Testing Laboratory 3787

RADIO EXPOSURE TEST REPORT

FCC ID	:	Z3WAIR4960X
Equipment	:	5400 Mbps 11ax Wi-Fi Mesh Extender Wi-Fi 6 Smart Mesh System 5400 Mbps 11ax Wi-Fi Mesh Access Point AX5400 Wi-Fi 6 Router Home Wi-Fi Solution Kit WiFi 6 Booster Wi-Fi 6 Smart Mesh Extender
Brand Name	:	Airties
Model Name	:	Air 4960X, Air 4960XR
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 Mar. 10, 2022, and testing was started from Mar. 22, 2022 and completed on Apr. 28, 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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Photographs of EUT v01

History of this test report

Report No.	Version	Description	Issued Date
FA230923	01	Initial issue of report	Jun. 07, 2022

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: Jessie Wei

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	5150-5250 5250-5350 5470-5725 5725-5850	5180-5250 5250-5320 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)

1.2 Antenna Information

Ant.	Port		Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	2.4GHz	5GHz					
1	2	1	AirTies	A01	Printed	N/A	Note 1
2	1	4	AirTies	A30	Printed	N/A	
3	-	2	AirTies	A1X	Printed	N/A	
4	-	3	AirTies	A2X	Printed	N/A	

Note 1:

Ant.	Antenna Gain (dBi)				
	WLAN 2.4GHz	WLAN 5GHz			
		UNII 1	UNII 2A	UNII 2C	UNII 3
1	2.73	3.56	3.95	4.61	4.20
2	1.86	2.24	1.70	3.30	3.16
3	-	1.89	2.05	1.17	1.02
4	-	1.89	1.14	2.73	3.97

Ant.	Directional Gain (dBi)				
	WLAN 2.4GHz	WLAN 5GHz			
		UNII 1	UNII 2A	UNII 2C	UNII 3
	2T1S	4T1S			
1	2.95	5.70	5.96	5.34	6.17
2					
3	-				
4	-				

Note 2: The above information (excepting antenna gain) was declared by manufacturer.
For WLAN 2.4GHz:
For IEEE 802.11b/g/n/VHT/ax mode (2TX/2RX):
Port 1 and Port 2 can be used as transmitting/receiving antenna.
Port 1 and Port 2 could transmit/receive simultaneously.
For WLAN 5GHz:
For IEEE 802.11a/n/ac/ax mode (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.
Note3: The directional gain is measured which follows the procedure of KDB 662911 D03. The antenna report is provided in the operational description for this application.

1.3 Table for EUT supports function

Function	Support Band
AP	2.4GHz / 5GHz
Router	2.4GHz / 5GHz
Mesh	5GHz

Note: The above information was declared by manufacturer.

1.4 Table for Multiple Listing

EUT	Equipment Name	Equipment Difference	Brand Name	Model Name
1	AX5400 Wi-Fi 6 Router	for different marketing	Airties	Air 4960XR
-	Wi-Fi 6 Smart Mesh System			
2	5400 Mbps 11ax Wi-Fi Mesh Extender	for different marketing	Airties	Air 4960X
-	Wi-Fi 6 Smart Mesh Extender			
-	5400 Mbps 11ax Wi-Fi Mesh Access Point			
-	Home Wi-Fi Solution Kit			
-	WiFi 6 Booster			

Model Name	Type	I/O Port Function	I/O Port Color	DDR		
				Brand Name	Model Name	Capacity
Air 4960XR	Router, Mesh	LAN*1, WAN*1	LAN: yellow, WAN: Red	Winbond	W634GU6NB-11	512MB
Air 4960X	AP, Mesh	LAN*2	LAN: yellow	Winbond	W632GU6NB-12	256MB

Note1: From the above models, model: Air 4960X (EUT 2) was selected as representative model for the test and its data was recorded in this report.

Note2: The above information was declared by manufacturer.

1.5 Accessories

Accessories			
Equipment Name	**Brand Name**	**Model Name**	**Rating**
Adapter	MOSO	MS-V1000R120-012H0-US	INPUT: 100-240V~ 50/60Hz, 0.3A max. OUTPUT: 12.0V, 1.0A
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 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/ cm²)	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/ cm²)	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 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

E (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

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.

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

Where

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

and

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

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 > λ / 2 π.

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^2f.
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;D1D	2.73	24.28	27.01	0.50	27.51	0.56364	20	0.11213	1.00000
5.2G;D1D	5.70	29.79	35.49	0.50	35.99	3.97192	20	0.79019	1.00000
5.3G;D1D	5.96	23.95	29.91	0.08	29.99	0.99770	20	0.19849	1.00000
5.6G;D1D	5.34	23.94	29.28	0.50	29.78	0.95060	20	0.18912	1.00000
5.8G;D1D	6.17	29.68	35.85	0.14	35.99	3.97192	20	0.79019	1.00000

MPE Exemption Option B						
Frequency (MHz)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	MPE Exemption
2437	0.2	27.51	25.36	0.344	3.060	Complies
5200		35.99	33.84	2.421	3.060	Complies

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

Simultaneous Transmissions Option B							
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	0.2	27.51	25.36	0.344	3.060	0.90	<= 1
5200		35.99	33.84	2.421	3.060		

———THE END———