



## FCC Modular Transmitter Compliance

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***Objective:***

This document illustrates the adherence of the Ember Net Node to the FCC Unlicensed Modular Transmitter requirements set forth in FCC Public Notice DA 00-1407.

***Item #1:***

From DA 00-1407: The modular transmitter must have its own RF Shielding. This is intended to ensure that the module does not have to rely upon the shielding provided by the device into which it is installed in order for all modular transmitter emissions to comply with Part 15 limits. It is also intended to prevent coupling between the RF circuitry of the module and any wires or circuits in the device into which the module is installed. Such coupling may result in non-compliant operation.

EmberNet Node Compliance: The EmberNet Node contains its own soldered RF Shield, and it does not rely upon the device into which it is installed for such shielding. The test harness used during testing was designed accordingly to ensure compliance.

***Item #2:***

From DA 00-1407: The modular transmitter must have buffered modulation/data inputs (if such inputs are provided) to ensure that the module will comply with Part 15 requirements under conditions of excessive data rates or over-modulation.

EmberNet Node Compliance: The EmberNet Node contains its own Microcontroller and radio control logic (baseband) and prevents excessive data rates and over-modulation.

***Item 3:***

From DA 00-1407: The modular transmitter must have its own power supply regulation. This is intended to ensure that the module will comply with Part 15 requirements regardless of the design of the power supplying circuitry in the device into which the module is installed.

EmberNet Node Compliance: The EmberNet Node contains its own power supply regulation.

***Item #4:***

From DA 00-1407: The modular transmitter must comply with the antenna requirements of Section 15.203 and 15.204(c). The antenna must either be permanently attached or employ a “unique” antenna coupler (at all connections between the module and the antenna, including the cable). Any antenna used with the module must be approved with the module, either at the time of initial authorization or through a Class II permissive change. The “professional installation” provision of Section 15.203 may not be applied to modules.

EmberNet Node Compliance: The EmberNet Node uses a Reverse Polar SMA (RP-SMA) antenna. According to LS Compliance and Curtis-Straus, this antenna is considered “unique” and was used during compliance testing.

***Item #5:***

From DA 00-1407: The modular transmitter must be tested in a stand-alone configuration, i.e., the module must not be inside another device during testing. This is intended to demonstrate that the module is capable of complying with Part 15 emission limits regardless of the device into which it is eventually installed. Unless the transmitter module will be battery powered, it must comply with the AC line conducted requirements found in Section 15.207. AC or DC power lines and data input/output lines connected to the module must not contain ferrites, unless they will be marketed with the module (see Section 15.27(a)). The length of these lines shall be length typical of actual use or, if that length is unknown, at least 10 centimeters to insure that there is no coupling between the case of the module and supporting equipment. Any accessories, peripherals, or support equipment connected to the module during testing shall be unmodified or commercially available (see Section 15.31(i)).

EmberNet Node Compliance: The EmberNet Node was tested with a stand-alone test harness (with all connections at least 10 cm in length) and not in another device. It also complies with AC line conducted requirements found in Section 15.207. The Node does not contain ferrites on the power lines or data I/O lines connected to the module.

***Item #6:***

From DA 00-1407: The modular transmitter must be labeled with its own FCC ID number, and, if the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: XYZMODEL1" or "Contains FCCID: XYZMODEL1." Any similar wording that expresses the same meaning may be included in the application for equipment authorization, or, must provide adequate instructions along with the module which explain this requirement. In the latter case, a copy of these instructions must be included in the application for equipment authorization.

EmberNet Node Compliance: The EmberNet Node contains its own FCC ID number, and instructions for referencing this number will be provided to OEMs utilizing the Node in their devices.

***Item #7:***

From DA 00-1407: The modular transmitter must comply with any specific rule or operating requirements applicable to the transmitter and the manufacturer must provide adequate instructions along with the module to explain any such requirements. A copy of these instructions must be included in the application for equipment authorization.

EmberNet Node Compliance: The EmberNet Node contains its own Microcontroller and radio control logic (baseband) and the manufacturer from interfacing with the transmitter directly. The manufacturer's device interfaces with the Microcontroller only.

***Item #8:***

From DA 00-1407: The modular transmitter must comply with any applicable RF exposure requirements.

EmberNet Node Compliance: The EmberNet Node is to be placed into mobile and not portable devices. It will transmit at power levels below +20dBm, and it will be installed at minimum distances from human tissue in order to comply with RF exposure requirements.