FCC RF Exposure Exemption report

for

Remote Keypad

Model No.: KPx-xxxxx-xxxxx Series

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

FCC ID: GX9KP39F1

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.: W6M22306-22734-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 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
June 20, 2023		Sora Kuo	Sora.

Technical responsibility for area of testing:

Date	WTS	Name	Signature
June 20, 2023		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.)
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 Details of approval holder

Name:	CLIMAX TECHNOLOGY CO., LTD.
Street:	No. 258, Sinhu 2nd Rd., Neihu District,
Town:	Taipei City 114,
Country:	Taiwan (R.O.C.)

1.4 Application details

Date of receipt of test item: June 07, 2023

Date of test: from June 08, 2023 to June 14, 2023

1.5 General information of Test item

Type of test item: Remote Keypad

Model no.: KPx-xxxxx-xxxxx Series(x=0~9, A~Z or blank)

Brand name: ./.

Multi-listing model no.: ./.

Sample no.: #02

Classification:

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

Manufacturer: (if applicable)

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

1.6 Test standards

47 CFR FCC Part 2.1093
447498 D04 Interim General RF Exposure Guidance v01

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 laboratory is obtained.
3. The x in model number is representing different case shape, case colors, led mask color, and control ID.
4. The model number of KP-39. This model does not contain logo.

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

The deviations were ascertained in the course of the tests performed. ☐.

2.2 Test environment

Relative humidity content: 20 ... 75 %

Air pressure: 86 ... 103 kPa

Power supply: Battery 3.7Vd.c. (CR123A)

Extreme conditions parameters: ./.

Test item Name	Uncertainty
Estimation Result of Uncertainty of Conducted Output Power Measurement	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

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2023/3/22	2024/3/21

3 RF Exposure Test Exemptions

3.1 1-mW Test Exemption

P ≤ 1mW

When the aggregate maximum available power of all transmitting antennas is ≤ 1 mW in the same time-averaging period.

3.2 SAR-Based Exemption

Max. time-averaged power(conducted power) or ERP ≤ Pth

P_{th}(mW)=$ERP_{20cm}(\frac{d}{20})^x$ for distance d ≤ 20cm

P_{th}(mW)=ERP_{20cm} for distance 20cm < d ≤ 40cm

$$x = -\log_{10}\left(\frac{60}{ERP_{20cm}\sqrt{f}}\right)$$

ERP_{20cm}(mW) 0.3GHz ≤ f < 1.5GHz: 2040*f
1.5GHz ≤ f ≤ 6GHz: 3060

d: cm
f: GHz

Table B.2 – Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)										
		5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217	
450	22	44	67	89	112	135	158	180	203	226	
835	9	25	44	66	90	116	145	175	207	240	
1900	3	12	26	44	66	92	122	157	195	236	
2450	3	10	22	38	59	83	111	143	179	219	
3600	2	8	18	32	49	71	96	125	158	195	
5800	1	6	14	25	40	58	80	106	136	169	

3.3 MPE-Based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 to support an exemption from further evaluation from 300 kHz through 100 GHz.

>300kHz & distance R > λ/2π ，MPE-based exemption

Table B.1 –Thresholds for single RF sources subject to routine environmental evaluation

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz	-	f_H MHz	$\lambda_L / 2\pi$	-	$\lambda_H / 2\pi$	W
0.3	-	1.34	159 m	-	35.6 m	1,920 R^2
1.34	-	30	35.6 m	-	1.6 m	3,450 R^2/f^2
30	-	300	1.6 m	-	159 mm	3.83 R^2
300	-	1,500	159 mm	-	31.8 mm	0.0128 R^2f^2
1,500	-	100,000	31.8 mm	-	0.5 mm	19.2 R^2

f: MHz
R: m
λ/2π
v=f λ
v: speed of light = $3 \times 10^8 m/s$
f: frequency (Hz)
λ: wavelength

f (MHz)	λ / 2π (m)	λ / 2π (mm)
0.125	382	381,972
13.56	3.52	3,521
300	0.159	159
918	0.052	52
2400	0.020	19.9
5250	0.009	9.09
5600	0.009	8.53
5825	0.008	8.20
6000	0.008	7.96
7000	0.007	6.82
10000	0.005	4.77

4 Exemption calculation

1-mW Test Exemption

The maximum power is 89.35 dBuV/m (0.2583 mW)

0.2583 mW ≤ 1mW

The device is qualify for simultaneous transmission SAR exemption.