

## **Vodafone comments on Ofcom's Consultation (June 08) on the Digital Dividend Review (geographic interleaved awards)**

The digital dividend in the UHF band is the most important spectrum to have become available in the UK in at least the last decade, and probably for the decade to come. It falls in the "sweet spot" in the radio spectrum that is suitable for both capacity and coverage, and is therefore attractive for a wide range of applications. The DDR spectrum awards are therefore the most significant that Ofcom has yet undertaken.

The digital dividend spectrum that is usable for mobile services is included in the cleared spectrum award. However, the interleaved spectrum is both a complement and a substitute for cleared spectrum for broadcast services and PMSE applications. There is also a technical linkage, due to the proximity in frequency.

This response focuses on issues that have relevance to the cleared spectrum award.

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

The proposals in this consultation are not very mature. As Ofcom refines them, it needs to take into account that the spectrum in the interleaved award is both a complement and a substitute for spectrum in the cleared award.

### **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?**

In response to the consultation on the DDR cleared spectrum award, Vodafone has proposed that channels 61 and 62 should be offered as cleared spectrum. This would require that DTT transmissions on these channels are moved to other parts of the UHF band. It may be possible to use some of the interleaved channels for this purpose. If this happens, they would not be available as part of this award.

These lots could also be of interest to PMSE, to provide long term security of spectrum access.

See also our response to the cleared spectrum award consultation, question 3.

### **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?**

The fact that Ofcom feels the need to ask this question highlights the fundamental incompatibility between cognitive radio and spectrum liberalisation.

Spectrum liberalisation and cognitive devices are different, and incompatible, approaches to increasing the efficiency of use of the spectrum. Spectrum liberalisation seeks to minimise the

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constraints on usage of the spectrum<sup>1</sup>, so that primary spectrum users can fully exploit the spectrum resource. On the other hand, cognitive radio aims to allow the use of spectrum resource that is not fully exploited by the primary user. The two approaches therefore compete for the same spectrum resource.

Cognitive radio relies on knowledge of the characteristics of the primary users of the radio spectrum (a “signature”) in order to avoid causing them harmful interference. Most proponents of cognitive devices assume that they will be licence-exempt. Once such devices are widely deployed, it is almost impossible to remove them from service. It is therefore also almost impossible for the licensed spectrum user to change his use of the spectrum.

Cognitive devices are at a very early stage of development. The proponents of cognitive radio have not been able to demonstrate that cognitive radio is effective in avoiding interference in broadcast bands, despite a formal programme of testing in the USA by the FCC. These devices rely on an artefact of the US DTV standard that provides an easily detectable signature. Therefore, any solution developed for USA is unlikely to be effective in UK, because of fundamental differences between DVB-T and the US DTV standard. Even if cognitive devices could be developed for DVB-T, this would prevent future enhancements to DTT technologies, because the cognitive devices could not be relied upon to avoid interference to transmissions with different characteristics.

Almost all economists consider that a market approach to spectrum management produces greater benefit than a commons approach<sup>2</sup> - the primary spectrum user can generate more value from exploiting spectrum resources previously unused than a licence-exempt technology. Therefore, Ofcom should pursue spectrum liberalisation for the UHF band, not white space and cognitive devices.

The answer to this question is therefore that the UK should not be prevented from taking advantage of any future development in DTT technology by the constraints imposed by cognitive radio devices that already deployed. **All** types of DTT transmission, current and future, should be protected from potential cognitive devices.

See also our response to the cleared spectrum award consultation, question 3.

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<sup>1</sup> The Ofcom Spectrum Vision”, is set out in its statement on the Spectrum Framework Review; 28 June 2005; section 1.7:

1. Spectrum should be free of technology and usage constraints as far as possible. Policy constraints should only be used where they can be justified;
2. It should be simple and transparent for licence holders to change the ownership and use of spectrum;
3. Rights of spectrum users should be clearly defined and users should feel comfortable that they will not be changed without good cause.

<sup>2</sup> See for example (both document contain extensive references):

The Governing regime of spectrum; Prof Gerald R Faulhaber; Oct 06; Reforming Spectrum Policy (The Vodafone Public Policy Paper Series, No 5); available at:  
[http://www.vodafone.com/start/misc/public\\_policy.html](http://www.vodafone.com/start/misc/public_policy.html)

Toward an evolutionary regime for spectrum governance; William J Baumol and Dorothy Robyn; 2006; AEI Brookings Joint Center for Regulatory Studies; available at:  
<http://aei-brookings.org/admin/authorpdfs/redirect-safely.php?fname=../pdffiles/phpOI.pdf>

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**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?**

Digital radio microphones are now beginning to appear on the market. One of the claims for these devices is the support of more channels within a given bandwidth (i.e. greater spectrum efficiency). Ofcom should therefore not hamper the deployment of these devices. The radio interface of these devices is proprietary, so there is no common "signature" that can be used by cognitive devices to avoid causing interference.

See also our response to question 3 above.

**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?**

The coexistence requirements for mobile television are presumably similar to other handheld and portable devices, including DVB-T receivers with indoor antennas. We believe that it would be reckless of Ofcom to preclude future use of this spectrum by portable and mobile devices by allowing use of cognitive devices.

See also our response to question 3 above.

**Questions 6 - 7:** No comment

**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?**

The interleaved spectrum is both a complement and a substitute for cleared spectrum for broadcasting services. Ofcom estimates that the lots in interleaved spectrum can provide coverage of up to 76% of UK population<sup>3</sup>. A broadcast operator could probably provide national coverage using aggregated interleaved spectrum and two channels of cleared spectrum.

To allow this to occur efficiently, the cleared spectrum award needs to take place at the same time as the award of interleaved spectrum suitable for aggregation.

See also our response to the cleared spectrum award consultation, question 5.

**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?**

There is the potential to combine the large lots of geographic interleaved spectrum with one or two channels of cleared spectrum to create a multiplex with national coverage. To do this efficiently, it would be necessary to hold both auctions at the same time.

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<sup>3</sup> This is for QPSK modulation, with capacity for 3 video streams. 64QAM would cover around 53% of the population, with capacity for 8-9 video streams.

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**Questions 10 - 16:** No comment

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

It is unclear why Ofcom is proposing to use a block edge mask for this award, when it has proposed SURs for the cleared award. The existing criteria for protection of broadcasting are closer to SURs than the criteria used for mobile services.

It is important that the TLCs are defined so that they do not discriminate between potential bidders (the existing masts in each interleaved area and the UKPM are owned or controlled by entities that could be bidders). DVB-T services could also be delivered by a regional SFN (single frequency network), using a number of smaller masts, and this option should not be precluded by the TLCs for the award. For this reason, it would not be appropriate to define the in-band TLCs using the block edge mask approach.

Neither this consultation nor the one on the cleared spectrum award address interference between new services in the cleared interleaved spectrum. We assume that Ofcom intends that services in interleaved channels will have a secondary status to the cleared spectrum – i.e. services in interleaved channels do not receive protection from transmissions in the cleared spectrum and should not cause interference to them. This needs to be clarified for both awards.

**Questions 18 - 20:** No comment

**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.**

Vodafone has no objection to a public register of spectrum ownership. However, we are not convinced that a condition for provision of information on spectrum use will do much to facilitate secondary trading in the UHF spectrum. There will be relatively few spectrum holders in the interleaved spectrum. The most likely use of the interleaved spectrum is for broadcasting, for which information about the use of spectrum must obviously be in the public domain. It is unclear what other potential applications might be, but in general we believe that it is not possible to put detailed information into the public domain without giving away confidential business plans. It will not be possible to aggregate data when the spectrum usage is dissimilar.

The most likely form of secondary trading in this spectrum is for PMSE, much of which is very short term. Ofcom proposes to establish a Band Manager for PMSE. It would be reasonable for Ofcom to expect spectrum holders to provide information to this band manager on the spectrum that could be available for PMSE use.

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

Ofcom needs to think through the implications on competition of the owner of the existing television masts also being a potential bidder in the interleaved awards.

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**Question 23:** No comment

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

See our response to question 21.

**Questions 25 - 26:** No comment

**Annex 13: Impact assessment**

For our comments on the impact assessment, see our responses to the related questions above.