



Report No.: TW2202145E

File Reference No.: 2022-03-11

Applicant: Kamoer Fluid Tech (Shanghai) Co., Ltd.

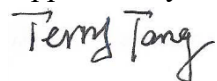
Product: X1 PRO T Stepper Micropump

Trademark: 

Model No.: X1 PRO T

Test Standards: FCC Part 15 Subpart B

Test Result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4&FCC Part 15 regulations for the evaluation of electromagnetic compatibility

Approved By  


Terry Tang

Manager

Dated: March 11, 2022

**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 Email: [info@timeway-lab.com](mailto:info@timeway-lab.com)



### **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

#### **CAB identifier: CN0033**

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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

### 1.2 Applicant Details

Applicant: Kamoer Fluid Tech (Shanghai) Co., Ltd.  
Address: 4th building, No79 Xiangjing Road, Songjiang District, Shanghai, China  
Telephone: +86-21-67742578  
Fax: --

### 1.3 Description of EUT

Product: X1 PRO T Stepper Micropump  
Manufacturer: Kamoer Fluid Tech (Shanghai) Co., Ltd.  
Address: 4th building, No79 Xiangjing Road, Songjiang District, Shanghai, China  
Trademark:



Model Number: X1 PRO T  
Rating: DC12V, 2A  
Power Supply: Model: TDX-1202000; Input: 100-240V~, 50/60Hz, 0.6A; Output: DC12V, 2A  
Hardware Version: V1.2  
Software Version: 1.0.08  
Serial No.: 5139101416

### 1.4 Submitted Sample: 2 pc

### 1.5 Test Duration

Date of Receipt of Application: February 24, 2022  
Date of Receipt of Test Item: February 24, 2022  
Date of Test: February 24, 2022 ~ March 10, 2022

### 1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB  
Radiated Emissions below 1GHz Uncertainty =4.7dB  
Radiated Emissions above 1GHz Uncertainty =6.0dB

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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

*Andy Xing*

---

Print Name: Andy Xing

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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 | ESH3       | 860905/006 | RS           | 2021.06.18       | 1 Year            |
| Spectrum Analyzer | ESA-L1500A | US37451154 | HP           | 2021.06.18       | 1 Year            |
| PULSE LIMITER     | ESH3-Z2    | 100281     | RS           | 2021.06.18       | 1 Year            |
| LISN              | ESH3-Z5    | 100294     | RS           | 2021.06.18       | 1 Year            |
| LISN              | ESH3-Z5    | 100253     | RS           | 2021.06.18       | 1 Year            |
| LISN              | NNB42      | 00012      | SCHAFFNER    | 2022.01.05       | 1 Year            |

### 2.2 Radiated electromagnetic disturbance test

| Name              | Model No   | Serial No. | Manufacturer | Calibration Date | Calibration Cycle |
|-------------------|------------|------------|--------------|------------------|-------------------|
| EMI Test Receiver | ESPI 3     | 100379     | RS           | 2021.06.18       | 1 Year            |
| Spectrum Analyzer | E4407B     | MY50441392 | HP/Agilent   | 2021.06.18       | 1 Year            |
| Amplifier         | BBV9743    | #218       | HP/Agilent   | 2021.06.18       | 1 Year            |
| Bilog Antenna     | VULB9163   | 9163/340   | Schwarebeck  | 2021.07.02       | 3 Year            |
| Horn Antenna      | BBHA 9120D | 9120D-631  | RS           | 2021.07.02       | 3 Year            |
| Amplifier         | 8449B      | 3008A00160 | HP/Agilent   | 2021.06.18       | 1 Year            |

### 2.3 Auxiliary Equipment

| Device | Manufacturer | Model | Rating |
|--------|--------------|-------|--------|
| --     | --           | --    | --     |

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### 3.0 Technical Details

#### 3.1 Investigations Requested

Perform Electromagnetic Interference [EMI] tests for FCC Requirement.

#### 3.2 Test Standards

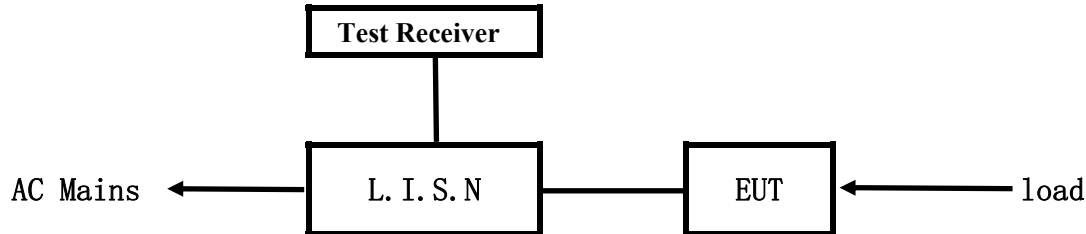
**FCC Part 15 Subpart B**

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#### 4.0 Conducted Power line Test

##### 4.1 Schematics of the test



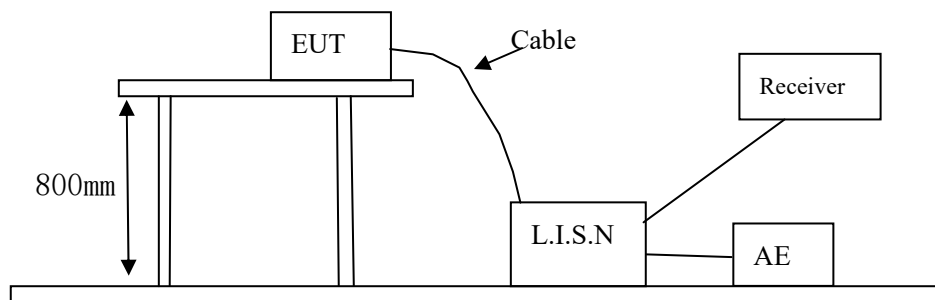
EUT: Equipment Under Test

##### 4.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2014. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2014. Cables and peripherals were moved to find the maximum emission levels for each frequency.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



##### 4.3 Power line conducted Emission Limit

| Frequency<br>(MHz) | Class A Limits dB(μV) |               | Class B Limits dB(μV) |               |
|--------------------|-----------------------|---------------|-----------------------|---------------|
|                    | Quasi-peak Level      | Average Level | Quasi-peak Level      | Average Level |
| 0.15 ~ 0.50        | 79.00                 | 66.00         | 66.00~56.00*          | 56.00~46.00*  |
| 0.50 ~ 5.00        | 73.00                 | 60.00         | 56.00                 | 46.00         |
| 5.00 ~ 30.00       | 73.00                 | 60.00         | 60.00                 | 50.00         |

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

##### 4.4 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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

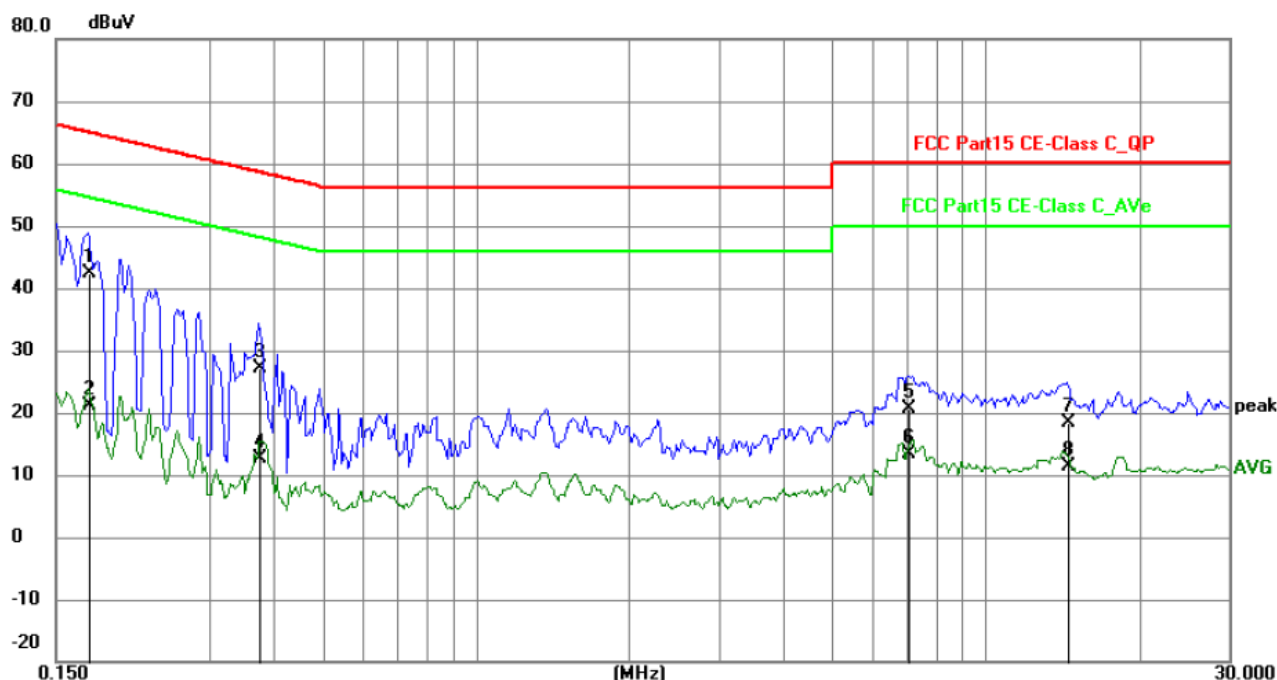
**EUT Operating Environment**

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

**EUT set Condition: Normal Operation**

**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          | 32.62          | 9.77        | 42.39        | 64.80        | -22.41      | QP       | P   |
| 2   | 0.1734          | 11.47          | 9.77        | 21.24        | 54.80        | -33.56      | AVG      | P   |
| 3   | 0.3762          | 17.41          | 9.76        | 27.17        | 58.36        | -31.19      | QP       | P   |
| 4   | 0.3762          | 2.87           | 9.76        | 12.63        | 48.36        | -35.73      | AVG      | P   |
| 5   | 7.0599          | 10.57          | 10.01       | 20.58        | 60.00        | -39.42      | QP       | P   |
| 6   | 7.0599          | 3.42           | 10.01       | 13.43        | 50.00        | -36.57      | AVG      | P   |
| 7   | 14.4816         | 8.08           | 10.36       | 18.44        | 60.00        | -41.56      | QP       | P   |
| 8   | 14.4816         | 1.01           | 10.36       | 11.37        | 50.00        | -38.63      | AVG      | P   |

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

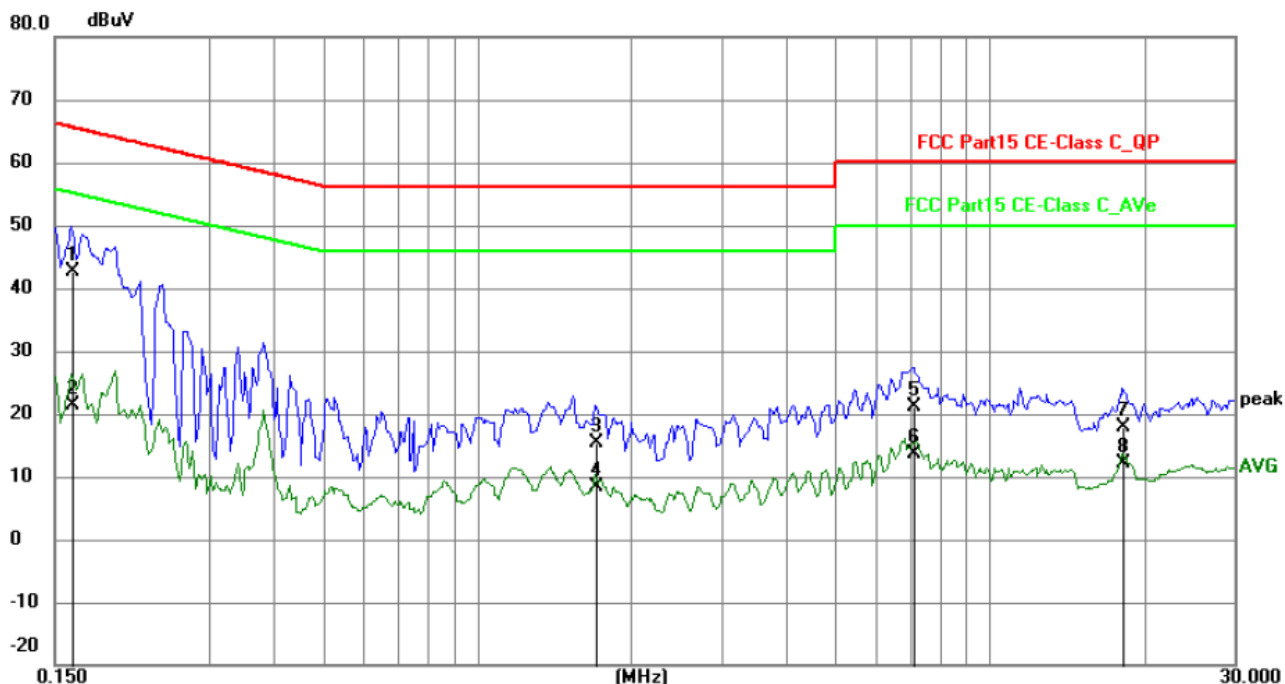
**EUT Operating Environment**

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

**EUT set Condition: Normal Operation**

**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   | 0.1617          | 32.79          | 9.78        | 42.57        | 65.38        | -22.81      | QP       | P   |
| 2   | 0.1617          | 11.70          | 9.78        | 21.48        | 55.38        | -33.90      | AVG      | P   |
| 3   | 1.6983          | 5.56           | 9.80        | 15.36        | 56.00        | -40.64      | QP       | P   |
| 4   | 1.6983          | -1.52          | 9.80        | 8.28         | 46.00        | -37.72      | AVG      | P   |
| 5   | 7.0833          | 11.02          | 10.01       | 21.03        | 60.00        | -38.97      | QP       | P   |
| 6   | 7.0833          | 3.65           | 10.01       | 13.66        | 50.00        | -36.34      | AVG      | P   |
| 7   | 18.2256         | 7.35           | 10.57       | 17.92        | 60.00        | -42.08      | QP       | P   |
| 8   | 18.2256         | 1.47           | 10.57       | 12.04        | 50.00        | -37.96      | AVG      | P   |

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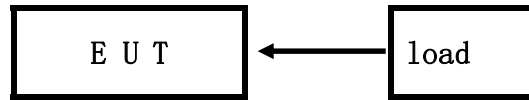
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## 5.0 Radiated Disturbance Test

### 5.1 Schematics of the test

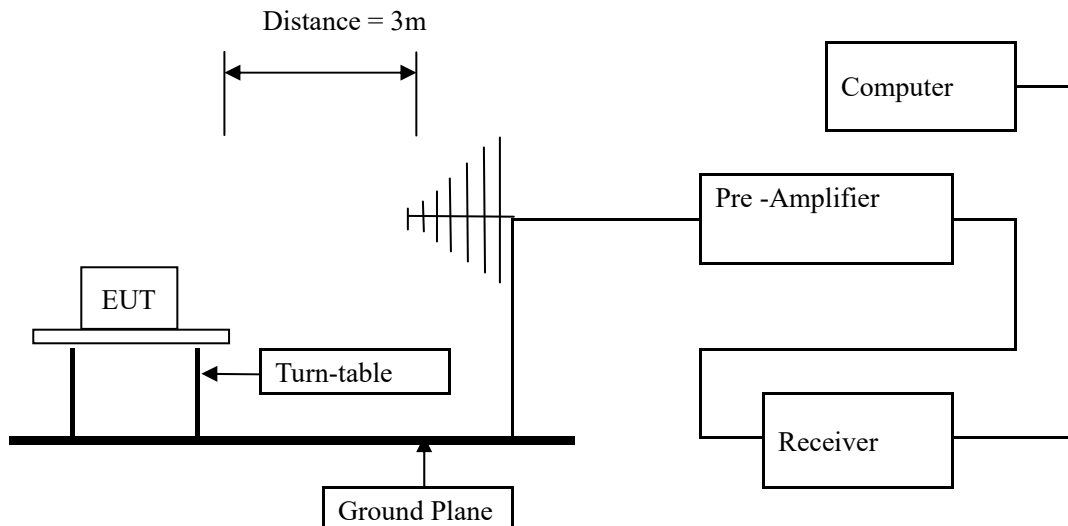


### 5.2 Test Method and test Procedure:

The EUT was tested according to ANSI C63.4 –2014; The frequency spectrum from 9kHz to 25GHz was investigated. All reading from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK

Actual Working Voltage and Frequency: 120V~, 60Hz

#### Block diagram of Test setup

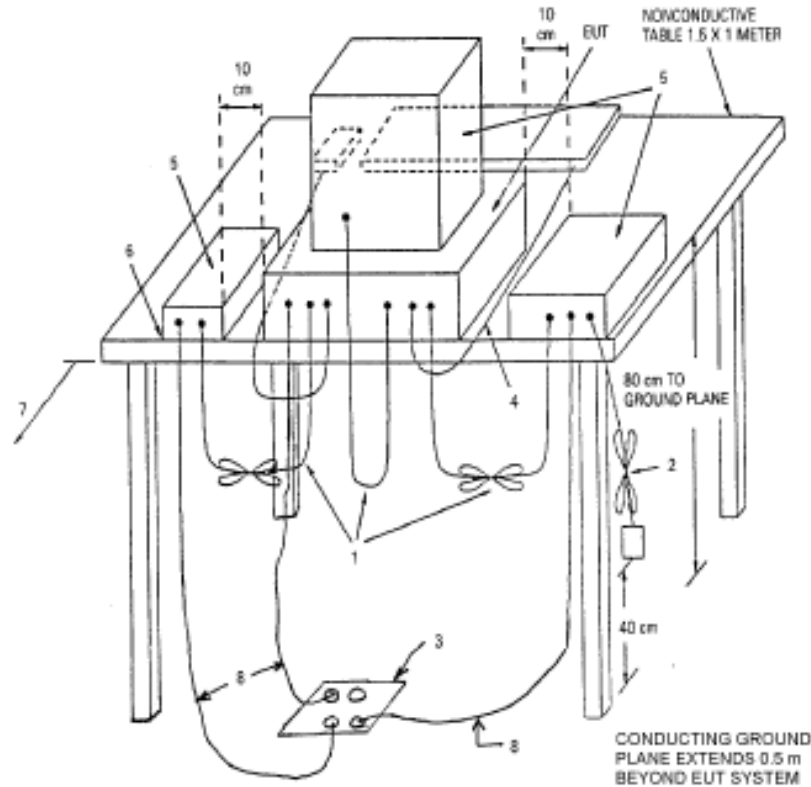


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### 5.3 Radiated Emission Limit

| Frequency Range (MHz) | Distance (m) | Field strength (dB $\mu$ V/m) |
|-----------------------|--------------|-------------------------------|
| 30-88                 | 3            | 40.00                         |
| 88-216                | 3            | 43.50                         |
| 216-960               | 3            | 46.00                         |
| Above 960             | 3            | 54.00                         |

Note: The lower limit shall apply at the transition frequencies

### 5.4 Test result

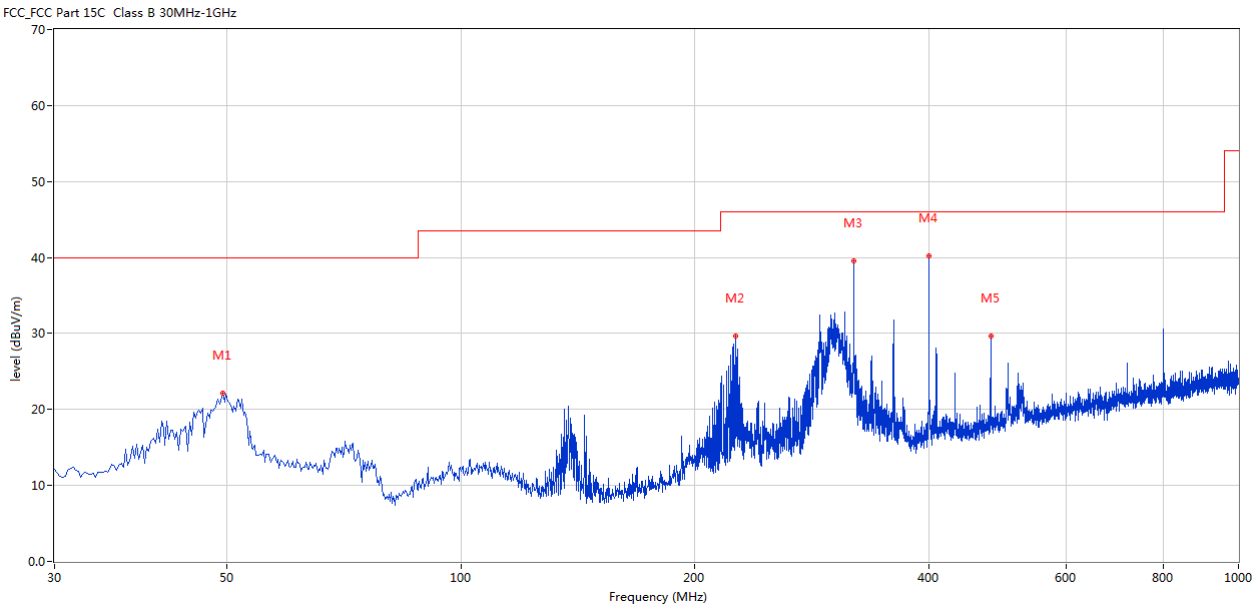
The frequency spectrum from 9MHz to 25GHz was investigated. All reading from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK. Measurements were made at 3 meters.

Note: For radiated Emissions from 18-25GHz and below 30MHz, it is only the floor noise and less than the limit for more than 20dB. No necessary to take down.

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

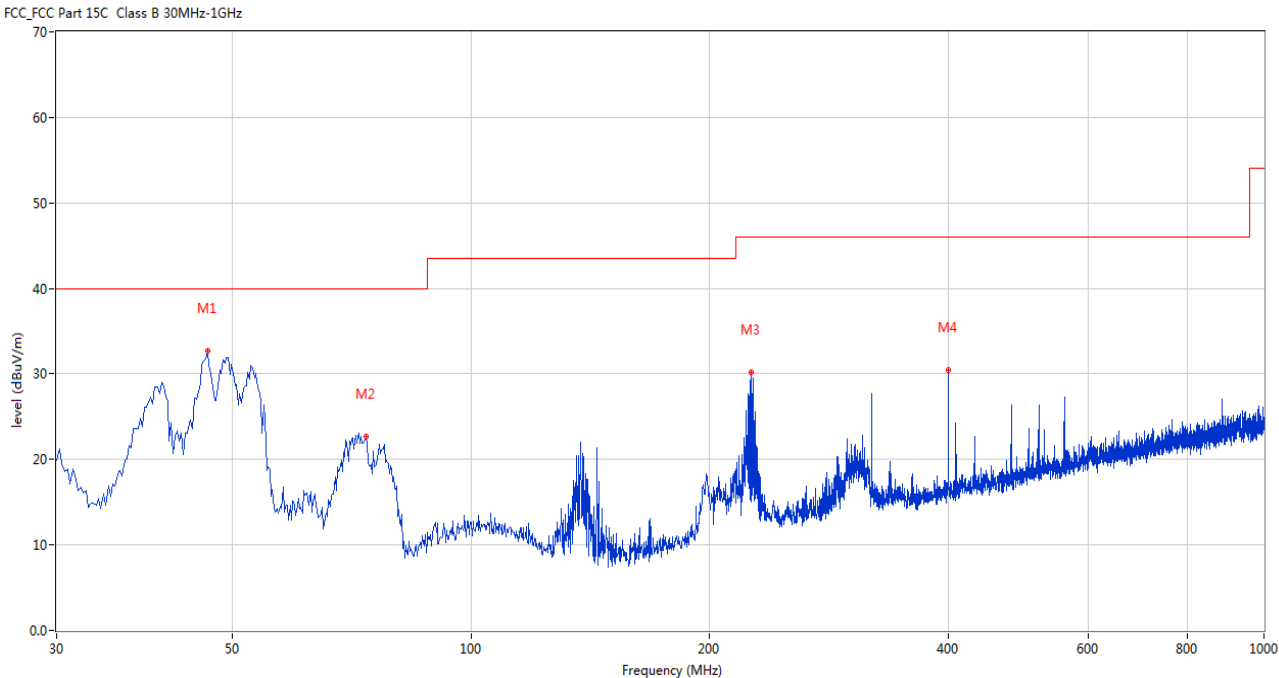


| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (o) | Height (cm) | ANT        | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|-----------|-------------|------------|---------|
| 1   | 49.395          | 22.19            | -11.28      | 40.0           | -17.81          | Peak     | 137.00    | 100         | Horizontal | Pass    |
| 2   | 225.406         | 29.70            | -12.89      | 46.0           | -16.30          | Peak     | 310.00    | 100         | Horizontal | Pass    |
| 3   | 319.958         | 39.56            | -10.60      | 46.0           | -6.44           | Peak     | 120.00    | 100         | Horizontal | Pass    |
| 4   | 399.963         | 40.20            | -8.57       | 46.0           | -5.80           | Peak     | 115.00    | 100         | Horizontal | Pass    |
| 5   | 479.968         | 29.68            | -7.40       | 46.0           | -16.32          | Peak     | 110.00    | 100         | Horizontal | Pass    |

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



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (o) | Height (cm) | ANT      | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|-----------|-------------|----------|---------|
| 1   | 46.486          | 32.67            | -11.43      | 40.0           | -7.33           | Peak     | 172.00    | 100         | Vertical | Pass    |
| 2   | 73.639          | 22.67            | -17.02      | 40.0           | -17.33          | Peak     | 0.00      | 100         | Vertical | Pass    |
| 3   | 225.406         | 30.15            | -12.89      | 46.0           | -15.85          | Peak     | 161.00    | 100         | Vertical | Pass    |
| 4   | 399.963         | 30.48            | -8.57       | 46.0           | -15.52          | Peak     | 150.00    | 100         | Vertical | Pass    |

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**C: Radiated Disturbance (1000MHz----18000MHz)**

**EUT Operating Environment**

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

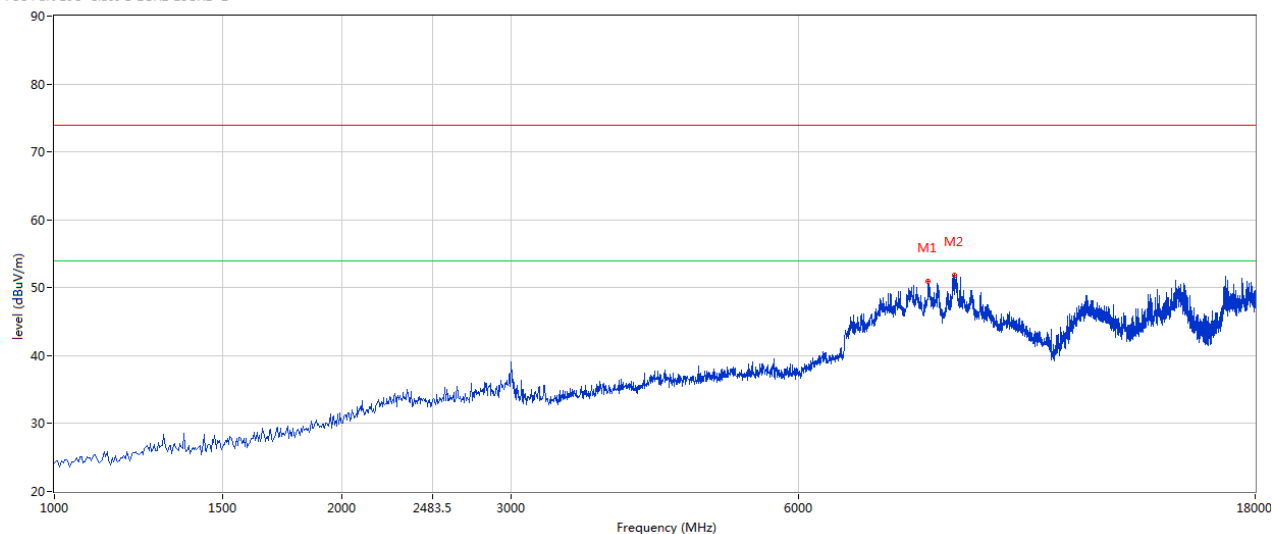
**EUT set Condition: Normal Operation**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual

FCC Part 15C Class B 1GHz-18GHz -2



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (o) | Height (cm) | ANT | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|-----------|-------------|-----|---------|
| 1   | 8193.452        | 50.89            | 8.34        | 74.0           | -23.11          | Peak     | 304.00    | 100         | H   | Pass    |
| 2   | 8733.067        | 51.86            | 7.98        | 74.0           | -22.14          | Peak     | 320.00    | 100         | H   | Pass    |

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**D: Radiated Disturbance (1000MHz----18000MHz)**

**EUT Operating Environment**

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

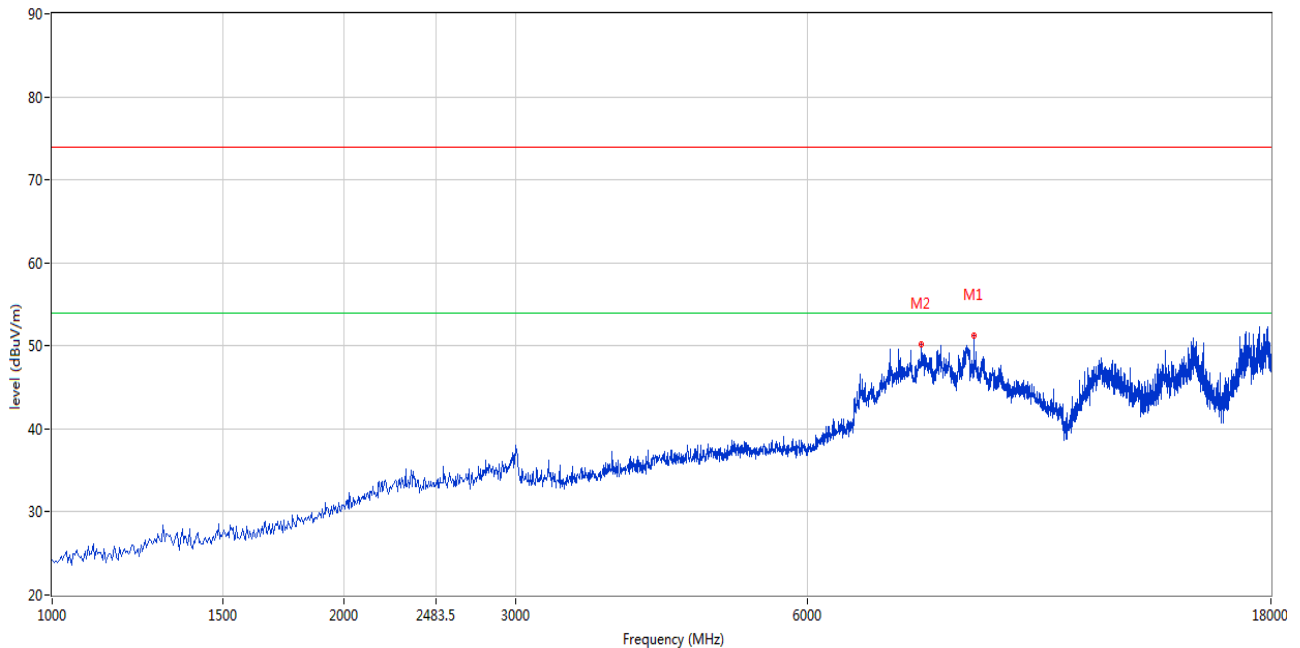
**EUT set Condition: Normal Operation**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual

FCC Part 15C Class B 1GHz-18GHz -2



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (o) | Height (cm) | ANT | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|-----------|-------------|-----|---------|
| 1   | 8903.024        | 51.17            | 7.89        | 74.0           | -22.83          | Peak     | 68.00     | 100         | V   | Pass    |
| 2   | 7853.537        | 50.20            | 8.40        | 74.0           | -23.80          | Peak     | 13.00     | 100         | V   | Pass    |

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## 6.0 FCC Label

### FCC ID: 2A5EG-X1PROT

**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.



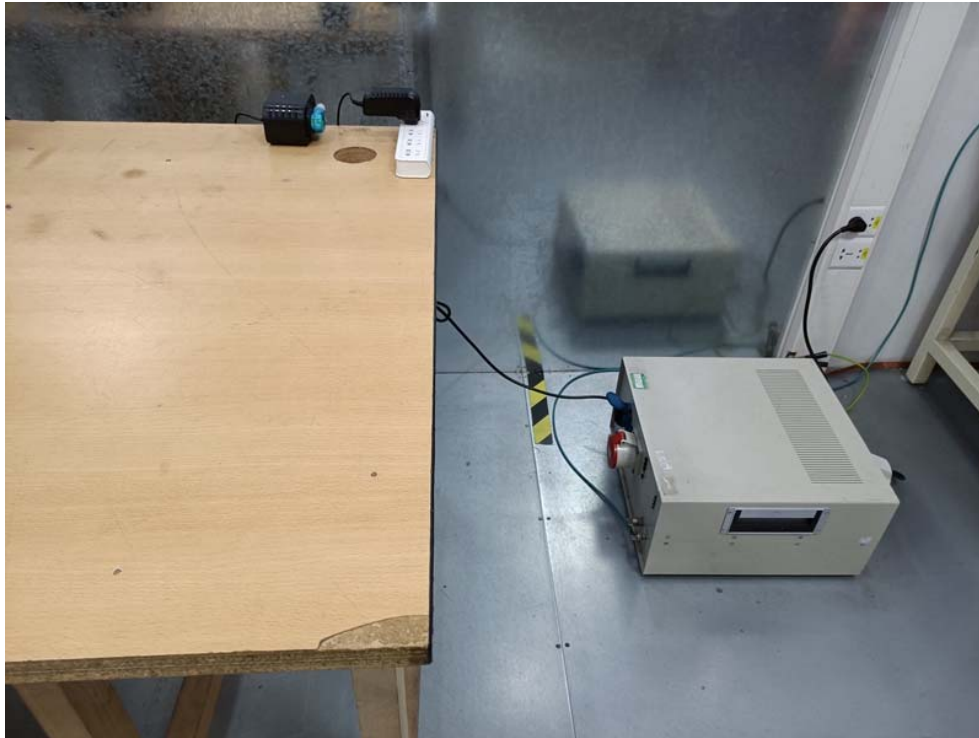
Label Location

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## 7.0 Photo of testing

### Conducted Emissions



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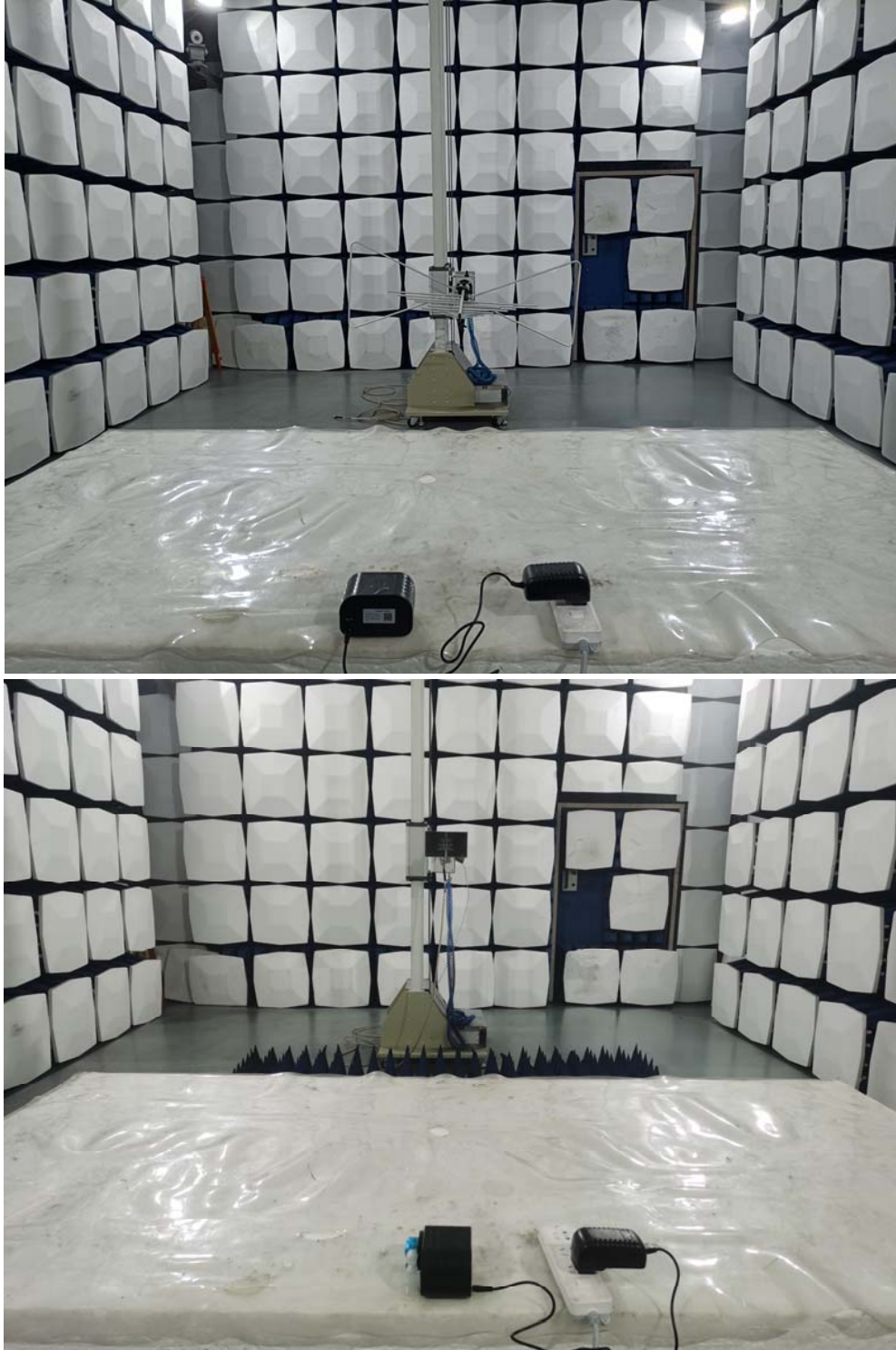
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### Radiated Emissions



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### Photographs – EUT



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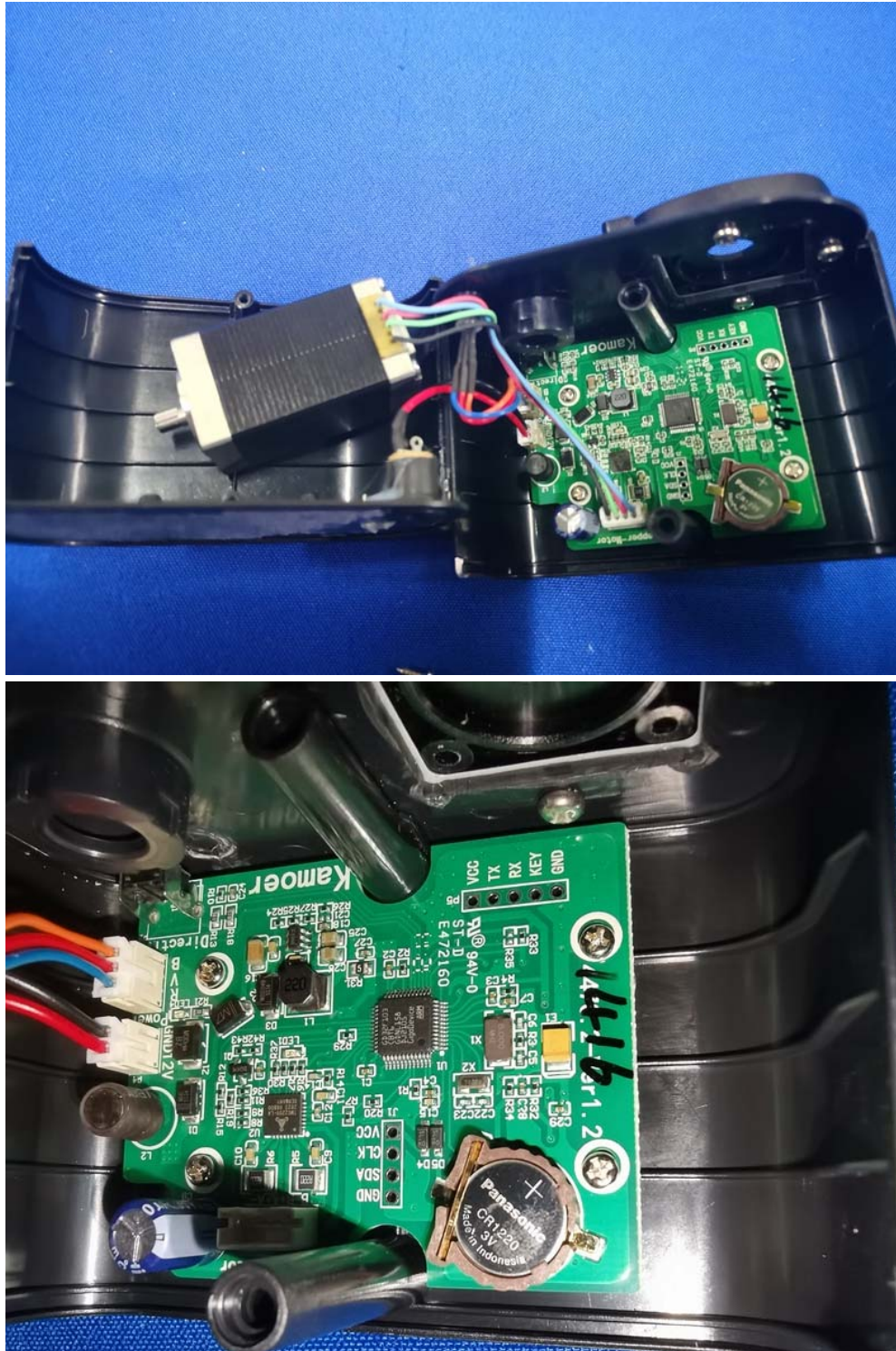


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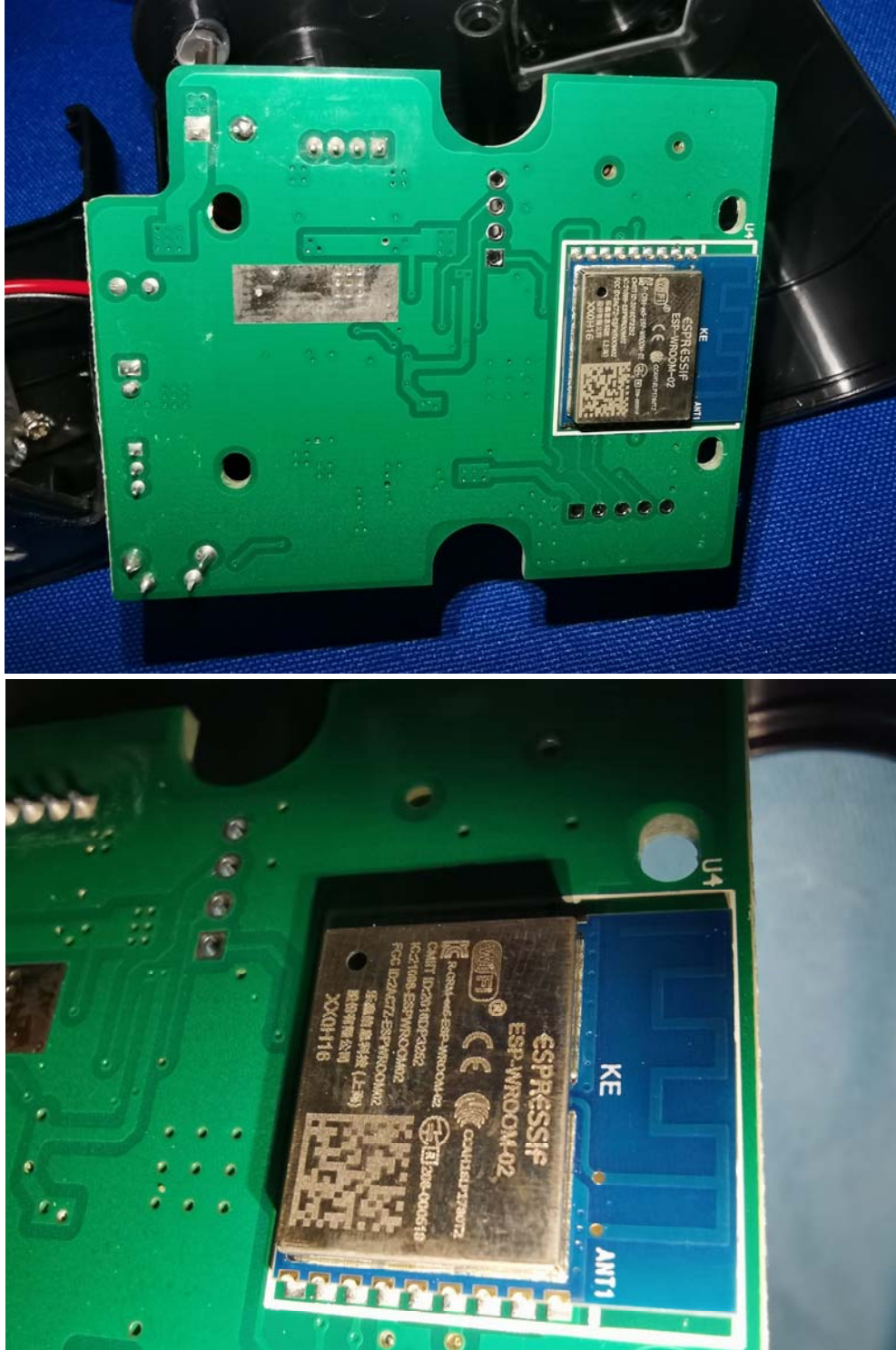
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### End of The Report

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