

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)	Requirement (mW/cm ²)
Bluetooth(1Mbps)	2402.00 ~ 2480.00	2.50	0.17	2.67	1.850	0.0004	1.000
Bluetooth(2,3Mbps)	2402.00 ~ 2480.00	-2.00	0.17	-1.83	0.657	0.0002	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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 1.85 / (4 \times 20^2 \times \pi) \\
 &= 0.0004 \text{ mW/cm}^2
 \end{aligned}$$

- Note

S= Maximum power density(mW/cm²)

EIRP= Equivalent Isotropic Radiated Power(mW)

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

▪ 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 : 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 ²)	Requirement (mW/cm ²)
802.11g	2412.00 ~ 2462.00	10.00	1.83	11.83	15.241	0.0031	1.000
802.11a	5180.00 ~ 5240.00	10.00	1.99	11.99	15.813	0.0032	1.000
802.11a	5260.00 ~ 5320.00	10.00	3.38	13.38	21.778	0.0044	1.000
802.11a	5500.00 ~ 5720.00	9.00	1.02	10.02	10.047	0.0020	1.000
802.11a	5745.00 ~ 5825.00	8.00	4.51	12.51	17.824	0.0036	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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 15.813 / (4 \times 20^2 \times \pi) \\
 &= 0.003 \text{ mW/cm}^2
 \end{aligned}$$

- Note

S= Maximum power density(mW/cm²)

EIRP= Equivalent Isotropic Radiated Power(mW)

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

▪ 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)	Requirement (mW/cm ²)
LTE(Band 13)	779.50 ~ 784.50	25.70	1.38	27.08	510.505	0.1016	0.519
LTE(Band 5)	824.70 ~ 848.30	25.70	2.80	28.50	707.946	0.1409	0.549
LTE(Band 4)	1710.70 ~ 1754.30	25.70	3.96	29.66	924.699	0.1840	1.000
LTE(Band 2)	1850.70 ~ 1909.30	25.70	5.23	30.93	1238.797	0.2465	1.000
CDMA(Band 850)	824.70 ~ 848.31	25.70	2.80	28.50	707.946	0.1409	0.549
CDMA(Band 1900)	1851.25 ~ 1908.75	25.70	5.23	30.93	1238.797	0.2465	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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 510.505 / (4 \times 20^2 \times \pi) \\
 &= 0.1016 \text{ mW/cm}^2
 \end{aligned}$$

- Note

S= Maximum power density(mW/cm²)

EIRP= Equivalent Isotropic Radiated Power(mW)

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

▪ 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

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

RF function or mode(Worst case)	BT	WLAN 5GHz	LTE	-	-	-	-	Σ of MPE ratios
Band(Worst case)	2.4GHz	NII-2	Band 5	-	-	-	-	
Power Density (mW/cm ²)	0.0004	0.0044	0.1409				-	
Requirement (mW/cm ²)	1.0000	1.0000	0.5490				-	
MPE ratio (Power Density/Requirement)	0.0004	0.0044	0.2566				-	
Worst case(MPE ratio)	0.0004	0.0044	0.2566				0.2614	

- Requirement = Σ of MPE ratios ≤ 1

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