British Entertainment Industry Radio Group (BEIRG)

Response to consultation ‘Licence Exemption of Wireless Telegraphy Devices’

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Introduction

The British Entertainment Industry Radio Group (BEIRG) is an independent, non-profitmaking association which represents the interests of members of the Programme Making and Special Events (PMSE) sector who use radio spectrum.

Over the past 50 years Wireless (Radio) Microphones have played a key role in entertainment production. The high level of audio quality, convenience and ease of use has led to their deployment across all areas of event production. Wireless microphones are used in a wide array of events, including film production, theatrical performances, live sporting events, religious worship and political conferences.

BEIRG believes that before progressing with proposals to introduce unproven and potentially damaging technology into TV Whitespaces, Ofcom must undertake extensive 'real life' testing with industry partners and work more closely with European standards and regulation organisations. This is essential in order to ensure that established licenced users of spectrum do not suffer irreparable damage to their industry.

Whilst BEIRG is not unsympathetic to the intention to make the most efficient use of spectrum, the projected size of the imagined benefits derived from the deployment of White Space Devices (WSD) must be thoroughly evaluated. More consideration must be put into analysing what effect the introduction of unlicenced technology would have on a highly productive existing industry.

Context: PMSE and Unlicenced White Space Devices

The Programme Making and Special Events sector is a key component of the British entertainment industry. Through their use of wireless microphones and in-ear talk back systems, PMSE users form an essential component of the British entertainment industry which contributes over £15 billion annually to the UK economy. Use of wireless microphones is wide and varied, ranging from film production and theatrical performances, to live sport events, music festivals, religious worship and political conferences.

For PMSE professionals to be able to provide world class content to consumers across the world, it is essential that they have access to clean, interference free spectrum. For wireless microphones to produce content successfully it is absolutely essential their usage is free from harmful interference. At present this is achieved by using either spectrum that is dedicated to wireless microphone use, or by using interleaved spectrum that is carefully managed and licensed by a PMSE Band Manager. The PMSE industry has been a conscientious user of spectrum, having complied and worked with the regulator closely over many years.

BEIRG believes that Ofcom's proposal to allow untested WSD into interleaved spectrum would diminish PMSE professionals' ability to produce high quality content for consumers. Ofcom's apparent intention to work towards awarding white space technologies licence exemption, without first carrying out thorough real life testing would cause irreversible damage to existing spectrum licence holders.

BEIRG believes that WSD have the potential to severely interfere with licenced PMSE users of spectrum. BEIRG remains concerned at the lack of "real-life" testing in this area. The sharing of spectrum between licenced users and unlicensed WSD is unprecedented in the UK and Europe. In Europe their remains considerable concern about the reliability of unlicensed WSD to not cause interference. In the United States, which has a very different spectrum environment compared to the United Kingdom, this process is in its infancy. BEIRG believes that Ofcom's haste to deploy unlicensed WSD into UK spectrum should be tempered in order to ensure that incumbent licensed users of spectrum, and consumers, are protected from interference and a consequential reduction in content quality. BEIRG urges Ofcom to work with European partners for harmonised standards and testing.

BEIRG believes Ofcom must undertake extensive 'real life' testing, with industry partners, before any WSD is allowed to operate without a licence in UK spectrum. Without a rigorous testing procedure, Ofcom is in no position to provide guarantees to existing licenced users that their industry will not suffer irreparable damage. Given the appetite for testing and expert knowledge within Europe, BEIRG believes that Ofcom should work closely with European regulators to develop safe operating parameters. A more patient and thorough approach to testing is required to ensure that existing licenced PMSE users receive a guarantee that their licenced access to spectrum will remain free from interference.

Response

1. This is the British Entertainment Industry Radio Group's (BEIRG) response to Ofcom's consultation "*Licence Exemption of Wireless Telegraphy Devices: Candidates for 2011*".

2. At present BEIRG does not believe that Ofcom has sufficiently evaluated the risks posed by WSD to established licenced users of spectrum, for them to be considered as candidates for licence exemption.

3. BEIRG does not believe that proposals to implement unlicensed WSD should be considered until real-testing is carried out. This real-life testing should be carried out in conjunction with existing users of spectrum, as well as those companies likely to manufacture WSD, to ensure that no interference is caused to established licenced PMSE users. BEIRG supports Ofcom's commitment in 9.3 of this consultation**,** which asserts that "*throughout 2011/12, we [Ofcom] intend to work closely with stakeholders and potential service providers on the specification, implementation and testing of geolocation databases. We [Ofcom] will work with existing licensees to ensure that the introduction of white space devices does not cause harmful interference to their services*"[1]. Ofcom have previously stated similar intentions to undertake engagement with stakeholders. Such testing has, as yet, not taken place. BEIRG would welcome the opportunity to work towards this outcome with Ofcom.

4. BEIRG believes that real-life testing is essential to produce accurate technical parameters which guarantee that unlicensed WSD will not interfere with existing licenced users. This must be done before they are considered as candidates for licence exemption. At present there remain considerable concerns over how stringent protection levels, as laid out in '*Implementing Geolocation'*, would be in protecting existing licenced users. In our response to '*Implementing Geolocation'* BEIRG expressed concern over the technical aspects of Ofcom's proposals. These points can be found in Annex 1 of this document. In particular in A4.21 of *Implementing Geolocation* Ofcom suggest a minimum signal level of -77dBm for PMSE devices[2]. By contrast ECC report 159 suggests a value of -95dBm. An error of this magnitude could have massive implications, which vastly increases the likelihood of interference to PMSE operators by WSD.

5. Point A4.22 of '*Implementing Geolocation*' appears to suggest that no protection would be provided for PMSE outside of the first adjacent channels (n±1) whereas protection is being provided to DTT to n±9[3]. BEIRG believes this is a potentially damaging proposal. Interference to a PMSE receiver affects the whole live broadcast, the experience of the whole audience (live and broadcast), and downstream revenues. By contrast interference to a DTT receiver affects only those viewers of that particular receiver.

6. In A4.31 of '*Implementing Geolocation'* Ofcom discusses the modelling of transmission loss and the risk of interference to PMSE due to stronger than expected signals from WSD resulting from incorrectly modelled radio propagation. Ofcom state that "*It is not possible to definitely determine the likelihood of harmful interference where the transmission loss is less than predicted since this depends on real-world geometries and deployment patterns*.[4]" The only means of achieving

[1] http://stakeholders.ofcom.org.uk/binaries/consultations/licence-exemption/summary/condoc.pdf 9.3 p.28
[2] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf A4.21 p.37
[3] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf A4.22 p.37
[4] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf A4.31 p.38

indisputable proof that existing licensed PMSE activities will not be damaged is through 'real-life' testing. Any model which does not countenance the possibility of harmful interference is, in BEIRG's view, not fit for purpose.

7. BEIRG believes that the measures Ofcom set out in *'Implementing Geolocation'* to alleviate the damage caused by interference are wholly inadequate. The 'one-hour' turnaround for correcting harmful interference (in life threatening situations) completely misunderstands the nature of the PMSE industry's activity. An hour's Interference to a live event such as a theatre show or live television broadcast would encompass the entire event. PMSE equipment is used at the very front of the production chain; therefore any interference not only destroys the performance or event at the live source, but also any downstream revenue generation**.** Given the inadequacy of this reactive response BEIRG believes that Ofcom must do all it can to prevent harmful interference before WSDs are introduced into interleaved spectrum.

8. The projected economic benefit of WSD is £10-20 million per year, by Ofcom's estimation. The British entertainment industry is worth at least £15 billion a year. Interference to PMSE from WSD would jeopardise production of content for live events and broadcast. To introduce WSD without first carrying out 'real-life' testing could result in a considerable net-economic loss to the UK. In addition to the significant economic loss, the esteemed cultural and social standing of British entertainment would be diminished. The UK would be at real risk of damaging its ability to attract international events, such as the Olympics, if interference free broadcast and production could not be guaranteed.

9. BEIRG would also suggest that failing to conduct real-life testing would damage potential consumers of WSD. If it is found upon implementation that WSD are not in fact compatible with existing licenced users of spectrum, then Ofcom's responsibility to the consumer will also have been disregarded. BEIRG can see no discernible benefit to consumers arising from considering WSD as a candidate for licenced exemption, until absolute clarity is achieved on whether they will be able to function alongside established licenced users of spectrum. BEIRG believes that Ofcom's desire to rush ahead with WSD implementation does not represent the best interests of consumers.

Conclusion

This response reiterates the significant dangers that may arise from failing to thoroughly evaluate the risk of interference from WSD before they are considered for licence exemption. BEIRGs position on WSD implementation remains that Ofcom should be doing everything possible, including undertaking ‘real-life’ testing, to guarantee that WSD, whether licensed or unlicensed, do not interfere with established licenced PMSE usage.

BEIRG believes that the most reasonable means of achieving this guarantee is through a combination of ‘real-life’ testing and further co-operation with European partners. Ofcom must ensure that it does everything possible to avoid irrevocably damaging the vibrant, highly profitable and world-renowned British entertainment industry.

Annex 1: Technical Analysis – Taken from BEIRG's response to Ofcom's Consultation 'Implementing Geolocation'[5]

Assumptions Regarding PMSE Modelling

A1. The proposal by Ofcom to use a "low height" model for PMSE interference modelling is not representative of real world PMSE practice, despite the fact that significant time and effort has been expended by the PMSE community in working with Ofcom to inform them of the realities of the PMSE industry. A great deal of work was undertaken on this during the studies of the problem of the "hidden node margin", work contracted to ERA[6] by Ofcom.

A2. The work by ERA was carried out on the basis that WSD may employ sensing methods – and although this particular consultation is not considering sensing - nevertheless the work done, and the content of the report, is still valid. It constitutes a detailed technical study of real world PMSE activities and propagation issues. It therefore seems appropriate that Ofcom should make use of this relevant information to form the basis of 'real life' testing of this type of use of white spaces.

A3. The model proposed by Ofcom in Annex 4 of 'Implementing Geolocation' assumes that both the transmitting and receiving antennas will be located at a height of just 1.5m above ground level. In professional radio microphone use it is standard practice to install the receiving antennas 'above head height' as a minimum. In practice, theatres and live music events position their receiving antennas at least 2.5m to 3m above the level of the performance stage. The level of the performance stage relative to ground level will vary considerably depending on the venue. Outdoor live events typically have stages which are elevated some 2 or 3m above ground level, so the receiving antennas are at an elevation of 5 or 6 metres above ground level. Transmitting antennas for In Ear Monitor systems are similarly normally installed or rigged. Theatre stages vary in elevation considerably; the Olivier at the Royal National Theatre for example is around 20m above ground level.

A4. In TV outside broadcast applications, particularly at sporting events, radio microphone receiving antennas are frequently located at heights of 8m or more to allow greater areas to be covered. Even in TV studios receiving antennas are typically located at an elevated gantry level as noted in the ERA report[7].

A5. In the Annexes accompanying 'Implementing Geolocation' there appears to be no attempt to take account of the very likely possibility that WSD's may well be located at significantly elevated positions. This would greatly increase the radius over which they can potentially cause interference to both DTT and PMSE.

PMSE Protection Levels

[5] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/responses/beirg.pdf
[6] http://stakeholders.ofcom.org.uk/binaries/spectrum/spectrum-policy-area/projects/ddr/eracog.pdf
[7] http://stakeholders.ofcom.org.uk/binaries/spectrum/spectrum-policy-area/projects/ddr/eracog.pdf, p 72

A6. In **A4.21** Ofcom are suggesting a minimum signal level of -77dBm for PMSE devices whereas ECC Report 159 assumes a value of -95dBm. It seems inappropriate for the UK to be using a value so vastly different from Europe for such an important parameter. An error of this magnitude could have massive implications and vastly increases the likelihood of interference to PMSE operations by WSD's.

A7. In **A4.22** Ofcom appear to be proposing that no protection be provided for PMSE outside of the first adjacent channels (n±1) whereas protection is being provided to DTT receivers all the way to n±9. Given the vast range of differing PMSE receiving equipment in use, and the consequent range of adjacent channel performance, we believe that this is an unrealistic and dangerous proposal. Interference to a DTT receiver affects only the viewers of that receiver; interference to PMSE receivers affects the whole audience – live and broadcast - for that event.

A8. Further study of the C/I characteristics of all types of professional PMSE receivers will be required to establish appropriate recommendations.

A9. In **A4.31** Ofcom discuss the modelling of transmission loss and the risk of interference to PMSE due to stronger than expected signals from WSD's resulting from incorrectly modelled radio propagation. They state: "*It is not possible to definitely determine the likelihood of harmful interference where the transmission loss is less than predicted since this depends on real-world geometries and deployment patterns*.[8]"

A10. This must therefore mean that the likelihood of harmful interference ***not*** occurring is equally uncertain for the same reasons. BEIRG believes this is inconsistent with Ofcom's stated aim that, *"We should allow access by licence-exempt devices to interleaved spectrum as long as we were satisfied that it would not cause harmful interference to licenced uses, including DTT and programme-making and special events (PMSE).[9]"*

A11. If the likelihood of harmful interference cannot be predicted using the models contained, 'real life' testing must be undertaken to produce indisputable proof that PMSE activities will not be damaged. Furthermore robust modeling methods need to be developed before a geolocation database or mechanism can be defined.

Database Translation process

A12. With reference to A4.7 and A4.8: The proposals as set out fail to take account of the interference characteristics of a WSD. They assume that the derived protection ratio is determined only by the receiver adjacent channel selectivity and the WSD's adjacent channel leakage-power ratio. Recent evidence from testing of LTE base station and mobile devices suggests that different traffic profiles, and the resulting changes in the envelope and spectrum of the resulting interference signal, produce massive variations in the apparent receiver protection ratio. Further study is needed and is currently being considered in ITU WP6A.

[8] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf A4.31 p.38
[9] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf S2.5