

# TEST REPORT

Applicant Name: Bytech NY Inc.  
Address: 2585 West 13th Street, Brooklyn NY 11223, New York, United States  
Report Number: 2501U64532E-RF-00  
FCC ID: 2AHN6-DE9

## Test Standard (s)

FCC PART 15.249

## Sample Description

Product Type: Wavy Wireless Keyboard-dongle  
Model No.: DE9  
Multiple Model(s) No.: N/A  
Trade Mark: BYTECH  
Date Received: 2025/06/13  
Issue Date: 2025/08/06

|              |       |
|--------------|-------|
| Test Result: | Pass▲ |
|--------------|-------|

▲ In the configuration tested, the EUT complied with the standards above.

## Prepared and Checked By:



GaLa Liu  
RF Engineer

## Approved By:



Michelle Zeng  
RF Supervisor

Note: The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

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## Bay Area Compliance Laboratories Corp. (Shenzhen)

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DOCUMENT REVISION HISTORY

| Revision Number | Report Number     | Description of Revision | Date of Revision |
|-----------------|-------------------|-------------------------|------------------|
| 0               | 2501U64532E-RF-00 | Original Report         | 2025/08/06       |

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

|                          |                                     |
|--------------------------|-------------------------------------|
| Product                  | Wavy Wireless Keyboard-dongle       |
| Tested Model             | DE9                                 |
| Multiple Model(s)        | N/A                                 |
| Frequency Range          | 2402-2479MHz                        |
| Maximum E-field strength | 78.65 dBuV/m@3m                     |
| Modulation Technique     | GFSK                                |
| Voltage Range            | DC 5.0 V from USB                   |
| Sample serial number     | 34PO-1 (Assigned by BACL, Shenzhen) |
| Sample/EUT Status        | Good condition                      |
| Adapter Information      | N/A                                 |

### Objective

This test report is in accordance with Part 2-Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

## Measurement Uncertainty

| Parameter                          |                             | Uncertainty                            |
|------------------------------------|-----------------------------|----------------------------------------|
| Occupied Channel Bandwidth         |                             | 109.2kHz(k=2, 95% level of confidence) |
| RF Frequency                       |                             | 56.6Hz(k=2, 95% level of confidence)   |
| RF output power, conducted         |                             | 0.86dB(k=2, 95% level of confidence)   |
| Unwanted Emission, conducted       |                             | 1.60dB(k=2, 95% level of confidence)   |
| AC Power Lines Conducted Emissions | 9kHz-150kHz                 | 3.63dB(k=2, 95% level of confidence)   |
|                                    | 150kHz-30MHz                | 3.66dB(k=2, 95% level of confidence)   |
| Radiated Emissions                 | 0.009MHz~30MHz              | 3.60dB(k=2, 95% level of confidence)   |
|                                    | 30MHz~200MHz (Horizontal)   | 5.32dB(k=2, 95% level of confidence)   |
|                                    | 30MHz~200MHz (Vertical)     | 5.43dB(k=2, 95% level of confidence)   |
|                                    | 200MHz~1000MHz (Horizontal) | 5.77dB(k=2, 95% level of confidence)   |
|                                    | 200MHz~1000MHz (Vertical)   | 5.73dB(k=2, 95% level of confidence)   |
|                                    | 1GHz - 6GHz                 | 5.34dB(k=2, 95% level of confidence)   |
|                                    | 6GHz - 18GHz                | 5.40dB(k=2, 95% level of confidence)   |
|                                    | 18GHz - 40GHz               | 5.64dB(k=2, 95% level of confidence)   |
| Temperature                        |                             | ±1°C                                   |
| Humidity                           |                             | ±1%                                    |
| Supply voltages                    |                             | ±0.4%                                  |

*Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.*

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 715558, the FCC Designation No. : CN5045.

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing by manufacturer.

### Frequency Channel List:

| Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) | Channel No. | Frequency (MHz) |
|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|
| 1           | <b>2402</b>     | 5           | 2421            | 9           | 2446            | 13          | 2468            |
| 2           | 2408            | 6           | 2423            | 10          | 2451            | 14          | 2474            |
| 3           | 2417            | 7           | 2428            | 11          | 2456            | 15          | 2478            |
| 4           | 2419            | 8           | <b>2437</b>     | 12          | 2460            | 16          | <b>2479</b>     |

Note: Test on Channel 1, 8 and 16.

### EUT Exercise Software

“FCC test tool .exe V 2.4.0”<sup>#</sup> exercise software was used and the power level is default <sup>#</sup>. The software and power level was provided by the applicant.

### Equipment Modifications

No modifications were made to the unit tested.

### Support Equipment List and Details

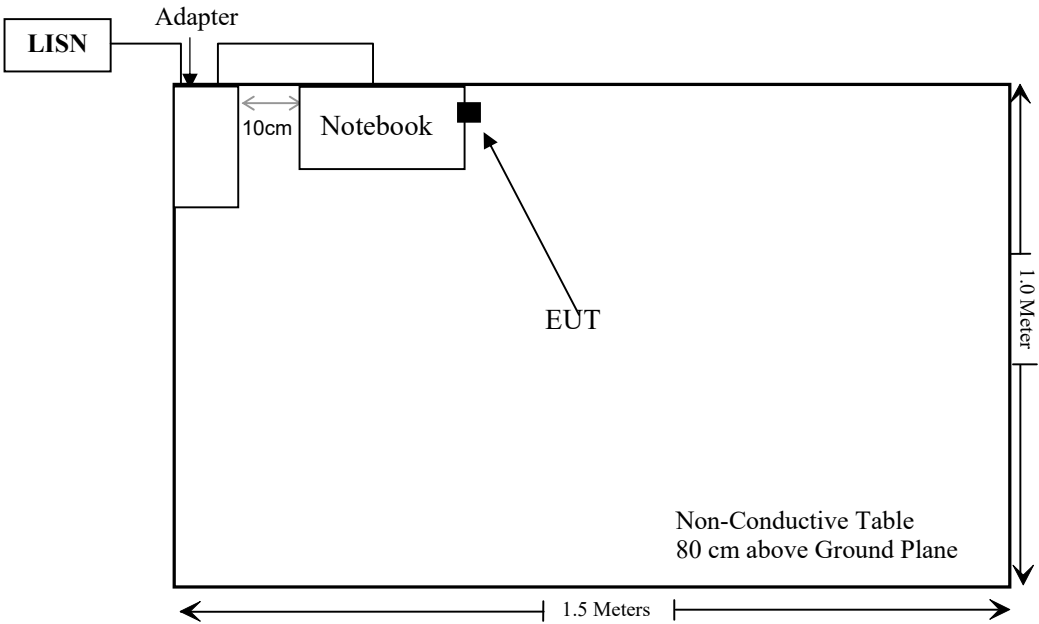
| Manufacturer | Description | Model          | Serial Number |
|--------------|-------------|----------------|---------------|
| DELL         | Notebook    | Latitude E6410 | 11429208685   |
| DELL         | Adapter     | Unknown        | Unknown       |
| Unknown      | USB Cable   | Unknown        | Unknown       |

### Support Cable Descriptions

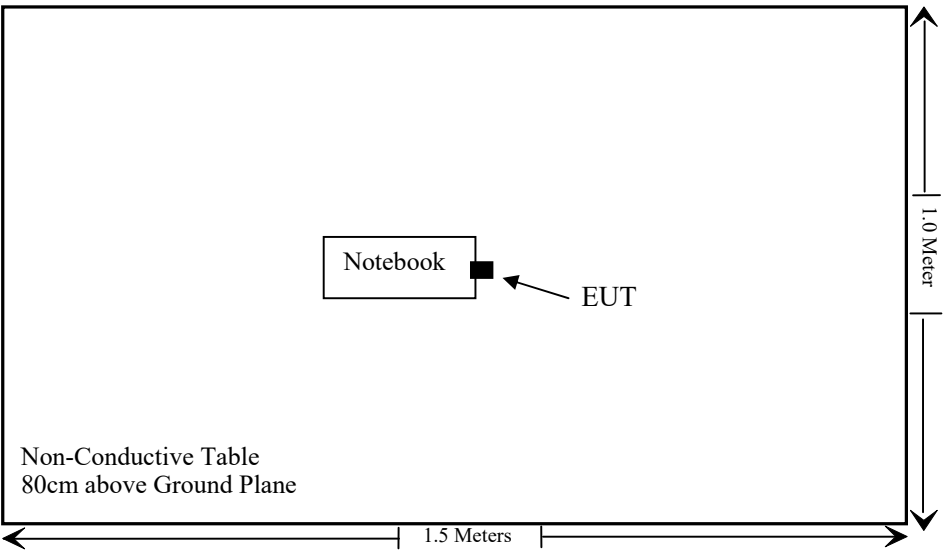
| Cable Description                  | Length (m) | From/Port | To       |
|------------------------------------|------------|-----------|----------|
| Unshielded Un-detachable Cable     | 1.0        | Adapter   | LISN     |
| Unshielded Un-detachable USB Cable | 1.2        | EUT       | Notebook |

**Block Diagram of Test Setup**

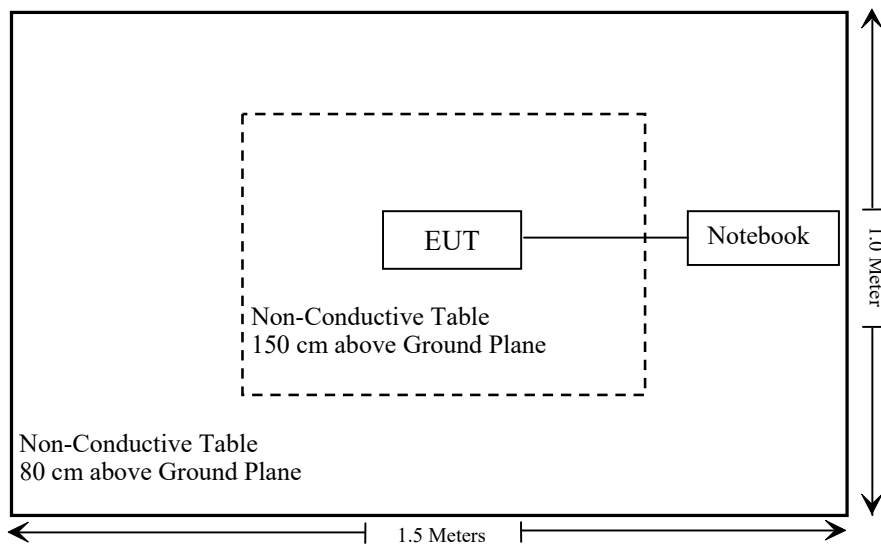
For Conducted Emissions:



**For Radiated Emission: Below 1GHz**



**For Radiated Emission: Above 1GHz**



**SUMMARY OF TEST RESULTS**

| FCC Rules                   | Description of Test                          | Result    |
|-----------------------------|----------------------------------------------|-----------|
| §1.1307 (b) (3) & §2.1093   | RF Exposure                                  | Compliant |
| §15.203                     | Antenna Requirement                          | Compliant |
| §15.207(a)                  | Conducted Emissions                          | Compliant |
| 15.205, §15.209, §15.249(d) | Radiated Emissions& Outside of Band Emission | Compliant |
| §15.215 (c)                 | 20 dB Bandwidth                              | Compliant |

**TEST EQUIPMENT LIST**

| Manufacturer                                       | Description                       | Model             | Serial Number          | Calibration Date | Calibration Due Date |
|----------------------------------------------------|-----------------------------------|-------------------|------------------------|------------------|----------------------|
| <b>Conducted Emissions Test</b>                    |                                   |                   |                        |                  |                      |
| Rohde & Schwarz                                    | EMI Test Receiver                 | ESCI              | 101120                 | 2024/12/04       | 2025/12/03           |
| Rohde & Schwarz                                    | LISN                              | ENV216            | 101613                 | 2024/12/04       | 2025/12/03           |
| Rohde & Schwarz                                    | Transient Limiter                 | ESH3Z2            | DE25985                | 2025/04/29       | 2026/04/28           |
| Unknown                                            | CE Cable                          | Unknown           | UF A210B-1-0720-504504 | 2025/04/29       | 2026/04/28           |
| Audix                                              | EMI Test software                 | E3                | 191218(V9)             | NCR              | NCR                  |
| <b>Radiated Emissions&amp;20 dB bandwidth Test</b> |                                   |                   |                        |                  |                      |
| Rohde & Schwarz                                    | EMI Test Receiver                 | ESR3              | 102455                 | 2024/12/04       | 2025/12/03           |
| Sonoma instrument                                  | Pre-amplifier                     | 310 N             | 186238                 | 2025/04/29       | 2026/04/28           |
| Sunol Sciences                                     | Broadband Antenna                 | JB1               | A040904-1              | 2023/07/20       | 2026/07/19           |
| Unknown                                            | Cable                             | Chamber A Cable 1 | N/A                    | 2025/04/29       | 2026/04/28           |
| Unknown                                            | Cable                             | XH500C            | J-10M-A                | 2025/04/29       | 2026/04/28           |
| BACL                                               | Active Loop Antenna               | 1313-1A           | 4031911                | 2024/05/14       | 2027/05/13           |
| Rohde & Schwarz                                    | Spectrum Analyzer                 | FSV40             | 101605                 | 2025/03/26       | 2026/03/25           |
| A.H.System                                         | Preamplifier                      | PAM-0118P         | 489                    | 2024/11/15       | 2025/11/14           |
| Schwarzbeck                                        | Horn Antenna                      | BBHA9120D (1201)  | 1143                   | 2023/07/26       | 2026/07/25           |
| Electro-Mechanics Co                               | Horn Antenna                      | 3116              | 9510-2270              | 2023/09/18       | 2026/09/17           |
| A.H.System                                         | Pre-amplifier                     | PAM-1840VH        | 190                    | 2025/04/29       | 2026/04/28           |
| Unknown                                            | RF Cable                          | KMSE              | 735                    | 2024/12/06       | 2025/12/05           |
| Unknown                                            | RF Cable                          | UFA147            | 219661                 | 2024/12/06       | 2025/12/05           |
| JD                                                 | Filter Switch Unit                | DT7220FSU         | DS79906                | 2024/09/09       | 2025/09/08           |
| JD                                                 | Multiplex Switch Test Control Set | DT7220SCU         | DS79903                | 2024/09/09       | 2025/09/08           |
| Audix                                              | EMI Test software                 | E3                | 191218(V9)             | NCR              | NCR                  |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

## **§1.1307 (b) (3) & §2.1093 - RF EXPOSURE**

### **Applicable Standard**

According to FCC §2.1093 and §1.1307(b) (3), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D04 Interim General RF Exposure Guidance V01

1-mW Test Exemption:

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

**For worst case:**

| Mode | Frequency<br>(MHz) | Maximum E-Field<br>(dBuV/m@3m) | Maximum EIRP |       | 1-mW Test<br>Exemption |
|------|--------------------|--------------------------------|--------------|-------|------------------------|
|      |                    |                                | (dBm)        | (mW)  |                        |
| GFSK | 2402-2479          | 78.65                          | -16.55       | 0.022 | Yes                    |

Note: EIRP = E-Field – 95.2 @3m

**Result: Compliant.**

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**FCC§15.203 - ANTENNA REQUIREMENT**

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**Applicable Standard**

According to FCC § 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 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.

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 § 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.

**Antenna Connector Construction**

The EUT has a PCB antenna which was permanently attached fulfill the requirement of this section. Please refer to the EUT photos.

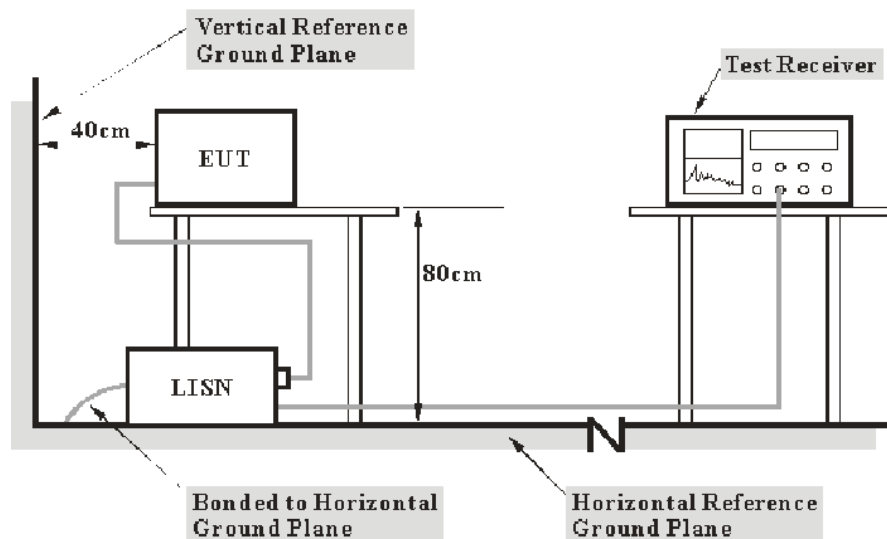
**Result: Compliant.**

## FCC §15.207 (a) - AC LINE CONDUCTED EMISSIONS

### Applicable Standard

FCC §15.207(a)

### EUT Setup



Note: 1. Support units were connected to second LISN.  
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.10-2020. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

### EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

| Frequency Range  | RBW   |
|------------------|-------|
| 150 kHz – 30 MHz | 9 kHz |

## Test Procedure

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

## Factor & Over Limit Calculation

The factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

$$\text{Factor} = \text{LISN VDF} + \text{Cable Loss}$$

The “**Over limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over limit of -7 dB means the emission is 7 dB below the limit. The equation for calculation is as follows:

$$\begin{aligned}\text{Over Limit} &= \text{Level} - \text{Limit} \\ \text{Level} &= \text{Read Level} + \text{Factor}\end{aligned}$$

Note: The term "cable loss" refers to the combination of a cable and a 10dB transient limiter (attenuator).

## Test Data

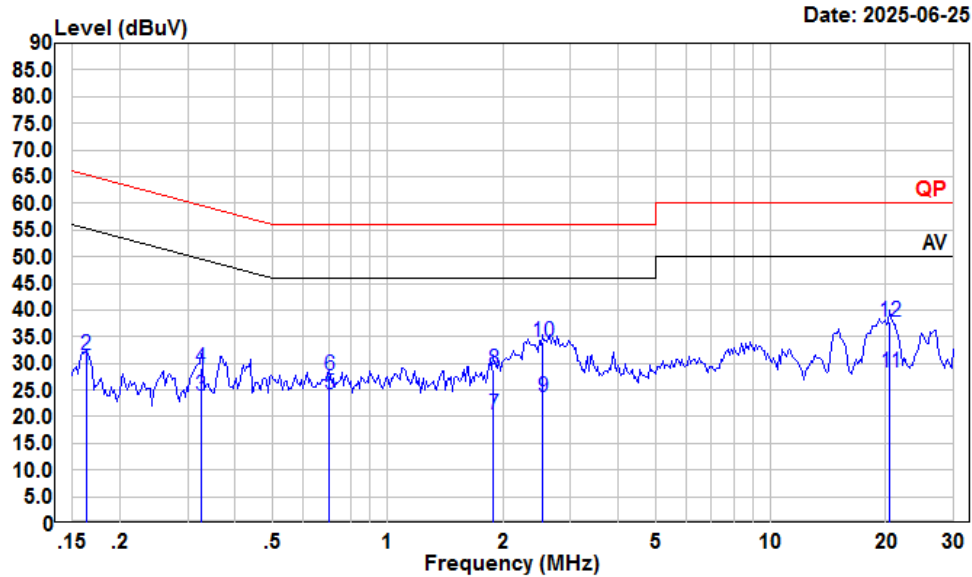
### Environmental Conditions

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 24.5 °C   |
| <b>Relative Humidity:</b> | 54 %      |
| <b>ATM Pressure:</b>      | 101.1 kPa |

*The testing was performed by Kungfumaster Liang on 2025-06-25.*

*EUT operation mode: Transmitting (Maximum E-field strength mode: High channel)*

## AC 120V/60 Hz, Line



Condition: Line

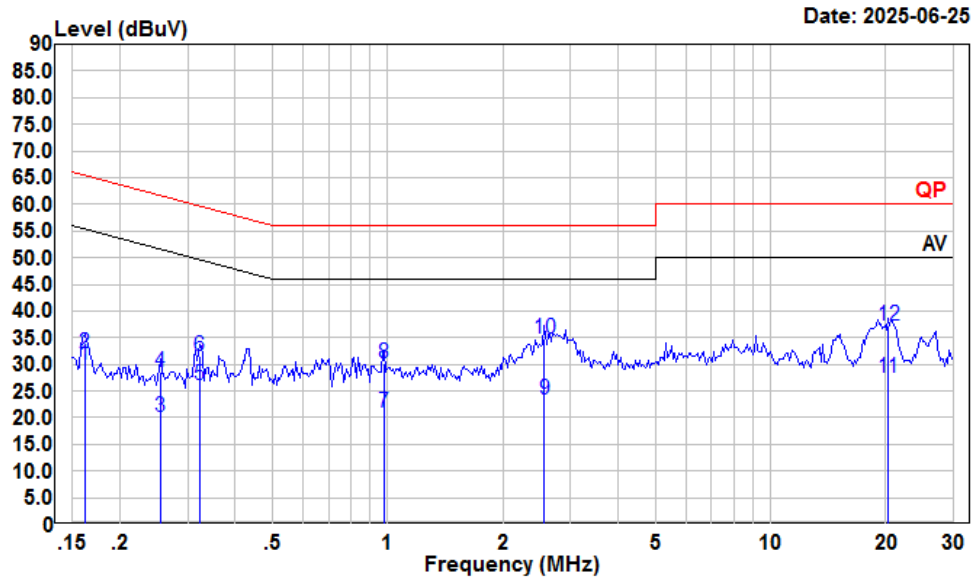
Project : 2501U64532E-RF

tester : Kungfumaster.Liang Note:Transmitting

Setting : RBW:9kHz

|    | Freq   | Read Level | Level | LISN Factor | Cable Loss | Limit Line | Over Limit | Remark  |
|----|--------|------------|-------|-------------|------------|------------|------------|---------|
|    | MHz    | dBuV       | dBuV  | dB          | dB         | dBuV       | dB         |         |
| 1  | 0.163  | 8.42       | 28.71 | 10.11       | 10.18      | 55.30      | -26.59     | Average |
| 2  | 0.163  | 11.18      | 31.47 | 10.11       | 10.18      | 65.30      | -33.83     | QP      |
| 3  | 0.325  | 3.66       | 24.06 | 10.22       | 10.18      | 49.57      | -25.51     | Average |
| 4  | 0.325  | 8.74       | 29.14 | 10.22       | 10.18      | 59.57      | -30.43     | QP      |
| 5  | 0.705  | 3.20       | 24.13 | 10.70       | 10.23      | 46.00      | -21.87     | Average |
| 6  | 0.705  | 6.80       | 27.73 | 10.70       | 10.23      | 56.00      | -28.27     | QP      |
| 7  | 1.888  | -0.22      | 20.33 | 10.32       | 10.23      | 46.00      | -25.67     | Average |
| 8  | 1.888  | 8.41       | 28.96 | 10.32       | 10.23      | 56.00      | -27.04     | QP      |
| 9  | 2.540  | 3.30       | 23.75 | 10.20       | 10.25      | 46.00      | -22.25     | Average |
| 10 | 2.540  | 13.60      | 34.05 | 10.20       | 10.25      | 56.00      | -21.95     | QP      |
| 11 | 20.486 | 7.78       | 28.42 | 10.39       | 10.25      | 50.00      | -21.58     | Average |
| 12 | 20.486 | 17.17      | 37.81 | 10.39       | 10.25      | 60.00      | -22.19     | QP      |

## AC 120V/60 Hz, Neutral



Condition: Neutral

Project : 2501U64532E-RF

tester : Kungfumaster.Liang Note:Transmitting

Setting : RBW:9kHz

|    | Freq   | Read Level | LISN Level | LISN Factor | Cable Loss | Limit Line | Over Limit | Remark  |
|----|--------|------------|------------|-------------|------------|------------|------------|---------|
|    | MHz    | dBuV       | dBuV       | dB          | dB         | dBuV       | dB         |         |
| 1  | 0.162  | 9.53       | 29.96      | 10.25       | 10.18      | 55.38      | -25.42     | Average |
| 2  | 0.162  | 11.80      | 32.23      | 10.25       | 10.18      | 65.38      | -33.15     | QP      |
| 3  | 0.255  | -0.22      | 20.21      | 10.23       | 10.20      | 51.60      | -31.39     | Average |
| 4  | 0.255  | 8.15       | 28.58      | 10.23       | 10.20      | 61.60      | -33.02     | QP      |
| 5  | 0.322  | 5.58       | 26.13      | 10.36       | 10.19      | 49.66      | -23.53     | Average |
| 6  | 0.322  | 10.96      | 31.51      | 10.36       | 10.19      | 59.66      | -28.15     | QP      |
| 7  | 0.979  | 0.12       | 21.05      | 10.69       | 10.24      | 46.00      | -24.95     | Average |
| 8  | 0.979  | 9.33       | 30.26      | 10.69       | 10.24      | 56.00      | -25.74     | QP      |
| 9  | 2.567  | 2.92       | 23.40      | 10.23       | 10.25      | 46.00      | -22.60     | Average |
| 10 | 2.567  | 14.35      | 34.83      | 10.23       | 10.25      | 56.00      | -21.17     | QP      |
| 11 | 20.270 | 7.12       | 27.58      | 10.21       | 10.25      | 50.00      | -22.42     | Average |
| 12 | 20.270 | 16.89      | 37.35      | 10.21       | 10.25      | 60.00      | -22.65     | QP      |

## FCC§15.205, §15.209 & §15.249(d) - RADIATED EMISSIONS

### Applicable Standard

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

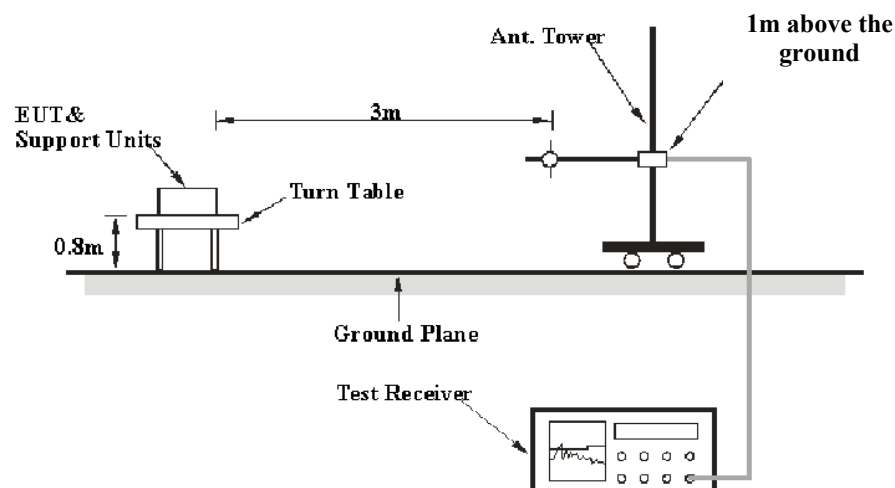
| Fundamental frequency | Field strength of fundamental (millivolts/meter) | Field strength of harmonics (microvolts/meter) |
|-----------------------|--------------------------------------------------|------------------------------------------------|
| 902–928 MHz           | 50                                               | 500                                            |
| 2400–2483.5 MHz       | 50                                               | 500                                            |
| 5725–5875 MHz         | 50                                               | 500                                            |
| 24.0–24.25 GHz        | 250                                              | 2500                                           |

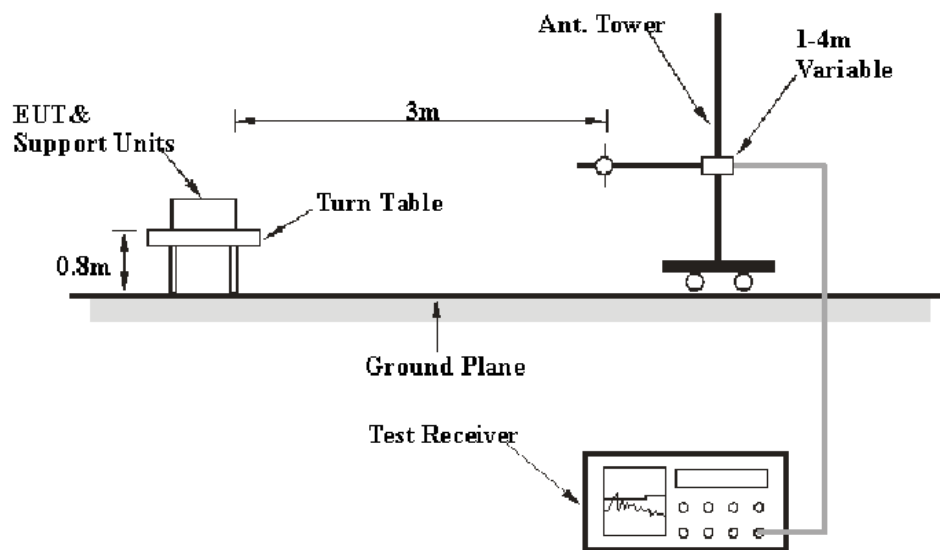
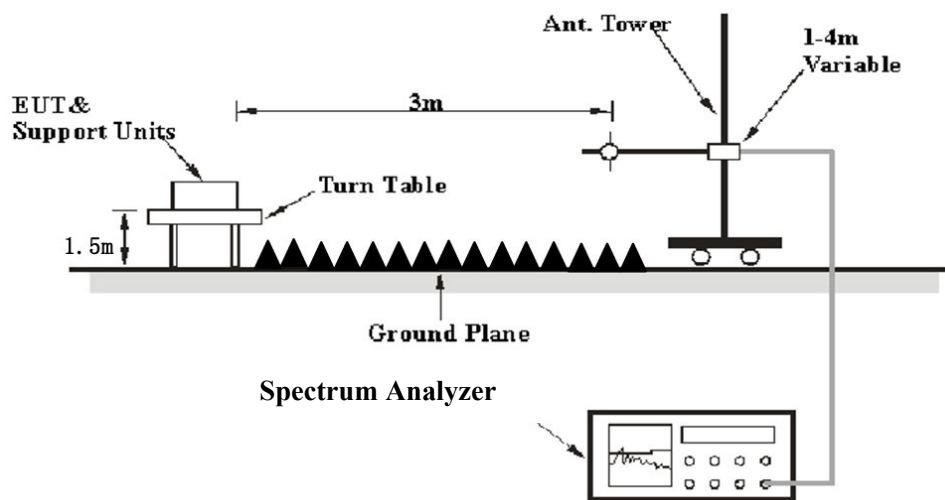
As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

As per FCC§15.249 (d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

### EUT Setup

9 kHz-30MHz:



**30MHz-1GHz:****Above 1GHz:**

The radiated emission and out of band emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2020. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

## EMI Test Receiver & Spectrum Analyzer Setup

The EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

| Frequency Range   | RBW                                                           | Video B/W | IF B/W  | Measurement | Detector |
|-------------------|---------------------------------------------------------------|-----------|---------|-------------|----------|
| 9 kHz – 150 kHz   | /                                                             | /         | 200 Hz  | QP          | QP       |
|                   | 300 Hz                                                        | 1 kHz     | /       | PK          | PK       |
| 150 kHz – 30 MHz  | /                                                             | /         | 9 kHz   | QP          | QP       |
|                   | 10 kHz                                                        | 30 kHz    | /       | PK          | PK       |
| 30 MHz – 1000 MHz | /                                                             | /         | 120 kHz | QP          | QP       |
|                   | 100 kHz                                                       | 300 kHz   | /       | PK          | PK       |
| Above 1 GHz       | Harmonics                                                     |           |         |             |          |
|                   | 1MHz                                                          | 3 MHz     | /       | PK          | PK       |
|                   | Average Emission Level=Peak Emission Level+20*log(Duty cycle) |           |         |             |          |
|                   | Band Edge & Other Emissions                                   |           |         |             |          |
|                   | 1MHz                                                          | 3 MHz     | /       | PK          | PK       |
|                   | 1MHz                                                          | ≥10 Hz    | /       | Average     | PK       |

For Duty cycle measurement:

Use the duty cycle factor correction factor method per 15.35(c).

Duty cycle=On time/100milliseconds, On time= $N_1 \cdot L_1 + N_2 \cdot L_2 + \dots + N_{n-1} \cdot L_{n-1} + N_n \cdot L_n$ ,

Where  $N_1$  is number of type 1 pulses,  $L_1$  is length of type 1 pulse, etc.

## Test Procedure

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

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane for below 1GHz or 1.5 meter for above 1GHz, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

All final data was recorded in Quasi-peak detection mode except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz, average detection modes for frequency bands 9–90 kHz and 110–490 kHz, peak and average detection modes for frequencies above 1 GHz.

For 9 kHz-30MHz, the report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground-parallel) unless the margin is greater than 20 dB.

All emissions under the average limit and under the noise floor have not recorded in the report.

## Factor & Over Limit/Margin Calculation

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Over Limit/Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

$$\begin{aligned}\text{Over Limit} &= \text{Level} - \text{Limit}; \text{Margin} = \text{Limit} - \text{Corrected Amplitude} \\ \text{Level} / \text{Corrected Amplitude} &= \text{Read Level} + \text{Factor}\end{aligned}$$

## Test Data

### Environmental Conditions

|                    |               |
|--------------------|---------------|
| Temperature:       | 21.7~25 °C    |
| Relative Humidity: | 48~61 %       |
| ATM Pressure:      | 100.8~101 kPa |

*The testing was performed by Alex Yan on 2025-07-11 for below 1GHz and Visen Wu on 2025-06-24 for above 1GHz.*

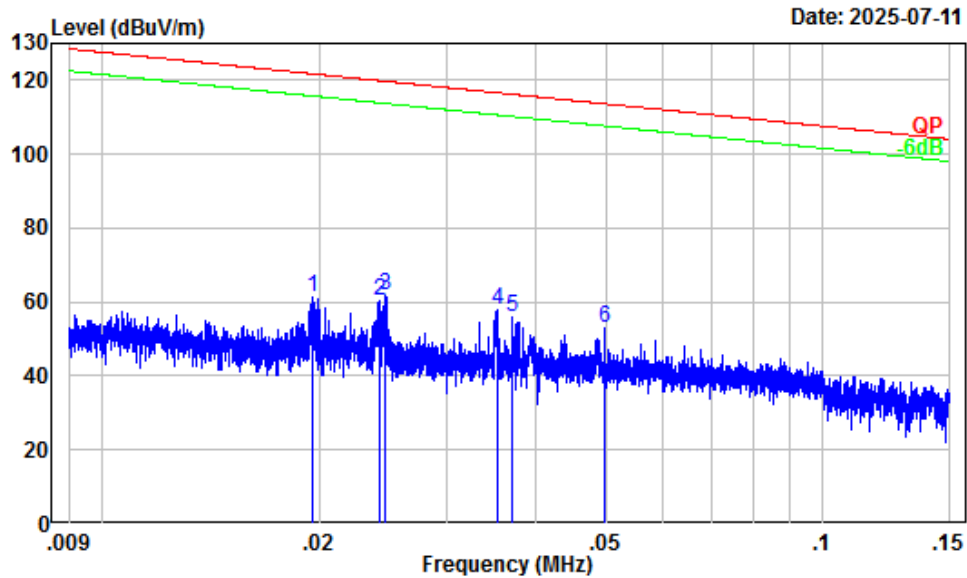
*EUT operation mode: Transmitting*

*Note: Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded*

**9 kHz-30MHz:** (Maximum E-field strength mode: High channel)

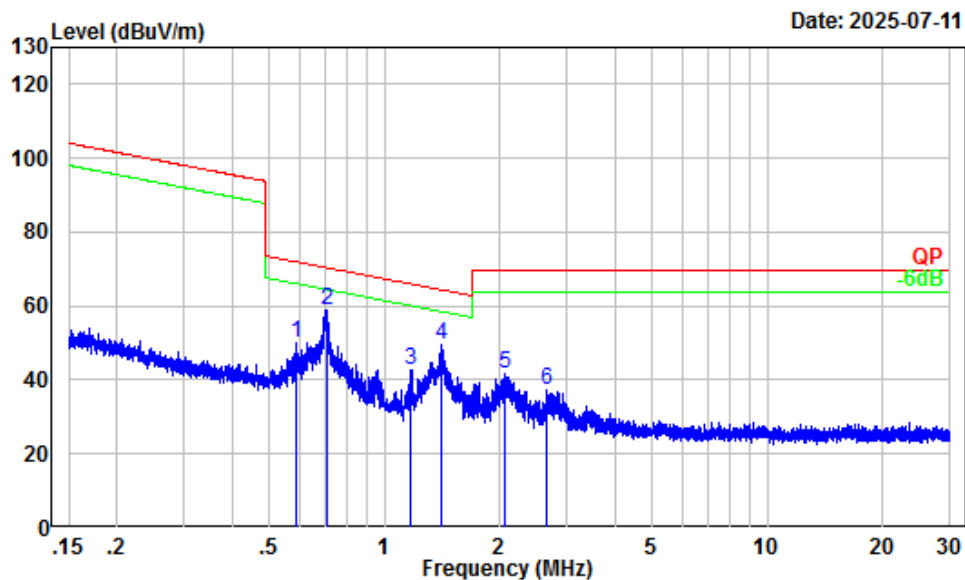
Note: When the test result of peak was less than the limit of QP/Average more than 6dB, just peak value were recorded.

Parallel (worst case)



Site : Chamber A  
Condition : 3m  
Project Number : 2501U64532E-RF  
Test Mode : Transmitting  
Detector: Peak RBW/VBW: 0.3/1kHz  
Tester : Alex Yan

|   | Freq  | Factor | Read<br>Level | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|-------|--------|---------------|--------|---------------|---------------|--------|
|   | MHz   | dB/m   | dBuV          | dBuV/m | dBuV/m        | dB            |        |
| 1 | 0.020 | 30.48  | 30.69         | 61.17  | 121.77        | -60.60        | Peak   |
| 2 | 0.024 | 29.58  | 30.75         | 60.33  | 119.88        | -59.55        | Peak   |
| 3 | 0.025 | 29.49  | 32.10         | 61.59  | 119.73        | -58.14        | Peak   |
| 4 | 0.035 | 27.94  | 29.89         | 57.83  | 116.65        | -58.82        | Peak   |
| 5 | 0.037 | 27.76  | 28.33         | 56.09  | 116.22        | -60.13        | Peak   |
| 6 | 0.050 | 26.42  | 26.65         | 53.07  | 113.65        | -60.58        | Peak   |

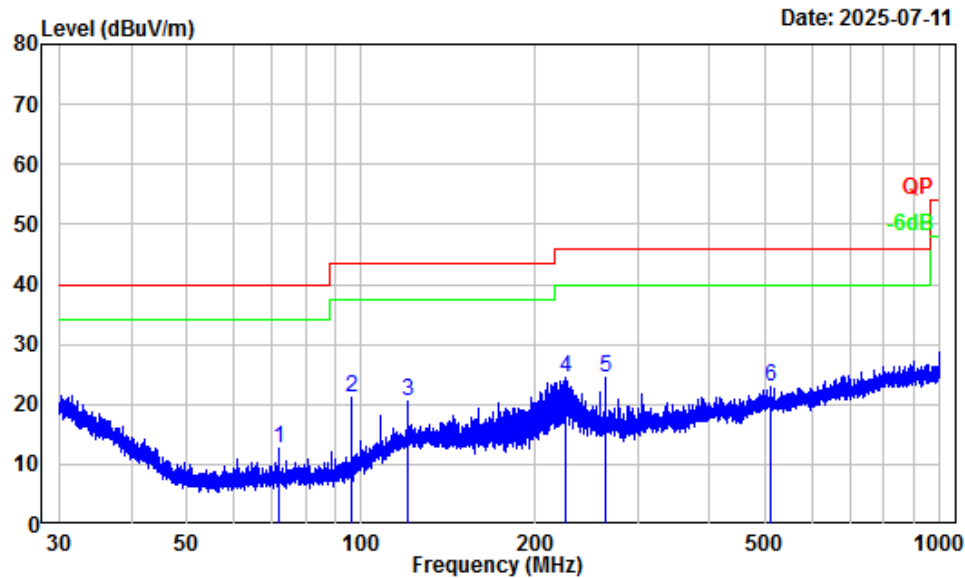


Site : Chamber A  
 Condition : 3m  
 Project Number : 2501U64532E-RF  
 Test Mode : Transmitting  
 Detector: Peak RBW/VBW: 10/30kHz  
 Tester : Alex Yan

|   | Freq  | Factor | Read Level | Level  | Limit Line | Over Limit | Remark |
|---|-------|--------|------------|--------|------------|------------|--------|
|   | MHz   | dB/m   | dBuV       | dBuV/m | dBuV/m     | dB         |        |
| 1 | 0.590 | 5.28   | 44.86      | 50.14  | 72.15      | -22.01     | Peak   |
| 2 | 0.707 | 3.85   | 55.14      | 58.99  | 70.55      | -11.56     | Peak   |
| 3 | 1.177 | 0.71   | 42.07      | 42.78  | 66.03      | -23.25     | Peak   |
| 4 | 1.412 | 0.05   | 49.64      | 49.69  | 64.41      | -14.72     | Peak   |
| 5 | 2.071 | -1.64  | 43.13      | 41.49  | 69.54      | -28.05     | Peak   |
| 6 | 2.643 | -1.95  | 39.45      | 37.50  | 69.54      | -32.04     | Peak   |

30MHz-1GHz: (Maximum E-field strength mode: High channel)

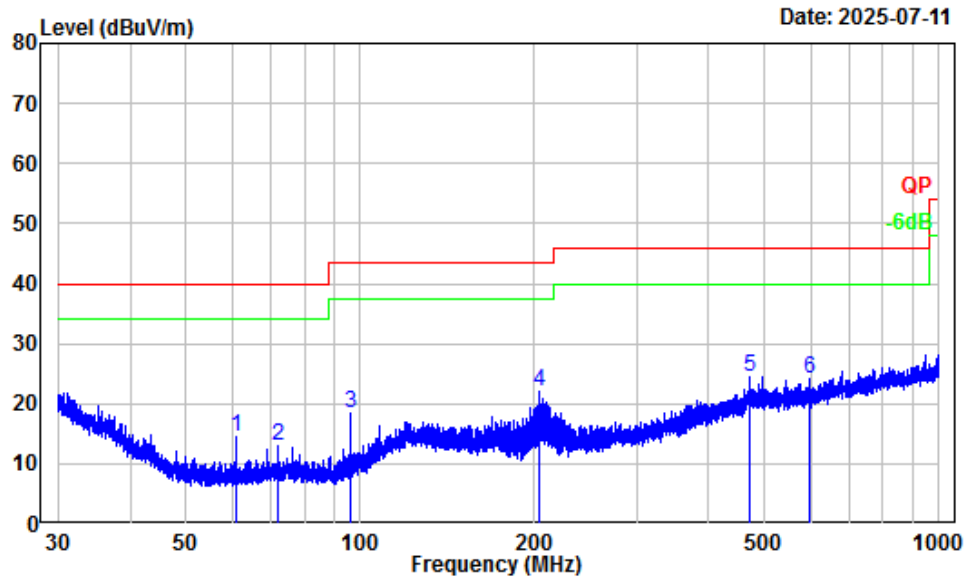
Horizontal



Site : Chamber A  
Condition : 3m Horizontal  
Project Number : 2501U64532E-RF  
Test Mode : Transmitting  
Detector: Peak RBW/VBW: 100/300kHz  
Tester : Alex Yan

|   | Freq   | Factor | Read Level | Limit Level | Over Limit | Remark      |
|---|--------|--------|------------|-------------|------------|-------------|
|   | MHz    | dB/m   | dBuV       | dBuV/m      | dBuV/m     | dB          |
| 1 | 71.99  | -17.85 | 30.55      | 12.70       | 40.00      | -27.30 Peak |
| 2 | 96.01  | -17.02 | 38.08      | 21.06       | 43.50      | -22.44 Peak |
| 3 | 120.01 | -11.45 | 31.86      | 20.41       | 43.50      | -23.09 Peak |
| 4 | 225.80 | -14.04 | 38.37      | 24.33       | 46.00      | -21.67 Peak |
| 5 | 264.05 | -12.35 | 36.92      | 24.57       | 46.00      | -21.43 Peak |
| 6 | 509.60 | -5.78  | 28.79      | 23.01       | 46.00      | -22.99 Peak |

## Vertical



Site : Chamber A  
Condition : 3m Vertical  
Project Number : 2501U64532E-RF  
Test Mode : Transmitting  
Detector: Peak RBW/VBW: 100/300kHz  
Tester : Alex Yan

|   | Freq   | Factor | Read<br>Level | Limit<br>Level | Over<br>Line | Over<br>Limit | Remark |
|---|--------|--------|---------------|----------------|--------------|---------------|--------|
|   | MHz    | dB/m   | dBuV          | dBuV/m         | dBuV/m       | dB            |        |
| 1 | 61.05  | -18.12 | 32.52         | 14.40          | 40.00        | -25.60        | Peak   |
| 2 | 71.96  | -17.85 | 30.95         | 13.10          | 40.00        | -26.90        | Peak   |
| 3 | 95.97  | -17.03 | 35.51         | 18.48          | 43.50        | -25.02        | Peak   |
| 4 | 203.79 | -13.34 | 35.23         | 21.89          | 43.50        | -21.61        | Peak   |
| 5 | 472.18 | -6.65  | 30.99         | 24.34          | 46.00        | -21.66        | Peak   |
| 6 | 596.44 | -5.28  | 29.47         | 24.19          | 46.00        | -21.81        | Peak   |

**Above 1GHz:**

| Frequency (MHz) | Reading (dBμV) | PK/AV | Polar (H/V) | Factor (dB/m) | Absolute Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|----------------|-------|-------------|---------------|-------------------------|----------------|-------------|
| Low Channel     |                |       |             |               |                         |                |             |
| 2402.00         | 82.56          | PK    | H           | -11.01        | 71.55                   | 114.00         | -42.45      |
| 2402.00         | 86.92          | PK    | V           | -11.01        | 75.91                   | 114.00         | -38.09      |
| 4804.00         | 59.00          | PK    | H           | -7.79         | 51.21                   | 74             | -22.79      |
| 4804.00         | 58.97          | PK    | V           | -7.79         | 51.18                   | 74             | -22.82      |
| Middle Channel  |                |       |             |               |                         |                |             |
| 2437.00         | 85.34          | PK    | H           | -10.93        | 74.41                   | 114.00         | -39.59      |
| 2437.00         | 88.50          | PK    | V           | -10.93        | 77.57                   | 114.00         | -36.43      |
| 4874.00         | 58.01          | PK    | H           | -7.61         | 50.40                   | 74             | -23.60      |
| 4874.00         | 58.13          | PK    | V           | -7.61         | 50.52                   | 74             | -23.48      |
| High Channel    |                |       |             |               |                         |                |             |
| 2479.00         | 87.93          | PK    | H           | -10.96        | 76.97                   | 114.00         | -37.03      |
| 2479.00         | 89.62          | PK    | V           | -10.96        | 78.65                   | 114.00         | -35.35      |
| 4958.00         | 55.48          | PK    | H           | -7.62         | 47.86                   | 74             | -26.14      |
| 4958.00         | 56.24          | PK    | V           | -7.62         | 48.62                   | 74             | -25.38      |

**Note:**

Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

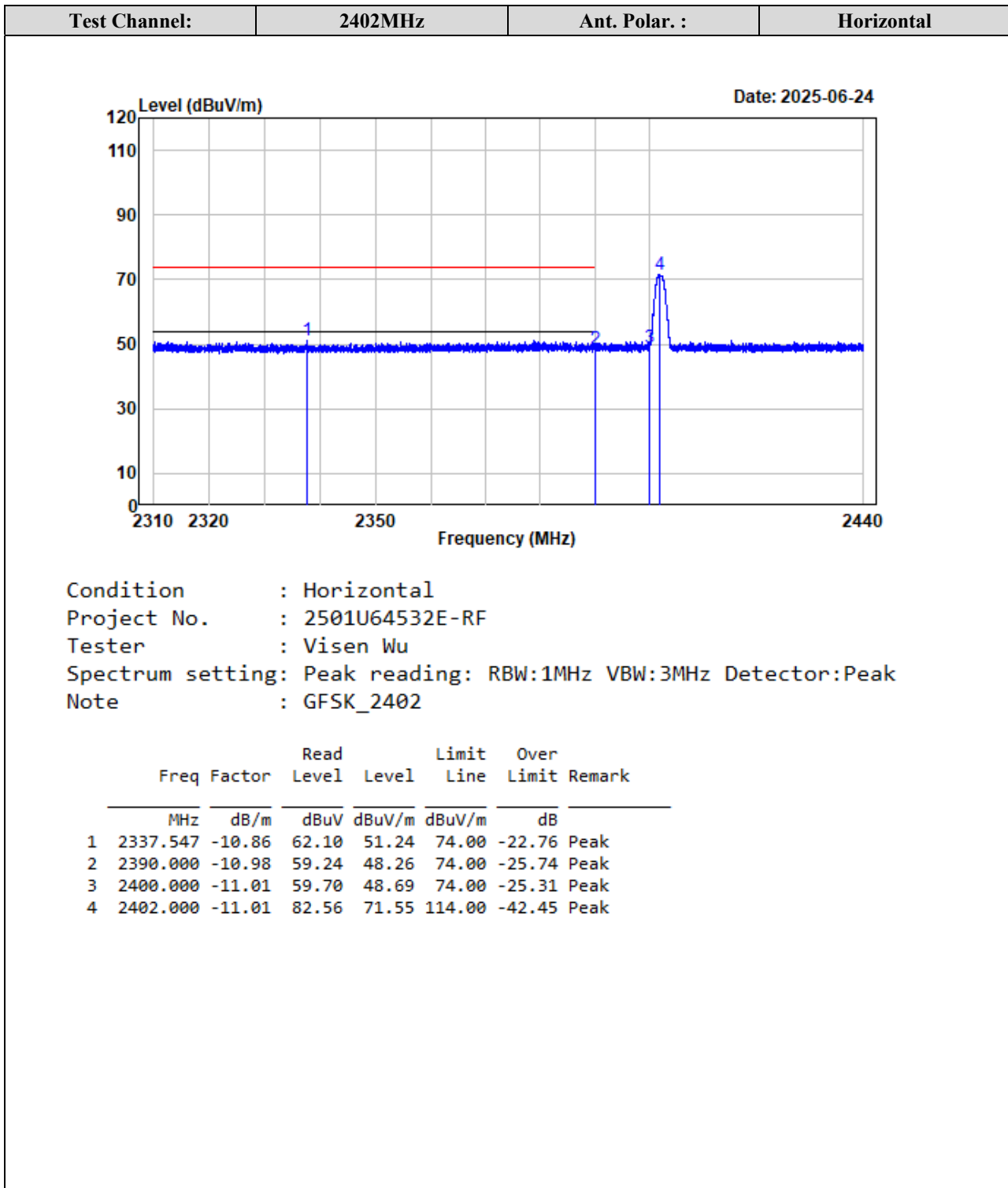
Absolute Level/Level= Factor + Reading

Margin = Absolute Level/Level - Limit

The other spurious emission which is 20dB to the limit or in noise floor level was not recorded.

The test result of peak was less than the limit of average, so it meets the average limit and just peak values were recorded.

## Test plots for Bandedge Measurements (Radiated):

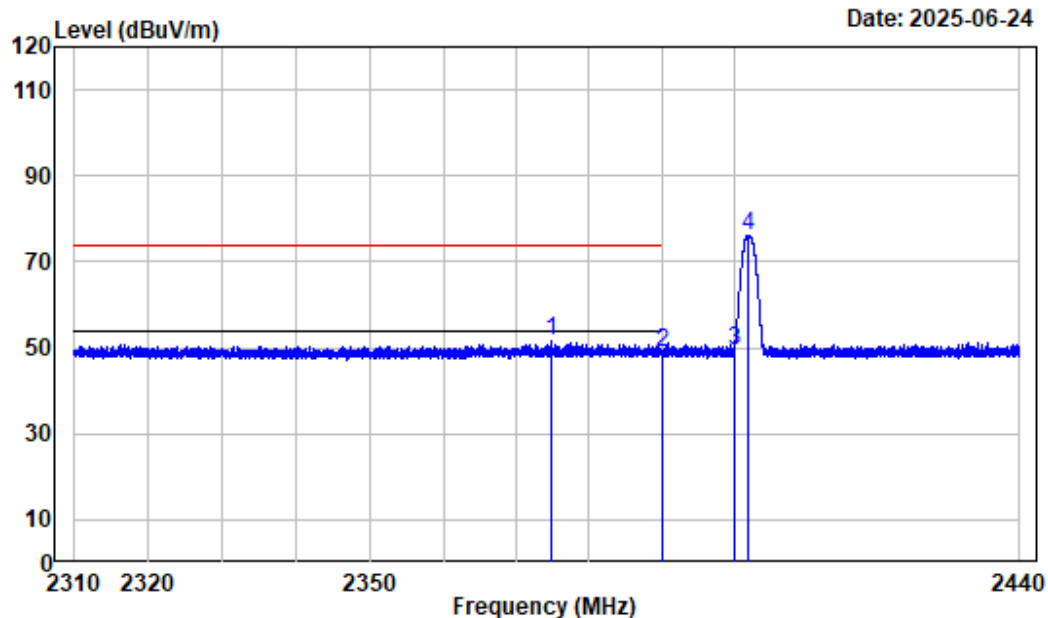


Test Channel:

2402MHz

Ant. Polar. :

Vertical



Condition : Vertical

Project No. : 2501U64532E-RF

Tester : Visen Wu

Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak

Note : GFSK\_2402

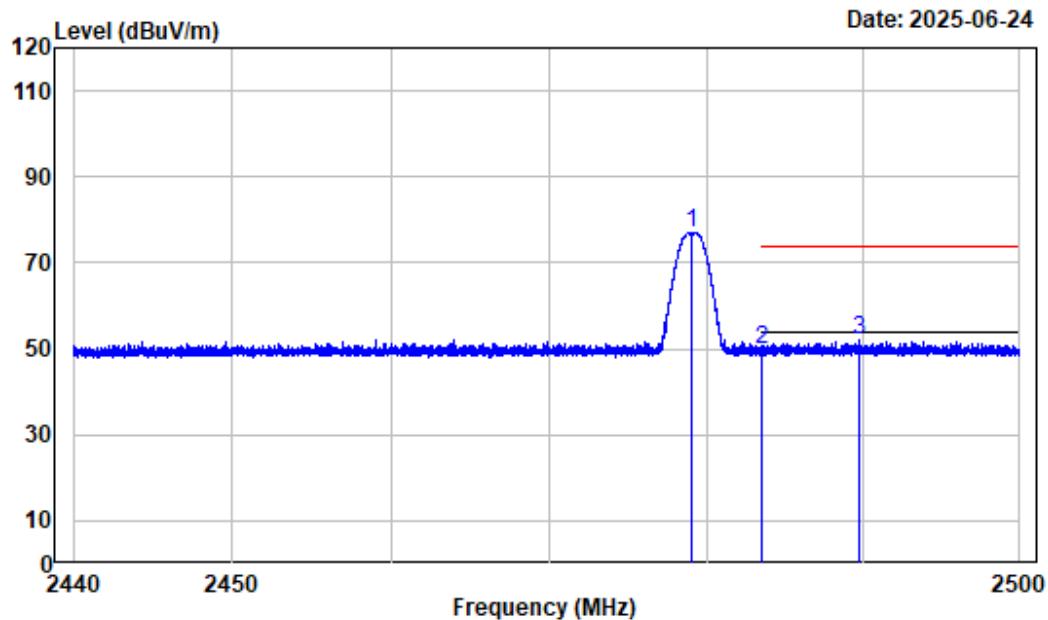
|   | Freq     | Factor | Read<br>Level | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|----------|--------|---------------|--------|---------------|---------------|--------|
|   | MHz      | dB/m   | dBuV          | dBuV/m | dBuV/m        | dB            |        |
| 1 | 2374.911 | -10.95 | 62.70         | 51.75  | 74.00         | -22.25        | Peak   |
| 2 | 2390.000 | -10.98 | 60.08         | 49.10  | 74.00         | -24.90        | Peak   |
| 3 | 2400.000 | -11.01 | 60.46         | 49.45  | 74.00         | -24.55        | Peak   |
| 4 | 2402.000 | -11.01 | 86.92         | 75.91  | 114.00        | -38.09        | Peak   |

Test Channel:

2479MHz

Ant. Polar. :

Horizontal



Condition : Horizontal

Project No. : 2501U64532E-RF

Tester : Visen Wu

Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak

Note : GFSK\_2479

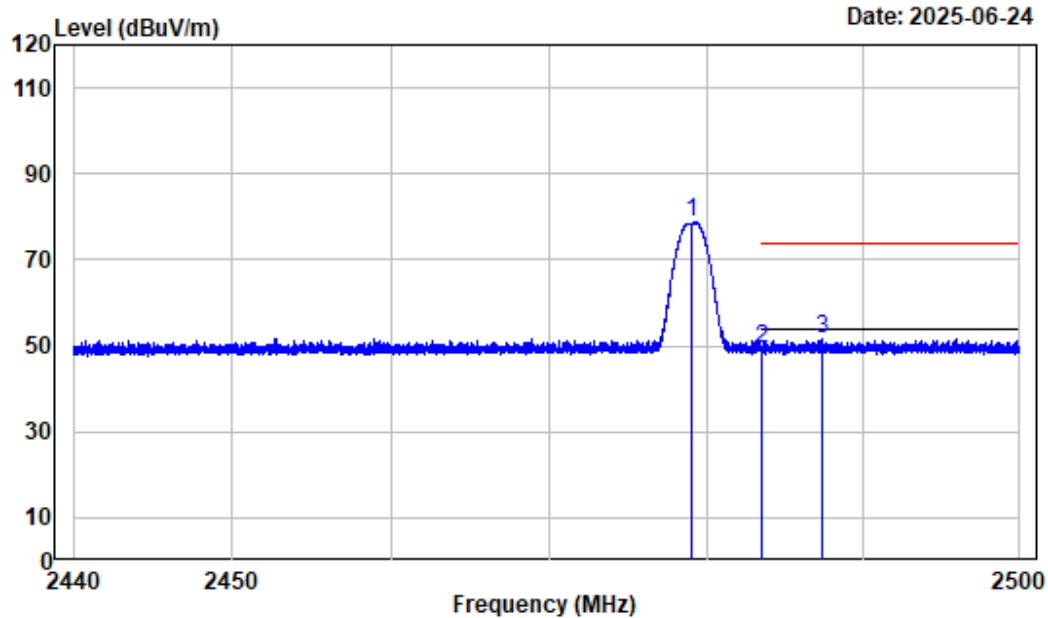
|   | Freq     | Factor | Read<br>Level | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|----------|--------|---------------|--------|---------------|---------------|--------|
|   | MHz      | dB/m   | dBuV          | dBuV/m | dBuV/m        | dB            |        |
| 1 | 2479.000 | -10.96 | 87.93         | 76.97  | 114.00        | -37.03        | Peak   |
| 2 | 2483.500 | -10.97 | 60.87         | 49.90  | 74.00         | -24.10        | Peak   |
| 3 | 2489.724 | -10.98 | 63.16         | 52.18  | 74.00         | -21.82        | Peak   |

Test Channel:

2479MHz

Ant. Polar. :

Vertical



Condition : Vertical

Project No. : 2501U64532E-RF

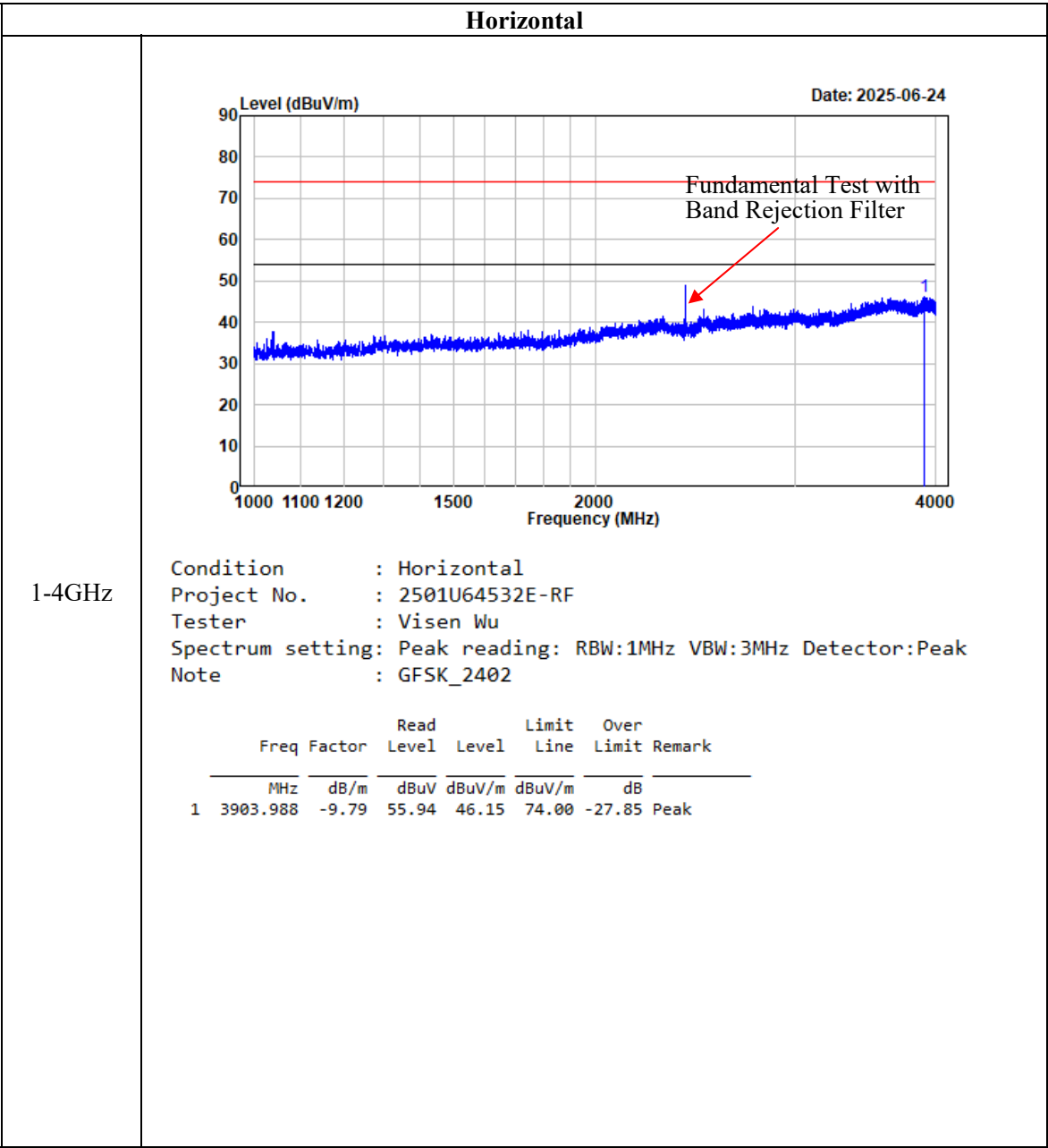
Tester : Visen Wu

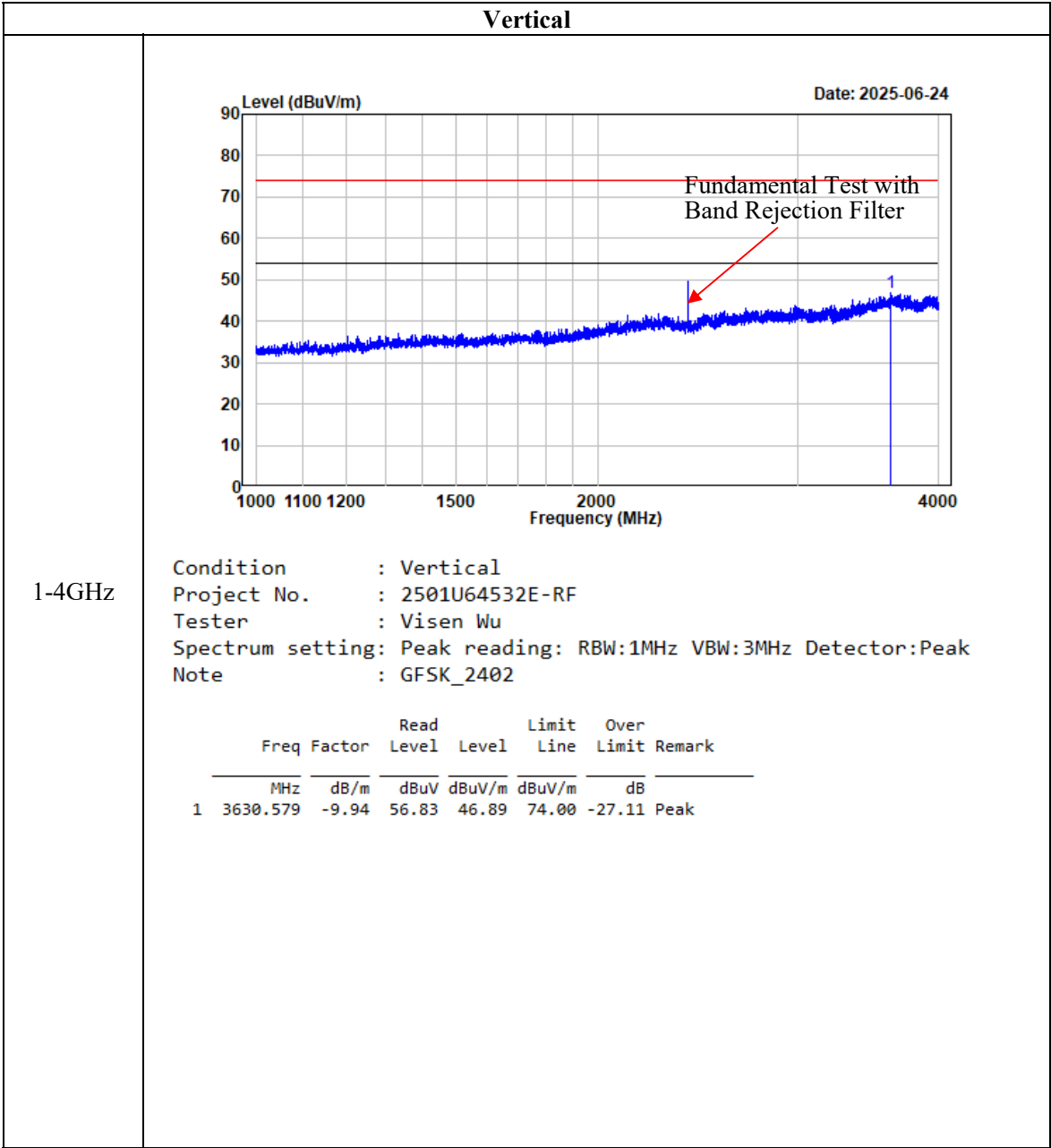
Spectrum setting: Peak reading: RBW:1MHz VBW:3MHz Detector:Peak

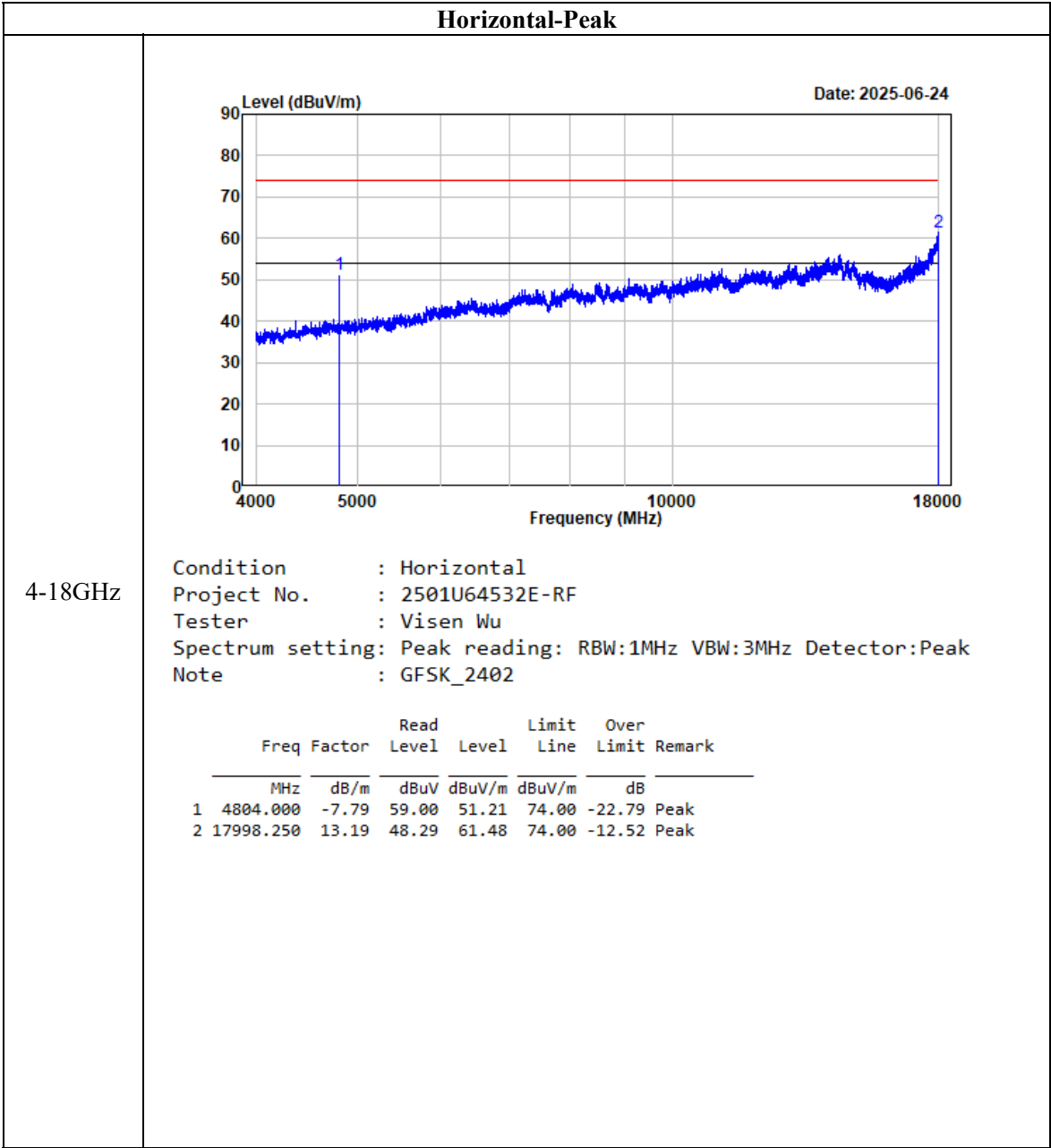
Note : GFSK\_2479

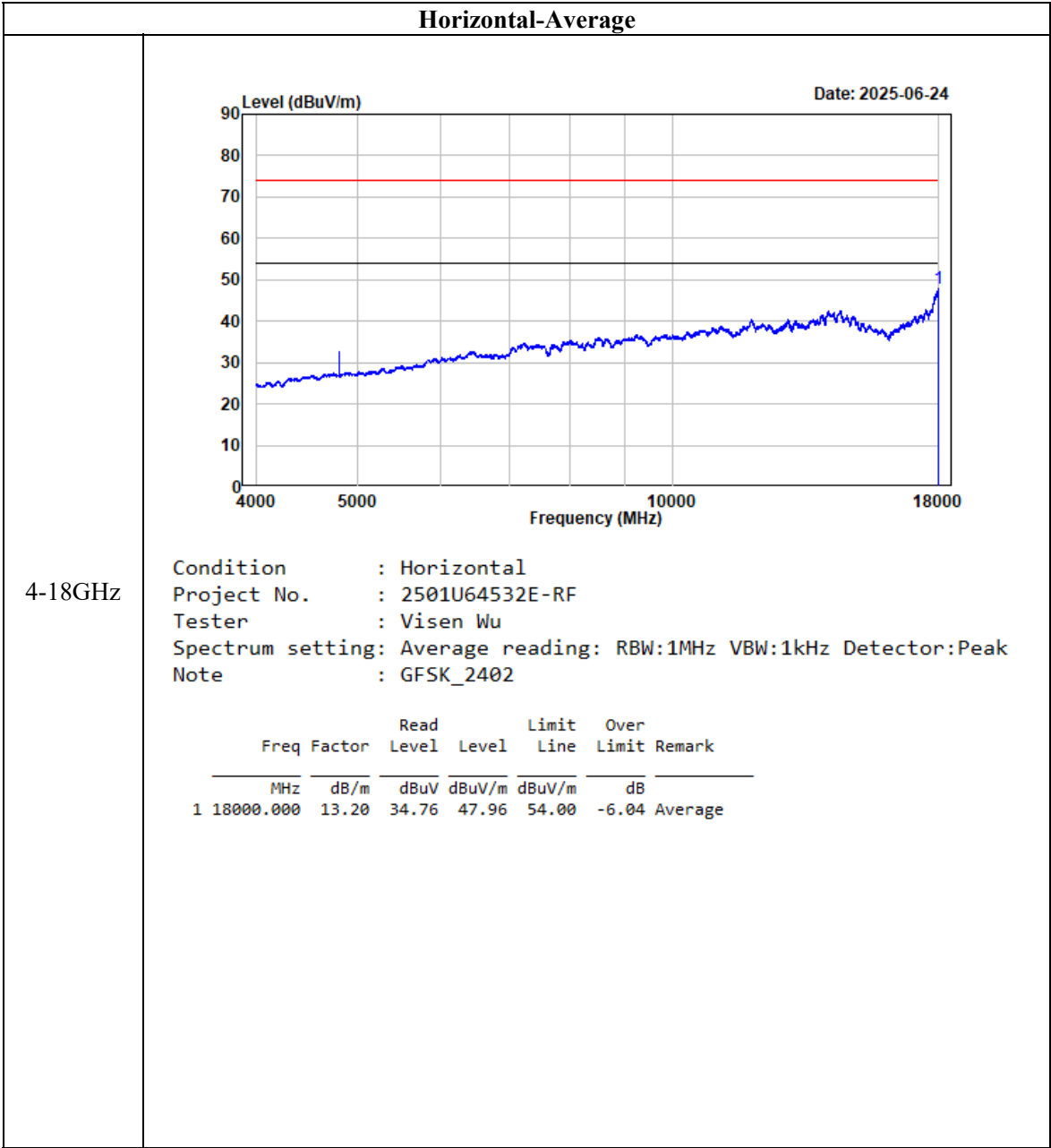
|   | Freq     | Factor | Read<br>Level | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|----------|--------|---------------|--------|---------------|---------------|--------|
|   | MHz      | dB/m   | dBuV          | dBuV/m | dBuV/m        | dB            |        |
| 1 | 2479.000 | -10.97 | 89.62         | 78.65  | 114.00        | -35.35        | Peak   |
| 2 | 2483.500 | -10.97 | 60.38         | 49.41  | 74.00         | -24.59        | Peak   |
| 3 | 2487.308 | -10.97 | 62.72         | 51.75  | 74.00         | -22.25        | Peak   |

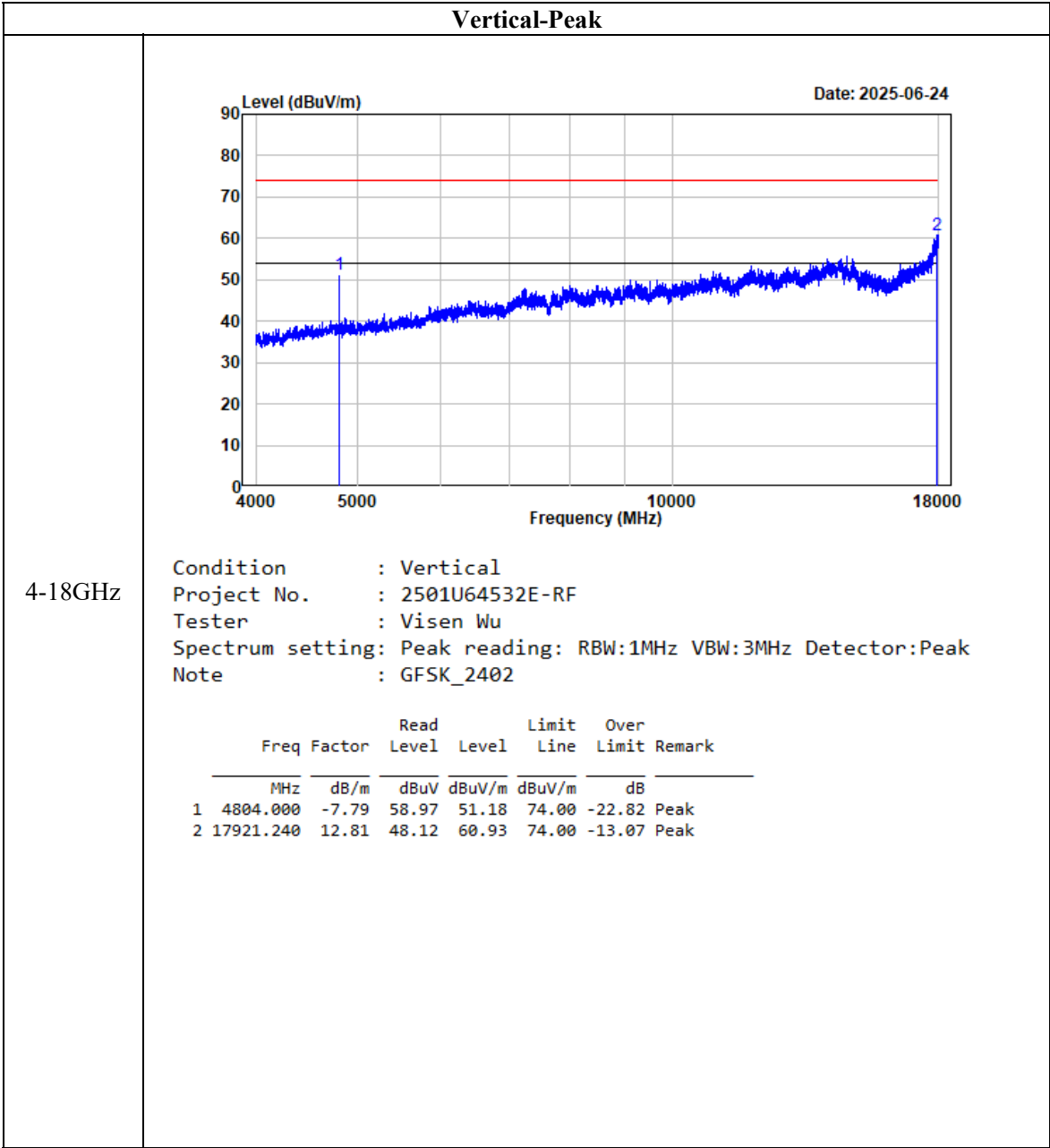
Listed with the worst harmonic margin test plot: (Low channel)

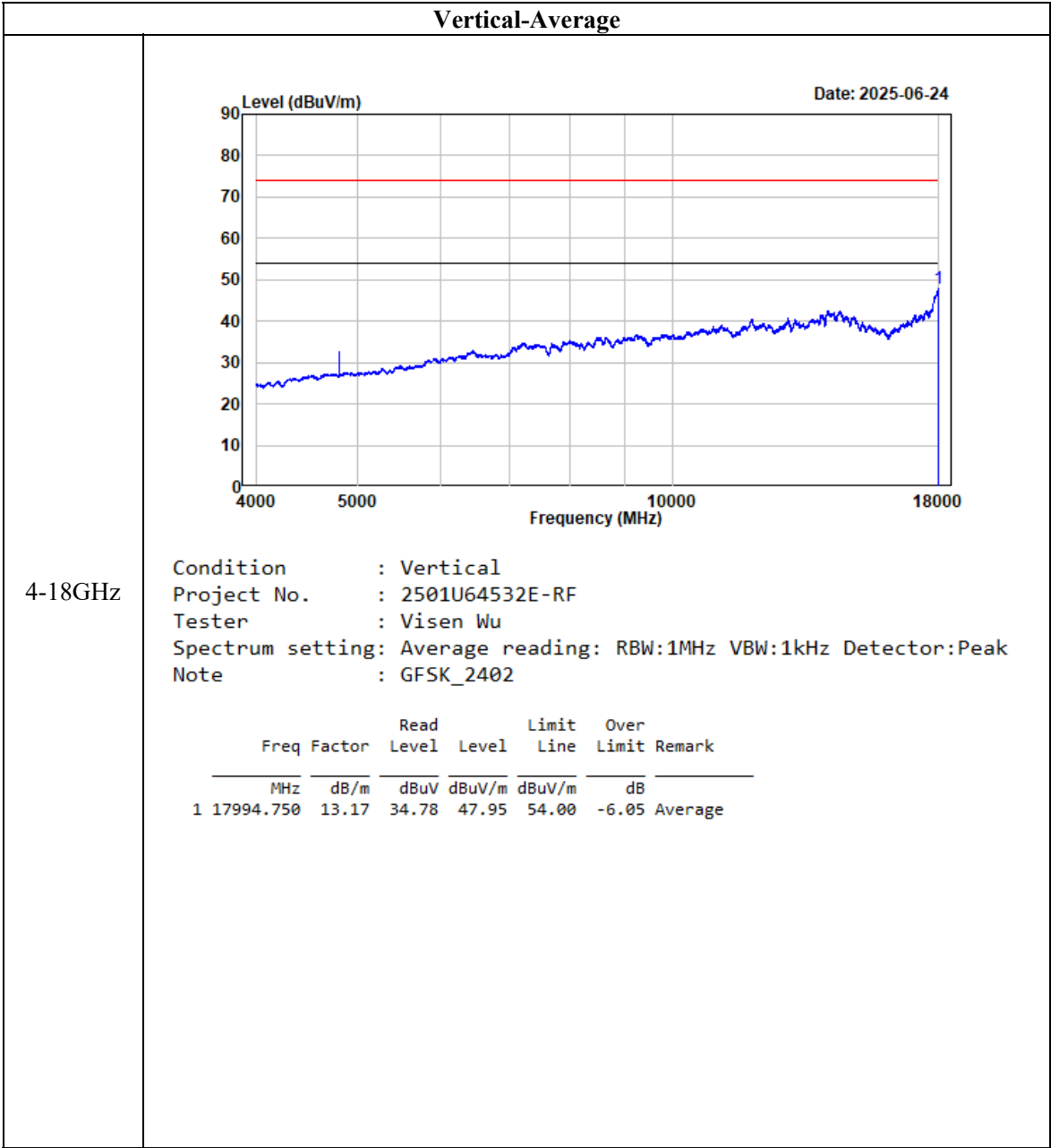


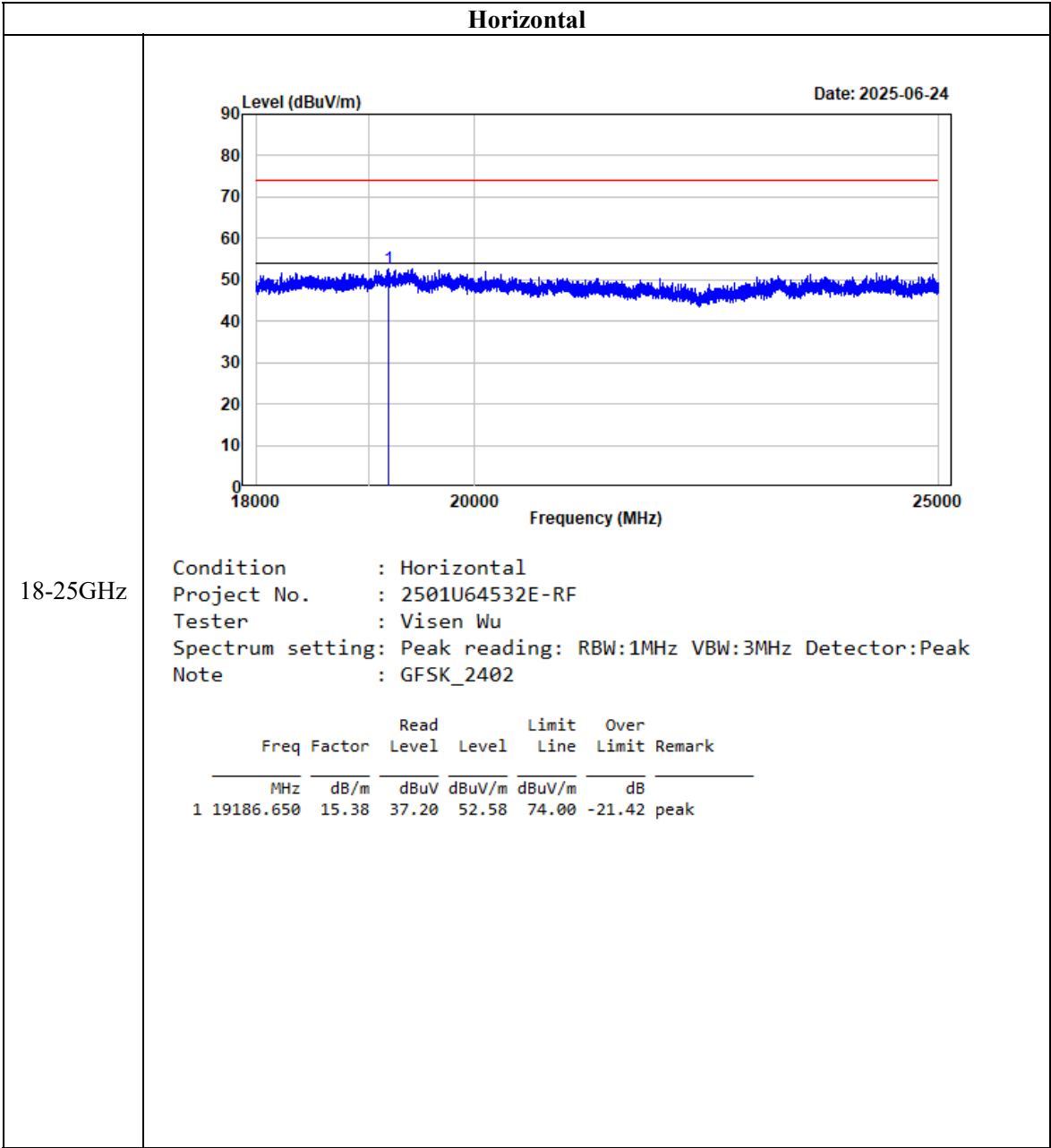


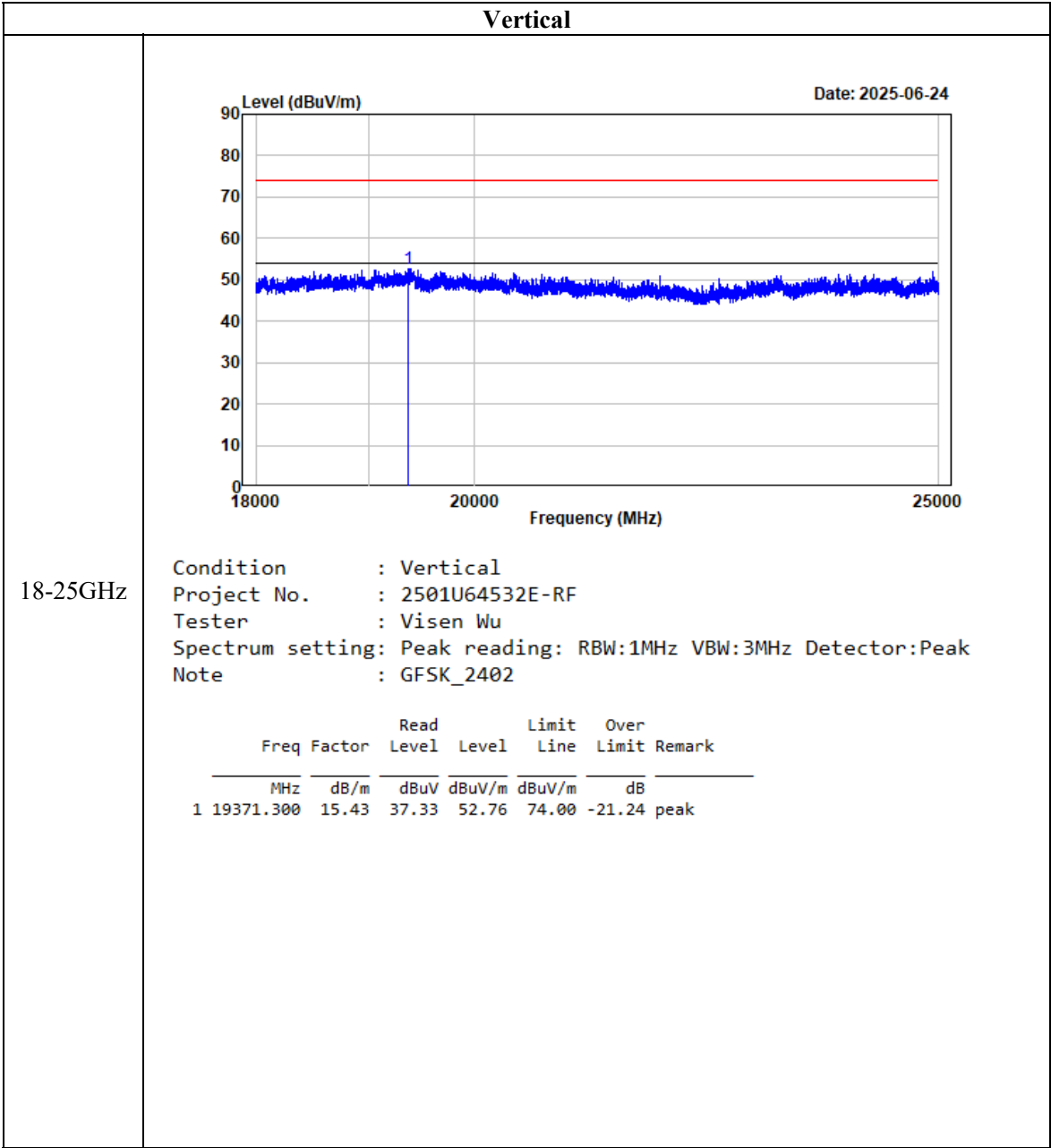












## **FCC§15.215(c) - 20dB EMISSION BANDWIDTH**

### **Applicable Standard**

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

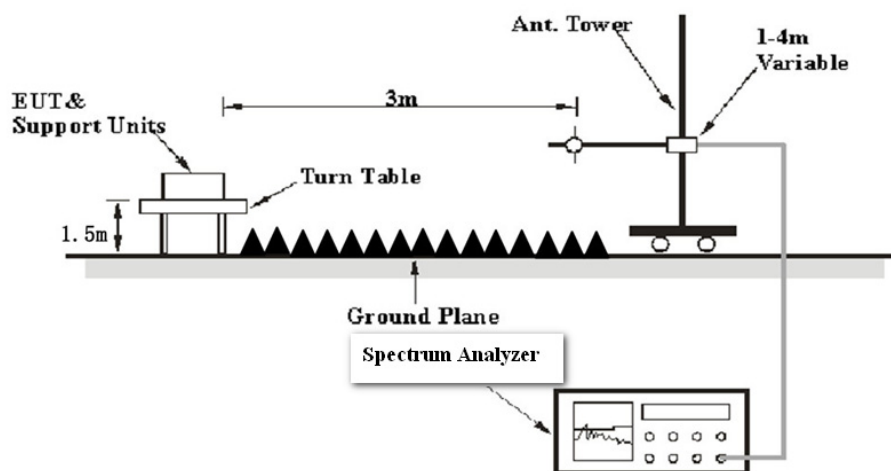
### **Test Procedure**

Test Method: ANSI C63.10-2020 Clause 6.9.2

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be at least three times RBW, unless otherwise specified by the applicable requirement.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than  $[10 \log (OBW/RBW)]$  below the reference level. Specific guidance is given in 4.1.6.2.
- d) Steps a) through c) might require iteration to adjust within the specified tolerances.
- e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “-xx dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
- f) Set detection mode to peak and trace mode to max-hold.
- g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
- h) Determine the “-xx dB down amplitude” using  $[(\text{reference value}) - xx]$ . Alternatively, this calculation may be made by using the marker-delta function of the instrument.
- i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).

j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-xx dB down amplitude” determined in step h). If a marker is below this “-xx dB down amplitude” value, then it shall be as close as possible to this value. The dBc bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.

k) The dBc bandwidth shall be reported by providing spectral plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).



## Test Data

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 21.7 °C   |
| Relative Humidity: | 61 %      |
| ATM Pressure:      | 100.8 kPa |

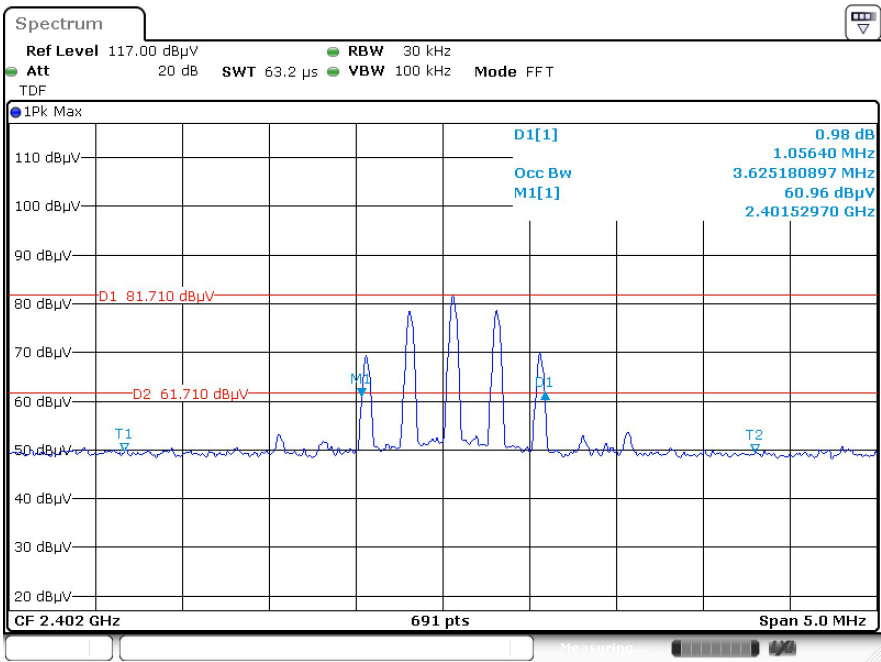
The testing was performed by Visen Wu on 2025-06-24.

EUT operation mode: Transmitting

Please refer to the following table and plots.

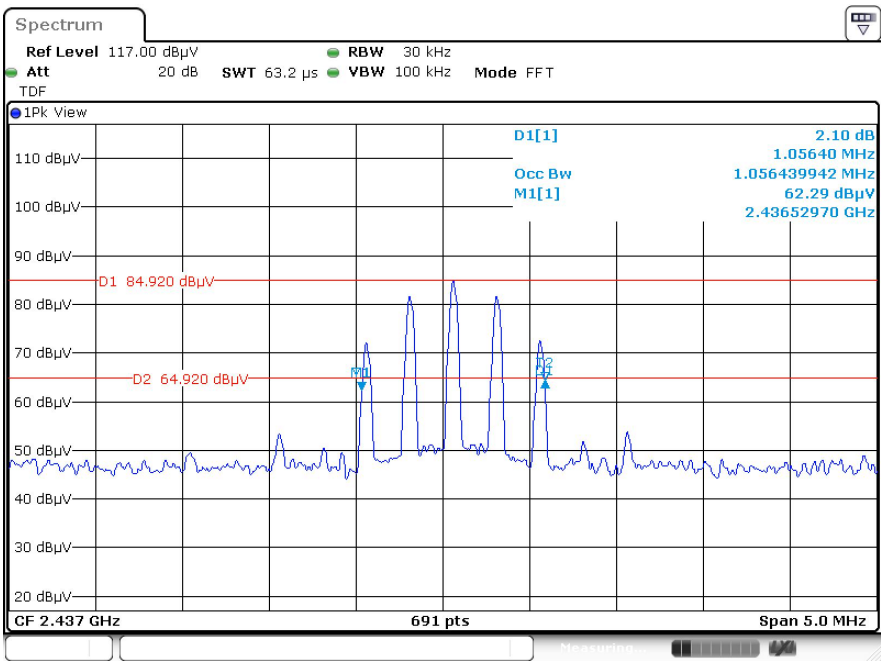
| Channel | Frequency (MHz) | 20dB Bandwidth (MHz) |
|---------|-----------------|----------------------|
| Low     | 2402            | 1.056                |
| Middle  | 2437            | 1.056                |
| High    | 2479            | 1.056                |

Low channel



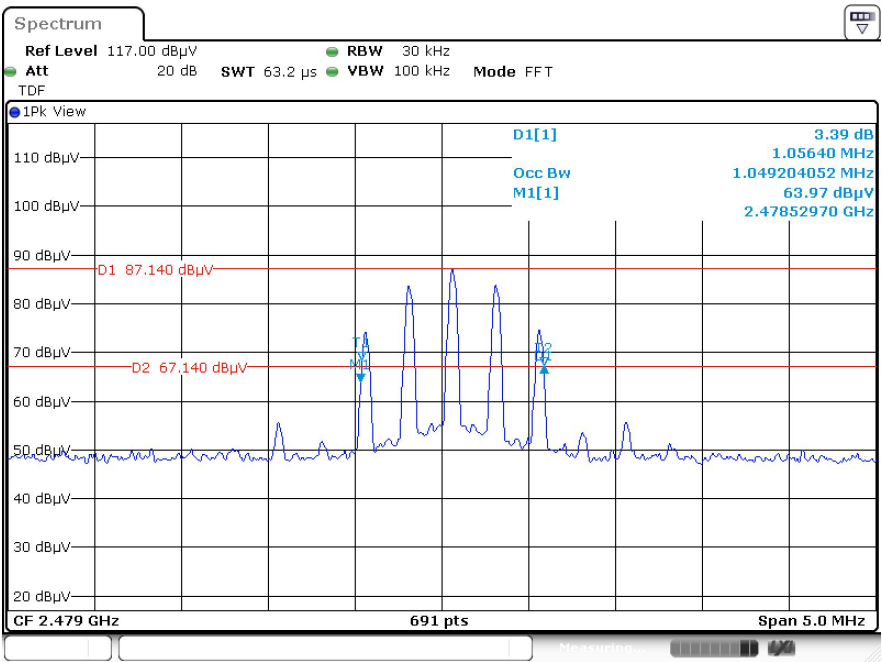
ProjectNo.:2501U64532E-RF Tester:Visen Wu  
Date: 24.JUN.2025 20:27:57

Middle Channel



ProjectNo.:2501U64532E-RF Tester:Visen Wu  
Date: 24.JUN.2025 20:23:36

High Channel



ProjectNo.:2501U64532E-RF Tester:Visen Wu  
Date: 24.JUN.2025 20:18:34

## **EUT PHOTOGRAPHS**

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Please refer to the attachment 2501U64532E-RF External photo and 2501U64532E-RF Internal photo.

## **TEST SETUP PHOTOGRAPHS**

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Please refer to the attachment 2501U64532E-RF Test Setup photo.

**\*\*\*\*\* END OF REPORT \*\*\*\*\***