


Radio Exposure Evaluation Report

Contains FCC ID : HDC-648E
HDC-649A

Equipment : WiFi6 2.5G Router

Brand Name : 

Model Name : 854-v6YYYYYYY(Y can be 0-9, a-z, A-Z, blank, "+" or "-" or "#") (With voice)
854-6YYYYYYY(Y can be 0-9, a-z, A-Z, blank, "+" or "-" or "#") (Without voice)

Applicant : Adtran
901 Explorer Blvd., Huntsville, AL 35806, USA

Manufacturer : XAVi Technologies Corporation
22F., No.69, Sec. 2, Guangfu Rd., Sanchong Dist., New Taipei City 241, Taiwan (R.O.C.)

Standard : 47 CFR FCC Part 2 Subpart J, section 2.1091

The product was received on Aug. 23, 2021, and testing was started from Sep. 23, 2021 and completed on Sep. 24, 2021. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR FCC Part 2 Subpart J, section 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. Hsinhua Laboratory, the test report shall not be reproduced except in full.



Approved by: Allen Lin

SPORTON INTERNATIONAL INC. Hsinhua Laboratory
No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)



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Photographs of EUT V01



History of this test report

Report No.	Version	Description	Issued Date
FA182309	01	Initial issue of report	Oct. 15, 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:
None

Reviewed by: Sam Tsai
Report Producer: Debby Hung

1 General Description

1.1 Information

1.1.1 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 5260-5320 5500-5700 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)
Bluetooth	2400-2483.5	2402-2480	LE: DSSS (GFSK)

1.1.2 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector
1	Galtronics	-	PCB antenna	UFL
2	Galtronics	-	PCB antenna	UFL
3	Galtronics	-	PCB antenna	UFL
4	Galtronics	-	PCB antenna	UFL
5	Galtronics	-	PCB antenna	UFL
6	Galtronics	-	PCB antenna	UFL
7	Galtronics	-	PCB antenna	UFL
8	Galtronics	-	PCB antenna	UFL
9	Galtronics	-	PCB antenna	UFL
10	Galtronics	-	PCB antenna	UFL



Ant.	Port	Gain (dBi)			
		2.4G	5G	DFS RX	BT
1	1	2.56	-	-	-
2	2	2.56	-	-	-
3	3	2.56	-	-	-
4	4	2.56	-	-	-
5	1	-	3.99	-	-
6	2	-	2.12	-	-
7	3	-	2.12	-	-
8	4	-	3.99	-	-
9	5	-	-	3.99	-
10	1	-	-	-	2.56

For 2.4GHz function:

For IEEE 802.11 b/g/n/VHT/ax mode (4TX/4RX)
Ant. 1~Ant. 4 could transmit/receive.

For BT function:

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)
Ant. 10 could transmit/receive.

For 5GHz function:

For IEEE 802.11 a/n/ac/ax mode (4TX/4RX)
Ant. 5~Ant. 8 could transmit/receive.

1.2 Testing Location

Test Lab. : Sporton International Inc. Hsinhua Laboratory		
<input checked="" type="checkbox"/>	Hsinhua (TAF: 3785)	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.) TEL: 886-3-327-3456 FAX: 886-3-327-0973
Test site Designation No. TW3785 with FCC.		
<input type="checkbox"/>	Wen 33rd.St. (TAF: 3785)	ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: 886-3-318-0787 FAX: 886-3-318-0287
Test site Designation No. TW0008 with FCC.		

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
	854-v6YYYYYYY(Y can be 0-9, a-z, A-Z, blank, "+" or "-" or "#") (With voice)	All the models are identical, the difference model for difference brand served as marketing strategy.
	854-6YYYYYYY(Y can be 0-9, a-z, A-Z, blank, "+" or "-" or "#") (Without voice)	

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

Multiple Transmitters Condition

Co-location as simultaneously transmitting (co-transmitting) and the evaluation shall be consider that simultaneous transmissions from co-located devices the individual transmitters are evaluated separately. After sum of the individual value (basic restriction / reference level) are measured/calculated also have to under basic restriction / reference level.

Co-transmitting mode: 2.4GHz WLAN+5GHz WLAN +Bluetooth

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:

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

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

Wi-Fi 2.4G+ Wi-Fi 5G Function+ Bluetooth Function

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm2)	Limit (mW/cm2)	Ratio (S/Limit)
2.4G;D1D	8.58	26.9	35.48	0.50	35.98	3.96278	26	0.46649	1.00000	0.46649
5.8G;D1D	9.13	26.36	35.49	0.50	35.99	3.97192	26	0.46757	1.00000	0.46757
2.4G;BT-LE	2.56	7.54	10.10	0.50	10.60	0.01148	26	0.00135	1.00000	0.00135
									Sum Ratio	0.93541
									Ratio Limit	1

————THE END————