

Annex 1

Summary of stakeholder responses

Introduction

A1.1 We responded to many of the key points raised by stakeholders in Section 3 of this Statement. This annex provides a summary of stakeholder responses, and responds to some additional detailed comments not covered in Section 3.

Lists of sections

Section 1	General comments, and comments on the costs and benefits of licensing MCWSDs
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Section 1 - General comments, and comments on the costs and benefits of licensing MCWSDs

Comments from respondents	Ofcom response
<p><i>Undermining development of licence exempt devices</i></p> <p>- The BBC said that it was essential that the licensing regime does nothing to entrench manually configurable devices in the UHF band at the expense of incumbent users nor disincentivises the development of licence-exempt devices.</p> <p>- BAE Systems asked whether the licensing regime might potentially delay the development of automatically configured WSDs.</p>	<p>We respond to these concerns in paragraph 3.11 of Section 3.</p>
<p><i>Reporting interference from MCWSDs</i></p> <p>Arqiva asked who a DTT household that experiences interference from a MCWSD should complain to. It suggested that the BBC, DUK and at800 be provided 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. The BBC and Digital UK made similar points.</p>	<p>We will work with those organisations that have responsibility for investigating DTT interference cases to discuss the most efficient way to handle any MCWSD related interference cases. We note we did this for the white space trials and no interference cases were reported.</p>

<p><i>Exempting MCWSDs</i></p> <p>Nominet were concerned by Ofcom's decision to limit the licence exemption to automatically configured devices only. They did not consider that Ofcom had provided any compelling evidence to suggest that such devices would be available within the three-year timescale suggested in the Consultation. They questioned whether a manufacturer would ever see the nascent European market as providing sufficient demand for devices that meet Ofcom's requirements for licence exemption.</p>	<p>We note that the proposal to only exempt automatically configurable devices from licensing has been a cornerstone of the white space work and consultations over the past few years, and has been broadly accepted by industry. Our TVWS Framework Statement²⁰ confirmed that licence exemption would only apply to automatically configured devices. In paragraphs 3.11 and 3.23 of Section 3, we note recent developments in the US which support our view that automatically configured devices are likely to be available within the three year timescale mentioned in the Consultation.</p>
<p><i>Level of costs and benefits unclear</i></p> <ul style="list-style-type: none"> - Arqiva commented that the costs and benefits are described in only very general terms without any specific numbers assigned to either category and encouraged Ofcom to further elaborate on this aspect in order to enable a meaningful impact assessment to be undertaken. - Digital UK said it was not possible to develop a view on the actual level of costs or benefits without further information. 	<p>We recognise that we did not seek to quantify the costs and benefits outlined in the cost and benefit assessment in our Consultation. We consider that this was appropriate in view of the uncertain nature of the costs and benefits. In particular the level of benefits is dependent on the take-up of MCWSDs and this is difficult to estimate. As we noted in our Consultation, the benefits to citizens and consumers of implementing the TVWS framework (and by extension, the incremental benefits of earlier implementation by licensing MCWSDs) are uncertain but potentially very substantial relative to the costs. Also, as set out in the Consultation, we consider that the incremental costs of implementing licensing of MCWSDs are likely to be low, both in terms of costs to existing users of the band due to interference (where, as set out elsewhere, we consider that the licence conditions should mean that the risk of interference from MCWSDs is low) and to Ofcom in administering the licence regime. For example, operational support of the MCWSD regime would use much of the functionality which is already in place for managing licence exempt WSDs.</p>

²⁰ Implementing TV White Spaces Statement, February 2015
(<http://stakeholders.ofcom.org.uk/consultations/white-space-coexistence/statement>)

<p><i>Risks around costs of interference management and investigation/inspection</i></p> <ul style="list-style-type: none"> - Arqiva said the costs of running the interference management and mitigation regime would be significant, and should be considered in greater detail. - The BBC said they had some concerns about the costs associated with investigating mis-configured installations and thought that a more tightly controlled licensing regime would be appropriate. - Digital UK thought that two areas of particular cost risk were interference management and Ofcom inspection of MCWSD installations. They commented that these cost risks could be minimised by ensuring that the framework, licensing and accreditation processes are robust, and that licensees only use well qualified and reputable installers. 	<p>We respond to these concerns in paragraphs 3.12 – 3.13 of Section 3.</p>
<p><i>Departure from the ETSI harmonised standard</i></p> <ul style="list-style-type: none"> - BAE Systems asked whether the “hidden” costs and risks of departing from the ETSI standard had been fully considered. It also questioned whether the ETSI standard (ETSI EN 301 598²¹) would be updated to reflect MCWSDs, and if not, how European harmonisation would be maintained in the future. - BEIRG said that Ofcom's approach to MCWSDs is contrary to the ETSI Standard. 	<p>We note that all equipment placed on the UK market must meet the requirements of the R&TTE Directive²² (which will be superseded by the Radio Equipment Directive²³ from 2016). For licence exempt equipment, we have set out the essential requirements for equipment operating in TVWS in the UK, and compliance with the ETSI standard EN 301 598 will meet those essential requirements. However, as recognised in our TVWS Framework Statement there may be other ways of meeting those essential requirements.</p> <p>With regards to MCWSDs, we will include the key technical conditions for operation of MCWSDs in the licence itself, which will be consistent with those for licence exempt devices, and with the ETSI Standard, with the exception of the requirements relating to automatic geolocation and manual configuration.</p> <p>As noted elsewhere, our proposals relate to a transitional licensing regime to allow the licensing of MCWSDs in the interim period until licence exempt equipment is available. Therefore, we do not see a strong need to change the ETSI standard to reflect MCWSDs. In practice, we would expect licensable devices to follow an alternative route that ensures compliance with the essential requirements of the R&TTE Directive, for example, going through a notified body.</p> <p>However, we think industry is best placed to decide on the best route for compliance, which could be to update the ETSI standard to cover MCWSDs. In any case, we would encourage device manufacturers to consider adopting</p>

²¹ http://www.etsi.org/deliver/etsi_en/301500_301599/301598/01.01.01_60/en_301598v010101p.pdf

²² <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:31999L0005&from=EN>

²³ <http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32014L0053&from=EN>

	aspects of the ETSI Standard as appropriate in order to facilitate interoperability of MCWSDs with databases and with automatically configured devices.
<p><i>Relationship between WSDs and MCWSDs</i></p> <p>BAE Systems were unsure how the licensed and unlicensed schemes would interoperate. They asked what the relative priorities would be when allocating spectrum to automatically configured WSDs and MCWSDs. They asked whether the requirement to pay a licence fee in relation to MCWSDs might create an expectation of higher priority.</p>	WSDs and MCWSDs will have equal priority under the TVWS framework – licensing MCWSDs does not give them any higher priority of access to spectrum than licence exempt WSDs. MCWSD licences will be issued on a non-protection, non-interference basis. This means that MCWSDs must not cause harmful interference to any other authorised services and that no protection will be given from harmful interference received from other authorised service, which would include licence-exempt WSDs. Finally, WSDs and MCWSDs may connect to each other – provided that each complies with the relevant rules.
<p><i>Concerns about status of MCWSDs in relation to existing uses</i></p> <ul style="list-style-type: none"> - Copley Communication Consultants, APWPT and Sennheiser were concerned that licensing would give WSDs the same status in the UHF band as PMSE - The BBC were concerned that, after the 3 year review, there would be a risk that MCWSDs could acquire elevated licence status which could challenge DTT and PMSE. 	<p>As we have made clear in the TVWS Framework Statement, TVWS refers to spectrum which is left over by DTT and PMSE, and WSDs must operate in accordance with technical parameters that result in a low probability of interference to existing users²⁴. As noted above, we will issue licences on a non-protection, non-interference basis. Licensed MCWSD users would not have any rights to protection from interference above those of users of WSDs operating on a licence-exempt basis. Use of the UHF TV band by WSDs would only be permitted in accordance with conditions which would ensure a low probability of harmful interference to existing users. This would also apply to MCWSDs.</p> <p>As described elsewhere, we will consider as part of the review whether there is a need for a longer term licensing arrangement. The details of any ongoing licensing arrangement would be subject to consultation at that time.</p>
<p><i>Interference to PMSE</i></p> <p>BEIRG were concerned that, even with the proposed regulatory framework in place, WSDs could still cause serious interference to PMSE users, and was particularly concerned by intermodulation and the danger of devices being 'hacked' or 'jail broken'.</p>	<p>We respond to concerns relating to the heightened risk of interference in paragraphs 3.8 to 3.10 of Section 3. On the issue of intermodulation, we note that, as set out in our TVWS Framework Statement, the TVWS framework now takes intermodulation into account²⁵. On the risk of devices being hacked or jailbroken, the licence will require that device parameters are accurately communicated to a database, and that devices only transmit in accordance with parameters provided by a database on the discoverable list. We do not set explicit requirements for integrity of communications, but appropriate integrity of communications will be a part of ensuring that this is the case.</p>

²⁴ Implementing TV White Spaces Statement, February 2015, par 2.7 (<http://stakeholders.ofcom.org.uk/consultations/white-space-coexistence/statement>)

²⁵ Implementing TV White Spaces Statement, February 2015, pars 8.43-8.49

	<p>We discussed the issues around security in our TVWS Framework Statement. As explained there, the ETSI standard includes strict requirements for the security of the communications between the master, the slave, the WSDB and the list of databases hosted by the regulator. Communications protocols must ensure integrity, and the master must authenticate the database and the list servers.</p> <p>For MCWSDs, we note that we intend to undertake some proactive compliance checks once real MCWSDs are in use. This is likely to include end to end testing at some operational MCWSD sites. We also note that unauthorised use of any radio equipment poses a risk of interference in any band and Ofcom has powers to bring enforcement action under the WT Act for unauthorised use or for use causing deliberate interference.</p>
<p><i>Sharing spectrum with PMSE</i></p> <p>BEIRG referenced Ofcom’s statement, published in 2010, on ‘<i>Programme-making and special events: Future spectrum access</i>’ and noted that in the Statement, Ofcom had stated that ‘if a rival service wants to use spectrum available for PMSE, it would have to justify why the incremental value of this spectrum means other existing available spectrum is unsuitable for its needs’. BEIRG said that it sees no reference to evidence of any such justification. BEIRG also noted that it was disappointed at the apparent lack of consideration of the suitability of non-UHF spectrum for MCWSDs and asked Ofcom to urgently consider the suitability of alternative spectrum for MCWSDs.</p>	<p>The focus of the discussion in the document referenced by BEIRG was on use of spectrum (which is available for PMSE use) by non-PMSE users which has the potential to deny or limit access by PMSE users. However, as noted above, use of UHF spectrum by WSDs is on an opportunistic basis, and PMSE use would continue to have priority over use of spectrum by MCWSDs in the UHF band. The intention is for PMSE use to not be in any way limited by MCWSD use.</p>

Section 2 – Comments on the duration of the licensing regime and the licensing regime review

Comments from respondents	Ofcom response
<p><i>Duration of the licensing regime</i></p> <p>Six respondents agreed with a three year licensing regime, while three respondents (Copsey Communication Consultants, APWPT and Sennheiser) did not agree with licensing MCWSDs for any period. Four respondents (BAE Systems, CloudNet IT Solutions, Kings College London and Nominet) thought that the licensing regime should be permanent. These responses said that there would be ongoing need for MCWSDs.</p>	<p>We discuss this issue in paragraphs 3.19 to 3.24 of Section 3. We conclude that we continue to expect that the transitional regime will be in place for no longer than 3 years and that we would cease to issue new licences following the review if it confirms that it would be appropriate to do so.</p>
<p><i>Clarifying the definition of manually configurable devices</i></p>	<p>We have sought to clarify the definition of manually configurable devices in the draft</p>

<p>Nominet suggested that the boundary between what constitutes a manually configurable device and what is an automatically configurable one was not clear in the Consultation, and that, without more precise technical specifications of what constitutes an automatically configured or manually configurable device, all WSDs (or the vast majority) would always belong to the MCWSD category. Nominet therefore considers that the licensing regime would need to be in place permanently unless Ofcom provides additional clarity as what would satisfy the requirement for automatic configuration as under the licence exemption regulations.</p>	<p>licence. We would consider providing further guidance on this issue if necessary subject to further feedback.</p>
<p><i>Length of time before conducting review</i></p> <p>A number of respondents suggested the review period should be shorter.</p> <ul style="list-style-type: none"> - Mr Gilliver said the regime should be reviewed six months to a year after introduction - Queen Mary University suggested a one year review followed by a review after two years. - King's College London said that the review could be conducted two to three years after introduction, suggesting that licence-exempt WSDs will soon develop around standards such as IEEE 802.11af. - Digital UK and Arqiva said Ofcom should review the regime after 18-24 months. Digital UK said this 18-24 month review should consider the efficacy of the regime and progress towards development of compliant devices, and be followed by a review in 24-30 months on whether to continue to licensing MCWSDs. 	<p>We discuss this issue in paragraphs 3.19 to 3.24 of Section 3. We conclude that we will conduct a review of the need for the licensing regime at some point between 18 months and 3 years from the date of implementation of the regime depending on how the market for white space devices, and take up and use of TV white space, develop.</p>
<p><i>Issues to be covered by review</i></p> <p>Some respondents suggested specific issues the three year review should include, or requested greater clarity on the scope of the review.</p> <ul style="list-style-type: none"> - Nominet said the review should assess the opportunity cost of licensing and the effect of licensing on wider TVWS development. - CloudNet IT Solutions said Ofcom should use the review to consult on potential changes to the TVWS Standards. - BEIRG requested that Ofcom detail the different steps which could be taken after the three year review. 	<p>We note these suggestions. At this stage we maintain an open mind as to the scope of the review, and will seek to provide more detail on what the review will cover closer to the time.</p>
<p><i>Long-term licensing</i></p> <p>Most respondents thought there was likely to be an ongoing need for MCWSDs.</p> <ul style="list-style-type: none"> - BAE Systems said that the ability to manually configure individual WSDs would create bigger, more flexible and optimally-configured networks - CloudNet IT Solutions said that MCWSDs could facilitate the investigation of a multitude of opportunities, e.g. nomadic, multi-hop scenarios where a device could be used to extend the 	<p>We discuss this issue in paragraphs 3.25 to 3.28 of Section 3.</p>

<p>range of TVWS to accommodate specific needs, or temporary installations.</p> <ul style="list-style-type: none"> - The DSA thought that there may be some situations in which manual entry may be more appropriate even when automatic configuration is available but supported revisiting this question in three years. - Digital UK did not believe that the approach to licensing set out in the Consultation would be appropriate in the longer term and that if there was a continuing need to license MCWSDs that Ofcom should introduce a new tier of formal licensing, allied to guaranteed spectrum access but subordinate to Broadcasting and PMSE. - Others thought it might be necessary to cover indoor use of WSDs where automatic geolocation might be problematic. 	
<p><i>Enhanced mode</i></p> <p>Most respondents that commented on this point agreed that there would be merit in exploring allowing enhanced operation through a licensing regime in the future. Three respondents (Copsey Communication Consultants, APWPT and Sennheiser) did not agree as they thought it undermined the original plans for WSDs to be cognitive and controlled by a database.</p> <ul style="list-style-type: none"> - The BBC thought that enhanced operation should be subject to a different licence regime than the one proposed in the Consultation. - Arqiva said that it saw potential merit in a Licensed Shared Access approach to TVWS and other spectrum bands, where TVWS is licensed on a secondary basis, subordinate to PMSE. - Digital UK did not believe that the TVWS framework is suitable for the operation of enhanced TVWS devices and said that such devices should be licensed in the conventional way, possibly using a new licence tier. 	<p>We are not proposing to allow licensing of enhanced operations at this time. In paragraph 3.29 of Section 3 we note that we would consider as part of our review the demand for and feasibility of an “enhanced” regime which allows for additional device characteristics to be provided to the WSDB in order to improve white space availability.</p>

Section 3 – Comments on the scope of the licensing regime and the licence term, fee and notice period

Comments from respondents	Ofcom response
<p><i>Master and slave devices</i></p> <p>All respondents that commented on this point agreed that the regime should cover master and slave devices.</p> <ul style="list-style-type: none"> - The DSA thought that both fixed and mobile slave devices that do not possess geolocation technology should be permitted to rely on manually configured masters without being required to obtain a separate license for operation. They said that in such cases, the slave devices would rely on the generic operational 	<p>We discuss this point in paragraphs 3.33 to 3.36 of Section 3 and confirm that we intend to license both masters and slaves under the MCWSDs regime.</p> <p>In response to the point made by King’s College London and BAE Systems, a slave device does not communicate with a database directly but receives its operational parameters from a master device. This is regardless of whether or not it the slave device is manually configurable.</p>

<p>parameters established by Ofcom for slaves served by their serving masters.</p> <ul style="list-style-type: none"> - King's College London thought it likely that in practical deployments there would be very little, if any, difference between master and slave white space devices, should the slave devices also be manually configurable. They believed users would choose to operate only master MCWSDs for this reason. - BAE Systems similarly said that if slaves can be manually configured, then the definition of a slave being 'under the control of a master' breaks down. 	<p>We therefore think that the definition of a master and slave device would allow users to clearly identify the type of a device.</p>
<p><i>Type A and type B devices</i></p> <ul style="list-style-type: none"> - DSA, Queen Mary University, Mr Gilliver, Digital UK, BBC and Arqiva agreed with our original proposal to limit the licensing regime to type A or 'fixed' devices. - BAE Systems said that, as military end users, they need the flexibility to operate both fixed and mobile devices as MCWSDs. - Cloudnet IT Solutions said the licence regime is necessary for both type A and B devices. They noted that they are a fixed and nomadic pilot. - Nominet said that type B devices will need to have a form of automated geolocation detection and reporting to the WSDB, but there may be other elements of configuration that are set manually. - King's College London sees the regime as being reliably applicable to type B devices, and therefore the constraint to type A devices as being somewhat unnecessary - Fairspectrum said the regime should primarily cover type A devices. However, it noted that there are some situations where the line between fixed and mobile device is not so clear, for example the Orkney Islands pilot - Arqiva said the risk of interference can be managed more effectively with type A devices, as databases understand the relative location of fixed devices to other licensed users. - BEIRG suggested that, under the proposed guidelines, users could be able to use a device as a mobile device, while maintaining that it is a type A device. 	<p>We discuss this issue in detail in paragraphs 3.37 to 3.48 of Section 3. There, we conclude that we will additionally allow licensing of some Type B devices subject to certain conditions being met.</p> <p>On BEIRG's concern that users may be able to use 'fixed' devices in a mobile context, we note that Ofcom will have the power to inspect licensees' records of installations and devices to check that licensees are inputting accurate parameters. If Ofcom found that a device registered as type A or type B device was transmitting while in motion without automatic geo-location capability, this would be a breach of the licence conditions. In these circumstances, Ofcom would take enforcement action as appropriate, which may ultimately include revoking the licence.</p>
<p><i>Number of devices allowed under a single licence</i></p> <p>Most respondents agreed with the proposed approach to allowing an unlimited number of devices under a single licence, including BAE Systems, Cloudnet IT Solutions, the DSA, King's College London, Queen Mary University, Fairspectrum and Nominet. For example, Queen Mary University said a simpler licence process would encourage faster research and development of WSDs. The DSA said requiring a separate licence for every device would</p>	<p>We discuss this issue in paragraphs 3.49 to 3.52 of Section 3. There, we set out our decision to go ahead with our proposal to allow any number of MCWSDs under the control of a single licensee but with installation records relating to each device in use under the licence.</p> <p>We note Digital UK's reference to the situation in the US. The current US regime is very different to the UK TVWS framework because:</p> <ol style="list-style-type: none"> i. MCWSDs in the UK will require a licence

<p>unnecessarily increase administrative complexity for both network operators and Ofcom.</p> <ul style="list-style-type: none"> - Arqiva suggested that devices should be registered individually against a single licence. King's College London similarly recommended that Ofcom keep a record of each individual MCWSD allowed under a licence. - Digital UK said Ofcom should license individual masters, or a fixed group of masters and associated slaves. They believed that allowing multiple devices under a single licence would result in an unacceptable loss of control, and cited the situation in the US as evidence for its concerns. - Mr Gilliver suggested we should limit the number of devices under each licence, but allow licensees to hold multiple licences. - BEIRG expressed concerns over our proposed approach, saying that if WSDs were licensed to a single user, but deployed by others whose operations were untraceable, this could cause serious harm to PMSE services. 	<p>to operate whereas in the US they are licence exempt. If a UK licensee does not comply with the terms of the licence, which include communicating accurate information to the database about every MCWSD in use, we would take enforcement action as appropriate; and</p> <ul style="list-style-type: none"> ii. as part of the licence conditions, we also require the licensee to put in place a quality assurance process to further mitigate the risks of entering incorrect information. <p>With regards to BEIRG's concern over MCWSDs being deployed by someone other than the licensee, Ofcom is clear that the licence would only authorise the licensee, and such persons who have been authorised in writing to operate equipment on behalf of the licensee, to operate devices. Ofcom does not intend to permit leasing of spectrum under the terms of the licence. In the event of equipment causing harmful interference or any breach of the licence conditions, it would be the licensee who would be subject to any enforcement action.</p>
<p><i>Licence term</i></p> <p>Of the respondents that commented on this point, four (BAE Systems, CloudNet IT Solutions, Kings College London and Nominet) supported the proposal that the licence should have no end date.</p> <ul style="list-style-type: none"> - Digital UK and the BBC suggested that the licence should be issued for a fixed term. - Digital UK thought that no end date appeared to be a more favourable licensing regime than that enjoyed by the primary users of TV spectrum, since multiplex licences have a fixed duration. They also noted that clearance of the 700MHz band is due to complete 2022, while the earliest date to withdraw MCWSDs licence would be 2023 and that licensing a new service on a longer basis than 700 MHz clearance would seem inappropriate. - The BBC said that the current proposals amounted to a spectrum lease of at least 8 years duration and that this would be inappropriate given the interim nature of the proposed licensing. They believed the licence should be issued for a period of 3 years - Copsey Communication Consultants, APWPT and Sennheiser said the licences should be valid for as short a period as possible, e.g. three months. - Mr Gilliver was concerned that the licence having no end date might disincentivise the development of licence exempt equipment. - Fairspectrum did not express a view on the length of the licence term but thought that the minimum duration should be clear from the 	<p>We discuss this issue in paragraphs 3.53 to 3.61 of Section 3.</p>

beginning.	
<p><i>Minimum notice period</i></p> <p>Of the respondents that commented on this point, four (BAE Systems, CloudNet IT Solutions, Kings College London and Nominet) supported a five year minimum notice period for revocation on spectrum management grounds.</p> <ul style="list-style-type: none"> - Arqiva said that the notice period seemed excessive, in light of the proposed three year review period, but also noted that the five year period may help to justify equipment investment in the initial three year period. - The BBC said it may be appropriate to withdraw the MCWSDs licences after the proposed three year review. - Mr Gilliver said five years seemed inappropriate, given the Consultation said licence-exempt devices are expected in three years' time. - Copsey Communication Consultants, APWPT and Sennheiser said the notice period should be six months. - Digital UK also supported a shorter revocation notice period, and for Ofcom to have the ability to revoke all MCWSD licences by 2020. - Fairspectrum thought that the minimum notice period should be known in advance. 	<p>We discuss this issue in paragraphs 3.53 to 3.64 of Section 3.</p>
<p><i>Licence fee</i></p> <ul style="list-style-type: none"> - BAE Systems, Cloudnet IT Solutions, the DSA, King's College London and the BBC suggested a variable or tiered fee might be appropriate. BAE Systems and the DSA said that a lower fee for small-scale deployments would ease the burden on smaller providers, such as SMEs and research organisations. - Nominet and King's College London said the £1,500 fee was too high. Nominet note the fee is higher than for PMSE licences, and questioned why this licensing scheme would be so expensive to operate. King's College London said the fee may be self-defeating in the sense that it may discourage the initial development and deployment of MCWSDs or white space devices in general. They believed a fee of around £200 at most to be appropriate. - Nominet also suggested that Ofcom's costs should be distributed across all users of the UHF TV band – they thought that the fact that there are fewer MCWSD licensees than PMSE should be reflected in the fee. - Copsey Communications Consultants, APWPT and Sennheiser said that the £1,500 fee is “cheap and unfair to mobile operators”, as they considered some users may wish to use white spaces for mobile services. 	<p>We respond to stakeholder comments on the fee level and tiered fees in paragraphs 3.65 – 3.68 in Section 3.</p> <p>We note Copsey Communications Consultants, APWPT and Sennheiser's suggestions that the fee level should be higher, as otherwise this would be 'unfair' to mobile operators. Ofcom sets costs based fees except where there is expected to be excess demand from existing and/or feasible alternative uses in future.²⁶ We continue to believe that a cost based fee is the most appropriate for this licensing regime, rather than Administered Incentive Pricing, as TVWS use is on an opportunistic basis. TVWS can only be used where UHF spectrum is not being used by DTT or PMSE, and so TVWS is not analogous to mobile spectrum. We do not therefore consider that this is a relevant point in determining the fee level.</p> <p>In response to Nominet's point, we are seeking to impose a licence fee which would reflect the estimated costs involved in administering the licensing regime. We explain in paragraphs 3.67 why we do not consider it appropriate to reduce the fee below costs for innovation reasons.</p>

²⁶ SRSP: The revised Framework for Spectrum Pricing, Statement, 17 December 2010, <http://stakeholders.ofcom.org.uk/binaries/consultations/srsp/statement/srsp-statement.pdf>

Section 4 – Comments on the non-technical conditions for ensuring accurate determination of device parameters and compliance

Comments from respondents	Ofcom response
<p><i>Importance of enforcing compliance</i></p> <p>BAE Systems and BBC agreed that the proposed licence terms could mitigate risks provided that the conditions were effectively policed to ensure compliance.</p>	<p>As discussed in 3.90 to 3.92, we intend to take appropriate measures to ensure compliance, which will include carrying out some proactive compliance checks once real MCWSDs are in use. This is likely to involve end to end testing at some operational MCWSD sites.</p>
<p><i>WSDB cease transmission function as a mitigation measure</i></p> <p>Nominet said that the ‘cease WSD transmissions’ function in the WSDB specification allows for rapid action to prevent interference should it occur, and is a more effective measure to mitigate the interference risk posed by the use of any TVWS devices. It suggested that the risk of interference from MCWSDs may have been over-estimated.</p>	<p>We agree that the ‘cease WSD transmissions’ function in the WSDB specification will be an important tool to deal with interference cases. However we also consider that MCWSDs present a greater risk of interference than automatically configured devices due to the potential for end users to accidentally or deliberately enter incorrect parameters into the device(s). For example, if the location was inputted incorrectly, and interference occurs, it may not be straightforward to identify that an interference problem is being caused by a white space device and to apply the cease transmissions function to the device causing interference. We therefore consider that additional non-technical conditions are appropriate to mitigate the risks of interference from MCWSDs.</p>
<p><i>Risk of interference to PMSE users</i></p> <p>Copsey Communication Consultants, APWPT and Sennheiser argued that the proposed licence conditions were insufficient to mitigate the risk to PMSE users of interference from MCWSDs – for example, they considered it was not clear how PMSE users would be compensated when things go wrong and an expensive event is ruined.</p>	<p>For the reasons explained in Section 3 of this statement, we consider that the suite of licence conditions which we intend to impose (including in particular the requirements relating to having in place a QA process) should result in a low risk of interference to existing users of the band.</p>
<p><i>Controls on use of subcontractors and to prevent re/misconfiguration by a third party</i></p> <ul style="list-style-type: none"> - BBC said that the licence should incorporate additional measures to prevent a third party reconfiguring or misconfiguring the device, and are particularly concerned with the use of unqualified sub-contractors. - Arqiva also encouraged 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. - Digital UK believe that the licences should make it clear to what extent the installation and configuration of such devices can be 	<p>We discuss our approach to the quality assurance process in paragraphs 3.71 to 3.79 of Section 3. As noted there we consider that any standard setting of appropriate procedures for the installation of MCWSDs should be industry-led rather than specified by Ofcom. We think licensees are better placed to set up the procedures that suit their operations. Ofcom will not be prescriptive about what must be included in a licensees’ QA process, including the extent to which third parties are allowed to modify equipment or the qualifications such third parties must have. However we have provided general guidance on what we consider should be included in any QA process. For example, we suggest that the QA process should include</p>

<p>subcontracted by the licensed organisation, and the controls that such an organisation needs to exercise over its subcontractors.</p>	<p>appropriate procedures to deal with and monitor inadvertent or unauthorised modification of the device configuration, and this would include modification carried out by third parties.</p>
<p><i>Interaction between WSDBs and MCWSDs</i></p> <ul style="list-style-type: none"> - The DSA said that the proposal to allow licensees to provide device parameters to databases directly creates some uncertainty regarding the obligations of database providers. It said Ofcom should make it clear that WSDBs are not required to implement a user interface for when licensees provide device parameters to the database directly. The DSA also said Ofcom should clarify that the responsibility to provide accurate geolocation data lies with the licence-holder, not with the database operator. - Nominet said we should not preclude either allowing the licensee to enter parameters directly in the device, or providing device parameters to the database directly. However, it noted that in principle there should not be any difference in the way MCWSDs and automatically configured WSDs will contact the geolocation databases, and therefore do not believe that the way device parameters are provided should be regulated. 	<p>We cover the issue of licensees providing parameters directly to a database in paragraphs 3.83 to 3.87</p> <p>The relationship between WSDBs and MCWSD licensees is explored further in paragraphs 3.93 to 3.103. To be clear, it would be the licensee's responsibility to provide accurate geo-location data to the database, and WSDBs are not required to ensure the accuracy of information provided to it by devices. Furthermore, we are not prescribing the way the device parameters are provided to WSDBs by the devices – this is for WSDBs and users to agree on.</p>
<p><i>Accreditation for installers</i></p> <p>Arqiva, Digital UK, the BBC, Copsey Communication Consultants, APWPT and Sennheiser commented on the importance of ensuring MCWSD installers are appropriately qualified.</p>	<p>As explained above, we will require the licensee to have a QA process in place, and have given general guidance on what this should include, e.g. having appropriate procedures or policies for ensuring that the Device Parameters are accurate at all times.</p> <p>We note that there is no existing accreditation place for installers. Ofcom does not intend to establish or require compliance with any specific accreditation scheme for installers of MCWSDs. In line with our general approach to the QA process, we consider that industry is best placed to formulate appropriate QA processes, including an accreditation scheme if appropriate.</p>
<p><i>Audit and accuracy of licensee's information, and compliance with QA procedures</i></p> <ul style="list-style-type: none"> - Arqiva suggested there should be a requirement on licence holders to regularly audit their active devices and provide a validation certificate to Ofcom on a periodic basis (e.g. every six months) to demonstrate that individual active devices continue to be operating as per their authorisation. - BEIRG queried how Ofcom would verify the accuracy of licensee's information. - The BBC and Digital UK also said licensees and installers should be required to demonstrate compliance with the QA processes. 	<p>As noted in paragraph 3.72 of Section 3, we will require licensees to have QA processes in place and to have these available for Ofcom to request or inspect (also see paragraphs 5 and 6 of schedule 1 of the licence in annex 2). We have also amended our proposals on installation records such that licensees will be required to provide these to the WSDBs that their MCWSDs will connect to. Ofcom would be able to obtain records from the WSDBs for the purposes of its spectrum management and interference management activities.</p> <p>In addition, we intend to carry out some proactive compliance checks once real MCWSDs are in use. This is likely to include end to end testing at</p>

	<p>some operational MCWSD sites.</p> <p>We do not think it is necessary to add, in addition to the measures outlined above, a requirement that licensees must regularly audit their devices and provide a “validation certificate” to us.</p>
<p><i>Proportionality of quality assurance proposals</i></p> <p>- Nominet questioned the proportionality of the proposed record keeping requirements, given they are not aware of any analogous requirements for PMSE licence holders. They also pointed out that the database provider would have a record of the locations as reported by the licensee.</p> <p>- BAE Systems agree that the licence should require licensees to have appropriate QA procedures in place. However, they say that these procedures might prove burdensome to SMEs and suggest Ofcom considers how this burden could be reduced without compromising integrity.</p>	<p>In response to Nominet’s point, we note that the process for making PMSE frequency assignments is quite different to the approach under the TVWS framework and therefore different considerations apply. In addition PMSE assignments are usually limited to specific frequencies and powers within a limited geographic area.</p> <p>On BAE Systems’ point, we note that we have concluded, as set out in Section 3, that licensees should be required to have appropriate QA processes in place in order to mitigate the risk of misconfiguration which could give rise to harmful interference, but that Ofcom should not be prescriptive in specifying the details of licensees QA processes and that this should be industry-led. We consider that this provides an appropriate balance between allowing licensees discretion as to what QA processes to put in place given their individual circumstances, while also ensuring that they take seriously their responsibility to ensure device parameters are accurate.</p>
<p><i>Obligation to follow the QA process</i></p> <p>Digital UK suggested a change to the draft licence to oblige licensees follow the QA process, as well as have one in place.</p>	<p>We would expect licensees to follow the QA process but do not consider it necessary to include a term in the licence to this effect. This is because the licence already includes a requirement that parameters should be accurately configured, which is what the QA process is intended to achieve.</p>
<p><i>Length of time licensees should maintain records</i></p> <p>Digital UK recommended that the licence should require licensees to keep configuration records for at least 12 months after licence termination, rather than the six months originally proposed.</p>	<p>While the draft licence in the consultation proposed licensees should keep records for the period the licence remains in force and six months thereafter, the current draft licence does not require licensees to keep records six months after expiry of the licence. Therefore, the obligation to maintain installation records would only apply for the duration of the licence itself.</p> <p>Ofcom considers that it is not necessary for licensees to maintain installation records once their licence has expired, as they will no longer be operating devices under the terms of the licence. Therefore, we would not anticipate requiring access to the installation records following expiry of the licence for compliance or enforcement purposes.</p>

How often licensees should send Ofcom their installation records

Digital UK suggested Ofcom should receive 'live' or daily information about new installations.

As explained in paragraphs 3.74, we have decided that installation records must be sent to databases, rather than separately to Ofcom, before a device starts operating and subsequently updated whenever the device is reconfigured. We will request this data from databases as required. We consider this will be sufficient for Ofcom's spectrum management and interference management activities and will mean that we have up to date information about any device that is transmitting.