

## 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(1Mbps)	2402.00 ~ 2480.00	2.00	-0.18	1.82	1.521	0.0004	1.000
Bluetooth(2,3Mbps)	2402.00 ~ 2480.00	-3.00	-0.18	-3.18	0.481	0.0001	1.000

Note: Please refer to the operation description for Max tune-up power.

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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 1.521 / (4 \times 20^2 \times \pi) \\
 &= 0.0004 \text{ mW/cm}^2
 \end{aligned}$$

- 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 antenn

▪ **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> )	Averaging 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 : WLAN

Mode(Worst case)	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> )
802.11g	2412.00 ~ 2462.00	5.00	-0.01	4.99	3.156	0.0007	1.000
802.11a	5180.00 ~ 5240.00	8.00	-0.61	7.39	5.483	0.0011	1.000
802.11a	5260.00 ~ 5320.00	8.00	-0.18	7.82	6.054	0.0013	1.000
802.11a	5500.00 ~ 5720.00	7.00	-0.77	6.23	4.198	0.0009	1.000
802.11a	5745.00 ~ 5825.00	3.00	-0.18	2.82	1.915	0.0004	1.000
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Note: Please refer to the operation description for Max tune-up power.

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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 5.483 / (4 \times 20^2 \times \pi) \\
 &= 0.001 \text{ mW/cm}^2
 \end{aligned}$$

- 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 antenn

#### ▪ 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> )	Averaging 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

- Worst case for simultaneous operations
- BT + WLAN(5GHz)

RF function or mode(Worst case)	BT	WLAN 5GHz	-	-	-	-	-	Σ of MPE ratios
Band(Worst case)	2.4GHz	5GHz	-	-	-	-	-	
Power Density (mW/cm <sup>2</sup> )	0.0004	0.0013					-	
Requirement (mW/cm <sup>2</sup> )	1.0000	1.0000					-	
MPE ratio (Power Density/Requirement)	0.0004	0.0013					-	
Worst case(MPE ratio)	0.0004	0.0013					0.0017	

- Requirement =  $\Sigma$  of MPE ratios  $\leq 1$

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