

4 FCC §2.1091 - RF Exposure

4.1 Applicable Standard

According to FCC §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

Chain 0

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>13.4</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>21.88</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5860</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>7.6</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>5.75</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.0250</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1</u>

Chain 1

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>18.43</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>69.66</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5860</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>7.6</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>5.75</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.0797</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1</u>

Additional Radios MPE Evaluation

LTE

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>25</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>316.23</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>2498.5</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>3.5</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>2.24</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.141</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1</u>

Radio Co-location MPE Evaluation

DSRC + Cellular

$$0.0797/1+0.141/1=0.2207\leq 1.0$$

Conclusion

The device compliances with FCC MPE limit at 20 cm distance.