

1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant: Hangzhou BroadLink Technology Co., Ltd.
Address of applicant: Unit C,Building 1,No.57 Jiang'er Road, Changhe Street,Binjiang District, Hangzhou, Zhejiang, China

Manufacturer: Hangzhou BroadLink Technology Co., Ltd.
Address of manufacturer: Unit C,Building 1,No.57 Jiang'er Road, Changhe Street,Binjiang District, Hangzhou, Zhejiang, China

General Description of EUT:

Product Name: Smart Plug
Trade Name: BroadLink
Model No.: SP4M-US
Adding Model(s): SP4F-US,SP4M-US-FFS,SP4D-US,SP4D-US-FFS
Rated Voltage: AC120V 60Hz
FCC ID: 2ATEV-SP4M-US
Equipment Type: Mobile

Technical Characteristics of EUT:

Wi-Fi

Support Standards: 802.11b, 802.11g, 802.11n
Frequency Range: 2412-2462MHz for 802.11b/g/n-HT20
2422-2452MHz for 802.11n-HT40
RF Output Power: 13.19dBm (Conducted)
Type of Modulation: DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM
Data Rate: 1-11Mbps, 6-54Mbps, up to 150Mbps
Quantity of Channels: 11 for 802.11b/g/n-HT20
7 for 802.11n-HT40
Channel Separation: 5MHz
Type of Antenna: PCB Antenna
Antenna Gain: 0dBi

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

For Wi-Fi

Maximum Tune-Up output power: 14(dBm)

Maximum peak output power at antenna input terminal: 19.95(mW)

Prediction distance: >20(cm)

Prediction frequency: 2437 (MHz)

Antenna gain: 0(dBi)

Directional gain (numeric gain): 1.00

The worst case is power density at prediction frequency at 20cm: 0.0040(mw/cm²)

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

Result: Pass