

**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.

**Calculation formula:**

Prediction of power density at the distance of the applicable MPE limit

$S = PG/4\pi R^2$  = 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:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

**Calculated Data:**

Radio	Description	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
			(dBi)	(numeric)	(dBm)	(mW)			
0	WLAN 5G Low Band	5180-5320	2.8	1.91	22	158.49	20.00	0.06	1.0
1	WLAN 2.4G+5G Whole Band	2412-2462	2	1.58	30	1000.00	20.00	0.32	1.0
		5180-5825	2.8	1.91	25	316.23	20.00	0.12	1.0
2	BLE	2402-2480	4	2.51	3	2.00	20.00	0.001	1.0

Note:

The Radio 1(WLAN 2.4G+5G Band) can transmit in 2.4G band, or 5G band, or transmit in both band simultaneously. Radio 1(WLAN 2.4G+5G Band) and Radio 0 can't transmit in 5150-5250MHz band simultaneously.

The 3 radios can transmit simultaneously, the maximum RF exposure condition as below:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$$=S_{Radio1-2.4G}/S_{limit-Radio1-2.4G} + S_{Radio1-5G}/S_{limit-Radio1-5G} + S_{Radio0-5G}/S_{limit-Radio0-5G} + S_{Radio2}/S_{limit-Radio2}$$

$$=0.06/1+0.32/1+0.12/1+0.001/1$$

$$=0.50$$

$$< 1.0$$

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