



Managing the effects of 700 MHz clearance on PMSE and DTT viewers

Summary of progress and call for input

Call for Input

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About this document

In November 2014 we decided to make some changes to the frequencies Digital Terrestrial Television and wireless microphones use in order to make valuable spectrum in the 700 MHz band available for mobile data.

This will deliver significant net benefits, including benefits to citizens and consumers. However, the process will also have a number of effects on DTT viewers and users of wireless microphones.

For the vast majority of viewers the only effect of the change will be that they need to retune their television – a process most people find easy. Nonetheless, a small minority will need to replace their aerials or pay for an installer to point them in a different direction. In addition, the change will mean that some people need to replace their wireless microphones.

Government is considering whether there is a case for making public funding available to support viewers and wireless microphone owners with these changes. In order to aid its thinking on this matter, it has requested advice from Ofcom on the effects the changes will have on stakeholders, the options for addressing these effects and the associated costs.

The purpose of this document is to gather information to inform this advice. The document asks for stakeholder input on a range of questions about the effect the change will have on DTT viewers and wireless microphone owners.

We would particularly welcome responses from groups that might be affected by change of use of the 700 MHz band – for example, DTT viewers, consumer groups, wireless microphones owners as well as interested industry bodies.

In addition to the questions asked in this document, we also invite PMSE (Programme Making and Special Events) stakeholders that are likely to be affected by clearance to fill in a separate financial questionnaire found here. Information submitted in this questionnaire will be treated as strictly confidential and will only be presented to Government in anonymised and aggregate form, without individual respondents being identified.

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Section 1

Introduction

We are clearing DTT and PMSE services from the 700 MHz band and will release the band for mobile data

- 1.1 Digital Terrestrial Television (DTT), wireless microphones (also known as audio Programme Making and Special Events (PMSE) devices)¹ and White Space Devices (WSDs)² currently use the spectrum between 470 and 790 MHz. In November 2014, we published a statement (the ‘2014 Statement’) setting out our decision to change the way part of this spectrum is used and re-allocate the frequencies between 694 MHz and 790 MHz (the ‘700 MHz band’) for mobile data. This change will deliver significant net benefits.³
- 1.2 Working with Government, the DTT multiplex operators, Digital UK⁴ and Arqiva Transco (the owner of the DTT transmission infrastructure), we have initiated a major programme of work to implement this change (the ‘700 MHz clearance programme’). The objectives of the programme are:
 - To clear and release the 700 MHz band as soon as practicably possible;
 - To deliver value for money in the use of public funds;
 - To safeguard the ongoing delivery of the benefits DTT provides;
 - To avoid undue disruption to DTT viewers; and
 - To safeguard the ongoing delivery of the benefits PMSE provides.
- 1.3 We have set up a grant scheme to fund the costs of modifying DTT transmission infrastructure to enable clearance of the band. In addition, we recently consulted on proposals which would enable us to release the band for mobile data by a target date of Q2 2020.

Government will take a view on support for DTT viewers and PMSE users that are affected by this change following this call for input

- 1.4 For the vast majority of DTT viewers, the 700 MHz clearance programme will simply mean that they need to retune their televisions. However, a small minority (less

¹ The term PMSE refers to radio devices (e.g. wireless microphones, in-ear monitors and talk back intercoms) which are used for activities such as broadcasting, newsgathering, community events, theatre productions and concerts.

² WSDs are innovative new devices which are able to identify and make use of previously unused gaps in frequency bands.

³ We discuss these benefits in detail in

<http://stakeholders.ofcom.org.uk/binaries/consultations/700MHz/statement/700-mhz-statement.pdf>

⁴ Digital UK is a not for profit company which is owned and operated by the DTT multiplex operators. It carries out a range of activities to support the DTT platform, including coordinating the multiplex operators’ engagement in 700 MHz clearance.

than 1%) will also need to replace or re-point their roof-top aerials. In addition, in a very small number of cases viewers might need to fit a filter to their televisions to prevent mobile phone signals from interfering with TV reception. Finally, there could be a very small number of cases in which viewers may need to change TV platform (from DTT to cable or satellite) but, if any such cases were to arise, they would be exceptional and isolated. The programme will also mean that some PMSE users need to replace their equipment with equipment that works at different frequencies.

- 1.5 As set out above, avoiding undue disruption to DTT viewers and safeguarding the ongoing delivery of the benefits PMSE provides are core objectives for the 700 MHz clearance programme. With this in mind, Government is currently considering:
- What support viewers might require and whether any public funding should be made available to pay for this; and
 - Whether support should be made available to PMSE users that need to replace their equipment as a result of the 700MHz Clearance Programme and, if so, what would be an appropriate level.

The purpose of this document is to gather information which will feed into Government's analysis of the options

- 1.6 Decisions on public funding for viewer support and PMSE equipment changes are a matter for Government. Government has asked Ofcom for advice on the implications of 700 MHz clearance for DTT viewers and PMSE users. It has also asked for advice on measures to mitigate these impacts and any associated costs.
- 1.7 We set out our assessment of the viewer costs and PMSE equipment replacement costs associated with 700 MHz clearance in the 2014 Statement. We want to refine this assessment in advance of providing final advice to Government. The purpose of this call for input is to gather evidence to help us do this.
- 1.8 In section 2 we give a general update on progress with the 700 MHz clearance programme so far. In section 3 we ask for feedback on our assessment of the effects that we anticipate clearance may have on viewers and the costs of mitigating these impacts. In section 4 we discuss our assessment of the costs of clearing PMSE from the 700 MHz band and request evidence from stakeholders as to the effects, including financial ones, that these costs may have on the PMSE sector. Finally, in section 5 we set out our next steps.
- 1.9 We have focussed our discussion of the effect clearance will have on viewers on retuning, aerial changes and platform changes. We do not consider interference from mobile services into DTT in this document.
- 1.10 In order to help us assess the implications for the PMSE sector of 700 MHz clearance, we are asking PMSE stakeholders to fill in a questionnaire that is available here, and email it to 700ClearanceCFI@ofcom.org.uk. This questionnaire asks PMSE users to provide simple financial information which we will use in our assessment. We will treat the information in responses to this questionnaire as strictly confidential. As part of our advice to Government, we will present this information in anonymised and aggregate form, without identifying individual respondents.

Section 2

Summary of progress with 700 MHz clearance

- 2.1 In this section we provide a summary of progress with the 700 MHz clearance programme since our 2014 Statement. We first focus on the steps we have taken to avoid undue disruption to viewers and safeguard the ongoing delivery of the benefits DTT provides. Then we talk about the actions we have taken to safeguard the ongoing delivery of the benefits PMSE provides. Finally, we provide an update on progress with harmonising the band for mobile data.
- 2.2 In light of our 2014 Statement, we are taking steps to ensure that viewer equipment can operate effectively following 700 MHz clearance
- 2.3 As we have explained above and go on to discuss in more detail in section 3, the 700 MHz clearance programme will affect DTT viewers in different ways. In addition to providing advice to Government on these matters, we are taking pre-emptive action to reduce the number of viewers affected by the clearance programme. There are a number of strands to this:
 - Most aerials sold today are ‘wideband’ aerials. This means that they are able to receive signals transmitted at any of the frequencies in the spectrum currently used by DTT. However, many older aerials (as well as a small proportion of those aerials sold today) are only designed to receive signals transmitted on a subset of the frequencies DTT uses. These are called grouped aerials. Because of the changes in frequencies associated with the re-plan, a small proportion of grouped aerials will no longer be able to receive TV signals properly following the change. In light of this, we have been engaging with aerial installers and asking them that any aerials they install in future should be wideband. This will reduce the number of viewers that need to replace their aerials when 700 MHz clearance takes place.
 - Following discussions with Ofcom, industry has agreed to make new televisions easier to retune. This will make the retuning process quicker and easier for DTT viewers both for regular changes on the platform (e.g. in channel line-up) and for the 700 MHz clearance programme.
 - The body which sets the technical standards for mobile equipment performance, 3GPP, has decided to impose improved restrictions on emissions from mobile handsets operating in the 700 MHz band. This will further reduce the risk of interference into DTT reception.

We have agreed a frequency plan for the main DTT transmitters that safeguards the ongoing delivery of the benefits the platform provides

- 2.4 The DTT platform carries a wide range of TV channels. DTT transmitters broadcast a number of signals, called multiplexes, each of which contains multiple TV channels or radio services. Currently, the following multiplexes hold licences to broadcast on the DTT platform:

- Three PSB multiplexes – BBC and D3&4⁵ provide these multiplexes. They broadcast from all of the 1156 transmitters in the DTT network and are available to around 98.5% of households. These multiplexes carry a range of PSB services, including the BBC's channels, ITV, ITV2, 3 and 4, Channel 4 and Channel 5. Two of the multiplexes carry Standard Definition ('SD') channels only. One of the multiplexes carries the High Definition ('HD') variants of some of the PSB channels.
 - Three commercial multiplexes – these are licensed to Arqiva and SDN. They broadcast from the largest 80 transmitters achieving coverage of around 90% of households. These carry a wide range of channels including ITV 2+1, 3+1 and 4+1.
 - Northern Ireland multiplex – one multiplex that broadcasts RTÉ and TG4 services from three transmitters and covers approximately 78% of households in Northern Ireland.
 - Local Television Multiplex – this broadcasts local TV services in 20 locations across the country. We expect further local services to launch in up to 14 additional locations
 - Geographic Interleaved spectrum multiplexes - two portions of spectrum that can be used to provide a DTT multiplex in Manchester and Cardiff. The service in Cardiff has not been launched.
 - Interim multiplexes – In 2013 Ofcom awarded interleaved spectrum in the 600MHz spectrum band (550MHz – 606MHz) to Arqiva on an interim basis by granting a single licence for the establishment of two temporary DTT multiplexes using DVB-T2/MPEG4 technology. These multiplexes have now both launched. They carry a range of HD and SD services and cover around 76% of households.
- 2.5 In order to safeguard the ongoing delivery of the benefits DTT provides we aim to ensure that the platform remains able to deliver:
- Near-universal coverage for PSB services;
 - Six national multiplexes with coverage broadly matching today;
 - A similar quantity of local TV services to those that the platform is capable of delivering today (including the Manchester and Cardiff GI services); and
 - The services carried on the Northern Ireland multiplex.
- 2.6 In order to achieve these objectives, we are working with the broadcasters to re-plan the frequencies the DTT network uses. Because radio waves travel across borders it is necessary to agree many of the details of this revised frequency plan with our international neighbours.
- 2.7 Since our 2014 Statement, we have made good progress in doing this. We have now agreed the frequencies that the main DTT transmitters will be able to use following clearance and are starting to work on the plan for the smaller transmitters. Based on the work to date, we remain confident that we will be able to meet the coverage objectives set out above.

⁵ D3&4 is a joint venture between ITV and Channel 4.

- 2.8 Arqiva Transco, the company that owns and operates the physical infrastructure on which DTT is broadcast, will need to modify a substantial proportion of the DTT transmission infrastructure to enable the multiplex operators to broadcast at the revised frequencies. Arqiva Transco and the broadcasters have provided us with early versions of a proposed plan for these infrastructure modifications. We are in the process of reviewing this information. Based on the information they have provided to date, we expect infrastructure modifications to start later this year. However, as set out above, viewers will not need to start retuning until 2018.
- 2.9 We have recently published a Code of Practice which sets out how the infrastructure changes will be managed.⁶

As part of our efforts to safeguard the benefits PMSE, we have made additional spectrum available to PMSE users

- 2.10 The concerts and performances which rely on audio PMSE devices make an important contribution to the creative economy and cultural life of the UK. As explained in our 2014 Statement, we wish to ensure that audio PMSE devices have access to sufficient spectrum to continue delivering the benefits they provide following change of use of the 700 MHz band.
- 2.11 The PMSE community uses the 700 MHz band intensely. The band accounts for around 30% of the spectrum currently used by audio PMSE devices. They will no longer be able to use this spectrum once it becomes available for mobile data.
- 2.12 Given the heavy usage of audio PMSE in the 700 MHz band and in order to ensure the PMSE sector remains able to deliver high quality events, we recently decided to allow audio PMSE users to share the 960-1164 MHz band with aeronautical users.⁷ We believe that this will ensure the audio PMSE sector has access to sufficient spectrum to address its needs for the foreseeable future. This decision is a key part of our efforts to safeguard the benefits PMSE provides. Following our decision, the 960-1164 MHz band is available for PMSE use now. In practice, it will be possible for PMSE users to use this band as soon as equipment capable of operating at these frequencies is available on the market.

We have made good progress in discussions on harmonising the 700 MHz band for mobile data use

- 2.13 As we explained, in our March 2016 consultation, the relevant international bodies have agreed band plan for mobile data use in the 700 MHz band
- 2.14 A number of European Union (EU) institutions are discussing issues related to release of the 700 MHz band.
- 2.15 The European Commission recently published a draft European Parliament and Council Decision which includes proposals that would require member states to allow the use of the 700MHz band for electronic communications services (including mobile data) under harmonised technical conditions by 30 June 2020.

⁶ See <http://stakeholders.ofcom.org.uk/binaries/consultations/700-code-practice/statement/700mhz-clearance-cop-statement.pdf>

⁷ See <http://stakeholders.ofcom.org.uk/consultations/new-spectrum-audio-PMSE/statement/>

These proposals are under discussion within the European Council at present and it is possible that this date may change according to member states' requirements. We do not yet have a fixed timetable for the conclusion of these discussions but we would expect them to be concluded by autumn 2016.

- 2.16 Separately, the RSC⁸ recently agreed harmonised technical conditions for use of the 700 MHz band in EU member states.

⁸ The RSC is the body that assists the European Commission in the development of technical implementing decisions and will establish the technical parameters for use of the cleared 700 MHz spectrum.

Section 3

DTT Viewer Support

- 3.1 In this section we discuss issues related to viewer support. We first give an overview of the approaches taken during previous changes to the DTT network. Then we set out and seek feedback on our assessment of the effects 700 MHz clearance will have on viewers. Finally we discuss the costs and challenges that would be associated with supporting viewers that experience these effects.

700 MHz clearance follows on from digital switchover and 800 MHz clearance

- 3.2 Between 2008 and 2012 broadcasters switched off the UK's analogue terrestrial TV systems and transitioned to fully digital television as part of a process known as Digital Switchover (DSO). In addition, between 2010 and 2013 broadcasters re-planned the frequencies DTT uses in order to make spectrum between 790 and 868 MHz (the '800 MHz band') available for mobile data. This process was known as '800 MHz clearance'.
- 3.3 DSO had a significant impact on viewers. The majority of households had to buy new TVs or set top boxes as part of the process. In addition 5-10% of households had to change their rooftop aerials. All viewers also had to retune their sets (at least) twice. Most viewers were expected to fund equipment changes themselves. However, financial support was made available for the following vulnerable viewer groups, by way of the Digital Switchover Help Scheme:
- Those aged 75 or more, or
 - Those eligible for certain disability benefits, or
 - Those living in a care home long-term, or registered blind or partially sighted.
- 3.4 800 MHz clearance meant that ca.7m DTT households had to retune their televisions. Moreover, to date mobile services in the 800MHz band have caused interference to a small proportion of households' DTT reception. Pursuant to a licence obligation imposed by Ofcom, mobile network operators (MNOs) set up an organisation called Digital Mobile Spectrum Ltd (DMSL – known to the public as at800) to remedy this interference. at800 supports DTT-only households on their primary television that experience interference from mobile services in the 800 MHz band on their primary sets. This service is usually at no cost to the viewers affected.

For most viewers 700 MHz clearance will just involve a retune, though a small proportion may need to change their aerial

- 3.5 700 MHz clearance will have a much smaller effect on DTT viewers than DSO and will in many ways be more akin to 800 MHz clearance. We summarise the implications of 700 MHz clearance for viewers in Table 1 and then go on to explain them in detail below.

Table 1 Summary of viewer effects of clearance

Effect	Cost of replacing/modifying equipment
14-20m households will need to retune their TVs	N/A
100,000-160,000 households may need to replace their aerials	Ca. £150 for a new aerial
40,000-110,000 households may need to repoint their aerials (i.e. make it point in a different direction)	Ca. £50 for an aerial repoint
A very small number of viewers may need to change TV platform (e.g. to satellite or cable)	On average, £220 for a Freesat installation

14m-20m households will need to retune their televisions

- 3.6 The 700 MHz clearance programme will involve changes to the frequencies used by the DTT platform. As televisions and DTT set top boxes are tuned to pick up signals transmitted on specific frequencies, viewers will need to retune their televisions when the frequencies of their DTT transmitting stations change.
- 3.7 We anticipate 14m-20m households will need to retune their televisions as a result of clearance. As the DTT frequency changes will be regionally phased, retunes will take place on a geographically staggered basis. As explained in section 2, if we accelerate the programme in the manner described in the March 2016 Consultation, we expect that viewers will need to retune between the start of 2018 and the first few months of 2020.⁹
- 3.8 As explained above, most viewers have already had experience of retuning during the DSO and 800 MHz clearance programmes.
- 3.9 Most viewers are confident retuning and only need to be reminded of when to retune. Research conducted by Digital UK from a retune in March 2013 in the Mendip and Winter Hill transmission areas found that 81% of people thought retuning was a straightforward process and 79% said they would feel confident about retuning equipment in the future.¹⁰ Similarly, statistics from Digital UK's consumer helpline suggest that at the time of DSO, only around 1% of households had queries about retuning. In its response to our 2014 Consultation on clearing the 700 MHz band (the '2014 Consultation'), Digital UK stated that 'with appropriate communications and support we agree that retuning is now a manageable process for most'.¹¹
- 3.10 All this considered, we do not believe that retuning will cause inconvenience to viewers, provided they receive adequate information about the change.

⁹ <http://stakeholders.ofcom.org.uk/binaries/consultations/maximising-benefits-700-MHz-clearance/summary/maximising-benefits-of-700MHz-clearance.pdf>

¹⁰ <http://stakeholders.ofcom.org.uk/binaries/consultations/700MHz/statement/700-mhz-statement.pdf>, see pages 38-39.

¹¹ http://stakeholders.ofcom.org.uk/binaries/consultations/700MHz/responses/Digital_UK_Limited.pdf

Nonetheless, we recognise that a minority of less technically confident viewers may find the retuning process challenging and may need additional assistance. We invite stakeholders to provide evidence as to whether there are any particular groups that are more likely to find retunes challenging and what support they might need.

Question 1: Do you agree with our assessment of the number of viewers that will need to retune?

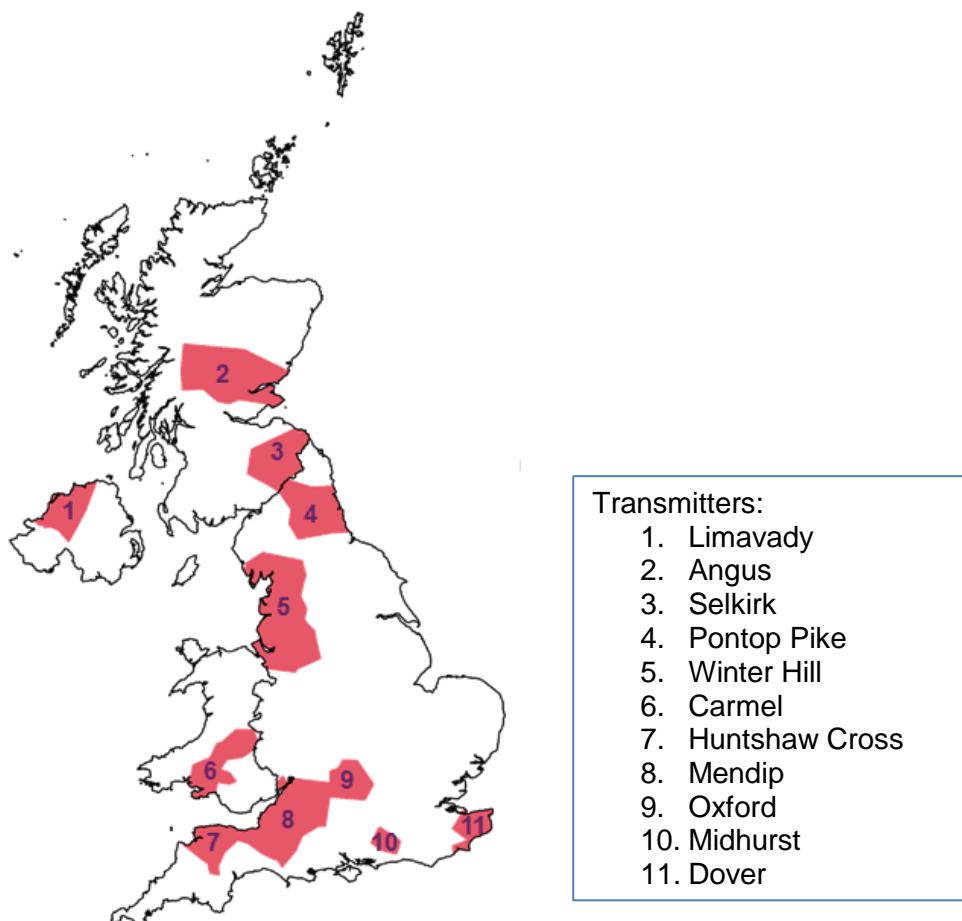
Question 2: Do you any comments on how viewers will find the retuning process and whether there are particular groups of viewers which will require greater consideration/assistance with the process? What help might they need?

100,000-160,000 viewers may need to replace their aerials

- 3.11 Most aerials sold today are ‘wideband’ aerials. This means that they are able to receive signals transmitted at any of the frequencies in the spectrum currently used by DTT. However, many older aerials (as well as a small proportion of those aerials sold today) are only designed to receive signals transmitted on a subset of the frequencies used by DTT. These are called ‘grouped’ aerials.
- 3.12 Because of the changes in frequencies associated with the re-plan, a small proportion of grouped aerials will no longer be able to receive TV signals properly following the change. The households that are affected in this way may lose or experience poorer quality reception of some or all of their DTT channels. They will be able to remedy this problem by replacing their roof-top aerial at an average cost of around £150.
- 3.13 In the 2014 Statement, we estimated between 105,000 and 110,000 households might need to replace their rooftop aerial. However, we have since done more research on the real-world distribution and performance of different types of aerial. We have revised our estimate of the number of aerial changes in light of the results of this research (which we have published alongside this CFI).¹² We now believe that 100,000-160,000 households may need to replace their aerials due to the 700 MHz clearance process.
- 3.14 It is difficult to predict precisely where the households who need to change their aerials will be, other than that most of them are likely to be in the coverage areas of the 11 main DTT transmitting stations (out of 50 in total) that use frequencies in the 700 MHz band today. Together these 11 stations cover around 7.5m households, which is around one third of all UK households. The locations of these stations below can be seen in Figure 1 below.

¹² http://stakeholders.ofcom.org.uk/binaries/consultations/700-clearance-cfi/annexes/Manchester_research_report.pdf

Figure 1 Map of the main areas whether the viewers affected by aerial replacements are likely to be located



- 3.15 As set out above, most grouped aerials tend to be old. Since 2002 Ofcom and Government have been asking industry to install wideband aerials when an aerial needs to be replaced. Therefore it is likely that many of the aerials needing replacement due to clearance will be nearing the end of their lifespan at the point of clearance (we estimate the average lifespan of an aerial is 25 years).

Question 3: Do you have any information to suggest that our estimate for the number of households that will need to replace their aerials should be different?

Question 4: Do you have any information relevant to our assessment of the average cost of an aerial replacement?

Question 5: Do you have any evidence as to what proportion of viewers may struggle to bear the cost of an aerial replacement?

40,000-110,000 households may need to repoint their aerials and a very small number may need to change TV platform

- 3.16 The changes to the DTT frequencies will also mean that in some cases the strength of the DTT signals households receive from the transmitter their aerial is pointing at will change. In a small proportion of cases the DTT signal strength may drop below the level that is necessary to provide a TV service viewers would ordinarily consider to be acceptable.
- 3.17 Based on information from the UK Planning Model, the model used to predict DTT coverage, we estimate that 40,000-110,000 households may be affected in this way. We consider that the actual number is likely to lie towards the lower bound of this range.
- 3.18 Affected households may lose, or experience poorer quality, reception of some or all of their DTT channels. In the overwhelming majority of cases, they will be able to remedy this effect by arranging for an aerial installer to repoint their aerial towards another DTT transmitter which provides a stronger signal. However, there may be isolated instances where affected households may not be able to pick up an acceptable signal from an alternative transmitter and may need to change TV platform (e.g. to cable or satellite) to solve the problem.
- 3.19 We estimate that repointing an aerial would cost on average £50, whereas a platform change to satellite would cost on average £220.¹³

Question 6: Do you have any information to suggest that our estimate of the number of viewers that may need to repoint their aerials should be different?

Question 7: Do you have any information relevant to our estimate of the cost of aerial repoints or platform changes?

Question 8: Do you have any evidence as to what proportion of viewers may struggle to bear the cost of an aerial repoint or platform change?

There are two potential types of viewer support: information and financial support

- 3.20 There are potentially two types of support that the 700 MHz clearance programme could provide to affected viewers:
- At a minimum there will likely need to be a coordinated campaign to provide viewers with information and advice about the effects of 700 MHz clearance and how to deal with them. This could in principle be funded either by the broadcasters or by Government. As we have stated, Government is currently considering the case for public funding.
 - In addition, there could be some form of scheme to provide financial assistance for some or all of the viewers that need to replace or make

¹³ Average estimates are based on information from industry. Platform change cost estimate includes SD and HD installations across the UK.

changes to their TV reception equipment as a result of 700 MHz clearance (we refer to this as a ‘help scheme’ in the rest of this document). As explained above, decisions as to whether to put such a scheme in place are a matter for Government.

- 3.21 We discuss our views on the costs and challenges that would be associated with providing these two types of support below.

Question 9: Are there any other matters the viewer support scheme should cover?

We estimate that an information and advice campaign would cost around £2.5m-5.5m

- 3.22 Based on our experience with previous changes to the DTT network and our engagement with industry, we consider that a successful viewer communications campaign would likely need to consist of the components set out in Table 2 below. We have set out our estimate of the costs of each of these components of such a scheme in the table.¹⁴ These cost estimates are based on information about the costs of 800 MHz clearance and information we have obtained from industry sources.

Table 2 Estimated cost of viewer communications scheme

Component	Estimated cost
On-screen pop-ups to tell viewers they need to re-tune	£0.5m-1m
A website explaining what viewers will need to do as a result of the clearance process	£0-0.5m website development costs
An advice line for viewers that experience problems	£1m-2m
Targeted communications to charities that help vulnerable groups of viewers	£0.5m-1m
Administrative costs	£0.5m-1m
Total cost	£2.5m-5.5m

- 3.23 The scope of the viewer communications campaign for DSO was much greater than what we have allowed for above. During the course of DSO, Digital UK spent £127m on viewer communications, i.e. ca.£6 per household. In addition to the

¹⁴ Where possible, we would expect whatever organisation was in charge of the communications campaign to leverage its existing assets, including any consumer-facing advice line and website, when setting up the scheme. These estimated costs are the incremental costs involved in scaling up these existing assets to take account of clearance.

measures in Table 2, this included expenditure on measures such as national television and radio advertising, widespread direct mailings and roadshows. Given the much smaller scale of the viewer effects of 700 MHz clearance, we do not consider that this broader set of communications measures will be necessary in this instance. Moreover, there is a risk that extensive, widespread communications about problems that will only affect a small minority of viewers could create unnecessary concern and confusion for the majority of viewers.

- 3.24 We invite stakeholders to comment and provide further evidence on our assessment of the scope and costs of a viewer communications campaign for 700 MHz clearance.

Question 10: Are there any other elements a viewer information campaign would need to include? Do you have any comments on or further evidence to inform the above estimates of the cost of providing information and advice to viewers? Please provide supporting evidence for any adjustments that you think may be relevant.

We have identified three types of cost associated with running a 700 MHz clearance help scheme

- 3.25 We believe putting in place a help scheme would have three main types of cost:

- Administrative costs;
- Cost of making financial contributions towards replacement or modification of viewers' equipment; and
- Cost of ensuring that claims made against the scheme genuinely relate to problems caused by 700 MHz clearance.

We estimate that administering a help scheme would cost £1m-4m

- 3.26 Based on the scale of the impacts of 700 MHz clearance and our experience with DSO,¹⁵ we estimate that the administrative costs associated with any 700 MHz clearance help scheme would be c. £1m-4m¹⁶.
- 3.27 If there were a help scheme, we believe it is important that it be well coordinated and integrated with the viewer information and advice campaign. Our cost estimate assumes that the body in charge of delivering any help scheme would be the same organisation that was responsible for the information and advice campaign.
- 3.28 Having one organisation in charge of both these potential elements of viewer support would be likely to yield cost efficiencies, such as avoiding duplicative costs relating to back-office and contact centre functions. We consider that, at a minimum, having one point of contact for viewers affected by 700 MHz clearance would benefit viewers and help minimise confusion.

¹⁵ Around 10% of all households were analogue-only at the time of DSO, and so required equipment changes in order to avoid losing service during switchover. By contrast, we anticipate 700MHz clearance would affect less than 1% of all households

¹⁶ During DSO, ca.75% of total costs related to the in-home services and assistance package provided, while the remainder related to associated administrative and communications costs.

Question 11: Do you have any comments on information which is relevant to our assessment of the potential costs of administering a help scheme?

The amount of any funding would in large measure depend on a help scheme's ability to identify who clearance had affected

- 3.29 The amount of money any help scheme disbursed to viewers would obviously in part be a function of Government decisions about which groups were eligible to receive financial support with equipment changes and how much they were entitled to receive. In addition, it would of course be influenced by the number of viewers affected by 700 MHz clearance and the unit costs of equipment changes (we discuss these latter two factors above). However, it would also in large measure depend upon the scheme's ability to distinguish between the effects of 700 MHz clearance and other unrelated reception problems.
- 3.30 Research that we commissioned from Kantar Media suggests that around 30% of households with DTT have experienced DTT reception problems in the last year.¹⁷ This may be due to a poor quality aerial installation or external sources of interference, such as those linked to the weather. In many cases, these reception issues will appear very similar to the symptoms experienced by households which suffer reception problems due to clearance, i.e. occasional pixilation or, in extreme circumstances, total loss of picture or sound.
- 3.31 This raises important questions for 700 MHz clearance. In particular, it is possible that a significant number of viewers may mistakenly attribute pre-existing reception problems to 700 MHz clearance. Some of these viewers might therefore seek to make claims against any help scheme.
- 3.32 This is borne out by our experience of 800 MHz clearance. To date, only a small percentage of calls to at800's contact centre have been confirmed as cases relating to interference from mobile services. This suggests that a substantial number of viewers mistook un-related reception problems for issues of interference from mobile services.
- 3.33 Of the ca.30% of households that the Kantar Media research identified as suffering from reception problems, around 15% contacted someone to remedy these problems. We assume for our analysis that a similar proportion of households with pre-existing reception problems might mistakenly make claims against a help scheme if one were put in place, although we recognise that this assumption is difficult to inform.
- 3.34 A key focus of our advice to Government is likely to be options for differentiating between claims which have been made in error and claims which genuinely relate to 700 MHz clearance.
- 3.35 Below we set out our initial view of what these options could be, how much they would cost, and how effective they are likely to be. We request stakeholders' comments on this initial assessment.

¹⁷ This research was published on 5 April 2016 and is available at <http://stakeholders.ofcom.org.uk/market-data-research/other/tv-research/viewers-experience-of-television-reception/>

Question 12: Do you have any evidence to further inform our assessment of the likelihood of viewers that suffer from un-related pre-existing reception problems erroneously making claims against a 700 MHz help scheme?

There are three main methods a help scheme could use to identify viewers genuinely affected by 700 MHz clearance

- 3.36 There are a number of different methods of sorting households that are suffering from clearance related problems from those that are experiencing unrelated reception issues. These include:
- Phone triage, including a postcode checker.** Viewers that were experiencing reception problems which they thought might be a result of 700 MHz clearance would call a helpline. A call centre agent would then try to identify whether they were experiencing a 700 MHz related problem and were eligible for financial assistance by asking a series of questions. These might include questions about their location, when they noticed the problem, what the problem looks like, etc. A postcode checker could be used to determine whether a household is in an 'at risk' location, as indicated by the UK Planning Model.
 - Test transmissions.** These would involve broadcasting a test signal in the new frequencies before and potentially after the final clearance date. For example, some channels could be broadcast simultaneously at the new and old frequencies, with the channels broadcasted in the old frequencies appearing in a separate area of the Electronic Programme Guide ('EPG'). This would allow viewers to test whether their equipment was capable of functioning adequately at the new frequencies – if they could receive both sets of channels, appearing in the original and alternative areas on the EPG, it would indicate that it was. If they can only receive the broadcast in the alternative spots on the EPG, it would indicate that it was not.

Such a test transmission could help viewers identify in advance whether they were likely to need to replace equipment as a result of clearance. This could potentially encourage affected viewers to make aerial changes ahead of the actual clearance date. This may be useful in the areas with a greater concentration of households affected by aerial replacements, and help address any short-term capacity constraints on local aerial installers. If left on after clearance, a test transmission could also be used to help identify whether or not a household's reception problems were clearance-related. As we explain below, there are a number of potential technical limitations to test transmissions. In light of these limitations, there is considerable uncertainty about the extent to which test transmissions would be effective. Before any decisions are taken about public funding for test transmissions, we believe further work is needed to evaluate their efficacy.
 - Installer-led triage,** where an aerial installer would evaluate a household's DTT set up to diagnose at the site whether a viewer's problem is due to clearance or an unrelated issue.
- 3.37 It is difficult to predict how effective these techniques would be. However we have made some baseline assumptions in our internal cost modelling on what we think are their likely costs and effectiveness. We have set these out below, and invite feedback from stakeholders on how to refine them.

Method	Estimated cost	Assumption of effectiveness
Phone triage, including a postcode checker	£1-2m This estimate is based on our understanding of average call centre costs in the UK and information we have gathered from industry.	Our internal cost modelling assumes that phone triage would be 30-40% effective. We consider that phone triage alone would not be a particularly effective method for determining whether a household is affected by clearance, as viewers may not be able to distinguish easily between pre-existing and clearance-related reception problems. The postcode checker would also only narrow down to the coverage areas of the transmitters that are affected by clearance. This will cover a large proportion of UK households, significantly greater than the ca.1% that we predict will be affected.
Test transmissions	Up to £200,000 per site, around £1-1.5m in total This estimate has been derived from early engagement with industry on test transmissions	Our internal cost modelling assumes that test transmissions, combined with phone triage, would be 40-70% effective. Test transmissions could be a fairly effective diagnostic tool for those whose aerials do not work at the new frequencies, in conjunction with phone triage, providing they are implemented carefully and targeted at the highest risk transmitting sites. However we understand that they are not totally fool-proof. For instance, complexities in the network may result in ‘false positives’ and potentially lead to some viewers replacing their aerials unnecessarily. It is also uncertain whether test transmissions can be used effectively to diagnose which households may have been affected by coverage changes and need to repoint their aerials. These households would be scattered across the country. It is questionable whether it would be technically feasible to roll out test transmissions to a sufficient number of sites to be able to identify all of these households. We are currently considering the benefits of undertaking a trial of test transmission later this year to determine if they are effective in helping consumers resolve aerial problems, and if they offer value for money when compared with other potential aspects of viewer support.

Installer diagnosis	<p>£40-50 per household</p> <p>This is based on our understanding of typical service call fees for installers to diagnose faults or test for signals</p>	<p>Our internal cost modelling assumes that installer-led triage, combined with test transmissions and phone triage, would be 70-95% effective</p> <p>We believe this would be the most effective form of triage, although it would also be the most time and labour-intensive, as it relies on reputable aerials installers with specialist knowledge to diagnose the source of a household's reception problems.</p>
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- 3.38 We recognise that there is some uncertainty about the assumptions we have made for the costs and effectiveness of these triage methods. We therefore invite stakeholder input and evidence to help refine and substantiate our estimates and assumptions.

Question 13: Do you have any additional information to further inform our cost estimates and assumptions of the effectiveness for the different triage methods? Are there any other triage methods which should be considered? Please provide supporting evidence for any adjustments you think may be relevant to our current estimates.

Section 4

The impacts and costs on PMSE users from 700 MHz clearance

- 4.1 In this section we discuss the implications of the 700 MHz clearance programme for PMSE users with equipment that tunes to this band. First we reprise the assessment of PMSE equipment replacement costs from our 2014 Statement¹⁸ and seek feedback on whether there have been any developments since 2014 which would warrant us revising this assessment. Second, we seek evidence on PMSE stakeholders' ability to fund these costs.

We estimate that up to 20,000 pieces of PMSE equipment may need replacing

- 4.2 Audio PMSE devices such as wireless microphones, in ear monitors, and talkback/intercom systems use spectrum between 470 MHz and 790 MHz. This is the main source of spectrum for these types of device.
- 4.3 Once we have completed the 700 MHz clearance programme, PMSE users will no longer be able to access the 700 MHz band. This will mean that they need to replace:
- all PMSE equipment which operates exclusively in the 700 MHz band;
 - a proportion of equipment that has a tuning range which extends both above and below 694 MHz (i.e. which lies within and immediately below the 700 MHz band). This is because change of use of the 700 MHz band will reduce such equipment's usable tuning range. In some instances this reduction may be sufficiently material that it renders the equipment unfit for its intended purpose; and
 - a proportion of equipment whose tuning range falls within the 470 MHz- 694 MHz spectrum and is used in a fixed location. This is because revisions to the DTT frequency plan will mean that the spectrum which is available for PMSE will change in some locations.
- 4.4 In our 2014 Statement, we estimated that PMSE stakeholders may need to replace up to 20,000 pieces of equipment due to 700 MHz clearance. This estimate was based on the results of a survey of PMSE which we undertook in 2013 (the 'PMSE equipment survey'). The survey involved asking a selection of large hiring companies, theatres and other owners of PMSE equipment to provide information on: the tuning range of their equipment; the approximate value of their equipment; when they purchased it; and when they intended to replace it¹⁹.

¹⁸ <http://stakeholders.ofcom.org.uk/consultations/700MHz/statement/>

¹⁹ We presented the results of this survey in annex 12 of our May 2014 consultation document.

- 4.5 We anticipate that some PMSE equipment owners will replace their equipment with radio microphones which function in the newly allocated 960-1164 MHz band. Others will make use of the 470-694 MHz band. There is currently no PMSE equipment which operates in the 960-1164 MHz band on the market. We discuss timelines for equipment development in the 960-1164 MHz band in our recent consultation on *Maximising the benefits of 700MHz clearance*²⁰ and have not covered this in this CFI.

Question 14: Have there been any developments since 2014 which would affect our estimate of the amount of equipment that PMSE users will need to replace as a result of 700 MHz clearance?

We estimate this will cost £14m-25m in 2016 NPV

- 4.6 In our 2014 Statement, we estimated that a change of use of the 700 MHz band would result in PMSE equipment replacement costs of £13m -21m in 2014 NPV, assuming clearance takes place at the start of 2022. If we were to clear the band in Q2 2020, as proposed in our March 2016 Consultation, then this would translates to £14m – 25m in 2016 NPV.
- 4.7 The 2014 Statement sought to describe the incremental effects of 700 MHz clearance, measured against a counterfactual in which we did not clear the band. PMSE users would have had to replace their equipment at some point in the future in this counterfactual. The cost estimates in the 2014 Statement therefore relate to the incremental cost of users replacing equipment earlier than they otherwise would have, rather than the full cash cost of the equipment. For illustrative purposes, our estimate of the full cash costs of replacing or modifying all equipment affected by 700 MHz clearance totals £45m – 55m, adjusting for inflation.
- 4.8 In order to generate these cost estimates we used information from the PMSE equipment survey about the price of PMSE equipment; the asset life of equipment; and the total amount of equipment that would need to be replaced. Further details of the methodology underpinning the cost estimate can be found in our 2014 Statement and the 2014 Consultation²¹. Our estimate factors in costs that PMSE users may incur when decommissioning equipment (e.g. paying for workers to strip redundant equipment out of theatres). As explained in our 2014 Statement, we have assumed that these are equivalent to 5% of the equipment replacement cost (this estimate is based on examples from channel 69 clearance).
- 4.9 Table 3 below shows the information about average equipment prices, and how this would vary depending on the tuning range of the equipment, which we extracted from the survey and fed into our cost estimate.

²⁰ <http://stakeholders.ofcom.org.uk/consultations/maximising-benefits-700MHz-clearance/>

²¹ <http://stakeholders.ofcom.org.uk/consultations/700MHz/>

Table 3 Average PMSE equipment prices (2016 NPV)

Tuning Range (MHz)	Average equipment price (£)
Wireless Microphones:	
0 – 50	1,580
50 – 100	1,756
100 – 200	2,799
200 +	2,751
In-ear monitors (IEMs):	
0 – 50	689
50 – 100	1,258
100+	1,634
Talkback equipment ²²	
0 – 50	1,658
50 – 100	2,571
100+	2,850

Question 15: Are you aware of any developments since the 2014 Statement that would affect our cost estimates?

Question 16: Do you have any information or evidence of the likely unit cost of new equipment which operates in the 960-1164 MHz band?

We welcome feedback on the impact of these costs for the PMSE sector

- 4.10 We have identified four broad groups of PMSE equipment owners that 700 MHz clearance will affect. The entities within these groups vary in nature (e.g. size) and core organisational purpose and will be affected to different extents. Table 4 below:
- lists the categories of PMSE equipment owner we have identified; and
 - sets out our estimate of the proportion of the total stock of PMSE equipment operating in the 700 MHz band which they account for. We have used information from our PMSE licensing database as the basis for this estimate.

²² These figures may not necessarily represent a meaningful average as the sample size of talkback equipment in our survey was much smaller than that of wireless microphones and in-ear monitors.

Table 4 Percentage of equipment owned by different groups of PMSE owner

Category of PMSE equipment owner	% of affected equipment owned
Hire companies (i.e. companies which hire out PMSE equipment, to theatrical productions, sports events, music events etc.)	{ 45%
Freelance contractors (i.e. freelance sound engineers/producers who own equipment and use it to provide services to event organisers)	{ 14%
Owner operators – PMSE integral to business model (i.e. venue operators or production companies who own equipment)	{ 41%
Owner operators – PMSE supplementary to business model (i.e. churches, schools, conference centres and other business who own equipment but are not dependent on it for their continued operation)	

Question 17: Have we correctly identified the main categories of PMSE user that 700 MHz clearance will affect? If not, please provide examples of stakeholders which do not fit broadly into any of the groups mentioned.

Question 18: Do you have any comments on our assessment of the proportion of equipment the different users types account for?

- 4.11 In order to inform our advice to Government, we have developed a questionnaire seeking to gather information about key financial indicators for PMSE stakeholders e.g. PMSE users' access to liquid assets and ability to secure credit to finance equipment replacement. Respondents can find this here.
- 4.12 We invite PMSE stakeholders that are likely to be affected by clearance to fill in the questionnaire and email it to 700ClearanceCFI@ofcom.org.uk. Subject to information availability, the questionnaire should take no more than 20 minutes to complete. We will hold the information you supply confidentially and we will only present it to Government in aggregate form, without identifying individual respondents.

Question 19: In addition to any information provided in response to the survey, do you have any other evidence as to how clearance may financially affect each of the different categories of PMSE equipment owner identified above?

Section 5

Next Steps

- 5.1 Once we have received responses to this call for inputs we will provide advice to Government on DTT viewer support and PMSE funding. This advice will reflect evidence respondents provide to us. In addition, it will take into account any relevant evidence provided to us in responses to our March consultation as well as any relevant information from the proposed technical plan for clearance which the DTT multiplex operators are due to provide us in May 2016.
- 5.2 We will provide stakeholders with further information about our next steps once Government has announced its decision as to whether to provide funding for viewer support and PMSE equipment replacement.

Annex 1

Responding to this call for input

How to respond

- A1.1 Ofcom invites written views and comments on the issues raised in this document, to be made **by 5pm on 13 May 2016**.
- A1.2 Ofcom strongly prefers to receive responses using the online web form at <http://stakeholders.ofcom.org.uk/consultations/700-clearance-cfi/>, as this helps us to process the responses quickly and efficiently. We would also be grateful if you could assist us by completing a response cover sheet (see Annex 3), to indicate whether or not there are confidentiality issues. This response coversheet is incorporated into the online web form questionnaire.
- A1.3 For larger responses - particularly those with supporting charts, tables or other data - please email 700ClearanceCFI@ofcom.org.uk attaching your response in Microsoft Word format, together with a CFI response coversheet.
- A1.4 For the PMSE financial questionnaire, found here, please email 700ClearanceCFI@ofcom.org.uk, attaching the Microsoft Excel document and putting "Data request" in the subject line of the email.
- A1.5 Responses may alternatively be posted or faxed to the address below, marked with the title of the CFI.

Jon Higham
Floor 3
Spectrum Policy Group
Riverside House
2A Southwark Bridge Road
London SE1 9HA

- A1.6 Note that we do not need a hard copy in addition to an electronic version. Ofcom will acknowledge receipt of responses if they are submitted using the online web form but not otherwise.
- A1.7 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 4. It would also help if you can explain why you hold your views and how Ofcom's proposals would impact on you.

Further information

- A1.8 If you want to discuss the issues and questions raised in this CFI, or need advice on the appropriate form of response, please contact Jon Higham on 020 7981 3673.

Confidentiality

- A1.9 We believe it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all

responses on our website, www.ofcom.org.uk, ideally on receipt. If you think your response should be kept confidential, can you please specify what part or whether all of your response should be kept confidential, and specify why. Please also place such parts in a separate annex.

- A1.10 We will not, however, seek to publish PMSE stakeholders responses to the separate financial questionnaire. Information submitted in this questionnaire will be treated as strictly confidential and will only be presented to Government in an anonymised and aggregated form.
- A1.11 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and will try to respect this. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.
- A1.12 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's approach on intellectual property rights is explained further on its website at <http://www.ofcom.org.uk/terms-of-use/>

Next steps

- A1.13 Following the end of the consultation period, Ofcom intends to publish a statement in summer 2016.
- A1.14 Please note that you can register to receive free mail Updates alerting you to the publications of relevant Ofcom documents. For more details please see: <http://www.ofcom.org.uk/email-updates/>

Ofcom's consultation processes

- A1.15 Ofcom seeks to ensure that responding to a consultation is easy as possible. For more information please see our consultation principles in Annex 2.
- A1.16 If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or e-mail us at consult@ofcom.org.uk. We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, who are less likely to give their opinions through a formal consultation.
- A1.17 If you would like to discuss these issues or Ofcom's consultation processes more generally you can alternatively contact Graham Howell, Secretary to the Corporation, who is Ofcom's consultation champion:

Graham Howell
Ofcom
Riverside House
2a Southwark Bridge Road
London SE1 9HA

Tel: 020 7981 3601

Email Graham.Howell@ofcom.org.uk

Annex 2

Ofcom's consultation principles

- A2.1 Ofcom has published the following seven principles that it will follow for each public written consultation:

Before the consultation

- A2.2 Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

During the consultation

- A2.3 We will be clear about who we are consulting, why, on what questions and for how long.
- A2.4 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened Plain English Guide for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.
- A2.5 We will consult for up to 10 weeks depending on the potential impact of our proposals.
- A2.6 A person within Ofcom will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. Ofcom's 'Consultation Champion' will also be the main person to contact with views on the way we run our consultations.
- A2.7 If we are not able to follow one of these principles, we will explain why.

After the consultation

- A2.8 We think it is important for everyone interested in an issue to see the views of others during a consultation. We would usually publish all the responses we have received on our website. In our statement, we will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

Annex 3

Call for input response cover sheet

- A3.1 In the interests of transparency and good regulatory practice, we will publish all consultation responses in full on our website, www.ofcom.org.uk.
- A3.2 We have produced a coversheet for responses (see below) and would be very grateful if you could send one with your response (this is incorporated into the online web form if you respond in this way). This will speed up our processing of responses, and help to maintain confidentiality where appropriate.
- A3.3 The quality of consultation can be enhanced by publishing responses before the consultation period closes. In particular, this can help those individuals and organisations with limited resources or familiarity with the issues to respond in a more informed way. Therefore Ofcom would encourage respondents to complete their coversheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.
- A3.4 We strongly prefer to receive responses via the online web form which incorporates the coversheet. If you are responding via email, post or fax you can download an electronic copy of this coversheet in Word or RTF format from the 'Consultations' section of our website at <http://stakeholders.ofcom.org.uk/consultations/consultation-response-coversheet/>.
- A3.5 Please put any parts of your response you consider should be kept confidential in a separate annex to your response and include your reasons why this part of your response should not be published. This can include information such as your personal background and experience. If you want your name, address, other contact details, or job title to remain confidential, please provide them in your cover sheet only, so that we don't have to edit your response.

Cover sheet for response to an Ofcom consultation/CFI

BASIC DETAILS

Consultation/CFI title:

To (Ofcom contact):

Name of respondent:

Representing (self or organisation/s):

Address (if not received by email):

CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why

Nothing

Name/contact details/job title

Whole response

Organisation

Part of the response

If there is no separate annex, which parts?

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.

Name

Signed (if hard copy)

Annex 4

Call for input questions

Question 1: Do you agree with our assessment of the number of viewers that will need to retune?

Question 2: Do you have any comments on how viewers will find the retuning process and whether there are particular groups of viewers which will require greater consideration/assistance with the process? What help might they need?

Question 3: Do you have any information to suggest that our estimate for the number of households that will need to replace their aerials should be different?

Question 4: Do you have any information relevant to our assessment of the average cost of an aerial replacement?

Question 5: Do you have any evidence as to what proportion of viewers may struggle to bear the cost of an aerial replacement?

Question 6: Do you have any information to suggest that our estimate of the number of viewers that may need to repoint their aerials should be different?

Question 7: Do you have any information relevant to our estimate of the cost of aerial repoints or platform changes?

Question 8: Do you have any evidence as to what proportion of viewers may struggle to bear the cost of an aerial repoint or platform change?

Question 9: Are there any other matters the viewer support scheme should cover?

Question 10: Are there any other elements a viewer information campaign would need to include? Do you have any comments on or further evidence to inform the above estimates of the cost of providing information and advice to viewers? Please provide supporting evidence for any adjustments that you think may be relevant.

Question 11: Do you have any comments on information which is relevant to our assessment of the potential costs of administering a help scheme?

Question 12: Do you have any evidence to further inform our assessment of the likelihood of viewers that suffer from un-related pre-existing reception problems erroneously making claims against a 700 MHz help scheme?

Question 13: Do you have any additional information to further inform our cost estimates and assumptions of the effectiveness for the different triage methods? Are there any other triage methods which should be considered? Please provide supporting evidence for any adjustments you think may be relevant to our current estimates.

Question 14: Have there been any developments since 2014 which would affect our estimate of the amount of equipment that PMSE users will need to replace as a result of 700 MHz clearance?

Question 15: Are you aware of any developments since the 2014 Statement that would affect our cost estimates?

Question 16: Do you have any information or evidence of the likely unit cost of new equipment which operates in the 960-1164 MHz band?

Question 17: Have we correctly identified the main categories of PMSE user that 700 MHz clearance will affect? If not, please provide examples of stakeholders which do not fit broadly into any of the groups mentioned.

Question 18: Do you have any comments on our assessment of the proportion of equipment the different users types account for?

Question 19: In addition to any information provided in response to the survey, do you have any other evidence as to how clearance may financially affect each of the different categories of PMSE equipment owner identified above?