




RADIO EXPOSURE TEST REPORT

FCC ID : MSQ-RTAX4T00
Equipment : AXE7800 Tri Band WiFi Router, AXE6600 Tri Band WiFi Router
Brand Name : ASUS
Model Name : ET9, ET8, EBM69, AXE7800, AXE6600
Applicant : ASUSTeK COMPUTER INC.
1F., No. 15, Lide Rd., Beitou, Taipei City 112, Taiwan
Standard : 47 CFR Part 2.1091

The product was received on Dec. 28, 2023, and testing was started from Jan. 03, 2024 and completed on Mar. 01, 2024. 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	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Sam Chen

Report Producer: Muse Chan



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)
6GHz WLAN	5925-7125	6115-7055	802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)

1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	M.gear	C660-510551-A	Dipole	I-PEX	Note 1
2	M.gear	C660-510551-A	Dipole	I-PEX	
3	M.gear	C660-510551-A	Dipole	I-PEX	
4	M.gear	C660-510551-A	Dipole	I-PEX	
5	M.gear	C660-510551-A	Dipole	I-PEX	
6	M.gear	C660-510551-A	Dipole	I-PEX	

Note 1:

Ant.	Port		Antenna Gain (dBi)				
	WLAN 2.4GHz	WLAN 5GHz	WLAN 2.4GHz	WLAN 5GHz			
				UNII 1	UNII 2A	UNII 2C	UNII 3
1	1	1	3.38	5.33	5.53	5.70	4.45
2	2	2	4.26	3.85	4.03	3.88	3.16

Ant.	Port	Antenna Gain (dBi)			
		WLAN 6GHz			
	WLAN 6GHz UNII 5~8	UNII 5	UNII 6	UNII 7	UNII 8
3	1	3.14	3.66	3.92	4.79
4	2	5.20	5.20	5.91	5.81
5	3	4.96	3.16	4.67	5.52
6	4	3.14	2.67	2.29	4.15



Item	Directional gain (dBi)								
	WLAN 2.4GHz	WLAN 5GHz				WLAN 6GHz			
		UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 6	UNII 7	UNII 8
2T1S	4.86	5.49	5.60	6.21	6.33	-	-	-	-
2T2S	4.26	5.33	5.53	5.70	4.45	-	-	-	-
4T1S	-	-	-	-	-	6.04	5.65	6.14	6.19
4T2S	-	-	-	-	-	5.20	5.20	5.91	5.81
4T4S	-	-	-	-	-	5.20	5.20	5.91	5.81

Note 2: The above information (except antenna gain and directional gain) was declared by manufacturer.

Note 3: The antenna gain and directional gain are measured which follow the procedure of KDB 662911 D03.

Note 4: For 2.4GHz function:

For IEEE 802.11 b/g/n/VHT/ax (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 802.11 a/n/ac/ax (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For 6GHz function:

For IEEE 802.11 ax (4TX/4RX):

Port 1~4 can be used as transmitting/receiving antenna.

Port 1~4 could transmit/receive simultaneously.

1.3 Table for Multiple Listing

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

Equipment Name	Model Name	Description
AXE7800 Tri Band WiFi Router, AXE6600 Tri Band WiFi Router	ET9	All the equipment names/models are identical, the difference equipment name/model served as marketing strategy.
	ET8	
	EBM69	
	AXE7800	
	AXE6600	

Note 1: From the above models, model: ET9 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 Components Source Information

EUT	Source	DDR4 (Location: U5)
EUT 1	Main	Brand Name: Samsung
EUT 2	Second	Brand Name: Hynix

Note 1: From the above EUT 1 was selected as representative EUT for the test and its data was recorded in this report.

Note 2: The above information was declared by manufacturer.



1.5 Table for EUT supports functions

Function	Support Type	Supports Band
AP Router	Master	2.4GHz, 5GHz UNII1~3 and 6GHz UNII 5~8
Bridge	Slave without radar detection	2.4GHz, 5GHz UNII1~3
Repeater	Master	2.4GHz, 5GHz UNII1~3
Mesh	Master	2.4GHz or 5GHz UNII1~3 or 6GHz UNII 5~8

Note 1: The USB port on this device supports both storage and WWAN functionality.

Note 2: The above information was declared by manufacturer.

1.6 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter 1	LEI	MU36D1120300-A1	INPUT: 100-240V~50/60Hz, 1.0A OUTPUT: 12V, 3A
Adapter 2	APD	WA-36N12FU	INPUT: 100-240V~, 50/60Hz, 0.9A, Max. OUTPUT: 12.0V, 3.0A
Other			
RJ-45 cable, non-shielded, 2m			

1.7 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

1.8 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 ISCED.



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 Mode 1: 50 cm and Mode 2: 247 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

For Mode 1: WLAN 2.4GHz + WLAN 5GHz + WLAN 6GHz

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	4.86	29.81	32.52	0.50	2004.472	50	C	4800.0	0.4177
5.2G;D1D	5.33	29.91	33.09	0.50	2285.599	50	C	4800.0	0.4763
5.3G;D1D	5.60	23.95	27.40	0.44	608.135	50	C	4800.0	0.1267
5.6G;D1D	6.21	23.73	27.79	0.05	608.135	50	C	4800.0	0.1267
5.8G;D1D	6.33	29.51	33.69	0.15	2421.029	50	C	4800.0	0.5046
6.2G;D1D	6.04	-	23.27	0.50	238.232	50	C	4800.0	0.0496
6.4G;D1D	5.65	-	22.47	0.50	198.153	50	C	4800.0	0.0413
6.7G;D1D	6.14	-	23.09	0.50	228.560	50	C	4800.0	0.0476
7.0G;D1D	6.19	-	23.71	0.50	263.633	50	C	4800.0	0.0549

Simultaneous Transmission Analysis Mode:

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	4.86	29.81	32.52	0.50	2004.472	50	C	4800.0	0.4177
5.8G;D1D	6.33	29.51	33.69	0.15	2421.029	50	C	4800.0	0.5046
7.0G;D1D	6.19	-	23.71	0.50	263.633	50	C	4800.0	0.0549
Sum TL Ratio_C	0.9772								
Ratio Limit	1								



For Mode 2: WLAN 2.4GHz + WLAN 5GHz + WLAN 6GHz + WWAN

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	4.86	29.81	32.52	0.50	2004.472	247	C	117138.3	0.0171
5.2G;D1D	5.33	29.90	33.08	0.50	2280.342	247	C	117138.3	0.0195
5.3G;D1D	5.60	23.95	27.40	0.44	608.135	247	C	117138.3	0.0052
5.6G;D1D	6.21	23.73	27.79	0.05	608.135	247	C	117138.3	0.0052
5.8G;D1D	6.33	29.51	33.69	0.15	2421.029	247	C	117138.3	0.0207
6.2G;D1D	6.04	-	23.27	0.50	238.232	247	C	117138.3	0.0020
6.4G;D1D	5.65	-	22.47	0.50	198.153	247	C	117138.3	0.0017
6.7G;D1D	6.14	-	23.09	0.50	228.560	247	C	117138.3	0.0020
7.0G;D1D	6.19	-	23.71	0.50	263.633	247	C	117138.3	0.0023
Band26;G7D	0.00	-	47.35	0.49	60813.500	247	C	63621.7	0.9562

Simultaneous Transmission Analysis Mode:

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	4.86	29.81	32.52	0.50	2004.472	247	C	117138.3	0.0171
5.8G;D1D	6.33	29.51	33.69	0.15	2421.029	247	C	117138.3	0.0207
7.0G;D1D	6.19	-	23.71	0.50	263.633	247	C	117138.3	0.0023
Band26;G7D	0.00	-	47.35	0.49	60813.500	247	C	63621.7	0.9562
Sum TL Ratio_C	0.9963								
Ratio Limit	1								

Note: The above antenna gain was declared by manufacturer.

—————THE END—————