

Interpretation/explanation Request 2004-C63-SC1-4

27 January 2005

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From: Art Wall

Sent: Thursday, January 27, 2005 3:37 PM

To: 'Don Heirman'

Subject: C63.4 testing

Re: FCC [reference number 898684](#)

Please advise how to answer the following questions:

“What are the requirements for testing table-top digital devices? Specifically, this question relates to the bundling and placement of cables during testing. Our client's understanding has been that he was to bundle extra cables as described in Section 6.1.4 of ANSI C-63.4 and then manipulate the cables to determine the worst case emissions as described in Sections 6.2.1.3 and 8.3.1.1. The client has now been told by a test laboratory, that it must determine the worst case emissions scenario before it bundles the cables as described in Section 6.1.4. In other words, the laboratory manipulates the cables, including bringing the cables near the sides and front of the digital device, to determine the worst case scenario. Once it has determined the worst case scenario (which often is when the cables are on the side or near the front of the equipment), it will then bundle the extra cable, if any. It is also our understanding that no further manipulation is made after the cables are bundled. The problem with this approach is that it is not a typical worst case configuration. Users typically do not bring excess cable from the back of a digital device toward the sides or front. It is more typical for a user to place the cables behind the unit and to bundle them there, if at all. Could you please advise us regarding the proper procedures?”

The following response from the C63 Subcommittee 1 is considered an explanation of the clause in ANSI C63.4

In response to the question on the application of ANSI C63.4, the following explanation and background are offered.

1. Clause 11 says that “...testing is performed as specified in Clause 6, Clause 7, and Clause 8 with the additions, specific clarifications and exceptions described in Clause 11” (all clauses are meant). So in particular, Clause 6.1.4 says: “For equipment tested on a table top, excess cable length shall be draped over the back edge of the table top. If any draped cable extends closer than 40 cm to the reference ground plane, the excess shall be bundled in the center in a serpentine fashion using 30 to 40 cm lengths in the center to maintain the 40 cm height. If the cables cannot be bundled because of bulk, length or stiffness, they shall be draped over the back edge of the tabletop unbundled, but in such a way that all portions of the interface cable remain at least 40 cm from the horizontal reference ground plane. Interconnection cables that are connected only between the EUT and the peripheral shall be bundled in the center to maintain the 40 cm height above the

reference ground plane." Finally in this clause, it says "See Figure 10 a" (for conducted) "and 11a" (for radiated). Hence it is quite clear that the starting point is with the cables bundled.

2. Later in Clause 11, we find Clause 11.2 which applies to Table Top ITE equipment and which states:
"Follow 6.2.1 for placement of the EUT, placement of the peripherals/accessory, and placement and manipulation of interface cables for testing Tabletop ITE systems".
3. Clause 6.2.1 and in particular clause 6.2.1.3 states: "The system shall be arranged in one typical equipment arrangement for the test. In making any tests, involving several table top equipment interconnected by cables or wires, it is essential to recognize that the measured levels may be critically dependent on the exact placement of the cables or wires. Thus, exploratory tests as specified in 7.2.3 (for conducted emissions) and 8.3.1.1 (for radiated emissions) shall be carried out while varying cable positions within typical arrangements to determine the maximum or near-maximum emission level. During manipulation, cables shall not be placed under or on top of the system units unless such placement is required by the inherent equipment design.
4. Clause 7.2.3 for conducted emission exploratory measurements states: "...operating the EUT in a range of typical modes of operation, cable positions, and with a typical system equipment configuration and arrangement. For each mode of operation and for each ac power current-carrying conductor, cable manipulation may be performed within the range of likely configurations." Clause 8.3.1.1 states: "The EUT should be set up in its typical configuration and arrangement, and operated in its various modes. For table top systems, cables or wires should be manipulated within the range of likely arrangements."

In summary, the explanation to address the inquiry is as follows:

1. The table top EUT setup is first made using clause 6.1.4 which means that it starts with the cables bundled.
2. During exploratory testing, cables are manipulated as stated in 7.2.3 and 8.3.1.1. This means that any cable not bundled shall be manipulated as it is really not practical or in some cases possible with the tight bundling for these to be manipulated. Typically the cables to be manipulated are those attached to the keyboard and mouse. Cables too short, bulky, or stiff to be bundled as indicated in Clause 6.1.4 are not bundled and hence can be manipulated. This would then be part of the manipulation for maximizing emissions.
3. Clause 6.2.1.3 says that only typical equipment arrangements shall be used and further warns not to place cables under or on top of the systems units unless that it is designed inherently to be done that way. So this precludes placing a cable, normally located to the rear of the EUT, on the side or near the front of the equipment which was questioned in the inquiry.
4. C63 and the FCC realized that limiting cable manipulation as stated in C63.4 was a compromise in order to reduce test time (and thus not finding the absolute maximum emissions) and yet still sufficiently measuring emission levels to protect the radio services.