

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: GX9HSGWCATM1ZB

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.: TW1072, TW1140, TW1146, TW1477, TW0037

Industry Canada filed test laboratory Reg. No.: 20037, 31634



Report No.: W6M22407-23644-EE



Registration number: W6M22407-23644-EE

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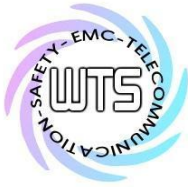
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1 General Information

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:

November 04, 2024

Sora Kuo

Date

WTS-Lab.

Name

Signature

Technical responsibility for area of testing:

November 04, 2024

Kevin Wang

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. 99, Sec. 1, Balian Rd., Xizhi Dist.,
New Taipei City 221032, Taiwan (R.O.C.)

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.: TW1072, TW1140, TW1146, TW1477, TW0037

Industry Canada filed test laboratory Reg. No.: 20037, 31634

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

Name: ./.
Accredited no.: ./.
Street: ./.
Town: ./.
Country: ./.

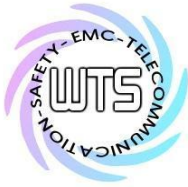
1.3 Application details

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: ./.



Registration number: W6M22407-23644-EE
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Date of receipt of test item: July 31, 2024

Date of test: from August 01, 2024 to October 24, 2024

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: Adapter (I/P: 100-240V~50/60Hz 0.30A
O/P: 12.0V=1.0A 12W)
Battery 7.2V, 1100mAh

Type of antenna: Zigbee: PCB antenna
WLAN & BT & BLE & LTE: Monopole antenna

Antenna gain: Zigbee (Mode 1): 3.61dBi
Zigbee (Mode 2): 0.94dBi
WLAN & BT & BLE: 2.78dBi
Cat M1
Part 2/22/24/27
Band 2: 3.31 dBi 、 Band 4: 3.52 dBi 、 Band 5: 1.39 dBi 、
Band 12: 1.22 dBi 、 Band 13: 2.09 dBi 、 Band 26: 1.39 dBi
、 Band 66: 1.73 dBi
Part 90: Band 26: 1.46 dBi

Technical data:

Mode	Conducted Power (dBm)
433.82	-14.39

Zigbee		
Mode	Channel	Conducted Power (dBm)
Mode 1	Ch 1 : 2405 MHz	15.82
	Ch 8 : 2440 MHz	15.52
	Ch 15 : 2475 MHz	14.94
Mode 2	Ch 1 : 2405 MHz	0.43
	Ch 8 : 2440 MHz	-1.58
	Ch 15 : 2475 MHz	-3.30

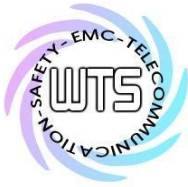


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WLAN		
Mode	Channel	Conducted Power (dBm)
802.11b	Ch 1 : 2412 MHz	14.83
	Ch 6 : 2437 MHz	14.91
	Ch 11 : 2462 MHz	15.27
802.11g	Ch 1 : 2412 MHz	13.00
	Ch 6 : 2437 MHz	13.13
	Ch 11 : 2462 MHz	13.42
802.11n20MHz	Ch 1 : 2412 MHz	12.45
	Ch 6 : 2437 MHz	12.58
	Ch 11 : 2462 MHz	12.68

BT			
Band	Mode	Channel	Power (dBm)
2.4GHz	BR	Ch 0 : 2402 MHz	8.61
		Ch 39 : 2441 MHz	8.31
		Ch 78 : 2480 MHz	8.19
	EDR	Ch 0 : 2402 MHz	8.83
		Ch 39 : 2441 MHz	8.62
		Ch 78 : 2480 MHz	8.41
	BLE 1M	Ch 0 : 2402 MHz	5.38
		Ch 19 : 2440 MHz	5.30
		Ch 39 : 2480 MHz	5.22



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LTE			
Band	Channel/Frequency(MHz)	Conducted Power (dBm)	EIRP/ERP (dBm)
Band 2	18900/1880	21.76	25.07
Band 4	19975/1712.5	21.65	25.17
Band 5	20525/836.5	22.51	21.75
Band 12	23130/711	22.97	22.04
Band 13	23205/779.5	22.43	22.37
Band 26 (Part 2/22/24/27)	26797/824.7	21.57	20.81
Band 66	132647/1777.5	21.89	23.62
Band 26 (Part 90)	26740/819	21.99	21.30

Operation modes: Duplex
 Modulation type: Zigbee & WLAN & BT & BLE:
 O-QPSK、DSSS/OFDM、GFSK、 $\pi/4$ DQPSK、8DPSK
 LTE: QPSK, 16QAM
 Sample no.: #01

Classification:

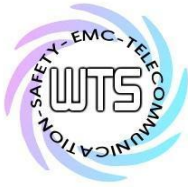
Fixed Device	<input type="checkbox"/>
Mobile Device (Human Body distance > 20cm)	<input checked="" type="checkbox"/>
Portable Device (Human Body distance < 20cm)	<input type="checkbox"/>

1.5 Test standards

15 SUBPART C § 15.247 (2023-10)
47CFR Part 22 (2023-10), Part 24 (2023-10), Part 27 (2023-10) and Part 90 (2023-10)

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 : 1.64 dB

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

2.3 Test Equipment List

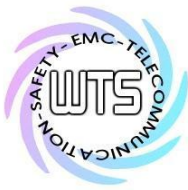
Max Output Power

Zigbee & WLAN & BT & BLE

Code No.	Test equipment	Mode No.	Serial No.	Brand	Cal. Date	Next Cal. Date
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2024/2/16	2025/2/15
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2024/3/7	2025/3/6
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2024/2/16	2025/2/15
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 (S_Cable 9)	279067	HUBER+SUHNER	2024/2/16	2025/2/15

LTE

Code No.	Test equipment	Mode No.	Serial No.	Brand	Cal. Date	Next Cal. Date
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2024/2/16	2025/2/15
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2024/2/16	2025/2/15
ETSTW-GSM 024	Radio Communication Analyzer	MT8821C	None	Anritsu	2024/4/23	2025/4/22
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 (S_Cable 9)	279067	HUBER+SUHNER	2024/8/26	2025/8/25



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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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433.82MHz

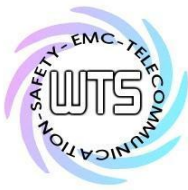
Band	Frequency (MHz)	Max output power (dBm)	Power density (mW/cm ²)	Limit (mW/cm ²)	Ratio
433.82	433.82	-14.39	0	0.2892	0

Zigbee

Band	Frequency (MHz)	Max output power (dBm)	Antenna Gain (dBi)	Power density (mW/cm ²)	Limit (mW/cm ²)	Ratio
Mode 1	2405 MHz	15.82	3.61	0.0174	1	0.0174
	2440 MHz	15.52	3.61	0.0163	1	--
	2475 MHz	14.94	3.61	0.0143	1	--
Mode 2	2405 MHz	0.43	0.94	0.0003	1	--
	2440 MHz	-1.58	0.94	0.0002	1	--
	2475 MHz	-3.30	0.94	0.0001	1	--

WLAN

Band	Frequency (MHz)	Max output power (dBm)	Antenna Gain (dBi)	Power density (mW/cm ²)	Limit (mW/cm ²)	Ratio
802.11b	2412 MHz	14.83	2.78	0.0115	1	--
	2437 MHz	14.91	2.78	0.0117	1	--
	2462 MHz	15.27	2.78	0.0127	1	0.0127
802.11g	2412 MHz	13.00	2.78	0.0075	1	--
	2437 MHz	13.13	2.78	0.0078	1	--
	2462 MHz	13.42	2.78	0.0083	1	--
802.11n20 MHz	2412 MHz	12.45	2.78	0.0066	1	--
	2437 MHz	12.58	2.78	0.0068	1	--
	2462 MHz	12.68	2.78	0.0070	1	--



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Bluetooth

Band	Frequency (MHz)	Max output power (dBm)	Antenna Gain (dBi)	Power density (mW/cm ²)	Limit (mW/cm ²)	Ratio
BR	2402 MHz	8.61	2.78	0.0028	1	--
	2441 MHz	8.31	2.78	0.0026	1	--
	2480 MHz	8.19	2.78	0.0025	1	--
EDR	2402 MHz	8.83	2.78	0.0029	1	0.0029
	2441 MHz	8.62	2.78	0.0028	1	--
	2480 MHz	8.41	2.78	0.0026	1	--
BLE 1M	2402 MHz	5.38	2.78	0.0013	1	--
	2440 MHz	5.30	2.78	0.0013	1	--
	2480 MHz	5.22	2.78	0.0012	1	--

LTE

Band	Frequency (MHz)	Max output power (dBm)	Antenna Gain (dBi)	Power density (mW/cm ²)	Limit (mW/cm ²)	Ratio
Band 2	1880	21.76	3.31	0.0639	1	--
Band 4	1712.5	21.65	3.52	0.0654	1	0.0654
Band 5	836.5	22.51	1.39	0.0488	0.5577	--
Band 12	711	22.97	1.22	0.0522	0.474	--
Band 13	779.5	22.43	2.09	0.0563	0.5197	--
Band 26 (Part 2/22/24/27)	824.7	21.57	1.39	0.0393	0.5498	--
Band 66	1777.5	21.89	1.73	0.0458	1	--
Band 26 (Part 90)	819	21.99	1.46	0.044	0.546	--

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-

$$0.0127 \text{ (WLAN 2.4G)} + 0.0174 \text{ (Zigbee)} + 0.0029 \text{ (BT \& BLE)} = 0.033 < 1$$