

## **FCC §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

### **Applicable Standard**

According to subpart 15.247 (i) and subpart 1.1310, 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

<b>Limits for General Population/Uncontrolled Exposure</b>				
<b>Frequency Range (MHz)</b>	<b>Electric Field Strength (V/m)</b>	<b>Magnetic Field Strength (A/m)</b>	<b>Power Density (mW/cm<sup>2</sup>)</b>	<b>Averaging Time (minutes)</b>
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

### **Calculated Formulary:**

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$  = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

**Calculated Data:**

Mode	Frequency Range (MHz)	Antenna Gain		Target Output Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(mW)			
GSM 850	824.2-848.8	0.0	1.00	24.00	251.19	20	0.0500	0.55
PCS 1900	1850.2-1909.8	0.0	1.00	21.00	125.89	20	0.0250	1.00

**Note:**

Antenna Gain (numeric): 0.0dBi (1.0) for GSM 850 mode.

Antenna Gain (numeric): 0.0 dBi (1.0) for PCS 1900 mode.

3. GSM 850: Tune-up maximum output power is 33.00 dBm, so the tune-up time based Ave. power compared to slotted Ave. power is 24.00dBm.

PCS 1900: Tune-up Maximum output power is 30.00 dBm, so the tune-up time based Ave. power compared to slotted Ave. power is 21.00 dBm.

Number of Time slot	1
Duty Cycle	1:8
Time based Ave. power compared to slotted Ave. power	-9 dB

**Result:** The device meet FCC MPE at 20 cm distance.