

# **FCC ID: 2BPYM-JT301A**

## **Maximum Permissible Exposure (MPE)**

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency(RF) Radiation as specified in §1.1307(b)

Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz \* = Plane-wave equivalent power density

## **MPE Calculation Method**

$$E \text{ (V/m)} = \frac{\sqrt{30 * P * G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Average RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 * P * G}{377 * D^2}$$

From the EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

BLE:

### Measurement Result

Operation Frequency: 2402MHz~2480MHz

Power density limited: 1mW/ cm<sup>2</sup>

Antenna Type: PCB antenna

Antenna gain:1dBi;

R=20cm

mW=10^(dBm/10)

antenna gain Numeric=10^(dBi/10)= 10^(1/10)=1.26

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )			
		(dBm)		tune-up power		Gain						
				(dBm)	(mW)	(dBi)	Numeric					
2402	BLE 1M	3.05	3.5±1	4.5	2.818	1.00	1.26	0.0007	1			
2440		3.12	3.5±1	4.5	2.818	1.00	1.26	0.0007	1			
2480		3.01	3.5±1	4.5	2.818	1.00	1.26	0.0007	1			
2402	BLE 2M	2.5	3±1	4	2.512	1.00	1.26	0.0006	1			
2440		4.01	3.5±1	4.5	2.818	1.00	1.26	0.0007	1			
2480		2.25	3±1	4	2.512	1.00	1.26	0.0006	1			

Antenna Type:FPC antenna

Antenna gain:

LTE:Band 2: -2.24dBi, Band 4: -0.26dBi, Band 5: -5 dBi, Band 12: -8.71dBi, B66:-0.26dBi

R=20cm

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm <sup>2</sup> )	Power density Limits (mW/cm <sup>2</sup> )			
		(dBm)		tune-up power		Gain						
				(dBm)	(mW)	(dBi)	Numeric					
1857.5	LTE Band 2	23.74	23±1	24	251.189	-2.24	0.60	0.0298	1			
1750	LTE Band 4	23.59	23±1	24	251.189	-0.26	0.94	0.0471	1			
846.5	LTE Band 5	23.01	23±1	24	251.189	-5	0.32	0.0158	0.5643			
711	LTE Band 12	23.31	23±1	24	251.189	-8.71	0.13	0.0067	0.4740			
1770	LTE Band 66	23.42	23±1	24	251.189	-0.26	0.94	0.0471	1			

## SIMULTANEOUS TRANSMISSIONS

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE. To comply with the MPE, the fraction of the MPE in terms of  $E^2$ ,  $H^2$  (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity. In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i} \leq 1$$

Band	Antenna	tune-up power	Antenna	Separation distance (cm)	Evaluation result	Power density Limits (mW/cm <sup>2</sup> )	Evaluation result	Power density Limits	Verdict
		(dBm)	Gain (dBi)						
		BLE	Ant1	20	0.000706	1	0.047773	1	PASS
LTE Band2	Ant1	24	-0.26	20	0.047067	1			

### Conclusion:

For the max result :  $0.047773 \leq 1.0$  for Max Power Density, compliance RF exposure.

Signature: 

Date: 2025-06-05

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