

(o) *Equipment certification for transmitters in the 3650–3700 MHz band.* (1) Applications for all transmitters must describe the methodology used to meet the requirement that each transmitter employ a contention based protocol and indicate whether it is capable of avoiding co-frequency interference with devices using all other types of contention-based protocols (see §§ 90.7, 90.1305 and 90.1321 of this part);

(2) Applications for mobile transmitters must identify the base stations with which they are designed to communicate and describe how the requirement to positively receive and decode an enabling signal is incorporated (see § 90.1333 of this part); and

(3) Applications for systems using advanced antenna technology must provide the algorithm used to reduce the equivalent isotropically radiated power (EIRP) to the maximum allowed in the event of overlapping beams (see § 90.1321 of this part).

(4) Applications for fixed transmitters must include a description of the installation instructions and guidelines for RF safety exposure requirements that will be included with the transmitter. (See § 90.1335).

(p) *Equipment certification for transmitters in the 763–769 and 793–799 MHz Bands.* Applications for all transmitters must show support for at least 3GPP TS 23.401, V8.8.0 (2009–12), “3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access (Release 8),” December, 2009, which is incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be inspected at the Federal Communications Commission, 445 12th Street, SW., Washington, DC 20554 or National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to:

[http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html). Copies of the 3GPP Standard E-UTRA Release 8 can be ob-

tained from 3GPP Mobile Competence Centre, c/o ETSI, 650, route des Lucioles, 06921 Sophia-Antipolis Cedex, France, Tel: +33 (0)4 92 94 42 00, Fax: +33 4 93 65 47 16, <http://www.3gpp.org>.

[43 FR 54791, Nov. 22, 1978; 44 FR 32219, June 5, 1979]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 90.203, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and on GPO Access.

#### § 90.205 Power and antenna height limits.

Applicants for licenses must request and use no more power than the actual power necessary for satisfactory operation. Except where otherwise specifically provided for, the maximum power that will be authorized to applicants whose license applications for new stations are filed after August 18, 1995 is as follows:

(a) *Below 25 MHz.* For single sideband operations (J3E emission), the maximum transmitter peak envelope power is 1000 watts.

(b) *25–50 MHz.* The maximum transmitter output power is 300 watts.

(c) *72–76 MHz.* The maximum effective radiated power (ERP) for stations operating on fixed frequencies is 300 watts. Stations operating on mobile-only frequencies are limited to one watt transmitter output power.

(d) *150–174 MHz.* (1) The maximum allowable station ERP is dependent upon the station's antenna HAAT and required service area and will be authorized in accordance with table 1. Applicants requesting an ERP in excess of that listed in table 1 must submit an engineering analysis based upon generally accepted engineering practices and standards that includes coverage contours to demonstrate that the requested station parameters will not produce coverage in excess of that which the applicant requires.

(2) Applications for stations where special circumstances exist that make it necessary to deviate from the ERP and antenna heights in Table 1 will be submitted to the frequency coordinator accompanied by a technical analysis, based upon generally accepted engineering practices and standards, that

demonstrates that the requested station parameters will not produce a signal strength in excess of 37 dBu at any point along the edge of the requested service area. The coordinator may then recommend any ERP appropriate to meet this condition.

(3) An applicant for a station with a service area radius greater than 40 km (25 mi) must justify the requested serv-

ice area radius, which will be authorized only in accordance with table 1, note 4. For base stations with service areas greater than 80 km, all operations 80 km or less from the base station will be on a primary basis and all operations outside of 80 km from the base station will be on a secondary basis and will be entitled to no protection from primary operations.

TABLE 1—150–174MHz—MAXIMUM ERP/REFERENCE HAAT FOR A SPECIFIC SERVICE AREA RADIUS

	Service area radius (km)									
	3	8	13	16	24	32	40	48 <sup>4</sup>	64 <sup>4</sup>	80 <sup>4</sup>
Maximum ERP (w) <sup>1</sup> .....	1	28	178	<sup>2</sup> 500	<sup>2</sup> 500	<sup>2</sup> 500	500	<sup>2</sup> 500	<sup>2</sup> 500	<sup>2</sup> 500
Up to reference HAAT (m) <sup>3</sup>	15	15	15	15	33	65	110	160	380	670

<sup>1</sup> Maximum ERP indicated provides for a 37 dBu signal strength at the edge of the service area per FCC Report R-6602, Fig. 19 (See § 73.699, Fig. 10).

<sup>2</sup> Maximum ERP of 500 watts allowed. Signal strength at the service area contour may be less than 37 dBu.

<sup>3</sup> When the actual antenna HAAT is greater than the reference HAAT, the allowable ERP will be reduced in accordance with the following equation:  $ERP_{allow} = ERP_{max} \times (HAAT_{ref} / HAAT_{actual})^2$ .

<sup>4</sup> Applications for this service area radius may be granted upon specific request with justification and must include a technical demonstration that the signal strength at the edge of the service area does not exceed 37 dBu.

(e) 217–220 MHz. Limitations on power and antenna heights are specified in § 90.259.

(f) 220–222 MHz. Limitations on power and antenna heights are specified in § 90.729.

(g) 421–430 MHz. Limitations on power and antenna heights are specified in § 90.279.

(h) 450–470 MHz. (1) The maximum allowable station effective radiated power (ERP) is dependent upon the station's antenna HAAT and required service area and will be authorized in accordance with table 2. Applicants requesting an ERP in excess of that listed in table 2 must submit an engineering analysis based upon generally accepted engineering practices and standards that includes coverage contours to demonstrate that the requested station parameters will not produce coverage in excess of that which the applicant requires.

(2) Applications for stations where special circumstances exist that make

it necessary to deviate from the ERP and antenna heights in Table 2 will be submitted to the frequency coordinator accompanied by a technical analysis, based upon generally accepted engineering practices and standards, that demonstrates that the requested station parameters will not produce a signal strength in excess of 39 dBu at any point along the edge of the requested service area. The coordinator may then recommend any ERP appropriate to meet this condition.

(3) An applicant for a station with a service area radius greater than 32 km (20 mi) must justify the requested service area radius, which may be authorized only in accordance with table 2, note 4. For base stations with service areas greater than 80 km, all operations 80 km or less from the base station will be on a primary basis and all operations outside of 80 km from the base station will be on a secondary basis and will be entitled to no protection from primary operations.

TABLE 2—450–470 MHz—MAXIMUM ERP/REFERENCE HAAT FOR A SPECIFIC SERVICE AREA RADIUS

	Service area radius (km)									
	3	8	13	16	24	32	40 <sup>4</sup>	48 <sup>4</sup>	64 <sup>4</sup>	80 <sup>4</sup>
Maximum ERP (w) <sup>1</sup> .....	2	100	<sup>2</sup> 500	<sup>2</sup> 500	<sup>2</sup> 500	<sup>2</sup> 500	<sup>2</sup> 500	<sup>2</sup> 500	<sup>2</sup> 500	<sup>2</sup> 500

TABLE 2—450–470 MHz—MAXIMUM ERP/REFERENCE HAAT FOR A SPECIFIC SERVICE AREA  
RADIUS—Continued

	Service area radius (km)									
	3	8	13	16	24	32	40 <sup>4</sup>	48 <sup>4</sup>	64 <sup>4</sup>	80 <sup>4</sup>
Up to reference HAAT (m) <sup>3</sup>	15	15	15	27	63	125	250	410	950	2700

<sup>1</sup> Maximum ERP indicated provides for a 39 dBu signal strength at the edge of the service area per FCC Report R-6602, Fig. 29 (See § 73.699, Fig. 10 b).

<sup>2</sup> Maximum ERP of 500 watts allowed. Signal strength at the service area contour may be less than 39 dBu.

<sup>3</sup> When the actual antenna HAAT is greater than the reference HAAT, the allowable ERP will be reduced in accordance with the following equation:  $ERP_{allow} = ERP_{max} \times (HAAT_{ref} / HAAT_{actual})^2$ .

<sup>4</sup> Applications for this service area radius may be granted upon specific request with justification and must include a technical demonstration that the signal strength at the edge of the service area does not exceed 39 dBu.

(i) 470–512 MHz. Power and height limitations are specified in §§ 90.307 and 90.309.

(j) 763–775 MHz and 793–805 MHz. Power and height limitations are specified in §§ 90.541 and 90.542.

(k) 806–824 MHz, 851–869 MHz, 896–901 MHz and 935–940 MHz. Power and height limitations are specified in § 90.635

(l) 902–928 MHz. LMS systems operating pursuant to subpart M of this part in the 902–927.25 MHz band will be authorized a maximum of 30 watts ERP. LMS equipment operating in the 927.25–928 MHz band will be authorized a maximum of 300 watts ERP. ERP must be measured as peak envelope power. Antenna heights will be as specified in § 90.353(h).

(m) 929–930 MHz. Limitations on power and antenna heights are specified in § 90.494.

(n) 1427–1429.5 MHz and 1429.5–1432 MHz. Limitations on power are specified in § 90.259.

(o) 2450–2483.5 MHz. The maximum transmitter power is 5 watts.

(p) 4940–4990 MHz. Limitations on power are specified in § 90.1215.

(q) 5850–5925 MHz. Power and height limitations are specified in subpart M of this part.

(r) All other frequency bands. Requested transmitter power will be considered and authorized on a case by case basis.

(s) The output power shall not exceed by more than 20 percent either the output power shown in the Radio Equipment List [available in accordance with § 90.203(a)(1)] for transmitters included in this list or when not so listed, the manufacturer's rated output

power for the particular transmitter specifically listed on the authorization.

[60 FR 37262, July 19, 1995, as amended at 62 FR 2039, Jan. 15, 1997; 63 FR 58651, Nov. 2, 1998; 64 FR 66409, Nov. 26, 1999; 67 FR 41860, June 20, 2002; 68 FR 38639, June 30, 2003; 69 FR 46443, Aug. 3, 2004; 72 FR 48860, Aug. 24, 2007]

#### § 90.207 Types of emissions.

Unless specified elsewhere in this part, stations will be authorized emissions as provided for in paragraphs (b) through (n) of this section.

(a) *Most common emission symbols.* For a complete listing of emission symbols allowable under this part, see § 2.201 of this chapter.

(1) The first symbol indicates the type of modulation on the transmitter carrier.

A—Amplitude modulation, double sideband with identical information on each sideband.

F—Frequency modulation.

G—Phase modulation.

J—Single sideband with suppressed carrier.

P—Unmodulated pulse.

W—Cases not covered above, in which an emission consists of the main carrier modulated, either simultaneously or in a pre-established sequence, in a combination of two or more of the following modes: amplitude, angle, pulse.

(2) The second symbol indicates the type of signal modulating the transmitter carrier.

0—No modulation.

1—Digital modulation, no subcarrier.

2—Digital modulation, modulated subcarrier.

3—Analog modulation.

(3) The third symbol indicates the type of transmitted information.

A—Telegraphy for aural reception.

B—Telegraphy for machine reception.