MPE Calculation : Bluetooth

FCC ID: TQ8-DA330DJAN

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)	Requriment (mW/cm^2)
Bluetooth(BDR)	2402.00	~	2480.00	3.50	-0.18	3.32	2.148	0.0005	1.000
Bluetooth(EDR)	2402.00	~	2480.00	0.00	-0.18	-0.18	0.960	0.0002	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.

▪ **S** = EIRP / (4 R^2 π)

= 2.148 / (4 X 20^2 X π)

= 0.0005 mW/cm^2

- Note

S= Maximum power density(mW/cm^2)

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^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

FCC ID: TQ8-DA330DJAN

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)	Requriment (mW/cm^2)
802.11g	2412.00	~	2462.00	14.50	-0.01	14.49	28.120	0.0056	1.000
802.11n(HT20)	5180.00	~	5240.00	8.50	-0.61	7.89	6.152	0.0013	1.000
802.11n(HT20)	5260.00	~	5320.00	8.00	-0.18	7.82	6.054	0.0013	1.000
802.11n(HT20)	5500.00	~	5720.00	6.00	-0.77	5.23	3.335	0.0007	1.000
802.11n(HT20)	5745.00	~	5825.00	3.00	-0.18	2.82	1.915	0.0004	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.

▪ **S** = EIRP / (4 R^2 π)

= 6.152 / (4 X 20^2 X π)

= 0.001 mW/cm^2

- Note

S= Maximum power density(mW/cm^2)

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^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-DA330DJAN

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)	Requriment (mW/cm^2)
LTE(Band 13)	779.50	~	784.50	25.70	4.14	29.84	963.830	0.1918	0.519
LTE(Band 5)	824.70	~	848.30	25.70	4.76	30.46	1111.732	0.2212	0.549
LTE(Band 4)	1710.70	~	1754.30	25.70	0.62	26.32	428.549	0.0853	1.000
LTE(Band 2)	1850.70	~	1909.30	25.70	4.70	30.40	1096.479	0.2182	1.000
CDMA(Band 850)	824.70	~	848.31	25.70	4.76	30.46	1111.732	0.2212	0.549
CDMA(Band 1900)	1851.25	~	1908.75	25.70	4.70	30.40	1096.479	0.2182	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.

▪ **S =** EIRP / (4 R^2 π)

= 963.83 / (4 X 20^2 X π)

= 0.1918 mW/cm^2

- Note

S= Maximum power density(mW/cm^2)

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^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 + 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/cm2)	0.0005	0.0013	0.2212				-	
Requirement (mW/cm2)	1.0000	1.0000	0.5490				-	
MPE ratio (Power Density/Requirement)	0.0005	0.0013	0.4029				-	
Worst case(MPE ratio)	0.0005	0.0013	0.4029					0.4047

- **Requirment = Σ of MPE ratios ≤ 1**

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