

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 ²)	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 ²)	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

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>15.84</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>38.37</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>4950</u>
<u>Maximum Antenna Gain (dB):</u>	<u>12</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>15.85</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.12</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

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/cm²):</u>	<u>0.153</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</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.