SLOVENSKI STANDARD
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Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) ï Oddajniġka oprema za zvokovne radiodifuzijske storitve s frekvenļ no modulacijo (FM) ï 1. del: Tehniļ ne karakteristike in preskusne metode

Electromagnetic compatibility and Radio spectrum Matters (ERM); Transmitting equipment for the Frequency Modulated (FM) sound broadcasting service; Part 1: Technical characteristics and test methods

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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

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

The present document is part 1 of a multi-part deliverable covering transmitting equipment for the Frequency Modulated (FM) sound broadcasting service, as identified below:

Part 1: "Technical characteristics and test methods";

Part 2: "Harmonized EN under article 3.2 of the R&TTE Directive".

National transposition dates	
Date of adoption of this EN:	24 February 2006
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Introduction

The present document covers a set of non-mandatory technical parameters that are considered to be the minimum requirement for the design and operation of an FM sound broadcasting service.

Other documents directly associated with the present document:

- EN 302 018-2 [1];
- EN 301 489-11 [2].

1 Scope

The present document applies to transmitting equipment for the frequency-modulated sound broadcasting service.

The types of equipment covered by the present document are as follows:

- Transmitting equipment for frequency modulated sound broadcasting service operating in both Monophonic and Stereophonic operating in the frequency range 68 MHz to 108 MHz.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

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

[1] ETSI EN 302 018-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Transmitting equipment for the Frequency Modulated (FM) sound broadcasting service; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive".

[2] ETSI EN 301 489-11: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 11: Specific conditions for terrestrial sound broadcasting service transmitters".

[3] CENELEC EN 55011: "Industrial, scientific and medical (ISM) radio-frequency equipment - Radio disturbance characteristics - Limits and methods of measurement".

[4] ITU-R Recommendation BS.468-4 (1986): "Measurement of audio-frequency noise voltage level in sound broadcasting".

[5] IEC 60489-1: "Methods of measurement for radio equipment used in the mobile services. Part 1: General definitions and standard conditions of measurement".

[6] ETSI TR 100 028 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

[7] ITU-R Recommendation SM.329: "Unwanted emissions in the spurious domain".

[8] ITU-R Recommendation BS.412: "Planning standards for terrestrial FM sound broadcasting at VHF".

[9] ITU-R Recommendation BS.641: "Determination of radio-frequency protection ratios for frequency-modulated sound broadcasting".

[10] ITU-R Recommendation BS.450-3 (2001): "Transmission standards for FM sound broadcasting at VHF".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions 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.

channel L: left hand channel of a stereophonic signal

channel R: right hand channel of a stereophonic signal

cabinet radiation: radiation from an enclosure containing, equipment, excluding radiation from connected antennas or cables

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

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

enclosure port: physical boundary of the apparatus through which electromagnetic fields may radiate or impinge

NOTE: In the case of integral antenna equipment, this port is inseparable from the antenna port.

environmental profile: range of environmental conditions under which equipment within the scope of EN 302 018-1 is required to comply with the provisions of EN 302 018-1

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 (2nd harmonic = 2 × 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

Radio Data System (RDS): signal containing information on programmes and broadcasting network as defined in EN 50067

NOTE: This signal is carried by a subcarrier at 57 kHz, amplitude modulated by the encoded data with suppressed carrier in a frequency band of ±2,4 kHz.

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}

3.3 Abbreviations

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

a.c.	alternating current
AF	Audio Frequency
AM	Amplitude Modulation
dB	deciBel, logarithmic ratio (tenths of a "Bel")
dBm	dB relative to one milliwatt
d.c.	direct current
EMC	ElectroMagnetic Compatibility
EN	European Norm
ERM	Electromagnetic compatibility and Radio spectrum Matters
EUT	Equipment Under Test
FM	Frequency Modulation
Hz	Hertz (cycles per second)
LV	Low Voltage
MPX	MultiPleX
R&TTE	Radio equipment and Telecommunications Terminal Equipment
RDS	Radio Data System

RF	Radio Frequency
rms	root mean square
SNR	Signal to Noise Ratio
VHF	Very High Frequency
V	Volts
W	Watt

4 Technical requirements specifications

4.1 Environmental profile

The environmental profile for operation of the equipment shall be declared by the supplier. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the required operational environmental profile.

4.2 Transmitter input configuration

If the transmitter does not incorporate a stereo encoder and is intended for stereo operation then a suitable test encoder shall be used.

4.3 Transmitter output characteristics

4.3.1 Rated output power

4.3.1.1 Definition

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

4.3.1.2 Method of measurement

4.3.1.2.1 Initial conditions

Test environment:

- the normal operating environment, as declared by the equipment manufacturer.

Test frequencies:

a) the lowest operating frequency of the EUT;

b) the highest operating frequency of the EUT;

c) a frequency mid-way between a) and b) above.

Test arrangement (see figure A.1):

1) connect the EUT to the Test Load, via the Coupling Device;

2) connect the Spectrum Analyser or power meter to the Coupling Device.

NOTE: AF Signal Generator and Voltage measuring equipment are not required for this test.