



RADIO EXPOSURE TEST REPORT

FCC ID : 2AHKM-ARIA2513
Equipment : ARIA2513 4x4 11ax wifi router
Brand Name : Hitron
Model Name : ARIA2513/OS2513
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 May 16, 2022, and testing was started from Jun. 08, 2022 and completed on Aug. 26, 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



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: Vicky Huang



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	5180-5240 5260-5320 5500-5700 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)
Bluetooth	2400-2483.5	2402-2480	LE: GFSK

1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	1	PSA	RFPCA311513IMLB701	PCB	I-PEX	Note 1
2	4	PSA	RFPCA311513IMLB701	PCB	I-PEX	
3	3	PSA	RFPCA311513IMLB701	PCB	I-PEX	
4	2	PSA	RFPCA311513IMLB701	PCB	I-PEX	
5	1	PSA	RFPCA311513IMLB701	PCB	I-PEX	

Note 1:

Ant.	Port	Antenna Gain (dBi)					Bluetooth
		WLAN 2.4GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	
1	1	2.33	2.59	2.18	2.68	2.17	-
2	4	3.59	2.25	2.84	2.78	2.8	-
3	3	2.52	2.65	2.72	2.43	2.57	-
4	2	2.58	2.61	3.31	2.32	2.67	-
5	1	-	-	-	-	-	2.75



Ant.	Port	Directional Gain (dBi)														
		WLAN 2.4GHz			WLAN 5GHz UNII 1			WLAN 5GHz UNII 2A			WLAN 5GHz UNII 2C			WLAN 5GHz UNII 3		
		4T1S	4T2S	4T4S	4T1S	4T2S	4T4S	4T1S	4T2S	4T4S	4T1S	4T2S	4T4S	4T1S	4T2S	4T4S
1	1															
2	4															
3	3	3.95	3.59	3.59	3.96	2.65	2.65	4.18	3.31	3.31	3.99	2.78	2.78	3.95	2.8	2.8
4	2															

Note 2: The EUT has five antennas.

Note 3: The above information (excepting antenna gain of 2.4GHz, 5GHz UNII 1~UNII 3) was declared by manufacturer.

Note 4: 2.4GHz, 5GHz UNII 1~UNII 3: Maximum Directional Gain following KDB662911 D03.

For 2.4GHz function:

For IEEE 802.11b/g/n/VHT/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 5GHz function:

For IEEE 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 Bluetooth Function:

For Bluetooth mode (1TX/1RX)

Only Port 1 can be use as transmit and receive antenna.

1.3 Table for Multiple Listing

The model names in the following table are all refer to the identical product.

Model Name	Description
ARIA2513	All the models are identical, the difference model served as marketing strategy.
OS2513	

Note 1: From the above models, model: ARIA2513 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 Table for EUT Supports Function

Function
AP Router
Repeater

Note: The above information was declared by manufacturer.

1.5 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter	MOSO	MS-V3000R120-036H0-US	INPUT: 100-240V, 50/60Hz, 1.0A max OUPUT: 12.0V, 3A
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 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 42 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

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;D1D	3.95	29.73	33.68	0.50	34.18	2.61818	42	0.11811	1.00000
5.2G;D1D	3.96	29.73	33.69	0.50	34.19	2.62422	42	0.11838	1.00000
5.3G;D1D	4.18	23.83	28.01	0.50	28.51	0.70958	42	0.03201	1.00000
5.6G;D1D	3.99	23.85	27.84	0.50	28.34	0.68234	42	0.03078	1.00000
5.8G;D1D	3.95	29.85	33.80	0.50	34.30	2.69153	42	0.12142	1.00000
2.4G;BT-LE	2.75	19.33	22.08	0.50	22.58	0.18113	42	0.00817	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	0.42	34.18	32.03	1.596	3.387	Complies
5795	0.0082		34.30	32.15	1.641	3.387	Complies
2440	0.0196		22.58	20.43	0.110	3.387	Complies

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

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	0.42	34.18	32.03	1.596	3.387	0.99	<= 1
5795		34.30	32.15	1.641	3.387		
2440		22.58	20.43	0.110	3.387		

—————THE END—————