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**Satellite Earth Stations (SES);
Transmit/receive Very Small Aperture Terminals (VSATs)
used for data communications
operating in the Fixed Satellite Service (FSS)
11/12/14 GHz frequency bands**

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Satellite Earth Stations (SES) Technical Committee of the European Telecommunications Standards Institute (ETSI), and, has undergone the ETSI standards approval procedure in Public Enquiry 20 and Vote 25.

Every ETS prepared by ETSI is a voluntary standard. This ETS may contain text concerning type approval of the equipment to which it relates. This text should be considered as guidance only and does not make this ETS mandatory.

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1 Scope

This European Telecommunication Standard (ETS) provides specifications for the standardisation of the characteristics of transmit/receive Very Small Aperture Terminals (VSATs) operating as part of a satellite network used for the distribution and/or exchange of data between users.

In such a network a Centralised Control and Monitoring Function (CCMF) is responsible for the monitoring and control of remote VSATs.

These VSATs have the following characteristics:

- operating in the exclusive part of the Ku-band allocated to the Fixed Satellite Services (FSS), 14,00 to 14,25 GHz (Earth-Space), 12,50 to 12,75 GHz (Space-Earth), and in the shared parts of the Ku-band, allocated to the FSS and Fixed Services (FS), 14,25 to 14,50 GHz (Earth-Space) and 10,70 to 11,70 GHz (Space-Earth);
- in these frequency bands linear polarisation is normally used and the system operates through satellites at 3° spacing;
- designed for unattended operation;
- limited to the reception and transmission of baseband digital signals;
- equipped with one, or several terrestrial ports but the total aggregate information bit rate transmitted towards the satellite through these ports shall be limited to 2,048 Mbit/s;
- antenna diameter not exceeding 3,8 m, or equivalent corresponding aperture.

The equipment considered in this ETS comprises both the "outdoor unit", usually composed of the antenna subsystem and, associated power amplifier and Low Noise Block (LNB), and the "indoor unit" composed of the remaining part of the communication chain, including the cable between these two units.

This ETS does not contain any requirement, recommendation or information about the installation of the VSATs. Nor is this ETS intended to apply to VSAT network hub stations.

This ETS deals with two types of specification:

a) Essential normative requirements (indicated in Clause 4)

Requirements are specified in order to protect other users of the frequency spectrum, both satellite and terrestrial, from unacceptable interference. In addition, requirements are specified for the purposes of electrical safety, structural safety and solar radiation protection as well as protection from harmful interference.

The test and measurement procedures associated with the normative requirements detailed in Clause 4 of this ETS shall be performed and the criteria met in order to demonstrate compliance with this ETS.

b) Recommendations (indicated in Clause 5)

These are related to characteristics which contribute to the quality of reception by providing the VSAT with minimum interference protection from other radio systems.

The test and measurement procedures associated with the informative recommendations detailed in Clause 5 of this ETS are given for verification purposes only. The compliance with the recommendations will not be taken as a condition to comply with this ETS.

All tests related to the requirements shall be performed and the results shall be entered in the data sheet of the test report. The ability to comply with the recommendations shall also be noted in the data sheet of the test report.

2 Normative references

This ETS incorporates, by dated or undated reference, provisions from other publications. These normative 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 ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- [1] IEC 950 (1991): "Safety of information technology equipment including electrical business equipment".
- [2] IEC 81(Co)6 (1981): "Standards for Lightning Protection of Structures".
- [3] CISPR publication No.22 (1985): "Limits and methods of measurement of radio interference characteristics of information technology equipment".
- [4] CISPR publication No.16 (1987): "Specifications for radio interference measuring apparatus and measurement methods".
- [5] EN 55011 (1986): "Limits and methods of measurements of radio interference characteristics of industrial, scientific and medical (ISM) radio-frequency equipment".
- [6] IEC 510-2-1 (1978): "Part 2: Measurements for sub-systems. Section one - General. Section Two - Antenna (including feed network)".
- [7] IEC 510-1-2 (1984): "Part 1: Measurements common to sub-systems and combinations of sub-systems. Section Two - Measurements in the r.f. range".
- [8] IEC 801-3 (1984): "Electromagnetic compatibility for industrial process measurement and control equipment Part 3: Radiated electromagnetic field requirement".
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- [9] ETS 300 160: "Satellite Earth Stations (SES); Control and monitoring functions at a VSAT".
- [10] ETS 300 161: "Satellite Earth Stations (SES); Centralised control and monitoring functions for VSAT networks".
- [11] CCIR Recommendation 732 (1990): "Method for statistical processing of Earth station antenna side-lobe peaks".
- [12] Draft prETS 300 193: "Satellite Earth Stations (SES); General requirements for the connection of Very Small Aperture Terminals (VSATs) systems to terrestrial networks (DE/SES-3001)".
- [13] Draft prETS 300 194: "Satellite Earth Stations (SES); The interconnection of Very Small Aperture Terminal (VSAT) systems to Packet Switched Public Data Networks (PSPDNs) (DE/SES-3002)".
- [14] DE/SES-3003: "Standard for the interconnection of VSAT systems to CSPDNs".
- [15] DE/SES-3007: "Standard for the interconnection of VSAT systems to ISDN".

3 Definitions and abbreviations

3.1 Definitions

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

Outdoor unit: is the part of the terminal installed in a position within line of sight to the satellite and it is intended to be operated in outdoor environmental conditions.

It usually comprises three main parts:

- 1) the antenna sub-system which converts the incident radiation field into a guided wave and vice versa;
- 2) the LNB, 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;
- 3) the power amplifier which amplifies the low level RF signals for transmission through the antenna subsystem.

NOTE: The installation equipment (means of attachment) is not included in this ETS. 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 this ETS.

Indoor unit: is composed of the remaining part of the equipment. It is generally installed inside the buildings and is connected to the outdoor unit. The connection cable between the outdoor and indoor unit belongs to the indoor unit.

Nominated bandwidth: the bandwidth of the VSAT radio frequency transmission is nominated by the manufacturer. The nominated bandwidth shall encompass all close-in spectral elements of the transmission which have a density greater than the specified spurious levels. The nominated bandwidth shall be wide enough to take account of the transmit carrier frequency stability. The value of the nominated bandwidth shall be entered in the data sheet of the test report.

This parameter is to allow flexibility regarding adjacent channel interference levels which shall be taken into account by operational procedures depending on the exact transponder carrier assignment situation.

Spurious radiation: is any radiation outside the nominated bandwidth.

3.2 Abbreviations

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

CCMF	Centralised Control and Monitoring Functions
CSPDN	Circuit Switched Public Data Network
EIRP	Equivalent Isotropically Radiated Power
EUT	Equipment Under Test
FS	Fixed Service
FSS	Fixed Satellite Service
ISDN	Integrated Services Digital Network
LNB	Low Noise Block (low noise amplifier and down converter)
PSPDN	Packet Switched Public Data Network