

## TEST REPORT

**Applicant:** RATTA US INC

**Address:** Office NO.1414 601W 1st Ave Suite 1400 Spokane  
WASHINGTON United States

**Product Name:** Electronic-notebook

**Model Name:** A5 X2-J

**Type of Equipment:** Certification Ordinance Article 2, Paragraph 1, Item 19

**Test method(s):** MIC Notice No.88 of 2004, Appendix No.43(Version: MIC Notice No.409 of 2023)

**Report Number:** 2502U63437E-07B

**Report Date:** 2025/6/30

The above device has been tested and found compliant with the requirement of the relative standards by Bay Area Compliance Laboratories Corp. (Dongguan).

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*Rocky Xiao*

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DOCUMENT REVISION HISTORY

| Revision Number | Report Number   | Description of Revision | Date of Revision |
|-----------------|-----------------|-------------------------|------------------|
| 1.0             | 2502U63437E-07B | Original Report         | 2025/6/30        |

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

|                      |                                            |
|----------------------|--------------------------------------------|
| Product Name:        | Electronic-notebook                        |
| Test Model:          | A5 X2-J                                    |
| Rated Input Voltage: | DC 3.85V from Battery or DC 5V from Type-C |
| Serial Number:       | 3461-1                                     |
| EUT Received Date:   | 2025/6/6                                   |
| EUT Received Status: | Good                                       |

Technical Specification

|                                                 |                                                                   |
|-------------------------------------------------|-------------------------------------------------------------------|
| Operation Frequency Range (MHz):                | 2402-2480                                                         |
| Nominal RF Output Power<br>(Conducted, mW/MHz): | GFSK: 0.1mW/MHz;<br>$\pi/4$ DQPSK: 0.1mW/MHz;<br>8DPSK: 0.1mW/MHz |
| Number of TX Chain(s)                           | 1                                                                 |
| Number of RX Chain(s)                           | 1                                                                 |
| Antenna Gain (dBi) <sup>▲</sup> :               | 0.6                                                               |
| Modulation Type:                                | GFSK, $\pi/4$ -DQPSK, 8DPSK                                       |
| Emission Type:                                  | F1D                                                               |

Objective

The objective of this current document is to demonstrate the EUT, as equipment type in Certification Ordinance Article 2-1-19 of Specific Radio Equipment Specified in Article 38-2-2 Paragraph 1 Item 1 of the Radio Law, compliant with Article 49-20 of Radio equipment regulations.

Test Methodology

All measurements contained in this report were conducted with technical regulations of MIC Notice No.88 of 2004, Appendix No.43 (Version: MIC Notice No.409 of 2023).

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1<sup>st</sup> Road, Tangxia Town, Dongguan, Guangdong, China.

**Measurement Uncertainty**

| Parameter                                  | Measurement Uncertainty |
|--------------------------------------------|-------------------------|
| Frequency Error                            | ±0,5 ppm                |
| Occupied bandwidth and spreading bandwidth | ±5 %                    |
| RF output power, conducted                 | ±0.61dB                 |
| Unwanted Emissions(TX&RX), conducted       | ±1.5 dB                 |
| Temperature                                | ±1 °C                   |
| Humidity                                   | ±5%                     |
| DC and low frequency voltages              | ±0.4%                   |
| Duty Cycle                                 | 1%                      |

**Note:**

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

## EUT TEST CONFIGURATION

### Description of Test Configuration

The system was configured for testing in engineering mode, which was provided by manufacturer. 79 channels are provided as below table:

| Channel | Frequency(MHz) |
|---------|----------------|
| 0       | 2402           |
| 1       | 2403           |
| ...     | ...            |
| ...     | ...            |
| 39      | 2441           |
| ...     | ...            |
| ...     | ...            |
| 77      | 2479           |
| 78      | 2480           |

For lowest, middle and highest channel, EUT was tested with channel 0, 39 and 78.

The extreme voltage test conditions and the normal conditions are as below:

NV: Normal Voltage  $3.85V_{DC}$

LV: Low Voltage  $3.465V_{DC}$

HV: High Voltage  $4.235V_{DC}$

The EUT in built a power manage system, power deviation of the power system output is less than 1% when extreme voltage supplied, therefore the test only performed at normal voltage condition. Details as following:

| Voltage Condition | Input( $V_{DC}$ ) | RF System Voltage( $V_{DC}$ ) |
|-------------------|-------------------|-------------------------------|
| NV                | 3.85              | 3.3                           |
| LV                | 3.465             | 3.3                           |
| HV                | 4.235             | 3.3                           |

### Equipment Modifications

No modification was made to the EUT tested.

## EUT Exercise Software

The 'CMD' command was used during test, which was provided by manufacturer. The maximum power level was configured by the software as below table:

| Mode           | Channel | Frequency (MHz) | Power Level Setting |
|----------------|---------|-----------------|---------------------|
| GFSK           | Low     | 2402            | Default             |
|                | Middle  | 2441            | Default             |
|                | High    | 2480            | Default             |
| $\pi/4$ -DQPSK | Low     | 2402            | Default             |
|                | Middle  | 2441            | Default             |
|                | High    | 2480            | Default             |
| 8DPSK          | Low     | 2402            | Default             |
|                | Middle  | 2441            | Default             |
|                | High    | 2480            | Default             |

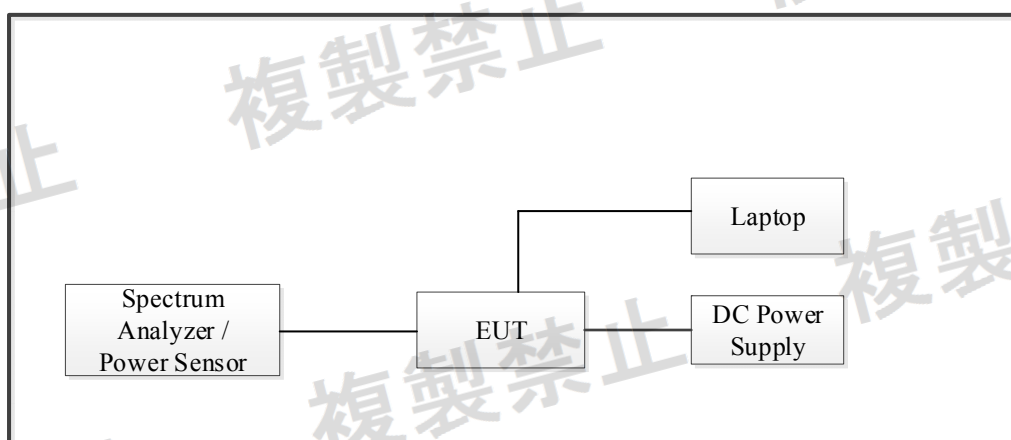
## Support Equipment List and Details

| Manufacturer | Description     | Model   | Serial Number |
|--------------|-----------------|---------|---------------|
| TDK-Lambda   | DC Power Supply | Z+60-14 | F-08-EM038-1  |
| DELL         | Laptop          | E6410   | GMLGPM1       |

## Support Cable List and Details

| Cable Description      | Shielding Cable | Ferrite Core | Length (m) | From Port       | To  |
|------------------------|-----------------|--------------|------------|-----------------|-----|
| USB Cable              | NO              | NO           | 1.2        | Laptop          | EUT |
| Detachable Power Cable | NO              | NO           | 1          | DC Power Supply | EUT |

## Configuration of Test Setup



Test Equipment List and Details

| Manufacturer  | Description                         | Model        | Serial Number | Calibration Date | Calibration Due Date | Calibration Agency | Calibration Method <sup>Note</sup> |
|---------------|-------------------------------------|--------------|---------------|------------------|----------------------|--------------------|------------------------------------|
| R&S           | Spectrum Analyzer                   | FSU 26       | 200445        | 2025/3/31        | 2026/3/30            | BACL Metrology     | C                                  |
| Anritsu       | Microwave Peak Power Sensor         | MA24418A     | 12618         | 2024/8/27        | 2025/8/26            | BACL Metrology     | C                                  |
| Mini-Circuits | Coaxial Power Splitters & Combiner  | ZFRSC-183-S+ | SF448201614   | 2025/2/25        | 2026/2/24            | BACL(DG)           | D                                  |
| R&S           | Wideband Radio Communication Tester | CMW500       | 147473        | 2024/9/5         | 2025/9/4             | BACL Metrology     | C                                  |
| All-sun       | Multimeter                          | EM305A       | 8348897       | 2024/8/16        | 2025/8/15            | BACL Metrology     | C                                  |
| TDK-Lambda    | DC Power Supply                     | Z+60-14      | F-08-EM038-1  | N/A              | N/A                  | N/A                | N/A                                |
| Agilent       | Signal Generator                    | E8247C       | MY43321350    | 2024/9/5         | 2025/9/4             | BACL Metrology     | C                                  |

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

Note:

- A. Calibration conducted by the National Institute of Information and Communications Technology (NICT) (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1).
- B. Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992).
- C. Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
- D. Calibration conducted by using measuring instruments and other equipment which shall have been given any of calibration, etc. listed above from a) to c)

Test Environmental Conditions

|                    |                     |
|--------------------|---------------------|
| Temperature:       | 25.4~26.2℃          |
| Relative Humidity: | 52~57%              |
| ATM Pressure:      | 100.3~100.4kPa      |
| Tester:            | Levi Shi            |
| Test Date:         | 2025/6/17~2025/6/18 |

**SUMMARY OF TEST RESULTS**

| SN | Description of Test                                           | Result             |
|----|---------------------------------------------------------------|--------------------|
| 1  | Frequency Error                                               | Compliant          |
| 2  | Occupied Bandwidth and Spread Bandwidth                       | Compliant          |
| 3  | Transmitter Spurious Emission and Unwanted Emission Intensity | Compliant          |
| 4  | Antenna Output Power and Output Power Tolerance               | Compliant          |
| 5  | Receiver Spurious Emission and Unwanted Emission Intensity    | Compliant          |
| 6  | Carrier sense capability (1)                                  | Not Applicable*    |
| 7  | Carrier sense capability (2)                                  | Not Applicable**   |
| 8  | Carrier sense capability (3)                                  | Not Applicable***  |
| 9  | Transmission frequency channel switching function             | Not Applicable*    |
| 10 | Transmission Antenna Gain                                     | Not Applicable**** |
| 11 | Transmission Radiation Angle Width                            | Not Applicable**** |
| 12 | Interference Prevention Function                              | Compliant          |
| 13 | Frequency Hopping Dwell Time                                  | Compliant          |
| 14 | Construction Protection Confirmation                          | Compliant          |

**Note:**

Not Applicable\*: Only required for device with “compensating for the reduction of EIRP with output power” function.

Not Applicable\*\*: Only required for OBW between 26MHz and 40MHz with OFDM modulation type.

Not Applicable\*\*\*: Only required for outdoor use radio control of model airplanes.

Not Applicable\*\*\*\*: This item not applicable when the EIRP less than the limit.

## 1 - FREQUENCY ERROR

### Limit

Within  $\pm 50$ ppm.

### Test Procedure

Set the EUT to the measurement frequency without modulation.

Setting of SA is following as: Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold.

Record the peak spot frequency.

If the EUT can't set at un-modulation mode, measure the 10dBc center frequency.

### Test Data

**Test Result:** Compliant

*Test Mode: Transmitting*

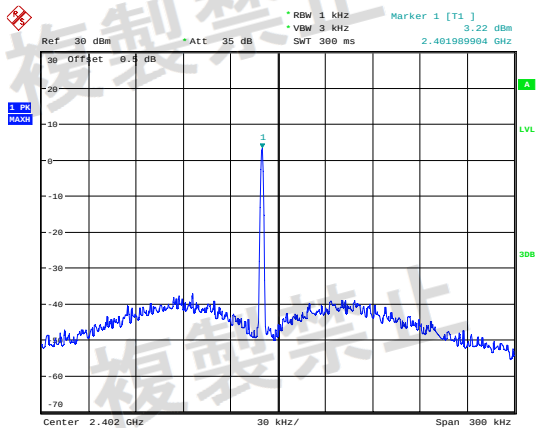
| Mode           | Test Condition | Channel | Test Frequency (MHz) | Measured Frequency (MHz) | Result (ppm) | Limit (ppm) |
|----------------|----------------|---------|----------------------|--------------------------|--------------|-------------|
| Single Carrier | NV             | Low     | 2402                 | 2401.989904              | -4.20        | $\pm 50$    |
|                |                | Middle  | 2441                 | 2440.994231              | -2.36        |             |
|                |                | High    | 2480                 | 2479.998558              | -0.58        |             |

*Note:*

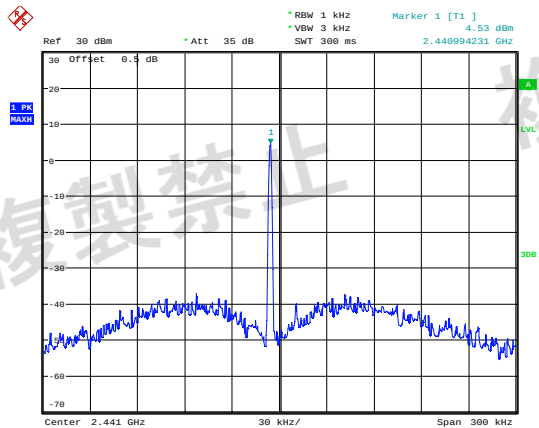
$$\text{Result} = (\text{Measured Frequency} - \text{Test Frequency}) / \text{Test Frequency} * 10^6$$

Please refer to the plots for normal voltage test:

Low Channel

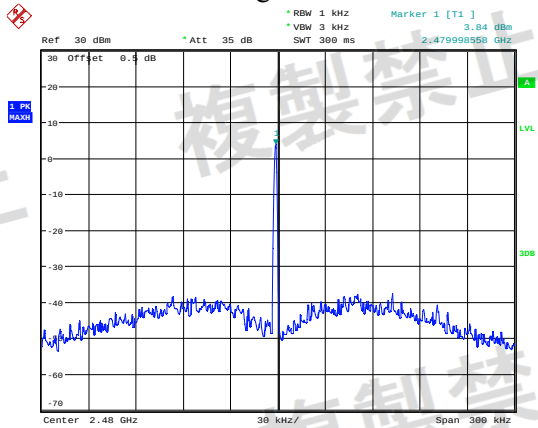


Middle Channel



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:09:21

High Channel



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:10:15

## 2 - OCCUPIED BANDWIDTH AND SPREADING BANDWIDTH

### Limit

- Occupied bandwidth:  $\leq 83.5$  MHz
- Spread Bandwidth:  $\geq 500$  kHz, Spread factor  $\geq 5$ .

### Test Procedure

- ❖ Conditions of Application Equipment (EUT)
  - The modulation state shall be “continuous frequency-hopping mode” by spread spectrum.
- ❖ Spectrum Analyzer Conditions
  - RBW: 300 kHz
  - VBW: 300 kHz
  - Sweep time: Auto, Marker: Marker Off
  - Log scale : 10dB/Div, Data points : 501points (400 points or more)
  - Detection: Positive Peak, Sweep mode: Continuous

### Test Data

#### Test Result: Compliant

Test Mode: Transmitting

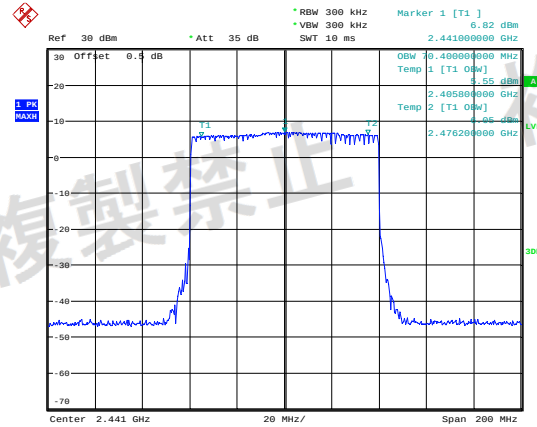
| Test Condition | Mode           | Occupied bandwidth (MHz) |             | Spreading bandwidth (MHz) |            | Spreading factor |          |
|----------------|----------------|--------------------------|-------------|---------------------------|------------|------------------|----------|
|                |                | Measured                 | Limit       | Measured                  | Limit      | Measured         | Limit    |
| NV             | GFSK           | 78.40                    | $\leq 83.5$ | 70.40                     | $\geq 0.5$ | 70.40            | $\geq 5$ |
|                | $\pi/4$ -DQPSK | 78.40                    |             | 70.80                     |            | 70.80            |          |
|                | 8DPSK          | 78.40                    |             | 70.80                     |            | 70.80            |          |

Note:

Spread Factor=Spread Bandwidth/modulation rate. The modulation rate: MR=1.

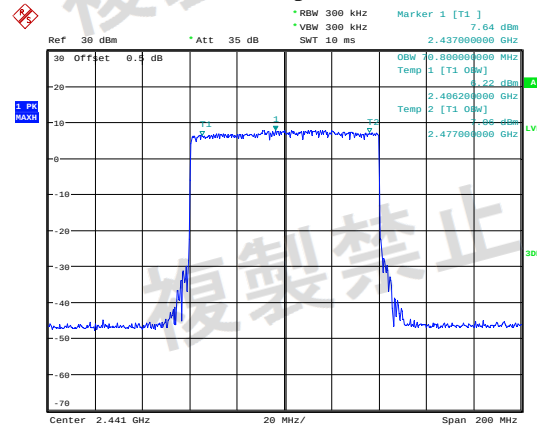
Please refer to the below plots for normal voltage test:

## GFSK Spread Bandwidth



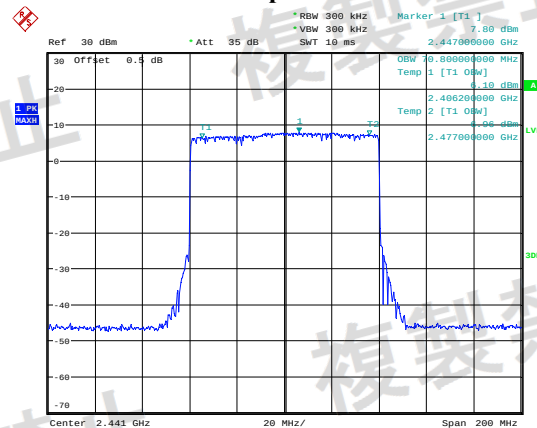
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:41:04

### $\pi/4$ -DQPSK Spread Bandwidth



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 23:00:07

### 8DPSK Spread Bandwidth



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 23:05:06

### 3 - TRANSMITTER SPURIOUS EMISSION STRENGTH AND UNWANTED EMISSION INTENSITY

#### Limit

- $f < 1000 \text{ MHz}$ :  $\leq 0.25 \mu\text{W}/100\text{kHz}$
- $f < 2387 \text{ MHz}$ ,  $f > 2496.5 \text{ MHz}$ :  $\leq 2.5 \mu\text{W}/\text{MHz}$
- $2387 \text{ MHz} \leq f \leq 2400 \text{ MHz}$ ;  $2483.5 \text{ MHz} < f \leq 2496.5 \text{ MHz}$ :  $\leq 25 \mu\text{W}/\text{MHz}$

#### Test Procedure

##### ❖ Conditions of Application Equipment (EUT)

- The modulation state shall be in continuously transmitting mode.

##### ❖ Spectrum Analyzer Conditions

##### Step1:

- Setting of SA start 30MHz and stop frequency 1000MHz, RB:100kHz/VB:100kHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value + cable loss shall be less than  $0.25 \mu\text{W}/100\text{kHz}$ .
- Setting of SA start 1000MHz and stop frequency 2387MHz, RBW: 1MHz/VBW: 1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. Reading value + cable loss shall be less than  $2.5 \mu\text{W}/\text{MHz}$ .
- Setting of SA start 2387MHz and stop frequency 2400MHz, RBW: 1MHz/VBW: 1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. Reading value + cable loss shall be less than  $25 \mu\text{W}/\text{MHz}$ .
- Setting of SA start 2483.5MHz and stop frequency 2496.5MHz, RBW: 1MHz/VBW: 1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. Reading value + cable loss shall be less than  $25 \mu\text{W}/\text{MHz}$ .
- Setting of SA start 2496.5MHz and stop frequency 12500MHz, RBW: 1MHz/VBW: 1MHz, Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. Reading value + cable loss shall be less than  $2.5 \mu\text{W}/\text{MHz}$ .

##### Step 2:

- Center frequency: Searched Frequency
- Span: 0Hz
- RBW:1MHz(Above 1GHz), 100 kHz(30MHz-1GHz). VBW: Same as RBW.
- Sweep time: Auto(Minimum time to ensure measurement accuracy. \*In case of burst wave, one burst shall be included per data point) Data points: 400 points or more. Sweep mode: Single Sweep.
- Detection Mode: Sample

#### Test Data

**Test Result: Compliant**

*Test Mode: Transmitting*

| Test Condition | Mode          | Channel | Test Band (RBW) | Frequency Range |            | Max. Emission Located (GHz) | Result (dBm/RBW) | Result (μW/RBW) | Limit (μW/RBW) |
|----------------|---------------|---------|-----------------|-----------------|------------|-----------------------------|------------------|-----------------|----------------|
|                |               |         |                 | Start (GHz)     | Stop (GHz) |                             |                  |                 |                |
| NV             | GFSK          | Low     | Band I (100kHz) | 0.03            | 1          | 0.68                        | -55.07           | 0.003           | 0.25           |
|                |               |         | Band II (1MHz)  | 1               | 2.387      | 1.766                       | -44.57           | 0.035           | 2.5            |
|                |               |         | Band III (1MHz) | 2.387           | 2.4        | 2.4                         | -22.27           | 5.929           | 25             |
|                |               |         | Band IV (1MHz)  | 2.4835          | 2.4965     | 2.495                       | -43.90           | 0.041           | 25             |
|                |               |         | Band V (1MHz)   | 2.4965          | 12.5       | 3.157                       | -42.27           | 0.059           | 2.5            |
|                |               | Middle  | Band I (100kHz) | 0.03            | 1          | 0.884                       | -54.85           | 0.003           | 0.25           |
|                |               |         | Band II (1MHz)  | 1               | 2.387      | 2.096                       | -44.54           | 0.035           | 2.5            |
|                |               |         | Band III (1MHz) | 2.387           | 2.4        | 2.396                       | -44.17           | 0.038           | 25             |
|                |               |         | Band IV (1MHz)  | 2.4835          | 2.4965     | 2.486                       | -44.07           | 0.039           | 25             |
|                |               |         | Band V (1MHz)   | 2.4965          | 12.5       | 3.157                       | -40.85           | 0.082           | 2.5            |
|                |               | High    | Band I (100kHz) | 0.03            | 1          | 0.591                       | -55.27           | 0.003           | 0.25           |
|                |               |         | Band II (1MHz)  | 1               | 2.387      | 2.16                        | -44.37           | 0.037           | 2.5            |
|                |               |         | Band III (1MHz) | 2.387           | 2.4        | 2.394                       | -44.12           | 0.039           | 25             |
|                |               |         | Band IV (1MHz)  | 2.4835          | 2.4965     | 2.484                       | -20.42           | 9.078           | 25             |
|                |               |         | Band V (1MHz)   | 2.4965          | 12.5       | 11.22                       | -43.24           | 0.047           | 2.5            |
|                | $\pi/4$ DQPSK | Low     | Band I (100kHz) | 0.03            | 1          | 0.932                       | -55.31           | 0.003           | 0.25           |
|                |               |         | Band II (1MHz)  | 1               | 2.387      | 2.387                       | -41.45           | 0.072           | 2.5            |
|                |               |         | Band III (1MHz) | 2.387           | 2.4        | 2.4                         | -18.94           | 12.764          | 25             |
|                |               |         | Band IV (1MHz)  | 2.4835          | 2.4965     | 2.486                       | -43.37           | 0.046           | 25             |
|                |               |         | Band V (1MHz)   | 2.4965          | 12.5       | 3.157                       | -42.75           | 0.053           | 2.5            |
|                |               | Middle  | Band I (100kHz) | 0.03            | 1          | 0.348                       | -55.11           | 0.003           | 0.25           |
|                |               |         | Band II (1MHz)  | 1               | 2.387      | 2.359                       | -44.84           | 0.033           | 2.5            |
|                |               |         | Band III (1MHz) | 2.387           | 2.4        | 2.395                       | -43.64           | 0.043           | 25             |
|                |               |         | Band IV (1MHz)  | 2.4835          | 2.4965     | 2.484                       | -43.81           | 0.042           | 25             |
|                |               |         | Band V (1MHz)   | 2.4965          | 12.5       | 3.157                       | -41.27           | 0.075           | 2.5            |
|                |               | High    | Band I (100kHz) | 0.03            | 1          | 0.907                       | -55.59           | 0.003           | 0.25           |
|                |               |         | Band II (1MHz)  | 1               | 2.387      | 2.373                       | -45.06           | 0.031           | 2.5            |
|                |               |         | Band III (1MHz) | 2.387           | 2.4        | 2.399                       | -44.30           | 0.037           | 25             |

|  |       |        |                    |        |        |       |        |        |      |
|--|-------|--------|--------------------|--------|--------|-------|--------|--------|------|
|  | 8DPSK |        | Band IV<br>(1MHz)  | 2.4835 | 2.4965 | 2.484 | -17.61 | 17.338 | 25   |
|  |       |        | Band V<br>(1MHz)   | 2.4965 | 12.5   | 11.32 | -41.09 | 0.078  | 2.5  |
|  |       | Low    | Band I<br>(100kHz) | 0.03   | 1      | 0.715 | -54.42 | 0.004  | 0.25 |
|  |       |        | Band II<br>(1MHz)  | 1      | 2.387  | 2.387 | -43.75 | 0.042  | 2.5  |
|  |       |        | Band III<br>(1MHz) | 2.387  | 2.4    | 2.4   | -18.85 | 13.032 | 25   |
|  |       |        | Band IV<br>(1MHz)  | 2.4835 | 2.4965 | 2.495 | -43.46 | 0.045  | 25   |
|  |       |        | Band V<br>(1MHz)   | 2.4965 | 12.5   | 3.157 | -41.35 | 0.073  | 2.5  |
|  |       | Middle | Band I<br>(100kHz) | 0.03   | 1      | 0.963 | -55.39 | 0.003  | 0.25 |
|  |       |        | Band II<br>(1MHz)  | 1      | 2.387  | 1.569 | -45.42 | 0.029  | 2.5  |
|  |       |        | Band III<br>(1MHz) | 2.387  | 2.4    | 2.389 | -44.30 | 0.037  | 25   |
|  |       |        | Band IV<br>(1MHz)  | 2.4835 | 2.4965 | 2.49  | -43.94 | 0.040  | 25   |
|  |       |        | Band V<br>(1MHz)   | 2.4965 | 12.5   | 3.157 | -40.29 | 0.094  | 2.5  |
|  |       | High   | Band I<br>(100kHz) | 0.03   | 1      | 0.796 | -54.26 | 0.004  | 0.25 |
|  |       |        | Band II<br>(1MHz)  | 1      | 2.387  | 2.204 | -45.61 | 0.027  | 2.5  |
|  |       |        | Band III<br>(1MHz) | 2.387  | 2.4    | 2.396 | -44.93 | 0.032  | 25   |
|  |       |        | Band IV<br>(1MHz)  | 2.4835 | 2.4965 | 2.484 | -17.75 | 16.788 | 25   |
|  |       |        | Band V<br>(1MHz)   | 2.4965 | 12.5   | 3.157 | -40.26 | 0.094  | 2.5  |

Note:

Band I:30MHz~1000MHz

Band II:1000MHz~2387MHz

Band III:2387MHz~2400MHz

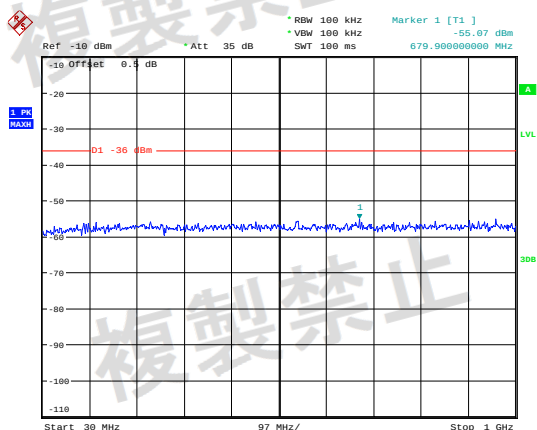
Band IV:2483.5MHz~2496.5MHz

Band V:2496.5MHz~12500MHz

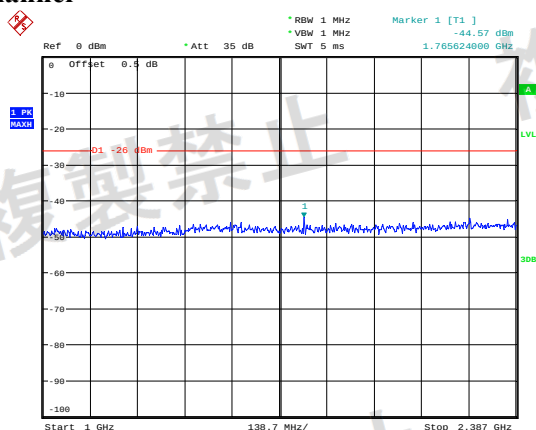
Please refer to the below plots for normal voltage test.

## GFSK:

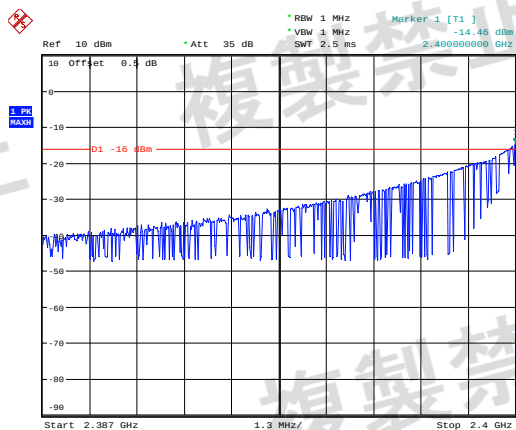
## Low Channel



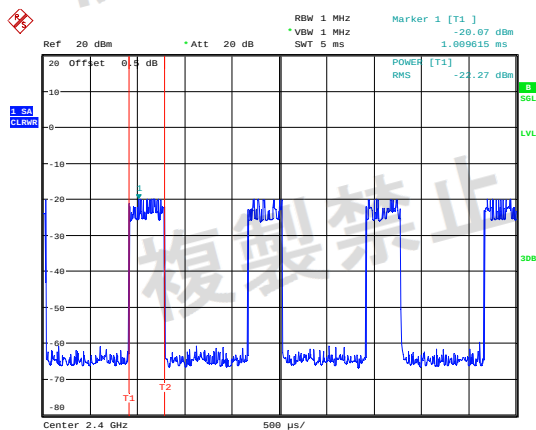
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Date: 17.JUN.2025 21:41:28



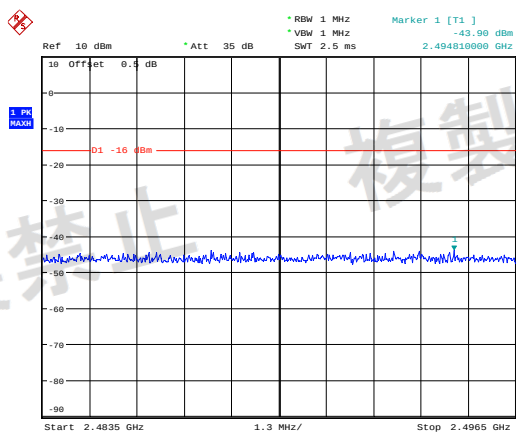
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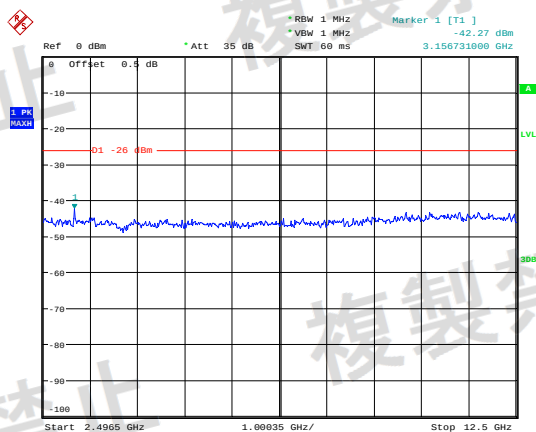
ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 17.JUN.2025 21:42:09



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 21:44:38

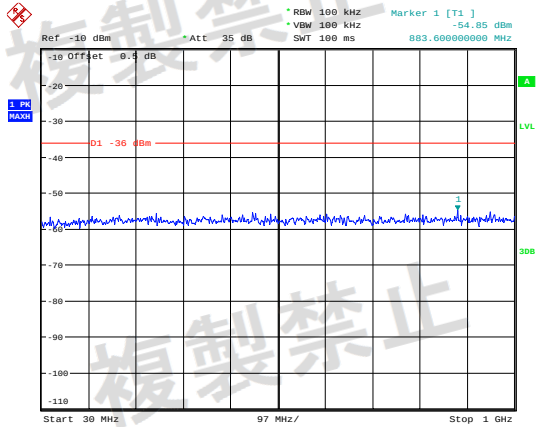


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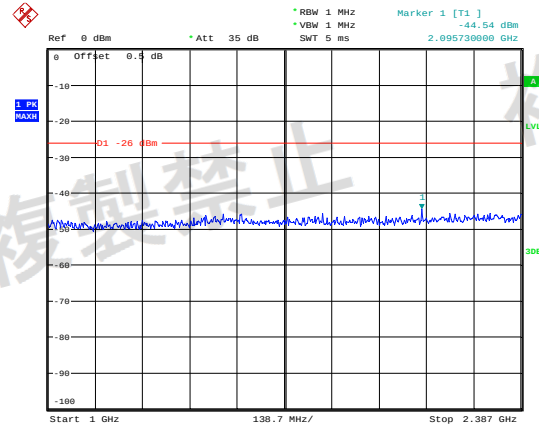


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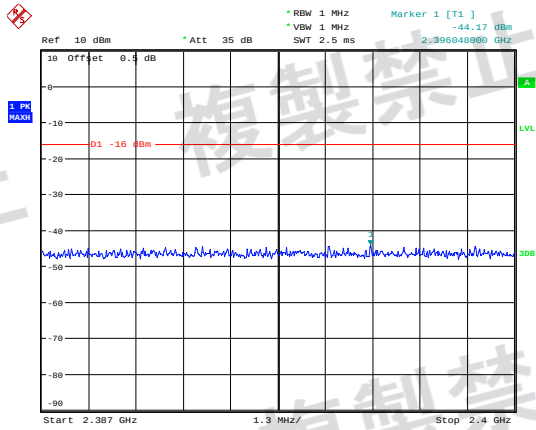
### Middle Channel



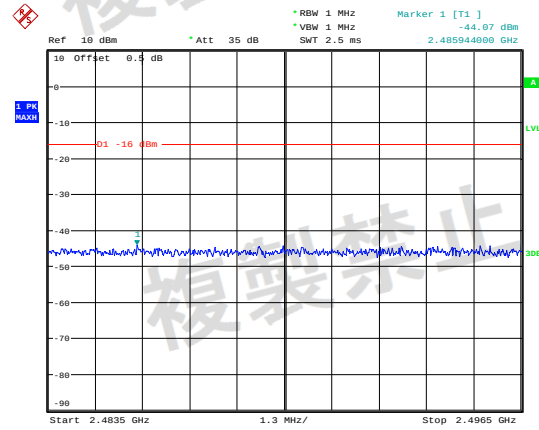
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Date: 17.JUN.2025 21:45:22



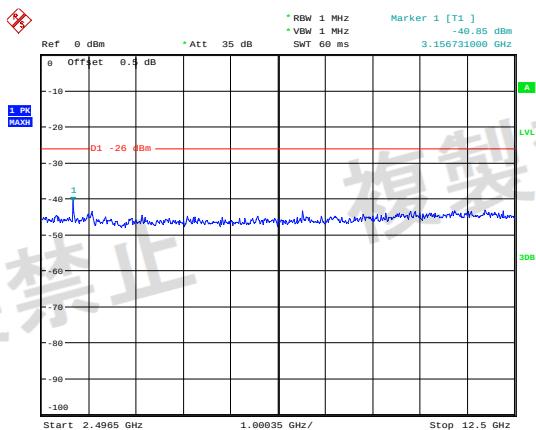
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ProjectNo.:2502U63437E-RFTester:Levi Shi  
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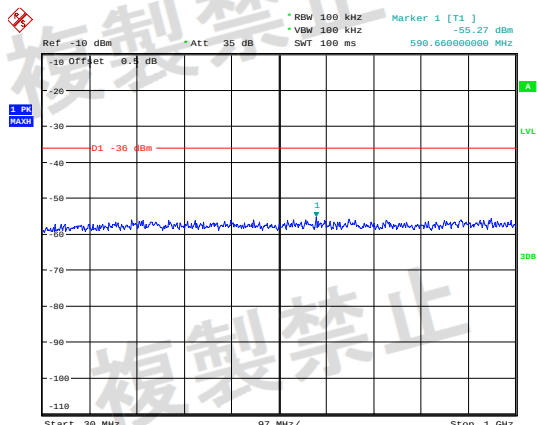


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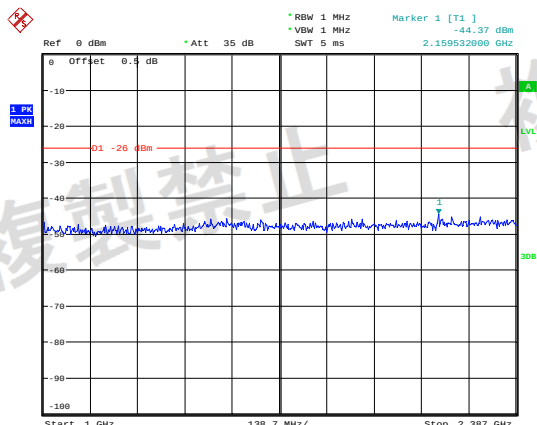


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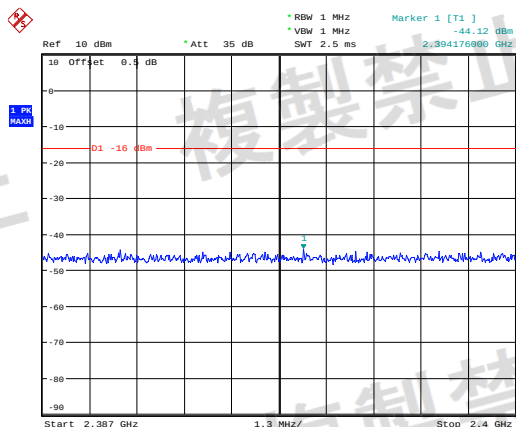
# High Channel



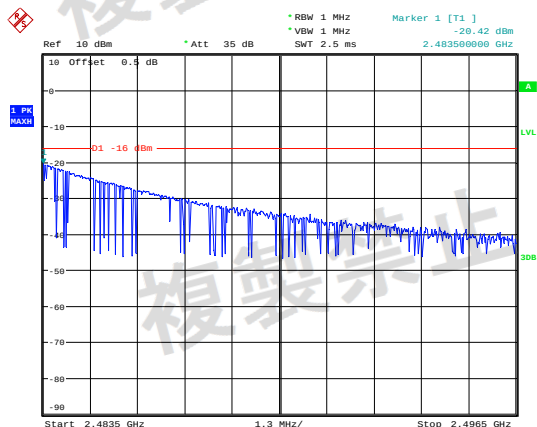
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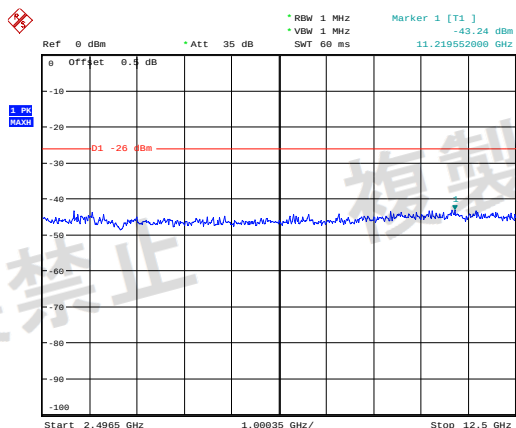
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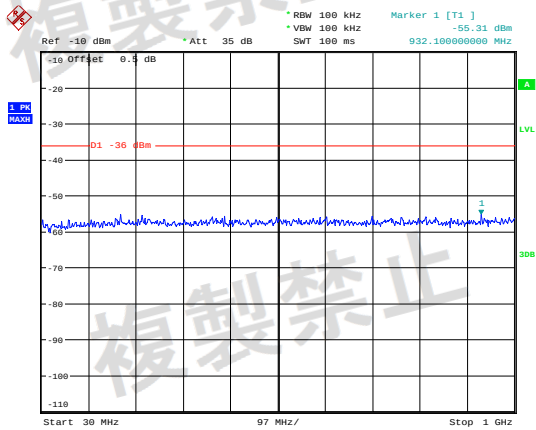
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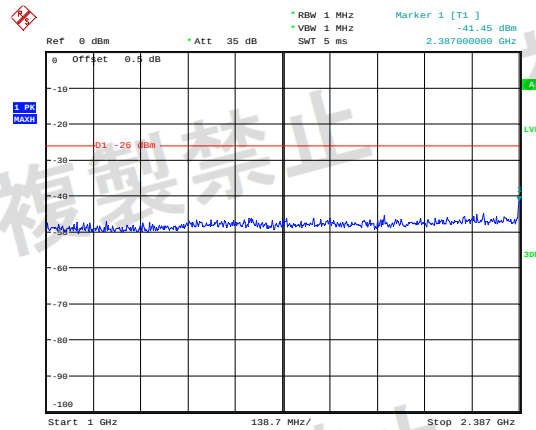
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$\pi/4$ -DQPSK:

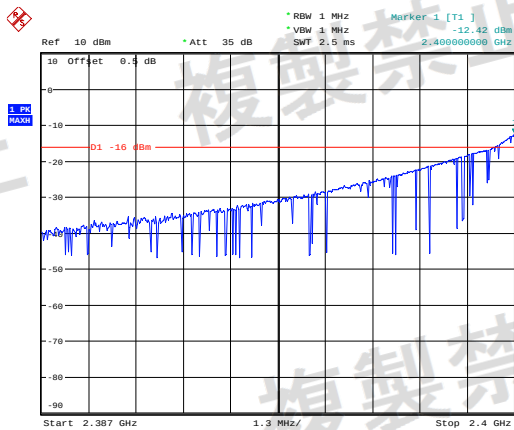
## Low Channel



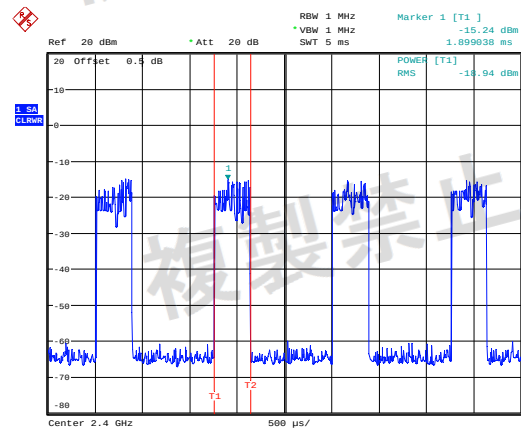
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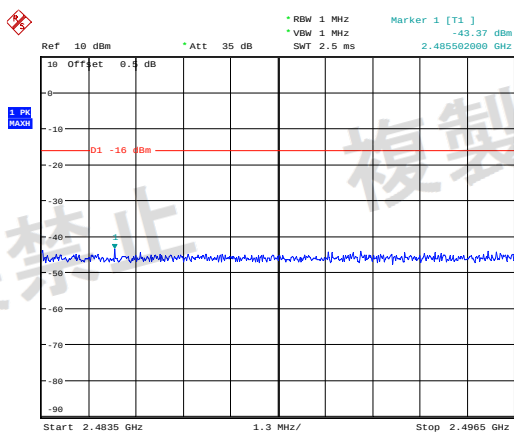
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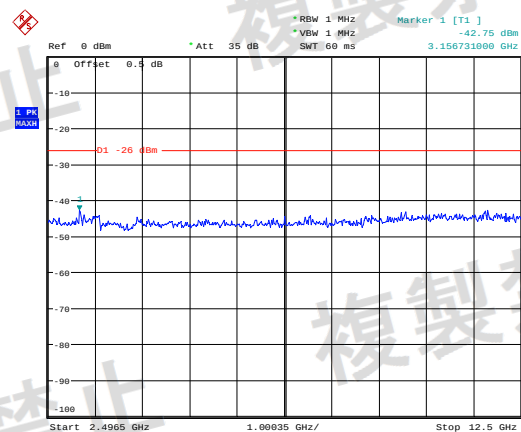
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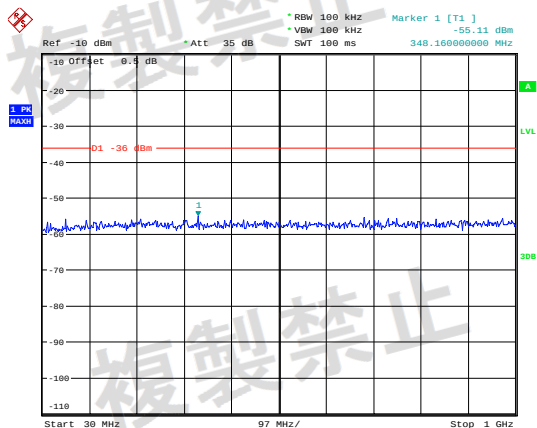


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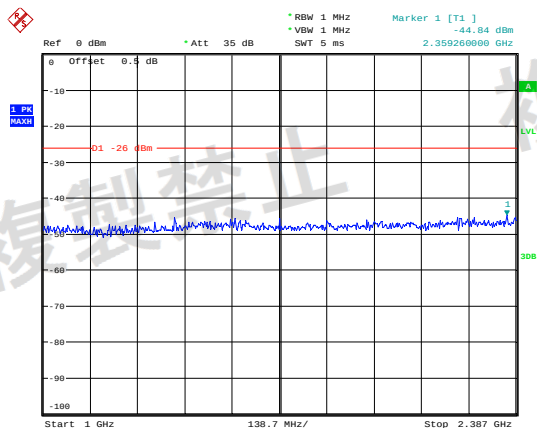


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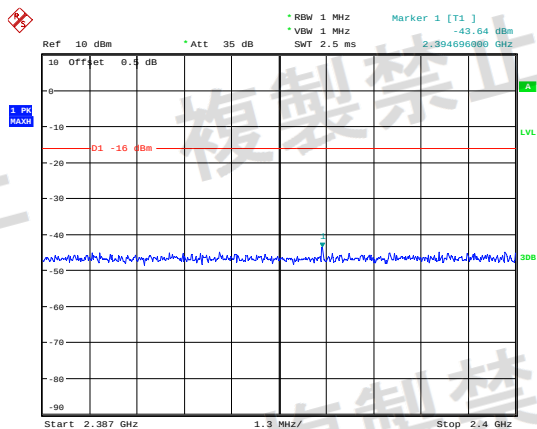
### Middle Channel



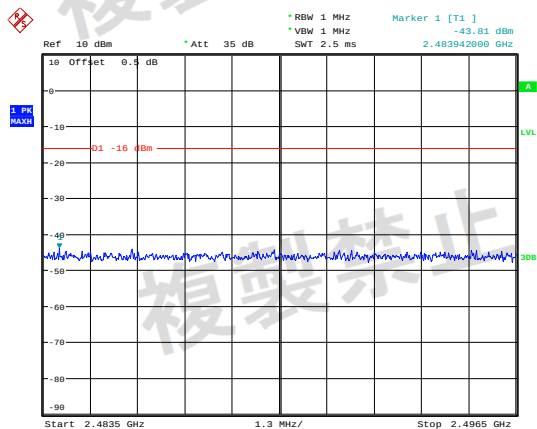
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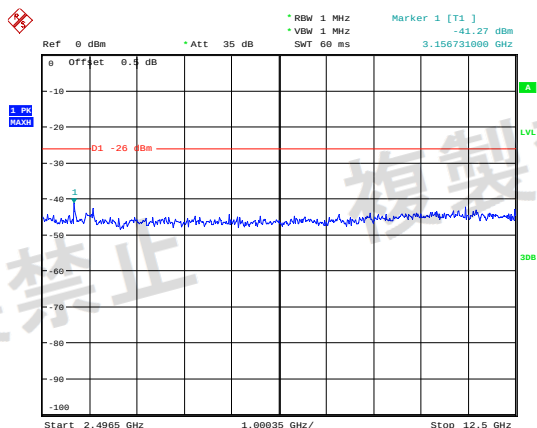
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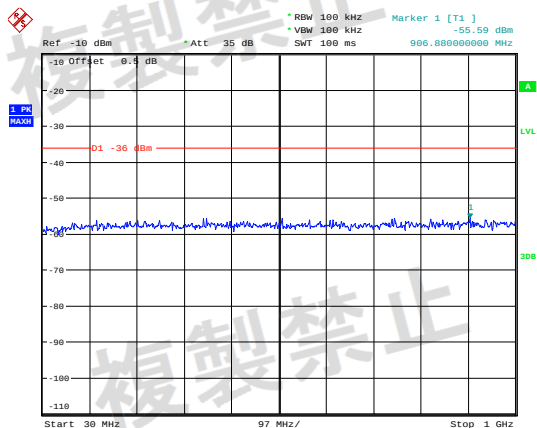


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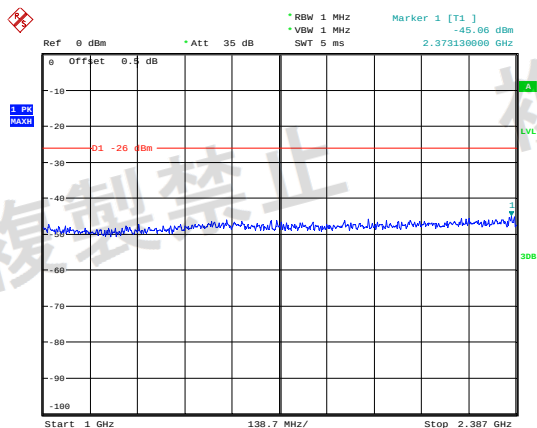


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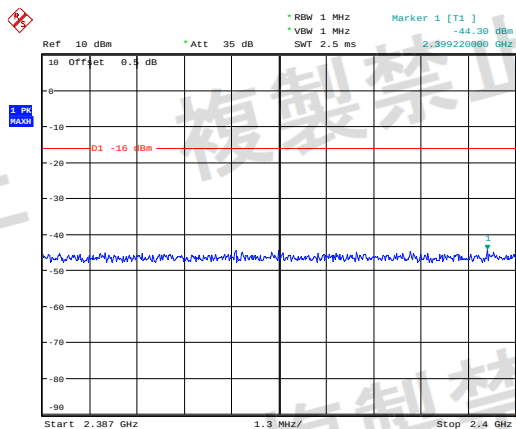
## High Channel



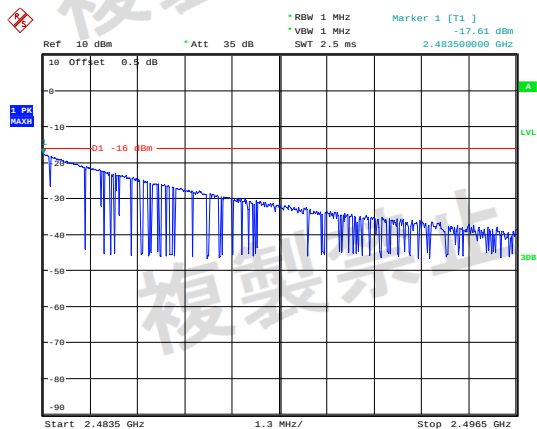
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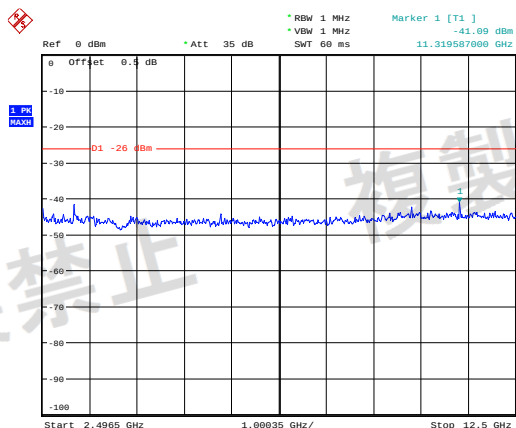
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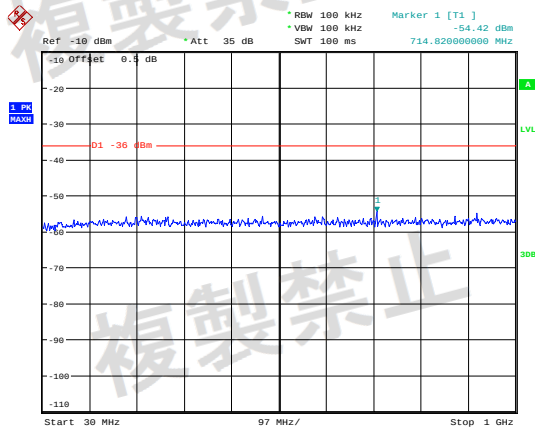
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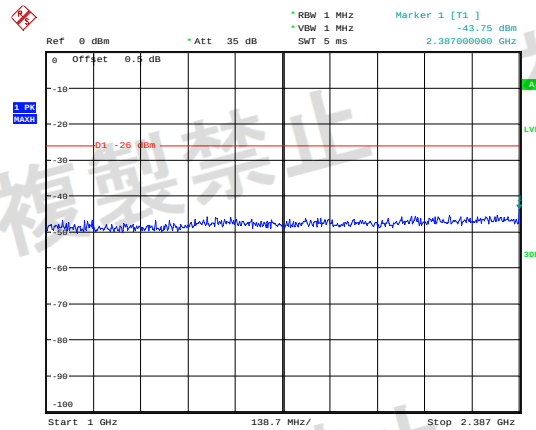
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## 8DPSK:

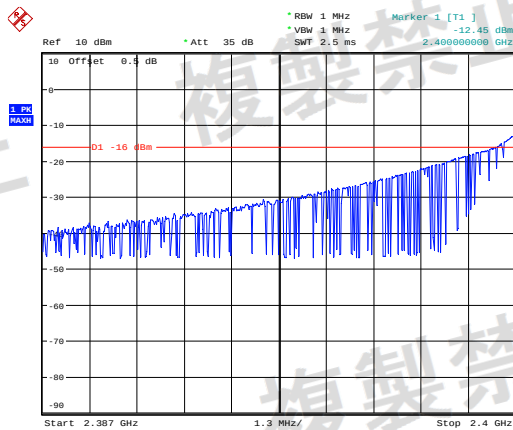
## Low Channel



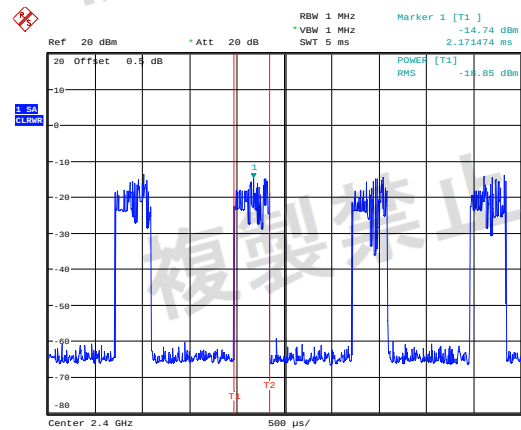
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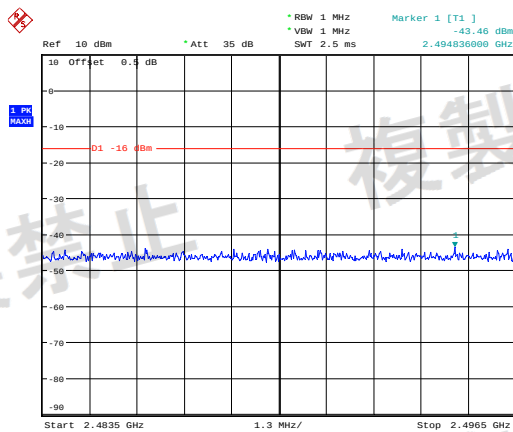
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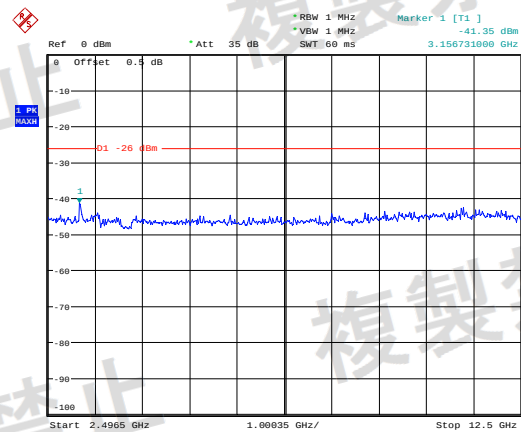
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ProjectNo.:2502U63437E-RF Tester:Levi Shi  
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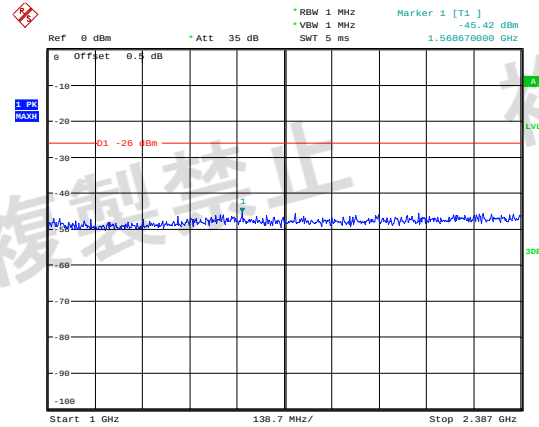
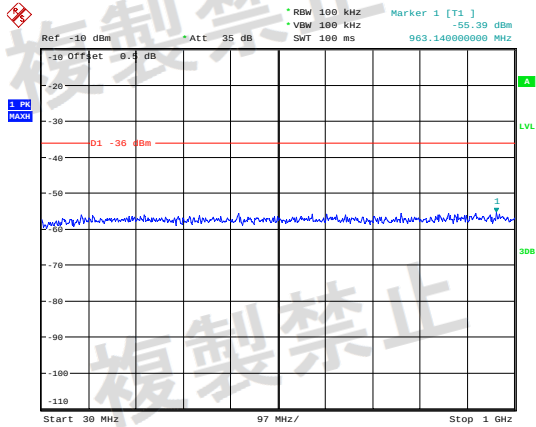


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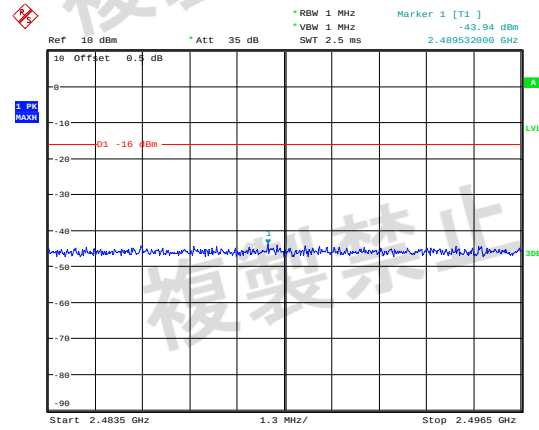
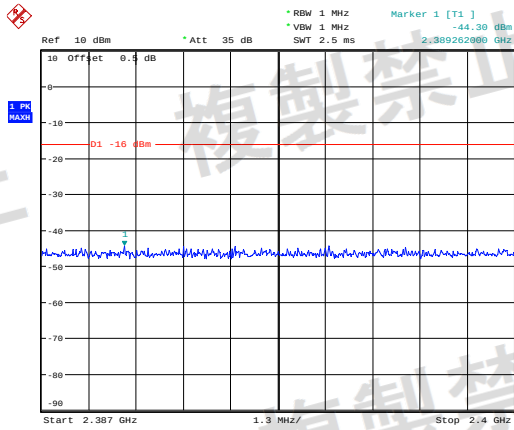
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### Middle Channel



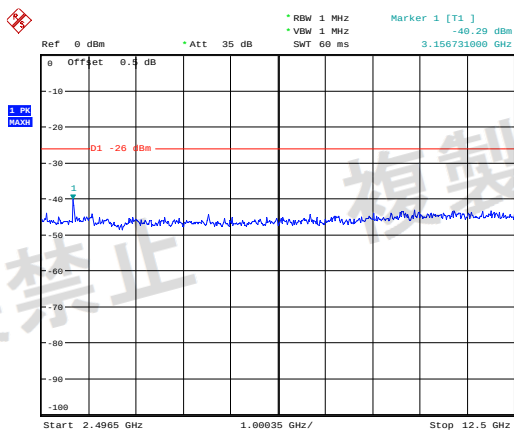
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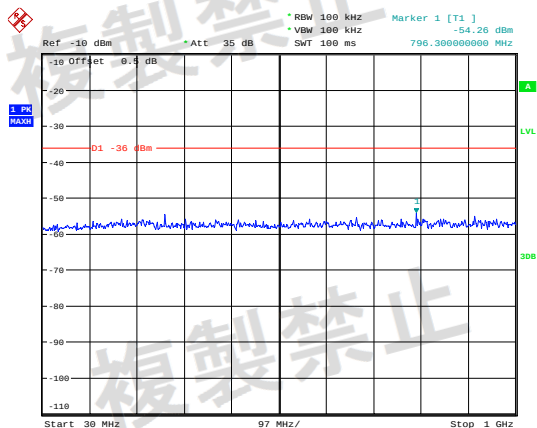
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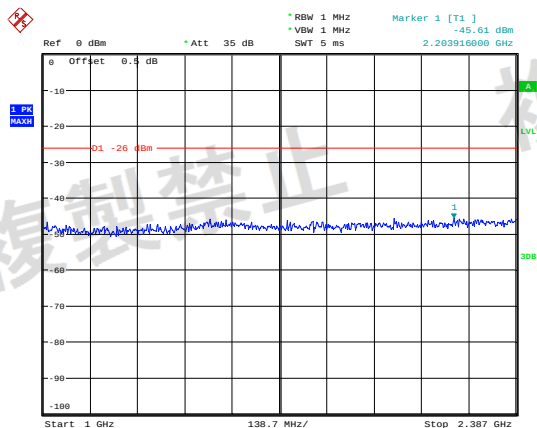


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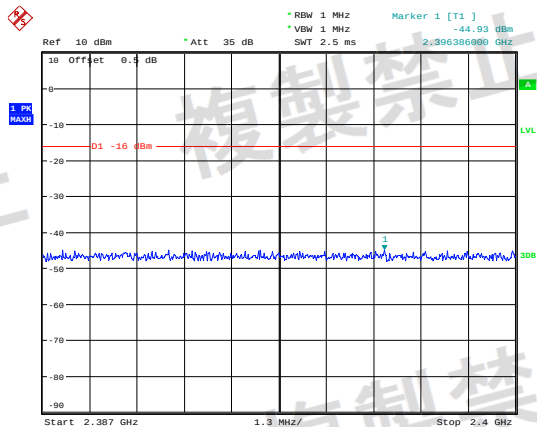
## High Channel



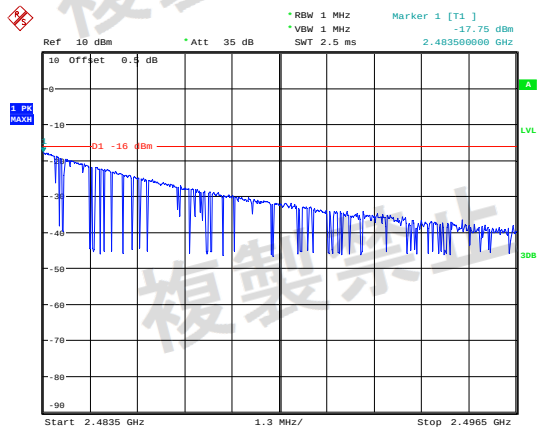
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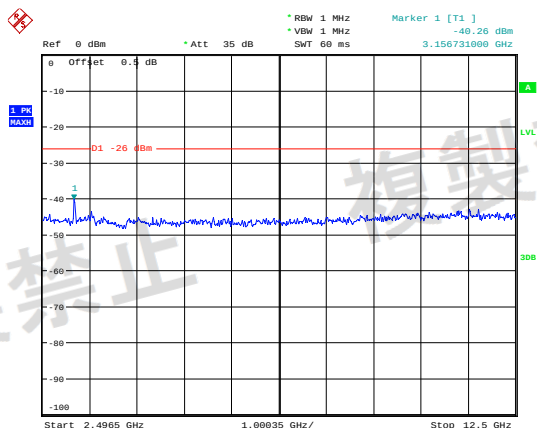
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ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 17.JUN.2025 21:56:02



ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 17.JUN.2025 21:56:33



ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 17.JUN.2025 21:56:45

## 4 - ANTENNA OUTPUT POWER AND ANTENNA POWER TOLERANCE

### Limit

- $\leq 3 \text{ mW /MHz}$
- The Output Power Tolerance must be within +20% ~ -80%.
- $\text{EIRP} \leq 6.91 \text{ dBm/MHz}$

### Test Procedure

For FHSS UUT:

- Connect the UUT to the power meter in a state of hopping mode.
- Set the power meter to trace average across the pulse on period, record the reading level on power meter.
- Calculate the mean power per 1MHz by dividing the reading level by "Spread Bandwidth".

### Test Data

**Test Result: Compliant**

*Test Mode: Transmitting*

#### Duty Cycle and Declared Power:

| Mode           | Ton (ms) | Ton+Toff (ms) | Duty cycle (%) |
|----------------|----------|---------------|----------------|
| GFSK           | 0.41     | 1.26          | 32.54          |
| $\pi/4$ -DQPSK | 0.42     | 1.26          | 33.33          |
| 8DPSK          | 0.42     | 1.26          | 33.33          |

| Mode           | Antenna gain (dBi) | Declared power (mW/MHz) |
|----------------|--------------------|-------------------------|
| GFSK           | 0.6                | 0.100                   |
| $\pi/4$ -DQPSK |                    | 0.100                   |
| 8DPSK          |                    | 0.100                   |

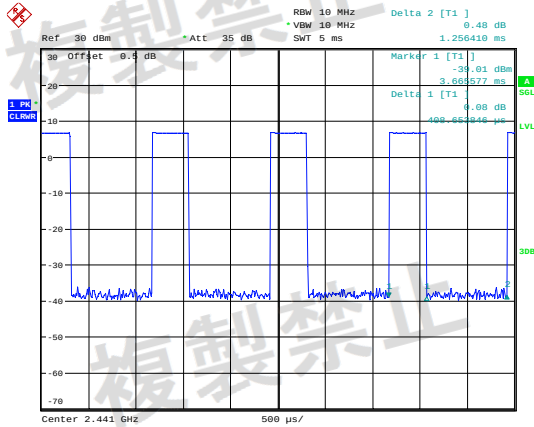
#### Output power

| Test Condition | Mode           | Reading (dBm) | Spread bandwidth (MHz) | Duty cycle (%) | Output power (mW/MHz) |          | Power tolerance (%) |         | EIRP (dBm/MHz) |             |
|----------------|----------------|---------------|------------------------|----------------|-----------------------|----------|---------------------|---------|----------------|-------------|
|                |                |               |                        |                | Result                | Limit    | Result              | Limit   | Result         | Limit       |
| NV             | GFSK           | 1.45          | 70.4                   | 32.54          | 0.061                 | $\leq 3$ | -39.00              | -80~+20 | -11.55         | $\leq 6.91$ |
|                | $\pi/4$ -DQPSK | 2.35          | 70.8                   | 33.33          | 0.073                 |          | -27.00              |         | -10.77         |             |
|                | 8DPSK          | 2.25          | 70.8                   | 33.33          | 0.071                 |          | -29.00              |         | -10.89         |             |

Note:

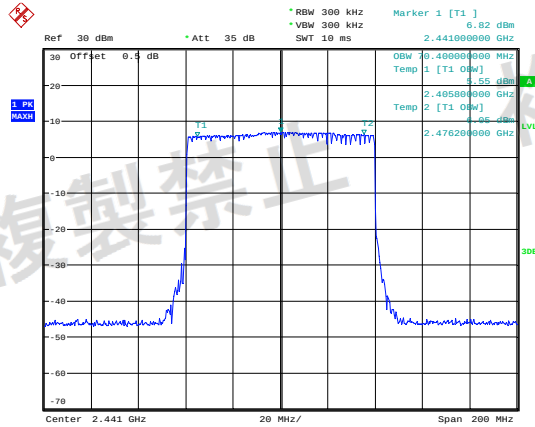
- 1)  $\text{Antenna output power (mW/MHz)} = 10^{\wedge}(\text{Reading (dBm)} / 10) / \text{Duty cycle (\%)} / \text{Spread Bandwidth (MHz)}$
- 2)  $\text{Antenna output Power Tolerance} = (\text{Antenna output power} - \text{Declared Power}) / \text{Declared Power} * 100\%$
- 3)  $\text{Antenna output power (dBm)} = 10 * \log_{10}(\text{Antenna output power (mW)})$
- 4)  $\text{EIRP (dBm)} = \text{Antenna output power (dBm)} + \text{Antenna gain.}$

## GFSK Duty cycle

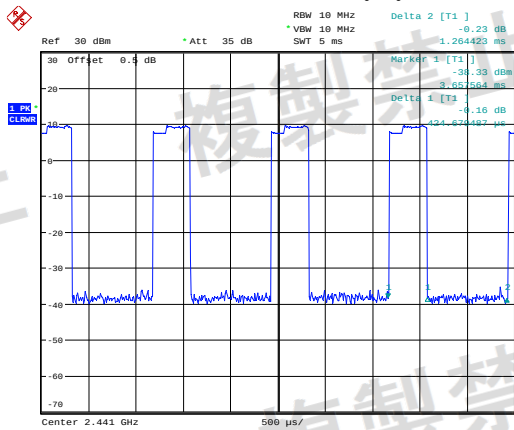


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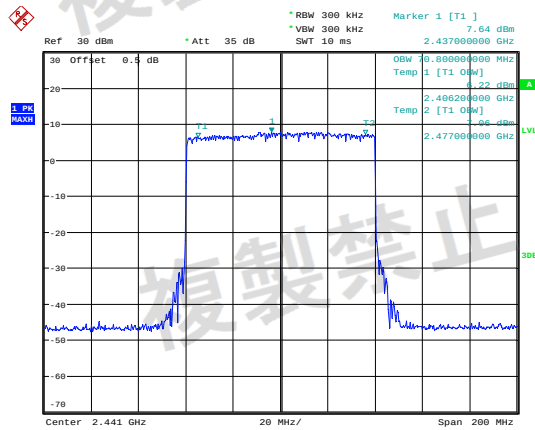
## GFSK Spread Bandwidth



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:41:04

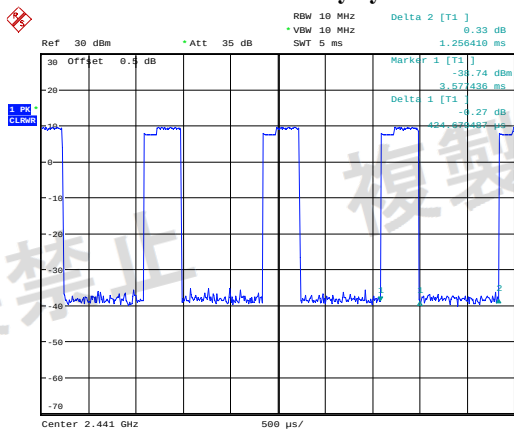
 $\pi/4$ -DQPSK Duty cycle

ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:11:33

 $\pi/4$ -DQPSK Spread Bandwidth

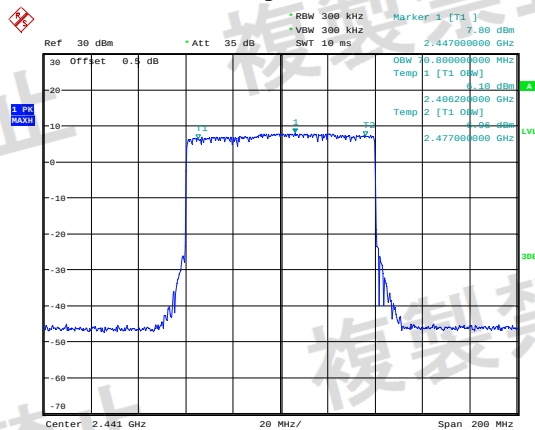
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 23:00:07

## 8DPSK Duty cycle



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:12:56

## 8DPSK Spread Bandwidth



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 23:05:06

## 5 - RECEIVER SPURIOUS EMISSION AND UNWANTED EMISSION INTENSITY

### Limit

- $\leq 4 \text{ nW}$  ( $30 \text{ MHz} \leq f \leq 1000 \text{ MHz}$ )
- $\leq 20 \text{ nW}$  ( $1 \text{ GHz} \leq f \leq 12.5 \text{ GHz}$ )

### Test Procedure

#### ❖ Conditions of Application Equipment (EUT)

- The modulation state shall be “continuous receiving mode”.

#### ❖ Spectrum Analyzer Conditions

- Start Frequency: Start Frequency of frequency range to measure (30MHz or 1GHz)
- Stop Frequency: Stop Frequency of frequency range to measure (1GHz or 12.5GHz)
- Span: AUTO (Measurement Range)
- RBW: 100 kHz, VBW: 100 kHz for Frequency  $< 1 \text{ GHz}$
- RBW: 1MHz, VBW: 1MHz for Frequency  $> 1 \text{ GHz}$
- Sweep time: AUTO or more
- Sweep mode: Auto Sweep
- Detection: Positive Peak
- Reference Level: Enough level for maximum dynamic range

**Test Data****Test Result: Compliant**, please see the below tables and plots

| Test Condition | Mode          | Channel | Test Band (RBW) | Frequency Range |            | Max. Emission Located (GHz) | Result (dBm) | Result (nW) | Limit (nW) |
|----------------|---------------|---------|-----------------|-----------------|------------|-----------------------------|--------------|-------------|------------|
|                |               |         |                 | Start (GHz)     | Stop (GHz) |                             |              |             |            |
| NV             | GFSK          | Low     | Band I (100kHz) | 0.03            | 1          | 0.286                       | -83.44       | 0.005       | 4          |
|                |               |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -74.37       | 0.037       | 20         |
|                |               | Middle  | Band I (100kHz) | 0.03            | 1          | 0.944                       | -83.11       | 0.005       | 4          |
|                |               |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -73.69       | 0.043       | 20         |
|                |               | High    | Band I (100kHz) | 0.03            | 1          | 0.534                       | -82.56       | 0.006       | 4          |
|                |               |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -72.55       | 0.056       | 20         |
|                | $\pi/4$ DQPSK | Low     | Band I (100kHz) | 0.03            | 1          | 0.391                       | -83.47       | 0.004       | 4          |
|                |               |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -72.38       | 0.058       | 20         |
|                |               | Middle  | Band I (100kHz) | 0.03            | 1          | 0.793                       | -83.38       | 0.005       | 4          |
|                |               |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -72.67       | 0.054       | 20         |
|                |               | High    | Band I (100kHz) | 0.03            | 1          | 0.969                       | -83.28       | 0.005       | 4          |
|                |               |         | Band II (1MHz)  | 1               | 12.5       | 1.774                       | -69.69       | 0.107       | 20         |
|                | 8DPSK         | Low     | Band I (100kHz) | 0.03            | 1          | 0.93                        | -83.36       | 0.005       | 4          |
|                |               |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -73.86       | 0.041       | 20         |
|                |               | Middle  | Band I (100kHz) | 0.03            | 1          | 0.977                       | -83.85       | 0.004       | 4          |
|                |               |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -72.93       | 0.051       | 20         |
|                |               | High    | Band I (100kHz) | 0.03            | 1          | 0.51                        | -83.57       | 0.004       | 4          |
|                |               |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -73.02       | 0.050       | 20         |

Note:

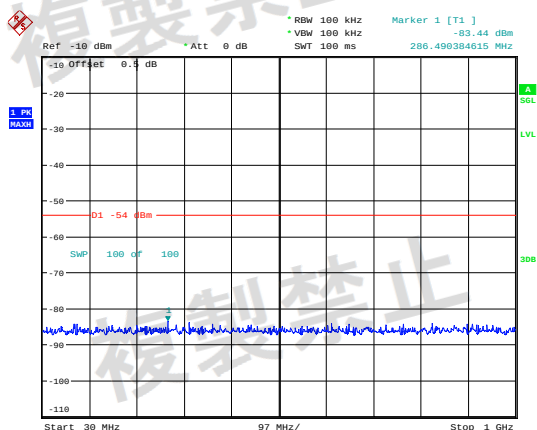
Band I:30MHz~1000MHz

Band II:1000MHz~12500MHz

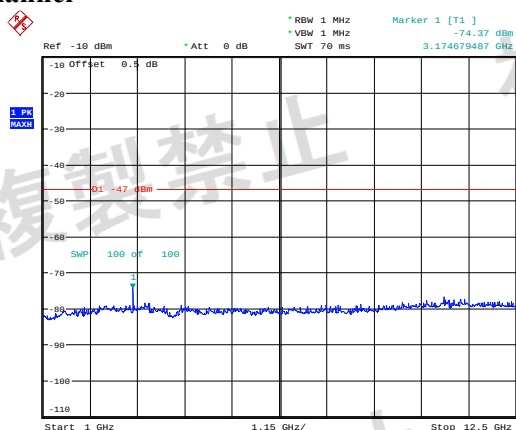
Please refer to the below plots for normal voltage test.

## GFSK:

## Low Channel

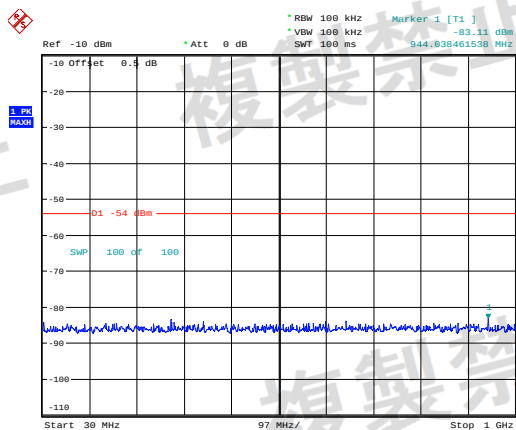


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:14:13

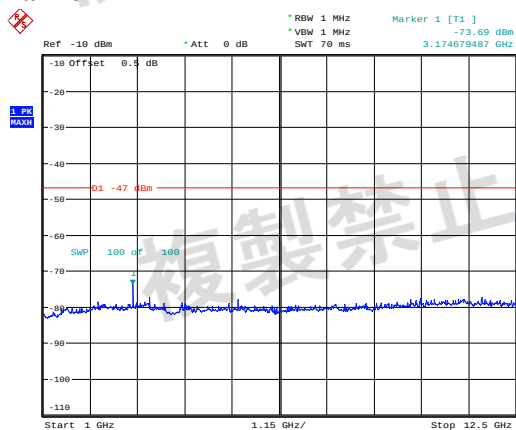


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:17:01

## Middle Channel

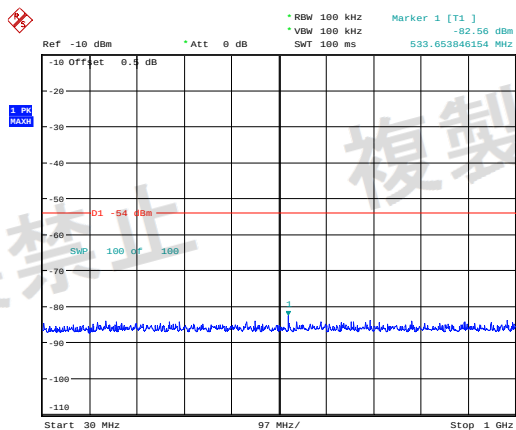


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:18:37

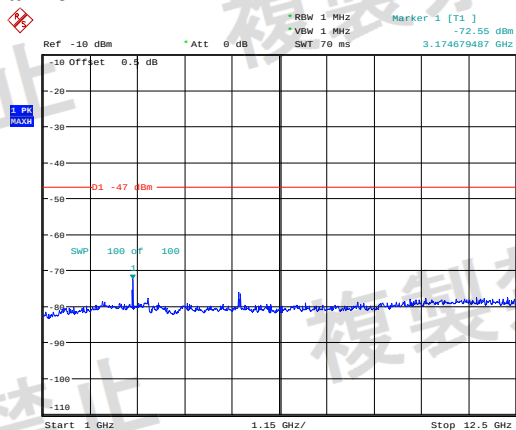


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:18:13

## High Channel



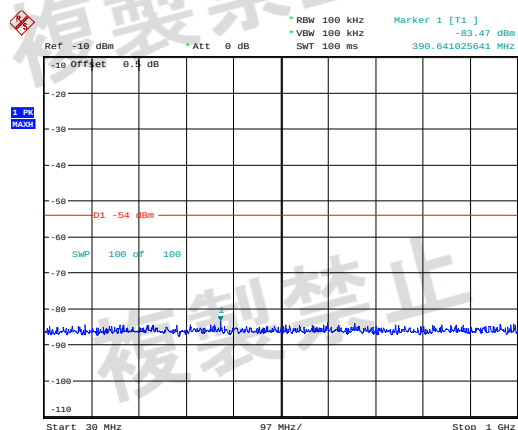
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Date: 18.JUN.2025 00:18:58



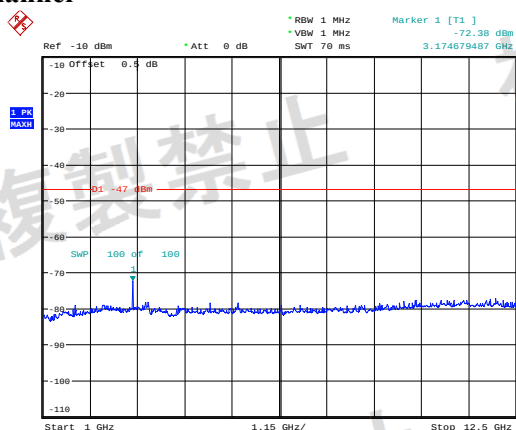
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:20:19

$\pi/4$ -DQPSK:

## Low Channel

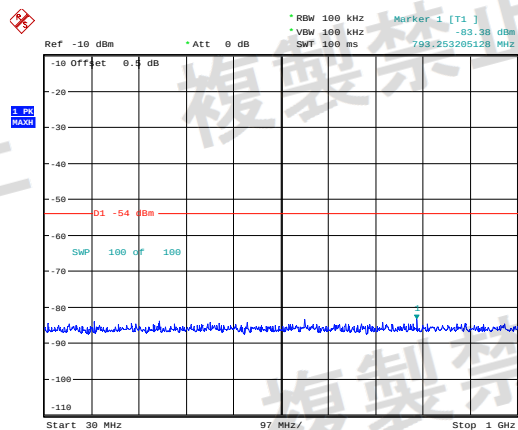


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:26:43

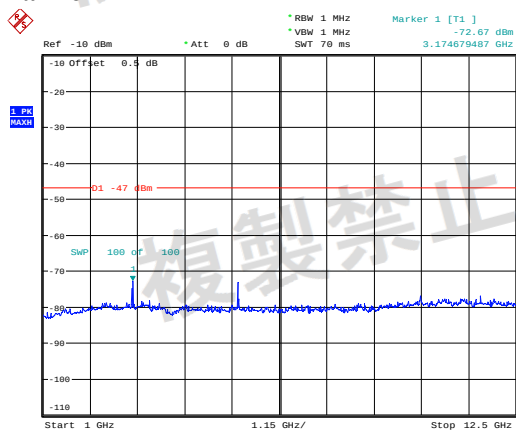


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:25:50

## Middle Channel

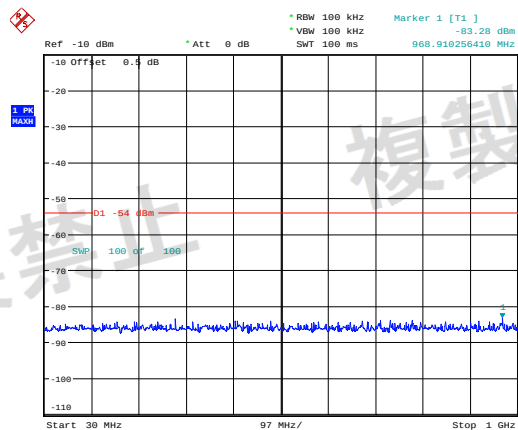


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:23:00

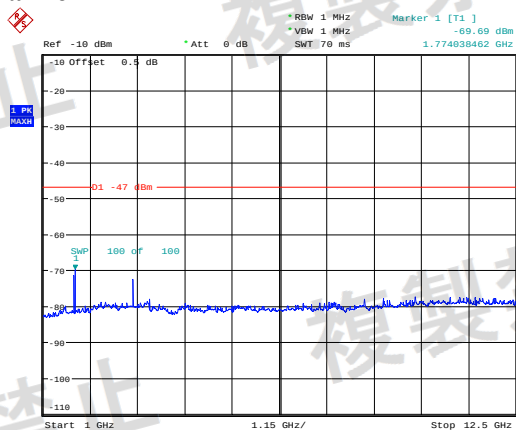


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:24:48

## High Channel



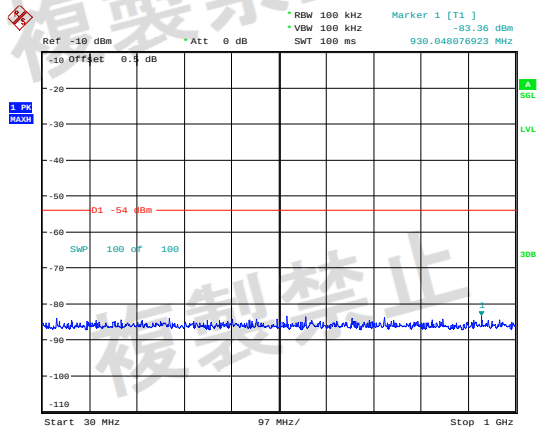
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Date: 18.JUN.2025 00:22:29



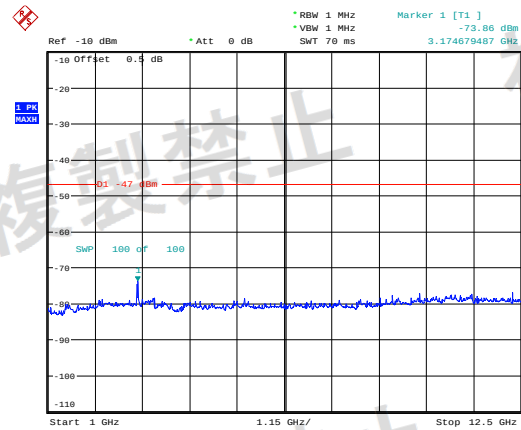
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:21:23

## 8DPSK:

## Low Channel

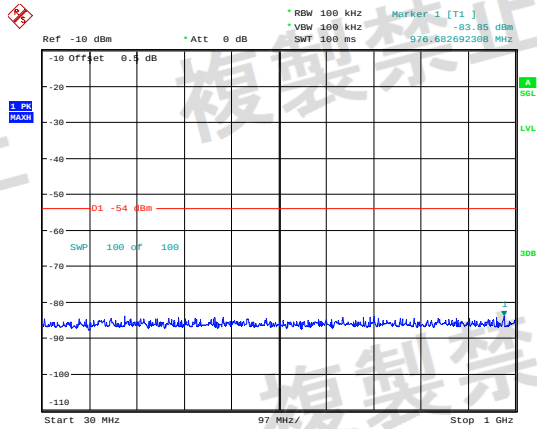


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:27:52

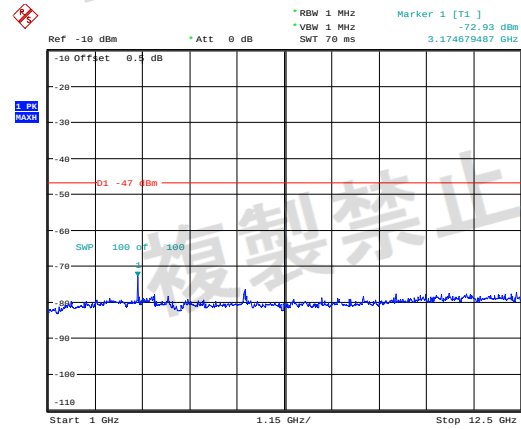


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:29:00

## Middle Channel

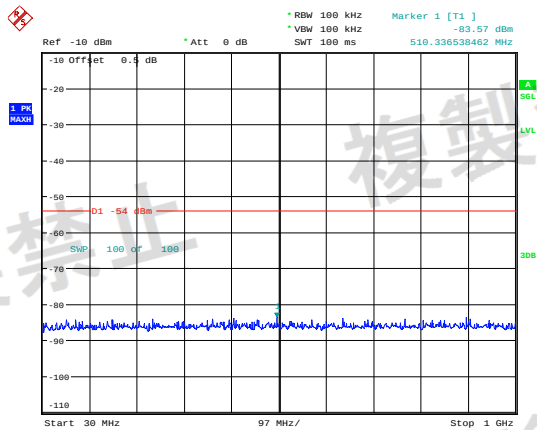


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:30:55

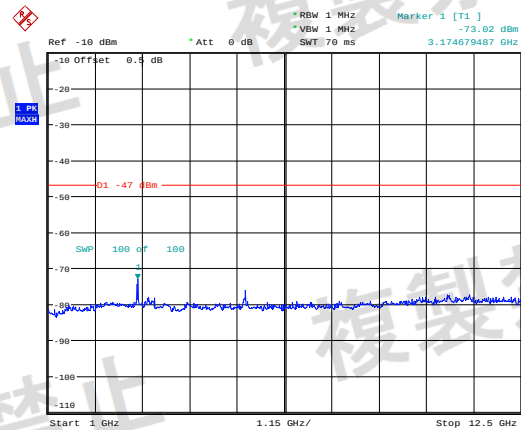


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:30:01

## High Channel



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:31:21



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:32:37

## 12 - INTERFERENCE PREVENTION FUNCTION

### Requirement

#### Article 6-2.3 of Regulations for Enforcement of the radio law

A wireless device used mainly in the same premises to automatically transmit or receive identification codes.

#### Article 1.8 of MPT Ministerial Notice No. 424 of 1994 (the last revision: Notice No. 374 of Nov. 10, 2023)

48 bits or more. However, for radio of the following frequencies, the requirement is 19 bits or more:

- (1), 5150-5250MHz; 5470-5730MHz; 5925-6425MHz;
- (2), 24.77-25.23GHz;
- (3), 57-66GHz.

### Test Procedure

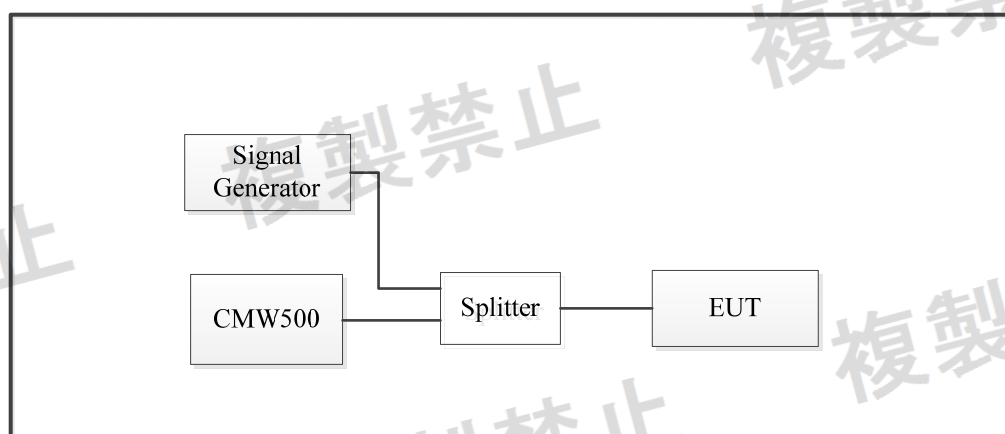
In the case that the EUT has the function of automatically transmitting the identification code:

1. Transmit the predetermined identification codes from EUT
2. Check the transmitted identification codes with the demodulator.

In the case of receiving the identification codes:

1. Transmit the predetermined identification codes from the counterpart.
2. Check if communication is normal
3. Transmit the signal other than predetermined ID codes from the counterpart.
4. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

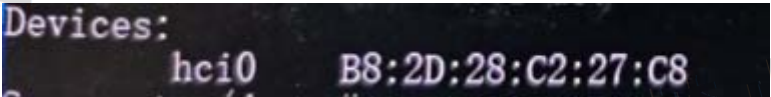
### Test Setup Block Diagram



Test Data

| Item                             | Result            | Requirement     | Verdict   |
|----------------------------------|-------------------|-----------------|-----------|
| Methodology to transmit ID Code: | Automatically     | Automatically   | Compliant |
| Methodology to receive ID Code:  | Automatically     | Automatically   | Compliant |
| Identification Codes (ID Codes): | B8:2D:28:C2:27:C8 | /               | /         |
| Bits of ID Codes:                | 48 bits           | 48 bits or more | Compliant |

Plot:



Test Result: Compliant

### 13 - FREQUENCY HOPPING DWELL TIME

#### Applicable Standard

According to Radio Law Radio Equipment Regulations Article 49-20, frequency dwell time is 0.4 seconds or below.

#### Test Procedure

##### ❖ Conditions of Application Equipment (EUT)

- Set the application equipment (EUT) to the measurement frequency.
- The modulation state shall be “continuous (burst) transmission mode”. If impossible, it shall be “continuous frequency-hopping mode”.

#### Test Data

##### Test Result: Compliant

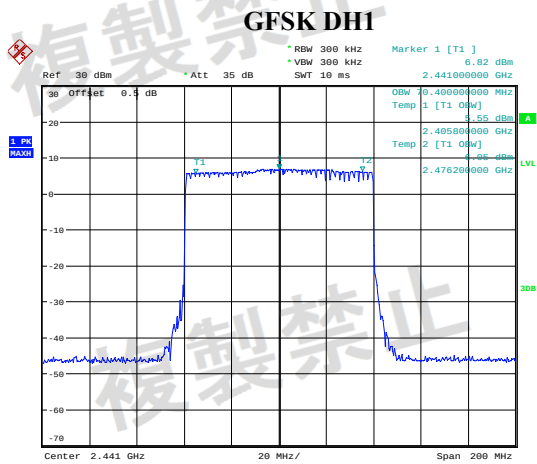
| Mode           | Packet Type | Spreading bandwidth | Ton (ms) | Observed Period (s) | Hopping Number In Observed Period | Result (s) | Limit(s) |
|----------------|-------------|---------------------|----------|---------------------|-----------------------------------|------------|----------|
| GFSK           | DH1         | 70.40               | 0.41     | 28.160              | 230                               | 0.09       | ≤ 0.4    |
|                | DH3         | 70.40               | 1.68     | 28.160              | 110                               | 0.18       |          |
|                | DH5         | 70.80               | 2.92     | 28.320              | 80                                | 0.23       |          |
| $\pi/4$ -DQPSK | 2DH1        | 70.80               | 0.42     | 28.320              | 160                               | 0.07       |          |
|                | 2DH3        | 70.40               | 1.68     | 28.160              | 110                               | 0.18       |          |
|                | 2DH5        | 70.80               | 2.95     | 28.320              | 90                                | 0.27       |          |
| 8DPSK          | 3DH1        | 70.80               | 0.42     | 28.320              | 160                               | 0.07       |          |
|                | 3DH3        | 70.80               | 1.63     | 28.320              | 110                               | 0.18       |          |
|                | 3DH5        | 70.40               | 2.90     | 28.160              | 80                                | 0.23       |          |

Note:

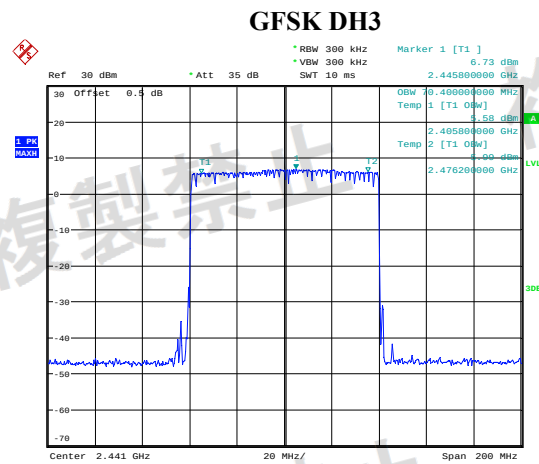
1, Dwell time = Time per one hopping(Ton) \* hopping number(within the time obtained by multiplying the spread factor);

2, For Bluetooth device, spread rate equal to spread bandwidth, the modulation rate is "1".

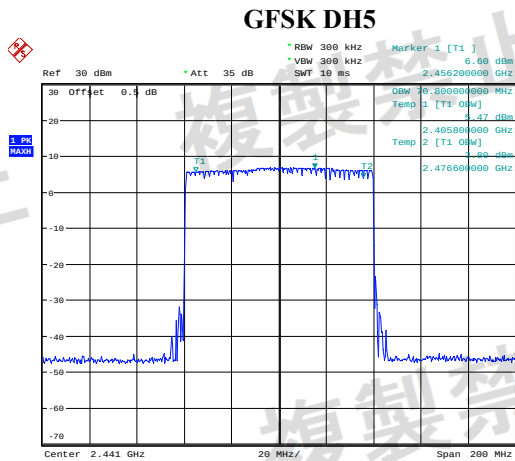
## Spread Bandwidth



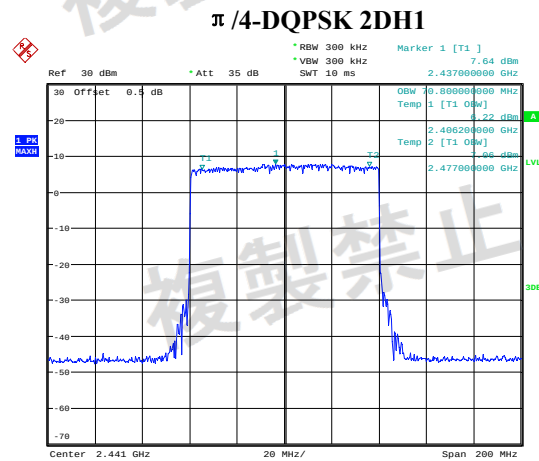
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:41:04



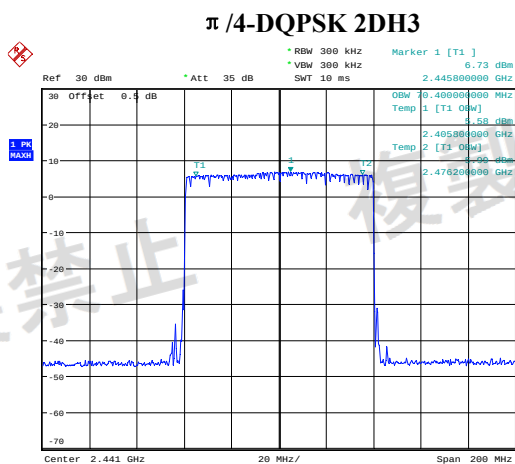
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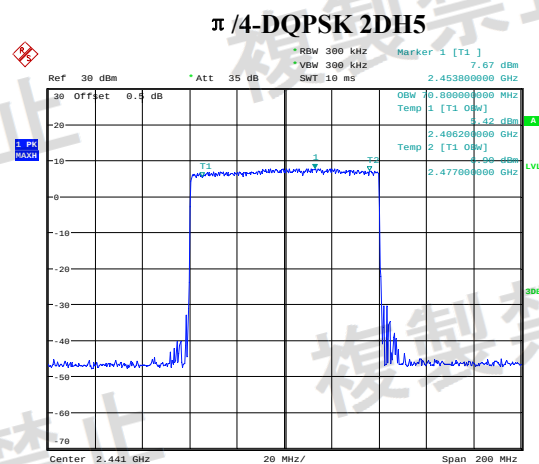
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
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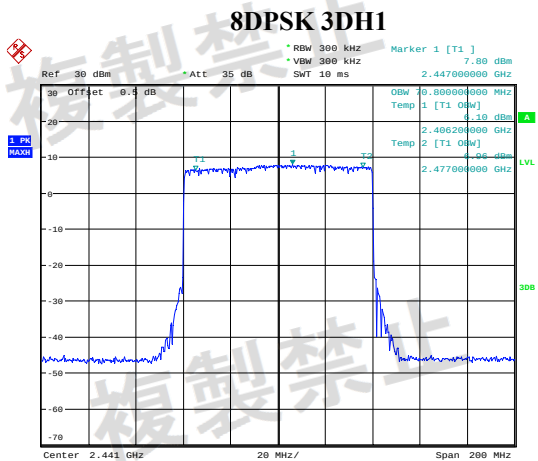
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Date: 17.JUN.2025 23:00:07



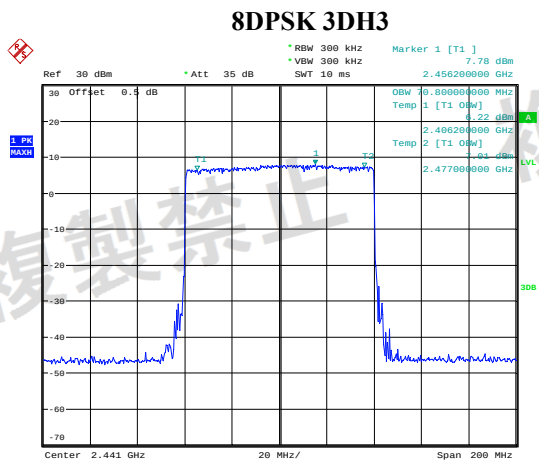
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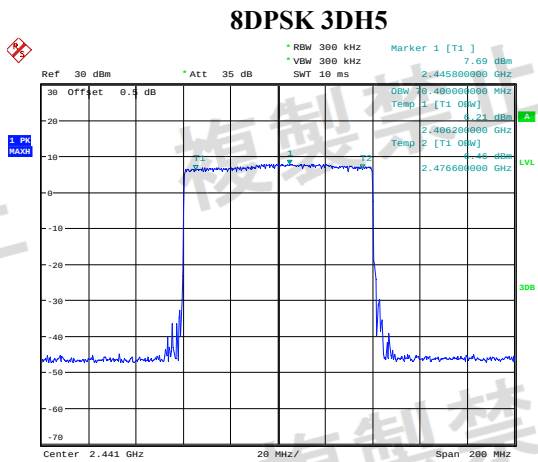
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 23:37:54



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 23:05:06



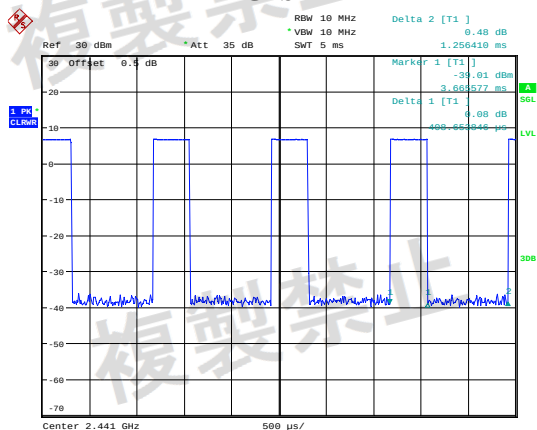
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Date: 17.JUN.2025 23:30:09



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 23:41:52

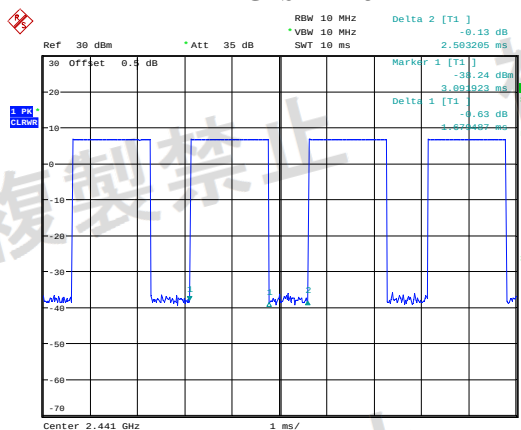
## Pulse Ton

## GFSK DH1



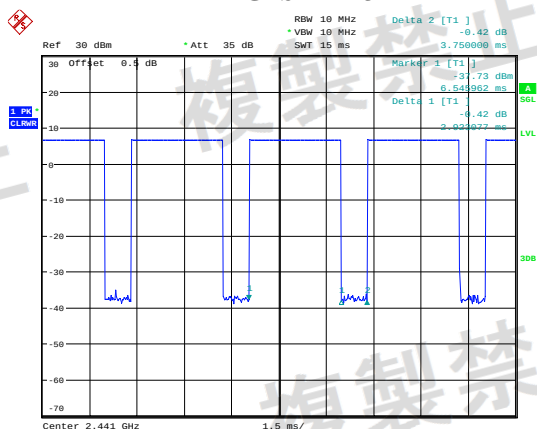
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:09:46

## GFSK DH3

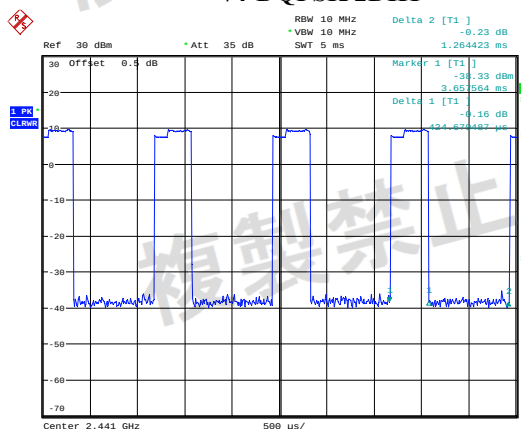


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:14:22

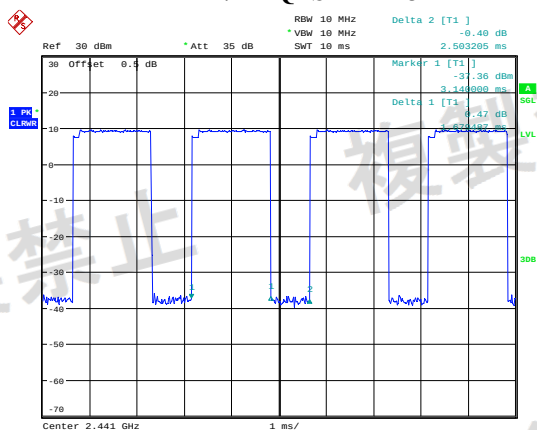
## GFSK DH5



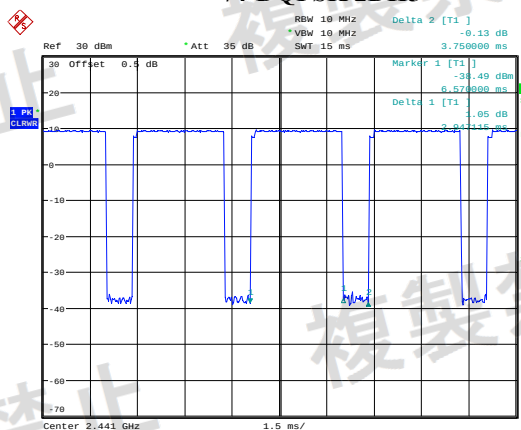
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:18:14

 $\pi/4$ -DQPSK 2DH1

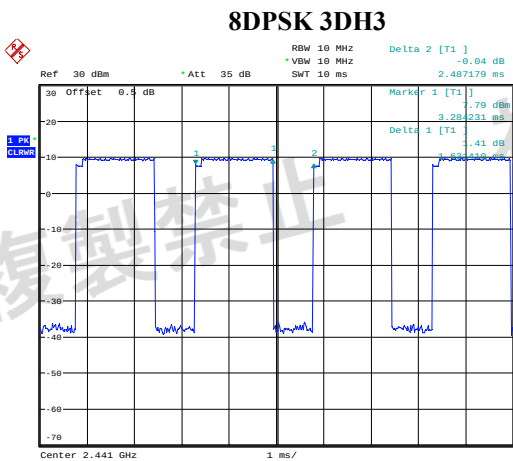
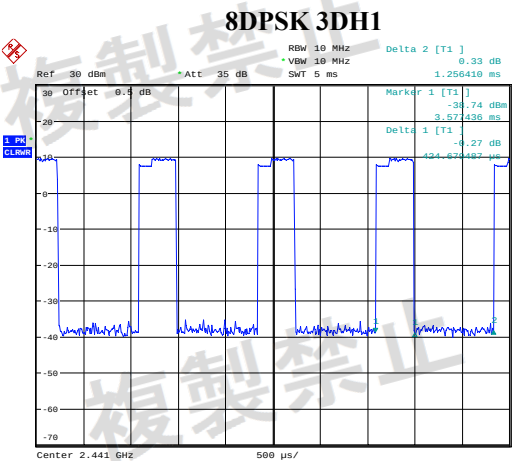
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:11:33

 $\pi/4$ -DQPSK 2DH3

ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:15:59

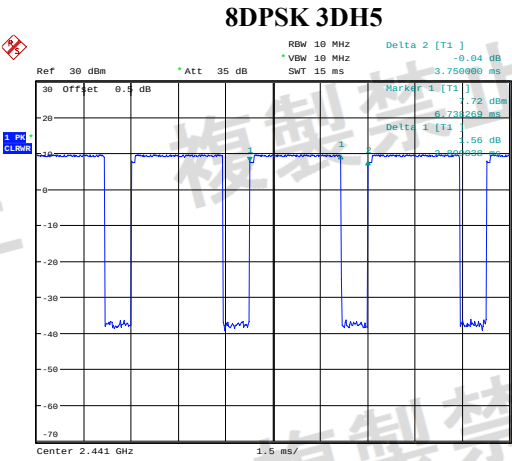
 $\pi/4$ -DQPSK 2DH5

ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:19:14



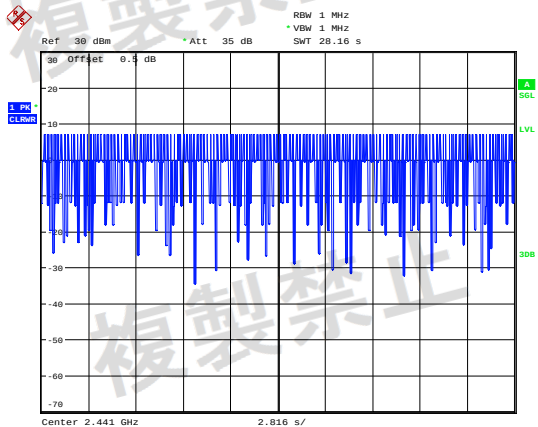
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:12:56

ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:16:55



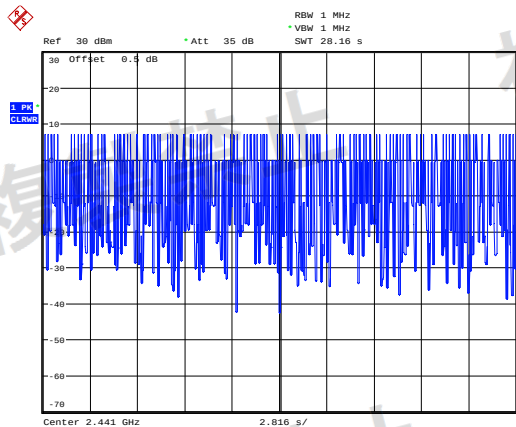
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 22:20:31

Hops Number In Observed Period  
GFSK DH1



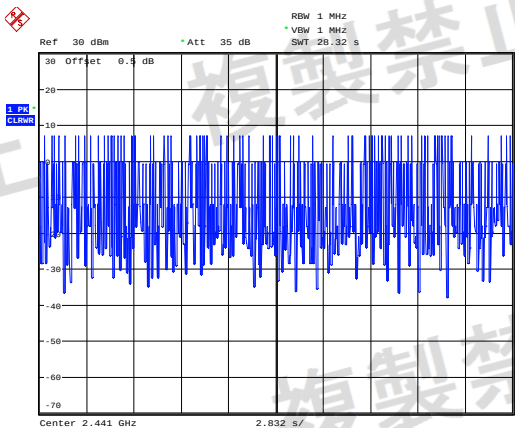
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 23:56:44

GFSK DH3



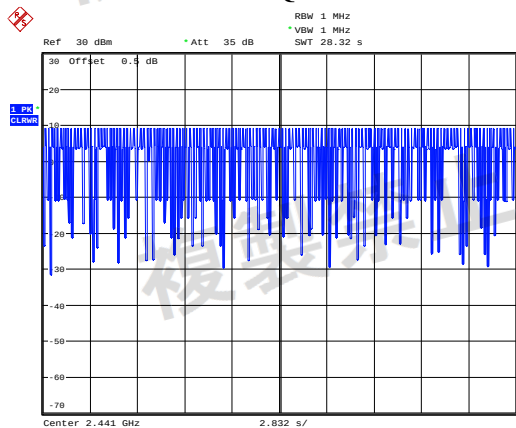
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:02:18

GFSK DH5



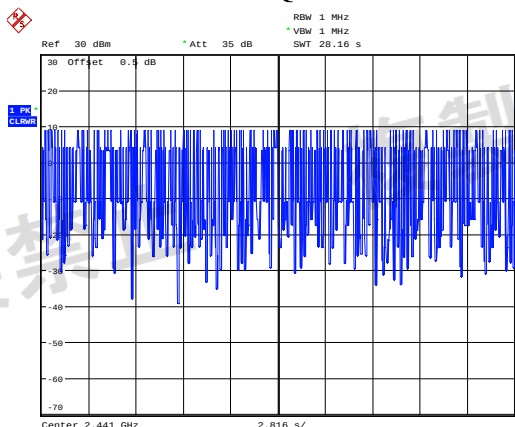
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 23:50:22

$\pi/4$ -DQPSK 2DH1



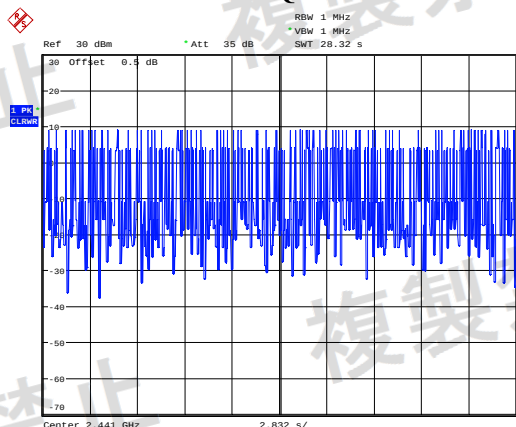
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 23:57:52

$\pi/4$ -DQPSK 2DH3

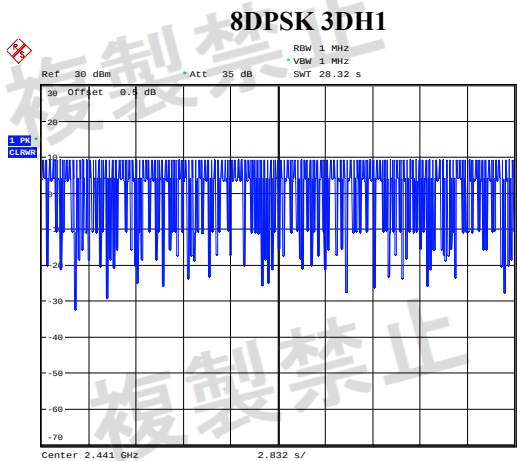


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 18.JUN.2025 00:03:55

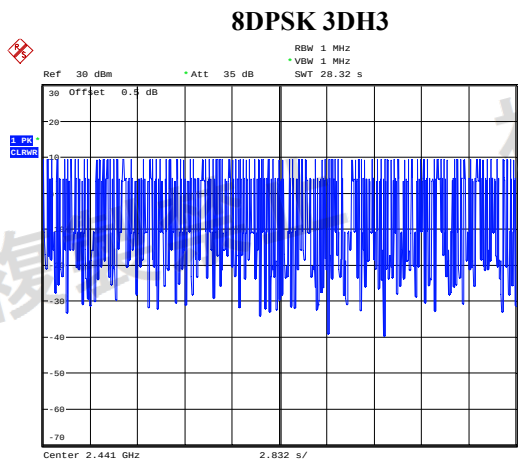
$\pi/4$ -DQPSK 2DH5



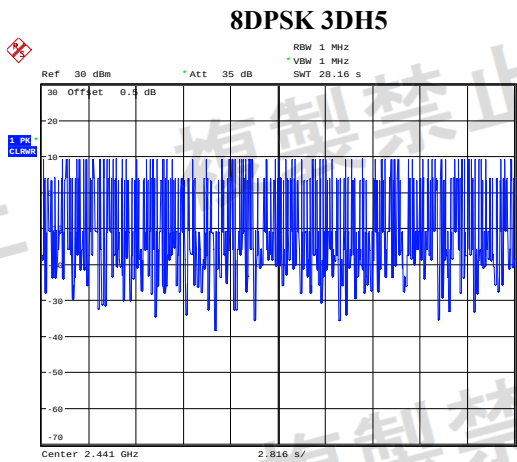
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ProjectNo.:2502U63437E-RF    Tester:Levi Shi  
Date: 17.JUN.2025    23:59:19



ProjectNo.:2502U63437E-RF    Tester:Levi Shi  
Date: 18.JUN.2025    00:06:35



ProjectNo.:2502U63437E-RF    Tester:Levi Shi  
Date: 17.JUN.2025    23:51:52

## 14 - CONSTRUCTION PROTECTION CONFIRMATION

### Limit

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

### Confirmation Result

Compliant, the RF part(Except for antenna) was covered by metal shielding case, it can't be opened easily.  
Please refer the EUT photo.

## EXHIBIT A – EUT PHOTOGRAPHS

Please refer to the attachment 2502U63437E-EXP EUT External photos and 2502U63437E-INP EUT Internal photos.

## EXHIBIT B – TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2502U63437E-RF-TSP Test Setup Photos.

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