



RADIO EXPOSURE TEST REPORT

FCC ID : MSQ-RTBE6M00
Equipment : ROG Rapture GT-BE98 Pro BE30000 Quad-band Gaming Router
Brand Name : ASUS
Model Name : GT-BE98 Pro
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 Jun. 16, 2023, and testing was started from Jul. 08, 2023 and completed on May 24, 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 variant 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

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 EUT General Information	5
1.2 Antenna Information	6
1.3 Accessories	7
1.4 Table for EUT supports function.....	7
1.5 Tble for Radio function	8
1.6 Table for EUT Information	8
1.7 Table for Permissive Change	8
1.8 Applicable Standards	9
1.9 Testing Location	9
2 Maximum Permissible Exposure	10
2.1 Limit of Maximum Permissible Exposure	10
2.2 MPE Calculation Method	10
2.3 MPE Exemption	11
2.4 Calculated Result and Limit.....	12
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: 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) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
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) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
6GHz WLAN (LPI Access Point)	5925-6425 6525-7125	5955-6415 6595-7095	802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
6GHz WLAN (Standard Power Access Point)	5925-6425 6525-6875	5955-6415 6595-6855	802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11be: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)



1.2 Antenna Information

Ant.	Port				Brand	Model Name			Antenna Type	Connector	Gain (dBi)
	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz UNII 5	WLAN 6GHz UNII 7/8		WLAN 2.4GHz / WLAN5GHz	WLAN 6GHz UNII 5	WLAN 6GHz UNII 7/8			
1	-	-	1	-	Whayu	-	C660-510595-AW1	-	Dipole	I-PEX	Note 1
2	-	-	2	-	Whayu	-	C660-510596-AW1	-	Dipole	I-PEX	
3	-	-	3	-	Whayu	-	C660-510597-AW1	-	Dipole	I-PEX	
4	-	-	4	-	Whayu	-	C660-510598-AW1	-	Dipole	I-PEX	
5	-	-	-	1	Whayu	-	-	C660-510595-AW2	Dipole	I-PEX	
6	-	-	-	4	Whayu	-	-	C660-510596-AW2	Dipole	I-PEX	
7	-	-	-	2	Whayu	-	-	C660-510597-AW2	Dipole	I-PEX	
8	-	-	-	3	Whayu	-	-	C660-510598-AW2	Dipole	I-PEX	
9	4	1	-	-	Whayu	C660-510591-AW1	-	-	Dipole	I-PEX	
10	1	4	-	-	Whayu	C660-510592-AW1	-	-	Dipole	I-PEX	
11	2	3	-	-	Whayu	C660-510593-AW1	-	-	Dipole	I-PEX	
12	3	2	-	-	Whayu	C660-510594-AW1	-	-	Dipole	I-PEX	

Note 1

Ant.	Antenna Gain (dBi)							
	WLAN 2.4GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	WLAN 6GHz		
1	-	-	-	-	-	UNII 5	UNII7	UNII8
2	-	-	-	-	-	1.80	-	-
3	-	-	-	-	-	1.95	-	-
4	-	-	-	-	-	1.82	-	-
5	-	-	-	-	-	1.74	-	-
6	-	-	-	-	-	-	1.38	1.91
7	-	-	-	-	-	-	2.30	3.01
8	-	-	-	-	-	-	3.50	3.51
9	-	-	-	-	-	-	3.29	2.92
9	3.22	2.16	1.26	2.44	3.08	-	-	-
10	3.31	2.91	2.84	2.86	4.20	-	-	-
11	4.09	4.07	3.99	3.62	3.02	-	-	-
12	1.94	2.30	2.28	2.41	3.66	-	-	-



Item	Directional gain (dBi)							
	WLAN 2.4GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	WLAN 6GHz		
						UNII 5	UNII7	UNII8
4T1S	6.24	5.90	5.76	5.94	5.78	5.66	5.48	5.92
4T2S	4.09	4.07	3.99	3.62	4.20	2.66	3.50	3.51

Note 2: The above information (excepting 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/be (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.

For 5GHz function:

For IEEE 802.11a/n/ac/ax/be (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.

For 6GHz function:

For IEEE 802.11ax/be mode (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 Accessories

Accessories				
Power	Brand Name	Model Name	Rating	Remark
Adapter 1	AcBel	ADD011	Input: 100-240V~ 1.7A, 50-60Hz Output: +19.5V, 3.33A, 65.0W MAX	With the DC cable: Non-shielded, 1.5m
Adapter 2	LEI	MU60B3120500-A1	Input: 100V-240V~50/60Hz, 1.5A Output: 12.0V, 5.0A	-
Others				
RJ-45 cable*1: Shielded, 1.5m				
Power cord*1: Non-shielded, 0.9m				

1.4 Table for EUT supports function

Function	Type
AP Router	Master
Bridge	Slave without radar detection
Extender	Master
Mesh	Master

Note: The above information was declared by manufacturer.

1.5 Tble for Radio function

Radio	2.4GHz	5GHz UNII1~UNII3	6GHz UNII7~UNII8	6GHz UNII5
1	-	-	V	-
2	-	-	-	V
3	V	-	-	-
4	-	V	-	-

Note: The above information was declared by manufacturer.

1.6 Table for EUT Information

EUT	H/W version	Integrated circuit packaging (Location: UP1)	Barometric pressure sensor (Location: U102)	Equip Adapter
1	R2.50	FCBGA Package Brand : Broadcom Model : BCM84891L	Without	1
2	R2.70	FCFBGA Package Brand : Broadcom Model : BCM84891L	With	1, 2

Note 1: From the above EUTs, EUT 1 was selected to test all the test items.

Note 2: The above information was declared by manufacturer.

1.7 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FA321615-08

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

Modifications	Performance Checking
1. Adding Adapter 2 used for EUT 2 only (Please refer to section 2.3 for detailed information about Adapter 2). 2. Adding WiFi+Barometric Position geolocation method via Firmware by factory for 6GHz Standard Power Access Point of EUT 2.	After evaluation, it does not need to re-test.

Note: All test results are based on original test report.



1.8 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

1.9 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 69 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 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, <= P_{th}.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

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	$19.2 R^2$.
Note: R is in meters, f is in MHz.	



2.4 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

For LPI Access Point:

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Distance (cm)	S Limit (mW/cm ²)	Option	TL EIRP (dBm)	TL Ratio
2.4G;D1D	6.24	27.98	32.07	0.50	1807.174	69	1.00000	C	9141.2	0.1978
5.2G;D1D	5.90	29.87	33.62	0.22	2421.029	69	1.00000	C	9141.2	0.2649
5.3G;D1D	5.76	23.93	27.54	0.3	608.135	69	1.00000	C	9141.2	0.0665
5.6G;D1D	5.94	23.95	27.74	0.1	608.135	69	1.00000	C	9141.2	0.0665
5.8G;D1D	5.78	29.96	33.59	0.25	2421.029	69	1.00000	C	9141.2	0.2649
6.2G;D1D	5.66	21.32	24.83	0.5	341.193	69	1.00000	C	9141.2	0.0373
6.7G;D1D	5.48	21.05	24.38	0.5	307.610	69	1.00000	C	9141.2	0.0337
7.0G;D1D	5.92	21.28	25.05	0.5	358.922	69	1.00000	C	9141.2	0.0393

For Standard Power Access Point:

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Distance (cm)	S Limit (mW/cm ²)	Option	TL EIRP (dBm)	TL Ratio
2.4G;D1D	6.24	27.98	32.07	0.50	1807.174	69	1.00000	C	9141.2	0.1978
5.2G;D1D	5.90	29.87	33.62	0.22	2421.029	69	1.00000	C	9141.2	0.2649
5.3G;D1D	5.76	23.93	27.54	0.3	608.135	69	1.00000	C	9141.2	0.0665
5.6G;D1D	5.94	23.95	27.74	0.1	608.135	69	1.00000	C	9141.2	0.0665
5.8G;D1D	5.78	29.96	33.59	0.25	2421.029	69	1.00000	C	9141.2	0.2649
6.2G;D1D	5.66	30.29	33.80	0.04	2421.029	69	1.00000	C	9141.2	0.2649
6.7G;D1D	5.48	30.46	33.79	0.05	2421.029	69	1.00000	C	9141.2	0.2649

**Simultaneous Transmission Analysis Mode:****Test Mode 1:****EUT 1_WLAN 2.4GHz + WLAN 5GHz + WLAN 6GHz UNII 5 (LPI Access Point) + WLAN 6GHz UNII 7/8 (LPI Access Point)**

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	S Limit (mW/cm ²)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	6.24	27.98	32.07	0.50	1807.174	69	1.00000	C	9141.2	0.1978
5.2G;D1D	5.90	29.87	33.62	0.22	2421.029	69	1.00000	C	9141.2	0.2649
6.2G;D1D	5.66	21.32	24.83	0.5	341.193	69	1.00000	C	9141.2	0.0373
7.0G;D1D	5.92	21.28	25.05	0.5	358.922	69	1.00000	C	9141.2	0.0393
Sum TL Ratio_C	0.5393									
Ratio Limit	1									

Test Mode 2:**EUT 1_WLAN 2.4GHz + WLAN 5GHz + WLAN 6GHz UNII 5 (Standard Power) + WLAN 6GHz UNII 7 (Standard Power)**

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	S Limit (mW/cm ²)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	6.24	27.98	32.07	0.50	1807.174	69	1.00000	C	9141.2	0.1978
5.2G;D1D	5.90	29.87	33.62	0.22	2421.029	69	1.00000	C	9141.2	0.2649
6.2G;D1D	5.66	30.29	33.80	0.04	2421.029	69	1.00000	C	9141.2	0.2649
6.7G;D1D	5.48	30.46	33.79	0.05	2421.029	69	1.00000	C	9141.2	0.2649
Sum TL Ratio_C	0.9925									
Ratio Limit	1									

————THE END————