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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 $43+10 \text{ Log}^{10}$ (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. $A=35+0.8(P;\text{minus};50)+10 \text{ Log}^{10} B$. (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

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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

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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 the antenna structure painting and lighting in accordance with part 17 of this chapter. In the event of default by the owner, each licensee or permittee shall be individually responsible for conforming to the requirements pertaining to antenna structure painting and lighting.

[61 FR 4365, Feb. 6, 1996]

§21.112 Marking of antenna structures.

No owner, conditional licensee, or licensee of an antenna structure for which obstruction marking or lighting is required and for which an antenna structure registration number has been obtained, shall discontinue the required painting or lighting without having obtained prior written authorization therefor from the Commission. (For complete regulations relative to antenna marking requirements, see part 17 of this chapter.)

[61 FR 4365, Feb. 6, 1996]

§21.113 Quiet zones and Arecibo Coordination Zone.

Quiet zones are those areas where it is necessary to restrict radiation so as to minimize possible impact on the operations of radio astronomy or other facilities that are highly sensitive to radio frequency interference. The areas involved and procedures required are as follows:

(a) In order to minimize possible harmful interference at the National Radio Astronomy Observatory site located at Green Bank, Pocahontas

County, West Virginia, and at the Naval Radio Research Observatory site at Sugar Grove, Pendleton County, West Virginia, any applicant for a station authorization other than mobile, temporary base, or temporary fixed seeking authorization for a new station or to modify an existing station in a manner which would change either the frequency, power, antenna height or directivity, or location of such a station within the area bounded by 39°15' N. on the north, 78°30' W. on the east, 37°30' N. on the south, and 80°30' W. on the west shall, at the time of filing such application with the Commission, simultaneously notify the Director, National Radio Astronomy Observatory, Post Office Box No. 2, Green Bank, West Virginia 24944, in writing, of the technical particulars of the proposed operation. Such notification shall include the geographical coordinates of the antenna, antenna height, antenna directivity (if any), proposed frequency, type of emission, and power. In addition, the applicant shall indicate in his application to the Commission the date notification was made to the Observatory. After receipt of such applications, the Commission will allow a period of twenty (20) days for comments or objections in response to the notifications indicated. If an objection to the proposed operation is received during the 20-day period from the National Radio Astronomy Observatory for itself or on behalf of the Naval Radio Research Observatory, the Commission will consider all aspects of the problem and take whatever action is deemed appropriate.

(b) In order to minimize possible harmful interference at the Table Mountain Radio Receiving Zone of the Research Laboratories of the Department of Commerce located in Boulder County, Colorado, applicants for new or modified radio facilities in the vicinity of Boulder County, Colorado are advised to give due consideration prior to filing applications, to the need to protect the Table Mountain Radio Receiving Zone from harmful interference. To prevent degradation of this present ambient radio signal level at the site, the Department of Commerce seeks to ensure that the field strengths of any radiated signals (excluding reflected signals) received on this 728.4 hectare (1800