

# Radio Exposure Evaluation Report

FCC ID : Z8H89FT0066

Equipment : XV2-2T Outdoor Wi-Fi 6 Access point

Brand Name : Cambium Networks

Model Name : XV2-2T, XV2-2T1

Applicant : Cambium Networks Inc.  
3800 Golf Road Suite 360 Rolling Meadows IL United States 60008

Manufacturer : Lite-On Network Communication (Dongguan) Limited  
No.30 QingXi-Keji Road, QingXi Town, DongGuan City, Guangdong Province, P.R. China

Standard : 47 CFR FCC Part 2 Subpart J, section 2.1091

The product was received on Apr. 09, 2021, and testing was started from Apr. 09, 2021 and completed on Jan. 20, 2022. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR FCC Part 2 Subpart J, section 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. Hsinhua Laboratory, the test report shall not be reproduced except in full.



Approved by: Jackson Tsai

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## **Table of Contents**

|                                                 |          |
|-------------------------------------------------|----------|
| <b>HISTORY OF THIS TEST REPORT .....</b>        | <b>3</b> |
| <b>1 GENERAL DESCRIPTION .....</b>              | <b>5</b> |
| 1.1 Information.....                            | 5        |
| 1.2 Antenna Information .....                   | 5        |
| 1.3 Table for Multiple Listing .....            | 7        |
| 1.4 Table for Permissive Change .....           | 7        |
| 1.5 Accessories .....                           | 7        |
| 1.6 Testing Location .....                      | 7        |
| <b>2 MAXIMUM PERMISSIBLE EXPOSURE .....</b>     | <b>8</b> |
| 2.1 Limit of Maximum Permissible Exposure ..... | 8        |
| 2.2 MPE Calculation Method .....                | 8        |
| 2.3 Calculated Result and Limit.....            | 9        |

### **Photographs of EUT V01**



TEL : 886-3-327-3456  
FAX : 886-3-327-0973  
Report Template No.: HE1-A1 Ver4.0  
FCC ID: Z8H89FT0066



## 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:**

None

**Reviewed by: Sam Tsai**

**Report Producer: Debby Hung**

# 1 General Description

## 1.1 Information

### 1.1.1 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>802.11ax/VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)             |
| 5GHz WLAN              | 5150-5250<br>5250-5350<br>5470-5725<br>5725-5850 | 5180-5240<br>5260-5320<br>5500-5700<br>5745-5825 | 802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)<br>802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)<br>802.11ax: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) |
| Bluetooth              | 2400-2483.5                                      | 2402-2480                                        | BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK)<br>LE: DSSS (GFSK)                                                                                    |

## 1.2 Antenna Information

Model:XV2-2T <Group 1>

| Ant. | Brand   | Model Name   | Antenna Type | Connector | Support |
|------|---------|--------------|--------------|-----------|---------|
| 1    | LYNwave | Snow Leopard | PIFA antenna | I-PEX     | 2.4G    |
| 2    | LYNwave | Snow Leopard | PIFA antenna | I-PEX     | 2.4G    |
| 3    | LYNwave | Snow Leopard | PIFA antenna | I-PEX     | 5G      |
| 4    | LYNwave | Snow Leopard | PIFA antenna | I-PEX     | 5G      |
| 5    | LYNwave | Snow Leopard | PIFA antenna | I-PEX     | BT      |

| Ant. | Port | Gain (dBi) |         |          |          |         |     |
|------|------|------------|---------|----------|----------|---------|-----|
|      |      | 2.4G       | 5G      |          |          |         | BT  |
|      |      |            | U-NII-1 | U-NII-2A | U-NII-2C | U-NII-3 |     |
| 1    | 1    | 5.2        | -       | -        | -        | -       | -   |
| 2    | 2    | 5.3        | -       | -        | -        | -       | -   |
| 3    | 1    | -          | 8.1     | 8.1      | 9.3      | 9.0     | -   |
| 4    | 2    | -          | 8.6     | 8.6      | 8.9      | 8.6     | -   |
| 5    | 1    | -          | -       | -        | -        | -       | 5.6 |

Note 1: The EUT has five antennas.

**For 2.4GHz function:**

For IEEE 802.11 b/g/n/VHT/ax mode (2TX/2RX)

Ant. 1 (port 1) and Ant. 2 (port 2) could transmit/receive simultaneously.

**For BT function:**

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)

Ant. 5 (port 1) could transmit/receive.

**For 5GHz function:**

For IEEE 802.11 a/n/ac/ax mode (2TX/2RX)

Ant. 3 (port 1) and Ant. 4 (port 2) could transmit/receive simultaneously.

**Model:XV2-2T1 <Group 2>**

| Ant. | Brand   | Model Name          | Antenna Type | Connector | Support |
|------|---------|---------------------|--------------|-----------|---------|
| 1    | M-gear  | Snow leopard_120deg | Array patch  | I-PEX     | 2.4G    |
| 2    | M-gear  | Snow leopard_120deg | Array patch  | I-PEX     | 2.4G    |
| 3    | M-gear  | Snow leopard_120deg | Array patch  | I-PEX     | 5G      |
| 4    | M-gear  | Snow leopard_120deg | Array patch  | I-PEX     | 5G      |
| 5    | LYNwave | Snow Leopard        | PIFA antenna | I-PEX     | BT      |

| Ant. | Port | Gain (dBi) |         |          |          |         |     |
|------|------|------------|---------|----------|----------|---------|-----|
|      |      | 2.4G       | 5G      |          |          |         | BT  |
|      |      |            | U-NII-1 | U-NII-2A | U-NII-2C | U-NII-3 |     |
| 1    | 1    | 11.9       | -       | -        | -        | -       | -   |
| 2    | 2    | 11.7       | -       | -        | -        | -       | -   |
| 3    | 1    | -          | 14.31   | 13.37    | 14.00    | 13.05   | -   |
| 4    | 2    | -          | 14.57   | 14.38    | 13.03    | 12      | -   |
| 5    | 1    | -          | -       | -        | -        | -       | 5.6 |

Note 1: The EUT has five antennas.

**For 2.4GHz function:**

For IEEE 802.11 b/g/n/VHT/ax mode (2TX/2RX)

Ant. 1 (port 1) and Ant. 2 (port 2) could transmit/receive simultaneously.

**For BT function:**

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)

Ant. 5 (port 1) could transmit/receive.

**For 5GHz function:**

For IEEE 802.11 a/n/ac/ax mode (2TX/2RX)

Ant. 3 (port 1) and Ant. 4 (port 2) could transmit/receive simultaneously.

### 1.3 Table for Multiple Listing

The brand/model names in the following table are all refer to the identical product.

| Model Name | Antenna | Description                                                                                                |
|------------|---------|------------------------------------------------------------------------------------------------------------|
| XV2-2T     | Group 1 | All the models are identical, the only difference is that the Wi-Fi antennas for each model are different. |
| XV2-2T1    | Group 2 |                                                                                                            |

### 1.4 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FA142329&FA142329-01

Below is the table for the change of the product with respect to the original one.

| Modifications                                                                 | Performance Checking |
|-------------------------------------------------------------------------------|----------------------|
| 1. Model:XV2-2T1 was added.<br>2. Group 2 Antenna was added for XV2-2T1 used. | MPE was evaluated    |

### 1.5 Accessories

| Accessories |            |   |            |   |
|-------------|------------|---|------------|---|
| Mount kit   | Brand Name | - | Model Name | - |

Reminder: Regarding to more detail and other information, please refer to user manual.

### 1.6 Testing Location

| Test Lab. : Sporton International Inc. Hsinhua Laboratory |                             |                                                                                         |                     |
|-----------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------|---------------------|
| <input checked="" type="checkbox"/>                       | Hsinhua<br>(TAF: 3785)      | ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)          |                     |
|                                                           |                             | TEL: 886-3-327-3456                                                                     | FAX: 886-3-327-0973 |
| Test site Designation No. TW3785 with FCC.                |                             |                                                                                         |                     |
| <input type="checkbox"/>                                  | Wen 33rd.St.<br>(TAF: 3785) | ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) |                     |
|                                                           |                             | TEL: 886-3-318-0787                                                                     | FAX: 886-3-318-0287 |
| Test site Designation No. TW0008 with FCC.                |                             |                                                                                         |                     |

## 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 <sup>2</sup> )*                 | 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 <sup>2</sup> )*                   | 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

#### Multiple Transmitters Condition

Co-location as simultaneously transmitting (co-transmitting) and the evaluation shall be consider that simultaneous transmissions from co-located devices the individual transmitters are evaluated separately. After sum of the individual value (basic restriction / reference level) are measured/calculated also have to under basic restriction / reference level.

Co-transmitting mode: 2.4GHz WLAN+5GHz WLAN Mode +Bluetooth

### 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:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

**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: Occupational / Controlled Exposure

| Mode       | DG<br>(dBi) | Power<br>(dBm) | EIRP<br>(dBm) | Tolerance<br>(dB) | Tune-up EIRP<br>(dBm) | Tune-up EIRP<br>(W) | Distance<br>(cm) | S<br>(mW/cm <sup>2</sup> ) | Limit<br>(mW/cm <sup>2</sup> ) | Ratio<br>(S/Limit) |
|------------|-------------|----------------|---------------|-------------------|-----------------------|---------------------|------------------|----------------------------|--------------------------------|--------------------|
| 2.4G;D1D   | 14.81       | 20.67          | 35.48         | 0.50              | 35.98                 | 3.96278             | 26               | 0.46649                    | 1.00000                        | 0.46649            |
| 5.8G;D1D   | 13.05       | 22.43          | 35.48         | 0.50              | 35.98                 | 3.96278             | 26               | 0.46649                    | 1.00000                        | 0.46649            |
| 2.4G;BT-LE | 5.60        | 7.71           | 13.31         | 0.50              | 13.81                 | 0.02404             | 26               | 0.00283                    | 1.00000                        | 0.00283            |
|            |             |                |               |                   |                       |                     |                  |                            | Sum Ratio                      | 0.93581            |
|            |             |                |               |                   |                       |                     |                  |                            | Ratio Limit                    | 1                  |

—————THE END—————