

4 FCC §101.1525 & §2.1091 – RF Exposure

4.1 Applicable Standard

According to FCC §1.1307 (b) (1) and §101.1525, 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.

According to §1.1310 and §2.1091 RF exposure is calculated.

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

72 GHz band:

Maximum peak output power at antenna input terminal (dBm):	20.64
Maximum peak output power at antenna input terminal (mW):	115.8777
Prediction distance (cm):	1522
Prediction frequency (MHz):	72,375
Maximum Antenna Gain, typical (dBi):	54
Maximum Antenna Gain (numeric):	251188.6
Power density of prediction frequency at 20 cm (mW/cm ²):	0.99991
MPE limit for uncontrolled exposure at prediction frequency (mW/cm ²):	1.0

82 GHz band:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>20.46</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>111.17</u>
<u>Prediction distance (cm):</u>	<u>1522</u>
<u>Prediction frequency (MHz):</u>	<u>82,375</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>54</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>251188.6</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.959314</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

74 GHz band:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>20.97</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>125.026</u>
<u>Prediction distance (cm):</u>	<u>1581</u>
<u>Prediction frequency (MHz):</u>	<u>74,875</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>54</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>251188.6</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.99983</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

84 GHz band:

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>20.59</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>114.551</u>
<u>Prediction distance (cm):</u>	<u>1581</u>
<u>Prediction frequency (MHz):</u>	<u>84,875</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>54</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>251188.6</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.916065</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

72/82 GHz Band:

The worst power density level at 1522 cm is 0.99991 mW/cm² antenna, which is below the uncontrolled exposure limit of 1.0 mW/cm².

74/84 GHz Band:

The worst power density level at 1581 cm is 0.99983 mW/cm² antenna, which is below the uncontrolled exposure limit of 1.0 mW/cm².

Note: The conducted output power was performed by the manufacturer.