

# 1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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## 1.1 General Information

### Client Information

Applicant: Shenzhen Jimi IOT Co., Ltd  
Address of applicant: 4/F, Building C, Gaoxinqi Industrial Park, Liuxian 1st Road,  
No.67 Xin'an Street, Bao'an District, Shenzhen, China

Manufacturer: Shenzhen Jimi IOT Co., Ltd  
Address of manufacturer: 4/F, Building C, Gaoxinqi Industrial Park, Liuxian 1st Road,  
No.67 Xin'an Street, Bao'an District, Shenzhen, China

### General Description of EUT:

Product Name: Intelligent E-bike GPS Alarm  
Trade Name: JIMI  
Model No.: EG02, ET500  
FCC ID: 2AMLF-ET500  
Rated Voltage: DC3.7V

### Technical Characteristics of EUT:

#### 2G

Support Networks: GSM, GPRS  
Support Band: GSM850/PCS1900  
Uplink Frequency: GSM/GPRS 850: 824~849MHz  
GSM/GPRS 1900: 1850~1910MHz  
Downlink Frequency: GSM/GPRS 850: 869~894MHz  
GSM/GPRS 1900: 1930~1990MHz  
Max RF Output Power: GSM850: 30.48dBm, GSM1900: 26.87dBm  
Type of Emission: GSM850: 262KGXW, GSM1900: 255KGXW  
Type of Modulation: GMSK  
Type of Antenna: Integral Antenna  
Antenna Gain: GSM850: -0.5dBi; GSM1900: -0.5dBi  
GPRS Class: Class 12

## 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 equivalents 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

For GSM850:

Maximum Tune-Up output power: 32.73 (dBm)

Maximum peak output power at antenna input terminal: 1874.99 (mW)

Prediction distance: >20(cm)

Prediction frequency: 824.20 (MHz)

Antenna gain: -0.5 (dBi)

Directional gain (numeric gain): 0.89

The worst case is power density at prediction frequency at 20cm: 0.3324(mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.5495 (mw/cm<sup>2</sup>)

The exclusion thresholds is  $0.3324 \text{ mw/cm}^2 < 0.5495 \text{ mw/cm}^2$

For GPRS850:

Maximum Tune-Up output power: 31.92 (dBm)

Maximum peak output power at antenna input terminal: 1555.97 (mW)

Prediction distance: >20(cm)

Prediction frequency: 848.80 (MHz)

Antenna gain: -0.5 (dBi)

Directional gain (numeric gain): 0.89

The worst case is power density at prediction frequency at 20cm: 0.2759(mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.5659(mw/cm<sup>2</sup>)

The exclusion thresholds is  $0.2759\text{mw/cm}^2 < 0.5659\text{mw/cm}^2$

For GSM1900:

Maximum Tune-Up output power: 28.96 (dBm)

Maximum peak output power at antenna input terminal: 787.05 (mW)

Prediction distance: >20(cm)

Prediction frequency: 1850.20 (MHz)

Antenna gain: -0.5 (dBi)

Directional gain (numeric gain): 0.89

The worst case is power density at prediction frequency at 20cm: 0.1395(mw/cm<sup>2</sup>)

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

The exclusion thresholds is  $0.1395\text{mw/cm}^2 < 1\text{mw/cm}^2$

For GPRS1900:

Maximum Tune-Up output power: 28.95(dBm)

Maximum peak output power at antenna input terminal: 785.24 (mW)

Prediction distance: >20(cm)

Prediction frequency: 1880.00 (MHz)

Antenna gain: -0.5 (dBi)

Directional gain (numeric gain): 0.89

The worst case is power density at prediction frequency at 20cm: 0.1392(mw/cm<sup>2</sup>)

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

The exclusion thresholds is  $0.1392\text{mw/cm}^2 < 1\text{mw/cm}^2$

Result: Pass