Testing Laboratory 3787

RADIO EXPOSURE TEST REPORT

FCC ID	:	2AHKM-ARIA3629
Equipment	:	WiFi7 Tri-Band Router w/SFP+ cage / WiFi7 Tri-Band Router
Brand Name	:	HITRON
Model Name	:	ARIA3629 / ARIA3626 / ARIA3625
Applicant	:	Hitron Technologies Inc. No. 1-8, Li-Hsin 1st Rd. Hsinchu Science Park, Hsinchu 30078, Taiwan
Manufacturer	:	Hitron Technologies Inc. No. 1-8, Li-Hsin 1st Rd. Hsinchu Science Park, Hsinchu 30078, Taiwan
Standard	:	47 CFR Part 2.1091

The product was received on Aug. 16, 2024, and testing was started from Aug. 21, 2024 and completed on Nov. 05, 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 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

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History of this test report

Report No.	Version	Description	Issued Date
FA480902	01	Initial issue of report	Jan. 02, 2025
FA480902	02	1. Revising Photographs of EUT 2. Adding Power core in section 1.4.	Jan. 17, 2025

Summary of Test Result

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

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/manufacturer 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) 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) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
6GHz WLAN	5925-7125	5955-7115	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

1.2 Antenna Information

Ant.	Port			Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	2.4GHz, 5GHz	6GHz	Bluetooth					
1	1	-	-	PSA	RFDPA230505IM6B901	Copper pipes	I-PEX	Note1
2	2	-	-	PSA	RFDPA230511IM6B902	Copper pipes	I-PEX	
3	3	-	-	PSA	RFDPA230510IM6B901	Copper pipes	I-PEX	
4	4	-	-	PSA	RFDPA230515IM6B901	Copper pipes	I-PEX	
5	-	1	-	PSA	RFDPA100512IM6B902	Copper pipes	I-PEX	
6	-	2	-	PSA	RFDPA100515IM6B902	Copper pipes	I-PEX	
7	-	3	-	PSA	RFDPA100505IM6B902	Copper pipes	I-PEX	
8	-	4	-	PSA	RFDPA100505IM6B902	Copper pipes	I-PEX	
9	-	-	1	PSA	RFDPA301419IMAB901	PCB	I-PEX	

Note 1:

Ant.	Antenna Gain (dBi)						
	WLAN 2.4GHz	WLAN 5GHz				WLAN 6GHz UNII 5~UNII 8	Bluetooth
		UNII 1	UNII 2A	UNII 2C	UNII 3		
1	2.74	4.99	4.13	5.28	5.41	-	
2	2.86	4.41	4.95	5.75	5.75	-	-
3	3.18	4.49	3.38	3.89	4.14	-	-
4	2.54	3.71	3.53	3.36	2.7	-	-
5	-	-	-	-	-	4.62	-
6	-	-	-	-	-	4.95	-
7	-	-	-	-	-	5.01	-
8	-	-	-	-	-	5.14	-
9	-	-	-	-	-	-	3.57

Item	Directional Gain (dBi)				
	WLAN 2.4GHz	WLAN 5GHz			
		UNII 1	UNII 2A	UNII 2C	UNII 3
4T1S	5.83	6.14	6.28	6.81	6.64
4T2S	3.18	4.99	4.95	5.75	5.75
4T4S	3.18	4.99	4.95	5.75	5.75

Note 2: The above information (except gain of Ant. 1~4 and directional gain) was declared by the manufacturer.

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

For 2.4GHz function:

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

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

Port 1~4 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 a/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):
Only Port 1 can be used as transmitting/receiving antenna.

1.3 Table for Multiple Listing

Equipment Name	EUT	Model Name (Number)	SFP+ cage WAN Port	2*FXS (Option)
WiFi7 Tri-Band Router w/SFP+ cage	1	ARIA3629	With	With
	2	ARIA3626	With	Without
WiFi7 Tri-Band Router	3	ARIA3625	Without	Without

Note 1: From the above models, model: ARIA3629 (EUT 1) was selected as representative model for the test and its data was recorded in this report.
Note 2: The above information was declared by manufacturer.

1.4 Accessories

Accessories				
Equipment Name	**Brand Name**	**Model Name**	**Rating**	**Remark**
Adapter	FRECOM	F60X-120450SPA	INPUT: 100-240~50/60Hz, 1.6A OUTPUT: 12.0V, 4.5A, 54.0W	DC power cable: Non-shielded, 1.6m
Others				
RJ-45 cable*1, non-shielded, 1.5m				
Power core*1, non-shielded, 1.2m				

1.5 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

1.6 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/f²)	<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/f²)	<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 53 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)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	5.83	29.92	33.60	0.24	2421.029	53	C	5393.3	0.4491
5.2G;D1D	6.14	29.74	33.73	0.11	2421.029	53	C	5393.3	0.4491
5.3G;D1D	6.28	23.65	27.78	0.06	608.135	53	C	5393.3	0.1128
5.6G;D1D	6.81	23.03	27.69	0.15	608.135	53	C	5393.3	0.1128
5.8G;D1D	6.64	29.31	33.80	0.04	2421.029	53	C	5393.3	0.4491
6.2G;D1D	-	-	25.42	0.50	390.841	53	C	5393.3	0.0725
6.4G;D1D	-	-	25.25	0.50	375.837	53	C	5393.3	0.0697
6.7G;D1D	-	-	24.91	0.50	347.536	53	C	5393.3	0.0645
7.0G;D1D	-	-	24.66	0.50	328.095	53	C	5393.3	0.0609
2.4G;BT-LE	3.57	18.98	20.40	0.50	123.027	53	C	5393.3	0.0228

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

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	5.83	29.92	33.60	0.24	2421.029	53	C	5393.3	0.4491
5.8G;D1D	6.64	29.31	33.80	0.04	2421.029	53	C	5393.3	0.4491
6.2G;D1D	-	-	25.42	0.50	390.841	53	C	5393.3	0.0725
2.4G;BT-LE	3.57	18.98	20.40	0.50	123.027	53	C	5393.3	0.0228
Sum TL Ratio_C	0.9935								
Ratio Limit	1								

Note: The above antenna gain was declared by manufacturer.

———THE END———