



## Shenzhen Huaxia Testing Technology Co., Ltd

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

Telephone: +86-755-26648640  
Fax: +86-755-26648637  
Website: [www.cqa-cert.com](http://www.cqa-cert.com)

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# RF Exposure Evaluation Report

**Report No.:** CQASZ20210400466E-04  
**Applicant:** PenPower Technology Ltd.  
**Address of Applicant:** 7F., No.47, Lane2.Sec.2, Guangfu Rd., Hsinchu 300, Twaiwan, R.O.C  
**Equipment Under Test (EUT):**  
**EUT Name:** WorldPenScan Go  
**Model No.:** MSE07, MSE09  
**Test Model No.:** MSE07  
**Brand Name:** PenPower  
**FCC ID:** QIC-MSE07  
**Standards:** 47 CFR Part 1.1307  
47 CFR Part 2.1093  
KDB447498D01 General RF Exposure Guidance v06  
**Date of Receipt:** 2021-4-14  
**Date of Test:** 2021-04-14 to 2021-6-04  
**Date of Issue:** 2021-6-04  
**Test Result:** **PASS\***

\*In the configuration tested, the EUT complied with the standards specified above

**Tested By:** Lewis Zhou  
**(Lewis Zhou)**  
**Reviewed By:** Jun Li  
**(Jun Li)**  
**Approved By:** Sheek Luo  
**(Sheek Luo)**



## 1 Version

### Revision History Of Report

| Report No.           | Version | Description    | Issue Date |
|----------------------|---------|----------------|------------|
| CQASZ20210400466E-04 | Rev.01  | Initial report | 2021-6-04  |

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### 3 General Information

#### 3.1 Client Information

|                          |   |
|--------------------------|---|
| Applicant:               | PenPower Technology Ltd.  |
| Address of Applicant:    | 7F., No.47, Lane2.Sec.2, Guangfu Rd., Hsinchu 300, Twaiwan, R.O.C |
| Manufacturer:            | PenPower Technology Ltd.  |
| Address of Manufacturer: | 7F., No.47, Lane2.Sec.2, Guangfu Rd., Hsinchu 300, Twaiwan, R.O.C |
| Factory:                 | PenPower Technology Ltd.  |
| Address of Factory:      | 7F., No.47, Lane2.Sec.2, Guangfu Rd., Hsinchu 300, Twaiwan, R.O.C |

#### 3.2 General Description of EUT

|                   |  |
|-------------------|--|
| Product Name:     | WorldPenScan Go  |
| Model No.:        | MSE07, MSE09   |
| Test Model No.:   | MSE07  |
| Trade Mark:       | PENPOWER   |
| Hardware Version: | RK3326   |
| Software Version: | X2V-VT-E02-V1.1  |
| EUT Power Supply: | lithium battery:3.8V 1050mAh;<br>DC 5V Charge by Adaptor |

#### 3.3 General Description of BT

|                       |  |
|-----------------------|--|
| Operation Frequency:  | 2402MHz~2480MHz  |
| Bluetooth Version:    | V5.0   |
| Modulation Technique: | Frequency Hopping Spread Spectrum(FHSS)  |
| Modulation Type:      | GFSK, $\pi/4$ DQPSK, 8DPSK   |
| Number of Channel:    | 79   |
| Transfer Rate:        | 1Mbps/2Mbps/3Mbps  |
| Hopping Channel Type: | Adaptive Frequency Hopping systems   |
| Sample Type:          | <input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Fix Location |
| Test Software of EUT: |  |
| Antenna Type:         | Shrapnel antenna   |
| Antenna Gain:         | 1.04 dBi   |

Model No.:MSE07, MSE09

Only the model MSE07 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance and model name.

### 3.4 General Description of BLE

|                       |  |
|-----------------------|--|
| Operation Frequency:  | 2402MHz~2480MHz  |
| Bluetooth Version:    | V5.0   |
| Modulation Type:      | GFSK   |
| Number of Channel:    | 40   |
| Transfer Rate:        | 1Mbps  |
| Sample Type:          | <input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Fix Location |
| Test Software of EUT: |  |
| Antenna Type:         | Shrapnel antenna   |
| Antenna Gain:         | 1.04 dBi   |

### 3.5 General Description of WIFI

|                       |   |
|-----------------------|---|
| Operation Frequency:  | IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz  |
| Version:              | 2.4G WIFI: IEEE for 802.11b<br>IEEE for 802.11g<br>IEEE for 802.11n(HT20)   |
| Modulation Type:      | IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK)<br>IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK)<br>IEEE for 802.11n(HT20) : OFDM (64QAM, 16QAM, QPSK,BPSK) |
| Number of Channel:    | IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels  |
| Channel Separation:   | 5M  |
| Sample Type:          | <input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Fix Location                                      |
| Test Software of EUT: |   |
| Antenna Type:         | Shrapnel antenna  |
| Antenna Gain:         | 1.04 dBi  |

## 4 SAR Evaluation

### 4.1 RF Exposure Compliance Requirement

#### 4.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

##### 4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

#### 4.1.2 Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$$\left[ \frac{\text{max. power of channel, including tune-up tolerance, mW}}{\text{min. test separation distance, mm}} \right] \cdot \sqrt{f(\text{GHz})} \leq 3.0$$
 for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

$f(\text{GHz})$  is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation<sup>17</sup>

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm is applied to determine SAR test exclusion

### 4.1.3 EUT RF Exposure

#### 1) For BT

#### Measurement Data

| GFSK mode        |                            |                            |                       |       |
|------------------|----------------------------|----------------------------|-----------------------|-------|
| Test channel     | Peak Output Power<br>(dBm) | Tune up tolerance<br>(dBm) | Maximum tune-up Power |       |
|                  |                            |                            | (dBm)                 | (mW)  |
| Lowest(2402MHz)  | 7.550                      | 7±1                        | 8                     | 6.310 |
| Middle(2441MHz)  | 6.310                      | 6±1                        | 7                     | 5.012 |
| Highest(2480MHz) | 5.370                      | 5±1                        | 6                     | 3.981 |
| π/4DQPSK mode    |                            |                            |                       |       |
| Test channel     | Peak Output Power<br>(dBm) | Tune up tolerance<br>(dBm) | Maximum tune-up Power |       |
|                  |                            |                            | (dBm)                 | (mW)  |
| Lowest(2402MHz)  | 4.180                      | 4±1                        | 5                     | 3.162 |
| Middle(2441MHz)  | 1.850                      | 1±1                        | 2                     | 1.585 |
| Highest(2480MHz) | 1.070                      | 1±1                        | 2                     | 1.585 |
| 8DPSK mode       |                            |                            |                       |       |
| Test channel     | Peak Output Power<br>(dBm) | Tune up tolerance<br>(dBm) | Maximum tune-up Power |       |
|                  |                            |                            | (dBm)                 | (mW)  |
| Lowest(2402MHz)  | 4.510                      | 4±1                        | 5                     | 3.162 |
| Middle(2441MHz)  | 2.280                      | 2±1                        | 3                     | 1.995 |
| Highest(2480MHz) | 1.610                      | 1±1                        | 2                     | 1.585 |

| Worst case: GFSK mode                                   |  |                               |                           |       |                     |                        |
|---|--|-------------------------------|---------------------------|-------|---------------------|------------------------|
| Channel   | Maximum Peak<br>Conducted<br>Output Power<br>(dBm) | Tune up<br>tolerance<br>(dBm) | Maximum tune-<br>up Power |       | Calculated<br>value | Exclusion<br>threshold |
|   |  |                               | (dBm)                     | (mW)  |                     |                        |
| Lowest<br>(2402MHz)                                     | 7.550  | 7±1                           | 8                         | 6.310 | 1.956               | 3.0                    |
| Middle<br>(2441MHz)                                     | 6.310  | 6±1                           | 7                         | 5.012 | 1.566               |                        |
| Highest<br>(2480MHz)                                    | 5.370  | 5±1                           | 6                         | 3.981 | 1.254               |                        |
| Conclusion: the calculated value ≤3.0, SAR is exempted. |  |                               |                           |       |                     |                        |

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20210400466E-01

2) For BLE

Measurement Data

| GFSK mode        |                            |                            |                       |       |
|------------------|----------------------------|----------------------------|-----------------------|-------|
| Test channel     | Peak Output Power<br>(dBm) | Tune up tolerance<br>(dBm) | Maximum tune-up Power |       |
|                  |                            |                            | (dBm)                 | (mW)  |
| Lowest(2402MHz)  | 7.21                       | 7±1                        | 8                     | 6.310 |
| Middle(2440MHz)  | 6.01                       | 6±1                        | 7                     | 5.012 |
| Highest(2480MHz) | 5.02                       | 5±1                        | 6                     | 3.981 |

| Worst case: GFSK mode                                   |  |                               |                           |       |                     |                        |
|---|--|-------------------------------|---------------------------|-------|---------------------|------------------------|
| Channel   | Maximum Peak<br>Conducted<br>Output Power<br>(dBm) | Tune up<br>tolerance<br>(dBm) | Maximum tune-<br>up Power |       | Calculated<br>value | Exclusion<br>threshold |
|   |  |                               | (dBm)                     | (mW)  |                     |                        |
| Lowest<br>(2402MHz)                                     | 7.550  | 7±1                           | 8                         | 6.310 | 1.956               | 3.0                    |
| Middle<br>(2440MHz)                                     | 4.180  | 4±1                           | 7                         | 5.012 | 1.566               |                        |
| Highest<br>(2480MHz)                                    | 4.510  | 4±1                           | 6                         | 3.981 | 1.254               |                        |
| Conclusion: the calculated value ≤3.0, SAR is exempted. |  |                               |                           |       |                     |                        |

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20210400466E-02



3) For WIFI

Measurement Data

| 802.11b mode      |                            |                            |                       |       |
|-------------------|----------------------------|----------------------------|-----------------------|-------|
| Test channel      | Peak Output Power<br>(dBm) | Tune up tolerance<br>(dBm) | Maximum tune-up Power |       |
|                   |                            |                            | (dBm)                 | (mW)  |
| Lowest(2412MHz)   | 3.66                       | 3±1                        | 4                     | 2.512 |
| Middle(2437MHz)   | 3.5                        | 3±1                        | 4                     | 2.512 |
| Highest(2462MHz)  | 3.55                       | 3±1                        | 4                     | 2.512 |
| 802.11b mode      |                            |                            |                       |       |
| Test channel      | Peak Output Power<br>(dBm) | Tune up tolerance<br>(dBm) | Maximum tune-up Power |       |
|                   |                            |                            | (dBm)                 | (mW)  |
| Lowest(2412MHz)   | 8.16                       | 8±1                        | 9                     | 6.310 |
| Middle(2437MHz)   | 8.17                       | 8±1                        | 9                     | 6.310 |
| Highest(2462MHz)  | 8.62                       | 8±1                        | 9                     | 6.310 |
| 802.11n(HT20)mode |                            |                            |                       |       |
| Test channel      | Peak Output Power<br>(dBm) | Tune up tolerance<br>(dBm) | Maximum tune-up Power |       |
|                   |                            |                            | (dBm)                 | (mW)  |
| Lowest(2412MHz)   | 8.17                       | 8±1                        | 9                     | 6.310 |
| Middle(2437MHz)   | 8.94                       | 8±1                        | 9                     | 6.310 |
| Highest(2462MHz)  | 8.44                       | 8±1                        | 9                     | 6.310 |

| Worst case: GFSK mode                                   |  |                               |                           |       |                     |                        |
|---|--|-------------------------------|---------------------------|-------|---------------------|------------------------|
| Channel   | Maximum Peak<br>Conducted<br>Output Power<br>(dBm) | Tune up<br>tolerance<br>(dBm) | Maximum tune-<br>up Power |       | Calculated<br>value | Exclusion<br>threshold |
|   |  |                               | (dBm)                     | (mW)  |                     |                        |
| Lowest<br>(2412MHz)                                     | 8.17   | 8±1                           | 9                         | 6.310 | 1.960               | 3.0                    |
| Middle<br>(2437MHz)                                     | 8.94   | 8±1                           | 9                         | 6.310 | 1.970               |                        |
| Highest<br>(2462MHz)                                    | 8.62   | 8±1                           | 9                         | 6.310 | 1.980               |                        |
| Conclusion: the calculated value ≤3.0, SAR is exempted. |  |                               |                           |       |                     |                        |

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20210400466E-03

That simultaneous transmission does not occur between the frequencies (BLE, BT and 2.4G WIFI).