

## 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 <sup>2</sup> )	Requirement (mW/cm <sup>2</sup> )
Bluetooth	2402.00	~	2480.00	1.00	-0.10	0.90	1.231	0.001	1.000
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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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 1.231 / (4 \times 20^2 \times \pi) \\
 &= 0.001 \text{ mW/cm}^2
 \end{aligned}$$

### - Note

S= Maximum power density(mW/cm<sup>2</sup>)

EIRP= Equivalent Isotropic Radiated Power(mW)

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

### ▪ Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)			Electric Field strength (V/m)	Magnetic field strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averageing time (minutes)
0.3	~	1.34	614	1.63	*100	30
1.34	~	30	824/f	2.19 / f	*180 / f <sup>2</sup>	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 <sup>2</sup> )	Requirement (mW/cm <sup>2</sup> )
LTE	779.50	~	784.50	25.00	1.22	26.22	418.794	0.084	0.519
LTE	1710.70	~	1754.30	25.00	2.58	27.58	572.797	0.114	1.000
CDMA 1x	824.70	~	848.31	26.00	-1.45	24.55	285.102	0.057	0.549
CDMA 1x EVDO(R Rev. A)	824.70	~	848.31	26.00	-1.45	24.55	285.102	0.057	0.549
CDMA 1x	1851.25	~	1908.75	26.00	3.28	29.28	847.228	0.169	1.000
CDMA 1 x EVDO(R Rev. A)	1851.25	~	1908.75	26.00	3.28	29.28	847.228	0.169	1.000
		~							
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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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 418.794 / (4 \times 20^2 \times \pi) \\
 &= 0.084 \text{ mW/cm}^2
 \end{aligned}$$

### - Note

S= Maximum power density(mW/cm<sup>2</sup>)

EIRP= Equivalent Isotropic Radiated Power(mW)

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

### ▪ Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)			Electric Field strength (V/m)	Magnetic field strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averageing time (minutes)
0.3	~	1.34	614	1.63	*100	30
1.34	~	30	824/f	2.19 / f	*180 / f <sup>2</sup>	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

### • Configurations for simultaneous operations(LTE, CDMA Module)

- CDMA Cellular or PCS(Voice) + LTE B4 or B13(Data)
- CDMA Cellular(Voice) + EVDO PCS(Data)
- CDMA PCS(Voice) + EVDO Cellular(Data)

Note: Above configuration was declared from applicant.

### • Configurations for simultaneous operator

RF function or mode	BT	LTE		CDMA 1x		CDMA 1x EVDO		Σ of MPE ratios
Band	2.4GHz	Band 13	Band 4	Cellular	PCS	Cellular	PCS	
Power Density (mW/cm2)	0.001	0.084	0.114	0.057	0.169	0.057	0.169	
Requirement (mW/cm2)	1.000	0.519	1.000	0.549	1.000	0.549	1.000	
MPE ratio (Power Density/Requirement)	0.001	0.162	0.114	0.104	0.169	0.104	0.169	
Configuration 1 (MPE ratio)	0.001	0.162		0.104				0.267
	0.001	0.162			0.169			0.332
	0.001		0.114	0.104				0.219
	0.001		0.114		0.169			0.284
	0.001			0.104			0.169	0.274
	0.001				0.169	0.104		0.274

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

▪ Requirement = Σ of MPE ratios ≤ 1

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