



FCC RADIO EXPOSURE TEST REPORT

FCC ID : 2AQ68W6RT2230
Equipment : Outdoor Wireless Gateway
Brand Name : Hon Lin
Model Name : W6R-T223-001,W6B-T223-001,W6S-T223-001
Applicant : Hon Lin Technology Co., Ltd.
11F, No.32, Jihu Rd., Neihu Dist.,Taipei City Taiwan
Manufacturer : Hon Lin Technology Co., Ltd.
11F, No.32, Jihu Rd., Neihu Dist.,Taipei City Taiwan
Standard : 47 CFR Part 2.1091

The product was received on Dec. 31, 2020, and testing was started from Jan. 11, 2021 and completed on Jan. 27, 2021. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.


Approved by: Cliff Chang

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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Photographs of EUT v01	



History of this test report

[illegible]



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: Sandy Chuang



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 5725-5850	5180-5240 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)



1.2 Antenna Information

Set	Ant.	Port			Brand	Model Name	Antenna Type	Connector	Gain (dBi)
		2.4GHz	5GHz (Band 1)	5GHz (Band 4)					
1	1	1	1	-	Shenzhen AotianChuangke	AMXF-2458-5	Omnidirectional	N Type	Note 1
	2	2	2	-	Shenzhen AotianChuangke	AMXF-2458-5	Omnidirectional	N Type	
2	3	-	-	1	Shenzhen AotianChuangke	ATCK-5800-8	Omnidirectional	N Type	
	4	-	-	2	Shenzhen AotianChuangke	ATCK-5800-8	Omnidirectional	N Type	
	5	-	-	3	Shenzhen AotianChuangke	ATCK-5800-8	Omnidirectional	N Type	
3	1	1	1	-	M.gear	C407-690902-A	Omnidirectional	N Type	
	2	2	2	-	M.gear	C407-690902-A	Omnidirectional	N Type	
4	3	-	-	1	M.gear	C407-690851-A	Omnidirectional	N Type	
	4	-	-	2	M.gear	C407-690851-A	Omnidirectional	N Type	
	5	-	-	3	M.gear	C407-690851-A	Omnidirectional	N Type	

Note 1

Set	Ant.	Gain (dBi)			Cable Loss	Gain (dBi)		
		2.4GHz	5GHz (Band 1)	5GHz (Band 4)		2.4GHz	5GHz (Band 1)	5GHz (Band 4)
1	1	6	6	-	0.5	5.5	5.5	-
	2	6	6	-	0.5	5.5	5.5	-
2	3	-	-	8	0.5	-	-	7.5
	4	-	-	8	0.5	-	-	7.5
	5	-	-	8	0.5	-	-	7.5
3	1	3.5	6	-	0.5	3	5.5	-
	2	3.5	6	-	0.5	3	5.5	-
4	3	-	-	7	0.5	-	-	6.5
	4	-	-	7	0.5	-	-	6.5
	5	-	-	7	0.5	-	-	6.5

Note 1: The above information was declared by manufacturer.

Note 2: Antenna set 1 and set 3 are the same type of antennas, antenna set 1 has the higher gain than set 2, so antenna set 1 is chosen to test.

Antenna set 2 and set 4 are the same type of antennas, antenna set 2 has the higher gain than set 4, so antenna set 2 is chosen to test.

**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:**Band 1****For IEEE 802.11a/n/ac/ax (2TX/2RX):**

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

Port 1 and Port 2 could transmit/receive simultaneously.

Band 4**For IEEE 802.11a/n/ac/ax (3TX/3RX):**

Port 1, Port 2 and Port 3 can be used as transmitting/receiving antenna.

Port 1, Port 2 and Port 3 could transmit/receive simultaneously

1.3 Table for Multiple Listing

The difference for each model name is shown as below:

Model Name	Support Function
W6R-T223-001	AP
W6B-T223-001	Mesh AP
W6S-T223-001	Mesh AP-satellite

Note 1: From the above models, model: W6R-T223-001 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 EUT Supports Type

The EUT supports AP, Mesh AP, Mesh AP-satellite functions, only the AP was performed for all the tests.

1.5 Accessories

Sealing Collar*1



1.6 Testing Location

Testing Location		
<input type="checkbox"/>	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL : 886-3-327-3456 FAX : 886-3-327-0973
<input checked="" type="checkbox"/>	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302, Taiwan (R.O.C.) TEL : 886-3-656-9065 FAX : 886-3-656-9085

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.



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)*	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)*	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	8.51	27.32	35.83	0.16	35.99	3.97192	26	0.46756	1.00000
5.2G;D1D	8.51	16.76	25.27	0.50	25.77	0.37757	26	0.04445	1.00000
5.8G;D1D	7.50	28.47	35.97	0.02	35.99	3.97192	26	0.46756	1.00000

Simultaneous Transmission Analysis Mode:

WLAN 2.4GHz + WLAN 5GHz Band 1 + WLAN 5GHz Band 4

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	8.51	27.32	35.83	0.16	35.99	3.97192	26	0.46756	1.00000	0.46756
5.2G;D1D	8.51	16.76	25.27	0.50	25.77	0.37757	26	0.04445	1.00000	0.04445
5.8G;D1D	7.50	28.47	35.97	0.02	35.99	3.97192	26	0.46756	1.00000	0.46756
									Sum Ratio	0.97957
									Ratio Limit	1.00000

Note: The above antenna gain was declared by manufacturer.

—————THE END—————