Date	Document
February 17, 2011	ANSI C63.4:2009

National Committee	Clause/ Subclause	Paragraph Figure/ Table	Type of comment (General/ Technical/Editorial)	COMMENTS	Proposed change	OBSERVATIONS OF THE SECRETARIAT on each comment submitted
C63	C63.4 8.3.2.2	1	Technical	As a member of the EMAC committee of A2LA I was mandated to request an interpretation from ANSI C63 about the way we should treat a specific requirement of ANSI C63.4. For many years we had a debate about the interpretation of the following requirement: ***8.3.2.2 Final radiated emission measurements (1 GHz to 40 GHz)*** *The final measurements are performed on a site meeting the requirements of 5.5. For measurements above 1 GHz, use the cable, EUT arrangement, and mode of operation determined in the exploratory testing to produce the emission that has the highest amplitude relative to the limit. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the antenna in the "cone of radiation" from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response. The antenna may have to be higher or lower than the EUT, depending on the size and mounting height of the EUT, but the antenna should be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.* All the discussions we have are on the meaning of "while keeping the antenna in the "cone of radiation"". In order to explain the dilemma, I will use an analogy. Let's presume that you would like to do a radiated emission test in a semi-anechoic room with the lighting system shut off and you attach a directive flashlight to the antenna having the exact light beam width of the horn antenna at the highest frequency of measurement. When you scan the antenna and flashlight assembly form 1 to 4 meters as required, does keeping the EUT in the "cone of radiation" would mean that the EUT will always be in the light? This would mean that the antenna and flashlight would aim down to the EUT if the beam width is too narrow to cover the EUT when the antenna moves to 4 meters. If this is not the case, could you please provide us with the proper interpretation of the meaning of keeping the EUT in the "cone of radiation"?		The FCC has a KDB that explicitly addresses this question and is in harmonization with the words in the clause cited. WebLink: https://apps.fcc.gov/oetcf/kdb/forms/FTSSearchResultPage.cfm?switch=P&id=29995 Note that the FCC bulletin addresses the 2003 version. In the 2009 revision, clause 8.3.1.2 was moved to 8.3.2.2. The analogy you provided is consistent with the text in the standard.

Weblink: https://apps.fcc.gov/oetcf/kdb/forms/FTSSearchResultPage.cfm?switch=P&id=29995

Federal Communications Commission
Office of Engineering and Technology
Laboratory Division

Electric Field Radiated Emission Measurements above 1 GHz

March 9, 2007

746324 D01 E Field Measurements above 1 GHz v01

The measurement method referenced in CISPR 22,[1] for making electric field radiated emission measurements above 1 GHz, does not satisfy the FCC requirement to maximize the radiated emission, and may not be used for making radiated emission measurements above 1 GHz. The measurement method in ANSI C63.4-2003,[2] as clarified below is to be used in making this measurement.

C63.4-2003 requires that the measurement antenna is kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. That means that if the directional radiation pattern of the EUT results in a maximum emission at an upwards angle from the EUT, when a directional antenna is used to make the measurement it will be necessary for it to be pointed towards the source of the emission within the EUT. This can be done by either pointing the antenna at an angle towards the source of the emission, or by rotating the EUT, in both height and polarization, to maximize the measured emission. The emission must be kept within the illumination area of the 3 dB beamwidth of the antenna so that the maximum emission from the EUT is measured.

Measurement procedures for electric field radiated emissions above 1 GHz are covered in Clause 8 of ANSI C63.4-2003. The C63.4-2003 measurement procedure consists of both an exploratory test and a final measurement. The exploratory test is critical to determine the frequency of all significant emissions. For each mode of operation required to be tested, the frequency spectrum is monitored. Variations in antenna height, antenna orientation, antenna polarization, EUT azimuth, and cable or wire placement is explored to produce the emission that has the highest amplitude relative to the limit.

The final measurements are made based on the findings in the exploratory testing. When making exploratory and final measurements it is necessary to maximize the measured radiated emission. Subclause 8.3.1.2 of C63.4-2003 states that the measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." We consider the "cone of radiation" to be the 3 dB beamwidth of the measurement antenna.

While the "bore-sighting" technique is not explicitly mentioned in C63.4-2003, it is a useful technique for measurements using a directional antenna, such as a double-ridged waveguide antenna. Several precautions must be observed, including: knowledge of the beamwidth of the antenna and the resulting illumination area relative to the size of the EUT, estimation for source of the emission and general location within larger EUTS, measuring system sensitivity, etc.

[1] CISPR 22 (2005), Amendment 1 (2005-07), Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement, Clause 10.6.

[2] 47 CFR Part 15.31(a)(3) specifies the use of the measurement procedure ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.