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Satellite Earth Stations and Systems (SES); Satellite News Gathering (SNG)
Transportable Earth Stations (TES) operating in the 11-12/13-14 GHz frequency bands

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**Satellite Earth Stations and Systems (SES);
Satellite News Gathering
Transportable Earth Stations (SNG TES)
operating in the 11-12/13-14 GHz frequency bands**

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Foreword

This Technical Basis for Regulation (TBR) has been produced by the Satellite Earth Stations and Systems (SES) Technical Committee of the European Telecommunications Standards Institute (ETSI).

Introduction

The SES Directive [1] which supplements the TTE Directive [2] concerns the harmonization of conditions for the placing on the market of such equipment.

Two classes of standards are applicable to satellite earth station equipment. European Telecommunication Standards (ETSS) give the full technical specifications for this equipment, whereas Technical Bases for Regulation (TBRs) give the essential requirements under the SES Directive [1] and the TTE Directive [2] for placing such equipment on the market. Receive-only equipment, not intended for terrestrial connection to the public telecommunications network, may be put into use. Nothing in this TBR is construed to prevent the use of Community internal production control procedures as set out in the annexes to the two Directives for such receive-only equipment. This TBR is based on ETS 300 327 (see annex C, Bibliography).

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1 Scope

This Technical Basis for Regulation (TBR) specifies the technical requirements that apply to Satellite News Gathering (SNG) Transportable Earth Stations (TESs) for compliance with Articles 4.1 and 4.3 of the SES Directive [1].

These SNG TESs 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 this TBR 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);
- 12,50 GHz to 12,75 GHz (space-to-earth);
- 12,75 GHz to 13,25 GHz (earth-to-space);
- 13,75 GHz to 14,25 GHz (earth-to-space);
- 14,25 GHz to 14,50 GHz (earth-to-space).

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).

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At present the ITU Radio Regulations [5] 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.

This TBR applies to the SNG TES with its ancillary equipment and its various terrestrial ports, and operated under the conditions which are within the ranges of humidity, temperature and supply voltage declared by the manufacturer.

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.

This TBR 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.

This TBR does not contain any requirement, recommendation or information about the installation of the SNG TESs. Compliance of a SNG TES to the requirements of this TBR does not imply compliance to any requirement related to the use of the SNG TES (e.g. licensing requirements).

2 Normative references

This TBR incorporates by dated or undated reference, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to, or revisions of any of these publications apply to this TBR only when incorporated into it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] Council Directive 93/97/EEC of 29 October 1993 supplementing Directive 91/263/EEC in respect of satellite earth station equipment. Called "SES Directive" in the present document.
- [2] Council Directive 91/263/EEC of 29 April 1991 on the approximation of the laws of Member States concerning telecommunications terminal equipment, including the mutual recognition of their conformity. Called "TTE Directive" in the present document.
- [3] ETS 300 673 (1996): "Radio Equipment and Systems (RES); ElectroMagnetic Compatibility (EMC) standard for 4/6 GHz and 11/12/14 GHz Very Small Aperture Terminal (VSAT) equipment and 11/12/13/14 GHz Satellite News Gathering (SNG) Transportable Earth Station (TES) equipment".
- [4] CISPR 16-1 (1993): "Specification for radio interference measuring apparatus and measurement 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).
- [5] ITU Radio Regulations

NOTE: This TBR also contains a number of informative references which have been included to indicate the sources from which various material has been derived, hence they do not have an associated normative reference number. Details of these publications are given in annex C, bibliography.

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3 Definitions and abbreviations

3.1 Definitions

For the purposes of this TBR, the following definitions apply:

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

NOTE 1: 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.

cross-polarization discrimination: The ratio of the on-axis co-polar gain to the cross-polar gain in a given direction, at a transmit or receive frequency. It is usually expressed in dB.

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

manufacturer: The legal entity responsible under the terms of Council Directive 93/97/EEC (SES Directive) [1] for placing the product on the market in a member state.

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 occupied bandwidth (Bo) is defined as follows:

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

with

ΔF_{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. 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:

- 1) 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;
- 2) the transmit subsystem, which is composed of the frequency translation equipment and the high power amplifier;
- 3) the receive subsystem, which consists of the low noise amplifier and the frequency translation equipment;
- 4) the ground communications subsystem, which consists of modulation and demodulation equipment, either analogue or digital, and associated baseband equipment;
- 5) the monitoring and control subsystem which consists of test equipment together with a transmitter identification system if implemented;
- 6) the communications subsystem which consists of and a facility for two way communication if implemented;
- 7) the power subsystem, which consists of any power generation equipment that may be required;
- 8) 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 manufacturer.

NOTE 2: An SNG TES may be designed for several transmit frequency bands.

3.2 Abbreviations

For the purposes of this TBR, the following abbreviations apply:

EIRP	Equivalent Isotropically Radiated Power
EMC	ElectroMagnetic Compatibility
ETS	European Telecommunication Standard
EUT	Equipment Under Test
FSS	Fixed Satellite Service
HPA	High Power Amplifier
LNA	Low Noise Amplifier
LNB	Low Noise Block
modem	MODulator/DEModulator
RF	Radio Frequency
SNG TES	Satellite News Gathering Transportable Earth Station
TBR	Technical Basis for Regulation
VSAT	Very Small Aperture Terminal

4 Requirements

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

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

4.1.1 Justification

Protection of other satellite (uplink) systems.

4.1.2 Specification

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

33 - 25 log ϕ	dBW	where	$2,5^\circ \leq \phi \leq 7,0^\circ$
+12	dBW	where	$7,0^\circ < \phi \leq 9,2^\circ$
36 - 25 log ϕ	dBW	where	$9,2^\circ < \phi \leq 48^\circ$
-6	dBW	where	$48,0^\circ < \phi \leq 180^\circ$

Where ϕ is the angle, in degrees, between the main beam axis and the direction considered.

In addition the maximum EIRP in any 40 kHz band of the cross-polarized component in any direction ϕ degrees from the antenna main beam axis shall not exceed the following limits:

23 - 25 log ϕ	dBW	where	$2,5^\circ \leq \phi \leq 7,0^\circ$
+2	dBW	where	$7,0^\circ < \phi \leq 9,2^\circ$

Where ϕ is the angle, in degrees, between the main beam axis and the direction considered.

4.1.3 Conformance tests

Conformance tests shall be carried out as per subclause 5.1.1 with the results being computed in accordance with subclause 5.1.2.