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Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)

Change 1 to
DO-262B Iridium Appendix D

RTCA DO-262B Change 1 to Appendix D
December 15, 2015

Prepared by SC-222
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Change 1 to DO-262B Iridium Appendix D

The following change summary lists the main changes that have been included in this Change 1 document for Iridium DO-262B Appendix D. Other editorial changes in the document were made but are not listed below. All changes have been included in the updated Appendix D.

High-Level Change Summary

1) Updated Table 2-4 values to move all measurements to Point A versus Point D on an AES
    a. S_{UW}
    b. S_{UN}
    c. S_{VS}
    d. S_{DS}
2) Removed active, steered antenna from the AES classes. Only passive LGA for all AES
    a. Removed from AES class definitions
    b. Removed the testing for active antenna throughout the document
    c. This covered many sections in requirements and testing
3) Updated value of $R_{SC\text{-}UD}$ in Table 2-4 to quote minimum versus max and added Note to table explaining the basis of this value.
4) 2.2.3.1.1.6.1 Radiated Antenna Intermodulation Products in the GNSS Band – updated test requirement to clarify loading of signals
5) 2.2.3.1.2.15 Transmitter Harmonics, Discrete Spurious and Noise Density Limits changes
    a. Removed Table 2-6 that referred to AES with EIRPmax greater than 15dBW as there are no Iridium AES that has power above this level
    b. Updated the notes on the tables to clarify the testing for non-GLONASS installations
    c. This change to Table 2-6 resulted in renumbering of all subsequent tables
6) 2.2.3.1.2.1.8 Power Control – updated the test requirement to indicated control of this is provided by the Iridium network but testing should be done to validate EIRPmin and EIRPmax
7) 2.2.3.1.2.1.9 On-Channel Output Spectrum – updated this test to make it clear that this was a requirement.
8) 2.2.3.1.2.2.4 Rejection of Carrier Signals Generated by Other AMS(R)S Equipment – updated this test section to call out different test for equipment operated under Section 2.1.8 (Dual Dissimilar SATCOM) or those that were not.
9) 2.2.3.1.2.2.7 Receiver Damage –updated this test section to call out different test for equipment operated under Section 2.1.8 (Dual Dissimilar SATCOM) or those that were not.
10) Removed references to ATN and ISO 8208 protocols in several sections.
11) 2.2.3.3.1 Packet Data – clarified that this is only applicable if more than one safety data service is in operation. So today is only FANS so priority is not required.
12) 2.2.3.5.1 and 2.2.3.5.2 – regarding Voice vocoder in Iridium for LBT and also in aircraft environment. Updated information to clarify requirements and to put in place testing is per ANSI testing the same as Inmarsat.

13) 2.3.3 Configuration Control – called out that special test equipment or configurations were allowed for DO-262 testing as well as DO-160
14) Table 2-12 DO-160 Sections Applicable to the AES – updated this table of testing requirements based on the recent DO-210 Change 4 updated.
15) 2.4.1 Definitions of Terms and Conditions of Test – Section e) Test Instrument Precautions updated to clarify that any noise floor introduced by test equipment must be corrected for and declared as part of any test where relevant.
16) 2.4.2.5 Voice Protocol Required Test Equipment – updated to state the ANSI test requirement for voice operation
17) 2.4.3.1.1 Antenna Test Requirement – updated to include both Rx and Tx in the test
18) 2.4.3.1.2.1.1 Minimum Individual Carrier Output (was Transmitter Minimum Power Output) – changed the name as indicated but updated the text to indicate this is for Minimum testing as prior it called out maximum in the test.
19) 2.4.3.1.2.1.1 Maximum Individual Carrier Output – updated this to cover maximum power test
20) 2.4.3.1.2.1.8 Power Control – updated to indicate testing of EIRPmin and EIRPmax is the test method for this requirement
21) 2.4.3.1.2.2.1 Receiver Sensitivity – updated the complete SBER test process to clarify the methods to be used
22) 2.4.3.1.2.2.5 Rejection of Signals Outside NGSS Receive Band - Updated the test to include the frequencies to use in the test. This replaced the previous Step 1 where a developer must first test to find these frequencies. The reason we can do this is that all RF signaling is handled within the Iridium transceiver (in a dedicated RF ASIC) and the AES can only attenuate or amplify this but not alter the signals.
23) 2.4.3.1.2.2.6 Rejection of Carrier Signals Generated by Other AMS(R)S Equipment & Receiver Damage – update this to establish updated this test section to call out different testing required for AES operated under Section 2.1.8 (Dual Dissimilar SATCOM) or those that were not.
24) 2.4.3.1.2.2.8 Receiver Susceptibility – all new tests in this to cover Wideband and Narrowband. Completely replaced the testing.
25) 3.1.8 Antenna Location – updated this to clarify that antenna mounting within +/- 1 degree is allowed but if greater then testing of average weighted gain would be impacted.
26) 3.4.2 Interference Test – reworked these sections to include the sections on GNSS to be together and also the AMS(R)S sections for clarity. 3.4.2.2 and sub headings cover GNSS. 3.4.2.3 and sub sections cover the AMS(R)S sections.
27) 3.4.5 Flight Test Procedures – clarifies that flight tests are not mandatory.
28) 5.2 AES Test Reference – updated this table to cover all of the changes in the document as needed.
29) Moved Information Security from Section 2 requirements to the installed equipment Section 3
30) Created Table 2-11 on Power Interruption to protect number references of tables due to Information security changes

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Normative Requirements for Iridium AMS(R)S Equipment

Appendix D Change 1

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1 INTRODUCTION

1.1 Scope and Objectives

This updated appendix to DO-262 provides information and requirements specific to an Aircraft Earth Station (AES) using the Iridium communication system for the purpose of providing Aeronautical Mobile Satellite (Route) service (AMS(R)S). The International Civil Aviation Organization and the International Telecommunications Union reserve the designation "(Route)" for services related to the "priority and regularity of flights along national and international air routes". This document represents a significant update to the Iridium-specific minimum operational performance standards currently published in DO-262B. The document contains provision for identifying and potentially certifying several configurations of Iridium AES equipment.

This normative appendix has been developed in accordance with RTCA DO-262 as a technique-specific attachment to an application for certification or other approval document. This appendix covers Iridium Satellite avionics requirements and tests for the AES only, including the Iridium transceiver and auxiliary equipment and the associated antenna. As required by DO-262, this appendix contains both detailed requirements and test procedures. Compliance with these requirements and test procedures is intended to provide one means of providing evidence for certification or other approval for Iridium AMS(R)S services. Alternative means of compliance that provide equivalent information are acceptable.

The focus in this document is on ensuring correct behavior of the AES at the services interfaces, where the user avionics interact with the AES, and at the signals-in-space interface, where the AES has desired interaction with the network, and potentially undesired interaction with other aircraft systems and the outside world.

1.2 Document Overview

Section 1 of this normative appendix provides an informative description of the Iridium Satellite network, focusing on those aspects particular to AMS(R)S. Definitions and assumptions essential to proper understanding of this normative appendix are provided in this Section, while a more extensive glossary can be found in Appendix A of the DO-262 MOPS main document. Section 1 is intended to be informative in nature and contains no requirements applicable to the avionics equipment covered in this normative appendix.

The remaining sections contain normative information regarding technique or technology-specific requirements that are unique to the Iridium Satellite network. These sections are organized based on the numbering and format of the DO-262 MOPS.

Section 2 contains minimum performance standards that specify the required performance under standard operating and environmental conditions and provides values which quantify requirements specific to Iridium AMS(R)S.

Section 3 describes the performance required of installed Iridium aircraft avionics equipment. Tests specifically for installed Iridium equipment are included when performance cannot be adequately determined through bench testing.

Section 4 describes the operational performance characteristics for Iridium equipment installations and for network operation, and defines conditions that will assure the Iridium equipment user that operations can be conducted safely and reliably in the expected operational environment.

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