

## 11 FCC §90.1217 & §2.1091 - RF Exposure Information

### 11.1 Applicable Standards

According to FCC §90.1217 and §1.1307(b), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

#### Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
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

### 11.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: *S* = power density

*P* = power input to antenna

*G* = power gain of the antenna in the direction of interest relative to an isotropic radiator

*R* = distance to the center of radiation of the antenna

#### For 12 dBi gain antenna

Maximum peak output power at antenna input terminal (dBm): 15.84

Maximum peak output power at antenna input terminal (mW): 38.37

Prediction distance (cm): 20

Prediction frequency (MHz): 4950

Maximum Antenna Gain (dB): 12

Maximum Antenna Gain (numeric): 15.85

Power density of prediction frequency at 20 cm (mW/cm<sup>2</sup>): 0.12

MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>): 1.0

**For 9 dBi gain antenna**

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>19.87</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>97.05</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>4970</u>
<u>Maximum Antenna Gain (dB):</u>	<u>9</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>7.94</u>
<u>Power density of prediction frequency at 20 cm (mW/cm<sup>2</sup>):</u>	<u>0.153</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u>	<u>1.0</u>

**Conclusion**

The device complies with the MPE requirements by providing a safe separation distance of at least 20 cm between the antenna with 12 and 9 dBi gains, including any radiating structure, and any persons when normally operated.