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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 11: Specific conditions for analogue terrestrial sound
broadcasting (Amplitude Modulation (AM) and
Frequency Modulation (FM)) service transmitters**



Reference

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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), and is now submitted for the Public Enquiry phase of the ETSI standards Two-step Approval Procedure.

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 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 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" [3]).

The present document is part 11 of a multi-part deliverable covering Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services, as identified below:

- Part 1: "Common technical requirements";
- Part 2: "Specific conditions for radio paging equipment";
- Part 3: "Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 40 GHz";
- Part 4: "Specific conditions for fixed radio links and ancillary equipment and services";
- Part 5: "Specific conditions for Private land Mobile Radio (PMR) and ancillary equipment (speech and non-speech)";
- Part 6: "Specific conditions for Digital Enhanced Cordless Telecommunications (DECT) equipment";
- Part 7: "Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS)";
- Part 8: "Specific conditions for GSM base stations";
- Part 9: "Specific conditions for wireless microphones and similar Radio Frequency (RF) audio link equipment, cordless audio and in-ear monitoring devices";
- Part 10: "Specific conditions for first (CT1 and CT1+) and Second generation Cordless telephone (CT2) equipment";
- Part 11: "Specific conditions for analogue terrestrial sound broadcasting (Amplitude Modulation (AM) and Frequency Modulation (FM)) service transmitters";**
- Part 12: "Specific conditions for Very Small Aperture Terminal, Satellite Interactive Earth Stations operated in the frequency ranges between 4 GHz and 30 GHz in the Fixed Satellite Service (FSS)";

- Part 13: "Specific conditions for Citizens' Band (CB) radio and ancillary equipment (speech and non-speech)";
- Part 14: "Specific conditions for terrestrial television broadcasting transmitters";
- Part 15: "Specific conditions for commercially available amateur radio equipment";
- Part 16: "Specific conditions for analogue cellular radio communications equipment, mobile and portable";
- Part 17: "Specific conditions for Wideband data and HIPERLAN equipment";
- Part 18: "Specific conditions for Terrestrial Trunked Radio (TETRA) equipment";
- Part 19: "Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications";
- Part 20: "Specific conditions for Mobile Earth Stations (MES) used in the Mobile Satellite Services (MSS)";
- Part 22: "Specific conditions for ground based VHF aeronautical mobile and fixed radio equipment";
- Part 23: "Specific conditions for IMT-2000 CDMA Direct Spread (UTRA) Base Station (BS) radio, repeater and ancillary equipment";
- Part 24: "Specific conditions for IMT-2000 CDMA Direct Spread (UTRA) for Mobile and portable (UE) radio and ancillary equipment";
- Part 25: "Specific conditions for IMT-2000 CDMA Multi-carrier Mobile Stations and ancillary equipment";
- Part 26: "Specific conditions for IMT-2000 CDMA Multi-carrier Base Stations and ancillary equipment".

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

1 Scope

The present document, together with EN 301 489-1 [1], covers the assessment of analogue transmitters, exciters, 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 analogue terrestrial sound 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.

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.

- [1] ETSI EN 301 489-1 (2000): "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.
- [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.
- [4] EN 55011 (1998): "Industrial, scientific and medical (ISM) radio-frequency equipment - Radio disturbance characteristics - Limits and methods of measurement".
- [5] 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:

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.

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

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

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

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

3.2 Abbreviations

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

AC	Alternating Current
AM	Amplitude Modulation
BER	Bit Error Ratio
DC	Direct Current
EMC	ElectroMagnetic Compatibility
EUT	Equipment Under Test
FM	Frequency Modulation
HF	High Frequency
IF	Intermediate Frequency
LF	Low Frequency
MF	Medium Frequency
RDS	Radio Data System
RF	Radio Frequency
Rx	Receiver
SNR	Signal to Noise Ratio
Tx	Transmitter
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 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 4.2.3 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.

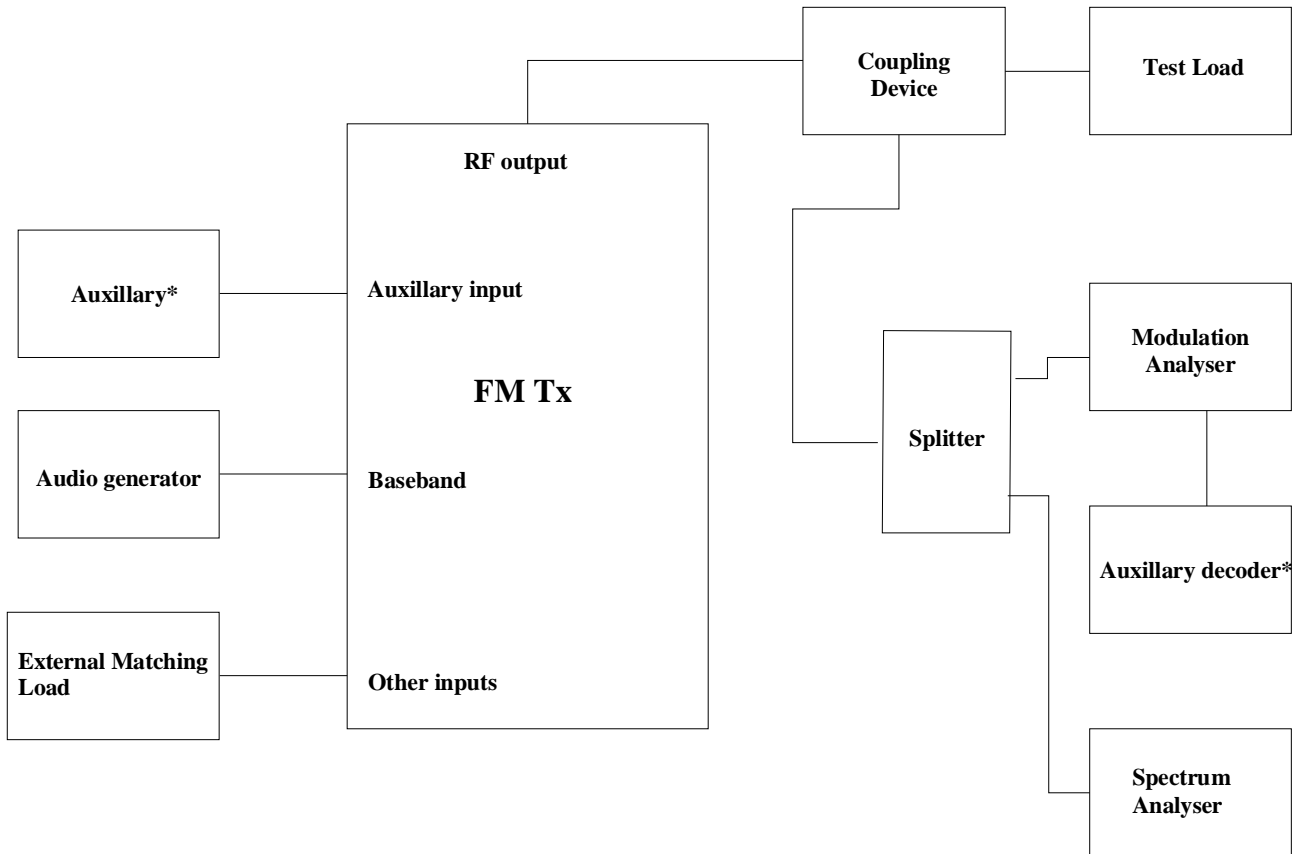
4.2.3 Arrangements for test signals at the output of transmitters, transposers, active deflectors or RF power amplifiers

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

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

- figure 1 for VHF FM transmitters;
- figure 2 for LF, MF and HF AM 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 1.



NOTE: *: For FM transmitters which use Auxillary encoder e.g. RDS, data radio channel, etc.

Figure 1: Typical test arrangement for the performance assessment of an FM transmitter

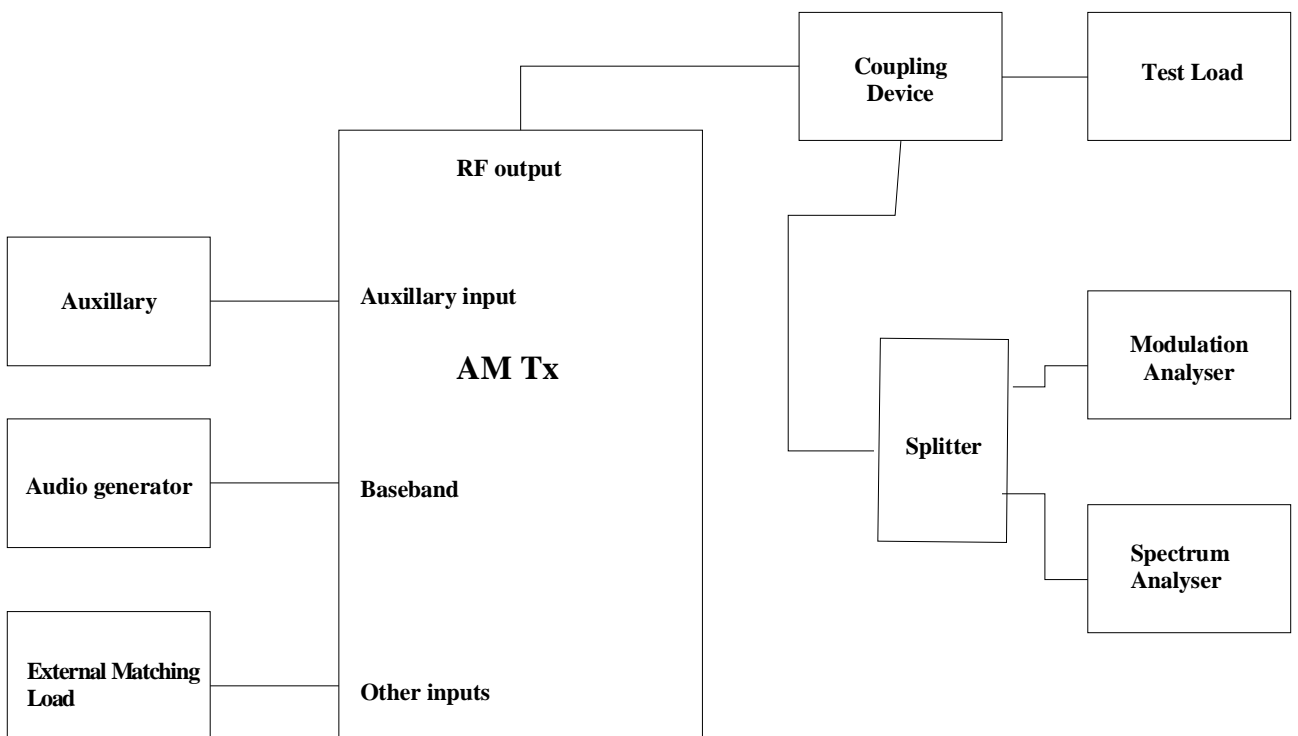


Figure 2: Typical test arrangement for the performance assessment of an LF, MF, or HF AM transmitter

4.3 RF exclusion bands

The provisions of EN 301 489-1 [1], clause 4.3 shall apply with the modifications set out in the clauses 4.4.1, 4.4.2 and 4.4.3 of the present document.

4.3.1 Transmitter and RF power amplifier exclusion band

4.3.1.1 Transmitter and RF power amplifier exclusion band for FM

The exclusion band for the transmitter and/or power amplifier extends from $F_c - 300$ kHz to $F_c + 300$ kHz, where F_c is the operating frequency.

4.3.1.2 Transmitter exclusion band for AM

The exclusion band for AM broadcasting transmitters shall be ± 250 % of the necessary bandwidth.

4.3.2 Active deflector exclusion band

The exclusion band for the active deflector (transmitting and receiving elements) is determined by the switching range of the receiver, as declared by the manufacturer, extended as follows:

- the lower frequency of the exclusion band is the frequency range determined by the switching range, minus 5 % of the centre frequency of the switching range;
- the upper frequency of the exclusion band is the frequency range determined by the switching range, plus 5 % of the centre frequency of the switching range;
- in the case of an active deflector operating on a single frequency that cannot be changed by the user, the exclusion band extends from -5 % to +5 % of the fixed frequency.

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 bands

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 receiving elements is the frequency range determined by the switching range of the receiver, as declared by the manufacturer, extended as follows:

- the lower frequency of the exclusion band is the frequency range determined by the switching range, minus 5 % of the centre frequency of the switching range;
- the upper frequency of the exclusion band is the frequency range determined by the switching range, plus 5 % of the centre frequency of the switching range;
- in the case of a transposer operating on a single frequency that cannot be changed by the user, the exclusion band extends from -5 % to +5 % of the fixed frequency.

4.4 Narrow band responses of receivers

The provisions of EN 301 489-1 [1], clause 4.4 shall apply during the immunity tests of transposers and active deflectors to continuous phenomena.

4.5 Normal test modulation

For the purpose of EMC tests, the transmitter under test shall be modulated according to the normal test modulation as specified below:

- FM: 1 kHz audio tone of sufficient amplitude to achieve ± 50 kHz deviation;
- AM: 1 kHz audio tone of sufficient amplitude to achieve 80 % modulation depth.

The characteristics of the wanted RF and modulation test signal used shall be recorded in the test report.

5 Performance assessment

5.1 General

The provisions of EN 301 489-1 [1], clause 5.1 shall apply.

In addition, the manufacturer shall, at the time of submission of the equipment for testing, declare the following information, also to be recorded in the test report, as appropriate:

- the frequencies as used in the transmitter for oscillators, clocks and intermediate frequencies;
- the bandwidth of the IF filter, or the bandwidth of the RF filter if no IF signal processing is used;
- for RF amplifiers, the nominal level of the wanted RF input signal to be used for the EMC tests.

For transmitters supplied for testing, which do 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), for inclusion in the product documentation. The manufacturer shall declare whether the EMC tests shall be performed with external encoder(s) fitted to the transmitter.

5.2 Equipment which can provide a continuous communication link as a broadcasting transmission

The provisions of EN 301 489-1 [1], clause 5.2 shall apply.

5.3 Equipment which does not provide a continuous communication link as a broadcasting transmission

Not applicable.

5.4 Ancillary equipment

The provisions of EN 301 489-1 [1], clause 5.4 shall apply.

5.5 Equipment classification

Unless specified otherwise in clause 7.1.2 and/or 7.2.2 of the present document, broadcast service transmitters and associated ancillary equipment in the scope of the present document shall meet the requirements for base station and ancillary equipment set out in EN 301 489-1 [1], clauses 7, 8 and 9.

6 Performance criteria

The provisions of EN 301 489-1 [1], clause 6 shall apply.

6.1 Performance criteria for continuous phenomena applied to transmitters (CT)

The provisions of EN 301 489-1 [1], clause 6.1 shall apply with the following modifications.

A broadcasting transmission link shall be established between the EUT and the monitoring equipment at the start of the test, and maintained during the test.

The parameters specified in table 1 shall be used to assess the performance of the Tx under test for continuous phenomena. During each individual exposure in the test sequence, it shall be verified that the characteristics of the wanted output signals remain within the permitted value ranges listed in table 1.

The performance of the Tx under test shall be assessed during the exposure with error correction activated and/or pre-emphasis and de-emphasis inserted into the transmission line, if appropriate.

Table 1: Performance criteria for continuous phenomena

Type of Equipment	Parameters	Reference values measured during pre-tests	Permitted values during immunity tests
FM equipment	RF power variation RF frequency variation Audio SNR BER from RDS	RF power RF frequency Manufacturers declared audio SNR $\leq 10^{-6}$	RF power $\pm 5\%$ RF frequency ± 2 kHz Manufacturers declared minimum audio SNR $\leq 10^{-5}$
LF, MF, and HF transmitters	RF power variation Audio SNR	RF power Manufacturers declared audio SNR	RF Power $\pm 5\%$ Manufacturers declared minimum audio SNR

During the test the readings of the parameters monitored by the test instrumentation shall remain within the permitted value ranges during the immunity tests, specified in table 1.

At the conclusion of the total test, the EUT shall operate as intended, with no loss of control functions or stored data, as declared by the manufacturer, and the broadcasting transmission link shall have been maintained. The readings of the parameters monitored by the test instrumentation shall regain their reference values measured during the pre-test.

No false alarms or abnormal commands shall be generated as a result of the electromagnetic stress. Alarms indicating well-defined incidents due to the electromagnetic stress affecting the general performance of the transmitter under test may however occur. It shall be possible to reset these alarms by manual operation of controls.

Where the EUT provides a stand-by mode, the exposure shall be repeated in this mode to ensure that no unintentional transmission occurs.

6.2 Performance criteria for transient phenomena applied to Transmitters (TT)

The provisions of EN 301 489-1 [1], clause 6.2 shall apply with the following modifications.

A broadcasting transmission link shall be established between the EUT and the monitoring equipment at the start of the test.

During the tests, no assessment of the actual performance applies.

The broadcasting transmission link shall be automatically regained at the conclusion of each individual test exposure.

At the conclusion of the total test, the EUT shall operate as intended, with no loss of control functions or stored data, as declared by the manufacturer, and the broadcasting transmission link shall have been maintained, or regained. The readings of the parameters monitored by the test instrumentation shall regain their nominal values measured during the pre-test.

No false alarms or abnormal commands shall be generated as a result of the electromagnetic stress. Alarms indicating well-defined incidents due to the electromagnetic stress temporarily affecting the general performance of the transmitter under test may however occur. It shall be possible to reset these alarms by manual operation of controls.

Where the EUT provides a stand-by mode, the test shall be repeated in this mode to ensure that no unintentional transmission occurs.

7 Applicability overview

7.1 Emission

7.1.1 General

Table 2 in EN 301 489-1 [1], contains the applicability of emission measurements to the relevant ports of radio and/or associated ancillary equipment.

Table 2 in EN 301 489-1 [1] shall apply.

7.1.2 Special conditions

The following special conditions set out in table 2 of the present document relate to the method of measurement and limits for EMC emissions used in EN 301 489-1 [1], clause 8.

Table 2: Special conditions for EMC emission measurements

Reference to clauses in EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions and limits in EN 301 489-1 [1]								
8.3.2 Test method; DC power input/output ports and 8.4.2 Test method; AC mains power input/output ports	For ports of transmitters drawing a power of greater than 200 W (DC) and greater than or equal to 200 VA (AC) respectively, the test method shall be in accordance with EN 55011 [4].								
8.3.3 Limits; DC power input/output ports and 8.4.3 Limits; AC mains power input/output ports	For ports of transmitters drawing a power of less than or equal to 200 W (DC) and less than or equal to 200 VA (AC) respectively, the emission limits specified in EN 301 489-1 [1] clauses 8.3.3 and 8.4.3 shall be applied as appropriate. For transmitters drawing an AC mains power of greater than 200 VA or DC power greater than 200 W the following limits shall be applied.								
	Limits for conducted emissions on AC and DC ports of transmitters								
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">AC Power (kVA) DC Power (kW)</th> <th colspan="2" style="width: 40%;">Limits (dBμV)</th> <th style="width: 30%;">Frequency range (MHz)</th> </tr> </thead> <tbody> <tr> <td></td> <td style="width: 50%;">Quasi-peak</td> <td style="width: 50%;">Average</td> <td></td> </tr> </tbody> </table>	AC Power (kVA) DC Power (kW)	Limits (dB μ V)		Frequency range (MHz)		Quasi-peak	Average	
AC Power (kVA) DC Power (kW)	Limits (dB μ V)		Frequency range (MHz)						
	Quasi-peak	Average							

Reference to clauses in EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions and limits in EN 301 489-1 [1]			
	> 0,2 to 2	79 73	66 60	0,15 to 0,5 > 0,5 to 30
	> 2 to 10	89 83	76 70	0,15 to 0,5 > 0,5 to 30
	> 10 to 75	100 86 90 to 70 (see note 1)	90 76 80 to 60 (see note 1)	0,15 to 0,5 > 0,5 to 5 5 to 30
	> 75	130 (see note 2) 125 (see note 2) 115 (see note 2)	120 (see note 2) 115 (see note 2) 105 (see note 2)	0,15 to 0,5 > 0,5 to 5 5 to 30
NOTE 1: Limits decreasing linearly with the logarithm of frequency.				
NOTE 2: Measured with CISPR voltage probe, see EN 55011 [4], figure 4).				

7.2 Immunity

7.2.1 General

Table 3 in EN 301 489-1 [1] contains the applicability of immunity measurements to the relevant ports of transmitters and/or associated ancillary equipment.

Table 3 in EN 301 489-1 [1] shall apply with the test signal levels set out in the present document.

7.2.2 Special conditions

The following special conditions set out in table 3 relate to the immunity test methods and levels used in EN 301 489-1 [1], clause 9.

Table 3: Special conditions for EMC immunity tests

Reference to clauses in EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions and limits in EN 301 489-1 [1]
9.2.2 Test method; Radio frequency electromagnetic field (80 MHz to 2 000 MHz)	The test method is described in EN 61000-4-3/A1 [5]. The level of the immunity RF test signal shall be 10V/m (measured unmodulated). Where the input power is greater than 2 kVA (AC) or 2 kW (DC), radiated RF immunity testing need not be carried out. In this case the conducted RF immunity test described in EN 301 489-1 [1], clause 9.5.2 shall be used only, with the test frequency range extended up to 230 MHz and the test level set to 10 V rms (measured unmodulated).
9.4.2 Test method; Fast transients, common mode	The following immunity test levels shall be applied: - on AC mains power input ports: ± 2 kV; - on DC power input, modulation input, and data cable ports: ± 1 kV, only if intended for connection to cables longer than 3 m. If the current consumption of the transmitter exceeds the capability of the test equipment then where possible sensitive electronics (exciters, etc.) may be tested separately.
9.5.2 Test method; RF common mode	The level of the immunity RF test signal shall be 10 V rms (measured unmodulated). Where the input power is greater than 2 kVA (AC) or 2 kW (DC), radiated RF immunity testing need not be carried out. In this case the conducted RF immunity test described in EN 301 489-1 [1], clause 9.5.2 shall be used only, with the test frequency range extended up to 230 MHz and the test level set to 10 V rms (measured unmodulated).
9.7 Voltage dips and interruptions	If the current consumption of the transmitter exceeds the capability of the test equipment then where possible sensitive electronics (exciters, etc.) may be tested separately.
9.8 Surges	If the current consumption of the transmitter exceeds the capability of the test equipment then where possible sensitive electronics (exciters, etc.) may be tested separately.
9.8.2 Test method; Surges	The following immunity test levels and performance criteria shall be applied: AC mains power input ports: - line to line mode: ± 1 kV open circuit voltage; - line to ground mode: ± 2 kV open circuit voltage. If the current consumption of the transmitter exceeds the capability of the test equipment then where possible sensitive electronics (exciters, etc.) may be tested separately. Telecommunication ports: - line to ground mode ± 2 kV open circuit voltage.

Annex A (informative): Types of broadcasting service equipment covered by the present document

A.1 AM sound broadcasting transmitters

Double side band AM sound broadcasting transmitters operating in the LF, MF and HF bands.

A.2 FM sound broadcasting transmitters

Monophonic FM sound broadcasting transmitters operating in the frequency range 68 MHz to 108 MHz.

Stereophonic FM sound broadcasting transmitters operating in the frequency range 68 MHz to 108 MHz.

Active deflectors operating in the band 68 MHz to 108 MHz.

Transposers operating in the band 68 MHz to 108 MHz.

Annex B (informative): Bibliography

- EN 50067 (1998): "Specification of the radio data system (RDS) for VHF/FM sound broadcasting in the frequency range from 87,5 to 108,0 MHz".
- IEC 60244-1 (1999): "Methods of measurement for radio transmitters - Part 1: General characteristics for broadcast transmitters".
- IEC 60244-13: "Methods of measurement for radio transmitters; Part 13: Performance characteristics for FM sound broadcasting".
- IEC 60244-15 (1999): "Methods of measurement for radio transmitters - Part 15: Amplitude-modulated transmitters for sound broadcasting".
- ITU-T Recommendation O.151: "Error performance measuring equipment operating at the primary rate and above".
- ITU-R Recommendation BS.468-4 (1990): "Measurement of audio-frequency noise voltage level in sound broadcasting".

History

Document history			
V1.1.1	July 2001	Public Enquiry	PE 20011123: 2001-07-25 to 2001-11-23