

## **FCC Appendix RF Test Data for BLE**

**Company : NCI TECHNOLOGY, INC.**

**EUT : Boxing Sensor**

**Model Number : BX300**

**Report No. : CTA26072302001**

**FCC ID : 2ACSTBX300**

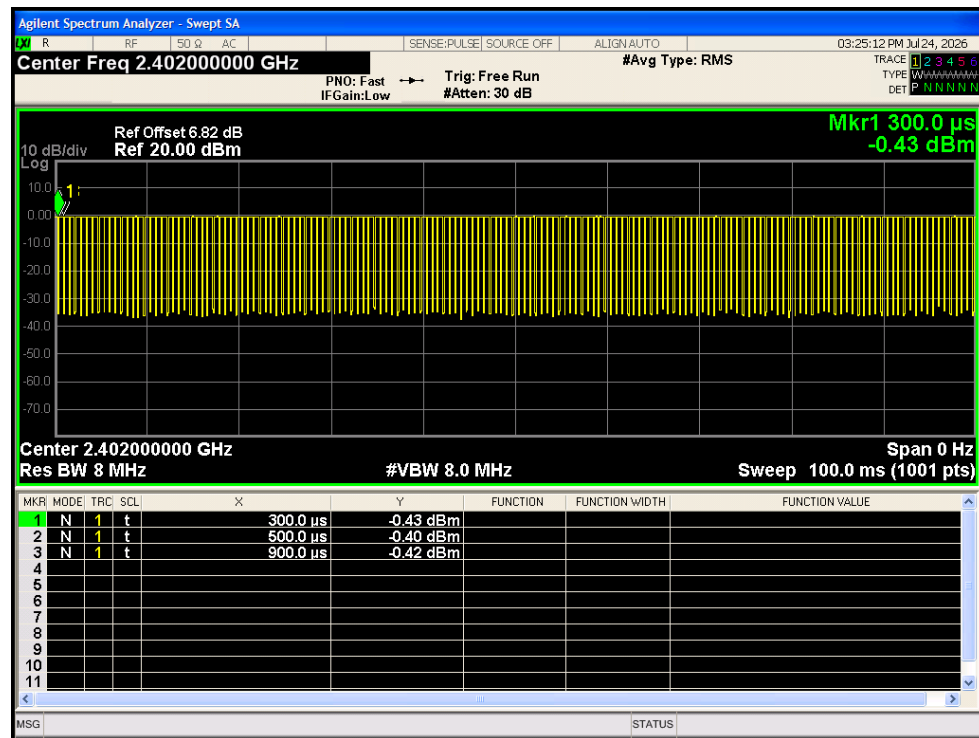
**Reviewed By : Eric Wang**

### Duty Cycle

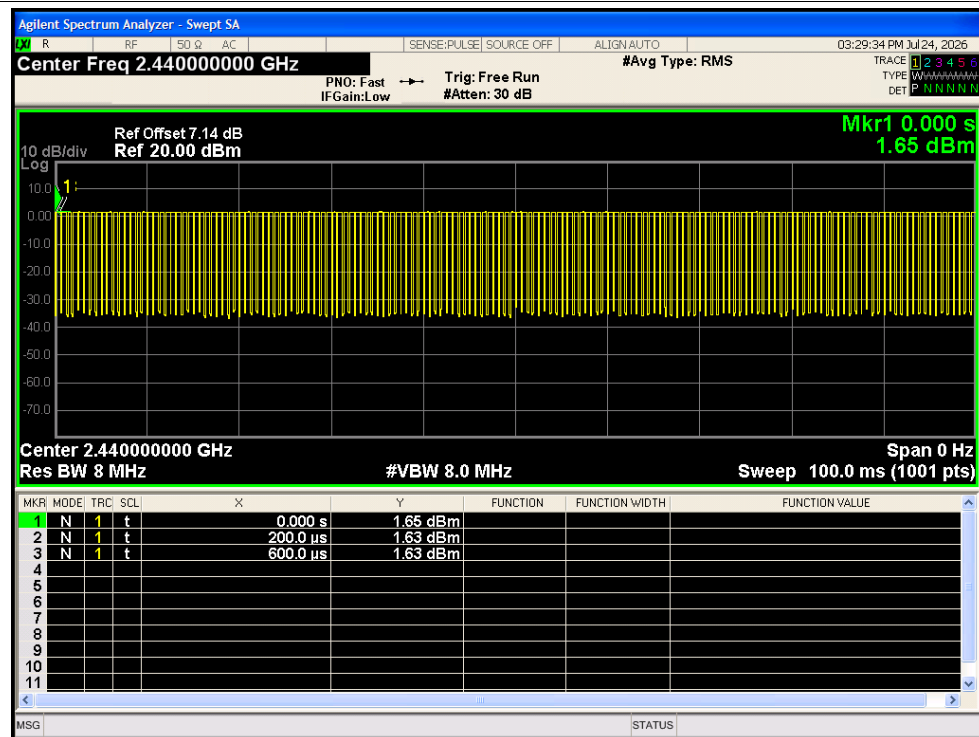
| Condition | Mode   | Frequency (MHz) | Duty Cycle (%) | Correction Factor (dB) |
|-----------|--------|-----------------|----------------|------------------------|
| NVNT      | BLE 1M | 2402            | 80.02          | 0.97                   |
| NVNT      | BLE 1M | 2440            | 76.02          | 1.19                   |
| NVNT      | BLE 1M | 2480            | 80.02          | 0.97                   |
| NVNT      | BLE 2M | 2402            | 51.95          | 2.84                   |
| NVNT      | BLE 2M | 2440            | 51.95          | 2.84                   |
| NVNT      | BLE 2M | 2480            | 51.95          | 2.84                   |

## Test Graphs

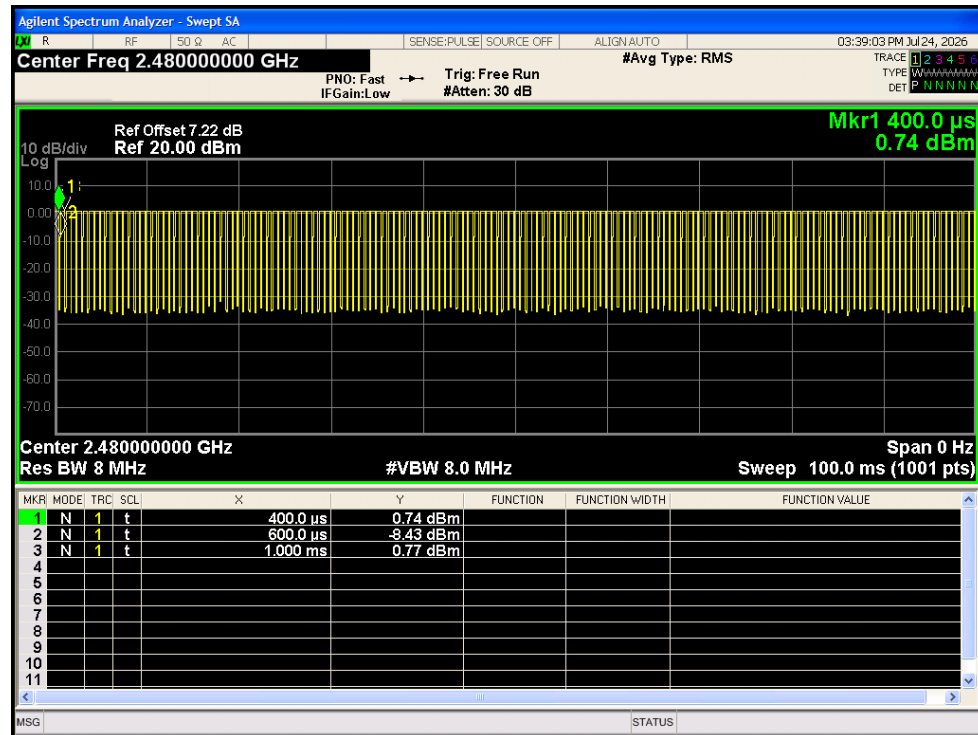
### Duty Cycle NVNT BLE 1M 2402MHz



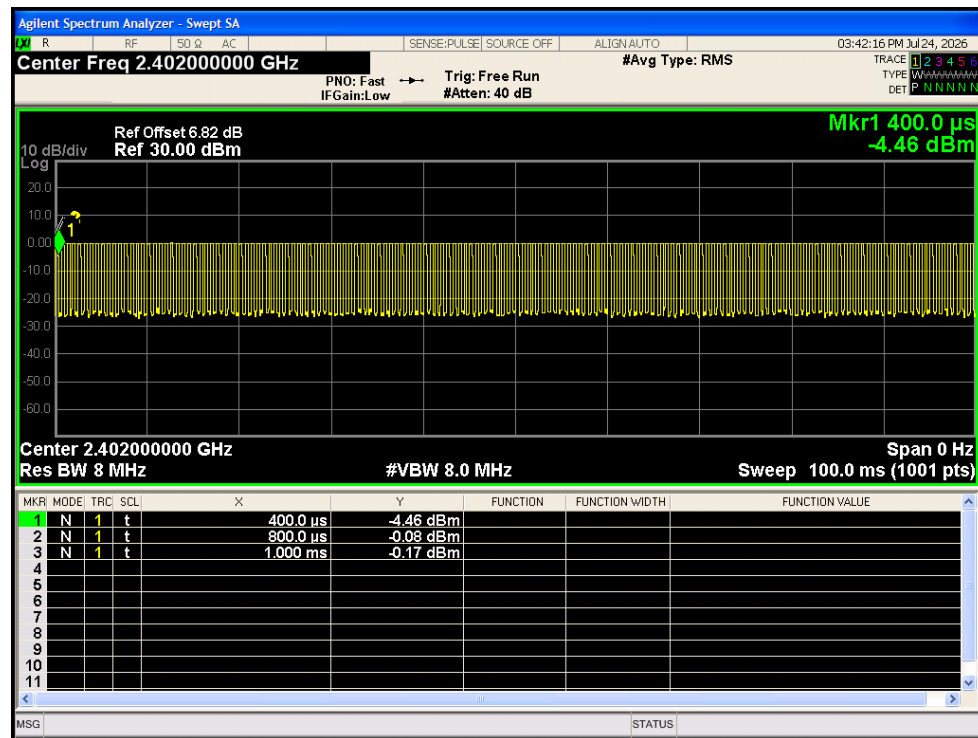
### Duty Cycle NVNT BLE 1M 2440MHz



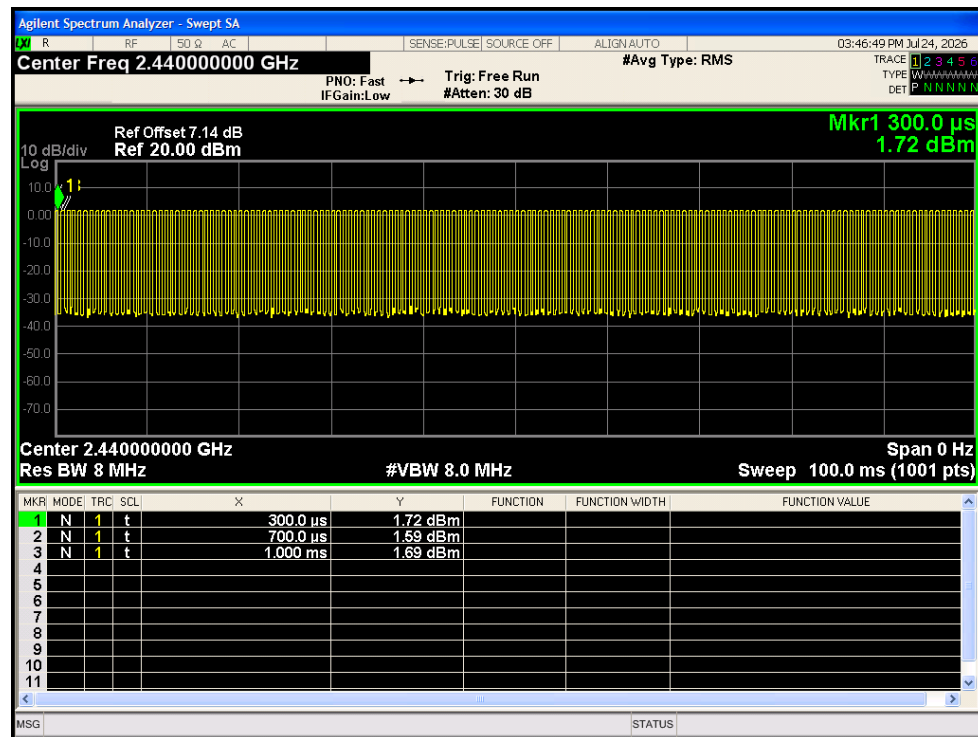
## Duty Cycle NVNT BLE 1M 2480MHz



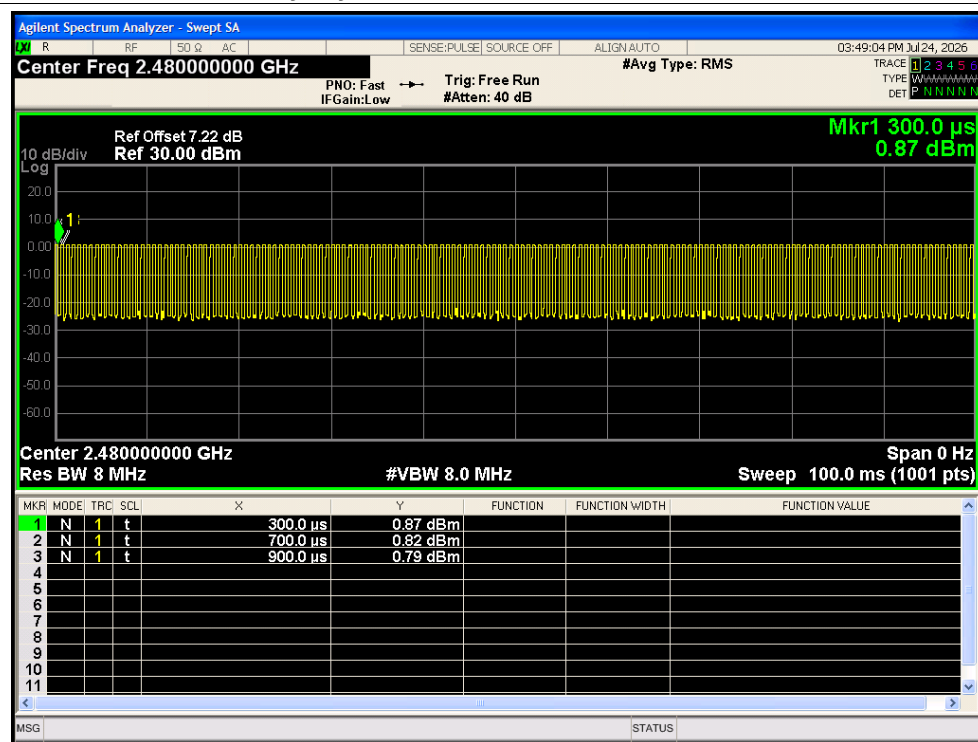
## Duty Cycle NVNT BLE 2M 2402MHz



## Duty Cycle NVNT BLE 2M 2440MHz



## Duty Cycle NVNT BLE 2M 2480MHz



### Maximum Conducted Output Power

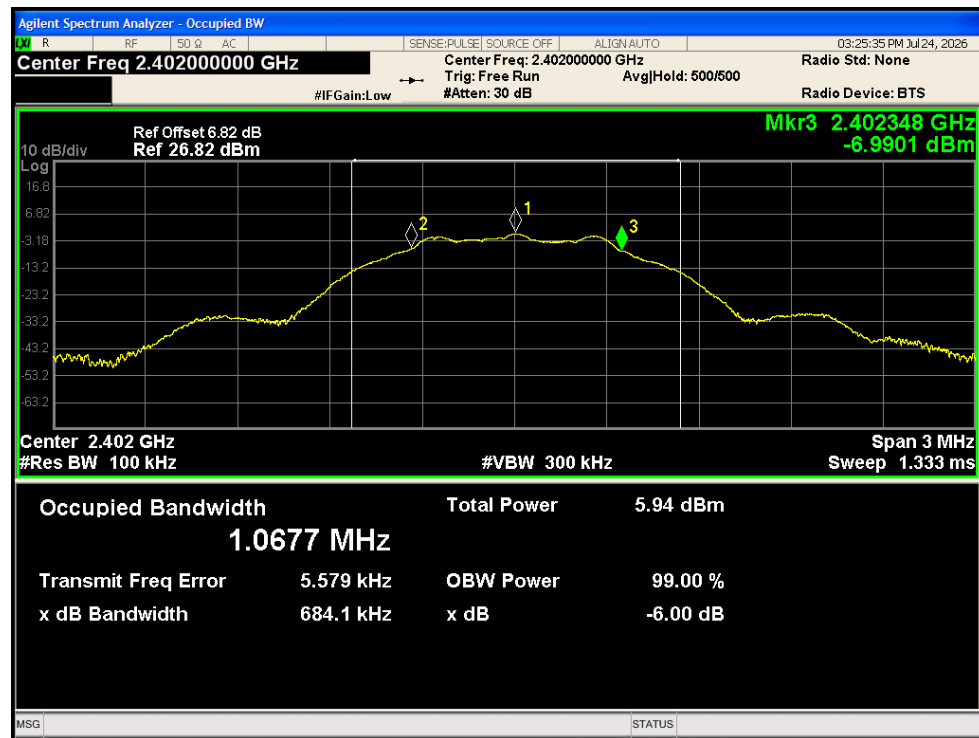
| Condition | Mode   | Frequency (MHz) | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|--------|-----------------|-----------------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | -0.59                 | 30          | Pass    |
| NVNT      | BLE 1M | 2440            | 1.43                  | 30          | Pass    |
| NVNT      | BLE 1M | 2480            | 0.54                  | 30          | Pass    |
| NVNT      | BLE 2M | 2402            | -0.51                 | 30          | Pass    |
| NVNT      | BLE 2M | 2440            | 1.57                  | 30          | Pass    |
| NVNT      | BLE 2M | 2480            | 0.55                  | 30          | Pass    |

**-6dB Bandwidth**

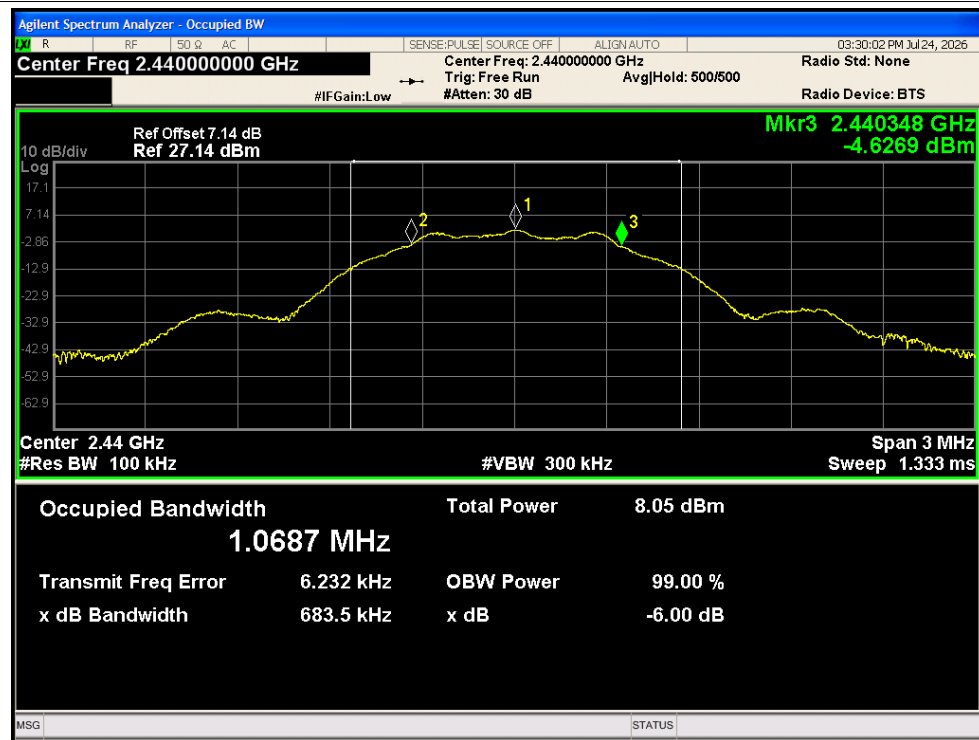
| Condition | Mode   | Frequency (MHz) | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|--------|-----------------|-----------------------|-----------------------------|---------|
| NVNT      | BLE 1M | 2402            | 0.684                 | 0.5                         | Pass    |
| NVNT      | BLE 1M | 2440            | 0.684                 | 0.5                         | Pass    |
| NVNT      | BLE 1M | 2480            | 0.690                 | 0.5                         | Pass    |
| NVNT      | BLE 2M | 2402            | 1.134                 | 0.5                         | Pass    |
| NVNT      | BLE 2M | 2440            | 1.139                 | 0.5                         | Pass    |
| NVNT      | BLE 2M | 2480            | 1.139                 | 0.5                         | Pass    |

## Test Graphs

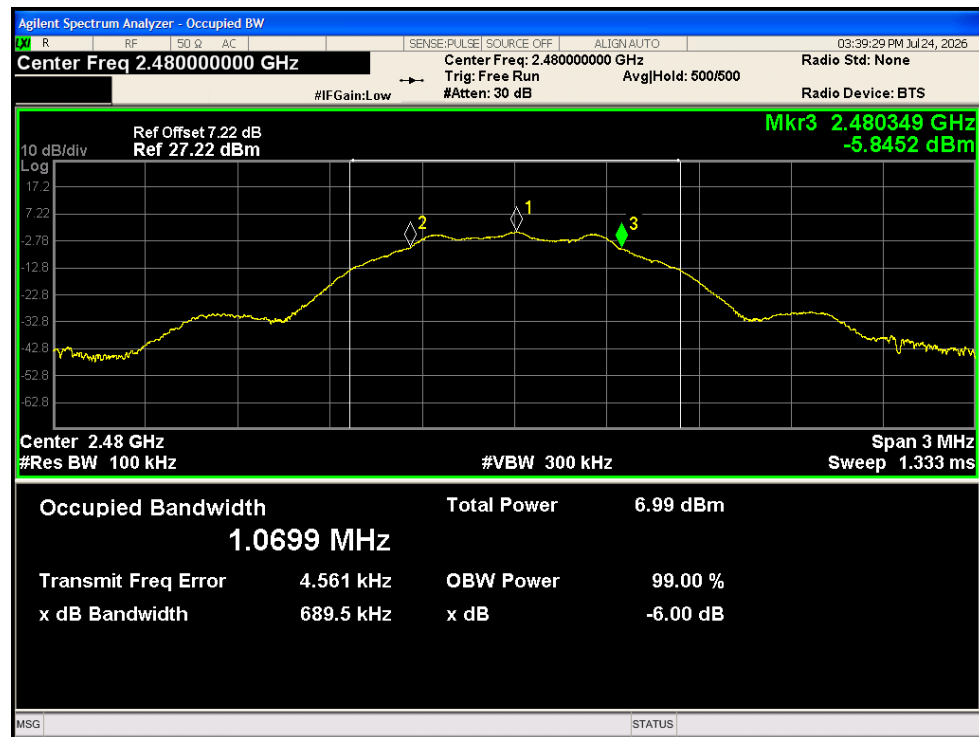
### -6dB Bandwidth NVNT BLE 1M 2402MHz



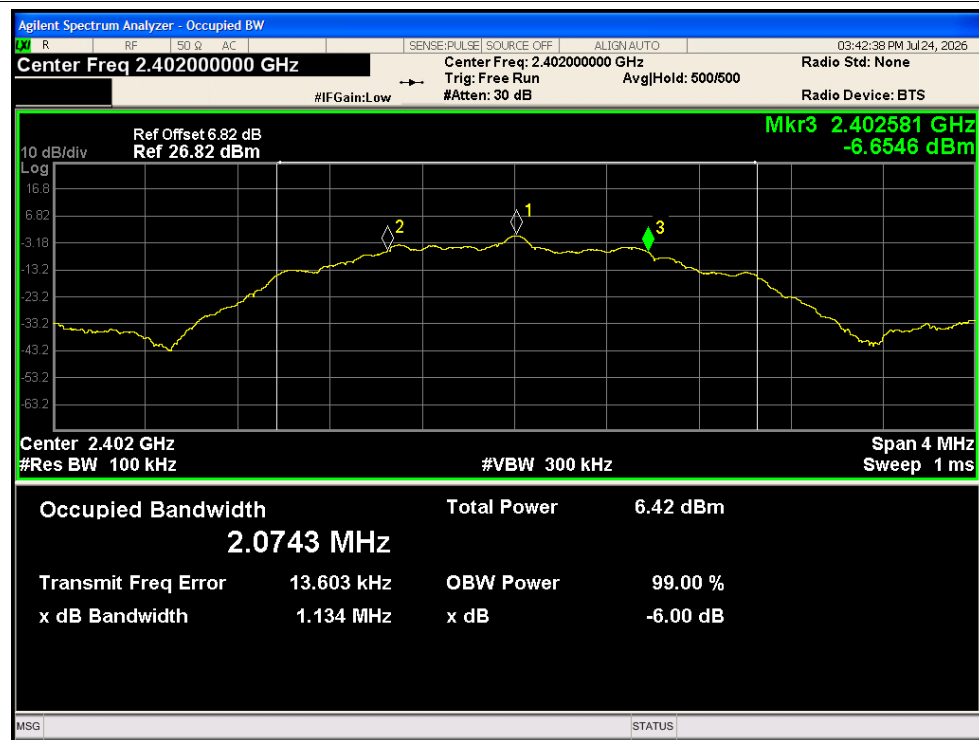
### -6dB Bandwidth NVNT BLE 1M 2440MHz



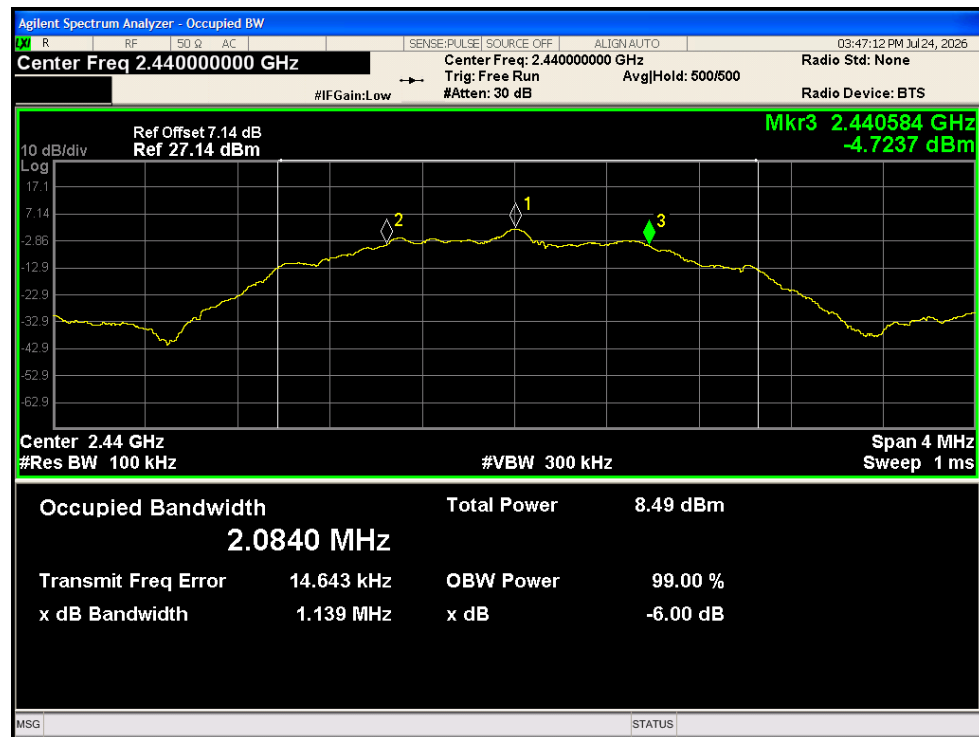
## -6dB Bandwidth NVNT BLE 1M 2480MHz



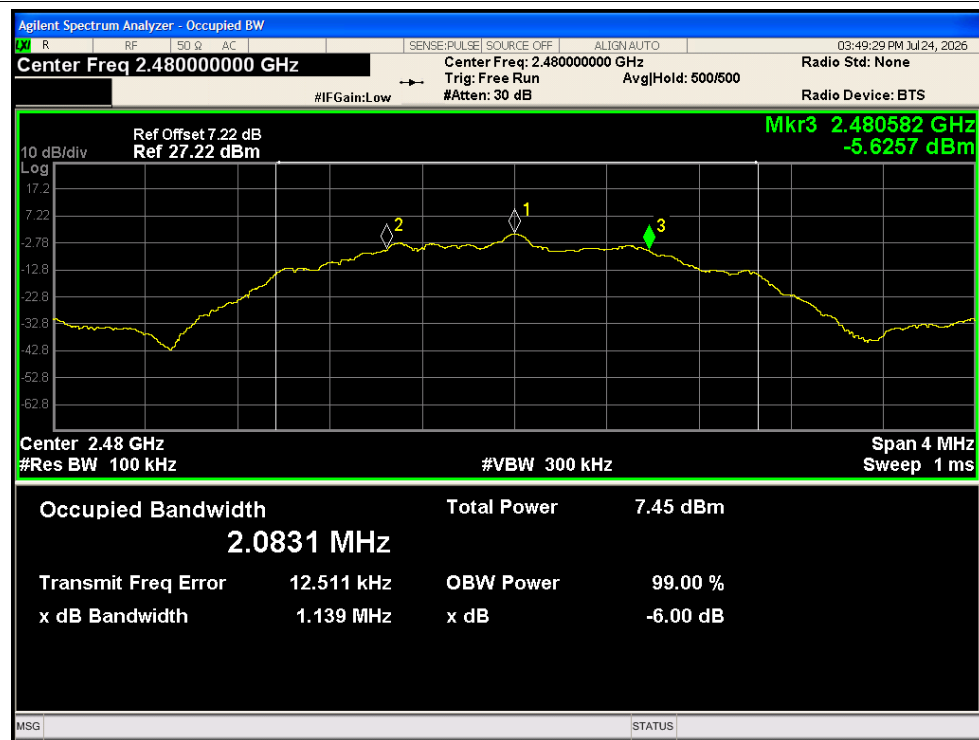
## -6dB Bandwidth NVNT BLE 2M 2402MHz



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



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

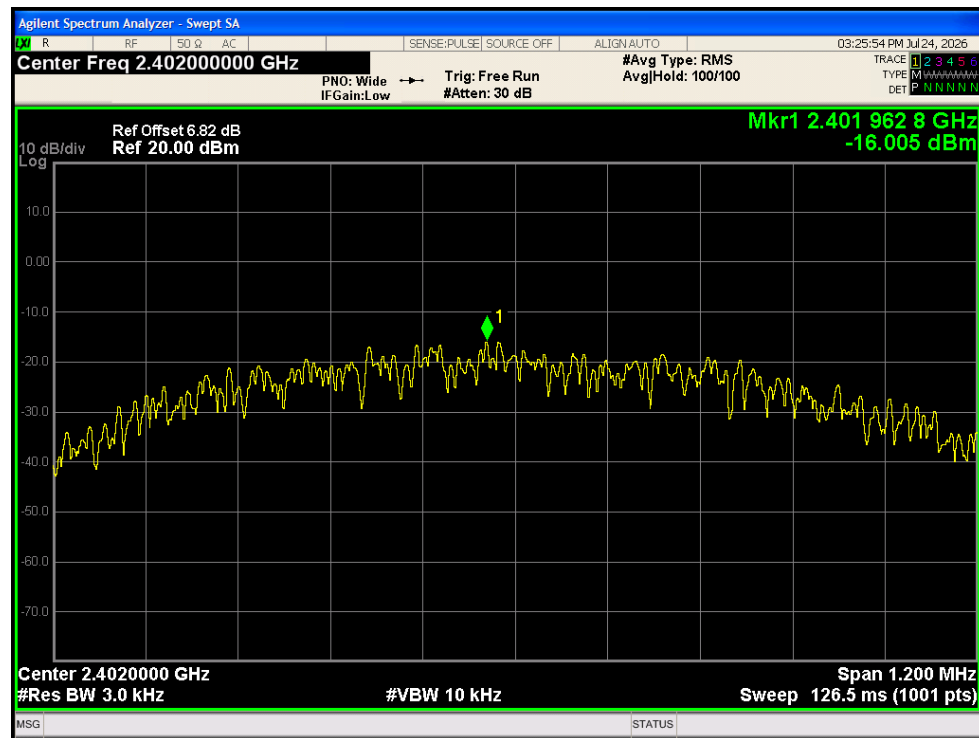


### Maximum Power Spectral Density Level

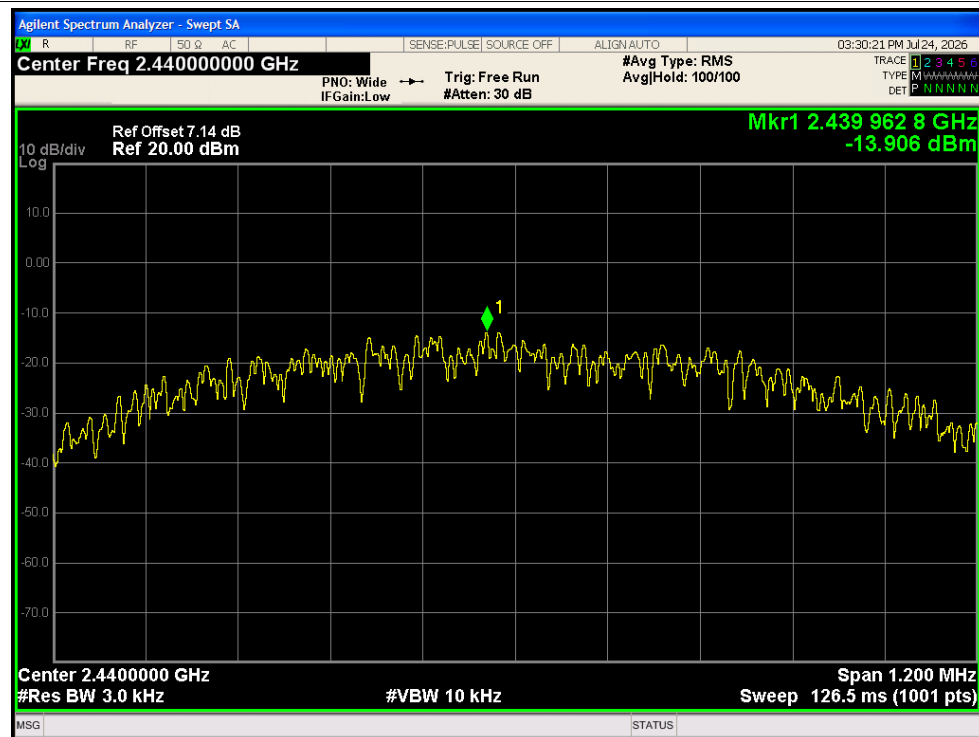
| Condition | Mode   | Frequency (MHz) | Conducted PSD (dBm) | Limit (dBm) | Verdict |
|-----------|--------|-----------------|---------------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | -16.01              | 8           | Pass    |
| NVNT      | BLE 1M | 2440            | -13.91              | 8           | Pass    |
| NVNT      | BLE 1M | 2480            | -14.81              | 8           | Pass    |
| NVNT      | BLE 2M | 2402            | -18.56              | 8           | Pass    |
| NVNT      | BLE 2M | 2440            | -16.39              | 8           | Pass    |
| NVNT      | BLE 2M | 2480            | -17.33              | 8           | Pass    |

## Test Graphs

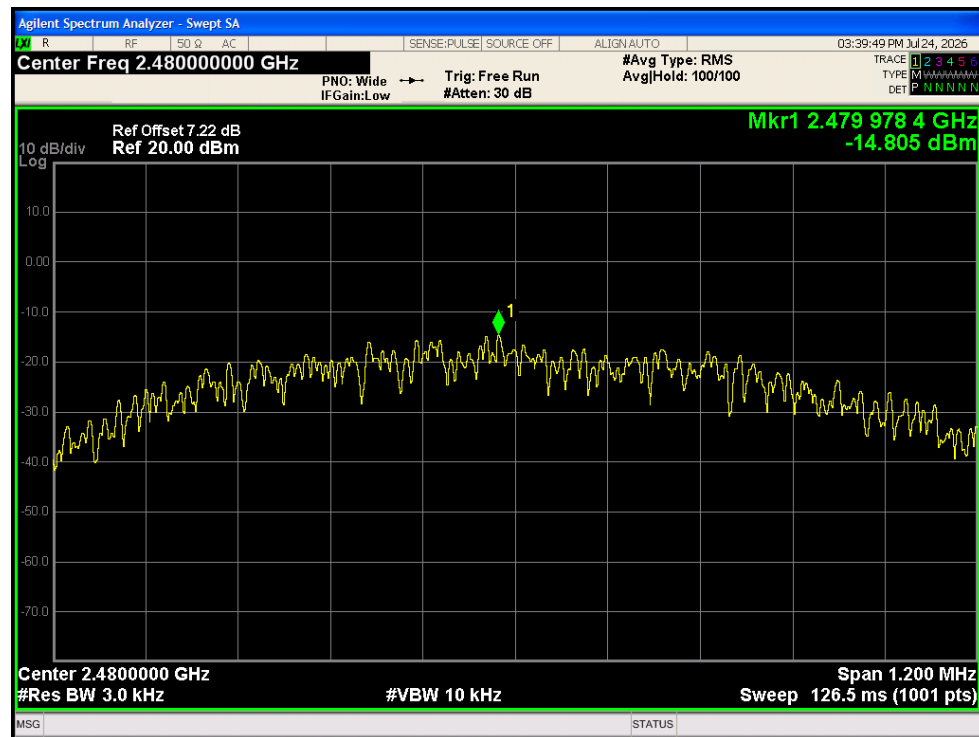
### PSD NVNT BLE 1M 2402MHz



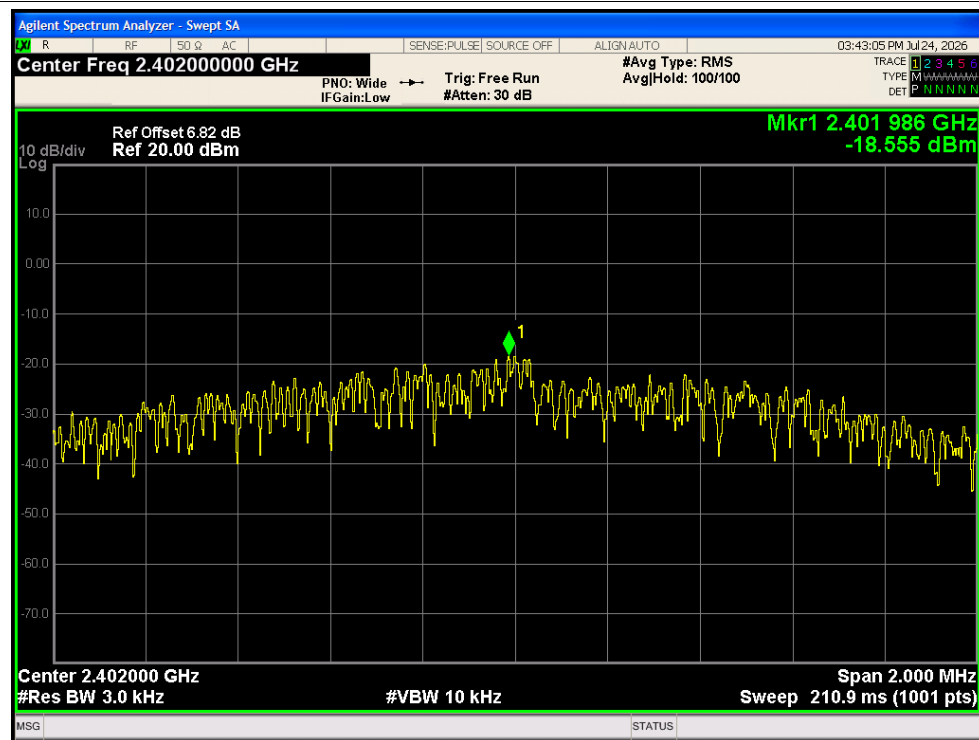
### PSD NVNT BLE 1M 2440MHz



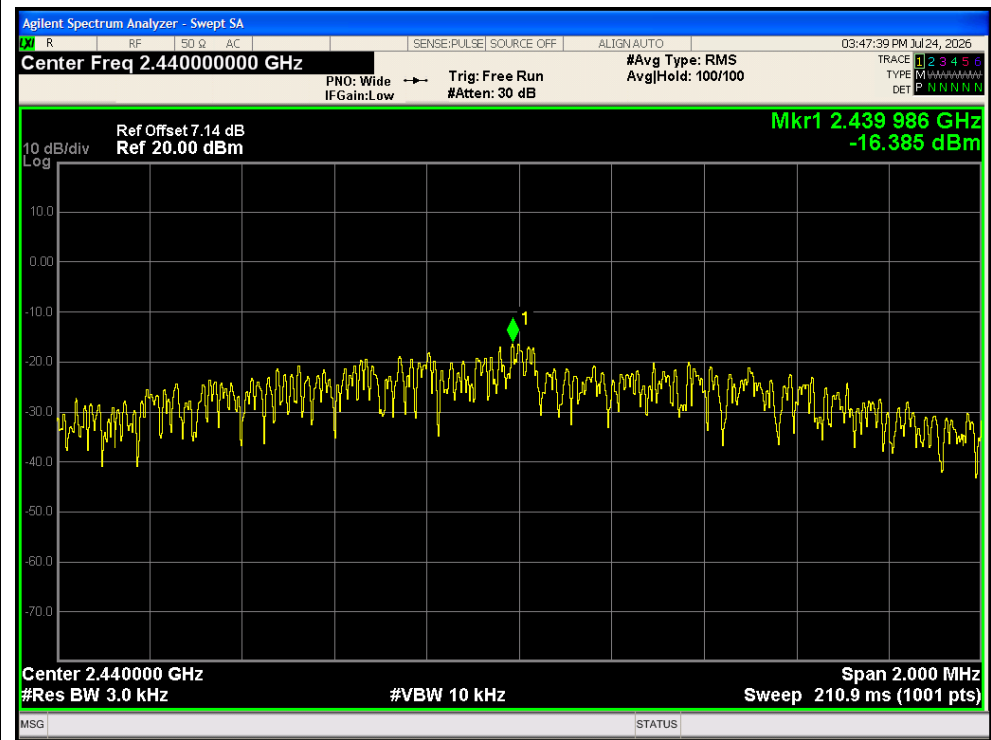
## PSD NVNT BLE 1M 2480MHz



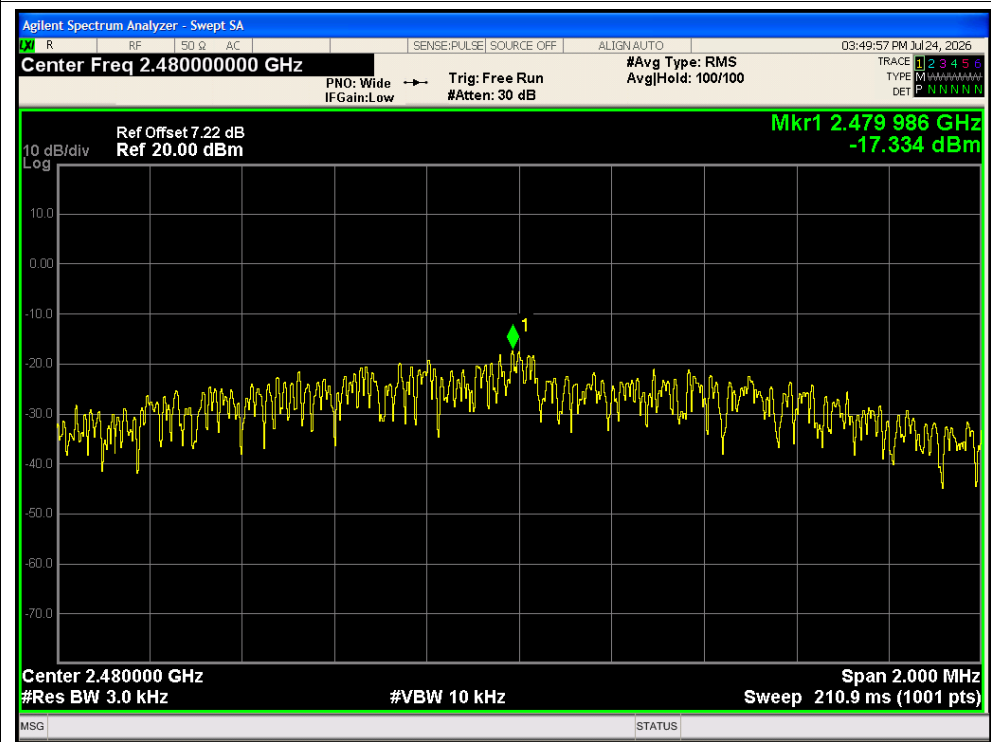
## PSD NVNT BLE 2M 2402MHz



PSD NVNT BLE 2M 2440MHz



PSD NVNT BLE 2M 2480MHz

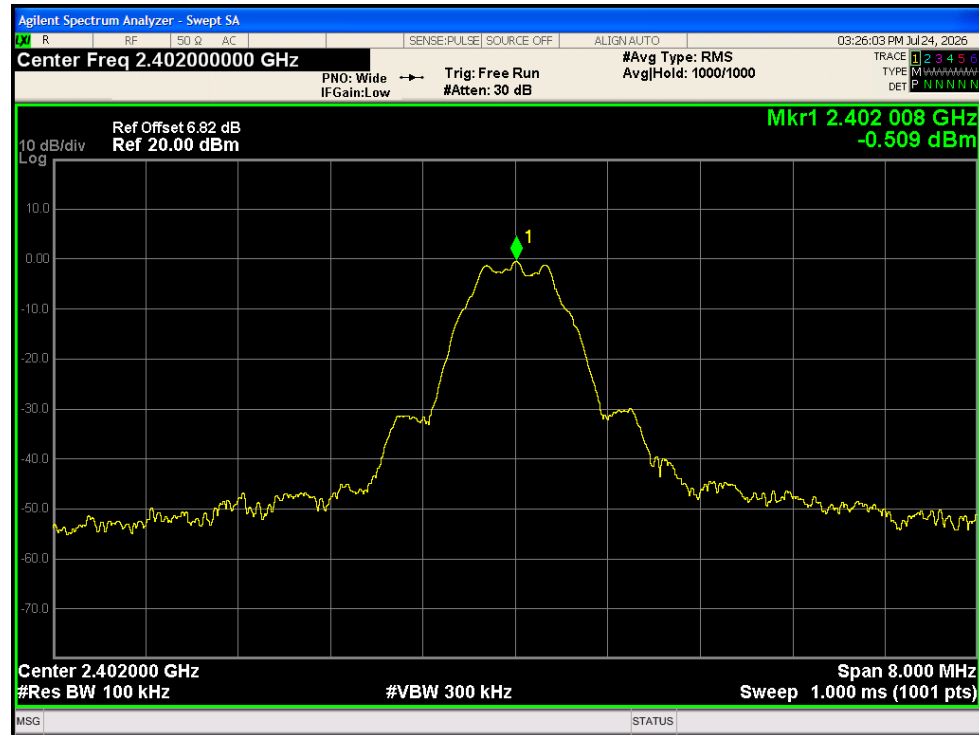


### Band Edge

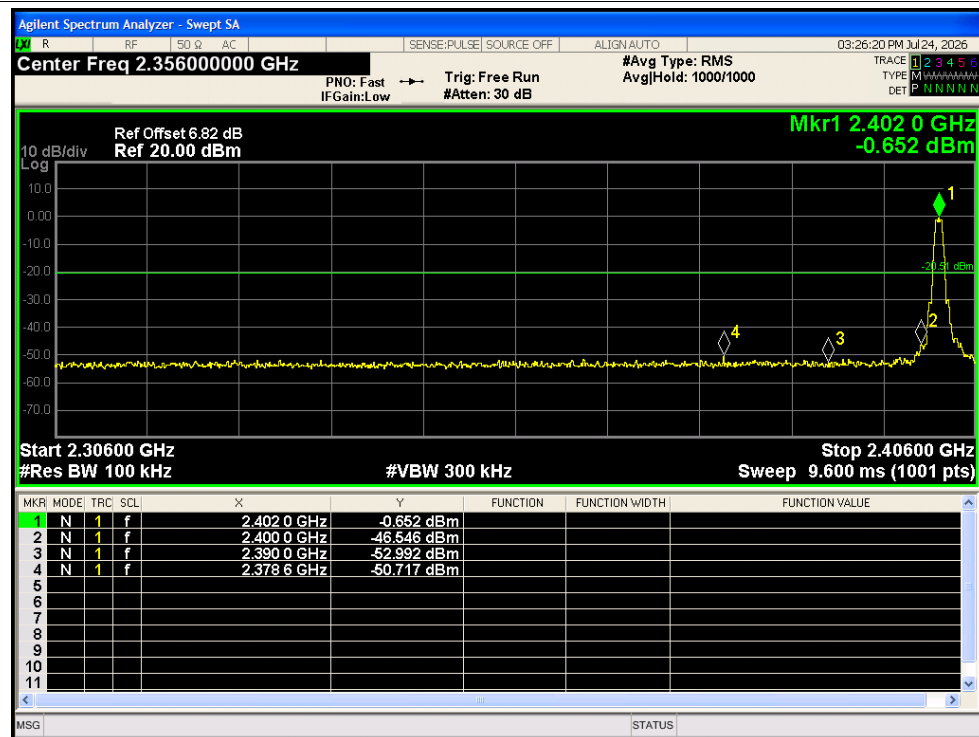
| Condition | Mode   | Frequency (MHz) | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | -50.20          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | -49.65          | -20         | Pass    |
| NVNT      | BLE 2M | 2402            | -50.63          | -20         | Pass    |
| NVNT      | BLE 2M | 2480            | -48.94          | -20         | Pass    |

## Test Graphs

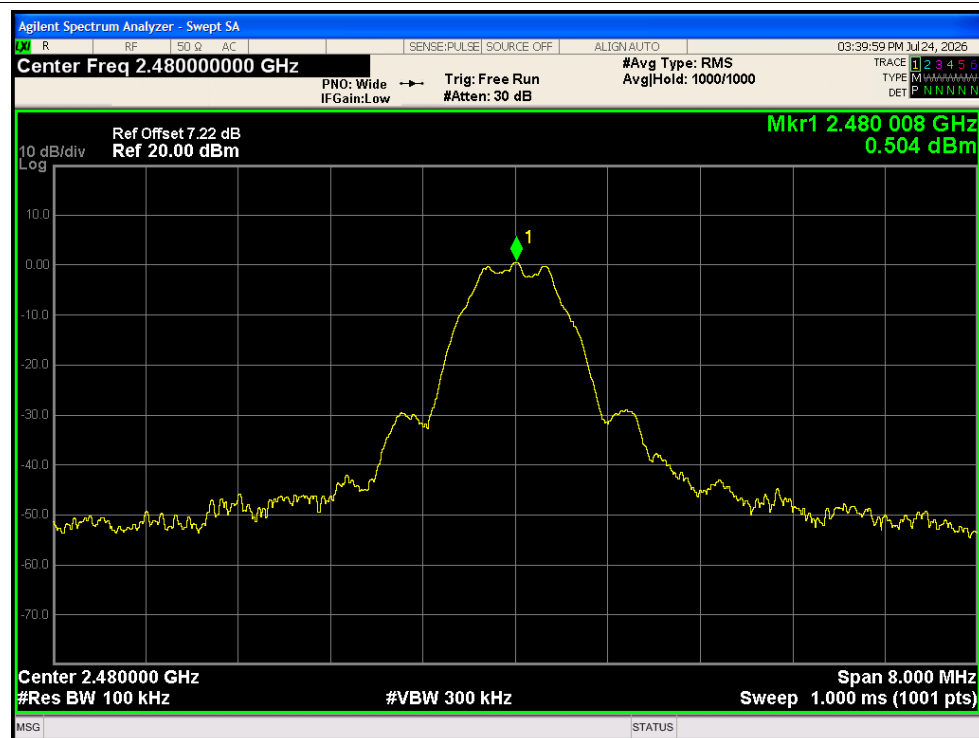
### Band Edge NVNT BLE 1M 2402MHz Ref



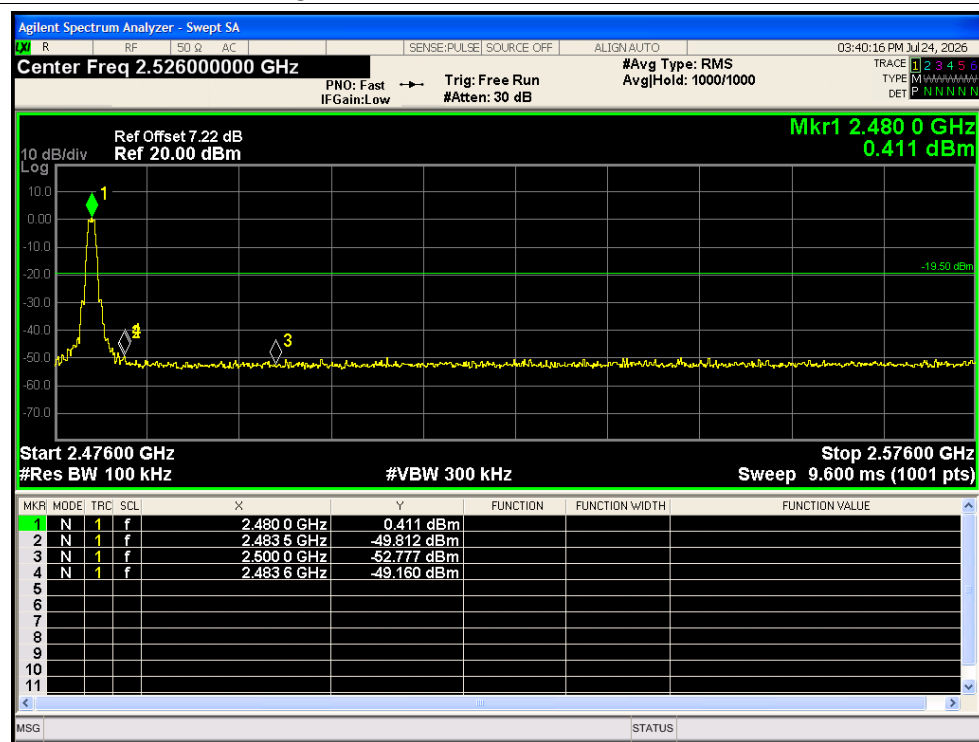
### Band Edge NVNT BLE 1M 2402MHz Emission



## Band Edge NVNT BLE 1M 2480MHz Ref



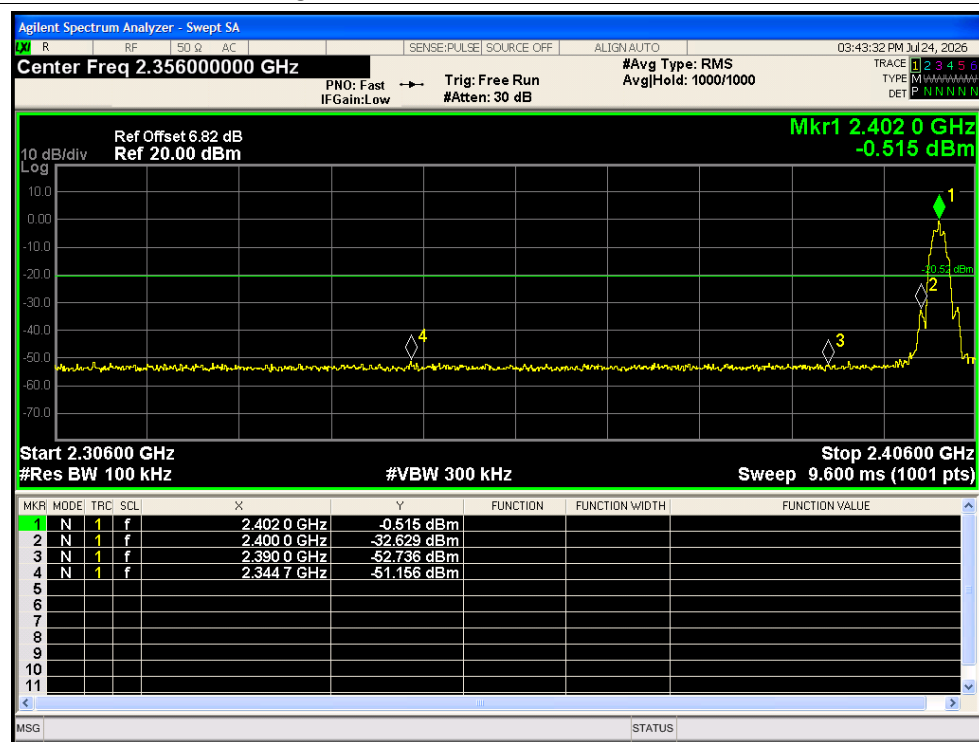
## Band Edge NVNT BLE 1M 2480MHz Emission



## Band Edge NVNT BLE 2M 2402MHz Ref



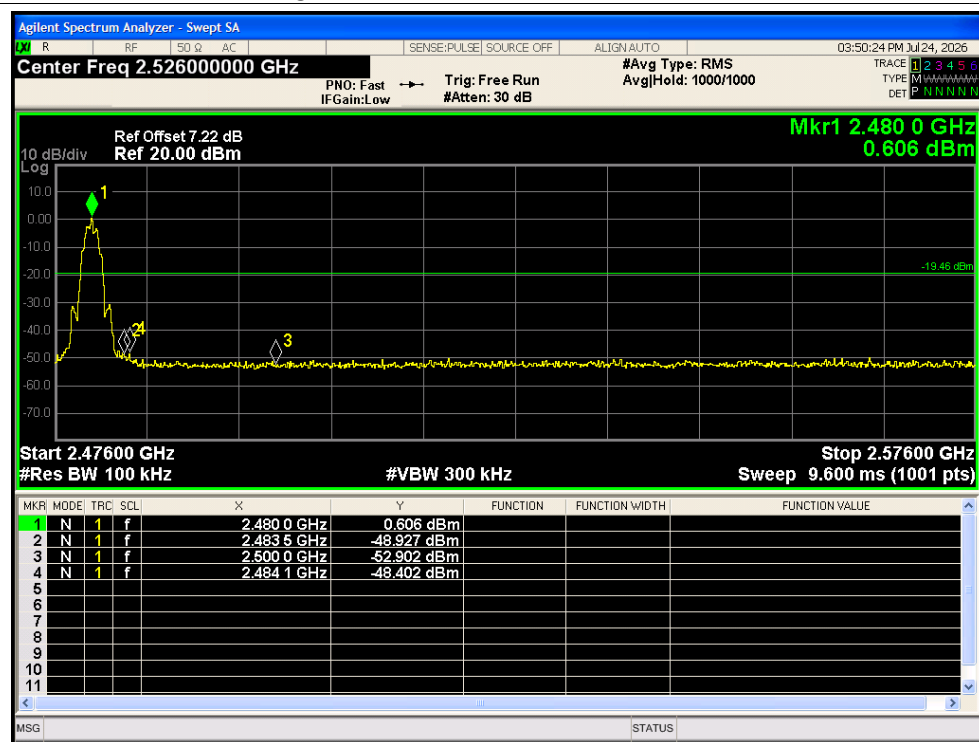
## Band Edge NVNT BLE 2M 2402MHz Emission



## Band Edge NVNT BLE 2M 2480MHz Ref



## Band Edge NVNT BLE 2M 2480MHz Emission

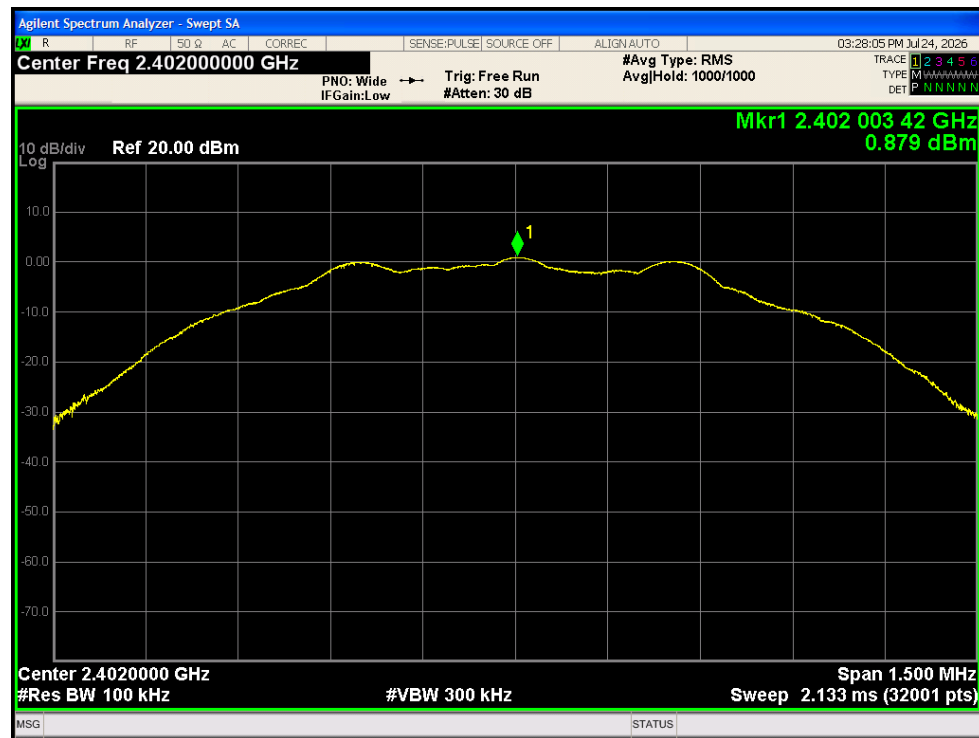


### Conducted RF Spurious Emission

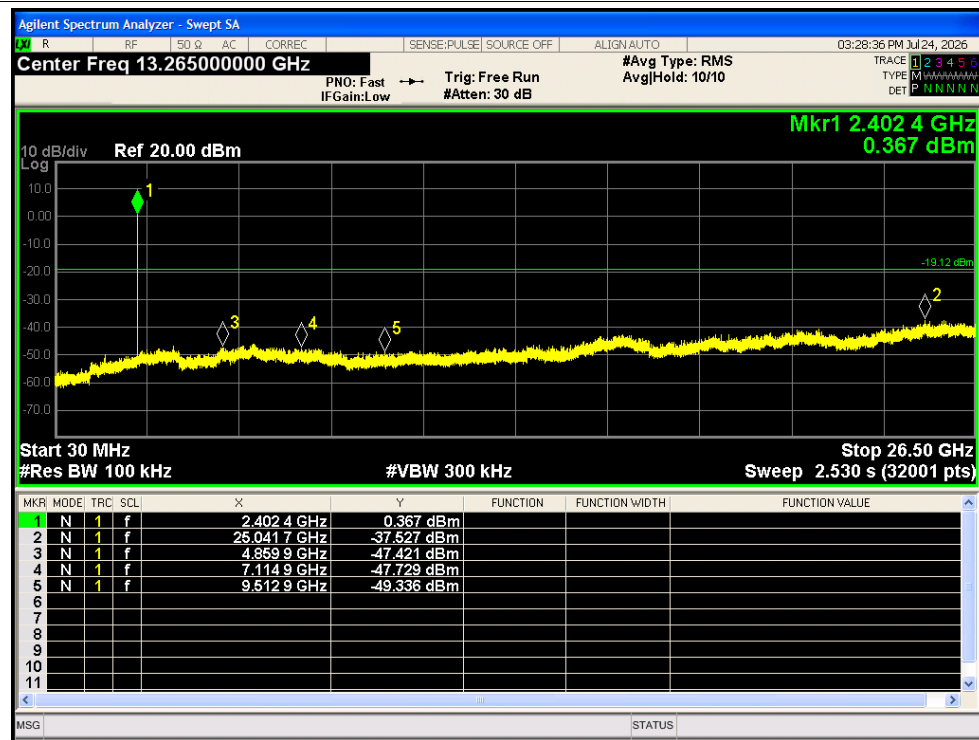
| Condition | Mode   | Frequency (MHz) | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | -38.40          | -20         | Pass    |
| NVNT      | BLE 1M | 2440            | -39.61          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | -39.39          | -20         | Pass    |
| NVNT      | BLE 2M | 2402            | -38.62          | -20         | Pass    |
| NVNT      | BLE 2M | 2440            | -40.84          | -20         | Pass    |
| NVNT      | BLE 2M | 2480            | -39.42          | -20         | Pass    |

## Test Graphs

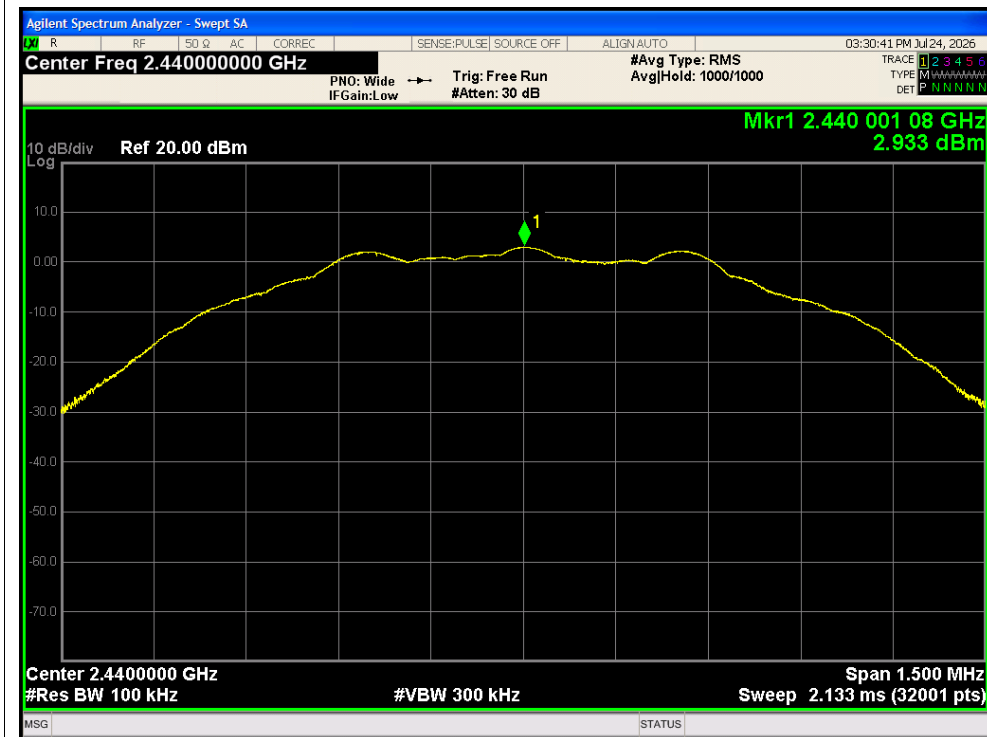
### Tx. Spurious NVNT BLE 1M 2402MHz Ref



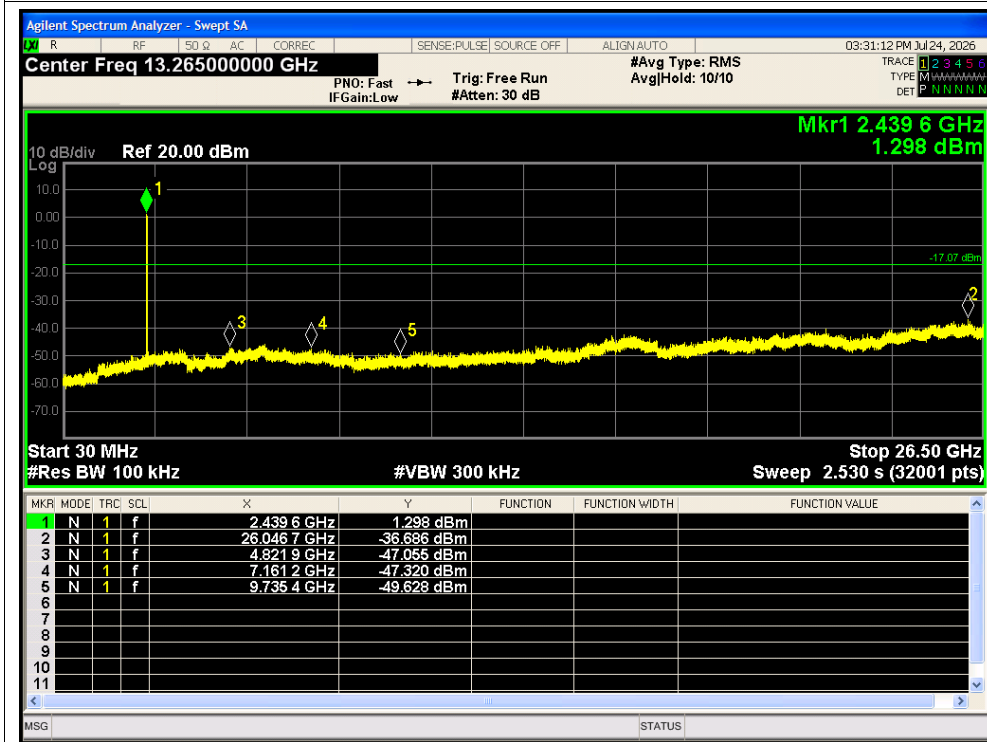
### Tx. Spurious NVNT BLE 1M 2402MHz Emission



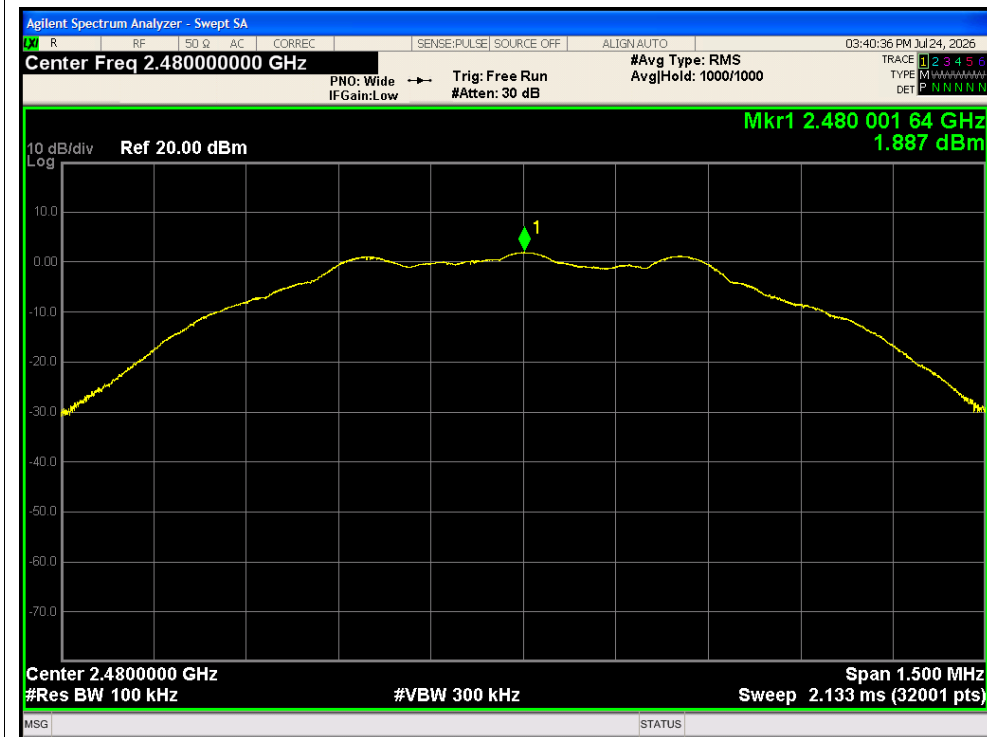
## Tx. Spurious NVNT BLE 1M 2440MHz Ref



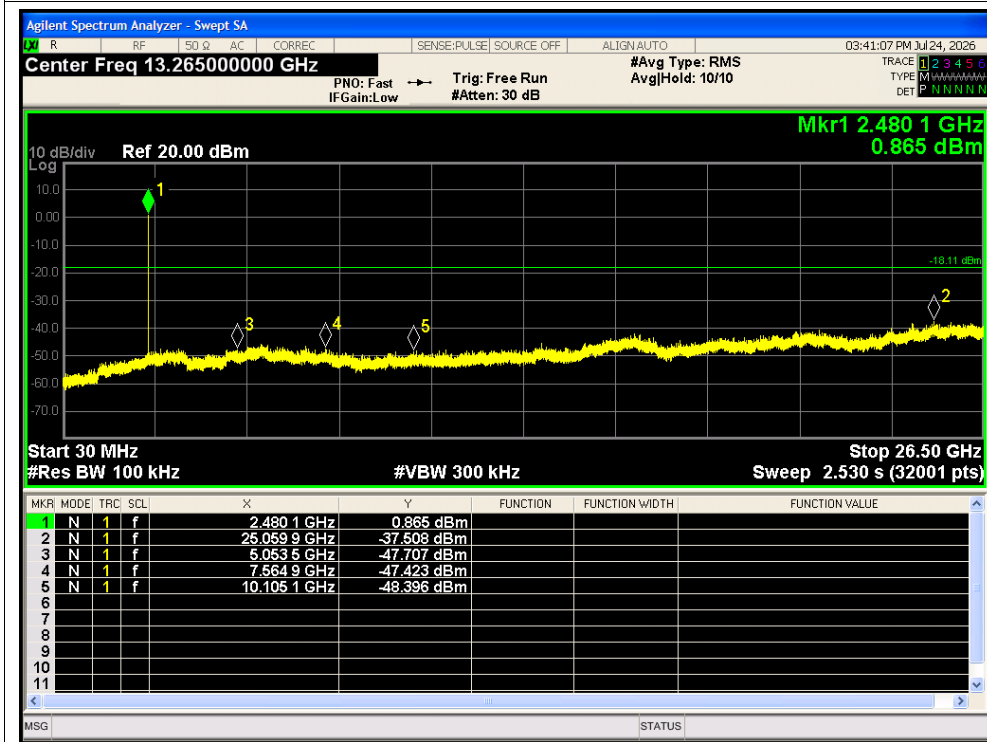
## Tx. Spurious NVNT BLE 1M 2440MHz Emission



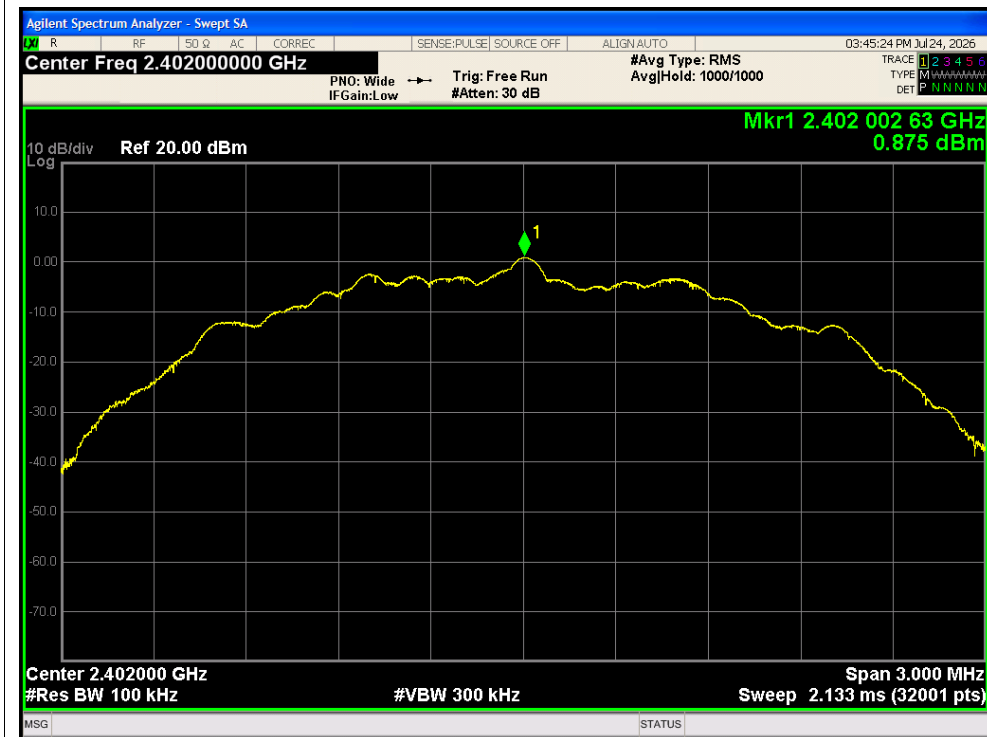
## Tx. Spurious NVNT BLE 1M 2480MHz Ref



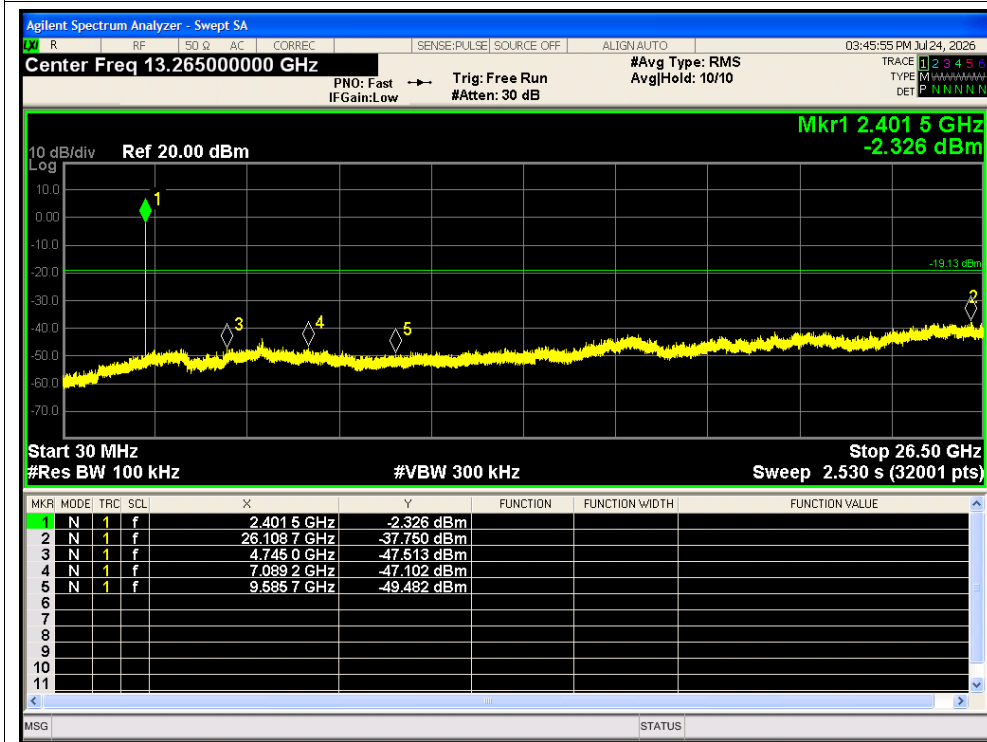
## Tx. Spurious NVNT BLE 1M 2480MHz Emission



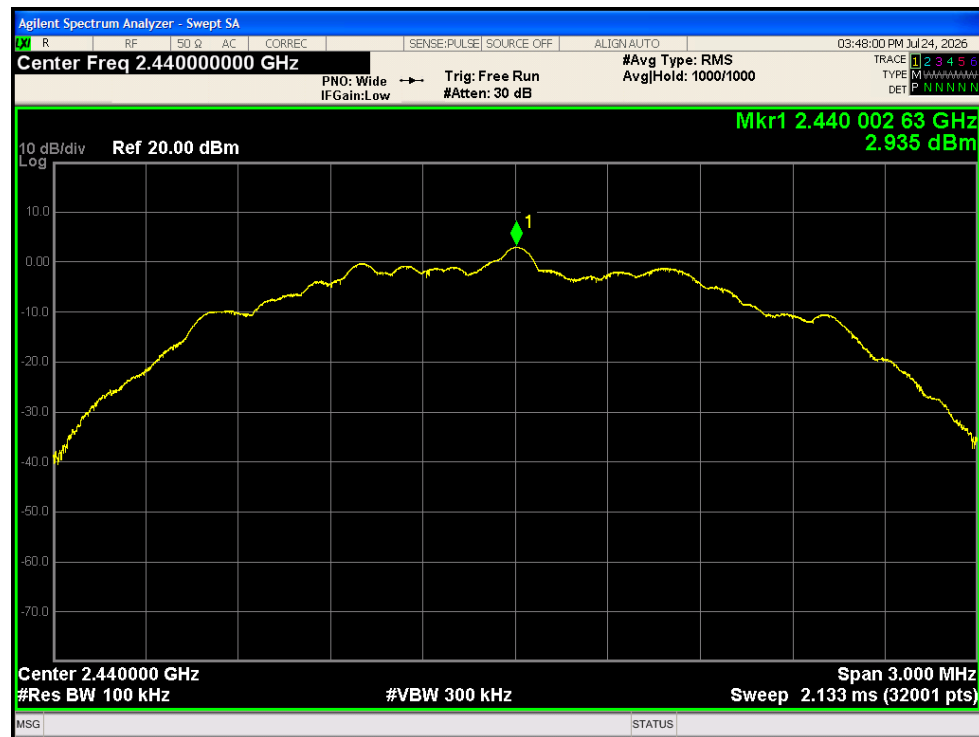
## Tx. Spurious NVNT BLE 2M 2402MHz Ref



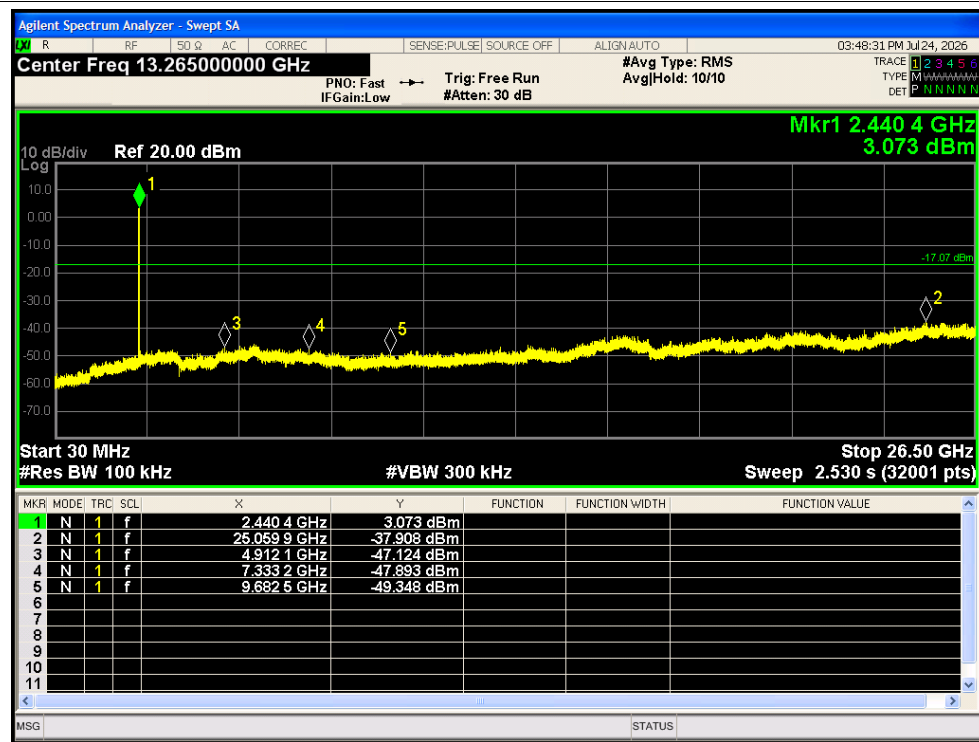
## Tx. Spurious NVNT BLE 2M 2402MHz Emission



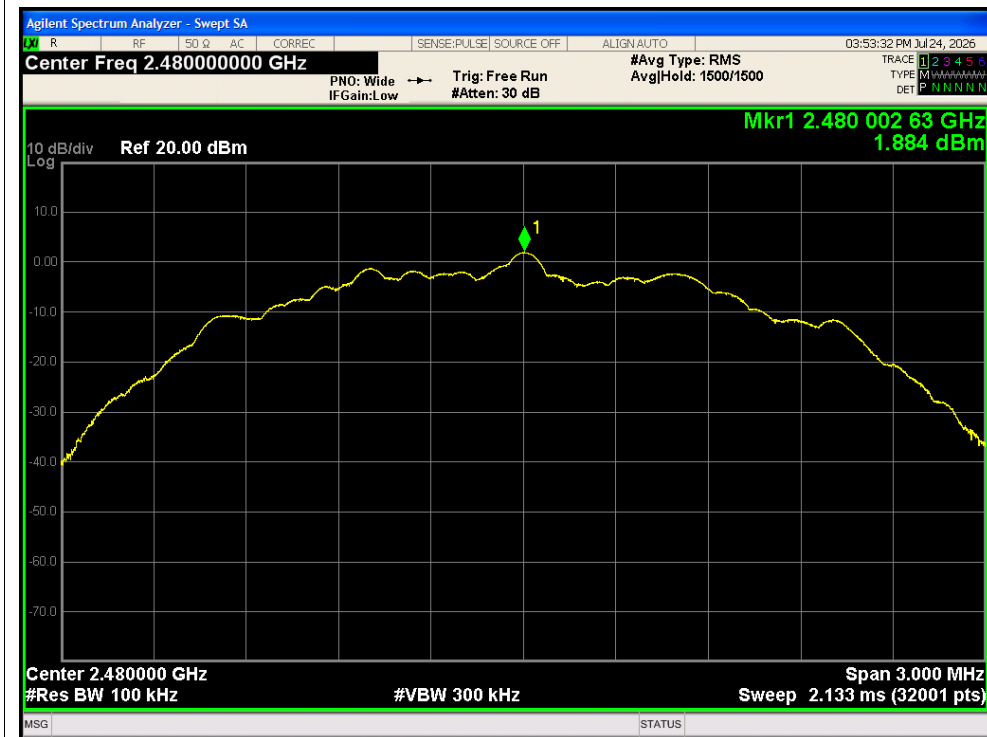
## Tx. Spurious NVNT BLE 2M 2440MHz Ref



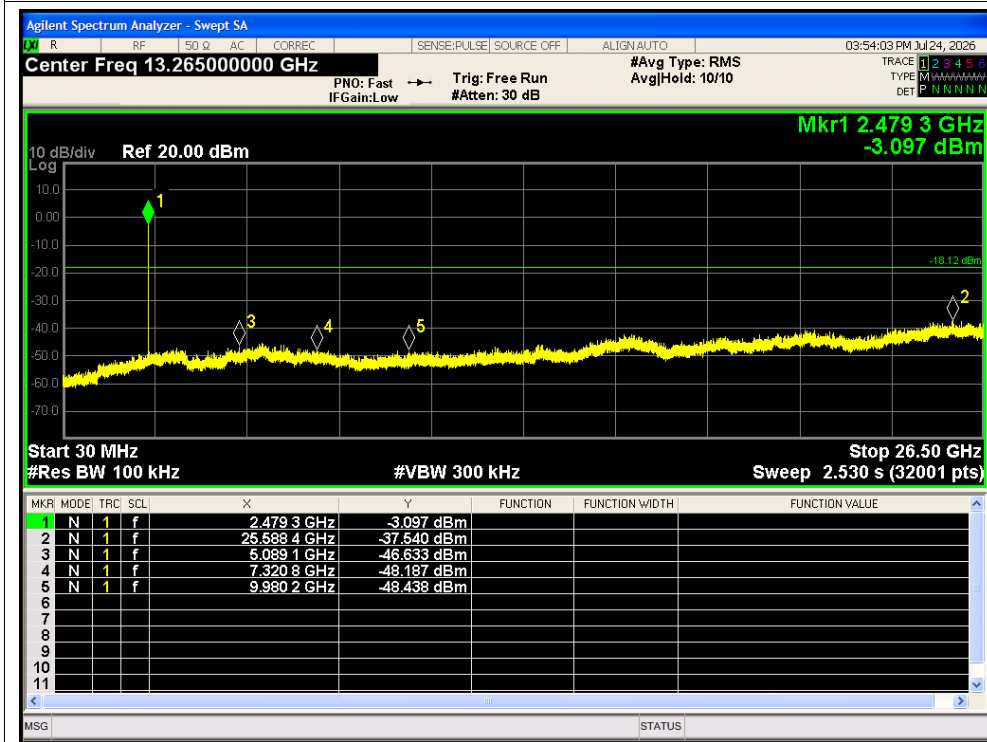
## Tx. Spurious NVNT BLE 2M 2440MHz Emission



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



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



### Emissions in Restricted Bands

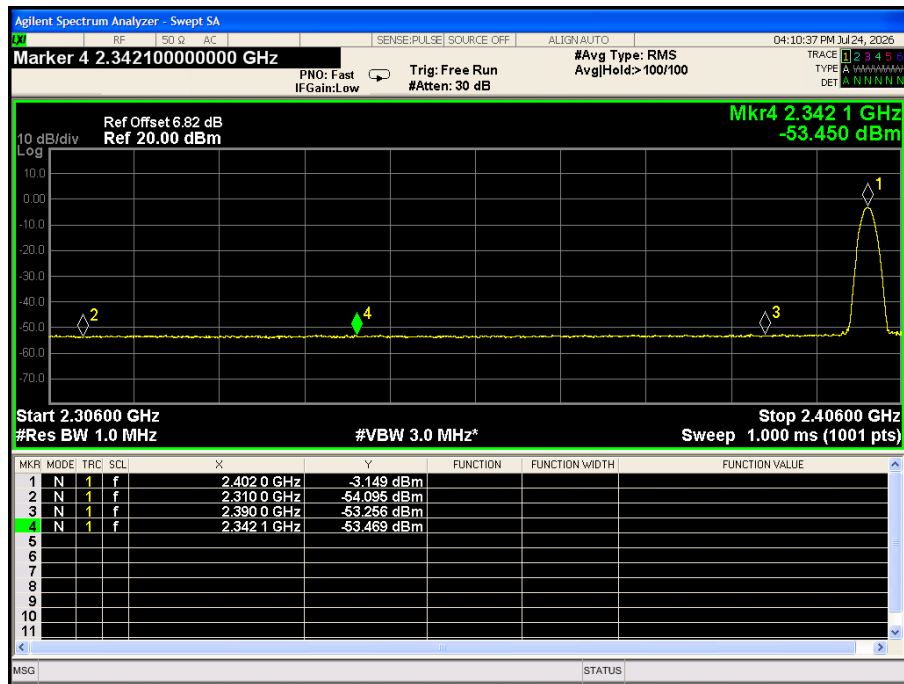
| Test Mode | Ch   | Freq (MHz) | Detector | Freq [MHz] | Result [dBm] | Gain [dBi] | DC Factor [dB] | Result [dBuV/m] | Limit [dBuV/m] | Verdict |
|-----------|------|------------|----------|------------|--------------|------------|----------------|-----------------|----------------|---------|
| BLE 1M    | Low  | 2402       | AV       | 2310.000   | -54.10       | 2.00       | 0.97           | 44.07           | ≤54            | PASS    |
|           |      |            | AV       | 2342.100   | -53.47       | 2.00       | 0.97           | 44.70           | ≤54            | PASS    |
|           |      |            | AV       | 2390.000   | -53.26       | 2.00       | 0.97           | 44.91           | ≤54            | PASS    |
|           |      |            | Peak     | 2310.000   | -43.54       | 2.00       | 0.00           | 53.66           | ≤74            | PASS    |
|           |      |            | Peak     | 2342.300   | -41.43       | 2.00       | 0.00           | 55.77           | ≤74            | PASS    |
|           |      |            | Peak     | 2390.000   | -42.66       | 2.00       | 0.00           | 54.54           | ≤74            | PASS    |
|           | High | 2480       | AV       | 2483.500   | -52.20       | 2.00       | 0.97           | 45.97           | ≤54            | PASS    |
|           |      |            | AV       | 2487.300   | -52.94       | 2.00       | 0.97           | 45.23           | ≤54            | PASS    |
|           |      |            | AV       | 2500.000   | -52.41       | 2.00       | 0.97           | 45.76           | ≤54            | PASS    |
|           |      |            | Peak     | 2483.500   | -33.82       | 2.00       | 0.00           | 63.38           | ≤74            | PASS    |
|           |      |            | Peak     | 2487.300   | -39.30       | 2.00       | 0.00           | 57.90           | ≤74            | PASS    |
|           |      |            | Peak     | 2500.000   | -42.28       | 2.00       | 0.00           | 54.92           | ≤74            | PASS    |
| BLE 2M    | Low  | 2402       | AV       | 2310.000   | -53.42       | 2.00       | 2.84           | 46.62           | ≤54            | PASS    |
|           |      |            | AV       | 2339.100   | -53.90       | 2.00       | 2.84           | 46.14           | ≤54            | PASS    |
|           |      |            | AV       | 2390.000   | -53.40       | 2.00       | 2.84           | 46.64           | ≤54            | PASS    |
|           |      |            | Peak     | 2310.000   | -43.46       | 2.00       | 0.00           | 53.74           | ≤74            | PASS    |
|           |      |            | Peak     | 2339.300   | -41.29       | 2.00       | 0.00           | 55.91           | ≤74            | PASS    |
|           |      |            | Peak     | 2390.000   | -42.85       | 2.00       | 0.00           | 54.35           | ≤74            | PASS    |
|           | High | 2480       | AV       | 2483.500   | -51.45       | 2.00       | 2.84           | 48.59           | ≤54            | PASS    |
|           |      |            | AV       | 2487.700   | -52.36       | 2.00       | 2.84           | 47.68           | ≤54            | PASS    |
|           |      |            | AV       | 2500.000   | -52.76       | 2.00       | 2.84           | 47.28           | ≤54            | PASS    |
|           |      |            | Peak     | 2483.500   | -32.66       | 2.00       | 0.00           | 64.54           | ≤74            | PASS    |
|           |      |            | Peak     | 2487.800   | -39.41       | 2.00       | 0.00           | 57.79           | ≤74            | PASS    |
|           |      |            | Peak     | 2500.000   | -41.87       | 2.00       | 0.00           | 55.33           | ≤74            | PASS    |

Note: 1. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a).

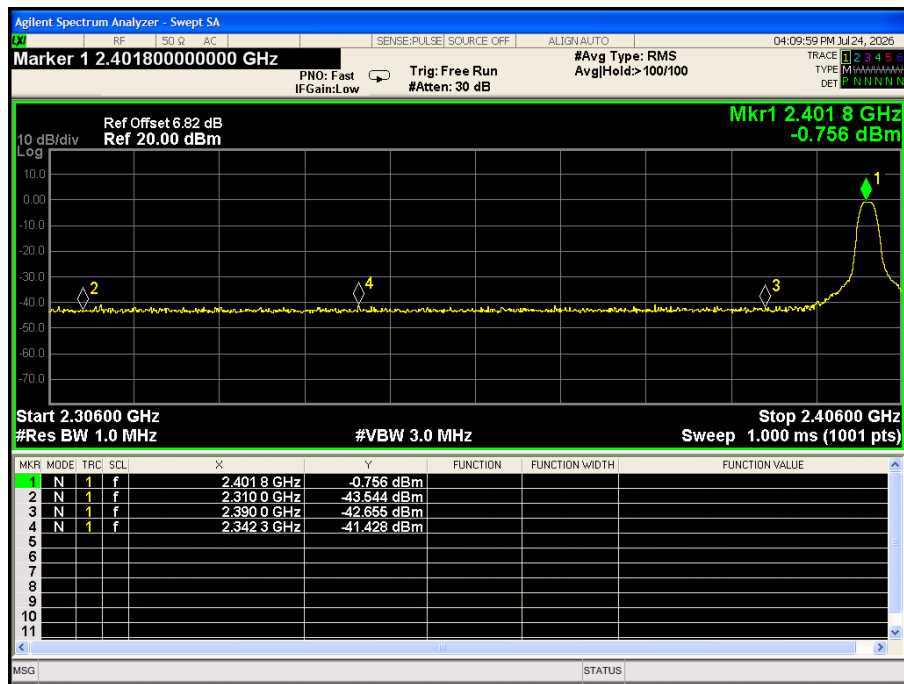
The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

## Test Graphs

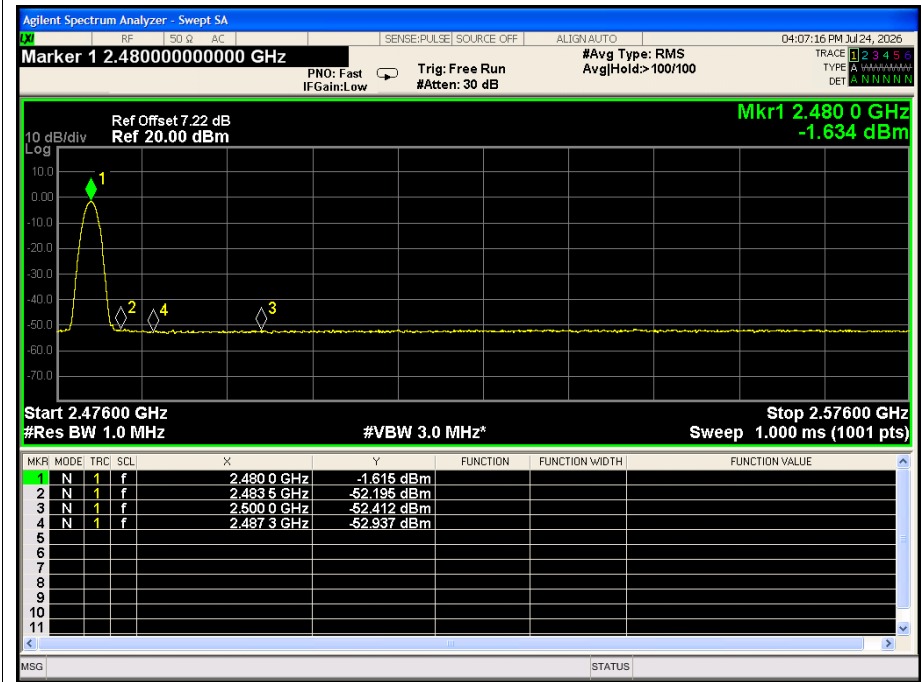
### NVNT BLE 1M 2402MHz AV



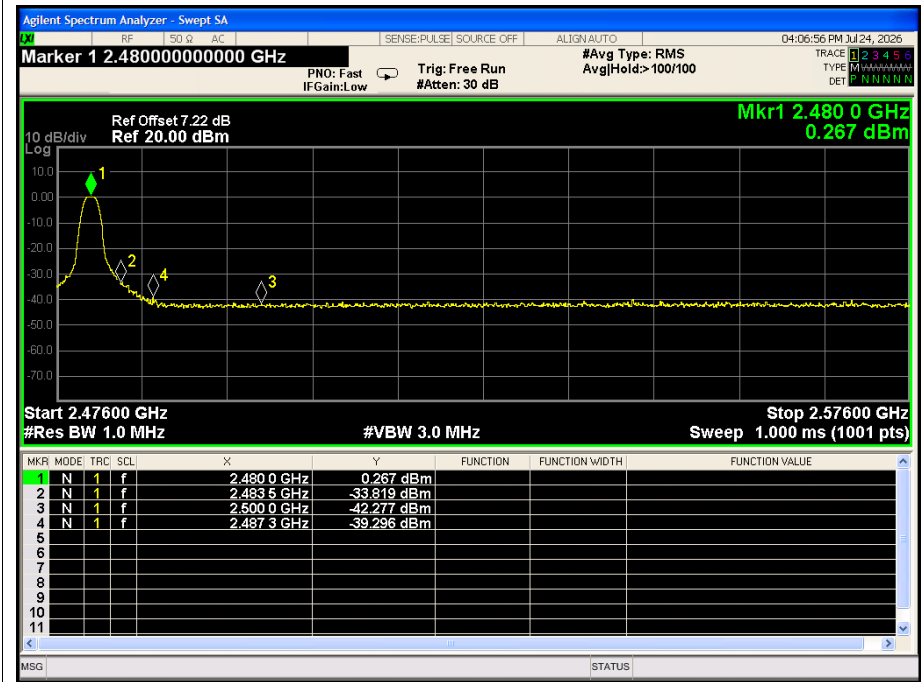
### NVNT BLE 1M 2402MHz PK



# NVNT BLE 1M 2480MHz AV

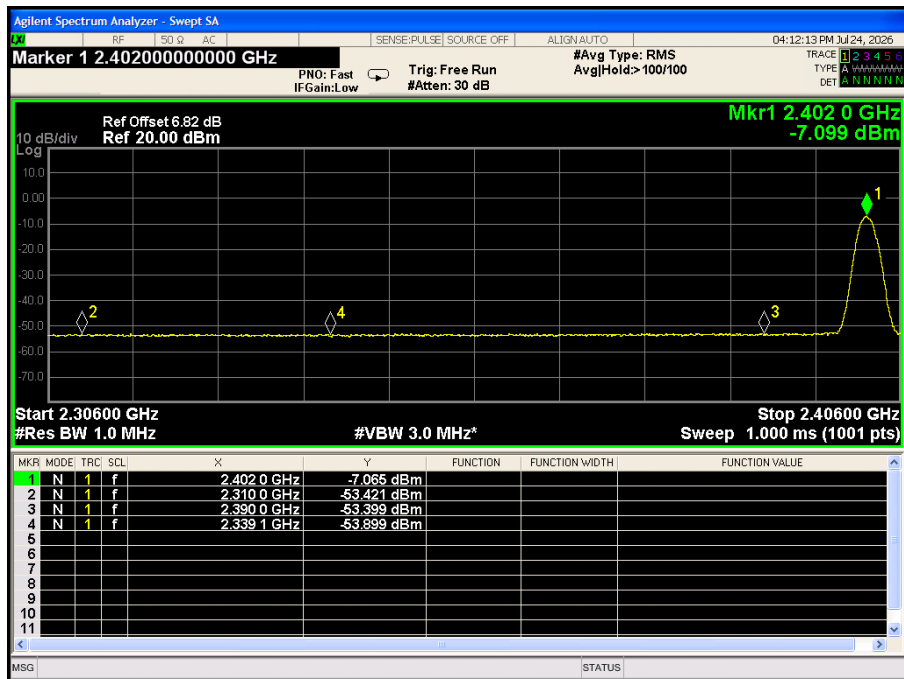


# NVNT BLE 1M 2480MHz PK

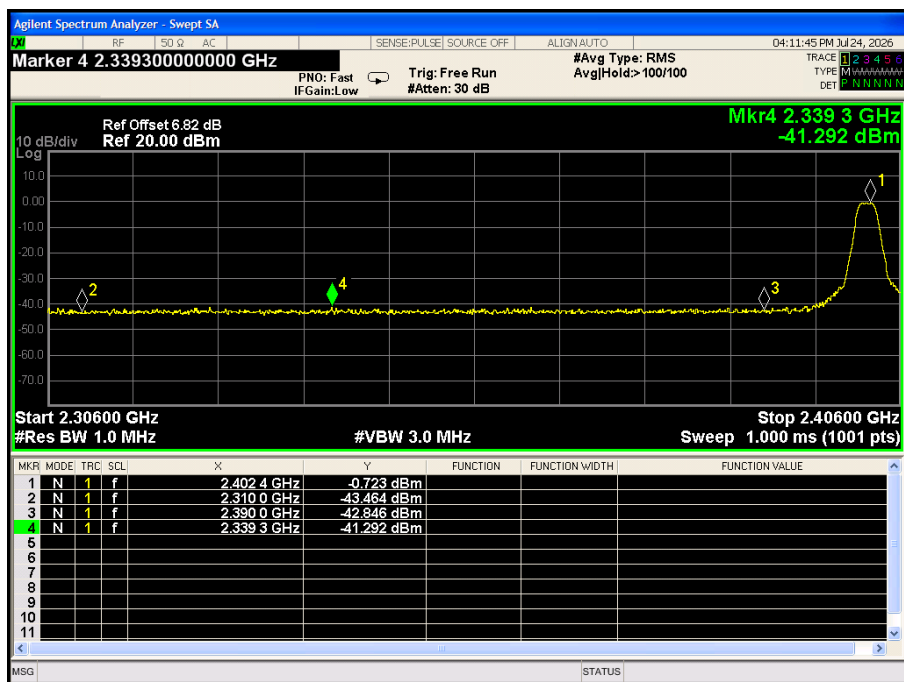


## Test Graphs

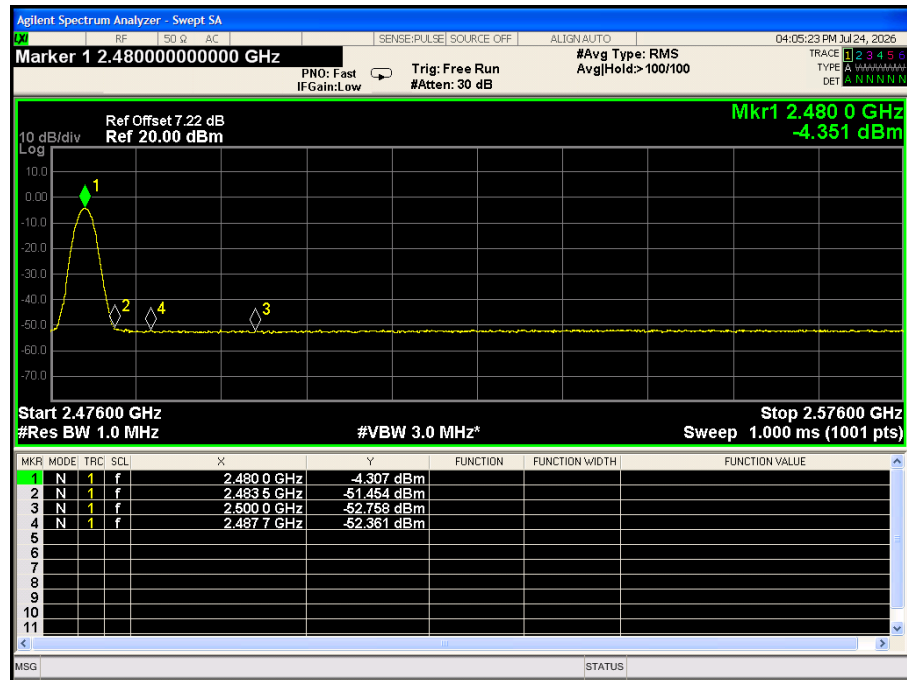
### NVNT BLE 2M 2402MHz AV



### NVNT BLE 2M 2402MHz PK



## NVNT BLE 2M 2480MHz AV



## NVNT BLE 2M 2480MHz PK

