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

Applicable Standard

According to 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:

Radio	Frequency Range (GHz)	EIRP		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBm)	(mW)			
60G Module 1	58.32-62.64	34.2	2630.27	25	0.3349	1.00
60G Module 2	58.32-62.64	32.0	1584.89	25	0.2018	1.00
60G Module 3	58.32-62.64	35.2	3311.31	25	0.4216	1.00
Bluetooth	2.402-2.48	4.6	2.88	25	0.0004	1.00

Note:

The output power was declared by manufacturer (Bluetooth conducted power is -0.3dBm, antenna gain is 4.9dBi)

The three 60GHz radio and Bluetooth can transmit simultaneously:

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

= 0.3349/1.00 + 0.2018/1.00 + 0.4216/1.00 + 0.0004/1.00
= 0.3349 + 0.2018 + 0.4216 + 0.0004
= 0.9585 < 1.0

Result: The device complied with the applicable MPE Limit at the 25 cm distance.