SLOVENSKI STANDARD
SIST EN 303 978 V1.1.2:2013

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Satelitske zemeljske postaje in sistemi (SES) - Harmonizirani EN za zemeljske postaje na mobilnih platformah, ki oddajajo proti satelitom v geostacionarni orbiti v pasovih od 27,5 GHz do 30,0 GHz, ki zajema bistvene zahteve člena 3.2 direktive R&TTE

Satellite Earth Stations and Systems (SES) - Harmonized EN for Earth Stations on Mobile Platforms (ESOMP) transmitting towards satellites in geostationary orbit in the 27,5 GHz to 30,0 GHz frequency bands covering the essential requirements of article 3.2 of the R&TTE Directive

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ICS:

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

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**Satellite Earth Stations and Systems (SES);
Harmonized EN for Earth Stations on Mobile Platforms
(ESOMP) transmitting towards satellites in geostationary orbit
in the 27,5 GHz to 30,0 GHz frequency bands
covering the essential requirements
of article 3.2 of the R&TTE Directive**

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Contents

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Foreword

This Harmonized European Standard (EN) 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 [i.1] as amended by Directive 98/48/EC [i.8].

The title and reference to the present document are intended to be included in the publication in the Official Journal of the European Union of titles and references of Harmonized Standard under the Directive 1999/5/EC [i.2].

See article 5.1 of Directive 1999/5/EC [i.2] for information on presumption of conformity and Harmonized Standards or parts thereof the references of which have been published in the Official Journal of the European Union.

The requirements relevant to Directive 1999/5/EC [i.2] are summarised in annex A.

For non EEA countries the present document may be used for regulatory (type approval) purposes.

National transposition dates	
Date of adoption of this EN:	11 February 2013
Date of latest announcement of this EN (doa):	31 May 2013
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 November 2013
Date of withdrawal of any conflicting National Standard (dow):	30 November 2014

Introduction

The present document is part of a set of standards developed by ETSI and is designed to fit in a modular structure to cover all radio and telecommunications terminal equipment within the scope of the R&TTE Directive [i.2]. The modular structure is shown in EG 201 399 [i.3].

The present document is partly based on EN 301 459 [i.6] and EN 301 360 [i.7].

The present document may also be applicable to the frequency bands 30,0 GHz to 31,0 GHz (Earth-to-space) and 20,2 GHz to 21,2 GHz (space-to-Earth) subject to national regulation.

Annex A (normative) provides HS Requirements and conformance Test specifications Table (HS-RTT).

Annex B (informative) provides information on Linear Polarization Alignment Error Calculation.

Annex C (normative) provides specifications concerning radiated measurements.

Annex D (normative) provides specifications concerning conducted measurements.

Annex E (informative) provides general information concerning RF cables.

Annex F (informative) provides information concerning RF waveguides.

Annex G (informative) Bibliography covers other supplementary information.

1 Scope

The present document applies to Earth Stations on Mobile Platforms (ESOMP), which have the following characteristics.

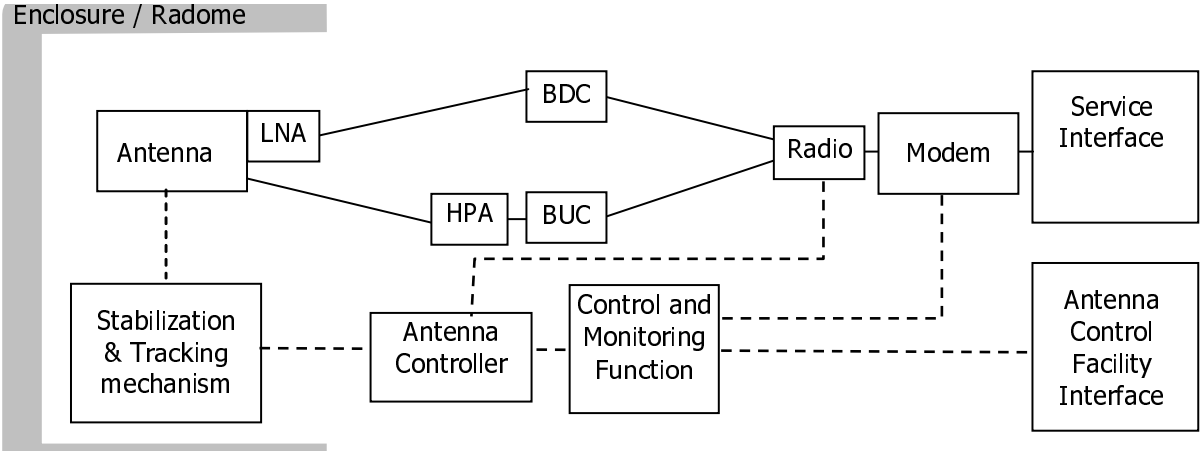

Figure 1: ESOMP System Overview

- The ESOMP is designed for both mobile and stationary operation.
- The ESOMP operates on various mobile platforms such as trains, maritime vessels, aircraft and other vehicles and, therefore, may be subject to occasional disturbances and interruptions in the satellite link.
- The ESOMP 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.
- The ESOMP is comprised of all the equipment, electrical and mechanical, from the antenna itself to the interface with other communications equipment on a mobile platform (usually referred to as the terrestrial interface).
- The transmit and receive frequencies are shown in table 1.

Table 1: Frequency bands

	Frequency Bands/frequencies (GHz)
Transmit (Earth-to-space)	27,50 to 30,00
Receive (space-to-Earth)	17,30 to 20,20

- The ESOMP transmits within the frequency range from 27,50 GHz to 30,00 GHz, which is a band allocated to the Fixed Satellite Services (FSS) (Earth-to-space) among other services. However, operation of the ESOMP is intended to be restricted to the frequency range 29,50 GHz to 30,00 GHz in and near those countries that have allocated Fixed Service (FS) to the other frequency ranges. Local regulation may permit operation in these frequency ranges.
- The ESOMP receives in one or more frequencies within the range from 17,30 GHz to 20,20 GHz (FSS).
- The ESOMP uses linear or circular polarization.
- The ESOMP operates through a geostationary satellite (or a cluster of co-located geostationary satellites) that is at least 2° away from any other geostationary satellite operating in the same frequencies and over the same coverage area.

NOTE 1: ESOMPs may operate with satellites that are more closely spaced than 2° with additional operational constraints that are beyond the scope of the present document.

- The ESOMP is designed for unattended operation.
- The ESOMP is controlled and monitored by a Network Control Facility (NCF). This function may be performed centrally (e.g. for a network of ESOMPs with a central hub) or it could be performed within the ESOMP for autonomous control. The NCF is outside the scope of the present document.

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

The present document is intended to cover the provisions of Directive 1999/5/EC [i.2] (R&TTE Directive) 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".

NOTE 2: Operational requirements are defined by national administrations and by relevant ECC Decisions.

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 Directive 1999/5/EC [i.2] (R&TTE Directive) may apply to equipment within the scope of the present document.

NOTE 3: A list of such ENs is included on the web site http://www.newapproach.org/.

2 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 reference document (including any amendments) applies.

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

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] ETSI TR 100 028 (all parts) (V1.4.1) (12/2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

[2] ETSI TR 102 273 (all parts) (V1.2.1) (12/2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties".

[3] ANSI C63.5 (2006): "American National Standard for Calibration of Antennas Used for Radiated Emission Measurements in Electro Magnetic Interference".

[4] CISPR 16-1-1 Ed.3.0 (2010): "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus".

[5] CISPR 16-1-4 Ed.3.0 (2010): "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-4: Radio disturbance and immunity measuring apparatus - Antennas and test sites for radiated disturbance measurements".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.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.

[i.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).

[i.3] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of Harmonized Standards for application under the R&TTE Directive".

[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] ETSI TS 103 052: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radiated measurement methods and general arrangements for test sites up to 100 GHz".

[i.6] ETSI EN 301 459: "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 GHz to 30,0 GHz frequency bands covering essential requirements under article 3.2 of the R&TTE Directive".

[i.7] ETSI EN 301 360: "Satellite Earth Stations and Systems (SES); Harmonized EN for Satellite Interactive Terminals (SIT) and Satellite User Terminals (SUT) transmitting towards geostationary satellites in the 27,5 GHz to 29,5 GHz frequency bands covering essential requirements under article 3.2 of the R&TTE Directive".

[i.8] Directive 98/48/EC of the European Parliament and of the Council of 20 July 1998 amending Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in Directive 1999/5/EC [i.2] and the following apply:

ancillary equipment: equipment used in connection with an ESOMP

NOTE: Equipment is considered as ancillary if the three following conditions are met:

- the equipment is intended for use in conjunction with the ESOMP 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 the ESOMP; and
- the absence of the equipment does not inhibit the operation of the ESOMP.

antenna controller: equipment used to maintain antenna stabilization and tracking accuracy based on inputs from the Control and Monitoring Function

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 ESOMP may transmit and does not transmit any carrier

NOTE 1: The phrase "the ESOMP 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 ESOMP is correctly pointed towards the satellite).

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

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

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

$EIRP_{Aggregate}$: the sum of the EIRP (Watts) within the nominated bandwidth of the ESOMP network

$EIRP_{max}$: maximum EIRP capability of the ESOMP as declared by the applicant

emissions disabled radio state: radio state in which the ESOMP shall not emit

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

external control channel: control channel which is either:

(i) carried by the ESOMP network via the same or another satellite, but not within the internal protocol of the ESOMP system; or

(ii) carried by any other radio communication system.

external response channel: response channel which is either:

(i) carried by the ESOMP network via the same or another satellite, but not within the internal protocol of the ESOMP system; or

(ii) carried by any other radio communication system.

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 ESOMP network via the same satellite as used for transmission of user data and within the internal protocol structure of the ESOMP system

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

mobile platform: any non-stationary platform such as a train, a vessel, an aircraft or other vehicles

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

nominated bandwidth: bandwidth of the ESOMP radio frequency transmission 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 in-band 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.

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 applicant's statement

Response Channel (RC): channel by which ESOMP transmit monitoring information to the ACF

spurious radiation: any radiation outside the nominated bandwidth

transmission disabled state: ESOMP is in this state when it is not authorized by the NCF to transmit

transmission enabled state: ESOMP is in this state when it is authorized by the NCF to transmit

3.2 Symbols

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

dBc	ratio expressed in decibels relative to the EIRP of the unmodulated carrier
dBi	ratio of an antenna gain to the gain of an isotropic antenna, expressed in decibels
dBW	ratio of a power to 1 watt, expressed in decibels
dBpW	ratio of a power to 1 picowatt, expressed in decibels
dBµV/m	ratio of an electric field to 1 µV/m, expressed in decibels (20 log(electric field /1 µV/m))

3.3 Abbreviations

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

BDC	Block Down Converter
Bo	occupied Bandwidth
BUC	Block Up Converter
CC	Control Channel
CCF	Control Channel reception Failure
CCR	Control Channel correctly Received
CENR	Cessation of Emissions Not Required
CEPT	Conférence Européenne des Postes et Télécommunications (European Conference of Postal and Telecommunications Administrations)
CER	Cessation of Emissions Required
CISPR	Comité International Spécial des Perturbations Radioélectriques (International Special Committee on Radio Interference)
CMF	Control and Monitoring Functions
DC	Direct Current
EIRP	Equivalent Isotropically Radiated Power
ECC	Electronic Communications Committee (of CEPT)
EEA	European Economic Area
EIA	Electronic Industries Alliance
EMC	Electro-Magnetic Compatibility
ESOMP	Earth Station On Mobile Platform
EUT	Equipment Under Test
FEC	Forward Error Correction
FS	Fixed Service
FSS	Fixed Satellite Service
GSO	Geostationary Satellite Orbit
HPA	High Power Amplifier
IPR	Intellectual Property Rights
LNA	Low Noise Amplifier
LO	Local Oscillator