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

Applicable Standard

According to subpart 15.247 (i) and subpart 1.1310, 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure										
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)						
0.3-1.34	614	1.63	*(100)	30						
1.34-30	824/f	2.19/f	*(180/f ²)	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

Calculated Formulary:

Predication of MPE limit at a given distance

 $S = PG/4 \pi R^2 =$ power density (in appropriate units, e.g. mW/cm²);

- 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:

$$\sum_{i} \frac{S_i}{S_{Limit,i}} \le 1$$

Mode	ANT	Frequency Range (MHz)	Max Antenna Gain		Target Output Power		Evaluation Distance	Power Density	MPE Limit
			(dBi)	(numeric)	(dBm)	(mW)	(cm)	(mW/cm ²)	(mW/cm ²)
Bluetooth	ANT2	2402-2480	0.00	1.00	7	5.01	50	0.0002	1.00
LTE Band 7	ANT0	2500-2570	12.50	17.78	23	199.53	50	0.1129	1.00
LTE Band 7	ANT1	2500-2570	12.50	17.78	23	199.53	50	0.1129	1.00
LTE Band 41	ANT0	2496-2690	12.50	17.78	22	158.49	50	0.0897	1.00
LTE Band 41	ANT1	2496-2690	12.50	17.78	22	158.49	50	0.0897	1.00

Calculated Data:

Note: Bluetooth and LTE can transmit simultaneously; the worst condition is Bluetooth & LTE Band 7 ANT1 + LTE Band 7 ANT0, as below:

$$\sum_{i} \frac{S_{i}}{S_{Limit,i}} = 0.0002 + 0.1129 + 0.1129 = 0.2260 < 1.0$$

Result: The device meet FCC MPE at 50 cm distance.