



SLOVENSKI STANDARD

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Satellite Earth Stations and Systems (SES); Harmonized EN for Very Small Aperture Terminal (VSAT); Transmit-only, transmit-and-receive, receive-only satellite earth stations operating in the 4 GHz and 6 GHz frequency bands covering essential requirements under article 3.2 of the R&TTE Directive

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ETSI EN 301 443 V1.3.1 (2006-02)

Candidate Harmonized European Standard (Telecommunications series)

**Satellite Earth Stations and Systems (SES);
Harmonized EN for Very Small Aperture Terminal (VSAT);
Transmit-only, transmit-and-receive,
receive-only satellite earth stations operating in the 4 GHz
and 6 GHz frequency bands covering essential requirements
under article 3.2 of the R&TTE Directive**

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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 Directive 98/34/EC [4] (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 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") [1].

Technical specifications relevant to Directive 1999/5/EC [1] are given in annex A.

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Date of adoption of this EN:	3 February 2006
Date of latest announcement of this EN (doa):	31 May 2006
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 November 2006
Date of withdrawal of any conflicting National Standard (dow):	30 November 2006

Introduction

The present document is part of a set of standards designed to fit in a modular structure to cover all radio and telecommunications terminal equipment under the R&TTE Directive [1]. Each standard is a module in the structure. The modular structure is shown in figure 1.

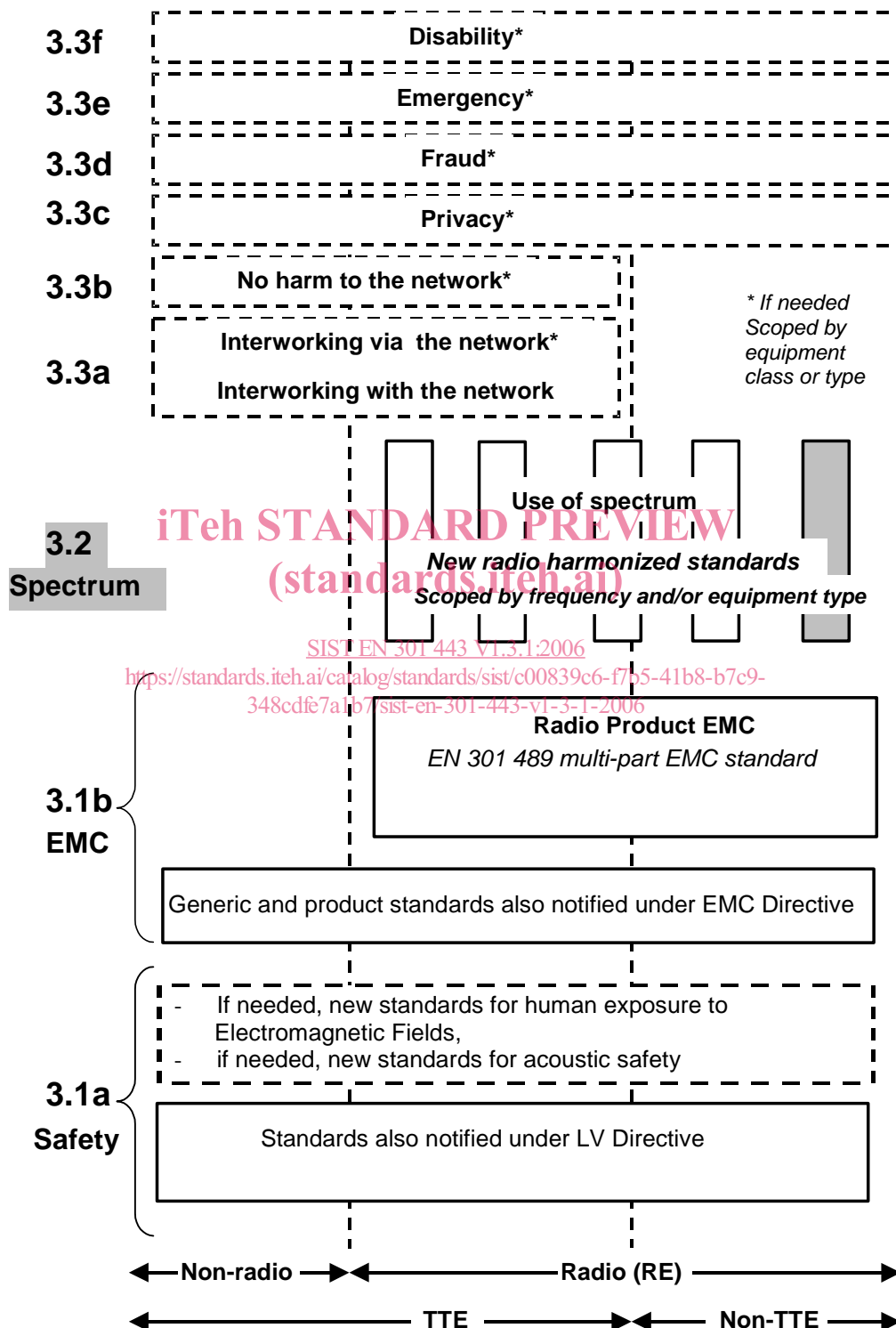


Figure 1: Modular structure for the various standards used under the R&TTE Directive [1]

The left hand edge of the figure 1 shows the different clauses of article 3 of the R&TTE Directive [1].

For article 3.3 various horizontal boxes are shown. Dotted lines indicate that at the time of publication of the present document essential requirements in these areas have to be adopted by the Commission. If such essential requirements are adopted, and as far and as long as they are applicable, they will justify 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 by radio equipment. 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 3.1b the diagram shows EN 301 489, the multi-part product EMC standard for radio used under the EMC Directive [2].

For article 3.1a the diagram shows the existing safety standards currently used under the LV Directive [5] and new standards covering human exposure to electromagnetic fields. New standards covering acoustic safety may also be required.

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. A radio spectrum standard will apply if it is radio equipment. An article 3.3 standard will apply as well only if the relevant essential requirement under the R&TTE Directive is adopted by the Commission and if the equipment in question is covered by the scope of the corresponding standard. Thus, depending on the nature of the equipment, the essential requirements under the R&TTE Directive may be covered in a set of standards.

The modularity principle has been taken because:

- it minimizes the number of standards needed. Because equipment may, in fact, 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;
- it clarifies, simplifies and promotes the usage of Harmonized Standards as the relevant means of conformity assessment.

Remarks on the present document

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. For this reason the requirement on the cross polarization discrimination which was in TBR 043 (see bibliography) has not been copied in the present document and inter-modulation limits inside the band 5,850 GHz to 7,075 GHz are to be determined by system design and are subject to satellite operator specifications.

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 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.

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

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.

1 Scope

The present document applies to any Very Small Aperture Terminal (VSAT) which has the following characteristics:

- the VSAT is operating in one or more frequency ranges within the following bands allocated to the Fixed Satellite Service (FSS), shared with other services, e.g. the Fixed Service (FS) and the Mobile Service (MS):
 - 5,850 GHz to 7,075 GHz (earth-to-space);
 - 3,400 GHz to 4,200 GHz (space-to-earth);
- the VSAT uses linear or circular polarization;
- the VSAT operates through a geostationary satellite at least 3° away from any other geostationary satellite operating in the same frequency band and covering the same area;
- the VSAT antenna diameter does not exceed 7,3 m, or equivalent effective area;
- the VSAT is either:
 - a transmit-only VSAT: designed for transmission-only of radio-communications signals in the frequency band (earth-to-space) specified above; or
 - a transmit-and-receive VSAT: designed for transmission-and-reception of radio-communications signals in the frequency bands specified above; or
 - a receive-only VSAT: designed for reception-only of radio-communications signals in the frequency band (space-to-earth) specified above;
- the VSAT is designed usually for unattended operation;
- the VSAT is operating as part of a satellite network (e.g. star, mesh or point-to-point) used for the distribution and/or exchange of information between users;
- the transmit-only and transmit-and-receive VSAT is controlled and monitored by a Centralized Control and Monitoring Function (CCMF). The CCMF is outside the scope of the present document.

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

The present document is intended to cover the provisions of Directive 1999/5/EC (R&TTE Directive) [1] 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 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.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

- [1] 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).
- [2] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive).
- [3] CISPR 16-1-5 (2003): "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-5: Radio disturbance and immunity measuring apparatus - Antenna calibration test sites for 30 MHz to 1 000 MHz".
- [4] 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.
- [5] Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (LV Directive).

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3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in Directive 1999/5/EC [1] and the following apply:

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

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

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

carrier-off radio state: radio state in which the VSAT may transmit and does not transmit any carrier

NOTE 1: The phrase "the VSAT may transmit" means that all the conditions for transmission are satisfied (e.g. in a state where transmissions are permitted and no failure detected).

NOTE 2: The existence of a "Carrier-off" radio state depends on the system of transmission used. For VSATs designed for continuous transmission mode there may be no "Carrier-off" radio state.

carrier-on radio state: radio state in which the VSAT may transmit and transmits a carrier

Centralized Control and Monitoring Functions (CCMF): set of functional entities that, at system level, monitor and control the correct operation of all transmit VSAT in a network

Control Channel (CC): channel or channels by which VSAT receive control information from the CCMF

EIRP_{max}: maximum e.i.r.p capability of the VSAT as declared by the applicant

NOTE: The applicant may declare different values of EIRP_{max} for each combination of occupied bandwidth and transmission parameters (see clause 4.1.3).

emissions disabled radio state: radio state in which the VSAT must not transmit a carrier

NOTE: This radio state only applies in certain CMF states as defined in clause 4.1.4. (e.g. before system monitoring pass, before the control channel is received, when a failure is detected, when the VSAT is commanded to disable). The "Emissions disabled" radio state requires lower unwanted emissions than the "Carrier-off" radio state.

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

external control channel: control channel which is either:

- (i) carried by the VSAT network via the same or another satellite, but not within the internal protocol of the VSAT system; or
- (ii) carried by the PSTN or some other means.

external response channel: response channel which is either:

- (i) carried by the VSAT network via the same or another satellite, but not within the internal protocol of the VSAT system; or
- (ii) carried by the PSTN or some other means.

f_{min}: lower bound of the VSAT transmit frequency range declared by the applicant

f_{max}: upper bound of the VSAT transmit frequency range declared by the applicant

NOTE: In the case of equipment designed to operate over more than one contiguous frequency range a separate f_{min} and f_{max} may be defined to each range.

indoor unit: is composed of that part of the VSAT which is not part of the outdoor unit. It is generally installed inside a building and is connected to the outdoor unit. The connection cable between the outdoor and indoor unit is considered part of the indoor unit

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

internal control channel: control channel which is carried by the VSAT network via the same satellite as used for transmission of user data and within the internal protocol structure of the VSAT system

internal response channel: response channel which is carried by the VSAT network via the same satellite as used for transmission of user data and within the internal protocol structure of the VSAT system

network: in the present document a network is any network configuration including star, mesh and point-to-point configurations

nominated bandwidth: bandwidth of the VSAT radio frequency transmission is nominated by the applicant

NOTE 1: The nominated bandwidth is centred on the transmit frequency and 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 (Bo): for a digital modulation scheme - the width of the signal spectrum 10 dB below the maximum inband density. For an analogue modulation scheme - the width of a frequency band such that, below the lower and above the upper frequency limits, the mean power emitted is equal to 0,5 % of the total mean power of the emission

outdoor unit: part of the VSAT intended to be installed outdoor, as declared by the applicant, or as indicated in the user documentation

The outdoor unit usually comprises three main parts:

- the antenna sub-system which converts the incident radiation field into a guided wave and vice versa;
- the Low Noise Block (LNB) down converter, 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;
- the upconverter and the power amplifier which convert from the intermediate frequency to RF and amplify the low level RF signals for transmission through the antenna subsystem.

NOTE: The installation equipment (means of attachment) 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.

removable antenna: antenna which may be removed during the tests according to the applicant's statement

Response Channel (RC): channel by which VSAT transmit monitoring information to the CCMF

spurious radiation: any radiation outside the nominated bandwidth

NOTE: For a receive-only VSAT there is no nominated bandwidth therefore any radiation is a spurious radiation.

transmission disabled state: VSAT is in this state when it is not authorized by the CCMF to transmit

transmit VSAT: VSAT capable of being used either for transmission only, or for transmission and reception

VSAT: the complete VSAT equipment, comprising the outdoor unit and the indoor unit including the connection cable(s) between the units

3.2 Abbreviations

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

CC	Control Channel
CCF	Control Channel reception Failure
CCMF	Centralized Control and Monitoring Functions
CISPR	(Comité International Spécial des Perturbations Radioélectriques) International Special Committee on Radio Interference
CMF	Control and Monitoring Function
CCR	Control Channel correctly Received
CV	Control Variable
EIRP, e.i.r.p	Equivalent Isotropically Radiated Power
EN	European Standard
EUT	Equipment Under Test
FEC	Forward Error Correction
FS	Fixed Service
FSS	Fixed Satellite Service
HPA	High Power Amplifier
ITU	International Telecommunications Union
LNA	Low Noise Amplifier