

opportunity for hearing, require the licensees to make such changes in operating techniques or equipment as it may deem necessary to avoid such interference.

[61 FR 26675, May 28, 1996]

§ 21.101 Frequency tolerance.

(a) The carrier frequency of each transmitter authorized in these services shall be maintained within the following percentage of the reference frequency except as otherwise provided in paragraph (b) of this section or in the applicable subpart of this part (unless otherwise specified in the instrument of station authorization the reference frequency shall be deemed to be the assigned frequency):

Frequency range (MHz)	Frequency tolerance for fixed stations (percent)
2,150 to 2,162 ^{1 2}	0.001
2,596 to 2,680 ²	0.005

¹Beginning Aug. 9, 1975, this tolerance will govern the marketing of equipment pursuant to §§ 2.803 and 2.805 of this chapter and the issuance of all authorizations for new radio equipment. Until that date new equipment may be authorized with a frequency tolerance of 0.03 percent in the frequency range 2,200 to 10,500 MHz and equipment so authorized may continue to be used for its life provided that it does not cause interference to the operation of any other licensee. Equipment authorized in the frequency range 2,450 to 10,500 MHz prior to June 23, 1969, at a tolerance of 0.05 percent may continue to be used until February 1, 1976 provided it does not cause interference to the operation of any other licensee.

²Beginning January 21, 2000, the equipment authorized to be used at all MDS main stations, and at all MDS booster stations authorized pursuant to § 21.913(b) of this part, shall maintain a frequency tolerance of 0.001%. MDS booster stations authorized pursuant to § 21.913(e) of this part and MDS response stations authorized pursuant to § 21.909 of this part shall employ transmitters with sufficient frequency stability to ensure that the emission is, at all times, within the required emission mask.

(b) As an additional requirement in any band where the Commission makes assignments according to a specified channel plan, provisions shall be made to prevent the emission included within the occupied bandwidth from radiating outside the assigned channel at a level greater than that specified in § 21.106.

[44 FR 60534, Oct. 19, 1979, as amended at 46 FR 23450, Apr. 27, 1981; 48 FR 50329, Nov. 1, 1983; 48 FR 50732, Nov. 3, 1983; 49 FR 37775, Sept. 26, 1984; 54 FR 10327, Mar. 13, 1989; 54 FR 24905, June 12, 1989; 55 FR 46009, Oct. 31, 1990; 56 FR 57816, Nov. 14, 1991; 61 FR 26675, May 28, 1996; 63 FR 65101, Nov. 25, 1998; 64 FR 63730, Nov. 22, 1999]

§§ 21.102–21.104 [Reserved]

§ 21.105 Bandwidth.

Each authorization issued pursuant to these rules will show, as the emission designator, a symbol representing the class of emission which shall be prefixed by a number specifying the necessary bandwidth. This figure does not necessarily indicate the bandwidth actually occupied by the emission at any instant. In those cases where part 2 of this chapter does not provide a formula for the computation of the necessary bandwidth, the occupied bandwidth may be used in the emission designator.

[49 FR 48700, Dec. 14, 1984]

§ 21.106 Emission limitations.

(a) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) When using transmissions other than those employing digital modulation techniques:

(i) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 decibels;

(ii) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 decibels;

(iii) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log_{10}$ (mean output power in watts) decibels, or 80 decibels, whichever is the lesser attenuation.

(2) When using transmissions employing digital modulation techniques (see § 21.122(b)) in situations other than those covered by subpart K of this part:

(i) For operating frequencies below 15 GHz, in any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 250 percent of the authorized bandwidth: As specified by the following equation but in no event less than 50 decibels.

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$A=35+0.8(P;\text{minus};50)+10 \text{ Log}_{10} B$. (Attenuation greater than 80 decibels is not required.)

where:

A=Attenuation (in decibels) below the mean output power level.

P=Percent removed from the carrier frequency.

B=Authorized bandwidth in MHz.

(ii) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43+10 \text{ Log}_{10}$ (mean output power in watts) decibels, or 80 decibels, whichever is the lesser attenuation.

(b) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraph (a) of this section.

[44 FR 60534, Oct. 19, 1979, as amended at 46 FR 23450, Apr. 27, 1981; 52 FR 23550, June 23, 1987; 61 FR 26675, May 28, 1996; 65 FR 46617, July 31, 2000]

§ 21.107 Transmitter power.

(a) The power which a station will be permitted to use in these services will be the minimum required for satisfactory technical operation commensurate with the size of the area to be served and local conditions which affect radio transmission and reception. In cases of harmful interference, the Commission may, after notice and opportunity for hearing, order a change in the effective radiated power of a station.

(b) The EIRP of a transmitter station employed in this radio service shall not exceed the values shown in the following tabulation:

Frequency range (MHz)	Maximum allowable EIRP for a fixed station (Watts)
2,150 to 2,162	¹ 2000
2,596 to 2,680	¹ 2000

¹When a Multipoint Distribution Service station uses a non-omnidirectional antenna EIRP up to 7943 Watts may be authorized pursuant to § 21.904(b) of this Part.

[44 FR 60534, Oct. 19, 1979, as amended at 49 FR 37775, Sept. 26, 1984; 52 FR 7140, Mar. 9, 1987; 52 FR 37783, Oct. 9, 1987; 54 FR 10328, Mar. 13, 1989; 54 FR 24905, June 12, 1989; 55 FR 46009, Oct. 31, 1990; 56 FR 57816, Nov. 14, 1991; 58 FR 49224, Sept. 22, 1993; 61 FR 26675, May 28, 1996]

§ 21.108 [Reserved]

§ 21.109 Antenna and antenna structures.

(a) In the event harmful interference is caused to the operation of other stations, the Commission may, after notice and opportunity for hearing, order changes to be made in the height, orientation, gain and radiation pattern of the antenna system.

(b) The Commission may require the replacement, at the licensee's expense, of any antenna system of a permanent fixed station operating at 2500 MHz or higher upon a showing that said antenna causes or is likely to cause interference to any other authorized or proposed station.

[44 FR 60534, Oct. 19, 1979, as amended at 52 FR 37783, Oct. 9, 1987; 61 FR 26675, May 28, 1996]

§ 21.110 Antenna polarization.

Stations operating in the radio services included in this part are not limited as to the type of polarization of the radiated signal, provided, however, that in the event interference in excess of permissible levels is caused to the operation of other stations the Commission may, after notice and opportunity for hearing, order the licensee to change the polarization of the radiated signal. No change in polarization shall be made without prior authorization from the Commission.

[52 FR 37783, Oct. 9, 1987]

§ 21.111 Use of common antenna structure.

The simultaneous use of a common antenna structure by more than one station authorized under this part, or by one or more stations of any other service may be authorized. The owner, however, of each antenna structure required to be painted and/or illuminated under the provisions of Section 303(q) of the Communications Act of 1934, as amended, shall install and maintain