

# C63<sup>®</sup> American National Standards Committee C63<sup>®</sup>

## Electromagnetic Compatibility Subcommittee 4: Wireless and ISM Equipment

Chair: [Abbondante, Nick](#)

Vice Chair: [Nixon, Jason](#)

Secretary: [Jerry Ramie](#)

May 16, 2024  
3:00 PM – 5:00 PM - EDT  
UL LLC, Research Triangle Park, NC / Web-meeting

### Approved Minutes

1. **Call to Order: Chair** - The meeting was called to order at 3:01PM-EDT
  - 1.1 **Announcements: Chair's remarks** - Welcome to the meeting!
  - 1.2 **Meeting logistics announcements: Host** - (N/A)
  - 1.3 **Introductions: Secretary – roll call** (record attending members with their affiliations and guests separately below) **Report any roster errors to the C63<sup>®</sup> Secretary** ([SC4 membership roster](#) from the website is shown below) Note **absences**, **excused absences** and **errors** below.

### Subcommittee 4 Membership Roster

Name	Role in SC	Affiliation
<a href="#">Abbondante, Nicholas</a>	Member	Intertek (Primary Rep)
<a href="#">Antola, Michael</a>	Member	UL LLC (Alternate Rep)
<a href="#">Case, David</a>	Member	TIMCO Engineering Inc., an IIA Company (Expert)
<a href="#">Chamberlain, David</a>	Member	Innovation, Science & Economic Development Canada (Expert)
<a href="#">Chen, Zhong</a>	Member	ETS-Lindgren (Primary)
<a href="#">Coder, Jason</a>	Member	NIST (Primary)
<a href="#">DeLisi, Bob</a>	Chair	UL LLC (Primary)
<a href="#">Elliott, William (Mac)</a>	Member	TÜV SÜD America, Inc. (Primary)
<a href="#">Friden, Jonas</a>	Member	Ericsson AB (Expert)
<a href="#">Graff, William</a>	Member	TCB Council, Inc. (Primary)
<a href="#">Heckrotte, Mike</a>	Member	UL LLC (Expert)
<a href="#">Hodes, Harry</a>	Member	Consultant (Individual)
<a href="#">Hoolihan, Dan</a>	Member	Hoolihan EMC Consulting (Individual)
<a href="#">House, Jody</a>	Member	Element Materials Technology (Alternate)
<a href="#">Kiemel, Greg</a>	Member	Apple Inc. (Primary)
<a href="#">Klinger, Jeff</a>	Member	Individual
<a href="#">Kramer, Doug</a>	Member	Apple Inc. (Expert)
<a href="#">Lee, Edmund</a>	Member	Apple Inc. (Expert)
<a href="#">Mahn, Terry</a>	Member	Fish & Richardson P.C.
<a href="#">Mendoza, Ernesto</a>	Member	Signify
<a href="#">Molaei, Nima</a>	Member	Element Materials Technology (Primary Rep)
<a href="#">Nixon, Jason</a>	Member	Innovation, Science and Economic Development Canada (Primary)
<a href="#">Pino, Dan</a>	Member	Element Materials Technology (Technical Expert)
<a href="#">Royer, Tim</a>	Member	TIMCO Engineering Inc., an IIA Company (Primary)
<a href="#">Salem, Pelin</a>	Member	Cisco Systems, Inc. (Technical Expert)

<a href="#">Skoglund, Kenth</a>	Member	Ericsson AB (Primary)
<a href="#">Zimmerman, Dave</a>	Member	Spectrum EMC, LLC (Individual)

**Guests and Observers:** (non-voting) Jerry Ramie, Javier Cardenas, Chad Beattie, Tim Harrington, Mark Arthurs, Steve Jones, Bob Mitchell,

**1.4 Quorum: (50% of roster) constitutes a quorum.** (rounding up) (28 roster members / 2 = 14 >> therefore **14 people** are required for a quorum. **Was quorum achieved? (Yes)** If not, any actions taken are subject to confirmation by electronic ballot or at a future meeting. (Quorum is not required for Working Group meetings)

**2. Approval of the Consent Agenda (includes modified [Agenda](#) & [previous Minutes](#)):** **Secretary** - The Consent Agenda was approved by acclamation. ([Previous Approved Minutes](#))

**2.1 Review of the [patent slides](#)** - The patent slides were reviewed and all agreed to abide by the policies shown.

**3. Review of [Subcommittee Membership](#):** **Secretary** - Report any errors to the ANSC-C63® Secretary

**3.1 Review of Membership Guidelines – Subcommittees:**

For an individual to remain a voting member of a Subcommittee, active participation in Subcommittee meetings and regular responses to Subcommittee email votes is required. Should a member fail to attend at least one of three consecutive scheduled meetings (in person or remotely via web conference (when used)) or respond to at least one of every two consecutive Subcommittee email votes, their membership in that Subcommittee may be at risk.

**Note:** Abstentions shall be treated the same as a “yes” or “no” vote regarding the requirement to respond to email votes.

**Member Attendance Log:** Any errors in the log?

20200602	20200924	20210225	20210527	20210909	20220215	20220517	20221108	20230510	SC4 Roster:
x	x	x	x	x	x	x	x	x	<a href="#">Abbondante, Nicholas</a>
		x	x	x	x	x	x	x	<a href="#">Antola, Michael</a>
x	x	x	x	x	x	x	x	x	<a href="#">Case, David</a>
x	x	x	x	x	x		x	x	<a href="#">Chamberlain, David</a>
		x	x	x	x	x	x	x	<a href="#">Chen, Zhong</a>
		x	x	x	x	x	x	x	<a href="#">Coder, Jason</a>
x	x	x	x	x	x	x	x	x	<a href="#">DeLisi, Bob</a>
x	x	x	x	x	x	x	x	x	<a href="#">Elliott, William (Mac)</a>
x				x			x	x	<a href="#">Friden, Jonas</a>
		x		x	x	x		x	<a href="#">Graff, William</a>
									<a href="#">Heckrotte, Mike</a>
						x			<a href="#">Hodes, Harry</a>
x	x	x	x		a	x	x	x	<a href="#">Hoolihan, Dan</a>
					x	x	x	x	<a href="#">House, Jody</a>
x	x	x	x	x		x	x	x	<a href="#">Kiemel, Greg</a>
x		x	x	x	x	x	x		<a href="#">Klinger, Jeff</a>
x	x			x	x	x		x	<a href="#">Kramer, Doug</a>
	x	x	x		x	x		x	<a href="#">Lee, Edmund</a>
x			x				a		<a href="#">Mahn, Terry</a>
x	x	x	x	x	x	x	x	x	<a href="#">Mendoza, Ernesto</a>
x	x	x	x	x	x		x		<a href="#">Molaei, Nima</a>
x	x	a		x	x	x	x	x	<a href="#">Nixon, Jason</a>
		x					x	x	<a href="#">Pino, Dan</a>
							x		<a href="#">Royer, Tim</a>
					x	x	x	x	<a href="#">Salem, Pelin</a>
x	x		x	x	x		x	x	<a href="#">Skoglund, Kenth</a>
x		x	x	x				x	<a href="#">Zimmerman, Dave</a>

Any members at risk? **None** are at risk.

**3.2 Consideration of new SC4 members? [Application for C63® Subcommittee](#)**

**Membership** [Naga Suryadevara](#) has applied for Membership in the C63.10 Ed.4 Working Group. [Application](#) [Resume](#) His application for membership in C63.10 was approved. **AI-63:** Jerry to add Mr. Suryadevara to the C63.10 roster and Webex invitation list.

**Denys Shumakov** has applied for Membership in SC4 and C63.10 & C63.26 [Application](#) [Resume](#) His application for membership in C63.10, C63.26 and SC4 was approved. **AI-64:** Jerry to add Dr. Shumakov to the C63.10, C63.26 and SC4 rosters.

**4. Working Group reviews - Chair - [More information about each standard](#) is available on the Standards Status Matrix page of the [C63® web site](#). This information will be reviewed for accuracy at each Spring Subcommittee meeting. The WG reports shall be made using either the [C63 PowerPoint template](#) or the [C63 PowerPoint template wide](#).**

**4.1 C63.10 Unlicensed transmitters Ed4.0 - Chamberlain**

**4.1.1 Status Matrix Review** Verify accuracy of document [status matrix](#) content and report any errors to the ANSC-C63® Secretary. **Is this information correct? (Yes)**

C63.10-202X <a href="#">Learn more</a>	Procedures for compliance testing of unlicensed wireless devices	<a href="#">SC 4</a>	<a href="#">Chamberlain, David</a>	<a href="#">C63.10 PINS</a>	See Scope of Work in <a href="#">Learn more</a> text below.
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**C63.10: C63.10-202X American National Standard for Testing Unlicensed Wireless Devices**

**Contact:** [Chamberlain, David](#) (Working Group Chair)

**Scope:** This PINS is intended to address the following topics to be incorporated into Edition 4: (a) editorial corrections, including clarification of terms and removal of subclauses no longer deemed necessary, updating the FCC cross reference matrix and review any standards references; (b) review and clarify as necessary the administrative procedures in Clause 5 of C63.10; (c) Test reduction methods based on emerging technologies (d) Add bandwidth correction methods for when a RBW less than reference BW is used (See C63.26 4.2.3) (e) review and change as necessary Clause 5.6.3 for testing band edge requirements as power levels change (f) review and change as necessary Clause 11 (DTS) for applicability; (g) review and change as necessary procedures for UNII due to changes in FCC Rules, including TPC and antenna elevation mask testing; (h) Measurement guidance for 802.11 technologies using resource units (i) review and include as necessary DFS test procedures; (j) review and change as necessary MIMO procedures: and, (k) review and include as necessary AFC validation procedures (l) Incorporate or revise Test methods based on relevant FCC KDBs (m) Extend the frequency range (n) Radar test methods for 57-71 GHz (o) incorporate changes made in the corrigendum and amendment (p) create antenna gain measurement procedure (q) review and correct any items as necessary

**Status:** New project. Draft is being written

**Purchase:** This standard is not yet complete and not available for purchase.

**4.2 C63.10 – draft Corrigendum v1 - Nixon**

**4.2.1 Status Matrix Review** Verify accuracy of document [status matrix](#) content and report any errors to the ANSC-C63® Secretary. **Is this information correct? (No)** **AI-65:** Jerry to remove this C63.10 Cor1 item from the next SC4 Agenda

C63.10-Cor1-2023 <a href="#">Learn more</a>	Procedures for compliance testing of unlicensed wireless devices	<a href="#">SC 4</a>	<a href="#">Nixon, Jason</a>	<a href="#">C63.10 Corr1 PINS</a>	Corrigendum to fix errors in the standard. Published April 2023.
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**C63.10: C63.10 CORR-1 2023 American National Standard for Testing Unlicensed Wireless Devices**

**Contact:** [Nixon, Jason](#) (Working Group Chair)

**Scope:** This corrigendum of C63.10:2020 Standard for American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices, will correct an error in the UWB -10 dB bandwidth, correct an error in the pulsed desensitization formula, clarify for WPT devices are tested to **ANSI** C63.30 for the WPT functions and harmonize clause 6.2.2 related to the use of an extension cord between the EUT and the LISN.

**Status:** Published April 10, 2023.

**Purchase:** [Search IEEE Standards](#) - Enter C63 Standard number then Search (Enter) - Click on the version you want - Click on Purchase

### 4.3 C63.10 –Amend 1 - Molaei

**4.3.1 Status Matrix Review** Verify accuracy of document [status matrix](#) content and report any errors to the ANSC-C63® Secretary. **Is this information correct? (No)**

C63.10-202X Amend 1 <a href="#">Learn more</a>	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	<a href="#">SC 4</a>	<a href="#">Molaei, Nima</a>	<a href="#">C63.10 Amend 1 PINS</a>	Amendment to address NFC OBW measurements, guidance for absorber use for UWB ground penetrating radar, other items as deemed necessary
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#### C63.10: C63.10 AMD-1 202X American National Standard for Testing Unlicensed Wireless Devices

**Contact:** [Molaei, Nima](#)

**Scope:** This amendment of C63.10:2020 Standard for American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices, will add bandwidth (Relative and Occupied) measurement procedures for device that exhibit fundamental emissions above the modulation signals. It will also address guidance for use of absorber material, in lieu of sand, as a load for ground penetrating radar and will update NII procedures for newly introduced emission mask requirements based on updated FCC and ISED rules.

**Status:** New. Draft **is in balloting.**

**Purchase:** This Amendment is not yet complete and not available for purchase

### 4.4 C63.26 – Licensed transmitters - Elliott

**4.4.1 Status Matrix Review** Verify accuracy of document [status matrix](#) content and report any errors to the ANSC-C63® Secretary. **Is this information correct? (Yes)**

C63.26-202X <a href="#">Learn more</a>	Procedures for compliance testing of licensed transmitters	<a href="#">SC 4</a>	<a href="#">Elliott, William</a>	<a href="#">C63.26 PINS</a>	2015 edition under revision
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#### C63.26-202X: American National Standard of procedures for compliance testing of transmitters used in licensed radio services

**Contact:** [Elliott, William](#) (Working Group Chair)

**Scope:** This standard covers the procedures for testing a wide variety of licensed transmitters; including but not limited to transmitters operating under Parts 22, 24, 25, 27, 90, 95 and 101 of the FCC Rules, transmitters subject to the general procedures in Part 2 of the FCC Rules and procedures for transmitters not covered in the FCC Rules. The standard also addresses specific topics; e.g., ERP/EIRP, average power measurements and instrumentation requirements.

**Status:** Draft is being written.

**Purchase:** This Draft is not yet complete and not available for purchase

### 4.5 C63.29 – Lighting equipment - Mendoza - new C63.29 PINS

**4.5.1 Status Matrix Review** Verify accuracy of document [status matrix](#) content and report any errors to the ANSC-C63® Secretary. **Is this information correct? (Yes)**

C63.29-2022 <a href="#">Learn more</a>	Lighting products	<a href="#">SC 4</a>	<a href="#">Mendoza, Ernesto</a>	<a href="#">C63.29 PINS</a>	Published 12/1/2022.
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#### C63.29-2022: American National Standard of procedures for compliance testing of lighting products

**Contact:** [Mendoza, Ernesto](#) (Working Group Chair)

**Scope:** This standard is intended to include procedures for compliance testing of general illumination lighting products with applicable radio regulatory requirements. This standard encompasses various technologies, from traditional lighting like fluorescent or HID, as well as novel technologies like LED and others. Related national and international standards (e.g., CISPR 15, ANSI C63.4) will be reviewed and used to the extent possible.

**Status:** Published 12/1/2022.

**Purchase:** [Search IEEE Standards](#) - Enter C63 Standard number then Search (Enter) - Click on the version you want - Click on Purchase

## 4.6 C63.30 – Wireless Power Transfer equipment - Thul

**4.6.1 Status Matrix Review** Verify accuracy of document [status matrix](#) content and report any errors to the ANSC-C63® Secretary. **Is this information correct? (Yes)**

C63.30-2021 <a href="#">Learn more</a>	Wireless Power Transfer Products	<a href="#">SC 4</a>	<a href="#">Thul, Travis</a>	<a href="#">C63.30 PINS</a>	Published. WG disbanded.
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**C63.30-2021: American National Standard of procedures for compliance testing of Wireless Power Transfer products**

**Contact:** [Thul, Travis](#) (Working Group Chair)

**Scope:** This standard is intended to include procedures for compliance testing of several different types of Wireless Power Transfer (WPT) products with applicable electromagnetic compatibility (EMC) and radio regulatory requirements. Test procedures will focus on radiated field and conducted measurements and may reference established standards. WPT RF exposure compliance procedures will not be included, although standards pertaining to laboratory EMF safety may be referenced. WPT testing methods may consider, but are not limited to, large in-situ installations, charging systems for electric vehicles (including impact of host on electromagnetic fields), house-hold appliances, and desktop chargers. Consideration will also be given to appropriate testing distances and test locations (such as Semi-Anechoic Chambers, Open Area Test Sites, ground plane, and earth sites). Related national and international standards (e.g., CISPR, SAE, etc.) will be reviewed and used to the extent possible.

**Status:** Balloting complete – document passed. WG disbanded.

**Purchase:** [Search IEEE Standards](#) - Enter C63 Standard number then Search (Enter) - Click on the version you want - Click on Purchase

## 4.7 C63.31 – ISM equipment - Abbondante

**4.7.1 Status Matrix Review** Verify accuracy of document [status matrix](#) content and report any errors to the ANSC-C63® Secretary. **Is this information correct? (Yes)**

C63.31-draft <a href="#">Learn more</a>	ISM equipment (MP-5)	<a href="#">SC 4</a>	<a href="#">Abbondante, Nicholas</a>	<a href="#">C63.31 PINS</a>	New standard. Draft being written.
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**C63.31-draft: American National Standard for compliance testing of Industrial, Scientific and Medical (ISM) Equipment**

**Contact:** [Abbondante, Nicholas](#) (Working Group Chair)

**Scope:** This standard is intended to include procedures for compliance testing of traditional ISM equipment (industrial heaters, dielectric heaters, food tempering equipment, microwave ovens, medical diathermy equipment, etc.) with applicable EMC and radio regulatory requirements. Related national (FCC/OET MP-5) and international standards (e.g., CISPR, IEEE) will be reviewed and used to the extent possible.

**Status:** New standard. Draft being written.

**Purchase:** Not yet available for sale.

## 4.8 White paper - Massive MIMO - PINS-C Project - Case

**4.8.1 Status Matrix Review** Verify accuracy of document [status matrix](#) content and report any errors to the ANSC-C63® Secretary. **Is this information correct? (No)** **AI-66:** Jerry to remove this MIMO white paper item from future SC4 Agendas

White paper (pending) <a href="#">Learn more</a>	Massive MIMO Test Distance Study	<a href="#">SC 4</a>	<a href="#">Case, David</a>	<a href="#">C63.xx PINS-C*</a>	Develop a White paper on testing issues to consider in regards to Near / Far field issues when measuring active antennas
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White paper **pending**: Massive MIMO Test Distance Study

Contact: **Case, David** (Working Group Chair)

Scope: This working group will study how to provide guidance in measurements when the required separation distance is larger than that available due to the minimum wavelength as determined by the antenna design.

Status: Study project

Purchase: **Not yet available for sale.**

**AI-67:** Jerry to modify MIMO matrix listing under "Purchase" to state "Publicly available at this link:" (Xplore)  
<https://ieeexplore.ieee.org/document/10416984>

## 5. Old Business: Chair

**5.1 Written reports** - Written reports of this Subcommittee meeting shall be presented by the Subcommittee Chair at the Main Committee meeting. These reports shall be made using either the [C63 PowerPoint template](#) or the [C63 PowerPoint template wide](#). Prior to the Main Committee meeting, the [SC report](#) and [approved previous SC meeting minutes](#) shall be provided to the projectionist for showing on the screen at the Main meeting. The Presentation and any written report shall also be sent by the Subcommittee Chair to the ASC-C63® [Newsletter editor](#)

### WG Reports:

**C63.10** - ([report](#))

**C63.26** - ([report](#))

**C63.29** - (new PINS provided and modified) Bill G. moved to accept the modified PINS, seconded by Bob D. The [modified PINS](#) was approved by acclamation.

**AI-68:** Jerry to provide [modified C63.29 PINS](#) for Main Committee consideration. Ernesto agreed to be Chair of C63.29, appointed by Nick. [Main Committee modified version](#).

**C63.30** - N/A (published)

**C63.31** - ([report](#)) Harry noted that the new C63.4 may take a year or two; can you reference existing text now? Since a mix of new and old text is in the draft, can we take text from the draft C63.4? The draft has been considered in SC1 and comments are being addressed.

**Massive MIMO Distance Study** - published and publicly available at this link. ([Xplore](#))

**5.2 Coordination with SC2 for definitions** - Before any Working Group draft can be submitted to Subcommittee for approval, the document must be provided to the SC2 Chair for evaluation and coordination of the definitions used. C63.31 has been "scrubbed" of definitions and others aligned.

**5.2 Coordination with SC3 for harmonization** – Are there any documents that need to be brought to SC3 for harmonization? WG chairs to provide input. High-power LISN? Ernesto is now the Chair of SC3 and will submit the 5uH LISN to SC3.

## 6. New Business: Chair

### 6.1 - New work items? – open discussion for SC4 – Chair

**Proposal for C63.10 Ed3.0 Amendment 2:** The 2009 edition of the standard allowed for horns to be used below 1GHz. In 2013 this became prohibited. With UWB needing to be tested to 960MHz with a very low limit, use of a horn may be beneficial assuming it is calibrated per C63.5 for below 1GHz (over a ground plane) in the 960-1000MHz range. It also eliminates any uncertainty of using a LPDA (or hybrid) in this range as typically labs will test at 0.5m and there is really no way to get the phase center of the antenna in the right spot (as it was calibrated). If the work is approved, a PINS will be needed for approval by SC4. Note this would be the only item in the PINS and it would be to revise Table 9 to add another footnote for the horn to address this, including information that in this range the SSM method for below 1GHz is to be used for calibration so that it ensures calibration is performed over a ground plane and not in free space.

**Discussion:** David C. felt we could leave this issue to the C63.10 WG. Harry thought that making testing more efficient is worth the effort. David thought it wasn't a big issue as nobody has asked for it. No interpretation requests have been received. Nick thought it was a "procedural" issue. Harry asked that ISED or FCC issue a KDB to address this. We can discuss this in the C63.10 Ed.4 WG. Do we need an amendment or do this as part



of Ed.4? Harry felt that sooner was better. The consensus was to keep this in C63.10 Ed.4. Nick encouraged the group to ask ISED or FCC for a KDB in the meantime.

**6.2 - Proposal for a unified methods Standard - Chair** - This comes out of C63.10 Ed.4 to make a proposal to SC4 for a unified methods Standard. Our working groups are taking similar, but slightly different approaches. We pull text from a document and modify it. Others do the same, so we're repeating discussions and making extra work for ourselves. We could take a method of maximizing emissions, for example, and make it modular to be used by other WGs. Do we use a new Standard or point at existing Standards? David noted that we would have to include exceptions and adjustments, making it a difficult document to write. David felt we should keep all this effort under SC4 if we do it. Harry observed that test labs hate documents that refer to other documents. He felt that European Standards do this to excess. Maybe we can organize a library of test methods (like MIL-STD) to point to. Nick noted that as we've tried to keep everything in each Standard, it takes over ten years to complete a document. We speaking of treating measurement methods like we treat definitions. Harry noted that ETSI can produce their documents in six months. Why can't we? We tend to "litigate minutiae." Bob felt that this was a great idea, but we need to decide how to structure this; a plan on paper. Randy pointed out that splitting up large Standards made sense. Nick summarized that something along these lines is needed and appropriate. Does the group support such a library of methods? We may want to produce adjunct Standards. Should we bring this to the Steering Committee? Bob thought you should form a small group with few people in it to produce a rough outline for the Steering Committee to consider. **AI-69:** Nick to call a meeting of interested persons to produce this Unified Methods outline. (David C, Andy G, N. Abbondante, H. Hodes, R. Long, B. DeLisi) When the outline is ready, it can be submitted to the Steering Committee. (a discussion item can be placed in tonight's steering agenda)

**6.3 - Approve Scope, Duties and Membership - Chair -**

**Scope**

Subcommittee 4 is responsible for writing and maintaining existing and proposed C63® standards for wireless and ISM devices (e.g. lighting, wireless power transfer, Industrial and dielectric heaters, and similar equipment), as assigned by the Main Committee ANSC-C63®.

**Duties**

- C63.10 -
- C63.26 -
- C63.29 -
- C63.30 -
- C63.31 -
- Massive MIMO Distance Study -

**Membership (one new member)**

**Subcommittee 4 Membership Roster**

Name	Role in SC	Affiliation
<a href="#">Abbondante, Nicholas</a>	Member	Intertek (Primary Rep)
<a href="#">Antola, Michael</a>	Member	UL LLC (Alternate Rep)
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<a href="#">Mahn, Terry</a>	Member	Fish & Richardson P.C.
<a href="#">Mendoza, Ernesto</a>	Member	Signify
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<a href="#">Zimmerman, Dave</a>	Member	Spectrum EMC, LLC (Individual)
<a href="#">Abbondante, Nicholas</a>	Member	Intertek (Primary Rep)
<a href="#">Denys Shumakov</a>		

## Subcommittee 4 Working Groups

### Membership Guidelines for Working Groups:

For an individual to remain a member of a Working Group, active participation is required. Should a member fail to attend at least one of three consecutive scheduled meetings (in person or via web conference (when used)) their membership in that Working Group may be at risk. Individual Working Groups may establish additional participation criteria and/or modify this requirement.

### **C63.10 Ed. 4 (Unlicensed wireless) Working Group Roster**

Name	Role in WG	Affiliation
<a href="#">Abbondante, Nicholas</a>	Vice Chair	Intertek (Primary Rep)
<a href="#">Antola, Michael</a>	Member	UL LLC (Alternate Rep)
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<a href="#">Kim, Steven</a>	Member	UL LLC (Expert)
<a href="#">Kuczynski, Victor</a>	Member	Vican Electronics
<a href="#">Molaei, Nima</a>	Member	Element Materials Technology Washington DC LLC (Primary)



<a href="#">Nixon, Jason</a>	Member	Innovation, Science & Economic Development Canada (Primary)
<a href="#">Paxman, Robert</a>	Member	Intel
<a href="#">Ramie, Jerry</a> (non-voting)	Secretary	ARC Technical Resources (ANSC-C63 Secretary)
<a href="#">Salem, Pelin</a>	Member	Cisco Systems, Inc. (Technical Expert)
<a href="#">Schaefer, David</a>	Member	Element Materials Technology (Primary)
<a href="#">Sigouin, Dan</a>	Member	Consultant
<a href="#">Wu, Jeffrey</a>	Member	Broadcom
<a href="#">Zainal, Khairul</a>	Member	Apple, Inc. (Expert)
<a href="#">Zhao, Yujuan</a>	Member	Intel

### C63.10 Amend. (Unlicensed wireless) Working Group Roster

Name	Role in WG	Affiliation
<a href="#">Abbondante, Nicholas</a>	Member	Intertek (Primary Rep)
<a href="#">Antola, Michael</a>	Member	UL LLC (Alternate)
<a href="#">Bartko, Hendrik</a>	Member	Rohde & Schwarz (Expert)
<a href="#">Chamberlain, David</a>	Member	Innovation, Science & Economic Development Canada (Expert)
<a href="#">DeLisi, Bob</a>	Member	UL LLC (Primary)
<a href="#">Ekiert, Tom</a>	Member	Consultant
<a href="#">Graff, William</a>	Member	TCB Council, Inc. (Primary)
<a href="#">Jones, Steve</a>	Member	Consultant
<a href="#">Kiemel, Greg</a>	Member	Apple Inc. (Primary)
<a href="#">Koebele, Johannes</a>	Member	Rohde & Schwarz (Expert)
<a href="#">Manacorda, Guido</a>	Member	Euro - GPR
<a href="#">Molaei, Nima</a>	Chair	Element Materials Technology Washington DC LLC (Primary)
<a href="#">McGann, Ryan</a>	Member	Bureau Veritas Consumer Product Services, Inc.
<a href="#">Nixon, Jason</a>	Member	Innovation, Science & Economic Development Canada (Primary)
<a href="#">Patel, Ronak</a>	Member	Cisco Systems (Expert)
<a href="#">Paxman, Robert</a>	Vice Chair	Intel
<a href="#">Ramie, Jerry</a> (non-voting)	Secretary	ARC Technical Resources (ANSC-C63 Secretary)
<a href="#">Schaefer, David</a>	Member	Element Materials Technology (Primary)
<a href="#">Sellergren, Sean</a>	Member	TÜV SÜD America, Inc. (Expert)
<a href="#">Zainal, Khairul</a>	Member	Apple, Inc. (Expert)
<a href="#">Zhao, Yujuan</a>	Member	Intel

### C63.26 (Licensed wireless) Working Group Roster

Name	Role in WG	Affiliation
<a href="#">Elliott, William (Mac)</a>	Chair	TÜV SÜD America, Inc. (Primary)
<a href="#">Case, Dave</a>	Vice Chair	TIMCO Engineering Inc., an IIA Company (Expert)
<a href="#">Zakharia, Deanna</a>	Secretary	Motorola Solutions (Primary)
<a href="#">Abbondante, Nicholas</a>	Member	Intertek ETL SEMKO (Primary)
<a href="#">Arthurs, Mark</a>	Member	Sony

<a href="#">Bria, Aurelian</a>	Member	Ericsson AB (Alternate)
<a href="#">Briggs, Mark</a>	Member	UL Verification Services Inc.
<a href="#">Carlton, Ross</a>	Member	Gibbs & Cox (ARRL Expert)
<a href="#">Chamberlain, David</a>	Member	Innovation, Science & Economic Development Canada (Expert)
<a href="#">Crumm, Allen</a>	Member	SSC Labs
<a href="#">DeLisi, Bob</a>	Member	UL LLC (Primary)
<a href="#">Demirci, Deniz</a>	Member	National Technical Systems - Silicon Valley
<a href="#">Forrester, John</a>	Member	Qualcomm Technologies, Inc. (Primary Rep)
<a href="#">Fridén, Jonas</a>	Member	Ericsson AB (Expert)
<a href="#">Graff, William</a>	Member	TCB Council, Inc. (Primary)
<a href="#">Harrington, Tim</a>	Member	FCC (Expert)
<a href="#">Ho, Alexander</a>	Member	Sporton
<a href="#">House, Jody</a>	Member	Element Materials Technology (Alternate Rep)
<a href="#">Haynberg, Sean</a>	Member	V-Comm, LLC
<a href="#">Heckrotte, Michael</a>	Member	UL Verification Services Inc.
<a href="#">Jones, Steve</a>	Member	Consultant
<a href="#">Kiemel, Greg</a>	Member	Apple Inc. (Primary)
<a href="#">Kuczynski, Victor</a>	Member	Vican Electronics
<a href="#">Klinger, Jeff</a>	Member	Individual
<a href="#">Lee, Edmund</a>	Member	Apple Inc. (Expert)
<a href="#">Li, C.K.</a>	Member	Nextivity, Inc.
<a href="#">Lin, Grace</a>	Member	HYTORC
<a href="#">Mahn, Terry</a>	Member	Fish & Richardson P.C.
<a href="#">McGann, Ryan</a>	Member	Bureau Veritas Consumer Product Services, Inc.
<a href="#">McMillen, Shawn</a>	Member	Compliance Testing, LLC
<a href="#">Mellberg, Hans</a>	Member	Consultant
<a href="#">Molaei, Nima</a>	Member	Element Materials Technology Washington DC LLC (Primary Rep)
<a href="#">Nixon, Jason</a>	Member	Innovation, Science & Economic Development Canada (Primary Rep)
<a href="#">Parikh, Hemish</a>	Member	Qualcomm Technologies, Inc. (Expert)
<a href="#">Parry, Mikel</a>	Member	Wilson Electronics
<a href="#">Paxman, Robert</a>	Member	Intel Corporation
<a href="#">Pino, Dan</a>	Member	Element Materials Technology Washington DC LLC (Expert)
<a href="#">Rapella, John</a>	Member	Washington Laboratories, Ltd.
<a href="#">Roman, John</a>	Member	Intel Corporation
<a href="#">Royer, Tim</a>	Member	TIMCO Engineering Inc., an IIA Company (Primary Rep)
<a href="#">Salinas, Daniel</a>	Member	Microsoft
<a href="#">Schramm, David</a>	Member	SGS North America, Inc.
<a href="#">Shumakov, Denys</a>	Member	Innovation, Science & Economic Development Canada (Expert)
<a href="#">Sigouin, Dan</a>	Member	Consultant
<a href="#">Stumpf, Bill</a>	Member	D.L.S. Electronic Systems
<a href="#">Ho, Sze Khian</a>	Member	Motorola Solutions (Alternate Rep)
<a href="#">Terrien, Mark</a>	Member	Consultant
<a href="#">Vagenas, Tom</a>	Member	Mobile Communications, Inc.
<a href="#">Wong, Eddie</a>	Member	CKC Laboratories, Inc.
<a href="#">Zainal, Khairul</a>	Member	Apple Inc. (Expert)
<a href="#">Zhan, Hongtao</a>	Member	SureCall Inc.

<a href="#">Zhao, Yujuan</a>	Member	Intel
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### C63.29 (Lighting products) Working Group Roster

Name	Role in WG	Affiliation
<a href="#">Mendoza, Ernesto</a>	Chair	Signify
<a href="#">Spehalski, Bob</a>	Vice Chair	Lutron Electronics Co., Inc.
<a href="#">Crumm, Allen</a> (non-voting)	Secretary	SSC Labs
<a href="#">Abbondante, Nicholas</a>	Member	Intertek (Primary Rep)
<a href="#">Beattie, Chad</a>	Member	FCC Lab (Expert)
<a href="#">Bloomfield, Carl</a>	Member	Intertek (Expert)
<a href="#">Case, Dave</a>	Member	Consultant (Expert)
<a href="#">DeLisi, Bob</a>	Member	UL LLC (Primary Rep)
<a href="#">Klinger, Jeff</a>	Member	Individual
<a href="#">Lin, Grace</a>	Member	HYTORC
<a href="#">Newman, Bob</a>	Member	Lutron Electronics Co., Inc.
<a href="#">O'Steen, Steve</a>	Member	TÜV SÜD America, Inc. (Expert)
<a href="#">Parisella, Joe</a>	Member	OSRAM
<a href="#">Popovici, Horia</a>	Member	Innovation, Science & Economic Development Canada (Alternate Rep)

### C63.30 (Wireless Power Transfer) Working Group Roster

Name	Role in WG	Affiliation
<b>Working Group disbanded</b>	ANSI-63.30-2021 will be published soon	<b>Purchase:</b> <a href="#">IEEE Store</a> . To purchase individual standards, go to the IEEE store and search on the standard number.

### C63.31 (ISM Equipment) Working Group Roster

Name	Role in WG	Affiliation
<a href="#">Abbondante, Nicholas</a>	Chair	Intertek
<a href="#">Walton, Derek</a>	Vice Chair	LF Research
<a href="#">Crumm, Allen</a>	Secretary	SSC Labs
<a href="#">Beattie, Chad</a>	Member	FCC Lab
<a href="#">Briggs, Mark</a>	Member	UL Verification Services Inc.
<a href="#">DeLisi, Bob</a>	Member	UL LLC
<a href="#">Frierson, Steven</a>	Member	SGS North America, Inc.
<a href="#">Graff, William</a>	Member	TCB Council, Inc. (Primary)
<a href="#">Granger, Jason</a>	Member	Electrolux
<a href="#">Heckrotte, Michael</a>	Member	UL Verification Services Inc.
<a href="#">Hoolihan, Dan</a>	Member	Hoolihan EMC Consultants, Inc.

<a href="#">House, Jody</a>	Member	Element Materials Technology
<a href="#">Kiemel, Greg</a>	Member	Apple Inc. (Primary Rep)
<a href="#">Klinger, Jeff</a>	Member	Individual
<a href="#">Krueger, Joe</a>	Member	Miller Electric Mfg. LLC
<a href="#">Lin, Grace</a>	Member	HYTORC
<a href="#">Manning, Billy</a>	Member	Energous Corporation
<a href="#">Mellberg, Hans</a>	Member	Consultant
<a href="#">Molaei, Nima</a>	Member	Element Materials Technology Washington DC LLC (Primary rep)
<a href="#">Müller, Ingomar</a>	Member	Fronius International GmbH
<a href="#">O'Steen, Steve</a>	Member	TÜV SÜD America, Inc.
<a href="#">Popovici, Horia</a>	Member	Innovation, Science and Economic Development Canada
<a href="#">Royer, Tim</a>	Member	TIMCO Engineering Inc., an IIA Company (Primary)
<a href="#">Sigouin, Dan</a>	Member	TIMCO Engineering Inc., an IIA Company (Expert)
<a href="#">Thul, Travis</a>	Member	Minnesota State College Southeast
<a href="#">Wilhelm, Johann</a>	Member	Wilhelm Consulting

## Massive MIMO Distance Study Project

Name	Role in WG	Affiliation
<a href="#">Case, Dave</a>	Chair	TIMCO Engineering Inc., an IIA Company (Expert)
<a href="#">Jerry Ramie</a> (non-voting)	Secretary	ARC Technical Resources (ANSC C63 Secretary)
<a href="#">Abbondante, Nicholas</a>	Member	Intertek (Primary Rep)
<a href="#">Bria, Aurelian</a>	Member	Ericsson AB (Alternate Rep)
<a href="#">Chamberlain, David</a>	Member	Innovation, Science & Economic Development Canada
<a href="#">Coder, Jason</a>	Member	NIST (Primary Rep)
<a href="#">DeLisi, Bob</a>	Member	UL LLC (Primary Rep)
<a href="#">Derat, Benoit</a>	Vice Chair	Rohde & Schwarz (Expert)
<a href="#">Fridén, Jonas</a>	Member	Ericsson AB (Expert)
<a href="#">Graff, William</a>	Member	TCB Council, Inc. (Primary)
<a href="#">Heckrotte, Michael</a>	Member	UL Verification Services Inc.
<a href="#">Jones, Steve</a>	Member	Consultant
<a href="#">Lin, Grace</a>	Member	HYTORC
<a href="#">Nixon, Jason</a>	Member	Innovation, Science & Economic Development Canada (Primary Rep)
<a href="#">Paxman, Robert</a>	Member	Intel
<a href="#">Razavi, Aidin</a>	Member	Ericsson AB (Expert)
<a href="#">Salem, Pelin</a>	Member	Cisco Systems, Inc. (Expert)
<a href="#">Shumakov, Denys</a>	Member	Innovation, Science & Economic Development Canada (Expert)
<a href="#">Terrien, Mark</a>	Member	Consultant

Bill G. moved to approve, seconded by W. Elliott to approve the Scope, Duties and Membership. Any discussion? any opposition? They were approved by acclamation.

**7. C63.org website use and updates: Secretary** - We normally post documents to the [SC4 protected area](#). If any SC or WG needs help with this posting, a Technical Secretary is available to assist.

## 8. Review of the Action Items: Secretary

**8.1 Review of Action Items from this meeting:** (read Action Items to Members, who must agree that they understand their meaning)

**8.2 Review of Action Items from previous meeting:** Consolidated Action Item table from the previous meeting Minutes is shown below:

**Consolidated Action Items from 10/03/22 Meeting of SC4**

Action Item #	Subject	Responsible Person(s)	Status	Delivery Date	Comments
AI-59:	Bob to send copies of C63.29 to the working group members	Bob DeLisi	Closed	Next meeting	
AI-60:	Ernesto to create a new PINS for the next version of C63.29. Include all items you want changed, such as Multi-channel lamps; grow lamps/luminaires; tunable lamps / human benefit; generic text from C63.4 to be removed and just cite the Standard. Li-Fi communications; burglar-alarm sensors in lighting (non-radio portion)	E. Mendoza	Closed	Next meeting	
AI-61:	Nick to contact Travis Thul re/ next edition of C63.30, discuss a new PINS	N. Abbondante	Closed	Next meeting	Spoke to Travis; he can't Chair it. Need a group to discuss. (below)
AI-62:	Jerry to circulate a request for C63.10 Ed.4 members (and the previous WG roster & Main & SC4) to join existing C63.10 Amd WG roster.	Jerry Ramie	Closed	Next meeting	Mailed 10/12

AI-70: Nick to assemble discussion group with Popovici, Nick, Bob D, T. Thul, C. Beattie to develop a C63.30 PINS

**9. Time and place of next meeting: Chair - Week of September 30 @ R&S Dallas (DFW)**

**10. Closing remarks and Adjournment: Chair -** Thanks for your participation and discussion. We'll see you at the next meeting. The meeting was adjourned at 5:16PM-EDT.

\*\*\*\*\* End of Meeting \*\*\*\*\*

**Consolidated Action Items from 5/16/24 Meeting of SC4**

Action Item #	Subject	Responsible Person(s)	Status	Delivery Date	Comments
AI-63:	Jerry to add Mr. Suryadevara to the C63.10 roster and Webex invitation list.	Jerry Ramie	Closed	Next meeting	Added 5/23
AI-64:	Jerry to add Dr. Shumakov to the C63.10, C63.26 and SC4 rosters	Jerry Ramie	Closed	Next meeting	Added 5/23
AI-65:	Jerry to remove this C63.10 Cor1 item from the next SC4 Agenda	Jerry Ramie	Open	Next meeting	
AI-66:	Jerry to remove this MIMO white paper item from future SC4 Agendas	Jerry Ramie	Open	Next meeting	
AI-67:	Jerry to modify MIMO matrix listing under "Purchase" to state "Publicly available at this link:" ( <a href="#">Xplore</a> )	Jerry Ramie	Closed	Next meeting	Modified 5/27

AI-68:	Jerry to provide <a href="#">modified C63.29 PINS</a> for Main Committee consideration ( <a href="#">Pins 3</a> )	Jerry Ramie	Closed	Next meeting	<a href="#">Pins 3</a> sent to Jennifer 5/27
AI-69:	Nick to call a meeting of interested persons to produce this <a href="#">Unified Methods outline</a> . (David C, Andy G, N. Abbondante, H. Hodes, R. Long, B. DeLisi)	N. Abbondante D. Chamberlain Andy Griffin Harry Hodes Randy Long Bob DeLisi	Open	Next meeting	
AI-70:	Nick to assemble discussion group with Popovici, Nick, Bob D, T. Thul, C. Beattie to develop a <a href="#">C63.30 PINS</a>	N. Abbondante H. Popovici Bob DeLisi Travis Thul Chad Beattie	Open	Next meeting	