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Environmental Conditions and Test Procedures for Airborne Equipment

Change 3

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Change Transmittal

This change forwards revised text for Section 22.0 – Lightning Induced Transient Susceptibility and Appendix C – Change Coordinators.

- Remove Section 22.0 (dated July 29, 1997) from RTCA/DO-160D and replace with revised Section 22.0.

- Remove Appendix C (dated December 14, 2000) from RTCA/DO-160D and replace with the revised Appendix C.

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Section 22

Lightning Induced Transient Susceptibility

Important Notice

Information pertinent to this test procedure is contained in Sections 1, 2 and 3. Further, Appendix A is applicable for identifying the environmental tests performed.

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22.0 Lightning Induced Transient Susceptibility

22.1 Purpose of Tests

These test methods and procedures apply idealized waveforms to verify the capability of equipment to withstand effects of lightning induced electrical transients. The criteria for equipment performance in the presence of lightning transients shall be defined in the applicable equipment specification.

Two groups of tests may be used for equipment qualification. The first is a damage tolerance test performed using pin injection as described in paragraph 22.5.1. The second group, as described in paragraph 22.5.2, evaluates the functional upset tolerance of equipment when transients are applied to interconnecting cable bundles. Cable bundle tests include single stroke, multiple stroke, and multiple burst, response tests (hereafter referred to as single stroke, multiple stroke and multiple burst). Cable bundle tests can also provide an indication of damage tolerance. The appropriate test group or groups will be defined in the applicable equipment specifications.

Note: These tests may not cover all aspects of lightning induced interaction and effects on equipment, particularly when incorporated into a system. Additional tests such as application of different waveforms, simultaneous cable bundle injection and multiple frequency, may be required to achieve certification of the equipment/system installation, depending upon the functions performed. Tests for the direct effects of lightning on equipment are covered in Section 23.0 of this document.

22.2 Definitions

Cable Bundle
A group of wires and/or cables bound or routed together that connect two pieces of equipment.

Calibration Loop
A heavy duty, low self-inductance, low resistance, single turn wire loop passed through the injection transformer to form an insulated secondary winding. It should be low enough in impedance to achieve the test level and waveform.

Generator
A set of equipment (waveform synthesizer, amplifiers, couplers, etc.) that delivers a voltage or current waveform, via direct or indirect coupling to the equipment under test (EUT).

Local Ground
Any ground strap or conductor that is connected to the equipment and the same part of airframe structure to which that equipment is installed. The ground strap or conductor would therefore be bonded to the same ground plane that the equipment is mounted to and, during a lightning strike, would be at the same potential as the equipment.