

shall be elevated no higher than necessary to assure adequate service. Receiving antenna height shall not exceed the height criteria of Part 17 of this chapter, unless authorization for use of a specific maximum height (above ground and mean sea level) for each location has been obtained from the Commission prior to the erection of the antenna. (See part 17 of this chapter concerning construction, marking and lighting of antenna structures.) A response station operating with an EIRP no greater than  $-6$  dBW per 6 MHz channel may use an omnidirectional receiving antenna. However, for the purpose of interference protection, such response stations will be treated as if utilizing a receive antenna meeting the requirements of the reference receiving antenna of Figure 1 of § 21.902(f)(3).

[44 FR 60534, Oct. 19, 1979, as amended at 52 FR 37786, Oct. 9, 1987; 58 FR 44896, Aug. 25, 1993; 63 FR 65104, Nov. 25, 1998; 64 FR 4054, Jan. 27, 1999; 64 FR 63733, Nov. 22, 1999; 65 FR 46617, July 31, 2000]

**§ 21.907 [Reserved]**

**§ 21.908 Transmitting equipment.**

(a) Except as otherwise provided in this section, the requirements of paragraphs (a), (b), (c), (d), and (e) of § 73.687 of this chapter shall apply to stations in this service transmitting standard television signals.

EDITORIAL NOTE: At 63 FR 65104, Nov. 25, 1999, paragraph (b) was redesignated as paragraph (a) and newly designated paragraph (a) was revised. However, paragraph (a) already exists. The text of the newly redesignated paragraph (a) follows:

(a) The maximum out-of-band power of an MDS station transmitter or booster transmitting on a single 6 MHz channel with an EIRP in excess of  $-9$  dBW employing analog modulation shall be attenuated at the channel edges by at least 38 dB relative to the peak visual carrier, then linearly sloping from that level to at least 60 dB of attenuation at 1 MHz below the lower band edge and 0.5 MHz above the upper band edge, and attenuated at least 60 dB at all other frequencies. The maximum out-of-band power of an MDS station transmitter or booster transmitting on a single 6 MHz channel or a

portion thereof with an EIRP in excess of  $-9$  dBW (or, when subchannels are used, the appropriately adjusted value based upon the ratio of the channel-to-subchannel bandwidths) employing digital modulation shall be attenuated at the 6 MHz channel edges at least 25 dB relative to the licensed average 6 MHz channel power level, then attenuated along a linear slope to at least 40 dB at 250 kHz beyond the nearest channel edge, then attenuated along a linear slope from that level to at least 60 dB at 3 MHz above the upper and below the lower licensed channel edges, and attenuated at least 60 dB at all other frequencies. Notwithstanding the foregoing, in situations where an MDS station or booster station transmits, or where adjacent channel licensees jointly transmit, a single signal over more than one contiguous 6 MHz channel utilizing digital modulation with an EIRP in excess of  $-9$  dBW (or, when subchannels or superchannels are used, the appropriately adjusted value based upon the ratio of 6 MHz to the subchannel or superchannel bandwidth), the maximum out-of-band power shall be attenuated at the channel edges of those combined channels at least 25 dB relative to the power level of each channel, then attenuated along a linear slope from that level to at least 40 dB at 250 kHz above or below the channel edges of those combined channels, then attenuated along a linear slope from that level to at least 60 dB at 3 MHz above the upper and below the lower edges of those combined channels, and attenuated at least 60 dB at all other frequencies. However, should harmful interference occur as a result of emissions outside the assigned channel, additional attenuation may be required. A transmitter licensed prior to November 1, 1991, that remains at the station site initially licensed, and does not comply with this paragraph, may continue to be used for its life if it does not cause harmful interference to the operation of any other licensee. Any non-conforming transmitter replaced after November 1, 1991, must be replaced by a transmitter meeting the requirements of this paragraph.

(b) A booster transmitting on multiple contiguous or non-contiguous channels carrying separate signals (a

“broadband” booster) with an EIRP in excess of  $-9$  dBW per 6 MHz channel and employing analog, digital or a combination of these modulations shall have the following characteristics:

(1) For broadband boosters operating in the frequency range of 2.150–2.160/2 GHz, the maximum out-of-band power shall be attenuated at the upper and lower channel edges forming the band edges by at least 25 dB relative to the licensed analog peak visual carrier or digital average power level (or, when subchannels are used, the appropriately adjusted value based on upon the ratio of the channel-to-subchannel bandwidths), then linearly sloping from that level to at least 40 dB of attenuation at 0.25 MHz above and below the band edges, then linearly sloping from that level to at least 60 dB of attenuation at 3.0 MHz above and below the band edges, and attenuated at least 60 dB at all other frequencies.

(2) For broadband boosters operating in the frequency range of 2.500–2.690 GHz, the maximum out-of-band power shall be attenuated at the upper and lower channel edges forming the band edges by at least 25 dB relative to the licensed analog peak visual carrier or digital average power level (or, when subchannels are used, the appropriately adjusted value based on upon the ratio of the channel-to-subchannel bandwidths), then linearly sloping from that level to at least 40 dB of attenuation at 0.25 MHz above and below the band edges, then linearly sloping from that level to at least 50 dB of attenuation at 3.0 MHz above and below the band edges, then linearly sloping from that level to at least 60 dB of attenuation at 20 MHz above and below the band edges, and attenuated at least 60 dB at all other frequencies.

(3) Within unoccupied channels in the frequency range of 2.500–2.690 GHz, the maximum out-of-band power shall be attenuated at the upper and lower channel edges of an unoccupied channel by at least 25 dB relative to the licensed analog peak visual carrier power level or digital average power level of the occupied channels (or, when subchannels or 125 kHz channels are used, the appropriately adjusted value based upon the ratio of the channel-to-subchannel bandwidths), then

linearly sloping from that level to at least 40 dB of attenuation at 0.25 MHz above and below the occupied channel edges, then linearly sloping from that level to at least 50 dB of attenuation at 3.0 MHz above and below the occupied channel edges, and attenuated at least 50 dB at all other unoccupied frequencies.

(c) Boosters operating with an EIRP less than  $-9$  dBW per 6 MHz channel shall have no particular out-of-band power attenuation requirement, except that if they cause harmful interference, their operation shall be terminated within 2 hours of notification by the Commission until the interference can be cured.

(d) The maximum out-of-band power of an MDS response station using all or part of a 6 MHz channel, employing digital modulation and transmitting with an EIRP greater than  $-6$  dBW per 6 MHz channel shall be attenuated (as measured in accordance with paragraph (e) of this section) at the 6 MHz channel edges at least 25 dB relative to the average 6 MHz channel power level, then attenuated along a linear slope to at least 40 dB at 250 kHz beyond the nearest channel edge, then attenuated along a linear slope from that level to at least 60 dB at 3 MHz above the upper and below the lower licensed channel edges, and attenuated at least 60 dB at all other frequencies. The maximum out-of-band power of an MDS response station using all or part of a 6 MHz channel, employing digital modulation and transmitting with an EIRP no greater than  $-6$  dBW per 6 MHz channel shall be attenuated (as measured in accordance with paragraph (e) of this section) at the channel edges at least 25 dB relative to the average 6 MHz channel transmitter output power level (P), then attenuated along a linear slope to at least 40 dB or  $33+10\log(P)$  dB, whichever is the lesser attenuation, at 250 kHz beyond the nearest channel edge, then attenuated along a linear slope from that level to at least 60 dB or  $43+10\log(P)$  dB, whichever is the lesser attenuation, at 3 MHz above the upper and below the lower licensed channel edges, and attenuated at least 60 dB or  $43+10\log(P)$  dB, whichever is the lesser attenuation, at all other frequencies.

## § 21.909

Where MDS response stations with digital modulation utilize all or part of more than one contiguous 6 MHz channel to form a larger channel (e.g., a channel of width 12 MHz), the above-specified attenuations shall be applied only at the upper and lower edges of the overall combined channel. Notwithstanding these provisions, should harmful interference occur as a result of emissions outside the assigned channel(s), additional attenuation may be required by the Commission.

(e) In measuring compliance with the out-of-band emissions limitations, the licensee shall employ one of two methods in each instance: (1) absolute power measurement of the average signal power with one instrument, with measurement of the spectral attenuation on a separate instrument; or (2) relative measurement of both the average power and the spectral attenuation on a single instrument. The formula for absolute power measurements is to be used when the average signal power is found using a separate instrument, such as a power meter; the formula gives the amount by which the measured power value is to be attenuated to find the absolute power value to be used on the spectrum analyzer or equivalent instrument at the spectral point of concern. The formula for relative power measurements is to be used when the average signal power is found using the same instrument as used to measure the attenuation at the specified spectral points, and allows different resolution bandwidths to be applied to the two parts of the measurement; the formula gives the required amplitude separation (in dB) between the flat top of the (digital) signal and the point of concern.

For absolute power measurements:

Attenuation in dB (below channel power) =  $A + 10_{\log} (C_{BW} / R_{BW})$

For relative power measurements:

Attenuation in dB (below flat top) =  $A + 10_{\log} (R_{BW1} / R_{BW2})$

Where:

$A$  = Attenuation specified for spectral point (e.g., 25, 35, 40, 60 dB)

$C_{BW}$  = Channel bandwidth (for absolute power measurements)

$R_{BW}$  = Resolution bandwidth (for absolute power measurements)

## 47 CFR Ch. I (10–1–00 Edition)

$R_{BW1}$  = Resolution bandwidth for flat top measurement (relative)

$R_{BW2}$  = Resolution bandwidth for spectral point measurement (relative)

[55 FR 46011, Oct. 31, 1990, as amended at 56 FR 57818, Nov. 14, 1991; 63 FR 65105, Nov. 25, 1998; 65 FR 46617, July 31, 2000]

### § 21.909 MDS response stations.

(a) An MDS response station is authorized to provide communication by voice, video and/or data signals with its associated MDS response station hub or MDS station. An MDS response station may be operated only by the licensee of an MDS station, by any lessee of the MDS station or response station hub, or by a subscriber of either. The authorized channel may be divided to provide distinct subchannels for each of more than one response station, provided that digital modulation is employed and the aggregate power does not exceed the authorized power for the channel. An MDS response station may also, jointly with other licensees, transmit utilizing bandwidth in excess of that authorized to the station, provided that digital modulation is employed, all power spectral density requirements set forth in this part are met, and the out-of-band emissions restrictions set forth in § 21.908(b) or paragraph (j) of this section are complied with. When a 125 kHz channel is employed, the specific channel which may be used by the response station is determined in accordance with §§ 21.901 and 74.939(j) of this chapter.

(b) MDS response stations that utilize the 2150–2162 MHz band, the 2500–2686 MHz band, and/or the 125 kHz channels may be installed and operated without an individual license, to communicate with a response station hub, provided that the conditions set forth in paragraph (g) of this section are met and that the MDS response stations' technical parameters are consistent with all applicable rules in this part and with the terms and conditions set out in the Commission's *Declaratory Ruling and Order*, 11 FCC Rcd 18839 (1996).

(c) An applicant for a response station hub license, or for modification thereto where not subject to § 21.41 or § 21.42, shall: