

**APPROVED MINUTES - ANSI ASC C63® SC 1: Techniques and Development
Hilton Hotel, Costa Mesa, CA
November 9, 2016**

Presiding Officer: Zhong Chen

Date Prepared: November 9, 2016

Members Present:

Mark Arthurs
Zhong Chen (Chair)
Bob DeLisi (via WebEx)
Thomas Dickten
Mac Elliott (via WebEx)
Dean Ghizzone
Andy Griffin
Tim Harrington (via WebEx)
Don Heirman
Harry Hodes (Vice-Chair)
Dan Hoolihan
Mike Howard
Steve Jones
Greg Kiemel
Victor Kuczynski
Jeff Klinger
Randy Long
Jason Nixon
Michael O'Dwyer
Janet O'Neil (Secretary)
Ghery Pettit
Nate Potts
Mits Samoto
Dan Sigouin
Jeff Silberberg
David Waitt
Art Wall
Deanna Zakjoria
David Zimmerman

Members Absent:

Masud Attayi
Bob Hofmann
Rick Lombardi
Werner Schaefer
Don Umbdenstock
Dennis Ward
Steve Whitesell
Khairul A. Zainal

Guests:

Vladimir Bazhanov
Henry Benitez
Aurelian Bria
Jeremiah Darden
John Forrester
Mario Guerrero
Beth Hackett
Ed Hare
Dheena Moongilan
John Norgard
Jerry Ramie
Richard Reitz
David Schaefer
Bob Spehalski
Sue Vogel
Xiong Yufei

Employer:

Sony
ETS-Lindgren
Underwriters Laboratories Inc. (UL)
GCC
ACS Test Lab
Northwest EMC
Cisco
FCC
Don HEIRMAN Consultants
ACIL/Proficiency Testing Services
Hoolihan EMC Consulting
Liberty Labs
FCC
Northwest EMC
Vican Electronics
Compatible Electronics
L-A-B
ISED Canada
Apple
ETS-Lindgren
Pettit EMC Consulting
Liberty Labs
Liberty Labs Asia
DHS
FDA Center for Devices & Radiological Health
Assessor
TCB Council
Motorola Solutions
Spectrum EMC Consulting, LLC (via telecom)

Employer:

Blackberry Corp.
Hofmann EMC Engineering
Visteon
Schaefer Associates
Tyco Retail Solutions
PC Test Lab
Consultant
LS Research

Employer:

Ericsson AB
EMI Comply
Ericsson
Northwest EMC
Qualcomm
NVLAP
NVLAP
ARRL
Alcatel Lucent
NASA/JSC Houston
ARC Technical Resources
Retlif/ACIL
TUV Sud America
Lutron Electronics
IEEE
China Telecomm

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 SC 1 Scope: Chair

Zhong Chen presented the draft agenda for the November 9, 2016 meeting for review. (See Attachment A.) **Harry Hodes moved to approve the agenda as presented. 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 11, 2016 meeting held at IEEE in Piscataway, New Jersey. **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 Don Umbdenstock of Tyco is at risk of losing membership in SC 1, meaning by not attending the meeting today, he has missed three consecutive meetings. (See Attachment D for the updated membership tracking record.) His membership in SC 1 will be dropped.

6.2 Consideration of Members. The secretary reported to the subcommittee that two new SC 1 membership applications were received and voted upon since the last meeting on May 11, 2016. These applications were from David Waitt and Thomas Dickten. Their applications and resumes were distributed to members of SC 1 for electronic voting in August 2016. Each membership application was endorsed by Werner Schaefer, David Zimmerman and Dan Sigouin.

ACTION: O'Neil to add David Waitt and Thomas Dickten to the SC 1 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 SC 1 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 2017).**

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

Dan Hoolihan presented a verbal report in the absence of Werner Schaefer. As Mr. Schaefer noted at our last meeting, the document text was to be completed by mid-June and sent to Sue Vogel at IEEE by the end of June. Mr. Hoolihan checked with Sue Vogel of IEEE before the meeting today and advised that the document has an expected publication date of December 21, 2016.

Chair Zhong Chen thanked Werner Schaefer and his working group members for their efforts on this standard.

C63.4: Emissions Measurements

Working Group Chair: Don Heirman

Status: Current-2014. New PINS-C approved by WG, SC1 and C63 in Nov. 2014

- a. C63.4 Full revision: Status: Current-2014. New PINS-C approved by WG, SC1 and C63 in Nov. 2014
- b. C63.4a - Limited Amendment Status: PINS approved in 2016 by C63
Amendment ballot failed in C63; revised document sent to SC 1 members on November 6, 2016 for review.

Don Heirman presented his report on C63.4. (See Attachment F.) He presented his roster of working group members and noted that they represent varied organizations, including government and industry. The working group met on November 8, 2016. They reviewed many inputs on the use of “shall” and “should” for normative and informative perspective, respectively. They discussed the need to perform NSA to cover EUT heights of up to 3 meters. Three “teams” were created to amend, where appropriate, parts of the 2014 standard. Mr. Heirman advised multiple webinars are planned to review particular areas requiring discussion and team output.

On future planning, the working group will move forward in amending the standard with input from teams. They will continue research in test methods above 1 GHz and review new interpretations. The goal is to prepare a draft to ballot in 2018 with publication in 2019.

Don Heirman gave a status report on C63.4a. (See Attachments G, H and I.) The working group met on November 8, 2016. Major improvements were made to the document, including:

- Clarified the single-position NSA geometry for validation of standard test sites
- Determined the maximum frequency step size for both discrete frequency method and swept frequency method
- Removed moving antenna inward from periphery
- Added equations for calculating theoretical NSA
- Validated test volumes for EUTs taller than 2 m
- Updated various formulas in Annexes F, G, N

Per “Next Steps” in the report (Attachment G), Don Heirman moved to send C63.4a with comments resolved from the first ballot back to C63 for the balloting process. (See Attachment J.) The motion was seconded and approved with 10 votes for and 9 votes against the motion. Mac Elliott, Tim Harrington, Dan Hoolihan, Steve Jones, Jeff Klinger, Victor Kuczynski, Jeff Silberberg, and Zhong Chen abstained from voting. The working group will resolve any additional comments by the end of November. Mandatory Editorial Coordination (MEC) will be requested.

Greg Kiemel gave a presentation on C63.4a titled, "Comparison of Standard vs. Extended Heights for NSA." (See Attachment K.) This involved a discussion on NSA at 2.5m and 3m heights. A fast-track amendment to ANSI C63.4-2014 is sought, primarily to address concerns about test site validation in Annex D. ANSI C63.4-2014 ANSI C63.4a/D1.01 was submitted for consensus ballot: "Is C63.4a-D1.01-2016-08-11 ready for formal ballot?" On October 28, C63 Secretary Jerry Ramie reported on the vote status: 11 Aye, 7 Nay, 7 Abstain, 8 no response. One of the changes in the amendment is an expansion of theoretical NSA for validating test volumes taller than 2m.

To make comparative measurements of the new heights added to the NSA tables (in the amended Annex D), he conducted a standard NSA test (for a 2m height EUT volume) then added another set of measurements at 3.0 m for horizontal and 2.5 m for vertical. The goal was to see if there is any reason to make the change to validate EUT volumes greater than 2m in height.

A 10m semi-anechoic chamber was used that meets the NSA requirements of ANSI C63.4-2014 by +/-3 dB. The measurements were made at a 10m test distance for five positions in the 2m x 2m volume (center, left, right, front, and rear). Biconical antennas were used 30 MHz – 200 MHz, and log periodic Antennas were used from 200 MHz – 1 GHz. They were calibrated with geometry-specific antenna factors. The 2m high horizontal factors were used for both 2m and 3m horizontal measurements. The 1.5m high vertical factors were used for both 1.5m and 2.5m vertical measurements. To the greatest extent possible, the only difference in the study were the transmit heights. In conclusion, Mr. Kiemel noted here is no significant difference in the NSA measured at the extended heights. This suggests that there is no compelling reason to measure NSA at heights greater than 2m. This will avoid the unnecessary expense of additional antenna calibrations and NSA measurements. These types of changes to the standard should be supported by measurement data. Mr. Kiemel then showed the measurement data to support his conclusions.

C63.5: Antenna Calibration

Working Group Chair: Bob DeLisi

Status: Current-2006. Public notice appeared in ANSI Standards Action; public comment period ends Nov 21.

Bob DeLisi presented his report via Web Ex. (See Attachment L.) No working group meeting was held during this meeting series. He noted C63.5:2006 was administratively withdrawn on September 30, 2016. The C63.5 Draft was submitted for BSR-8 public review. The closing date for public comment is November 21, 2016. Two negative votes were addressed in the comment resolution as not being resolved since they dealt with C63.4 having undated reference to C63.5. All other negative comments were resolved. The report concluded with a list of the working group members.

After the report, it was noted the reference to C63.5 in the standard C63.4 shows the 2006 version while others do not have a date. Dan Hoolihan noted that the C63 steering committee would address dated and undated references during its steering committee meeting tonight. Sue Vogel noted this standard was withdrawn in September 2016 when it reached the 10-year mark.

C63.25: Test Site Validation

Working Group Chair: Dan Sigouin

Status: New Standard. Draft being written. PINS approved by SC 1 on October 27, 2014

Dan Sigouin presented his report. (See Attachment M.) The working group met on November 8 and had a productive meeting. There were 19 attendees, including Tim Harrington who called in. Dan thanked Tim for his work in editing the document. The working group went thru five pages of comments. All were resolved and there are seven open action items. Details on how to perform the time domain sVSWR

measurement are included in the document with links provided to IEEE to download the script needed to perform the TDR measurements.

8.0 Old Business – Chair

8.1 Interpretation request dated May 7, 2016 from Charles Wang with Champro Technology – C63.4 (2014) Annex D-3 Horizontal Polarization

A call for subgroup volunteers resulted in Don Heirman, Bob DeLisi and Harry Hodes being the subgroup members.

9.0 New Business – Chair

9.1 New Standard to Address the 60cm Loop Antenna – Art Wall

Art Wall advised this came up during one of the SC 4 working group meetings addressing wireless power transfer. The working group discussed the fact that there was no documentation on the 60 cm loop antenna. (See PINS in Attachment N.)

A document is needed to provide construction details for field measurements below 30 MHz. Mike Howard was asked to provide some details of what should be in this standard. The committee reviewed the email in which Mike provided a list of items to include in the loop antenna description, including:

1. If it is a shielded 60 cm loop, the diameter and thickness of the shield needs to be addressed. Also the gap in the shield at the top of the shield. Also the material used for the shield has an impact.
2. Diameter of the shield to the actual diameter of the loop conductor inside the shield.
3. Balance of the loop. If it becomes unbalanced, it will act like a vertical rod antenna.
4. Electrical and mechanical construction of the balun over the frequency range of use.
5. The Q of the winding of the loop conductor, which has the effect on the bandwidth.
6. Loop antenna radiation pattern needs to be defined and shown.
7. The phase and amplitude of the current in the loop.
8. Use of tuned loops at specific frequencies (i.e. Capacitor tuning at top of loop).
9. Impedance and VSWR over the frequency range of the loop.
10. Electrical and mechanical tolerances required for the loops.
11. Measurement uncertainties for key parameters being measured on the loops.

These are just a few items that would ensure that if followed would produce a loop antenna with usable antenna factors that can be used for the wireless power transfer measurements under C63.30 or other measurement programs below 30 MHz. It was agreed to initiate a PINS-C.

ACTION: After the discussion, Art Wall will amend the PINS he presented at the meeting.

ACTION: Mike Howard to revise the PINS to address these topics.

Ghery Pettit volunteered to assist Mike Howard and Art Wall in this effort. Zhong Chen offered to help as well, once he reviews the revised PINS-C and understands if he can contribute to this effort.

9.2 Review of Interpretation Requests: Chair

Zhong Chen advised there have been several interpretation requests received after the last SC 1 meeting on May 11, 2016. Items 1-3 below are closed with response available via hyperlink. Items 4-5 are open. 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 (2014) [“Annex N.4.3 Use of Attenuators”](#) from Doug Schlam, request dated 3-2-16; Subgroup members include DeLisi (Chair), Heirman, Hodes, Kuczynski, Pettit, Samoto, Schaefer, and Sigouin. Subgroup response sent to Jerry Ramie on May 2, 2016 to forward to the parent committee. Sent to Main Committee on May 3, 2016.
2. C63.4 (2014) [“Clause 4.4 & 5.6 In-situ LISN Use”](#) from Ehav Ever, request dated 3-24-16; Subgroup members include Heirman (Chair), Harrington and Kuczynski. Sent to Main Committee on May 8, 2016.
3. C63.4 (2014) [“Clause 5.4.1 & 5.4.2 RSM/NSA”](#) from Werner Schaefer, request dated 5-4-16; Subgroup members include Bob DeLisi (Chair) Heirman, Hodes, Samoto, and Chen. Sent to Main Committee on June 15, 2016; accepted on July 5, 2016.
4. C63.5 (2006) [“Annex H Antennas for NSA”](#) from Charles Wang, request dated 5-7-16; Subgroup members include Khairul Zainal (Chair), DeLisi, Chen, and Samoto. No report available in absence of Khairul Zainal.
5. C63.4 (2014) [“Clause 4.5 Horn Antenna Aperture”](#) from Charles Wang, request dated 5-7-16; Subgroup members include Samoto (Chair), Zainal, Heirman, Pettit, Chen, DeLisi, and Potts. Sent to Main Committee on June 15, 2016; rejected on July 5, 2016.

[Click here for more information about interpretation request procedures](#) (see pages 12-14)

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 SC 1 members along with the draft minutes from this meeting. (See Attachment O for the Action Items list.)

ACTION ITEM: O’Neil to distribute the updated consolidated action items and draft minutes from the November 9, 2016 meeting to the committee.

13.0 Time and Place of Next Meeting: Chair

Zhong Chen noted the next series of C63® meetings would be May 8-11, 2017 in Frederick, MD. The SC 1 meeting will be held on Wednesday, May 10.

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:



Janet O'Neil, Secretary, SC 1

ATTACHMENTS

- Attachment A: Agenda for May 11, 2016 SC 1 Meeting
- Attachment B: Patent Slides Required Meeting Template Slides for ASC C63®, IP Info
- Attachment C: Approved Minutes from November 11, 2015 SC 1 Meeting
- Attachment D: Meeting Attendance/Tracking List
- Attachment E: SC 1 Membership Roster and Working Group Roster
- Attachment F: Heirman Report on C63.4
- Attachment G: Heirman Report on C63.4a – Status Report
- Attachment H: Heirman Report on C63.4a-D1 00_2016-07-17_matrix-from-D01 10
- Attachment I: Heirman Report on C63 4a-D1 00_2016-07-17_edit-relative-to-D0 10
- Attachment J: Heirman Report on C63 4a-D1 00_2016-07-17_for-ballot
- Attachment K: Kiemel Report on C63.4a
- Attachment L: DeLisi Report on C63.5
- Attachment M: Sigouin Report on C63.25
- Attachment N: Wall PINS on 60 cm Loop Antenna (SC 4)
- Attachment O: Consolidated Action Item List