

§ 90.541

47 CFR Ch. I (10-1-00 Edition)

(b) The frequency stability of base transmitters operating in the narrowband segment must be 100 parts per billion or better.

(c) The frequency stability of mobile, portable, and control transmitters operating in the narrowband segment must be 400 parts per billion or better when AFC is locked to the base station. When AFC is not locked to the base station, the frequency stability must be at least 1.0 ppm for 6.25 kHz, 1.5 ppm for 12.5 kHz (2 channel aggregate), and 2.5 ppm for 25 kHz (4 channel aggregate).

(d) The frequency stability of base transmitters operating in the wideband segment must be 1 part per million or better.

(e) The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked.

[63 FR 58651, Nov. 2, 1998, as amended at 65 FR 53646, Sept. 5, 2000]

EFFECTIVE DATE NOTE: At 65 FR 53646, Sept. 5, 2000, §90.539 was amended by revising paragraph (c), effective Nov. 6, 2000. For the convenience of the reader, the superseded text is set forth as follows:

§ 90.539 Frequency stability.

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(c) The frequency stability of mobile, portable and control transmitters operating in the narrowband segment must be 400 parts per billion or better when AFC is locked to a base station, and 2.5 parts per million or better when AFC is not locked.

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§ 90.541 Transmitting power limits.

The transmitting power of base, mobile, portable and control stations operating in the 764-776 MHz and 794-806

MHz frequency bands must not exceed the maximum limits in this section, and must also comply with any applicable effective radiated power limits in §90.545.

(a) The transmitting power of base transmitters must not exceed the limits given in paragraphs (a), (b) and (c) of §90.635.

(b) The transmitter output power of mobile and control transmitters must not exceed 30 Watts.

(c) The transmitter output power of portable (hand-held) transmitters must not exceed 3 Watts.

(d) Mobile and portable transmitters must be designed to employ automatic power control.

[63 FR 58651, Nov. 2, 1998]

EFFECTIVE DATE NOTE: At 65 FR 53646, Sept. 5, 2000, §90.541 was amended by removing paragraph (d), effective Nov. 6, 2000.

§ 90.543 Emission limitations.

Transmitters designed to operate in 764-776 MHz and 794-806 MHz frequency bands must meet the emission limitations in this section.

(a) The adjacent channel coupled power (ACCP) requirements for transmitters designed for various channel sizes are shown in the following tables. Mobile station requirements apply to handheld, car mounted and control station units. The tables specify a maximum value for the ACCP relative to maximum output power as a function of the displacement from the channel center frequency. In addition, the ACCP for a mobile station transmitter at the specified frequency displacement must not exceed the value shown in the tables. For transmitters that have power control, the latter ACCP requirement can be met at maximum power reduction. In the following power charts, "(s)" means a swept measurement is to be used.

6.25 KHZ MOBILE TRANSMITTER ACCP REQUIREMENTS

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP Relative (dBc)	Maximum ACCP Absolute (dBm)
6.25	6.25	-40	(1)
12.5	6.25	-60	-45
18.75	6.25	-60	-45
25	6.25	-65	-50
37.5	25	-65	-50
62.5	25	-65	-50

6.25 KHz MOBILE TRANSMITTER ACCP REQUIREMENTS—Continued

Offset from Center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP Relative (dBc)	Maximum ACCP Absolute (dBm)
87.5	25	-65	-50
150	100	-65	-50
250	100	-65	-50
>400 to receive band	30(s)	-75	-55
in the receive band	30(s)	-100	-70

¹ Not specified.

12.5 KHz MOBILE TRANSMITTER ACCP REQUIREMENTS

Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACCP relative (dBc)	Maximum ACCP absolute (dBm)
9.375	6.25	-40	(¹)
15.625	6.25	-60	-45
21.875	6.25	-60	-45
37.5	25	-65	-50
62.5	25	-65	-50
87.5	25	-65	-50
150	100	-65	-50
250	100	-65	-50
>400 to receive band	30(s)	-75	-55
in the receive band	30(s)	-100	-70

¹ Not specified.

25 KHz MOBILE TRANSMITTER ACCP REQUIREMENTS

Offset from center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP Relative (dBc)	Maximum ACCP Absolute (dBm)
15.625	6.25	-40	(¹)
21.875	6.25	-60	-45
37.5	25	-65	-50
62.5	25	-65	-50
87.5	25	-65	-50
150	100	-65	-50
250	100	-65	-50
> 400 to receive band	30(s)	-75	-55
in the receive band	30(s)	-100	-70

¹ Not specified.

150 KHz MOBILE TRANSMITTER ACCP REQUIREMENTS

Offset from center Frequency (kHz)	Measurement Bandwidth (kHz)	Maximum ACCP Relative (dBc)	Maximum ACCP Absolute (dBm)
100	50	-40	(¹)
200	50	-50	-35
300	50	-50	-35
400	50	-50	-35
600 to 1000	30(s)	-60	-45
1000 to receive band	30(s)	-70	-55
in the receive band	30(s)	-100	-75

¹ Not specified.

6.25 KHz BASE TRANSMITTER ACCP REQUIREMENTS

Offset from center frequency (kHz)	Measurement bandwidth (kHz)	Maximum ACCP (dBc)
6.25	6.25	-40
12.5	6.25	-60
18.75	6.25	-60
25	6.25	-65
37.5	25	-65
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65

6.25 KHZ BASE TRANSMITTER ACCP REQUIREMENTS—Continued

Offset from center frequency (kHz)	Measurement band-width (kHz)	Maximum ACCP (dBc)
>400 to receive band	30(s)	(1)
In the receive band	30(s)	-100

¹ – 80 (continues @ -6dB/oct)

12.5 KHZ BASE TRANSMITTER ACCP REQUIREMENTS

Offset from center Frequency (kHz)	Measurement Band-width (kHz)	Maximum ACCP (dBc)
9.375	6.25	-40
15.625	6.25	-60
21.875	6.25	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
>400 to receive band	30(s)	(1)
In the receive band	30(s)	-100

¹ – 80 (continues @ -6dB/oct)

25 KHZ BASE TRANSMITTER ACCP REQUIREMENTS

Offset from center frequency (kHz)	Measurement band-width (kHz)	Maximum ACCP (dBc)
15.625	6.25	-40
21.875	6.25	-60
37.5	25	-60
62.5	25	-65
87.5	25	-65
150	100	-65
250	100	-65
>400 to receive band	30(s)	(1)
In the receive band	30(s)	-100

¹ – 80 (continues @ -6dB/oct)

150 KHZ BASE TRANSMITTER ACCP REQUIREMENTS

Offset from center Frequency (kHz)	Measurement band-width (kHz)	Maximum ACCP (dBc)
100	50	-40
200	50	-50
300	50	-55
400	50	-60
600 to 1000	30 (s)	-65
1000 to receive band	30 (s)	(1)
In the receive band	30 (s)	-100

¹ – 75 (continues @ -6dB/oct)

(b) *ACCP measurement procedure.* The following are procedures for making transmitter measurements. For time division multiple access (TDMA) systems, the measurements are to be made under TDMA operation only during time slots when the transmitter is on. All measurements must be made at the input to the transmitter’s antenna.

Measurement bandwidth used below implies an instrument that measures the power in many narrow bandwidths (e.g. 300 Hz) and integrates these powers across a larger band to determine power in the measurement bandwidth.

(1) *Setting reference level.* Using a spectrum analyzer capable of ACCP measurements, set the measurement

bandwidth to the channel size. For example, for a 6.25 kHz transmitter, set the measurement bandwidth to 6.25 kHz; for a 150 kHz transmitter, set the measurement bandwidth to 150 kHz. Set the frequency offset of the measurement bandwidth to zero and adjust the center frequency of the spectrum analyzer to give the power level in the measurement bandwidth. Record this power level in dBm as the "reference power level".

(2) *Measuring the power level at frequency offsets <600kHz.* Using a spectrum analyzer capable of ACCP measurements, set the measurement bandwidth as shown in the tables above. Measure the ACCP in dBm. These measurements should be made at maximum power. Calculate the coupled power by subtracting the measurements made in this step from the reference power measured in the previous step. The absolute ACCP values must be less than the values given in the table for each condition above.

(3) *Measuring the power level at frequency offsets >600kHz.* Set a spectrum analyzer to 30 kHz resolution bandwidth, 1 MHz video bandwidth and sample mode detection. Sweep ± 6 MHz from the carrier frequency. Set the reference level to the RMS value of the transmitter power and note the absolute power. The response at frequencies greater than 600 kHz must be less than the values in the tables above.

(4) *Upper power limit measurement.* The absolute coupled power in dBm measured above must be compared to the table entry for each given frequency offset. For those mobile stations with power control, these measurements should be repeated with power control at maximum power reduction. The absolute ACCP at maximum power reduction must be less than the values in the tables above.

(c) *Out-of-band emission limit.* On any frequency outside of the frequency ranges covered by the ACCP tables in this section, the power of any emission must be reduced below the unmodulated carrier power (P) by at least $43 + 10 \log (P)$ dB.

(d) *Authorized bandwidth.* Provided that the ACCP requirements of this section are met, applicants may re-

quest any authorized bandwidth that does not exceed the channel size.

§ 90.545 TV/DTV interference protection criteria.

Public safety base, control, and mobile transmitters in the 764–776 MHz and 794–806 MHz frequency bands must be operated only in accordance with the rules in this section, to reduce the potential for interference to public reception of the signals of existing TV and DTV broadcast stations transmitting on TV Channels 62, 63, 64, 65, 67, 68 or 69.

(a) *D/U ratios.* Licensees of public safety stations must choose site locations that are a sufficient distance from co-channel and adjacent channel TV and DTV stations, and/or must use reduced transmitting power or transmitting antenna height such that the following minimum desired signal to undesired signal ratios (D/U ratios) are met:

(1) The minimum D/U ratio for co-channel stations is 40 dB at the hypothetical Grade B contour (64 dB μ V/m) (88.5 kilometers or 55.0 miles) of the TV station or 17 dB at the equivalent Grade B contour (41 dB μ V/m) (88.5 kilometers or 55.0 miles) of the DTV station.

(2) The minimum D/U ratio for adjacent channel stations is 0 dB at the hypothetical Grade B contour (64 dB μ V/m) (88.5 kilometers or 55.0 miles) of the TV station or –23 dB at the equivalent Grade B contour (41 dB μ V/m) (88.5 kilometers or 55.0 miles) of the DTV station.

(b) *Maximum ERP and HAAT.* The maximum effective radiated power (ERP) and the antenna height above average terrain (HAAT) of the proposed land mobile base station, the associated control station, and the mobile transmitters shall be determined using the methods described in this section.

(1) Each base station is limited to a maximum ERP of 1000 watts.

(2) Each control station is limited to a maximum ERP of 200 watts and a maximum HAAT of 61 m. (200 ft).

(3) Each mobile station is limited to a maximum ERP of 30 watts and a maximum antenna height of 6.1 m. (20 ft.).