

**APPROVED MINUTES**  
**ANSC C63® SC1: Techniques and Development**  
**Webex Meeting and In-Person Meeting**  
**Thursday, October 3, 2024**  
**Rohde & Schwarz, Coppel, Texas**

**Members Present:**

Nicholas Abbondante  
Mike Antola (via Webex)  
Mark Arthurs  
David Chamberlain  
Bob DeLisi (via Webex)  
Mac Elliott  
Andy Griffin (Chair)  
Tim Harrington (via Webex)  
Brandon Hobbs (via Webex)  
Harry Hodes  
Dan Hoolihan  
Greg Kiemel (via Webex)  
Victor Kuczynski  
Randy Long  
Jason Nixon (Vice Chair)  
Janet O'Neil (Secretary)  
Denys Shumakov  
Soham Surve (via Webex)

**Members Absent:**

Zhong Chen  
Mike Heckrotte  
Jeff Klinger  
Doug Kramer  
Bob Mitchell  
Nima Molaei  
Nate Potts  
Tim Royer  
David Schaefer  
Jeff Silberberg  
David Zimmerman

**Guests:**

Steve Anderson  
Chad Beattie  
Henry Benitez  
Tom Braxton  
Aurelian Bria  
Bill Graff  
Ken Gjerde  
Ho Sze Khian  
Steve Koster

**Employer:**

Intertek  
UL LLC  
Sony  
ISED Canada  
UL Solutions  
TUV Sud America  
Cisco  
FCC  
AMD  
PTSI LLC  
Hoolihan EMC Consulting  
Apple  
Vican Electronics  
ANAB  
ISED Canada  
ETS-Lindgren  
ISED Canada  
Amazon Lab 126

**Employer:**

ETS-Lindgren  
UL Solutions  
Cetecom  
Apple  
TUV Rheinland  
Element Materials Technology  
Keysight Technologies  
Timco Engineering  
Element Materials Technology  
FDA Center for Devices & Radiological Health  
Spectrum EMC, LLC

**Employer:**

ARRL  
FCC  
IEEE EMC Society  
ARRL  
Ericsson  
TCB Council  
Starkey  
Motorola Solutions  
ACIL

**Guests Continued:**

Janneth Marcelo  
John Norgard  
Chuck Patterson  
Horia Popovici (via Webex)  
Vignesh Rajamani  
Deanna Zakharia  
Kendall Zerman

**Employer:**

NVLAP  
NASA/JSC  
Rohde & Schwarz  
ISED  
Rohde & Schwarz  
Motorola Solutions  
Sony

**1.0 Call to Order: Chair**

Chair Andy Griffin called the meeting to order at 8:30 am CDT. A roll call was taken and as a result it was confirmed there was a quorum with 17 voting members present of 28 total voting members.

**2.0 Approval of the Consent Agenda: Secretary**

Secretary O'Neil presented the consent agenda. This includes the draft meeting agenda for October 3, 2024. The agenda was amended to add Under New Business: 6.2 Antenna Height Scan Report – Zhong Chen, 6.3 New PINS for C63.4 – Horia Popovici, and 6.4 Price of Standards – Harry Hodes. The consent agenda included acceptance of the terms contained in the [patent slides](#) by all attendees, and approval of the minutes from the last meeting held on May 16, 2024. The consent agenda was approved as presented. (See Attachment A for the approved amended agenda. See Attachment B for the Approved Minutes of the May 16, 2024, meeting.)

**3.0 Review of [Subcommittee Membership](#) and Scope: Secretary**

**3.1 Review of Membership – Members at Risk.** Secretary Janet O'Neil reviewed the Member Attendance Log included in the agenda. (See Attachment A). David Zimmerman is a member at risk of losing his membership by having missed three consecutive meetings. The secretary will follow up with Mr. Zimmerman to determine if he wishes to continue as a member of SC1.

**3.2 Consideration of New Members – Working Group Rosters**

A new membership application was received from Soham Surve with Amazon Lab 126 and Brandon Hobbs with Advanced Micro Devices (AMD). They are interested in joining SC1 and the C63.4 working group. Their respective membership applications and CVs were distributed to the SC1 committee. As a result of the vote within SC1, they were both approved for membership in SC1 and the C63.4 working group.

The current Working Group Roster is shown [here](#).

**ACTION ITEM: All Working Group (WG) Chairs need to complete their rosters and indicate their officers (Vice Chair and Secretary) and submit to SC1 Chair prior to the next meeting.**

**4.0 Working Group Reports****C63.2: Field Strength Measuring Instrumentation**

Chair Andy Griffin provided an update for Jens Medler, Working Group Chair. C63.2 was published in January 2024. The working group is currently inactive.

#### **C63.4: Emissions Measurements**

Working Group Chair: Andy Griffin

Status: C63.4: Current 2014. Publication Expected in Mid/Late 2025; PINS for reaffirmation sent to parent committee in February 2024

Status C63.4a: Merged into C63.25.1

Andy Griffin presented his report (see Attachment C). As a reminder, the vote on the latest draft closed on Feb. 21, 2020, and passed (14 yes, 10 no, and 3 abstain). Eight members submitted a total of 122 comments. Since the start of 2023, the Working Group has met every two weeks to try and sort out the remaining issues. More members are wanting to contribute, which is incredibly positive.

On progress, after completing the major part of the document, the Working Group sent version PC63.4/D2.3, February 2024 to members of SC1 and the Task Force members for a six-week comment period that ended 3/20/24. This was extended further due to "popular demand" to 4/5/24.

Andy reviewed the comment submission/matrix (see Attachment D). Comments were received from Mark Arthurs, Andy Griffin, Apple, UL, Harry Hodes, David Zimmerman, and Randy Long. Some 50 comments were received. The working group has held monthly meetings to address the issues. Of the approximate 50 comments around 18 comments were not accepted. Harry Hodes requested that tilting (or bore-sighting) be put back in the draft. This was not accepted but it was agreed to include an annex explaining the rationale behind the method proposed to replacing the current text in C63.4 about aiming the antenna at the source of the emission. The working group agreed to use the current process in early 2022. There is no support for having multiple methods within the document.

Mark Arthurs noted that this is a long and complicated document with many changes from the previous edition and more comments expected when the document is sent for vote. The working group has tried to summarize the major changes at the start but an actual redline version would not be effective.

There is an open item to provide data to change the tolerance of the AC mains supply from the current proposed draft of 5 % to 10 %. The main concern is from higher power devices. We also need to check both the live and the neutral lines. The current version of C63.4 has no tolerance just that the supply shall be sufficient to power the device.

Harry Hodes talked about high voltage devices and issues with stabilized mains. This should be kept in mind when addressing C63.4 revisions. Andy will do some research to see if there is more information on this issue online. Horia suggested that this topic be brought up during the working group meetings.

**ACTION: Andy to research additional information on high voltage devices and issues with stabilized mains and report back to the committee.**

#### **C63.5: Antenna Calibration**

Working Group Chair: Nate Potts

Status: Current-2017

Bob DeLisi reported for Nate Potts. Tim Harrington updated the document and it is ready to send to SC1 for review before passing along to the parent committee. It was noted that C63.5 needs to get ahead of C63.4. Andy asked about getting a list of what has changed in the document; Bob believes that is available and can be shared with SC1. He will check the document and see if the summary can be shared or if he needs to work on this before sharing. Then Bob will share it with the C63.4 working group. Bob said there are few edits to address.

**ACTION: Bob DeLisi to send the list of what has changed in the C63.5 document to SC1 for review.**

The document being “frequency agnostic” is the biggest change with procedures in the standard pointing to C63.2 or site validation requirements per C63.4. Bob asked for some target dates for C63.4 for publication so C63.5 can move forward with publication accordingly. Nick suggested having C63.5 ready to be published but hold the publication date until C63.4 has passed review by SC1 and the Main Committee. Andy said the working group intends to reference the latest version of C63.5 in C63.4.

Harry asked if a Transition Statement can be a Normative Statement? Can Jen Santulli with IEEE answer this question? Bob said he would check with IEEE to confirm.

**ACTION ITEM: Bob DeLisi to check with IEEE about Transition Statements and report back to SC1.**

*NOTE: Subsequent to the meeting, Bob DeLisi reached out to Lisa at IEEE about the latest template having the transition text in a note rather than as normative text. According to Lisa, after she checked, last year with other IEEE SA staff about the text, it was determined that ANSI requires any additional text in the normative reference clause to be included in a note. So the transition period information that we have in our standards, is now in an informative note rather than normative text.*

#### **C63.7: Construction of Test Sites**

Working Group Chair: None

Status: Published update on March 9, 2015; Working Group disbanded. Nothing new to report.

Andy noted that a new PINS is needed to start new work on FARs and SACs in the next edition of this standard if there is interest. Nick said he had a champion from Raymond EMC that may be interested in creating a new PINS. Harry is interested in helping with this work; he suggested Henry Osgood may be interested in helping.

**ACTION: Nick to contact Raymond EMC and Harry to contact Harry Osgood to see if they are interested in creating a new PINS to initiate work on the next edition of C63.7.**

#### **C63.23: Measurement Uncertainty**

Working Group Chair: None – Candidate Requested

Status: Reaffirmed in May 2018 by the parent committee. IEEE reaffirmed C63.23 on August 10, 2020; it was posted to IEEE Xplore in October 2020. Future work is needed to revise the standard or C63 should refer users to the CISPR equivalent standard.

**Jason Nixon moved to expire the PINS he initiated on C63.23. The motion was seconded and approved.**

**ACTION: Andy to tell Jerry Ramie to update the C63 website to reflect the dormant status of C63.23.**

**C63.25: Time Domain Applications for Test Site Validation**

Working Group Chair: Andy Griffin

Status: New Standard. Draft being written. PINS approved by SC1 on October 27, 2014

This work addresses the family of C63.25 standards:

- o C63.25.1 (1 GHz to 18 GHz) TDR – Published March 2019 – WG Chair: Zhong Chen
- o C63.25.2 (30 MHz to 1000 MHz) NSA – Work began in January 2019 – WG Chair: Bob DeLisi
- o C63.25.3 (18 GHz – 40 GHz) – Future plan to address NSA above 18 GHz – WG Chair: Nick Abbondante

**On C63.25.1**, Zhong Chen volunteered to take over as chair of this Working Group from Andy Griffin. Zhong created a new PINS for the updates to the document.

**Andy showed the PINS to update C63.25.1 as prepared by Zhong Chen (see Attachment E). Victor moved to approve the PINS. The motion was seconded and approved.**

**On C63.25.2**, this standard will be published in the near future. IEEE is running 12-16 weeks behind schedule so there has been a delay in publication.

**On C63.25.3**, Working Group chair Nick Abbondante presented his report. (See Attachment F.) Current site validation methods only extend up to 18 GHz; however, testing is being performed at frequencies as high as 231 GHz. This standard will develop a list of acceptable types of test sites and their corresponding site validation methods and recommended criteria for frequencies from 18-40 GHz. Existing site validation methods will be leveraged where possible. Update: The frequency range for Reverb and CATR will NOT be limited.

The test environments include:

- SAC/OATS/FAR/FSOATS - exploring use of sVSWR, Time Domain sVSWR, and Mode Filtered sVSWR techniques
- Compact Antenna Test Range (CATR)
- Reverberation Chamber

Following is an update on task group activity:

**SAC/OATS/FAR/FSOATS:** Martin Wiles is the task group chair. A number of antenna manufacturers are now participating, including ETS-Lindgren, Steatite, Schwarzbeck Mess, and Seibersdorf. The initial design of the Alford's Loop antenna is now available and has been demonstrated. Round robin testing of multiple antennas in one chamber is being discussed, also demonstrating a chamber that passes below 18 GHz, but fails above 18 GHz. Work is currently focusing on adapting the antenna specifications from CISPR 16-1-4 below 18 GHz to the above 18 GHz frequency range. Small tweaks to the requirements and patterns may be in order as shown in the graphs included in Attachment F. The next meeting will be held on November 14, 2024, 12-2PM Eastern.

**CATR:** Robert Paxman is the task group chair. Several meetings have occurred since the last SC meeting. Active discussions are occurring, and text is being edited – the task group is aiming for a complete first draft in the next few months. The next meeting will be held on October 30, 10:05 AM-11:00 AM Eastern.

**Reverberation Chamber:** Phil Miller is the task group chair. The most recent meeting was held on July 9, 11AM-12:30PM Eastern. The group is finalizing text methodically – directivity is one of the major topics. The goal is to have a first draft of text available for review in the next few months.

On future C63.25.3 activity, the main working group is not meeting very often; the last meeting was held on December 5 – work is taking place in the task groups. Once text is available from the task groups, the main working group will resume meetings. Task groups are meeting roughly monthly; some are meeting every two weeks. The goals are to obtain first drafts of validation text for the standard, determine basic antenna requirements for SAC, and develop round robins to validate the methods and cross correlate results across chamber types.

In summary, the SAC task group is focusing on transmit antennas. The Reverb and CATR task groups are making good progress on text; completion of initial text should hopefully be this year, CATR and Reverb look to be back on track to be included in first edition. The timeline will be dependent on the time it takes to perform the round robin testing, as appropriate.

## 5.0 Old Business – Chair

There was no old business to discuss.

## 6.0 New Business – Chair

**6.1 Motion to approve PINS for new work on C63.25.1 – Validation Methods for Radiated Emission Test Sites, 1 GHz to 18 GHz – Zhong Chen.** This PINS was approved earlier in the meeting during the C63.25.1 report.

**6.2 Antenna Height Scan Report – Zhong Chen** was not present to review this report from Otto von Guericke University, Magdeburg (see Attachment G); it will be deferred to the main committee meeting on October 4, 2024, if possible.

**6.3 New PINS for C63.4 – Horia Popovici** – Horia presented two new PINS for review; one on LISN and one on Antenna. It was suggested that the work in these PINS should be in one spot, i.e. C63.2 which is a shorter standard. Horia combined both PINS into one PINS that will be shown as a revision to C63.2 (in the form of a new annex) – see Attachment H. **Harry Hodes moved to approve the new combined into one PINS for C63.2 as submitted. The motion was seconded and approved.**

**6.4 Price of Standards – Harry Hodes** – This topic was deferred to the parent committee for further discussion.

**7.0 Interpretation Requests:** The secretary reviewed the following open interpretation requests since the last SC1 meeting on May 16, 2024:

**C63.4 (2014) Gaps in Ground Plane** received from Charles Wang, request dated October 20, 2023. Call for task group chair/members sent to members of SC1 on May 16 with follow up sent on August 12. Task group members include David Zimmerman, Victor Kuczynski and Harry Hodes. Victor presented a draft response. After discussion, SC1 recommended a simplified response.

**ACTION ITEM: Victor to send the simplified response on the original interpretation request form to SC1 for review and approval to send to the parent committee.**

**C63.4 (2014) Annex F Insulating Ground Plane** received from Brandon Hobbs, December 13, 2023. Call for task group chair/members sent to members of SC1 on May 16 with follow up sent on August 12. Task group members include Victor Kuczynski and Harry Hodes. Brandon shared a response to his request with SC1. After discussion, he will revise his response.

**ACTION ITEM: Brandon to send the revised response on the original interpretation request form to SC1 for review and approval to send to the parent committee.**

**C63.4 (2014) Clause 10.2.7 Special Software** received from David Zimmerman, July 31, 2024. A call for task group chair/members was sent to members of SC1 on August 12; no replies were received. As a result of discussion, Harry Hodes agreed to chair this task group with Victor Kuczynski. A proposed response was moved and approved by SC1 (see Attachment I).

**ACTION ITEM: SC1 Chair Andy Griffin to send the approved response on the original interpretation request form to the parent committee for further action.**

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

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

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

On behalf of Jerry Ramie, Andy Griffin requested that SC1 members be specific with any requests for postings to the website. Andy asked SC1 members to be sure to update or confirm with Jerry directly that they are correctly listed on the website.

## **9.0 Review of Action Items from Previous Meetings: Secretary**

Secretary O'Neil advised that an updated action item list would be distributed to the SC1 members along with the draft minutes from this meeting.

**ACTION ITEM: O'Neil to distribute the updated consolidated action items and draft minutes from the October 3, 2024, meeting to the committee.**

#### **10.0 Time and Place of Next Meeting: Vice Chair**

Andy advised that SC1 would meet during the next C63 meeting series scheduled for the week of May 5, 2025, at TUV Rheinland in Boxborough, MA. The host hotel will be located nearby.

#### **11.0 Closing Remarks and Adjournment: Vice Chair**

With no further business, Andy adjourned the meeting at 12:30 pm CDT. 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: Approved Agenda for October 3, 2024, SC1 Meeting
- Attachment B: Approved Minutes from May 16, 2024, SC1 Meeting
- Attachment C: Griffin Report on C63.4
- Attachment D: C63.4 Comment Matrix
- Attachment E: Chen PINS on C63.25.1
- Attachment F: Abbondante Report on C63.25.3
- Attachment G: Otto von Guericke University, Magdeburg, Report on Antenna Height Scan
- Attachment H: Popovici PINS on C63.2
- Attachment I: C63.4 (2014) Clause 10.2.7 Special Software Interpretation Response