RF exposure

According to FCC part 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in § 1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (㎒)	Electric field strength(V/m)	Magnetic field strength (A/m)	Power density (㎽/㎠)	Average time
(A) Limits for Occupational / Control Exposures				
300 – 1 500	--	--	f/300	6
1 500 - 100000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300 – 1 500	--	--	f/1500	6
1 500 – 100 000	--	--	1	30

f= frequency in ㎒

Friis transmission formula: $Pd = (Pout \times G)/(4 \times pi \times R^2)$

Where,

Pd = power density in ㎽/㎠

Pout = output power to antenna in ㎽

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd the limit of MPE, 1 ㎽/㎠. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Results - Worst case

1) BLE (2.4G)

Operation mode		Max tune-up Average power (dBm)	Antenna gain (dBi)	Power density at 20 ㎝(㎽/㎠)	Limit (㎽/㎠)
BLE	SISO	7.00	5.25	0.0033	1

2) WIFI (2.4G)

Operation mode		Max tune-up Average power (dBm)	Antenna gain (dBi)	Power density at 20 ㎝(㎽/㎠)	Limit (㎽/㎠)
802.11b	SISO	9.00	5.25	0.0053	1
802.11g	SISO	9.00	5.25	0.0053	1
802.11n(HT20)	SISO	9.00	5.25	0.0053	1

3) BLE + WIFI (Sum)

Power density at 20 ㎝(㎽/㎠) (LE)	Power density at 20 ㎝(㎽/㎠) (Wi-Fi)	Sum(㎽/㎠)	Limit (㎽/㎠)
0.0033	0.0053	0.0086	1

Note : This device includes two RF modules(LE & Wi-Fi).
The two transmitters can operate simultaneously.