

## 4 FCC §1.1310, §2.1091, §15.407(f) - Maximum Permissible Exposure (MPE)

### 4.1 Applicable Standard

According to subpart 15.247(i) 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) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
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);

### 4.2 RF Exposure Evaluation Result

Mode	Frequency Range (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(mW)			
BLE	2402-2480	3.80	2.3988	19.00	79.4328	20	0.0379	1
BR/EDR	2402-2480	3.80	2.3988	21.00	125.8925	20	0.0601	1
Wi-Fi 2.4G	2412-2472	3.80	2.3988	25.00	316.2278	20	0.1510	1
Wi-Fi 5G	5150-5850	5.50	3.5481	14.50	28.1838	20	0.0199	1

*Note: Wi-Fi and BT can't simultaneously.*

**Result:** MPE evaluation meet 20 cm the requirement of standard.