ANSI-ASC-C63® Interpretation Request Form

This form shall be used for submission of Interpretation Requests related to ANSI-IEEE standards that are within the responsibility of ANSI-ASC-C63®. The eight parts of the form must be filled out completely, with the exception of the Subcommittee Response, to ensure expedient processing. This completed form is to be submitted to the Secretary of ANSI-ASC-C63® via e-mail.

Submission Date	Originator Name, Company
08/04/2015	Tim Lee, Underwriters Laboratories

Standard	Clause/ Sub clause	Paragraph Figure/ Table	Type (General/ Technical/ Editorial)	Comment / Inquiry	Subcommittee Response (to be filled in by Subcommittee Chair)
C63.10-2013	6.6	All (6.6.1, 6.6.2, 6.6.3, 6.6.4, 6.6.5)	Technical	The scope should be limited to the frequency range 1 GHz to 40 GHz Many general procedures given in sub clause 6.6 are in conflict with specific procedures for radiated measurements above 40 GHz given in clause 9. Conflicting procedures include, but are not necessarily limited to, measurement antenna height scan, exploratory radiated procedures and final radiated procedures.	It is agreed that these sections should be limited to measurements below 40 GHz. This interpretation form will be provided to the relevant C63® SC1 working group, to serve as a request for the matter to be addressed in the next edition of C63.10. C63.10-2013 supporting provisions: a) "9.13 Measurement of harmonic and spurious emissions at or below 40 GHz Use the standard test methods described in 6.3 through 6.6." It is notable that 9.12 for emissions above 40 GHz does not similarly cross-reference 6.3 through 6.6. b) Footnote 75 in the first paragraph of Clause 9 cites 47 CFR 15.253, 15.255, 15.257. The associated rows 74 to 88 in Table A.2 of Annex A do not cross-reference 6.6.

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C63.10-2013	9.5	Equation 23	Technical	EIRP = $P_{COND} - G_{EUT}$ is incorrect. The correct equation is: EIRP = $P_{COND} + G_{EUT}$	Agreed. This will be corrected in the next edition of the standard.
C63.10-2013	9	9.1 and/or 9.9	Technical	The required EUT height should be specified as not less than 0.8 m. In the absence of such a specification there is currently no text in clause 9 that would supersede the general EUT height requirement of 1.5 m for measurements above 1 GHz as given in sub clause 6.6. It is our understanding that a 1.5 m EUT height requirement was not the intent during the drafting of clause 9. A 1.5 m EUT height for measurements above 40 GHz would place an undue burden on the procedures given in sub clause 9.9. Specifying an EUT height requirement of not less than 0.8 m for measurements above 40 GHz is sufficient. The burden of the 1.5 m height is described below and the sufficiency of the 0.8 m height is analyzed on the next page.	It is agreed that requiring a minimum height of 80 cm for measurements above 40 GHz is sufficient. This interpretation form will be provided to the relevant C63® SC1 working group, to serve as a request for the matter to be addressed in the next edition of C63.10.

a) Considerations that make a 1.5 m EUT height requirement burdensome for emissions above 40 GHz include:

1) Measurement distances determined in sub clause 9.8 will typically be very short.
2) Maximizing procedures in sub clause 9.9 require manually scanning around all surfaces of the EUT.
3) Beamwidths of emissions will be narrow.

b) These factors result in a need to hold the antenna/harmonic mixer assembly in one's hand, as also stated in sub clause 9.1. At a 1.5 m EUT height one would need a stepstool or ladder to reach above the top surface of the EUT. One would also need to raise the spectrum analyzer to a height of ~1.5 m to accommodate the short external mixer LO/IF feed cable.

c) A 0.8 m EUT height requirement is sufficient for emissions above 40 because the floor is many wavelengths away from the EUT at these frequencies. The following comparative analysis is made at the worst-case frequencies for the ranges (1 to 40 GHz) and (above 40 GHz).

d) For the 1 to 40 GHz range:

1) The longest wavelength in this range corresponds to 1 GHz, lambda is 0.3 m.

2) Floor absorbers needed to meet SVSWR requirements will almost certainly be a minimum of 0.3 m thick, perhaps more.

3) For EUT height = 0.8 m the separation to the floor is 2.67 wavelengths;
   i) If 0.3 m floor absorbers are utilized, the EUT is 1.67 wavelengths from the absorber tips;
   ii) If 0.5 m floor absorbers are utilized, the EUT is 1 wavelength from the absorber tips.

4) For EUT height = 1.5 m the separation to the floor is 5 wavelengths;
   i) If 0.3 m floor absorbers are utilized, the EUT is 4 wavelengths from the absorber tips;
   ii) If 0.5 m floor absorbers are utilized, the EUT is 3.33 wavelengths from the absorber tips.

5) Changing the EUT height from 0.8 m to 1.5 m yields a significant improvement at 1 GHz.

e) For the range above 40 GHz:

1) For the purpose of this analysis the longest wavelength in this range is represented by 40 GHz, lambda is 0.0075 m.

2) Floor absorbers might not be needed due to the narrow beamwidths of emissions and the directivity of the measuring antennas. If used, it is feasible to achieve >20 dB reflectivity with a 0.010 m thick absorber panels, and >27 dB with 0.025 m thickness. Alternatively the absorbers that meet SVSWR requirements to 18 GHz can be utilized if they are effective above 40 GHz.

3) For EUT height = 0.8 m the separation to the floor is 107 wavelengths;
   i) With 0.010 m floor absorbers, the EUT is 105 wavelengths from the absorber panel;
   ii) With 0.025 m floor absorbers, the EUT is 103 wavelengths from the absorber panel;
   iii) Any improvement that results from increasing the separation past ~100 wavelengths will be insignificant compared to results at lower frequencies.

4) If the absorbers that meet SVSWR requirements to 18 GHz are suitable and kept in place for measurements above 40 GHz:
   i) For 0.3 m floor absorbers, the EUT is 66.7 wavelengths from the absorber tips. The relative separation for 40 GHz at 0.8 m is >16 times that for 1 GHz at 1.5 m.
   ii) For 0.5 m floor absorbers, the EUT is 40 wavelengths from the absorber tips. The relative separation for 40 GHz at 0.8 m is 12 times that for 1 GHz at 1.5 m.