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**Certification Guidance for Installation of
Non-Essential, Non-Required Aircraft Cabin
Systems & Equipment**

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FORWARD

This document was prepared by RTCA Special Committee 210 (SC-210). It was approved by the RTCA Program Management Committee (PMC) on October 2, 2008.

RTCA, Inc. is a not-for-profit corporation formed to advance the art and science of aviation and aviation electronic systems for the benefit of the public. The organization functions as a Federal Advisory Committee and develops consensus based recommendations on contemporary aviation issues. RTCA's objectives include but are not limited to:

- Coalescing aviation system user and provider technical requirements in a manner that helps government and industry meet their mutual objectives and responsibilities;
- Analyzing and recommending solutions to the system technical issues that aviation faces as it continues to pursue increased safety, system capacity and efficiency;
- Developing consensus on the application of pertinent technology to fulfill user and provider requirements, including development of minimum operational performance standards for electronic systems and equipment that support aviation; and
- Assisting in developing the appropriate technical material upon which positions for the International Civil Aviation Organization and the International Telecommunication Union and other appropriate international organizations can be based.

The organization's recommendations are often used as the basis for government and private sector decisions as well as the foundation for many Federal Aviation Administration Technical Standard Orders.

This document contains procedures for Electromagnetic Compatibility (EMC) ground and flight testing of Cabin Systems & Equipment (CS&E) in Appendix C. It also contains guidelines for certification and installation of Commercial Off The Shelf (COTS) equipment in Appendix D. Additional flammability guidance is provided in Appendix E.

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EXECUTIVE SUMMARY

The United States Federal Aviation Administration (FAA) requested that RTCA, Inc. form a special committee to develop installation and certification guidance for Cabin Systems and Equipment (CS&E) on board civil aircraft. This guidance will standardize and streamline the installation and compliance demonstration process.

Special Committee SC-210 was formed to create this guidance document and included representatives from avionics manufacturers, aircraft manufacturers, airlines, aircraft operators, flight attendant associations, regulatory agencies, and related industry associations.

This document includes three Normative Appendices, Appendix C, Appendix D, and Appendix E, which contain additional requirements not covered in the main body.

1 INTRODUCTION

This document provides certification guidance on how to meet the airworthiness requirements for the installation of non-essential, non-required aircraft CS&E and in doing so enable a standardized approach across equipment manufacturers and installers. The information contained herein is applicable to installation methodologies of aircraft CS&E approved under Title 14 of the Code of Federal Regulations (14 CFR) parts 23, 25, 27 and 29. Both aerospace manufactured equipment and commercial off the shelf (COTS) equipment is considered.

2 CERTIFICATION OF CS&E

CS&E installations may be approved through Type or Supplemental Type Certificates (or amendments thereto), Field Approval, or 8110-3 supported FAA Form 33.

3 ACCEPTABLE MEANS OF COMPLIANCE

A failure of CS&E to “perform as intended” must not adversely affect the safety of the aircraft or its occupants, or the proper functioning of equipment and systems that are required by the design and operating rules. This must be confirmed through a system safety assessment. General items that must be considered to ensure the airworthiness of the CS&E installation include:

- Software
- Complex Electronic Hardware
- Environmental Requirements
- Electrical Requirements
- Equipment and System Wiring
- Equipment Grounding and Bonding
- Flammability
- Ventilation
- Structural and Stress Certification
- Crashworthiness and Structural Integrity
- Electromagnetic Compatibility
- Markings and Placards

4 OTHER CERTIFICATION CONSIDERATIONS

Some items that may pertain to the specific CS&E installations include:

- Lithium Batteries
- Glass in the Cabin
- Wireless Radio Frequency (RF) Cabin Systems Electromagnetic Compatibility
- Configuration Control and Conformity
- Approval of In-seat Video Systems
- System Security Considerations
- Instructions for Continued Airworthiness
- Airplane/Rotorcraft Flight Manual

Appendix C ELECTROMAGNETIC COMPATIBILITY GROUND TEST/FLIGHT TEST PROCEDURES FOR INSTALLED CS&E EQUIPMENT

Compliance with RTCA/DO-160 Section 21 does not guarantee that installed CS&E will not interfere with other essential or critical aircraft systems. On-aircraft Electromagnetic Compatibility (EMC) testing must be performed on-ground, and sometimes in-air, to ensure non-interference with other aircraft systems.

Appendix D GUIDELINES FOR CERTIFICATION AND INSTALLATION OF COMMERCIAL OFF THE SHELF (COTS) EQUIPMENT

COTS equipment is defined as a part or product that is designed and/or intended for use in the consumer market. Additional requirements must be met to ensure that the installation of COTS equipment on an aircraft will provide an acceptable level of safety.

Appendix E ADDITIONAL FLAMMABILITY CRITERIA

Installed equipment must meet the flammability requirements of 14 CFR part 25, Appendix F. When testing is required, the test method will depend upon the equipment type. Flammability guidance is provided for:

- Food Preparation Appliances
- Passenger Convenience Appliances
- Non-metallic and/or Vented Cases

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1 INTRODUCTION

1.1 Purpose and Scope

- a. This document provides certification guidance on meeting the airworthiness requirements for the installation of aircraft cabin systems and associated equipment. It does not cover specific installations on specific aircraft in support of particular certification projects. Installation specific concerns should be considered when using this guidance material.

This guidance includes compliance methodologies to be employed in installation and certification of Cabin Systems and Equipment (CS&E). These methodologies can be applied to any non-essential, non-required systems and equipment in the cabin. They are based on the technology as it currently exists and cannot anticipate future developments. As new technology is introduced and new hazards identified, this document may need to be updated.

- b. RTCA Special Committee 210 (SC-210) developed this guidance for the installation approval of CS&E to enable a standardized approach across equipment manufacturers and installers. It was developed with input from the aviation industry for the consideration of civil aviation authorities with the intention of addressing the following segments of the industry:
- Equipment manufacturers
 - Aircraft manufacturers
 - Component suppliers
 - Aircraft operators
 - System Integrators
 - Modification centers
- c. This guidance is not mandatory and does not constitute a regulation. It is intended to give the industry an acceptable means, but not the only means, of showing compliance with Title 14 of the Code of Federal Regulations (14 CFR) applicable to aircraft CS&E installations.
- d. This document covers the regulations, industry specifications, and guidance material in existence as of the date of publication.
- e. The term “aircraft”, ~~is~~ as used herein, refers to both airplanes and rotorcraft, unless specific differentiation is required.
- f. The convention of listing Federal Aviation Authority (FAA) and industry documents by their base number (e.g., RTCA/DO-160 rather than RTCA/DO-160F) will be used, and the latest revision level is implied, unless a specific revision level is cited.

1.2 Applicable Certification Methods

This guidance applies to installations of aircraft CS&E approved under 14 CFR parts 23, 25, 27 and 29, for:

- Type Certification (TC),
- Amended Type Certification (ATC),