



SLOVENSKI STANDARD
SIST EN 303 345-3 V1.1.1:2021

01-september-2021

Radiodifuzijski zvočni sprejemniki - 3. del: Radiodifuzijska zvočna storitev FM - Harmonizirani standard za dostop do radijskega spektra

Broadcast Sound Receivers - Part 3: FM broadcast sound service - Harmonised Standard for access to radio spectrum

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Ta slovenski standard je istoveten z: ^{SIST EN 303 345-3 V1.1.1:2021} ETSI EN 303 345-3 V1.1.1 (2021-06)

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ICS:

33.060.20	Sprejemna in oddajna oprema	Receiving and transmitting equipment
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SIST EN 303 345-3 V1.1.1:2021 **en**

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ETSI EN 303 345-3 V1.1.1 (2021-06)



**Broadcast Sound Receivers;
Part 3: FM broadcast sound service;
Harmonised Standard for access to radio spectrum**

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Reference

DEN/ERM-TG17-153

Keywords

analogue, broadcast, harmonised standard, radio, receiver

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Foreword

This Harmonised European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).
SIST EN 303 345-3 V1.1.1:2021
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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 3 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].

National transposition dates

Date of adoption of this EN:	31 May 2021
Date of latest announcement of this EN (doa):	31 August 2021
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	28 February 2022
Date of withdrawal of any conflicting National Standard (dow):	28 February 2023

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 FM 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 the test signal configuration and the limits for sensitivity, selectivity, blocking and unwanted emissions in the spurious domain for devices that receive FM broadcast sound services.

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 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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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] Recommendation ITU-R BS.468-4 (07/1986): "Measurement of audio-frequency noise voltage level in sound broadcasting"
- [3] Recommendation ITU-R BS.559-2 (06/1990): "Objective measurement of radio-frequency protection ratios in LF, MF and HF broadcasting"
- [4] EN 55032:2015: "Electromagnetic compatibility of multimedia equipment - Emission Requirements", produced by CENELEC.

2.2 Informative references

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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] Recommendation ITU-R BS.641 (07/1986): "Determination of radio-frequency protection ratios for frequency-modulated sound broadcasting".

- [i.4] AES17: "AES standard method for digital audio engineering - Measurement of digital audio equipment".
- [i.5] 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.6] 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.7] Recommendation ITU-R BS.412-9 (12/1998): "Planning standards for terrestrial FM sound broadcasting at VHF".
- [i.8] 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

crest factor: peak to rms voltage ratio

external antenna: antenna designed to be connected to the equipment with the use of a 50 Ω or 75 Ω external connector

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.4]

dBm: decibels relative to 1 mW of power

dBQ: audio decibels after Recommendation ITU-R BS.468-4 [2] noise weighting and a quasi-peak detector have been applied

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:

ACS	Adjacent Channel Selectivity
ADC	Analogue to Digital Converter
ALC	Automatic Level Control
AM	Amplitude Modulation
ATT	ATTenuation
BS	Broadcast Sound
BW	BandWidth
DDC	Direct Digital Conversion
EFTA	European Free Trade Association
EU	European Union

FM	Frequency Modulation
IQ	In-phase and Quadrature
ITU-R	International Telecommunications Union - Radiocommunications sector
LO	Local Oscillator
NZIF	Near-Zero Intermediate Frequency
PC	Personal Computer
RBW	Resolution BandWidth
RED	Radio Equipment Directive
RF	Radio Frequency
RMS	Root Mean Square
SNR	Signal to Noise Ratio
SWT	SWEEP Time
USB	Universal Serial Bus
VHF	Very High Frequency

4 Technical requirements specifications

4.1 Test signal configurations

The generated FM signals (wanted and unwanted) and the blocking signal shall be in accordance with table 1. The configuration is based on Recommendation ITU-R BS.641 [i.3].

Table 1: FM configuration

Parameter	FM signals		AM signal Blocking
	Wanted	Unwanted	
Audio modulation	1 kHz tone	Weighted noise Recommendation ITU-R BS.559-2 [3], clause 1, band- limited to 15 kHz (see note 1)	1 kHz tone
Other modulation parameters	$\pm 60,8$ kHz peak deviation	15,9 kHz RMS deviation (see note 2)	80 % depth
Pilot tone	None	None	

NOTE 1: The filter shall have a cut-off frequency of 15 kHz and a minimum roll-off of 60 dB/octave.
NOTE 2: This is equivalent to a quasi-peak deviation of 34,8 kHz and has pre-emphasis enabled. The quasi-peak level measurement is defined by Recommendation ITU-R BS.641 [i.3], clause 5; with pre-emphasis disabled the quasi-peak deviation is 32 kHz (14,5 kHz RMS).

The means of generating the noise modulation for the "unwanted" signal is shown in figure 1.