The Bluetooth SIG

Question 4.1: Do you agree with our proposal to conduct a market led award through an auction process for licensed use of the 2.3 and 3.4 GHz bands? If not, please provide evidence to counter this proposal.:

Bluetooth SIG does not have any comments on this section.

Question 4.2: Do you agree that we should not offer arrangements for aggregate bidding for low power use for these release bands? If you believe we should make such arrangements, please provide supporting evidence.:

Bluetooth SIG does not have any comments on this section.

Question 6.1: Do you have evidence to challenge our methodology and assumptions, which show the number of Wi-Fi routers likely to be affected by LTE interference is low?:

Bluetooth SIG does not have any comments on this section.

Question 6.2: Do you have evidence to challenge our methodology and assumptions, which show the number of Wi-Fi client devices affected by LTE interference is low?:

Bluetooth SIG does not have any comments on this section.

Question 6.3: Do you agree with our assessment of the available options for mitigation of interference to home networks?:

Bluetooth SIG does not have any comments on this section.

Question 6.4: Do you agree with our assessment of the available options for mitigation of interference to public networks (both indoor and outdoor)?:

Bluetooth SIG does not have any comments on this section.

Question 6.5: Do you agree with our assessment of the available options for mitigation of interference to Enterprise Networks?:

Bluetooth SIG does not have any comments on this section.

Question 6.6: Do you agree with our conclusion that the impact to Wi-Fi is not of a significant nature and therefore no regulatory intervention is necessary? If not, can you provide evidence?:

Bluetooth SIG does not have any comments on this section.

Question 7.1: Do you agree that we do not need to perform technical analysis on the applications in the middle of the band as set out in paragraph 7.7?:

Bluetooth SIG does not have any comments on this section.

Question 7.2: Do you agree with our technical analysis in relation to Bluetooth devices operating in the 2.4 GHz band, and that no additional restrictions are required in order to protect these applications?:

We have the following questions and comments:
1. Figure A2 shows a product category breakdown that is two years old. Based on current trends, and that this consultation represents future deployments of LTE, the analysis should be based on projected product category percentages.
2. We see medical devices as a major growth segment, yet no Bluetooth medical devices were tested in this analysis. We would like to see similar testing done with these devices.
3. The last bullet on page 11 of 99 states that "The adaptive frequency hopping mechanism employed by Bluetooth as a way of mitigating interference is very effective in combatting interference on the lower Bluetooth channels." Although we agree with the statement, it should be understood, that with the huge deployments of Wi-Fi devices, Bluetooth channel 0 is currently one of the clearest channels. Adding interference below channel 0 is therefore a more challenging situation than the statement alleges. Further, Bluetooth LE devices use static advertising channels and cannot avail themselves of adaptive frequency hopping, with Channel 37 @ 2402 MHz at particular risk".
4. The testing scenarios are based on the effects of LTE on a single Bluetooth device. We would like to see testing of the effect of the 2.3 GHz LTE on Bluetooth device in the process of sharing with other Bluetooth and Wi-Fi devices. Because of the mass deployment of hundreds of millions of devices in dozens of applications, the effect of an LTE BS on a single Bluetooth device does not truly represent the real world harm to Bluetooth devices.

Question 7.3: Do you agree with our technical analysis in relation to ZigBee devices operating in the 2.4 GHz band and that no additional restrictions are required in order to protect these applications?:

Bluetooth SIG does not have any comments on this section.

Question 7.4: Do you agree with our technical analysis in relation to video sender devices operating in the 2.4 GHz band and that no additional restrictions are required in order to protect these applications?:

Bluetooth SIG does not have any comments on this section.

Question 7.5: Do you agree with our technical analysis in relation to radio microphones devices operating in the 2.4 GHz band and that no additional restrictions are required in order to protect these applications?:

Bluetooth SIG does not have any comments on this section.

Question 7.6: Do you agree with our technical analysis in relation to short range devices operating in the 2.4 GHz band and that no additional restrictions are required in order to protect these applications?:

Bluetooth SIG does not have any comments on this section.

Question 7.7: Do you agree with our technical analysis in relation to medical devices operating in the 2.4 GHz band and that no additional restrictions are required in order to protect these applications?:

The consultation medical devices analysis does not encompass Bluetooth medical devices. This is a major growth segment and needs to be considered along with the ZigBee and Wi-Fi devices. The Bluetooth interference analysis did not evaluate any Bluetooth medical devices. Not given any consideration in the analysis or in the overall consultation is that the mere threat of interference will require any entity planning a Bluetooth rollout, be it medical devices, industrial controls and sensors, or safety or social networking devices, to consider other options. With its limited number of advertisement channels (which are static and cannot avail themselves of adaptive frequency hopping), Bluetooth low energy (LE) advertising Channel 37 @ 2402 MHz is especially vulnerable. This could very quietly limit the market size and have a significant economic impact on the industry.

Question 7.8: Do you agree with our technical analysis in relation to emergency services use in the 2.4 GHz band and that no additional restrictions are required in order to protect these applications?:

The widespread use and expansion of applications for Bluetooth technology in all walks of life introduced common emergency equipment, and HAM radios, that use standard Hands-free Profile (HFP) Bluetooth headsets, and ensures that there will be more emergency service uses in the near future. This should also be considered when the impact of the impairment of Bluetooth services is measured.

Question 7.9: Do you agree with our technical analysis in relation to hearing aids and assisted listening devices operating in the 2.4 GHz band and that no additional restrictions are required in order to protect these applications?:

The Bluetooth SIG believes that Ofcom must protect the Bluetooth point-to-point and broadcast applications that are used and becoming more and more prevalent in new in hearing aid devices. Low power requirements for hearing aids has spurred increased interest in Bluetooth low energy (LE) for connecting from devices to monaural and binaural earpieces, to such an extent that the SIG has established a separate working group to support its standardization. Hearing aids can and should be considered a safety of life application as it supports the millions of the hearing-impaired.

Question 8.1: Do you agree that the available mitigations address the potential shortfall of spectrum for PMSE at major events and that no additional regulatory intervention is necessary to protect PMSE in frequencies adjacent to the award bands?:

Bluetooth SIG does not have any comments on this section.

Question 8.2: Do you agree that PMSE should have some continuing access to spectrum in the 3.4 GHz band until new services are rolled out in an area?:

Bluetooth SIG does not have any comments on this section.

Question 8.3: Which option for the provision of information about the roll-out of new services is most the appropriate? Should the requirement to supply information apply only in designated locations?:

Bluetooth SIG does not have any comments on this section.

Question 8.4: Do you agree that any continuing access should be limited to five years from the award of new 2.3 and 3.4 GHz licences?:

Bluetooth SIG does not have any comments on this section.

Question 8.5: Do you agree with our assessment that there is little incremental benefit in on-going PMSE access to the 2.3 GHz award band?:

Bluetooth SIG does not have any comments on this section.

Question 10.1: Do you agree with our proposal that no coordination procedure is necessary in respect to maritime radar?:

Bluetooth SIG does not have any comments on this section.

Question 11.1: Do you agree with our proposal to require coordination procedures for the 3.4 GHz band - in order to protect of air traffic control radar - in line with those applied to the 2.6 GHz band?:

Bluetooth SIG does not have any comments on this section.

Question 12.1: Do you agree that for mobile satellite services operating in the band between 2170 and 2200 MHz, coexistence with LTE operating in the award bands above 2.35 GHz is unlikely to be an interference problem?:

Bluetooth SIG does not have any comments on this section.

Question 12.2: Do you agree that satellite services operating in the band 2483.5 MHz to 2500 MHz can co-exist with LTE operating in the award bands (i.e. 2350 to 2390 MHz and 3410 to 3590 MHz) and there is unlikely to be an interference problem?:

Bluetooth SIG does not have any comments on this section.

Question 12.3: Do you agree with that for satellite services operating between 2200 and 2290 MHz, coexistence with LTE operating in the release bands is unlikely to be an interference problem?:

Bluetooth SIG does not have any comments on this section.

Question 12.4: Do you agree that for amateur satellite services operating between 2400 and 2450 MHz, coexistence with unwanted/out of band emissions of LTE operating in the release bands (the nearest release band is 2350 to 2390 MHz) is unlikely to be a greater problem than the current in-band interference from licence exempt and ISM uses?:

Bluetooth SIG does not have any comments on this section.

Question 12.5: Do you agree with our preferred option to adopt our proposed mask with informal co-operation on a case-by-case basis if required?:

Bluetooth SIG does not have any comments on this section.

Question 13.1 Do you agree with our preference not to have a transitional region between blocks for licences in the 2.3 GHz band?:

Bluetooth SIG does not have any comments on this section.

Question 13.2: Do you agree with our preference not to have a transitional region between blocks for licences in the 3.4 GHz band?:

Bluetooth SIG does not have any comments on this section.

Question 13.3: Do you agree with our preference to not require synchronisation between different networks in the frequency band?:

Bluetooth SIG does not have any comments on this section.

Question 13.4: Do you agree with our preference to include both the permissive (unsynchronised) and restrictive (synchronised) masks within the TLCs in the 2.3 GHz band?:

Bluetooth SIG does not have any comments on this section.

Question 13.5: Do you agree with our preference to include both the permissive (unsynchronised) and restrictive (synchronised) masks within the TLCs in the 3.4 GHz band?:

Bluetooth SIG does not have any comments on this section.

Question 13.6: Do you agree with our preference to not require synchronisation between different networks in the frequency band?:

Bluetooth SIG does not have any comments on this section.

Question 13.7: Do you agree with our proposed maximum in band power limit for base stations in the 2.3 GHz band?:

In most instances the power limits should have no effect on Bluetooth in the 2.4 GHz band. At the high end of the 2.3 GHz band, however, OOBE can have severe consequences for these devices. A recent EC mandate suggests that RLANs in the 2.4 GHz band be protected. We believe this mandate, if taken into consideration by Ofcom, should also help with the Bluetooth interference problem.

Question 13.8: Do you agree with our proposed maximum in band power limit for user terminals in the 2.3 GHz band?:

In most instances the power limits should have no effect on Bluetooth in the 2.4 GHz band. At the high end of the 2.3 GHz band, however, OOBE can have severe consequences for these devices. A recent EC mandate suggests that RLANs in the 2.4 GHz band be protected. We believe this mandate, if taken into consideration by Ofcom, should also help with the Bluetooth interference problem.

Question 13.9: Do you agree with our proposed maximum in band power limit for base stations in the 3.4 GHz band?:

Bluetooth SIG does not have any comments on this section.

Question 13.10: Do you agree with our proposed maximum in band power limit for user terminals in the 3.4 GHz band:

Bluetooth SIG does not have any comments on this section.

Question 14.1: Do you agree with our approach that it is not necessary to impose any guard bands or restricted blocks in order to manage the adjacencies between the incumbent UK Broadband and new users of spectrum to be awarded in the 3.4 GHz band?:

Bluetooth SIG does not have any comments on this section.

Question 14.2: Do you agree with our approach to require UK Broadband to have the same coordination requirements as other users of the band?:

Bluetooth SIG does not have any comments on this section.