

Draft **ETSI EN 303 345-5** V1.2.0 (2021-09)



**Broadcast Sound Receivers;
Part 5. DRM broadcast sound service;
Harmonised Standard for access to radio spectrum**

[ETSI EN 303 345-5 V1.2.0 \(2021-09\)
https://standards.iteh.ai/catalog/standards/sist/e963ee70-9678-4f15-be70-74f306a20d2c/etsi-en-303-345-5-v1-2-0-2021-09](https://standards.iteh.ai/catalog/standards/sist/e963ee70-9678-4f15-be70-74f306a20d2c/etsi-en-303-345-5-v1-2-0-2021-09)

Reference

REN/ERM-TG17-159

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Foreword

ETSI EN 303 345-5 V1.2.0 (2021-09)

This draft Harmonised European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.2] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.1].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

The present document is part 5 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

The present document has a number of test data files that are contained in archive en_30334501v010101p0.zip which accompanies ETSI EN 303 345-1 [1].

Proposed national transposition dates

Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

The present document provides the necessary limits and conformance requirements for radio receivers to meet the essential requirements of article 3.2 of Directive 2014/53/EU [i.1] for the DRM sound broadcast service and is used with reference to ETSI EN 303 345-1 [1], which describes the generic requirements and test methods.

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1 Scope

The present document specifies technical characteristics and methods of measurements for broadcast sound receivers with DRM demodulation.

NOTE: The relationship between the present document and essential requirements of article 3.2 of Directive 2014/53/EU [i.1] is given in annex A.

2 References

2.1 Normative references

References are specific, identified by date of publication and/or edition number or version number. Only the cited version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <https://docbox.etsi.org/Reference/>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

- [1] ETSI EN 303 345-1 (V1.1.1) (06-2019): "Broadcast Sound Receivers; Part 1: Generic requirements and measuring methods".
- [2] ETSI ES 201 980 (V4.1.1) (01-2014): "Digital Radio Mondiale (DRM); System Specification".
- [3] EN 55032:2015: "Electromagnetic compatibility of multimedia equipment - Emission Requirements", produced by CENELEC
<https://standards.iteh.ai/catalog/standards/sist/e963ee70-9678-4f15-be70-74f306a20d2c/etsi-en-303-345-5-v1-2-0-2021-09>

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.
- [i.2] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.
- [i.3] Void.
- [i.4] Void.
- [i.5] AES17: "AES standard method for digital audio engineering - Measurement of digital audio equipment".

- [i.6] ETSI EG 203 336 (V1.1.1) (08-2015): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide for the selection of technical parameters for the production of Harmonised Standards covering article 3.1(b) and article 3.2 of Directive 2014/53/EU".
- [i.7] ITU GE75: "Final Acts of the Regional Administrative LF/MF Broadcasting Conference (Regions 1 and 3)".
- [i.8] ITU GE84: "Final Acts of the Regional Administrative Radio Conference for the Planning of the VHF Sound Broadcasting (Region 1 and part of Region 3)".
- [i.9] ITU GE06: "Final Acts RRC-06".
- [i.10] Recommendation ITU-R BS.1615-1 (05/2011): "Planning parameters' for digital sound broadcasting at frequencies below 30 MHz".
- [i.11] Recommendation ITU-R BS.1660-7 (10/2015): "Technical basis for planning of terrestrial digital sound broadcasting in the VHF band".
- [i.12] Recommendation ITU-R SM.332-4 (07/1978): "Selectivity of Receivers".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in Directive 2014/53/EU [i.1] and the following apply:

built-in antenna: antenna that cannot be detached from the equipment

integral antenna: antenna which is detachable from the equipment without the use of any tools, and not using a 50 Ω or 75 Ω external connector

NOTE: A device that uses a supplied earphone as the antenna has an integral antenna.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

dBFS	decibels relative to Full Scale in accordance with AES17 [i.5]
dBm	decibels relative to 1 mW of power
dB μ V/m	decibels relative to 1 μ V/m

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AAC	Advanced Audio Coding
ACS	Adjacent Channel Selectivity
ADC	Analogue to Digital Converter
AM	Amplitude Modulation
DDC	Direct Digital Conversion
DRM	Digital Radio Mondiale
EFTA	European Free Trade Association
EU	European Union
HF	High Frequency
ITU-R	International Telecommunications Union - Radiocommunications sector
LF	Low Frequency
LO	Local Oscillator
MF	Medium Frequency
MSC	Main Service Channel

NZIF	Near-Zero Intermediate Frequency
OFDM	Orthogonal Frequency Division Modulation
RED	Radio Equipment Directive
RF	Radio Frequency
RM	Robustness Mode
VHF	Very High Frequency

4 Technical requirements specifications

4.1 Test signal configurations

The generated DRM signals (wanted and unwanted) and the blocking signal shall be in accordance in table 1.

Table 1: DRM configuration

Parameter	DRM signals						AM signal
	Wanted			Unwanted			Blocking
Audio coding	Service label: "Sine 1 kHz" 1 kHz tone at a level of -3 dBFS Coding: mono AAC at maximum permitted rate			Service label: "Sine 2 kHz" 2 kHz tone at a level of -3 dBFS Coding: mono AAC at maximum permitted rate			1 kHz tone
Frequency band	LF/MF	HF	VHF	LF/MF	HF	VHF	
Channel coding parameters	RM flag	0	0	1	0	0	1
	protection level	1	1	2	1	1	2
	MSC mode	0	0	0	0	0	0
	interleaver depth	1	0	1	1	0	0
	robustness mode	B	B	E	B	B	E
spectrum occupancy	2	3	0	2	3	0	
Other modulation Parameters	DRM signal to ETSI ES 201 980 [2], clause 8			DRM signal to ETSI ES 201 980 [2], clause 8			80 % depth

NOTE: Level is defined in accordance with AES17 [i.5].

An arbitrary waveform file producing the blocking signal is available in archive en_30334501v010101p0.zip which accompanies ETSI EN 303 345-1 [1].

4.2 Sensitivity

4.2.1 Definition

The receiver sensitivity is the minimum wanted signal level required to provide a given level of audio quality.

4.2.2 Limits

The limits for sensitivity specified in table 2 shall apply. Each figure quoted is the required level of wanted signal which provides a given level of audio quality. The audio impairment criteria relevant for these tests is clean audio: that is 10 seconds of audio without impairments (e.g. no muting, clicks, warbles or squeaks).

Table 2: DRM sensitivity limits

De-modulation	Tuned frequency band	Wanted signal centre frequency (MHz)	Required sensitivity limit	
			Conducted (dBm)	Radiated (dBµV/m)
DRM	LF	0,216	-99	58
	MF	0,999	-99	52
	HF1	4	-99	44
	HF2	19	-99	40
	VHF band I	65	-100	45
	VHF band II	100	-100	46
	VHF band III	200	-100	51

4.2.3 Conformance

Conformance tests as defined in ETSI EN 303 345-1 [1], clause 5.3.4.2 shall be carried out for each DRM band provided by the receiver. The wanted signal generator shall be set to produce a signal according to table 1 at the centre frequency according to table 2. The required sensitivity level shall be as indicated in table 2. If the impairment criterion given in clause 4.2.2 is met then the receiver has passed the sensitivity requirement.

4.3 Adjacent channel selectivity and blocking

4.3.1 Definition

The adjacent channel selectivity is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted signal which differs in frequency from the wanted signal by an amount equal to the adjacent channel separation. The wanted and unwanted signals are of the same modulation type.

The blocking ratio at a given frequency separation, is a measure of the capability of the receiver to receive a wanted modulated signal without exceeding a given degradation due to the presence of an unwanted input signal.

In order to provide effective use of spectrum, devices shall be able to demodulate the tuned signal in the presence of similar signals in adjacent channels. In addition, testing shall also be performed to check the ability of the receiver to work effectively with interfering signals at a greater separation from the wanted signal (blocking).

The channel spacings specified in table 3 shall apply.

Table 3: Channel spacing for adjacent channel selectivity and blocking

Demodulation	Tuned frequency band	Unwanted frequency (N = 1, 2, 3)	Unwanted frequency (blocking)
DRM	LF	$\pm N \times 9$ kHz	± 90 kHz
	MF	$\pm N \times 9$ kHz	± 90 kHz
	HF	$\pm N \times 10$ kHz	± 100 kHz
	VHF band I	$\pm N \times 100$ kHz	± 800 kHz
	VHF band II	$\pm N \times 100$ kHz	± 800 kHz
	VHF band III	$\pm N \times 100$ kHz	± 800 kHz

4.3.2 Limits

The limits for selectivity and blocking specified in table 4 shall apply with the channel spacings given in table 3. Each figure quoted is the minimum acceptable level of unwanted signal, relative to that of the wanted signal, which provides a given level of audio quality. The audio impairment criterion relevant for these tests is clean audio: that is 10 seconds of audio without impairments (e.g. no muting, clicks, warbles or squeaks).