



---

Reference

REN/SES-00382

---

Keywords

earth station, regulation, satellite, SNG

**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 - NAF 742 C  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88

---

**Important notice**

The present document can be downloaded from:  
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at  
<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:  
<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

---

**Copyright Notification**

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.  
All rights reserved.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.  
**3GPP™** and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.  
**GSM®** and the GSM logo are Trade Marks registered and owned by the GSM Association.

# Contents

Intellectual Property Rights .....	5
Foreword.....	5
Modal verbs terminology.....	5
Introduction .....	5
1 Scope .....	7
2 References .....	8
2.1 Normative references .....	8
2.2 Informative references.....	8
3 Definitions, symbols and abbreviations .....	9
3.1 Definitions .....	9
3.2 Symbols.....	10
3.3 Abbreviations .....	10
4 Technical requirement specifications .....	11
4.1 Environmental profile.....	11
4.2 Conformance requirements .....	11
4.2.1 Off-axis EIRP emission density within the band(s).....	11
4.2.1.0 General .....	11
4.2.1.1 Justification .....	11
4.2.1.2 Specification.....	11
4.2.1.3 Conformance tests .....	11
4.2.2 Off-axis spurious radiation .....	12
4.2.2.1 Justification .....	12
4.2.2.2 Specification.....	12
4.2.2.3 Conformance tests .....	13
4.2.3 On-axis spurious radiation .....	13
4.2.3.1 Justification .....	13
4.2.3.2 Specification.....	13
4.2.3.3 Conformance tests .....	13
4.2.4 Mechanical (antenna pointing) .....	13
4.2.4.1 Justification .....	13
4.2.4.2 Specification.....	13
4.2.4.3 Conformance tests .....	14
4.2.5 Receive antenna off-axis gain pattern .....	14
4.2.5.1 Justification .....	14
4.2.5.2 Specification.....	14
4.2.5.3 Conformance tests .....	14
4.2.6 Blocking performance.....	14
4.2.6.1 Justification .....	14
4.2.6.2 Specification.....	14
4.2.6.3 Conformance tests .....	15
4.2.7 Adjacent Signal Selectivity.....	15
4.2.7.1 Justification .....	15
4.2.7.2 Specification.....	15
4.2.7.3 Conformance tests .....	15
5 Testing for compliance with technical requirements.....	15
5.1 Environmental conditions for testing .....	15
5.2 Essential radio test suites.....	15
6 Test methods .....	16
6.1 General .....	16
6.2 Off-axis EIRP density within the band.....	16
6.2.0 General.....	16
6.2.1 Test method .....	16

6.2.1.1	General .....	16
6.2.1.2	Transmit output power density .....	17
6.2.1.2.1	General .....	17
6.2.1.2.2	Test site .....	17
6.2.1.2.3	Method of measurement .....	17
6.2.1.3	Antenna transmit gain .....	17
6.2.1.3.1	General .....	17
6.2.1.3.2	Test site .....	18
6.2.1.3.3	Method of measurement .....	18
6.2.1.4	Antenna transmit radiation patterns .....	19
6.2.1.4.1	General .....	19
6.2.1.4.2	Test site .....	19
6.2.1.4.3	Method of measurement .....	19
6.2.1.4.4	Co-polar radiation pattern - azimuth .....	19
6.2.1.4.5	Co-polar radiation pattern - elevation .....	20
6.2.1.4.6	Crosspolar radiation pattern - azimuth .....	21
6.2.1.4.7	Crosspolar radiation pattern - elevation .....	21
6.2.2	Computation of results .....	22
6.3	Off-axis spurious radiation .....	22
6.3.1	Test method .....	22
6.3.1.0	General .....	22
6.3.1.1	Up to 1,0 GHz .....	22
6.3.1.1.1	Test site .....	22
6.3.1.1.2	Measuring receivers .....	23
6.3.1.1.3	Procedure .....	23
6.3.1.2	Above 1,0 GHz .....	23
6.3.1.2.1	General .....	23
6.3.1.2.2	Identification of the significant frequencies of spurious radiation .....	23
6.3.1.2.3	Measurement of radiated power levels of identified spurious radiation .....	24
6.3.1.2.4	Measurement of conducted spurious radiation at the antenna flange .....	25
6.4	On-axis spurious radiation .....	26
6.4.1	Test method .....	26
6.4.1.1	General .....	26
6.4.1.2	Method of measurement .....	26
6.5	Mechanical (antenna pointing) .....	26
6.5.1	Test method .....	26
6.6	Receive antenna off-axis gain pattern .....	27
6.6.1	Test Method .....	27
6.6.1.1	Test site .....	27
6.6.1.2	Method of measurement .....	27
6.7	Blocking performance .....	28
6.7.1	Test method .....	28
6.8	Adjacent Signal Selectivity .....	28
7	Test methods for SNG TES subsystems .....	29
7.1	General .....	29
7.2	Antenna subsystem replacement .....	29
<b>Annex A (normative):</b>	<b>Relationship between the present document and the essential requirements of Directive 2014/53/EU .....</b>	<b>31</b>
<b>Annex B (informative):</b>	<b>Pointing stability methodology .....</b>	<b>33</b>
<b>Annex C (informative):</b>	<b>Bibliography .....</b>	<b>34</b>
History .....		35

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

## Foreword

This Harmonised European Standard (EN) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES).

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 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 [6].

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.

National transposition dates	
Date of adoption of this EN:	16 May 2016
Date of latest announcement of this EN (doa):	31 August 2016
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	28 February 2017
Date of withdrawal of any conflicting National Standard (dow):	28 February 2018

## Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

## 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 equipment within the scope of the Directive 2014/53/EU [6]. The modular structure is shown in ETSI EG 201 399 [i.1].

The present document is based on ETSI TBR 030 [5].

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 ETSI TBR 30 [5] has not been copied in the present document and intermodulation limits inside the transmit frequency band(s) 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 SNG TESSs.

**ITeH STANDARD PREVIEW**  
(standards.iteh.ai)  
Full standard:  
<https://standards.iteh.ai/catalog/standards/sist/9de17720-5b94-4196-b659-60adec302ab7/etsi-en-301-430-v2.1.1-2016-05>

# 1 Scope

The present document applies to Satellite News Gathering (SNG) Transportable Earth Stations (TESs) which have the following characteristics:

- the SNG TESs are designed for Satellite News Gathering (SNG) which can be either an unforeseen or pre-planned activity;
- SNG TES is capable of transmitting television signals and associated audio or programme audio only towards a satellite positioned on the geostationary orbit. The modulation method may be either analogue or digital. Such transmissions are point-to-point or point-to-multipoint but not for general broadcast reception;
- the SNG TESs are designed for relocation at any time to a different fixed operating location but are not intended to operate during the relocation period. The SNG TESs can be either vehicle mounted or packed for transportation. The SNG TESs considered in the present document are those designed to operate whilst stationary;
- the SNG TESs are operating in the following bands allocated to the Fixed Satellite Services (FSS):
  - 10,70 GHz to 11,70 GHz (space-to-earth, shared);
  - 12,50 GHz to 12,75 GHz (space-to-earth, exclusive);
  - 12,75 GHz to 13,25 GHz (earth-to-space, shared);
  - 13,75 GHz to 14,25 GHz (earth-to-space, exclusive);
  - 14,25 GHz to 14,50 GHz (earth-to-space, shared);
- frequencies could be selected from through the entire frequency range or be restricted to a range completely enclosed within those bands. These bands are partly shared between FSS and Fixed Service (FS);
- at present the ITU Radio Regulations [3] restrict the use of the 13,75 GHz to 14,00 GHz band to earth stations having an antenna diameter of 4,5 m or greater and having a transmitting EIRP between 68 dBW and 85 dBW;
- the SNG TESs use linear polarization;
- the SNG TESs operate 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 SNG TES antenna diameter does not exceed 5 m, or equivalent corresponding aperture;
- the SNG TESs are designed for attended operation.

The present document applies to the SNG TES 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.

The present document is intended to cover the provisions of Directive 2014/53/EU [6] (RE Directive) article 3.2, which states that "... radio equipment shall be so constructed that it both effectively uses and supports the efficient use of radio spectrum in order 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 Directive 2014/53/EU [6]) may apply to equipment within the scope of the present document.

NOTE: A list of such ENs is included on the ETSI web site.

---

## 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.

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.

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

- [1] Void.
- [2] CISPR 16-1 (all parts) (2015): "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1: Radio disturbance and immunity measuring apparatus" (annex G: Validation of the open area test site for the frequency range of 30 MHz to 1 000 MHz).
- [3] ITU Radio Regulations (2012).
- [4] Void.
- [5] ETSI TBR 030 (Edition 1) (12-1997): "Satellite Earth Stations and Systems (SES); Satellite News Gathering (SNG) Transportable Earth Stations (TES) operating in the 11-12/13-14 GHz frequency bands".
- [6] 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).

### 2.2 Informative 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.

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

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] ETSI EG 201 399: "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of Harmonized Standards for application under the Radio & Telecommunication Terminal Equipment Directive 1999/5/EC (R&TTE) and a first guide on the impact of the Radio Equipment Directive 2014/53/EU (RED) on Harmonized Standards".
- [i.2] 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.



## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in the Directive 2014/53/EU [6] and the following apply:

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

**carrier-off state:** that state where the SNG TES is electrically powered and is not transmitting a signal

NOTE: A SNG TES is considered to be in the carrier-off state when one of the following conditions is satisfied:

- the High Power Amplifier (HPA) is in standby mode;
- the transmit subsystem is not switched to the antenna.

**carrier-on state:** that state where the SNG TES is transmitting a signal

**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

**exclusion band:** exclusion band is centred on the transmit frequency and is equal to 5 times the occupied bandwidth

**nominal antenna diameter:** antenna diameter declared by the manufacturer that is a parameter in performance characteristics and that allows reference to a certain performance

NOTE: An antenna with circular aperture of diameter equal to the nominal diameter does typically have the performance specified.

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. Manufacturers can mark their equipment with antenna diameters used in the requirements during compliance test.

**occupied Bandwidth ( $B_o$ ):** for a digital modulation scheme the width of the signal spectrum 10 dB below the maximum inband density

NOTE: For an analogue modulation scheme the occupied bandwidth ( $B_o$ ) is defined as follows:

$$B_o = \Delta F_{pp} + 2f_m$$

where:

$\Delta F_{pp}$  = peak-to-peak frequency deviation of the TV-carrier for a 1 V peak-to-peak test tone at the pre-emphasis network cross-over frequency in Hz; and

$f_m$  = top video baseband frequency (e.g. 5 MHz).

**Satellite News Gathering Transportable Earth Station (SNG TES):** equipment capable of transmitting television signals and associated audio or programme audio only towards a satellite positioned on the geostationary orbit

NOTE: The modulation method may be either analogue or digital. Such transmissions are point-to-point or point-to-multipoint but not for general broadcast reception.

The SNG TES usually comprises the main parts, as defined below, and all power, interconnecting and other cables required for proper operation of the equipment as follows:

- a) the antenna subsystem, which converts the incident electromagnetic wave into a guided wave and vice versa and which includes any mounting that may be required;

- b) the transmit subsystem, which is composed of the frequency translation equipment and the high power amplifier;
- c) the receive subsystem, which consists of the low noise amplifier and the frequency translation equipment;
- d) the ground communications subsystem, which consists of modulation and demodulation equipment, either analogue or digital, and associated baseband equipment;
- e) the monitoring and control subsystem which consists of test equipment together with a transmitter identification system if implemented;
- f) the communications subsystem which consists of and a facility for two way communication if implemented;
- g) the power subsystem, which consists of any power generation equipment that may be required;
- h) the transportation subsystem, which consists of either a vehicle for vehicle mounted SNG TES or flight cases for "flyaway" SNG TES.

**spurious radiation:** any radiation outside the exclusion band

**transmit frequency band:** One of the following frequency bands, or a part of them, within which the SNG TES is able to transmit its carrier:

- 12,75 GHz to 13,25 GHz;
- 13,75 GHz to 14,50 GHz.

The transmit frequency bands of the SNG TES are declared by the applicant.

NOTE: An SNG TES may be designed for several transmit frequency bands.

## 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:

BW	Wanted signal occupied Bandwidth
EIRP	Equivalent Isotropically Radiated Power
EUT	Equipment Under Test
FS	Fixed Service
FSS	Fixed Satellite Services
HPA	High Power Amplifier
IME	Internally Mounted Equipment
LNA	Low Noise Amplifier
LNB	Low Noise Block
modem	MODulator/DEModulator
R&TTE	Radio and Telecommunications Terminal Equipment
RE	Radio Equipment
RED	Radio Equipment Directive
RF	Radio Frequency
SNG TES	Satellite News Gathering Transportable Earth Station

## 4 Technical requirement specifications

### 4.1 Environmental profile

The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be declared by the supplier. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the declared operational environmental profile.

### 4.2 Conformance requirements

#### 4.2.1 Off-axis EIRP emission density within the band(s)

##### 4.2.1.0 General

Off-axis EIRP emission density (co-polar and crosspolar) within the transmit frequency band(s).

##### 4.2.1.1 Justification

Protection of other satellite (uplink) systems.

##### 4.2.1.2 Specification

The maximum EIRP in any 40 kHz band of the co-polarized component in any direction  $\phi$  degrees from the antenna main beam axis shall not exceed the following limits:

$$\begin{array}{llll}
 33 - 25 \log \phi & \text{dBW} & \text{where} & 2,5^\circ \leq \phi \leq 7,0^\circ \\
 +12 & \text{dBW} & \text{where} & 7,0^\circ < \phi \leq 9,2^\circ \\
 36 - 25 \log \phi & \text{dBW} & \text{where} & 9,2^\circ < \phi \leq 48^\circ \\
 -6 & \text{dBW} & \text{where} & 48,0^\circ < \phi \leq 180^\circ
 \end{array}$$

Where  $\phi$  is the angle, in degrees, between the main beam axis and the direction considered.

For  $\phi > 70^\circ$  the values given above may be increased to 0 dBi over the range of angles for which the particular feed system may give rise to relatively high levels of spillover.

In addition the maximum EIRP in any 40 kHz band of the crosspolarized component in any direction  $\phi$  degrees from the antenna main beam axis shall not exceed the following limits:

$$\begin{array}{llll}
 23 - 25 \log \phi & \text{dBW} & \text{where} & 2,5^\circ \leq \phi \leq 7,0^\circ \\
 +2 & \text{dBW} & \text{where} & 7,0^\circ < \phi \leq 9,2^\circ
 \end{array}$$

Where  $\phi$  is the angle, in degrees, between the main beam axis and the direction considered.

##### 4.2.1.3 Conformance tests

Conformance tests shall be carried out as per clause 6.2.1 with the results being computed in accordance with clause 6.2.2.