

# 1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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## 1.1 General Information

### Client Information

Applicant: Hangzhou Gubei Electronics Technology Co., Ltd.  
Address of applicant: Room 106, Building 1, No. 611 Jianghong Road, Binjiang, Hangzhou, Zhejiang 310052, China

Manufacturer: Hangzhou Gubei Electronics Technology Co., Ltd.  
Address of manufacturer: Room 106, Building 1, No. 611 Jianghong Road, Binjiang, Hangzhou, Zhejiang 310052, China

### General Description of EUT:

Product Name: WiFi Module  
Trade Name: BroadLink  
Model No.: BL3336-P  
Adding Model(s): /  
FCC ID: 2ACDZ-BL3336-P  
Rated Voltage: DC 3.3V

### Technical Characteristics of EUT:

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: 15.88dBm (Conducted)  
Type of Modulation: CCK, OFDM, QPSK, BPSK, 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: 1.6dBi  
Lowest Internal Frequency of EUT: 40MHz

*Note: The test data is gathered from a production sample provided by the manufacturer.*

## 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 <sup>2</sup> ) | Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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 <sup>2</sup> ) | Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> 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 equivalent power density

### 1.3 MPE Calculation Method

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

S = power density (in appropriate units, e.g., mw/cm<sup>2</sup>)

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

Maximum Tune-Up output power: 16 (dBm)

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

Prediction distance: >20(cm)

Prediction frequency: 2412 (MHz)

Antenna gain: 1.6 (dBi)

Directional gain (numeric gain): 1.45

The worst case is power density at prediction frequency at 20cm: 0.010(mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm<sup>2</sup>)

Result: Pass