

MPE Calculation : Bluetooth

FCC ID: TQ8-VT240GKAN

RF function(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	1.00	-0.38	0.62	1.154	0.0003	1.0000
Bluetooth(2,3Mbps)	2402.00 ~ 2480.00	-4.00	-0.38	-4.38	0.365	0.0001	1.0000

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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 1.154 / (4 \times 20^2 \times \pi) \\
 &= 0.0003 \text{ mW/cm}^2
 \end{aligned}$$

- 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 : WLAN

FCC ID: TQ8-VT240GKAN

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)	Requirment (mW/cm ²)
802.11g	2412.00	~ 2462.00	8.50	-1.19	7.31	5.383	0.0011	1.0000
802.11a	5180.00	~ 5240.00	8.50	0.59	9.09	8.110	0.0017	1.0000
802.11a	5260.00	~ 5320.00	8.50	2.00	10.50	11.221	0.0023	1.0000
802.11a	5500.00	~ 5720.00	7.00	4.58	11.58	14.388	0.0029	1.0000
802.11a	5745.00	~ 5825.00	7.00	4.19	11.19	13.153	0.0027	1.0000
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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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 5.383 / (4 \times 20^2 \times \pi) \\
 &= 0.0011 \text{ mW/cm}^2
 \end{aligned}$$

- 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

MPE Calculation : LTE, CDMA

FCC ID: TQ8-VT240GKAN

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)	Requiriment (mW/cm ²)
LTE(Band 13)	777.00 ~ 787.00	26.20	4.14	30.34	1081.434	0.2152	0.5180
LTE(Band 5)	824.70 ~ 848.30	26.20	4.76	30.96	1247.384	0.2482	0.5490
LTE(Band 4)	1710.70 ~ 1754.30	26.20	0.62	26.82	480.840	0.0957	1.0000
LTE(Band 2)	1850.70 ~ 1909.30	26.20	4.70	30.90	1230.269	0.2448	1.0000
CDMA(Band 850)	824.70 ~ 848.31	26.20	4.76	30.96	1247.384	0.2482	0.5490
CDMA(Band 1900)	1851.25 ~ 1908.75	26.20	4.70	30.90	1230.269	0.2448	1.0000
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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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 1081.434 / (4 \times 20^2 \times \pi) \\
 &= 0.2152 \text{ mW/cm}^2
 \end{aligned}$$

- 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

RF Exposure Compliance for simultaneous operations

- Worst case for simultaneous operations
- BT + W-LAN(5GHz) + LTE (Band 5)

RF function or mode(Worst case)	BT	WLAN	LTE	-	-	-	-	Σ of MPE ratios
Band(Worst case)	2.4GHz	5GHz	Band 5	-	-	-	-	
Power Density (mW/cm ²)	0.0003	0.0029	0.2482				-	
Requirement (mW/cm ²)	1.0000	1.0000	0.5490				-	
MPE ratio (Power Density/Requirement)	0.0003	0.0029	0.4521				-	
Worst case(MPE ratio)	0.0003	0.0029	0.4521				0.4553	

- Requirement = Σ of MPE ratios ≤ 1

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