

10 FCC §1.1307(b)(1), §2.1091 & IC RSS-102 - RF Exposure

10.1 Applicable Standards

According to §1.1310 and §2.1091 (Mobile Devices) 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 (minute)
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

Note: f = frequency in MHz

* = Plane-wave equivalent power density

According to IC RSS-102 Issue 5 section 4, RF limits used for general public will be applied to the EUT.

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ f ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ f ^{0.25}	0.1540/ f ^{0.25}	8.944/ f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619 f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/ f ^{1.2}
Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

10.2 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

10.3 Test Results

Downlink

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>40.75</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>11885.02</u>
<u>Prediction distance (cm):</u>	<u>72</u>
<u>Prediction frequency (MHz):</u>	<u>1960</u>
<u>Antenna Gain, typical (dBi):</u>	<u>4</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>2.512</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.458</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>1</u>
<u>Power density at predication frequency and distance (W/m2):</u>	<u>4.58</u>
<u>MPE limit for uncontrolled exposure at predication frequency (W/m2):</u>	<u>4.67</u>

Uplink

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>20.79</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>119.95</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>1850.2</u>
<u>Antenna Gain, typical (dBi):</u>	<u>4</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>2.512</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.05994</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>1</u>
<u>Power density at predication frequency and distance (W/m2):</u>	<u>0.5994</u>
<u>MPE limit for uncontrolled exposure at predication frequency (W/m2):</u>	<u>4.48</u>

Results

For uplink and downlink, the highest power density levels at **72 cm** are below the MPE uncontrolled exposure limit.