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Audio Systems Characteristics and Minimum Operational Performance Standards for Aircraft Audio Systems and Equipment

RTCA DO-214A
Supersedes DO-214
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Prepared by: SC-226

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FOREWORD

This report was prepared by Special Committee 226 (SC-226) and approved by the RTCA Program Management Committee (PMC) on December 18, 2013.

RTCA, Incorporated 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 recommendations of RTCA 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 and several advisory circulars.

Since RTCA is not an official agency of the United States Government, its recommendations may not be regarded as statements of official government policy unless so enunciated by the U. S. Government organization or agency having statutory jurisdiction over any matters to which the recommendations relate.

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EXECUTIVE SUMMARY

RTCA/DO-214 was originally prepared by RTCA Special Committee 164 (SC-164). It was approved by the RTCA Program Management Committee on March 2, 1993 and supersedes RTCA/DO-170, Audio System Characteristics and Minimum Performance Standards, Aircraft Microphones (Except Carbon), Aircraft Headsets and Speakers, Aircraft Audio Selector Panels and Amplifiers. RTCA/DO-214A was prepared by RTCA Special Committee 226 (SC-226). It was approved by the RTCA Program Management Committee on December 18, 2013 and supersedes RTCA/DO-214.

The purpose of this revision is to add a number of important improvements. This revision includes requirements covering technology advances, harmonization of DO-214 with other revised standards, addresses industry and FAA feedback for improvements and from advancements in audio, acoustic and communications sciences and methodologies that have developed since the original release of DO-214. DO-214A is not intended to cover all aspects of the rapidly advancing field of digital audio technology. The scope of digital audio science is much wider and more comprehensive than can be covered in this revision. Examples of changes that have been made are: Active Noise Reduction (ANR) technology has advanced significantly since the original release of DO-214 so ANR requirements have been added to DO-214A. EUROCAE Document ED-112 is now being widely used for Cockpit Voice Recorders (CVR) and CVR Microphones so CVR microphones have been removed from DO-214A. Oxygen Mask Microphones have been added, along with Speakers with Active Circuitry, different types of Handsets and Push-To-Talk switches that are available on the market as well as some changes covering advancements in digital audio technology. DO-214A has also been harmonized with DO-160G, DO-178C, DO-254 and new industry standards ARINC535B and ARINC538C.

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1.0 PURPOSE AND SCOPE

1.1 Introduction

This document contains audio systems characteristics and minimum operational performance standards for aircraft headset microphones, handset microphones (Except carbon), oxygen mask microphones, headsets, handsets, speakers, audio selector panels (ASP) and amplifiers. These standards specify system characteristics that should be useful to designers, manufacturers, installers and users of the equipment.

Compliance with these standards is recommended as one means of assuring that the equipment will perform its intended function(s) satisfactorily under all conditions normally encountered in routine aeronautical operations. Any regulatory application of this document is the sole responsibility of appropriate governmental agencies.

Section 1.0 of this document provides information needed to understand the rationale for equipment characteristics and requirements stated in the remaining sections. It describes typical equipment applications and operational goals and establishes the basis for standards stated in Section 2.0 through 4.0. Definitions and assumptions essential to the proper understanding of this document are also provided in this section.

Section 2.0 contains the minimum performance standards for the equipment. These standards specify the required performance under standard, operational, and environmental conditions. Also included are recommended bench test procedures necessary to demonstrate equipment compliance with the stated minimum requirements.

Section 3.0 describes the performance required of the installed equipment. Tests for the installed equipment are included when performance cannot be adequately determined through bench testing.

Section 4.0 describes the operational performance characteristics for equipment installations and defines conditions that will assure the equipment user that operations can be conducted safely and reliably in the expected operational environment.

The word "equipment" as used in this document includes all components or units necessary to properly perform the intended function(s). Since the measured values of equipment performance may be a function of the measurement method, standard test conditions and methods of test are recommended.

Consideration was given to the overall system characteristics that affect the intelligibility of air-ground speech communication. This included, to the extent feasible, review and evaluation of all design measures giving promise of audio response improvement. Although consideration was specifically applied to equipment design characteristics, it became evident that environmental conditions and practices of communicators create not only a need for improvements in the system, but seriously limit improvements attainable by design changes alone. Other limitations are imposed by regulatory agencies and international agreements. In view of this, it was considered important, in the interest of aviation, to emphasize these related