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| Date<br>March 23, 2012 | Document<br>C63.4 2003 and 2009 |
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| National Committee | Clause/ Subclause   | Paragraph Figure/ Table | Type of comment (General/ Technical/Editorial) | COMMENTS   | Proposed change  | OBSERVATIONS OF THE SECRETARIAT on each comment submitted   |
|--------------------|---|-------------------------|--|--|--|---|
|                    | 4.1.5.3<br>C63.4 2003<br><br>And<br><br>4.5.3<br>C63.4 2009 |                         | Technical.                                     | <p>Extract</p> <p>“...<b>Alternatively, a linearly polarized broadband antenna</b> or dipole tuned only above 80MHz, and set to the 80MHz tuned length when used between 30 and 80 MHz, and set to the 80 MHz tuned length when used between 30 and 80MHz, <b>may be used</b> in lieu of a tuned dipole, <b>provided that the measurements can be correlated with that made with tuned dipole with an acceptable degree accuracy.....</b>”</p> <p>Above statements allows linearly polarized broadband antennas (i.e. hybrid antennas) to be used.</p> | <p>Hybrid antennas are not allowed for final product testing in both 2003 and 2009 editions of C63.4.</p> <p style="text-align: center;">Or</p> <p>Hybrid antennas are allowed for final product testing in both 2003 and 2009 editions of C63.4 provided that the measurement can be correlated with that made with tuned dipole with an acceptable degree of accuracy.</p> | <p>There are several differences between the editions and each will be addressed individually.</p> <p>This reply applies to C63.4-2003:<br/>Section 4.1.5.3 refers to C63.2-1996 for the list of acceptable antennas. C63.2-1996 contains the following broadband antennas for 30-1000 MHz (sections 15 and 15.5.4): biconical antenna, log periodic antenna, double-ridged guide horn. There is no mention of a hybrid antenna. However, C63.2-1996: section 15.5.4 further states that linearly polarized broadband antennas are allowed, with the biconical and log periodic as the recommended types. Since a hybrid is classified as a linearly polarized antenna, it is accepted provided it is calibrated using the latest edition of C63.5 or SAE-ARP-958:1992 and can be shown to be correlated with measurements made with a tuned dipole with an acceptable degree of accuracy.</p> <p>The reply for C63.4-2009 is stated below.</p> |

This reply applies to C63.4-2009:

The broadband antennas referred to in section 4.5.3 are listed in Table 1. These are the dipole, biconical dipole, log-periodic dipole array and the double-ridged guide horn for 30-1000 MHz. That is the list of acceptable antennas. However, in section 4.5.3 there is a statement that linearly polarized broadband antennas are allowed (as specified in C63.2 or CISPR 16-1-4:2007).

Hybrid antennas are not listed in Table 1 but are listed in normative references and because of this inconsistency there are two approaches for compliance.

- 1) (preferred) Use table 1 that lists the acceptable antennas. Hybrids are not listed and therefore hybrids are not accepted.
- 2) Use normative references CISPR 16-1-4:2007 or C63.2 that state hybrids are allowed provided they meet the requirements summarized below.

Let us look at these two referenced documents and their ramifications.

The two documents are C63.2-2009 and CISPR 16-1-4:2007-02.

Normative reference CISPR 16-1-4:2007-02

A broadband antenna may be used provided it meets the requirements in clause 4.4.1.3 (30-300 MHz) and clause 4.5.2 (300-1000 MHz).

Clause 4.4.1.3 refers to clause 4.5.2 requirements which are summarized as:

- 1) Linearly polarized antenna,
- 2) Main lobe and reflected lobe within 1 dB; i.e. broad beam or pointed antenna,
- 3) Antenna with a 2:1 SWR at receiver,
- 4) Antenna calibration to meet the requirements in 4.1 of CISPR 16-1-4:2007-02.

There would also be the requirement stated in C63.4-2009; that is “provided that the measurement can be correlated with that made with a tuned dipole with an acceptable degree of accuracy”.

Normative reference C63.2-2009

To find the link to hybrid antennas;

C63.2-2009 uses CISPR 16-1-1 undated as its only normative reference. It also notes sensor specifications (Table 1, note 2) in CISPR 16-2-1, CISPR 16-2-2, CISPR 16-2-3, Measurement Procedures.

CISPR 16-2-3 clause 7.3.7 states that antennas need to conform to CISPR 16-1-4. In CISPR 16-1-4:2010-04 clause 4.5.1 it is stated:

*“The antenna shall be a dipole-like antenna designed to measure the E-field, and the free-space antenna factor shall be used. The antenna types include:*

- a) tuned dipole antennas, whose element pairs are either straight rods or conical in shape;*
- b) dipole arrays such as the log-periodic dipole array (LPDA) antennas, comprising a series of staggered sets of straight rod elements;*
- c) and hybrid antennas.”*

But there are conditions stated in clause 4.5.3 and summarized here:

- Linearly polarized,
- Meet balance test of clause 4.5.4 for frequencies below 200 MHz,
- Conditions for beamwidth, described in clause 4.5.3(c),
- Return loss of 10dB or more,
- Calibration factor to meet clause 4.1 requirements.

There would also be the requirement stated in C63.4-2009; that is “provided that the measurement can be correlated with that made with a tuned dipole with an acceptable degree of accuracy”.