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American National Standard for Evaluation of Wireless Coexistence

C63®

Accredited Standards Committee C63®—Electromagnetic Compatibility

Accredited by the
American National Standards Institute

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ANSI C63.27-2017

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Secretariat

Institute of Electrical and Electronics Engineers, Inc.

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Abstract: An evaluation process and supporting test methods are provided in this standard to quantify the ability of a wireless device to coexist with other wireless services in its intended radio frequency (RF) environments.

Keywords: ANSI C63.27, coexistence, electromagnetic environments, EMI, immunity, interference, reliability, RF, RFI, susceptibility

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Introduction

This introduction is not part of ANSI C63.27-2017, American National Standard for Evaluation of Wireless Coexistence.

The proliferation of radio-frequency (RF) wireless devices has been both explosive and pervasive in virtually every field in our society. The everyday use of wireless devices goes well beyond the early hand-held walkie-talkies, introduced in the 1950s. It is estimated that cellular telephones outnumber individuals in the US population and other countries have even higher penetration rates for cell (mobile) phone usage. Wireless technologies have resulted in the birth of new applications like radio-frequency identification (RFID) systems and distributed sensor systems. Thousands of types of equipment used in consumer and industrial environments now contain one or more wireless technologies. Almost every building now contains a wireless network to support multiple uses of wireless devices.

While the benefits of wireless technology are obvious and explain the explosive growth in both number and applications of wireless technology, there are also risks and disadvantages. These risks must be carefully evaluated and managed. As wireless technology is integrated into systems that require high degrees of reliability, such as medical devices, aircraft, and nuclear power plants, it is imperative that risks be quantified, mitigated, and managed to be at or below acceptable levels. Verification of the risk control measures associated with the following two areas are of interest to this group: 1) traditional EMC and 2) coexistence. Traditional EMC testing is designed to exclude frequency bands where the device under test communicates wirelessly. Coexistence testing focuses on devices and systems that intentionally use wireless and it extends beyond traditional EMC to examine the device's performance in frequency bands where it uses wireless communication. This standard provides methods for evaluating the ability of a device to coexist in its intended RF wireless communications environment.

History

On May 3, 2011, ASC C63® Subcommittee 7 commissioned a task group to study the need for wireless coexistence evaluation methods. In response to a request from the U.S. Food and Drug Administration (FDA) the committee considered developing such evaluation methods. The FDA has observed an increasing use of wireless communication links in medical devices and, simultaneously, a growing application of home telehealth, with wireless devices going with patients into a wider variety of environments. Their concern is that these devices and their wireless interface be designed to be suitable for a range of electromagnetic environments in which they will be used, particularly in the presence of in-band and adjacent band congestion.

The assignment of the task group, quoting from its PINS-C, was:

> *This committee project will study the need and approach to a set of tests and evaluation methods for wireless interference and coexistence. Regulators, IT system planners and others need tests that accurately evaluate the ability of wireless devices to operate in their intended environments, particularly in the vicinity of nearby in-band and adjacent-band transmitters.*

The task group presented its report to Subcommittee 7, recommending development of this standard. That recommendation was acted on by Subcommittee 7. As a result, ASC C63® approved this project on April 19, 2012.

This project builds upon the guidance of IEEE Std 1900.2™, *IEEE Recommended Practice for the Analysis of In-Band and Adjacent Band Interference and Coexistence between Radio Systems*. IEEE Std 1900.2 provides a structure for, and guidance to be used in, performing a coexistence analysis.

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American National Standard for Evaluation of Wireless Coexistence

1. Overview

1.1 Scope

This standard specifies methods for assessing the radio frequency (RF) wireless coexistence of equipment that incorporates RF communications. This standard specifies key performance indicators (KPIs) that can be used to assess the ability of the equipment under test (EUT) to coexist with other equipment in its intended operational environment.

1.2 Purpose

The purpose of this standard is to provide evaluation procedures, test methods, and other guidance for assessing the ability of the EUT to successfully maintain its functional wireless performance (FWP) (see 5.3) in the presence of unintended signals that are likely to be found in the same operating environment. This standard includes assessment of the effects of the EUT on the unintended signals. The results of this test may optionally be used to compute the likelihood of coexistence (LoC), or as an input to a risk assessment.

1.3 Interference and coexistence

Interference is the unintentional effect of energy emitted by a source. Coexistence is the ability of one wireless system to perform a task in a given shared environment where other systems (in that environment) have an ability to perform their tasks and might or might not be using the same set of rules.

2. Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

3GPP TS 36.101 V13.2.1 (2016-01), Technical Specification 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception (Release 13).