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Candidate Harmonized European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
ElectroMagnetic Compatibility (EMC)
standard for radio equipment and services;
Part 14: Specific conditions for analogue
and digital terrestrial TV broadcasting service transmitters**

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Contents

Intellectual Property Rights	4
Foreword.....	4
1 Scope	5
2 References	5
3 Definitions and abbreviations.....	6
3.1 Definitions	6
3.2 Abbreviations	6
4 Test conditions	7
4.1 General	7
4.2 Arrangements for test signals	7
4.2.1 Arrangements for test signals at the input of transmitters.....	7
4.2.2 Arrangements for test signals at the input of transposers, active deflectors, or RF power amplifiers	7
4.2.3 Arrangements for test signals at the output of transmitters, transposers, active deflectors or RF power amplifiers	8
4.3 RF exclusion bands	9
4.3.1 Transmitter and RF power amplifier exclusion band.....	9
4.3.2 Active deflector exclusion band.....	9
4.3.3 Transposer exclusion band.....	9
4.4 Narrow band responses of receivers	10
4.5 Normal test modulation	10
4.5.1 Analogue Modulation	10
4.5.2 Digital Modulation (T-DVB).....	10
5 Performance assessment.....	10
5.1 General	10
5.2 Equipment which can provide a continuous communication link as a broadcasting transmission.....	10
5.3 Equipment which does not provide a continuous communication link as a broadcasting transmission.....	10
5.4 Ancillary equipment	11
5.5 Equipment classification	11
6 Performance criteria	11
6.1 Performance criteria for Continuous phenomena applied to Transmitters (CT)	11
6.2 Performance criteria for Transient phenomena applied to Transmitters (TT)	12
7 Applicability overview	12
7.1 Emission	12
7.1.1 General.....	12
7.1.2 Special conditions.....	12
7.2 Immunity	13
7.2.1 General.....	13
7.2.2 Special conditions.....	13
Annex A (informative): Types of broadcasting service equipment covered by the present document	15
A.1 Analogue television.....	15
A.2 Digital television	15
Annex B (informative): Bibliography.....	16
Annex C (informative): The EN title in the official languages	17
History	18

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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 (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document, together with EN 301 489-1 [1], 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 14 of a multi-part deliverable. Full details of the entire series can be found in part 1 [1].

National transposition dates	
Date of adoption of this EN:	25 April 2003
Date of latest announcement of this EN (doa):	31 July 2003
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Date of withdrawal of any conflicting National Standard (dow):	31 July 2006

1 Scope

The present document, together with EN 301 489-1 [1], covers the assessment of analogue and digital transmitters, exciters, and any associated ancillary equipment dedicated for television 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 analogue and digital terrestrial television broadcasting transmitters and their associated ancillary equipment.

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

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 a 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>.

- | | |
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| [1] | ETSI EN 301 489-1 "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] | ITU-R Recommendation BT.500-9: "Methodology for the subjective assessment of the quality of television pictures". |
| [5] | EN 55011 (1998): "Industrial, scientific and medical (ISM) radio-frequency equipment; Radio disturbance characteristics - Limits and methods of measurement". |
| [6] | ETSI EN 300 744 (V1.4.1): "Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for digital terrestrial television". |

- [7] EN 61000-4-3 1996/A1 (1998): "Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test".

3 Definitions 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:

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

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.

exciter: low level RF power driver stage of a broadcasting transmitter

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 Abbreviations

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

AC	Alternating Current
BER	Bit Error Ratio
CISPR	International Special Committee on Radio Interference (in IEC)
CT	Continuous phenomena applied to Transmitters
DC	Direct Current
DQPSK	Differential Quaternary Phase-Shift Keying
DVB	Digital Video Broadcasting
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
IF	Intermediate Frequency
IRT	Institut für RundfunkTechnik
MER	Modulation Error Ratio
MPEG	Moving Picture Experts Group
NICAM	Near-Instantaneous Companded Audio Multiplex
QAM	Quadrature Amplitude Modulation
RF	Radio Frequency
rms	root mean square
Rx	Receiver
SNR	Signal to Noise Ratio
T-DVB	Terrestrial Digital Video Broadcasting
TS	Transport Stream
TT	Transient phenomena applied to Transmitters
TV	TeleVision
Tx	Transmitter
UHF	Ultra High Frequency
VHF	Very High Frequency

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 NICAM encoder for an analogue modulated TV transmitter, or an MPEG2 encoder for a digital television 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 4.2.1 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 of a suitable level shall be delivered from an adequate external modulator provided by the manufacturer. The modulator may 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 4.2.2 shall apply with the following modifications.

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

- figure 1 for analogue modulated TV transmitters;
- figure 2 for T-DVB transmitters.

NOTE: In practice it is not necessary to use all the individual instrumentation shown in figure 1. For specific measurement requirements refer to table 1.

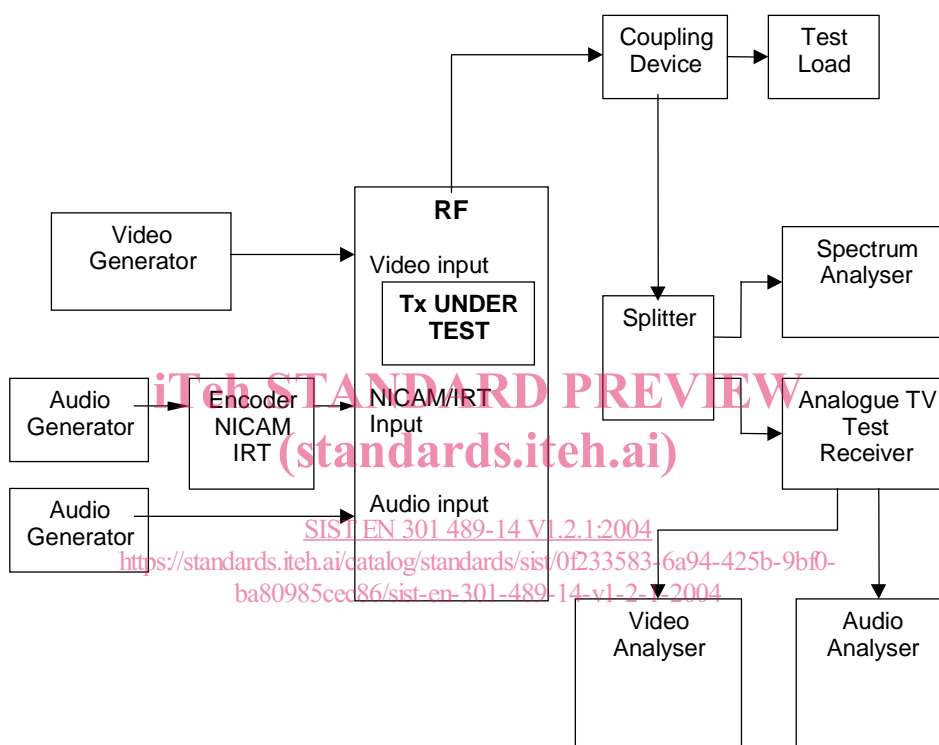


Figure 1: Typical test arrangement for the performance assessment of a standard analogue modulated TV transmitter, example

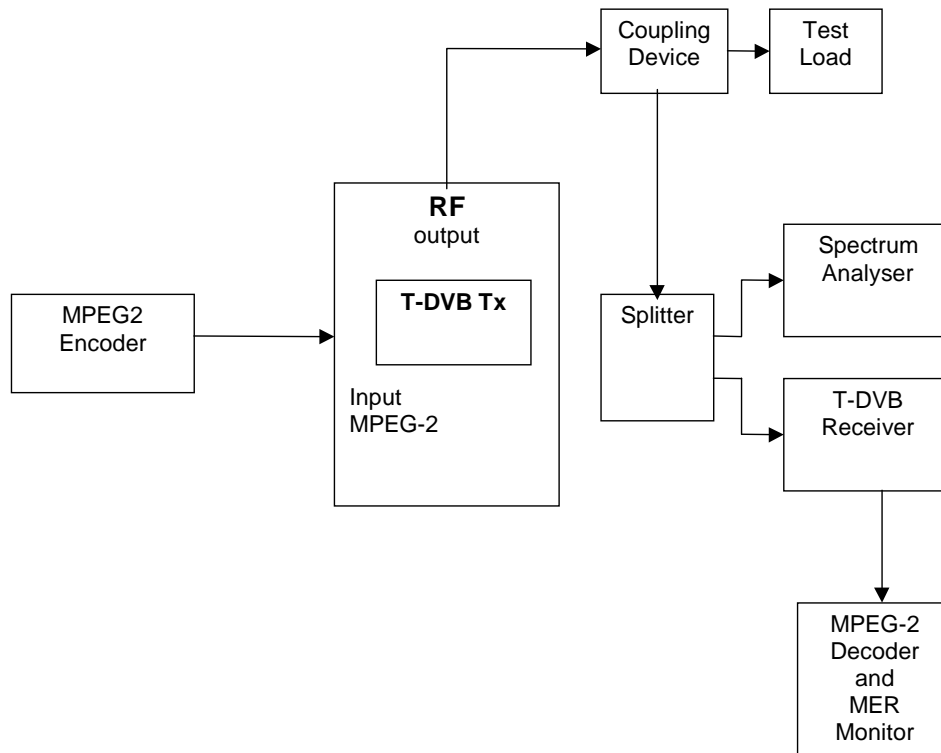


Figure 2: Typical test arrangement for the performance assessment of a T-DVB transmitter, example
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4.3 RF exclusion bands

The provisions of EN 301 489-1 [1], clause 4.3 shall apply with the modifications set out in clauses 4.3.1, 4.3.2 and 4.3.3 of the present document.

4.3.1 Transmitter and RF power amplifier exclusion band

The exclusion band for the transmitter and/or power amplifier shall be the allocated channel.

4.3.2 Active deflector exclusion band

The exclusion band for the active deflector (transmitting and receiving elements) is equal to the channel centre frequency -5 % to +5 %.

Special precautions shall be taken to avoid the wanted RF output of the active deflector from disturbing the signal at the RF input port.

4.3.3 Transposer exclusion band

For emission measurements, the transposer exclusion band shall comprise the exclusion band of the transmitting element of the equipment under test only.

For immunity tests with continuous phenomena, the transposer exclusion bands shall comprise both the exclusion bands of the transmitting and receiving elements of the equipment under test.

The exclusion band for the transposer (transmitting and receiving elements) is equal to the channel centre frequency for each element -5 % to +5 %.

For the receiver part of the transposer, the exclusion band takes into account the blocking effect that may occur due to the high level of the immunity test field strength (10 V/m) in regard to the RF input level of that receiver part (which is usually less than 1 mV).