

Chair: [Ed Hare](#)

Vice Chair: **VACANT**

Secretary: [Jerry Ramie](#)

November 28, 2018; 1:00 PM – 3:00 PM - MST

NIST

Boulder, CO

### Approved Meeting Minutes

1. **Call to Order: Chair** - The Chair called the meeting to order at 1:03PM-MST. The Chair asks for a moment of silence for the passing of our good friend and colleague [Steve Whitesell](#), former Vice Chair and former Chair of SC5.



[Steve Whitesell](#) (left) receiving an award from ASC-C63<sup>®</sup> Chairman **Dan Hoolihan** for his efforts Chairing the Working Group that produced the update to C63.16 on Electrostatic Discharge measurement.

May, 2016 award photo for C63.16 Chair

#### 1.1 Announcements: Chair's remarks -

#### 1.2 Meeting logistics announcements: Host

- 1.3 **Introductions: Secretary – roll call** (record attending members with their affiliations and guests separately below) **Report any roster errors to the ASC-C63<sup>®</sup> Secretary** (insert [SC5 membership roster](#) from the website as shown below)

### Subcommittee 5 Membership Roster **AI-61:** Jerry to Remove **dba L-A-B** for Randy Long.

Name	Role within SC	Affiliation
<a href="#">Berger, Stephen</a>	Member	TEM Consulting
<a href="#">Carlton, Ross</a>	Member	ETS - Lindgren
<a href="#">Fanning, Craig</a>	Member	Elite Electronic Engineering
<a href="#">Griffin, Andy</a>	Member	Cisco Systems
<a href="#">Hare, Ed</a>	Chair	ARRL
<a href="#">Heirman, Don</a>	Member	Don HEIRMAN Consultants
<a href="#">Hoolihan, Dan</a>	Member	Hoolihan EMC Consulting
<a href="#">Lombardi, Rick</a>	Member	Visteon Corporation
<a href="#">Long, Randy</a>	Member	ANSI-ASQ National Accreditation Board <b>dba L-A-B</b>
<a href="#">Ramie, Jerry</a>	Secretary	ARC Technical Resources, Inc.
<a href="#">Schaefer, Dave</a>	Member	Element Materials Technology
<a href="#">Silberberg, Jeffrey L</a>	Member	FDA Center for Devices & Radiological Health
<a href="#">Zimmerman, Dave</a>	Member	Spectrum EMC, LLC

**Guests and Observers:** (non-voting) Xiong Yufei, Doug Kramer, Henry Benitez, Ken Gjerda,

John Repella, Marcus Shellman, Jason Coder, John Norgard, Dan Sigouin

**1.4 Quorum: (50% of roster + 1) constitutes a quorum.** (rounding down) (Example: 13 roster members / 2 = 6.5 + 1 = 7 (therefore 7 people are required for a quorum) **Was quorum achieved? (Yes)** If not, any actions taken are subject to confirmation by electronic ballot or at a future meeting. (Quorum is not required for Working Group meetings)

**2. Approval of the Agenda: Secretary** - The [Agenda](#) was approved by acclamation.

**2.1 Approval of the previous Minutes** - [Minutes of the previous meeting](#) The previous Minutes were shown in a line-by-line manner and [approved](#) by acclamation.

**2.2 Review of the [patent slides](#)** - The patent slides were shown and no patent issues were raised.

**3. Review of [Subcommittee Membership](#): Secretary** - See roster on website. **Report any errors to the ASC-C63<sup>®</sup> Secretary**

**3.1 Review of Membership Guidelines – any members at risk?**

**Subcommittees:**

For an individual to remain a voting member of a Subcommittee, active participation in Subcommittee meetings and regular responses to Subcommittee email votes is required. Should a member fail to attend at least one of three consecutive scheduled meetings (in person or remotely via web conference (when used)) or respond to at least one of every two consecutive Subcommittee email votes, their membership in that Subcommittee may be at risk.

Note: Abstentions shall be treated the same as a “yes” or “no” vote regarding the requirement to respond to email votes.

**Working Groups:**

For an individual to remain a member of a Working Group, active participation is required. Should a member fail to attend at least one of three consecutive scheduled meetings (in person or via web conference (when used)) their membership in that Working Group may be at risk. Individual Working Groups may establish additional participation criteria and/or modify this requirement.

**Member Attendance Log:**

SC5 Members	Nov 2014	May 2015	Nov 2015	May 2016	Nov-16	May-17	Nov-17	2018Jan	20180306	20180502
Stephen Berger	X			x			x			x
Ross Carlton										x
Craig Fanning					x		x	x	a	
Andy Griffin	X	x	W	x	x				a	x
Ed Hare	X	X	X	x	x	x	x	x		x
Don Heirman	X	X	X	x	x	x	x	x	x	x
Dan Hoolihan	X	X	X	x	x		x			x
Rick Lombardi		W	W	x	x	x	x		x	x
Randy Long			X	x	x		x			x
Jerry Ramie	X	X	X	x	x	x	x	x	x	x
David Schaefer	X	X	W		x				x	x
Jeff Silberberg	X	X	X	x	x	x	x	x	x	x
Dave Zimmerman		X	W	x	x	x	x	x	x	

**Members at risk?** These members are at risk: **None**

**3.2 Consideration of new members?** [Application for C63<sup>®</sup> Subcommittee Membership](#)

**3.3 Approval of Membership (Spring meeting only)**

**4. Approval of [Scope and Duties](#): Chair - (Spring meeting only)** (Report approval or any changes to the Main Committee)

## Scope

Subcommittee 5 is responsible for developing and maintaining new and existing standards for immunity testing techniques and associated instrumentation as requested by the Main Committee ANSI ASC C63®.

**4.1 Election of Officers** (as required) **Vice Chair** position is open. No volunteers were found.  
**AI-62:** Ed Hare to suggest / interview a new Vice Chair for SC5.

**5. Working Group reports - Chair** - [More information about each standard](#) is available on the Standards Status Matrix page of the [C63® web site](#). This information will be reviewed for accuracy at each Spring Subcommittee meeting.

### 5.1 C63.9 – Office Equipment Immunity - Heirman ([WG report](#))

**5.11 Status Matrix Review (Spring meeting only)** Verify accuracy of document [status matrix](#) content and report any errors to the ASC-C63® Secretary. **Is this information correct? (Yes)**

C63.9-2014 <a href="#">Learn more</a>	Office equipment immunity	<a href="#">SC 5</a>	<a href="#">Heirman, Don</a>	<a href="#">C63.9 PINS</a>	PINS approved to revise 2008 edition including the 2014 reaffirmation.
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### C63.9: C63.9-2014 American National Standard for RF Immunity of Audio Office Equipment to General Use Transmitting Devices with Transmitter Power Levels up to 8 Watts

**Contact:** [Heirman, Don](#)

**Scope:** This standard provides recommended test methods and limits for assuring the RF immunity of office equipment to general use transmitters with transmitter power up to 8 watts

**Status:** Reaffirmed in 2014. Revision currently underway to update references, add coverage for interference threats from newer technologies such as LTE, consider latest test instrumentation and techniques, and clarify alternative test methods.

**Purchase:** [IEEE Store](#). To purchase individual standards, go to the IEEE store and search on the standard number.

## Status

- Work delayed primarily to work on C63.24
- Desire to more generalize the document to more portable wireless sources and not limit it to 8 Watts
- Limit reproducing parts of C63.18 and the draft C63.24/P473 effort
- Consider using as RF sources portable transceivers much like the path for C63.24.
- Focus on test setups if audio devices are scattered throughout the meeting space.
- Test similar to IEC 61000-4-3 (radiated E-field) with actual transmitters or replication.

### 5.2 C63.15 – Immunity Measurement & Instrumentation - Heirman (no WG report)

See **AI-60**: Jerry to place a discussion of moving some C63.15 content to SC3 for harmonization on our next SC5 meeting Agenda. We need to bring up this content at the SC3 meeting. (tomorrow) We need a person to do a comparison to other International Standards.

**5.21 Status Matrix Review (Spring meeting only)** Verify accuracy of document [status matrix](#) content and report any errors to the ASC-C63® Secretary. **Is this information correct? (Yes)**

C63.15-2017	Immunity Measurement & Instrumentation	<a href="#">SC 5</a>	<a href="#">Heirman, Don</a>	<a href="#">C63.15 PINS</a>	Published 2017 Working group disbanded
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<a href="#">Learn more</a>					
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### **C63.15: C63.15-2017 American National Standard Recommended Practice for the Immunity Measurement of Electrical and Electronic Equipment**

**Contact:** [Heirman, Don](#) (Working Group Chair)

**Scope:** This immunity measurement and measurement instrumentation recommended practice document complements the emission measurement procedures specified in ANSI C63.4 noting that C63.15 is a recommendation while C63.4 is a standard. The immunity methods are of use to manufacturers who want to produce a reliable product working in the customer location RF environment to reduce customer complaints. This document generally covers the frequency range of 30 Hz to 10 GHz. The test instrumentation needed to replicate the RF environment is also identified that will support the immunity testing.

**Status:** Published in 2017. Working group disbanded.

**Purchase:** [IEEE Store](#). To purchase individual standards, go to the IEEE store and search on the standard number.

## **5.3 C63.16 – ESD Test Methodology - Worley (no WG report)**

**5.31 Status Matrix Review (Spring meeting only)** Verify accuracy of document [status matrix](#) content and report any errors to the ASC-C63<sup>®</sup> Secretary. **Is this information correct? (No)**

C63.16-2016 <a href="#">Learn more</a>	ESD Test Methodology	<a href="#">SC 5</a>	<a href="#">Whitesell, Steve</a>	No active PINS	Current. (published 5/10/16) Working group disbanded
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### **C63.16: C63.16-2016 American National Standard Guide for Electrostatic Discharge Test Methodologies and Criteria for Electronic Equipment**

**Contact:** [Whitesell, Steve](#) (Working Group Chair)

**Scope:** This guide provides electrostatic discharge (ESD) test considerations that a manufacturer should use in assessing the expected ESD effects on products in a wide range of environments and customer use. The focus is well beyond that used to simply show that a product complies with a local, regional, or international standard or regulation. The guide includes unique new material on testing of charged peripherals being connected to a system and system components being placed in a docking station. It also includes information on the use of preliminary investigatory testing to identify test points, methods for visually documenting the location of those test points, and the use of a stepped approach in ratcheting up the test voltage to determine failure thresholds. The annexes include test plan and data sheet examples along with more background on air and contact discharge for those who want to further understand the differences in these methods.

**Status:** Current. Guide was published 10 May 2016. Working group disbanded.

**Purchase:** [IEEE Store](#). To purchase individual standards, go to the IEEE store and search on the standard number.

**AI-63:** Jerry to replace Mr. Whitesell with Mr. Worley on the [status matrix](#) page.

## **5.4 C63.24 – On-Site Generic Immunity testing - Heirman (WG report & Stds. comparison)**

**5.41 Status Matrix Review (Spring meeting only)** Verify accuracy of document [status matrix](#) content and report any errors to the ASC-C63<sup>®</sup> Secretary. **Is this information correct? (Yes)**

C63.24-draft <a href="#">Learn more</a>	On-Site Generic Immunity testing	<a href="#">SC 5</a>	<a href="#">Heirman, Don</a>	<a href="#">C63.24 PINS</a>	New recommended practice restarted (joint task with IEEE 473); new PINS needed
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### **C63.24-draft: American National Standard Recommended Practice for In-Situ RF Immunity Evaluation of Products, Instrumentation, and Control Systems in High Reliability Installations**

**Contact:** [Heirman, Don](#) (Working Group Chair)

**Scope:** This recommended practice provides an in-situ EMC immunity qualification test for products, instrumentation, and control systems in their installed environment. The recommended practice will focus on installation environments that require a high level of confidence that these products and systems have a high level of EMC immunity. This project will provide a generic method for evaluating the RF immunity of electronic products, instrumentation, and control systems, as and where installed or operated. A particular focus is on immunity to RF sources that may enter the environment, intentionally or unintentionally or be integrated into the operating environment. The characteristics of RF sources in the environment will be used to establish the levels and test methods.

**Status:** New recommended practice. Consideration being given to working as a joint project with the revision of EMC Society standard IEEE 473 on RF site survey measurement. PINS will need revision.

**Purchase:** Not yet available for sale.

Mr. Heirman moved to approve the C63.24 WG membership, seconded by Mr. Ramie. The WG Membership roster was approved unanimously.

viewing with email.org's server

## 18 November Webinar

- Principles to use in revision D2.1
  - The EUTs are only tested where they are installed
  - They are selected as they have experienced some sort of interference attributable to portable transmitters or the RF ambient
  - The sources of RF are only portable transmitters and the RF ambient
  - The detailed information on frequencies, modulations, etc. have been removed as all we need to know is what transmitter or ambient signal triggered interference
  - Removed any reference to testing performed in an EMC lab environment

## 18 November Webinar

- Progress:
  - Continue to use text for “common test site setups” for C63.24 in performing on-site/in-situ immunity measurements and in P473 for performing site surveys
  - Draft text is in both standards
  - In the meantime, both working groups continue to update their respective standards

C63.24 should be ready for ballot early next year.

## 6. Other Old Business: Chair

**6.1 Written reports** - Written reports of this Subcommittee meeting shall be presented by the Subcommittee Chair at the Main Committee meeting. These reports shall be made using the [PowerPoint template](#). Prior to the Main Committee meeting, the [SC report](#) and [approved previous meeting minutes](#) shall be



provided to the projectionist for showing on the screen at the Main meeting. The Presentation and any written report shall also be sent by the Subcommittee Chair to the ASC-C63® [Newsletter editor](#).

**6.2 Coordination with SC2 for definitions** - Before any Working Group draft can be submitted to Subcommittee for approval, the document must be provided to the SC2 Chair for evaluation and coordination of the definitions used.

**6.3 Coordination with SC3 for harmonization** - Before any Working Group draft can be submitted to the Subcommittee for approval, the document must be provided to the SC3 Chair for evaluation and coordination of any harmonization effort.

## 7. New Business: Chair added:

### 7.1 C63.28 input form for SC2

#### C63.9 - Office Equip. - Heirman

**E. Typical Products: (if any)**

- 1) Test Equipment
- 2) Hearing Aids
- 3) Wireless Devices

**F. Prospective Industry/Customer-Base:**

- 1) Manufacturing I
- 2) Communications
- 3) Medical

**G. Lessons Learned:**

**H. Conformity with Major Standards (FCC, IEC, ISO, DoD):**

AI-64: Ed to forward the SC2 forms on to the respective WG chairs for C63.28.

AI-65: Ed to ask Main Committee members for additional C63.9 Working Group participation

#### C63.15 - Measurement Instrumentation - Heirman

#### C63.16 - ESD- Worley

#### C63.28 draft - SC2 - Chris Dilay

I am reaching out to you on behalf of the C63.28 WG developing the EMC Best Practice Guide in application of C63 standards. The draft is in progress and we'd like your assistance in filling out the questionnaires for each standard published under C63. I have attached surveys for each of the published C63 standards. I have also attached a draft of the latest C63.28 draft revision as background. The surveys will assist in the guide recommended use of C63 standards by providing clarification on applications, lessons learned, and equivalencies/similarities and conformities with other major national and international EMC standards.

Please bring this up during your SC meetings next week and pass to the appropriate standard WG chair under each of your respective SCs for review and action. We appreciate your support and look forward to a successful round of meetings next week.

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### 7.2 Presentation: Xiong Yufei, The Effect of Isotropy in Radiated Immunity

# A new method of E-field Probe Isotropy Computation and Its Effect in Radiated Immunity

Xiong Yufei   Dong Licheng

China Academy of Information and  
Communications Technology

Telecommunication Technology Lab



2018/11/28

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## Catalogue

- **Background**
  - Origin of Isotropic Problem
  - Computation Method of Isotropy in IEEE-1309
- **Objective**
- **Methods Proposed**
- **Experimental Results Comparison**
- **Exploratory Research on New method used in Radiated Immunity**

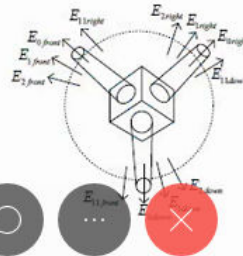
## Background

- **Origin of Isotropic Problem**

- (1) Basic Construction of E-field Probe-Three Orthogonal Dipoles
- (2) Coupling Error due to Environmental Reflections
- (3) Simplified Simulation of 3D Space

- **Computation Method of Isotropy in IEEE-1309**

- (1) Using Geometrical Mean of the Maximum and Minimum, i.e. Isotropy shown by Anisotropy
- (2) Can only show the worst case
- (3) 
$$\text{Isotropy} = 20 * \log_{10} \frac{E_{\max}}{\sqrt{E_{\max} E_{\min}}}$$

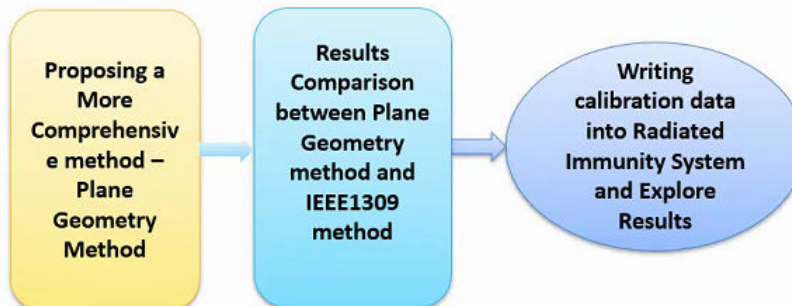


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## Objective

- **Proposing a more comprehensive method-Plane Geometry Method**
- **Explore the usage of new method in Radiated Immunity**



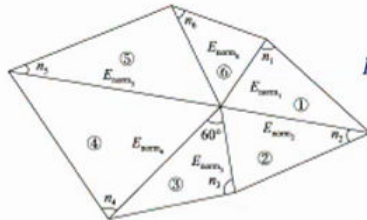
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## Method Proposed

- Idea: To find the equivalent radius of measurement values in a single isotropic calibration procedure
- More Comprehensive



$$Isotropy = 20 * \log_{10} \sqrt{\frac{\sum_{i=1}^{n-1} E_{normi} E_{norm(i+1)} + E_{normn} E_{norm1}}{n}}$$

$$E_{normn} = \frac{E_n}{E_{min}}$$

## Experimental Comparison

In frequency range of 1GHz-5GHz, take 10 times isotropic measurements. The difference between the proposed method and IEEE-1309 method is within 0.01dB to 0.08dB.

Frequency (GHz)	Results for this method (dB)	Results for the method in IEEE1309 (dB)	Difference (absolute value) (dB)
1	0.24	0.26	0.02
1.5	0.28	0.26	0.02
2	0.26	0.30	0.04
2.5	0.26	0.34	0.08
3	0.36	0.39	0.03
3.5	0.35	0.36	0.01
4	0.27	0.26	0.01
4.5	0.23	0.26	0.03
5	0.28	0.29	0.01

Viewing w1rfi@arri.org's scr...

## Exploratory Research on New method used in Radiated Immunity

**CAICT**  
中国信息通信研究院  
China Academy of Information and Communications Technology

Writing the calibration data into Radiated Immunity test system, the results shown below demonstrates that the E-field variation is 0.16dB-0.18dB better with calibration data than without calibration. (Horizontal Polarized, 4 different rotating positions of E-field probe)

Frequency (GHz)	E-field Probe Variation with calibration data(dB)	E-field Probe Variation without calibration data(dB)	Difference (dB)
1	1.01	1.17	-0.16
1.5	0.51	0.68	-0.17
2	1.19	1.38	-0.18

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AI-66: Jerry to provide Xiong's e-mail address to all SC5 members>> (xiongyufei@caict.ac.cn)

8. **C63.org website use and updates: Secretary** - We normally post documents to the [SC5 protected area](#). If any SC or WG needs help with this posting, a Technical Secretary is available to assist.

## 9. Review of the Action Items: Secretary

**9.1 Review of Action Items from this meeting:** (read Action Items to Members, who must agree that they understand their meaning)

**9.2 Review of Action Items from previous meeting:** The consolidated Action Items table from the previous meeting Minutes are shown below:

**Consolidated Action Items from 5/2/18 Meeting of SC5**

Action Item #	Subject	Responsible Person(s)	Status	Delivery Date	Comments
AI-58:	Jerry to update SC5 landing page to show the amended Scope in Item 4	Jerry Ramie	Closed	Next meeting	Sent to Shannon 6/2
AI-59:	Jerry to add Ross Carlton to the SC5 roster.	Jerry Ramie	Closed	Next meeting	Added 6/2
AI-60:	Jerry to place a discussion of moving some C63.15 content to SC3 for harmonization on our next SC5 meeting Agenda	Jerry Ramie	Closed	Next meeting	Placed on this agenda

10. Time and place of next meeting: Chair - April 29 week at UL-RTP

11. Closing remarks and Adjournment: Chair - The Chair thanked the group for their participation and adjourned the meeting at 2:36PM-MST

\*\*\*\*\* End of Meeting \*\*\*\*\*

**Consolidated Action Items from 11/28/18 Meeting of SC5**

Action Item #	Subject	Responsible Person(s)	Status	Delivery Date	Comments
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AI-61:	Jerry to Remove <b>dba L-A-B</b> for Randy Long	Jerry Ramie	Closed	Next meeting	Removed 12/28
AI-62:	Ed Hare to suggest / interview a new Vice Chair for SC5	Ed Hare	Open	Next meeting	
AI-63:	Jerry to replace Mr. Whitesell with Mr. Worley on the <a href="#">status matrix</a> page	Jerry Ramie	Closed	Next meeting	Replaced 12/28
AI-64:	Ed to forward the SC2 forms on to the respective WG chairs for C63.28.	Ed Hare	Open	Next meeting	
AI-65:	Ed to ask Main Committee members for additional C63.9 Working Group participation	Ed Hare	Open	Next meeting	
AI-66:	Jerry to provide Xiong's e-mail address to all SC5 members>> (xiongyufei@caict.ac.cn)	Jerry Ramie	Closed	Next meeting	Provided 12/28