

9 FCC §1.1307(b)(1) & §2.1091 - RF Exposure

9.1 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

9.2 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

9.3 Test Results

Cellular Band Uplink

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>20.00</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>100.00</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>848.20</u>
<u>Antenna Gain, typical (dBi):</u>	<u>5</u>
<u>Cable Loss (dB)</u>	<u>8</u>
<u>Maximum Antenna Gain+ Cable Loss (numeric):</u>	<u>0.501</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.0692</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>0.5654</u>

Cellular Band Downlink

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>9.99</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>9.98</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>869.2</u>
<u>Antenna Gain, typical (dBi):</u>	<u>5</u>
<u>Cable Loss (dB)</u>	<u>8</u>
<u>Maximum Antenna Gain+ Cable Loss (numeric):</u>	<u>0.501</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.0062</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>0.5794</u>

PCS Band Uplink

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>20.00</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>100.00</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>1880.0</u>
<u>Antenna Gain, typical (dBi):</u>	<u>3</u>
<u>Cable Loss (dB)</u>	<u>5</u>
<u>Maximum Antenna Gain+ Cable Loss (numeric):</u>	<u>1.584</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.0396</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>1.0</u>

PCS Band Downlink

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>10.02</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>10.05</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>1930.2</u>
<u>Antenna Gain, typical (dBi):</u>	<u>3</u>
<u>Cable Loss (dB)</u>	<u>5</u>
<u>Maximum Antenna Gain+ Cable Loss (numeric):</u>	<u>1.584</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.0039</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>1.0</u>

Results

For uplink and downlink, the highest power density levels at 20 cm are below the MPE uncontrolled exposure limit.