

Radio Exposure Evaluation Report

FCC ID : YL6-1438852R

Equipment : Wireless Module

Brand Name : ALARM.COM

Model Name : ADC-WM8852-A

Applicant : Alarm.com Incorporated
8281 Greensboro Drive, Suite 100, Tysons, VA 22102
United States

Manufacturer : Alarm.com Incorporated
8281 Greensboro Drive, Suite 100, Tysons, VA 22102
United States

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

The product was received on Dec. 07, 2021, and testing was started from Dec. 28, 2021 and completed on Jan. 10, 2022. 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: Jackson Tsai

SPORTON INTERNATIONAL INC. Hsinhua Laboratory
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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: Jenny Yang

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)
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) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK) LE: DSSS (GFSK)

1.1.2 Antenna Information

Source	Ant.	Brand	Model Name	Antenna Type	Connector	Support
1	1	PSA	WCBN3511L_PCA	Dipole	I-Pex	2.4G+5G
	2	PSA	WCBN3511L_PCA	Dipole	I-Pex	2.4G+5G+BT
2	3	INPAQ	RFFPA301205IMLB401	Dipole	I-Pex	2.4G+5G
	4	INPAQ	RFFPA301213IMLB401	Dipole	I-Pex	2.4G+5G
3	5	LYNwave	ALX18F-222A A4-00	Dipole	I-Pex	2.4G+5G
	6	LYNwave	ALX18F-222A A5-00	Dipole	I-Pex	2.4G+5G
4	7	LITEON	3010001121L7	Dipole	I-Pex	2.4G+5G
	8	LITEON	3010001122L7	Dipole	I-Pex	2.4G+5G

Source	Ant.	Port	Gain (dBi)		
			2.4G	5G	BT
1	1	1	5.3	5.71	-
	2	2	5.3	5.71	5.3
2	3	1	3.94	5.3	-
	4	2	3.78	4.28	-
3	5	1	4.9	5.4	-
	6	2	5.2	4.7	-
4	7	1	5.1	5.6	-
	8	2	3.5	5.5	-

Note 1: The EUT has eight antennas.

Note 2: The EUT can be matched with the above antennas and Source 1 antennas were used to perform the worst configuration and result of that was recorded as the final test result.

For 2.4GHz function:

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

Ant. 1 (port 1) and Ant. 2 (port 2) could transmit/receive simultaneously.

Ant. 3 (port 1) and Ant. 4 (port 2) could transmit/receive simultaneously.

Ant. 5 (port 1) and Ant. 6 (port 2) could transmit/receive simultaneously.

Ant. 7 (port 1) and Ant. 8 (port 2) could transmit/receive simultaneously.

For BT function:

For IEEE 802.15.1 Bluetooth mode (1TX/1RX)

Only Ant. 2 (port 2) can be used as transmitting/receiving.

For 5GHz function:

For IEEE 802.11 a/n/ac/ax mode (2TX/2RX)

Ant. 1 (port 1) and Ant. 2 (port 2) could transmit/receive simultaneously.

Ant. 3 (port 1) and Ant. 4 (port 2) could transmit/receive simultaneously.

Ant. 5 (port 1) and Ant. 6 (port 2) could transmit/receive simultaneously.

Ant. 7 (port 1) and Ant. 8 (port 2) could transmit/receive simultaneously.

1.2 Testing Location

Test Lab. : Sporton International Inc. Hsinhua Laboratory			
☒	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.			
☐	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.			

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 20 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

2.4GHz WLAN

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;G1D	5.30	23.08	28.38	0.50	28.88	0.77268	20	0.15372	1.00000
2.4G;D1D	5.30	21.47	26.77	0.50	27.27	0.53333	20	0.10610	1.00000

5GHz WLAN

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)
5.2G;D1D	5.71	21.55	27.26	0.50	27.76	0.59704	20	0.11878	1.00000
5.3G;D1D	5.71	21.71	27.42	0.50	27.92	0.61944	20	0.12323	1.00000
5.6G;D1D	5.71	21.16	26.87	0.50	27.37	0.54576	20	0.10858	1.00000
5.8G;D1D	5.71	22.36	28.07	0.50	28.57	0.71945	20	0.14313	1.00000

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)
2.4G;BT-LE	5.30	11.37	16.67	0.50	17.17	0.05212	20	0.01037	1.00000
2.4G;BT-BR	5.30	11.29	16.59	0.50	17.09	0.05117	20	0.01018	1.00000
2.4G;BT-EDR	5.30	11.06	16.36	0.50	16.86	0.04853	20	0.00965	1.00000

————THE END————