

SLOVENSKI STANDARD
SIST EN 301 489-11 V1.3.1:2006
01-julij-2006

Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) – Standard elektromagnetne združljivosti (EMC) za radijsko opremo in storitve – 11. del: Posebni pogoji za oddajnike v storitvi prizemne zvokovne radiodifuzije

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

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Ta slovenski standard je istoveten z: EN 301 489-11 Version 1.3.1

ICS:

33.060.20	Sprejemna in oddajna oprema	Receiving and transmitting equipment
33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general
33.170	Televizijska in radijska difuzija	Television and radio broadcasting

SIST EN 301 489-11 V1.3.1:2006 **en**

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ETSI EN 301 489-11 V1.3.1 (2006-05)

Candidate Harmonized European Standard (Telecommunications series)

**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**

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Reference

REN/ERM-EMC-242-11

Keywords

broadcast, EMC, radio, regulation, testing, VHF

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

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

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [8] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility ("the EMC Directive") (89/336/EEC [2] as amended) and Directive 1999/5/EC [3] of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity ("the R&TTE Directive").

The present document is part 11 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

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National transposition dates

Date of adoption of this EN:	21 April 2006
Date of latest announcement of this EN (doa):	31 July 2006
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2007
Date of withdrawal of any conflicting National Standard (dow):	31 January 2008

1 Scope

The present document, together with EN 301 489-1 [1], covers the assessment of transmitters, excitors, and any associated ancillary equipment dedicated for radio broadcasting services, in respect of ElectroMagnetic Compatibility (EMC).

Technical specifications related to the antenna port emissions and cabinet radiation are not included in the present document. Such technical specifications are found in the relevant product standards of ETSI for the effective use of the radio spectrum.

The present document specifies the applicable test conditions, performance assessment and performance criteria for terrestrial sound broadcasting transmitters and their associated ancillary equipment.

Definitions of the type of broadcast transmitters and excitors covered by the present document are given in annex B.

In case of differences (for instance concerning special conditions, definitions, abbreviations) between the present document and EN 301 489-1 [1], the provisions of the present document take precedence.

The environmental classification and the emission and immunity requirements used in the present document are as stated in EN 301 489-1 [1], except for any specific conditions included in the present document, under which broadcast service transmitters are typically used.

The present document may not cover those cases where a potential source of interference which is producing individually repeated transient phenomena or continuous phenomena is permanently present, e.g. a radar site in the near vicinity. In such a case it may be necessary to use special protection applied to either the source of interference or the interfered part or both.

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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 301 489-1 (V1.6.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements".
- [2] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive).
- [3] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).
- [4] CENELEC EN 55011 (1998): "Industrial, scientific and medical (ISM) radio-frequency equipment - Radio disturbance characteristics - Limits and methods of measurement".
- [5] CENELEC EN 61000-4-3-am1 (2002): "Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test".
- [6] FINAL ACTS of the CEPT T-DAB-Planning Meeting Wiesbaden 1995.

- [7] FINAL ACTS of the CEPT T-DAB Planning Meeting (4) Maastricht, 2002: "Special Arrangement of the European Conference of Postal and Telecommunications Administrations (CEPT) relating to the use of the band 1 452 - 1 479.5 MHz for Terrestrial Digital Audio Broadcasting (T-DAB)".
- [8] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.
- [9] ETSI ETS 300 799 (Edition 1): "Digital Audio Broadcasting (DAB) distribution interfaces; Ensemble Transport Interface (ETI)".
- [10] ETSI TS 102 820 (V1.1.1): "Digital Radio Mondiale (DRM) Multiplex Distribution Interface (MDI)".
- [11] ITU-R Recommendation SM.329-10: "Unwanted emissions in the spurious domain".

3 Definitions symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 301 489-1 [1] and the following apply:

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

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

active deflector: Tx/Rx (transceiver, repeater, gap filler), which receives an input signal off-air, and re-broadcasts the same signal on the same frequency

Exciter/Modulator: low level RF power stage of a broadcasting transmitter

modulation error ratio: single figure of merit analysis of the transmitted signal

NOTE: See annex A.

necessary bandwidth: As defined in ITU-R Recommendation SM.329-10 [11].

RF power amplifier: Tx, which comprises an amplifier, declared by the manufacturer to be capable of being connected to a terrestrial broadcasting antenna system

transposer: Tx/Rx (transceiver), which receives an input signal off-air, and re-broadcasts the same signal on a different frequency

3.2 Symbols

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

%	percent
μ	micro, 10^{-6}
A	Ampere
Hz	Hertz (cycles per second)
M	Mega (i.e. 10^6)
m	metre
W	Watt

3.3 Abbreviations

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

AC	Alternating Current
AM	Amplitude Modulation
BER	Bit Error Ratio
CISPR	Comité International Spécial des Perturbations Radioélectriques (International Special Committee On Radio Interference)
COFDM	Coded Orthogonal Frequency Division Multiplex
DC	Direct Current
DRM	Digital Radio Mondiale
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
FM	Frequency Modulation
HF	High Frequency
IF	Intermediate Frequency
LF	Low Frequency
MER	Modulation Error Ratio
MF	Medium Frequency
MPX	MultiPleX
OFDM	Orthogonal Frequency Division Multiplex
QAM	Qadrature Amplitude Modulation
RDS	Radio Data System
RF	Radio Frequency
Rx	Receiver
SNR	Signal to Noise Ratio
T-DAB	Terrestrial-Digital Audio Broadcast
Tx	Transmitter
VA	Volt Amperes
VHF	Very High Frequency

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4 Test conditions

For the purposes of the present document, the test conditions of EN 301 489-1 [1], clause 4, shall apply as appropriate. Further provisions related to test conditions for broadcasting service transmitters are specified in the present document.

4.1 General

For emission and immunity tests the test modulation, test arrangements, etc., as specified in the present document, clauses 4.1 to 4.5, shall apply.

For immunity tests, the output of the Tx shall be monitored as specified in the present document, clause 4.2.3.

4.2 Arrangements for test signals

The provisions of EN 301 489-1 [1], clause 4.2 shall apply.

4.2.1 Arrangements for test signals at the input of transmitters

The provisions of EN 301 489-1 [1], clause 4.2.1 shall apply, with the following modifications.

If the transmitter under test incorporates base-band processing and/or coding equipment (e.g. a RDS encoder for a FM transmitter), then this equipment shall be active as in normal operation. The manufacturer shall provide reference encoders and the tests shall be carried out with these in operational mode.

If the transmitter under test does not include integrated base-band processing and/or coding equipment, the manufacturer shall declare whether the transmitter is designed for operation with or without encoder(s). The manufacturer shall clearly state this in the product documentation.

If the transmitter under test is designed for operation with externally fitted encoder(s), then it is left to the decision of the manufacturer whether the transmitter under test shall be tested with such encoder(s). Depending on the manufacturer's decision, the manufacturer may have to provide reference encoders and the tests shall be carried out with these in operational mode.

Any unused input port of the transmitter under test shall be terminated according to the manufacturer's instructions.

4.2.2 Arrangements for test signals at the input of transposers, active deflectors, or RF power amplifiers

The provisions of EN 301 489-1 [1], clause 4.2.2 shall apply with the following modifications.

In case of transposers and active deflectors, the wanted RF input signal, at a frequency determined from the manufacturer's specification, shall be set to a level equal to the mid point of the range declared by the manufacturer.

In case of RF amplifiers, the wanted RF input signal at a level equal to the mid point of the range declared by the manufacturer shall be delivered from an adequate external modulator provided by the manufacturer. The modulator shall be placed outside the test environment.

A broadcasting transmission shall be established at the start of the test and maintained during the test.

4.2.3 Arrangements for test signals at the output of transmitters, transposers, active deflectors or RF power amplifiers

The provisions of EN 301 489-1 [1], clause 4.2.3 shall apply with the following modifications.

Typical test arrangements to assess the performance of the EUT are shown in:

- figure 4.1 for VHF FM transmitters;
- figure 4.2 for LF, MF and HF AM transmitters;
- figure 4.3 for T-DAB and DRM transmitters.

NOTE: In practice it is not necessary to use all the individual instrumentation shown in the figures. For specific measurement requirements refer to table 6.1.