



# RADIO EXPOSURE TEST REPORT

**FCC ID** : Z3WAIR4985

**Equipment** : Wi-Fi 6E Smart Mesh System

**Brand Name** : Airties

**Model Name** : Air 4985

**Applicant** : Airties Wireless Networks  
Sehit Mehmet Mikdat Uluunlu Sokagi No:23  
Esentepe, Sisli İstanbul, 34394 Turkey

**Manufacturer** : Airties Wireless Networks  
Sehit Mehmet Mikdat Uluunlu Sokagi No:23  
Esentepe, Sisli İstanbul, 34394 Turkey

**Standard** : 47 CFR Part 2.1091

The product was received on Aug. 19, 2022, and testing was started from Aug. 24, 2022 and completed on Oct. 06, 2022. We, Sporton International Inc. Hsinchu 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 variant report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.



Approved by: Sam Chen

**Sporton International Inc. Hsinchu Laboratory**

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## History of this test report

TEL : 886-3-656-9065  
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Page Number : 3 of 11  
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## Summary of Test Result

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

**Conformity Assessment Condition:**

The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account. Please refer to each test results in the chapter "Measurement Uncertainty" for measurement uncertainty.

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

**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              | 5150-5350<br>5250-5350<br>5470-5725<br>5725-5850 | 5180-5250<br>5260-5320<br>5500-5720<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)                                 |
| 6GHz WLAN              | 5925-7125                                        | 5955-7095                                        | 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)                                                                                                                                    |

|            |                      |
|------------|----------------------|
| SW version | 4.144.8.0_wltest     |
| HW version | PCB-4985-D01-M01-R02 |



## 1.2 Antenna Information

| Ant. | Port        |           |           | Brand   | Model Name | Antenna Type | Connector | Gain (dBi) |
|------|-------------|-----------|-----------|---------|------------|--------------|-----------|------------|
|      | WLAN 2.4GHz | WLAN 5GHz | WLAN 6GHz |         |            |              |           |            |
| 1    | 1           | -         | 1         | AirTies | ANT A00    | PCB          | N/A       | Note 1     |
| 2    | 2           | -         | 2         | AirTies | ANT A11    | PCB          | N/A       |            |
| 3    | -           | 1         | -         | AirTies | ANT A0X    | PCB          | N/A       |            |
| 4    | -           | 2         | -         | AirTies | ANT A1X    | PCB          | N/A       |            |
| 5    | -           | 3         | -         | AirTies | ANT A2X    | PCB          | N/A       |            |
| 6    | -           | 4         | -         | AirTies | ANT A3X    | PCB          | N/A       |            |

Note 1:

### <Antenna Gain>

| Ant. | Port        |           |           | Antenna Gain (dBi) |           |         |         |        |           |        |        |        |
|------|-------------|-----------|-----------|--------------------|-----------|---------|---------|--------|-----------|--------|--------|--------|
|      | WLAN 2.4GHz | WLAN 5GHz | WLAN 6GHz | WLAN 2.4GHz        | WLAN 5GHz |         |         |        | WLAN 6GHz |        |        |        |
|      |             |           |           |                    | UNII 1    | UNII 2A | UNII 2C | UNII 3 | UNII 5    | UNII 6 | UNII 7 | UNII 8 |
| 1    | 1           | -         | 1         | 4.21               | -         | -       | -       | -      | 1.32      | 1.46   | 1.76   | 2.61   |
| 2    | 2           | -         | 2         | 4.42               | -         | -       | -       | -      | 1.62      | 1.98   | 2.47   | 2.12   |
| 3    | -           | 1         | -         | -                  | 3.49      | 3.27    | 2.85    | 2.09   | -         | -      | -      | -      |
| 4    | -           | 2         | -         | -                  | 3.58      | 2.61    | 4.52    | 2.72   | -         | -      | -      | -      |
| 5    | -           | 3         | -         | -                  | 2.41      | 2.6     | 3.51    | 5.47   | -         | -      | -      | -      |
| 6    | -           | 4         | -         | -                  | 4.45      | 4.89    | 4.53    | 4.93   | -         | -      | -      | -      |

### < Directional Gain>

| Directional Gain (dBi) |             |           |         |         |        |           |        |        |        |
|------------------------|-------------|-----------|---------|---------|--------|-----------|--------|--------|--------|
| Item                   | WLAN 2.4GHz | WLAN 5GHz |         |         |        | WLAN 6GHz |        |        |        |
|                        |             | UNII 1    | UNII 2A | UNII 2C | UNII 3 | UNII 5    | UNII 6 | UNII 7 | UNII 8 |
| 2T1S                   | 4.52        | -         | -       | -       | -      | 3.75      | 3.57   | 4.12   | 4.26   |
| 4T1S                   | -           | 4.57      | 4.92    | 5.39    | 5.58   | -         | -      | -      | -      |

Note 2: The above information (except gain) was declared by manufacturer.

The directional gain is measured which follows the procedure of KDB 662911 D03.

Note 3: The EUT has six antennas.:

**For 2.4GHz function:****For 802.11 b/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:****For 802.11a/n/ac/ax (4TX/4RX):**

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

**For 6GHz function:****For 802.11ax (2TX/2RX):**

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

Port 1 and Port 2 could transmit/receive simultaneously.



### 1.3 Table for EUT Supports Function

| Function  | Support Band                                              |
|-----------|-----------------------------------------------------------|
| AP Router | WLAN 2.4GHz, WLAN 5GHz UNII 1~3<br>and WLAN 6GHz UNII 5~8 |
| Mesh      | WLAN 5GHz UNII 1~3<br>and WLAN 6GHz UNII 5~8              |

Note: The above information was declared by manufacturer.

### 1.4 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FA281911

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

| Modifications                                 | Performance Checking                              |
|-----------------------------------------------|---------------------------------------------------|
| Add the Zero wait for DFS by software change. | After evaluating,<br>it does not affect the test. |

Note: All test results were based on original report.



## 1.5 Accessories

| Accessories                       |                |            |                       |                                                           |
|-----------------------------------|----------------|------------|-----------------------|-----------------------------------------------------------|
| No.                               | Equipment Name | Brand Name | Model Name            | Rating                                                    |
| 1                                 | Adapter        | MOSO       | MS-V2000R120-024H0-US | Input: 100-240V~50/60Hz, 0.7A max.<br>Output: 12.0V, 2.0A |
| Others                            |                |            |                       |                                                           |
| RJ-45 cable*1: Non-shielded, 1.5m |                |            |                       |                                                           |

## 1.6 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2.1091
  - ♦ KDB 447498 D04 Interim General RF Exposure Guidance v01
- The following reference test guidance is not within the scope of accreditation of TAF.
- ♦ 47 CFR Part 1.1307
  - ♦ 47 CFR Part 1.1310

## 1.7 Testing Location

| Testing Location Information                              |                                                                                    |
|-----------------------------------------------------------|------------------------------------------------------------------------------------|
| Test Lab. : Sporton International Inc. Hsinchu Laboratory |                                                                                    |
| Hsinchu                                                   | ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) |
| (TAF: 3787)                                               | TEL: 886-3-656-9065 FAX: 886-3-656-9085                                            |
|                                                           | Test site Designation No. TW3787 with FCC.                                         |
|                                                           | Conformity Assessment Body Identifier (CABID) TW3787 with ISCED.                   |



## 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

### 2.2 MPE Calculation Method

The MPE was calculated at 45cm 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 MPE Exemption

Option (A): 1.1307(b)(3)(i)(A): Available maximum time-averaged power is < 1 mW

Option (B): 1.1307(b)(3)(i)(B): Device operates between 300 MHz and 6 GHz and the maximum time-averaged power or effective radiated power (ERP), whichever is greater, <= Pth.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left( \frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

$d$  = the separation distance (cm);

Option (C): 1.1307(b)(3)(i)(C): ERP is below a threshold calculated based on the distance

$R$  between the person and the antenna / radiating structure, where  $R > \lambda / 2 \pi$ .

| Single RF Sources Subject to Routine Environmental Evaluation |                       |
|---------------------------------------------------------------|-----------------------|
| RF Source frequency (MHz)                                     | Threshold ERP (watts) |
| 0.3-1.34                                                      | $1,920 R^2$ .         |
| 1.34-30                                                       | $3,450 R^2/f^2$ .     |
| 30-300                                                        | $3.83 R^2$ .          |
| 300-1,500                                                     | $0.0128 R^2 f$ .      |
| 1,500-100,000                                                 | $19.2 R^2$ .          |
| Note: R is in meters, f is in MHz.                            |                       |



## 2.4 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;G1D | 4.42     | 27.45       | 31.87      | 0.50           | 32.37              | 1.72584          | 45            | 0.06782                 | 1.00000                       |
| 5.2G;D1D | 4.57     | 29.91       | 34.48      | 0.50           | 34.98              | 3.14775          | 45            | 0.12370                 | 1.00000                       |
| 5.3G;D1D | 4.92     | 23.95       | 28.87      | 0.50           | 29.37              | 0.86497          | 45            | 0.03399                 | 1.00000                       |
| 5.6G;D1D | 5.39     | 23.94       | 29.33      | 0.50           | 29.83              | 0.96161          | 45            | 0.03779                 | 1.00000                       |
| 5.8G;D1D | 5.58     | 29.97       | 35.55      | 0.44           | 35.99              | 3.97192          | 45            | 0.15608                 | 1.00000                       |
| 6.2G;D1D | 3.75     | -           | 26.97      | 0.50           | 27.47              | 0.55847          | 45            | 0.02195                 | 1.00000                       |
| 6.4G;D1D | 3.57     | -           | 25.89      | 0.50           | 26.39              | 0.43551          | 45            | 0.01711                 | 1.00000                       |
| 6.7G;D1D | 4.12     | -           | 26.97      | 0.50           | 27.47              | 0.55847          | 45            | 0.02195                 | 1.00000                       |
| 7.0G;D1D | 4.26     | -           | 25.76      | 0.50           | 26.26              | 0.42267          | 45            | 0.01661                 | 1.00000                       |

| MPE Exemption Option C |                    |       |                    |                   |                 |                   |               |
|------------------------|--------------------|-------|--------------------|-------------------|-----------------|-------------------|---------------|
| Frequency (MHz)        | $\lambda/2\pi$ (m) | R (m) | Tune-up EIRP (dBm) | Tune-up ERP (dBm) | Tune-up ERP (W) | ERP Threshold (W) | MPE Exemption |
| 2437                   | 0.0196             | 0.45  | 32.37              | 30.22             | 1.052           | 3.888             | Complies      |
| 5755                   | 0.0083             |       | 35.99              | 33.84             | 2.421           | 3.888             | Complies      |
| 6185                   | 0.0077             |       | 27.47              | 25.32             | 0.340           | 3.888             | Complies      |

### Simultaneous Transmission Analysis Mode: WLAN 2.4GHz + WLAN 5GHz + WLAN 6GHz

| Simultaneous Transmissions Option C |       |                    |                   |                 |                   |                            |                                  |
|-------------------------------------|-------|--------------------|-------------------|-----------------|-------------------|----------------------------|----------------------------------|
| Frequency (MHz)                     | R (m) | Tune-up EIRP (dBm) | Tune-up ERP (dBm) | Tune-up ERP (W) | ERP Threshold (W) | Simultaneous Transmissions | Simultaneous Transmissions Limit |
| 2437                                | 0.45  | 32.37              | 30.22             | 1.052           | 3.888             | 0.98                       | <= 1                             |
| 5755                                |       | 35.99              | 33.84             | 2.421           | 3.888             |                            |                                  |
| 6185                                |       | 27.47              | 25.32             | 0.340           | 3.888             |                            |                                  |

————THE END————