

MPE Calculation

Regulation(s): Part 1.1310, Part 2.1091

Method: KDB447498 D01v06

RF feature (Worst-Case Mode)	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)	MPE Ratio
WLAN 802.11b	2412.0	~	2462.0	14.0	2.57	16.57	45.395	0.009	1.000	0.009
WLAN 802.11n(HT20)	5180.0	~	5240.0	11.0	1.21	12.21	16.635	0.003	1.000	0.003
WLAN 802.11n(HT20)	5745.0	~	5825.0	11.0	2.53	13.53	22.543	0.005	1.000	0.005
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Note 1: The above MPE 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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 45.395 / (4 \times 20^2 \times \pi) \\
 &= 0.009 \text{ mW/cm}^2
 \end{aligned}$$

- 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(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)	MPE Ratio
LTE B12, NR n12	699.0	~	716.0	25.0	-0.2	24.80	301.996	0.060	0.466	0.129
LTE B14	788.0	~	798.0	25.0	1.0	26.00	398.108	0.079	0.525	0.151
LTE B5, NR n5	824.0	~	849.0	25.0	1.1	26.10	407.381	0.081	0.549	0.148
LTE B66(4), NR n66	1710.0	~	1780.0	25.0	0.6	25.60	363.079	0.072	1.000	0.072
LTE B2, NR n2	1850.0	~	1910.0	25.0	1.7	26.70	467.736	0.093	1.000	0.093
NR n77	3450.0	~	3550.0	25.0	0.0	25.00	316.228	0.063	1.000	0.063
NR n77	3700.0	~	3980.0	25.0	0.0	25.00	316.228	0.063	1.000	0.063
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Note 1: The above MPE calculations are taken from a certified module.(FCC ID: 2BO3LTM16FNNATY0)

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.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 301.996 / (4 \times 20^2 \times \pi) \\
 &= 0.060 \text{ mW/cm}^2
 \end{aligned}$$

- 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)

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Conclusion : This device complies with RF exposure requirement.

RF Exposure Compliance for simultaneous operations

- **Simultaneous Transmission Configuration**

2.4GHz WLAN + WWAN Module, 5GHz WLAN + WWAN Module

- **Worst case for simultaneous operations**

2.4GHz WLAN + WWAN Module [ENDC Uplink(14A_n2A)]

5GHz WLAN + WWAN Module [ENDC Uplink(14A_n2A)]

Simultaneous Transmission Configuration	2.4GHz WLAN + WWAN Module [ENDC Uplink(14A_n2A)]			5GHz WLAN + WWAN Module [ENDC Uplink(14A_n2A)]		
	WLAN	ENDC		WLAN	ENDC	
Band(mode)	2.4GHz, 802.11b	14A (LTE)	n2A (5G NR)	5GHz(NII-3), 802.11n(HT20)	14A (LTE)	n2A (5G NR)
Power Density (mW/cm2)	0.009	0.079	0.093	0.005	0.079	0.093
Requirement (mW/cm2)	1.000	0.525	1.000	1.000	0.525	1.000
MPE ratio (Power Density/Requirement)	0.009	0.151	0.093	0.005	0.151	0.093
Σ of MPE ratios	0.253			0.249		
Requirment	1.000			1.000		

▪ Requirement = Σ of MPE ratios ≤ 1

Conclusion : This device complies with RF exposure requirement.