



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 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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Summary of Test Result

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

Declaration of Conformity:

1. The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to report "Measurement Uncertainty".

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) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5350 5250-5350 5470-5725 5725-5850	5180-5250 5260-5320 5500-5720 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 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 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. Output: 12.0V, 2.0A
Others				
RJ-45 cable*1: Non-shielded, 1.5m				

1.4 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

1.5 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 ISED.	



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 ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	*(100)	<6
3.0-30	1842/f	4.89/f	*(900/f ²)	<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 ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f ²)	<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:

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

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	19.2R 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 ²)	S Limit (mW/cm ²)
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————