

## 6.6. RF SAFETY @ 27.52, 1.1310

### 6.6.1. Requirements

**Sec. 27.52 RF Safety:** Licensees and manufacturers are subject to the radio frequency radiation exposure requirements specified in sections 1.1307(b), 2.1091, and 2.1093 of this chapter, as appropriate. Applications for equipment authorization of mobile or portable devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

**FCC 1.1310:** The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b).

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

#### Calculation Method of RF Safety Distance:

$$S = PG/4\pi r^2 = EIRP/4\pi r^2$$

Where: P: power input to the antenna in mW  
EIRP: Equivalent (effective) isotropic radiated power.  
S: power density mW/cm<sup>2</sup>  
G: numeric gain of antenna relative to isotropic radiator  
r: distance to centre of radiation in cm

$$r = \sqrt{PG/4\pi S}$$

## 6.6.2. MPE Evaluation

**Antenna Gain Limit specified by Manufacturer: 30 dBi**

Maximum Measured RF Conducted (dBm)	Calculated EIRP (dBm)	Laboratory's Recommended Minimum RF Safety Distance r (cm)
30.7	60.7	433.4

**Note 1: RF EXPOSURE DISTANCE LIMITS:**  $r = (PG/4\Pi IIS)^{1/2} = (EIRP/4\Pi IIS)^{1/2}$   
 $S = F/1500 = 746.5/1500 = 0.498 \text{ mW/cm}^2$

Evaluation of RF Exposure Compliance Requirements	
RF Exposure Requirements	Compliance with FCC Rules
Minimum calculated separation distance between antenna and persons required: <b>433.4 cm</b>	Manufacturer' instruction for separation distance between antenna and persons required: <b>434 cm</b> . Please refer to page v of the Installation and Operation Guide Manual for details
Antenna installation and device operating instructions for installers (professional/unskilled users), and the parties responsible for ensuring compliance with the RF exposure requirement	See Installation and Operation Guide Manual, section 3.0 Hardware Installation and Basic Interface Requirements for details
Caution statements and/or warning labels that are necessary in order to comply with the exposure limits	Please refer to page v of the Installation and Operation Guide Manual for details
Any other RF exposure related issues that may affect MPE compliance	None.

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*All test results contained in this engineering test report are traceable to National Institute of Standards and Technology (NIST)*