



# TEST REPORT

Applicant: Guangzhou FriendlyElec Technology Co., Limited  
Address of Applicant: Room1106, 11F, East Tower, Top Plaza, No.222, Xingmin Road,  
Tianhe District, Guangzhou, China  
Manufacturer: Guangzhou FriendlyElec Technology Co., Limited  
Address of Manufacturer: Room1106, 11F, East Tower, Top Plaza, No.222, Xingmin Road,  
Tianhe District, Guangzhou, China  
Product Name: Single Board Computer  
Model No.: NanoPi R28S  
Trade Mark: N/A  
FCC ID: 2BXZJ-R28S  
Applicable standards: 47CFR Part 15.247  
Date of Test: Aug.20, 2026-Sep.22, 2026  
Date of report issued: Sep.22, 2026

**Remark:**

*The results shown in this test report refer only to the sample(s) tested , this test report cannot be reproduced, except in full without prior written permission of the company.*

*The report would be invalid without specific stamp of test institute and the signatures of compiler and approver*

## Prepared By

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| Report Revision History |             |              |
|-------------------------|-------------|--------------|
| Report No.              | Description | Issue Date   |
| ET-26084288E04          | Original    | Sep.22, 2026 |
|                         |             |              |



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## 1 Test Summary

| Test Item                        | Section                                       | Result | Test by     |
|----------------------------------|-----------------------------------------------|--------|-------------|
| Antenna Requirement              | 47CFR Part 15.203/15.247 (b) (4)              | Pass   | /           |
| AC Power Line Conducted Emission | 47CFR Part 15.207                             | Pass   | Jason Huang |
| Conducted Peak Output Power      | 47CFR Part 15.247 (b)(1)                      | Pass   | Oliver Wang |
| 20dB Occupied Bandwidth          | 47CFR Part 15.247 (a)(1)                      | Pass   | Oliver Wang |
| Carrier Frequencies Separation   | 47CFR Part 15.247 (a)(1)                      | Pass   | Oliver Wang |
| Hopping Channel Number           | 47CFR Part 15.247 (a)(1)(iii)                 | Pass   | Oliver Wang |
| Dwell Time                       | 47CFR Part 15.247 (a)(1)(iii)                 | Pass   | Oliver Wang |
| Radiated Emission                | 47CFR Part 15.205/15.209                      | Pass   | Leo Zhong   |
| Band Edge                        | 47CFR Part 15.247(d) 47CFR part 15.205/15.209 | Pass   | Oliver Wang |

### Remarks:

1. Pass: The EUT complies with the essential requirements in the standard.
2. Test according to ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 and KDB558074 D01 15.247 Meas Guidance v05r02.
3. Note: Compliance determination rules
  - 1). The Compliance determination of test results does not take into account measurement uncertainty. Measurement results are determined based on regulatory limitations or requirements specified by the applicant/manufacture. If measurement uncertainty is taken into account, the applicant/manufacture will bear all possible risks of non-compliance.
  - 2). The measurement uncertainty please refer to each test result in the "Measurement Uncertainty"

### Measurement Uncertainty

| Test Item                         | Measurement Uncertainty | Notes |
|-----------------------------------|-------------------------|-------|
| Occupied Channel Bandwidth        | 0.72%                   | (1)   |
| RF output power, conducted        | ±0.67 dB                | (1)   |
| Power Spectral Density, conducted | ±0.51 dB                | (1)   |
| Unwanted Emissions, conducted     | ±0.64 dB                | (1)   |
| AC Power Line Conducted Emission  | ± 3.38 dB               | (1)   |
| Radiated emissions 9K-30MHz       | ±4.26 dB                | (1)   |
| Radiated emissions 30M- 1GHz      | ±4.88 dB                | (1)   |
| Radiated emissions 1GHz-18GHz     | ± 4.16 dB               | (1)   |
| Radiated emissions 18GHz-40GHz    | ±4.14 dB                | (1)   |
| Frequency error                   | Uc=6X10 <sup>-7</sup>   | (1)   |
| Dwell Time                        | ±0.03                   | (1)   |

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

## 2 General Information

### 2.1 General Description of EUT

|                         |                                      |
|-------------------------|--------------------------------------|
| Product Name:           | Single Board Computer                |
| Model No.:              | NanoPi R28S                          |
| Difference of model(s): | N/A                                  |
| Test Model:             | NanoPi R28S                          |
| Hardware Version:       | N/A                                  |
| Software Version:       | N/A                                  |
| Power supply:           | DC 5V from adapter with AC 230V/50Hz |
| Battery:                | N/A                                  |
| Adapter:                | N/A                                  |
| Radio Technology:       | Bluetooth                            |
| Operation Frequency:    | 2402MHz~2480MHz                      |
| Channel numbers:        | 79                                   |
| Channel separation:     | 1MHz                                 |
| Modulation type:        | GFSK, $\pi/4$ -DQPSK, 8DPSK          |
| Antenna Type:           | FPC antenna                          |
| Antenna gain:           | 2.12dBi                              |

**Note:**

1. For more details, refer to the user's manual of the EUT.

2. Antenna information is provided by applicant, Testing lab is not responsible for the accuracy of the information.

| Operation Frequency each of channel |           |         |           |         |           |         |           |
|-------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel                             | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1                                   | 2402MHz   | 21      | 2422MHz   | 41      | 2442MHz   | 61      | 2462MHz   |
| 2                                   | 2403MHz   | 22      | 2423MHz   | 42      | 2443MHz   | 62      | 2463MHz   |
| 3                                   | 2404MHz   | 23      | 2424MHz   | 43      | 2444MHz   | 63      | 2464MHz   |
| 4                                   | 2405MHz   | 24      | 2425MHz   | 44      | 2445MHz   | 64      | 2465MHz   |
| 5                                   | 2406MHz   | 25      | 2426MHz   | 45      | 2446MHz   | 65      | 2466MHz   |
| 6                                   | 2407MHz   | 26      | 2427MHz   | 46      | 2447MHz   | 66      | 2467MHz   |
| 7                                   | 2408MHz   | 27      | 2428MHz   | 47      | 2448MHz   | 67      | 2468MHz   |
| 8                                   | 2409MHz   | 28      | 2429MHz   | 48      | 2449MHz   | 68      | 2469MHz   |
| 9                                   | 2410MHz   | 29      | 2430MHz   | 49      | 2450MHz   | 69      | 2470MHz   |
| 10                                  | 2411MHz   | 30      | 2431MHz   | 50      | 2451MHz   | 70      | 2471MHz   |
| 11                                  | 2412MHz   | 31      | 2432MHz   | 51      | 2452MHz   | 71      | 2472MHz   |
| 12                                  | 2413MHz   | 32      | 2433MHz   | 52      | 2453MHz   | 72      | 2473MHz   |
| 13                                  | 2414MHz   | 33      | 2434MHz   | 53      | 2454MHz   | 73      | 2474MHz   |
| 14                                  | 2415MHz   | 34      | 2435MHz   | 54      | 2455MHz   | 74      | 2475MHz   |
| 15                                  | 2416MHz   | 35      | 2436MHz   | 55      | 2456MHz   | 75      | 2476MHz   |
| 16                                  | 2417MHz   | 36      | 2437MHz   | 56      | 2457MHz   | 76      | 2477MHz   |
| 17                                  | 2418MHz   | 37      | 2438MHz   | 57      | 2458MHz   | 77      | 2478MHz   |
| 18                                  | 2419MHz   | 38      | 2439MHz   | 58      | 2459MHz   | 78      | 2479MHz   |
| 19                                  | 2420MHz   | 39      | 2440MHz   | 59      | 2460MHz   | 79      | 2480MHz   |
| 20                                  | 2421MHz   | 40      | 2441MHz   | 60      | 2461MHz   |         |           |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Channel             | Frequency |
|---------------------|-----------|
| The lowest channel  | 2402MHz   |
| The middle channel  | 2441MHz   |
| The Highest channel | 2480MHz   |

## 2.2 Test mode

|                                                                                                  |                                                                                         |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Conducted test                                                                                   | Link mode                                                                               |
| RF and Radiated test                                                                             | Transmitting mode<br>(Keep the EUT in Max. power level continuously transmitting mode.) |
| Remark: Remark: For battery operated equipment, the EUT was performed using a new DC3.7V battery |                                                                                         |

## 2.3 Description of Support Units

| No. | Description | Manufacturer | Model     | Serial Number |
|-----|-------------|--------------|-----------|---------------|
| 1   | ADAPTER     | XIAO MI      | MDY-11-EM | /             |

## 2.4 Test Facility

|                             |                                                                                                                           |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Test laboratory:            | Shenzhen ETR Standard Technology Co., Ltd.                                                                                |
| CNAS Registration Number:   | L11864                                                                                                                    |
| A2LA Certificate Number:    | 6640.01                                                                                                                   |
| FCC Designation Number:     | CN1326                                                                                                                    |
| FCC Test Firm Registration: | 183064                                                                                                                    |
| IC Company Number:          | 28440                                                                                                                     |
| Laboratory location:        | No.103, No.10, Phase I, Zone 3, Xinxing Industrial Park, Xinhe, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China |

## 2.5 Additional Instructions

|                   |                                       |
|-------------------|---------------------------------------|
| Test Software     | Manufacturer-specific serial commands |
| Power level setup | Default                               |

### 3 Test Instruments list

| Item | Equipment name           | Manufacturer        | Model                      | Serial No.   | Calibration date | Due date  |
|------|--------------------------|---------------------|----------------------------|--------------|------------------|-----------|
| 1    | EMI Test Receiver        | Rohde&schwarz       | ESCI7                      | 101214       | 2026.3.05        | 2027.3.04 |
| 2    | EMI Test Receiver        | Rohde&schwarz       | ESCI3                      | 102696       | 2026.3.05        | 2027.3.04 |
| 3    | Loop Antenna             | schwarabeck         | FMZB 1519 B                | 128          | 2026.3.08        | 2028.3.07 |
| 4    | Broadband antenna        | schwarabeck         | VULB9168                   | 1064         | 2026.3.11        | 2028.3.10 |
| 5    | Horn antenna             | schwarabeck         | BBHA9120D                  | 2288         | 2026.3.08        | 2028.3.07 |
| 6    | amplifier                | EMtrace             | RP01A                      | 50117        | 2026.3.05        | 2027.3.04 |
| 7    | AMN                      | schwarabeck         | NSLK8127                   | 8127483      | 2026.3.05        | 2027.3.04 |
| 8    | AMN                      | ETS                 | 3186/2NM                   | 1132         | 2026.3.05        | 2027.3.04 |
| 9    | 10dB attenuator          | HUBER+SUHN<br>R     | 10dB                       | /            | 2026.3.05        | 2027.3.04 |
| 10   | amplifier                | Space-Dtronics      | EWLAN0118G-<br>P40         | 19113001     | 2026.3.05        | 2027.3.04 |
| 11   | Filter                   | Xingbo              | XBLBQ-GTA19                | 210410-3-1   | 2026.3.05        | 2027.3.04 |
| 12   | Spectrum analyzer        | KEYSIGHT            | N9020A                     | MY55370280   | 2026.3.05        | 2027.3.04 |
| 13   | Power control box        | MWRFTtest           | MW100-PSB                  | MW201020JYT  | 2026.3.05        | 2027.3.04 |
| 14   | Power Sensor             | Keysight            | U2021XA                    | MY54111006   | 2026.3.05        | 2027.3.04 |
| 15   | amplifier                | SKET                | LNPA_1840-50<br>(18-40GHz) | 19113001     | 2026.3.05        | 2027.3.04 |
| 16   | Horn antenna             | schwarabeck         | BBHA 9170                  | 946          | 2026.3.08        | 2028.3.07 |
| 17   | Spectrum analyzer        | Rohde&schwarz       | FSU40                      | 1166.1660K43 | 2026.3.05        | 2027.3.04 |
| 18   | Temp. & Humidity Chamber | Jiecheng Instrument | QA-LP-80                   | 20160705001  | 2026/3/06        | 2027/3/05 |

Note: the calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to international system unit (SI).

| Software Name           | Manufacturer | Model    | Version           |
|-------------------------|--------------|----------|-------------------|
| RF test software        | MWRFTtest    | MTS 8310 | V2.0.0.0          |
| Conducted test software | EZ-EMC       | Farad    | Ver.EMC-CON 3A1.1 |
| Radiated test software  | EZ-EMC       | Farad    | Ver.FA-03A2 RE    |

## 4 Test results and Measurement Data

### 4.1 Antenna requirement

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| <b>Standard requirement:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FCC Part15 C Section 15.203 /247(b) (4) |
| <b>15.203 requirement:</b><br><p>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, 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.</p>                                                                                                      |                                         |
| <b>15.247(b) (4) requirement:</b><br><p>The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> |                                         |
| <b>E.U.T Antenna:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                         |
| The antenna is FPC antenna, the best case gain of the is 2.12 dBi, reference to the Internal photos for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                         |

## 4.2 Conducted Emissions

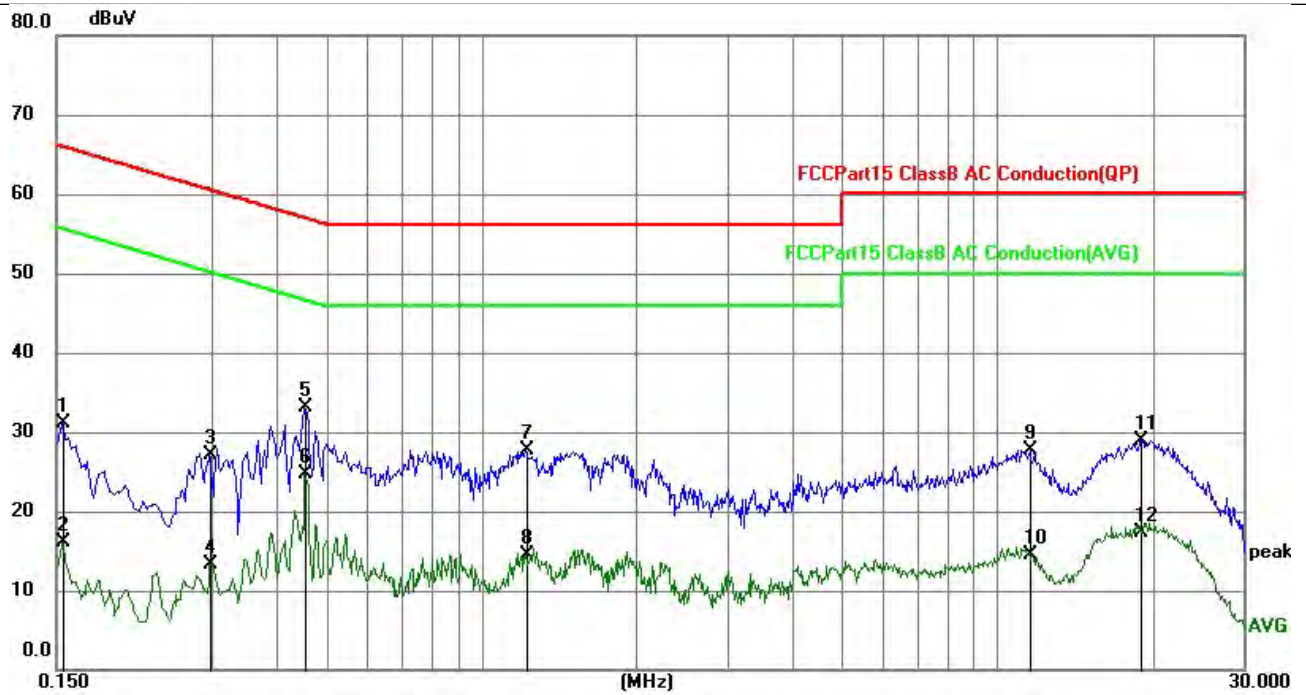
|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |              |     |           |           |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|-----|-----------|-----------|
| Test Requirement:                                | 47CRF Part 15.207                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |        |              |     |           |           |
| Test Method:                                     | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 §6.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |              |     |           |           |
| Test Frequency Range:                            | 150KHz to 30MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |              |     |           |           |
| Receiver setup:                                  | RBW=9KHz, VBW=30KHz, Sweep time=auto                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |              |     |           |           |
| Limit:                                           | Frequency range (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        | Limit (dBuV) |     |           |           |
|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        | Quasi-peak   |     | Average   |           |
|                                                  | 0.15-0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        | 66 to 56*    |     | 56 to 46* |           |
|                                                  | 0.5-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        | 56           |     | 46        |           |
|                                                  | 5-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        | 60           |     | 50        |           |
| * Decreases with the logarithm of the frequency. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |              |     |           |           |
| Test setup:                                      | <div><div><div><div></div><div>Reference Plane</div><div></div></div><div><div></div><div>40cm</div><div></div></div><div><div>LISN</div><div>AUX Equipment</div><div>E.U.T</div><div>LISN</div><div>Filter</div><div>EMI Receiver</div></div><div><div>Test table/Insulation plane</div></div><div><div>80cm</div></div><div><div>AC power</div></div></div><div>Remark<br/>E.U.T: Equipment Under Test<br/>LISN: Line Impedance Stabilization Network<br/>Test table height=0.8m</div></div>                                                                                                                                                                                                                              |        |              |     |           |           |
| Test procedure:                                  | <div>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</div> <div>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</div> <div>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2020 on conducted measurement.</div> |        |              |     |           |           |
| Test Instruments:                                | Refer to section 3.0 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |              |     |           |           |
| Test mode:                                       | Refer to section 2.2 for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |        |              |     |           |           |
| Test environment:                                | Temp.:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 23.2°C | Humid.:      | 41% | Press.:   | 1002 mbar |
| Test voltage:                                    | AC 120V, 60Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |              |     |           |           |
| Test results:                                    | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |              |     |           |           |

### Remark:

1. Both high voltage and low voltage have been tested, and the report only shows the worst case data with AC 120V/60Hz.
2. All modes have been tested, and the report only displays the worst mode 8DPSK (2402MHz) data.

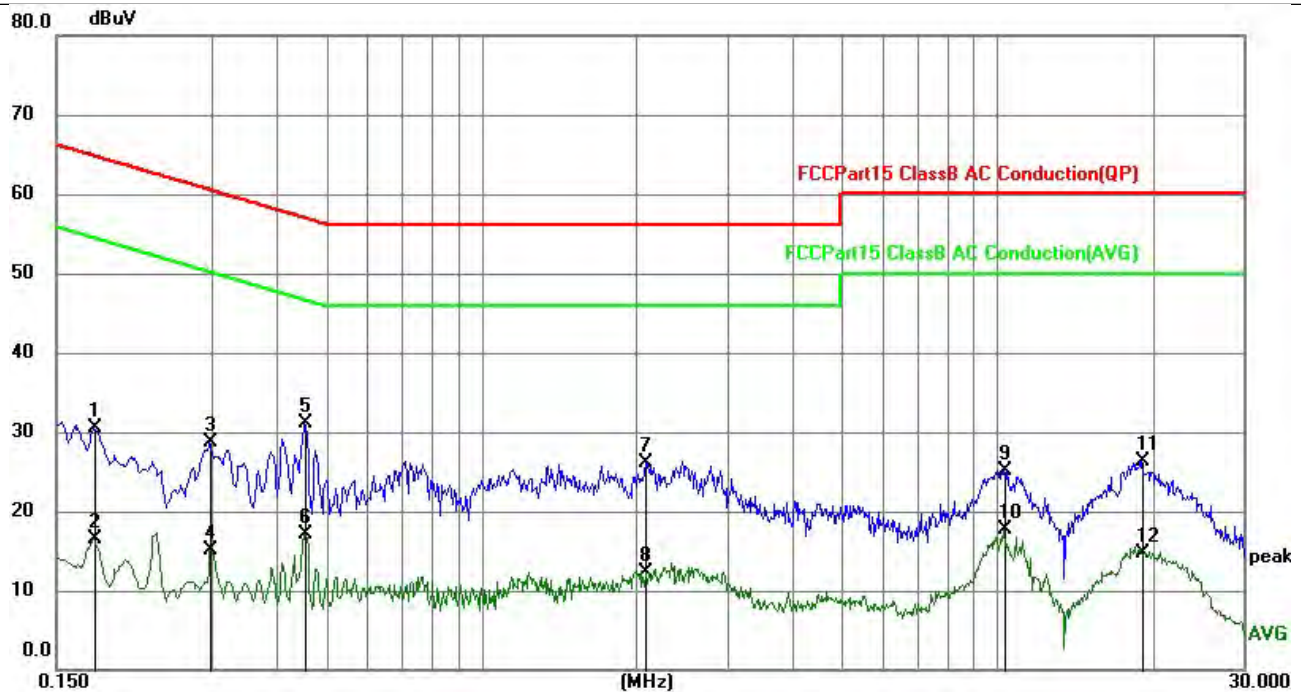
Measurement data:

Line:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|
| 1   | 0.1547          | 21.19          | 9.97        | 31.16        | 65.74        | -34.58      | QP       |
| 2   | 0.1547          | 6.12           | 9.97        | 16.09        | 55.74        | -39.65      | AVG      |
| 3   | 0.2983          | 17.08          | 10.00       | 27.08        | 60.29        | -33.21      | QP       |
| 4   | 0.2983          | 3.35           | 10.00       | 13.35        | 50.29        | -36.94      | AVG      |
| 5   | 0.4560          | 23.07          | 10.07       | 33.14        | 56.77        | -23.63      | QP       |
| 6   | 0.4560          | 14.73          | 10.07       | 24.80        | 46.77        | -21.97      | AVG      |
| 7   | 1.2162          | 17.61          | 10.07       | 27.68        | 56.00        | -28.32      | QP       |
| 8   | 1.2162          | 4.51           | 10.07       | 14.58        | 46.00        | -31.42      | AVG      |
| 9   | 11.6158         | 17.74          | 10.06       | 27.80        | 60.00        | -32.20      | QP       |
| 10  | 11.6158         | 4.39           | 10.06       | 14.45        | 50.00        | -35.55      | AVG      |
| 11  | 18.9735         | 18.97          | 9.94        | 28.91        | 60.00        | -31.09      | QP       |
| 12  | 18.9735         | 7.44           | 9.94        | 17.38        | 50.00        | -32.62      | AVG      |

### Neutral:

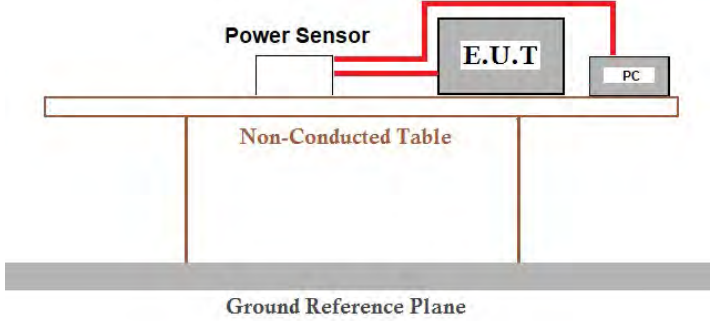


| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|
| 1   | 0.1768          | 20.57          | 9.97        | 30.54        | 64.63        | -34.09      | QP       |
| 2   | 0.1768          | 6.52           | 9.97        | 16.49        | 54.63        | -38.14      | AVG      |
| 3   | 0.2983          | 18.67          | 10.00       | 28.67        | 60.29        | -31.62      | QP       |
| 4   | 0.2983          | 5.16           | 10.00       | 15.16        | 50.29        | -35.13      | AVG      |
| 5   | 0.4560          | 20.96          | 10.07       | 31.03        | 56.77        | -25.74      | QP       |
| 6   | 0.4560          | 7.04           | 10.07       | 17.11        | 46.77        | -29.66      | AVG      |
| 7   | 2.0803          | 16.06          | 10.00       | 26.06        | 56.00        | -29.94      | QP       |
| 8   | 2.0803          | 2.35           | 10.00       | 12.35        | 46.00        | -33.65      | AVG      |
| 9   | 10.3063         | 14.98          | 10.07       | 25.05        | 60.00        | -34.95      | QP       |
| 10  | 10.3063         | 7.64           | 10.07       | 17.71        | 50.00        | -32.29      | AVG      |
| 11  | 19.0813         | 16.44          | 9.94        | 26.38        | 60.00        | -33.62      | QP       |
| 12  | 19.0813         | 4.86           | 9.94        | 14.80        | 50.00        | -35.20      | AVG      |

#### Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss

### 4.3 Conducted Peak Output Power

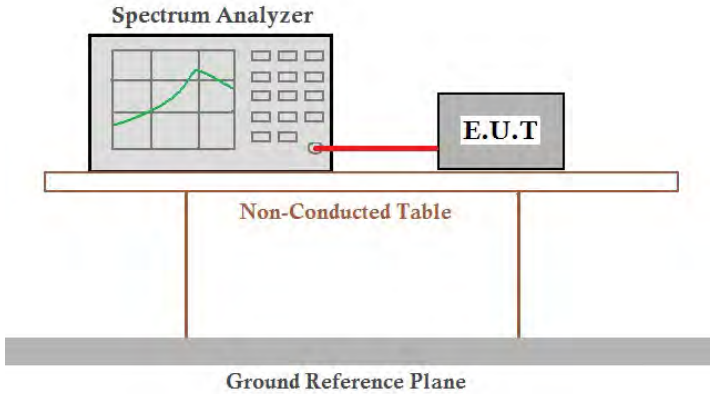
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Test Requirement: | 47CRF Part 15.247 (b)(1)                                                                                                                                                                                                                                                                                                                                                                                                                     |               |
| Test Method:      | KDB558074 D01 15.247 Meas Guidance v05r02<br>ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 §7.8.5                                                                                                                                                                                                                                                                                                                     |               |
| Limit:            | Output Power :20.97dBm                                                                                                                                                                                                                                                                                                                                                                                                                       |               |
| Test setup:       |  <p>The diagram illustrates the test setup. A 'Power Sensor' is connected via red lines to an 'E.U.T' (Equipment Under Test) and a 'PC'. Both the 'E.U.T' and 'PC' are placed on a 'Non-Conducted Table'. This table is supported by two vertical legs and sits on a 'Ground Reference Plane', which is represented by a thick grey bar at the bottom.</p> |               |
| Test Instruments: | Refer to section 3.0 for details                                                                                                                                                                                                                                                                                                                                                                                                             |               |
| Test mode:        | Refer to section 2.2 for details                                                                                                                                                                                                                                                                                                                                                                                                             |               |
| Test environment: | Temp.: 23.2°C                                                                                                                                                                                                                                                                                                                                                                                                                                | Humid.: 41%RH |
| Test voltage:     | DC 5V from adapter                                                                                                                                                                                                                                                                                                                                                                                                                           |               |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |



**Measurement Result**

| Mode           | Test channel | Peak Output Power (dBm) | Limit (dBm) | Result |
|----------------|--------------|-------------------------|-------------|--------|
| GFSK           | Lowest       | -1.54                   | 20.97       | Pass   |
|                | Middle       | -2.39                   |             |        |
|                | Highest      | -1.77                   |             |        |
| $\pi/4$ -DQPSK | Lowest       | -0.71                   | 20.97       | Pass   |
|                | Middle       | -1.59                   |             |        |
|                | Highest      | -1.00                   |             |        |
| 8DPSK          | Lowest       | -0.41                   | 20.97       | Pass   |
|                | Middle       | -1.37                   |             |        |
|                | Highest      | -0.63                   |             |        |

#### 4.4 20dB Emission Bandwidth

|                   |                                                                                    |               |
|-------------------|------------------------------------------------------------------------------------|---------------|
| Test Requirement: | 47CRF Part 15.247 (a)(1)                                                           |               |
| Test Method:      | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 §6.9.2        |               |
| Limit:            | N/A                                                                                |               |
| Test setup:       |  |               |
| Test Instruments: | Refer to section 3.0 for details                                                   |               |
| Test mode:        | Refer to section 2.2 for details                                                   |               |
| Test environment: | Temp.: 23.2°C                                                                      | Humid.: 41%RH |
| Test voltage:     | DC 5V from adapter                                                                 |               |
| Test results:     | Pass                                                                               |               |

#### Measurement Data

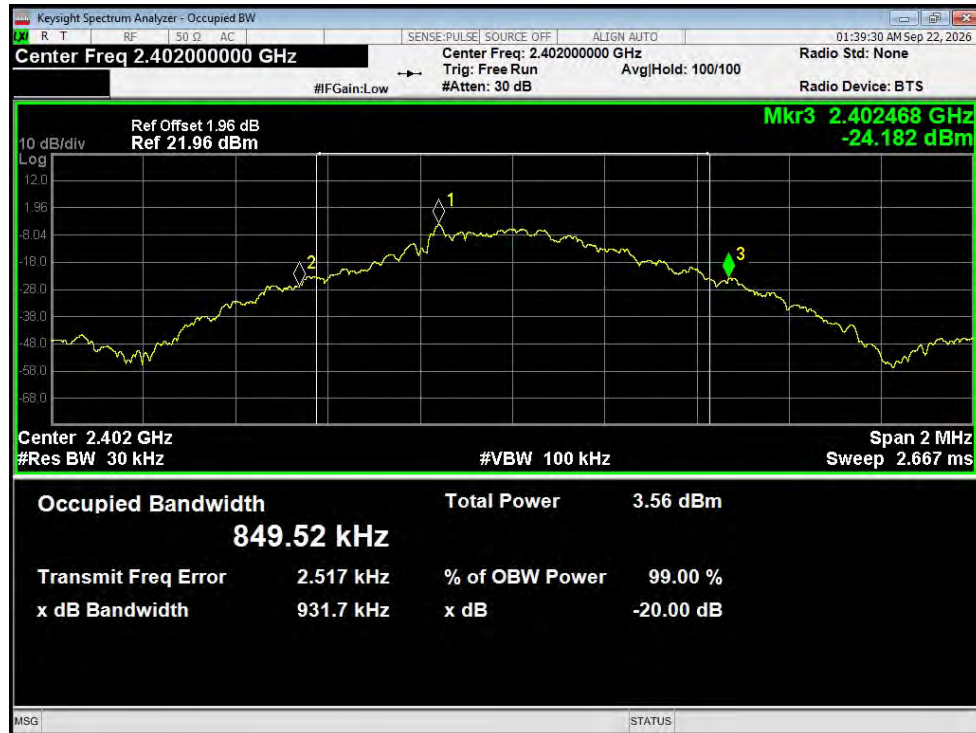
| Mode           | Test channel | 20dB Emission Bandwidth (MHz) | Result |
|----------------|--------------|-------------------------------|--------|
| GFSK           | Lowest       | 0.932                         | Pass   |
|                | Middle       | 0.942                         |        |
|                | Highest      | 0.915                         |        |
| $\pi/4$ -DQPSK | Lowest       | 1.260                         | Pass   |
|                | Middle       | 1.262                         |        |
|                | Highest      | 1.263                         |        |
| 8DPSK          | Lowest       | 1.273                         | Pass   |
|                | Middle       | 1.249                         |        |
|                | Highest      | 1.265                         |        |

Remark: Test performed at worst case in DH5, 2DH5, 3DH5 mode separately.

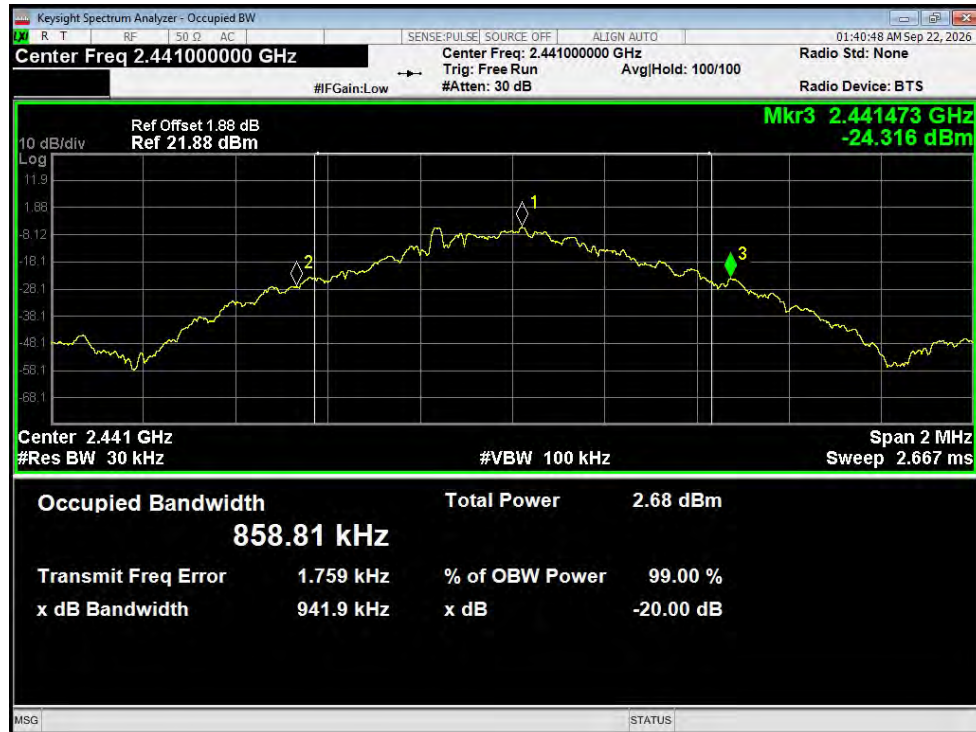


Test plot as follows:

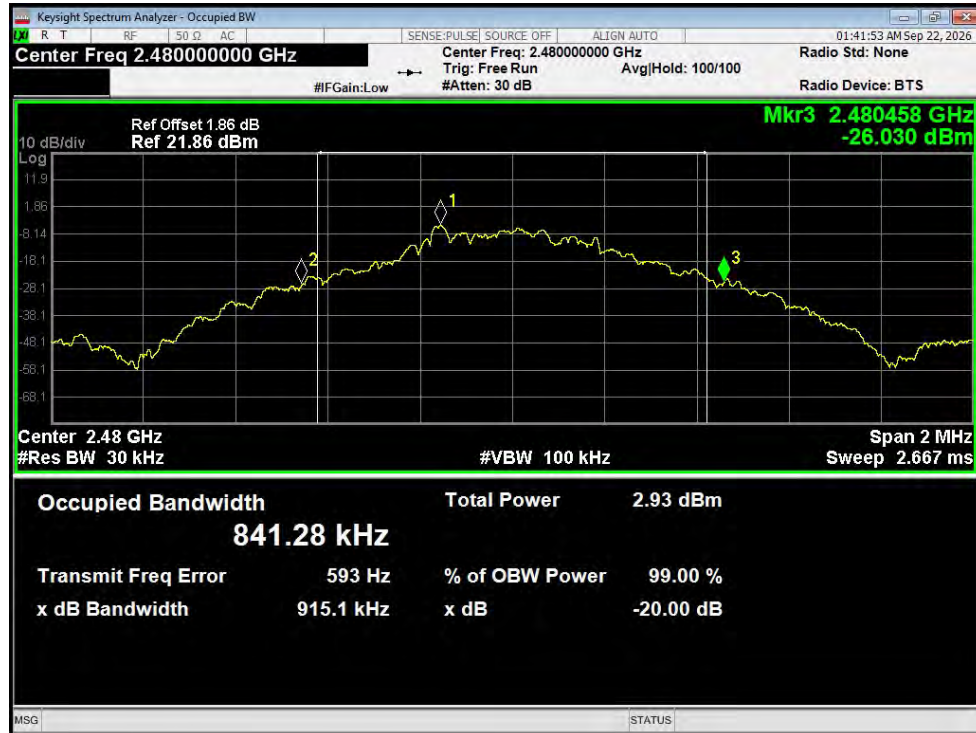
-20dB Bandwidth NVNT 1-DH5 2402MHz Ant1



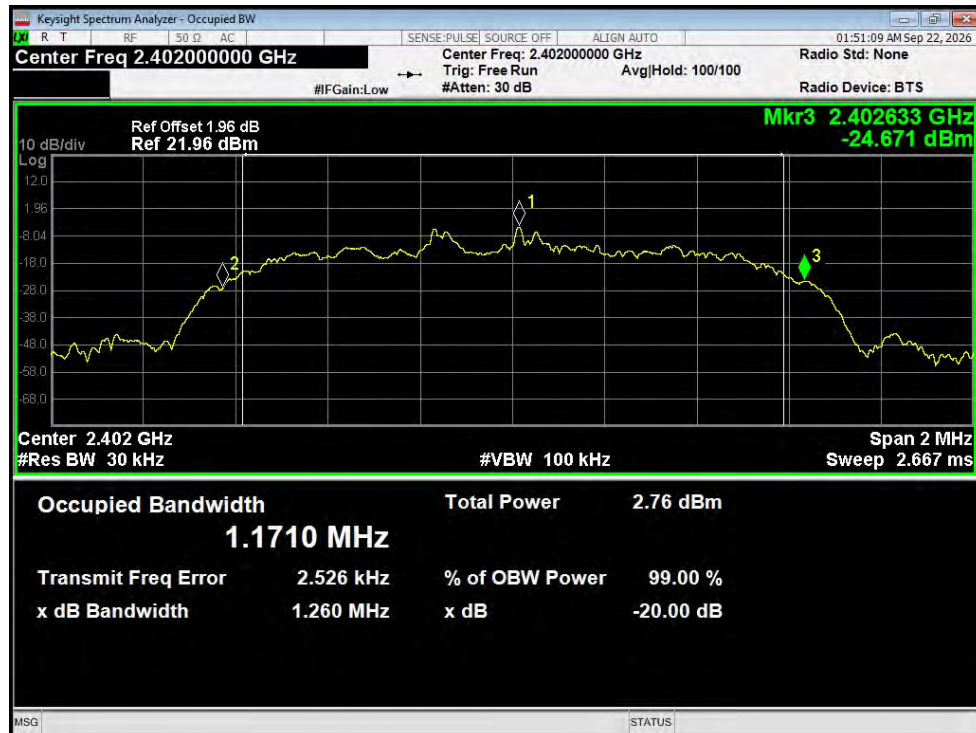
-20dB Bandwidth NVNT 1-DH5 2441MHz Ant1



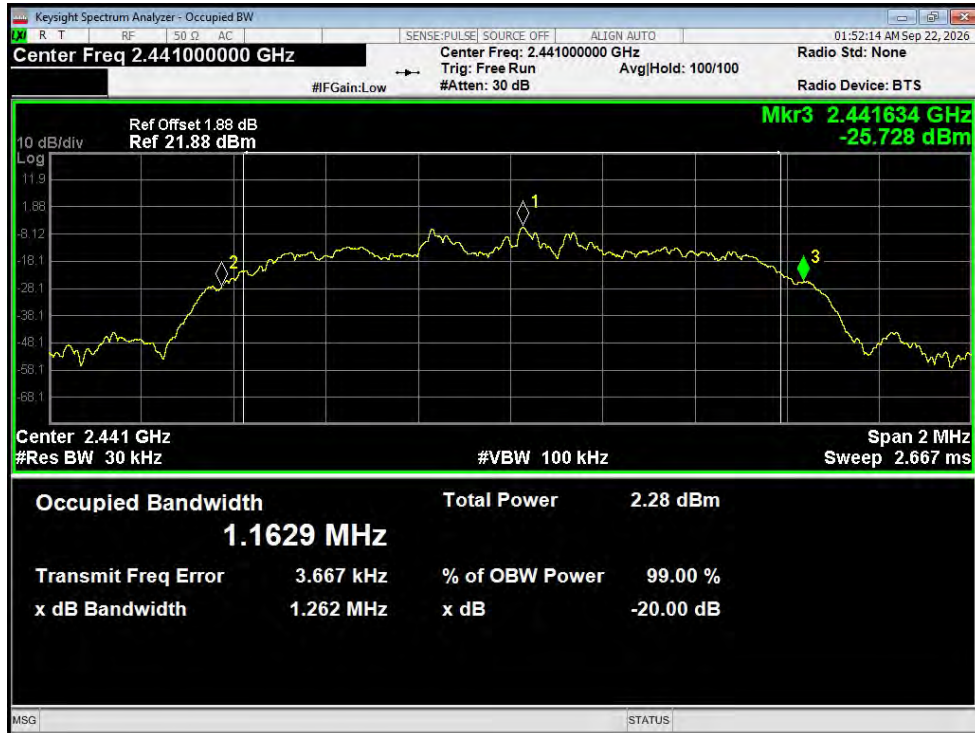
### -20dB Bandwidth NVNT 1-DH5 2480MHz Ant1



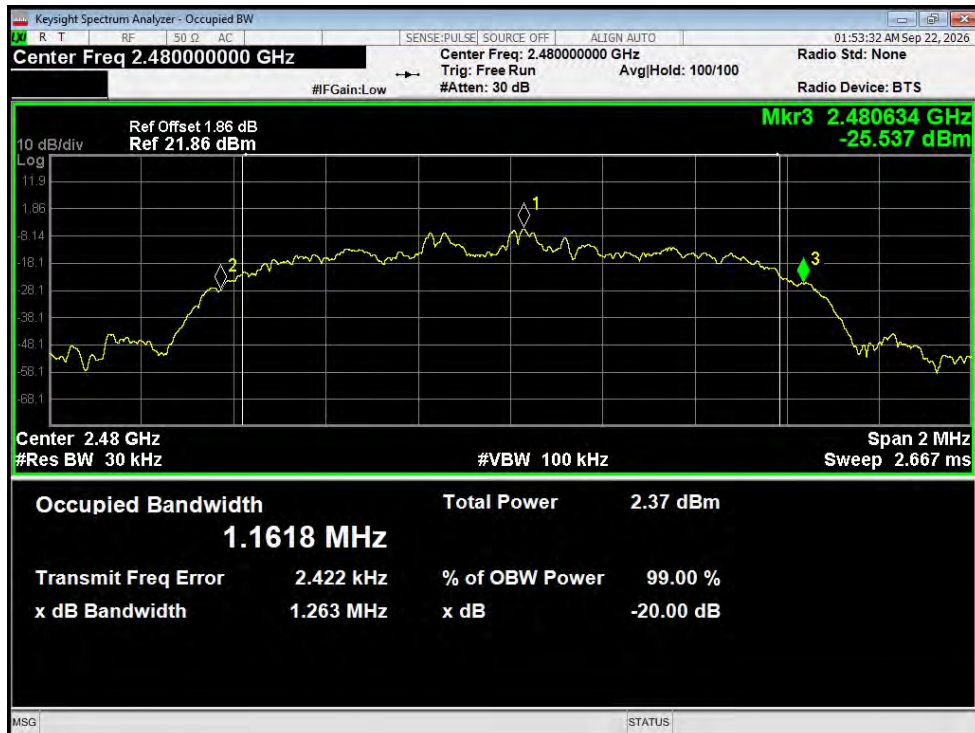
### -20dB Bandwidth NVNT 2-DH5 2402MHz Ant1



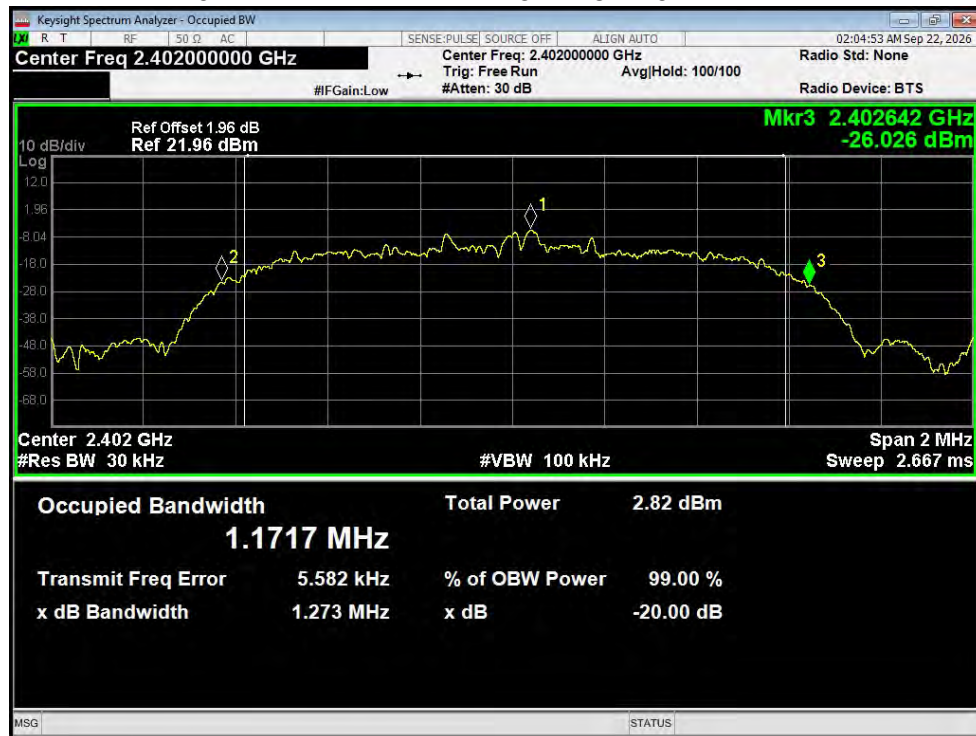
### -20dB Bandwidth NVNT 2-DH5 2441MHz Ant1



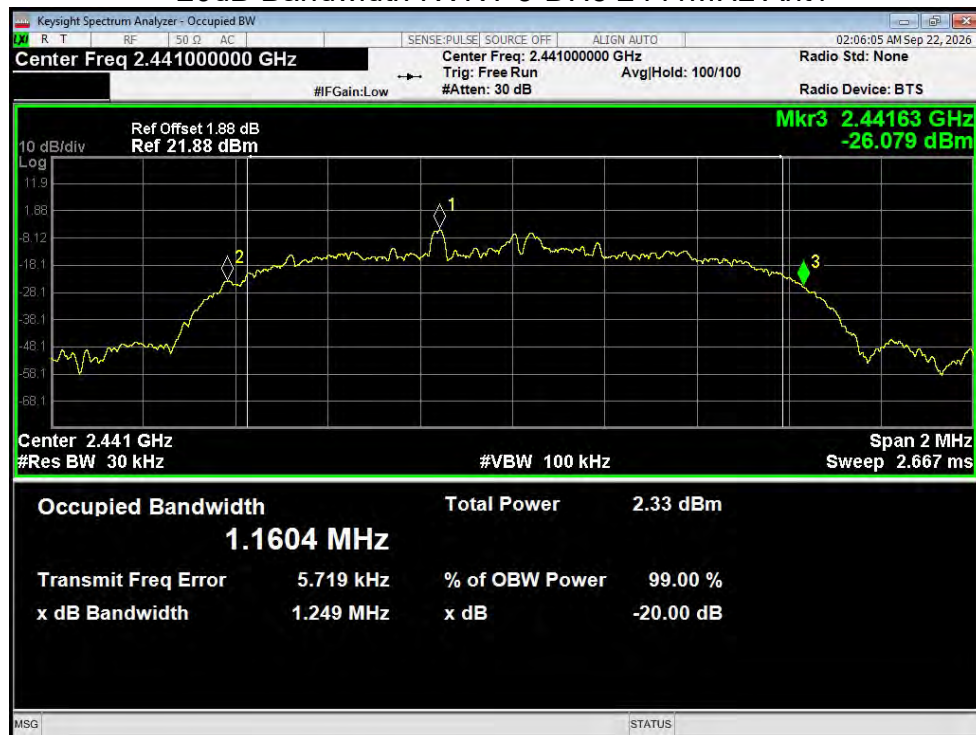
### -20dB Bandwidth NVNT 2-DH5 2480MHz Ant1



### -20dB Bandwidth NVNT 3-DH5 2402MHz Ant1

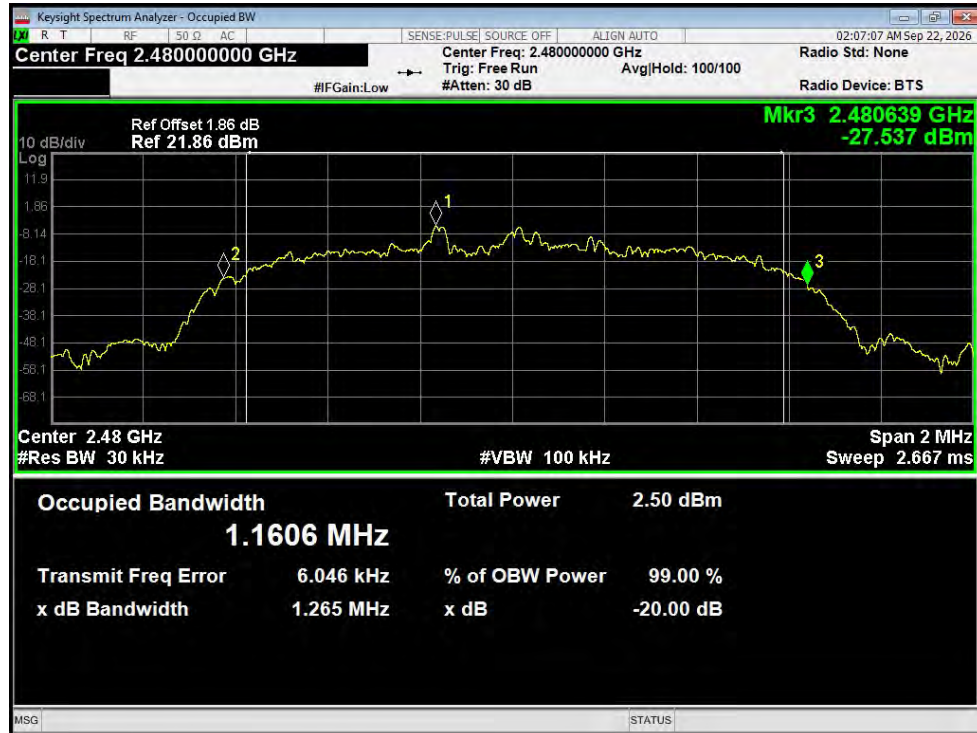


### -20dB Bandwidth NVNT 3-DH5 2441MHz Ant1

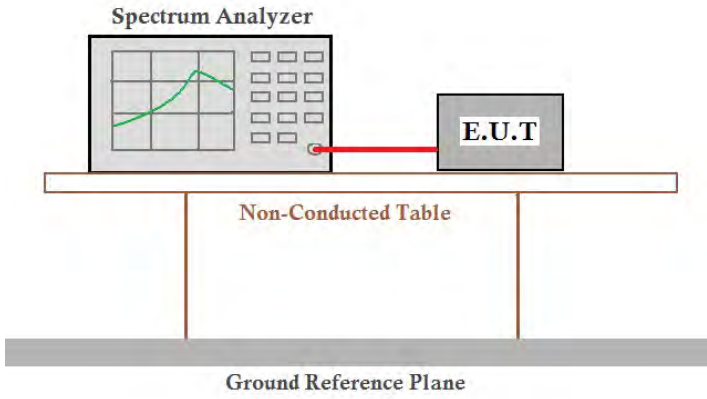




-20dB Bandwidth NVNT 3-DH5 2480MHz Ant1



#### 4.5 Carrier Frequencies Separation

|                   |                                                                                    |               |
|-------------------|------------------------------------------------------------------------------------|---------------|
| Test Requirement: | 47CRF Part 15.247 (a)(1)                                                           |               |
| Test Method:      | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 §7.8.2        |               |
| Receiver setup:   | RBW=300KHz, VBW=1000KHz, detector=Peak                                             |               |
| Limit:            | >0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)                      |               |
| Test setup:       |  |               |
| Test Instruments: | Refer to section 3.0 for details                                                   |               |
| Test mode:        | Refer to section 2.2 for details                                                   |               |
| Test environment: | Temp.: 23.2°C                                                                      | Humid.: 41%RH |
| Test voltage:     | DC 5V from adapter                                                                 |               |
| Test results:     | Pass                                                                               |               |

#### Measurement Data

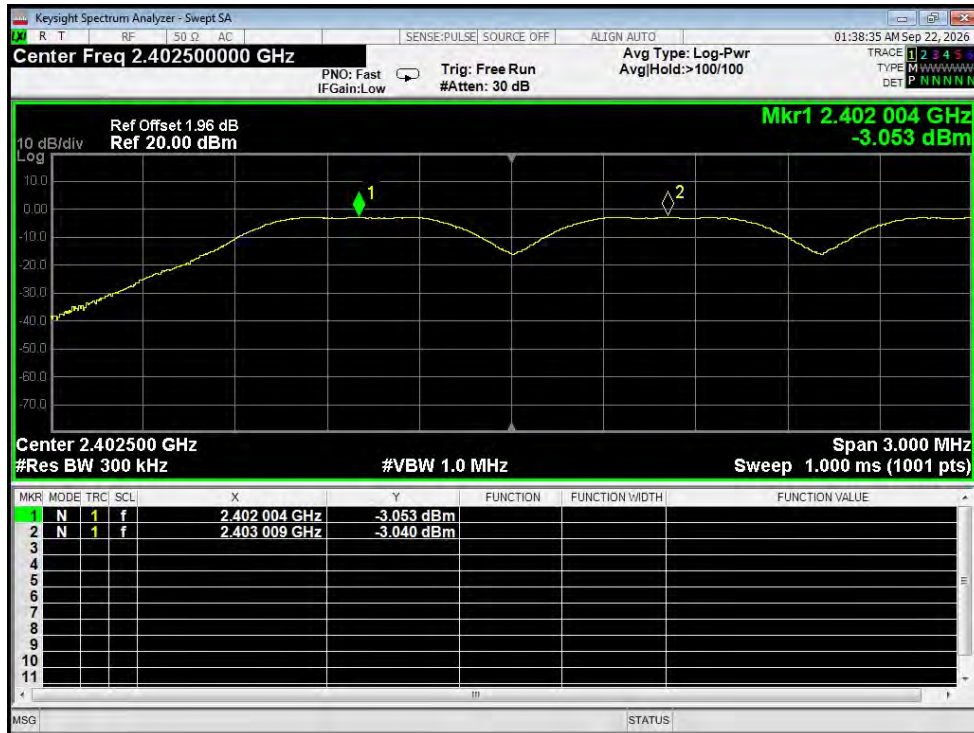
| Mode           | Test channel | Carrier Frequencies Separation (MHz) | Limit (MHz) | Result |
|----------------|--------------|--------------------------------------|-------------|--------|
| GFSK           | Lowest       | 1.005                                | 0.621       | Pass   |
|                | Middle       | 1.005                                | 0.628       | Pass   |
|                | Highest      | 1.002                                | 0.610       | Pass   |
| $\pi/4$ -DQPSK | Lowest       | 1.011                                | 0.840       | Pass   |
|                | Middle       | 1.329                                | 0.841       | Pass   |
|                | Highest      | 1.047                                | 0.842       | Pass   |
| 8DPSK          | Lowest       | 1.008                                | 0.849       | Pass   |
|                | Middle       | 1.011                                | 0.833       | Pass   |
|                | Highest      | 1.320                                | 0.843       | Pass   |

Note:

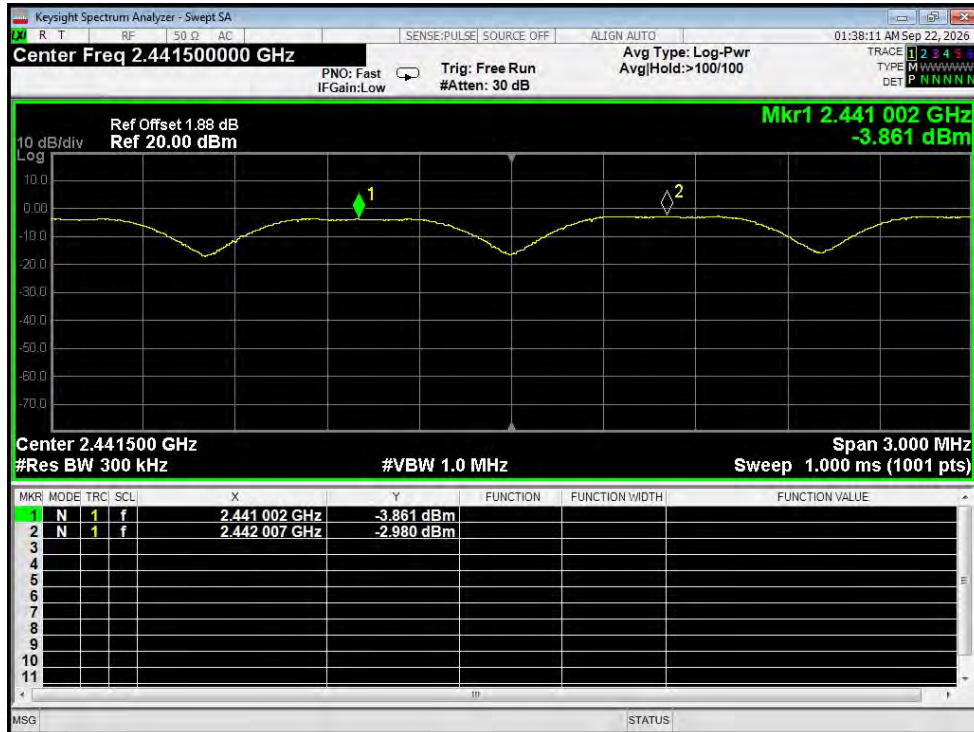
- Limit According to section 4.4.
- Test performed at worst case in DH5, 2DH5, 3DH5 mode separately.

Test plot as follows:

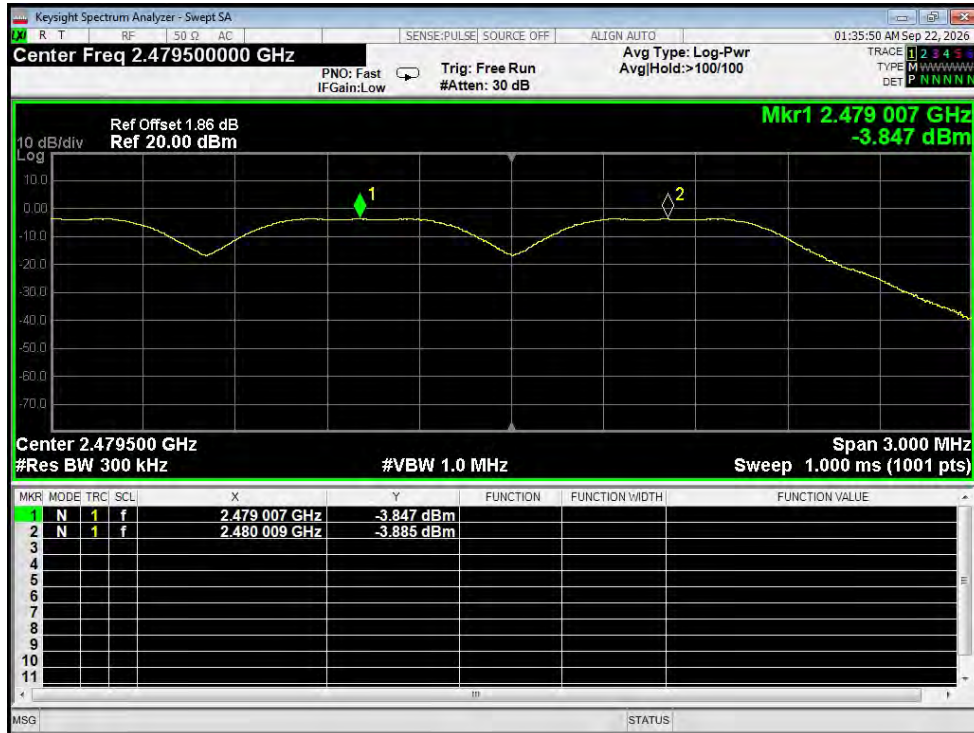
### CFS NVNT 1-DH5 2402MHz Ant1



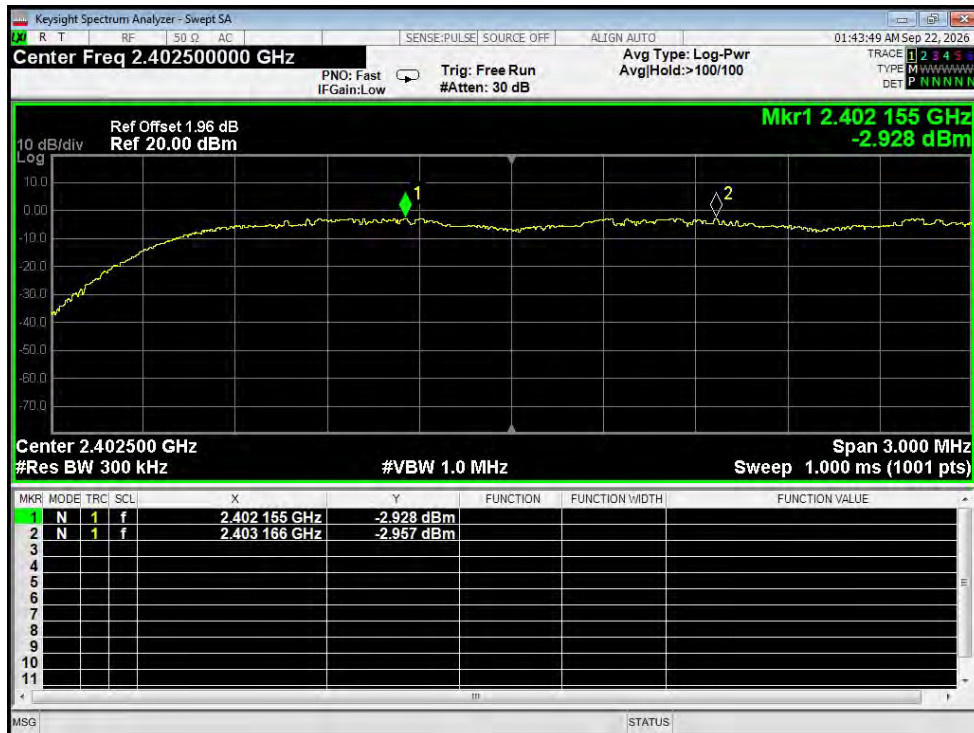
### CFS NVNT 1-DH5 2441MHz Ant1



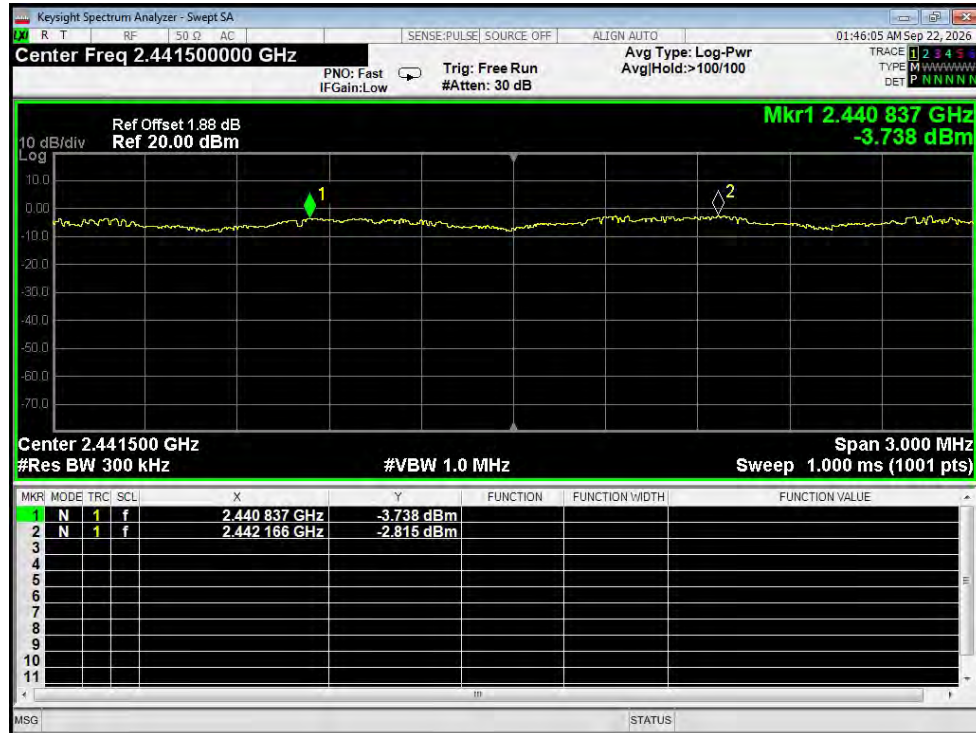
### CFS NVNT 1-DH5 2480MHz Ant1



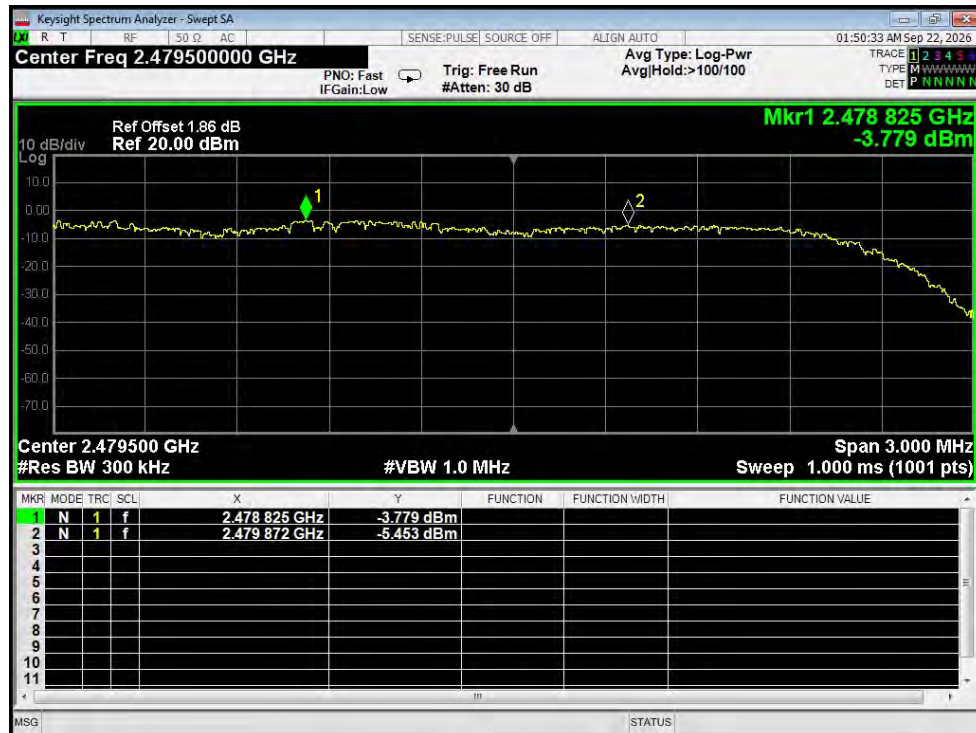
### CFS NVNT 2-DH5 2402MHz Ant1



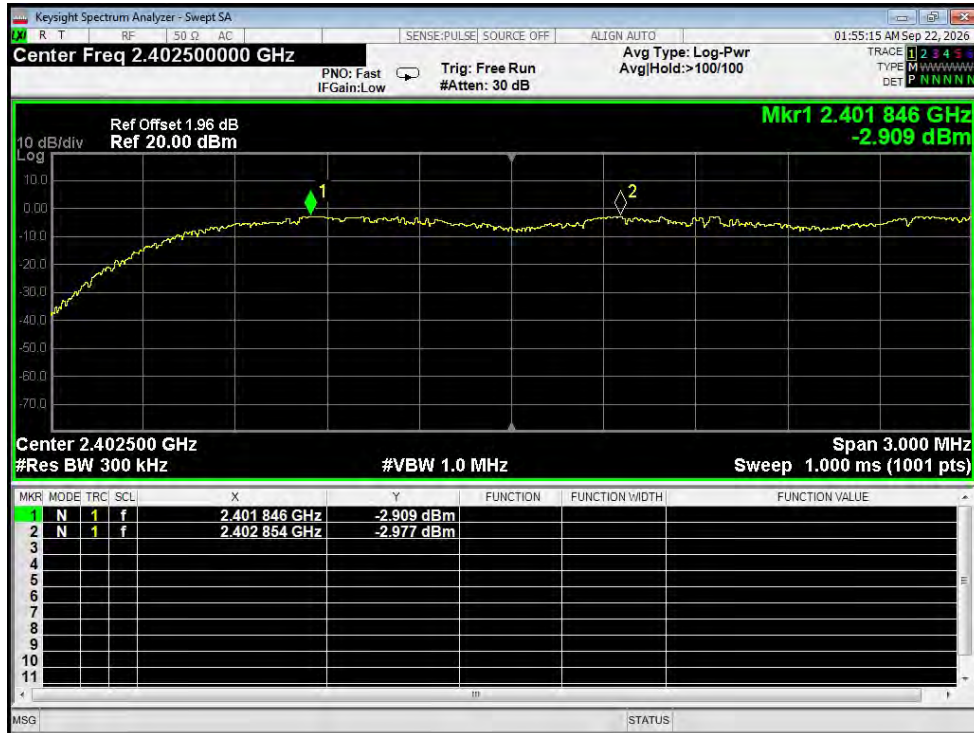
### CFS NVNT 2-DH5 2441MHz Ant1



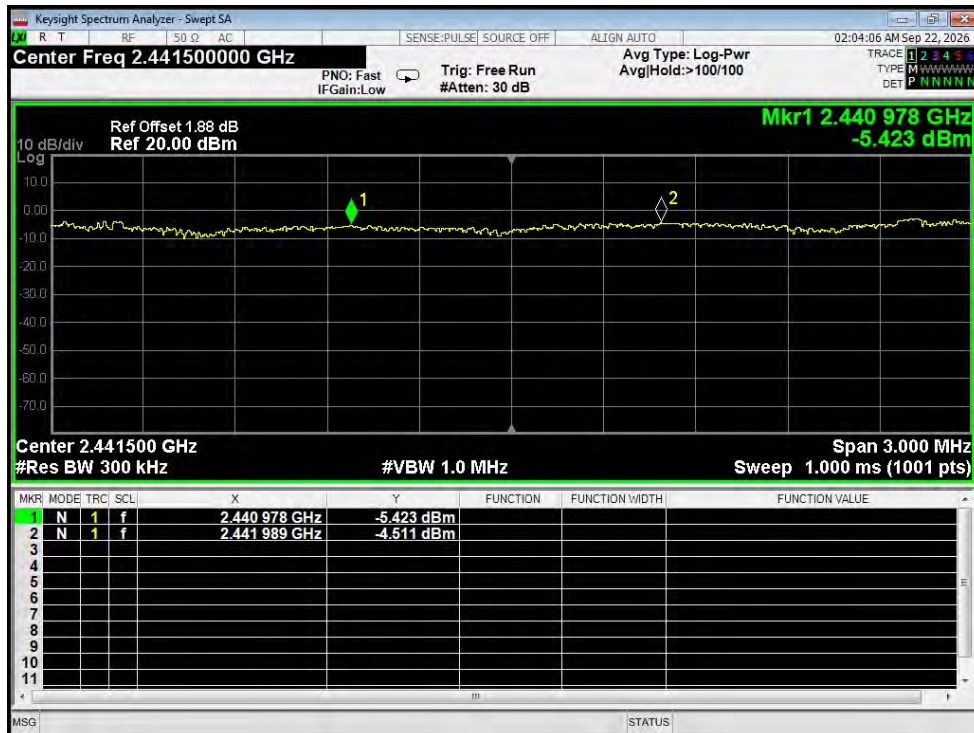
### CFS NVNT 2-DH5 2480MHz Ant1



### CFS NVNT 3-DH5 2402MHz Ant1



### CFS NVNT 3-DH5 2441MHz Ant1

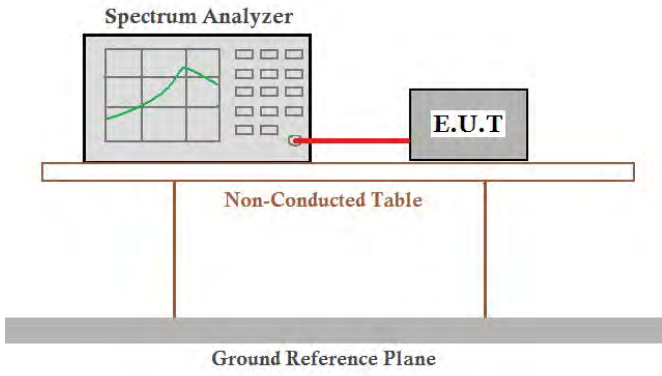




### CFS NVNT 3-DH5 2480MHz Ant1



#### 4.6 Hopping Channel Number

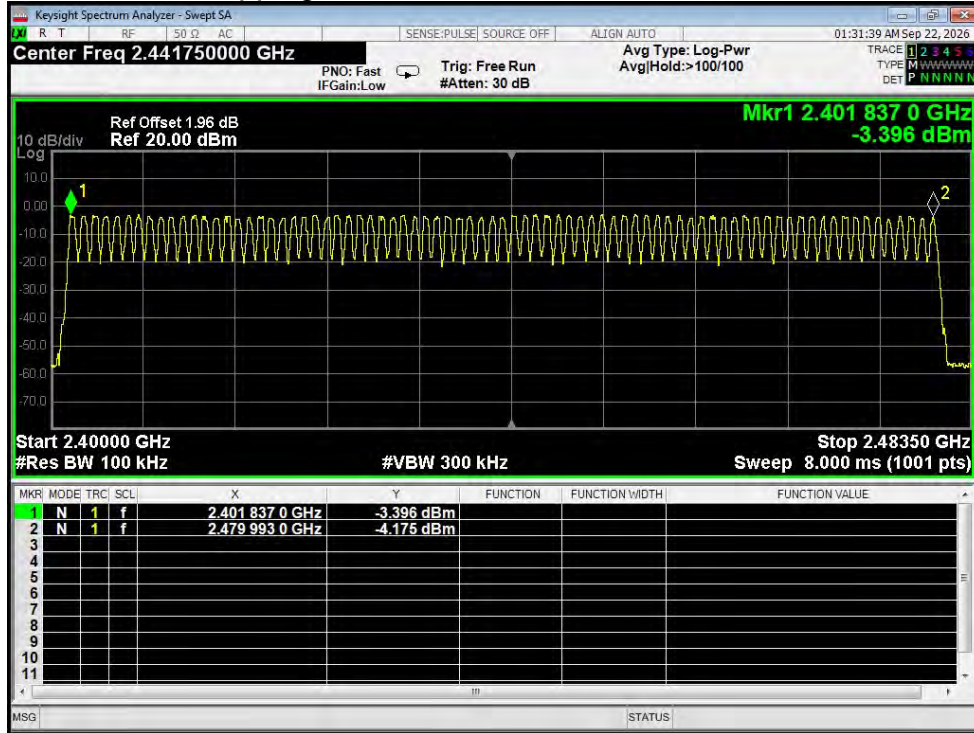
|                   |                                                                                    |               |
|-------------------|------------------------------------------------------------------------------------|---------------|
| Test Requirement: | 47CRF Part 15.247 (a)(1)(iii)                                                      |               |
| Test Method:      | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 §7.8.3        |               |
| Receiver setup:   | RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak           |               |
| Limit:            | 15 channels                                                                        |               |
| Test setup:       |  |               |
| Test Instruments: | Refer to section 3.0 for details                                                   |               |
| Test mode:        | Refer to section 2.2 for details                                                   |               |
| Test environment: | Temp.: 23.2°C                                                                      | Humid.: 41%RH |
| Test voltage:     | DC 5V from adapter                                                                 |               |
| Test results:     | Pass                                                                               |               |

#### Measurement Data:

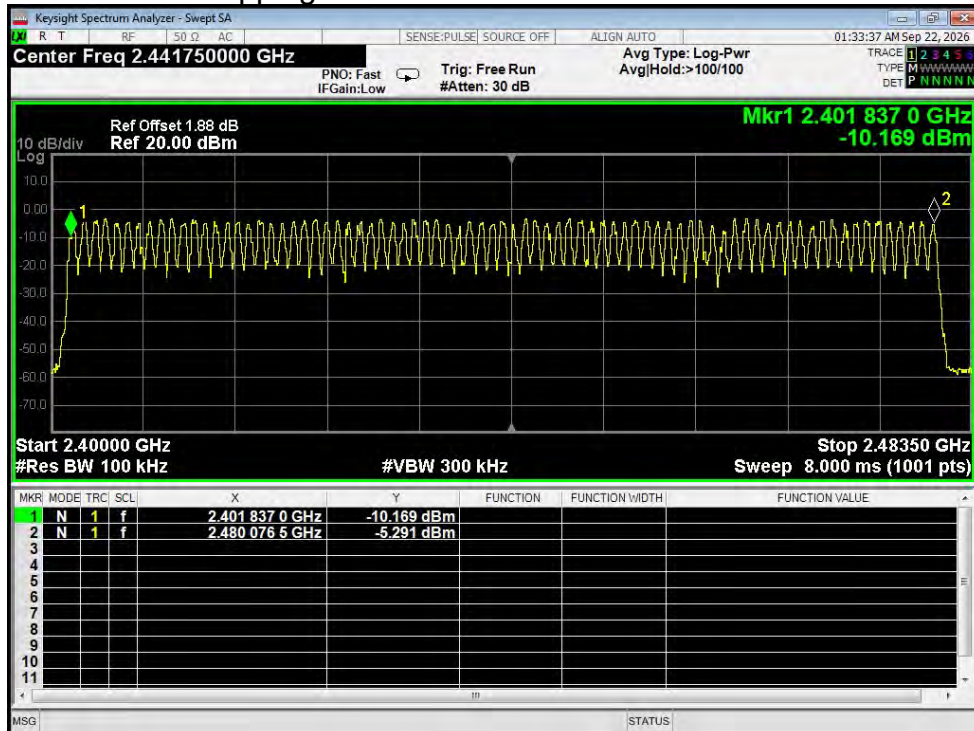
| Mode           | Hopping channel numbers | Limit | Result |
|----------------|-------------------------|-------|--------|
| GFSK           | 79                      | 15    | Pass   |
| $\pi/4$ -DQPSK | 79                      | 15    | Pass   |
| 8DPSK          | 79                      | 15    | Pass   |

Test plot as follows:

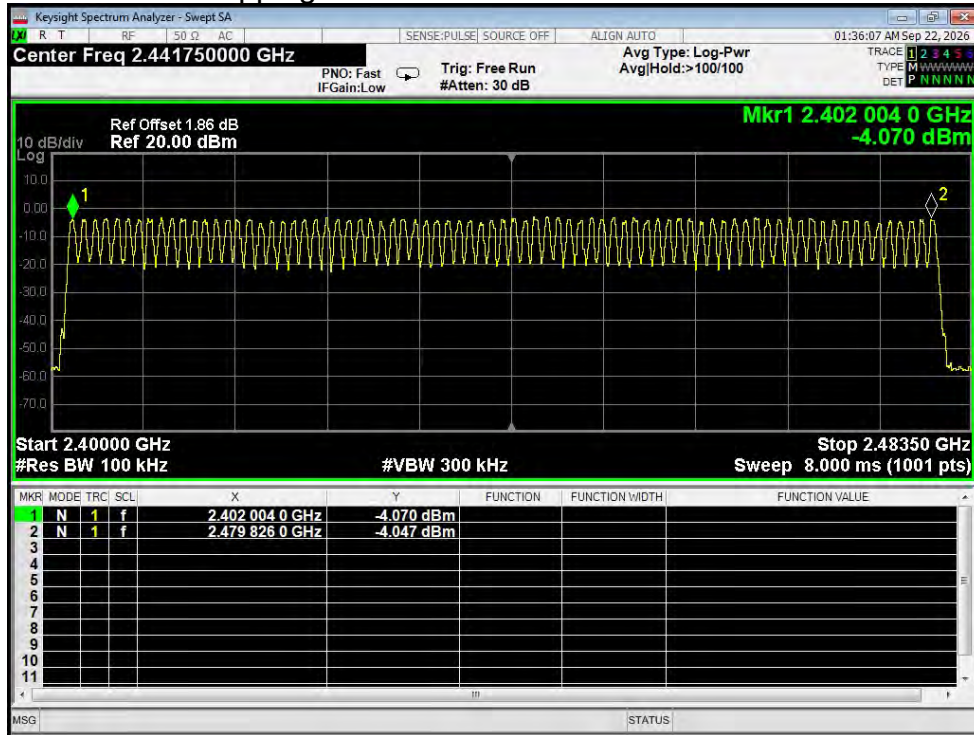
### Hopping No. NVNT 1-DH5 2402MHz Ant1



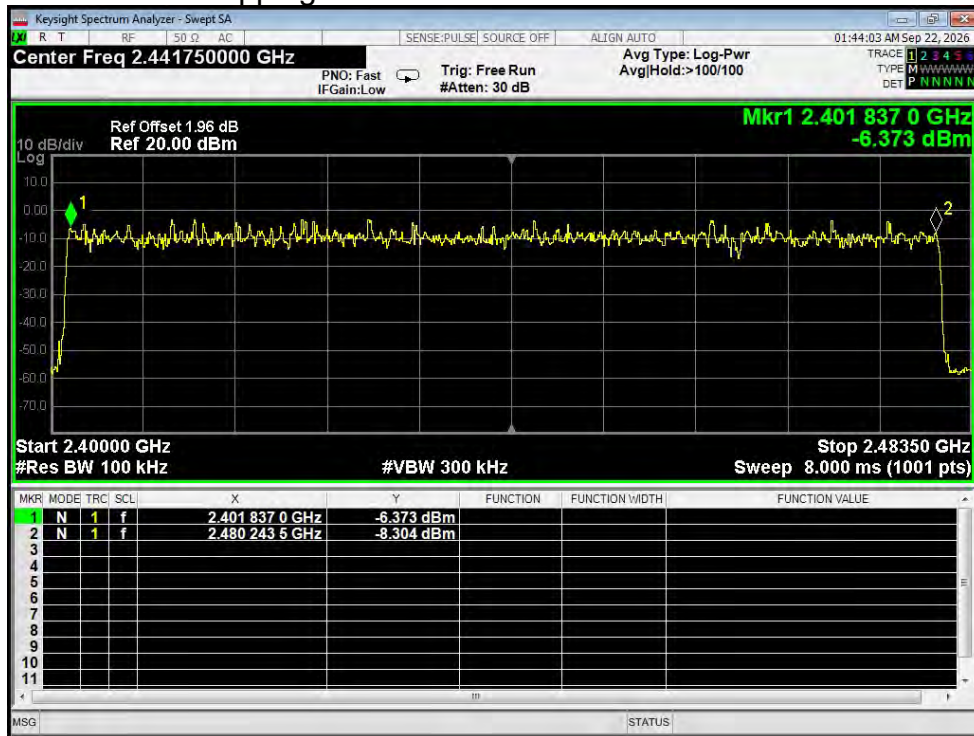
### Hopping No. NVNT 1-DH5 2441MHz Ant1



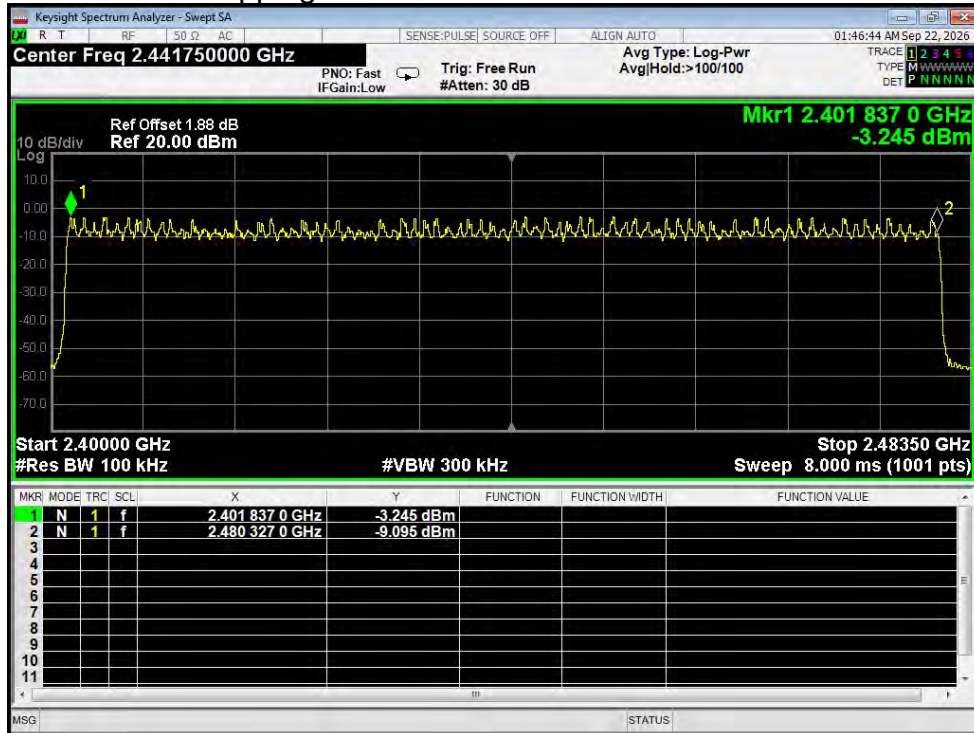
### Hopping No. NVNT 1-DH5 2480MHz Ant1



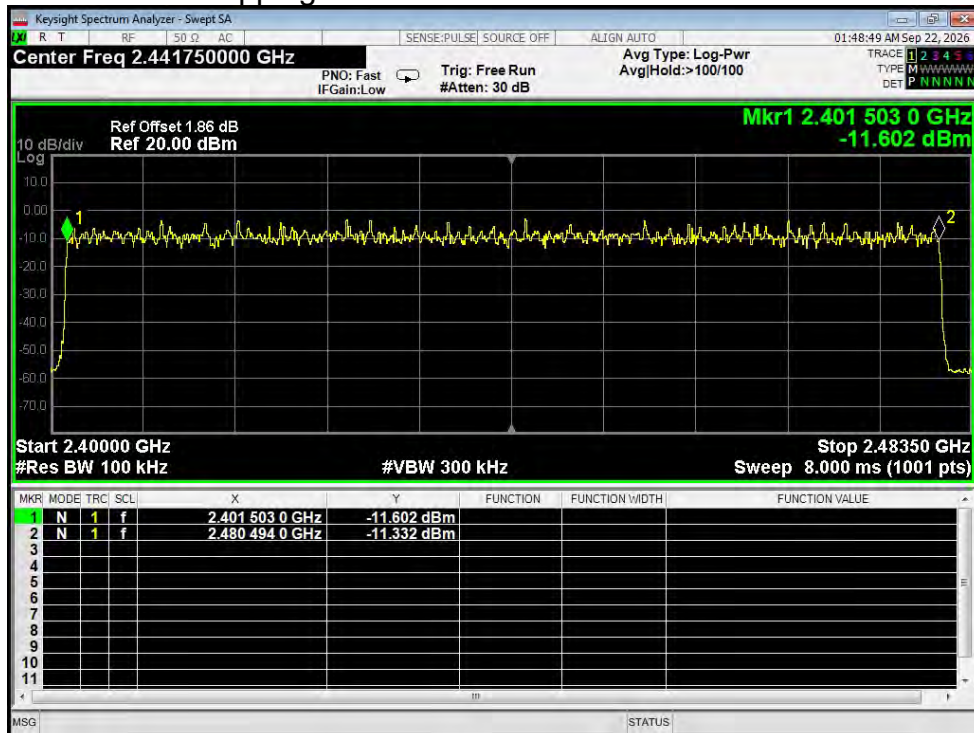
### Hopping No. NVNT 2-DH5 2402MHz Ant1



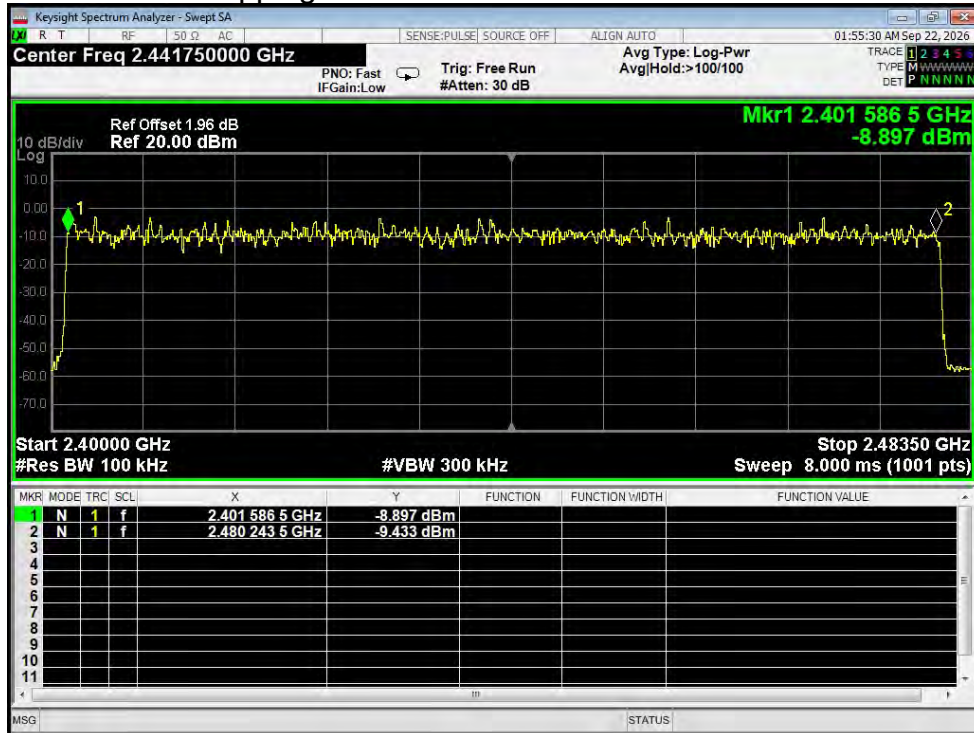
### Hopping No. NVNT 2-DH5 2441MHz Ant1



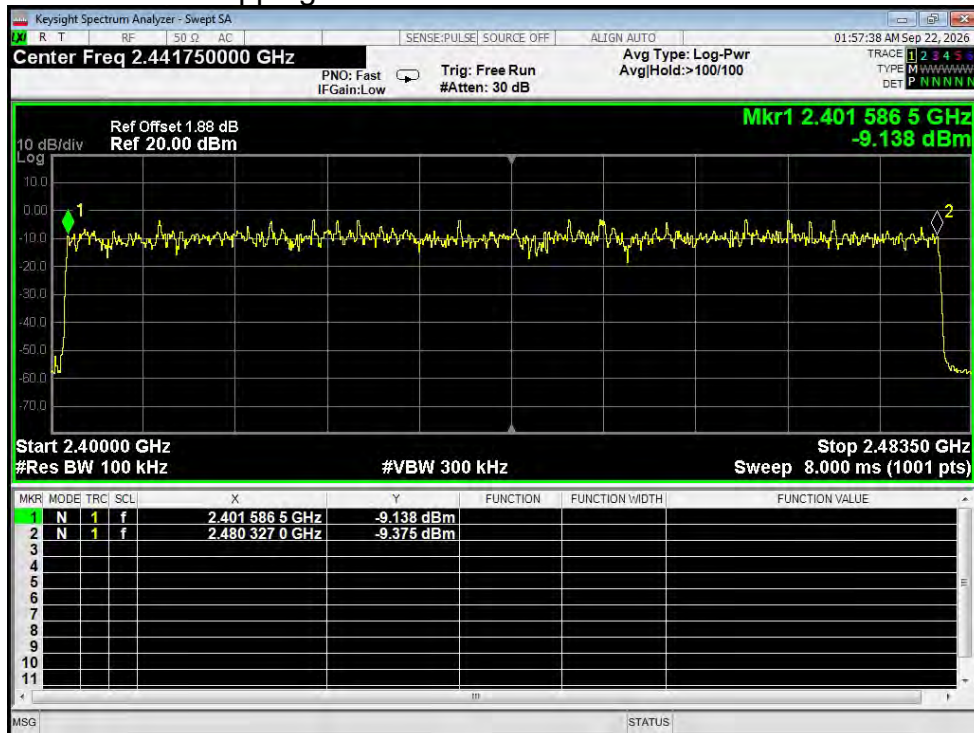
### Hopping No. NVNT 2-DH5 2480MHz Ant1



### Hopping No. NVNT 3-DH5 2402MHz Ant1

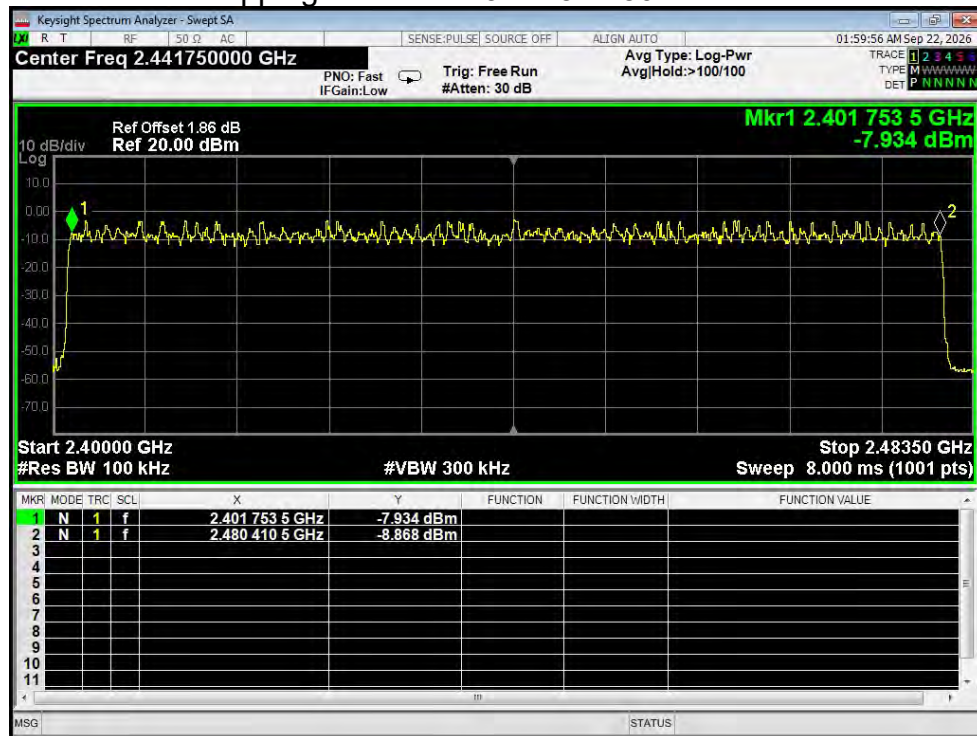


### Hopping No. NVNT 3-DH5 2441MHz Ant1

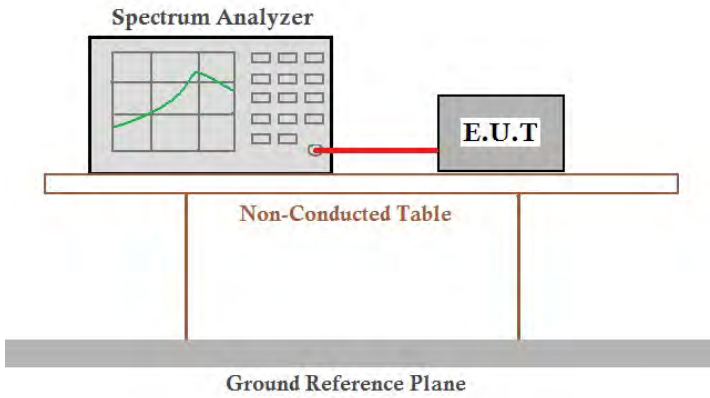




### Hopping No. NVNT 3-DH5 2480MHz Ant1



#### 4.7 Dwell Time

|                   |                                                                                    |               |
|-------------------|------------------------------------------------------------------------------------|---------------|
| Test Requirement: | 47CRF Part 15.247 (a)(1)(iii)                                                      |               |
| Test Method:      | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 §7.8.4        |               |
| Receiver setup:   | RBW=1MHz, VBW=3MHz, Span=0Hz, Detector=Peak                                        |               |
| Limit:            | 0.4 Second                                                                         |               |
| Test setup:       |  |               |
| Test Instruments: | Refer to section 3.0 for details                                                   |               |
| Test mode:        | Refer to section 2.2 for details                                                   |               |
| Test environment: | Temp.: 23.2°C                                                                      | Humid.: 41%RH |
| Test voltage:     | DC 5V from adapter                                                                 |               |
| Test results:     | Pass                                                                               |               |

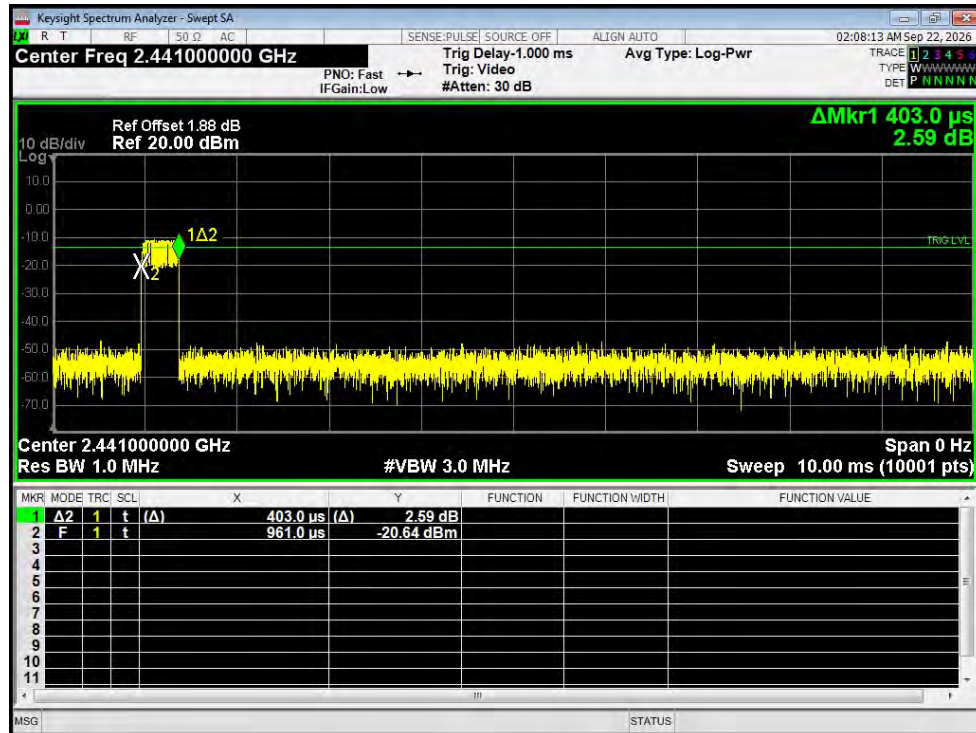


**Measurement Result**

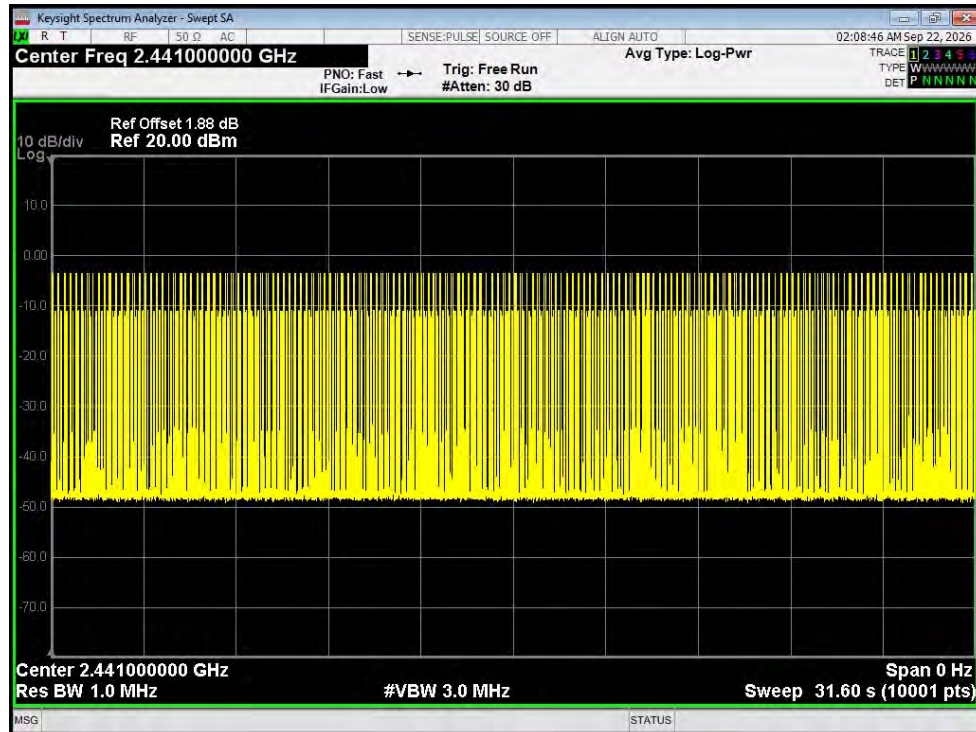
| Mode  | Frequency<br>(MHz) | Pulse Time<br>(ms) | Total Dwell Time<br>(ms) | Burst<br>Count | Period Time<br>(ms) | Limit<br>(ms) | Result |
|-------|--------------------|--------------------|--------------------------|----------------|---------------------|---------------|--------|
| 1-DH1 | 2441               | 0.403              | 128.557                  | 319            | 31600               | 400           | Pass   |
| 1-DH3 | 2441               | 1.659              | 272.076                  | 164            | 31600               | 400           | Pass   |
| 1-DH5 | 2441               | 2.908              | 299.524                  | 103            | 31600               | 400           | Pass   |
| 2-DH1 | 2441               | 0.414              | 132.066                  | 319            | 31600               | 400           | Pass   |
| 2-DH3 | 2441               | 1.663              | 261.091                  | 157            | 31600               | 400           | Pass   |
| 2-DH5 | 2441               | 2.911              | 334.765                  | 115            | 31600               | 400           | Pass   |
| 3-DH1 | 2441               | 0.413              | 132.16                   | 320            | 31600               | 400           | Pass   |
| 3-DH3 | 2441               | 1.662              | 254.286                  | 153            | 31600               | 400           | Pass   |
| 3-DH5 | 2441               | 2.917              | 347.123                  | 119            | 31600               | 400           | Pass   |

Test plot as follows:

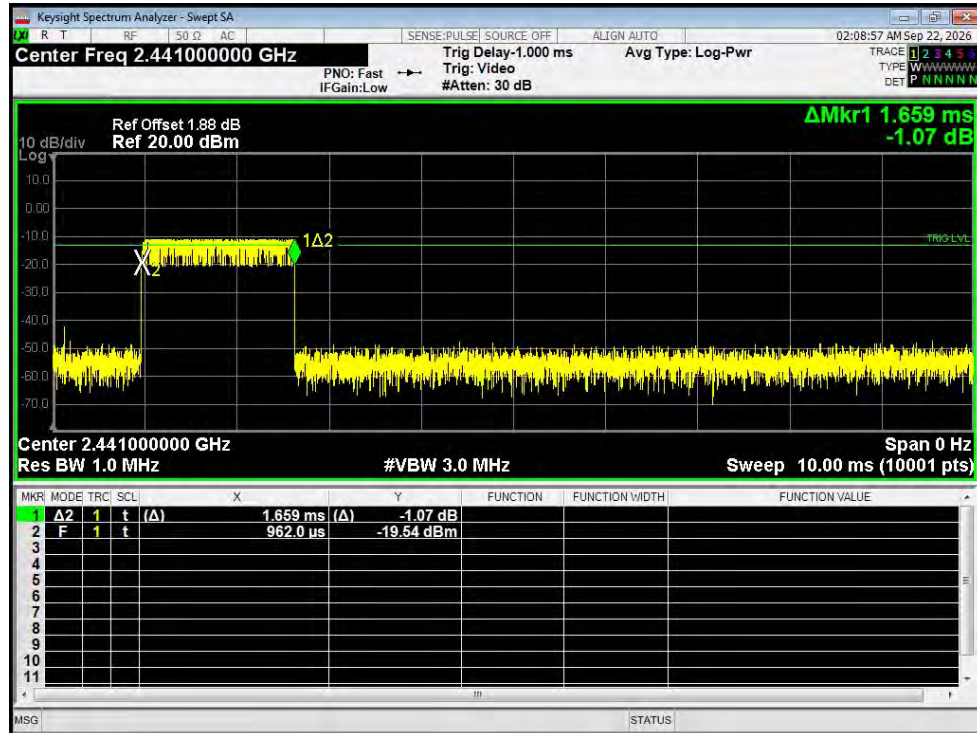
Dwell NVNT 1-DH1 2441MHz Ant1 One Burst



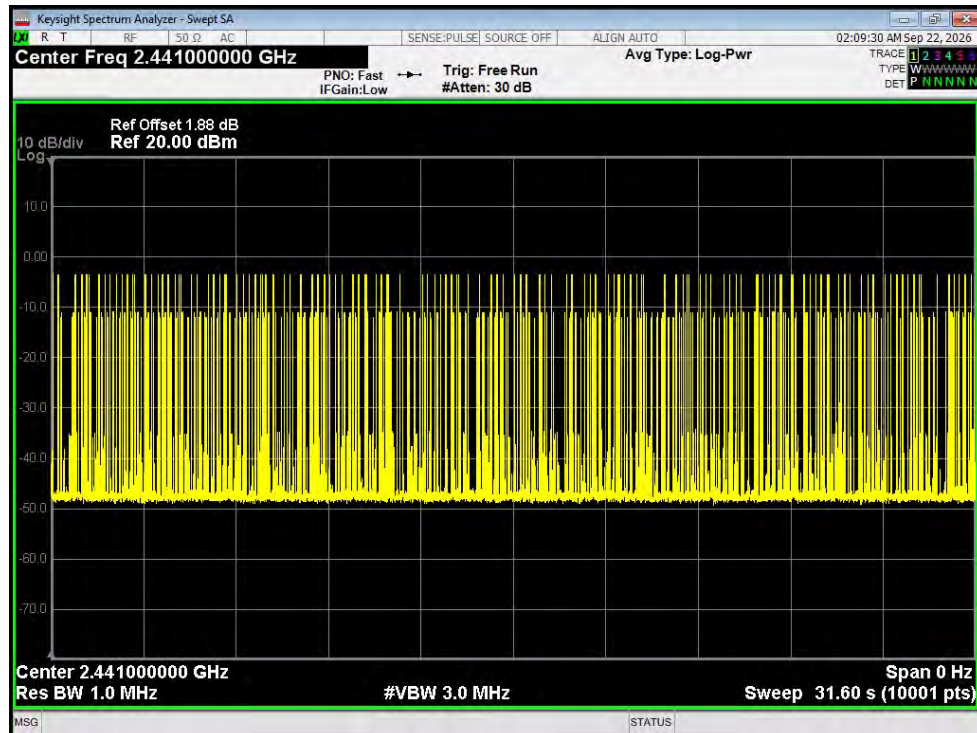
Dwell NVNT 1-DH1 2441MHz Ant1 Accumulated



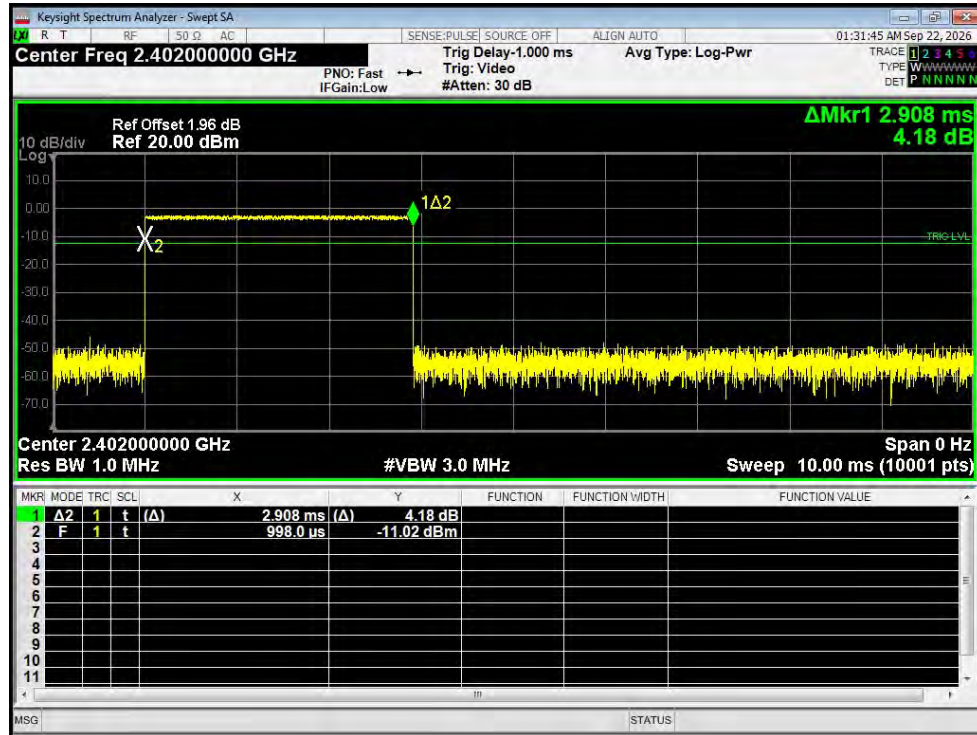
### Dwell NVNT 1-DH3 2441MHz Ant1 One Burst



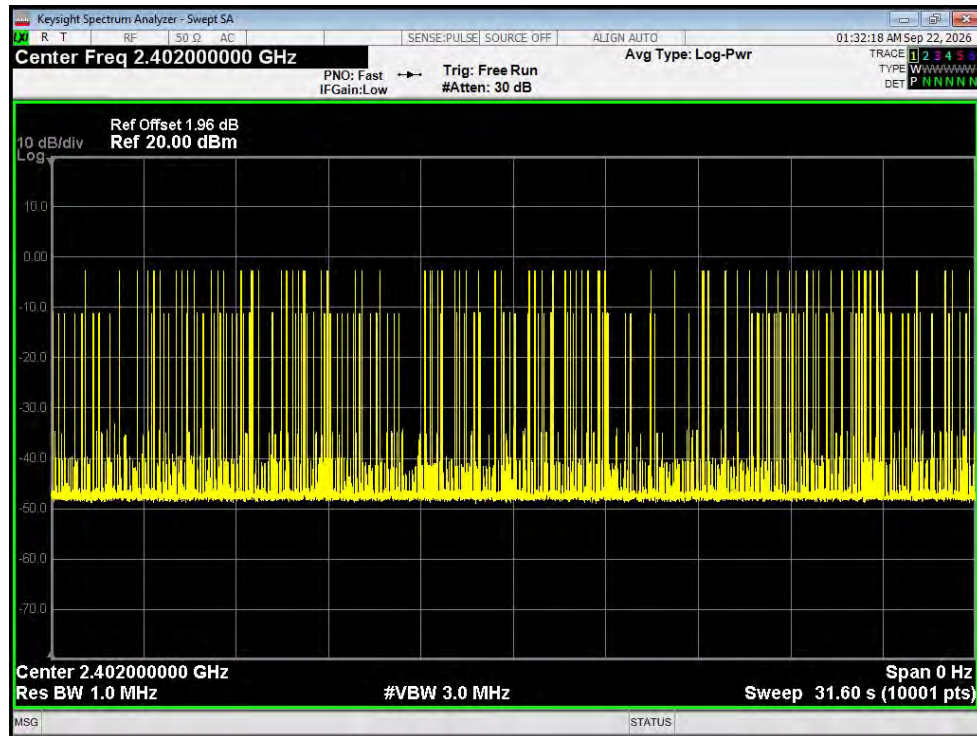
### Dwell NVNT 1-DH3 2441MHz Ant1 Accumulated



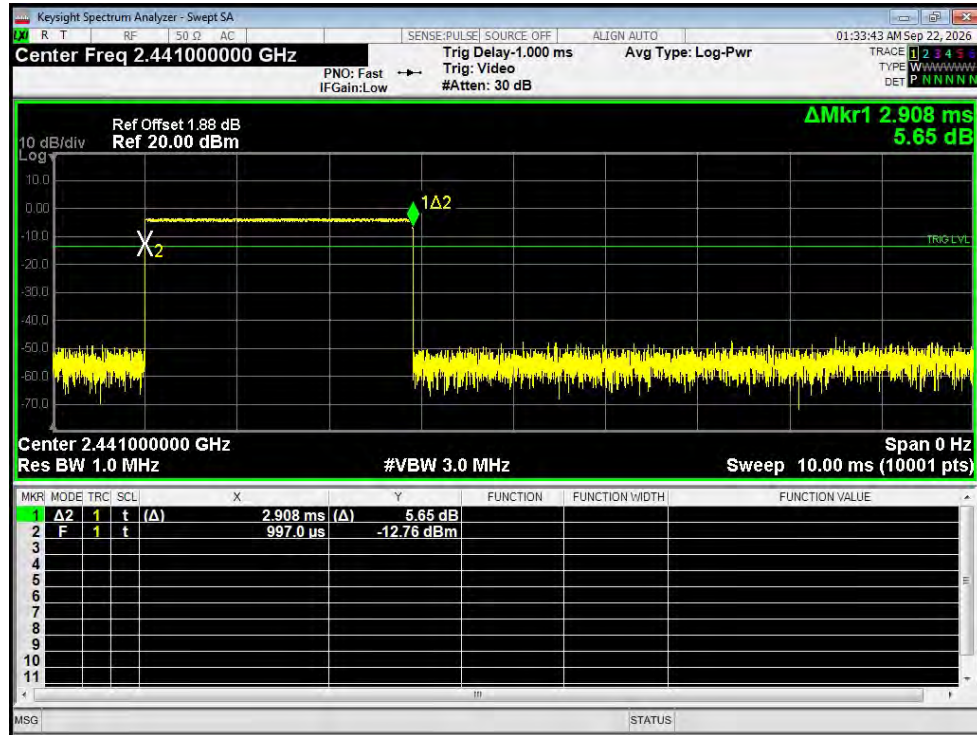
### Dwell NVNT 1-DH5 2402MHz Ant1 One Burst



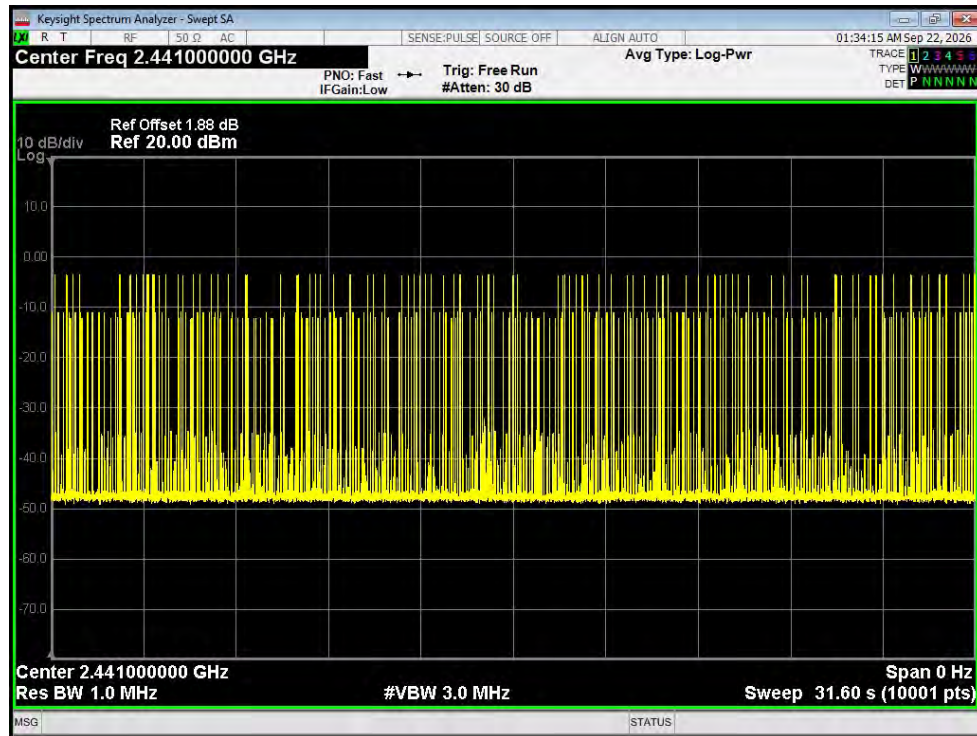
### Dwell NVNT 1-DH5 2402MHz Ant1 Accumulated



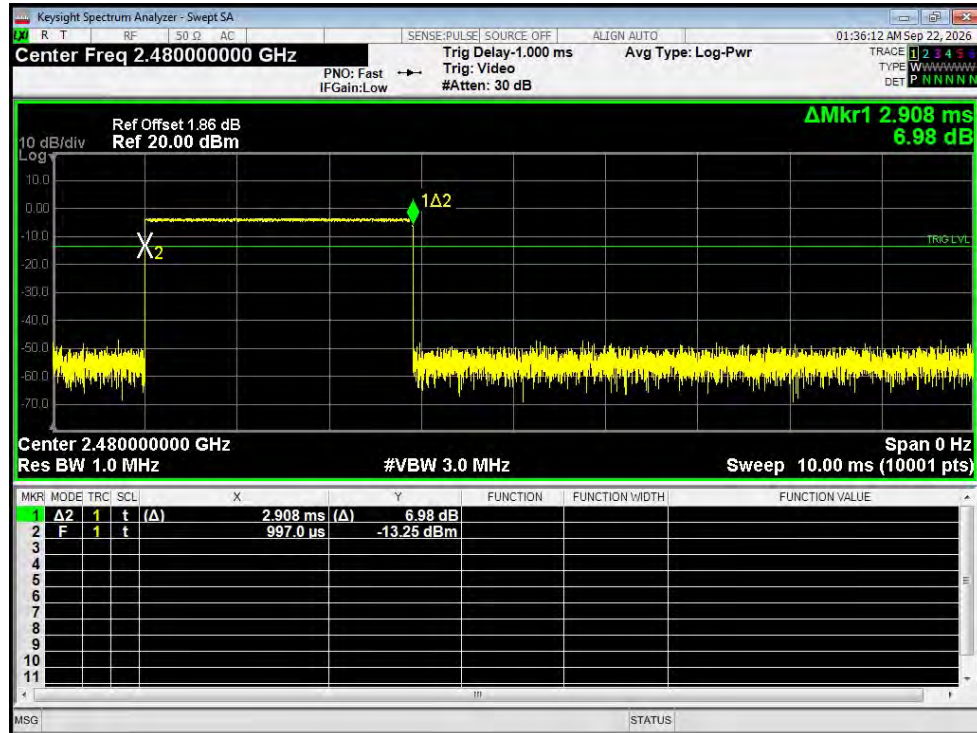
### Dwell NVNT 1-DH5 2441MHz Ant1 One Burst



### Dwell NVNT 1-DH5 2441MHz Ant1 Accumulated



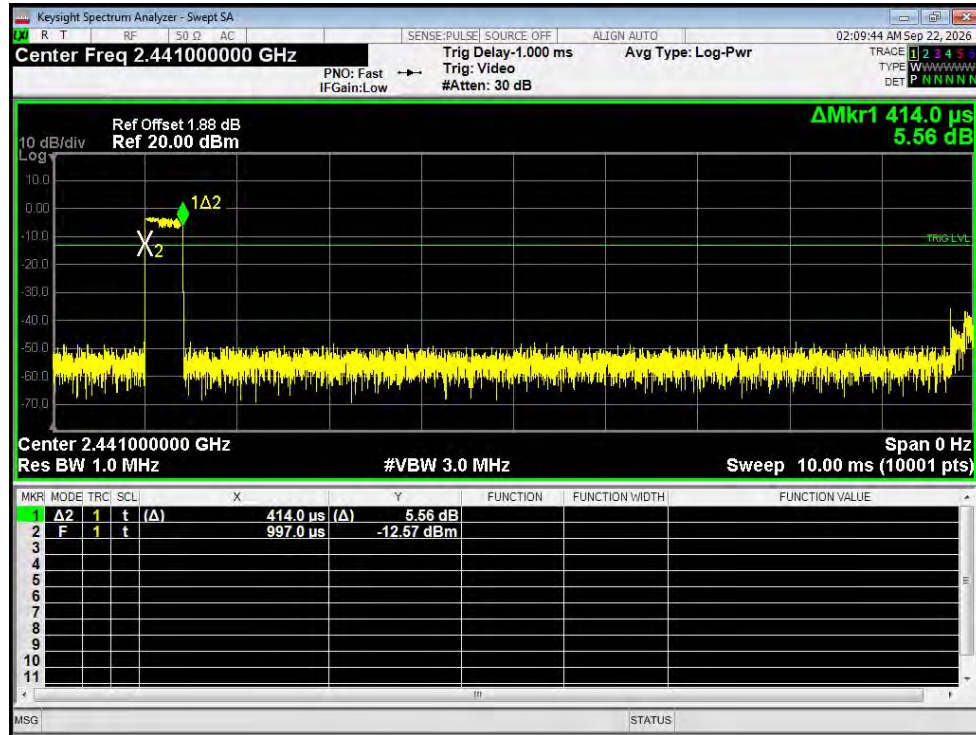
### Dwell NVNT 1-DH5 2480MHz Ant1 One Burst



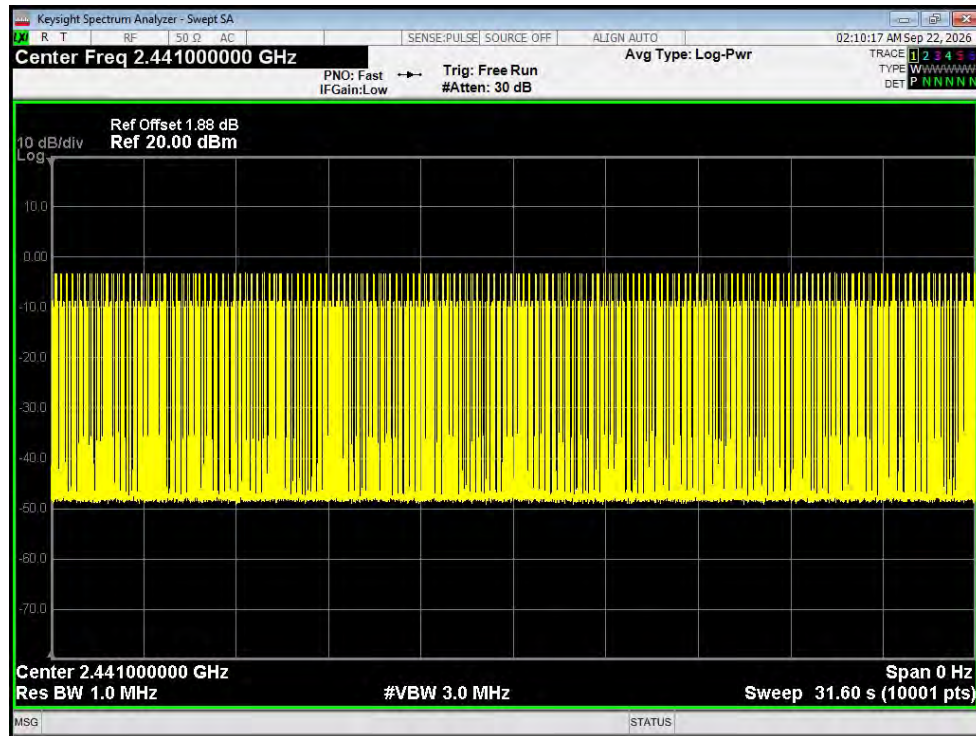
### Dwell NVNT 1-DH5 2480MHz Ant1 Accumulated



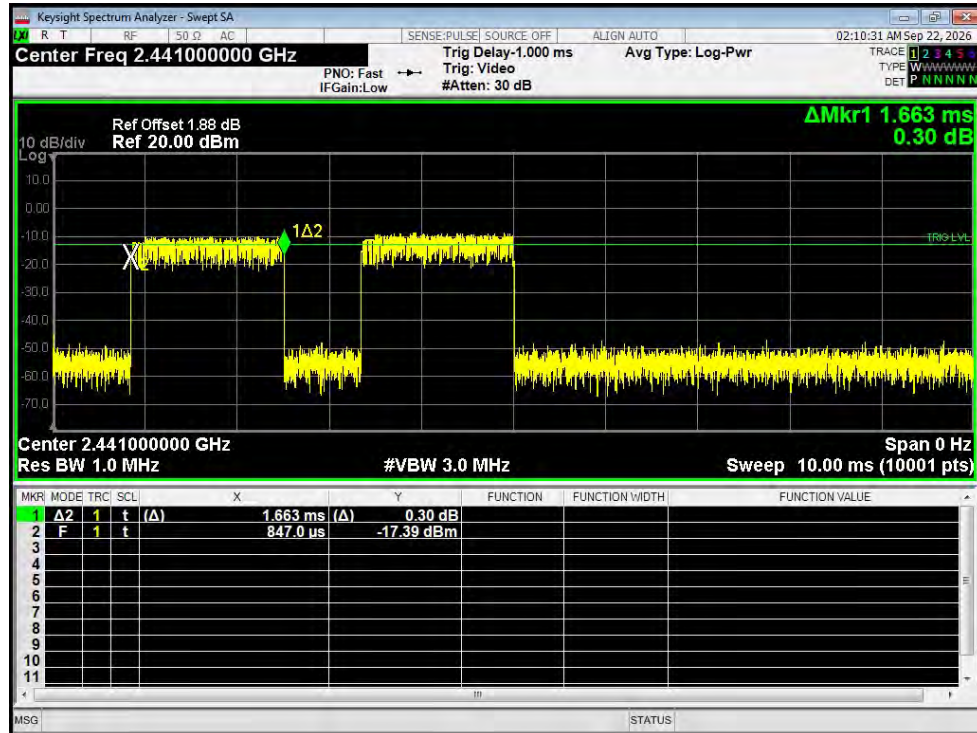
### Dwell NVNT 2-DH1 2441MHz Ant1 One Burst



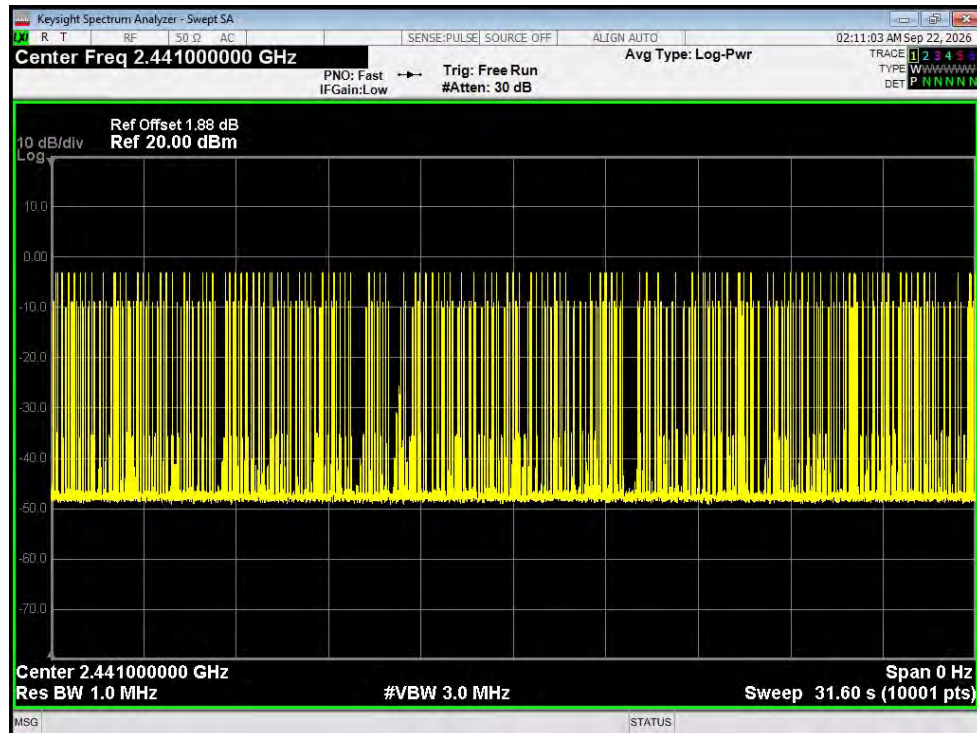
### Dwell NVNT 2-DH1 2441MHz Ant1 Accumulated



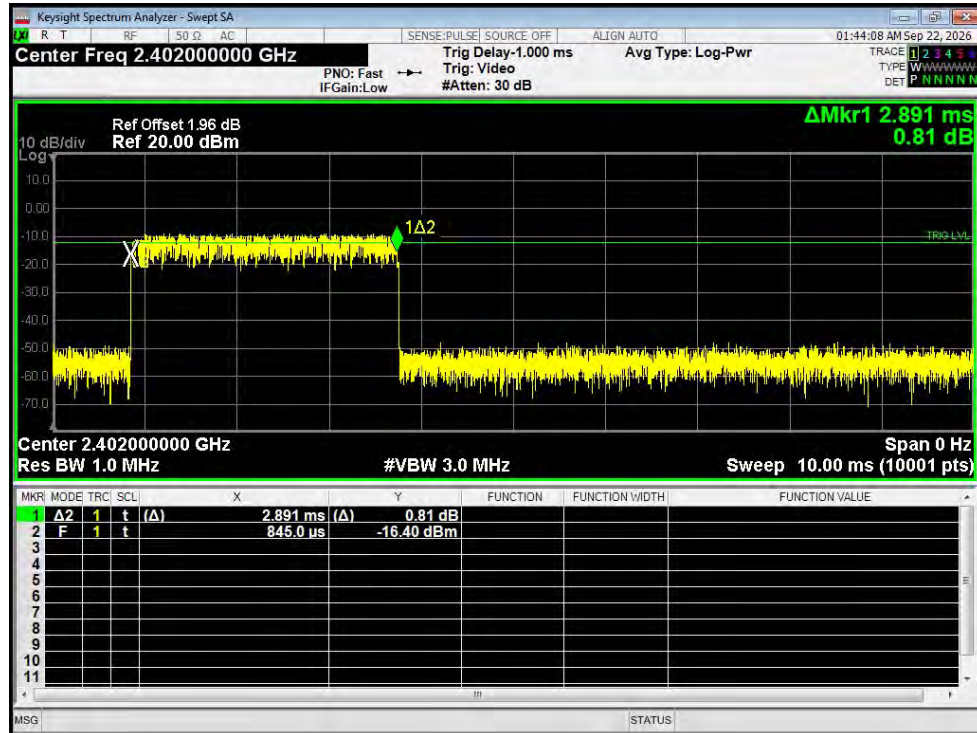
### Dwell NVNT 2-DH3 2441MHz Ant1 One Burst



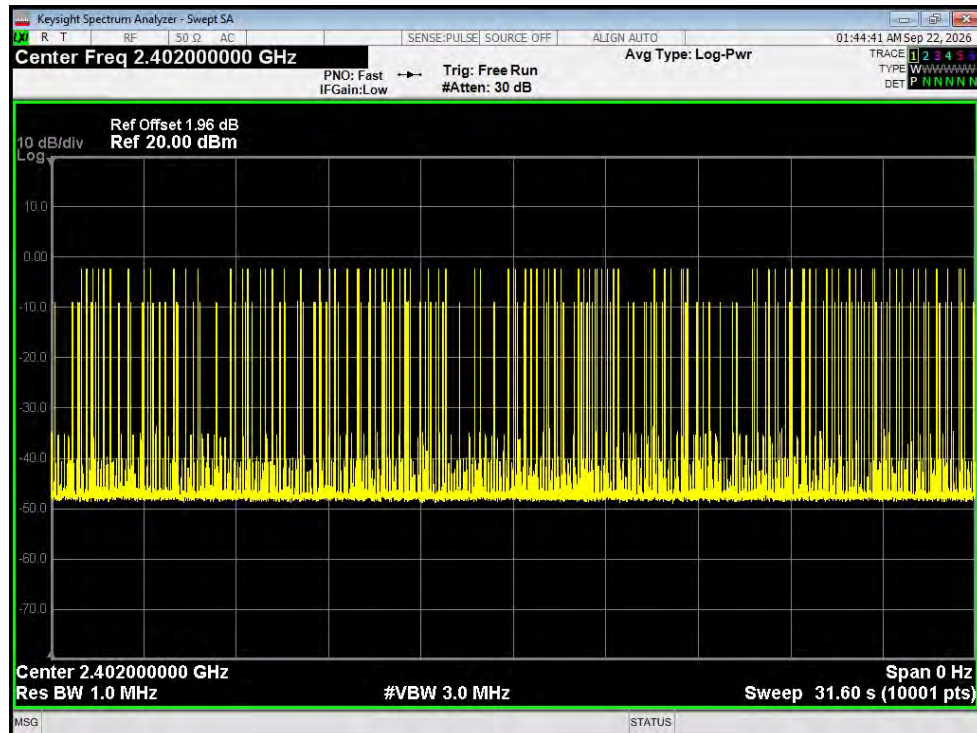
### Dwell NVNT 2-DH3 2441MHz Ant1 Accumulated



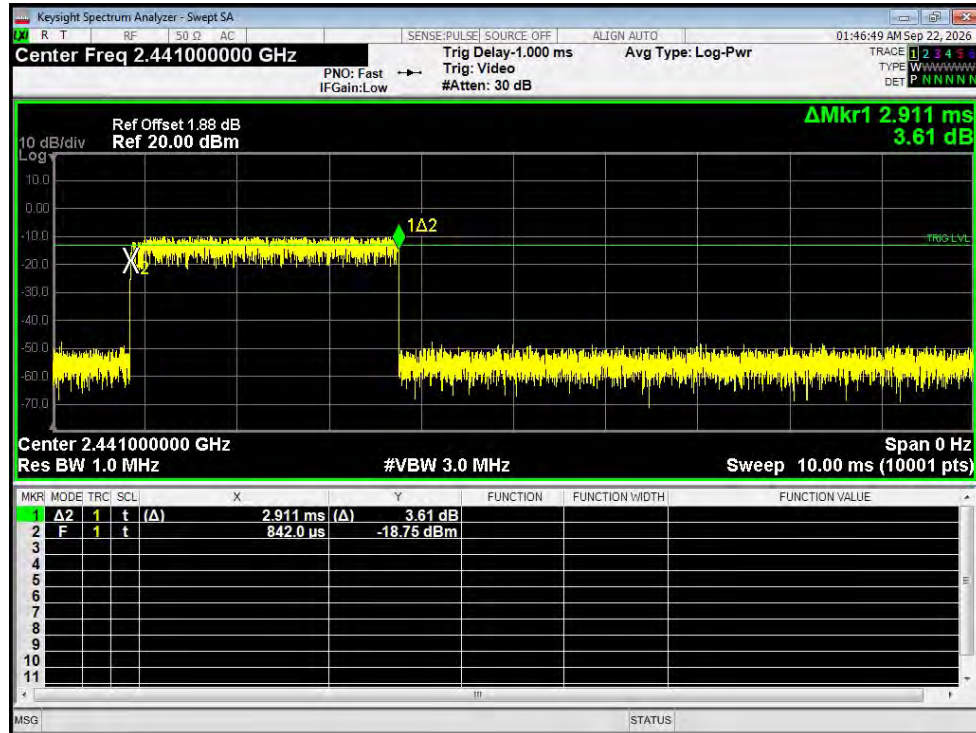
### Dwell NVNT 2-DH5 2402MHz Ant1 One Burst



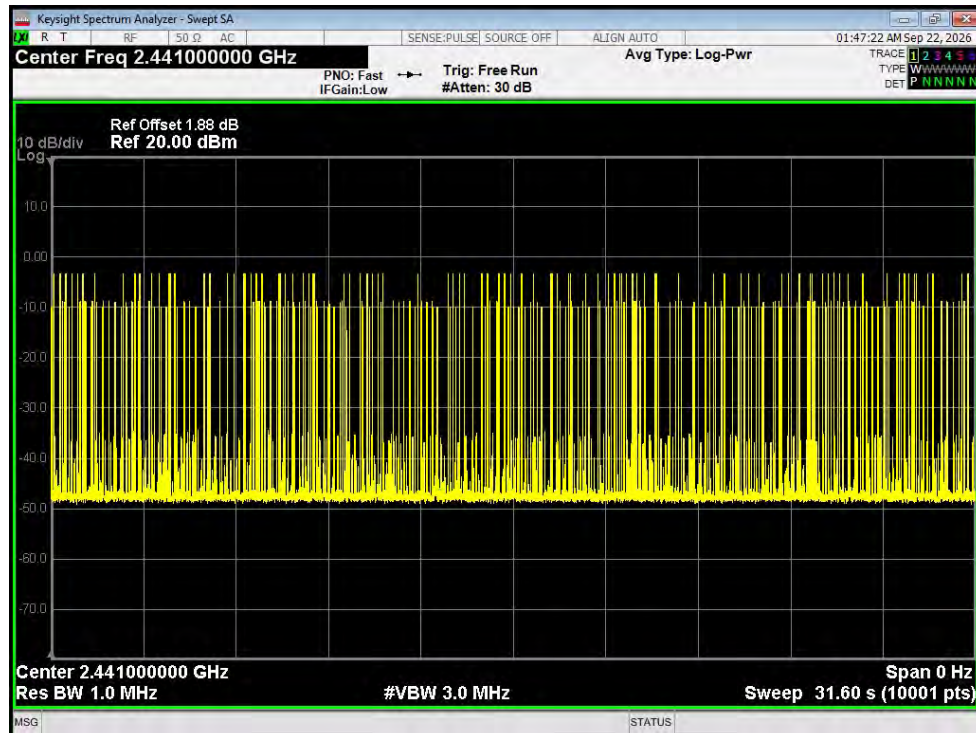
### Dwell NVNT 2-DH5 2402MHz Ant1 Accumulated



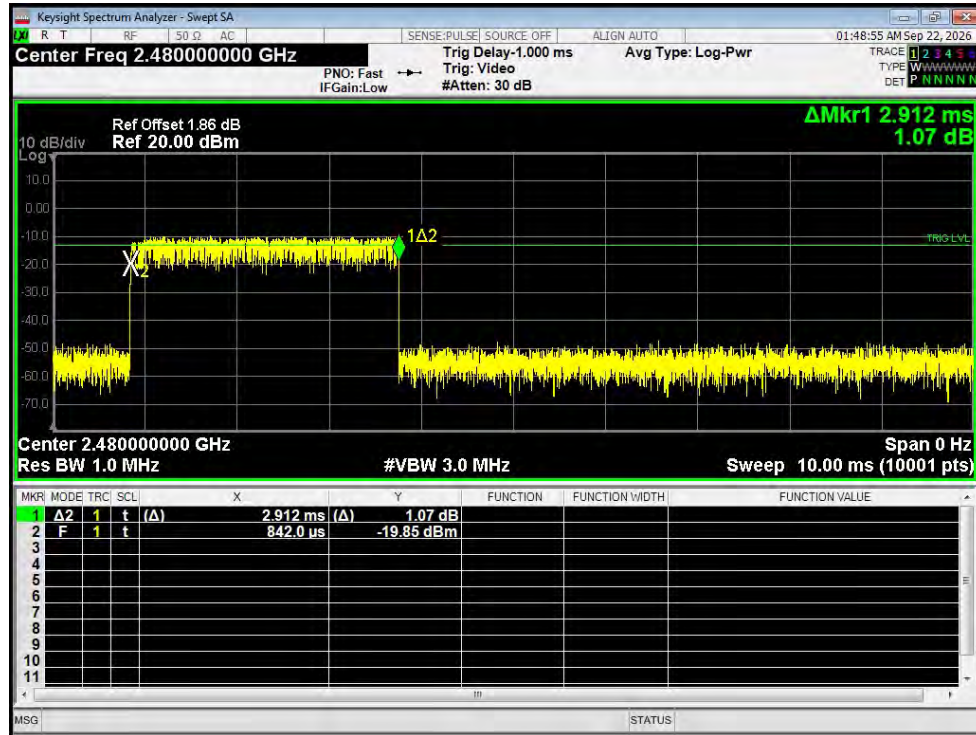
### Dwell NVNT 2-DH5 2441MHz Ant1 One Burst



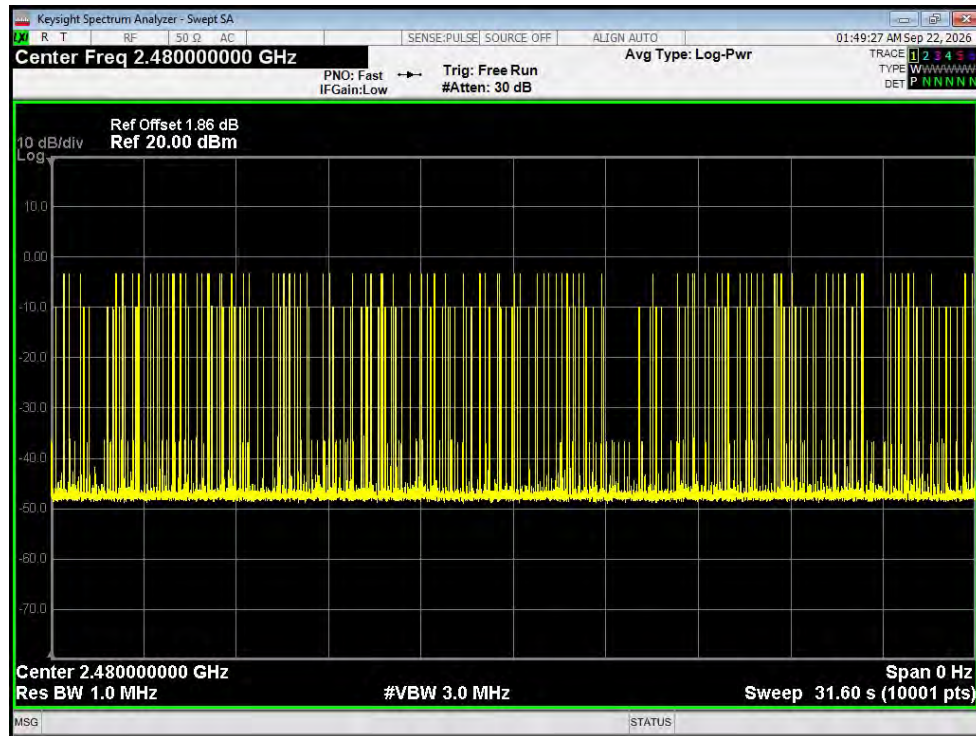
### Dwell NVNT 2-DH5 2441MHz Ant1 Accumulated



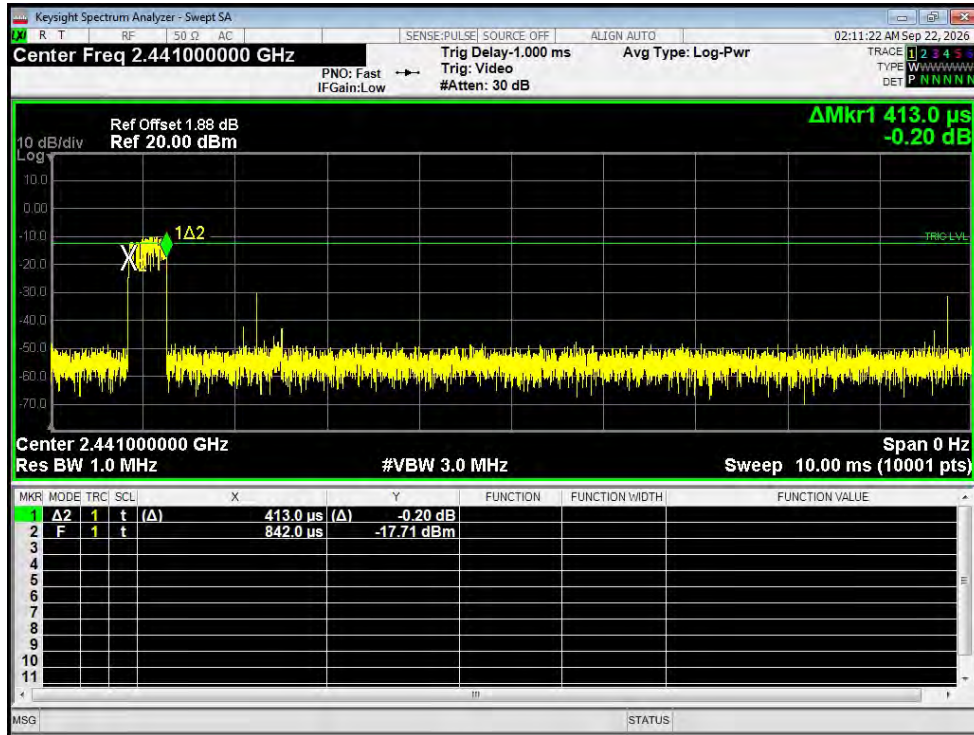
### Dwell NVNT 2-DH5 2480MHz Ant1 One Burst



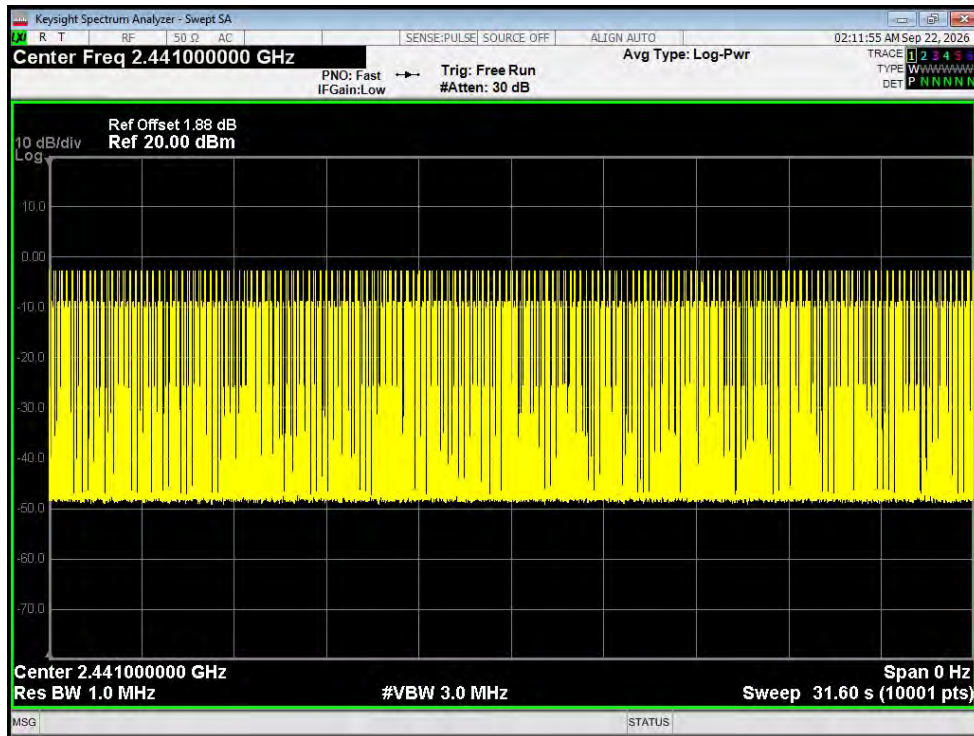
### Dwell NVNT 2-DH5 2480MHz Ant1 Accumulated



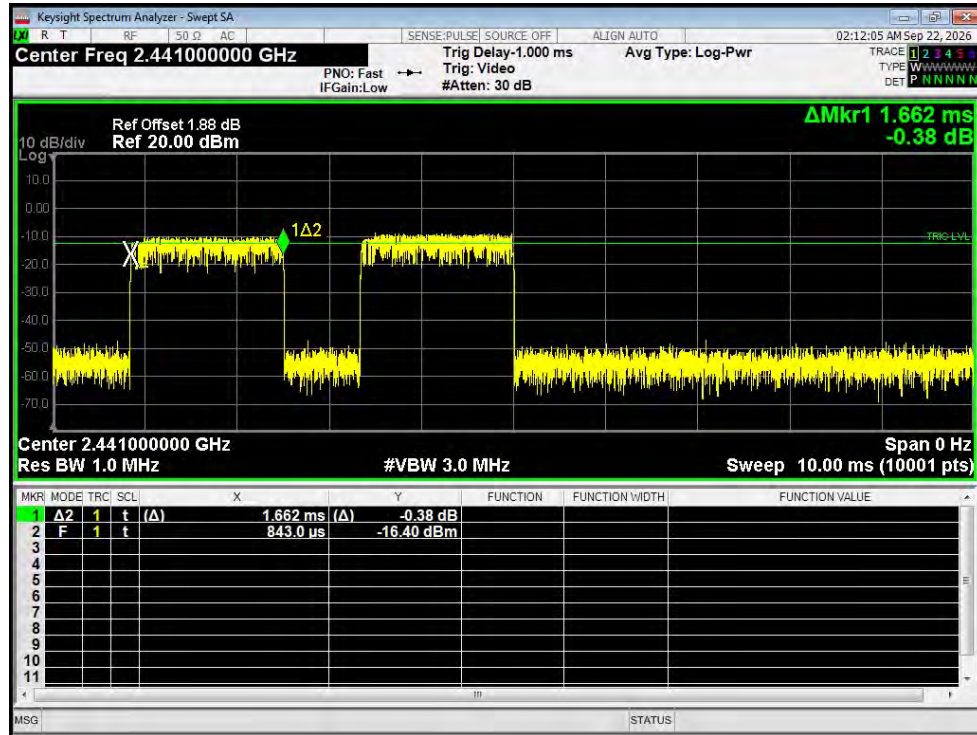
### Dwell NVNT 3-DH1 2441MHz Ant1 One Burst



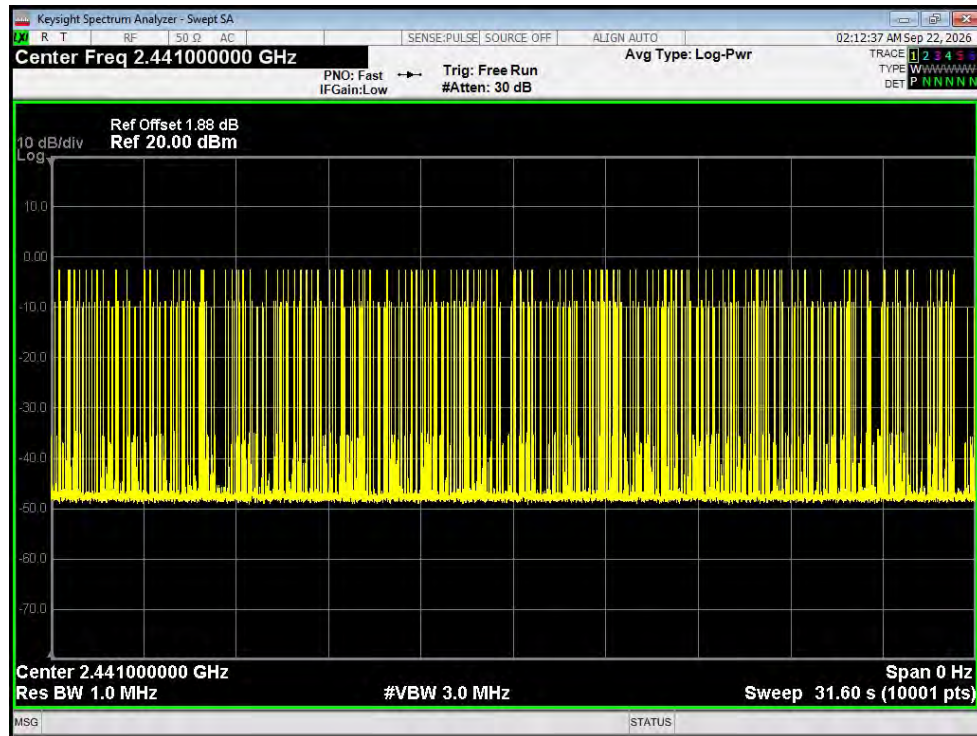
### Dwell NVNT 3-DH1 2441MHz Ant1 Accumulated



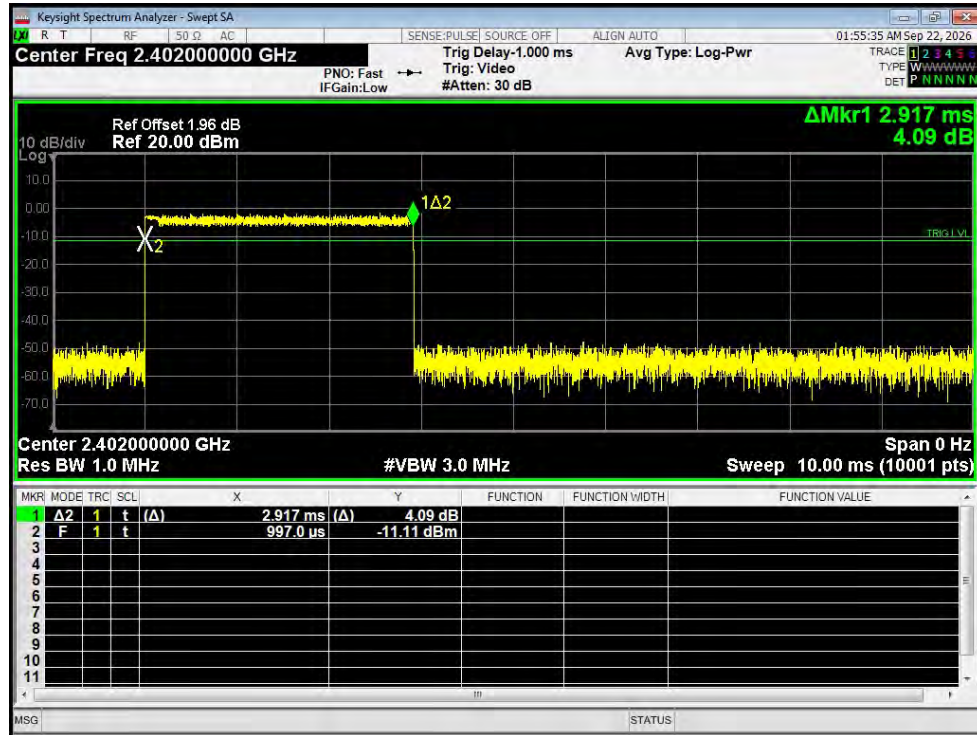
### Dwell NVNT 3-DH3 2441MHz Ant1 One Burst



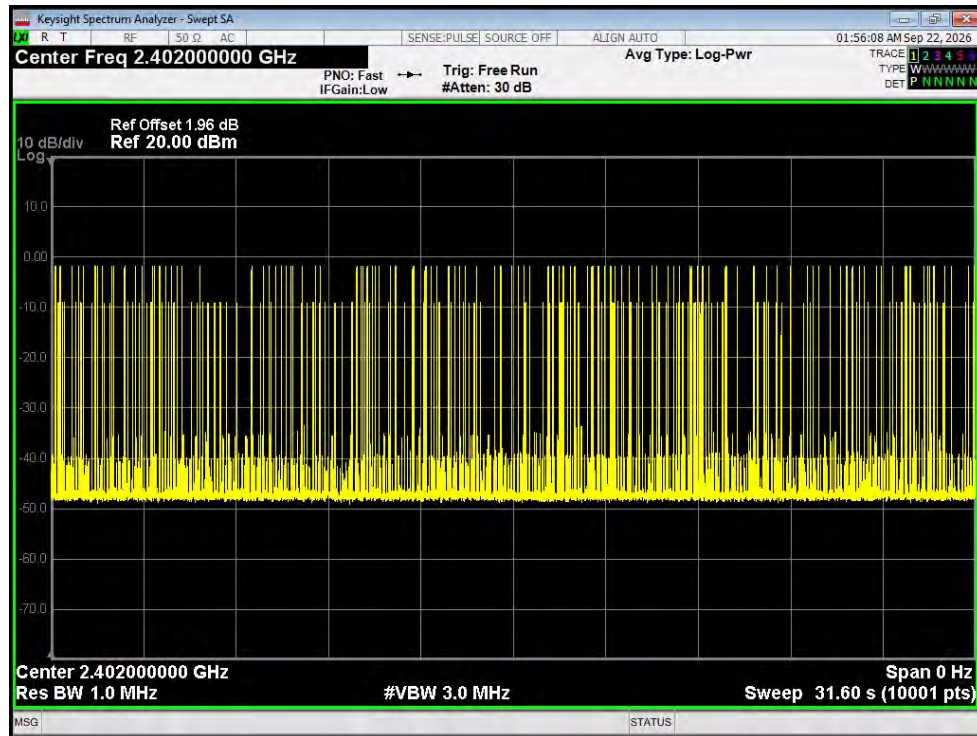
### Dwell NVNT 3-DH3 2441MHz Ant1 Accumulated



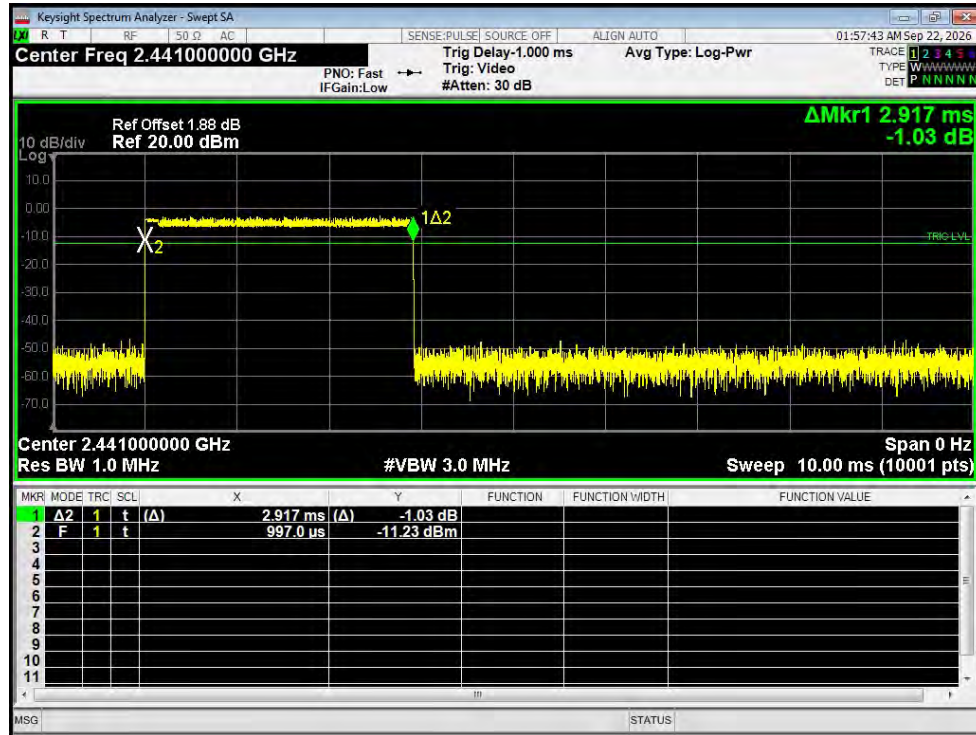
### Dwell NVNT 3-DH5 2402MHz Ant1 One Burst



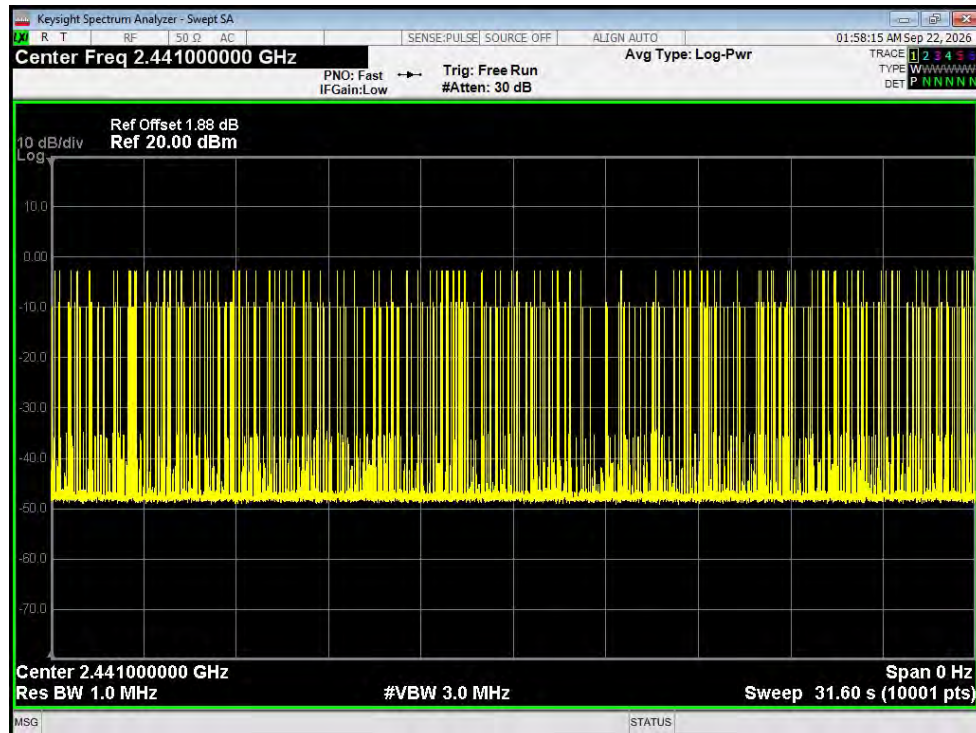
### Dwell NVNT 3-DH5 2402MHz Ant1 Accumulated



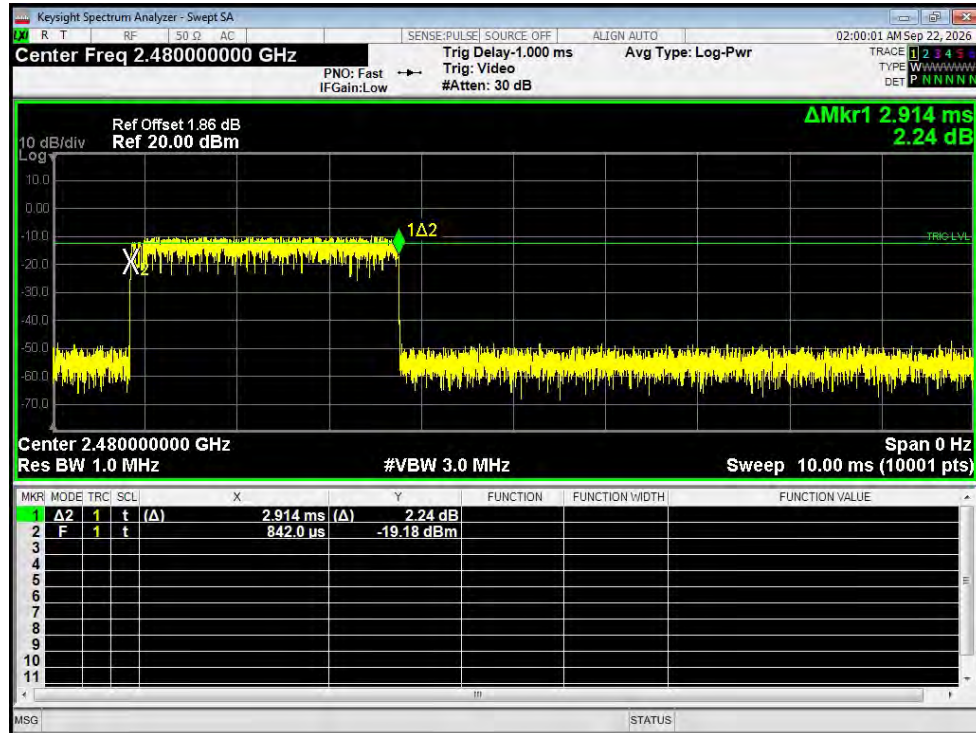
### Dwell NVNT 3-DH5 2441MHz Ant1 One Burst



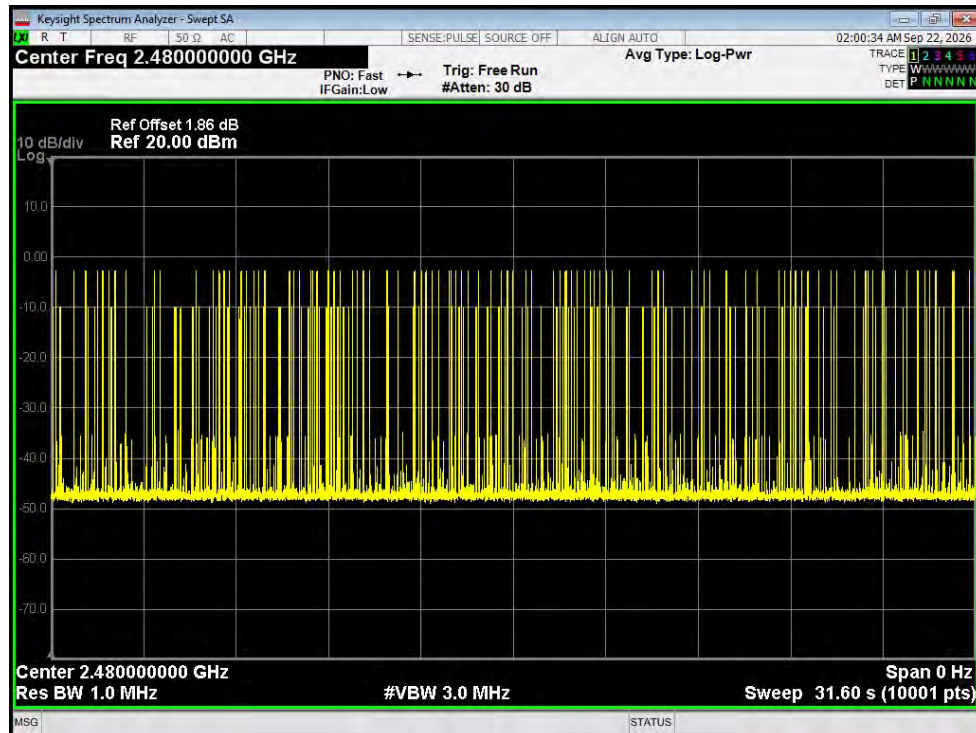
### Dwell NVNT 3-DH5 2441MHz Ant1 Accumulated



### Dwell NVNT 3-DH5 2480MHz Ant1 One Burst

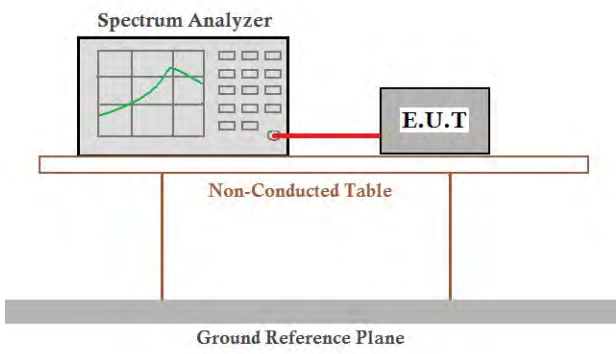


### Dwell NVNT 3-DH5 2480MHz Ant1 Accumulated



## 4.8 Band Edge

### 4.8.1 Conducted Emission Method

|                   |                                                                                                                                                                                                                                                                                                                                                                                         |               |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Test Requirement: | 47CRF Part 15.247 (d)                                                                                                                                                                                                                                                                                                                                                                   |               |
| Test Method:      | ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 §7.8.6                                                                                                                                                                                                                                                                                                             |               |
| Receiver setup:   | RBW=100kHz, VBW=300kHz, Detector=Peak                                                                                                                                                                                                                                                                                                                                                   |               |
| Limit:            | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. |               |
| Test setup:       |                                                                                                                                                                                                                                                                                                      |               |
| Test Instruments: | Refer to section 3.0 for details                                                                                                                                                                                                                                                                                                                                                        |               |
| Test mode:        | Refer to section 2.2 for details                                                                                                                                                                                                                                                                                                                                                        |               |
| Test environment: | Temp.: 23.2°C                                                                                                                                                                                                                                                                                                                                                                           | Humid.: 41%RH |
| Test voltage:     | DC 5V from adapter                                                                                                                                                                                                                                                                                                                                                                      |               |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                    |               |