Executive Summary

Arqiva has been involved in a range of trails of WSDs in the UK. The WS products that have been deployed in these trials have come from a range of organisations. The products have been in the majority development devices and have therefore not had the full functionality needed to enable dynamic contact with WS databases to allow them to be automatically configured and activated. We therefore understand the purpose of the MCWSD licensing proposals that are subject to consultation and welcome the implementation of an effective regime for WSD deployment that avoids disruption to the incumbent licensed services, Digital Terrestrial Television (DTT) and Programme Making and Special Events (PMSE)

To this end we have proposed additional aspects for consideration within the detailed responses to questions and outline the key aspects below;

- The impact assessment lacks a detailed cost / benefit analysis, in particular we note a lack of a clearly defined interference management / mitigation process that has been subject to a full costing review;
- In the event that there is disruption to the incumbent licensed services, DTT and PMSE, we suggest that information on licensed and active MCWSDs should be available on a dynamic basis to key industry stakeholders, e.g. BBC, @800 and Digital UK, to be able to address consumer enquiries;
- We encourage the development of a robust registration / recording process for active devices that is available to Ofcom on a 'live' basis and subject to regular audit;
- The licensing regime should be applicable to Type A devices only, with both Master and Slave Devices registered against the licence. This will make it easier to manage interference events as they arise.
- We are supportive of the proposed Quality Assurance regime being considered by Ofcom but provide additional aspects for consideration. In particular we encourage Ofcom to consider what additional Quality Assurance steps should be introduced to ensure that active White Space devices are not at risk of being 'hacked' and adjusted by third parties, i.e. not the licence holder.

Following recent developments in the US, Arqiva is concerned of reports that Professional Engineers, either deliberately or by accident, have been providing the White Space database incorrect information with respect to location with false parameters being set up in the MCWSD leading to interference to other users in the band. We encourage Ofcom to seek advice / guidance from colleagues in the US to better understand these failures so that they can be avoided in the event that this regime is introduced in the UK.

Detailed Responses to Questions

Question 1: Do you agree with our assessment of the likely costs and benefits of our proposal to license MCWSDs as a transitional arrangement? Please provide any available evidence to support your response.

The costs and benefits are described in only very general terms without any specific numbers assigned to either category and as such we encourage Ofcom to further elaborate this aspect in order to enable a meaningful impact assessment to be undertaken. In particular one of the cost categories that needs further detail is the interference management and mitigation regime.

In the event that a DTT household experiences interference from a MCWSD who do they complain to? In the case of LTE in the 800 MHz band the organisation @800 has been set up to handle complaints and to pre-empt interference issues by sending out postcards to households which are at risk from interference and offering follow-up support if they experience a problem related to the 4G service. In Ofcom's proposed framework for White Space Devices for MCWSDs there is no equivalent body set up to address interference management and mitigation issues. If you put TV interference into a search engine the @800 site is the result.

https://at800.tv/guide/common-causes-tv-interference-2/

Furthermore, the Ofcom web site directs a household experiencing interference to the BBC and asks the householder to fill in a WEB form. This is a very slow process and as a result may lead to platform change as a result of the disruption experienced, particularly if households are deprived of their main source of TV for a prolonged period. On the basis that the BBC, DUK and @800 will be contacted by consumers in the event that White Space interference presents it would be sensible to provide these bodies with dynamic information of active White Space services in a form that would allow their triage processes to operate efficiently to deal with consumer enquiries.

Finally, the costs of running an interference investigation and mitigation service is significant and should be considered in more detail as part of the impact assessment.

Question 2: If you agree that Ofcom should allow MCWSDs to operate in the UHF TV band within the TVWS framework, how long do you believe that the licensing regime would need to be in place?

Arqiva do not have a perspective on what an appropriate time period would be. Although in the event that devices are deployed under this regime the term of the licensing regime may need to take account of the anticipated economic life of the service.

Question 3: If you agree that Ofcom should allow MCWSDs to operate in the UHF TV band within the TVWS framework, when do you believe it would be appropriate to conduct a review to assess whether there is an on-going need to license MCWSDs?

If Ofcom adopts an initial term of three years for this regime then we propose that an overall review of the licensing regime should be undertaken in the period 18 – 24 Months post introduction to ensure that industry has had adequate time to work with the regime whilst also affording Ofcom sufficient time prior to the end of the initial period to undertake a thorough review and implement the necessary regulatory changes to the regime.

Neverthless, in addition to this proposed overall regime review we also encourage Ofcom to implement a 6 monthly audit of device / service / licensee performance to monitor whether MCWSDs from a particular manufacturer or installed by a particular company are unmanageable / causing unreasonable amounts to disruption to incumbent licensed users, i.e. DTT and PMSE. In the event that there is clear evidence of harm or poor practice then those devices / companies should be excluded from the market until it can be demonstrated that the device has been modified or correct training or investment in test equipment has taken place.

Question 4: Do you agree with the proposed terms of the draft licence as set out in Annex 5 and as discussed below?

Proposed additions / amendments to the licence;

I. Ofcom should have the facility to disclose the active device information, including device location and operational parameters, to designated third parties. This will be particularly important in the event that interference events need to be considered by third parties, e.g. @800, BBC and Digital UK;

II. Ofcom should maintain records of active deployments ideally for the life of the service ;

III. Ofcom should require a licence holder to register all active devices individually against the licence held;

IV. Ofcom should have 'live' device parameters for all registered devices from each licensee so as to be able to rapidly respond to any reports of harmful interference being caused. Ofcom proposes that the information could be provided as a simple spreadsheet sent monthly or added to as and when installations take place. We feel that such a system would not keep track of new and changed installations and Ofcom's access to real time information is essential if cases of harmful interference are to be effectively dealt with.

V. When activating a white space device it is important that the height of the device be established so that the database can provide appropriate technical operating parameters to the device relative to the incumbent licensed services, DTT and PMSE.

Question 5: Do you think it would be beneficial for the licensing regime for MCWDs to cover both masters and slaves?

Arqiva believe that it would be sensible for the licensing regime to be applicable to both Master and Slave devices and that all active devices, including Slave Devices, should be registered against the licence. This will make it easier to manage interference events as they arise.

Question 6: Do you agree that our licensing regime should only apply to type A devices?

Arqiva agree that the licensing regime should only apply to type A devices as these devices are fixed and hence their location relative to other licensed users is understood by the database and hence risk of interference can be managed more effectively.

Question 7: Do you agree with our approach to allow a number of MCWSDs under the control of a single licensee to be subject to a single licence?

In order to make it easier to control active devices, to enable interference mitigation activities, it would seem sensible that active devices be licensed on an individual basis. However, recognising that this might lead to a significant administrative burden an alternative approach would be for devices to be added to the licence at the point at which they become active with basic operating

information such as Unique ID, operating power, frequency, location, etc. In addition, and as noted above we suggest that this information should be made available to designated third parties, e.g. BBC, Digital UK, @800 to help industry analyse interference events.

Arqiva also supports Ofcom's view that all MCWSDs should stay under the direct control of the licensee with all user configurable settings protected physically or by passwords from being reconfigured by third parties independent of the licensee.

Question 8: Do you agree that the proposal for specific licence terms will mitigate the risks posed by the use of MCWSDs?

We agree with the arrangements proposed by Ofcom as the proposed licence regime places an obligation to maintain accurate records for each configuration or reconfiguration of the radio equipment and that this information will be passed to Ofcom. Whilst we are supportive of this approach we also encourage Ofcom to secure 'live' access to this information from each of the licensees so as to be able to rapidly respond to any reports of harmful interference being caused. In addition, we suggest that there should be a requirement on licence holders to regularly check / audit their active devices and provide a validation certificate to Ofcom on a periodic basis [6 monthly] to demonstrate that individual active devices continue to be operating as per their authorisation. Finally, we encourage Ofcom to consider what additional Quality Assurance steps should be introduced to ensure that active White Space devices are not at risk of being 'hacked' and adjusted by third parties, i.e. not the licence holder. If this were to occur then there may be an increased risk of interference.

Question 9: Do you consider the proposed licence terms are appropriate and proportionate?

We propose further enhancements as set-out in our responses to Questions 4 – 8 above.

Question 10: Do you have any comments on our proposal to require applicants for licences to deploy MCWSDs to supply details of their QA process on application?

Arqiva welcomes Ofcom's proposal to request licence applicants to provide details of their QA processes on application and as a consequence we suggest that the MCWSD licensee should include in their QA procedures the following aspects:

- Procurement of MCWSD to demonstrate that they are ETSI EN 301 598 compliant as appropriate;
- Staff training designed to ensure licence compliant installation of MCWSDs;
    - Deployment of MCWSDs with a range of external antennas and feeder runs requires the Commissioning Engineer to be able to work out the total system gains to calculate the EIRP of the system;
    - When a WS system is indoors its location needs to be referenced to a known datum which will require adequate training for the Commissioning Engineer. Arqiva would encourage a location accuracy of the MCWSDs antenna system to +/- 10m as this is an order of magnitude less than the pixel size of the data base; and
- Robust systems to manage the data associated with the installation, commissioning of and changes post commissioning due to frequency, power or modulation (class) changes.

It is clear that robust and audited QA management systems will be essential if recent developments in the US[1] are to be avoided in the UK. In the US, Professional Engineers, either deliberately or by accident, have been providing the White Space database incorrect information with respect to location resulting in false parameters being set up in the MCWSD leading to interference to other users in the band. We encourage Ofcom to seek advice / guidance from colleagues in the US to better understand these failures so that they can be avoided when this regime is introduced in the UK.

Thus and in addition, we encourage Ofcom to undertake periodic random checks on licence holders working practices to ensure that the QA systems are adhered to.

Question 11: Do you agree with the proposed technical conditions of the draft licence?

The proposed draft technical conditions seem sensible although we do note concerns regarding the Manual configuration of devices, in particular accurate parameter setting such as location for indoor devices and ensuring exact EIRP where external antennas are used. We therefore encourage a periodic audit of all active devices to ensure that their operating parameters are consistent with those authorised by the database.

Question 12: Do you have any comments on the proposed duration for this licence?

See response to Question 2

Question 13: Do you have any comments on our proposed licence fee of £1,500?

No comment.

Question 14: Do you have any comments on our proposed five year minimum notice period for revocation for spectrum management reasons?

A 5 year revocation period appears excessive in light of the initial licence term of 3 years. Although there may be merit in this additional 5 year term to justify equipment investment in the initial 3 year licence term.

Question 15: Do you believe there is likely to be an ongoing need for white space devices that allow some level of manual configuration? Please give reasons for your answer.

It would seem likely that the requirement for manual configuration of some white space devices will remain in the future even if only for indoor devices where there would be great difficulty in automatically determining the location of the device or in the case of devices allowing enhanced operation (see response to Question 16).

Question 16: Do you believe there is merit in exploring allowing enhanced operation through a licensing regime in the future and if so what additional capabilities should be allowed?

We note and share the concerns that Ofcom has highlighted in regard to enhanced operation of white space devices implemented under a licence exempt regime. Clearly the use of a licensed approach would help to address this and we are supportive of further consideration being given to

[1] http://www.nab.org/documents/newsroom/pressRelease.asp?id=3618

this and particularly in regard to how the qualification and use of skilled installers will be managed by the industry.

Moreover, at a recent workshop hosted by the European Commission[2] the focus of the debate amongst Industry and Policy makers was the potential for Licensed Shared Access (LSA). There was very little discussion about the Dynamic Spectrum Access licence exempt framework developed in the UK which has been developed over many years by Ofcom. Arqiva see potential merit in the application of the proposed LSA approach to TVWS as well as other spectrum bands. In the context of the UHF band TVWS could be potentially licensed on a secondary basis (subordinate to PMSE) as per the 'Future spectrum access arrangements for PMSE[3]' issued in 2010. This would afford the TVWS service licenced status, ensure controlled deployment of the TVWS service, afford full protection of the DTT and PMSE services and ultimately enabling the deployment of TVWS services in a controlled way to allow the service to develop. If this controlled and fully regulated licence framework were to be adopted for TVWS then there would be potential to allow enhanced operation as considered in this question.

[2] Workshop: Spectrum sharing by using geo-location databases, 20th March 2015, Organised by DG CONNECT/European Commission. https://ec.europa.eu/digital-agenda/en/news/workshop-spectrum-sharing-using-geo-location-databases

[3] Programme-making and special events, Future spectrum access, Ofcom statement 31 August 2010. http://stakeholders.ofcom.org.uk/binaries/consultations/bandmanager09/statement/statement310810.pdf