

FCC §15.247 (i) & §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);

Calculated Data:

2.4G Wi-Fi & BLE:

Mode	Frequency Range (MHz)	Maximum Antenna Gain		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
802.11b	2412-2462	2.4	1.74	19.50	89.13	20	0.0308	1.0
802.11g		2.4	1.74	20.50	112.20	20	0.0388	1.0
802.11n-HT20		2.4	1.74	19.00	79.43	20	0.0275	1.0
BLE(1Mbps)	2402-2480	4.0	2.51	0.50	1.12	20	0.0006	1.0
BLE(2Mbps)	2402-2480	4.0	2.51	0.00	1.00	20	0.0005	1.0

Note: 1. For the above tune up power were declared by the manufacturer.

2. Wi-Fi and BLE can't transmit simultaneously.

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