

MPE Calculation

Applicant:	Hangzhou Tuya Information Technology Co.,Ltd.
Address:	Room 301,Building 1,Huace Center,Xihu District, Hangzhou,Zhejiang, China
FCC ID:	2ANDL-T1-3S
Product:	Wi-Fi and Bluetooth Module
Model No.:	T1-3S
Reference RF report #	709502502981-00A, 709502502981-00B

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) (KDB 447498 D01, §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 for Wi-Fi

Maximum peak output power at antenna input terminal (dBm):	20.12
Maximum peak output power at antenna input terminal (mW):	102.801
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	1.68
Maximum Antenna Gain (numeric):	1.4723
The worst case is power density at predication frequency at 20 cm (mW/cm ²):	0.0301
MPE limit for general population exposure at prediction frequency (mW/cm ²):	1.0

The max power density 0.0301 (mW/cm²) < 1 (mW/cm²)

Result: Compliant

Calculated Data for BLE

Maximum peak output power at antenna input terminal (dBm):	5.85
Maximum peak output power at antenna input terminal (mW):	3.8459
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	1.68
Maximum Antenna Gain (numeric):	1.4723
The worst case is power density at predication frequency at 20 cm (mW/cm ²):	0.0011
MPE limit for general population exposure at prediction frequency (mW/cm ²):	1.0

The max power density 0.0011 (mW/cm²) < 1 (mW/cm²)

Result: Compliant

Remark:

The device does not support simultaneous 2.4GHz Wi-Fi and 2.4GHz BLE, because the 2.4GHz Wi-Fi and 2.4GHz BLE share the same antenna and can't transmit simultaneously. There is not simultaneous transmission possibility.

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

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