



## Appendix A

### RF Test Data for BT LE (Conducted Measurement)

Product Name: BDE Dual Band (2.4 and 5 GHz) Wi-Fi 6 & BLE Combo Module

Test Model: BDE-BW3351N1

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23.1° C   |
| Relative Humidity: | 52.3%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Can Kun   |
| 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    | 0.651                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 0.658                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 0.656                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 2M | 2404            | Ant1    | 1.12                  | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 2M | 2440            | Ant1    | 1.073                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 2M | 2478            | Ant1    | 1.084                 | $\geq 0.5$                  | Pass    |

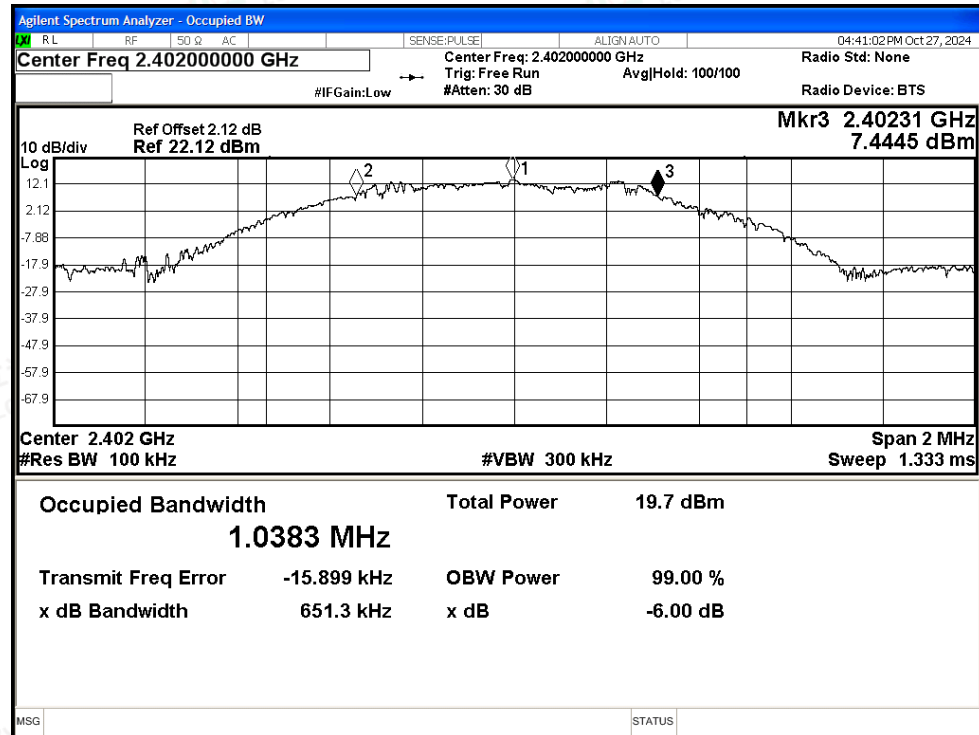


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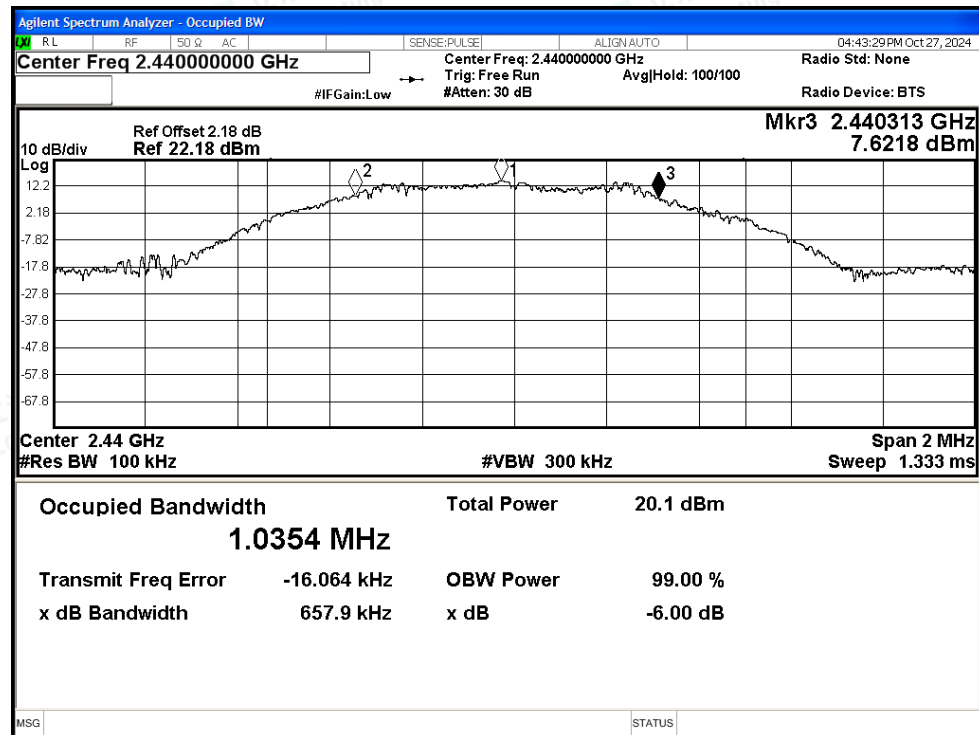


## Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1

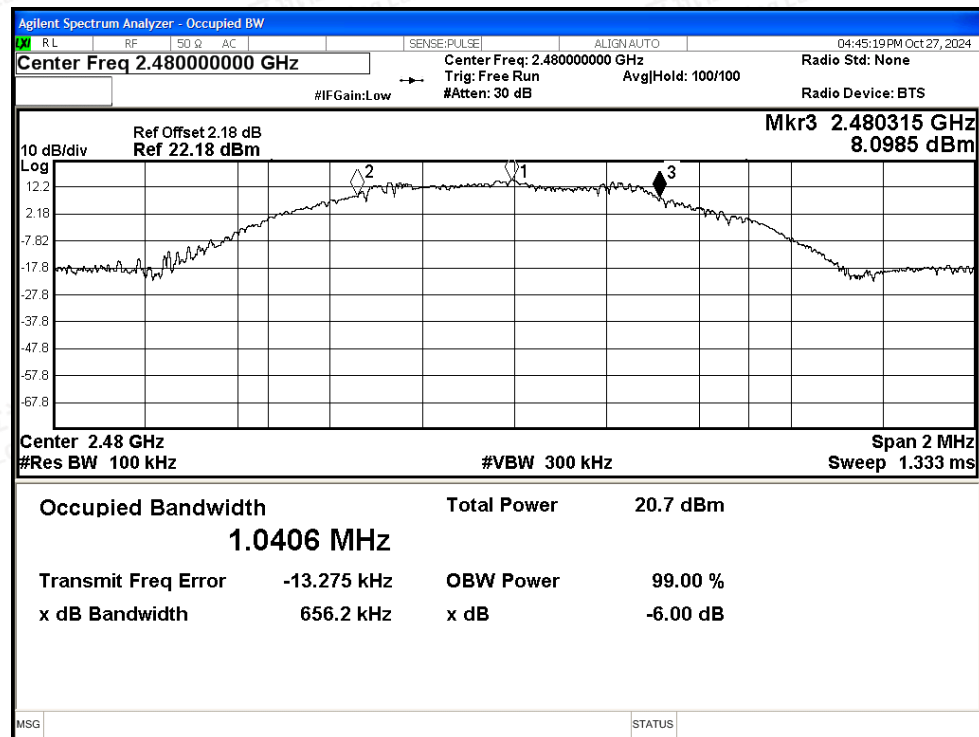


-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1

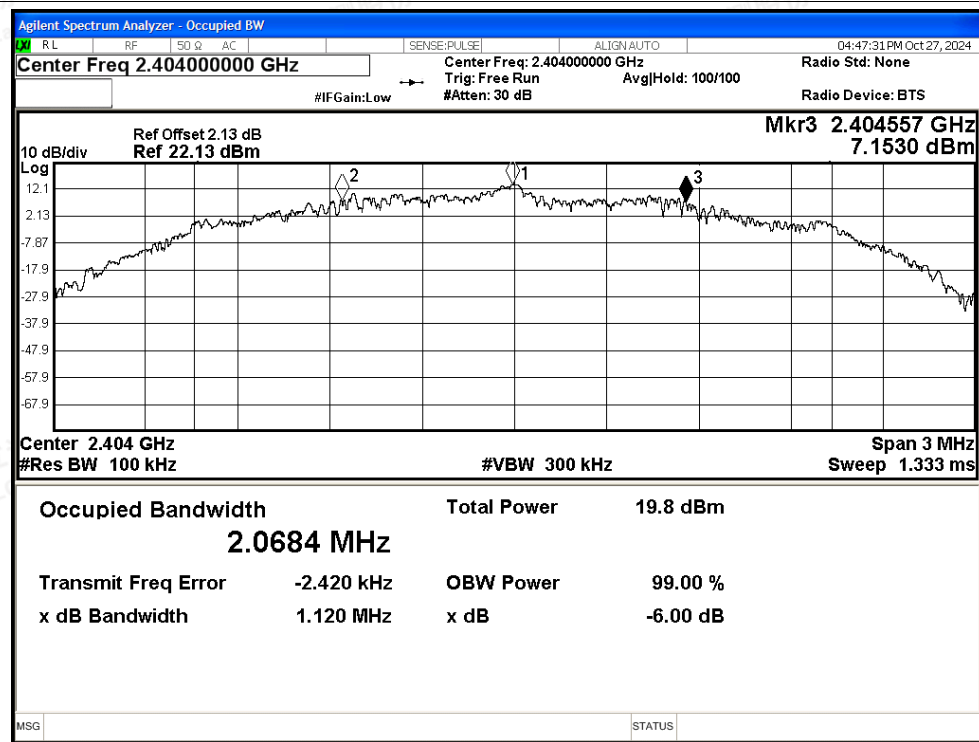




## -6dB Bandwidth NVNT BLE 1M 2480MHz Ant1

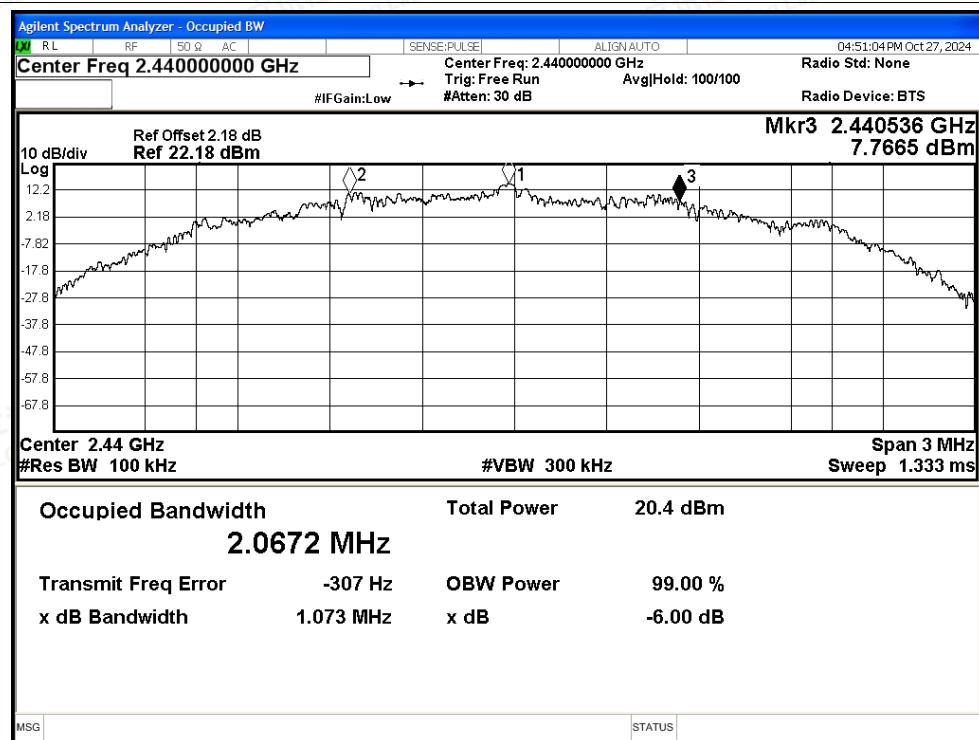


## -6dB Bandwidth NVNT BLE 2M 2404MHz Ant1

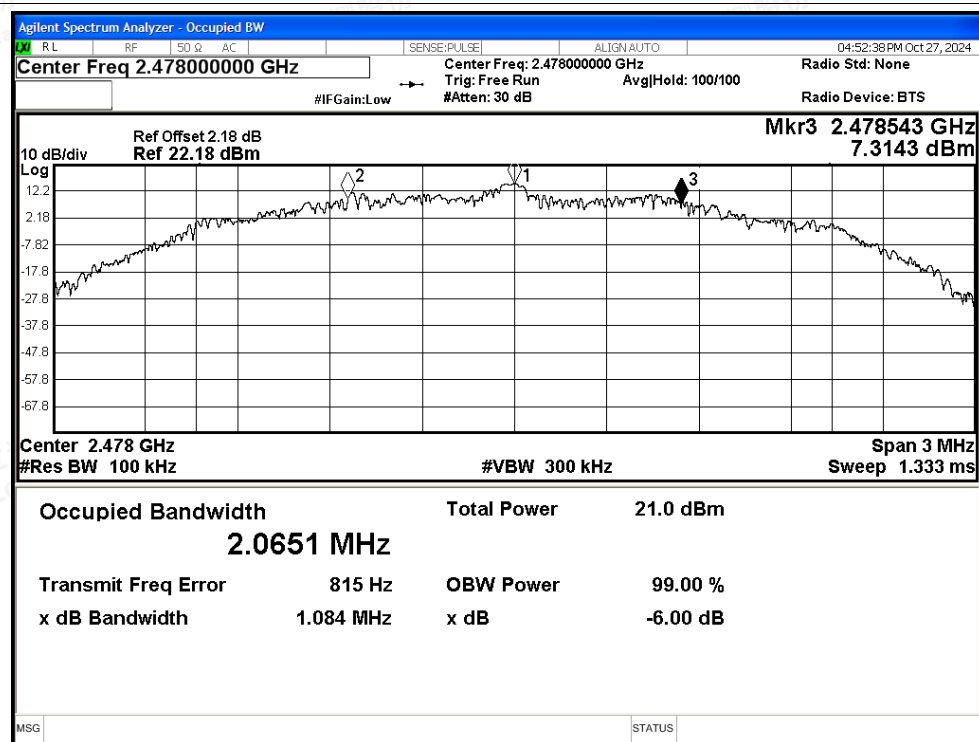




## -6dB Bandwidth NVNT BLE 2M 2440MHz Ant1



## -6dB Bandwidth NVNT BLE 2M 2478MHz Ant1





## A.2 Maximum Conducted Output Power

| Condition | Mode   | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|--------|-----------------|---------|-----------------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 14.08                 | 30          | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 14.53                 | 30          | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 15                    | 30          | Pass    |
| NVNT      | BLE 2M | 2404            | Ant1    | 14.15                 | 30          | Pass    |
| NVNT      | BLE 2M | 2440            | Ant1    | 14.96                 | 30          | Pass    |
| NVNT      | BLE 2M | 2478            | Ant1    | <b>15.43</b>          | 30          | Pass    |

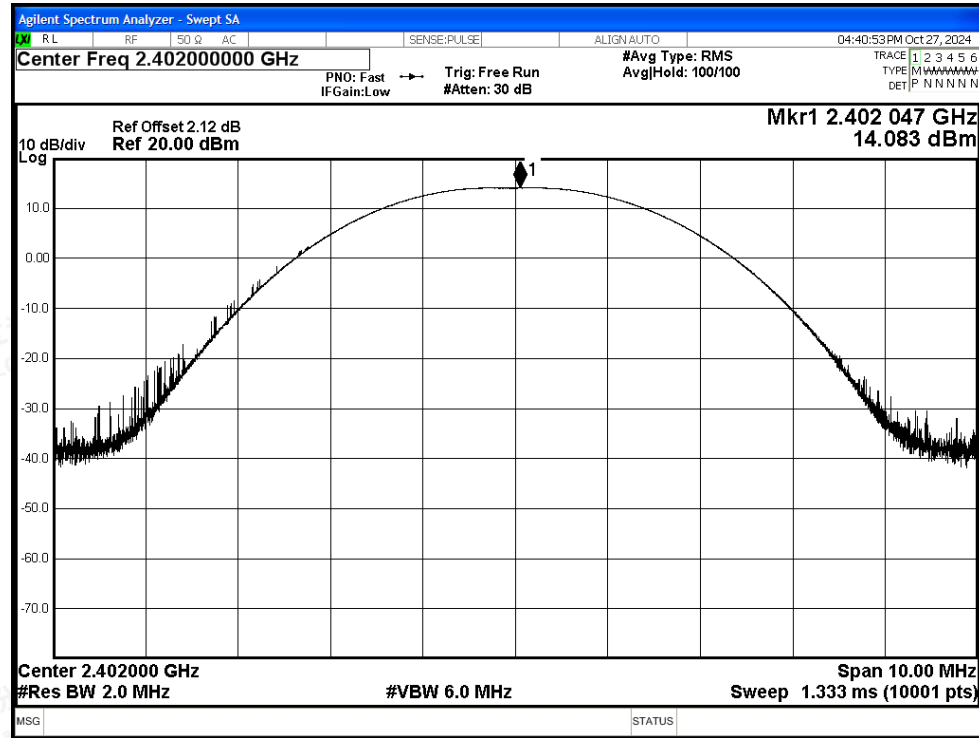


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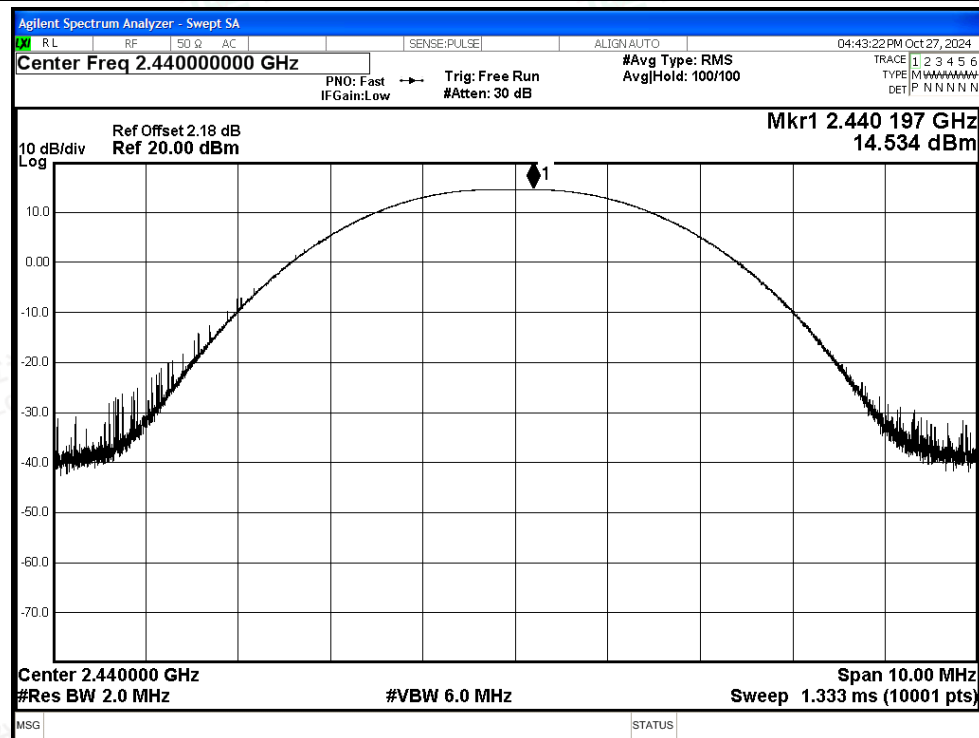


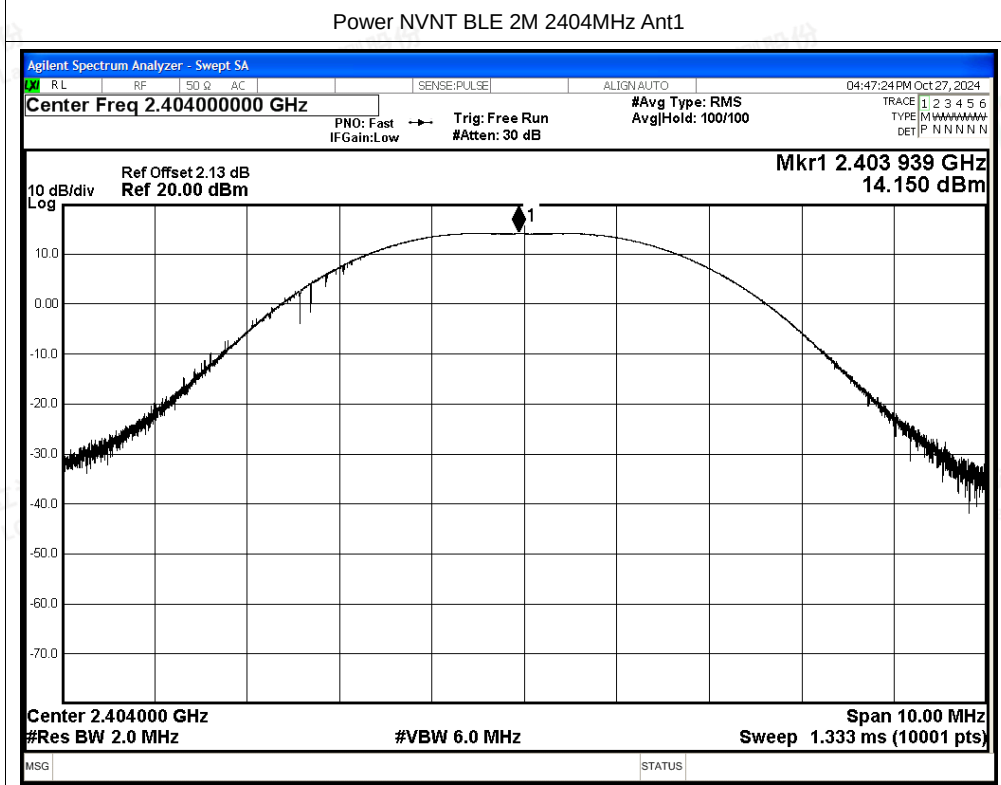
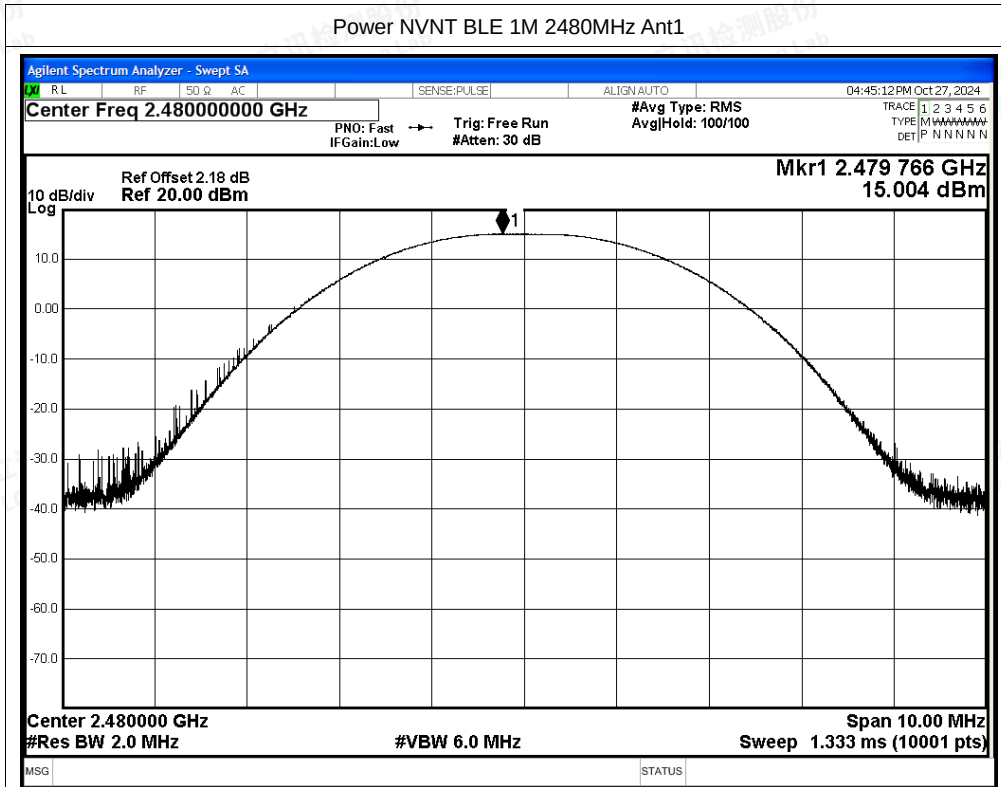
## Test Graphs

## Power NVNT BLE 1M 2402MHz Ant1

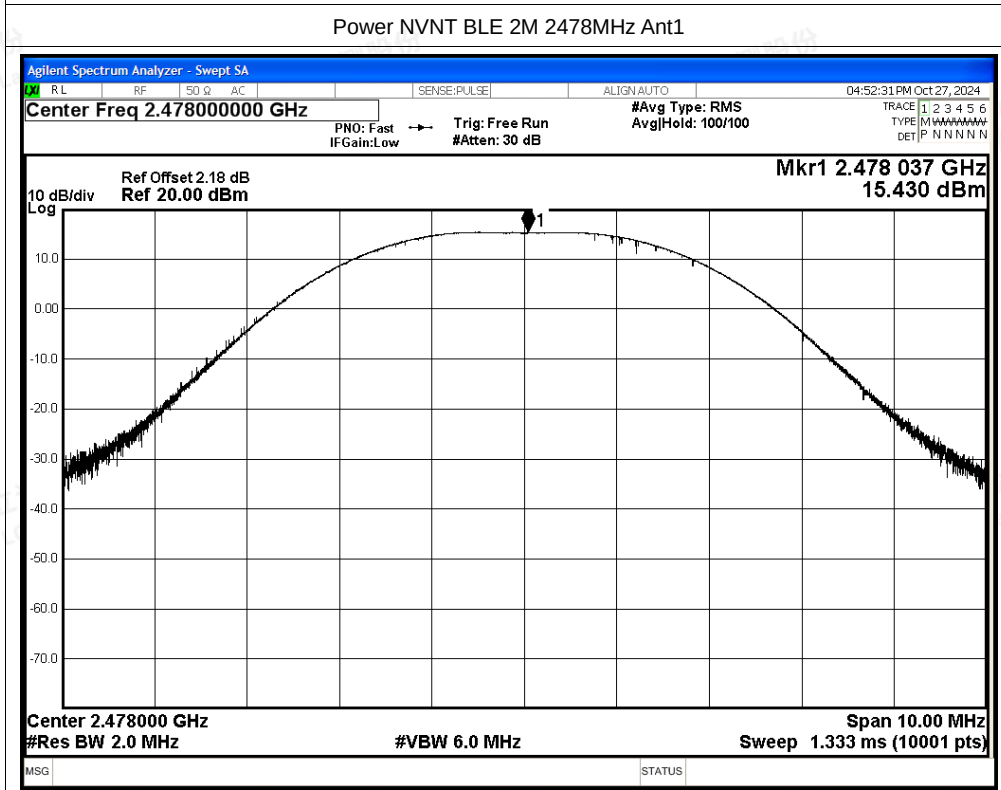
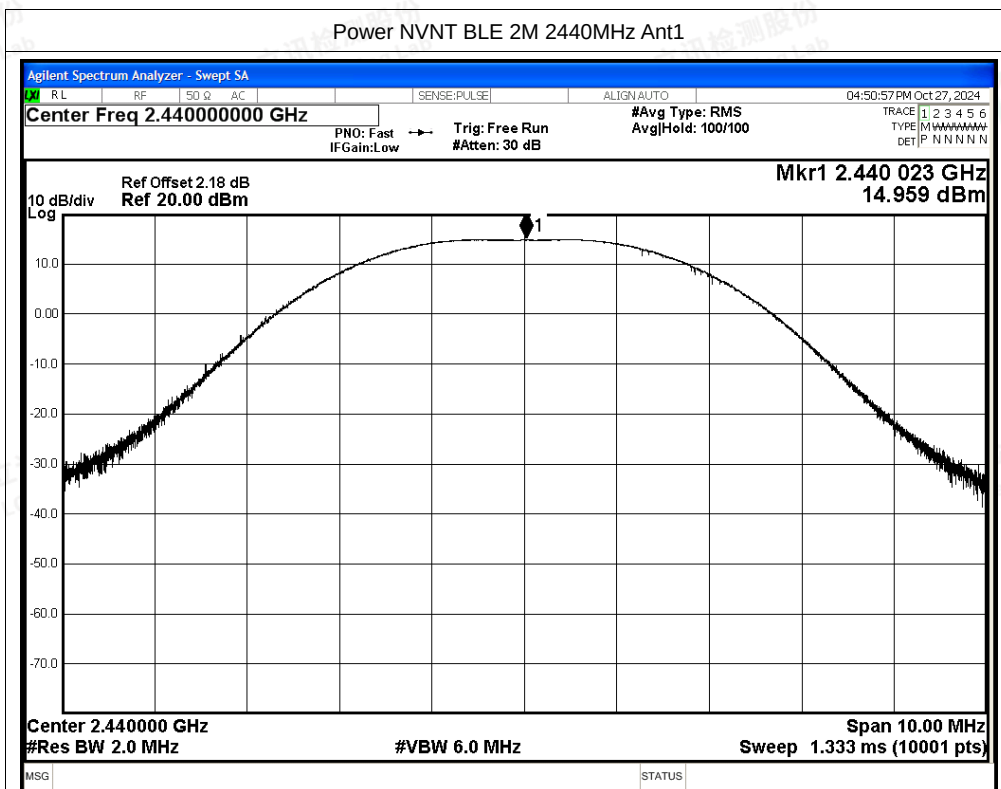


## Power NVNT BLE 1M 2440MHz Ant1











### A.3 Maximum Power Spectral Density Level

| Condition | Mode   | Frequency (MHz) | Antenna | Conducted PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|-----------|--------|-----------------|---------|--------------------------|------------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -1.43                    | 8                | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -0.76                    | 8                | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -0.37                    | 8                | Pass    |
| NVNT      | BLE 2M | 2404            | Ant1    | -4.46                    | 8                | Pass    |
| NVNT      | BLE 2M | 2440            | Ant1    | -3.93                    | 8                | Pass    |
| NVNT      | BLE 2M | 2478            | Ant1    | -3.44                    | 8                | Pass    |

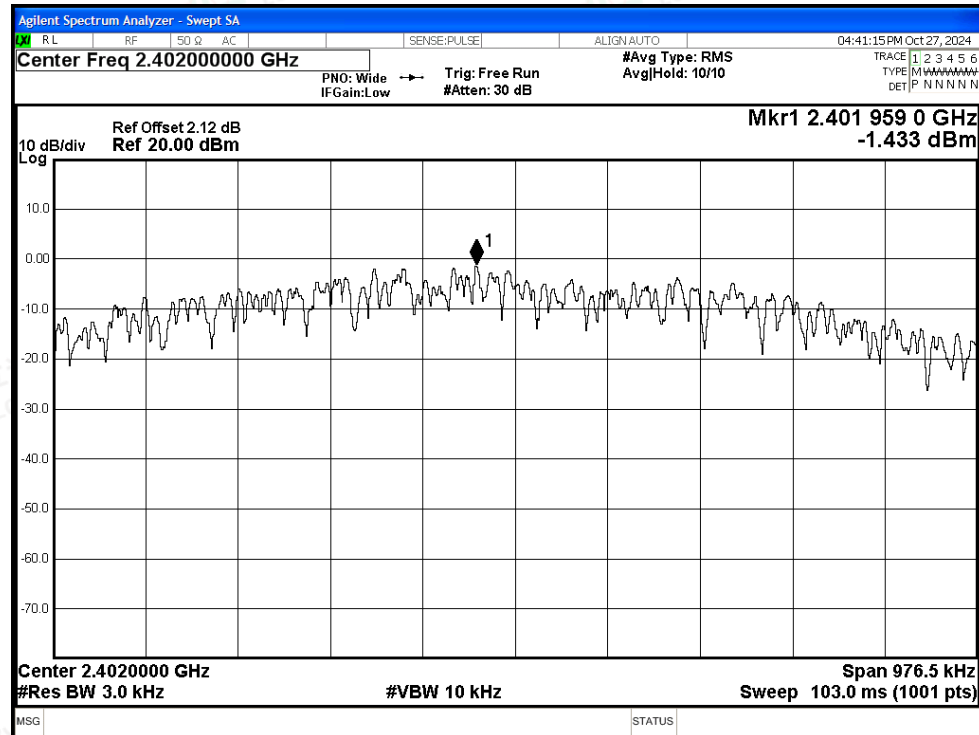


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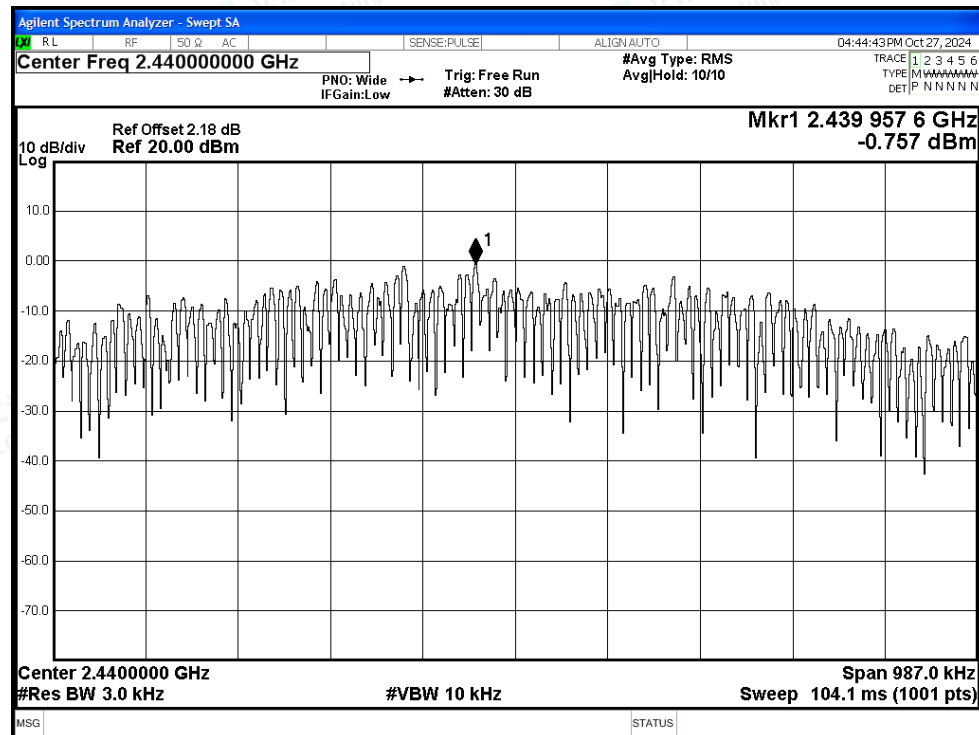


## Test Graphs

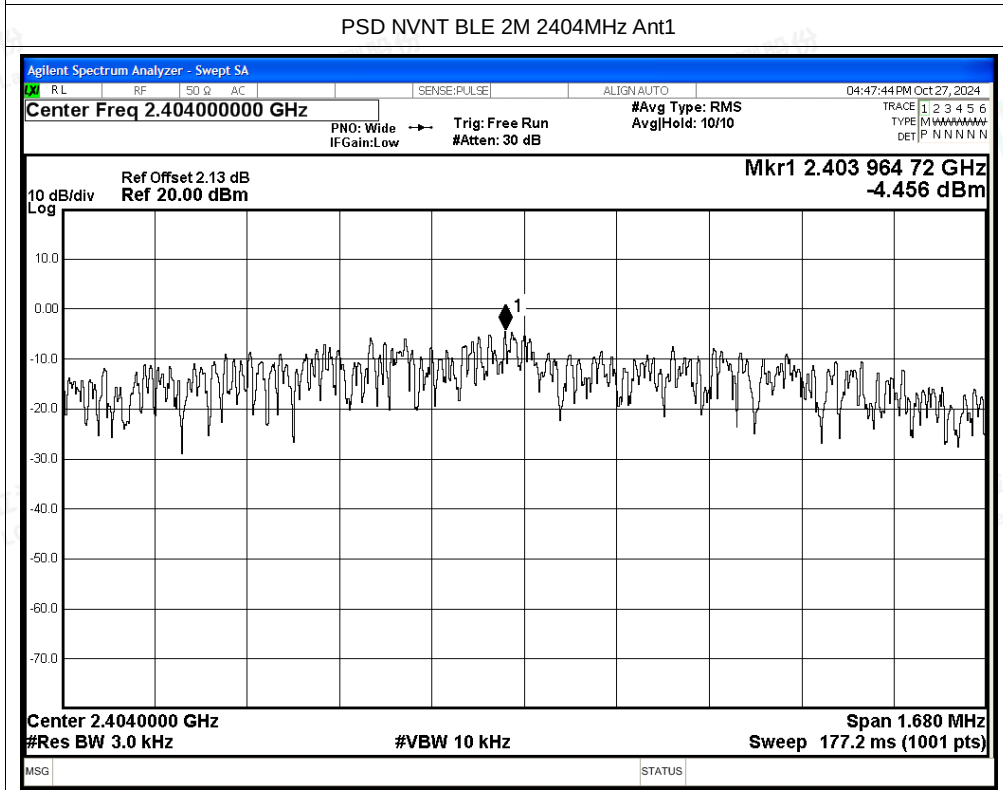
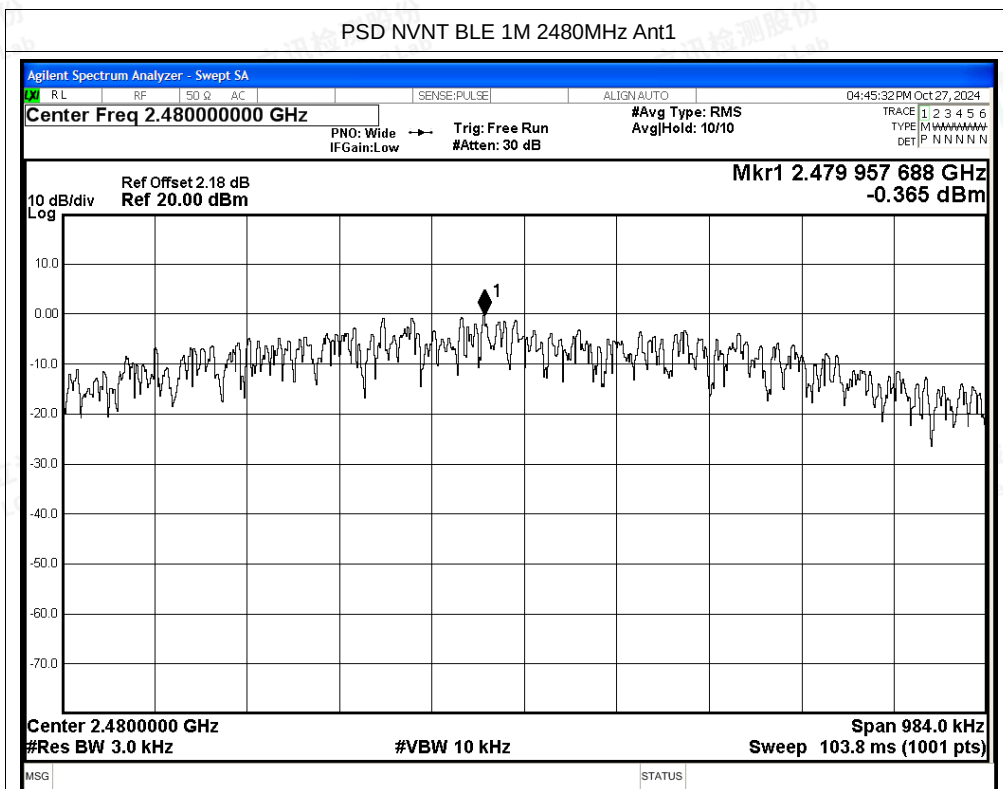
PSD NVNT BLE 1M 2402MHz Ant1

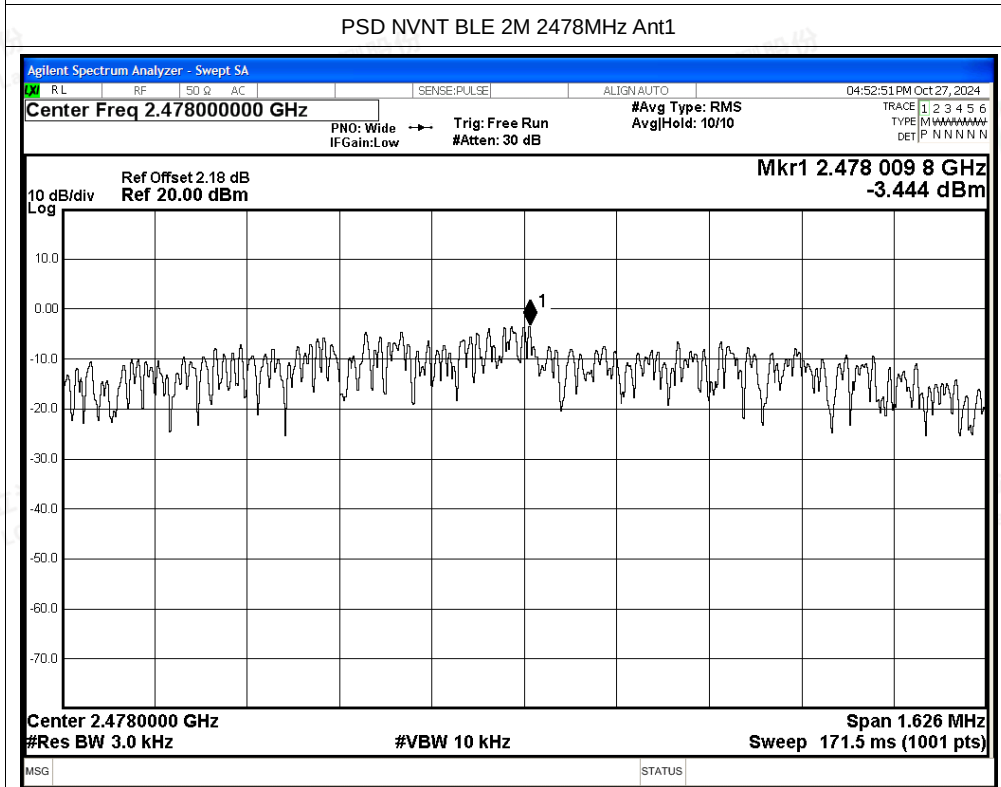
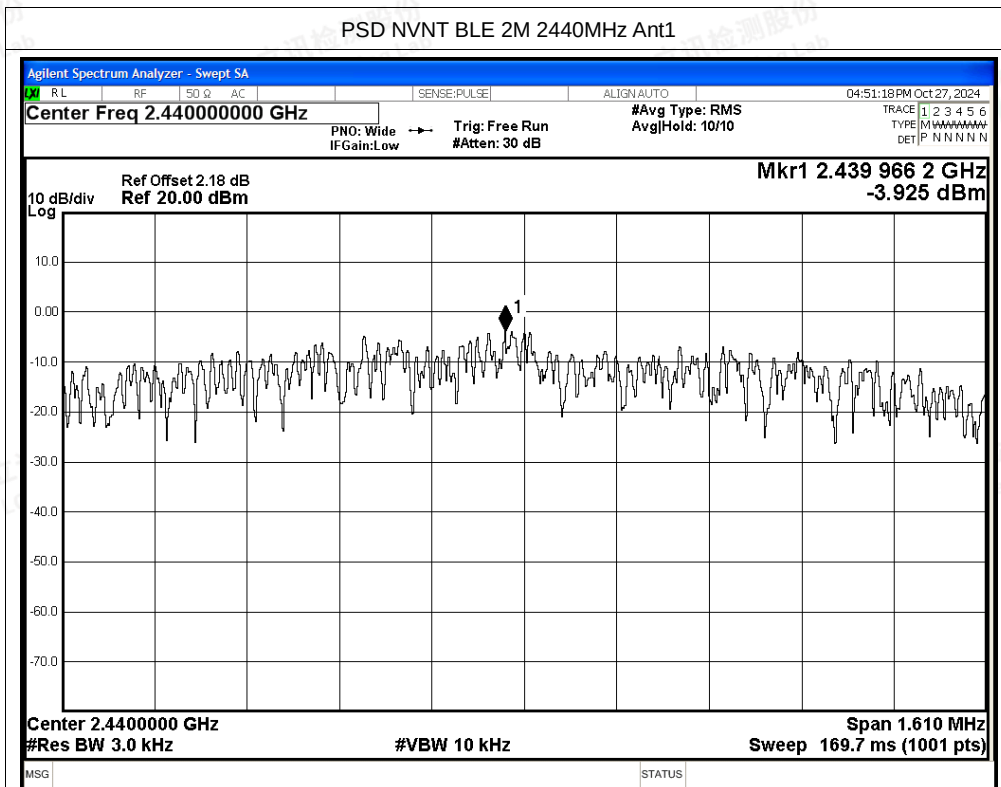


PSD NVNT BLE 1M 2440MHz Ant1



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### A.4 Band Edge

| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -48.59          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -60.32          | -20         | Pass    |
| NVNT      | BLE 2M | 2404            | Ant1    | -51.41          | -20         | Pass    |
| NVNT      | BLE 2M | 2478            | Ant1    | -63.84          | -20         | Pass    |

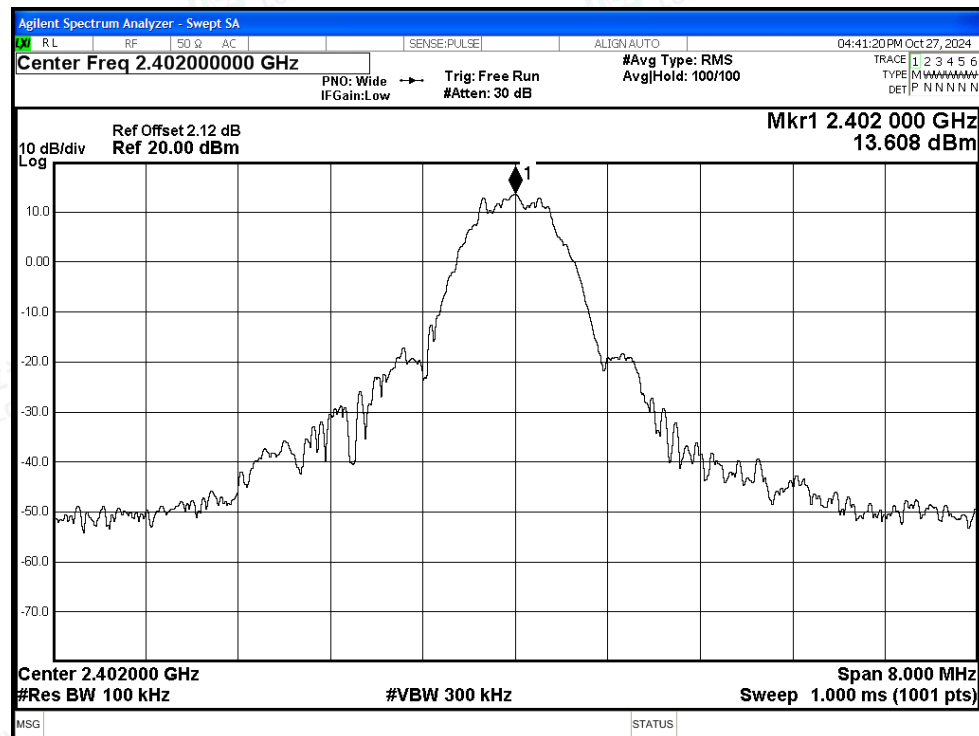


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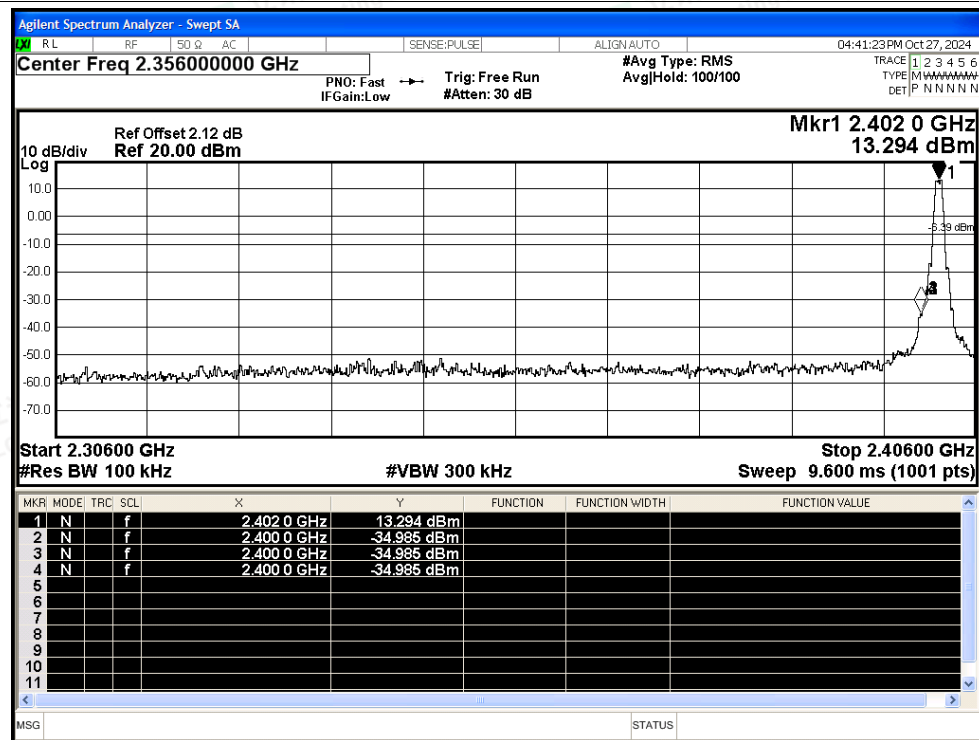


## Test Graphs

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

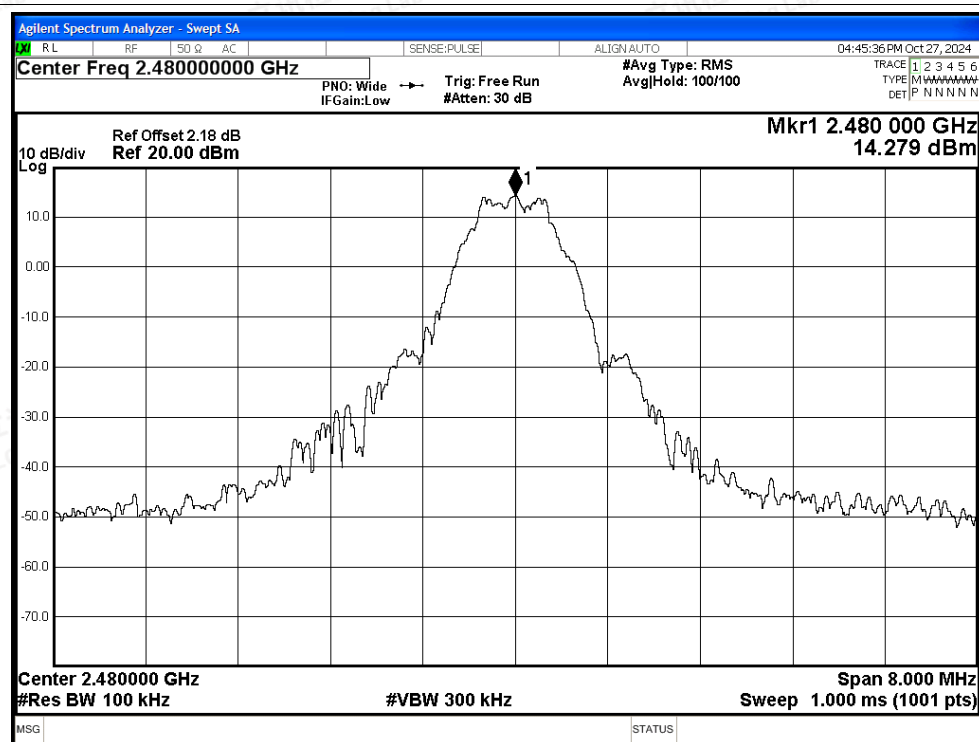


## Band Edge NVNT BLE 1M 2402MHz Ant1 Emission

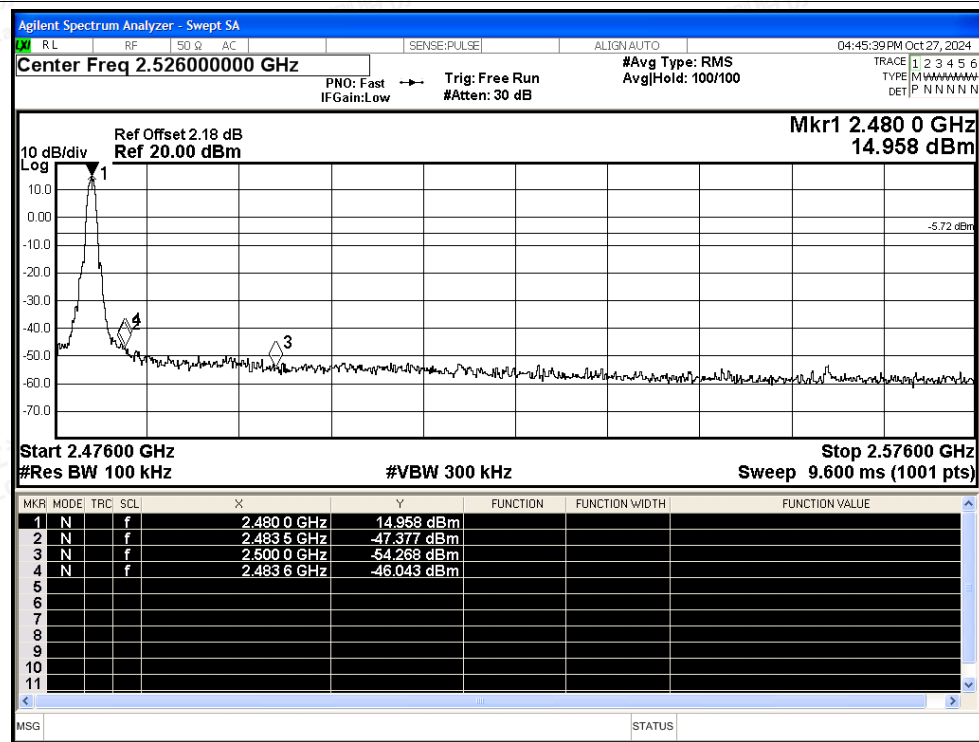




## Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



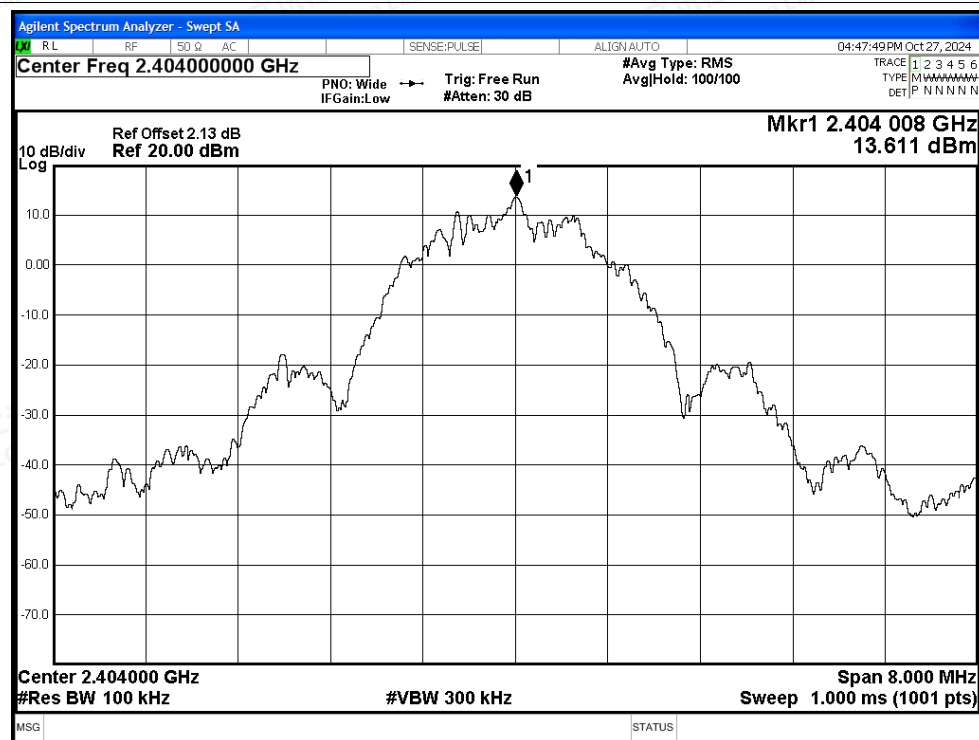
## Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



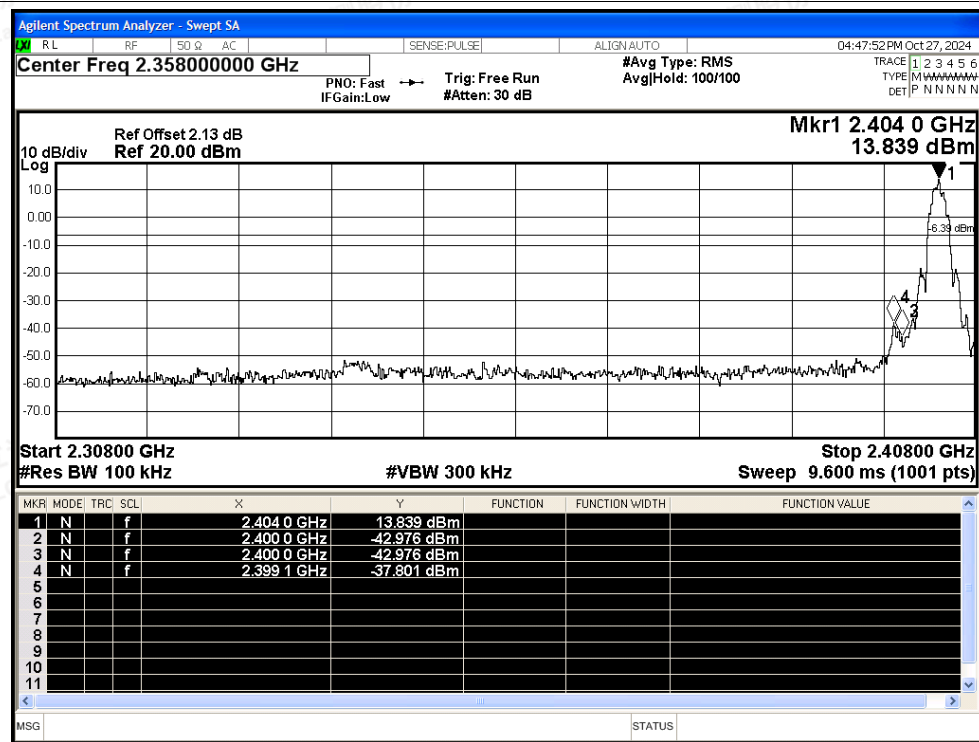




## Band Edge NVNT BLE 2M 2404MHz Ant1 Ref

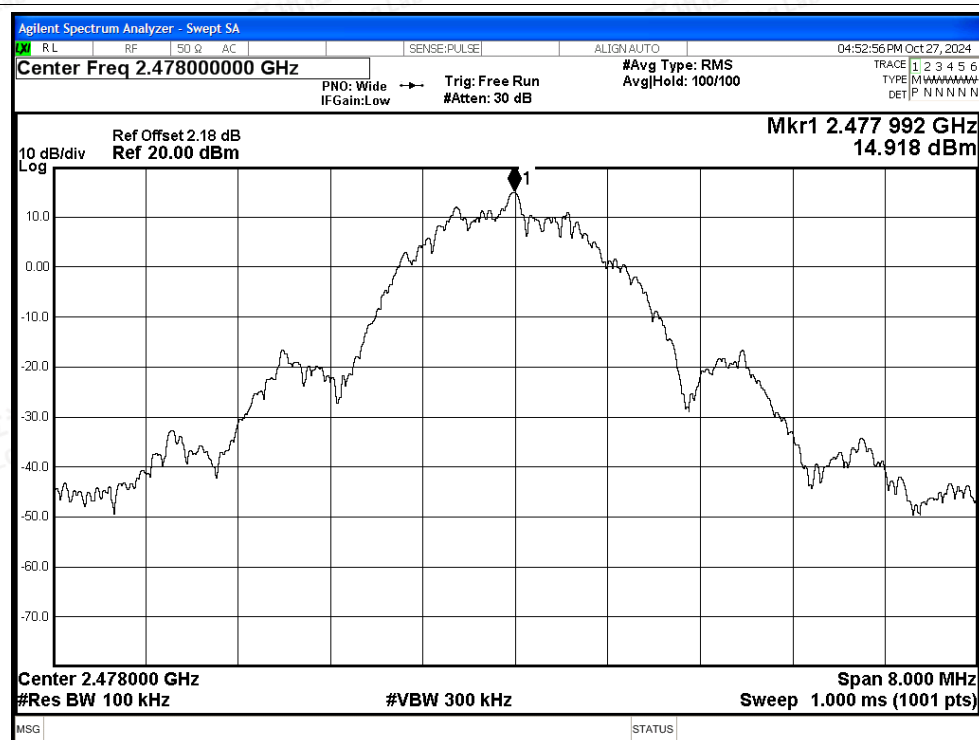


## Band Edge NVNT BLE 2M 2404MHz Ant1 Emission

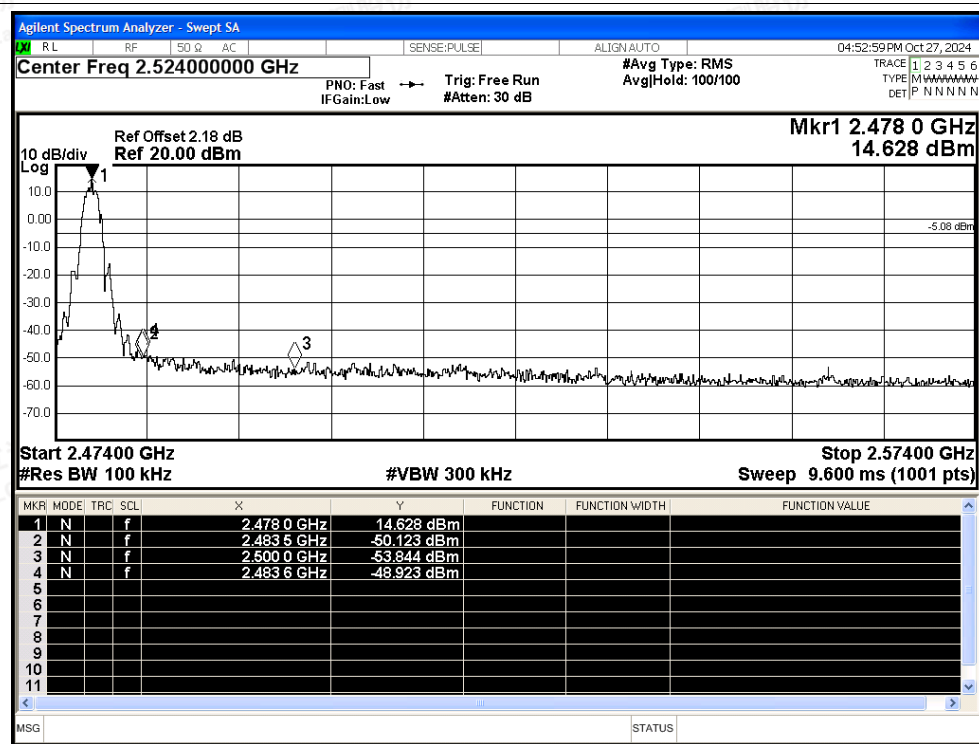




## Band Edge NVNT BLE 2M 2478MHz Ant1 Ref



## Band Edge NVNT BLE 2M 2478MHz Ant1 Emission





## A.5 Conducted RF Spurious Emission

| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -49.11          | -20         | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -49.73          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -50.25          | -20         | Pass    |
| NVNT      | BLE 2M | 2404            | Ant1    | -49.21          | -20         | Pass    |
| NVNT      | BLE 2M | 2440            | Ant1    | -49.88          | -20         | Pass    |
| NVNT      | BLE 2M | 2478            | Ant1    | -50.55          | -20         | Pass    |

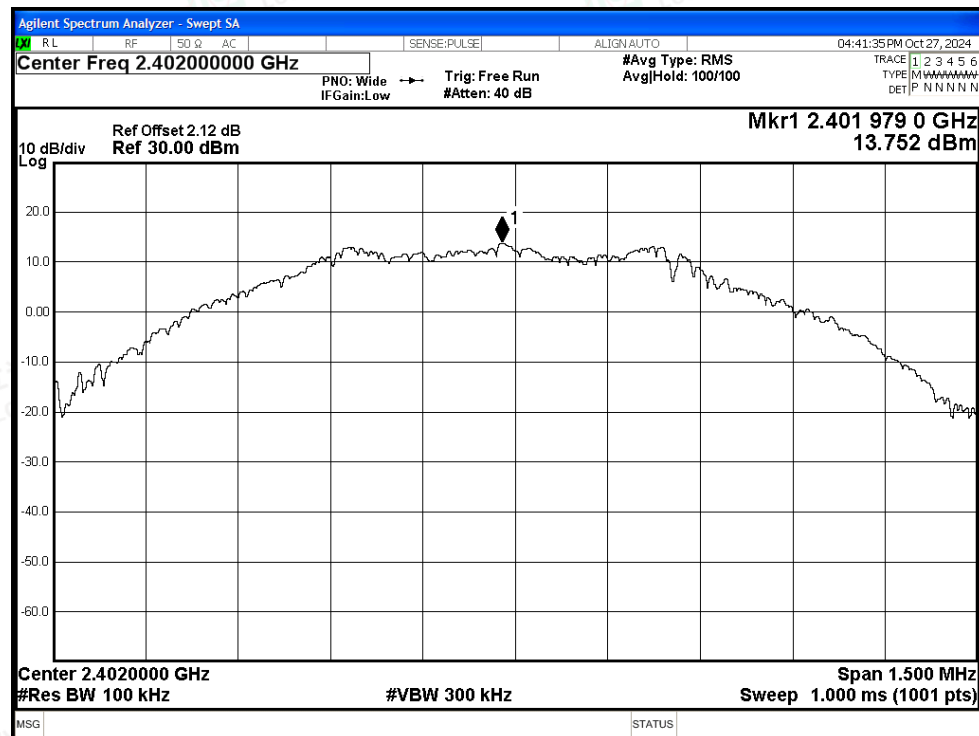


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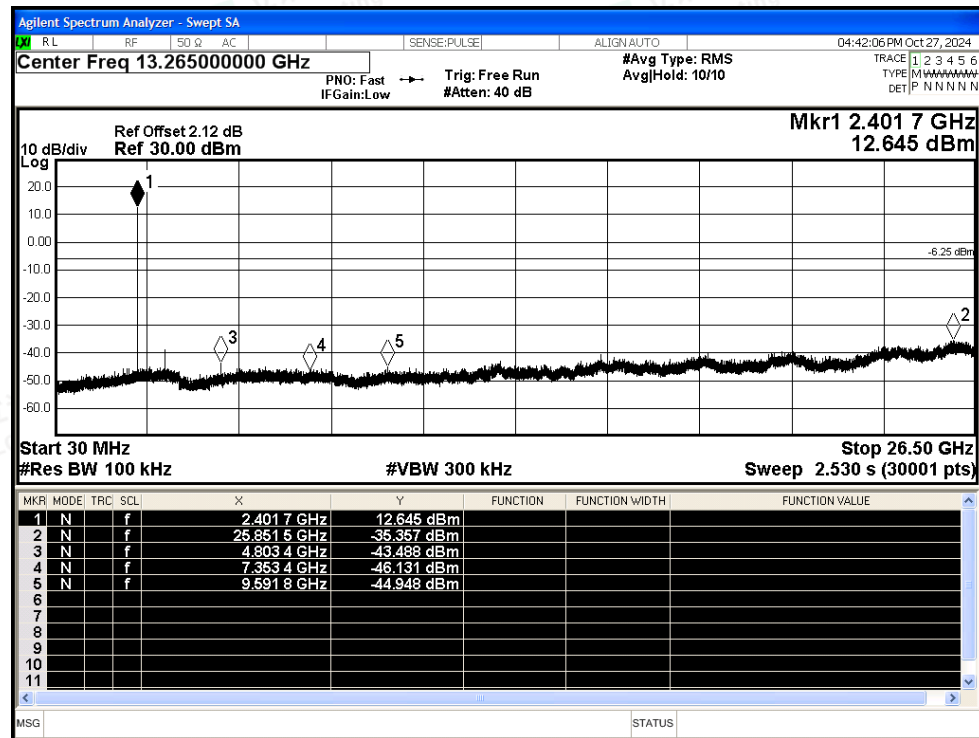


## Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



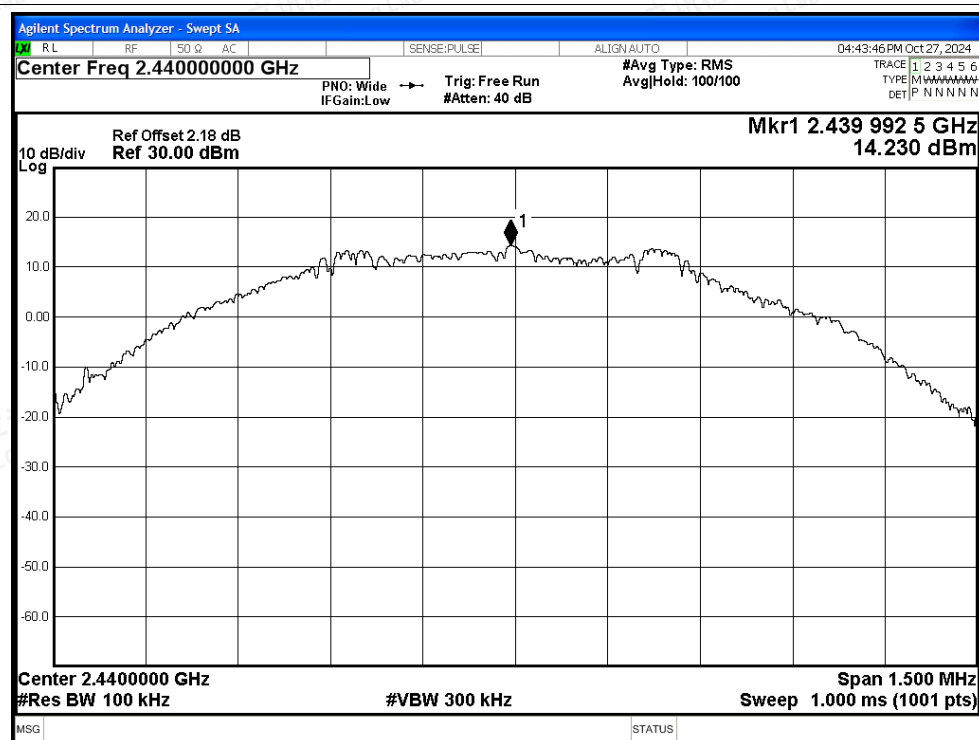
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



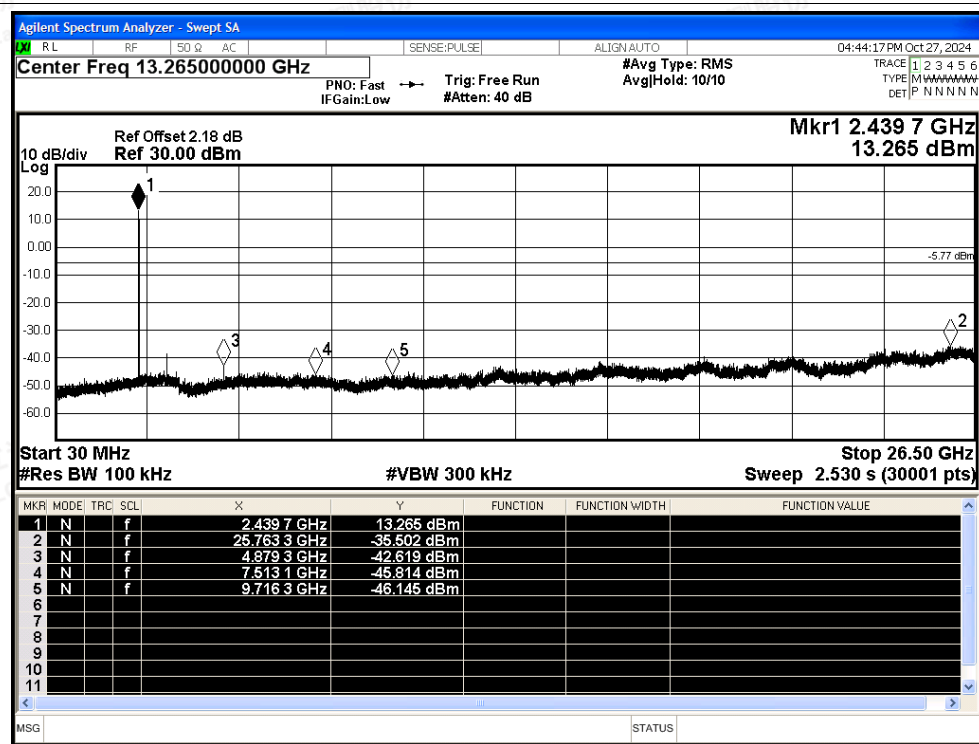
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## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref

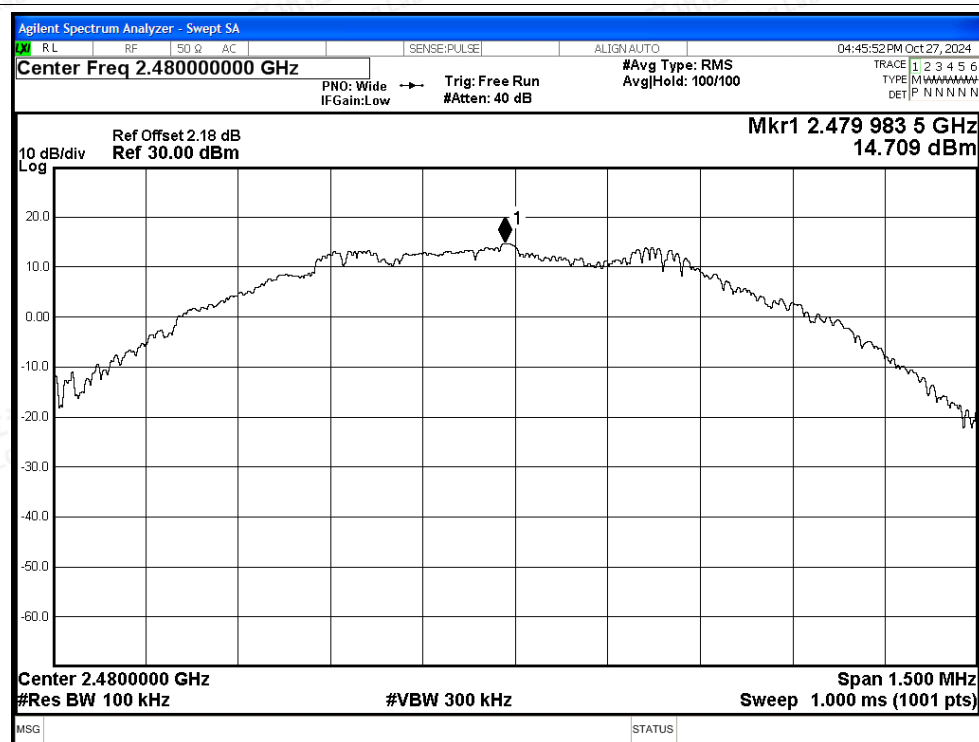


## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission

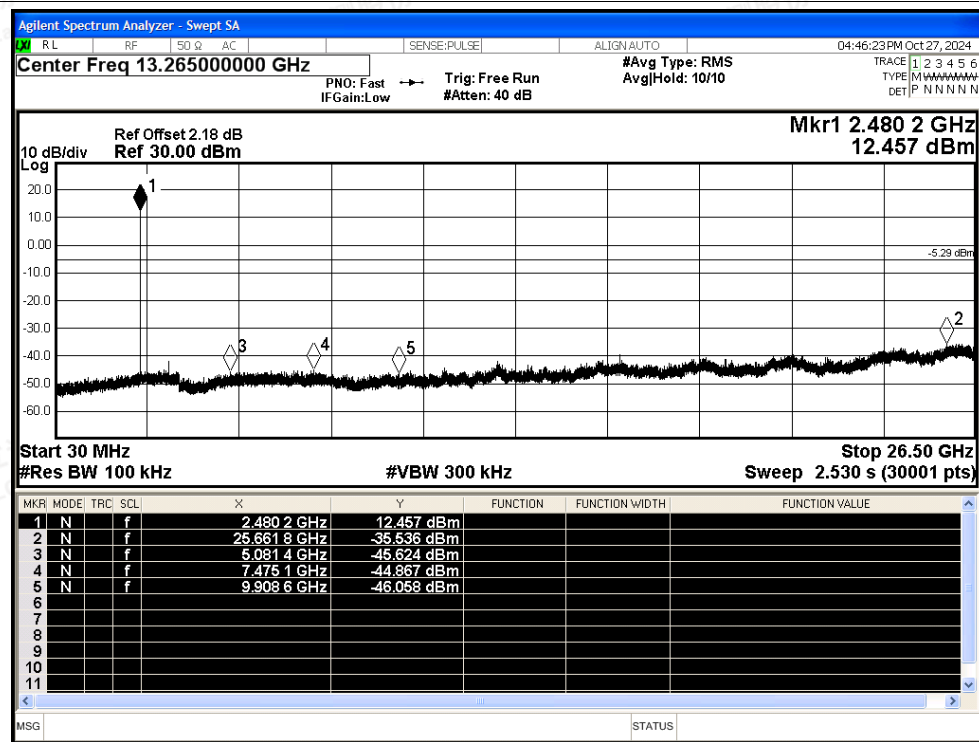




## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref

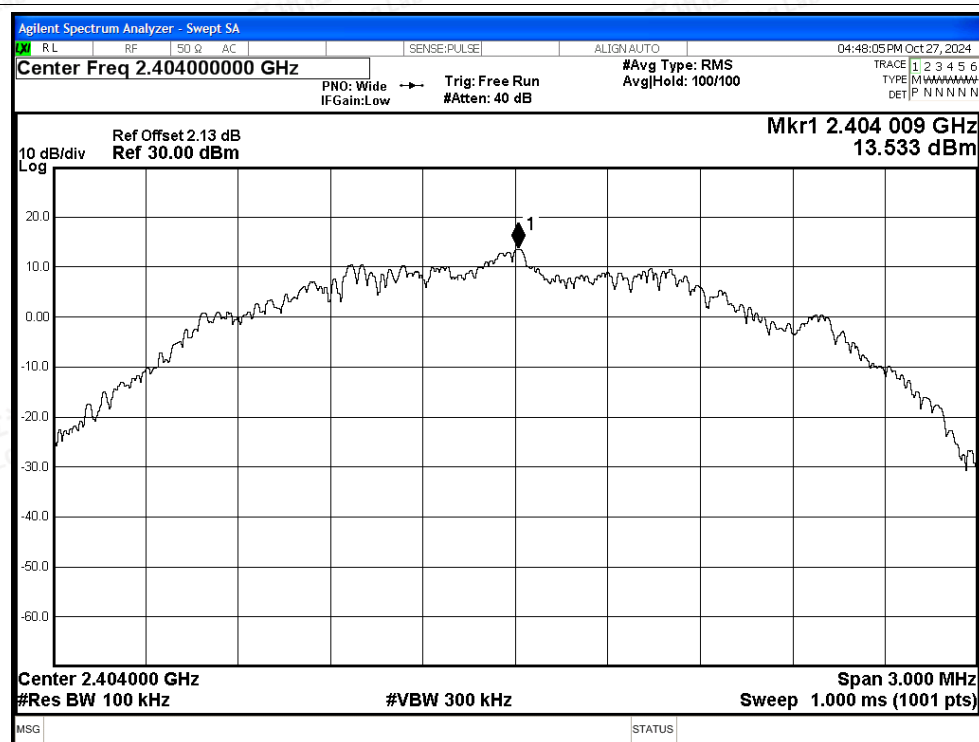


## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission

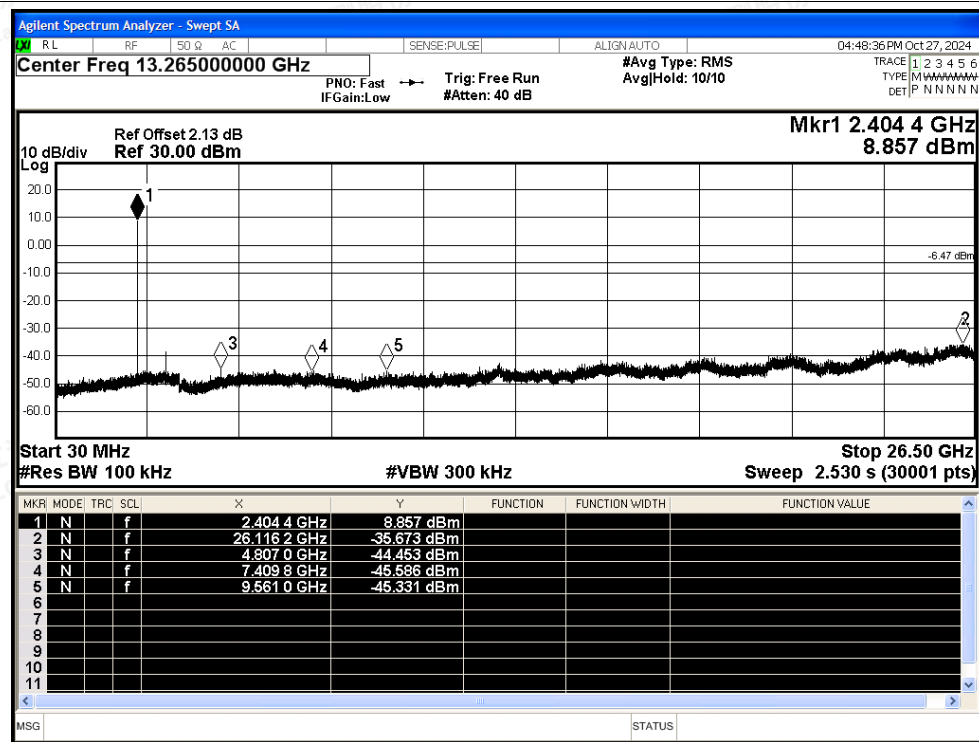




## Tx. Spurious NVNT BLE 2M 2404MHz Ant1 Ref

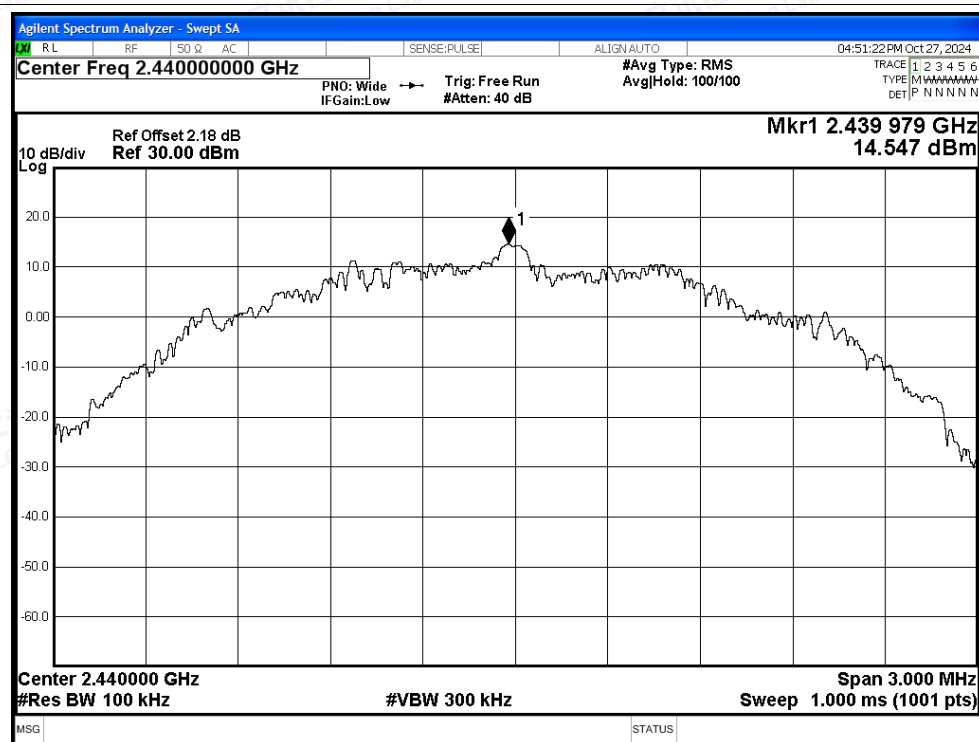


## Tx. Spurious NVNT BLE 2M 2404MHz Ant1 Emission

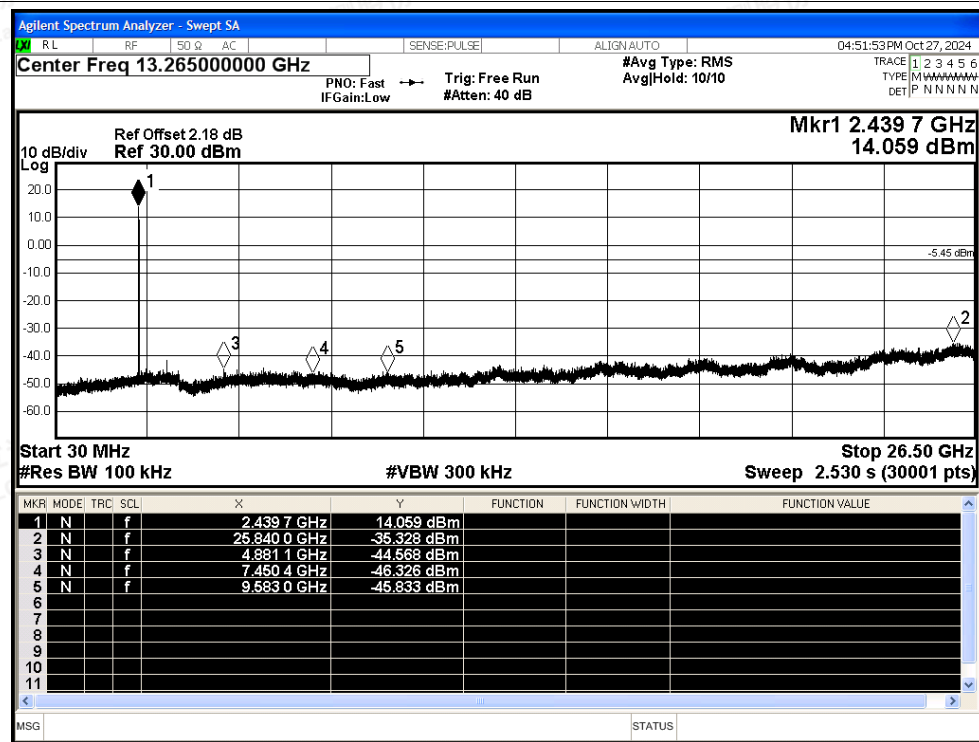




## Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Ref



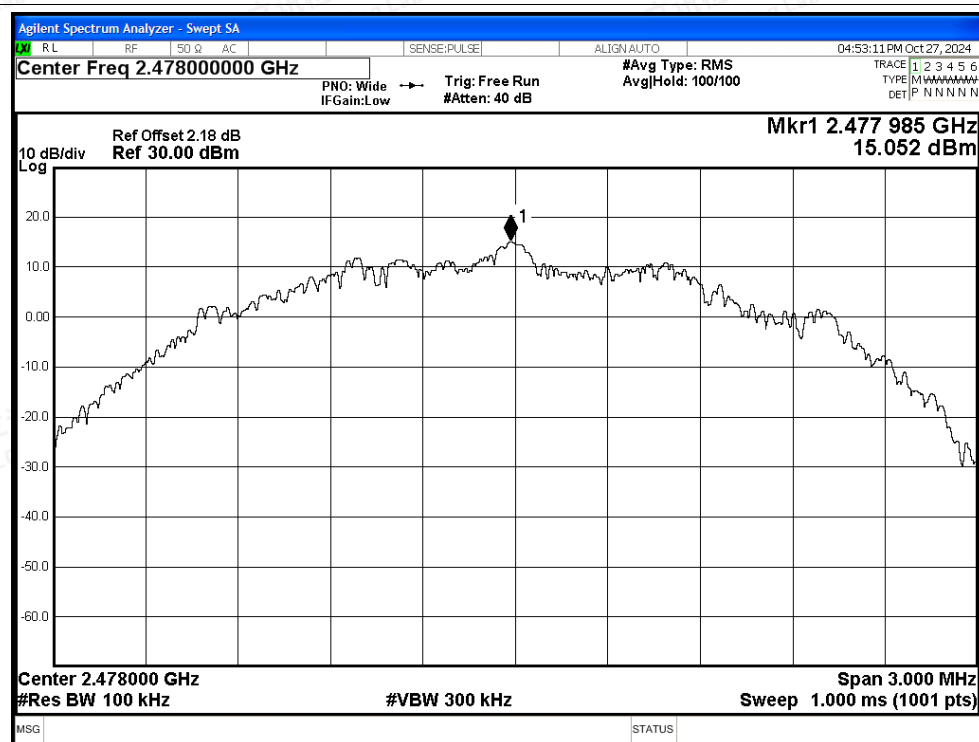
## Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Emission



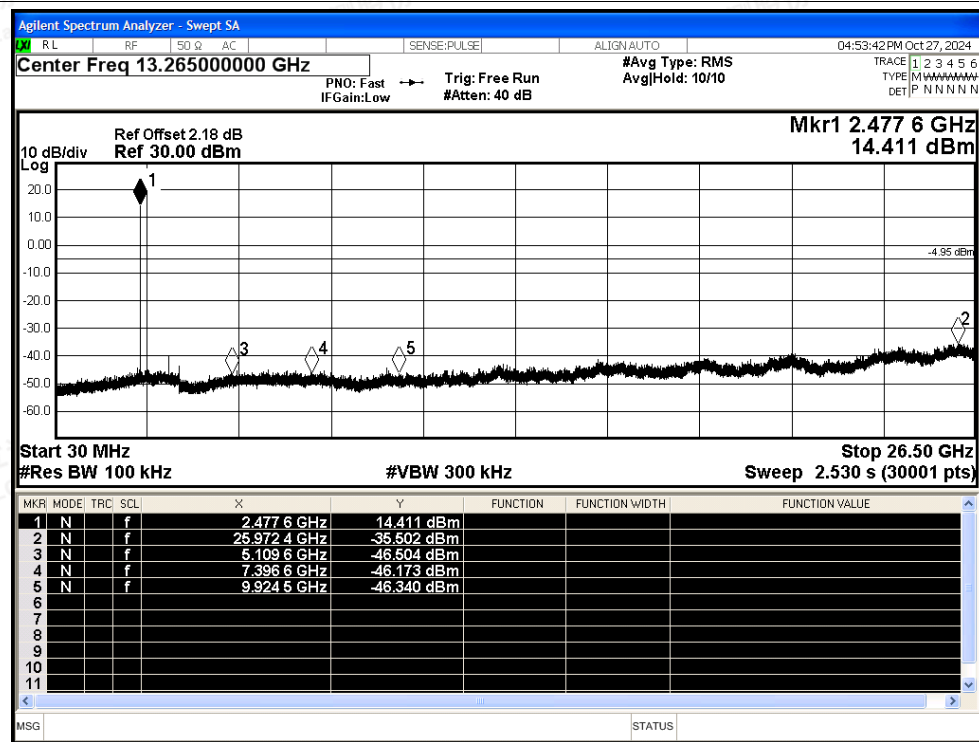




## Tx. Spurious NVNT BLE 2M 2478MHz Ant1 Ref



## Tx. Spurious NVNT BLE 2M 2478MHz Ant1 Emission





## A.6 Duty Cycle

| Condition | Mode   | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|-----------|--------|-----------------|---------|----------------|------------------------|-----------|
| NVNT      | BLE 1M | 2402            | Ant1    | 39             | 4.09                   | 2.56      |
| NVNT      | BLE 1M | 2440            | Ant1    | 39             | 4.09                   | 2.56      |
| NVNT      | BLE 1M | 2480            | Ant1    | 39             | 4.09                   | 2.56      |
| NVNT      | BLE 2M | 2404            | Ant1    | 20.39          | 6.91                   | 4.9       |
| NVNT      | BLE 2M | 2440            | Ant1    | 20.4           | 6.9                    | 4.9       |
| NVNT      | BLE 2M | 2478            | Ant1    | 20.4           | 6.9                    | 4.9       |

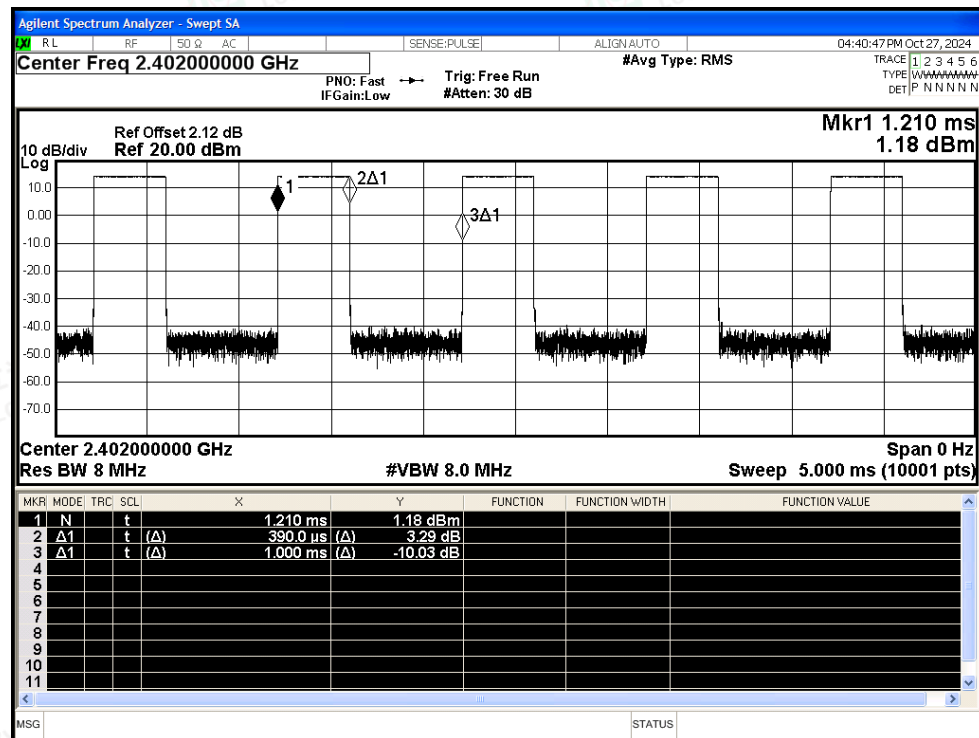


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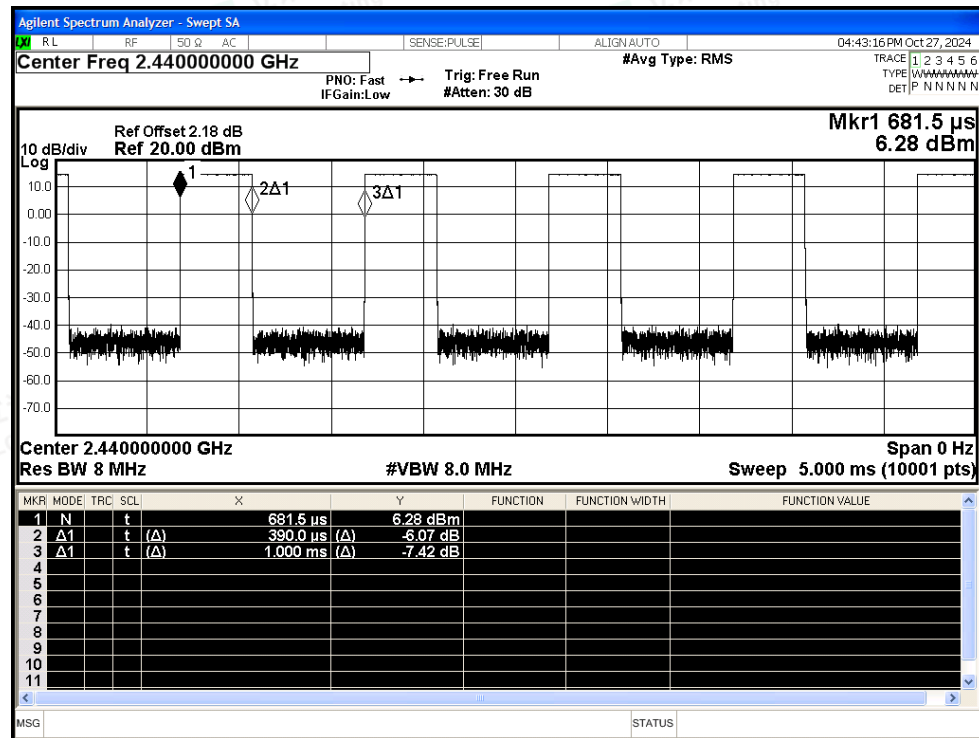


## Test Graphs

## Duty Cycle NVNT BLE 1M 2402MHz Ant1

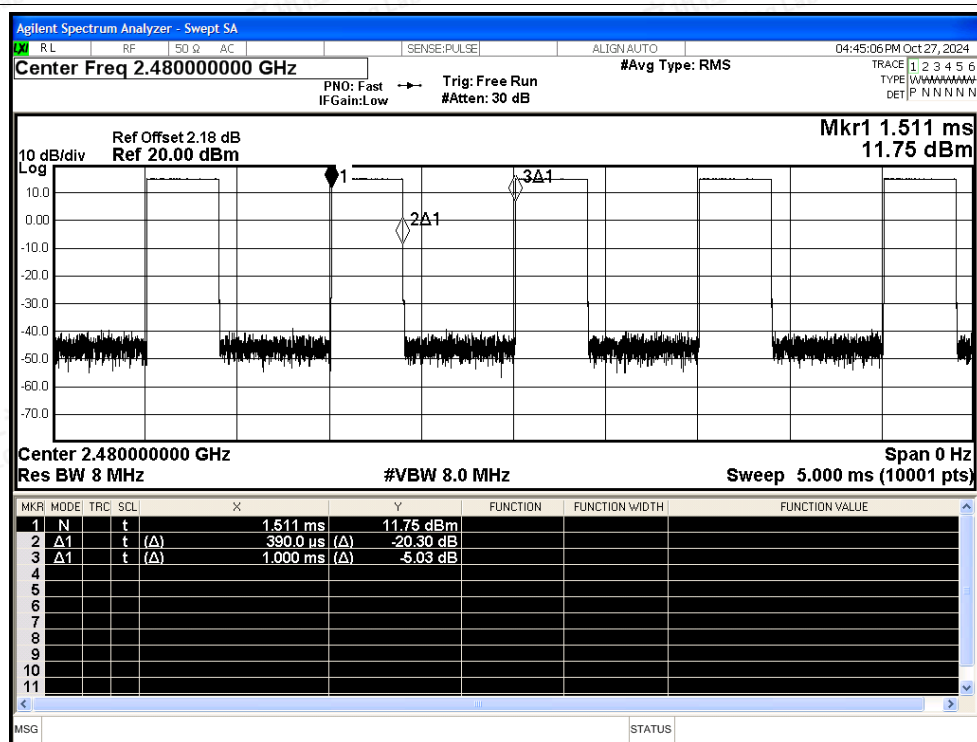


## Duty Cycle NVNT BLE 1M 2440MHz Ant1

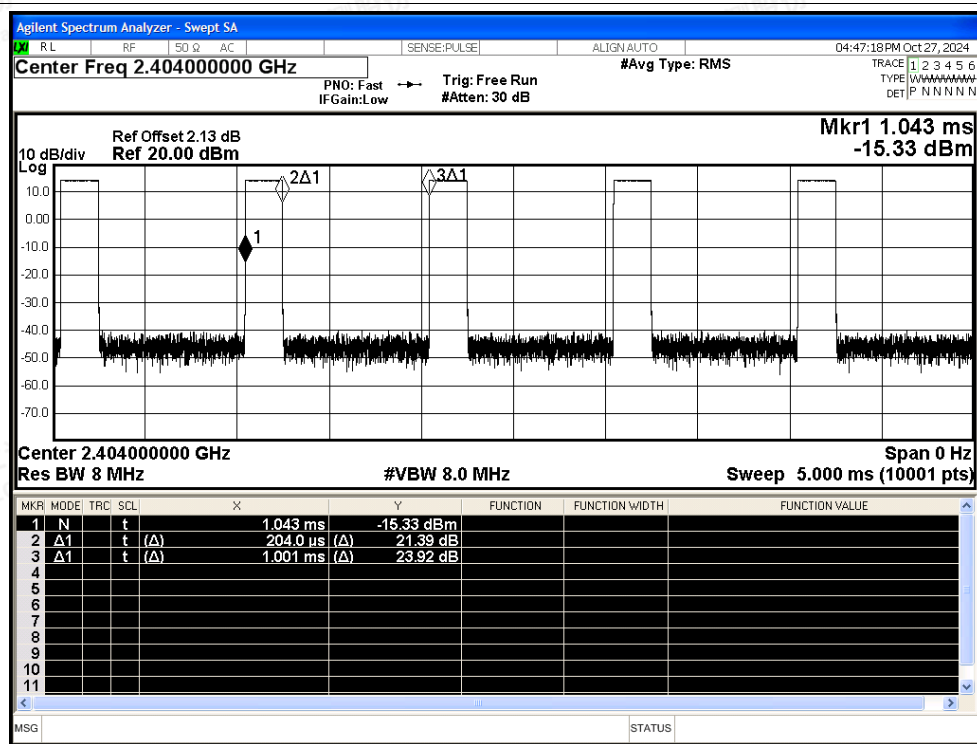




## Duty Cycle NVNT BLE 1M 2480MHz Ant1

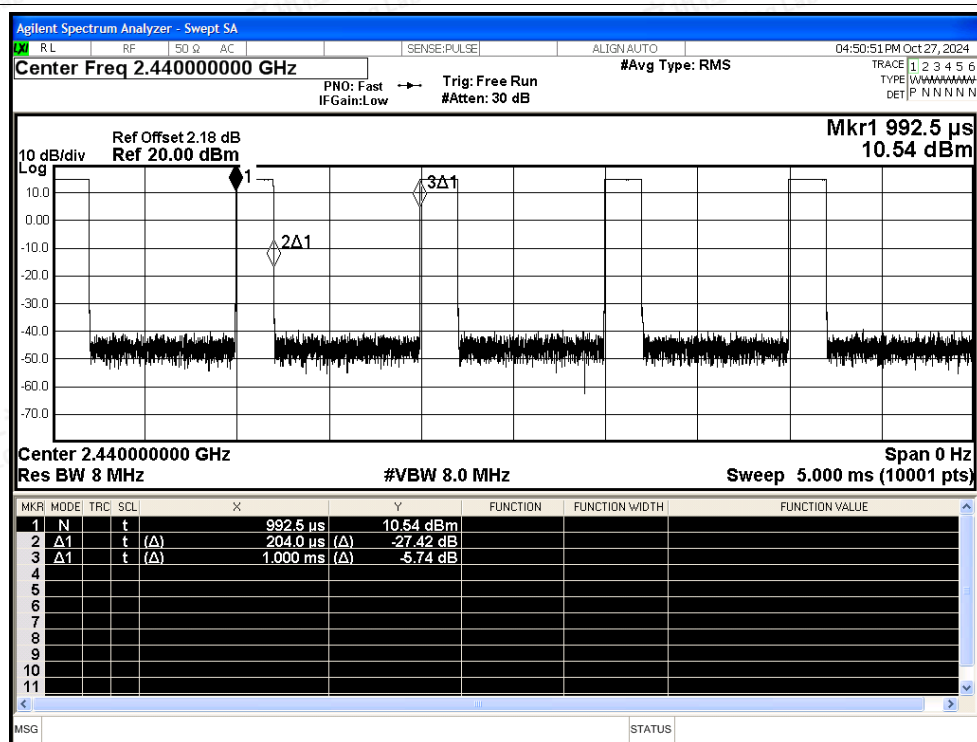


## Duty Cycle NVNT BLE 2M 2404MHz Ant1

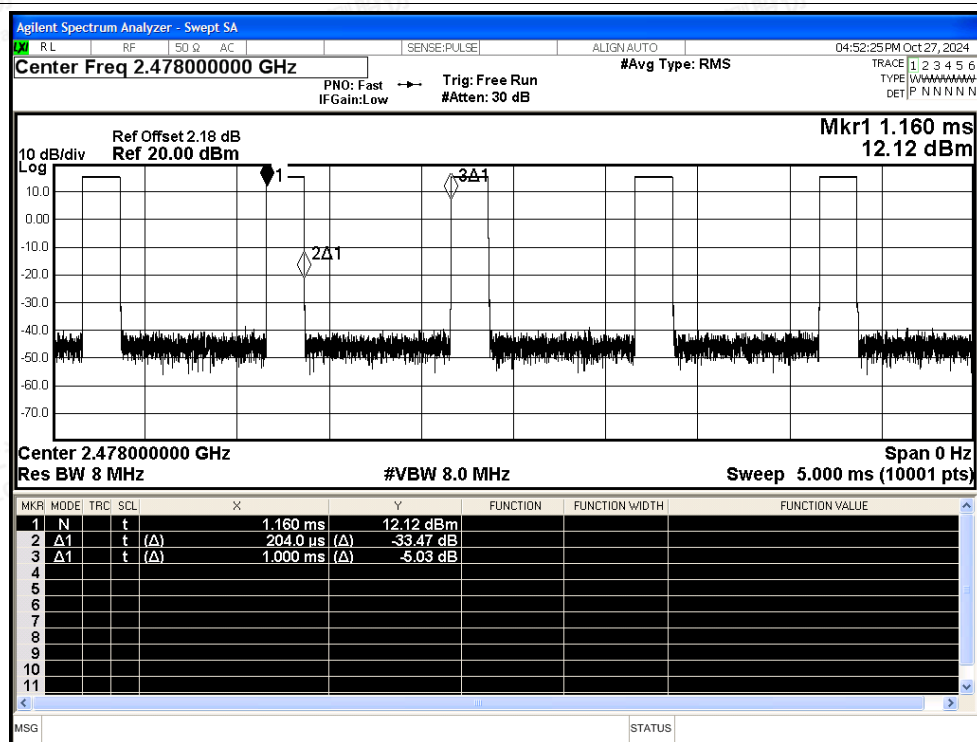




## Duty Cycle NVNT BLE 2M 2440MHz Ant1



## Duty Cycle NVNT BLE 2M 2478MHz 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            | -48.63      | 2.7        | -                | 49.33      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -57.2       | 2.7        | 4.09             | 44.85      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2385.936        | -41.35      | 2.7        | -                | 56.61      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2389.968        | -53.89      | 2.7        | 4.09             | 48.16      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -44.93      | 2.7        | -                | 53.03      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -53.89      | 2.7        | 4.09             | 48.16      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -38.98      | 2.7        | -                | 58.98      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -50.14      | 2.7        | 4.09             | 51.91      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.728        | -37.09      | 2.7        | -                | 60.87      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.584        | -48.69      | 2.7        | 4.09             | 53.36      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -44.12      | 2.7        | -                | 53.84      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -54.94      | 2.7        | 4.09             | 47.11      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2404            | Ant1    | 2310            | -47.69      | 2.7        | -                | 50.27      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2404            | Ant1    | 2310            | -58.58      | 2.7        | 6.91             | 46.29      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2404            | Ant1    | 2340.576        | -40.04      | 2.7        | -                | 57.92      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2404            | Ant1    | 2340.086        | -54.15      | 2.7        | 6.91             | 50.72      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2404            | Ant1    | 2390            | -47.1       | 2.7        | -                | 50.86      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2404            | Ant1    | 2390            | -57.21      | 2.7        | 6.91             | 47.66      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2478            | Ant1    | 2483.5          | -39.67      | 2.7        | -                | 58.29      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2478            | Ant1    | 2483.5          | -52.17      | 2.7        | 6.9              | 52.69      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2478            | Ant1    | 2483.672        | -36.68      | 2.7        | -                | 61.28      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2478            | Ant1    | 2483.724        | -51.12      | 2.7        | 6.9              | 53.74      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2478            | Ant1    | 2500            | -47.44      | 2.7        | -                | 50.52      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2478            | Ant1    | 2500            | -54.99      | 2.7        | 6.9              | 49.87      | Average  | 54             | Pass    |

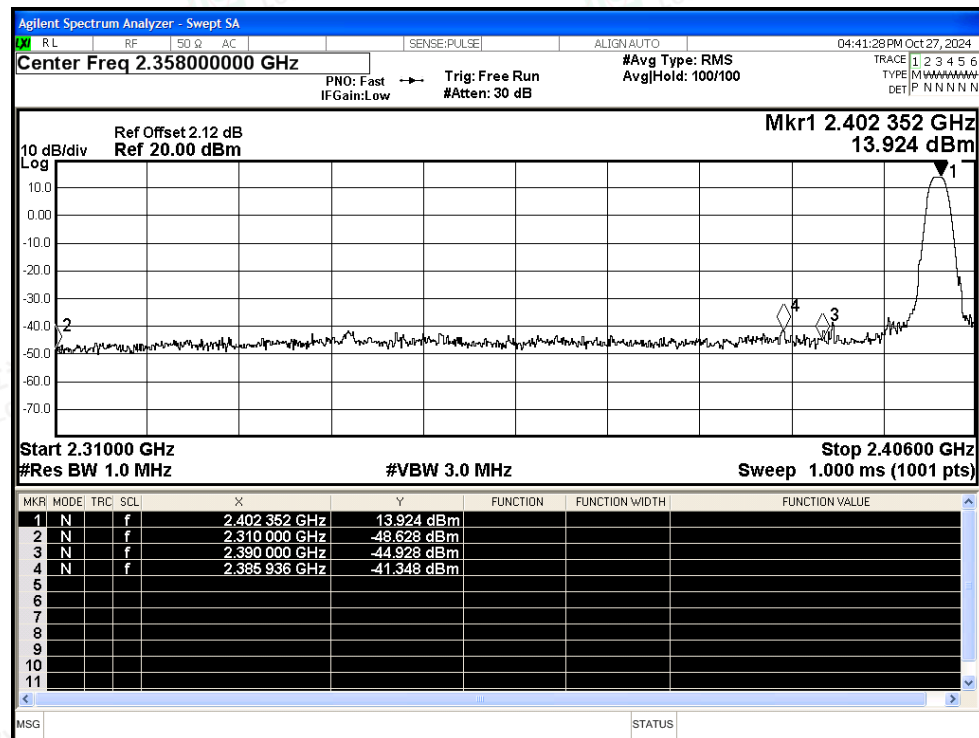


Shenzhen LCS Compliance Testing Laboratory Ltd.  
Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street,  
Baoan District, Shenzhen, 518000, China  
Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com  
Scan code to check authenticity

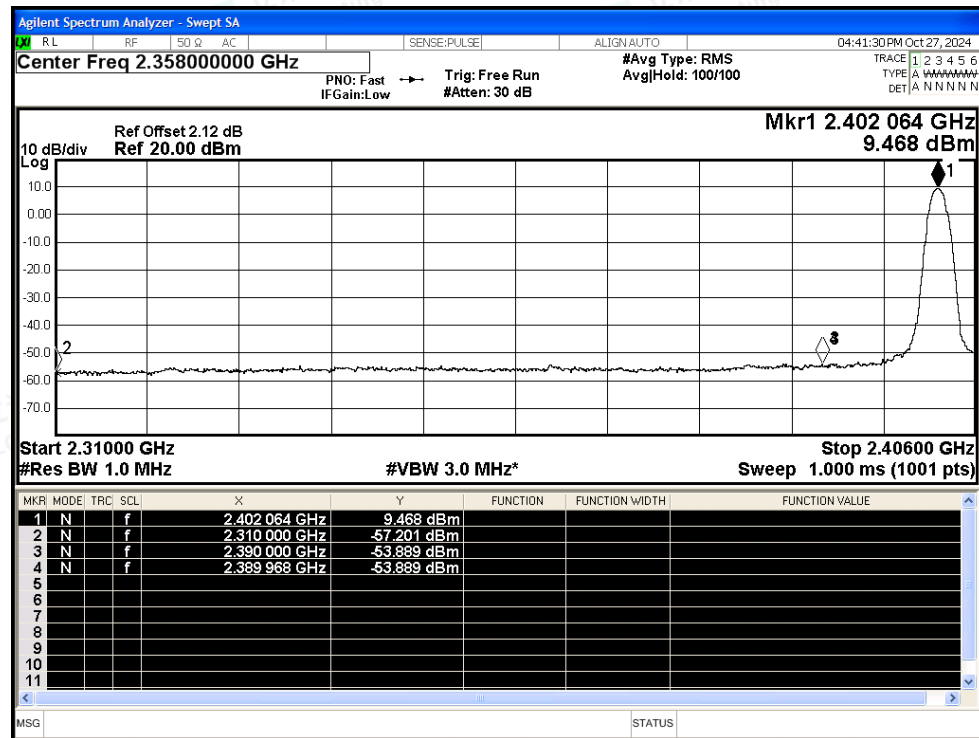


## Test Graphs

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



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

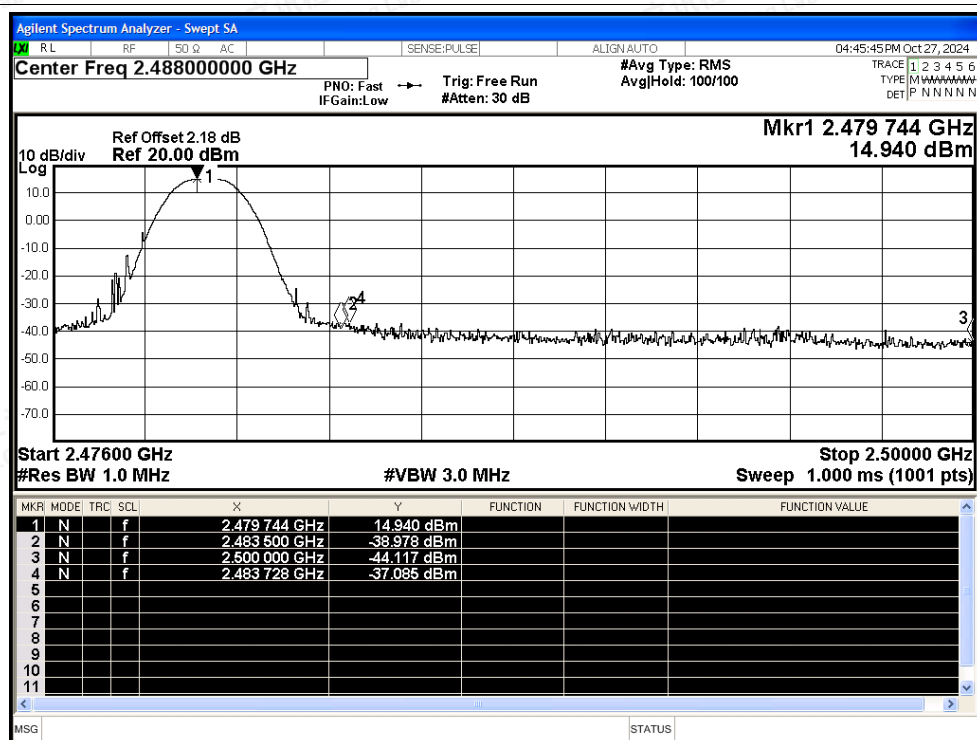


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Baoan District, Shenzhen, 518000, China  
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Scan code to check authenticity

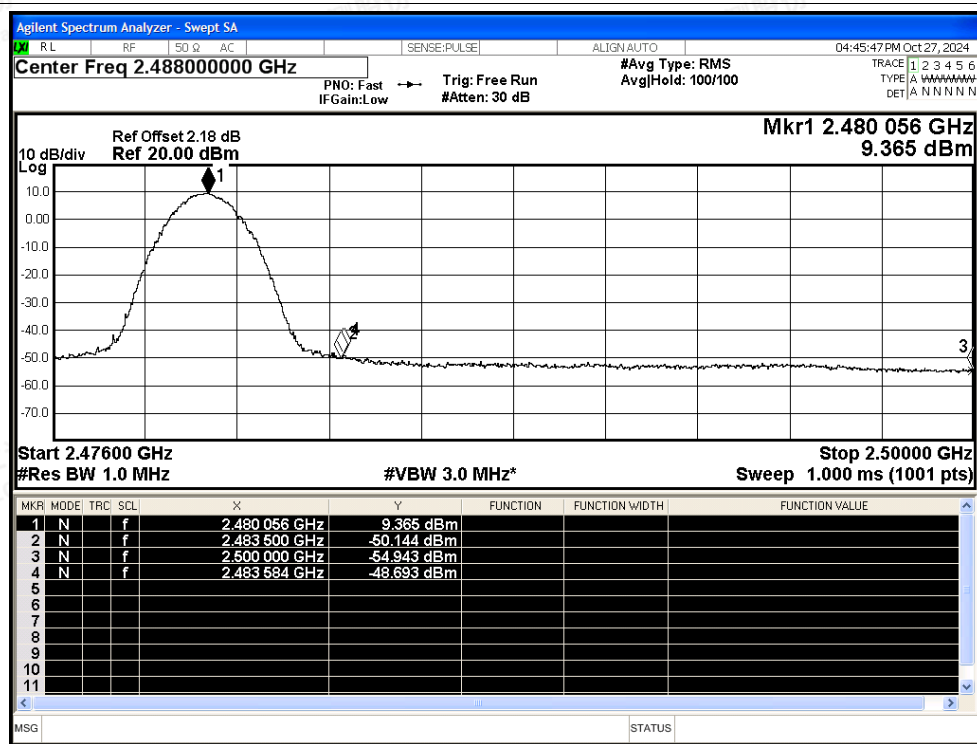




## Restrict Band NVNT BLE 1M 2480MHz Ant1 Peak



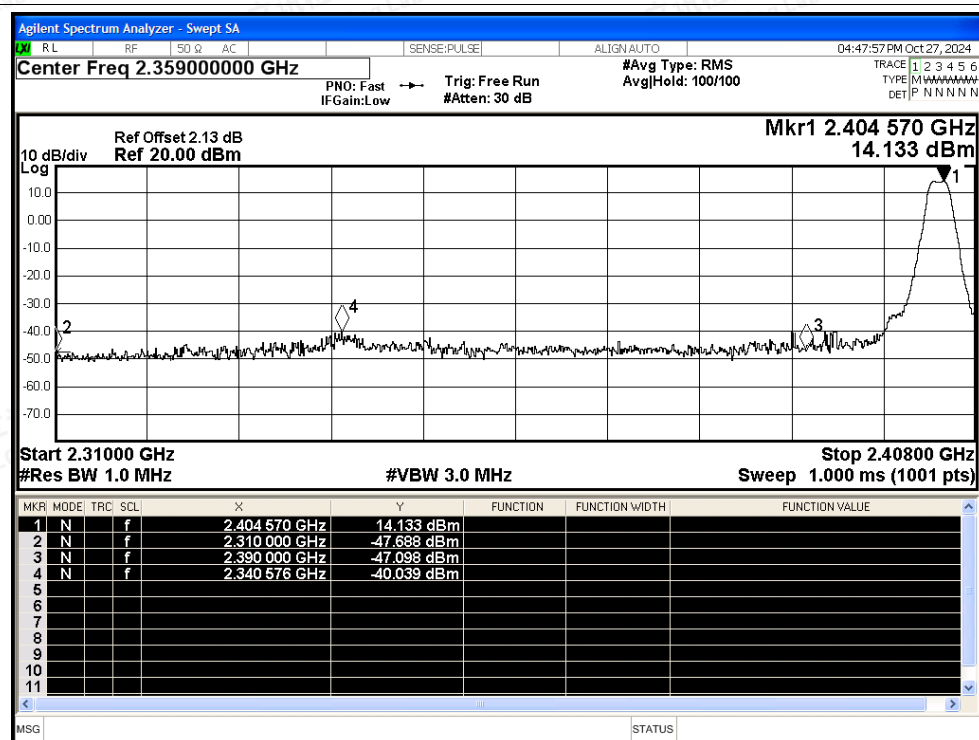
## Restrict Band NVNT BLE 1M 2480MHz Ant1 Average



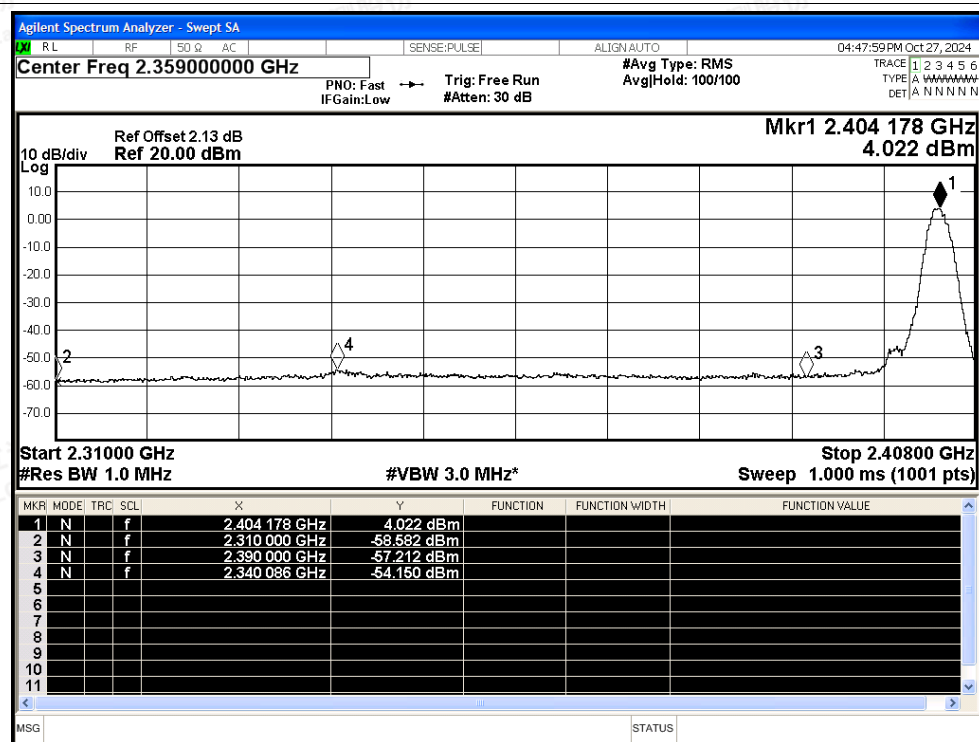




## Restrict Band NVNT BLE 2M 2404MHz Ant1 Peak

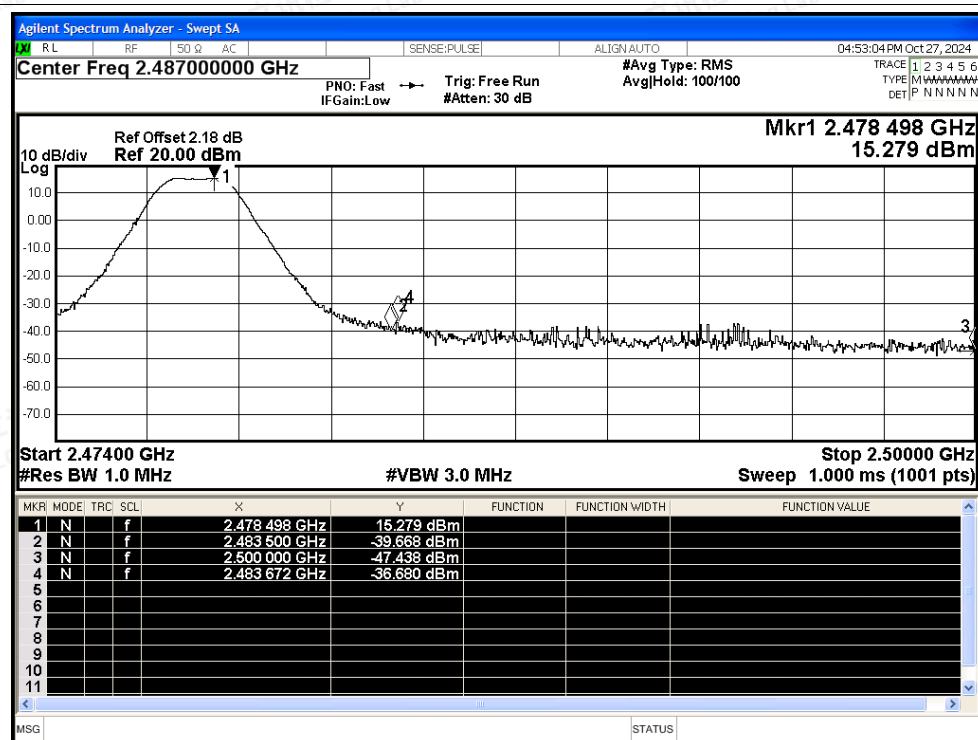


## Restrict Band NVNT BLE 2M 2404MHz Ant1 Average





## Restrict Band NVNT BLE 2M 2478MHz Ant1 Peak



## Restrict Band NVNT BLE 2M 2478MHz Ant1 Average

