ETSO-C159d

NEXT GENERATION SATELLITE SYSTEMS (NGSS) EQUIPMENT

1   Applicability

This ETSO provides the requirements which next generation satellite systems (NGSS) equipment that is designed and manufactured on or after the date of this ETSO must meet in order to be identified with the applicable ETSO marking.

2   Procedures

2.1   General

The applicable procedures are detailed in CS-ETSO, Subpart A.

2.2   Specific

None.

3   Technical Conditions

3.1   Basic

3.1.1   Minimum Performance Standard

The standards are those provided in EUROCAE ED-243 'Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)', dated April, 2017.

Note: *There are no MPS security requirements for NGSS equipment. However, a security risk assessment may be required at the time of installation, and if needed, security controls may be implemented in connected aircraft systems or addressed by flight crew procedures.*

3.1.2   Environmental Standard

See CS-ETSO, Subpart A, paragraph 2.1.

3.1.3   Software

See CS-ETSO, Subpart A, paragraph 2.2.

3.1.4   Airborne Electronic Hardware

See CS-ETSO, Subpart A, paragraph 2.3.

3.2   Specific

The MPS allows for different equipment classes and subclasses as defined by EUROCAE ED-243. There are 6 applicable equipment classes and 11 equipment subclass components identified as shown in Tables 1A, 1B and Tables 2A, 2B of this ETSO. Tables 1A and 2A show the requirements for satellite communication (short burst data) (SATCOM (SBD)) equipment classes and subclass components, and Tables 1B and 2B show the requirements for satellite communication (swift Broadband) (SATCOM (SBB)) equipment classes and subclass components. The manufacturer must declare the equipment class requirements from those identified in the applicable table of this ETSO. The equipment configuration shall satisfy the relevant requirements of the EUROCAE ED-243 minimum operational performance standards (MOPS) as identified in Tables 1A and 1B and 2A and 2B of this ETSO.

Table 1A — Equipment Class Identifiers supporting SATCOM (SBD)

Equipment Class Identifier	Description	Requirement
AES1	AES using a single channel Satellite Data Unit (SDU) that contains one transceiver for data only applications. AES1 is a Short Burst Data (SBD)-only transceiver and cannot support voice calling. A passive Low Gain Antenna (LGA) is required for use with the AES1.	Appendix D, Section 2.2.1.1 and Section 2.4 for the applicable test requirements
AES2	AES2 is capable of multiple services using a single or dual channel SDU that contains one or two transceivers for data and/or voice applications. A passive LGA is required for use with the AES2.	Appendix D, Section 2.2.1.2 and Section 2.4 for the applicable test requirements
AES3	AES using two or more transceivers for multiple data and/or voice applications. A passive LGA is required for use with the AES3.	Appendix D, Section 2.2.1.3 and Section 2.4 for the applicable test requirements

Table 1B — Equipment Class Identifiers supporting SATCOM (SBB)

Equipment Class Identifier	Description	Requirement
AES4	AES using an enhanced Low Gain Antenna (ELGA). AES4 configured as a complete system.	Appendix E, Section 2.2.1.1.1 and Section 2.4 for the applicable test requirements
AES6	AES using a High Gain Antenna (HGA), transceiver, and Diplexer Low Noise Amplifier (DLNA).	Appendix E, Section 2.2.1.1.2 and Section 2.4 for the applicable test requirements
AES7	AES using an Intermediate Gain Antenna (IGA), transceiver, and DLNA.	Appendix E, Section 2.2.1.1.3 and Section 2.4 for the applicable test requirements

Table 2A — Equipment Subclass Identifiers supporting SATCOM (SBD)

Subclass Identifier	Description	Requirement
LGA	Passive LGA for use with AES1, AES2 or AES3.	Appendix D, Section 2.2.3.1.1

Table 2B — Equipment Subclass Identifiers supporting SATCOM (SBB)

Subclass Identifier	Description	Requirement
HGA	HGA for AES6.	Appendix E, Section 2.2.3.1.2
IGA	IGA for AES7.	Appendix E, Section 2.2.3.1.2
6MA	Transceiver, SDU Configuration Module (SCM), SDU, Modified Type A (DMA) Diplexer Low Noise Amplifier (DLNA), and HGA for use with AES6.	Appendix E, Section 2.2.1.1.4
7MA	Transceiver, SDU, SCM, DMA DLNA, and IGA for use with AES7.	Appendix E, Section 2.2.1.1.6
6D	Transceiver and DLNA combination includes SDU, High-Power Amplifier (HPA), DLNA, SCM, and HGA functions for use with AES6.	Appendix E, Section 2.2.1.1.8
7D	Transceiver and DLNA combination includes SDU, HPA, DLNA, SCM, and IGA functions for use with AES7.	Appendix E, Section 2.2.1.1.9
6F	Transceiver and Type F (DF) DLNA includes SDU, HPA, SCM, and HGA functions for use with AES6.	Appendix E, Section 2.2.1.1.5
7F	Transceiver and DF DLNA includes SDU, HPA, SCM, and IGA functions for use with AES7.	Appendix E, Section 2.2.1.1.7
DMA	DLNA with standard Transmitter (Tx) filter configures with 6MA transceiver and HGA for use with AES6, or 7MA transceiver and IGA for use with AES7.	Appendix E, Section 2.2.1.1.10

Subclass Identifier	Description	Requirement
DF	DLNA with enhanced Tx filter configures with 6MA or 6F transceiver and HGA for use with AES6, or with 7MA or 7F transceiver and IGA for use with AES7.	Appendix E, Section 2.2.1.1.11

This ETSO standard applies to equipment intended for long-range communication services, procedural and continental communication services, aeronautical mobile satellite (route) services (AMS(R)S) by means of satellite communications between AES, corresponding satellites, and ground earth stations (GES). The NGSS supports voice and data communications between aircraft users and ground-based users, such as air navigation service providers (ANSPs) and aircraft operators.

The functionality of an NGSS supports four categories of communication service in the aircraft control domain (ACD) and/or aircraft information services domain (AISD). Two are safety of flight communication used for air traffic services (ATS) and aeronautical operational control (AOC) communication. The other two are aeronautical administrative communication (AAC) and special-purpose aeronautical passenger communication (APC) under the physical or virtual access control of the flight crew.

EUROCAE ED-243, Normative Appendix E, also contains provisions for supporting a non-priority communications service known as passenger information and entertainment services (PIES). EUROCAE ED-243, Normative Appendix E, states that non-priority services are outside the scope of that Appendix. However, PIES communications, if supported, must be partitioned from communications in the ACD and AISD for security reasons. Therefore, PIES communications are non-ETSO functions, and equipment that supports shared ACD and PIES communications must provide security partitioning of the PIES functionality from priority communications services in the ACD and AISD in accordance with this ETSO.

See paragraphs 3.1.3, 3.1.4 and 3.2.1 of this ETSO for specific additional data, design/security assurance and verification requirements related to the required security partitioning for equipment intended to support shared ACD/AISD and PIES communications.

NGSS equipment is intended for procedural/continental airspace area operations. The failure conditions specified in paragraph 3.2.1 of this ETSO have been determined based on NGSS equipment that supplements or complements primary HF/VHF voice or data communications in procedural/continental airspace area operations, and on equipment that provides 'Segregation & arbitration' as described in EUROCAE ED-243, Appendix E, Section 1.3.4, or the equivalent functionality. Use of NGSS equipment in other operating environments (for example, high-density terminal/en route airspace) may impact equipment performance and safety considerations.

3.2.1 Failure Condition Classification

See CS-ETSO, Subpart A, paragraph 2.4.

A loss or malfunction of the security partitioning required by paragraph 3.2 of this ETSO that enables unauthorised or inadvertent access to ACD or AISD communications from outside the ACD or AISD is a major failure condition.

A loss or malfunction of the functions defined in paragraph 3.1.1 of this ETSO, except for a loss or malfunction of the security partitioning required by paragraph 3.2 of this ETSO, is a minor failure condition.

Note: The use of NGSS equipment as the sole means of routine ATS communication may change the classification of the failure conditions.

4 Marking

4.1 General

See CS-ETSO, Subpart A, paragraph 1.2.

4.2 Specific

For valid combinations of system component markings, see Table 3 below.

Table 3 — Valid Combinations of System Components

Valid Combinations		EUROCAE ED-243 Normative Appendix	Transceiver						Transceiver & DLNA		DLNA		Antenna			Complete System
			SBD	LBT	6MA	6F	7MA	7F	6D	7D	DMA	DF	LGA (passive)	HGA	IGA	
AES1	1	D														x
	2	D	x										x			
AES2	3	D														x
	4	D		x									x			
AES3	5	D														x
	6	D	x	x									x			
AES4	1	E														x
AES6	2	E			x						x			x		
	3	E				x						x		x		
	4	E							x					x		
	5	E			x							x		x		
	6	E														x
AES7	7	E					x				x				x	
	8	E						x				x			x	
	9	E								x					x	
	10	E					x					x			x	
	11	E														x

5   Availability of Referenced Documents

See CS-ETSO, Subpart A, paragraph 3.

[Amdt ETSO/11]
[Amdt ETSO/13]
[Amdt ETSO/16]