



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

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**ULTRA-WIDEBAND (UWB) DEVICES
FREQUENTLY ASKED QUESTIONS**

Question 1: What technical characteristics must be measured to demonstrate ultra-wideband (UWB) device compliance to the applicable requirements specified in Part 15 Subpart F?

Answer 1: The general technical parameters to be measured and provided in an application for certification are listed in Sections 15.31, 15.33, 15.35(a), 15.35(b), 15.204, 15.207, and 15.521; Sections 15.509 through 15.519 apply for different types of UWB devices. The specific UWB technical characteristics that must be measured include the emission bandwidth, the average and peak power spectral density associated with the fundamental emission, and the average power spectral density associated with unwanted emissions (out-of-band and spurious domain).

Question 2: Are standardized measurement procedures available for performing the requisite compliance measurements?

Answer 2: Standardized procedures for measuring the technical parameters necessary to demonstrate compliance to the UWB rule requirements can be found in clause 10.1 of ANSI C63.10-2013.

Question 3: What portion of the emission spectrum from a UWB device is required to be contained within the authorized frequency bands? Is it adequate for just the center frequency to be within the authorized band?

Answer 3: For a UWB device emission spectrum, the entire fundamental bandwidth (that portion of the spectrum between the outermost –10 dB points) must be fully contained within the authorized frequency band. Consequently, it is not adequate that just the UWB center frequency be within the authorized frequency band. For example, the emissions spectrum from a ground penetrating radar (GPR) applying for authorization under Section 15.509 must have its fundamental bandwidth located below 960 MHz.

Question 4: How is the requirement for a UWB device to cease transmission after 10 seconds of inactivity (*i.e.*, Section 15.519(a)(1)) interpreted?

Answer 4: An acknowledgement of reception must continue to be received by the UWB device at least once every 10 seconds, or else the device shall cease transmission of any information other than periodic signals for use in the establishment or re-establishment of a communications link with an associated receiver.

Question 5: What types of devices are considered to be “hand held” under Section 15.519?

Answer 5: The Commission has authorized a variety of devices under this rule part on a case-by-case basis on the following general principle:

A small size UWB device that is intended to operate outdoors on a frequent basis and is capable of operating without the need for fixed infrastructure installation (*e.g.*, antennas mounted on poles or towers). Where it is not practical for the device to actually be held in a person's hand during operation, it is sufficient to show that the operator can exercise control over the device, or the object to which the device is affixed, while the device is operating.

It will still be necessary to evaluate applications for outdoor UWB operations under Section 15.519 on a case-by-case basis to ensure fidelity to the rule intent.

Question 6: What compliance information should be included with an application for certification?

Answer 6: In addition to the requirements specified in Sections 2.947, 2.911, 2.1033(b), 15.31, 15.203, and 15.521, the following information is required for the processing of a UWB application for certification:

- The UWB application category (*e.g.*, imaging device, indoor system, hand held device), and the applicable rule section (among Sections 15.509 through 15.519).
- The lower and upper -10 dB frequencies (f_L and f_H , respectively) and the frequency of the maximum observed emission level (f_M). Also provide a frequency vs. amplitude plot that graphically depicts these values.
- The maximum radiated emissions (including narrowband emissions) and the associated frequencies observed in each frequency band identified in the applicable emission limits tables.
- In the event that no emissions are observed in the aforementioned frequency bands, report the minimum sensitivity (noise floor) of the measurement system in these bands (*i.e.*, show that the measurement system is capable of detecting emissions down to the level indicated by the applicable emissions limit).
- If applicable, report all digital circuitry emissions exceeding the applicable UWB limits, and provide a complete description of the process used to justify invoking the exception stated in Section 15.521(c).
- Frequency vs. amplitude plots depicting the measured fundamental emission, the out-of-band emission domain, and the emissions into the GPS frequency bands.
- Where applicable, indicate the location of required operating labels and/or a manual disable switch.
- Supporting photographs depicting the measurement system set-up and the device under test.

Question 7: Are there any special considerations for UWB devices applying for modular approval?

Answer 7: UWB modules can only be granted under the requirements specified in §15.519 (b) – (e) and only used in a host intended to operate under the conditions of §15.519 (a), small, primarily handheld devices, or § 15.517 (a) for indoor use.

The integration manual shall provide instructions for all host's operational restrictions and limitations of the UWB rules such that:

- Host devices intended for indoor use must comply with the requirements of §15.517 (a). The host's user manual shall bear a statement on the device or in the instruction manual stating, "*This equipment may only be operated indoors. Operation outdoors violates 47 U.S.C. 301 and could subject the operator to serious legal penalties.*"
- Host devices with any potential for outdoor usage shall comply with the handheld limitations of §15.519 (a).
- For both an indoor or primarily handheld host, the module integration manual shall state that under § 15.521 (a) UWB devices may not be employed to operate toys. Operation on board an aircraft, a ship, or a satellite is prohibited.

Question 8: Are there any other options for certifying UWB devices under FCC rules?

Answer 8: Whenever possible (*i.e.*, if the UWB fundamental emission can be fully contained within the 5925–7250 MHz frequency band), Section 15.250 should be considered as an alternative to either Section 15.517 or Section 15.519.

Question 9: Is there a provision for operating wireless tank level gauges (*e.g.*, level-probing radar) under the UWB rules?

Answer 9: Section 15.517(a)(4) authorizes the use of tank level gauges as indoor UWB devices only if they are used within metal or underground storage tanks, and the emissions are directed downward, into the tank.

Change Notice

01/29/2018: 393764 D01 UWB FAQ v01 has been replaced by 393764 D01 UWB FAQ v02. Updated questions and answers including the addition of a question on “hand-held” devices.

04/25/2022: 393764 D01 UWB FAQ v02 has been replaced by 393764 D01 UWB FAQ v02r01. Updated to provide clarification of answer to question 7 regarding modular approval of UWB devices.