Friday, 09 March 2007

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

Intel is pleased to comment on this consultation proposing licenses for available spectrum in the 2500-2690 MHz, 2010-2025 MHz, and 2290-2300 MHz spectrum bands. First, we would like to commend Ofcom for the proposals outlined in this consultation to authorise use of the bands as well as the auction mechanisms proposed. The Ofcom proposals in this consultation are well-reasoned and appropriate and will likely advance the deployment of advanced telecommunications capability in the United Kingdom. Overall, they employ an innovative, market-based approach which will foster competition and technological innovation and maximize benefits for consumers and businesses in the United Kingdom.

As the world's largest semiconductor manufacturer and a leader in technological innovation, Intel believes that ever-increasing convergence in services and product offerings provides great potential benefits and a need for a more technology neutral approach to spectrum management. The approach proposed by Ofcom in this consultation will likely ensure that the benefits of this convergence are realised by consumers. We believe that the initial auction design, coupled with secondary trading will allow the market to decide on the best and highest value use of the spectrum.

Furthermore, we agree that there is significant evidence of demand for licenses for the 2500-2690 MHz spectrum bands. Given the substantial potential benefits that the use of this band offers, we strongly urge Ofcom to award licenses for the 2500-2690 MHz spectrum band as soon as possible**.** Intel also believes it is critical for the market to decide the optimal ratio of paired and unpaired spectrum and therefore strongly supports the proposed two-stage auction for this band. We note that licenses for the 2500-2690 MHz band are expected to become available in many countries over the next several years. Regulators worldwide are attempting to determine the conditions under which use of the bands will be authorised. We believe that Ofcom's proposals provide a valuable blueprint on how to optimize use of the band in a technology neutral manner.

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

Intel agrees with the analysis performed in section 5.

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

Intel supports Ofcom's objectives to promote -

a) the efficient management and use of the spectrum;

b) the economic and other benefits that may arise from use of the spectrum;

c) the development of innovative services; and

d) competition in the provision of electronic communications services.

We believe that the expeditious authorisation of these bands will accomplish these objectives and provide substantial benefits to the citizens and businesses in the United Kingdom including increased competition, technological innovation, and new services. Furthermore, we note that the bands are currently free of incumbent users and none of these benefits would be realized until the utilization of these bands is authorized. Therefore, Intel concurs that Ofcom should authorise use of the spectrum bands 2500-2690 MHz, 2010-2025 MHz, and 2290-2300 MHz as soon as possible.

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

Intel believes that auctions are the most appropriate mechanism for authorising the use of these bands and that the auction processes proposed by Ofcom are well-designed. In particular, the demand for licenses in the 2500-2690 MHz band is likely to be quite high due to the large amount of spectrum available, the potential for low cost devices due to economies of scale, the high demand for mobile data services, and technological innovation. We believe these bands will provide substantial economic benefits to businesses and consumers in the United Kingdom, but the universe of possible services, band plans, technologies and licensees is large. Therefore, it is imperative that the award process for this band be done through an appropriate mechanism. We concur with Ofcom that auctions provide the greatest likelihood for success, while minimizing the risk of regulatory error. In particular, we note that the two stage auction process proposed for the 2500-2690 MHz spectrum band is likely to provide the market with maximum flexibility in determining the optimal use of the spectrum bands. We commend Ofcom for their proposed approach.

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

Intel agrees that the interests of citizens and consumers would be best served if licenses for these bands were awarded as soon as possible. The resulting heightened competition among service providers will promote better service, lower prices, faster deployment and innovation. None of these benefits will be realized as long as the bands lie fallow.

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

Intel agrees that Ofcom should award the bands by the end of 2007. We note that discussions on this topic to date have been lengthy and inconclusive and that any potential EC RSC decisions are unlikely to conflict with the Ofcom approach. Because these licenses will generate substantial consumer benefits, Intel urges awarding them expeditiously consistent with the proposals in this consultation.

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

Intel agrees with Ofcom's position that –

a) license terms should be for an indefinite term with an initial 20 year term,

b) Ofcom's power to revoke should exclude spectrum management reasons and

c) licenses should not to include roll-out obligations or so called 'use it or lose it' conditions.

We agree that the auction process will provide "sufficient incentives to use spectrum efficiently with the relevant degree of flexibility for licensees to conduct their business" and that "concerns regarding spectrum hoarding, which sometimes underlie proposals for 'use it or lose it' conditions, may be addressed ex post, for example through competition law."

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

Intel agrees "there is a small chance that a large amount of the available spectrum could be won by one party". Moreover, were an operator to acquire a large percentage of the 2.5 GHz spectrum, it would compete with applications and services offered by wireless carriers utilizing other spectrum bands and in many cases by wireline carriers as well. Finally, as mentioned above, we agree with Ofcom that any unlikely market failure could be addressed through competition law. Accordingly, Intel would prefer no safeguard cap, but if one is imposed we recommend the higher value.

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

Intel supports Ofcom's proposal to package the spectrum in lots of 5 MHz and to allow the aggregation of the lots by bidders. Technological trends suggest that wider channels will enhance performance. Therefore, "channel bonding" to utilize wider channels (e.g. 10 MHz) should not be prohibited.

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

Intel strongly supports Ofcom's proposed approach of allowing the market to determine the optimal relative amounts of paired and unpaired spectrum. Band plans such as CEPT ECC Decision (05)05 that limit the amount of spectrum available for TDD-based technologies can impede technology neutral spectrum management and limit competition. Because service providers are likely to bid for allocations of 30 MHz or more, the CEPT band plan could result in only a single TDD service provider.

While we support the Ofcom approach, we do propose one modification regarding alternative frequency plans. Ofcom's proposal allows for authorization of more than 50 MHz of TDD spectrum, if the demand for unpaired spectrum is stronger than that for paired spectrum. Ofcom proposes that any additional unpaired spectrum be made available at the top end of the band. However, TDD-FDD interference issues may be less severe and there is potential for better performance of TDD systems if the additional unpaired spectrum is located at the bottom end of the band. There are also additional benefits for devices with multiple radio systems. We therefore propose that the auction process allow bidders to express their preference for the location of paired versus unpaired spectrum in the second stage of the auction process via their top-off bids. We recognize TDD use may require restricting the power on the lower two channels if they were unpaired. If the other advantages of TDD operation at the bottom of the band outweighed the disadvantage of more restrictive power, however, the auction might lead to the placement of additional unpaired spectrum at the bottom of the band. Structuring the auction to let the bidding process decide this issue would be more consistent with Ofcom's general approach to these questions.

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

Intel suggests that Operators may be best positioned to determine any restricted-block and/or guard-band requirements. In any event, the affected parties should be permitted to agree on new requirements. As noted above, Intel believes that the market should determine the location of any additional unpaired spectrum via the second stage of the auction process via top-off bids.

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

Intel agrees with the proposal to release the 2010 MHz band as a single 15 MHz lot.

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

Intel agrees with the proposal to release the 2290 MHz band as a single 10 MHz lot.

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

Intel agrees that the 2.6 GHz and the 2010 MHz bands should be awarded under a combined auction. However, given the strong evidence of demand for the 2.6 GHz spectrum band, we believe that any delays in the award of the other bands should not delay awarding licenses in the 2.6 GHz band.

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

Intel strongly supports Ofcom's proposals for a two-stage auction. Ofcom has correctly identified the risk of regulatory error in determining the correct FDD / TDD split of spectrum. We believe that the process proposed by Ofcom provides a true technology neutrality solution with maximum flexibility for the market to utilize the spectrum optimally. The simultaneous multi-round combinatorial clock auction with a best and final offers stage allows the market to determine the correct ratio of TDD to FDD spectrum. The final assignment stage allows the market to express preferences for individual lots.

Intel's only proposed change would be for a potential alternative band plan in the second stage, provided that this does not create undue interference to other systems. Ofcom has proposed that any extra TDD allocation be added at the top end of the 2500-2690 MHz band. We believe that the market should also be allowed to determine whether any extra TDD spectrum should be assigned to the bottom or top edge of the band. Therefore, Intel proposes that the location of any additional unpaired spectrum be determined in the Final Assignment process via top up bids.

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

Intel does not have any comments on this issue.

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

Given that current and future terrestrial cellular systems accommodate multiple licenses in same geographical areas operating in adjacent channels, and that setting EIRP and boundary limits will not be sufficient to provide optimum utilization of system resources, Intel believes that specifying statistical-based power flux density limits for spectrum usage rights may hold promise and therefore, should be investigated more fully. However, we believe that the potential benefits of use of the 2500-2690 MHz spectrum bands are substantial and should therefore be awarded in an expeditious manner. Therefore, Intel supports the early award of licenses utilizing transmitter spectrum masks to specify technical license conditions unless all issues and concerns with SUR are addressed in full in an acceptable timeframe.

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

Intel believes that, given the significant impact of spectral emission masks on the operation, performance, and proliferation of wireless technologies, careful consideration should be given to the appropriateness of emission masks for bands under consideration. Specifically, all potential technologies for deployment in the bands and their technical capabilities affecting emissions should be taken into consideration in the process of determining the service rules for these bands. For instance wireless technologies utilizing OFDM waveforms have considerably different emission behaviour with sharper drops than CDMA technologies. Intel is finalizing an analysis and will provide Ofcom with its conclusions as soon as possible.

Question 19: Do you have any comments on the SUR parameters defined below?
Intel believes the SUR parameters detailed in this section seem to be appropriate for the methodology being used.

Question 20: Do you have any comments on the SUR methodology and assumptions detailed in this annex?
As noted above, Intel believes that spectrum usage rights (SUR) do offer promise for future spectrum assignments. However, the SUR methodology and assumptions will require further investigation and validation. Currently, the assumptions used to derive at SUR parameters are based on specific technologies that may or may not be deployed in these bands by licensees. At a minimum, the effects of utilizing assumptions based on other technologies that are likely candidates for deployment in these bands need to be investigated.

Question 21: Do you have any comments on the use of the Visualyse tool as described, on the assumptions or the propagation model proposed in this annex?
The assumptions used to derive at SUR parameters are based on specific technologies that may or may not be deployed in these bands by licensees. The effects of utilizing assumptions based on other technologies that are likely candidates for deployment in these bands need to be investigated.

Question 22: Do you have any comments on the assumptions detailed in this annex?
The assumptions used to derive at SUR parameters are based on specific technologies that may or may not be deployed in these bands by licensees. The effects of utilizing assumptions based on other technologies that are likely candidates for deployment in these bands need to be investigated.

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