

Changes to the digital television and digital radio technical codes

CONSULTATION:

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1. Overview

Ofcom has specific responsibilities for licensing and regulating TV and radio broadcast services which are transmitted via networks of land-based transmitter masts (i.e. 'terrestrial' broadcast services). The UK's terrestrial digital TV and radio broadcasting platforms are usually referred to as Freeview and DAB (Digital Audio Broadcasting) respectively.

The organisations which provide the Freeview and DAB signals are known as multiplex operators, and most multiplexes require licences which are issued by Ofcom under the Broadcasting Act 1996 and the Wireless Telegraphy Act 2006¹. Among other things, the multiplex operators' licences require them to comply with certain technical rules set by Ofcom. These rules – our broadcast technical codes – define a common minimum set of technical standards for the way that terrestrial TV and radio signals are transmitted in the UK. There are separate technical code documents for TV and DAB services.

The main aim of Ofcom's broadcast technical codes is to ensure that the signals carrying different groups of TV or radio stations do not technically conflict or interfere with one another. The rules also establish basic common technical standards for the Freeview and DAB services, which helps provide a stable technical platform for broadcasters, receiver manufacturers and ultimately for viewers and listeners.

Ofcom updates these rules to ensure they remain relevant and proportionate as the digital broadcasting environment develops. The most recent substantive changes to the DAB technical codes were made in 2019 (with a further minor update in 2020), and the TV technical codes were last updated in 2016.

We are now proposing to make further amendments to the TV and radio technical codes, as summarised below.

¹ The main exceptions are the BBC's National DAB multiplex and its standard definition DTT multiplex, PSB1. These multiplexes are not licensed under the Broadcasting Act by Ofcom and they are therefore not formally required to observe the DAB or DTT technical codes. They do however hold Wireless Telegraphy Act licences issued by Ofcom. The local TV multiplex does hold a Broadcasting Act licence but is also not required to observe the DTT Technical Code (though it must comply with the Code's associated 'DTT Reference Parameters', which is described in Section 2 of this document.

What we are proposing - in brief

Network resilience and disaster planning – TV and radio multiplexes

- We propose to require TV multiplex operators to provide regular updates to Ofcom on their
 progress towards meeting the recommendations set out in Ofcom's separate <u>report</u> into the fire and consequent loss of all broadcast radio and TV services at the Bilsdale TV and radio
 transmitter mast in North Yorkshire during August 2021.
- Similarly, we are proposing that digital radio multiplex operators should be required to consider the technical resilience of their services and to have proportionate service continuity plans in place.
- Following a <u>separate incident</u> in September 2021 that resulted in the loss of some subtitling, audio description and signing on a number of broadcast TV services for a prolonged period, we propose to add a requirement for the Channel 3, Channel 4 and Channel 5 licensees to ensure that they assign the same priority to the resilience of access services as they do to the vision and sound for those programmes that are scheduled to carry access services.

Radio multiplexes

- Before bringing a DAB transmitter site into operation, multiplex operators need to assess the risk
 of its signals causing disruption due to technical effects known as 'Adjacent Channel Interference'
 (ACI) and 'blocking' or 'hole punching' in the immediate vicinity of the new transmitter site. We
 are proposing to simplify the current process for identifying and mitigating these risks by
 adopting a system whereby Ofcom will carry out initial assessments of hole punching risk and
 would generally approve proposals posing negligible risk of disruption. This will reduce the
 burden on multiplex licensees, particularly new small-scale multiplexes as well as larger
 established licensees that would otherwise have to consider multiple requests for new
 transmitters from others. It will also reduce the risk of inconsistent outcomes in managing hole
 punching, and lead to quicker decision-making.
- While maintaining our existing requirements for 'acceptance testing' of new transmitter
 installations, we are providing additional support and guidance to licensees on the process and
 specific technical checks which they need to carry out before a new or modified transmitter can
 enter service. These checks are intended to ensure that a transmitter meets its licensed technical
 parameters and does not cause potentially harmful interference to other services. This additional
 guidance and support will be included on an informative basis only.

Other proposed changes

- We propose to add references in the digital TV and radio technical codes to signpost Ofcom's new requirements on exposure to electromagnetic fields. These requirements already apply to all relevant spectrum licensees holding Wireless Telegraphy Act licences, and therefore the references in the technical codes will be informative only.
- We are also proposing to include HbbTV into our Reference Parameters document as a recommended standard for data services on DTT.

2. Introduction

TV technical codes – background

- 2.1 Digital terrestrial television (DTT) usually known as Freeview is broadcast from a network of over 1,100 transmitter masts. Each mast generally transmits three or more 'multiplexes' (with each multiplex containing a number of individual TV channels). Each multiplex is licensed to a specific multiplex operator.
- 2.2 Three 'public service broadcaster' DTT multiplexes provide near-universal coverage across the UK. Three other 'commercial' multiplexes cover around 9 in 10 households, and a separate local TV multiplex provides more localised coverage in some areas.
- 2.3 The national DTT multiplexes which are licensed by Ofcom under the Broadcasting Act 1996 are required to observe Ofcom's <u>Television Technical Performance Code</u> ("the DTT Technical Code") and its accompanying <u>Reference Parameters for Digital Terrestrial</u> <u>Television Transmissions in the United Kingdom</u> ("the DTT Reference Parameters"), which set out the high-level technical requirements with which these TV multiplexes must comply².
- 2.4 The DTT Technical Code and Reference Parameters are intended to ensure that the UK's main DTT services achieve at least minimum standards of technical quality, availability and coverage. They also set standards which seek to prevent DTT multiplexes causing undue interference to other licensed services, and to provide for basic technical interoperability between different DTT multiplexes.
- 2.5 The DTT Technical Code and Reference Parameters were last revised in 2016 and we are now taking the opportunity to propose amendments to both documents as set out later in this document.

DAB radio technical codes – background

- DAB (Digital Audio Broadcasting) digital radio services are widely available in the UK, and are transmitted from a large network of transmitter masts. As with DTT, a single DAB signal is known as a multiplex, and can contain up to 20 or more individual radio stations.
 Listeners can usually receive more than one DAB multiplex at a given geographic location.
- 2.7 The UK's DAB radio platform consists of a number of established multiplex operators providing both local and national DAB services. More recently, 'small-scale' DAB services (which target smaller geographic areas than existing local DAB services) have begun broadcasting, and Ofcom will be advertising further licences for small-scale DAB services across the UK over the next few years.

² The local TV multiplex is also required to observe the requirements in the Reference Parameters document.

- 2.8 DAB multiplex licensees which are licensed by Ofcom under the Broadcasting Act 1996 are required to observe Ofcom's <u>Digital Radio Technical Code</u> ("the DAB Technical Code") and <u>Technical Policy Guidance for DAB Multiplex Licensees</u> ("the DAB Guidance").
- 2.9 The most recent substantive changes to the DAB Technical Code and Guidance were made in 2019 (with a further minor update in 2020), and we are now taking the opportunity to propose further amendments to both documents as set out later in this document.

Draft versions of the revised DTT and DAB technical code documents

- 2.10 We are publishing draft versions of the following revised documents alongside this consultation:
 - The DTT Technical Code (the "Television Technical Performance Code");
 - The DTT Reference Parameters ("Reference Parameters for Digital Terrestrial Television Transmissions in the United Kingdom");
 - The DAB Technical Code (the "Digital Radio Technical Code");
 - The DAB Guidance ("Technical Policy Guidance for DAB Multiplex Licensees").
- 2.11 We are also publishing separate documents that identify the significant changes we are proposing to make to the DTT Technical Code, the DTT Reference Parameters, and the DAB Technical Code compared to their current versions. The proposed changes to the DAB Guidance are however more extensive and for clarity we are not publishing a marked-up version. The current DAB Guidance is available on the Ofcom website.

3. Broadcast transmission network resilience (DTT and DAB technical codes)

Background

- 3.1 On 10 August 2021, a fire broke out at the main Bilsdale transmitter mast in North Yorkshire, which led to a prolonged loss of terrestrial TV and radio services for a large number of households across the north-east of England. Although temporary transmission arrangements were put into place by the transmitter operator relatively quickly after the fire, normal reception is not expected to be restored to all households until sometime in 2023 when a rebuilt mast is expected to come into operation.
- 3.2 On 25 September 2021, a broadcasting centre in London was damaged in a separate incident which led to a loss of a number of programme services. Although most affected programme services' vision and sound were restored within a few hours, there was a subsequent much more prolonged loss of access services³ on some channels, which were not fully restored on some platforms until November 2021.
- 3.3 Of com has carried out a review of the Bilsdale transmitter fire and the separate incident at the Broadcast Centre. The reports containing our conclusions and recommendations were published in June 2022 in the 'Broadcast Incidents' section of our <u>website</u>.

Transmission resilience and disaster recovery

- 3.4 Our Bilsdale transmitter fire incident review recommended that terrestrial broadcast industry stakeholders should review the circumstances and their response to the fire, and that they should address any identified areas of weakness.
- 3.5 We said in our incident review that we would consider whether further regulatory action is necessary, depending on what initiatives have been put in place by the multiplex licensees, broadcasters and their transmission contractors, and on their progress in taking forward our recommendations.
- 3.6 We understand that some progress has been made, although the issues under discussion between the parties are technically complex, and any initiatives arising from the discussions are likely to involve detailed technical, contractual and commercial considerations.
- 3.7 While these discussions are ongoing, Ofcom believes it is important that positive momentum on addressing broadcast resilience is maintained. We are therefore proposing to add requirements to the DTT Technical Code and the DAB Technical Code to build on the progress that has been made to date, and ensure that the initiative continues to be taken forward.

³ Subtitling, audio description and signing.

- 3.8 Similarly, for the Broadcast Centre incident, our review made a number of recommendations including that the broadcasters' disaster recovery facilities are able to carry the full suite of access services, and that they are regularly tested, with adequate numbers of trained staff available.
- 3.9 Our review found that broadcasters and their contractors were already starting to address the matters that we summarised in our review's recommendations. These recommendations included that we would consider whether specific requirements for access services need to be added to the Television Technical Code to ensure that they are dealt with in the same way as other essential components in the technical delivery of programmes. We are therefore proposing to include a requirement on the Commercial Public Service Broadcasters to cement the importance of access services alongside vision and sound for those programmes that are scheduled to carry them.

Television Technical Performance Code

- 3.10 The Television Technical Performance Code requires relevant Ofcom-licensed multiplex operators⁴ to submit an annual technical report containing, amongst other things, a summary of the multiplex's performance against the minimum transmitter reliability requirements contained in the Code.
- 3.11 We now propose to add a new resilience reporting requirement to the scope of the existing annual report. This will cover two areas:
 - A requirement for the annual reports to include a brief narrative summary of the progress towards reviewing and enhancing service continuity plans.
 - A requirement for the annual reports to include a brief description of any disaster recovery tests carried out by (or on behalf of) the multiplex licensee during the reporting period, and a summary of the outcome of such tests.
- 3.12 As well as the multiplex licensees, the commercial Public Service Broadcasters (the Channel 3, Channel 4 and Channel 5 licensees) are obliged to comply with the terms of the Television Technical Performance Code. We are proposing to include a requirement on the commercial Public Service Broadcasters to give the same priority to ensuring that access services are present and reliable, as they do to the programme's vision and sound components. The proposed wording is in the draft Television Technical Performance Code that we have published as part of this consultation and is identified in the separate summary of changes document.
- 3.13 We believe that this is a proportionate measure that should help to ensure that access services are given equal status as other essential components of the delivery of programmes to viewers, whilst not imposing any significant additional burden on the Commercial PSBs.

⁴ All 'national' DTT multiplex operators licensed by Ofcom under the Broadcasting Act 1996, specifically multiplexes 2, A, B C and D. These multiplexes are licensed to Digital 3&4 Ltd, BBC Free To View Ltd, SDN Ltd, and Arqiva. The local TV multiplex and the BBC's Multiplex 1 are not required to observe to the Technical Code.

Digital Radio Technical Code

- 3.14 The DAB sector is characterised by a much larger number of multiplex licensees than the DTT sector, and there is a wide variation in the size of individual multiplexes. Although their licences place a requirement upon each DAB multiplex licensee to provide its licensed service from each transmitter, the DAB transmitter networks are not subject to the same annual reporting requirements as the DTT services mentioned above. We do not propose to introduce such a requirement for DAB multiplex operators.
- 3.15 The size of DAB transmitter networks ranges from small-scale multiplexes (which may serve only part of a city using a single low-power transmitter) to national networks (which can comprise several hundred transmitters operating at moderate to high power levels). This large diversity in the relative scale of these multiplexes and hence the resources available to their operators means that it would not be proportionate (or indeed realistic) from either a technical or commercial perspective for all multiplexes to adopt the same approach to network resilience and disaster planning.
- 3.16 It is however important that each of the DAB multiplex licensees pays attention to the infrastructure they deploy to provide their service, and has in place plans for dealing with equipment breakdowns or failures of other infrastructure, so as to avoid prolonged loss of service. We therefore propose adding a general condition to the Digital Radio Technical Code requiring radio multiplex licensees to consider the technical resilience of their service, and recommending that each licensee has service continuity plans in place which are proportionate to the service they are providing. The proposed wording is in the draft Digital Radio Technical Code that we have published as part of this consultation, and is also shown in the associated summary of changes document.
- 3.17 Licensees will not be required to report on their plans or show how they test implementation of those plans, although Ofcom may ask for details and evidence in the course of any investigation. Should Ofcom need to investigate any future transmitter or network failure, we expect that one of the factors which we would take into account is the extent to which multiplex licensees have considered and made preparations for dealing with significant outages, including their disaster recovery plans.

Consultation question 1

Do you agree with our proposals for adding requirements to the Television Technical Code and Digital Radio Technical Code relating to resilience of broadcast networks and access services?

4. Changes to approval of transmitters process (DAB Guidance)

Background and current process

- 4.1 'Adjacent Channel Interference' (ACI) and 'blocking' are two separate technical effects, but they are commonly simply referred to as ACI or coverage hole punching. Our 2019 consultation on revisions to the DAB technical codes contains more details⁵ of the specific mechanisms which cause ACI and blocking. However, in brief, both effects can result in disruption to the reception of DAB services in locations close to another DAB transmitter in certain circumstances.
- 4.2 This is a practical issue where a DAB multiplex licensee wishes to build a transmitter that could affect reception of services provided by other DAB multiplex licensees. Disruption is particularly likely to occur in locations where there is a large difference in the signal strengths of the new and the existing DAB service(s), typically where the masts used to transmit the different services are not co-sited.
- 4.3 The 'approval of transmitter proposals' section of the *Technical Policy Guidance for DAB Multiplex Licensees* document (section 3) sets out a procedure for the management of ACI. This procedure needs to be followed by licensees before they bring any new DAB transmitters into operation (whether these new transmitters are part of a new DAB network or an addition to an existing network).
- 4.4 Recognising the potential negative effect on both listeners and broadcasters where ACI causes reception disruption, Ofcom has had procedures in place for many years which aim to manage and limit the impact new transmitters cause to DAB reception. The main principle behind these procedures has always been that a proportionate balance needs to be struck between protecting the services that are already available yet may be lost to a small area near the proposed new transmitter, and the significant consumer benefits that the new DAB transmitter would provide (i.e. the opportunity for DAB listeners to receive new services over a potentially sizeable area).
- 4.5 The procedures which we adopted following our 2019 consultation aimed to simplify the previous process for managing ACI and blocking. Our primary objective at the time was to make the procedures clearer and more manageable for the (then-anticipated) tranche of new small-scale multiplex operators. These operators will be bringing a large number of new transmitters into service as the roll-out of small-scale DAB progresses across the UK. In general, small-scale multiplex operators are not expected to have access to the depth of technical and other resources which are available to the relatively small number of existing national and local multiplex operators and their transmission providers.

⁵ Sections 4.25 to 4.28 of Ofcom, <u>Revisions to Digital Radio Technical Codes: Consultation on Ofcom's proposals</u>, February 2019.

- 4.6 In brief, under the procedure we adopted following our 2019 consultation, each multiplex operator (or successful licence awardee) wishing to implement a new DAB transmitter site is required to make their own assessment of the potential impact of that site on reception of other multiplexes in the area. Depending on the severity of the identified likely impact(s), the proposer may need to consider implementing mitigations (such as reducing the proposed transmitter power or other technical characteristics of their site). The proposer then liaises with potentially-impacted multiplex operators outlining their proposals and any mitigations, before seeking final approval from Ofcom for implementing the transmitter site.
- 4.7 In cases where the proposing and incumbent multiplex operators cannot agree on the transmitter proposal (including any potential mitigating measures), Ofcom makes a final decision on whether to allow the transmitter to be implemented.

Operator feedback and interim procedures for small-scale DAB

- 4.8 Since these changes to the ACI process in 2019, Ofcom has awarded the first dedicated small-scale DAB licences. At the time of writing, small-scale multiplex licences have been awarded for over 50 areas of the UK, and multiplexes have launched in around 20 of these areas.
- 4.9 While these initial small-scale services were preparing to launch, we received informal feedback from stakeholders who felt that the ACI processes adopted in 2019 could benefit from further refinement.
- 4.10 We do recognise that even in their simplified form, the procedures could still present a challenge to new small-scale multiplex operators, particularly given that these operators may not have the scale of technical resources that are available to the more established broadcasters.
- 4.11 We are also conscious of the resources which existing multiplex licensees need to devote to dealing with ACI liaison requests from parties wishing to bring new transmitters into service. While our 2019 consultation clearly recognised that the roll-out of small-scale DAB was likely to lead to an increase in such requests, we would like to further reduce this burden if possible.
- 4.12 The legislation for small-scale DAB also sets a clear maximum time limit of 18 months between licence award and the launch of a particular multiplex. Although the current ACI procedures set out target turnaround times for potentially-affected broadcasters to respond to ACI liaison requests, we would like to further reduce the likelihood of protracted discussions between proposers and incumbent licensees which could potentially impact new operators' launch windows.
- 4.13 During the initial phases of small-scale DAB's roll-out, Ofcom has been operating a slightly streamlined 'interim' procedure compared to the process set out in the Guidance. This was put in place on a temporary basis because we recognised the generally restricted resources available to the initial small-scale DAB licence awardees, and their lack of previous exposure to the ACI liaison process.

- 4.14 Under this interim procedure, Ofcom has been carrying out its own technical assessments of likely ACI impacts for proposed new small-scale DAB transmitters. The tools, methods and assumptions Ofcom uses in its assessments had previously been discussed with the local and national DAB licensees through a series of meetings held during 2018-19.
- 4.15 Ofcom shares a summary of its assessment with the relevant small-scale DAB licence awardee who can use the predictions to liaise with existing multiplex operators, as per the existing process set out in the current version of the Guidance. This interim procedure has removed the need for licence awardees to carry out their own ACI assessments, and has also removed any potential inconsistencies in generating ACI impact assessments by different operators.

Proposals for modified ACI procedures

- 4.16 The initial assessment stage of the interim procedures set out above appears to have been working well. Carrying out ACI assessments has not had significant resource implications for Ofcom's other work, as we already routinely predict the ACI impact of small-scale networks as part of our assessment of each applicant's technical plans. We therefore propose to continue assessing the potential hole punching impact for all new proposed small-scale DAB transmitters. For consistency we propose to also do so for proposals from local and national licenses to launch new transmitters, although we expect the volume of these to be modest in the short to medium term.
- 4.17 In addition to these initial assessments, we also recognise that the liaison process with other broadcasters could also benefit from improvement. In particular, where our ACI impact predictions suggest that the 'real world' impact of a new site is likely to be negligible, we propose to remove the requirement for the party wishing to launch the new transmitter to liaise with other licensees. The following section provides details on how this would work in practice.

ACI impact predictions versus real world impact

- 4.18 Ofcom's theoretical modelling of ACI impacts is carried out using a commercially available planning tool we have provided details of the tool and specific settings used in the new Annex A2 in our proposed update to the Guidance. However, the real world impact of ACI depends on a number of factors including the actual performance of individual receivers (which does vary widely between different models of DAB radios), as well as the inherent difficulty in predicting signal levels very close to transmitters, where antenna patterns may be changing rapidly, such as underneath where the antenna is sited and where local clutter may have a material impact on the interfering signal levels.
- 4.19 In practice, we have found that the impact on actual reception has generally been less than our ACI hole punching modelling would suggest. This does not mean that our prediction model is incorrect, merely that that it tends to produce cautious, conservative predictions, as it contains a generous allowance for signal level variations that seeks to ensure listeners' radios work in a very high proportion of locations.

- 4.20 In order to more robustly quantify any differences between real world hole punching impacts and our theoretical modelling, we have carried out a series of drive tests including signal level measurements as well as observing receiver behaviour in the vicinity of transmitters where we have predicted hole punching may occur.
- 4.21 These measurements have shown that very little actual reception disruption has been observed for the transmitters that have launched during 2021/2022, even in the cases where our predictions suggest that there may be some significant impacts, up to several hundred households in some cases.
- 4.22 The current process requires the proposer of a new site to liaise with several parties prior to obtaining consent form Ofcom to build and launch a new transmitter which places a burden on all parties involved. We have therefore considered where there are options to simplify the process and make the following proposals.
- 4.23 Where there is no, or a negligible, predicted impact on reception of other services using our standard planning criteria and protection ratios, Ofcom will generally approve the proposal if this is consistent with our other relevant policies. The proposer will not need to liaise with other multiplex licensees other than to notify them of their intention to launch the transmitter and provide technical details of the transmitter, the predicted ACI impact as well as when it is proposed that the transmitter will come on-air. We take negligible to be where a predicted impact that falls below the proposed significance thresholds which we have included in the draft Technical Guidance, and are set out below:

Guideline significance thresholds for predicted impacts

- 25 households; or
- 150m of major roads in towns; or
- 400m of major roads in areas where traffic is usually likely to be flowing at the national speed limit
- 4.24 Where there is a greater predicted impact, we will carry out a sensitivity analysis as detailed in paragraphs 4.33 to 4.38 below. Where the predicted impact reduces to below the 'negligible' threshold under Case 2 or Case 3 of the sensitivity analysis, Ofcom will generally approve the proposal, although we will require the proposer to carry out a check that real world reception is not affected more than is expected. Ofcom may also carry out drive surveys at its discretion to verify our predictions. The proposer will not need to liaise with other multiplex licensees other than to notify them of their intention to launch the transmitter and provide technical details of the transmitter, the predicted ACI impact as well as when it is proposed that the transmitter comes on-air.
- 4.25 Where there is a greater than negligible impact that does not reduce to below the negligible threshold through the sensitivity analysis, Ofcom will require the proposer to suggest mitigation measures such as a power reduction to reduce the predicted impact. If this is not sufficient to reduce the predicted impact to a negligible level with sensitivity analysis, then Ofcom may give conditional approval to the transmitter to enable the proposer to carry out tests to confirm the impact that the transmitter has on reception of

the other multiplexes. The proposer would have the same notification obligations to other multiplex licensees as in paragraph 4.24 above, but would also need to provide the results of the mitigation measures agreed with Ofcom, and results of their reception survey to Ofcom and the other multiplex licensees.

- 4.26 For the avoidance of doubt, in cases where our modelling predicts a negligible ACI impact, the proposing party would not be required to liaise with other multiplex operators over the predicted impact, and Ofcom would not normally require ACI mitigations to be considered. The proposer would however still need to pass details of the proposed transmitter(s) to the relevant multiplex licensees for their information, together with advanced warning of at least two weeks before any of the transmitters is due to come on-air. The decision on the acceptability of the proposal rests with Ofcom alone. We would expect to routinely approve 'negligible impact' proposals.
- 4.27 Where our predictions suggest a non-negligible risk of hole punching, we will agree a plan with the party wishing to launch the transmitter for mitigating the impact to bring it down to a negligible level, or to assess the real world impact. That party would then share this information with the other licensees potentially affected by the impact, as well as providing at least two weeks' notice of the date when they expect the transmitter to come on-air.
- 4.28 If mitigating measures (for example power reductions or re-locating the site) are successful in reducing the predicted impact below the negligible threshold, Ofcom will give approval for the transmitter to come on air. If the predicted impact remains above the threshold, Ofcom will require that the party wishing to build the transmitter takes steps to quantify the real world impact on reception of the other multiplexes. This may take the form of a drive survey at the time the transmitter is being tested ahead of its anticipated bringing into service, or could be a specific test of temporary equipment carried out in advance. That proposing party will need to gather drive data of the real world impact on reception, and share the results promptly with Ofcom and other multiplex licensees if the transmitter is to remain on-air. It is important that the proposing party gathers data in a sufficiently rigorous manner for it to be suitable for scrutiny by Ofcom and other licensees. Ofcom may choose to carry out a drive survey of areas that are at risk of hole punching in order to refine our planning tool.

Further refinements to assessment process and sensitivity analysis

Vertical radiation pattern information

4.29 Our predictions of hole punching impact currently take into account the horizontal pattern of transmitting antennas, but not their vertical patterns. The reason for this was that the bulk of our anticipated work over the past and next few years is likely to relate to small-scale DAB, and we were uncertain at the outset whether applicants would be able to provide pattern information in both horizontal and vertical planes. We currently require applicants for small scale DAB licences to provide only horizontal patterns in a simple spreadsheet format.

- 4.30 The market is now more mature and we are considering whether to require or to make it optional for applicants or parties that are confirming transmitter details to provide both horizontal and vertical antenna pattern information for each of their proposed transmitters. While it is relatively straightforward to provide this information for a simple omnidirectional antenna such as a monopole, doing so for a directional antenna is more complex, ideally requiring pattern information in three dimensions as the vertical pattern will not be uniform around the antenna.
- 4.31 As signal levels can reduce significantly close to and under the base of a vertically polarised antenna, we judge that even if applicants are unable to provide 3D patterns, it would be beneficial for us to take into account the vertical pattern in the main beam of the antenna.
- 4.32 We are therefore seeking views on both the desirability and practicability of requiring DAB licensees and applicants for DAB licences to provide both horizontal and vertical antenna pattern information for each transmitter that they propose to build.

Sensitivity analysis

- 4.33 One refinement we are proposing to introduce to our assessment is to include a sensitivity analysis to help judge the severity of a predicted impact. Our current procedure is to count all affected pixels⁶ as having lost service due to ACI where the nearby transmitter's signal level exceeds a wanted signal from a more distant transmitter by more than our assumed protection ratio⁷. The protection ratio includes a 13dB allowance for signal level variation with the aim of ensuring that receivers work in 99% of outdoor locations (on the assumption that the wanted and interfering signals are completely uncorrelated). In reality therefore, few receivers would be expected to fail exactly at the point that the protection ratio is exceeded. Indeed, most would continue to function well beyond that point, although statistically would be expected to do so in fewer locations within the pixel.
- 4.34 Sensitivity analysis is a technique that is useful to test how far a threshold has been exceeded, and therefore to help gain a better understanding of the likely severity that a predicted impact might have in the real world. We intend using sensitivity analysis, plus experience from real world signal and receiver tests to refine our prediction and decision making process.
- 4.35 Our starting point will be to carry out our analysis using the standard protection ratios for 99% of outdoor locations as set out in Table 7 of the Guidance. Where we predict that an impact may occur using these standard ratios, we will carry out a sensitivity analysis with the protection ratio increased in 4dB steps up to the point that the 13dB signal variation allowance is used up, to determine the distribution of the impact. The table below summarises the impact on statistical likelihood of reception continuing to be available

⁶ The planning tool predicts signal levels within 50m x 50m areas that we call a pixel

⁷ The protection ratio is the ratio of strength of the wanted signal (from a more distant transmitter) to a potential interfering signal (from the proposed transmitter) at which we expect a receiver to function with allowance for how those signals may vary within a prediction pixel. For example, we assume that an unwanted signal can be 22dB higher than a wanted signal on an immediately adjacent channel (N±1), meaning the protection ratio is -22dB.

Case	Protection ratio variation	Percentage of pixel area where a receiver should function – outdoor locations	Percentage of pixel area where a receiver should function – indoor locations
1	Normal protection ratio (eg -22dB at N±1)	99%	96%
2	Protection ratio -4 dB (eg -26dB at N±1)	95%	89%
3	Protection ratio -8dB	81%	75%
4	Protection ratio -12dB	57%	55%

under conditions of higher levels of unwanted signals in adjacent channels. These figures are captured in Table 8 in our revised Guidance.

- 4.36 If the predicted impact is fully or almost fully eliminated under Cases 2 or 3 of the sensitivity analysis, we would expect the real world impact to be similarly small and may not require mitigation, other than to confirm that the negligible impact is borne out in reality through a site test. If, however, the impact remains high up to Case 4, then proactive mitigation measures, such as an option to reduce power or choice of an alternative transmitter site, may be required.
- 4.37 We will seek to introduce this technique and to refine it and other aspects of our hole punching predictions over time through analysing real world reception data and amending parameters used in our prediction model. We propose to keep immediately interested stakeholders updated on our progress through industry briefings when appropriate.
- 4.38 If our modelling system or parameters change in the future, we will revise the thresholds in the ACI procedure.

Impact assessment

- 4.39 We believe that these proposed changes represent a pragmatic way to streamline the ACI process, which will benefit both new entrants and established licensees by reducing the resources which they need to devote to ACI issues compared to the current process as set out in the Guidance.
- 4.40 We also believe that the proposed changes will have no material effect on the outcome of individual ACI requests compared to the current process. Our reasons for this are below.
- 4.41 Firstly, the administrative and technical burden on proposers and existing broadcasters would be significantly reduced under the new procedures: proposers would not have to carry out their own assessments of ACI risk, and existing broadcasters would not have to deal with ACI liaison requests.

- 4.42 The new procedures also reduce or eliminate the risks of errors or inconsistency for example, where a proposer inadvertently mis-classifies the ACI risk level for a particular site, or where different proposers interpret the classification criteria in slightly different ways.
- 4.43 To date, a number of liaison requests for new small-scale DAB transmitters have been circulated to incumbent broadcasters under the existing procedures. We have observed that multiplex operators have in some cases raised objections to transmitters which are predicted to cause relatively small impacts to the reception of their services (and as noted above, the 'real world' impact of ACI is significantly less severe than the prediction models suggest).
- 4.44 Under the existing ACI process, it falls to Ofcom to make a final decision on the acceptability of a transmitter proposal in situations where the proposer and the existing multiplex operators cannot reach agreement between themselves. In the absence of changes to the ACI process it is highly likely that cases where existing multiplex operators object to a low-impact proposals would be referred to Ofcom for a final decision in any event. Therefore the change to the decision making process flow should have no effect on the outcome of a specific proposal.
- 4.45 Other small-scale DAB transmitter proposals have been circulated which have had no predicted ACI impact. These have been agreed by the incumbent multiplex operators (and would also have been agreed by Ofcom).
- 4.46 For non-negligible predicted impacts, under the proposed process Ofcom will agree a plan with the proposing party including mitigation measures if appropriate. This will involve either the proposing party suggesting measures, such as modifications to the transmitter's parameters in advance (e.g. power reductions) or for measuring the real world impact of the transmitter if built and brought into operation on a trial basis. If this produces a significant reception impact, then the proposer would need to suggest and implement further mitigation measures, or the transmitter would need to be switched off.
- 4.47 In all of the illustrative situations above (which we believe are representative of ACI liaisons more generally), the new and existing procedures would lead to identical outcomes, but the administrative overhead on all parties would be greatly reduced under the revised process.

Consultation question 2

Do you have any comments on our proposed changes to the DAB Technical Policy Guidance relating to the process of transmitter approvals? In particular, do you have any comments on our proposed sensitivity analysis, or on whether we should require or permit applicants to provide both horizontal and vertical antenna pattern information?

5. DAB spectrum masks (DAB Technical Code)

Background

- 5.1 The international technical standards for DAB signals specify spectrum 'masks': these essentially define the maximum levels of out-of-band signals which a DAB transmission system is permitted to produce. DAB multiplex licensees are required as a condition of their licences to comply with the spectral mask characteristic set out in the DAB Technical Code, which replicates the critical mask characteristic in <u>EN 302 720</u>.
- 5.2 Our previous <u>consultation and subsequent statement</u> on revisions to the DAB Technical Code in 2019 asked for stakeholders' views on including the ability for licensees to use the less stringent non-critical mask, perhaps for low power DAB transmitters.
- 5.3 Our statement concluded that further work was required before the adoption of the noncritical mask should be permitted. We also noted that non-critical filters were not generally available at that time, and therefore there was little reason to progress the work as there was then little demand for modest power transmitters, and the cost savings that could be achieved through the use of a less stringent filter were unknown at that time.

Update and further call for inputs

- 5.4 The first non-trial small-scale DAB service launched in late 2021, and there are now around 20 multiplexes operational in the UK, with several dozen licences awarded and making preparations to come on-air. We have been approached by stakeholders suggesting that there would be a benefit for small-scale DAB licensees if low-cost transmitters were available to fill coverage holes. The cost of these could be significantly reduced if it were permissible to use non-critical filtering.
- 5.5 Ofcom therefore intends carrying out further work during 2023 and will engage with industry stakeholders, including established DAB multiplex licensees, to explore the issues and opportunities associated with use of non-critical filtering. If this work yields positive results then we intend to permit the non-critical mask on a case by case/trial basis at lower power levels.
- 5.6 We invite comments from interested parties on our proposal. Those that have responded to our previous consultation can refer to their previous responses which we have retained on record.

Consultation question 3

Do you have any comments on our proposals for investigating and potentially permitting use of the non-critical mask?

6. Acceptance test results and compliance checks (DAB Guidance - informative)

Acceptance test requirements

Background

- 6.1 The DAB Technical Code requires licensees to demonstrate that their transmitter systems comply with specific technical standards. These 'technical acceptance' checks must be carried out before bringing any new or modified transmitters into service.
- 6.2 The acceptance check requirements primarily relate to the spectral characteristics of the radiated DAB signal, where Ofcom sets limits for the strength of out-of-band emissions. These are relatively weak signals on frequencies above and below the wanted DAB signal, and are an inevitable by-product of the normal operation of radio transmitter equipment. However if the strength of out-of-band emissions exceeds the permitted limits, there is a risk of causing interference to users in neighbouring parts of the spectrum bands. Licensees must also check that the power of the transmitted signal does not exceed the maximum power level specified in their licence.
- 6.3 It is the responsibility of licensees to carry out these acceptance checks, and to provide the results to Ofcom before a transmitter comes into service. However, historically, Ofcom's engineering staff have been able to attend sites to witness or carry out acceptance checks in some cases. This may be at the licensee's request, or where the transmission site has certain characteristics (for example where the site is an existing DAB transmitter and where there are specific risks such as intermodulation interference between the new and existing services).

Ofcom's future approach to site attendance (informative)

- 6.4 Although Ofcom staff have attended acceptance tests for the majority of small-scale DAB transmitter sites to date, in future we will only attend site where there is a compelling reason to do so. These reasons may include:
 - where an installation is at a multi-user site where intermodulation may be an issue. This could be either where there is another broadcast radio user (FM or DAB), or certain other spectrum users already operating from the site;
 - where there is a new type of transmitter being installed that has not been previously checked for compliance;
 - where we wish to carry out a check of a sample installation for quality control purposes; or
 - where we have chosen to carry out a reception survey to gather signal level information relating to a predicted ACI impact.

- 6.5 Of com will retain discretion to attend site acceptance checks in other circumstances or to carry out our own technical compliance checks where we deem this necessary.
- 6.6 For the avoidance of doubt, this future approach to site attendance has no direct implications for the DAB technical codes, as responsibility for carrying out acceptance checks remains formally with the licensee as is currently the case.

Transmitter acceptance: enhanced guidance and support for licensees

- 6.7 To support licensees who are carrying out their own acceptance checks, we intend to add some informative practical advice to the DAB Technical Guidance. This advice will cover some of the common issues which we have observed during our visits to small-scale DAB transmitter sites to date.
- 6.8 In addition to advice covering the formal acceptance tests themselves, we will also include more general advice on other transmitter site-related matters which licensees have commonly encountered as they prepare for launch.
- 6.9 The advice will be purely informative and has no formal regulatory status, and is contained in Section 4 of the draft DAB Technical Guidance.
- 6.10 We will also provide similar guidance to small-scale licensees directly as they prepare for launch as part of the normal multiplex launch process, and we intend to develop and make further technical training material available on our website in due course when we publish our Statement following this Consultation.

Acceptance test results template

6.11 Of com will make a template available for recording acceptance check test results, and we have published the proposed template alongside this consultation. Licensees should submit completed acceptance check test results to Of com by email.

General pre-launch guidance

6.12 In order to provide an overview of the various technical steps which need to be carried out before bringing a DAB transmitter on-air, we propose to add an illustrative 'routes to launch' flow chart to the Technical Guidance document. This flowchart will describe the steps and actions which licence awardees and licensees must complete before a new transmitter is brought into service. The flow-chart will capture the process for proposing, licensing and bringing a transmitter on-air and will be included in Annex A4 of our final DAB Guidance that we will publish following this consultation.

Impact assessment

6.13 The additional support and guidance which we are proposing to put in place is solely informative, and therefore there will be no additional regulatory burden on licensees.

6.14 Similarly, our proposed clarification of the circumstances in which Ofcom field staff expect to attend DAB site acceptance checks does not change the current requirement for licensees to ensure that their equipment meets the technical standards set out in the DAB Technical Code.

Consultation question 4

Do you have any observations on Ofcom's processes and information we are providing and proposing to provide in relation to acceptance tests and compliance checks? Is there anything missing that would help make the process smoother or easier from your perspective?

7. Other proposed updates

Electromagnetic fields licence condition

- 7.1 Following a <u>consultation</u> in 2020, Ofcom added a condition to certain spectrum (Wireless Telegraphy Act) licences explicitly requiring holders of those licences to comply with international guidelines on electromagnetic field (EMF) emissions for the protection of the general public. These guidelines have been issued by the <u>International Commission on Non-Ionizing Radiation Protection (ICNIRP)</u>.
- 7.2 This new licence condition applies to all radio equipment that is authorised to transmit at powers above 10 watts EIRP⁸, and therefore applies to many licensed DTT and DAB broadcast transmitter systems in the UK.

Proposed informative addition to the DAB Technical Code and the DTT Technical Code

- 7.3 Although this condition applies to each DTT & DAB licensee through their individual Wireless Telegraphy Act (WT Act) licences (and these licences have already been varied to add the EMF condition), for clarity we propose to add an informative reference to the EMF emissions requirement to the DAB Technical Code and DTT Technical Code.
- 7.4 Because this is solely an informative reference to an existing licence condition there is no regulatory impact. The text which we are proposing to add to the DTT and DAB documents is shown below:

All transmitter equipment operating at powers above 10 watts EIRP (effective isotropic radiated power) must – as a condition of the service's Wireless Telegraphy Act licence – comply with international guidelines on electromagnetic field (EMF) emissions for the protection of the general public. These guidelines have been issued by ICNIRP (the International Commission on Non-Ionizing Radiation Protection). More guidance on <u>EMF requirements</u> is available on the Ofcom website.

HbbTV

7.5 The DTT Reference Parameters currently recommends that data services which are broadcast as part of a 'qualifying service'⁹ (Channel 3, Channel 4, Channel 5 or S4C) should use a technical standard called <u>MHEG-5</u>. This standard was used when DTT services first launched in the UK in the late 1990s, and since then more technically advanced standards for data broadcast services have been developed. Several DTT broadcasters now use the alternative <u>HbbTV</u> standard (either in addition to, or as a replacement for, the MHEG-5

⁸ Effective Isotropic Radiated Power.

⁹ 'Qualifying Services' as interpreted under the Broadcasting Act 1996.

standard), and HbbTV capability is now required for UK DTT reception equipment which complies with the DTG's \underline{D} -Book.

- 7.6 In order to bring the DTT Reference Parameters into line with current industry practice, we are therefore proposing to add a reference to HbbTV to the DTT Reference Parameters as an alternative recommended data broadcast standard (in addition to MHEG-5).
- 7.7 This section of the Reference Parameters is non-binding and is therefore informative. There is therefore no regulatory impact arising from this proposed change.

Updated document formats

- 7.8 We have taken the opportunity to update the formats of the technical codes and their associated documents so that they more closely align with Ofcom's current corporate document templates.
- 7.9 These format changes particularly affect the DTT Reference Parameters and have led to significant changes to the paragraph numbering in this document compared to the current (2016) version.

Consultation question 5

Do you have any comments on the EMF, HbbTV, or document format modifications proposed in this section?

A1. Responding to this consultation

How to respond

- A1.1 Of com would like to receive views and comments on the issues raised in this document, by 5pm on 20 February 2023.
- A1.2 You can download a response form from <u>https://www.ofcom.org.uk/consultations-and-</u> <u>statements/category-1/changes-to-digital-television-and-radio-technical-codes</u>. You can return this by email or post to the address provided in the response form.
- A1.3 If your response is a large file, or has supporting charts, tables or other data, please email it to broadcast.technical@ofcom.org.uk, as an attachment in Microsoft Word format, together with the cover sheet.
- A1.4 Responses may alternatively be posted to the address below, marked with the title of the consultation:

Broadcast Spectrum Planning Team Ofcom Riverside House 2A Southwark Bridge Road London SE1 9HA

- A1.5 We welcome responses in formats other than print, for example an audio recording or a British Sign Language video. To respond in BSL:
 - Send us a recording of you signing your response. This should be no longer than 5 minutes. Suitable file formats are DVDs, wmv or QuickTime files. Or
 - Upload a video of you signing your response directly to YouTube (or another hosting site) and send us the link.
- A1.6 We will publish a transcript of any audio or video responses we receive (unless your response is confidential)
- A1.7 We do not need a paper copy of your response as well as an electronic version. We will acknowledge receipt if your response is submitted via the online web form, but not otherwise.
- A1.8 You do not have to answer all the questions in the consultation if you do not have a view; a short response on just one point is fine. We also welcome joint responses.
- A1.9 It would be helpful if your response could include direct answers to the questions asked in the consultation document. The questions are listed at Annex 4. It would also help if you could explain why you hold your views, and what you think the effect of Ofcom's proposals would be.
- A1.10 If you want to discuss the issues and questions raised in this consultation, please contact the broadcast spectrum planning team by email at <u>broadcast.technical@ofcom.org.uk</u>.

Confidentiality

- A1.11 Consultations are more effective if we publish the responses before the consultation period closes. In particular, this can help people and organisations with limited resources or familiarity with the issues to respond in a more informed way. So, in the interests of transparency and good regulatory practice, and because we believe it is important that everyone who is interested in an issue can see other respondents' views, we usually publish all responses on <u>the Ofcom website</u> as soon as we receive them.
- A1.12 If you think your response should be kept confidential, please specify which part(s) this applies to, and explain why. Please send any confidential sections as a separate annex. If you want your name, address, other contact details or job title to remain confidential, please provide them only in the cover sheet, so that we don't have to edit your response.
- A1.13 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and try to respect it. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.
- A1.14 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's intellectual property rights are explained further in our <u>Terms of Use</u>.

Next steps

- A1.15 Following this consultation period, Ofcom plans to publish a statement in April 2023.
- A1.16 If you wish, you can <u>register to receive mail updates</u> alerting you to new Ofcom publications.

Ofcom's consultation processes

- A1.17 Of com aims to make responding to a consultation as easy as possible. For more information, please see our consultation principles in Annex 2.
- A1.18 If you have any comments or suggestions on how we manage our consultations, please email us at <u>consult@ofcom.org.uk</u>. We particularly welcome ideas on how Ofcom could more effectively seek the views of groups or individuals, such as small businesses and residential consumers, who are less likely to give their opinions through a formal consultation.
- A1.19 If you would like to discuss these issues, or Ofcom's consultation processes more generally, please contact the corporation secretary:

Corporation Secretary Ofcom Riverside House 2a Southwark Bridge Road London SE1 9HA Email: corporationsecretary@ofcom.org.uk

A2. Ofcom's consultation principles

Ofcom has seven principles that it follows for every public written consultation:

Before the consultation

A2.1 Wherever possible, we will hold informal talks with people and organisations before announcing a big consultation, to find out whether we are thinking along the right lines. 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

- A2.2 We will be clear about whom we are consulting, why, on what questions and for how long.
- A2.3 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 for people to give us a written response. If the consultation is complicated, we may provide a short Plain English / Cymraeg Clir guide, to help smaller organisations or individuals who would not otherwise be able to spare the time to share their views.
- A2.4 We will consult for up to ten weeks, depending on the potential impact of our proposals.
- A2.5 A person within Ofcom will be in charge of making sure we follow our own guidelines and aim to reach the largest possible number of people and organisations who may be interested in the outcome of our decisions. Ofcom's Consultation Champion is the main person to contact if you have views on the way we run our consultations.
- A2.6 If we are not able to follow any of these seven principles, we will explain why.

After the consultation

A2.7 We think it is important that everyone who is interested in an issue can see other people's views, so we usually publish all the responses on our website as soon as we receive them. After the consultation we will make our decisions and publish a statement explaining what we are going to do, and why, showing how respondents' views helped to shape these decisions.

A3. Consultation coversheet

BASIC DETAILS

Consultation 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

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.

Signed (if hard copy)

Name

A4. Consultation questions

Question 1

Do you agree with our proposals for adding requirements to the Television Technical Code and Digital Radio Technical Code relating to resilience of broadcast networks and access services?

Question 2

Do you have any comments on our proposed changes to the DAB Technical Policy Guidance relating to the process of transmitter approvals? In particular, do you have any comments on our proposed sensitivity analysis, or on whether we should require or permit applicants to provide both horizontal and vertical antenna pattern information?

Question 3

Do you have any comments on our proposals for investigating and potentially permitting use of the non-critical mask?

Question 4

Do you have any observations on Ofcom's processes and information we are providing and proposing to provide in relation to acceptance tests and compliance checks? Is there anything missing that would help make the process smoother or easier from your perspective?

Question 5

Do you have any comments on the EMF, HbbTV, or document format modifications proposed in this section?

The overview section in this document is a simplified high-level summary only. The proposals we are consulting on and our reasoning are set out in the full document.