



Report No.: TW2111088E

File reference No.: 2021-12-08

Applicant: NINGBO WANMING ELECTRIC APPLIANCE CO.,LTD

Product: Wireless transmitter

Model No.: SF70WK, SF70W, SFTRANS70

Trademark: N/A

Test Standards: FCC Part 15 Subpart C, Paragraph 15.231

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4&FCC Part 15 Subpart C, Paragraph 15.231 for the evaluation of electromagnetic compatibility



Dated: December 08, 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**



### **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 meets 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 17025:1999 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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## Test Report Conclusion

### Content

|            |                                           |    |
|------------|-------------------------------------------|----|
| <b>1.0</b> | <b>General Details</b>                    | 4  |
| 1.1        | Test Lab Details                          | 4  |
| 1.2        | Applicant Details                         | 4  |
| 1.3        | Description of EUT                        | 4  |
| 1.4        | Submitted Sample                          | 4  |
| 1.5        | Test Duration                             | 4  |
| 1.6        | Test Uncertainty                          | 5  |
| 1.7        | Test By                                   | 5  |
| <b>2.0</b> | <b>List of Measurement Equipment</b>      | 6  |
| <b>3.0</b> | <b>Technical Details</b>                  | 7  |
| 3.1        | Summary of Test Results                   | 7  |
| 3.2        | Test Standards                            | 7  |
| <b>4.0</b> | <b>EUT Modification</b>                   | 7  |
| <b>5.0</b> | <b>Power Line Conducted Emission Test</b> | 8  |
| 5.1        | Schematics of the Test                    | 8  |
| 5.2        | Test Method and Test Procedure            | 8  |
| 5.3        | Configuration of the EUT                  | 8  |
| 5.4        | EUT Operating Condition                   | 9  |
| 5.5        | Conducted Emission Limit                  | 9  |
| 5.6        | Test Result                               | 9  |
| <b>6.0</b> | <b>Radiated Emission test</b>             | 12 |
| 6.1        | Test Method and Test Procedure            | 12 |
| 6.2        | Configuration of the EUT                  | 13 |
| 6.3        | EUT Operation Condition                   | 13 |
| 6.4        | Radiated Emission Limit                   | 14 |
| 6.5        | Test Result                               | 15 |
| 7.0        | 20dB Bandwidth Test                       | 20 |
| 8.0        | Deactivate Test                           | 22 |
| 9.0        | Duty Cycle                                | 24 |
| 10.0       | Antenna Requirement                       | 29 |
| 11.0       | FCC Label                                 | 30 |
| 12.0       | Photo of Testing                          | 31 |

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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: +86 755 83448688  
Fax: +86 755 83442996  
Site on File with the Federal Communications Commission – United States  
Registration Number: 744189  
For 3m Anechoic Chamber

### 1.2 Applicant Details

Applicant: NINGBO WANMING ELECTRIC APPLIANCE CO.,LTD  
Address: No.689 Rixian Road, Cidong Industrial Zone, Cixi Zhejiang China  
Telephone: 0574-63666667  
Fax: 0574-63666600

### 1.3 Description of EUT

Product: Wireless transmitter  
Manufacturer: NINGBO WANMING ELECTRIC APPLIANCE CO.,LTD  
Address: No.689 Rixian Road, Cidong Industrial Zone, Cixi Zhejiang China  
Trademark: N/A  
Model Number: SF70WKR  
Additional Model Name SF70W, SFTRANS70  
Additional Trademark N/A  
Rating: 12VDC  
Operation Frequency: 433.92MHz  
Modulation Type: OOK  
Hardware Version: V0  
Software Version: V0  
Serial No.: SF70  
Antenna Designation Integral Antenna with Gain 3.0dBi (Declared by the applicant)

### 1.4 Submitted Sample: 2 Samples

### 1.5 Test Duration

2021-11-08 to 2021-12-08

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#### 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%

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

#### 1.7 Test Engineer

The sample tested by



Print Name: Terry Tang

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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 |
| 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   | 2021-06-18   | 2022-06-17 |
| Horn Antenna       | R&S          | BBHA 9120D           | 9120D-631    | 2021-07-02   | 2024-07-01 |
| 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 | 2020-01-16   | 2022-01-15 |
| RF Cable           | Zhengdi      | ZT26-NJ-NJ-8<br>M/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 tested according to the following specifications: |                         |        |           |  |
|--------------------------------------------------------------------|-------------------------|--------|-----------|--|
| Standard                                                           | Test Type               | Result | Notes     |  |
| FCC Part 15, Paragraph 15.203                                      | Antenna requirements    | Pass   | Compliant |  |
| FCC Part 15, Paragraph 15.207                                      | Conducted Emission Test | Pass   | Compliant |  |
| FCC Part 15, Paragraph 15.209                                      | General Requirement     | Pass   | Compliant |  |
| FCC Part 15, Paragraph 15.231 (b)                                  | Radiated Emission Test  | Pass   | Compliant |  |
| FCC Part 15, Paragraph 15.231 (c)                                  | 20dB Bandwidth Testing  | Pass   | Compliant |  |
| FCC Part 15, Paragraph 15.231 (a1)                                 | Deactivate Testing      | Pass   | Compliant |  |

#### 3.2 Test Standards

**FCC Part 15 Subpart C, Paragraph 15.231 , ANSI C63.4 :2014 and ANSI C63.10 :2013**

#### 4.0 EUT Modification

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES

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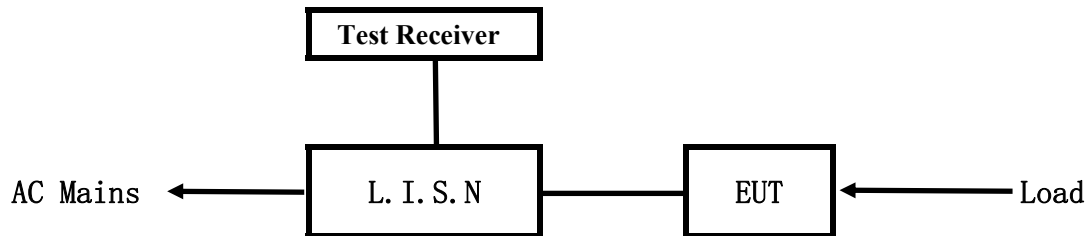
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## 5. Power Line Conducted Emission Test

### 5.1 Schematics of the test

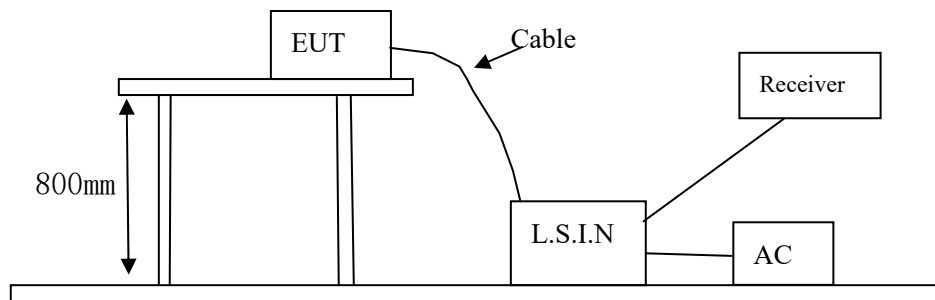


EUT: Equipment Under Test

### 5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2014. 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.

Block diagram of Test setup



### 5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2014. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

#### A. EUT

| Device               | Manufacturer                              | Model                    | FCC ID        |
|----------------------|-------------------------------------------|--------------------------|---------------|
| Wireless transmitter | NINGBO WANMING ELECTRIC APPLIANCE CO.,LTD | SF70WK, SF70W, SFTRANS70 | 2A3PQ-TRANS70 |

#### B. Internal Device

| Device | Manufacturer | Model | FCC ID/DOC |
|--------|--------------|-------|------------|
| N/A    |              |       |            |

#### C. Peripherals

| Device       | Manufacturer | Model            | Rating                                                 |
|--------------|--------------|------------------|--------------------------------------------------------|
| Power Supply | TEKA         | TEKA024-120200EU | Input: 100-240V, 50/60Hz, 0.7A;<br>Output: DC12V, 2.0A |

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#### 5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2014.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

#### 5.5 Power line conducted Emission Limit according to Paragraph 15.207

| Frequency<br>(MHz) | Limits (dB $\mu$ V) |               |
|--------------------|---------------------|---------------|
|                    | Quasi-peak Level    | Average Level |
| 0.15 ~ 0.50        | 66.0~56.0*          | 56.0~46.0*    |
| 0.50 ~ 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

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz. (The average detector is necessary when the Quasi-peak emission level beyond the average Limit.)

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

**EUT Operating Environment**

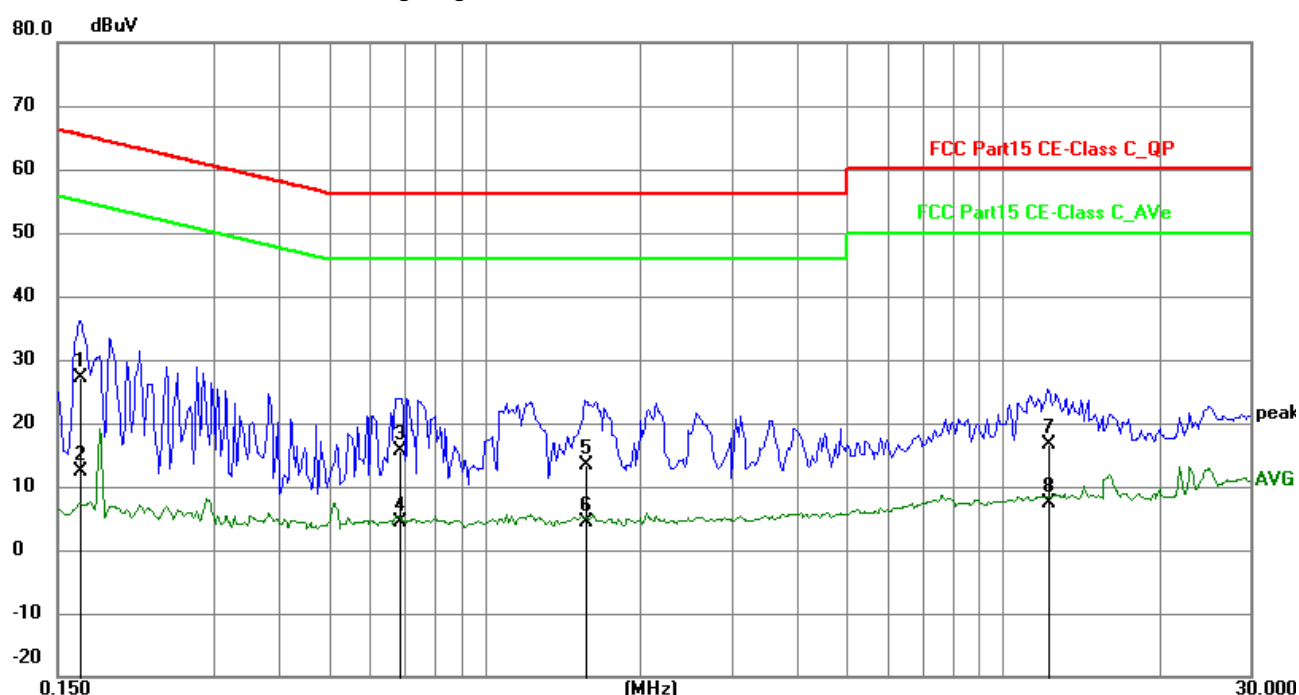
Temperature: 25°C Humidity: 75%RH Atmospheric Pressure: 101 KPa

**EUT set Condition: Working**

**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   | 0.1655          | 17.27          | 9.77        | 27.04        | 65.18        | -38.14      | QP       | P   |
| 2   | 0.1655          | 2.71           | 9.77        | 12.48        | 55.18        | -42.70      | AVG      | P   |
| 3   | 0.6843          | 5.81           | 9.78        | 15.59        | 56.00        | -40.41      | QP       | P   |
| 4   | 0.6843          | -5.38          | 9.78        | 4.40         | 46.00        | -41.60      | AVG      | P   |
| 5   | 1.5657          | 3.48           | 9.80        | 13.28        | 56.00        | -42.72      | QP       | P   |
| 6   | 1.5657          | -5.53          | 9.80        | 4.27         | 46.00        | -41.73      | AVG      | P   |
| 7   | 12.2313         | 6.28           | 10.26       | 16.54        | 60.00        | -43.46      | QP       | P   |
| 8   | 12.2313         | -2.91          | 10.26       | 7.35         | 50.00        | -42.65      | AVG      | P   |

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

**EUT Operating Environment**

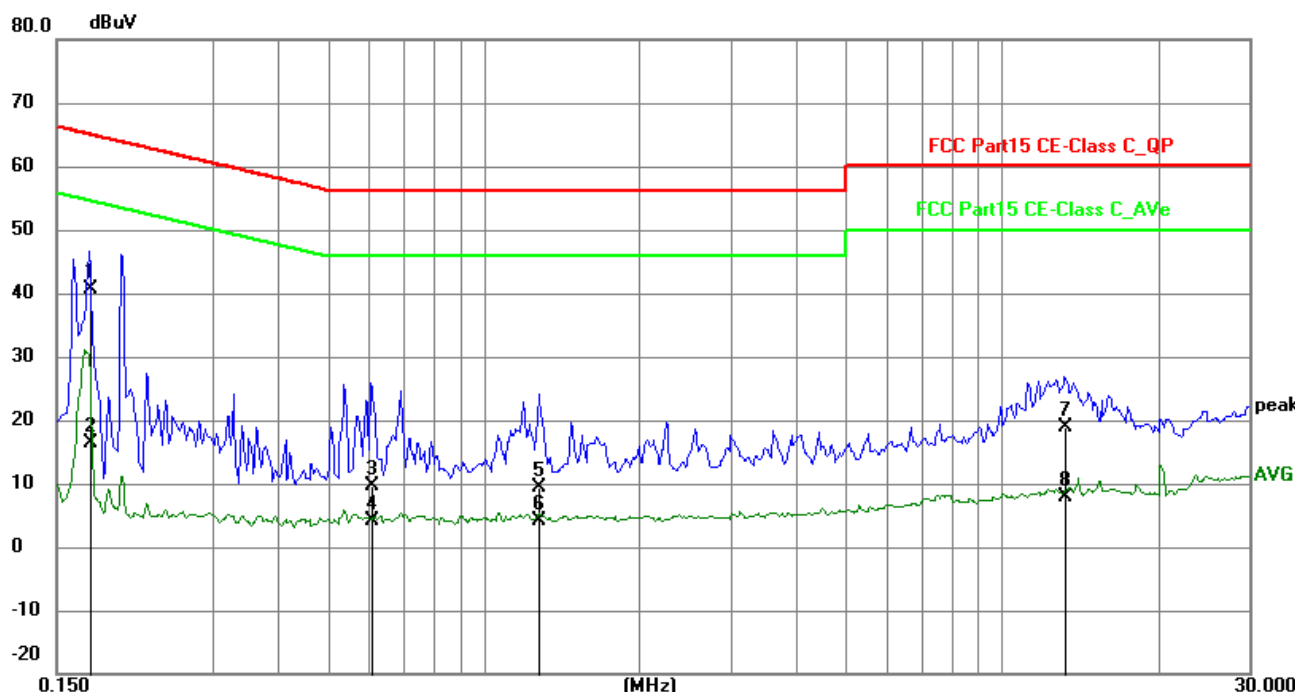
Temperature: 25°C Humidity:75%RH Atmospheric Pressure: 101 KPa

**EUT set Condition: Working**

**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          | 30.79          | 9.77        | 40.56        | 64.80        | -24.24      | QP       | P   |
| 2   | 0.1734          | 6.60           | 9.77        | 16.37        | 54.80        | -38.43      | AVG      | P   |
| 3   | 0.6063          | -0.11          | 9.78        | 9.67         | 56.00        | -46.33      | QP       | P   |
| 4   | 0.6063          | -5.70          | 9.78        | 4.08         | 46.00        | -41.92      | AVG      | P   |
| 5   | 1.2771          | -0.39          | 9.79        | 9.40         | 56.00        | -46.60      | QP       | P   |
| 6   | 1.2771          | -5.78          | 9.79        | 4.01         | 46.00        | -41.99      | AVG      | P   |
| 7   | 13.2297         | 8.50           | 10.30       | 18.80        | 60.00        | -41.20      | QP       | P   |
| 8   | 13.2297         | -2.47          | 10.30       | 7.83         | 50.00        | -42.17      | AVG      | P   |

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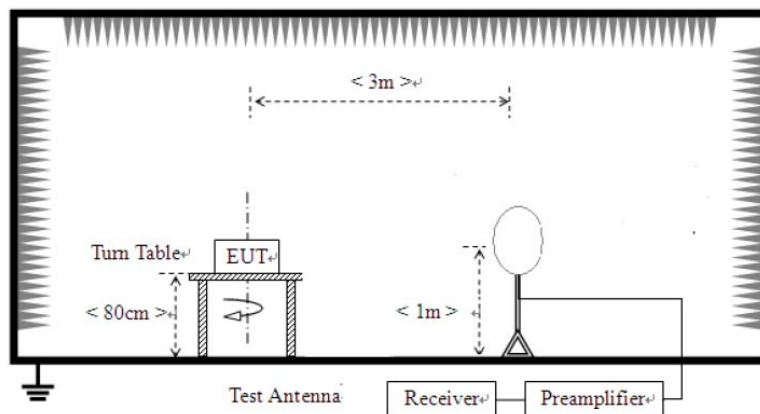
## 6 Radiated Emission Test

### 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 5 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. 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) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization: Vertical polarization and Horizontal polarization.

### Block diagram of Test setup

For radiated emissions from 9kHz to 30MHz



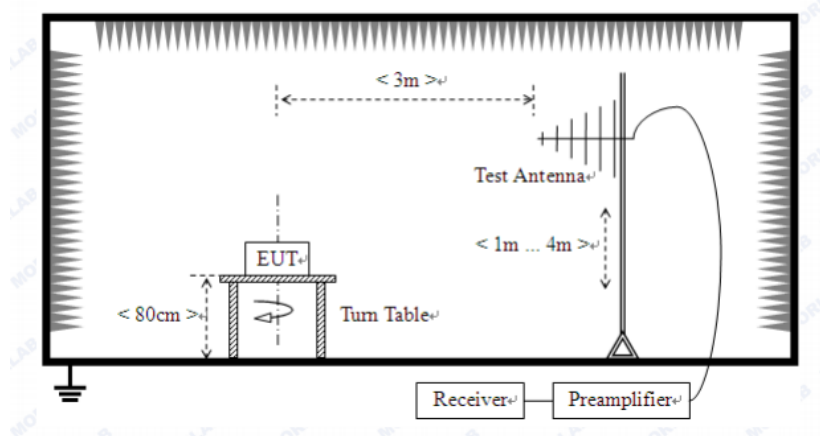
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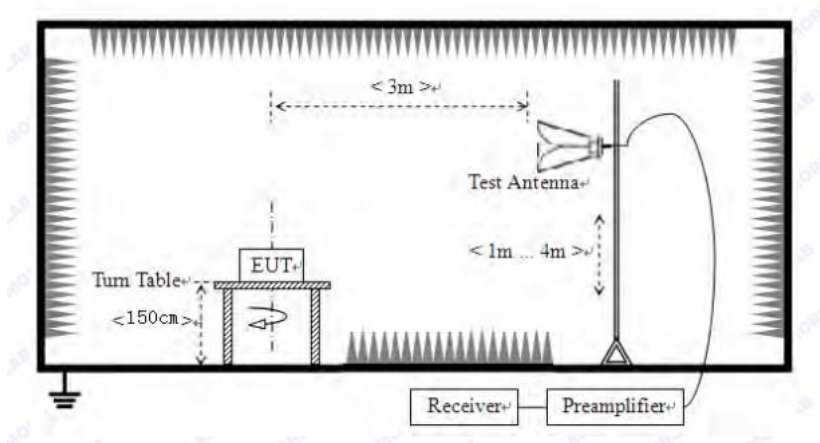
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For radiated emissions from 30MHz to 1GHz



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 15.231(a) Limit

| Fundamental Frequency (MHz) | Field Strength of Fundamental |             | Field Strength of Spurious Emission |             |
|-----------------------------|-------------------------------|-------------|-------------------------------------|-------------|
|                             | uV/m                          | dBuV/m      | uV/m                                | dBuV/m      |
| 40.66-40.70                 | 2250                          | 67.04       | 225                                 | 47.04       |
| 70-130                      | 1250                          | 61.94       | 125                                 | 41.94       |
| 130-174                     | 1250-3750                     | 61.94-71.48 | 125-375                             | 41.94-51.48 |
| 174-260                     | 3750                          | 71.48       | 375                                 | 51.48       |
| 260-470                     | 3750-12500                    | 71.48-81.94 | 375-1250                            | 51.48-61.94 |
| Above 470                   | 12500                         | 81.94       | 1250                                | 61.94       |

- 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.
  4. Linear interpolations for frequency ranges 130-174MHz and 260-470MHz
  5. the above field strength limits are specified at a distance of 3-meters and the tighter limits apply at the band edges

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

| Frequency Range (MHz) | Distance (m) | Field strength (dB $\mu$ V/m) |
|-----------------------|--------------|-------------------------------|
| 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 Voltage ( $\mu$ V)
  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-5G, the final emission level got using PK detector. And Average = peak(dBuV/m) – duty cycle(dB)

**6.5 Test result**

**A Fundamental and Harmonics Radiated emission data**

| Product:        | Wireless transmitter                                     | Test Mode:            | Keep Transmitting     |
|-----------------|----------------------------------------------------------|-----------------------|-----------------------|
| Test Item:      | Fundamental Radiated Emission and Spurious Emission Data | Temperature:          | 25°C                  |
| Test Voltage:   | DC12V                                                    | Humidity:             | 56%                   |
| Test Result:    | Pass                                                     |                       |                       |
| Frequency (MHz) | Emission PK/AV (dBuV/m)                                  | Horizontal / Vertical | Limits PK/AV (dBuV/m) |
| 433.92          | 83.26 (PK)/ 74.46 (AV)                                   | H                     | 100.8/80.6            |
| 433.92          | 81.36 (PK)/ 72.56 (AV)                                   | V                     | 100.8/80.6            |
| 867.84          | 49.99 (PK)/ 41.19 (AV)                                   | H                     | 80.8/60.6             |
| 867.84          | 47.87 (PK)/ 39.07 (AV)                                   | V                     | 80.8/60.6             |
| 1301.76         | --                                                       | H                     | 74/54                 |
| 1301.76         | --                                                       | V                     | 74/54                 |
| 1735.68         | 44.88 (PK)/ 36.08 (AV)                                   | H                     | 80.8/60.6             |
| 1735.68         | 35.24 (PK)/ 26.44 (AV)                                   | V                     | 80.8/60.6             |
| 2169.6          | --                                                       | H                     | 80.8/60.6             |
| 2169.6          | --                                                       | V                     | 80.8/60.6             |
| 2603.52         | --                                                       | H/V                   | 80.8/60.6             |
| 3037.44         | --                                                       | H/V                   | 80.8/60.6             |
| 3471.36         | --                                                       | H/V                   | 80.8/60.6             |
| 3905.28         | -                                                        | H/V                   | 74/54                 |
| 4339.2          | --                                                       | H/V                   | 74/54                 |

Note: H=Horizontal, V=Vertical, AV=PK- | duty cycle factor | =PK-8.80

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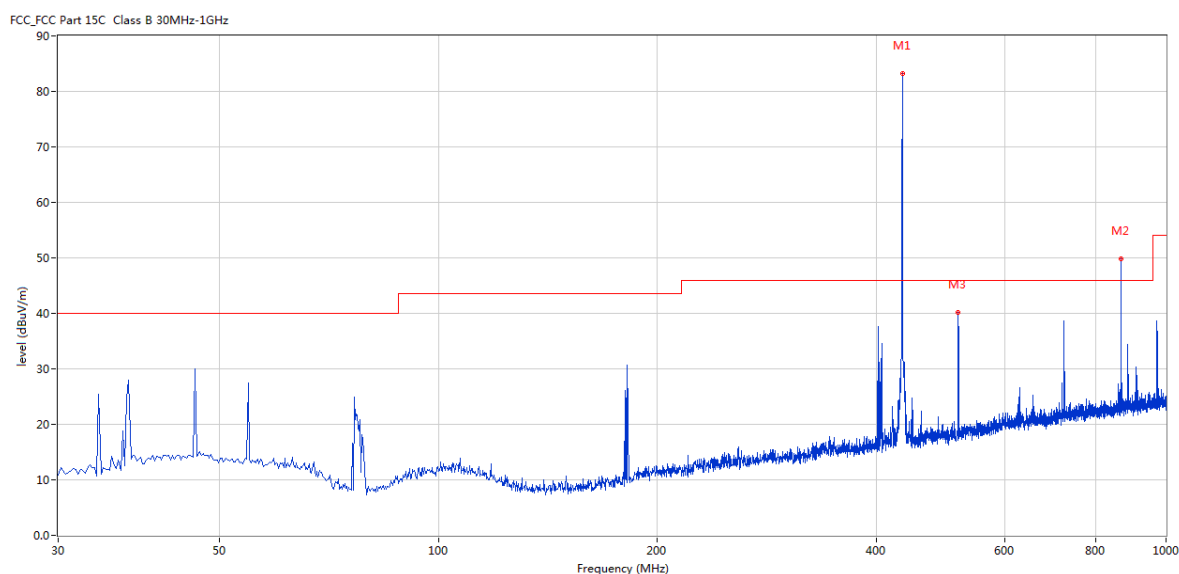
## B. General Radiated Emission Data

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

EUT set Condition: Keep Transmitting

**Results: Pass**

Please refer to following diagram for individual



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (o) | Height (cm) | ANT        | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|-----------|-------------|------------|---------|
| 1   | 433.904         | 83.26            | -8.03       | 46.0           | 37.26           | Peak     | 82.00     | 100         | Horizontal | N/A     |
| 2   | 867.871         | 49.99            | -2.31       | 46.0           | 3.99            | Peak     | 123.00    | 100         | Horizontal | N/A     |
| 3   | 517.303         | 40.20            | -6.70       | 46.0           | -5.80           | Peak     | 335.00    | 100         | Horizontal | Pass    |

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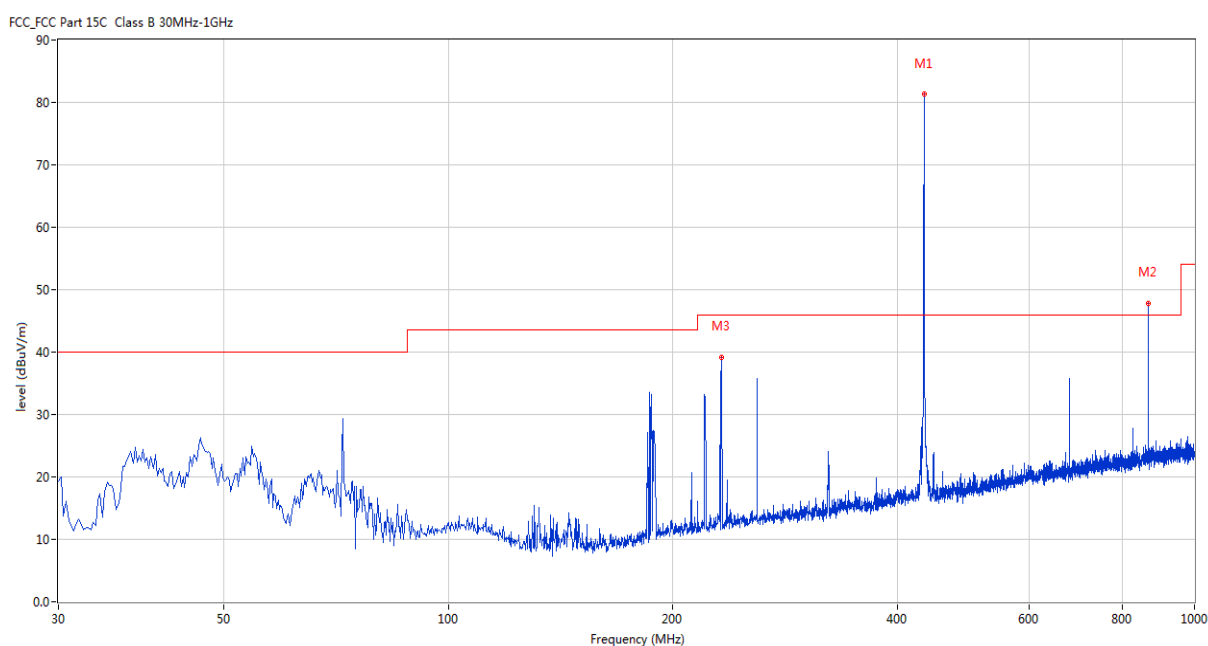
## B. General Radiated Emission Data

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

EUT set Condition: Keep Transmitting

**Results: Pass**

Please refer to following diagram for individual



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (o) | Height (cm) | ANT      | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|-----------|-------------|----------|---------|
| 1   | 433.904         | 81.36            | -8.03       | 46.0           | 35.36           | Peak     | 35.00     | 100         | Vertical | N/A     |
| 2   | 867.871         | 47.87            | -2.31       | 46.0           | 1.87            | Peak     | 345.00    | 100         | Vertical | N/A     |
| 3   | 232.194         | 39.21            | -12.53      | 46.0           | -6.79           | Peak     | 97.00     | 100         | Vertical | Pass    |

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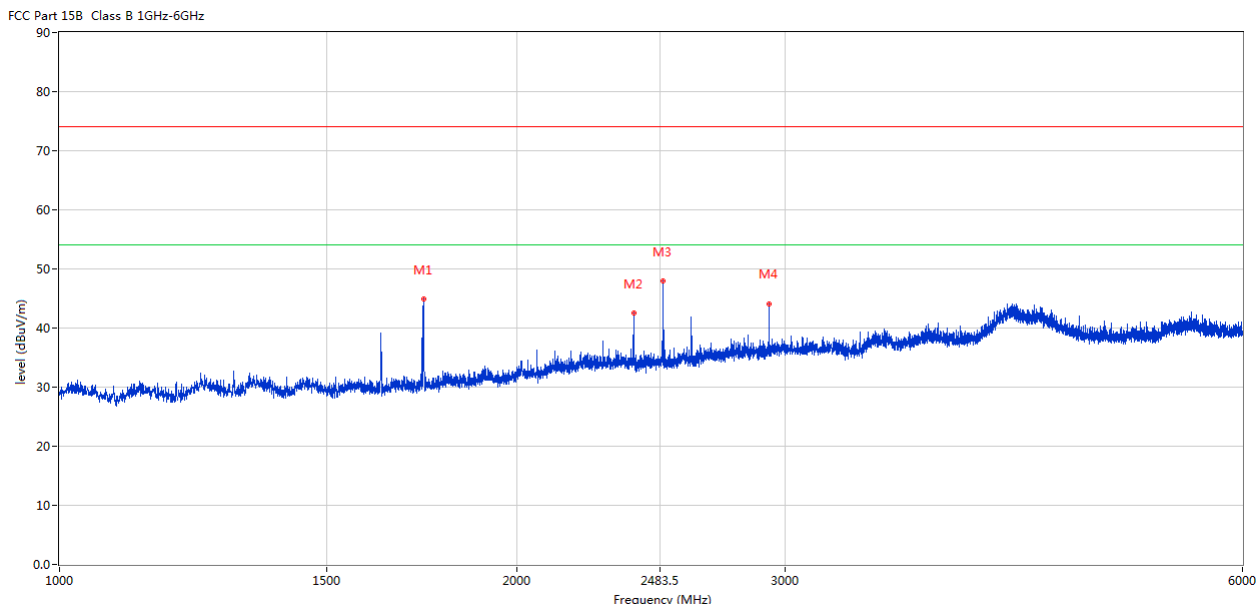
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# Test Plot above 1G

## Horizontal



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (o) | Height (cm) | ANT        | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|-----------|-------------|------------|---------|
| 1   | 1735.316        | 44.88            | -7.29       | 74.0           | -29.12          | Peak     | 267.00    | 100         | Horizontal | Pass    |
| 2   | 2386.153        | 42.54            | -3.52       | 74.0           | -31.46          | Peak     | 244.00    | 100         | Horizontal | Pass    |
| 3   | 2494.626        | 47.93            | -3.57       | 74.0           | -26.07          | Peak     | 225.00    | 100         | Horizontal | Pass    |
| 4   | 2929.018        | 44.10            | -2.66       | 74.0           | -29.90          | Peak     | 281.00    | 100         | Horizontal | Pass    |

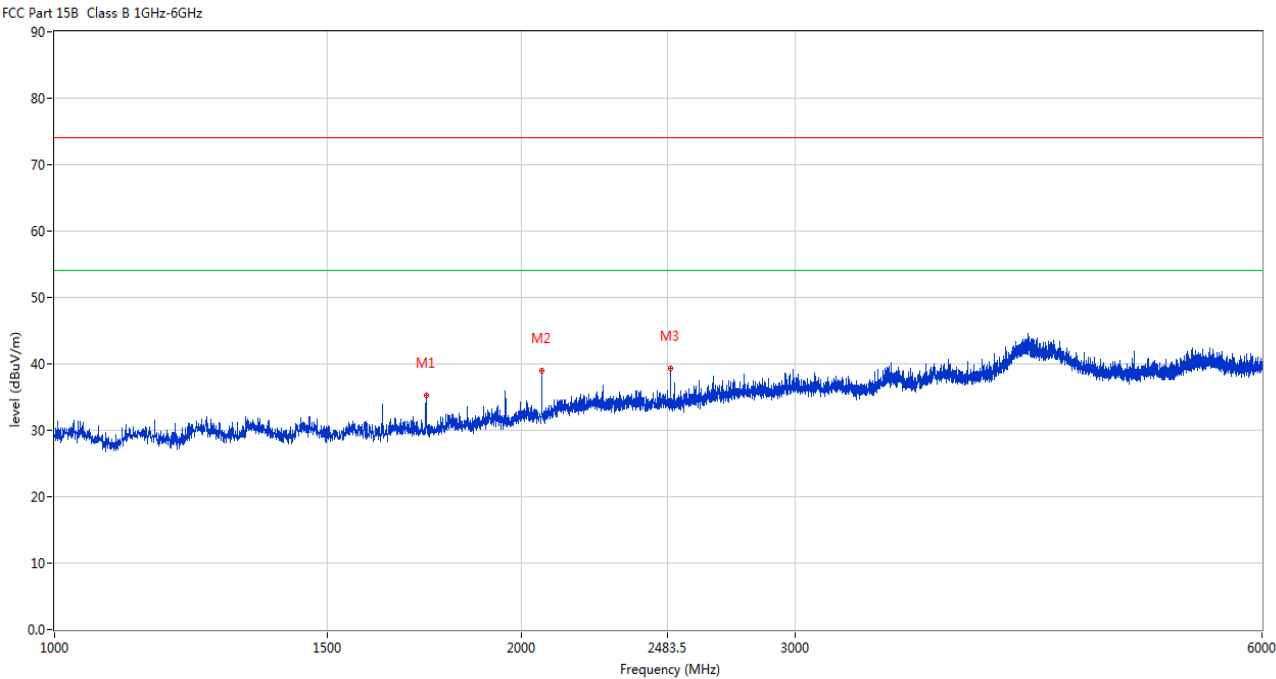
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Vertical



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (o) | Height (cm) | ANT      | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|-----------|-------------|----------|---------|
| 1   | 1735.316        | 35.24            | -7.29       | 74.0           | -38.76          | Peak     | 182.00    | 100         | Vertical | Pass    |
| 2   | 2061.235        | 38.94            | -4.58       | 74.0           | -35.06          | Peak     | 93.00     | 100         | Vertical | Pass    |
| 3   | 2495.126        | 39.26            | -3.57       | 74.0           | -34.74          | Peak     | 173.00    | 100         | Vertical | Pass    |

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## 7.0 20dB and 99% Bandwidth Testing

### 7.1 Requirement

Per 15.231(c) and RSS-210 A1, The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

### 7.2 Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

### 7.3 Test Data

| Frequency (MHz) | 20dB Bandwidth Emission (kHz) | Limit (kHz) | Result |
|-----------------|-------------------------------|-------------|--------|
| 433.92          | 235.47                        | 1084.8      | Pass   |

Limit=Frequency x 0.25%=433.92x 0.25%=1084.8kHz

Refer to attached plots:

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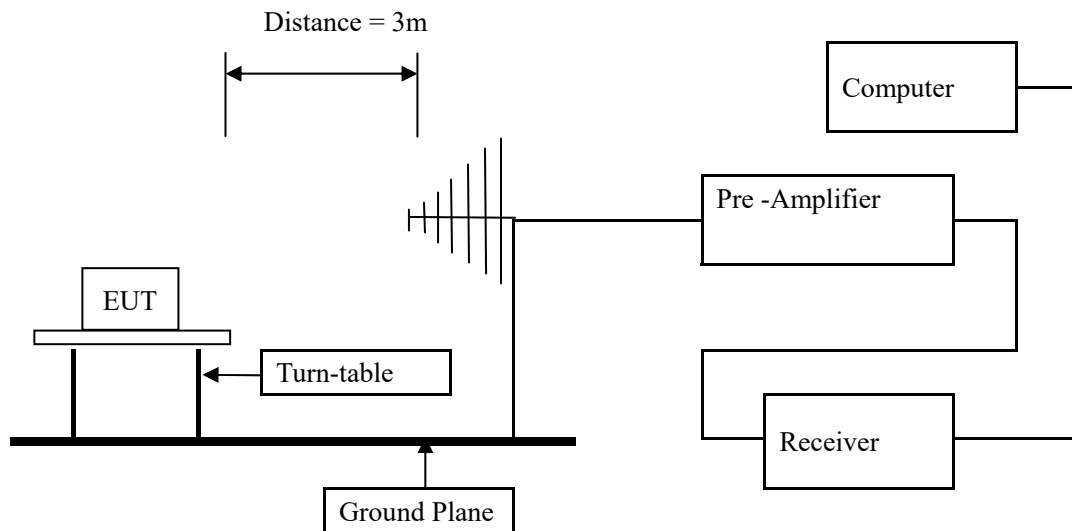
## 8.0 Deactivate Test

### 8.1 Requirement

Per 15.231(a) (2)

A transmitter activated automatically shall cease transmission within 5 seconds after activation.

### 8.2 Radiated Test Setup



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

The deactivation test was performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.231(e) limits.

### 8.3 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

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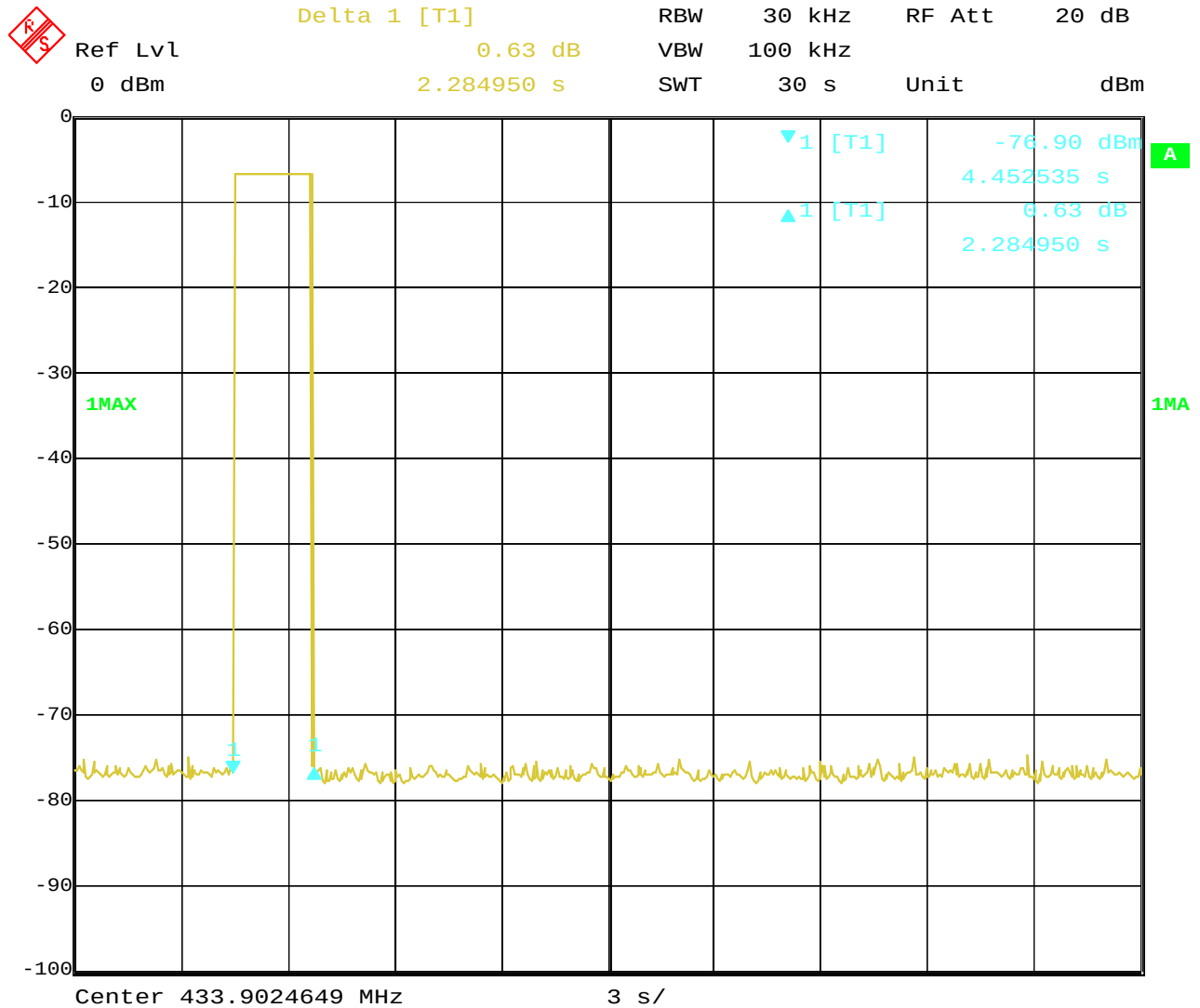
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#### 8.4 Test Data

Refer to attached plots:



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#### 8.5 Test result

Pass

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## 9.0 Duty Cycle

### 9.1 Limit

No dedicated limit specified in the Rules

### 9.2 Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer=operating frequency.
4. Set the spectrum analyzer as RBW = VBW=1000kHz, Span=0Hz, Adjust Sweep=100ms.
5. Repeat above procedures until all frequency measured were complete.

### 9.3 Test Data

**Base on the worst case**

$$T_p = 49.379\text{ms}$$

$$T_{on1} = 1.222 \times 10 = 12.22(\text{ms})$$

$$T_{on2} = 0.381 \times 15 = 5.715(\text{ms})$$

$$\text{Duty cycle} = T_{on}/T_p = 17.935/49.379 = 0.3632 = 36.32\%$$

$$\text{Duty cycle factor} = 20 * \log (\text{duty cycle}) = 20 * \log (0.3632) = -8.80\text{dB}$$

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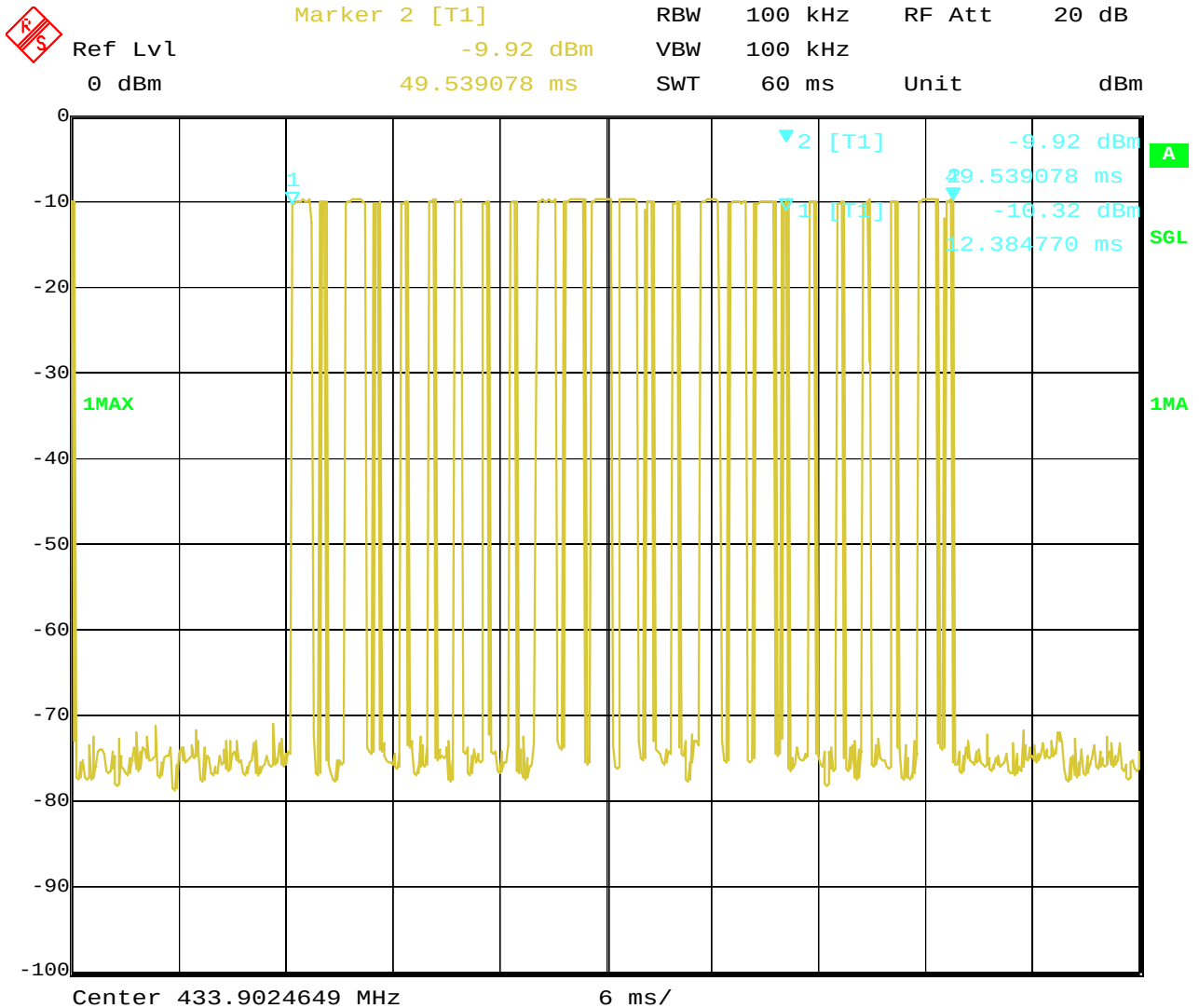
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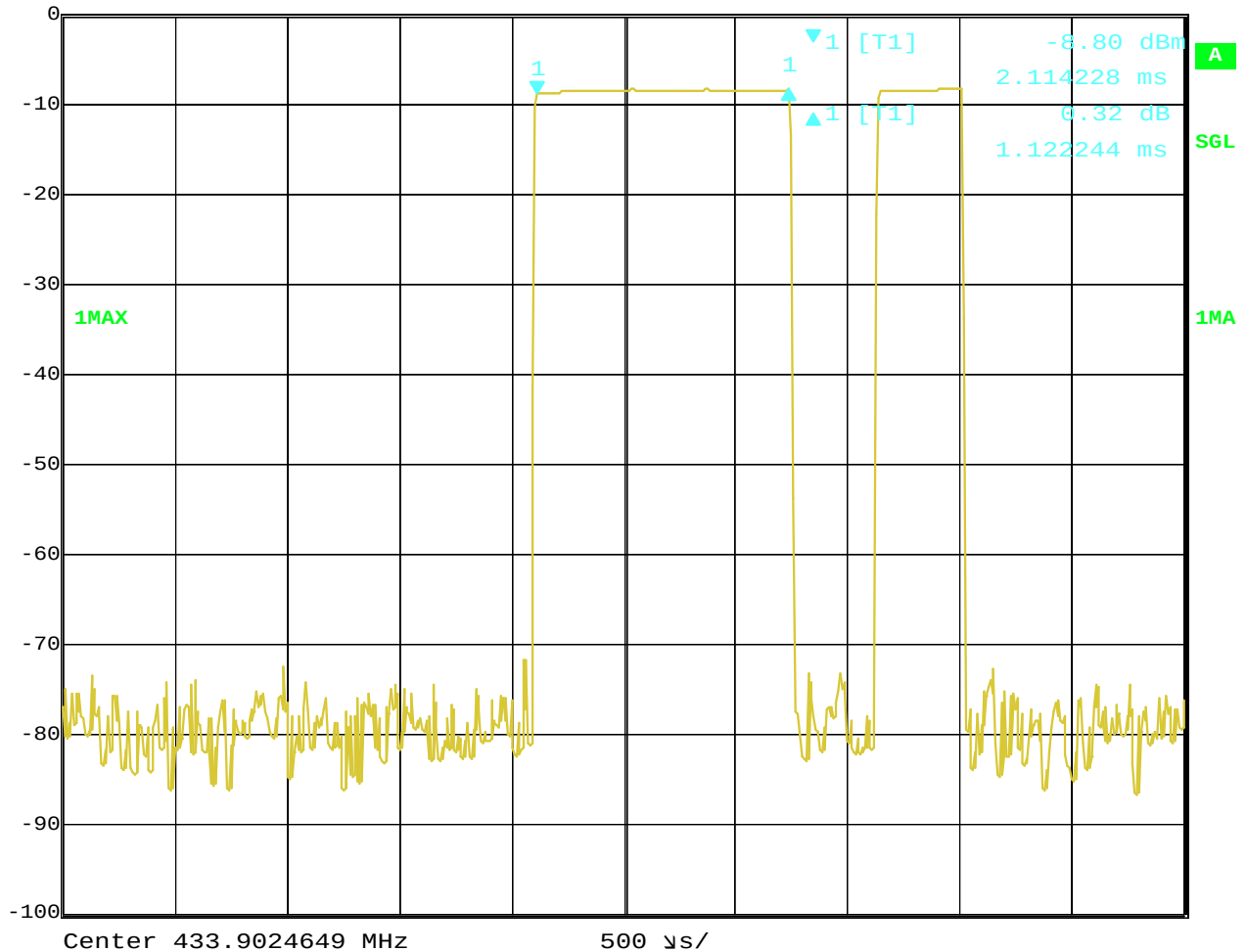
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T<sub>on1</sub>



Delta 1 [T1] RBW 100 kHz RF Att 20 dB  
Ref Lvl 0 dBm 0.32 dB VBW 100 kHz  
1.122244 ms SWT 5 ms Unit dBm



Date: 29.SEP.2021 19:47:20

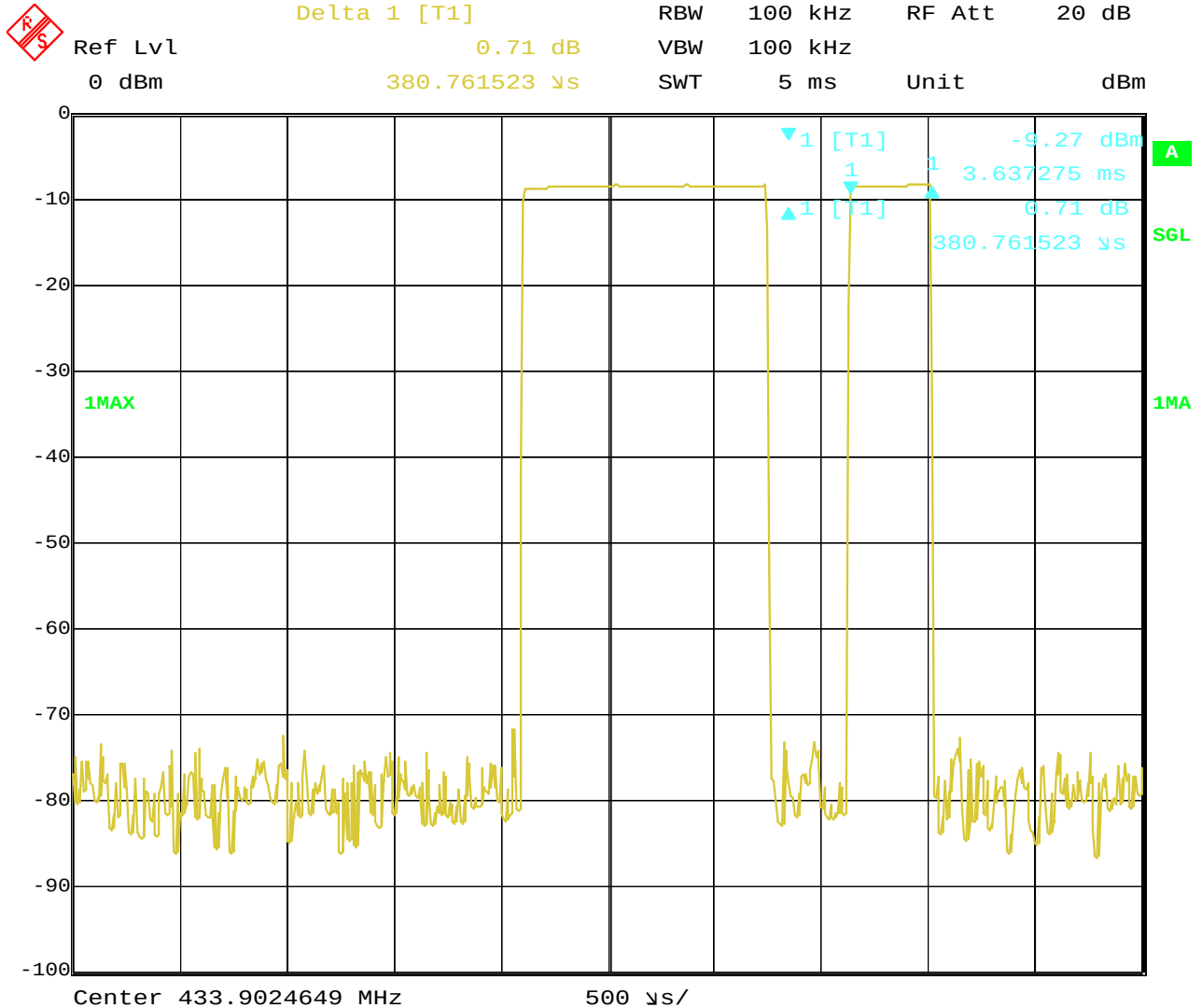
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T<sub>on2</sub>



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## 10.0 Antenna Requirement

### 10.1 Standard Applicable

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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

### 10.2 Antenna Connected constructions

The integral antenna is used. The antenna gain is 3.0dBi. So, it meets the requirement of 15.203

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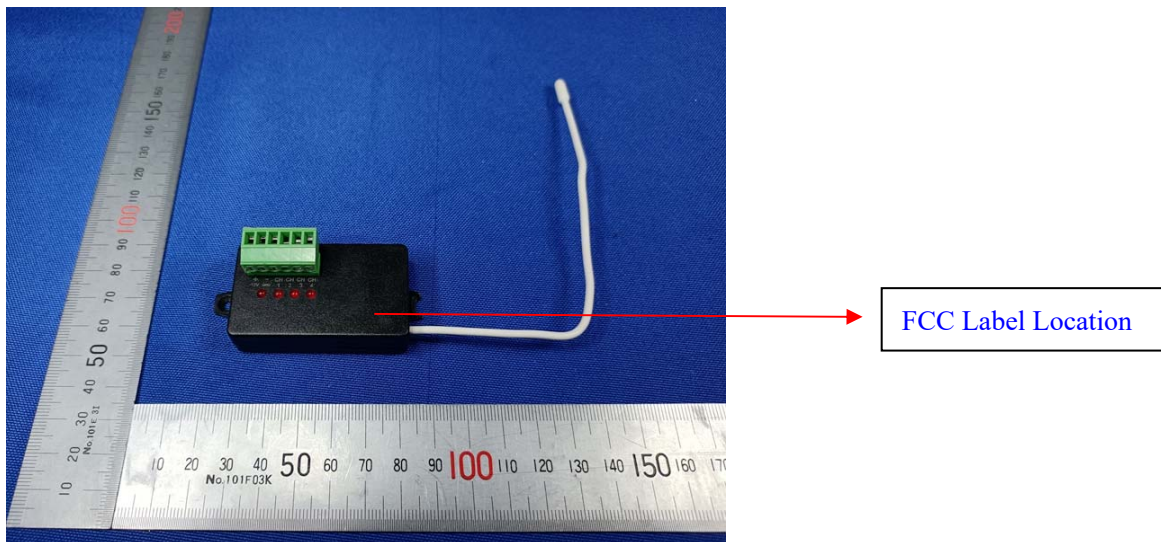


## 11.0 FCC ID Label

### FCC ID: 2A3PQ-TRANS70

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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## 12.0. Photo of testing

### 12.1 Conducted test View



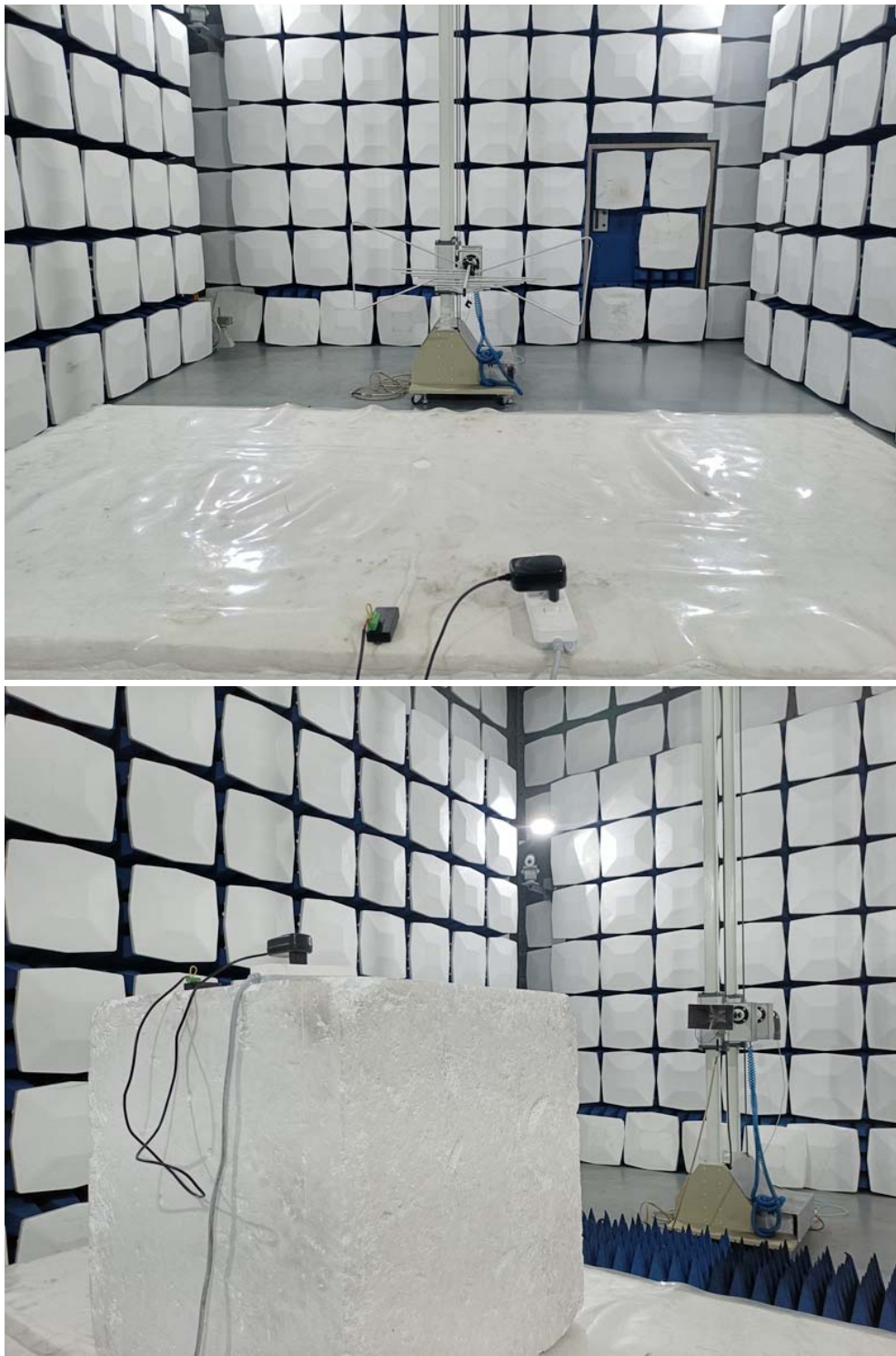
The report refers only to the sample tested and does not apply to the bulk.

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



## 12.2 Radiated emission test view



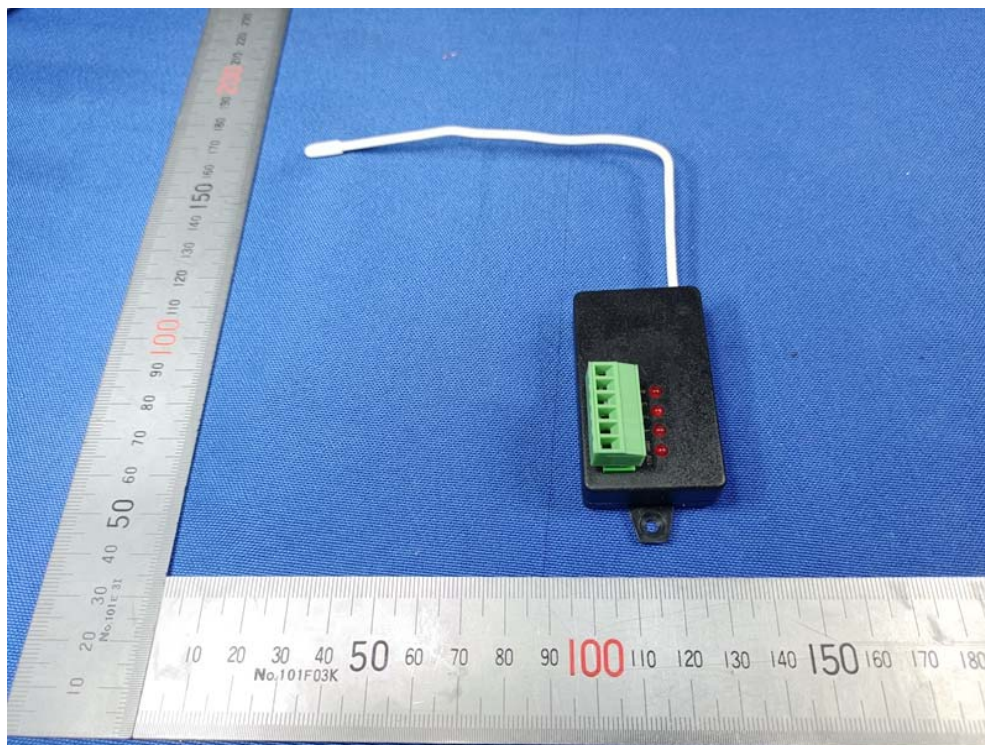
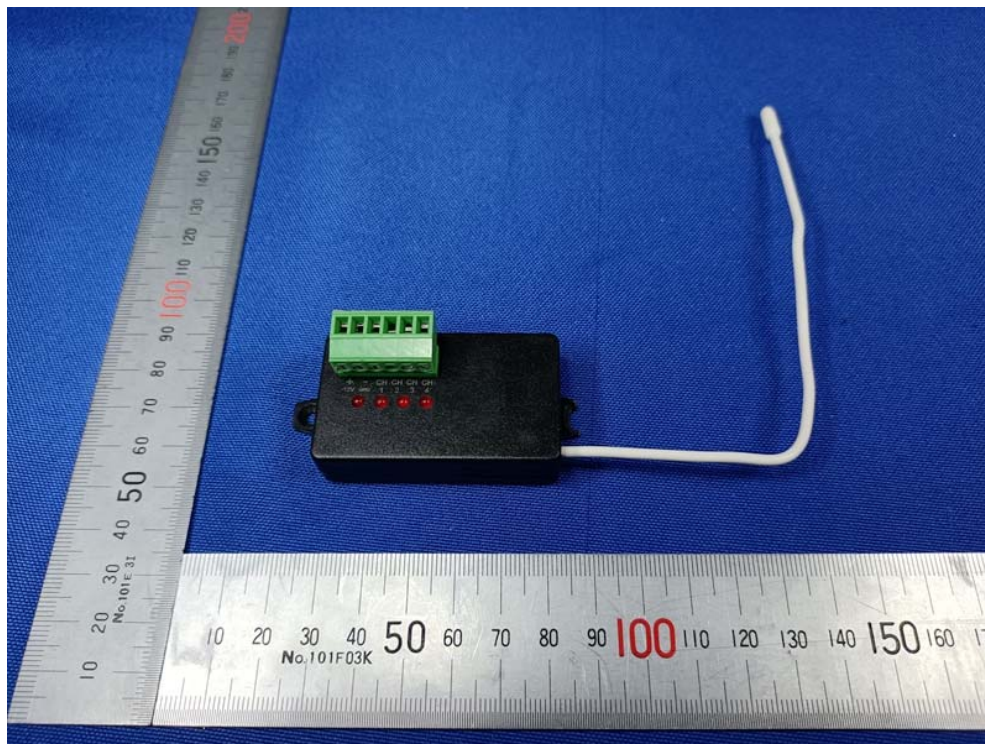
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Photo for the EUT



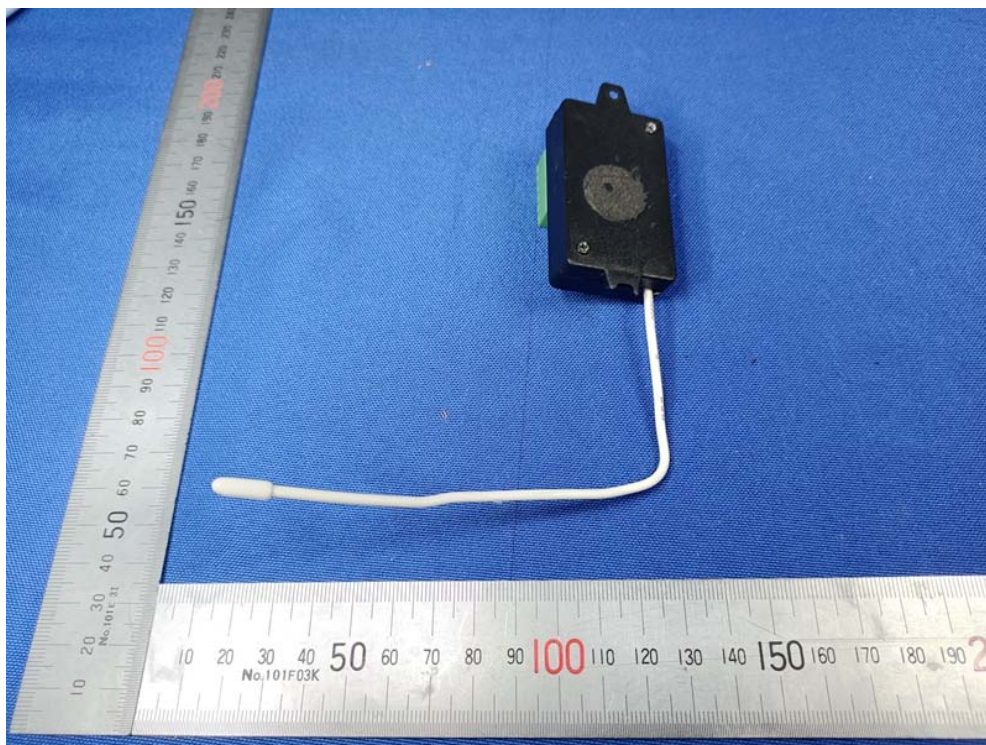
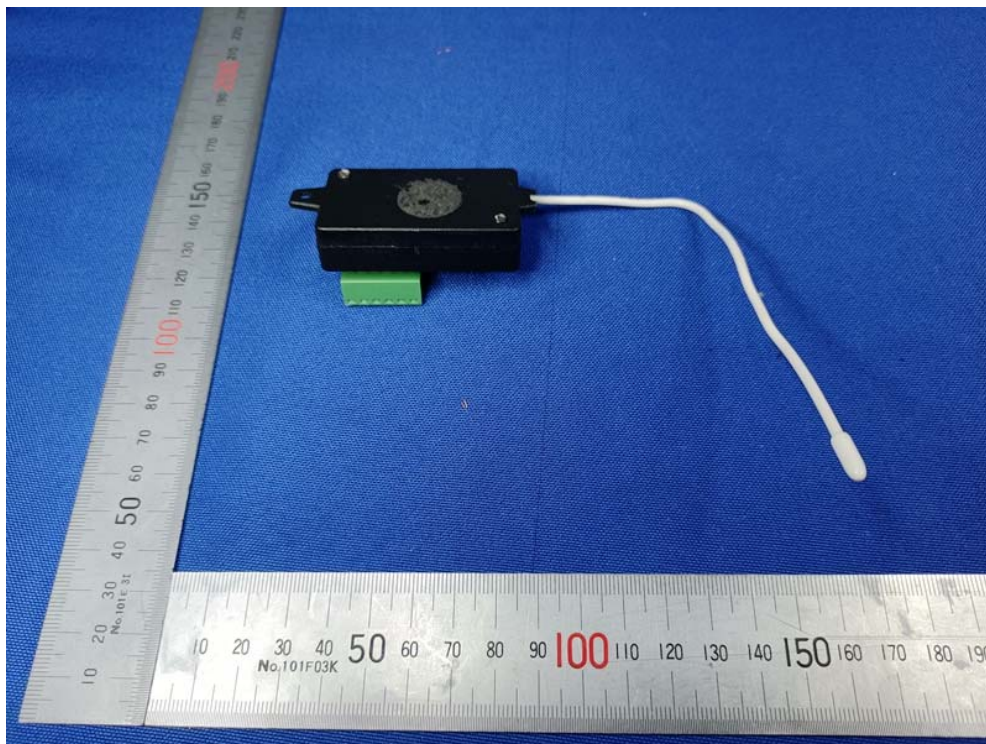
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Photo for the EUT



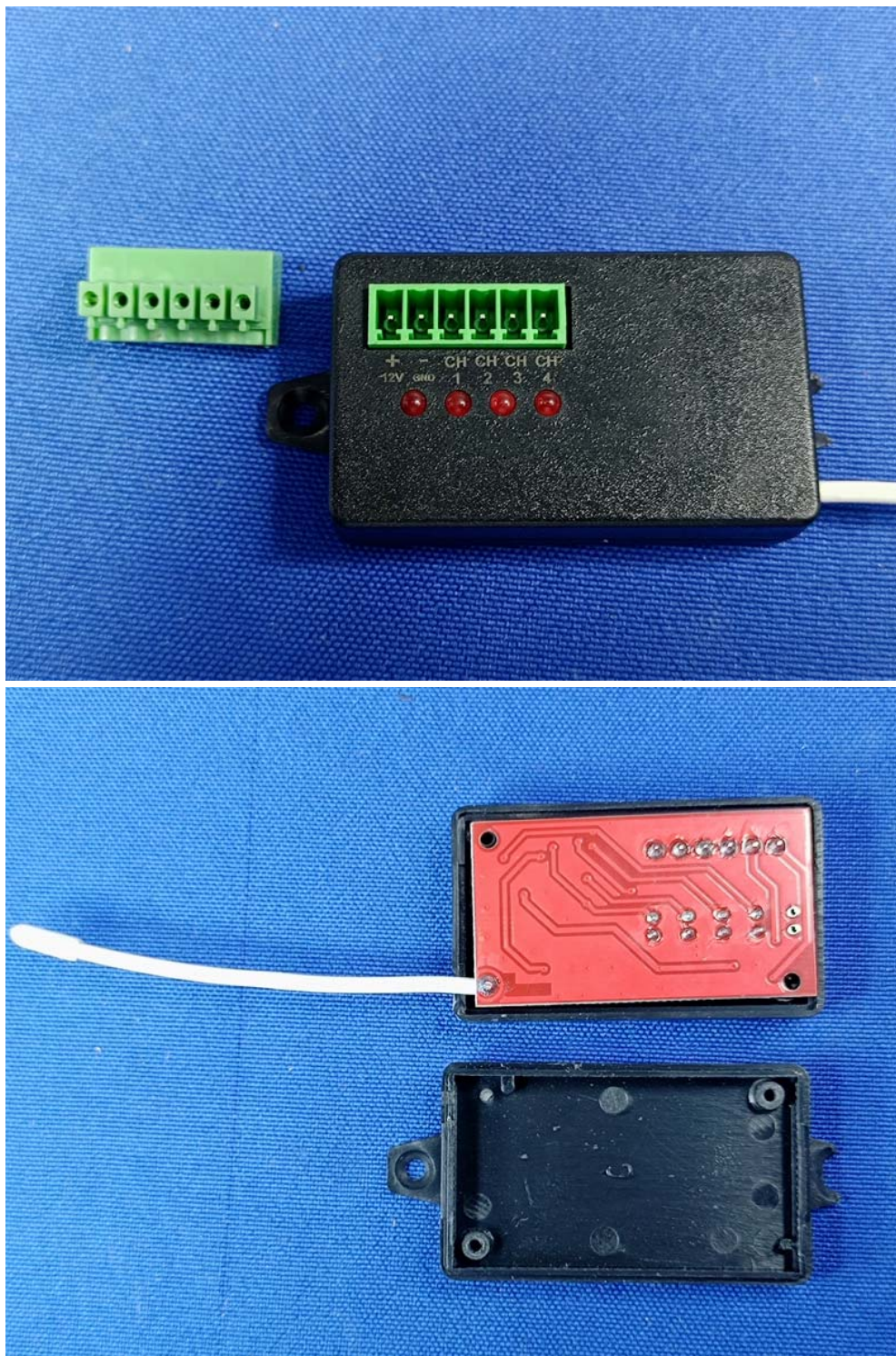
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Photo for the EUT



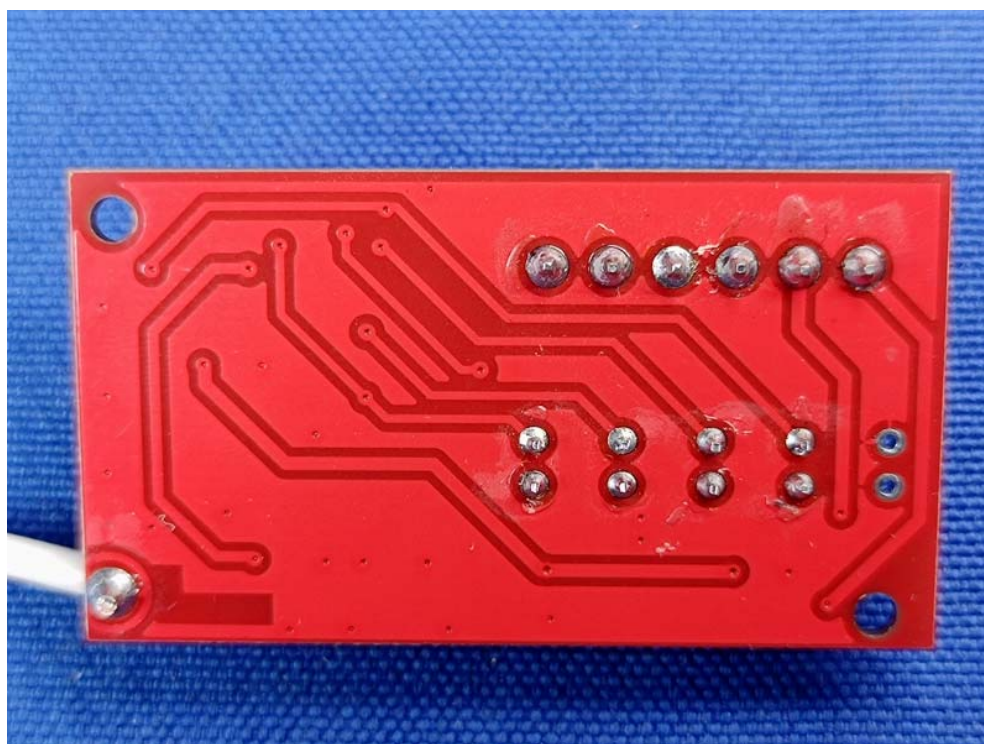
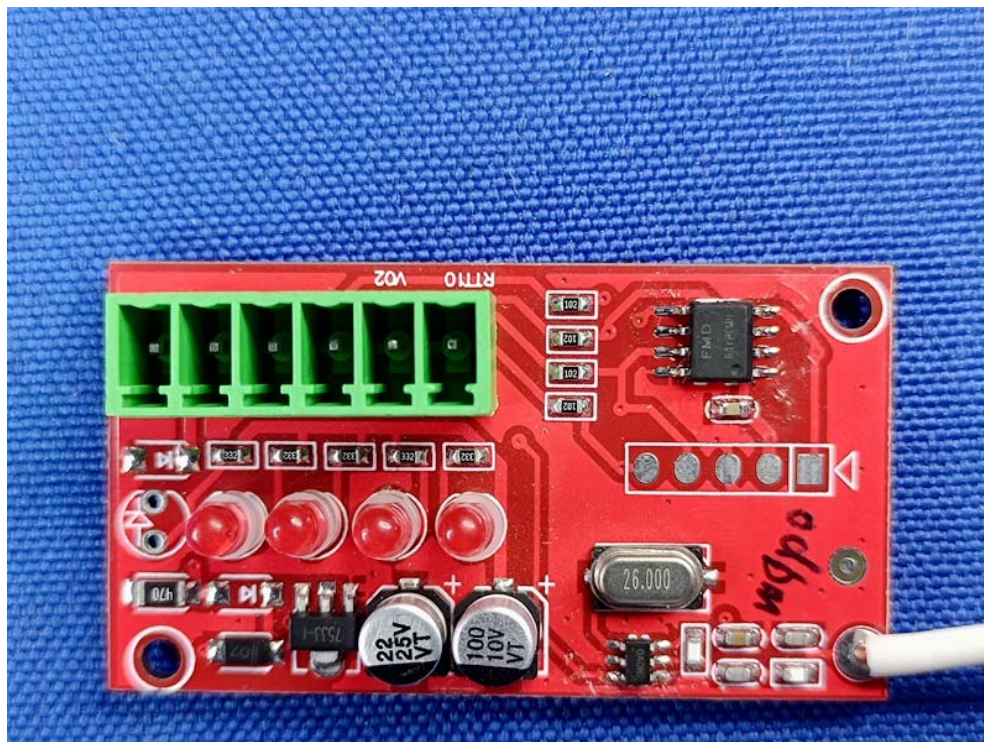
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Photo for the EUT



--End of the report--

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