

## FCC Appendix RF Test Data for 2.4GWIFI

Product Name: Smart Diagnostic System

Test Model: P805

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23.8° C   |
| Relative Humidity: | 52.1%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Zoey Cao  |
| Supervised by:     | Eric Wang |

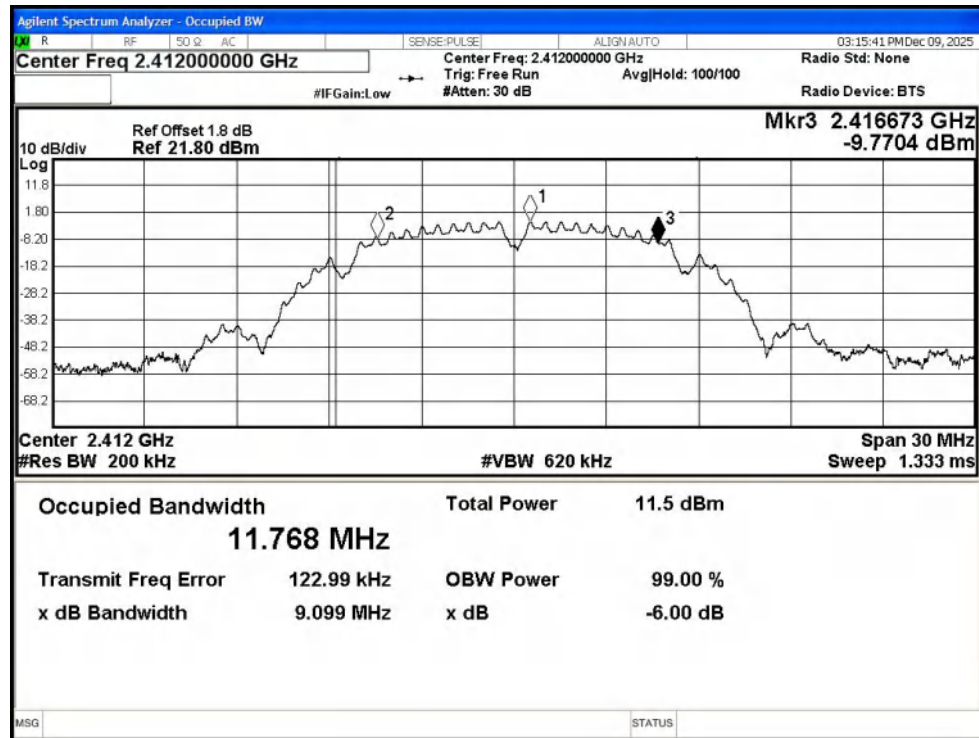
## 1. -6dB Bandwidth

RTL8821:

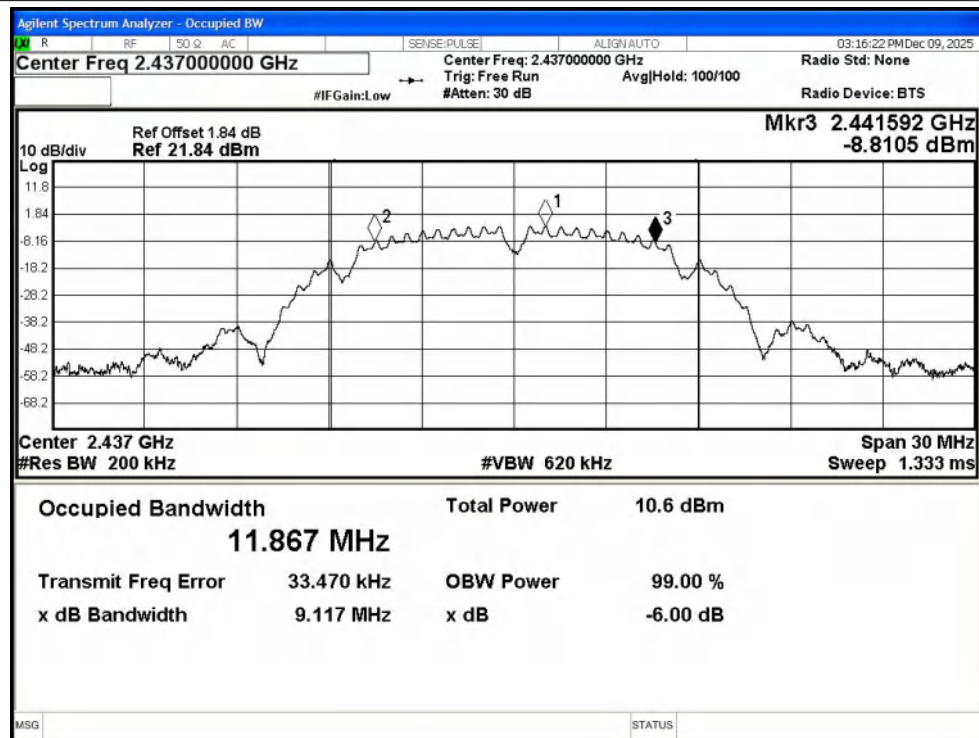
| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-----------------------------|---------|
| NVNT      | b    | 2412            | Ant1    | 9.099                 | $\geq 0.5$                  | Pass    |
| NVNT      | b    | 2437            | Ant1    | 9.117                 | $\geq 0.5$                  | Pass    |
| NVNT      | b    | 2462            | Ant1    | 9.105                 | $\geq 0.5$                  | Pass    |
| NVNT      | g    | 2412            | Ant1    | 16.333                | $\geq 0.5$                  | Pass    |
| NVNT      | g    | 2437            | Ant1    | 16.381                | $\geq 0.5$                  | Pass    |
| NVNT      | g    | 2462            | Ant1    | 16.335                | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 17.398                | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2437            | Ant1    | 17.467                | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 17.316                | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2422            | Ant1    | 35.393                | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2437            | Ant1    | 36.05                 | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2452            | Ant1    | 35.865                | $\geq 0.5$                  | Pass    |

## Test Graphs

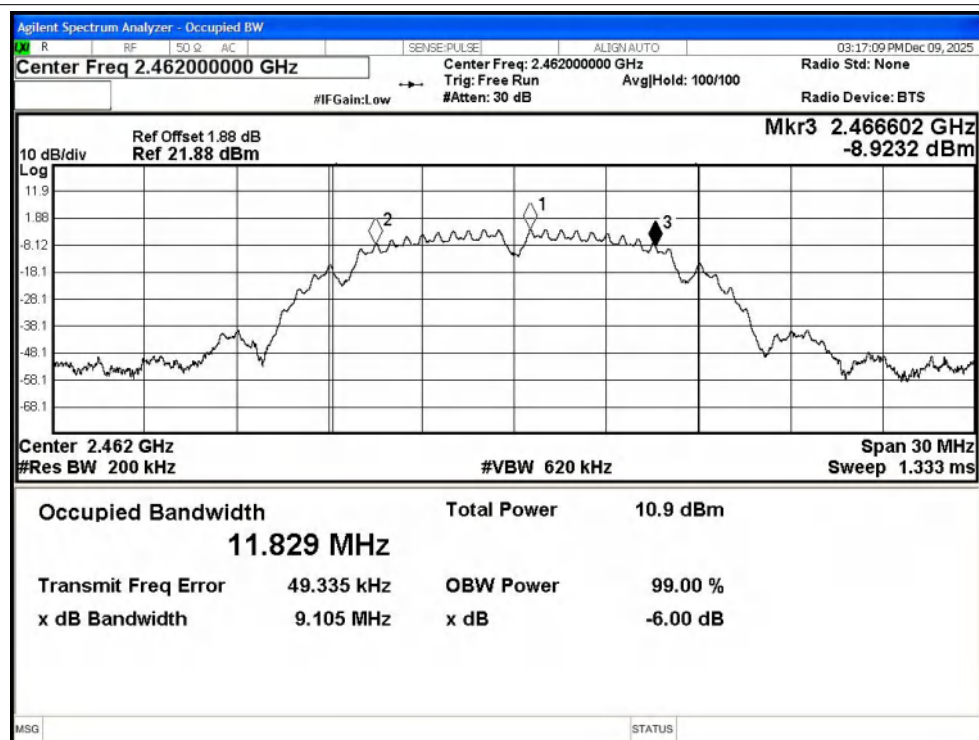
-6dB Bandwidth NVNT b 2412MHz Ant1



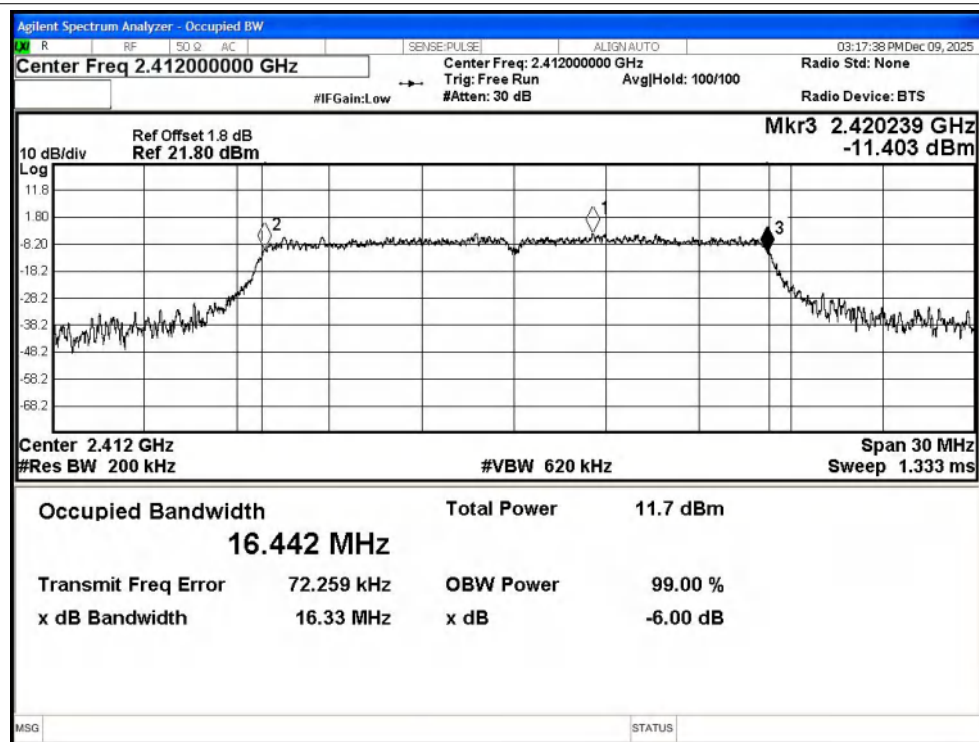
-6dB Bandwidth NVNT b 2437MHz Ant1



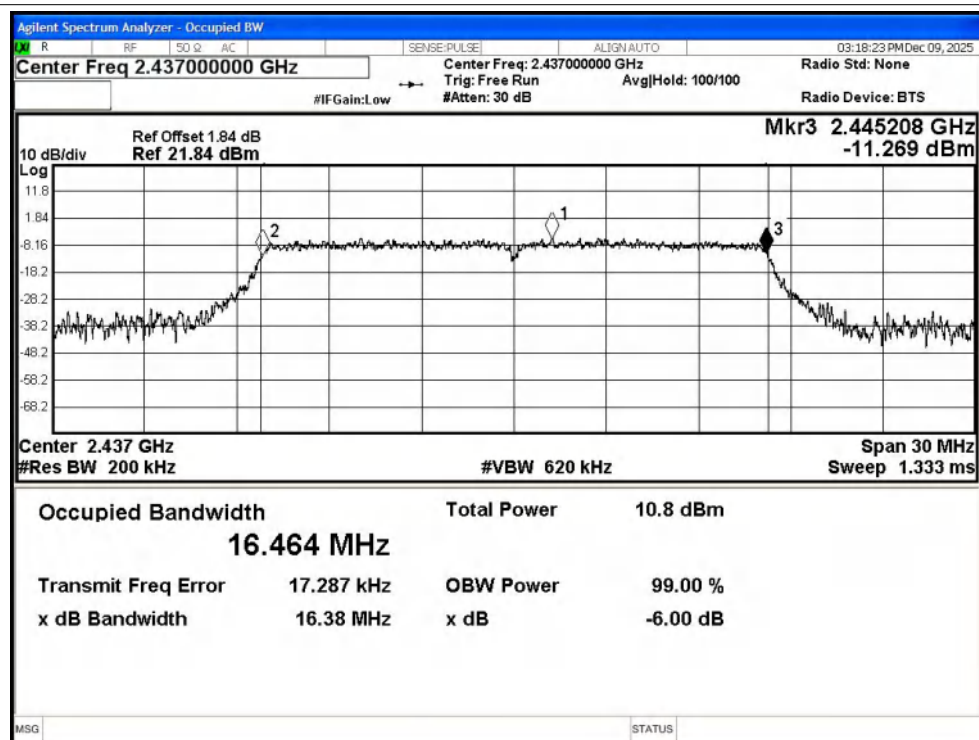
## -6dB Bandwidth NVNT b 2462MHz Ant1



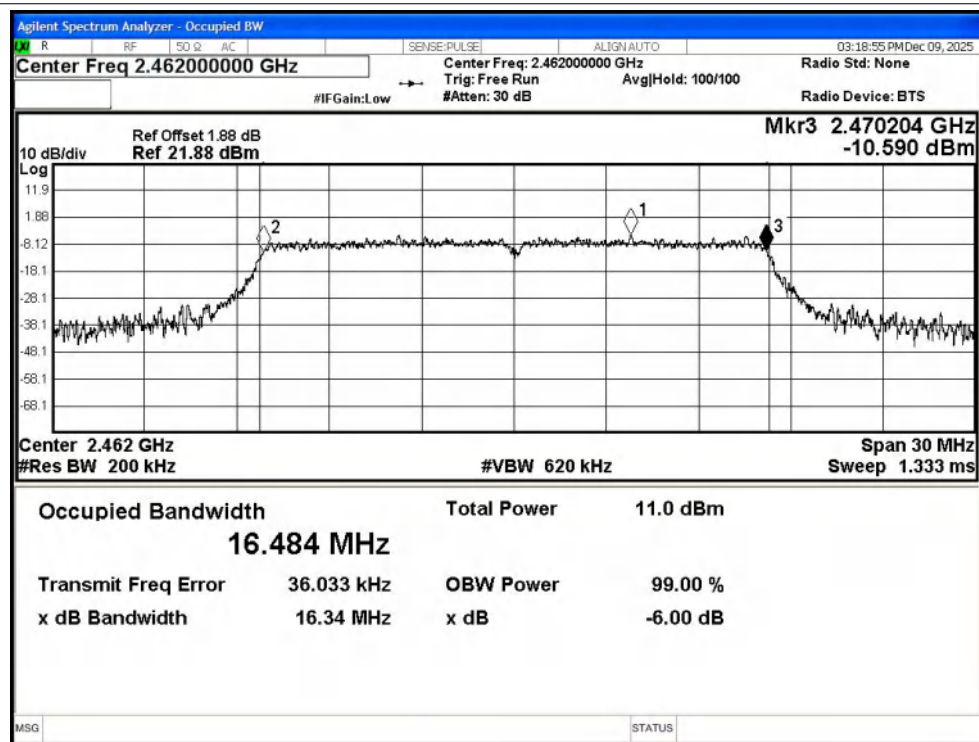
## -6dB Bandwidth NVNT g 2412MHz Ant1



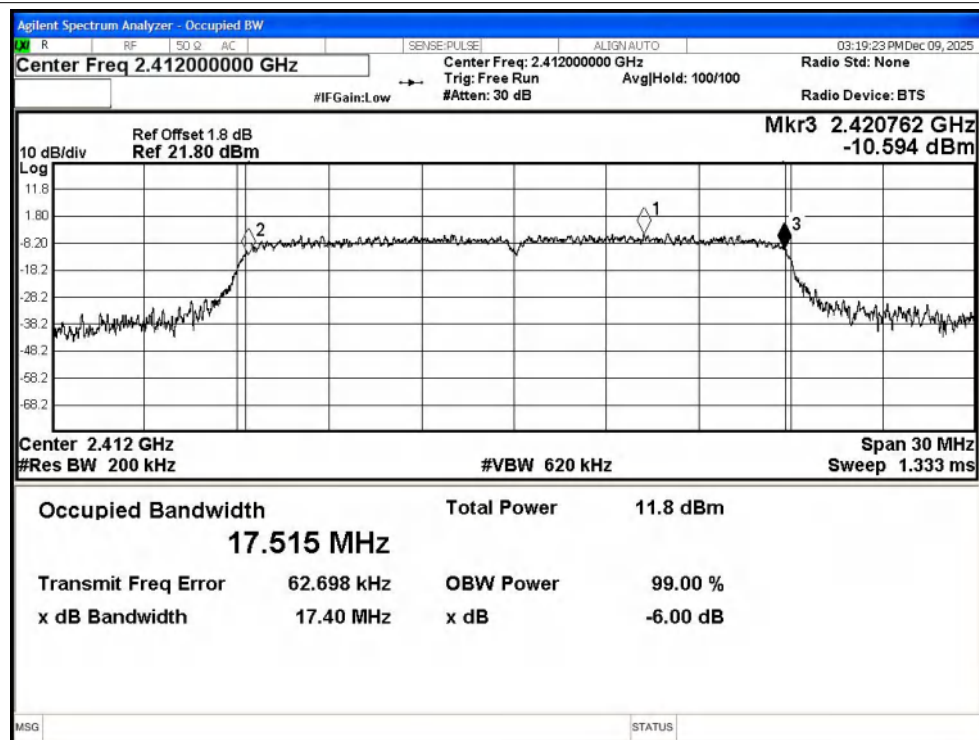
## -6dB Bandwidth NVNT g 2437MHz Ant1



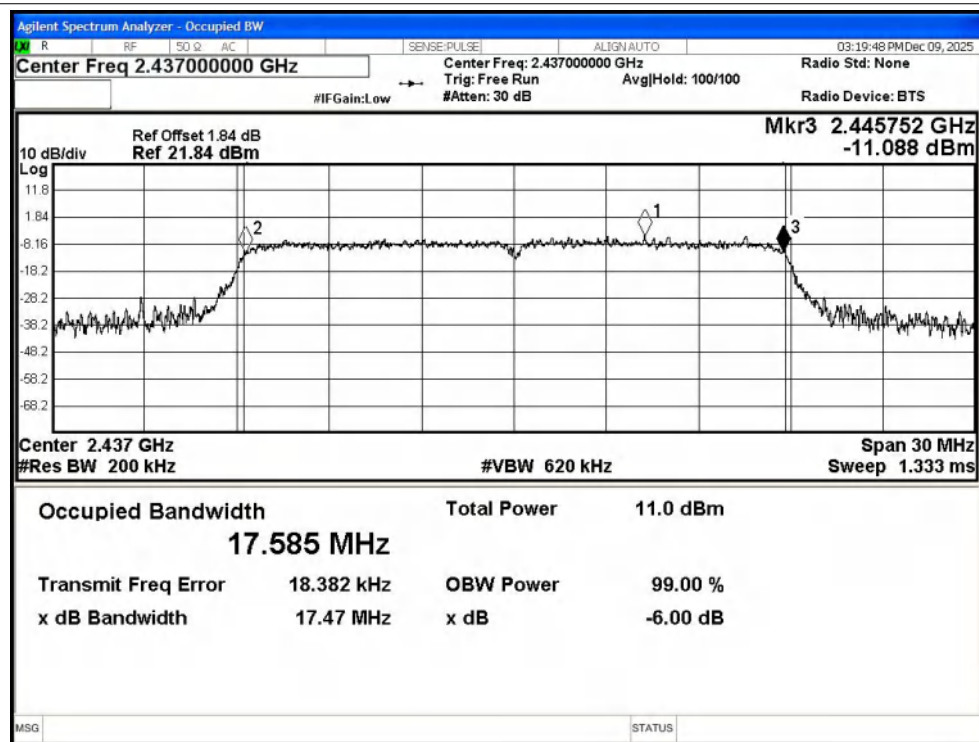
## -6dB Bandwidth NVNT g 2462MHz Ant1



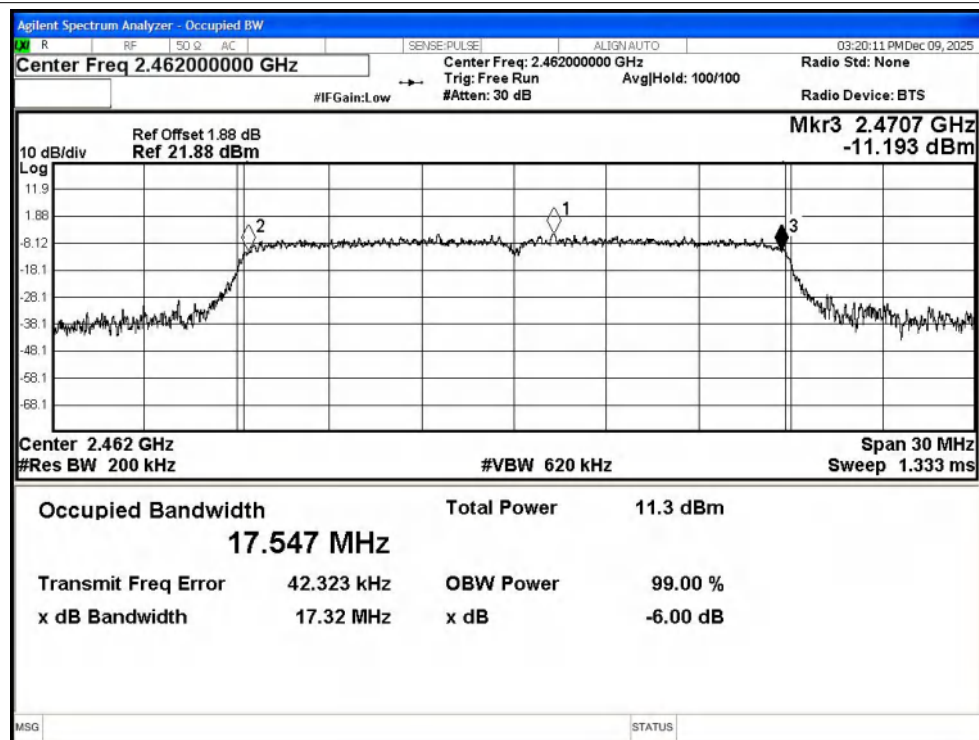
## -6dB Bandwidth NVNT n20 2412MHz Ant1



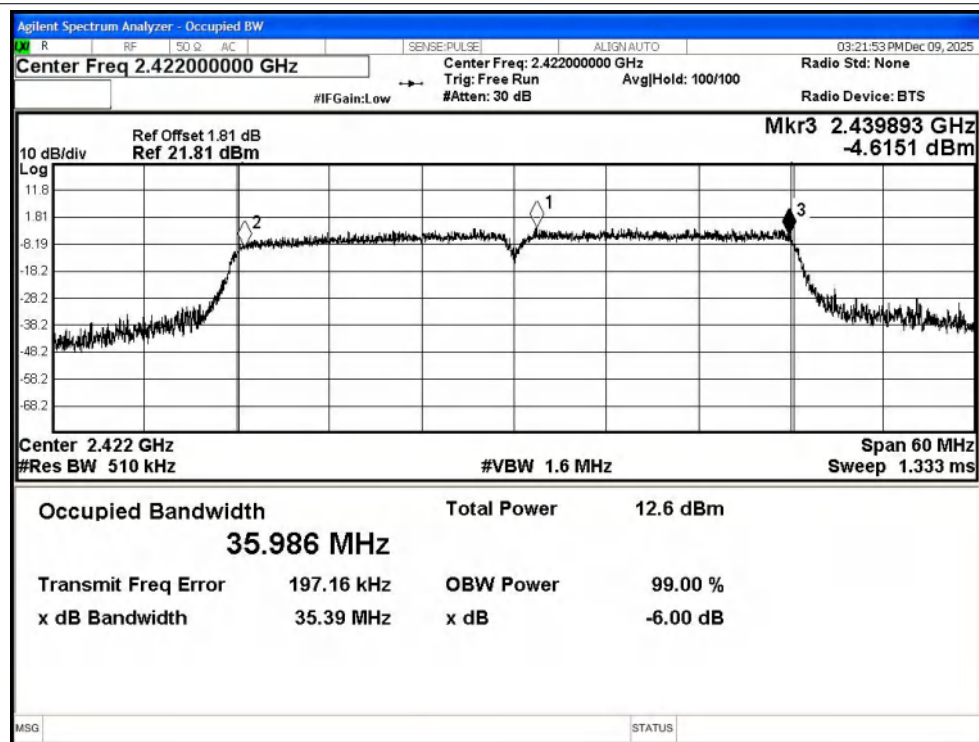
## -6dB Bandwidth NVNT n20 2437MHz Ant1



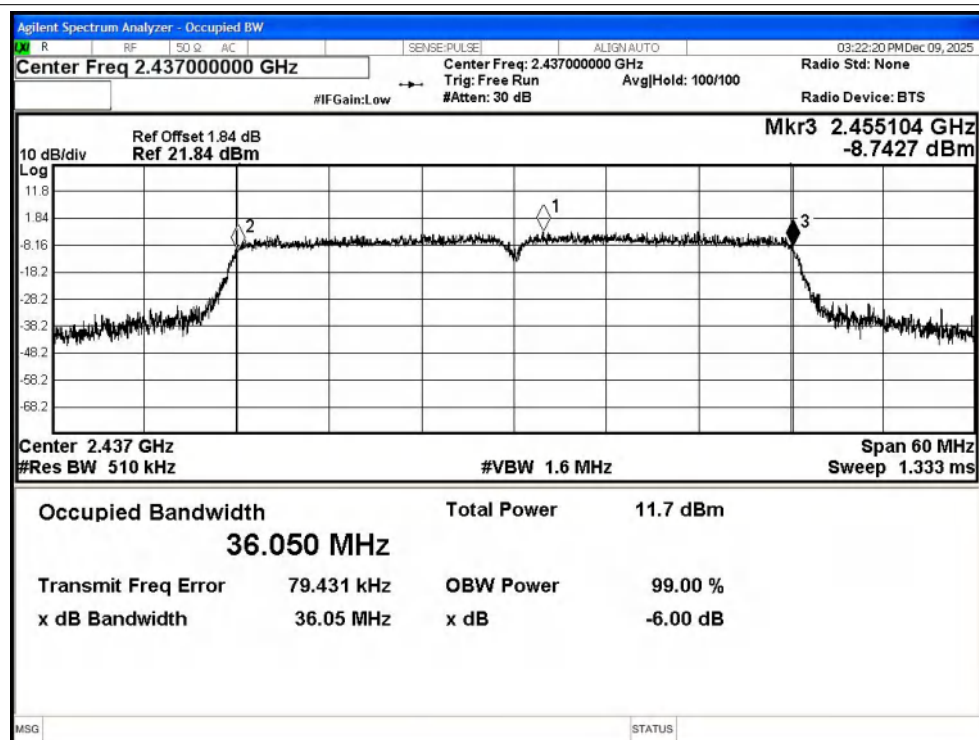
## -6dB Bandwidth NVNT n20 2462MHz Ant1



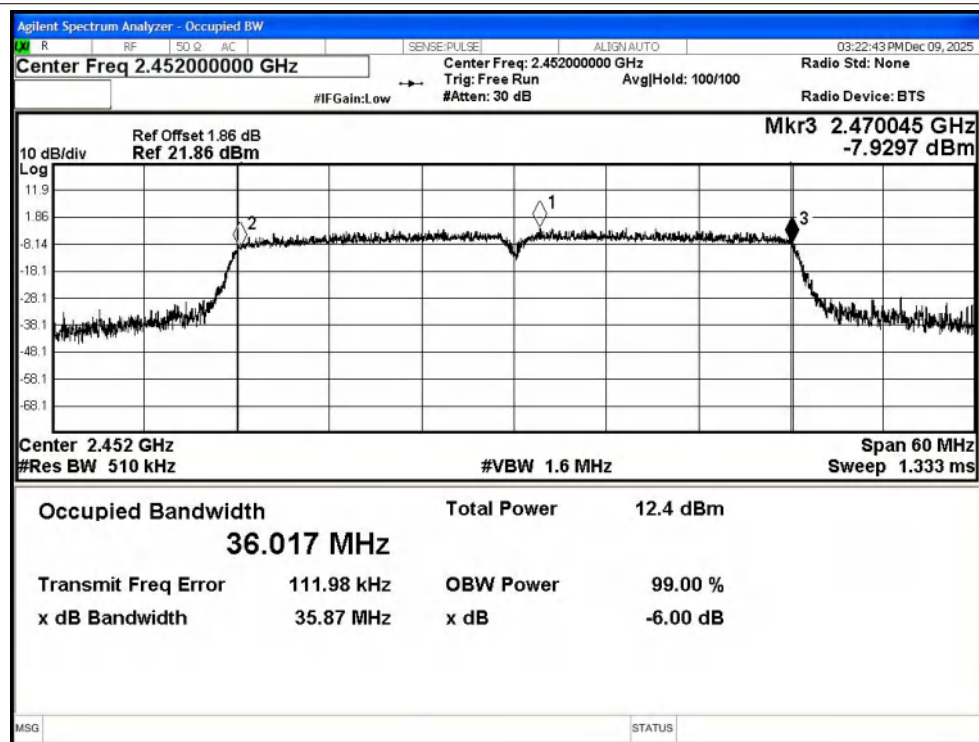
## -6dB Bandwidth NVNT n40 2422MHz Ant1



## -6dB Bandwidth NVNT n40 2437MHz Ant1



## -6dB Bandwidth NVNT n40 2452MHz Ant1

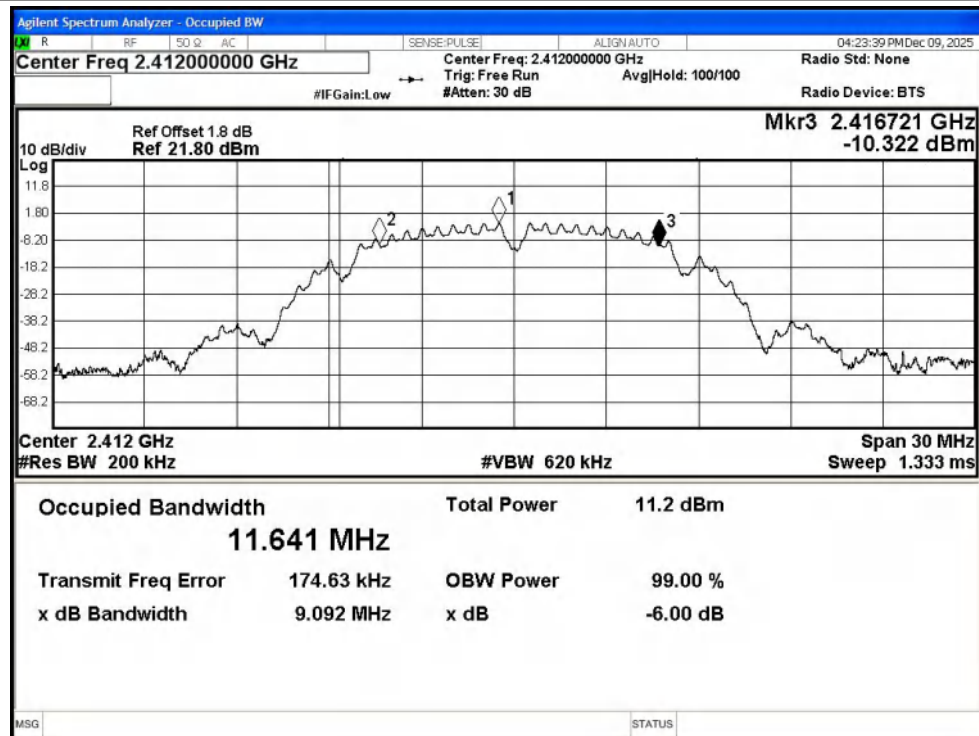


ESP32:

| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-----------------------------|---------|
| NVNT      | b    | 2412            | Ant2    | 9.092                 | $\geq 0.5$                  | Pass    |
| NVNT      | b    | 2437            | Ant2    | 9.116                 | $\geq 0.5$                  | Pass    |
| NVNT      | b    | 2462            | Ant2    | 9.109                 | $\geq 0.5$                  | Pass    |
| NVNT      | g    | 2412            | Ant2    | 16.334                | $\geq 0.5$                  | Pass    |
| NVNT      | g    | 2437            | Ant2    | 16.384                | $\geq 0.5$                  | Pass    |
| NVNT      | g    | 2462            | Ant2    | 16.372                | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2412            | Ant2    | 17.312                | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2437            | Ant2    | 17.512                | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2462            | Ant2    | 17.368                | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2422            | Ant2    | 35.566                | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2437            | Ant2    | 35.696                | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2452            | Ant2    | 35.536                | $\geq 0.5$                  | Pass    |

## Test Graphs

-6dB Bandwidth NVNT b 2412MHz Ant2



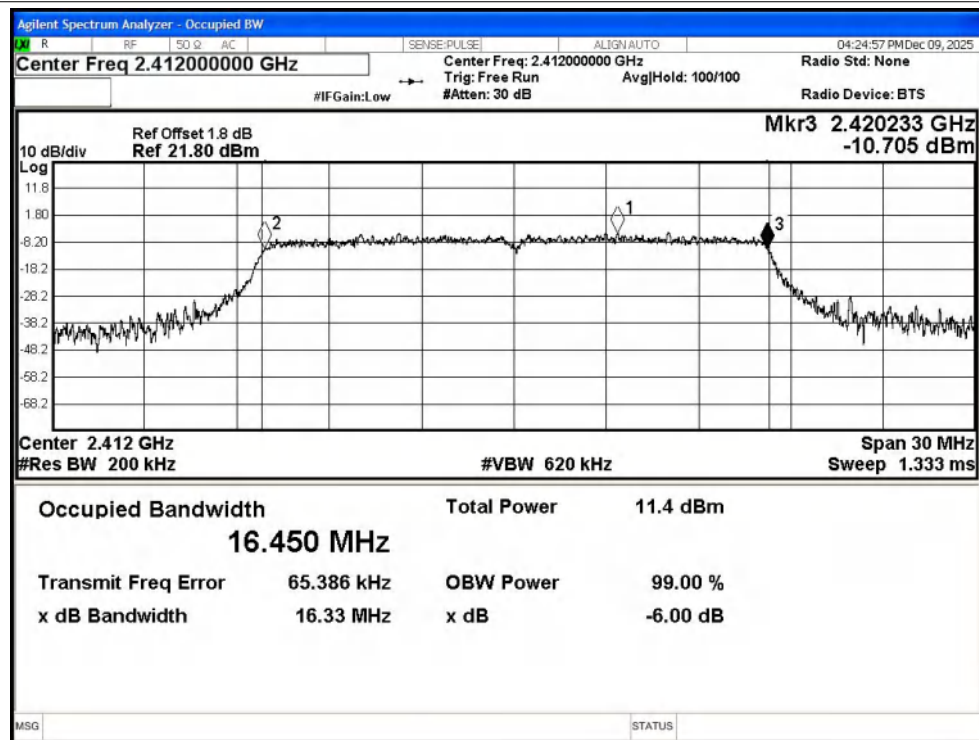
-6dB Bandwidth NVNT b 2437MHz Ant2



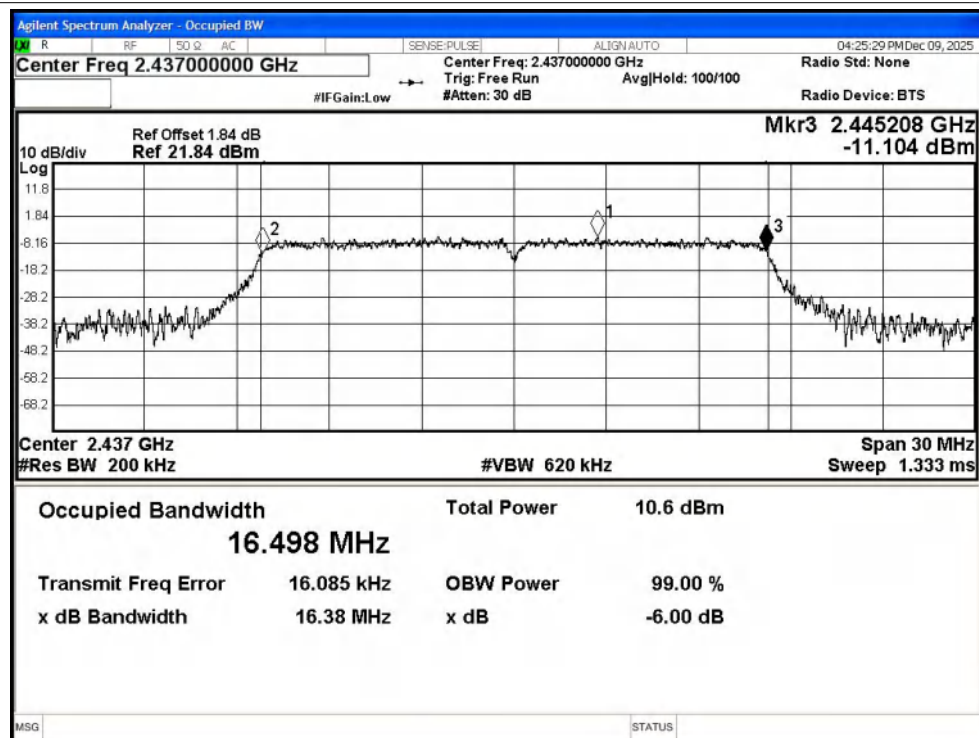
## -6dB Bandwidth NVNT b 2462MHz Ant2



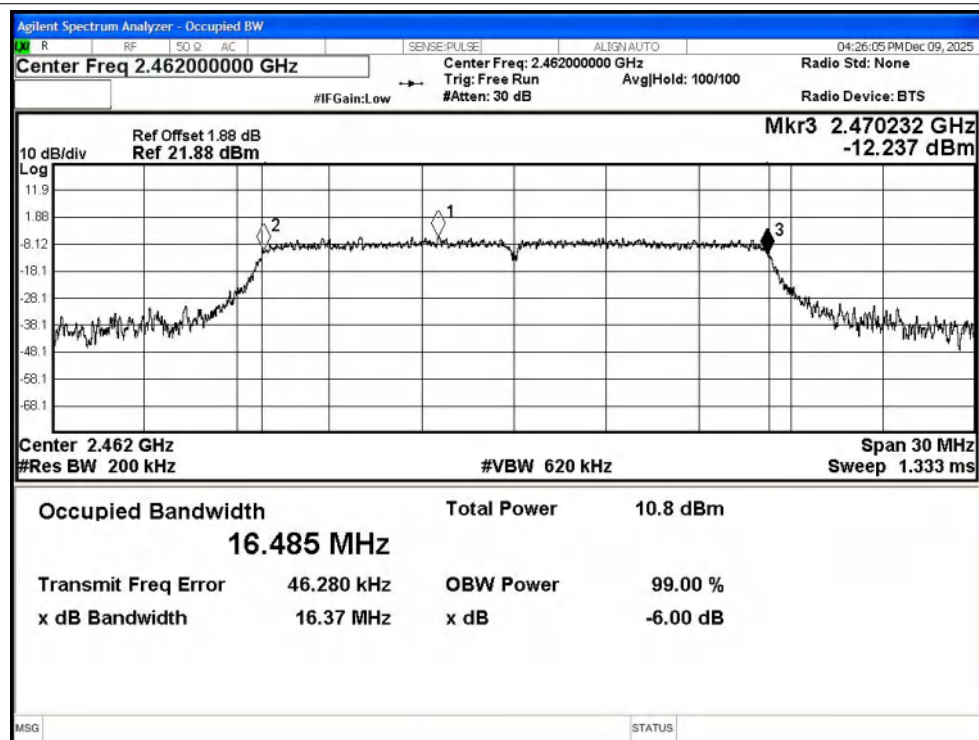
## -6dB Bandwidth NVNT g 2412MHz Ant2



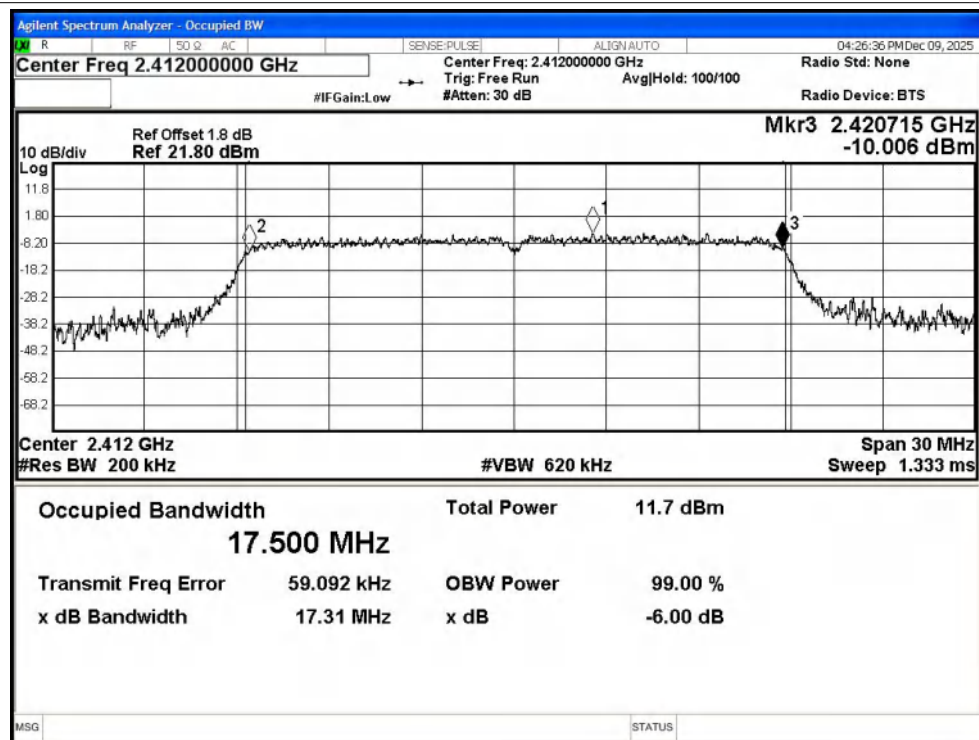
## -6dB Bandwidth NVNT g 2437MHz Ant2



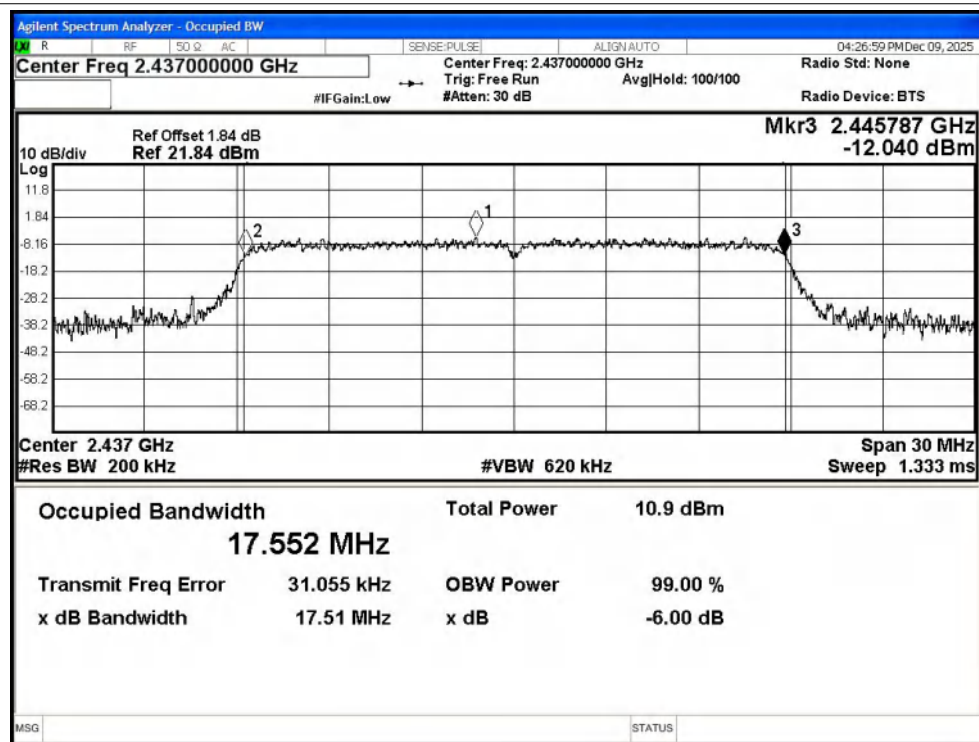
## -6dB Bandwidth NVNT g 2462MHz Ant2



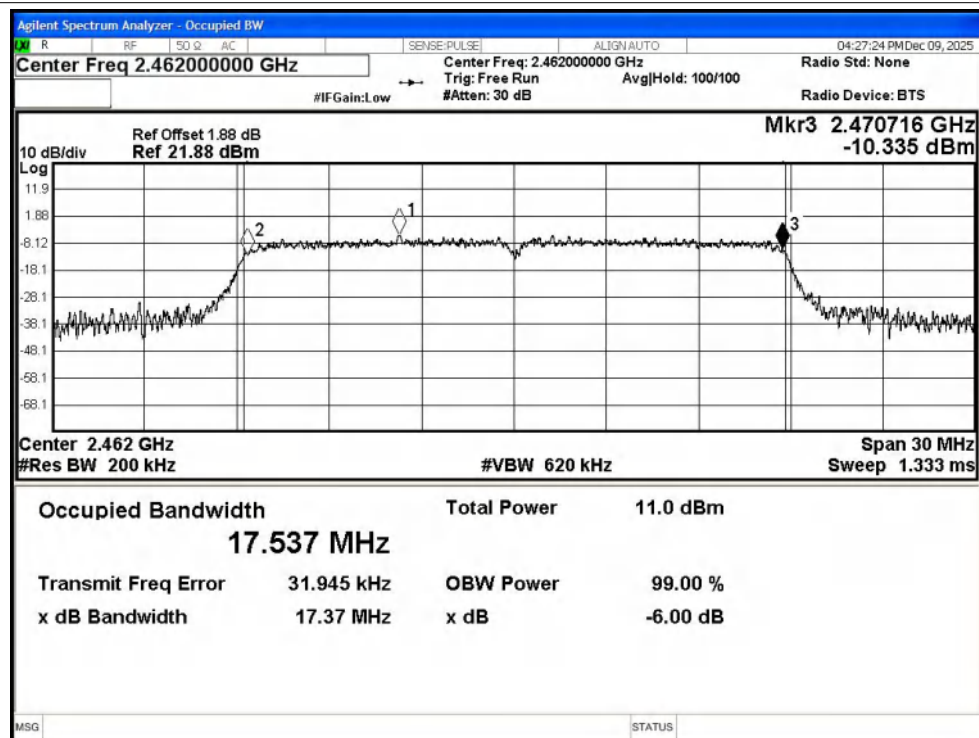
## -6dB Bandwidth NVNT n20 2412MHz Ant2



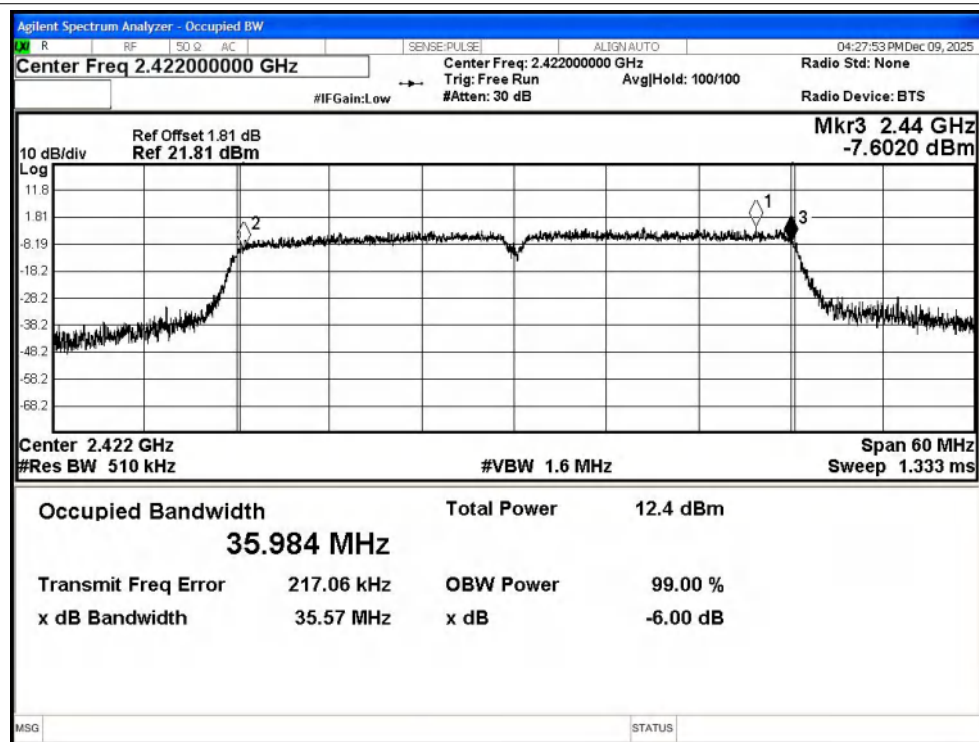
## -6dB Bandwidth NVNT n20 2437MHz Ant2



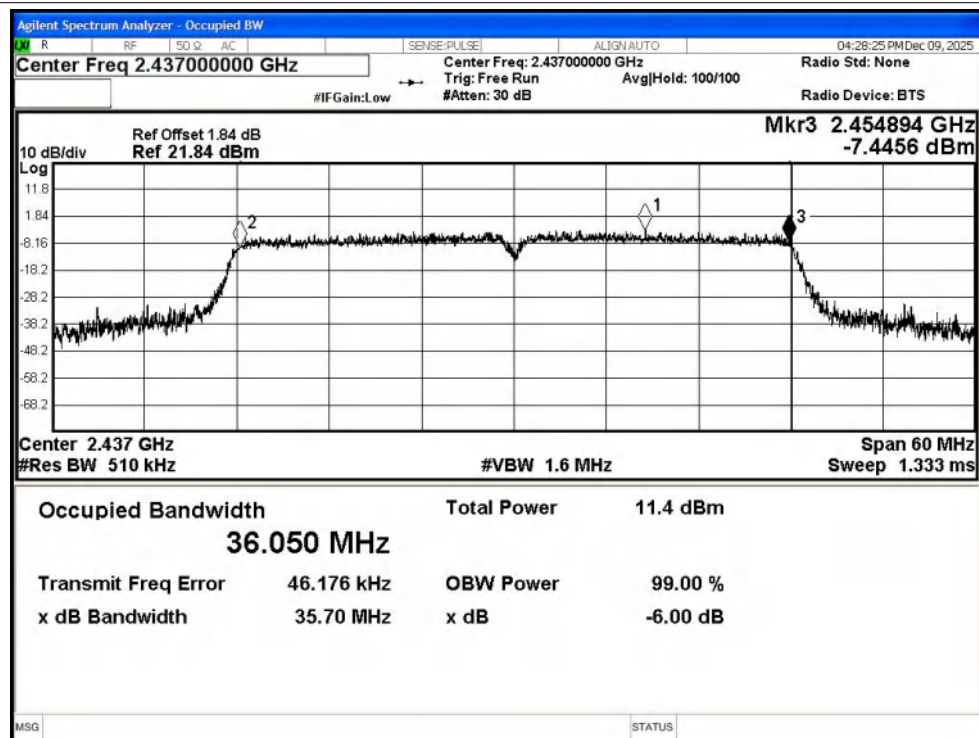
## -6dB Bandwidth NVNT n20 2462MHz Ant2



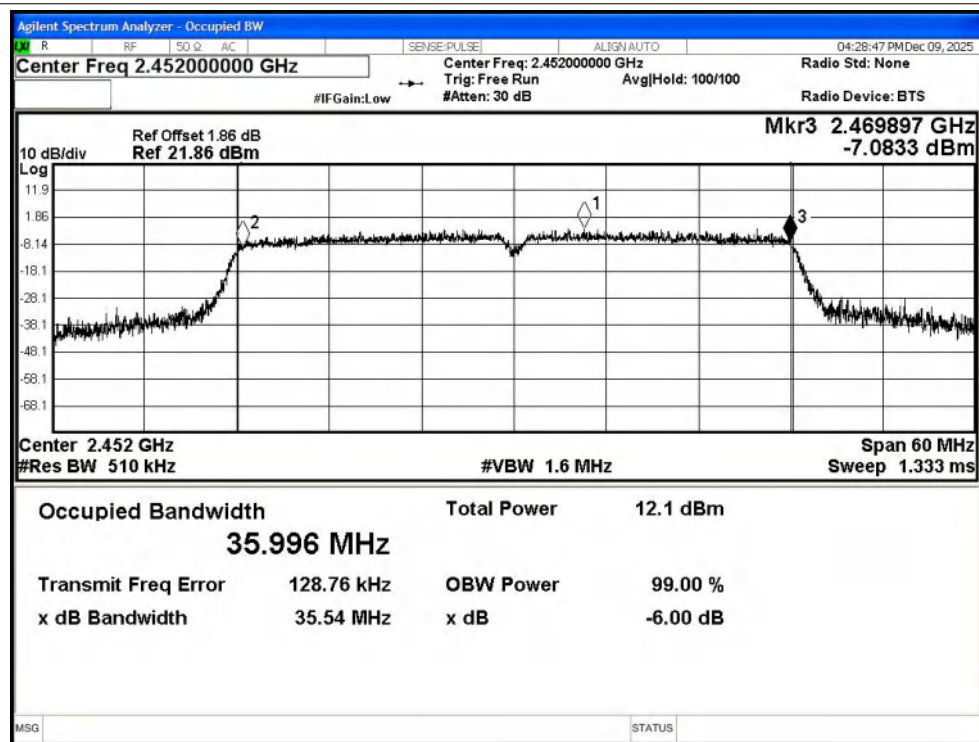
## -6dB Bandwidth NVNT n40 2422MHz Ant2



## -6dB Bandwidth NVNT n40 2437MHz Ant2



## -6dB Bandwidth NVNT n40 2452MHz Ant2



## 2. Maximum Peak Conducted Output Power

RTL8821:

| Condition | Mode | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-------------|---------|
| NVNT      | b    | 2412            | Ant1    | 14.43                 | 30          | Pass    |
| NVNT      | b    | 2437            | Ant1    | 13.58                 | 30          | Pass    |
| NVNT      | b    | 2462            | Ant1    | 13.32                 | 30          | Pass    |
| NVNT      | g    | 2412            | Ant1    | 13.70                 | 30          | Pass    |
| NVNT      | g    | 2437            | Ant1    | 12.94                 | 30          | Pass    |
| NVNT      | g    | 2462            | Ant1    | 12.74                 | 30          | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 14.23                 | 30          | Pass    |
| NVNT      | n20  | 2437            | Ant1    | 13.37                 | 30          | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 13.18                 | 30          | Pass    |
| NVNT      | n40  | 2422            | Ant1    | 13.62                 | 30          | Pass    |
| NVNT      | n40  | 2437            | Ant1    | 12.54                 | 30          | Pass    |
| NVNT      | n40  | 2452            | Ant1    | 13.49                 | 30          | Pass    |

ESP32:

| Condition | Mode | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-------------|---------|
| NVNT      | b    | 2412            | Ant2    | 14.33                 | 30          | Pass    |
| NVNT      | b    | 2437            | Ant2    | 13.54                 | 30          | Pass    |
| NVNT      | b    | 2462            | Ant2    | 13.19                 | 30          | Pass    |
| NVNT      | g    | 2412            | Ant2    | 13.73                 | 30          | Pass    |
| NVNT      | g    | 2437            | Ant2    | 12.83                 | 30          | Pass    |
| NVNT      | g    | 2462            | Ant2    | 12.76                 | 30          | Pass    |
| NVNT      | n20  | 2412            | Ant2    | 14.25                 | 30          | Pass    |
| NVNT      | n20  | 2437            | Ant2    | 13.45                 | 30          | Pass    |
| NVNT      | n20  | 2462            | Ant2    | 13.29                 | 30          | Pass    |
| NVNT      | n40  | 2422            | Ant2    | 13.55                 | 30          | Pass    |
| NVNT      | n40  | 2437            | Ant2    | 12.51                 | 30          | Pass    |
| NVNT      | n40  | 2452            | Ant2    | 13.57                 | 30          | Pass    |

### 3. Maximum Power Spectral Density Level

RTL8821:

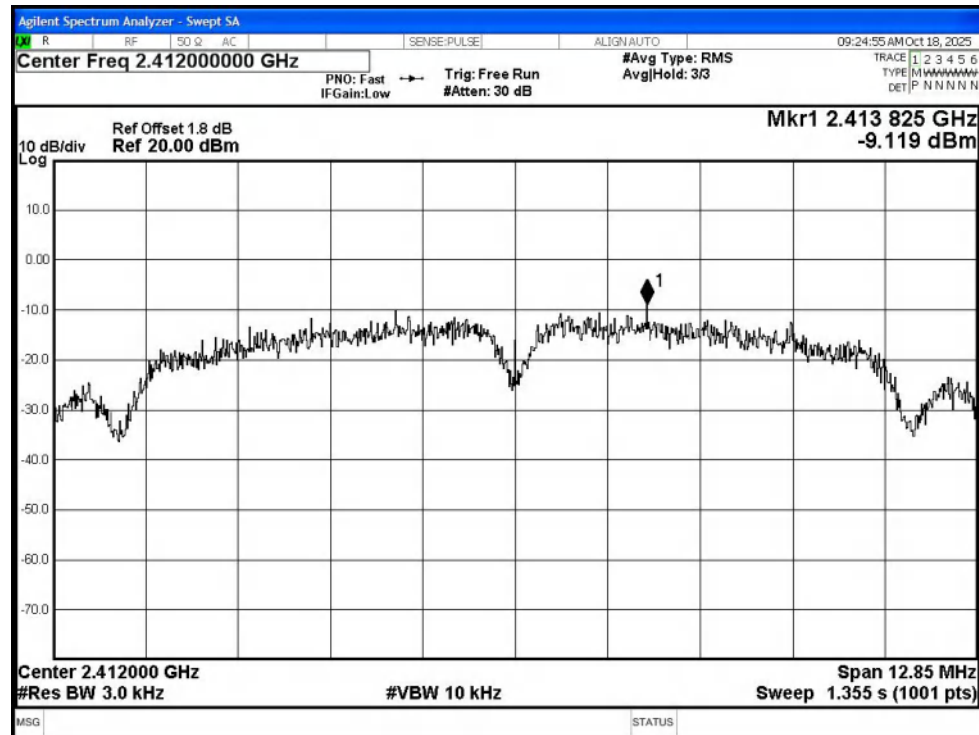
| Condition | Mode | Frequency (MHz) | Antenna | Conducted PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|-----------|------|-----------------|---------|--------------------------|------------------|---------|
| NVNT      | b    | 2412            | Ant1    | -9.12                    | 8                | Pass    |
| NVNT      | b    | 2437            | Ant1    | -9.59                    | 8                | Pass    |
| NVNT      | b    | 2462            | Ant1    | -9.99                    | 8                | Pass    |
| NVNT      | g    | 2412            | Ant1    | -16.59                   | 8                | Pass    |
| NVNT      | g    | 2437            | Ant1    | -18.02                   | 8                | Pass    |
| NVNT      | g    | 2462            | Ant1    | -18.17                   | 8                | Pass    |
| NVNT      | n20  | 2412            | Ant1    | -15.88                   | 8                | Pass    |
| NVNT      | n20  | 2437            | Ant1    | -16.87                   | 8                | Pass    |
| NVNT      | n20  | 2462            | Ant1    | -17.5                    | 8                | Pass    |
| NVNT      | n40  | 2422            | Ant1    | -20.44                   | 8                | Pass    |
| NVNT      | n40  | 2437            | Ant1    | -20.87                   | 8                | Pass    |
| NVNT      | n40  | 2452            | Ant1    | -20.25                   | 8                | Pass    |

ESP32:

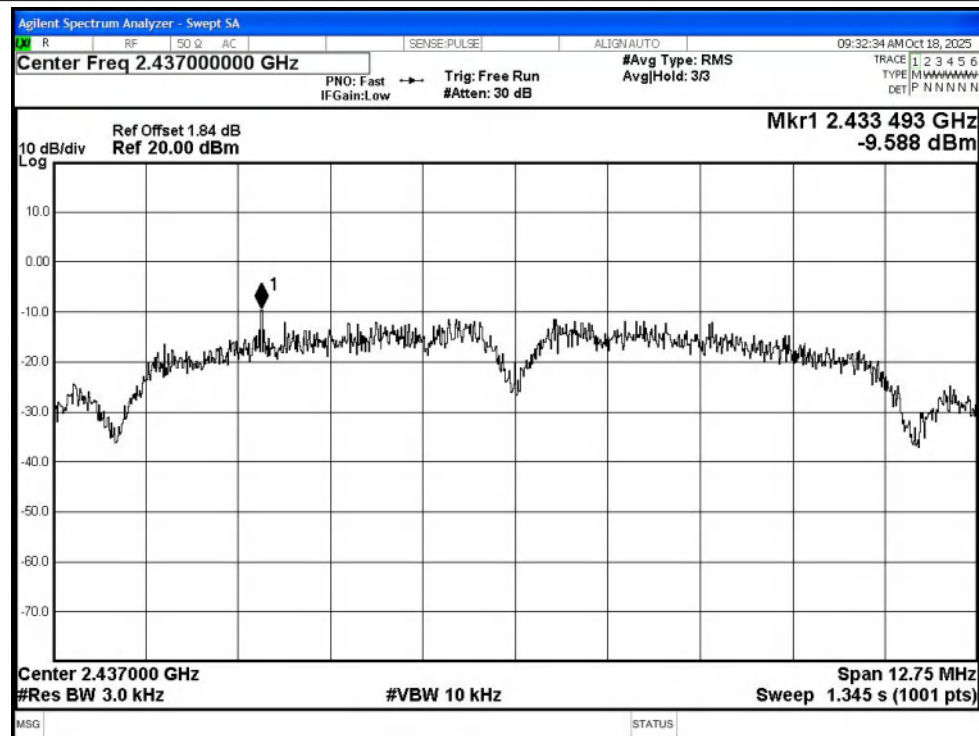
| Condition | Mode | Frequency (MHz) | Antenna | Conducted PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|-----------|------|-----------------|---------|--------------------------|------------------|---------|
| NVNT      | b    | 2412            | Ant2    | -7.77                    | 8                | Pass    |
| NVNT      | b    | 2437            | Ant2    | -7.50                    | 8                | Pass    |
| NVNT      | b    | 2462            | Ant2    | -8.78                    | 8                | Pass    |
| NVNT      | g    | 2412            | Ant2    | -16.69                   | 8                | Pass    |
| NVNT      | g    | 2437            | Ant2    | -17.05                   | 8                | Pass    |
| NVNT      | g    | 2462            | Ant2    | -17.87                   | 8                | Pass    |
| NVNT      | n20  | 2412            | Ant2    | -17.04                   | 8                | Pass    |
| NVNT      | n20  | 2437            | Ant2    | -16.54                   | 8                | Pass    |
| NVNT      | n20  | 2462            | Ant2    | -17.11                   | 8                | Pass    |
| NVNT      | n40  | 2422            | Ant2    | -19.84                   | 8                | Pass    |
| NVNT      | n40  | 2437            | Ant2    | -21.28                   | 8                | Pass    |
| NVNT      | n40  | 2452            | Ant2    | -20.37                   | 8                | Pass    |

## Test Graphs

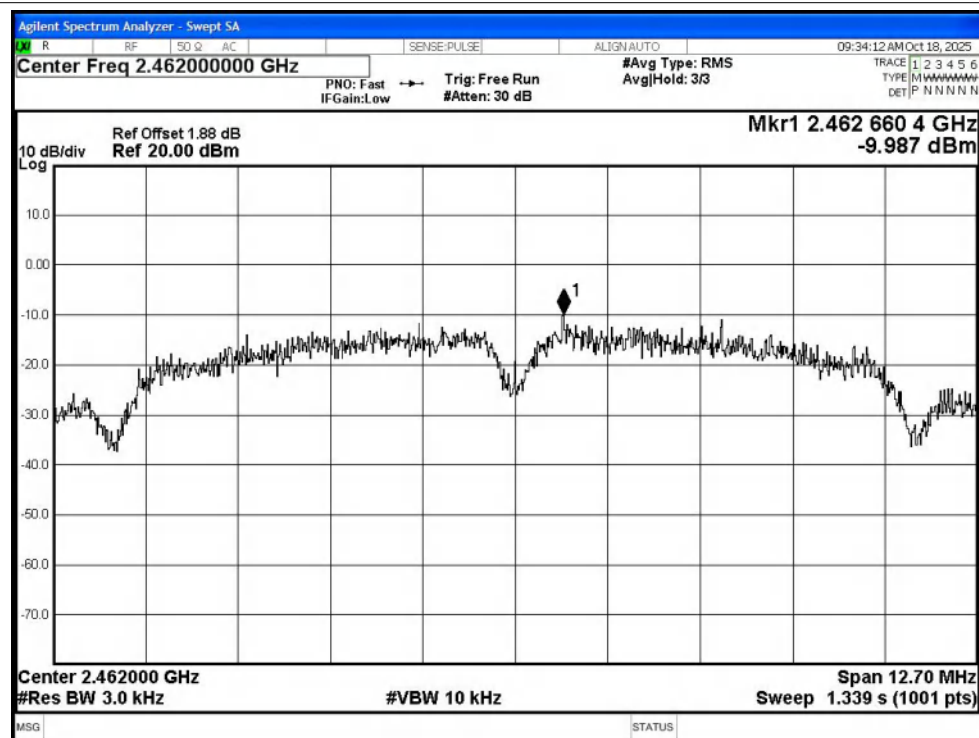
## PSD NVNT b 2412MHz Ant1



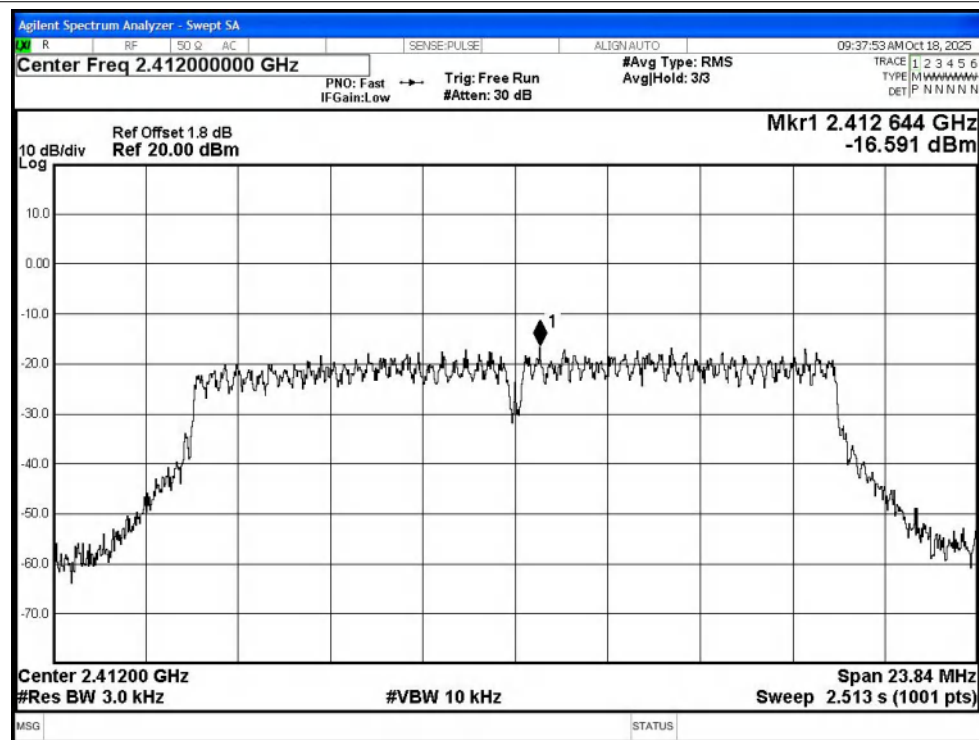
## PSD NVNT b 2437MHz Ant1



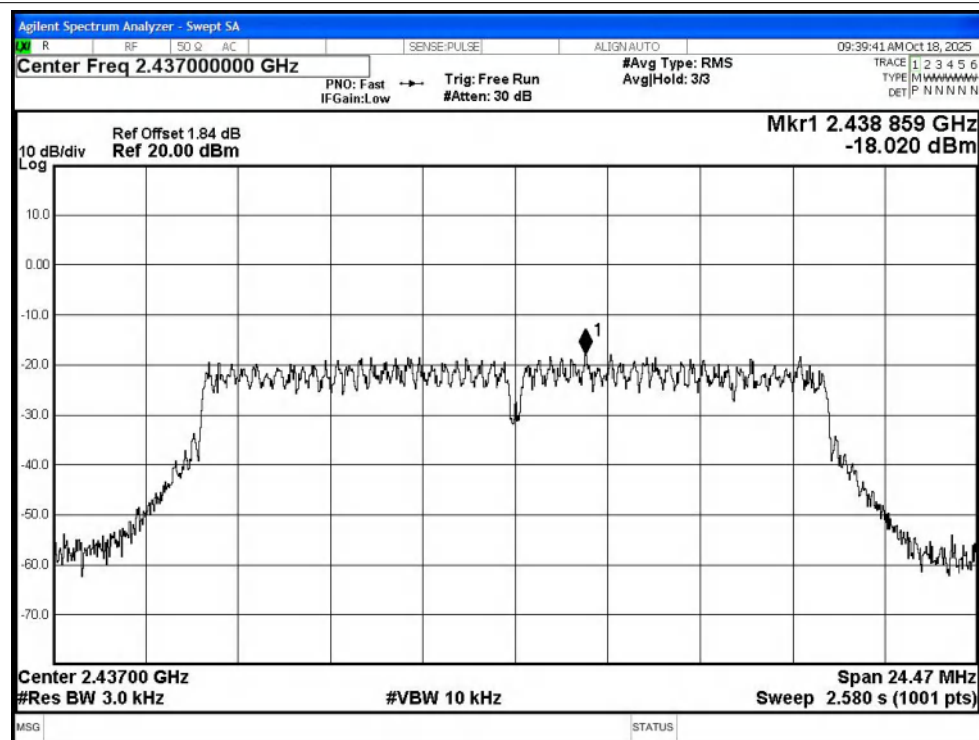
PSD NVNT b 2462MHz Ant1



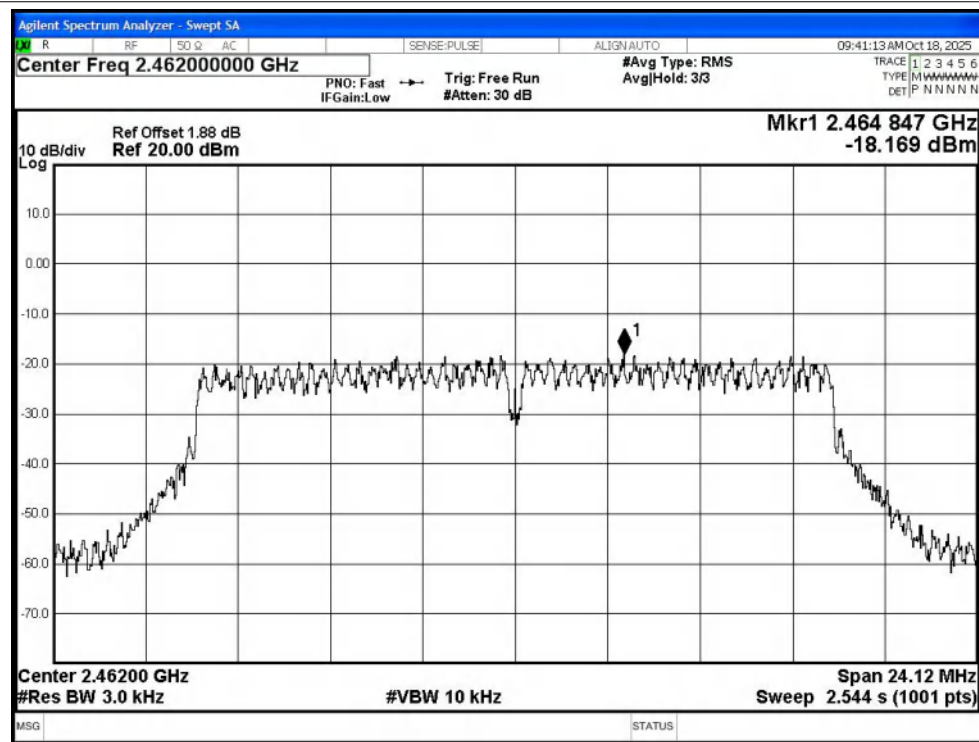
PSD NVNT g 2412MHz Ant1



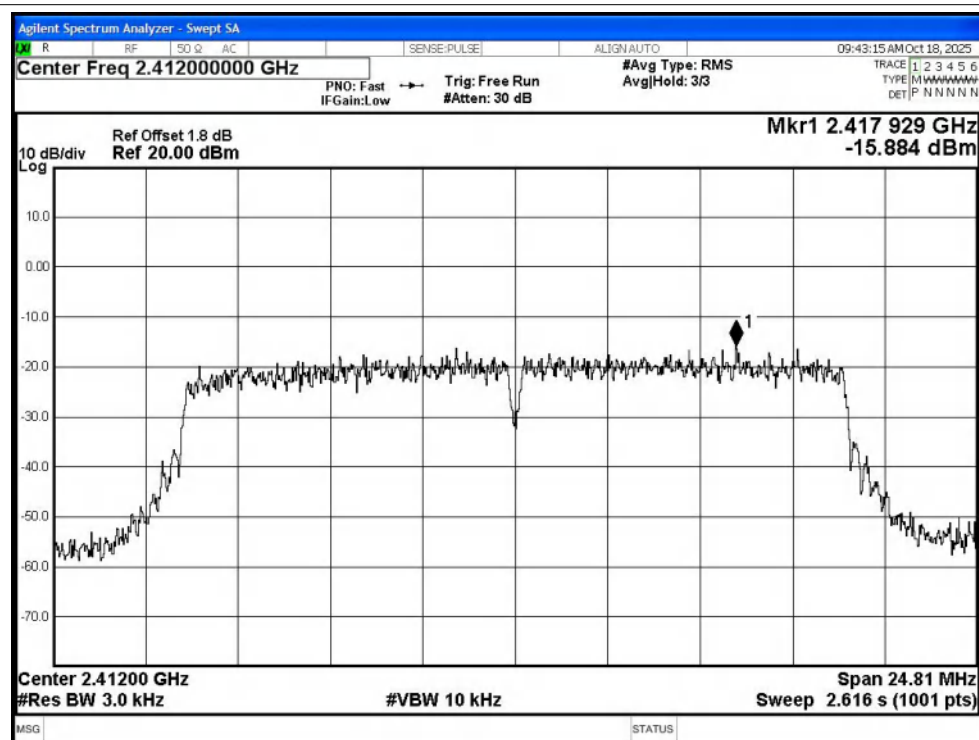
PSD NVNT g 2437MHz Ant1



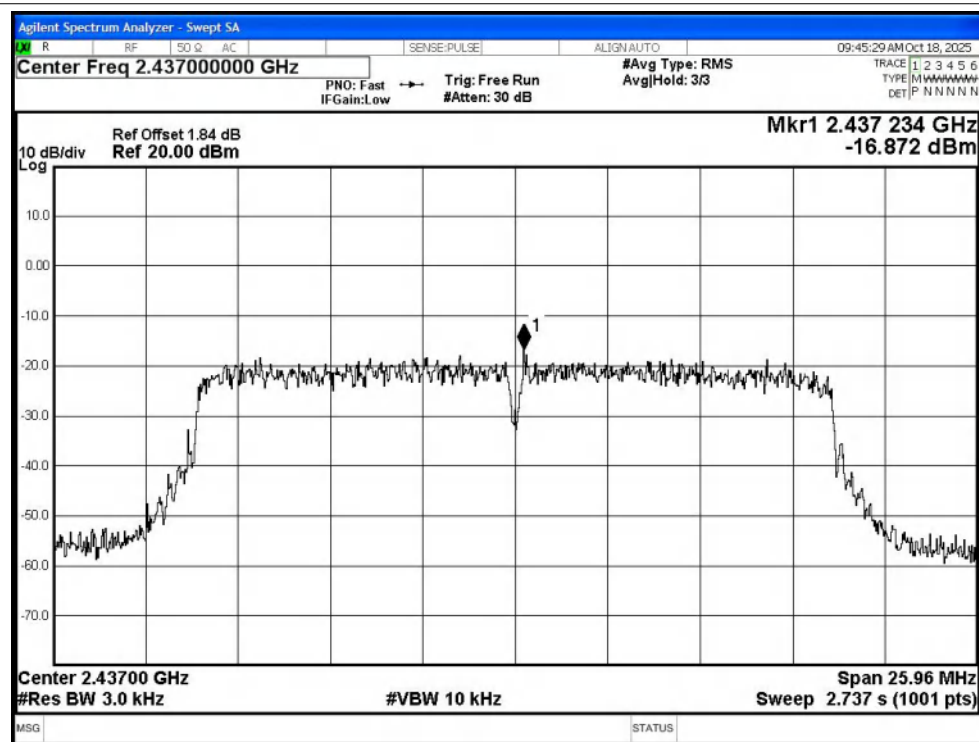
PSD NVNT g 2462MHz Ant1



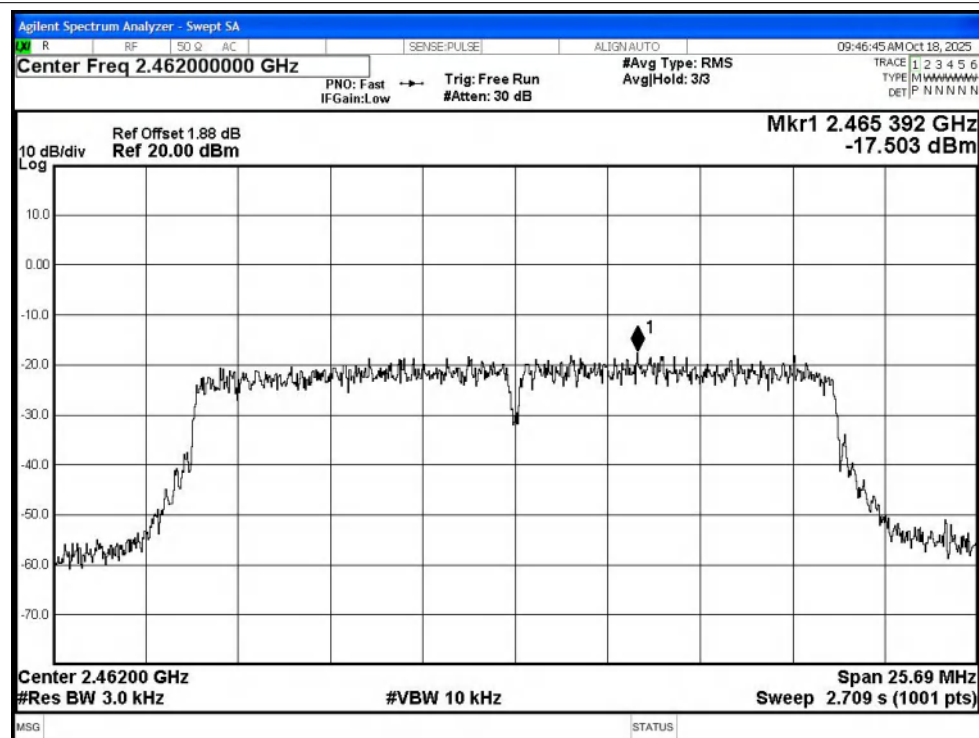
PSD NVNT n20 2412MHz Ant1



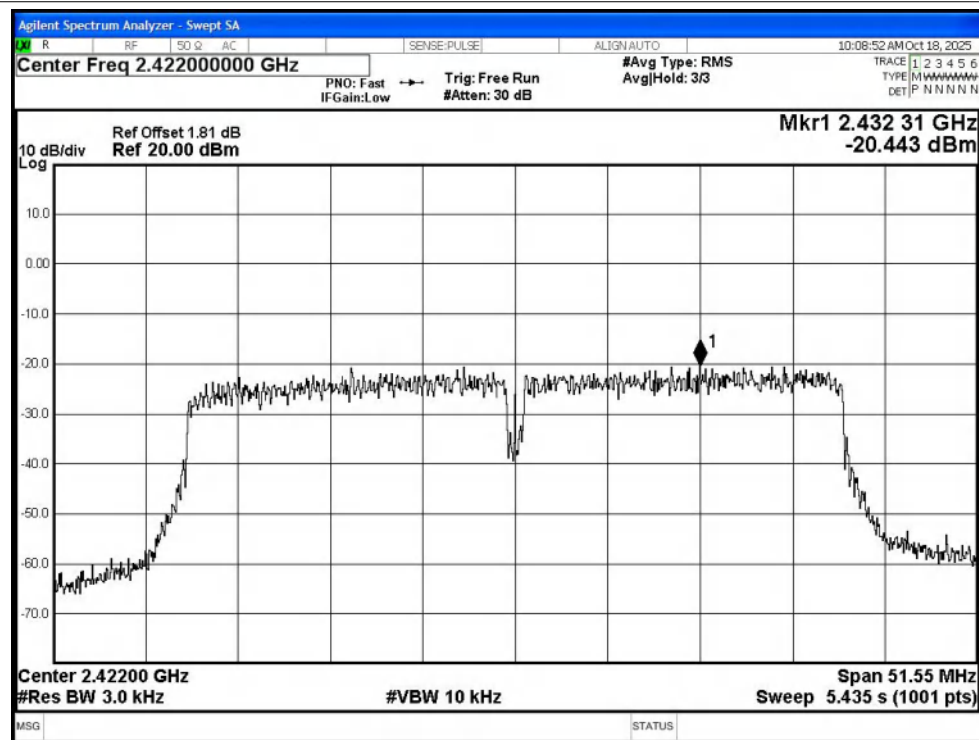
PSD NVNT n20 2437MHz Ant1



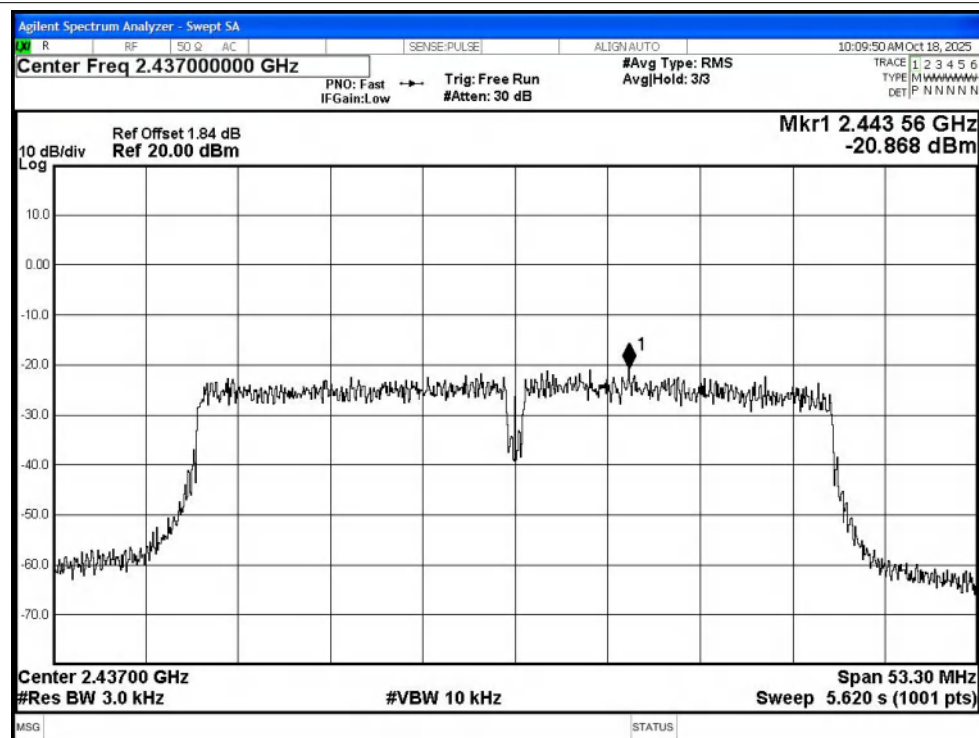
PSD NVNT n20 2462MHz Ant1



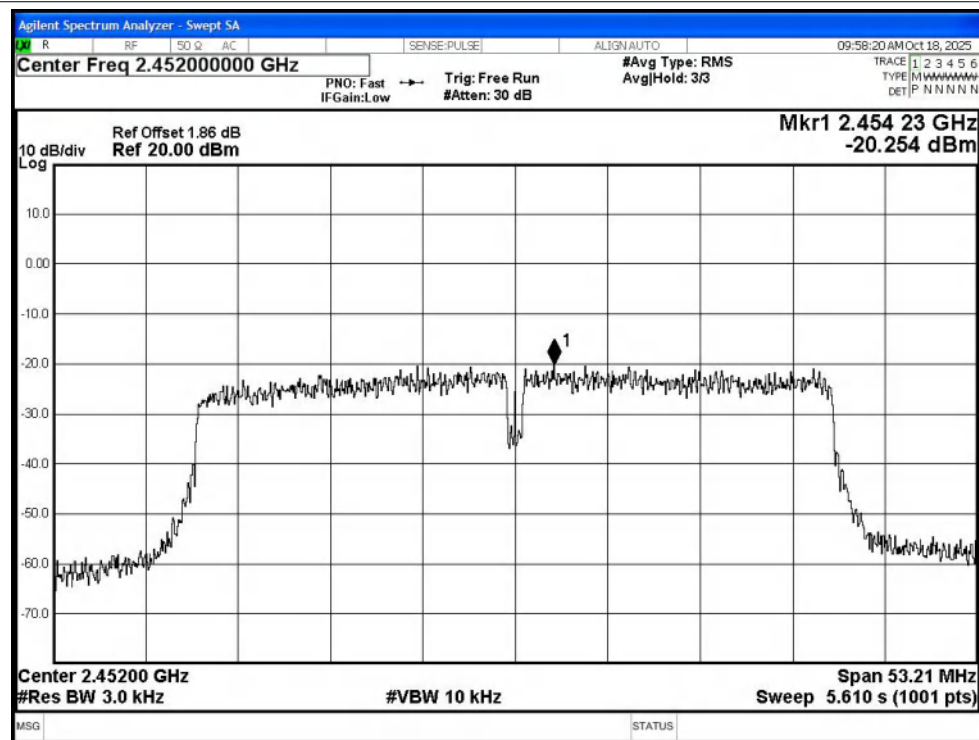
PSD NVNT n40 2422MHz Ant1



PSD NVNT n40 2437MHz Ant1

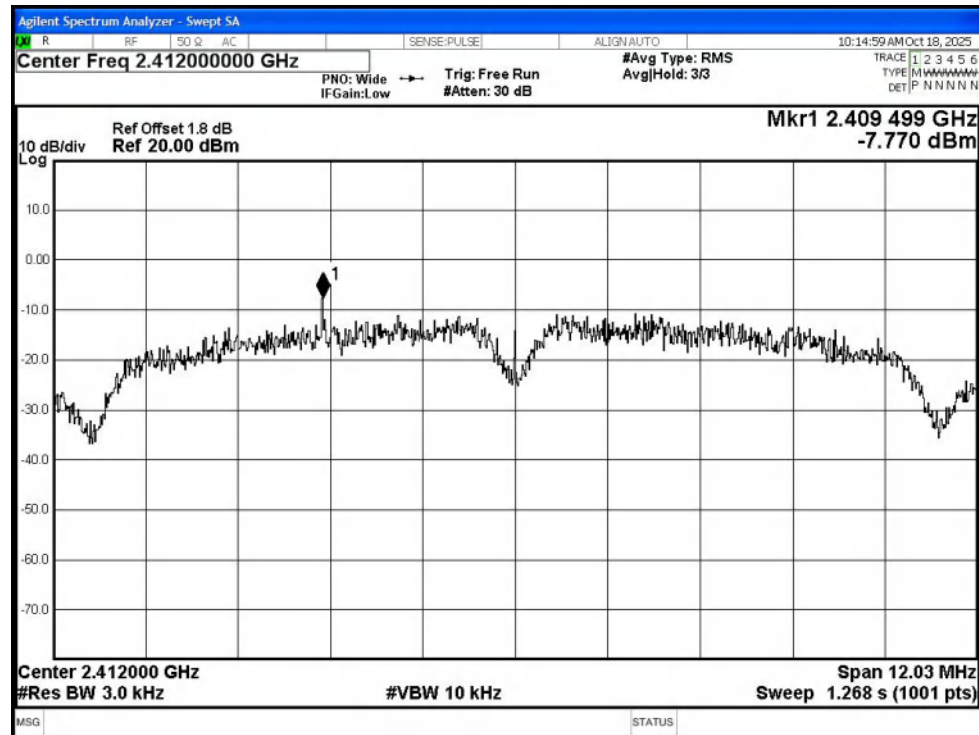


PSD NVNT n40 2452MHz Ant1

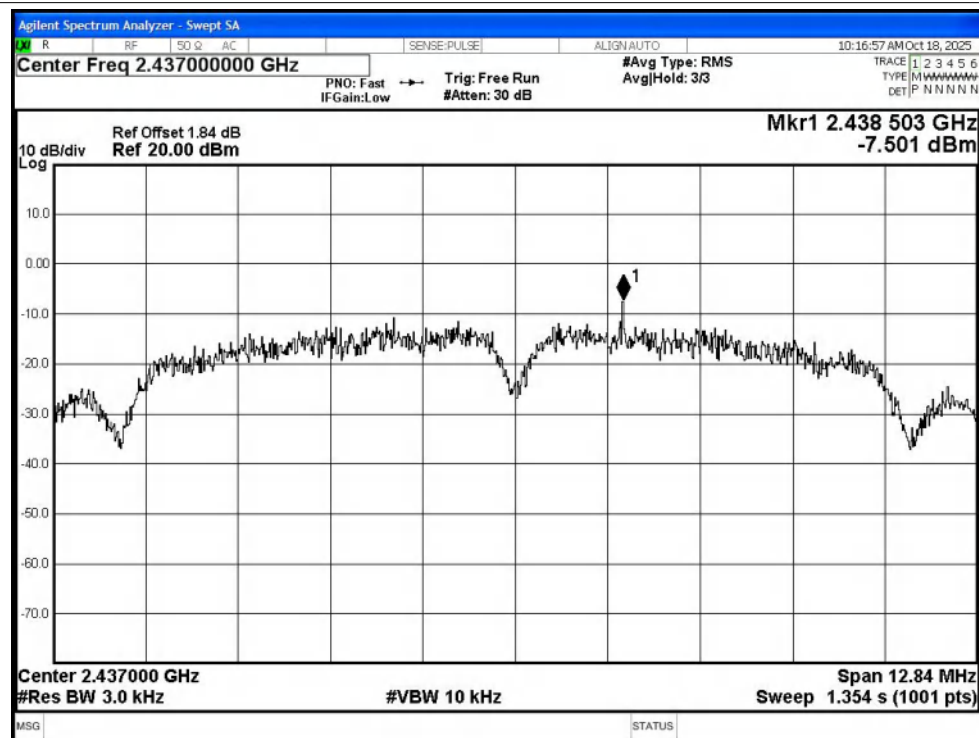


## Test Graphs

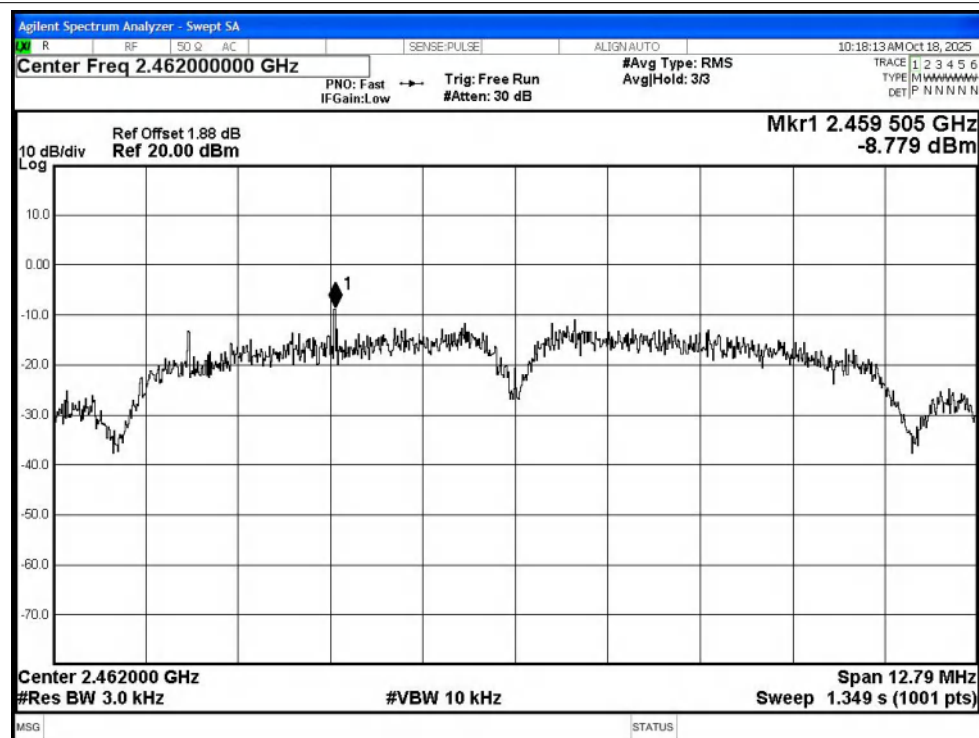
## PSD NVNT b 2412MHz Ant2



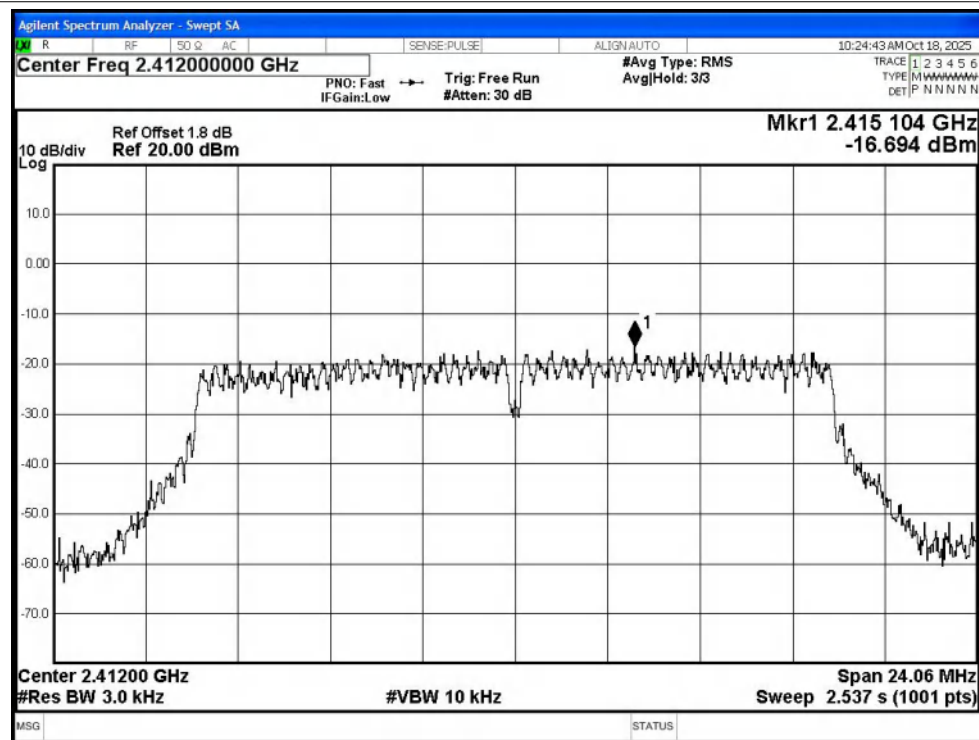
## PSD NVNT b 2437MHz Ant2



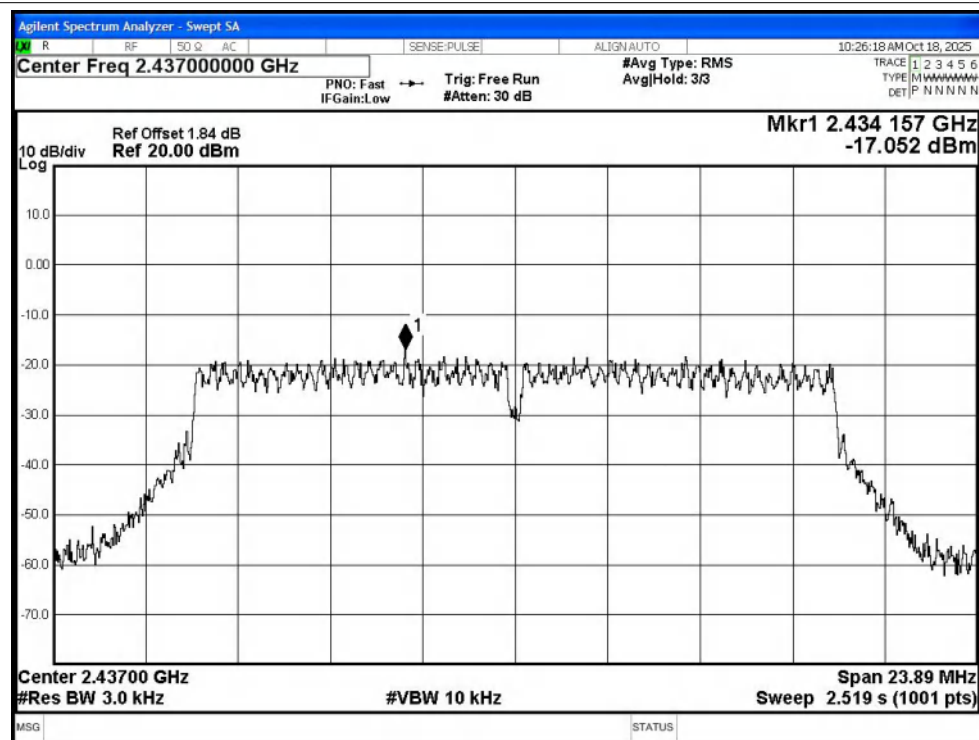
PSD NVNT b 2462MHz Ant2



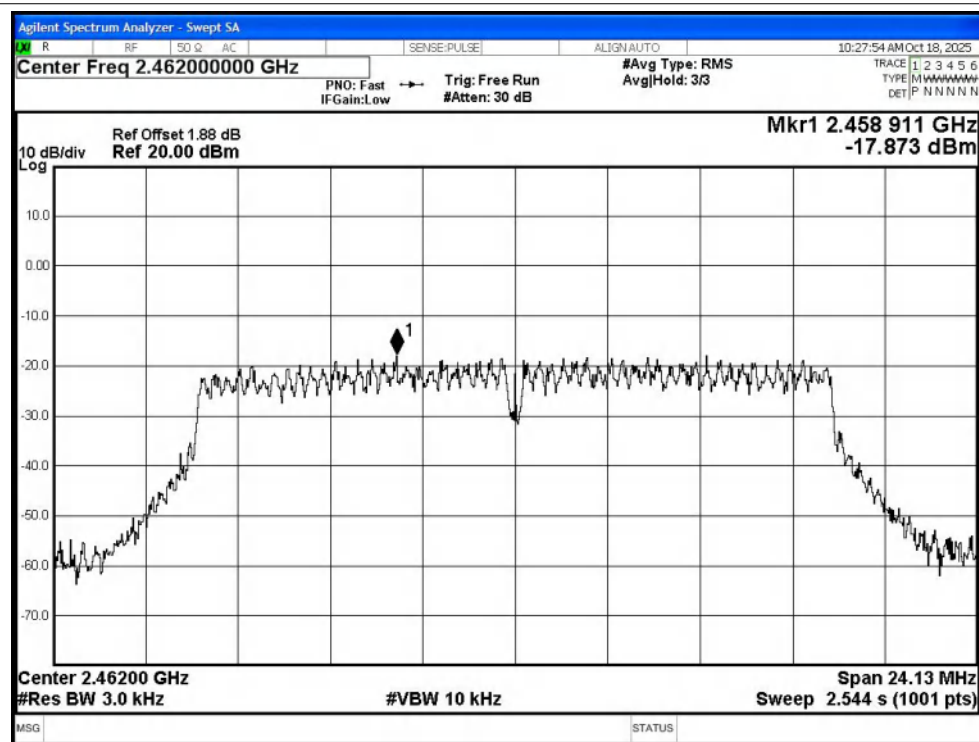
PSD NVNT g 2412MHz Ant2



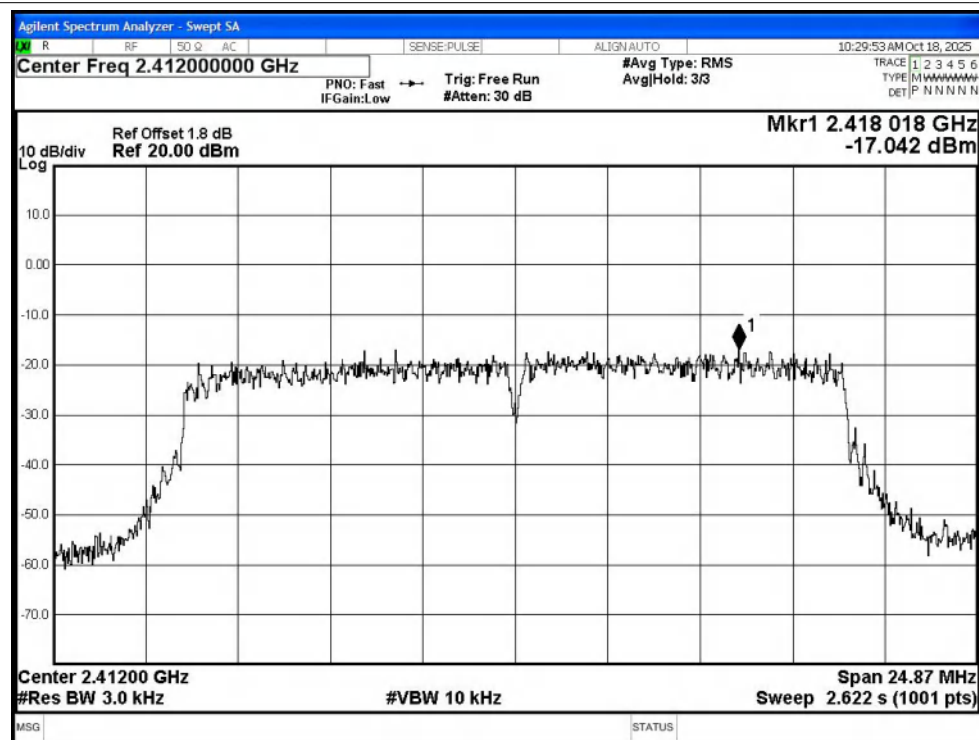
PSD NVNT g 2437MHz Ant2



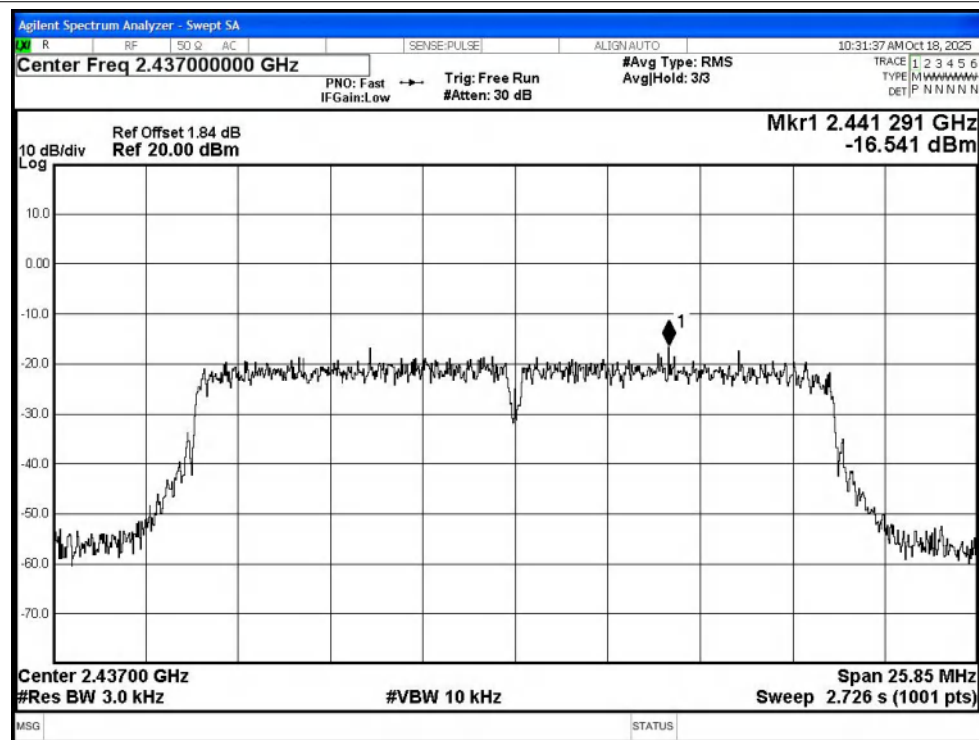
PSD NVNT g 2462MHz Ant2



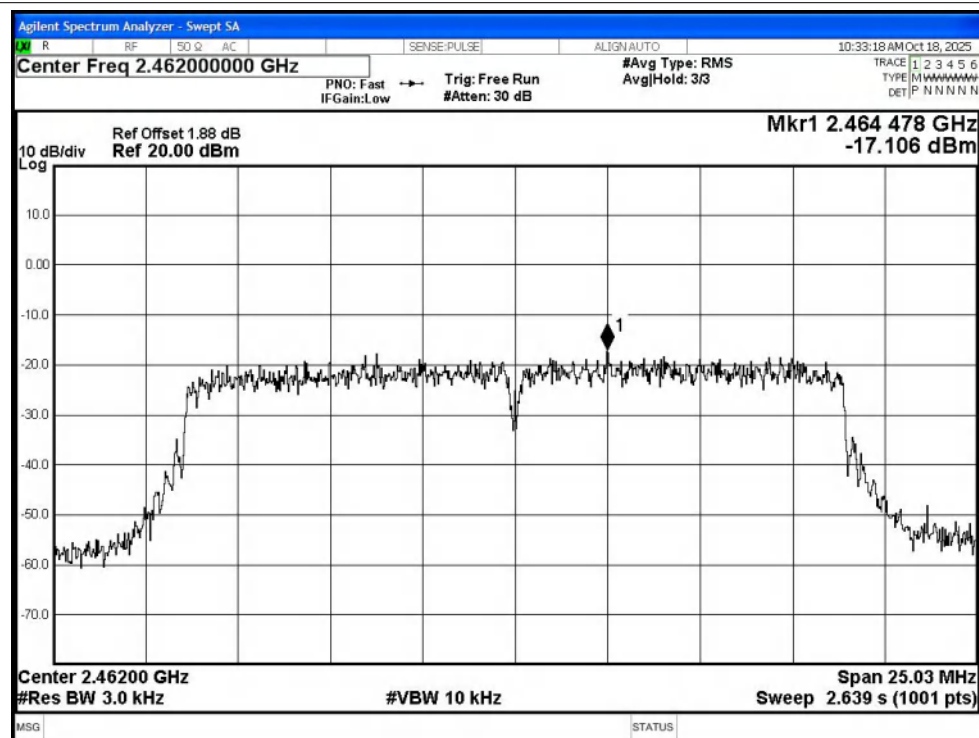
PSD NVNT n20 2412MHz Ant2



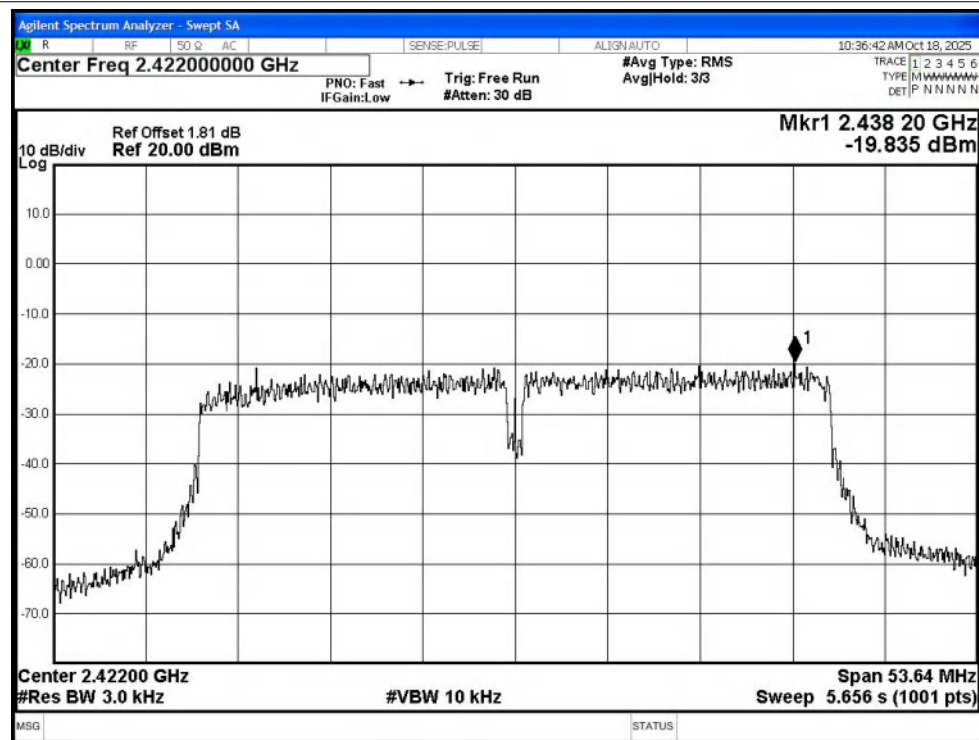
PSD NVNT n20 2437MHz Ant2



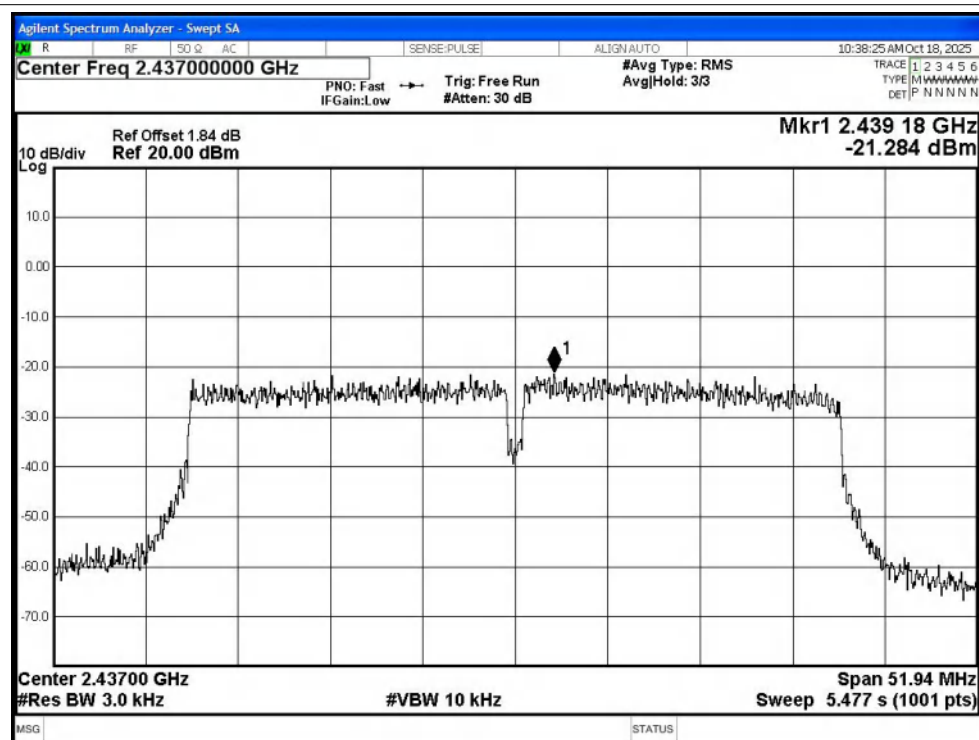
PSD NVNT n20 2462MHz Ant2



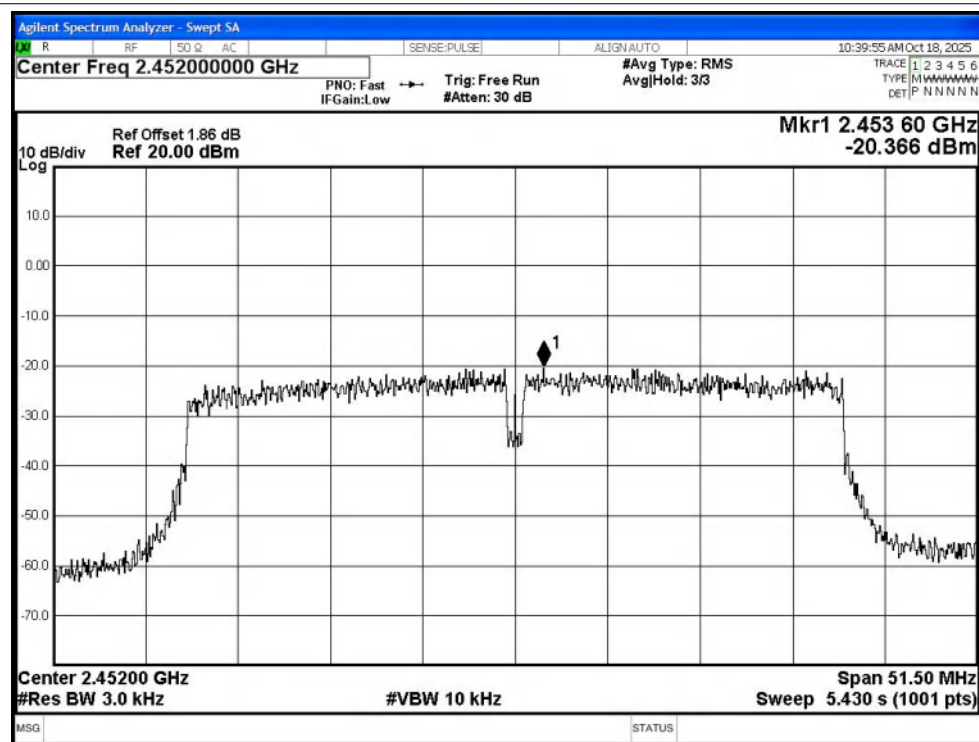
PSD NVNT n40 2422MHz Ant2



PSD NVNT n40 2437MHz Ant2



PSD NVNT n40 2452MHz Ant2

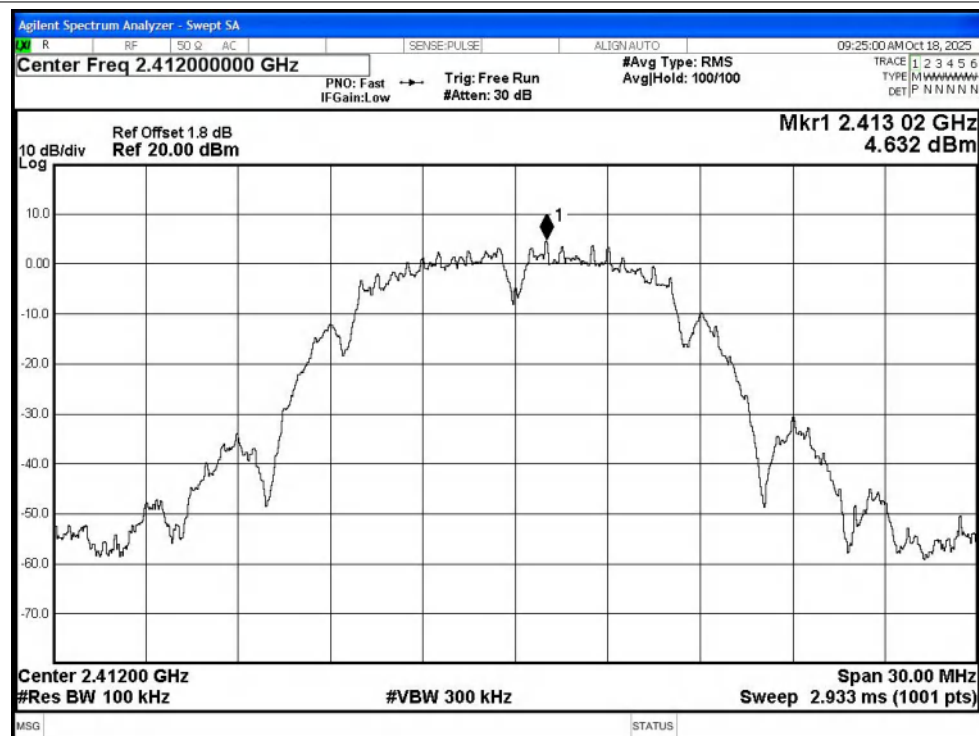


## 4. Band Edge

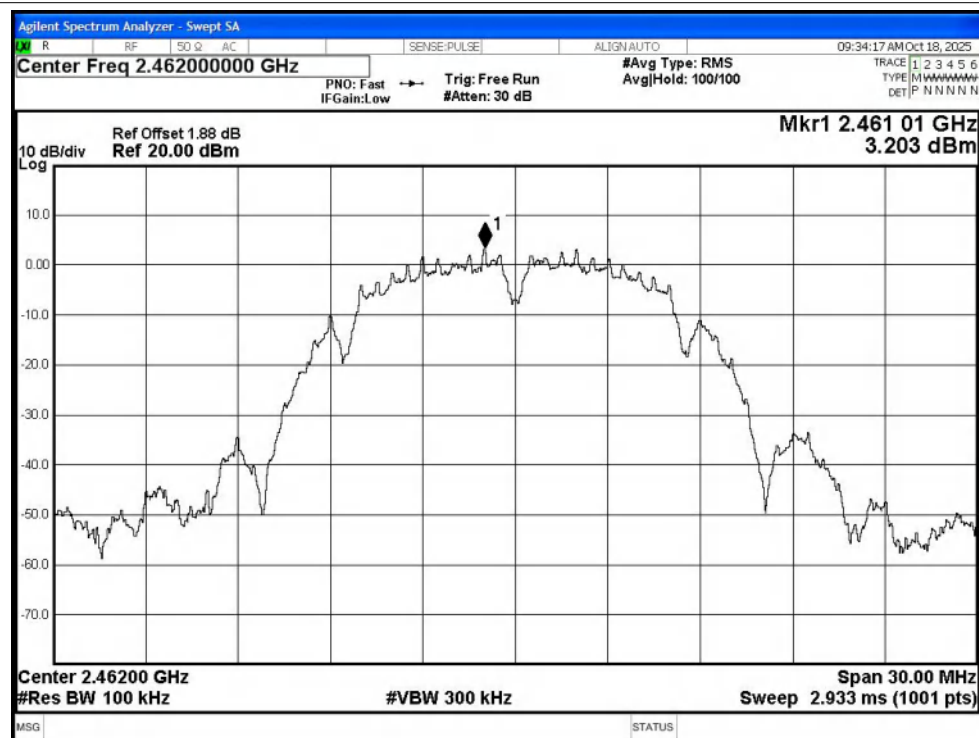
RTL8821:

| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | b    | 2412            | Ant1    | -51.35          | -20         | Pass    |
| NVNT      | b    | 2462            | Ant1    | -56.36          | -20         | Pass    |
| NVNT      | g    | 2412            | Ant1    | -30             | -20         | Pass    |
| NVNT      | g    | 2462            | Ant1    | -42.08          | -20         | Pass    |
| NVNT      | n20  | 2412            | Ant1    | -31.88          | -20         | Pass    |
| NVNT      | n20  | 2462            | Ant1    | -41.13          | -20         | Pass    |
| NVNT      | n40  | 2422            | Ant1    | -35.2           | -20         | Pass    |
| NVNT      | n40  | 2452            | Ant1    | -36.16          | -20         | Pass    |

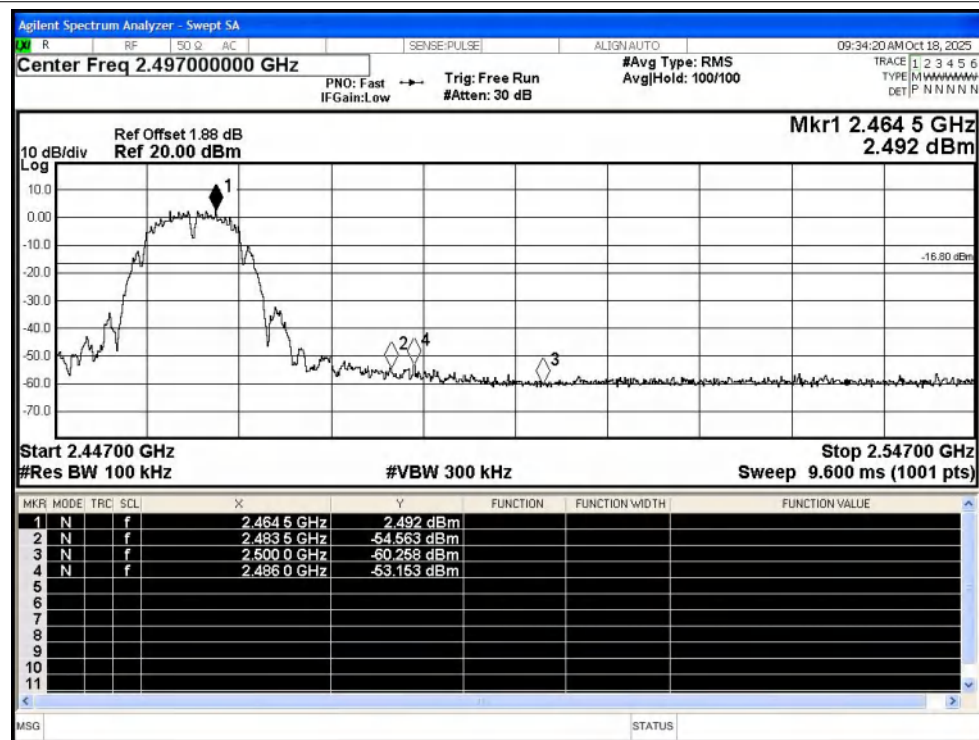
Band Edge NVNT b 2412MHz Ant1 Ref



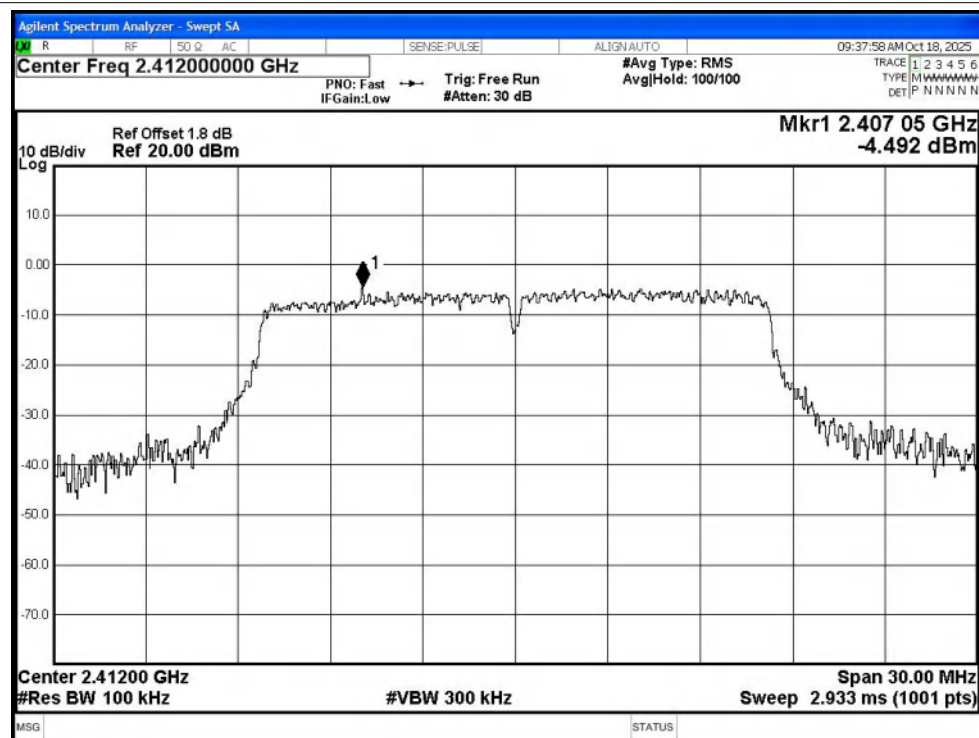
## Band Edge NVNT b 2462MHz Ant1 Ref



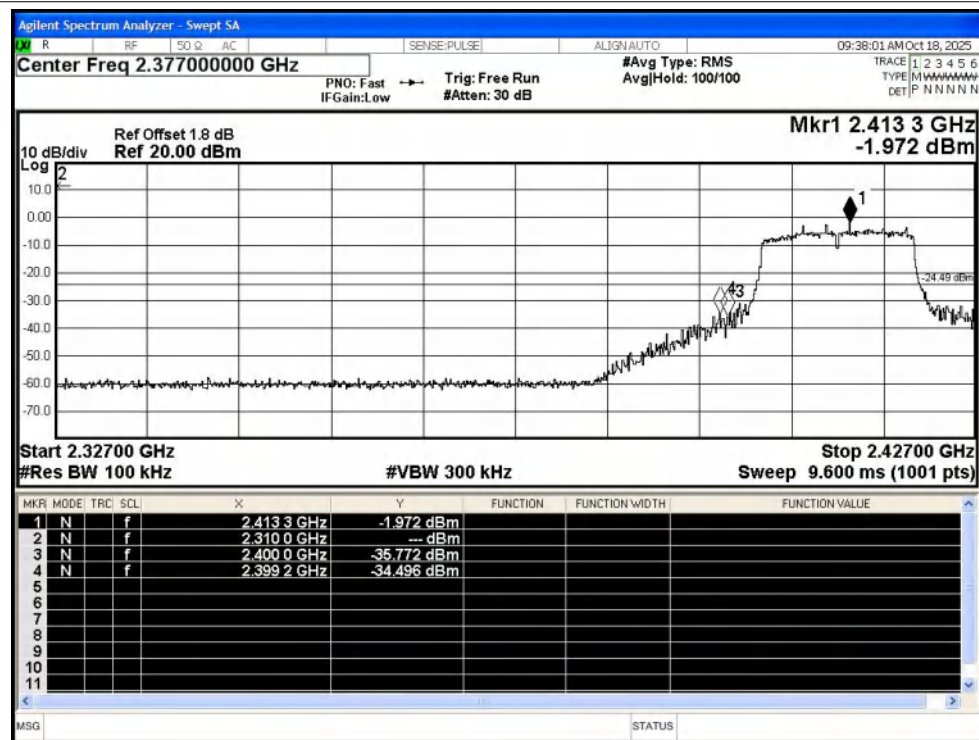
## Band Edge NVNT b 2462MHz Ant1 Emission



## Band Edge NVNT g 2412MHz Ant1 Ref



## Band Edge NVNT g 2412MHz Ant1 Emission



Agilent Spectrum Analyzer - Swept SA

R RF 50 Q AC SENSE:PULSE ALIGN:AUTO 09:41:18 AM Oct 18, 2025

Center Freq 2.46200000 GHz

PNO: Fast IF Gain: Low Trig: Free Run #Atten: 30 dB #Avg Type: RMS Avg|Hold: 100/100

TRACE 1 2 3 4 5 6  
TYPE: M W W W W W W W  
DET: P N N N N N

Ref Offset 1.88 dB  
Ref 20.00 dBm

Mkr1 2.464 52 GHz  
-2.759 dBm

10 dB/div  
Log

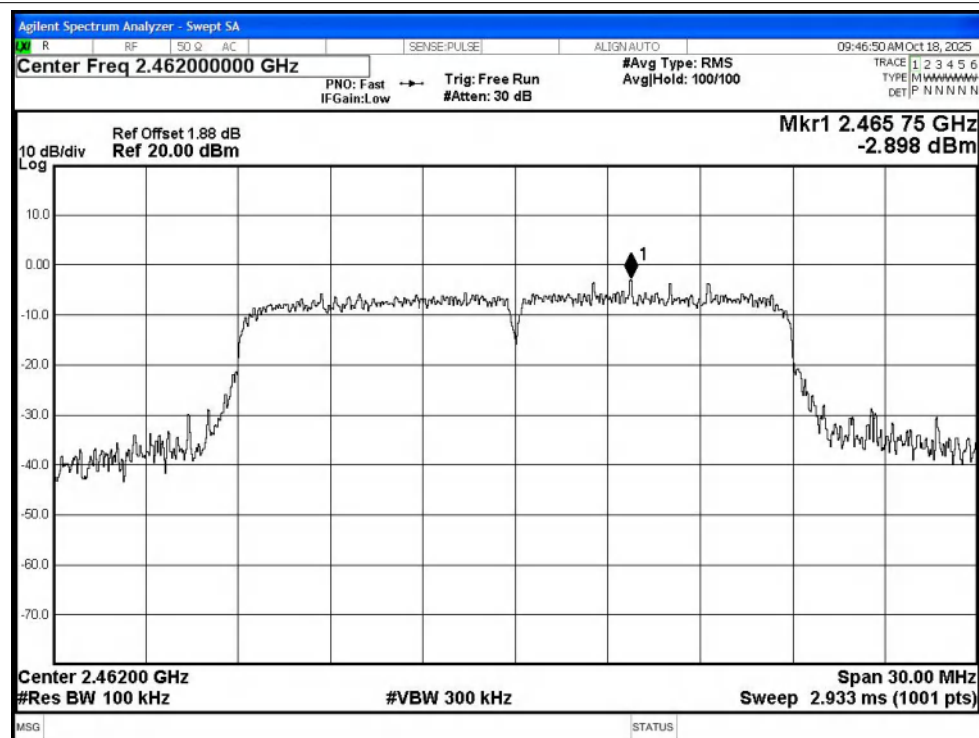
Center 2.46200 GHz  
#Res BW 100 kHz  
#VBW 300 kHz  
Span 30.00 MHz  
Sweep 2.933 ms (1001 pts)

MSG STATUS

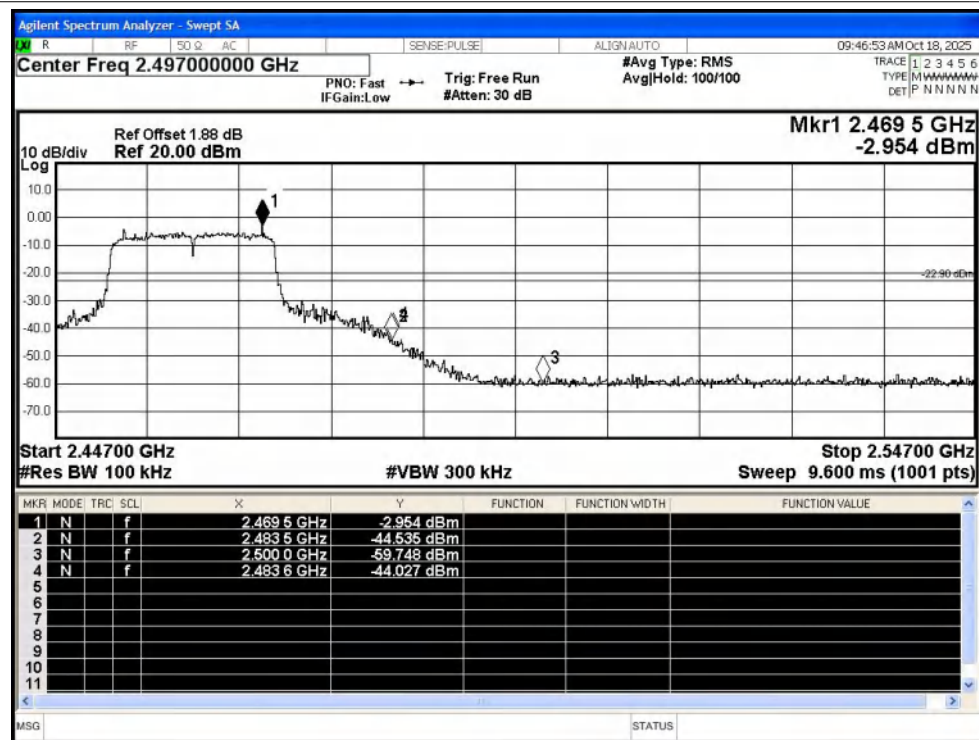
[illegible]



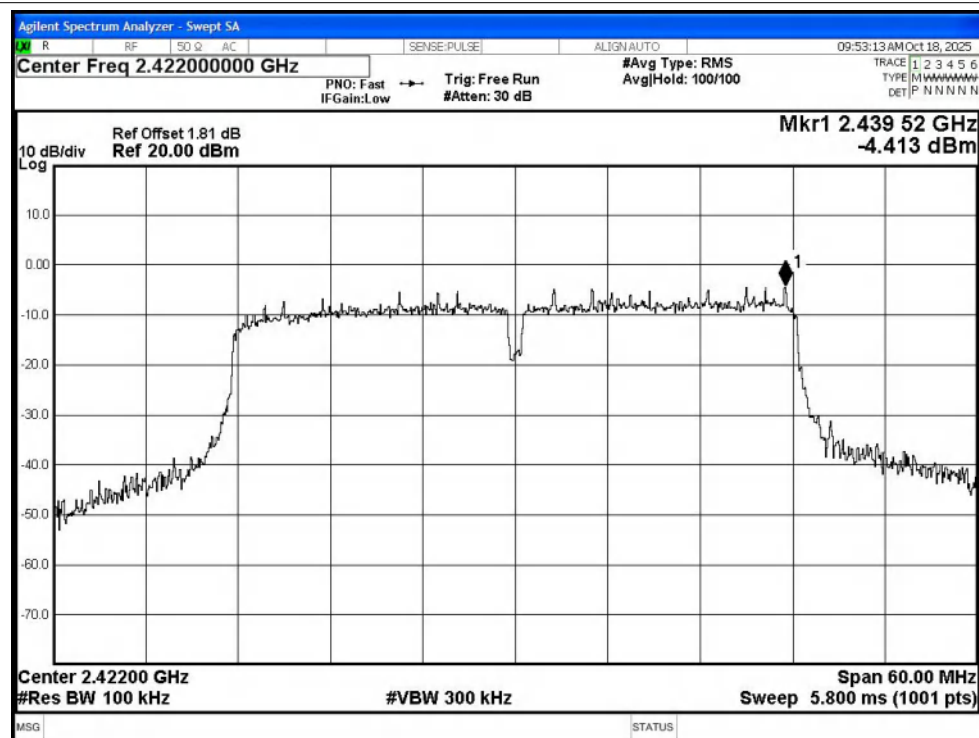
## Band Edge NVNT n20 2462MHz Ant1 Ref



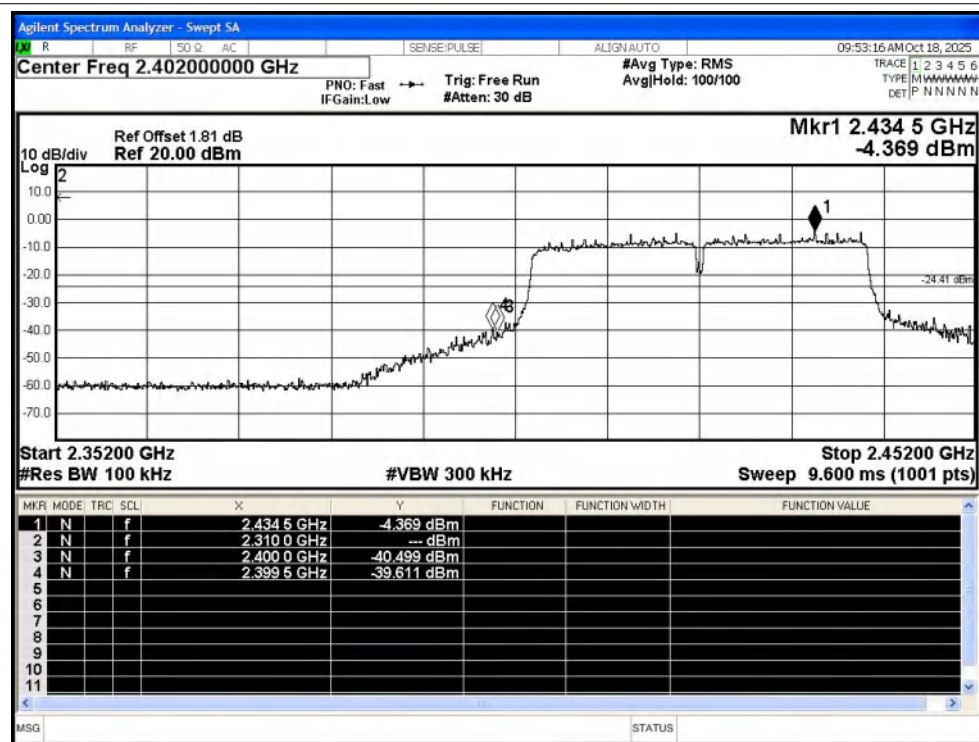
## Band Edge NVNT n20 2462MHz Ant1 Emission



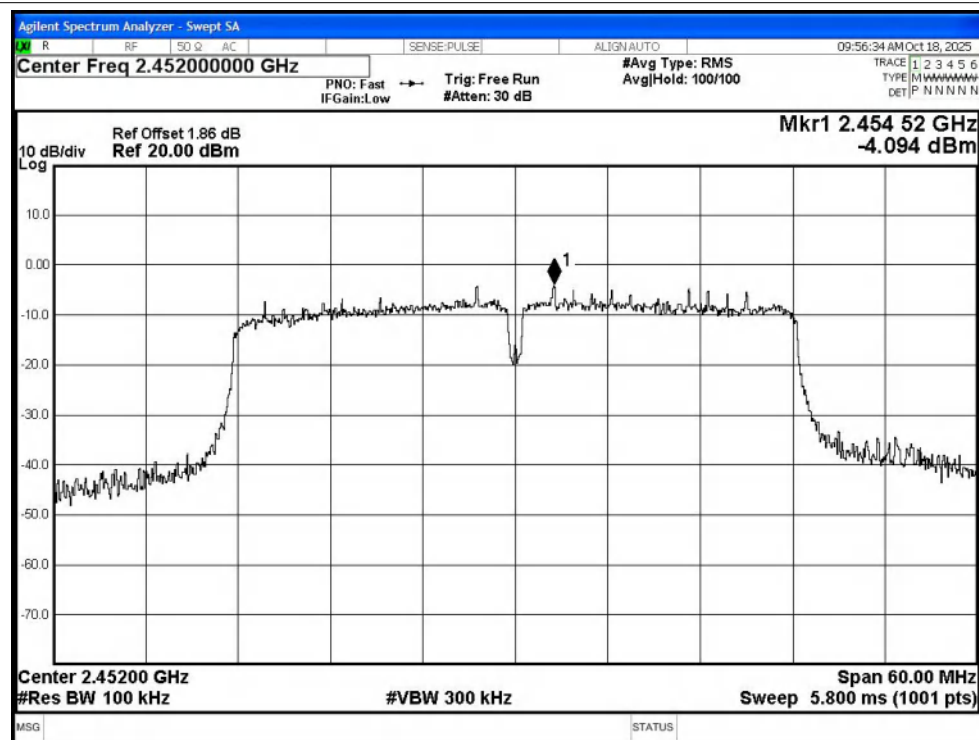
## Band Edge NVNT n40 2422MHz Ant1 Ref



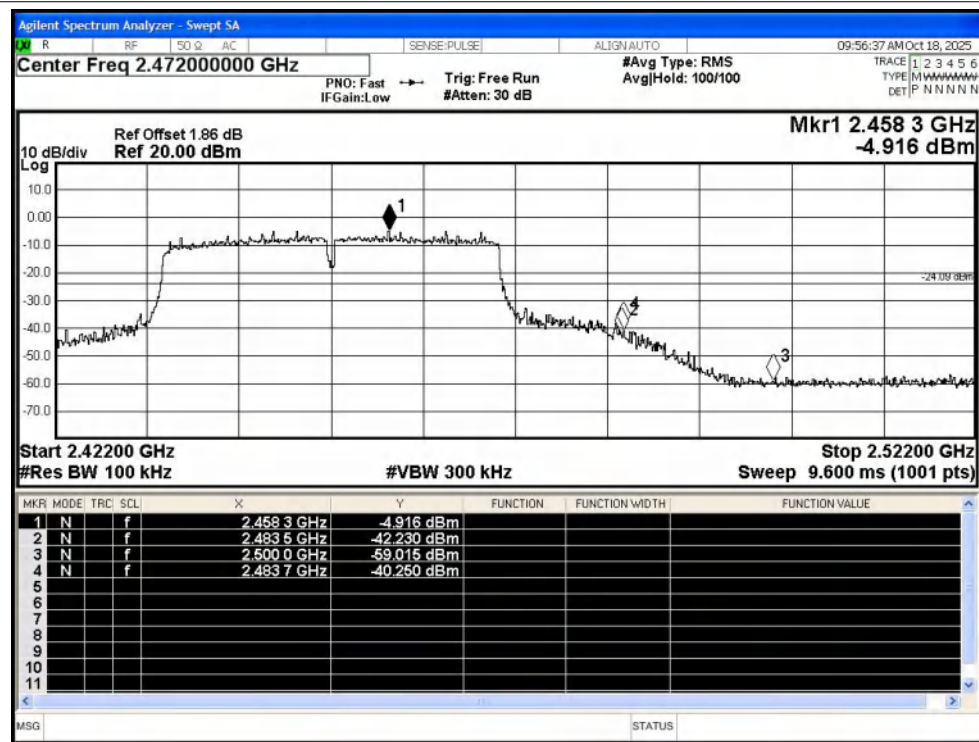
## Band Edge NVNT n40 2422MHz Ant1 Emission



## Band Edge NVNT n40 2452MHz Ant1 Ref



## Band Edge NVNT n40 2452MHz Ant1 Emission

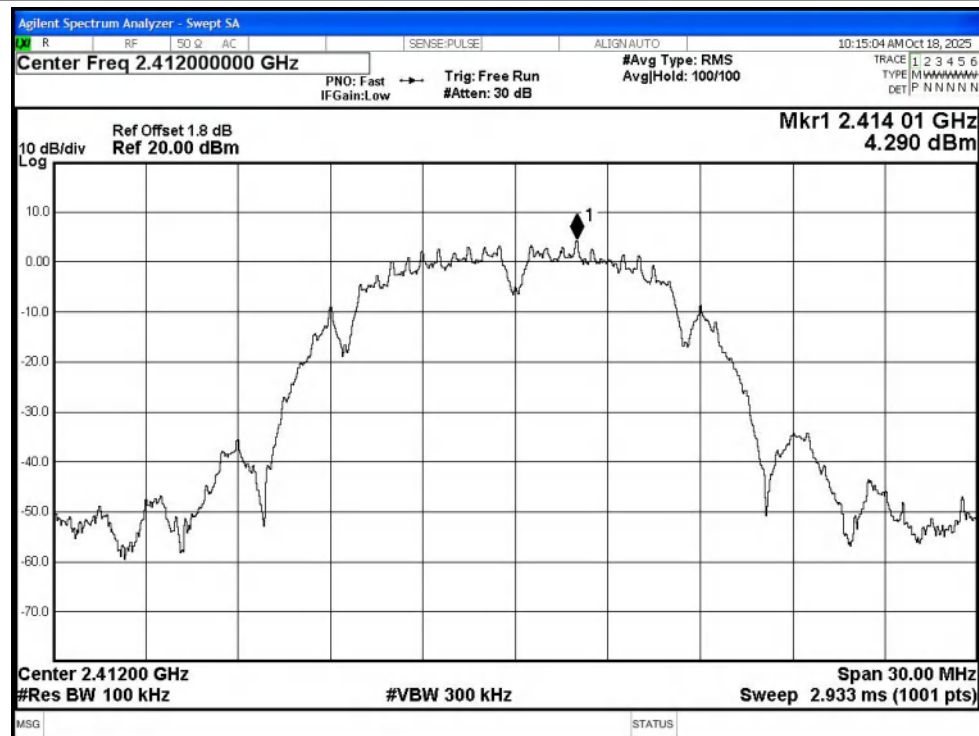


ESP32:

| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | b    | 2412            | Ant2    | -52.09          | -20         | Pass    |
| NVNT      | b    | 2462            | Ant2    | -57.76          | -20         | Pass    |
| NVNT      | g    | 2412            | Ant2    | -32.63          | -20         | Pass    |
| NVNT      | g    | 2462            | Ant2    | -41.3           | -20         | Pass    |
| NVNT      | n20  | 2412            | Ant2    | -33.55          | -20         | Pass    |
| NVNT      | n20  | 2462            | Ant2    | -38.88          | -20         | Pass    |
| NVNT      | n40  | 2422            | Ant2    | -36.64          | -20         | Pass    |
| NVNT      | n40  | 2452            | Ant2    | -34.83          | -20         | Pass    |

## Test Graphs

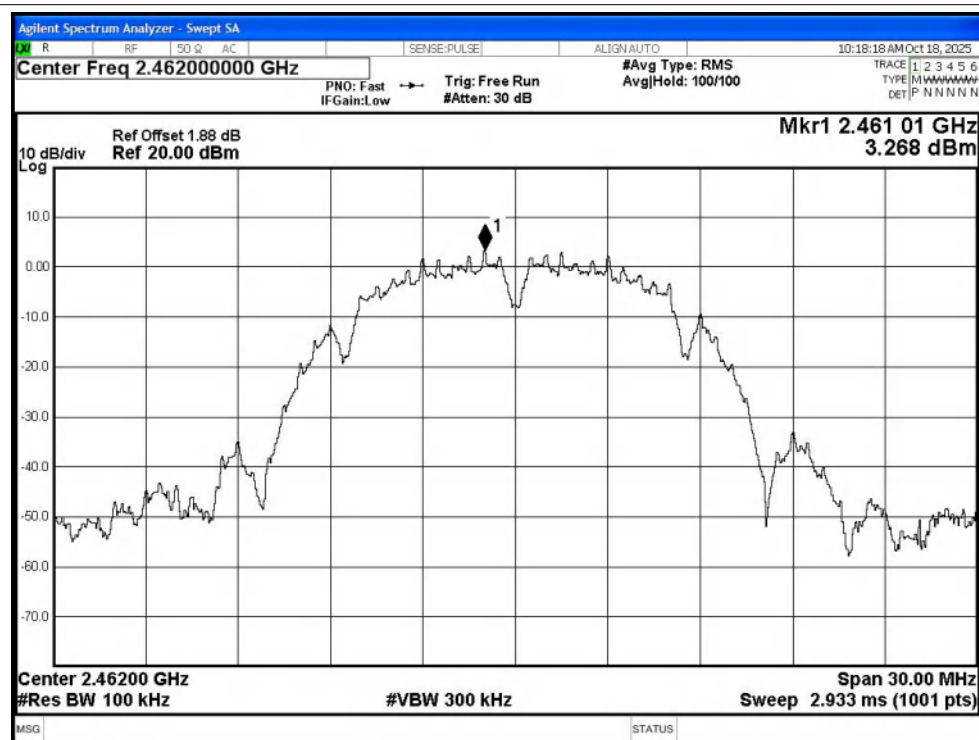
Band Edge NVNT b 2412MHz Ant2 Ref



Band Edge NVNT b 2412MHz Ant2 Emission



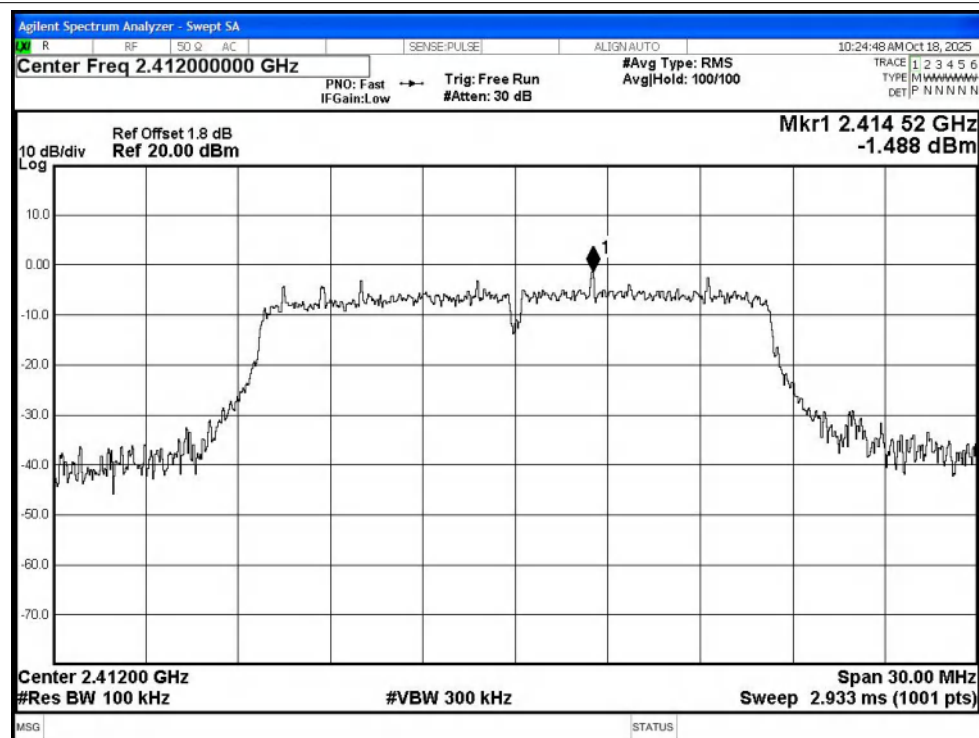
## Band Edge NVNT b 2462MHz Ant2 Ref



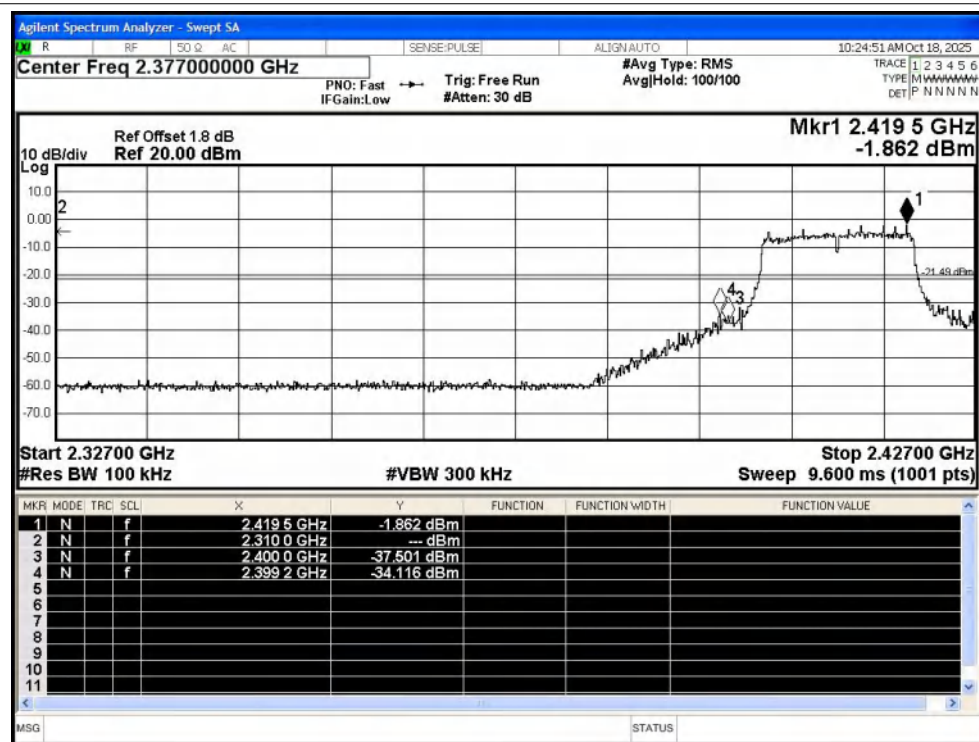
## Band Edge NVNT b 2462MHz Ant2 Emission



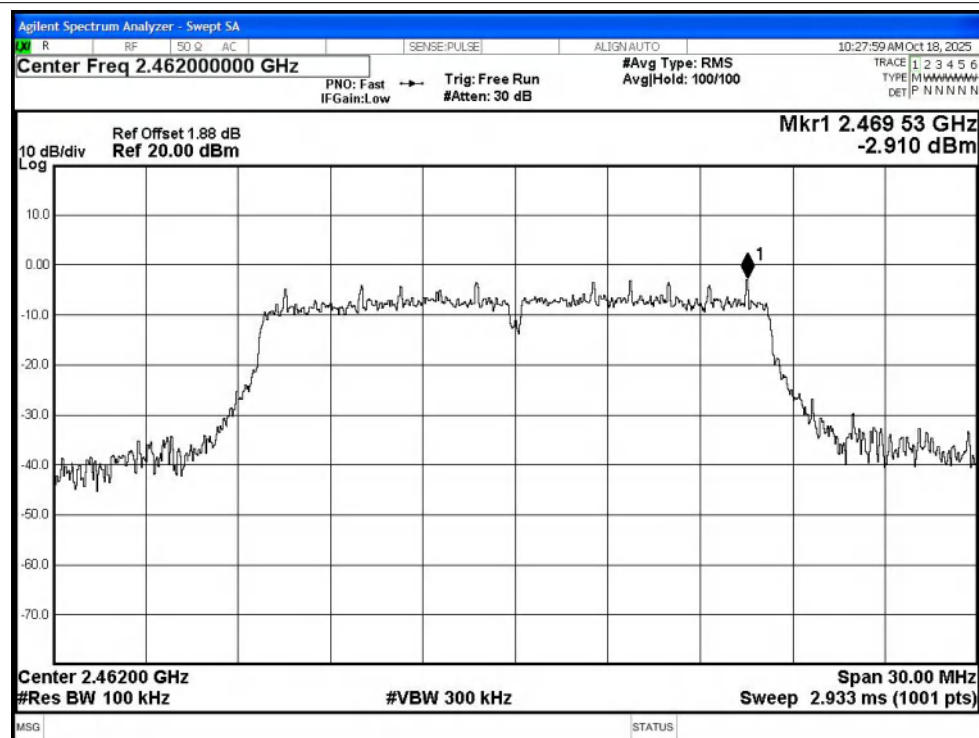
## Band Edge NVNT g 2412MHz Ant2 Ref



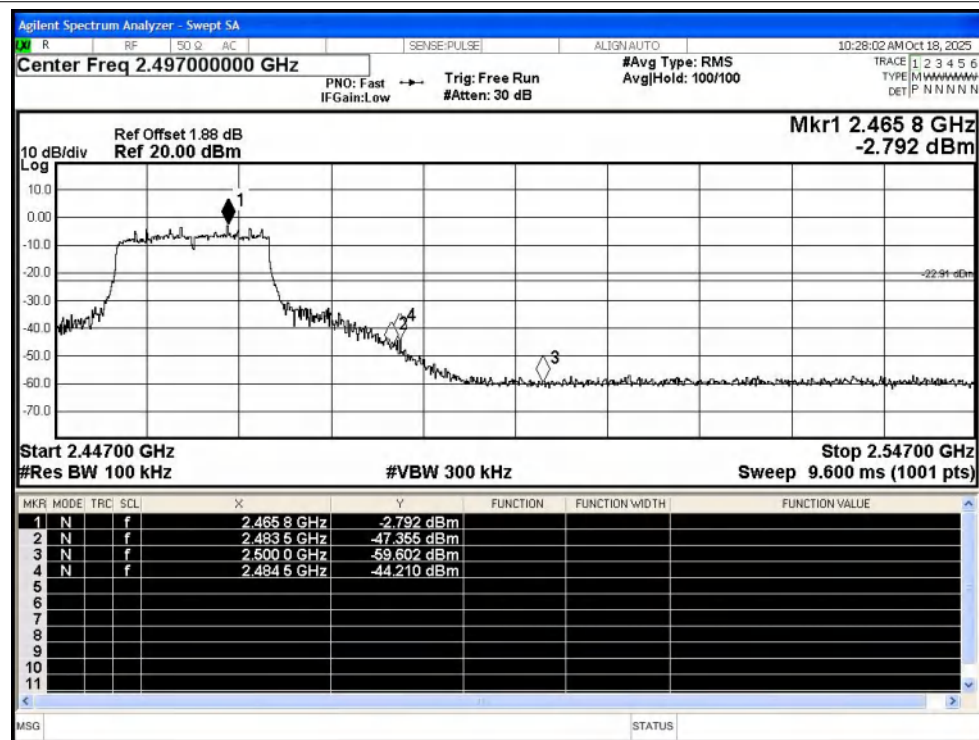
## Band Edge NVNT g 2412MHz Ant2 Emission



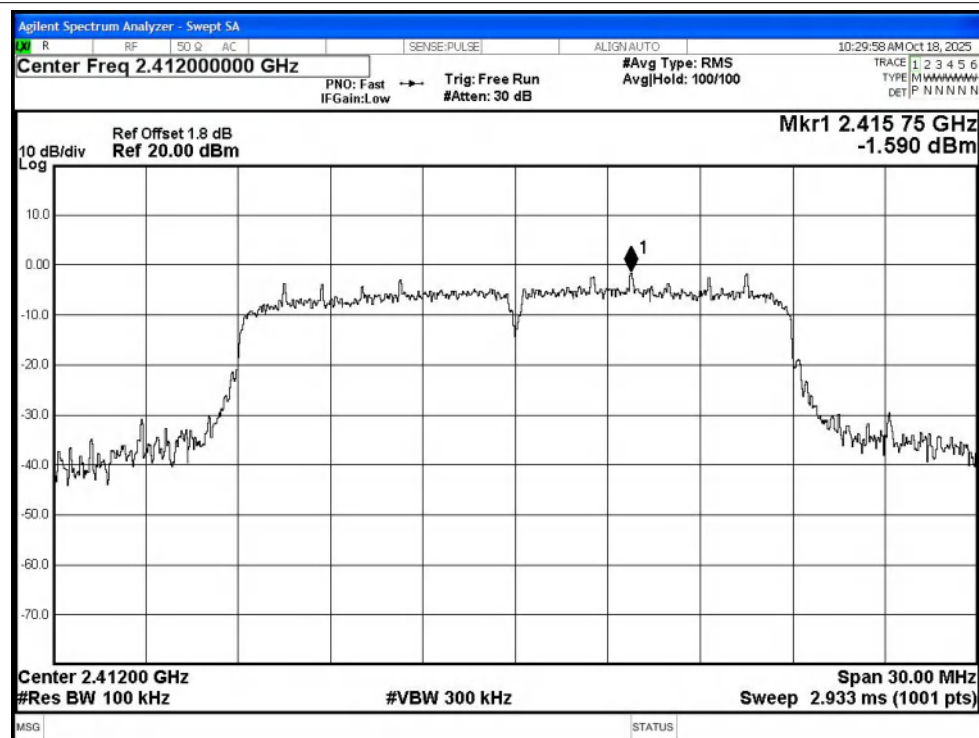
## Band Edge NVNT g 2462MHz Ant2 Ref



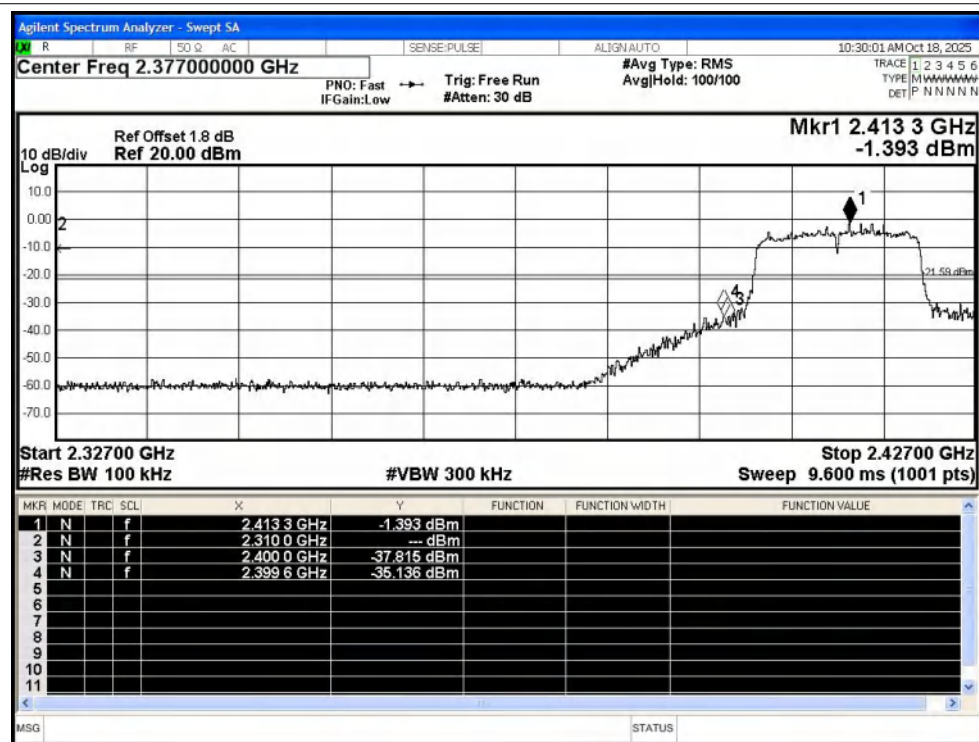
## Band Edge NVNT g 2462MHz Ant2 Emission



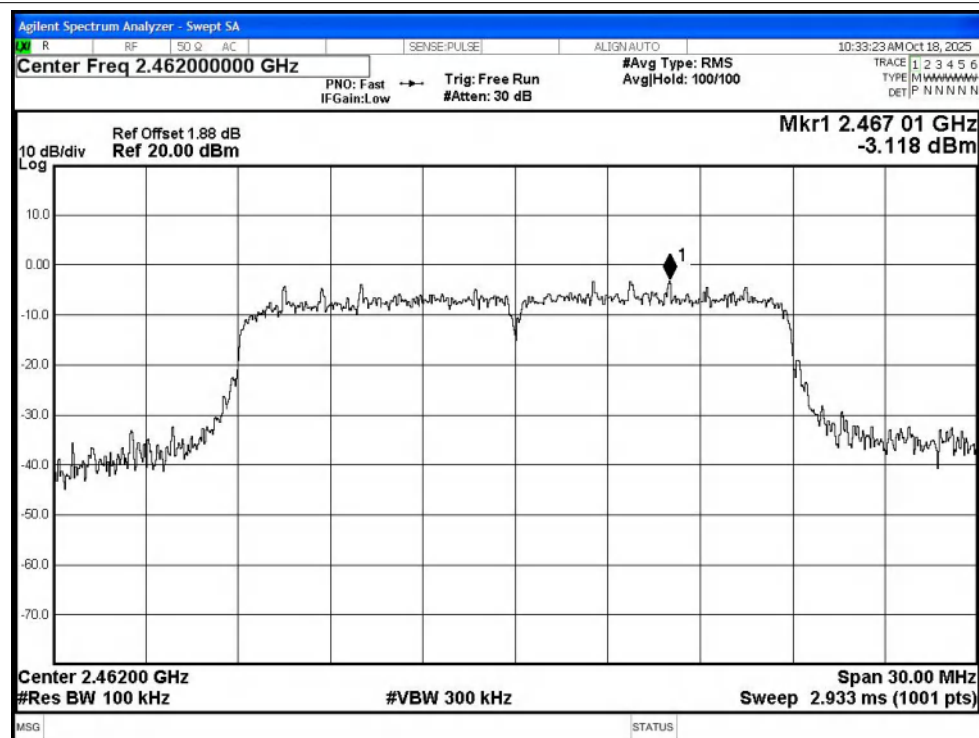
## Band Edge NVNT n20 2412MHz Ant2 Ref



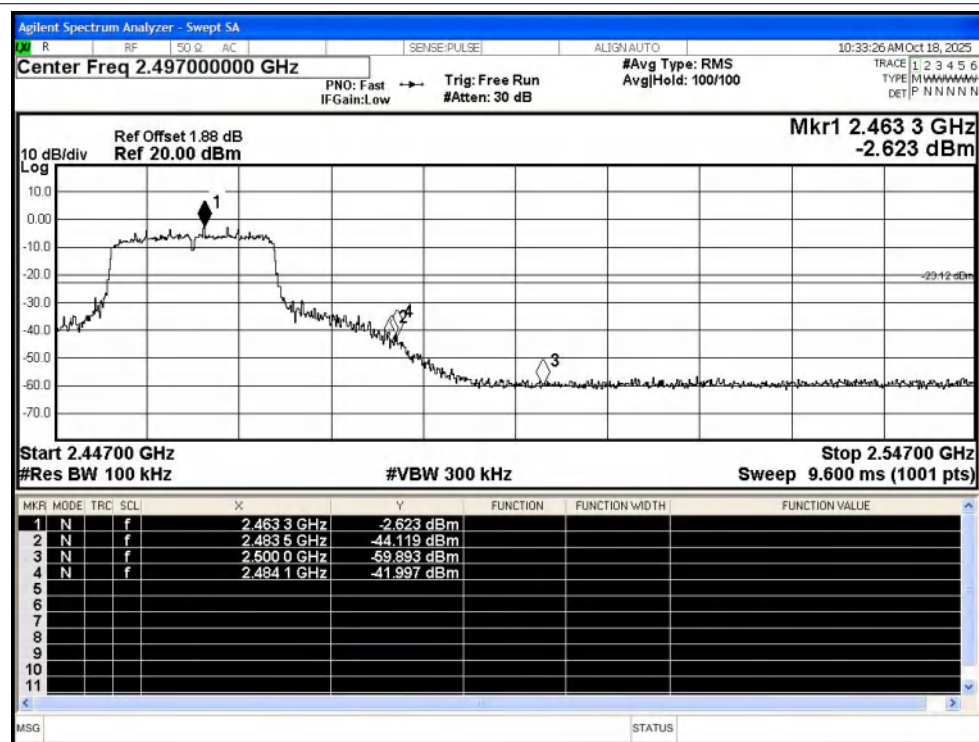
## Band Edge NVNT n20 2412MHz Ant2 Emission



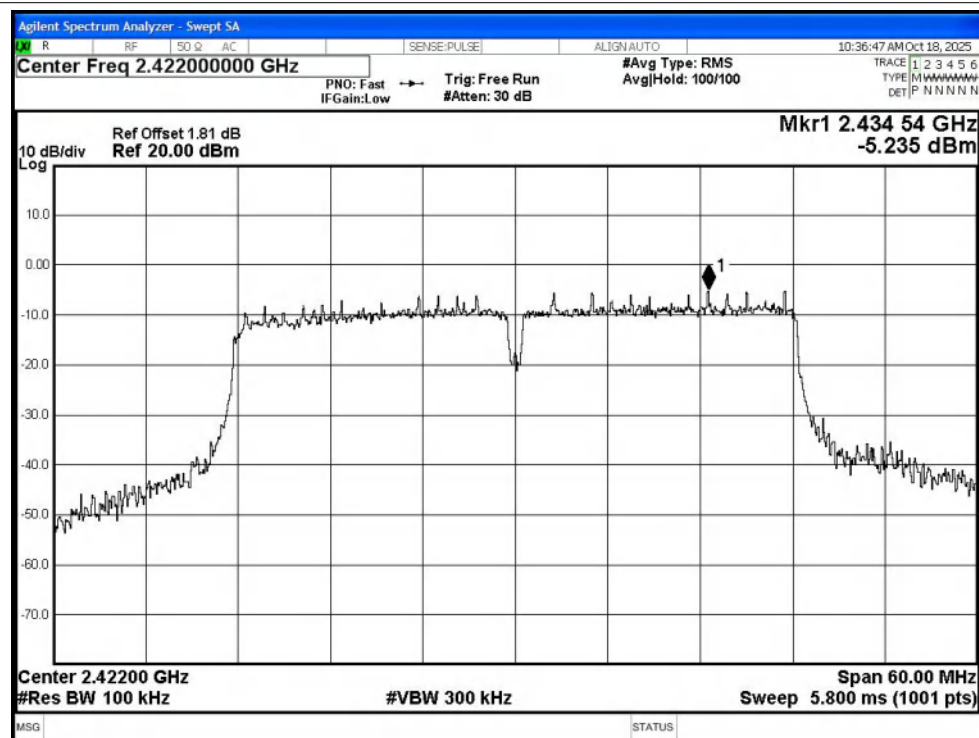
## Band Edge NVNT n20 2462MHz Ant2 Ref



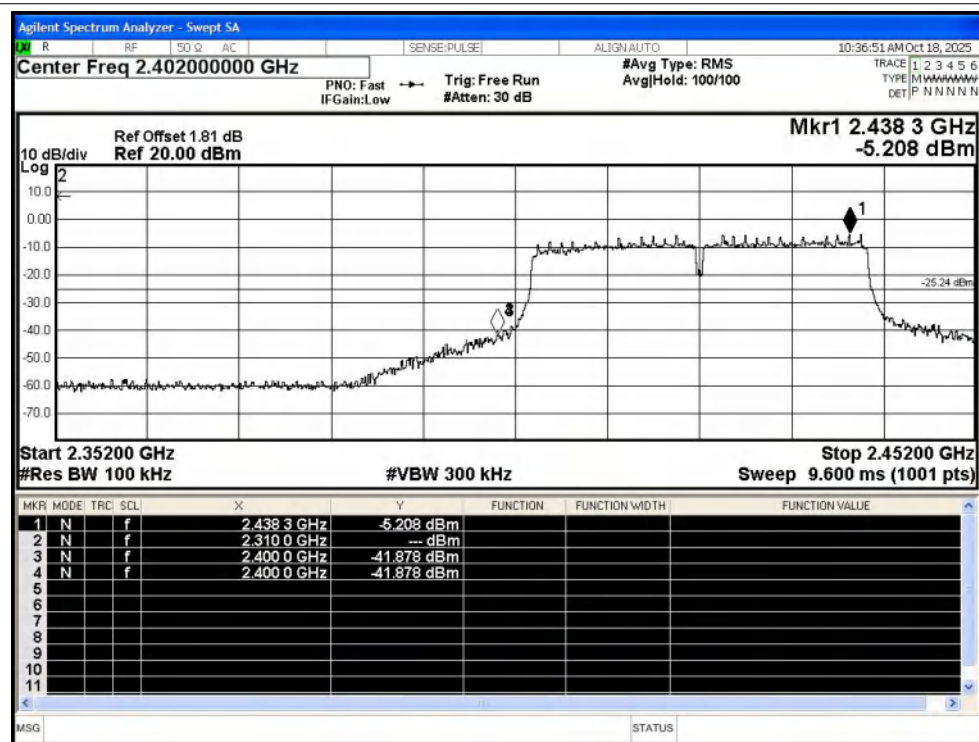
## Band Edge NVNT n20 2462MHz Ant2 Emission



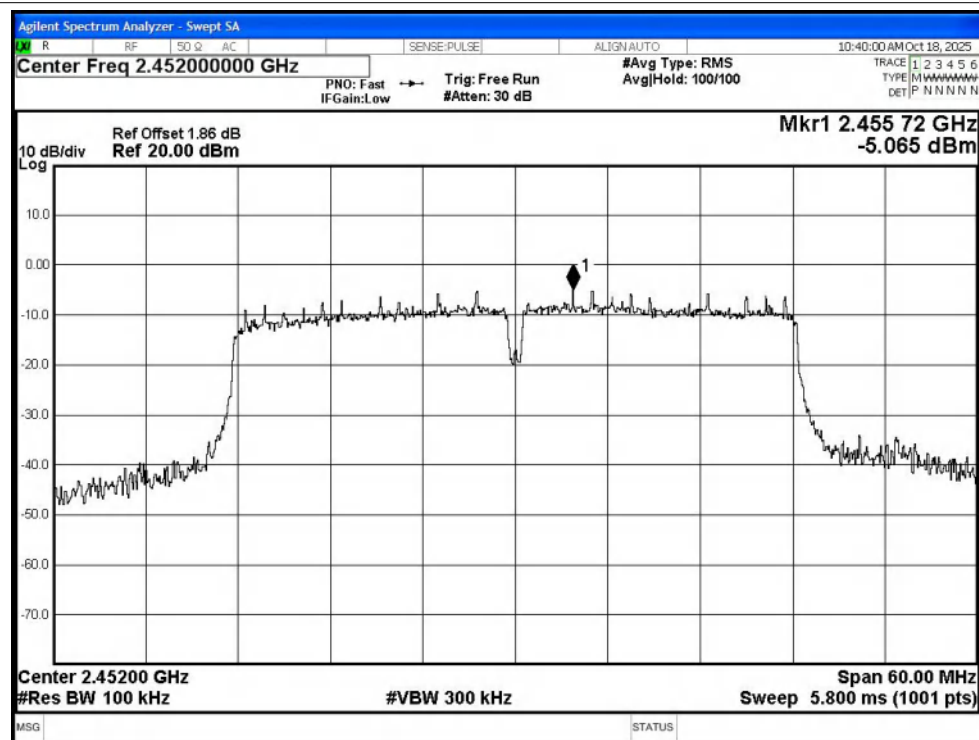
## Band Edge NVNT n40 2422MHz Ant2 Ref



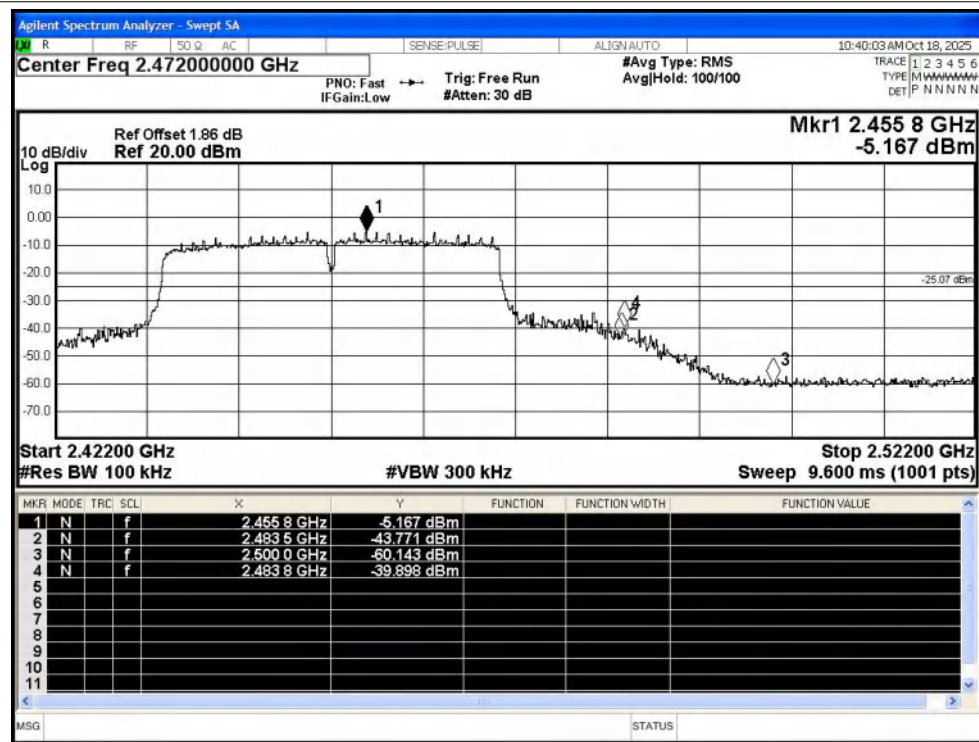
## Band Edge NVNT n40 2422MHz Ant2 Emission



## Band Edge NVNT n40 2452MHz Ant2 Ref



## Band Edge NVNT n40 2452MHz Ant2 Emission



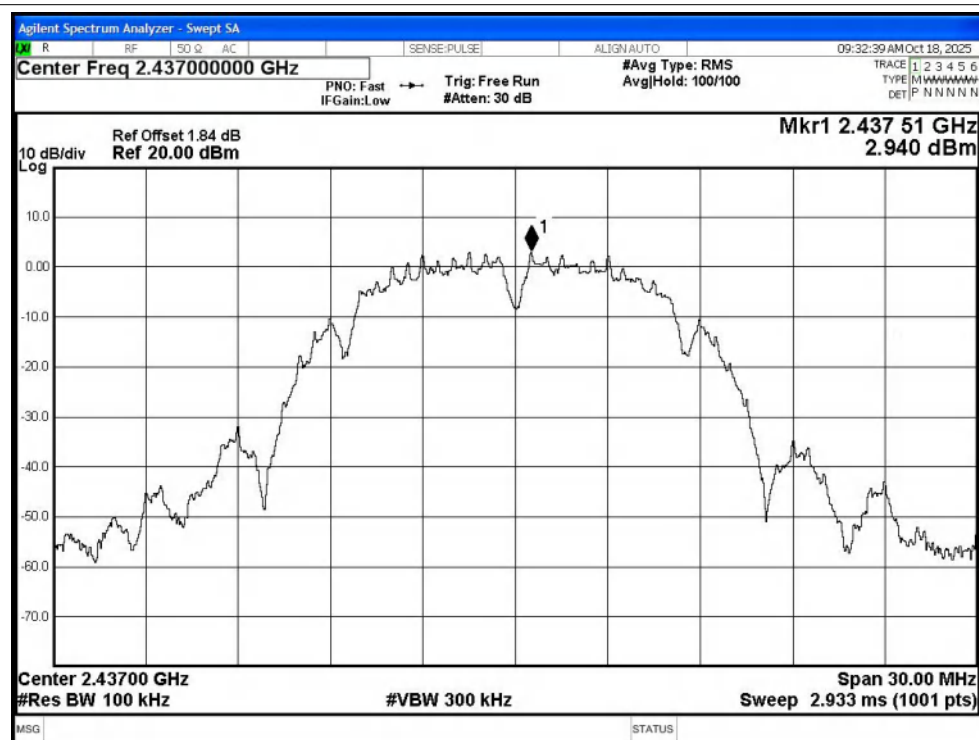
## 5. Conducted RF Spurious Emission

RTL8821:

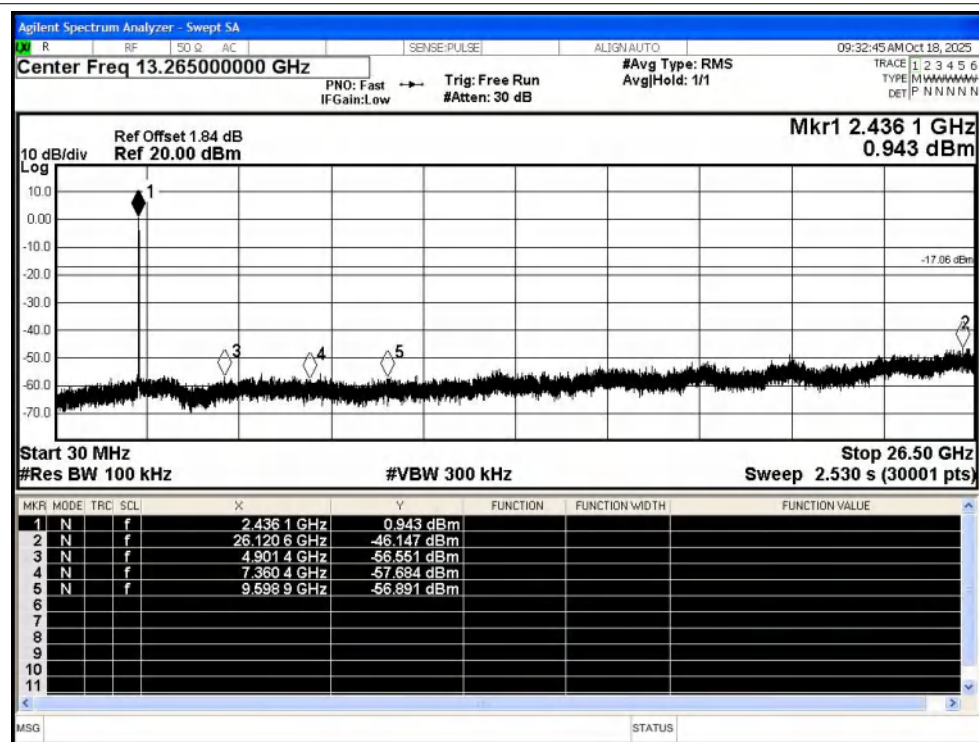
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | b    | 2412            | Ant1    | -50.94          | -20         | Pass    |
| NVNT      | b    | 2437            | Ant1    | -49.09          | -20         | Pass    |
| NVNT      | b    | 2462            | Ant1    | -49.97          | -20         | Pass    |
| NVNT      | g    | 2412            | Ant1    | -42.99          | -20         | Pass    |
| NVNT      | g    | 2437            | Ant1    | -43.19          | -20         | Pass    |
| NVNT      | g    | 2462            | Ant1    | -42.7           | -20         | Pass    |
| NVNT      | n20  | 2412            | Ant1    | -43.75          | -20         | Pass    |
| NVNT      | n20  | 2437            | Ant1    | -43.21          | -20         | Pass    |
| NVNT      | n20  | 2462            | Ant1    | -43.51          | -20         | Pass    |
| NVNT      | n40  | 2422            | Ant1    | -41.43          | -20         | Pass    |
| NVNT      | n40  | 2437            | Ant1    | -40.99          | -20         | Pass    |
| NVNT      | n40  | 2452            | Ant1    | -41.37          | -20         | Pass    |



Tx. Spurious NVNT b 2437MHz Ant1 Ref



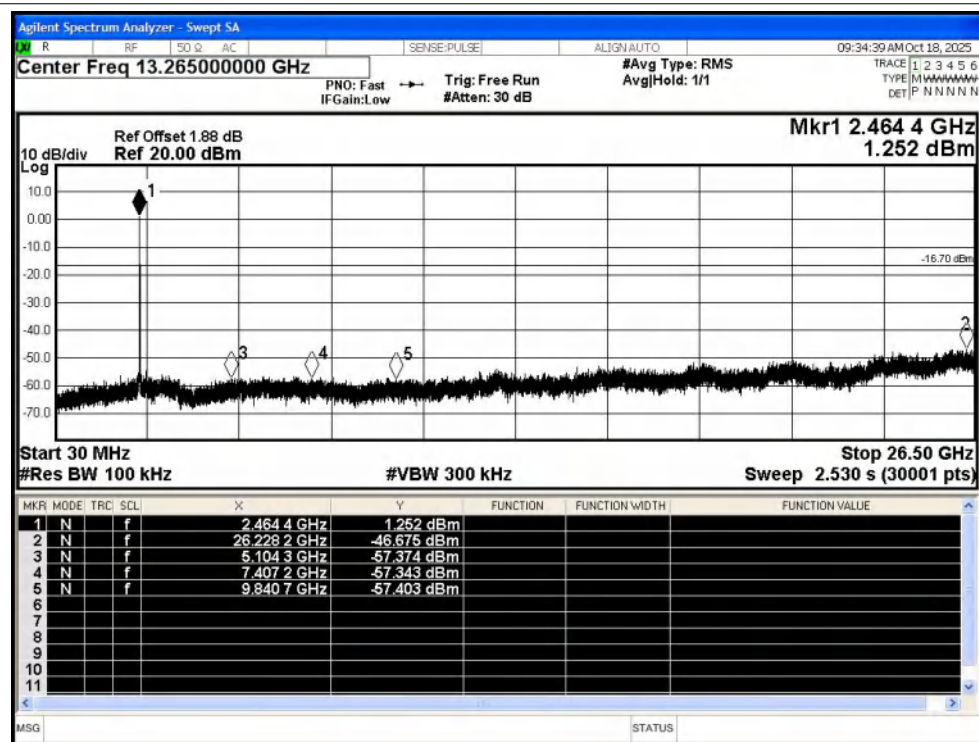
Tx. Spurious NVNT b 2437MHz Ant1 Emission



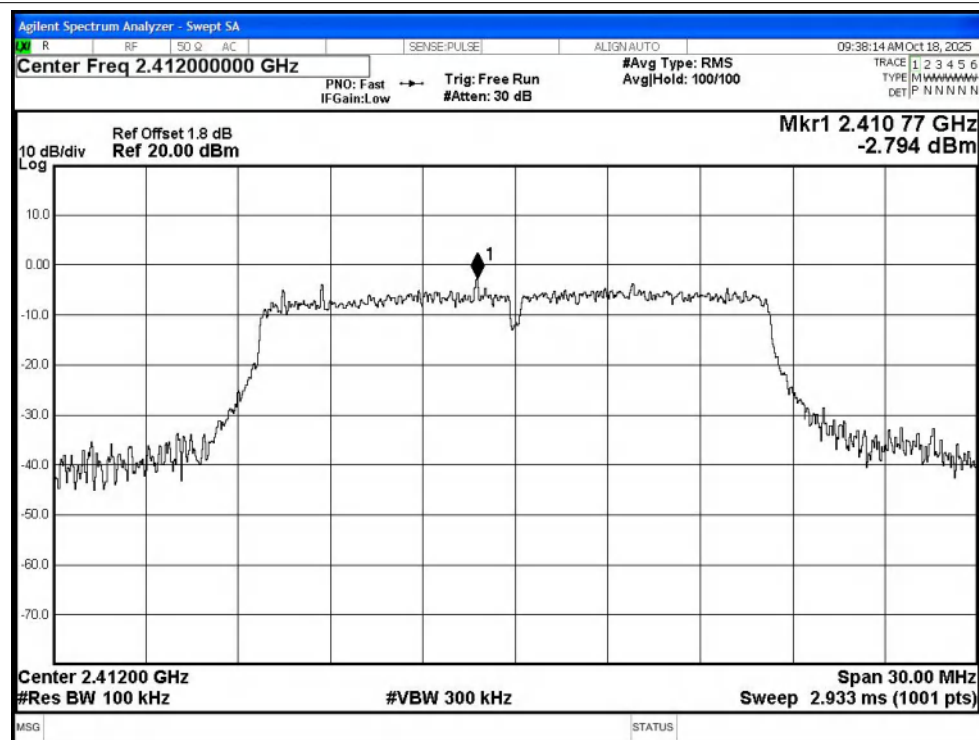
## Tx. Spurious NVNT b 2462MHz Ant1 Ref



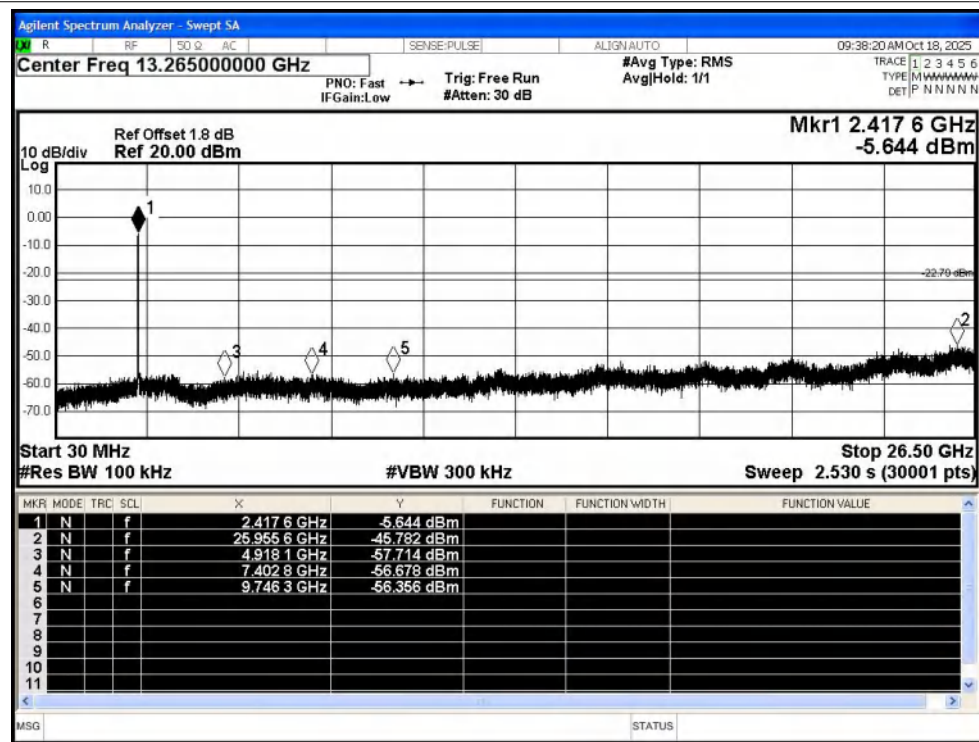
## Tx. Spurious NVNT b 2462MHz Ant1 Emission



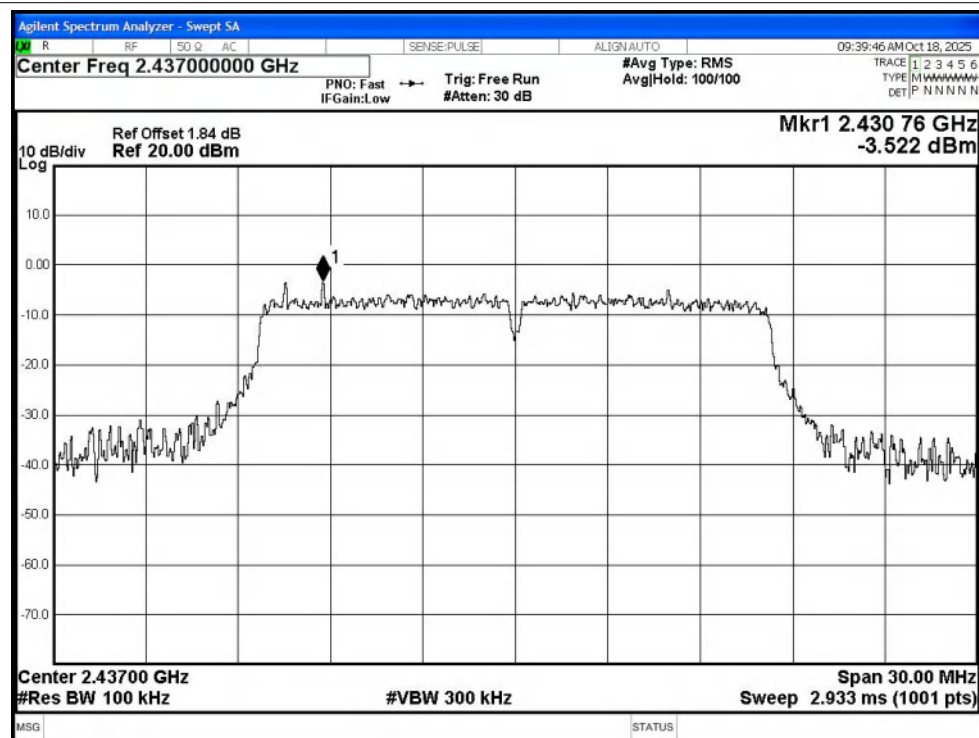
## Tx. Spurious NVNT g 2412MHz Ant1 Ref



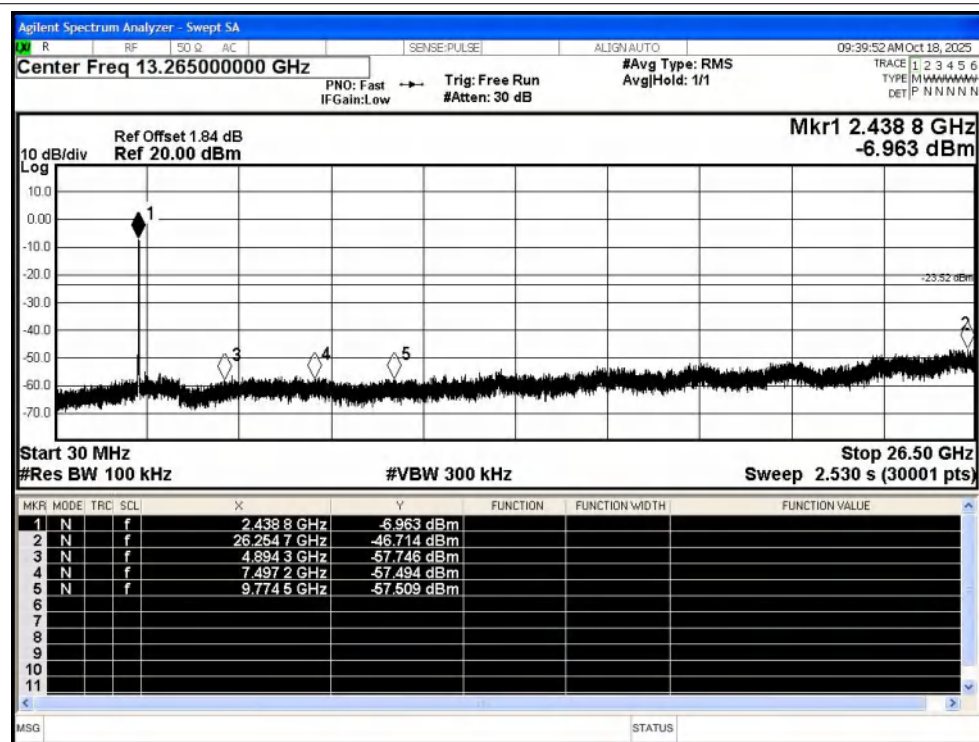
## Tx. Spurious NVNT g 2412MHz Ant1 Emission



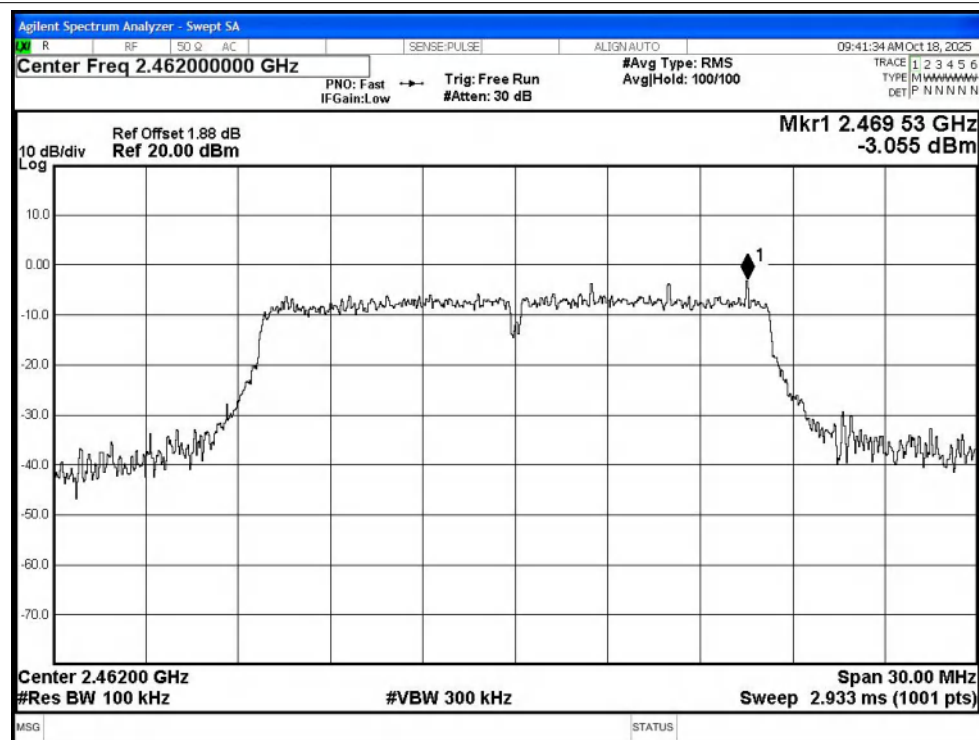
## Tx. Spurious NVNT g 2437MHz Ant1 Ref



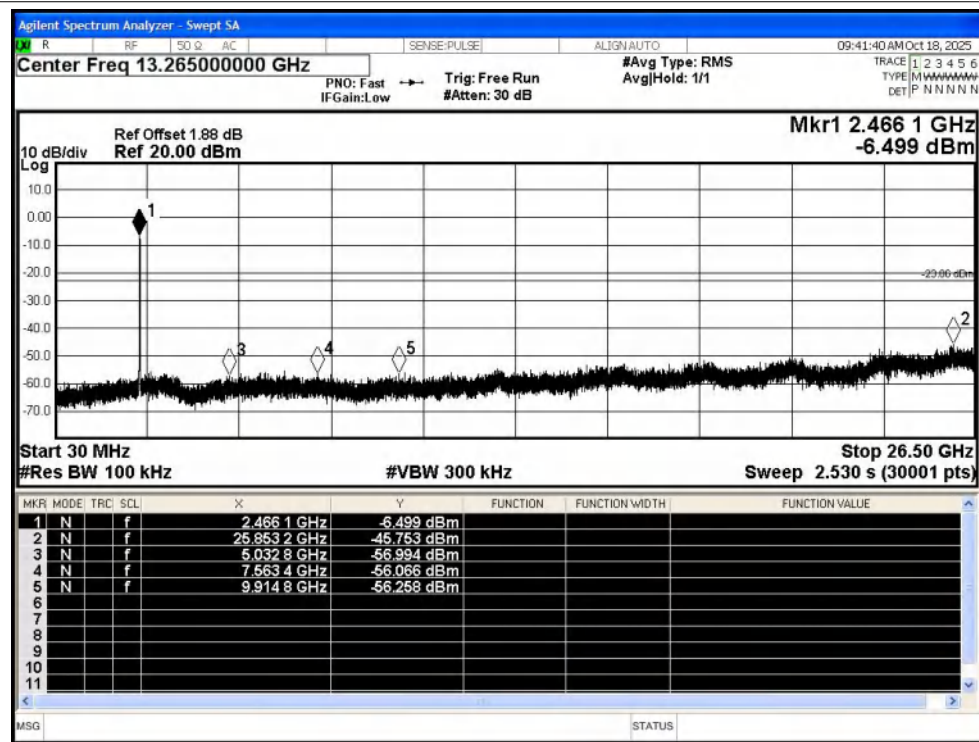
## Tx. Spurious NVNT g 2437MHz Ant1 Emission



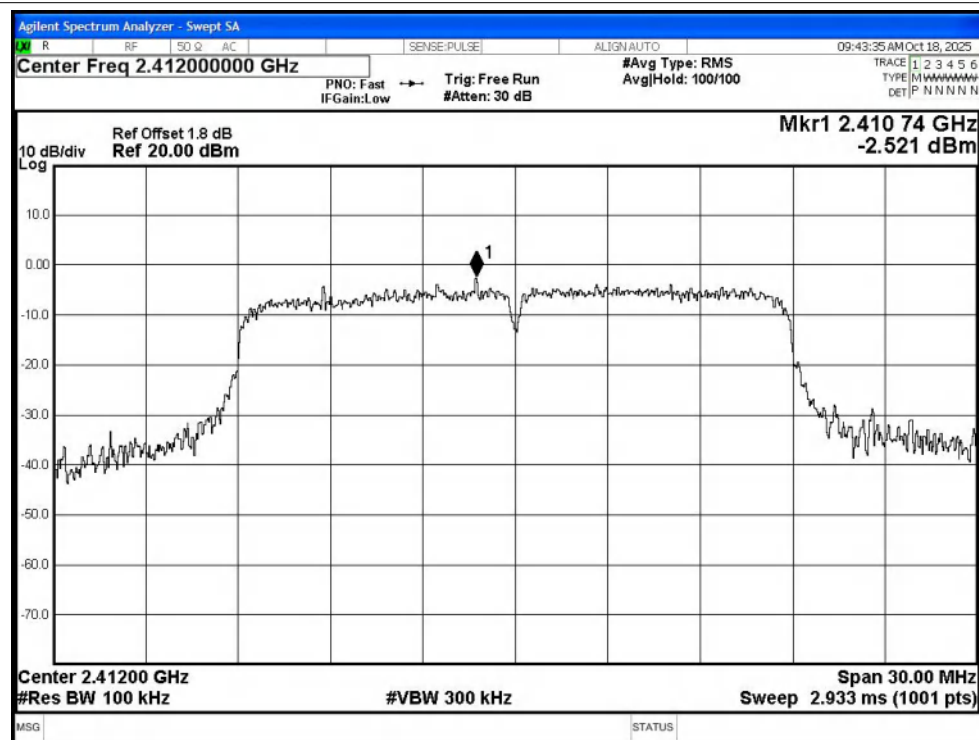
## Tx. Spurious NVNT g 2462MHz Ant1 Ref



## Tx. Spurious NVNT g 2462MHz Ant1 Emission



## Tx. Spurious NVNT n20 2412MHz Ant1 Ref



## Tx. Spurious NVNT n20 2412MHz Ant1 Emission

