

5.825 GHz band pursuant to § 15.407. The output power of such an amplifier must not exceed the maximum permitted output power of its associated transmitter.

(c) Except as otherwise described in paragraph (b) of this section, only the antenna with which an intentional radiator is authorized may be used with the intentional radiator.

11. Section 15.212 is added to read as follows:

§ 15.212 Modular transmitters.

(a) The radio elements of the modular transmitter must have its own shielding. If the modular transmitter consists of two or more partitioned sections, the interface between the sections of the modular system must be digital with a minimum signaling amplitude of 150 mV peak-to-peak. The physical crystal and tuning capacitors for partitioned modules can be located external to the shielded radio elements.

(b) 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. For partitioned modules, control information and other data may be exchanged between the firmware and radio front end.

(c) The modular transmitter must have its own power supply regulation.

(d) The modular transmitter must comply with the antenna requirements of §§ 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 § 15.203 may not be applied to modules.

(e)(1) The modular transmitter must be tested in a stand-alone configuration, *i.e.*, the module must not be inside another device during testing. Unless the transmitter module will be battery powered, it must comply with the AC line conducted requirements found in § 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* § 15.27(a)). The length of these lines used during testing shall be a 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 test equipment. Any accessories, peripherals, or support equipment

connected to the module during testing shall be unmodified or commercially available (*see* § 15.31(i)).

(2) A module comprised of two or more sections shall be tested installed on a reference platform or final host device. Signal injection testing shall be performed on the implementation with a length of cable not exceeding ten centimeters connecting the module components and platform.

(f) 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 FCC ID: XYZMODEL1." Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions to parties that may include the module in their product that such a label must be placed on the outside of the device. In the latter case, a copy of these instructions must be included in the application for equipment authorization.

(g) 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.

(h) The modular transmitter must comply with any applicable RF exposure requirements.

(i) The type number of a partitioned module will consist of a digital word 4 bytes in length with the following bit definition: 16 bits for the company information, 16 bits for the Device Number.

12. Section 15.247 is amended by revising paragraph (a)(1) introductory text and by adding paragraphs (b)(6), (b)(7), (b)(8), (b)(9), (b)(10), (b)(11) and (e) to read as follows:

§ 15.247 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.

(a) * * *

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Frequency hopping systems in the 2.4 GHz band may have hopping channel carrier frequencies separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems employ fewer than 75 hopping channels and operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

* * * * *

(b) * * *

(6) A device that operates in the 2.4 GHz band and transmits to multiple receivers (simultaneously or sequentially) will be permitted to operate at point-to-point power levels if it satisfies both of the following conditions:

(i) It must form multiple directional beams (simultaneously or sequentially) for the purpose of focusing energy on different receivers or groups of receivers.

(ii) It must transmit different information to each receiver.

(7) For devices qualifying as point-to-point under this interpretation, total RF power supplied to the array or arrays that comprise the device (*i.e.*, sum of power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels) is limited as follows:

(i) Total power is limited to the applicable power level as specified in paragraph (b)(1) or (b)(3) of this section.

(ii) Total power must be reduced by 1 dB for each 3 dB of directional gain above 6 dB of the antenna/array device, as defined in paragraph (b)(9) of this section.

(8) The power limits specified previously will be applied to the aggregate power of all simultaneously operated frequency channels and directional beams, except that, for devices that transmit on multiple beams simultaneously (on the same or different frequency channels), a higher total power level may be allowed. For such devices, both of the following power limits must be satisfied.

(i) The power supplied to each beam will be subject to the power limit as specified in paragraph (b)(7)(i) of this section.

(ii) Aggregate power transmitted simultaneously on all beams must not