
Satelitske zemeljske postaje in sistemi (SES) - Satelitski terminal z zelo majhno antensko odprtino (VSAT) - Oddajne, oddajno-sprejemne ali sprejemne satelitske zemeljske postaje, delujoče v frekvenčnih pasovih 4 GHz in 6 GHz - Harmonizirani standard za dostop do radijskega spektra

Satellite Earth Stations and Systems (SES) - 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 - Harmonised Standard for access to radio spectrum

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**Satellite Earth Stations and Systems (SES);
Very Small Aperture Terminals (VSAT);
Transmit-only, transmit-and-receive, receive-only satellite
earth stations operating in the 4 GHz and 6 GHz
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Harmonised Standard for access to radio spectrum**

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Foreword

This draft Harmonised European Standard (EN) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI Standardisation Request deliverable Approval Procedure (SRdAP).

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.2] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU [i.5] on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

Proposed national transposition dates	
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Modal verbs terminology

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Introduction

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1 Scope

The present document specifies technical characteristic and methods of measurements for Very Small Aperture Terminal (VSAT) equipment 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);
 - 4,500 GHz to 4,800 GHz (space-to-Earth);
- the VSAT uses linear or circular polarization;
- the VSAT operates through a geostationary satellite at least 2° 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 in the present clause; or
 - a transmit-and-receive VSAT: designed for transmission-and-reception of radio-communications signals in the frequency bands specified in the present clause; or
 - a receive-only VSAT: designed for reception-only of radio-communications signals in the frequency band (space-to-Earth) specified in the present clause;
- the VSAT is designed 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 VSAT is controlled, and monitored for the transmit functionality, by a Centralized Control and Monitoring Facility (CCMF). The VSAT has to implement Control and Monitoring Functions with either Class A or Class B (structures of the radio states). The specifications associated to the CCMF facility are 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 defined for the intended use of the VSAT including all equipment as brought to the market.

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. The present document is intended to cover the provisions of Directive 2014/53/EU (Radio Equipment Directive) [i.5] article 3.2.

NOTE: The relationship between the present document and essential requirements of article 3.2 of Directive 2014/53/EU [i.5] is given in annex A.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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- [1] Void.
- [2] Void.
- [3] [CISPR 16-1-5:2014](#): "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-5: Radio disturbance and immunity measuring apparatus - Antenna calibration test sites for 5 MHz to 18 GHz".
- [4] Void.
- [5] Void.
- [6] [ERC/REC 74-01 \(2021\)](#): "Unwanted emissions in the spurious domain".

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- [i.1] Void.
- [i.2] [Commission Implementing Decision C\(2015\) 5376](#) of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.
- [i.3] Void.
- [i.4] ETSI TR 102 375 (V1.2.1): "Satellite Earth Stations and Systems (SES); Guidelines for determining the parts of satellite earth station antenna radiation patterns concerned by the geostationary satellite orbit protection".
- [i.5] [Directive 2014/53/EU](#) of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC (Radio Equipment Directive).
- [i.6] Void.

- [i.7] ETSI TR 102 215 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Recommended approach, and possible limits for measurement uncertainty for the measurement of radiated electromagnetic fields above 1 GHz".
- [i.8] ETSI EG 203 336: "Guide for the selection of technical parameters for the production of Harmonised Standards covering article 3.1(b) and article 3.2 of Directive 2014/53/EU".

3 Definitions of terms, symbols and abbreviations

3.1 Terms

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

ancillary equipment: equipment used in connection with a VSAT where 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 standalone basis, to provide user functions independently of the VSAT; and
- c) the absence of the equipment does not inhibit the operation of the VSAT

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

NOTE 1: The phrase "the VSAT may transmit" means that all the conditions for transmission are satisfied (e.g. where transmissions are permitted and no failure is 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 actually 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 defined for the intended use of the VSAT

NOTE: Different values of EIRP_{max} for each combination of occupied bandwidth and transmission parameters can be applied as per the intended use of the VSAT (see clause 4.1.3).

emissions disabled radio state: radio state in which the VSAT does 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 defined for the intended use of the VSAT

$f_{\max}$: upper bound of the VSAT transmit frequency range defined for the intended use of the VSAT

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: part of the VSAT which is not part of the outdoor unit

NOTE: 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 intended use of the VSAT

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

Internally Mounted Equipment (IME): modules of the internal equipment which are not defined for the intended use of the VSAT as externally mounted equipment are defined as IMEC

network: collection of interconnected earth stations and satellite allowing the transfer of information between earth stations and satellite including star, mesh and point-to-point configurations

nominal antenna diameter: diameter of the antenna defined for the intended use of the VSAT

NOTE 1: An antenna with a nominal antenna diameter D has the same technical characteristics as a circular aperture antenna of diameter D . For non circular aperture antenna, the nominal antenna diameter is defined for the intended use of the VSAT.

NOTE 2: Network operators might request antennas of a certain diameter. Then an antenna that is compliant with the requirement for nominal antenna diameter equal to the requested antenna diameter can be used and its diameter noted in the test report.

nominated bandwidth: bandwidth of the VSAT radio frequency transmission which is wide enough to encompass all spectral elements of the transmission and meet the conditions of notes 1 and 2

NOTE 1: The nominated bandwidth is centred on the transmit frequency and does not exceed five 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 (B_o): for a digital modulation scheme - the width of the signal spectrum 10 dB below the maximum inband density

outdoor unit: part of the VSAT intended to be installed outdoor, as defined for the intended use of the VSAT, or as indicated in the user documentation

NOTE 1: The outdoor unit usually comprises 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) 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;

- c) 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 2: 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 intended use of the VSAT

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: radio state in which the VSAT is not authorized by the CCMF to transmit

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

Very Small Aperture Terminal (VSAT): complete VSAT equipment, comprising the outdoor unit and the indoor unit including the connection cable(s) between the units, as brought to the market

3.2 Symbols

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

dBsd Ratio expressed in decibels relative to the spectral density

3.3 Abbreviations

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

BDU	Below Deck Unit
BW	Wanted signal occupied Bandwidth
CC	Control Channel
CCF	Control Channel reception Failure
CCMF	Centralized Control and Monitoring Function
CCR	Control Channel correctly Received
CISPR	(Comité International Spécial des Perturbations Radioélectriques) International Special Committee on Radio Interference
CV	Control Variable
CW	Continuous Wave
EIRP, e.i.r.p	Equivalent Isotropically Radiated Power
EMC	ElectroMagnetic Compatibility
EN	European Standard
EUT	Equipment Under Test
FEC	Forward Error Correction
FS	Fixed Service
FSS	Fixed Satellite Service
G _{EUT}	Antenna Gain of EUT
GSO	Geostationary Satellite Orbit
HPA	High Power Amplifier
IME	Internally Mounted Equipment
ITU	International Telecommunication Union
LNB	Low Noise Block (low noise amplifier and down-converter)
LO	Local Oscillator
MS	Mobile Service
OATS	Open Area Test Site
PSTN	Public Switched Telephone Network
RC	Response Channel
RE	Reset Event
RED	Radio Equipment Directive