

MPE Calculation

RF feature(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 (1Mbps)	2 402.00	~	2 480.00	10.50	-0.45	10.05	10.116	0.002 1	1.000 0
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Note: Please refer to the tune-up porcedure for tune-up max.

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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 10.116 / (4 \times 20^2 \times \pi) \\
 &= 0.002 \text{ mW/cm}^2
 \end{aligned}$$

- 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

RF feature(Mode)	Frequency range (MHz)			Tune-up Max power(dBm)	ANT Gain (dBi)	Duty Factor(dB)	Adjusted EIRP to tune-up max(dBm)	Maximum power density (mW/cm ²)	Requirement (mW/cm ²)
GSM 850(1TX slot)	824.20	~	848.80	33.50	1.44	-9.03	25.91	0.077 6	0.549 0
GSM 850(4TX slot)	824.20	~	848.80	29.00	1.44	-3.01	27.43	0.110 1	0.549 0
GSM 1900(1TX slot)	1 850.20	~	1 909.80	30.50	4.88	-9.03	26.35	0.086 0	1.000 0
GSM 1900(4TX slot)	1 850.20	~	1 909.80	28.00	4.88	-3.01	29.87	0.193 1	1.000 0
WCDMA 850	826.40	~	846.60	24.00	1.44	NA	25.44	0.069 7	0.550 0
WCDMA 1700	1 712.40	~	1 752.60	23.00	5.56	NA	28.56	0.142 9	1.000 0
WCDMA 1900	1 852.40	~	1 907.60	23.00	4.88	NA	27.88	0.122 2	1.000 0
LTE Band 12(17)	699.00	~	716.00	24.00	-1.03	NA	22.98	0.039 5	0.466 0
LTE Band 26(5)	824.00	~	849.00	24.00	1.44	NA	25.44	0.069 7	0.549 0
LTE Band 26	814.00	~	824.00	24.00	1.44	NA	25.44	0.069 7	0.542 0
LTE Band 4	1 710.00	~	1 755.00	24.00	5.56	NA	29.56	0.179 8	1.000 0
LTE Band 2	1 850.00	~	1 910.00	24.00	4.88	NA	28.88	0.153 9	1.000 0
LTE Band 7	2 500.00	~	2 570.00	23.00	2.81	NA	25.81	0.075 9	1.000 0

Note1: Please refer to the tune-up porcedure for tune-up max.

Note2: EIRP(Adjusted EIRP to Tune- up Max) = Tune-up power(dBm) + Antenna gain(dBi) + Duty factor(dB)

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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 25.911 / (4 \times 20^2 \times \pi) \\
 &= 0.078 \text{ mW/cm}^2
 \end{aligned}$$

- Note

S= Maximum power density(mW/cm²)

EIRP= Equivalent Isotropic Radiated Power(mW)

R= Distance to the center of the radiation of the antenna(2l

▪ 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

RF Exposure Compliance for simultaneous operations

- Worst case for simultaneous operations
- Bluetooth LE + GSM850

RF feature or mode	BLE(1Mbps)	GSM(4TX slot)	-	-	-	-	-	Σ of MPE ratios
Band(Worst case)	2.4GHz	GSM 850	-	-	-	-	-	
Power Density (mW/cm ²)	0.002 1	0.110 1	-	-	-	-	-	
Requirement (mW/cm ²)	1.000 0	0.549 0	-	-	-	-	-	
MPE ratio (Power Density/Requirement)	0.002 1	0.200 5	-	-	-	-	-	
Worst case(MPE ratio)	0.002 1	0.200 5	-	-	-	-	-	0.202 6

- Requirement = Σ of MPE ratios ≤ 1

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