

Report No.: TW2409102-02E

Applicant: Eastern Times Technology Co., Ltd

Product: 3 MODES 87 KEYS ALUMINUM MECHANICAL

**KEYBOARD** 

Model No.: K660RGB-PRO, ET-7015

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 long

Terry Tang

Manager

Dated: September 14, 2024

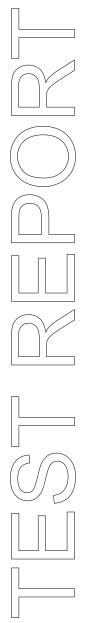
Results appearing herein relate only to the sample tested

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.: TW2409102-02E Page 2 of 34

Date: 2024-09-14



# **Special Statement:**

#### 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

**CAB identifier: CN0033** 

38

Report No.: TW2409102-02E

Date: 2024-09-14



# Test Report Conclusion

#### Content 1.0 General Details 1.1 Test Lab Details.... 4 1.2 Applicant Details.... 4 1.3 Description of EUT ..... 1.4 Submitted Sample.... 4 Test Duration. 1.5 5 1.6 5 Test Uncertainty. 1.7 Test By..... 5 List of Measurement Equipment..... 2.0 3.0 7 Technical Details..... 3.1 Summary of Test Results.... 7 3.2 7 Test Standards.... 4.0 EUT Modification.... 7 Power Line Conducted Emission Test.... 5.0 8 Schematics of the Test..... 5.1 8 5.2 Test Method and Test Procedure. Configuration of the EUT..... 5.3 8 5.4 EUT Operating Condition. Conducted Emission Limit. 9 5.5 5.6 Test Result. 6.0 Radiated Emission test.... 12 Test Method and Test Procedure. 6.1 12 6.2 Configuration of the EUT.... 13 6.3 EUT Operation Condition. 13 Radiated Emission Limit. 14 6.4 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 20dB bandwidth measurement.... 9.0 29

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

10.0

11.0

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.

FCC ID Label.....

Photo of Test Setup and EUT View....

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: 2024-09-14



#### 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.

#### 1.3 Description of EUT

Product: 3 MODES 87 KEYS ALUMINUM 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

Additional Trademark: N/A

Model Number: K660RGB-PRO

Additional Model Name ET-7015

Hardware Version: 8479-A RX V1

Software Version: C5202

Serial No.: RDK660RGB-PRO24042000998

Rating: Input: DC5V, 640mA or DC3.7V, 110mA

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

Modulation Type: GFSK

Operation Frequency: 2402-2480MHz

Channel Separate: 1MHz Channel Number: 79

Antenna Designation PCB antenna with gain 2.34dBi Max (Get from the antenna specification)

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.: TW2409102-02E Page 5 of 34

Date: 2024-09-14



1.4 Submitted Sample: 2 Samples

1.5 Test Duration

2024-09-10 to 2024-09-14

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: Terry Tang

Page 6 of 34

Report No.: TW2409102-02E

Date: 2024-09-14



2.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2024-07-12	2025-07-11
LISN	R&S	EZH3-Z5	100294	2024-07-12	2025-07-11
LISN	R&S	EZH3-Z5	100253	2024-07-12	2025-07-11
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2024-07-12	2025-07-11
Loop Antenna	EMCO	6507	00078608	2022-07-18	2025-07-17
Spectrum	R&S	FSIQ26	100292	2024-07-12	2025-07-11
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	2025-07-17
Power meter	Anritsu	ML2487A	6K00003613	2024-07-12	2025-07-11
Power sensor	Anritsu	MA2491A	32263	2024-07-12	2025-07-11
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2022-07-18	2025-07-17
9*6*6 Anechoic			N/A	2022-07-26	2025-07-25
EMI Test Receiver	RS	ESVB	826156/011	2024-07-12	2025-07-11
EMI Test Receiver	RS	ESCS 30	834115/006	2024-07-12	2025-07-11
Spectrum	HP/Agilent	E4407B	MY50441392	2024-07-12	2025-07-11
Spectrum	RS	FSP	1164.4391.38	2024-07-12	2025-07-11
RF Cable	Zhengdi	ZT26-NJ-NJ-8M/FA	-	2024-07-12	2025-07-11
RF Cable	Zhengdi	7m		2024-07-12	2025-07-11
Pre-Amplifier	Schwarebeck	BBV9743	#218	2024-07-12	2025-07-11
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2024-07-12	2025-07-11
LISN	SCHAFFNER	NNB42	00012	2024-07-12	2025-07-11
ESPI Test Receiver	R&S	ESPI 3	100379	2024-07-12	2025-07-11
LISN	R&S	EZH3-Z5	100294	2024-07-12	2025-07-11

### 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 34

Report No.: TW2409102-02E

Date: 2024-09-14



#### 3.0 Technical Details

## 3.1 Summary of test results

The EUT has been tested according to the following 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

#### 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

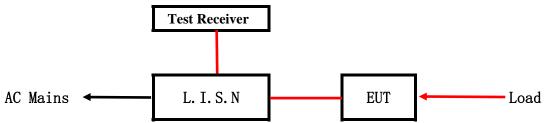
Report No.: TW2409102-02E

Date: 2024-09-14



#### 5. Power Line Conducted Emission Test

#### 5.1 Schematics of the test

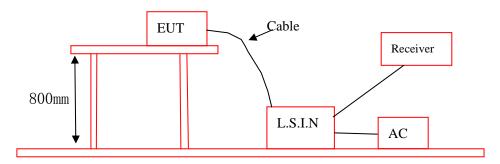


**EUT: Equipment Under Test** 

#### 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
3 MODES 87 KEYS ALUMINUM MECHANICAL KEYBOARD	Eastern Times Technology Co., Ltd	K660RGB-PRO, ET7015	TUVET-7015A

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.: TW2409102-02E Page 9 of 34

Date: 2024-09-14



#### 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 \( \mu \)			
(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:

Pass

Date: 2024-09-14



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

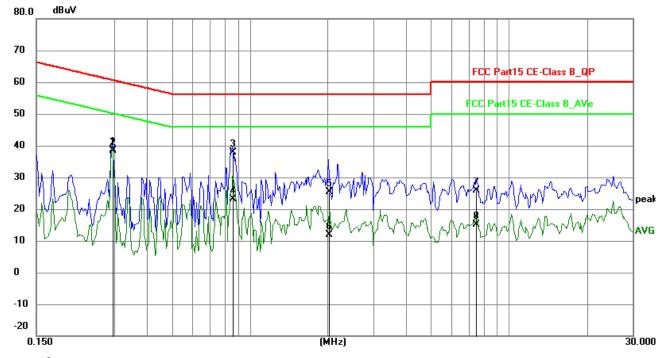
## **EUT Operating Environment**

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

**EUT set Condition: Charging and 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	0.2943	28.94	9.76	38.70	60.40	-21.70	QP	Р
2	0.2943	28.71	9.76	38.47	50.40	-11.93	AVG	Р
3	0.8598	28.02	9.79	37.81	56.00	-18.19	QP	Р
4	0.8598	13.37	9.79	23.16	46.00	-22.84	AVG	Р
5	2.0181	15.59	9.80	25.39	56.00	-30.61	QP	Р
6	2.0181	2.12	9.80	11.92	46.00	-34.08	AVG	Р
7	7.4733	15.97	10.03	26.00	60.00	-34.00	QP	Р
8	7.4733	5.14	10.03	15.17	50.00	-34.83	AVG	Р

Date: 2024-09-14



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

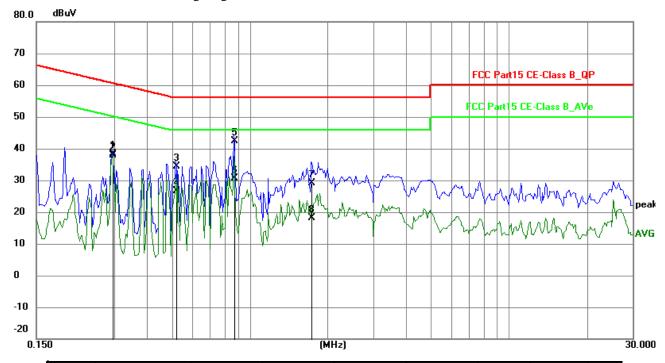
**EUT Operating Environment** 

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

EUT set Condition: Charging and 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	0.2943	28.55	9.76	38.31	60.40	-22.09	QP	Р
2	0.2943	28.03	9.76	37.79	50.40	-12.61	AVG	Р
3	0.5205	24.56	9.77	34.33	56.00	-21.67	QP	Р
4	0.5205	16.77	9.77	26.54	46.00	-19.46	AVG	Р
5	0.8676	32.55	9.79	42.34	56.00	-13.66	QP	Р
6	0.8676	20.89	9.79	30.68	46.00	-15.32	AVG	Р
7	1.7334	19.39	9.80	29.19	56.00	-26.81	QP	Р
8	1.7334	8.28	9.80	18.08	46.00	-27.92	AVG	Р

Report No.: TW2409102-02E Page 12 of 34

Date: 2024-09-14

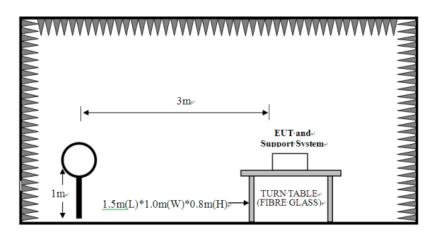


#### **6** Radiated Emission Test

- 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 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz (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



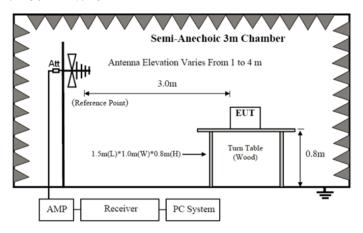
Page 13 of 34

Report No.: TW2409102-02E

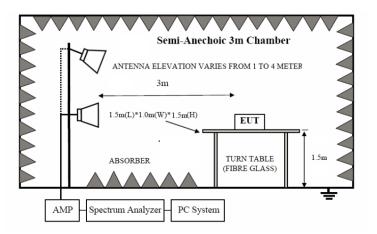
Date: 2024-09-14



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.

Report No.: TW2409102-02E Page 14 of 34

Date: 2024-09-14



#### 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 Strength of Fundamental (3m)			mental (3m) Field Strength of Harmonics (3m)		
(MHz)	mV/m	dBuV/m		uV/m	dBu	V/m
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 $\mu$ 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
30-88	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. For radiated emissions from 9kHz to 30MHz, the emission level is much less than the limit for more than 20dB. No necessary to take down the record.
- 6. Battery full charged during tests.

Report No.: TW2409102-02E

Date: 2024-09-14



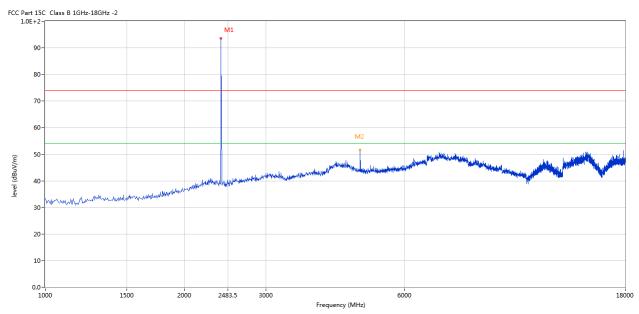
Page 15 of 34

#### 6.5 Test result

#### **A** Fundamental & Harmonics Radiated Emission Data

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

#### Horizontal



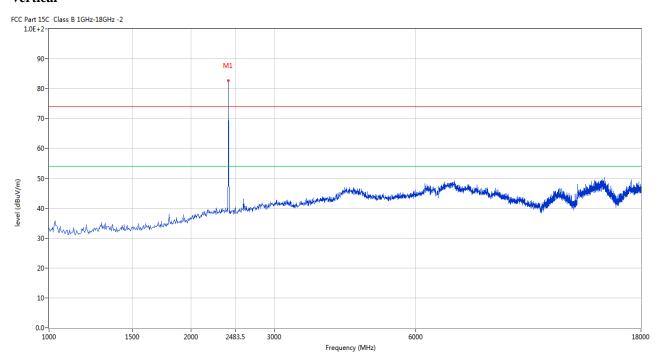
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2402	93.52	-3.57	114.0	-20.48	Peak	96.00	100	Horizontal	Pass
2	4802.799	51.55	3.12	74.0	-22.45	Peak	85.00	100	Horizontal	Pass

Report No.: TW2409102-02E Page 16 of 34

Date: 2024-09-14



#### Vertical



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	2402	82.74	-3.57	114.0	-31.26	Peak	213.00	100	Vertical	Pass

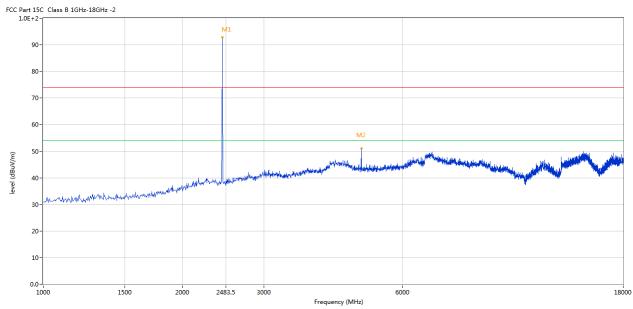
Report No.: TW2409102-02E Page 17 of 34

Date: 2024-09-14



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

#### **Horizontal**



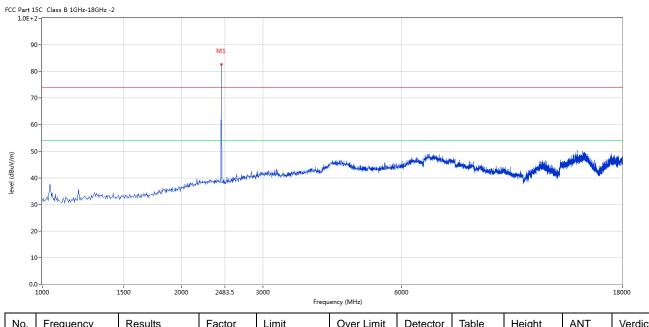
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2441	92.87	-3.57	114.0	-21.13	Peak	84.00	100	Horizontal	Pass
2	4879.280	51.00	3.20	74.0	-23.00	Peak	94.00	100	Horizontal	Pass

Report No.: TW2409102-02E Page 18 of 34

Date: 2024-09-14



#### Vertical



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2441	82.75	-3.57	114.0	-31.25	Peak	175.00	100	Vertical	Pass

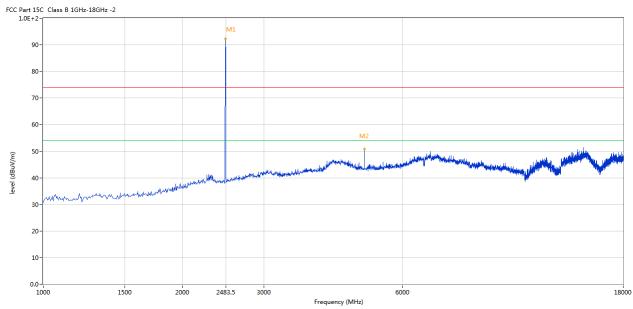
Report No.: TW2409102-02E Page 19 of 34

Date: 2024-09-14



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

#### Horizontal



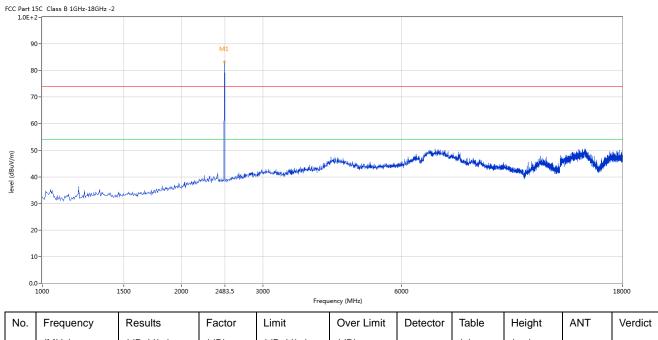
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480	92.31	-3.57	114.0	-21.69	Peak	72.00	100	Horizontal	Pass
2	4960.010	50.92	3.36	74.0	-23.08	Peak	76.00	100	Horizontal	Pass

Report No.: TW2409102-02E Page 20 of 34

Date: 2024-09-14



#### Vertical



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480	83.27	-3.57	114.0	-30.73	Peak	227.00	100	Vertical	Pass

Note: (2) Emission Level = Reading Level + Antenna Factor + Cable Loss-Amplifier

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

Report No.: TW2409102-02E Page 21 of 34

Date: 2024-09-14

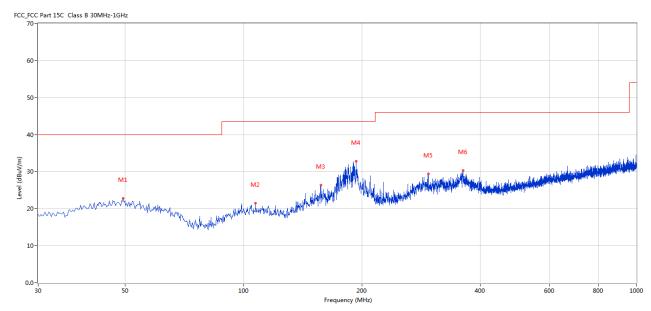


# B. General Radiated Emission Data Radiated Emission In Horizontal (30MHz----1000MHz)

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	49.395	22.81	-11.28	40.0	17.19	Peak	182.00	100	Horizontal	Pass
2	107.338	21.46	-13.39	43.5	22.04	Peak	32.00	100	Horizontal	Pass
3	157.281	26.37	-16.58	43.5	17.13	Peak	157.00	100	Horizontal	Pass
4	193.404	32.78	-13.87	43.5	10.72	Peak	264.00	100	Horizontal	Pass
5	295.471	29.35	-11.12	46.0	16.65	Peak	34.00	100	Horizontal	Pass
6	361.657	30.35	-9.51	46.0	15.65	Peak	2.00	100	Horizontal	Pass

Report No.: TW2409102-02E Page 22 of 34

Date: 2024-09-14

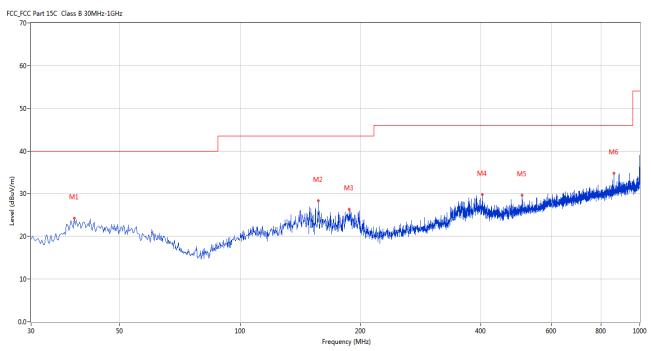


#### Radiated Emission In Vertical (30MHz----1000MHz)

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	38.485	24.32	-12.66	40.0	15.68	Peak	238.00	100	Vertical	Pass
2	156.796	28.39	-16.59	43.5	15.11	Peak	221.00	100	Vertical	Pass
3	187.586	26.33	-14.54	43.5	17.17	Peak	238.00	100	Vertical	Pass
4	403.842	29.79	-8.51	46.0	16.21	Peak	338.00	100	Vertical	Pass
5	508.090	29.61	-6.88	46.0	16.39	Peak	42.00	100	Vertical	Pass
6	862.052	34.86	-2.29	46.0	11.14	Peak	327.00	100	Vertical	Pass

Report No.: TW2409102-02E

Date: 2024-09-14

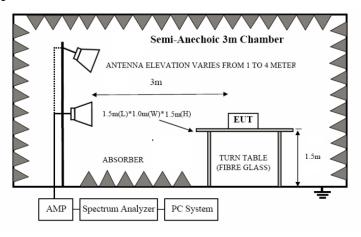


#### 7. Band Edge

#### 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.

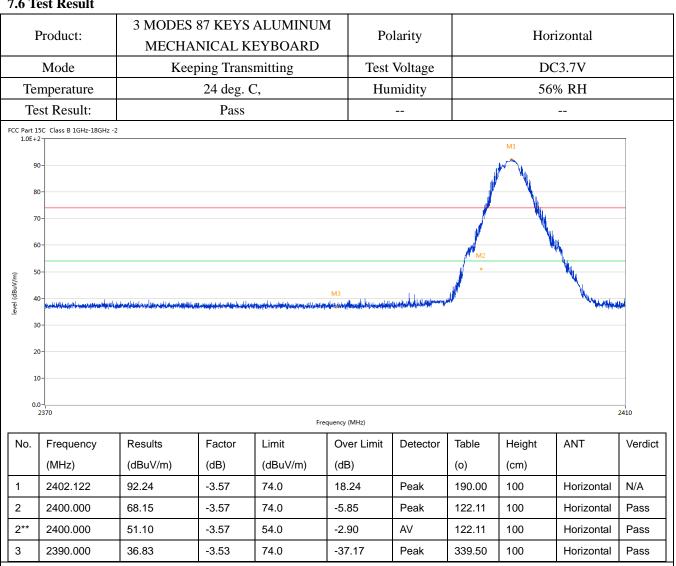
The report refers only to the sample tested and does not apply to the bulk.

Report No.: TW2409102-02E Page 24 of 34

Date: 2024-09-14



#### 7.6 Test Result

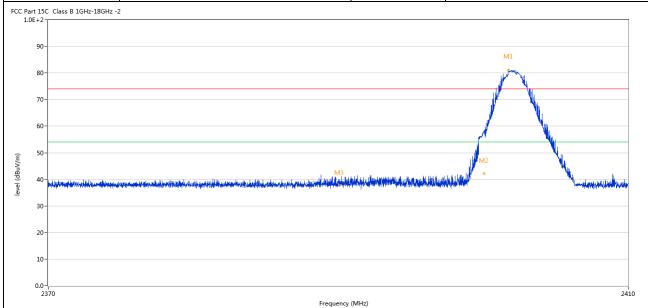


Report No.: TW2409102-02E Page 25 of 34

Date: 2024-09-14



Product:	3 MODES 87 KEYS ALUMINUM MECHANICAL KEYBOARD	Detector	Vertical
Mode	Keeping Transmitting	Test Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass		



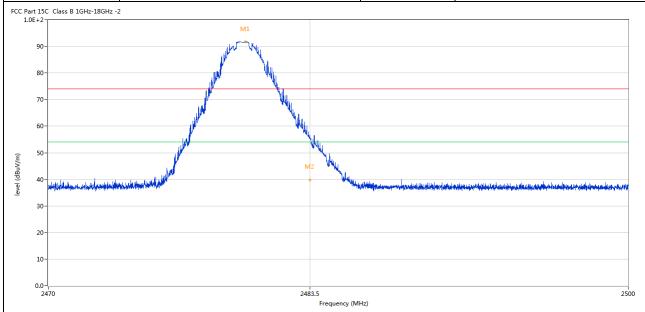
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2401.712	81.25	-3.57	74.0	7.25	Peak	95.00	100	Vertical	N/A
2	2400.000	58.44	-3.57	74.0	-15.56	Peak	48.00	100	Vertical	Pass
2**	2400.000	42.27	-3.57	54.0	-11.73	AV	48.00	100	Vertical	Pass
3	2390.000	37.65	-3.53	74.0	-36.35	Peak	2.50	100	Vertical	Pass

Report No.: TW2409102-02E Page 26 of 34

Date: 2024-09-14



Product:	3 MODES 87 KEYS ALUMINUM MECHANICAL KEYBOARD	Polarity	Horizontal
Mode	Keeping Transmitting	Test Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass		



No.	Frequency	Results	Factor	Limit	Over	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	Limit (dB)		(o)	(cm)		
1	2480.145	91.69	-3.57	74.0	17.69	Peak	248.00	100	Horizontal	N/A
2	2483.500	56.75	-3.57	74.0	-17.25	Peak	233.71	100	Horizontal	Pass
2**	2483.500	39.71	-3.57	54.0	-14.29	AV	233.71	100	Horizontal	Pass
										_

Page 27 of 34

Report No.: TW2409102-02E

Date: 2024-09-14



	Product:	3 MODES 87 KEYS ALUMINUM MECHANICAL KEYBOARD		Detector	Detector		Vertical		
Mode		Keeping Transmitting			Test Voltage	Test Voltage DC3.7V			
Temperature			24 deg. C,				56% RH		
T	est Result:		Pass						
CC Part 1.0E	15C Class B 1GHz-18GHz +2-	-2			•				
	90-								
	90-		M	1					
	80-		Madi	k,					
	70-		je V	W					
	60-		1W						
Ê	50-		u' -	M <sub>2</sub>					
	40- Militari da hali yan kana da kana								
evel (dbuV)	40 -	minerialistic and supplied the second bet	<i>Γ</i>	A Comment	geress <sub>ter</sub> d, <sub>wer</sub> ha <u>an me</u> de deutswissels of helpfields as elyn	adolymenta property and	a delpositivo a gel cica à colonga de litera	and the same of th	Hald de la const
	40 - West Special Control of Cont	minorialistics and apply of according	) ·	N-www	والمراجعة	<del>ad haranda</del> n bayabaha	adalyddin syddigaethiga	nsahiphadipadipadipadipadipadipadipadipadipadip	yet de armet
	المطرحا والمعاود المتعاطف المستطوعيات فالمكند بالرحاء	minuminalistenine desprimentalist		Munde	graffigall.anglynnussed drugtwigglasthripedfiaddsystyre	and have been desired to the	a hay asira i mara ny kaona dalah ka	n, will have been and an experience of the	Had de arrows
eve	holdelperketelikuludesperieteldenlere	manusaldurinada hurunda		Marine Ma	grovers all any house, and a single specific his significant pro-	den de la como de la colonia d	a dalpadha dagha an i agha an ghlidh a	e, will hander, generally gravity dendered	ya kumar
	lykyksipeksikkispeksikasioodi kirakya 30- 20-	nerenialistenere appropriation alph		A	arvasi pali angkananan kabupaning dagkahapat pakabapat pa	adama da wing dika ba	edifysilessedeisse up <u>besedelit</u> e	e. Waka-bungan garap kira-bad	ye karar
	hafrifieta deidiche de general den de en	nemonialistense destrologico de la constanta d		2483.5 Frequency		hadi haran-kan it syridik dan	hidystlasselva kriposeletika	o, which when special query fire stand	2500
	30- 20- 10-	Results	Factor	Frequency		Table	Height	ANT	
(	10	and the second s	Factor (dB)	Limit O	y (MHz)		The state of the s		2500
(	30- 20- 10- 2470	Results		Limit Or (dBuV/m) (d	y (MHz)  ver Limit Detector	Table	Height		2500
No.	30- 20- 10- 2470 Frequency (MHz)	Results (dBuV/m)	(dB)	Limit Or (dBuV/m) (d 74.0 6.5	y (MHz) Iver Limit Detector	Table (o)	Height (cm)	ANT	2500 Verdic

Note: 1. The PK emission level less than the AV limit. No necessary to record the AV emission level.

Report No.: TW2409102-02E

Date: 2024-09-14



Page 28 of 34

# 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 2.34dBi maximum. It fulfills the requirement of this section.

Test Result: Pass

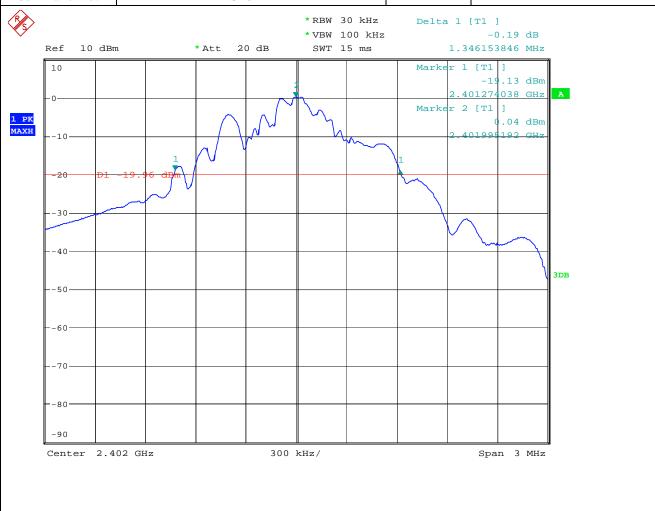
Page 29 of 34

Report No.: TW2409102-02E

Date: 2024-09-14



9.0 20dB Bandwidt	h Measurement			
Product:	3 MODES 87 KEYS ALUMINUM	Test Mode:	Voor tronsmitting	
Product.	MECHANICAL KEYBOARD	rest wrode.	Keep transmitting	
Mode	Keeping Transmitting	Test Voltage	DC3.7V	
Temperature	24 deg. C,	Humidity	56% RH	
Test Result:	Pass	Detector	PK	
20dB Bandwidth	1.346MHz			



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

Date: 14.SEP.2024 16:55:43

Page 30 of 34

Report No.: TW2409102-02E

Date: 2024-09-14



Product:	3 MODES 87 KEYS ALUMINUM MECHANICAL KEYBOARD		Test Mode:	Keep transmitting	
Mode	Keeping Transmitt	ting	Test Voltage	DC3.7V	
Temperature	24 deg. C,		Humidity	56% RH	
Test Result:	Pass		Detector	PK	
0dB Bandwidth	1.264MHz				
Ref 10 dF	m *Att 20 dB	*RBW 30 } *VBW 100 SWT 15 r	kHz	-0.44 dB 264423077 MHz	
1 PK MAXH10		2	Marker 2	440307692 GHz A	
-20 Đ1	20.15 dBm		1		
40				3DB	
60-				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	
70					
-80					
-90					

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

Date: 14.SEP.2024 16:53:17

Page 31 of 34

Span 3 MHz

Report No.: TW2409102-02E

Date: 2024-09-14



Product:	3 MODES 87 KEYS ALUMINUM MECHANICAL KEYBOARD	Test Mode:	Keep transmitting DC3.7V	
Mode	Keeping Transmitting	Test Voltage		
Temperature	24 deg. C,	Humidity	56% RH	
Test Result:	Pass	Detector	PK	
20dB Bandwidth	1.163MHz			
Ref 10 dl	* RBW 30 * VBW 100	) kHz	0.37 dB 163461538 MHz	
1 PK MAXH		Marker	479350962 GHz A	
-20 D1	20.09 dBm	1		
30				
50			3DB	
70				
-80				

Date: 14.SEP.2024 16:52:12

Center 2.48 GHz

-90

300 kHz/

Report No.: TW2409102-02E Page 32 of 34

Date: 2024-09-14



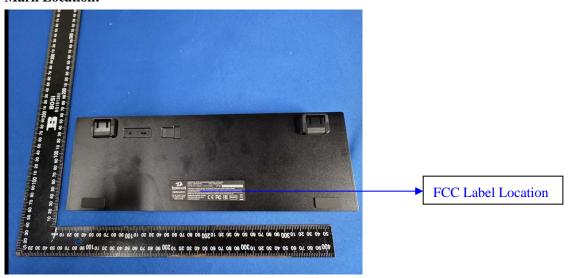
#### 10.0 FCC ID Label

#### FCC ID: TUVET-7015A

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:**



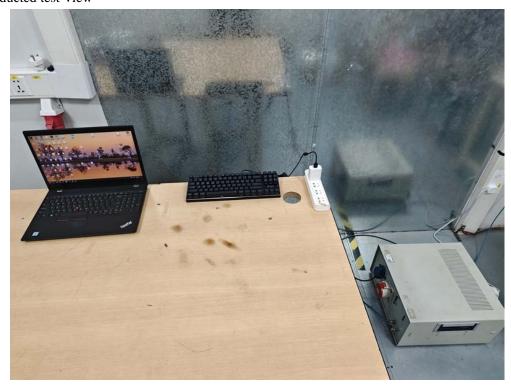
Report No.: TW2409102-02E Page 33 of 34

Date: 2024-09-14



#### 11.0 Photo of testing

#### 11.1 Conducted test View--



Report No.: TW2409102-02E

Date: 2024-09-14



#### Radiated emission test view





Photographs - EUT

Please refer test report TW2409102-01E

# -- 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.