BEIRG
BRITISH ENTERTAINMENT INDUSTRY RADIO GROUP

Digital Dividend Review

British Entertainment Industry Radio Group (BEIRG)

Response to consultation 'Implementing Geolocation'

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Context: PMSE and White Space Devices

Over the past 50 years Wireless (Radio) Microphones have played a key role in television and radio program 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.

The success of wireless microphones relies on access to radio frequencies (spectrum) that is free from interference. At present, this is achieved by either using spectrum that is dedicated specifically for wireless microphones, or by using spectrum that is shared with broadcasters through careful management and licensing. The proposals in the 'Implementing Geolocation' consultation document threaten to irreversibly damage the stable operating environment in which PMSE (Program Making and Special Events) professionals have been working for many years, providing world class content to consumers.

The PMSE industry has been a conscientious user of spectrum, having complied and worked with the regulator closely over many years. PMSE equipment users, and the services they provide, are an essential component of the British Entertainment Industry, which contributes over £15 billion annually to the UK economy. 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. The proposal to allow unlicenced devices to operate in the valuable UHF spectrum ('TV Whitespace') must be scrutinised thoroughly, in order to make sure that the UK is able to continue at the forefront of the worldwide creative industries.

The mass sharing of spectrum by both licenced and unlicenced users proposed in this consultation has never been attempted before in either the UK or Europe. In the United States, which has a very different spectrum environment compared to the United Kingdom, this process is in its infancy. Ofcom's haste to deploy WSD into UK spectrum should be tempered by caution in order to ensure that incumbent users of spectrum, and consumers, are protected from interference and a consequential reduction in content quality.

BEIRG believes that before progressing with these proposals to introduce unproven and potentially damaging technology into TV Whitespace spectrum, 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.

BEIRG Response Summary

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 sector who use radio spectrum. BEIRG believes that Ofcom must not proceed with their plans to introduce unlicenced White Space Devices at this time, primarily for the following two reasons:

- This legislation is being brought forward too soon.
    - Ofcom are working on introducing legislation ahead of the rest of Europe. BEIRG believes that the desire to race ahead is unnecessary in representing the best interests of consumers, and potentially damaging to relevant established industries.
    - BEIRG believe that the testing on White Space Devices to date has been deficient, not having been undertaken with industry partners in conditions which reflect real-life situations. More extensive testing is needed before this potentially damaging technology should be allowed to be used unlicenced.
- The opportunities laid out in the legislation are greatly outweighed by the risks to existing industries.
    - BEIRG represents members of the British entertainment industry, which generates £15bn annually for the UK economy. The potential economic benefits outlined by Ofcom in their own calculations show that White Space Devices will produce only a modest financial return (£170m over 20 years).
    - The operational and financial hindrance that could potentially be caused to this valuable industry suggests that it is simply not reasonable to push ahead with White Space Device implementation, whilst there is still a serious risk of interference to licenced users.
    - In the United States, where the potential market is five times the size of the UK, it is only estimated that the opening up of TV White Spaces could generate an annual value of between $3.9bn and $7.3bn[1]. This is still significantly less than the £15bn the UK entertainment industry brings in annually.

[1] http://www.ingeniousmedia.co.uk/websitefiles/Value_of_unlicensed_-_website_-_FINAL.pdf

Response

1. This is the British Entertainment Industry Radio Group's (BEIRG) response to this consultation document.

2. At present BEIRG does not accept that there is sufficient evidence to suggest that the implementation of unlicenced WSD is technically possible without causing considerable disruption to existing licenced users, *both fixed and mobile*. This is reinforced by Ofcom's assertion in the consultation document, section 1.18 that; "*at this stage we [Ofcom] are uncertain about the balance of costs and benefits and level of interest associated with these proposals*"[2]. In light of this, BEIRG believes that the decision to proceed with implementation of unlicenced WSD, without undertaking rigorous 'real life' testing, is wrong. Until it can be clearly shown that existing Programme Making and Special Events (PMSE) and broadcast users of spectrum and consumers will be entirely protected from harmful interference or disruption, BEIRG believes that it would be wholly irresponsible to proceed with Ofcom's proposed policy on WSD implementation.

3. To move from discussion to implementation without permitting all interested parties to fully understand the irreversible consequences of such an action is wrong. Many within the PMSE sector are of the opinion that unlicenced WSD implementation will severely hinder the successful operation of the UK entertainment industry. As a result, BEIRG believes that it is not reasonable or responsible to proceed with unlicenced WSD implementation without first conducting a thorough and comprehensive impact assessment. This assessment should undertake real-life trials in conjunction with the industry, as had previously been with agreed with Ofcom, in order to show whether such unlicenced devices can actually coexist with existing licenced users of spectrum. These trials should include the testing of unlicenced WSD themselves, as well as the operation of databases and their efficiency in dealing with interference problems when they arise. Indeed, without such an impact assessment the introduction of unlicenced WSD should not be considered.

4. Further, BEIRG maintains that no clearly definable benefits to citizen or consumer, as a result of the implementation of unlicenced WSD, have been identified. Ofcom highlights this by stating: *"In enabling white space access we hope that a range of valuable new applications will emerge but as with any innovative new technology we cannot predict what will actually happen"*[3]. Nevertheless, Ofcom asserts that the speculated financial returns from the implementation of WSD will be around £170-£270 million over 20 years[4]. By contrast, the British entertainment industry is worth some £15 billion annually. The operational and financial hindrance that could potentially be caused to this valuable industry suggests that it is simply not reasonable to push ahead with WSD implementation unless there is absolute certainty that PMSE usage will not be interfered with or disrupted. This reinforces the need for a thorough impact assessment to be conducted in order to attain certainty that existing licenced,

[2] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf s1.18
[3] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf s1.9
[4] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf p.46

paying users of the spectrum, as well as consumers of content, will be protected from disruptions and interference from these new unlicenced users of WSD.

5. The approach set out by Ofcom in this consultation document does not achieve this type of certainty. The overarching policy for implementation set out in this consultation is one of non-intervention, which speculatively hopes for uncertain technological innovation at an unknown point in the future. BEIRG believes that this approach is flawed. In simply setting up a framework for innovation, and then attempting to deal with disruptions or interference as they arise, Ofcom are not taking seriously the considerable interference risk posed by unlicenced WSD which once released to the market cannot simply be withdrawn. Ofcom states that its approach "*is to allow as much flexibility as possible for the market to try a range of applications.*"[5] In BEIRG's view, this increases Ofcom's responsibility to be actively engaged in the testing and scrutinising of new unlicenced devices and to not adopt a laissez-faire mindset toward the development of a potential WSD market. The risk to incumbent licenced users of the spectrum is too great.

6. BEIRG believes that this approach is grossly negligent. As BEIRG highlighted in response to the previous consultation[6], without regulation WSD manufacturers are unlikely to create devices that are guaranteed not to interfere with PMSE applications; and once unlicenced WSD products are on the market having been initially self-authenticated, it would be costly and time-consuming for Ofcom to implement and back-date effective regulation, if disruption or interference to PMSE was to become apparent. The risk is highlighted by the inadequate measures put forward to deal with any potential interference.

7. Point A.6.22 in the impact assessment asserts that if the interference situation is serious, "*we will immediately deal with the problem by removing the relevant frequencies and areas from the database which we will require database providers to reflect within one hour*"[7]. 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**,** this proposed hour turnaround would be disastrous. For any of these events, an hour can encompass the entire event. Moreover, even if action could be taken more quickly to prevent interference, the point still stands. Under Ofcom's present implementation model interference can only be corrected after the event. It appears that no steps are being taken to undertake the considerable research required in order to achieve definite assurances that potential unlicenced WSD are prevented from interfering with licenced PMSE users. It is essential for the PMSE industry that interference is prevented in the first place, rather than simply addressed after the event.

8. It should also be noted that Ofcom's inexplicable eagerness to push ahead with WSD implementation causes it to skip the important step of conducting a thorough impact assessment, and allows misinterpretation of any potential

[5] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf s1.9
[6] http://stakeholders.ofcom.org.uk/binaries/consultations/cogaccess/responses/BEIRG.pdf
[7] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf a6.22

developments abroad. Our particular concerns about the incorrect assumptions and inadequate modelling are laid out in Annex 1 of this response. At present Ofcom can only work with the regulations for WSD that have been produced by the FCC in the United States. BEIRG believes that these regulations are not relevant. Given that the UK and the US operate markedly different spectrum environments, not least because of their vastly differing geographical sizes, BEIRG believes it would be irresponsible for Ofcom to proceed with implementation of unlicenced WSD without further consultation and research, involving testing with actual products in congested RF operating environments. This is of course relevant to the current lack of harmonised European standards. BEIRG believes that because of the substantial and serious risk that the implementation of unlicenced WSD entail, it is only sensible that Ofcom should not go it alone in creating legislation.

9. Ofcom should take a lead in working cooperatively with their European partners for the creation of European-wide regulation and standards, thus making a more informed decision. In Europe, working groups such as ETSI TC RRS, ETSI ERM TG 17, CEPT PT SE43, CEPT FM SRDMG, CEPT FM 45 and PT FRMA are all concerned with the development of WSD standards and regulation. Ofcom should work with these groups in order to ensure that there is harmonisation on an EU wide basis, rather than simply 'going it alone'. Given the requirement for compliance with the RTTE directive, it would seem advisable to continue in this model of joint European working to ensure quality of standards and service throughout the EU. The change in the use of channel 69 represents a case in point.

10. BEIRG believes that Ofcom should not only be conducting its own thorough risk and impact assessment taking account of relevant industry expertise, but in the longer term Ofcom, working with Trading Standards and other statutory UK and EU bodies, should also be responsible for actively overseeing the testing of consumer devices and stipulating, in conjunction with CEPT and ETSI, a regulatory and standards regime for devices. This is required in particular due to Ofcom's intention to allow WSD to operate without licences, therefore reducing Ofcom's opportunity to protect licenced users once the devices have been introduced to the general population.

11. This response is from a PMSE perspective; however the consultation document also regrettably fails to reflect TV licence payers (especially those using communal aerial systems) whose reception may well be compromised by unlicenced WSD products. BEIRG does not believe, at this stage and until proven otherwise, that unlicenced WSD and licenced users can coexist in the crowded spectrum without interference. The document does not address the potential interference to prospective consumers of WSD, should the interference between licenced and unlicenced users mean they are unable to use their devices.

12. **Q1: What are your views on the likely use and take-up of WSDs? Do you intend to participate in this area, for example by hosting a pilot or developing equipment?**

12.1. BEIRG recognises that if unlicenced WSD are introduced then the potential uses set out in the consultation document are possible[8]. We also envisage WSD being small handheld devices with mass appeal 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 prove very difficult for Ofcom and device manufacturers to deal with quickly and effectively. Therefore BEIRG believes that Ofcom should first conduct real-life tests in conjunction with PMSE industry representatives before it considers sanctioning the development of mass-market devices. The PMSE community is still waiting for Ofcom to engage with it in meaningful testing as promised earlier.

12.2. BEIRG believes that, even if these tests prove to be successful, Ofcom should be involved, in conjunction with CEPT and ETSI, in setting the standards and technical parameter's for unlicenced WSD, and ensuring that such standards are upheld by legislation for all products including those imported; the purpose being to ensure that no device that does not meet stringent UK standards is utilised in this country. As stated in previous consultation responses, BEIRG believe it would be naïve for Ofcom to trust that WSD manufacturers would voluntarily produce equipment that avoids interfering with licenced PMSE services. Given the potential impact of interference it is essential that Ofcom take an extremely cautious approach to the testing and scrutiny of unlicenced WSD.

13. Q2: Are these appropriate conditions for licence exempting the WSDs?

13.1. BEIRG does not believe that these are appropriate conditions for licence exemption. In particular, BEIRG has significant concerns over the 'master – slave' split of responsibilities. 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. The assertion that a master device should be required to determine its location with only 95% certainty is also a major concern. Even the slightest error in assessing its location on the part of the master device could lead to numerous slave devices being fed incorrect data. This in turn would have the potential of allowing slave devices to transmit on frequencies that are unavailable, that are already occupied by a licenced user, and as such would potentially interfere with or disrupt PMSE activities and broadcast reception. BEIRG also has concerns about the potential communication between Slave devices from the same Master. Neither split of responsibilities is able to assure licenced users that they will not experience interference.

[8] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf Table A1

13.2. As BEIRG has stated in previous consultation responses, it is imperative that unlicenced WSD are covered by harmonised regulation and standards as part of the CE marking procedure (via CEPT and ETSI) and are assessed, via compatibility studies, by the ECC for inclusion within Recommendation 70-03. It is particularly important that these unlicenced devices are subject to stringent real-life testing in order to ensure that the highest standards are met, and that licenced users are protected from interference.

13.3. The impact assessment that accompanies this consultation details some types of interference which could be experienced by licenced users. In A6.21 it states "*we cannot be certain that no interference will ever be experienced*"[9]. However, the Ofcom impact assessment also states that Ofcom believes that interference will have no *material impact*[10]. This position suggests that Ofcom have failed to adequately understand the business and technical requirements of licenced PMSE users, and the extremely damaging consequences of any potential interference. Any interference at all would not only affect live events, broadcast and recordings, but also downstream revenue.

13.4. BEIRG believes that not only would the quality of events and broadcasts be affected, but that the UK would risk losing international events to neighbouring countries. Should UK events be unable to guarantee they would be free from interference, major sporting or cultural events could be awarded to those countries where WSD regulation was better able to protect against interference.

14. Q3: Is the lack of European harmonised standards problematic for development of WSDs?

14.1. The current lack of European harmonised regulation and standards is a problem for the development of WSD. Given the fact that the implementation of WSD poses a strong risk of interference to PMSE users, it seems sensible to wait for European convergence on the issue. As Ofcom state in point 4.5, *"the conformance of radio devices is covered by Directive 1999/5/EC on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (the "RTTE Directive) 16. This requires manufacturers to ensure that devices placed on the market are compliant"*[11]. At present all licenced radio devices recognise and conform to a set of stipulated and recognised European harmonised standards. It is illogical for Ofcom to propose not applying a similar proviso to unlicenced users, which undoubtedly pose a more significant risk.

15. Q4: Do you have any comments on these requirements? Are there any other requirements that should be placed on the database?

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[9] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf a6.21

[10] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf a6.15

[11] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf s4.5

15.1. In response to the previous consultation on geolocation, BEIRG asserted that a combined operation of geolocation database and sensing technology was the most effective means of protecting PMSE users from harmful interference[12]. The inadequacy of the database requirements detailed in this consultation reaffirms this view. In point 5.4 Ofcom highlight that they have "*not yet discussed conditions of access to the amended version of the DTT coverage plan and the PMSE usage with the relevant parties*."[13] It is essential that this process is completed before any conditions of access are promulgated for WSD database access. It is imperative that there is no additional financial burden placed on PMSE users in providing this information to the database.

15.2. The inadequacy of the suggested database requirements is further illustrated by the shortcomings in point 5.9, in which Ofcom states that database operators will be required to *"update their algorithms or parameter values within a week of receiving notification from Ofcom"*[14]. Further, Ofcom suggests that in a case "*where Ofcom deems that interference is significant (for example with safety of life or other serious implications) they may be asked by Ofcom to "blank out" parts of the database to prevent any access to particular areas and must do this in less than an hour*"[15]. As mentioned in the introduction to this consultation response, such measures display a clear misunderstanding of the specific nature and character of the PMSE industry and its clients.

15.3. It is essential to recognise that any interference to PMSE usage poses a serious risk to the revenue generation of a £15 billion UK industry. 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. Given the severe consequences that interference poses to PMSE usage, it is wholly inadequate for Ofcom to set the requirements for database updates to one week in so-called 'non-significant' cases of interference, or one hour in significant cases. As stated, even the hour turnaround would be wholly inadequate to protect the PMSE industry from suffering considerable operational and financial damage.

15.4. BEIRG believes that prior to the start of operation, the databases must be subject to real-life testing to ensure the resilience of the system. This should include not only the collation and distribution of data, but also the speed and efficiency with which the database providers can deal with problems of interference when they occur. Furthermore, this information should be used to develop a fit-for-purpose grievance procedure.

16. Q5: Do you have any comments on these responsibilities?

16.1. BEIRG are concerned about Ofcom's reactive stance on dealing with potential problems with unlicenced WSD. Ideally these responsibilities would

[12] http://stakeholders.ofcom.org.uk/binaries/consultations/cogaccess/responses/BEIRG.pdf
[13] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf s5.4
[14] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf s5.9
[15] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf s5.9

include a 100% guarantee that no interference would occur. Given the considerable risk posed to PMSE users by unlicenced WSD, it is essential that lines of responsibility are unambiguous and that those responsible for interference are swiftly identified and prosecuted, as well as being made liable for appropriate compensation. The payment of adequate compensation for interference is essential, and Ofcom should make this clear when detailing responsibilities. Despite this, and as has already been highlighted earlier in this response, the notion that interference can only be punished and not prevented is inadequate considering the character of the PMSE industry.

16.2. BEIRG believes that all database providers must act in accordance with the rules of an independent intermediary who will deal with grievances, without discrimination, between database providers, WSD users and licenced users. Where appropriate this intermediary would be responsible for deciding the level of compensation required as a result of interference, or recommending to Ofcom the removal of certain types of devices which continually caused disruption via a remotely operated 'kill switch'. There must also be provision to remove spectrum from the databases in the future if it could be more beneficially used by licenced users.

16.3. It is BEIRG's view that more information on the nature of the database providers is required. How will Ofcom judge that the required database coverage has been reached? Would the number of databases be limited nationally, or according to smaller geographical regions? Does Ofcom foresee that the location of database providers would have an effect on the accuracy of the information which they provided?

17. Q6: Might you be interested in becoming a database provider? If so, can you provide more details on the extent and timing of likely provision?

17.1. BEIRG believes that the current proposals to contract out database provision to private providers are very worrying and threaten to compromise the PMSE community. As with the development of WSD, BEIRG believes that without stringent regulation the market is not best placed to ensure that standards are met in order to guarantee PMSE usage will not suffer interference or disruption.

17.2. BEIRG believes that database providers who benefit from WSD must be amongst those who meet the costs. Whilst DTT providers and the PMSE band manager will be expected to provide data to the databases, the burden of cost should not fall on them.

18. Q7: Is our approach of working with Europe where possible but moving ahead alone if no European approach appears forthcoming appropriate or should we await European harmonisation regardless of how long this might take?

18.1. Ofcom's approach to harmonisation is injudicious. As existing licenced users of spectrum are likely to be disadvantaged by unlicenced WSD, a

unilateral approach in the UK would be a profound mistake. European harmonised regulation and standards will be essential for any successful WSD deployment as US FCC standards are not transferable to a UK or European spectrum environment.

18.2. BEIRG believes that it is essential that real-life tests with significant input from the PMSE industry, not laboratory tests, are conducted before any deployment of unlicenced WSD is considered. Choosing to work on the development of European compatibility studies, regulation and standards, rather than going it alone, would not only provide time to conduct these real-life tests, but it would also provide accepted specifications at a European level which would further contribute to any potential assessment over unlicenced WSD ability to operate in conjunction with existing licenced users. This would allow the UK to participate in developing standards which would ensure they were not left at a disadvantage when competing against their European neighbours to host high profile and lucrative international events.

18.3. Given the uncertainty of the present digital dividend and protection clause issues both within the UK and Europe, time should be taken to resolve these issues before implementing yet another disruption of the 470-862MHz band.

Annex 1: Technical Analysis

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[16] 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[17].

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.

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[16] http://stakeholders.ofcom.org.uk/binaries/spectrum/spectrum-policy-area/projects/ddr/eracog.pdf

[17] http://stakeholders.ofcom.org.uk/binaries/spectrum/spectrum-policy-area/projects/ddr/eracog.pdf, p 72

PMSE Protection Levels

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*.[18]"

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).[19]"*

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

[18] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf a4.31
[19] http://stakeholders.ofcom.org.uk/binaries/consultations/geolocation/summary/geolocation.pdf s2.5

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.