

Applicant: Eastern Times Technology Co.,Ltd

Product: WIRELESS 94 KEY HOT-SWAPPABLE MECHANICAL

KEYBOARD

Model No.: K658-RGB-PRO, K658CT-RGB-PRO, K658CTB-RGB-PRO,

K669CLO-RGB-PRO, ET-8886, ET-8953

Trademark: REDRAGON

Test Standards: FCC Part 15.249

Test result:

It is herewith confirmed and found to comply with the

requirements set up by ANSI C63.10 & FCC Part 15 Subpart C,

Paragraph 15.249 regulations for the evaluation of

electromagnetic compatibility

Approved By

Terry Tang

Manager

Dated: August 30, 2023

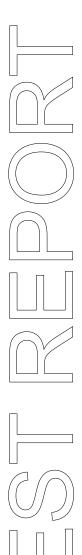
Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



Report No.: TW2307043-02E Page 2 of 35

Date: 2023-08-30



Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

Industry Canada (IC) — Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

A2LA (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

Date: 2023-08-30



Test Report Conclusion

m	16	nt.
	on	ontei

1.0	General Details	4
1.1	Test Lab Details	4
1.2	Applicant Details	4
1.3	Description of EUT	4
1.4	Submitted Sample	4
1.5	Test Duration.	5
1.6	Test Uncertainty	5
1.7	Test By	5
2.0	List of Measurement Equipment	6
3.0	Technical Details	7
3.1	Summary of Test Results	7
3.2	Test Standards	7
4.0	EUT Modification	7
5.0	Power Line Conducted Emission Test	8
5.1	Schematics of the Test	8
5.2	Test Method and Test Procedure	8
5.3	Configuration of the EUT	8
5.4	EUT Operating Condition	9
5.5	Conducted Emission Limit.	9
5.6	Test Result	9
6.0	Radiated Emission test	12
6.1	Test Method and Test Procedure	12
6.2	Configuration of the EUT	13
6.3	EUT Operation Condition.	13
6.4	Radiated Emission Limit	13
6.5	Test Result	15
7.0	Band Edge	23
7.1	Test Method and Test Procedure	23
7.2	Radiated Test Setup.	23
7.3	Configuration of the EUT	23
7.4	EUT Operating Condition.	23
7.5	Band Edge Limit.	23
7.6	Band Edge Test Result.	24
8.0	Antenna Requirement	28
9.0	20dB bandwidth measurement	29
10.0	FCC ID Label	33
11.0	Photo of Test Setup and EUT View	34

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

Date: 2023-08-30



1.0 General Details

1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TESTING LABORATORIES.

Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le

Village, Nanshan District, Shenzhen, China

Telephone: (755) 83448688 Fax: (755) 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 744189 For 3m Anechoic Chamber

1.2 Applicant Details

Applicant: Eastern Times Technology Co.,Ltd

Address: Building D, Nan An Industrial Area, Youganpu Village, Fenggang Town, Dongguan City,

Guangdong, China.

Telephone: --Fax: --

1.3 Description of EUT

Product: WIRELESS 94 KEY HOT-SWAPPABLE MECHANICAL KEYBOARD

Manufacturer: Eastern Times Technology Co.,Ltd

Address: Building D, Nan An Industrial Area, Youganpu Village, Fenggang Town,

Dongguan City, Guangdong, China.

Trademark: REDRAGON
Model Number: K658-RGB-PRO

Additional Model Name K658CT-RGB-PRO, K658CTB-RGB-PRO, K669CLO-RGB-PRO, ET-8886,

ET-8953

Rating: Input: DC5V, 720mA or DC3.7V, 290mA

Battery: DC3.7V, 1600mAh Li-ion battery

Hardware Version: 8479-A RX V1

Software Version: C5205

Serial No.: RDK658CTB-RGB-PRO23051600449

Operation Frequency: 2402-2480MHz

Modulation Type: GFSK Number of Channels: 79 Channel Separation: 1MHz

Antenna Designation PCB antenna with gain -7.30dBi maximum (Declared by the Manufacturer)

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

Report No.: TW2307043-02E Page 5 of 35

Date: 2023-08-30



1.4 Submitted Sample: 2 Samples

1.5 Test Duration 2023-07-04 to 2023-08-30

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions below 1GHz Uncertainty =4.7dB

Radiated Emissions above 1GHz Uncertainty =6.0dB

Conducted Power Uncertainty = 6.0dB

Occupied Channel Bandwidth Uncertainty = 5%

Conducted Emissions Uncertainty = 3.6dB

Note: The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

1.7 Test Engineer

The sample tested by

Print Name: Andy Xing

Page 6 of 35

Report No.: TW2307043-02E

Date: 2023-08-30



2.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2023-07-14	2024-07-13
LISN	R&S	EZH3-Z5	100294	2023-07-14	2024-07-13
LISN	R&S	EZH3-Z5	100253	2023-07-14	2024-07-13
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2023-07-14	2024-07-13
Loop Antenna	EMCO	6507	00078608	2022-07-18	2025-07-17
Spectrum	R&S	FSIQ26	100292	2023-07-14	2024-07-13
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2022-07-18	2025-07-17
Horn Antenna	R&S	BBHA 9120D	9120D-631	2022-07-18	2024-07-17
Power meter	Anritsu	ML2487A	6K00003613	2023-07-14	2024-07-13
Power sensor	Anritsu	MA2491A	32263	2023-07-14	2024-07-13
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2022-07-18	2025-07-17
9*6*6 Anechoic		1	N/A	2022-07-26	2025-07-25
EMI Test Receiver	RS	ESVB	826156/011	2023-07-14	2024-07-13
EMI Test Receiver	RS	ESCS 30	834115/006	2023-07-14	2024-07-13
Spectrum	HP/Agilent	E4407B	MY50441392	2023-07-14	2024-07-13
Spectrum	RS	FSP	1164.4391.38	2023-07-14	2024-07-13
RF Cable	Zhengdi	ZT26-NJ-NJ-8M/FA	1	2023-07-14	2024-07-13
RF Cable	Zhengdi	7m		2023-07-14	2024-07-13
Pre-Amplifier	Schwarebeck	BBV9743	#218	2023-07-14	2024-07-13
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2023-07-14	2024-07-13
LISN	SCHAFFNER	NNB42	00012	2023-07-14	2024-07-13
ESPI Test Receiver	R&S	ESPI 3	100379	2023-07-14	2024-07-13
LISN	R&S	EZH3-Z5	100294	2023-07-14	2024-07-13

2.2 Automation Test Software

For Conducted Emission Test

Name	Version
EZ-EMC	Ver.EMC-CON 3A1.1

For Radiated Emissions

Name	Version
EMI Test Software BL410-EV18.91	V18.905
EMI Test Software BL410-EV18.806 High Frequency	V18.06

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

Page 7 of 35

Report No.: TW2307043-02E

Date: 2023-08-30



3.0 Technical Details

3.1 Summary of test results

The 1	EUT has	been	tested	accord	ing to	the f	ollowing	specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.203	Antenna Requirement	Pass	Complies
FCC Part 15, Paragraph 15.207	Conducted Emission Test	Pass	Complies
FCC Part 15 Subpart C Paragraph 15.249(a) & 15.249(b) Limit	Field Strength of Fundamental	Pass	Complies
FCC Part 15, Paragraph 15.209	Radiated Emission Test	Pass	Complies
FCC Part 15 Subpart C Paragraph 15.249(d) Limit	Band Edge Test	Pass	Complies
FCC Part 15.215(c)	20dB bandwidth	Pass	Complies

3.2 Test Standards

FCC Part 15 Subpart C, Paragraph 15.249, ANSI C63.4:2014 and ANSI C63.10:2013

4.0 EUT Modification

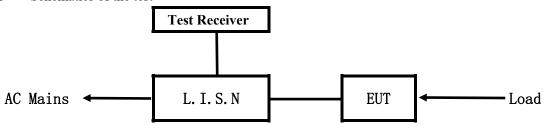
No modification by SHENZHEN TIMEWAY TESTING LABORATORIES

Date: 2023-08-30



5.0 Power Line Conducted Emission Test

5.1 Schematics of the test

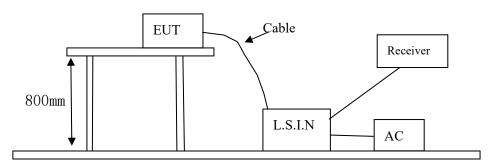


EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum from 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10-2013.

Test Voltage: 120V~, 60Hz Block diagram of Test setup



5.3 Configuration of the EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

79 channels are provided to the EUT

A. EUT

Device	Manufacturer	Model	FCC ID
WIRELESS 94 KEY HOT-SWAPPABLE MECHANICAL KEYBOARD	Eastern Times Technology Co.,Ltd	K658-RGB-PRO, K658CT-RGB-PRO, K658CTB-RGB-PRO, K669CLO-RGB-PRO,	TUVET-8886B
KLIBOARD		ET-8886, ET-8953	

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

Report No.: TW2307043-02E Page 9 of 35

Date: 2023-08-30



B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

C. Peripherals

Device	Manufacturer	Model	Rating
Power Supply	KEYU	KA23-0502000DEU	Input: 100-240V~, 50/60Hz, 0.35A;
			Output: DC5V, 2A

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2013

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency	Limits (dB µ V)			
(MHz)	Quasi-peak Level	Average Level		
$0.15 \sim 0.50$	66.0~56.0*	56.0~46.0*		
$0.50 \sim 5.00$	56.0	46.0		
5.00 ~ 30.00	60.0	50.0		

Notes:

- 1. *Decreasing linearly with logarithm of frequency.
- 2. The tighter limit shall apply at the transition frequencies

5.6 Test Results:

Date: 2023-08-30



A: Conducted Emission on Live Terminal (150kHz to 30MHz)

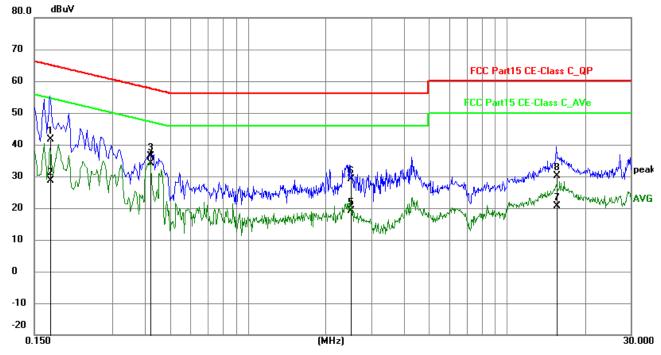
EUT Operating Environment

Temperature: 25°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Charging + Communication by BT

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1730	31.94	9.77	41.71	64.82	-23.11	QP	Р
2	0.1730	18.74	9.77	28.51	54.82	-26.31	AVG	Р
3	0.4200	26.56	9.76	36.32	57.45	-21.13	QP	Р
4	0.4200	24.38	9.76	34.14	47.45	-13.31	AVG	Р
5	2.4930	9.40	9.82	19.22	46.00	-26.78	AVG	Р
6	2.4949	19.19	9.82	29.01	56.00	-26.99	QP	Р
7	15.5260	10.15	10.41	20.56	50.00	-29.44	AVG	Р
8	15.5320	19.62	10.41	30.03	60.00	-29.97	QP	Р

Date: 2023-08-30



B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

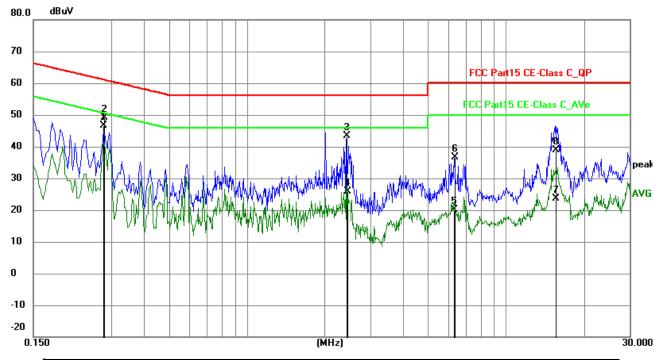
EUT Operating Environment

Temperature: 25°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Charging + Communication by BT

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.2800	36.81	9.76	46.57	50.82	-4.25	AVG	Р
2	0.2810	39.37	9.76	49.13	60.79	-11.66	QP	Р
3	2.4329	33.53	9.82	43.35	56.00	-12.65	QP	Р
4	2.4350	16.01	9.82	25.83	46.00	-20.17	AVG	Р
5	6.3170	10.22	9.98	20.20	50.00	-29.80	AVG	Р
6	6.3210	26.62	9.98	36.60	60.00	-23.40	QP	Р
7	15.5310	13.18	10.41	23.59	50.00	-26.41	AVG	Р
8	15.5460	28.52	10.41	38.93	60.00	-21.07	QP	Р

Date: 2023-08-30



6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 9kHz to 25 GHz was investigated. The frequency spectrum is set as follows:

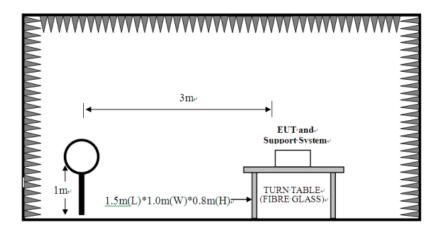
Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
ADOVE IGHZ	Peak	1MHz	10Hz	Average

(Note: for Fundamental frequency radiated emission measurement, RBW=3MHz, VBW=10MHz). Measurements were made at 3 meters.

- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) The antenna polarization: Vertical polarization and Horizontal polarization.

Block diagram of Test setup

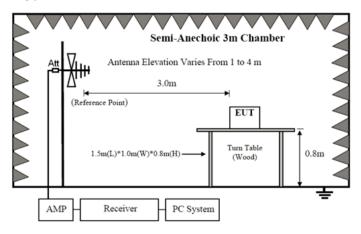
For radiated emissions from 9kHz to 30MHz



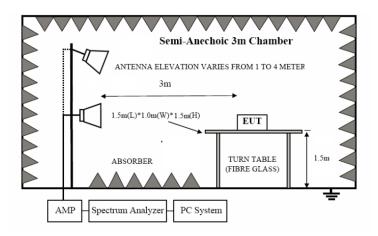
Date: 2023-08-30



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



- 6.2 Configuration of the EUT
 Same as section 5.3 of this report
- 6.3 EUT Operating Condition

 Same as section 5.4 of this report.
- 6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

A FCC Part 15 Subpart C Paragraph 15.249(a) Limit

Fundamental Frequency	Field Stre	ength of Fundamental (3m)	trength of Harmonics (3m)	
(MHz)	mV/m	dBuV/m	uV/m	dBuV/m

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

Report No.: TW2307043-02E Page 14 of 35

Date: 2023-08-30



2400-2483.5 50	94 (Average)	114 (Peak)	500	54 (Average)	74 (Peak)
----------------	--------------	------------	-----	--------------	-----------

Note:

- 1. RF Field Strength (dBuV) = 20 log RF Voltage (uV)
- 2.Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- 3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

B. Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
0.009-0.490	3	20log(2400/F(kHz)) +40log (300/3)
0.490-1.705	3	20log(24000/F(kHz)) +40log (30/3)
1.705-30	3	69.5
30-80	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1. RF Voltage $(dBuV) = 20 \log RF \text{ Voltage } (uV)$
- 2. In the Above Table, the tighter limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
- 4. All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30-1000MHz.As to 1G-25G, the final emission level got using PK. For fundamental measurement, PK detector used.
- 5. Battery fully charged was used during the test.

Report No.: TW2307043-02E Page 15 of 35

Date: 2023-08-30

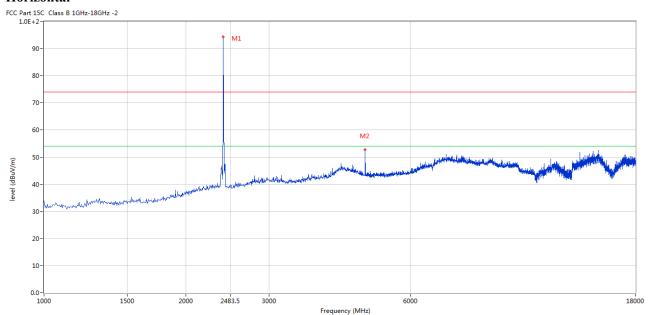


6.5 Test result

A Fundamental & Harmonics Radiated Emission Data

Please refer to the following test plots for details: Low Channel-2402MHz

Horizontal



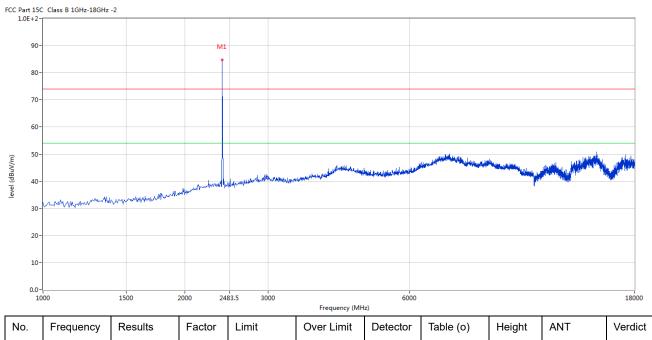
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2402	94.73	-3.57	114.0	-19.27	Peak	284.00	100	Horizontal	Pass
1*	2402	85.01	-3.57	94.0	-8.99	AV	284.00	100	Horizontal	Pass
2	4802.799	53.65	3.12	74.0	-20.35	Peak	58.00	100	Horizontal	Pass

Report No.: TW2307043-02E Page 16 of 35

Date: 2023-08-30



Vertical



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	2402	85.41	-3.57	114.0	-28.59	Peak	108.00	100	Vertical	Pass

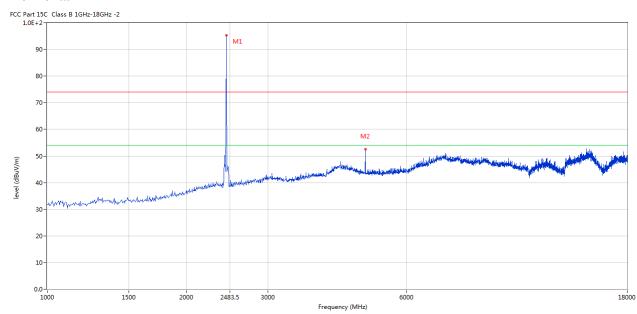
Report No.: TW2307043-02E Page 17 of 35

Date: 2023-08-30



Please refer to the following test plots for details: Middle Channel-2441MHz

Horizontal



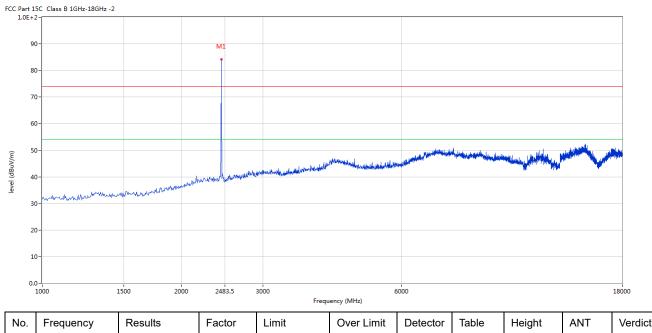
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(0)	(cm)		
1	2441	95.20	-3.57	114.0	-18.80	Peak	77.00	100	Horizontal	Pass
1*	2441	85.38	-3.57	94.0	-8.62	AV	77.00	100	Horizontal	Pass
2	4879.280	53.51	3.20	74.0	-20.49	Peak	274.00	100	Horizontal	Pass

Report No.: TW2307043-02E Page 18 of 35

Date: 2023-08-30



Vertical



N	0.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
		(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1		2441	84.16	-3.57	114.0	-29.84	Peak	106.00	100	Vertical	Pass

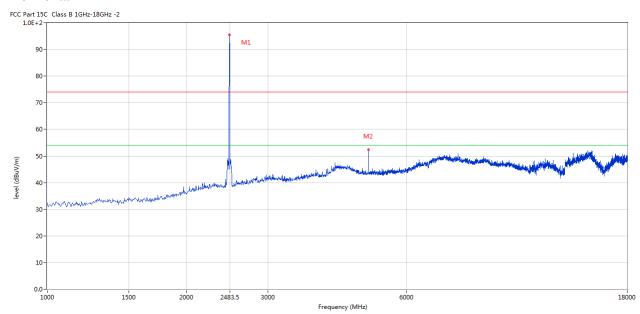
Report No.: TW2307043-02E Page 19 of 35

Date: 2023-08-30



Please refer to the following test plots for details: High Channel-2480MHz

Horizontal



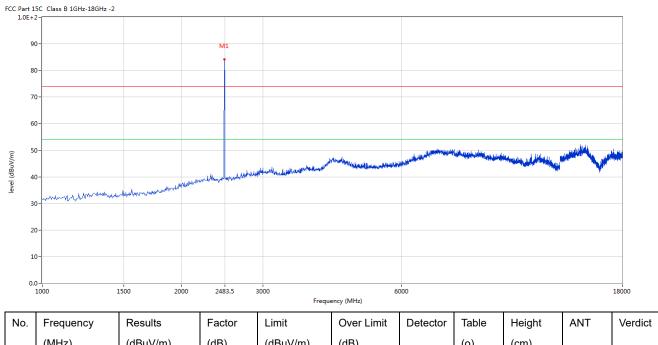
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480	95.56	-3.57	114.0	-18.44	Peak	268.00	100	Horizontal	Pass
1*	2480	85.77	-3.57	94.0	-8.23	AV	268.00	100	Horizontal	Pass
2	4960.010	53.25	3.36	74.0	-20.75	Peak	69.00	100	Horizontal	Pass

Report No.: TW2307043-02E Page 20 of 35

Date: 2023-08-30



Vertical



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480	84.51	-3.57	114.0	-29.49	Peak	71.00	100	Vertical	Pass

Note: (1) Emission Level = Reading Level + Antenna Factor + Cable Loss-Amplifier

- (2) Margin=Emission-Limits
- (3) According to section 15.35(b), the peak limit is 20dB higher than the average limit
- (4) For test purpose, keep EUT continuous transmitting
- (5) For emission above 18GHz and Below 30MHz, It is only the floor noise and less than the limit for more than 20dB. No necessary to take down.
- (6) the measured PK value less than the AV limit.

Date: 2023-08-30

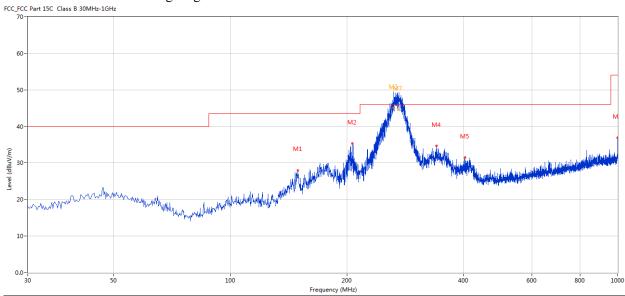


B. General Radiated Emission Data Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep Tx transmitting

Results: Pass

Please refer to following diagram for individual



No.	Frequency	Results	Factor	Limit	Margin	Detector	Table	Height	Antenna	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(Degree)	(cm)		
1	149.523	27.92	-17.07	43.5	15.58	Peak	72.00	100	Horizontal	Pass
2	206.738	35.28	-13.66	43.5	8.22	Peak	34.00	100	Horizontal	Pass
3*	264.349	45.05	-11.82	46.0	0.95	QP	287.00	113	Horizontal	Pass
4	341.050	34.69	-9.75	46.0	11.31	Peak	0.00	100	Horizontal	Pass
5	403.114	31.47	-8.58	46.0	14.53	Peak	192.00	100	Horizontal	Pass
6	999.515	36.97	-1.17	54.0	17.03	Peak	279.00	100	Horizontal	Pass
7*	270.721	44.52	-11.74	46.0	1.48	QP	307.00	121	Horizontal	Pass

Report No.: TW2307043-02E Page 22 of 35

Date: 2023-08-30

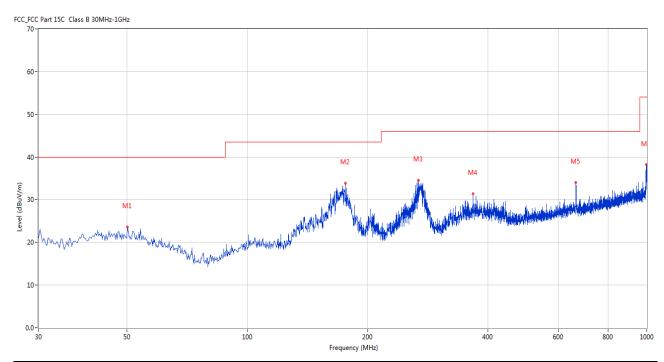


Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: Keep Tx transmitting

Results: Pass

Please refer to following diagram for individual



No.	Frequency	Results	Factor	Limit	Margin	Detector	Table	Height	Antenna	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(Degree)	(cm)		
1	50.122	23.63	-11.38	40.0	16.37	Peak	236.00	100	Vertical	Pass
2	175.949	33.93	-15.62	43.5	9.57	Peak	196.00	100	Vertical	Pass
3	267.833	34.56	-11.72	46.0	11.44	Peak	168.00	100	Vertical	Pass
4	367.476	31.34	-9.51	46.0	14.66	Peak	52.00	100	Vertical	Pass
5	663.494	34.00	-4.45	46.0	12.00	Peak	344.00	100	Vertical	Pass
6	997.818	38.17	-1.23	54.0	15.83	Peak	32.00	100	Vertical	Pass

Date: 2023-08-30

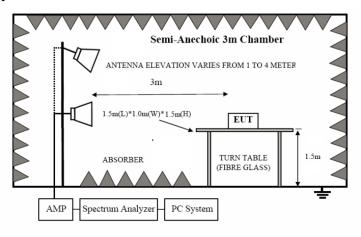


7. Band Edge

7.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.10–2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189
- (2) Set Spectrum as RBW=1MHz, VBW=3MHz and Peak detector used for PK value. RBW=1MHz, VBW=10Hz and Peak detector used for AV value.
- (3) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (4) The antenna polarization: Vertical polarization and Horizontal polarization.

7. 2 Radiated Test Setup



For the actual test configuration, please refer to the related items – Photos of Testing

7.3 Configuration of the EUT

Same as section 5.3 of this report

7.4 EUT Operating Condition

Same as section 5.4 of this report.

7.5 Band Edge Limit

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

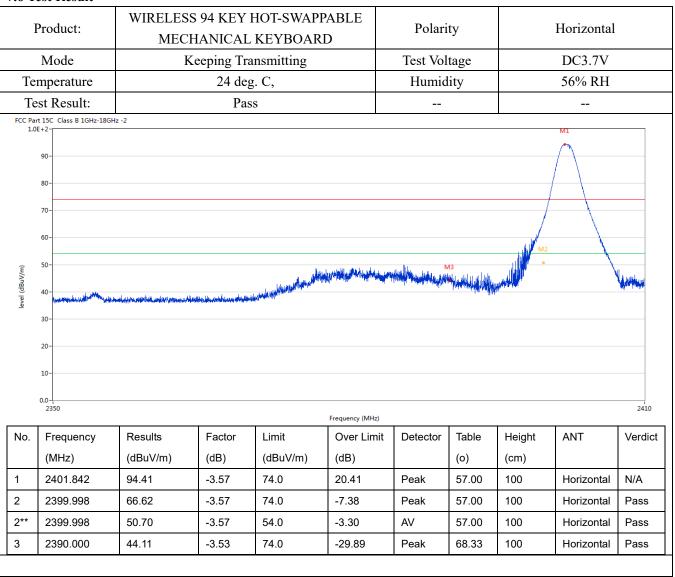
The report refers only to the sample tested and does not apply to the bulk.

Report No.: TW2307043-02E Page 24 of 35

Date: 2023-08-30



7.6 Test Result



Report No.: TW2307043-02E Page 25 of 35

Date: 2023-08-30



]	Product:			HOT-SWAPI KEYBOAR		Detect	or	Vertical			
	Mode	k		Test Voltage		DC3.7V					
Te	mperature		24 deg. C,					56% RH			
Te	est Result:		Pas	SS							
Part 1	L5C Class B 1GHz-18GHz 2-	-2			•		•				
									M1		
9	0-								^ MI		
8	0-					/					
7	0-										
6	0-										
									$\overline{}$		
. 5	0-							M2			
								٠ الأرار	1		
4	O-	والمراجع والم والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراج	والمعالم والإفارة والمام والمادرة	مهدوه أمزوم ويوافأ ومراد فرواي والمرادوس	on the state of th	M	: ugodajpajdajuj _{eki} ajajajd	-		Magazina	
		the property that the property and the second state of the second	distributed by the state of the	المراجع والمراجع والم	and the state of t	M		-	\	Mesperalija	
3		يفاجع والمراجع والمرا	المتعقب إمانة فأفرا ويعمله مرامة الم	المستور بالمقاهر ميلادو المواجعة المقاهدية والمقاهد المقاهد المقاهدية المقاهدية المقاهدية المقاهدية المقاهدة ال	entropies of the state of the s		s aga kapada dal anganada		\	A Company of the Comp	
2	0-	عند معينا مه الله الموسط الموس	والمراجعة والمتحاجبة والمتحاج والمتحاجبة والمتحاجبة والمتحاجبة والمتحاجبة والمتحاجبة والمتحاجبة والمتحاجبة والمتحاجبة وال	المستعد والمستعدد والمستعد والمستعدد والمستعد والمستعدد والمستعد والمستعدد و	one sometimes are not a single facility of the sound	ME MARKET STATE OF THE STATE OF	3 Agad b <u>ig vel</u> k <u>vild_a ((Agad Ag</u> d)		\	A designation of the second	
2	0-	directal property and the second direction con-	ad a december in indicate a discount of	المراجعة والمراجعة والمراج	aavadajainsaanyotta sityyddiataili	M. M. Land, John J. A.	s Amhanair id _{el} (a.aah			Manualin	
3 2 1 0.	0-	· · · · · · · · · · · · · · · · · · ·	ad industrian <u>indistribu</u> n, alien iz <u>al</u>			M. Marine Lindby	3 Angeligingi dal _{ang} a kalang			2	
1 0.	0				Frequency (MHz)		andarahi ahanganah		1	1	
3 2 1 0.	0- 0- 0- 2350 Frequency	Results	Factor	Limit	Frequency (MHz) Over Limit	Detector	Table	Height	ANT	1	
3 2 1 0. No.	o- 0- 0- 2350 Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Frequency (MHz) Over Limit (dB)	Detector	(o)	(cm)		Verdi	
1 0 No.	o- 0- 0- 2350 Frequency (MHz) 2401.872	Results (dBuV/m) 85.26	Factor (dB) -3.57	Limit (dBuV/m) 74.0	Frequency (MHz) Over Limit (dB) 11.26	Detector Peak	(o) 71.00	(cm) 100	Vertical	Verdi N/A	
1 0. No. I	Frequency (MHz) 2401.872 2400.000	Results (dBuV/m) 85.26 56.83	Factor (dB) -3.57	Limit (dBuV/m) 74.0	Frequency (MHz) Over Limit (dB) 11.26 -17.17	Detector Peak Peak	(o) 71.00 71.00	(cm) 100 100	Vertical Vertical	Pass	
1 0 No.	o- 0- 0- 2350 Frequency (MHz) 2401.872	Results (dBuV/m) 85.26	Factor (dB) -3.57	Limit (dBuV/m) 74.0	Frequency (MHz) Over Limit (dB) 11.26	Detector Peak	(o) 71.00	(cm) 100	Vertical	Verdi N/A	

Report No.: TW2307043-02E Page 26 of 35

Date: 2023-08-30



I	Product:			Y HOT-SWA AL KEYBOA		Polarity			Horizontal		
	Mode		Keeping 7	Transmitting		Test	t Voltage		DC3.7V		
Te	mperature		24 d	leg. C,			Humidity		56% RH		
Te	est Result:		P	ass							
C Part 1	15C Class B 1GHz-18GHz	-2	M					<u>'</u>			
9											
70 6 (w//nngp) level (dp//nngp) 3	0-	arakan da		M	2 Mary Market	akdy oddinina y jedovila kajkel	hitigi dhamil day lasa wila	the state of the s	organish dhipundha yashi	deblijskep omdere	
(w/nngp) 4 3 2 1 0.	0- 	anter his graph of the state of		M. M. 248:	The state of the s	ind also produced to a graph of the self-ord	Ministrative Paragraphy		ing panggalag di digandi dina gang d	25	
(w/\ngap) 9\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	0			248:	3.5 Frequency (MHz)	idadh e dhall e ag indiri illiadh dhall e a	The second secon			ı	
(w/nngp) 4 3 2 1 0.	0- 0- 0- 0- 0- 0- 0- 0- 2470	Results	Factor	2483	3.5 Frequency (MHz)	Detector	Table	Height	ANT	25 Verdic	
6 6 5 5 5 4 4 5 5 6 6 6 6 6 6 6 6 6 6 6	o- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0-	Results (dBuV/m)	(dB)	Limit (dBuV/m)	3.5 Frequency (MHz) Over Limit (dB)		Table (o)	Height (cm)	ANT	Verdi	
6 6 5 5 5 1 1 0. No.	0- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0	Results (dBuV/m) 93.34	(dB) -3.57	Limit (dBuV/m)	3.5 Frequency (MHz) Over Limit (dB) 19.34	Peak	Table (o) 270.00	Height (cm)	ANT Horizontal	Verdid	
6 6 5 5 5 4 4 5 5 6 6 6 6 6 6 6 6 6 6 6	o- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0- 0-	Results (dBuV/m)	(dB)	Limit (dBuV/m)	3.5 Frequency (MHz) Over Limit (dB)		Table (o)	Height (cm)	ANT	Verdid	

Page 27 of 35

Report No.: TW2307043-02E

Date: 2023-08-30



]	Product:		-	HOT-SWAPP KEYBOARI		Detect	or	Vertical			
	Mode		eeping Tra			Test Vol	tage	DC3.7V			
Te	mperature		24 deg			Humidity			56% RH		
	est Result:		Pas								
	rt 15C Class B 1GHz-18GHz E+2-	: -2			'						
	90 - 80 - 70 -		MI	and the same of th							
level (dBuV/m)	50- 40- 18 January 19	are a superior de la company de la compa	N	Market Market	The and the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the second section in the second section is the second section in the section is the second section in the section is the section in the section in the section is the section in the section in the section is the section in	irosha,dahadra,didahadra,	ik manigari (Manigari da	الماسلية ويتها فالمهادا والال	المراجعة	North House of the State of the	
level (dBuV/m)	50- 40- 10- 10- 10- 10- 10- 10- 10- 10- 10- 1	Are a second distribution of the second distribu	N	2483.5	WELL OF THE TOTAL	irosha,dahadra,didahadra,as	iki melajaja delektronistaka	الدغطية ويتها فالمهدام الالم	and the state of t	2500	
	30 - 20 - 10 - 2470		Factor	2483.5 Fr	requency (MHz)		Table	Height	ANT	ı	
No.	30- 20- 10- 2470	Results	Factor (dB)	2483.5 Fr	requency (MHz) Over Limit	Detector	Table (o)	Height (cm)	ANT	2500	
	30 - 20 - 10 - 2470		Factor (dB)	2483.5 Fr	requency (MHz)		Table (o) 56.00	Height (cm)	ANT	ı	

Note: The PK emission level less than the AV limit. No necessary to record the AV emission level.

Date: 2023-08-30



Page 28 of 35

8.0 Antenna Requirement

Applicable Standard

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

This product has a PCB antenna with gain -7.30dBi maximum. It fulfills the requirement of this section.

Test Result: Pass

Date: 2023-08-30



Page 29 of 35

9.0 20dB Bandwidth Measurement

Test Configuration



Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

Limit

N/A

Page 30 of 35

Report No.: TW2307043-02E

Date: 2023-08-30



Test Result

GFSK												
Product:				Г-SWAPPA YBOARD		Т	est Mode:		Keep tran	smitting		
Mode		Keeping Transmitting					Test Voltage		DC3.7V			
Temperature	24 deg. C,					I	Humidity		56%	RH		
Test Result:	Test Result:						Detector		PI	ζ		
20dB Bandwidth			1.311MHz	:								
Ref Lvl		Delta 1		.71 dB		SW SW	30 k 100 k		RF Att	20 dB		
10 dBm		-	L.310621	L24 MHz	SI	VΤ	8.5 m	s	Unit	dBm	L	
10					2		v ₁	[T1]	-21 2.40134	.74 dBm 168 GHz	A	
-10				V	M	\	^ 1 ∇ ₂	[T1]	1.31062	1.71 dB 124 MHz .59 dBm		
20		1	\bigcap	•		h.	}	1	2.40201	503 GHz		
D1 -21.5	59 dBm	~~	V								1MA	
-40	مسمه									,		
-50												
-60												
-70												
-80												
-90 Center 2. Date: 23		Hz 2023 16	:42:30	300	kHz/				Spa	n 3 MHz		

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

Page 31 of 35

Report No.: TW2307043-02E

Date: 2023-08-30



FSK	WIDE	ECC 04 P	TEVILOT	CMA DDA I	or E							
Product:	WIRELESS 94 KEY HOT-SWAPPABLE MECHANICAL KEYBOARD Keeping Transmitting					Test Mode:			Keep transmitting			
Mode						Test Voltage			DC3.7V			
Temperature	24 deg. C,						Humidity		56% RH			
Test Result:	Pass					Detector			PK			
20dB Bandwidth		1.	220MHz									
Ref Lvl		Delta 1		30 dB		BW BW	30 k 100 k		RF Att	20 dB		
10 dBm		1	1.220440	88 MHz	SI	TW	8.5 m	s	Unit	dBn	n	
					2		V ₁	[T1]	-2: 2.4403	1.29 dBm 7776 GHz	A	
0			(W	\	١	^ 1	[T1]	1.22044	0.30 dB 4088 MHz 1.36 dBm		
-10		1,	\sim			5			2.44103			
1MAX	36 dBm	\sim	V				V				1M	
-30	ممممر											
-40												
-50												
-60												
-70												
-80												
-90 Center 2	.441 G	Hz		300	kHz/				Spa	an 3 MHz		
			:50:41		•				1			

Page 32 of 35

Report No.: TW2307043-02E

Date: 2023-08-30



GFSK	WIRFI	FSS 94 K	FY HOT-	SWAPPAI	RLF							
Product:		ECHANIO			JLL	Τ	est Mode:		Keep transmitting			
Mode		Keepin	g Transmi	tting		T	est Voltage	e		DC	3.7V	
Temperature		24	4 deg. C,	deg. C,			Humidity		56% RH			
Test Result:							Detector		PK			
20dB Bandwidth	1.112MHz											
Ref Lvl		Delta 1		01 dB	V	BW BW WT	BW 100 kHz			'Att	20 d	B Bm
10								Τ				_
				2			▼ 1	[T1]		-21 2.47942	.16 di 585 GI	A
-10				$\sqrt{}$	كرم	1	^ 1 ▽ 2	[T1]		-0 1.11222 -1	.01 di 445 ME .37 di	
20			10			\$	1			2.48000	301 GE	Ηz
D1 -21.	37 dBm	~~~	<i>)</i>				- Val					1M2
-40	مسمر							5		\rightarrow		
											\	
-50											V	
-60												
-70												
-80												
-90 Center 2	.48 GH:	z		300	kHz/					Spa	n 3 MI	łz
	3.AUG.2		:11:07	300	KHZ/					Spa	11 3 MI	12

Report No.: TW2307043-02E Page 33 of 35

Date: 2023-08-30



10.0 FCC ID Label

FCC ID: TUVET-8886B

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



Page 34 of 35

Report No.: TW2307043-02E

Date: 2023-08-30



11.0 Photo of testing

11.1 Conducted test View



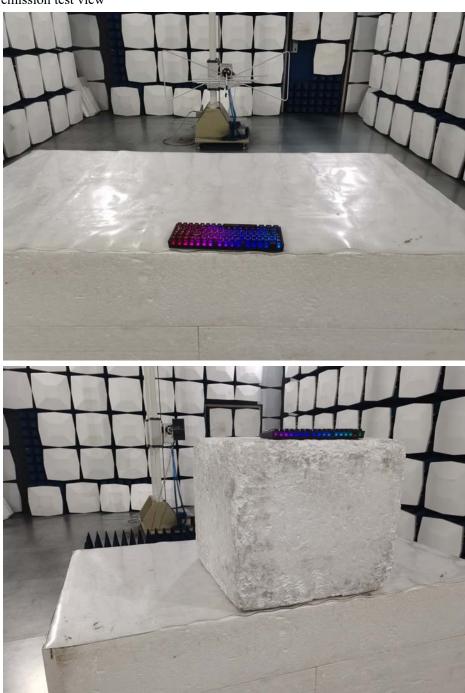
Page 35 of 35

Report No.: TW2307043-02E

Date: 2023-08-30



Radiated emission test view



11.2 Photographs – EUT

Please refer test report TW2307043-01E

-- End of the report--

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.