

## **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);

For simultaneously transmit system, the calculated power density should comply with:

**Calculated Data (worst case):**

Mode	Frequency Range (MHz)	Maximum Antenna Gain		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(mW)			
Wi-Fi 802.11b	2412-2462	2.0	1.58	23.50	223.87	20	0.0704	1.00
Wi-Fi 802.11g		2.0	1.58	23.50	223.87	20	0.0704	1.00
Wi-Fi 802.11n-HT20		2.0	1.58	23.50	223.87	20	0.0704	1.00
Wi-Fi 802.11n-HT40	2422-2452	2.0	1.58	23.50	223.87	20	0.0704	1.00
BLE	2402-2480	2.0	1.58	4.50	2.82	20	0.0009	1.00
Bluetooth	2402-2480	2.0	1.58	7.50	5.62	20	0.0018	1.00

Note: Wi-Fi and BT/BLE cannot transmit simultaneously.

**Conclusion:** The device meets MPE at distance 20cm.