

## Appendix A

### RF Test Data for 2.4GWIFI (Conducted Measurement)

**Product Name: Digital Projector**

**Test Model: NeoPix 140**

#### Environmental Conditions

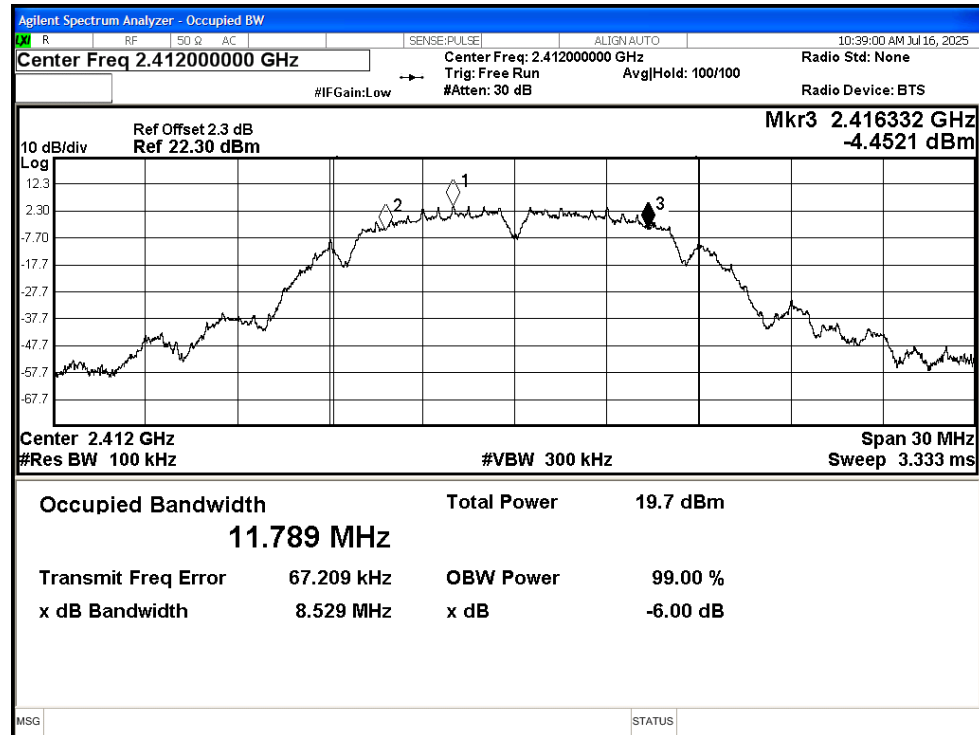
|                    |             |
|--------------------|-------------|
| Temperature:       | 23.2°C      |
| Relative Humidity: | 52.6%       |
| ATM Pressure:      | 100.0 kPa   |
| Test Engineer:     | Suichao Lai |
| Supervised by:     | Yan Chen    |

## A.1 -6dB Bandwidth

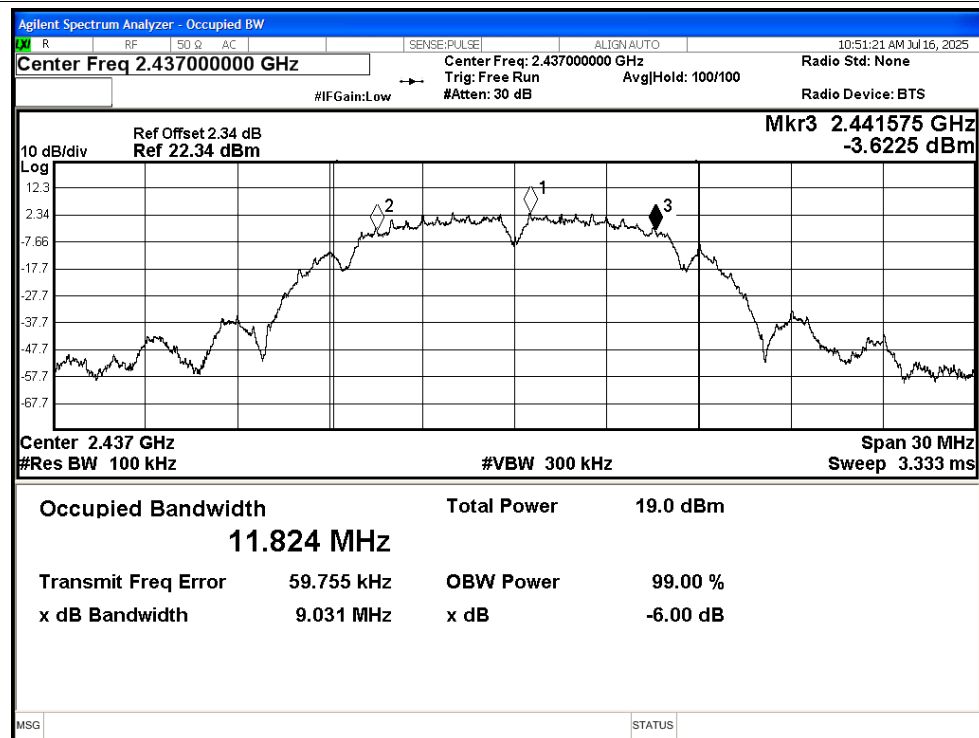
| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-----------------------------|---------|
| NVNT      | b    | 2412            | Ant1    | 8.529                 | $\geq 0.5$                  | Pass    |
| NVNT      | b    | 2437            | Ant1    | 9.031                 | $\geq 0.5$                  | Pass    |
| NVNT      | b    | 2462            | Ant1    | 8.047                 | $\geq 0.5$                  | Pass    |
| NVNT      | g    | 2412            | Ant1    | 16.027                | $\geq 0.5$                  | Pass    |
| NVNT      | g    | 2437            | Ant1    | 16.313                | $\geq 0.5$                  | Pass    |
| NVNT      | g    | 2462            | Ant1    | 16.309                | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 17.09                 | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2437            | Ant1    | 17.433                | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 16.977                | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2422            | Ant1    | 34.899                | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2437            | Ant1    | 35.279                | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2452            | Ant1    | 35.367                | $\geq 0.5$                  | Pass    |

## Test Graphs

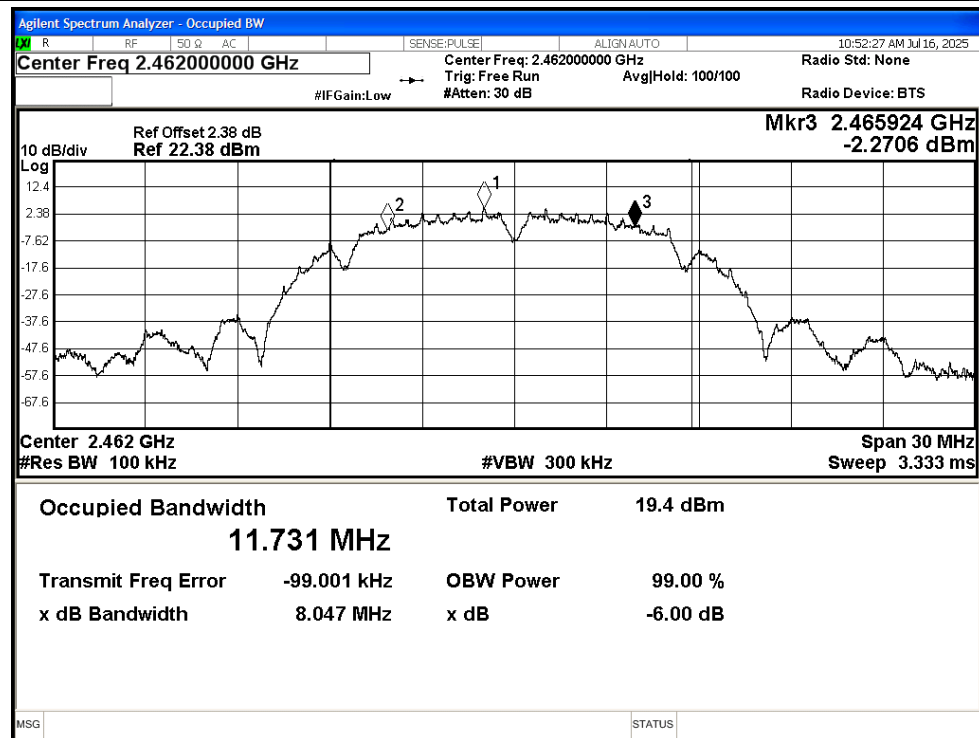
-6dB Bandwidth NVNT b 2412MHz Ant1



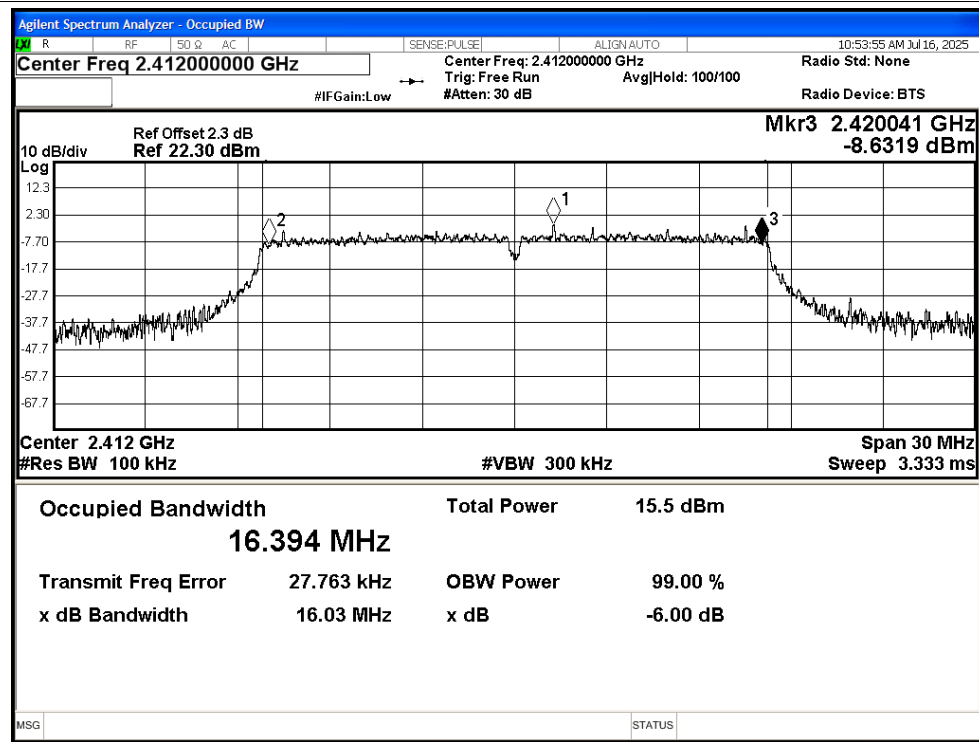
-6dB Bandwidth NVNT b 2437MHz Ant1



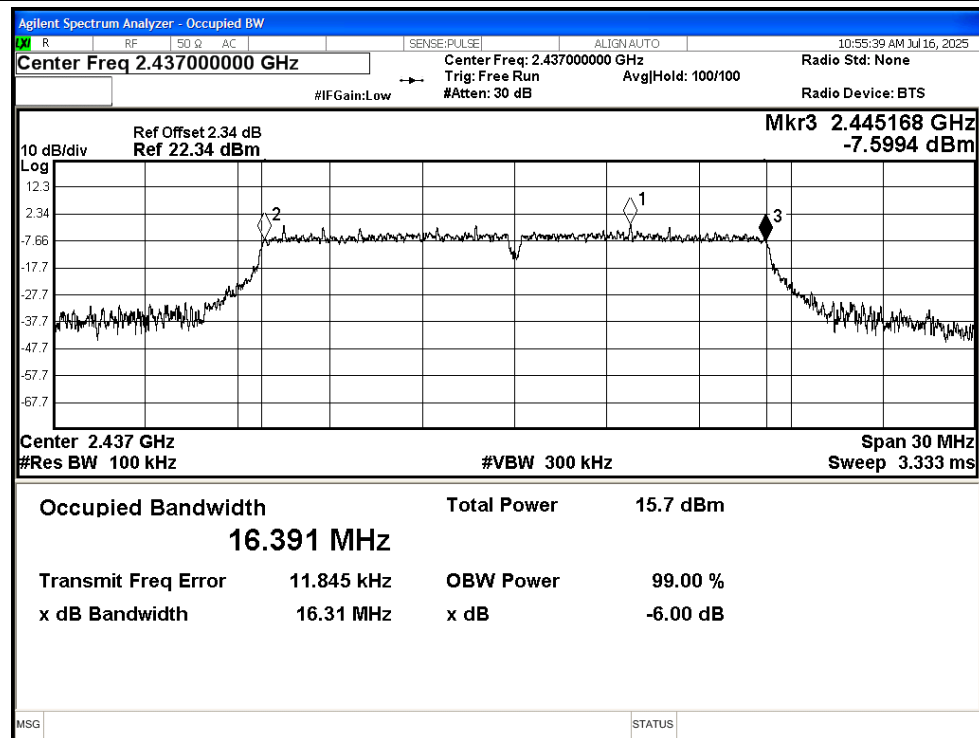
## -6dB Bandwidth NVNT b 2462MHz Ant1



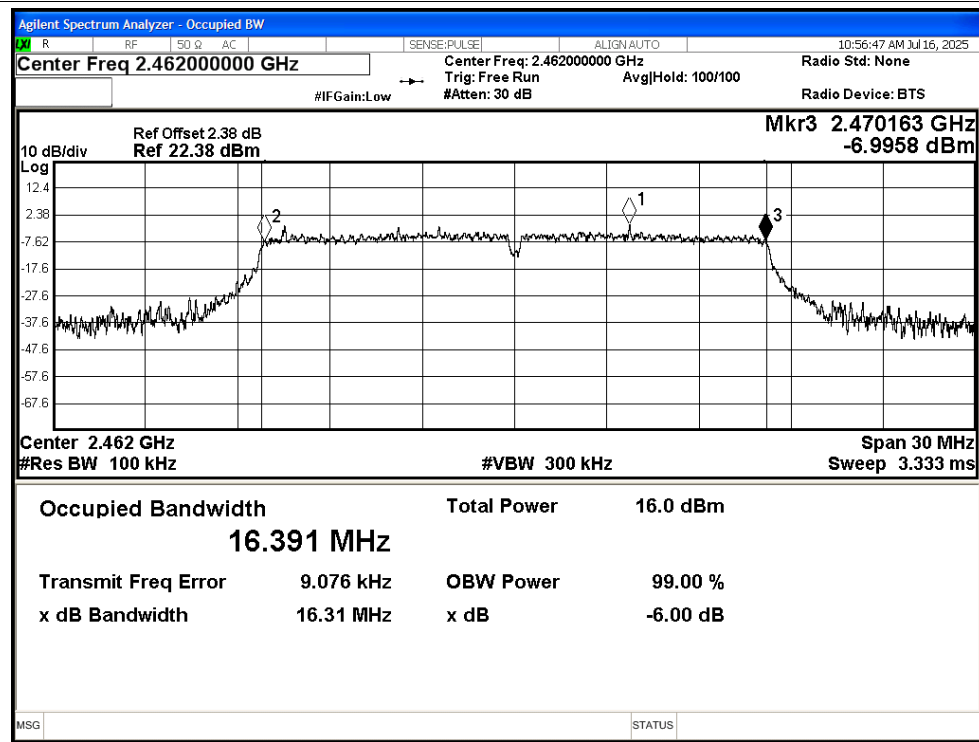
## -6dB Bandwidth NVNT g 2412MHz Ant1



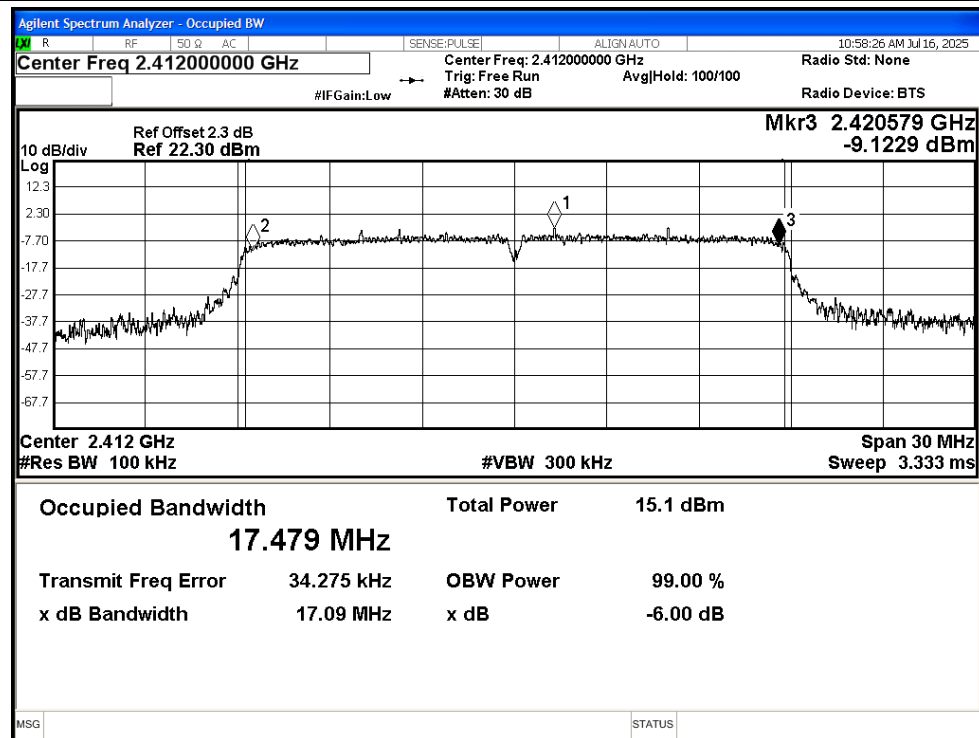
## -6dB Bandwidth NVNT g 2437MHz Ant1



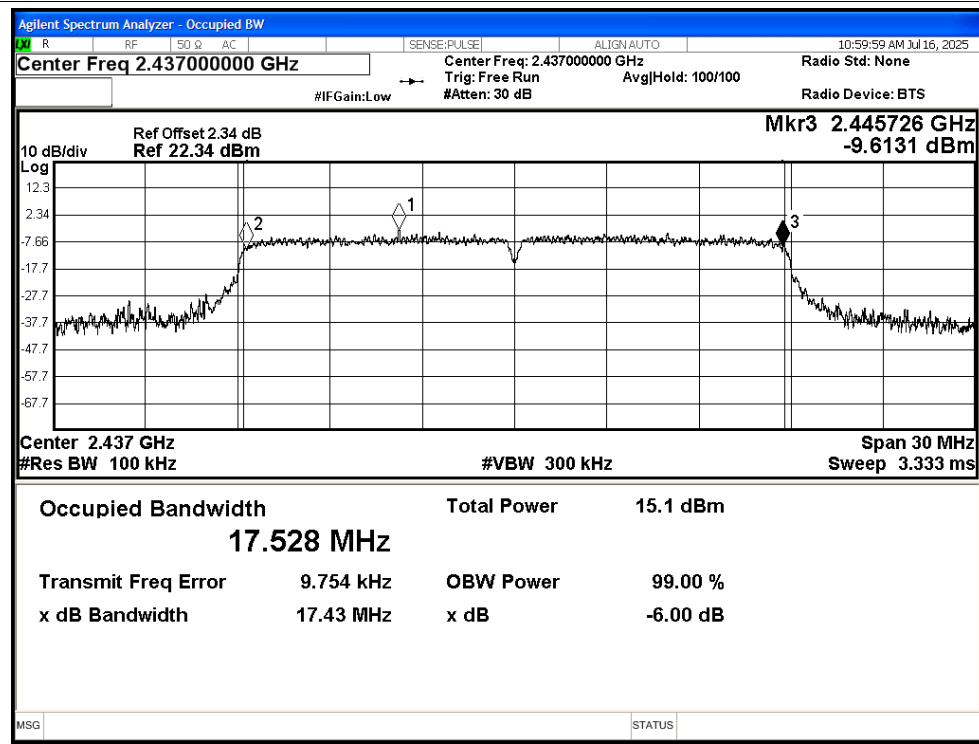
## -6dB Bandwidth NVNT g 2462MHz Ant1



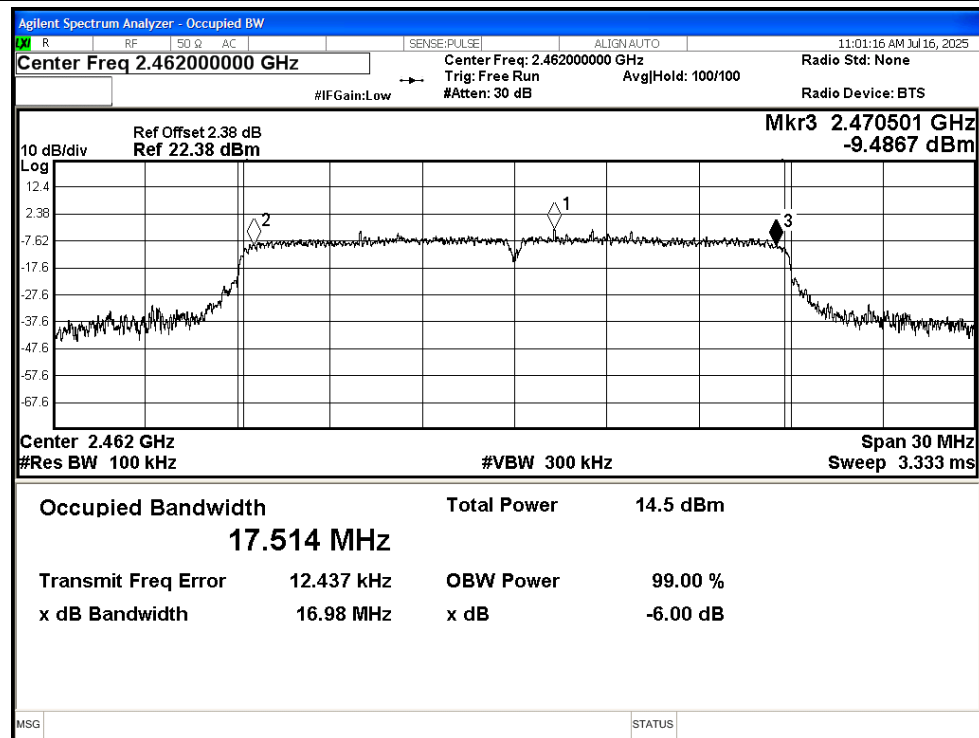
## -6dB Bandwidth NVNT n20 2412MHz Ant1



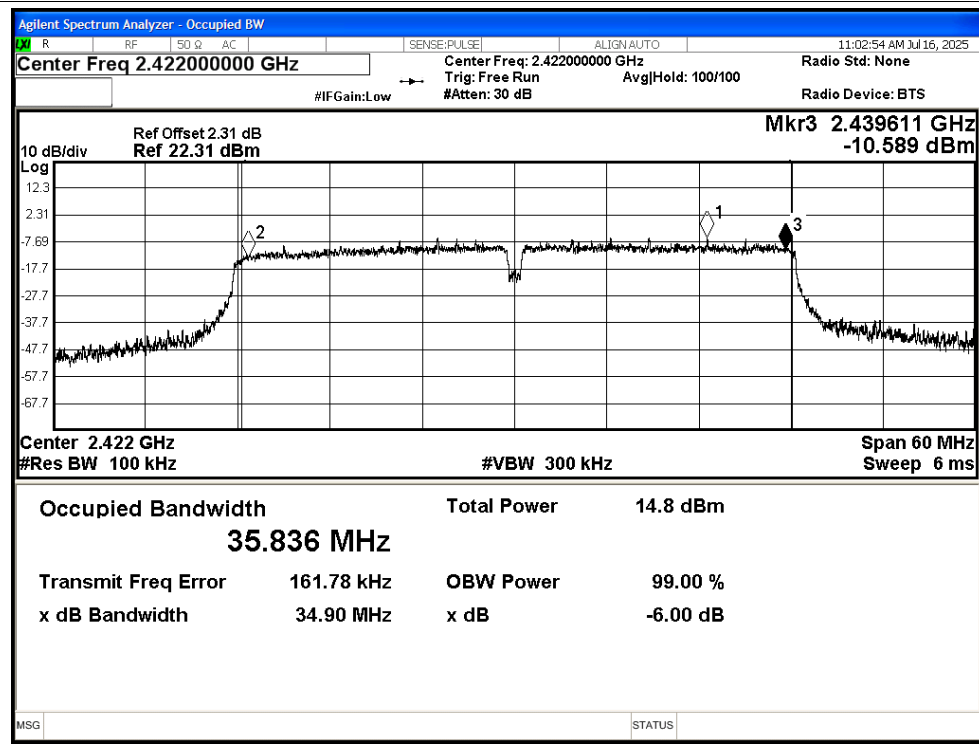
## -6dB Bandwidth NVNT n20 2437MHz Ant1



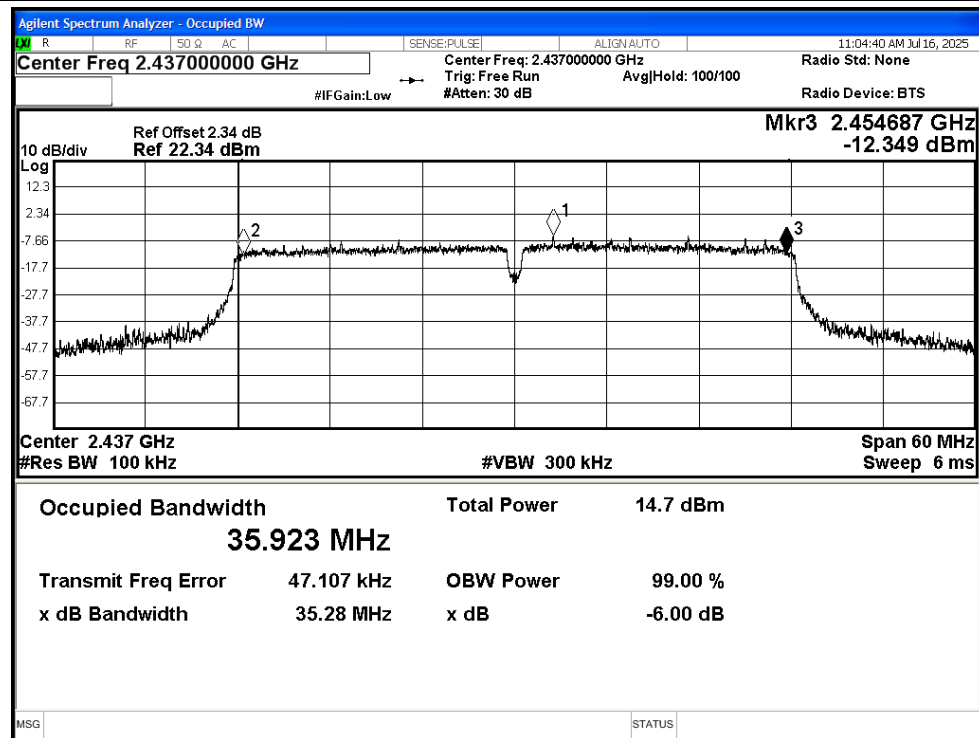
## -6dB Bandwidth NVNT n20 2462MHz Ant1



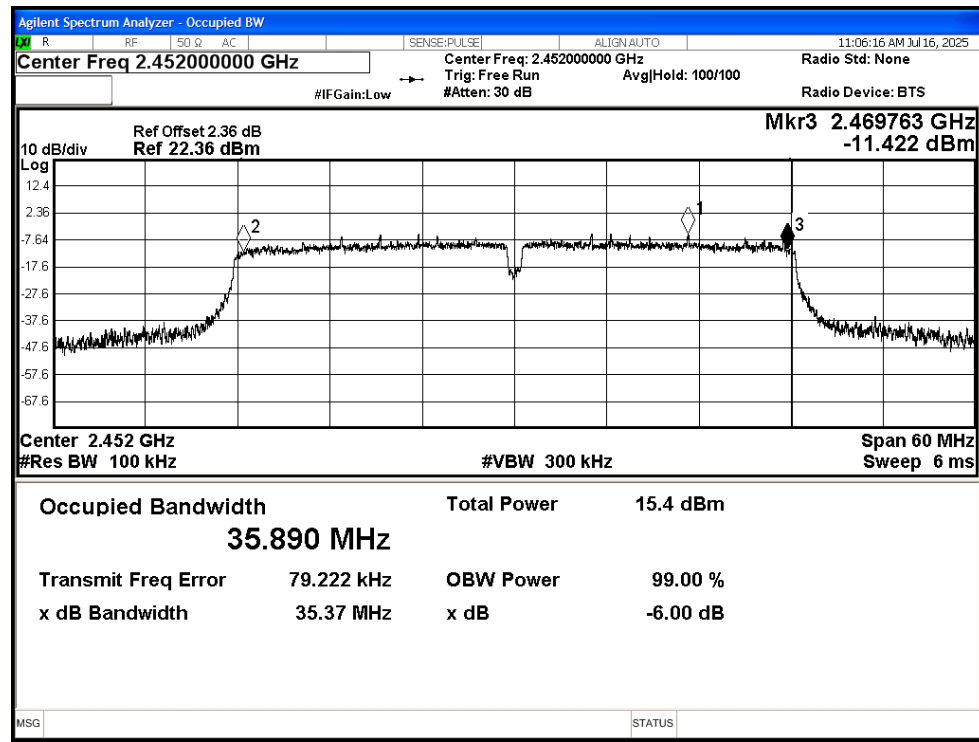
## -6dB Bandwidth NVNT n40 2422MHz Ant1



## -6dB Bandwidth NVNT n40 2437MHz Ant1



## -6dB Bandwidth NVNT n40 2452MHz Ant1



## A.2 Maximum Peak Conducted Output Power

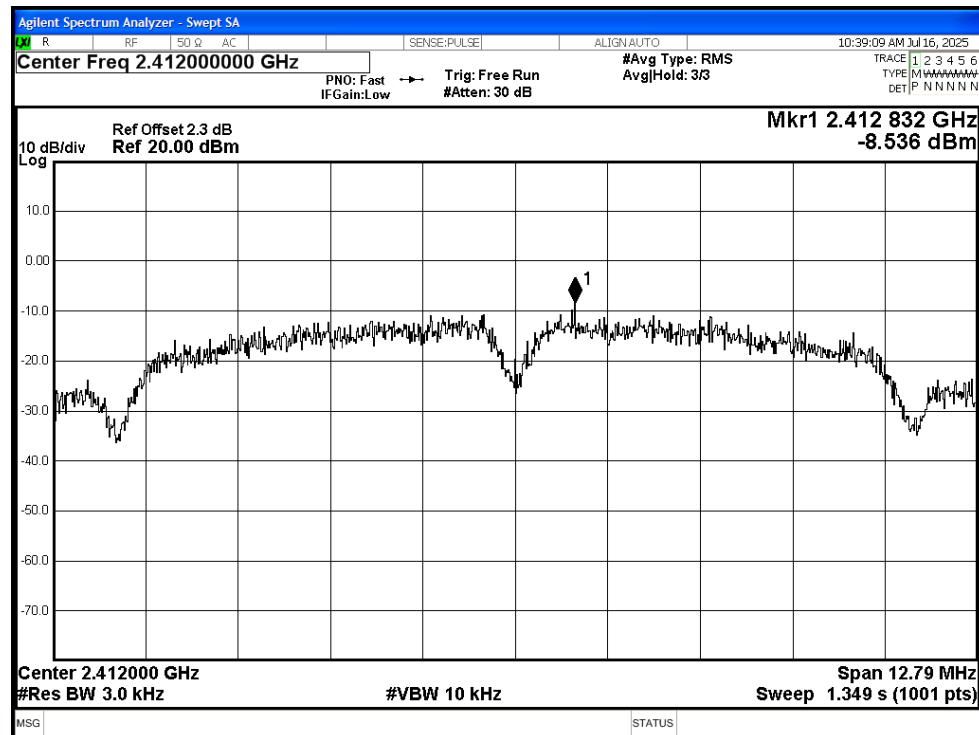
| Condition | Mode | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-------------|---------|
| NVNT      | b    | 2412            | Ant1    | 14.74                 | 30          | Pass    |
| NVNT      | b    | 2437            | Ant1    | 14.07                 | 30          | Pass    |
| NVNT      | b    | 2462            | Ant1    | 14.37                 | 30          | Pass    |
| NVNT      | g    | 2412            | Ant1    | 14.29                 | 30          | Pass    |
| NVNT      | g    | 2437            | Ant1    | 14.49                 | 30          | Pass    |
| NVNT      | g    | 2462            | Ant1    | <b>14.83</b>          | 30          | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 13.67                 | 30          | Pass    |
| NVNT      | n20  | 2437            | Ant1    | 13.84                 | 30          | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 13.08                 | 30          | Pass    |
| NVNT      | n40  | 2422            | Ant1    | 13.29                 | 30          | Pass    |
| NVNT      | n40  | 2437            | Ant1    | 13.1                  | 30          | Pass    |
| NVNT      | n40  | 2452            | Ant1    | 13.92                 | 30          | Pass    |

### A.3 Maximum Power Spectral Density Level

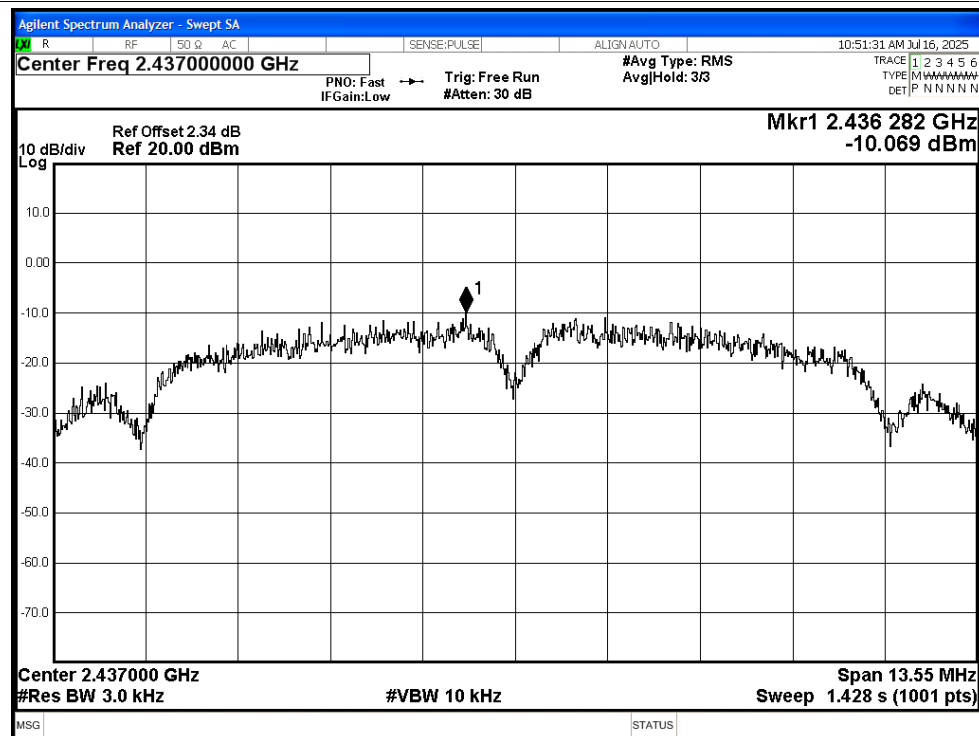
| Condition | Mode | Frequency (MHz) | Antenna | Conducted PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|-----------|------|-----------------|---------|--------------------------|------------------|---------|
| NVNT      | b    | 2412            | Ant1    | -8.54                    | 8                | Pass    |
| NVNT      | b    | 2437            | Ant1    | -10.07                   | 8                | Pass    |
| NVNT      | b    | 2462            | Ant1    | -9.35                    | 8                | Pass    |
| NVNT      | g    | 2412            | Ant1    | -16.73                   | 8                | Pass    |
| NVNT      | g    | 2437            | Ant1    | -16.16                   | 8                | Pass    |
| NVNT      | g    | 2462            | Ant1    | -15.75                   | 8                | Pass    |
| NVNT      | n20  | 2412            | Ant1    | -17.01                   | 8                | Pass    |
| NVNT      | n20  | 2437            | Ant1    | -16.83                   | 8                | Pass    |
| NVNT      | n20  | 2462            | Ant1    | -16.38                   | 8                | Pass    |
| NVNT      | n40  | 2422            | Ant1    | -20.31                   | 8                | Pass    |
| NVNT      | n40  | 2437            | Ant1    | -20.57                   | 8                | Pass    |
| NVNT      | n40  | 2452            | Ant1    | -19.7                    | 8                | Pass    |

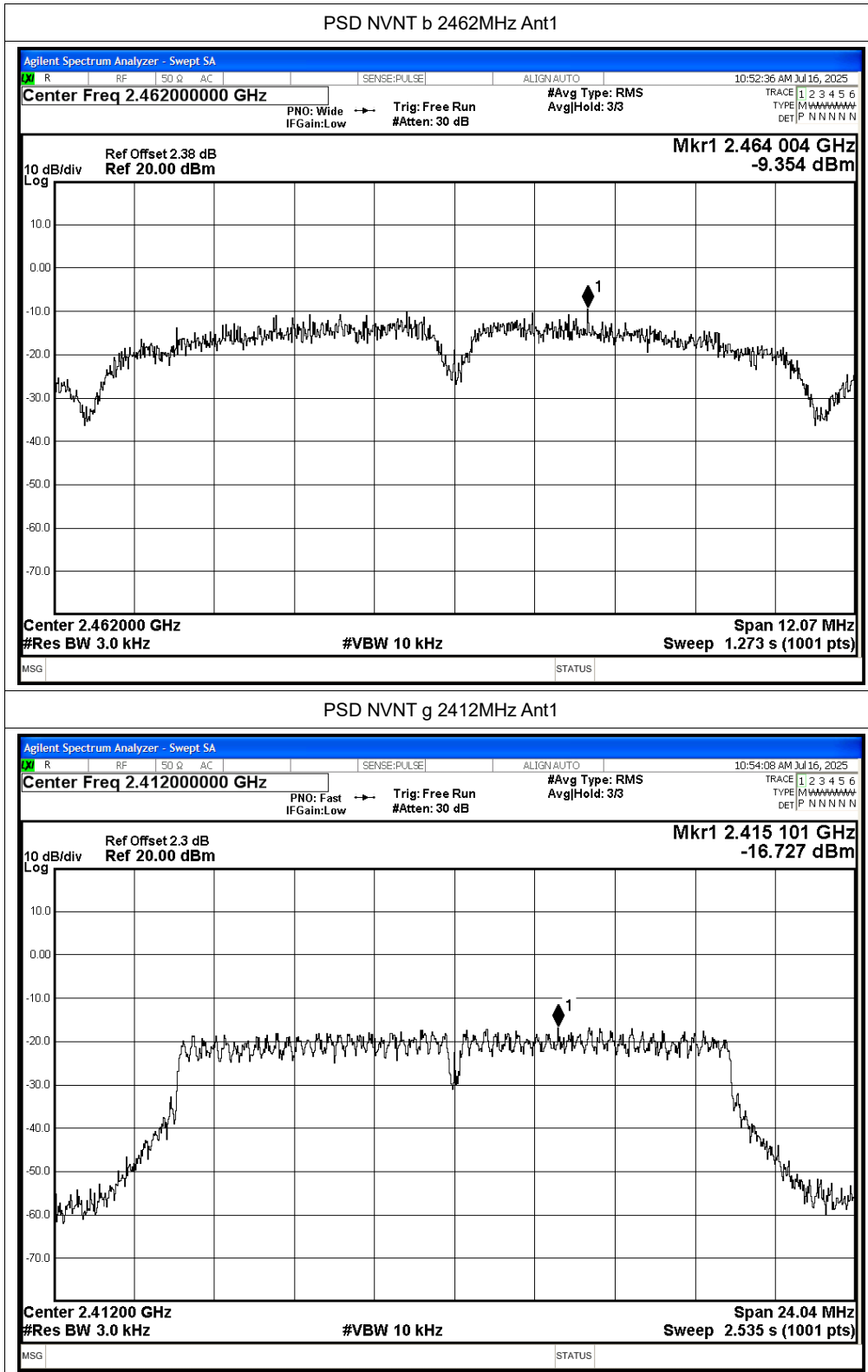
## Test Graphs

## PSD NVNT b 2412MHz Ant1

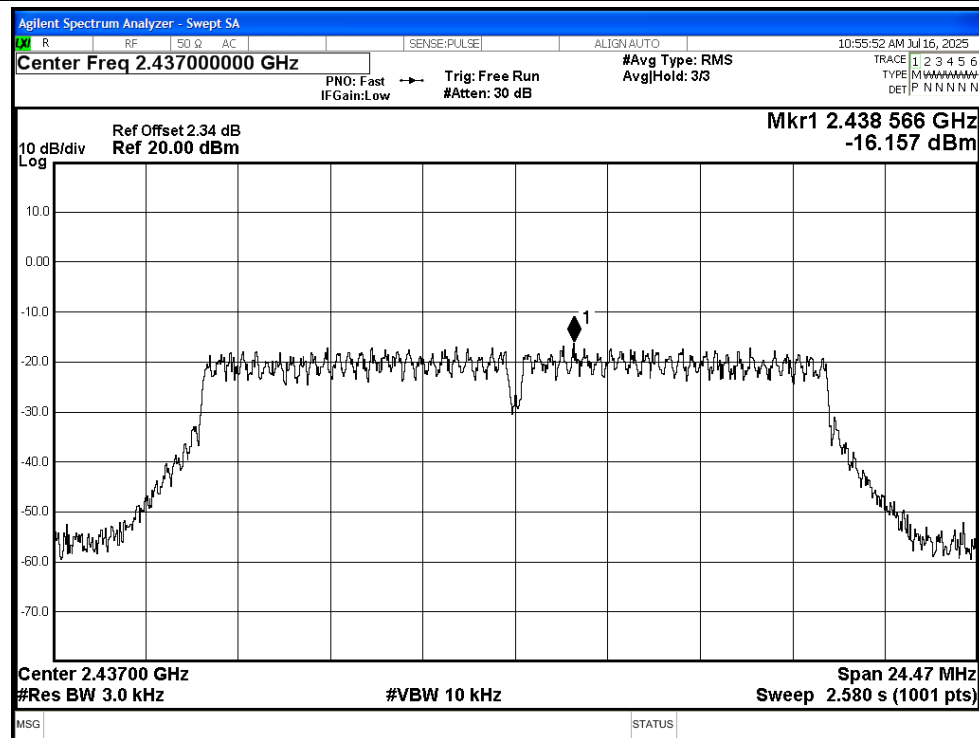


## PSD NVNT b 2437MHz Ant1

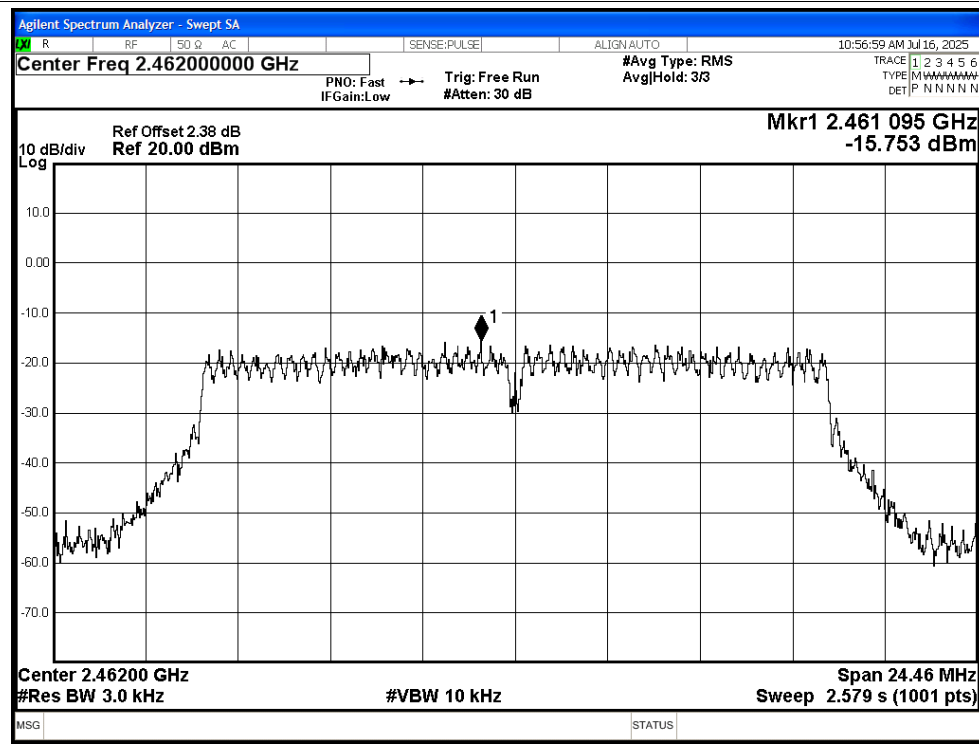


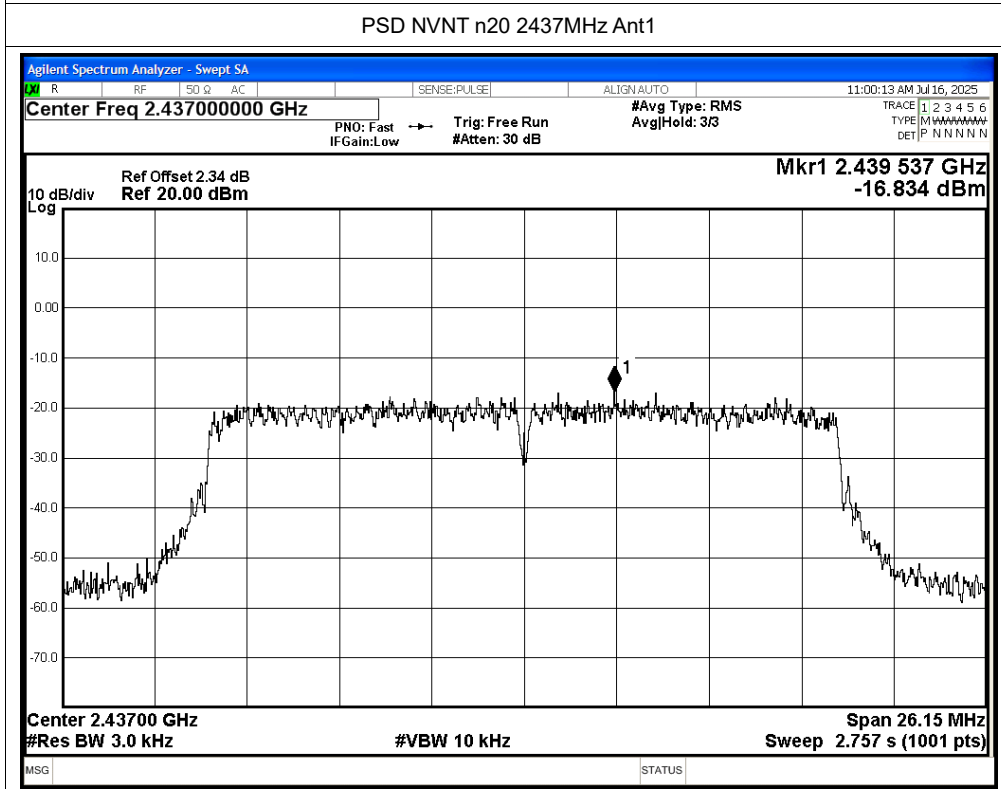
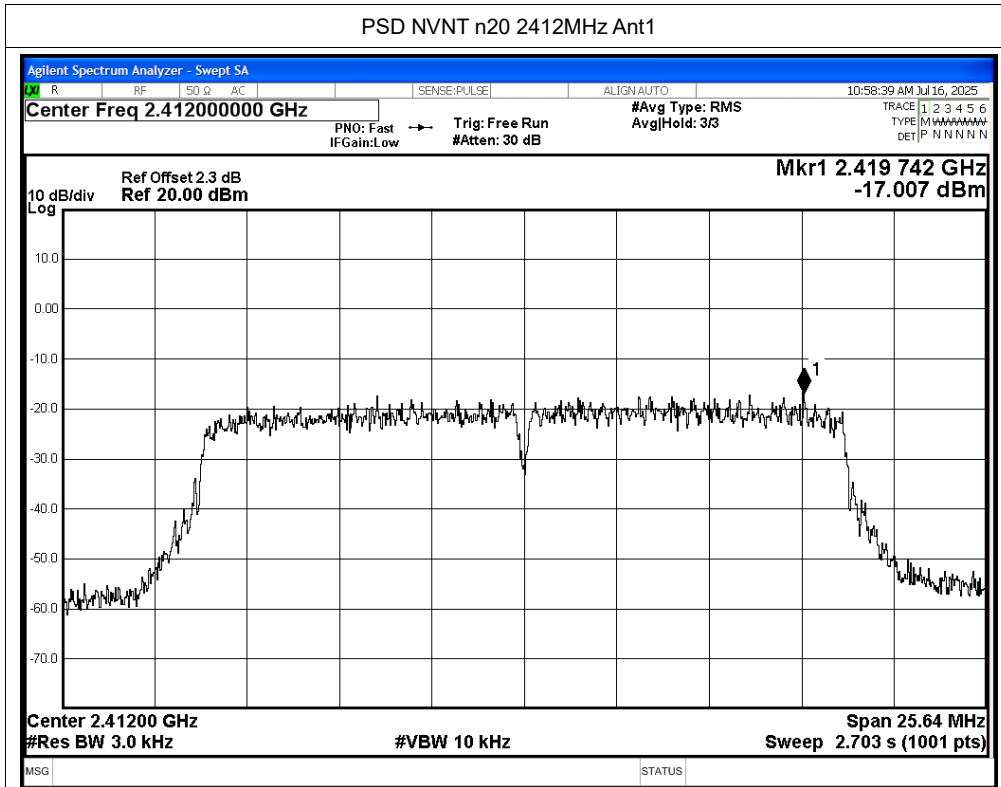


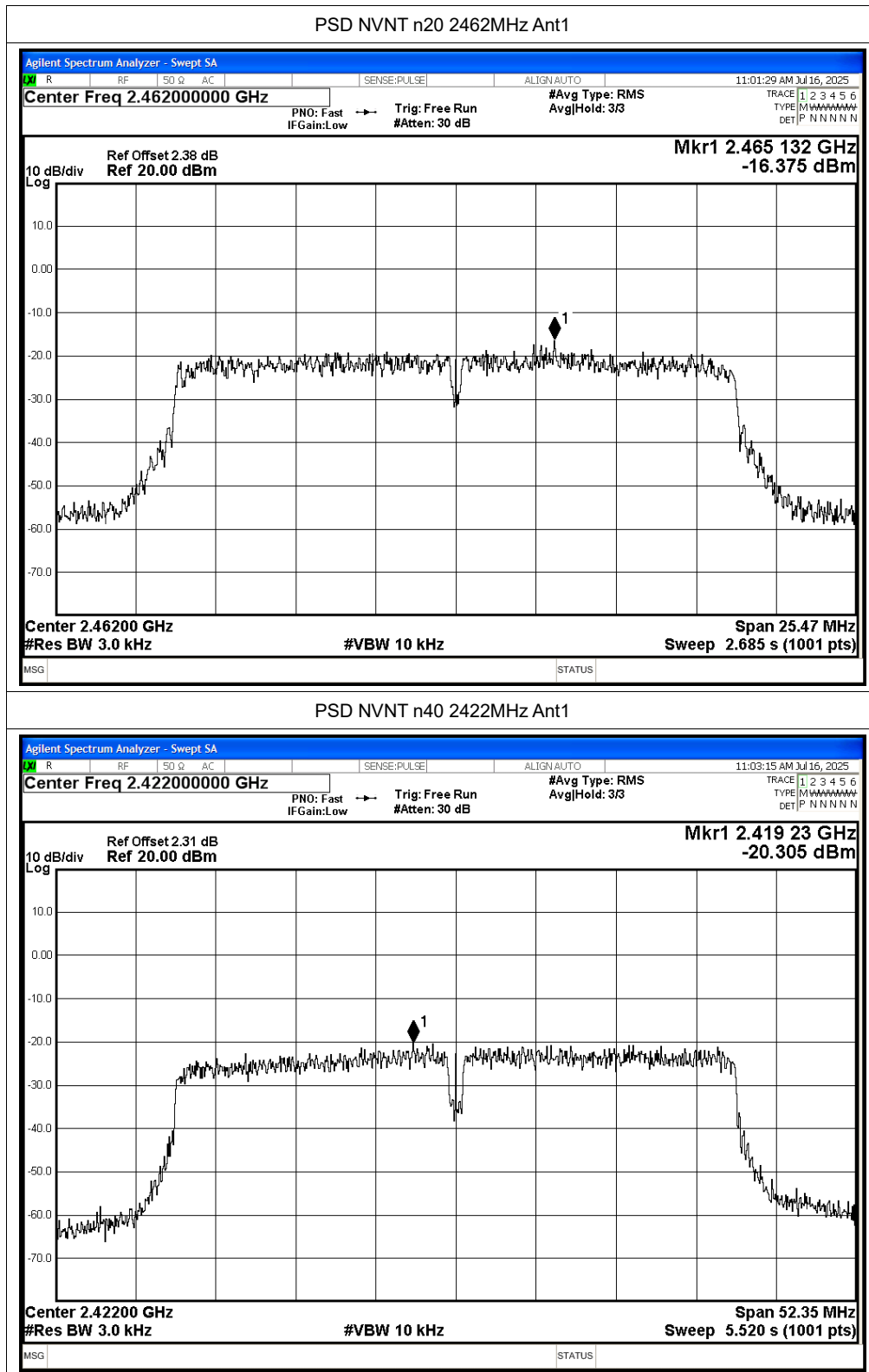
## PSD NVNT g 2437MHz Ant1

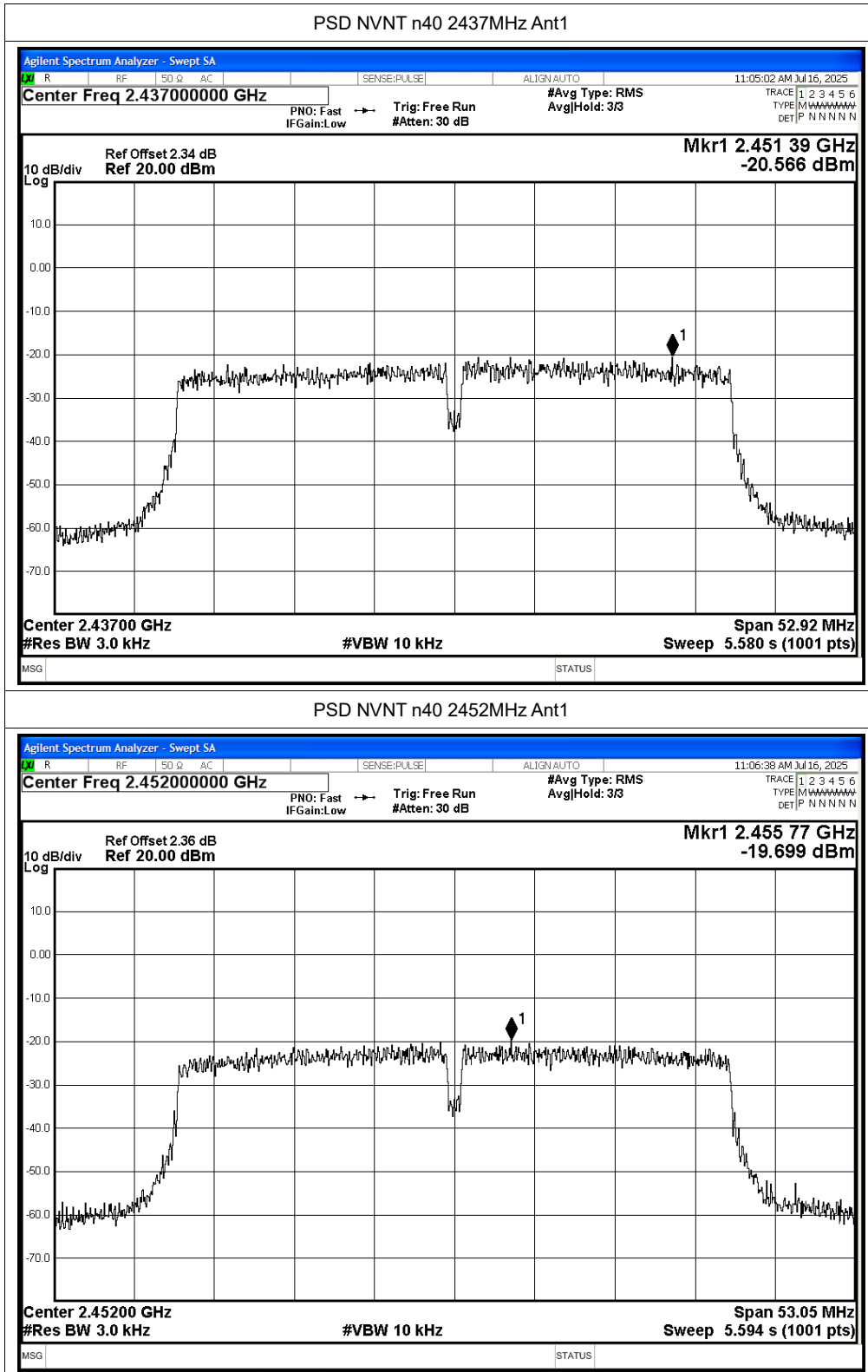


## PSD NVNT g 2462MHz Ant1









## A.4 Band Edge

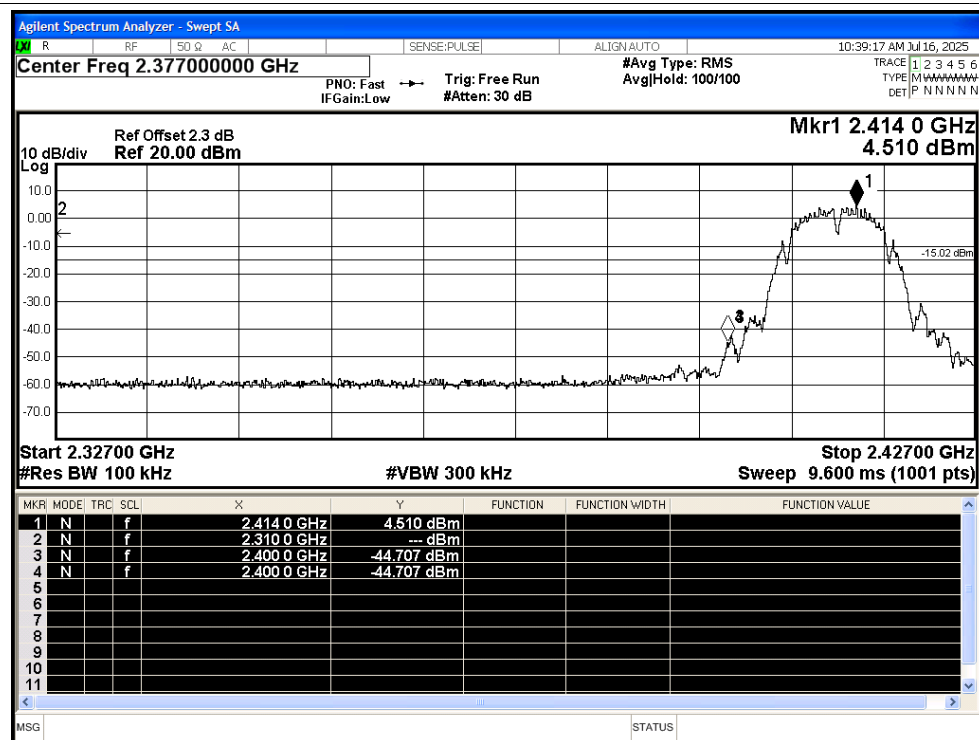
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | b    | 2412            | Ant1    | -49.69          | -20         | Pass    |
| NVNT      | b    | 2462            | Ant1    | -57.86          | -20         | Pass    |
| NVNT      | g    | 2412            | Ant1    | -32.32          | -20         | Pass    |
| NVNT      | g    | 2462            | Ant1    | -45.18          | -20         | Pass    |
| NVNT      | n20  | 2412            | Ant1    | -30.07          | -20         | Pass    |
| NVNT      | n20  | 2462            | Ant1    | -41.84          | -20         | Pass    |
| NVNT      | n40  | 2422            | Ant1    | -33.93          | -20         | Pass    |
| NVNT      | n40  | 2452            | Ant1    | -39             | -20         | Pass    |

## Test Graphs

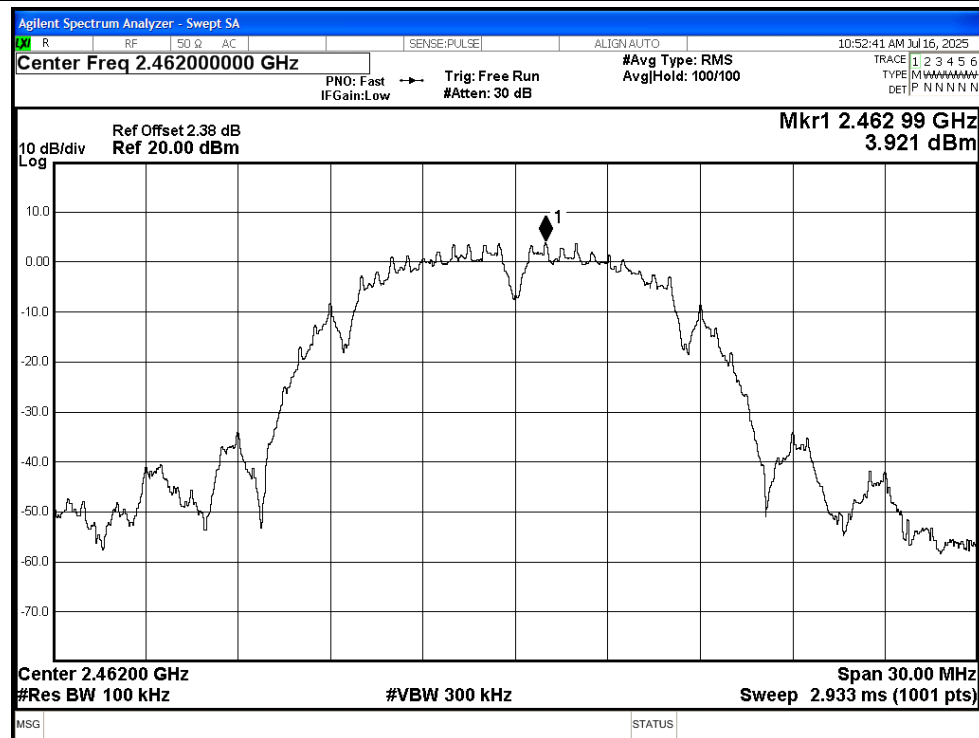
## Band Edge NVNT b 2412MHz Ant1 Ref



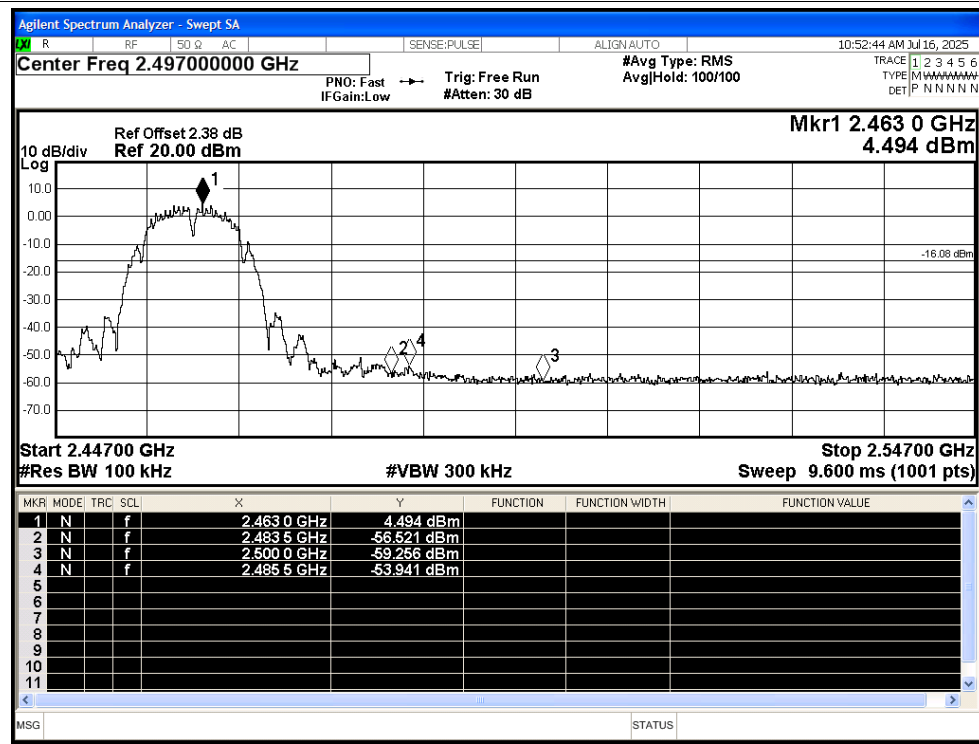
## Band Edge NVNT b 2412MHz Ant1 Emission



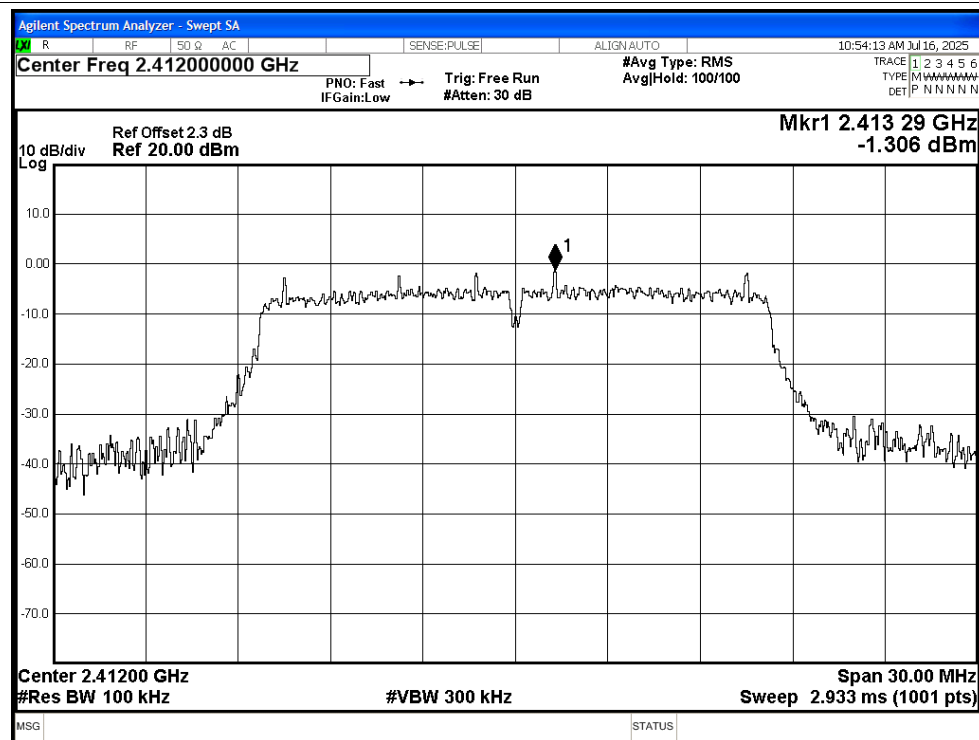
## Band Edge NVNT b 2462MHz Ant1 Ref



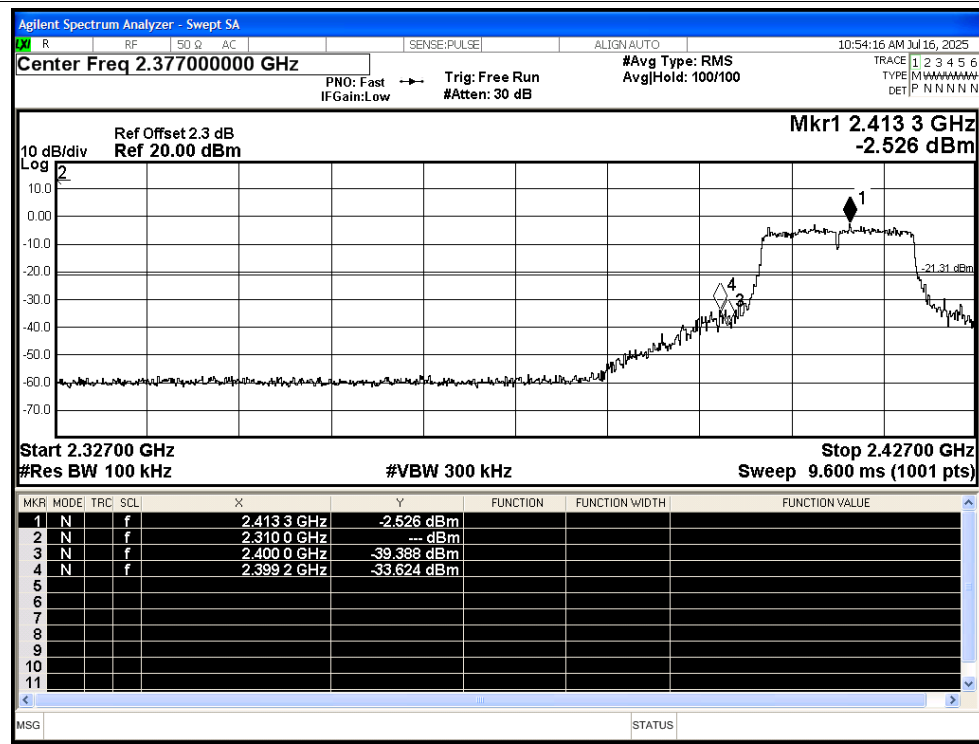
## Band Edge NVNT b 2462MHz Ant1 Emission



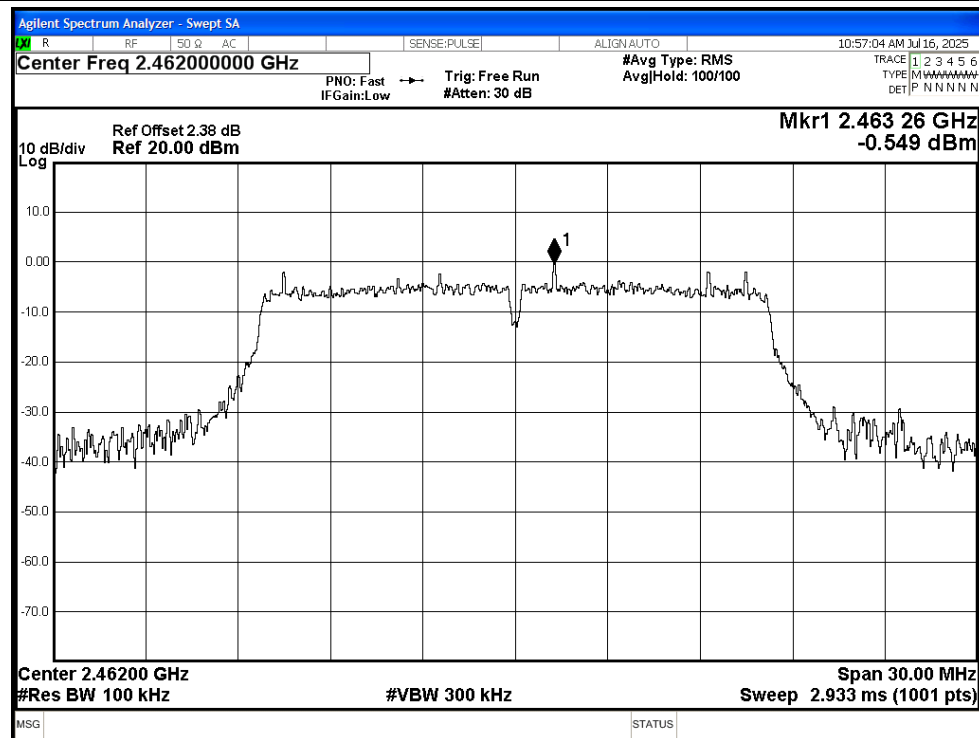
## Band Edge NVNT g 2412MHz Ant1 Ref



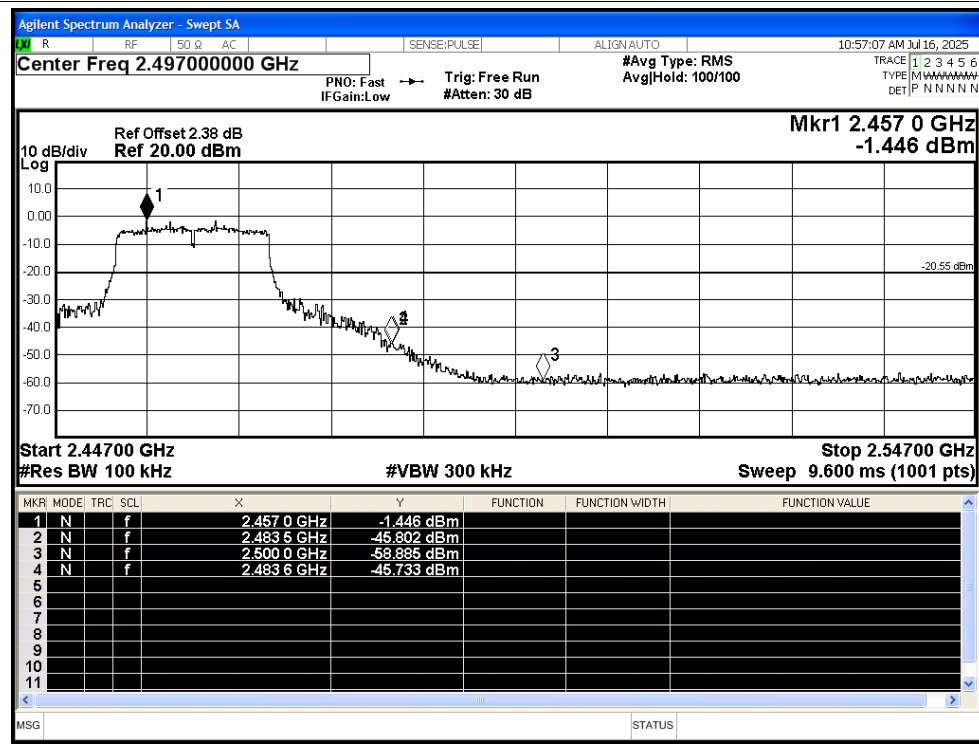
## Band Edge NVNT g 2412MHz Ant1 Emission



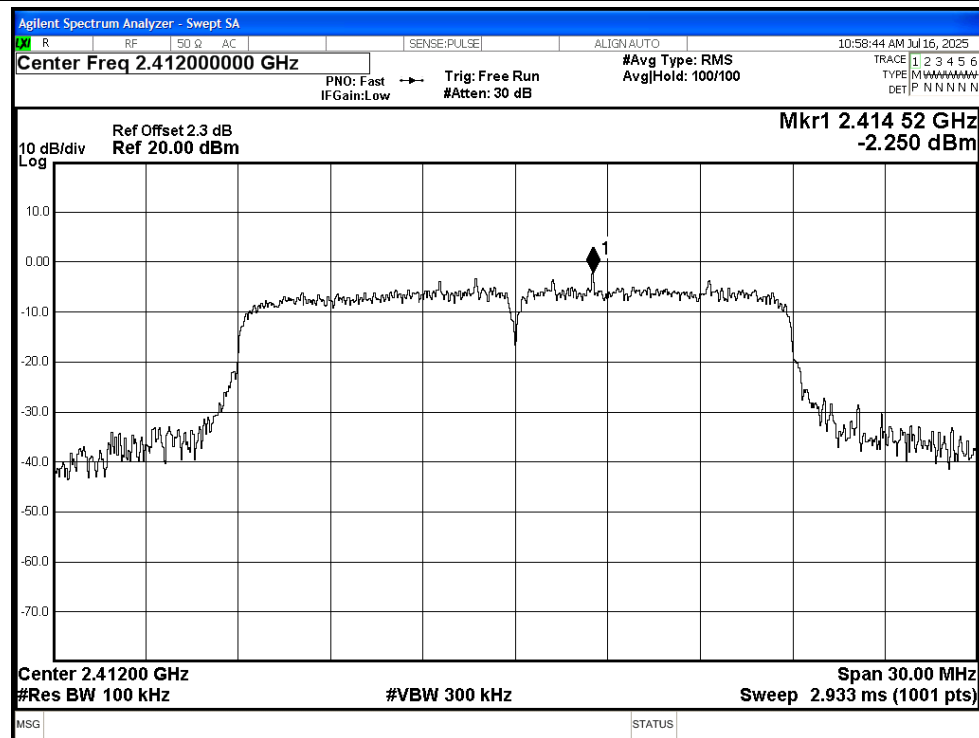
## Band Edge NVNT g 2462MHz Ant1 Ref



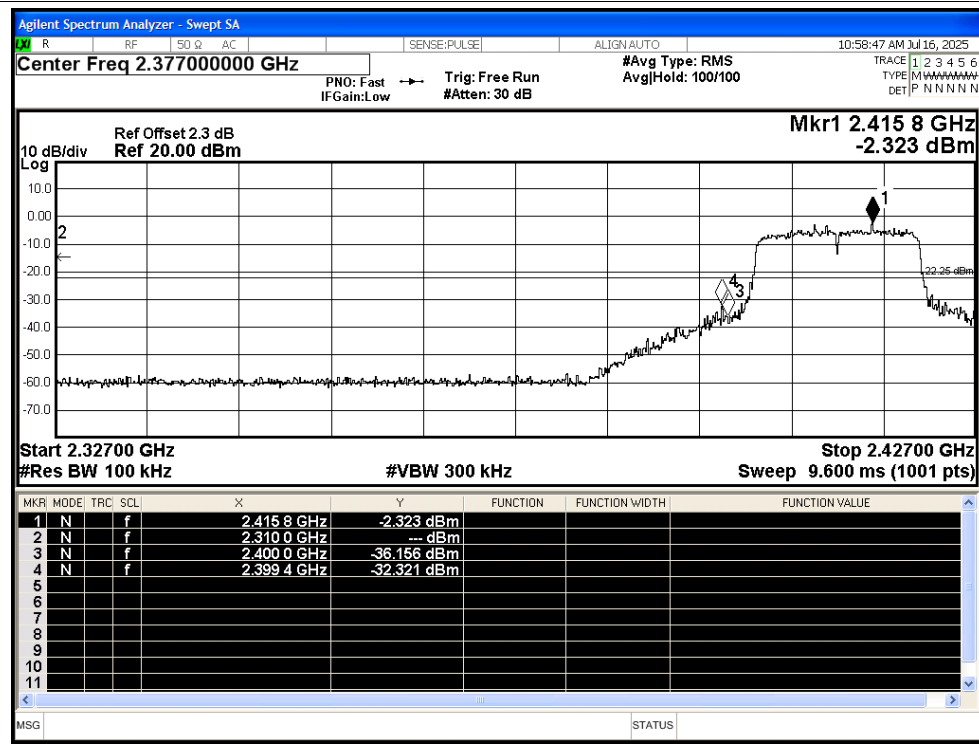
## Band Edge NVNT g 2462MHz Ant1 Emission



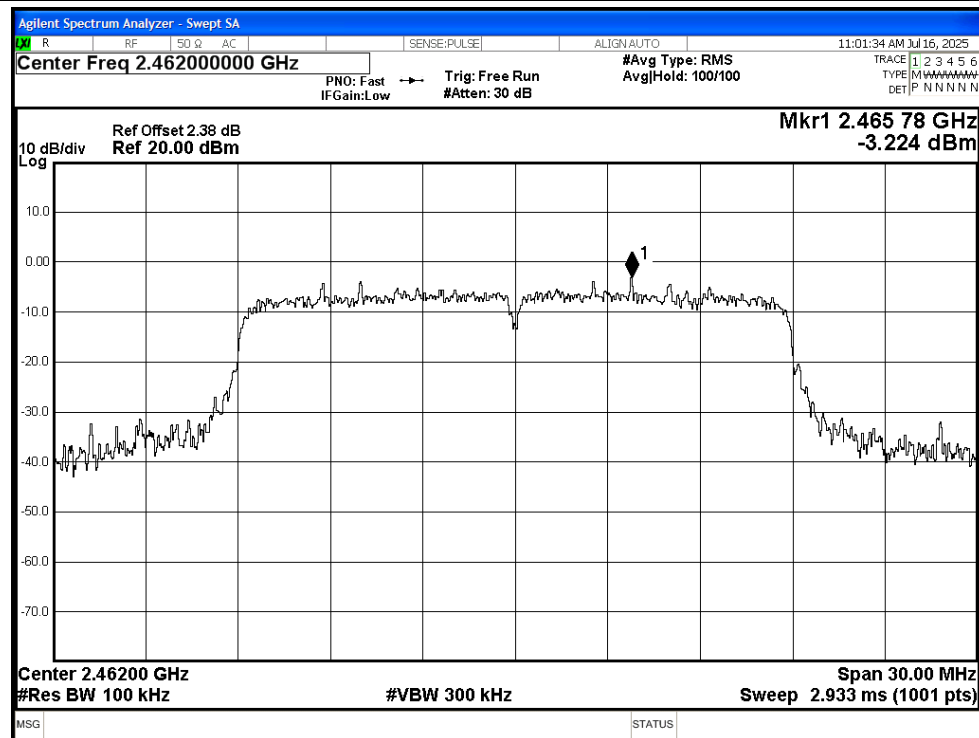
## Band Edge NVNT n20 2412MHz Ant1 Ref



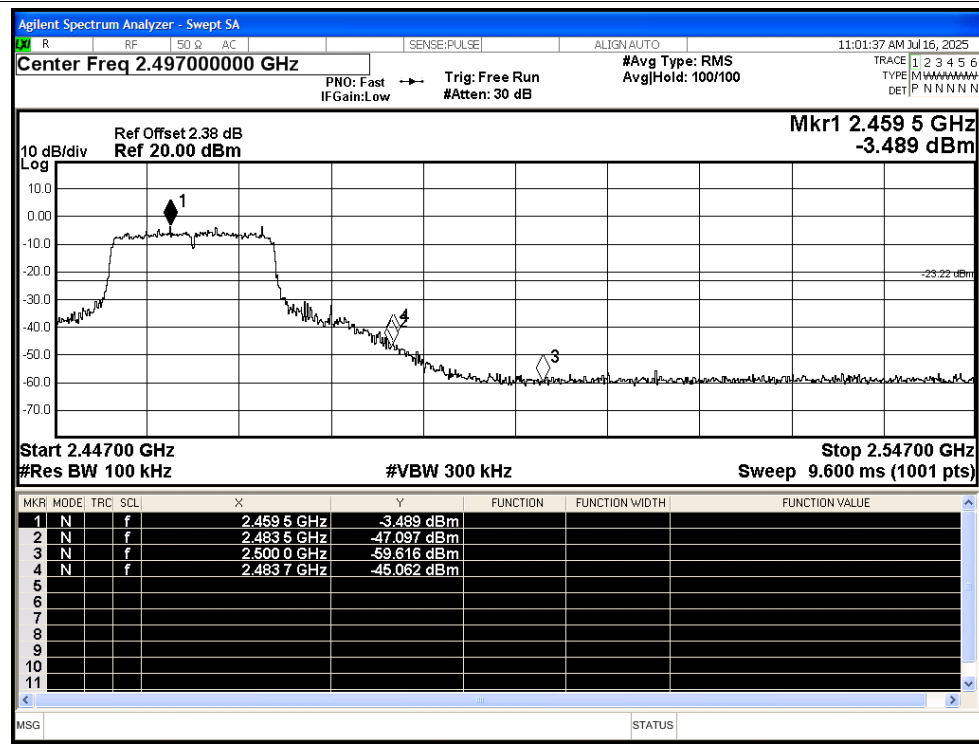
## Band Edge NVNT n20 2412MHz Ant1 Emission



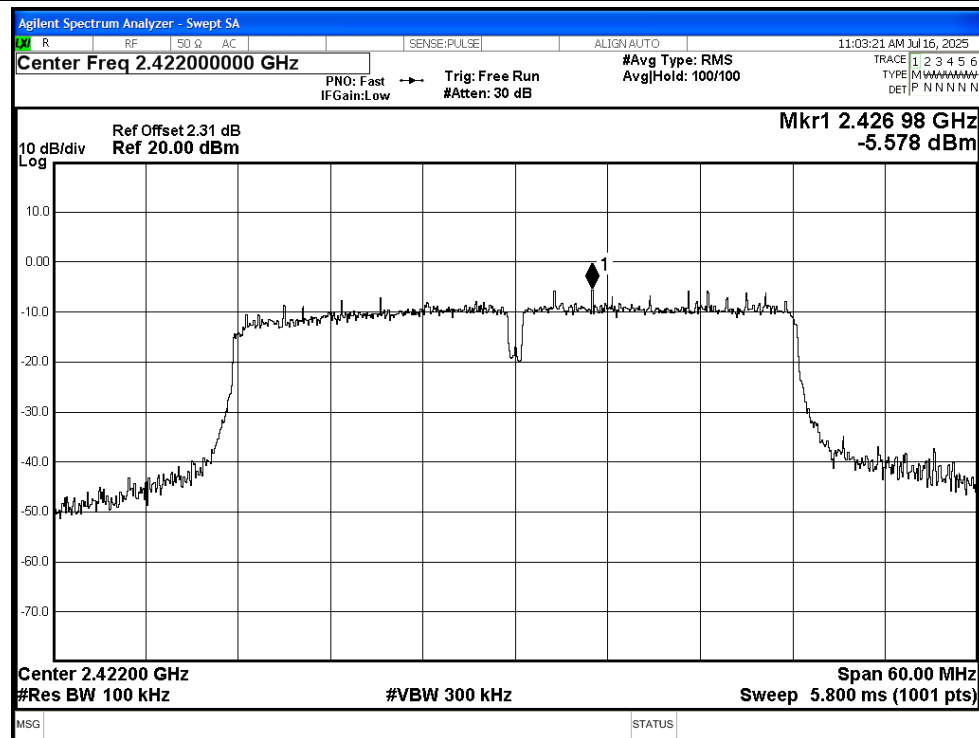
## Band Edge NVNT n20 2462MHz Ant1 Ref



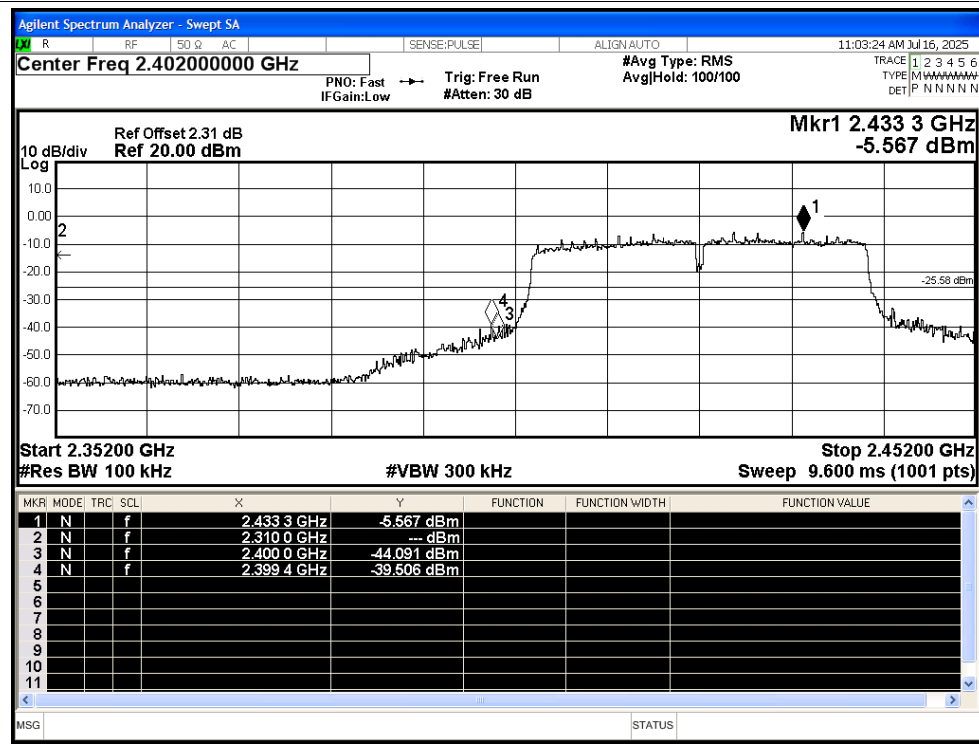
## Band Edge NVNT n20 2462MHz Ant1 Emission



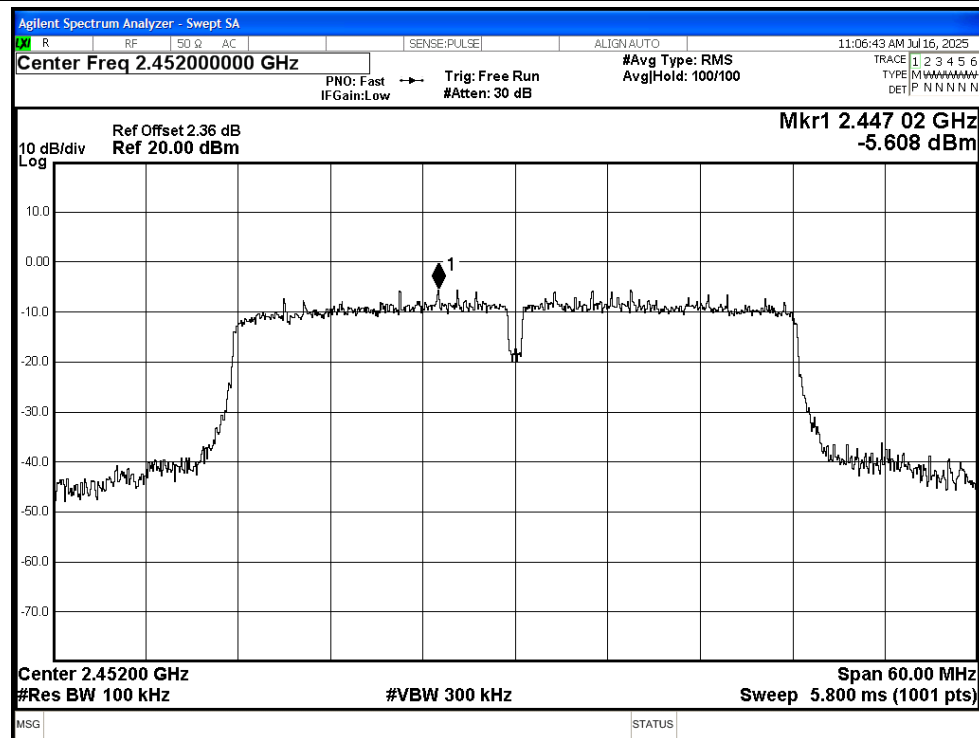
## Band Edge NVNT n40 2422MHz Ant1 Ref



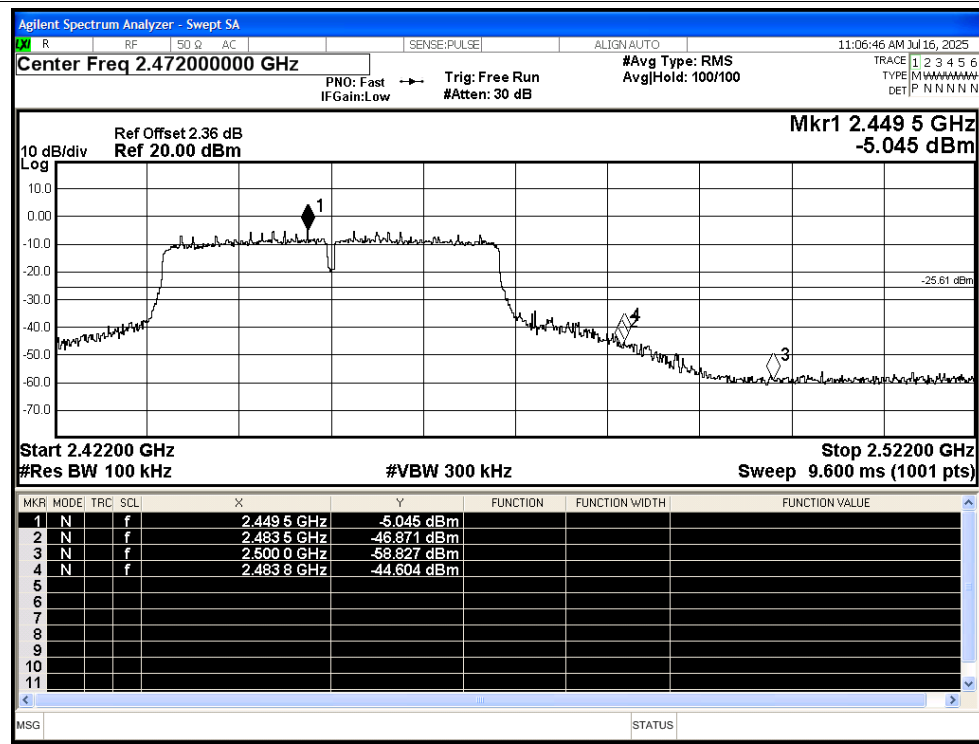
## Band Edge NVNT n40 2422MHz Ant1 Emission



## Band Edge NVNT n40 2452MHz Ant1 Ref



## Band Edge NVNT n40 2452MHz Ant1 Emission

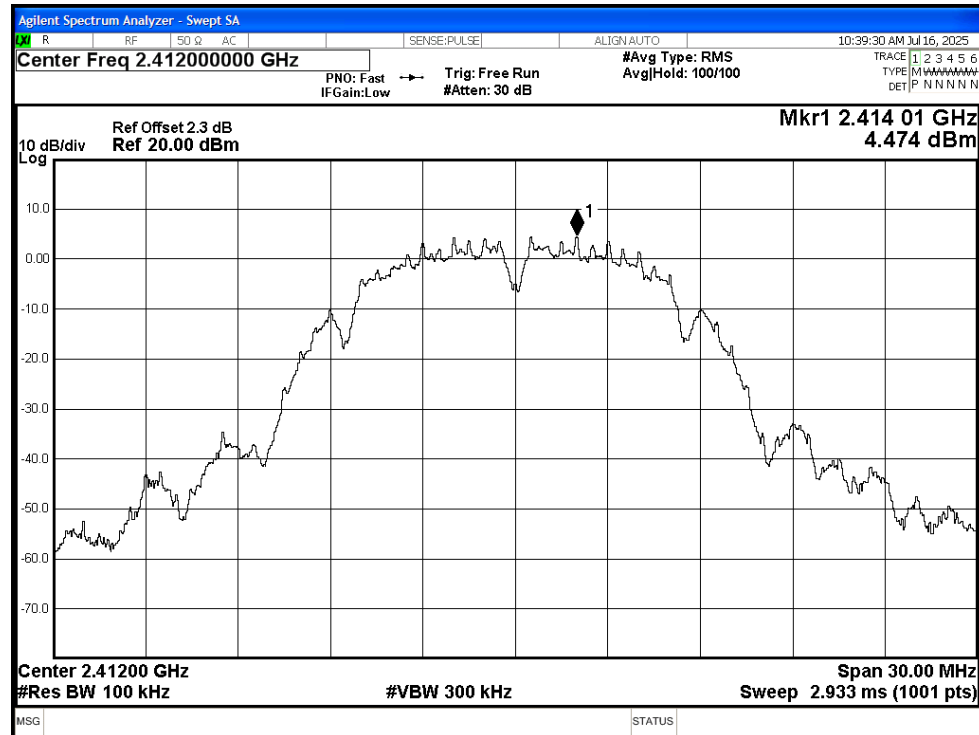


## A.5 Conducted RF Spurious Emission

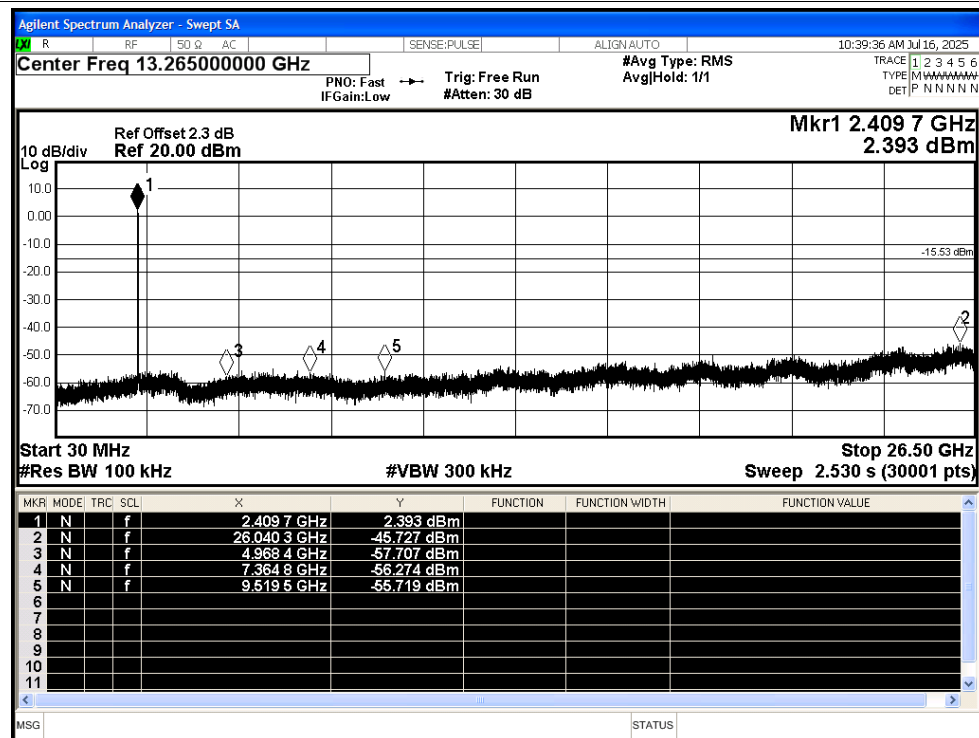
| Condition | Mode | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | b    | 2412            | Ant1    | -50.2           | -20         | Pass    |
| NVNT      | b    | 2437            | Ant1    | -50.11          | -20         | Pass    |
| NVNT      | b    | 2462            | Ant1    | -50.2           | -20         | Pass    |
| NVNT      | g    | 2412            | Ant1    | -43.64          | -20         | Pass    |
| NVNT      | g    | 2437            | Ant1    | -43.98          | -20         | Pass    |
| NVNT      | g    | 2462            | Ant1    | -45.22          | -20         | Pass    |
| NVNT      | n20  | 2412            | Ant1    | -43.46          | -20         | Pass    |
| NVNT      | n20  | 2437            | Ant1    | -43.72          | -20         | Pass    |
| NVNT      | n20  | 2462            | Ant1    | -42.73          | -20         | Pass    |
| NVNT      | n40  | 2422            | Ant1    | -39.6           | -20         | Pass    |
| NVNT      | n40  | 2437            | Ant1    | -40.16          | -20         | Pass    |
| NVNT      | n40  | 2452            | Ant1    | -41.03          | -20         | Pass    |

## Test Graphs

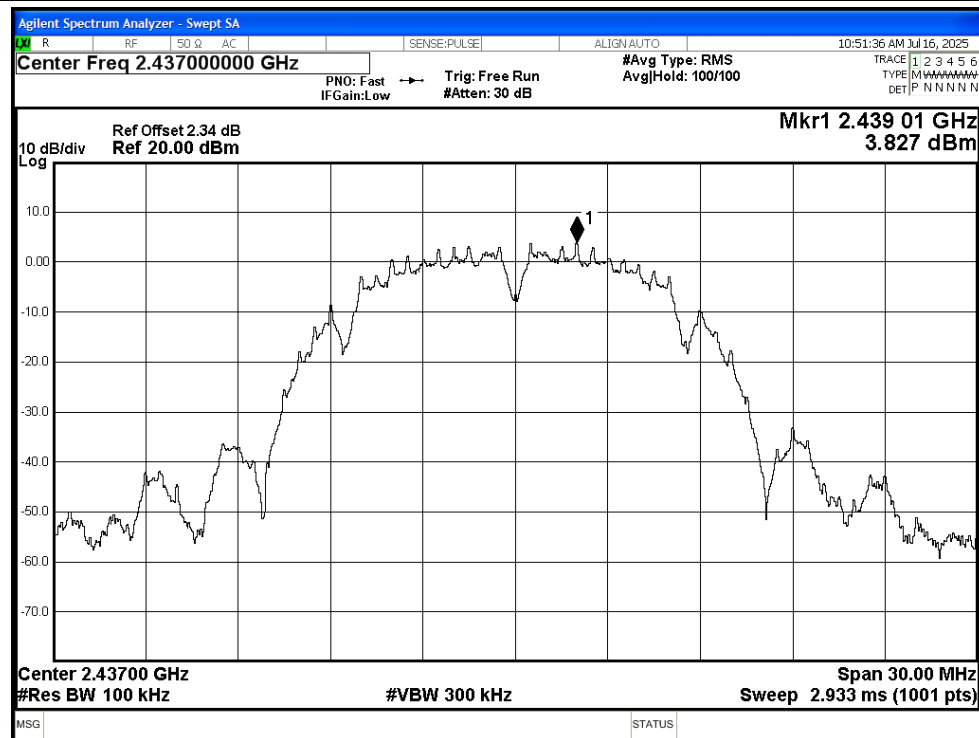
## Tx. Spurious NVNT b 2412MHz Ant1 Ref



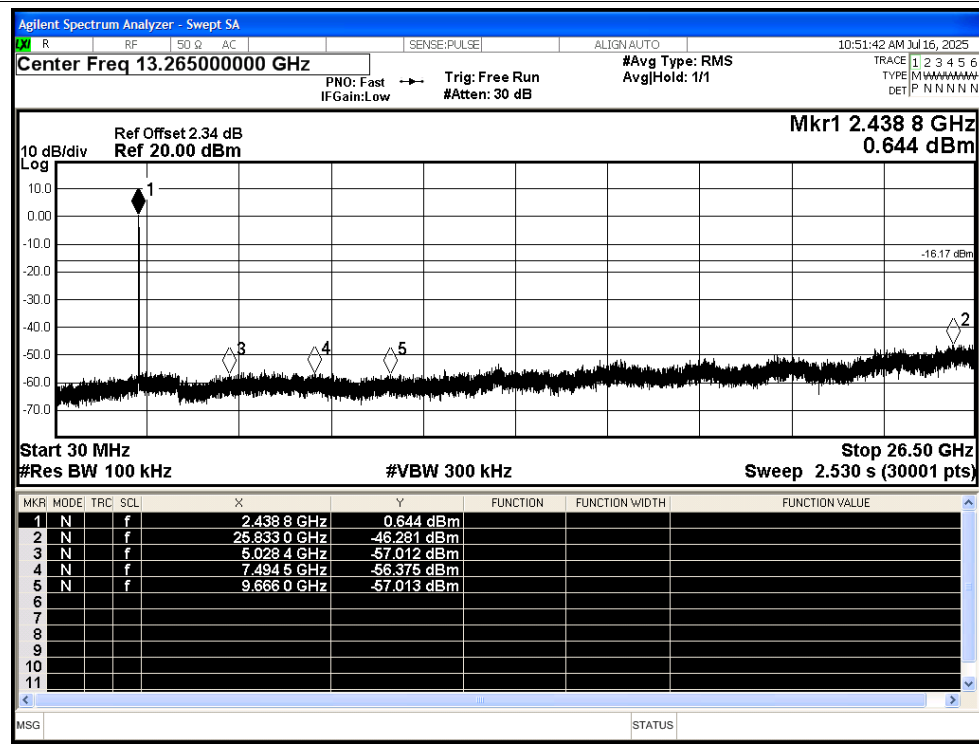
## Tx. Spurious NVNT b 2412MHz Ant1 Emission



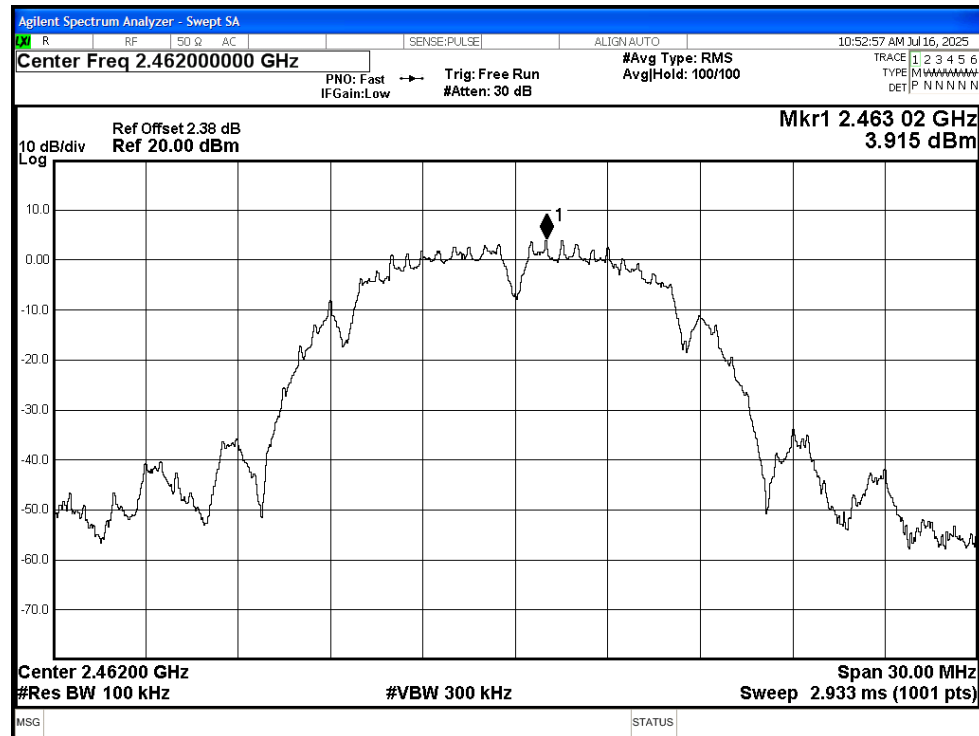
## Tx. Spurious NVNT b 2437MHz Ant1 Ref



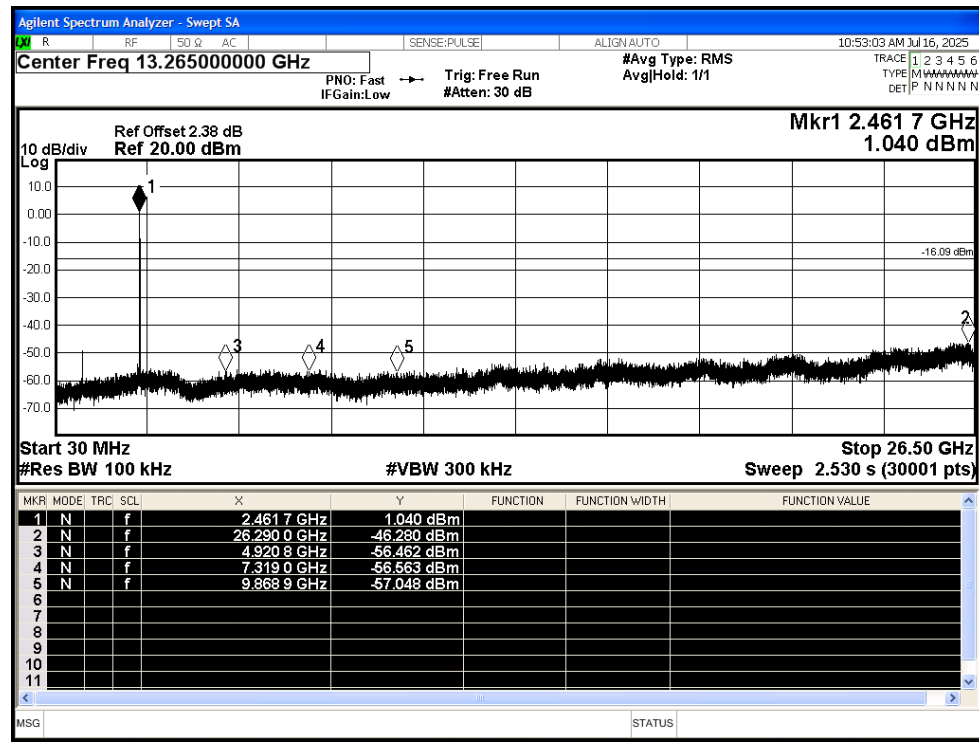
## Tx. Spurious NVNT b 2437MHz Ant1 Emission



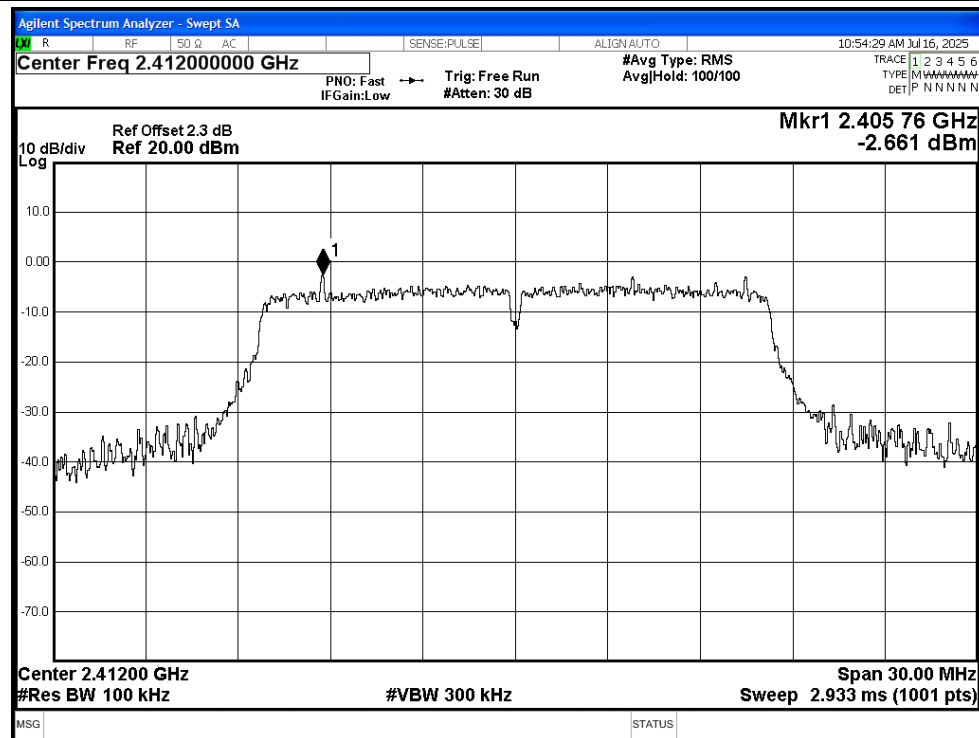
## Tx. Spurious NVNT b 2462MHz Ant1 Ref



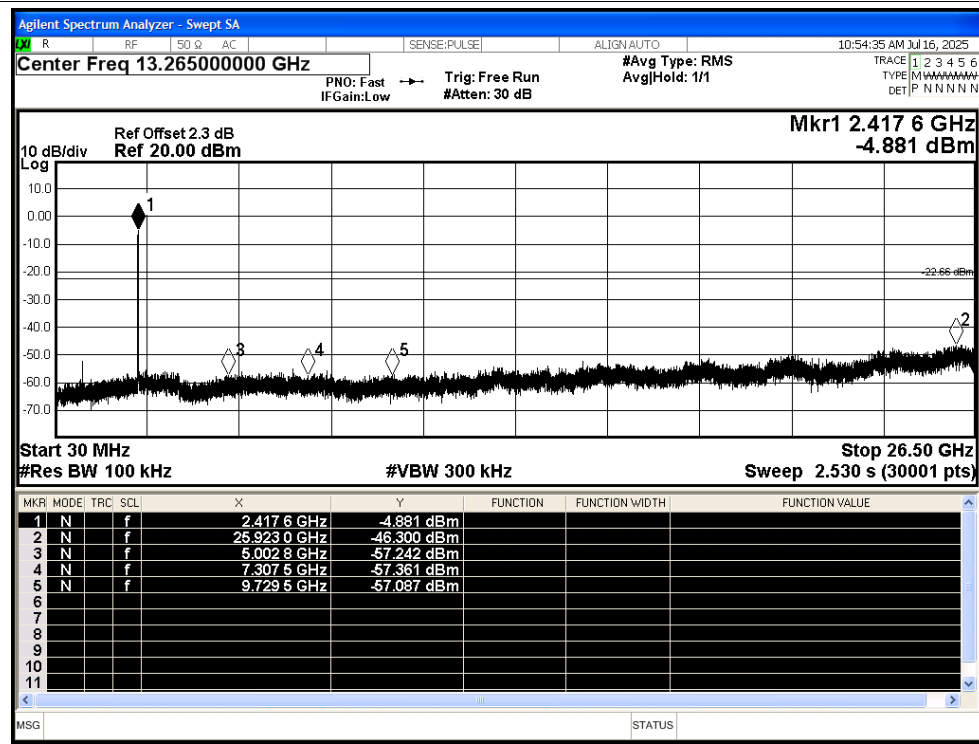
## Tx. Spurious NVNT b 2462MHz Ant1 Emission



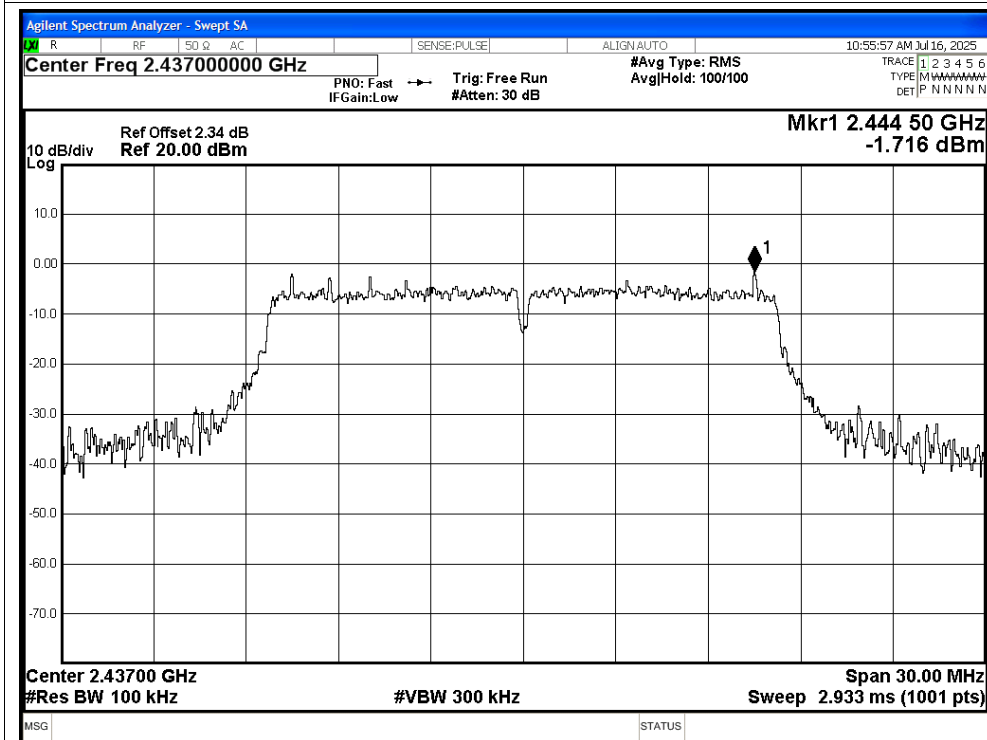
## Tx. Spurious NVNT g 2412MHz Ant1 Ref



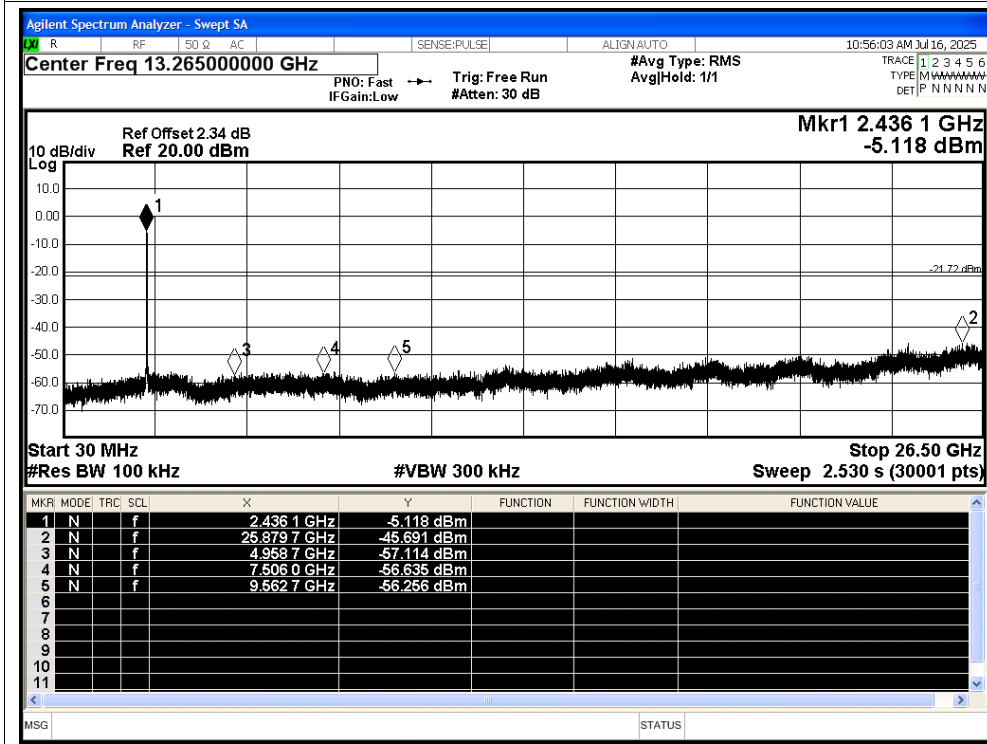
## Tx. Spurious NVNT g 2412MHz Ant1 Emission



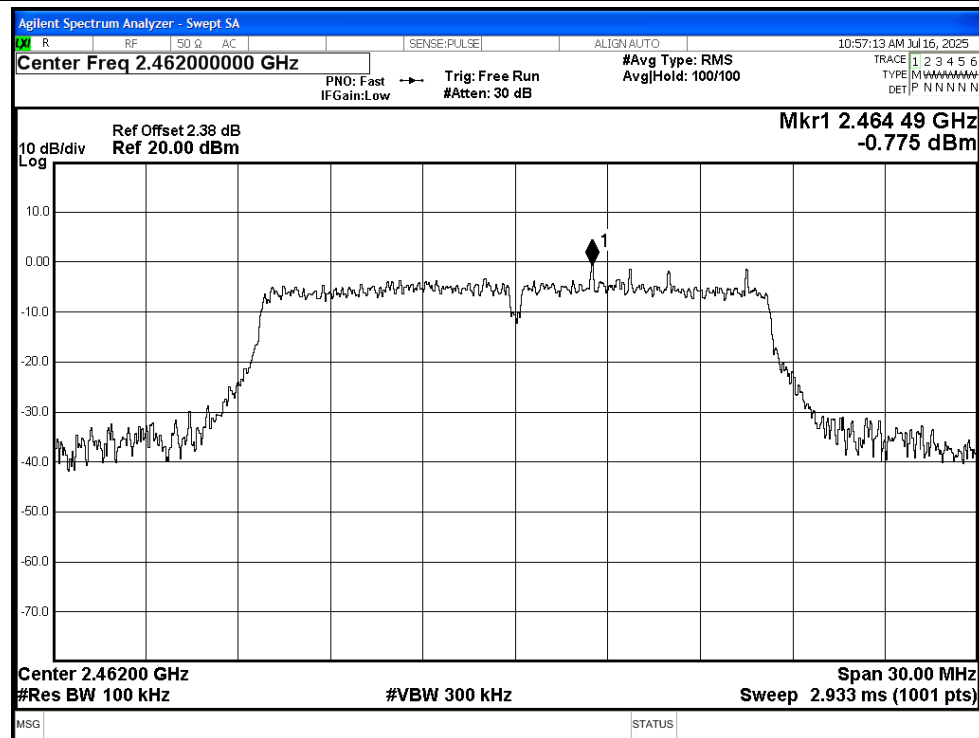
## Tx. Spurious NVNT g 2437MHz Ant1 Ref



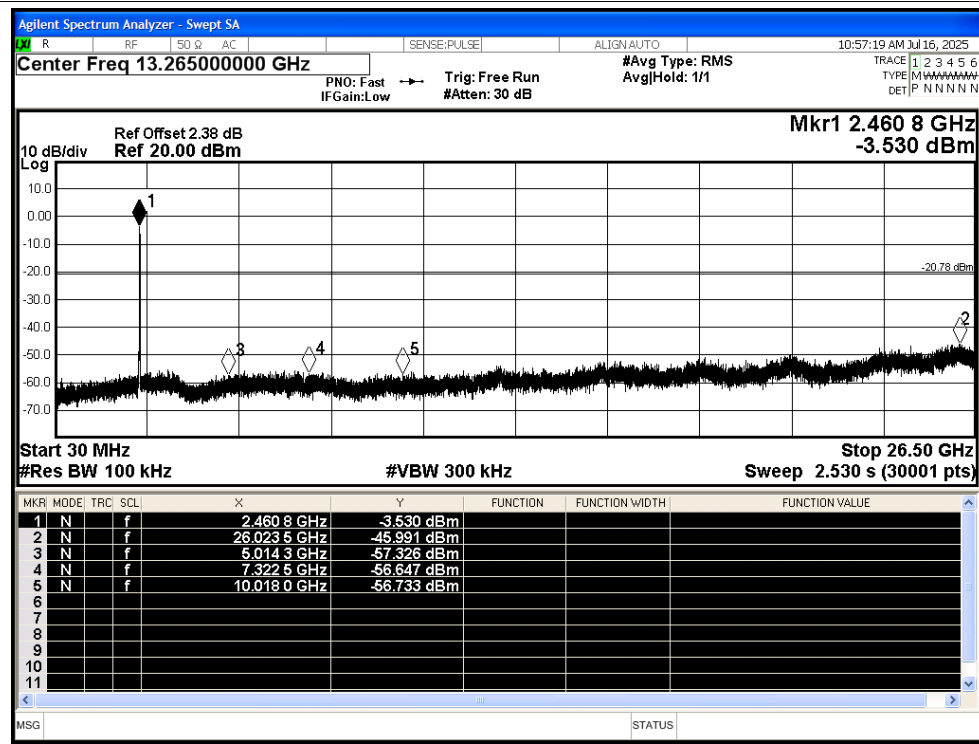
## Tx. Spurious NVNT g 2437MHz Ant1 Emission



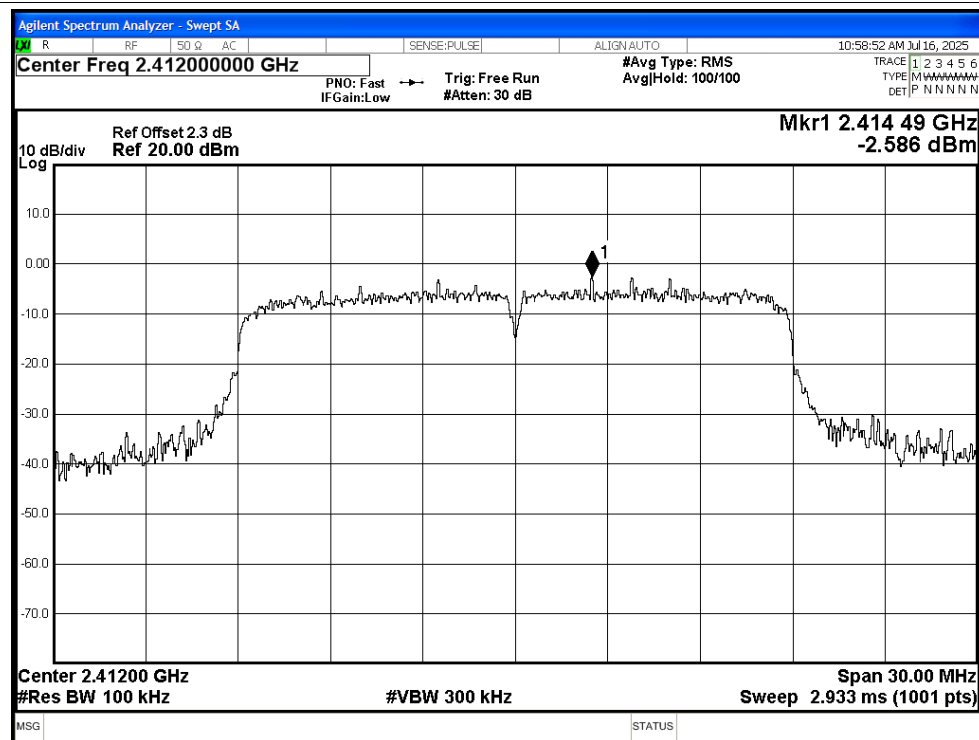
## Tx. Spurious NVNT g 2462MHz Ant1 Ref



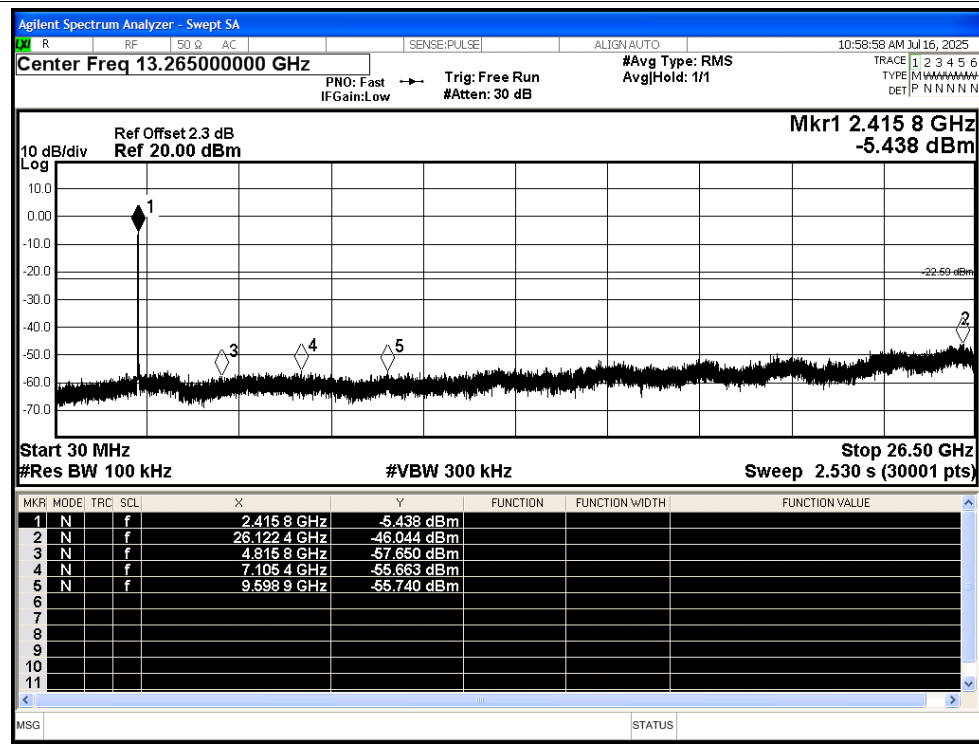
## Tx. Spurious NVNT g 2462MHz Ant1 Emission



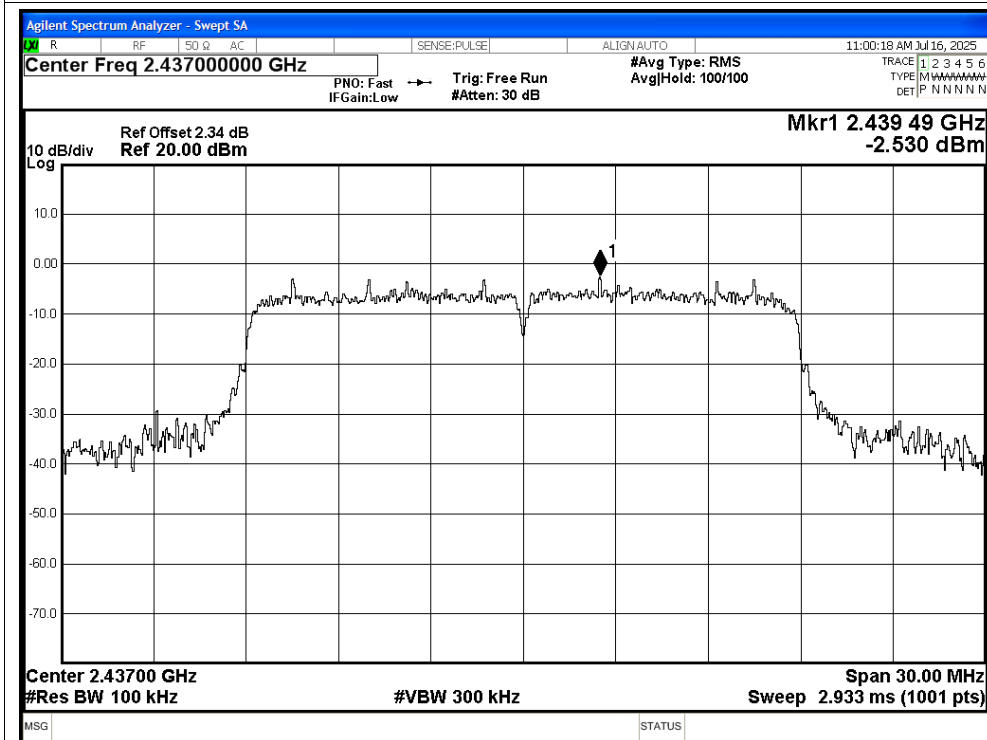
## Tx. Spurious NVNT n20 2412MHz Ant1 Ref



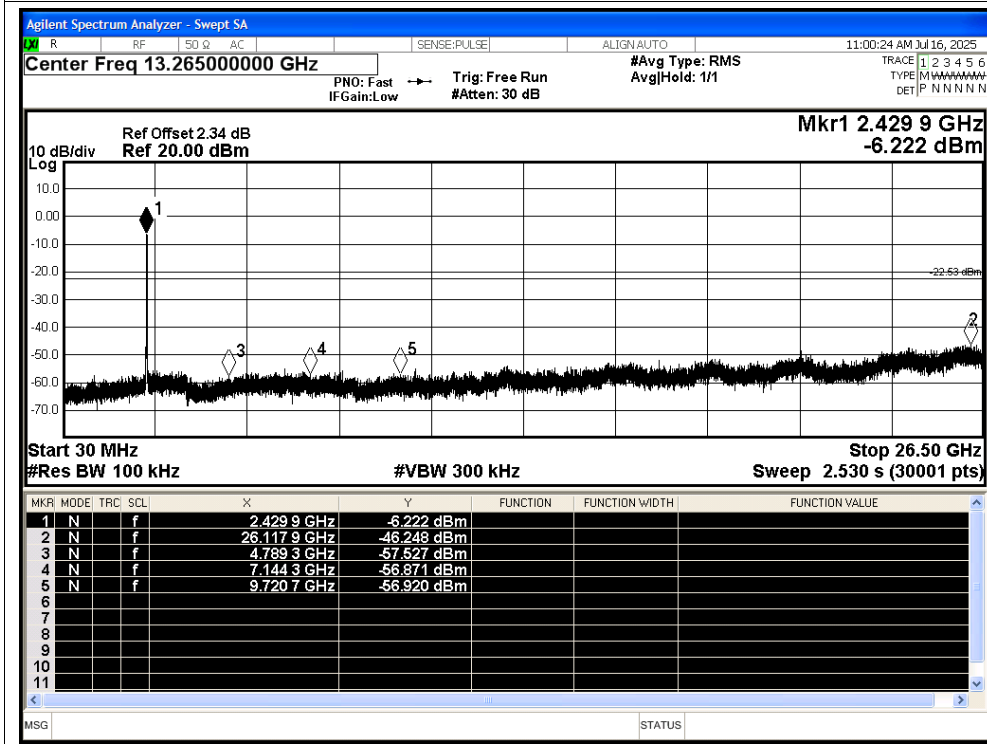
## Tx. Spurious NVNT n20 2412MHz Ant1 Emission



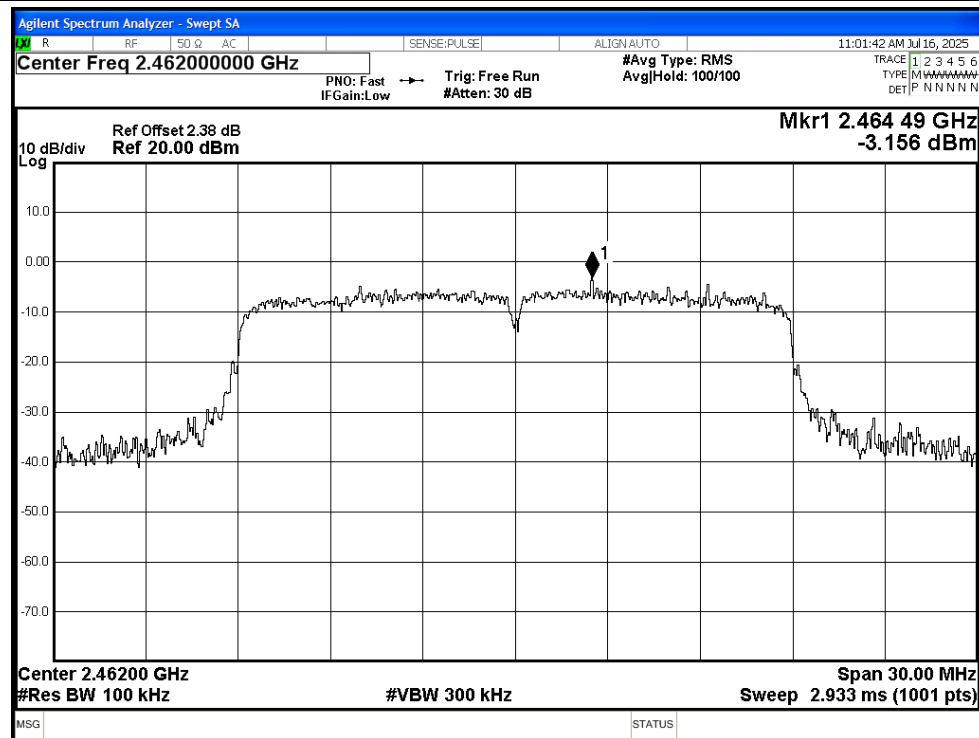
## Tx. Spurious NVNT n20 2437MHz Ant1 Ref



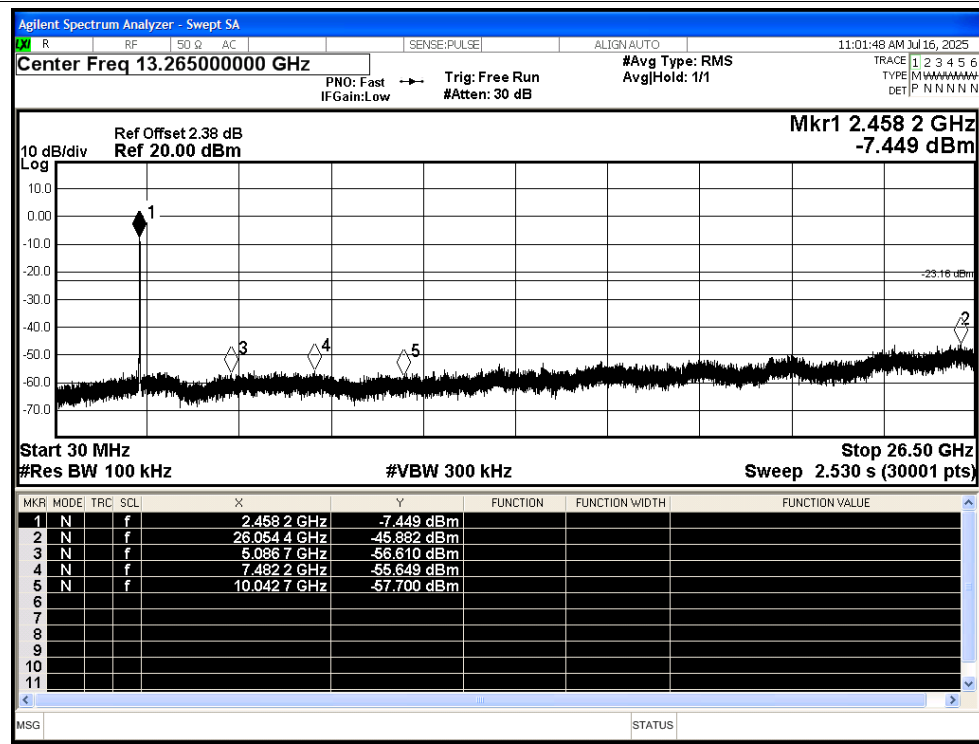
## Tx. Spurious NVNT n20 2437MHz Ant1 Emission



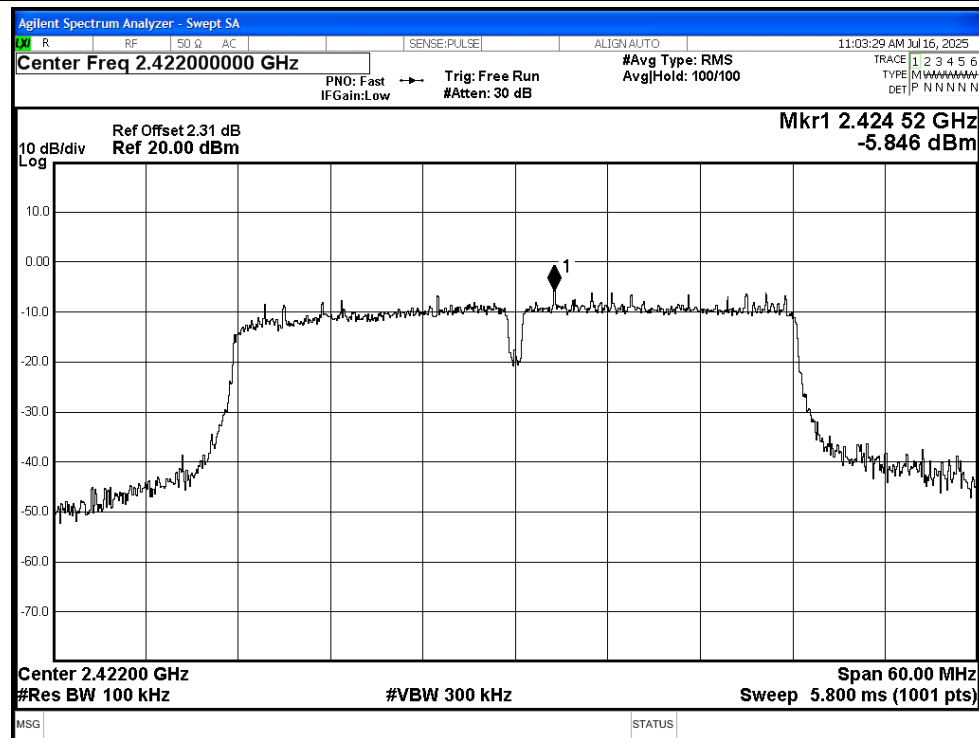
## Tx. Spurious NVNT n20 2462MHz Ant1 Ref



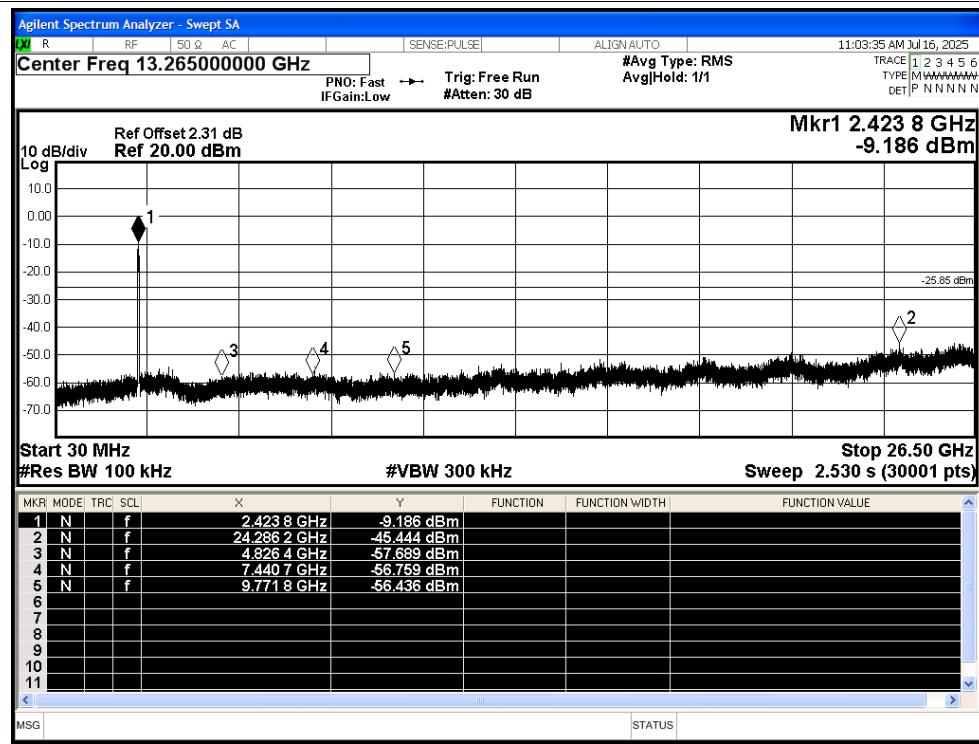
## Tx. Spurious NVNT n20 2462MHz Ant1 Emission



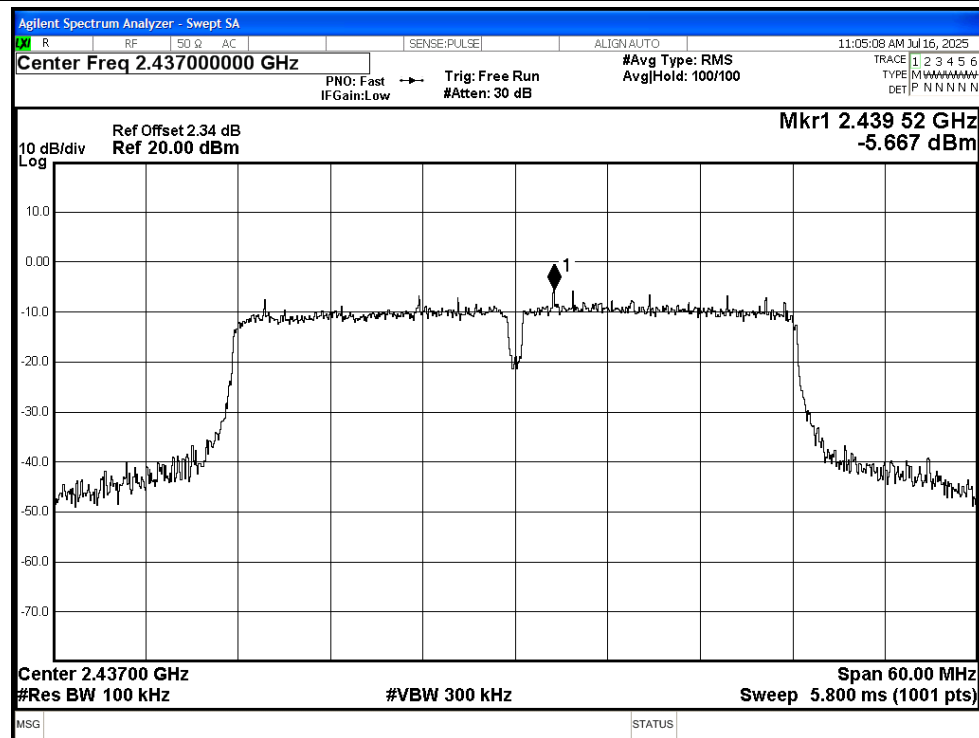
## Tx. Spurious NVNT n40 2422MHz Ant1 Ref



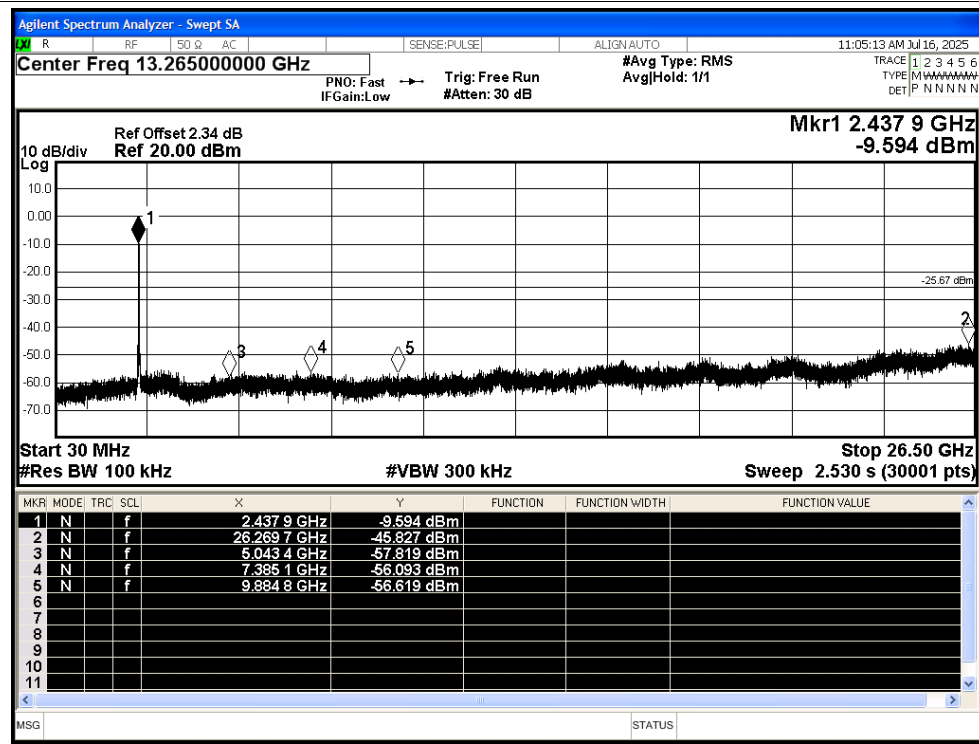
## Tx. Spurious NVNT n40 2422MHz Ant1 Emission



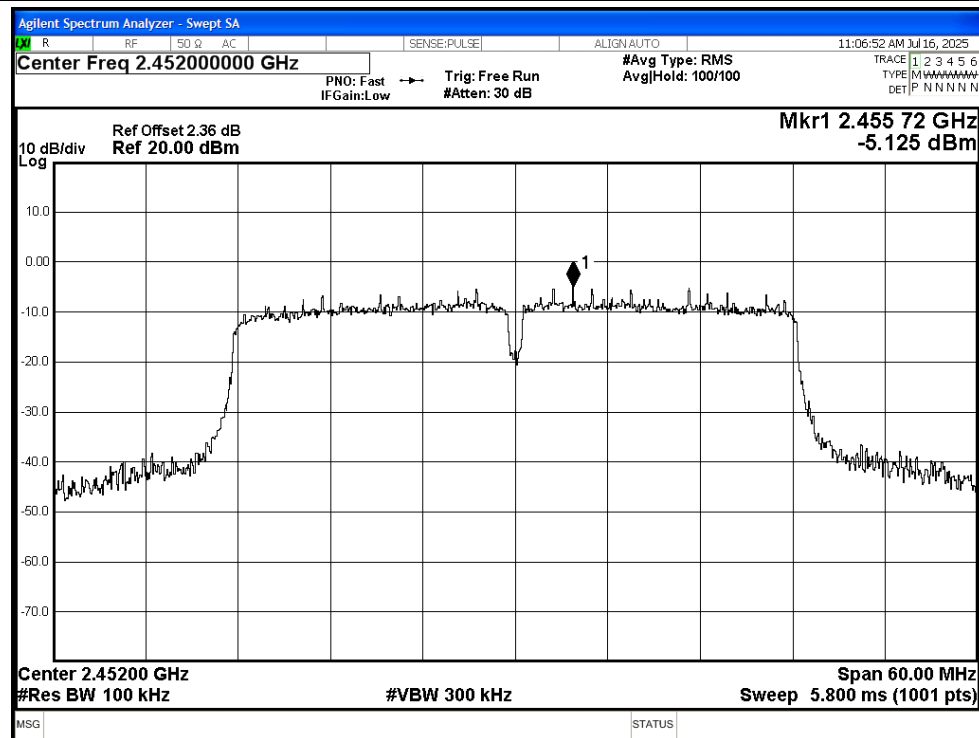
## Tx. Spurious NVNT n40 2437MHz Ant1 Ref



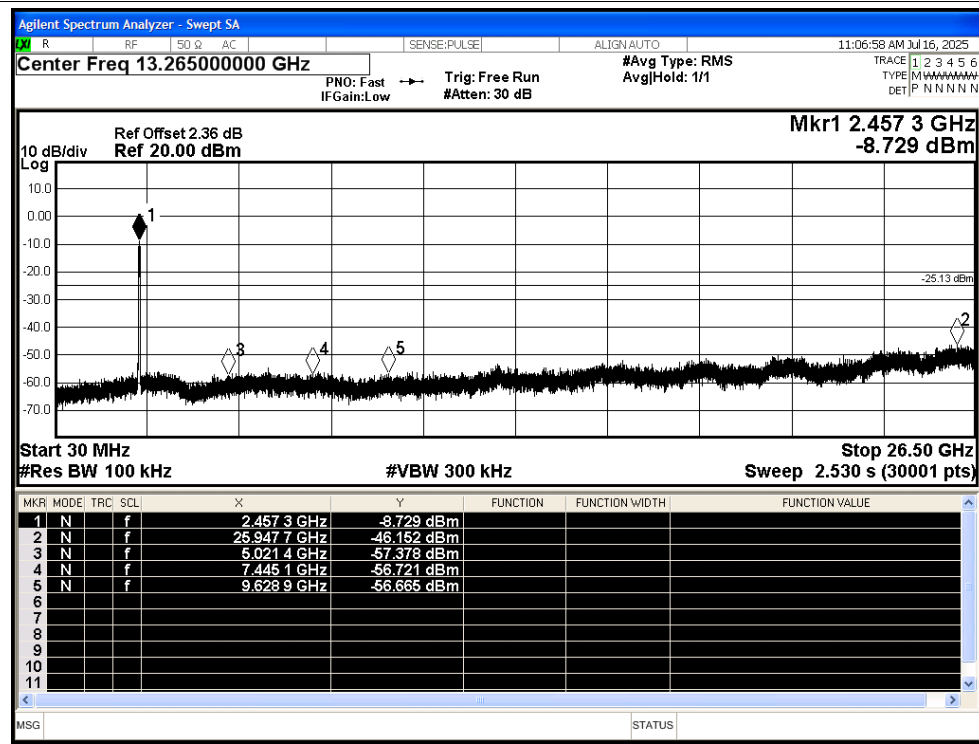
## Tx. Spurious NVNT n40 2437MHz Ant1 Emission



## Tx. Spurious NVNT n40 2452MHz Ant1 Ref



## Tx. Spurious NVNT n40 2452MHz Ant1 Emission

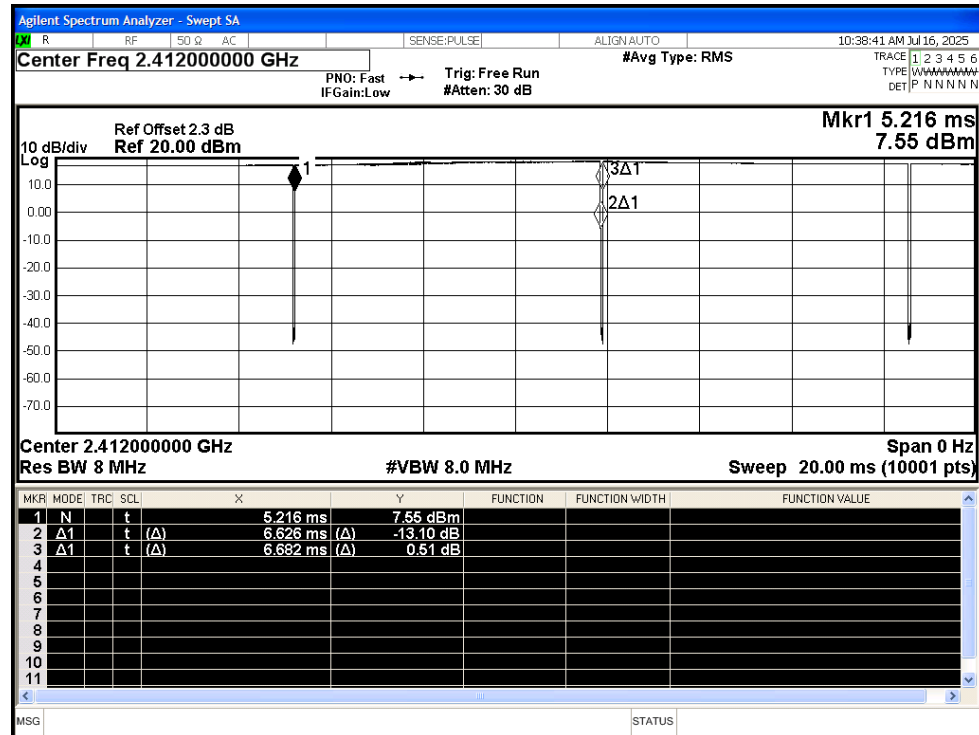


## A.6 Duty Cycle

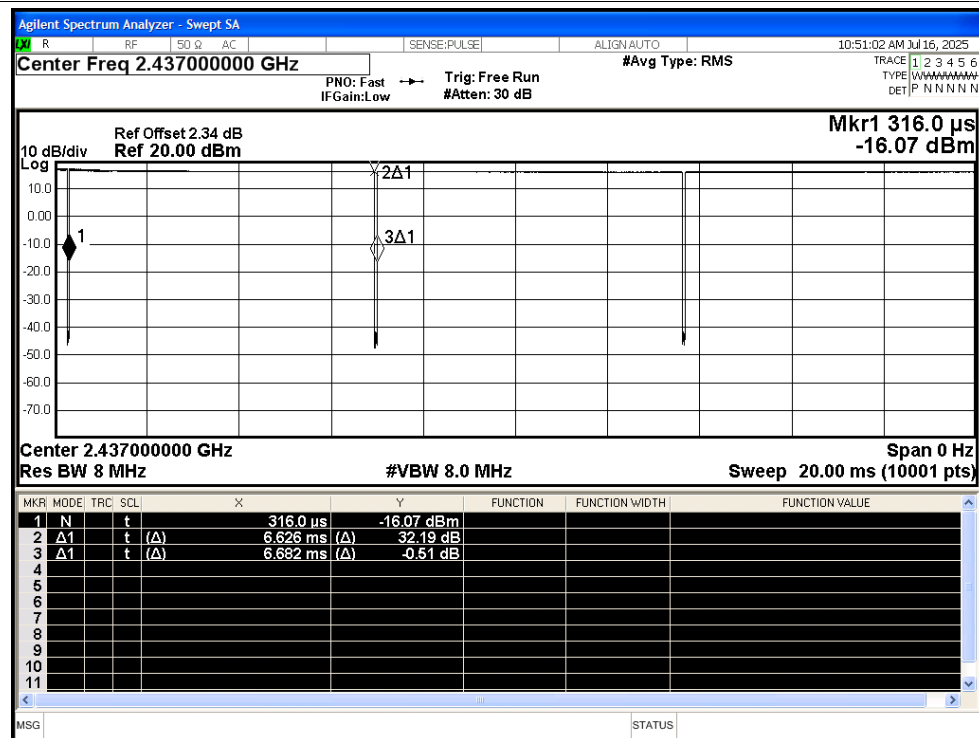
| Condition | Mode | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|-----------|------|-----------------|---------|----------------|------------------------|-----------|
| NVNT      | b    | 2412            | Ant1    | 99.16          | 0                      | 0.15      |
| NVNT      | b    | 2437            | Ant1    | 99.16          | 0                      | 0.15      |
| NVNT      | b    | 2462            | Ant1    | 99.16          | 0                      | 0.15      |
| NVNT      | g    | 2412            | Ant1    | 97.68          | 0.1                    | 0.37      |
| NVNT      | g    | 2437            | Ant1    | 97.75          | 0.1                    | 0.37      |
| NVNT      | g    | 2462            | Ant1    | 97.68          | 0.1                    | 0.37      |
| NVNT      | n20  | 2412            | Ant1    | 97.33          | 0.12                   | 0.44      |
| NVNT      | n20  | 2437            | Ant1    | 97.33          | 0.12                   | 0.44      |
| NVNT      | n20  | 2462            | Ant1    | 97.25          | 0.12                   | 0.44      |
| NVNT      | n40  | 2422            | Ant1    | 94.87          | 0.23                   | 0.9       |
| NVNT      | n40  | 2437            | Ant1    | 94.7           | 0.24                   | 0.9       |
| NVNT      | n40  | 2452            | Ant1    | 94.71          | 0.24                   | 0.9       |

## Test Graphs

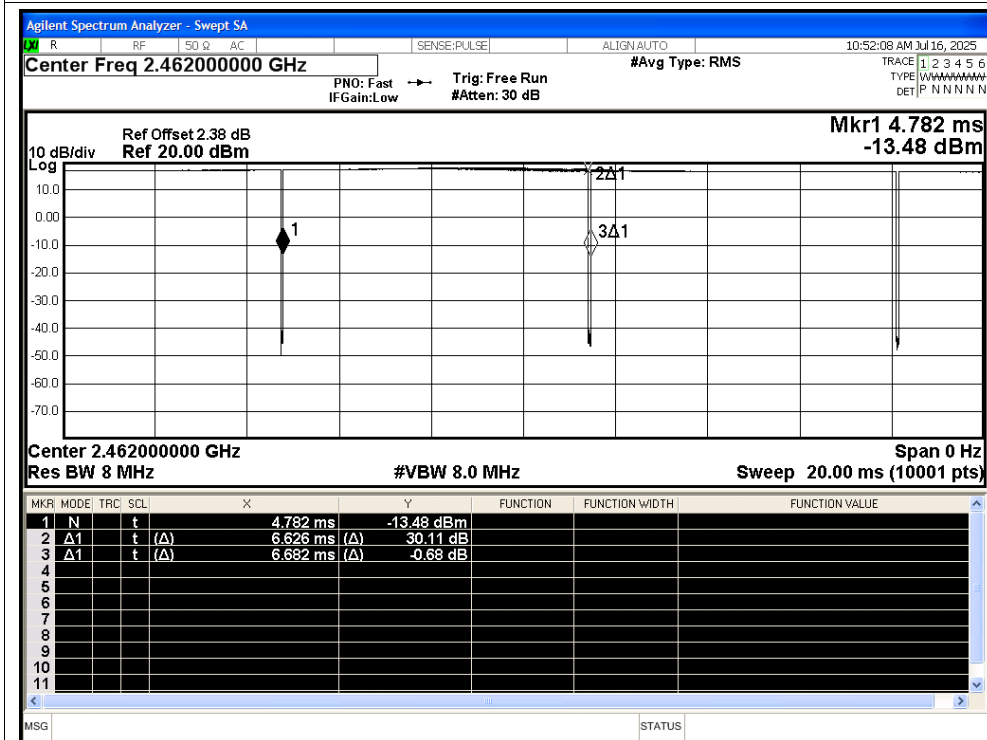
## Duty Cycle NVNT b 2412MHz Ant1



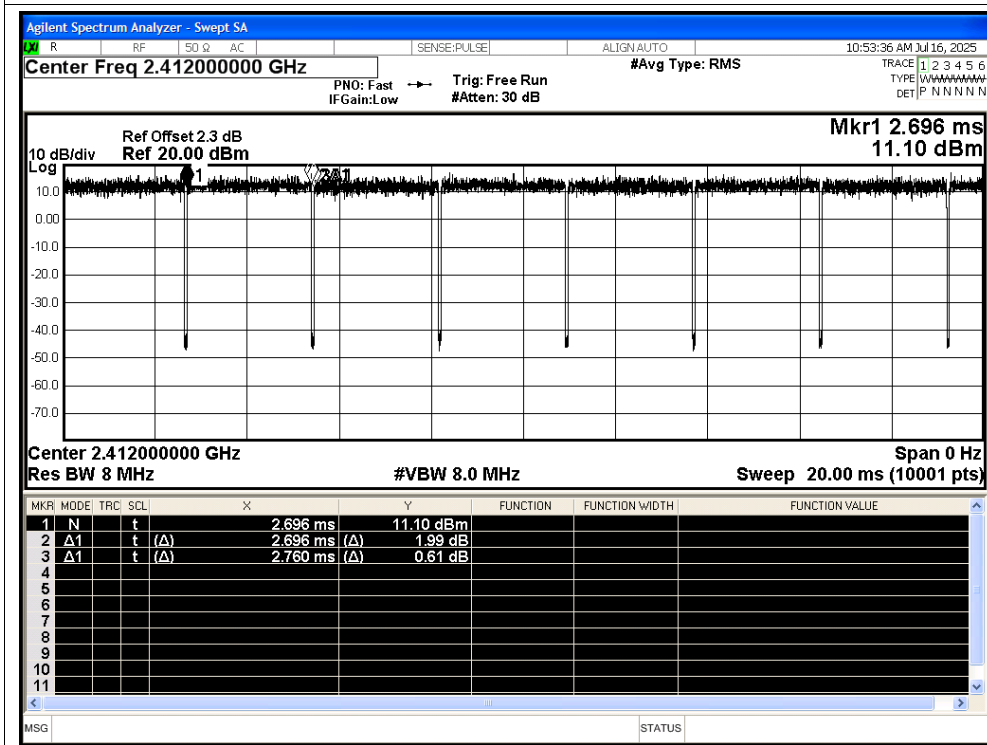
## Duty Cycle NVNT b 2437MHz Ant1



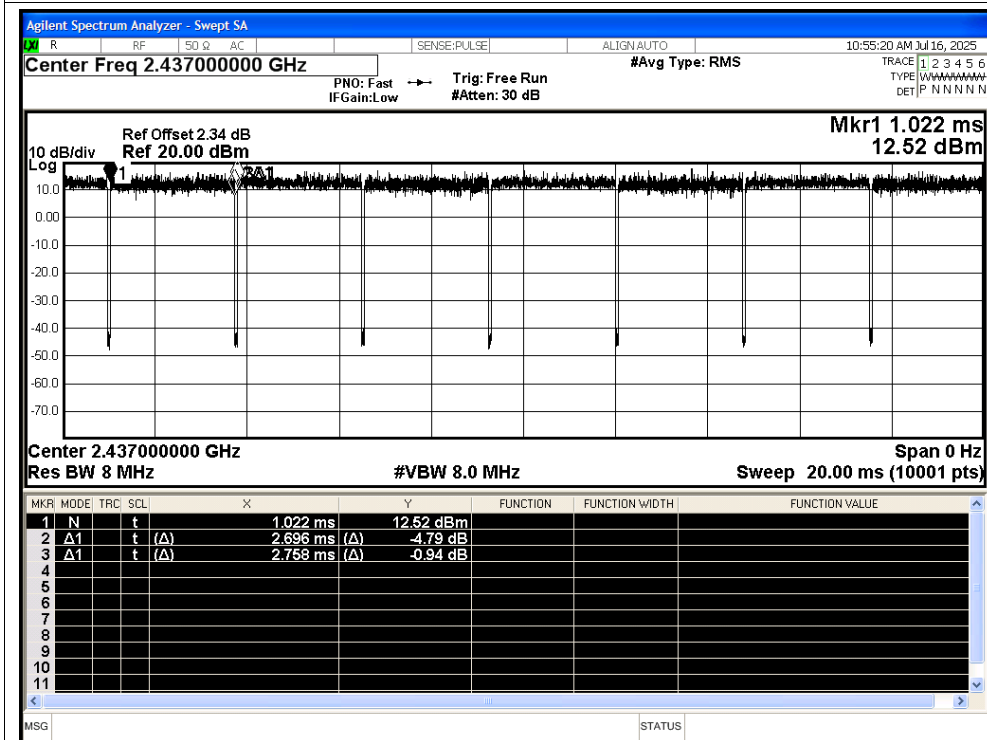
## Duty Cycle NVNT b 2462MHz Ant1



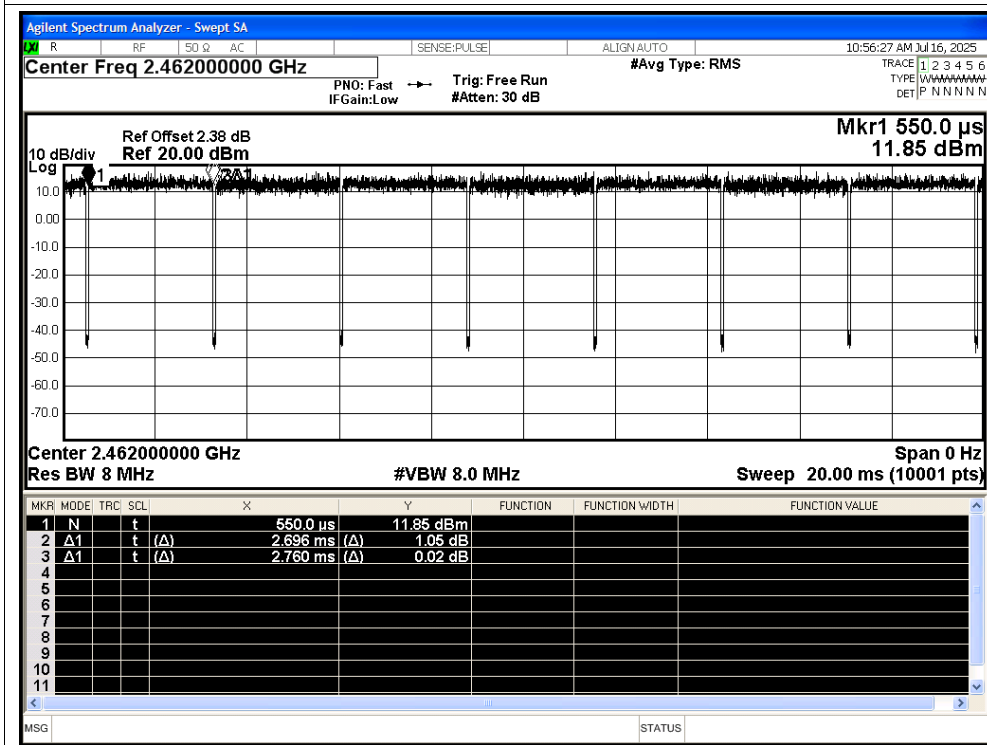
## Duty Cycle NVNT g 2412MHz Ant1

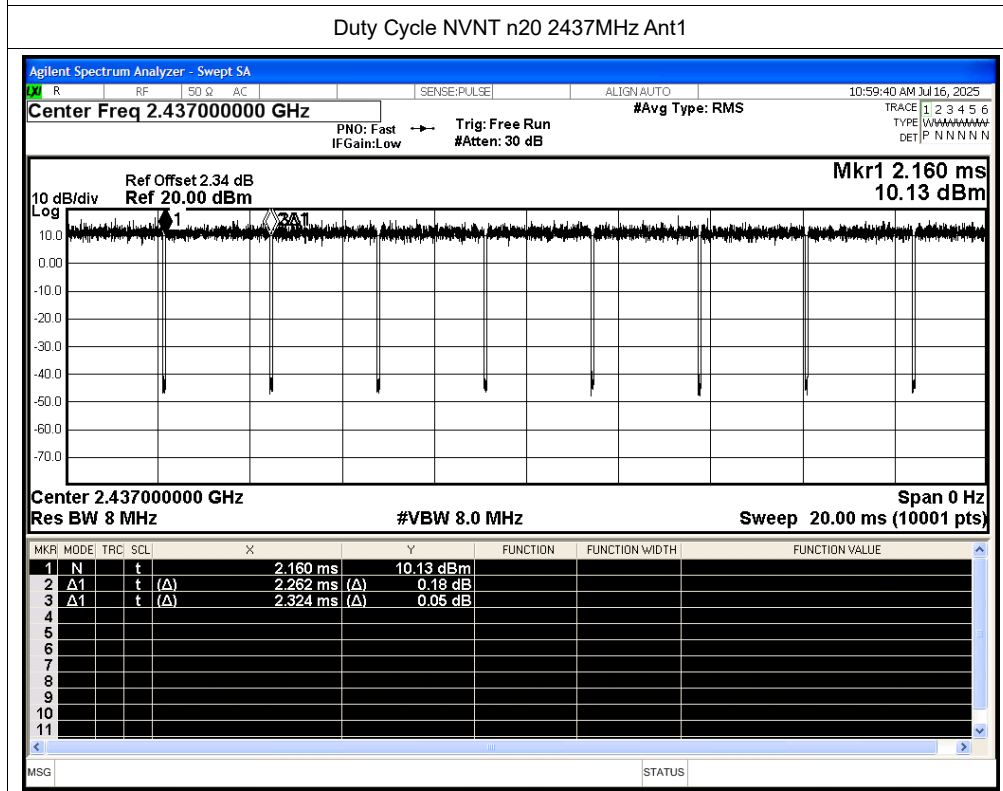
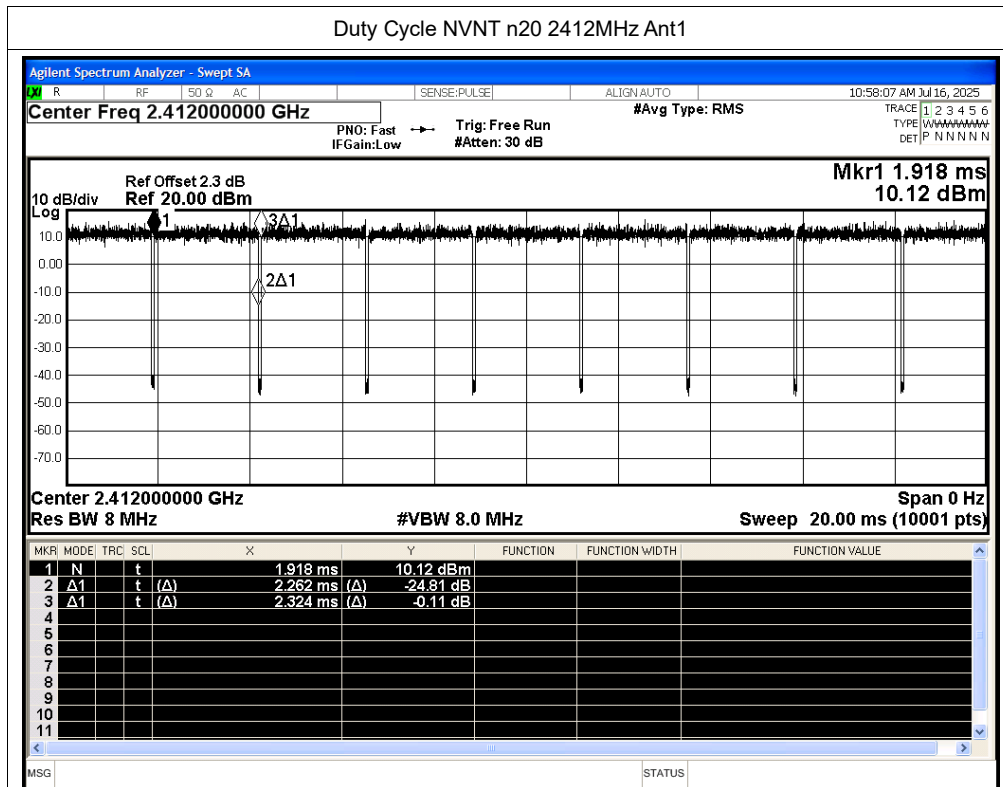


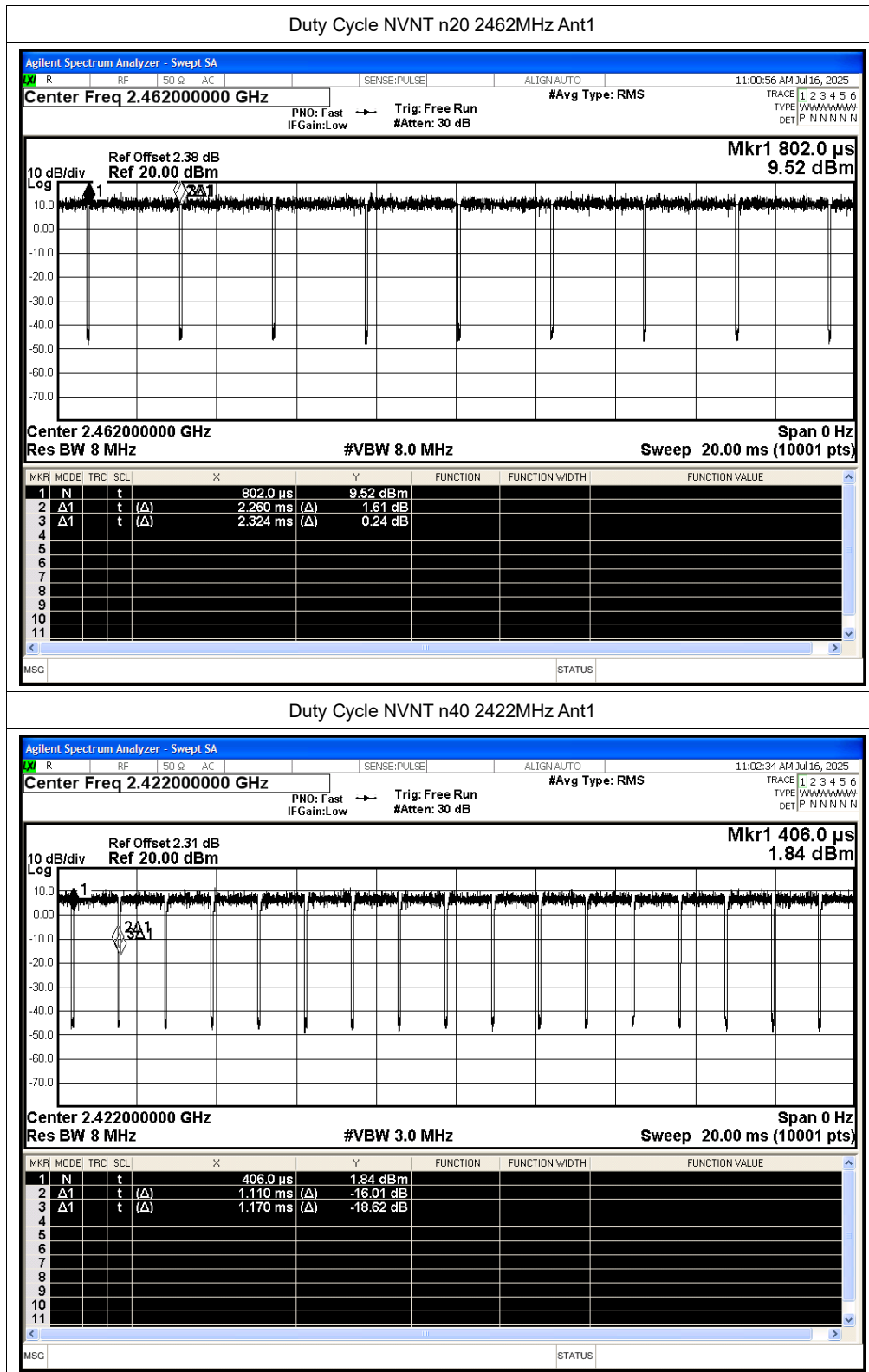
## Duty Cycle NVNT g 2437MHz Ant1



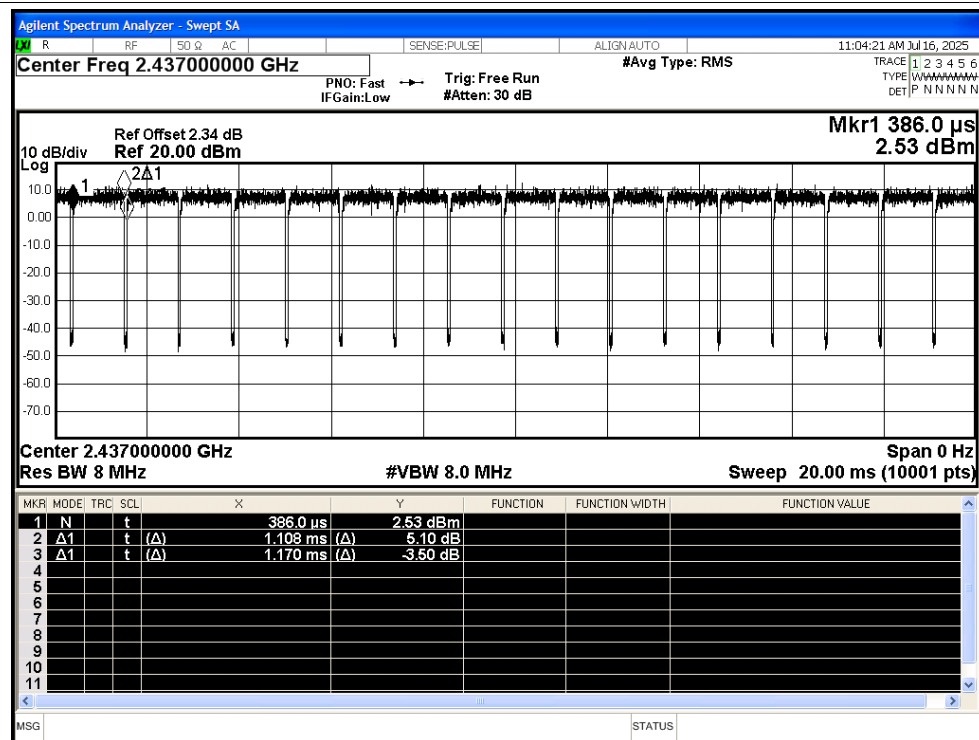
## Duty Cycle NVNT g 2462MHz Ant1



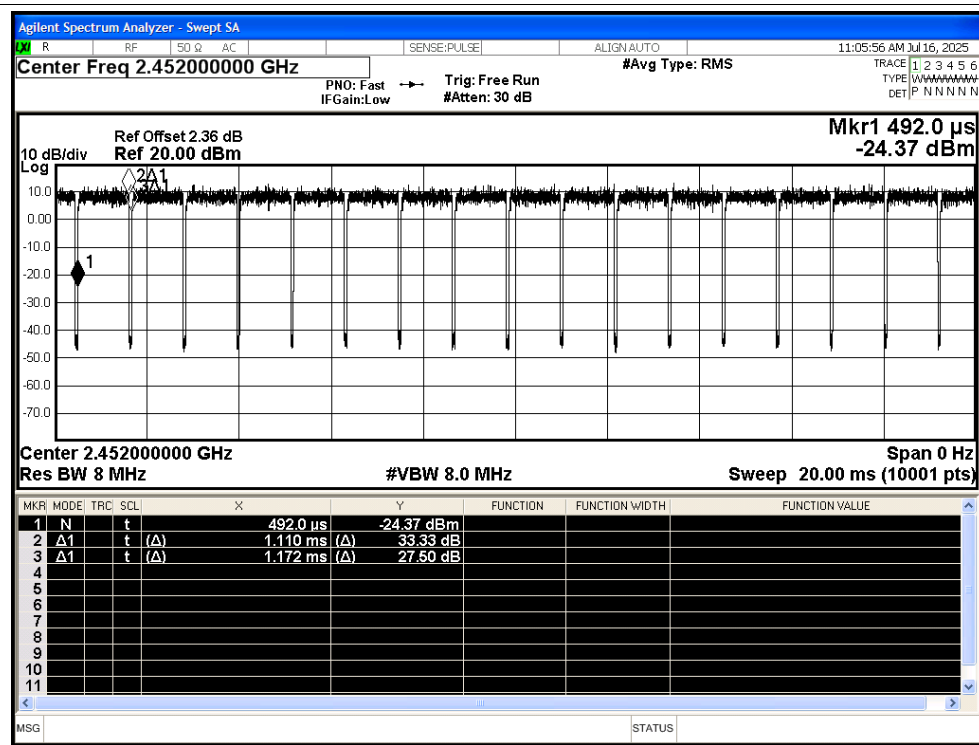




## Duty Cycle NVNT n40 2437MHz Ant1



## Duty Cycle NVNT n40 2452MHz Ant1



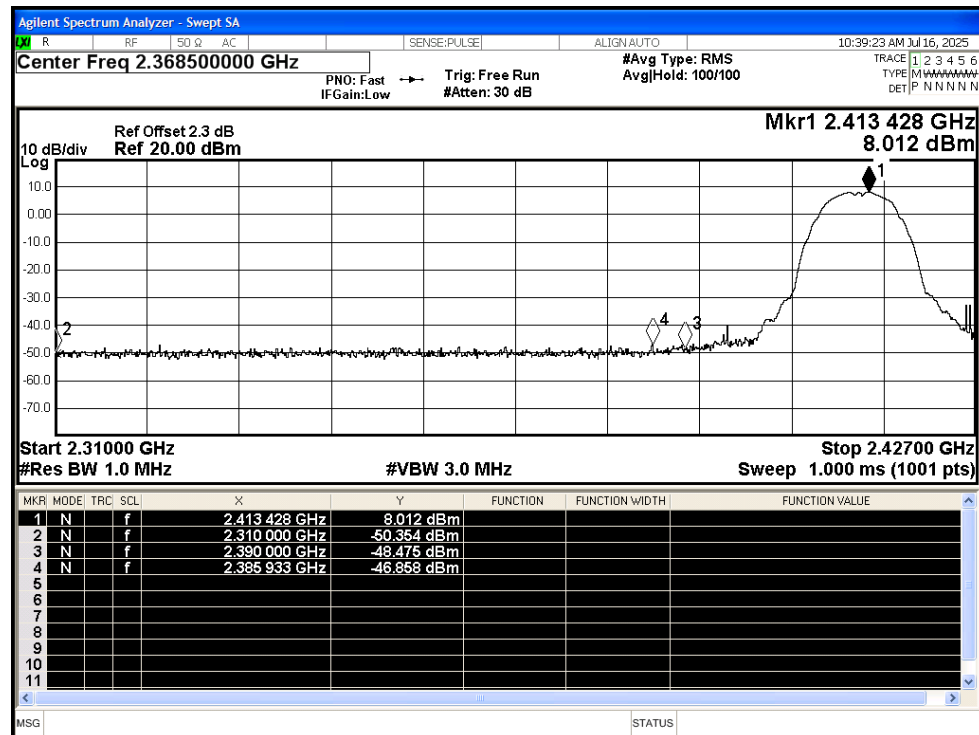
## A.7 Restrict Band

| Condition | Mode | Frequency (MHz) | Antenna | Spur Freq (MHz) | Power (dBm) | Gain (dBi) | Duty Factor (dB) | E (dBuV/m) | Detector | Limit (dBuV/m) | Verdict |
|-----------|------|-----------------|---------|-----------------|-------------|------------|------------------|------------|----------|----------------|---------|
| NVNT      | b    | 2412            | Ant1    | 2310            | -50.35      | 2          | -                | 46.91      | Peak     | 74             | Pass    |
| NVNT      | b    | 2412            | Ant1    | 2310            | -59.11      | 2          | 0                | 38.15      | Average  | 54             | Pass    |
| NVNT      | b    | 2412            | Ant1    | 2385.933        | -46.86      | 2          | -                | 50.4       | Peak     | 74             | Pass    |
| NVNT      | b    | 2412            | Ant1    | 2389.56         | -55.44      | 2          | 0                | 41.82      | Average  | 54             | Pass    |
| NVNT      | b    | 2412            | Ant1    | 2390            | -48.48      | 2          | -                | 48.78      | Peak     | 74             | Pass    |
| NVNT      | b    | 2412            | Ant1    | 2390            | -56.38      | 2          | 0                | 40.88      | Average  | 54             | Pass    |
| NVNT      | b    | 2462            | Ant1    | 2483.5          | -46.54      | 2          | -                | 50.72      | Peak     | 74             | Pass    |
| NVNT      | b    | 2462            | Ant1    | 2483.5          | -55.52      | 2          | 0                | 41.74      | Average  | 54             | Pass    |
| NVNT      | b    | 2462            | Ant1    | 2487.916        | -43.52      | 2          | -                | 53.74      | Peak     | 74             | Pass    |
| NVNT      | b    | 2462            | Ant1    | 2485.319        | -54.4       | 2          | 0                | 42.86      | Average  | 54             | Pass    |
| NVNT      | b    | 2462            | Ant1    | 2500            | -49.73      | 2          | -                | 47.53      | Peak     | 74             | Pass    |
| NVNT      | b    | 2462            | Ant1    | 2500            | -57.91      | 2          | 0                | 39.35      | Average  | 54             | Pass    |
| NVNT      | g    | 2412            | Ant1    | 2310            | -51.31      | 2          | -                | 45.95      | Peak     | 74             | Pass    |
| NVNT      | g    | 2412            | Ant1    | 2310            | -58.73      | 2          | 0.1              | 38.63      | Average  | 54             | Pass    |
| NVNT      | g    | 2412            | Ant1    | 2310.468        | -46.73      | 2          | -                | 50.53      | Peak     | 74             | Pass    |
| NVNT      | g    | 2412            | Ant1    | 2389.794        | -56.86      | 2          | 0.1              | 40.5       | Average  | 54             | Pass    |
| NVNT      | g    | 2412            | Ant1    | 2390            | -48.89      | 2          | -                | 48.37      | Peak     | 74             | Pass    |
| NVNT      | g    | 2412            | Ant1    | 2390            | -56.91      | 2          | 0.1              | 40.45      | Average  | 54             | Pass    |
| NVNT      | g    | 2462            | Ant1    | 2483.5          | -43.46      | 2          | -                | 53.8       | Peak     | 74             | Pass    |
| NVNT      | g    | 2462            | Ant1    | 2483.5          | -57.03      | 2          | 0.1              | 40.33      | Average  | 54             | Pass    |
| NVNT      | g    | 2462            | Ant1    | 2483.782        | -41.22      | 2          | -                | 56.04      | Peak     | 74             | Pass    |
| NVNT      | g    | 2462            | Ant1    | 2483.835        | -55.73      | 2          | 0.1              | 41.63      | Average  | 54             | Pass    |
| NVNT      | g    | 2462            | Ant1    | 2500            | -49.9       | 2          | -                | 47.36      | Peak     | 74             | Pass    |
| NVNT      | g    | 2462            | Ant1    | 2500            | -57.41      | 2          | 0.1              | 39.95      | Average  | 54             | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 2310            | -51.04      | 2          | -                | 46.22      | Peak     | 74             | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 2310            | -58.38      | 2          | 0.12             | 39         | Average  | 54             | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 2388.39         | -45.65      | 2          | -                | 51.61      | Peak     | 74             | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 2388.858        | -56.39      | 2          | 0.12             | 40.99      | Average  | 54             | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 2390            | -41.87      | 2          | -                | 55.39      | Peak     | 74             | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 2390            | -56.83      | 2          | 0.12             | 40.55      | Average  | 54             | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 2483.5          | -33.77      | 2          | -                | 63.49      | Peak     | 74             | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 2483.5          | -55.01      | 2          | 0.12             | 42.37      | Average  | 54             | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 2483.517        | -33.77      | 2          | -                | 63.49      | Peak     | 74             | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 2483.57         | -54.62      | 2          | 0.12             | 42.76      | Average  | 54             | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 2500            | -49.95      | 2          | -                | 47.31      | Peak     | 74             | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 2500            | -57.73      | 2          | 0.12             | 39.65      | Average  | 54             | Pass    |

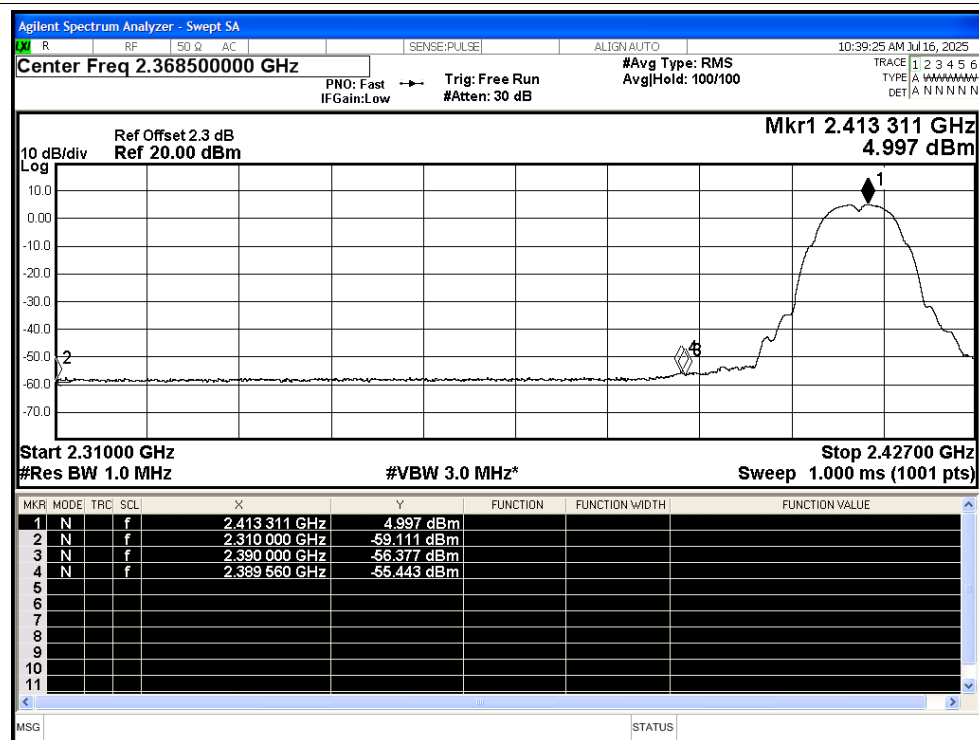
|      |     |      |      |          |        |   |      |       |         |    |      |
|------|-----|------|------|----------|--------|---|------|-------|---------|----|------|
| NVNT | n40 | 2422 | Ant1 | 2310     | -49.2  | 2 | -    | 48.06 | Peak    | 74 | Pass |
| NVNT | n40 | 2422 | Ant1 | 2310     | -58.29 | 2 | 0.23 | 39.2  | Average | 54 | Pass |
| NVNT | n40 | 2422 | Ant1 | 2389.378 | -42.11 | 2 | -    | 55.15 | Peak    | 74 | Pass |
| NVNT | n40 | 2422 | Ant1 | 2389.946 | -54.94 | 2 | 0.23 | 42.55 | Average | 54 | Pass |
| NVNT | n40 | 2422 | Ant1 | 2390     | -44.95 | 2 | -    | 52.31 | Peak    | 74 | Pass |
| NVNT | n40 | 2422 | Ant1 | 2390     | -54.94 | 2 | 0.23 | 42.55 | Average | 54 | Pass |
| NVNT | n40 | 2452 | Ant1 | 2483.5   | -38.51 | 2 | -    | 58.75 | Peak    | 74 | Pass |
| NVNT | n40 | 2452 | Ant1 | 2483.5   | -54.37 | 2 | 0.24 | 43.13 | Average | 54 | Pass |
| NVNT | n40 | 2452 | Ant1 | 2485.414 | -38.31 | 2 | -    | 58.95 | Peak    | 74 | Pass |
| NVNT | n40 | 2452 | Ant1 | 2483.932 | -53.73 | 2 | 0.24 | 43.77 | Average | 54 | Pass |
| NVNT | n40 | 2452 | Ant1 | 2500     | -51.37 | 2 | -    | 45.89 | Peak    | 74 | Pass |
| NVNT | n40 | 2452 | Ant1 | 2500     | -57.82 | 2 | 0.24 | 39.68 | Average | 54 | Pass |

## Test Graphs

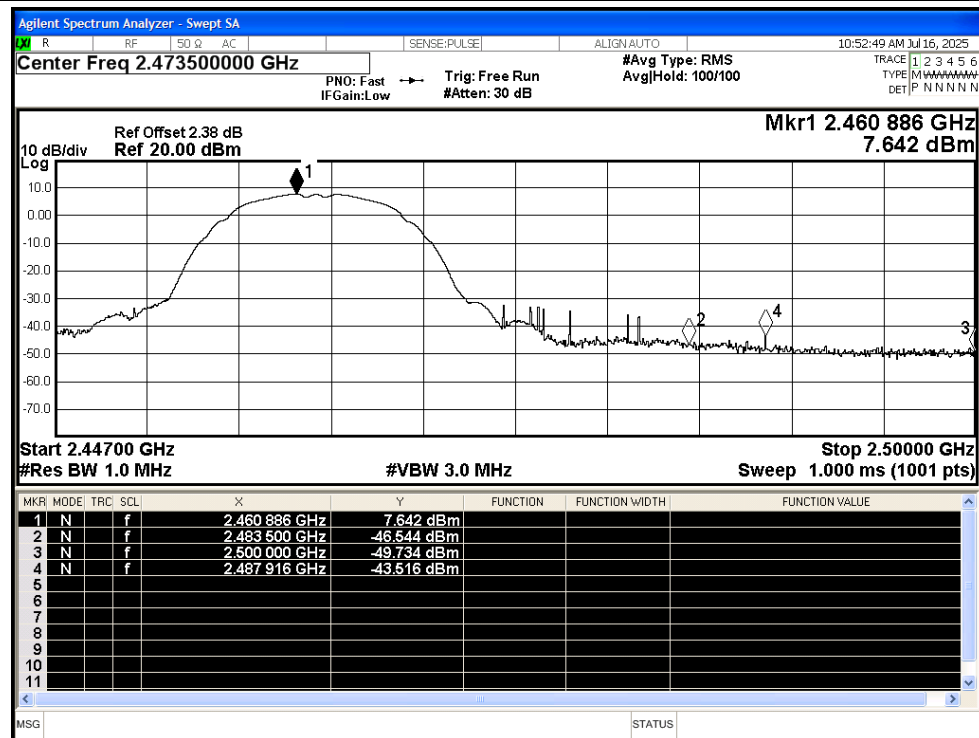
## Restrict Band NVNT b 2412MHz Ant1 Peak



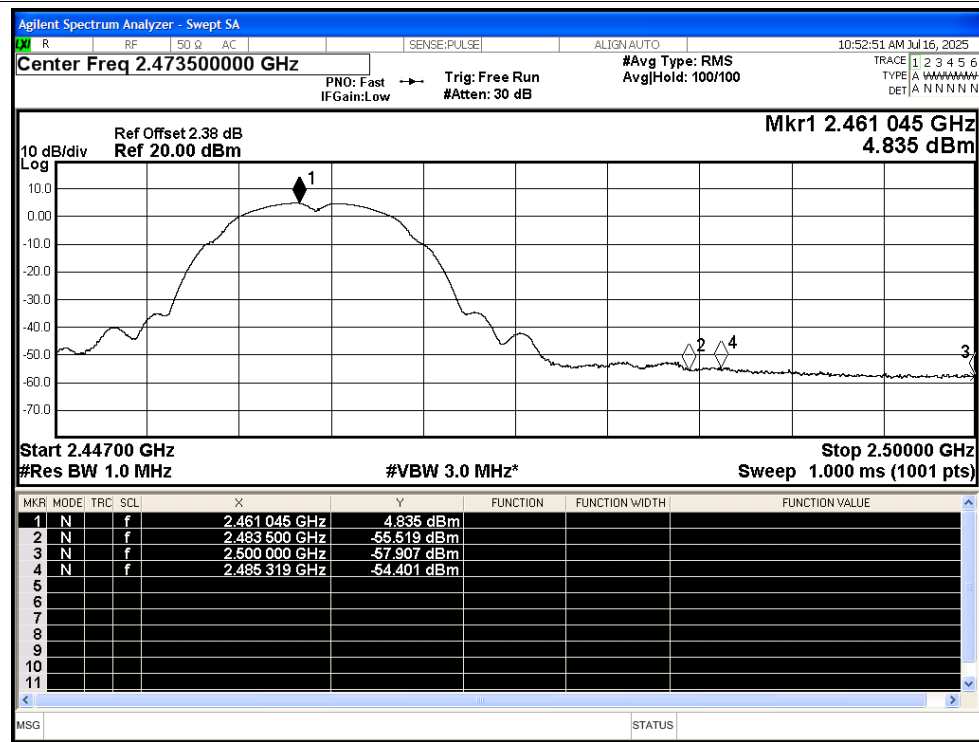
## Restrict Band NVNT b 2412MHz Ant1 Average



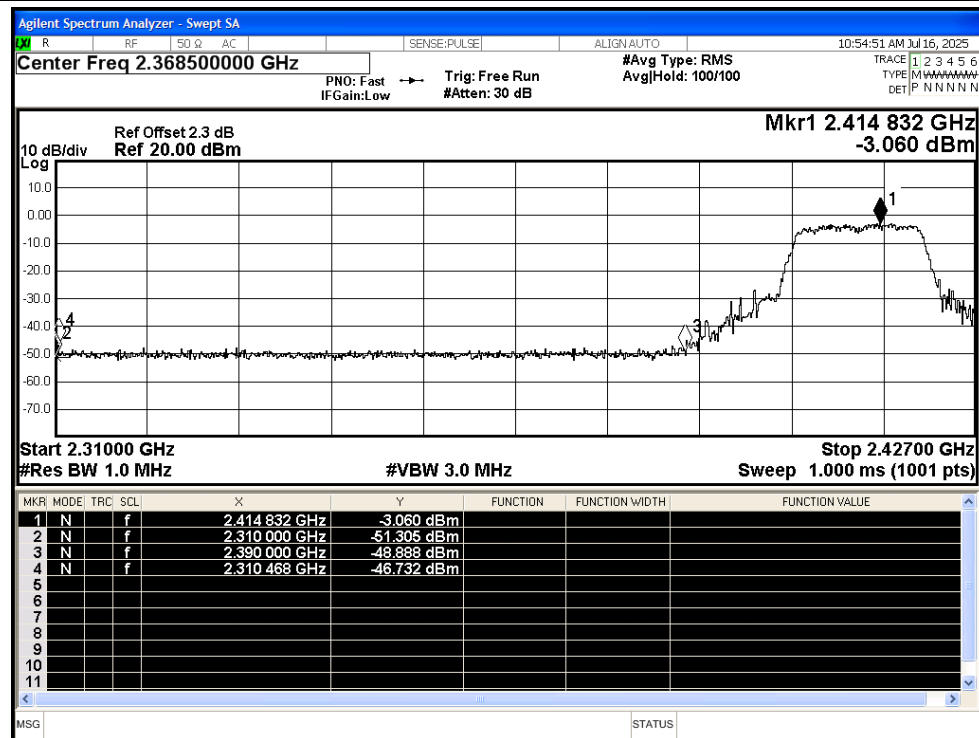
## Restrict Band NVNT b 2462MHz Ant1 Peak



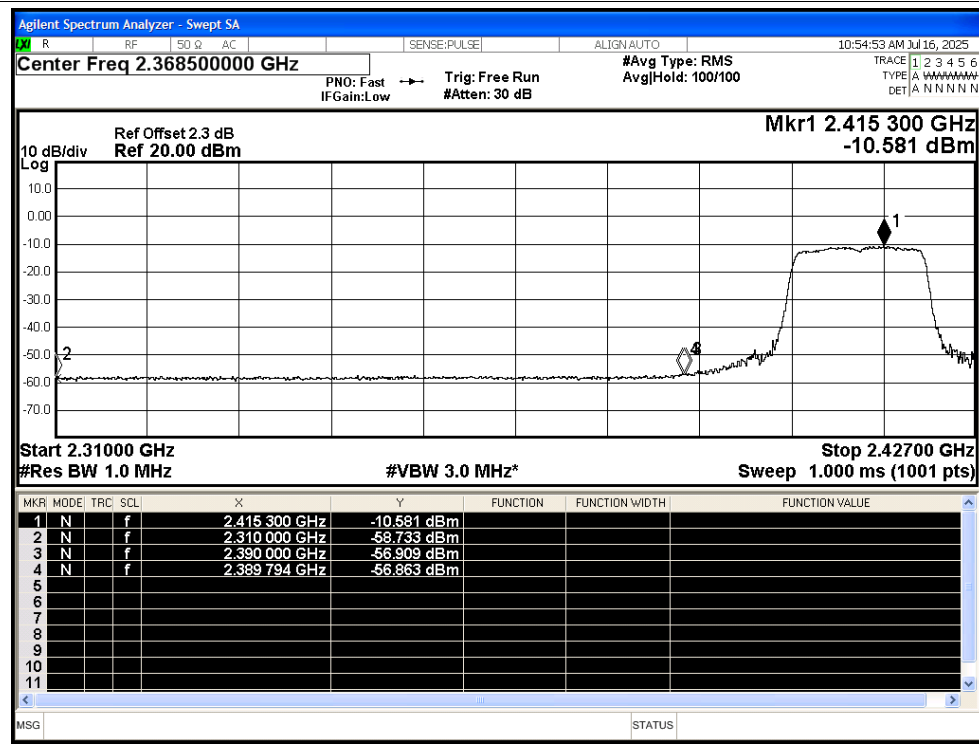
## Restrict Band NVNT b 2462MHz Ant1 Average



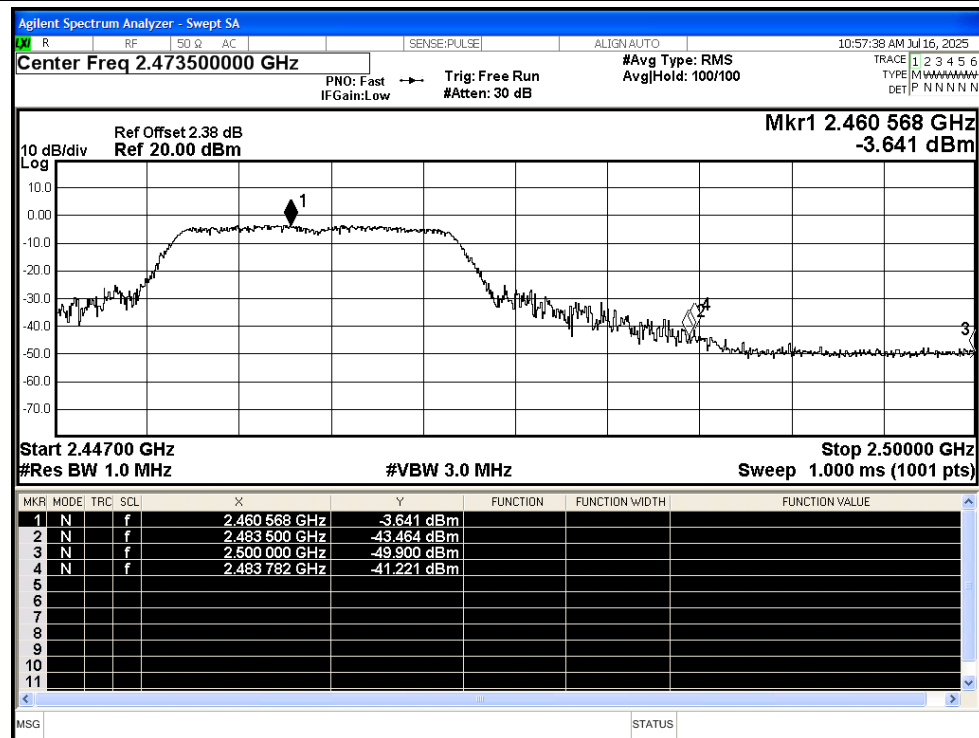
## Restrict Band NVNT g 2412MHz Ant1 Peak



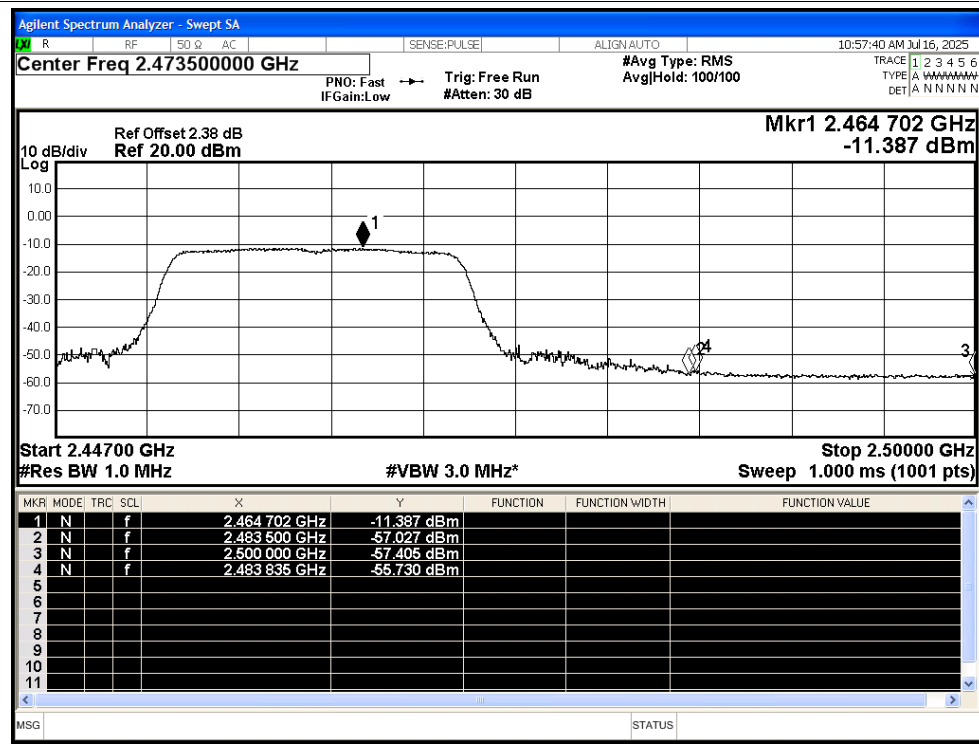
## Restrict Band NVNT g 2412MHz Ant1 Average



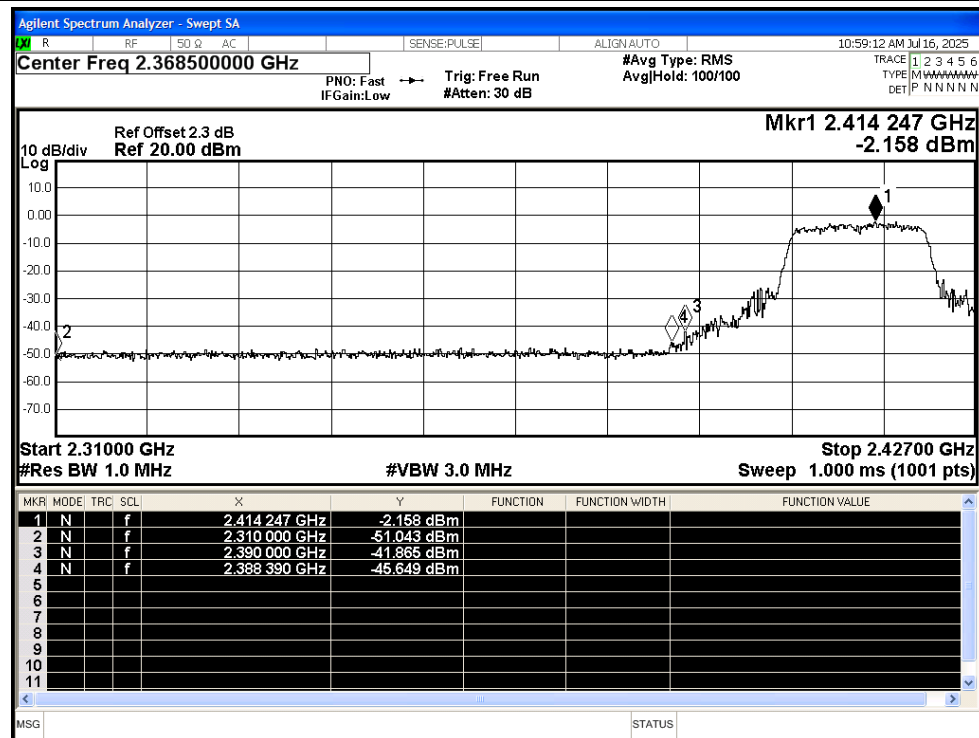
## Restrict Band NVNT g 2462MHz Ant1 Peak



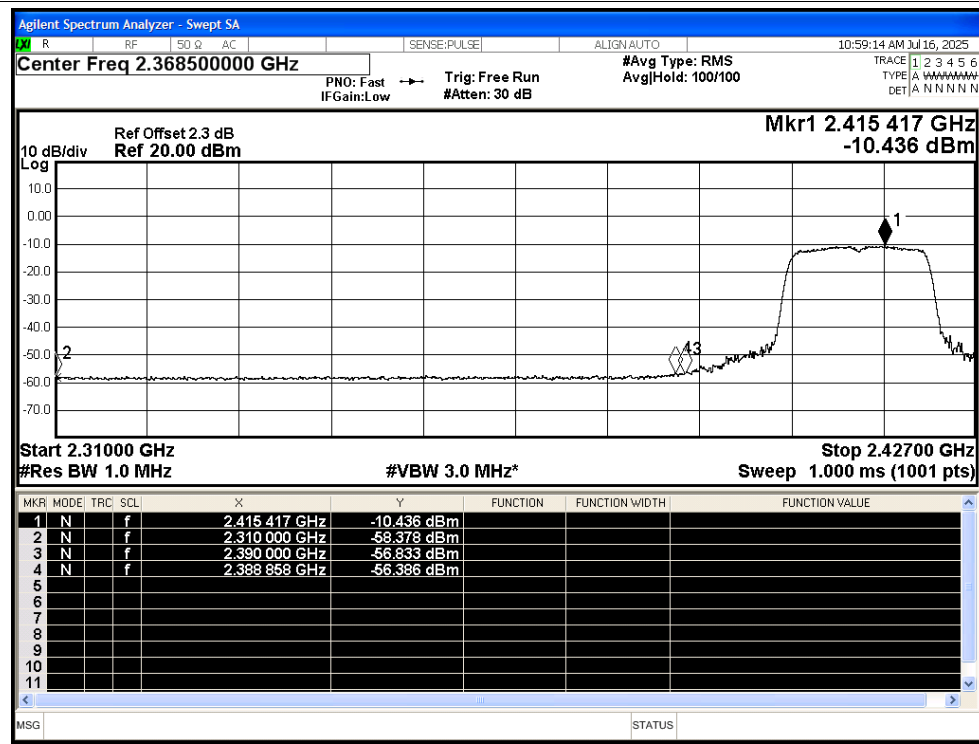
## Restrict Band NVNT g 2462MHz Ant1 Average



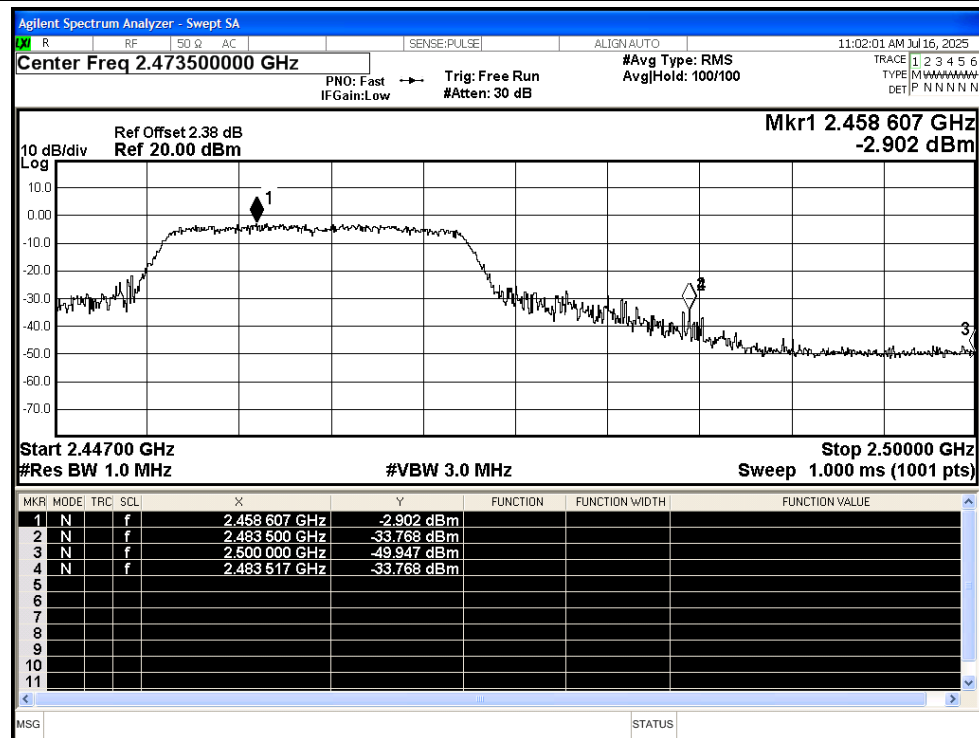
## Restrict Band NVNT n20 2412MHz Ant1 Peak



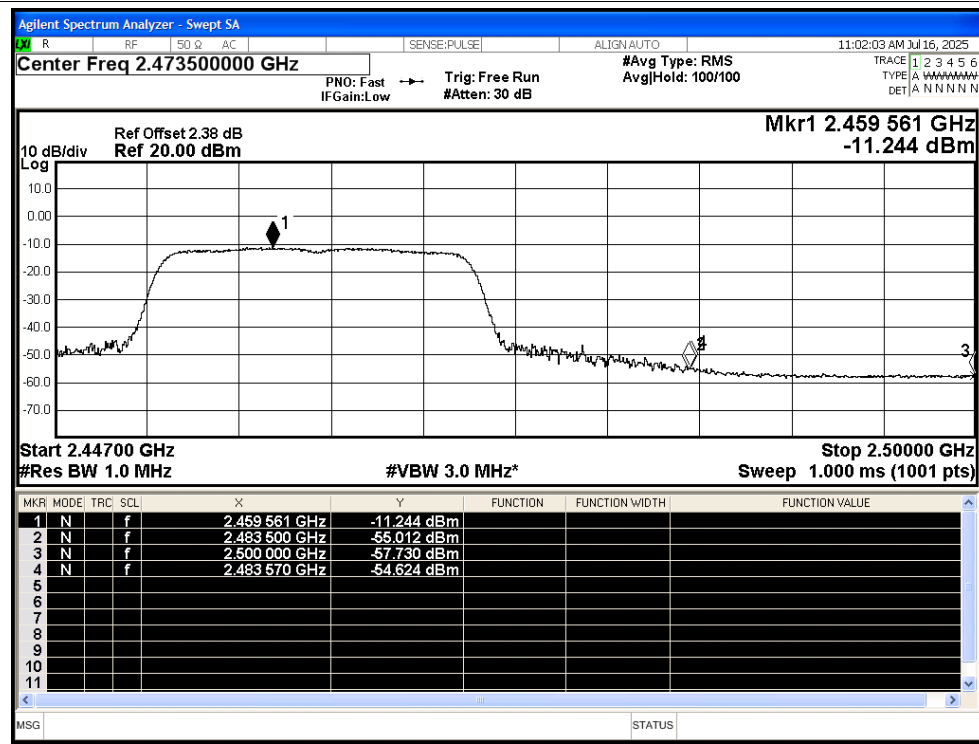
## Restrict Band NVNT n20 2412MHz Ant1 Average



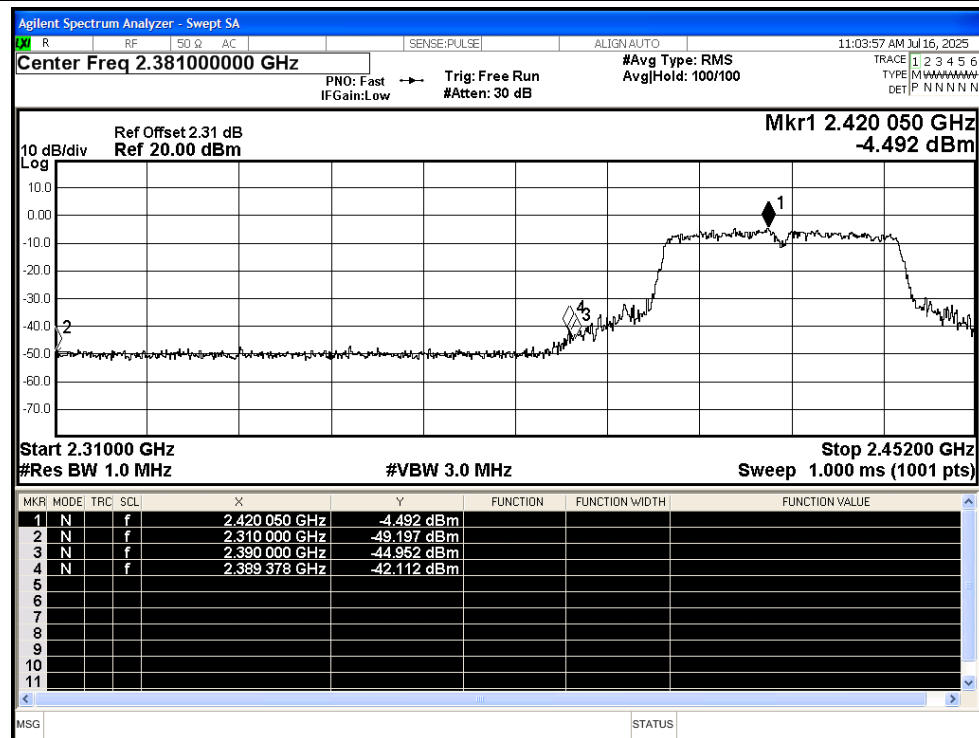
## Restrict Band NVNT n20 2462MHz Ant1 Peak



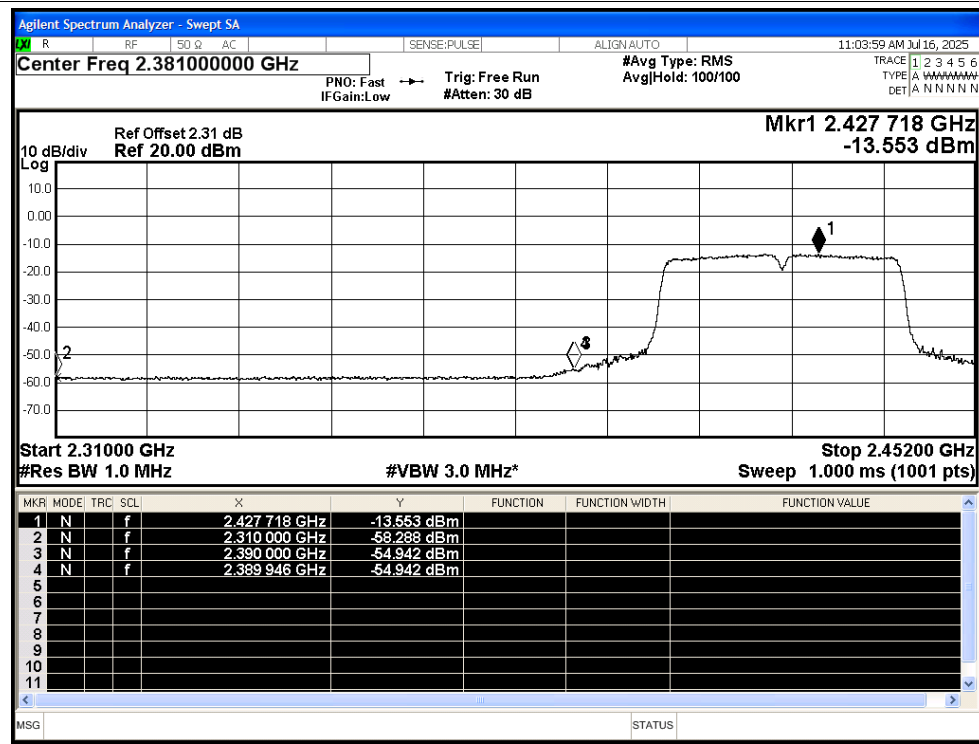
## Restrict Band NVNT n20 2462MHz Ant1 Average



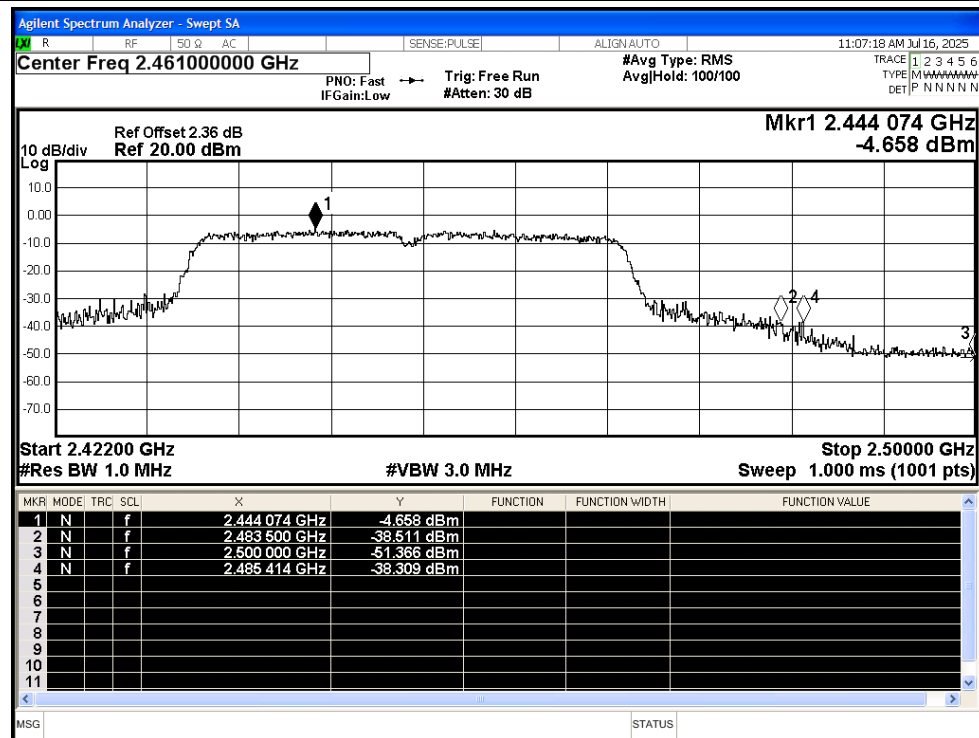
## Restrict Band NVNT n40 2422MHz Ant1 Peak



## Restrict Band NVNT n40 2422MHz Ant1 Average



## Restrict Band NVNT n40 2452MHz Ant1 Peak



## Restrict Band NVNT n40 2452MHz Ant1 Average

