

Satellitjordstationer og -systemer (SES) – Flyinstalleret AES til kommunikation med satellit-jordstationer via geostationære satellitter over frekvensbåndene 11/12/14 GHz – Harmoniseret Standard for radiospekteraccess

Satellite Earth Stations and Systems (SES); Satellite mobile Aircraft Earth Stations (AESs) operating in the 11/12/14 GHz frequency bands; Harmonised Standard for access to radio spectrum

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DS projekt: M348524
ICS: 33.040.01; 33.060.30; 33.070.40

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Satellite mobile Aircraft Earth Stations (AESs)
operating in the 11/12/14 GHz frequency bands;
Harmonised Standard for access to radio spectrum**

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Reference

REN/SES-00435

Keywordsaeronautical, air interface, AMSS, earth station,
FSS, GSO, mobile, MSS, regulation, satellite**ETSI**650 Route des Lucioles
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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 [i.7].

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:	26 April 2021
Date of latest announcement of this EN (doa):	31 July 2021
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 2022
Date of withdrawal of any conflicting National Standard (dow):	31 January 2023

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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 [i.7]. Each standard is a module in the structure. The modular structure is shown in ETSI EG 201 399 [i.1].

The requirements have been selected to ensure an adequate level of compatibility with other radio services.

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 AES on aircraft.

The determination of the parameters of the AES using a given Geostationary Satellite Orbit (GSO) 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.

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1 SCOPE

The present document specifies certain minimum technical performance requirements of Aircraft Earth Station (AES) equipment with both transmit and receive capabilities for provision of aeronautical mobile satellite service, in the frequency bands given in table 1.

Table 1: Frequency bands for the AES equipment specified in the present document

Mode of Operation	Frequency Band
AES transmit	14,00 GHz to 14,50 GHz
AES transmit	12,75 GHz to 13,25 GHz
AES receive	10,70 GHz to 12,75 GHz

The AES has the following characteristics:

- These AESs are equipment for installation on aircraft.
- The AESs transmit in the 14,00 GHz to 14,50 GHz band receive within the range from 10,70 GHz to 12,75 GHz ("14 GHz"), referred to as "14 GHz AES" in the present document, are operating in one or more frequency ranges of the Fixed-Satellite Service and Mobile-Satellite Service.
- The AESs transmit in the 12,75 GHz to 13,25 GHz band receive within the range from 10,70 GHz to 12,75 GHz ("13 GHz"), referred to as "13 GHz AES" in the present document, are operating in one or more frequency ranges of the Fixed-Satellite Service.

NOTE 1: When the term "AES" used in the present document without stating 13 GHz AES or 14 GHz AES, it is a reference to both 14 GHz AES and 13 GHz AES.

- The AES could consist of a number of modules from the antenna subsystem to the user interfaces.
- The AES uses linear polarization.
- The AES system uses digital modulation.
- The 14 GHz AES operates through a GSO satellite at least 3° away from any other geostationary satellite operating in the same frequency band and covering the same area.
- The 13 GHz AES operates with a GSO satellite network whose frequency assignments are from the List of Appendix 30B of the Radio Regulations.
- The antenna of the AES is directional, with means of tracking the satellites, which can be achieved by using either an active phase array or reflective type configuration.
- These AESs are operating as part of a satellite network used for the distribution and/or exchange of information between users.
- These AESs are controlled and monitored by a Network Control Facility (NCF). The NCF is outside the scope of the present document.
- When on the ground, the 14 GHz AES does not transmit at elevation angles below 7° with respect to the local horizontal plane, except at locations where transmissions below 7° are permitted by the local Administration; (the minimum elevation angle is also limited as per clause 4.2).

The technical requirements in the present document are in two major categories:

- **emission limits:** to protect other radio services and systems from harmful interference generated by the AES in normal use;
- **AES Control and Monitoring Functions (CMFs):** to protect other radio services and systems from unwanted transmissions from the AES. The CMF in each AES is capable of answering to commands from the Network Control Facility (NCF) for its supporting satellite network.

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within the boundary limits of the operational environmental profile specified by the manufacturer.

The technical requirements for the 14 GHz AES in regard to the Power Flux Density (PFD) limits to protect Fixed Service (FS) and Radio Astronomy Service (RAS) are based on annexes B and C of Recommendation ITU-R M.1643 [5] and ECC Report 26 [i.4]. Furthermore, in relation to the protection of the Fixed Satellite Service (FSS) the technical requirements of the AES take into account annex A of Recommendation ITU-R M.1643 [5].

The technical requirements for the 13 GHz AES in regards to the PFD limits on earth for the protection of FS are based on the ECC Decision (19)04 [6].

The present document is intended to cover the provisions of Directive 2014/53/EU [i.7] (RE Directive) article 3.2, which states that "... *radio equipment shall be so constructed that it both effectively and supports the use of radio spectrum allocated in order to avoid harmful interference*".

NOTE 2: The relationship between the present document and essential requirements of article 3.2 of Directive 2014/53/EU [i.7] is given in annex A.

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements of other parts of article 3 of the RE Directive [i.7] may apply to equipment within the scope of the present document.

NOTE 3: A list of such ENs is included on the web site at: https://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/red_en.

The present document does not cover equipment compliance with relevant civil aviation regulations. In this respect, an AES, for its installation and operation on board an aircraft is subject to additional national or international civil aviation airworthiness certification requirements, for example to EUROCAE ED-14 [4].

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 <https://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 16-1-1:2019: "Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus".
- [3] IEEE STD 149TM-1979: "IEEE Standard Test Procedures for Antennas".
- [4] EUROCAE ED-14 (2015) (Equivalent to RTCA DO-160D): "Environmental Conditions and Test Procedures for Airborne Equipment".
- [5] Recommendation ITU-R M.1643 (06-2003): "Technical and operational requirements for aircraft earth stations of aeronautical mobile-satellite service including those using fixed-satellite service network transponders in the band 14-14.5 GHz (Earth-to-space)".
- [6] CEPT ECC Decision (19)04 (03-2020): "The harmonised use of spectrum, free circulation and use of earth stations on-board aircraft operating with GSO FSS networks and NGSO FSS systems in the frequency bands 12.75-13.25 GHz (Earth-to-space) and 10.7-12.75 GHz (space-to-Earth)".

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methods for Television Receive Only (TVRO) operating in the 11/12 GHz frequency bands".