FCC RADIO EXPOSURE TEST REPORT

FCC ID	:	**UIDW31**
Equipment	:	**Wireless Router**
Brand Name	:	**ARRIS**
Model Name	:	**W31, W30**
Applicant	:	**ARRIS** **3871 Lakefield Drive Suite 300,Suwanee, Georgia, 30024 United States**
Manufacturer	:	**ARRIS** **3871 Lakefield Drive Suite 300,Suwanee, Georgia, 30024 United States**
Standard	:	**47 CFR Part 2.1091**

The product was received on Sep. 13, 2018, and testing was started from Sep. 13, 2018 and completed on Jan. 02, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FA842742-03	01	Initial issue of report	Jun. 28, 2019

Summary of Test Result

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

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
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: Cindy Peng

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) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 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, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / π/4-DQPSK / 8DPSK) LE: DSSS (GFSK)

1.2 Table for Multiple Listing

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

Model Name	Color of Device's Bottom
W31	Matte Black
W30	Silver

From the above models, model name "W31" was selected as representative model for the test and its data was recorded in this report.

1.3 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA842742-01

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

Modifications	Performance Checking
1. Adding the beamforming function for 802.11n/ac/ax.	Maximum Permissible Exposure.
2. Adding Zero-Wait function.	It doesn't need to verify Maximum Permissible Exposure test.

Note: Maximum Permissible Exposure of other modes are based on original test report.

1.4 Testing Location

Testing Location			
☐	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973	
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085	

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.

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)*	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)*	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 30 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 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

For Radio 1 (WLAN 2.4GHz)

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	5.35	29.87	35.22	0.01	35.23	3.33426	30	0.29481	1.00000

For Radio 3 (WLAN 5GHz Band 1~2)

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)
5.2G;D1D	6.23	29.66	35.89	0.10	35.99	3.97192	30	0.35119	1.00000
5.3G;D1D	6.23	23.73	29.96	0.03	29.99	0.99770	30	0.08821	1.00000

For Radio 2 (WLAN 5GHz Band 3~4)

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)
5.6G;D1D	6.93	23.02	29.95	0.04	29.99	0.99770	30	0.08821	1.00000
5.8G;D1D	6.93	29.03	35.96	0.03	35.99	3.97192	30	0.35119	1.00000

For Radio 4 (Bluetooth)

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;BT-BR	4.12	2.95	7.07	0.50	7.57	0.00571	30	0.00050	1.00000
2.4G;BT-LE	4.12	2.72	6.84	0.50	7.34	0.00542	30	0.00047	1.00000

Simultaneous Transmission Analysis Mode:

Radio 1 (WLAN 2.4GHz) + Radio 3 (WLAN 5GHz Band 1~2) + Radio 2 (WLAN 5GHz Band 3~4) + Radio 4 (Bluetooth)

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)	Ratio (S/Limit)
2.4G;G1D	5.35	29.87	35.22	0.04	35.26	3.35738	30	0.29685	1.00000	0.29685
5.2G;D1D	6.23	29.66	35.89	0.10	35.99	3.97192	30	0.35119	1.00000	0.35119
5.8G;D1D	6.93	29.03	35.96	0.03	35.99	3.97192	30	0.35119	1.00000	0.35119
2.4G;BT-BR	4.12	2.95	7.07	0.50	7.57	0.00571	30	0.00050	1.00000	0.00050
									Sum Ratio	0.99974
									Ratio Limit	1

THE END