

9`Y_hfca U bYfbUnXfi y`1j cghf0A7Ljb`nUXYj Yj`nj Ynj`nfUX]g_ja`gdY_hfca`f0FAŁ!
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Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) for Mobile Earth Stations (MES) providing Low Bit Rate Data Communications (LBRDC) using satellites in Low Earth Orbits (LEO) operating in frequency bands below 1 GHz

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European Standard (Telecommunications series)

**Electromagnetic compatibility
and Radio spectrum Matters (ERM);
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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 based upon the Generic Standards EN 50081-1 [1] and EN 50082-1 [2]. Other standards cover radio communications equipment not listed in the scope of the present document.

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 83/189/EEC (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document, together with ETS 300 721, 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 as amended).

Technical specifications relevant to the EMC Directive are given in annex A.

National transposition dates

Date of adoption of this EN:	6 February 1998
Date of latest announcement of this EN (doa):	31 May 1998
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 November 1998
Date of withdrawal of any conflicting National Standard (dow):	30 November 1998

1 Scope

The present document covers the assessment of Mobile Earth Stations (MESs) and ancillary equipment in respect of ElectroMagnetic Compatibility (EMC).

Technical specifications related to the antenna port and emissions from the enclosure port of the equipment are not included in the present document. Such specific technical specifications are found in the relevant product standard.

The present document specifies the applicable EMC tests, the test methods, the limits and the minimum performance criteria for MESs providing Low Bit Rate Data Communications (LBRDC) using satellites in Low Earth Orbit (LEO) and operating in frequency bands below 1 GHz, as defined in ETS 300 721 [3], and ancillary equipment.

In addition to the technical specification of the present document, there may be published in the Official Journal of the European Communities (OJEC) references to Harmonized EMC standards that apply to the products covered by the present document in their own right, for example, EN 61000-3-2 and EN 61000-3-3 (power frequency harmonics and voltage fluctuation).

The environment classification used in the present document refers to the environment classification used in the Generic Standards EN 50081-1 [1] and EN 50082-1 [2], except 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, which is producing individually repeated transient phenomena, or a continuous phenomenon, is permanently present, e.g. 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.

Compliance of a MES to the requirements of the present document does not signify compliance to any requirements related to the use of the equipment (i.e. licensing requirements).

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

2 References

References may be made to:

- a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or
- b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or
- c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or
- d) publications without mention of a specific version, in which case the latest version applies.

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] | EN 50081-1 (1992): "Electromagnetic compatibility - Generic emission standard - Part 1: Residential, commercial and light industry". |
| [2] | EN 50082-1 (1993): "Electromagnetic compatibility - Generic immunity standard - Part 1: Residential, commercial and light industry". |

- [3] ETS 300 721: " Satellite Earth Stations and Systems (SES); MES providing Low Bit Rate Data Communications (LBRDC) using LEO satellites operating below 1 GHz".
- [4] ISO 7637-1 (1990): "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 (1990): "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 (1994): "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 - Part 1: Radio disturbance and immunity measuring apparatus".
- [8] EN 61000-4-3 (modified): "Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 3: Radiated, radio-frequency, electromagnetic field immunity test".
- [9] EN 61000-4-2: "Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 2: Electrostatic discharge 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 61000-4-6: "Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 6: Immunity to conducted disturbances, induced by radio-frequency fields".
- [12] EN 61000-4-11: "Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 11: Voltage dips, short interruptions and voltage variations immunity tests".
- [13] EN 61000-4-5: "Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 5: Surge immunity test".
- [14] ETR 238: "ETSI/CENELEC standardization programme for the development of Harmonized Standards related to Electro-Magnetic Compatibility (EMC) in the field of telecommunications".
- [15] 89/336/EEC: "Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility".
- [16] ITU Radio Regulations.

3 Definitions and abbreviations

3.1 Definitions

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

ancillary equipment: Equipment (apparatus), where used in connection with a MES is considered as an ancillary equipment (apparatus) if:

- the equipment is intended for use in conjunction with a MES to provide additional operational and/or control features to the MES (e.g. to extend control to another position or location); and
- the equipment cannot be used on a stand alone basis to provide MES user functions independently of a MES; and
- the absence of the ancillary equipment does not inhibit the operation of the MES.

applicant: A party seeking an approval, or to place an MES on the European market, i.e. the manufacturer of the equipment, or his authorized representative, or an equipment supplier to the European market.

carrier-on state: An MES is in this state when it is transmitting a signal in a continuous or non-continuous mode.

carrier-off: An MES is in this state when it is not transmitting a signal, i.e. not in the carrier on state.

enclosure port: The physical boundary of the apparatus through which an electromagnetic field may radiate or impinge (see figure 1).

host equipment: Any equipment which has complete user functionality when not connected to the MES, and to which connection is necessary for the MES to offer additional functionality.

Installable Equipment (IE), Internally Mounted Equipment (IME) and Externally Mounted Equipment (EME): An Installable Equipment (IE) is an equipment which is intended to be installed in a vehicle. An IE may consist of one or several modules. The IE is composed of modules intended to be externally mounted and declared by the applicant as Externally Mounted Equipment (EME). The remaining module(s) are defined as Internally Mounted Equipment (IME).

integral antenna: An antenna which may not be removed during the tests, according to the applicant statement.

occupied bandwidth: See ITU Radio Regulations [16], Part A, Chapter 1, Terminology RR 147.

port: A particular interface of the specified equipment (apparatus) with the electromagnetic environment (see figure 1).

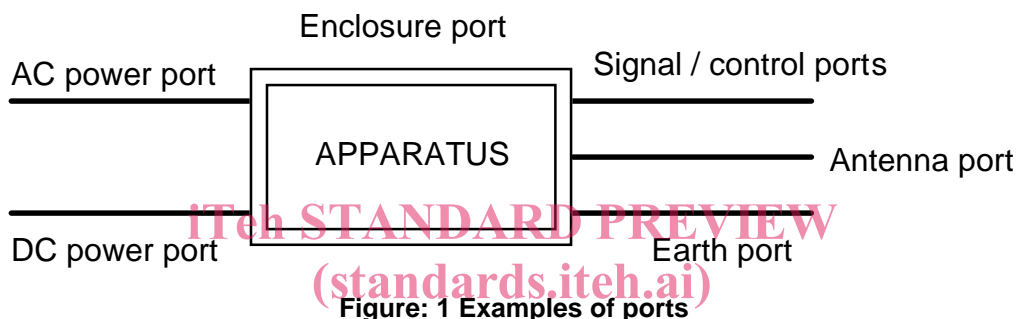


Figure: 1 Examples of ports

portable equipment: A Portable Equipment (PE) is generally intended to be self-contained, free standing and portable. A PE would normally consist of a single module, but may consist of several interconnected modules.

NOTE: More than one of the equipment classifications can apply to certain equipment, as described in subclause 5.2, dependent upon the applicant's declaration of normal intended use.

removable antenna: An antenna which may be removed for the test according to the applicant statement.

3.2 Abbreviations

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

BER	Bit Error Ratio
CMF	Control and Monitoring Functions
CP	Continuous Phenomena
EIRP	Equivalent Isotropically Radiated Power
EMC	ElectroMagnetic Compatibility
EME	Externally Mounted Equipment
EUT	Equipment Under Test
F-MES	Fixed MES
IE	Installable Equipment
IME	Internally Mounted Equipment
LBRDC	Low Bit Rate Data Communication
LEO	Low Earth Orbit
LISN	Line Impedance Stabilizing Network
MES	Mobile Earth Station
MSS	Mobile Satellite Service
NCF	Network Control Facilities
OJEC	Official Journal of the European Commission
PE	Portable Equipment

PEP	Peak Envelope Power
P-MES	Portable MES
QTMA	Quality of Transmission Measurement Apparatus
RF	Radio Frequency
rms	root mean square
STE	Special Test Equipment
TP	Transient Phenomena
V-MES	Vehicle mounted MES

4 General test conditions

4.1 Test conditions

For Mobile Earth Stations (MESs) with ancillary equipment and/or various ports, the number of test configurations shall be determined. The assessment shall include sufficient representative configurations of the MES to adequately exercise the equipment. These configurations shall be recorded in the test report.

In the following clauses, the Equipment Under Test (EUT) is the MES with the selected configuration of ancillary equipment.

The equipment shall be tested under conditions which are within the applicant's declared range of humidity, temperature, and supply voltage.

The EUT operational frequencies used during the test shall be recorded in the test report.

The test conditions shall be recorded in the test report.

The test configuration shall be as close to normal intended use as possible, and shall be recorded in the test report.

For testing and if physically separated from the MES, any voltage converter, shall form part of the EUT.

Whenever the Equipment Under Test (EUT) is provided with an integral antenna, the EUT shall be tested with the antenna fitted in a manner typical of normal intended use.

For MES for which connection to a host equipment is necessary to offer additional functionality, the test configuration shall be as defined in subclause 5.4.

4.2 Arrangements for tests

In order to measure the system emission and electromagnetic immunity under operational conditions, proper arrangements have to be provided (by the applicant) e.g.:

- a) a Special Test Equipment (STE) to put the MES terminal in its normal operating mode, and providing the MES with a receive signal to emulate the operational conditions of reception. This equipment shall control the EUT, when it is capable of transmission, so that it switches between the carrier-on and carrier-off states;
- b) a specific Quality of Transmission Measurement Apparatus (QTMA).

EXAMPLE: The quality of transmission can concern:

- the Bit Error Ratio (BER);
- the message throughput;
- the continuity of the communication link; or
- a combination of them.