

4 FCC §15.407(f) & §2.1091 - RF Exposure

4.1 Applicable Standard

According to FCC §15.407(f) and §1.1307(b)(1), 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

4.2 MPE Prediction

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

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

4.3 MPE Results

For 25 dBi antenna

5.2 GHz Band:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>17.25</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>53.09</u>
<u>Prediction distance (cm):</u>	<u>37</u>
<u>Prediction frequency (MHz):</u>	<u>5200</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>25</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>316.227</u>
<u>Power density of prediction frequency at 37 cm (mW/cm²):</u>	<u>0.975858</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

5.8 GHz Band:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>21.90</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>154.882</u>
<u>Prediction distance (cm):</u>	<u>63</u>
<u>Prediction frequency (MHz):</u>	<u>5785</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>25</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>316.227</u>
<u>Power density of prediction frequency at 63 cm (mW/cm²):</u>	<u>0.981994</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

For 0 dBi antenna:

5.2 GHz Band:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>29.8</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>954.99</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5200</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>0</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.1899</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

5.8 GHz Band:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>29.85</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>966.05</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5785</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>0</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.1921</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

The device meets FCC MPE requirement for uncontrolled exposure environment at 63 cm distance.