

APPROVED MINUTES
ANSC C63® SC1: Techniques and Development
Webex Meeting and In-Person Meeting
Wednesday, October 4, 2023
Google, Mountain View, CA

Members Present:

Nicholas Abbondante
Mike Antola (via Webex)
Mark Arthurs
David Chamberlain
Zhong Chen
Bob DeLisi
Mac Elliott
Andy Griffin (Chair)
Tim Harrington (via Webex)
Mike Heckrotte (via Webex)
Dan Hoolihan
Greg Kiemel
Jeff Klinger
Doug Kramer (via Webex)
Victor Kuczynski
Randy Long (via Webex)
Bob Mitchell (via Webex)
Nima Molaei
Jason Nixon (Vice Chair)
Janet O'Neil (Secretary)
Nate Potts (via Webex)
David Schaefer (via Webex)
Jeff Silberberg (via Webex)

Members Absent:

Harry Hodes
Tim Royer
David Zimmerman

Guests:

Steve Anderson
Wally Arceneaux
Henry Benitez
Bill Graff
George He
Ken Gjerde
Bo Li
Janneth Marcelo
Megan McConnell
Amanda McDonald
John Nogard
Jerry Ramie
Khairul Aidi Zainal
Deanna Zakharia

Employer:

Intertek
UL LLC
Sony
ISED Canada
ETS-Lindgren
UL LLC
TUV Sud America
Cisco
FCC
UL LLC
Hoolihan EMC Consulting
Apple
Cetecom
Apple
Vican Electronics
ANAB
TUV Rheinland
Element Materials Technology
ISED Canada
ETS-Lindgren
Keysight Technologies
Element Materials Technology
FDA Center for Devices & Radiological Health

Employer:

Consultant
Timco Engineering
Spectrum EMC, LLC

Employer:

ARRL
Rohde & Schwarz
IEEE EMC Society
TCB Council
Google
Starkey
Google
NVLAP/NIST
A2LA
NVLAP/NIST
NASA/JSC
ARC Technical Resources
Apple
Motorola Solution

1.0 Call to Order: Chair

Chair Andy Griffin called the meeting to order at 3:00 pm PDT.

2.0 Approval of the Consent Agenda: Secretary

Secretary O'Neil presented the consent agenda. This includes the draft meeting agenda for October 4, 2023, the acceptance of the terms contained in the [patent slides](#) by all attendees, and approval of the minutes from the last meeting held on May 11, 2023. The consent agenda was approved as presented. (See Attachment A for the approved agenda. See Attachment B for the Approved Minutes of the May 11, 2023, 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). Harry Hodes is a member at risk of losing his membership by having missed three consecutive meetings.

3.2 Consideration of New Members – Working Group Rosters

A new membership application was received from Bob Mitchell of TUV Rheinland (Littleton, MA). He is interested in joining SC1. His membership application and CV were distributed to the SC1 committee. A vote to approve this SC1 membership application will be taken under New Business.

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 The SC1 Scope was confirmed as follows:

Subcommittee 1 provides the technical expertise and resources necessary for maintaining existing and newly proposed C63[®] and other standards documents. Subcommittee 1 addresses new and existing measurement methods, site qualification methods, calibration methods, associated instrumentation, and limits development as assigned by the Main Committee ANSC C63[®].

3.4 Approval of Duty – The list of standards as currently appears on the C63 website, for which SC1 is responsible, were reviewed. **SC1 approved the list of standards, but agreed the list is out of duty.**

ACTION ITEM: Andy Griffin (SC1 Chair) to update the list of standards currently on the C63 website so it aligns with the committee's duty.

4.0 Working Group Reports

C63.2: Field Strength Measuring Instrumentation

C63 Chair Bob DeLisi provided an update for Jens Medler, Working Group Chair. Following the May 2023 meeting of SC1, Jennifer Santulli with IEEE indicated at the C63 steering committee meeting

that C63.2 had just entered BSR-9 process. At this point, IEEE has completed its editorial review. Bob said he expected this standard to be published by December 31, 2023.

C63.4: Emissions Measurements

Working Group Chair: Andy Griffin

Status: C63.4: Current-2014. New PINS approved by WG, SC1 and C63 in Nov. 2017. The draft was considerably revised in late 2020; latest draft circulated to SC1 in mid-2021. Publication timing will be dependent upon publication of C63.25.2 to make sure these documents are harmonized.

Andy Griffin noted C63.4-2017 is set to expire at the end of 2023. **Mike Heckrotte moved to reaffirm C63.4 by taking it to the main committee to approve moving forward with the affirmation process. The motion was seconded by Nick Abbondante and approved by SC1.**

Andy Griffin then 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.

Andy summarized the technical issues and recent Working Group activity related to C63.4. Regarding discussion about characterization/calibration, for the above 1 GHz test method, further alignment is needed with CISPR 16 (updates). The NSA requirement will be moved to C63.25.2. The WG is addressing how to deal with standard gain horn antennas (loss with the any waveguide to coaxial adaptor). They are effectively waiting for the publication of C63.25.2 to align with C63.4 publication.

C63.5: Antenna Calibration

Working Group Chair: Nate Potts

Status: Current-2017

Nate Potts is the new Working Group chair having taken over for Doug Kramer. David Knight of NPL in the UK has agreed to be Vice Chair. Nate presented his report. (See Attachment D.)

The main changes in the document include:

- No GSCF's tables for bicons or LPA's will be used apart from G1 table to convert bicon ACF to free space.
- VSWR, return loss, impedance section for general S-parameters measurements of antennas.
- Added SCM procedure to obtain Site Insertion Loss (SIL) similar to RSM in CISPR16-1-6
- More details in separating SSM over ground plane below 1GHz and TAM in free space above 1GHz.
- RAM not only for calculable dipoles, but other antennas can also be "standards" if calibrated to SSM or TAM. All other antennas besides dipoles will have a new section for SAM (Standard Antenna Method).
- Added Annex for 1m antenna calibrations used for automotive testing, mirrored new edition of SAE ARP 958 2021.
- Section added for connector care specific to Type N connectors typically used for antennas 30MHz to 18GHz. Construction of Type N connectors causes more issues than other connectors

due to the “shoulder” on the male pin that can bind against the female pin and damage one or both connectors.

The WG activity has essentially been on hold pending resolution of C63.25.2 and C63.4. However, the WG could move forward with incorporating C63.25.2 into the C63.5 draft since C63.25.2 has been balloted. Nate acknowledged that the WG has already incorporated the necessary updating to reflect the changes in C63.25.2. Nate suggested, and SC 1 Chair Andy Griffin agreed, to have C63.5 published before the updated version of C63.4. SC 1 agreed with this plan to not wait to publish the updated C63.5 based on C63.4 being published.

ACTION ITEM: Potts to direct C63.5 WG towards publishing C63.5 before the updated version of C63.4 is published.

C63.7: Construction of Test Sites

Working Group Chair: None – Candidate Requested

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

This document needs basic revisions beyond adding chambers. For example, it states a ground plane is not necessary on an OATS. A three-page amendment was suggested to be added to the standard, but a Working Group chair is needed to initiate this work. SC1 supported the idea of keeping C63.7 as a separate standalone document.

ACTION ITEM: Anyone interested in Chairing the WG and drafting a new PINS for revision of C63.7 should contact Andy Griffin.

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.

ACTION ITEM: Anyone interested in Chairing the WG and drafting a new PINS for revision of C63.23 should contact Andy Griffin.

C63.25: Time Domain Applications for Test Site Validation

Working Group Chair: Dan Sigouin

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: Andy Griffin
- 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 volunteered to be the chair of this working group. Zhong Chen noted he heard comments from others that there are ways to get around this test method to make a chamber pass. He suggested clearer wording on the test method so people could not abuse the process. Andy will create a new PINs for the updates to the document.

ACTION ITEM: Griffin to create a new PINS to update C63.25.1.

On C63.25.2, Bob DeLisi noted that the C63.25.2 ballot closed with a 55% response rate and an 86% approval rating, with over 275 comments received. Bob has reconvened the Working Group and invited those with the most comments to join the WG so their comments can be resolved in real time. Andy will edit the document before it is sent to the SC1 committee to review. The WG is meeting weekly to address the comments and expand its editing group.

On C63.25.3, Working Group chair Nick Abbondante presented his report. (See Attachment E.) 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 GHz - 40 GHz. Existing site validation methods will be leveraged where possible.

The test environments include:

- SAC/OATS/FAR/FSOATS
- Compact Antenna Test Range (CATR)
- Reverberation Chamber

Following is an update on task group (TG) activity:

SAC/OATS/FAR/FSOATS: Martin Wiles is the task group chair. They are exploring use of sVSWR, Time Domain sVSWR, and Mode Filtered sVSWR techniques. CMF Pre-RRT is largely complete and demonstrates the need for validation as not all chambers 'pass'. Also documented some challenges related to turntables and antenna nulls specifically for horizontal measurements. sVSWR and TD-sVSWR work is on hold. The TG continues to explore antenna options – past pre-RRT testing used the prototype ETS 3185, NIST has obtained an antenna from A-Info, Phil Miller has acquired an antenna, Zhong Chen is designing an Alford Dipole (biconical magnetic loop similar to the ones used in CTIA). The next meeting will be held on November 3 from 12-2PM Eastern Time.

CATR: Robert Paxman is the task group chair. Several meetings have been held since the last SC 1 meeting with active discussions occurring and text being edited. The next meeting will be held on November 6 from 10-11AM Eastern Time.

Reverberation Chamber: Phil Miller is the task group chair. Multiple new members have joined the group via NIST as well as through recruiting at the EMC Symposium and EMC Europe, including convenors from JTF REV that maintains IEC 61000-4-21. Ongoing meetings are being held with active discussions. Garth D'Abreu provided text which was reviewed and commented on by Jason Coder and John Ladbury of NIST. This text is now the focus of discussions within the TG. The next meeting will be held on October 17 from 12-2PM Eastern Time.

Nick noted the main working group is meeting every 2-3 months; the last meeting was held on September 14 with the next meeting scheduled for December 5, 12-1:30PM Eastern Time. The task groups are meeting monthly, some are meeting every two weeks to develop validation text for the standard as well as to develop round robins to validate the methods and cross correlate results across chamber types.

In summary, the SAC task group is currently focusing on transmit antennas. The Reverb and CATR task groups are making good progress on their respective text. Completion of the standard is likely two years away; the CATR and Reverb text is on track to be included in the first edition.

5.0 Old Business – Chair

There was no old business to discuss.

6.0 New Business – Chair

New Member Consideration: Bob Mitchell’s application to join SC1 and CV were reviewed and discussed. Janet O’Neil, Bill Graff, and Nick Abbondante have endorsed his membership application. **Andy Griffin moved to approve the application of Bob Mitchell to join SC1. The motion was seconded and approved.**

7.0 Interpretation Requests: Andy Griffin reviewed the following open interpretation requests since the last SC 1 meeting on May 11, 2023:

C63.4 (2014) Conducted Emissions LISN Choke received from Henrik Nielsen, request dated November 18, 2022. The task group chair is David Zimmerman with members Nate Potts, Andy Griffin, and Nick Abbondante. Vote taken to approve interpretation response in September. Not enough votes were received to approve. Nick explained the issue with the current response. Basically, the test is not specified in C63.4, it comes from the VDE. David Zimmerman was tasked with updating the response.

ACTION ITEM: Zimmerman to update the interpretation response and distribute to SC1 for review and approval.

C63.5 (2017) Annex F Delta Antenna Factors received from Jeong Hwan Kim, request dated May 16, 2023. A task group chair and members are needed to draft a response. Nate Potts volunteered to chair this task group and Secretary O’Neil will issue a call for volunteers to be members of this task group to create an interpretation response.

ACTION ITEM: O’Neil to issue a call for volunteers to be members of this task group chaired by Nate Potts.

[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 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 4, 2023, meeting to the committee.

10.0 Time and Place of Next Meeting: Chair

Andy Griffin advised that SC1 would meet during the next C63 meeting series scheduled for the week of May 13, 2024, at an east coast location to be determined.

11.0 Closing Remarks and Adjournment: Chair

With no further business, Andy Griffin adjourned the meeting at 5:00 pm PDT. He thanked everyone for attending the meeting.

Minutes submitted by:



Janet O'Neil, Secretary, SC1

ATTACHMENTS

Attachment A: Approved Agenda for October 4, 2023, SC1 Meeting

Attachment B: Approved Minutes from May 11, 2023, SC1 Meeting

Attachment C: Griffin Report on C63.4

Attachment D: Potts Report on C63.5

Attachment E: Abbondante Report on C63.25.3