

MPE Calculation : BLE

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)	Requirement (mW/cm ²)
Bluetooth LE	2402.00 ~ 2480.00	-1.00	0.50	-0.50	0.892	0.001	1.000
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Note:

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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 0.892 / (4 \times 20^2 \times \pi) \\
 &= 0.001 \text{ mW/cm}^2
 \end{aligned}$$

- Note

S= Maximum power density(mW/cm²)

EIRP= Equivalent Isotropic Radiated Power(mW)

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

▪ Limits for Maximum Permissible Exposure (MPE)

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 ~ 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 : GSM/WCDMA

RF function or Mode	Frequency range (MHz)	Max Target Power (dBm)	ANT Gain (dBi)	Calculated EIRP (dBm)	Maximum EIRP (mW)	Maximum power density (mW/cm ²)	Requirement (mW/cm ²)
GSM850	824.20 ~ 848.80	25.00	0.05	25.05	319.890	0.064	0.549
GSM1900	1850.20 ~ 1909.80	22.00	1.73	23.73	236.048	0.047	1.000
WCDMA850	826.40 ~ 846.60	25.00	0.05	25.05	319.890	0.064	0.550
WCDMA1900	1852.40 ~ 1907.60	25.00	1.73	26.73	470.978	0.094	1.000
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Note: The max target power was based on time-averaged power. Refer to the tune-up procedure.

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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 319.89 / (4 \times 20^2 \times \pi) \\
 &= 0.064 \text{ mW/cm}^2
 \end{aligned}$$

- Note

S= Maximum power density(mW/cm²)

EIRP= Equivalent Isotropic Radiated Power(mW)

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

▪ 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:** Bluetooth LE + GSM/WCDMA(850 band)
- **Configuration 2:** Bluetooth LE + GSM/WCDMA(1900 band)

Note: Above configuration was declared from applicant.

▪ Configurations for simultaneous operations

RF function or mode	BT LE	GSM or WCDMA		Σ of MPE ratios
Band	2.4GHz	850 band	1900 band	
Power Density (mW/cm ²)	0.001	0.064	0.094	
Requirement (mW/cm ²)	1.000	0.549	1.000	
MPE ratio (Power Density/Requirement)	0.001	0.117	0.094	
Configuration 1 (MPE ratio)	0.001	0.117		0.118
Configuration 2 (MPE ratio)	0.001		0.094	0.095

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

▪ Requirement = Σ of MPE ratios ≤ 1

Conclusion : Σ exposure condition of this device is compliant with FCC rule