MPE Calculation : Bluetooth

RF function or Mode	Frequency range (MHz)			Max Target Power (dBm)	ANT Gain (dBi)	Maximum EIRP (dBm)	Maximum EIRP (mW)	Maximum power density (mW/cm^2)	Requriment (mW/cm^2)
Bluetooth(1Mbps)	2402.00	~	2480.00	1.00	-0.10	0.90	1.231	0.0003	1.000
Bluetooth(2Mbps)	2402.00	~	2480.00	0.00	-0.10	-0.10	0.978	0.0002	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)

= 1.231 / (4 X 20^2 X π)

= 0.0003 mW/cm^2

- Note

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

EIRP= Equivalent Isotropic Radiated Power(mW)

R= Distance to the center of the radiation of the antenn

▪ Limits for Maximum Permissible Exposure (MPE)

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

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

MPE Calculation : LTE, CDMA

RF function or Mode	Frequency range (MHz)			Max Target Power (dBm)	ANT Gain (dBi)	Maximum EIRP (dBm)	Maximum EIRP (mW)	Maximum power density (mW/cm^2)	Requriment (mW/cm^2)
LTE(Band 13)	776.00	~	787.00	25.00	-0.08	24.92	310.456	0.0618	0.517
LTE(Band 4)	1710.70	~	1755.00	25.00	-1.44	23.56	226.987	0.0452	1.000
CDMA(Band 850)	824.70	~	848.31	26.00	3.40	29.40	870.964	0.1733	0.549
CDMA(Band 1900)	1851.25	~	1908.75	26.00	2.72	28.72	744.732	0.1482	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)

= 310.456 / (4 X 20^2 X π)

= 0.0618 mW/cm^2

- Note

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

EIRP= Equivalent Isotropic Radiated Power(mW)

R= Distance to the center of the radiation of the antenn

▪ Limits for Maximum Permissible Exposure (MPE)

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

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

RF Exposure Compliance for simultaneous operations

▪ **Configurations for simultaneous operations**

- **Configuration 1:** BT + LTE, CDMA Module

Note: Above configuration was declared from applicant.

▪ **Configurations for simultaneous operations(LTE, CDMA Module)**

– LTE Band 13 + CDMA 850(Cellular)
– LTE Band 4 + CDMA 850(Cellular)
– LTE Band 4 + CDMA 1900(PCS)
– LTE Band 13 + CDMA 1900(PCS)

▪ **Configurations for simultaneous operatio**

RF function or mode	BT	LTE		CDMA		-		Σ of MPE ratios
Band	2.4GHz	Band 13	Band 4	Cellular	PCS	-	-	
Power Density (mW/cm2)	0.0003	0.0618	0.0452	0.1733	0.1482			
Requirement (mW/cm2)	1.0000	0.5170	1.0000	0.5490	1.0000			
MPE ratio (Power Density/Requirement)	0.0003	0.1195	0.0452	0.3157	0.1482			
Configuration 1 (MPE ratio)	0.0003	0.1195		0.3157				**0.4355**
	0.0003		0.0452	0.3157				0.3612
	0.0003		0.0452		0.1482			0.1937
	0.0003	0.1195			0.1482			0.2680

Note: The maximum power density in each RF function was used for above table.

▪ **Requirment = Σ of MPE ratios ≤ 1**

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