Testing Laboratory 3787

RADIO EXPOSURE TEST REPORT

FCC ID	:	2AYRA-03639
Equipment	:	Velop AX5400 WiFi 6 System
Brand Name	:	LINKSYS
Model Name	:	MX5500, MX55EC, MX55MS, MX55WH
Applicant	:	Linksys USA, Inc. 12045 East Waterfront Drive Playa Vista, CA 90094, United States.
Standard	:	47 CFR Part 2.1091

The product was received on Feb. 03, 2021, and testing was started from Feb. 03, 2021 and completed on May 11, 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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History of this test report

Report No.	Version	Description	Issued Date
FA122657-01	01	Initial issue of report	May 27, 2021

Summary of Test Result

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

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) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5250-5320 5500-5700 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / π/4-DQPSK / 8DPSK) LE: GFSK

1.2 Antenna Information

Ant.	Port			Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	2.4GHz	5GHz	Bluetooth					
1	2	1	-	Galtronics	02102140-07315-1	PCB	U.FL	Note
2	1	2	-	Galtronics	02102140-07315-2	PCB	U.FL	
3	-	3	-	Galtronics	02102142-07315-1	PCB	U.FL	
4	-	4	-	Galtronics	02102142-07315-2	PCB	U.FL	
5	-	-	1	Galtronics	02036073-07315	PCBA Launched	N/A	

Note:

<Antenna Gain>

Ant.	Port	WLAN Gain (dBi)				
		2.4 GHz	5GHz Band 1	5GHz Band 2	5GHz Band 3	5GHz Band 4
1	1	1.67	2.85	2.85	2.80	2.84
2	2	1.67	2.85	2.85	2.80	2.84
3	3	-	4.90	4.90	4.42	4.60
4	4	-	4.90	4.90	4.42	4.60

Ant.	Bluetooth Gain (dBi)
5	5.3

< Directional Gain>

Ant.	Port	Gain (dBi)							
		4T1S				4T4S			
		5GHz Band 1	5GHz Band 2	5GHz Band 3	5GHz Band 4	5GHz Band 1	5GHz Band 2	5GHz Band 3	5GHz Band 4
1	1	5.48	6.08	5.82	5.5	1.58	2.27	1.44	2.03
2	2								
3	3								
4	4								

Note: The above information was declared by manufacturer.

For 2.4GHz function:

For IEEE 802.11b/g/n/VHT/ax (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 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 Bluetooth Function:

For Bluetooth mode (1TX/1RX)

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

1.3 Table for Multiple Listing

The brand/model names in the following table are all refer to the identical product.

Brand Name	Model Name	Description
LINKSYS	MX5500	All the models are identical, the difference model for difference brand served as marketing strategy.
	MX55EC	
	MX55MS	
	MX55WH	

Note 1: From the above models, model: MX5500 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.

1.4 Accessories

Accessories			
Equipment Name	**Brand Name**	**Model Name**	**Rating**
Adapter 1 (Fixed plug)	Ktec	KSA-24W-120200HU	INPUT: 100-240V~50/60Hz, 0.6A OUTPUT: 12V, 2.0A
Adapter 2 (Fixed plug)	APD	WB-24J12FU	INPUT: 100-240V~50-60Hz, 0.7A Max. OUTPUT: 12V, 2A
Adapter 3 (Removable plug)	Ktec	KSA-24W-120200D5	INPUT: 100-240V~50/60Hz, 0.6A OUTPUT: 12.0V, 2.0A 24.0W
Adapter 4 (Removable plug)	APD	WB-24J12R	INPUT: 100-240V~50-60Hz, 0.7A Max. OUTPUT: 12.0V, 2.0A 24.0W
Other			
US plug*2 (for adapter 3 and adapter 4 use) RJ-45 cable 1*1, non-shielded, 1.8m, Type: flat wire RJ-45 cable 2*1, non-shielded, 1.8m, Type: round wire			

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/ 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 35 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	4.68	27.75	32.43	0.50	32.93	1.96336	35	0.12754	1.00000
5.2G;D1D	5.48	29.68	35.16	0.50	35.66	3.68129	35	0.23914	1.00000
5.3G;D1D	6.08	23.21	29.29	0.50	29.79	0.95280	35	0.06190	1.00000
5.6G;D1D	5.82	23.54	29.36	0.50	29.86	0.96828	35	0.06290	1.00000
5.8G;D1D	5.50	29.98	35.48	0.50	35.98	3.96278	35	0.25743	1.00000
2.4G;BT-BR	5.30	4.54	9.84	0.50	10.34	0.01081	35	0.00070	1.00000
2.4G;BT-LE	5.30	4.57	9.87	0.50	10.37	0.01089	35	0.00071	1.00000

Simultaneous Transmission Analysis Mode: WLAN 2.4GHz+WLAN 5GHz+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	4.68	27.75	32.43	0.50	32.93	1.96336	35	0.12754	1.00000	0.12754
2.4G;BT-BR	5.50	29.98	35.48	0.50	35.98	3.96278	35	0.25743	1.00000	0.25743
5.8G;D1D	5.30	4.57	9.87	0.50	10.37	0.01089	35	0.00071	1.00000	0.00071
									Sum Ratio	0.38568
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

———THE END———