



FCC RADIO EXPOSURE TEST REPORT

FCC ID : MSQ-RTAXJ300
Equipment : AX3000 Dual Band Wi-Fi Router, AX5400 Dual Band Wi-Fi Router, Dual Band Wi-Fi Router
Brand Name : ASUS
Model Name : RT-AX58U, RT-AX82U, RT-AX3000, RT-AX5400, TUF-AX3000, GS-AX3000, GS-AX5400
Applicant : ASUSTeK COMPUTER INC.
1F., No. 15, Lide Rd., Beitou, Taipei 112, Taiwan
Manufacturer (1) : Datamax Electronics (DongGuan) Co., Ltd.
Niu Shan Foreign Economic Industrial Park, Dong Cheng District, Dong Guan City, Guang Dong, China
Manufacturer (2) : Compal Networking (KunShan) Co., LTD.
No. 520, Nabbang Rd., Economic & Technical Development Zone Kunshan, Jiangsu Province China
Manufacturer (3) : ARCADYAN TECHNOLOGY (VIETNAM) CO., LTD.
Ba Thien Industrial Park, Ba Hien commune, Binh Xuyen district, Vinh Phuc Province
Standard : 47 CFR Part 2.1091

The product was received on May 06, 2020, and testing was started from May 06, 2020 and completed on Feb. 18, 2021. 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 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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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: Wendy Pan



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)
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)



1.2 Antenna Information

Set	Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	1	PSA	RFDPA161314IMLB701	Dipole Antenna	I-PEX	Note 1
	2	PSA	RFDPA161311IM5B702	Dipole Antenna	I-PEX	
	3	PSA	RFDPA161310IM5B701	Dipole Antenna	I-PEX	
	4	PSA	RFDPA161316IMLB701	Dipole Antenna	I-PEX	
2	1	M.gear	C660-510468-A	Dipole Antenna	I-PEX	
	2	M.gear	C660-510469-A	Dipole Antenna	I-PEX	
	3	M.gear	C660-510470-A	Dipole Antenna	I-PEX	
	4	M.gear	C660-510471-A	Dipole Antenna	I-PEX	
3	1	M.gear	C660-510472-A	Dipole Antenna	I-PEX	
	2	M.gear	C660-510473-A	Dipole Antenna	I-PEX	
	3	M.gear	C660-510474-A	Dipole Antenna	I-PEX	
	4	M.gear	C660-510475-A	Dipole Antenna	I-PEX	
4	1	PSA	RFDPA171314IMLB701	Dipole Antenna	I-PEX	
	2	PSA	RFDPA171311IM5B702	Dipole Antenna	I-PEX	
	3	PSA	RFDPA171310IM5B702	Dipole Antenna	I-PEX	
	4	PSA	RFDPA171316IMLB701	Dipole Antenna	I-PEX	



Note 1:

Set	Ant.	Port			2.4GHz	5GHz Band 1	5GHz Band 2	5GHz Band 3	5GHz Band 4
		2.4G 2TX	5G 2TX	5G 4TX					
1	1	2	-	2	1.71	1.75	1.89	1.88	1.70
	2	-	1	1	-	1.93	1.93	1.92	1.95
	3	-	2	4	-	1.75	1.85	1.83	1.89
	4	1	-	3	1.63	1.92	1.88	1.90	1.87
2	1	2	-	2	1.61	1.74	1.84	1.86	1.67
	2	-	1	1	-	1.76	1.80	1.87	1.87
	3	-	2	4	-	1.66	1.72	1.69	1.84
	4	1	-	3	1.60	1.88	1.82	1.85	1.86
3	1	2	-	2	1.70	1.71	1.85	1.85	1.68
	2	-	1	1	-	1.68	1.73	1.80	1.85
	3	-	2	4	-	1.63	1.74	1.76	1.77
	4	1	-	3	1.62	1.67	1.74	1.79	1.85
4	1	2	-	2	1.7	1.74	1.74	1.82	1.68
	2	-	1	1	-	1.86	1.90	1.64	1.90
	3	-	2	4	-	1.48	1.60	1.46	1.88
	4	1	-	3	1.61	1.63	1.71	1.81	1.86

Note 2: The above information was declared by manufacturer.

Note 3: The EUT has four sets of antennas and there are four antennas for each set.

Set 1~4 are the same type antenna. Only the highest gain Set 1 antenna was selected to test and record in this report.

For 2.4GHz WLAN function**IEEE 802.11b/g/n/VHT/ax mode (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 WLAN function**IEEE 802.11a/n/ac/ax mode (2TX, 4TX/4RX):**

For 2TX

Port 1 and port 2 can be used as transmitting antenna.

Port 1 and port 2 could transmit simultaneously.

For 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.



1.3 Table for Multiple Listing

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

Equipment	Model Name	Description
AX3000 Dual Band Wi-Fi Router, AX5400 Dual Band Wi-Fi Router, Dual Band Wi-Fi Router	RT-AX58U, RT-AX82U, RT-AX3000, RT-AX5400, TUF-AX3000, GS-AX3000, GS-AX5400	All the equipment and model names are identical, the different equipment and model names served as marketing strategy.

Note 1: From the above table, equipment: AX3000 Dual Band Wi-Fi Router and model: RT-AX82U 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 SKU information

SKU	Material	5G PA	2G PA	Housing Size	Adapter
SKU 1	RJ-45 port was covered by plastic.	SKY85743	SKY85331	223.62mm x 129.48mm x 32.9mm	1 ~ 8
SKU 2	RJ-45 port was covered by metal.	SKY85743	SKY85331	264.82mm x 156.11mm x 54.97mm	1 ~ 8
SKU 3	RJ-45 port was covered by metal.	SKY85743	SKY85331	265.00mm x 158.39mm x 54.99mm	1 ~ 8
SKU 4	RJ-45 port was covered by metal.	SKY85743	SKY85331	275.50mm x 170.40mm x 65.00mm	1 ~ 8
SKU 5	RJ-45 port was covered by plastic.	QPF4516B	SKY85331	223.62mm x 129.48mm x 32.9mm	1 ~ 8
SKU 6	RJ-45 port was covered by plastic.	SKY85743	SKY85331	223.62mm x 129.48mm x 32.9mm	9
SKU 7	RJ-45 port was covered by plastic.	QPF4516B	SKY85331	223.62mm x 129.48mm x 32.9mm	9
SKU 8	RJ-45 port was covered by metal.	SKY85743	QPF4216B	275.50mm x 170.40mm x 65.00mm	1 ~ 8
SKU 9	RJ-45 port was covered by metal.	QPF4516B	QPF4216B	275.50mm x 170.40mm x 65.00mm	1 ~ 8
SKU 10	RJ-45 port was covered by plastic.	QPF4516B	QPF4216B	223.62mm x 129.48mm x 32.9mm	9

Note1: The SKU 3 is same as SKU 2 except for the logo of housing, housing size and antenna appearance,

Note2: The SKU 4 is same as SKU 2 except for the logo of housing, housing size, antenna appearance and design of light board.

Note3: The SKU 5 is same as SKU 1 except for 5G PA.

Note4: The SKU 6 is same as SKU 1 except for size of DC jack port and only equip with adapter 9.

Note5: The SKU 7 is same as SKU 5 except for size of DC jack port and only equip with adapter 9.

Note6: The SKU 8 is same as SKU 4 except for 2G PA.

Note7: The SKU 9 is same as SKU 4 except for 2G PA and 5G PA.

Note8: The SKU 10 is same as SKU 6 except for 2G PA and 5G PA.



1.5 Table for EUT supports functions

Function	Support Type
AP Router	Master
Bridge	Slave without radar detection
Repeater	Master
Mesh	Master

1.6 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA952922-06AA

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

Modifications	Performance Checking
1. Adding four adapters (adapter 6~adapter 9). Note: Adapter 6~8 are matched with SKU 1~5 and SKU 8~9. Adapter 9 is matched with SKU 6, SKU 7 and SKU 10.(Refer to section 1.1.5 for detail information). 2. Adding the SKU 6~SKU 7. 3. Adding model name: GS-AX3000, GS-AX5400.	After evaluating, it is not necessary to re-test all test items.
4. Adding the SKU 8~SKU 10 are matched with second source 2G PA (QPF4216B). (Refer to section 1.4 for detail information).	SKU 8: WLAN 2.4GHz MPE

Note: The MPE results for SKU 1 WLAN 2.4GHz and SKU 1, SKU 5WLAN 5GHz Band 1 ~ Band 4 were based on original report.



1.7 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter 1	PI	AD2088320	INPUT: 100-240V ~ 50/60Hz, 0.8A OUTPUT: 19V, 1.75A
Adapter 2	PI	AD2088320	INPUT: 100-240V ~ 50/60Hz, 0.8A OUTPUT: 19V, 1.75A
Adapter 3	Delta	ADP-33AW B	INPUT: 100-240V ~ 1A, 50-60Hz OUTPUT: 19V, 1.75A
Adapter 4	Delta	ADP-33AW B	INPUT: 100-240V ~ 1A, 50-60Hz OUTPUT: 19V, 1.75A
Adapter 5	Delta	ADP-33AW Y	INPUT: 100-240V ~ 1A, 50-60Hz OUTPUT: 19V, 1.75A
Adapter 6 (Fixed plug)	Delta	ADP-33AW Y	INPUT: 100-240V ~ 1.0A, 50-60Hz OUTPUT: 19V, 1.75A, 33.0W
Adapter 7 (Interchangeable plug)	PI	AD2131M20	INPUT: 100-240V ~ 50/60Hz, 0.8A OUTPUT: 19V, 1.75A, 33.0W
Adapter 8 (Fixed plug)	PI	AD2131320	INPUT: 100-240V ~ 50/60Hz, 0.8A OUTPUT: 19V, 1.75A, 33.0W
Adapter 9 (Fixed plug)	LEI	MU24B1120200-A1	INPUT: 100-240V ~ 50/60Hz, 0.7A OUTPUT: 12V, 2A
Other			
RJ-45 cable*1, Non-shielded, 1.5m			

1.8 Testing Location

Testing Location		
<input type="checkbox"/>	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL : 886-3-327-3456 FAX : 886-3-327-0973
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei 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/ 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 24 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 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

<SKU 1>

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	4.68	29.95	34.63	0.50	35.13	3.25837	24	0.45016	1.00000
5.2G;D1D	7.86	28.12	35.98	0.01	35.99	3.97192	24	0.54874	1.00000
5.3G;D1D	7.91	22.05	29.96	0.03	29.99	0.99770	24	0.13784	1.00000
5.6G;D1D	7.90	22.07	29.97	0.02	29.99	0.99770	24	0.13783	1.00000
5.8G;D1D	7.87	28.06	35.93	0.06	35.99	3.97192	24	0.54874	1.00000

<SKU 5>

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	7.86	28.06	35.92	0.07	35.99	3.97192	24	0.54874	1.00000
5.3G;D1D	7.91	21.96	29.87	0.12	29.99	0.99770	24	0.13784	1.00000
5.6G;D1D	7.90	22.05	29.95	0.04	29.99	0.99770	24	0.13784	1.00000
5.8G;D1D	7.87	28.12	35.99	-0.00	35.99	3.97192	24	0.54874	1.00000

<SKU 8>

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	4.72	29.88	34.60	0.50	35.10	3.23594	24	0.44706	1.00000

**Simultaneous Transmission Analysis Mode:****Test Mode: Mode 1 / SKU 1: WLAN 2.4GHz + SKU 1: WLAN 5GHz**

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;D1D	4.68	29.95	34.63	0.50	35.13	3.25837	24	0.45016	1.00000	0.45016
5.2G;D1D	7.86	28.12	35.98	0.01	35.99	3.97192	24	0.54874	1.00000	0.54874
									Sum Ratio	0.99890
									Ratio Limit	1

Test Mode: Mode 2 / SKU 1: WLAN 2.4GHz + SKU 5: WLAN 5GHz

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;D1D	4.68	29.95	34.63	0.50	35.13	3.25837	24	0.45016	1.00000	0.45016
5.8G;D1D	7.87	28.12	35.99	0.00	35.99	3.97192	24	0.54874	1.00000	0.54874
									Sum Ratio	0.99890
									Ratio Limit	1

Test Mode: Mode 3 / SKU 8: WLAN 2.4GHz + SKU 1: WLAN 5GHz

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;D1D	4.72	29.88	34.60	0.50	35.10	3.23594	24	0.44705	1.00000	0.44705
5.2G;D1D	7.86	28.12	35.98	0.01	35.99	3.97192	24	0.54873	1.00000	0.54873
									Sum Ratio	0.99578
									Ratio Limit	1

Test Mode: Mode 4 / SKU 8: WLAN 2.4GHz + SKU 5: WLAN 5GHz

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;D1D	4.72	29.88	34.60	0.50	35.10	3.23594	24	0.44705	1.00000	0.44705
5.8G;D1D	7.87	28.12	35.99	0.00	35.99	3.97192	24	0.54873	1.00000	0.54873
									Sum Ratio	0.99578
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

————THE END————