

FCC RF Exposure Exemption report

for

Smart Home Alarm System

Model No.: HSGW_x-xxxxx-xxxxx Series

(x=0~9, A~Z or blank)

FCC ID: GX9HSGWCATM1

of

Applicant: CLIMAX TECHNOLOGY CO., LTD.

**Address: No. 258, Sinhu 2nd Rd., Neihu District, Taipei City 114,
Taiwan (R.O.C.)**

Tested and Prepared

by

Worldwide Testing Services (Taiwan) Co., Ltd.

FCC Registration No.: TW1477, TW1072

Industry Canada filed test laboratory Reg. No.: 20037, 5107A



Report No.: W6M22302-22480-EE

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
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1 General Information

1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems. The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

Laboratory disclaimer-

1. The test results of this test report relate exclusively to the item tested as specified in 1.5.
2. The test report may only be reproduced or published in full.
3. Reproduction or publication of extracts from the report requires the prior written approval of the Worldwide Testing Services(Taiwan) Co., Ltd.
4. Antenna gain is provided by applicant and laboratory issue relevant data and results.

Tester:

April 17, 2023	Rick Chen	<i>Rick Chen.</i>
Date	WTS-Lab. Name	Signature

Technical responsibility for area of testing:

April 17, 2023	Kevin Wang	<i>Kevin Wang</i>
Date	WTS Name	Signature



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1.2 Testing laboratory

1.2.1 Location

10m OATS

No.5-1, Lishui, Shuang Sing Village, Wanli Dist.,
New Taipei City 207, Taiwan (R.O.C.)

3 meter semi-anechoic chamber

No.35, Aly. 21, Ln. 228, Ankang Rd., Neihu Dist.,
Taipei City 114, Taiwan (R.O.C.)

Tel: 886-2-6613-0228

Worldwide Testing Services (Taiwan) Co., Ltd.

6F., No. 58, Ln. 188, Ruiguang Rd., Neihu Dist.,
Taipei City 114, Taiwan (R.O.C.)

Tel: 886-2-6606-8877

1.2.2 Details of accreditation status

Accredited testing laboratory

FCC filed test laboratory Reg. No.: TW1477, TW1072

Industry Canada filed test laboratory Reg. No.: 20037, 5107A

Test location, where different from Worldwide Testing Services (Taiwan) Co., Ltd. :

Name: ./.

Accredited no.: ./.

Street: ./.

Town: ./.

Country: ./.

1.3 Application details

Approval holder

Name: CLIMAX TECHNOLOGY CO., LTD.

Street: No. 258, Sinhu 2nd Rd., Neihu District,

Town: Taipei City 114,

Country: Taiwan (R.O.C.)

Manufacturer: (if applicable)

Name: ./.

Street: ./.

Town: ./.

Country: ./.



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Date of receipt of test item: February 21, 2023
Date of test: from February 22, 2023 to April 14, 2023

1.4 General information of Test item

Type of test item: Smart Home Alarm System
Model no.: HSGWx-xxxxx-xxxxx Series(x=0~9, A~Z or blank)
Multi-listing model no.: ./.
Brand name: ./.
Power supply: Adaptor (I/P: 100-240V~0.4A, 50/60Hz
O/P: 12.0V, 1.0A, 12.0W)
Battery 7.2Vd.c.
Type of antenna: Monopole antenna
Antenna gain: WLAN 2.4G: 1.53 dBi
CAT-M1: Band 2: 3.13 dBi
Band 4: -0.08 dBi
Band 5: 2.34 dBi
Band 12: 0.04 dBi
Band 13: 2.46 dBi
Band 66: -0.08 dBi

Technical data

WLAN		
Mode	Channel/Frequency(MHz)	Conducted Power (dBm)
802.11b	Ch 1 : 2412 MHz	14.42
	Ch 6 : 2437 MHz	14.75
	Ch 11 : 2462 MHz	15.03
802.11g	Ch 1 : 2412 MHz	9.14
	Ch 6 : 2437 MHz	9.55
	Ch 11 : 2462 MHz	9.83
802.11n20MHz	Ch 1 : 2412 MHz	9.18
	Ch 6 : 2437 MHz	9.60
	Ch 11 : 2462 MHz	9.90
802.11n40MHz	Ch 1 : 2422 MHz	8.06
	Ch 4 : 2437 MHz	8.36
	Ch 7 : 2452 MHz	8.56



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CAT-M1			
Band	Channel/Frequency(MHz)	Conducted Power (dBm)	EIRP/ERP (dBm)
Band 2	18675/1857.5	22.61	25.74
Band 4	20175/1732.5	21.84	21.76
Band 5	20525/836.5	21.99	22.18
Band 12	23095/707.5	22.67	20.56
Band 13	23230/782	21.82	22.13
Band 66	132622/1775	22.36	22.28

Operation modes: Duplex
 Modulation type: WLAN: DSSS, OFDM · CAT-M1: QPSK
 Sample no.: #01
 Classification:

Fixed Device	<input checked="" type="checkbox"/>
Mobile Device (Human Body distance > 20cm)	<input type="checkbox"/>
Portable Device (Human Body distance < 20cm)	<input type="checkbox"/>

1.5 Duty cycle and factor

The duty factor is computed as $[10 \log (1 / D)]$, where D is the duty cycle.

Mode	T _{on} (ms)	T _{on} +T _{off} (ms)	Duty cycle (%)	Duty Factor (dB)	1/T - VBW (kHz)
802.11b	12	12.532	95.75%	0.19	0.08
802.11g	2.083	2.155	96.66%	0.15	0.48
802.11n 20M	1.939	2.043	94.91%	0.23	0.52
802.11n 40M	0.97	1.106	87.70%	0.57	1.03

1.6 Test standards

15 SUBPART C § 15.247 (2021-10)
 47CFR Part 22 (2021-10), Part 24 (2021-10), Part 27 (2021-10)

Special statement:

1. This test report is valid in connection to the model has been tested, any modification to the product which is different from the test model will avoid the certification of the test report.
2. This test report shall always be duplicated in full pages unless the written approval of the testing.
3. The x in model number is representing different case shape, case colors, led mask color, and control ID.
4. The model number of EUT is HSGW-MAX8-DT32. This model does not contain logo.



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2 Test configuration

2.1 Test environment

Relative humidity content: 20 ... 75 %

Air pressure: 86 ... 103 kPa

Extreme conditions parameters: ./.

2.2 Measurement uncertainty

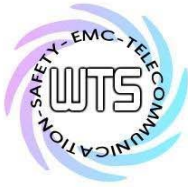
Test item Name	Uncertainty
Estimation Result of Uncertainty of Conducted Output Power Measurement (Peak Output Power (transmitter))	Expanded Uncertainty : 1.48 dB

The decision rule is: Measurement uncertainty is not included in the calculation of test results.

2.3 Test Equipment List

RF Conducted

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2022/8/3	2023/8/2
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2023/2/17	2024/2/16
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2023/2/17	2024/2/16
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2023/2/17	2024/2/16
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2023/3/22	2024/3/21
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2023/2/17	2024/2/16
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2023/2/17	2024/2/16
ETSTW-RE 112	AC POWER SOURCE	TFC-1005	T-0A023536	T-Power	Function test	
ETSTW-RE 127	RF Switch Box	RFS-01	None	WTS	2023/2/17	2024/2/16
ETSTW-RE 153	Signal Analyzer	FSV40	101929	R&S	2022/10/3	2023/10/2
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2022/9/2	2023/9/1
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2022/5/6	2023/5/5
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 (S_Cable 9)	279067	HUBER+SUHNER	2023/02/17	2024/2/16
ETSTW-Cable 045	Microwave Cable	SUCOFLEX 104	325536	HUBER+SUHNER	2022/10/21	2023/10/20
ETSTW-Cable 058	Microwave Cable	SUCOFLEX 104	none	HUBER+SUHNER	2022/5/27	2023/5/26
WTSTW-SW 008	Signal studio	Agilent	None	AUDIX	Version 2.0.0.1	



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No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2023/3/22	2024/3/21
ETSTW-GSM 003	Radio Communication Analyzer	MT8820C	6201342073	Anritsu	2022/5/9	2023/5/8
ETSTW-GSM 004	Wideband Radio Communication Tester	CMW500	128092	R&S	2022/10/24	2023/10/23
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849-822/851-40/12+9SS	3	WI	2023/1/4	2024/1/3
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	2023/1/4	2024/1/3
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5-1875.5/1884.5-32/5SS	3	WI	2023/1/4	2024/1/3
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	2023/1/4	2024/1/3
ETSTW-GSM 024	Radio Communication Analyzer	MT8821C	None	Anritsu	2022/5/3	2023/5/2
ETSTW-GSM 025	Band Reject Filter	BRM19835	1	Micro-Tronics	2022/8/5	2023/8/4



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3 Equivalent Isotropic Radiated Power (EIRP)

3.1 Exemption Limits for Routine Evaluation

according to 47 CFR FCC Part 2 Subpart J, section 2.1091

FCC OET Bulletin 65 Edition 97.01 determines the equations for predicting RF fields and applicable limits.

The prediction for power density in the far-field but will over-predict power density in the near field, where it could be used for walking a “worst case” or conservative prediction.

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20 cm normally can be maintained between the user and the device.

MPE Calculation Method

(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

f = frequency in MHz

*Plane-wave equivalent power density

E = Electric field (V/m) P = output power (W) G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2} \quad \text{mW/cm}^2.$$



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WLAN 2.4G

Mode	Channel/ Frequency (MHz)	Max output power (dBm)	Antenna Gain (dBi)	Power density (mW/cm ²)	Limit (mW/cm ²)	Ratio
802.11b	Ch 1 : 2412 MHz	14.42	1.53	0.0078	1	0.0078
	Ch 6 : 2437 MHz	14.75	1.53	0.0085	1	0.0085
	Ch 11 : 2462 MHz	15.03	1.53	0.009	1	0.009
802.11g	Ch 1 : 2412 MHz	9.14	1.53	0.0023	1	0.0023
	Ch 6 : 2437 MHz	9.55	1.53	0.0025	1	0.0025
	Ch 11 : 2462 MHz	9.83	1.53	0.0027	1	0.0027
802.11n 20MHz	Ch 1 : 2412 MHz	9.18	1.53	0.0023	1	0.0023
	Ch 6 : 2437 MHz	9.60	1.53	0.0026	1	0.0026
	Ch 11 : 2462 MHz	9.90	1.53	0.0028	1	0.0028
802.11n 40MHz	Ch 1 : 2422 MHz	8.06	1.53	0.0018	1	0.0018
	Ch 4 : 2437 MHz	8.36	1.53	0.002	1	0.002
	Ch 7 : 2452 MHz	8.56	1.53	0.002	1	0.002

CAT-M1

Band	Frequency (MHz)	Max output power (dBm)	Antenna Gain (dBi)	Power density (mW/cm ²)	Limit (mW/cm ²)	Ratio
Band 2	1857.5	22.61	3.13	0.0746	1	0.0746
Band 4	1732.5	21.84	-0.08	0.0298	1	0.0298
Band 5	836.5	21.99	2.34	0.0539	0.5577	0.0966
Band 12	707.5	22.67	0.04	0.0371	0.4717	0.0787
Band 13	782	21.82	2.46	0.0533	0.5213	0.1022
Band 66	1775	22.36	-0.08	0.0336	1	0.0336

From the peak EUT RF output power, the minimum mobile separation distance, $d = 20$ cm, as well as the gain of the used antenna, the RF power density can be obtained.

Simultaneous evaluation-

$$0.009 (\text{WLAN 2.4G}) + 0.1022 (\text{CAT-M1}) = 0.1112 < 1$$