



Your Association with Expertise

CONSULTATION: Digital Dividend: cognitive access

Consultation Deadline: 1st May 2009

Respondent: PLASA (Professional Lighting and Sound Association)

Introduction to PLASA (Professional Lighting and Sound Association)

PLASA is the lead professional body for those who supply technologies and services to the event, entertainment, communication and architectural industries. PLASA has a membership of over 550 members worldwide, including the leading specialists in professional audio, lighting, AV, staging, communications and related disciplines.

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

The reference receive level for wireless microphones must accommodate the maximum receiver sensitivity of all existing wireless microphones and other PMSE applications that make use of the interleaved spectrum; this will take into account all working scenarios.

Whilst a received signal level of -67 dBm at the receiver input is desirable in order to provide an adequate fade margin, this does not imply that the signal will always be at this level. The level to be protected should be in the vicinity of the -95 dBm value unless the PMSE user is willing to accept shortened range and reduced performance. It is our understanding that greatest sensitivity at the input of existing wireless microphone receivers is in the vicinity of -95 dBm.

For further explanation, please see BEIRG's answer, which we support and endorse.

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

As Ofcom have indicated, ensuring that the additional margin is sufficient to ensure that no interference is caused to wireless microphones in any usage scenario is extremely difficult. As 'it is impossible to measure all situations'¹ and 'the measurements themselves will be probabilistic'² in addition to the reasons explained in BEIRG's response, we would suggest that additional margin of 59 dB would only be acceptable provided that network sensing³ is also a compulsory requirement in order to help mitigate hidden terminal problems.

¹ <http://www.ofcom.org.uk/consult/condocs/cognitive/cognitive.pdf> section 4.7

² <http://www.ofcom.org.uk/consult/condocs/cognitive/cognitive.pdf> section 4.7

³ All devices in a "network" (2 or more devices that are interconnected) must be required to (a) undertake detection/sensing as per the parameters agreed and (b) share sensing data to mitigate against hidden terminal problems.



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

If Ofcom's reasoning was adopted, the sensitivity requirement would be $-95 - 59 = -154$ dBm. However, a sensitivity requirement of -126 dB would be more realistic, provided that:

1. Devices are tested by Ofcom and achieve that level under conditions that simulate a real-world operational working environment and PMSE stakeholders are involved in formulating the test standards and process.
2. Devices are not sold on the UK market on the basis of self-certification.
3. All cognitive devices in a "network" (2 or more devices that are interconnected) are required to both sense and share sensing data.
4. All cognitive devices are required to operate using geolocation as well as sensing.
5. Ofcom take all necessary and appropriate action to ensure that cognitive devices do not in practice interfere with PMSE applications. This should include the requirement for cognitive devices to have and use the database-geolocation utility and for Ofcom to retain the capability to use the database for spectrum management purposes.

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?

The deployment of alternative service in the interleaved spectrum will be dictated by the band manager's licence obligations.

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?

With regard to cooperative detection, Ofcom should adopt the FCC rules and ensure that all devices in a "network" (2 or more devices that are interconnected) are required to (a) undertake detection/sensing as per the parameters agreed and (b) share sensing data.

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

In view of the ad hoc use of these applications, and in some cases the rapidity of movement required, we believe that the 'short timescale' approach for updating the database would not be practical, would place



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undue burdens on PMSE users and potentially involve safety risks⁴. In addition, movement of these applications can be dictated by circumstances out of their control about which no prior knowledge existed, hence providing no planning time.

'Ring-fencing' for ENG would limit the band manager's flexibility considerably and restrict certain applications to certain bands. This is a burden that cognitive access to the interleaved spectrum should not impose.

The best option put forward by Ofcom is for the database approach to be coupled with a requirement for sensing.

Question 15. What positional accuracy should be specified?

3-10 metres should be practical, given current commercial technology. In addition, the parameters for cognitive access must take into account whether the geolocation utility can function indoors. For further views on this, please see BEIRG's response, which we endorse and support.

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

In light of the fact that licensing of PMSE frequencies can and does occur immediately before use, the database should be updated in real-time and be constantly available. If this is not possible, for whatever reason (e.g. lack of internet connection), then cognitive devices must have and use sensing capabilities as a requirement in addition to database-geolocation.

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

Neither the PMSE sector nor band manager should bear any costs associated with the deployment of cognitive devices in the interleaved spectrum.

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

⁴ e.g. users may have to update the database and carry out their work at the same time



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Yes. This ability is necessary because, coupled with the obvious requirement that all cognitive devices have and use the geolocation-database utility, it will allow Ofcom to ensure that if cognitive devices interfere in practice with PMSE applications then they can stop it (interference) from happening again.

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

Base station transmissions must not cause any interference to PMSE applications or use PMSE-allocated spectrum.

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

Neither the PMSE sector nor band manager should bear any costs associated with the deployment of cognitive devices in the interleaved spectrum.

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

In absence of beacon transmissions, cognitive devices must not be permitted to transmit (i.e. no information provision from beacons must mean 'no available frequencies' not 'all frequencies are available')

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

No, the detection and geolocation are both necessary requirements in order to protect PMSE from harmful interference. Please see BEIRG's response to this question, which we endorse and support.

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?

Yes. Cognitive devices should not in any way impinge upon PMSE use of channel 38⁵ or any other bands awarded to the band manager. Should guard bands be required, they must not reduce useable bandwidth for PMSE.

⁵ If awarded to the band manager



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

There might be a requirement for a minimum bandwidth (e.g. 500 kHz) to ensure that cognitive devices can distinguish wireless microphones from other cognitive devices.

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

To help to cater for immediacy of use and reduce the likelihood of interference when, for example, users enter the auditorium already using the wireless application or other PMSE device, less than 1s would be preferable.

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

Lower power levels would reduce the likelihood of interference occurring.

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

Whilst this is a question for cognitive device manufacturers, whatever transmission and silence time parameters are decided, the devices must not interfere with PMSE applications.

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

No. All cognitive devices in a "network" (2 or more devices that are interconnected) should be required to (a) undertake detection/sensing as per the parameters agreed and (b) share sensing data to mitigate against hidden terminal problems.