



RADIO EXPOSURE TEST REPORT

FCC ID : MSQ-RTAXE4P00
Equipment : AXE11000 Tri Band WiFi Router
Brand Name : ASUS
Model Name : ET12, ZenWiFi ET12, ASUS ZenWiFi ET12
Applicant : ASUSTeK COMPUTER INC.
1F., No. 15, Lide Rd., Beitou, Taipei 112, Taiwan
Manufacturer (1) : Compal Networking (KunShan) Co., LTD.
No. 520, Nanbang Rd., Economic & Technical
Development Zone Kunshan, Jiangsu
Province China
Manufacturer (2) : ARCADYAN TECHNOLOGY (VIETNAM) CO., LTD.
Ba Thien Industrial Park, Ba Hien commune, Binh
Xuyen district, Vinh Phuc Province
Standard : 47 CFR Part 2.1091

The product was received on Jul. 19, 2021, and testing was started from Jul. 21, 2021 and completed on Nov. 15, 2021. 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
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



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Report Template No.: CB-A1_1 Ver1.1



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Note: Reference to Sporton Project No.: FA0D2518

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

1. The test configuration, test mode and test software were written in this test report are declared by the manufacturer.
2. 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)
6GHz	5925-7125	6115-7095	802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK) LE: GFSK



1.2 Antenna Information

Ant.	Port				Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz	Bluetooth					
1	-	-	3	-	WHA YU	C660-510565-A	PIFA	I-PEX	Note1
2	-	-	2	-	WHA YU	C660-510565-A	PIFA	I-PEX	
3	-	-	1	-	WHA YU	C660-510565-A	PIFA	I-PEX	
4	-	-	4	-	WHA YU	C660-510565-A	PIFA	I-PEX	
5	3	2	-	-	WHA YU	C660-510565-A	PIFA	I-PEX	
6	4	1	-	-	WHA YU	C660-510565-A	PIFA	I-PEX	
7	1	4	-	-	WHA YU	C660-510565-A	PIFA	I-PEX	
8	2	3	-	-	WHA YU	C660-510565-A	PIFA	I-PEX	
9	-	-	-	1	YAGEO	ANT3216A063R2400A	Chip	N/A	

Note1:

Ant.	Port				Antenna Gain (dBi)									
	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz	Bluetooth	WLAN 2.4GHz	WLAN 5GHz				WLAN 6GHz				Bluetooth
						UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 6	UNII 7	UNII 8	
1	-	-	3	-	-	-	-	-	-	0.97	0.81	1.07	1.14	-
2	-	-	2	-	-	-	-	-	-					-
3	-	-	1	-	-	-	-	-	-					-
4	-	-	4	-	-	-	-	-	-					-
5	3	2	-	-	3.03	3.63	3.43	3.18	4.44	-	-	-	-	-
6	4	1	-	-	2.13	4.04	3.59	2.73	3.14	-	-	-	-	-
7	1	4	-	-	2.34	2.76	3.12	3.17	3.46	-	-	-	-	-
8	2	3	-	-	3.67	4.17	4.44	4.41	4.94	-	-	-	-	-
9	-	-	-	1	-	-	-	-	-	-	-	-	-	1.69

Directional Gain (dBi)									
WLAN 2.4GHz		WLAN 5GHz UNII 1		WLAN 5GHz UNII 2A		WLAN 5GHz UNII 2C		WLAN 5GHz UNII 3	
4T1S	4T2S	4T1S	4T2S	4T1S	4T2S	4T1S	4T2S	4T1S	4T2S
6.66	3.67	4.32	4.17	5.3	4.44	4.83	4.41	5.09	4.94

Note2: The above information was declared by manufacturer.

WLAN 6GHz: The directional gain is calculated which follows the procedure of KDB 662911 D01.

WLAN 2.4GHz/5GHz: 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.



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.

For Bluetooth Function:

For Bluetooth mode (1TX/1RX)

Only Port 1 can be use as transmit and receive antenna.

1.3 Table for Multiple Listing

Brand Name	Model Name	Description
ASUS	ET12	All the models are identical, the different model names served as a marketing strategy.
	ZenWiFi ET12	
	ASUS ZenWiFi ET12	

Note: From the above model: ET12 was selected as representative model for the test and its data was recorded in this report.

The above information was declared by manufacturer.

1.4 Table for components source information

Items	Main Source	Second Source
Transceiver (2.5G LAN)	Brand: MAXLINEAR Model: GPY211	Brand: Broadcom Model: BCM50991

Note: The above information was declared by manufacturer.

1.5 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



1.6 Accessories

Accessories				
Equipment Name	Brand Name	Model Name	Rating	Remark
Adapter 1	DELTA	ADP-45FE F	INPUT: 100-240V~1.2A, 50-60Hz OUTPUT: 19.0V, 2.37A, 45.0W	With the DC Power cable: Non-shielded, 1.5m
Adapter 2	AcBel	ADH011	INPUT: 100-240V~1.4A, 50-60Hz OUTPUT: 19.5V, 2.31A, 45.0W	With the DC Power cable: Non-shielded, 1.5m
Others				
Power cable*1: Non-shielded, 0.9m RJ-45 cable*1: Non-shielded, 1.5m				

1.7 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 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 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 26 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 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	6.66	29.27	35.93	0.06	35.99	3.97192	26	0.46756	1.00000
5.2G;D1D	4.32	29.97	34.29	0.50	34.79	3.01301	26	0.35469	1.00000
5.3G;D1D	5.30	23.95	29.25	0.50	29.75	0.94406	26	0.11113	1.00000
5.6G;D1D	4.83	23.96	28.79	0.50	29.29	0.84918	26	0.09996	1.00000
5.8G;D1D	5.09	29.97	35.06	0.50	35.56	3.59749	26	0.42348	1.00000
6.2G;D1D	3.98	-	27.31	0.50	27.81	0.60395	26	0.07109	1.00000
6.4G;D1D	0.81	-	26.56	0.50	27.06	0.50816	26	0.05982	1.00000
6.7G;D1D	1.07	-	26.24	0.50	26.74	0.47206	26	0.05557	1.00000
7.0G;D1D	7.16	-	27.10	0.50	27.60	0.57544	26	0.06774	1.00000
2.4G;BT-EDR	1.69	5.64	7.33	0.50	7.83	0.00607	26	0.00071	1.00000
2.4G;BT-LE	1.69	0.22	1.91	0.50	2.41	0.00174	26	0.0002	1.00000

Simultaneous Transmission Analysis Mode: WLAN 2.4GHz+WLAN 5GHz + WLAN 6E + Bluetooth

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	6.66	29.27	35.93	0.06	35.99	3.97192	26	0.46756	1.00000	0.46756
5.8G;D1D	5.09	29.97	35.06	0.50	35.56	3.59749	26	0.42348	1.00000	0.42348
6.2G;D1D	3.98	-	27.31	0.50	27.81	0.60395	26	0.07109	1.00000	0.07109
2.4G;BT-EDR	1.69	5.64	7.33	0.50	7.83	0.00607	26	0.00071	1.00000	0.00071
									Sum Ratio	0.96284
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

————THE END————