

APPROVED MINUTES
ANSI ASC C63® SC1: Techniques and Development
UL
Research Triangle Park, NC
November 11, 2015

Presiding Officer: Zhong Chen

Date Prepared: Nov 11, 2015

Members Present:

Mark Arthurs
Masud Attayi
Zhong Chen (Chair)
Bob DeLisi
Dean Ghizzone
Andy Griffin
Tim Harrington
Don Heirman
Dan Hoolihan
Mike Howard
Steve Jones
Greg Kiemel
Victor Kuczynski
Rick Lombardi
Randy Long
Michael O'Dwyer
Janet O'Neil (Secretary)
Ghery Pettit
Nate Potts
Mits Samoto
Werner Schaefer
Dan Sigouin
Jeff Silberberg
Art Wall
Dennis Ward
Steve Whitesell
Khairul A. Zainal
David Zimmerman

Members Absent:

Harry Hodes (Vice-Chair)
Jeff Klinger
Don Umbdenstock

Guests:

Vladimir Bazhanov
Chris Dilay
Mac Elliott
Ed Hare
Beth Hackett
Tom Knipple
Megan McConnell
Dheena Moongilan
Brad Moore
Jeff Moser
John Norgard
Vic Powley
Marcus Shellman
Sue Vogel
Tomasz Wojtaszek

Employer:

Sony
Blackberry Corp.
ETS-Lindgren
Underwriters Laboratories Inc. (UL)
Northwest EMC
Cisco
FCC (via telecom)
Don HEIRMAN Consultants
Hoolihan EMC Consulting
Liberty Labs
FCC
Northwest EMC
Vican Electronics
Visteon (via telecom)
L-A-B
Apple
ETS-Lindgren
Pettit EMC Consulting (via telecom)
Liberty Labs
Liberty Labs Asia
Schaefer Associates
DHS
FDA Center for Devices & Radiological Health
TCB Council
PC Test Lab
Consultant
LS Research
Spectrum EMC Consulting, LLC (via telecom)

Employer:

ACIL/Proficiency Testing Services
Compatible Electronics
Tyco Retail Solutions

Employer:

Ericsson AB
SPAWAR
Motorola Solutions
ARRL
NVLAP
Motorola Mobility
A2LA
Alcatel Lucent
NVLAP
UL
NASA/JSC Houston
UL
DISA/JSC
IEEE
SPAWAR

1.0 Call to Order—Chair

1.1 Opening Remarks and Announcements: Chair

1.2 Meeting Logistics Announcements: Host

1.3 Introductions: Secretary

Chair Zhong Chen called the meeting to order at 1:00 pm. A round of introductions was made.

2.0 Approval of the Meeting Agenda and SC1 Scope: Chair

Zhong Chen presented the draft agenda for the November 11, 2015 meeting for review. (See Attachment A.) Werner Schaefer requested to add to the agenda under new business a discussion of interpretation of standards in general. Steve Jones was added under new members to review his application to join SC1. **Don Heirman moved to approve the agenda as amended. The motion was seconded and approved.**

3.0 Presentation of [patent slides](#): Chair

Zhong Chen gave a presentation that reviewed the status of the meeting fees, ANSI policy related to Intellectual Property (IP), inappropriate topics for IEEE working group meetings and the working group meeting slide template. (See Attachment B.) **Mr. Chen moved to confirm everyone present agreed to abide by the procedures outlined in the patent slides. The motion was seconded. All confirmed compliance.**

4.0 Presentation of [meeting attendance](#) fee slides: Chair

Zhong Chen reviewed the meeting attendance fee structure and noted that Dan Hoolihan, Chair of C63®, would contact individuals present who are required to pay a meeting attendance fee.

5.0 Approval of Minutes of Previous Meeting: Secretary

Secretary Janet O'Neil presented the minutes of the May 6, 2015 meeting held at the Embassy Suites Hotel, Brooklyn Center, MN. The meetings were hosted by Northwest EMC. **Don Heirman moved to approve the minutes as distributed. The motion was seconded and approved.** The approved minutes are included in Attachment C.

6.0 Review of [Subcommittee Membership](#): Secretary

6.1 Review of membership – Members at risk. Janet O'Neil advised that Dean Ghizzone, Nate Potts, Dan Sigouin and Steve Whitesell were at risk of losing membership in SC1, meaning by not attending the meeting today, they would have missed three consecutive meetings. However, all were present so they did not lose their membership. It was subsequently noted that Dean Ghizzone was mistakenly shown as absent at the May 2015 meeting that his company hosted. The secretary corrected this error. (See Attachment D for the updated membership tracking record.)

6.2 Consideration of Members. The secretary reported to the subcommittee that a new SC1 membership application was received from Steve Jones of the FCC. His application and resume were distributed to members of SC1. His membership application was endorsed by Art Wall, Greg Kiemel, Dan Hoolihan and Dave Case. **The motion to approve the membership application of Steve Jones was seconded and approved.**

ACTION: O'Neil to add Steve Jones to the SC1 membership roster.

The secretary reviewed the roster of working group members as shown on the C63 website. Some revisions were made. The updated roster of working groups and the SC1 membership roster are included in Attachment E to these minutes.

ACTION ITEM: All working group Chairs need to complete their rosters and indicate their officers (Vice-Chair and Secretary) and submit to Chair prior to the next meeting (May 2016).

7.0 Working Group Reports

C63.2: Specifications for Electromagnetic Noise and Field Strength Measurement Instrumentation

Working Group Chair: Werner Schaefer

Status: PINS submitted to IEEE on May 8, 2013. Next edition in progress C63.2

Werner Schaefer presented his report. (See Attachment F.) He advised that the ballot closed on Tuesday, April 21, 2015. There were 19 people in the ballot pool. There were three negative votes, four no responses, zero abstentions, six approvals and six approvals with comments. The ballot passed as there was 63% Approval (Majority Test - entire ballot body) and 80% Approval (Two-thirds Test: returned votes, excluding abstentions).

The reasons for the negative votes included:

- Limitation of the lower frequency end from 10 Hz to 9 kHz (due to reference to C63.2 in MIL-STD 461x)
- Existence of Table 2 in new revision (concern is that test instrumentation acceptable under CISPR 16-1-1 would be unacceptable under C63.2)

In response to the limitation of the frequency range to 9 kHz an inquiry was made to the Tri-Services committee with an extended deadline for response and no input was received. Based on this situation, the two negative votes were withdrawn in writing.

On the concern related to harmonization of test equipment, Werner noted C63.2-2015 clause 1.2 clearly states that the standard does harmonize the requirements in CISPR 16-1-1. However, it was agreed that an additional explicit statement would be added to clause 3 to indicate harmonization.

SC1 requested the addition of definitions and acronyms. It was agreed to add a list of acronyms and definitions (e.g., IF, CW, VSWR, etc.) to the document during the last SC1 meeting in May 2015. This still has to be added. SC1 also requested the addition of standards such as CISPR 16-2-1/2/3 to the bibliography of the standard, not the normative reference section.

Following is the planned timeline to finalize the document:

- Text to be completed by January 31, 2016
- Review by working group February 28, 2016
- Submission to IEEE (Sue Vogel) by March 15, 2016

Steve Jones asked about the policy related to addressing comments received on standards following the ballot process. Don Heirman noted that there is a table used for listing the comments and the resolution. Comments received within the working group can follow a more informal process where they agree to mark up the document.

C63.4: Emissions Measurements

Working Group Chair: Don Heirman

Status: Current-2014. Next edition planned (2018?)

Don Heirman presented his report. (See Attachment G.) He presented his roster of working group members and noted that they represent varied organizations, including government and industry. David Zimmerman noted he was added to the working group roster. The working group met on November 9, 2015.

He noted the PINS-C was approved by the working group, SC1 and C63 in November 2014. Over 21 topics were addressed as being included in the next edition of the standard. Of these 21 topics, the working group narrowed this down to nine, including:

- Measurement methods above 1 GHz
- Use of multiple antenna masts/antennas in SAC
- Remove absorber “patch” option above 1 GHz
- Way forward with 2 dB “rule”
- Tolerances for dimensional requirements
- Adding phase requirements for
- Harmonizing visual displays with CISPR 32
- Revisiting antenna bore citing
- Handling approved interpretations

The other topics not of high priority were identified and the reasons were given in the C63 voting document. The PINS-C study question process is well underway. It presents what should initially be studied for the next edition of C63.4. The objective is to form a PINS to start in earnest on the revisions.

Chair Zhong Chen asked about including some of the work Don’s working group is doing on the C63.25 effort as this work overlaps. Greg Kiemel noted that the FCC had removed the “absorber patch” requirement. He encouraged members to move away from the absorber patch option. Ghery Pettit noted that the C63.4 working group is moving the absorber patch option from the next edition of the standard. In addition, some of this effort is being relayed to CISPR 22/32.

The main issue with the 2 dB rule (used to determine when to stop adding plug in cards, cables attached to plug in cards, and other devices of the same type to a frame of equipment that has many slots for these items) is to give more guidance on its application. The WG is looking into a possibility of fully or partially populating frames with plug ins right at the start of the emission test as an alternative to adding plug ins one at a time using the 2 dB rule, for example.

The next steps for this C63.4 project include:

- Continue to do research work
- Form PINS for SC1 to move it to C63 for approval by email in first quarter 2016
- Draft changes for review by mid-2016
- Ready for balloting process by end of 2016
- Publish by mid-2017 to early 2018

C63.5: Antenna Calibration

Working Group Chair: Bob DeLisi

Status: Current-2006. Next edition in progress

Working Group Chair Bob DeLisi presented a report. (See Attachment H.) The PINS (dated October 2012) is on the website. The working group met on November 10, 2015. Eleven members attended. They will have a webinar to continue ballot resolution, currently scheduled for after the Thanksgiving holiday.

The recirculation ballot closed in July 2014. It was approved with 62% of the 26 person ballot body voting yes. There were four negative votes, three abstentions, and a response was not received from three people in the ballot body. Of those that voted, 14 people provided comments. In all, there were 239 comments received; of these, 14 were technical in nature to address. Bob thanked Tim Harrington for his efforts in editing the draft standard. Over 200 comments received on the draft were editorial in nature. He appreciated the work required by Tim to address these editorial comments.

Bob will add to his report an update related to Werner's comment that a VSWR site validation is not required if the lab is using the time domain approach.

Outstanding items to be resolved include:

- Measurement uncertainty.
- Making correct references for site requirements for above 1GHz in Annex M. (Annex L contains correct references needed.)
- Remove comparison between traditional methods and time domain methods.
- Clean up of Annex L.
- Annex L.2.1.3 (a)(3) needs to be revised to state only single point calibration is required. (Remove volume).
- Clarify that NSA is not required for Time Domain method since site is gated out of the measurement.
- L.3(c) needs to be reworded to allow for just 3m; just 10m or both. Height needs to be added - 1mH, 2mH, 1mV, 1.5mV at all locations.

The working group is targeting a recirculation of the document by to C63® by January 2016.

C63.7: Construction of Test Sites

Working Group Chair: Don Heirman

Status: Current – Published January 2015

Don Heirman presented his report. C63.7 was approved in January 2015 and is published. It is already being referenced in the draft C63 standards under preparation (C63.12, C63.16, C63.25, etc.). No further work is anticipated at this time, especially since there were no suggestions received to add to the document in the last review. Don suggested this topic can be removed from future SC1 agendas since there is no activity planned.

C63.25: Test Site Validation

Working Group Chair: Dan Sigouin

Status: New Standard. Draft being written. PINS Current.

Dan Sigouin presented his report. (See Attachment I.) He confirmed the scope of the standard: This standard provides methods of measurement requirements for the validation of radiated emission test sites in the frequency range of 30 MHz to 18 GHz. These requirements are applicable to open area test sites (OATS), fully and partially covered OATS, semi-anechoic chambers (SAC), and fully anechoic rooms (FAR).

Dan noted that the frequency range will stay at 30 MHz to 18 GHz. Twenty-two people attended the working group meeting on November 10, 2015. Sue Vogel from IEEE confirmed since the standard title

change was not “significant”, a new PINS was not necessary. Gerald Paul from UL RTP is a new member of the working group. Dan noted he has not received any comments on the standard this year, but there were many comments on the NSA topic!

It had been decided to retain the use of dipole antennas but the required frequency step size for such measurements will be drastically decreased. Greg Kiemel noted the legacy methods of NSA that the committee has been dealing with for years are a main focus of the working group efforts. Dan noted that the antenna size, including large hybrid antennas, needs to be addressed in the new standard as well as eliminating the conditional omission of the back position as part of the volumetric NSA. Zhong noted that some of these issues have been raised in the interpretation requests submitted to SC1. Dan noted the use of antennas and technology has changed; for example, hybrid antennas were not around years ago. This needs to be addressed.

Dan advised the working group plans to circulate a draft of the standard to SC1 in 2017.

C63.26: Licensed Transmitter Testing

Working Group Chair: Art Wall

Status: New Standard. Draft being written.

Chair Art Wall presented his report. (See Attachment J.) The Wireless and ISM working groups met on November 10, 2015 for a half-day session with 21 people in attendance (nine via webinar).

C63.26 was balloted twice, in January 2015 and June 2015. The ballot was approved and submitted to IEEE for approval.

- a. Minor edits to wideband consumer booster/amplifiers procedures were discussed and approved by the working group.
- b. The ANSI review process is scheduled to be completed by November 23, 2015
- c. C63.26 is tentatively scheduled to be published January 7, 2016

A PINS for the 3rd Edition of C63.10 was reviewed and approved for submission to SC1. A PINS-C for the 2nd Edition of C63.26 was reviewed and approved for submission SC1.

Following is a report of the work of each Industrial, Scientific and Medical (ISM) TG:

- a) C63.29 Lighting TG Report
 - i. TG Leader: Ernesto Mendoza
 - ii. 21 members
 - iii. Meeting via webinar every three weeks
 - iv. Met three hours on November 9, 2015
 - v. Agreed on a scope of 12 lighting devices
 - vi. Conducted emission measurements 9 kHz to 30 MHz
 - vii. Radiated emission measurements 9 kHz to 30 MHz, 30-1000 MHz, > 1 GHz
 - viii. Review scope and definitions
 - ix. Use C63, CISPR and other documents, as appropriate
- b) C63.30 WPT TG Report
 - i. TG Leader: Travis Thul
 - ii. 38 members
 - iii. Meeting via webinar every two weeks
 - iv. Met four hours on November 9, 2015

- v. Primary goal to identify and validate an appropriate means of conducting radiated EMI testing on wireless power transfer systems. Procedures need to be repeatable and practical.
 - vi. Systems under consideration include PMA, A4WP, Qi, and SAE compliant devices.
 - vii. Frequencies range from 20 kHz to 6.78 MHz.
 - viii. Power levels range from 5W to 3.7 kW.
 - ix. Data analysis of measurements intended to inform standard test procedure development
 - x. Simulation of test cases allowing for comparative analysis
 - xi. Consideration of conducted emissions
 - xii. Consideration of > 30 MHz WPT systems
Other items under review include:
 - xiii. In-situ testing
 - xiv. Power across distances (both inductive and radiative)
 - xv. Technical components of standard to be drafted post data analysis
- c) C63.31 MP-5 TG report
- i. TG Leader: Derek Walton
 - ii. 37 members
 - iii. Meeting several times over past four months
 - iv. Met two hours on November 9, 2015
 - v. Agreed on a scope to include only Part 18 devices, excluding WPT and lighting devices
 - vi. Conducted emission measurements 9 kHz to 30 MHz for consumer devices
 - vii. Radiated emission measurements 9 kHz to 30 MHz, 30-1000 MHz, 1-18 (?) GHz
 - viii. Review scope and definitions
 - ix. Use C63.10 as guide for developing standard
 - x. Use C63, CISPR, MP-5 and other documents, as appropriate

Art presented two motions for voting upon by SC1.

Motion 1: Art moved to recommend the adoption of a PINS for the 3rd Edition of ANSI C63.10 -- American National Standard of procedures for compliance testing of unlicensed wireless devices. (See Attachment K.)

Rationale: The 3rd Edition of C63.10, in addition to maintenance items, will address the topics mentioned in Item 8 of the PINS.

Dan Hoolihan seconded the motion. Bob suggested removing the 12-18 months completion schedule at the end of the document. Art agreed to this change. The motion as amended was approved.

Motion 2: Art recommended the adoption of a PINS-C for the 2nd Edition of ANSI C63.26 -- American National Standard of procedures for compliance testing of licensed transmitters. (See Attachment L.)

Rationale: C63.26 covers procedures for testing a wide variety of licensed transmitters; including, but not limited to, transmitters operating under Parts 22, 24, 25, 27, 90, 95 and 101 of the FCC Rules. The 1st Edition of C63.26 is expected to be published in January 2016. The 2nd Edition of this standard will address a number of topics, as mentioned in item 8 of the attached PINS-C.

Zhong Chen moved to approve the motion. Ghery Pettit seconded the motion. The motion was approved.

Dan Hoolihan noted Sue Vogel of IEEE had checked on the earlier question about a small change in a PINS title requiring a new PINS. Sue confirmed that a small change would not require a new PINS.

8.0 Old Business - Chair

Addressing errata and amendments for SC1 standards based on interpretations – Zhong Chen noted we have received several interpretation requests. Since many standards do not get revised for several years following an interpretation request, how does this information get relayed to the public in the meantime? Dan Hoolihan noted this will be addressed at the C63 steering committee meeting on November 11, 2015; Sue Vogel from IEEE is prepared to address this.

9.0 New Business – Chair

Werner Schaefer raised the issue of interpreting ANSI standards and used the example of bore-sighting (tilting) the antenna below 1 GHz, as described in CISPR 16-2-3. As ANSI C63.4 does not have provisions for bore-sighting the antenna below 1 GHz (only in the frequency range above 1 GHz) the question arose if bore-sighting below 1 GHz could be used for measurements in accordance with ANSI C63.4. C63.4 does not specifically prohibit bore-sighting below 1 GHz; therefore, is it acceptable to apply bore-sighting below 1 GHz to be able to use the same test process for measurements in accordance with CISPR-based standards and ANSI C63.4?

Werner moved that the C63 steering committee address the general topic of interpretation of ANSI standards: If a standard does not explicitly state an activity (like bore-sighting below 1 GHz), does that automatically mean that such an activity is prohibited? The motion was seconded by Victor Kuczynski. The motion failed as there were 12 yes votes, 11 no votes, and Zhong Chen as SC1 chair voted no. This resulted in a tie vote, so there was no majority.

10.0 Review of Interpretation Requests: Chair

Zhong Chen advised there have been several interpretation requests received after the last SC1 meeting on May 6, 2015. Items 1-5 below are closed with the response available via hyperlink. Items 6 and 8 are out for ballot; Item 7 was submitted to parent committee on November 4. He reviewed these requests below and asked each subgroup chair to provide a brief summary on the response provided.

Dan Hoolihan reminded the committee that responses to interpretation requests are informative, NOT normative, in nature.

1. C63.4-2009 and -2014, request dated 11-6-14, "[C63.4 \(2014\) NSA Phase Center of Antenna](#)" - From **Bob DeLisi of UL - Khairul Aidi Zainal (Chair)**; subgroup members include Don Heirman, Harry Hodes and Mits Samoto.
2. C63.4-2009, request dated 1-15-15, "[Testing Large TVs as Floor Standing](#)" - From **Winnie Liu of Foxconn - Don Heirman (Chair)**; subgroup members include Werner Schaefer, Victor Kuczynski, Bob DeLisi, and Khairul Aidi Zainal.
3. C63.4-2014, four separate requests dated 2-21-15, "[Exploratory emissions Clause 8.3.1.2](#), [Antenna Symmetry Annex N.1](#), [NSA Measurement Annex D.3](#), and [NSA Measurement Annex D.2](#)" From **Takashi Maruyama of LAB Support - Dan Sigouin (Chair)**; Subgroup members include Don Heirman, Werner Schaefer, Victor Kuczynski, Bob DeLisi, Mits Samoto, Khairul Aidi Zainal, Zhong Chen and Harry Hodes.

4. C63.4-2014, request dated 3-27-15, [“Site Validation Distance”](#) - From **Nana Liu of Foxconn - Bob DeLisi (Chair)**; Subgroup members include Tim Harrington, Dan Sigouin, and Don Heirman.
5. C63.10-2013, Clause 6.3.4, request dated 5-20-15, [“Definition of Plot”](#) – From **Bob DeLisi of UL – Dennis Ward (Chair)**; Subgroup members include Tim Harrington and Dan Sigouin.
6. C63.4-2014, request dated 6-11-15, **“NSA for Alternate Sites Annex D.4”** – From **Haruki Nakai of Ametek – David Zimmerman (Chair)**; Subgroup members include Khairul Aidi Zainal, Werner Schaefer, Mits Samoto, Victor Kuczynski, Dan Sigouin, Don Heirman.
7. C63.10-2013, request dated 8-4-2015, **“Millimeter Wave Procedures”** – From **Tim Lee of UL. Tim Harrington (Chair)**; Subgroup members include Werner Schaefer, Mike Heckrotte, Bob DeLisi and Art Wall.
8. C63.4-2014, request dated 9-25-15, **“Annex D.3_2 NSA for Alternate Sites”** – From **Takashi Maruyama of LAB Support. Dan Sigouin (Chair)**; Subgroup members include Werner Schaefer, Ghery Pettit, Victor Kuczynski, Don Heirman.

It was noted on Tim Lee’s interpretation request (Item 7) that he asked if editorial changes can be made to C63.26. Tim Harrington noted one part of Interpretation # 7 was to affirm that 1.5 meter EUT height above 1 GHz is for up to 40 GHz only; above 40 GHz EUT height is 0.8 meter. The same interpretation would apply for C63.26-2015 (which is now in publication preparation) to use 0.8 meter EUT height above 40 GHz (also below 1 GHz as usual); with 1.5 meter EUT height for 1 GHz to 40 GHz only. Tim Harrington posed the questions below to Art Wall and SC1:

Question 1) Similar that some changes to C63.26-2015 for boosters might be arranged before publication, could 5.5.2.3.1 of C63.26-2015 be corrected to state use 0.8 meter above 40 GHz?

Question 2) If change is not possible per Question 1), is there streamlined way to make Interpretation #7 also apply for C63.26-2015?

Art noted January 7, 2016 as the publication date of C63.26. He will review the document to revisit a few editorial changes that were made and he will review Tim’s questions. He agrees that the FCC should be consulted on this. Dan Hoolihan said that any editorial changes could be made, but any technical changes, such as changing the EUT height, require a recirculation of the document.

11.0 [C63.org](#) Website Use and Updates

Jerry Ramie requested members be specific with any requests for postings to the website. He asked members to be sure to update or confirm they are correctly listed on the website.

12.0 Review of the Action Items from Previous Meetings: Secretary

Secretary O’Neil advised that an updated action item list will be distributed to the SC1 members along with the draft minutes from this meeting. (See Attachment M for the Action Items list.)

ACTION ITEM: O’Neil to distribute the updated consolidated action items and draft minutes from the November 11, 2015 meeting to the committee.

13.0 Time and Place of Next Meeting: Chair

Zhong Chen noted the next series of C63® meetings will be announced following the C63 steering committee meeting that evening.

14.0 Closing Remarks and Adjournment: Chair

With no further business, Zhong Chen adjourned the meeting at 4:00 pm. He thanked everyone for attending the meeting.

Minutes submitted by:

A handwritten signature in black ink, appearing to read "Janet O'Neil", written in a cursive style.

Janet O'Neil, Secretary, SC1

ATTACHMENTS

- Attachment A: Agenda for November 11, 2015 SC1 Meeting
- Attachment B: Patent Slides Required Meeting Template Slides for ASC C63®, IP Info
- Attachment C: Approved Minutes from May 6, 2015 SC1 Meeting
- Attachment D: Meeting Attendance/Tracking List
- Attachment E: SC1 Membership Roster and Working Group Roster
- Attachment F: Schaefer Report on C63.2
- Attachment G: Heirman Report on C63.4
- Attachment H: DeLisi Report on C63.5
- Attachment I: Kiemel/Sigouin Report on C63.25
- Attachment J: Wall Report on C63.26 and Wireless Working Group
- Attachment K: Wireless Working Group: PINS for the 3rd Edition of ANSI C63.10
- Attachment L: Wireless Working Group: PINS-C for the 2nd Edition of ANSI C63.26
- Attachment M: Consolidated Action Item List