

(iii) On any frequency above the upper channel limit or below the lower channel limit by more than 150 percent of the authorized channel width: At least  $43 + 10 \log_{10}$  (power in watts) decibels below the mean power of the emission.

(2) For CARS stations using vestigial sideband AM transmission: At least 50 decibels below the peak power of the emission.

(c) For operation in the 17.7-19.7 GHz band:

The mean power of any emission shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) When using frequency modulation:

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

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

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

(2) When using digital modulation:

(i) In any 1 MHz band, the center frequency of which is removed from the assigned frequency by more than 50% up to and including 250% of the authorized bandwidth: As specified by the following equation but in no event less than 11 dB.

$$A = 11 + 0.4 (P - 50) + 10 \log_{10} B$$

where:

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

P = Percent removed from the carrier frequency.

B = Authorized bandwidth in MHz.

[Attenuation greater than 56 decibels is not required.]

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

(3) Amplitude Modulation:

For vestigial sideband AM video: On any frequency removed from the center frequency of the authorized band by more than 50%: at least 50 dB below peak power of the emission.

(d) In the event that interference to other stations is caused by emissions outside the authorized channel, the Commission may require greater attenuation than that specified in paragraph (b) of this section.

(e) The maximum bandwidth that will be authorized per frequency assignment is set out in the table that follows. Regardless of the maximum authorized bandwidth specified for each frequency band, the Commission reserves the right to issue a license for less than the maximum bandwidth if it appears that a bandwidth less than the maximum would be sufficient to support an applicant's intended communications.

Frequency band (MHz)	Maximum authorized band-width (MHz)
1,990 to 2,110 .....	17 or 18. <sup>1</sup>
6,425 to 6,525 .....	8 or 25.
6,875 to 7,125 .....	25.
12,700 to 13,250 .....	25.
17,700 to 19,700 .....	80.

<sup>1</sup>After a licensee has been relocated in accordance with § 78.40, the maximum authorized bandwidth in the frequency band 2025 to 2010 MHz will be 12 megahertz.

[37 FR 3292, Feb. 12, 1972, as amended at 37 FR 15927, Aug. 8, 1972; 38 FR 16648, June 25, 1973; 39 FR 26025, July 16, 1974; 48 FR 50736, Nov. 3, 1983; 49 FR 37779, Sept. 26, 1984; 52 FR 7145, Mar. 9, 1987; 65 FR 48182, Aug. 7, 2000; 68 FR 12776, Mar. 17, 2003; 68 FR 68253, Dec. 8, 2003]

**§ 78.104 Authorized bandwidth and emission designator.**

(a) The authorized bandwidth permitted to be used by a CARS station and specified in the station license shall be the occupied or necessary bandwidth, whichever is greater, except when otherwise authorized by the Commission in accordance with paragraph (b) of this section.

(b) As an exception to the provision of paragraph (a) of this section, the Commission may approve requests to base the authorized bandwidth for the station on the lesser of the occupied or necessary bandwidth where a persuasive showing is made that:

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(1) The frequency stability of the transmitting equipment to be used will permit compliance with § 78.103(b)(1) and, additionally, will permit 99 percent of the total radiated power to be kept within the frequency limits of the assigned channel.

(c) The emission designator shall be specified in terms of the necessary bandwidth. (See § 2.201(a) of this chapter.)

[39 FR 26025, July 16, 1974, as amended at 45 FR 78694, Nov. 26, 1980]

**§ 78.105 Antenna systems.**

(a) For fixed stations operating in the 12.7-13.2 GHz and 17.7-19.7 GHz bands, the following standards apply:

(1) Fixed CARS stations shall use directional antennas that meet the performance standards indicated in the following table.

(i) Stations must employ an antenna that meets the performance standards for Category B. In areas subject to fre-

quency congestion, where proposed facilities would be precluded by continued use of a Category B antenna, a Category A antenna must be employed. The Commission may require the use of a high performance antenna where interference problems can be resolved by the use of such antennas.

(ii) Upon adequate showing of need to serve a larger sector, or more than a single sector, greater beamwidth or multiple antennas may be authorized. Applicants shall request and authorization for stations in this service will specify the polarization of each transmitted signal.

(iii) Licensees shall comply with the antenna standards table shown in this paragraph in the following manner:

(A) With either the maximum beamwidth to 3 dB points requirement or with the minimum antenna gain requirement; and

(B) With the minimum radiation suppression to angle requirement.

**ANTENNA STANDARDS**

Frequency (MHz)	Category	Maximum beamwidth to 3 dB points <sup>1</sup> (included angle in degrees)	Minimum antenna gain (dbi)	Minimum radiation suppression to angle in degrees from centerline of main beam in decibels						
				5° to 10°	10° to 15°	15° to 20°	20° to 30°	30° to 100°	100° to 140°	140° to 180°
12,700 to 13,250 .....	A	1.0	n/a	23	28	35	39	41	42	50
	B	2.0	n/a	20	25	28	30	32	37	47
17,700 to 19,700 .....	A	2.2	38	25	29	33	36	42	55	55
	B	2.2	38	20	24	28	32	35	36	36

<sup>1</sup> If a licensee chooses to show compliance using maximum beamwidth to 3 dB points, the beamwidth limit shall apply in both the azimuth and the elevation planes.

(2) New periscope antenna systems will be authorized upon a certification that the radiation, in a horizontal plane, from an illuminating antenna and reflector combination meets or exceeds the antenna standards of this section. This provision similarly applies to passive repeaters employed to redirect or repeat the signal from a station's directional antenna system.

(3) The choice of receiving antennas is left to the discretion of the licensee. However, licensees will not be protected from interference which results from the use of antennas with poorer performance than defined in paragraph (a) of this section.

(4) Pickup stations are not subject to the performance standards herein stat-

ed. The provisions of this paragraph are effective for all new applications accepted for filing after October 1, 1981.

(b) Any fixed station licensed pursuant to an application accepted for filing prior to October 1, 1981, may continue to use its existing antenna system, subject to periodic renewal until April 1, 1992. After April 1, 1992, all licensees are to use antenna systems in conformance with the standards of this section. TV auxiliary broadcast stations are considered to be located in an area subject to frequency congestion and must employ a Category A antenna when:

(1) A showing by an applicant of a new CAR service or TV auxiliary broadcast, which shares the 12.7-13.20