



Draft royal decree adopting measures to promote DAB+ technology in the terrestrial digital audio broadcasting (DAB) service.

Royal Decree 1287/1999 of 23 July 1999 approved the National technical plan for terrestrial digital audio broadcasting. Its main purpose was to ensure the orderly introduction of digital technology into the radio broadcasting sector (digital audio broadcasting [DAB] technology).

Its successive amendments have sought to promote the implementation of digital technology and to adapt the operating conditions of this audiovisual media service (AVMS) to the technological and economic situation of the sector at various times.

Subsequently, the European Electronic Communications Code, adopted in December 2018 and transposed into our current General Telecommunications Law 11/2022 of 28 June 2022, included constraints relating to the interoperability of car radio receivers, establishing that receivers integrated into a new category M vehicle presented for sale or rent in the European Union must include a receiver capable of receiving and reproducing at least the broadcasting services offered via terrestrial digital broadcasting.

This measure also shows the interest at European level in terrestrial audio broadcasting services using digital technologies.

Despite all this, the audience for terrestrial DAB AVMS in Spain remains comparatively small compared to other forms and technologies of radio audio broadcasting in our country.

One of the mechanisms available to relaunch the terrestrial DAB AVMS service in Spain consists in incorporating and extending the latest technologies available in this service, such as DAB+ technology.

DAB+ technology permits more efficient use of the spectrum, optimises audio signal coding by making it more robust against interference, allows advanced audio formats (multichannel sound) and makes it possible to incorporate certain functionalities such as the automatic safety alert (ASA) system.

Hence why this regulation adopts a series of measures to promote DAB+ technology in terrestrial DAB AVMS.

This provision has been subject to the procedure laid down in Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services and to the provisions of Royal Decree 1337/1999 of 31 July 1999 regulating the provision of information in the field of technical standards and regulations and of regulations on Information Society services.

This royal decree has been processed in accordance with the provisions of Article 133 of Law 39/2015 of 1 October, on the Common Administrative Procedure of Public Administrations, and Article 26 of Law 50/1997 of 27 November 1997, The Government. The draft has been notified by the National Commission on Markets and



Competition, in accordance with Article 5(2)(a) of Law 3/2013 of 4 June 2013 establishing the National Commission on Markets and Competition.

This royal decree is issued by virtue of the exclusive competence of the State regarding telecommunications, as recognised in Article 149(1.21) of the Spanish Constitution.

By virtue thereof, on the proposal of the Minister for Digital Transformation and the Civil Service, in agreement with the Council of State and after deliberation by the Council of Ministers at its meeting on xxx,

THE FOLLOWING IS DECREED:

Article 1. Purpose.

The purpose of this royal decree is to adopt the measures specified in the following articles and provisions to implement the promotion of DAB+ technology in terrestrial DAB AVMS.

Article 2. Technical specifications of broadcasts and number of radio channels in each terrestrial DAB network.

1. Terrestrial digital audio broadcasts using DAB technology must comply with specification TS 103 466 of the European Telecommunications Standards Institute (ETSI).

2. Terrestrial digital audio broadcasts using DAB+ technology must comply with the MPEG HE-AACv2 audio coding standard, in accordance with specification TS 102 563 of the European Telecommunications Standards Institute (ETSI).

3. The audio loudness level of programmes must be standardised in accordance with the relevant provisions of Standard ITU-R BS.1770 on measuring audio loudness and Recommendation EBU R-128 and their respective supplements.

4. Each network used to make terrestrial digital audio broadcasts using DAB technology, irrespective of its area of coverage, has the capacity to integrate a maximum of six sound broadcasting channels.

Each network, irrespective of its area of coverage, in which the competent body in audiovisual matters has decided that terrestrial digital audio broadcasting is carried out exclusively with DAB+ technology, has the capacity to integrate a maximum of 12 audio broadcasting channels.

Depending on technological and market developments, the Ministry for Digital Transformation and the Civil Service may, by order, modify the maximum number of radio broadcasting channels that can be integrated into a network, using both DAB and DAB+ technology.



5. Holders of licences for terrestrial DAB AVMS authorising them to provide DAB AVMS on a network may use part of the capacity allocated for the provision of services additional to, complementary to or different from radio broadcasting, provided that they do not exceed 20 % of the total capacity allocated to them.

Article 3. *Measures to promote DAB+ technology in terrestrial DAB AVMS at national level.*

1. The national-level terrestrial DAB service shall be provided exclusively using DAB+ technology.

2. The national-level terrestrial DAB service shall be provided via the networks specified in the National technical plan for terrestrial digital audio broadcasting, approved by Royal Decree 1287/1999 of 23 July 1999.

3. The use of the FU-E network shall be determined by order issued by the head of the Ministry for Digital Transformation and the Civil Service, depending on the possibility of configuring a network with territorial disconnections, the technological advances in DAB+ technology, the technological innovation of different standards for the terrestrial DAB service and changes in the radio market in Spain. In any event, until such use has been determined, the capacity of the FU-E network may be used to carry out tests of technological capacities and experimental uses, which must be authorised in accordance with the Regulation on the use of the public radio spectrum approved by Royal Decree 123/2017 of 24 February 2017.

4. The Spanish Radio and Television Corporation (RTVE) shall exploit the full capacity of the MF-I network for provision of the public service of national-level terrestrial DAB.

It must achieve at least the following levels of coverage:

- a) 50 % of the population within six months of this royal decree entering into force.
- b) 70 % of the population within 18 months of this royal decree coming into force, including at least 50 % of the population of each provincial capital.

Additionally, within this 18-month period, it must cover 50 % of the motorway and dual carriageway network.

- c) 80 % of the population within 30 months of this royal decree coming into force, including at least 70 % of towns with more than 25 000 inhabitants.

Additionally, within this 30-month period, it must cover 70 % of the motorway and dual carriageway network.

5. Current national-level licence holders for terrestrial DAB AVMS shall operate the radio audio broadcasting channels authorised by their licences via the MF-II network.

The coverage of the MF-II network must reach at least 20 %. When the audience share of the digital terrestrial radio broadcasting service exceeds 10 % of the overall



radio audience, the head of the Ministry for Digital Transformation and Public Service may, by order, set higher coverage targets for the MF-II network, subject to prior consultation with the licence holders concerned.

Article 4. Measures to promote DAB+ technology in regional and local terrestrial DAB AVMS.

1. Regional and local terrestrial DAB services shall be provided via the networks specified in the National technical plan for terrestrial digital audio broadcasting.

2. Initially, the regional and local terrestrial DAB service shall be provided using DAB technology, without prejudice to the possibility that each holder authorised to provide the service voluntarily and unilaterally decide to provide the service using DAB+ technology, after notifying the competent body for audiovisual matters in the respective autonomous community. In this case, the holder may not exceed the conditions laid down in the licence and, in particular, may not enjoy a greater number of DAB AVMS, by virtue of the provisions of Article 28(4) of General Law 13/2022 of 7 July 2022 on Audiovisual Media.

3. The competent authority for audiovisual matters in the autonomous community or city may decide at any time the date as of which broadcasts on regional networks in its autonomous community or city will be made exclusively using DAB+ technology, as well as the date on which this technology will be used exclusively on local networks planned in that autonomous community or city.

Once the competent audiovisual authority of the autonomous community or city has decided that only DAB+ technology may be used for broadcasting on regional or local networks planned within the territory of its autonomous community or city, the number of channels comprising each network shall be the maximum established in Article 2.4 for broadcasting using DAB+ technology.

At this time, the competent body in audiovisual matters of the autonomous community or city must decide whether all channels reserved for the DAB service, at regional or local level separately, are assigned to a single network, the other networks automatically being left unused by any holder authorised to provide the service. In this case, these unexploited networks will no longer be reserved for that autonomous community or city, and the corresponding spectral capacity may be used for the planning of new networks or for the modification of existing networks, regardless of their territorial scope.

Likewise, at this time, that competent body shall decide on the number of channels that will be allocated for provision of the public terrestrial DAB service and for licensed provision of the service, respectively, and may establish the corresponding coverage targets.

The competent authority for audiovisual matters in the autonomous community or city shall notify the Secretary of State for Telecommunications and Digital Infrastructure of any decision taken pursuant to the provisions of this section.



4. In the event that, within 36 months of the entry into force of this royal decree, the regional single-frequency network planned for each autonomous community and city in the National technical plan for terrestrial digital audio broadcasting does not have any licence holder authorised to provide the service, or the competent body responsible for audiovisual matters has not determined in that plan the allocation to the public service of that network or launched the corresponding call for tenders, the corresponding spectrum capacity shall no longer be reserved for that network and may be used for the planning of new networks or for the modification of existing ones, regardless of their territorial scope.

Article 5. *Technical management of terrestrial DAB networks.*

1. Entities sharing capacity in the networks defined in the National technical plan for terrestrial digital audio broadcasting must adopt agreements on everything that affects the technical management of these networks. In particular, they must designate a system operator.

2. Where a public service AVMS providing audio broadcasting is provided on a regional network, decisions on the technical management of the network shall be taken by the entity entrusted with that provision.

3. The National Commission for Markets and Competition shall be responsible for maintaining the Register of terrestrial digital audio broadcasting information parameters, whose regulation shall be established by order approved by the head of the Ministry for Digital Transformation and the Civil Service.

The competent bodies in the field of audiovisual media, at both national and regional level, must notify the National Commission for Markets and Competition of any decision they take regarding terrestrial DAB networks and licences that might affect the aforementioned Register, particularly any relating to the commencement or cessation of service provision.

4. Any disputes relating to technical management arising between entities operating audio broadcasting channels within the same network shall be settled by the National Commission on Markets and Competition by means of a resolution.

Article 6. *Automatic safety alert system.*

1. The managers of networks on which terrestrial DAB services are provided entirely using DAB+ technology on a mandatory basis, in accordance with this royal decree, must ensure that these networks are capable of managing and sending public alerts in accordance with the Automatic Safety Alert System (ASA), as defined by technical specifications TS 104 089 and TS 104 090 of the European Telecommunications Standards Institute (ETSI).

In particular, managers of national and regional networks providing the public service of DAB AVMS and via which, in accordance with the previous paragraph, public warnings can be sent in accordance with the automatic safety alert (ASA)



system), must provide the authorities responsible for sending such warnings with the capacities they need to transmit warning messages via that network and provide other networks, with which they share coverage and whose service areas are affected by the warnings, the relevant information on the warning messages they transmit.

2. Taking into account developments in the technical configuration of the networks and equipment used for broadcasting and the service coverage reached, the head of the Ministry for Digital Transformation and the Civil Service shall, by order, determine the applicable requirements and the date from which the functionalities referred to in the previous section must be operational.

Article 7. Characteristics of terrestrial DAB receivers.

1. Terrestrial DAB receivers marketed in Spain must include clear and detailed user information on the capabilities they possess, including in particular that relating to DAB and DAB+ technologies and additional functionalities, in particular those relating to the automatic safety warning system.

2. Receivers capable of receiving and reproducing terrestrial DAB services broadcast through technologies other than terrestrial DAB must permit easy and direct access to such terrestrial radio audio broadcasting services and include functionalities enabling users to easily change settings and default settings.

First transitional provision. Amendments to the licences granted for the provision of DAB AVMS.

Any amendments to the licences granted for the provision of DAB AVMS resulting from application of this royal decree will be approved, at each instance, by the competent bodies responsible for granting them.

Second transitional provision. Amendments to the licences granted for the use of the public radio frequencies.

The Secretariat of State for Telecommunications and Digital Infrastructure shall, *ex officio*, make such amendments to the licences granted for the use of the public radio domain as may be necessary as a consequence of application of this royal decree, noting them in the corresponding registers.

Repealing provision. Regulatory repeal.

1. The following are hereby repealed: section 1, section 3, last paragraph, section 4, last paragraph, section 5, section 6, section 7 and section 8 of the first additional provision and Article 2.3 of the Annex (National technical plan for terrestrial digital audio broadcasting) to Royal Decree 1287/1999 of 23 July 1999 approving the National technical plan for terrestrial digital audio broadcasting.



2. Any provisions of equal or lower status that run contrary to the provisions of this royal decree are hereby repealed.

First final provision. *Amendment of Royal Decree 1287/1999 of 23 July 1999 approving the National technical plan for terrestrial digital audio broadcasting.*

Royal Decree 1287/1999 of 23 July 1999 approving the National technical plan for terrestrial digital audio broadcasting is amended as follows:

One. Article 6 of the Annex (National technical plan for terrestrial digital audio broadcasting) is worded as follows:

‘Article 6. International coordination.

1. The technical characteristics of the stations shall be subject to any modifications that might result from application of the international coordination procedures provided for in the Regional Radiocommunication Conference Agreement (CRR-2006), adopted in Geneva in June 2006, as well as in any other international agreements that might bind the Spanish State within the framework of the International Telecommunication Union (ITU) or the European Conference of Postal and Telecommunications Administrations (CEPT).

2. The Secretary of State for Telecommunications and Digital Infrastructure may, in exceptional circumstances, authorise stations using frequency blocks other than those provided for in this technical plan, particularly where this is necessary as a result of international coordination agreements or to ensure radio compatibility with neighbouring areas.

Two. Article 7 of the Annex (National technical plan for terrestrial digital audio broadcasting) is worded as follows:

‘Article 7. Adjustments to local network planning.

The list of municipalities making up each local district may be amended by resolution of the head of the Secretariat of State for Telecommunications and Digital Infrastructure, at the request of the competent audiovisual authority of the respective autonomous community.’

Second final provision. *Amendment of the Regulation governing common telecommunications infrastructure for access to telecommunications services in the interior of buildings, approved by Royal Decree 346/2011 of 11 March 2011.*

The Regulation governing common telecommunications infrastructure for access to telecommunications services in the interior of buildings, approved by Royal Decree 346/2011 of 11 March 2011, is amended as follows:

One. Section 4.4.2 of Annex I to the Regulation reads as follows:

‘4.4.2. Channel amplitude/frequency response.



Channel amplitude/frequency response for signals	UNIT	FREQUENCY BAND	
		47 MHz - 694 MHz	950 MHz - 2.150 MHz
FM-Radio, AM-TV*, 64QAM	dB	±3 dB across the entire band; ±0.5 dB within a bandwidth of 1 MHz	-
FM-TV, QPSK-TV	dB	≤ 6	±4 dB across the entire band; ±1.5 dB within a bandwidth of 1 MHz.
COFDM-DAB/DAB+, COFDM-TV, COFDM 256QAM-TV	dB	±3 dB across the entire band'	-

Two. Section 4.5 of Annex I to the Regulation reads as follows:

'4.5. Quality levels for audio and television broadcasting services.

In any case, the signals distributed to each user outlet must meet the following characteristics:

PARAMETER	UNIT	FREQUENCY BAND	
		47 MHz - 694 MHz	950 MHz - 2.150 MHz
Signal level			
AM-TV level*	dBμV	57-80	
64QAM-TV level	dBμV	45-70 (1)	
QPSK-TV level	dBμV	47-77 (1)	
FM radio level	dBμV	40-70	
DAB/DAB+ radio level	dBμV	30-70 (1)	
COFDM-TV level	dBμV	47-70 (1)	
Carrier to random noise ratio			
C/N FM-radio	dB	≥ 38	
C/N AM-TV*	dB	≥ 43	
C/N QPSK-TV	QPSK DVB-S	dB	> 11
	QPSK DVB-S2		> 12
C/N 8PSK DVB-S2	dB	> 14	
C/N 64QAM-TV	dB	≥ 28	
C/N COFDM-DAB/DAB+	dB	≥ 18	
C/N COFDM TV	dB	≥ 25	



PARAMETER	UNIT	FREQUENCY BAND
Differential gain and phase		
Gain	%	14
Phase	°	12
Carrier-to-interference ratio at single frequency		
AM-TV*	dB	≥ 54
64 QAM-TV	dB	≥ 35
QPSK-TV	dB	≥ 18
COFDM-TV	dB	≥ 10 (3)
Intermodulation ratio (4)		
AM-TV*	dB	≥ 54
64 QAM-TV	dB	≥ 35
QPSK-TV	dB	≥ 18
COFDM-TV	dB	≥ 30 (3)
Overall installation quality parameters		
BER 64 QAM-TV	(5)	9×10^{-5}
VBER QPSK	(6)	9×10^{-5}
BER COFDM-TV	(5)	9×10^{-5}
BER COFDM RADIO DAB/DAB+	(5)	5×10^{-4}
MER COFDM TV	dB	≥ 21 at the outlet (2)
MER COFDM-256QAM TV (DVB-T2)	dB	≥ 22 at the outlet (2)

(*) The quality levels for AM-TV signals are provided solely so that they may be taken into account in the event that you wish to distribute any non-compulsory distribution signal in the ICT (common telecommunications infrastructure using this modulation).

BER (Bit Error Rate): measures the bit error rate after the two error protection stages (Viterbi and Reed Solomon), if present.

VBER (Viterbi Bit Error Rate): measures the bit error rate after Viterbi (if present) and before Reed Solomon.

(1) For digital modulations, the levels refer to the power value across the entire bandwidth of the channel.

(2) For COFDM-64QAM TV, the recommended MER (Modulation Error Ratio) value at the outlet is 22 dB. On the other hand, if the influence of the receiving installation as a whole is taken into account, the minimum MER value at the antenna is 23 dB.

For COFDM-256QAM TV, the recommended MER value at the outlet is 23 dB and at the antenna 24 dB.

(3) For 64 QAM 2/3 modulations.



- (4) the specified parameter refers to third order intermodulation, produced by beating between the components of any two frequencies present in the network.
- (5) Measured at the input of the Reed-Solomon decoder.
- (6) This is the BER measured after convolutional decoding (Viterbi).¹

Third final provision. *Authorisation to modify frequency blocks.*

The head of the Secretariat of State for Telecommunications and Digital Infrastructure is authorised to modify the frequency blocks established in the National technical plan for terrestrial digital audio broadcasting, taking into account the limitations associated with the availability of the public radio spectrum and international frequency coordination.

Fourth final provision. *Regulatory implementation and application.*

1. The head of the Ministry for Digital Transformation and the Civil Service shall, within the scope of their powers, issue any provisions necessary to implement the provisions of this royal decree.

2. The head of the Ministry of Digital Transformation and the Civil Service and the head of the State Secretariat for Telecommunications and Digital Infrastructure shall, within the scope of their powers, approve all measures necessary for the application of the provisions of this royal decree.

Fifth final provision. *Entry into force.*

This royal decree shall enter into force three months after the day after its publication in the 'Official State Gazette'.

Issued in Madrid, on XXX of XXXX of XXXX.

FELIPE R.

The Minister for Digital Transformation and the Civil Service,
Óscar López Águeda