



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 Oct. 06, 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
FA0D3031-01	01	Initial issue of report	Dec. 09, 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 5260-5320 5500-5720 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 (UNII 1, UNII 2A)	5GHz (UNII 2C, UNII 3)					
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	
5	1	1	1	-	INPAQ	DAM-E9-C-N0-000-50-03	Omnidirectional	N Type	
	2	2	2	-	INPAQ	DAM-E9-C-N0-000-50-03	Omnidirectional	N Type	
6	3	-	-	1	INPAQ	DAM-E9-A-N0-000-50-03	Omnidirectional	N Type	
	4	-	-	2	INPAQ	DAM-E9-A-N0-000-50-03	Omnidirectional	N Type	
	5	-	-	3	INPAQ	DAM-E9-A-N0-000-50-03	Omnidirectional	N Type	
7	1	1	1	-	M.gear	C107-691992-A	Omnidirectional	N Type	
	2	2	2	-	M.gear	C107-691992-A	Omnidirectional	N Type	
8	3	-	-	1	M.gear	C107-691991-A	Omnidirectional	N Type	
	4	-	-	2	M.gear	C107-691991-A	Omnidirectional	N Type	
	5	-	-	3	M.gear	C107-691991-A	Omnidirectional	N Type	



Note 1:

Set	Ant.	Gain (dBi)			Cable Loss	Gain (dBi)		
		2.4GHz	5GHz (UNII 1, UNII 2A)	5GHz (UNII 2C, UNII 3)		2.4GHz	5GHz (UNII 1, UNII 2A)	5GHz (UNII 2C, UNII 3)
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
5	1	5.85	6	-	0.5	5.35	5.5	-
	2	5.85	6	-	0.5	5.35	5.5	-
6	3	-	-	7.15	0.5	-	-	6.65
	4	-	-	7.15	0.5	-	-	6.65
	5	-	-	7.15	0.5	-	-	6.65
7	1	5.64	6	-	0.5	5.14	5.5	-
	2	5.64	6	-	0.5	5.14	5.5	-
8	3	-	-	7	0.5	-	-	6.5
	4	-	-	7	0.5	-	-	6.5
	5	-	-	7	0.5	-	-	6.5

Note 2: The above information was declared by manufacturer.

Note 3: Antenna set 1, 3, 5 and 7 are the same type of antennas, antenna set 1 has the higher gain than set 3, 5 and 7 so antenna set 1 is chosen to test for WLAN 2.4GHz, WLAN 5GHz UNII 1 and UNII 2A.

Antenna set 2, 4, 6 and 8 are the same type of antennas, antenna set 2 has the higher gain than set 4, so antenna set 2, 6 and 8 is chosen to test for WLAN 5GHz UNII 2C and UNII 3.

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:

UNII 1 ~ UNII 2A

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.

UNII 2C ~ UNII 3

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-satelite

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-satelite functions.

1.5 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA0D3031

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

Modifications	Performance Checking
1. Adding 5GHz UNII 2A and UNII 2C (5250~5350 MHz, 5470~5725 MHz) for this device.	MPE (WLAN 5GHz UNII 2A and UNII 2C).
2. Modifying the MPE distance to 27 cm.	MPE (WLAN 2.4GHz, WLAN 5GHz UNII 1 and UNII 3).
3. Adding set 5 ~ 8 antenna.	After evaluating, it doesn't affect the test results.

1.6 Accessories

Sealing Collar*1



1.7 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/ 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 27 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

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	27	0.43356	1.00000
5.2G;D1D	8.51	16.76	25.27	0.50	25.77	0.37757	27	0.04121	1.00000
5.3G;D1D	8.51	21.44	29.95	0.04	29.99	0.99770	27	0.10891	1.00000
5.6G;D1D	7.50	22.42	29.92	0.07	29.99	0.99770	27	0.10891	1.00000
5.8G;D1D	7.50	28.47	35.97	0.02	35.99	3.97192	27	0.43356	1.00000

Simultaneous Transmission Analysis Mode:

WLAN 2.4GHz (Antenna Set 1) + WLAN 5GHz Low Band (Antenna Set 1) + WLAN 5GHz High Band (Antenna Set 2)

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	27	0.43356	1.00000	0.43356
5.3G;D1D	8.51	21.44	29.95	0.04	29.99	0.99770	27	0.10891	1.00000	0.10891
5.8G;D1D	7.50	28.47	35.97	0.02	35.99	3.97192	27	0.43356	1.00000	0.43356
									Sum Ratio	0.97603
									Ratio Limit	1.00000

Note: The above antenna gain was declared by manufacturer.

————THE END————