



SLOVENSKI STANDARD SIST EN 301 459:2001

01-september-2001

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Satellite Earth Stations and Systems (SES); Harmonized EN for Satellite Interactive Terminals (SIT) and Satellite User Terminals (SUT) transmitting towards satellites in geostationary orbit in the 29,5 to 30,0 GHz frequency bands covering essential requirements under article 3.2 of the R&TE Directive

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Ta slovenski standard je istoveten z: EN 301 459 Version 1.2.1

ICS:

33.060.30 Radiorelejni in fiksni satelitski komunikacijski sistemi Radio relay and fixed satellite communications systems

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ETSI EN 301 459 V1.2.1 (2000-10)

Candidate Harmonized European Standard (Telecommunications series)

**Satellite Earth Stations and Systems (SES);
Harmonized EN for Satellite Interactive Terminals (SIT)
and Satellite User Terminals (SUT)
transmitting towards satellites in geostationary orbit
in the 29,5 to 30,0 GHz frequency bands
covering essential requirements
under article 3.2 of the R&TTE Directive**

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Reference

DEN/SES-00044-46

Keywords

FSS, earth station, satellite

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Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This Candidate Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES).

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [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 Directive 1999/5/EC [2] 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") [2].

Technical specifications relevant to Directive 1999/5/EC are given in annex A.

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National transposition dates

Date of adoption of this EN:	13 October 2000
Date of latest announcement of this EN (doa):	31 January 2001
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 July 2001
Date of withdrawal of any conflicting National Standard (dow):	31 July 2001

Introduction

ETSI has designed a modular structure for the standards. Each standard is a module in the structure. The modular structure is shown in figure 1.

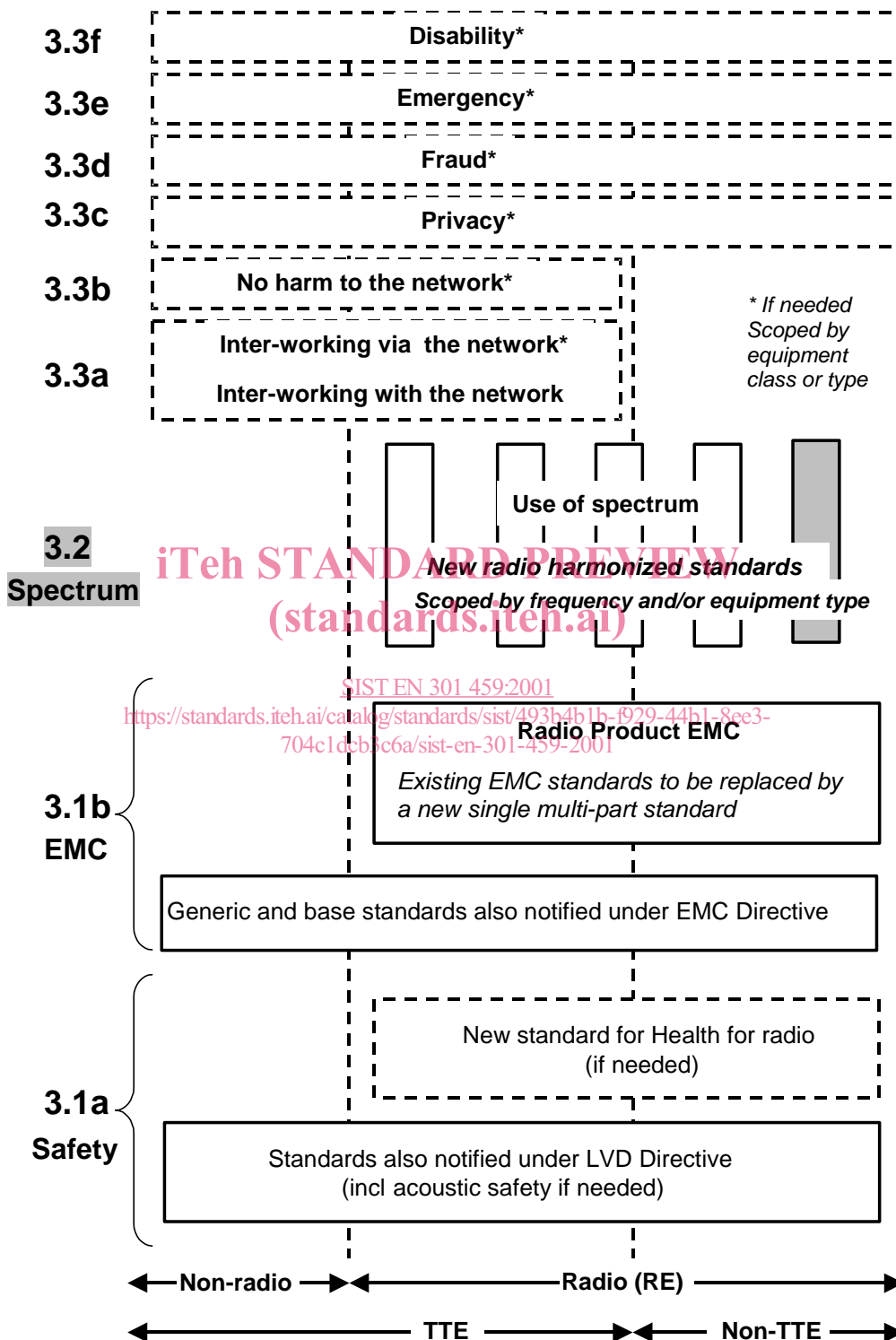


Figure 1: Modular structure for the various standards used under the R&TTE Directive

The left hand edge of the figure shows the different subclauses of Article 3 of the Directive.

For article 3.3 various horizontal boxes are shown. Their dotted lines indicate that no essential requirements in these areas have yet been adopted by the Commission. If such essential requirements are adopted, they will be elaborated in individual standards whose scope is likely to be specified by function or interface type.

The vertical boxes show the standards under article 3.2 for the use of the radio spectrum. The scopes of these standards are specified either by frequency (normally in the case where frequency bands are harmonized) or by radio equipment type.

For article 3.1(b), the diagram shows the new single multi-part product EMC standard for radio, and the existing collection of generic and base standards currently used under the EMC Directive. The parts of this new standard will become available in the second half of 2000, and the existing separate EMC standards will be used until it is available.

For article 3.1(a) the diagram shows the existing safety standards currently used under the LVD Directive and the possibility of a new standard on health relating to radio emissions

The bottom of the figure shows the relationship of the standards to radio equipment and telecommunications terminal equipment. A particular equipment may be radio equipment, telecommunications terminal equipment or both.

The modular approach has been taken because:

- it minimizes the number of standards needed. Because equipment may have multiple interfaces and functions it is not practicable to produce a single standard for each possible combination of functions that may occur in an equipment.
- it provides scope for standards to be added
 - under article 3.2 when new frequency bands are agreed or
 - under article 3.3 should the Commission take the necessary decisions,
 without requiring alteration of standards that are already published.

The present document is based on EN 301 358 [4] and EN 301 359 [5].

The present document applies to Satellite Interactive Terminals (SIT) and Satellite User Terminals (SUT) either for individual or collective use.

The present document deals with the specification defined to protect other users of the frequency spectrum, both satellite and terrestrial, from harmful interference.

The determination of the parameters of the user earth stations using a given geo-stationary satellite for the protection of the spectrum allocated to that satellite, is considered to be under the responsibility of the satellite operator or the satellite network operators.

The requirements have been selected to ensure an adequate level of compatibility with other radio services. 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 phenomena 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 the source of interference, or the interfered part or both.

The present document does not contain any requirement, recommendation or information about the installation of SITs and SUTs.

Typically, in case of SITs, the received signal will be a digitally modulated signal as defined in EN 300 421 [6].

1 Scope

The present document applies to Satellite Interactive Terminals (SIT) and Satellite User Terminals (SUT) operating as part of a bi-directional satellite network. Satellite Terminal (ST) is used in the present document as a generic name that refers equally to a SIT and/or a SUT.

In such a network a Network Control Facility (NCF) is responsible for the monitoring and control of the transmit functions of the STs. These STs have the following characteristics:

- in the case of SITs reception is in the Fixed Satellite Service (FSS) frequency ranges from 10,70 GHz to 11,70 GHz and from 12,50 GHz to 12,75 GHz as well as the Broadcast Satellite Service (BSS) frequency range from 11,70 GHz to 12,50 GHz;
- in the case of SUTs reception is in the Fixed Satellite Service (FSS) frequency ranges from 19,70 GHz to 20,20 GHz and from 17,70 GHz to 19,70 GHz as well as the Broadcast Satellite Service (BSS) frequency range from 21,40 GHz to 22,00 GHz;
- in all cases ST transmission is in the frequency band allocated to FSS on a primary basis from 29,5 GHz to 30,0 GHz;
- STs transmit through geostationary satellites with spacing down to 2° away from any other geostationary satellite operating in the same frequency band and covering the same area;
- linear or circular polarization is used for transmission or reception;
- the received signals may be analogue and/or digital;
- the transmitted signals are always of digital nature;
- the ST antenna diameter does not exceed 1,8 m, or equivalent corresponding aperture;
- the ST is designed for unattended operations.

The equipment considered in the present document comprises both the outdoor unit, usually composed of the antenna subsystem and associated upconverter, power amplifier and Low Noise Block (LNB) downconverter, and the indoor unit, usually composed of receive and transmit logic as well as the modulator, including cables between these two units.

The present document applies to the ST with its ancillary equipment and its various ports and when operated within the boundary limits of all the operational environmental profile declared by the manufacturer and when installed as required by the manufacturer by declaration or in the user documentation.

All parts of the indoor unit related to reception, processing and presentation of the received information except the control channel are not within the scope of the present document. The syntax of the control channel messages is outside the scope of the present document.

The present document is intended to cover the provisions of Directive 1999/5/EC (R&TTE Directive) [2] Article 3.2, which states that "..... radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements under other parts of Article 3 of the R&TTE Directive [1] may apply to equipment within the scope of the present document.

NOTE: A list of such ENs is included on the web site <http://www.newapproach.org/>.

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] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.
- [2] 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).
- [3] CISPR No 16-1: "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1: Radio disturbance and immunity measuring apparatus".
- [4] ETSI EN 301 358: "Satellite Earth Stations and Systems (SES); Satellite User Terminals (SUT) using satellites in geostationary orbit operating in the 19,7 GHz to 20,2 GHz (space-to-earth) and 29,5 GHz to 30 GHz (earth-to-space) frequency bands".
- [5] ETSI EN 301 359: "Satellite Earth Stations and Systems (SES); Satellite Interactive Terminals (SIT) using satellites in geostationary orbit operating in the 11 GHz to 12 GHz (space-to-earth) and 29,5 GHz to 30,0 GHz (earth-to-space) frequency bands".
- [6] ETSI EN 300 421: "Digital Video Broadcasting (DVB); Framing structure, channel coding and modulation for 11/12 GHz satellite services".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purpose of the present document, the terms and definitions given in the R&TTE Directive [1], and the following apply:

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

- a) the equipment is intended for use in conjunction with the ST to provide additional operational and/or control features; and
- b) the equipment can not be used on a stand alone basis, to provide user functions independently of the ST; and
- c) the absence of the equipment does not inhibit the operation of the ST

carrier-off state: ST is in this state when it is authorized by the Network Control Facility (NCF) to transmit, but when it does not transmit any signal

NOTE 1: The existence of a carrier-off state depends on the system of transmission used. For STs designed for continuous transmission mode there may be no carrier-off state.

carrier-on state: ST is in this state when it is authorized by the NCF to transmit and when it transmits a signal in a continuous or non-continuous mode

Control Channel (CC): channel or channels by which STs receive control information from the NCF for their network. Typically the CC(s) is/are carried via the same or collocated satellite as used for transmission of user data and within the internal protocol structure of the broadcast system

EIRP_{max}: maximum EIRP capability of the ST as declared by the manufacturer

EIRP_{nom}: either

- i. when uplink power control is not implemented EIRP_{max};
- ii. or, when uplink power control is implemented, the maximum required EIRP of the ST under clear sky condition as declared by the manufacturer

Environmental profile: range of environmental conditions under which equipment within the scope of the present document is required to comply with the provisions of the present document

indoor unit: it is composed of that part of the ST which is not part of the outdoor unit. It is generally installed inside a building and is connected to the outdoor unit

integral antenna: antenna which may not be removed during the tests according to the manufacturer's statement

manufacturer: manufacturer, his authorized representative within the Community or the person responsible for placing the apparatus on the market

nominated bandwidth: bandwidth of the ST radio frequency transmission is nominated by the manufacturer. The nominated bandwidth does not exceed 5 times the occupied bandwidth.

NOTE 2: The nominated bandwidth is wide enough to encompass all spectral elements of the transmission which have a level greater than the specified spurious radiation limits. The nominated bandwidth is wide enough to take account of the transmit carrier frequency stability. This definition is chosen to allow flexibility regarding adjacent channel interference levels which will be taken into account by operational procedures depending on the exact transponder carrier assignment situation.

occupied bandwidth: width of the signal spectrum 10 dB below the maximum inband density

outdoor unit: those parts of the ST intended to be installed outdoor, as declared by the manufacturer, or as indicated in the user documentation.

The outdoor unit usually comprises of three main parts:

- a) the antenna sub-system which converts the incident radiation field into a guided wave and vice versa;
- b) the Low Noise Block (LNB) downconverter, which is a device that amplifies, with very low internal noise, the received signals in the Radio Frequency (RF) band and converts them to Intermediate Frequencies (IF);
- c) the upconverter and the power amplifier which convert from the IF to RF and amplify the low level RF signals for transmission through the antenna subsystem.

NOTE 3: The installation equipment is outside the scope of the present document. However, the antenna structures and other components directly mounted on the antenna and forming an integral part of it, are subject to the specifications of the present document.

port: particular interface of the specified apparatus with the external electromagnetic environment (figure 2)

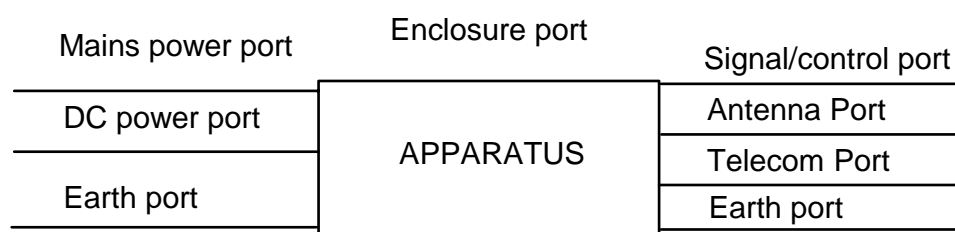


Figure 2: Examples of ports