

Ofcom Consultation

British Entertainment Industry Radio Group (BEIRG)

TV White Spaces: Consultation on White Space Device Requirements Response

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Introduction – Executive Summary

The British Entertainment Industry Radio Group (BEIRG) is an independent, not-for-profit organisation that works for the benefit of all those who produce, distribute and ultimately consume content made using radio spectrum in the UK. Productions that depend on radio spectrum include TV, film, sport, theatre, circuses, music, newsgathering, political and corporate events, and many others. BEIRG campaigns for the maintenance of Programme Making and Special Events (PMSE) access to sufficient quantity of interference-free spectrum for use by wireless production tools such as wireless microphones and wireless in-ear monitor (IEM) systems.

The economic and social importance of PMSE, from the circus to the media, and the creative industries which rely on it, is growing. In the UK the creative industries are currently responsible for 1.5 million jobs, and contribute £36 billion annually to the UK economy. While PMSE is growing in size and importance, the access to spectrum which is the life blood of its operations is being steadily eroded. Without sufficient access to spectrum, the PMSE sector's ability to produce content for consumers is severely hindered. It is essential to recognise that any interference to PMSE usage poses a serious risk to the revenue generation of this sector. As interference affects PMSE content production at its live source, industry users will be directly affected and face a huge potential loss of earnings and consumer reputation.

In any production uninterrupted audio is **absolutely critical**. As such, any interference experienced that causes a wireless audio failure has severe consequences for both the production and the audience alike. For example, during a recent high profile TV talent show final, technical issues caused one of the main performers to believe that her wireless microphone was not working. This resulted in her duetting with another performer and having to share his microphone. It was a major news story on-line before the show had even finished and was all over the newspapers on the following day. Though in this instance the issue was not caused by interference, it is easy to imagine the public uproar if major broadcast or live events begin to suffer wireless microphone drop out as a result of interference caused by White Space Devices (WSDs).

BEIRG believes that the deployment of WSDs into UHF spectrum has the potential to severely compromise PMSE's operating environment. Interference free spectrum is crucial to the successful operation of PMSE equipment. By allowing the deployment of White Space Devices into UHF spectrum, Ofcom will effectively be allowing an environment to develop that allows increasing levels of interference to affect existing users of UHF spectrum far more frequently. Allowing more RF energy to radiate in the band will, inevitably, impact negatively on existing spectrum users. BEIRG therefore urges an extremely cautious approach to the deployment of WSDs. The UK and EU spectrum landscape is very different to that which is found in the USA. Spectrum in Europe is relied upon far more heavily for both the manufacturing of content and the delivery of that content via Digital Terrestrial Television (DTT) to citizens and consumers. At the very least, BEIRG believes that a phased introduction should be considered, to ensure that any negative consequences resulting from WSD deployment can be accurately measured and fully assessed.

BEIRG also believes that there should be clear lines of accountability. If the audio portion of a major concert or sporting event is ruined by interference from WSDs, resulting in cancellation of the event, BEIRG would like it to be made clear who will be held accountable. Whilst BEIRG would prefer not to see any WSDs operating in TV whitespace, we recognise that the current direction of travel is towards a shared spectrum access model. With this in mind, BEIRG has engaged with Ofcom on on-going WSD policy, and has responded to this consultation as constructively as possible.

Question 1: Do you agree with our approach to defining the various categories of WSDs?

BEIRG is reasonably happy with the rules regarding how WSDs interact with WSDBs and Ofcom, assuming that every WSD user sticks to them, and that Ofcom is prepared to strongly enforce their correct use. However, BEIRG does not currently agree with Ofcom's approach to defining the categories of WSDs.

Firstly, BEIRG would like Ofcom to further clarify their definition of "integral antenna" used in respect to those connected to type B WSDs, as referred to in 5.15. The definition BEIRG would recognise is 'an integral antenna is designed as a fixed part of the equipment, without the use of an external connector, and as such, cannot be disconnected from the equipment by a user with the intent to connect another antenna, and with a maximum antenna gain of 2.15 dBi for non-geo-located slave WSDs'.

Secondly, BEIRG is concerned with the use of the term "undue interference" in 4.7.2. As far as the PMSE industry is concerned, all interference is potentially harmful and able to cause serious problems within our sector. BEIRG urges Ofcom to work to mitigate all interference from WSDs, and look to introduce buffer zones in Channels 34 and 39, to protect PMSE services operating in Channels 35-38. BEIRG is also concerned about the very large costs that the presence of WSD interference could entail, and whether a database provider or Ofcom would be liable for these costs in the event of disruption to PMSE as a consequence of WSD operation. There is concern over whether the introduction of WSDs will even provide sufficient value to taxpayers, when weighed up against expenditure on proposed database management by Ofcom, the threat of damaging interference, and potential compensation costs to disrupted industries. It is vital that the operation of the £36 billion creative industries is not compromised by any avoidable, harmful interference.

Thirdly, with the previous point in mind, BEIRG believes that a phased introduction of WSDs is both necessary and reasonable to help accurately forecast what problems may develop. BEIRG would recommend that Ofcom only initially allow WSDs within the first emission class to operate, before conducting extensive checks to ensure that no harmful interference is being experienced, and that work can be carried out to eradicate any interference as soon as possible. Until it can be clearly shown that existing PMSE and broadcast users of spectrum and consumers will be entirely protected from harmful interference or disruption, and a safe balance can be struck, further WSDs should not be introduced. An additional concern is the possible high power use of WSD in rural areas; any such use must ensure no interference to PMSE operations.

Question 2: *Do you agree with our proposed sequence of operations for WSDs?*

Broadly, BEIRG agrees with Ofcom's proposed sequence of operations for WSDs. BEIRG is happy that qualifying WSDB must receive information from a WSD about the characteristics of that WSD, in order to generate operational parameters for that WSD. Furthermore, all slave devices should report back to their master devices, resulting in a closed feedback loop. It is also important that both master and slave WSDs are required to report their height or be provided with a power commensurate with the highest building in the pixel (plus an additional amount to compensate for error) as well as reporting their horizontal location, to ensure geographic validity of their operational parameters in such places as high-rise buildings.

BEIRG is concerned about the general duties of Ofcom as set out in section 4.2, with regards to its operation in "furthering the interests of citizens in relation to communication matters", and notes that PMSE and DTT interference from WSDs would not further these interests. It is critical that Ofcom ensures that no interference from WSDs is likely to occur following their deployment. White space is a limited resource, especially in places such as Edinburgh, Liverpool and Malvern, and must not be exploited to the detriment of existing users and citizens. There is a delicate tightrope to be walked in this respect. BEIRG recognises WSDs as an experiment in spectrum management, and can foresee that using a database to allow for remote control of devices will offer advantages to both administration and users. However there is also a clear danger that WSDs will impact on industries vital to the social and economic wellbeing of the UK, and negatively affect the benefits received by citizens.

Having a master device between the actual device emitting a signal and the database increases the likelihood of device failure, and as a consequence, increases the risk of interference and disruption to licenced users of spectrum. BEIRG is concerned about the risk of aggregate interference, syncing of databases, and inter-WSD interference, and seeks Ofcom's reassurances that it will be able to protect PMSE from these potential problems.

As Ofcom has confirmed that DTT and PMSE are the primary users in the bands in question, BEIRG can envisage situations when WSDs will be unusable. If demand for PMSE or DTT exists, it must always take precedence and be served before WSD requirements, in a similar fashion to the management necessitated by the London 2012 Olympics.

We also have concerns that there appears to be no control of the number and type of WSD operating on the same frequency at the same location, interference generated by competing WSDs will cause intermodulation products and a rise in the noise floor which can and will impact on primary users.

Ofcom needs to provide further information on whether a PMSE user suffering interference from a WSD will be allowed to change frequency without paying an additional license fee or giving long-term notice, so that the event that the PMSE user is servicing can continue uninhibited. BEIRG is concerned that many PMSE users will experience WSD interference and be forced to change their frequencies in order to keep an event going. However, the nearer it is to 'show time', the less likely it will be that any problems will be discussed with a licensing body, and the more urgently a PMSE user will require a new frequency. Therefore, many users may find themselves unable to report a problem with sufficient warning, and be forced to move without notice.

However, under current proposals, simply moving to another frequency in this situation is not a viable option, as doing so could increase the likelihood of interference. In the presence of WSDs, if a radio mic or IEM user were to change frequency without notice, they would be more likely to experience further problems as the databases would not know that the PMSE user is temporarily operating on another frequency. Consequently, the industry would suffer as a result. Because users are going to be particularly engaged with their work on the day, they are not necessarily going to report these difficulties at the time, but will be more concerned with completing their production tasks. Due to the nature of the touring business, it is unlikely that PMSE professionals would be afforded the time to report back issues that they might have experienced on a previous evening's performance. This could potentially lead to a scenario where Ofcom falsely believe that there are no (or very few) interference issues introduced as a consequence of WSDs, as they are not reported.

Question 3: *Do you agree with our proposed additional operational requirements for master WSDs?*

Yes, with some modifications. BEIRG agrees with the time and geographic validity proposed in 5.57.5.60, but as mentioned previously, believes that a reference point for vertical geolocation is also required as an integral part of interference prevention. BEIRG is also in agreement with the requirements that must be met before WSDs can operate over multiple channels.

Additionally, BEIRG agrees that device parameters must be determined automatically by the master WSD, and be beyond the control of the user. Otherwise, databases are presented with the risk of tampering and an input of false parameters, which could lead to many problems down the line. BEIRG envisages some WSDs as being small handheld devices with mass appeal when used in a congested spectrum environment. Such products could be open to a "jailbreak" type software fix, which may be able to bypass the database permission procedure or other changes to device operation that could cause interference to licenced users. For example, devices could send out spoof GPS data to obtain permission to access spectrum which is not free in their real location. This could result in severe disruption to PMSE and/or DTT, and prove very difficult for Ofcom and device manufacturers to deal with quickly and effectively.

The concern is not that users would do this with the intention of deliberately causing interference to licensed services, it is that users may find themselves in a location where there is no available 'white space' spectrum to allow their device(s) to operate due to the need to protect licensed services. Due to the 'hidden node effect', however, it may appear that there is in fact clear spectrum, or at least a low enough noise floor, to allow the WSDs to operate satisfactorily as far as the user is aware. There is a considerable difference between operating range and the radius over which interference to licensed services is caused, and the average WSD user will most likely not appreciate this.

PMSE equipment is used at the very front of the production chain; therefore any interference experienced by this equipment destroys not only the performance or event, but also any downstream revenue generation. For many PMSE users such as theatres, live TV broadcasts, live music and large political and industrial events, the presence of interference can be disastrous, even if for only a short period of time. BEIRG welcomes the implementation of a "kill switch", but notes that to be truly useful in protecting the industry it must have a simple and quick operating system

and be able to operate, from reported interference to PMSE or DTT to the ceasing of any and all WSD transmission, in the space of 3-5 minutes.

Question 4: *Do you agree with our proposed additional operational requirements for slave WSDs?*

On the whole BEIRG agrees with the additional operational requirements proposed for slave WSDs, and expects that the decent implementation of a kill switch will provide a good level of protection to other spectrum users, such as PMSE. However, BEIRG would like to see the guaranteed implementation of a maximum antenna gain of 2.15 dBi for non-geo-located slave WSDs. This must be made in conjunction with those changes to the process presented in Question 3, as previously noted.

Question 5: *Do you agree with the proposed device parameters, operational parameters and channel usage parameters?*

Again, provisionally BEIRG is in agreement, but much will depend on the detail within these parameters. See below for further comment.

Question 6: *Do you agree with our approach of implementing the requirements in the example SI and the draft IR and VNS?*

BEIRG has a number of comments and concerns over the content of the VNS. Primarily, BEIRG believes that a statement needs to be clearly made with regard to the position of equipment placed on the market using the VNS after the ETSI harmonised standard becomes available. BEIRG would like to know if such equipment would need to be removed from the market in the case that it does not conform to the ETSI standard. If so, it is necessary to know how this will be achieved.

Additionally, for the protection of other users, in the instance where WSDs are unable to make contact with a WSDB, BEIRG would like a requirement for a slave to shut down until their master can communicate with the database again. It should also be mandatory that if communication is not available with databases included on the list at <https://twws-databases.ofcom.org.uk/>, then no transmissions in the 470-790 MHz band should take place.

It is also not clear within the VNS or consultation document exactly how often the horizontal position of a WSD should be checked or determined, in order to ascertain when the device has exceeded its 50m radius. A clear definition of 'continuous' must be sought to ensure that WSDs are communicating with a database at regular intervals. BEIRG believes that a reasonable refresh rate would be no more than every 30 seconds.

With regard to the time validity parameter, it is unclear from the VNS or consultation document what, or where, the source of the 'Time of Day' information will be for any given master or slave device. Furthermore, is it not clear what should govern the accuracy of this information. We are

also concerned that there are no means to combat WSDs whose internal clocks are inaccurate. If a device's clock is slow, incorrect, or has ceased functioning altogether, BEIRG would like to know what remains in place to stop it from continuing operations where they have been prohibited. This must be tightly defined by Ofcom.

It is apparent that the results of many of the tests defined within the VNS are dependent upon specialist test databases and equipment most likely provided by the manufacturer. However, there does not currently appear to be a method of confirming the ability of these test systems to conform to the requirements identified in the VNS. Therefore, BEIRG believes that either the VNS needs to carefully define the method of achieving these communications and activities, or else some form of calibration of these units is required. Ideally, BEIRG would like to see Ofcom providing a trial database to be used with these tests.

In addition, it may be extremely difficult for many individuals to understand the complexities of the test systems. Consideration should therefore be given to a separate document describing these in a basic way, for both test houses and for new equipment providers, to ensure greater clarity and confidence in these systems. The VNS does not currently contain many of the basic requirements of ETSI standards, such as the normal and extreme test conditions for all radio parameters, power sources, and so forth. Instead, it leaves this up to the manufacturer. BEIRG believes that this is unacceptable if this equipment is to be left operational after the introduction of the ETSI standard. BEIRG therefore recommends that the ETSI approach is urgently incorporated into the VNS, and that Ofcom checks that all WSD manufacturers conform to the VNS. Consequently, all equipment placed on the market using the VNS should contain a data marker such that the database can use the kill switch to shut them down if the VNS requirements prove insufficient to prevent interference to primary users.