

MPE Calculation

Regulation(s): Part 1.1310, Part 2.1091

Method: KDB447498 D01v06

RF feature	Frequency range (MHz)			Max Target Power (dBm) ^{Note 1}	ANT Gain (dBi)	Maximum EIRP (dBm)	Maximum EIRP (mW)	Maximum power density (mW/cm ²)	Requirement (mW/cm ²)
WLAN 2.4G_802.11b	2412.0	~	2462.0	16.00	4.62	20.62	115.346	0.0230	1.000
WLAN 5G_802.11ac(VHT20)	5180.0	~	5240.0	12.50	1.52	14.02	25.235	0.0051	1.000
WLAN 5G_802.11ac(VHT20)	5745.0	~	5825.0	12.00	3.31	15.31	33.963	0.0068	1.000
		~							
		~							
		~							
		~							
		~							
		~							
		~							
		~							
		~							
		~							

Note 1: Please refer to the Operation description for Max tune-up power.

Note 2: The antenna gain was corrected for the cable loss from the conducted feed point to the antenna terminal.

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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 115.346 / (4 \times 20^2 \times \pi) \\
 &= 0.023 \text{ mW/cm}^2
 \end{aligned}$$

- Note

S= Maximum power density(mW/cm²)

EIRP= Equivalent Isotropic Radiated Power(mW)

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

Part 1.1310

▪ 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 : This device complies with RF exposure requirement.

MPE Calculation

Regulation(s): Part 1.1310, Part 2.1091

Method: KDB447498 D01v06

RF feature	Frequency range (MHz)			Max Target Power (dBm) ^{Note 1}	ANT Gain (dBi)	Duty Factor(dB)	Maximum EIRP (dBm)	Maximum EIRP (mW)	Maximum power density (mW/cm ²)	Requirement (mW/cm ²)
GSM 850(1TX slot)	824.2	~	848.8	33.00	1.18	-9.03	25.15	327.341	0.065	0.549
GSM 1900(1TX slot)	1850.2	~	1909.8	29.00	3.90	-9.03	23.87	243.782	0.049	1.000
WCDMA 850	826.4	~	846.6	24.00	1.18	N/A	25.18	329.610	0.066	0.550
WCDMA 1700	1712.4	~	1752.6	23.00	4.08	N/A	27.08	510.505	0.102	1.000
WCDMA 1900	1852.4	~	1907.6	23.00	3.90	N/A	26.90	489.779	0.098	1.000
LTE B12	699.0	~	716.0	23.50	-1.08	N/A	22.42	174.583	0.035	0.466
LTE B13	777.0	~	787.0	23.50	1.18	N/A	24.68	293.765	0.059	0.518
LTE B26	814.0	~	824.0	23.50	1.18	N/A	24.68	293.765	0.059	0.542
LTE B26(5)	824.0	~	849.0	23.50	1.18	N/A	24.68	293.765	0.059	0.549
LTE B4	1710.0	~	1755.0	23.00	4.08	N/A	27.08	510.505	0.102	1.000
LTE B25(2)	1850.0	~	1915.0	23.00	3.90	N/A	26.90	489.779	0.098	1.000
LTE B41(38)	2496.0	~	2690.0	23.00	3.95	N/A	26.95	495.451	0.099	1.000
LTE B7	2500.0	~	2570.0	22.50	3.95	N/A	26.45	441.571	0.088	1.000

Note 1: Please refer to the Operation description for Max tune-up power.

Note 2: The antenna gain was corrected for the cable loss from the conducted feed point to the antenna terminal.

Note 3: Maximum EIRP(dBm) = Max Target 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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 327.341 / (4 \times 20^2 \times \pi) \\
 &= 0.065 \text{ mW/cm}^2
 \end{aligned}$$

- 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)

Part 1.1310

▪ 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 : This device complies with RF exposure requirement.

RF Exposure Compliance for simultaneous operations

- Worst case for simultaneous operations
- WLAN 2.4GHz_802.11b + WCDMA 850

RF feature or mode	WLAN(802.11b)	WCDMA	-	-	-	-	-	Σ of MPE ratios
Band(Worst case)	2.4 GHz	850	-	-	-	-	-	
Power Density (mW/cm ²)	0.023	0.066	-	-	-	-	-	
Requirement (mW/cm ²)	1.000	0.550	-	-	-	-	-	
MPE ratio (Power Density/Requirement)	0.023	0.119	-	-	-	-	-	
Worst case(MPE ratio)	0.023	0.119	-	-	-	-	-	0.142 3

- Requirement = Σ of MPE ratios ≤ 1

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