

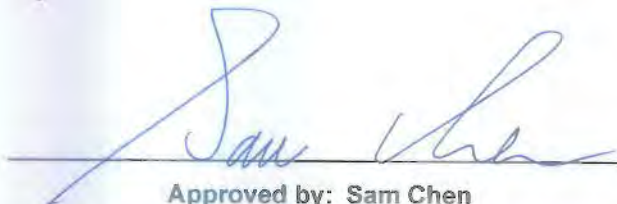


# RADIO EXPOSURE TEST REPORT

**FCC ID** : MSQ-RTAX5D00  
**Equipment** : ROG Rapture Quad-band Gaming Router  
**Brand Name** : ASUS  
**Model Name** : GT-AXE16000  
**Applicant** : ASUSTeK COMPUTER INC.  
1F., No. 15, Lide Rd., Beitou Dist., Taipei City 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)** : 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 Road, Guishan District, Taoyuan City,  
Taiwan  
**Manufacturer (4)** : ASKEY COMPUTER CORP.  
5F,NO.119,JIANKANG RD., ZHONGHE DIST.,NEW TAIPEI CITY 23585,  
TAIWAN, R.O.C.  
**Manufacturer (5)** : ARCADYAN TECHNOLOGY (VIETNAM) CO.,LTD  
NO.4-5-6, Thang long Industrial Park (Vinh Phuc), Thien Ke  
commune,Binh Xuyen district,Vinh Phuc province,Vietnam  
**Standard** : 47 CFR Part 2.1091

The product was received on Nov. 15, 2021, and testing was started from Nov. 15, 2021 and completed on Jan. 27, 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: 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
<b>1 General Description .....</b>	<b>5</b>
1.1 EUT General Information .....	5
1.2 Antenna Information .....	6
1.3 Table for EUT Supports Function.....	9
1.4 Accessories .....	10
1.5 Testing Location .....	10
<b>2 Maximum Permissible Exposure .....</b>	<b>11</b>
2.1 Limit of Maximum Permissible Exposure .....	11
2.2 MPE Calculation Method.....	11
2.3 Calculated Result and Limit.....	12
<b>Photographs of EUT v01</b>	





## 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: **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)
6GHz	5925-7125	5955-7025	802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)



1.2 Antenna Information

Ant.	Port				Brand Name	Model Name	Antenna Type	Connector	Gain (dBi)
	WLAN 2.4GHz	WLAN 5GHz UNII 1& UNII 2A	WLAN 5GHz UNII 2C& UNII 3	WLAN 6GHz					
1	2	2	-	-	WALSIN	RFPCA311406IMLB901	PCB	I-PEX	Note2
2	1	1	-	-	WALSIN	RFDPA181121IMLB901	Dipole	I-PEX	
3	4	4	-	-	WALSIN	RFDPA181121IMLB902	Dipole	I-PEX	
4	3	3	-	-	WALSIN	RFDPA181105IMLB901	Dipole	I-PEX	
5	-	-	4	-	WALSIN	RFPCA191412IM5B901	PCB	I-PEX	
6	-	-	3	-	WALSIN	RFDPA181108IM5B901	Dipole	I-PEX	
7	-	-	2	-	WALSIN	RFDPA181119IM5B901	Dipole	I-PEX	
8	-	-	1	-	WALSIN	RFDPA181125IM5B901	Dipole	I-PEX	
9	-	-	-	4	WALSIN	RFPCA170920IM6B901	PCB	I-PEX	
10	-	-	-	3	WALSIN	RFPCA222024IMLB901	PCB	I-PEX	
11	-	-	-	2	WALSIN	RFDPA181119IM6B901	Dipole	I-PEX	
12	-	-	-	1	WALSIN	RFDPA181110IM6B901	Dipole	I-PEX	

Note1: The above information was declared by manufacturer.

Note2:

Mode 1: 2G5GL-external antenna Vertical

Band (MHz)	2400-2483.5	5150-5250	5250-5350
Frequency (Hz)	2.45G	5.2G	5.3G
Ant. 1 Max Gain (dBi)	2.65	4.07	4.06
Ant. 2 Max Gain (dBi)	2.48	4.53	4.51
Ant. 3 Max Gain (dBi)	3.86	4.4	4.61
Ant. 4 Max Gain (dBi)	2.62	5.3	5.33
DG [1SS] (dBi)	4.65	5.99	6.25

Mode 2: 2G5GL-external antenna Horizontal

Band (MHz)	2400-2483.5	5150-5250	5250-5350
Frequency (Hz)	2.45G	5.2G	5.3G
Ant. 1 Max Gain (dBi)	2.65	4.07	4.06
Ant. 2 Max Gain (dBi)	4.51	5.02	5.28
Ant. 3 Max Gain (dBi)	3.89	3.87	3.47
Ant. 4 Max Gain (dBi)	3.72	5.28	5.32
DG [1SS] (dBi)	6.22	5.64	5.45



## Mode 3: 5GH-external antenna Vertical

<b>Band (MHz)</b>	<b>5470-5725</b>	<b>5725-5850</b>
<b>Frequency (Hz)</b>	<b>5.6G</b>	<b>5.785G</b>
Ant. 1 Max Gain (dBi)	2.24	1.85
Ant. 2 Max Gain (dBi)	3.91	4.69
Ant. 3 Max Gain (dBi)	4.67	5.38
Ant. 4 Max Gain (dBi)	3.24	3.84
DG [1SS] (dBi)	6.24	6.26

## Mode 4: 5GH-external antenna Horizontal

<b>Band (MHz)</b>	<b>5470-5725</b>	<b>5725-5850</b>
<b>Frequency (Hz)</b>	<b>5.6G</b>	<b>5.785G</b>
Ant. 1 Max Gain (dBi)	2.24	1.85
Ant. 2 Max Gain (dBi)	3.58	4.1
Ant. 3 Max Gain (dBi)	2.6	2.76
Ant. 4 Max Gain (dBi)	2.74	2.54
DG [1SS] (dBi)	3.62	4.12

## Mode 5: 6G-external antenna Vertical

<b>Band (MHz)</b>	<b>6175</b>	<b>6475</b>	<b>6695</b>	<b>6995</b>
<b>Frequency (Hz)</b>	<b>6.175G</b>	<b>6.475G</b>	<b>6.695G</b>	<b>6.995G</b>
Ant. 1 Max Gain (dBi)	3.38	2.11	1.82	2.74
Ant. 2 Max Gain (dBi)	1.44	2.37	3.17	4.47
Ant. 3 Max Gain (dBi)	4.13	3.01	3.54	4.44
Ant. 4 Max Gain (dBi)	4.46	4.4	4.49	4.91
DG [1SS] (dBi)	4.52	4.89	4.95	5.58
DG [2SS] (dBi)	4.46	4.4	4.49	4.91





Mode 6: 6G-external antenna Horizontal

Band (MHz)	6175	6475	6695	6995
Frequency (Hz)	6.175G	6.475G	6.695G	6.995G
Ant. 1 Max Gain (dBi)	3.38	2.11	1.82	2.74
Ant. 2 Max Gain (dBi)	1.44	2.37	3.17	4.47
Ant. 3 Max Gain (dBi)	4.56	3.5	4.02	4.63
Ant. 4 Max Gain (dBi)	3.6	3.92	3.54	4.81
DG [1SS] (dBi)	3.84	3.98	2.78	3.35
DG [2SS] (dBi)	-	3.92	-	-

Note3: The directional gain is measured which follows the procedure of KDB 662911 D03.

The antenna report is provided in the operational description for this application.

Only the highest gain antenna was selected from each different antenna mode of antenna to test and record in this report.

**For 2.4GHz function:**

**For IEEE 802.11b/g/n/VHT/ax (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 (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 (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.



**1.2.1 Table for Components Source Information**

Component	Main Source	Second Source
5G pre filter	Brand: Qorvo Model: QPQ1904	-
DDR4	Brand: SAMSUNG Model: K4A4G165WF-BCTD	Brand: SAMSUNG Model: K4A8G165WC-BCWE

Note: The above information was declared by manufacturer.

**1.2.2 Table for EUT information**

EUT	5G pre filter	DDR4
EUT 1	N/A	Main Source
EUT 2	V	Main Source
EUT 3	N/A	Second Source

Note: The EUT 1 was performed testing for all items.

**1.3 Table for EUT Supports Function**

Function	Support Type	Remark
AP Router	Master	Support 2.4GHz/5GHz/6GHz
Bridge	Slave without radar detection	Support 2.4GHz/5GHz
Repeater	Master	Support 2.4GHz/5GHz
Mesh	Master	Support 2.4GHz/5GHz/6GHz

Note: The above information was declared by manufacturer.



### 1.4 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.	With the DC cable: Non-shielded, 1.5m
Adapter 2	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 3	DELTA	ADP-65GD	INPUT: AC100-240V ~ 50-60Hz, 1.5A OUTPUT: +19V, 3.42A.	With the DC cable: Non-shielded, 1.8m
Adapter 4	DELTA	ADP-65DE B	INPUT: 100-240V~1.5A, 50-60Hz OUTPUT: 19.0V, 3.42A, 65.0W	With the DC cable: Non-shielded, 1.5m
Adapter 5	DELTA	ADP-65DE B	INPUT: 100-240V ~ 1.5A, 50-60Hz OUTPUT: 19.0V, 3.42A, 65.0W	With the DC cable: Non-shielded, 1.5m
Others				
RJ-45 cable*1: Non-shielded, 1.5m				
Power cord*1: Non-shielded, 0.9m				

Note: Refer to photographs of EUT for the detail information of difference between Adapter 1 & Adapter 2 and Adapter 4 & Adapter 5.

### 1.5 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/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	*(100)	<6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	<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 <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	<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 28 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 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 <sup>2</sup> )	S Limit (mW/cm <sup>2</sup> )
2.4G;D1D	6.22	29.75	35.97	0.02	35.99	3.97192	28	0.40315	1.00000
5.2G;D1D	5.99	29.97	35.96	0.03	35.99	3.97192	28	0.40315	1.00000
5.3G;D1D	6.25	23.71	29.96	0.03	29.99	0.99770	28	0.11284	1.00000
5.6G;D1D	6.24	23.66	29.90	0.09	29.99	0.99770	28	0.11129	1.00000
5.8G;D1D	6.26	29.70	35.96	0.03	35.99	3.97192	28	0.40315	1.00000
6.2G;D1D	4.46	-	26.84	0.50	27.34	0.54200	28	0.05501	1.00000
6.4G;D1D	4.40	-	26.89	0.50	27.39	0.54828	28	0.05565	1.00000
6.7G;D1D	4.49	-	26.83	0.50	27.33	0.54075	28	0.05489	1.00000
7.0G;D1D	4.91	-	26.21	0.50	26.71	0.46881	28	0.04758	1.00000

#### Simultaneous Transmission Analysis Mode:

##### 1. EUT 1 + WLAN 2.4GHz + WLAN 5GHz (UNII 2C/ UNII 3) + WLAN 6GHz

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm <sup>2</sup> )	S Limit (mW/cm <sup>2</sup> )	Ratio (S/Limit)
2.4G;D1D	6.22	29.75	35.97	0.02	35.99	3.97192	28	0.40315	1.00000	0.40315
5.8G;D1D	6.26	29.70	35.96	0.03	35.99	3.97192	28	0.40315	1.00000	0.40315
6.2G;D1D	4.40	-	26.89	0.50	27.39	0.54828	28	0.05565	1.00000	0.05565
									Sum Ratio	0.86195
									Ratio Limit	1

##### 2. EUT 1 + WLAN 5GHz (UNII 1/ UNII 2A) + WLAN 5GHz (UNII 2C/ UNII 3) + WLAN 6GHz

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm <sup>2</sup> )	S Limit (mW/cm <sup>2</sup> )	Ratio (S/Limit)
5.2G;D1D	5.99	29.97	35.96	0.03	35.99	3.97192	28	0.40315	1.00000	0.40315
5.8G;D1D	6.26	29.70	35.96	0.03	35.99	3.97192	28	0.40315	1.00000	0.40315
6.2G;D1D	4.40	-	26.89	0.50	27.39	0.54828	28	0.05565	1.00000	0.05565
									Sum Ratio	0.86195
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

————THE END————