# TEST REPORT

| | |
|---|---|
| Report No.: | BCTC2512214823E |
| Applicant: | Ugreen Group Limited |
| Product Name: | UGREEN FineTrack Slim 2& UGREEN FineTrack Slim G 2& UGREEN FineTrack Slim Duo 2& UGREEN FineTrack |
| Test Model: | FT503 |
| Tested Date: | 2025-12-25 to 2026-02-27 |
| Issued Date: | 2026-02-27 |

**Shenzhen BCTC Technology Co., Ltd.**

| | |
|---|---|
| Product Name: | UGREEN FineTrack Slim 2& UGREEN FineTrack Slim G 2& UGREEN FineTrack Slim Duo 2& UGREEN FineTrack |
| Trademark: | UGREEN |
| Model/Type Reference: | FT503 |
| Prepared For: | Ugreen Group Limited |
| Address: | Ugreen Building, Longcheng Industrial Park, Longguanxi Road, Longhua, ShenZhen, China |
| Manufacturer: | Ugreen Group Limited |
| Address: | Ugreen Building, Longcheng Industrial Park, Longguanxi Road, Longhua, ShenZhen, China |
| Prepared By: | Shenzhen BCTC Technology Co., Ltd. |
| Address: | Room 101M, Unit 1, Building1, Pengyuan, No.18, Lilang Road, Shanglilang, Nanwan Subdistrict, Longgang District, Shenzhen, Guangdong, China |
| Sample Received Date: | 2025-12-25 |
| Sample Tested Date: | 2025-12-25 to 2026-02-27 |
| Issue Date: | 2026-02-27 |
| Report No.: | BCTC2512214823E |
| Test Standards: | Article 2 paragraph 1 of item 19<br>MIC Notice No.88 Appendix No.43 |
| Test Results: | PASS |
| Remark: | This is JAPAN RADIO test report. |

Tested by:

Louis.zeng

Louis Zeng / Project Handler

Approved by:

Sewen Guo

Sewen Guo/Reviewer

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(Note: N/A Means Not Applicable)

## 1. Version

| Report No. | Issue Date | Description | Approved |
|---|---|---|---|
| BCTC2512214823E | 2026-02-27 | Original | Valid |
| | | | |

## 2. Test Summary

Test procedures according to the technical standards:

| Article 2 paragraph 1 of item 19 | |
|---|---|
| **Description of Test** | **Result** |
| Frequency Error | Complies |
| Occupied Bandwidth (99%) and Spread-spectrum Bandwidth (90%) | Complies |
| Unwanted Emission Intensity | Complies |
| Antenna Power Error | Complies |
| Limitation of Collateral Emission of Receiver | Complies |
| Transmission Antenna Gain (EIRP Antenna Power) | N/A |
| Transmission Radiation Angle Width (3dB Beamwidth) | N/A |
| Radio Interference Prevention Capability | Complies |
| Construction Protection Confirmation | Complies |

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

## 3. Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

| No. | Item | Uncertainty |
|---|---|---|
| 1 | Conducted Emission Test | ±3.2dB |
| 2 | Radiated Emission Test | ±4.7dB |
| 3 | RF power,conducted | ±0.16dB |
| 4 | Spurious emissions,conducted | ±0.21dB |
| 5 | All emissions,radiated(<1G) | ±4.68dB |
| 6 | All emissions,radiated(>1G) | ±5.0dB |
| 7 | frequency error ppm | ±0.5ppm |

# 4. Product Information And Test Setup

## 4.1 Product Information

Model/Type Reference: FT503

P/N code Differences: All the P/N code and test models are the same circuit and RF module, except for the sales platform.

Hardware Version: N/A

Software Version: N/A

Operation Frequency: 2402-2480MHz

Type of Modulation: GFSK1Mbps, GFSK2Mbps

Number Of Channel: 40 CH

Antenna Type: Internal antenna

Antenna Gain: -0.04 dBi

Remark:

☒ The antenna gain of the product comes from the antenna report provided by the customer, and the test data is affected by the customer information.

☐ The antenna gain of the product is provided by the customer, and the test data is affected by the customer information.

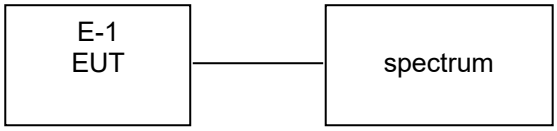
Ratings: Battery:3V⎓ 540mA

Remark:

- Product Number (P/N) code in the below table, for marketing purpose, will be marked on the marking plate.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 95076 | 95076EU | 95076UK | 95076DE | 95076FR | 95076US | 95076KSA | 95076JP |
| 95076CN | 95076A | 95076B | 95076C | 95076D | 95076E | 95076F | 95076G |
| 95076H | 95076I | 95076J | 95076K | 95076L | 95076M | 95076N | 95076O |
| 95076P | 95076Q | 95076R | 95076S | 95076T | 95076U | 95076X | 95076Y |
| 95076P1 | 95076P2 | 95076P3 | KC-95076 | 95076KC | 95076SR | 95076HC | |
| 95855 | 95855EU | 95855UK | 95855DE | 95855FR | 95855US | 95855KSA | 95855JP |
| 95855CN | 95855A | 95855B | 95855C | 95855D | 95855E | 95855F | 95855G |
| 95855H | 95855I | 95855J | 95855K | 95855L | 95855M | 95855N | 95855O |
| 95855P | 95855Q | 95855R | 95855S | 95855T | 95855U | 95855X | 95855Y |
| 95855P1 | 95855P2 | 95855P3 | KC-95855 | 95855KC | 95855SR | 95855HC | |
| 95867 | 95867EU | 95867UK | 95867DE | 95867FR | 95867US | 95867KSA | 95867JP |
| 95867CN | 95867A | 95867B | 95867C | 95867D | 95867E | 95867F | 95867G |
| 95867H | 95867I | 95867J | 95867K | 95867L | 95867M | 95867N | 95867O |
| 95867P | 95867Q | 95867R | 95867S | 95867T | 95867U | 95867X | 95867Y |
| 95867P1 | 95867P2 | 95867P3 | KC-95867 | 95867KC | 95867SR | 95867HC | |

## 4.2 Block Digram Parameters Of Text Software Setting




## 4.3 Description Of Support Units (Conducted Mode)

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|---|---|---|---|---|---|
| E-1 | EUT | UGREEN | FT503 | N/A | / |

Notes:
1. The support equipment was authorized by Declaration of Confirmation.
2. For detachable type I/O cable should be specified the length in cm in 『Length』 column
3. "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".

## 4.4 Channel List

| Channel List | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 01 | 2402 | 11 | 2422 | 21 | 2442 |
| 02 | 2404 | 12 | 2424 | 22 | 2444 |
| 03 | 2406 | 13 | 2426 | 23 | 2446 |
| ~ | ~ | ~ | ~ | ~ | ~ |
| 09 | 2418 | 19 | 2438 | 39 | 2478 |
| 10 | 2420 | 20 | 2440 | 40 | 2480 |

## 4.5 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| For All Mode | Description | Modulation Type |
|---|---|---|
| Mode 1 | CH01 | GFSK(1Mbps) |
| Mode 2 | CH20 | |
| Mode 3 | CH40 | |
| Mode 4 | CH01 | GFSK(2Mbps) |
| Mode 5 | CH20 | |
| Mode 6 | CH40 | |
| Mode 7 | RX | GFSK |

## 4.6 Test Conditions

The EUT was tested while in a continuous transmitter/receiver mode.

The EUT was tuned to a low, middle, and high channel for all tests. For all test case pre/scans were completed in all Modes to determine worst case levels.

**Power Supply Voltage Fluctuation Test**

| Voltage Fluctuation Test | Normal Voltage | High Voltage +10% of Normal Voltage | Low Voltage -10% of Normal Voltage |
|---|---|---|---|
| Input DC Power | 3V | 3.3V | 2.7V |
| Voltage Variation (%) | 0% | +10% | -10% |

Note:
Voltage Variation (%)= (Output high or Low Voltage - Output Normal Voltage)/ Output Normal Voltage* 100.

During the input supply voltage to the EUT from the external power source is varied by +/-10%,+/-10% of the external power change, will not affect the voltage of the RF(Voltage: DC 3.3V), so only operated in normal voltage to test all regulations.

## 4.7 Table Of Parameters Of Test Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

| Test software Version | sscom5.13.1 | | |
|---|---|---|---|
| Frequency | 2402 MHz | 2440 MHz | 2480 MHz |
| Parameters | DEF | DEF | DEF |

# 5. Test Facility And Test Instrument Used

## 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Technology Co., Ltd. Address: Room 101M, Unit 1, Building1, Pengyuan, No.18, Lilang Road, Shanglilang, Nanwan Subdistrict, Longgang District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

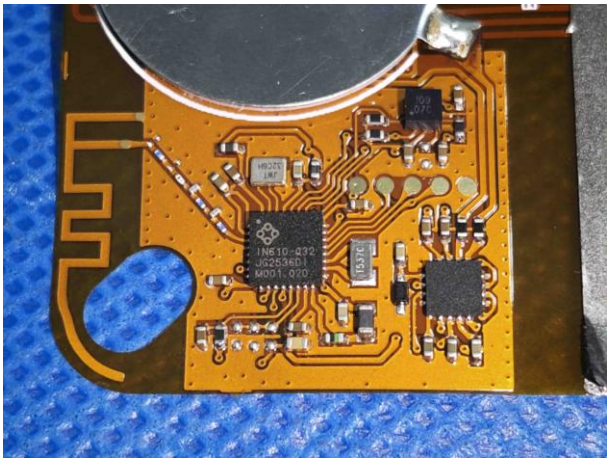
## 5.2 Test Instrument Used

| RF Conducted Test | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model#** | **Serial#** | **Last Cal.** | **Next Cal.** |
| Spectrum Analyzer | Keysight | N9020A | MY51287403 | Aug.30, 2025 | Aug.29, 2026 |
| Signal Generator | Keysight | N5182A | MY50144088 | Aug.30, 2025 | Aug.29, 2026 |
| Power Sensor | Keysight | U2001 | MY51250006 | Oct. 28, 2025 | Oct. 27, 2026 |
| Radio frequency control box | MWRFtest | MW100-RFCB | MW100-RFCB 1 | \ | \ |
| Software | Frad | EZ-EMC | FA-03A2 RE | \ | \ |
| Software | Keysight | Keysight.ETSL Test system | 1.02.05 | \ | \ |
| D.C. Power Supply | LongWei | D-41747 Viersen | 6230316 | Aug.30, 2025 | Aug.29, 2026 |
| Communication test set | R&S | CMW500 | 157483 | Aug.30, 2025 | Aug.29, 2026 |
| Programmable constant temperature and humidity test chamber | Auchno | OJN-9606-408 L | 19120183 | July.9, 2025 | July.8, 2026 |
| hygrothermograph | Thermo | HTC-1 | \ | Sep.01, 2025 | Aug.31, 2026 |

Calibration laboratory: CCIC(Shenzhen) Co., Ltd

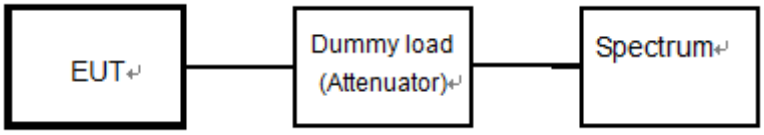
## 6. RF Shielding Method

Chipset:
The product structure is uses SMD patch process.
As shown in the picture, If the will be open so the product be damage.
terminal number is 32. Pitch is 0.5mm.



# 7. Frequency Error

## 7.1 Block Diagram Of Test Setup




## 7.2 Limit

| Item | Limits |
|---|---|
| Frequency Error | ±50ppm |

## 7.3 Measuring Instruments And Setting

The following table is the setting of Spectrum Analyzer.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| RB / VB | 10KHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

## 7.4 Test procedure

(1) In the case of unmodulated signal (continuous or continuous burst), measure the frequency directly by a frequency meter.

(2) In the case of burst waves, the measurement shall be done for enough time in order to obtain the enough measuring accuracy, and the average of the measured values becomes the final value.

(3) In the case of a test mode with a specific frequency spectrum, measure the frequency of the specific spectrum by a spectrum analyzer.

(4) In the cases above, if the frequency equivalent to the test frequency is not directly measured in principle, it shall be obtained by necessary calculation.
In the case of modulated signal, if there is no specific spectrum measurable by a spectrum analyzer but a specific dip is observed, it is allowed to measure the frequency with the signal generator (synthesized). That is, observe a signal of the signal generator concurrently (or alternately) with the tested signal using the spectrum analyzer while setting the frequency of the signal generator to the position of the dip on the screen of the spectrum analyzer, and determine the frequency of the signal generator at the time as a measured value.

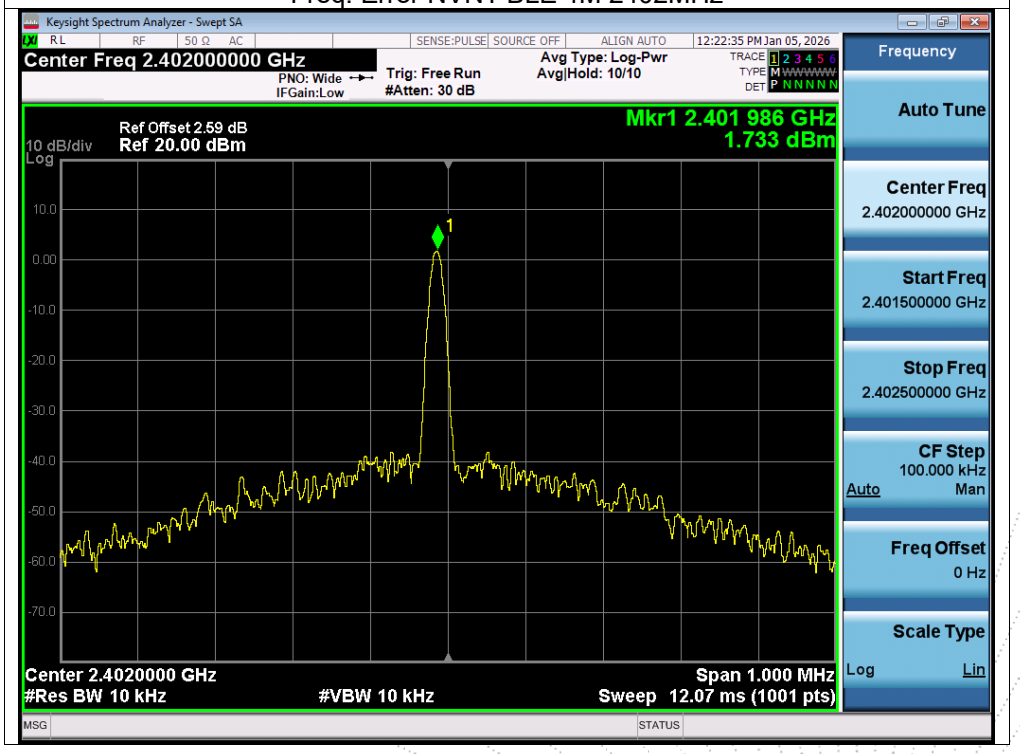
## 7.5 Test Result

| | | | |
|---|---|---|---|
| Temperature: | 26°C | | |
| Humidity: | 54%RH | Test Voltage | DC 3V |
| Condition: | NVNT | | |

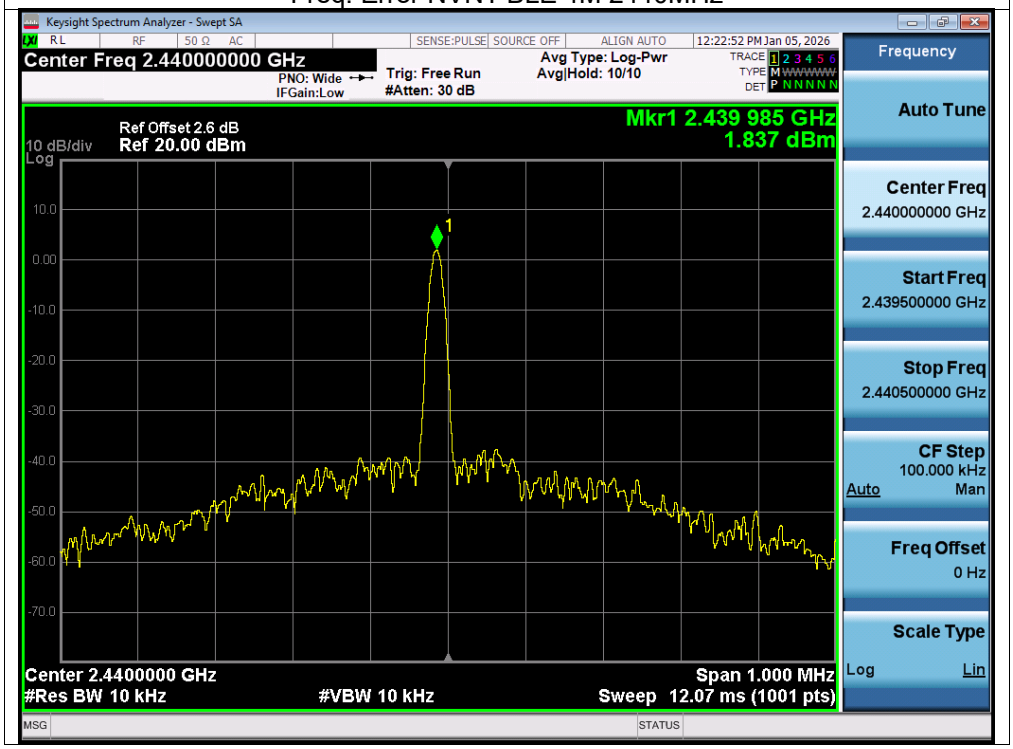
| Test Mode | Frequency | Measured Frequency | Frequency Error | Limit | Verdict |
|---|---|---|---|---|---|
| GFSK | MHz | MHz | ppm | (ppm) | |
| | 2402 | 2401.986 | -5.83 | ±50 | Pass |
| | 2440 | 2439.985 | -6.15 | ±50 | Pass |
| | 2480 | 2479.985 | -6.05 | ±50 | Pass |

Test Graphs

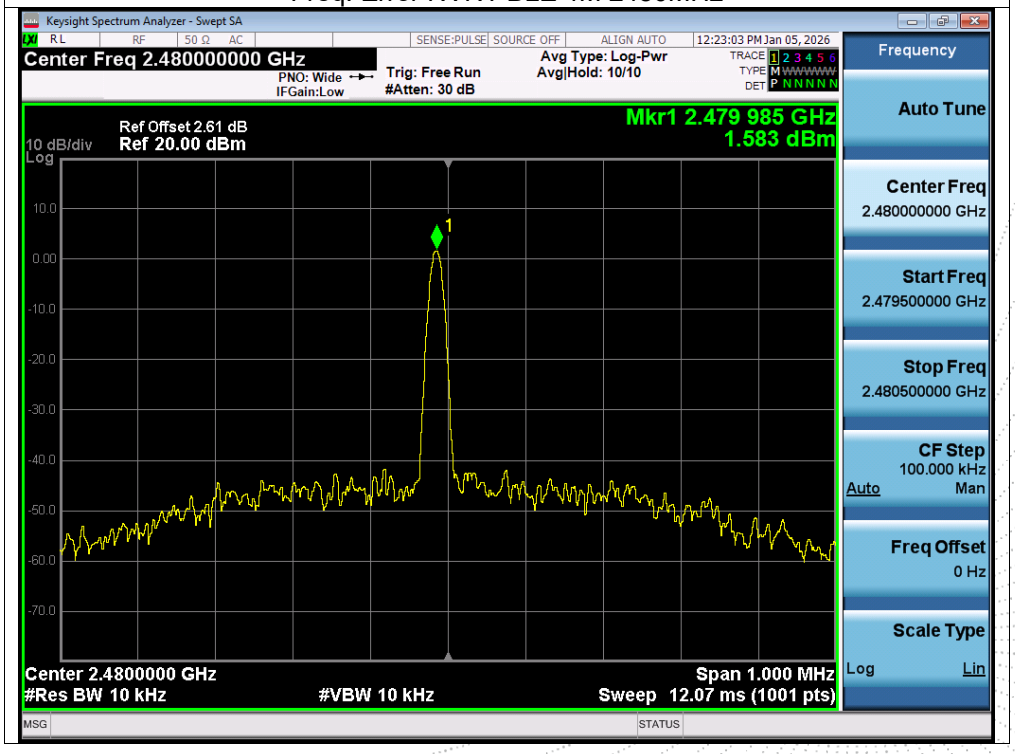
Freq. Error NVNT BLE 1M 2402MHz



Freq. Error NVNT BLE 1M 2440MHz

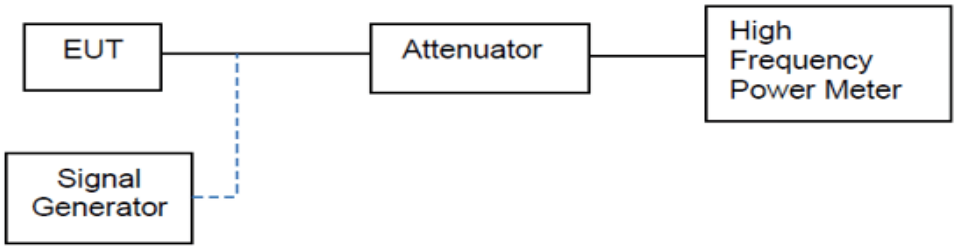



Freq. Error NVNT BLE 1M 2480MHz



# 8. Antenna Power

## 8.1 Block Diagram Of Test Setup




## 8.2 Limit

| Item | Limits |
|---|---|
| Antenna Power Density | (1)≦3mW/MHz (FH,FH+DS,FH+OFDM form 2400 - 2483.5 MHz)<br>(2)≦10mW/MHz (OFDM OBW＜26MHz, DS, FH other than (1) )<br>(3)≦5mW/MHz (OFDM OBW 26-38MHz)<br>(4) ≦10mW (Other than (1) & (2)& (3) |
| Antenna Power Error | +20%, -80% (Base on manufacturer declare antenna power density) |

## 8.3 Test procedure

1: Measure the total power by Power Meter in a state of hopping mode or non-hopping mode (with Average Sensor)
2: If it's the burst wave, please measure the burst ratio. Then calculate the real total power by burst ratio.
3: Calculate the mean power.
Output Power Density (mW) = Total Output Power (mW) / Duty cycle

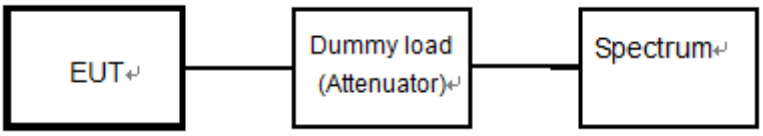
## 8.4 Test Result

| | | | |
|---|---|---|---|
| Temperature: | 26°C | | |
| Humidity: | 54%RH | Test Voltage | DC 3V |
| Condition: | NVNT | | |

| Test Mode | Test Frequency (MHz) | Antenna Power (dBm) | Antenna Power (mW) | Rated output power (mW) | Antenna Power Error (%) | Limit | Verdict |
|---|---|---|---|---|---|---|---|
| GFSK (1Mbps) | 2402 | 3.28 | 2.13 | 3 | -29 | 10mW | PASS |
| | 2440 | 3.26 | 2.12 | | -29 | | |
| | 2480 | 3.08 | 2.03 | | -32 | | |
| GFSK (2Mbps) | 2402 | 3.25 | 2.12 | 3 | -29 | | |
| | 2440 | 3.24 | 2.11 | | -30 | | |
| | 2480 | 3.04 | 2.01 | | -33 | | |
| Limit: +20%, -80% (Base on manufacturer declare antenna power density) | | | | | | | |

# 9. Occupied Bandwith

## 9.1 Block Diagram Of Test Setup




## 9.2 Limit

| Item | Limits |
|---|---|
| Occupied Band Width: | FH 83.5MHz; OFDM,DS ≤26MHz;Others≤26MHz |
| Spreading Bandwidth: | ≥500 kHz (FH, DS) |

## 9.3 Test procedure

1. Setting of SA is following as: RB: 300kHz / VB:300kHz / SPAN: 3MHz / AT: 20dB Ref: 10dBm / 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 ( For DSSS or OFDM Device) or continuous maximum power of hopping mode(For FHSS Device).
SA set to 99% of occupied bandwidth to measure occupied bandwidth. The limit is less than 26MHz (For DSSS or OFDM Device) or 83.5MHz (For FHSS Device).
3. SA set to 90% of occupied bandwidth to measure Spread Spectrum Bandwidth and must greater than 500kHz.
4. Spread Spectrum Factor = Spread Spectrum Bandwidth / modulation rate of EUT.
5. Spread Spectrum Factor limit is greater than 5

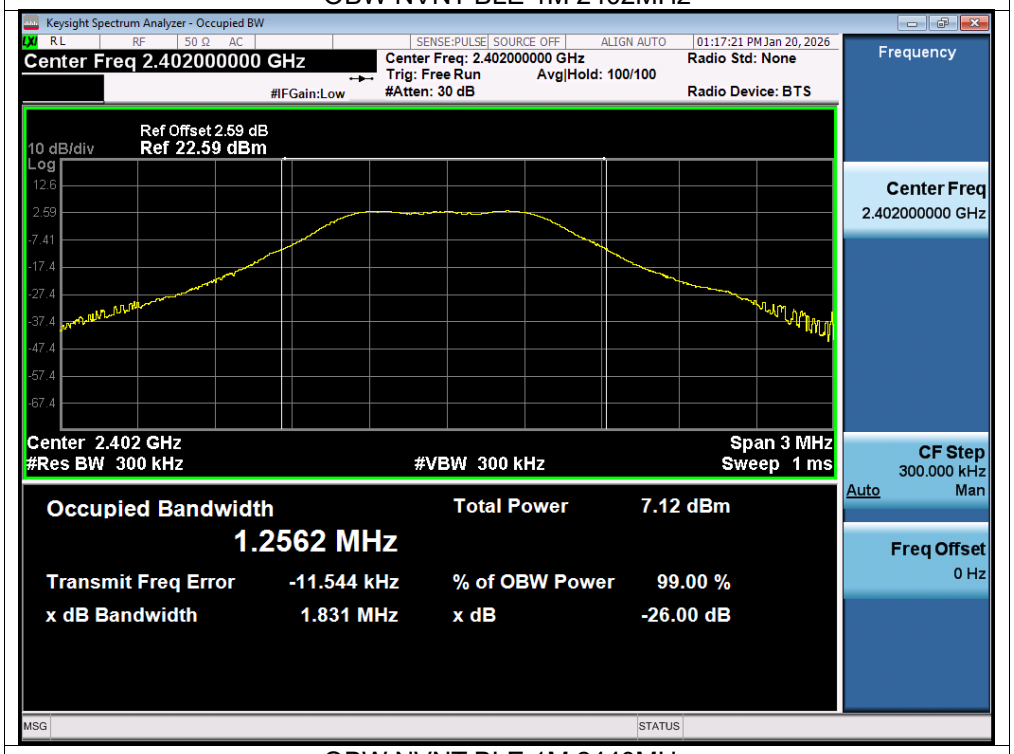
## 9.4 Test Result

| | | | |
|---|---|---|---|
| Temperature: | 26°C | | |
| Humidity: | 54%RH | Test Voltage | DC 3V |
| Condition: | NVNT | | |

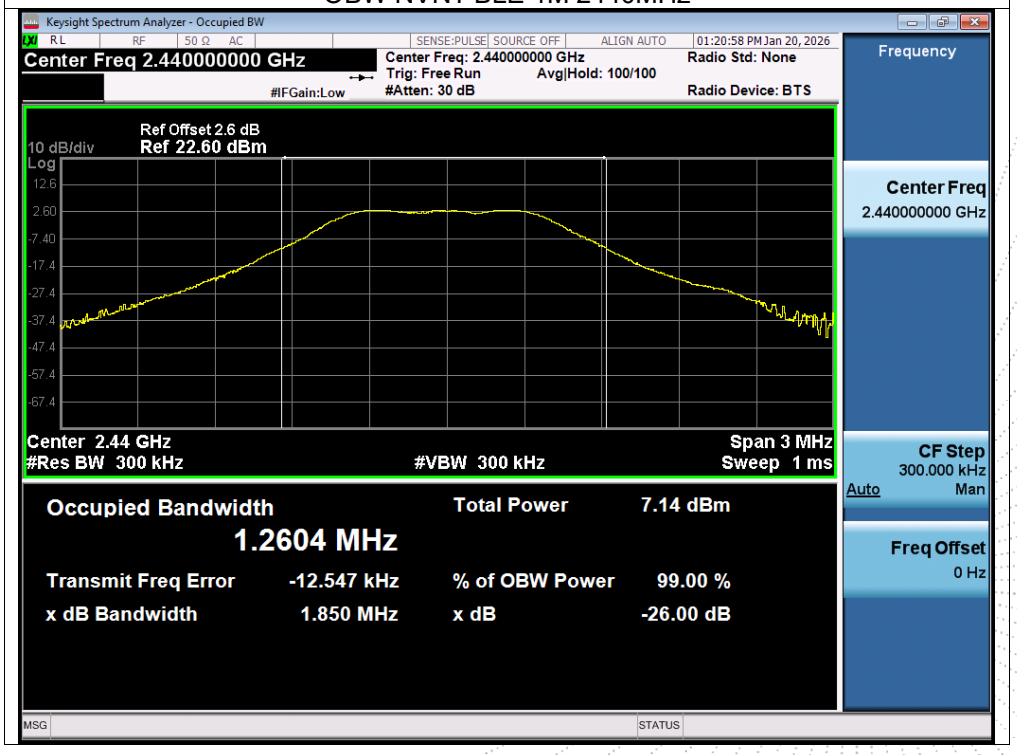
| Test Mode | Test Frequency MHz | 99%Occupied bandwidth MHz | 90%Spread bandwidth MHz | Occupied Bandwidth Limit MHz | Spread Bandwidth Limit | Verdict |
|---|---|---|---|---|---|---|
| GFSK (1Mbps) | 2402 | 1.256 | 0.829 | ≤26MHz | ≥500 kHz | PASS |
| | 2440 | 1.26 | 0.831 | ≤26MHz | ≥500 kHz | PASS |
| | 2480 | 1.287 | 0.839 | ≤26MHz | ≥500 kHz | PASS |
| GFSK (2Mbps) | 2402 | 2.206 | 1.402 | ≤26MHz | ≥500 kHz | PASS |
| | 2440 | 2.206 | 1.413 | ≤26MHz | ≥500 kHz | PASS |
| | 2480 | 2.211 | 1.413 | ≤26MHz | ≥500 kHz | PASS |

Test Graphs

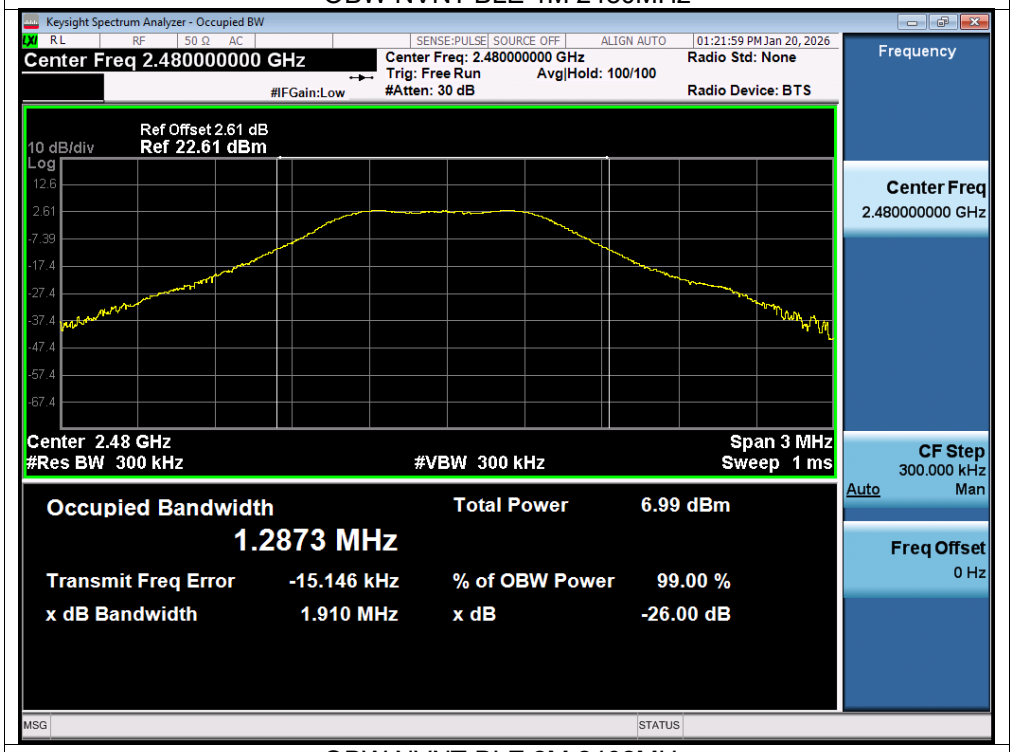
OBW NVNT BLE 1M 2402MHz



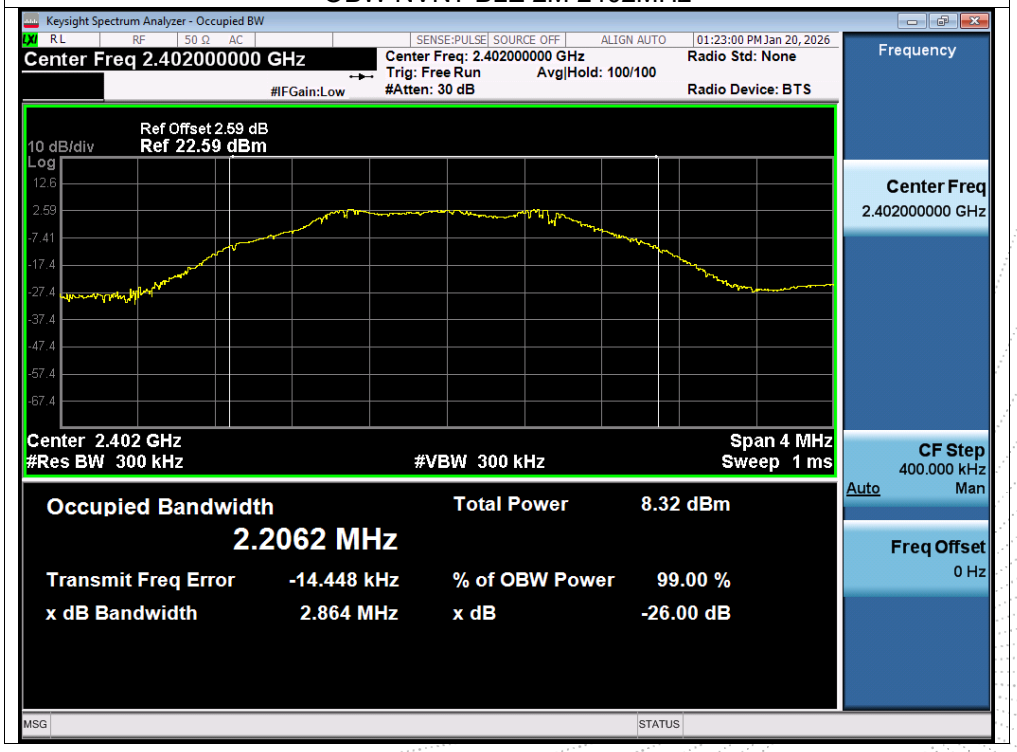

OBW NVNT BLE 1M 2440MHz



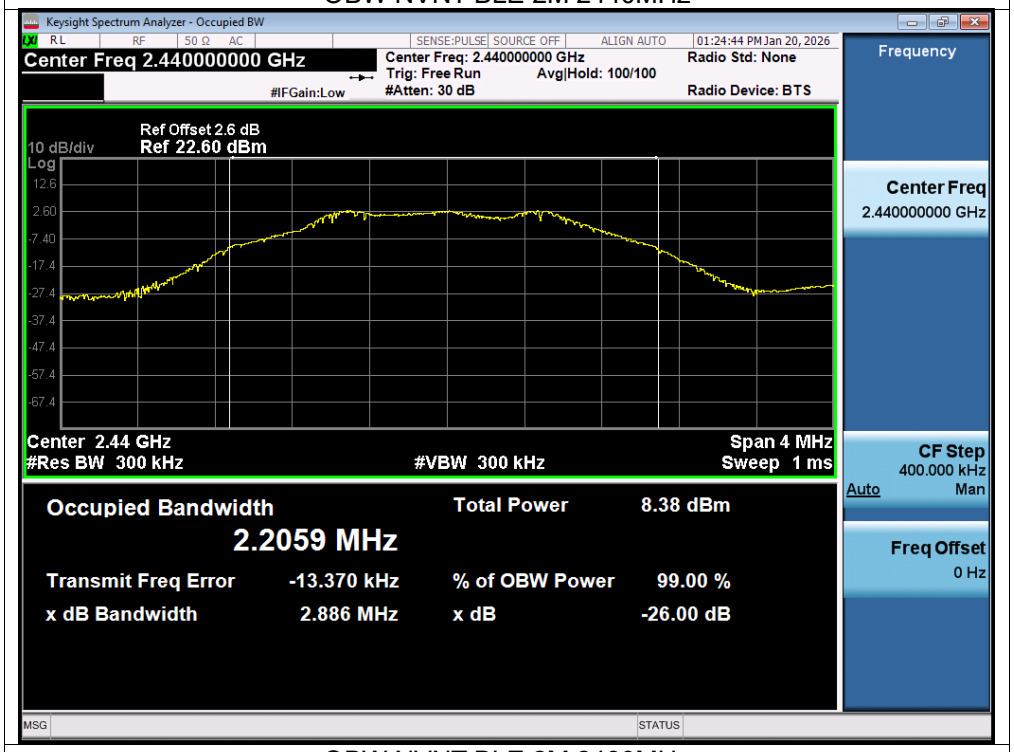
OBW NVNT BLE 1M 2480MHz



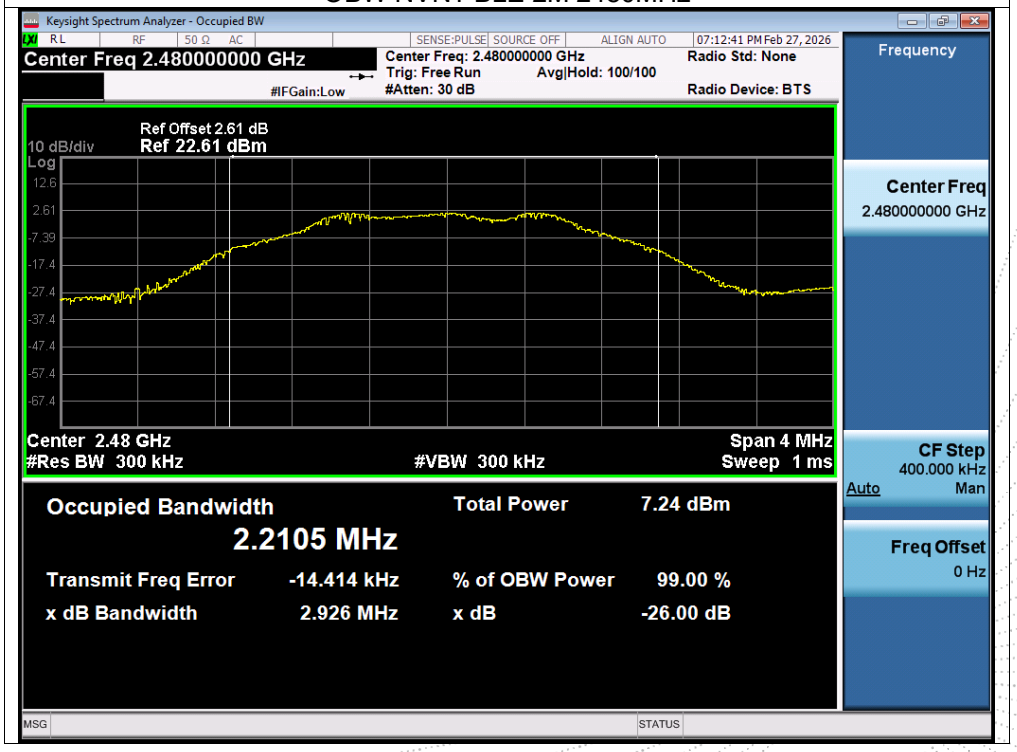

OBW NVNT BLE 2M 2402MHz



OBW NVNT BLE 2M 2440MHz

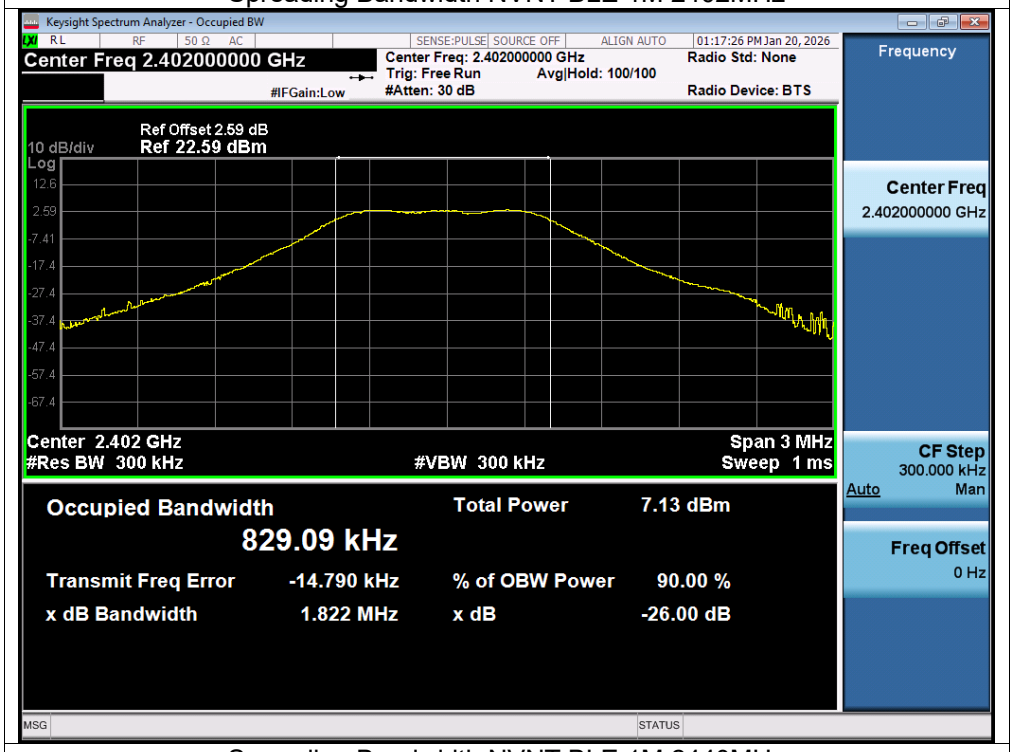



OBW NVNT BLE 2M 2480MHz



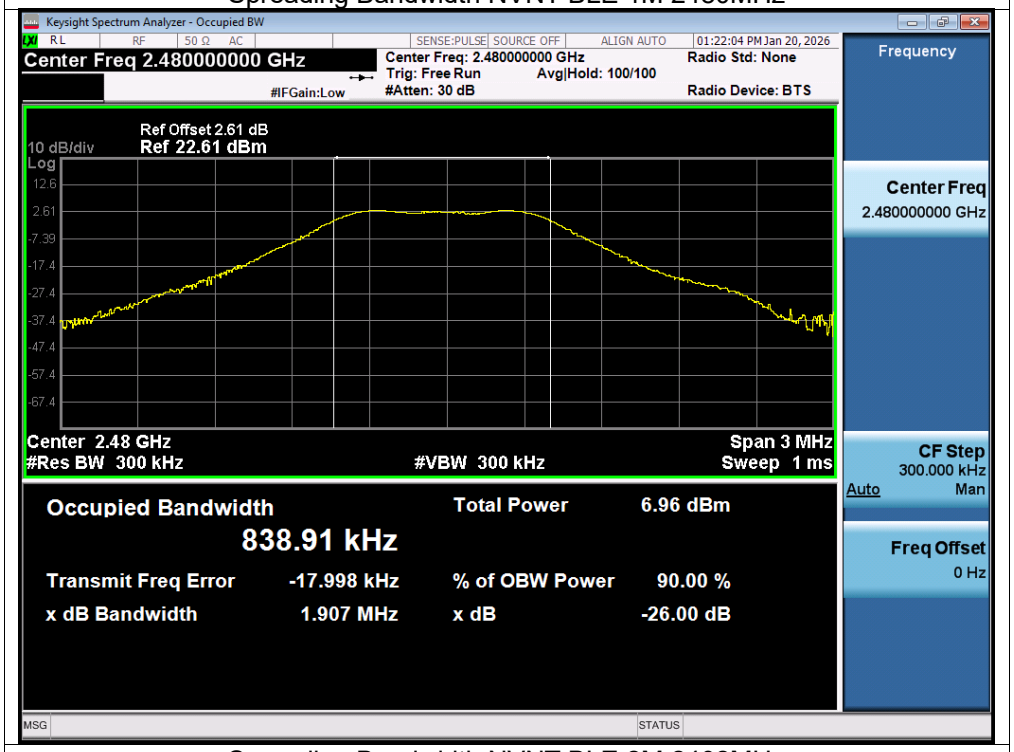
Test Graphs

Spreading Bandwidth NVNT BLE 1M 2402MHz

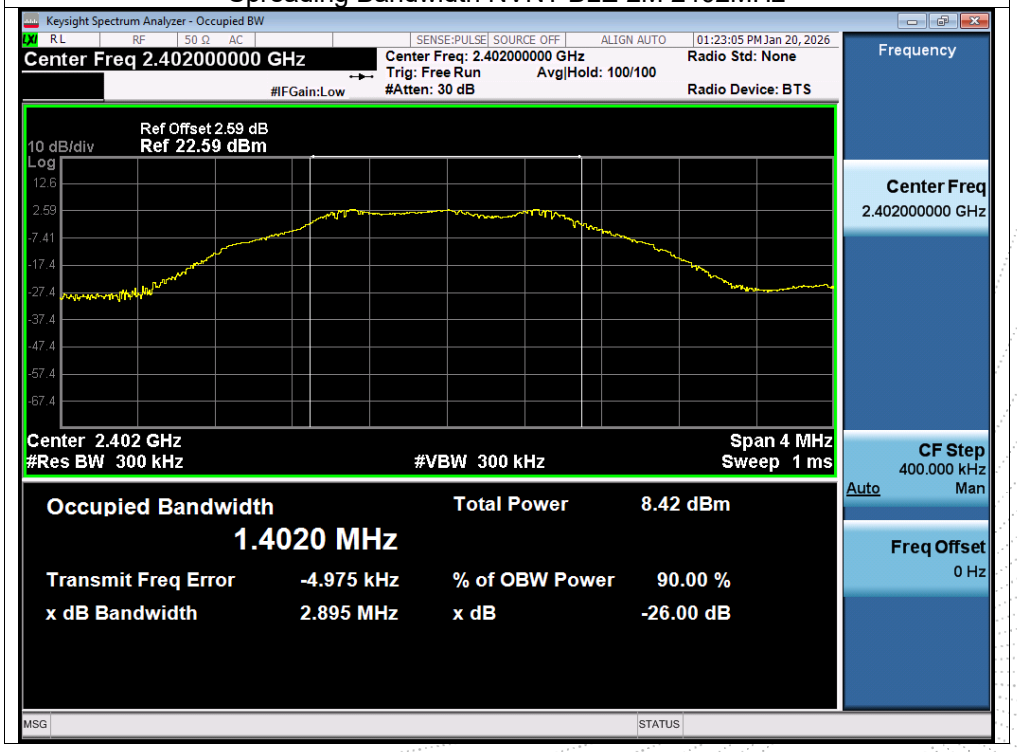



Spreading Bandwidth NVNT BLE 1M 2440MHz

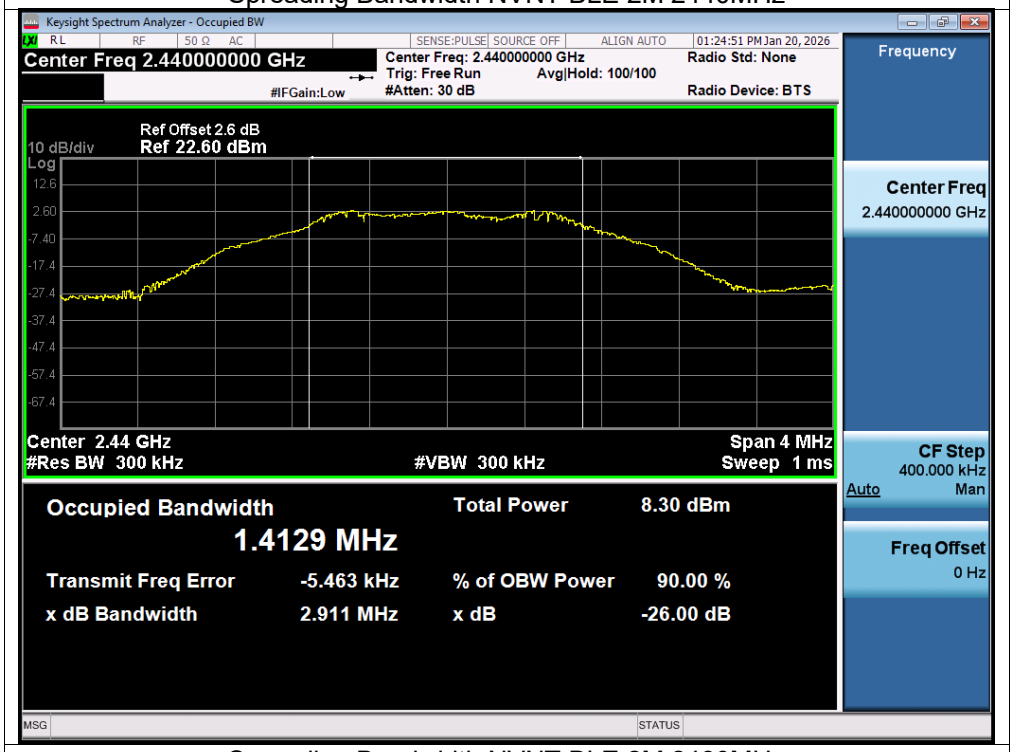
Spreading Bandwidth NVNT BLE 1M 2480MHz



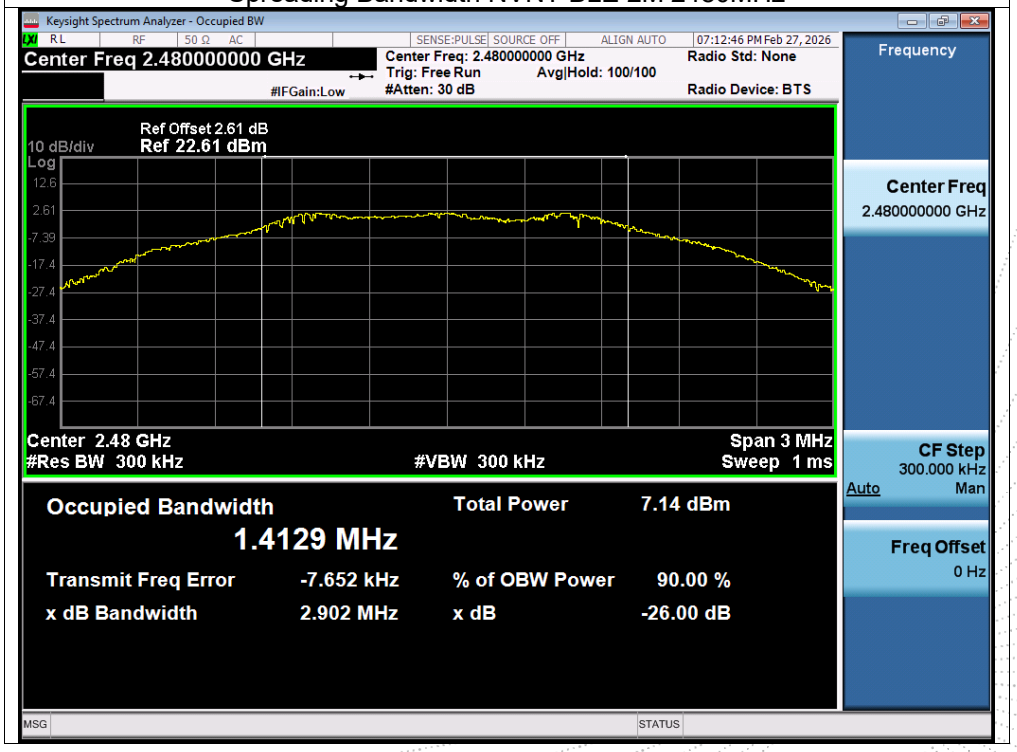

Spreading Bandwidth NVNT BLE 2M 2402MHz



Spreading Bandwidth NVNT BLE 2M 2440MHz

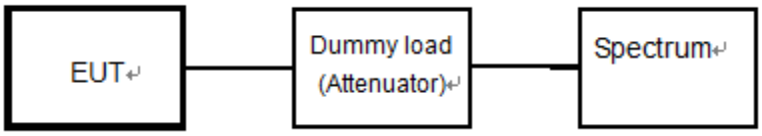



Spreading Bandwidth NVNT BLE 2M 2480MHz



# 10. Unwanted Emission Intensity Measurement

## 10.1 Block Diagram Of Test Setup




## 10.2 Limit

| Item | RB / VB | Limits |
|---|---|---|
| TX Spurious Emission | 100KHz | ≦ 0.25 μW (-36dBm) (30MHz≦f≦1000MHz) |
| | 1 MHz | ≦2.5 μW (-26dBm) (1000MHz<f≦2387MHz) |
| | 1 MHz | ≦25 μW (-16dBm) (2387MHz<f≦2400MHz) |
| | 1 MHz | ≦25 μW (-16dBm) (2483.5MHz≦f<2496.5MHz) |
| | 1 MHz | ≦2.5 μW (-26dBm) (2496.5MHz≦f<12500MHz) |

## 10.3 Measuring Instruments And Setting

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| RB / VB | 1 MHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

## 10.4 Test procedure

1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Setting of SA is following as: Below 1GHz RB:100KHz / VB:100KHz
Above 1GHz RB:1MHz / VB:1MHz / AT: 20dB Ref: 10dBm / Sweep time: Auto
Sweep Mode: Continuous sweep / Detect mode: Positive peak
Trace mode: Max hold
3. Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 0.25μW.
4. Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25μW.
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25μW
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5μW

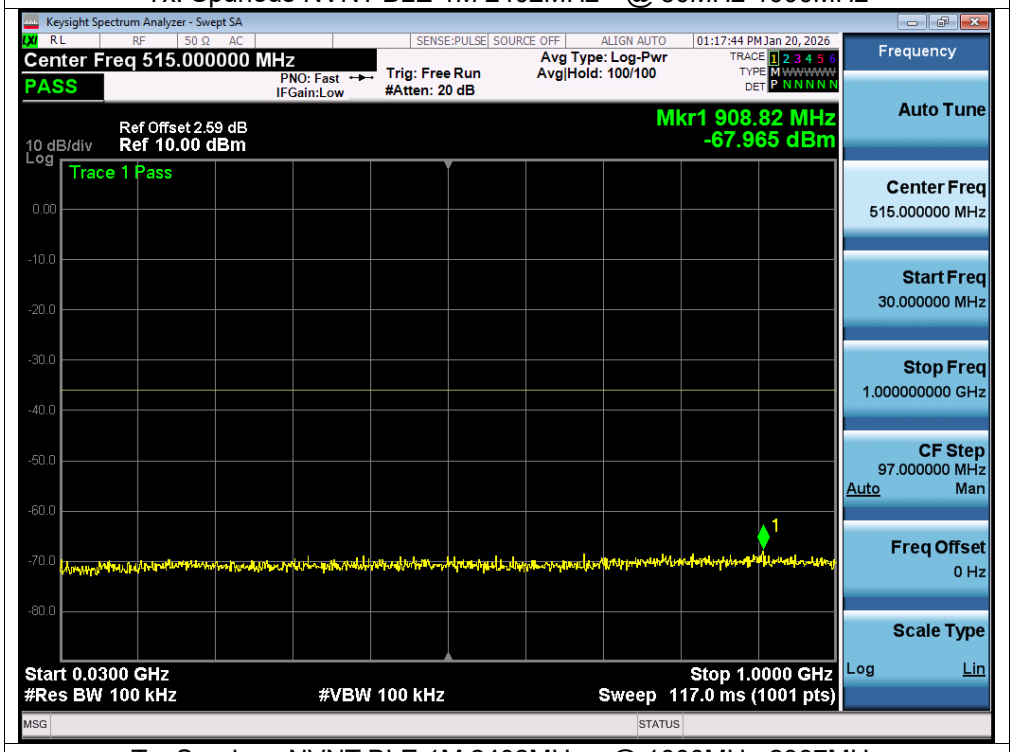
## 10.5 Test Result

| | | | |
|---|---|---|---|
| Temperature: | 26°C | | |
| Humidity: | 54%RH | Test Voltage | DC 3V |

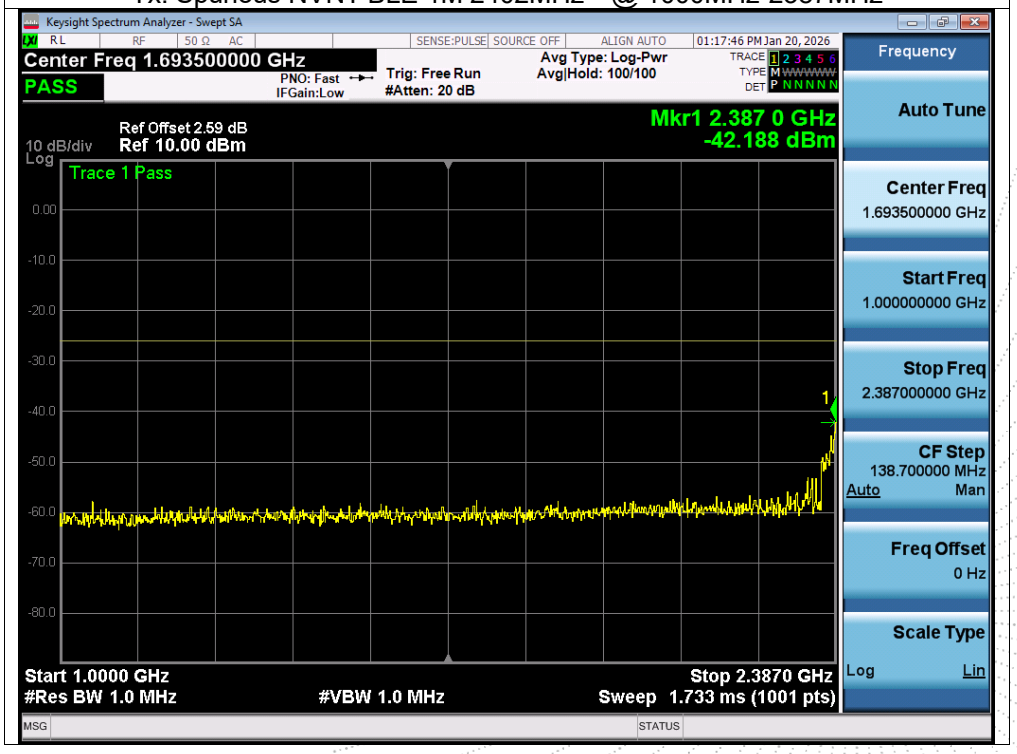
| Condition | Mode | Frequency (MHz) | Range (MHz) | Emission Frequency (MHz) | Max Value (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|---|
| NVNT | GFSK 1Mbps | 2402 | 30-1000 | 908.82 | -67.97 | -36 | Pass |
| NVNT | | 2402 | 1000-2387 | 2387 | -42.19 | -26 | Pass |
| NVNT | | 2402 | 2387-2400 | 2399.97 | -23.41 | -16 | Pass |
| NVNT | | 2402 | 2483.5-2496.5 | 2490.01 | -52.56 | -16 | Pass |
| NVNT | | 2402 | 2496.5-13000 | 4807.27 | -50.18 | -26 | Pass |
| NVNT | | 2440 | 30-1000 | 207.51 | -67.62 | -36 | Pass |
| NVNT | | 2440 | 1000-2387 | 2382.84 | -52.27 | -26 | Pass |
| NVNT | | 2440 | 2387-2400 | 2395.75 | -48.68 | -16 | Pass |
| NVNT | | 2440 | 2483.5-2496.5 | 2489.95 | -49.52 | -16 | Pass |
| NVNT | | 2440 | 2496.5-13000 | 4880.79 | -50.14 | -26 | Pass |
| NVNT | | 2480 | 30-1000 | 977.69 | -68.01 | -36 | Pass |
| NVNT | | 2480 | 1000-2387 | 1764.24 | -44.91 | -26 | Pass |
| NVNT | | 2480 | 2387-2400 | 2399.56 | -52.15 | -16 | Pass |
| NVNT | | 2480 | 2483.5-2496.5 | 2483.94 | -29.46 | -16 | Pass |
| NVNT | | 2480 | 2496.5-13000 | 2496.5 | -41.69 | -26 | Pass |
| NVNT | GFSK 2Mbps | 2402 | 30-1000 | 909.79 | -67.74 | -36 | Pass |
| NVNT | | 2402 | 1000-2387 | 2384.23 | -43.99 | -26 | Pass |
| NVNT | | 2402 | 2387-2400 | 2399.99 | -18.75 | -16 | Pass |
| NVNT | | 2402 | 2483.5-2496.5 | 2484.2 | -52.37 | -16 | Pass |
| NVNT | | 2402 | 2496.5-13000 | 4807.27 | -49.99 | -26 | Pass |
| NVNT | | 2440 | 30-1000 | 942.77 | -68.19 | -36 | Pass |
| NVNT | | 2440 | 1000-2387 | 2387 | -51.92 | -26 | Pass |
| NVNT | | 2440 | 2387-2400 | 2399.67 | -48.67 | -16 | Pass |
| NVNT | | 2440 | 2483.5-2496.5 | 2483.8 | -48.31 | -16 | Pass |
| NVNT | | 2440 | 2496.5-13000 | 4880.79 | -50.08 | -26 | Pass |
| NVNT | | 2480 | 30-1000 | 734.22 | -68.15 | -36 | Pass |
| NVNT | | 2480 | 1000-2387 | 2374.52 | -55.33 | -26 | Pass |
| NVNT | | 2480 | 2387-2400 | 2396.18 | -53.27 | -16 | Pass |
| NVNT | | 2480 | 2483.5-2496.5 | 2483.93 | -29.63 | -16 | Pass |
| NVNT | | 2480 | 2496.5-13000 | 2496.5 | -42.38 | -26 | Pass |

Test Graphs

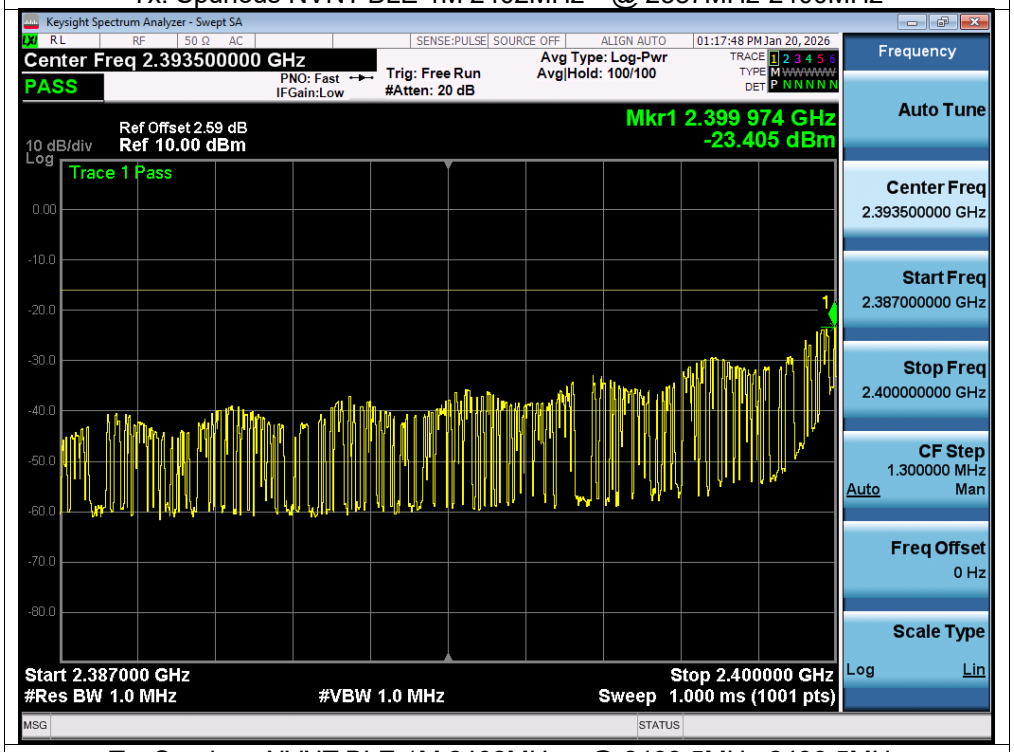
Tx. Spurious NVNT BLE 1M 2402MHz @ 30MHz-1000MHz



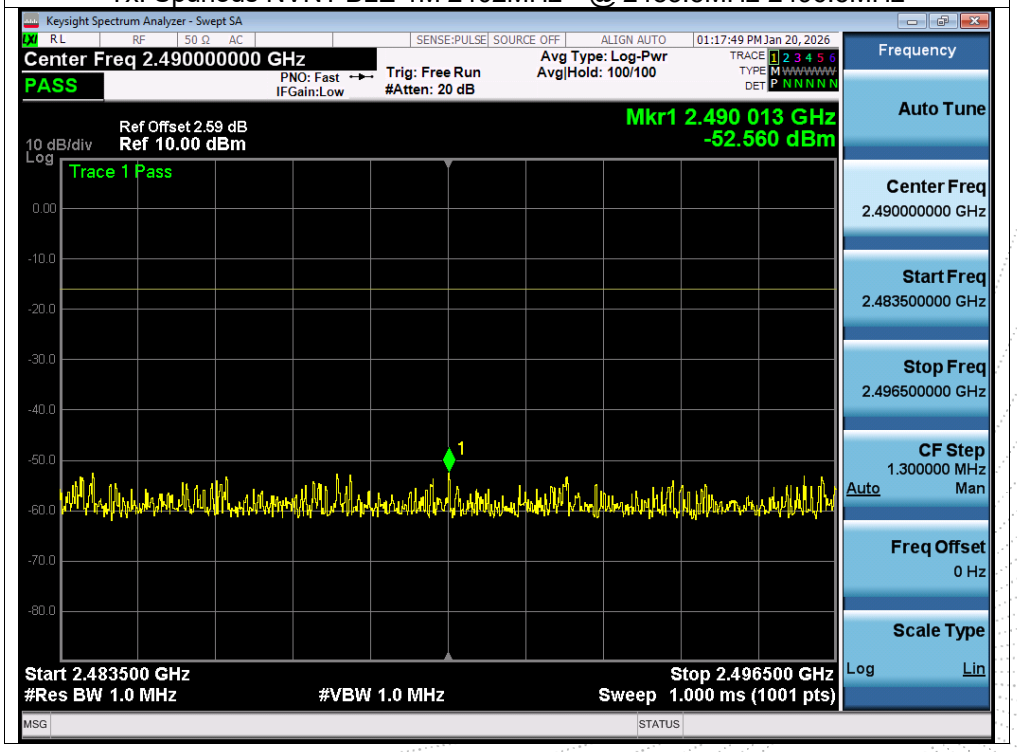

Tx. Spurious NVNT BLE 1M 2402MHz @ 1000MHz-2387MHz



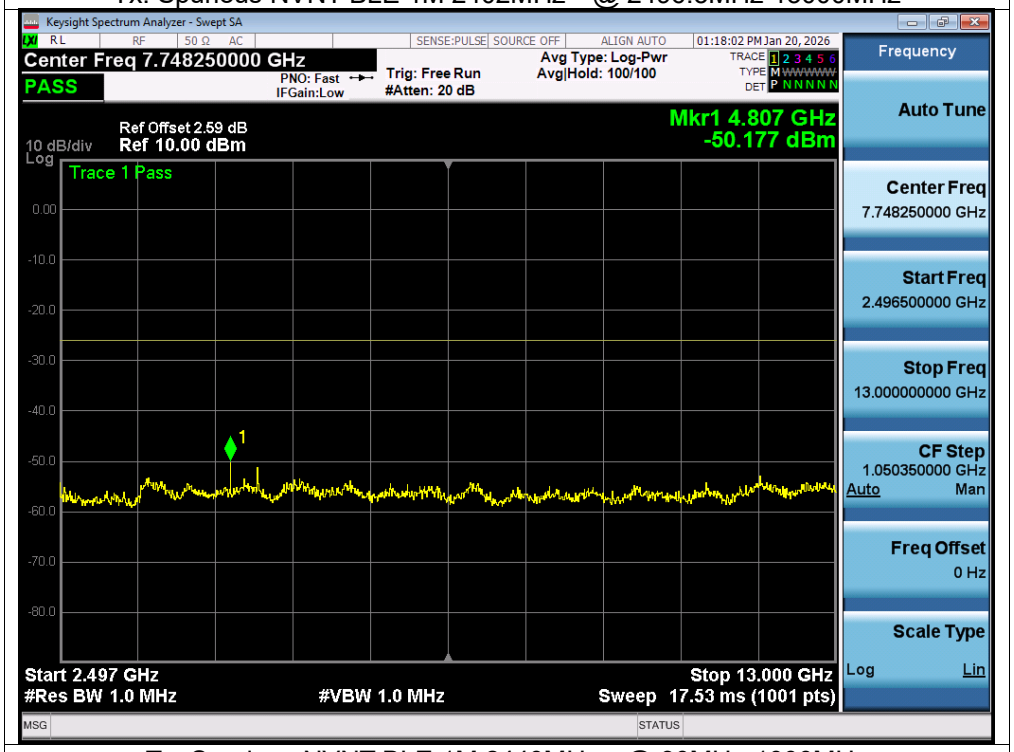
Tx. Spurious NVNT BLE 1M 2402MHz @ 2387MHz-2400MHz



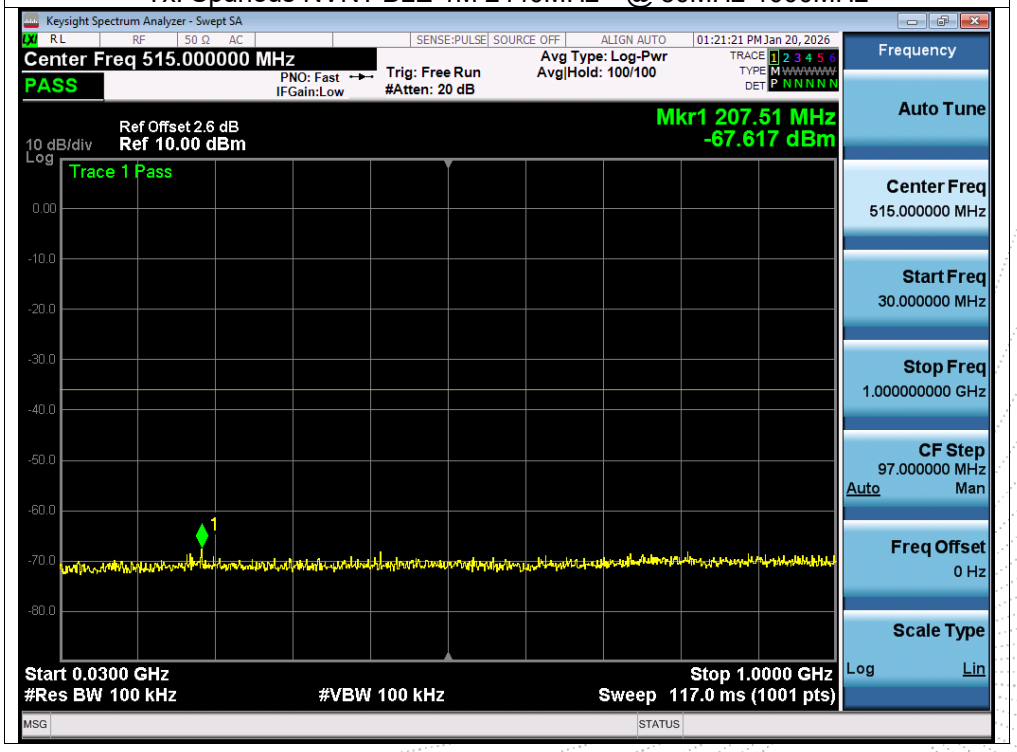

Tx. Spurious NVNT BLE 1M 2402MHz @ 2483.5MHz-2496.5MHz



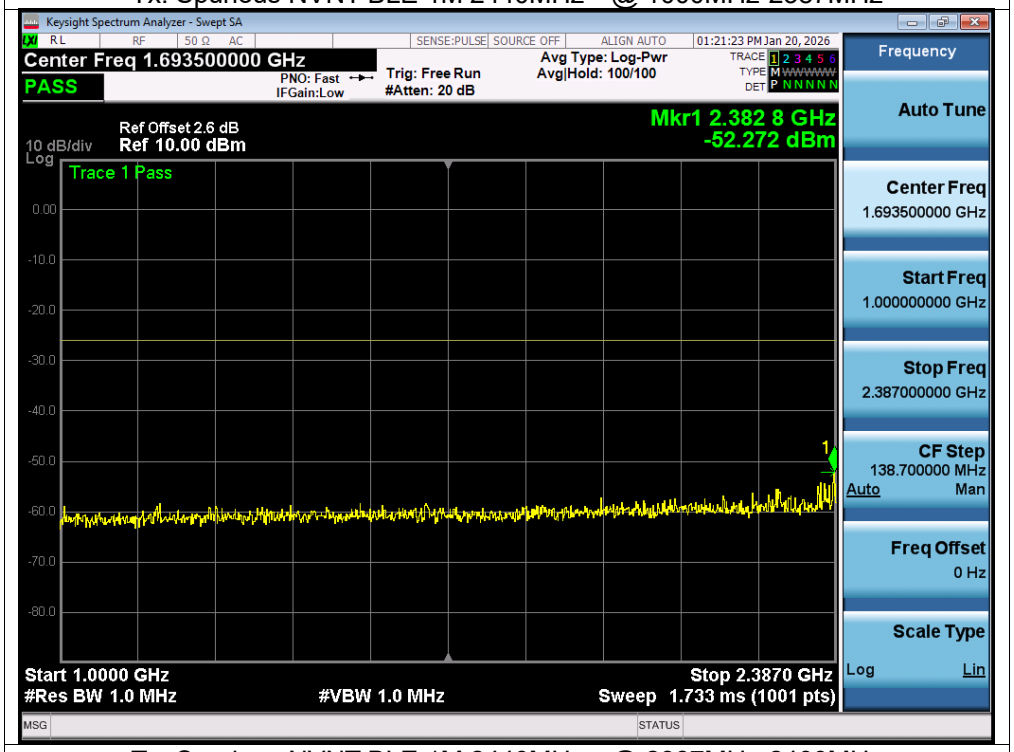
Tx. Spurious NVNT BLE 1M 2402MHz @ 2496.5MHz-13000MHz



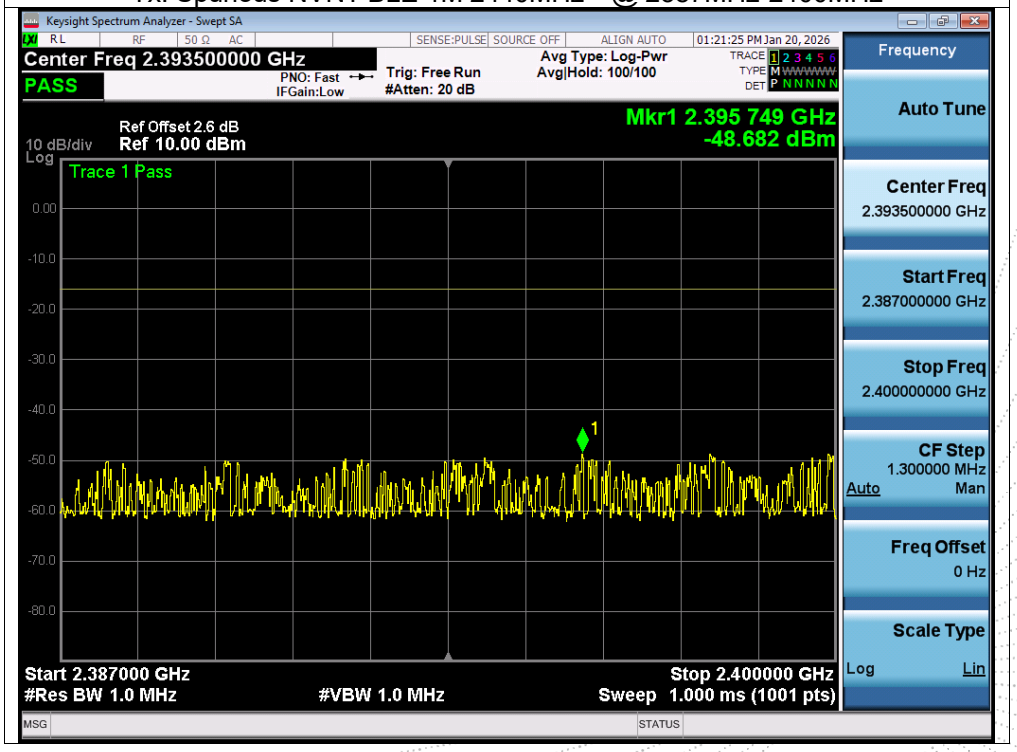

Tx. Spurious NVNT BLE 1M 2440MHz @ 30MHz-1000MHz



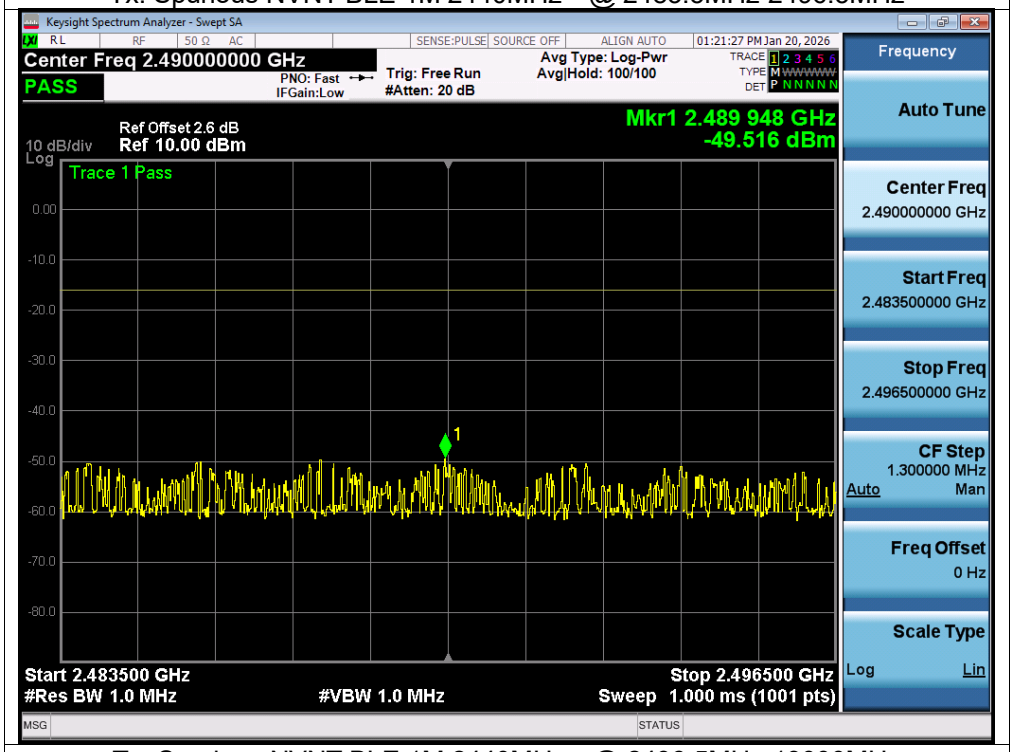
Tx. Spurious NVNT BLE 1M 2440MHz @ 1000MHz-2387MHz



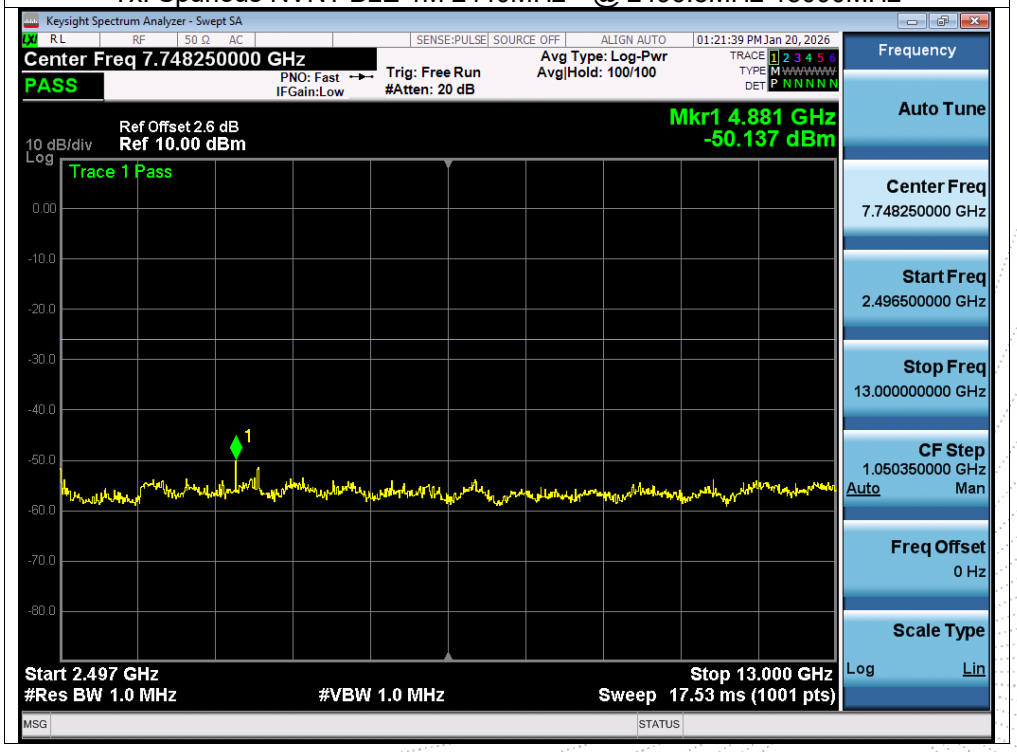

Tx. Spurious NVNT BLE 1M 2440MHz @ 2387MHz-2400MHz



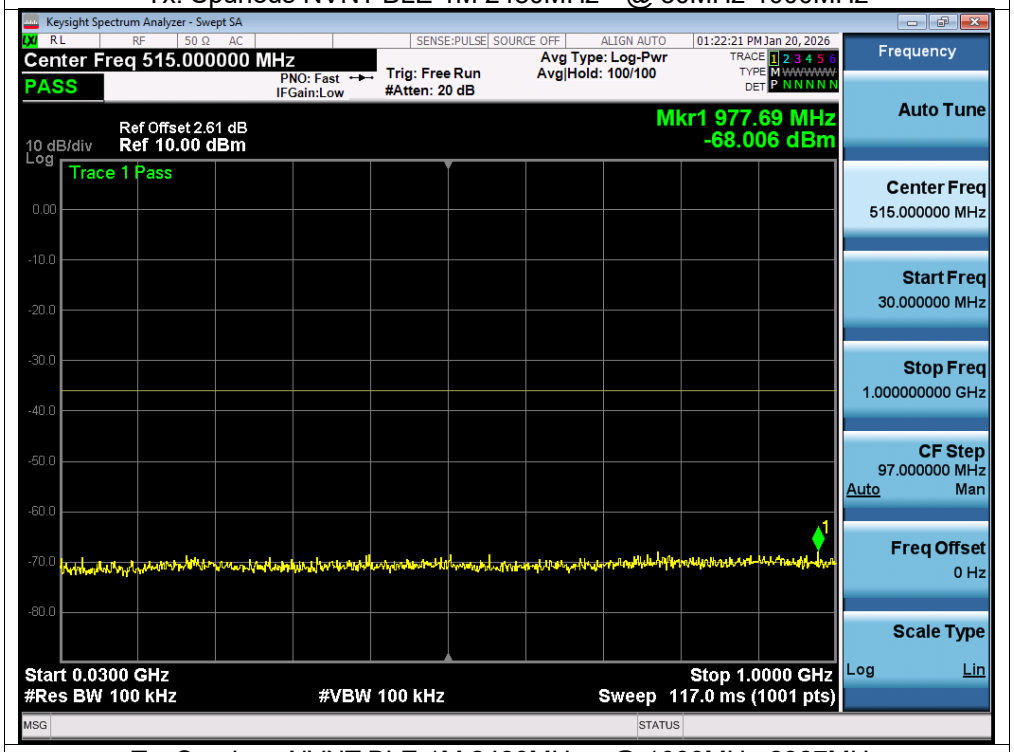
Tx. Spurious NVNT BLE 1M 2440MHz @ 2483.5MHz-2496.5MHz



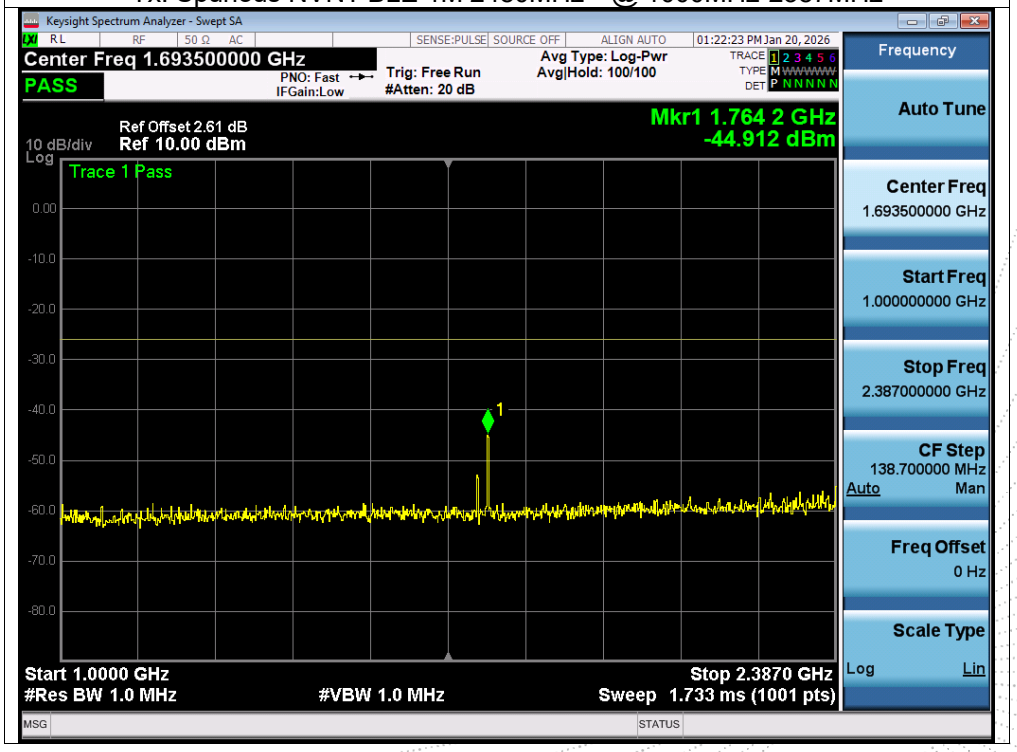

Tx. Spurious NVNT BLE 1M 2440MHz @ 2496.5MHz-13000MHz



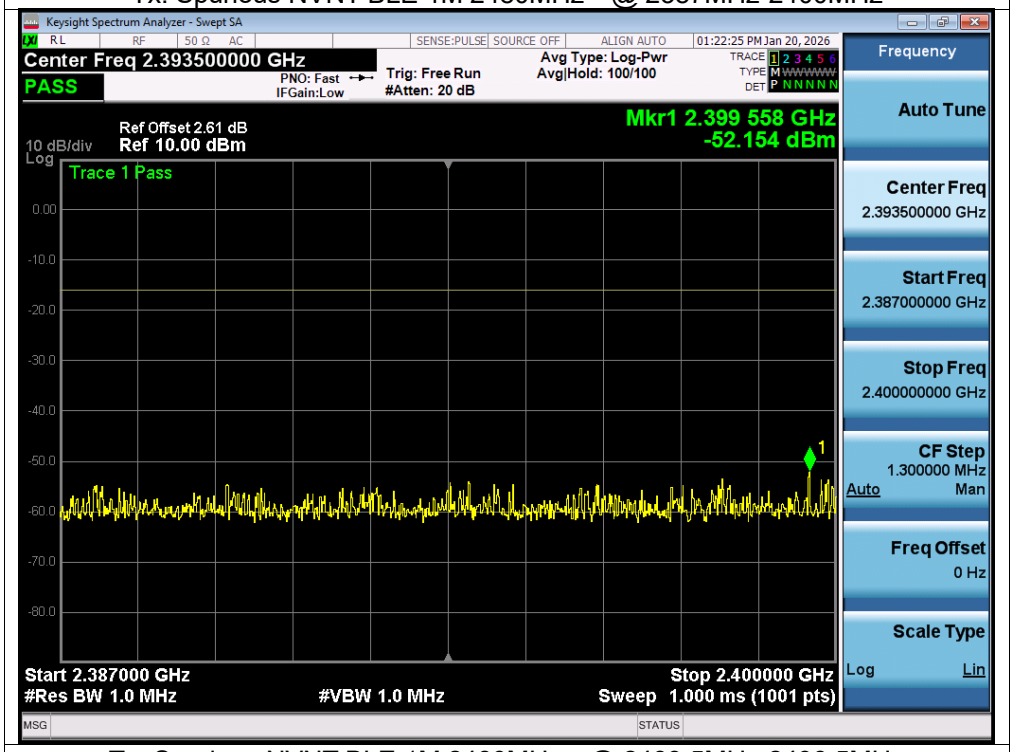
Tx. Spurious NVNT BLE 1M 2480MHz @ 30MHz-1000MHz



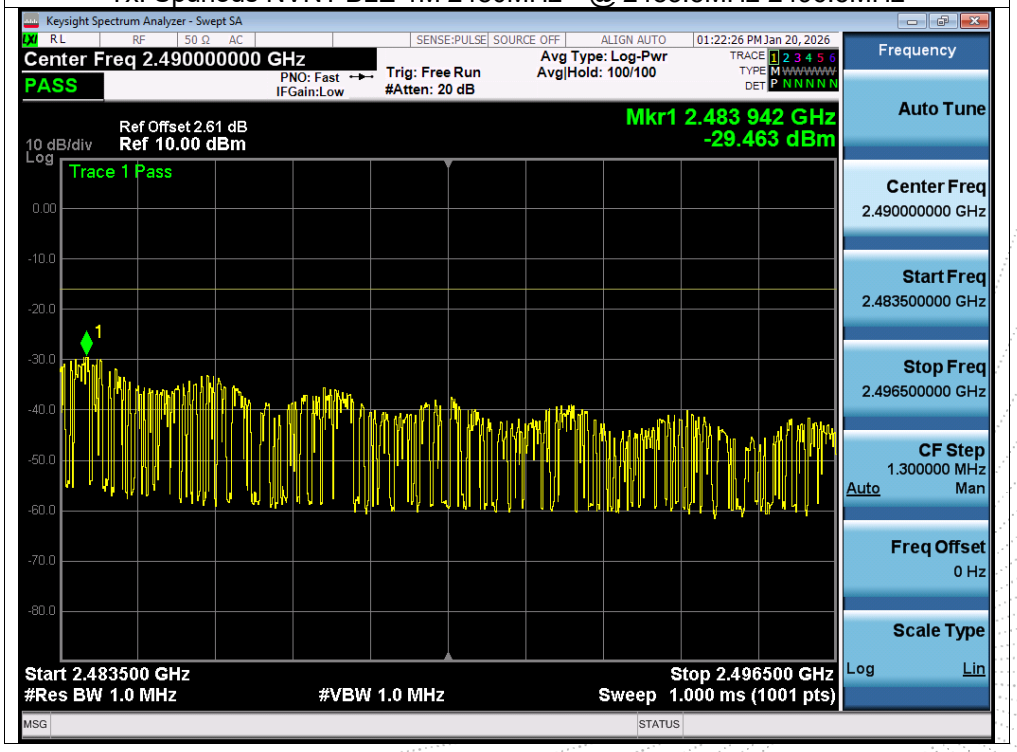

Tx. Spurious NVNT BLE 1M 2480MHz @ 1000MHz-2387MHz



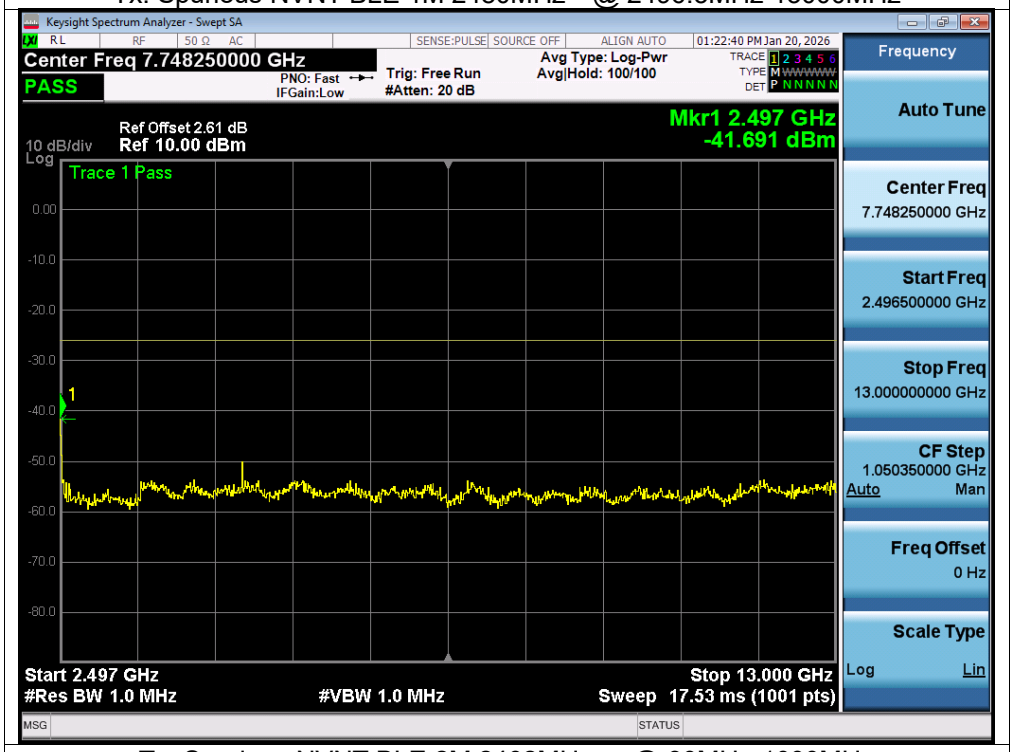
Tx. Spurious NVNT BLE 1M 2480MHz @ 2387MHz-2400MHz



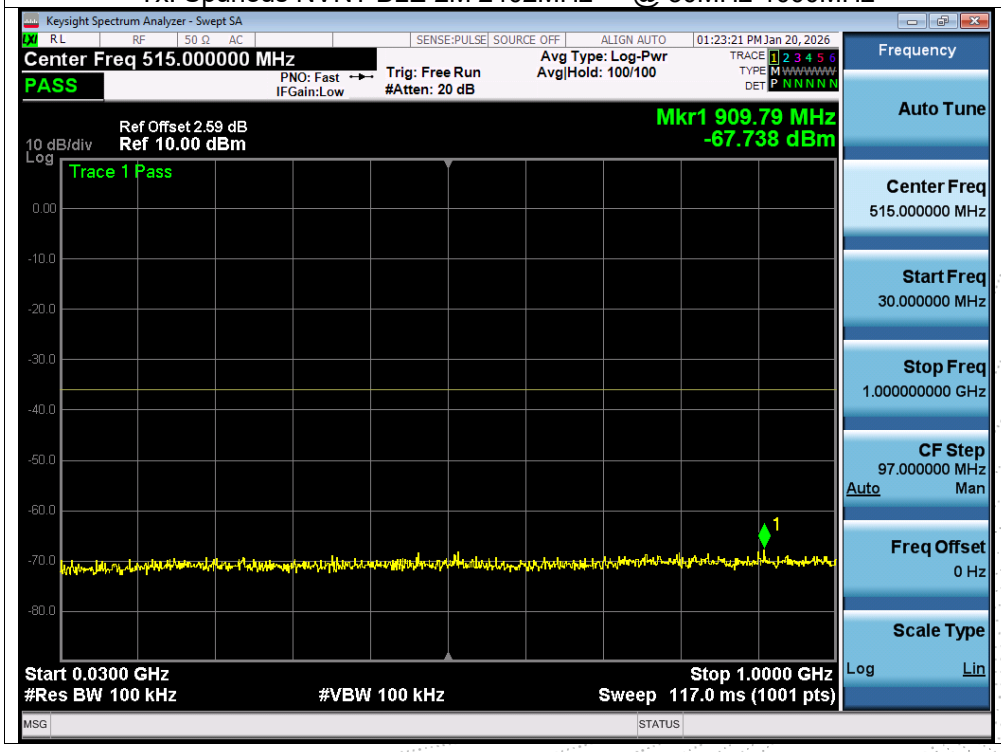

Tx. Spurious NVNT BLE 1M 2480MHz @ 2483.5MHz-2496.5MHz



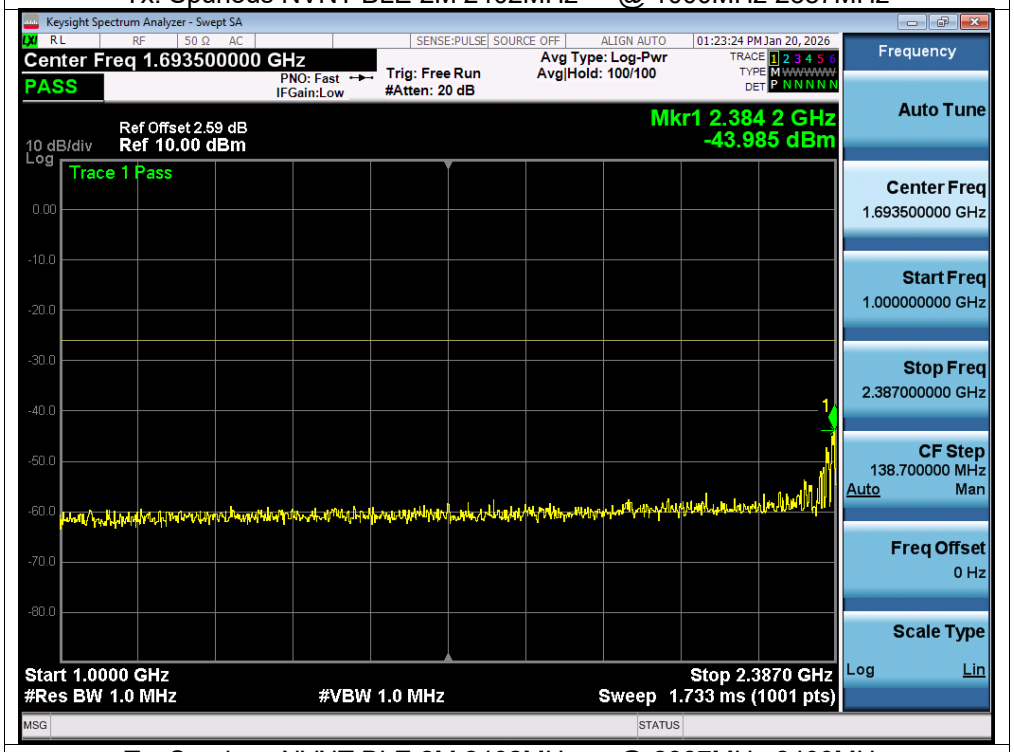
Tx. Spurious NVNT BLE 1M 2480MHz @ 2496.5MHz-13000MHz



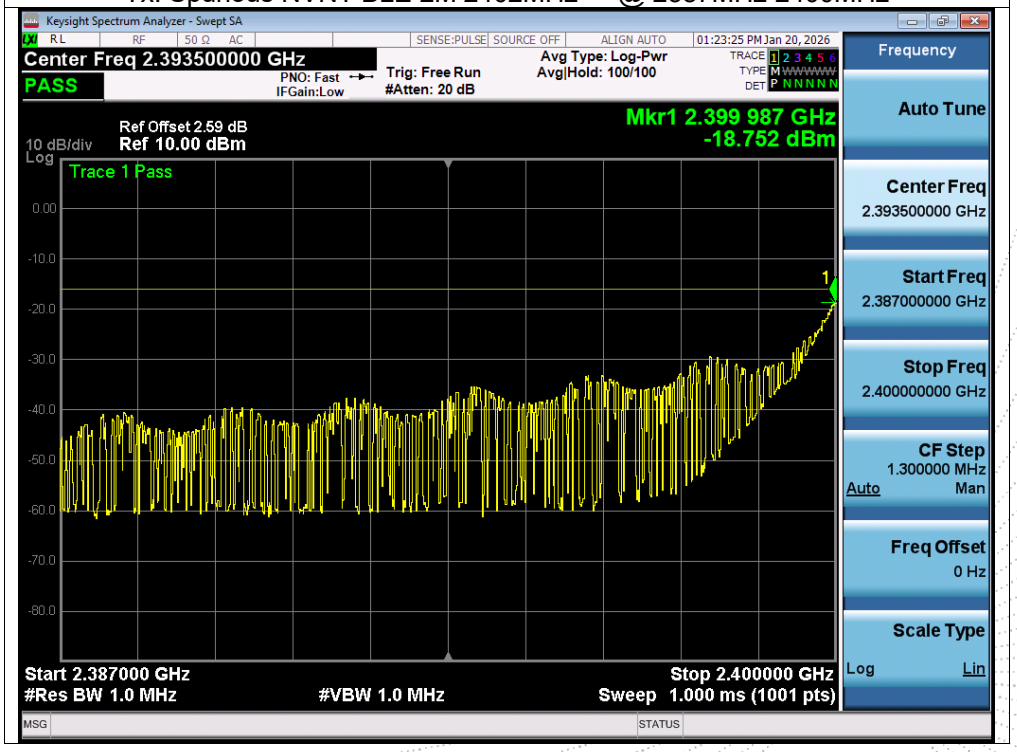

Tx. Spurious NVNT BLE 2M 2402MHz @ 30MHz-1000MHz



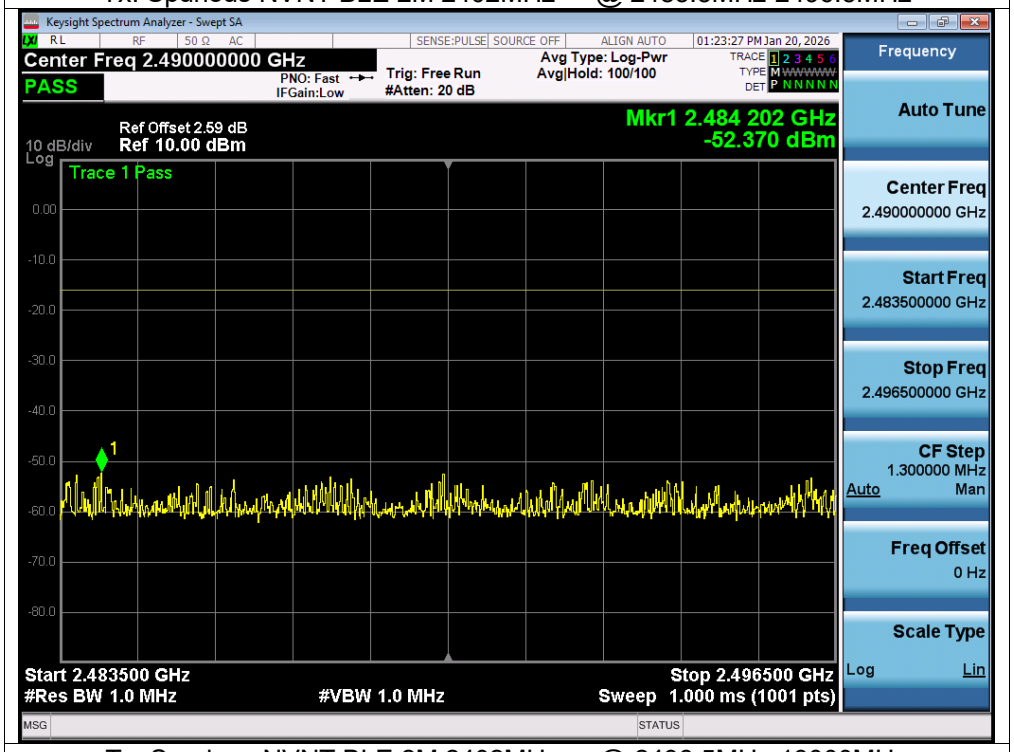
Tx. Spurious NVNT BLE 2M 2402MHz @ 1000MHz-2387MHz



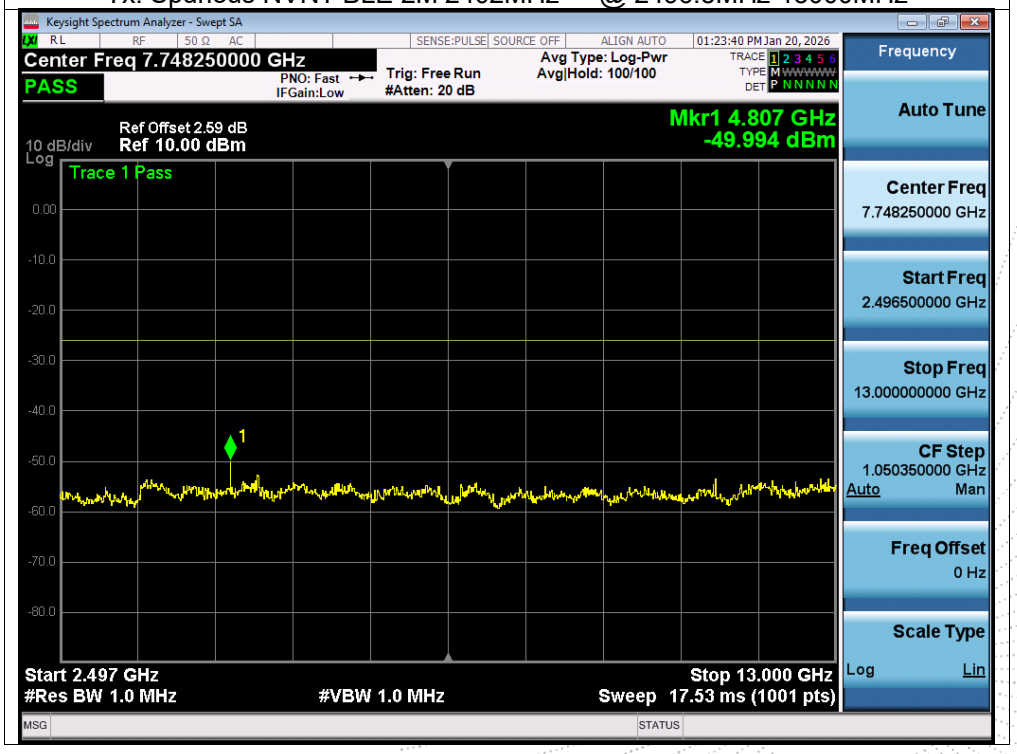

Tx. Spurious NVNT BLE 2M 2402MHz @ 2387MHz-2400MHz



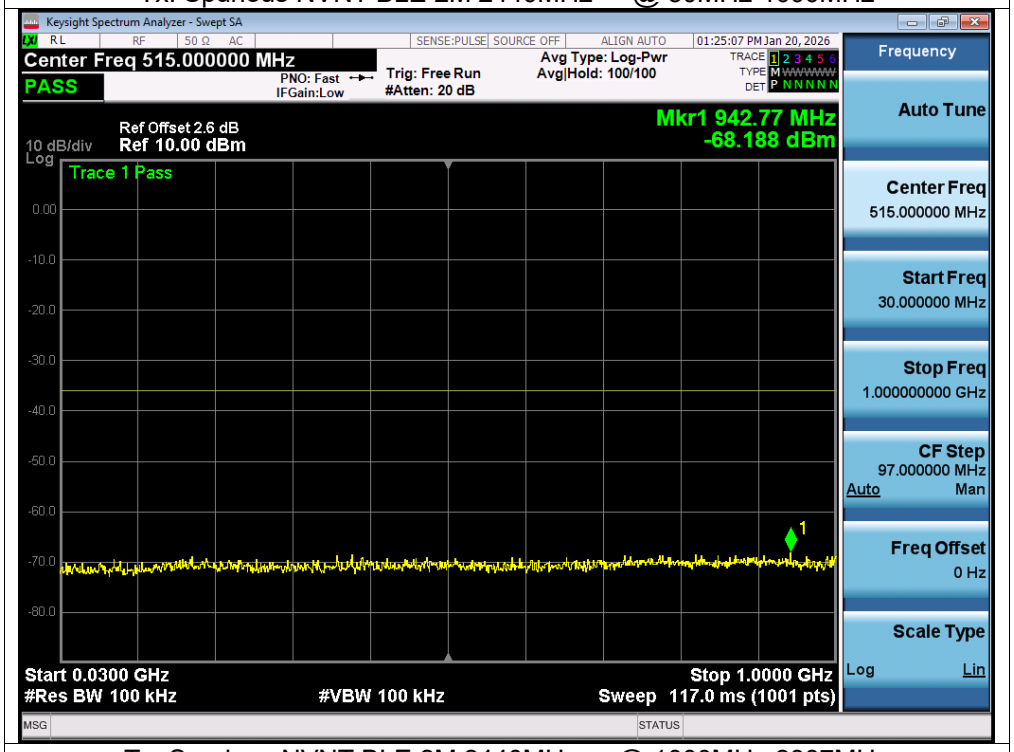
Tx. Spurious NVNT BLE 2M 2402MHz @ 2483.5MHz-2496.5MHz



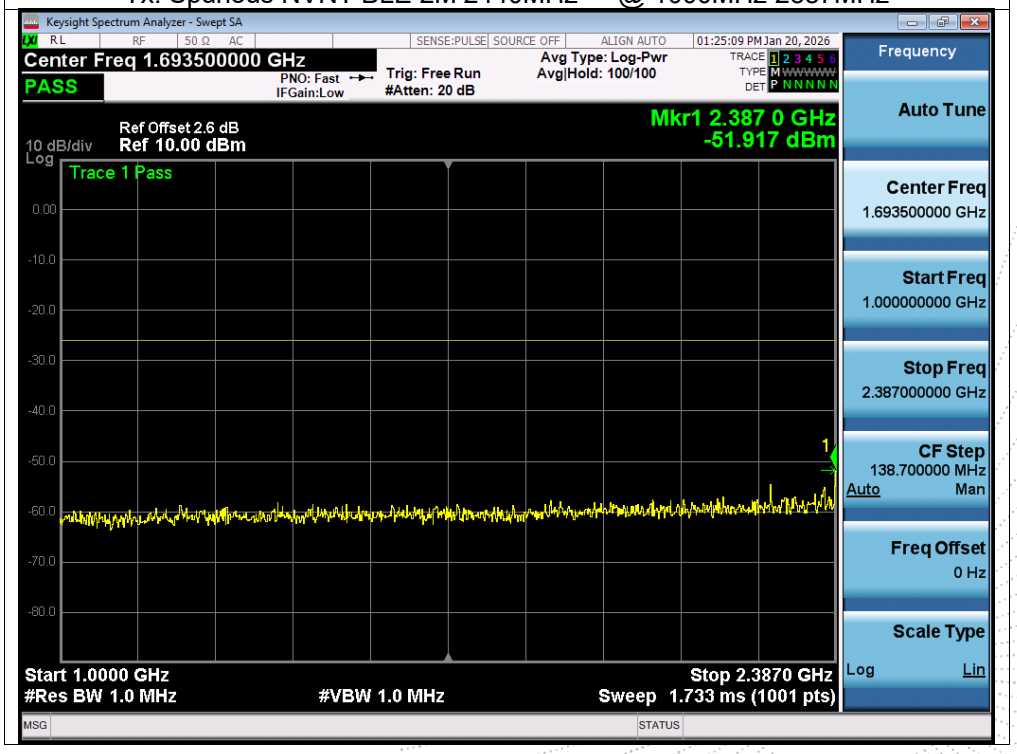

Tx. Spurious NVNT BLE 2M 2402MHz @ 2496.5MHz-13000MHz



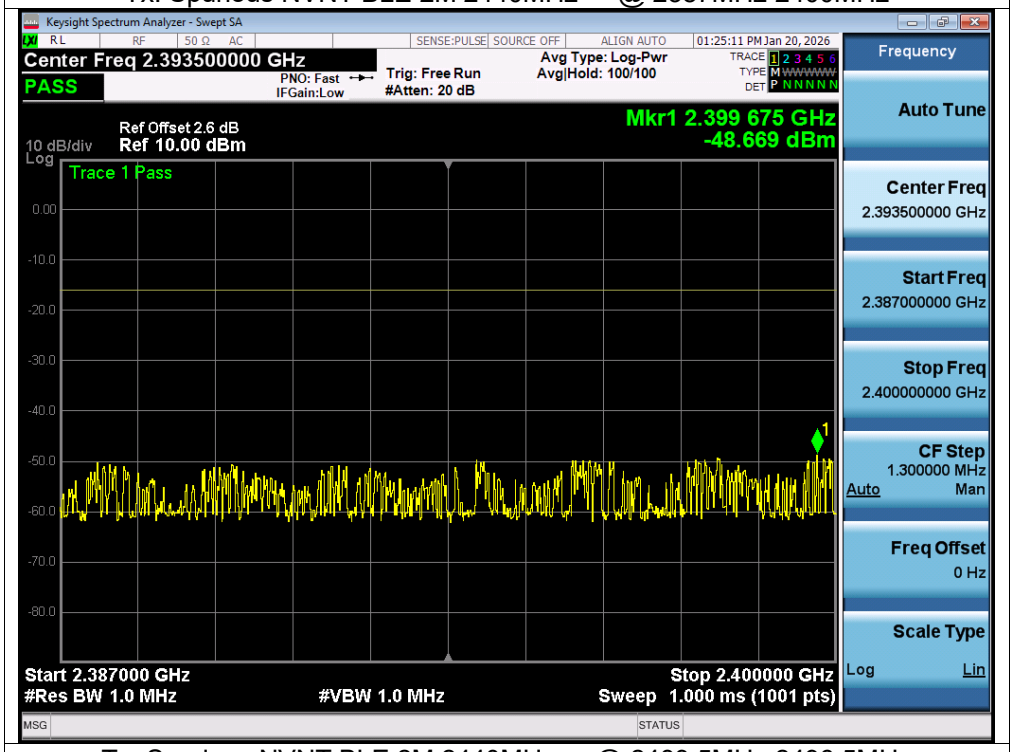
Tx. Spurious NVNT BLE 2M 2440MHz @ 30MHz-1000MHz



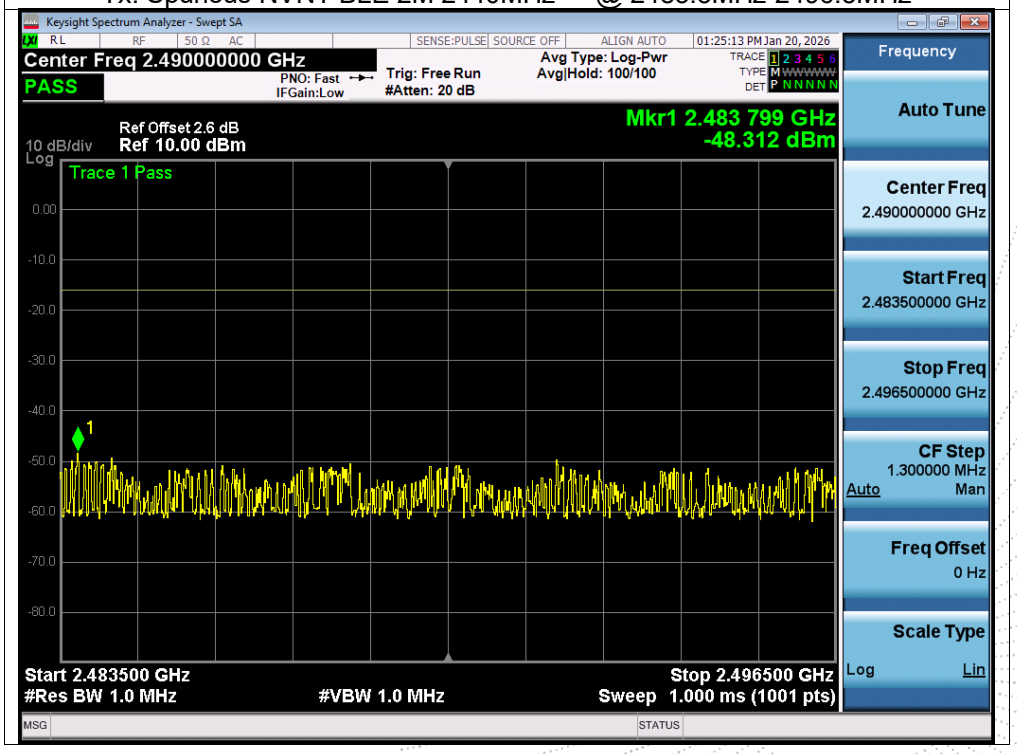

Tx. Spurious NVNT BLE 2M 2440MHz @ 1000MHz-2387MHz



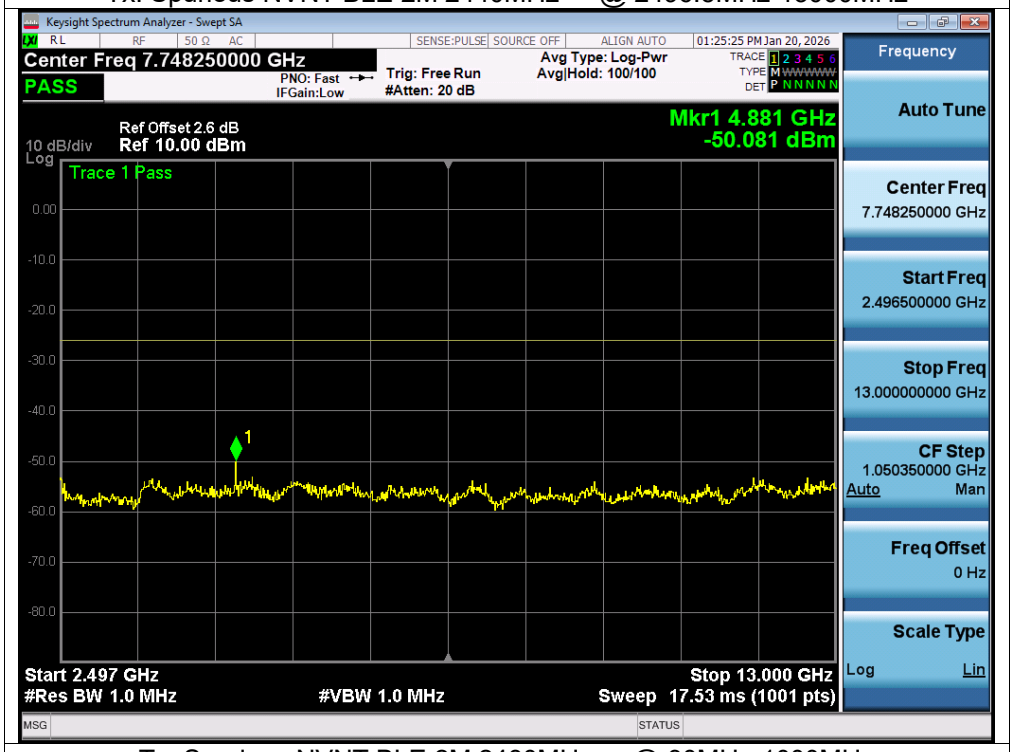
Tx. Spurious NVNT BLE 2M 2440MHz @ 2387MHz-2400MHz



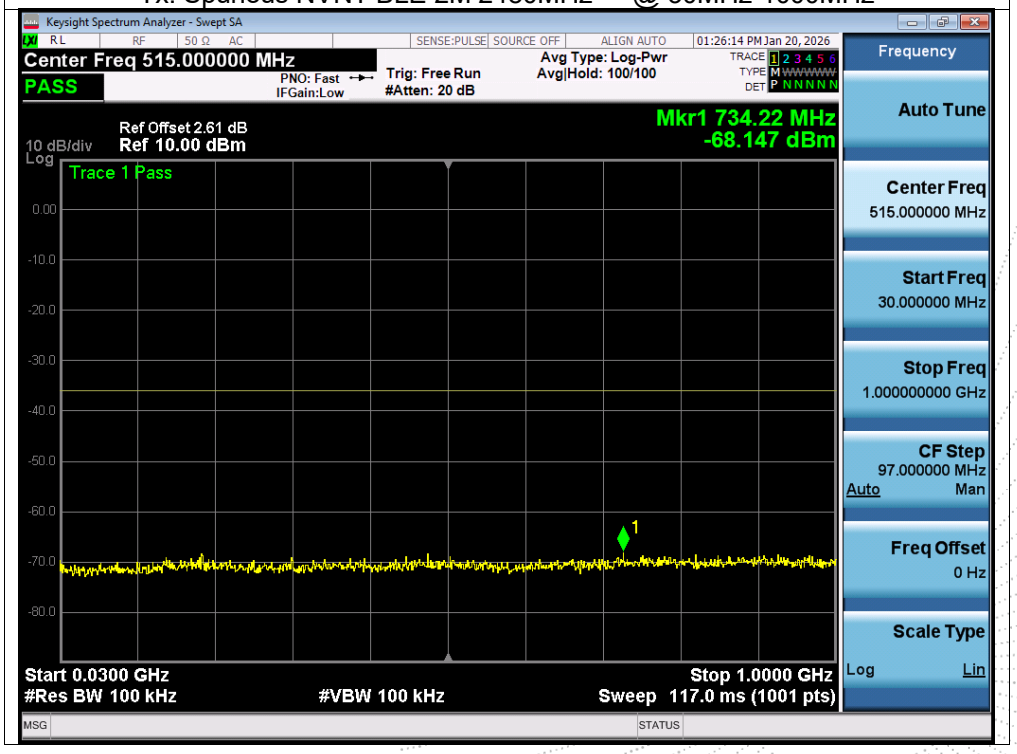

Tx. Spurious NVNT BLE 2M 2440MHz @ 2483.5MHz-2496.5MHz



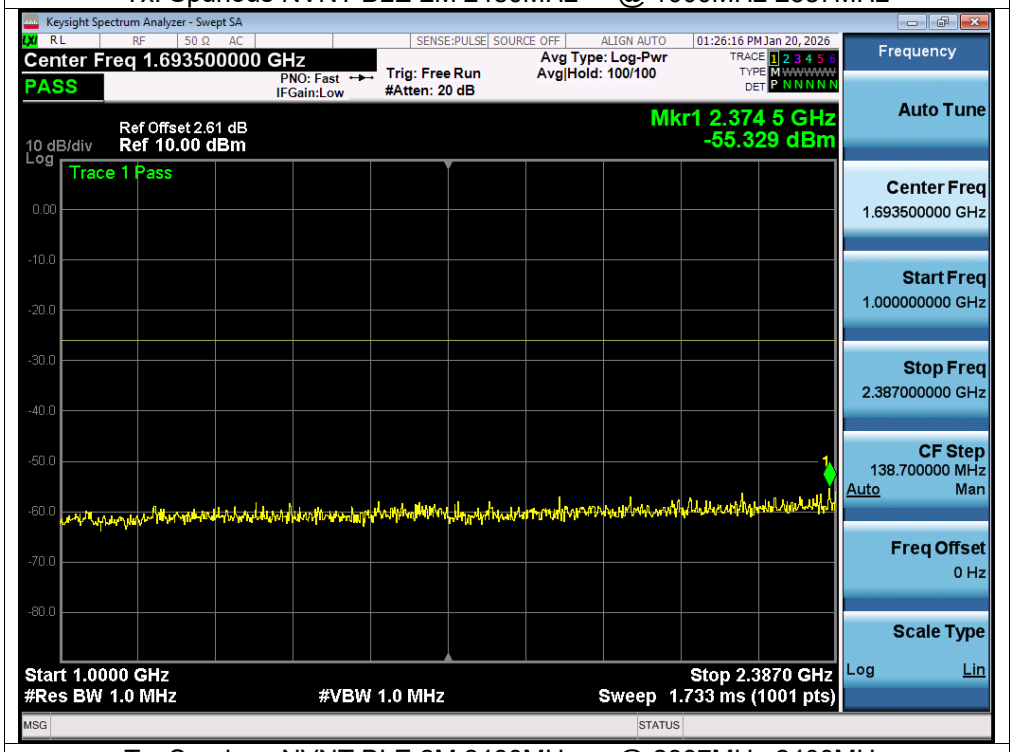
Tx. Spurious NVNT BLE 2M 2440MHz @ 2496.5MHz-13000MHz



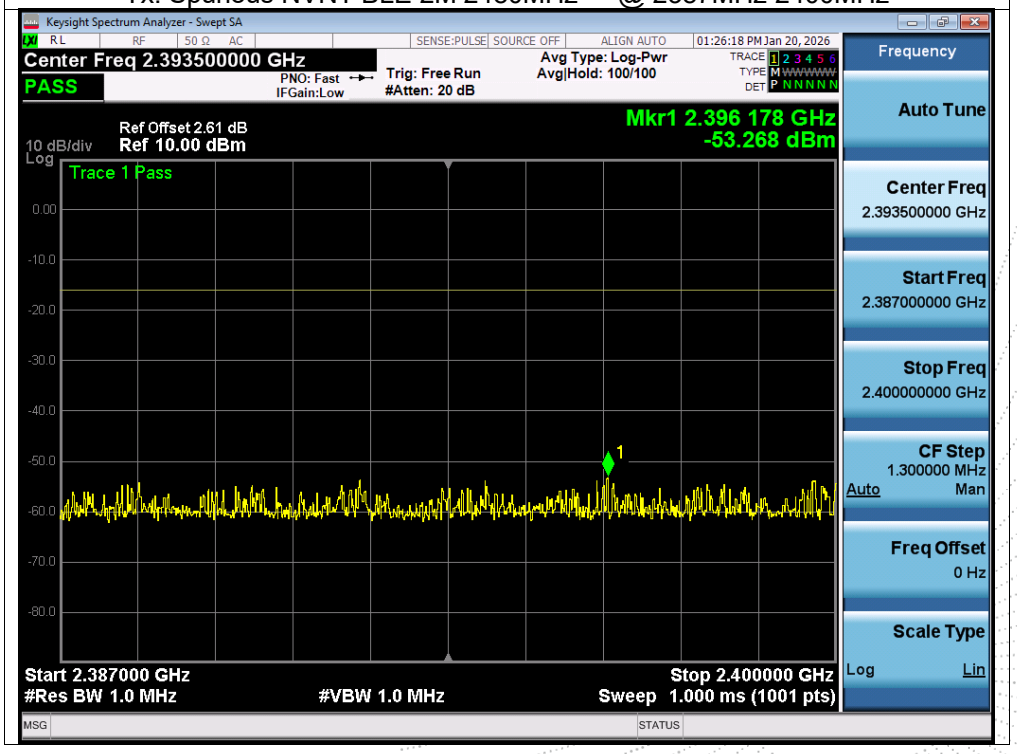

Tx. Spurious NVNT BLE 2M 2480MHz @ 30MHz-1000MHz



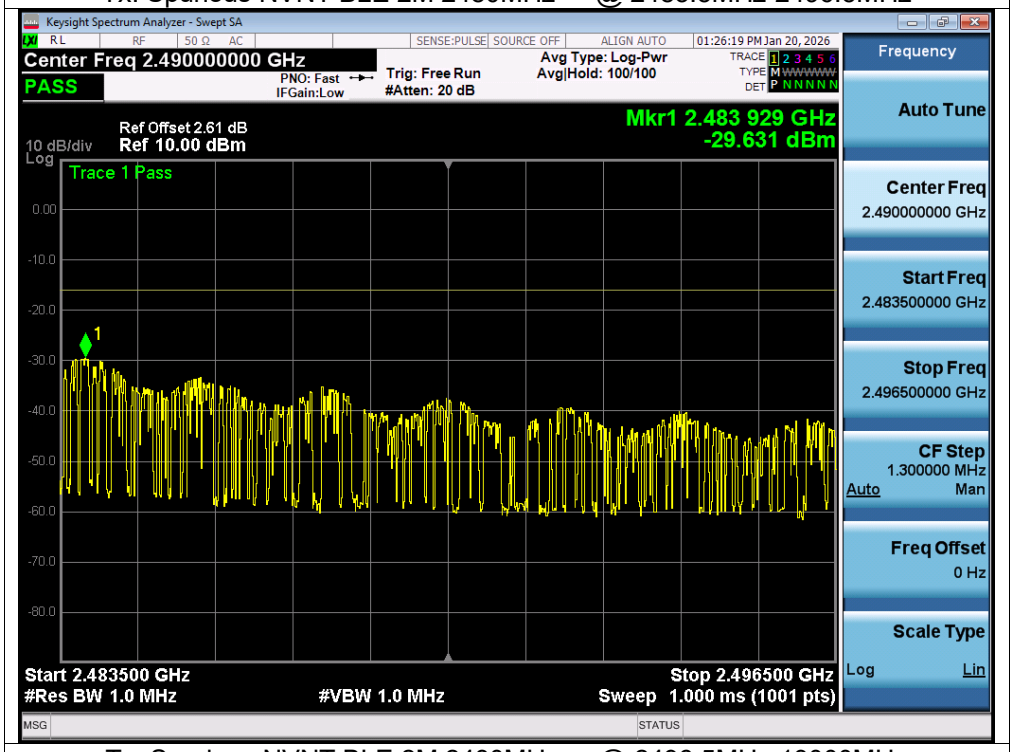
Tx. Spurious NVNT BLE 2M 2480MHz @ 1000MHz-2387MHz



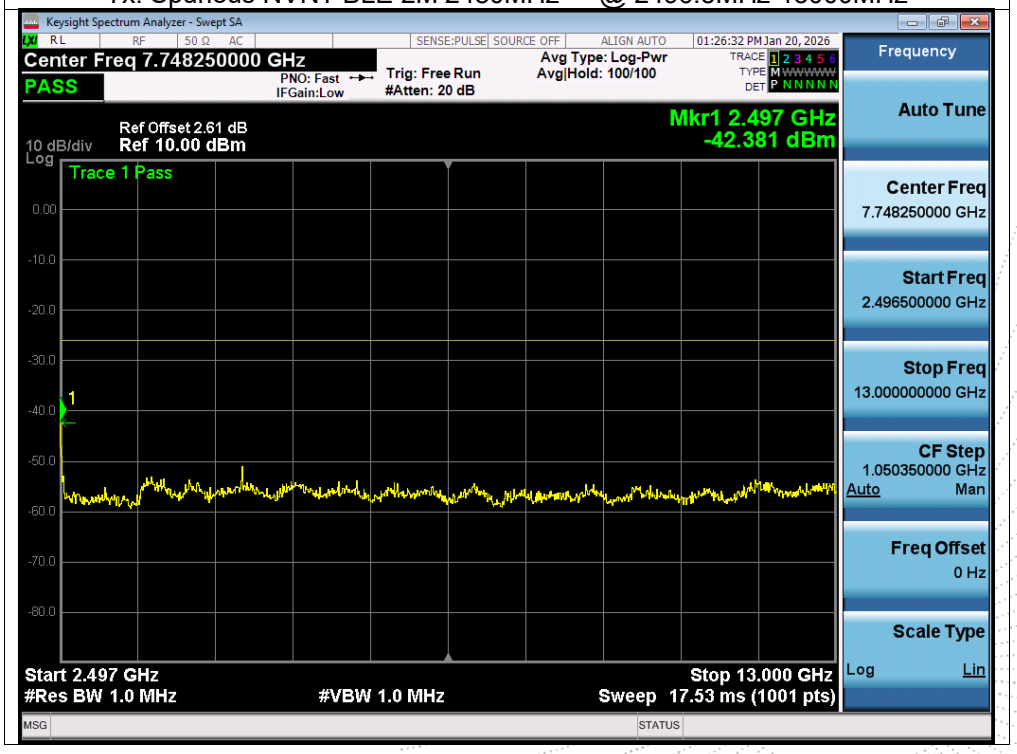

Tx. Spurious NVNT BLE 2M 2480MHz @ 2387MHz-2400MHz



Tx. Spurious NVNT BLE 2M 2480MHz @ 2483.5MHz-2496.5MHz

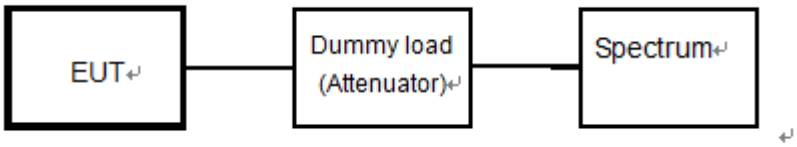



Tx. Spurious NVNT BLE 2M 2480MHz @ 2496.5MHz-13000MHz



# 11. Imitation Of Collateral Emission Of Receiver Measurement

## 11.1 Block Diagram Of Test Setup




## 11.2 Limit

| Item | Limits |
|---|---|
| RX Spurious Emission: | ≦4nW (-54dBm) (f<1GHz) |
| | ≦20nW (-47dBm) (1GHz≦f) |

## 11.3 Measuring Instruments And Setting

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| RB | 100 kHz (below 1GHz emissions)<br>1 MHz (above 1GHz emissions) |
| VB | 100 kHz (below 1GHz emissions)<br>1 MHz (above 1GHz emissions) |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

## 11.4 Test procedure

1. EUT have the continuous reception mode and fixed only one channelize.
2. Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) /AT: 6dB / Ref: -20dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
3. SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
4. SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW
5. If power level of lower emissions are more than 1/10 of limit (.0.4nW for f < 1GHz, 2nW for f >= 1GHz), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.

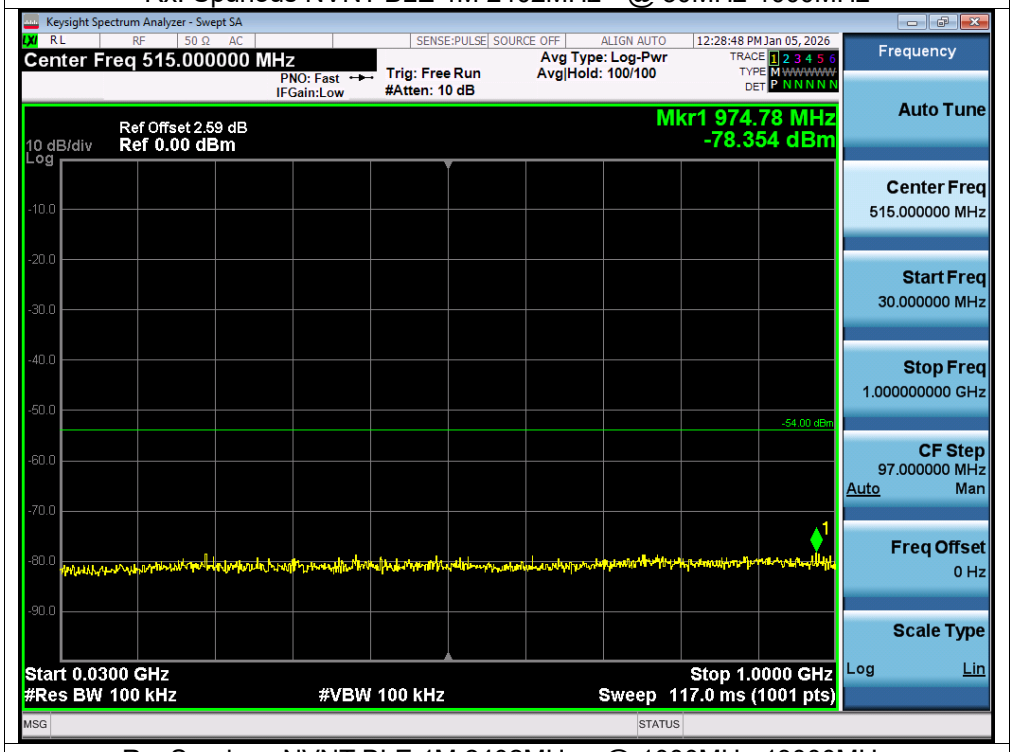
## 11.5 Test Result

| | | | |
|---|---|---|---|
| Temperature: | 26°C | | |
| Humidity: | 54%RH | Test Voltage | DC 3V |
| Operation Mode: | GFSK Normal Voltage | | |

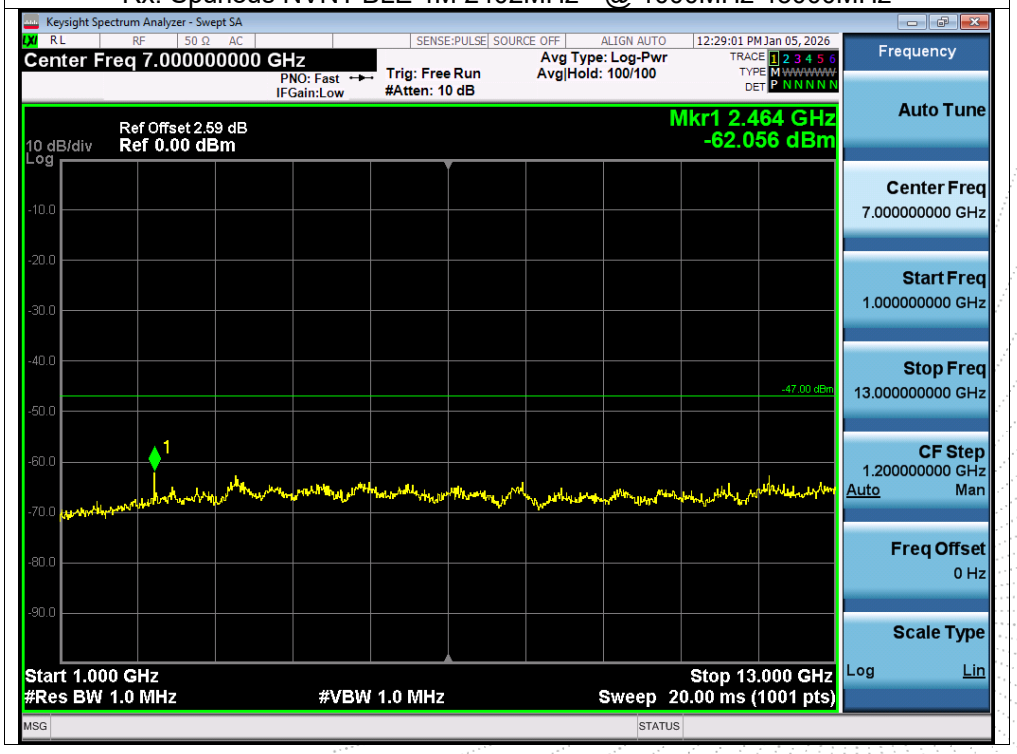
| Condition | Mode | Frequency (MHz) | Range (MHz) | Emission Frequency (MHz) | Max Value (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|---|
| NVNT | GFSK | 2402 | 30-1000 | 974.78 | -78.35 | -54 | Pass |
| NVNT | | 2402 | 1000-13000 | 2464 | -62.06 | -47 | Pass |
| NVNT | | 2440 | 30-1000 | 795.33 | -78.19 | -54 | Pass |
| NVNT | | 2440 | 1000-13000 | 3736 | -63.23 | -47 | Pass |
| NVNT | | 2480 | 30-1000 | 871.96 | -77.16 | -54 | Pass |
| NVNT | | 2480 | 1000-13000 | 3700 | -62.22 | -47 | Pass |

Test Graphs

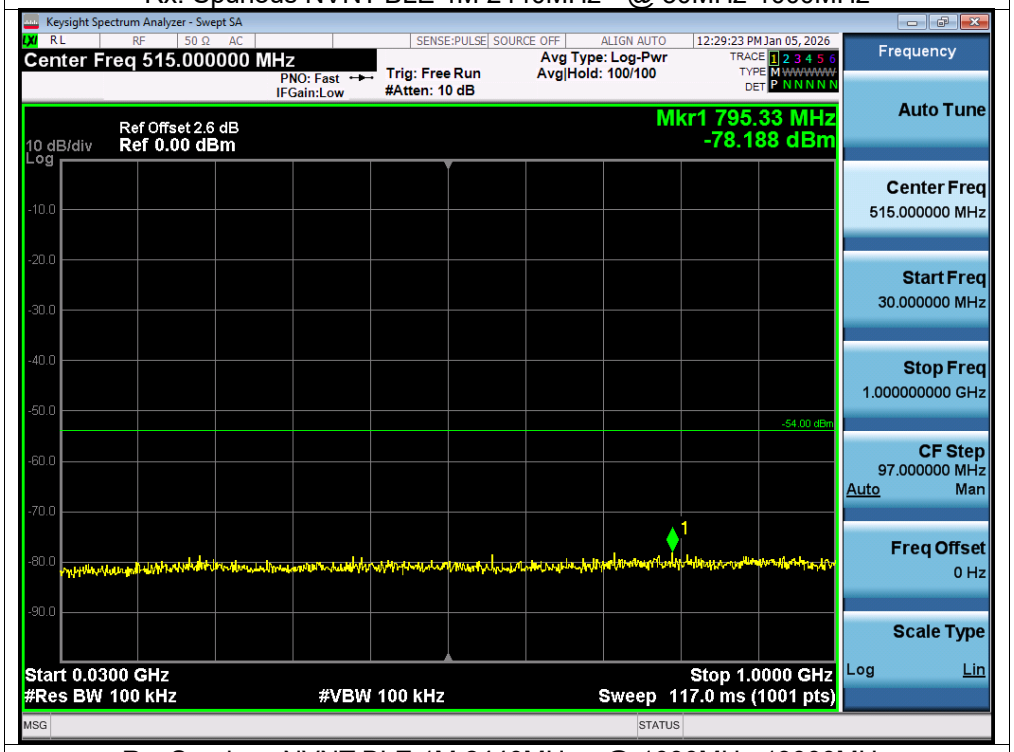
Rx. Spurious NVNT BLE 1M 2402MHz @ 30MHz-1000MHz



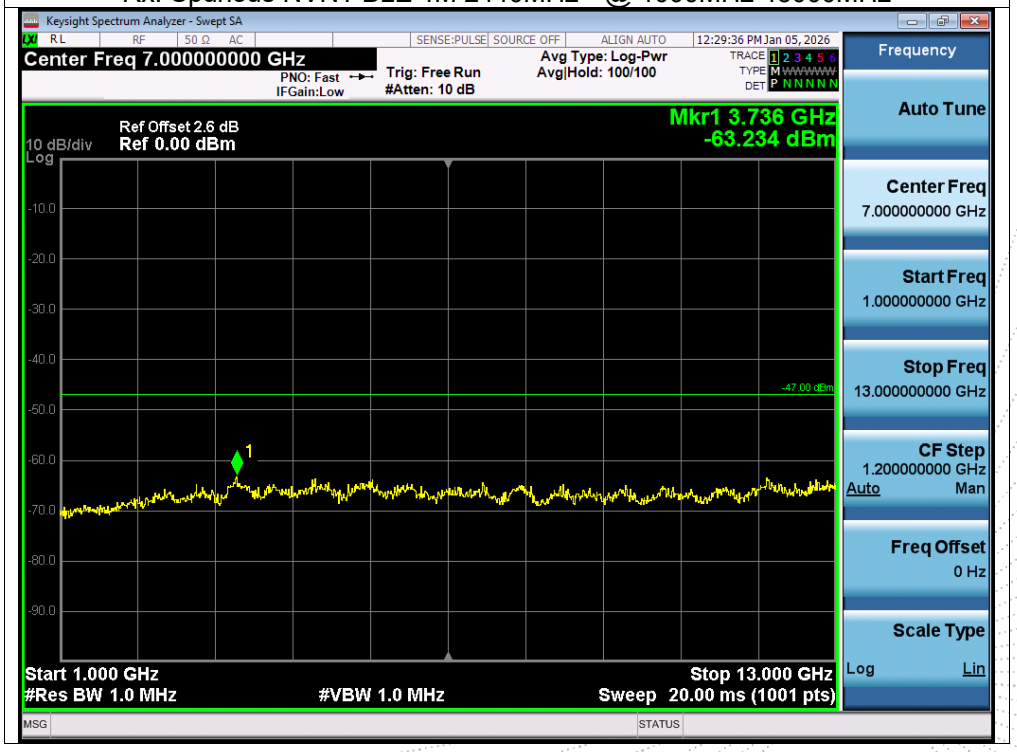

Rx. Spurious NVNT BLE 1M 2402MHz @ 1000MHz-13000MHz



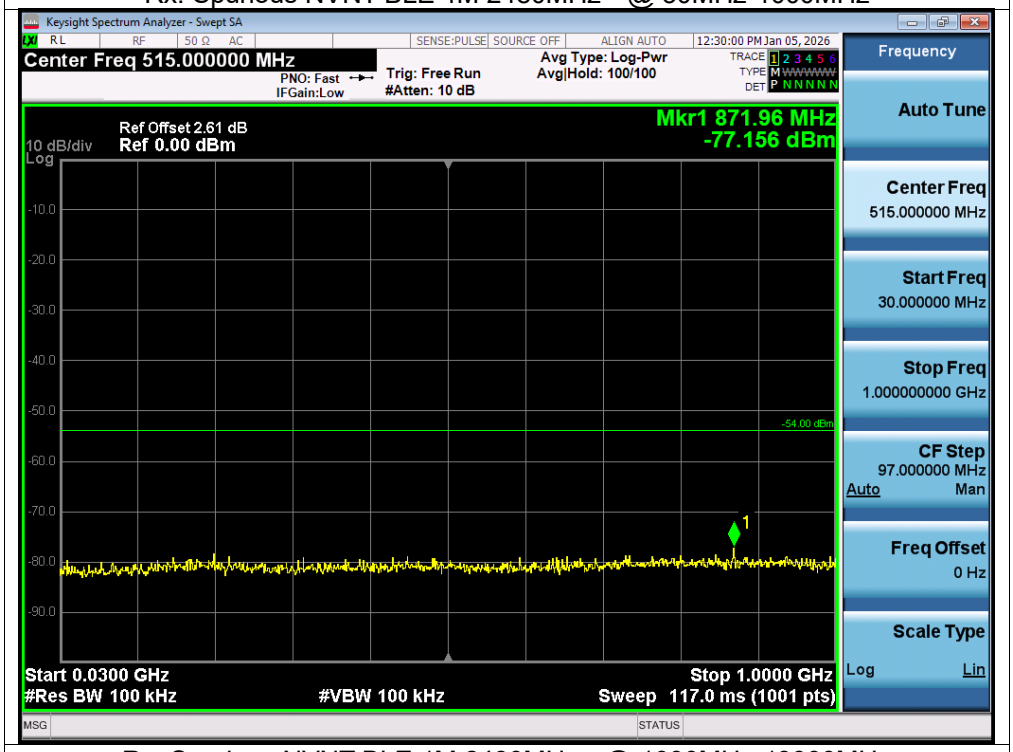
Rx. Spurious NVNT BLE 1M 2440MHz @ 30MHz-1000MHz



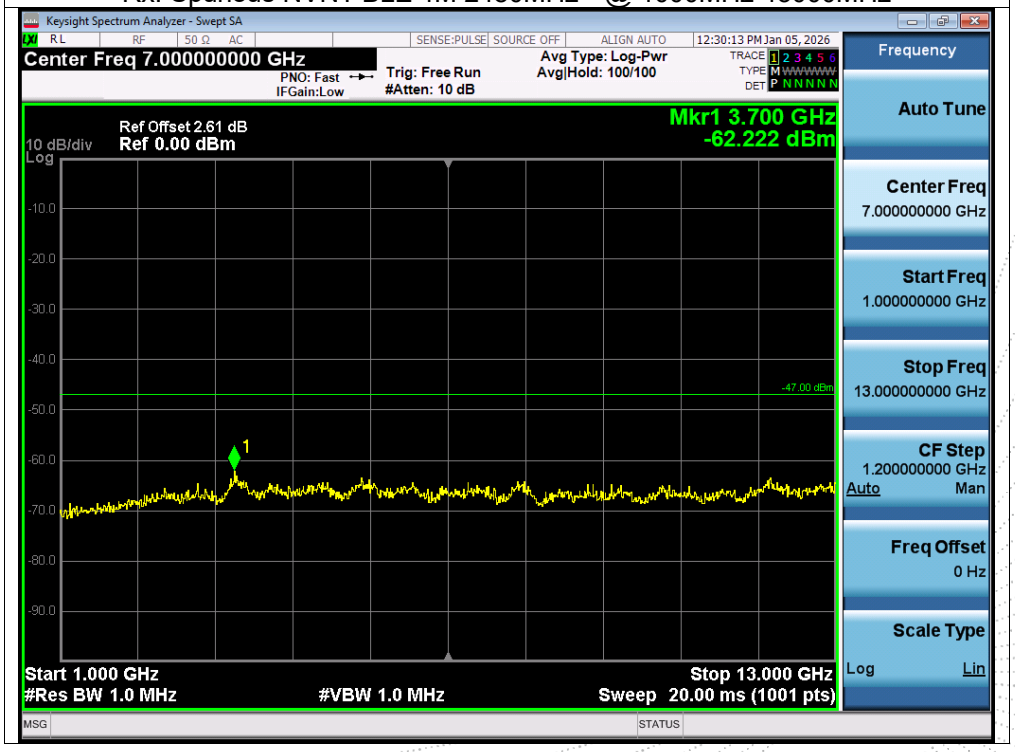

Rx. Spurious NVNT BLE 1M 2440MHz @ 1000MHz-13000MHz



Rx. Spurious NVNT BLE 1M 2480MHz @ 30MHz-1000MHz



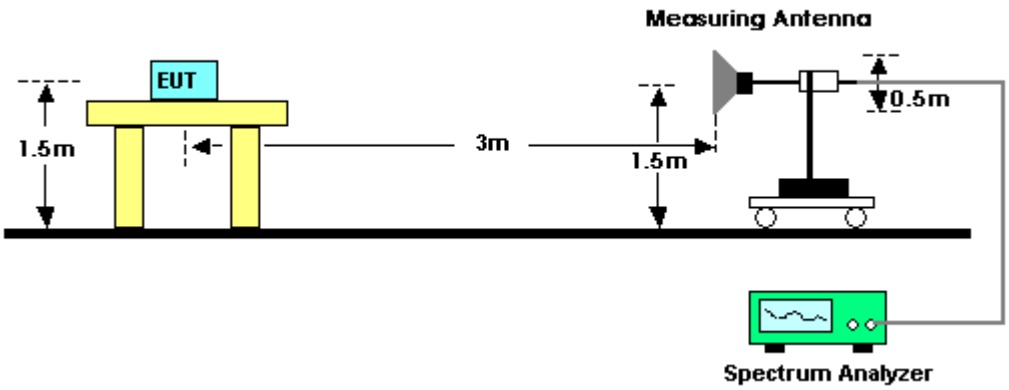

Rx. Spurious NVNT BLE 1M 2480MHz @ 1000MHz-13000MHz



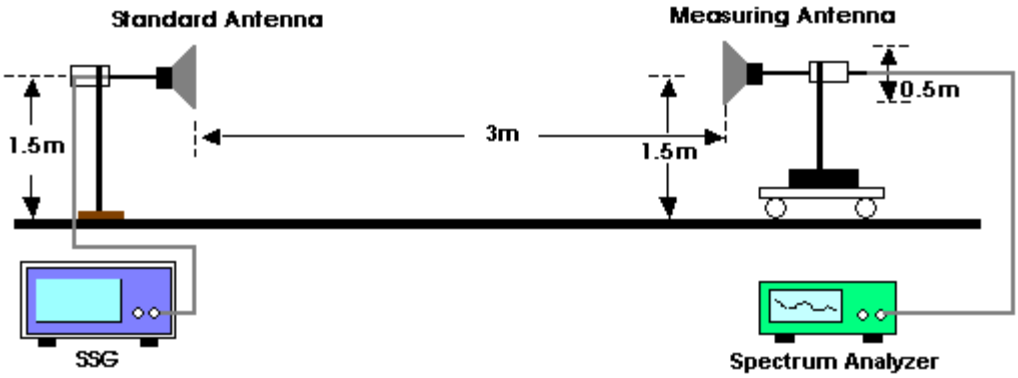
# 12. Transmission Antenna Gain (EIRP Antenna Power) Measurement

## 12.1 Block Diagram Of Test Setup

**For EUT radiation measurement**




**For standard antenna measurement**




## 12.2 Limit

| Item | Limits |
|---|---|
| EIRP Power Density | ≦16.91dBm/MHz (FH form 2427 - 2470.75 MHz)<br>≦22.14dBm/MHz (OFDM,DS from 2400~2483.5MHz)<br>≦22.14dBm (Other from 2400~2483.5MHz) |
| Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz, but Antenna Power(Conducted) limit is 10 mW/MHz (10 dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less | |

## 12.3 Measuring Instruments And Setting

Please refer to section 5 in this report. The following table is the setting of spectrum analyzer.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| RB/VB | 1 MHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

## 12.4 Test procedure

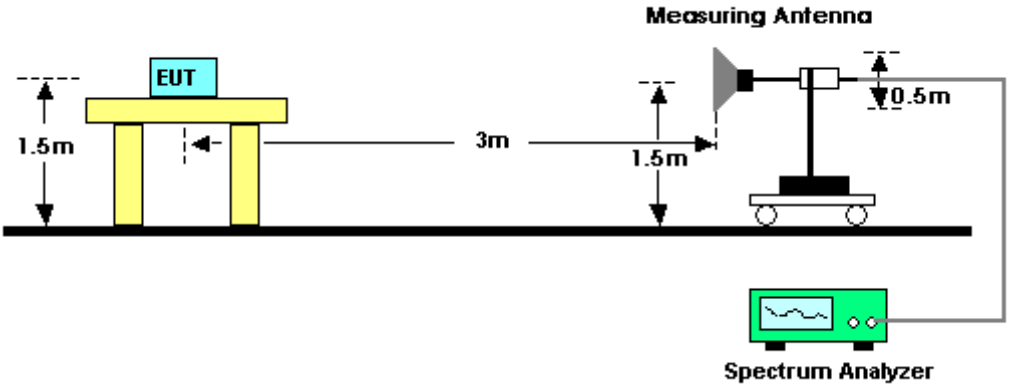
1. Set EUT ad measuring antenna at the same height and roughly facing each other.
2. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read sa “E“.
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within ± 50cm of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at Pt to give the equivalent output level of “E” or caluate Pt with SSG output which gives the nearest of “E” and difference (± 1dB). Record the Pt.
7. Calculate EIRP by the formula below EIRP = Gt – L + Pt.
Gt: gain of replacing antenna (dBi)
L: feeder loss between SSG and replacing antenna
Pt: Output power of the SSG
8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization.

## 12.5 Test Result

The test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less.

# 13. Transmission Radiation Angle Width (3db Beamwidth) Measurement

## 13.1 Block Diagram Of Test Setup




## 13.2 Limit

| Item | Limits |
|---|---|
| 3dB antenna beam width | 360/A (If A<1; then A=1) |
| Note: A = E.I.R.P. / ( 2.14dBi + "Antenna Power (limit)" of each modulation method (*3mW/MHz, 10mW/MHz, etc.)) | |

## 13.3 Measuring Instruments And Setting

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | 0 MHz |
| RB | 1 MHz |
| VB | 1 kHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

## 13.4 Test procedure

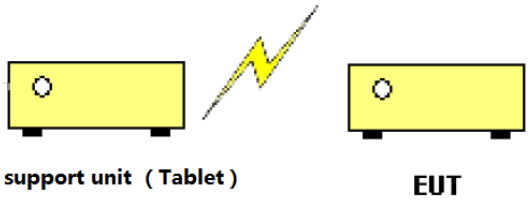
1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 4.7.2 and tune reference level to observe receving signal position.
3. Rotate directions of the EUT horizontally and ertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of measuing antenna. The output level at the spectrum analyzer is read as “E”
5. Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below 360/A (If A<1; then A=1).

## 13.5 Test Result

N/A

# 14. Radio Interference Prevention Capability Measurement

## 14.1 Block Diagram Of Test Setup




## 14.2 Limit

| Item | Limits |
|---|---|
| Identification code | ≥48 bits |

## 14.3 Measuring Instruments And Setting

| Item | Limits |
|---|---|
| MAC IP List | MAC Scan |

## 14.4 Test procedure

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

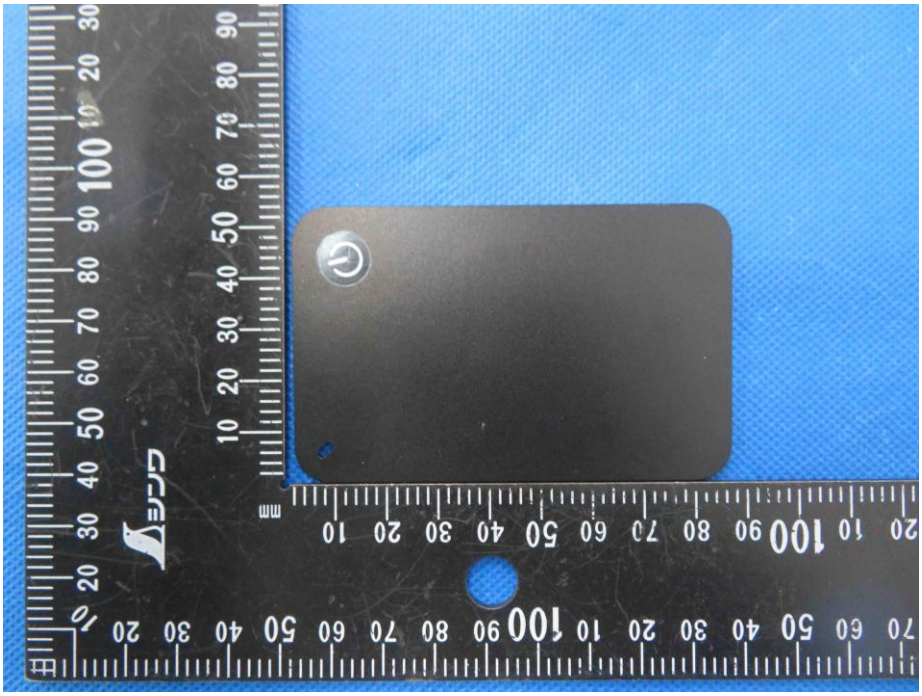
## 14.5 Test Result

| | | | |
|---|---|---|---|
| Temperature: | 26°C | | |
| Humidity: | 54%RH | Test Voltage | DC 3V |
| Operation Mode: | GFSK | Test result: | PASS |

Bluetooth Device Address: E6:5B:90:11:E8:01

## 15. EUT Photographs

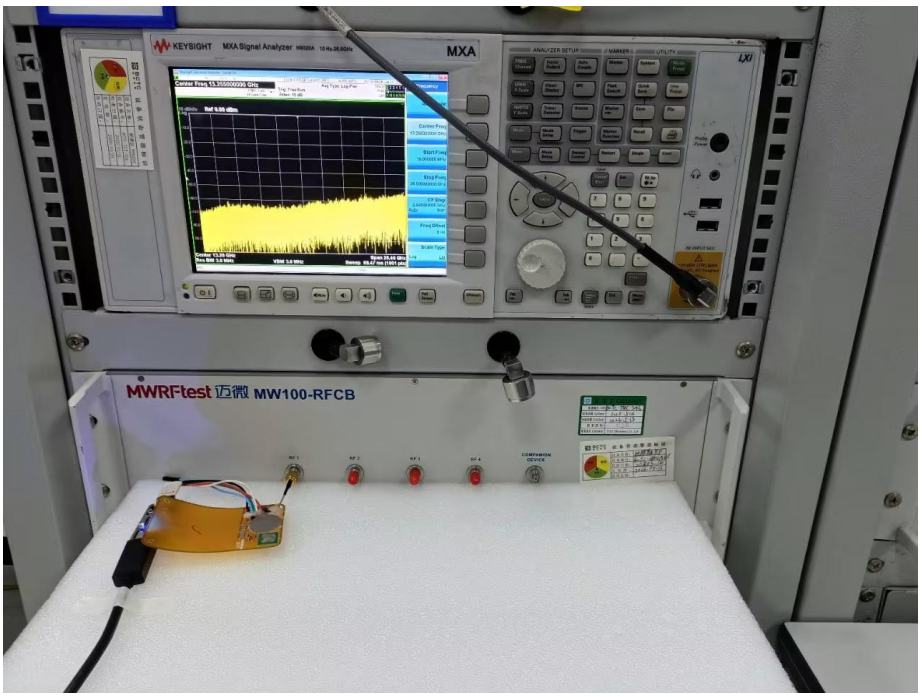
EUT Photo

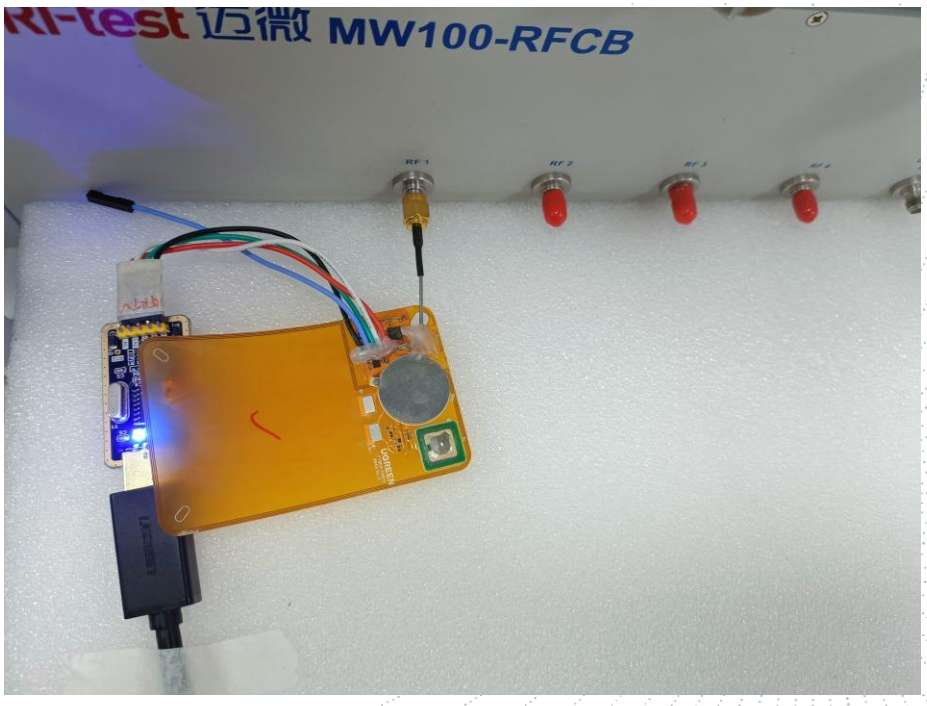


Appendix-Photographs Of EUT Constructional Details
(FT503_External & Internal Photos)

## 16. EUT Test Setup Photographs

Measurement Photos



STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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Complaint/Advice E-mail: advice@bctc-lab.com.cn

※※※※※ END ※※※※※