

APPROVED MINUTES
ANSC C63® SC1: Techniques and Development
Webex Meeting and In-Person Meeting
Tuesday, May 6, 2025
TUV Rheinland, Boxborough, MA

Members Present:

Nicholas Abbondante
David Chamberlain
Zhong Chen
Bob DeLisi (via Webex)
Mac Elliott
Andy Griffin (Chair)
Tim Harrington (via Webex)
Mike Heckrotte (via Webex)
Dan Hoolihan
Greg Kiemel (via Webex)
Jeff Klinger (via Webex)
Doug Kramer (via Webex)
Bob Mitchell
Victor Kuczynski
Randy Long
Janet O'Neil (Secretary)
Nate Potts (via Webex)
Richard Reitz
Tim Royer (via Webex)
David Schaefer
Denys Shumakov (via Webex)
Soham Surve (via Webex)
Jeff Silberberg (via Webex)
David Zimmerman (via Webex)

Members Absent:

Mike Antola
Brandon Hobbs
Harry Hodes
Nima Molaei
Jason Nixon (Vice Chair)

Guests:

Steve Anderson (via Webex)
Chad Beattie (via Webex)
Henry Benitez
Tom Braxton
Aurelian Bria
Reuben Brown
Craig Fanning
Bill Graff
Ken Gjerde
Grace Lin
Horia Popovici (via Webex)

Employer:

Intertek
ISED Canada
ETS-Lindgren
UL Solutions
TUV Sud America
Cisco
FCC
UL Solutions
Hoolihan EMC Consulting
Apple
Cetecom
Apple
TUV Rheinland
Vican Electronics
ANAB
ETS-Lindgren
Keysight Technologies
Retlif Testing Labs
Timco Engineering
Element Materials Technology
ISED Canada
Amazon Lab 126
C63 Member Emeritus
Spectrum EMC, LLC

Employer:

UL Solutions
AMD
PTSI LLC
Element Materials Technology
ISED Canada

Employer:

ARRL
FCC
IEEE EMC Society
ARRL
Ericsson
Schneider Electric
Elite Electronic Engineering
TCB Council
Starke
HYTORC
ISED

Guests:

Vignesh Rajamani
Justing Rison (via Webex)
Yibo Wang
Deanna Zakharia

Employer:

Rohde & Schwarz
FCC
ETS-Lindgren
Motorola Solutions

1.0 Call to Order: Chair

Chair Andy Griffin called the meeting to order at 8:30 am EDT. A roll call was taken and as a result it was confirmed there was a quorum with 24 voting members present in person and online of 28 voting members.

2.0 Approval of the Consent Agenda: Secretary

Secretary O'Neil presented the consent agenda. This includes the draft meeting agenda for May 6, 2025. The agenda was amended to add Under New Business: 6.2 Record Keeping (Bob DeLisi). 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 October 3, 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 October 3, 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's membership was at risk since he has missed three consecutive meetings; however, he attended today's meeting via Webex so his membership remains intact. Nima Molaei has missed two consecutive meetings. Jeff Silberberg has retired from the FDA and would like to be a member emeritus of SC1.

3.2 Consideration of New Members – Working Group Rosters

A new membership application has been received from Richard Reitz of Retlif. His application and resume were circulated to SC1 on May 1. His application will be voted upon under New Business.

Reuben Brown of Schweitzer Engineering in Pullman, Washington applied for membership in SC1 Working Group C63.4. His membership application was approved by SC1. He has been added to the applicable roster on the C63 website.

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.

3.3 Review of SC1 Scope

The committee approved the existing SC1 scope with slight revisions. The approved scope reads as follows:

Subcommittee 1 provides the technical expertise and resources necessary for maintaining existing and newly proposed C63® standards and other documents. This includes new measurement methods, site validation methods, calibration methods, associated instrumentation, and limits development as assigned by the main committee ANSC C63®.

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.

Andy noted that work needs to be taken forward to further this effort. Jens is not available to chair this working group, but he is willing to be a committee member. The committee debated about revising this standard to include additional products, such as LISNs, voltage probes, antennas, pre-amplifiers, and everything else. Horia agreed to write a new PINS to revise the scope so it doesn't restrict how to break up the standard.

David Schaefer moved to approve division of C63.2 into separate standards to address receivers, LISNs/voltage probes, and antennas, etc. The motion was seconded and approved.

David Schaefer moved to approve labeling the new standard with numbers, i.e. C63.2.number, etc. The motion was seconded and approved. Nick Abbondante voted against the motion and wished to be recorded. Randy Long abstained and wished to be recorded.

Bob DeLisi asked that the IEEE (Jen Santulli) review this renaming/renumbering system before we move forward with this standard numbering plan.

ACTION: Jen Santulli to review the C63.2 renaming/renumbering system and advise what revisions may be made in compliance with IEEE requirements.

Three PINS were discussed: C63.2 for Receivers/Spectrum Analyzers; C63.2.2 for LISNS/Voltage Probes; and C63.2.3 for Antennas. Andy revised these PINS documents in real time during the meeting. (See Attachments C, D, and E for the final versions.) He will present these PINS to the steering committee and suggest the new title be C63.1 to align with our numbering system.

ACTION: Andy Griffin to present the new PINS for C63.2, C63.2.2, and C63.2.3 to the parent committee for approval.

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 F). There is a wide range of working group members, which keeps growing, but not all members contribute equally.

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.

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 March 20, 2024. This was extended further due to "popular demand," to April 5, 2024.

Andy discussed the comment submission/matrix. 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 titling (or bore-sighting) be put back in the draft. This was not agreed 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.

Regarding the power requirements, for AC mains powered EUT, the voltage supplied to the EUT power input port, while the EUT is in its normal operating mode, shall be the nominal voltage specified for the region (country) for which the compliance of the EUT is being demonstrated. Alternatively, any lower AC mains voltage is acceptable as it is expected to result in worst-case emissions from the EUT. The nominal voltages applicable in North America are listed in Table 7 in the document. For DC powered EUT, the DC voltage supplied to the EUT while the EUT is in its normal operating mode shall be the rated DC voltage specified for the EUT.

On the Informative Annex about the above 1 GHz test method, this was developed and the working group is still discussing it, but the summary of the annex is as follows:

- All methods have problems (many methods and many problems)
- Only the fixed height matches site validation method
- We did not want multiple methods
- We don't want to develop another validation method
- Existing text is very vague and allows too much variance
- Balance between test / cost and achieving reasonable results is important
- Simple EUT setup and access to it during testing is also important
- Overcomplicated, the reproducibility and repeatability suffer as it increases the chances that test laboratories do not perform the measurement the same way; standardization is important
- Alignment with other relevant international, national and regional standards is desirable

C63.5: Antenna Calibration

Working Group Chair: Nate Potts

Status: Current-2017

Nate Potts gave a verbal report. He acknowledged the work done by Doug Kramer on the document. Tim Harrington has finished the editing. Nate will send out the updated C63.5 document to SC1 for review by the end of May. Andy asked for a summary of the items addressed in the standard.

Nate said the new content involves showing a different antenna method used for above and below 1 GHz. They added a substitution method. The biggest change is getting away from the NSA calculations which are similar to the reference in CISPR and C63.25.2. The latest version includes clarifications of many areas that were ambiguous before. There is added text on how to make SVSWR measurements.

Andy confirmed work has started on the document again because C63.25.2 is published. We want C63.4 to refer to the new version of C63.5. From a timing perspective, we will refer to C63.5:2026 in C63.4 and then explain in an Informative Annex what the updates are to C63.5.

The document has removed the frequency range over which symmetry needs to be performed. Hence we have defined this at 200 MHz for C63.4.

Nate approved the scope for C63.5 as presented.

C63.7: Construction of Test Sites

Working Group Chair: None

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

Nick said Raymond EMC was interested in participating in this standard which is a guidance document on how to build an OATS, but not leading the work on this. The document needs to be reaffirmed since it's been 10 years since the last affirmation. If we don't reaffirm it, the standard will be withdrawn. Bob DeLisi will confirm the status of this document with IEEE (Jen Santulli).

ACTION: Bob DeLisi to confirm the status of C63.7 with IEEE (Jen Santulli).

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.

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, Andy encouraged Zhong to hold his first working group meeting and get started on updating this document.

ACTION: Zhong Chen to hold C63.25.1 working group meeting to update the document.

On C63.25.2, this standard will be published in the near future. Working Group Chair Bob DeLisi said this document is moving along and we'll get a status update at the parent committee meeting as part of the IEEE report.

On C63.25.3, Working Group chair Nick Abbondante presented his report. (See Attachment G.) 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 to 40 GHz. Existing site validation methods will be leveraged where possible. Update: The frequency range for Reverb and CATR will NOT be limited.

This standard will specify the test site types and validation methods for use from 18 to 40 GHz for reference in product specific test method standards. 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.

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.

Reverberation Chamber: Phil Miller is the task group chair. 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 Vote to Approve SC1 Membership Application of Richard Reitz with Retlif – The application of Richard Reitz to join SC1 as well as his resume were circulated to the committee for review. His application was endorsed by Harry Hodes, Dan Hoolihan, and Bob DeLisi. **It was moved, seconded, and approved to accept the SC1 membership application of Richard Reitz.**

6.2 Record Keeping – Bob DeLisi advised that we need to ensure that all attachments to all minutes (subcommittee, working group, etc.) are available on the members site or embedded into the minutes moving forward.

7.0 Interpretation Requests: The secretary reviewed the following open interpretation requests since the last SC1 meeting on October 3, 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. **After reviewing the proposed response distributed to SC1, it was moved, seconded, and approved to send the response to the parent committee for further actions.** (See approved response in Attachment H.)

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.

ACTION ITEM: Andy Griffin to follow up with Brandon Hobbs directly on the status of this open interpretation request.

[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 May 6, 2025 meeting to the committee.

10.0 Time and Place of Next Meeting: Chair

Andy advised that SC1 would meet during the next C63 meeting series scheduled for the week of October 6, 2025 in Southern California. The host hotel will be located nearby.

11.0 Closing Remarks and Adjournment: Chair

With no further business, Andy adjourned the meeting at 12:30 pm EDT. He thanked everyone for attending the meeting.

Minutes submitted by:



Janet O'Neil, Secretary, SC1

ATTACHMENTS

- Attachment A: Approved Agenda for May 6, 2025, SC1 Meeting
- Attachment B: Approved Minutes from Oct 3, 2024, SC1 Meeting
- Attachment C: PINS on C63.2 (Receivers and Spectrum Analyzers)
- Attachment D: PINS on C63.2.2 (LISNs/Voltage Probes)
- Attachment E: PINS on C63.2.3 (Antennas)
- Attachment F: Griffin Report on C63.4
- Attachment G: Abbondante Report on C63.25.3
- Attachment H: Interpretation Response – C63.4 (2014) Gaps in Ground Plane