RADIO EXPOSURE TEST REPORT

FCC ID	:	MSQ-RTAXJE01
Equipment	:	AX1800 Dual Band WiFi Router
Brand Name	:	ASUS
Model Name	:	XD4N, RP-AX1800, XD4RV2, XD4
Applicant	:	ASUSTeK COMPUTER INC. 1F., No. 15, Lide Rd., Beitou, Taipei 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
Standard	:	47 CFR Part 2.1091

The product was received on Dec. 24, 2019, and testing was started from Dec. 25, 2019 and completed on May 17, 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 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.)

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History of this test report

Report No.	Version	Description	Issued Date
FA021444-02	01	Initial issue of report	Jun. 25, 2021

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.: 021444.				

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:
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 5725-5850	5180-5240 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)

1.2 Antenna Information

Set	Ant.	Port	Brand	Part number	Type	Connector	Uncorrelated Gain (dBi)			Correlated Gain (dBi)		
							2.4GHz	5GHz B1	5GHz B4	2.4GHz	5GHz B1	5GHz B4
1	1	1	WHA YU	C660-510493-A (SRF20191786)	Dipole	I-PEX	0.69	0.88	1.22	3.68	3.85	4.08
	2	2	WHA YU	C660-510494-A (SRF20191787)	Dipole	I-PEX	0.69	0.88	1.22	3.68	3.85	4.08
Set	**Ant.**	**Port**	**Brand**	**Part number**	**Type**	**Connector**	**Uncorrelated Gain (dBi)**			**Correlated Gain (dBi)**		
							2.4GHz	**5GHz B1**	**5GHz B4**	**2.4GHz**	**5GHz B1**	**5GHz B4**
2	1	1	WALSIN	RFDPA210608IMLB902	Dipole	I-PEX	0.65	0.65	0.71	3.57	3.39	3.05
	2	2	WALSIN	RFDPA210606IMLB902	Dipole	I-PEX	0.65	0.65	0.71	3.57	3.39	3.05

Note1: The above information was declared by manufacturer.

Note2: For WLAN Function (2TX/2RX):

The WLAN 2.4GHz supports the b, g, n, VHT, ax, and the WLAN 5GHz supports the a, n, VHT, ax.

There are two set antenna for WLAN Function use, and each set contains two antennas.

Because Set 1 antenna & Set 2 antenna are the same type antennas, only the higher gain antenna "Set 1 antenna" was tested.

Port 1 and Port 2 could transmit/receive simultaneously.

1.3 Table for EUT Supports Functions

Function	Support Type
AP Router	Master
Bridge	Client without radar detection
Repeater	Master
Mesh	Master

1.4 Table for Components Source Information

Items	Main source	Second Source	Third Source
2.4GHz PA	Brand name: Qorvo Model name: QPF4206B	Brand name: Skyworks Model name: SKY85337	Brand name: Richwave Model name: RTC7646HT

Note: The above information was declared by manufacturer.

1.5 Table for EUT information

EUT	Amount of LAN Port	2.4G PA	Size of DC jack port	Adapter
1	2	Main	Big	Adapter 1, 2, 5
2	2	Second	Big	Adapter 1, 2, 5
3	1	Main	Big	Adapter 1, 2, 5
4	1	Second	Big	Adapter 1, 2, 5
5	1	Main	Small	Adapter 3~4
6	2	Third	Big	Adapter 1, 2, 5
7	1	Third	Big	Adapter 1, 2, 5

1.6 Table for Multiple Listing

The EUT has four model names which are identical to each other in all aspects except for the following table:

Model Name	Description
XD4N	There is nothing different for two model names, just for different marketing use.
RP-AX1800	
XD4RV2	
XD4	

Note 1: From the above models, model: XD4N 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.

1.7 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA021444

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

Modifications	Performance Checking
1. Adding EUT 5. 2. Adding three adapters (Adapter 3, 4, 5). 3. Adding one model name: XD4. 4. Changing the Manufacturer (3) information: from “Manufaturer: Kentec Inc. / address: No. 5, Tzu-Chiang 1st Rd. Chungli Industrial Zone, Taoyuan City, Taiwan” to “Manufacturer: Lih Rong Electronic Enterprise Co.,Ltd. / address: No. 486, Sec. 1, Wanshou Road, Guishan District, , Taoyuan City, Taiwan”.	After evaluating, it doesn't affect the test results.
5. Adding the third source of 2.4GHz PA combines as EUT 6~7.	EUT 6 WLAN 2.4GHz

Note: The MPE results of WLAN 5GHz Band 1, Band 4 were based on original report.

1.8 Accessories

Accessories			
Equipment Name	**Brand Name**	**Model Name**	**Rating**
Adapter 1	LEI	MU18B1120150-A1	INPUT: 100-240V ~ 50/60Hz, 0.6A OUTPUT: 12V, 1.5A
Adapter 2	DVE	DSA-18PFR-12 FUS 120150	INPUT: 100-240V ~ 50/60Hz, 0.6A OUTPUT: 12V, 1.5A, 18.0W
Adapter 3	PI	AD2055320	INPUT: 100-240V ~ 50/60Hz, 0.6A OUTPUT: 12V, 2.0A
Adapter 4	DELTA	ADP-24EW B	INPUT: 100-240V ~ 0.9A, 50-60Hz OUTPUT: 12V, 2A
Adapter 5	LEI	MU18D1120150-A1	INPUT: 100-240V ~ 50/60Hz, 0.6A OUTPUT: 12V, 1.5A
Other			
RJ-45 cable*1: Non-shielded, 2m			

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 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/ cm²)	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/ cm²)	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 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

E (V/m) = $\frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) = $\frac{E^2}{377}$

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 (EUT 1)	3.68	28.65	32.33	0.50	32.83	1.91867	20	0.381710	1.00000
2.4G;D1D (EUT 2)	3.68	28.56	32.24	0.50	32.74	1.87932	20	0.37387	1.00000
2.4G;D1D (EUT 6)	3.68	27.88	31.56	0.50	32.06	1.60694	20	0.31969	1.00000
5.2G;D1D	3.85	29.92	33.77	0.50	34.27	2.67301	20	0.53178	1.00000
5.8G;D1D	4.08	29.98	34.06	0.50	34.56	2.85759	20	0.56849	1.00000

Simultaneous Transmission Analysis Mode: WLAN 2.4GHz + WLAN 5GHz

Test Mode 1: EUT 1 - WLAN 2.4GHz + WLAN 5GHz

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	3.68	28.65	32.33	0.50	32.83	1.91867	20	0.38170	1	0.38170
5.8G;D1D	4.08	29.98	34.06	0.50	34.56	2.85759	20	0.56849	1	0.56849
									Sum Ratio	0.95019
									Ratio Limit	1

Test Mode 2: EUT 2 - WLAN 2.4GHz + WLAN 5GHz

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	3.68	28.56	32.24	0.50	32.74	1.87932	20	0.37387	1	0.37387
5.8G;D1D	4.08	29.98	34.06	0.50	34.56	2.85759	20	0.56849	1	0.56849
									Sum Ratio	0.94236
									Ratio Limit	1

Test Mode 2: EUT 6 - WLAN 2.4GHz + WLAN 5GHz

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	3.68	27.88	31.56	1.43219	32.06	1.60694	20	0.31969	1	0.31969
5.8G;D1D	4.08	29.98	34.06	0.50	34.56	2.85759	20	0.56849	1	0.56849
									Sum Ratio	0.88818
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

———THE END———