APPROVED MINUTES
ANSC C63® SC1: Techniques and Development
Webex Meeting and In-Person Meeting
Tuesday, May 5, 2026
National Institute of Standards and Technology (NIST) - Boulder, CO

Members Present:	**Employer:**
Nicholas Abbondante	Intertek
Mike Antola	UL Solutions
David Chamberlain	ISED Canada
Bob DeLisi	UL Solutions
Mac Elliott	TUV Sud America
Angel Escamilla	Element Materials Technology
Andy Griffin (Chair)	Cisco
Tim Harrington	FCC
Dan Hoolihan	Hoolihan EMC Consulting
Jeff Klinger	Cetecom
Doug Kramer	Apple
Victor Kuczynski	Vican Electronics
Bob Mitchell	TUV Rheinland
Jason Nixon (Vice Chair)	ISED Canada
Nate Potts	Keysight Technologies
David Schaefer	Element Materials Technology
Denys Shumakov	ISED Canada
Jeff Silberberg	C63 Member Emeritus

Members Absent:	**Employer:**
Zhong Chen	ETS-Lindgren
Brandon Hobbs	AMD
Harry Hodes	PTSI LLC
Mike Heckrotte	UL Solutions
Randy Long	ANAB
Janet O'Neil (Secretary)	ETS-Lindgren
Richard Reitz	Retlif Testing Labs
Tim Royer	Timco Engineering
Soham Surve	Amazon Lab 126
David Zimmerman	Spectrum EMC, LLC

Guests:	**Employer:**
Chad Beattie	FCC
Henry Benitez	IEEE EMC Society
Aurelian Bria	Ericsson
Jason Coder	NIST
Ken Gjerde	Starkey
Ho Sze Khian	Motorola Solutions
Steve Koster	Washington Labs
Bill Kroener	Keysight Technologies
Horia Popovici	ISED Canada
Thomas Rigolage	FCC
Frans Stork	ETS-Lindgren
Pao Thao	Starkey
Yibo Wang	ETS-Lindgren

1.0 Call to Order: Chair

Chair Andy Griffin called the meeting to order at 9:50 am Mountain Time (MT).

2.0 Approval of the Consent Agenda: Secretary

In the absence of Secretary Janet O'Neil, Vice-Chair Jason Nixon presented the consent agenda. This includes the draft meeting agenda for May 5, 2026. 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 7, 2025. Andy reviewed the slides with the committee. The May 5, 2026, meeting agenda was amended to add the annual review of Membership, Scope and Duties (See Attachment A for the approved amended agenda. See Attachment B for the Approved Minutes of the October 7, 2025, meeting.)

David Chamberlain moved to approve the Consent Agenda. David Schaefer seconded the motion. The motion to approve the amended consent agenda was approved.

3.0 Review of Subcommittee Membership and Scope: Secretary

3.1 Review of Membership – Members at Risk. Vice-Chair Jason Nixon reviewed the Member Attendance Log included in the agenda. (See Attachment A). Nima Molaei has missed five consecutive meetings; his membership was terminated. Greg Kiemel has changed employers; he will be removed from membership.

3.2 Consideration of New Members – Working Group Rosters

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

Andy Griffin advised that there is an active PINS to add the content of C63.2.2 and C63.2.3 into C63.2 but the subcommittee does not want to follow the PINS. It will remain outstanding.

Working Group Chair Horia Popovic presented his report. (See Attachments C and D.) He noted the two working groups did not want to include cables, filters, attenuators, and pre-amplifiers in the C63.2.2 and C63.2.3 documents.

Regarding C63.2.2: "Specification of Electromagnetic Compatibility Measurement Instrumentation – LISN and Voltage Probe," the PINS for this project will create a new standard for ancillary equipment used in performing conducted emission measurements. The most important part is the LISN, but the standard will also include other equipment used for conducted emission measurements, such as the

voltage probe for in situ measurements. It will incorporate, as necessary, corresponding material that is currently in C63.4, C63.29 and C63.30. Since this ancillary equipment (and in particular the LISN) is used for conducted emissions tests by many C63 standards, it is beneficial to have the corresponding requirements in a separate C63 standard, which can then be referred to by any C63 product-specific standard. A LISN interlab comparison is being organized to support this project.

Regarding C63.2.3: "Specifications of Electromagnetic Compatibility Measurement Instrumentation - Antennas," Horia advised this document is completed and will be submitted to SC1 to initiate the ballot. Nick Abbondante questioned the symmetry with regards to some of the standards and potential confusion. He asked that symmetry is considered for all antennas. For reference, this document will create a new standard for ancillary equipment used in performing radiated emission measurements. The most important part is the antenna, but the standard will also include other equipment used for radiated emission measurements. It will incorporate, as necessary, corresponding material that is currently in C63.4, C63.25.1 and C63.25.2. Since this ancillary equipment (and in particular the antenna) is used for radiated emissions tests by many C63 standards, it is beneficial to have the corresponding requirements in a separate C63 standard, which can then be referred to by any C63 product-specific standard and the C63.25-series of site validation standards.

In the future, Andy suggested that perhaps C63 SC1 would want to create a PINS to add preamplifiers to C63.2 as an amendment. Once Horia and the WG have finalized C63.2.2 and C63.2.3, then we can address a new PINS and creating the amendment to C63.2.

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 E). 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.

Discussion ensued about what to do with C63.4 as the working group doesn't have additional text. Dave Chamberlain proposed that the working group move forward with voting. Yibo Wang mentioned that he would have comments soon, but he would have the opportunity to comment in the voting process. Andy Griffin suggested that the C63.4 draft goes through the SC1 voting process in order to get comments with a four-week period. Discussion ensued on whether the document has been aligned with all other C63 documents? Can the Linear vs Boresight accuracy questions be solved in the working

group? There is concern that the working group comments were not addressed; however, the members can still provide comments.

Horia was tasked to provide Secretary O'Neil with a clean copy of the C63.4 Draft to SC1 for a vote if it is ready to go to the main committee with a four-week comment period.

C63.5: Antenna Calibration

Working Group Chair: Nate Potts
Status: Current-2017

Note Potts provided an update on the document. The working group is waiting on SC1 comments from Jeff Silberberg; they are all editorial in nature at this point. Once completed, it will be sent to SC1 for vote. Symmetry is a comment that needs to be addressed as related to Bicon and Hybrids antennas.

C63.7: Construction of Test Sites

Working Group Chair: None
Status: Published update on March 9, 2015; Working Group disbanded. Nothing new to report.

Bob DeLisi said this standard has been withdrawn. He instructed the secretary to remove it from future SC1 meeting agendas.

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.

Bob DeLisi would like to see editorial changes made to the document to refer to CISPR and ETSI for the relevant requirements. He knows there are labs that use C63.23. Once C63.5 is finalized in hopefully the spring 2026, we may have the manpower available to update 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:

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

On C63.25.1, Zhong Chen previously advised that he is looking at this document as more of a refinement than a complete redo. David Chamberlain mentioned C63.25.2, that we may want to include some of this content in C63.25.1. The issue to address is related to moving the antenna and having to re-validate the chamber performance. Zhong has agreed to consider these comments in the document refinement discussion.

Andy will reach out to Zhong to see if he will chair the working group for this revision. He requested Secretary O'Neil send a call for experts to join the working group.

On C63.25.2, Working Group Chair Bob DeLisi said this standard will be published in the near future.

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 to 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 chairs the SAC task group. Antenna manufacturers, including ETS-Lindgren, Schwarzbeck Mess-Elektronik, and Seibersdorf, are participating. An initial Alford loop antenna design has been demonstrated, but the design is being patented by ETS-Lindgren and cannot be included in the standard at this point. A vector sVSWR method proposed by Alex Kriz is expected to be addressed through CISPR rather than C63. The SAC documentation is progressing but still requires integration and formatting within the main draft.

The group continues to evaluate time-domain sVSWR and mode-filtered sVSWR methods, including whether an additional validation method is needed at these frequencies. Concerns were raised about required test positions and the practicality of a proposed 16,601-point vector network analyzer setting, since some commonly available instruments provide only 1,601 points. A possible alternative is to include the method in an informative annex as a diagnostic tool. These matters remain open for further discussion and potential round-robin evaluation.

CATR and Reverberation Chamber: The CATR task group, previously chaired by Robert Paxman, completed an initial draft and submitted it to the working group. Robert has stepped back, and the task group is currently inactive. The reverberation chamber task group, chaired by Phil Miller, last met on November 18, 2025. Its final draft text has not yet been received, and a status update is needed.

Next Steps and Schedule: The main working group plans to resume meetings after the CATR and reverberation chamber material has been incorporated into the manuscript. The SAC task group is considering round-robin testing involving multiple antennas, with participating laboratories still being sought. Additional round robins may be developed to validate methods and compare results across chamber types. The objective is to complete the initial draft text during 2026, with the overall schedule dependent on the scope and duration of any round-robin testing.

5.0 Old Business – Chair

Membership, Scope and Duties – The Committee reviewed the membership, scope, and duties on the C63.org webpage to ensure all is correct as per its annual requirement to do so. SC1 approved the membership roster as updated in the minutes and the online duties including C63.2, C63.2.2, C63.2.3, C63.4, C63.5, C63.7, C63.23, C63.25.1, C63.25.2, and C63.25.3.

On the Scope, this was updated to include the content in red font below as proposed by Doug Kramer.

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

Doug Kramer moved to approve the updated SC1 Scope. Victor Kuczynski seconded the motion. There was discussion if this should be the same as FCC rules. The consensus reached by SC1 was no, this does not need to be the same. The motion was approved.

6.0 New Business – Chair

There was no new business to discuss.

7.0 Interpretation Requests: There are no interpretation requests open or received since the last meeting on October 7, 2025.

An inquiry has been received from Intertek via Jeff Guerrieri with NIST/NVLAP regarding antenna calibration for the GHz band, but no formal interpretation request has been submitted to date.

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

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. If assistance is needed in posting to the SC1 protected area of the website, please contact Jerry.

9.0 Review of Action Items from Previous Meetings: Secretary

An updated action item list will be distributed to the SC1 members along with the draft minutes from this meeting.

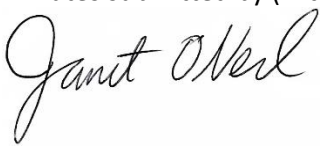
10.0 Time and Place of Next Meeting: Chair

Andy advised that SC1 would meet during the next C63 meeting series scheduled for the week of October 19 at A2LA in Frederick, MD. The host hotel will be located nearby.

11.0 Closing Remarks and Adjournment: Chair

With no further business, Andy adjourned the meeting at 12:15 pm MT. He thanked everyone for attending the meeting.

Minutes submitted by (with assistance from Jason Nixon):



Janet O'Neil, Secretary, SC1

ATTACHMENTS

Attachment A: Approved Agenda for May 5, 2026, SC1 Meeting
Attachment B: Approved Minutes from October 7, 2025, SC1 Meeting
Attachment C: Popovici Report on C63.2.2
Attachment D: Popovici Report on C63.2.3
Attachment E: Griffin Report on C63.4
Attachment F: Abbondante Report on C63.25.3