

Report to SC-1

ANSI C63.4

Methods of measurement of emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz

Andy Griffin

Working group for ANSI C63.4 Chair

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ANSI C63.4 WG membership

Name	Role within WG	Affiliation
Griffin, Andy	Chair	CISCO Systems
Popovici, Horia	Vice Chair	Innovation, Science and Economic Development Canada
Ramie, Jerry	Secretary	Consultant (non-voting)
Abbondante, Nick	Member	Intertek
Antola, Michael	Member	UL Solutions
Beattie, Chad	Member	FCC Lab
Behm, Steve	Member	CKC Laboratories
Chen, Zhong	Member	ETS-Lindgren
Cuevas, Jose	Member	Apple Inc. (Alternate Rep)
DeLisi, Bob	Member	UL Solutions
Harrington, Tim	Member	FCC Lab
Heckrotte, Michael	Member	UL Verification Services Inc.
Hobbs, Brandon	Member	Advanced Micro Devices
Hofmann, Bob	Member	Hofmann EMC Engineering
Kiemel, Greg	Member	Apple Inc. (Primary Rep)
Klinger, Jeff	Member	Individual
Lin, Grace	Member	HYTORC
Mellberg, Hans	Member	Consultant
Molaei, Nima	Member	Element Materials Technology (Primary)
Pettit, Ghery	Member	Pettit EMC Consulting LLC
Potts, Nate	Member	Keysight Technologies
Royer, Tim	Member	TIMCO ENGINEERING, INC. (Primary)
Schaefer, David	Member	Element Materials Technology - Alternate
Shumakov, Denys	Member	ISED Canada (Expert)
Sigouin, Dan	Member	Consultant
Surve, Soham	Member	Amazon Lab 126
Terrien, Mark	Member	Consultant
Walton, Derek	Member	LF Research
Zainal, Khairul	Member	Apple, Inc.
Zerman, Kendall	Member	Sony
Zimmerman, Dave	Member	Spectrum EMC, LLC

ANSI C63.4**1) SC1 vote**

Vote ended Feb. 21st 2020 and passed (14 yes, 10 no, 3 abstain)
8 members submitted a total of 122 comments

2) Progress

After completing the major part of the document, we 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

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3) Comment matrix

We received comments from

Mark Arthurs

Andy Griffin

Apple

UL

Harry Hodes

David Zimmerman

Randy Long

Around 50 comments were received.

ANSI C63.4**3) Comment matrix**

We have held monthly meetings (mostly) to fix 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.

We agreed to use current process back in early 2022. There is no support for having multiple methods within the document.

ANSI C63.4**3) Comment matrix, power requirements...**

We updated the document based on the discussion..

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.

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.

We still have to agreed on so suggest text about hot/live ... etc

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3) Comment matrix, Informative annex about the above 1GHz test method

This was developed and we are still discussing it... but the summary of the annex is as follows.

We got consensus back in 2022 (everybody is equally unhappy) and we have been discussing it

1. All methods have problems (many methods and many problems).
2. Only the fixed height matches site validation method
3. We did not want multiple methods
4. We don't want to develop another validation method.
5. Existing text is very vague and allows too much variance.
6. Balance between test / cost and achieving reasonable results is important
7. Simple EUT setup and access to it during testing is also important

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8. 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

9. alignment with other relevant international, national and regional standards is desirable

Simplified case...

.. Average of these..

Linear -1.2

Bore-sight +2

instrumentation uncertainty
is +5dB

linear scan		bore-sighted scan	
	<u>no absorber</u>	absorber	<u>no absorber</u>
	+2 / -2.6	0 / 0	+2.6 / +2.4
	+0.5 / -2.5	0 / 0	+1.5 / +1
	+1.5 / -1.2	0 / 0	+2 / +1
	+2.5 / -2.5	0 / 0	+3.5 / +2.5
	-3.5 / -5.5	0 / 0	0 / 0
	-2.5 / -5	0 / 0	0 / 0
	+4 / -3	0 / 0	+4 / +0.5
	+0.5 / -2.5	0 / 0	+2 / +1.5