

period of 60 seconds followed by a minimum quiescent period four times the duration of the transmission period.

(g) Radar stations operating in the bands above 2.4 GHz may use any type of modulation consistent with the bandwidth requirements in § 80.209(b).

(h) Radar transponder coast stations using the 2900–3100 MHz or 9300–9500 MHz band must operate in a variable frequency mode and respond on their operating frequencies with a maximum error equivalent to 100 meters. Additionally, their response must be encoded with a Morse character starting with a dash. The duration of a Morse dot is defined as equal to the width of a space and 1/3 of the width of a Morse dash. The duration of the response code must not exceed 50 microseconds. The sensitivity of the stations must be adjustable so that received signals below –10 dBm at the antenna will not activate the transponder. Antenna polarization must be horizontal when operating in the 9300–9500 MHz band and either horizontal or both horizontal and vertical when operating in the 2900–3100 MHz band. Racons using frequency agile transmitting techniques must include circuitry designed to reduce interference caused by triggering from radar antenna sidelobes.

(i) Variable frequency ship station transponders operating in the 2900–3100 MHz or 9300–9500 MHz band that are not used for search and rescue purposes must meet the following requirements:

(1) Non-selectable transponders must have the following characteristics:

(i) They must respond on all their frequencies with a maximum range error equivalent to 100 meters;

(ii) They must use a Morse encoding of “PS” (dot-dash-dash-dot, dot-dot-dot), meaning “You should not come any closer”. The width of a Morse dot is defined as equal to the width of a space and 1/3 of the width of a Morse dash;

(iii) When they employ swept frequency techniques they must not transmit on any frequency for more than 10 seconds in any 120 second period;

(iv) Any range offset of their response must occur during their pause on the fixed frequency;

(v) The duration of the response code must not exceed 50 microseconds;

(vi) The sensitivity of the stations must be adjustable so that received signals below –10 dBm at the antenna input will not activate the transponder;

(vii) Antenna polarization must be horizontal when operating in the 9300–9500 MHz band and either horizontal or both horizontal and vertical when operating in the 2900–3100 MHz band.

(viii) Transponders using frequency agile techniques must include circuitry designed to reduce interference caused by triggering from radar antenna sidelobes.

(2) Selectable transponders must be authorized under part 5 of the Commission’s rules until standards for their use are developed.

(j) The transmitted signals of search and rescue transponders must cause to appear on a radar display a series of at least 20 equally spaced dots.

(k) The modulation requirements for EPIRB’s are contained in subpart V.

[51 FR 31213, Sept. 2, 1986, as amended at 52 FR 7418, Mar. 11, 1987; 52 FR 28825, Aug. 4, 1987; 54 FR 40058, Sept. 29, 1989; 57 FR 43407, Sept. 21, 1992; 65 FR 77824, Dec. 13, 2000; 68 FR 46965, Aug. 7, 2003; 69 FR 64673, Nov. 8, 2004]

§ 80.215 Transmitter power.

(a) Transmitter power shown on the radio station authorization is the maximum power the licensee is authorized to use. Power is expressed in the following terms:

(1) For single sideband emission: Peak envelope power;

(2) For G3E emission: Carrier power;

(3) For PON and F3N emission: Mean power;

(4) For all emissions in the 1626.5–1646.5 MHz band: equivalent isotropic radiated power.

(5) For all other emissions: the carrier power multiplied by 1.67.

(b) *Coast station frequencies below 27500 kHz.* The maximum power must not exceed the values listed below.

(1) Public coast stations, except Alaska:

(i) Radiotelegraphy:

100–160 kHz—80kW

405–525 kHz—40kW

2035–2065 kHz—6.6kW

4000–8000 kHz—10kW

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8000–9000 kHz—20kW
12000–27500 kHz—30kW

(ii) Radiotelephony:

2000–4000 kHz—day—800W
2000–4000 kHz—night—400W
4000–27500 kHz—10kW

(2) Private coast stations, except in Alaska: 1kW

(3) Coast stations in Alaska, public and private:

405–525 kHz—265W
1605–12000 kHz—150W

(c) *Coast station frequencies above 27500 kHz.* The maximum power must not exceed the values listed below.

(1) Coast stations:

156–162 MHz—50W^{1,2,13}
216–220 MHz²

(2) Marine utility stations:

156–162 MHz—10W

(d) *Ship station frequencies below 27500 kHz.* The maximum power must not exceed the values listed below:

(1) Radiotelegraphy: All ships—2kW³

(2) Radiotelephony:

(i) All ships—Great Lakes and Inland Waters—150W

(ii) All ships—Open waters; 2000–4000 kHz—150W

2182 kHz—emergency, urgency, or safety ship to shore—400W⁴

(iii) All ships—Open waters; 4000–27500 kHz—1.5kW⁵.

(3) Digital selective calling:

All ships 415–526.5 kHz—400 W

All ships 1605–4000 kHz—400 W

All ships 4000–27500 kHz—1.5 kW

(e) *Ship stations frequencies above 27500 kHz.* The maximum power must not exceed the values listed below.

(1) Ship stations 156–162 MHz—25W^{6,13}

¹Maximum authorized power at the input terminals of the station antenna.

²See paragraph (h) of this section.

³For passenger ships 5000 gross tons and over—8kW. For cable-repair ships operating on radiodetermination frequencies, 15 watts; see § 80.375(b).

⁴For passenger ships 5000 gross tons and over—1kW.

⁵For passenger ships 5,000 gross tons and over 3kW.

⁶Reducible to 1 watt or less, except for transmitters limited to public correspondence channels and used in an automated system.

¹³The frequencies 156.775 and 156.825 MHz are available for navigation-related port operations or ship movement only, and all precautions must be taken to avoid harmful in-

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Marine utility stations and hand-held portable transmitters: 156–162 MHz—10W

(2) Ship stations 216–220 MHz—25W⁷

(3) On board stations 456–468 MHz—4W⁸

(4) Ship earth stations 1626.5–1646.5 MHz⁹

(5) Ship radar stations with F3N emission—200 mW

(6) EPIRB—121.500 and 243.00 MHz¹⁰

(7) EPIRB—156.750 and 156.800 MHz¹⁰

(f) *Fixed stations.* The maximum power must not exceed the values listed below.

(1) Maritime support (receiver test):

R3E and J3C emission—150W

F3E emission—50W

(2) Operational fixed: 72–76 MHz and above 162 MHz¹¹

(3) Alaska—Private fixed:¹²

10–200 kHz—650W

405–525 kHz—265W

1605–12000 kHz—150W

(4) Alaska—Public fixed:

405–525 kHz—1kW

1605–12000 kHz—1kW

(g) The carrier power of ship station radiotelephone transmitters, except portable transmitters, operating in the 156–162 MHz band must be at least 8 but not more than 25 watts. Transmitters that use 12 volt lead acid storage batteries as a primary power source must be measured with a primary voltage between 12.2 and 13.7 volts DC. Additionally, unless otherwise indicated, equipment in radiotelephone ship stations operating in the 156–162 MHz band must meet the following requirements:

(1) All transmitters and remote control units must be capable of reducing the carrier power to one watt or less;

interference to channel 16. Transmitter output power is limited to 1 watt for ship stations, and 10 watts for coast stations.

⁷[Reserved]

⁸Certification based on a carrier power of 4 watts with transmitter connected to a dummy load of matching impedance. The effective radiated power must not exceed 2 watts.

⁹See paragraph (k) of this section.

¹⁰See subpart V of this part.

¹¹See paragraph (l) of this section.

¹²The frequencies 156.375 MHz and 156.650 MHz are primarily intership frequencies. When authorized for coast stations on a secondary basis, the normal output power must not exceed 1 watt and the maximum output power must not exceed 10 watts.

(2) Except as indicated in (g)(4) of this section, all transmitters manufactured after January 21, 1987, or in use after January 21, 1997, must automatically reduce the carrier power to one watt or less when the transmitter is tuned to 156.375 MHz or 156.650 MHz, and must be provided with a manual override switch which when held by an operator will permit full carrier power operation on 156.375 MHz and 156.650 MHz;

(3) Except as indicated in (g)(4) of this section, all ship station transmitters installed after January 9, 2006, must be capable of tuning to 156.775 MHz and 156.825 MHz and must automatically reduce the carrier power to one watt or less, with no manual override capability, when the transmitter is tuned to either 156.775 MHz or 156.825 MHz;

(4) Hand-held portable transmitters are not required to comply with the automatic reduction of carrier power in (g)(2) of this section; and

(5) Transmitters dedicated for use on public correspondence duplex channels as additional equipment to a VHF ship station in the Great Lakes which meet all pertinent rules in this part are not required to reduce their carrier power to one watt.

(h) Coast stations in an AMTS may radiate as follows, subject to the condition that no harmful interference will be caused to television reception except that TV services authorized subsequent to the filing of the AMTS station application will not be protected.

(1) When located more than 169 kilometers (105 miles) from the antenna of a Channel 13 TV station and more than 129 kilometers (80 miles) from the antenna of a channel 10 station, the ERP of coast stations having an antenna height of 61 meters (200 feet) or less above ground must not exceed 1000 watts.

(2) Coast stations located less than 169 kilometers (105 miles) from a channel 13 TV station, or less than 129 kilometers (80 miles) from a channel 10 TV station, or when using a transmitting antenna height above ground greater than 61 meters (200 feet), must submit a plan to limit interference to TV reception, unless the station's predicted interference contour is fully encom-

passed by the composite interference contour of the system's existing stations, or the station's predicted interference contour extends the system's composite interference contour over water only (disregarding uninhabited islands). The plan must include:

(i) A description of the interference contour with identification of the method used to determine this contour; and

(ii) A statement concerning the number of residences within the interference contour. The interference contour includes only areas inside the TV grade B contour with the latter determined assuming maximum permissible TV antenna height and power for broadcast stations and the actual facility parameters for translators and low power TV stations. See part 73, subpart E of this chapter for further information on TV grade B contour determination.

(3) When located as described in paragraph (h)(2) of this section, the coast station (or stations affecting the same TV Grade B contour) will be authorized if the applicant's plan has limited the interference contour(s) to fewer than 100 residences or if the applicant:

(i) Shows that the proposed site is the only suitable location (which, at the application stage, requires a showing that the proposed site is especially well-suited to provide the proposed service);

(ii) Develops a plan to control any interference caused to TV reception within the Grade B contour from its operations; and

(iii) Agrees to make such adjustments in the TV receivers affected as may be necessary to eliminate interference caused by its operations.

(4) The applicant must eliminate any interference caused by its operation to TV reception within the Grade B contour that might develop within 90 days of the time it is notified in writing by the Commission. If this interference is not removed within the 90-day period, operation of the coast station must be discontinued. The licensee is expected to help resolve all complaints of interference, whether inside or outside the Grade B contour.

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(5) The transmitter power, as measured at the input terminals to the station antenna, must be 50 watts or less.

(i) A ship station must have a transmitter output not exceeding 25 watts and an ERP not exceeding 18 watts. The maximum transmitter output power is permitted to be increased to 50 watts under the following conditions:

(1) Increases exceeding 25 watts are made only by radio command from the controlling coast stations; and

(2) The application for an equipment authorization demonstrates that the transmitter output power is 25 watts or less when external radio commands are not present.

(j) A ship installation with a transmitter output power exceeding 25 watts under the conditions of paragraph (i) of this section is exempted from the limitation of 18 watts ERP when operating in specific geographical areas identified in a plan for the use of higher power.

(k) Within the 1626.5–1646.5 MHz band the maximum e.i.r.p. by a ship earth station in any direction in the horizontal plane or in the direction of the space station must not exceed +40 dB relative to one watt in any 4 kHz band in the main beam, except upon a satisfactory showing of need for greater power, in which case a maximum of +55 dB relative to one watt may be authorized.

(l) For operational fixed stations using frequencies in the 72–76 MHz band and for other classes of stations operating above 162.025 MHz, the transmitter power must be specified in the station authorization. Frequencies in the 72–76 MHz band are listed in § 80.381. The operational requirements for 72–76 MHz are contained in subpart L of this part.

(m) For radiodetermination transmitters using A1D, A2D, F1D, F2D, G1D and G2D emissions on 154.585 MHz, 159.480 MHz, 160.725 MHz, 160.785 MHz, 454.000 MHz and 459.000 MHz the mean output power of the unmodulated carrier must not exceed 25 watts.

(n) For radiodetermination stations operating above 2400 MHz the output power must be as follows:

(1) For radar stations that use F3N emission the mean output power must not exceed 200 milliwatts;

(2) For search and rescue stations the output power must be at least 400 milliwatts peak e.i.r.p.

(3) For all other transponder stations the output power must not exceed 20 watts peak e.i.r.p. Licensees of non-selectable transponder coast stations operating in the 2920–3100 MHz and 9320–9500 MHz bands must notify in writing the USCG District Commander of any incremental increase of their station's output power above 5 watts peak e.i.r.p.

[51 FR 31213, Sept. 2, 1986, as amended at 52 FR 7419, Mar. 11, 1987; 52 FR 35244, Sept. 18, 1987; 54 FR 40058, Sept. 29, 1989; 54 FR 49994, Dec. 4, 1989; 56 FR 3783, Jan. 31, 1991; 59 FR 35269, July 11, 1994; 63 FR 36606, July 7, 1998; 65 FR 77824, Dec. 13, 2000; 67 FR 48564, July 25, 2002; 68 FR 46965, Aug. 7, 2003; 69 FR 64673, Nov. 8, 2004]

§ 80.217 Suppression of interference aboard ships.

(a) A voluntarily equipped ship station receiver must not cause harmful interference to any receiver required by statute or treaty.

(b) The electromagnetic field from receivers required by statute or treaty must not exceed the following value at a distance over sea water of one nautical mile from the receiver:

Frequency of interfering emissions	Field intensity in microvolts per meter
Below 30 MHz	0.1
30 to 100 MHz3
100 to 300 MHz	1.0
Over 300 MHz	3.0

or

Deliver not more than the following amounts of power, to an artificial antenna having electrical characteristics equivalent to those of the average receiving antenna(s) use on shipboard:

Frequency of interfering emissions	Power to artificial antenna in microwatts
Below 30 MHz	400
30 to 100 MHz	4,000
100 to 300 MHz	40,000
Over 300 MHz	400,000