

1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant: Pin Genie Inc
Address of applicant: 555 California Street, Suite 4925, San Francisco, CA 94104 U.S.A

Manufacturer: Smart Electronic Industrial (Dong Guan) Co., Ltd.
Address of manufacturer: Qing Long Road, Long Jian Tian Village, Huang Jiang Town,
Dong Guan, Guang Dong, China

General Description of EUT:

Product Name: WIFI & BLE Gateway; USB-A plug input 5V
Trade Name: /
Model No.: PGH200
FCC ID: 2ASIVSMARTPGH200
Rated Voltage: DC5V

Technical Characteristics of EUT:

Wi-Fi

Support Standards: 802.11b, 802.11g, 802.11n-HT20
Frequency Range: 2412-2462MHz
RF Output Power: 15.91dBm (Conducted)
Type of Modulation: DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM
Data Rate: 1-11Mbps, 6-54Mbps, up to 72.2Mbps
Quantity of Channels: 11
Channel Separation: 5MHz
Type of Antenna: Integral Antenna
Antenna Gain: 2dBi

BT

Bluetooth Version: V4.2
Frequency Range: 2402-2480MHz
RF Output Power: 9.263dBm (Conducted)
Data Rate: 1Mbps, 2Mbps, 3Mbps
Modulation: GFSK, Pi/4 QDPSK, 8DPSK
Quantity of Channels: 79/40
Channel Separation: 1MHz
Type of Antenna: Integral
Antenna Gain: 2dBi

433.92MHz Tx

Frequency Range: 433.92 MHz
Max. Field Strength: 93.17dBuV/m(3m)
Modulation: FSK

Antenna Type: Integral Antenna
 Antenna Gain: -3dBi

1.2 Standard Applicable

According to § 1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

1.3 MPE Calculation Method

$$S = (30 * P * G) / (377 * R^2)$$

S = 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 (in appropriate units, e.g., cm)

1.4 MPE Calculation Result

Wi-Fi

Maximum Tune-Up output power: 16 (dBm)

Maximum peak output power at antenna input terminal: 39.81 (mW)

Prediction distance: >20(cm)

Prediction frequency: 2462 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.013(mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

BT

Maximum Tune-Up output power: 10 (dBm)

Maximum peak output power at antenna input terminal: 10 (mW)

Prediction distance: >20(cm)

Prediction frequency: 2480 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.003(mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

Wi-Fi and BT can't transmit at the same time.

Result: Pass