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# Revisions to Digital Radio Technical Codes

Consultation on Ofcom's proposals

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**CONSULTATION:**

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# 1. Overview

**Ofcom requires the UK's DAB digital radio broadcasters to comply with certain technical rules which establish a common minimum set of technical standards for the way that DAB signals are transmitted. We are proposing to revise some aspects of these technical rules, to ensure they remain appropriate and proportionate.**

The main aim of these rules is to ensure that the signals carrying different groups of radio stations do not conflict or interfere with one another, and to establish common minimum standards for listeners' experience of the DAB radio.

We are also starting to think about the needs of the forthcoming 'small scale DAB' services: small scale DAB is a new 'tier' of DAB radio services which Ofcom is expecting to begin licensing on a permanent basis during 2019/2020. The changes we are proposing in this consultation are equally applicable to further roll-out of the local or national multiplexes that may wish to deploy smaller transmitters than previously to fill areas of coverage deficiency.

## What we are proposing – in brief

The main changes that we are proposing are in the following areas:

**ACI/blocking procedures** – This is a co-ordination process which DAB broadcasters wishing to build new transmitters must go through in order to minimise the risk of causing interference to the reception of existing DAB services in the vicinity of new DAB transmitters. We are proposing to make this process more flexible and timely, while still retaining protections for listeners and broadcasters.

**Spectrum masks for DAB** – We are proposing to update the spectrum mask in our Code to align with the recognised international specification. A spectrum mask sets limits on the power of signals produced by a practical transmitter system on frequencies above and below the main signal in order to avoid interference to nearby signals. We also set out that it could be possible for DAB services in some circumstances to operate with a less stringent spectrum mask. The alternative mask would potentially allow smaller, lower-cost output filters to be used at transmitter sites, and therefore reduce the capital costs of building new transmitters. We would welcome input from stakeholders on this.

**DAB+ audio encoding** – We propose to amend the technical rules around the adoption of DAB+ to reduce the potential barriers to stations adopting this more efficient method of audio encoding.

**Other detailed revisions and updates** – We are also seeking to revise, rationalise, and update several other more detailed technical rules for DAB broadcasters. We intend to add clarification where needed, and to remove potentially burdensome requirements where appropriate. For example, we are proposing to clarify requirements around repetition rates for the signalling which is present in the DAB data stream, and we are proposing to remove certain requirements for the physical availability of transmitter site monitoring equipment.

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

## 2. Introduction

- 2.1 Ofcom’s Digital Radio Technical Code<sup>1</sup> (the ‘Code’) and ‘Technical Policy Guidance for DAB Multiplex Licensees’<sup>2</sup> (the ‘Guidance’) set out the technical rules which commercial DAB radio multiplex operators are required to comply with as a condition of their Broadcasting Act and Wireless Telegraphy Act multiplex licences. These requirements are in place to ensure that licensed services are implemented using common minimum ‘baseline’ technical characteristics, and do not cause undue interference to other licensed services. They also seek to ensure basic interoperability and coexistence between individual DAB multiplexes and other services which use nearby spectrum (for both broadcast and non-broadcast uses), and with domestic DAB receivers.
- 2.2 The Code and Guidance were last revised in 2014. Since that time, there have been changes in both the technology and the landscape of the radio industry. In particular, following a successful technical trial of ‘small scale DAB’<sup>3</sup> in ten UK towns and cities, the UK Government is in the process of drafting legislation that is expected to establish a permanent licensing framework for small scale DAB which will enable a wider roll-out of these services.
- 2.3 The technical characteristics of small scale DAB signals will be similar, or identical, to the UK’s existing national and local DAB services. However, we expect that the types of transmission networks used for small scale DAB – and the organisations operating them – will differ from existing DAB services. The likely introduction of small scale DAB therefore provides a good opportunity for us to review the existing technical rules for DAB multiplexes to ensure that they remain appropriate and proportionate to the needs of both existing and potential new multiplex operators, and that they continue to provide a baseline technical performance standard which benefits the wider industry as well as consumers<sup>4</sup>.
- 2.4 Specifically, in contrast to the existing DAB multiplexes (which are operated by a relatively small group of specialist companies with a high level of technical expertise in DAB technologies) we expect that small scale DAB multiplexes could be operated by a larger and more diverse group of multiplex broadcasters, some of whom may not have direct previous experience of digital radio broadcasting. We also expect that the small scale DAB

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<sup>1</sup> [https://www.ofcom.org.uk/data/assets/pdf\\_file/0030/95718/Digital-Technical-Code.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0030/95718/Digital-Technical-Code.pdf)

<sup>2</sup> [https://www.ofcom.org.uk/data/assets/pdf\\_file/0031/95719/Technical-Policy-Guidance-for-DAB-Multiplex-Licensees.pdf](https://www.ofcom.org.uk/data/assets/pdf_file/0031/95719/Technical-Policy-Guidance-for-DAB-Multiplex-Licensees.pdf)

<sup>3</sup> ‘Small scale DAB’ is a new approach to digital radio broadcasting using software-defined radio techniques which has the potential to lower the cost of DAB broadcasting, and which can potentially provide a path to digital broadcasting for stations which are not currently carried on DAB.

<sup>4</sup> Although we do not yet know in detail what will be contained in small scale DAB legislation, or whether it will be passed by Parliament, there are sufficient areas of the Digital Radio Technical Code and Guidance Note that would benefit from revision at this time that could be of benefit to existing and potential future licensees. We expect to provide further clarification when we consult on how we would interpret the small scale DAB legislation once it is laid in Parliament later this year.

services will use comparatively low transmission powers, and that they may not necessarily be transmitted from existing DAB transmitter masts.

## Main proposed changes

2.5 We are therefore proposing the following main changes to the Code and Guidance.

- **ACI/Blocking Procedures:** we are proposing to modify the existing procedures relating to ‘adjacent channel interference’ (ACI) and ‘blocking’. ACI and blocking are technical effects which can be sometimes be caused in the immediate vicinity of new DAB transmitter sites, and which can disrupt reception of other, weaker, signals from more distant transmitters. The roll-out of small scale DAB (or further expansion of the existing networks) is expected to involve building a relatively large number of modestly-powered transmitter sites, and we consider that the existing ACI procedures are not ideally-suited to the requirements of the needs of these new services. Specifically the existing procedures do not contain timescales for liaison between broadcasters, and rely on specialist technical tools. In order to avoid potential delays to the roll-out of small scale DAB services, we are therefore proposing to revise the current ACI procedures to streamline the process and to introduce specific turnaround times for ACI liaison requests between broadcasters.
- **Spectral Masks:** we propose to update the mask in our Code to reflect what is specified in the recognised international specification. We are also seeking views on whether there are opportunities to amend the spectral mask requirements for some DAB services without causing undue interference to users (both DAB and non-DAB services) using nearby frequencies. A spectral mask sets limits on the amount of radio frequency energy which a practical transmitter system inevitably produces on frequencies which lie outside the main useful signal, and protects services on adjacent frequencies from the interference which would otherwise be caused by these unwanted signals. Permitting use of a less stringent mask could allow simpler, lower-cost, filters to be used by broadcasters. Ofcom is currently carrying out further technical validation work, and we would welcome stakeholders’ views.
- **DAB+:** Currently the Technical Code states that DAB+ (a more efficient method of encoding audio than that used in the original DAB system) can only be used when specifically permitted by Ofcom: i.e. the default expectation in our Code is that conventional DAB audio encoding will normally be used. However, DAB+ compatible receivers have become increasingly widespread in recent years and DAB+ more widely used. In order to remove barriers to the adoption of the DAB+ standard, we propose to remove the requirement for licensees to obtain specific authorisation from Ofcom for adopting DAB+.
- **Editorial clarifications** We are seeking to clarify the Code and Guidance where possible to make the documents easier for less technical stakeholders to understand and comply with.

2.6 We are also proposing other changes to the Code to clarify and update certain detailed technical regulations in the following areas:

- Rationalising the requirements for monitoring facilities and equipment which broadcasters are currently required to make available at their transmitter sites.
- Clarifying the implications of minimum repetition rates for some of the essential technical signalling which forms part of the transmitted DAB signal.
- Providing information on a possible future need to re-use certain technical signalling codes (known as TII codes and SId codes) if the size and number of DAB networks in the UK increases significantly in the future. We are also seeking initial views from stakeholders on whether bodies other than Ofcom might be better-placed to manage the allocation of codes to individual services and multiplexes in future.

2.7 Complete copies of the proposed Code and Guidance are available as Annexes 5 and 7 to this consultation. Copies of the proposed Code and Guidance containing markup highlighting the changes from the versions which are currently in force are available as Annexes 6 and 8 to this consultation.

2.8 The changes that we are proposing to make are described in more detail in the following sections of this document.

2.9 We will carefully consider all responses received as part of this consultation process and will then publish a statement detailing our final decisions on the proposed changes. We will publish final versions of the Code and Guidance alongside the statement, and we intend to bring the new Code and Guidance into force at that time. This means that DAB multiplex operators will need to comply with new Code and Guidance under their Broadcasting Act and Wireless Telegraphy Act licences from that point. However, if the consultation process identifies practical issues which would warrant a delay in bringing the new Code and Guidance into force, we will consider doing so.

## 3. Adjacent Channel Interference (ACI) and blocking processes

### Background and current requirements in the Guidance

- 3.1 Section 3 ('Approval of transmitter proposals') in the current Technical Policy Guidance for DAB Multiplex Licensees contains procedures for the management of Adjacent Channel Interference (ACI) and blocking when broadcasters propose building new DAB transmitters.
- 3.2 'ACI' and 'blocking' are two separate effects (although they are commonly referred to interchangeably), and their causes are discussed in more detail in Sections 4.26 and 4.27 of this consultation document.
- 3.3 In summary, the current ACI and blocking process requires that a multiplex operator wanting to implement new DAB transmitter sites (a 'proposer') should calculate the potential impact of that new transmitter site, and then consider mitigating actions (such as building a small 'coverage recovery' relay transmitter) if a significant impact is likely to occur. The proposer is then required to liaise with potentially-impacted multiplex operators before seeking final approval from Ofcom for implementing the site.

### Reasons for change

- 3.4 The anticipated future roll-out of small scale DAB and/or any further expansion of the existing networks is likely to involve the building of a relatively large number of modestly-powered transmitter sites. ACI and blocking issues will need to be addressed before these sites are deployed.
- 3.5 We believe that a broadcaster-led approach to ACI and blocking remains the most appropriate and proportionate approach to managing the issue, as it provides important protection for listeners to existing DAB services. However, the current procedures can be time-consuming and have a number of features which mean they are unlikely to be well-suited to the anticipated needs of smaller scale DAB services:
- The current procedure requires site proposers to calculate the likely impact of a new site using a proprietary theoretical computer model. Although they provide a useful initial indication of the likely impact that a new transmitter site may have, theoretical calculations based on frequency planning models do not always provide an accurate indication of the ACI problems which are actually experienced in practice.
  - The current procedure does not define timescales within which potentially affected broadcasters should respond to ACI/blocking liaison requests from proposers. In addition, much of this dialogue is currently carried out by a common transmission provider on behalf of the proposer. In contrast, new entrants to the DAB platform may use alternative transmission providers (or may operate their networks themselves). Lack of clarity about expected response times and delays in responding to liaison requests could impact the timely roll-out of future DAB services.



- The current procedure does not contain examples of the practical measures which might be taken to mitigate the impact of ACI/blocking, or worked examples of the process.

## Modified ACI/blocking procedure proposals

- 3.6 We are therefore proposing to modify the ACI/blocking (hereafter referred to simply as 'ACI') procedure to seek to address these issues. The full proposed procedure is contained in Section 3 of the draft Guidance (Annex 7 to this consultation).
- 3.7 In summary, the modified procedure involves proposers self-categorising new site proposals into 'Red', 'Amber' or 'Green' categories (reflecting the level of ACI risk) using simple non-mathematical criteria. Proposers will still need to liaise with other potentially affected multiplex operators, but these broadcasters will now need to respond to proposals within specified timeframes. The procedure also contains simple guidance on the techniques and measures which can be used to minimise or mitigate the risk of ACI, as well as guidance on the information that proposers will need to provide to other multiplex licensees when submitting liaison requests.
- 3.8 During the rollout of local multiplexes and small scale DAB trials it was found that carrying out 'drive tests' in the immediate vicinity of the new transmitter was an effective method of confirming the extent of any actual ACI effects. While drive tests are already commonly used by the broadcasters and by Ofcom, we are now proposing that they become a formal part of the ACI process for 'Amber' sites.
- 3.9 A drive test is carried out in the immediate vicinity of a new transmitter which has the potential to cause ACI issues. Typically, a route is driven once with the new transmitter switched off, and the quality of reception along the route is recorded. The same route is subsequently driven again with the new transmitter switched on. If any additional disruption to signal decoding is noted, this can be attributed to the new site.
- 3.10 We expect that drive tests will initially need to be carried out by competent engineers with experience of radio broadcast engineering, though it is possible that easier-to-use measurement devices may become available in future: if so it may be possible for non-specialist staff to carry out the drive measurements.
- 3.11 We also propose to permit multiplex operators to carry out site tests for new sites. This would allow the proposer to implement a temporary site which can be brought on-air for a few hours to assess the impact of the new site.

## Impact Assessment

- 3.12 Ofcom is aware that the administrative burden of ACI management can be relatively high for both new and existing DAB transmitter site operators. However, unmanaged ACI can have a significant real-world impact, and in the most serious situations can deprive consumers of reception of DAB stations that they have previously enjoyed.

- 3.13 Our proposed ACI procedure continues the general approach to ACI management which has protected the interests of listeners and existing broadcasters since the ACI process was last revised in 2014, but aims to simplify and clarify the approach to analysis and liaison between multiplex operators.
- 3.14 The introduction of explicit timescales for responses to ACI liaison requests may lead to ‘spikes’ in demand on responding parties compared to the existing ACI process, and the broadcasters should ensure that they have sufficient resource in place to accommodate this. However, the overall burden on existing licensees should not increase as a direct result of the changes (as the current procedures already require broadcasters to respond to ACI requests from proposers). Existing licensees will also benefit from more timely responses to proposals when they are expanding their own DAB transmitter networks.
- 3.15 The modified ACI process still requires final Ofcom approval before new transmitters are commissioned and brought into service. This will offer continued protection for listeners by giving us the opportunity to ensure that the ACI impact assessment and liaison procedure has been carried out correctly, and to require reconsideration of the proposal if, in our view, it has not been.
- 3.16 On balance, we believe that the revised ACI process provides a pragmatic way of dealing with ACI and protecting the interests of listeners, and is better-suited to all existing parties and new entrants (who may lack the benefits of scale or in-depth technical expertise of the larger, existing, broadcasters).

**Consultation question 1**

Do you agree with our proposed changes to the ACI/blocking procedures?

## 4. Spectrum masks for DAB: update and opportunities for relaxation

### Update – alignment with international standard

- 4.1 Since our last revision of the Technical Code in 2014, European Directive 2014/53/EU (The Radio Equipment Directive or RED) has come into force. The RED contains requirements that apply to ‘equipment which intentionally emits or receives radio waves for the purpose of radio communication’, which includes broadcast radio transmitters.
- 4.2 The RED principally creates obligations on manufacturers and sellers of equipment. They must ensure that radio equipment which is placed on the market meets certain minimum requirements (known as the “essential requirements”).
- 4.3 Ofcom’s wireless telegraphy licences and multiplex broadcasting licences regulate the use of radio equipment, not the manufacture and sale. The RED does not therefore necessarily apply direct legal obligations on the stakeholders likely to be concerned by this consultation.
- 4.4 However, the RED is highly relevant because the digital radio equipment which broadcasters purchase for broadcasting use is likely to be equipment which previously met the requirements placed on manufacturers (and sellers) under the RED.
- 4.5 Further, although a variety of equipment can be sold under the RED, the RED (and its predecessor Directive) has resulted in standardisation of equipment which is manufactured according to European wide standards. Such standards are regularly used because they provide a very useful reference point and benchmark for regulators (including Ofcom) when describing limitations on the use of equipment for transmission.
- 4.6 Ofcom regularly cites standards under the RED (and ETSI) when describing limitations and conditions on parameters of radio transmission when authorising use under licences issued under the Wireless Telegraphy Act 2006.
- 4.7 In this consultation we also (for the same reasons) propose to reference RED based standards in relation to the authorisation of DAB equipment.
- 4.8 Compliance (by manufacturers and sellers) with the RED can be demonstrated through a number of methods. One route is to ensure the equipment complies with recognised standards which leads to a presumption that the equipment is compliant with the relevant parts of the RED.
- 4.9 For DAB transmitters, EN 302 077<sup>5</sup> is the recognised standard for assessing compliance against Article 3(2) of the RED which requires that ‘Radio equipment shall be so

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<sup>5</sup> [https://www.etsi.org/deliver/etsi\\_en/302000\\_302099/302077/02.01.01\\_60/en\\_302077v020101p.pdf](https://www.etsi.org/deliver/etsi_en/302000_302099/302077/02.01.01_60/en_302077v020101p.pdf)

constructed that it both effectively uses and supports the efficient use of radio spectrum in order to avoid harmful interference.’

- 4.10 We therefore propose aligning the critical spectral mask in our Digital Radio Technical Code (“the current mask”) which specifies equipment which can be used with that specified in EN 302 077 (“the ETSI critical mask”).
- 4.11 There are some differences between the current mask and the ETSI critical mask. The present Code sets out one filter characteristic that applies to all power classes of transmitter except very lower power repeaters. The ETSI critical mask is specified for three power classes: low power (up to 25W), medium power (greater than 25W and up to 1kW) and high power (above 1kW).
- 4.12 The ETSI critical mask characteristic shown in Table 1 below is the same shape and is identical to the current mask for the medium power class, in that its limits are expressed relative to the transmitter’s output power (i.e. units are dBc). For the low power and high power cases, the ETSI mask specifies absolute power values (units are dBm). This means that the ETSI filtering requirements become less stringent for transmitter powers below 25W and more stringent as transmitter powers rise above 1kW.

**Table 1: Table showing ETSI critical characteristic**

Frequency difference from centre carrier frequency $F_c$ (MHz)	Low Power ( $P_c \leq 25$ watts): Absolute Level (dBm)	Medium Power ( $P_c > 25$ watts and $\geq 1000$ watts): Relative level (dBc)	High Power ( $P_c > 1000$ watts): Absolute level (dBm)
$\pm 0.77$	18	-26	34
$\pm 0.97$	-27	-71	-11
$\pm 1.75$	-62	-106	-46
$\pm 3.0$	-62	-106	-46

- 4.13 Transmitter installations will need to comply with the critical mask, although as discussed below, we are considering the case for permitting use of an alternative non-critical mask and expect that it will be permissible for it to be used, at least in certain situations. We therefore propose to include the ‘uncritical’ filtering characteristic<sup>6</sup> specified in EN 302 077 (shown in Table 2 below) in the Code, together with a statement that its use may be permissible in some situations and licences will explicitly notify where this is permitted in respect of individual transmitter sites.

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<sup>6</sup> We will generally refer to this as the non-critical mask as is the convention in the UK.

**Table 2: Non-critical ('uncritical') ETSI characteristic**

Frequency difference from centre carrier frequency $F_c$ (MHz)	Low Power ( $P_c \leq 25$ watts): Absolute Level (dBm)	Medium Power ( $P_c > 25$ watts and $\geq 1000$ watts): Relative level (dBc)	High Power ( $P_c > 1000$ watts): Absolute level (dBm)
$\pm 0.97$	18	-26	34
$\pm 0.97$	-12	-56	4
$\pm 3.0$	-62	-106	-46

4.14 We will make clear in a future consultation the circumstances under which we propose to permit use of the non-critical mask, taking into account the information we receive in response to our request for information below.

### Note on compliance of existing installations with the updated critical mask

4.15 The ETSI critical mask is more demanding than the current mask for transmitter powers above 1kW. Existing transmitters put into service before the updated version of the Technical Code comes into force following this consultation with an output power above 1kW will not need to be made compliant with the ETSI mask retrospectively and the current mask (corresponding to the ETSI medium power critical mask) will continue to apply. Transmitters put into service after that date will need to comply with the new ETSI mask.

### Background to considering adoption of an alternative mask

4.16 The purpose of a spectrum mask is to ensure that a transmitted service does not have a detrimental impact upon adjacent services. These adjacent services might use signals of the same or different service types. In the case of DAB digital radio, the international standards<sup>7</sup> which DAB services operate under define two spectrum masks that are applicable to the UK:

- a *non-critical* mask; and
- a *critical* (also known as *sensitive*) mask

4.17 The critical mask sets more restrictive limits on the permitted level of out-of-band emissions than the non-critical mask.

<sup>7</sup> ETSI EN 300 401: *Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers* ([https://www.etsi.org/deliver/etsi\\_en/300400\\_300499/300401/02.01.01\\_60/en\\_300401v020101p.pdf](https://www.etsi.org/deliver/etsi_en/300400_300499/300401/02.01.01_60/en_300401v020101p.pdf)) and ETSI EN 302 077: *Transmitting equipment for the Digital Audio Broadcasting (DAB) service; Harmonised Standard for access to radio spectrum* ([https://www.etsi.org/deliver/etsi\\_en/302000\\_302099/302077/02.01.01\\_60/en\\_302077v020101p.pdf](https://www.etsi.org/deliver/etsi_en/302000_302099/302077/02.01.01_60/en_302077v020101p.pdf))

4.18 In order to enable the use of adjacent DAB frequency channels (or ‘blocks’) with minimal risk of inter-block interference between sites, the critical mask has been used for all UK DAB transmitters to date. Use of the critical mask is required under Section 2.5 of the existing version of the Digital Radio Technical Code.

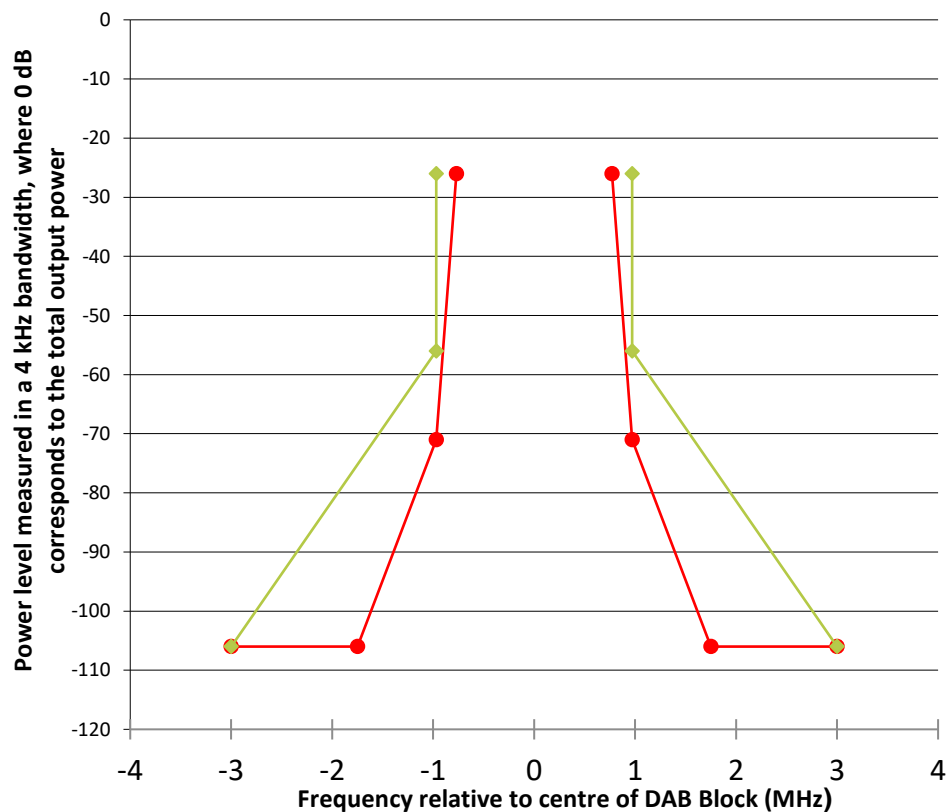
## Issues and alternative approaches

4.19 While the critical mask provides the highest level of protection for services in adjacent frequencies, the bandpass filters which are required to meet the critical mask characteristic are relatively costly (and physically bulky) compared to filters with a less stringent characteristic.

4.20 We are therefore considering whether there are circumstances in which the non-critical mask could instead be specified if doing so would not lead to undue interference to other spectrum users.

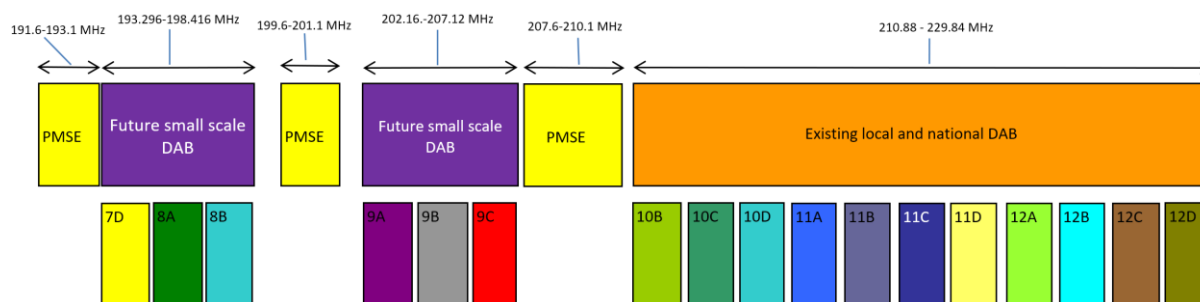
4.21 An ideal DAB signal would contain all of its transmitted energy within the 1.536 MHz that the signal itself occupies. However, real-world transmitters also put some energy into other portions of spectrum and Figure 1 illustrates the spectral masks defined in the international specifications for DAB for the amount of energy that a transmitter can put into immediately adjacent frequencies. As noted above, the existing version of the DAB Technical Code requires adherence to the critical mask in all situations.

Figure 1: Critical (red) and non-critical (green) spectrum masks - medium power case



- 4.22 The chief difference between the masks is that the non-critical version permits more energy to be put into adjacent frequencies between 0.97 MHz and 3.0 MHz from the centre of the DAB signal. Beyond 3 MHz, the masks are the same. Adopting the non-critical mask would therefore only affect other spectrum users that are within the range of frequencies that are 0.97 MHz to 3.0 MHz higher than the centre frequency of a DAB transmission or 0.97 MHz to 3.0 MHz lower.
- 4.23 Potentially affected users would be other DAB multiplexes in the upper and lower two adjacent frequency blocks. Other potentially affected users would be PMSE licensees, particularly when considering the six frequency blocks in Band III Sub band 2 (blocks 7D, 8A, 8B, 9A, 9B, & 9C). These blocks accommodate most of the small scale DAB trials and are where we anticipate accommodating more small scale DAB services in the longer term. Figure 2 shows the current arrangement of DAB frequency blocks and other spectrum users.

Figure 2: Allocation of DAB blocks and PMSE use



- 4.24 The sections below provide more detailed technical information on interactions between DAB blocks and other spectrum users and the effects of different masks on these.

## Inter-block interference mechanisms

- 4.25 Interactions between two non-co-block DAB services can be characterised by two effects known as *Adjacent Channel Interference (ACI)* and *blocking*. Although they refer to two distinct effects, these two phrases are frequently used interchangeably.
- 4.26 **ACI** is caused by the unwanted signals of one channel ‘bleeding’ into the spectrum used for an adjacent channel. This is not necessarily just to the immediately adjacent channel, but also to channels at greater frequency separations. If the level of the unwanted signal in the wanted channel is high enough (or damages too many signal carriers) it will cause deterioration of the wanted signal. In DAB this can lead to the receiver muting. The degree to which a DAB signal causes ACI to other services is primarily determined by the filtering applied to the transmitter (i.e. the spectral mask).
- 4.27 **Blocking** is caused when very high signal levels from a nearby transmitter cause the receiver to be driven into an overload condition when it is tuned to a weaker signal from a (usually) more distant transmitter site. DAB receivers can operate in environments containing signals of various levels and will dynamically adjust their ‘gain’ to a level appropriate for the wanted signal. However, if the receiver gets close to a broadcast site

that is not used by all DAB multiplexes, the signals received from the nearby site will become very much stronger than those of DAB services broadcast from other transmitters. This difference might exceed the range that the receiver is capable of operating within, leading to it being unable to receive a weaker wanted service.

- 4.28 This effect does not occur where the wanted service is also transmitted from the same site as the receiver should compensate by dynamically adjusting its gain to handle the higher signal level. In addition, newer receivers tend to be able to cope with a wider range of signal levels and are consequently less prone to this form of interaction.

## Assessing the impact of permitting use of the non-critical mask

### Impact on other DAB services for co-sited transmissions

- 4.29 The amount of energy a DAB transmitter complying with the critical mask puts into the closest part of an adjacent DAB frequency is attenuated by more than 45 dB below the power the transmitter puts into the wanted frequency block. The required attenuation increases to around 76 dB at the further side of the adjacent DAB channel. For the non-critical mask, the attenuation requirement is less demanding, starting at around 30 dB at the closest point of the adjacent DAB block and increasing to 66 dB at the furthest point<sup>8</sup>.
- 4.30 Even with the non-critical mask, the level of unwanted signal put into adjacent blocks is attenuated by more than 30 dB. This is unlikely to cause any significant degrading of other DAB services transmitted from the same transmitter site, even where the services are broadcast from different antennas or at different powers.
- 4.31 Our preliminary view is therefore that permitting the non-critical mask would not be problematic for co-sited transmissions.

### Impact on other DAB services for transmissions that are no co-sited

- 4.32 In general, the national DAB radio multiplexes (BBC, Digital 1 and SDL) share common transmitter sites, as they are all seeking to serve households across the UK (although not all multiplexes are present at all of those sites).
- 4.33 The local multiplexes have distinct licence areas that they are required to serve and this results in those multiplexes sharing some transmitter sites with the national multiplexes, but also choosing different sites in some areas to better meet their more targeted coverage obligations.
- 4.34 As a consequence, a listener in a particular area may receive radio services from more than one transmitter. The received signals for the multiplexes may therefore be quite different and there could (at least in principle) be circumstances where adopting the non-critical mask at a transmitter could affect reception of DAB services from a different transmitter. We intend carrying out further analysis to determine whether this impact is likely to be

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<sup>8</sup> All levels measured in a 4kHz bandwidth as set out in EN 302 077



significant and will consult on our conclusions later in 2019 alongside proposals we expect to make on licensing small scale DAB services. In the interim, we welcome views and relevant information from stakeholders in response to this consultation.

## Impact on Programme Making and Special Events in Band III sub band 2

- 4.35 There are three portions of Band III spectrum allocated to use by Programme Making and Special Events licensees close to current or future DAB services: 191.6 to 193.1 MHz, 199.6 to 201.1 MHz and 207.6 to 210.1 MHz. Some licensees within these ranges fall within 0.97 MHz to 3.0 MHz of the centre frequency of a DAB frequency block.
- 4.36 The majority of these are closest to the six blocks that we expect will be used by small scale DAB, although block 10B used by local DAB is also included, as shown in Table 3 below. We therefore intend considering whether adopting the non-critical mask would affect PMSE licensees alongside the work we are carrying out in developing a frequency plan for small scale DAB services and will consult on our conclusions in due course. Again, we welcome views and relevant information from stakeholders in response to this consultation.

**Table 3 – DAB frequency blocks closest to PMSE frequency allocations**

DAB Block	Centre frequency (MHz)	Nearest Edge of PMSE band (MHz)	PMSE separation from DAB block centre (MHz)
7D	194.064	193.100	-0.964
8A	195.936	193.100	-2.836
8B	197.648	199.600	1.952
9A	202.928	201.100	-1.828
9B	204.640	207.600	2.960

## Users above 230 MHz

- 4.37 We propose not changing the filtering requirement for the 'Band edge' DAB multiplex in frequency blocks 12C and 12D which will be required to continue complying with the critical mask.

## Call for inputs

- 4.38 We intend developing our analysis on the points described in this section as we prepare for consulting on small scale DAB and following responses to this consultation. We intend setting out the results of our analysis and to make proposals concerning adoption of the non-critical spectral mask alongside our planned consultation on how we intend to license small scale DAB multiplexes later this year, subject to Government tabling the necessary enabling legislation.

- 4.39 We welcome views from stakeholders on the provisional proposals we have set out above, along with any relevant information that respondents may be able to provide to help us to quantify further the impact adopting the non-critical mask would have on real-world services.

**Consultation question 2**

Do you have any comments on the adoption of the new ETSI mask characteristic and on the potential use of the non-critical spectrum mask?

## 5. DAB+ audio encoding

- 5.1 Sections 3.7 & 3.8 of the current Code outline the two permitted audio encoding standards for digital radio services. MPEG 1 Layer II encoding standard is used for conventional DAB services, and the MPEG 4 HE-AAC v2 encoding standard is used for DAB+ services.
- 5.2 The 2014 revision to our Technical Code first introduced the option for broadcasters to use DAB+ encoding, but only where prior written consent from Ofcom had been obtained. Layer II therefore remained the default encoding standard for most UK digital radio services.
- 5.3 In our Statement following the 2014 consultation, we also undertook to review a separate requirement placed on the second national DAB multiplex licence (subsequently awarded to Sound Digital Limited<sup>9</sup> (SDL)) which limited the proportion of capacity which could be used for DAB+ services on this new multiplex to a maximum of 30%. We are therefore reviewing this separate requirement as part of the current consultation.
- 5.4 Since the Code was last revised, a number of stations have adopted DAB+ encoding: these stations are primarily carried on the small scale DAB trial multiplexes, and the SDL multiplex itself also carries a number of DAB+ stations.
- 5.5 DAB+ offers significantly improved spectral efficiency compared to DAB (in terms of the bitrate requirement for a given level of audio quality), and also implements a more robust form of error correction than DAB. DAB+ can therefore provide an improved listener experience, and increased range of services. It can also lower the transmission costs incurred by radio stations. Outside the UK, DAB+ is used almost exclusively in preference to DAB.
- 5.6 To date, DAB+ has mainly been used by stations which are new to DAB (as has been seen in the small scale DAB trials). Carriage costs for conventional DAB may be prohibitive for new entrant stations such as these, and we believe it would be beneficial to reduce potential barriers to joining the DAB platform.
- 5.7 Therefore, we propose to remove the requirement for broadcasters to obtain prior written permission from Ofcom to adopt DAB+, so as to put the two encoding formats on a more equal footing. We also propose to discontinue the separate 30% DAB+ limit which currently applies to SDL.
- 5.8 We are however proposing to introduce a new condition in our Technical Code requiring multiplex operators carrying services wishing to move from DAB to DAB+. This condition will require multiplex operators to liaise with the affected service provider(s) (i.e. the individual radio station(s)) with the aim of providing appropriate information to listeners on the changes (e.g. on-air announcements), and providing advice on the steps listeners can take to continue receiving the service (e.g. purchasing a DAB+-capable receiver).

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<sup>9</sup> <https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2015/dab-award>

## Impact assessment

- 5.9 All digital radios which carry the digital ‘tick’ mark are capable of receiving DAB+ services. Receivers with the tick also have to meet certain other minimum technical performance standards, resulting in a more predictable and consistent listener experience.
- 5.10 However, some radios (particularly older sets) do not have DAB+ decoders, and therefore they cannot receive DAB+ encoded stations.
- 5.11 We believe that DAB+ is likely to play a progressively more important role in the long-term future of the UK digital radio sector, and therefore we wish to reduce barriers to adoption of the standard where possible. However, we are mindful that a large-scale transition to DAB+ in the near future would disenfranchise listeners with DAB-only radios.
- 5.12 We estimate that at least 50% of receivers are compatible with DAB+ services, based on our discussions with industry. Unfortunately, reliable estimates of the proportion of DAB+ radios currently in use are not available, and therefore it is not possible to state with certainty how many sets can currently receive DAB+. While all factory-fitted in-car systems and most ‘branded’ domestic receivers are DAB+ capable, we are aware that DAB-only receivers (without the digital tick) are still being sold. particularly in the lower-cost segment of the market.
- 5.13 However, we believe that individual multiplex operators and radio stations themselves would best-placed to judge when - or if - to move to DAB+: retaining and building audiences is critical to the commercial viability of radio broadcasters, and therefore broadcasters are only likely to move to DAB+ when a sufficiently large proportion of their audiences are capable of receiving their service in the alternative format.
- 5.14 We note that since the Code was last revised to permit DAB+ encoding, there has been relatively little demand to move to DAB+ among existing radio stations on DAB. Therefore, we consider that an early large-scale transition to DAB+ is unlikely to occur. We would in any case expect broadcasters to consider the interests of their listeners when contemplating any move to DAB+.
- 5.15 Proposed changes and additions to services carried on national and local multiplexes will continue to need to go through Ofcom’s multiplex licence variation request process.

### Consultation question 3:

Do you agree with our proposed changes on DAB+ audio encoding?

## 6. Digital Radio Technical Code: other proposed revisions

### Rationalisation of 'Other Responsibilities'

- 6.1 Section 1 of the Code deals with the regulatory basis, scope, and applicability of the Code and Guidance.
- 6.2 Section 1.4 is an informative section which lists some specific legislative and regulatory areas which fall outside the scope of the Code and of Ofcom's responsibilities, but which licensees are advised to be aware of (for example, Health and Safety requirements and electromagnetic field exposure limits).
- 6.3 There is however a wide variety of other legislative areas that corporate bodies and similar organisations are required to comply with in their day-to-day operations, and which are not listed in Section 1.4. Because the list of 'out-of-scope' requirements in Section 1.4 can never be comprehensive (and because of the practical difficulty of keeping references up-to-date in the infrequently-updated Digital Radio Technical Code), we propose to rationalise Section 1.4 so that it only refers to broad areas of requirements, rather than to specific regulations and guidance.

### Removal of DAB Mode II

- 6.4 Section 2.5 of the current Code gives local multiplex licensees the option of using DAB transmission Mode I or II. However, transmission Mode II has been removed from the current version of EN 300 401<sup>10</sup> (and was never used in practice by any UK broadcast services), and therefore we intend to remove this reference.

### Removal of directional coupler requirement

- 6.5 Section 2.8 of the current Code requires all DAB transmitters to incorporate a forward/reverse monitoring point, including a directional coupler. This monitoring point allows RF measurements to be made by Ofcom or by the licensee without interrupting the transmitted service.
- 6.6 We are aware that while directional couplers are not excessively costly, they are likely to constitute a higher percentage of total capital costs for a low-power transmitter system than for a large one.
- 6.7 Because we are seeking to lower the technical costs of entry to the DAB platform where possible, we propose to remove the explicit requirement for a directional coupler to be provided in standalone transmitter systems (i.e. those where a single DAB multiplex is being transmitted, as opposed to transmitter installations where multiple DAB multiplexes

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<sup>10</sup> [https://www.etsi.org/deliver/etsi\\_en/300400\\_300499/300401/02.01.01\\_60/en\\_300401v020101p.pdf](https://www.etsi.org/deliver/etsi_en/300400_300499/300401/02.01.01_60/en_300401v020101p.pdf)

are combined into a common antenna). However, if a directional coupler is not fitted to the transmitter, the licensee should be aware that (as is already noted in the Code), Ofcom may require the transmitter to be temporarily taken out of service at short notice and without compensation in order for technical compliance measurements to be made.

- 6.8 We propose to retain the requirement to provide a directional coupler on transmitters whose signals are combined with other services into a common antenna: this is due to the practical difficulty of making technical compliance measurements on such equipment if it does not incorporate a directional coupler.

## Removal of dummy load requirement

- 6.9 Section 2.9 of the current Code requires licensees to make a 'dummy load' available at their transmitter sites. A dummy load is a radio-frequency resistor which is placed on the output of the transmitter, and which allows the transmitter to be tested without it radiating power into an antenna. Dummy loads, particularly those with moderate power handling capability, are relatively bulky and costly, and licensee-supplied dummy loads are not generally used in practice by Ofcom during on-site commissioning, except at very high power transmitter sites.
- 6.10 We are therefore proposing to remove the requirement for licensees to provide a dummy load. The remainder of Section 2.9 of the code (specifying RF feeder arrangements and performance) would remain in place.

## MCI/FIC Repetition Rate and AIC

- 6.11 Sections 3.11 and 3.12 of the current Code concern minimum repetition rates for Multiplex Configuration Information (or MCI<sup>11</sup>) and Service Information (SI) within the Fast Information Channel (FIC<sup>11</sup>). These rates are also contained in the international standards for the DAB/DAB+ system which transmission systems are expected to conform to, and to which consumer receiver manufacturers design their products.
- 6.12 In recent years there has been an increase in the number of DAB+ encoded audio services on UK DAB multiplexes, particularly on the multiplexes transmitted as part of the small scale DAB trials which operate in ten areas of the UK.
- 6.13 Because the size (and hence transmitted duration) of the MCI is proportional to the number of audio services carried on the multiplex, it may not always be possible to meet the required repetition rate when a multiplex carries a large number of services.
- 6.14 For example, the current version of the open-source ODR-DabMux<sup>12</sup> multiplexer used in the small scale DAB trials cannot sustain the required repetition rate when more than 20 audio services are carried in the multiplex, although other multiplexer designs may have different inherent limits.

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<sup>11</sup> <https://www.worlddab.org/glossary>

<sup>12</sup> <https://wiki.opendigitalradio.org/ODR-DabMux>

- 6.15 The current international technical standard TS 103 176<sup>13</sup> that sets repetition rates for DAB/DAB+ also states that the nominal repetition rates can be expected to be met when a multiplex carries up to 20 DAB+ audio services. It does, however, allow for reduced repetition rates under some circumstances of multiplex loading, with the proviso that repetition rates should not fall below one-third of the nominal rates (and noting that receiver behaviour may be impaired).
- 6.16 We do not have detailed information on the design or behaviour of other commercial multiplexing equipment, or on the practical impact of slower repetition rates on domestic radios. We are aware that some multiplexes have operated carrying significantly more than 20 services in some areas without any reported issues with receivers. We have also carried out some testing of a limited sample of receivers presented with test signals with lower repetition rates than that specified in our Technical Code and not been able to identify any significant problems.
- 6.17 In order to more clearly articulate the link between MCI repetition rates and the number of services carried, and to provide consistency with the international standards for DAB, we propose
- a) adding an explanatory note on repetition rates to section 3.11 of the Code (renumbered as Sections 3.10 & 3.11 in the draft Code) and alerting broadcasters to the risk that the minimum repetition rate may not be met when the multiplex carries more than 20 services; and
  - b) amending the requirement on repetition rate in our Technical Code so that it aligns with the limits set out in TS 103 176 which permits lower repetition rates to be used under some circumstances of multiplex loading.
- 6.18 If broadcasters or other interested parties can provide evidence that the minimum MCI repetition rate can be maintained when more than 20 services are carried on a multiplex, or that the functioning of domestic receivers is or is not impaired when the repetition rate falls below ten times per second, we would welcome such information.
- 6.19 On a related matter, Section 3.13 of the current Code states that the Auxiliary Information Channel (AIC) can be used to address any overflow from the FIC. However, the AIC has been removed from the current version of the international technical standard for DAB<sup>14</sup>, and therefore we propose deleting this reference from Code.

## Error Protection

- 6.20 In our statement following our previous consultation<sup>15</sup> on the Digital Radio Codes in 2014, we stated that we would introduce a minimum error protection level for DAB, and a fixed error protection level for DAB+. The current Guidance (sections 4.19 to 4.21) does contain text reflecting this position, however for completeness we propose to include

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<sup>13</sup> ETSI TS 103 176 V2.1.1 *Digital Audio Broadcasting (DAB); Rules of implementation; Service information features*

<sup>14</sup> ETSI EN 300 401 *Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers*

<sup>15</sup> <https://www.ofcom.org.uk/consultations-and-statements/category-2/digital-radio-tech-codes>

corresponding text in the Code itself. This proposed text is in Sections 3.14 and 3.15 of the draft Code.

## Data Services: Code Section 4

- 6.21 In the interests of clarity, we propose changing the title of Section 4 of the Code from 'Relationship of data services to bearer conduits' to 'Data Services and Features'

## SId & TII Codes

- 6.22 Currently, the 'features' table in section 4.3 of the Code states that the Service Identifier (SId) code must be unique for each service. However, only a finite number of SId codes are available, and the 'pool' of available codes is also shared by RDS PI codes for FM radio stations.
- 6.23 Depending on the eventual number of small scale multiplexes which launch in future, it is possible that there may not be sufficient unused SIds available to provide each station with a unique code, and that code re-use (on a geographically separated basis) may be required. We therefore propose to remove the description of the SId code as being 'unique' for each service.
- 6.24 Until such time as the SId range is exhausted, Ofcom will continue to allocate unique SId codes. We will also carry out a more detailed analysis of any implications (e.g. on receiver behaviour) of SId code re-use before issuing non-unique codes.
- 6.25 We would however welcome views, in particular from receiver manufacturers, on this proposed change.
- 6.26 For similar reasons of possible future scarcity, TII (Transmitter Identification Information) codes may need to be re-used in future, though this will depend on the eventual size and topologies of the new DAB transmitter networks.
- 6.27 TII codes are not currently required to be unique. We also understand that TII information is not currently used by domestic receivers. However, we would welcome input from respondents to this consultation on any implications of future TII code re-use.
- 6.28 More generally, Ofcom currently centrally allocates codes (e.g. SId, Eld and TII) to DAB multiplexes and services as part of our normal technical licensing processes. In line with our general approach of only regulating where necessary, we would welcome stakeholders' initial views on whether alternative models for administering code allocations might be more appropriate, e.g. whether an external body that is suitably skilled and resourced could take on this role. Such a body would need to be able to provide codes to all future DAB services and multiplexes on an efficient, fair, reasonable and non-discriminatory basis. If responses to this consultation indicate that a change of approach to code allocation would be beneficial to the sector, we will formally consult separately on any proposed changes later in 2019.



## References to international standards

6.29 References to international standards documents have been updated throughout the draft Code and Guidance.

### Consultation question 4

Do you agree with our other proposed revisions to the Digital Radio Technical Code outlined in Section 6 of this document? Do you have any views on alternative models for dealing with the administration of Sid and TII codes?

## 7. Technical Policy Guidance for DAB Multiplex Licensees: other proposed revisions

### Audio characteristics

- 7.1 Sections 2.1 to 2.4 of the Technical Policy Guidance deal with Ofcom's position on the allocation of, and changes to, the audio characteristics of services carried on DAB multiplexes.
- 7.2 However, our policy regarding the audio characteristics of future small scale DAB services has not yet been set: this issue will form part of our separate future consultation on the licensing of small scale DAB.
- 7.3 Therefore, we are proposing to modify the current Guidance to clarify that sections 2.1 to 2.4 apply only to national and local DAB multiplex licences.
- 7.4 When the policy for small scale DAB has been determined, we will revise and re-issue the Guidance in line with this policy.

### Consultation question 5

Do you agree with our other proposed revisions to the Technical Policy Guidance for DAB Multiplex Licensees document outlined in Section 7 of this document?

# A1. Responding to this consultation

## How to respond

- A1.1 Ofcom would like to receive views and comments on the issues raised in this document, by 5pm on 18 March 2019.
- A1.2 You can download a response form from <https://www.ofcom.org.uk/consultations-and-statements/category-2/revisions-to-digital-radio-technical-codes>. 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](mailto:broadcast.technical@ofcom.org.uk), as an attachment in Microsoft Word format, together with the cover sheet (<https://www.ofcom.org.uk/consultations-and-statements/consultation-response-coversheet>).
- A1.4 Responses may alternatively be posted to the address below, marked with the title of the consultation:
- Spectrum Radio & TV Broadcast Team  
Ofcom  
3<sup>rd</sup> Floor, 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 email [broadcast.technical@ofcom.org.uk](mailto:broadcast.technical@ofcom.org.uk) and a member of the team will contact you.

## 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 our website, [www.ofcom.org.uk](http://www.ofcom.org.uk), 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 at <https://www.ofcom.org.uk/about-ofcom/website/terms-of-use>.

## Next steps

A1.15 Following this consultation period, Ofcom plans to publish a statement during Spring 2019.

A1.16 If you wish, you can register to receive mail updates alerting you to new Ofcom publications; for more details please see <https://www.ofcom.org.uk/about-ofcom/latest/email-updates>

## Ofcom's consultation processes

- A1.17 Ofcom aims to make responding to a consultation as easy as possible. For more information, please see our consultation principles in Annex x.
- A1.18 If you have any comments or suggestions on how we manage our consultations, please email us at [consult@ofcom.org.uk](mailto:consult@ofcom.org.uk). 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](mailto: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

Nothing

Name/contact details/job title

Whole response

Organisation

Part of the response

If there is no separate annex, which parts? \_\_\_\_\_

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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)

## A4. Consultation questions

A4.1 The questions that we are seeking views on in this consultation are reproduced below:

Question 1 – Do you agree with our proposed changes to the ACI/blocking procedures?

Question 2 – Do you have any comments on the adoption of the new ETSI mask characteristic and on the potential use of the non-critical spectrum mask?

Question 3 – Do you agree with our proposed changes on DAB+ audio encoding?

Question 4 – Do you agree with our other proposed revisions to the Digital Radio Technical Code outlined in Section 6 of this document? Do you have any views on alternative models for dealing with the administration of Sid and TII codes?

Question 5 - Do you agree with our other proposed revisions to the Technical Policy Guidance for DAB Multiplex Licensees document outlined in Section 7 of this document?