

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)
802.11b	2412.00	~	2462.00	18.50	1.97	20.47	111.430	0.022 2	1.000 0
802.11g	2412.00	~	2462.00	15.50	1.97	17.47	55.848	0.011 2	1.000 0
802.11n(HT20)	2412.00	~	2462.00	15.00	1.97	16.97	49.774	0.010 0	1.000 0
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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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 111.430 / (4 \times 20^2 \times \pi) \\
 &= 0.022 \text{ mW/cm}^2
 \end{aligned}$$

- Note

S= Maximum power density(mW/cm²)

EIRP= Equivalent Isotropic Radiated Power(mW)

R= Distance to the center of the radiation of the antenna(20 cm)

▪ 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)	Cable loss between transmitter and antenna(dB)	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	33.00	0.44	3.75	-9.03	20.66	0.023 2	0.549 0
GSM 850(4TX slot)	824.20	~	848.80	32.00	0.44	3.75	-3.01	25.68	0.073 6	0.549 0
GSM 1900(1TX slot)	1 850.20	~	1 909.80	31.00	1.51	5.75	-9.03	17.73	0.011 8	1.000 0
GSM 1900(4TX slot)	1 850.20	~	1 909.80	30.00	1.51	5.75	-3.01	22.75	0.037 5	1.000 0
WCDMA 850	826.40	~	846.60	24.00	0.44	3.75	N/A	20.69	0.023 4	0.550 0
WCDMA 1700	1 712.40	~	1 752.60	24.00	0.83	5.58	N/A	19.25	0.016 8	1.000 0
WCDMA 1900	1 852.40	~	1 907.60	24.00	1.51	5.75	N/A	19.76	0.018 9	1.000 0
LTE Band 2	1 850.00		1 910.00	23.00	1.51	5.75	N/A	18.76	0.015 0	1.000 0
LTE Band 4	1 710.00		1 755.00	23.00	0.83	5.58	N/A	18.25	0.013 3	1.000 0
LTE Band 5	824.00		849.00	23.00	0.44	3.75	N/A	19.69	0.018 6	0.549 0
LTE Band 12(17)	699.00	~	716.00	23.00	0.13	3.46	N/A	19.67	0.018 5	0.466 0
LTE Band 13	777.00	~	787.00	23.00	-0.36	3.69	N/A	18.95	0.015 7	0.518 0
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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) + Cable loss(dB) + 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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 20.660 / (4 \times 20^2 \times \pi) \\
 &= 0.023 \text{ mW/cm}^2
 \end{aligned}$$

- Note

S= Maximum power density(mW/cm²)

EIRP= Equivalent Isotropic Radiated Power(mW)

R= Distance to the center of the radiation of the antenna(20 cm)

▪ 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

▪ Configurations for simultaneous operations

- Configuration 1: 2.4 GHz WiFi + (LTE or WCDMA or GPRS)

Note: Above configuration was declared from applicant.

▪ Configurations for simultaneous operation

RF function or mode	2.4GHz WiFi	WCDMA	LTE		GPRS		Σ of MPE ratios
Band	2.4GHz	1700	Band 12(17)	Band13	850	1900	
Power Density (mW/cm2)	0.0222	0.0133	0.0185	0.0157	0.0736	0.0375	
Requirement (mW/cm2)	1.0000	1.0000	0.4660	0.4660	0.5490	1.0000	
MPE ratio (Power Density/Requirement)	0.0222	0.0133	0.0397	0.0337	0.1341	0.0375	
Configuration 1 (MPE ratio)	0.0222	0.0133					0.0355
	0.0222		0.0397				0.0619
	0.0222			0.0337			0.0559
	0.0222				0.1341		0.1563
	0.0222					0.0375	0.0597

Note: The maximum power density in each RF function was used for above table.

- Requirement = Σ of MPE ratios ≤ 1

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