



## Appendix A

### RF Test Data for BLE (Conducted Measurement)

Product Name: Portable locator device

Test Model: BF18

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23.1°C    |
| Relative Humidity: | 52.3%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Jay Luo   |
| Supervised by:     | Nick Peng |



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## A.1 -6dB Bandwidth

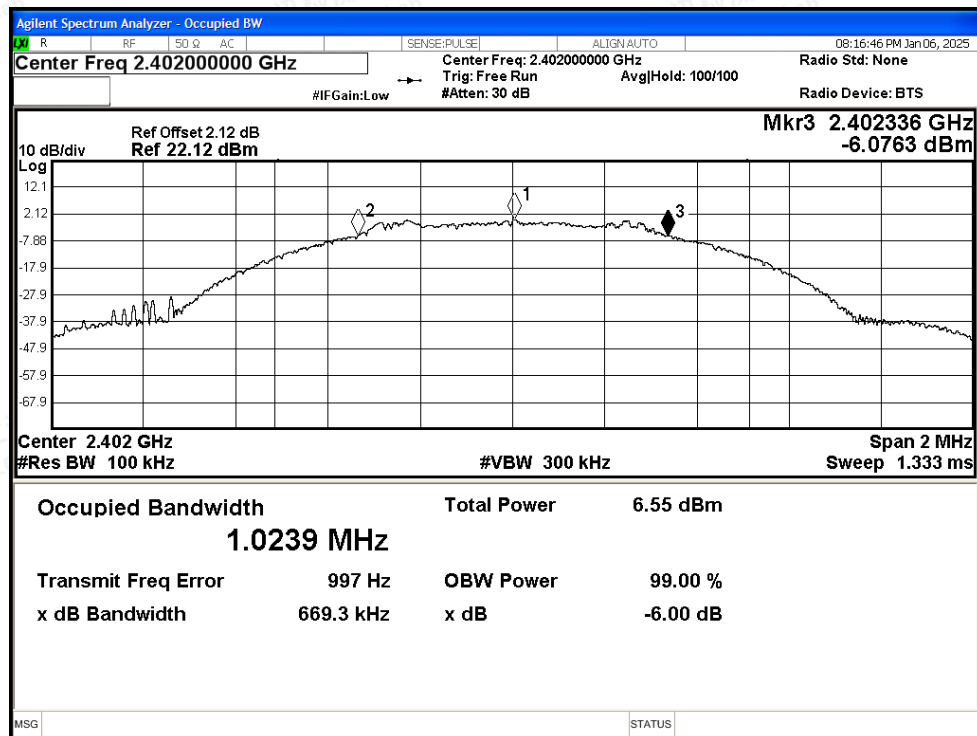
| Condition | Mode   | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|--------|-----------------|---------|-----------------------|-----------------------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 0.669                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 0.651                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 0.658                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 1.141                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 2M | 2440            | Ant1    | 1.131                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 1.157                 | $\geq 0.5$                  | Pass    |



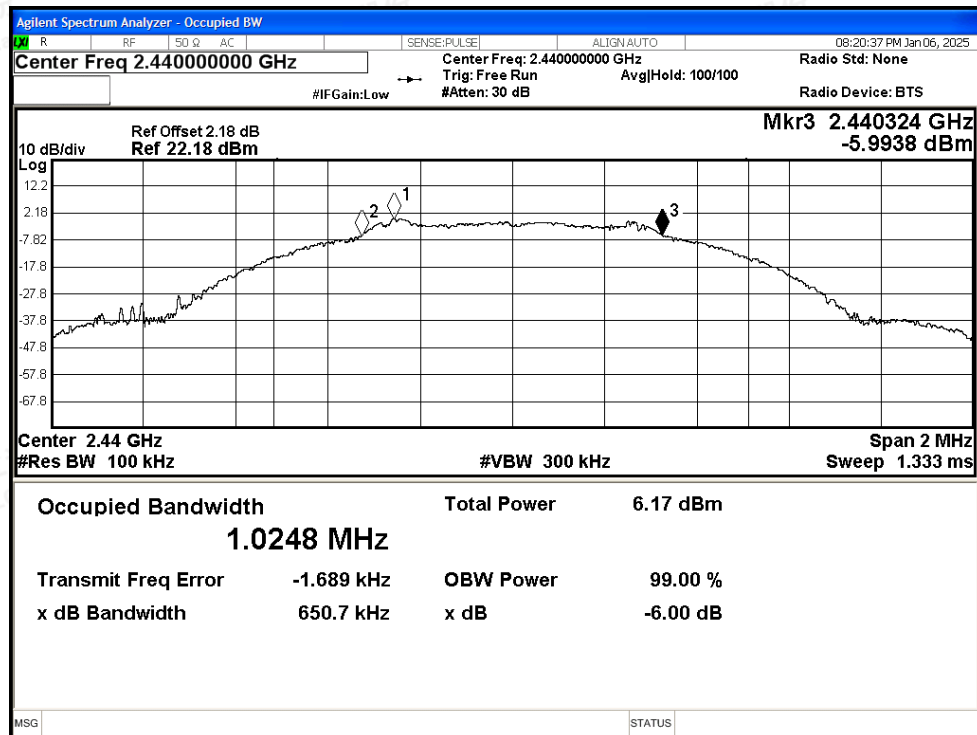


## Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1

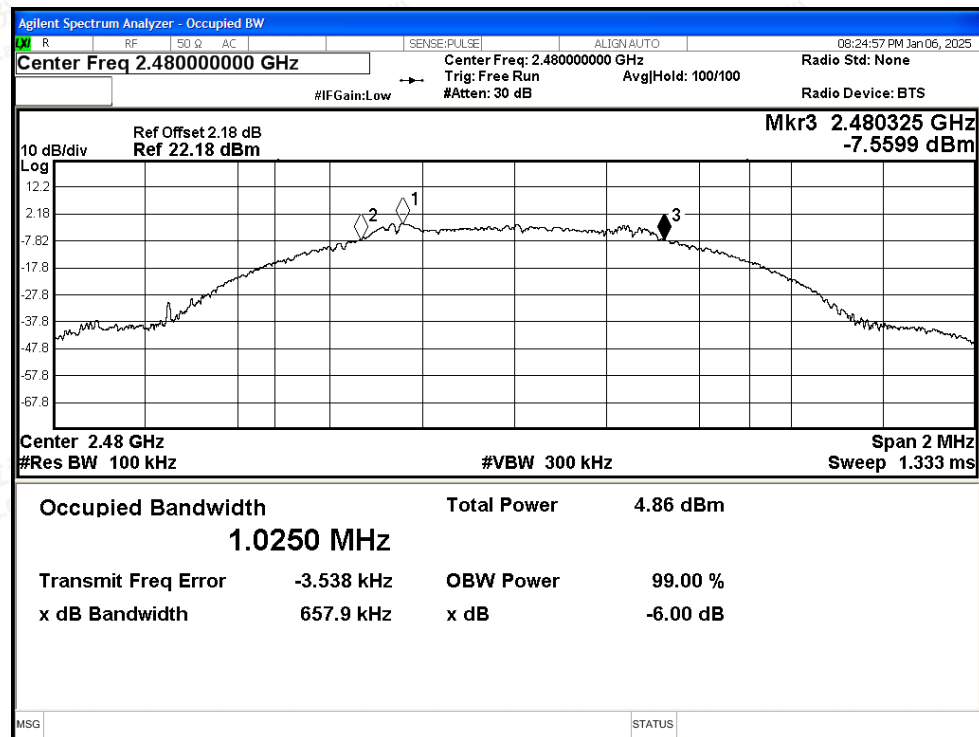


-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1

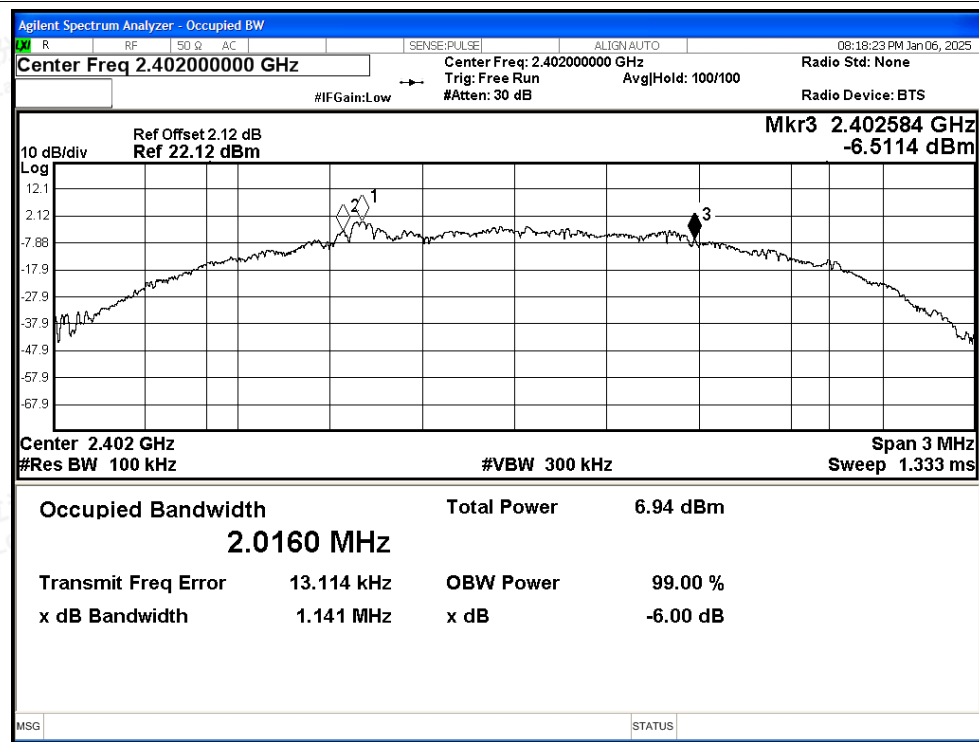




## -6dB Bandwidth NVNT BLE 1M 2480MHz Ant1

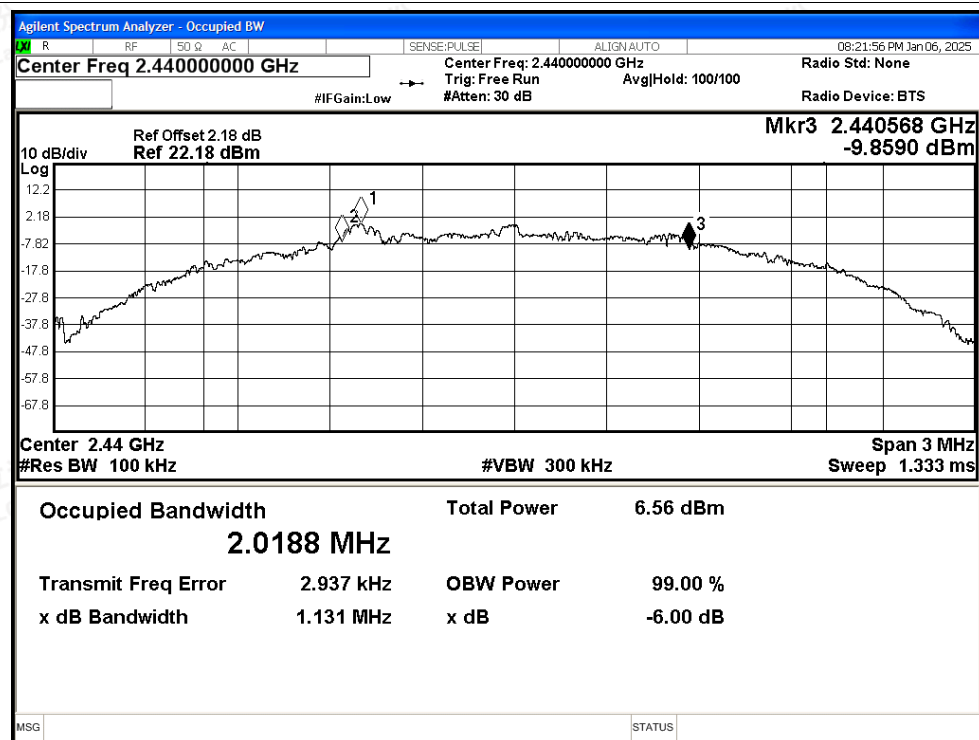


## -6dB Bandwidth NVNT BLE 2M 2402MHz Ant1

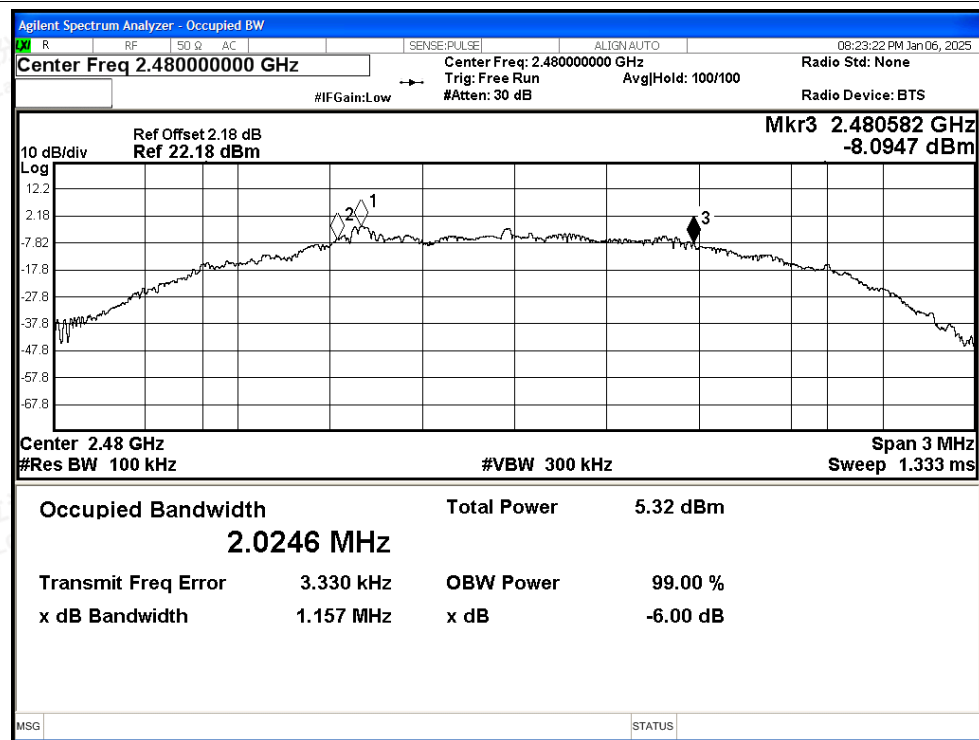




## -6dB Bandwidth NVNT BLE 2M 2440MHz Ant1



## -6dB Bandwidth NVNT BLE 2M 2480MHz Ant1



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## A.2 Maximum Conducted Output Power

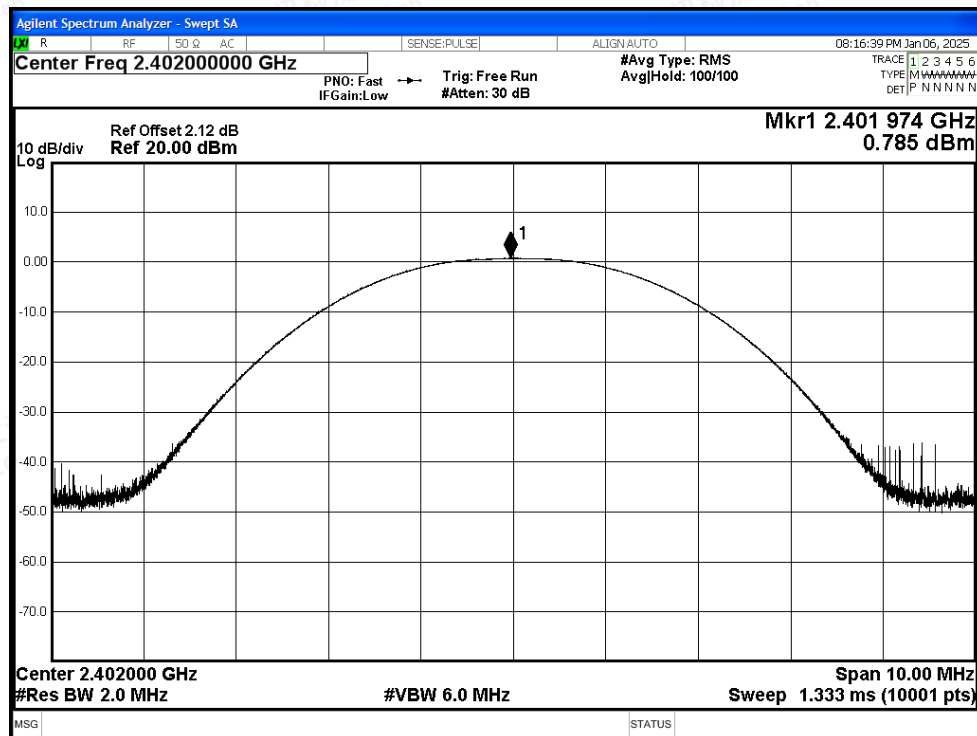
| Condition | Mode   | Frequency (MHz) | Antenna | Total Power (dBm) | Limit (dBm) | Verdict |
|-----------|--------|-----------------|---------|-------------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 0.79              | 30          | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 0.37              | 30          | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -0.94             | 30          | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 0.63              | 30          | Pass    |
| NVNT      | BLE 2M | 2440            | Ant1    | 0.12              | 30          | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | -1.09             | 30          | Pass    |



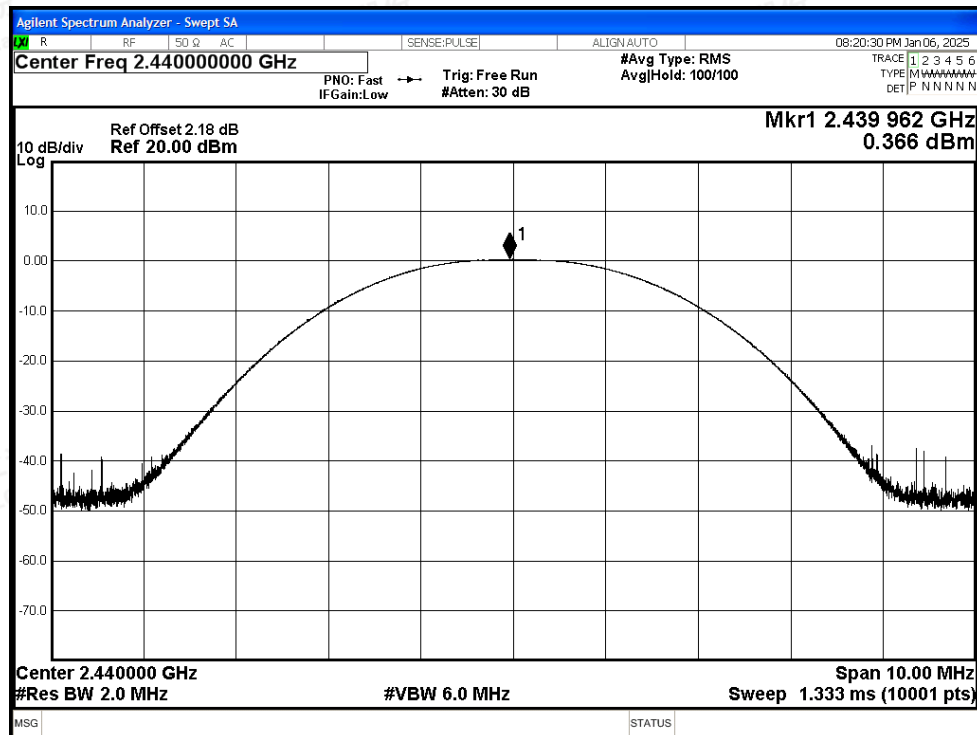


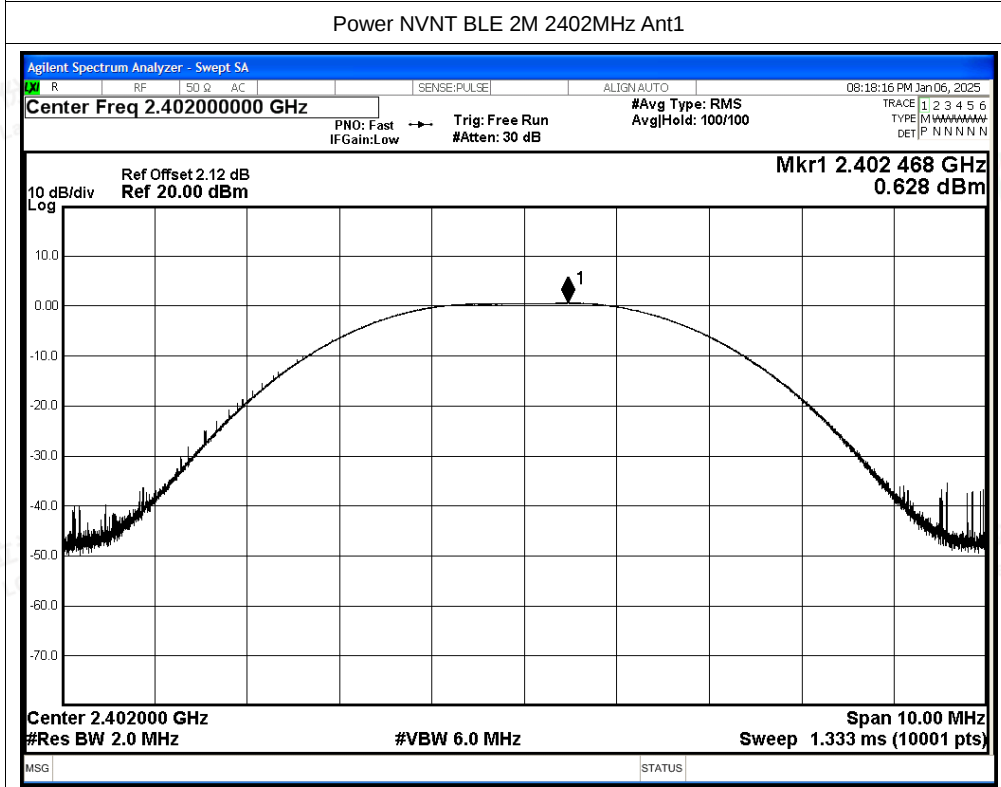
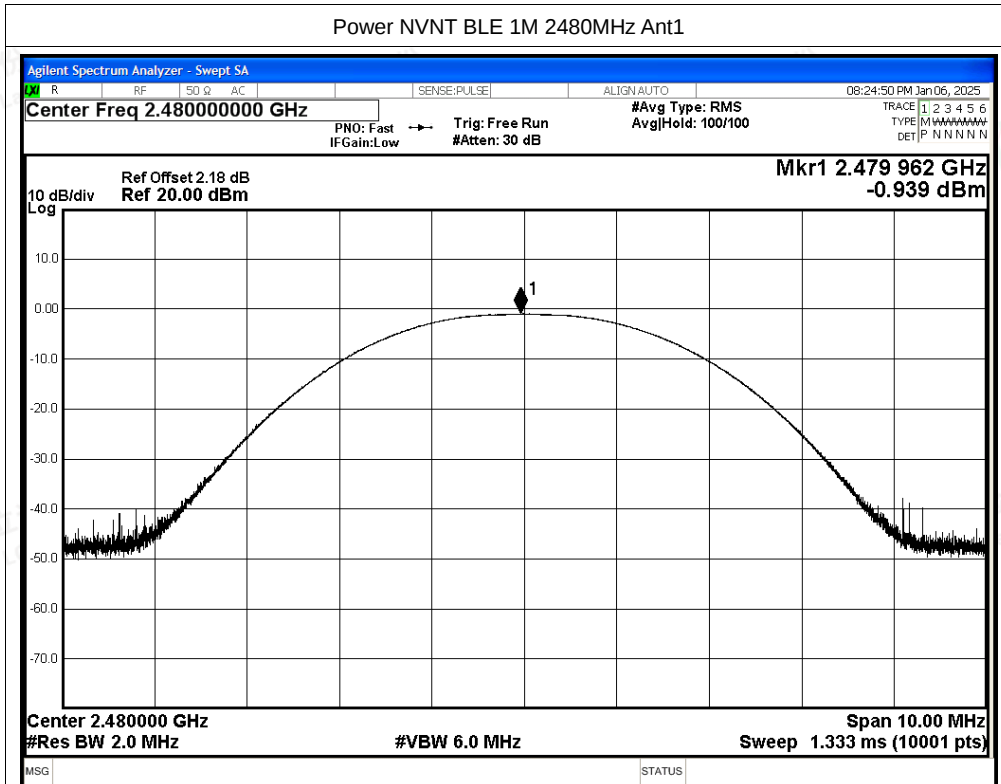
## Test Graphs

Power NVNT BLE 1M 2402MHz Ant1



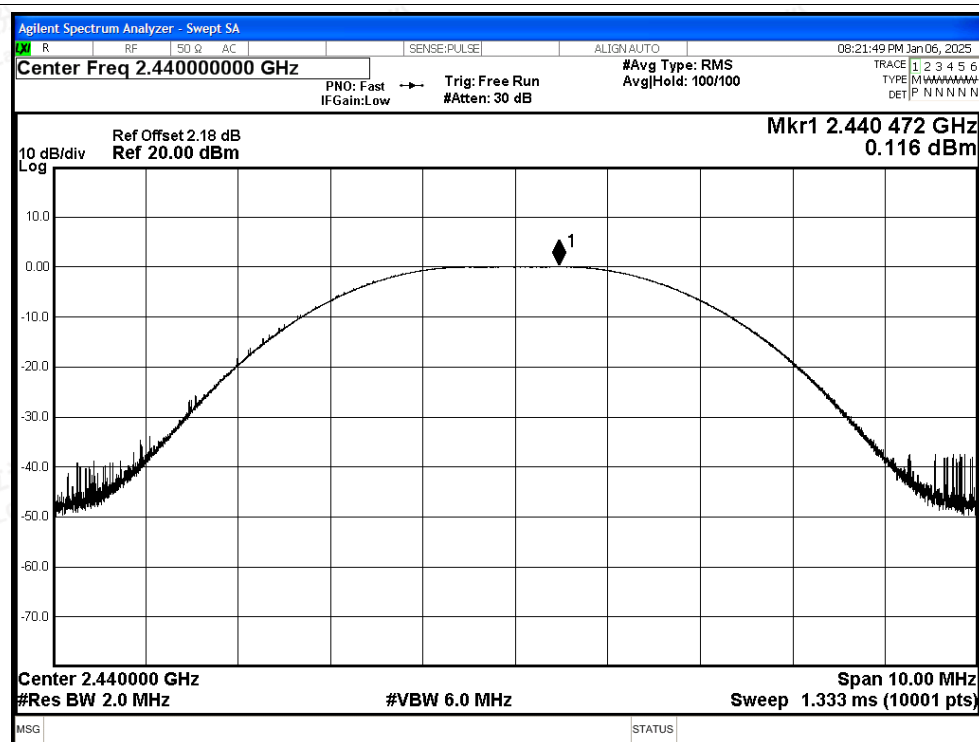
Power NVNT BLE 1M 2440MHz Ant1



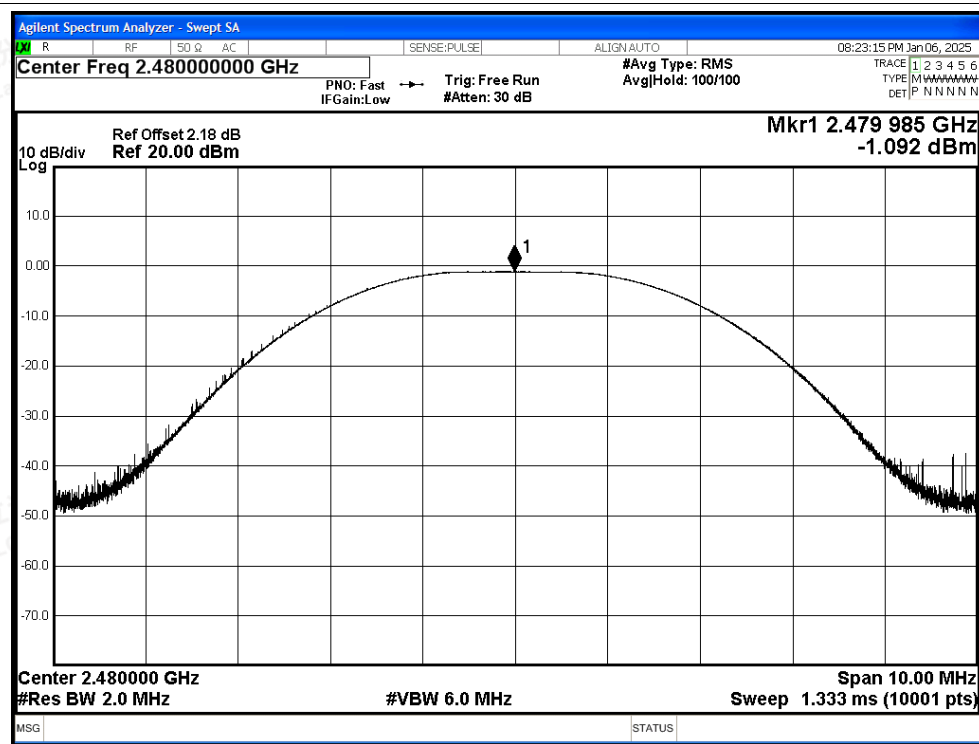




Power NVNT BLE 2M 2440MHz Ant1



Power NVNT BLE 2M 2480MHz Ant1





### A.3 Maximum Power Spectral Density Level

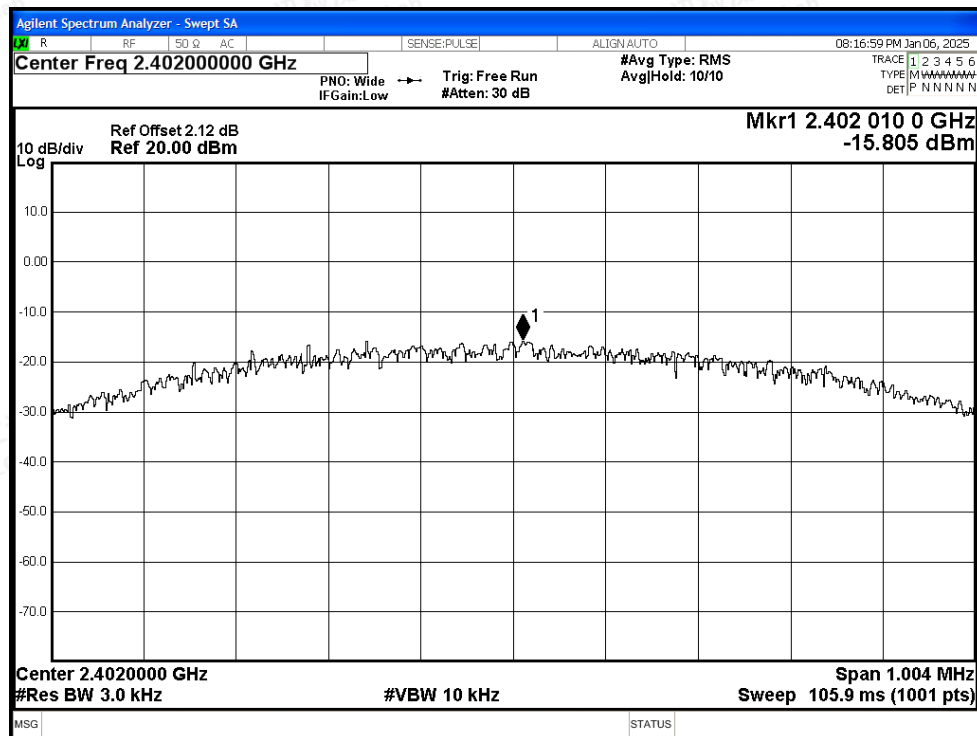
| Condition | Mode   | Frequency<br>(MHz) | Antenna | Total PSD<br>(dBm/3kHz) | Limit<br>(dBm/3kHz) | Verdict |
|-----------|--------|--------------------|---------|-------------------------|---------------------|---------|
| NVNT      | BLE 1M | 2402               | Ant1    | -15.81                  | 8                   | Pass    |
| NVNT      | BLE 1M | 2440               | Ant1    | -16.39                  | 8                   | Pass    |
| NVNT      | BLE 1M | 2480               | Ant1    | -17.46                  | 8                   | Pass    |
| NVNT      | BLE 2M | 2402               | Ant1    | -19.48                  | 8                   | Pass    |
| NVNT      | BLE 2M | 2440               | Ant1    | -19.48                  | 8                   | Pass    |
| NVNT      | BLE 2M | 2480               | Ant1    | -20.85                  | 8                   | Pass    |



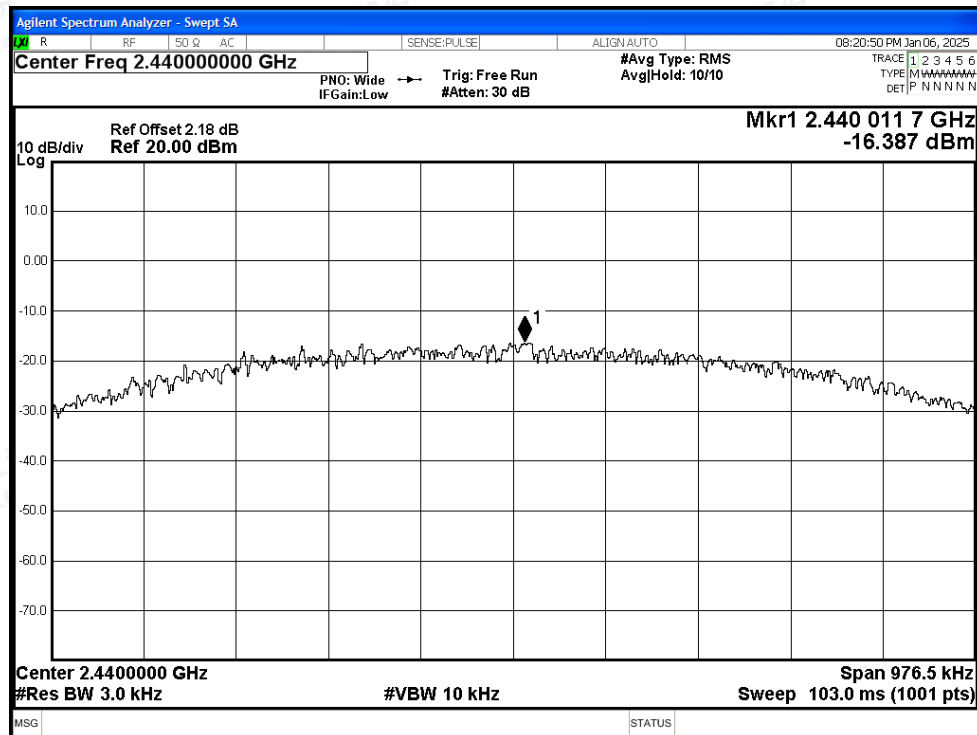


## Test Graphs

PSD NVNT BLE 1M 2402MHz Ant1

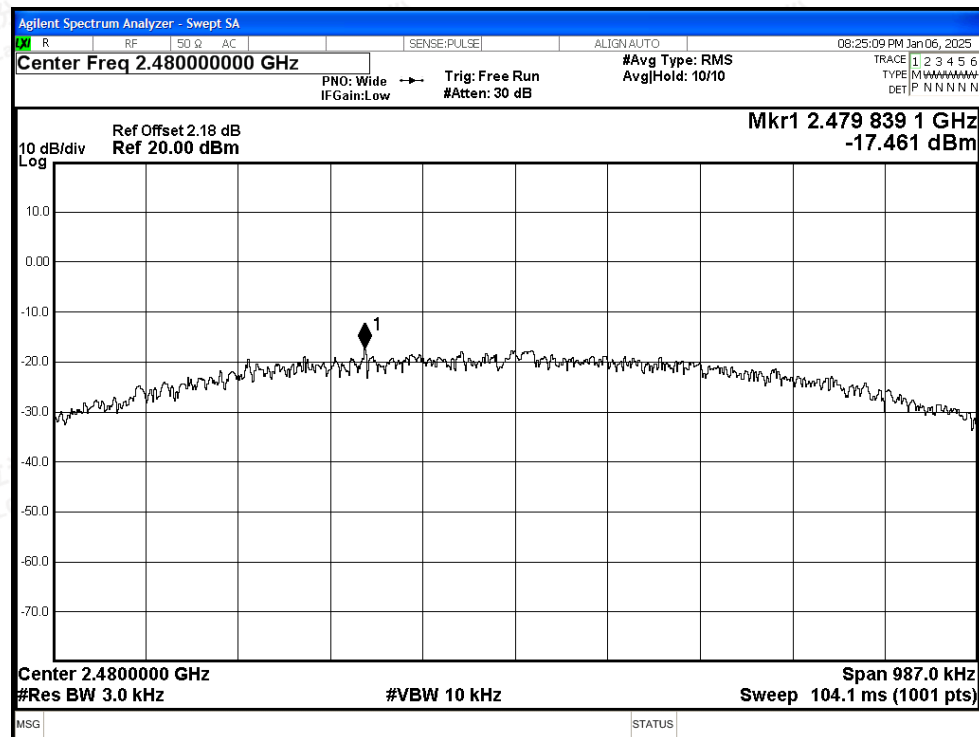


PSD NVNT BLE 1M 2440MHz Ant1

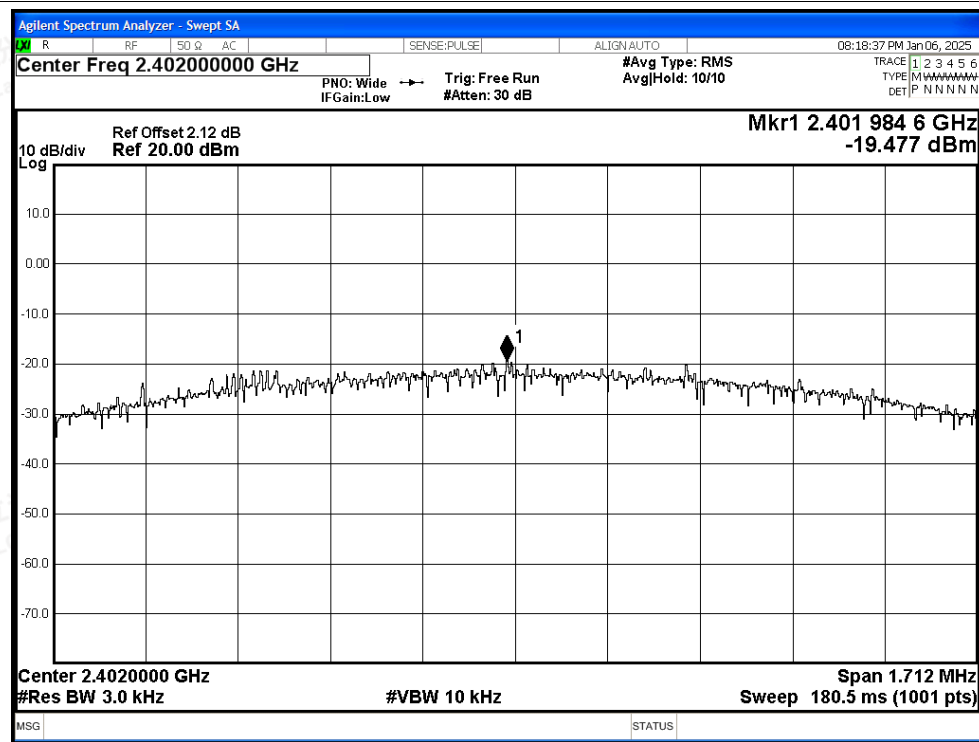




## PSD NVNT BLE 1M 2480MHz Ant1

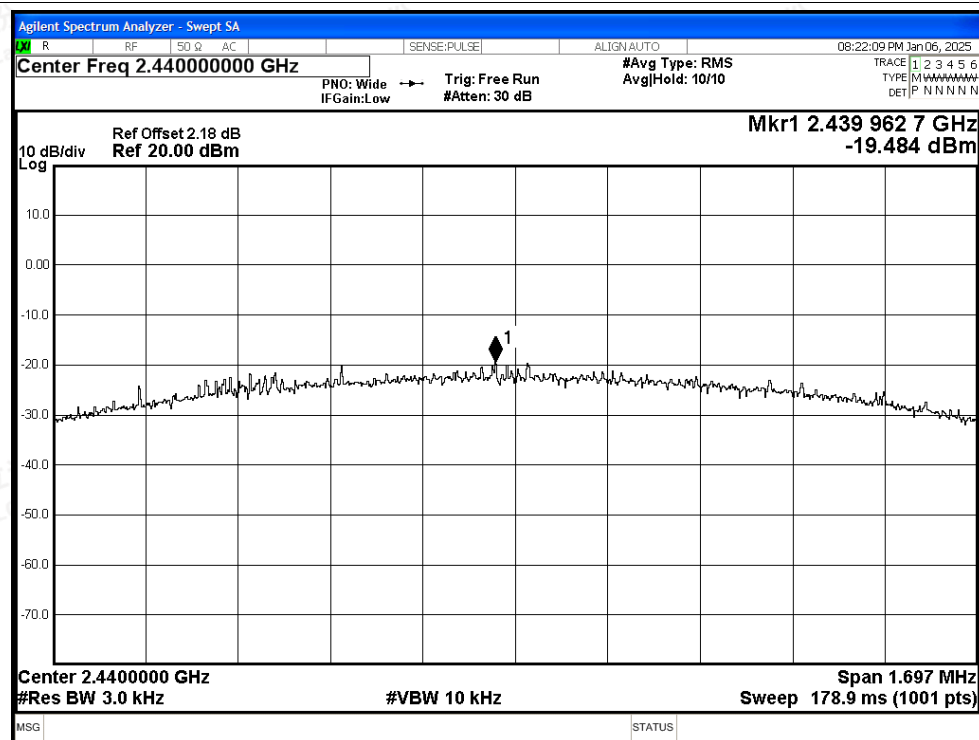


## PSD NVNT BLE 2M 2402MHz Ant1

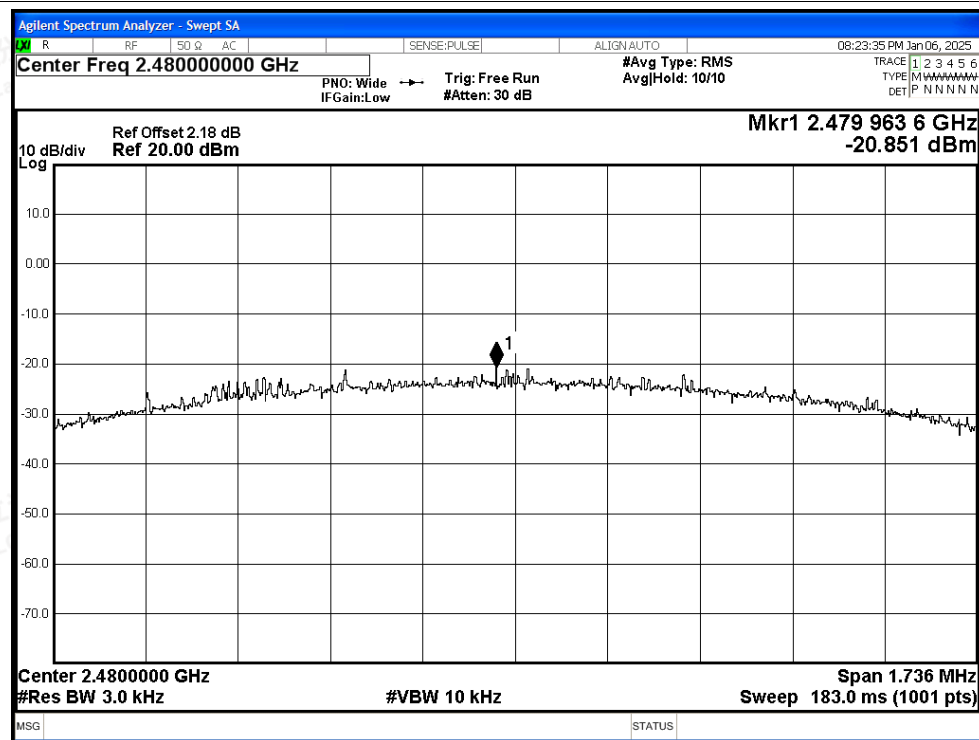




PSD NVNT BLE 2M 2440MHz Ant1



PSD NVNT BLE 2M 2480MHz Ant1





## A.4 Band Edge

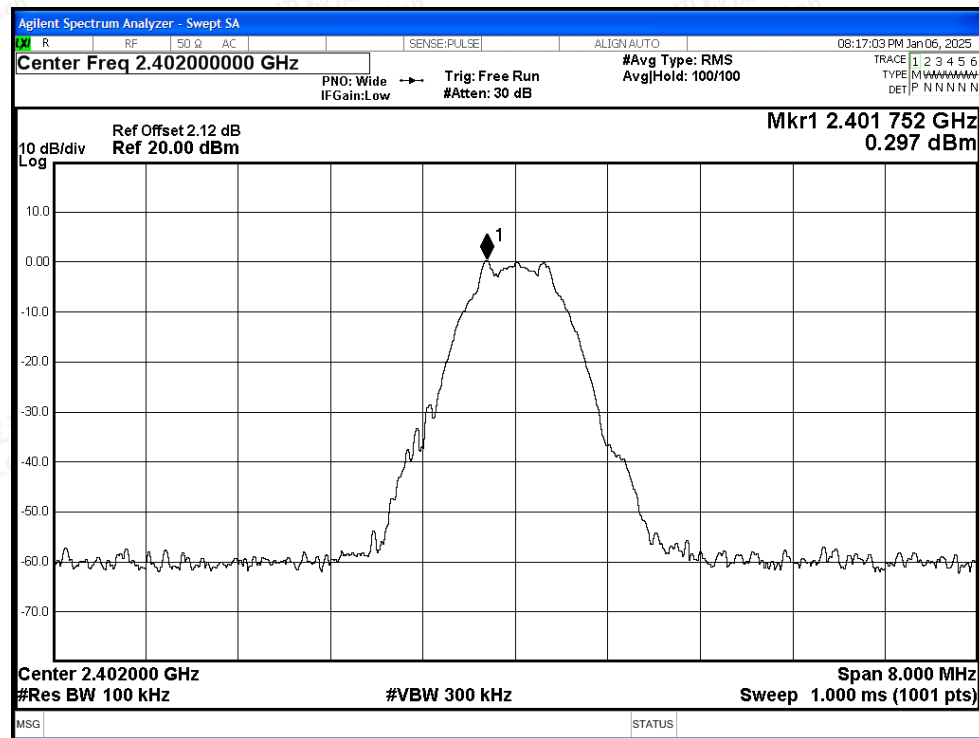
| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -56.74          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -55.63          | -20         | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | -44.91          | -20         | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | -55.89          | -20         | Pass    |



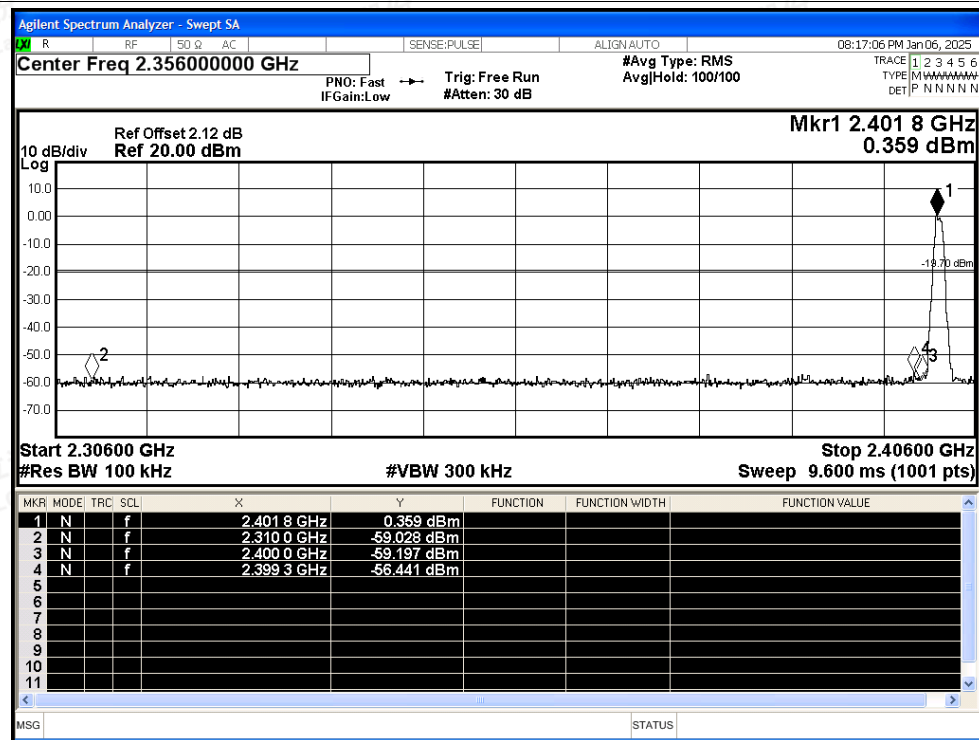


## Test Graphs

## Band Edge NVNT BLE 1M 2402MHz Ant1 Ref

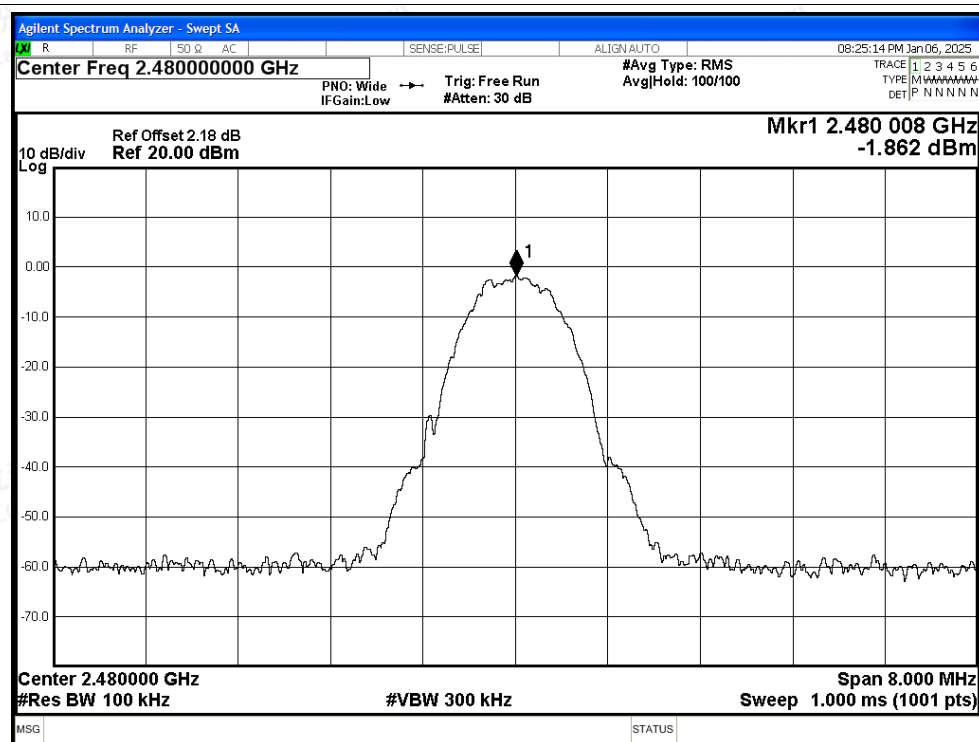


## Band Edge NVNT BLE 1M 2402MHz Ant1 Emission

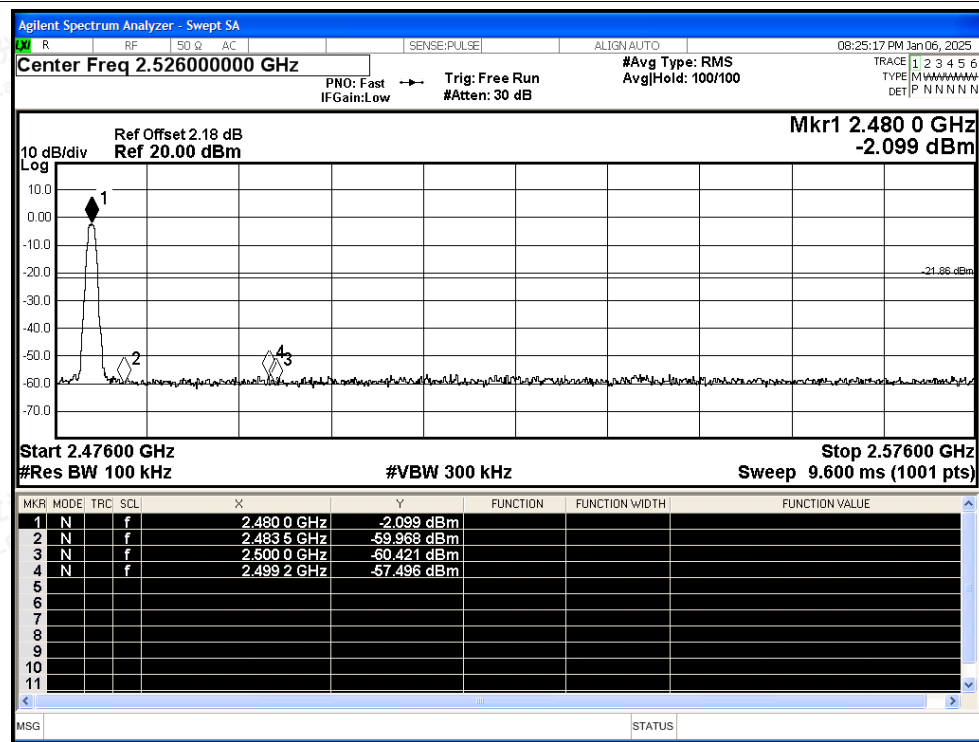




## Band Edge NVNT BLE 1M 2480MHz Ant1 Ref

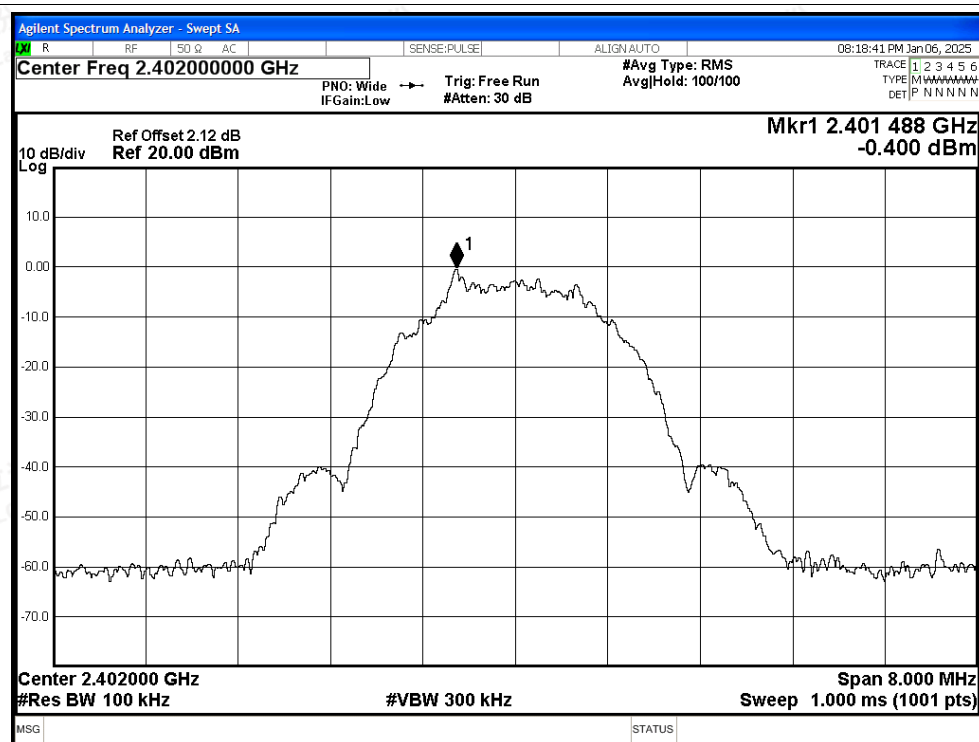


## Band Edge NVNT BLE 1M 2480MHz Ant1 Emission

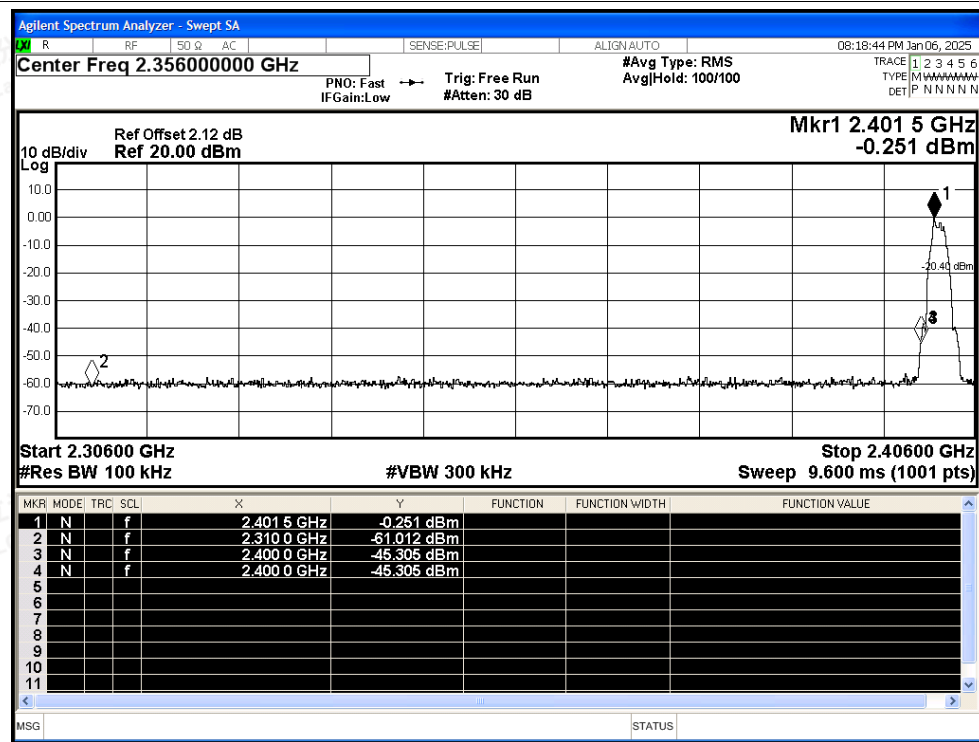




## Band Edge NVNT BLE 2M 2402MHz Ant1 Ref

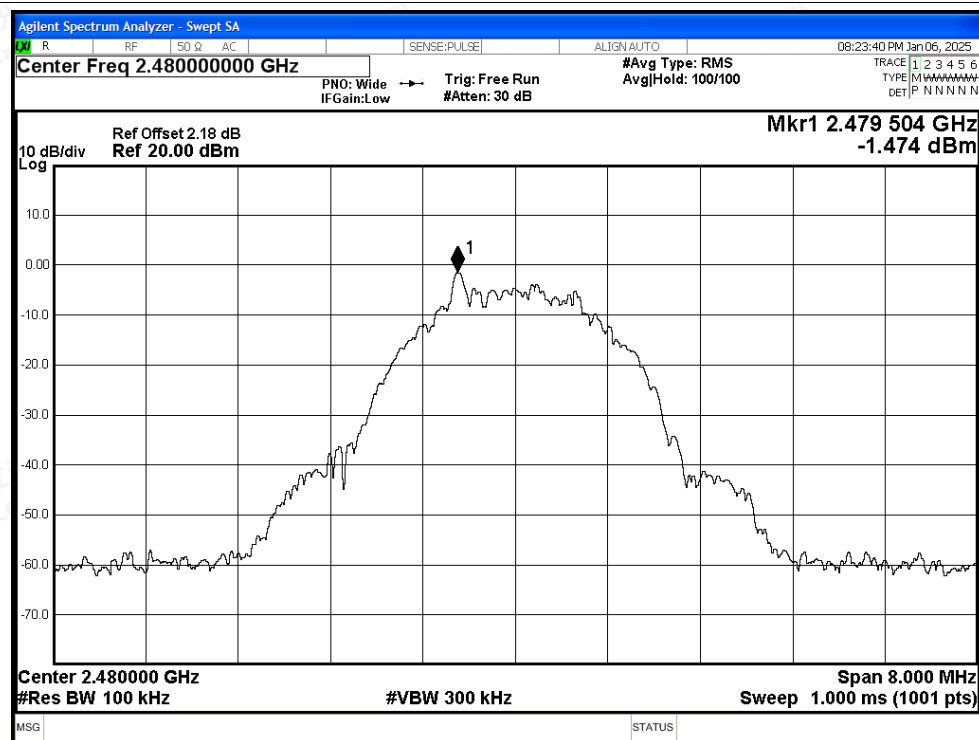


## Band Edge NVNT BLE 2M 2402MHz Ant1 Emission

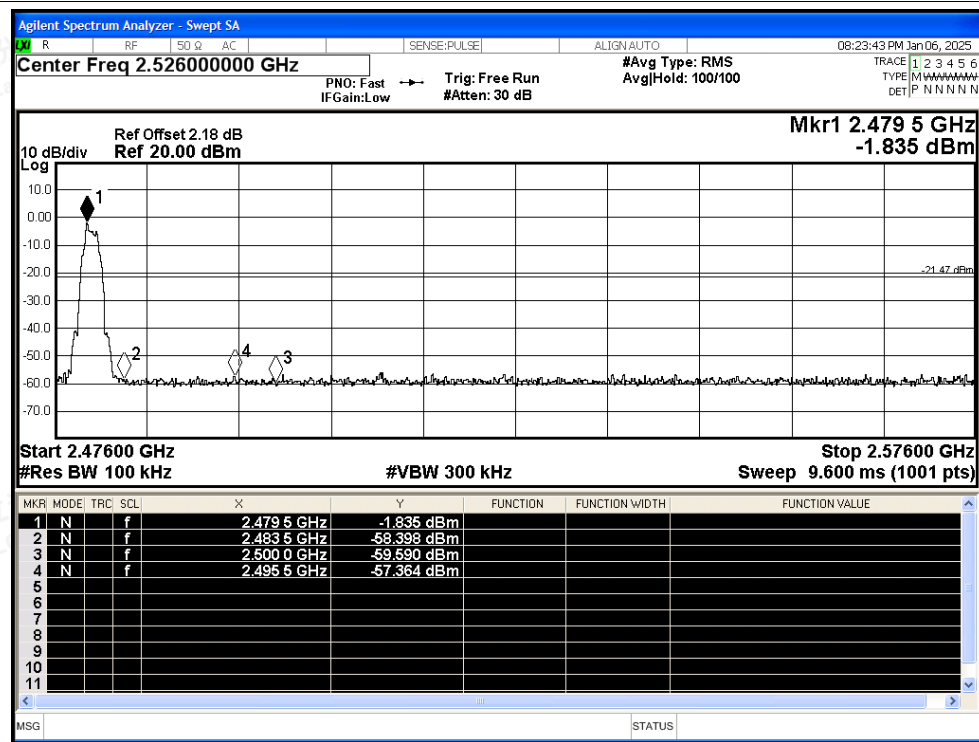




## Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



## Band Edge NVNT BLE 2M 2480MHz Ant1 Emission



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## A.5 Conducted RF Spurious Emission

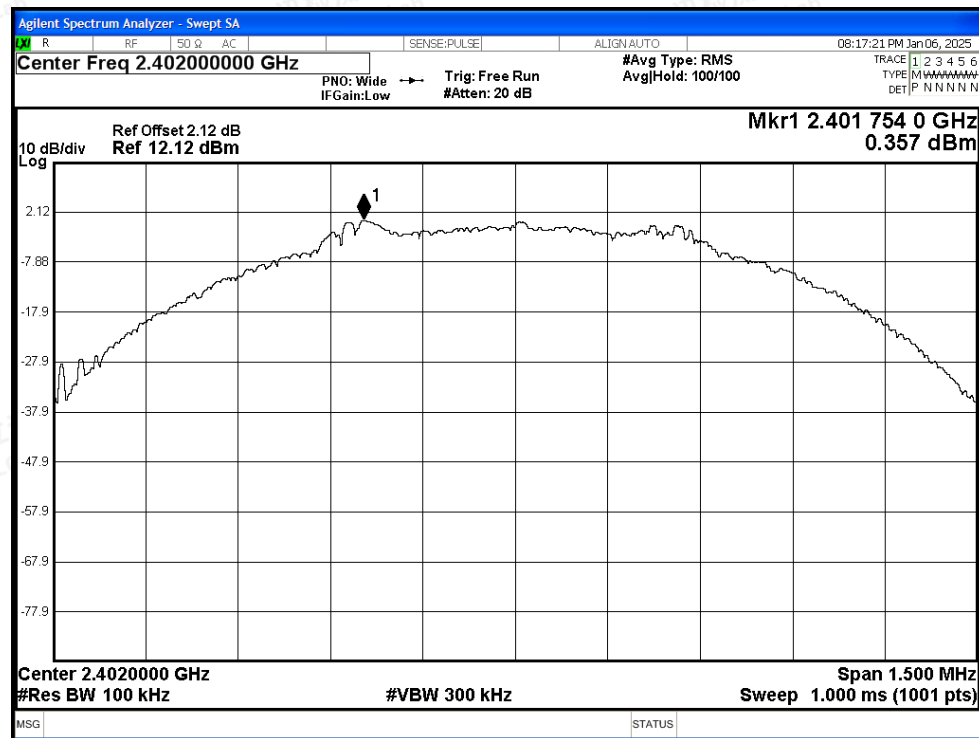
| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -55.02          | -20         | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -55.04          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -53.73          | -20         | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | -54.88          | -20         | Pass    |
| NVNT      | BLE 2M | 2440            | Ant1    | -54.26          | -20         | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | -52.28          | -20         | Pass    |



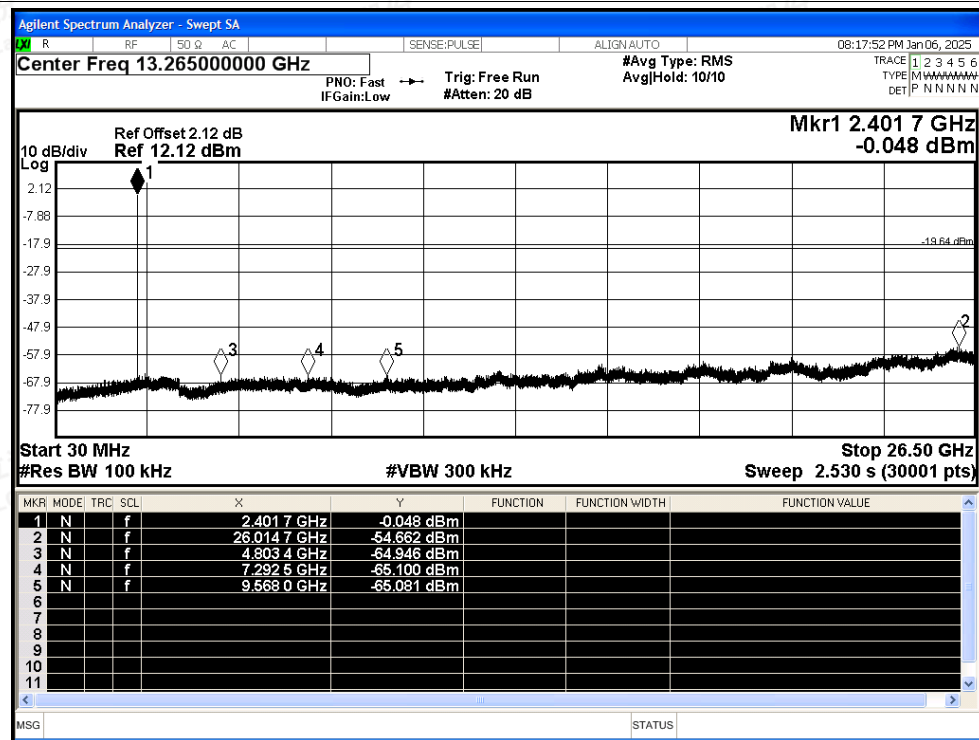


## Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

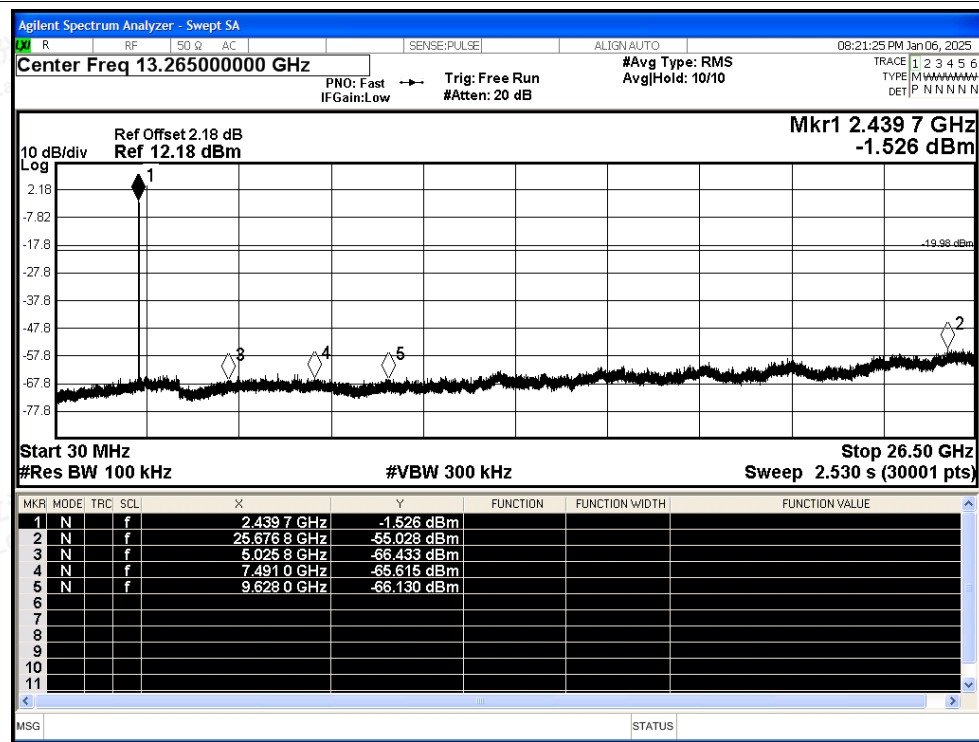




## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref

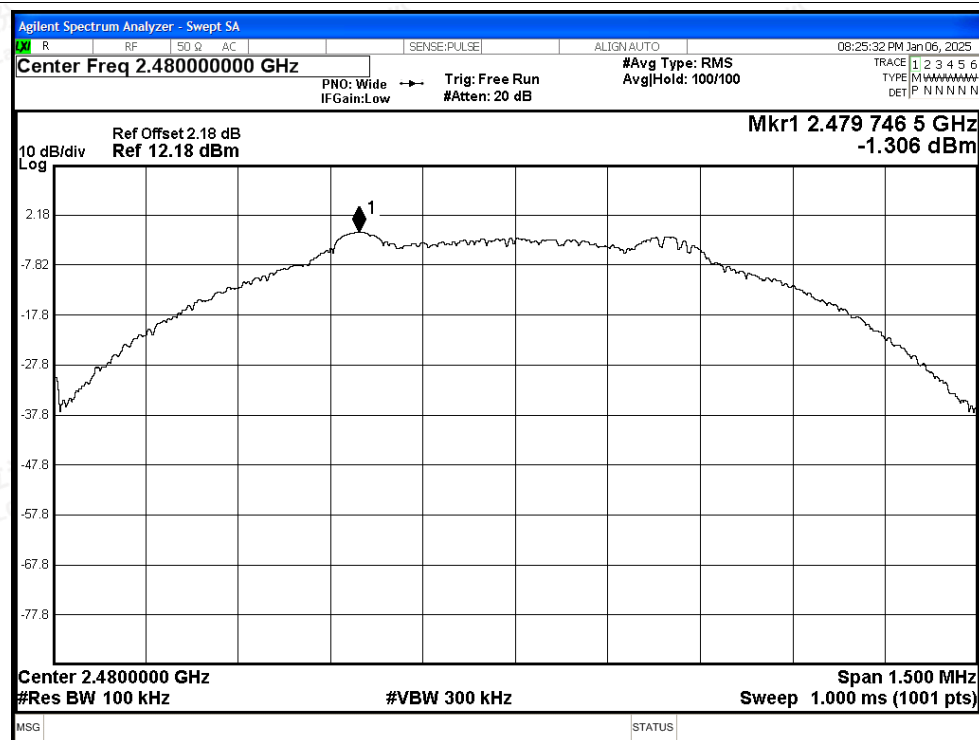


## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission

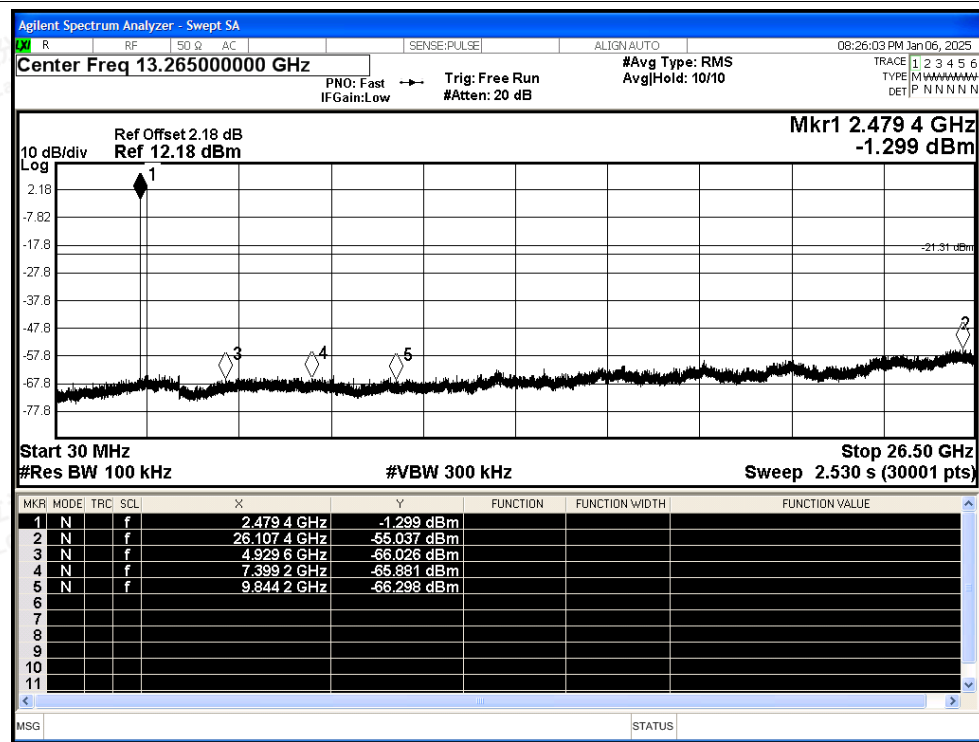




## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref

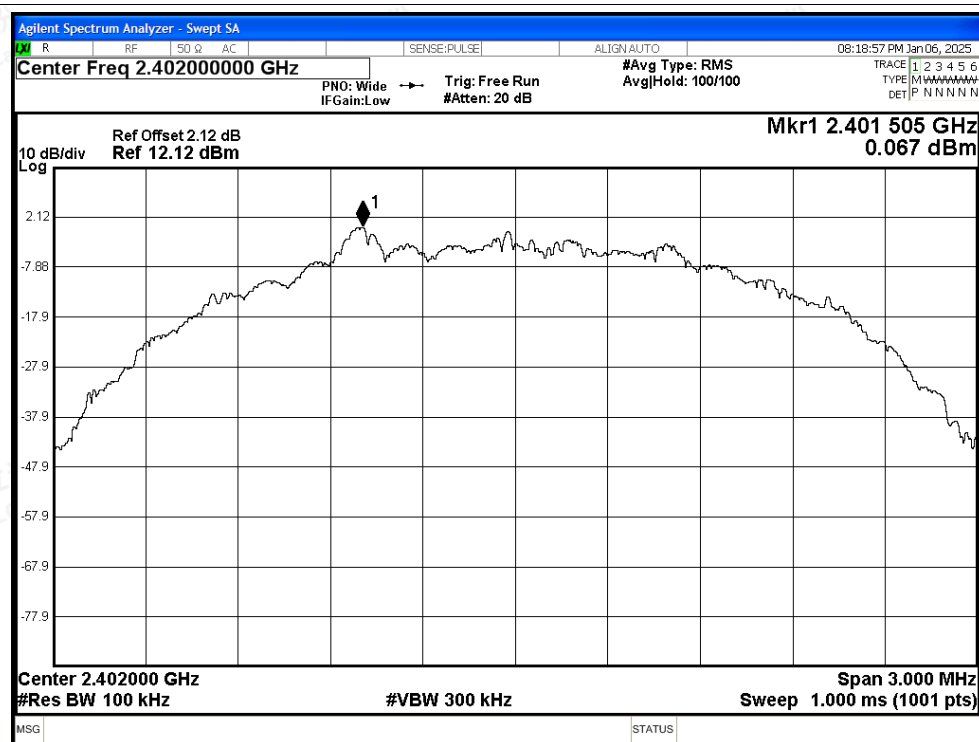


## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission

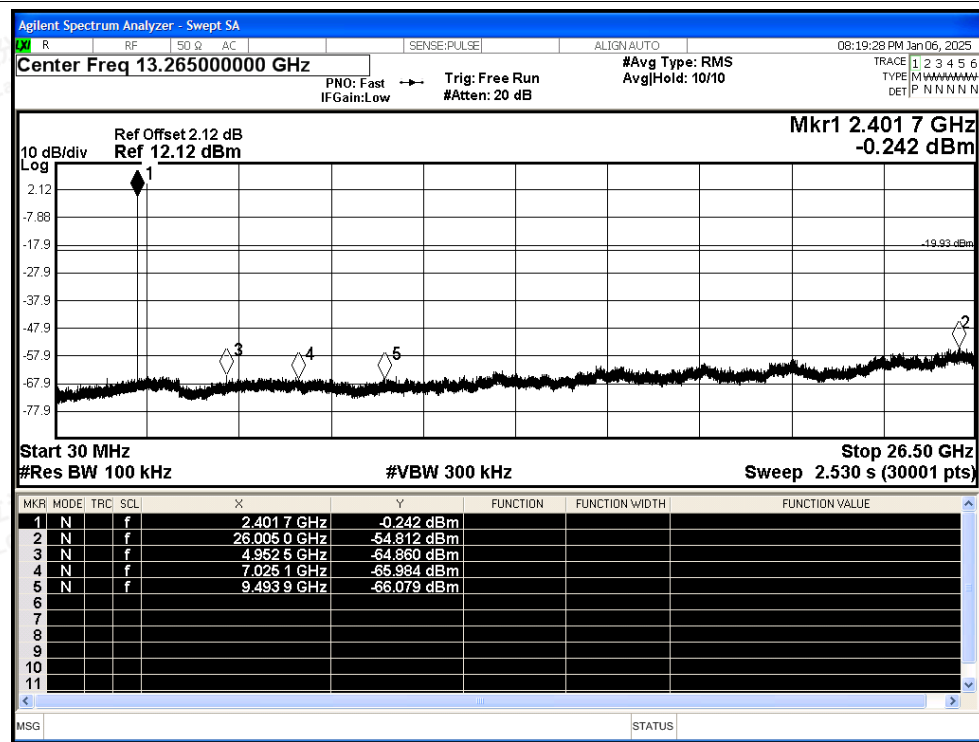




## Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



## Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission

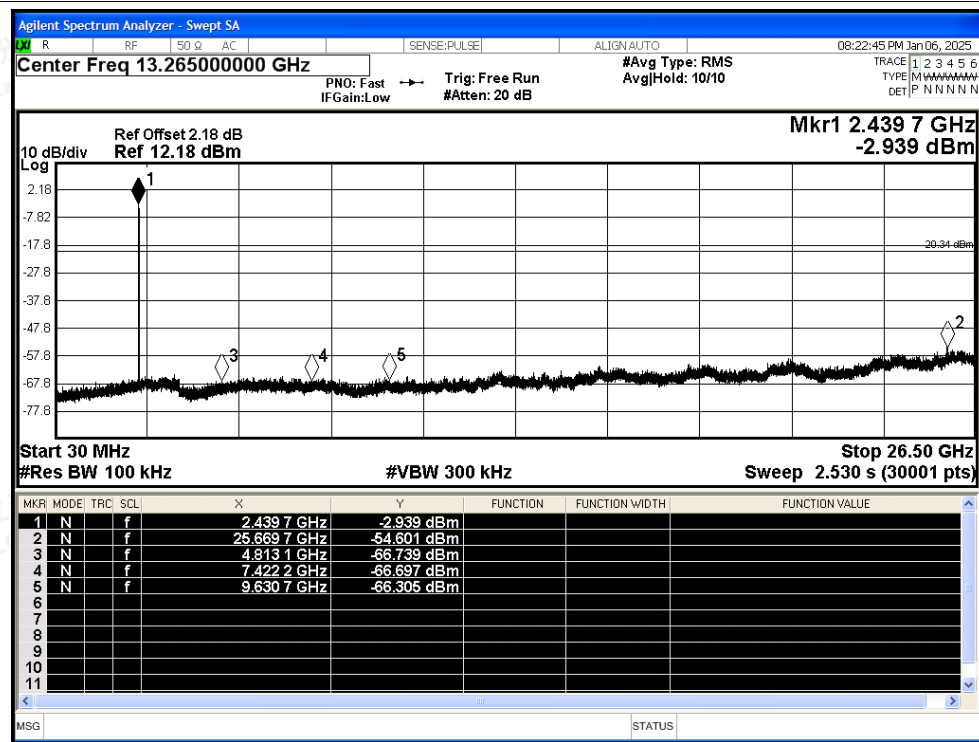




## Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Ref

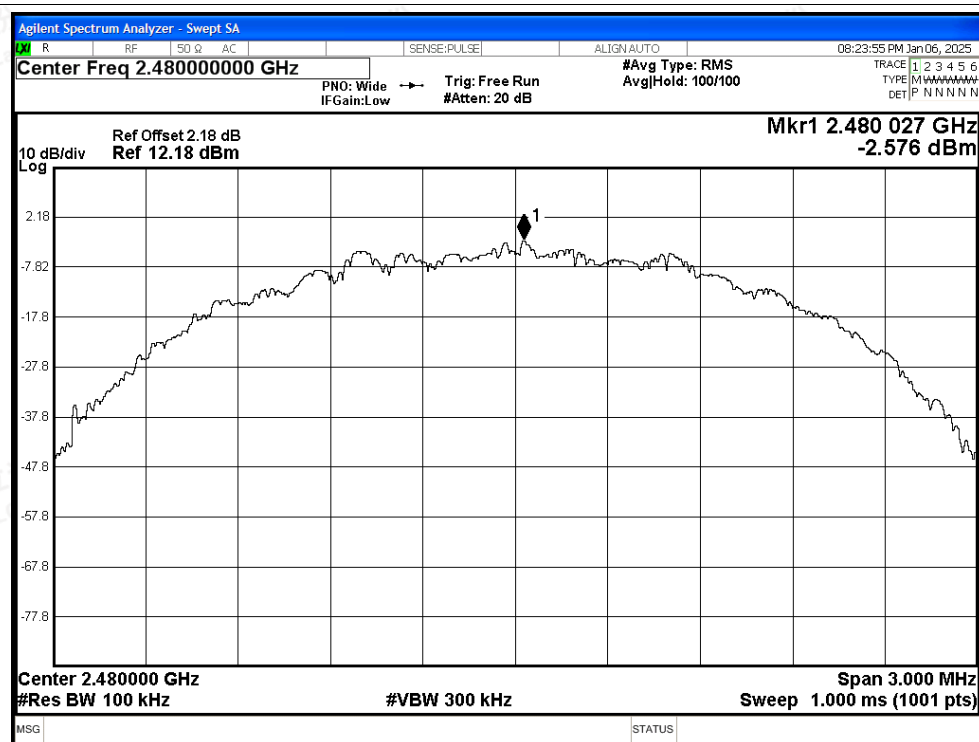


## Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Emission

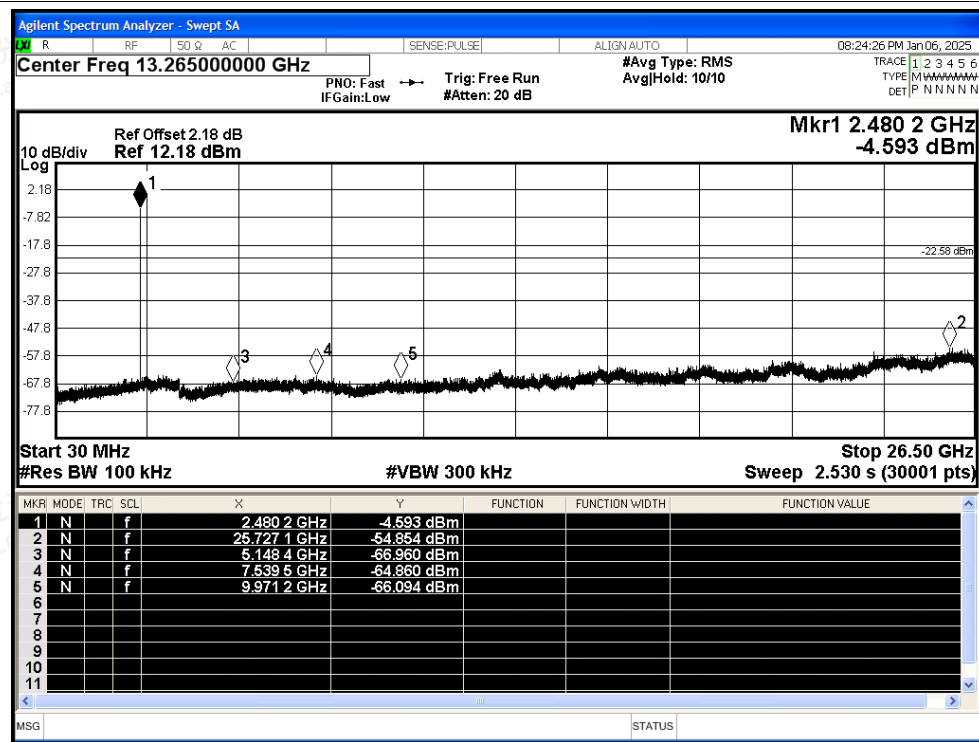




## Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref



## Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission





## A.6 Duty Cycle

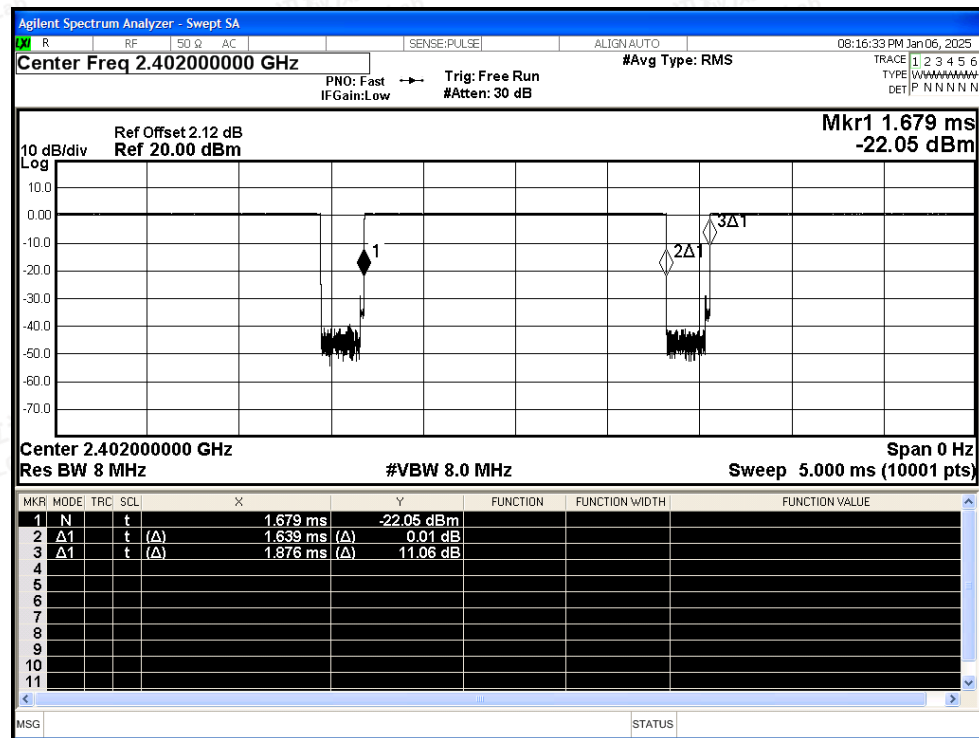
| Condition | Mode   | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|-----------|--------|-----------------|---------|----------------|------------------------|-----------|
| NVNT      | BLE 1M | 2402            | Ant1    | 87.39          | 0.59                   | 0.61      |
| NVNT      | BLE 1M | 2440            | Ant1    | 87.39          | 0.59                   | 0.61      |
| NVNT      | BLE 1M | 2480            | Ant1    | 87.39          | 0.59                   | 0.61      |
| NVNT      | BLE 2M | 2402            | Ant1    | 65.96          | 1.81                   | 1.21      |
| NVNT      | BLE 2M | 2440            | Ant1    | 65.93          | 1.81                   | 1.21      |
| NVNT      | BLE 2M | 2480            | Ant1    | 65.92          | 1.81                   | 1.21      |



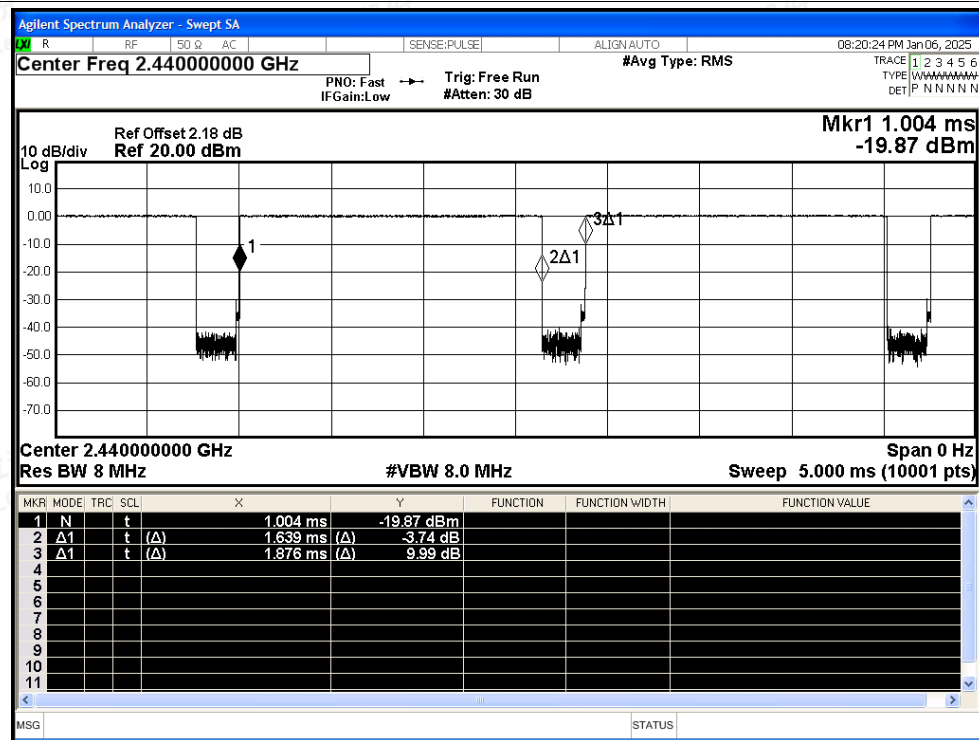


## Test Graphs

## Duty Cycle NVNT BLE 1M 2402MHz Ant1

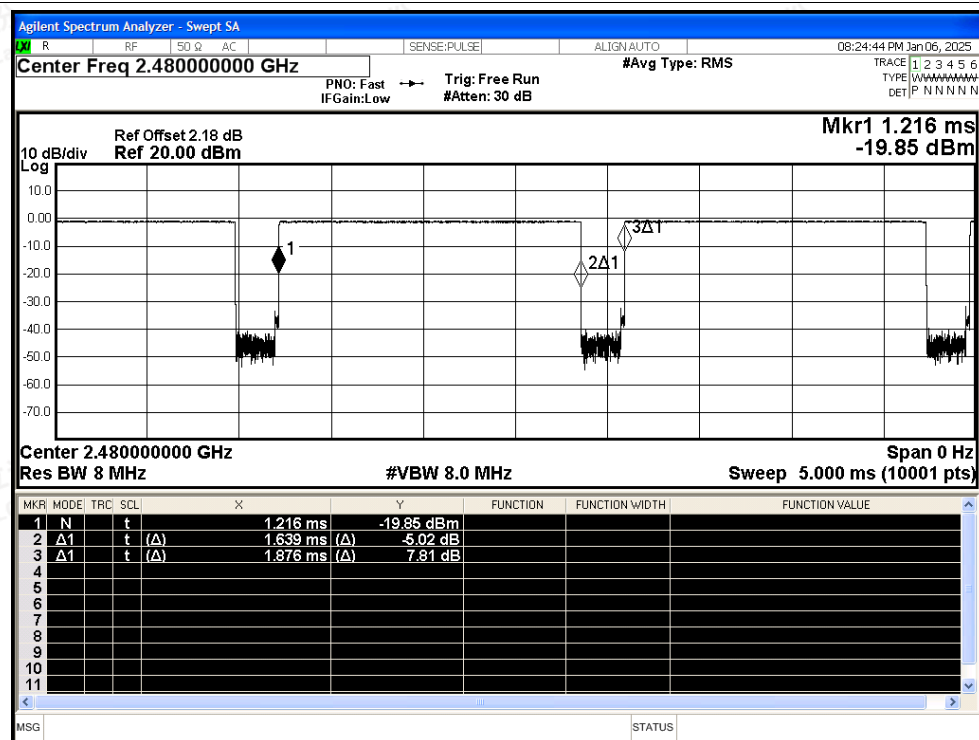


## Duty Cycle NVNT BLE 1M 2440MHz Ant1

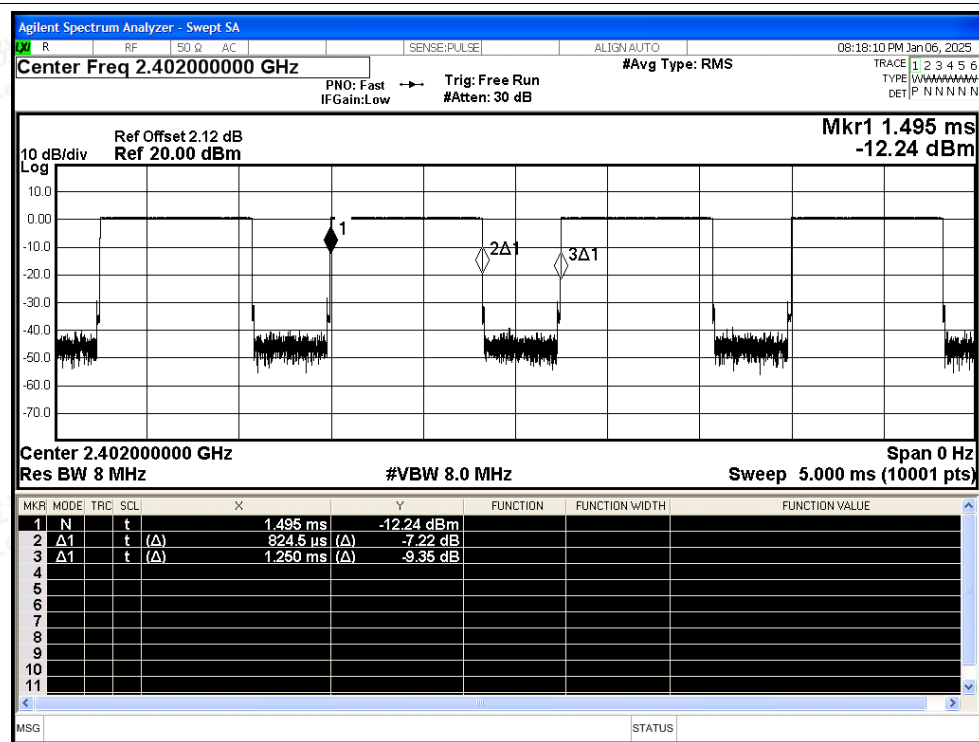




## Duty Cycle NVNT BLE 1M 2480MHz Ant1

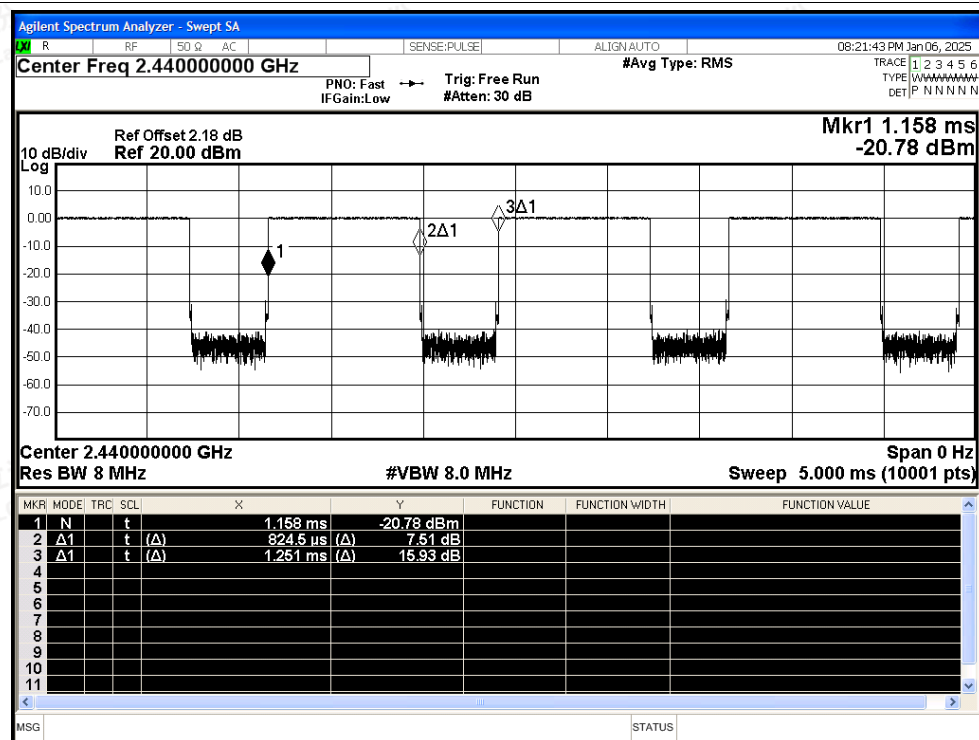


## Duty Cycle NVNT BLE 2M 2402MHz Ant1

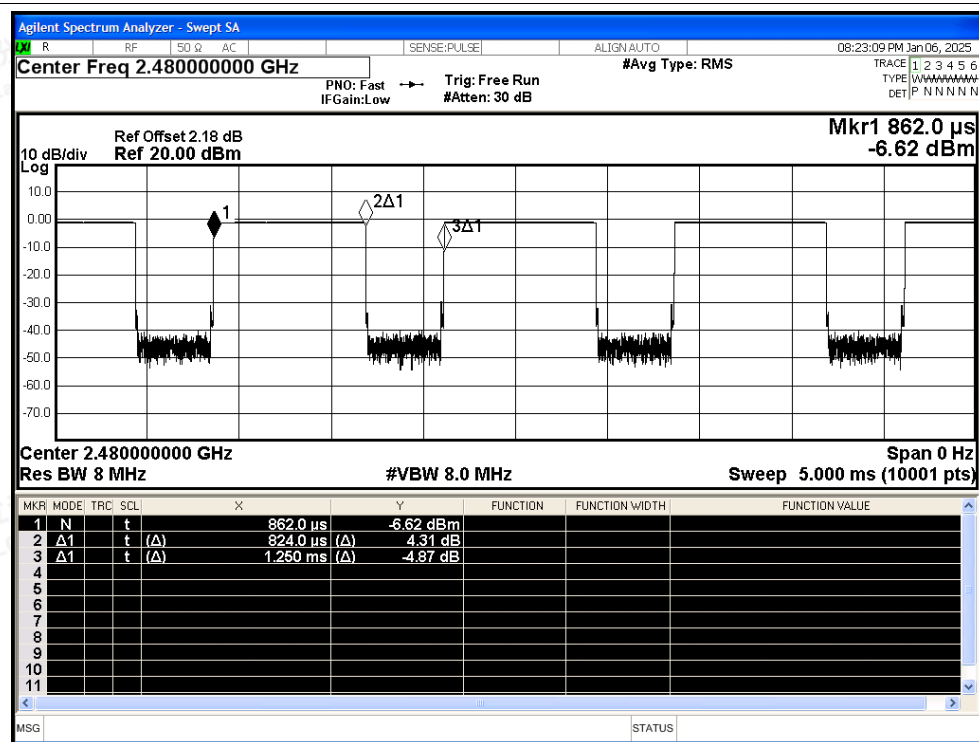




## Duty Cycle NVNT BLE 2M 2440MHz Ant1



## Duty Cycle NVNT BLE 2M 2480MHz Ant1





## A.7 Restrict Band

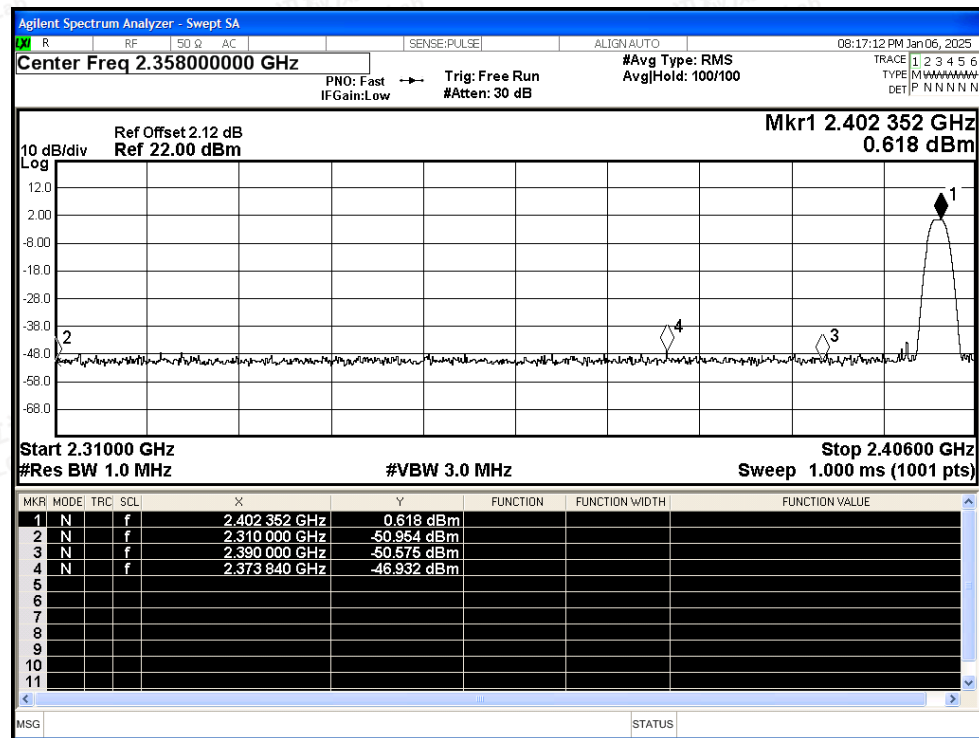
| Condition | Mode   | Frequency (MHz) | Antenna | Spur Freq (MHz) | Power (dBm) | Gain (dBi) | Duty Factor (dB) | E (dBuV/m) | Detector | Limit (dBuV/m) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|------------|------------------|------------|----------|----------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -50.95      | 2.67       | -                | 46.98      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -58.72      | 2.67       | 0.59             | 39.80      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2373.84         | -46.93      | 2.67       | -                | 51.00      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2389.488        | -58.03      | 2.67       | 0.59             | 40.49      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -50.58      | 2.67       | -                | 47.35      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -58.31      | 2.67       | 0.59             | 40.21      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -48.4       | 2.67       | -                | 49.53      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -57.59      | 2.67       | 0.59             | 40.93      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2484.4          | -43.6       | 2.67       | -                | 54.33      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2484.736        | -57.44      | 2.67       | 0.59             | 41.08      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -50.99      | 2.67       | -                | 46.94      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -57.94      | 2.67       | 0.59             | 40.58      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2310            | -50.05      | 2.67       | -                | 47.88      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2310            | -58.53      | 2.67       | 1.81             | 41.21      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2346.48         | -47.02      | 2.67       | -                | 50.91      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2344.272        | -57.64      | 2.67       | 1.81             | 42.10      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2390            | -49.9       | 2.67       | -                | 48.03      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2390            | -58.26      | 2.67       | 1.81             | 41.48      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2483.5          | -49.65      | 2.67       | -                | 48.28      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2483.5          | -57.56      | 2.67       | 1.81             | 42.18      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2484.424        | -44.16      | 2.67       | -                | 53.77      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2483.632        | -57.02      | 2.67       | 1.81             | 42.72      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2500            | -49.19      | 2.67       | -                | 48.74      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2500            | -58.38      | 2.67       | 1.81             | 41.36      | Average  | 54             | Pass    |



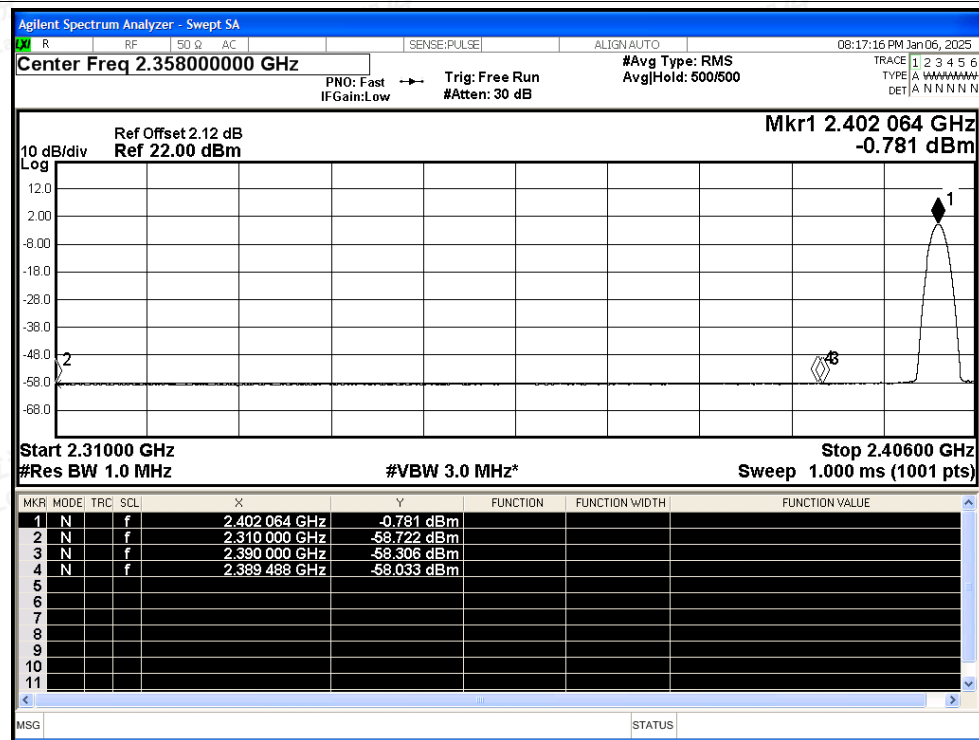


## Test Graphs

## Restrict Band NVNT BLE 1M 2402MHz Ant1 Peak

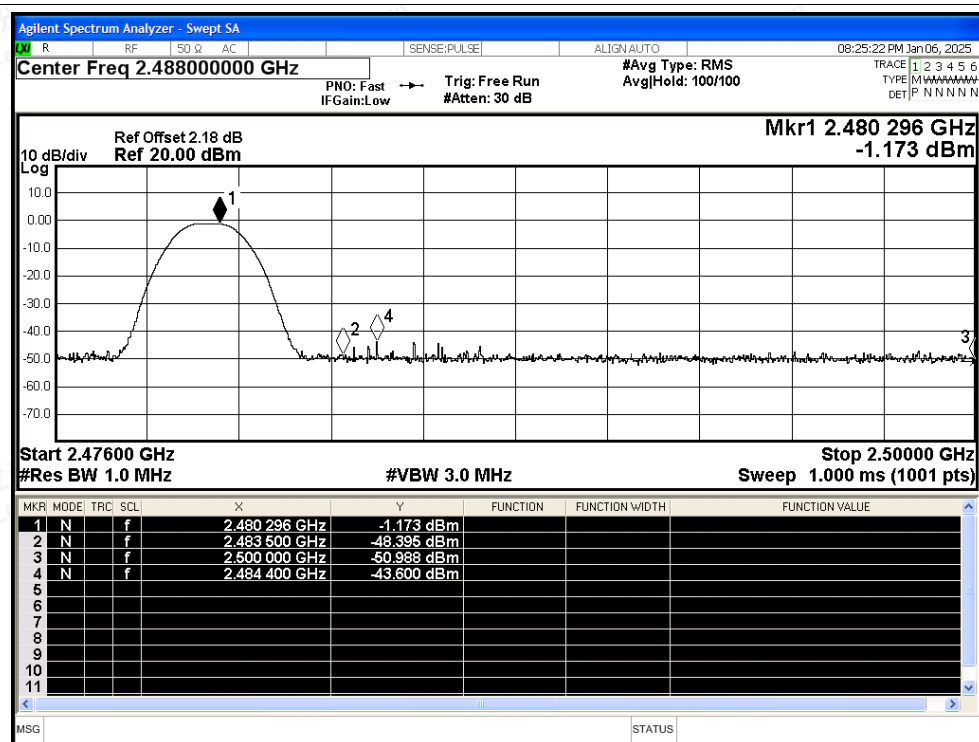


## Restrict Band NVNT BLE 1M 2402MHz Ant1 Average

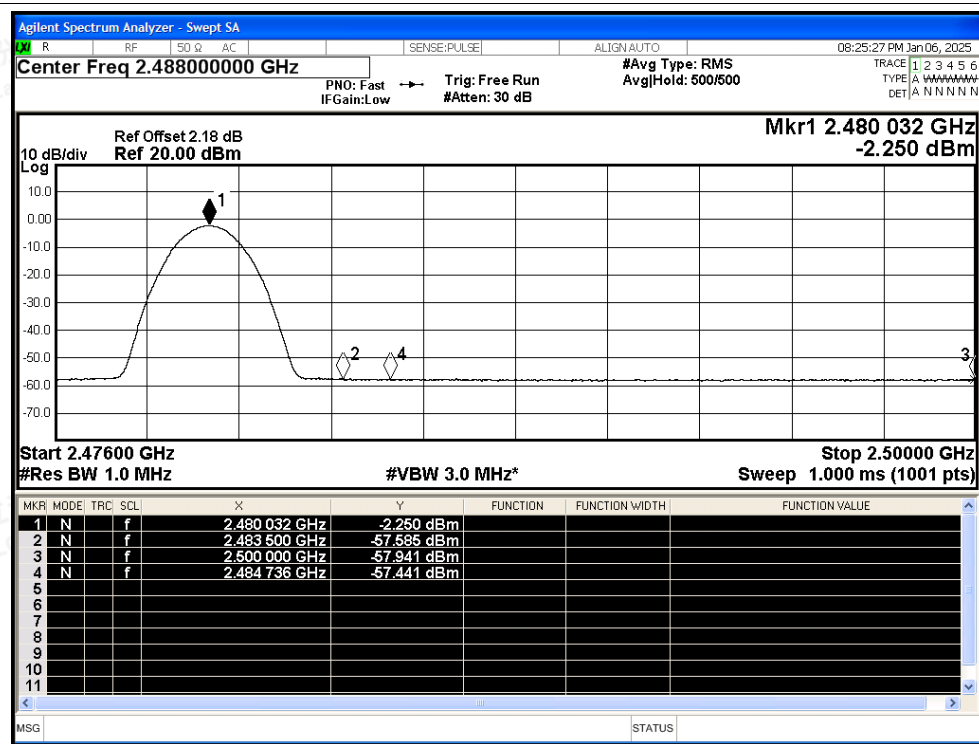




## Restrict Band NVNT BLE 1M 2480MHz Ant1 Peak

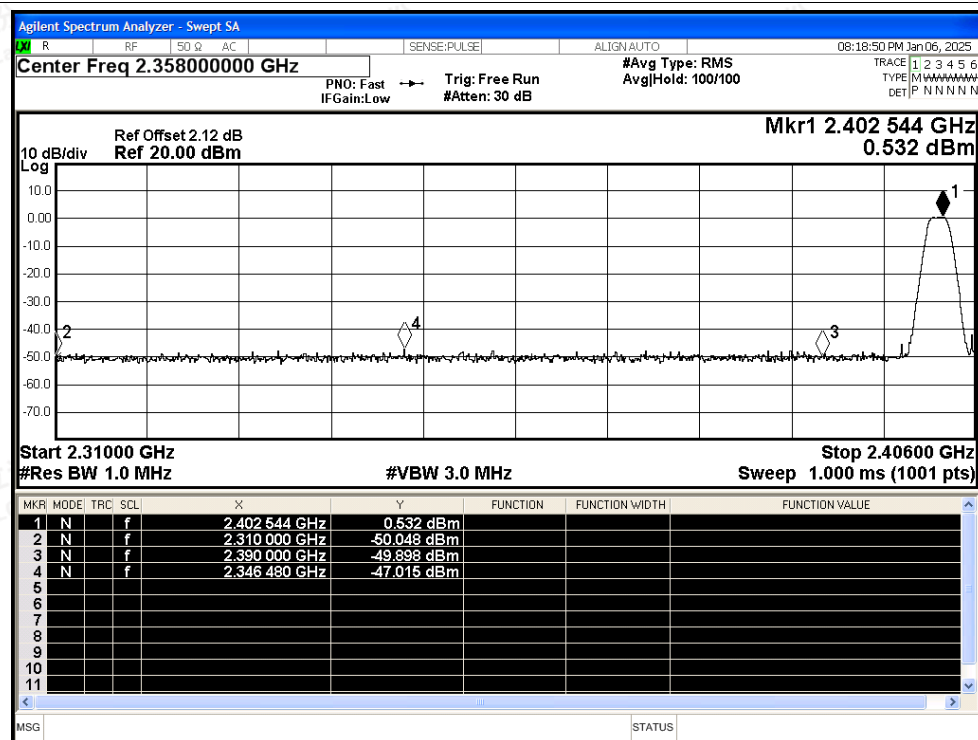


## Restrict Band NVNT BLE 1M 2480MHz Ant1 Average

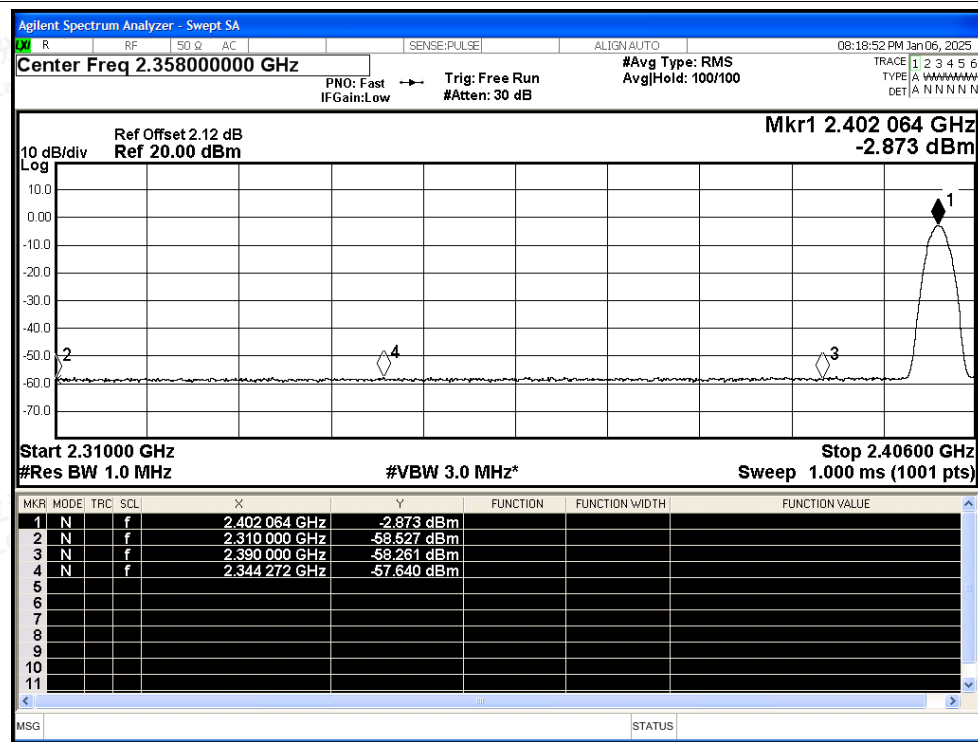




## Restrict Band NVNT BLE 2M 2402MHz Ant1 Peak

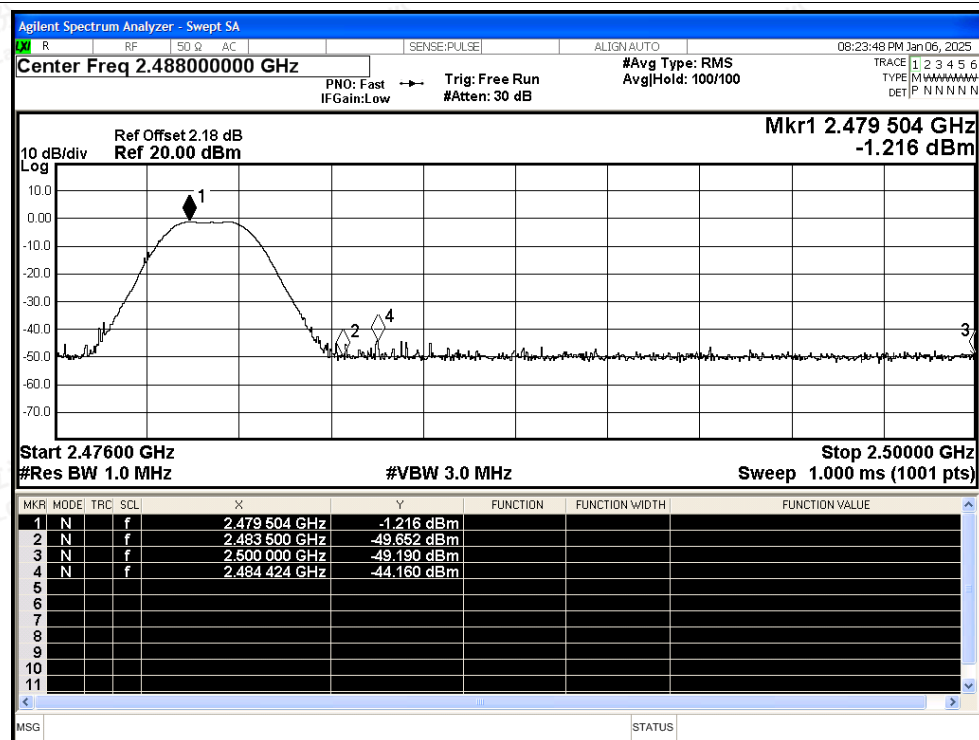


## Restrict Band NVNT BLE 2M 2402MHz Ant1 Average





## Restrict Band NVNT BLE 2M 2480MHz Ant1 Peak



## Restrict Band NVNT BLE 2M 2480MHz Ant1 Average

