



RADIO EXPOSURE TEST REPORT

FCC ID : Z3WAIR4991-41

Equipment : AT&T ALL-Fi Extender

Brand Name : Airties

Model Name : WFEXT4991-41

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 Jun. 17, 2024, and testing was started from Jul. 26, 2024 and completed on Sep. 12, 2024. 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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Photographs of EUT v01



History of this test report

TEL : 886-3-656-9065
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Summary of Test Result

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

Note: Reference to Sporton Project No.: 3D0518-02

Conformity Assessment Condition:

1. 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.
2. The measurement uncertainty please refer to each test result in the chapter "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: Cathy Chiu



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, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
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, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
6GHz WLAN	For Indoor Access Point: 5925-7125 For Standard Power Access Point: 5925-6425 6525-6875	For Indoor Access Point: 5955-7095 For Standard Power Access Point: 5955-6415 6535-6855	802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
Bluetooth	2400-2483.5	2402-2480	LE: GFSK
Zigbee	2400-2483.5	2405-2480	O-QPSK
HW	HW1.2		
SW	4.193.2.0_wltest		
SN	For Bluetooth and Zigbee: J50VA4HW100124 For 2.4GHz and 5GHz: J50VA4HW100120 For 2.4GHz and 5GHz (Support Equipment): J50VA4DC100098 For 6GHz: J50VA4HW100123 For 6GHz (Support Equipment): J50VA4DC100079		



1.2 Antenna Information

Ant.	Port				Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	WLAN			Bluetooth /Zigbee					
	2.4GHz	5GHz	6GHz						
1	-	-	1	-	Galtronics	60-3744-03-2	PIFA	I-Pex	Note 1
2	-	-	2	-	Galtronics	60-3695-03-1	PIFA	I-Pex	
3	-	-	3	-	Galtronics	60-3695-03-2	PIFA	I-Pex	
4	-	-	4	-	Galtronics	60-3744-03-2	PIFA	I-Pex	
5	1	1	-	-	Galtronics	60-3693-03-2	PIFA	I-Pex	
6	-	2	-	-	Galtronics	60-2917-03	PIFA	I-Pex	
7	2	3	-	-	Galtronics	60-3755-03-2	PIFA	I-Pex	
8	-	4	-	-	Galtronics	60-2917-03	PIFA	I-Pex	
9	-	-	-	1	Airties	Air-BT-01	PCB	I-Pex	
10	-	-	-	2	Airties	Air-BT-02	PCB	I-Pex	
11	-	-	-	-	Galtronics	60-3756-03-2	PCB	I-Pex	

Ant.	Remark
1	6G4 (Mated to Connector J1)
2	6G3 (Mated to Connector J2)
3	6G1 (Mated to Connector J3)
4	6G2 (Mated to Connector J4)
5	DB1 (Mated to Connector J20)
6	5G2 (Mated to Connector J21)
7	DB2 (Mated to Connector J22)
8	5G1 (Mated to Connector J23)
9	N/A
10	N/A
11	GNSS

Note 1:

Tests 1:

Ant.	Antenna Gain (dBi)										
	WLAN 2.4GHz	WLAN 5GHz				WLAN 6GHz				Bluetooth /Zigbee	GPS
		UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 6	UNII 7	UNII 8		
1	-	-	-	-	-	5.38	3.86	4.02	2.84	-	-
2	-	-	-	-	-	5.09	4.72	4.61	4.69	-	-
3	-	-	-	-	-	4.88	6.09	5.24	6.46	-	-
4	-	-	-	-	-	6.63	6.7	5.53	6.03	-	-
5	2.16	3.61	2.65	2.56	2.47	-	-	-	-	-	-
6	-	2.73	2.49	3.24	3.3	-	-	-	-	-	-
7	2.15	3.89	3.85	3.62	2.69	-	-	-	-	-	-
8	-	2.31	2.88	3.09	2.63	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	4.3	-
10	-	-	-	-	-	-	-	-	-	4.3	-
11	-	-	-	-	-	-	-	-	-	-	4.7



Item	Directional Gain (dBi)								
	WLAN 2.4GHz	WLAN 5GHz				WLAN 6GHz			
		UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 6	UNII 7	UNII 8
2T1S	3.95	-	-	-	-	-	-	-	-
2T2S	2.16	-	-	-	-	-	-	-	-
4T1S	-	3.89	3.85	3.62	3.36	6.63	6.72	5.96	6.72
4T2S	-	3.89	3.85	3.62	3.3	6.63	6.7	5.53	6.46
4T4S	-	3.89	3.85	3.62	3.3	6.63	6.7	5.53	6.46

Note 2: The above information (except gain of Ant. 1~8 and directional gain) was declared by the manufacturer.

Note 3: For 2.4GHz/5GHz/6GHz, the antenna gain and directional gain are measured which follow the procedure of KDB 662911 D03.

Note 4: **For 2.4GHz function:**

For IEEE 802.11 b/g/n/VHT/ax/be (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 IEEE 802.11 a/n/ac/ax/be (4TX/4RX):

Port 1~4 can be used as transmitting/receiving antenna.

Port 1~4 could transmit/receive simultaneously.

For 6GHz function:

For IEEE 802.11 ax/be (4TX/4RX):

Port 1~4 can be used as transmitting/receiving antenna.

Port 1~4 could transmit/receive simultaneously.

For Bluetooth function (1TX/1RX):

The EUT supports the antenna with TX/RX diversity functions.

Port 1~2 can be used as transmitting/receiving antenna, but only one of them will be used at one time.

For Zigbee function (1TX/1RX):

The EUT supports the antenna with TX/RX diversity functions.

Port 1~2 can be used as transmitting/receiving antenna, but only one of them will be used at one time.

For GPS function (1RX):

Only Ant. 11 can be used as receiving antenna.

1.3 Table for EUT Supports Function

Support Type	Remark
AP Router	Support 2.4GHz / 5GHz UNII 1~3 / 6GHz UNII 5~8
Mesh	Support 5GHz UNII 1~3 / 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: FA3D0518-02

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

Modifications	Performance Checking
Adding the Standard Power Access Point for UNII-5, UNII-7.	MPE for Standard Power Access Point

Note: Other test results are based on original test report.

1.5 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter	AT&T	EPS26R0-16	INPUT: 120V ~ 0.725A Max 60Hz OUTPUT: 12V, 2.2A, 26.4W
Other			
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 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 45 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 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)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	3.95	26.91	28.71	0.50	833.681	45	C	3888.0	0.2145
5.2G;D1D	3.89	29.87	31.61	0.50	1625.549	45	C	3888.0	0.4182
5.3G;D1D	3.85	23.96	25.66	0.50	413.048	45	C	3888.0	0.1063
5.6G;D1D	3.62	23.95	25.42	0.50	390.841	45	C	3888.0	0.1006
5.8G;D1D	3.36	29.94	31.15	0.50	1462.177	45	C	3888.0	0.3762
2.4G;BT-LE	4.30	19.91	22.06	0.50	180.302	45	C	3888.0	0.0464
2.4G;Zigbee	4.30	19.90	22.05	0.50	179.887	45	C	3888.0	0.0463

For Indoor Access Point:

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
6.2G;D1D	6.01	-	24.23	0.50	297.167	45	C	3888.0	0.0765
6.4G;D1D	6.72	-	24.62	0.50	325.087	45	C	3888.0	0.0836
6.7G;D1D	5.96	-	24.49	0.50	315.500	45	C	3888.0	0.0812
7.0G;D1D	6.72	-	21.88	0.50	172.982	45	C	3888.0	0.0445

For Standard Power Access Point:

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
6.2G;D1D	6.01	-	29.34	0.50	963.829	45	C	3888.0	0.2480
6.7G;D1D	5.96	-	30.17	0.50	1166.810	45	C	3888.0	0.3002

Simultaneous Transmission Analysis Mode:

Mode 1: WLAN 2.4GHz + WLAN 5GHz + WLAN 6GHz (6ID) + Bluetooth

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	3.95	26.91	28.71	0.50	833.681	45	C	3888.0	0.2145
5.2G;D1D	3.89	29.87	31.61	0.50	1625.549	45	C	3888.0	0.4182
6.4G;D1D	6.72	-	24.62	0.50	325.087	45	C	3888.0	0.0836
2.4G;BT-LE	4.30	19.91	22.06	0.50	180.302	45	C	3888.0	0.0464
Sum TL Ratio_C	0.7627								
Ratio Limit	1								

**Mode 2: WLAN 2.4GHz + WLAN 5GHz + WLAN 6GHz (6ID) + Zigbee**

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	3.95	26.91	28.71	0.50	833.681	45	C	3888.0	0.2145
5.2G;D1D	3.89	29.87	31.61	0.50	1625.549	45	C	3888.0	0.4182
6.4G;D1D	6.72	-	24.62	0.50	325.087	45	C	3888.0	0.0836
2.4G;G1D	4.30	19.90	22.05	0.50	179.887	45	C	3888.0	0.0463
Sum TL Ratio_C	0.7626								
Ratio Limit	1								

Mode 3: WLAN 2.4GHz + WLAN 5GHz + WLAN 6GHz (6SD) + Bluetooth

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	3.95	26.91	28.71	0.50	833.681	45	C	3888.0	0.2145
5.2G;D1D	3.89	29.87	31.61	0.50	1625.549	45	C	3888.0	0.4182
6.7G;D1D	5.96	-	30.17	0.50	1166.810	45	C	3888.0	0.3002
2.4G;BT-LE	4.30	19.91	22.06	0.50	180.302	45	C	3888.0	0.0464
Sum TL Ratio_C	0.9793								
Ratio Limit	1								

Mode 4: WLAN 2.4GHz + WLAN 5GHz + WLAN 6GHz (6SD) + Zigbee

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	3.95	26.91	28.71	0.50	833.681	45	C	3888.0	0.2145
5.2G;D1D	3.89	29.87	31.61	0.50	1625.549	45	C	3888.0	0.4182
6.7G;D1D	5.96	-	30.17	0.50	1166.810	45	C	3888.0	0.3002
2.4G;G1D	4.30	19.90	22.05	0.50	179.887	45	C	3888.0	0.0463
Sum TL Ratio_C	0.9792								
Ratio Limit	1								

Note: The above antenna gain was declared by manufacturer.

—THE END—