

## TEST REPORT

**Applicant:** Renesas Design Korea Inc.

**Address:** 7th SiliconPark, 35 Pangyo-ro 255 beon-gil Bundang-gu,  
Seongnam-si, Gyeonggi-do, 13486 Republic of Korea

**Product Name:** RRQ61051 Module

**Model Name:** RRQ61051-009, RRQ61051-010

**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:** 2502Q45198E-RF-07A

**Report Date:** 2025/8/28

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

**Reviewed By:** Carlos Wu

**Title:** Project Engineer

**Approved By:** Rocky Xiao

**Title:** RF Supervisor

**Bay Area Compliance Laboratories Corp. (Dongguan)**  
No.12, Pulong East 1<sup>st</sup> Road, Tangxia Town, Dongguan, Guangdong, China

Tel: +86-769-86858888

Fax: +86-769-86858891

[www.baclcorp.com.cn](http://www.baclcorp.com.cn)

Note: The information marked ▲ is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This report cannot be reproduced except in full, without prior written approval of the Company. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0. This report may contain data that are not covered by the accreditation scope and shall be marked with ★. Each test item follows the test standard(s) without deviation.

## **TABLE OF CONTENTS**

|                                                                                         |           |
|-----------------------------------------------------------------------------------------|-----------|
| <b>DOCUMENT REVISION HISTORY</b> .....                                                  | <b>3</b>  |
| <b>GENERAL INFORMATION</b> .....                                                        | <b>4</b>  |
| PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....                                 | 4         |
| ACCESSORY INFORMATION .....                                                             | 4         |
| TECHNICAL SPECIFICATION.....                                                            | 4         |
| <b>SUMMARY OF TEST RESULTS</b> .....                                                    | <b>5</b>  |
| <b>DESCRIPTION OF TEST CONFIGURATION</b> .....                                          | <b>6</b>  |
| OPERATION FREQUENCY DETAIL .....                                                        | 6         |
| EUT OPERATION CONDITION .....                                                           | 6         |
| EQUIPMENT MODIFICATIONS.....                                                            | 6         |
| SUPPORT EQUIPMENT LIST AND DETAILS.....                                                 | 7         |
| SUPPORT CABLE LIST AND DETAILS.....                                                     | 7         |
| CONFIGURATION OF TEST SETUP.....                                                        | 8         |
| TEST FACILITY .....                                                                     | 9         |
| MEASUREMENT UNCERTAINTY .....                                                           | 9         |
| <b>1 - FREQUENCY ERROR</b> .....                                                        | <b>10</b> |
| LIMIT.....                                                                              | 10        |
| TEST PROCEDURE.....                                                                     | 10        |
| TEST DATA.....                                                                          | 10        |
| <b>2 - OCCUPIED BANDWIDTH</b> .....                                                     | <b>11</b> |
| LIMIT.....                                                                              | 11        |
| TEST PROCEDURE.....                                                                     | 11        |
| TEST DATA.....                                                                          | 11        |
| <b>3 - TRANSMITTER SPURIOUS EMISSION STRENGTH AND UNWANTED EMISSION INTENSITY</b> ..... | <b>12</b> |
| LIMIT.....                                                                              | 12        |
| TEST PROCEDURE.....                                                                     | 12        |
| TEST DATA.....                                                                          | 12        |
| <b>4 - ANTENNA OUTPUT POWER AND ANTENNA POWER TOLERANCE</b> .....                       | <b>13</b> |
| LIMIT.....                                                                              | 13        |
| TEST PROCEDURE.....                                                                     | 13        |
| TEST DATA.....                                                                          | 13        |
| <b>5 - RECEIVER SPURIOUS EMISSION AND UNWANTED EMISSION INTENSITY</b> .....             | <b>14</b> |
| LIMIT.....                                                                              | 14        |
| TEST PROCEDURE.....                                                                     | 14        |
| TEST DATA.....                                                                          | 14        |
| <b>12 - INTERFERENCE PREVENTION FUNCTION</b> .....                                      | <b>15</b> |
| REQUIREMENT.....                                                                        | 15        |
| TEST PROCEDURE.....                                                                     | 15        |
| TEST DATA.....                                                                          | 16        |
| <b>14 - CONSTRUCTION PROTECTION CONFIRMATION</b> .....                                  | <b>18</b> |
| LIMIT.....                                                                              | 18        |
| CONFIRMATION RESULT.....                                                                | 18        |
| <b>EXHIBIT A – EUT PHOTOGRAPHS</b> .....                                                | <b>19</b> |
| <b>EXHIBIT B – TEST SETUP PHOTOGRAPHS</b> .....                                         | <b>20</b> |
| <b>APPENDIX - TEST DATA</b> .....                                                       | <b>21</b> |
| FREQUENCY ERROR.....                                                                    | 21        |
| OCCUPIED BANDWIDTH.....                                                                 | 23        |
| TRANSMITTER SPURIOUS EMISSION AND UNWANTED EMISSION INTENSITY .....                     | 25        |
| ANTENNA OUTPUT POWER AND OUTPUT POWER TOLERANCE.....                                    | 30        |
| RECEIVER SPURIOUS EMISSION AND UNWANTED EMISSION INTENSITY .....                        | 32        |

DOCUMENT REVISION HISTORY

| Revision Number | Report Number      | Description of Revision | Date of Revision |
|-----------------|--------------------|-------------------------|------------------|
| 1.0             | 2502Q45198E-RF-07A | Original Report         | 2025/8/28        |

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

|                      |                             |
|----------------------|-----------------------------|
| Product Name:        | RRQ61051 Module             |
| Test Model:          | RRQ61051-009                |
| Multiple Models:     | RRQ61051-010                |
| Model Difference:    | Please refer to the DOS     |
| Rated Input Voltage: | 1.8~3.6Vdc (Typical:3.3Vdc) |
| Serial Number:       | 2YVE-1                      |
| EUT Received Date:   | 2025/2/25                   |
| EUT Received Status: | Good                        |

Accessory Information

|                       |              |       |            |
|-----------------------|--------------|-------|------------|
| Accessory Description | Manufacturer | Model | Parameters |
| /                     | /            | /     | /          |

Technical Specification

|                                   |           |
|-----------------------------------|-----------|
| Operation Frequency Range (MHz):  | 2402-2480 |
| Max. RF Output Power (Conducted): | 2mW/MHz   |
| Number of TX Chain(s):            | 1         |
| Number of RX Chain(s):            | 1         |
| Antenna Gain (dBi)▲:              | 3.3       |
| Modulation Type:                  | GFSK      |
| Emission Type                     | F1D       |

**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.

## DESCRIPTION OF TEST CONFIGURATION

### Operation Frequency Detail

The system was configured for testing in engineering mode, which was provided by manufacturer. 40 channels are provided as below table:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 0       | 2402            | 20      | 2442            |
| 1       | 2404            | ...     | ...             |
| ...     | ...             | ...     | ...             |
| ...     | ...             | ...     | ...             |
| ...     | ...             | 38      | 2478            |
| 19      | 2440            | 39      | 2480            |

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

The extreme voltage test conditions which were declared by the manufacturer and the normal conditions are as below:

NV: Normal Voltage 3.3V<sub>DC</sub>

LV: Low Voltage 1.8V<sub>DC</sub>

HV: High Voltage 3.6V<sub>DC</sub>

The EUT in built a power manage system, power deviation of the RF part input of BLE SoC: DA14531 is less than 1% when the extreme voltage supplied, by measuring the crystal (Part number: Y203) voltage because of the input voltage of this crystal is equivalent to the input voltage of RF blocks according to the BLE SoC specification), 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                | 3.3                     | 0.9                                 |
| LV                | 1.8                     | 0.9                                 |
| HV                | 3.6                     | 0.9                                 |

### EUT Operation Condition

The EUT was configured for testing in Engineering Mode, which was provided by the manufacturer. The EUT configuration as below:

| <b>EUT Exercise Software:</b> SmartSnippets Toolbox v5.0.26.4230                                                                           |                     |                |                 |
|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------|-----------------|
| The software was provided by manufacturer. The maximum power was configured as below, that was provided by the manufacturer <sup>^</sup> : |                     |                |                 |
| Mode                                                                                                                                       | Power Level Setting |                |                 |
|                                                                                                                                            | Lowest Channel      | Middle Channel | Highest Channel |
| BLE_1M                                                                                                                                     | default             | default        | default         |

### Equipment Modifications

No modifications are made to the EUT during all test items.

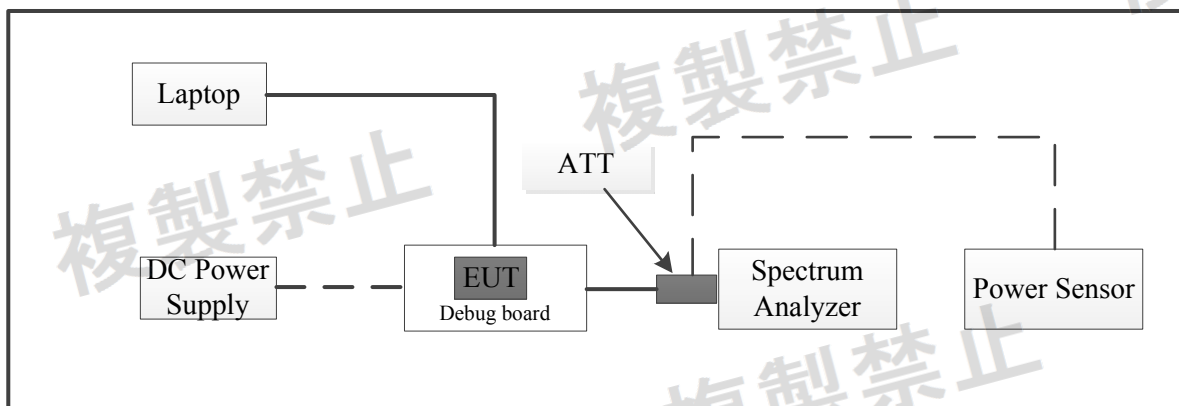
**Support Equipment List and Details**

| Manufacturer | Description     | Model   | Serial Number |
|--------------|-----------------|---------|---------------|
| All-sun      | Multimeter      | EM305A  | 8348897       |
| TDK-Lambda   | DC Power Supply | Z+60-14 | F-08-EM038-1  |
| Azeyoo       | Laptop          | AL141U  | unknown       |
| unknown      | Debug Board     | unknown | unknown       |

**Support Cable List and Details**

| Manufacturer | Shielding Type | Ferrite Core | Length (m) | From Port   | To              |
|--------------|----------------|--------------|------------|-------------|-----------------|
| USB Cable    | NO             | NO           | 1.1        | Debug Board | Laptop          |
| DC Cable     | NO             | NO           | 0.8        | EUT         | DC Power Supply |

## Configuration of Test Setup



## 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 1st Road, Tangxia Town, Dongguan, Guangdong, China.

## Measurement Uncertainty

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.

| 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%                      |

## 1 - FREQUENCY ERROR

### Limit

Within  $\pm 50\text{ppm}$ .

### 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. The details please refer to the Appendix.

## 2 - OCCUPIED BANDWIDTH

### Limit

- Occupied bandwidth:  $\leq 26$  MHz

### Test Procedure

1. 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
2. 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. The details please refer to the Appendix.

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

#### Limit

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

#### 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. The details please refer to the Appendix.

## 4 - ANTENNA OUTPUT POWER AND ANTENNA POWER TOLERANCE

### Limit

Antenna output power:

- $\leq 10\text{mW}$
- The Output Power Tolerance must be within  $+20\% \sim -80\%$ .
- $\text{EIRP} \leq 12.14\text{dBm}$  (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. The details please refer to the Appendix.

## 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. The details please refer to the Appendix.

## 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.

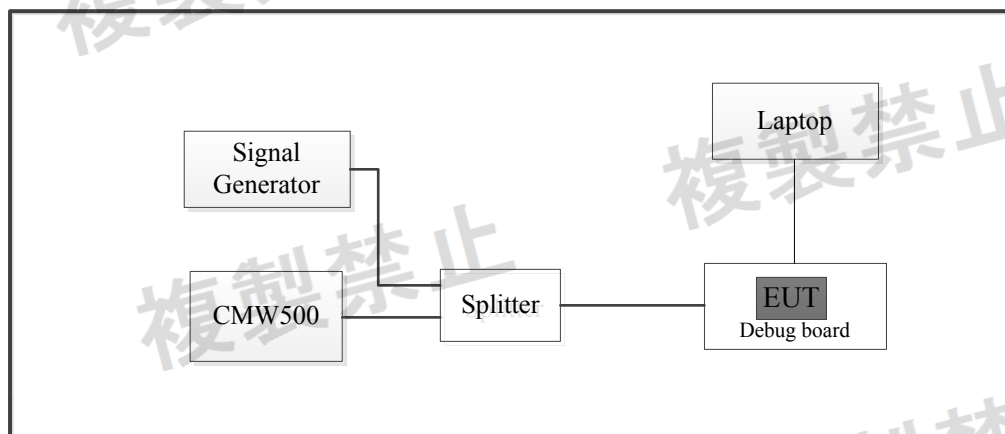
#### Article 1.8 of MPT Ministerial Notice No. 424 of 1994 (the last revision: Notice No. 374 of Nov. 10, 2023)

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

Test Information:

|             |          |              |              |
|-------------|----------|--------------|--------------|
| Serial No.: | 2YVE-1   | Test Date:   | 2025/03/21   |
| Test Site:  | RF       | Test Mode:   | Transmitting |
| Tester:     | Jeff Wei | Test Result: | Pass         |

Environmental Conditions:

|                      |      |                              |    |                        |       |
|----------------------|------|------------------------------|----|------------------------|-------|
| Temperature:<br>(°C) | 21.8 | Relative<br>Humidity:<br>(%) | 50 | ATM Pressure:<br>(kPa) | 101.8 |
|----------------------|------|------------------------------|----|------------------------|-------|

Test Equipment List and Details:

| Manufacturer  | Description                         | Model        | Serial Number | Calibration Date | Calibration Due Date | Calibration Agency | Calibration Method |
|---------------|-------------------------------------|--------------|---------------|------------------|----------------------|--------------------|--------------------|
| Mini-Circuits | Coaxial DC Block                    | BLK-18-S+    | 15542         | 2025/2/28        | 2026/2/27            | BACL(DG)           | D                  |
| 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       | 149216        | 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       | MXG Vector Signal Generator         | N5182B       | MY51350142    | 2024/8/26        | 2025/8/25            | GRGTEST            | C                  |

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, 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).

| Item                                    | Result            | Requirement     | Verdict   |
|-----------------------------------------|-------------------|-----------------|-----------|
| Methodology to transmit ID Code:        | Automatically     | Automatically   | Compliant |
| Methodology to receive ID Code:         | Automatically     | Automatically   | Compliant |
| Identification Codes (ID Codes) of EUT: | 48:23:35:F4:00:09 | /               | /         |
| Bits of ID Codes:                       | 48 bits           | 48 bits or more | Compliant |

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 2502Q45198E-RF-EXP EUT External photos and 2502Q45198E-RF-INP EUT Internal photos.

## **EXHIBIT B – TEST SETUP PHOTOGRAPHS**

Please refer to the attachment 2502Q45198E-RF-TSP Test Setup Photos.

APPENDIX - TEST DATA

Frequency Error

Test Information:

|             |          |              |              |
|-------------|----------|--------------|--------------|
| Serial No.: | 2YVE-1   | Test Date:   | 2025/03/21   |
| Test Site:  | RF       | Test Mode:   | Transmitting |
| Tester:     | Jeff Wei | Test Result: | Pass         |

Environmental Conditions:

|                      |      |                           |    |                        |       |
|----------------------|------|---------------------------|----|------------------------|-------|
| Temperature:<br>(°C) | 21.8 | Relative Humidity:<br>(%) | 50 | ATM Pressure:<br>(kPa) | 101.8 |
|----------------------|------|---------------------------|----|------------------------|-------|

Test Equipment List and Details:

| Manufacturer  | Description        | Model     | Serial Number | Calibration Date | Calibration Due Date | Calibration Agency | Calibration Method |
|---------------|--------------------|-----------|---------------|------------------|----------------------|--------------------|--------------------|
| R&S           | Coaxial Attenuator | 10dB      | F-08-EM512    | 2024/06/13       | 2025/06/12           | BACL(DG)           | D                  |
| R&S           | Spectrum Analyzer  | FSV40     | 101589        | 2024/09/05       | 2025/09/04           | BACL Metrology     | C                  |
| Mini-Circuits | Coaxial DC Block   | BLK-18-S+ | 15542         | 2025/2/28        | 2026/2/27            | BACL(DG)           | D                  |

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, 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).

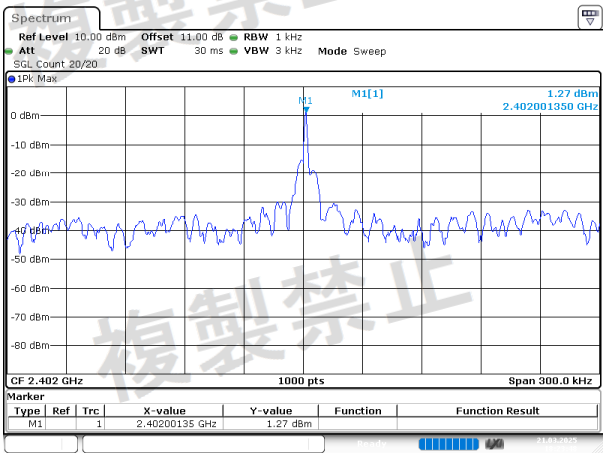
Test Condition: NV

| Mode           | Frequency (MHz) | Measure Frequency (MHz) | Frequency Tolerance (ppm) | Limit (ppm) | Verdict |
|----------------|-----------------|-------------------------|---------------------------|-------------|---------|
| Single Carrier | 2402            | 2402.00135              | 0.56                      | ± 50        | Pass    |
|                | 2440            | 2440.00135              | 0.55                      |             | Pass    |
|                | 2480            | 2480.00135              | 0.54                      |             | Pass    |

Frequency Tolerance = (Measure Frequency - Frequency)/Frequency\*10<sup>6</sup>

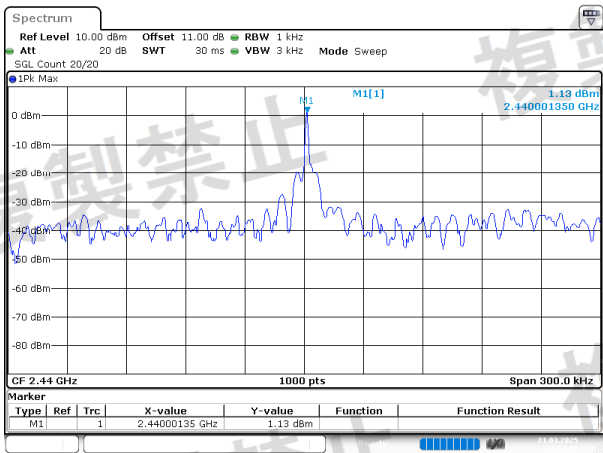
Test Condition: NV

2402MHz



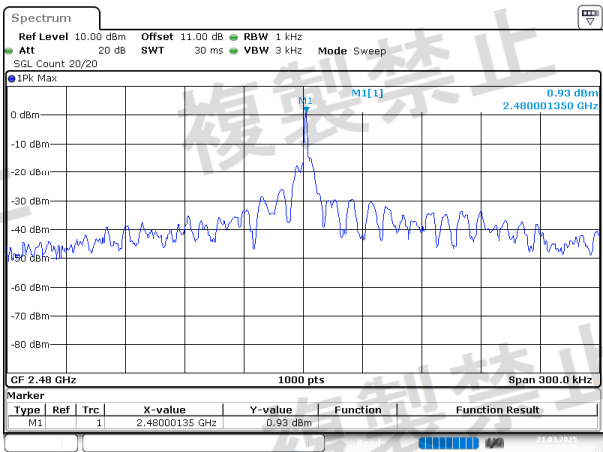
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:23:48

2440MHz



ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:24:08

2480MHz



ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:24:25

Note: Offset = Coaxial Attenuator (10dB) + Cable Loss (1dB)

Occupied Bandwidth

Test Information:

|             |          |              |              |
|-------------|----------|--------------|--------------|
| Serial No.: | 2YVE-1   | Test Date:   | 2025/03/21   |
| Test Site:  | RF       | Test Mode:   | Transmitting |
| Tester:     | Jeff Wei | Test Result: | Pass         |

Environmental Conditions:

|                      |      |                           |    |                        |       |
|----------------------|------|---------------------------|----|------------------------|-------|
| Temperature:<br>(°C) | 21.8 | Relative Humidity:<br>(%) | 50 | ATM Pressure:<br>(kPa) | 101.8 |
|----------------------|------|---------------------------|----|------------------------|-------|

Test Equipment List and Details:

| Manufacturer  | Description        | Model     | Serial Number | Calibration Date | Calibration Due Date | Calibration Agency | Calibration Method |
|---------------|--------------------|-----------|---------------|------------------|----------------------|--------------------|--------------------|
| R&S           | Coaxial Attenuator | 10dB      | F-08-EM512    | 2024/06/13       | 2025/06/12           | BACL(DG)           | D                  |
| R&S           | Spectrum Analyzer  | FSV40     | 101589        | 2024/09/05       | 2025/09/04           | BACL Metrology     | C                  |
| Mini-Circuits | Coaxial DC Block   | BLK-18-S+ | 15542         | 2025/2/28        | 2026/2/27            | BACL(DG)           | D                  |

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

Note:

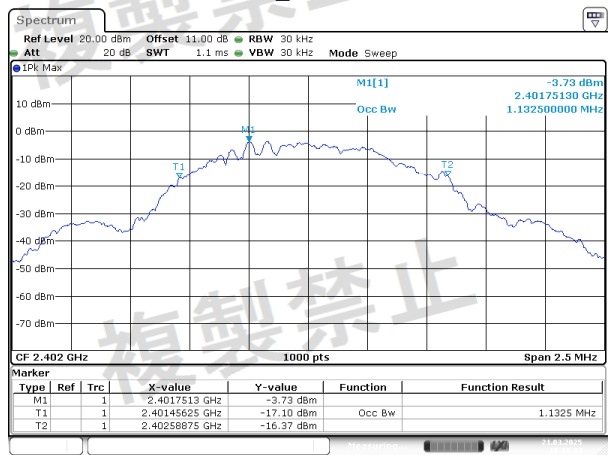
- A. Calibration conducted by the National Institute of Information and Communications Technology (NICT) (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1).
- B. Correction conducted pursuant to the provisions of Article 135 or Article 144 of the 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 Condition: NV

| Mode   | Occupied bandwidth (MHz) |                |              | Limit(MHz) | Verdict |
|--------|--------------------------|----------------|--------------|------------|---------|
|        | Low Channel              | Middle Channel | High Channel |            |         |
| BLE 1M | 1.133                    | 1.123          | 1.083        | ≤ 26       | Pass    |

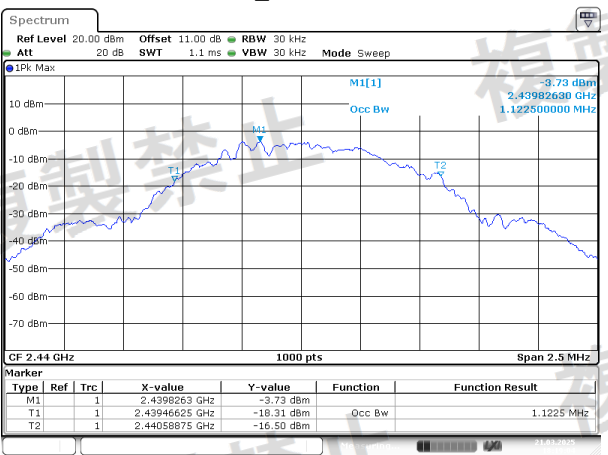
Test Condition: NV

BLE 1M\_Low Channel



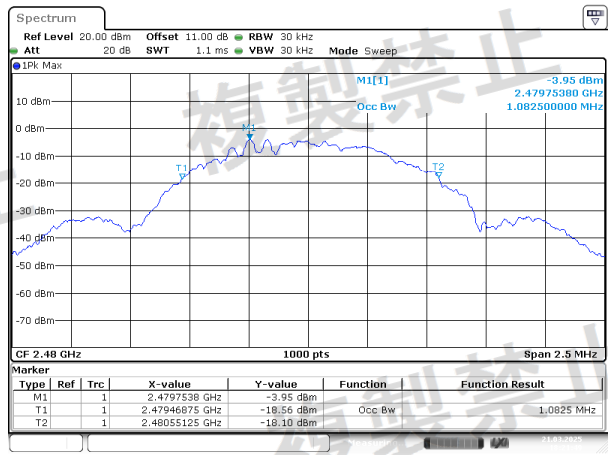
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:16:34

BLE 1M\_Middle Channel



ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:19:04

BLE 1M\_High Channel



ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:21:49

Note: Offset = Coaxial Attenuator (10dB) + Cable Loss (1dB)

Transmitter Spurious Emission and Unwanted Emission Intensity

Test Information:

|             |          |              |              |
|-------------|----------|--------------|--------------|
| Serial No.: | 2YVE-1   | Test Date:   | 2025/03/21   |
| Test Site:  | RF       | Test Mode:   | Transmitting |
| Tester:     | Jeff Wei | Test Result: | Pass         |

Environmental Conditions:

|                      |      |                           |    |                        |       |
|----------------------|------|---------------------------|----|------------------------|-------|
| Temperature:<br>(°C) | 21.8 | Relative Humidity:<br>(%) | 50 | ATM Pressure:<br>(kPa) | 101.8 |
|----------------------|------|---------------------------|----|------------------------|-------|

Test Equipment List and Details:

| Manufacturer  | Description        | Model     | Serial Number | Calibration Date | Calibration Due Date | Calibration Agency | Calibration Method |
|---------------|--------------------|-----------|---------------|------------------|----------------------|--------------------|--------------------|
| R&S           | Coaxial Attenuator | 10dB      | F-08-EM512    | 2024/06/13       | 2025/06/12           | BACL(DG)           | D                  |
| R&S           | Spectrum Analyzer  | FSV40     | 101589        | 2024/09/05       | 2025/09/04           | BACL Metrology     | C                  |
| Mini-Circuits | Coaxial DC Block   | BLK-18-S+ | 15542         | 2025/2/28        | 2026/2/27            | BACL(DG)           | D                  |

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

Note:

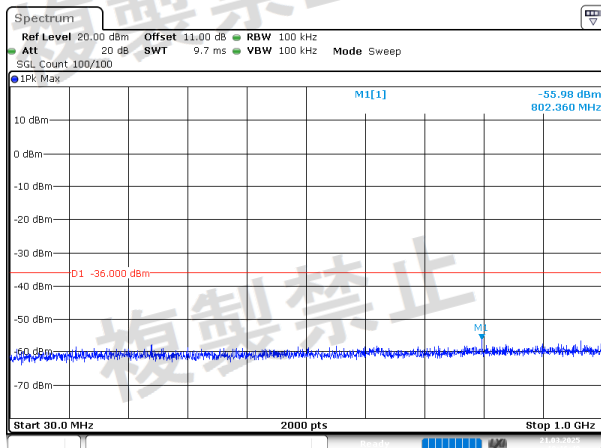
- A. Calibration conducted by the National Institute of Information and Communications Technology (NICT) (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1).
- B. Correction conducted pursuant to the provisions of Article 135 or Article 144 of the 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 Condition: Normal, BLE 1M**

| Channel | Test Band (RBW) | Frequency Range |            | Max.Emission Located(MHz) | Result (dBm/RBW) | Result (μW/RBW) | Limit (μW/RBW) | Verdict |
|---------|-----------------|-----------------|------------|---------------------------|------------------|-----------------|----------------|---------|
|         |                 | Start (MHz)     | Stop (MHz) |                           |                  |                 |                |         |
| Low     | Band I (100kHz) | 30              | 1000       | 802.36                    | -55.98           | 0.003           | 0.25           | Pass    |
|         | Band II (1MHz)  | 1000            | 2387       | 1281.91                   | -47.43           | 0.018           | 2.50           | Pass    |
|         | Band III (1MHz) | 2387            | 2400       | 2399.9903                 | -31.77           | 0.665           | 25             | Pass    |
|         | Band IV (1MHz)  | 2483.5          | 2496.5     | 2495.6323                 | -47.86           | 0.016           | 25             | Pass    |
|         | Band V (1MHz)   | 2496.5          | 12500      | 6970.6                    | -42.84           | 0.052           | 2.50           | Pass    |
| Middle  | Band I (100kHz) | 30              | 1000       | 832.43                    | -49.25           | 0.012           | 0.25           | Pass    |
|         | Band II (1MHz)  | 1000            | 2387       | 1220.88                   | -47.59           | 0.017           | 2.50           | Pass    |
|         | Band III (1MHz) | 2387            | 2400       | 2393.9973                 | -47.23           | 0.019           | 25             | Pass    |
|         | Band IV (1MHz)  | 2483.5          | 2496.5     | 2485.1933                 | -47.08           | 0.020           | 25             | Pass    |
|         | Band V (1MHz)   | 2496.5          | 12500      | 6970.6                    | -42.57           | 0.055           | 2.50           | Pass    |
| High    | Band I (100kHz) | 30              | 1000       | 969.2                     | -56.68           | 0.002           | 0.25           | Pass    |
|         | Band II (1MHz)  | 1000            | 2387       | 1239.6                    | -46.78           | 0.021           | 2.50           | Pass    |
|         | Band III (1MHz) | 2387            | 2400       | 2399.3013                 | -47.61           | 0.017           | 25             | Pass    |
|         | Band IV (1MHz)  | 2483.5          | 2496.5     | 2483.8868                 | -43.08           | 0.049           | 25             | Pass    |
|         | Band V (1MHz)   | 2496.5          | 12500      | 6955.6                    | -42.54           | 0.056           | 2.50           | Pass    |

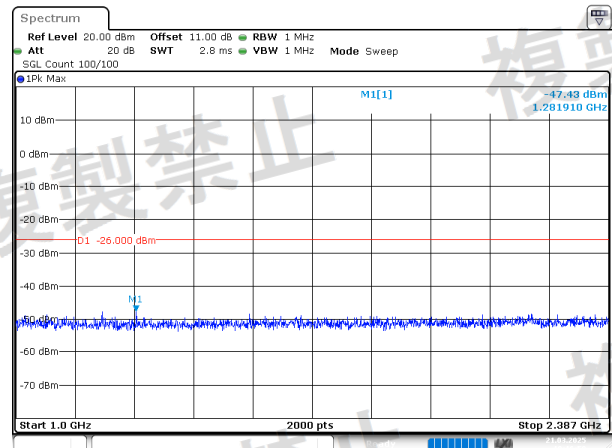
## Test Condition: NV

## BLE 1M\_Low Channel(30MHz~1GHz)



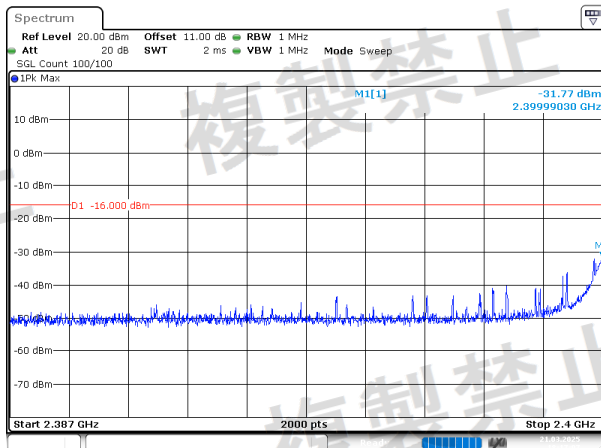
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:16:49

## BLE 1M\_Low Channel(1GHz~2.387GHz)



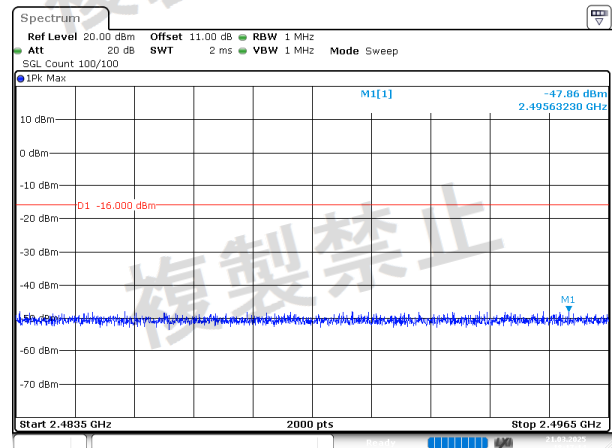
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:16:59

## BLE 1M\_Low Channel(2.387GHz~2.4GHz)



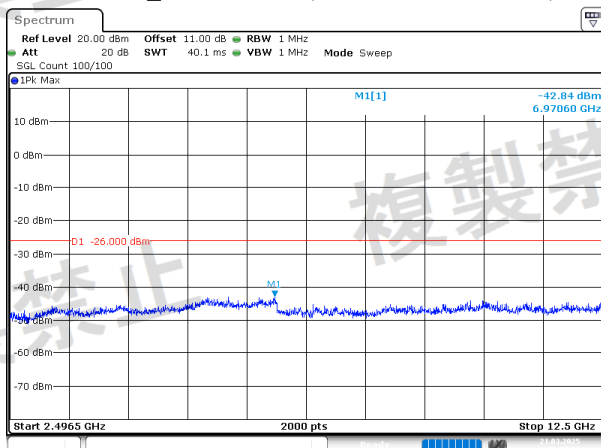
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:17:07

## BLE 1M\_Low Channel(2.4835GHz~2.4965GHz)



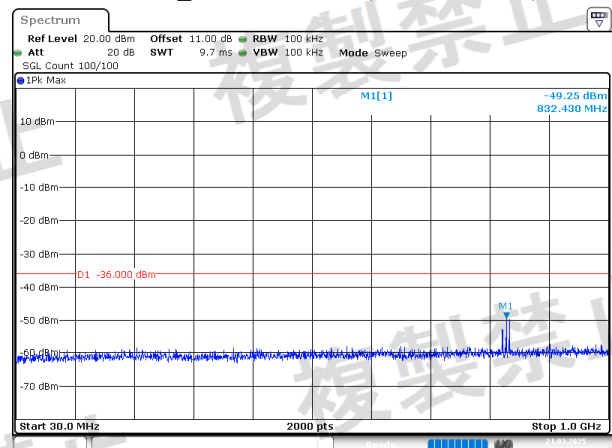
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:17:15

## BLE 1M\_Low Channel(2.4965GHz~12.5GHz)



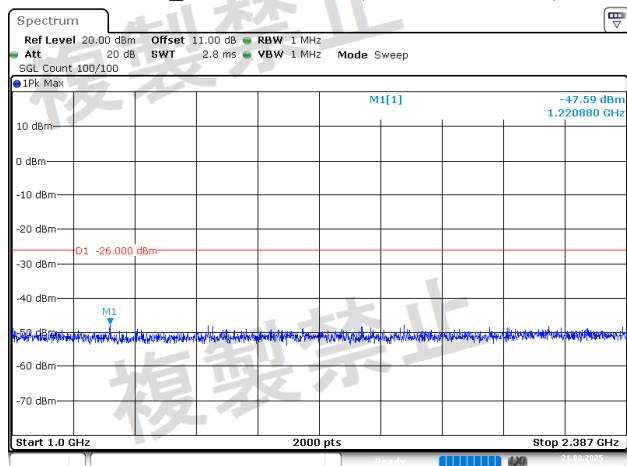
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:17:38

## BLE 1M\_Middle Channel(30MHz~1GHz)



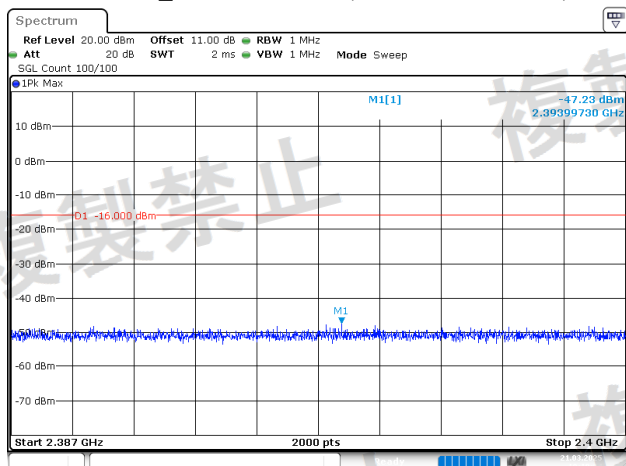
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:19:17

## BLE 1M\_Middle Channel(1GHz~2.387GHz)



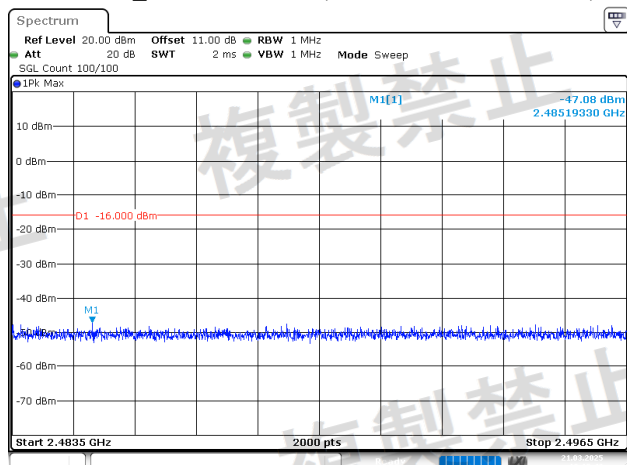
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:19:27

## BLE 1M\_Middle Channel(2.387GHz~2.4GHz)



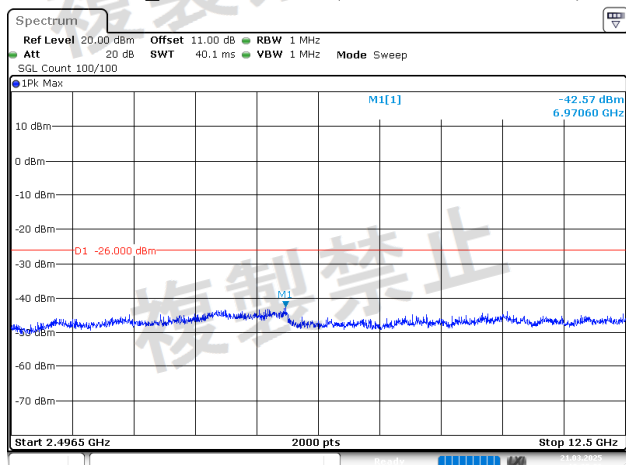
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:19:34

## BLE 1M\_Middle Channel(2.4835GHz~2.4965GHz)



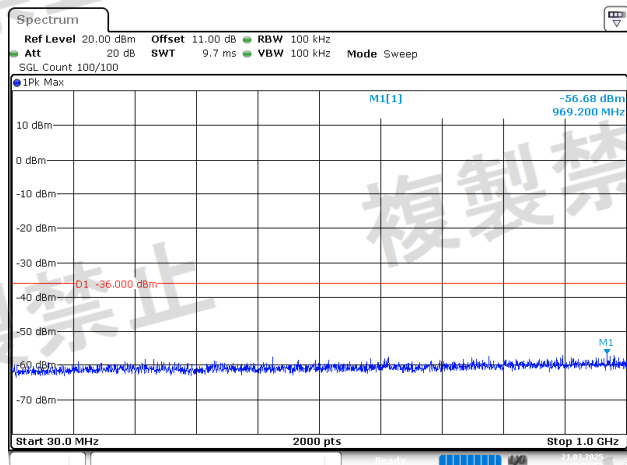
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:19:42

## BLE 1M\_Middle Channel(2.4965GHz~12.5GHz)



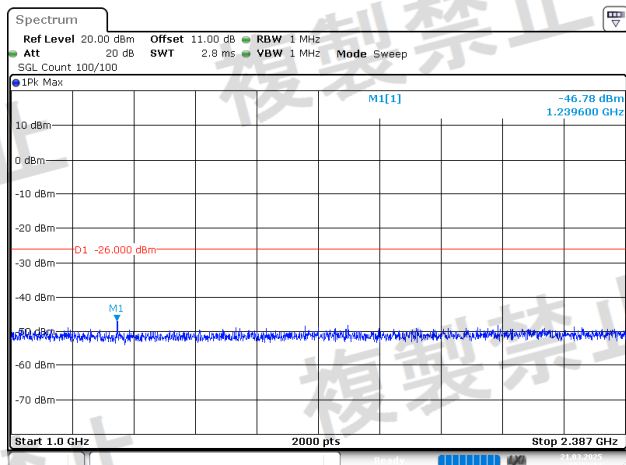
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:20:06

## BLE 1M\_High Channel(30MHz~1GHz)



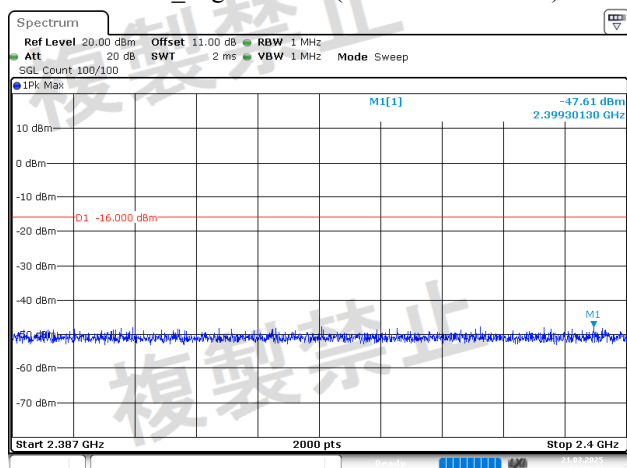
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:22:03

## BLE 1M\_High Channel(1GHz~2.387GHz)



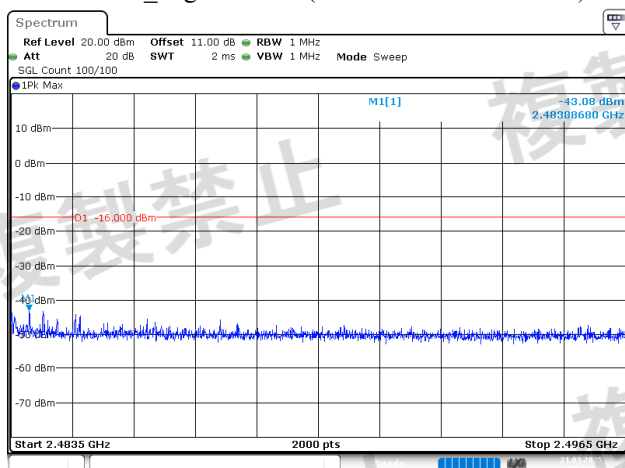
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:22:14

## BLE 1M\_High Channel(2.387GHz~2.4GHz)



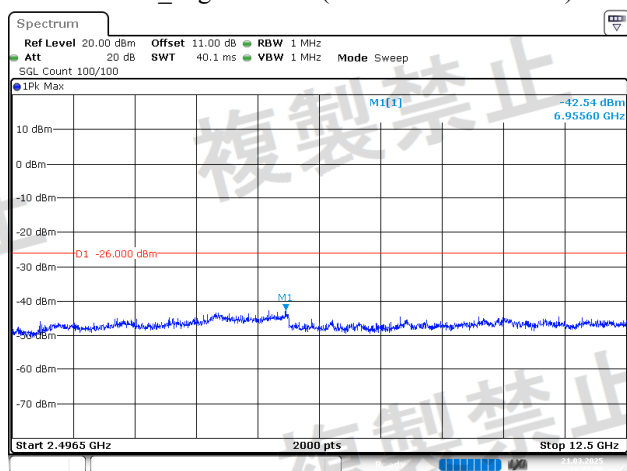
ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:22:23

## BLE 1M\_High Channel(2.4835GHz~2.4965GHz)



ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:22:32

## BLE 1M\_High Channel(2.4965GHz~12.5GHz)



ProjectNo.:2502Q45198E-RF Tester:Jeff Wei  
Date: 21.MAR.2025 18:22:57

Note: Offset = Coaxial Attenuator (10dB) + Cable Loss (1dB)

Antenna Output Power and Output Power Tolerance

Test Information:

|             |          |              |              |
|-------------|----------|--------------|--------------|
| Serial No.: | 2YVE-1   | Test Date:   | 2025/03/21   |
| Test Site:  | RF       | Test Mode:   | Transmitting |
| Tester:     | Jeff Wei | Test Result: | Pass         |

Environmental Conditions:

|                      |      |                              |    |                        |       |
|----------------------|------|------------------------------|----|------------------------|-------|
| Temperature:<br>(°C) | 21.8 | Relative<br>Humidity:<br>(%) | 50 | ATM Pressure:<br>(kPa) | 101.8 |
|----------------------|------|------------------------------|----|------------------------|-------|

Test Equipment List and Details:

| Manufacturer  | Description                 | Model           | Serial Number | Calibration Date | Calibration Due Date | Calibration Agency | Calibration Method |
|---------------|-----------------------------|-----------------|---------------|------------------|----------------------|--------------------|--------------------|
| Anritsu       | Microwave Peak Power Sensor | MA24418A        | 12618         | 2024/8/27        | 2025/8/26            | BACL Metrology     | C                  |
| Eastsheep     | Coaxial Attenuator          | 5W-N-JK-6G-10dB | F-08-EM504    | 2024/6/7         | 2025/6/6             | BACL(DG)           | D                  |
| Mini-Circuits | Coaxial DC Block            | BLK-18-S+       | 15542         | 2025/2/28        | 2026/2/27            | BACL(DG)           | D                  |

\* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, 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 Condition: NV**

| Mode   | Antenna gain (dBi) | Declared power (mW) |
|--------|--------------------|---------------------|
| BLE 1M | 3.30               | 2                   |

| Mode   | Channel | Conducted power(dBm) | Antenna output power(mW) |       | Antenna output tolerance(%) |         | EIRP (dBm) |         | Verdict |
|--------|---------|----------------------|--------------------------|-------|-----------------------------|---------|------------|---------|---------|
|        |         |                      | Result                   | Limit | Result                      | Limit   | Result     | Limit   |         |
| BLE 1M | Low     | 0.94                 | 1.242                    | ≤ 10  | -37.90                      | -80~+20 | 4.24       | ≤ 12.14 | Pass    |
|        | Middle  | 0.85                 | 1.216                    |       | -39.20                      |         | 4.15       |         | Pass    |
|        | High    | 0.65                 | 1.161                    |       | -41.95                      |         | 3.95       |         | Pass    |

Note:

 $\text{Antenna output power(mW)} = 10^{\{\text{Conducted power(dBm)} / 10\}}$  $\text{Antenna output power tolerance(\%)} = (\text{Antenna output power} - \text{Declared power}) / \text{Declared power} * 100\%$  $\text{Antenna output power(dBm)} = 10 * \log_{10}\{\text{Antenna output power(mW)}\}$  $\text{EIRP(dBm)} = \text{Antenna output power(dBm)} + \text{Antenna gain.}$

Receiver Spurious Emission and Unwanted Emission Intensity

Test Information:

|             |          |              |              |
|-------------|----------|--------------|--------------|
| Serial No.: | 2YVE-1   | Test Date:   | 2025/04/03   |
| Test Site:  | RF       | Test Mode:   | Transmitting |
| Tester:     | Jeff Wei | Test Result: | Pass         |

Environmental Conditions:

|                      |      |                           |    |                        |       |
|----------------------|------|---------------------------|----|------------------------|-------|
| Temperature:<br>(°C) | 21.3 | Relative Humidity:<br>(%) | 55 | ATM Pressure:<br>(kPa) | 101.4 |
|----------------------|------|---------------------------|----|------------------------|-------|

Test Equipment List and Details:

| Manufacturer  | Description        | Model     | Serial Number | Calibration Date | Calibration Due Date | Calibration Agency | Calibration Method |
|---------------|--------------------|-----------|---------------|------------------|----------------------|--------------------|--------------------|
| R&S           | Coaxial Attenuator | 10dB      | F-08-EM512    | 2024/06/13       | 2025/06/12           | BACL(DG)           | D                  |
| R&S           | Spectrum Analyzer  | FSV40     | 101589        | 2024/09/05       | 2025/09/04           | BACL Metrology     | C                  |
| Mini-Circuits | Coaxial DC Block   | BLK-18-S+ | 15542         | 2025/02/28       | 2026/02/27           | BACL(DG)           | D                  |

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

Note:

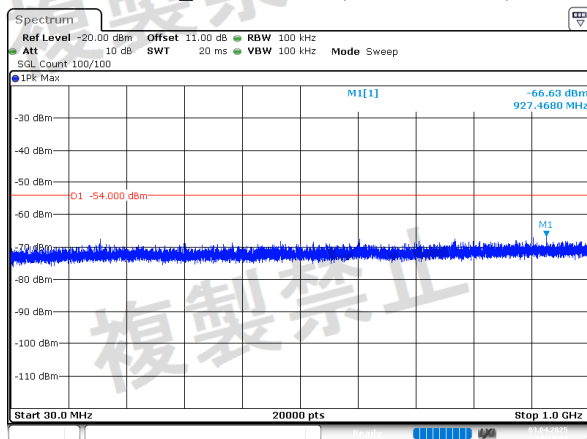
- A. Calibration conducted by the National Institute of Information and Communications Technology (NICT) (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1).
- B. Correction conducted pursuant to the provisions of Article 135 or Article 144 of the 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 Condition: NV

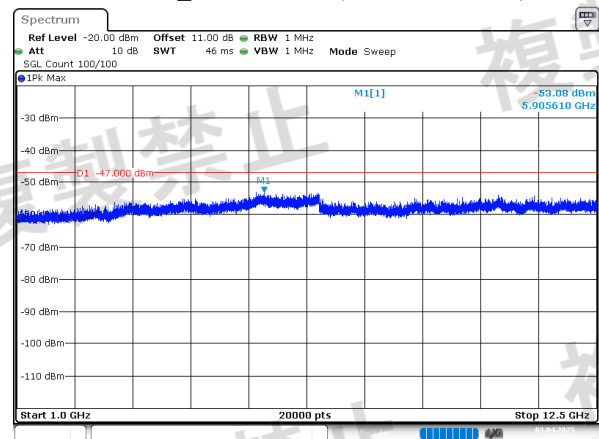
| Mode   | Channel | Test Band<br>(RBW) | Frequency Range |           | Max.Emission<br>Located(MHz) | Result<br>(dBm) | Result<br>(nW) | Limit<br>(nW) | Verdict |
|--------|---------|--------------------|-----------------|-----------|------------------------------|-----------------|----------------|---------------|---------|
|        |         |                    | Start(MHz)      | Stop(MHz) |                              |                 |                |               |         |
| BLE 1M | Low     | Band I (100kHz)    | 30              | 1000      | 927.47                       | -66.63          | 0.217          | 4             | Pass    |
|        |         | Band II (1MHz)     | 1000            | 12500     | 5905.61                      | -53.08          | 4.920          | 20            | Pass    |
|        | Middle  | Band I (100kHz)    | 30              | 1000      | 987.12                       | -66.94          | 0.202          | 4             | Pass    |
|        |         | Band II (1MHz)     | 1000            | 12500     | 6751.44                      | -52.43          | 5.715          | 20            | Pass    |
|        | High    | Band I (100kHz)    | 30              | 1000      | 809.42                       | -66.99          | 0.200          | 4             | Pass    |
|        |         | Band II (1MHz)     | 1000            | 12500     | 6969.36                      | -52.81          | 5.236          | 20            | Pass    |

# Test Condition: NV

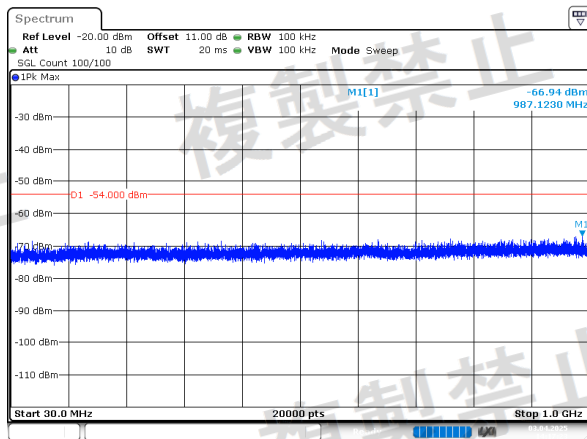
## BLE 1M\_Low Channel(30MHz~1GHz)



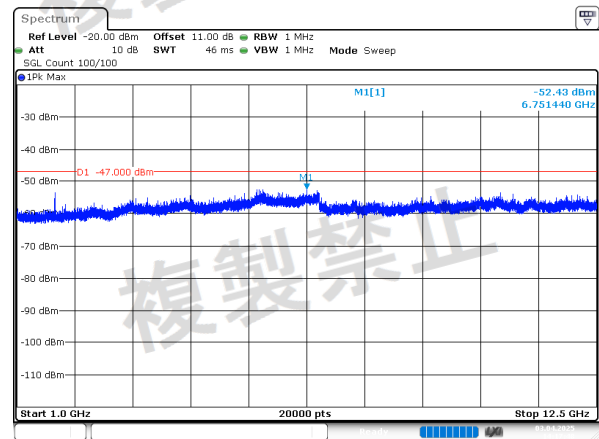
## BLE 1M\_Low Channel(1GHz~12.5GHz)



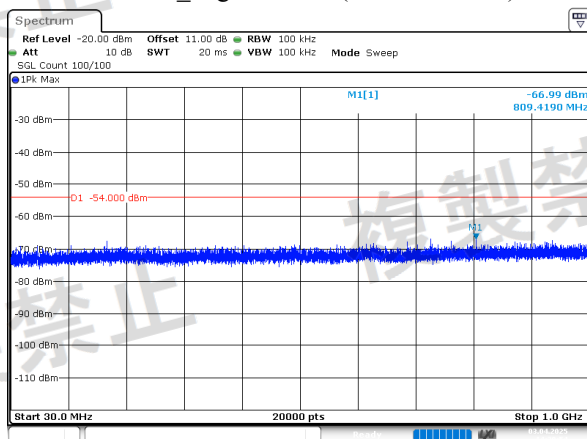
## BLE 1M\_Middle Channel(30MHz~1GHz)



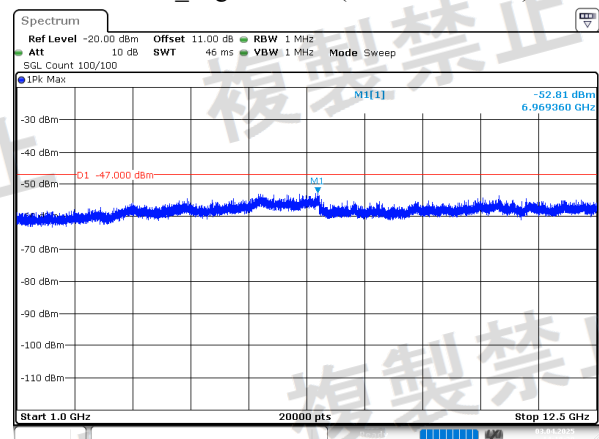
## BLE 1M\_Middle Channel(1GHz~12.5GHz)



## BLE 1M\_High Channel(30MHz~1GHz)



## BLE 1M\_High Channel(1GHz~12.5GHz)



Note: Offset = Coaxial Attenuator (10dB) + Cable Loss (1dB)

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