

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

4.1 Applicable Standard

According to FCC §15.407(f): U-NII devices are subject to the radio frequency radiation exposure requirements specified in §1.1307(b), §2.1091 and §2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a “general population/uncontrolled” environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

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

9.5 dBi antenna

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>24.27</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>267.30</u>
<u>Prediction distance (cm):</u>	<u>180</u>
<u>Prediction frequency (MHz):</u>	<u>5240</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>9.5</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>8.912</u>
<u>Power density of prediction frequency at 180.0 cm (mW/cm²):</u>	<u>0.005</u>
<u>FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.00</u>

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 180 cm is 0.005 mW/cm². Limit is 1.0 mW/cm².

28 dBi antenna

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>6.1</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>4.074</u>
<u>Prediction distance (cm):</u>	<u>180</u>
<u>Prediction frequency (MHz):</u>	<u>5240</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>28</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>630.96</u>
<u>Power density of prediction frequency at 180.0 cm (mW/cm²):</u>	<u>0.006</u>
<u>FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.00</u>

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 180 cm is 0.006 mW/cm². Limit is 1.0 mW/cm².