FCC RF Exposure Exemption report

for

Base Unit

Model No.: BUNx-xxxxx-xxxxx Series

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

FCC ID: GX9BUN3

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, TW1141, TW1146, TW1477, TW0200, TW0037

Industry Canada filed test laboratory Reg. No.: 20037, 5107A, 31634

Report No.: W6M22405-23456-EE

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
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Registration number: W6M22405-23456-EE
FCC ID: GX9BUN3

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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 is 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:

Date	WTS-Lab.	Name	Signature
May 30, 2024		Sora Kuo	Sora

Technical responsibility for area of testing:

Date	WTS	Name	Signature
May 30, 2024		Kevin Wang	Kevin Wang

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.)

Xizhi Lab
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, TW1141, TW1146, TW1477, TW0200, TW0037
Industry Canada filed test laboratory Reg. No.: 20037, 5107A, 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.)

Registration number: W6M22405-23456-EE
FCC ID: GX9BUN3

Manufacturer: (if applicable)

Name:	./.
Street:	./.
Town:	./.
Country:	./.

Date of receipt of test item:	May 06, 2024
Date of test:	from May 07, 2024 to May 30, 2024

1.4 General information of Test item

Type of test item:	Base Unit
Model no.:	BUNx-xxxxx-xxxxx Series(x=0~9, A~Z or blank)
Multi-listing model no.:	./.
Brand name:	./.
Power supply:	Adapter (I/P: 100-240V~0.4A 50/60Hz O/P: 12.0V⎓1.0A 12.0W) Battery 7.2V, 2300mAh 230mA
Type of antenna:	PCB antenna
Antenna gain:	WLAN: 2.27 dBi 910.76MHz: 2.49 dBi LTE: Band 2: 1.87 dBi Band 4: 0.12 dBi Band 5: -0.76 dBi Band 12: 0.91 dBi Band 13: -0.29 dBi

Technical data

WLAN		
Mode	Channel	Conducted Power (dBm)
802.11b	Ch 1 : 2412 MHz	14.21
	Ch 6 : 2437 MHz	14.44
	Ch 11 : 2462 MHz	14.80
802.11g	Ch 1 : 2412 MHz	8.77
	Ch 6 : 2437 MHz	9.06
	Ch 11 : 2462 MHz	9.47
802.11n20MHz	Ch 1 : 2412 MHz	8.78
	Ch 6 : 2437 MHz	9.05
	Ch 11 : 2462 MHz	9.41

802.11n40MHz	Ch 1 : 2422 MHz	8.93
	Ch 4 : 2437 MHz	9.00
	Ch 7 : 2452 MHz	9.10

910.76MHz		
Mode	Channel	Conducted Power (dBm)
910.76	906.32 MHz	7.12
	914.84 MHz	4.30

CAT-M1			
Band	Channel/Frequency(MHz)	Conducted Power (dBm)	EIRP/ERP (dBm)
Band 2	18675/1857.5	24.47	26.34
Band 4	20375/1752.5	23.72	23.84
Band 5	20450/829	24.33	21.42
Band 12	23095/707.5	23.95	22.71
Band 13	23205/779.5	24.44	22.00

Operation modes: Duplex

Modulation type: WLAN: DSSS, OFDM、910.76MHz: FSK、LTE: QPSK

Sample no.: #01

Classification:

Fixed Device	☒
Mobile Device (Human Body distance ＞ 20cm)	☐
Portable Device (Human Body distance ＜ 20cm)	☐

1.5 Duty cycle and factor

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

Mode	Ton (ms)	Ton+Toff (ms)	Duty cycle (%)	Duty Factor (dB)	1/T - VBW (KHz)
802.11b	12.564	12.628	99.49%	0.02	0.01
802.11g	2.083	2.196	94.85%	0.23	0.48
802.11n 20M	1.939	2.091	92.73%	0.33	0.52
802.11n 40M	0.954	1.504	63.43%	1.98	1.05

1.6 Test standards

15 SUBPART C § 15.247 (2023-10)
47CFR Part 22 (2023-10), Part 24 (2023-10), Part 27 (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 BUN-3. This model does not contain logo.

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

WLAN、910.76MHz

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 003	Radio Communication Analyzer	MT8820C	6201342073	Anritsu	2024/5/8	2025/5/7
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 （S_Cable 9）	279067	HUBER+SUHNER	2024/2/16	2025/2/15

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

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

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WLAN

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	14.21	2.27	0.0089	1	0.0089
	Ch 6 : 2437 MHz	14.44	2.27	0.0093	1	0.0093
	Ch 11 : 2462 MHz	14.80	2.27	0.0101	1	**0.0101**
802.11g	Ch 1 : 2412 MHz	8.77	2.27	0.0025	1	0.0025
	Ch 6 : 2437 MHz	9.06	2.27	0.0027	1	0.0027
	Ch 11 : 2462 MHz	9.47	2.27	0.0030	1	0.0030
802.11n 20MHz	Ch 1 : 2412 MHz	8.78	2.27	0.0026	1	0.0026
	Ch 6 : 2437 MHz	9.05	2.27	0.0027	1	0.0027
	Ch 11 : 2462 MHz	9.41	2.27	0.0029	1	0.0029
802.11n 40MHz	Ch 1 : 2422 MHz	8.93	2.27	0.0026	1	0.0026
	Ch 4 : 2437 MHz	9.00	2.27	0.0027	1	0.0027
	Ch 7 : 2452 MHz	9.10	2.27	0.0027	1	0.0027

910.76MHz

Mode	Channel/ Frequency (MHz)	Max output power (dBm)	Antenna Gain (dBi)	Power density (mW/cm^2)	Limit (mW/cm^2)	Ratio
910.76	906.32 MHz	7.12	2.49	0.0018	0.60	**0.003**
	914.84 MHz	4.30	2.49	0.0010	0.61	0.002

LTE

Band	Frequency (MHz)	Max output power (dBm)	Antenna Gain (dBi)	Power density (mW/cm^2)	Limit (mW/cm^2)	Ratio
Band 2	1857.5	24.47	0.87	0.068	1	0.068
Band 4	1752.5	23.72	0.12	0.0482	1	0.0482
Band 5	829	24.33	-0.76	0.0453	0.5527	0.082
Band 12	707.5	23.95	0.91	0.0609	0.4717	**0.1291**
Band 13	779.5	24.44	-0.29	0.0517	0.5197	0.0995

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-
0.0101 (WLAN 2.4G)+0.003 (910.76MHz)+0.1291 (LTE) = 0.1422<1