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 Jul. 18, 2018, and testing was started from Jul. 23, 2018 and completed on Dec. 26, 2018. 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
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History of this test report

Report No.	Version	Description	Issued Date
FA842742-01	01	Initial issue of report	Jan. 07, 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

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

Modifications	Performance Checking
1. Adding the 802.11ax mode for WLAN 2.4GHz and WLAN 5GHz. 2. Adding the 160MHz. 3. Adding the WLAN 5GHz band 2 and band 3 (5250~5350 MHz, 5470~5725 MHz) for this device.	Maximum Permissible Exposure.
4. Adding an adapter (Model Name: NBS42D120350VU). 5. Updating the WIFI chip (BCM43684KRFBG) version to B1 from A1. The difference between A1 (original) and B1 (new) as below: (1) No functional RF changes versus A1. (2) MAC/PHY related bug fixes and optimizations. (3) Power and yield optimizations. 6. Adding the Master (Extender), Bridge (Client without radar detection) and Client without radar detection modes for WLAN 5GHz band 3 and band 4 (5470~5725 MHz, 5725~5850 MHz).	It doesn't need to verify Maximum Permissible Exposure test.
7. Updating the 802.11ac data rate and data modulation of WLAN 2.4GHz to “MCS 0-11, 1024QAM” from “MCS 0-9, 256QAM”.	It doesn't affect the test result.
8. Changing the internal structure of housing. 9. Changing the housing color to black from white. 10. Removing USB port. 11. Changing the equipment name to “Wireless Router” from “W31”. Based on the modification above. 12. Adding a new model name “W30” which the color of device’s bottom is silver.	It does not affect the 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	4.22	29.97	34.19	0.50	34.69	2.94442	30	0.26047	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	5.71	29.81	35.52	0.48	36.00	3.98107	30	0.35218	1.00000
5.3G;D1D	5.71	23.97	29.68	0.31	29.99	0.99770	30	0.08822	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	5.82	23.95	29.77	0.22	29.99	0.99770	30	0.08822	1.00000
5.8G;D1D	5.82	29.93	35.75	0.25	36.00	3.98107	30	0.35218	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	4.22	29.97	34.19	0.50	34.69	2.94442	30	0.26047	1.00000	0.26047
5.2G;D1D	5.71	29.81	35.52	0.48	36.00	3.98107	30	0.35218	1.00000	0.35218
5.8G;D1D	5.82	29.93	35.75	0.25	36.00	3.98107	30	0.35218	1.00000	0.35218
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	0.96533
									Ratio Limit	1

THE END