



Report No.: TW2112168-02E

File reference No.: 2021-12-31

Applicant: Eastern Times Technology Co.,Ltd

Product: MECHANICAL GAMING KEYBOARD

Model No.: K621-RGB, K621W-RGB, ET-8541

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

# Jack Chung

Jack Chung

Manager

Dated: December 31, 2021

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

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## **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 17025:2005 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

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# Test Report Conclusion

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

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### 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: MECHANICAL GAMING 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: K621-RGB

Additional Model Name K621W-RGB, ET-8541

Serial No.: RDK621-RGB21063002011

Rating: DC3.7V, 260mA or DC5V, 660mA Battery: DC3.7V, 1900mAh Li-ion Battery

Modulation Type: GFSK, π/4D-QPSK, 8DPSK (Bluetooth)

Operation Frequency: 2402-2480MHz

Channel Separate: 1MHz Channel Number: 79

Antenna Designation PCB antenna with gain -1.85dBi maximum (Declared by the Manufacturer)

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1.4 Submitted Sample: 1 pc

1.5 Test Duration

2021-12-11 to 2021-12-31

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

Terry Tang

The sample tested by

Print Name: Terry Tang

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2.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2021-06-18	2022-06-17
LISN	R&S	EZH3-Z5	100294	2021-06-18	2022-06-17
LISN	R&S	EZH3-Z5	100253	2021-06-18	2022-06-17
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2021-06-18	2022-06-17
Loop Antenna	EMCO	6507	00078608	2021-06-18	2024-06-17
Spectrum	R&S	FSIQ26	100292	2021-06-18	2022-06-17
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2021-07-02	2024-07-01
Horn Antenna	R&S	BBHA 9120D	9120D-631	2021-07-02	2024-07-01
Power meter	Anritsu	ML2487A	6K00003613	2021-06-18	2022-06-17
Power sensor	Anritsu	MA2491A	32263	2021-06-18	2022-06-17
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2021-07-02	2024-07-01
9*6*6 Anechoic			N/A	2021-07-02	2022-07-01
EMI Test Receiver	RS	ESVB	826156/011	2021-06-18	2022-06-17
EMI Test Receiver	RS	ESH3	860904/006	2021-06-18	2022-06-17
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2021-06-18	2022-06-17
Spectrum	HP/Agilent	E4407B	MY50441392	2021-06-18	2022-06-17
Spectrum	RS	FSP	1164.4391.38	2021-01-16	2022-01-15
RF Cable	Zhengdi	ZT26-NJ-NJ-8M/FA		2021-06-18	2022-06-17
RF Cable	Zhengdi	7m		2021-06-18	2022-06-17
RF Switch	EM	EMSW18	060391	2021-06-18	2022-06-17
Pre-Amplifier	Schwarebeck	BBV9743	#218	2021-06-18	2022-06-17
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2021-06-18	2022-06-17
LISN	SCHAFFNER	NNB42	00012	2021-01-06	2022-01-05

### 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

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### 3.0 Technical Details

### 3.1 Summary of test results

The EUT has been	ı tested accordin	g to the following	specifications:
		A	, 50000

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

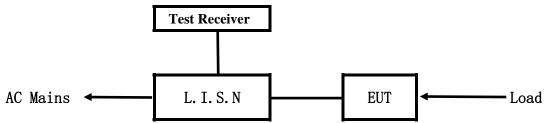
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### 5. Power Line Conducted Emission Test

### 5.1 Schematics of the test

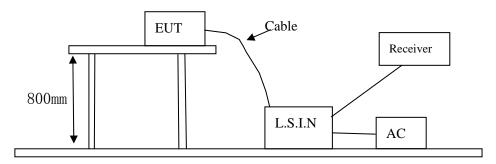


**EUT: Equipment Under Test** 

### 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
MECHANICAL GAMING	Eastern Times	V621 DCD V621W DCD ET 9541	TUVET-8541
KEYBOARD	Technology Co.,Ltd	K621-RGB, K621W-RGB, ET-8541	10 VE1-0341

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### 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

<u> </u>					
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:

Pass

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

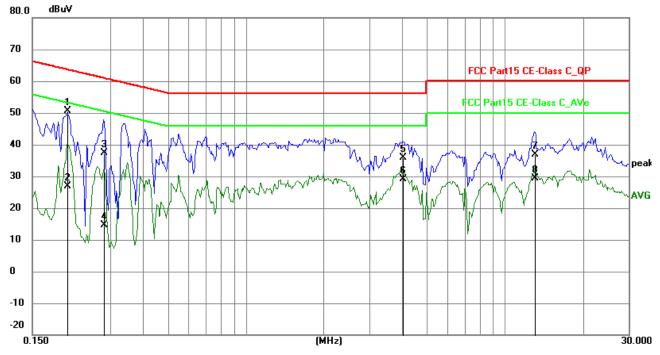
**EUT Operating Environment** 

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

**EUT set Condition: 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	0.2046	40.97	9.75	50.72	63.42	-12.70	QP	Р
2	0.2046	17.13	9.75	26.88	53.42	-26.54	AVG	Р
3	0.2826	27.74	9.76	37.50	60.74	-23.24	QP	Ч
4	0.2826	4.87	9.76	14.63	50.74	-36.11	AVG	П
5	4.0413	25.94	9.89	35.83	56.00	-20.17	QP	П
6	4.0413	19.19	9.89	29.08	46.00	-16.92	AVG	J
7	13.0113	26.51	10.29	36.80	60.00	-23.20	QP	Р
8	13.0113	19.14	10.29	29.43	50.00	-20.57	AVG	Р

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

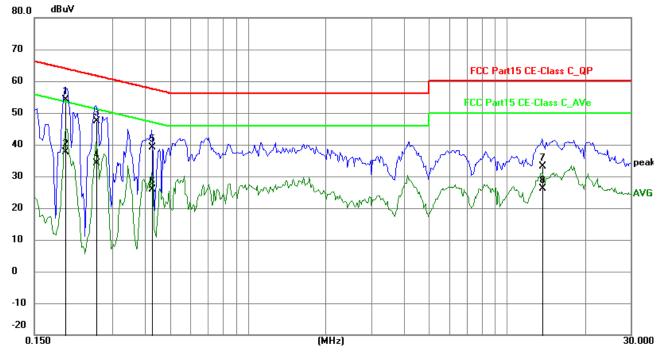
**EUT Operating Environment** 

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

**EUT set Condition: 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	0.1968	44.29	9.75	54.04	63.74	-9.70	QP	Р
2	0.1968	27.79	9.75	37.54	53.74	-16.20	AVG	Р
3	0.2592	37.54	9.75	47.29	61.46	-14.17	QP	Р
4	0.2592	24.44	9.75	34.19	51.46	-17.27	AVG	Р
5	0.4269	29.29	9.77	39.06	57.31	-18.25	QP	Р
6	0.4269	16.04	9.77	25.81	47.31	-21.50	AVG	Р
7	13.6431	22.81	10.32	33.13	60.00	-26.87	QP	Р
8	13.6431	15.79	10.32	26.11	50.00	-23.89	AVG	Р

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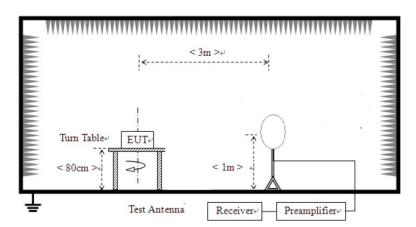


### 6 Radiated Emission Test

- 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

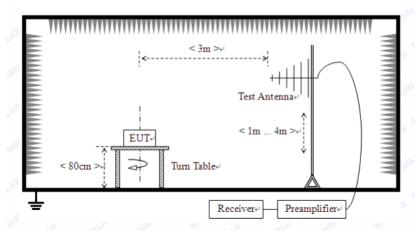


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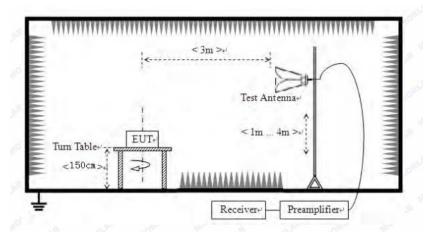
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For radiated emissions from 30MHz to1GHz



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.

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### 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 Fundame	ntal (3m)	Field Strength of Harmonics (3m)			
(MHz)	mV/m	dBu	V/m	uV/m	dBuV/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)
0.009-0.049	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. The three modulation modes of GFSK,  $\pi$  /4D-QPSK and 8DPSK were tested. And only the worst case was recorded in the test report. GFSK was the worst case.
- 6. 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.
- 7. Battery full charged during tests.

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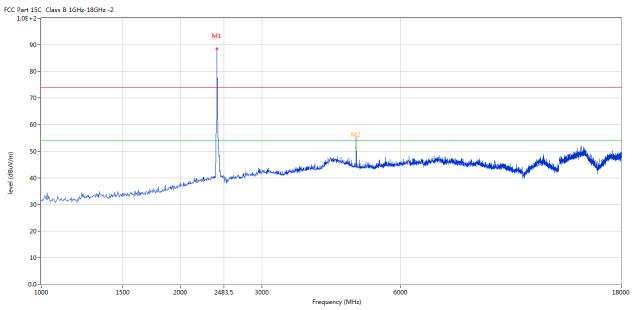


### 6.5 Test result

## A Fundamental & Harmonics Radiated Emission Data

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

### Horizontal



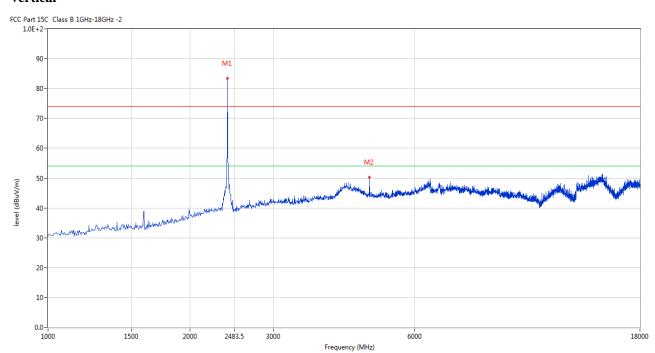
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2402.149	88.48	-3.57	114.0	-25.52	Peak	312.00	100	Horizontal	Pass
2	4802.799	56.05	3.12	74.0	-17.95	Peak	350.00	100	Horizontal	Pass
2**	4802.799	51.45	3.12	54.0	-2.55	AV	350.00	100	Horizontal	Pass

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### Vertical



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	2402.149	83.49	-3.57	114.0	-30.51	Peak	37.00	100	Vertical	Pass
2	4802.799	50.28	3.12	74.0	-23.72	Peak	221.00	100	Vertical	Pass

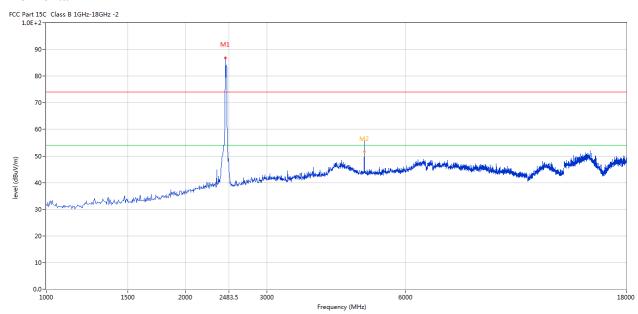
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Please refer to the following test plots for details: Middle Channel-2441MHz

### **Horizontal**



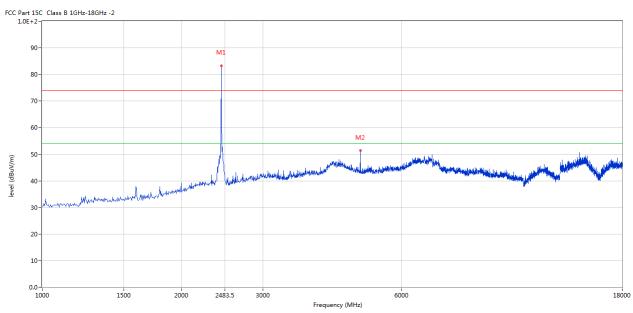
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2440.390	86.83	-3.57	114.0	-27.17	Peak	119.00	100	Horizontal	Pass
2	4883.529	56.67	3.20	74.0	-17.33	Peak	356.00	100	Horizontal	Pass
2**	4883.529	51.53	3.20	54.0	-2.47	AV	356.00	100	Horizontal	Pass

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### Vertical



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2440.390	83.32	-3.57	114.0	-30.68	Peak	42.00	100	Vertical	Pass
2	4883.529	51.34	3.20	74.0	-22.66	Peak	103.00	100	Vertical	Pass

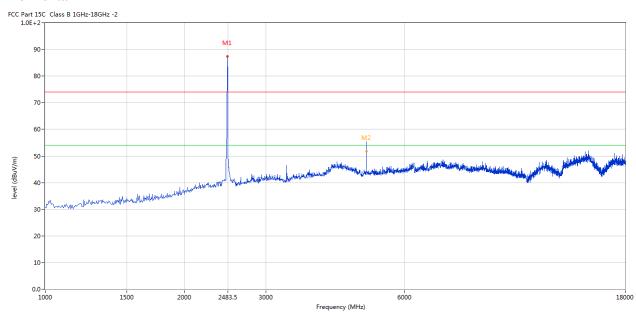
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Please refer to the following test plots for details: High Channel-2480MHz

### Horizontal



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2479.630	87.37	-3.57	114.0	-26.63	Peak	132.00	100	Horizontal	Pass
2	4960.010	55.41	3.36	74.0	-18.59	Peak	351.00	100	Horizontal	Pass
2**	4960.010	51.82	3.36	54.0	-2.18	AV	351.00	100	Horizontal	Pass

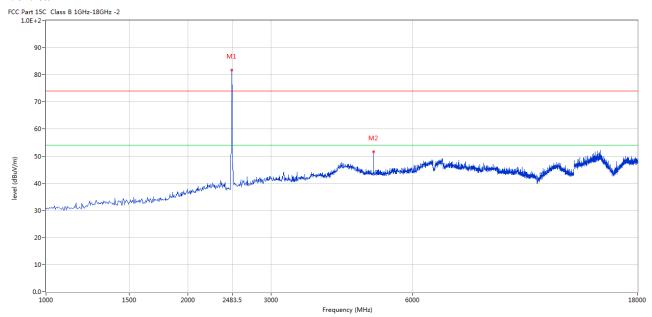
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### Vertical



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2479.630	82.33	-3.57	114.0	-31.67	Peak	247.00	100	Vertical	Pass
2	4960.010	51.59	3.36	74.0	-22.41	Peak	100.00	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.

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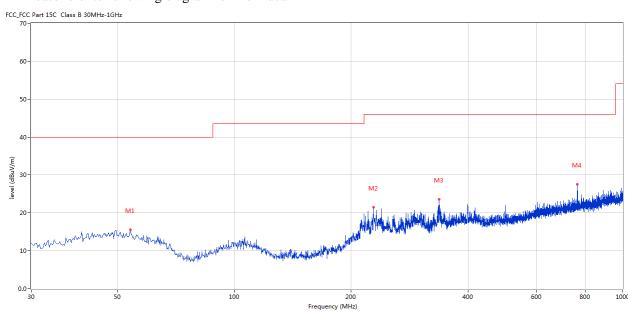


# B. General Radiated Emission Data Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep Tx transmitting

**Results:** Pass

Please refer to following diagram for individual



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	54.001	15.57	-11.54	40.0	-24.43	Peak	181.00	100	Horizontal	Pass
2	228.073	21.45	-12.77	46.0	-24.55	Peak	67.00	100	Horizontal	Pass
3	336.201	23.65	-9.90	46.0	-22.35	Peak	287.00	100	Horizontal	Pass
4	763.864	27.57	-3.26	46.0	-18.43	Peak	102.00	100	Horizontal	Pass

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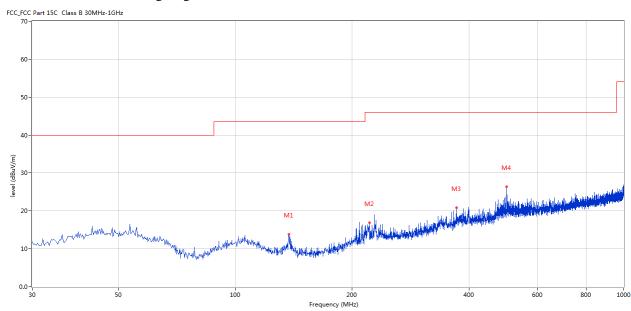


### Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: Keep Tx transmitting

**Results:** Pass

Please refer to following diagram for individual



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	137.401	13.79	-17.23	43.5	-29.71	Peak	188.00	100	Vertical	Pass
2	221.527	16.87	-13.25	46.0	-29.13	Peak	311.00	100	Vertical	Pass
3	370.870	20.79	-9.53	46.0	-25.21	Peak	329.00	100	Vertical	Pass
4	500.090	26.38	-6.91	46.0	-19.62	Peak	320.00	100	Vertical	Pass

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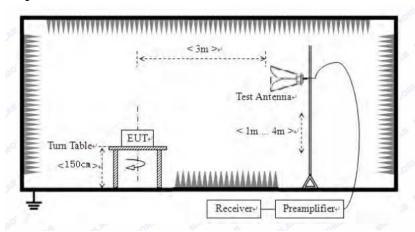


### 7. Band Edge

### 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.

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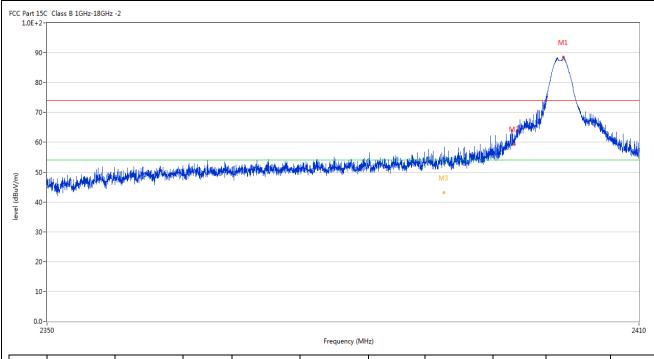
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### 7.6 Test Result

Product:	MECHANICAL GAMING 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 Limit	Detector	Table (o)	Height	ANT	Verdict
		(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
	2	2399.788	68.16	-3.57	74.0	-5.84	Peak	73.00	100	Horizontal	Pass
	2**	2399.788	51.28	-3.57	54.0	-2.72	AV	73.00	100	Horizontal	Pass
	3	2390.055	55.84	-3.53	74.0	-18.16	Peak	314.00	100	Horizontal	Pass
	3**	2390.055	43.21	-3.53	54.0	-10.79	AV	314.00	100	Horizontal	Pass
_											

Product:	MECHANICAL GAMING KEYBOARD	Detector	Vertical
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The report refers only to the sample tested and does not apply to the bulk.

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	Mode		Keeping To	ransmitting		Test Volta	age	Γ	C3.7V					
Te	mperature		24 de	eg. C,		Humidit	ty	5	6% RH					
Те	est Result:		Pa	ass										
CC Part 1	15C Class B 1GHz-18GHz	-2			•									
1.02+														
9	90-							N	M1					
8	30-							-	<b>\</b>					
7	70-													
								a parket de la	A STATE OF THE STA					
6	50-						الباد		No. of the last of	الساباب				
		M3 M2  M4 M2  M4 M2  M4 M												
5	50-		nak tanadarah	ولونظ فيجل غدارين ومالين ليراران الرا	والمال فيساد والماليا والأفاسي الم		A PARTY OF THE PAR			14				
(w/\ngg) 4	10-							*		150				
m/youal (abuy/a	10-	i geografially delt geografiales						۰		1100				
m/youal (abuy/a	ilo, a	والمراجع والمناورة والمناو	udi di sadak abilalari					۰						
EI/Angn) Javai	10-	gayatille the children the		il la sinda di serve de la completa	a har and he had been all their			0						
E/Angn) 19A91 3	10 - H	i yangan dilike bigi ajibi ing pangan dib		i languagi en				۰						
#/\ngp\ ja\ai	00-	hiphographically distributed and the	ed disciplinated them					٠						
ш/длядр) јалан 3	20-	i yangan salike dipinal di di angalayak d <sup>i</sup> n						۰		2410				
E/(Appp) 4	20-			Fr	equency (MHz)				T	1				
ш/длядр) јалан 3	10	Results	Factor	Fre	equency (MHz)  Over Limit	Detector	Table	Height	ANT	ı				
E/(Appp) 4	20-			Fr	equency (MHz)				ANT	1				
# 1 0 No.	10	Results	Factor	Fre	equency (MHz)  Over Limit		Table	Height	ANT Vertical	1				
E/(ληηρ)   44   3   3   2   1   1   0   0   0   0   0   0   0   0	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	equency (MHz)  Over Limit (dB)	Detector	Table (o)	Height (cm)		Verdic				

Product:	MECHANICAL GAMING KEYBOARD	Polarity	Horizontal
Mode	Keeping Transmitting	Test Voltage	DC3.7V
Temperature	24 deg. C,	Humidity	56% RH

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

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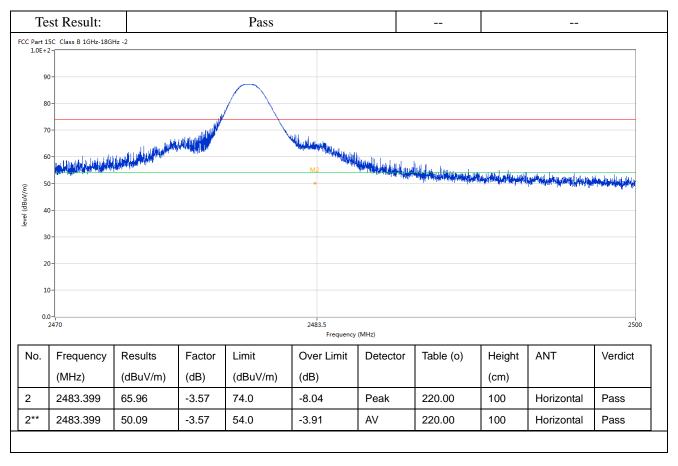
adopt any other remedies which may be appropriate.

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

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

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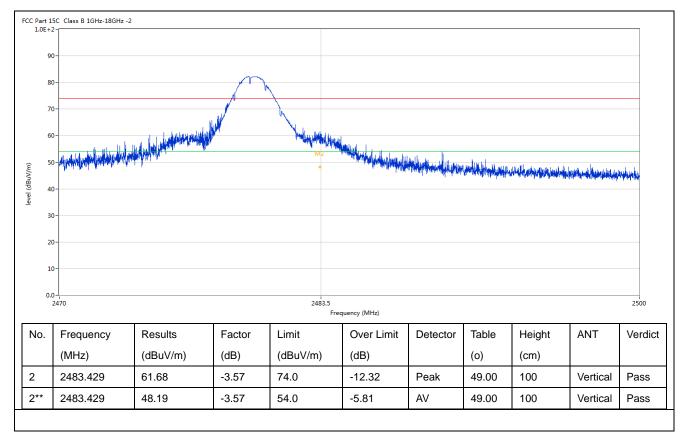
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Note: 1. The PK emission level less than the AV limit. No necessary to record the AV emission level.

2. The three modulation modes of GFSK,  $\pi$ /4D-QPSK and 8DPSK were tested. And only the worst case was recorded in the test report. GFSK was the worst case.

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### 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 -1.85dBi maximum. It fulfills the requirement of this section.

Test Result: Pass

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Product:	MECHANICA	AL GAMING KEYB	OARD	Test Mode:	Keep t	ransmitting
Mode	Kee	ping Transmitting		Test Voltage	D	C3.7V
Temperature		24 deg. C,		Humidity	56	5% RH
Test Result:		Pass		Detector		PK
dB Bandwidth		1.076MHz				
Ref Lvl	ndB	1 [T1 ndB] 20.00 dB	RBW VBW	30 kHz 100 kHz	RF Att	30 dB
10 dBm	BW :	1.07615230 MHz	SWT	8.5 ms	Unit	dBm
0				▼1 [T		8.12 dBm 5491 GHz
-10		A. e	۸	ndB BW ∇ <sub>Tl</sub> [	1.0761 [1] -2	0.00 dB 5230 MHz 8.11 dBm
-20			W/	∇ <sub>T2</sub> ['	2.4014 r1] -2	1984 GHz 8.35 dBm
1MAX				V <sub>T2</sub>	2.4024	9599 GHz
				Ly Ly		
-50 <b>L</b>	w/\/ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\			(	mmm	Julyllan
-60						
70						
-80						
-90						

### **GFSK Modulation**

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

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Product:	MECHANICAL	GAMING KEYBOA	ARD	Test Mode:	Keep tra	ansmitting
Mode	Keepin	g Transmitting		Test Voltage	DC	23.7V
Temperature	24	4 deg. C,		Humidity	569	% RH
Test Result:		Pass		Detector	]	PK
20dB Bandwidth	1.	070MHz				
Ref Lvl	Marker ndB	1 [T1 ndB]	RBW VBW			30 dB
10 dBm		.07014028 MHz	SWI		Unit	dBm
10				<b>▼</b> 1 ['	T1] -9	.44 dBm
					2.44095	A 491 GHz
0				ndB	20	.00 dB
		1		BW V <sub>T1</sub>	1.07014	
-10		_ \\\^\	1	V T-1	[T1] -29 2.44041	.32 dBm 984 GHz
		_/V	V	$\nabla_{\mathrm{T}}_2$	[T1] -29	3.09 dBm
-20			V		2.44148	998 GHz
1MAX	3			V <sub>T2</sub>		1MA
-30	^			<b> </b>		
-40						
-40	www.				Lynn	
-50					" "WM	Mondeline
-60						
-70						
-80						
-90						
Center 2	.441 GHz	300	kHz/		Spa	an 3 MHz
Date: 27	7.DEC.2021 14	:48:46				

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GFSK Modulat	ion										
Product:	MECH	ANICAL	GAMING	KEYBOA	ARD	Te	st Mode:		Keep tra	ansmitting	
Mode		Keepin	g Transmi	tting		Tes	st Voltage	<b>.</b>	DC	C3.7V	
Temperature		2	4 deg. C,			Н	lumidity		569	% RH	
Test Result:			Pass			Ι	Detector		]	PK	
20dB Bandwidth		1.	070MHz								
Ŕ		Marker	1 [T1 r	ndB]	RI	ВW	30 k	Hz RI	7 Att	30 dB	
Ref Lvl		ndB		00 dB	VE	ВW	100 k				
10 dBm		BW 1	1.070140	)28 MHz	SV	VT.	8.5 m	ıs Ur	nit	dBm	
10							<b>v</b> <sub>1</sub>	[T1]	-11	l.53 dBm	A
									2.47995	491 GHz	
0							ndE	3	20	0.00 dB	
				1			BW ▽ <sub>T</sub> -	[T1]	1.07014	028 MHz $1.52$ dBm	
-10				٨٨٨	٨			_ [ + + ]	2.47941		
			_	$\bigvee_{i=1}^{n}$	W		$\nabla_{\mathrm{T}2}$	[T1]	-31		
-20			^			W	^		2.48048	8998 GHz	1MA
		-				V	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				IMA
-30		-					V				
		^					<i>\</i> _				
-40	went	1 N/V						t <sub>y</sub>			
1 400 000	www	1~						My	<u> </u>		
-50								W	~~~	munul	
-60											
-70						-					
-80											
-90											
Center 2	.48 GH:	Z		300	kHz/				Spa	an 3 MHz	
Date: 27	7.DEC.2	021 14	:57:09								

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Product:	MECH.	ANICAL	GAMING	KEYBOA	RD	T	est Mode:		Keep tra	nsmitting	
Mode		Keepin	g Transmi	tting		Т	est Voltage		DC	3.7V	
Temperature		2	4 deg. C,			]	Humidity		56%	6 RH	
Test Result:			Pass				Detector		I	PK	
20dB Bandwidth	1.311MHz										
<b>₽</b>		Marker	1 [T1 n	idB]	R	.BW	30 kH	Iz R	F Att	30 dB	
Ref Lvl		ndB	20.	00 dB	V	BW	100 kH	Iz			
10 dBm		BW 1	1.310621	24 MHz	S	WT	8.5 ms	U:	nit	dBm	n
10							<b>v</b> <sub>1</sub>	[T1]	-11	.49 dBm	A
									2.40176	854 GHz	-
0							ndB		20	.00 dB	
				1			BW ▼⊤1	Femal 1	1.31062		
-10				Ž.			V T I	[T1]	2.40131	.67 dBm 162 GHz	
			- · · · · · ·		۸ ۸		~~ ¬ <sub>T2</sub>	[T1]	-31	.59 dBm	
-20			/ <sup>()</sup>		() ·	V V	-7/2		2.40262	224 GHz	
1MAX							\ \				1M2
-30		T <u>İ</u>					1	2			
	a hual	mm						L,			
-40	whole							Mary A	LM.,	<u> </u>	
•									Murun	hallely	
-50											
-60											
-70											
-80											
-90											
Center 2	.402 GI	Hz		300	kHz/		<u>'</u>		Spa	n 3 MHz	9

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π/4D-QPSK N	Modulati	on									
Product:	MECH	ANICAL	GAMING	KEYBOA	ARD	Test	Mode:		Keep tra	ansmitting	
Mode		Keepin	g Transmi	tting		Test	Voltage	<b>)</b>	DC	23.7V	
Temperature		2	4 deg. C,			Hu	midity		569	% RH	
Test Result:			Pass			De	etector		l	PK	
20dB Bandwidth		1.	.311MHz								
Ŕ		Marker	1 [T1 r	ndB]	RE	BW .	30 k	Hz R	F Att	30 dB	
Ref Lvl		ndB		00 dB	VE	BM .	100 k				
10 dBm		BW 1	L.310621	24 MHz	SV	ľΤ	8.5 m	s U	nit	dBm	
10							<b>v</b> <sub>1</sub>	[T1]	-12	.93 dBm	A
									2.44076	854 GHz	
0							ndE	8	20	.00 dB	
							BW ▼ <sub>Tj</sub>	[T1]	1.31062	124 MHz .70 dBm	
-10				<del>1</del> <del>1</del> .			. 1	- [ + + ]	2.44031		
			$\sim$	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Λ Λ		$ abla_{ m T2}$	2 [T1]	-32		
-20			~~~\\	100 00	V~	<u> </u>	<u>~</u>		2.44162	224 GHz	
1MAX		ſ					7				1MA
-30		7					~	<u>F2</u>			
	n Allmh	Nur						J.			
-40	/ July 9							M	Muyha	Mundan	
-50											
-60											
-70											
-80											
-90 Center 2	441 0	Ue		300	kHz/				Cra	n 2 MII-	
				300	лп4/				aga	ın 3 MHz	
Date: 27	/.DEC.2	2021 15	:32:41								

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Product:	MECHANICA	L GAMING	KEYBOARI	ГС	Test Mode:	Keep	transmitting		
Mode	Keep	ing Transmi	tting	Т	est Voltage	DC3.7V			
Temperature		24 deg. C,			Humidity	5	6% RH		
Test Result:		Pass			Detector	PK			
dB Bandwidth	1.311MHz								
	Marke	r 1 [T1 n	ndB]	RBW	30 kHz	RF Att	30 dB		
Ref Lvl	ndB	20.	00 dB	VBW	100 kHz				
10 dBm	BW	1.310621	24 MHz	SWT	8.5 ms	Unit	dBm		
10					<b>▼</b> 1 [3	r1] -	14.75 dBm		
						2.479			
0					ndB		20.00 dB		
					BW ▼ <sub>T</sub>	1.310 [T1] -	62124 MHz 34.53 dBm		
-10			1		1		31162 GHz		
					$ abla_{\mathrm{T2}}$	[T1] -	34.89 dBm		
-20		~~~ <del>~</del>		M	~~~ <u> </u>	2.480			
1MAX		N					114		
-30	тſ				72				
	am an				<u>\</u>				
-40					<u> </u>	m,			
						- January	manny		
-50									
-60									
-70									
-80									
-90									
Center 2	.48 GHz		300 kH	z/		S	pan 3 MHz		

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Product:	MECH	ANICAL	GAMING	KEYBOA	RD	Τ	est Mode:		Keep tra	ansmitting		
Mode		Keepin	g Transmi	tting		To	est Voltage		DC	23.7V		
Temperature		2	4 deg. C,				Humidity		56% RH PK			
Test Result:			Pass				Detector					
0dB Bandwidth	1.311MHz											
r)		Marker	1 [T1 n	ndB]	I	RBW	30 k	Hz R	F Att	30 dB		
Ref Lvl		ndB	20.	00 dB	7	/BW	100 k	Hz				
10 dBm		BW 1	1.310621	24 MHz	Š	SWT	8.5 m	s U	nit	dBm	1	
10							<b>v</b> <sub>1</sub>	[T1]	-11	.52 dBm	A	
									2.40177	455 GHz		
0							ndB		20	.00 dB		
				1			BW ▽ <sub>T1</sub>	[T1]	1.31062	124 MHz 55 dBm		
-10				X			-		2.40131			
			mW	\ \\\	$\setminus \wedge$	<i>۱</i>	~~~ <sup>∇</sup> T2	[T1]	-31	.51 dBm		
-20		^			V	V .	7		2.40262	224 GHz	1M	
Inn							V	10				
-30								ζ				
4.	/_m/m_//l	ham						الم-11				
-40	<i>\( \sqrt{\pi} \)</i>							~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	March	hi wholes		
										Who was		
-50												
-60												
-70												
-80												
-90												
Center 2	.402 GI	Hz		300	kHz/	′			Spa	ın 3 MHz		

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Product: MECHANICAL GAMING KEYBOARD					DD	Test Mode:		Voor transmitting			
						Test Woltage		Keep transmitting			
Mode		Keeping Transmitting 24 deg. C, Pass					=	DC3.7V			
Temperature								56% RH PK 			
Test Result:											
OdB Bandwidth	1.311MHz										
Ŕ	I	Marker	1 [T1 r	idB]	RBW	30 k	Hz R	F Att	30 dB		
Ref Lvl	1	ndB		00 dB	VBW	100 k					
10 dBm	1	BW 1	L.310621	24 MHz	SWT	8.5 m	ns U:	nit	dBm	l	
10						<b>v</b> <sub>1</sub>	[T1]	-12	.69 dBm		
								2.44076	854 GHz	A	
0						ndI	8	20	.00 dB		
						BW		1.31062	124 MHz		
-10				1		∇ <sub>T</sub>	[T1]	-32	.57 dBm		
						∇		2.44031			
-20			_^	W/\	\_^	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2 [T1]	-32 2.44162	.63 dBm 224 GHz		
1MAX								2.44102	ZZ4 GHZ	1MA	
-30	nun	ww					ζ,				
-40								m	mm		
-50											
-60											
7.0											
-70											
-80											
-90											
Center 2	.441 GH	z		300	kHz/			Spa	n 3 MHz		
Date: 2'	7.DEC.20	001 16									

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8QPSK Modula	tion											
Product:	MECH	MECHANICAL GAMING KEYBOARD  Keeping Transmitting					Test Mode: Test Voltage		Keep transmitting DC3.7V 56% RH PK			
Mode												
Temperature	24 deg. C, Pass 1.311MHz					Humidity Detector						
Test Result:												
20dB Bandwidth												
Ŕ		Marker	1 [T1 r	ndB]	RI	3W	30 k	Hz R	F Att	30 dB		
Ref Lvl		ndB		00 dB	VI		100 k					
10 dBm		BW I	L.310621	24 MHz	SV	T 8	3.5 m	s U	nit	dBm		
							<b>v</b> <sub>1</sub>	[T1]	-14	.40 dBm	A	
									2.47976	854 GHz		
0							ndE	8	20	.00 dB		
							BW ∇ <sub>T1</sub>	[T1]	1.31062	124 MHz .61 dBm		
-10				1					2.47931			
				$\sim$			$oldsymbol{ abla}_{\mathrm{T}2}$	2 [T1]	-34	.74 dBm		
-20			~~~	<del>\\\</del>	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	74~V	$\sim$		2.48062	224 GHz	1MA	
IMAX		,l									IMA	
-30		<u>T</u>					4	<u>[</u> 2				
		<b>y</b>						Y				
-40	MINITO	War						h				
	) (I) V							· wy	mhhu	May A Thro		
-50										VAIJ V		
-60												
-70												
-80												
-90												
Center 2.48 GHz 300									Spa	ın 3 MHz		
Date: 27	7.DEC.2	2021 16	:21:04									

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### 10.0 FCC ID Label

### FCC ID: TUVET-8541

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:**



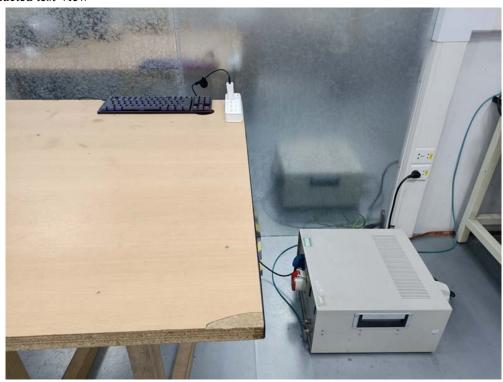
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#### 11.0 Photo of testing

#### 11.1 Conducted test View--



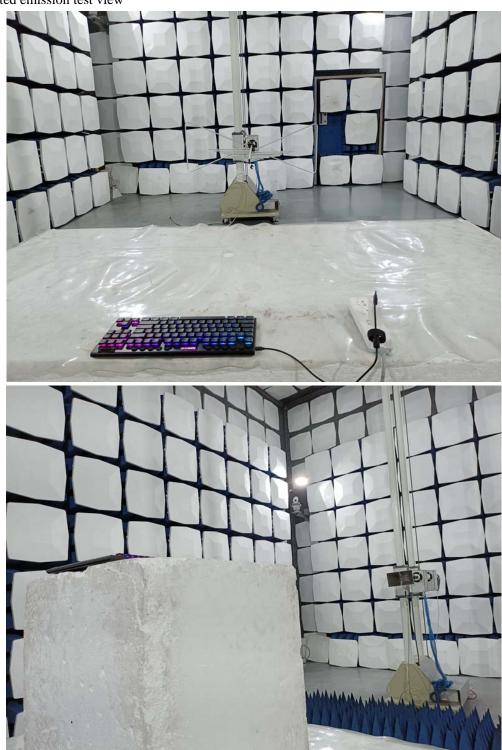
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### Radiated emission test view



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

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#### 11.2 Photographs – EUT

### Outside View



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Photographs - EUT

### Outside View





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Outside View



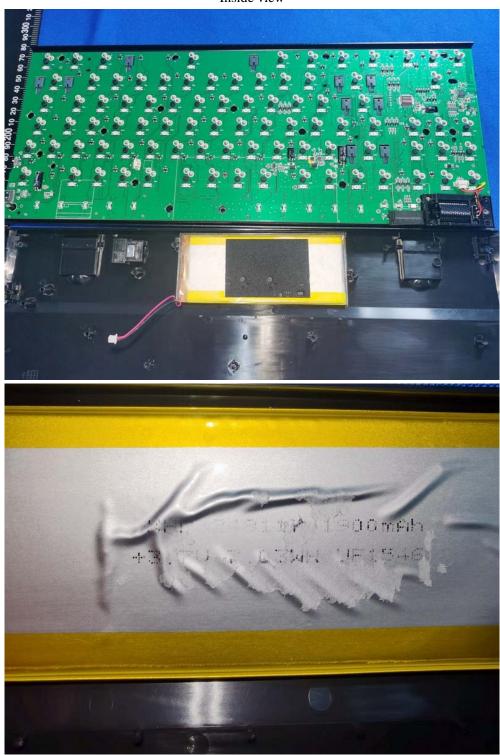
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Inside view



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### Inside view





-- End of the report--