



Report No.: TW2503095E

Applicant: Eastern Times Technology Co., Ltd

Product: 3-MODES 98 KEY GASKET HOT-SWAPPABLE RGB MECHANICAL KEYBOARD

Trademark: REDRAGON

Model No.: K686WB-RGB-PRO, K686AK-RGB-PRO, ET-7199, K688GB-RGB-PRO, K686WBG-RGB-MAX

Test Standards: EN 55032:2015+A11:2020+A1:2020  
EN IEC 61000-3-2:2019 +A1:2021  
EN 55035:2017+A11:2020  
EN 61000-3-3:2013+A2:2021+AC:2022-01

Test Result: The EMC testing has been performed on the submitted samples and found in compliance with council EMC Directive 2014/30/EU.

Approved By

A handwritten signature in black ink that reads 'Terry Tang'.

Terry Tang

Manager

Dated: March 05, 2025

**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

TEST REPORT



## **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**

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## 1.0 General Details

### 1.1 Test Lab Details

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: +86 755 83448688 Fax: +86 755 83442996

#### Test Location

**All tests were performed 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: +86 755 83448688 Fax: +86 755 83442996

### 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.

Manufacturer: 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 98 KEY GASKET HOT-SWAPPABLE RGB MECHANICAL KEYBOARD

Trademark: REDRAGON

Model Number: K686WB-RGB-PRO

Adding Trademark: N/A

Adding Model Number: K686AK-RGB-PRO, ET-7199, K688GB-RGB-PRO, K686WBG-RGB-MAX

Rating: Input: DC5V, 500mA or DC3.7V, 120mA

Battery: DC3.7V, 3000mAh Li-ion battery

Note: This is an addition test report based on original one: TW2409129E. Only one model (K686WBG-RGB-MAX) is added. This model is identical with the original ones in the PCB, Schematics and constructions. Only the silk printing is different.

### 1.4 Submitted Sample(s)

2 Samples

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## 2.0 List of Measurement Equipment

### 2.1 Conducted Emission Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
EMI Test Receiver	ESCS 30	834115/006	RS	2024.07.12	1 Year
LISN	NNB42	00012	SCHAFFNER	2024.07.12	1 Year

### 2.2 Radiated Disturbance Test

Name	Model No	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
EMI Test Receiver	ESPI 3	100379	RS	2024.07.12	1 Year
Spectrum Analyzer	E4407B	MY50441392	HP/Agilent	2024.07.12	1 Year
Amplifier	BBV9743	#218	HP/Agilent	2024.07.12	1 Year
Bilog Antenna	VULB9163	9163/340	Schwarebeck	2022.07.18	3 Year
Horn Antenna	BBHA 9120D	9120D-631	RS	2022.07.18	3 Year
Amplifier	8449B	3008A00160	HP/Agilent	2024.07.12	1 Year

### 2.3 Harmonic & Flicker Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Harmonics Flicker Test System	PACS-1	72305	CI	2024.07.12	1 Year
5K VA AC Power Source	5001iX	56060	CI	2024.07.12	N/A

### 2.4 ESD Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
ESD Simulator	ESS-2002	ESS06Y6394	NoiseKen	2024.07.12	1 Year

### 2.5 RF field Strength Susceptibility

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Signal Generator	SMT03	100059	RS	2024.07.12	1 Year
Power Meter	NRVS	---	RS	2024.07.12	1 Year
Voltage Probe	URV5-Z2	100012	RS	2024.07.12	1 Year

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Voltage Probe	URV5-Z2	100013	RS	2024.07.12	1Year
Power Amplifier	150W1000	300999	AR	2024.07.12	1Year
Power Amplifier	25S1G4AM1	305993	AR	2024.07.12	1Year
Field Probe	CBL6111C	2576	Holaday	2024.07.12	1Year
Bilog Antenna	MCDC	---	Chase	2024.07.12	1Year

## 2.6 Electrical Fast Transient/Burst (EFT/B) Immunity test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
EFT Generator	UCS 500 M4	0304-42	EM TEST	2024.07.12	1Year
Power Source	MV2616	0104-14	EM TEST	2024.07.12	1Year

## 2.7 Surge Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Ultra Compact Simulator	UCS 500 M4	0304-42	EM TEST	2024.07.12	1Year
Power Source	MV2616	0104-14	EM TEST	2024.07.12	1Year

## 2.8 Conducted Immunity Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Continuous Wave Simulator	CWS 500C	0407-05	EM TEST	2024.07.12	1 Year

## 2.9 Power-frequency Magnetic Field

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Continuous Wave Simulator	UCS 500 M4	0304-42	EM TEST	2024.07.12	1 Year
Power Source Network	MV 2616	0104-14	EM TEST	2024.07.12	1 Year
Current Transformer	MC2630	--	EM TEST	2024.07.12	1 Year
Magnetic Coil	MS100	0304-42	EM TEST	2024.07.12	1 Year

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2.10 Voltage Dips/Interruption Immunity Test

Name	Model No.	Serial No.	Manufacturer	Calibration Date	Calibration Cycle
Ultra Compact Simulator	UCS 500 M4	0304-42	EM TEST	2024.07.12	1Year
Power Source	MV2616	0104-14	EM TEST	2024.07.12	1Year

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**3.0 Technical Details**

**3.1 Investigations Requested**

Perform Electromagnetic Interference [EMI] & Electromagnetic Susceptibility [EMS] tests for CE Marking

**3.2 Test Standards**

Test Standards		
EN 55032:2015+A11:2020+A1:2020	Electromagnetic compatibility of multimedia equipment - Emission Requirements	
EN IEC 61000-3-2:2019+ A1:2021	Electromagnetic compatibility(EMC)- Part 3-2:Limits-Limits for harmonic current emissions(equipment input current $\leq 16A$ per phase)	
EN 61000-3-3:2013 +A2:2021+AC:2022-01	Electromagnetic compatibility (EMC)- Part 3-3: Limits-Limitation of voltage changes, Voltage fluctuations and flicker in public low-voltage supply systems. For equipment with rated current $\leq 16A$ per phase and not subject to conditional connection	
EN 55035:2017+A11:2020	Electromagnetic compatibility of multimedia equipment - Immunity requirements	
	EN 61000-4-2:2009	Electrostatic discharge
	EN IEC 61000-4-3:2020	RF electromagnetic field disturbances
	EN 61000-4-4:2012	Electrical Fast transients
	EN 61000-4-5:2014	Surge
	EN 61000-4-6:2014	Conducted susceptibility
	EN 61000-4-8:2010	Power-frequency Magnetic Field
	EN IEC 61000-4-11: 2020	Dips/Voltage Interruption Variation

**3.3 Performance Criteria**

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

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### 3.4 Test standards and Results Summary Tables

Test Condition	Test Requirement	Test Method	Test Result
<b>EMISSION Results Summary</b>			
Conducted Emission on AC Mains, 150kHz to 30MHz	EN 55032:2015 +A11:2020+A1:2020	EN 55032:2015 +A11:2020+A1:2020	Pass
Conducted Emission on at telecommunication ports, 150kHz to 30MHz	EN 55032:2015 +A11:2020+A1:2020	EN 55032:2015 +A11:2020+A1:2020	N/A
Radiated Emissions, 30MHz to 6GHz	EN 55032:2015 +A11:2020+A1:2020	EN 55032:2015 +A11:2020+A1:2020	Pass
Harmonic Emissions on AC supply	EN IEC 61000-3-2:2019 +A1:2021	EN IEC 61000-3-2:2019 +A1:2021	N/A
Voltage fluctuations on AC supply	EN 61000-3-3:2013 +A2:2021+AC:2022-01	EN 61000-3-3:2013 +A2:2021+AC:2022-01	N/A
<b>IMMUNITY Results Summary</b>			
Electrostatic Discharge	EN 55035:2017+A11:2020	EN 61000-4-2: 2009	Pass
Continuous RF electromagnetic field disturbances	EN 55035:2017+A11:2020	EN IEC 61000-4-3:2020	Pass
Continuous induced RF disturbances	EN 55035:2017+A11:2020	EN 61000-4-6:2014	Pass
Power frequency magnetic field	EN 55035:2017+A11:2020	EN 61000-4-8: 2010	N/A
Electrical fast transients/burst (EFT/B)	EN 55035:2017+A11:2020	EN 61000-4-4: 2012	Pass
Surges	EN 55035:2017+A11:2020	EN 61000-4-5: 2014	Pass
Voltage dips and interruptions	EN 55035:2017+A11:2020	EN IEC 61000-4-11: 2020	Pass
Broadband impulsive conducted disturbances	EN 55035:2017+A11:2020	EN 61000-4-6:2014	N/A

**Note: N/A-Not applicable**

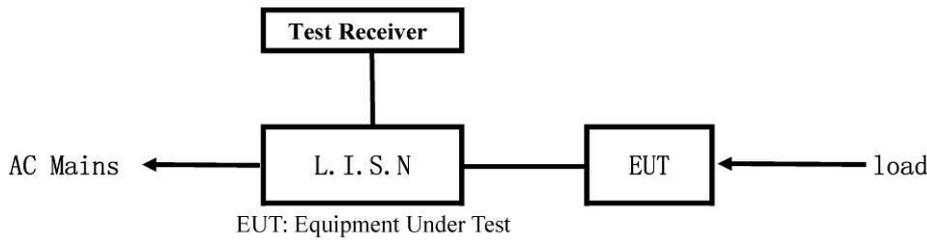
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#### 4.0 Electromagnetic Interference Test results

##### 4.1 Power line Conducted Emission Test

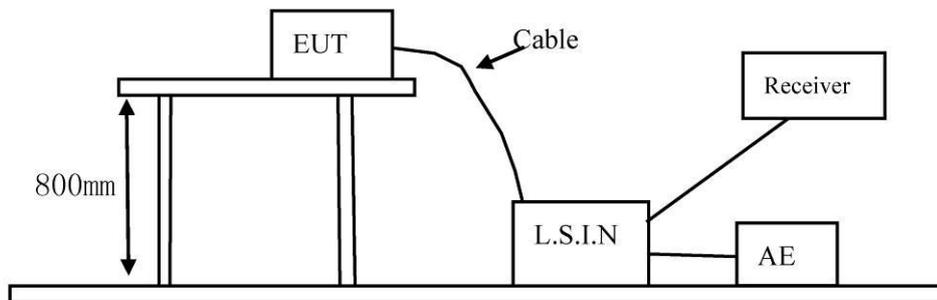
###### 4.1.1 Schematics of the test



###### 4.1.2 Test Method:

The test was performed in accordance with EN 55032:2015+A11:2020+A1:2020

###### Block diagram of Test setup



###### 4.1.3 Power line conducted Emission Limit

Frequency(MHz)	Limits dB(μV)			
	Class A Equipment		Class B Equipment	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

- Notes: 1. \*decreasing linearly with logarithm of frequency.  
 2. The lower limit shall apply at the transition frequencies

###### 4.1.4 Test Results

Limits for Conducted Emission test, please refer to limit line (Quasi-peak) and Average in the following diagram labelled as (QP)&AV

**Remark:** Calculated measurement uncertainty=3.6dB

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**A: Disturbance Voltage Limits at mains on Live terminals (150kHz to 30MHz)**

**EUT Operating Environment**

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

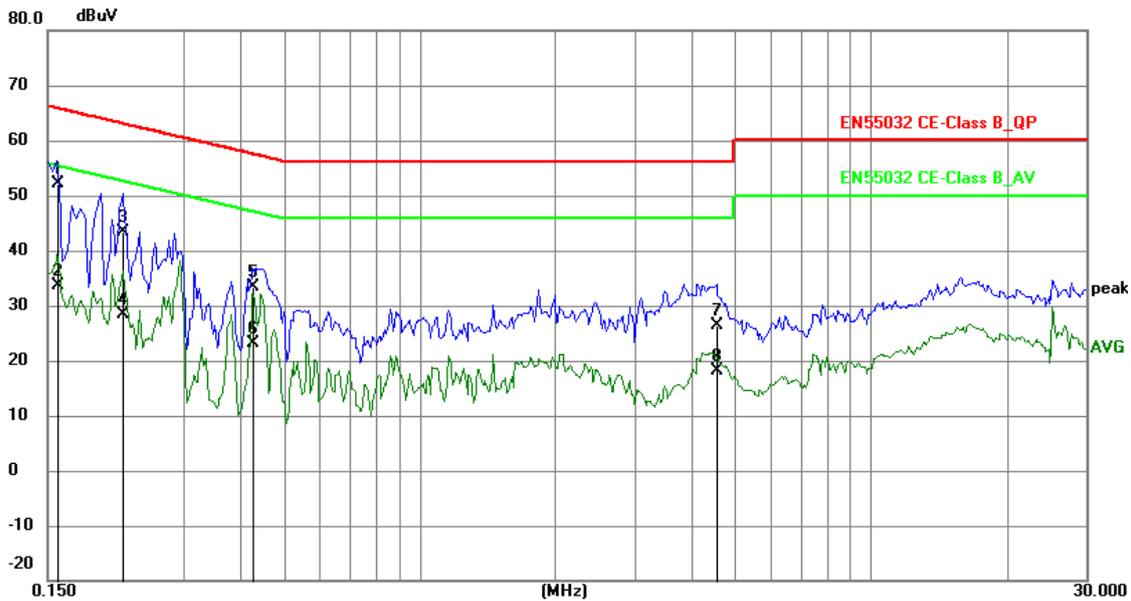
**EUT set Condition: Wired Operation Mode**

**Power: AC230V/50Hz**

**Equipment Level: Class B**

**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	0.1578	42.39	9.78	52.17	65.58	-13.41	QP	P
2	0.1578	23.87	9.78	33.65	55.58	-21.93	AVG	P
3	0.2202	33.70	9.75	43.45	62.81	-19.36	QP	P
4	0.2202	18.61	9.75	28.36	52.81	-24.45	AVG	P
5	0.4269	23.69	9.77	33.46	57.31	-23.85	QP	P
6	0.4269	13.25	9.77	23.02	47.31	-24.29	AVG	P
7	4.5717	16.57	9.91	26.48	56.00	-29.52	QP	P
8	4.5717	8.25	9.91	18.16	46.00	-27.84	AVG	P

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**B: Disturbance Voltage Limits at mains on Neutral terminals (150kHz to 30MHz)**

**EUT Operating Environment**

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

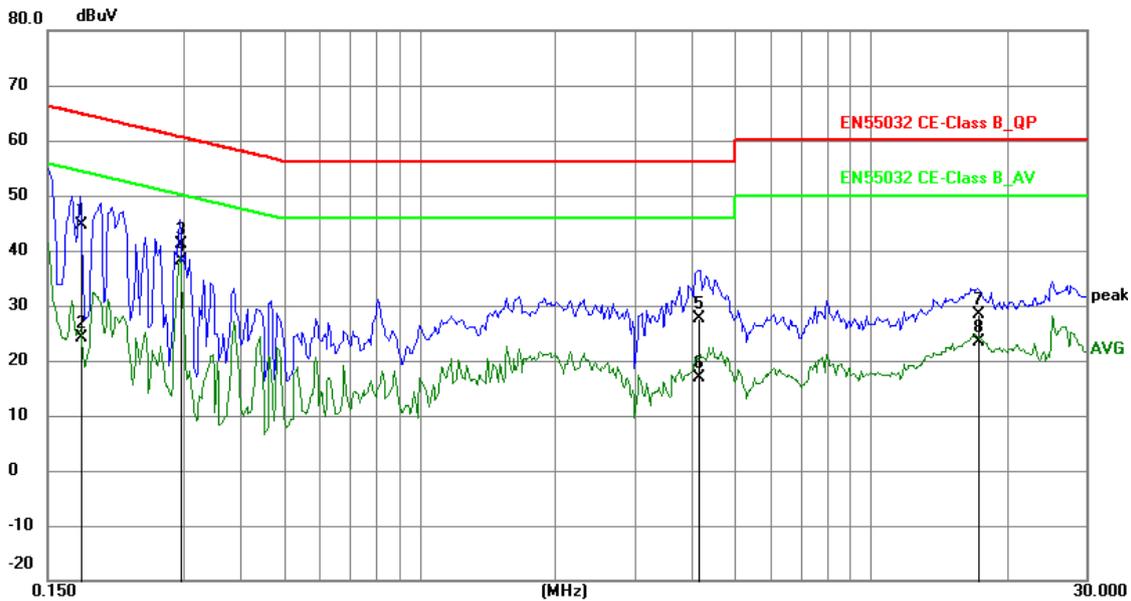
**EUT set Condition: Wired Operation Mode**

**Power: AC230V/50Hz**

**Equipment Level: Class B**

**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	0.1773	34.82	9.77	44.59	64.61	-20.02	QP	P
2	0.1773	14.33	9.77	24.10	54.61	-30.51	AVG	P
3	0.2943	31.31	9.76	41.07	60.40	-19.33	QP	P
4	0.2943	28.25	9.76	38.01	50.40	-12.39	AVG	P
5	4.1388	17.84	9.89	27.73	56.00	-28.27	QP	P
6	4.1388	6.96	9.89	16.85	46.00	-29.15	AVG	P
7	17.1999	17.89	10.51	28.40	60.00	-31.60	QP	P
8	17.1999	12.77	10.51	23.28	50.00	-26.72	AVG	P

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**C: Disturbance Voltage Limits at mains on Live terminals (150kHz to 30MHz)**

**EUT Operating Environment**

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

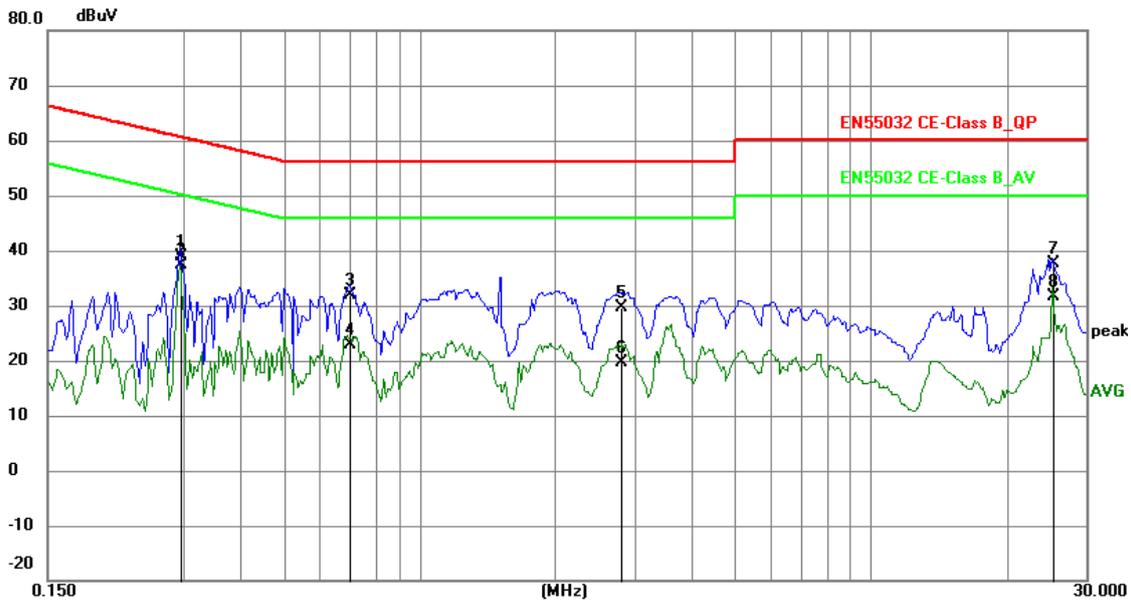
**EUT set Condition: Charging**

**Power: AC230V/50Hz**

**Equipment Level: Class B**

**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	29.02	9.76	38.78	60.40	-21.62	QP	P
2	0.2943	27.55	9.76	37.31	50.40	-13.09	AVG	P
3	0.6999	22.06	9.78	31.84	56.00	-24.16	QP	P
4	0.6999	13.12	9.78	22.90	46.00	-23.10	AVG	P
5	2.7864	19.76	9.83	29.59	56.00	-26.41	QP	P
6	2.7864	9.81	9.83	19.64	46.00	-26.36	AVG	P
7	25.2300	26.73	11.00	37.73	60.00	-22.27	QP	P
8	25.2300	20.56	11.00	31.56	50.00	-18.44	AVG	P

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**D: Disturbance Voltage Limits at mains on Neutral terminals (150kHz to 30MHz)**

**EUT Operating Environment**

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

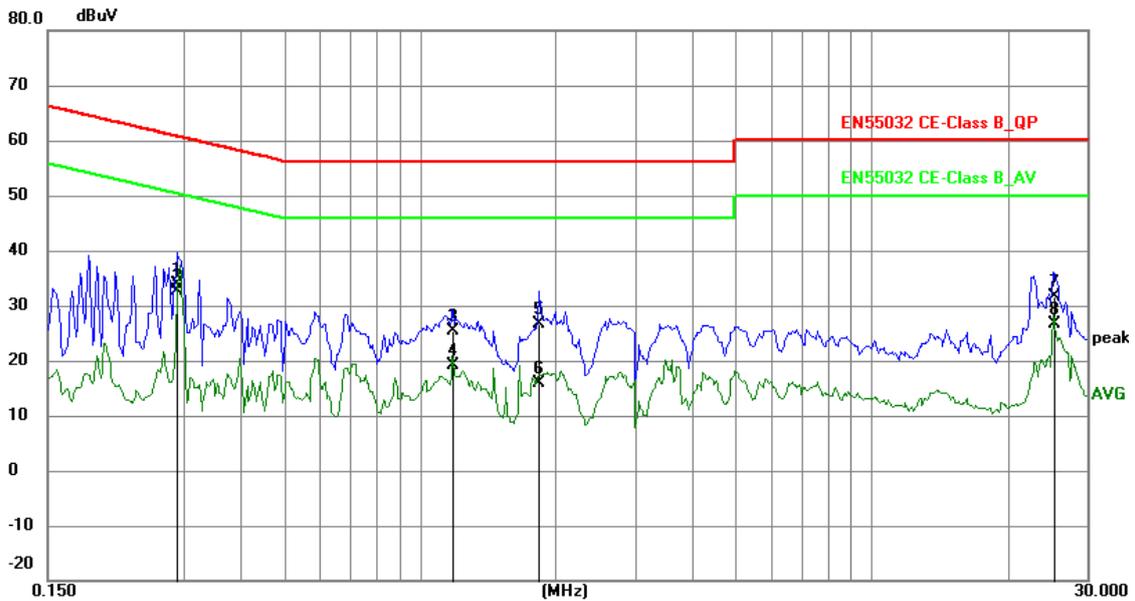
**EUT set Condition: Charging**

**Power: AC230V/50Hz**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual



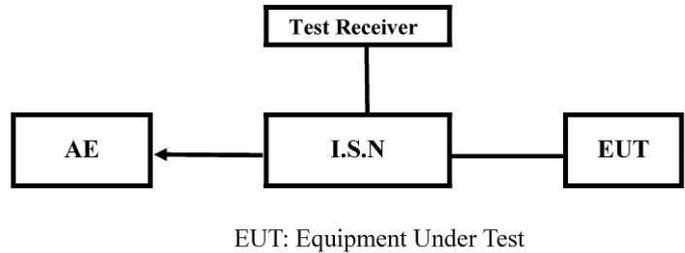
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1734	29.32	9.77	39.09	64.80	-25.71	QP	P
2	0.1734	11.22	9.77	20.99	54.80	-33.81	AVG	P
3	0.2163	24.01	9.75	33.76	62.96	-29.20	QP	P
4	0.2163	8.89	9.75	18.64	52.96	-34.32	AVG	P
5	1.8231	15.57	9.80	25.37	56.00	-30.63	QP	P
6	1.8231	8.61	9.80	18.41	46.00	-27.59	AVG	P
7	11.9154	21.69	10.24	31.93	60.00	-28.07	QP	P
8	11.9154	15.86	10.24	26.10	50.00	-23.90	AVG	P

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## 4.2 Telecommunication ports Conducted Emission Test

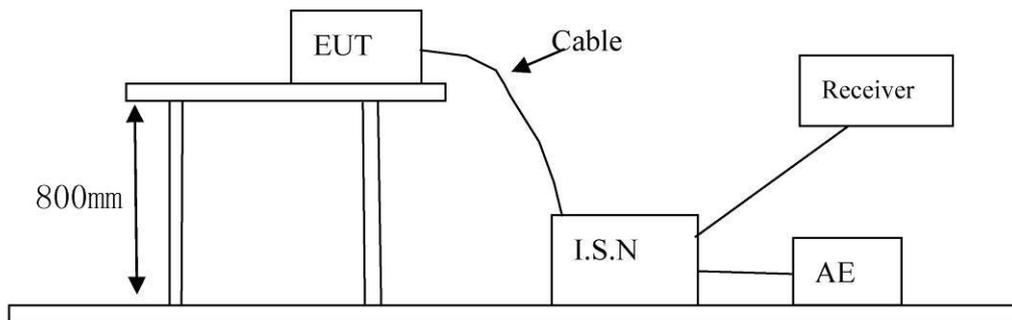
### 4.2.1 Schematics of the test



### 4.2.2 Test Method:

The test was performed in accordance with EN 55032:2015+A11:2020+A1:2020

#### Block diagram of Test setup



### 4.2.3 Telecommunication ports conducted Emission Limit

Frequency (MHz)	Class A Limits				Class B Limits			
	Quasi-peak Level		Average Level		Quasi-peak Level		Average Level	
	Voltage dB(uV)	Current dB(uA)	Voltage dB(uV)	Current dB(uA)	Voltage dB(uV)	Current dB(uA)	Voltage dB(uV)	Current dB(uA)
0.15 ~ 0.50	97 to 87	53 to 43	87 to 74	40 to 30	84 to 74	40 to 30	74 to 64	30 to 20
0.50 ~ 30.00	87	43	74	30	74	30	64	20

Notes: 1.\*decreasing linearly with logarithm of frequency.  
 2.The tighter limit shall apply at the transition frequencies

### 4.2.4 Test Results: N/A

Limits for Conducted Emission test, please refer to limit line (Quasi-peak) and Average in the following diagram labelled as (QP)&AV

#### Remark:

Calculated measurement uncertainty=1.9dB

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**A: Conducted Emission on Telecommunication port (150kHz to 30MHz)**

**EUT Operating Environment**

Temperature: 25°C      Humidity: 75 %RH      Atmospheric Pressure: 101 kPa

**EUT set Condition: Normal operation mode**

**Equipment Level: Class B**

**Results: N/A**

Please refer to following diagram for individual

Frequency (MHz)	Port	Reading(dBμV)		Limit(dBμV)	
		Quasi-peak	Average	Quasi-peak	Average

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**B: Conducted Emission on Telecommunication port (150kHz to 30MHz)**

**EUT Operating Environment**

Temperature: 25°C      Humidity: 75 %RH      Atmospheric Pressure: 101 kPa

**EUT set Condition: Normal operation mode**

**Equipment Level: Class B**

**Results: N/A**

Please refer to following diagram for individual

Frequency (MHz)	Port	Reading(dBμA)		Limit(dBμA)	
		Quasi-peak	Average	Quasi-peak	Average

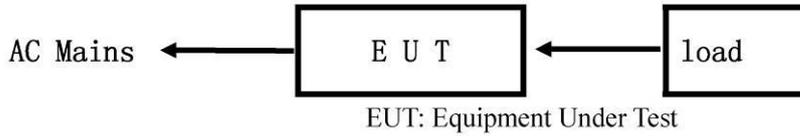
**Note: This test item is not applicable because there is no telecommunication port**

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**4.3 Radiated Disturbance Test**

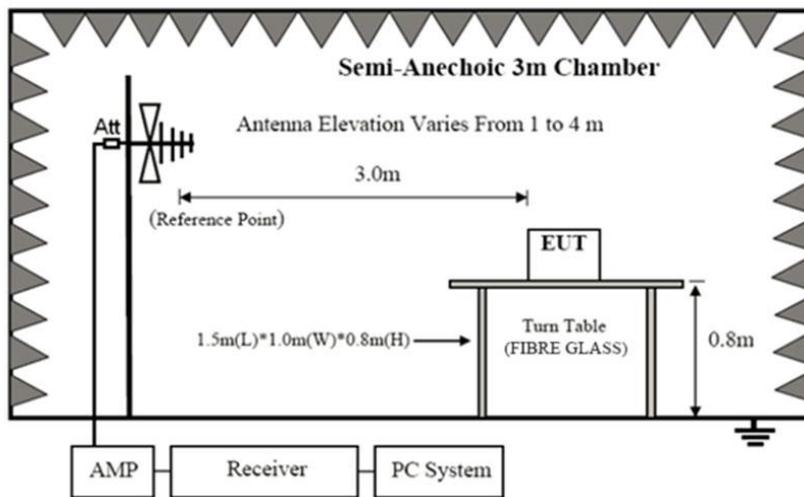
**4.3.1 Schematics of the test**



**4.3.2 Test Method:**

The test was performed in accordance with EN 55032:2015+A11:2020+A1:2020

**Block diagram of Test setup**



**4.3.3 Radiated Disturbance Test Limit**

Frequency Range (MHz)	Quasi-Peak limits (dB $\mu$ V/m)	
	Class A Limits	Class B Limits
30-230	50.00	40.00
230-1000	57.00	47.00
1000-3000	56(AV)/76(PK)	50(AV)/70(PK)
3000-6000	60(AV)/80(PK)	54(AV)/74(PK)

Note: The lower limit shall apply at the transition frequencies

**4.3.4 Test result**

Limits for Radiated Disturbance test, please refer to limit line (Quasi-peak) in the following diagram labelled as (QP)

**Remark:**

Calculated measurement uncertainty=4.7dB

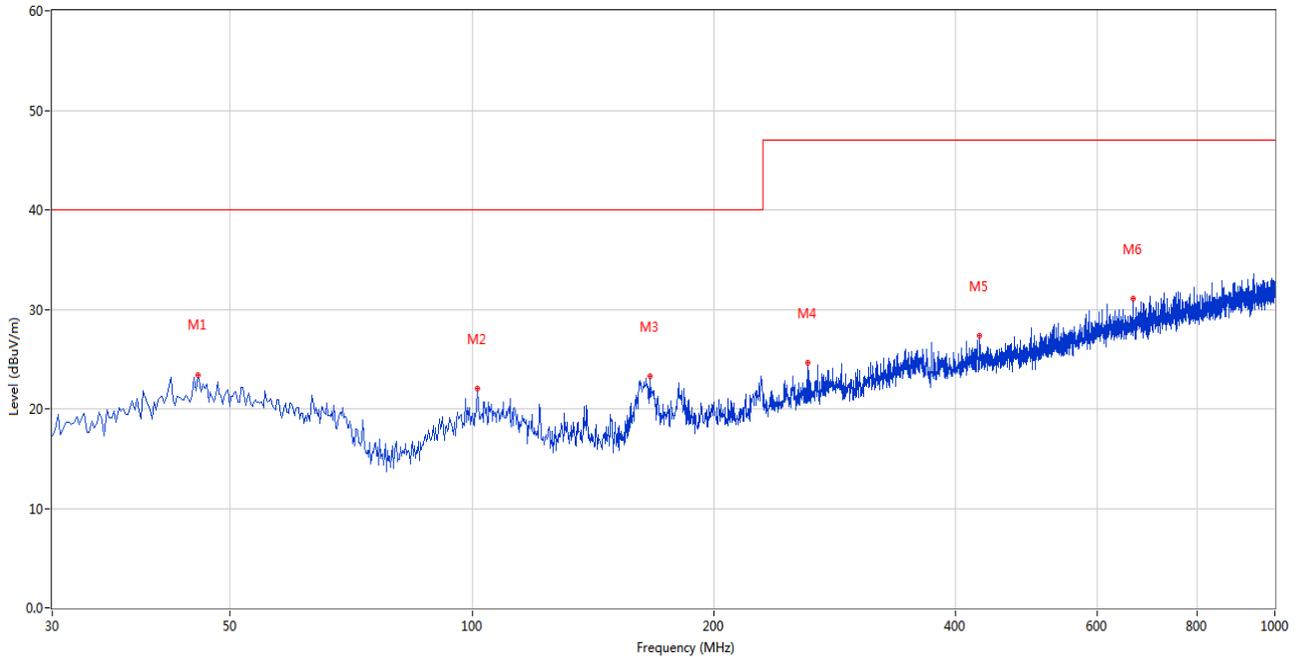
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**A: Radiated Disturbance (30MHz----1000MHz)**

Project Number:	CASE3	Test Time:	2024-09-13_14.00.46
EUT Name:	3-MODES 98 KEY GASKET HOT-SWAPPABLE RGB MECHANICAL KEYBOARD	Test Engineer:	CHASE
Manufacturer:	Eastern Times Technology Co., Ltd	Test Standard:	EN 55032
Model:	K686WB-RGB-PRO	Work Addition:	Charging
Temp.(°C):	25	Load:	
Hum.:	65%	Test Voltage:	230V~, 50Hz

CE\_EN 55032 Class B 30MHz-1GHz



No	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	45.516	23.42	-11.39	40.0	16.58	Peak	210.00	100	Horizontal	Pass
2	101.520	22.03	-13.44	40.0	17.97	Peak	323.00	100	Horizontal	Pass
3	166.736	23.23	-16.06	40.0	16.77	Peak	75.00	100	Horizontal	Pass
4	262.014	24.66	-11.90	47.0	22.34	Peak	325.00	100	Horizontal	Pass
5	428.328	27.37	-8.07	47.0	19.63	Peak	190.00	100	Horizontal	Pass
6	666.161	31.10	-4.50	47.0	15.90	Peak	52.00	100	Horizontal	Pass

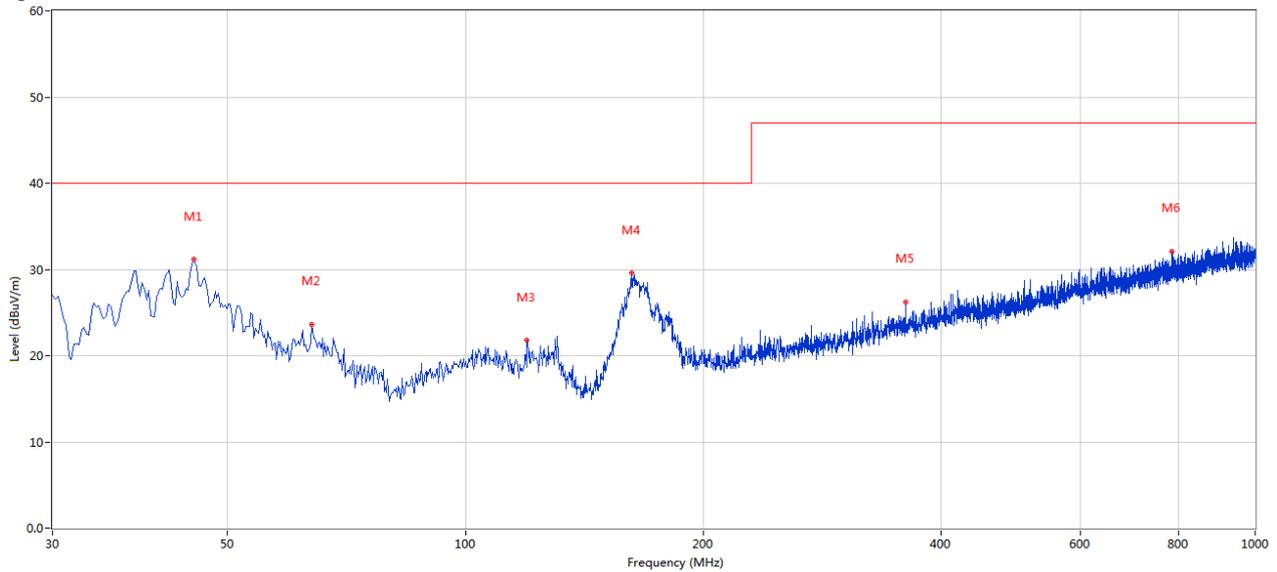
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**B: Radiated Disturbance (30MHz----1000MHz)**

Project Number:	CASE3	Test Time:	2024-09-13_14.02.27
EUT Name:	3-MODES 98 KEY GASKET HOT-SWAPPABLE RGB MECHANICAL KEYBOARD	Test Engineer:	CHASE
Manufacturer:	Eastern Times Technology Co., Ltd	Test Standard:	EN 55032
Model:	K686WB-RGB-PRO	Work Addition:	Charging
Temp.(°C):	25	Load:	
Hum.:	65%	Test Voltage:	230V~, 50Hz

CE\_EN 55032 Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	45.274	31.14	-11.40	40.0	8.86	Peak	280.00	100	Vertical	Pass
2	63.942	23.66	-13.32	40.0	16.34	Peak	358.00	100	Vertical	Pass
3	119.703	21.78	-15.26	40.0	18.22	Peak	38.00	100	Vertical	Pass
4	162.372	29.58	-16.39	40.0	10.42	Peak	88.00	100	Vertical	Pass
5	360.445	26.26	-9.50	47.0	20.74	Peak	289.00	100	Vertical	Pass
6	784.229	32.14	-3.08	47.0	14.86	Peak	97.00	100	Vertical	Pass

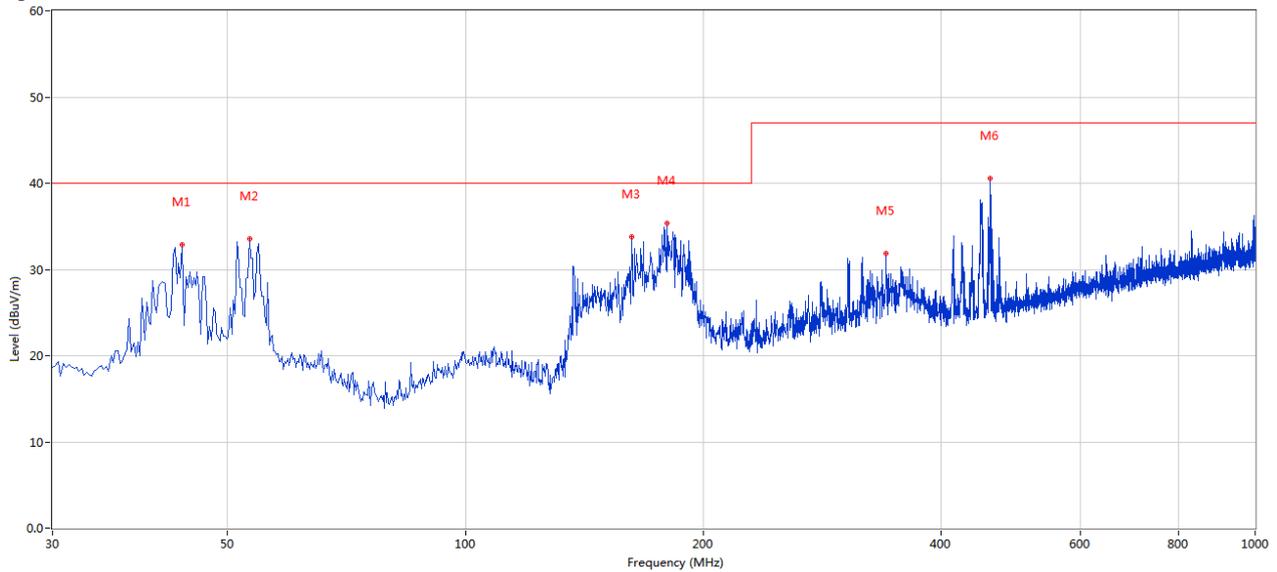
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**C: Radiated Disturbance (30MHz----1000MHz)**

Project Number:	CASE3	Test Time:	2024-09-13_14.10.13
EUT Name:	3-MODES 98 KEY GASKET HOT-SWAPPABLE RGB MECHANICAL KEYBOARD	Test Engineer:	CHASE
Manufacturer:	Eastern Times Technology Co., Ltd	Test Standard:	EN 55032
Model:	K686WB-RGB-PRO	Work Addition:	Wired Operation Mode
Temp.(°C):	25	Load:	
Hum.:	65%	Test Voltage:	DC5.0V

CE\_EN 55032 Class B 30MHz-1GHz



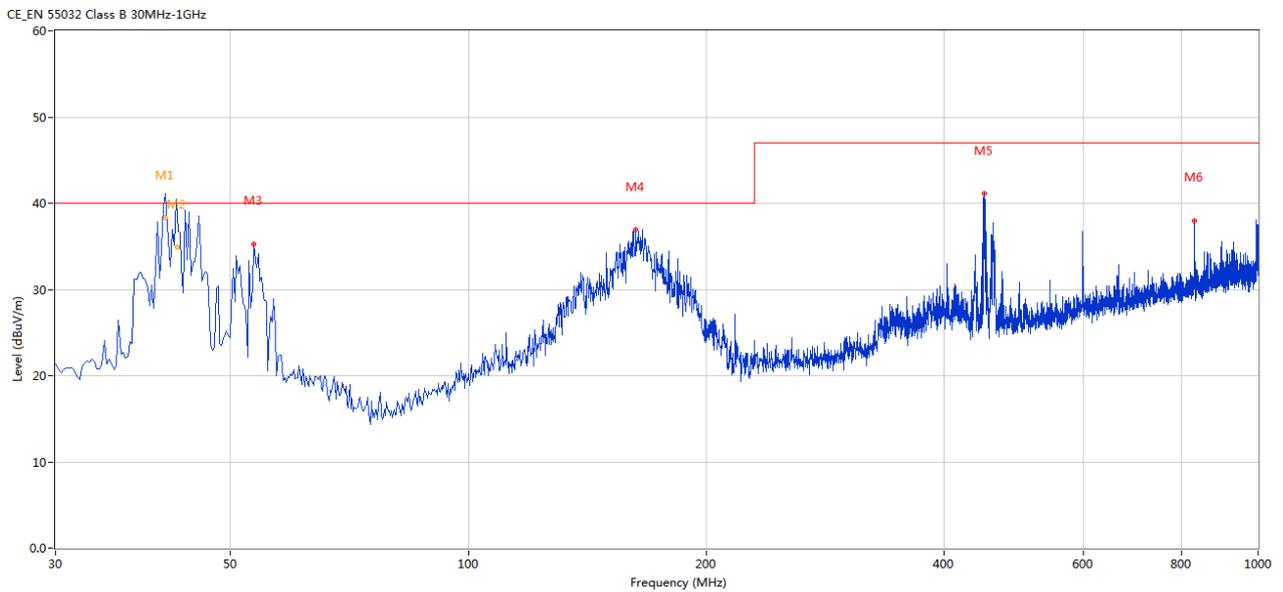
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	43.819	32.87	-11.48	40.0	7.13	Peak	331.00	100	Horizontal	Pass
2	53.274	33.56	-11.51	40.0	6.44	Peak	329.00	100	Horizontal	Pass
3	162.614	33.75	-16.38	40.0	6.25	Peak	287.00	100	Horizontal	Pass
4	180.070	35.35	-15.31	40.0	4.65	Peak	258.00	100	Horizontal	Pass
5	341.292	31.83	-9.73	47.0	15.17	Peak	24.00	100	Horizontal	Pass
6	461.300	40.59	-7.84	47.0	6.41	Peak	169.00	100	Horizontal	Pass

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**D: Radiated Disturbance (30MHz----1000MHz)**

Project Number:	CASE3	Test Time:	2024-09-13_14.08.32
EUT Name:	3-MODES 98 KEY GASKET HOT-SWAPPABLE RGB MECHANICAL KEYBOARD	Test Engineer:	CHASE
Manufacturer:	Eastern Times Technology Co., Ltd	Test Standard:	EN 55032
Model:	K686WB-RGB-PRO	Work Addition:	Wired Operation Mode
Temp.(°C):	25	Load:	
Hum.:	65%	Test Voltage:	DC5.0V



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1*	41.311	38.28	-11.91	40.0	1.72	QP	287.00	101	Vertical	Pass
2*	42.768	34.91	-11.55	40.0	5.09	QP	264.00	102	Vertical	Pass
3	53.517	35.23	-11.52	40.0	4.77	Peak	281.00	100	Vertical	Pass
4	163.099	36.96	-16.36	40.0	3.04	Peak	194.00	100	Vertical	Pass
5	449.663	41.11	-8.01	47.0	5.89	Peak	166.00	100	Vertical	Pass
6	829.565	38.00	-2.89	47.0	9.00	Peak	328.00	100	Vertical	Pass

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Harmonic order n	Maximum permissible harmonic current A
<b>Odd harmonics</b>	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq n \leq 39$	$0,15 \frac{15}{n}$
<b>Even harmonics</b>	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

**4.4.4 Test Results**

Please refer to the following pages

**Harmonic Current Emission Test**

**EUT Operating Environment**

Temperature: 25°C      Humidity: 53%RH      Atmospheric Pressure: 101 kPa

**EUT set Condition:**

**Results: N/A**

N/A ---the input power less than 75W.

Please refer to following diagram for individual

Harmonic results as a% of the limits

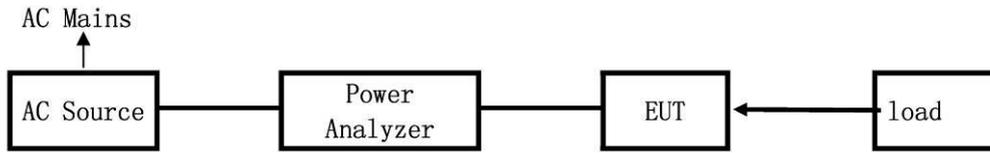
No	(Test result/Limit) %						
1		11		21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

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#### 4.5 Voltage Fluctuations & Flicker Test

##### 4.5.1 Schematic of the test

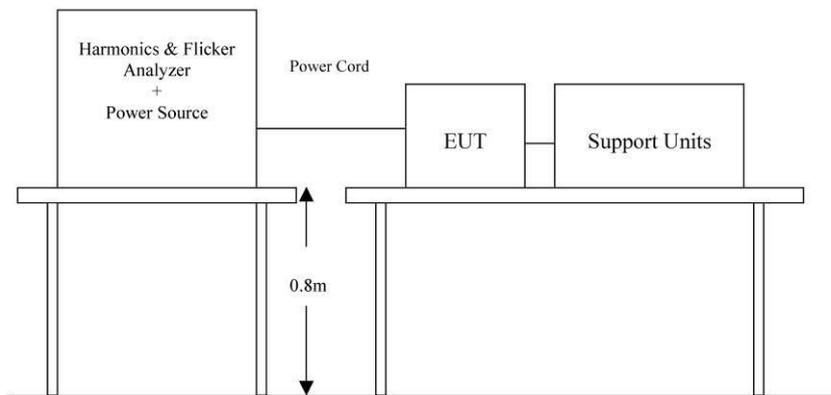


EUT: Equipment Under Test

##### 4.5.2 Test Method:

The test was performed in accordance with EN 61000-3-3:2013+A2:2021+AC:2022-01

##### Block diagram of Test setup



##### 4.5.3 Test Results

Result: N/A

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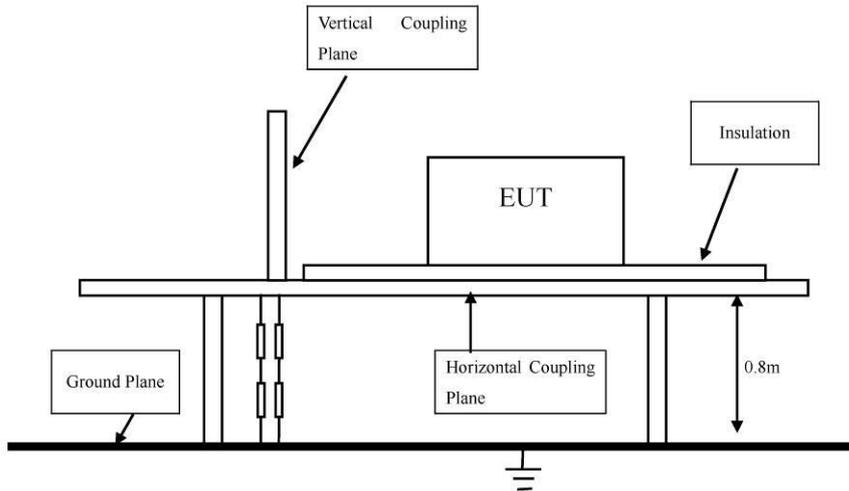
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**5.0 Immunity Test**

**5.1 Electrostatic Discharge**

**5.1.1 Schematic of the test**



**5.1.2 Test method**

The test was performed in accordance with EN 61000-4-2: 2009

**5.1.3 Test severity**

±4kV for direct & in-direct Contact Discharge

±8kV for air Discharge

Performance Criterion Require: **B** (Please see following table)

**5.1.4 Susceptibility performance Criteria and Severity level**

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

**Severity Level**

Level	Test Voltage Direct & in-direct contact Discharge (kV)	Test Voltage Air discharge(kV)
1	±2kV	±2kV
2	±4kV	±4kV
3	±6kV	±8kV
4	±8kV	±15kV

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

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### 5.1.5 Test Result

#### EUT Operating Environment

Temperature: 25°C      Humidity: 53%RH      Atmospheric Pressure: 101 kPa

Please refer to the following table for individual results.

Location	Discharge Method	Test Voltage	Results
HCP (Horizontal coupling plane)	In-Direct	$\pm 2\text{kV}, \pm 4\text{kV}$	Pass
VCP (Vertical Coupling Plane)	In-Direct	$\pm 2\text{kV}, \pm 4\text{kV}$	Pass
Type-C Port	Contact Discharge	$\pm 2\text{kV}, \pm 4\text{kV}$	Pass
Screw	Contact Discharge	$\pm 2\text{kV}, \pm 4\text{kV}$	Pass
Enclosure	Air Discharge	$\pm 2\text{kV}, \pm 4\text{kV}, \pm 8\text{kV}$	Pass
Keys	Air Discharge	$\pm 2\text{kV}, \pm 4\text{kV}, \pm 8\text{kV}$	Pass
Switch	Air Discharge	$\pm 2\text{kV}, \pm 4\text{kV}, \pm 8\text{kV}$	Pass
Indicator Light	Air Discharge	$\pm 2\text{kV}, \pm 4\text{kV}, \pm 8\text{kV}$	Pass
Gaps	Air Discharge	$\pm 2\text{kV}, \pm 4\text{kV}, \pm 8\text{kV}$	Pass

**Remark:** Calculated measurement uncertainty= 0.2kV

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

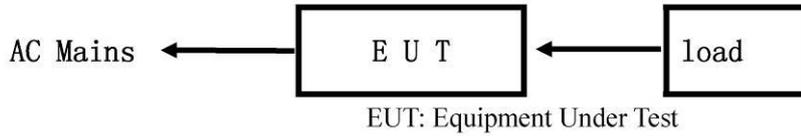
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**5.2 RF field strength susceptibility (80MHz-1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz)**

**5.2.1 Schematics of the test**



**5.2.2 Test Method:**

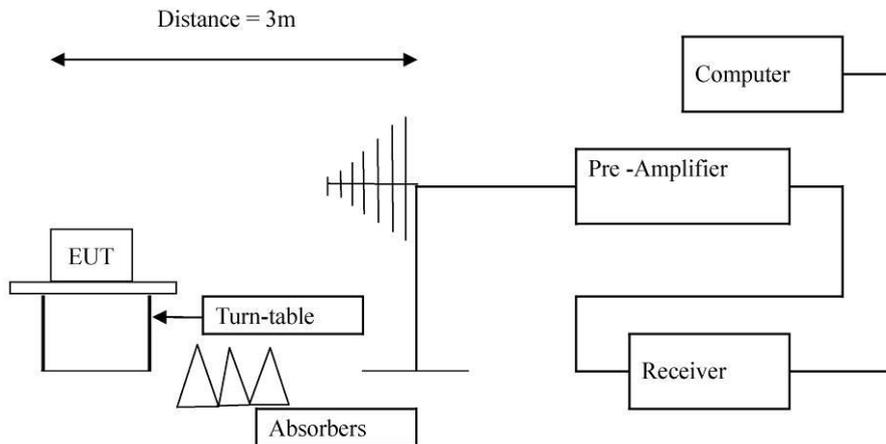
The test was performed in accordance with EN IEC 61000-4-3:2020

Severity: Level 2 (3V/m)

Modulation: 80% AM

Performance Criterion Require: A (Please see following table)

**Block diagram of Test setup**



**5.2.3 Susceptibility performance Criteria and severity Level**

Susceptibility performance Criteria

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

**Severity Level**

Level	Field Strength (V/m)
1	1
2	3
3	10

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**5.2.4 Test Result:**

**EUT Operating Environment**

Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 kPa

Please refer to the following table for individual results.

Frequency (MHz)	Face	Polarity	Level (V/m)	Dwell Time(s)	Sweep Rate (%)	Results
80-1000	0°	Horizontal	3	1	1	Pass
80-1000	90°	Horizontal	3	1	1	Pass
80-1000	180°	Horizontal	3	1	1	Pass
80-1000	270°	Horizontal	3	1	1	Pass
80-1000	0°	Vertical	3	1	1	Pass
80-1000	90°	Vertical	3	1	1	Pass
80-1000	180°	Vertical	3	1	1	Pass
80-1000	270°	Vertical	3	1	1	Pass
1800, 2600, 3500, 5000	0°	Horizontal	3	1	1	Pass
	90°	Horizontal	3	1	1	Pass
	180°	Horizontal	3	1	1	Pass
	270°	Horizontal	3	1	1	Pass
1800, 2600, 3500, 5000	0°	Vertical	3	1	1	Pass
	90°	Vertical	3	1	1	Pass
	180°	Vertical	3	1	1	Pass
	270°	Vertical	3	1	1	Pass

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**5.3 Electrical Fast Transient/Burst (EFT/B) immunity test**

**5.3.1 Schematics of the test**



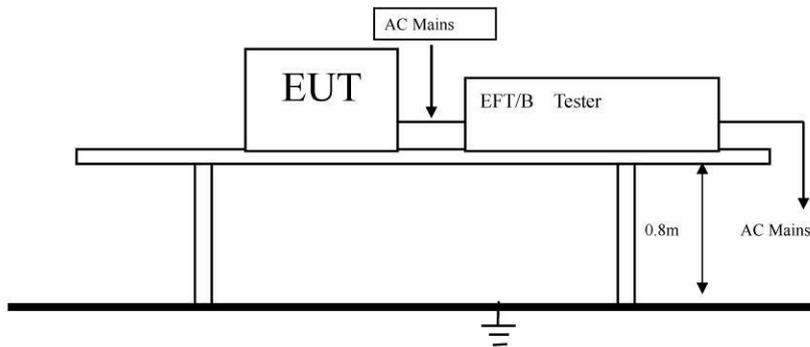
**5.3.2 Test Method**

The test was performed in accordance with EN 61000-4-4:2012

Severity: Level 2 (1kV)

Performance Criterion Require: **B** (Please see following table)

**Block diagram of Test setup**



**5.3.3 Susceptibility performance Criteria and Severity Level**

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

**Severity Level**

Level	Open Circuit output Test Voltage $\pm 10\%$	
	On power Supply Lines	On I/O (Input/output) Signal data and control lines
1	0.5kV	0.5kV
2	1kV	1kV
3	2kV	2kV
4	4kV	4kV
X	Special	Special

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### 5.3.4 Test Results

#### EUT Operating Environment

Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 kPa

Please refer to the following table for individual results.

Inject location: AC mains

Inject Line	Voltage kV	Inject Times (s)	Method	Results
L	± 1	120	Direct	Pass
N	± 1	120	Direct	Pass
L-N	± 1	120	Direct	Pass

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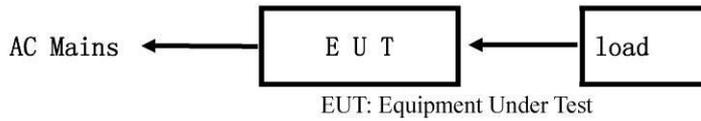
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**5.4 Surge test**

**5.4.1 Schematics of the test**



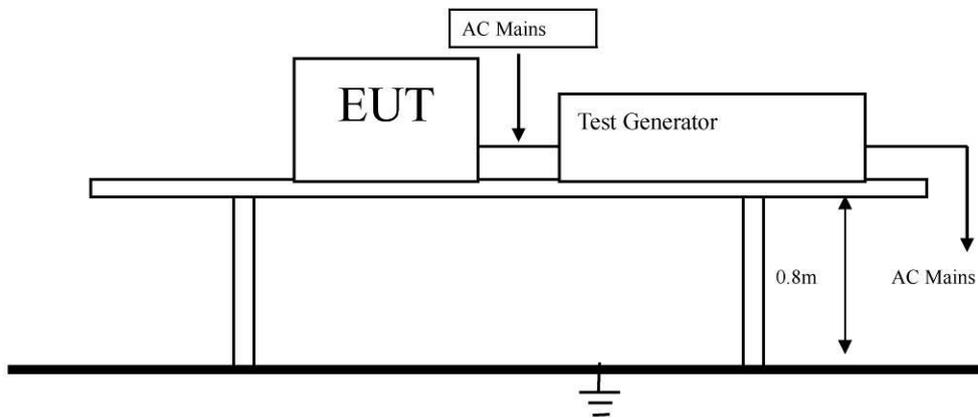
**5.4.2 Test Method:**

The test was performed in accordance with EN 61000-4-5:2014

Severity: Level 2 (Line to Neutral at 1kV)

Performance Criterion Require: B (Please see following table)

**Block diagram of Test setup**



**5.4.3 Susceptibility performance Criteria and Severity Level**

Susceptibility performance Criteria

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

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Severity Level

Severity Level	Open-Circuit Test Voltage kV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

**5.4.4 Test Results**

**EUT Operating Environment**

Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 kPa

Please refer to the following table for individual results.

Test location:

Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage(kV)	Results
L-N	+	90	5	1.0	Pass
	-	270	5	1.0	Pass

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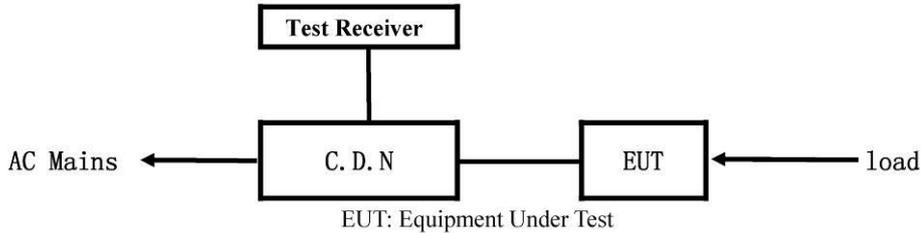
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**5.5 Conducted Immunity test**

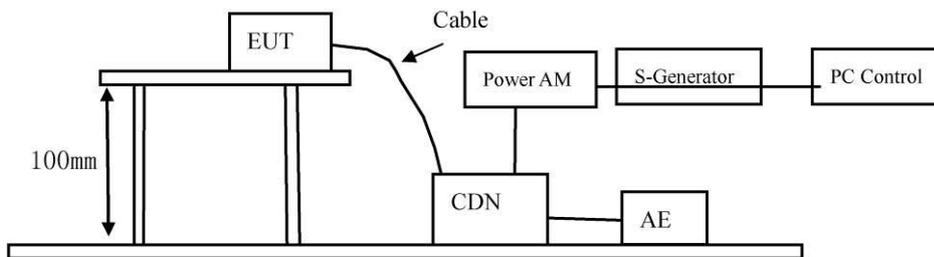
**5.5.1 Schematics of the test**



**5.5.2 Test Method**

The test was performed in accordance with EN 61000-4-6:2014  
 Severity: Level 2 (3 V rms),0.15MHz—80MHz  
 Performance Criterion Require: A (Please see following table)

**Block diagram of Test setup**



**5.5.3 Susceptibility performance Criteria and Severity Level**

Susceptibility performance Criteria

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

Severity Level

Severity Level	Voltage Level (e.m.f) V
1	1
2	3
3	10
*	Special

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#### 5.5.4 Test Results:

##### EUT Operating Environment

Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 KPa

Please refer to the following table for individual results.

Frequency Range (MHz)	Injected Position	Strength	Criterion	Result
0.15 - 10	C Line	3V (rms)	A	Pass
10 - 30	AC Line	3 to 1V (rms)	A	Pass
30 - 80	AC Line	1V (rms)	A	Pass

Note: the amplitude of a test level varies over a given frequency range, it changes linearly with respect to the logarithm of the frequency

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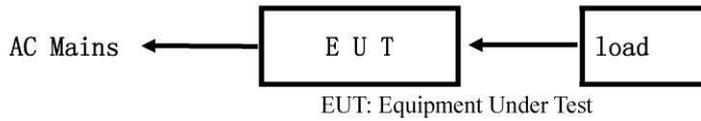
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**5.6 Power-Frequency magnetic field test**

**5.6.1 Schematics of the test**



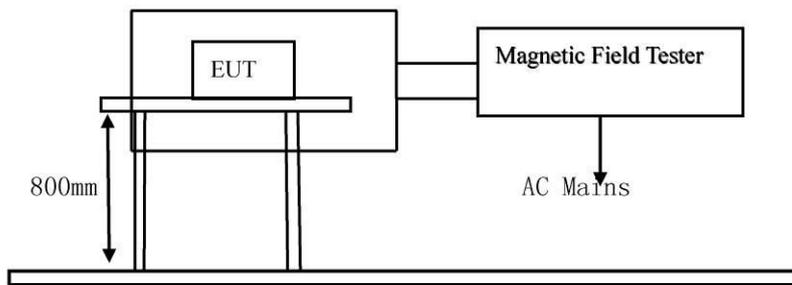
**5.6.2 Test Method**

The test was performed in accordance with EN 61000-4-8:2010

Severity: Level 1 (1A/m),

Performance Criterion Require: A (Please see following table)

**Block diagram of Test setup**



**5.6.3 Susceptibility performance Criteria and Severity Level**

Susceptibility performance Criteria

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
<b>C</b>	Loss of function allowed during the test, provided that function is self recoverable or can be recovered by operation of controls.

Severity Level

Severity Level	Magnetic Field Strength A/m
1	1
2	3
3	10
4	30
5	100
*	Special

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**5.6.4 Test Results:**

**EUT Operating Environment**

Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 kPa

Please refer to the following table for individual results.

Test Level	Testing Duration	Coil Orientation	Criterion	Result
1A/m	5 Mins	X	A	N/A
1A/m	5 Mins	Y	A	N/A
1A/m	5 Mins	Z	A	N/A

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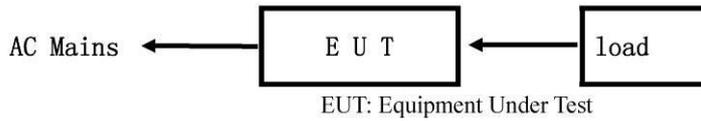
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**5.7 Voltage Dips/Interruptions immunity test**

**5.7.1 Schematics of the test**

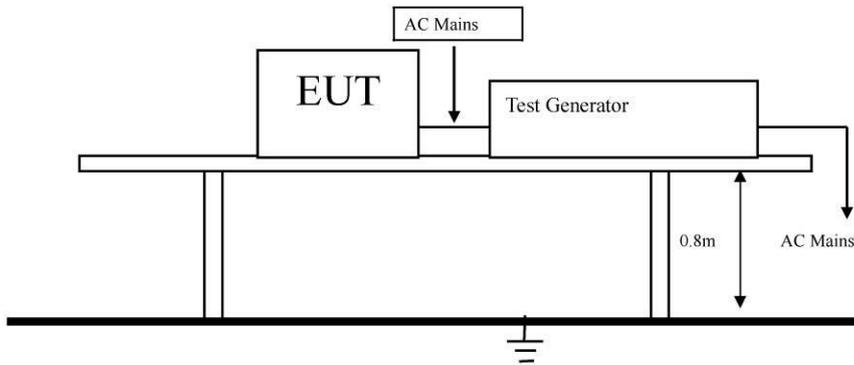


**5.7.2 Test Method:**

The test was performed in accordance with EN IEC 61000-4-11: 2020

Performance Criterion Require: C&B (Please see following table)

**Block diagram of Test setup**



**5.7.3 Susceptibility performance Criteria and Severity Level**

Susceptibility performance Criteria

Criterion	Description
<b>A</b>	No change in operational mode or degradation of performance outside of specification and no change in stored parameters.
<b>B</b>	Degradation of performance allowed during the test the EUT returning to intended operation after the test.
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Severity Level

Voltage Dip	Test Level %Ut	Reduction	Duration (Periods)	Performance Criteria
	<5	>95	0.5	B
	70	30	25	C
Voltage Interceptions	Test Level %Ut	Reduction	Duration (Periods)	Performance Criteria
	<5	>95	250	C

**5.7.4 Test Result:**

**EUT Operating Environment**

Temperature: 25°C      Humidity: 75%RH      Atmospheric Pressure: 101 kPa

Please refer to the following table for individual results.

Voltage Dip:

Test Level % Ut	Reduction	Duration (periods)	Phase Angle	Meet Criterion	Result
0	100	0.5	0° - 360°	B	Pass
70	30	25	0° - 360°	B	Pass

Voltage Interceptions:

Test Level % Ut	Reduction	Duration (periods)	Phase Angle	Meet Criterion	Result
0	100	250	0° - 360°	B	Pass

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## 6.0 Product Labelling

### 6.1 CE Mark label specification

Text of the mark is black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.



### 6.2 Mark Location: Rear enclosure

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Appendix:

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Conducted Emissions



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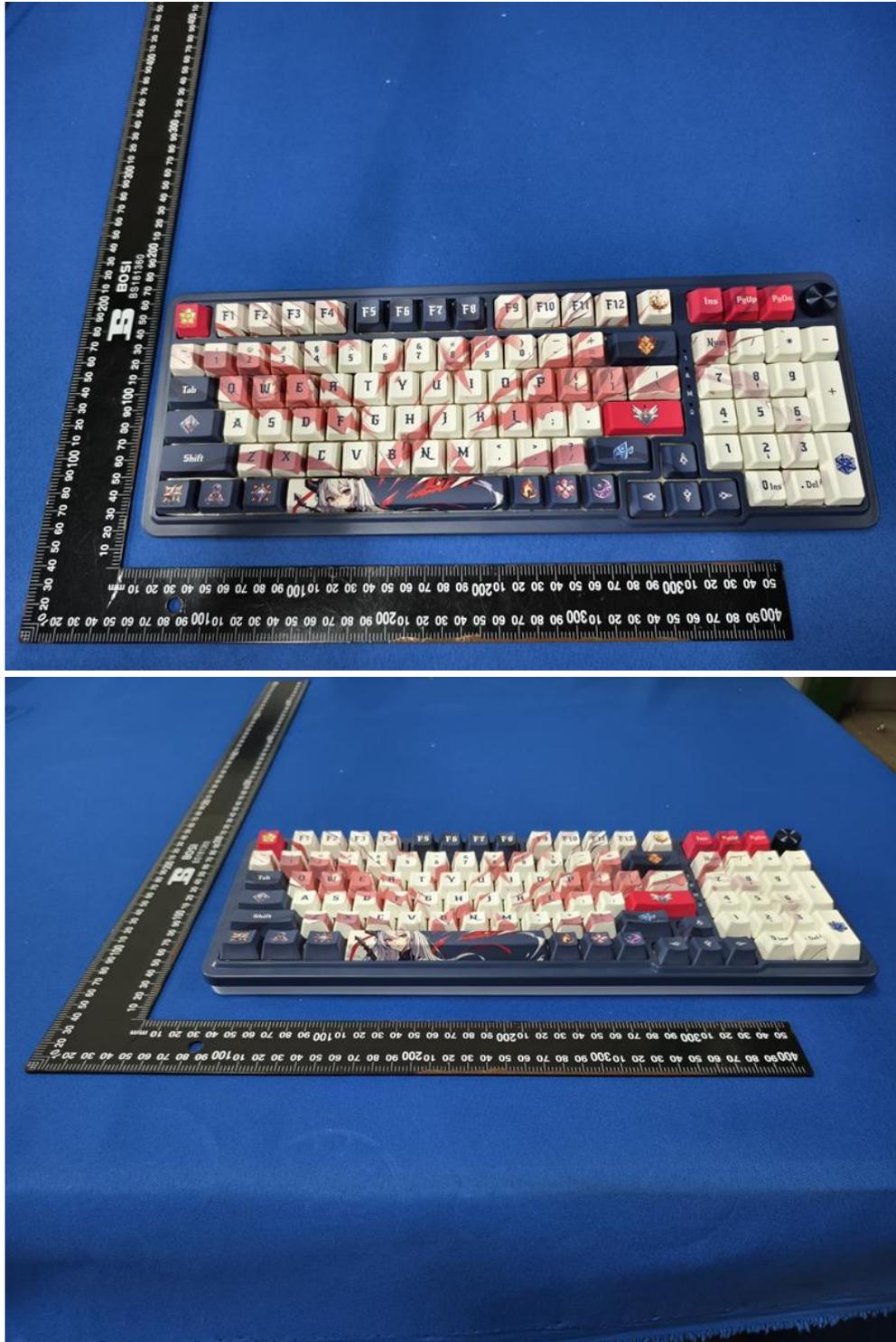
### Radiated Emissions



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Outside View-Keyboard



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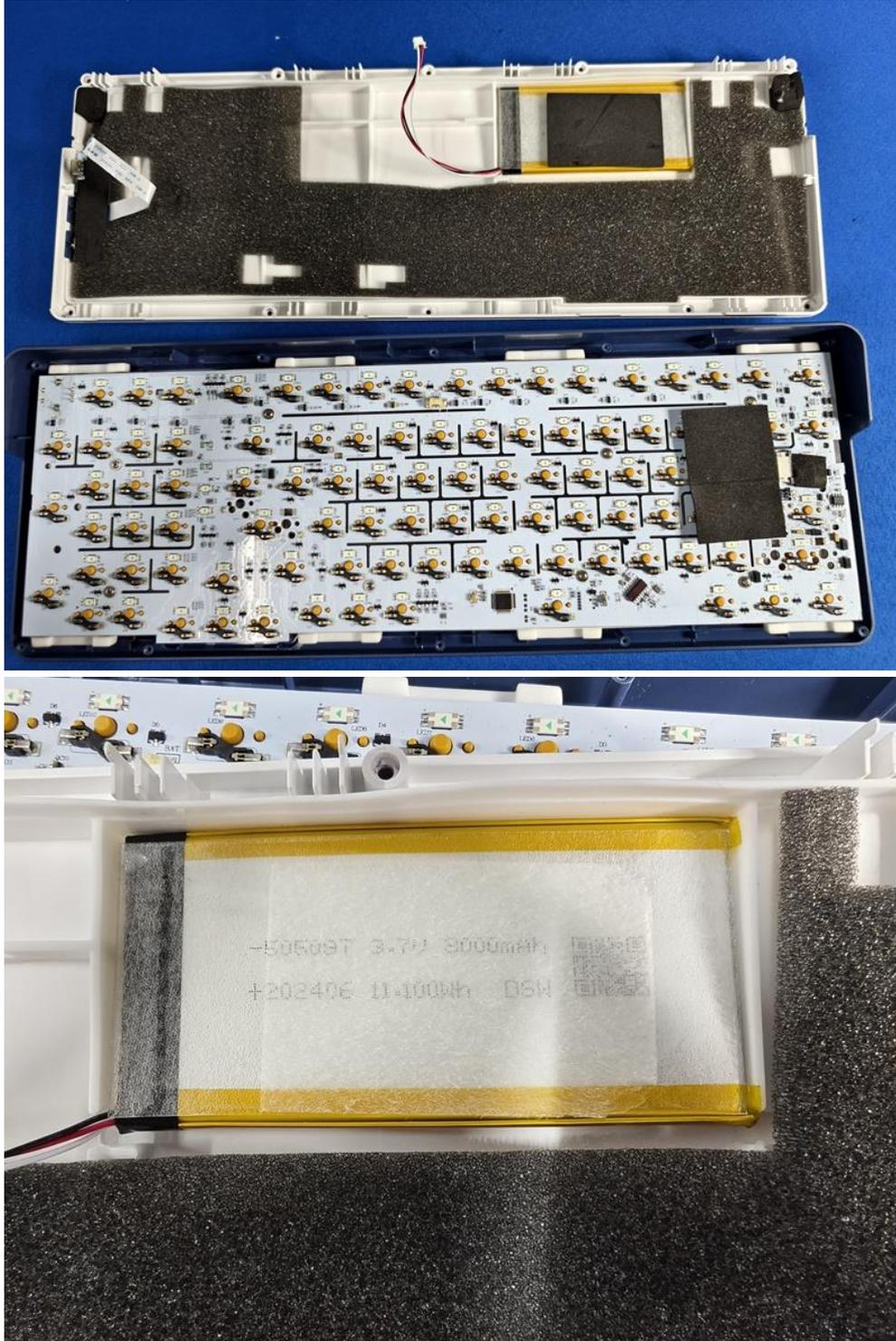
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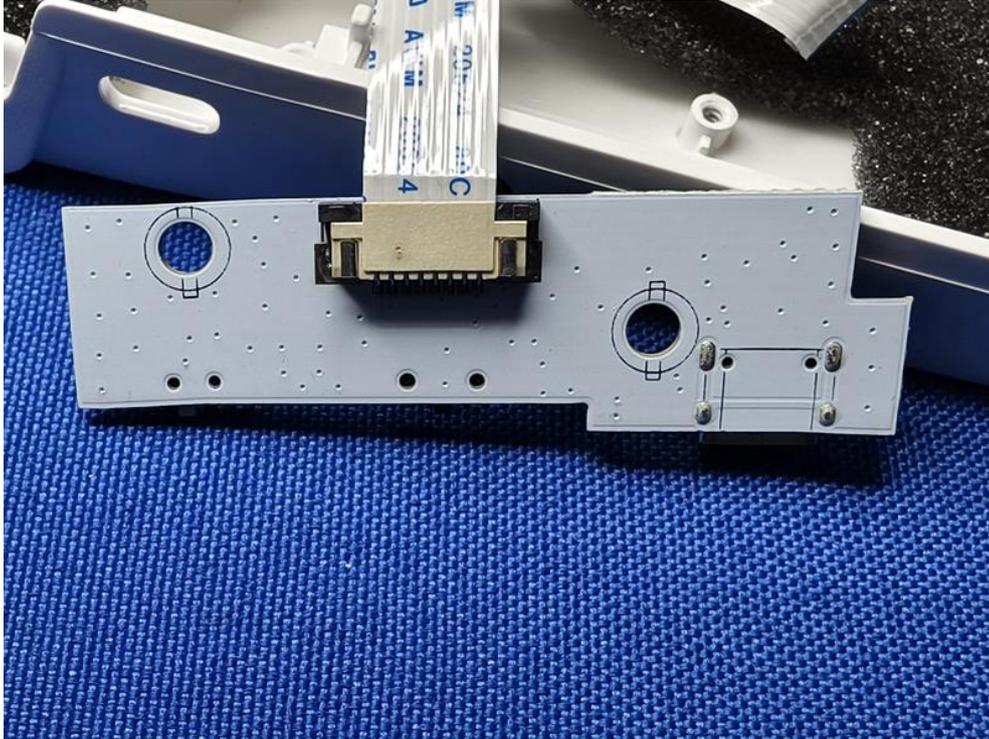


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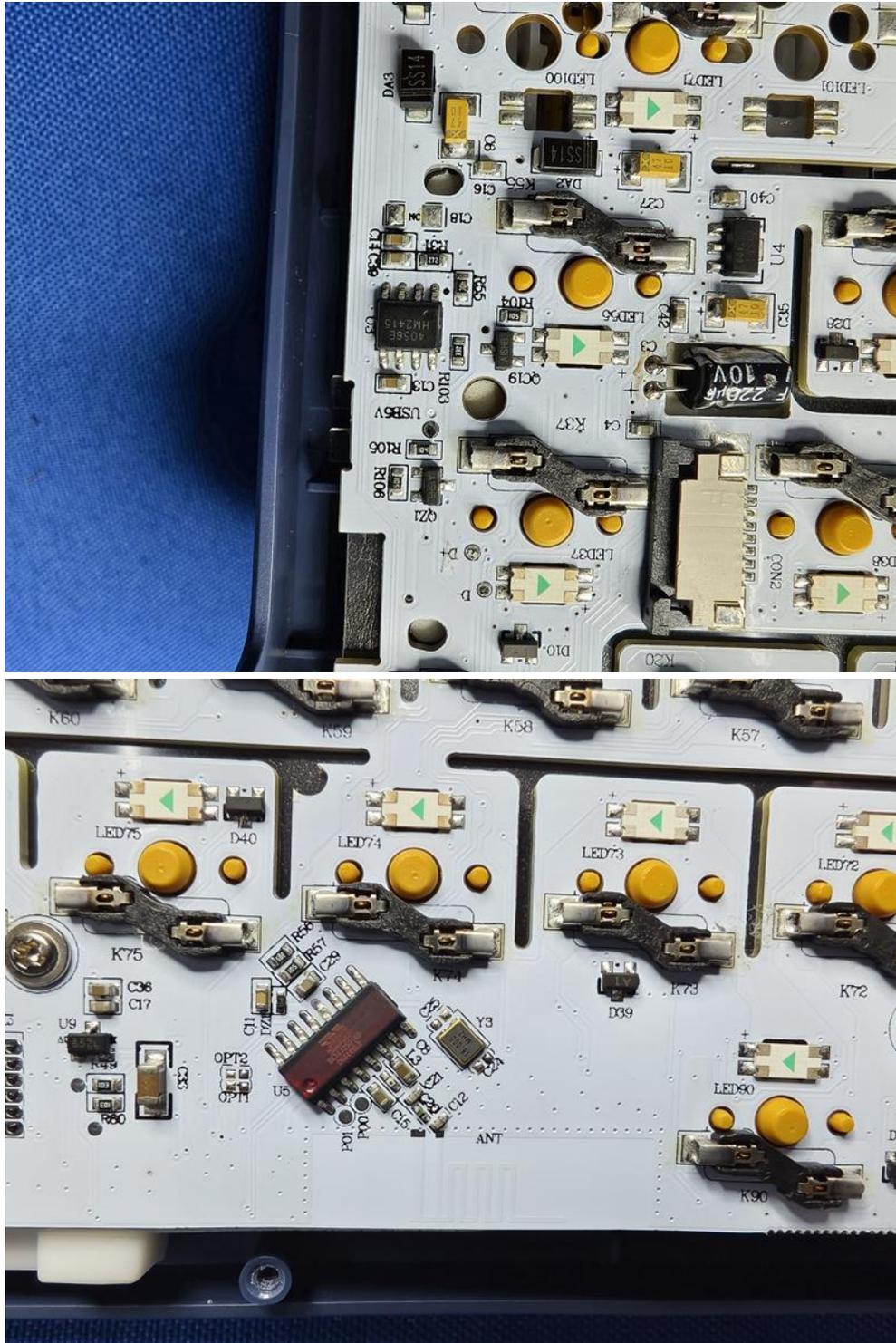
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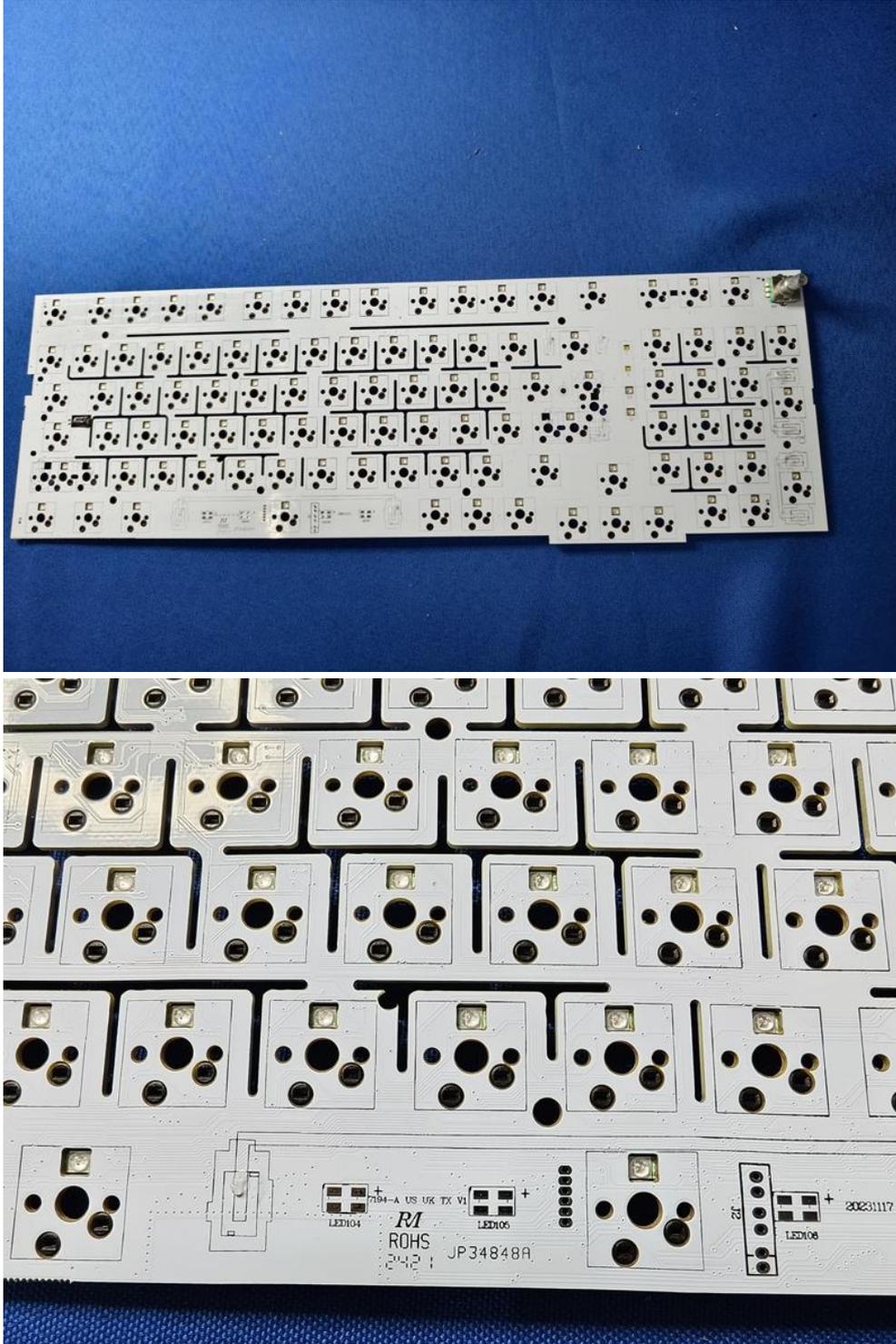
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**--End of the Report--**

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