SLOVENSKI STANDARD
SIST EN 300 673:2000

01-julij-2000

Elektromagnetna združljivost (EMC) in zadeve v zvezi z radijskim spektrom (ERM) - Standard elektromagnetne združljivosti (EMC) za opremo VSAT (satelitski terminal z manjšo anteno), ki deluje na 4/6 GHz in 11/12/14 GHz, in opremo prenosljivih zemeljskih postaj (TES) za satelitsko novinarstvo (SNG), ki delujejo na 11/12/13/14 GHz

Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for Very Small Aperture Terminal (VSAT), Satellite News Gathering (SNG), Satellite Interactive Terminals (SIT) and Satellite User Terminals (SUT) Earth Stations operated in the frequency ranges between 4 GHz and 30 GHz in the Fixed Satellite Service (FSS)

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Candidate Harmonized European Standard (Telecommunications series)

Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for Very Small Aperture Terminal (VSAT), Satellite News Gathering (SNG), Satellite Interactive Terminals (SIT) and Satellite User Terminals (SUT) Earth Stations operated in the frequency ranges between 4 GHz and 30 GHz in the Fixed Satellite Service (FSS)

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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, 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 [3] as amended) and relating to Article 3.1.b) of the R&TTE Directive 99/5/EC.

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

The present document is based upon the Generic Standards EN 50081-1 [1] and EN 50082-1 [2] and other standards, where appropriate to meet the essential requirements of Council Directive 89/336/EEC [3]. For equipment which can be connected to the AC main supply, of EN 61000-3-2 [12] and EN 61000-3-3 [13] also apply where appropriate from 1-1-2001.

National transposition dates	
Date of adoption of this EN:	18 February 2000
Date of latest announcement of this EN (doa):	31 May 2000
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 November 2000
Date of withdrawal of any conflicting National Standard (dow):	31 May 2003

1 Scope

The present document covers the assessment of Very Small Aperture Terminals (VSAT), Satellite News Gathering (SNG) Transportable Earth Stations (TESs), Satellite Interactive Terminals (SITs) and Satellite User Terminals (SUTs) 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 standards for the effective use of the radio spectrum.

The present document specifies the applicable EMC tests, the limits, and the minimum performance criteria for the Earth Stations (ES) defined in annex B.

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].

The EMC requirements have been selected to ensure an adequate level of compatibility for apparatus in residential, commercial and light industrial 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 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 ES equipment to the requirements of the present document does not imply compliance to any requirement related to the use of this ES (e.g. licensing requirements).

Compliance to the present document does not signify compliance to any safety requirements. However, it is the responsibility of the assessor of the equipment, that any observations regarding apparatus becoming dangerous or unsafe as a result of the application of the tests of the present document, should be recorded in the test report.

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, 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: "Electromagnetic compatibility - generic emission standard. Part 1: Residential, commercial and light industry".

[2] EN 50082-1: "Electromagnetic compatibility - generic immunity standard. Part 1: Residential, commercial and light industry".

[3] 89/336/EEC: "Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility" as amended by 92/31/EEC: "Council Directive amending 89/336/EEC".

[4] EN 55022: "Limits and methods of measurement of radio disturbance characteristics of information technology equipment".

[5] CISPR 16-1: "Specification for radio disturbance and immunity measuring apparatus and methods; Part 1: Radio disturbance and immunity measuring apparatus".

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

[7] EN 61000-4-2: "Electromagnetic compatibility (EMC); Part 4: Testing and measurement techniques; Section 2: Electrostatic discharge immunity test; Basic EMC publication".

[8] EN 61000-4-4: "Electromagnetic Compatibility (EMC); Part 4: Testing and measurements techniques - Section 4: Electrical fast transient/burst immunity test. Basic EMC publication".

[9] EN 61000-4-6: "Electromagnetic Compatibility (EMC); Part 4: Testing and measurement techniques - Section 6: Immunity to conducted disturbances, induced by radio-frequency fields".

[10] EN 61000-4-11: "Electromagnetic Compatibility (EMC); Part 4: Testing and measurements techniques - Section 11: Voltage dips, short interruptions and voltage variations immunity tests - Basic EMC publication".

[11] EN 61000-4-5: "Electromagnetic Compatibility (EMC) - Part 4: Testing and measurements techniques - Section 5: Surge immunity test".

[12] EN 61000-3-2 (1995): "Electromagnetic compatibility (EMC) - Part 3: Limits - Section 2: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)".

[13] EN 61000-3-3 (1995): "Electromagnetic compatibility (EMC) - Part 3: Limits - Section 3: Limits of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A per phase".

3 Definitions and abbreviations

3.1 Definitions

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

ancillary equipment: equipment used in connection with an ES is considered as ancillary if the following three conditions are met:

- the equipment is intended for use in conjunction with an ES to provide additional operational and/or control features (e.g. 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 an ES; and
- the absence of the equipment does not inhibit the operation of the ES.

carrier-on state: transmit ES is in this state when it is authorized to transmit, and when it transmits a signal, either authorized by a Centralized Control and Monitoring Function (CCMF) or a Network Control Facility (NCF) when designed for unattended operation or by local control when designed for attended operation.

carrier-off state: transmit ES is in this state when it is authorized to transmit, and when it does not transmit any signal, either authorized by a CCMF or a NCF when designed for unattended operation or by local control when designed for attended operation.

NOTE: The existence of a carrier-off state depends on the system of transmission used. For ES designed for continuous transmission mode there may be no carrier-off state.

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

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

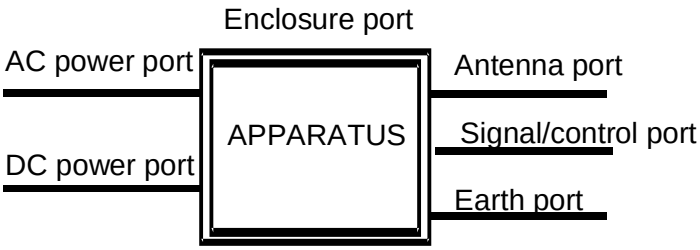

Figure 1: Examples of ports

transmission disabled state: transmit ES is in this state when it is not authorized to transmit either by a CCMF or a NCF respectively when designed for unattended operation or by local control when designed for attended operation.

3.2 Abbreviations

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

CCMF	Centralized Control and Monitoring Functions
CMF	Control and Monitoring Functions
EIRP	Equivalent Isotropically Radiated Power
EMC	ElectroMagnetic Compatibility
ES	Earth Station
EUT	Equipment Under Test
FSS	Fixed Satellite Service
LISN	Line Impedance Stabilizing Network
LNB	Low Noise Block converter
NCF	Network Control Facility
QTMA	Quality of Transmission Measurement Apparatus
RF	Radio Frequency
rms	root mean square
SIT	Satellite Interactive Terminals
SNG	Satellite News Gathering
SUT	Satellite User Terminals
TES	Transportable Earth Station
VSAT	Very Small Aperture Terminal

4 General test conditions

4.1 Test conditions

For Earth Stations with or without ancillary equipment, and/or various terrestrial ports, the number of test configurations shall be determined. The assessment shall include sufficient representative configurations of the ES 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 ES with the selected configuration of ancillary equipment.

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

The test conditions shall be recorded in the test report.

4.2 Arrangements for tests

In order to measure the unwanted emissions and electromagnetic immunity under operational conditions, the following arrangements shall be provided by the manufacturer:

a) a special test equipment to put the ES terminal in its normal operating mode, and providing the ES 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 transmission disabled, carrier-on and carrier-off states;

b) the specific Quality of Transmission Measurement Apparatus (QTMA).

For the measurement of the quality of transmission a communications link shall be established and the wanted input signal shall be applied to the Radio Frequency (RF) input of the receiver via the antenna. For tests on the receiver, the level of the signal received from the test transmitter shall be as close as possible to the normal operation level of the EUT receiver. Care should be taken to avoid the broadband noise from the power amplifier of the test transmitter from influencing the measurement.

Adequate measures shall be taken to avoid the effects of the unwanted signal on the measuring equipment.

The special test equipment, the QTMA and the source of the wanted input signal shall be located outside the test environment. Adequate measures shall be taken to protect them from the effects of all the radiated fields within the test environment.

5 Performance assessment

5.1 General

The manufacturer shall, at the time of submission of the equipment for test, declare the intended use of the equipment, and provide full and complete documentation necessary for user operation, testing and evaluation purposes. This documentation shall include, but not be limited to:

- the ranges of the operational parameters, e.g. the power delivered to the antenna, the frequency ranges;
- an exhaustive list of ports, classified as either power, antenna or signal/control. Power ports shall further be classified as AC or DC power;
- the ancillary equipment to be combined with the ES for testing, if applicable;
- the user-control functions that are required for normal operation;
- the minimum quality of transmission, and the method to be used to assess it.

This information shall be in accordance with the documentation accompanying the equipment.

All this information shall be recorded in the test report.

5.2 Equipment configuration(s)

For radiation measurements in carrier-on state, the ES shall be put in a continuous transmit mode or to the maximum burst rate where applicable. The ES shall be operated at the highest normal operating Equivalent Isotropically Radiated Power (EIRP) or, if that is the maximum attainable, then 3 dB below such maximum.

A suggested test configuration is shown in figure 2.

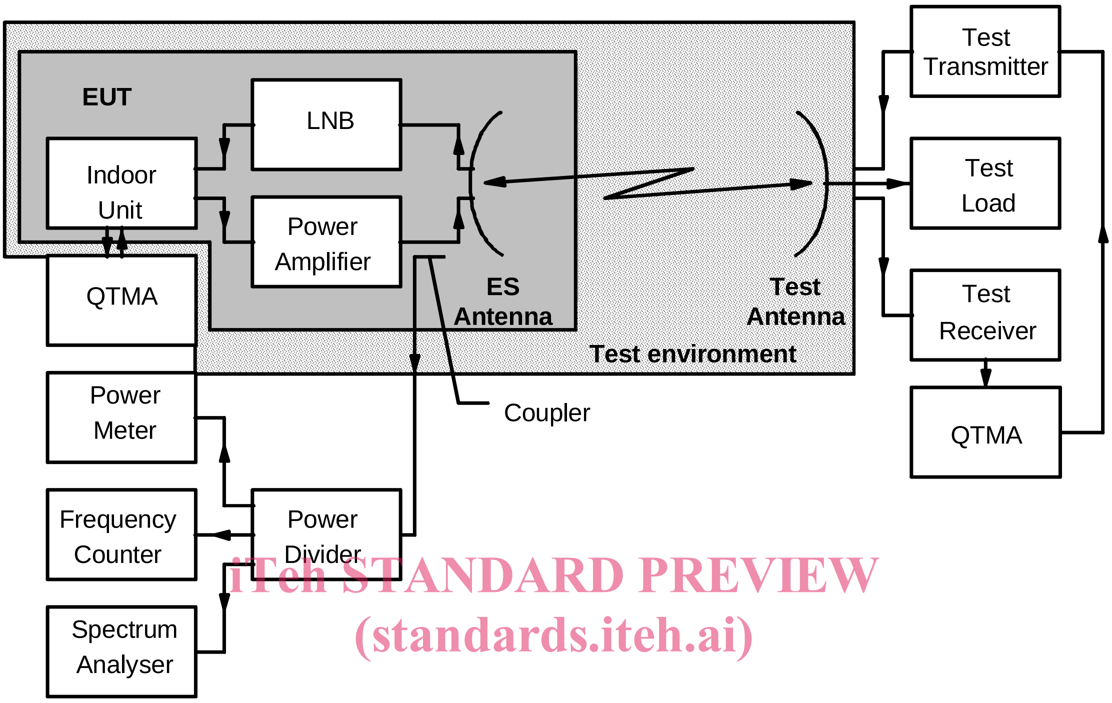

Figure 2: Suggested test configuration

For the tests, the ES antenna reflector and the test antenna may be removed at their flanges and be replaced by one direct wave guide connection.

The following test equipment shall be the means whereby the correct operation of the EUT is verified:

a) the power meter measures the output power and is used to confirm the transmission disabled, carrier-on and carrier-off states and output level consistency;

b) the frequency counter measures the centre frequency of the radiated carrier in the absence of modulation;

c) the spectrum analyser measures the bandwidth of the transmission;

d) the test receiver is used to demodulate the transmitted signal;

e) the two QTMA are used in conjunction with each other to assess the quality of transmission;

f) the test transmitter is used to control the switching between transmission disabled, carrier-on and carrier-off states by transmitting the control and monitoring signals.