

**FCC §15.407 (f) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**Applicable Standard**

According to subpart 15.407(f) 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 fac vhtor, 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:**

Mode	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)			
WLAN-2.4G	2412-2462	2.5	1.78	23	199.53	25.00	<b>0.05</b>	<b>1.00</b>
WLAN-5.2G	5150-5250	2.5	1.78	14	25.12	25.00	0.01	1.00
WLAN-5.8G	5725-5850	2.5	1.78	15	31.62	25.00	<b>0.01</b>	<b>1.00</b>
GSM850	824-849	1.75	1.50	33	1995.26	25.00	<b>0.38</b>	<b>0.55</b>
PCS1900	1850-1910	-0.24	0.95	31	1258.93	25.00	0.15	1.00
WCDMA Band 2	1850-1910	-0.24	0.95	24.5	281.84	25.00	0.03	1.00
WCDMA Band 4	1710-1755	1.05	1.27	23.5	223.87	25.00	0.04	1.00
WCDMA Band 5	824-849	1.75	1.50	25	316.23	25.00	0.06	0.55
LTE Band 2	1850-1910	-0.24	0.95	23	199.53	25.00	0.02	1.00
LTE Band 4	1710-1755	1.05	1.27	24	251.19	25.00	0.04	1.00
LTE Band 5	824-849	1.75	1.50	24	251.19	25.00	0.05	0.55
LTE Band 7	2500-2570	0.29	1.07	24	251.19	25.00	0.03	1.00
LTE Band 12	699-716	-1.71	0.67	24	251.19	25.00	0.02	0.47
LTE Band 13	777-787	0.12	1.03	24	251.19	25.00	0.03	0.52
LTE Band 17	704-716	-1.71	0.67	24	251.19	25.00	0.02	0.47
LTE Band 26	814-849	1.75	1.50	22	158.49	25.00	0.03	0.54
LTE Band 38	2570-2620	-1.37	0.73	24	251.19	25.00	0.02	1.00
LTE Band 40	2305-2315	0.69	1.17	22	158.49	25.00	0.02	1.00
LTE Band 41	2535-2655	-1.37	0.73	24	251.19	25.00	0.02	1.00

Note: the device contains a WWAN module, FCC ID: 2AC88-GLMM18A02.

The WLAN 2.4G ,5G and WWAN can transmit simultaneously:

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

$$=S_{2.4}/S_{limit-2.4}+ S_5/S_{limit-5}+ S_{WWAN}/S_{limit-WWAN}$$

$$=0.05/1+0.01/1+0.38/0.55$$

$$=0.75$$

$$< 1.0$$

**Result:** The device meet FCC MPE at **25 cm** distance