



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
01/07/2020	Ian Watch, Underwriters Laboratories

Standard	Clause/ Sub clause	Paragraph Figure/ Table	Type (General/ Technical/ Editorial)	Comment / Inquiry	Subcommittee Response <i>(to be filled in by Subcommittee Chair)</i>
C63.10-2013	6.4.6	3 rd paragraph	Technical	<p>The requirement to perform radiated measurements below 30 MHz on a EUT containing a loop antenna that can be placed in a horizontal or vertical axis (for example, a cellphone or credit card reader having NFC and/or WPT functionality) with the measurement antenna horizontal, produces incorrect results. The measurement antenna used is typically a shielded, active loop antenna. The shield of the loop antenna has a gap at the top.</p> <p>Measurements should only be performed with the active loop antenna vertical (perpendicular to the test site ground plane).</p> <p style="text-align: right;"><i>Continued on following page...</i></p>	<p>The requirements related to the orientation of the measurement antenna (loop) are separate from those related to the orientation of the EUT. The former are specified in 6.4.6, while the latter are in 6.3.1.</p> <p>With regard to the measurement antenna (loop), the text in the third paragraph of subclause 6.4.6 states: <i>“When the EUT contains a loop antenna that can be placed in a horizontal or vertical axis, normal measurements shall be made aligning the measurement antenna along the site axis, orthogonal to the axis, and then with the measurement antenna horizontal.”</i></p> <p>As per the second paragraph of subclause 1.1, the word “<i>shall</i>” indicates a mandatory requirement that must be met to satisfy the ANSI C63.10-2013 standard.</p> <p>Therefore, for complying with ANSI C63.10-2013, all three loop antenna orientations have to be investigated where so required (i.e., where the EUT’s antenna can be oriented horizontally).</p>

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C63.10-2013	6.4.6	3 rd paragraph	Technical	<p>From ANSI C63.5-2017 Clause N.2 Field strength calibrations using loop antennas, 30 Hz to 30 MHz N.2.1 Standard receiving loop, 2nd paragraph: <i>The shielded-loop antenna has come into general use for direction finders and can be used for measuring field strength. It is desirable that the shield have a gap at the top so that the antenna is symmetrical with respect to ground. This also minimizes the response of the loop to a vertically polarized electric field strength (see Whiteside and King [B45]).</i></p> <p>We do not consider making radiated measurements with a shielded loop antenna mounted horizontally is a valid method or accurate because:</p> <ol style="list-style-type: none"> 1. The antenna factors derived from the calibration are made with the loop antenna vertically mounted on a tripod. The transmitting loop antenna is also vertically mounted. The antenna factor calibration data are part of the radiated emissions measurement. 2. There is a gap in the shield at the top of the loop therefore the received emission level from the EUT at the gap will be probably be higher than the rest of the loop. 3. The metal base of the loop antenna may affect received emission levels from the EUT because it is in-line with the EUT and gap in the loop shielding when the loop antenna is horizontal. 4. The site ground plane may have a different effect on the loop antenna and received emission levels from the equipment under test compared with the loop antenna in the position it was calibrated in. The loop antenna performance is not symmetrical with respect to ground when it is horizontally mounted. <p><i>Continued on following page...</i></p>	<p>An interpretation response cannot change a standard, but can be used as input for future updates to the standard. However, in this particular case, the measurement procedure in 6.4.6 is correct:</p> <ul style="list-style-type: none"> - Simulations and measurements performed within the ANSI C63.30 working group have shown that propagation in the z-axis (measurement loop antenna parallel with the floor) rolls off faster than the other two axes. Therefore, reorienting the EUT is not the same as measuring the z-axis magnetic field. - While the loop antenna factor might indeed be different in the three orientations, this is not a new situation in emission measurements. The free space factors used above 30 MHz are also not representative for when the antenna is at the low end of its height scanning range (i.e., 1 m). The antenna factor issue, if needed, has to be dealt with in the ANSI C63.5 and not in the test method standard (ANSI C63.10). - The position of the gap is less important than that of the cable connected to the loop antenna. The cable should be away from the measurement axis and routed straight down to the floor and then away, to the measurement instrument. As such, where the antenna coaxial port is opposite to its gap (as usually is the case), the gap should be at the top for the x and y orientations and at the front (towards the EUT) for the z orientation. However, the current measurement method specification in ANSI C63.10 does not include any normative requirements on the location of the gap or routing of the cable.

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C63.10-2013	6.4.6	3 rd paragraph	Technical	<p>The shielded loop antenna we are using is designed, manufactured and calibrated by ETS-Lindgren. The company's technical staff agree that the above points are valid and suggested they should be raised to the relevant standards organization.</p> <p>If the measurement antenna is vertical only, the maximum emission levels for an EUT containing a loop antenna that can be placed in horizontal or vertical axis will be determined accurately when:</p> <ol style="list-style-type: none"> 1. The EUT is rotated through 360 deg. in the X, Y & Z planes (as ANSI-C63.10 Figures 7 and 8) 2. The loop antenna is rotated through 360 degrees while the EUT is in the X, Y and Z planes at the angular position(s) that has/have the highest emission levels 	