

MPE Calculation

Product: Bluetooth & 2.4GHz Wi-Fi dual band Communication Module

Model no.: MWB-S-WB01-2

Brand name: Midea

FCC ID: 2ADQOMWBSWB012

Rating: DC 5V, 0.5A, 2.5W

RF Transmission Frequency: 2412-2462MHz

No. of Operated Channel: 11

Modulation: DSSS, OFDM, GFSK

Antenna Type: PCB Antenna

Antenna Gain: 0 dBi

Description of the EUT: EUT is a Bluetooth & 2.4GHz Wi-Fi dual band Communication Module with Bluetooth and WIFI function which operated at 2.4GHz.

According to subpart 15.247(i) and subpart §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
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

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

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Maximum peak output power (2.4GHz Wi-Fi):	21.95dBm (156.68mW)
Maximum peak output power (BLE):	4.87dBm (3.07mW)
Total Power(mW):	159.75mW
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	0
Maximum Antenna Gain (numeric):	1
The worst case is power density at predication frequency at 20 cm (mW/cm2):	0.0318
MPE limit for general population exposure at prediction frequency (mW/cm2):	1.0

$0.0318 \text{ (mW/cm}^2\text{)} < 1 \text{ (mW/cm}^2\text{)}$

Result: Compliant

TUV SUD China, Shenzhen Branch

Reviewed by:



John Zhi/ Project Manager
Date: 2022-05-18

Prepared By:



Mark Chen/Project Engineer
Date: 2022-05-18