

4 FCC §15.247 (i) & §2.1091 – RF Exposure

4.1 Applicable Standard

According to FCC §15.247(i) 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

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

4.3 MPE Results

2.4 GHz Band:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>27.35</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>543.25</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>2437</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>5</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>3.162</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.342</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

5 GHz Module:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>25.51</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>355.63</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5240</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>1.9</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1.54</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.109</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

Radio Mode	Frequency (MHz)	Max Antenna Gain (dBi)	Max Conducted Power (dBm)	Power Density @ 20 cm (mW/cm²)	% of MPE
2.4 GHz	2437	5	27.35	0.342	34.2%
5 GHz	5240	1.9	25.51	0.109	11%

The device is compliant with the requirement MPE limit for uncontrolled exposure.