



# FCC RADIO EXPOSURE TEST REPORT

FCC ID : 2AQ68W6RT2230  
Equipment : Outdoor Wireless Gateway  
Brand Name : Hon Lin  
Model Name : W6R-T223-001,W6B-T223-001,W6S-T223-001  
Applicant : Hon Lin Technology Co., Ltd.  
11F, No.32, Jihu Rd., Neihu Dist.,Taipei City Taiwan  
Manufacturer : Hon Lin Technology Co., Ltd.  
11F, No.32, Jihu Rd., Neihu Dist.,Taipei City Taiwan  
Standard : 47 CFR Part 2.1091

The product was received on Dec. 31, 2020, and testing was started from Jan. 11, 2021 and completed on Jan. 27, 2021. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this 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: Cliff Chang

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**  
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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## Summary of Test Result

| Report Clause | Ref Std. Clause | Test Items          | Result (PASS/FAIL) | Remark |
|---------------|-----------------|---------------------|--------------------|--------|
| 2             | -               | Exposure evaluation | PASS               | -      |

**Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

**Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

**Reviewed by: Sam Chen**

**Report Producer: Sandy Chuang**



# 1 General Description

## 1.1 EUT General Information

| RF General Information |                        |                           |                                                                                                                                                                                                |
|------------------------|------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Evaluation Mode        | Frequency Range (MHz)  | Operating Frequency (MHz) | Modulation Type                                                                                                                                                                                |
| 2.4GHz WLAN            | 2400-2483.5            | 2412-2462                 | 802.11b: DSSS (DBPSK, DQPSK, CCK)<br>802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)<br>802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) |
| 5GHz WLAN              | 5150-5250<br>5725-5850 | 5180-5240<br>5745-5825    | 802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)<br>802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)                                 |

## 1.2 Antenna Information

| Set | Ant. | Port   |               |               | Brand                   | Model Name    | Antenna Type    | Connector | Gain (dBi) |
|-----|------|--------|---------------|---------------|-------------------------|---------------|-----------------|-----------|------------|
|     |      | 2.4GHz | 5GHz (Band 1) | 5GHz (Band 4) |                         |               |                 |           |            |
| 1   | 1    | 1      | 1             | -             | Shenzhen AotianChuangke | AMXF-2458-5   | Omnidirectional | N Type    | Note 1     |
|     | 2    | 2      | 2             | -             | Shenzhen AotianChuangke | AMXF-2458-5   | Omnidirectional | N Type    |            |
| 2   | 3    | -      | -             | 1             | Shenzhen AotianChuangke | ATCK-5800-8   | Omnidirectional | N Type    |            |
|     | 4    | -      | -             | 2             | Shenzhen AotianChuangke | ATCK-5800-8   | Omnidirectional | N Type    |            |
|     | 5    | -      | -             | 3             | Shenzhen AotianChuangke | ATCK-5800-8   | Omnidirectional | N Type    |            |
| 3   | 1    | 1      | 1             | -             | M.gear                  | C407-690902-A | Omnidirectional | N Type    |            |
|     | 2    | 2      | 2             | -             | M.gear                  | C407-690902-A | Omnidirectional | N Type    |            |
| 4   | 3    | -      | -             | 1             | M.gear                  | C407-690851-A | Omnidirectional | N Type    |            |
|     | 4    | -      | -             | 2             | M.gear                  | C407-690851-A | Omnidirectional | N Type    |            |
|     | 5    | -      | -             | 3             | M.gear                  | C407-690851-A | Omnidirectional | N Type    |            |

Note 1

| Set | Ant. | Gain (dBi) |               |               | Cable Loss | Gain (dBi) |               |               |
|-----|------|------------|---------------|---------------|------------|------------|---------------|---------------|
|     |      | 2.4GHz     | 5GHz (Band 1) | 5GHz (Band 4) |            | 2.4GHz     | 5GHz (Band 1) | 5GHz (Band 4) |
| 1   | 1    | 6          | 6             | -             | 0.5        | 5.5        | 5.5           | -             |
|     | 2    | 6          | 6             | -             | 0.5        | 5.5        | 5.5           | -             |
| 2   | 3    | -          | -             | 8             | 0.5        | -          | -             | 7.5           |
|     | 4    | -          | -             | 8             | 0.5        | -          | -             | 7.5           |
|     | 5    | -          | -             | 8             | 0.5        | -          | -             | 7.5           |
| 3   | 1    | 3.5        | 6             | -             | 0.5        | 3          | 5.5           | -             |
|     | 2    | 3.5        | 6             | -             | 0.5        | 3          | 5.5           | -             |
| 4   | 3    | -          | -             | 7             | 0.5        | -          | -             | 6.5           |
|     | 4    | -          | -             | 7             | 0.5        | -          | -             | 6.5           |
|     | 5    | -          | -             | 7             | 0.5        | -          | -             | 6.5           |

Note 1: The above information was declared by manufacturer.

Note 2: Antenna set 1 and set 3 are the same type of antennas, antenna set 1 has the higher gain than set 2, so antenna set 1 is chosen to test.

Antenna set 2 and set 4 are the same type of antennas, antenna set 2 has the higher gain than set 4, so antenna set 2 is chosen to test.

**For 2.4GHz function:****For IEEE 802.11b/g/n/VHT/ax (2TX/2RX):**

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

**For 5GHz function:****Band 1****For IEEE 802.11a/n/ac/ax (2TX/2RX):**

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

**Band 4****For IEEE 802.11a/n/ac/ax (3TX/3RX):**

Port 1, Port 2 and Port 3 can be used as transmitting/receiving antenna.

Port 1, Port 2 and Port 3 could transmit/receive simultaneously

### 1.3 Table for Multiple Listing

The difference for each model name is shown as below:

| Model Name   | Support Function  |
|--------------|-------------------|
| W6R-T223-001 | AP                |
| W6B-T223-001 | Mesh AP           |
| W6S-T223-001 | Mesh AP-satellite |

Note 1: From the above models, model: W6R-T223-001 was selected as representative model for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.

### 1.4 EUT Supports Type

The EUT supports AP, Mesh AP, Mesh AP-satellite functions, only the AP was performed for all the tests.

### 1.5 Accessories

Sealing Collar\*1



## 1.6 Testing Location

| Testing Location                    |        |                                                                                                                               |
|-------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | HWA YA | ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)<br>TEL : 886-3-327-3456 FAX : 886-3-327-0973        |
| <input checked="" type="checkbox"/> | JHUBEI | ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302, Taiwan (R.O.C.)<br>TEL : 886-3-656-9065 FAX : 886-3-656-9085 |

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.





## 2 Maximum Permissible Exposure

### 2.1 Limit of 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 Time  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                                                                |
| 1500-100,000          |                                   |                                   | 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 Time  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                                                               |
| 1500-100,000          |                                   |                                   | 1.0                                      | 30                                                               |

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

### 2.2 MPE Calculation Method

The MPE was calculated at 26 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

**E** = Electric field (V/m)

**P** = RF output power (W)

**G** = EUT Antenna numeric gain (numeric)

**d** = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



## 2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

| Mode     | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) |
|----------|----------|-------------|------------|----------------|--------------------|------------------|---------------|-------------------------|-------------------------------|
| 2.4G;D1D | 8.51     | 27.32       | 35.83      | 0.16           | 35.99              | 3.97192          | 26            | 0.46756                 | 1.00000                       |
| 5.2G;D1D | 8.51     | 16.76       | 25.27      | 0.50           | 25.77              | 0.37757          | 26            | 0.04445                 | 1.00000                       |
| 5.8G;D1D | 7.50     | 28.47       | 35.97      | 0.02           | 35.99              | 3.97192          | 26            | 0.46756                 | 1.00000                       |

### Simultaneous Transmission Analysis Mode:

WLAN 2.4GHz + WLAN 5GHz Band 1 + WLAN 5GHz Band 4

| Mode     | DG (dBi) | Power (dBm) | EIRP (dBm) | Tolerance (dB) | Tune-up EIRP (dBm) | Tune-up EIRP (W) | Distance (cm) | S (mW/cm <sup>2</sup> ) | S Limit (mW/cm <sup>2</sup> ) | Ratio (S/Limit) |
|----------|----------|-------------|------------|----------------|--------------------|------------------|---------------|-------------------------|-------------------------------|-----------------|
| 2.4G;D1D | 8.51     | 27.32       | 35.83      | 0.16           | 35.99              | 3.97192          | 26            | 0.46756                 | 1.00000                       | 0.46756         |
| 5.2G;D1D | 8.51     | 16.76       | 25.27      | 0.50           | 25.77              | 0.37757          | 26            | 0.04445                 | 1.00000                       | 0.04445         |
| 5.8G;D1D | 7.50     | 28.47       | 35.97      | 0.02           | 35.99              | 3.97192          | 26            | 0.46756                 | 1.00000                       | 0.46756         |
|          |          |             |            |                |                    |                  |               |                         | Sum Ratio                     | 0.97957         |
|          |          |             |            |                |                    |                  |               |                         | Ratio Limit                   | 1.00000         |

Note: The above antenna gain was declared by manufacturer.

—————THE END—————