
Satelitske zemeljske postaje in sistemi (SES) - Satelitske zemeljske postaje na ladjah (ESV), ki delujejo v frekvenčnih pasovih 11/12/14 GHz, dodeljenih za fiksne satelitske storitve (FSS) - Harmonizirani standard za dostop do radijskega spektra

Satellite Earth Stations and Systems (SES) - Satellite Earth Stations on board Vessels (ESVs) operating in the 11/12/14 GHz frequency bands allocated to the Fixed Satellite Service (FSS) - Harmonised Standard for access to radio spectrum

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**Satellite Earth Stations and Systems (SES);
Satellite Earth Stations on board Vessels (ESVs)
operating in the 11/12/14 GHz frequency bands
allocated to the Fixed Satellite Service (FSS);
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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
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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.5] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU 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 [i.8].

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 characteristics and methods of measurements for Earth Stations located on board Vessels (ESVs) which have the following characteristics:

- The ESV is comprised of all the equipment, electrical and mechanical, from the antenna itself to the interface with other communications equipment on board (usually referred to as the terrestrial interface).
- The ESV transmits in the frequency range from 14,00 GHz to 14,50 GHz in the Fixed Satellite Services (FSS) (earth-to-space).
- The ESV receives in one or more frequencies within the range from 10,70 GHz to 12,75 GHz in the bands allocated to the Fixed Satellite Services (FSS) (space-to-earth), depending on the ITU Region where the ESV is located.
- The ESV uses linear polarization.
- The ESV operates through a geostationary satellite at least 2° to 3° away from any other geostationary satellite operating in the same frequency band and covering the same area.

NOTE 1: The satellite spacing is mainly equal to 3° in ITU Regions 1 and 3 and 2° in ITU Region 2.

- The ESV transmits at elevations greater or equal to the minimum elevation angle defined for its intended use.
- The ESV antenna diameter is not smaller than 0,6 m.

NOTE 2: Operation within 125 km of non-CEPT countries is subject to specific agreement with concerned administrations as stated in ITU-R Resolution 902 (Rev. WRC-23). Decision ECC(05)10 [i.9] applies for CEPT countries.

- The ESV is designed for transmission and reception of radio-communications signals in accordance with any of the frequency bands specified above.
- The ESV is usually designed for unattended operation.
- The ESV 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 ESV is controlled and monitored by a Network Control Facility (NCF). The NCF is outside the scope of the present document.

The present document applies to the ESV with its ancillary equipment and its various telecommunication ports, and when operated within the boundary limits of the operational environmental profile defined for its intended use including all equipment as brought to the market.

The present document incorporates the technical limitations listed in annex 2 of ITU Radio Regulations Resolution 902 (Rev. WRC-23) [9].

NOTE 3: The relationship between the present document and essential requirements of article 3.2 of Directive 2014/53/EU [i.8] (RE Directive) 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.
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- [4] Void.
- [5] [CISPR 16-1 \(2019\)](#): "Specification for radio disturbance and immunity measuring apparatus and methods".
- [6] [CISPR 16-1-5:2014+AMD1:2016](#): "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-5: Radio disturbance and immunity measuring apparatus - Antenna calibration sites and reference test sites for 5 MHz to 18 GHz".
- [7] [EN 60945:2002](#): "Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results", (produced by CEN).
- [8] [ITU Radio Regulations \(2024\)](#).
- [9] [ITU Radio Regulations Resolution 902 \(Rev. WRC-23\)](#): "Provisions relating to earth stations located on board vessels which operate in fixed-satellite service networks in the uplink frequency bands 5 925-6 425 MHz and 14-14.5 GHz".

2.2 Informative references

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- [i.1] Void.
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- [i.3] ETSI TR 102 215: "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.4] ETSI TR 102 375: "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] [Commission Implementing Decision C\(2015\) 5376 final](#) 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.6] 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".
- [i.7] ETSI TR 100 028-2: "Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Uncertainties in the Measurement of Mobile Radio Equipment Characteristics Part 2".
- [i.8] [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 (RE Directive).
- [i.9] [ECC/DEC/\(05\)10](#): "The free circulation and use of Earth Stations on board Vessels operating in fixed satellite service networks in the frequency bands 14-14.5 GHz".

3 Definition of terms, symbols and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in Directive 2014/53/EU [i.8] and the following apply:

above-deck unit: part of the ESV intended to be installed above deck, as defined for its intended use, and as indicated in the user documentation

NOTE 1: The above-deck unit usually comprises the following 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 up-converter 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.
- d) The stabilization and tracking subsystems that ensure pointing of the antenna main beam towards the satellite within the required accuracy.

NOTE 2: The installation equipment (means of attachment) is outside the scope of the present document.

NOTE 3: 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.

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

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

below-deck unit: part of the ESV equipment which is installed inside the vessel (i.e. below deck) and its connection cables with the above deck units

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

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

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

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

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

EIRP_{max}: maximum e.i.r.p. capability of the ESV as defined for the intended use of the ESV

EIRP_{nom}:

- i) either EIRP_{max};
- ii) or, when uplink power control is implemented, the maximum required e.i.r.p. of the ESV under clear sky condition as defined for the intended use of the ESV

e.i.r.p density: e.i.r.p. within a given frequency range

emissions disabled radio state: radio state in which the ESV does not emit

NOTE: Examples of cases where the ESV is in this radio state: before system monitoring pass, before the control channel is received, when a failure is detected, when an ESV is commanded to disable, and when the ESV is in a location requiring cessation of emissions.

environmental profile: range of environmental conditions under which equipment within the scope of ETSI EN 302 340 (the present document) is required to comply

external control channel: control channel which is either (i) carried by the ESV network via the same or another satellite, but not within the internal protocol of the ESV system, or (ii) carried by any other radio communication system

external response channel: response channel which is either (i) carried by the ESV network via the same or another satellite, but not within the internal protocol of the ESV system, or (ii) carried by any other radio communication system

integral antenna: antenna which may not be removed during the tests according to the documentation provided with the EUT

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

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

network: any network configuration including star, mesh and point-to-point configurations

Network Control Facility (NCF): set of functional entities that, at system level, monitor and control the correct operation of all ESVs in a network

nominal antenna diameter: antenna diameter as defined for the intended use of the ESV

NOTE 1: An antenna with a nominal antenna diameter D has the same technical characteristic 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 ESV.

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.

nominated bandwidth: bandwidth of the ESV radio frequency transmission nominated for the intended use of the ESV

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.

off-axis angle: angle between the direction of the axis of the antenna main beam and the considered direction

removable antenna: antenna which may be removed during the tests according to the intended use of the ESV and upon the EUT equipment capabilities

Response Channel (RC): channel by which ESV transmit monitoring information to the NCF

spurious radiation: any radiation outside the nominated bandwidth

transmission disabled state: state of the ESV when it is not authorized by the NCF to transmit

transmission enabled state: state of the ESV when it is authorized by the NCF to transmit

wanted signal occupied Bandwidth (BW): for a digital modulation scheme: width of the signal spectrum 10 dB below the maximum in-band density

3.2 Symbols

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

dBc	Ratio expressed in decibels relative to the e.i.r.p. of the unmodulated carrier
dBi	Ratio of an antenna gain to the gain of an isotropic antenna, expressed in decibels
dBsd	Ratio expressed in decibels relative to the spectral density
dBW	Ratio of a power to 1 watt, expressed in decibels
dBpW	Ratio of a power to 1 pico watt, expressed in decibels
dB μ V/m	Ratio of an electric field to 1 μ V/m, expressed in decibels ($20 \log(\text{electric field} / 1 \mu\text{V/m})$)

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
CCR	Control Channel correctly Received
CENR	Cessation of Emissions Not Requested
CEPT	Conférence Européenne des Postes et Télécommunications (European Conference of Postal and Telecommunications Administrations)
CER	Cessation of Emissions Requested
CISPR	Comité International Spécial des Perturbations Radioélectriques (International Special Committee on Radio Interference)
CMF	Control and Monitoring Functions
e.i.r.p.	equivalent isotropically radiated power
ECC	Electronic Communications Committee (of CEPT)
EMC	Electro-Magnetic Compatibility
EN	European Standard
ESV	Earth Station on board a Vessel
EUT	Equipment Under Test
FEC	Forward Error Correction
FS	Fixed Service
FSS	Fixed Satellite Service
GEUT	Gain of EUT
GSO	Geostationary Satellites Orbit
HPA	High Power Amplifier
IPR	Intellectual Property Rights