BASIC DETAILS

Consultation title: Digital Dividend: Cognitive Access, Consultation on licence-exempting cognitive devices using interleaved spectrum

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Question 1: The executive summary sets out our proposals for licence-exempting cognitive devices using interleaved spectrum. Do you agree with these proposals?

We believe that licence exempting cognitive devices is an important advance in the way the radio frequency spectrum is shared. While we agree in principle with the executive summary, we consider a geo-location database the only way for personal portable devices to accurately determine where and when they may operate.

Although in theory sensing makes a lot of sense, the cost of this technology, in power-consuming sensing time and computing power, makes it impractical for low-power devices. Additionally, sensing requires these devices to maintain a fairly significant silent period (100ms in Table 1 and 2) which would be detrimental or fatal for any QoS application.

Question 2: Do you agree that the sensitivity level for DTT should be -72 dBm?

We believe that the application of a geo-location database to determine the safe operating channels and power limits in a particular region is sufficiently effective to protect the DTTs from TVBD interference.

Question 3: Do you agree with an additional margin of 35 dB resulting in a sensitivity requirement for cognitive devices of -114 dBm?

We believe that -114 dBm is:

- too high a threshold to effectively protect incumbent services
- too low to enable battery-operated devices to operate due to excessive power consumption required.

Question 4: Do you agree with a maximum transmit power level of 13 dBm EIRP on adjacent channels and 20 dBm on non-adjacent channels?

Yes, for personal portable devices.

Question 5: Would it be appropriate to expect DTT equipment manufacturers to improve their receiver specifications over time? If so, what is the best mechanism to influence this?

No comment.

Question 6: Do you agree that the reference receive level for wireless microphones should be -67 dBm?

We believe that the application of a geo-location database to determine the safe operating channels and power limits in a particular region is sufficiently effective to protect the licensed wireless microphones from TVBD interference.

Question 7: Do you agree with an additional margin of 59 dB for wireless microphones?

See Question 6.

Question 8: Do you agree with a sensitivity requirement for -126 dB (in a 200 kHz channel) for wireless microphones?

See Question 6.

Question 9: Do you agree with a maximum transmit power level in line with that for DTT? Are there likely to be any issues associated with front end overload?

Yes.

Question 10: Do you agree that the sensitivity level for mobile television receivers should be -86.5 dBm?

No comment.

Question 11: Do you agree with an additional margin of 20 dB for mobile television?

No comment.

Question 12: Is it likely that mobile television will be deployed in the interleaved spectrum? If so, would it be proportionate to provide full protection from cognitive access?

No comment.

Question 13: Should we take cooperative detection into account now, or await further developments and consult further as the means for its deployment become clearer?

This may be an unreasonable burden for battery-powered personal/portable devices.

These devices require the use of very low power modes to conserve battery power, which would render them useless in such a scheme.

Question 14: How could the database approach accommodate ENG and other similar applications?

Push technology could be used to update the nearby license-exempt devices to clear the channels if they are connected to the Internet.

The database approach would allow for this, whereby an authorised person would define the frequency range to be provided protection, the geographical area over which the protection is to be offered and the time period at which it applies.

There must be a few designated channels that ENG can use when access to the geo-location database fails. Because the channels are in the database, they do not have to be the same two channels throughout the country, but can be picked to suit local conditions and ENG practices.

Question 15: What positional accuracy should be specified?

The proposed 100 metres accuracy seems to be reasonable.

Question 16: How rapidly should the database be updated? What should its minimum availability be? What protocols should be used for database enquiries?

As mentioned in our response to question 14, we believe proven Internet push technology is a better approach.

Proper security and authentication protocols, such as SSL, at the transport layer should be used to access the database to assure that the device is communicating with a verified and approved database.

Question 17: Is funding likely to be needed to enable the database approach to work? If so, where should this funding come from?

No comment.

Question 18: Should the capability to use the database for spectrum management purposes be retained? Under what circumstances might its use be appropriate?

Yes.

Question 19: Should any special measures be taken to facilitate the deployment of cognitive base stations?

No comment.

Question 20: Where might the funding come from to cover the cost of provision of a beacon frequency?

No comment.

Question 21: Is a reliability of 99.99% in any one location appropriate? Does reliability need to be specified in any further detail?

No comment.

Question 22: Do you agree with our proposal to enable both detection and geolocation as alternative approaches to cognitive access?

No, we believe that sensing by battery-powered personal/portable devices is difficult for a number of reasons, and that a properly implemented and maintained geo-location database will provide the interference protection required.

Question 23: Should we restrict cognitive use of the interleaved spectrum at the edge of these bands? If so, what form should these restrictions take?

No, we believe that this is a function of the database.

Question 24: Do you agree that there should be no limits on bandwidth?

We recommend defining a maximum power spectrum density limit (e.g., 8 dBm per 3 kHz as per Part 15.247e in the US) would allow narrow bandwidth applications while preventing these applications from concentrating all the admissible power in a narrow bandwidth.

Question 25: Do you agree that a maximum time between checks for channel availability should be 1s?

No, as battery-powered devices will require a variety of very low power modes to maximize battery life that will make it difficult to detect and take appropriate action within one second.

We believe that 10 seconds is a more appropriate time, and that even in the case of ENG services, setup times under 10 seconds seem very unlikely.

Question 26: Do you agree that the out-of-band performance should be -44 dBm?

It does not seem to be realistic to require tighter out-of-band emission level from licence exempt devices than from other electronic equipment.

Question 27: Is a maximum transmission time of 400ms and a minimum silence time of 100ms appropriate?

No, this would make this band unusable by most, if not all systems that have QoS requirements, e.g. VoIP services utilising standard codecs require a maximum time between transmissions of 20mS.

Question 28: Is it appropriate to allow "slave" operation where a "master" device has used a geolocation database to verify spectrum availability?

No comment.