MPE Calculation : WLAN, Zigbee, BLE

RF function or Mode	Frequency range (MHz)			Max Target Power (dBm)	ANT Gain (dBi)	Calculated EIRP (dBm)	Maximum EIRP (dBm)	Maximum EIRP (mW)	Maximum power density (mW/cm^2)	FCC Requriment (mW/cm^2)
802.11b	2412.00	~	2472.00	18.50	3.50	22.00	22.00	158.489	**0.032**	1.000
802.11a	5745.00	~	5825.00	16.50	2.20	18.70	18.70	74.131	**0.015**	1.000
Bluetooth LE 2M	2402.00	~	2480.00	9.50	3.50	13.00	13.00	19.953	**0.004**	1.000
Zigbee	2405.00	~	2480.00	20.00	3.50	23.50	23.50	223.872	**0.045**	1.000

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user.

The MPE sample calculation for this exposure is shown below.

▪ **S =** EIRP / (4 R^2 π)

= **223.872** / (4 X 20^2 X π) mW/cm2

= **0.045**

- Note

S= Maximum power density(mW/cm^2)

EIRP= Equivalent Isotropic Radiated Power(mW)

R= Distance to the center of the radiation of the antenna(20cm)

▪ **Limits for General Population/Uncontrolled Exposur**

Frequency range (MHz)			Electric Field strength (V/m)	Magnetic field strength (A/m)	Power Density (mW/cm^2)	Averageing 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	~	1,500			f / 1500	30
1,500	~	100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

Additional Calculation (with WPT)	Measured (WPT)	0.402 A/m	Calculation (Zigbee)	0.045 mW/cm^2	**The sum of the individual ratios does not exceed 50%.**
	Limit	1.63 A/m	Limit	1 mW/cm^2	
	Per(%).	**24.66**	**Per(%).**	**4.50**	

Conclusion : The exposure condition of this device is compliant with FCC