

## 5 FCC §15.247(i), §1.1310, § 2.1091 - Maximum Permissible Exposure (MPE)

### 5.1 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>(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);

### 5.2 RF Exposure Evaluation Result

#### MPE evaluation:

<b>Mode</b>	<b>Frequency Range (MHz)</b>	<b>Antenna Gain</b>		<b>Target Power</b>		<b>Evaluation Distance (cm)</b>	<b>Power Density (mW/cm<sup>2</sup>)</b>	<b>MPE Limit (mW/cm<sup>2</sup>)</b>
		<b>(dBi)</b>	<b>(numeric)</b>	<b>(dBm)</b>	<b>(mW)</b>			
WI-FI 2.4G	2412-2462	1.5	1.413	21	125.893	20	0.0354	1
BT	2402-2480	1.5	1.413	8	6.310	20	0.0018	1
BLE	2402-2480	1.5	1.413	6.5	4.467	20	0.0013	1

Note: Wi-Fi 2.4G and BT/BLE can’t transmit simultaneously.

**Result:** MPE evaluation meets the requirements of the **20cm** standard.

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