

**§ 15.706 Information to the user.**

(a) In addition to the labeling requirements contained in §15.19, the instructions furnished to the user of a TVBD shall include the following statement, placed in a prominent location in the text of the manual:

This equipment has been tested and found to comply with the rules for TV bands devices, pursuant to part 15 of the FCC rules. These rules are designed to provide reasonable protection against harmful interference. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- (1) Reorient or relocate the receiving antenna.
- (2) Increase the separation between the equipment and receiver.
- (3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- (4) Consult the manufacturer, dealer or an experienced radio/TV technician for help.

(b) In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

[74 FR 7326, Feb. 17, 2009, as amended at 75 FR 75836, Dec. 6, 2010]

**§ 15.707 Permissible channels of operation.**

(a) All TVBDs are permitted to operate available channels in the frequency bands 512–608 MHz (TV channels 21–36) and 614–698 MHz (TV channels 38–51), subject to the interference protection requirements in §§15.711 and 15.712, except that operation of TVBDs is prohibited on the first channel above and the first channel below TV channel 37 (608–614 MHz) that are available, *i.e.*, not occupied by an authorized service. If a channel is not available both above and below channel 37, operation is prohibited on the first two channels near-

est to channel 37. These channels will be identified and protected in the TV bands database(s).

(b) Operation on available channels in the bands 54–60 MHz (TV channel 2), 76–88 MHz (TV channels 5 and 6), 174–216 MHz (TV channels 7–13) and 470–512 MHz (TV channels 14–20), subject to the interference protection requirements in §§15.711 and 15.712, is permitted only for fixed TVBDs that communicate only with other fixed TVBDs.

(c) Fixed and Mode II TVBDs shall operate only on available channels as identified in paragraphs (a) and (b) of this section and as determined by a TV bands database in accordance with the interference avoidance mechanisms of §§15.711 and 15.712.

(d) Mode I TVBDs shall operate only on available channels as identified in paragraphs (a) and (b) of this section and provided from a fixed or Mode II TVBD in accordance with §15.711(b)(3)(iv).

[75 FR 75836, Dec. 6, 2010]

**§ 15.709 General technical requirements.**

(a) *Power limits for TVBDs.* (1) For fixed TVBDs, the maximum power delivered to the transmitting antenna shall not exceed one watt per 6 megahertz of bandwidth on which the device operates. The power delivered to the transmitting antenna is the maximum conducted output power reduced by the signal loss experienced in the cable used to connect the transmitter to the transmit antenna. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For personal/portable TVBDs, the maximum EIRP shall not exceed 100 milliwatts (20 dBm) per 6 megahertz of bandwidth on which the device operates with the following exceptions; Mode II personal/portable TVBDs that do not meet the adjacent channel separation requirements in §15.712(a) and Mode I personal/portable TVBDs that operate on available channels (provided by a Mode II TVBD) that do not meet the adjacent channel separation requirements of §15.712(a) are limited to

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a maximum EIRP of 40 milliwatts (16 dBm) per 6 megahertz of bandwidth on which the device operates.

(3) TVBDs shall incorporate transmit power control to limit their operating power to the minimum necessary for successful communication. Applicants for equipment certification shall include a description of a device's transmit power control feature mechanism.

(4) Maximum conducted output power is the total transmit power over the occupied bandwidth delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(5) The power spectral density conducted from the TVBD to the antenna shall not be greater than the following values when measured in any 100 kHz band during any time interval of continuous transmission:

- (i) Fixed devices: 12.2 dBm.
- (ii) Personal/portable devices operating adjacent to occupied TV channels: -1.8 dBm.
- (iii) Sensing-only devices: -0.8 dBm.
- (iii) All other personal/portable devices: 2.2 dBm.

(6) TVBDs shall incorporate adequate security measures to prevent the TVBD from accessing databases not approved by the FCC and to ensure that unauthorized parties can not modify the TVBD or configure its control features to operate inconsistent with the rules and protection criteria set forth in this subpart.

(b) *Antenna requirements.* (1) All transmit and receive antenna(s) of personal/portable devices shall be permanently attached.

(2) The transmit antenna used with fixed devices may not be more than 30 meters above the ground. In addition, fixed devices may not be located at sites where the height above average

terrain (HAAT) at ground level is more than 76 meters. The ground level HAAT is to be calculated by the TV bands database that the device contacts for available channels using computational software employing the methodology in §73.684(d) of this chapter.

(3) For personal/portable TVBDs operating under §15.717, the provisions of §15.204(c)(4) do not apply to an antenna used for transmission and reception/spectrum sensing.

(4) For personal/portable TVBDs operating under §15.717 that incorporate a separate sensing antenna, compliance testing shall be performed using the lowest gain antenna for each type of antenna to be certified.

(c) *Emission limits for TVBDs.* (1) In the television channels immediately adjacent to the channel in which a TVBD is operating, emissions from the TVBD shall be at least 72.8 dB below the highest average power in the TV channel in which the device is operating.

(2) Emission measurements in the channel of operation shall be performed over a reference bandwidth of 6 megahertz with an average detector. Emission measurements in the adjacent channels shall be performed using a minimum resolution bandwidth of 100 kHz with an average detector. A narrower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 100 kHz.

(3) At frequencies beyond the television channels immediately adjacent to the channel in which the TVBD is operating, the radiated emissions from TVBDs shall meet the requirements of §15.209.

(4) Emissions in the band 602–620 MHz must also comply with the following field strength limits at a distance of one meter.

Frequency (MHz)	Field strength dBμV/meter/120 kHz
602–607 .....	120–5[F(MHz)–602]
607–608 .....	95
608–614 .....	30
614–615 .....	95
615–620 .....	120–5[620–F(MHz)]

(5) TVBDs connected to the AC power line are required to comply with the conducted limits set forth in §15.207.

(d) Compliance with radio frequency exposure requirements. To ensure compliance with the Commission's radio frequency exposure requirements in §§1.1307(b), 2.1091 and 2.1093 of this chapter, fixed TVBDs shall be accompanied by instructions on measures to take to ensure that persons maintain a distance of at least 40 cm from the device, as well as any necessary hardware that may be needed to implement that protection. These instructions shall be submitted with the application for certification. Personal/portable TVBDs that meet the definition of portable devices under §2.1093 of this chapter and that operate with a source-based time-averaged output of less than 20 mW will not be subject to routine evaluation for compliance with the radio frequency exposure guidelines, while devices that operate with a source-based time-average output power greater than 20 mW will be subject to the routine evaluation requirements.

[74 FR 7326, Feb. 17, 2009, as amended at 75 FR 75836, Dec. 6, 2010]

#### § 15.711 Interference avoidance methods.

Except as provided in §15.717, television channel availability for a TVBD is determined based on the geo-location and database access method described in paragraphs (a) and (b) of this section.

(a) *Geo-location and database access.* A TVBD shall rely on the geo-location and database access mechanism to identify available television channels consistent with the interference protection requirements of §15.712. Such protection will be provided for the following authorized and unlicensed services: digital television stations, digital and analog Class A, low power, translator and booster stations; translator receive operations; fixed broadcast auxiliary service links; private land mobile service/commercial radio service (PLMRS/CMRS) operations; off-shore radiotelephone service; low power auxiliary services authorized pursuant to §§74.801 through 74.882 of this chapter, including wireless microphones and MVPD receive sites; and unlicensed wireless microphones used by venues of large events and productions/shows as provided under

§15.713(h)(8). In addition, protection shall be provided in border areas near Canada and Mexico in accordance with §15.712(g).

(b) *Geo-location and database access requirements.* (1) The geographic coordinates of a fixed TVBD shall be determined to an accuracy of  $\pm 50$  meters by either an incorporated geo-location capability or a professional installer. In the case of professional installation, the party who registers the fixed TVBD in the database will be responsible for assuring the accuracy of the entered coordinates. The geographic coordinates of a fixed TVBD shall be determined at the time of installation and first activation from a power-off condition, and this information may be stored internally in the TVBD. If the fixed TVBD is moved to another location or if its stored coordinates become altered, the operator shall re-establish the device's:

(i) Geographic location and store this information in the TVBD either by means of the device's incorporated geo-location capability or through the services of a professional installer; and

(ii) Registration with the database based on the device's new coordinates.

(2) A Mode II personal/portable device shall incorporate a geo-location capability to determine its geographic coordinates to an accuracy of  $\pm 50$  meters. A Mode II device must also re-establish its position each time it is activated from a power-off condition and use its geo-location capability to check its location at least once every 60 seconds while in operation, except while in sleep mode, i.e., in a mode in which the device is inactive but is not powered-down.

(3)(i) Fixed devices must access a TV bands database over the Internet to determine the TV channels that are available at their geographic coordinates, taking into consideration the fixed device's antenna height, prior to their initial service transmission at a given location. Operation is permitted only on channels that are indicated in the database as being available for such TVBDs. Fixed TVBDs shall access the database at least once a day to verify that the operating channels continue to remain available. Operation on a channel must cease immediately if