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**BT Response to the Ofcom Consultation:**

**Digital Dividend Review: geographic interleaved awards  
470 - 550 MHz and 630 - 790 MHz  
- Consultation on detailed award design**

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## **Executive Summary**

- 1 BT welcomes Ofcom's consultation document on the DDR interleaved spectrum awards. We are generally supportive of the approach that Ofcom is taking to the DDR project as a whole and recognise that Ofcom has to balance some difficult technical, administrative and policy issues in formulating the best way forward on the awards.
- 2 We have examined Ofcom's current proposals for the interleaved spectrum awards and have identified a number of areas of concern, including the fundamental issue as to whether there is any real prospect of using the interleaved spectrum for purposes other than DTT (and PMSE that is addressed by Ofcom separately).
- 3 BT would appreciate any further clarity that Ofcom can provide as to whether new innovative applications could be accommodated within the interleaved award, and if so how these could be facilitated beyond what is presently proposed.
- 4 We agree with Ofcom's comments regarding the sharing constraints that may affect cognitive radio applications and would welcome any further information that Ofcom can make available.
- 5 BT looks forward to working with Ofcom and other stakeholders to shape the UK award plans through this present and further additional consultations. We would be pleased to meet with Ofcom to further discuss any points if Ofcom would consider that to be helpful.

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## **1 General Issues**

BT welcomes Ofcom's consultation document on the interleaved DDR spectrum awards. We have studied this and the associated technical reports that have been published alongside and previously. In section 2 of this BT response we have expressed our present views on the specific consultation questions.

The DDR awards are clearly very complex: technically; administratively; and politically. So far as we can determine Ofcom has, in the case of the proposed interleaved spectrum, given clear priority to Broadcasting and related interests. We have considered the possibility for other uses when formulating our response but have concluded that under the current proposals there is little scope for broader types of use of the band.

It is not entirely clear to BT as to what constraints are placed on the interleaved channels, particularly if considered for use by applications other than DTT. We presume that the list of transmitter sites and associated available channels mentioned in the document (e.g. Table 6.1) are examples in the case of TV use and that the frequencies could instead be used at locations of the licensees choice within the approximate area on which the licence is centred. Indeed we assume that large numbers of relatively low power transmitters could be distributed throughout the licensed geographic area. We would appreciate any further clarity that Ofcom can provide on this matter.

Having said this, we do note in section 8.14 that it is stated: "Also we are not proposing initially to include in the licences the right to use the spectrum for services other than DTT". We therefore wonder what Ofcom's intention is in identifying mobile TV and mobile broadband as potential applications in Section 4 of the consultation and whether Ofcom is open to considering other uses of the interleaved spectrum or not. Also, given the previous Ofcom statement dated 16 Jan 2008, where it is indicated that the interleaved channels will be available for PMSE, we are further concerned that other uses of the interleaved spectrum are not in fact being considered, noting that the sharing with PMSE and new uses has not been studied and may be complicated.

## **2 Answers to the consultation questions**

***Question 1. The executive summary sets out our proposals for the digital dividend geographic interleaved award. Do you agree with these proposals?***

BT has a number of comments on detailed aspects of the proposals, which we explain in our responses to the questions below.

***Question 2. Do you have any comments on our assessment of the most likely uses of the geographic interleaved lots? Are there any potential uses which should be considered that we have not mentioned?***

We note that Ofcom lists some potential uses of the interleaved spectrum. However little evidence is provided that would enable potentially interested parties to understand whether these are in practice realizable, given interference constraints. Furthermore, given the fact that the spectrum features in other Ofcom documents where it is clearly designated for PMSE, and also noting that Ofcom states in this document that any new licences will only address DTT, Ofcom is not demonstrating willingness to facilitate other uses.

***Question 3. Are there any other types of DTT transmission that should be protected from potential cognitive devices or other factors that we should take into account?***

No, we are not aware of any other types of DTT transmission that should be protected beyond those that Ofcom has identified.

***Question 4. Are there any potential future PMSE applications, other than currently available wireless microphones, in-ear monitors and talkback systems, that you consider should be protected from potential cognitive devices?***

BT has no comments on this matter.

***Question 5. Is there sufficient evidence to require protection for other services such as mobile television, bearing in mind the potentially negative implications of such protection for deployment of cognitive devices?***

Receiver performance guideline documents produced by broadcasters (e.g., NTSC/ATSC forum, DBH, etc.) have been developed not taking into account the possibility of having secondary transmitters, and hence the receivers do not usually have good out-of-band filtering capabilities. Therefore, even if a cognitive device transmitter is operating several channels away from that of the mobile TV, but is sufficiently geographically close to a mobile TV receiver, it is plausible that significant amount of out-of-band energy can spill into the desired receiver which may result in harmful interference.

Therefore, we believe that the point OFCOM is making is a valid one. Unless receiver performance guidelines are improved, the CR devices may have to either clear several adjacent channels or operate at the very low power levels so that they can operate without causing harmful interference to nearby mobile TV receivers. However, we believe further evidence based on computer modelling and field trials are required in order to specify what level of protection is required for mobile television from the operation of cognitive devices.

Recent test performed at the University of Kansas indicated, for example, that fixed DTV receivers (ATSC standard) were highly robust to adjacent channel interference by cognitive radio. In particular, adjacent channel signals several orders of magnitude stronger than the co-channel signal were required in order to start seeing errors at the DTV receiver<sup>1</sup>.

As a first step we suggest that Ofcom makes publicly available details of the modelling of the interference caused by cognitive devices operating in the vicinity of mobile TV receivers, which is only briefly mentioned in paragraph 4.36 of this consultation.

***Question 6. What levels of coverage and aggregation are of interest to you?***

BT has no specific views on this question at this time.

***Question 7. Do you agree that the median option offers an acceptable balance between protecting reception of DTT services and maximising new DTT services using geographic interleaved lots?***

BT has not established a view on this issue in the time available. We have noted Ofcom's findings.

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<sup>1</sup> Quantifying the Impact of Unlicensed Devices on Digital TV Receivers, Study commissioned by New America Foundation, University of Kansas, 31 Jan 2007, available from [http://www.newamerica.net/publications/resources/2007/final\\_results\\_of\\_university\\_of\\_kansas\\_tv\\_white\\_space\\_interference\\_study](http://www.newamerica.net/publications/resources/2007/final_results_of_university_of_kansas_tv_white_space_interference_study)

***Question 8. Do you agree with the proposal for a series of awards of spectrum lots - an award of lots for Caldbeck, Winter Hill and Wenvoe in late 2008 or early 2009, a single award in 2009 of large lots and awards of lots for other locations linked to DSO?***

BT believes that the earliest possible award of available spectrum is in the interests of delivering innovative customer propositions and business models into the market place.

***Question 9. Do you agree with the proposal to hold the combined award for large lots of geographic interleaved spectrum shortly after the cleared award in 2009? What should the time interval be?***

Yes, BT agrees that this approach seems reasonable. We would suggest that sufficient time is allowed for participants in the cleared award to assess the outcome ahead of the award of interleaved large lots. Therefore an interval of perhaps ~3 months could be suitable.

***Question 10. Do you agree with our approach to expressions of interest in order to finalise the spectrum lots appropriate to allocate by auction?***

Ofcom's approach seems to strike a reasonable balance between the benefits of making spectrum available and the costs involved in doing so. We note that Ofcom appears to speak only of expressions of interest in particular locations. It is not clear to BT as to whether such expressions of interest could also address channel frequency availability. Indeed, having examined the Table 6.1, it appears that some DTT channels are not listed at all (e.g. ch. 25) at any of the list of sites and we would appreciate further clarity on whether all DTT channels will be available for geographic sharing, or just a sub-set. We have assumed that this may be because Ofcom has decided to award some or all of the interleaved spectrum separately for PMSE use. Therefore it is difficult once again to understand the degree to which the interleaved spectrum may be available for uses other than TV and PMSE.

Regarding the timing of the final phase (Table 6.2) we suggest that the deadline for expressions of interest in the final phase award is set after the completion of the combined award.

***Question 11. Do you agree that we should run single unit ascending bid auctions for the award of each of the spectrum lots for Caldbeck, Winter Hill and Wenvoe?***

The single unit ascending bid auction seems a simple but effective format which may be suitable for the lots involved.

***Question 12. Do you have comments on whether the initial auctions of spectrum lots for Caldbeck, Winter Hill and Wenvoe should be run in sequence or in parallel?***

BT has no particular preferences on this matter.

***Question 13. If the initial auctions are run in sequence do you have a preference for the order in which they run?***

BT has no preference on the order.

***Question 14. Do you consider that a combinatorial clock auction would be more suitable than a simultaneous multiple round auction for the combined award of large lots suitable for aggregation?***

Although the effectiveness of the two types of auction will very much depend on the specific rules applied, BT agrees with Ofcom that the general principle of a combinatorial clock auction is best

suited to avoid aggregation risk, which is a major concern for the allocation of “large” lots. Although the outline proposal regarding the Combinatorial Clock Auction is largely in line with previous similar awards, a more definitive response on the suitability of this type of auction can be provided only after a further consultation on the detail of the auction design.

***Question 15. Do you agree with the proposal that the phased award of medium/small spectrum lots at locations linked to the DSO timetable should be by single unit ascending bid auctions? If not, which would be your preferred auction format and timing?***

BT has no particular preference to express on this matter.

***Question 16. Do you agree with the proposals for the main rules that we are minded to adopt for each of the three single unit ascending bid auctions?***

Yes, these proposals seem reasonable.

***Question 17. Do you have any comments on the technical licence conditions we are proposing to include in the licences?***

We note that the proposed licence conditions will initially only address DTT use. The conditions are derived from the UK PM broadcast planning tool, which has little relevance to other licence applications. We further note that if this were varied post-award to cover use for other applications, then a “protection clause” would be added. Ofcom does not give full details of what this new clause would exactly entail or, more importantly, the extent of the likely burden this would place in practice on the new licensee.

In summary, the license conditions are a barrier to the introduction of services other than DTT, if indeed that would in any case be at all feasible (given the impediments already highlighted in our response to earlier questions). Also the spectrum would have to be bought at risk, since there is no *a priori* guarantee of a suitable licence variation being granted, nor visibility of what it would entail.

***Question 18. Do you agree that the licences for the geographic interleaved spectrum should not allow the co-ordination threshold to be exceeded?***

On the basis of the information Ofcom has provided, BT tends to agree with the conclusions reached. This may however reduce the utility of the spectrum in significant areas, including some of the more populated areas of the UK.

***Question 19. Do you agree that where the geographic interleaved spectrum is used for the operation of a DTT multiplex, we should replicate the ownership restrictions from the Broadcasting Act regime relating to (a) local authorities, (b) political bodies, (c) religious bodies and (d) bodies exerting undue influence but not replicate restrictions relating to (e) broadcasting bodies and (f) advertising agencies?***

Yes, this appears to us to be the best way of managing the transition from current licensing practice to the single converged, and thus more transparent, proposal tabled by Ofcom.

***Question 20. Do you agree that we should facilitate interoperability between existing DTT multiplex operators and new operators using cleared spectrum?***

We do not understand why this question is asking about the *cleared* spectrum when the consultation concerns the award of the interleaved spectrum.

***Question 21. We welcome views on the merits of the proposed approach to information provision; in particular concerning the type of information that may be helpful and any impacts that publication of information might have both on licence holders and the wider spectrum market.***

Ofcom could consult in more detail once allocations, and thus use, are known. The assumption should be predicated on the minimum necessary and it may be appropriate to have controlled and limited access to the information, once it's made available, rather than totally open access.

***Question 22. Do you agree with our approach to assessing whether the awards of geographic interleaved spectrum fully promote competition and efficiency?***

Yes, we agree with the approach that Ofcom has taken to consider these important matters.

***Question 23. Do you have particular concerns about possibilities for award outcomes to fail to fully promote competition in downstream markets or to result in inefficient use of spectrum? If so, please explain what these are and provide supporting evidence.***

The license conditions and rules relating to this award apply to DTT and any other use is very uncertain at present. The award deviates substantially from Ofcom's usual goals of technology and service neutrality and thus the availability of the spectrum for different or innovative potential uses is distorted at the outset. We accept that this may be for good practical and or policy reasons, but this has not been indicated in the consultation.

***Question 24. Do you agree with our proposals to include an information provision licence condition to help facilitate efficient secondary trading?***

Yes, we agree in principle that such a licence condition would be reasonable to assist with secondary trading. The amount of information should be kept to the minimum necessary and should not be such that these require commercially confidential information to be released that would adversely affect the licensee significantly.

***Question 25. Do you agree with our view that we should not apply any general remedies other than for information provision in the geographic interleaved award?***

Yes, we agree with Ofcom's conclusions on this issue.

***Question 26. Do you agree with our initial assessment that we should not intervene in the geographic interleaved award to remedy any potential impact on competition resulting from the holding of geographic interleaved spectrum by either Sky or NGW/Arqiva?***

We agree with Ofcom's assessment of this matter.

### **3 Conclusions**

BT is supportive of Ofcom's approach to the award of the Digital Dividend. We have set out in this response document our current views on the specific questions that Ofcom has raised in relation to the interleaved DDR spectrum awards.

BT looks forward to working with Ofcom and other stakeholders to shape the UK award plans through this present and further additional consultations. We would be pleased to meet with Ofcom to further discuss any points if Ofcom would consider that to be helpful.

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