA data cards in Optus test. Seamless inter-working capability between UMTS900 and other systems.
- Reuse the existing GSM900 antenna & feeders with Huawei's co-siting solution without affecting the performance of existing GSM900 network.

Annex 4: Flaws in technical assessment and modelling

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