OFFICE OF COMMUNICATIONS

Award of available spectrum: 1781.7-1785 MHz paired with 1876.7-1880 MHz

This documents sets out Ofcom's decisions for the award of wireless telegraphy licences for the use of these Spectrum Bands.
The Information Memorandum for this award is published separately.

Statement

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Contents

Section 1

Executive Summary

1.1 In January 2005, Ofcom published outline proposals for the award of licences to use the frequencies 1781.7-1785 MHz paired with 1876.7-1880 MHz ("the Licences" and "the Spectrum Bands"). These frequencies are currently substantially unused in the UK. These proposals were set out in the Spectrum Framework Review: Implementation Plan ("SFR:IP"), which also included consideration of the options for releasing a wide range of other available frequencies.

1.2 Having considered carefully the responses to the proposals in the SFR:IP, Ofcom published a further, more detailed consultation relating specifically to the Spectrum Bands in July 2005 ("the July Consultation").

1.3 Ofcom has now considered carefully the responses received to the July Consultation, as well as feedback received during two public seminars that have been held relating to the proposals. In light of this consideration Ofcom has reached conclusions on a wide range of matters that were the subject of the July Consultation. This statement sets out those conclusions. The principal matters in relation to which Ofcom has decided to amend its proposals following the consultation include the following:

- the technical Licence conditions
  - the power limits for the licensed frequencies at 1781.7-1785 MHz and 1876.7-1880 MHz are now defined as an EIRP density masks expressed in dBm/kHz rather than a fixed maximum EIRP expressed as dBm per carrier;
  - the Licences will now include an option for the licensees in the Spectrum Bands as a result of this award (the "Licensees") to agree unanimously to a limited increase in the in-band power limit in certain specific circumstances (such as where systems are geographically or physically isolated, for instance in tunnels and basements); the Licences will however still be low power in character;
- the minimum and maximum number of Licences in the range on offer for the menu bidding auction has been amended from a minimum of 5 and maximum of 10 to a minimum of 7 and maximum of 12.

1.4 Ofcom is publishing the following other documents alongside this Statement which are relevant to the award of licences for the Spectrum Bands:

- an Information Memorandum, which sets out relevant information for the attention of interested parties to help them decide whether to proceed with further investigations of possible participation in the award. This includes a description of the spectrum packaging and the auction format and rules; and
- a Notice of Ofcom's proposal to make four statutory instruments in relation to the award process in accordance with sections 394 and 395 of the Communications Act

2003. These statutory instruments include the auction regulations, regulations extending spectrum trading to the Spectrum Bands, an order limiting the number of licences in the Spectrum Bands and regulations to allow for publication of the identity and terms of the licences in the Spectrum Bands.

1.5 Interested parties are advised to familiarise themselves with the auction regulations as these contain rules preventing association and collusion between bidders.

1.6 Ofcom intends to start the award process before the end of the financial year 2005-06.

Section 2

Introduction

2.1 This Statement sets out Ofcom's decisions on various matters relating to the award of wireless telegraphy licences for the use of the spectrum bands1781.7 to 1785 MHz paired with 1876.7 to 1880 MHz. It sets out various amendments to proposals in the July Consultation (published on 28 July 2005)[1]. These decisions follow careful consideration of the responses to the July Consultation. It also takes into account the feedback received at two seminars open to interested parties, held on 8 September and 26 October 2005. At the first of these seminars Ofcom presented the proposals under consultation[2]. At the second Ofcom introduced further documents that provided an update on its thinking on potential revisions to the technical conditions contained in the July Consultation (the "Technical Study" and presentation slides for the seminar on 26 October)[3].

2.2 Further details of Ofcom's plans for the award, including how to apply to be a bidder, are given in certain documents published alongside this Statement, which include an Information Memorandum and the draft auction Regulations.

2.3 Ofcom intends to start the award process before the end of its financial year 2005-06.

Overview of responses to the July Consultation

2.4 Ofcom received 24 responses to the July Consultation; a summary of the responses is included in Annex 1. For the most part, the responses showed general support for proceeding with the award of the Spectrum Bands on broadly the basis proposed, although a small number of respondents expressed concern that the proposed award could discriminate unduly against the existing mobile network operators and / or that the award should be delayed pending resolution of various issues. A number of other respondents pressed for the award to take place as soon as possible. A large number of respondents also commented on the number of Licences, with a number pressing for an increase in the minimum number of Licences offered for award.

2.5 Some features of the proposals attracted general support or little or no comment. These included aspects of the proposed auction process such as the reserve price, the auction pricing rule and the use of rules to prevent collusion and association.

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[1] See http://www.ofcom.org.uk/consult/condocs/1781/. The consultation closed on 16 September 2005.
[2] The presentation slides are available at http://www.ofcom.org.uk/media/speeches/2005/09/spectrum.
[3] The Technical Note and the presentation slides for the second seminar are also available at http://www.ofcom.org.uk/consult/condocs/1781/.

2.6 Other features attracted more comment. For example, some respondents suggested that some aspects of the proposed technical conditions should be revised or clarified. These aspects included a definition of the bandwidth over which in-band power emissions should be defined, how guard bands could be defined on the edges of the Spectrum Bands to protect adjacent uses and whether the emissions from a base station to a user station should be constrained to one particular band of the paired Spectrum Bands ("uplink" from user stations at 1781.7-1785 MHz and "downlink" from base stations at 1876.7-1880 MHz).

2.7 Some respondents also requested clarification regarding:

- the analysis of relevant downstream markets, and the implications of this analysis;
- the possible spectrum management reasons for revocation of a Licence after its minimum term;
- the ability of a Licensee in the Spectrum Bands to allow a third party to provide a service under its Licence;
- the status of the proposed Code of Practice for engineering coordination; and
- the details of MoD use in the Spectrum Bands.

2.8 A limited number of respondents also expressed concern in relation to other, more fundamental, elements of the proposals, including:

- three respondents who considered that, on some important points, Ofcom should undertake further consultation, and/or assemble or review the evidence in further detail;
- two respondents (CMA and OnAir) who considered that an auction of licences was not necessarily an appropriate basis for authorising relevant uses of the Spectrum Bands;
- two respondents (Orange and O2) who proposed an alternative auction format;
- a small number of responses from mobile network operators ("MNOs") which argued that proceeding with the proposals could give rise to undue discrimination against existing licensees.

2.9 Ofcom has carefully considered all these points. The following sections 3 to 5 and Annex 1 set out its responses.

Associated documents

2.10 Ofcom is publishing the following documents required to implement the award of the Spectrum Bands alongside this Statement.

- The Information Memorandum. This sets out relevant information for the attention of interested parties to help them decide whether to proceed with further investigations of possible participation in the award.
- A Notice of Ofcom's proposal to make four statutory instruments in relation to the award process in accordance with sections 394 and 395 of the Communications Act 2003. These statutory instruments include the auction regulations, regulations extending spectrum trading to the Spectrum Bands, an order limiting the number of licences in the Spectrum Bands and regulations to allow for publication of the

identity and terms of the licences in the Spectrum Bands. The statutory consultation period expires on 05 January 2006.

Document structure

2.11 In addition to the Executive Summary (section 1) and this Introduction (section 2), this document comprises:

- Section 3 – which considers issues relating to the packaging of the Spectrum Bands;
- Section 4 – which considers issues relating to wireless telegraphy licence conditions and other spectrum rights and obligations;
- Section 5 – which considers the auction format and rules.

2.12 The document also contains an Annex, providing a summary and discussion of the main points made in the responses to the July Consultation.

Section 3

Spectrum packaging

3.1 In the July Consultation, Ofcom proposed that licence exemption was not likely to ensure optimal use of the Spectrum Bands and that it should make available a limited number of concurrent low power licences. Ofcom proposed that the number of licences awarded should be between five and ten (inclusive), and that the format of the auction should allow the market to determine within this range the number of Licences eventually to be granted.

3.2 Ofcom proposed to offer licences that did not include any restrictions as to the technology employed or service offered by licensees. Specific technical conditions were however proposed, in particular power limits, in order to promote efficient use of the radio spectrum.

Need for licences

3.3 Most respondents did not query the need to license use in the Spectrum Bands and there was general support for setting an upper limit on the number of concurrent licences that could be granted under this award process.

3.4 However, one respondent (OnAir) argued that use of the Spectrum Bands to provide GSM services on board aircraft should not be subject to licensing. OnAir argued that licensing would not be necessary for these systems as they would be designed to avoid harmful interference to other legitimate uses of the frequencies outside the aircraft.

3.5 Ofcom considers that the provision of electronic communication services by means of wireless telegraphy on board aircraft raises a number of complex issues, including a variety of legal, regulatory and technical matters. In relation to the proposed deployment of GSM systems on aircraft, these issues are currently under consideration in the Electronic Communications Committee of the CEPT. On present information, it seems likely that proposals will be brought forward in the near future for adopting a common European framework in relation to the deployment of such systems, and that proposals on these lines might be adopted. However, the content of these proposals is not yet clear, nor is it clear whether any measure will be binding on the UK (for example whether it would be limited to a decision of the ECC, or include a decision of the European Union's Radio Spectrum Committee). It is also not clear whether the scope of any measure will extend to the Spectrum Bands.

3.6 It is possible that any European measure, and/or the further development of Ofcom's consideration of the issue at national level, may lead to further statements or proposals by Ofcom in relation to the use of the Spectrum Bands to provide services on-board aircraft. Given the work under way in European regulatory fora, it is not possible at present to state whether this will relate to use on a licensed or licence-exempt basis.

3.7 Ofcom considers that the analysis contained in paragraphs 4.5-4.8 of the July Consultation in relation to use of the spectrum on a licensed basis is unaffected by

the issue of potential use on aircraft, in as much as this discussion was intended principally to address terrestrial use across the landmass of the UK.

Offering the choice between high power and low power during the award

3.8 Three respondents made submissions arguing that the award should allow both high power and low power licences to be offered. They disagreed with Ofcom's proposal in the July Consultation and argued that a single-licence high power option should not be precluded under the auction. Some arguments used by these respondents were also relevant to Ofcom's proposal to set a minimum number of licences greater than one (which is discussed below). In particular, some expected precise descriptions of future conditions, for example in downstream markets, in lieu of Ofcom's assessment of likelihood and risks of particular outcomes during and after the award.

3.9 However, those responses did not include further evidence on the basis of which Ofcom could reassess the relative merits of allowing both high- and low-power use or specifying low-power use. Ofcom considers that its analysis expressed in paragraphs 5.36 to 5.45 and 5.46 to 5.51 of the July Consultation remains a robust basis on which to proceed with the design of the award. Ofcom has therefore decided to award wireless telegraphy licences with a low power specification in the Spectrum Bands.

Technology neutrality

3.10 Two respondents commented on the principle of technology neutrality for the Spectrum Bands. One argued that it was not achievable and the other saw in the proposals a form of precedent favouring GSM technology.

3.11 Ofcom believes that it can proceed on the basis of a technology and usage neutral award, for the reasons discussed in paragraphs 5.52 to 5.59 of the July Consultation and elsewhere. Furthermore, as discussed in the SFR:IP Interim Statement[4] , in particular at paragraphs 3.61 to 3.65, it is necessary to package spectrum in a particular way (including specified technical conditions) for it to be brought to market. Ofcom's approach is to do this in as flexible a fashion as possible, based on Ofcom's understanding of the most likely uses of the frequencies. In relation to the Spectrum Bands, Ofcom has taken into account the evidence that the most likely use of the frequencies is for low-power mobile services, and that GSM is one of the most likely technologies to be used in providing these services. Ofcom also considers that GSM is a relevant reference point for specifying the technical parameters for use of the Spectrum Bands, as GSM is one of the neighbouring uses. The issues have been considered at some length by Ofcom, including in sections 5 and 6 of the July Consultation.

3.12 Four respondents also asked for a clarification of how requests for licence variation would be addressed by Ofcom in relation to the Spectrum Bands, in particular requests for a change to allow high-power use. For the reasons discussed in the July

[4] Published on 28 July 2005. See http://www.ofcom.org.uk/consult/condocs/sfrip/.

Consultation, in particular at paragraphs 5.36 to 5.45 and 5.46 to 5.51, Ofcom has decided to specify a low power condition in the Licences for award. If any requests for variation to Licences were submitted to Ofcom after the Licences have been awarded, Ofcom would consider such requests on their merits at the time, in the light of Ofcom's relevant statutory duties. Ofcom considers that it is neither necessary nor useful for it to speculate regarding the treatment of possible future requests for variation to the Licences when the circumstances in which these might be made cannot be predicted accurately.

Number of concurrent low-power Licences

3.13 In the July Consultation, Ofcom proposed that five to ten low power Licences should be offered, with the eventual number to be awarded determined by bids in the auction. A large number of respondents expressed views on this range, with most strongly in favour of an increase in the minimum number of Licences.

3.14 Four respondents did not agree with Ofcom's analysis in favour of specifying a minimum number of licences greater than one. In particular, the following arguments were made:

- ex post powers under competition law could be used to address a case where a single licensee would operate low power services under a high power licence, and potentially acquire a dominant position in the market for low power services as a result;
- strong demand for licences was not an appropriate justification for setting a minimum number of licences greater than one;
- the duty to promote competition in relevant markets was not a relevant basis for setting a minimum number of licences greater than one, as Ofcom proposed to conduct the award on a technology- and service-neutral basis; it was not therefore possible to predict the downstream markets in which services would be located;
- the concerns about potential asymmetries between bidders were surprising, in particular as Ofcom has not found SMP in the existing market for mobile access and origination (which uses high power technologies);
- the side effect of the 'pay what you bid' rule (i.e. the modest bias towards fewer licences being awarded than would be efficient) could not be relevant if there were more bidders than the maximum number of Licences.

3.15 However, most respondents to the July Consultation were strongly in favour of a minimum number of Licences greater than one, and most of these argued for an increase in the minimum number beyond the five proposed by Ofcom. Their proposals ranged from a minimum of six to a minimum of ten.

3.16 Some of these respondents expressed a strong concern that, unless the minimum number was increased, the existing mobile network operators would have a strong incentive to bid high amounts for the option with fewest licences. They argued that the mobile network operators would do this in order to forestall the prospect of entry into their market, and in order to maintain their market share and control over innovation. Certain respondents also argued that Ofcom would in effect facilitate a strategy of this kind on the part of the mobile network operators if it set a minimum number of five, as five is equal to the existing number of operators with 2G and 3G licences. Bidding to acquire one of five licences for the Spectrum Bands would therefore be an obvious route that was open to these operators: as a bidding strategy

on these lines was self-evident, it would not be necessary for the mobile network operators to engage in extensive prior co-ordination to arrive at their preferred outcome.

3.17 Certain respondents also noted that under the proposed auction design it would be possible for the mobile network operators (and other large bidders) to bid large amounts for the option with fewest Licences, and then to make no bid at all for options with larger numbers of Licences. A bidding strategy on these lines would, in conjunction with the proposed auction design, enhance the scope for existing large operators to secure the outcome they preferred.

3.18 The respondents that argued in favour of increasing the minimum number of Licences also expressed, in general, little concern regarding the prospective costs of co-ordination. To the extent that they commented on this, they considered that it would be feasible and not excessively costly for co-ordination to occur between say seven or ten Licensees, or potentially more.

3.19 Ofcom has considered the responses carefully. Ofcom's approach to the award remains to offer a limited number of low-power concurrent licences, between a minimum and maximum that are determined in advance of the award. Ofcom has taken into account the following considerations, among others, in reaching these conclusions.

3.19.1 Ofcom considers that it is not appropriate for the award process to determine use as between high and low power options. High power use is technically only likely to be feasible for one licensee on a UK-wide basis. Low power use technically could allow a number of UK-wide licensees, subject to appropriate licence conditions. Ofcom has set out its analysis of the factors pointing towards specifying low-power use in section 5 of the July Consultation and elsewhere, and considers that this reasoning remains valid. This analysis addressed (inter alia in paragraphs 5.36-5.51) the proposition that ex post competition law powers were sufficient to address any issues arising if a single high-power licence were awarded, the relevance of Ofcom's duty to promote competition, the relevance of potential asymmetries between bidders, and the relevance of likely high demand for low-power licences.

3.19.2 Ofcom's view remains that low power use of the Spectrum Bands can accommodate technically a number of concurrent low power licensees, subject to engineering coordination, but that a limit to the number of licensees is required, for the reasons discussed at paragraphs 4.9 to 4.12 in the July Consultation.

3.19.3 Ofcom believes that the most efficient approach to licensing low power concurrent use in the Spectrum Bands involves setting a minimum and a maximum number of Licences, using an auction format that allows the market to determine the number of Licences within this range. This is for the reasons set out at paragraphs 5.60 to 5.66 and 7.15 to 7.22 in the July Consultation.

3.19.4 Ofcom considers that the analysis at paragraphs 5.70 and 5.71 of the July Consultation is relevant to deciding the relevant minimum number of Licences in a range. These considerations include of the level of demand and number

of likely users of the Spectrum Bands, the promotion of competition and the implications of the 'pay what you bid rule'. Ofcom believes that in the case of the 'pay what you bid' rule, the potential for perceived competition to affect bidders' behaviours is likely to apply whether or not the number of bidders is greater than the maximum number of Licences.

3.20 Ofcom has, however, concluded that the precise levels of the minimum and maximum number of Licences should be considered further, in light of the responses received to the July Consultation and Ofcom's own further analysis of this issue.

3.21 In the July Consultation, Ofcom proposed setting a minimum number of Licences of five, and a maximum number of ten. Ofcom noted that there was a variety of considerations that needed to be taken into account in determining this range, and that there were significant uncertainties about many of these factors. The existence of uncertainties (for example, in relation to the size of co-ordination costs) was indeed a major reason for proposing to offer the market a range in the number of Licences, so that any additional information available to the market can be reflected in the outcome of the award process. However, the existence of uncertainty also makes it difficult to be sure of the optimal upper and lower bounds for the range.

3.22 The discussion that follows addresses first the considerations relevant to setting the minimum number of Licences, and then those relevant to setting the maximum number.

3.23 In the July Consultation, Ofcom reasoned that, once the option of allowing the auction to determine high vs low power use of the spectrum had been rejected, it was appropriate to set a minimum number of Licences greater than one. In principle it would be desirable to set the range that was offered to the market as widely as possible, to give the market maximum flexibility. However, three considerations in particular pointed towards setting the minimum number of Licences at five. These were:

- The promotion of competition. Ofcom noted that it was not clear into which economic market(s) any services supplied by licensees in the Spectrum Bands would fall, but it was possible that they might constitute one or more new economic markets. While it would be possible to rely on powers under sectoral and competition law to address any competition issues that might arise, Ofcom also considered that it would be reasonable to set a minimum number of Licences that would have benefits by way of promoting competition. Ofcom suggested that there was no evidence that a minimum number higher than five was necessary for this objective, but that a minimum of five would promote competition more assuredly than a smaller number.
- The evidence of strong demand for six or more Licences, emerging from the previous consultation on the SFR:IP. Ofcom noted that the evidence of this strong demand suggested setting a minimum number of Licences that was not much below six.
- The implications of the 'pay what you bid' pricing rule. Ofcom noted that a possible side-effect of this pricing rule is to create a modest bias towards fewer Licences being awarded than would be efficient. This effect arises because bidders anticipate less competition in options with more Licences, and are apt to adjust their bidding behaviour accordingly.

3.24 Ofcom considers that much of the reasoning in the July Consultation on this issue remains valid. However, Ofcom considers that two factors should, on reflection, be given additional weight in light of the consultation responses and Ofcom's own further consideration. These are, first, the importance of keeping limitations on the number of Licences to a minimum; and, second, the relative balance of costs, benefits, and risks associated with setting the minimum number of Licences too low or too high, relative to the optimal number of Licences.

3.25 On the first point, Ofcom considers that its objective in relation to this matter, in light of the relevant provisions in the European Directives and the Communications Act, should be to offer as many Licences to the market as is compatible with efficient use of the frequencies. This is consistent with the general policy that is reflected in the legislation, of seeking to keep restrictions on spectrum usage, and limitations on the number of Licences, to a minimum. Ofcom also considers that the principal factor that should be taken into account in limiting the number of Licences, in order to promote efficient use of the spectrum, is the technical requirement for co-ordination between licensees, to avoid undue interference, and the importance of this co-ordination process not being unduly costly or onerous.

3.26 Ofcom considers that the objective identified in the previous paragraph is more pertinent than the objective of offering maximum freedom to the market to determine the number of Licences. It implies that, once Ofcom has decided to offer low power licences, Ofcom should not set the minimum number of Licences significantly below the level at which it can be confident that the co-ordination process is feasible and not unduly costly. The difficulty lies, of course, in judging the relationship between the costs of co-ordination and the number of licensees.

3.27 The second consideration relates to the relative balance of costs, benefits and risks associated with setting the minimum number of Licences too high or too low relative to its optimal level, and the effects that this may have on the outcome of the auction in terms of the number of Licences awarded. In conditions of uncertainty, the appropriate policy stance may differ depending on whether this balance is symmetric or asymmetric, and depending on the nature of any asymmetry.

3.28 Ofcom's analysis of this issue is as follows. If the minimum number of Licences is set too low, relative to its optimum, this may lead to fewer Licences being awarded than is optimal. This outcome is possible not least given the potential effects of asymmetries between bidders, as discussed in the July Consultation; the possible effects of the 'pay what you bid' pricing rule, also discussed in the July Consultation; and the inherent uncertainty of an auction outcome. If fewer Licences are awarded than the optimal number, Ofcom considers that the consequences are potentially serious:

- There will be less competition in the provision of services using these frequencies than there could have been.
- Persons who could have been awarded Licences, had a greater number been offered, will not have the opportunity to use the spectrum.

It will also be difficult and time-consuming to respond to any adverse effects. In particular, while Ofcom may have the discretion to issue further licences in the

Spectrum Bands in time, this is a lengthy regulatory process, requiring public consultation, and the making of statutory regulations. At the minimum, this is likely to involve significant delay and uncertainty.

3.29 If the minimum number of Licences is set too high, this may also have adverse consequences. In particular, there is a risk that if, as a result, more Licences are awarded than is optimal, the level of co-ordination costs will be inefficient.

3.30 However, under this scenario, several remedies are likely to be available to bidders and/or licensees, and their ability to correct that situation will not be dependent entirely on regulatory action. For example, once the auction has been concluded, if more Licences have been awarded than is optimal, it would be possible for Licensees to effect outright total transfers of Licences using spectrum trading. Ofcom recognises that for the benefits of such a trade to be shared amongst all licensees, some co-ordination would be required amongst all licensees; and any spectrum trade or other agreement would need to comply with relevant legislation, including competition law. However, it should in principle be possible for the problem of excessive engineering co-ordination costs – which is internalised amongst the licensees – to be resolved by commercial means. It is also worth noting that the auction itself may provide some remedy to the problem of too many Licences being offered, in that the prospective costs of co-ordination can be reflected in the bids made by bidders. It is also possible that if Ofcom sets too high a minimum number some Licences may remain unsold, and the costs of such an outcome in terms of efficient spectrum usage need not be high.

3.31 Ofcom considers that on balance the adverse consequence of awarding too few Licences are likely to be greater, and more enduring, than the adverse consequences of awarding too many. The balance of cost, benefit and risk is therefore likely to be asymmetric as between setting the minimum number at too high or low a level, and favour setting a higher rather than lower minimum number.

3.32 In Ofcom's view, the two considerations discussed in paragraphs 3.24-3.31 both point towards increasing the minimum number of Licences beyond that proposed in the July Consultation. This is consistent with most responses to the consultation, which argued strongly that the balance of advantage lay with a higher minimum number.

3.33 For the reasons already discussed, it is difficult to be sure of the optimum level for the minimum number of Licences: the uncertainty regarding the extent of co-ordination costs is too great, not least given that this matter concerns services and applications that do not yet exist, and which may vary significantly both between licensees and over time. However, some information can be obtained from the consultation responses, which, in general, expressed little or no concern about the likely costs of co-ordination for smaller numbers of Licences. No respondent presented evidence that the costs of co-ordination between five or six licensees would be excessive. T-Mobile argued that a large number of Licences would make the agreement and working of the Code of Practice on engineering coordination difficult. However, Red-M/CDS argued that the additional costs of co-ordination with each licensee might decrease with the number of parties, because of the preponderance of fixed costs in organising engineering co-ordination. Coffee Telecom stated its assessment that engineering coordination costs would not be greater for ten licensees than for a much lower number.

3.34 In the absence of reliable market information on engineering coordination costs, Ofcom considers that it is difficult to determine a precise number for the minimum number of Licences on offer. But the considerations identified above, and the lack of evident concern among respondents to the costs of co-ordination between smaller numbers of licensees, suggest that an increase in the minimum number would be appropriate.

3.35 Ofcom also believes that, so long as coordination between Licensees remains manageable at a reasonable cost, an award with a higher minimum number of Licences is likely to have a number of other beneficial effects. These include the potential effects, discussed in the July Consultation, on competition and innovation in downstream markets (in particular paragraphs 5.62 and 5.70).

3.36 An increase in the minimum number of Licences is also likely to have benefits by way of mitigating potential bidder asymmetries, as described at paragraph 7.4 of the July Consultation. By increasing the minimum number of Licences, the perception by weak bidders of the likelihood of succeeding on the basis of their intended use of spectrum compared to the costs of participating in the auction should be improved. This is likely to help widen participation in the auction process, thereby promoting the scope for the auction to secure optimal use of the spectrum. Following the analysis in the July Consultation, and responses to it, Ofcom considers that potential bidder asymmetries remain a pertinent factor to the design of the award process for the Spectrum Bands.

3.37 Ofcom has also taken into account further analysis by its independent auction advisers, in light of the potential effects of the 'pay what you bid' pricing rule, as discussed in paragraphs 5.70 and 8.10 of the July Consultation. This analysis suggests that a small increase in the minimum number of Licences could be beneficial in terms of addressing this potential bias, while being unlikely to affect negatively the efficiency of the auction to any significant extent.

3.38 Taking into account all of these considerations, Ofcom has decided to increase the minimum number of Licences in the menu bidding format to seven. Ofcom considers that overall this is likely to be beneficial to promoting efficient use of the spectrum, and securing the objectives identified for this auction. Ofcom considers that a minimum of seven is appropriate given that there is a lack of evidence that co-ordination between five or six, or fewer, licensees would be excessively costly, but that Ofcom is not confident that the same would be true of co-ordination between nine or ten licensees, and a minimum number of seven is a more pro-competitive approach than a smaller number, and should have other benefits, as discussed above.

3.39 The discussion now turns to the maximum number of Licences to be specified in the range.

3.40 Ofcom considers that the factors identified in paragraphs 5.72 and 5.73 of the July Consultation remain relevant to this decision, as does the assessment at paragraphs 4.9 to 4.12, and 5.63 to 5.64 of that document.

3.41 Responses to the July Consultation included relatively few comments on the maximum number of Licences, and there was some support for the broad approach

taken by Ofcom. Those respondents who did comment explicitly on the maximum number under the menu format proposed by Ofcom supported values of either ten or twelve.

3.42 Ofcom considers that there is a good case for revising the maximum number to twelve, so as to maintain the same breadth of choice for bidders as proposed in the July Consultation (i.e. there would be six options available in the menu bidding format). This would maintain a similar balance between giving bidders freedom to choose, and avoiding undue complexity in the auction process, as previously proposed. A maximum of twelve would also be consistent with such evidence of demand as has emerged from the SFR:IP and July Consultations. Any potential risks to efficiency of spectrum use from a higher number should be mitigated by the auction design which will allow bidders to select from a menu of options.

3.43 Ofcom has therefore concluded that the maximum number of Licences should be increased from ten to twelve.

3.44 Ofcom therefore considers that it should proceed on the basis of the design described at paragraphs 7.24 and 8.13 in the July Consultation (with appropriate additional rules as described in Section 4 of the Information Memorandum and the draft auction regulations), with a revised range of options of seven to twelve concurrent Licences.

Future assignments in the Spectrum Bands and other issues

3.45 In this document, Ofcom sets out its conclusions regarding the assignment of wireless telegraphy licences for use of the Spectrum Bands which should result in a number of licences being awarded. This document has already identified (paragraphs 3.4-3.6 above) the proposals that are under development in international fora in relation to GSM systems on aircraft, and that this work may lead to regulatory proposals in due course. This issue to one side, Ofcom has no present plans to offer other licences for use of the Spectrum Bands or to permit use of the Spectrum Bands by licence exemption. However as a matter of principle it is possible that Ofcom may be required to take one or more of these steps in order to comply with international obligations which do not presently exist. Ofcom may also, in principle, use its discretion to assign additional wireless telegraphy licences for use of the Spectrum Band either of the same character or of a different character to those described in this Statement. Similarly it has the discretion to allow use of the Spectrum Bands by licence exemption.

3.46 In the July Consultation, Ofcom noted that it would not expect to award any other licences in the Spectrum Bands (or allow any licence exempt uses) before a reasonable period has passed following this award process (subject to international obligations), and that this period would probably be a minimum of five years. If Ofcom were to make proposals for authorising additional use of the Spectrum Bands, either by way of licences or licence-exemption, Ofcom would consult stakeholders on its plans as part of its assessment of the case for such action. Ofcom would take fully into account the interests of Licensees in the Spectrum Bands. On reflection, however, Ofcom is not minded to give any guidance as to the minimum time period before such proposals could be put into effect.

3.47 It should be noted that other wireless telegraphy licences granted in future as part of Ofcom's ongoing award programme, may permit the provision of services that could compete with those that may be offered using the Spectrum Bands. Similar effects

may also occur by means of future Ofcom decisions as to licence exemptions or the removal of unnecessary restrictions on the use of bands already licensed. For the avoidance of doubt, Ofcom is not placing any limitation as a function of this award process on the scope for it to authorise other providers to use spectrum to offer services that could compete with those that may be offered using the Spectrum Bands. As set out in the SFR and elsewhere, Ofcom's general policy is to move towards technology and application neutral licensing that provides much greater flexibility for the use of spectrum to respond to demand and to be economically efficient.

Section 4

Wireless telegraphy licence conditions and other spectrum rights and obligations

4.1 In section 6 of the July Consultation, Ofcom set out it proposals regarding:

- the power level for in-band emissions – 23 dBm per carrier;
- the maximum outdoor antenna height – 10 metres above ground level;
- an out-of-block emission mask – with power levels expressed in dBc was derived from the GSM specification 05-05 for a 42 dBm base station and a 18 dBi antenna gain;
- exemption of users stations – to remain as in Statutory Instrument 2003 No. 74 covering user stations in the 1781.7-1785 MHz band which includes certain conditions;
- a requirement on concurrent Licensees to coordinate for engineering purposes according to a Code of Practice;
- an indefinite Licence term with a minimum term of 10 years (during which Ofcom may not revoke a Licence for spectrum management reasons);
- the need to accept any interference from MoD use described;
- certain requirements in case of interference with adjacent spectrum users or when international agreements apply;
- the possibility of outright total transfers under the spectrum trading regulations for Licensees in the Spectrum Bands;
- current adjacent uses defining the elements of a Spectrum Quality Benchmark for the Spectrum Bands;
- the request from Government that Licensees in the Spectrum Bands using GSM, UMTS or TETRA technologies voluntarily provide relevant information for the Sitefinder database.

4.2 A draft Licence illustrating these proposals was included in Annex F of the July Consultation. An updated version, following the consultation process, is included at Annex 1 of the Information Memorandum.

In-band power

4.3 The original proposal discussed at paragraphs 6.3 to 6.10 of the July Consultation, was to specify an equivalent isotropically radiated power (EIRP) limit of 23 dBm per carrier. Ofcom's interference analysis was based on the assumption that the most likely technology to be deployed would be GSM with a nominal 200 kHz carrier bandwidth and therefore the power would be constrained to bandwidths of 200 kHz or greater. However, a number of the respondents pointed out that if the carrier bandwidth remained unspecified, a system radiating multiple narrowband carriers (i.e. <<200 KHz) could produce a higher interference power than a single 200 kHz

carrier. In order to resolve this issue and to ensure that, regardless of technology choice, the interference power that any system can generate is no greater than a 23 dBm GSM carrier could produce, Ofcom has decided to modify the way the EIRP limit is specified. It is now specified as an EIRP density mask for in-band emissions in dBm per kHz.

4.4 Several responses to the July Consultation made the case for allowing higher power transmissions (up to 30 dBm per carrier) arguing that under certain conditions, i.e. where systems are geographically or physically isolated (for instance in basements or tunnels), use of higher powers would not adversely affect interference to other systems. Ofcom is sympathetic to this and recognises that in practice, the Licensees themselves will often be best placed to decide on the interference costs of allowing increased power in particular circumstances. Ofcom, however, recognises that any such flexibility must be kept to within defined bounds to ensure interference is effectively managed.

4.5 Ofcom has therefore decided to allow Licensees the flexibility to agree amongst themselves a limited use of higher powers within an absolute upper bound. This agreement may be restricted to a certain set of circumstances or conditions either nationally or locally, possibly over a limited period of time, and may or may not apply to a limited subset of Licensees. However, agreement must be reached unanimously by all Licensees and any such agreement should be notified to Ofcom in writing. It would also be possible for such an agreement to be incorporated into the Code of Practice on Engineering Coordination if desired. It should be noted that this does not give Licensees freedom to increase the power to any level they desire; any increase above those specified below would have to be requested from Ofcom in the form of a licence variation request.

4.6 The July Consultation proposed at paragraphs 6.17 to 6.18 that, to protect the neighbouring GSM band from interference, the band 1876.7 – 1876.9 MHz should be left unassigned. The July Consultation also implied at paragraph 6.19 that the band 1879.9 – 1880 MHz would be unassigned in order to protect the neighbouring DECT band from interference. This was reflected in Annex F of the July Consultation which defined the Frequencies of Operation as 1781.9 – 1784.9 MHz and 1876.9 – 1879.9 MHz. Ofcom has reconsidered this situation and no longer thinks it desirable to leave any frequencies unassigned between the Spectrum Bands and the neighbouring users. However, in order to provide the equivalent protection to the neighbouring spectrum bands, sloped masks at the inside edges of the Spectrum Bands should be applied. The revised sloped masks are continuous with the out-of-block masks (see paragraph 4.20 and 4.21 below). They have been derived from the GSM specification 05-05: for the frequency band 1781.7 – 1785.0 MHz they are based on the mask for a 30 dBm user station and for the frequency band 1876.7 – 1880.0 MHz they are based on the mask for a 30 dBm base station.

4.7 One response to the July Consultation suggested that Ofcom should not prescribe uplink and downlink transmit and receive paths (duplex direction), but should leave to each Licensee the freedom to choose the particular transmit and receive paths for their base stations and handsets. At the seminar on 26 October, Ofcom considered, in principle, allowing such freedom and not specifying a particular duplex direction in the Licences. However, after careful consideration, Ofcom considers that there may be a significant risk of unacceptable interference to the concurrent and neighbouring

spectrum users if reversed duplex operation was permitted by the Licences. Before reversed duplex operation in the Spectrum Bands could be authorised further detailed technical study is necessary and Ofcom would need to consult widely on any such proposals.

4.8 The Licences define 'The Permitted Frequencies Bands' as: 1781.7 – 1785.0 MHz and 1876.7 – 1880.0 MHz.

4.9 The Licences also specify that the maximum mean EIRP density in the Permitted Frequency Bands shall not be greater than the figures indicated in the following tables.

For the frequency band 1781.7 – 1785.0 MHz

Frequency range as measured from the lower frequency of the frequency band	Maximum mean EIRP density dBm/kHz	
	Under normal circumstances	Under specific circumstances where all Licensees agree
0 to 0.05 MHz	$-33 + 140 \times \Delta_{FL}$*	$-33 + 140 \times \Delta_{FL}$*
0.05 to 0.1 MHz	$-26 + 60 \times (\Delta_{FL}$* $- 0.05)$	$-26 + 60 \times (\Delta_{FL}$* $- 0.05)$
0.1 to 0.2 MHz	$-23 + 230 \times (\Delta_{FL}$* $- 0.1)$	$-23 + 300 \times (\Delta_{FL}$* $- 0.1)$
0.2 to 3.2 MHz	0†	7†
3.2 to 3.3 MHz	$-23 + 230 \times (3.3 - \Delta_{FL}$ *)	$-23 + 300 \times (3.3 - \Delta_{FL}$ *)

For the frequency band 1876.7 – 1880.0 MHz

Frequency range as measured from the lower frequency of the frequency band	Maximum mean EIRP density dBm/kHz	
	Under normal circumstances	Under specific circumstances where all Licensees agree
0 to 0.05 MHz	$-33.6 + 153.3 \times \Delta_{FL}$*	$-33.6 + 153.3 \times \Delta_{FL}$ *
0.05 to 0.1 MHz	$-26 + 60 \times (\Delta_{FL}$* $- 0.05)$	$-26 + 60 \times (\Delta_{FL}$* $- 0.05)$
0.1 to 0.2 MHz	$-23 + 230 \times (\Delta_{FL}$* $- 0.1)$	$-23 + 300 \times (\Delta_{FL}$* $- 0.1)$
0.2 to 3.2 MHz	0†	7†
3.2 to 3.3 MHz	$-23 + 230 \times (3.3 - \Delta_{FL}$ *)	$-23 + 300 \times (3.3 - \Delta_{FL}$ *)

* Note: Δ_{FL} is the offset from the lower edge of the relevant Permitted Frequency Band in MHz.

† within the occupied bandwidth of the transmission.

4.10 The occupied bandwidth is defined as the width of the frequency band occupied such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to 0.5% of the total mean power of the emission.

4.11 Some examples for the maximum mean EIRP density of 0 dBm per kHz under normal circumstances:

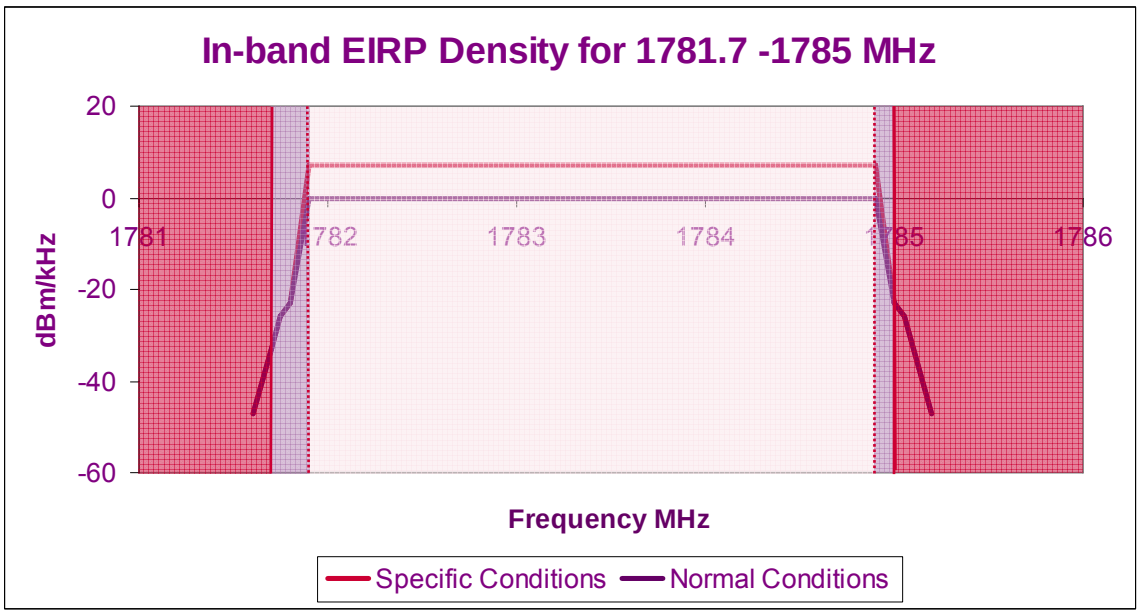
- for GSM (nominal carrier bandwidth of 200 kHz) this equates to 23 dBm (200 mW) per carrier which is identical to the original July Consultation proposal;

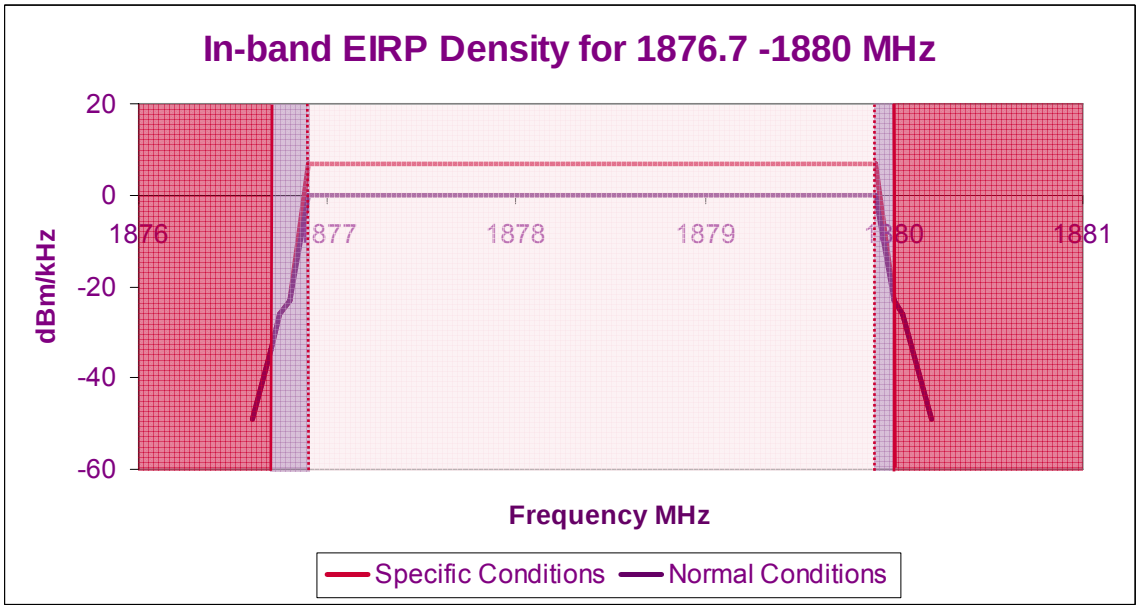
- for a cdma 1x based system (nominal carrier bandwidth of 1.25 MHz) this equates to 31 dBm per carrier; and
- for a narrowband system with a nominal carrier bandwidth of say 25 kHz this equates to 14 dBm per carrier.

4.12 An example for the maximum mean EIRP density of 7 dBm per kHz under specific circumstances (where all Licensees agree):

- for GSM this equates to 30 dBm (1 W) per carrier.

4.13 Graphical representations of the in-band EIRP density masks are as follows:





Antenna height

4.14 The July Consultation proposed at paragraph 6.15 to restrict the height of outdoor antenna systems to no more than 10 metres. A number of respondents commented on this, either requesting greater clarity on the term outdoor or asking how the restriction would be enforced.

4.15 Ofcom does not believe that there is any ambiguity in the term outdoor. It is obvious that if an antenna system is mounted within the fabric of a building then the antenna cannot be outdoors, the material from which the building is constructed is to a certain extent irrelevant (though there is an implicit assumption that it will typically provide the necessary attenuation to facilitate sharing). It is true that different building materials have different propagation characteristics, for instance glass is likely to attenuate a radio signal to a much lesser extent than brick or steel. However, whilst this may be relevant to engineering coordination considerations, it is incidental to whether an antenna system is considered to be outdoors or not.

4.16 Enforcement of the 10 metre height restriction for outdoor antenna systems will be treated in the same manner as the enforcement of any other Licence condition. The responses received to the July Consultation imply that it may be beneficial to supplement the Licence condition with provisions in the Code of Practice on engineering co-ordination relating to good site engineering practice, in relation to antenna location. If so, this will be a matter for the Licensees to pursue.

Out-of-block emission mask

4.17 The out-of-block emission mask proposed in the July Consultation at paragraph 6.22 and Table 6.1 was derived from the GSM specification 05-05. It was implicitly based on power levels (expressed as dBc) relative to a 30 kHz measurement on a 200 kHz carrier. One respondent commented that it was not clear how the proposed out-of-block emissions mask applied to alternative technologies (which has been assumed to mean non GSM technologies).

4.18 The July Consultation defined a mask that was identical for both the upper and lower frequency bands. This mask was based on that for a 42 dBm base station and an 18 dBi antenna gain. However, after further consideration Ofcom is of the view that there may be a risk of unacceptable interference to the neighbouring spectrum users and a more appropriate basis is to derive two masks, one for the band 1781.7 – 1785.0 MHz based on a 30 dBm GSM user station, and another for the band 1876.7 – 1880.0 MHz based on a 30 dBm GSM base station.

4.19 In order to clarify how the out-of-block emissions masks will apply to technologies that do not employ a carrier bandwidth of 200 kHz, Ofcom has redefined the way the out-of-block emissions masks are specified, with a view to making them consistent with the way the in-band masks are specified. They will therefore be specified as an EIRP density masks in dBm per kHz derived from the GSM specification 05-05.

4.20 Additionally, the revised out-of-block emissions masks also take into account the decision not to leave any unassigned frequencies between the Spectrum Bands and the neighbouring spectrum users (see paragraph 4.6 above). In order to ensure that the masks are continuous with the sloped masks at the inside edges of the Spectrum

Bands, they need to be derived separately for frequencies above and below each of the Permitted Frequency Bands. The revised masks are as follows:

Frequency band 1781.7 – 1785 MHz

Frequency range as measured from the lower frequency of the frequency band	Maximum mean EIRP density dBm per kHz
0.0 to -0.1 MHz	$-33 + 140 \times \Delta_{FL}$*
-0.1 to -0.3 MHz	$-47 + 30 \times (\Delta_{FL}$* + 0.1)
-0.3 to -1.5 MHz	-53
-1.5 to -5.7 MHz	-63

* Note: Δ_{FL} is the offset from the lower edge of the relevant Permitted Frequency Band in MHz (it has values between 0 and - 0.3 MHz).

Frequency band 1781.7 – 1785 MHz

Frequency range as measured from the higher frequency of the frequency band	Maximum mean EIRP density dBm per kHz
0.0 to 0.05 MHz	$-23 - 60 \times \Delta_{FH}$*
0.05 to 0.2 MHz	$-26 - 140 \times (\Delta_{FH}$* - 0.05)
0.2 to 0.4 MHz	$-47 - 30 \times (\Delta_{FH}$* - 0.2)
0.4 to 1.6 MHz	-53
1.6 to 5.8 MHz	-63

* Note: Δ_{FH} is the offset from the upper edge of the relevant Permitted Frequency Band in MHz (it has values between 0 and + 0.4 MHz).

Frequency band 1876.7 – 1880.0 MHz

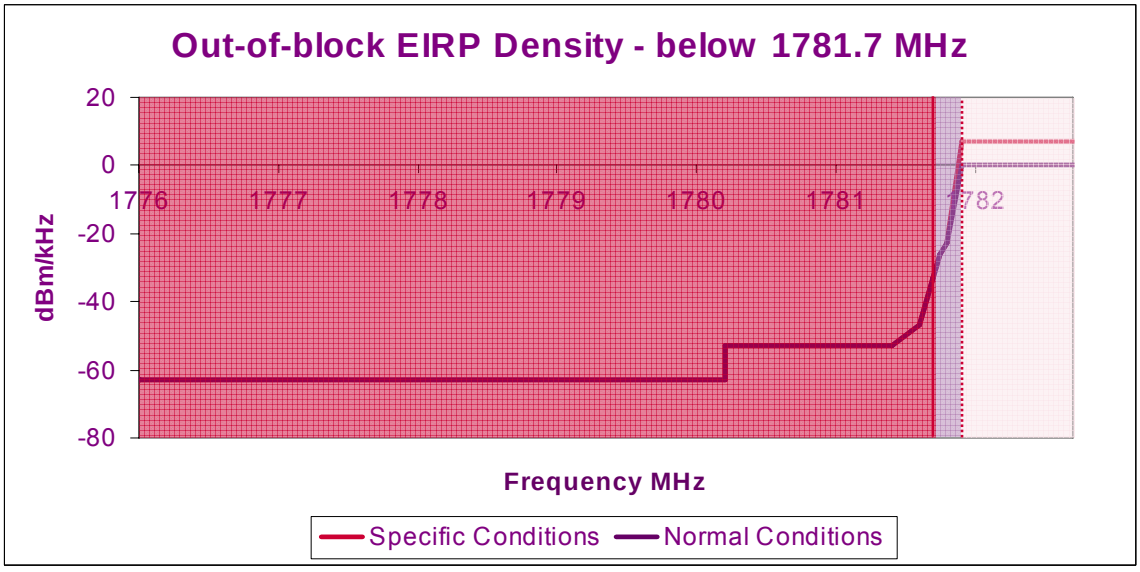
Frequency range as measured from the lower frequency of the frequency band	Maximum mean EIRP density dBm per kHz
0.0 to -0.1 MHz	$-33.6 + 153.3 \times \Delta_{FL}$*
-0.1 to -0.3 MHz	$-49 + 20 \times (\Delta_{FL}$* + 0.1)
-0.3 to -0.9 MHz	-53
-0.9 to -1.5 MHz	-56
-1.5 to -5.7 MHz	-74

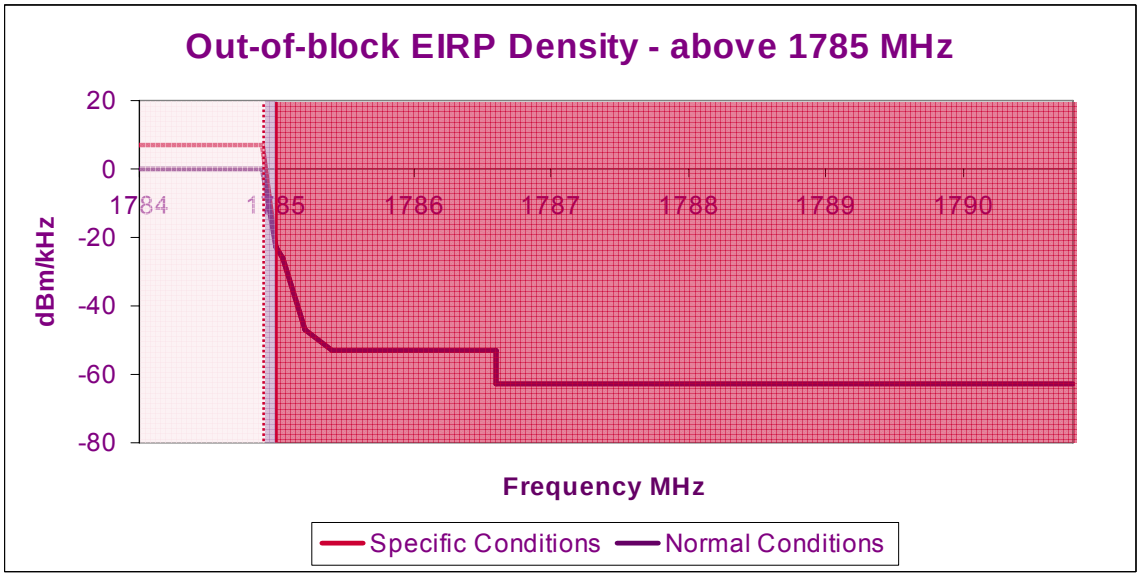
* Note: Δ_{FL} is the offset from the lower edge of the relevant Permitted Frequency Band in MHz (it has values between 0 and - 0.3 MHz).

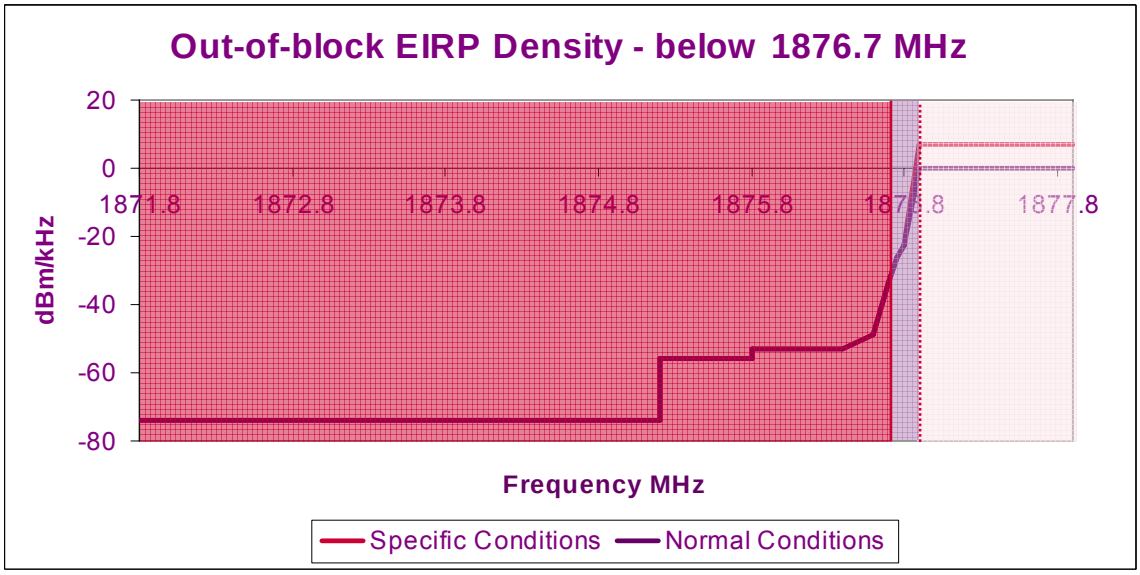
Frequency band 1876.7 – 1880.0 MHz	
Frequency range as measured from the higher frequency of the frequency band	Maximum mean EIRP density dBm per kHz
0 to 0.05 MHz	-23 - 60 x Δ_{FH}*
0.05 to 0.2 MHz	-26 - 153.3 x (Δ_{FH}* - 0.05)
0.2 to 0.4 MHz	-49 - 20 x (Δ_{FH}* - 0.2)
0.4 to 1.0 MHz	-53
1.0 to 1.6 MHz	-56
1.6 to 5.8 MHz	-74

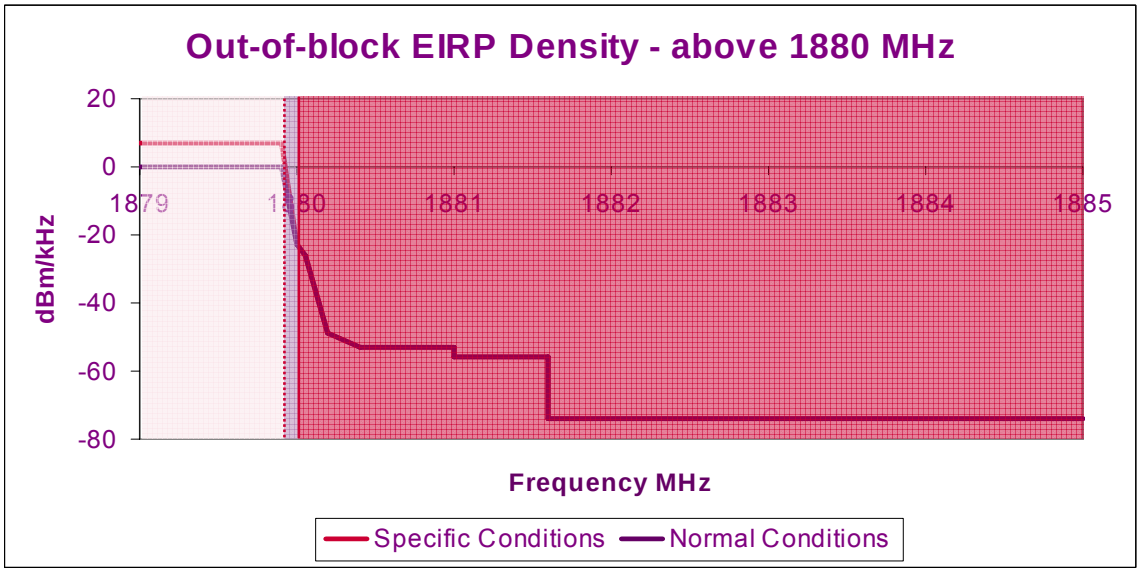
* Note: Δ_{FH} is the offset from the upper edge of the relevant Permitted Frequency Band in MHz (it has values between 0 and + 0.4 MHz).

4.21 Graphical representations of the out-of-block EIRP density masks are as follows:




Out-of-block EIRP Density - above 1785 MHz
20
0
-20
-40
-60
-80
dBm/kHz
1784
1785
1786
1787
1788
1789
1790
Frequency MHz
Specific Conditions
Normal Conditions


Out-of-block EIRP Density - below 1876.7 MHz
20
0
-20
-40
-60
-80
dBm/kHz
1871.8
1872.8
1873.8
1874.8
1875.8
1877.8
Frequency MHz
Specific Conditions
Normal Conditions



4.22 One respondent commented that for frequencies more than 1.7 MHz from the block edge a spurious emissions limit of -30 dBm should be applied. However, Ofcom notes that spurious emissions are governed by the R&TTE Directive[5] and nothing within the Licence can negate the need for equipment to comply with the requirements of the R&TTE Directive. It is therefore not appropriate for Ofcom to set spurious emissions limits for equipment operating in the Spectrum Bands.

Licence exemptions for user stations

4.23 The applicability of the Licence Exemption Regulations[6] to user stations (i.e. handsets) was discussed at paragraph 6.23 of the July Consultation. In the case of user stations that fall within the scope of the current Exemption Regulations, the requirements of the Exemption Regulations will continue to apply. At present, these cover the use of Personal Communications Network (PCN) user stations transmitting in the 1781.7 – 1785 MHz band. Therefore user stations complying with these regulations may be used without a Licence in conjunction with licensed base stations transmitting in the 1876.7 – 1880 MHz band. Other user stations not within the scope of the Exemption Regulations must comply with the relevant Licence conditions.

4.24 The scope and content of the Exemption Regulations will continue to be kept under review and if it seems desirable, Ofcom retains the right to expand the scope of the Exemption Regulations to cover a range of user stations wider than the current PCN definition.

[5] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.
[6] Licence Exemption Regulations (SI No. 74/2003)

Engineering Coordination between concurrent Licensees for interference management

4.25 Ofcom's proposed approach to engineering coordination was outlined in paragraphs 6.29 to 6.36 of the July Consultation. The overarching principle was to allow Licensees to manage engineering coordination themselves via the establishment of an industry Code of Practice on Engineering Coordination. A number of responses commented on this; however Ofcom sees no reason to revise the general approach.

4.26 There were some concerns on what would happen if different Licensees wanted to use the band in 'incompatible' ways or if the industry Code of Practice favoured some technologies more than others. It is not Ofcom's intention to vet or approve the industry Code. However, Ofcom will need to assess whether or not the objectives sought by the Code (as detailed in the Licence) are being achieved. In cases where, in Ofcom's sole opinion, the objectives are not being met (either through lack of cooperation or shortcomings in the Code itself), Ofcom reserves the right to impose its own Engineering Coordination Code. In making this judgement, Ofcom will need to take into consideration how the industry Code deals with the situation where Licensees wish to deploy different technologies and/or use the spectrum in different ways. However, prior to imposing its own Engineering Coordination Code, Ofcom is likely to inform Licensees where it thinks the industry Code might be deficient and, at its discretion, may give Licensees an opportunity to amend the Code accordingly.

4.27 One respondent questioned how Ofcom would deal with the situation where the industry Code does not comply with international obligations. The circumstances in which this could happen in practice are not clear to Ofcom. However, it is clear that any international obligations would have to take precedence over the Code and if such a situation arose, Ofcom would inform the Licensees and require them to amend the Code accordingly. As specified at paragraph 6.34 in the July Consultation, it will be the Licensees' responsibility to ensure that the Code is consistent with any relevant legal requirement, including international obligations and compliance with competition or any other law.

4.28 Several respondents wanted clarity on Ofcom's role in developing the industry Code of Practice. Ofcom believes that the Licensees are best placed to assess their own needs and Ofcom does not intend to participate actively in the Code's development. Ofcom will, within its statutory functions and duties, respond to specific requests for information and advice that the Licensees may need to complete it. However, as explained at paragraph 6.30 of the July Consultation and above at paragraph 4.26, Ofcom will not approve the Code developed by Licensees. Ofcom's role will be to assess whether the Code is achieving the objectives set out for it in the Licence and this may well be best achieved by monitoring interference issues and their resolution (if any) in the Spectrum Bands as Licensees roll out services to their customers.

4.29 Some respondents commented on what measures exist to enforce the Code. Ofcom believes that it will be in the Licensee's best interest to abide voluntarily by the Code and therefore it is likely to be self-enforcing. As a matter of principle Ofcom would expect the Code itself to contain some form of conflict resolution procedure.

4.30 Ofcom will not police the industry Code and will not play an active role in resolving individual coordination disputes. In cases where the Code is not working, which may

be expected to include cases of insufficient cooperation, Ofcom has the right to impose its own Engineering Coordination Code. Failure to comply with an Engineering Coordination Code imposed by Ofcom would constitute a breach of Licence conditions which could ultimately result in the revocation of a Licence.

4.31 There were some respondents who favoured the creation of an independent group or body responsible for overseeing/managing Engineering Coordination. Ofcom sees this as a matter for the Licensees to decide. If they feel that the establishment of such a body would be beneficial, they are free to agree such an arrangement amongst themselves.

4.32 Though Ofcom intends Licensees to agree the Code within six months of award of the Licences, Ofcom anticipates that there may be an ongoing need to maintain and update the Code in light of experience in its use and to adjust to changing circumstances. Ofcom will expect to be notified of any modifications to the Code after its initial agreement.

4.33 There were some comments on what would happen in the first six months before the Code is agreed. Where Licensees choose to roll out services prior to the agreement of the Code, they will obviously need to be mindful that their deployment could potentially be incompatible with the future Code and as such may require significant re-engineering. However, provided that Licensees act responsibly, the chances of such a situation arising seem small. The fact that Licensees will be negotiating the Code at the same time as they are making early deployments should enable them to make reasonable judgements on whether they are likely to need to adjust their deployment once it is agreed.

Licence term

4.34 Three respondents commented on the reasons related to the management of the radio spectrum for which Ofcom may revoke a Licence after its minimum term. Orange and Vodafone sought clarification on what these might be and Nokia argued that a different presentation should be given (a 10 year licence that might be extended on payment of an annual fee to be set later). Ofcom believes that, on the basis of what can reasonably be described in advance of what would be specific circumstances, it discussed in sufficient detail what potential reasons for revocation on spectrum management grounds may be in the Interim Statement (see paragraphs 3.29), in the Spectrum Trading Statement (see paragraphs 6.13 to 6.17) and in the Statement on Competition following the introduction of Spectrum Trading (see paragraph 3.45). As explained in these documents, such a revocation process would be the result of careful consideration of all relevant circumstances at the time and would be consistent with the requirements of section 1E of the Wireless Telegraphy Act 1949.

4.35 Respondents to the July Consultation did not generally comment on the length of the minimum term. One respondent however asked for greater clarity on why this would not be likely to favour GSM technology deployment, which was the basis of the NERA scenarios. The scenarios developed by NERA were based on use of the most likely technology expected to generate the greatest welfare benefits, which Ofcom thinks is the relevant benchmark for determining an appropriate minimum term. Ofcom is also of the opinion that it is a reasonable assumption to consider that if alternative technologies were to be used, either in complement to GSM or solely, as part of an efficient use of the Spectrum Bands, these would generate similar or greater benefits over a similar or shorter initial term so the minimum term proposed is

appropriate for all uses of the Spectrum Bands. Ofcom has also identified GSM as the technology most likely to be deployed through the NERA study, as mentioned in the SFR:IP (at paragraphs 5.65 to 5.67). As a result of the July Consultation, Ofcom has not received submissions arguing for a different term (on the basis of the use of GSM or other technology). Ofcom therefore believes that its analysis at paragraphs 6.41 to 6.43 is appropriate and will include a minimum term of 10 years.

4.36 Some respondents referred to the possibility that defining the Licence term as indefinite with a minimum term of 10 years would be discriminatory to existing licensees. As discussed in Annex 1 to this Statement, Ofcom considers that its proposals do not unduly discriminate against existing licensees. This is based on the assessment of its proposals against the potential for discrimination, detailed in the July Consultation at paragraphs 4.15, 6.51 to 6.54, 6.62 to 6.69 and 6.88 in particular.

Other submissions relating to discrimination

4.37 Four respondents raised a number of other arguments relating to what they identified as discriminatory aspects in the proposals of the July Consultation.

- O2 argued that discriminatory conditions would arise if aggregation of the low power Licences and a variation allowing high power was granted or if an MNO held a Licence.
- O2, T-Mobile and Vodafone argued to varying extents that the assessment of discrimination in the July Consultation was incorrect as it did not involve an assessment of impacts on downstream markets.
- Three respondents were of the opinion that the absence of onerous terms such as roll-out obligations and the presence of such favourable terms as the capacity to trade (in contrast to the licences held by MNOs), meant that the proposed Licences were discriminatory.

4.38 Ofcom has already addressed some of these points at paragraphs 6.55 to 6.69 in the July Consultation; it has responded to the others in Annex 1 of this Statement.

Other coordination and interference management issues

Coordination with licensees in adjacent spectrum

4.39 As was outlined in paragraphs 6.70 to 6.71 of the July Consultation, Ofcom does not believe that specific coordination with users of the neighbouring spectrum will be necessary.

4.40 It may be that, in light of experience gained from the actual deployment of services, the frequencies within the sloped part of the in-band mask could be brought into use at a higher power without causing undue interference to the neighbouring GSM licence holder. If the Licensees of the Spectrum Bands and the neighbouring GSM licensee can agree on a mutually acceptable set of conditions then they would be free to request Licence variations to enable these frequencies to be brought into effective use.

MoD use

4.41 The July Consultation highlighted, in paragraphs 6.72 to 6.77, existing MoD use in the Spectrum Bands at three specific sites. It was made clear that any interference for MoD operation at these sites will have to be accepted by Licensees.

4.42 The information given in the July Consultation covers current and known potential future use by the MoD in the Spectrum Bands. Except by special agreement having the approval of the National Frequency Planning Group ("NFPG") the Spectrum Bands are reserved exclusively for Civil use. The MoD only has agreement to use the Spectrum Bands as indicated in the July Consultation. The MoD has no authority to make additional use of the Spectrum Bands.

Spectrum trading

4.43 Spectrum trading was discussed in paragraphs 6.82 – 6.88 of the July Consultation. Few respondents commented on these proposals.

4.44 One respondent however argued that Ofcom's intention to keep provisions for trading in the Spectrum Bands under review created uncertainty for the auction and could affect the efficiency of the process. However, Ofcom believes that in principle, a greater degree of flexibility for the market to trade might be beneficial. The process for review of the spectrum trading provisions, if sufficient evidence became available to support such a review, would allow the views of Licensees and other stakeholders to be taken into consideration when considering changes to the Spectrum Trading Regulations for the Spectrum Bands. In Ofcom's view, this is the right approach to take into account such regulatory duties as those under sections 3 and 6 of the Communications Act and the specific circumstances of the Spectrum Bands.

4.45 Nokia also argued that the total number of Licences in the Spectrum Bands should not be reduced as a result of spectrum trading. Ofcom believes that trading could give rise to a number of benefits in relation to use of the Spectrum Bands, such as aggregation to take account of experience in relation to coordination costs. Ofcom has a wide range of powers available to address issues relating to potential anti-competitive behaviour in relation to use of the Spectrum Bands.

4.46 Ofcom's view that only outright total transfers should be allowed has therefore not changed.

Sitefinder

4.47 Sitefinder is the national database of mobile phone base stations. Sections 6.94 to 6.99 of the July Consultation provide a fuller description of the database and how Ofcom intends to apply it to use of the Spectrum Bands following advice from the Government. A number of respondents commented on the relevance of Sitefinder both for and against its application to the Spectrum Bands.

4.48 Some respondents claimed that the technologies that will be used are in fact "access points" not "base stations" and that therefore Sitefinder is inappropriate.

4.49 Other respondents stated that it was unclear why some technologies were included in Sitefinder and others were excluded and that an invitation to join Sitefinder should apply to all Licensees in the Spectrum Bands regardless of the technology used.

Another respondent wished that Sitefinder, in general, were expanded to include other technologies.

4.50 Ofcom has forwarded the comments about Sitefinder to the Government for their reaction. In the meantime Ofcom sees no reason to deviate from the proposal outlined in paragraph 6.99 of the July Consultation. This would however be reviewed in the light of any change in position by the Government.

Section 5

Auction format and rules

5.1 In the July Consultation, Ofcom proposed a simultaneous, sealed bid menu auction as the most appropriate format for the auction of the Licences for the Spectrum Bands. In addition to the basic format of the auction, Ofcom proposed a set of rules to govern the conduct of the auction.

5.2 In summary Ofcom proposed the following.

- The auction pricing rule - it was proposed that the winning bidders pay what they bid, a first price rule.
- Transparency of the bidding process - Ofcom proposed that the auction format be transparent so that the identity of bidders is published before the auction and full information about the results and bids submitted is published after the auction.
- Bidder association - Ofcom proposed that bidder association be prohibited in the auction.
- Rules on collusion - Ofcom proposed that specific rules prohibit collusionary behaviour.

5.3 In addition Ofcom set out proposals on reserve prices, deposits, payment terms, and default and procedures for unsold Licences. The full auction rules are published alongside this Statement as the draft auction Regulations and a summary is provided in section 4 of the Information Memorandum, also published alongside this Statement. The specific points raised by respondents on the auction rules are discussed in the Annex.

5.4 There was clear support for the Spectrum Bands to be auctioned in the responses to the July Consultation. Only a small number argued against an auction on the grounds that it was not appropriate for innovative services. Ofcom does not accept this argument since, subject to an appropriate auction design, Ofcom considers its reasoning in the Interim Statement at paragraphs 3.4 to 3.8 is as applicable to the Spectrum Bands as to other bands. Ofcom considers that holding an auction, appropriately designed, will allow the award of Licences in the Spectrum Bands on the basis of objective and transparent criteria, and under a process that will give all potential bidders a fair opportunity to compete. Those wishing to use the spectrum for more innovative services will be able to compete in the auction alongside all other bidders, and if their use is the highest value this should (subject to their bidding behaviour) be reflected in the auction outcome.

5.5 In general there was broad support for the auction design proposed by Ofcom, though some stakeholders raised specific concerns on aspects of the auction design which are dealt with below.

Simultaneous bidding

5.6 There was no opposition to the use of a simultaneous procedure to award concurrent Licences.

Sealed bid process

5.7 Although a majority of respondents supported the use of a sealed bid process, some identified specific concerns. Orange and T-Mobile argued that a sealed bid was not sufficiently transparent. Ofcom believes that though open auctions may be more transparent (during the course of the auction), they are not necessarily more efficient. In this case, in particular because there are likely to be significant bidder asymmetries, a sealed bid auction is likely to be more efficient than an open auction.

5.8 Vodafone said that it was unconvinced that there was evidence of bidder asymmetries. Ofcom's view however is that there is strong evidence that many prospective bidders perceive there to be strong asymmetries for example, as between small bidders and the MNOs and BT. Past auction experience has shown that even the perception of bidder asymmetries has been sufficient to cause some auction designs to fail to achieve what was regarded as an efficient outcome.

5.9 O2 and Orange argued that an SMRA format for the auction would produce a more efficient outcome. However, given the presence of significant bidder asymmetries, a sealed bid auction is likely to be more efficient than an SMRA, as explained in paragraphs 7.10 to 7.14 of the July Consultation. If there were high common value uncertainty and large variation in bidders' valuation of the uncertainty, the argument for an SMRA would be stronger. Yet there is little evidence that these conditions will be significant in this auction, notably because valuations are likely to be based on a range of different services.

5.10 O2, Orange and T-Mobile expressed a concern that the sealed bid menu format was vulnerable to manipulation by a "strong" or "high" bidder. It does appear to Ofcom that a bidder with a much higher valuation than others could play a pivotal role in deciding the winning option in the menu bidding auction. It has identified two main cases in which this could happen. The first case is when the "high" bidder attempts to manipulate the auction outcome by not bidding on the basis of its true valuations - e.g. by bidding only on the option for the lowest number of Licences on the menu. It is unclear that such a bidder would have a strong incentive to act in that way, as such a strategy would run the potentially high risk of not winning a Licence at all. A relatively modest error in the expectation of other bidders' valuations could make this manipulative "high" bidder strategy fail and Ofcom sees it as a low risk with the proposed design. The second case is when a "high" bidder has a valuation that is markedly higher than that of the other bidders, to such an extent that its ranking of options determines the ranking in the auction and the outcome. Ofcom believes that in this case, the bids are likely to reflect the "high" bidder's ability to make a comparatively highly efficient use of the Spectrum Bands and does not see this as creating a concern for the efficiency of the auction.

Combinatorial or 'menu' bidding

5.11 There was widespread support for the menu bidding approach, subject to the "high" bidder concern addressed above. Only Nokia disagreed with the approach on the grounds that it believed coordination costs were minimal and that there was a greater risk of reducing competition and optimal spectrum use. Ofcom believes that it has safeguards in place to address competition concerns, including for instance the minimum number of Licences for the award and the rules preventing association of bidders in the auction. It also believes that the menu bidding approach is the best way to determine the balance between the number of concurrent users and the coordination costs they place on each other, as discussed at paragraphs 7.16 to 7.18 in the July Consultation.

Auction pricing rule

5.12 Only two respondents raised concerns about the pricing rule. O2 argued that a second price SMRA would be more efficient than a first price sealed bid auction. Ofcom proposed a first price auction (in the context of a sealed bid) because, in the presence of bidder asymmetries, it is more likely to achieve an efficient outcome for the reasons detailed in paragraphs 7.10 to 7.14 of the July Consultation.

5.13 Olswang suggested that the pay what you bid rule may be discriminatory. However Ofcom does not believe this pricing rule would involve any undue discrimination because the pricing rule will be clear to all parties in advance and it will apply to all equally. Furthermore, if bidders behave rationally, they will not pay more than their value for a Licence.

Transparency of the bidding process

5.14 There were no specific comments on Ofcom's proposals regarding the transparency of the bidding process, other than in relation to an alternative auction format (SMRA). No respondent commented on Ofcom's plan to publish the identity of bidders and the full results of the auction.

Bidder association rules

5.15 O2 made the only significant comment on the bidder association rules. They requested that bidder association or collusion rules should specifically exclude situations where either two bidders have contracts to supply services to each other or an important share of network capacity if they win a Licence or a bidder has an option to buy a Licence from the other. The concern related to the fact that prior to the auction, subject to the parties qualifying and winning a Licence, the provisions relating to the minimum number of Licences could have been evaded. Ofcom considers that the auction rules adequately set out rules prohibiting collusion between bidders or prospective bidders and preventing manipulation of the outcome of the auction. Agreements with third parties entered into by bidders prior to the auction should not raise concerns to the extent that they do not contravene the auction rules.

Rules on collusion

5.16 Generally, there was support for the principle of applying rules on collusion and no respondent argued against their inclusion.

Reserve price

5.17 Most stakeholders welcomed Ofcom's proposed reserve price or did not comment, apart from the CMA which claimed that the reserve price was too high and favoured larger bidders. Ofcom does not intend, therefore, to change its proposal on the reserve price. A fuller response to the CMA's point is given in the Annex.

Deposits

5.18 There were no specific comments on Ofcom's proposals regarding deposits.

Payment terms and default

5.19 There were no specific comments on Ofcom's proposals regarding payments nor on those regarding default.

Unsold licences

5.20 Some respondents asked for clarification on Ofcom's proposal regarding unsold Licences. Four respondents made proposals for their treatment: Mobile200 argued that they should be cancelled; ntl believed they should not be awarded for at least 5 years after the initial award; The Cloud proposed that they should be assigned to the highest losing bidders in the auction; UKCTA proposed that they should be assigned to unsuccessful active bidders.

5.21 Ofcom's approach to unsold Licences is as follows. The draft auction regulations set out the approach that if there are unsold licences for the winning licence option but there are other bidders for that option then the unsold licences will be offered to those other bidders in accordance with the regulations. Such a situation could arise if a successful bidder subsequently defaulted on payment of the licence fee. If there unsold licences for the winning licence option but there are no other bidders for that option then unsold licences will be retained by Ofcom and may be assigned subsequently in a new award process at Ofcom's discretion. Ofcom intends to consult at the appropriate time should this situation arise.

5.22 One respondent also saw a potential problem in the later award by Ofcom of Licences unsold in the proposed process. This was because it would not be clear for Licensees (as a result of the process) how this further award process would impact on the Code of Practice on Engineering Coordination agreed between Licensees following the initial award process. Ofcom believes that this is a relevant point, but that it should be addressed at the relevant time, through consultation. Ofcom would not want further assignments of unsold Licences in the Spectrum Bands to have a disruptive effect. However if new Licences were granted, the new Licensees may have valid and helpful proposals in relation to the Code.

Related auction issue

5.23 In a confidential submission, one stakeholder argued that Ofcom could not justify taking action through its duty to promote innovation, such as excluding 2G or 3G MNOs from the auction (as proposed by some attendees to the stakeholder seminar of 8 September). The stakeholder continued that only if capital markets were inefficient would innovative uses be at a disadvantage in an auction. Ofcom is not proposing to exclude the MNOs or any other party from participating in the auction. While it has identified asymmetries between different potential bidders, Ofcom considers that its auction design will deal satisfactorily with this issue and so there is no need for exclusion from the auction.

Auction rules

5.24 The auction rules are contained in Regulations published in draft alongside this Statement. These Regulations provide a full description of the auction rules for this award. Section 4 of the Information Memorandum also provides a summary of these rules and a description of the process.

5.25 The consultation period on the draft auction regulations ends on 05 January 2006.

5.26 It is proposed that certain rules for the award relating to the prevention of association and collusion between bidders will apply from the date of entry into force of the Auction Regulations. Interested parties should therefore familiarise themselves with the rules in advance of that date.

Section 6

Next Steps

6.1 Ofcom's intention is to hold this award as soon as possible. As explained in section 2, alongside this Statement Ofcom has published the other documents necessary for the award to take place.

6.2 The key next step in the process of holding the award is for Ofcom to make the statutory instrument which sets out the auction rules. A draft of these regulations is published alongside this statement. This is subject to a minimum statutory consultation period of one month.

6.3 After the closing date for responses to this consultation, Ofcom will consider responses and assess whether it should amend the proposals. Ofcom will then make the regulations. The regulations will come into force at the date specified in them (around one month after they are made).

6.4 The timing cannot be finalised until after the regulations are made. However, Ofcom intends to start the award process before the end of its financial year 2005-06.

Further seminars

6.5 Ofcom is planning to hold a further seminar with interested parties explaining the auction rules, probably including a test auction, after the regulations are made.

Annex 1

Summary of responses to the July Consultation

A1.1 Ofcom received 24 responses to the July Consultation. There was a wide measure of support for many of the proposals. The responses also provided detailed comments on a number of aspects of the proposals in the July Consultation, including the number of Licences, technical Licence conditions, and other matters.

A1.2 This Annex sets out a summary of the responses to the July Consultation and Ofcom's view on the main points raised. Some of the issues are discussed in detail in the preceding sections of this Statement.

Issue raised	Comments	Ofcom's response
Allowing both high and low power in the auction	Three respondents were in favour of allowing high power or did not find that there was a clear case for not allowing high power in the auction. They also found that the award should allow for the grant of one licence only.	Ofcom has considered these responses but none of them present any new arguments not taken into account in the July Consultation and therefore it does not think it should change its position on this issue (see further section 3 of this Statement (paragraphs 3.8 to 3.9).
Number of Licences offered	16 respondents were in favour of increasing the minimum number of Licences from 5. A number of respondents favoured increasing the maximum number of Licences from 10. One respondent queried why a minimum number of Licences was necessary in the award since a later reduction in the number of Licences would be possible through trading. Nokia argued that, post award, a reduction in the number of Licences through trading should not be possible.	Ofcom considers that it is appropriate to specify a minimum and maximum number of licences for the reasons discussed in this document (in particular at paragraph 3.19) and in the July Consultation. Ofcom has concluded that the minimum number should be revised to seven and the maximum to twelve, for reasons set out in Section 3 of this Statement (see paragraphs 3.13 to 3.44). Ofcom does not consider that the proposal to extend spectrum trading to these Licences affects the validity of the arguments for setting a minimum number of Licences. The two matters are distinct. It will be a matter for any Licensees holding Licences in the Spectrum Bands to decide whether or not to engage in spectrum trading. Should they do so, Ofcom is required to ensure that spectrum trades do not distort competition, and Ofcom has set out how it expects to achieve this in the

		context of its work on spectrum trading. See for example paragraphs 3.1 to 3.3 of its Statement[7] and section 4 of its Consultation[8] on competition following the introduction of spectrum trading. Ofcom believes that there may be a number of legitimate reasons for the number of licences to be reduced post award, without any adverse effect on competition in the provision of services. Ofcom is of the view that, having designed an award that takes due account of the duties to promote competition, it should address competition concerns post award consistently with its approach described at paragraphs 3.1 to 3.3 of its Statement and section 4 of its Consultation on competition following the introduction of spectrum trading.
Auction and its design	CMA was opposed to the use of an auction as an award process. Two respondents favoured a different auction format (simultaneous, multi-round auction, or SMRA) with different views on pricing rules.	For reasons discussed both in general terms in the SFR:IP Interim Statement (see paragraphs 3.3 to 3.8) and in relation to the Spectrum Bands (see the July Consultation, paragraphs 4.13 to 4.16), Ofcom believes that it should award the Licences through an auction. For reasons discussed in section 5 of this statement (see paragraphs 5.9 to 5.10), Ofcom believes that an SMRA is less likely to result in an efficient award process for the Licences than the single round sealed bid 'menu bidding' process.
Consideration of asymmetry between bidders	Vodafone argued that Ofcom's consideration of asymmetries gave undue weight to possible differences between potential bidders for high power use and low power use. It also argued that the possibility of 'weak' bidders being deterred from participating in an auction was unclear. One respondent commented that potential inefficiencies of capital markets affecting 'weak' bidders should be justified further for innovative services.	Ofcom believes that the arguments exposed at paragraphs 5.41 to 5.45, 7.4 to 7.5 and 7.11 to 7.14 in the July Consultation reflect known and foreseeable circumstances and associated risks relevant to this auction. Ofcom considers that the consultation responses provide some further evidence of the relevance of bidder asymmetries. The auction design has taken these into account as explained in the July Consultation (at paragraphs 5.39 to 5.45 and 7.4 for example) and in Section 5 of this Statement.

[7] See http://www.ofcom.org.uk/consult/condocs/sec/statement/?a=87101.
[8] See http://www.ofcom.org.uk/consult/condocs/sec/effective_competition/?a=87101.

Association and collusion rules	O2 suggested that two cases should be addressed by the auction rules: contracts between bidders to supply capacity post award; options between bidders to transfer a Licence.	Ofcom believes that the association and collusion rules set out in the draft auction regulations adequately address the relevant risks. Contracts between third parties which do not breach competition law or the auction rules are unlikely to raise concerns.
Discrimination - against other licensees or the Licensees	Four respondents considered that, to various extents and on various grounds, the proposed award of the Licences would result in discrimination against existing licensees. O2 argued that through trading and a subsequent request for a Licence variation, the narrowly defined nature of the Licence could change to be more similar to current MNO licences. O2 argued that this would represent a stronger case for discrimination. O2 argued that Ofcom should either delay the auction until there was clarity over policy on 2G and 3G licences or provide a definitive statement of policy towards a Licence variation.	Ofcom considers that undue discrimination can only arise where like cases are treated differently, or different cases are treated alike, without objective justification for the treatment given. For the reasons given in paragraphs 6.61 to 6.69 of the July Consultation, Ofcom does not consider that differences between the terms of the proposed Licences and any existing classes of licence are such as to result in undue discrimination between the various classes of licence holder As several respondents noted, regulatory decisions in relation to spectrum management must be made on a case-by-case basis, and must be tailored to reflect the individual circumstances pertinent to each relevant spectrum band. Ofcom cannot fetter its discretion with respect to a licence variation since it must take all factors into account at the time of the variation request. Ofcom believes that providing further guidance on its policy on a possible future request for licence variation is neither appropriate nor necessary. It is not appropriate given the number of uncertain factors that could be relevant to such a request; it is not necessary as any such request would need to be considered thoroughly at the time, taking all relevant considerations into account.
Possibility of higher power use in defined circumstances	One respondent argued that in particular confined places such as tunnels, higher power than 23 dBm (per carrier) could be allowed.	Ofcom proposes to allow an in-band power increase to 7 dBm/kHz, subject to the agreement of all Licensees, in specific circumstances to be defined by them. This is discussed at paragraphs 4.4 to 4.5 and 4.9 to 4.13.
High power use of the Spectrum Bands	Four respondents required clarity on whether or how high power use would be allowed in case of Licence variation request.	As discussed at paragraph 3.8 to 3.9 of this Statement, Ofcom believes that it should make the Spectrum Bands available for low power use. High power use is therefore not relevant to the award of Licences for the Spectrum Bands at this stage. It is possible for requests for licence variation to be made and Ofcom would consider any such

		request in accordance with its statutory duties at the relevant time. Ofcom does not think it would be appropriate to speculate on the outcome of any such requests now.
Technical conditions – in-band power, duplex arrangements, guard bands, antenna height	Ip.access, ntl, PBUK, Red-M, STA and T-Mobile argued that it was necessary to calculate the in-band power level over a specified bandwidth. PBUK argued that a duplex prescription ('uplink' and 'downlink') was not necessary while STA required clarity on how Ofcom would address this. One respondent argued that the way technical conditions were defined favoured GSM technology and that it was not clear that alternative uses were consistent.	Ofcom proposes to specify the in-band power limit in dBm/kHz, as discussed at paragraphs 4.3 to 4.13. As discussed at paragraph 4.7 of this Statement, Ofcom believes that it is necessary to specify the duplex direction to avoid creating unacceptable interference. Ofcom has not unduly favoured any particular technology in specifying the technical conditions. It has defined the spectrum mask for the Spectrum Bands on the basis of technical analysis that showed that the determining adjacent use in addressing out-of-band interference risks was GSM. In respect of in-band interference, it considered the technology most likely to be used, i.e. GSM according to available evidence, but also cdma2000 1x and more generally various types of carriers. Ofcom expects that technologies other than GSM could be used, provided Licence conditions are respected. It considers its approach is the most appropriate in the circumstances of the Spectrum Bands.
Band management - sub-contracting use of the Spectrum Bands by Licensees to third parties	Nokia pointed out that there was scope for market interest in the ability for one Licensee to allow other parties use of the Spectrum Bands under its Licence; CMA requested clarification on the possibility of such arrangements.	Ofcom has not carried out an exhaustive analysis of all arrangements that a Licensee could make with another party to provide for use of the Spectrum Bands under the terms of the Licence (to be referred to here as band management). The assessment of such arrangements is largely dependant on their details and it seems difficult for Ofcom to provide guidance on generic principles. Parties interested in exploring the possibilities of band management in the Spectrum Bands should carry out their own assessment of the feasibility of their precise plans, against wireless telegraphy and other relevant legislation.
'Use it or lose it' licence condition	FMS argued that a 'use it or lose it' condition could be applied for the Licences.	Consistent with approach described at paragraph 3.34 of the Interim Statement, Ofcom does not believe that such licence

		conditions are likely to meet the objective of ensuring that the Spectrum Bands are used efficiently.
Economic study by NERA	O2 and T-Mobile argued that the NERA study was based on the assumption that national roaming onto existing 2G networks would be available. T-Mobile and Vodafone respectively argued that the models inputs and Ofcom's critical review were not clear.	Ofcom is aware that roaming agreements with 2G MNOs could play a part in some service scenarios considered by NERA. However, they are not necessarily a prerequisite to low power services; as discussed at paragraph 5.21 of the July Consultation, the available evidence suggests that costs associated to potential linkages between low power networks and wide area networks, where applicable, are unlikely to alter the conclusion that the benefits of low power use are likely to be larger than those of high power use. Ofcom also believes that the both the NERA study, available from the Ofcom website[9], including its sensitivity analysis, and Ofcom's review of it at paragraphs 5.18 to 5.22 in the July Consultation, are transparent and sufficiently clear.
Regulation of downstream markets	O2 suggested that Ofcom should assess whether any potential bidders could have market power in a downstream market as a result of the acquisition of this spectrum; it argued Ofcom should exclude BT from the auction.	A view on market power in downstream markets would require an assessment and/or definition of the relevant downstream market. Ofcom believes that the technology and service neutral character of this auction makes it difficult to determine how the Spectrum Bands will be used, and therefore to define a relevant market. Moreover, multiple concurrent Licences will be awarded, reducing the likelihood that one party could acquire or abuse a dominant position as a result of acquiring a Licence. In relation to BT, Ofcom's view is that there is no adequate justification for excluding any provider from the auction. Exclusion would require strong evidence – for example evidence that an award to that provider would enable it either to create or strengthen a dominant position for that service. As described at paragraphs 5.5 and 5.15, the low power services likely to result from the award are new and innovative; combined with the considerations for a minimum number of Licences, the award seems unlikely to create or strengthen any dominant position. Ofcom also believes that the fact that BT has been determined to have SMP in some fixed markets should, if it were to be a concern in relation to the Spectrum Bands, be mitigated by the potential for other Licensees to replicate

[9] See http://www.ofcom.org.uk/consult/condocs/ra_condoc_2g3g_spectrum_old/gms.pdf.

		fixed services through BT's fixed wholesale access products or for new wholesale access products to be provided by BT if there were strong competition concerns.
	O2 and T-Mobile argued that Ofcom should specify whether it will impose access or call termination conditions on 2G MNOs in favour of the Licensees. Ntl argued that an access condition (roaming) should be imposed. One respondent submitted that if it won a Licence, it may not, for commercial or legal reasons, be in a position to provide access products for its mobile network.	A discussion of the regulatory framework that is relevant to mobile call termination was included in Annex D of the July Consultation (see in particular paragraphs D.10 –D.17). In relation to access conditions (which might for example require the provision of national roaming) Ofcom expects that access and interconnection services with existing MNOs should be negotiated commercially (see Annex D of the July Consultation). Ofcom presently has no plans to impose roaming conditions on MNOs in relation to use of the Spectrum Bands. It is the responsibility of parties to obtain relevant commercial, technical and legal advice on their requirements for access to existing mobile networks.
Uncertainty for bidders as a result of potential for regulation	Four respondents argued, in relation to downstream markets or other provisions such as spectrum trading for the bands, that the uncertainty created by potential regulatory intervention in the future was likely to affect the efficiency of the award and incentives for investment. One respondent in particular argued for any regulatory conditions to be fixed in relation to the Licences, as at the time of award.	Ofcom believes that it is necessary and appropriate that some areas of regulatory policy will be reviewed from time to time to respond to changing conditions. Ofcom considers that it is unrealistic to suppose that all areas of regulatory uncertainty will be removed prior to an auction. Ofcom also considers that it is in the interests of citizens and consumers to proceed with the auction, as proposed, rather than to delay it on the grounds of seeking to reduce regulatory risk (which may, in any event, be unachievable). In relation to spectrum trading for the Spectrum Bands, Ofcom may in future make proposals to allow additional types of transfers. In doing so, Ofcom would take due account of its relevant duties, and any proposals would be subject to consultation.
Revenue raising in the auction	O2 argued that a first price sealed bid auction maximises revenue, not efficiency.	Ofcom does not accept that the auction design is based on an objective of maximising revenue. It has been developed to take account of the specific circumstances of this award as discussed in section 7 and paragraphs 8.2 to 8.13 of the July Consultation, including bidder asymmetries. Economic theory and practice

		shows that first price sealed bid auctions do not necessarily produce higher revenues than other auction format, for reasons such as the tendency of bidders to shade down their bids below their valuation in order to increase their surplus.
Auction licence fees and AIP for other spectrum	One respondent suggested that Ofcom should review the level of the AIP licence fees for 2G mobile operators in the light of the auction outcome.	As explained in paragraphs 6.55 to 6.69 of the July Consultation, the Licences for award are distinct from existing licences. Ofcom does not therefore see a case for a review of AIP in relation to 2G licences specifically to take account of the outcome of the auction of the Licences.
Reserve price	CMA argued that the proposed reserve price of £50,000 was inappropriate and too high.	Ofcom's main objective in setting the reserve price has been to deter frivolous bidding in the auction. It believes that the proposed value is proportionate to the circumstances of the Spectrum Bands, and relatively modest in the light of the potential benefits from their use, described at paragraph 5.19 to 5.22 in the July Consultation.
Impact assessment	T-Mobile argued that the Impact Assessment for the award should have included a quantified analysis for the sectors concerned.	Ofcom believes that the Impact Assessment it carried out satisfies the requirement of considering objectively the respective costs, benefits and risks of the options involved. Ofcom has based its assessment on what it considers to be a robust analysis, presented in the July Consultation, and including consideration of the relevant quantitative economic assessment of the NERA study.
Consideration of responses – weight of numbers	O2 and T-Mobile argued that Ofcom relies on the number of responses in support of a particular point in preparing its proposals.	Ofcom disagrees with this assertion. In developing its proposals, Ofcom takes account of stakeholders' submission in the light of all relevant evidence. In such cases as an assessment of likely demand, the number of parties who have expressed a clear interest in potentially acquiring the spectrum is a relevant factor, but Ofcom also carefully analyses the substance of arguments put to it, against its relevant duties.
Need to consult further and disclose further evidence	T-Mobile argued that Ofcom needed to consult further, and Vodafone argued that Ofcom should make more evidence available in relation to the exclusion of high power use, before proceeding with an award for the Spectrum Bands. Four respondents argued that various points in Ofcom's reasoning in the July Consultation were weak.	Ofcom believes that it has sufficient evidence and has analysed and disclosed issues and evidence in such a way that allows it to proceed with the award. This evidence was summarised in the July Consultation, in particular at paragraphs 5.15 to 5.35 in relation to spectrum packaging and in section 7 and paragraphs 8.2 to 8.13 in relation to auction design. Ofcom does not accept that the analysis set out in the July Consultation is weak; it has not received any new evidence which in its

		view provides a basis for changing its spectrum packaging (save in relation to the minimum and maximum number of licences) or the auction format proposals.
Singularity of this award Inconsistencies with other Ofcom policies – account taken of competition duties for this award, SFR principles	Several respondents sought assurances that the proposals were specific to this award and were not setting a precedent for other awards. Two respondents argued that Ofcom put significant weight on competition consideration ex ante in its proposals for the award, despite having stated in other documents its preference to rely on ex post competition law powers. Two respondents also argued that the approach for this award conflicted with principles of the SFR and the reliance on market mechanisms for spectrum management.	Ofcom will act consistently in respect of its statutory duties for spectrum awards, addressing each award on the basis of its specific circumstances as indicated for instance at paragraph 3.24 and 3.60 of the SFR:IP Interim Statement. Ofcom believes that the process of making wireless telegraphy licences available by auction requires careful consideration by the regulator of the specific circumstances in each case. In assessing options in this case against its statutory duties, Ofcom has paid due regard to the potential effect of the number of Licensees on sustainable competition in the provision of what may constitute new and innovative services. Ofcom has taken this consideration into account alongside a number of other factors, in judging spectrum packaging and auction design, as discussed elsewhere in this Statement (see paragraphs 3.8 to 3.44 in particular). Ofcom does not agree that there is any conflict between the principles taken into account in making proposals for this award and the principles set out in the SFR. The proposals for this award are based heavily on the use of market mechanisms and the application of principles such as technology and service neutrality.
Linkage with issues discussed in the SFR:IP – extension of liberalisation and trading to existing mobile spectrum	Three respondents argued that there were direct links between the proposed award and the mobile liberalisation issues discussed in section 9 of the SFR:IP. One respondent argued that the proposals in the July Consultation implied a resolution of the SFR:IP mobile liberalisation issues, although Ofcom stated in the Interim Statement that it would consult on these matters.	Ofcom does not accept that it may not proceed with the award or that the appropriate course would be to engage in further delay. In line with discussion in the July Consultation (paragraphs 4.15, 6.51 to 6.54, 6.62 to 6.69 and 6.88 in particular and Annex E), Ofcom considers that issues discussed in the SFR:IP relating to extension of liberalisation and trading to existing mobile spectrum are distinct from those raised by this award. As explained at paragraph 2.5 of the SFR:IP Interim Statement, Ofcom expects to consult further, and separately, on the issues of mobile spectrum liberalisation and trading.

Definition by Ofcom of spectrum rights outstanding	One respondent argued that completion of Ofcom's on-going work on the definition of spectrum rights was necessary before an auction could take place, if Ofcom were to act consistently with the vision described in the SFR.	Ofcom believes that its proposals provide a set of Licence conditions that can be defined now and in an appropriate fashion to allow an efficient award process to proceed. Ofcom recognises that there may be further regulatory developments in relation to developing the definition of spectrum usage rights[10]. Any such developments are likely to be generic in their nature, and subject to extensive prior discussion and development work. Ofcom does not consider that it is necessary or appropriate to delay this spectrum award pending further work which is somewhat speculative and long-term in nature.

[10] Information on Ofcom's research work is available at http://www.ofcom.org.uk/research/technology/overview/ese/neutral/?a=87101.