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Oddajniška oprema za zvokovne radiodifuzijske storitve s frekvenčno modulacijo (FM) - Harmonizirani standard, ki zajema bistvene zahteve člena 3.2 direktive 2014/53/EU

Transmitting equipment for the Frequency Modulated (FM) sound broadcasting service - Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

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Frequency Modulated (FM) sound broadcasting service;
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Contents

Intellectual Property Rights	6
Foreword.....	6
Modal verbs terminology.....	6
Introduction	6
1 Scope.....	7
2 References	7
2.1 Normative references	7
2.2 Informative references.....	7
3 Definitions, symbols and abbreviations	8
3.1 Definitions.....	8
3.2 Symbols.....	9
3.3 Abbreviations	9
4 Technical requirements specifications	10
4.1 Environmental profile.....	10
4.2 Conformance requirements	10
4.2.1 Rated output power.....	10
4.2.1.1 Definition	10
4.2.1.2 Limit.....	10
4.2.1.3 Conformance.....	10
4.2.2 Frequency drift.....	10
4.2.2.1 Definition	10
4.2.2.2 Limit.....	10
4.2.2.3 Conformance.....	10
4.2.3 Deviation sensitivity stability	10
4.2.3.1 Definition.....	10
4.2.3.2 Limit.....	10
4.2.3.3 Conformance.....	11
4.2.4 Residual AM (Hum and noise).....	11
4.2.4.1 Definition	11
4.2.4.2 Limits.....	11
4.2.4.3 Conformance.....	11
4.2.5 Synchronous AM (AM due to FM)	11
4.2.5.1 Definition	11
4.2.5.2 Limit.....	11
4.2.5.3 Conformance.....	11
4.2.6 Modulator performance (pulse response)	11
4.2.6.1 Definition	11
4.2.6.2 Limit.....	11
4.2.6.3 Conformance.....	12
4.2.7 MPX intermodulation	12
4.2.7.1 Definition	12
4.2.7.2 Limit.....	12
4.2.7.3 Conformance.....	12
4.2.8 Deviation limiting.....	12
4.2.8.1 Definition	12
4.2.8.2 Limit.....	12
4.2.8.3 Conformance.....	12
4.2.9 FM Signal to Noise Ratio (SNR)	12
4.2.9.1 Definition	12
4.2.9.2 Limit.....	13
4.2.9.3 Conformance.....	13
4.2.10 Spurious emissions	13
4.2.10.1 Definition	13
4.2.10.2 Limit.....	13

4.2.10.3	Conformance	14
4.2.11	Transmitter muting during frequency shift	14
4.2.11.1	Definition	14
4.2.11.2	Limit	14
4.2.11.3	Conformance	14
4.2.12	Out-of-band emissions	15
4.2.12.1	Definition	15
4.2.12.2	Limit	15
4.2.12.3	Conformance	15
5	Testing for compliance with technical requirements	16
5.1	Environmental conditions for testing	16
5.2	Interpretation of the measurement results	16
5.3	Methods of measurement	16
5.3.1	Rated output power	16
5.3.1.1	Initial conditions	16
5.3.1.2	Procedure	17
5.3.1.3	Test requirements	17
5.3.2	Frequency drift	17
5.3.2.1	Initial conditions	17
5.3.2.2	Procedure	17
5.3.2.3	Test requirements	17
5.3.3	Deviation sensitivity stability	18
5.3.3.1	Initial conditions	18
5.3.3.2	Procedure	18
5.3.3.3	Test requirements	18
5.3.4	Residual AM (Hum and noise)	18
5.3.4.1	Initial conditions	18
5.3.4.2	Procedure	19
5.3.4.3	Test requirements	19
5.3.5	Synchronous AM (AM due to FM)	19
5.3.5.1	Initial conditions	19
5.3.5.2	Procedure	19
5.3.5.3	Test requirements	20
5.3.6	Modulator performance (pulse response)	20
5.3.6.1	Initial conditions	20
5.3.6.2	Procedure	20
5.3.6.3	Test requirements	21
5.3.7	MPX intermodulation	21
5.3.7.1	Initial conditions	21
5.3.7.2	Procedure	21
5.3.7.3	Test requirements	21
5.3.8	Deviation limiting	22
5.3.8.1	Initial conditions	22
5.3.8.2	Procedure	22
5.3.8.3	Test requirements	22
5.3.9	FM Signal to Noise Ratio (SNR)	23
5.3.9.1	Initial conditions	23
5.3.9.2	Procedure	23
5.3.9.3	Test requirements	23
5.3.10	Spurious emissions	23
5.3.10.1	Initial conditions	23
5.3.10.2	Procedure	24
5.3.10.3	Test requirements	24
5.3.11	Transmitter muting during frequency shift	24
5.3.11.1	Initial conditions	24
5.3.11.2	Procedure	24
5.3.11.3	Test requirements	25
5.3.12	Out-of-band emissions	25
5.3.12.1	Initial conditions	25
5.3.12.2	Procedure	25
5.3.12.3	Test requirements	26

Annex A (informative):	Relationship between the present document and the essential requirements of Directive 2014/53/EU	27
Annex B (normative):	General measuring arrangements	28
B.1	Testing arrangements for antenna port measurements	28
B.1.1	Testing arrangement for monophonic transmitters	28
B.1.2	Testing arrangement stereophonic transmitters	29
B.1.3	Test frequency range	30
B.1.4	Test modulating signal	30
B.2	Test load characteristics	32
Annex C (informative):	Change History	33
History		34

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[SIST EN 302 018 V2.1.1:2017](https://standards.iteh.ai/catalog/standards/sist/874e1e2f-4db0-49df-b321-0059cdd316d9/sist-en-302-018-v2-1-1-2017)

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Foreword

This Harmonised European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.4] 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.

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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).

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Introduction

The present document describes the requirements for the design and operation of an FM sound broadcasting service transmitter to meet the essential requirements of article 3.2 of Directive 2014/53/EU [i.1].

1 Scope

The present document specifies technical characteristics and methods of measurements for transmitter equipment for broadcast sound services using the frequency modulated sound broadcasting service operating in the frequency range 68 MHz to 108 MHz.

The present document covers the essential requirements of article 3.2 of Directive 2014/53/EU [i.1] under the conditions identified 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/>.

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

- [1] Recommendation ITU-R BS.468-4 (1986): "Measurement of audio-frequency noise voltage level in sound broadcasting".
- [2] Recommendation ITU-R BS.450-3 (2001): "Transmission standards for FM sound broadcasting at VHF".

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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] ETSI TR 100 028 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".
- [i.3] ETSI TR 100 028-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2".
- [i.4] 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.5] Recommendation ITU-R BS.412 (1998): "Planning standards for terrestrial FM sound broadcasting at VHF".

- [i.6] Recommendation ITU-R BS.641 (1986): "Determination of radio-frequency protection ratios for frequency-modulated sound broadcasting".

3 Definitions, symbols and abbreviations

3.1 Definitions

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

antenna port: port of an apparatus which is designed, in normal operation, to be connected to an antenna using coaxial cable

broadcasting service: radio communication service in which the transmissions are intended for direct reception by the general public

NOTE: This service may include sound transmissions, television transmissions or other types of transmission.

carrier power: average power supplied to the antenna port by a transmitter during one cycle taken under the condition of no modulation

channel L: left hand channel of a stereophonic signal

channel R: right hand channel of a stereophonic signal

class of emission: set of characteristics of an emission, designated by standard symbols, e.g. type of modulation of the main carrier, modulating signal, type of information to be transmitted, and also, if appropriate, any additional signal characteristics

composite: See "Multiplex (MPX) signal".

dBc: decibels relative to the unmodulated carrier power of the emission

NOTE: In the cases which do not have a carrier, for example in some digital modulation schemes where the carrier is not accessible for measurement, the reference level equivalent to dBc is decibels relative to the mean power P.

difference signal: signal (S) theoretically equal to half the difference between the left (L) and right (R) stereophonic signals. $S = (L - R) / 2$

exclusion band: band of radio frequencies where no measurements are made

frequency tolerance: maximum permissible departure of the characteristic frequency of an emission from the assigned frequency

NOTE: The frequency tolerance is expressed in parts per 10^6 or in Hz.

harmonic: component of order greater than 1 of the Fourier series of a periodic quantity

harmonic number: integral number given by the ratio of the frequency of a harmonic to the fundamental frequency (second harmonic = $2 \times$ fundamental frequency)

mean power: average power supplied to the antenna port by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation envelope taken under normal operating conditions

MultiPlex (MPX) signal: contains all information, including the pilot tone and any supplementary signal which is used to frequency modulate the VHF FM transmitter

necessary bandwidth: for a given class of emission, the width of the frequency band which is sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions

out-of-band emissions: emission on a frequency or frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emissions

pilot tone: 19 kHz tone used to recover the stereo subcarrier in the stereo-receiver

reference bandwidth: bandwidth in which the emission level is specified

signal L: corresponds to the information in the left channel of the stereophonic signal

signal R: corresponds to the information in the right channel of the stereophonic signal

spurious emissions: emission on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information

NOTE: Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products but exclude out of band emissions.

stereo subcarrier: 38 kHz subcarrier used to carry the difference signal

sum signal: signal (M) theoretically equal to half of the sum of the left (L) and right (R) stereophonic signals.

$$M = (L + R) / 2$$

unwanted emissions: consist of spurious emissions and out of band emissions

3.2 Symbols

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

Ω	ohms (unit of resistance)
μ	micro, 10^{-6}

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3.3 Abbreviations (standards.iteh.ai)

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

a.c.	alternating current
AF	Audio Frequency
AM	Amplitude Modulation
BS	Broadcast Sound
d.c.	direct current
dB	deciBel
dBm	dB relative to one milliwatt
EC	European Commission
EFTA	European Free Trade Area
EN	European Norm
ERM	Electromagnetic compatibility and Radio spectrum Matters
EUT	Equipment Under Test
FM	Frequency Modulation
Hz	Hertz (cycles per second)
MPX	MultiPleX
RF	Radio Frequency
rms	root mean square
SNR	Signal to Noise Ratio
V	Volts
VHF	Very High Frequency

4 Technical requirements specifications

4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the manufacturer. The equipment shall comply with all the technical requirements of the present document which are identified as applicable in annex A at all times when operating within the boundary limits of the declared operational environmental profile.

4.2 Conformance requirements

4.2.1 Rated output power

4.2.1.1 Definition

The rated output power is the carrier power that the EUT shall deliver at its antenna port under manufacturers specified conditions of operation.

4.2.1.2 Limit

The carrier output power shall be the rated output power under normal operating conditions as defined by the manufacturer.

4.2.1.3 Conformance **(standards.iteh.ai)**

Conformance tests as defined in clause 5.3.1 shall be carried out.

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4.2.2 Frequency drift

4.2.2.1 Definition

The frequency drift of an emission is the uncontrolled continuous and irreversible variation of frequency against a predetermined timescale.

4.2.2.2 Limit

For a period of not less than ninety days, the frequency tolerance of the transmitter shall stay within ± 300 Hz.

4.2.2.3 Conformance

Conformance tests as defined in clause 5.3.2 shall be carried out.

4.2.3 Deviation sensitivity stability

4.2.3.1 Definition

Stability of the required audio or MPX input level to the transmitter to achieve desired deviation.

4.2.3.2 Limit

- a) The deviation sensitivity of the transmitters shall remain within ± 3 % of the declared value under the manufacturers declared operating conditions.