RADIO EXPOSURE TEST REPORT

FCC ID	:	MSQ-RTAX5000
Equipment	:	AX3000 Dual Band Wi-Fi Router
Brand Name	:	ASUS
Model Name	:	RT-AX58U V2 / RT-AX3000 V2
Applicant	:	ASUSTeK Computer Inc 1F., No. 15, Lide Rd., Beitou, Taipei 112, Taiwan
Manufacturer (1)	:	ASUSTeK Computer Inc 1F., No. 15, Lide Rd., Beitou, Taipei 112, Taiwan
Manufacturer (2)	:	Lukisen Electronic Corp. 3F., No.236, Boai St., Shulin Dist., New Taipei City 23845, Taiwan
Manufacturer (3)	:	Lih Rong Electronic Enterprise Co.,Ltd No. 486, Sec. 1, Wanshou Rd., Guishan Dist., Taoyuan City 33350, Taiwan
Standard	:	47 CFR Part 2.1091

The product was received on Jun. 29, 2021, and testing was started from Sep. 17, 2021 and completed on Jan. 10, 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: Cliff Chang

Sporton International Inc. Hsinchu Laboratory
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History of this test report

Report No.	Version	Description	Issued Date
FA112119	01	Initial issue of report	Jan. 24, 2022

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: Jessie Wei

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

Ant.	Port		Brand	Model Name	Antenna Type	Connector	Gain (dBi)				
	WLAN 2.4GHz	WLAN 5GHz					WLAN 2.4GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3
1	1	-	M.gear	C059-510469-A	Dipole	I-PEX	2.5	-	-	-	-
2	-	1	M.gear	C059-510470-A	Dipole	I-PEX	-	2.57	2.62	2.70	2.95
3	-	2	M.gear	C059-510471-A	Dipole	I-PEX	-	2.13	2.33	2.51	2.50
4	2	-	M.gear	C059-510472-A	Dipole	I-PEX	2.2	-	-	-	-

Note1: The above information was declared by manufacturer.

For 2.4GHz function:
For 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 function:
For IEEE 802.11a/n/ac/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.

Note2: Directional gain information

	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{i=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{i,k}\right\}^2}{N_{ANT}}\right]$
BF	$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{i=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{i,k}\right\}^2}{N_{ANT}}\right]$	$DirectionalGain = 10 \cdot \log\left[\frac{\sum_{i=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{i,k}\right\}^2}{N_{ANT}}\right]$

Ex.

Directional Gain (NSS1) formula : $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{i=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{i,k}\right\}^2}{N_{ANT}}\right]$

NSS1(g1,1) = $10^{G1/20}$; NSS1(g1,2)= $10^{G2/20}$

gj,k =(Nss1(g1,1) + Nss1(g1,2))^2

DG = 10 log[(Nss1(g1,1) + Nss1(g1,2))^2 / N_{ANT}] => 10 log[($10^{G1/20}$ + $10^{G2/20}$)^2 / N_{ANT}]

Where ;

G1 = Ant 1 Gain ; G2 = Ant 2 Gain

(NSS1)

2.4GHz DG = 5.36 dBi

5 GHz U-NII-1 DG = 5.36 dBi

5 GHz U-NII-2A DG = 5.49 dBi

5 GHz U-NII-2C DG = 5.62 dBi

5 GHz U-NII-3 DG = 5.74 dBi

1.3 Table for EUT supports functions

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

Note: The above information was declared by manufacturer.

1.4 Table for Multiple Listing

Model No.	Description
RT-AX58U V2	All the model names are identical, the difference model names served as marketing strategy.
RT-AX3000 V2	

Note 1: From the above models, model: RT-AX58U V2 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.

1.5 Accessories

Accessories			
Equipment Name	**Brand Name**	**Model Name**	**Rating**
Adapter 1	LEI	MU24D1120200-A1	INPUT: 100-240V~50/60Hz, 0.7A OUTPUT: 12V, 2A
Adapter 2	DVE	DSA-24PFS-12 FUS 120200	INPUT: 100-240V~50/60Hz, 0.8A OUTPUT: +12.0V, 2.0A, 24.0W
Others			
RJ-45 cable*1: Non-shielded, 1.5m			

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/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/ 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^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 25 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

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	5.36	29.89	35.25	0.50	35.75	3.75837	25	0.47853	1.00000
5.2G;D1D	5.36	29.96	35.32	0.50	35.82	3.81944	25	0.48631	1.00000
5.3G;D1D	5.49	23.97	29.46	0.50	29.96	0.99083	25	0.12616	1.00000
5.6G;D1D	5.62	23.93	29.55	0.44	29.99	0.99770	25	0.12703	1.00000
5.8G;D1D	5.74	29.94	35.68	0.31	35.99	3.97192	25	0.50572	1.00000

Simultaneous Transmission Analysis Mode: WLAN 2.4GHz+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	5.36	29.89	35.25	0.50	35.75	3.75837	25	0.47853	1.00000	0.47853
5.8G;D1D	5.74	29.94	35.68	0.31	35.99	3.97192	25	0.50572	1.00000	0.50572
									Sum Ratio	0.98425
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

———THE END———