

(ii) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: at least 35 dB.

(iii) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: at least  $43 + 10 \log(P)$  dB.

(3) *Emission Mask 3*—For transmitters designed to operate with a 25 kHz channel bandwidth that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows:

(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 5 kHz, but not more than 10 kHz: at least  $83 \log(f_d/5)$  dB.

(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 10 kHz, but not more than 250 percent of the authorized bandwidth: at least  $29 \log(f_d^2/11)$  dB or 50 dB, whichever is the lesser attenuation.

(iii) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: at least  $43 + 10 \log(P)$  dB.

(f) DSRCS-OBUs are governed under subpart L of this part.

[53 FR 36789, Sept. 22, 1988, as amended at 56 FR 15837, Apr. 18, 1991. Redesignated and amended at 61 FR 28769, 28770, June 6, 1996, and further redesignated and amended at 61 FR 46567, 46568, Sept. 4, 1996; 63 FR 36610, July 7, 1998; 64 FR 69931, Dec. 15, 1999; 65 FR 60878, Oct. 13, 2000; 67 FR 63289, Oct. 11, 2002; 69 FR 46446, Aug. 3, 2004]

#### § 95.637 Modulation standards.

(a) A GMRS transmitter that transmits emission types F1D, G1D, or G3E must not exceed a peak frequency deviation of plus or minus 5 kHz. A GMRS transmitter that transmits emission type F3E must not exceed a peak frequency deviation of plus or minus 5 kHz. A FRS unit that transmits emission type F3E must not exceed a peak frequency deviation of plus or minus 2.5 kHz, and the audio frequency response must not exceed 3.125 kHz.

(b) Each GMRS transmitter, except a mobile station transmitter with a power output of 2.5 W or less, must automatically prevent a greater than normal audio level from causing over-modulation. The transmitter also must include audio frequency low pass filtering, unless it complies with the applicable paragraphs of § 95.631 (without filtering.) The filter must be between the modulation limiter and the modulated stage of the transmitter. At any frequency ( $f$  in kHz) between 3 and 20 kHz, the filter must have an attenuation of at least  $60 \log_{10}(f/3)$  dB greater than the attenuation at 1 kHz. Above 20 kHz, it must have an attenuation of at least 50 dB greater than the attenuation at 1 kHz.

(c) When emission type A3E is transmitted, the modulation must be greater than 85% but must not exceed 100%. Simultaneous amplitude modulation and frequency or phase modulation of a transmitter are not permitted.

(d) When emission type A3E is transmitted by a CB transmitter having a TP of greater than 2.5 W, the CB transmitter must automatically prevent the modulation from exceeding 100%.

(e) Each CB transmitter that transmits emission type H3E, J3E or R3E must be capable of transmitting the upper sideband. The capability of also transmitting the lower sideband is permitted.

(f) DSRCS-OBUs are governed under subpart L of this part.

[53 FR 36789, Sept. 22, 1988. Redesignated and amended at 61 FR 28769, 28770, June 6, 1996, and further redesignated at 61 FR 46567, Sept. 4, 1996; 69 FR 46446, Aug. 3, 2004]

#### § 95.639 Maximum transmitter power.

(a) No GMRS transmitter, under any condition of modulation, shall exceed:

(1) 50 W *Carrier power* (average TP during one unmodulated RF cycle) when transmitting emission type A1D, F1D, G1D, A3E, F3E or G3E.

(2) 50 W peak envelope TP when transmitting emission type H1D, J1D, R1D, H3E, J3E or R3E.

(b) No R/C transmitter, under any condition of modulation, shall exceed a carrier power or peak envelope TP (single-sideband only) of:

§ 95.639

47 CFR Ch. I (10–1–06 Edition)

(1) 4 W in the 26–27 MHz frequency band, except on channel frequency 27.255 MHz;

(2) 25 W on channel frequency 27.255 MHz;

(3) 0.75 W in the 72–76 MHz frequency band.

(c) No CB transmitter, under any condition of modulation, shall exceed:

(1) 4 W Carrier power when transmitting emission type A1D or A3E;

(2) 12 W peak envelope TP when transmitting emission type H1D, J1D, R1D, H3E, J3E or R3E. Each CB transmitter which transmits emission type H3E, J3E or R3E must automatically prevent the TP from exceeding 12 W peak envelope TP or the manufacturer's rated peak envelope TP, whichever is less.

(d) No FRS unit, under any condition of modulation, shall exceed 0.500 W effective radiated power (ERP).

(e) The maximum transmitter output power authorized for LPRS stations is 100 mW.

(f) In the MICS the following limits apply:

(1) The maximum EIRP for MICS transmitter stations is 25 microwatts. The antenna associated with any MICS transmitter must be supplied with the transmitter and shall be considered part of the transmitter subject to equipment authorization. Compliance of any MICS transmitter with the 25 microwatts EIRP limit may be determined by measuring the radiated field from the equipment under test at 3 meters and calculating the EIRP. The equivalent radiated field strength at 3 meters for 25 microwatts EIRP is 18.2 mV/meter when measured on an open area test site, or 9.1 mV/meter when measured on a test site equivalent to free space such as a fully anechoic test chamber. In either case, compliance is based on measurements using a peak detector function and measured over an interval of time when transmission is continuous and at its maximum power level. In lieu of using a peak detector function, instrumentation techniques set forth in ANSI C63.17–1998, Section 6.1.2.2.1 or Section 6.1.2.2.2 may be used in determining compliance with the above specifications.

(2) For a transmitter intended to be implanted in a human body, the fol-

lowing test fixture must be used to simulate operation of the implant under actual operating conditions. See § 95.605.

(i) For measurement purposes to determine compliance with emission limits, the radiating characteristics of an implant transmitter placed in a test fixture should approximate those of an implant transmitter placed in a human body. An appropriate human torso simulator for testing medical implant transmitters consists of a cylindrical Plexiglas container with a size of 30 cm by 76 cm with a sidewall thickness of 0.635 cm. It must be completely filled with a material that is sufficiently fluidic that it will flow around the implant without any voids. The dielectric and conductivity properties of this material must match the dielectric and conductivity properties of human muscle tissue at 403.5 MHz. All emissions measurements will be made using the above specification at a nominal temperature of 20–25°C. Simple saline solutions do not meet the above criteria. A mounting grid for the implant inside the container must be provided that permits the radiating element or elements of the implant to be positioned vertically and horizontally. The grid should also support any additional implant leads associated with the therapeutic function in a fixed repeatable manner. The implant must be mounted 6 cm from the sidewall and centered vertically within the container. The above fixture shall be placed on a turntable such that the implant transmitter will be located at a nominal 1.5-meter height above ground and at a 3-meter distance from the measurement antenna. Radiated emissions measurements shall then be performed to insure compliance with the applicable technical specifications.

(ii) A formula for a suitable tissue substitute material is defined in the paper "Simulated Biological Materials for Electromagnetic Radiation Absorption Studies" by G. Hartsgrrove, A. Kraszewski, and A. Surowiec as published in "Bioelectromagnetics 8:29–36 (1987)".

(3) The power radiated in any 300 kHz bandwidth shall not exceed 25 microwatts EIRP. See §§ 95.633(e) and 95.639(g).

(g) The maximum field strength authorized for WMTS stations in the 608–614 MHz band is 200 mV/m, measured at 3 meters. For stations in the 1395–1400 MHz and 1427–1429.5 MHz bands, the maximum field strength is 740 mV/m, measured at 3 meters.

(h) No MURS unit, under any condition of modulation, shall exceed 2 Watts transmitter power output.

(i) DSRCS-OBUs are governed under subpart L of this part, except the maximum output power for portable DSRCS-OBUs is 1.0 mW. For purposes of this paragraph, a portable is a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

[53 FR 36789, Sept. 22, 1988; 53 FR 44144, Nov. 1, 1988. Redesignated and amended at 61 FR 28769, 28770, June 6, 1996, and further redesignated and amended at 61 FR 46567, 46569, Sept. 4, 1996; 64 FR 69932, Dec. 15, 1999; 65 FR 44008, July 17, 2000; 65 FR 53190, Sept. 1, 2000; 65 FR 60878, Oct. 13, 2000; 67 FR 6193, Feb. 11, 2002; 67 FR 8579, Feb. 25, 2002; 67 FR 63290, Oct. 11, 2002; 69 FR 46446, Aug. 3, 2004]

#### CERTIFICATION REQUIREMENTS

##### § 95.643 DSRCS-OBU certification.

Sections 95.645 through 95.655 do not apply to certification of DSRCS-OBUs. DSRCS-OBUs must be certified in accordance with subpart L of this part and subpart J of part 2 of this chapter.

[69 FR 46446, Aug. 3, 2004]

##### § 95.645 Control accessibility.

(a) No control, switch or other type of adjustment which, when manipulated, can result in a violation of the rules shall be accessible from the transmitter operating panel or from exterior of the transmitter enclosure.

(b) An R/C transmitter which incorporates plug-in frequency determining modules which are changed by the user must be certificated with the modules. Each module must contain all of the frequency determining circuitry including the oscillator. Plug-in crystals are not considered modules and must not be accessible to the user.

[53 FR 36789, Sept. 22, 1988. Redesignated at 61 FR 28769, June 6, 1996, and further redesignated at 61 FR 46567, Sept. 4, 1996; 63 FR 36610, July 7, 1998]

##### § 95.647 FRS unit and R/C transmitter antennas.

The antenna of each FRS unit, and the antenna of each R/C station transmitting in the 72–76 MHz band, must be an integral part of the transmitter. The antenna must have no gain (as compared to a half-wave dipole) and must be vertically polarized.

[61 FR 28770, June 6, 1996. Redesignated at 61 FR 46567, Sept. 4, 1996]

##### § 95.649 Power capability.

No CB, R/C, LPRS, FRS, MICS, MURS or WMTS unit shall incorporate provisions for increasing its transmitter power to any level in excess of the limits specified in § 95.639.

[65 FR 60878, Oct. 13, 2000]

##### § 95.651 Crystal control required.

All transmitters used in the Personal Radio Services must be crystal controlled, except an R/C station that transmits in the 26–27 MHz frequency band, a FRS unit, a LPRS unit, a MURS unit, a MICS transmitter, or a WMTS unit.

[65 FR 60878, Oct. 13, 2000]

##### § 95.653 Instructions and warnings.

(a) A user's instruction manual must be supplied with each transmitter marketed, and one copy (a draft or preliminary copy is acceptable provided a final copy is provided when completed) must be forwarded to the FCC with each request for certification.

(b) The instruction manual must contain all information necessary for the proper installation and operation of the transmitter including:

(1) Instructions concerning all controls, adjustments and switches that may be operated or adjusted without resulting in a violation of the rules.

(2) Warnings concerning any adjustment that could result in a violation of the rules or that is recommended to be performed by or under the immediate supervision and responsibility of a person certified as technically qualified to perform transmitter maintenance and repair duties in the private land mobile services and fixed services by an organization or committee representative of users of those services.