

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

### 4.1 Applicable Standard

According to FCC §15.407(f) 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 <sup>2</sup> )	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 <sup>2</sup> )	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

#### 5.8 GHz Band:

**Antenna gain = 4 dBi**  
**HT20 Dual Antenna (Data Rate: M8)**

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>26.04</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>401.79</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5825</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>4</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>2.512</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm<sup>2</sup>):</u>	<u>0.2</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u>	<u>1.0</u>

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.2 mW/cm<sup>2</sup>. Limit is 1.0 mW/cm<sup>2</sup>.

**Antenna gain = 7 dBi**  
**HT20 Dual Antenna (Data Rate: M8)**

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>26.04</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>401.79</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5825</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>7</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>5.012</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm<sup>2</sup>):</u>	<u>0.4</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u>	<u>1.0</u>

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.4 mW/cm<sup>2</sup>. Limit is 1.0 mW/cm<sup>2</sup>.

**Antenna gain = 8 dBi**  
**Non HT20 Dual Antenna**

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>24.61</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>289.07</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5825</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>8</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>6.31</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm<sup>2</sup>):</u>	<u>0.363</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u>	<u>1.0</u>

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.363 mW/cm<sup>2</sup>. Limit is 1.0 mW/cm<sup>2</sup>.

**Antenna gain = 14 dBi  
HT20 Dual Antenna (Data Rate: M0)**

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>18.81</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>76.033</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5745</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>14</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>25.119</u>
<u>Power density of prediction frequency at 20.0 cm (mW/cm<sup>2</sup>):</u>	<u>0.38</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u>	<u>1.0</u>

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.38 mW/cm<sup>2</sup>. Limit is 1.0 mW/cm<sup>2</sup>.