

4 FCC §2.1091 - RF Exposure

4.1 Applicable Standards

According to FCC §2.1091, 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

Where: 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 RF exposure evaluation for FCC

Antenna A Worst Case

<u>Maximum output power at antenna input terminal (dBm):</u>	<u>23.06</u>
<u>Maximum output power at antenna input terminal (mW):</u>	<u>202.30</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>470.1</u>
<u>Maximum Directional Antenna Gain, typical (dBi):</u>	<u>2.15</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1.64</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.066</u>
<u>FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>0.313</u>

The device is compliant with the requirement FCC MPE limit for uncontrolled exposure. The maximum power density at the distance of 20cm is 0.066 mW/cm². Limit is 0.313 mW/cm².66

Antenna B Worst Case

<u>Maximum output power at antenna input terminal (dBm):</u>	<u>23.21</u>
<u>Maximum output power at antenna input terminal (mW):</u>	<u>209.41</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>470.1</u>
<u>Maximum Directional Antenna Gain, typical (dBi):</u>	<u>2.15</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>1.64</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm²):</u>	<u>0.068</u>
<u>FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>0.313</u>

The device is compliant with the requirement FCC MPE limit for uncontrolled exposure. The maximum power density at the distance of 20cm is 0.068 mW/cm². Limit is 0.336 mW/cm².

Antennas cannot transmit simultaneously