BBC response to Ofcom's consultation: '*PMSE clearing the 700 MHz band: Support for PMSE equipment owners*'

13 July 2017

Overview

1. The BBC welcomes the opportunity to respond to Ofcom's consultation 'PMSE clearing the 700 MHz band' and acknowledges Ofcom's work to help PMSE stakeholders understand the challenges related to clearing this band for reassignment to the mobile service.

2. We agree that PMSE equipment owners who will have to vacate the 700 MHz band earlier than expected should receive funding for their equipment which needs to be removed from service prematurely.

3. However, even with the support scheme in place, Ofcom should not underestimate the size of the challenge for PMSE users including the BBC. The changes being made to the DTT network for 700 MHz clearance[1] are extensive. Twelve UHF channels (49-60) will be cleared and the new DTT plan includes 47 additional transmissions. This will not only reduce the number of available channels for PMSE, but it is also likely to reduce spectrum quality in many areas. As a consequence PMSE will increasingly need to operate co-channel with 'secondary' DTT signals.[2]

4. As a result the BBC and the third-party hire companies that support our programme making operations are considering a move to digital technology as the audible effects of co-channel DTT interference are less immediately apparent when using digital technology. Such a technology change will carry significant cost, as all our PMSE equipment operating in interleaved spectrum at affected sites could require replacement. This replacement might be the only way to maintain the required number of services at the required quality and reliability in the new spectrum environment.

5. The problem of spectrum availability is made even more acute at some locations because many programmes such as "Strictly Come Dancing", "Let it Shine", "Pitch Battle" and "Let's Dance for Comic Relief" are made in studio environments (e.g. Media City and Elstree) where adjacent productions are also making intensive use of the UHF band (e.g. ITV Studios, Channel 5 and Netflix). At Elstree where a number of programme makers are located, we estimate the number of completely clear channels, (i.e. where the DTT predicted signal level falls below 46dBμV/m) will be reduced from 14 to four. At Salford the number of completely clean channels has reduced from eight to one. If PMSE users in such congested locations are to maintain production quality, the interference and spectrum quality issues will require very careful consideration. The BBC is in the process of re-planning each of approximately 40 studio sites across the Nations and English Regions to take account of the DTT network changes and has spent considerable time analysing this problem. This required engineering effort is a direct consequence of 700MHz clearance.

[1] The assessment in this response is based on DTT Plan 7.022

[2] This is a consequence of the DTT services in Ch49 – 60 being "re-stacked" below Ch49. The reduction in spectrum quality will require some PMSE operations to be planned co-channel with overspill DTT coverage as completely clean channels will be difficult to secure.

6. In respect of the detail of the proposed scheme we have the following points to raise:

- The process for providing proof of ownership of eligible equipment: We welcome the range of options set out by Ofcom, as we would be concerned if users were required to provide a receipt for each piece of equipment. This would be impractical for many in the PMSE community including the BBC. Many of the BBC's studio systems are procured and installed by system integrators who do not provide individual receipts for the component parts of a system. We therefore welcome the option to have asset register entries endorsed, but would be concerned if this required a certified register to have been in existence before the publication of Ofcom's consultation.

- Eligibility of equipment operating below 694 MHz for the support scheme: A substantial amount of the BBC's PMSE equipment will be required to operate co-channel with the re-planned DTT service post-clearance.[3] As a direct result, our licenses for 1W talk-back equipment will not be valid in some cases (e.g. where equipment operates at a higher power than can be licensed co-channel with DTT) and the performance of other systems will be degraded by DTT interference even where these can be licensed. This represents a loss of utility for this equipment as a direct result of the 700 MHz clearance programme. We therefore believe Ofcom should re-consider the position that all equipment operating below 694 MHz will be excluded from the scheme and take a more nuanced approach to assessing the material loss of value of this equipment post-clearance.

- The position in respect of duplex talk-back equipment: Some of the talk-back systems in use by the BBC have the downlink half of the duplex pair in the 700 MHz cleared spectrum, and the uplink half below 694 MHz in retained spectrum. It is not immediately clear from Ofcom's three categories of equipment[4] where such talk-back equipment would fall (i.e. if it would be eligible for support). We would assume that the totality of such equipment should be eligible for compensation (as per paragraph 3.2.4), but would welcome clarity on this point.

- Funding formula: In many cases replacement kit (even like-for-like) will be more expensive than the original equipment purchased. We would therefore welcome clarity from Ofcom on the relationship (if any) between expected replacement cost and the funding formula being proposed.

- Lack of consideration for project management and re-engineering costs: We question why there is no allowance for project management nor re-engineering

[3] This could include operation co-channel with the primary DTT service in a given area (for indoor PMSE operation), as well as co-channel operation with DTT services which are not the primary service in any given geographic area but which could nevertheless be received and will cause a rise in the noise floor for PMSE operation. For example, in Elstree where Crystal Palace is the primary DTT service transmissions can also be picked up from Hemel Hempstead, Oxford and Sandy Heath.
[4] Equipment operating exclusively in the 700 MHz band; Equipment operating exclusively below 694 MHz; and equipment that operates partially in the 700 MHz band and partially below 694 MHz.

costs for PMSE users as part of the support scheme. This is in marked contrast to the DTT 700 clearance programme where all the project-planning and re-engineering costs have been funded.

- Re-planning of COM-7 & COM-8 multiplexes during the clearance programme: We understand that the interim HD multiplexes in the 600 MHz band will be relocated to an SFN operating in channel 55 and 56 and these changes are imminent. This requires the replacement of some PMSE equipment operating in channels 55 and 56 ahead of the planned launch of Ofcom's compensation scheme in mid-2019. We would welcome Ofcom's view on how reimbursement can be claimed for equipment affected by early clearance events.

6. We provide detailed answers to the consultation questions below.

Question 1: Do you agree with our proposed criteria for who should be eligible for the grant scheme?

7. We agree checks are important to ensure that only those who will incur a loss attributable to Ofcom's decision should be eligible for funding.

8. In respect of the detailed criteria set out by Ofcom (paragraph 3.2) we wish to focus on the requirement for evidence that equipment belongs to claimants (paragraph 3.2.2). We believe that the requirement for producing paperwork for each piece of equipment would not be practicable in many cases. Much of the BBC's studio equipment was purchased through system integrators and we were not provided with individual receipts for each component of a system.

9. We therefore welcome the proposal that owners of PMSE equipment will be able to verify their ownership through having an asset register of equipment endorsed by a Chartered Accountant. We would be concerned if there was a cut-off date for asset registration, such that users would need a pre-existing asset register predating Ofcom's launch of the compensation scheme.

Question 2: Do you agree with our assessment of the impact clearance will have on equipment which operates exclusively below 694 MHz?

10. We disagree with Ofcom's assessment that equipment operating exclusively below 694 MHz should not be eligible for the support scheme. A substantial amount of equipment, which operates co-channel with the re-planned DTT channels post-clearance, will no longer be usable and will therefore lose utility as a direct result of the clearance programme.

11. The BBC has specific concerns relating talk-back equipment operating below 694 MHz at 1W ERP. In contrast to Ofcom's claim that "PMSE equipment typically has tuning ranges greater than 24 MHz" (paragraph 3.10), most talk-back equipment operating below 694

MHz is restricted to much narrower tuning ranges. Talk-back systems which operate co-channel with a re-planned DTT service will not be licensable post-clearance and should be eligible for compensation if they cannot be retuned clear of the DTT service.

12. We have some concerns regarding the reduced spectrum quality post-clearance at some of our studio sites. This may require a complete replacement of certain PMSE equipment. Prior to the availability of equipment in 960 MHz, a shift to digital technology with installation upgrades to improve diversity reception may be needed to maintain adequate performance; this results from reduced spectrum availability requiring co-channel operation with 'overspill' DTT coverages[5] from adjacent networks that form the new, denser DTT plan.[6]

13. We are sceptical of Ofcom's claim that equipment operating below 694 MHz that is no longer usable due to DTT re-planning could simply be used in another location. Even for the BBC, where there are options for redeployment, this is not practical in operational terms. Setting aside the issue about whether a 'straight swap' (e.g. between studios in London and Manchester) would be possible, it would not be operationally feasible to shut down two production studios while the equipment was switched over. The cost of undertaking such as switch would include finding the right alternative location, taking the studios out of use, hiring alternative studio locations, reinstallation costs, and retraining costs. In contrast, when new equipment is purchased it can be installed in parallel so there is no studio downtime.

14. We also question Ofcom's assumption that equipment that is no longer fit-for-purpose in its current location can easily be sold on the secondary market (paragraph 3.11). Some of this equipment is highly specialised and many professional studios do not buy second hand. Therefore, selling second-hand user equipment may prove a challenge. If Ofcom are of the view that equipment does have value on the secondary market, we would welcome Ofcom (or its agents) taking on the task of selling such equipment. However, where equipment is shown to have no secondary market value, and is no longer usable in the location where it previously operated we believe Ofcom should consider eligibility for the compensation scheme.

Question 3: Do you agree with our analysis of the impact clearance will have on equipment which straddles the 700 MHz band and the spectrum below 694 MHz?

[5] For example, in Elstree the Crystal Palace transmitter provides the 'primary' DTT service, but transmissions can also be picked up from Hemel Hempstead, Oxford and Sandy Heath. This reduces the amount on 'clear' spectrum available for PMSE operations.

[6] This is of particular concern for outdoor use and in studios where shutter doors need to be raised during performances to support set changes. On large productions sets are often wheeled in and when shutters are opened DTT signals leak in and degrade the radio mic reception. The problem is currently solved by using clear channels but there will be reduced availability of clear channels post-clearance.

15. The utility of some equipment where 49% of the tuning range lays in the cleared spectrum above 700 MHz will be significantly reduced, yet such equipment would not be eligible for the support scheme. While we recognise Ofcom's research in considering that the two largest PMSE manufacturers make equipment with only a few MHz or more than 50% of its tuning range is in the 700 MHz band (paragraph 3.14), we do not think this is fully representative of all the equipment on the market. Indeed, several hire companies that supply the BBC with equipment have expressed concerns that they will lose out due to reduced flexibility and hireability of equipment if these terms are imposed.

16. We would also welcome clarification from Ofcom about talk-back systems with duplex assignments with one link operating above 694 MHz and one below and whether these will be eligible for compensation under the scheme. This is a separate issue to the one discussed earlier in our response to Question 2. Such equipment will require complete replacement as the uplink equipment operating below 694 MHz cannot be used on its own and cannot be integrated into other equipment and so the entire system will become redundant. It is not immediately clear from Ofcom's three categories of equipment[7] where talk-back equipment would fall. We would assume that such equipment would qualify for inclusion in the support scheme (as per paragraph 3.2.4), but we would welcome clarity on this point.

17. Finally, we would note that the replacement costs will include procuring and installing a new system from a system integrator. We believe these costs should also be considered as part of the support scheme.

Question 4: Do you have any evidence that an alternative boundary for the tuning range of equipment should be drawn?

18. Ofcom has selected the cut-off boundary point of 50% in recognition that equipment that can still access some spectrum post-clearance will retain some utility. We understand that Ofcom will want users to retain equipment that still has utility, and setting a boundary point is therefore difficult. Given the additional costs associated with equipment replacement (e.g. project management and re-engineering costs), without additional support for these expenses many PMSE users may indeed continue to use their existing PMSE kit, rather than surrender it for 47% of its replacement value.

19. We are therefore concerned that setting the boundary at 50% will unfairly penalise users who have bought higher-end equipment that works across a larger tuning range and will see that tuning range diminish. These users will have paid a premium for the additional flexibility enabled by an extended tuning range, only to see that utility removed with no recognition of the reduced utility imposed by clearance. Instead of setting a fixed boundary of 50%, it might therefore be simpler to compensate users who

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wish to surrender their equipment, regardless of the precise percentage of the tuning range that has been affected.

20. In respect of the proposed use of the 694 to 703 MHz band we have also responded to Ofcom's parallel consultation.

Question 5: Do you agree with the proposed formula to estimate the level of funding?

21. We welcome Government's decision to provide "funding equivalent to the residual value of PMSE equipment at the time of clearance" and to use replacement cost (RC) as part of the formula to calculate the funding (F) for each piece of equipment (paragraph 4.3).

22. We would welcome further detail from Ofcom as to how and whether replacement cost (rather than retail price) will indeed be part of the formula. Paragraph 4.3 appears to suggest that Ofcom is going to look at replacement costs, but the document then goes on to talk about the "retail price" of equipment (paragraph 4.4). These values are not necessarily the same.

23. We believe Ofcom should consider more than just retail price (either current replacement retail price, or historic RRP), as the replacement cost for equivalent equipment on the market today will sometime differ and in many cases will be higher than the original retail price of the equipment being made obsolete by clearance. In these cases using the retail price (either current or historic) of obsolete equipment as a basis for the funding formula would disadvantage PMSE equipment owners who will have to purchase equipment that is actually on the market today and is fit-for-purpose to replace the equipment rendered obsolete by clearance.

24. This is an issue for PMSE users in the following respects:

- Replacing talk-back equipment. The BBC has a large number of talk-back systems that cannot be replaced with like-for-like systems as the vendor has recently ceased production. For some studio talk-back scenarios, we are therefore moving to DECT based equipment in licence-exempt spectrum. This is not only necessary because the vendor has ceased manufacturing equipment, but also because there is uncertainty over licensing equipment as a consequence of DTT frequency changes. The DECT-based equipment requires a more complex installation with multiple antenna units to support the required number of talk-back terminals. This equipment is proving more expensive than conventional UHF talk-back equipment (by typically 20% or so).

- Locations where we may wish to use equipment in 960 MHz (e.g. due to the reduced quality of Channels 21 - 48), the equipment, if available in time, is likely to be more expensive than existing UHF equipment.

25. For many of our studio operations, we rely on third party, expert hire companies to supply the radio microphone systems on an as-required basis. These hire companies are small enterprises and have expressed concerns that they will not be able to replace their equipment on the basis of the proposed scheme. The risk of such businesses ceasing operation is a significant business risk for the BBC as we rely heavily on such providers for complex programmes such as "Strictly Come Dancing", "Let it Shine", "Pitch Battle" and "Let's Dance for Comic Relief".

26. In addition to the issue of retail price versus replacement cost, we are concerned that limiting the scope of the scheme to equipment costs will disadvantage PMSE users. This is because equipment costs do not represent the full range of costs incurred by PMSE users as a result of the decision to clear 700 MHz.

27. In particular we note that DTT multiplex operators (of which the BBC is one) are receiving reimbursement for project management time spent on the 700 MHz clearance project (e.g. for evaluation of re-engineering proposals, spectrum planning and project governance). However, no such consideration has been proposed for PMSE users. We believe this should be considered:

    Re-engineering costs: For simple, low-density PMSE operations, the changes for 700 MHz clearance are potentially straightforward and can be accommodated with minimal re-planning. However, for more complex studio operations (e.g. at Media City, Elstree and London) and for large TV shows such as "Strictly Come Dancing", where the large number of radio channels in use requires sophisticated antenna systems, combiners and distribution systems, the issues of re-planning a complex system of radio microphones (RMs), in-ear monitors (IEMs) and the coordination with adjacent studios and visiting performers are considerable. Studio talk-back systems are generally integrated into each studio with fixed antennas throughout the studio complex and duplex base stations in racks in control areas. The replacement of studio talk-back equipment will require fundamental changes to the studio infrastructure. We estimate the re-engineering costs for a small studio to be of the order of £50,000 for equipment with £5,000 for the installation. Of the total cost of £55,000 (which excludes acceptance testing and project management fees) Ofcom's proposed scheme would allow PMSE users to reclaim c.£23,500 (subject to the final agreed PMSE equipment rate card.) The remaining replacement costs would need to be funded by PMSE users, which may be difficult for many.

    In addition, for some sites like-for-like replacement may not be possible due to spectrum scarcity. We have been evaluating alternative equipment to prepare for such scenarios (e.g. using 960 MHz spectrum or improved digital technology); this is proving to be a major task and the BBC has to date invested over five man-weeks of effort on trials with Shure and Wisycom at Elstree, Birmingham and Glasgow and

expects to do a great deal of further work to address the requirements of our larger productions.[8]

- Lack of consideration for project management costs: No consideration is given to the project management costs in understanding the changes, managing the equipment return process with Ofcom or Ofcom's agent, organising proof of ownership, contracting system integrators to provide the expertise needed to manage the changes and carrying out the required acceptance tests of commissioning new equipment. The project management costs for channel 69 clearance were c.£200,000 however this excluded Television Centre which was closing and the already planned installation at New Broadcasting House.

28. Providing support for re-engineering and project management costs would assist users who have to vacate the 700 MHz band earlier than expected and would reflect the fact that this needs to take place as a direct result of 700 MHz clearance.

Question 6: Do you agree with our approach to calculating asset life?

29. A typical asset life of 15 years is considered reasonable.

Question 8: Do you agree with the use of an average asset age for the estimation of funding entitlements? If not, do you have any suggestions for an alternative approach?

30. This eliminates the requirement to produce receipts and is helpful in that respect.

Question 9: Are we correct in our assumption that a large proportion of PMSE equipment owners will not have evidence of when they purchased their equipment?

31. Proving the age of equipment, tracking down the receipts and purchase orders, particularly for systems installed by third-party system integrators is a time consuming and expensive process. It is likely that the assumption that a large proportion of PMSE users will not have the required evidence is probably true.

Question 10: Do the data in the 2013 equipment survey provide a reasonable basis for calculating average equipment age? If not do you have an alternative approach for gathering relevant data for making this calculation?

32. We agree that this is a reasonable way of estimating asset life.

[8] For large studio productions equipment operating in 960 MHz will probably be required, but manufacturers have indicated that this equipment is unlikely to be commercially available in time for clearance in 2020. It is unclear how some of these large shows can be made in future using existing analogue PMSE equipment if the 960 MHz band is not available in good time.

Question 11: Do you have any comments on our proposals for how the claims handling process should operate?

33. We appreciate Ofcom's work to ensure that "the claims process does not impose a disproportionate administrative burden on PMSE operators and enables [Ofcom] to process claims quickly" (paragraph 5.1). We agree that the claims handling system needs to be streamlined and obstacles should be removed wherever possible as a complex system would increase the costs both to PMSE users and Ofcom or any third party contracted to manage the scheme.

34. We note however that Ofcom considers *both* the surrender of equipment *and* documentary evidence to be required to demonstrate adequate proof of ownership for eligibility for the support scheme (paragraphs 5.5 and 5.6). We would be interested to understand why Ofcom rejected a scheme whereby the surrender of previously licensed equipment without additional documentary evidence was sufficient to demonstrate proof of ownership as this would be a way to further simplify the administration of the scheme.

ENDS.