



## Appendix A

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

Product Name: Solar String Light (Bluetooth)

Test Model: S14-4815-SS-3R

#### Environmental Conditions

|                    |            |
|--------------------|------------|
| Temperature:       | 23.5° C    |
| Relative Humidity: | 52.2%      |
| ATM Pressure:      | 100.0 kPa  |
| Test Engineer:     | Jack Cheng |
| Supervised by:     | Li Huan    |



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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    | 0.701                 | 0.5                         | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 0.668                 | 0.5                         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 0.71                  | 0.5                         | Pass    |

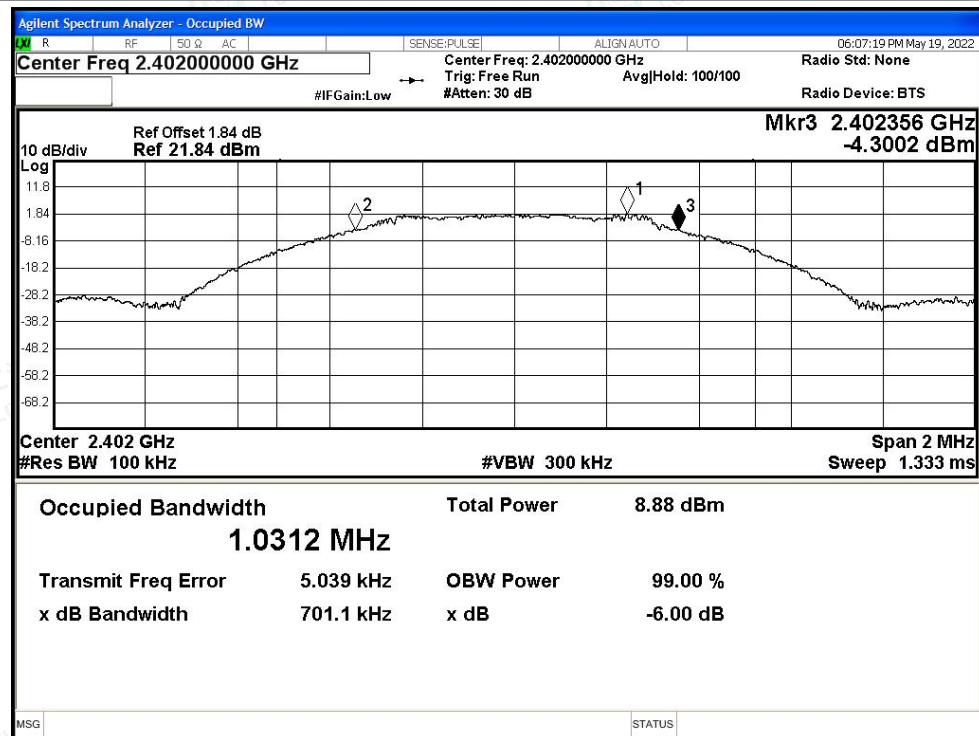


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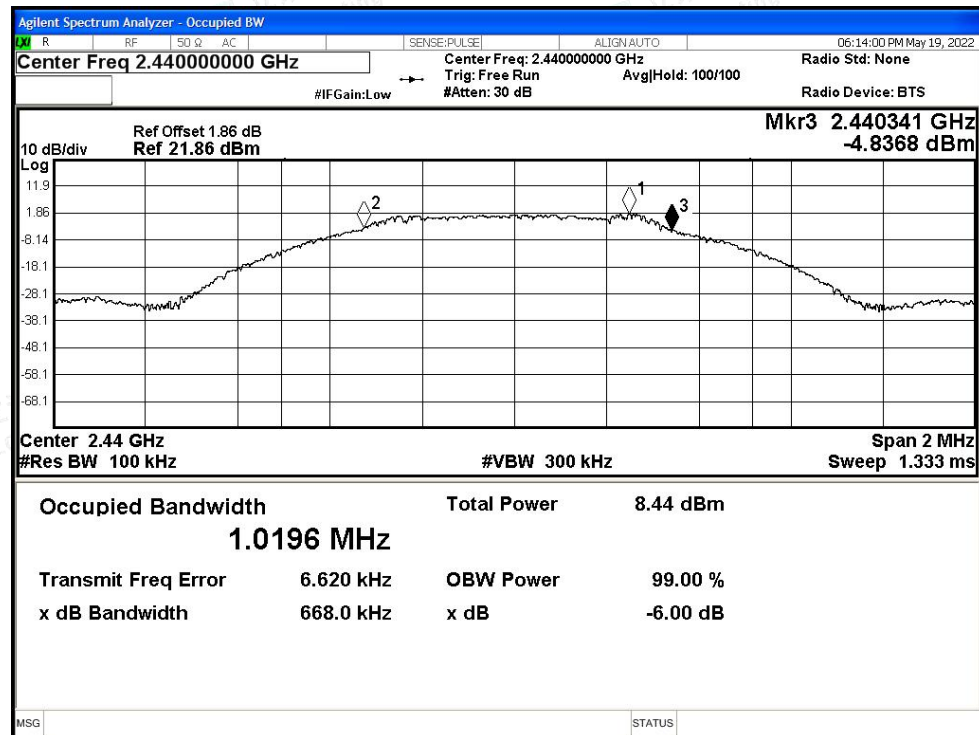


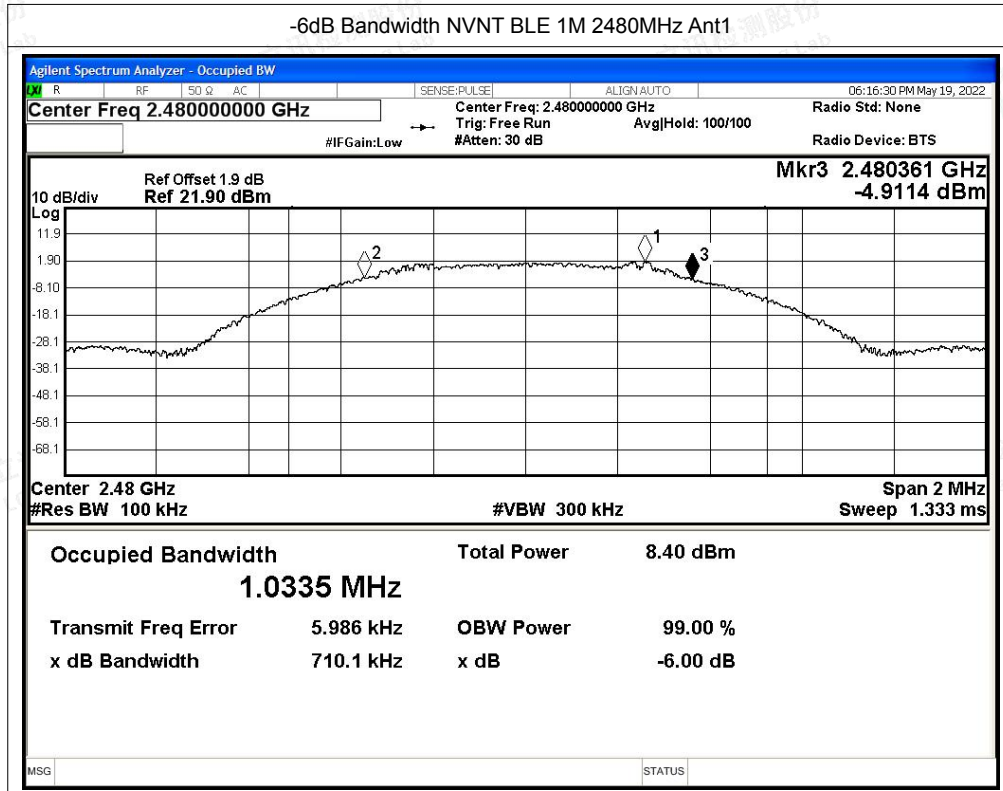
## Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1







## A.2 Maximum Conducted Output Power

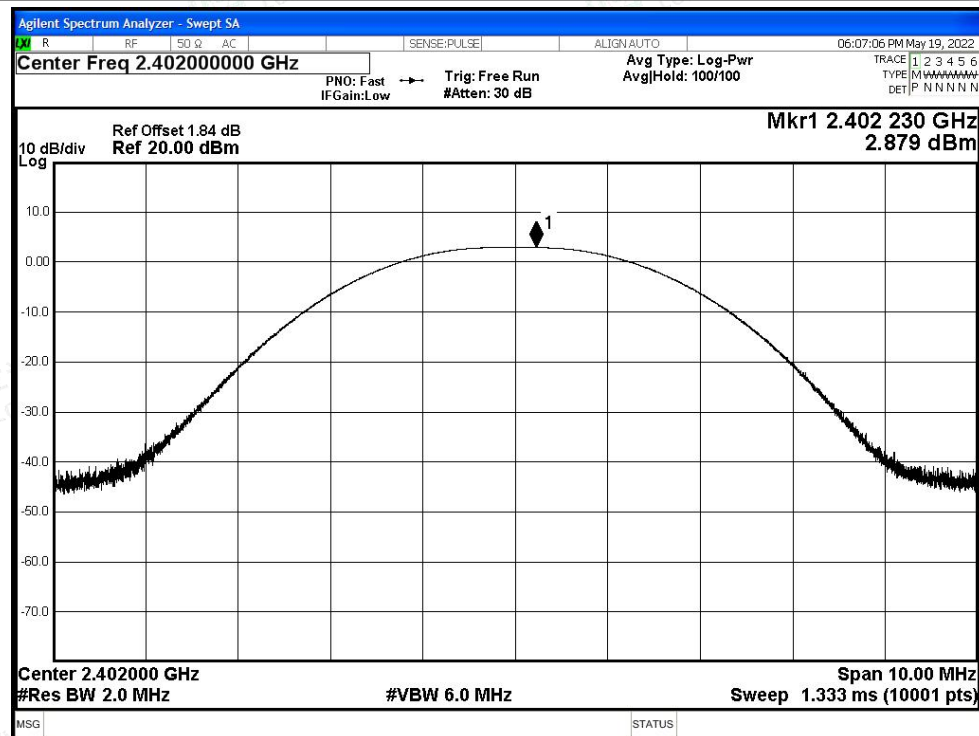
| Condition | Mode   | Frequency (MHz) | Antenna | Conducted Power (dBm) | Duty Factor (dB) | Total Power (dBm) | Limit (dBm) | Verdict |
|-----------|--------|-----------------|---------|-----------------------|------------------|-------------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 2.88                  | 0                | 2.88              | 30          | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 2.45                  | 0                | 2.45              | 30          | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2.49                  | 0                | 2.49              | 30          | Pass    |



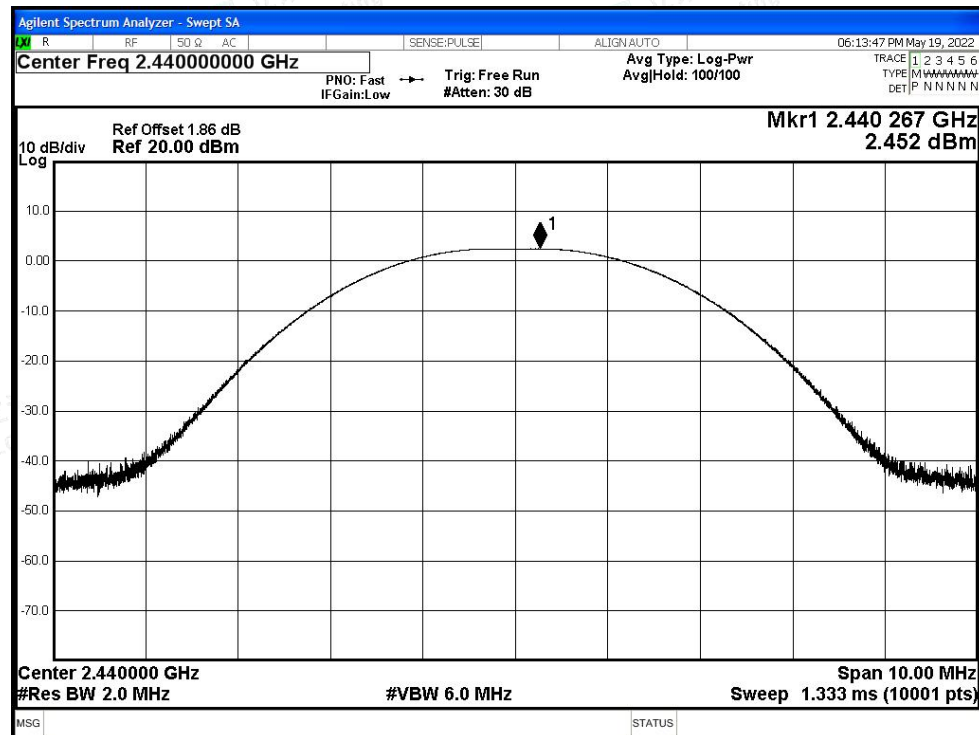


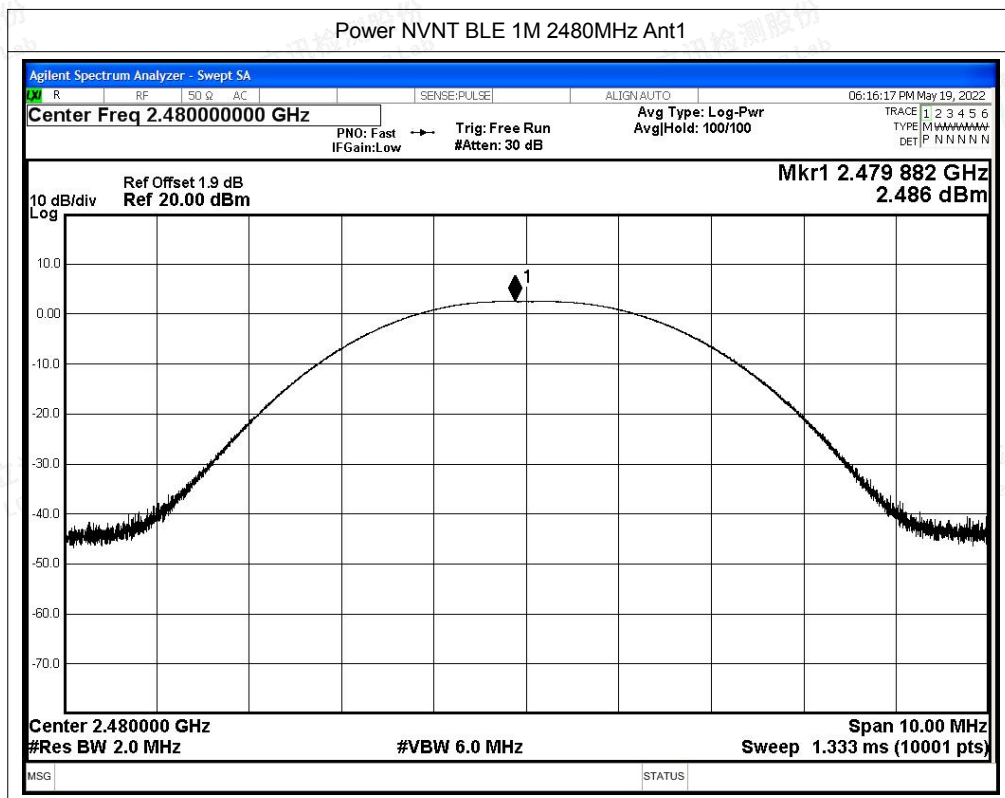
## Test Graphs

Power NVNT BLE 1M 2402MHz Ant1



Power NVNT BLE 1M 2440MHz Ant1







### A.3 Maximum Power Spectral Density Level

| Condition | Mode   | Frequency<br>(MHz) | Antenna | Conducted PSD<br>(dBm/3kHz) | Duty Factor<br>(dB) | Total PSD<br>(dBm/3kHz) | Limit<br>(dBm/3kHz) | Verdict |
|-----------|--------|--------------------|---------|-----------------------------|---------------------|-------------------------|---------------------|---------|
| NVNT      | BLE 1M | 2402               | Ant1    | -13.02                      | 0                   | -13.02                  | 8                   | Pass    |
| NVNT      | BLE 1M | 2440               | Ant1    | -13.24                      | 0                   | -13.24                  | 8                   | Pass    |
| NVNT      | BLE 1M | 2480               | Ant1    | -13.4                       | 0                   | -13.4                   | 8                   | Pass    |

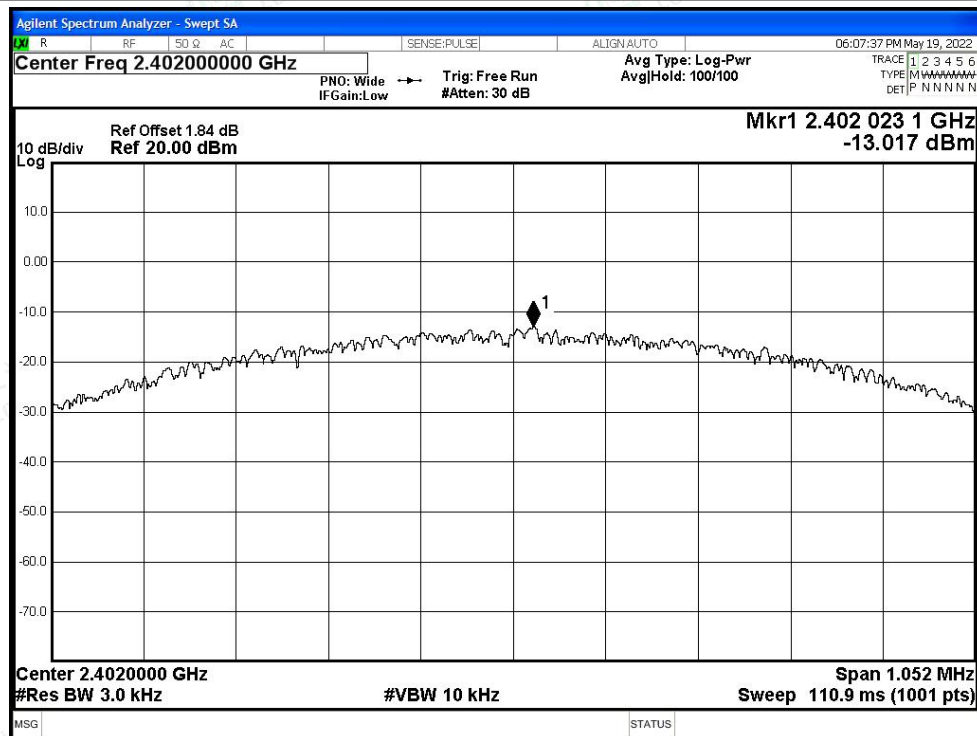


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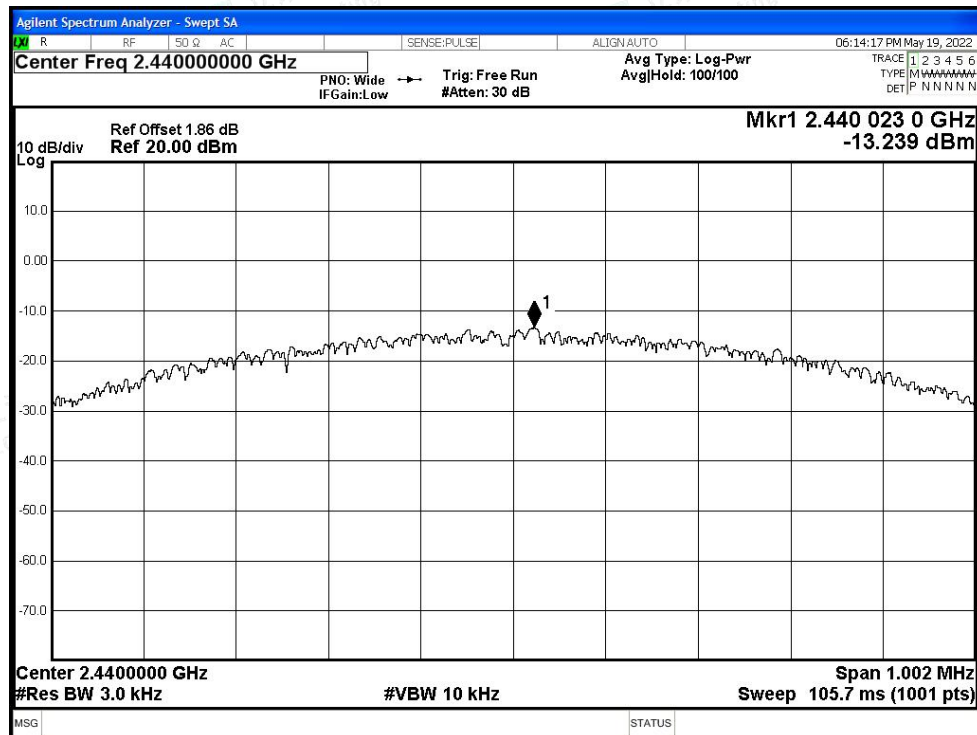


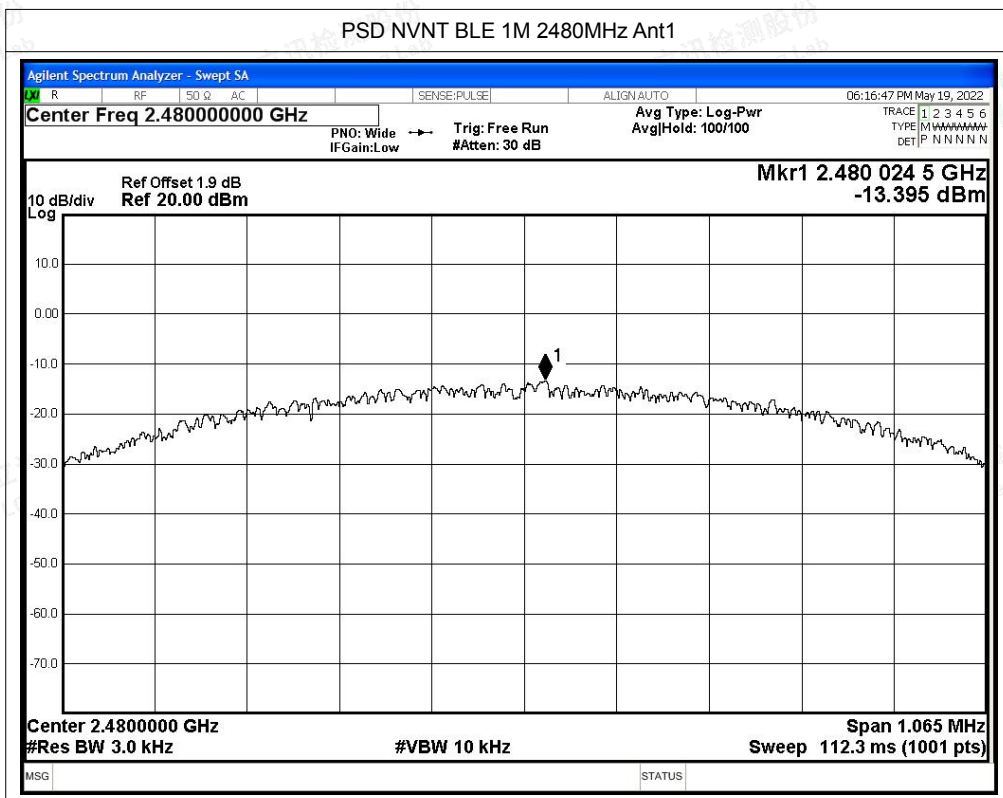
## Test Graphs

PSD NVNT BLE 1M 2402MHz Ant1



PSD NVNT BLE 1M 2440MHz Ant1







## A.4 Band Edge

| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -42.83          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -53.71          | -20         | Pass    |

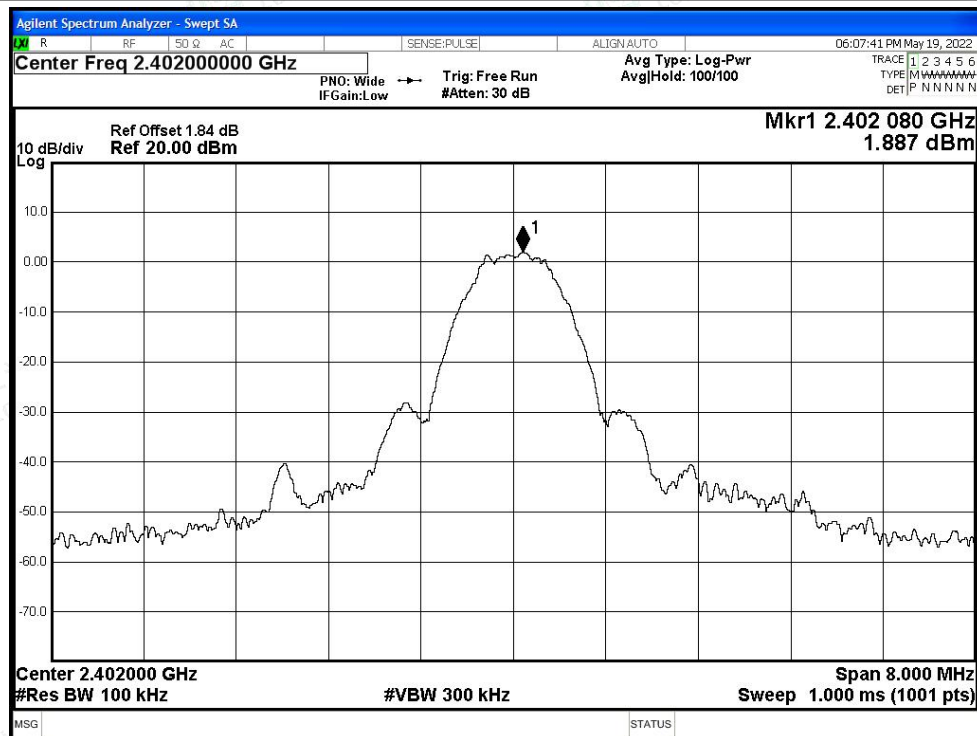


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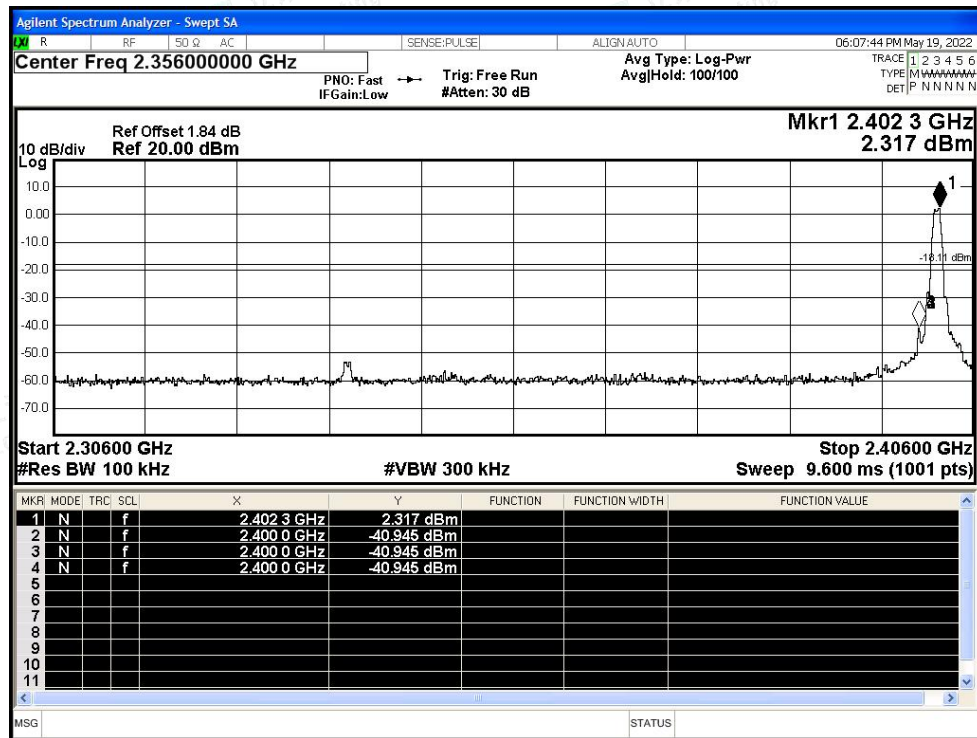


## Test Graphs

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

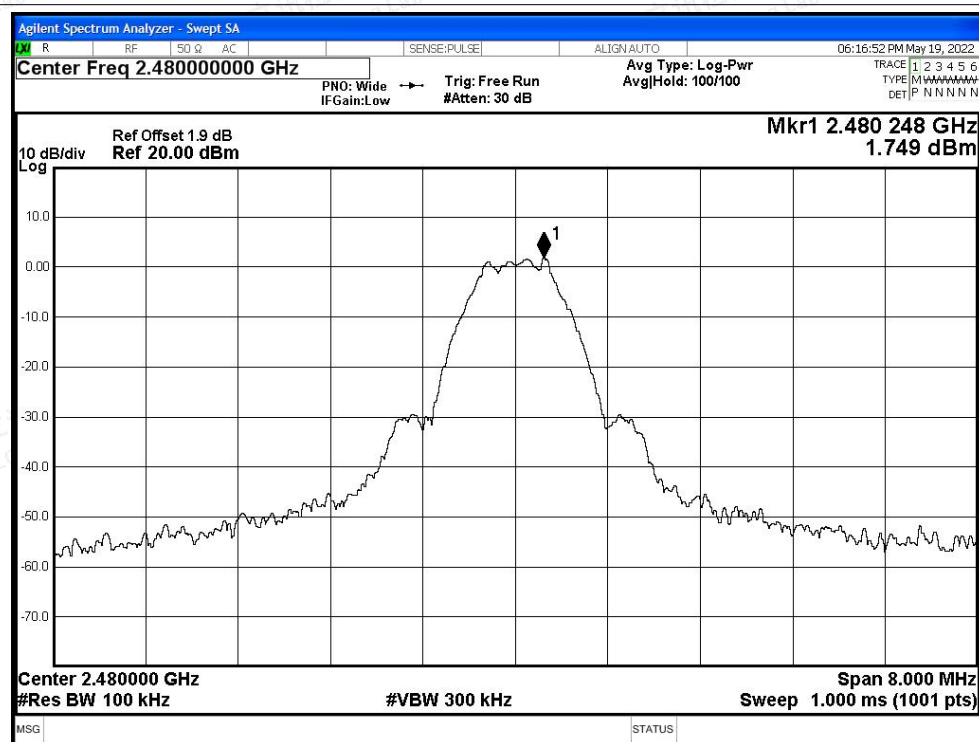


## Band Edge NVNT BLE 1M 2402MHz Ant1 Emission

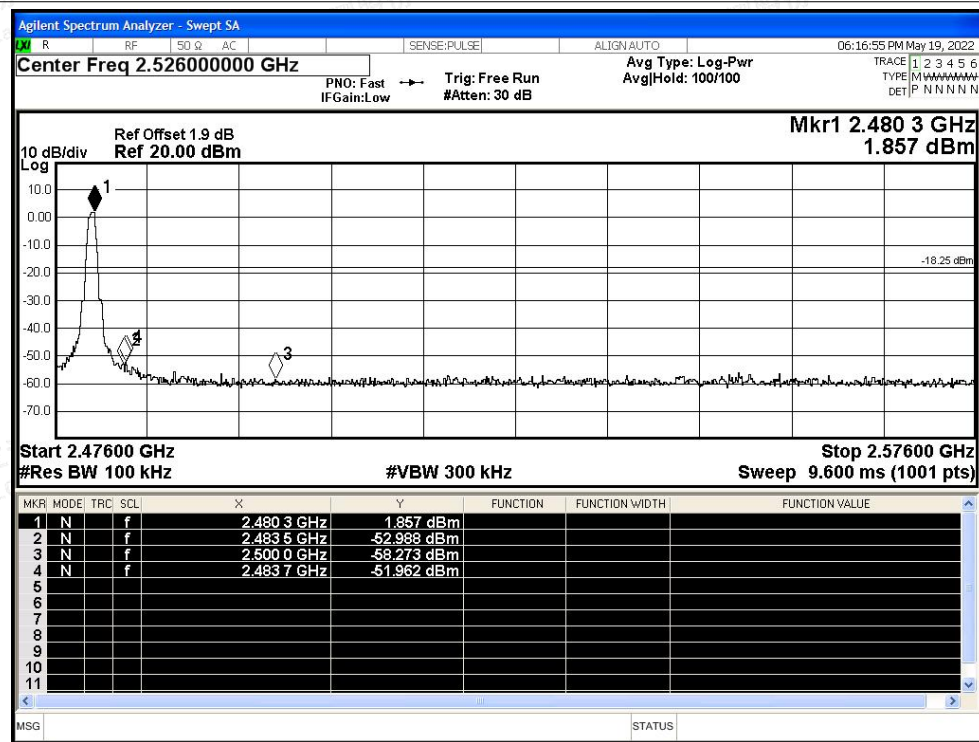




## Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



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





## A.5 Conducted RF Spurious Emission

| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -40.59          | -20         | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -36.96          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -37.51          | -20         | Pass    |

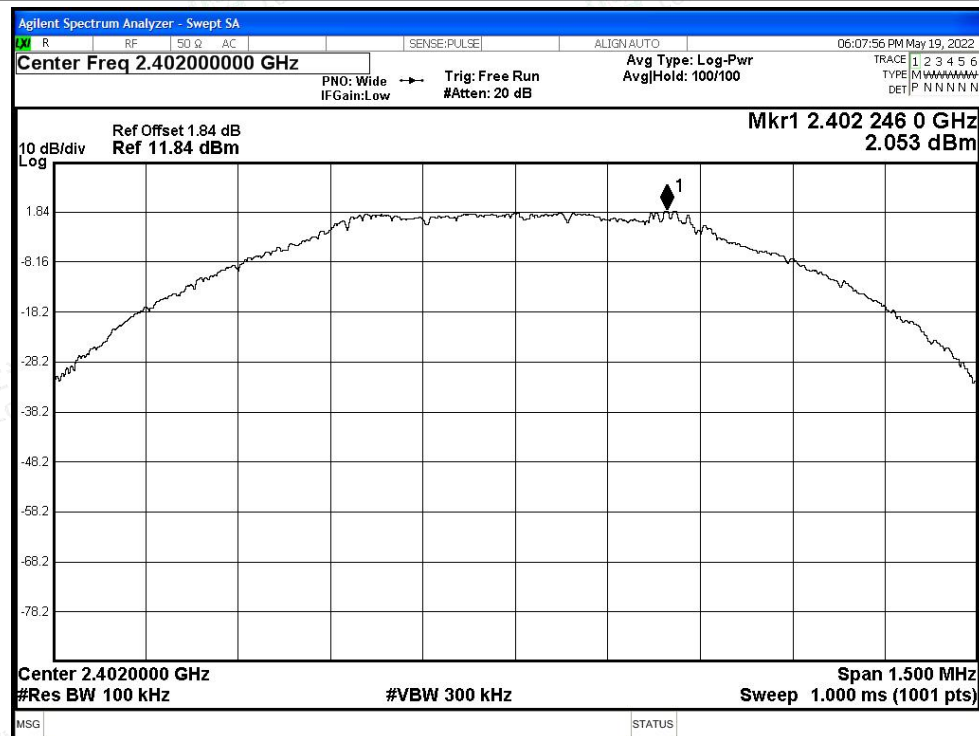


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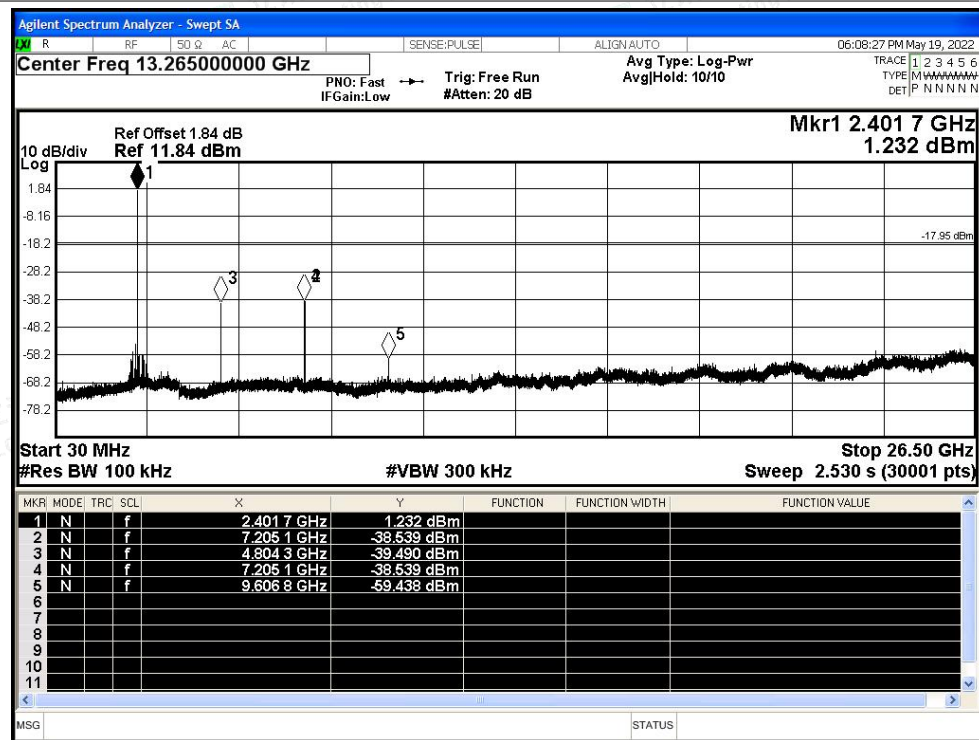


## Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref

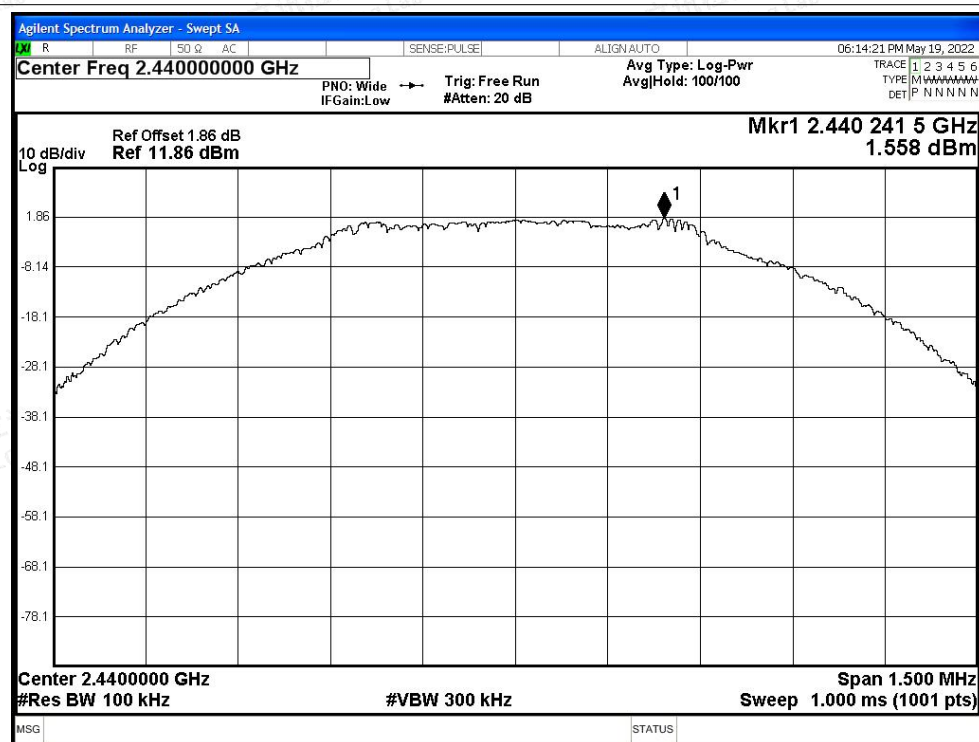


Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

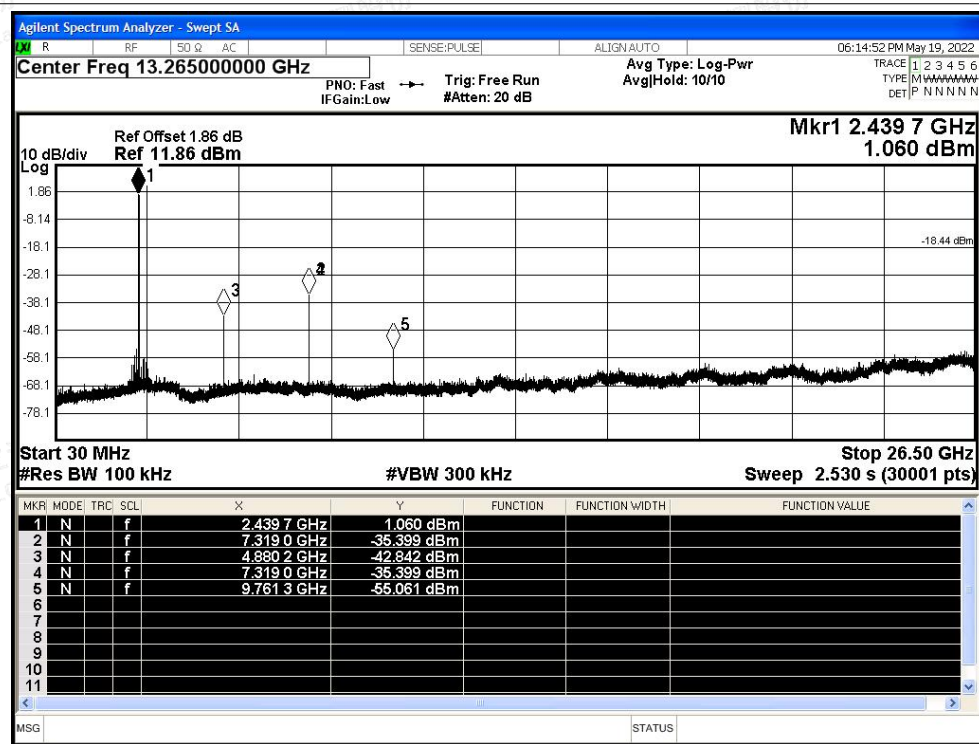




## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref

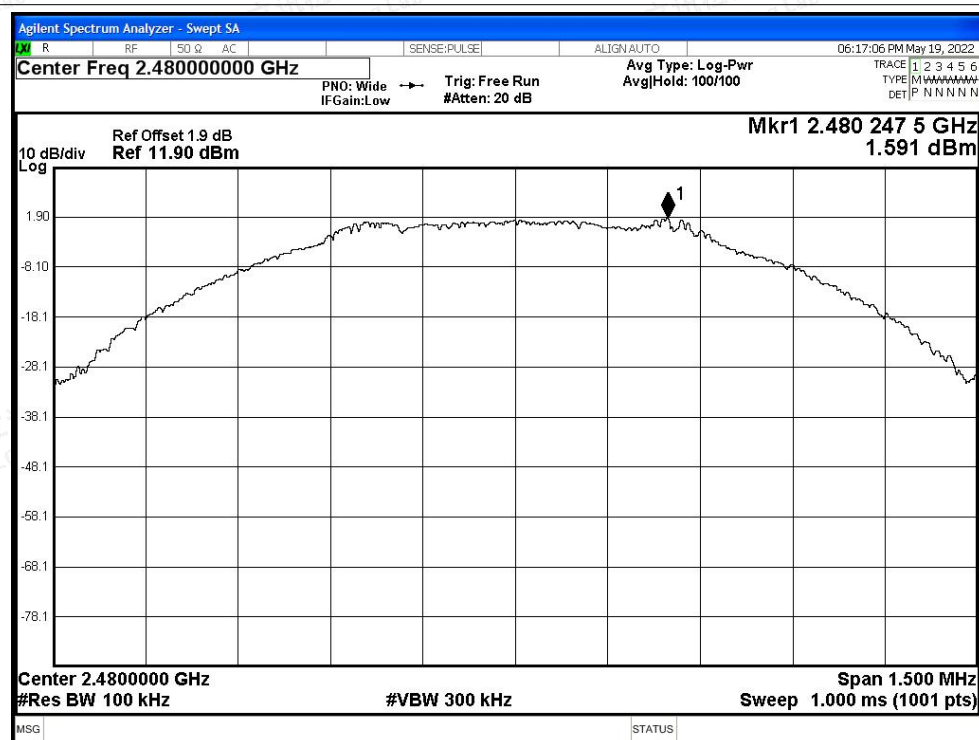


## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission

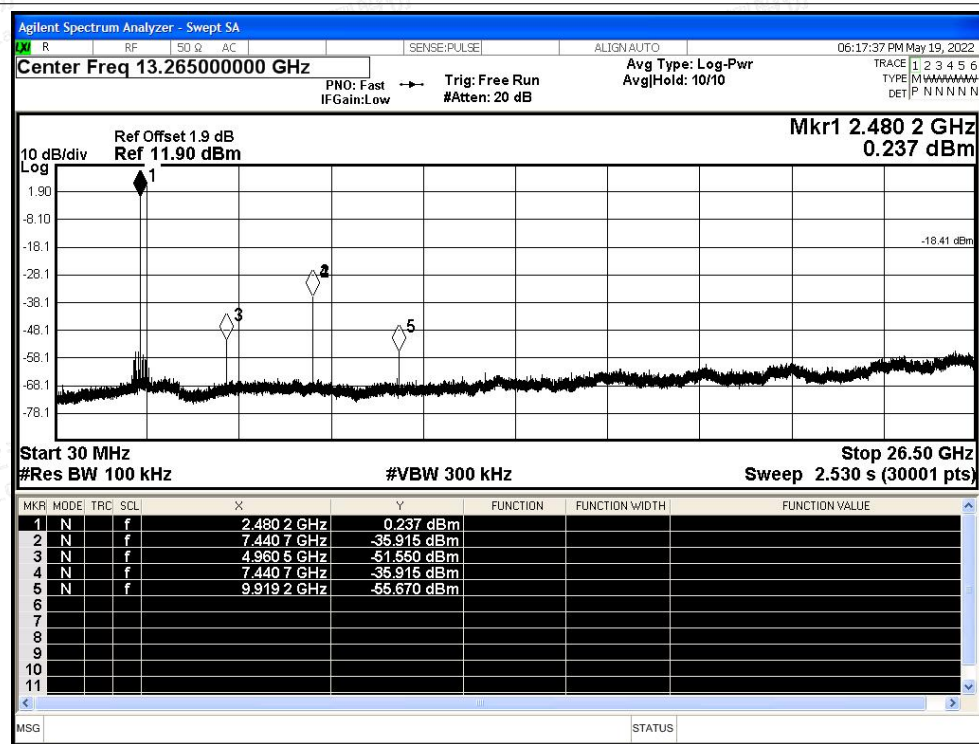




## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



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





## A.6 Duty Cycle

| Condition | Mode   | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|-----------|--------|-----------------|---------|----------------|------------------------|-----------|
| NVNT      | BLE 1M | 2402            | Ant1    | 100            | 0                      | 0         |
| NVNT      | BLE 1M | 2440            | Ant1    | 100            | 0                      | 0         |
| NVNT      | BLE 1M | 2480            | Ant1    | 100            | 0                      | 0         |

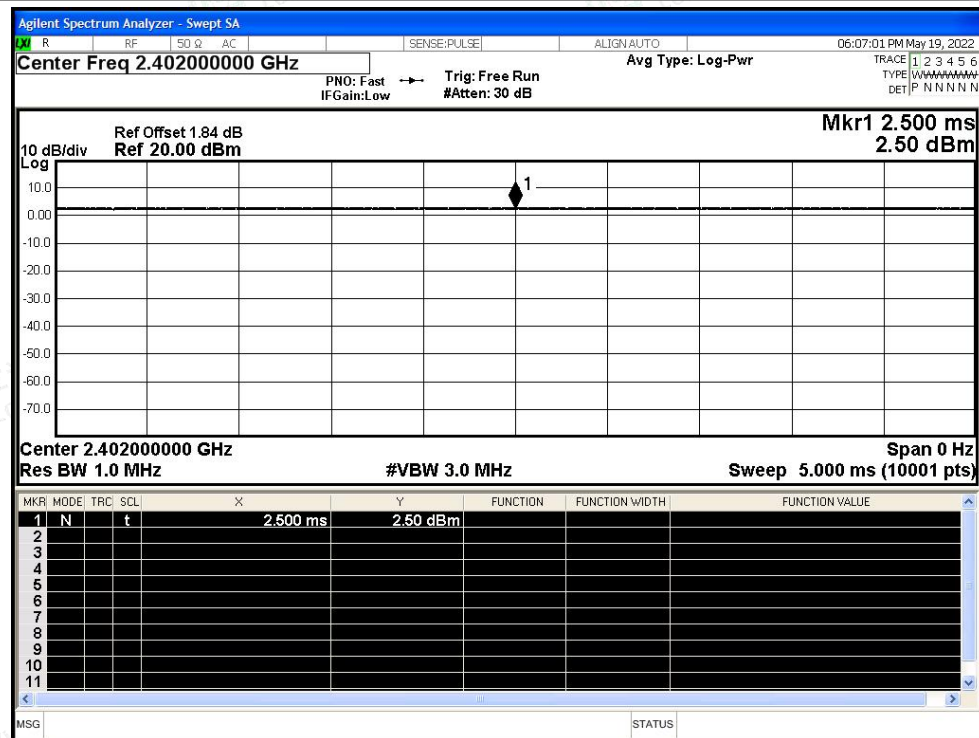


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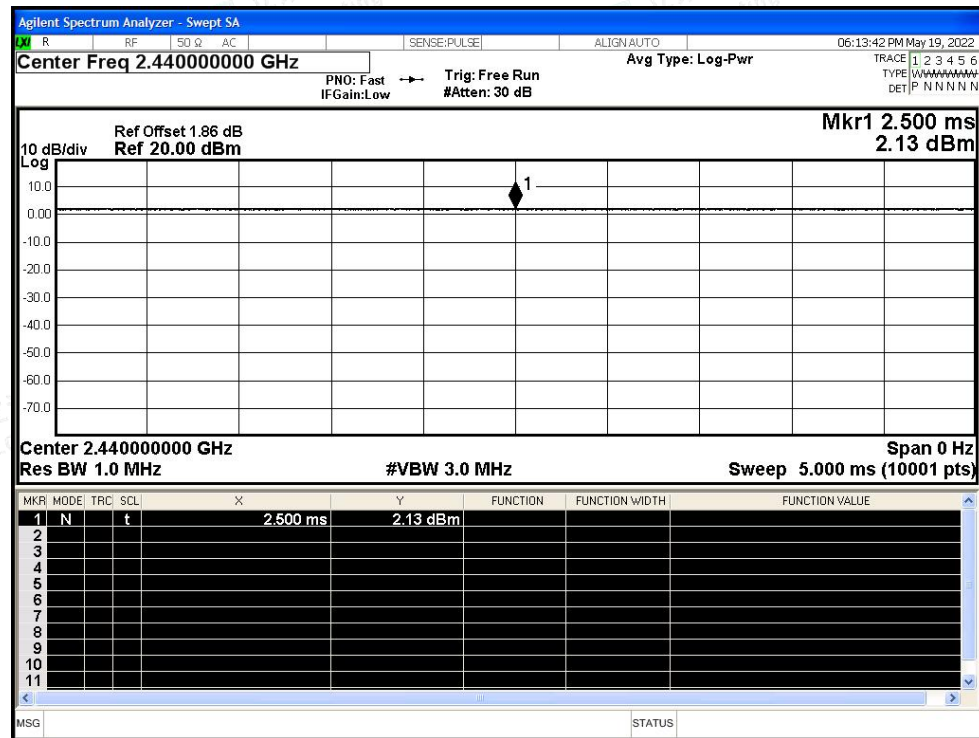


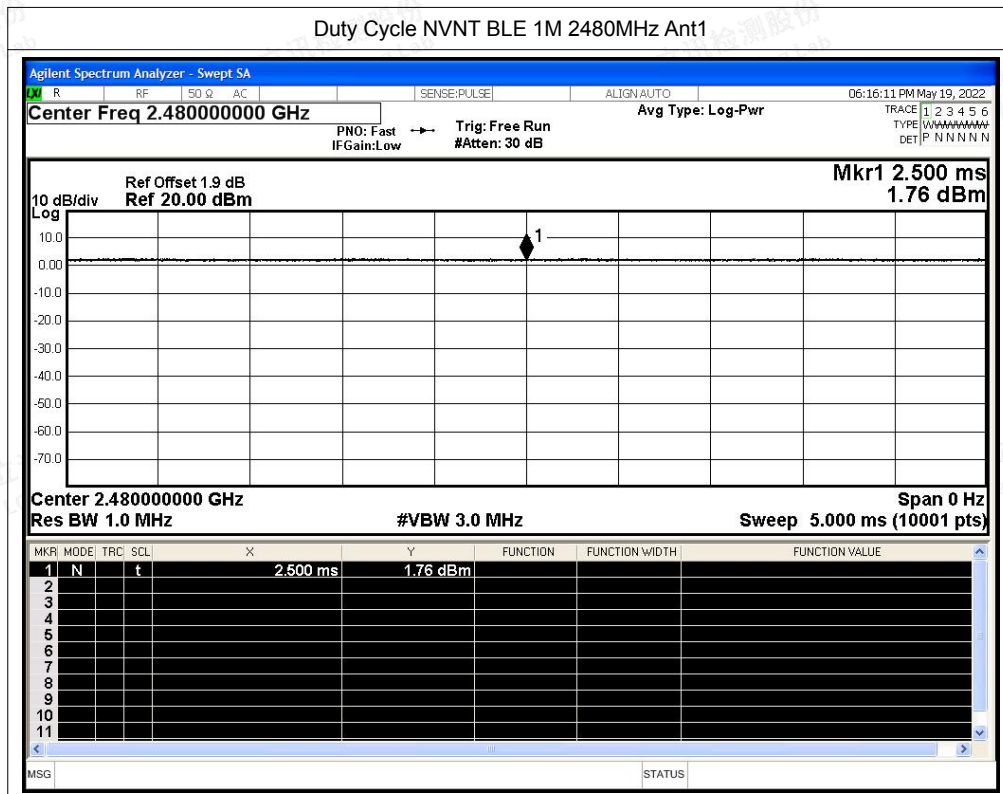
## Test Graphs

## Duty Cycle NVNT BLE 1M 2402MHz Ant1



## Duty Cycle NVNT BLE 1M 2440MHz Ant1







## A.7 Restrict Band

| Condition | Mode   | Frequency (MHz) | Antenna | Spur Freq (MHz) | Power (dBm) | Gain (dBi) | E (dBuV/m) | Detector | Limit (dBuV/m) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|------------|------------|----------|----------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -50.75      | 2          | 46.51      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -59.93      | 2          | 37.33      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2338.128        | -46.03      | 2          | 51.23      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2337.84         | -54.79      | 2          | 42.47      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -48.77      | 2          | 48.49      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -59.2       | 2          | 38.06      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -43.99      | 2          | 53.27      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -54         | 2          | 43.26      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.776        | -43.83      | 2          | 53.43      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.536        | -53.99      | 2          | 43.27      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -49.95      | 2          | 47.31      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -59.08      | 2          | 38.18      | Average  | 54             | Pass    |

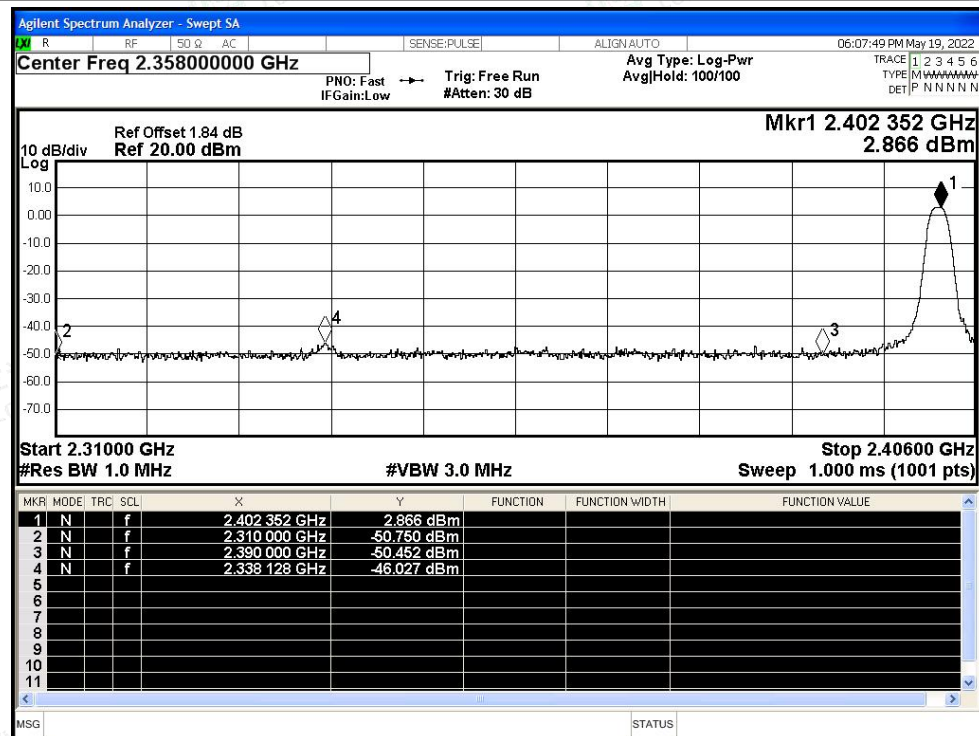


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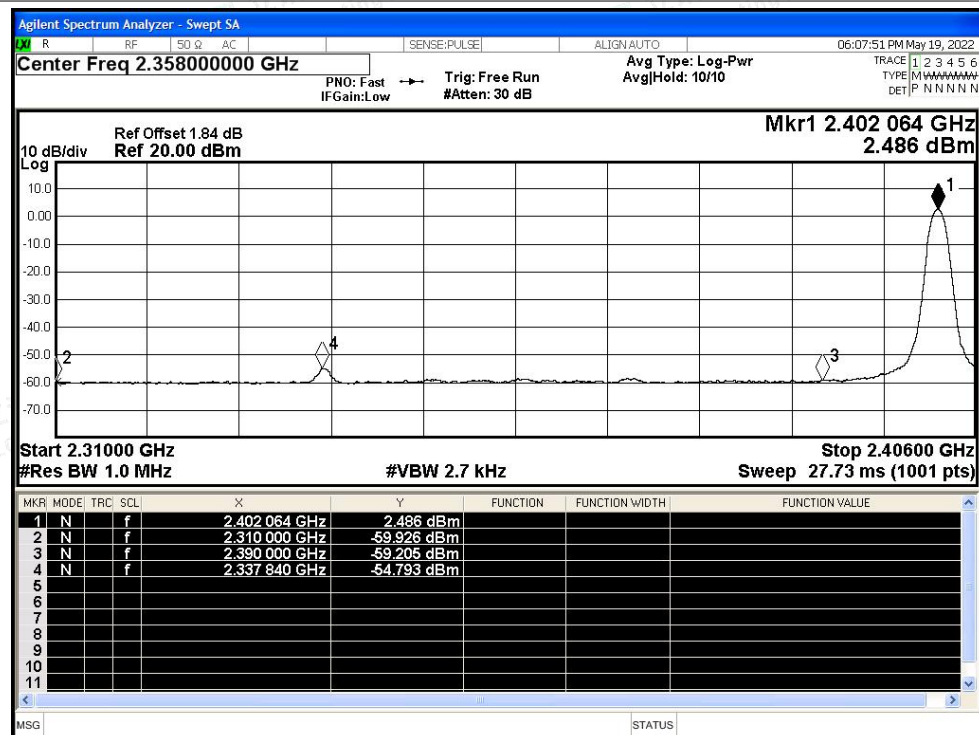


## Test Graphs

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

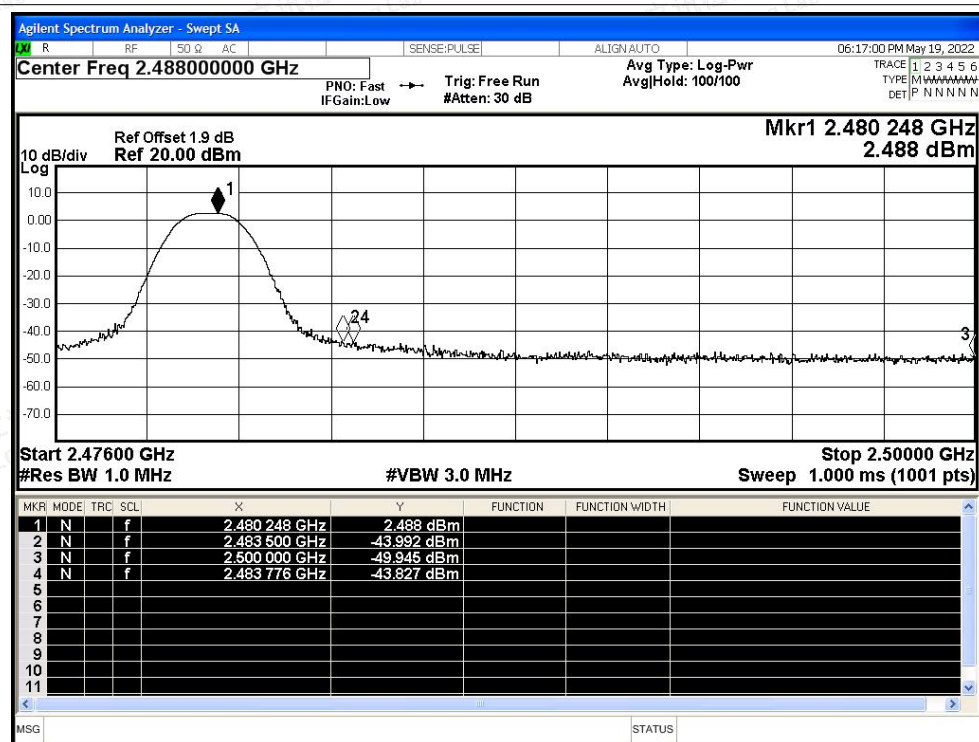


## Restrict Band NVNT BLE 1M 2402MHz Ant1 Average





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



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

