



**Federal Communications Commission
Office of Engineering and Technology
Laboratory Division**

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**AC POWER-LINE CONDUCTED EMISSIONS
FREQUENTLY ASKED QUESTIONS**

Q1. Which devices are exempt or for which there are no applicable line conducted emission limits?

Section 15.103 provides for the exemption of certain digital devices from the technical standards and other requirements in Part 15. Therefore, these devices need not comply with the line conducted emission limits of Part 15. However, note that the exemption applies only to the digital devices specified in Section 15.103. It does not apply to the entire piece of equipment, which contains or is connected to a digital device or digital circuitry. The equipment, other than the digital device or circuitry, must comply with the applicable equipment authorization requirements including the AC power-line conducted (and radiated emissions) limits.

When no AC power-line conducted emission limits are specified, such as for some devices in Part 18, line conducted emission measurements are not required. Note that a domestic microwave oven is a consumer device and is subject to the AC power-line conducted emission limits in Section 18.307(b).

Q2. What are the AC power-line conducted measurement procedures for Part 15 and Part 18 devices?

The measurement procedure for Part 15 unintentional radiators are provided in ANSI C63.4-2014. For Part 15 intentional radiators the measurement procedures are provided in ANSI C63.10-2013. For Part 18 devices the measurement procedures are provided in OET MP-5.¹

The Commission has harmonized AC power-line conducted emission limits with the applicable CISPR standards, however, the measurement procedures listed above are to be followed and not the measurement procedures found in the related CISPR standards.

Q3. When a Part 15 or Part 18 device has quasi-peak and average limits for AC power-line conducted emissions, what is required to demonstrate compliance?

The device must comply with both limits, but compliance can be demonstrated in three different ways: (1) If either a peak or a quasi-peak measurement does not exceed the average limit, the device

¹ The Equipment Authorization Report and Order (FCC 14-208) has updated references to the measurement procedures for use when testing unintentional radiators (ANSI C63.4-2014) and intentional radiators (ANSI C63.10-2013). These new standards may be used effective immediately and must be followed by the end of the transition period. During the transition period, which is one year from the effective date of the rules, the new editions as well as the older editions of ANSI C63.4 and ANSI C63.10 (as noted in FCC Public Notice DA 09-2478) may be used.

is considered compliant; (2) if a peak or a quasi-peak measurement exceeds the average limit but does not exceed the quasi-peak limit, an average measurement must also be made to determine compliance with the average limit; and (3) if a peak measurement exceeds the quasi-peak limit, then a quasi-peak measurement must be made to determine compliance with the quasi-peak limit and an average measurement must also be made to determine compliance with the average limit unless the quasi-peak measurement does not exceed the average limit.

Q4. When performing AC power-line conducted emission measurements which public utility AC power-line voltages and frequencies must be used for a Part 15 or Part 18 device?

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies. Intentional radiators must be tested according to the test procedures in ANSI C63.10-2013 and unintentional radiators must be tested according to ANSI C63.4-2014 and Part 18 devices must be tested according to measurement procedure MP-5.

Q5. How should the RF power output port of a Part 15 intentional radiator be configured when making AC power-line conducted emissions measurements?

The method used for AC power-line conducted measurements with suitable dummy loads will differ for detachable and non-detachable antennas, depending on whether the operating frequency is above or below 30 MHz.

A suitable dummy load is a radio frequency termination used in place of the antenna, which has the same electrical properties as the intended antenna without radiated emissions. A device with a suitable dummy load must supply identical signals to the dummy load, as it would if an antenna were connected. In the test report, results obtained using a suitable dummy antenna shall be so noted.

Devices Operating Above 30 MHz

For a device with a permanent or detachable antenna operating above 30 MHz, measurements must be performed with the antenna connected as specified in clause 6.2 of ANSI C63.10-2013.

Devices Operating Below 30 MHz

For a device with a permanent or detachable antenna operating at or below 30 MHz, the FCC will accept measurements performed with a suitable dummy load in lieu of the antenna under the following conditions: (1) perform the AC power-line conducted tests with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band; (2) retest with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. For a detachable antenna, remove the antenna and connect a suitable dummy load to the antenna connector. For a permanent antenna, remove the antenna and terminate the RF output with a dummy load or network which simulates the antenna in the fundamental frequency band.

All measurements must be performed as specified in clause 6.2 of ANSI C63.10-2013.

Q6 When is a vertical conducting plane required for making AC power-line conducted emissions measurements on Part 15 devices?

As referred to in clause 6 of ANSI C63.10-2013 and clause 5 of ANSI C63.4-2014, a vertical conducting plane is optional when making AC power-line conducted emission measurements on tabletop devices for both intentional and unintentional radiators. The plane, if used, must be at least 2 by 2 meters in size, located 40 cm behind the EUT support table and electrically bonded to the reference ground plane. A vertical conducting plane is not required when making line conducted emission measurements on floor standing equipment.

Q7. Can the CE MARK be used to demonstrate compliance to FCC line conducted rules?

The CE Mark is used by the European Commission to indicate that a product meets the applicable European directives. The CE Mark is not an indication that the product complies with the FCC requirements and as such is not sufficient to demonstrate compliance with the U.S. regulations.

Q8. If a Part 15 device is powered from a computer or any other external power source via a USB connection, what type of USB power source is required when measuring the AC power-line conducted emissions?

It is required to perform the AC power-line conducted emissions testing and demonstrate compliance with the AC power-line emission requirements in Sections 15.107 or 15.207. Section 15.31(i) requires that the device be fully exercised and configured in a manner that maximizes the emissions. As such, the device is to be tested with each type of power source that is typically used to provide power via a USB connection such as computers and power adapters.

Change Notice

06/03/2015: [174176 D01 Line Conducted FAQ v01](#) has been replaced by [174176 D01 Line Conducted FAQ v01r01](#), added question 8 on devices powered by a USB port and footnote 1 to address use of new editions ANSI C63.4 and ANSI C63.10 standards.