



SLOVENSKI STANDARD

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**Elektromagnetna združljivost (EMC) in zadeve v zvezi z radijskim spektrom (ERM) -
Splošna elektromagnetna združljivost (EMC) za radiokomunikacijsko opremo**

Electromagnetic compatibility and Radio spectrum Matters (ERM); General
ElectroMagnetic Compatibility (EMC) for radio communications equipment

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Electromagnetic compatibility and Radio spectrum Matters (ERM); General ElectroMagnetic Compatibility (EMC) for radio communications equipment

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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 has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 89/336/EEC [1] (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 [1] as amended).

Technical specifications relevant to the EMC Directive 89/336/EEC [1] are listed in annex A.

The present document is based on Generic Standards EN 50081-1 [2] and EN 50082-1 [3], and other standards where appropriate, to meet the essential requirements of Council Directive 89/336/EEC [1].

National transposition dates

Date of adoption of this EN:	5 June 1998
Date of latest announcement of this EN (doa):	30 September 1998
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 March 1999
Date of withdrawal of any conflicting National Standard (dow):	30 September 2001

Introduction

Users of the present document are requested to note that it may become part 1 of a series, as a result of possible future revision(s) to address one or more of the following issues:

- a) CEPT ERC is in the process of developing limits for spurious emissions. When these limits are agreed and available, then for reasons of consistency it is planned that the present document will be revised where appropriate, to embody this same information.
- b) Fixed service upper microwave equipment is not well covered by this version of the present document as a result of the need for specialised measurements to evaluate some aspects of EMC performance.

- c) Ultra high power transmitters (>10kW) require to be tested on site for logistical reasons associated with the power supply feed, the physical size (large), RF power output and heat dissipation. This class of equipment is not well covered by this version of the present document, as a result of the need for specialised measurements to evaluate some aspects of EMC performance.
- d) Extremely broadband data systems using spread spectrum or CDMA technology are also not well covered by this version of the present document, as a result of the need for specialised measurements to evaluate some aspects of EMC performance.

Use of the present document in the case where no Harmonized radio product standard and no Harmonized product EMC standard or product family EMC standard exists:

- all technical specifications within the present document are applicable and sufficient to assess the EMC conformity of the product.

Use of the present document in the case where a Harmonized radio product standard exists but no Harmonized product EMC standard or product family EMC standard exists:

- where a Harmonized radio product standard or radio product family standard exists, any technical specifications relevant to the antenna port and the enclosure port contained in that radio product standard take precedence over the corresponding technical specifications in the present document and are to be applied instead (see annex A). All other technical specifications within the present document remain applicable to assess the EMC conformity of the product.

Use of the present document in the case where no standards exist relevant to the radio product:

- all technical specifications within the present document are applicable and sufficient to assess the EMC conformity of the radio product.

Use of the present document in the case where there is a radio product standard which is not Harmonized:

- where technical specifications relevant to the antenna port or enclosure port are contained within such a standard, these specifications can be used to demonstrate EMC conformity of the radio product via article 10.2 or 10.5 of the EMC Directive 89/336/EEC [1].

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1 Scope

The present document covers the assessment of radio communication and ancillary equipment in respect of ElectroMagnetic Compatibility (EMC).

The present document may be applied to all categories of radio communications equipment with the exception of broadcast receivers. It does not apply to inductive communications equipment.

Where a relevant Harmonized dedicated product EMC EN or product family Harmonized EMC EN exists, such an EN takes precedence over the present document.

The present document specifies the applicable EMC tests, the methods of measurements, the limits and the minimum performance criteria for radio equipment operating in the frequency range 9 kHz to 3 000 GHz, and any associated ancillary equipment.

The present document contains all of the EMC requirements for radio equipment. However, it does not specify general methods of measurement related to the antenna port.

The present document does not specify requirements for emission above 40 GHz from the antenna port or enclosure port.

For equipment operating at frequencies above 20 GHz, specialized methods of measurement may be found in other standards related to the effective use of the radio spectrum.

The electromagnetic environments encompassed in the present document refer to generic standards EN 50081-1 [2], EN 50082-1 [3], except for the vehicular environment class which refers to ISO 7637-1 [4] and ISO 7637-2 [5].

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus at residential, commercial, light industrial and vehicular environments. The levels, however, do not cover extreme cases which may occur in any location but with a low probability of occurrence.

The present document may not cover those cases where a potential source of interference producing individually repeated transient phenomena or a continuous phenomena is permanently present, for example a radar or broadcast 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.

Certain products such as high power radio transmitters, which cannot be tested in a normal test laboratory environment, can be tested on-site or at the manufacturer's premises. The general basis for the test methods and limits used to assess these products should be in accordance with the present document, where appropriate.

Compliance of radio equipment with the requirements of the present document does not signify compliance with any requirements related to the use of the equipment, for example licensing requirements.

Compliance with the requirements of the present document does not signify compliance with any safety requirements. However, it is the responsibility of the assessor of the equipment to record in the report any observations regarding the test sample becoming dangerous or unsafe as a result of the application of the tests called for in the present document.

The present document is based on the considerations and guidance given in ETR 238 [14].

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, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, subsequent revisions do apply.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] 89/336/EEC: "Council Directive on the Approximation of the Laws of the Member States Relating to Electromagnetic Compatibility".
- [2] EN 50081-1: "Electromagnetic Compatibility; Generic Emission Standard; Part 1: Residential, Commercial and Light Industry".
- [3] EN 50082-1: "Electromagnetic Compatibility; Generic Immunity Standard; Part 1: Residential, Commercial and Light Industry".
- [4] ISO 7637-1: "Road vehicles, Electrical disturbance by conduction and coupling; Part 1: Passenger cars and light commercial vehicles with nominal 12 V supply voltage - Electrical transient conduction along supply lines only".
- [5] ISO 7637-2: "Road vehicles, Electrical disturbance by conduction and coupling; Part 2: Commercial vehicles with nominal 24 V supply voltage - Electrical transient conduction along supply lines only".
- [6] EN 55022: "Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment".
- [7] CISPR 16-1: "Specification for radio disturbance and immunity measuring apparatus and methods".
- [8] EN 61000-4-2: "Electromagnetic Compatibility (EMC); Part 4: Testing and Measurement Techniques; Section 2: Electrostatic Discharge Immunity Test".
- [9] EN 61000-4-3: "Electromagnetic Compatibility (EMC); Part 4: Testing and Measurement Techniques; Section 3: Radiated, Radio-Frequency, Electromagnetic Field Immunity Test".
- [10] EN 61000-4-4: "Electromagnetic Compatibility (EMC); Part 4: Testing and Measurement Techniques; Section 4: Electrical Fast Transient/Burst Immunity Test".
- [11] EN 61000-4-5: "Electromagnetic Compatibility (EMC); Part 4: Testing and Measurement Techniques; Section 5: Surge Immunity Test".
- [12] EN 61000-4-6: "Electromagnetic Compatibility (EMC); Part 4: Testing and Measurement Techniques; Section 6: Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields".
- [13] EN 61000-4-11: "Electromagnetic Compatibility (EMC); Part 4: Testing and Measurement Techniques; Section 11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests".
- [14] ETR 238: "CENELEC/ETSI Standardization Programme for the Development of Harmonized Standards Related to Electro-Magnetic Compatibility (EMC) in the Field of Telecommunications".
- [15] ITU-R Radio Regulations (1994).

- [16] ETS 300 296: "Radio Equipment and Systems (RES); Land mobile service; Technical characteristics and test conditions for radio equipment using integral antennas intended primarily for analogue speech".
- [17] ETS 300 390: "Radio Equipment and Systems (RES); Land mobile service; Technical characteristics and test conditions for radio equipment intended for the transmission of data (and speech) and using an integral antenna".
- [18] ETR 027 (1991): "Radio Equipment and Systems (RES); Methods of measurement for private mobile radio equipment".
- [19] ETR 028 (1992): "Radio Equipment and Systems (RES); Uncertainties in the measurement of mobile radio equipment characteristics".
- [20] ETS 300 086: "Radio Equipment and Systems (RES); Land mobile group; Technical characteristics and test conditions for radio equipment with an internal or external RF connector intended primarily for analogue speech".
- [21] ETS 300 113: "Radio Equipment and Systems (RES); Land mobile service; Technical characteristics and test conditions for radio equipment intended for the transmission of data (and speech) and having an antenna connector".

3 Definitions and abbreviations

3.1 Definitions STANDARD PREVIEW

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

ancillary equipment: Equipment used in connection with a radio communications equipment is considered as an ancillary equipment if:

- the equipment is intended for use in conjunction with a radio communications equipment to provide additional operational and/or control features, for example to extend control to another position or location; and
- the equipment cannot be used on a stand alone basis to provide user functions independently of a radio communications equipment; and
- the radio communications equipment to which it is connected is capable of providing some intended operation such as transmitting and/or receiving without the ancillary equipment. (i.e. it is not a sub unit of the main equipment essential to the main equipment's basic functions).

integral antenna equipment: Radio communications equipment fitted with an antenna designed to be connected to the equipment without the use of an external connector and considered to be part of the equipment. An integral antenna may be fitted internally or externally to the equipment. In equipment of this type, the enclosure port and the antenna port are identical.

non-integral antenna equipment: Radio communications equipment with a connector or waveguide flange intended for connection to an antenna either directly, or via a feeder or waveguide. In equipment of this type, the antenna port is separate from the enclosure port.

fixed equipment: Equipment intended for installation in a fixed position.

manufacturer (supplier): The legal entity responsible under the terms of the Council Directive 89/336/EEC [1] for placing the product on the market in a member state of the European Union.

port: A particular interface of the specified equipment (apparatus) with the electromagnetic environment. Any connection point on an equipment intended for connection of cables to or from that equipment is considered as a port (see figure 1).

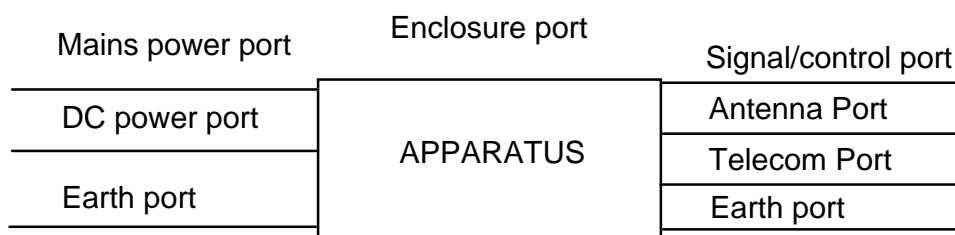


Figure 1: Examples of ports

necessary bandwidth: For a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions (ITU-R Radio Regulations [15], clause 146). For application to multi-channel or multi-carrier transmitters/transponders, where several carriers may be transmitted simultaneously from a final output amplifier or an active antenna, the necessary bandwidth is taken to be the transmitter or transponder bandwidth.

occupied bandwidth: The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage $\beta/2$ of the total mean power of a given emission. Unless otherwise specified by ITU-R for the appropriate class of emission, the value of $\beta/2$ should be taken as 0,5 % (ITU-R Radio Regulations [15]).

telecommunications port: A port intended for direct connection to a telecommunications network.

simplex: Instantaneous one-way communications link (includes semi-duplex mode).

product standard: Functional standard describing frequency management parameters of radio product.

radio communications equipment: Telecommunications equipment which includes one or more radio transmitters and/or receivers and/or parts thereof for use in a fixed, mobile or portable application. It can be operated with ancillary equipment but if so, is not dependent on it for basic functionality.

operating frequency range: The range(s) of continuous radio frequencies covered by the (Equipment Under Test) EUT.

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enclosure port: The physical boundary of the equipment onto which an electromagnetic phenomenon may radiate or impinge. In the case of integral antenna equipment, this port is inseparable from the antenna port.

3.2 Abbreviations

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

AC	Alternating Current
AM	Amplitude Modulation
AMN	Artificial Mains Network
B	measurement Bandwidth
BER	Bit Error Ratio
DC	Direct Current
DSB	Double SideBand full carrier
EMC	ElectroMagnetic Compatibility
emf	electromotive force
ESD	Electro Static Discharge
EUT	Equipment Under Test
FER	Frame Erasure Ratio
LISN	Line Impedance Stabilizing Network
PEP	Peak Envelope Power
RF	Radio Frequency
rms	root mean of squares
SSB	Single SideBand suppressed carrier modulation
TDM	Time Division Multiplexed