

# TEST REPORT

Applicant Name: Yeasound (Xiamen) Hearing Technology Co., Ltd  
Address: No.668 Hu'an Road, Huli District, Xiamen China  
Report Number: 2401W49073E-RF-00  
FCC ID: 2BFVL-RIC700

## Test Standard (s)

FCC PART 15.247

## Sample Description

Product Type: Hearing Aids  
Model No.: RIC700  
Multiple Model(s) No.: RIC700 MP, RIC700 HP, RIC700 LP  
Trade Mark: **Yeasound**  
Date Received: 2024/08/16  
Issue Date: 2024/08/29

Test Result:

Pass▲

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

## Prepared and Checked By:

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Kungfumaster Liang  
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## Approved By:

*Michelle Zeng*

Michelle Zeng  
RF Supervisor

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

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DOCUMENT REVISION HISTORY

| Revision Number | Report Number     | Description of Revision | Date of Revision |
|-----------------|-------------------|-------------------------|------------------|
| 0               | 2401W49073E-RF-00 | Original Report         | 2024/08/29       |

## GENERAL INFORMATION

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

|                                                                                                                                                                                                                                                                                                                                                       |                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Product                                                                                                                                                                                                                                                                                                                                               | Hearing Aids                                                                                    |
| Tested Model                                                                                                                                                                                                                                                                                                                                          | RIC700                                                                                          |
| Multiple Model(s)                                                                                                                                                                                                                                                                                                                                     | RIC700 MP, RIC700 HP, RIC700 LP                                                                 |
| Frequency Range                                                                                                                                                                                                                                                                                                                                       | BLE: 2402-2480MHz                                                                               |
| Maximum Conducted Peak Output Power                                                                                                                                                                                                                                                                                                                   | BLE: 0.37dBm                                                                                    |
| Modulation Technique                                                                                                                                                                                                                                                                                                                                  | BLE: GFSK                                                                                       |
| Antenna Specification <sup>#</sup>                                                                                                                                                                                                                                                                                                                    | -5.58dBi (provided by the applicant)                                                            |
| Voltage Range                                                                                                                                                                                                                                                                                                                                         | DC 3.85V from battery                                                                           |
| Sample serial number                                                                                                                                                                                                                                                                                                                                  | 2Q5P-5 for Radiated Emissions Test<br>2Q5P-3 for RF Conducted Test (Assigned by BACL, Shenzhen) |
| Sample/EUT Status                                                                                                                                                                                                                                                                                                                                     | Good condition                                                                                  |
| Adapter Information                                                                                                                                                                                                                                                                                                                                   | Model: YLPS052000UC1-US<br>Input: AC 100-240V, 50/60Hz, 0.5A<br>Output: DC 5V, 2A               |
| Note: The multiple models are electrically identical with the test model except for model name and software version. Please refer to the declaration letter <sup>#</sup> for more detail, which was provided by manufacturer.<br>Note: The left ear receiver and the right ear receiver are the same, so the left ear receiver was selected for test. |                                                                                                 |

### Objective

This report is in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209, 15.247 rules.

### Test Methodology

All tests and measurements indicated in this document were performed in accordance ANSI C63.10-2013.

And KDB 558074 D01 15.247 Meas Guidance v05r02.

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

Each test item follows test standards and with no deviation.

## Measurement Uncertainty

| Parameter                          |                             | Uncertainty                           |
|------------------------------------|-----------------------------|---------------------------------------|
| Occupied Channel Bandwidth         |                             | ±5%                                   |
| RF output power, conducted         |                             | 0.72 dB(k=2, 95% level of confidence) |
| AC Power Lines Conducted Emissions | 9kHz~150 kHz                | 3.94dB(k=2, 95% level of confidence)  |
|                                    | 150 kHz ~30MHz              | 3.84dB(k=2, 95% level of confidence)  |
| Radiated Emissions                 | 9kHz - 30MHz                | 3.30dB(k=2, 95% level of confidence)  |
|                                    | 30MHz~200MHz (Horizontal)   | 4.48dB(k=2, 95% level of confidence)  |
|                                    | 30MHz~200MHz (Vertical)     | 4.55dB(k=2, 95% level of confidence)  |
|                                    | 200MHz~1000MHz (Horizontal) | 4.85dB(k=2, 95% level of confidence)  |
|                                    | 200MHz~1000MHz (Vertical)   | 5.05dB(k=2, 95% level of confidence)  |
|                                    | 1GHz - 6GHz                 | 5.35dB(k=2, 95% level of confidence)  |
|                                    | 6GHz - 18GHz                | 5.44dB(k=2, 95% level of confidence)  |
| Temperature                        |                             | ±1°C                                  |
| Humidity                           |                             | ±1%                                   |
| Supply voltages                    |                             | ±0.4%                                 |

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

## Test Facility

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

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

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

For BLE 1M&2M mode, 40 channels are provided to testing:

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 0       | 2402            | 20      | 2442            |
| 1       | 2404            | 21      | 2444            |
| 2       | 2406            | 22      | 2446            |
| 3       | 2408            | 23      | 2448            |
| 4       | 2410            | 24      | 2450            |
| 5       | 2412            | 25      | 2452            |
| 6       | 2414            | 26      | 2454            |
| 7       | 2416            | 27      | 2456            |
| 8       | 2418            | 28      | 2458            |
| 9       | 2420            | 29      | 2460            |
| 10      | 2422            | 30      | 2462            |
| 11      | 2424            | 31      | 2464            |
| 12      | 2426            | 32      | 2466            |
| 13      | 2428            | 33      | 2468            |
| 14      | 2430            | 34      | 2470            |
| 15      | 2432            | 35      | 2472            |
| 16      | 2434            | 36      | 2474            |
| 17      | 2436            | 37      | 2476            |
| 18      | 2438            | 38      | 2478            |
| 19      | 2440            | 39      | 2480            |

EUT was tested with Channel 0, 19 and 39.

### Equipment Modifications

No modification was made to the EUT tested.

### EUT Exercise Software

“dtm\_test”<sup>#</sup> exercise software was used and the power level is Default<sup>#</sup>. The software and power level was provided by the applicant.

**Duty cycle**

Please refer to the Appendix.

**Support Equipment List and Details**

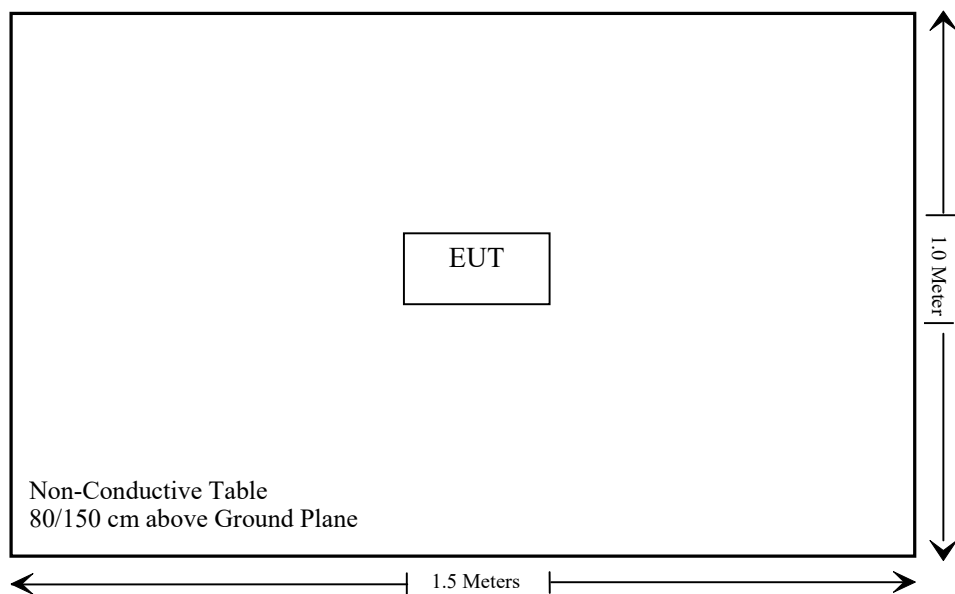
| Manufacturer | Description | Model | Serial Number |
|--------------|-------------|-------|---------------|
| /            | /           | /     | /             |

**External I/O Cable**

| Cable Description | Length (m) | From Port | To |
|-------------------|------------|-----------|----|
| /                 | /          | /         | /  |

**Block Diagram of Test Setup**

For Radiated Emissions:



**SUMMARY OF TEST RESULTS**

| FCC Rules                               | Description of Test                      | Result         |
|-----------------------------------------|------------------------------------------|----------------|
| §15.247 (i) & §1.1307 (b) (1) & §2.1093 | RF Exposure                              | Compliant      |
| §15.203                                 | Antenna Requirement                      | Compliant      |
| §15.207 (a)                             | AC Line Conducted Emissions              | Not Applicable |
| §15.205, §15.209, §15.247(d)            | Spurious Emissions                       | Compliant      |
| §15.247 (a)(2)                          | 6 dB Emission Bandwidth                  | Compliant      |
| §15.247(b)(3)                           | Maximum Conducted Output Power           | Compliant      |
| §15.247(e)                              | Power Spectral Density                   | Compliant      |
| §15.247(d)                              | 100 kHz Bandwidth of Frequency Band Edge | Compliant      |

Not Applicable: The EUT is powered by battery.

**TEST EQUIPMENT LIST**

| Manufacturer                  | Description                       | Model             | Serial Number | Calibration Date | Calibration Due Date |
|-------------------------------|-----------------------------------|-------------------|---------------|------------------|----------------------|
| <b>Radiated Emission Test</b> |                                   |                   |               |                  |                      |
| Rohde & Schwarz               | EMI Test Receiver                 | ESR3              | 102455        | 2024/01/16       | 2025/01/15           |
| Sonoma instrument             | Pre-amplifier                     | 310 N             | 186238        | 2024/05/21       | 2025/05/20           |
| Sunol Sciences                | Broadband Antenna                 | JB1               | A040904-1     | 2023/07/20       | 2026/07/19           |
| Unknown                       | Cable                             | Chamber A Cable 1 | N/A           | 2024/06/18       | 2025/06/17           |
| Unknown                       | Cable                             | XH500C            | J-10M-A       | 2024/06/18       | 2025/06/17           |
| BACL                          | Active Loop Antenna               | 1313-1A           | 4031911       | 2024/05/14       | 2027/05/13           |
| Unknown                       | Cable                             | 2Y194             | 0735          | 2024/05/21       | 2025/05/20           |
| Unknown                       | Cable                             | PNG214            | 1354          | 2024/05/21       | 2025/05/20           |
| Audix                         | EMI Test software                 | E3                | 19821b(V9)    | NCR              | NCR                  |
| Rohde & Schwarz               | Spectrum Analyzer                 | FSV40             | 101605        | 2024/03/27       | 2025/03/26           |
| COM-POWER                     | Pre-amplifier                     | PA-122            | 181919        | 2024/06/18       | 2025/06/17           |
| Schwarzbeck                   | Horn Antenna                      | BBHA9120D(1201)   | 1143          | 2023/07/26       | 2026/07/25           |
| Unknown                       | RF Cable                          | KMSE              | 735           | 2024/06/18       | 2025/06/17           |
| Unknown                       | RF Cable                          | UFA147            | 219661        | 2024/06/18       | 2025/06/17           |
| Unknown                       | RF Cable                          | XH750A-N          | J-10M         | 2024/06/18       | 2025/06/17           |
| JD                            | Multiplex Switch Test Control Set | DT7220FSU         | DQ77926       | 2024/06/18       | 2025/06/17           |
| A.H.System                    | Pre-amplifier                     | PAM-1840VH        | 190           | 2024/06/18       | 2025/06/17           |
| Electro-Mechanics Co          | Horn Antenna                      | 3116              | 2026          | 2023/09/18       | 2026/09/17           |
| UTIFLEX                       | RF Cable                          | NO. 13            | 232308-001    | 2024/06/18       | 2025/06/17           |
| Audix                         | EMI Test software                 | E3                | 191218(V9)    | NCR              | NCR                  |
| <b>RF Conducted Test</b>      |                                   |                   |               |                  |                      |
| Tonscend                      | RF control Unit                   | JS0806-2          | 19D8060154    | 2023/09/06       | 2024/09/05           |
| Rohde & Schwarz               | Spectrum Analyzer                 | FSV40             | 101473        | 2024/01/16       | 2025/01/15           |
| MARCONI                       | 10dB Attenuator                   | 6534/3            | 2942          | 2024/06/27       | 2025/06/26           |

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

## **FCC§15.247 (i), §1.1307 (b) (1) &§2.1093 - RF EXPOSURE**

### **Applicable Standard**

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

1.  $f(\text{GHz})$  is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm is applied to determine SAR test Exclusion.

### **Measurement Result**

**For worst case:**

| Mode | Frequency (MHz) | Max tune-up conducted power <sup>#</sup> (dBm) | Max tune-up conducted power <sup>#</sup> (mW) | Distance (mm) | Calculated value | Threshold (1-g SAR) | SAR Test Exclusion |
|------|-----------------|------------------------------------------------|-----------------------------------------------|---------------|------------------|---------------------|--------------------|
| BLE  | 2402-2480       | 1.00                                           | 1.26                                          | 5             | 0.40             | 3                   | Yes                |

**Result: Compliant**

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## **FCC §15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

### **Antenna Connector Construction**

The EUT has a internal antenna arrangement which was permanently attached and the maximum antenna gain<sup>#</sup> is -5.58dBi, fulfill the requirement of this section. Please refer to the EUT photos.

**Result: Compliant**

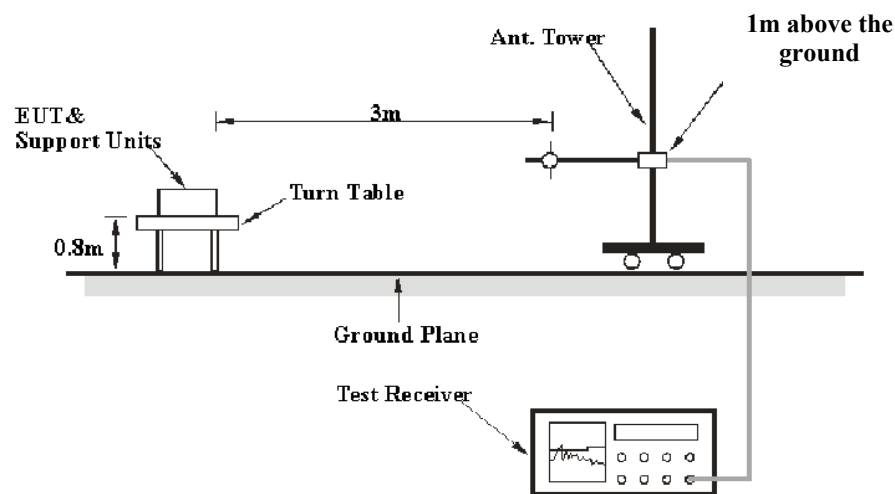
## FCC §15.209, §15.205 & §15.247(D) – UNWANTED EMISSION FREQUENCIES AND RESTRICTED BANDS

### Applicable Standard

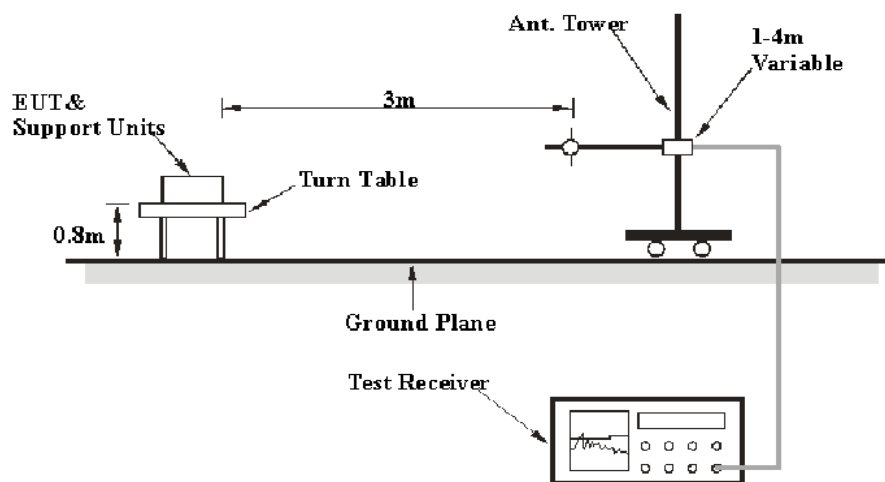
FCC §15.247 (d); §15.209; §15.205;

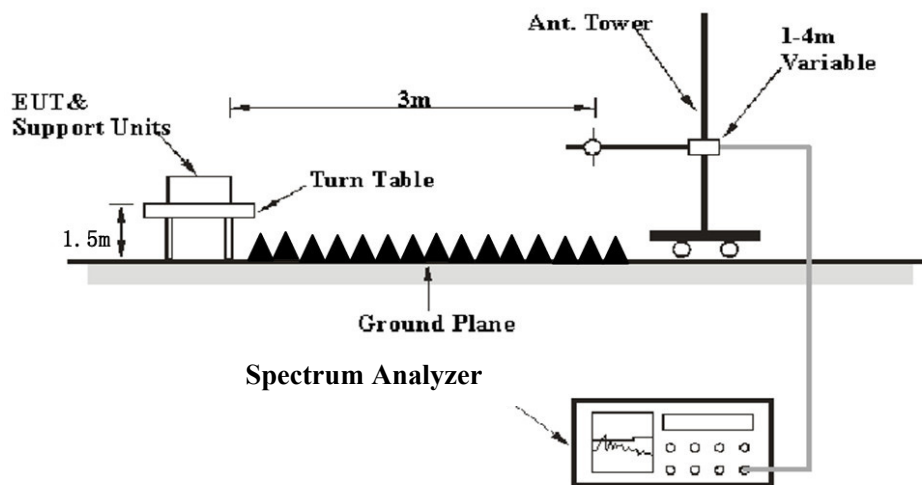
### EUT Setup

9 kHz-30MHz:



30MHz-1GHz:



**Above 1GHz:**

The radiated emission tests were performed in the 3meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.205, FCC 15.209, FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

**EMI Test Receiver & Spectrum Analyzer Setup**

The system was investigated from 9 kHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

9 kHz-1GHz:

| Frequency Range   | RBW     | Video B/W | IF B/W  | Measurement |
|-------------------|---------|-----------|---------|-------------|
| 9 kHz – 150 kHz   | /       | /         | 200 Hz  | QP          |
|                   | 300 Hz  | 1 kHz     | /       | PK          |
| 150 kHz – 30 MHz  | /       | /         | 9 kHz   | QP          |
|                   | 10 kHz  | 30 kHz    | /       | PK          |
| 30 MHz – 1000 MHz | /       | /         | 120 kHz | QP          |
|                   | 100 kHz | 300 kHz   | /       | PK          |

1-25 GHz:

| Measurement | Duty cycle | RBW  | Video B/W |
|-------------|------------|------|-----------|
| PK          | Any        | 1MHz | 3 MHz     |
| AV          | >98%       | 1MHz | 10 Hz     |
|             | <98%       | 1MHz | ≥1/Ton    |

Note: Ton is minimum transmission duration

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

### Test Procedure

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

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

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

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

### Factor & Over Limit/Margin Calculation

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

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

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

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

### Test Data

#### Environmental Conditions

|                           |            |
|---------------------------|------------|
| <b>Temperature:</b>       | 22~25.6 °C |
| <b>Relative Humidity:</b> | 50~54 %    |
| <b>ATM Pressure:</b>      | 101 kPa    |

*The testing was performed by Anson Su on 2024-08-27 for below 1GHz and Sadow Tan on 2024-08-27 for above 1GHz.*

*EUT operation mode: Transmitting*

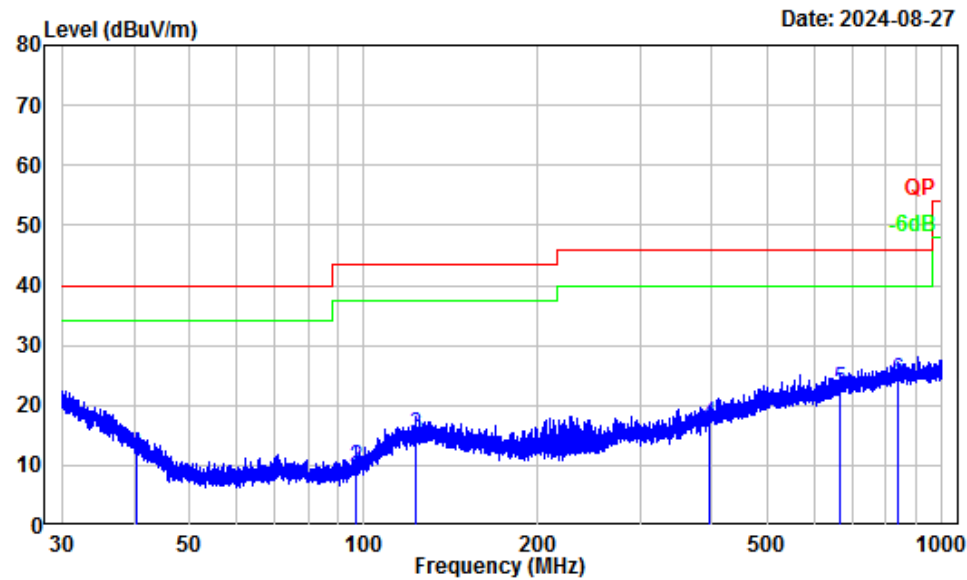
*Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded.*

**9 kHz-30MHz** (*Maximum output power mode, BLE 1M, Low channel*):

*The amplitude of spurious emissions attenuated more than 20 dB below the limit was not recorded.*

30MHz-1GHz: (Maximum output power mode, BLE 1M, Low channel)

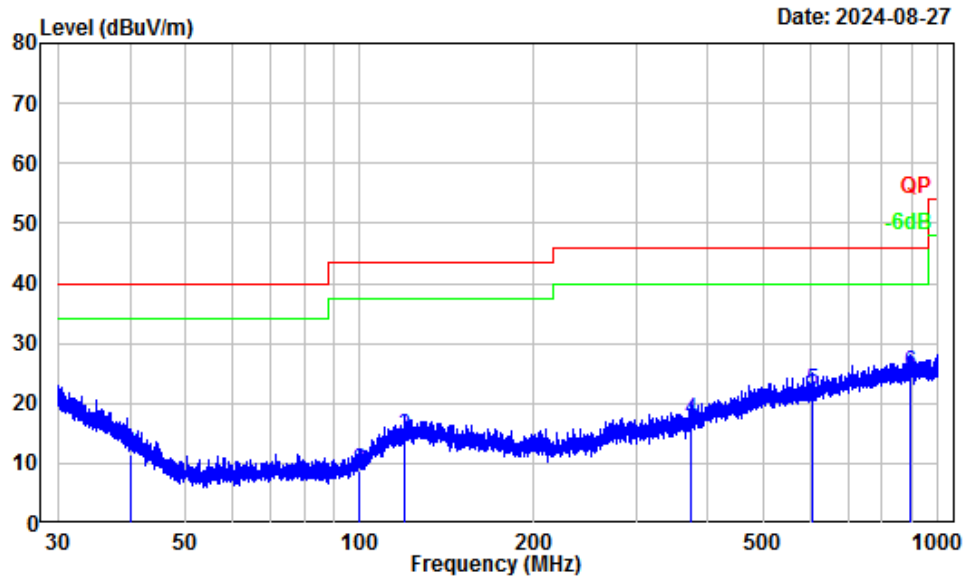
Horizontal



Site : Chamber A  
Condition : 3m Horizontal  
Project Number: 2401W49073E-RF  
Test Mode : Transmitting  
Tester : Anson Su

| Freq Factor |               | Read Level | Level  | Limit Line | Over Limit | Remark |
|-------------|---------------|------------|--------|------------|------------|--------|
| MHz         | dB/m          | dBuV       | dBuV/m | dBuV/m     | dB         |        |
| 1           | 40.51 -12.72  | 24.05      | 11.33  | 40.00      | -28.67     | QP     |
| 2           | 96.61 -16.90  | 26.47      | 9.57   | 43.50      | -33.93     | QP     |
| 3           | 123.27 -11.14 | 26.16      | 15.02  | 43.50      | -28.48     | QP     |
| 4           | 395.89 -8.60  | 25.54      | 16.94  | 46.00      | -29.06     | QP     |
| 5           | 665.51 -3.87  | 26.39      | 22.52  | 46.00      | -23.48     | QP     |
| 6           | 842.13 -1.78  | 25.95      | 24.17  | 46.00      | -21.83     | QP     |

## Vertical



Site : Chamber A  
Condition : 3m Vertical  
Project Number: 2401W49073E-RF  
Test Mode : Transmitting  
Tester : Anson Su

| Freq Factor |        | Read Level | Limit Level | Over Limit | Remark          |
|-------------|--------|------------|-------------|------------|-----------------|
| MHz         | dB/m   | dBuV       | dBuV/m      | dBuV/m     | dB              |
| 1           | 40.24  | -12.54     | 24.14       | 11.60      | 40.00 -28.40 QP |
| 2           | 99.70  | -15.98     | 24.84       | 8.86       | 43.50 -34.64 QP |
| 3           | 119.38 | -11.52     | 26.05       | 14.53      | 43.50 -28.97 QP |
| 4           | 374.62 | -9.31      | 26.51       | 17.20      | 46.00 -28.80 QP |
| 5           | 608.32 | -5.20      | 27.38       | 22.18      | 46.00 -23.82 QP |
| 6           | 898.57 | -1.31      | 26.36       | 25.05      | 46.00 -20.95 QP |

**1-25 GHz:**

| Frequency<br>(MHz)     | Receiver          |       | Polar<br>(H/V) | Factor<br>(dB/m) | Corrected<br>Amplitude<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) |
|------------------------|-------------------|-------|----------------|------------------|------------------------------------|-------------------|----------------|
|                        | Reading<br>(dBμV) | PK/AV |                |                  |                                    |                   |                |
| BLE 1M                 |                   |       |                |                  |                                    |                   |                |
| Low Channel 2402MHz    |                   |       |                |                  |                                    |                   |                |
| 2389.94                | 54.27             | PK    | H              | -2.93            | 51.34                              | 74                | -22.66         |
| 2389.94                | 41.62             | AV    | H              | -2.93            | 38.69                              | 54                | -15.31         |
| 2386.70                | 54.25             | PK    | V              | -2.93            | 51.32                              | 74                | -22.68         |
| 2386.70                | 44.72             | AV    | V              | -2.93            | 41.79                              | 54                | -12.21         |
| 4804.00                | 45.99             | PK    | H              | 1.69             | 47.68                              | 74                | -26.32         |
| 4804.00                | 33.43             | AV    | H              | 1.69             | 35.12                              | 54                | -18.88         |
| 4804.00                | 45.31             | PK    | V              | 1.69             | 47.00                              | 74                | -27.00         |
| 4804.00                | 32.00             | AV    | V              | 1.69             | 33.69                              | 54                | -20.31         |
| Middle Channel 2440MHz |                   |       |                |                  |                                    |                   |                |
| 4880.00                | 45.91             | PK    | H              | 1.69             | 47.60                              | 74                | -26.40         |
| 4880.00                | 33.37             | AV    | H              | 1.69             | 35.06                              | 54                | -18.94         |
| 4880.00                | 45.16             | PK    | V              | 1.69             | 46.85                              | 74                | -27.15         |
| 4880.00                | 32.68             | AV    | V              | 1.69             | 34.37                              | 54                | -19.63         |
| High Channel 2480MHz   |                   |       |                |                  |                                    |                   |                |
| 2483.69                | 66.77             | PK    | H              | -3.17            | 63.60                              | 74                | -10.40         |
| 2483.69                | 47.27             | AV    | H              | -3.17            | 44.10                              | 54                | -9.90          |
| 2483.53                | 60.98             | PK    | V              | -3.17            | 57.81                              | 74                | -16.19         |
| 2483.53                | 44.52             | AV    | V              | -3.17            | 41.35                              | 54                | -12.65         |
| 4960.00                | 46.16             | PK    | H              | 2.77             | 48.93                              | 74                | -25.07         |
| 4960.00                | 33.67             | AV    | H              | 2.77             | 36.44                              | 54                | -17.56         |
| 4960.00                | 45.73             | PK    | V              | 2.77             | 48.50                              | 74                | -25.50         |
| 4960.00                | 33.14             | AV    | V              | 2.77             | 35.91                              | 54                | -18.09         |

| Frequency<br>(MHz)     | Receiver          |       | Polar<br>(H/V) | Factor<br>(dB/m) | Corrected<br>Amplitude<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) |
|------------------------|-------------------|-------|----------------|------------------|------------------------------------|-------------------|----------------|
|                        | Reading<br>(dBμV) | PK/AV |                |                  |                                    |                   |                |
| BLE 2M                 |                   |       |                |                  |                                    |                   |                |
| Low Channel 2402MHz    |                   |       |                |                  |                                    |                   |                |
| 2389.53                | 54.49             | PK    | H              | -2.93            | 51.56                              | 74                | -22.44         |
| 2389.53                | 41.14             | AV    | H              | -2.93            | 38.21                              | 54                | -15.79         |
| 2388.67                | 54.12             | PK    | V              | -2.93            | 51.19                              | 74                | -22.81         |
| 2388.67                | 44.44             | AV    | V              | -2.93            | 41.51                              | 54                | -12.49         |
| 4804.00                | 45.70             | PK    | H              | 1.69             | 47.39                              | 74                | -26.61         |
| 4804.00                | 33.63             | AV    | H              | 1.69             | 35.32                              | 54                | -18.68         |
| 4804.00                | 44.77             | PK    | V              | 1.69             | 46.46                              | 74                | -27.54         |
| 4804.00                | 33.61             | AV    | V              | 1.69             | 35.30                              | 54                | -18.70         |
| Middle Channel 2440MHz |                   |       |                |                  |                                    |                   |                |
| 4880.00                | 45.88             | PK    | H              | 1.69             | 47.57                              | 74                | -26.43         |
| 4880.00                | 33.62             | AV    | H              | 1.69             | 35.31                              | 54                | -18.69         |
| 4880.00                | 45.50             | PK    | V              | 1.69             | 47.19                              | 74                | -26.81         |
| 4880.00                | 33.39             | AV    | V              | 1.69             | 35.08                              | 54                | -18.92         |
| High Channel 2480MHz   |                   |       |                |                  |                                    |                   |                |
| 2483.63                | 66.10             | PK    | H              | -3.17            | 62.93                              | 74                | -11.07         |
| 2483.63                | 53.36             | AV    | H              | -3.17            | 50.19                              | 54                | -3.81          |
| 2483.58                | 60.46             | PK    | V              | -3.17            | 57.29                              | 74                | -16.71         |
| 2483.58                | 49.18             | AV    | V              | -3.17            | 46.01                              | 54                | -7.99          |
| 4960.00                | 46.53             | PK    | H              | 2.77             | 49.30                              | 74                | -24.70         |
| 4960.00                | 33.92             | AV    | H              | 2.77             | 36.69                              | 54                | -17.31         |
| 4960.00                | 46.11             | PK    | V              | 2.77             | 48.88                              | 74                | -25.12         |
| 4960.00                | 33.68             | AV    | V              | 2.77             | 36.45                              | 54                | -17.55         |

**Note:**

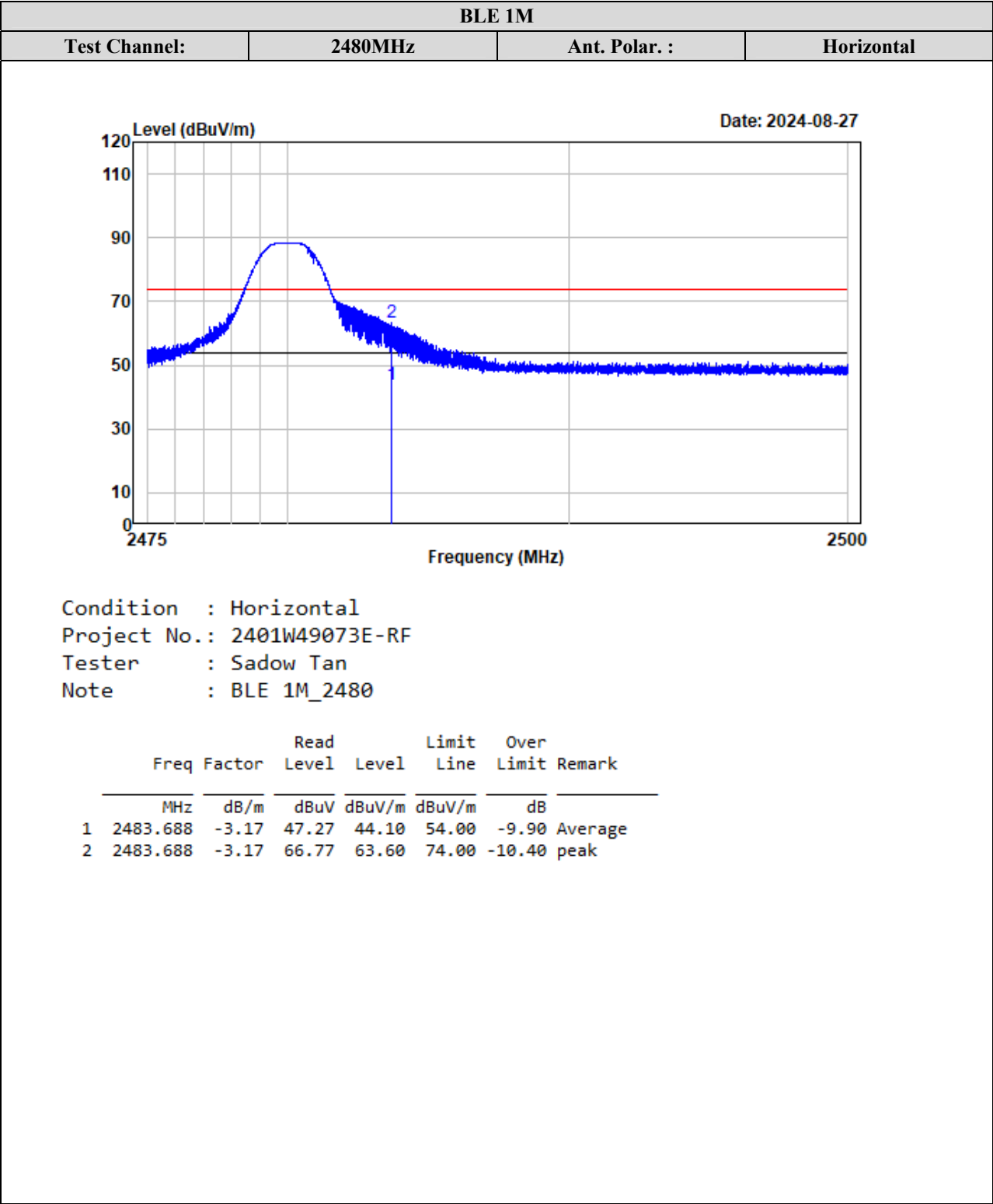
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

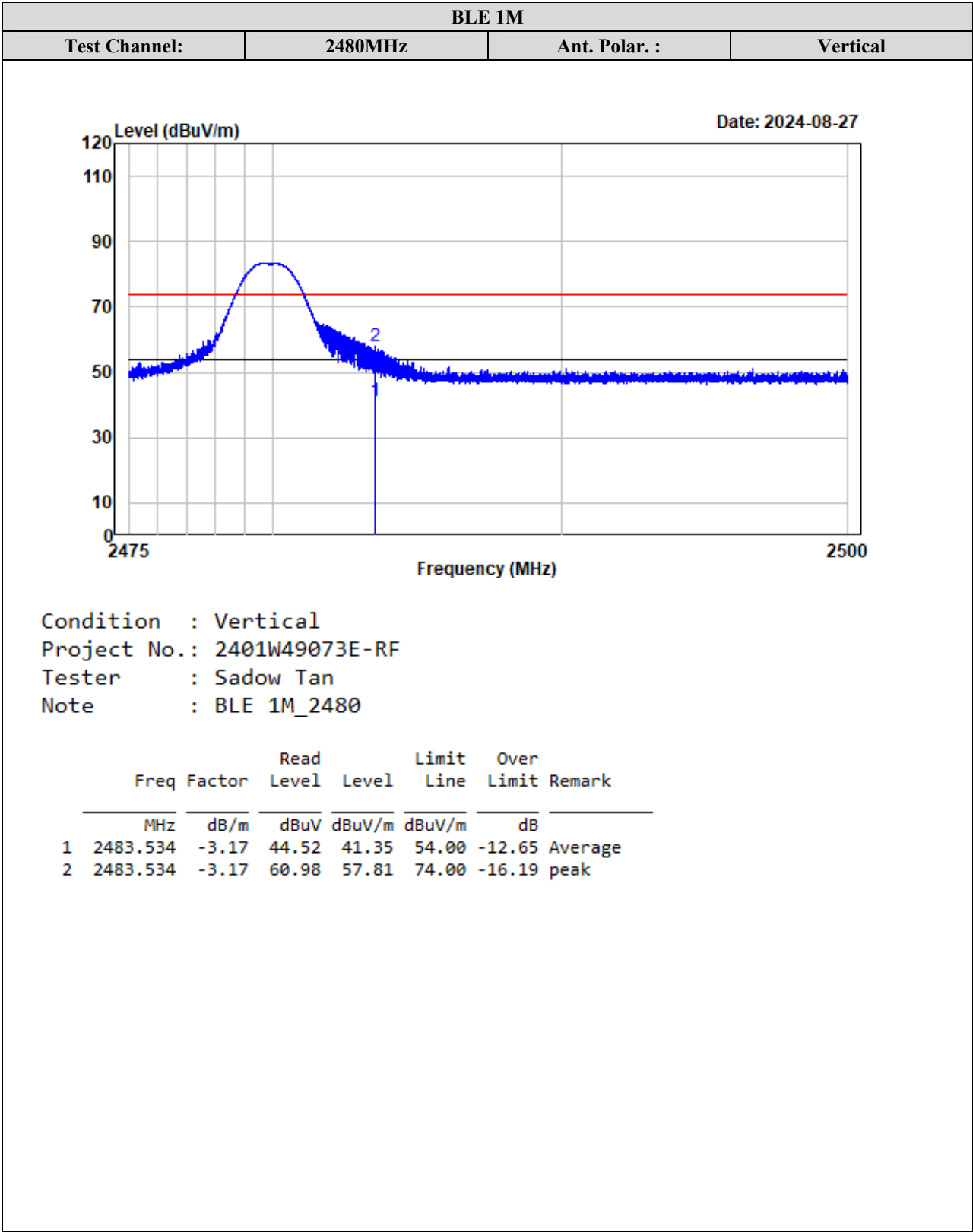
Corrected Amplitude/Level = Corrected Factor + Reading

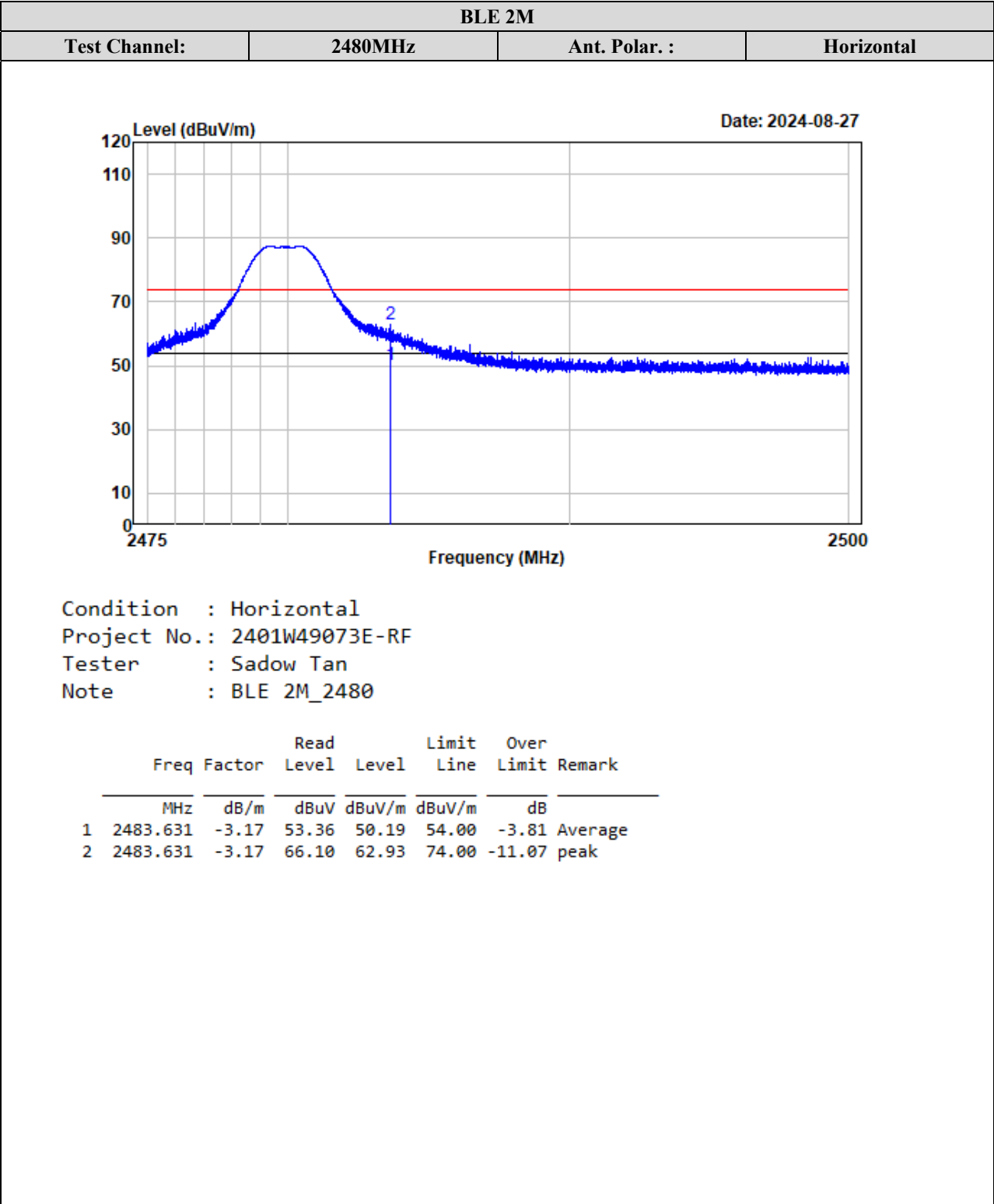
Margin = Corrected Amplitude/Level - Limit

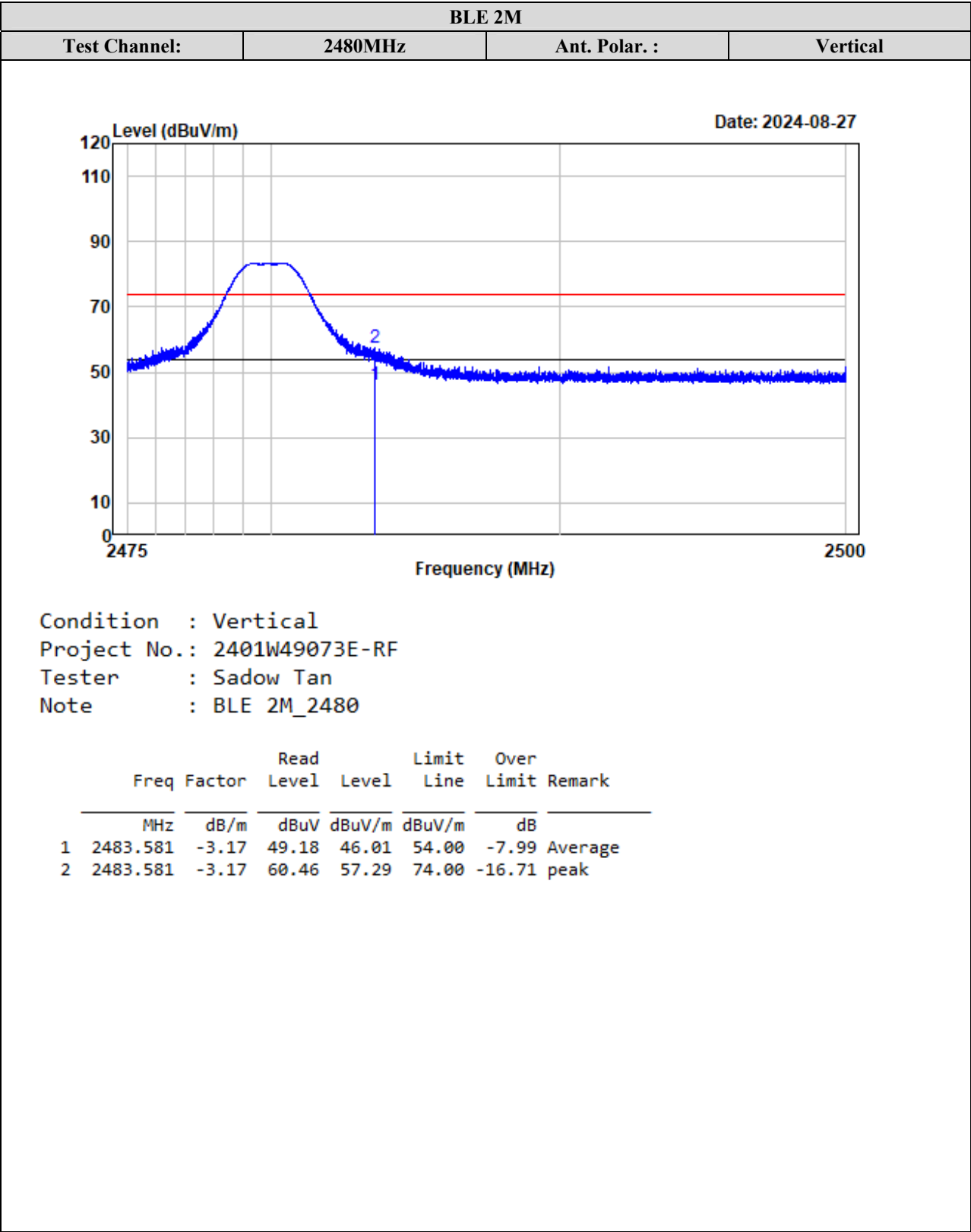
The other spurious emission which is in the noise floor level was not recorded.

Test plots for Band Edge Measurements (Radiated):

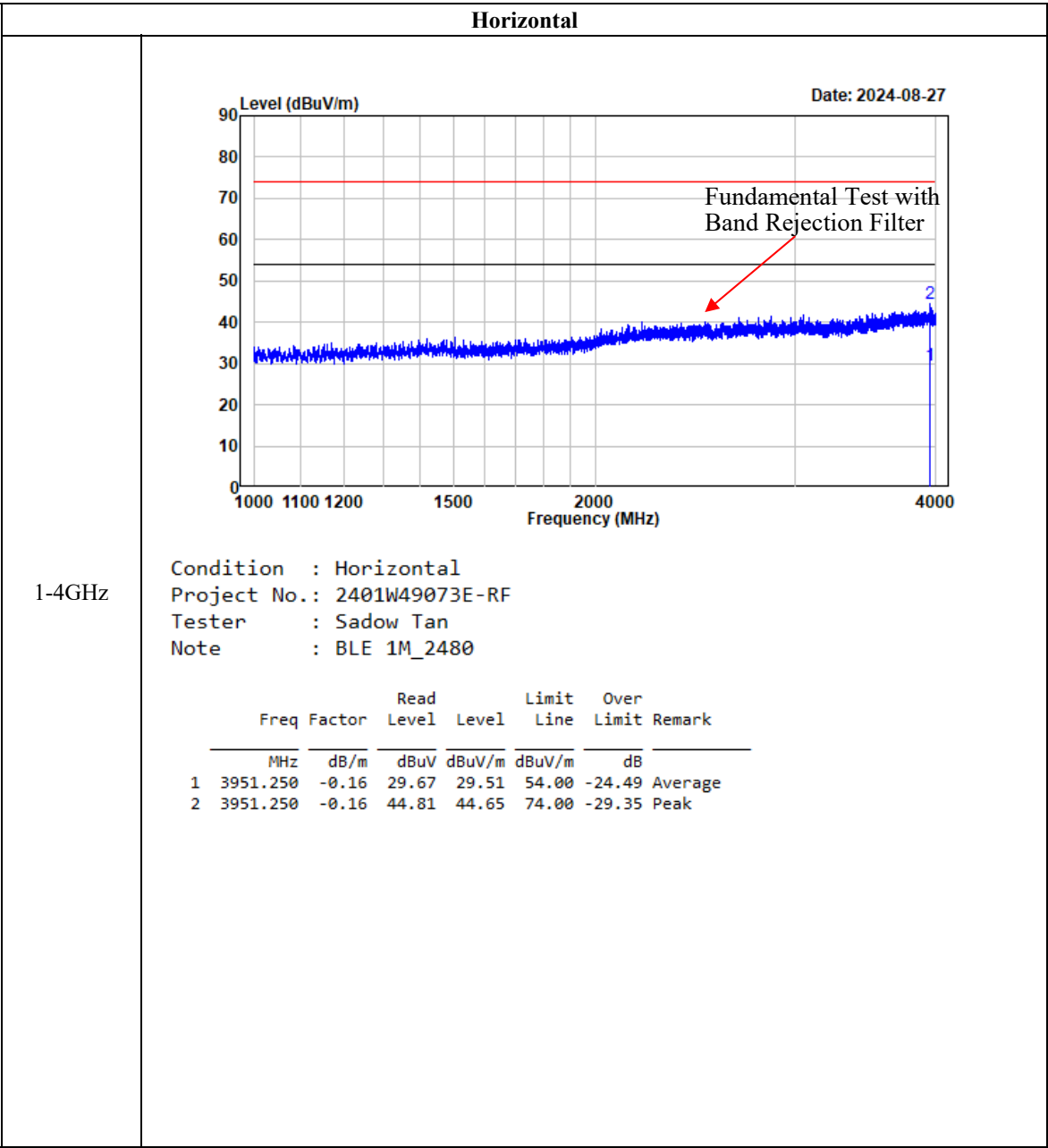


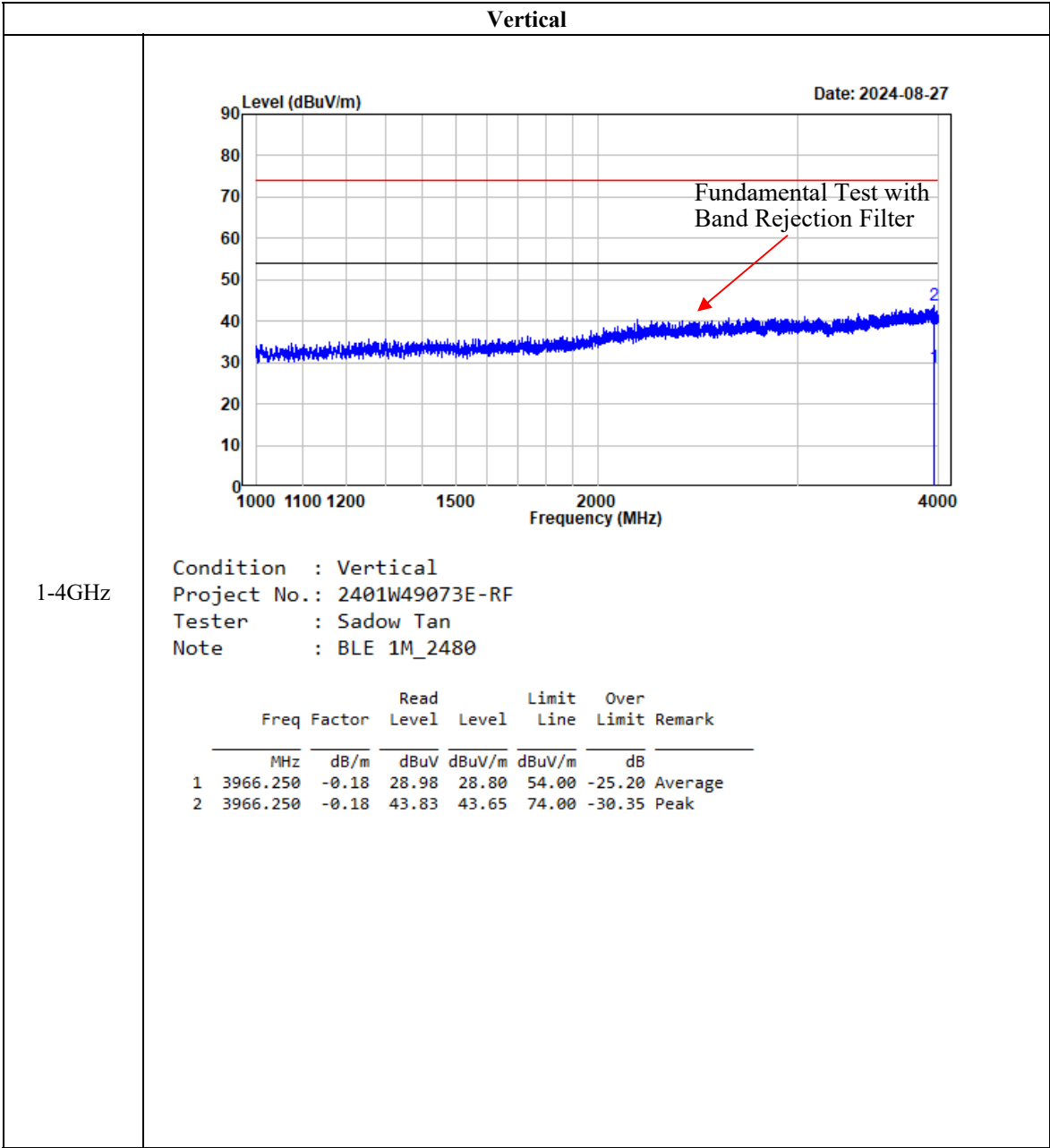


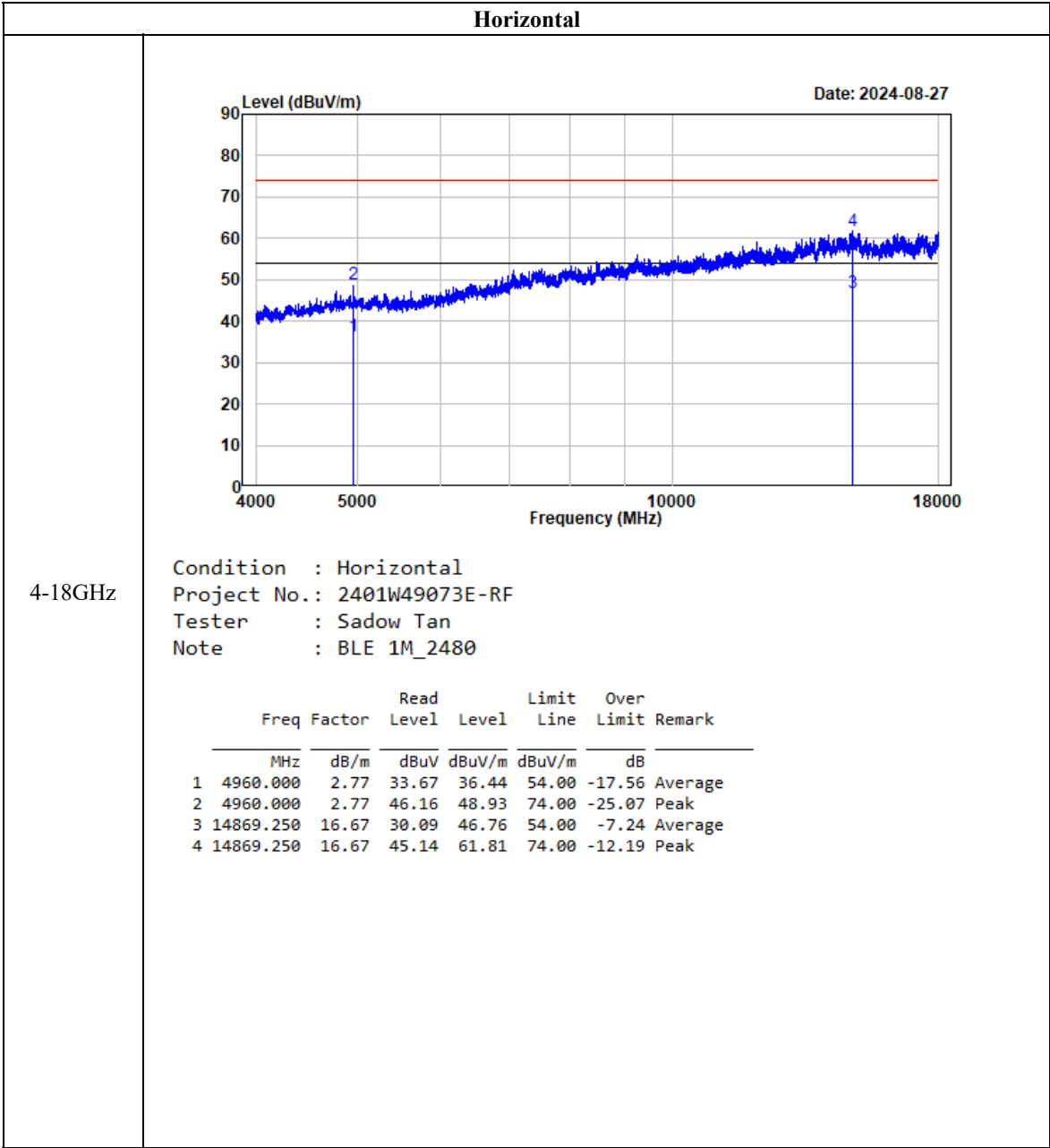


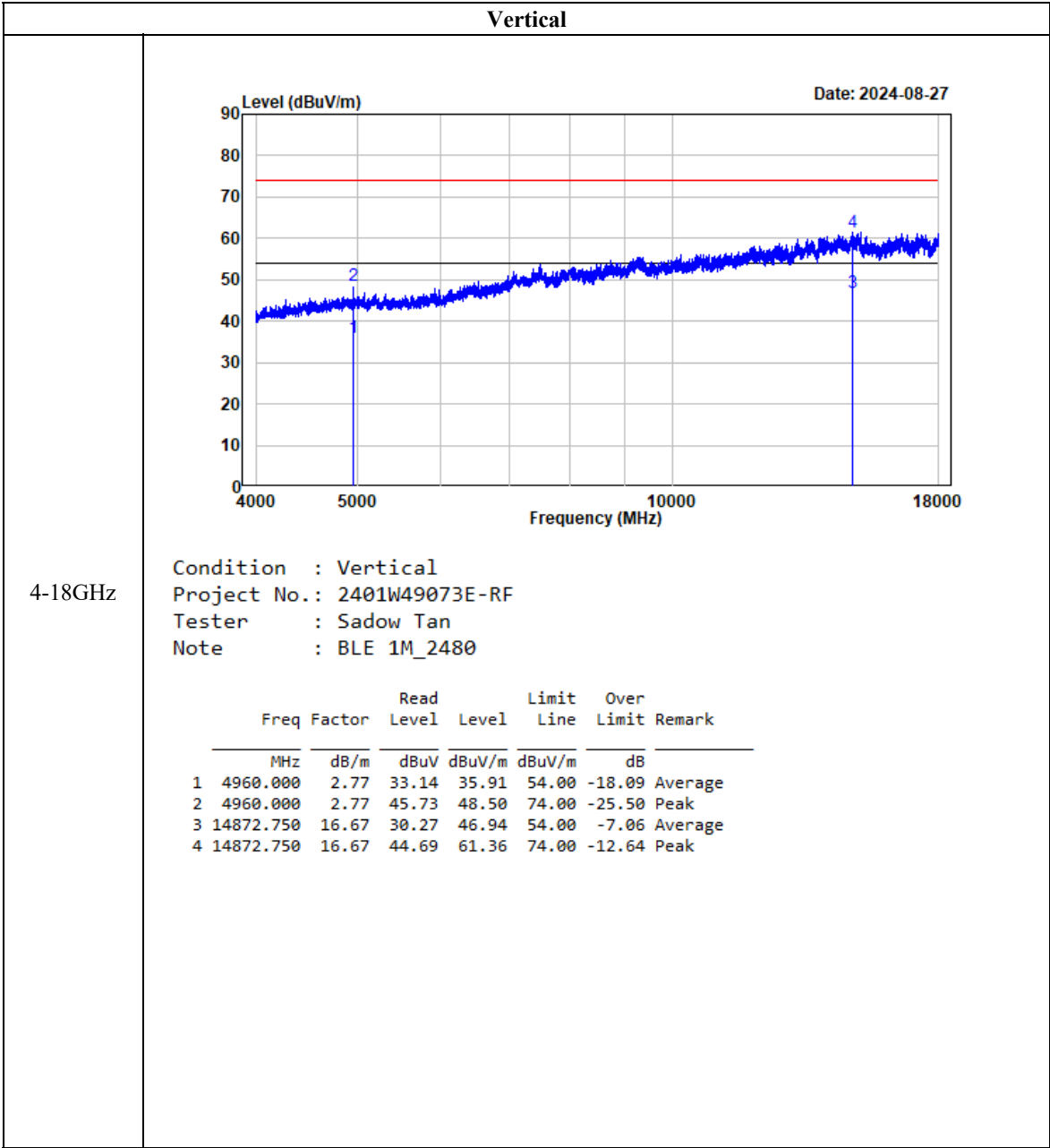


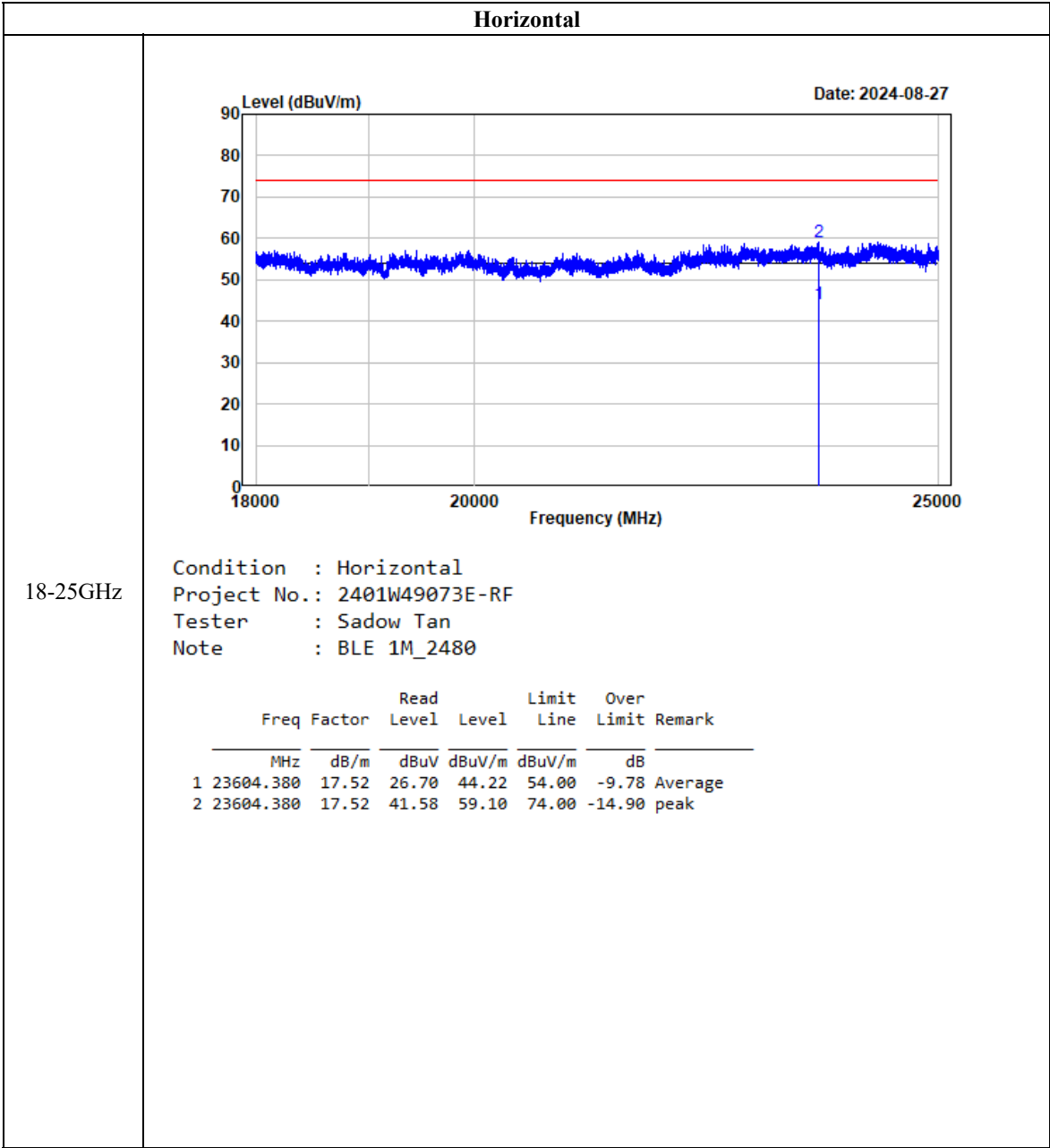
Test plots for Harmonic and Emissions Measurements:

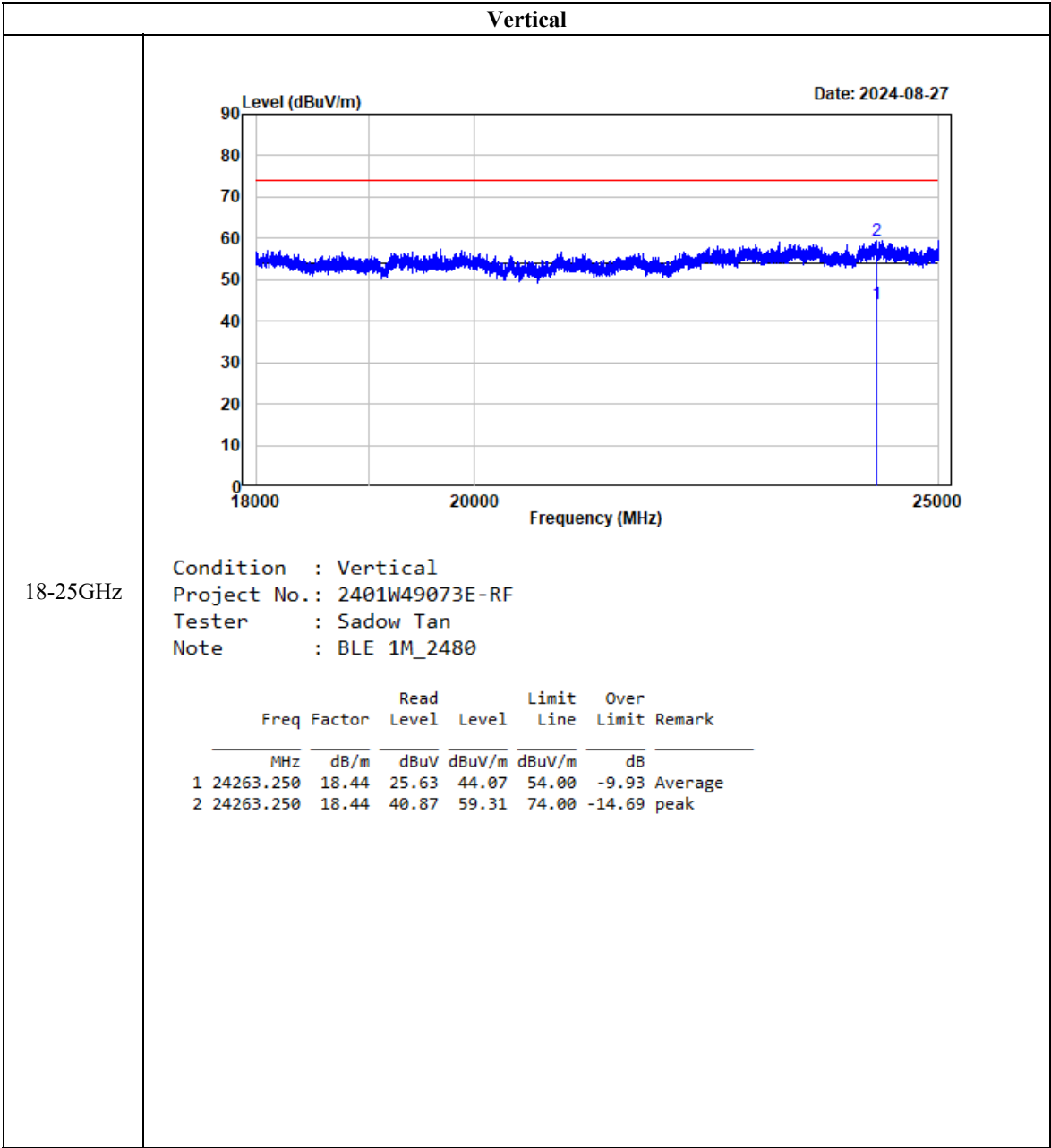












## FCC §15.247(a) (2) - 6 dB EMISSION BANDWIDTH

### Standard Applicable

According to FCC §15.247(a) (2)

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

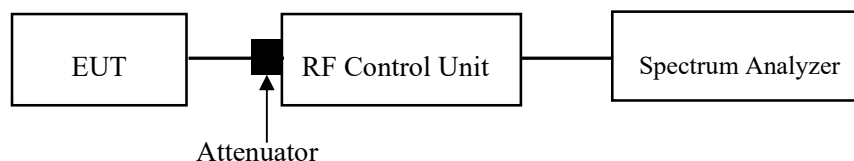
### Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.8.1 & Clause 6.9.3

- a. Set RBW = 100 kHz.
- b. Set the VBW  $\geq [3 \times \text{RBW}]$ .
- c. Detector = peak.
- d. Trace mode = max hold.
- e. Sweep = auto couple.
- f. Allow the trace to stabilize.
- g. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. Procedure as below

- a. The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- b. The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
- c. Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than  $[10 \log (\text{OBW}/\text{RBW})]$  below the reference level.
- d. Step a) through step c) might require iteration to adjust within the specified range.
- e. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- f. Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
- g. If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
- h. The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).



Test Data

Environmental Conditions

|                    |         |
|--------------------|---------|
| Temperature:       | 25 °C   |
| Relative Humidity: | 55 %    |
| ATM Pressure:      | 101 kPa |

*The testing was performed by Navilite Cai from 2024-08-27 to 2024-08-28.*

*EUT operation mode: Transmitting*

***Test Result: Compliant. Please refer to the Appendix.***

## FCC §15.247(b) (3) - PEAK OUTPUT POWER MEASUREMENT

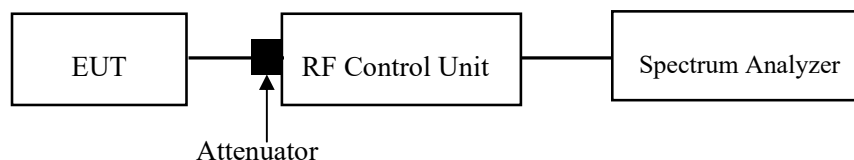
### Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

### Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.9.1.1

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.
4. Set the RBW  $\geq$  DTS bandwidth.
5. Set the VBW  $\geq [3 \times \text{RBW}]$ .
6. Set span  $\geq [3 \times \text{RBW}]$ .
7. Sweep time = auto couple.
8. Detector = peak.
9. Trace mode = max hold.
10. Allow the trace to stabilize.
11. Use peak marker function to determine the peak amplitude level.



### Test Data

#### Environmental Conditions

|                    |         |
|--------------------|---------|
| Temperature:       | 25 °C   |
| Relative Humidity: | 55 %    |
| ATM Pressure:      | 101 kPa |

*The testing was performed by Navilite Cai on 2024-08-27.*

*EUT operation mode: Transmitting*

***Test Result: Compliant. Please refer to the Appendix.***

## FCC §15.247(e) - POWER SPECTRAL DENSITY

### Applicable Standard

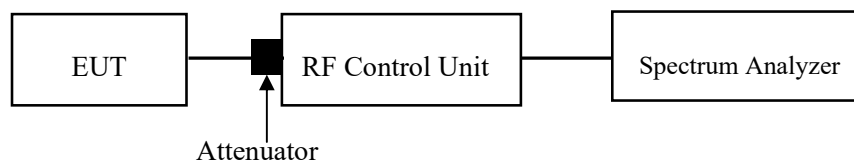
According to FCC §15.247(e):

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.10.2

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set analyzer center frequency to DTS channel center frequency
3. Set the span to 1.5 times the DTS bandwidth.
4. Set the RBW to:  $3\text{kHz} \leq \text{RBW} \leq 100\text{ kHz}$ .
5. Set the VBW  $\geq 3 \times \text{RBW}$ .
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum amplitude level within the RBW.
11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



### Test Data

#### Environmental Conditions

|                    |         |
|--------------------|---------|
| Temperature:       | 25 °C   |
| Relative Humidity: | 55 %    |
| ATM Pressure:      | 101 kPa |

*The testing was performed by Navilite Cai on 2024-08-27.*

*Test Mode: Transmitting*

***Test Result: Compliant. Please refer to the Appendix.***

## **FCC §15.247(d) - 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE**

### **Applicable Standard**

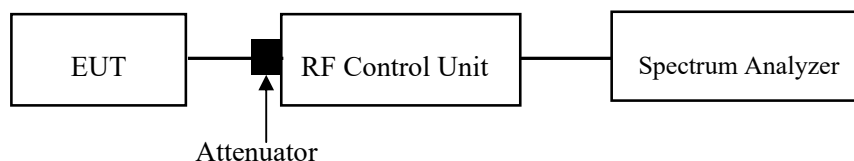
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required

### **Test Procedure**

Test Method: ANSI C63.10-2013 Clause 11.11

1. Set the RBW =100 kHz.
2. Set the VBW  $\geq 3 \times$  RBW.
3. Detector = peak
4. Sweep time = auto couple.
5. Trace mode=max hold
6. All trace to fully stabilize
7. Use the peak marker function to determine the maximum amplitude level.  
Ensure that amplitude of all unwanted emissions outside of the authorized frequency band(excluding restricted frequency bands) is attenuated by at least the minimum requirement specified in 11.11.  
Report the three highest emissions relative to the limit.



Test Data

Environmental Conditions

|                    |         |
|--------------------|---------|
| Temperature:       | 25 °C   |
| Relative Humidity: | 55 %    |
| ATM Pressure:      | 101 kPa |

*The testing was performed by Navilite Cai on 2024-08-27.*

*EUT operation mode: Transmitting*

***Test Result: Compliant. Please refer to the Appendix.***

## **EUT PHOTOGRAPHS**

Please refer to the attachment 2401W49073E-RF External photo and 2401W49073E-RF Internal photo.

## **TEST SETUP PHOTOGRAPHS**

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Please refer to the attachment 2401W49073E-RF Test Setup photo.

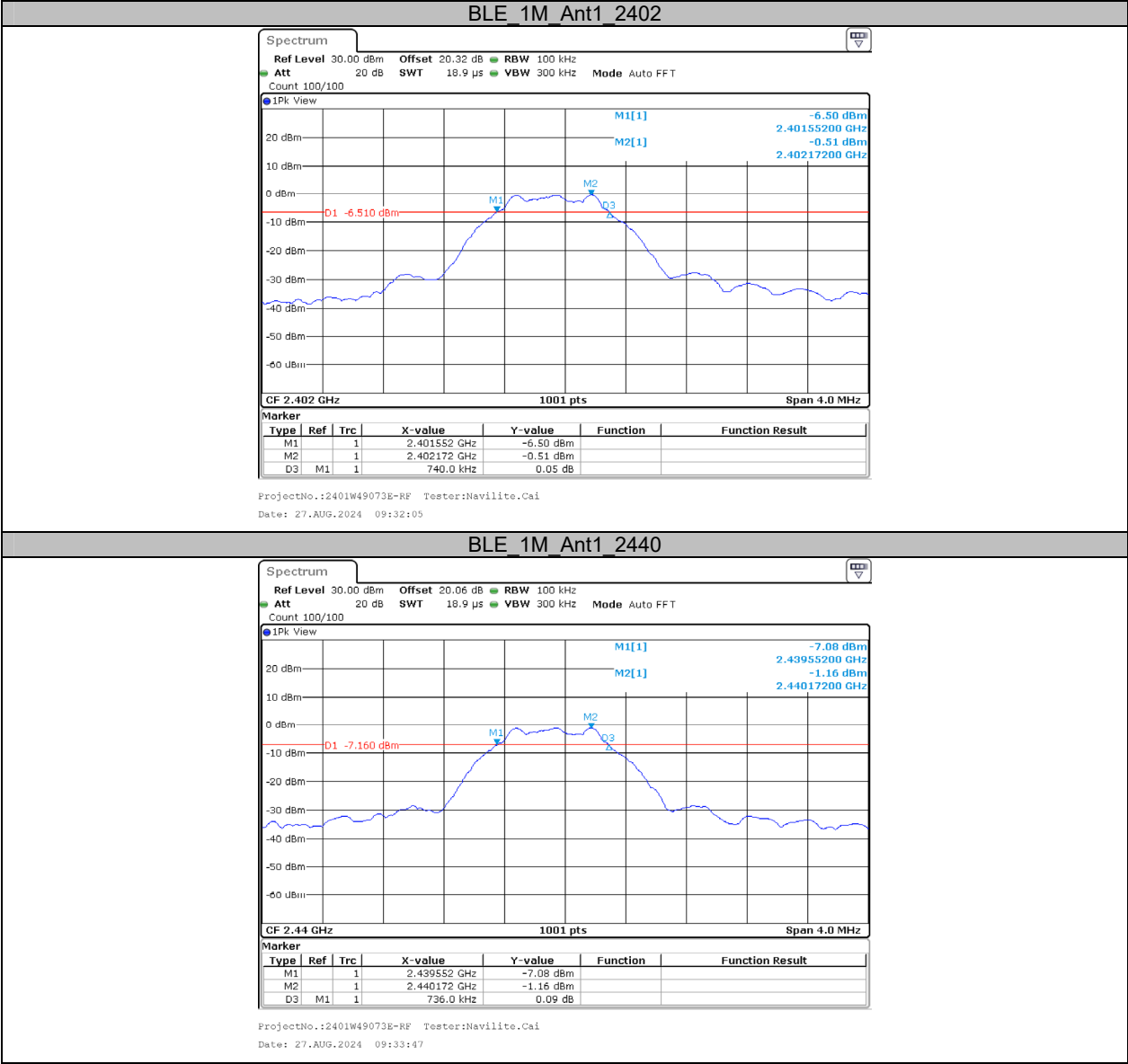
## APPENDIX

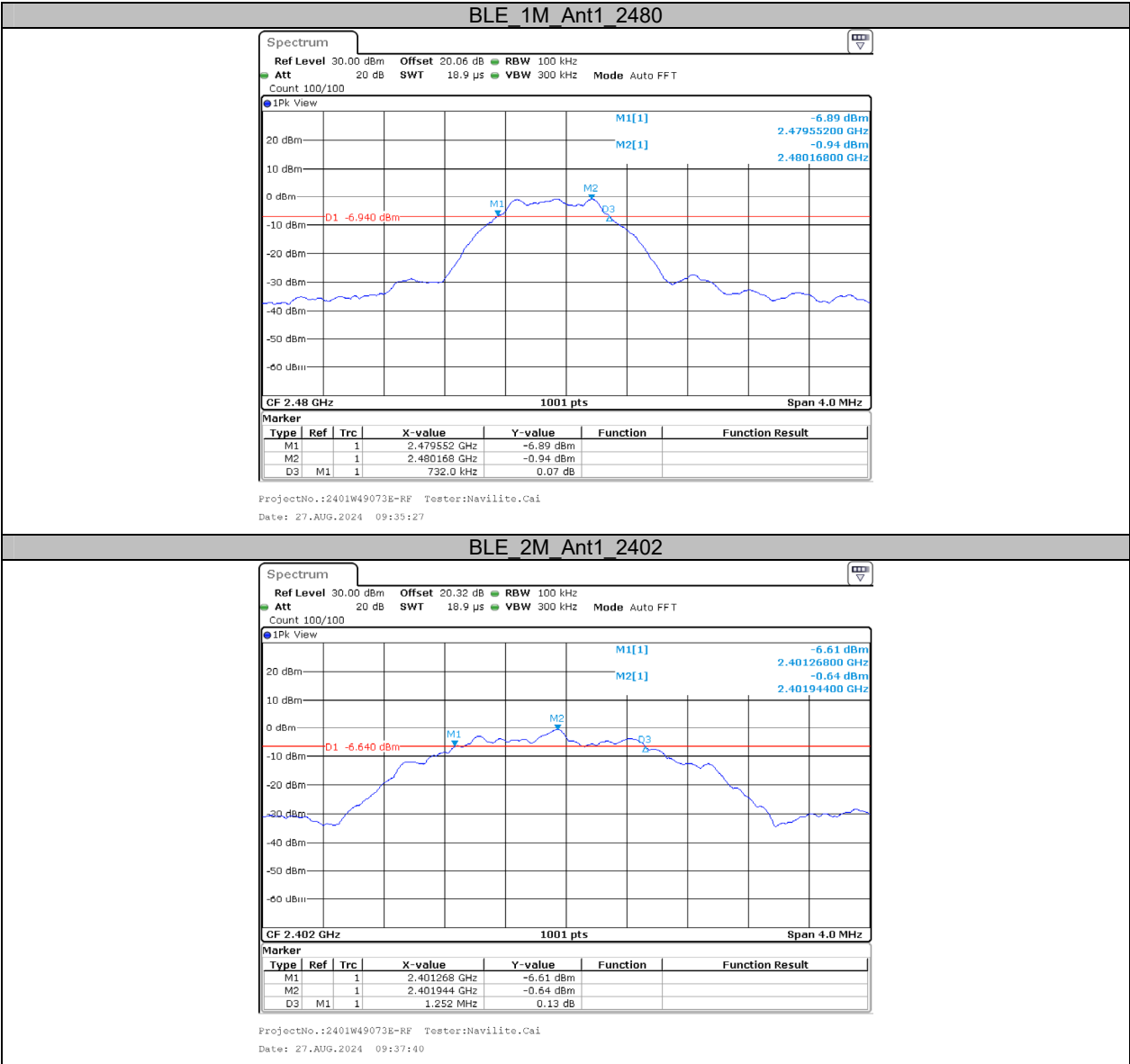
### Appendix A: DTS Bandwidth

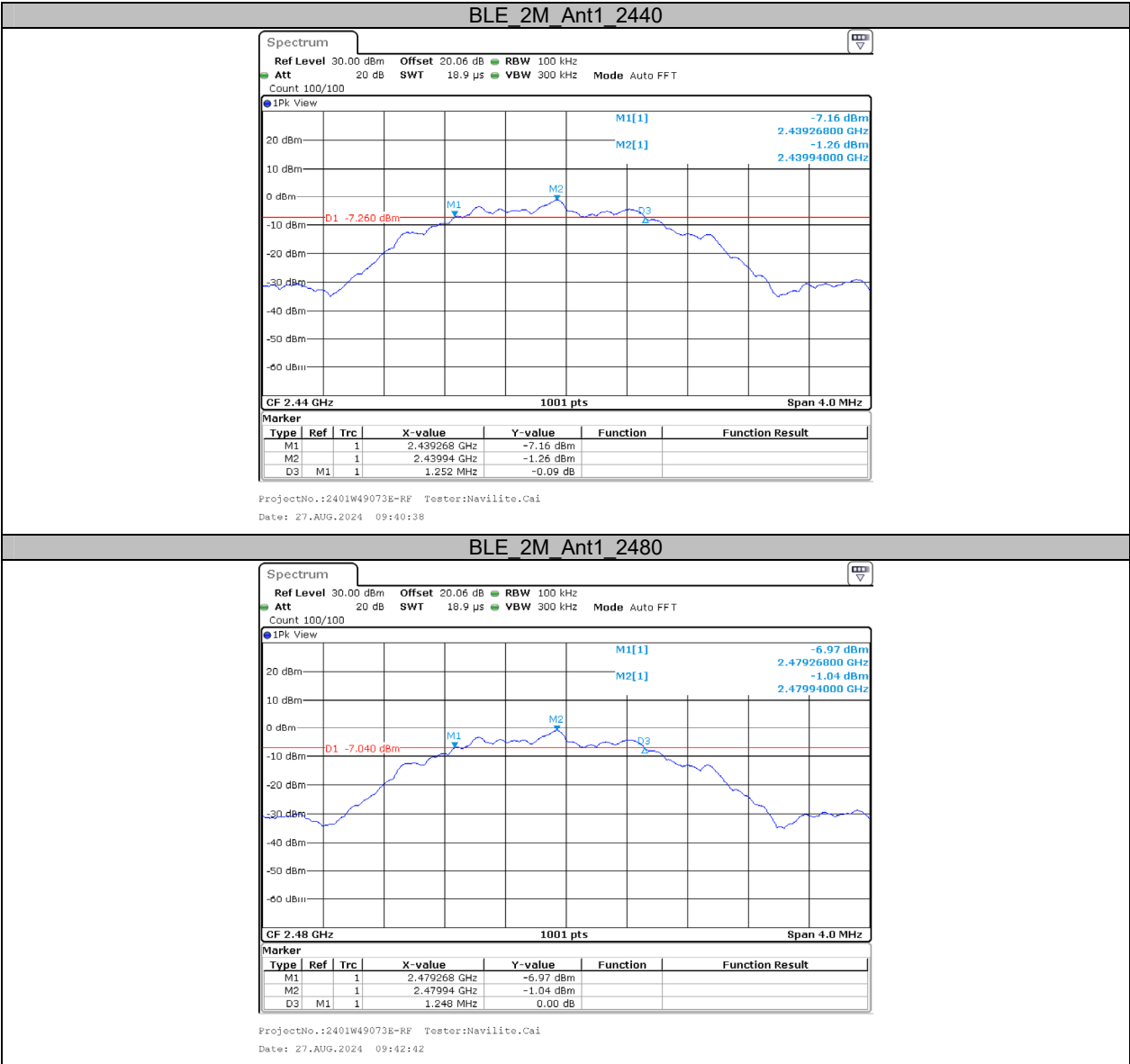
#### Test Result

| Test Mode | Antenna | Frequency[MHz] | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|-----------|---------|----------------|--------------|---------|---------|------------|---------|
| BLE_1M    | Ant1    | 2402           | 0.74         | 2401.55 | 2402.29 | 0.5        | PASS    |
|           |         | 2440           | 0.74         | 2439.55 | 2440.29 | 0.5        | PASS    |
|           |         | 2480           | 0.73         | 2479.55 | 2480.28 | 0.5        | PASS    |
| BLE_2M    | Ant1    | 2402           | 1.25         | 2401.27 | 2402.52 | 0.5        | PASS    |
|           |         | 2440           | 1.25         | 2439.27 | 2440.52 | 0.5        | PASS    |
|           |         | 2480           | 1.25         | 2479.27 | 2480.52 | 0.5        | PASS    |

Test Graphs



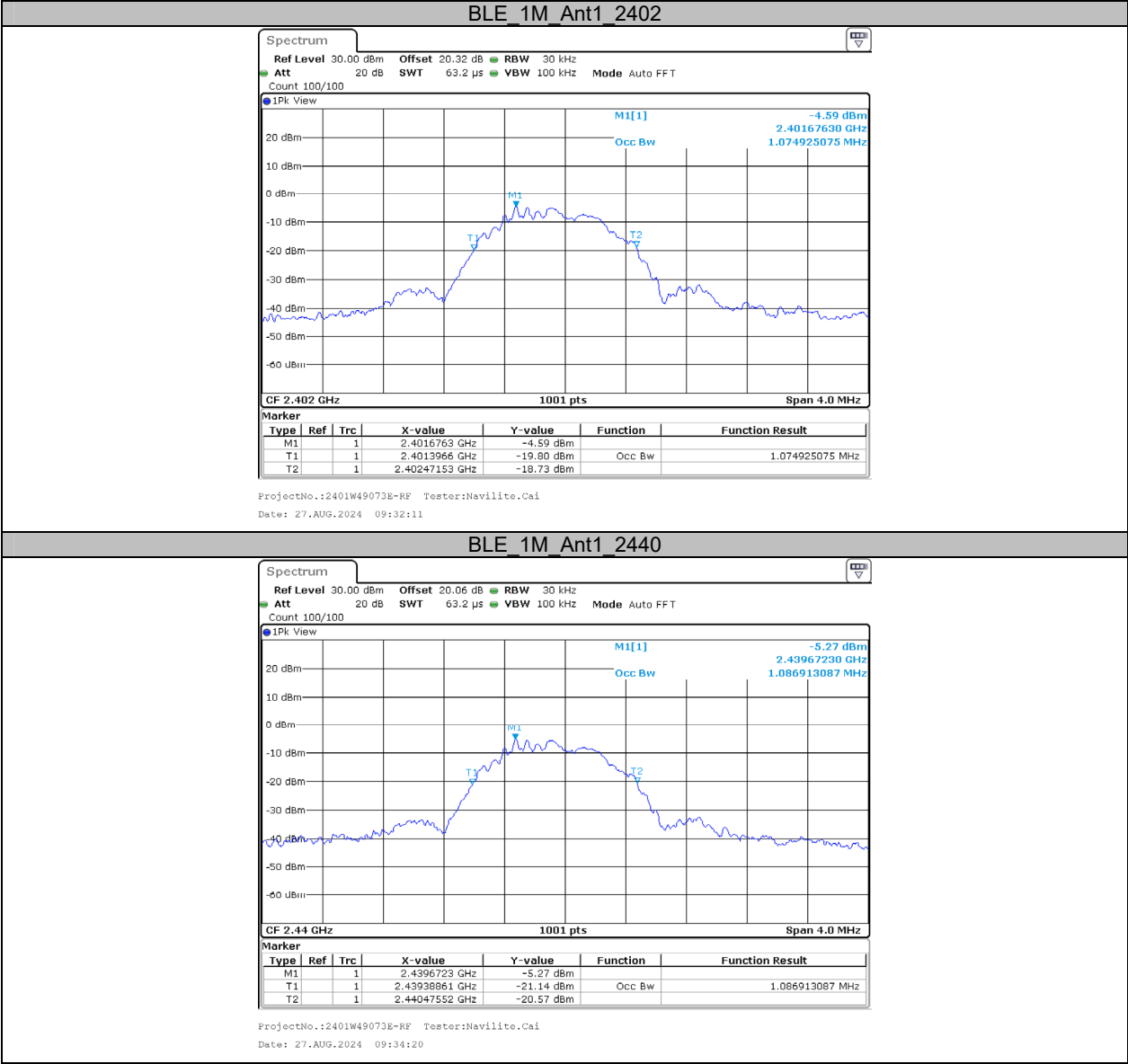


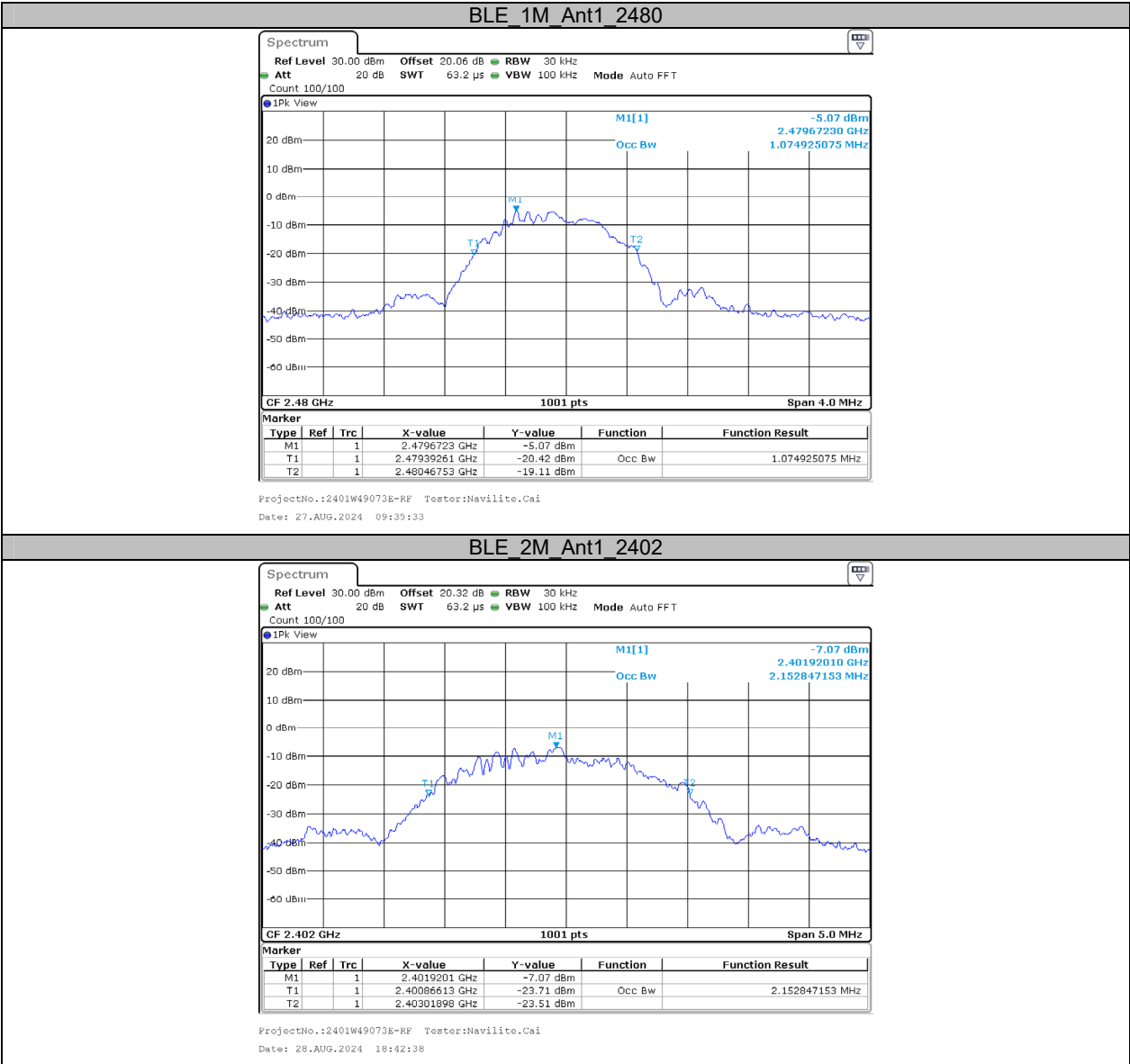


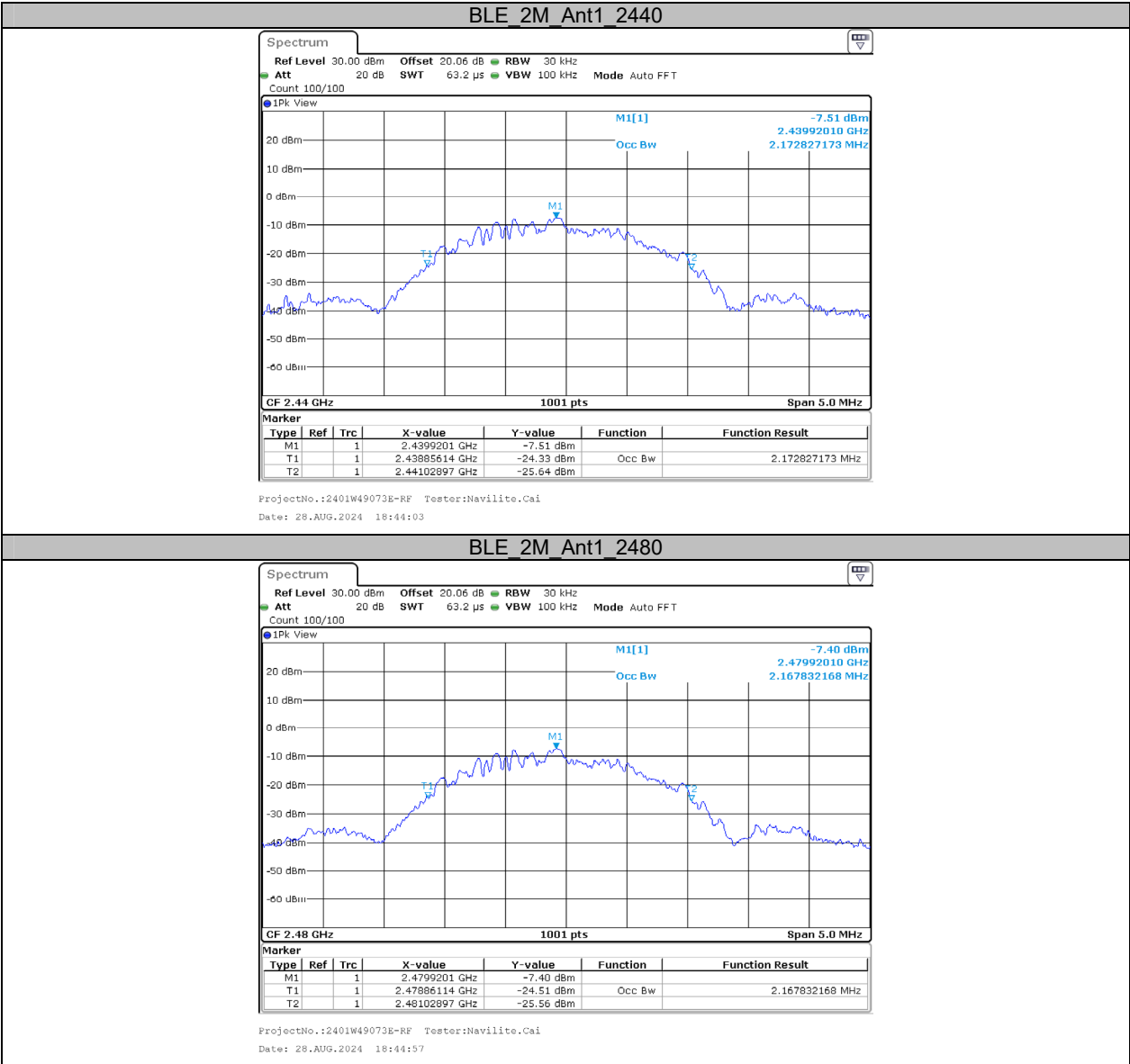
**Appendix B: Occupied Channel Bandwidth****Test Result**

| Test Mode | Antenna | Frequency[MHz] | OCB [MHz] | FL[MHz]   | FH[MHz]   | Limit[MHz] | Verdict |
|-----------|---------|----------------|-----------|-----------|-----------|------------|---------|
| BLE_1M    | Ant1    | 2402           | 1.075     | 2401.3966 | 2402.4715 | ---        | ---     |
|           |         | 2440           | 1.087     | 2439.3886 | 2440.4755 | ---        | ---     |
|           |         | 2480           | 1.075     | 2479.3926 | 2480.4675 | ---        | ---     |
| BLE_2M    | Ant1    | 2402           | 2.153     | 2400.8661 | 2403.0190 | ---        | ---     |
|           |         | 2440           | 2.173     | 2438.8561 | 2441.0290 | ---        | ---     |
|           |         | 2480           | 2.168     | 2478.8611 | 2481.0290 | ---        | ---     |

Test Graphs

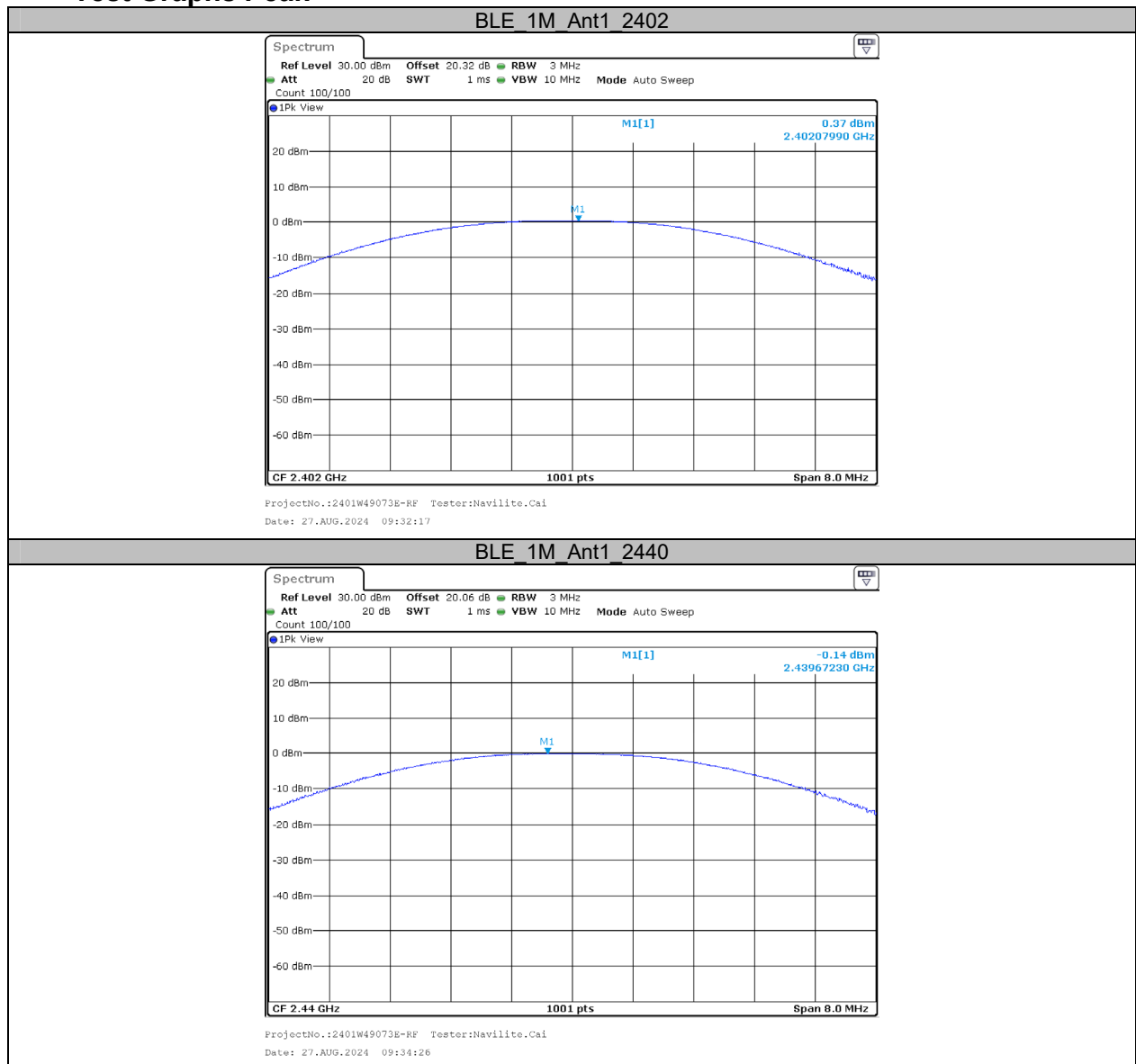


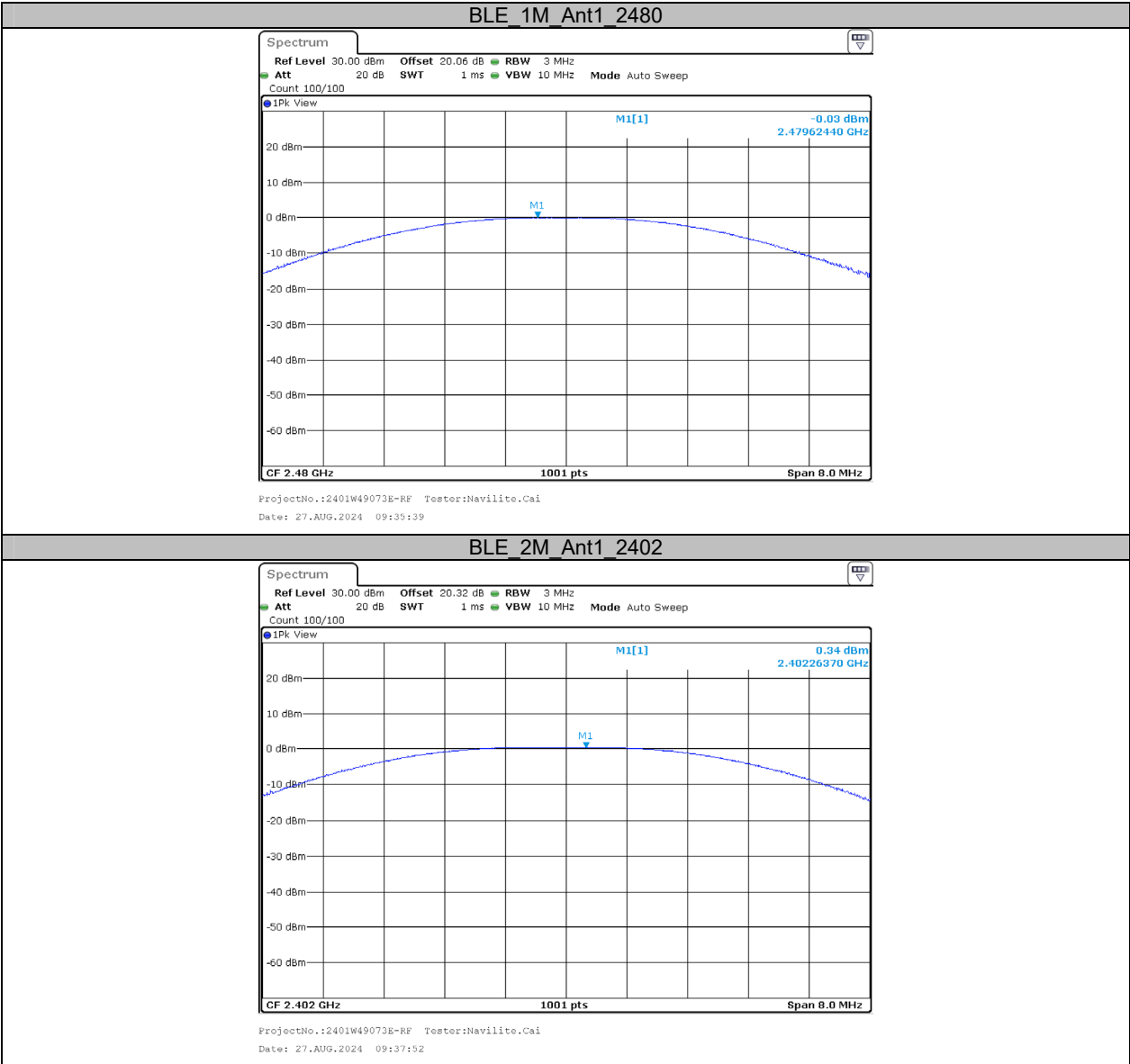


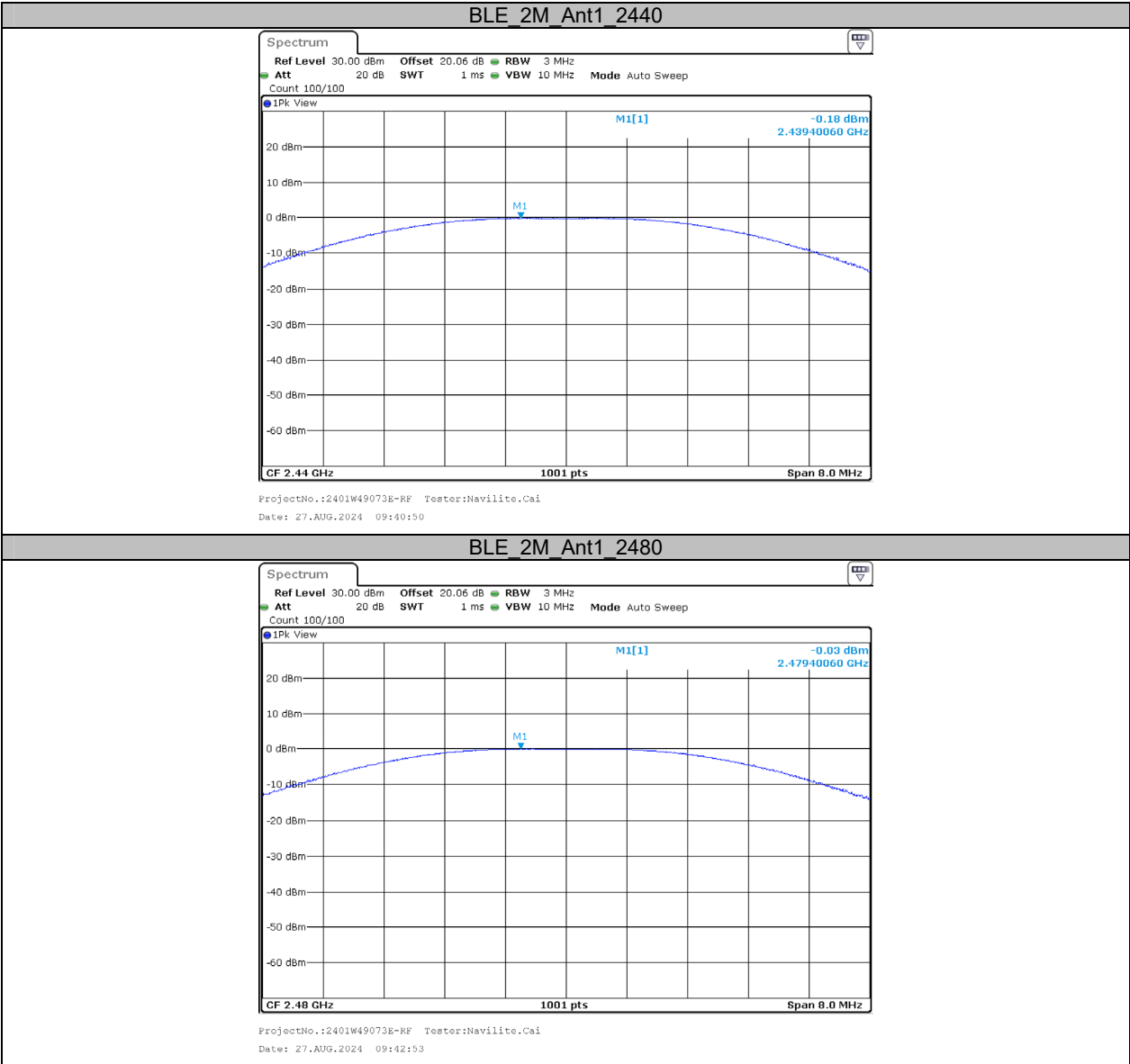


**Appendix C: Maximum Conducted Output Power****Test Result Peak**

| Test Mode | Antenna | Frequency[MHz] | Conducted Peak Power[dBm] | Conducted Limit[dBm] | EIRP[dBm] | EIRP Limit[dBm] | Verdict |
|-----------|---------|----------------|---------------------------|----------------------|-----------|-----------------|---------|
| BLE_1M    | Ant1    | 2402           | 0.37                      | ≤30                  | -5.21     | ≤36             | PASS    |
|           |         | 2440           | -0.14                     | ≤30                  | -5.72     | ≤36             | PASS    |
|           |         | 2480           | -0.03                     | ≤30                  | -5.61     | ≤36             | PASS    |
| BLE_2M    | Ant1    | 2402           | 0.34                      | ≤30                  | -5.24     | ≤36             | PASS    |
|           |         | 2440           | -0.18                     | ≤30                  | -5.76     | ≤36             | PASS    |
|           |         | 2480           | -0.03                     | ≤30                  | -5.61     | ≤36             | PASS    |

**Test Graphs Peak**

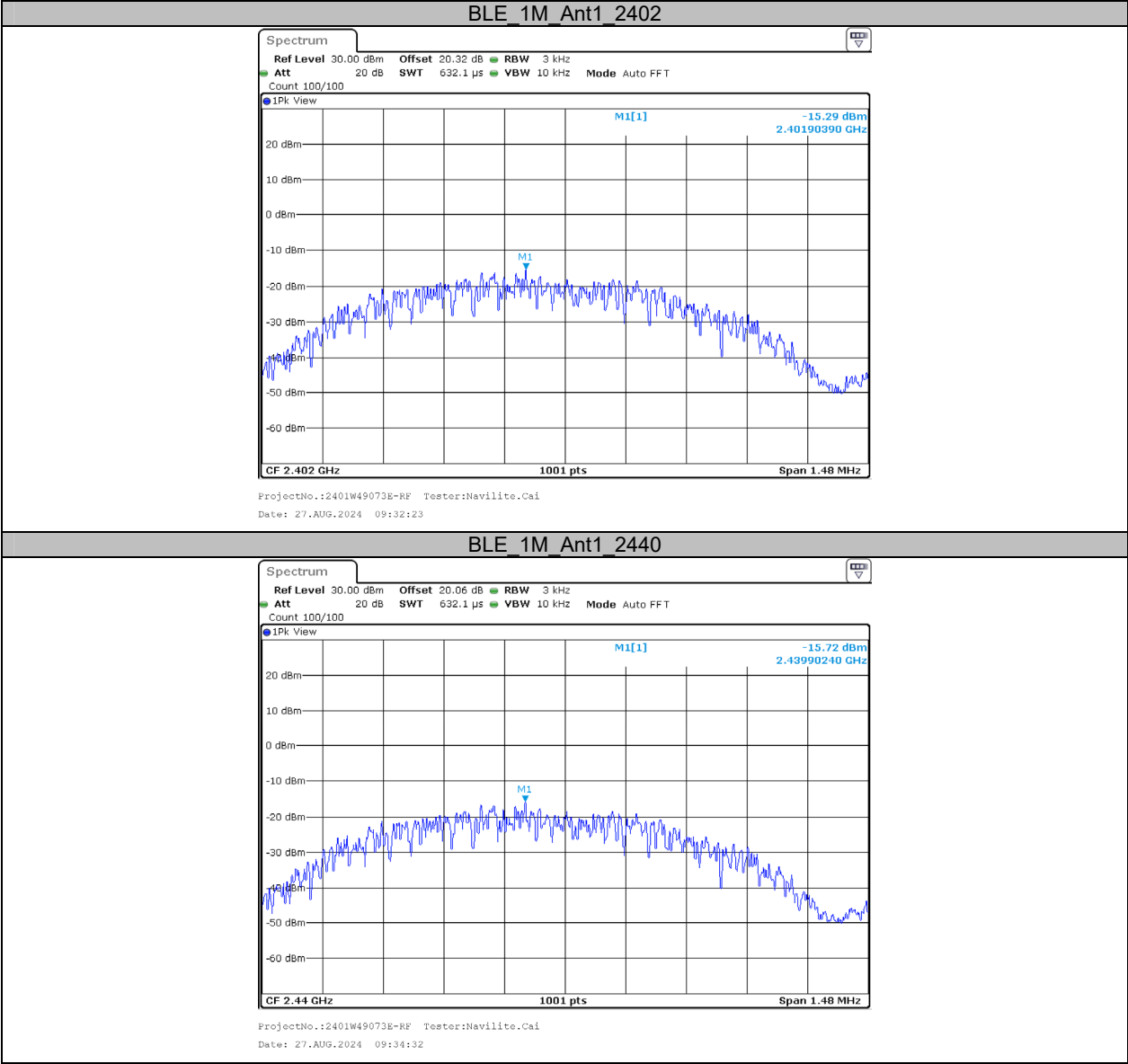


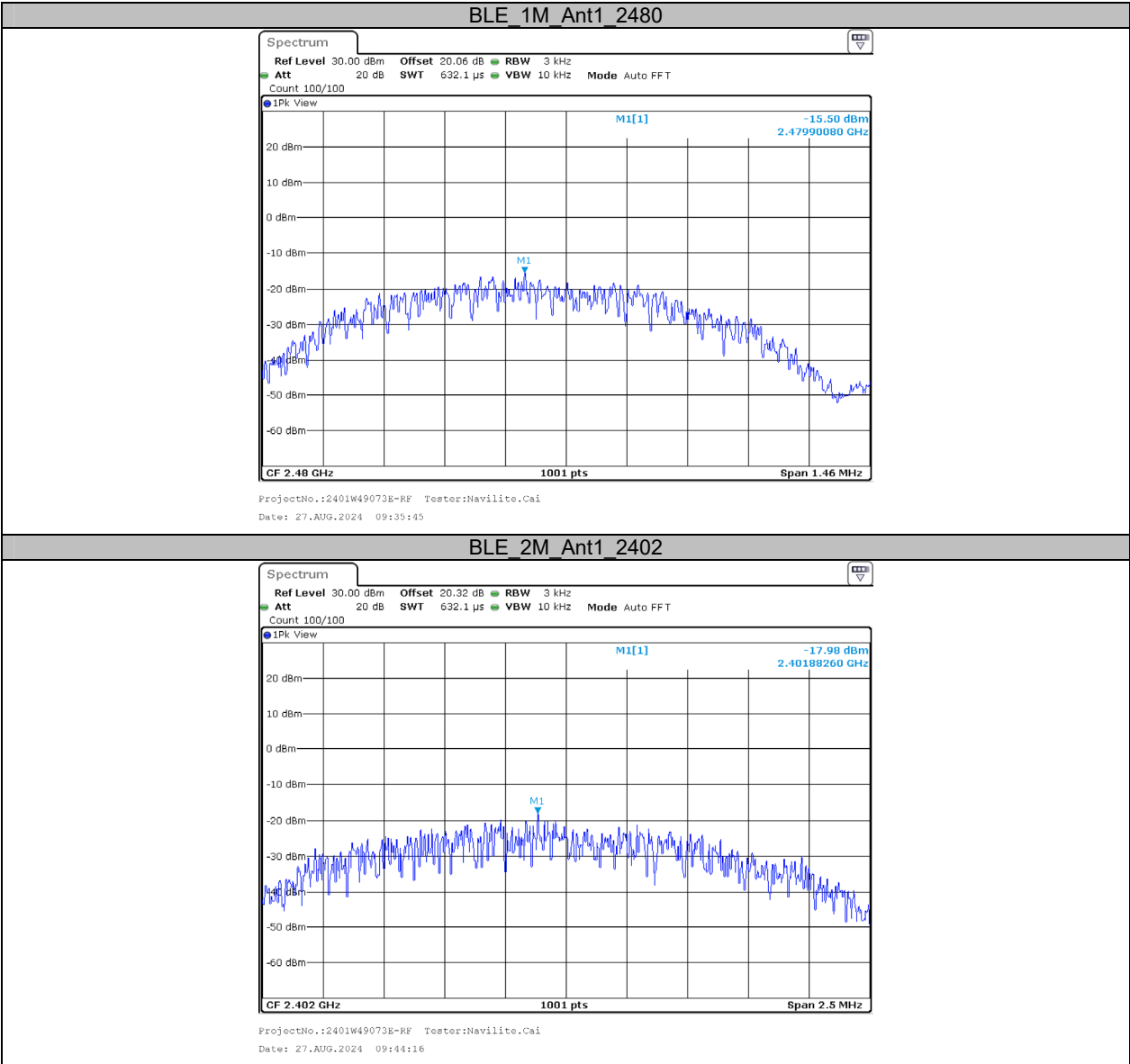


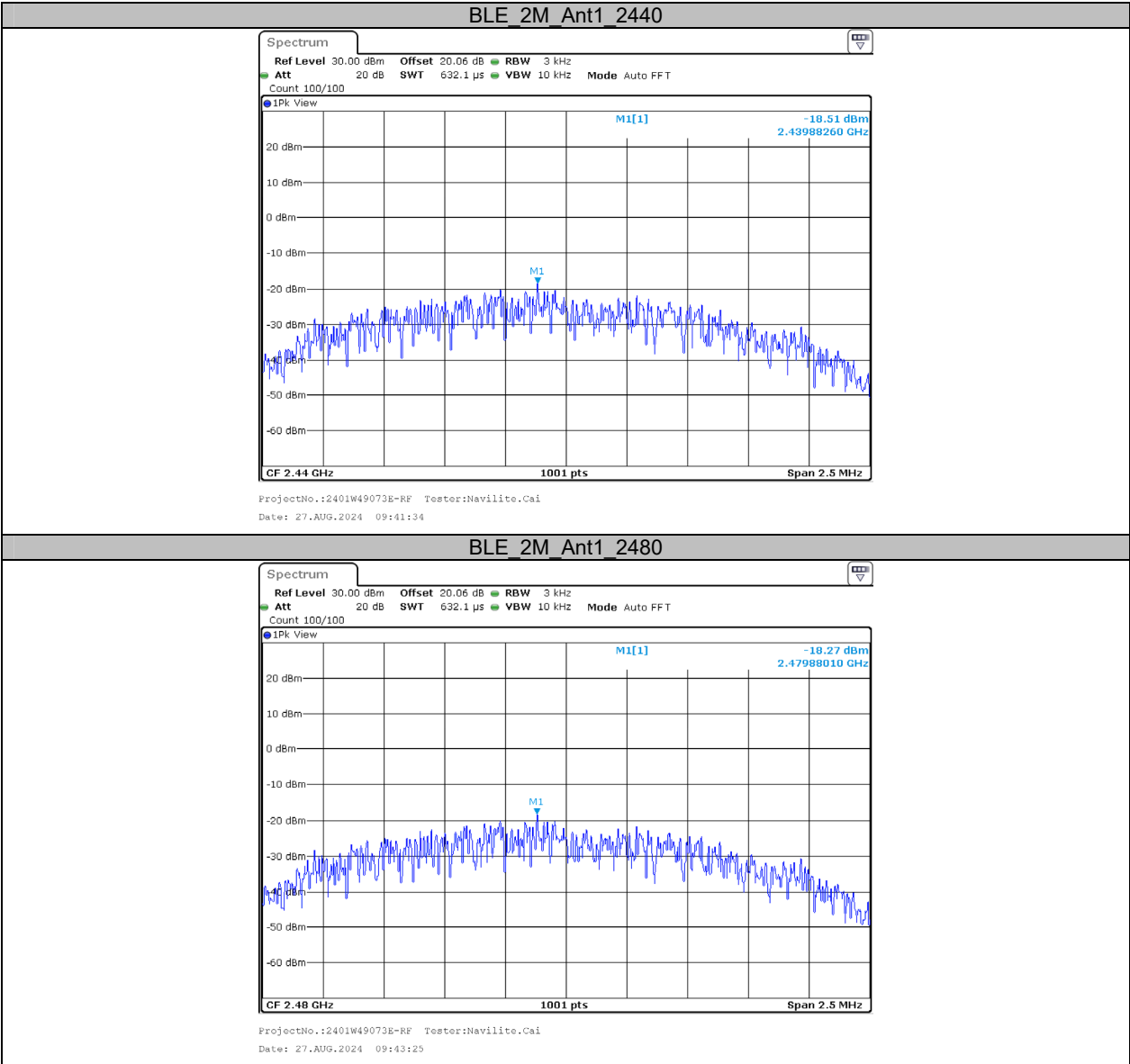
**Appendix D: Maximum Power Spectral Density****Test Result**

| Test Mode | Antenna | Frequency[MHz] | Result[dBm/3kHz] | Limit[dBm/3kHz] | Verdict |
|-----------|---------|----------------|------------------|-----------------|---------|
| BLE_1M    | Ant1    | 2402           | -15.29           | ≤8.00           | PASS    |
|           |         | 2440           | -15.72           | ≤8.00           | PASS    |
|           |         | 2480           | -15.50           | ≤8.00           | PASS    |
| BLE_2M    | Ant1    | 2402           | -17.98           | ≤8.00           | PASS    |
|           |         | 2440           | -18.51           | ≤8.00           | PASS    |
|           |         | 2480           | -18.27           | ≤8.00           | PASS    |

Test Graphs

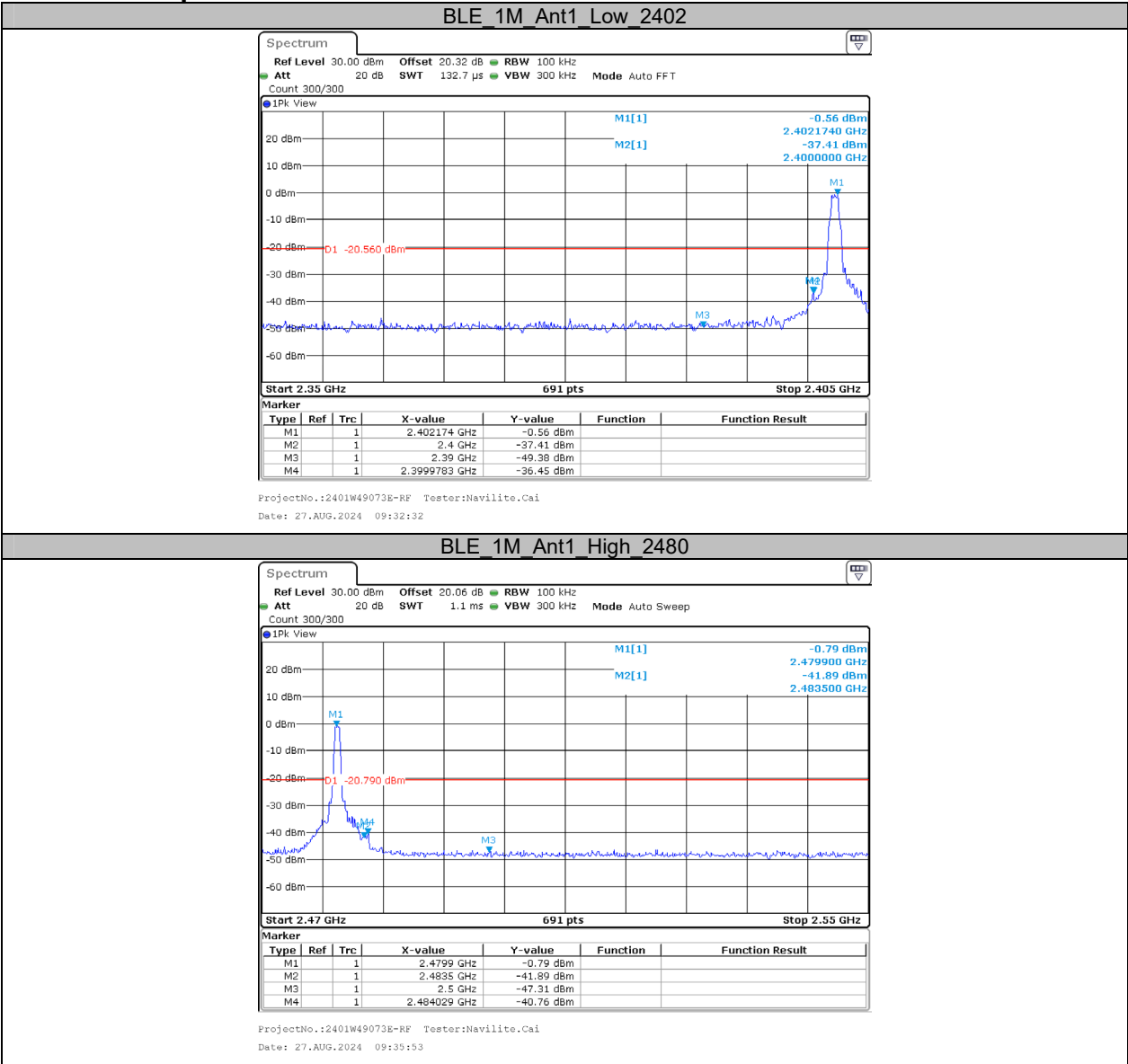


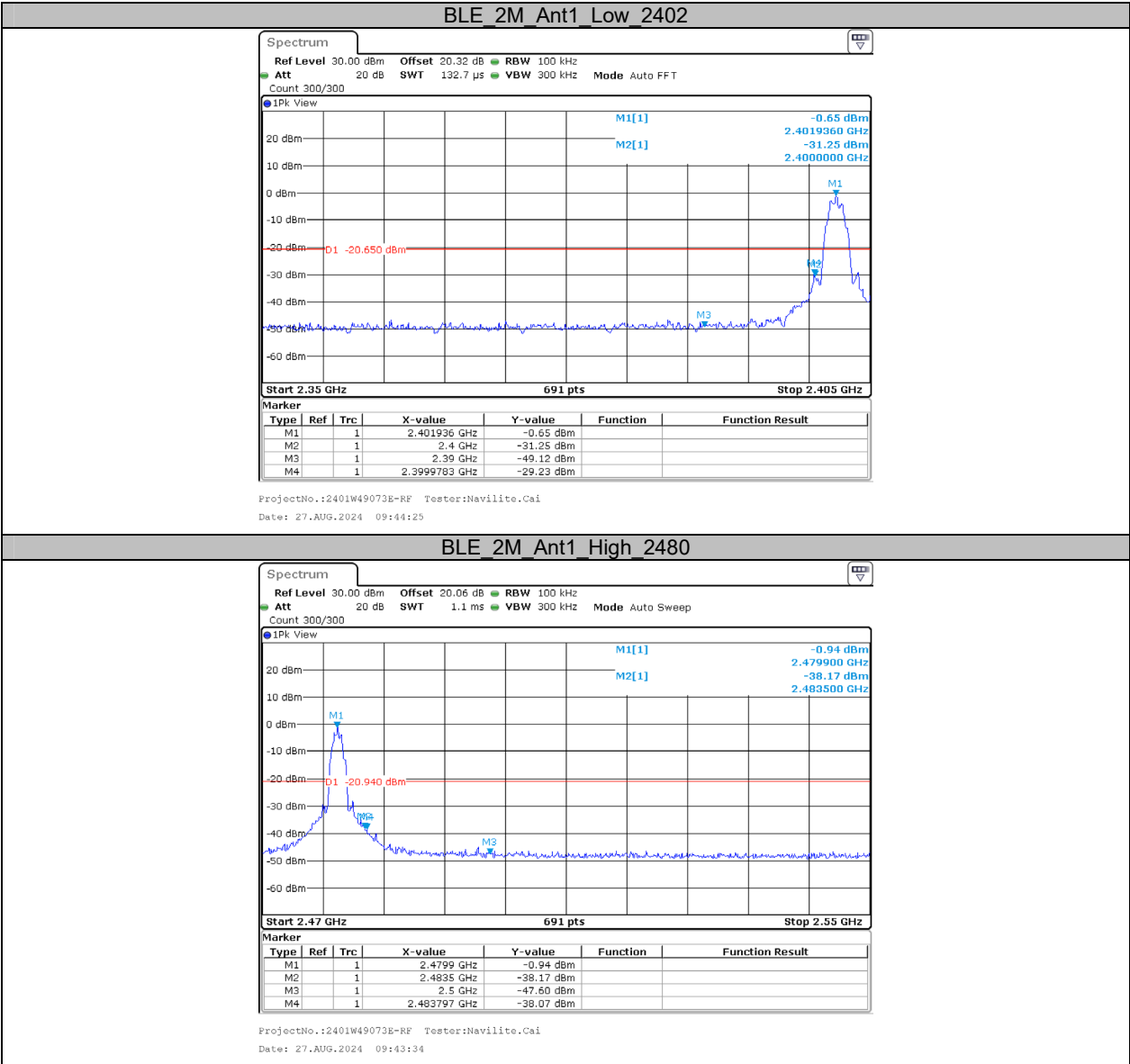




Appendix E: Band Edge Measurement

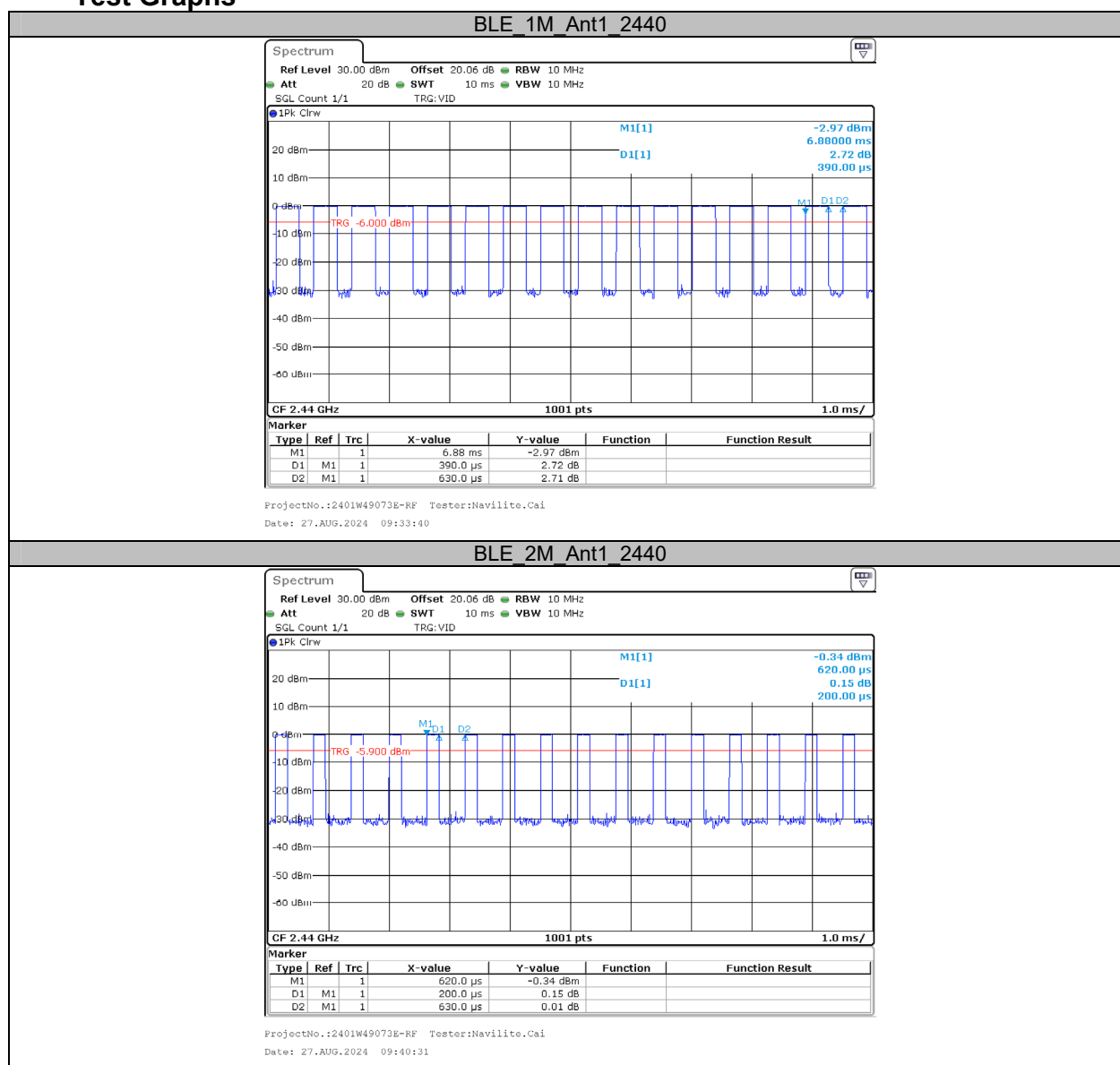
Test Graphs





**Appendix F: Duty Cycle****Test Result**

| Test Mode | Antenna | Frequency[MHz] | ON Time [ms] | Period [ms] | Duty Cycle [%] | Duty Cycle Factor[dB] | 1/T(Hz) | VBW setting(kHz) |
|-----------|---------|----------------|--------------|-------------|----------------|-----------------------|---------|------------------|
| BLE_1M    | Ant1    | 2440           | 0.39         | 0.63        | 61.90          | 2.08                  | 2564    | 3                |
| BLE_2M    | Ant1    | 2440           | 0.20         | 0.63        | 31.75          | 4.98                  | 5000    | 10               |

**Test Graphs**

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