

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

### **Applicable Standard**

According to subpart §2.1091 and subpart §1.1310, 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 Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

<b>(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;

According to §1.1310 and §2.1091 RF exposure is calculated.

### **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		Tune-up Output Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2412~2462	2.55	1.80	20.00	100.00	20	0.0358	1.0
802.11g		2.55	1.80	21.00	125.89	20	0.0451	1.0
802.11n-HT20		2.55	1.80	21.00	125.89	20	0.0451	1.0
802.11n-HT40	2422~2452	2.55	1.80	21.50	141.25	20	0.0506	1.0
802.11a	5150~5250	4.56	2.86	13.50	22.39	20	0.0127	1.0
	5725~5850	4.56	2.86	11.00	12.59	20	0.0072	1.0
802.11n20	5150~5250	4.56	2.86	13.50	22.39	20	0.0127	1.0
	5725~5850	4.56	2.86	11.00	12.59	20	0.0072	1.0
802.11n40	5150~5250	4.56	2.86	6.00	3.98	20	0.0023	1.0
	5725~5850	4.56	2.86	11.00	12.59	20	0.0072	1.0

**Note:** 1. For the above tune up power were declared by the manufacturer.  
 2. 2.4G Wi-Fi and 5G Wi-Fi can't transmit simultaneously.

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