

## 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-07A

**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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DOCUMENT REVISION HISTORY

| Revision Number | Report Number   | Description of Revision | Date of Revision |
|-----------------|-----------------|-------------------------|------------------|
| 1.0             | 2502U63437E-07A | 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 (Conducted, mW): | 3         |
| Number of TX Chain(s)                    | 1         |
| Number of RX Chain(s)                    | 1         |
| Antenna Gain (dBi)▲:                     | 0.6       |
| Modulation Type:                         | GFSK      |
| 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                            | $\pm 0,5$ ppm           |
| Occupied bandwidth and spreading bandwidth | $\pm 5$ %               |
| RF output power, conducted                 | $\pm 0.61$ dB           |
| Unwanted Emissions(TX&RX), conducted       | $\pm 1.5$ dB            |
| Temperature                                | $\pm 1$ °C              |
| Humidity                                   | $\pm 5$ %               |
| DC and low frequency voltages              | $\pm 0.4$ %             |
| 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. 40 channels are provided as below table:

| Channel | Frequency(MHz) |
|---------|----------------|
| 0       | 2402           |
| 1       | 2404           |
| ...     | ...            |
| ...     | ...            |
| 19      | 2440           |
| ...     | ...            |
| ...     | ...            |
| 38      | 2478           |
| 39      | 2480           |

For lowest, middle and highest channel, EUT was tested with channel 0, 19 and 39.

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

NV: Normal Voltage 3.85V<sub>DC</sub>

LV: Low Voltage 3.465V<sub>DC</sub>

HV: High Voltage 4.235V<sub>DC</sub>

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 condition. Details as following:

| Voltage Condition | Input(V <sub>DC</sub> ) | RF System Voltage(V <sub>DC</sub> ) |
|-------------------|-------------------------|-------------------------------------|
| 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 |
|--------|---------|-----------------|-------------|
| BLE_1M | Low     | 2402            | Default     |
|        | Middle  | 2440            | Default     |
|        | High    | 2480            | Default     |
| BLE_2M | Low     | 2402            | Default     |
|        | Middle  | 2440            | Default     |
|        | High    | 2480            | Default     |

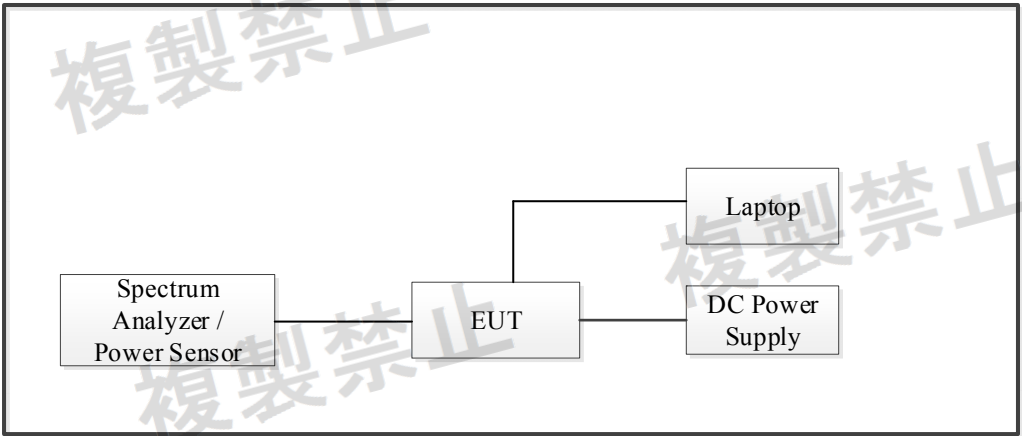
Support Equipment List and Details

| 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:       | 25.1~26.2℃          |
| Relative Humidity: | 57~61%              |
| ATM Pressure:      | 100.2~100.3kPa      |
| Tester:            | Levi Shi            |
| Test Date:         | 2025/6/15~2025/6/17 |

**SUMMARY OF TEST RESULTS**

| SN | Description of Test                                           | Result              |
|----|---------------------------------------------------------------|---------------------|
| 1  | Frequency Error                                               | Compliant           |
| 2  | Occupied 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                                  | Not Applicable***** |
| 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.

Not Applicable\*\*\*\*\*: Testing is only required for FHSS system devices.

## 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*

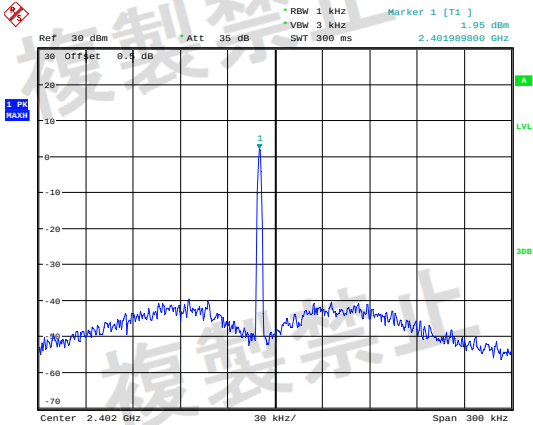
| Mode           | Test Condition | Channel | Test Frequency (MHz) | Measured Frequency (MHz) | Result (ppm) | Limit (ppm) |
|----------------|----------------|---------|----------------------|--------------------------|--------------|-------------|
| Single Carrier | NV             | Low     | 2402                 | 2401.9898                | -4.25        | $\pm 50$    |
|                |                | Middle  | 2440                 | 2439.994                 | -2.46        |             |
|                |                | High    | 2480                 | 2480.00                  | -0.81        |             |

*Note:*

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

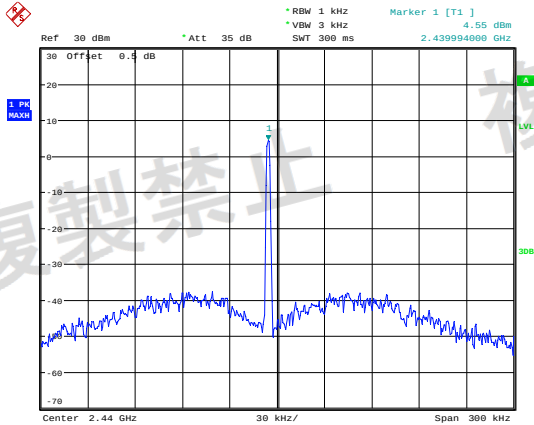
Please refer to the plots for normal voltage test.

Low Channel



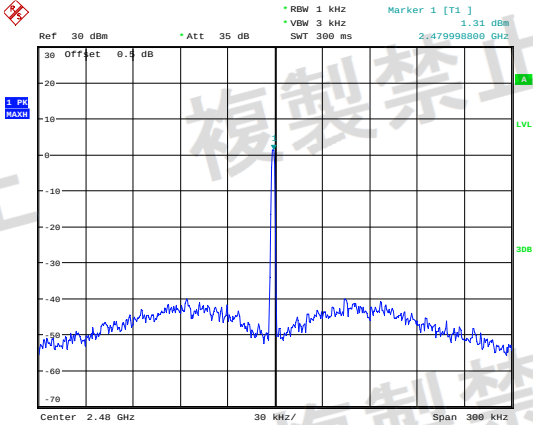
ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:27:25

Middle Channel



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:30:03

High Channel



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:28:16

## 2 - OCCUPIED BANDWIDTH

### Limit

- Occupied bandwidth:  $\leq 26$  MHz

### Test Procedure

- Setting of SA is following as: RB: 30 kHz/VB: 30 kHz / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
- EUT have transmitted the maximum modulation signal and fixed channelize. SA set to 99% of occupied bandwidth to measure occupied bandwidth.

### Test Data

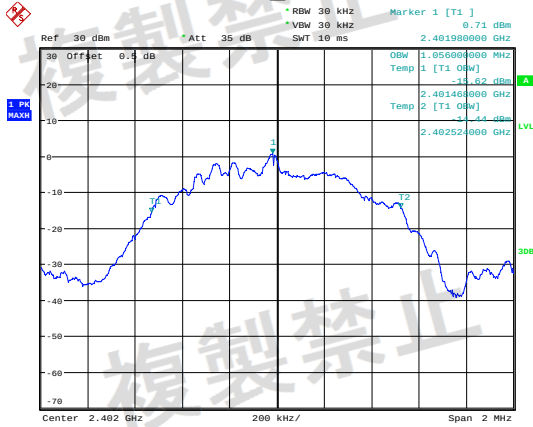
**Test Result:** Compliant

*Test Mode: Transmitting*

| Test Condition | Occupied bandwidth (MHz) |             |                |              |           |
|----------------|--------------------------|-------------|----------------|--------------|-----------|
|                | Mode                     | Low Channel | Middle Channel | High Channel | Limit     |
| NV             | BLE 1M                   | 1.056       | 1.052          | 1.056        | $\leq 26$ |
|                | BLE 2M                   | 2.080       | 2.080          | 2.072        | $\leq 26$ |

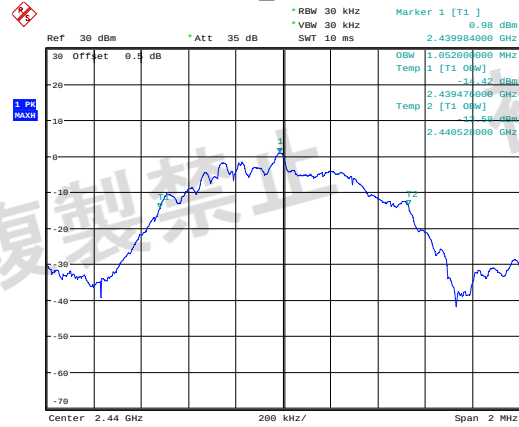
Please refer to the plots for normal voltage test.

### BLE 1M\_Low Channel



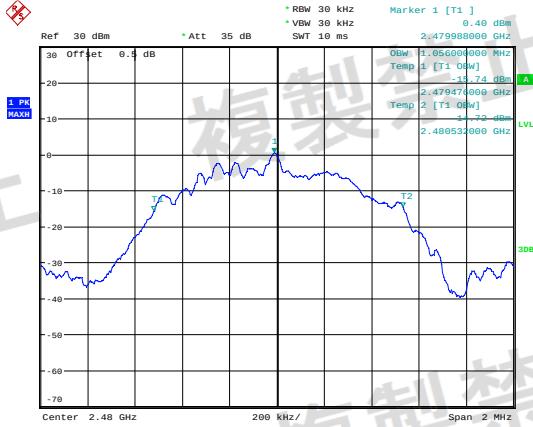
ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15.JUN.2025 14:33:58

### BLE 1M\_Middle Channel



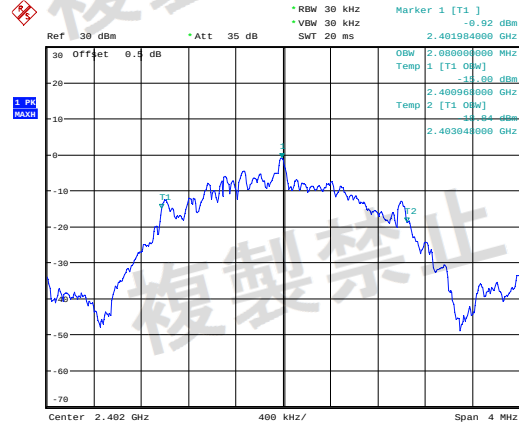
ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15.JUN.2025 14:36:16

### BLE 1M\_High Channel



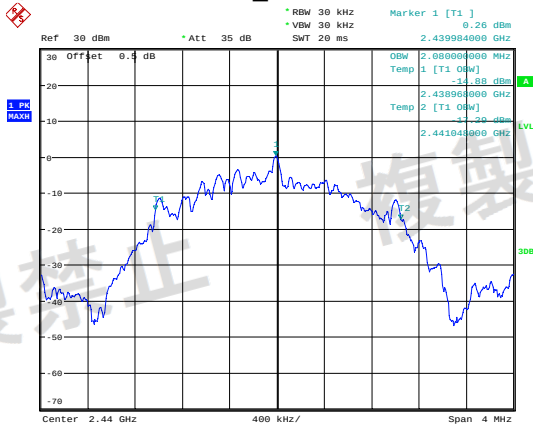
ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15.JUN.2025 14:41:34

### BLE 2M\_Low Channel



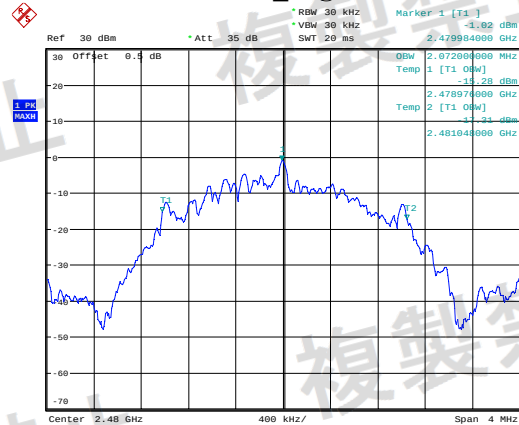
ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15.JUN.2025 14:43:35

### BLE 2M\_Middle Channel



ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15.JUN.2025 16:27:06

### BLE 2M\_High Channel



ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15.JUN.2025 16:29:21

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

#### Limit

- $30\text{MHz} \leq f < 2387\text{ MHz}: \leq 2.5\mu\text{W}/\text{MHz}$
- $2387\text{ MHz} \leq f \leq 2400\text{ MHz}: \leq 25\mu\text{W}/\text{MHz};$
- $2483.5\text{ MHz} < f \leq 2496.5\text{ MHz}: \leq 25\mu\text{W}/\text{MHz}$
- $2496.5\text{ MHz} < f \leq 12500\text{MHz}: \leq 2.5\mu\text{W}/\text{MHz}$

#### Test Procedure

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

- The modulation state shall be in continuously transmitting mode.

##### ❖ Spectrum Analyzer Conditions

- 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, RB:1MHz/VB: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, RB:1MHz/VB: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, RB:1MHz/VB: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, RB:1MHz/VB: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  $2.5\mu\text{W}/\text{MHz}$ .

If above test over the limit, the below test procedure should be used:

##### Step 1:

Center the frequency which was want to investigate, search the peak frequency.

##### Step 2:

Center frequency: Searched Frequency

Span: 0Hz

RBW: 1MHz(Above 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             | BLE 1M | Low     | Band I (100kHz) | 0.03            | 1          | 0.238                       | -55.12           | 0.003           | 0.25           |
|                |        |         | Band II (1MHz)  | 1               | 2.387      | 2.298                       | -44.85           | 0.033           | 2.5            |
|                |        |         | Band III (1MHz) | 2.387           | 2.4        | 2.4                         | -18.60           | 13.804          | 25             |
|                |        |         | Band IV (1MHz)  | 2.4835          | 2.4965     | 2.488                       | -43.95           | 0.040           | 25             |
|                |        |         | Band V (1MHz)   | 2.4965          | 12.5       | 3.157                       | -38.02           | 0.158           | 2.5            |
|                |        | Middle  | Band I (100kHz) | 0.03            | 1          | 0.93                        | -55.15           | 0.003           | 0.25           |
|                |        |         | Band II (1MHz)  | 1               | 2.387      | 2.354                       | -44.20           | 0.038           | 2.5            |
|                |        |         | Band III (1MHz) | 2.387           | 2.4        | 2.399                       | -44.47           | 0.036           | 25             |
|                |        |         | Band IV (1MHz)  | 2.4835          | 2.4965     | 2.488                       | -43.63           | 0.043           | 25             |
|                |        |         | Band V (1MHz)   | 2.4965          | 12.5       | 3.157                       | -39.62           | 0.109           | 2.5            |
|                |        | High    | Band I (100kHz) | 0.03            | 1          | 0.777                       | -55.79           | 0.003           | 0.25           |
|                |        |         | Band II (1MHz)  | 1               | 2.387      | 1.555                       | -45.38           | 0.029           | 2.5            |
|                |        |         | Band III (1MHz) | 2.387           | 2.4        | 2.399                       | -44.88           | 0.033           | 25             |
|                |        |         | Band IV (1MHz)  | 2.4835          | 2.4965     | 2.484                       | -38.79           | 0.132           | 25             |
|                |        |         | Band V (1MHz)   | 2.4965          | 12.5       | 3.157                       | -38.05           | 0.157           | 2.5            |
|                | BLE 2M | Low     | Band I (100kHz) | 0.03            | 1          | 0.847                       | -55.35           | 0.003           | 0.25           |
|                |        |         | Band II (1MHz)  | 1               | 2.387      | 2.354                       | -45.14           | 0.031           | 2.5            |
|                |        |         | Band III (1MHz) | 2.387           | 2.4        | 2.4                         | -17.60           | 17.378          | 25             |
|                |        |         | Band IV (1MHz)  | 2.4835          | 2.4965     | 2.49                        | -44.20           | 0.038           | 25             |
|                |        |         | Band V (1MHz)   | 2.4965          | 12.5       | 3.157                       | -40.10           | 0.098           | 2.5            |
|                |        | Middle  | Band I (100kHz) | 0.03            | 1          | 0.676                       | -54.92           | 0.003           | 0.25           |
|                |        |         | Band II (1MHz)  | 1               | 2.387      | 2.323                       | -45.17           | 0.030           | 2.5            |
|                |        |         | Band III (1MHz) | 2.387           | 2.4        | 2.395                       | -44.39           | 0.036           | 25             |
|                |        |         | Band IV (1MHz)  | 2.4835          | 2.4965     | 2.489                       | -44.15           | 0.038           | 25             |
|                |        |         | Band V (1MHz)   | 2.4965          | 12.5       | 3.157                       | -42.38           | 0.058           | 2.5            |

|  |  |      |                    |        |        |       |        |       |      |
|--|--|------|--------------------|--------|--------|-------|--------|-------|------|
|  |  | High | Band I<br>(100kHz) | 0.03   | 1      | 1     | -55.48 | 0.003 | 0.25 |
|  |  |      | Band II<br>(1MHz)  | 1      | 2.387  | 2.379 | -45.18 | 0.030 | 2.5  |
|  |  |      | Band III<br>(1MHz) | 2.387  | 2.4    | 2.398 | -44.73 | 0.034 | 25   |
|  |  |      | Band IV<br>(1MHz)  | 2.4835 | 2.4965 | 2.484 | -35.58 | 0.277 | 25   |
|  |  |      | Band V<br>(1MHz)   | 2.4965 | 12.5   | 3.177 | -40.75 | 0.084 | 2.5  |

Note:

Band I:30MHz~1000MHz

Band II:1000MHz~2387MHz

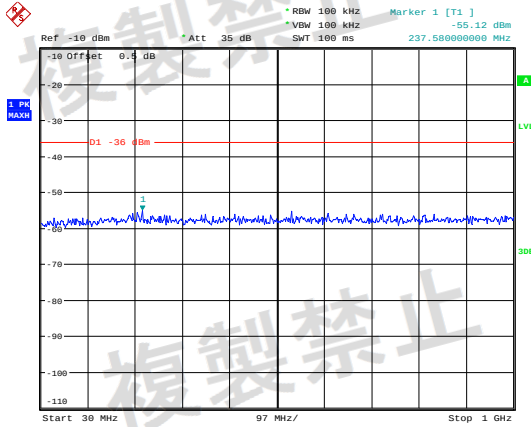
Band III:2387MHz~2400MHz

Band IV:2483.5MHz~2496.5MHz

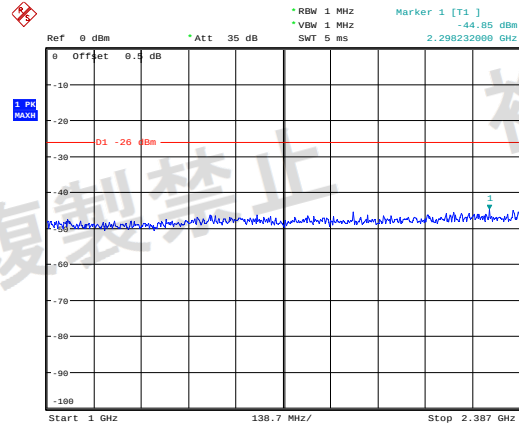
Band V:2496.5MHz~12500MHz

Please refer to the below plots for normal voltage test.

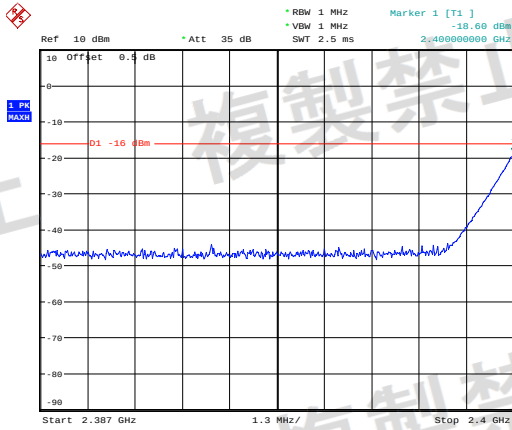
### BLE 1M\_Low Channel



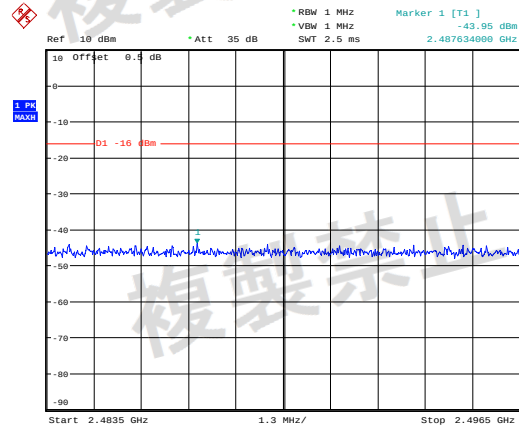
ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15 JUN.2025 14:32:56



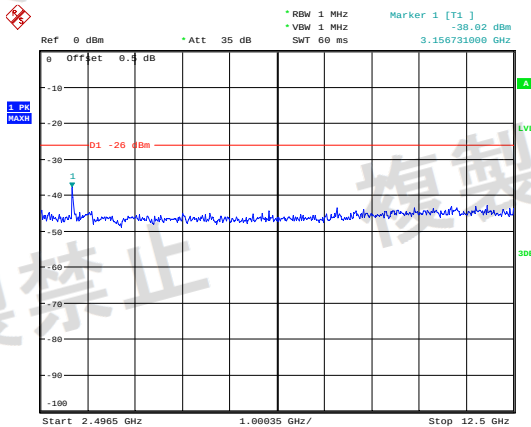
ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15 JUN.2025 14:33:08



ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15 JUN.2025 14:33:21

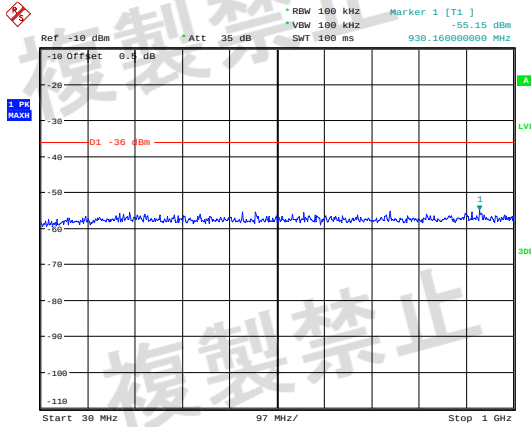


ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15 JUN.2025 14:33:32

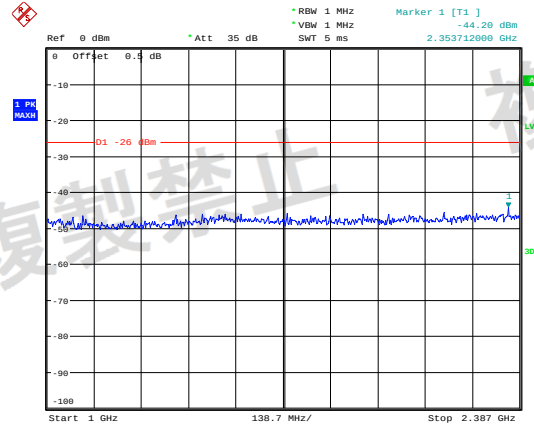


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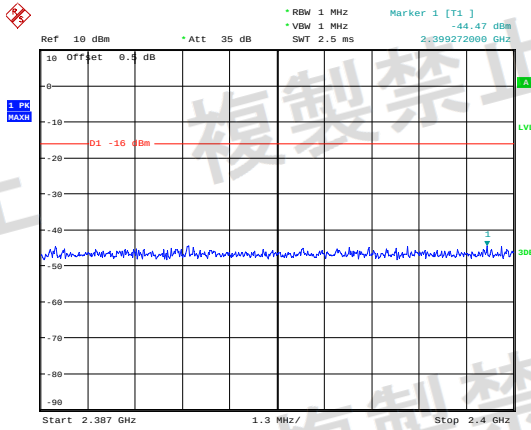
### BLE 1M\_Middle Channel



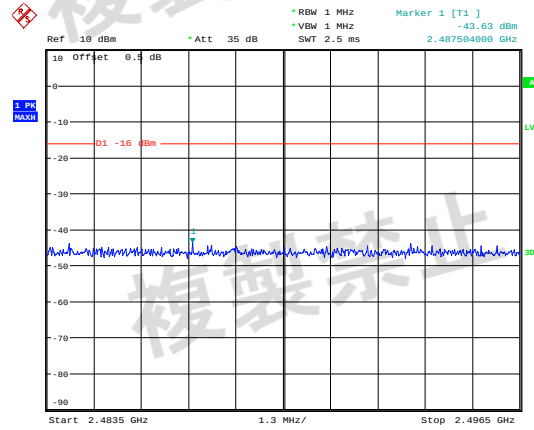
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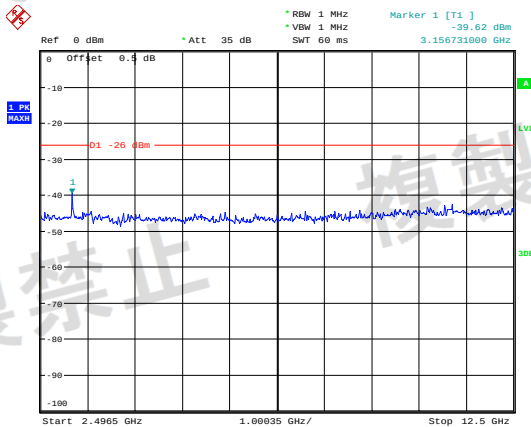
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Date: 15 JUN.2025 14:35:27



ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15 JUN.2025 14:35:39

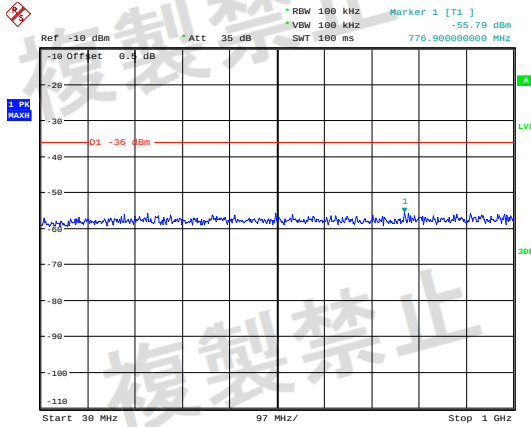


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Date: 15 JUN.2025 14:35:51

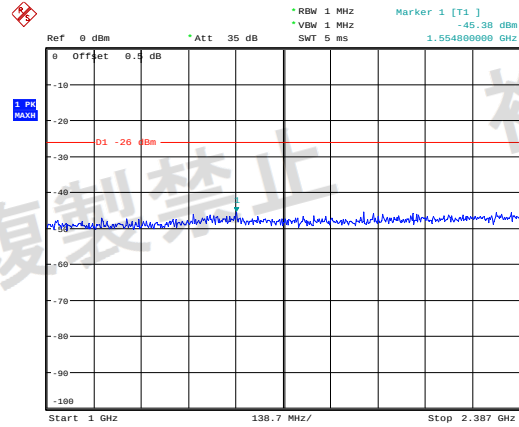


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Date: 15 JUN.2025 14:36:03

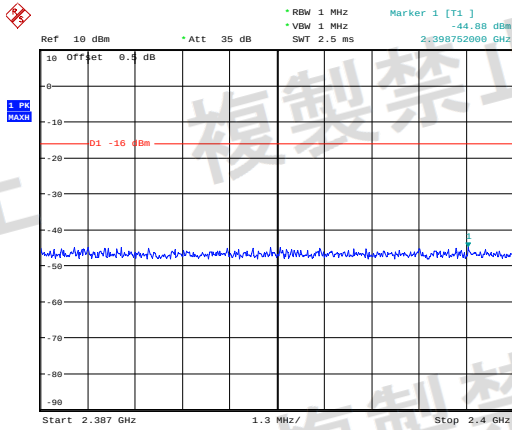
### BLE 1M\_High Channel



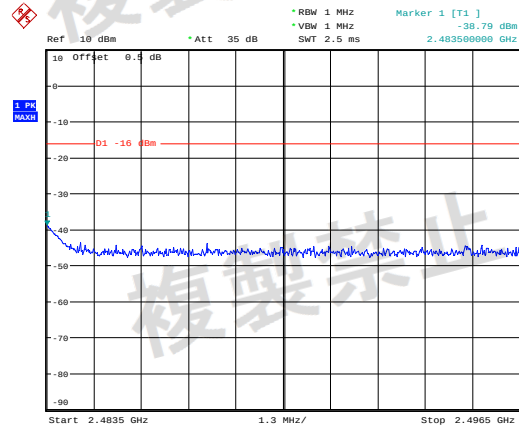
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Date: 15.JUN.2025 14:40:32



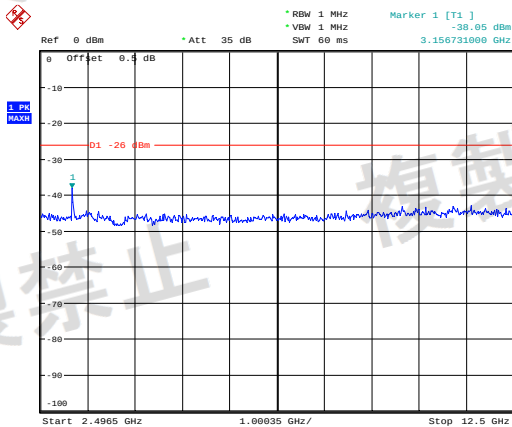
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ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15.JUN.2025 14:40:57

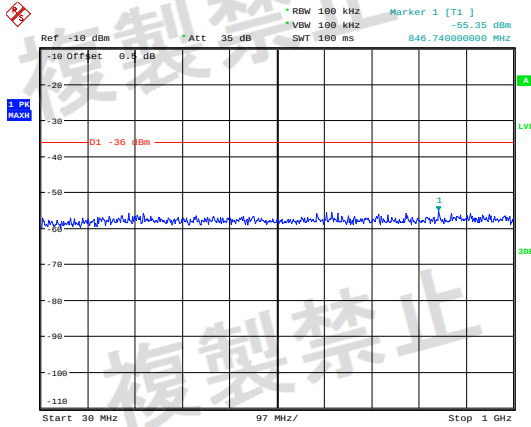


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Date: 15.JUN.2025 14:41:09

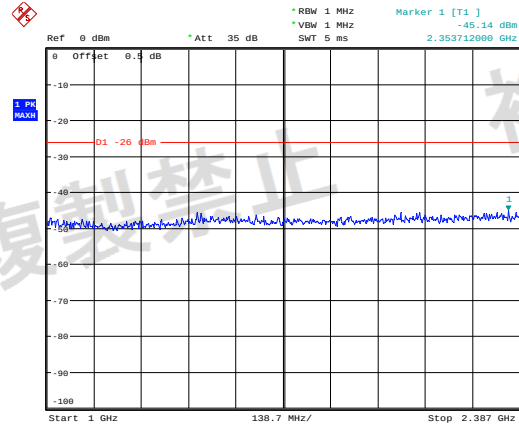


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Date: 15.JUN.2025 14:41:21

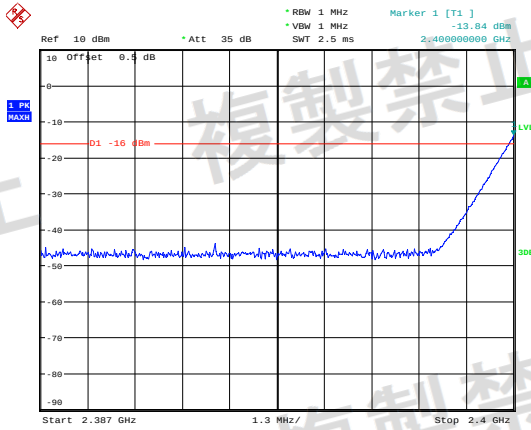
# BLE 2M\_Low Channel



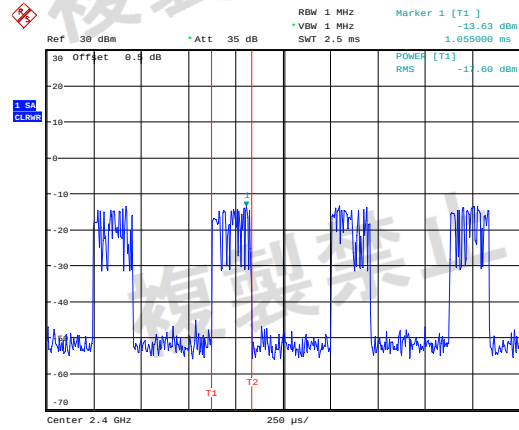
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Date: 15.JUN.2025 14:42:36



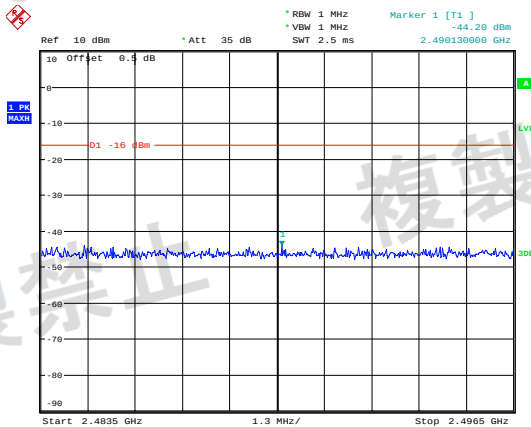
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Date: 15.JUN.2025 14:42:48



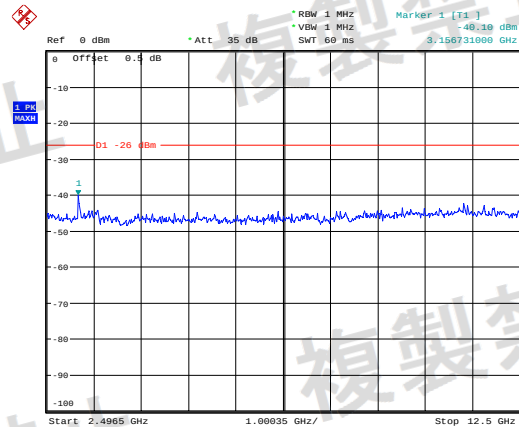
ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15.JUN.2025 14:43:01



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:20:24

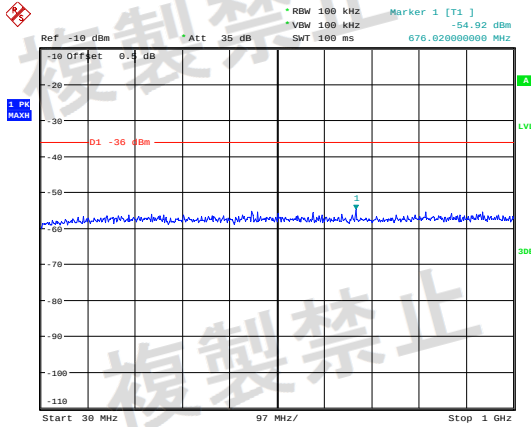


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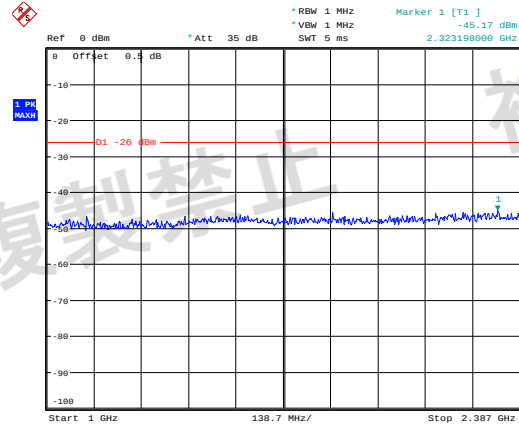


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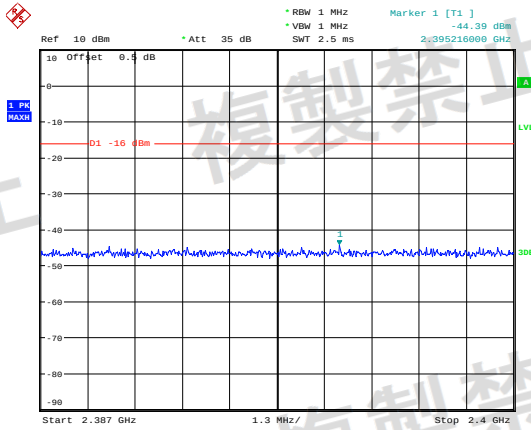
### BLE 2M\_Middle Channel



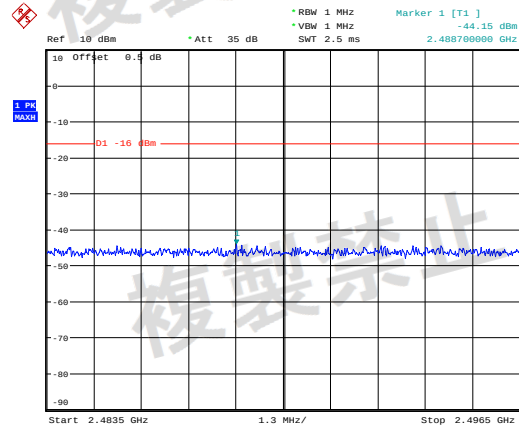
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Date: 15 JUN.2025 16:26:01



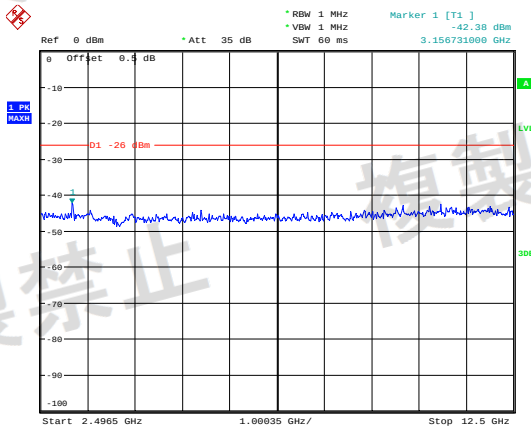
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ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15 JUN.2025 16:26:29

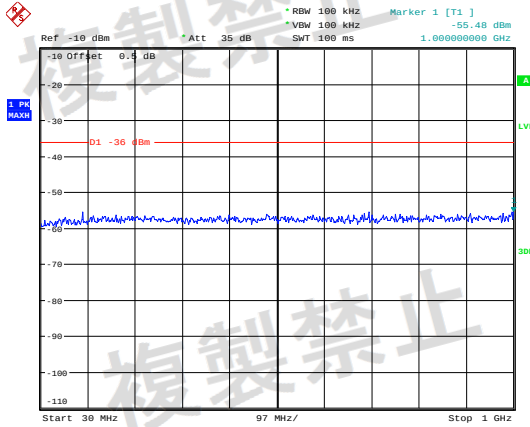


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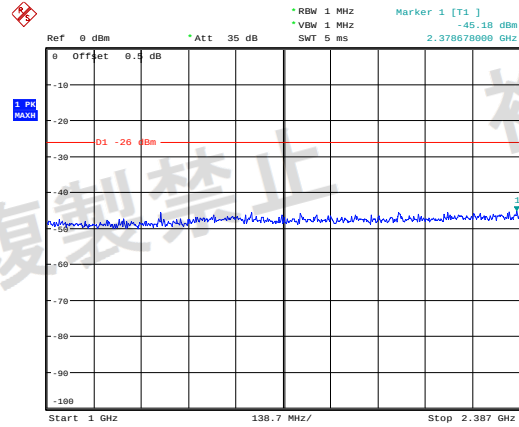


ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15 JUN.2025 16:26:53

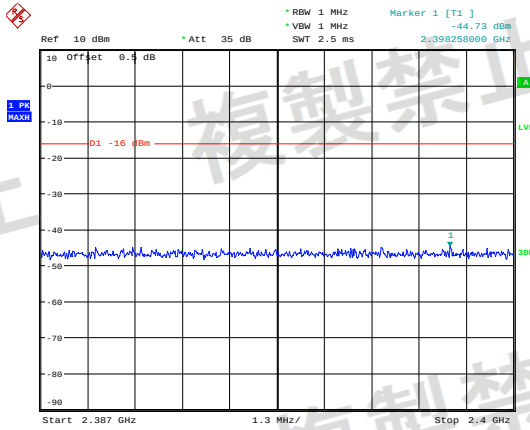
### BLE 2M\_High Channel



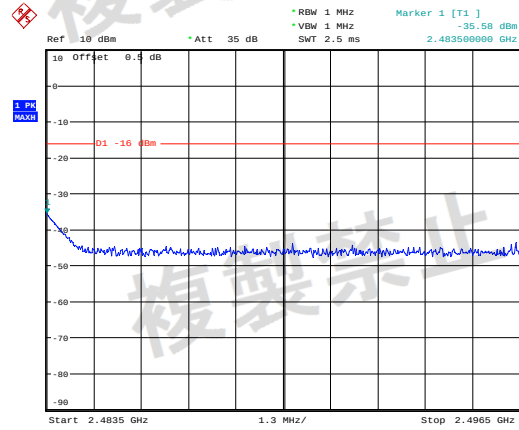
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Date: 15.JUN.2025 16:28:15



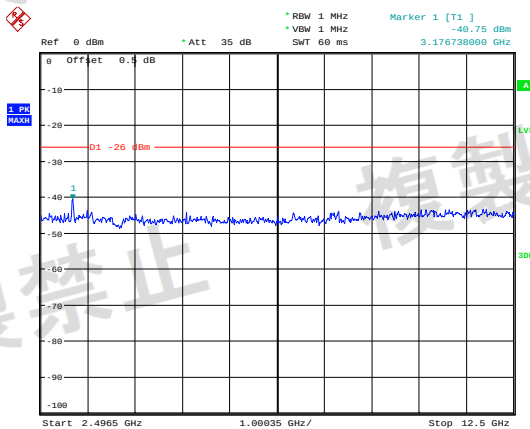
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Date: 15.JUN.2025 16:28:31



ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15.JUN.2025 16:28:44



ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15.JUN.2025 16:28:56



ProjectNo.:2502U63437E-RFTester:Levi Shi  
Date: 15.JUN.2025 16:29:08

## 4 - ANTENNA OUTPUT POWER AND ANTENNA POWER TOLERANCE

### Limit

Antenna output power:

- $\leq 10$  mW
- The Output Power Tolerance must be within +20% ~ -80%.
- EIRP  $\leq 12.14$  dBm (other from 2400-2483.5 MHz)

### Test Procedure

- Connect the EUT antenna port to Power meter with RF cable;
- Power meter Detector: Average, Auto Duty factor
- Set the EUT Frequency to measure, test mode continuous transmitting.

### Test Data

**Test Result:** Compliant, test mode: Transmitting

#### Duty Cycle and Declared Power:

| Mode   | Ton (ms) | Ton+Toff (ms) | Duty cycle (%) |
|--------|----------|---------------|----------------|
| BLE 1M | 0.416    | 0.626         | 66.45          |
| BLE 2M | 0.226    | 0.626         | 36.10          |

| Mode   | Antenna gain (dBi) | Declared power (mW) |
|--------|--------------------|---------------------|
| BLE 1M | 0.6                | 3.000               |
| BLE 2M |                    | 3.000               |

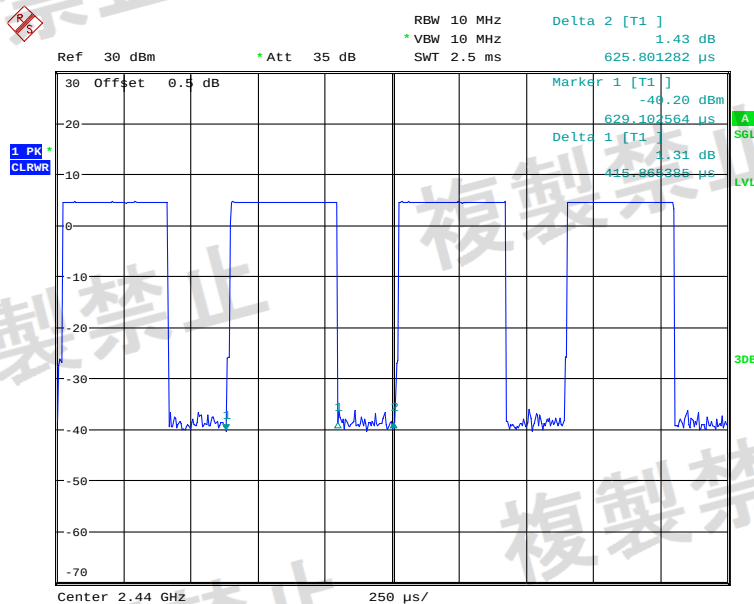
### Output power

| Test Condition | Mode   | Channel | Conducted power (dBm) | Antenna output power (mW) |           | Antenna output tolerance (%) |         | EIRP (dBm) |              |
|----------------|--------|---------|-----------------------|---------------------------|-----------|------------------------------|---------|------------|--------------|
|                |        |         |                       | Result                    | Limit     | Result                       | Limit   | Result     | Limit        |
| NV             | BLE 1M | Low     | 2.66                  | 2.777                     | $\leq 10$ | -7.43                        | -80~+20 | 5.04       | $\leq 12.14$ |
|                |        | Middle  | 2.57                  | 2.720                     |           | -9.33                        |         | 4.95       |              |
|                |        | High    | 2.61                  | 2.745                     |           | -8.50                        |         | 4.99       |              |
|                | BLE 2M | Low     | -0.28                 | 2.597                     | $\leq 10$ | -13.43                       | -80~+20 | 4.74       | $\leq 12.14$ |
|                |        | Middle  | -0.21                 | 2.639                     |           | -12.03                       |         | 4.81       |              |
|                |        | High    | -0.33                 | 2.567                     |           | -14.43                       |         | 4.69       |              |

Note:

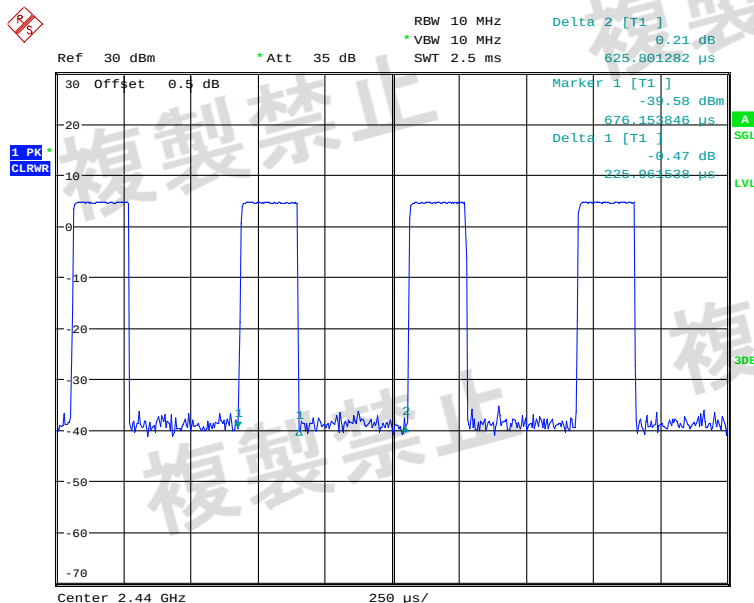
- 1) Antenna output power (mW) =  $10^{(\text{Conducted power(dBm)} / 10) / \text{Duty cycle} (\%)}$
- 2) Antenna output Power Tolerance =  $(\text{Antenna output power} - \text{Declared Power}) / \text{Declared Power} * 100\%$
- 3) Antenna output power(dBm) =  $10 * \log_{10}(\text{Antenna output power(mW)})$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

### BLE 1M \_Duty Cycle



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
 Date: 17.JUN.2025 20:24:33

### BLE 2M \_Duty Cycle



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
 Date: 17.JUN.2025 20:25:58

## 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 to 1GHz)
  - Stop Frequency: Stop Frequency of frequency range to measure (1GHz to 12.5GHz)
  - Span: AUTO (Measurement Range)
  - RBW: 100 kHz, VBW: 100 kHz for Frequency < 1 GHz
  - RBW: 1MHz, VBW: 1MHz for Frequency > 1 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 Mode:** Receiving

| Test Condition | Mode   | Channel | Test Band (RBW) | Frequency Range |            | Max. Emission Located (GHz) | Result (dBm) | Result (nW) | Limit (nW) |
|----------------|--------|---------|-----------------|-----------------|------------|-----------------------------|--------------|-------------|------------|
|                |        |         |                 | Start (GHz)     | Stop (GHz) |                             |              |             |            |
| NV             | BLE 1M | Low     | Band I (100kHz) | 0.03            | 1          | 0.302                       | -83.04       | 0.005       | 4          |
|                |        |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -73.03       | 0.050       | 20         |
|                |        | Middle  | Band I (100kHz) | 0.03            | 1          | 0.527                       | -83.55       | 0.004       | 4          |
|                |        |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -73.24       | 0.047       | 20         |
|                |        | High    | Band I (100kHz) | 0.03            | 1          | 0.822                       | -83.42       | 0.005       | 4          |
|                |        |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -72.81       | 0.052       | 20         |
|                | BLE 2M | Low     | Band I (100kHz) | 0.03            | 1          | 0.108                       | -83.85       | 0.004       | 4          |
|                |        |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -73.60       | 0.044       | 20         |
|                |        | Middle  | Band I (100kHz) | 0.03            | 1          | 0.3                         | -83.04       | 0.005       | 4          |
|                |        |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -73.73       | 0.042       | 20         |
|                |        | High    | Band I (100kHz) | 0.03            | 1          | 0.302                       | -83.90       | 0.004       | 4          |
|                |        |         | Band II (1MHz)  | 1               | 12.5       | 3.175                       | -73.61       | 0.044       | 20         |

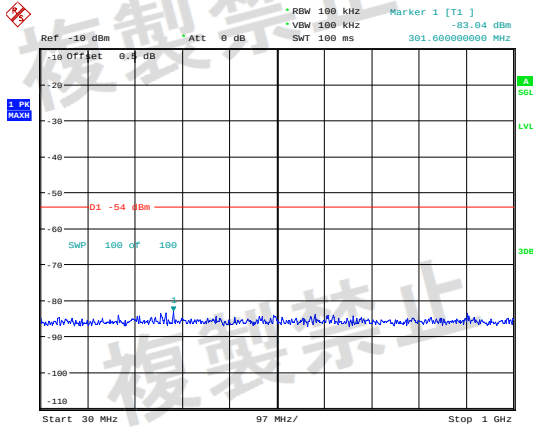
**Note:**

Band I:30MHz ~1000MHz

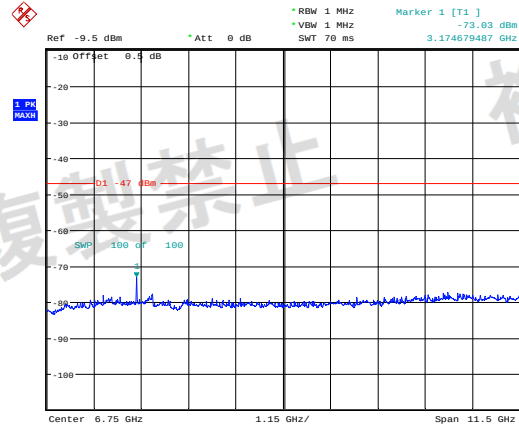
Band II:1000MHz ~12500MHz

Please refer to the below plots for normal voltage test.

### BLE 1M\_Low Channel

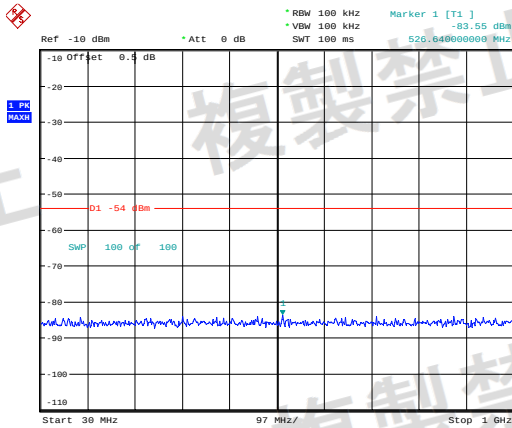


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:32:39

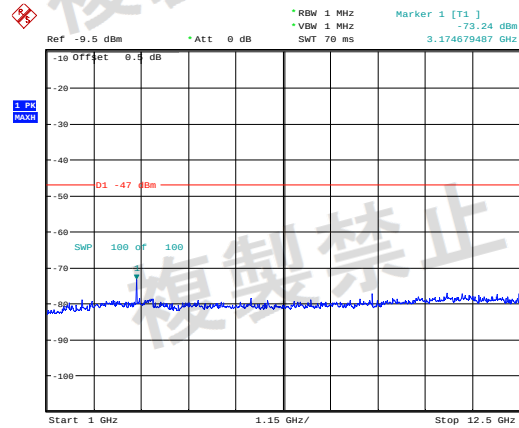


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:52:25

### BLE 1M\_Middle Channel

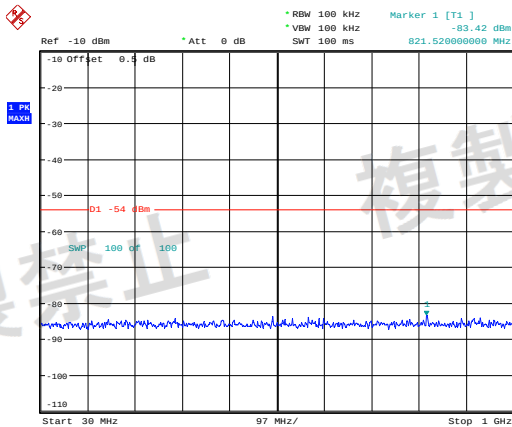


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:36:25

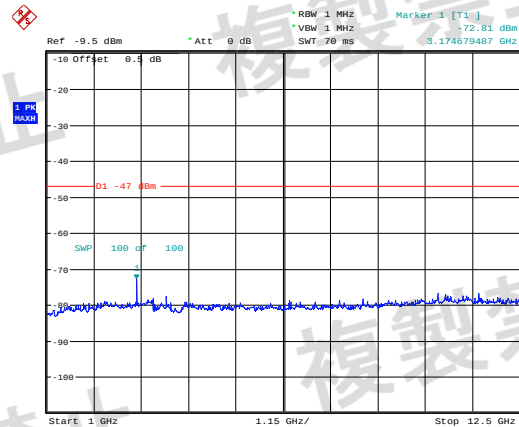


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:50:46

### BLE 1M\_High Channel

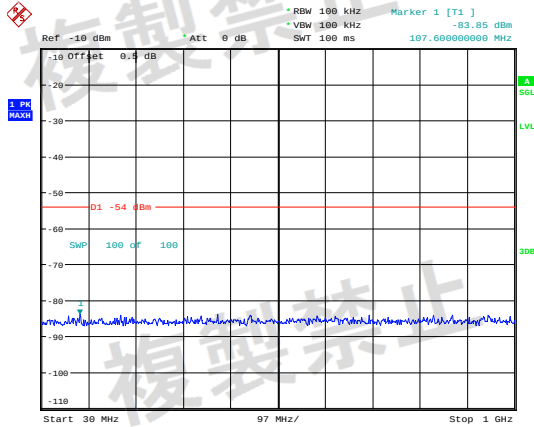


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:37:22

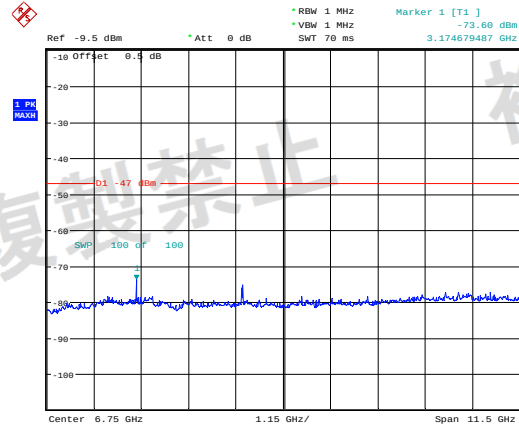


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:49:36

### BLE 2M\_Low Channel

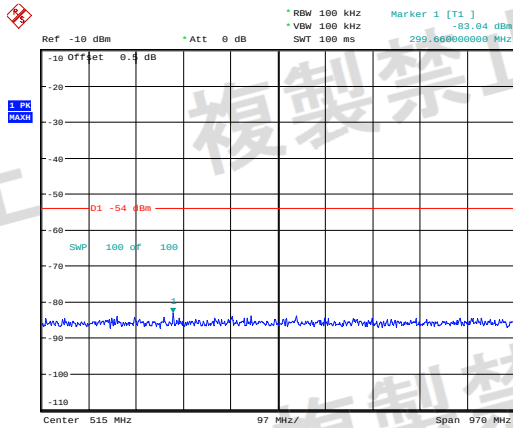


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Date: 17.JUN.2025 20:44:58

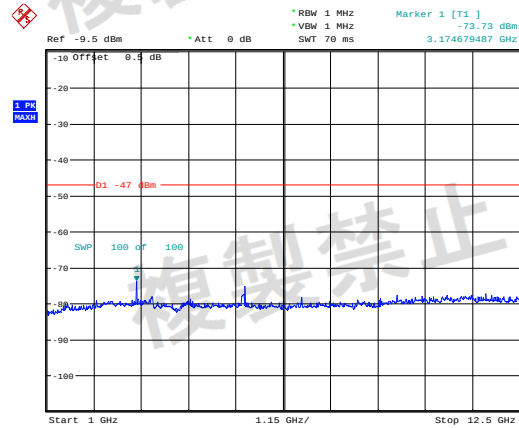


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:46:12

### BLE 2M\_Middle Channel

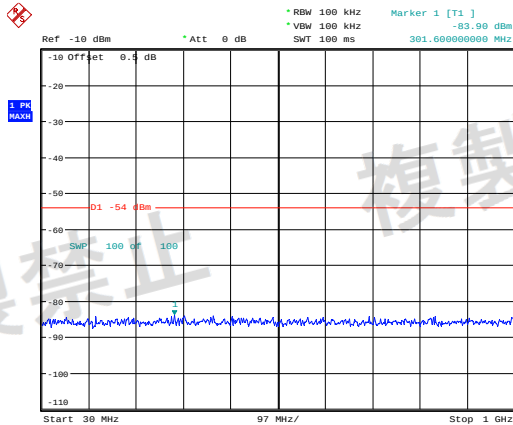


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:41:55

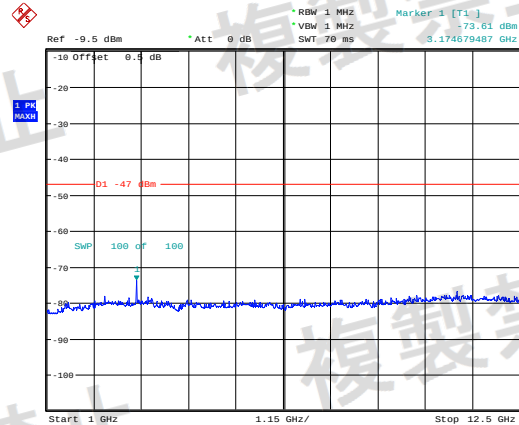


ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:47:34

### BLE 2M\_High Channel



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:48:57



ProjectNo.:2502U63437E-RF Tester:Levi Shi  
Date: 17.JUN.2025 20:48:34

## 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.

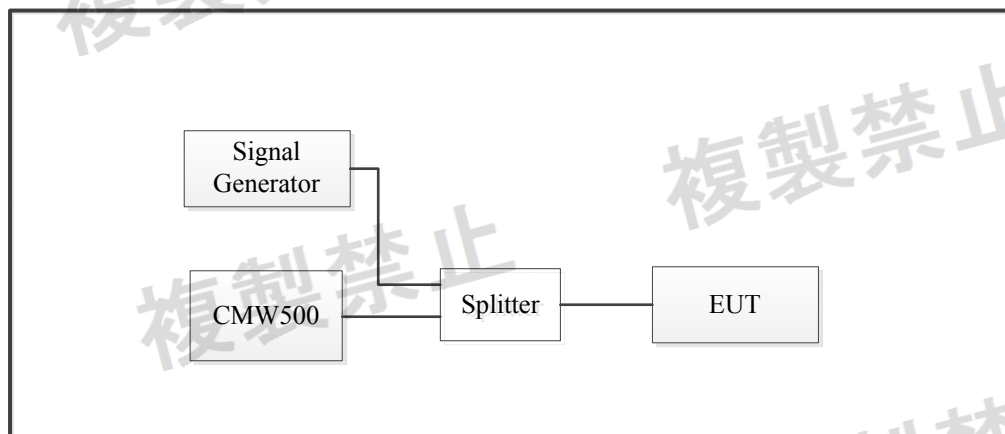
#### Article 1.8 of MPT Ministerial Notice No. 424 of 1994 (the last revision: Notice No. 374 of Nov. 10, 2023)

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

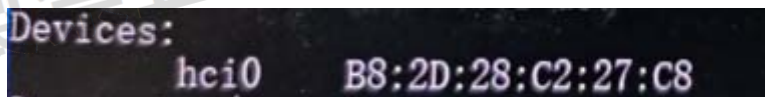
#### ❖ Measurement System Diagram



- ❖ 1. In the case that the EUT has the function of automatically transmitting the identification code: a. Transmit the predetermined identification codes from EUT. b. Check the transmitted identification codes with the demodulator.
- ❖ 2. In the case of receiving the identification code: a. Transmit the predetermined identification codes from the counterpart. b. Check if communication is normal. c. Transmit the signals other than predetermined ID codes from the counterpart. d. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

**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:**

Devices:  
hci0 B8:2D:28:C2:27:C8

**Test Result: Compliant**

## 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\*\*\*\***