

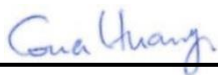
# RF EXPOSURE EVALUATION REPORT

FCC ID : U8G-P1MBX  
Equipment : PEPWAVE / peplink Wireless Product  
Brand Name : PEPWAVE / peplink  
Model Name : 1. MAX-HD4-MBX-LTEA-R-T  
2. MAX HD4 MBX  
3. HD4 MBX  
4. MBX  
5. MAX HD4 MBX LTEA  
6. EXM-T4-LTEA-R  
7. Peplink Balance 310X  
8. Balance 310X  
Applicant : PISMO LABS TECHNOLOGY LIMITED  
A8, 5/F, HK Spinners Industrial Building, Phase 6, 481  
Castle Peak Road, Cheung Sha Wan, Hong Kong  
Manufacturer : PISMO LABS TECHNOLOGY LIMITED  
A8, 5/F, HK Spinners Industrial Building, Phase 6, 481  
Castle Peak Road, Cheung Sha Wan, Hong Kong  
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated in accordance with 47 CFR Part 2.1091 for the device and pass the limit.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Cona Huang / Deputy Manager

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## History of this test report

| Report No. | Version | Description             | Issued Date   |
|------------|---------|-------------------------|---------------|
| FA8D0607   | Rev. 01 | Initial issue of report | Jul. 25, 2019 |
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## 1. Description of Equipment Under Test (EUT)

| Product Feature & Specification         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT Type                                | PEPWAVE / peplink Wireless Product                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Brand Name                              | PEPWAVE / peplink                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Model Name                              | 1. MAX-HD4-MBX-LTEA-R-T<br>2. MAX HD4 MBX<br>3. HD4 MBX<br>4. MBX<br>5. MAX HD4 MBX LTEA<br>6. EXM-T4-LTEA-R<br>7. Peplink Balance 310X<br>8. Balance 310X                                                                                                                                                                                                                                                                                                                                                                                                    |
| FCC ID                                  | U8G-P1MBX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| EUT Stage                               | Identical Prototype                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Integrated WWAN Module                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| EUT Type                                | Radio Moudle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Brand Name                              | Sierra                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Model Name                              | EM7511                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| FCC ID                                  | N7NEM75S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Wireless Technology and Frequency Range | WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz<br>WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz<br>WCDMA Band V: 826.4 MHz ~ 846.6 MHz<br>LTE Band 2: 1850 MHz ~ 1910 MHz<br>LTE Band 4: 1710 MHz ~ 1755 MHz<br>LTE Band 5: 824 MHz ~ 849 MHz<br>LTE Band 7: 2500 MHz ~ 2570 MHz<br>LTE Band 12: 699 MHz ~ 716 MHz<br>LTE Band 13: 777 MHz ~ 787 MHz<br>LTE Band 14: 790.5 MHz ~ 795.5 MHz<br>LTE Band 26: 814 MHz ~ 849 MHz<br>LTE Band 30: 2305 MHz ~ 2315 MHz<br>LTE Band 41: 2496 MHz ~ 2690 MHz<br>LTE Band 48: 3550 MHz ~ 3700 MHz<br>LTE Band 66: 1710 MHz ~ 1780 MHz |
| Mode                                    | RMC 12.2Kbps<br>HSDPA<br>HSUPA<br>LTE: QPSK, 16QAM, 64QAM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Integrated WLAN Module                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Brand Name                              | COMPEX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Model Name                              | WLE600VX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| FCC ID                                  | TK4WLE600VX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Wireless Technology and Frequency Range | WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz<br>WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz<br>WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz<br>WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz<br>WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz                                                                                                                                                                                                                                                                                                                                                     |
| Mode                                    | 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

**Reviewed by:** Jason Wang

**Report Producer:** Wan Liu

## **2. Maximum RF average output power among production units**

<EM7511>

| Mode  |         | Maximum Average power(dBm) |
|-------|---------|----------------------------|
| WCDMA | Band II | 24                         |
|       | Band IV | 24                         |
|       | Band V  | 24                         |
| LTE   | Band 2  | 24                         |
|       | Band 4  | 24                         |
|       | Band 5  | 24                         |
|       | Band 7  | 23.8                       |
|       | Band 12 | 24                         |
|       | Band 13 | 24                         |
|       | Band 14 | 24                         |
|       | Band 26 | 24                         |
|       | Band 30 | 23                         |
|       | Band 41 | 23.8                       |
|       | Band 48 | 23                         |
|       | Band 66 | 24                         |

<WLE600VX>

| Mode        |                | Maximum Average power(dBm) |
|-------------|----------------|----------------------------|
| 2.4GHz WLAN | 802.11b        | 21.71                      |
|             | 802.11g        | 21.63                      |
|             | 802.11n HT20   | 23.86                      |
|             | 802.11n HT40   | 18.10                      |
| 5GHz WLAN   | 802.11a        | 20.33                      |
|             | 802.11n HT20   | 22.80                      |
|             | 802.11n HT40   | 22.77                      |
|             | 802.11ac VHT20 | 21.82                      |
|             | 802.11ac VHT40 | 22.16                      |
|             | 802.11ac VHT80 | 19.04                      |

### 3. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

| Frequency range (MHz)                                          | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|----------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| <b>(A) Limits for Occupational/Controlled Exposures</b>        |                               |                               |                                     |                          |
| 0.3-3.0                                                        | 614                           | 1.63                          | *(100)                              | 6                        |
| 3.0-30                                                         | 1842/f                        | 4.89/f                        | *(900/f <sup>2</sup> )              | 6                        |
| 30-300                                                         | 61.4                          | 0.163                         | 1.0                                 | 6                        |
| 300-1500                                                       |                               |                               | f/300                               | 6                        |
| 1500-100,000                                                   |                               |                               | 5                                   | 6                        |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                               |                               |                                     |                          |
| 0.3-1.34                                                       | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34-30                                                        | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                       |
| 30-300                                                         | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300-1500                                                       |                               |                               | f/1500                              | 30                       |
| 1500-100,000                                                   |                               |                               | 1.0                                 | 30                       |

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna

## 4. Radio Frequency Radiation Exposure Evaluation

### 4.1. Standalone Power Density Calculation

<EM7511>

| Band         | Frequency (MHz) | Antenna Gain (dBi) | Maximum Power (dBm) | Maximum EIRP (dBm) | Maximum EIRP (W) | Average EIRP (mW) | Power Density at 20cm (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Power Density / Limit |
|--------------|-----------------|--------------------|---------------------|--------------------|------------------|-------------------|---------------------------------------------|-----------------------------|-----------------------|
| WCDMA Band 2 | 1852.4          | 2.14               | 24                  | 26.140             | 0.411            | 411.150           | 0.082                                       | 1.000                       | 0.082                 |
| WCDMA Band 4 | 1712.4          | 2.56               | 24                  | 26.560             | 0.453            | 452.898           | 0.090                                       | 1.000                       | 0.090                 |
| WCDMA Band 5 | 826.4           | 2.34               | 24                  | 26.340             | 0.431            | 430.527           | 0.086                                       | 0.551                       | 0.156                 |
| LTE Band 2   | 1850.7          | 2.14               | 24                  | 26.140             | 0.411            | 411.150           | 0.082                                       | 1.000                       | 0.082                 |
| LTE Band 4   | 1710.7          | 2.56               | 24                  | 26.560             | 0.453            | 452.898           | 0.090                                       | 1.000                       | 0.090                 |
| LTE Band 5   | 824.7           | 2.34               | 24                  | 26.340             | 0.431            | 430.527           | 0.086                                       | 0.550                       | 0.156                 |
| LTE Band 7   | 2502.5          | 4.38               | 23.8                | 28.180             | 0.658            | 657.658           | 0.131                                       | 1.000                       | 0.131                 |
| LTE Band 12  | 699.7           | 1.50               | 24                  | 25.500             | 0.355            | 354.813           | 0.071                                       | 0.466                       | 0.151                 |
| LTE Band 13  | 779.5           | 2.34               | 24                  | 26.340             | 0.431            | 430.527           | 0.086                                       | 0.520                       | 0.165                 |
| LTE Band 14  | 790.5           | 2.34               | 24                  | 26.340             | 0.431            | 430.527           | 0.086                                       | 0.527                       | 0.163                 |
| LTE Band 26  | 814.7           | 2.34               | 24                  | 26.340             | 0.431            | 430.527           | 0.086                                       | 0.543                       | 0.158                 |
| LTE Band 30  | 2307.5          | 4.38               | 23                  | 27.380             | 0.547            | 547.016           | 0.109                                       | 1.000                       | 0.109                 |
| LTE Band 41  | 2498.5          | 4.38               | 23.8                | 28.180             | 0.658            | 657.658           | 0.131                                       | 1.000                       | 0.131                 |
| LTE Band 48  | 3547.5          | 1.65               | 23                  | 24.650             | 0.292            | 291.743           | 0.058                                       | 1.000                       | 0.058                 |
| LTE Band 66  | 1710.7          | 2.56               | 24                  | 26.560             | 0.453            | 452.898           | 0.090                                       | 1.000                       | 0.090                 |

**Note:** For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band

<WLE600VX>

| Band        | Frequency (MHz) | Antenna Gain (dBi) | Maximum Power (dBm) | Maximum EIRP (dBm) | Maximum EIRP (W) | Average EIRP (mW) | Power Density at 20cm (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Power Density / Limit |
|-------------|-----------------|--------------------|---------------------|--------------------|------------------|-------------------|---------------------------------------------|-----------------------------|-----------------------|
| 2.4GHz WLAN | 2412.0          | 2.44               | 23.86               | 26.300             | 0.427            | 426.580           | 0.085                                       | 1.000                       | 0.085                 |
| 5GHz WLAN   | 5180.0          | 4.73               | 22.80               | 27.530             | 0.566            | 566.239           | 0.113                                       | 1.000                       | 0.113                 |

**Note:** For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band

### 4.2. Collocated Power Density Calculation

| WWAN Power Density / Limit | WLAN Power Density / Limit | $\Sigma$ (Power Density / Limit) of WWAN+WLAN |
|----------------------------|----------------------------|-----------------------------------------------|
| 0.165                      | 0.113                      | 0.278                                         |

**Note:**

1.  $\Sigma$ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN.
2. Considering the WWAN module collocation with the WLAN transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant

### Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.