



## TEST REPORT

For RF

Report No..... : CHTW25090042

Project No ..... : SHT2506080407W

FCC ID: ..... : 2BRCKENGWN9000101

Applicant's name ..... : Endrich Bauelemente Vertriebs GmbH

Address..... : D-72202 Nagold, Hauptstrasse 56.

Product Name ..... : EIOT-USBGW-MESH-NCXXX-USB

Trade Mark..... : -

Model No..... : EIOT-USBGW-MESH-NC915-USB

Listed Model(s) ..... : -

Standard ..... : **FCC CFR Title 47 Part 15 Subpart C § 15.247**

Date of receipt of test sample.....: 2025/7/17

Date of testing.....: 2025/7/17- 2025/9/12

Date of issue.....: 2025/9/15

Result.....: **Pass**



|                                                      |                    |               |  |
|------------------------------------------------------|--------------------|---------------|--|
| Compiled by<br>(Position+Printed name+Signature) :   | File administrator | Xiaodong Zhao |  |
| Supervised by<br>(Position+Printed name+Signature) : | Project Engineer   | Kiki Kong     |  |
| Approved by<br>(Position+Printed name+Signature) :   | RF Manager         | Xu Yang       |  |

**Testing Laboratory Name ..... : Shenzhen Huatongwei International Inspection Co., Ltd.**

Address..... : Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China

Test Report Form No. .... : R0066

Test Report Form(s) Originator ..... : Shenzhen Huatongwei International Inspection Co., Ltd.

Master TRF ..... : Dated 2025-07

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## Contents

|                  |                                                    |                  |
|------------------|----------------------------------------------------|------------------|
| <b><u>1.</u></b> | <b><u>TEST STANDARDS AND REPORT VERSION</u></b>    | <b><u>3</u></b>  |
| 1.1.             | Test Standards                                     | 3                |
| 1.2.             | Report version                                     | 3                |
| <b><u>2.</u></b> | <b><u>TEST DESCRIPTION</u></b>                     | <b><u>4</u></b>  |
| <b><u>3.</u></b> | <b><u>SUMMARY</u></b>                              | <b><u>5</u></b>  |
| 3.1.             | Client Information                                 | 5                |
| 3.2.             | Product Description                                | 5                |
| 3.3.             | Radio Specification Description                    | 5                |
| 3.4.             | Testing Laboratory Information                     | 5                |
| <b><u>4.</u></b> | <b><u>TEST CONFIGURATION</u></b>                   | <b><u>6</u></b>  |
| 4.1.             | Test frequency list                                | 6                |
| 4.2.             | Descriptions of Test mode                          | 6                |
| 4.3.             | Test sample information                            | 6                |
| 4.4.             | Support unit used in test configuration and system | 6                |
| 4.5.             | Testing environmental condition                    | 7                |
| 4.6.             | Statement of the measurement uncertainty           | 7                |
| 4.7.             | Equipment Used during the Test                     | 8                |
| <b><u>5.</u></b> | <b><u>TEST CONDITIONS AND RESULTS</u></b>          | <b><u>10</u></b> |
| 5.1.             | Antenna Requirement                                | 10               |
| 5.2.             | AC Conducted Emission                              | 11               |
| 5.3.             | Peak Output Power                                  | 13               |
| 5.4.             | Power Spectral Density                             | 14               |
| 5.5.             | 6dB bandwidth                                      | 15               |
| 5.6.             | Conducted Band edge and Spurious Emission          | 16               |
| 5.7.             | Radiated Band edge Emission                        | 17               |
| 5.8.             | Radiated Spurious Emission                         | 19               |
| <b><u>6.</u></b> | <b><u>TEST SETUP PHOTOS</u></b>                    | <b><u>24</u></b> |
| <b><u>7.</u></b> | <b><u>EXTERNAL AND INTERNAL PHOTOS</u></b>         | <b><u>26</u></b> |
| 7.1.             | External Photos                                    | 26               |
| 7.2.             | Internal Photos                                    | 29               |
| <b><u>8.</u></b> | <b><u>APPENDIX REPORT</u></b>                      | <b><u>31</u></b> |

## 1. TEST STANDARDS AND REPORT VERSION

### 1.1. Test Standards

The tests were performed according to following standards:

- [FCC CFR Title 47 Part 15 Subpart C § 15.247](#): Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
- [ANSI C63.10:2020](#): American National Standard for Testing Unlicensed Wireless Devices
- [KDB 558074 D01 15.247 Meas Guidance v05r02](#): Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of The FCC Rules

### 1.2. Report version

| Revision No. | Date of issue | Description |
|--------------|---------------|-------------|
| N/A          | 2025-09-15    | Original    |
|              |               |             |
|              |               |             |
|              |               |             |
|              |               |             |

## 2. TEST DESCRIPTION

| Report clause | Test Items                                | Standard Requirement    | Result             | Test Engineer |
|---------------|-------------------------------------------|-------------------------|--------------------|---------------|
| 5.1           | Antenna Requirement                       | 15.203/15.247(c)        | PASS               | Weixiangyu    |
| 5.2           | AC Conducted Emission                     | 15.207                  | PASS               | YATING.CHEN   |
| 5.3           | Peak Output Power                         | 15.247(b)(3)            | PASS <sup>*1</sup> | -             |
| 5.4           | Power Spectral Density                    | 15.247(e)               | PASS <sup>*1</sup> | -             |
| 5.5           | 6dB Bandwidth                             | 15.247(a)(2)            | PASS <sup>*1</sup> | -             |
| 5.6           | Conducted Band Edge and Spurious Emission | 15.247(d)/15.205        | PASS <sup>*1</sup> | -             |
| 5.7           | Radiated Band Edge Emission               | 15.205/15.209           | PASS               | Yifan Wang    |
| 5.8           | Radiated Spurious Emission                | 15.247(d)/15.205/15.209 | PASS               | Yifan Wang    |

**Note:**

- The measurement uncertainty is not included in the test result.
- <sup>\*1</sup>: EUT in built a RF module(IFCC ID: 2AB76NC1000C1) which had been certified by telefication and the report No. is 21012195,21012195\_Rev.00 and 6P02721-3 rev.3 tested by TÜV NORD Hochfrequenztechnik GmbH & Co.KG and KTOS Testing& ReliabilityServices A/S So except the “Radiated Band Edge Emission and Radiated Spurious Emission,and AC Conducted Emission” was retested, all other items please refer to the module report 21012195,21012195\_Rev.00 and 6P02721-3 rev.3.

### 3. SUMMARY

#### 3.1. Client Information

|               |                                    |
|---------------|------------------------------------|
| Applicant:    | Endrich Bauelemente Vertriebs GmbH |
| Address:      | D-72202 Nagold, Hauptstrasse 56.   |
| Manufacturer: | Endrich Bauelemente Vertriebs GmbH |
| Address:      | D-72202 Nagold, Hauptstrasse 56.   |

#### 3.2. Product Description

| Main unit information: |                           |
|------------------------|---------------------------|
| Product Name:          | EIOT-USBGW-MESH-NCXXX-USB |
| Trade Mark:            | -                         |
| Model No.:             | EIOT-USBGW-MESH-NC915-USB |
| Listed Model(s):       | -                         |
| Power supply:          | USB 5V power supply       |
| Hardware version:      | 1.0                       |
| Software version:      | 1.0                       |

#### 3.3. Radio Specification Description

|                      |                   |
|----------------------|-------------------|
| Modulation:          | GFSK              |
| Operation frequency: | 902.6MHz~927.4MHz |
| Channel number:      | 251               |
| Antenna type:        | Monopole Antenna  |
| Antenna gain:        | 3.00dBi           |

#### 3.4. Testing Laboratory Information

|                      |                                                                                                                                                    |                      |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Laboratory Name      | Shenzhen Huatongwei International Inspection Co., Ltd.                                                                                             |                      |
| Laboratory Location  | Building 7, Baiwang Idea Factory, No.1051, Songbai Road, Yangguang Community, Xili Subdistrict, Nanshan District, Shenzhen, Guangdong, China       |                      |
| Contact information: | Tel: 400-963-0755<br>E-mail: <a href="mailto:cs@szhtw.com.cn">cs@szhtw.com.cn</a><br><a href="http://www.szhtw.com.cn">http://www.szhtw.com.cn</a> |                      |
| Qualifications       | Type                                                                                                                                               | Accreditation Number |
|                      | FCC Registration Number                                                                                                                            | 762235               |
|                      | FCC Designation Number                                                                                                                             | CN1181               |

## 4. TEST CONFIGURATION

### 4.1. Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channels which were tested. The Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the below blue front.

| Channel | Frequency (MHz) |
|---------|-----------------|
| CH-L    | 902.6           |
| CH-M    | 915             |
| CH-H    | 927.4           |

### 4.2. Descriptions of Test mode

|                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| For RF test items                                                                                                                                                                                                                         |
| The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%).                                                                                                                                   |
| For AC power line conducted emissions:                                                                                                                                                                                                    |
| The EUT connect to laptop by USB cable. the laptop control LORA transmitting.                                                                                                                                                             |
| For Radiated spurious emissions test item:                                                                                                                                                                                                |
| The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%). The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data Recorded in the report. |

### 4.3. Test sample information

| Test item               | HTW sample no.  |
|-------------------------|-----------------|
| RF Conducted test items | -               |
| RF Radiated test items  | YPHT25060804005 |
| EMI test items          | YPHT25060804006 |

Note:

RF Conducted test items: Peak Output Power, Power Spectral Density, 6dB Bandwidth, 99% Occupied Bandwidth, Duty cycle, Conducted Band Edge and Spurious Emission

RF Radiated test items: Radiated Band Edge Emission, Radiated Spurious Emission

EMI test items: AC Conducted Emission

### 4.4. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

| Whether support unit is used? |            |            |                |            |
|-------------------------------|------------|------------|----------------|------------|
| ✓ Yes                         |            |            |                |            |
| Item                          | Equipement | Trade Name | Model No.      | Power cord |
| 1                             | Laptop     | DELL       | Vostro 14-3459 | -          |
| 2                             |            |            |                |            |

#### 4.5. Testing environmental condition

| Type               | Requirement  | Actual   |
|--------------------|--------------|----------|
| Temperature:       | 15~35°C      | 25°C     |
| Relative Humidity: | 25~75%       | 50%      |
| Air Pressure:      | 860~1060mbar | 1000mbar |

#### 4.6. Statement of the measurement uncertainty

| No. | Test Items                                | Measurement Uncertainty                        |
|-----|-------------------------------------------|------------------------------------------------|
| 1   | AC Conducted Emission                     | 3.21dB                                         |
| 2   | Peak Output Power                         | 1.07                                           |
| 3   | Power Spectral Density                    | 1.07                                           |
| 4   | 6dB Bandwidth                             | 0.002%                                         |
| 5   | 99% Occupied Bandwidth                    | 0.002%                                         |
| 6   | Duty cycle                                | -                                              |
| 7   | Conducted Band Edge and Spurious Emission | 1.68dB                                         |
| 8   | Radiated Band Edge Emission               | 4.54dB for 30MHz-1GHz<br>5.10dB for above 1GHz |
| 9   | Radiated Spurious Emission                | 4.54dB for 30MHz-1GHz<br>5.10dB for above 1GHz |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=1.96$ .

#### 4.7. Equipment Used during the Test

| ● RF Test Software |                            |               |              |               |            |
|--------------------|----------------------------|---------------|--------------|---------------|------------|
| Used               | Test Item                  | Software Name | Manufacturer | Equipment No. | Version    |
| ●                  | Radiated Spurious Emission | EMC32         | R&S          | HTWER012      | V10.60.20  |
| ●                  | Radiated Spurious Emission | E3            | AUDIX        | HTWER006      | V6.110407a |
| ●                  | Conducted Emission         | EMC32         | R&S          | HTWER012      | V10.60.20  |

| ● Conducted Emission |                    |              |               |                 |            |                           |                           |
|----------------------|--------------------|--------------|---------------|-----------------|------------|---------------------------|---------------------------|
| Used                 | Test Equipment     | Manufacturer | Equipment No. | Model No.       | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| ●                    | EMI Test Receiver  | R&S          | HTWE0111      | ESCI            | 101247     | 2025/8/6                  | 2026/8/5                  |
| ●                    | Artificial Mains   | SCHWARZBECK  | HTWE0113      | NNLK 8121       | 573        | 2025/8/6                  | 2026/8/5                  |
| ●                    | Protection Network | SCHWARZBECK  | HTWE0567      | VTSD9561FN      | 00899      | 2025/8/6                  | 2026/8/5                  |
| ●                    | ISN                | FCC          | HTWE0148      | FCC-TLISN-T2-02 | 20371      | 2025/8/6                  | 2026/8/5                  |
| ●                    | ISN                | FCC          | HTWE0150      | FCC-TLISN-T8-02 | 20375      | 2025/8/6                  | 2026/8/5                  |

| ● Radiated emission- 9kHz~30MHz |                       |                    |               |           |            |                           |                           |
|---------------------------------|-----------------------|--------------------|---------------|-----------|------------|---------------------------|---------------------------|
| Used                            | Test Equipment        | Manufacturer       | Equipment No. | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| ●                               | Semi-Anechoic Chamber | Albatross projects | HTWE0127      | SAC-3m-02 | C11121     | 2023/4/6                  | 2026/4/5                  |
| ●                               | EMI Test Receiver     | R&S                | HTWE0099      | ESCI 7    | 100900     | 2025/8/6                  | 2026/8/5                  |
| ●                               | Loop Antenna          | R&S                | HTWE0546      | HFH2-Z2E  | 101073     | 2024/4/8                  | 2027/4/7                  |

| ● Radiated emission- 30MHz~1GHz |                         |                    |               |           |            |                           |                           |
|---------------------------------|-------------------------|--------------------|---------------|-----------|------------|---------------------------|---------------------------|
| Used                            | Test Equipment          | Manufacturer       | Equipment No. | Model No. | Serial No. | Last Cal. Date (YY-MM-DD) | Next Cal. Date (YY-MM-DD) |
| ●                               | Semi-Anechoic Chamber   | Albatross projects | HTWE0127      | SAC-3m-02 | C11121     | 2023/4/6                  | 2026/4/5                  |
| ●                               | EMI Test Receiver       | R&S                | HTWE0099      | ESCI 7    | 100900     | 2025/8/6                  | 2026/8/5                  |
| ●                               | Ultra-Broadband Antenna | SCHWARZBECK        | HTWE0119      | VULB9163  | 546        | 2023/2/22                 | 2026/2/21                 |
| ●                               | Pre-Amplifier           | SCHWARZBECK        | HTWE0295      | BBV 9742  | /          | 2025/5/26                 | 2026/5/25                 |
| ●                               | CMAD                    | SCHWARZBECK        | HTWE0537      | CMAD1614  | 1614-530   | 2025/8/4                  | 2026/8/3                  |

● Radiated emission- Above 1GHz

| Used | Test Equipment          | Manufacturer       | Equipment No. | Model No.  | Serial No. | Last Cal. Date<br>(YY-MM-DD) | Next Cal. Date<br>(YY-MM-DD) |
|------|-------------------------|--------------------|---------------|------------|------------|------------------------------|------------------------------|
| ●    | Full-Anechoic Chamber   | Albatross projects | HTWE0122      | SAC-3m-01  | C11122     | 2023/4/17                    | 2026/4/16                    |
| ●    | Spectrum Analyzer       | R&S                | HTWE0098      | FSP40      | 100597     | 2025/8/6                     | 2026/8/5                     |
| ●    | Horn Antenna            | SCHWARZBECK        | HTWE0126      | BBHA 9120D | 1011       | 2023/2/14                    | 2026/2/13                    |
| ●    | Broadband Pre-amplifier | SCHWARZBECK        | HTWE0551      | SCU18F     | 100855     | 2025/5/26                    | 2026/5/25                    |

● Auxiliary Equipment

| Used | Test Equipment  | Manufacturer | Equipment No. | Model No. | Serial No.  | Last Cal. Date<br>(YY-MM-DD) | Next Cal. Date<br>(YY-MM-DD) |
|------|-----------------|--------------|---------------|-----------|-------------|------------------------------|------------------------------|
| ●    | DC Power Supply | Gwinstek     | HTWE0274      | SPS-2415  | GER835793   | N/A                          | N/A                          |
| ●    | DC Power Supply | MESTEK       | HTWE0705      | DP6010    | 00230820197 | N/A                          | N/A                          |

## 5. TEST CONDITIONS AND RESULTS

### 5.1. Antenna Requirement

#### Requirement

**FCC CFR Title 47 Part 15 Subpart C Section 15.203:**

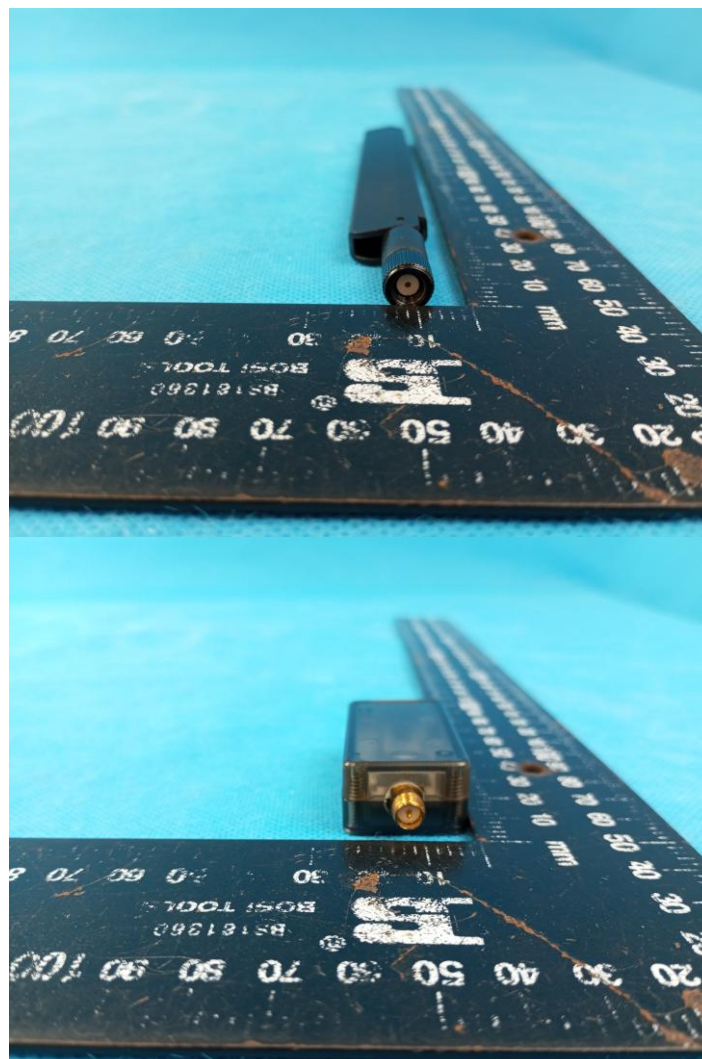
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

#### TEST RESULT

☒ Passed      ☐ Not Applicable

The antenna type is a Monopole antenna, please refer to the below antenna photo.

|



## 5.2. AC Conducted Emission

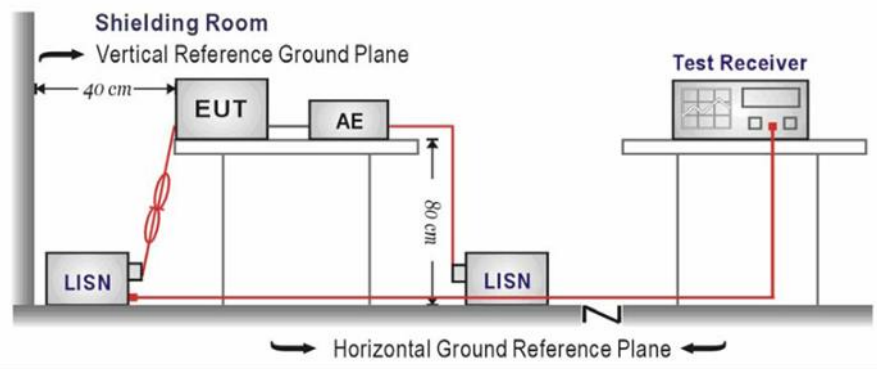
### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

| Frequency range (MHz) | Limit (dBuV) |           |
|-----------------------|--------------|-----------|
|                       | Quasi-peak   | Average   |
| 0.15-0.5              | 66 to 56*    | 56 to 46* |
| 0.5-5                 | 56           | 46        |
| 5-30                  | 60           | 50        |

\* Decreases with the logarithm of the frequency.

### TEST CONFIGURATION



### TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

### TEST MODE:

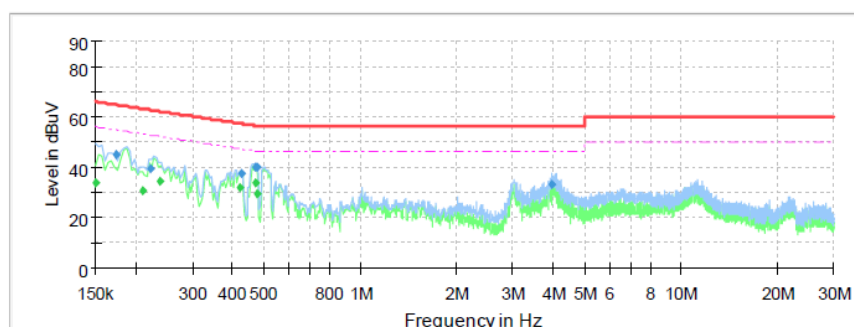
Refer to the clause 4.2

### TEST RESULT

☒ Passed ☐ Not Applicable

Test Line:

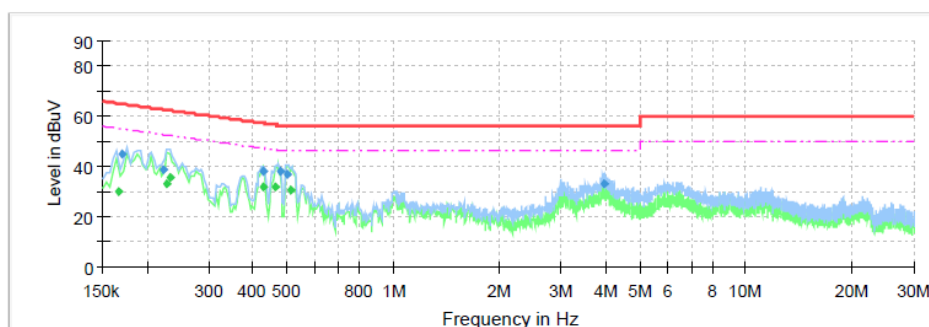
L

**Final Result**

| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|------------|
| 0.1500          | ---              | 33.92           | 56.00        | 22.08       | L1   | 10.1       |
| 0.1728          | 45.11            | ---             | 64.82        | 19.71       | L1   | 10.2       |
| 0.2098          | ---              | 30.75           | 53.21        | 22.46       | L1   | 10.2       |
| 0.2216          | 39.32            | ---             | 62.76        | 23.44       | L1   | 10.2       |
| 0.2379          | ---              | 34.33           | 52.17        | 17.84       | L1   | 10.2       |
| 0.4239          | ---              | 31.69           | 47.37        | 15.68       | L1   | 10.3       |
| 0.4287          | 37.27            | ---             | 57.28        | 20.01       | L1   | 10.3       |
| 0.4729          | 39.96            | ---             | 56.46        | 16.50       | L1   | 10.4       |
| 0.4732          | ---              | 33.70           | 46.46        | 12.76       | L1   | 10.4       |
| 0.4782          | 39.97            | ---             | 56.37        | 16.40       | L1   | 10.4       |
| 0.4782          | ---              | 29.63           | 46.37        | 16.74       | L1   | 10.4       |
| 3.9686          | 33.40            | ---             | 56.00        | 22.60       | L1   | 10.6       |

Test Line:

N

**Final Result**

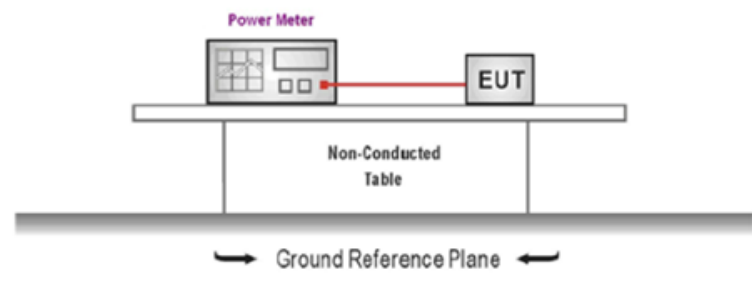
| Frequency (MHz) | QuasiPeak (dBuV) | CAverage (dBuV) | Limit (dBuV) | Margin (dB) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|------|------------|
| 0.1660          | ---              | 30.03           | 55.16        | 25.13       | N    | 10.1       |
| 0.1696          | 45.15            | ---             | 64.98        | 19.83       | N    | 10.1       |
| 0.2219          | 38.55            | ---             | 62.75        | 24.20       | N    | 10.2       |
| 0.2285          | ---              | 33.02           | 52.51        | 19.49       | N    | 10.2       |
| 0.2339          | ---              | 35.32           | 52.31        | 16.99       | N    | 10.2       |
| 0.4276          | 38.34            | ---             | 57.30        | 18.96       | N    | 10.2       |
| 0.4276          | ---              | 32.04           | 47.30        | 15.26       | N    | 10.2       |
| 0.4641          | ---              | 31.97           | 46.62        | 14.65       | N    | 10.2       |
| 0.4801          | 38.43            | ---             | 56.34        | 17.90       | N    | 10.2       |
| 0.5020          | 36.61            | ---             | 56.00        | 19.39       | N    | 10.2       |
| 0.5100          | ---              | 30.35           | 46.00        | 15.65       | N    | 10.2       |
| 3.9678          | 33.11            | ---             | 56.00        | 22.89       | N    | 10.3       |

### 5.3. Peak Output Power

#### LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3): 30dBm

#### TEST CONFIGURATION



#### TEST PROCEDURE

1. The EUT was tested according to ANSI C63.10 and KDB 558074 D01 requirements.
2. The maximum peak conducted output power may be measured using a broadband peak RF power meter.
3. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.
4. Record the measurement data.

#### TEST MODE:

Refer to the clause 4.2

#### TEST RESULT

☒ Passed      ☐ Not Applicable

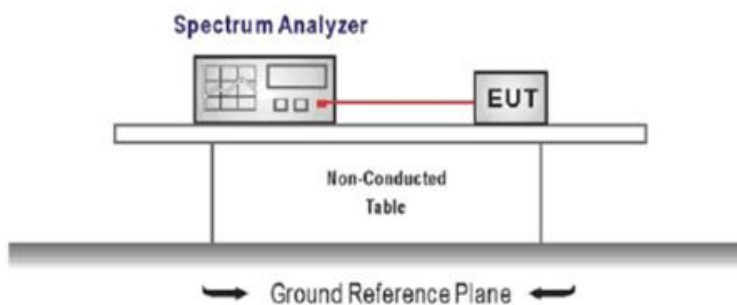
## 5.4. Power Spectral Density

### LIMIT

#### **FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e):**

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

### TEST CONFIGURATION



### TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input,
2. Configure the spectrum analyzer as shown below:  
Center frequency=DTS channel center frequency  
Span =1.5 times the DTS bandwidth  
 $RBW = 3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$ ,  $VBW \geq 3 \times RBW$   
Sweep time = auto couple  
Detector = peak  
Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
4. Use the peak marker function to determine the maximum amplitude level within the RBW.
5. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### TEST MODE:

Refer to the clause 4.2

### TEST RESULT

☒ Passed      ☐ Not Applicable

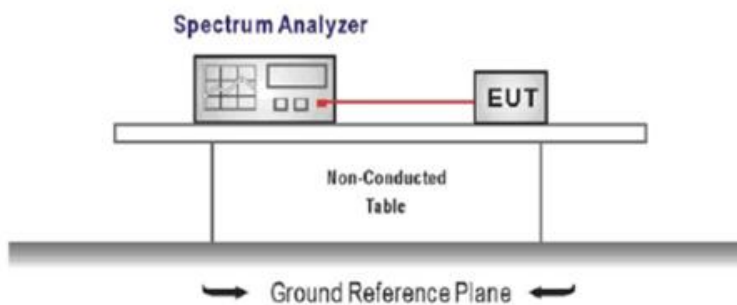
## 5.5. 6dB bandwidth

### LIMIT

**FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2):**

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

### TEST CONFIGURATION



### TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).  
Center Frequency = DTS channel center frequency  
Span =  $2 \times \text{DTS bandwidth}$   
RBW = 100 kHz, VBW  $\geq 3 \times \text{RBW}$   
Sweep time = auto couple  
Detector = Peak  
Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission, and record the pertinent measurements.

### TEST MODE:

Refer to the clause 4.2

### TEST RESULT

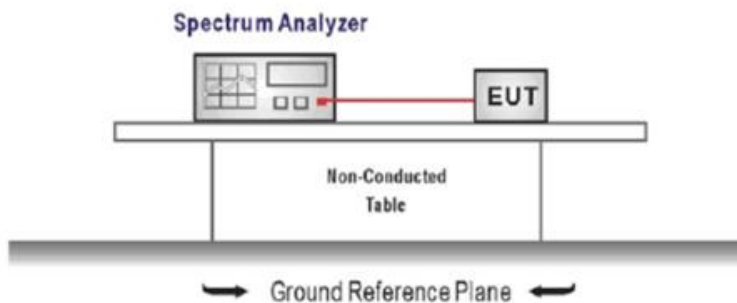
☒ Passed      ☐ Not Applicable

## 5.6. Conducted Band edge and Spurious Emission

### LIMIT

**FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):** In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

### TEST CONFIGURATION



### TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Emission level measurement  
Set the center frequency and span to encompass frequency range to be measured  
RBW = 100 kHz, VBW  $\geq 3 \times$  RBW  
Detector = peak, Sweep time = auto couple, Trace mode = max hold  
Allow trace to fully stabilize  
Use the peak marker function to determine the maximum amplitude level.
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
4. Ensure that the amplitude of all unwanted emission outside of the authorized frequency band excluding restricted frequency bands) are attenuated by at least the minimum requirements specified (at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz). Report the three highest emission relative to the limit.

### TEST MODE:

Refer to the clause 4.2

### TEST RESULT

☒ Passed ☐ Not Applicable

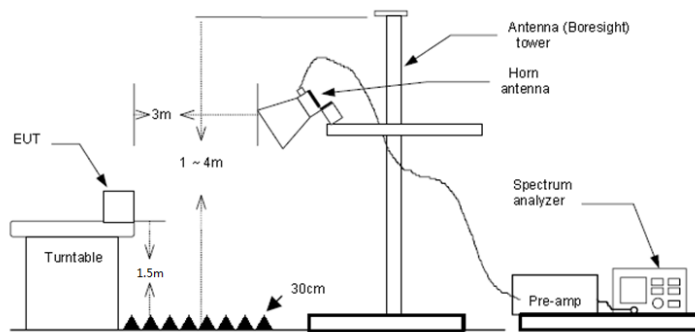
## 5.7. Radiated Band edge Emission

### LIMIT

#### **FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

### TEST CONFIGURATION



### TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10 .
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10 on radiated measurement.
5. Use the following spectrum analyzer settings:
  - a) Span shall wide enough to fully capture the emission being measured
  - b) Set RBW=100kHz for <1GHz, VBW=3\*RBW, Sweep time=auto, Detector=peak, Trace=max hold
  - c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement:

  - VBW=10Hz, When duty cycle is no less than 98 percent
  - $VBW \geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clause 5.6 duty cycle.

### TEST MODE:

Refer to the clause 4.2

### TEST RESULT

☒ Passed      ☐ Not Applicable

Note:

- 1) Level= Reading + Factor; Factor =Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level– Limit

| Test channel: |                  | CH-L              |               |             | Polarity     |                 |                 | Horizontal    |        |  |
|---------------|------------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|--|
| Mark          | Frequency<br>MHz | Reading<br>dBuV/m | Antenna<br>dB | Cable<br>dB | Preamp<br>dB | Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>limit | Remark |  |
| 1             | 902.00           | 34.93             | 22.90         | 6.22        | 0.00         | 64.05           | 80.99           | -16.94        | Peak   |  |
| 2             | 902.39           | 71.87             | 22.90         | 6.22        | 0.00         | 100.99          |                 |               |        |  |

| Test channel: |                  | CH-L              |               |             | Polarity     |                 |                 | Vertical      |        |  |
|---------------|------------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|--|
| Mark          | Frequency<br>MHz | Reading<br>dBuV/m | Antenna<br>dB | Cable<br>dB | Preamp<br>dB | Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>limit | Remark |  |
| 1             | 902.00           | 25.79             | 22.90         | 6.22        | 0.00         | 54.91           | 71.87           | -16.96        | Peak   |  |
| 2             | 902.44           | 62.75             | 22.90         | 6.22        | 0.00         |                 |                 |               |        |  |

| Test channel: |                  | CH-H              |               |             | Polarity     |                 |                 | Horizontal    |        |  |
|---------------|------------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|--|
| Mark          | Frequency<br>MHz | Reading<br>dBuV/m | Antenna<br>dB | Cable<br>dB | Preamp<br>dB | Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>limit | Remark |  |
| 1             | 927.14           | 72.48             | 22.95         | 6.33        | 0.00         | 101.76          |                 |               |        |  |
| 2             | 928.00           | 30.85             | 22.96         | 6.34        | 0.00         | 60.15           | 81.76           | -21.61        | Peak   |  |
| Test channel: |                  | CH-H              |               |             | Polarity     |                 |                 | Vertical      |        |  |
| Mark          | Frequency<br>MHz | Reading<br>dBuV/m | Antenna<br>dB | Cable<br>dB | Preamp<br>dB | Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>limit | Remark |  |
| 1             | 927.09           | 63.82             | 22.95         | 6.33        | 0.00         | 93.10           |                 |               |        |  |
| 2             | 928.00           | 22.09             | 22.96         | 6.34        | 0.00         | 51.39           | 73.10           | -21.71        | Peak   |  |

NOTE: The limit is calculated by 20dB down from fundamental peak

## 5.8. Radiated Spurious Emission

### LIMIT

#### FCC CFR Title 47 Part 15 Subpart C Section 15.209

| Frequency            | Limit (dBuV/m)    | Value      |
|----------------------|-------------------|------------|
| 0.009 MHz ~0.49 MHz  | 2400/F(kHz) @300m | Quasi-peak |
| 0.49 MHz ~ 1.705 MHz | 24000/F(kHz) @30m | Quasi-peak |
| 1.705 MHz ~30 MHz    | 30 @30m           | Quasi-peak |

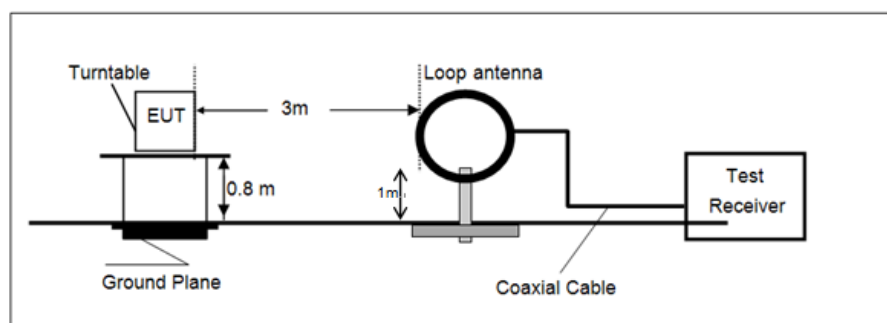
Note: Limit dBuV/m @3m = Limit dBuV/m @300m + 40\*log(300/3)= Limit dBuV/m @300m +80,

Limit dBuV/m @3m = Limit dBuV/m @30m +40\*log(30/3)= Limit dBuV/m @30m + 40.

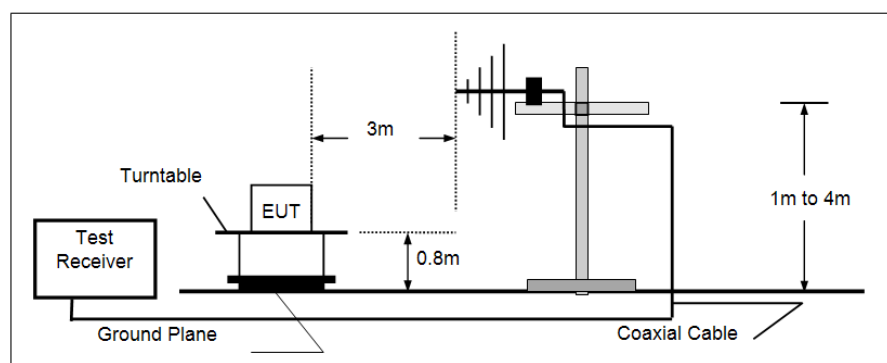
| Frequency     | Limit (dBuV/m @3m) | Value      |
|---------------|--------------------|------------|
| 30MHz~88MHz   | 40.00              | Quasi-peak |
| 88MHz~216MHz  | 43.50              | Quasi-peak |
| 216MHz~960MHz | 46.00              | Quasi-peak |
| 960MHz~1GHz   | 54.00              | Quasi-peak |
| Above 1GHz    | 54.00              | Average    |
|               | 74.00              | Peak       |

### TEST CONFIGURATION

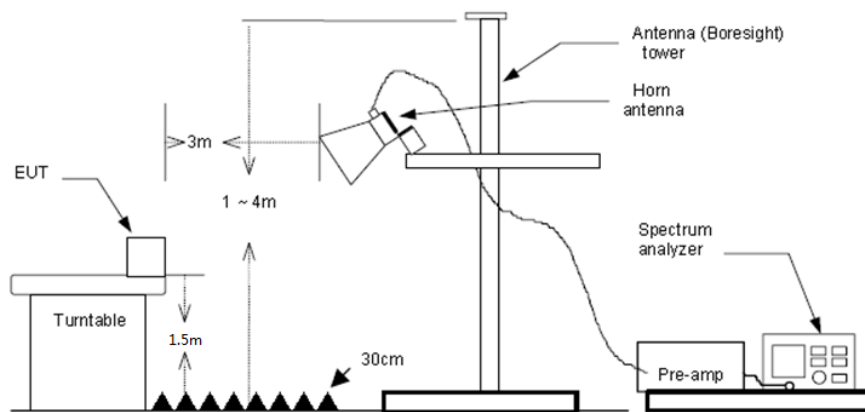
- 9 kHz ~ 30 MHz



- 30 MHz ~ 1 GHz



- Above 1 GHz



### **TEST PROCEDURE**

1. The EUT was setup and tested according to ANSI C63.10 .
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
  - a) Span shall wide enough to fully capture the emission being measured;
  - b) Below 1 GHz:
 

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
  - c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement:

  - VBW=10Hz, When duty cycle is no less than 98 percent
  - VBW $\geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation, so refer to this clause 5.6 duty cycle.

### **TEST MODE:**

Refer to the clause 4.2

### **TEST RESULT**

☒ Passed      ☐ Not Applicable

Note:

- 1) Level= Reading + Factor/Transd; Factor/Transd =Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level– Limit

- 3) Average measurement was not performed if peak level is lower than average limit(54 dBuV/m) for above 1GHz.

**FOR 9 kHz ~ 30 MHz**

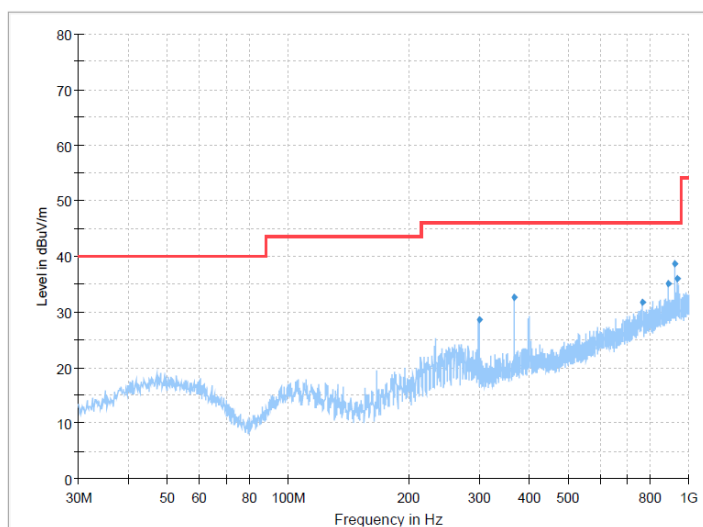
The EUT was pre-scanned this frequency band, found the radiated level 20dB lower than the limit, so don't show data on this report.

**FOR 30 MHz ~ 1000 MHz**

Have pre-scan all test channel, found CH-L which it was worst case, so only show the worst case's data on this report.

Polarization:

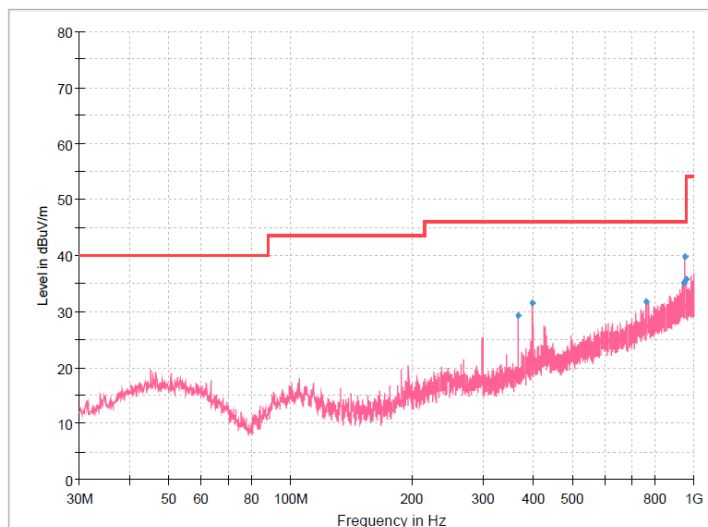
Horizontal

**Final Result**

| Frequency (MHz) | MaxPeak (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 299.7813        | 28.56            | 46.00          | 17.44       | 100.0       | H   | 66.0          | -7.3         |
| 366.5900        | 32.60            | 46.00          | 13.40       | 100.0       | H   | 268.0         | -5.7         |
| 764.0475        | 31.83            | 46.00          | 14.17       | 300.0       | H   | 162.0         | 4.0          |
| 888.0863        | 34.99            | 46.00          | 11.01       | 100.0       | H   | 278.0         | 6.3          |
| 924.2188        | 38.69            | 46.00          | 7.31        | 100.0       | H   | 11.0          | 6.9          |
| 938.7688        | 35.91            | 46.00          | 10.09       | 300.0       | H   | 0.0           | 7.0          |

Polarization:

Vertical

**Final Result**

| Frequency (MHz) | MaxPeak (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 366.4688        | 29.32            | 46.00          | 16.68       | 100.0       | V   | 0.0           | -5.7         |
| 398.8425        | 31.51            | 46.00          | 14.49       | 100.0       | V   | 179.0         | -4.3         |
| 762.2288        | 31.78            | 46.00          | 14.22       | 100.0       | V   | 243.0         | 4.1          |
| 940.9513        | 35.08            | 46.00          | 10.92       | 100.0       | V   | 141.0         | 7.0          |
| 948.4688        | 39.72            | 46.00          | 6.28        | 100.0       | V   | 4.0           | 7.0          |
| 958.4113        | 35.71            | 46.00          | 10.29       | 100.0       | V   | 0.0           | 7.3          |

NOTE: For blocking the fundamental A Notch filter was used in the testing

**FOR 1 GHz ~ 10 GHz**

| Test channel |                  | CH-L              |               |             | Polarity     |                 | Horizontal      |               |        |
|--------------|------------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| Mark         | Frequency<br>MHz | Reading<br>dBuV/m | Antenna<br>dB | Cable<br>dB | Preamp<br>dB | Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>limit | Remark |
| 1            | 2705.54          | 60.66             | 27.73         | 4.48        | 40.95        | 51.92           | 74.00           | -22.08        | Peak   |
| 2            | 4512.97          | 51.35             | 30.63         | 5.87        | 40.20        | 47.65           | 74.00           | -26.35        | Peak   |
| 3            | 6992.14          | 46.14             | 35.07         | 7.69        | 38.90        | 50.00           | 74.00           | -24.00        | Peak   |
| 4            | 11341.14         | 40.41             | 40.22         | 9.17        | 40.19        | 49.61           | 74.00           | -24.39        | Peak   |

| Test channel |                  | CH-L              |               |             | Polarity     |                 | Vertical        |               |        |
|--------------|------------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| Mark         | Frequency<br>MHz | Reading<br>dBuV/m | Antenna<br>dB | Cable<br>dB | Preamp<br>dB | Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>limit | Remark |
| 1            | 2987.92          | 57.94             | 28.50         | 4.67        | 40.82        | 50.29           | 74.00           | -23.71        | Peak   |
| 2            | 4256.33          | 57.29             | 30.03         | 5.84        | 40.37        | 52.79           | 74.00           | -21.21        | Peak   |
| 3            | 4996.69          | 54.84             | 31.39         | 6.31        | 39.92        | 52.62           | 74.00           | -21.38        | Peak   |
| 4            | 6974.36          | 48.75             | 35.00         | 7.70        | 38.90        | 52.55           | 74.00           | -21.45        | Peak   |

| Test channel |                  | CH-M              |               |             | Polarity     |                 | Horizontal      |               |        |
|--------------|------------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| Mark         | Frequency<br>MHz | Reading<br>dBuV/m | Antenna<br>dB | Cable<br>dB | Preamp<br>dB | Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>limit | Remark |
| 1            | 1828.13          | 57.95             | 25.41         | 3.65        | 41.50        | 45.51           | 74.00           | -28.49        | Peak   |
| 2            | 1993.40          | 55.01             | 26.06         | 3.77        | 41.23        | 43.61           | 74.00           | -30.39        | Peak   |
| 3            | 2747.18          | 56.41             | 27.98         | 4.50        | 40.93        | 47.96           | 74.00           | -26.04        | Peak   |
| 4            | 4570.77          | 48.63             | 30.78         | 6.04        | 40.20        | 45.25           | 74.00           | -28.75        | Peak   |

| Test channel |                  | CH-M              |               |             | Polarity     |                 | Vertical        |               |        |
|--------------|------------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| Mark         | Frequency<br>MHz | Reading<br>dBuV/m | Antenna<br>dB | Cable<br>dB | Preamp<br>dB | Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>limit | Remark |
| 1            | 2987.92          | 58.20             | 28.50         | 4.67        | 40.82        | 50.55           | 74.00           | -23.45        | Peak   |
| 2            | 4256.33          | 55.62             | 30.03         | 5.84        | 40.37        | 51.12           | 74.00           | -22.88        | Peak   |
| 3            | 6992.14          | 47.85             | 35.07         | 7.69        | 38.90        | 51.71           | 74.00           | -22.29        | Peak   |
| 4            | 8996.12          | 44.56             | 37.99         | 8.60        | 40.39        | 50.76           | 74.00           | -23.24        | Peak   |

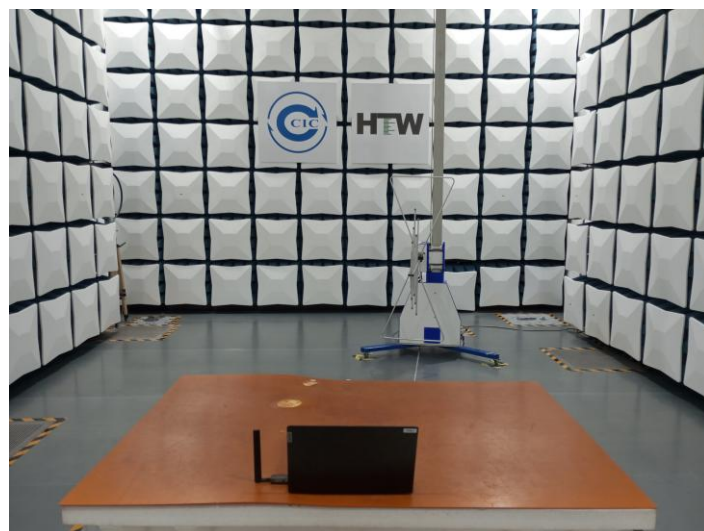
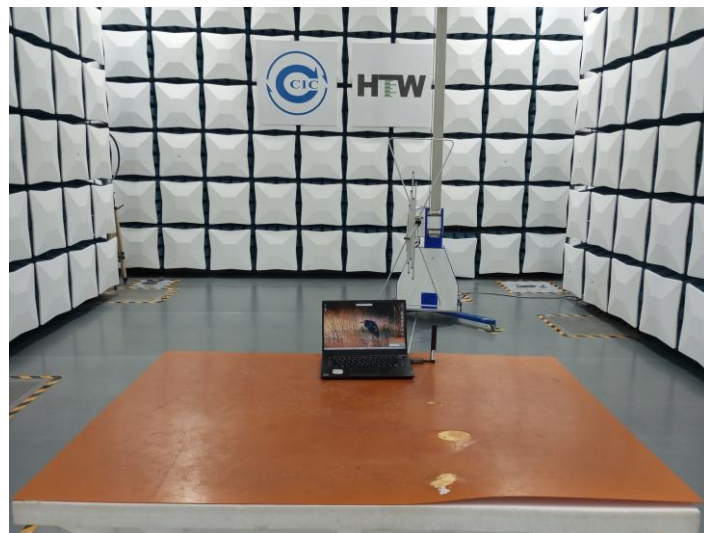
| Test channel |                  | CH-H              |               |             | Polarity     |                 | Horizontal      |               |        |
|--------------|------------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| Mark         | Frequency<br>MHz | Reading<br>dBuV/m | Antenna<br>dB | Cable<br>dB | Preamp<br>dB | Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>limit | Remark |
| 1            | 1851.54          | 62.17             | 25.51         | 3.65        | 41.46        | 49.87           | 74.00           | -24.13        | Peak   |
| 2            | 2782.37          | 53.62             | 28.19         | 4.55        | 40.91        | 45.45           | 74.00           | -28.55        | Peak   |
| 3            | 4641.12          | 48.49             | 30.98         | 6.11        | 40.18        | 45.40           | 74.00           | -28.60        | Peak   |
| 4            | 6974.36          | 45.52             | 35.00         | 7.70        | 38.90        | 49.32           | 74.00           | -24.68        | Peak   |

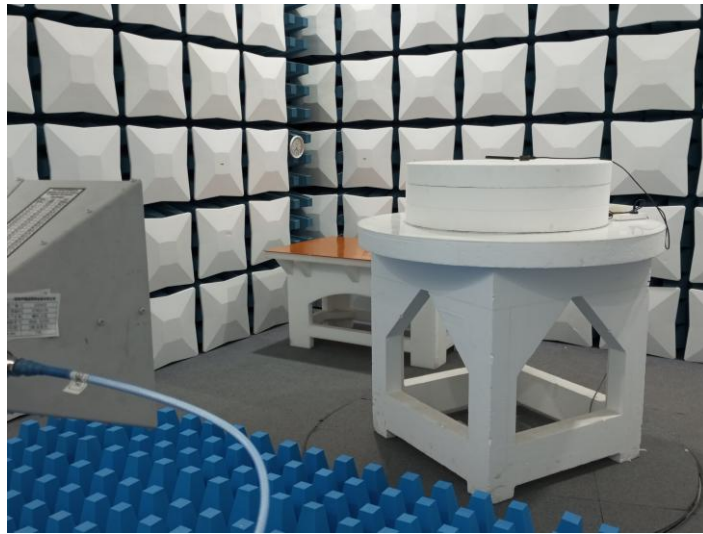
  

| Test channel |                  | CH-H              |               |             | Polarity     |                 | Vertical        |               |        |
|--------------|------------------|-------------------|---------------|-------------|--------------|-----------------|-----------------|---------------|--------|
| Mark         | Frequency<br>MHz | Reading<br>dBuV/m | Antenna<br>dB | Cable<br>dB | Preamp<br>dB | Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>limit | Remark |
| 1            | 2987.92          | 59.13             | 28.50         | 4.67        | 40.82        | 51.48           | 74.00           | -22.52        | Peak   |
| 2            | 3993.90          | 52.98             | 29.79         | 5.58        | 40.41        | 47.94           | 74.00           | -26.06        | Peak   |
| 3            | 6974.36          | 46.74             | 35.00         | 7.70        | 38.90        | 50.54           | 74.00           | -23.46        | Peak   |
| 4            | 8250.27          | 45.61             | 36.50         | 8.44        | 39.25        | 51.30           | 74.00           | -22.70        | Peak   |

## 6. TEST SETUP PHOTOS

Radiated Emission



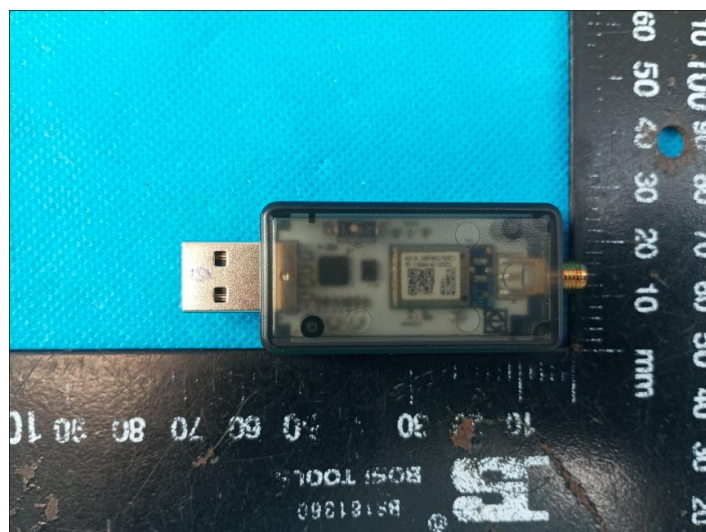


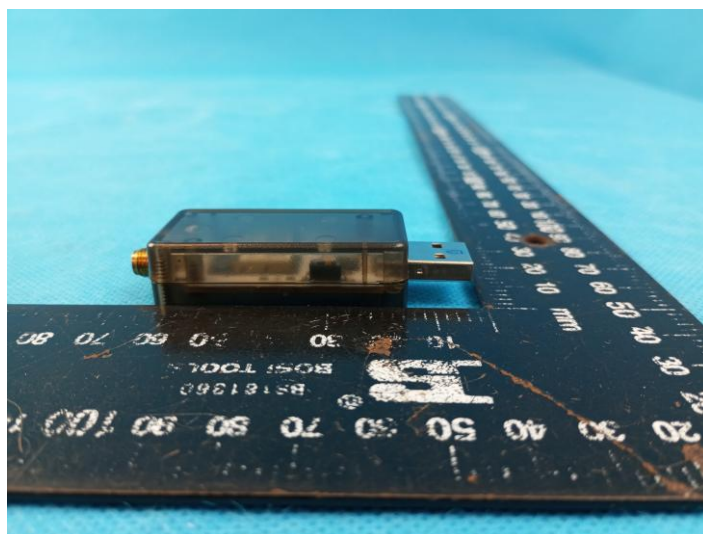
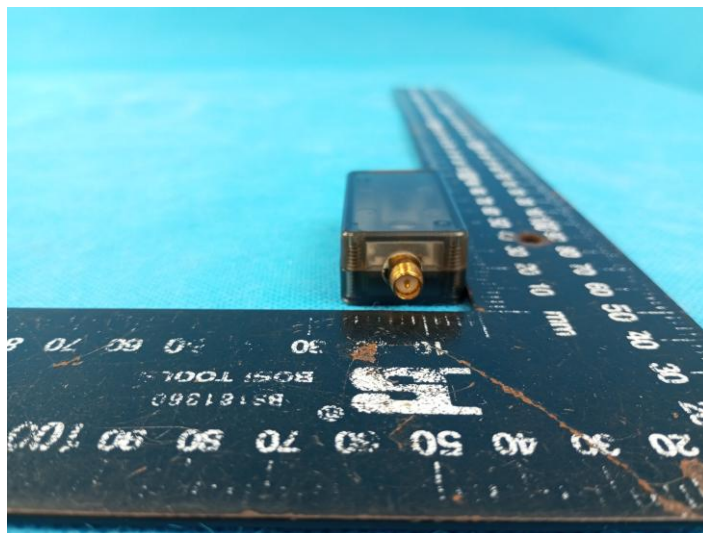
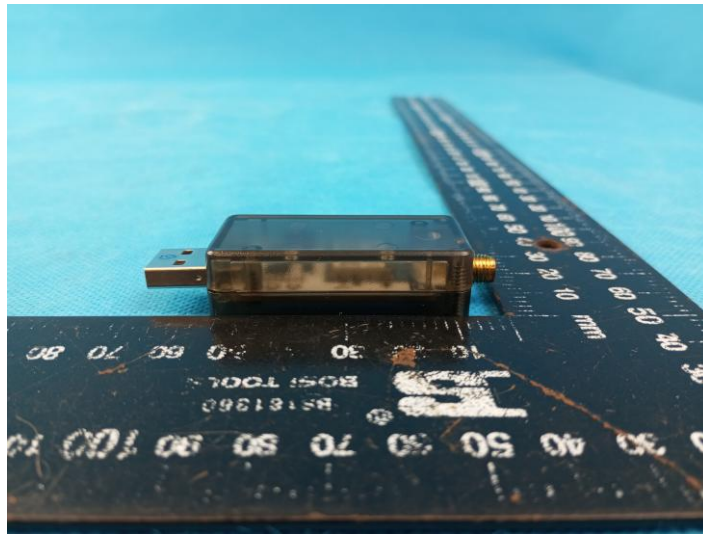
AC Conducted Emission

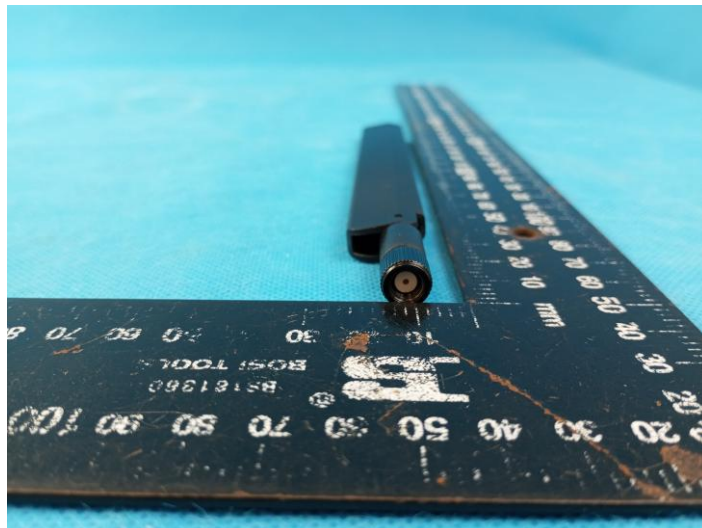
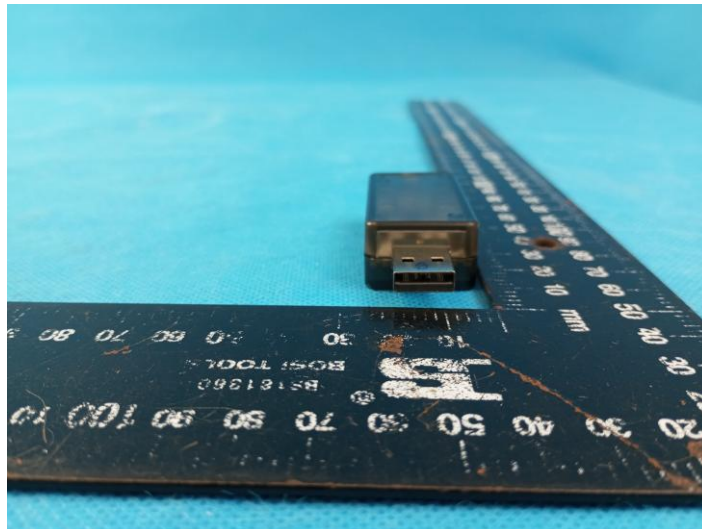


## 7. EXTERNAL AND INTERNAL PHOTOS

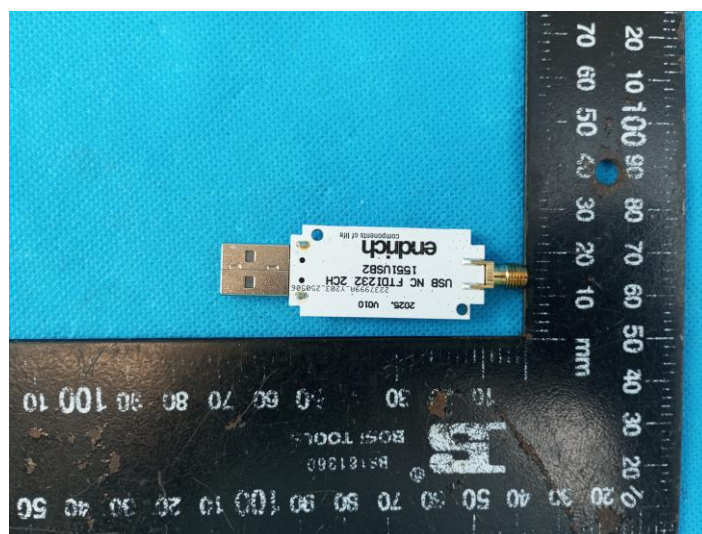
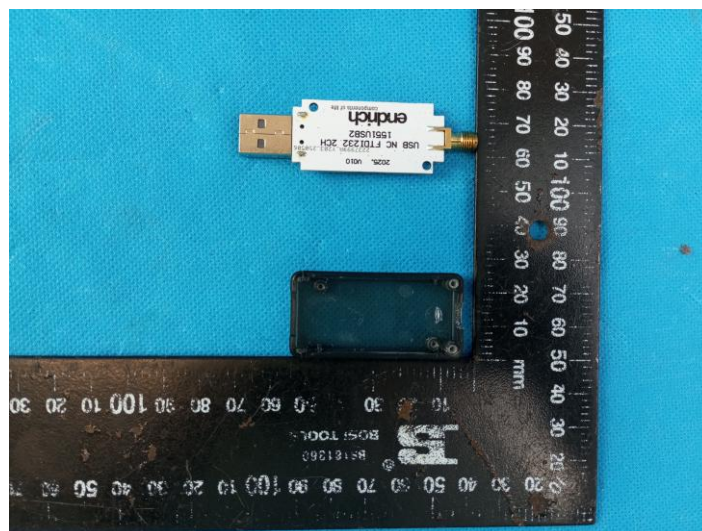
### 7.1. External Photos



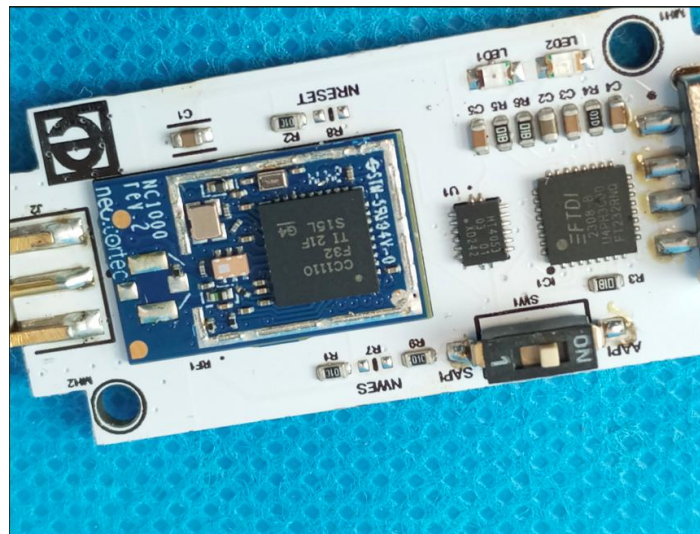




## 7.2. Internal Photos







## 8. APPENDIX REPORT