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/cm^2);
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:

Mode	ANT	Frequency Range (MHz)	Max Antenna Gain		Target Output Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
			(dBi)	(numeric)	(dBm)	(mW)			
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

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.