

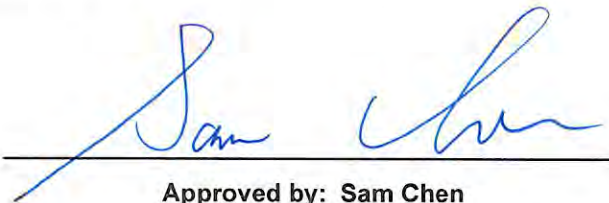


RADIO EXPOSURE TEST REPORT

FCC ID : MSQ-RTBE6X00
Equipment : BE30000 Quad Band WiFi Router
Brand Name : ASUS
Model Name : BQ16 Pro, BE30000
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 Jul. 31, 2023, and testing was started from Jul. 31, 2023 and completed on Apr. 18, 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 Table for Radio Function	7
1.4 Table for EUT supports functions.....	7
1.5 Table for Multiple Listing	8
1.6 Table for EUT Information	8
1.7 Table for Permissive Change	8
1.8 Accessories	9
1.9 Applicable Standards	9
1.10 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



History of this test report

TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A1_1 Ver1.1

Page Number : 3 of 12
Issued Date : May 28, 2024
Report Version : 01



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: Sandy Chuang



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 5260-5320 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.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Walsin	RFDPA220510IMLB901	Dipole	I-PEX	Note 1
2	Walsin	RFDPA220513IMLB901	Dipole	I-PEX	
3	Walsin	RFPCA180916IMLB901	Dipole	I-PEX	
4	Walsin	RFPCA251813IMLB901	Dipole	I-PEX	
5	Walsin	RFDPA100504IM6B901	Dipole	I-PEX	
6	Walsin	RFDPA100514IM6B901	Dipole	I-PEX	
7	Walsin	RFDPA100509IM6B901	Dipole	I-PEX	
8	Walsin	RFDPA100507IM6B901	Dipole	I-PEX	
9	Walsin	RFDPA100506IM6B901	Dipole	I-PEX	
10	Walsin	RFDPA100506IM6B902	Dipole	I-PEX	
11	Walsin	RFDPA100505IM6B901	Dipole	I-PEX	
12	Walsin	RFDPA100512IM6B901	Dipole	I-PEX	
13	Walsin	RFPCA180915IMLB901	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	2.48	2.10	2.16	2.31	2.30
2	2	2	2.46	3.09	3.47	2.84	3.65
3	3	3	2.80	2.67	2.36	2.36	2.39
4	4	4	2.04	2.15	2.42	2.50	2.01

Ant.	Port		Antenna Gain (dBi)		
	WLAN 6GHz UNII 5	WLAN 6GHz UNII 7~8	WLAN 6GHz		
			UNII 5	UNII 7	UNII 8
5	3	-	1.72	-	-
6	2	-	1.68	-	-
7	1	-	2.77	-	-
8	4	-	2.08	-	-
9	-	2	-	2.27	1.82
10	-	1	-	1.52	1.70
11	-	3	-	3.71	3.40
12	-	4	-	2.11	2.23
13	-	-	-	-	-

Item	Directional gain (dBi)							
	WLAN 2.4GHz	WLAN 5GHz				WLAN 6GHz		
		UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 7	UNII 8
4T1S	4.60	4.94	4.51	4.43	4.70	4.13	4.23	4.84
4T2S	2.80	3.09	3.47	2.84	3.65	2.77	3.71	3.40
4T4S	2.80	3.09	3.47	2.84	3.65	2.77	3.71	3.40

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/be (4TX/4RX):

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

Port 1~4 could transmit/receive simultaneously.

For 5GHz function:

For IEEE 802.11 a/n/ac/ax/be (4TX/4RX):

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

Port 1~4 could transmit/receive simultaneously.

For Zero-wait function (1RX):

Only Ant. 13 can be used as receiving antenna.

For 6GHz function:

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

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

Port 1~4 could transmit/receive simultaneously.

1.3 Table for Radio Function

Radio (R)	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz UNII 5	WLAN 6GHz UNII 7~8
R1	V (20/40MHz)	-	-	-
R2	-	V (20/40/80/160MHz)	-	-
R3	-	-	V (20/40/80/160/320MHz)	-
R4	-	-		V (20/40/80/160/320MHz)

Note: The above information was declared by manufacturer.

1.4 Table for EUT supports functions

Function
AP Router
Mesh

Note: The above information was declared by manufacturer.

1.5 Table for Multiple Listing

Model Name	Description
BQ16 Pro	All the models are identical, the difference model name served as marketing strategy.
BE30000	

Note 1: From the above models, model: BQ16 Pro 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.

1.6 Table for EUT Information

EUT	H/W version	Barometric pressure sensor (Location: U102)	Integrated circuit packaging (Location: UP1)	X'TAL (Location: Y202)	Components and antenna connector of GPS
1	R1.30	Without	FCBGA Package Brand : Broadcom Model : BCM84891L	With	With
2	R1.40	With	FCFBGA Package Brand : Broadcom Model : BCM84891L	Without	Without
3			FCBGA Package Brand : Broadcom Model : BCM84891L	Without	Without

Note 1: From the above EUTs, EUT 1 is for the LPI Access Point of 2.4GHz/5GHz/6GHz, EUT 2 is for the Standard Power of 6GHz.

Note: 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: FA351907

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

Modifications	Performance Checking
1. Adding the Standard Power Access Point for this device via Firmware by factory.	Maximum Permissible Exposure
2. Revising the Distance to "68cm" from "53cm".	
3. Adding the EUT 2~3 (Please refer to section 1.6 for detailed information about the difference with EUT 1).	After evaluation, it does not need to re-test.

Note: Maximum Permissible Exposure of 2.4GHz Band and 5GHz UNII1~UNII3 are based on original test report.



1.8 Accessories

Accessories				
Equipment Name	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.	DC power cable: Non-shielded, 1.5m
Adapter 2	LEI	MU60B3120500-A1	Input: 100-240V~50/60Hz, 1.5A Output: 12.0V, 5.0A	-
Others				
Power cord*1: Non-shielded, 0.8m (for Adapter 1 use)				
RJ-45 cable*1: Shielded, 1.5m				

1.9 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

1.10 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu (TAF: 3787)	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) 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 68 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, <= 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	$19.2 R^2$.
Note: R is in meters, f is in MHz.	



2.4 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	4.60	29.95	32.40	0.50	1949.845	68	C	8878.2	0.2197
5.2G;D1D	4.94	29.84	32.63	0.50	2055.891	68	C	8878.2	0.2317
5.3G;D1D	4.51	23.92	26.28	0.50	476.431	68	C	8878.2	0.0537
5.6G;D1D	4.43	23.96	26.24	0.50	472.063	68	C	8878.2	0.0532
5.8G;D1D	4.70	29.97	32.52	0.50	2004.472	68	C	8878.2	0.2259
6.2G;D1D	4.13	31.80	33.78	0.06	2421.029	68	C	8878.2	0.2728
6.7G;D1D	3.71	32.26	33.82	0.02	2421.029	68	C	8878.2	0.2728

Simultaneous Transmission Analysis Mode:

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)	Option	TL ERP (mW)	TL Ratio
2.4G;D1D	4.60	29.95	32.40	0.50	1949.845	68	C	8878.2	0.2197
5.2G;D1D	4.94	29.84	32.63	0.50	2055.891	68	C	8878.2	0.2317
6.2G;D1D	4.13	31.80	33.78	0.06	2421.029	68	C	8878.2	0.2728
6.7G;D1D	3.71	32.26	33.82	0.02	2421.029	68	C	8878.2	0.2728
Sum TL Ratio_C	0.997								
Ratio Limit	1								

————THE END————