

**FCC §15.247 (i) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**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.

**Per 447498 D01 General 25 RF Exposure Guidance v05r01**, simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0.

**Calculated Formulary:**

Predication of MPE limit at a given distance

S = PG/4πR<sup>2</sup> = 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:**

RF module	Frequency band	Antenna Gain		Conducted Power	Duty cycle	Evaluation	Power Density	MPE Limit	MPE Ratios
	(MHz)	(dBi)	(numeric)	(mW)	(%)	(cm)	(mW/cm <sup>2</sup> )	(mW/cm <sup>2</sup> )	(%)
WIFI*	2412-2462	2.1	1.62	117	100	20	0.038	1	3.77
	2422-2452	2.1	1.62	32	100	20	0.010	1	1.03
	5475-5825	2.1	1.62	36	100	20	0.012	1	1.16
	5755-5795	2.8	1.91	120	100	20	0.046	1	<b>4.56</b>
	5190-5230	3.8	2.40	30	100	20	0.014	1	1.43
	5180-5240	3.8	2.40	32	100	20	0.015	1	1.53
BT	2402-2480	2.5	1.78	4	100	20	0.001	1	<b>0.13</b>
CDMA**	824.7-848.31	2.1	1.62	298	100	20	0.096	0.55	<b>17.48</b>
	1851.25-1908.75	3.0	2.00	274	100	20	0.109	1	10.86
Total sum of MPE ratios (%)									22.17

**Note:**

\* For WIFI module, 2.4GHz and 5GHz band can't transmit simultaneously, the worst case for MPE was chosen to be added up.

\* For CDMA module, the worst case for MPE was chosen to be added up.

**Result:** 22.17 % < 1, the device meet FCC MPE at 20 cm distance.