



## Appendix A

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

Product Name: LED Bulb

Test Model: E26-15W-SMT

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23.5° C   |
| Relative Humidity: | 52.2%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Kay Hu    |
| Supervised by:     | Li huan   |



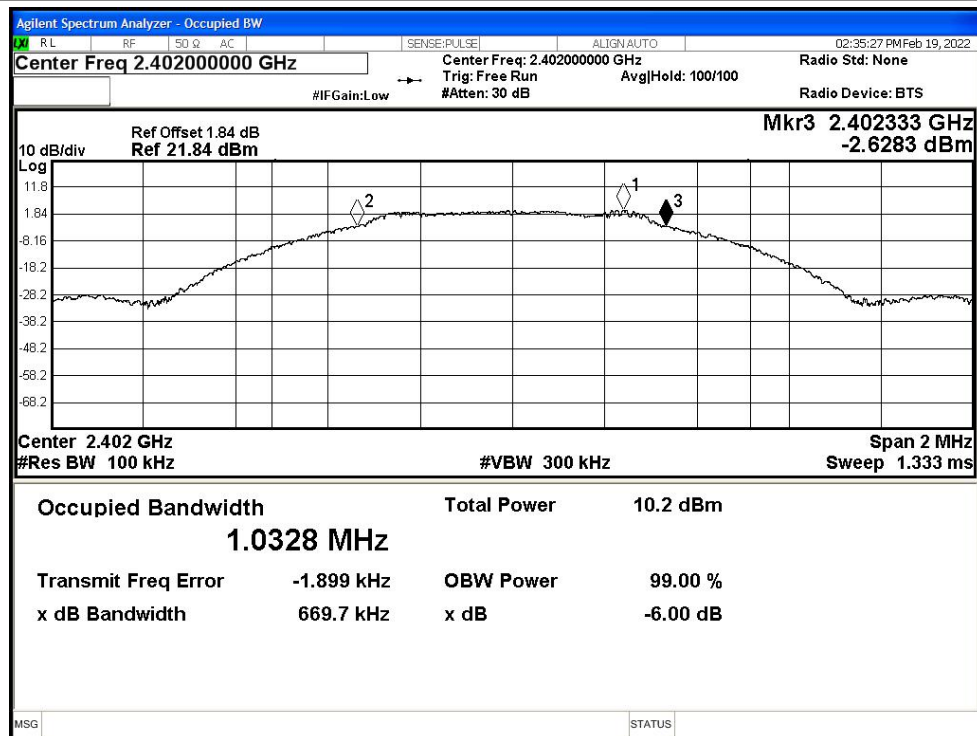
## A.1 6dB Bandwidth

| Condition | Mode   | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|--------|-----------------|---------|-----------------------|-----------------------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 0.67                  | 0.5                         | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 0.681                 | 0.5                         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 0.69                  | 0.5                         | Pass    |

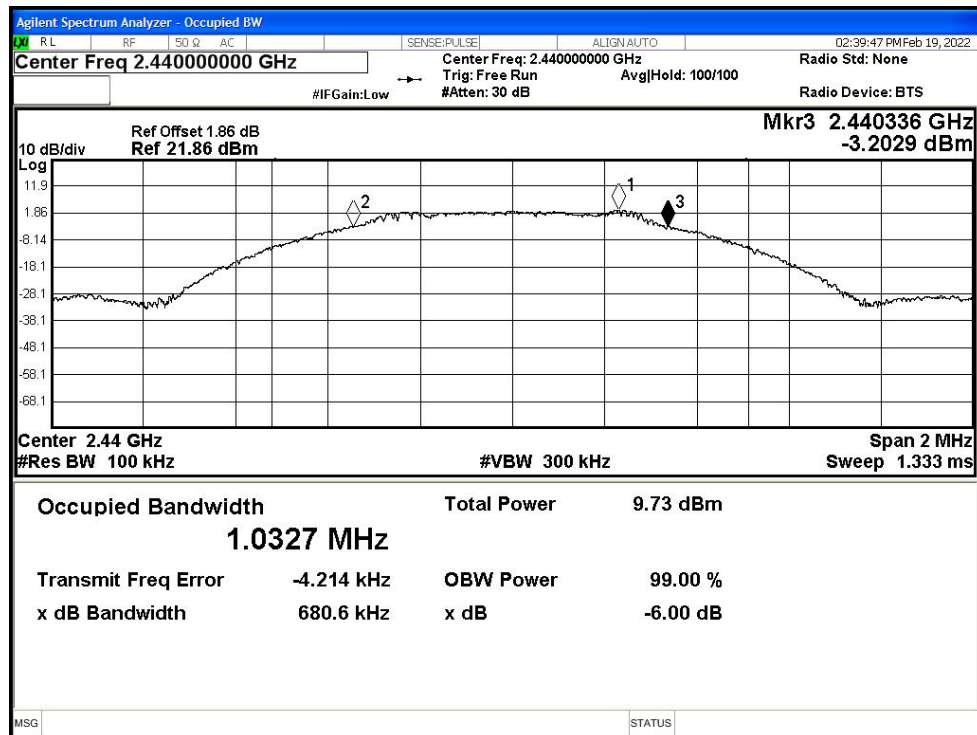


## Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1

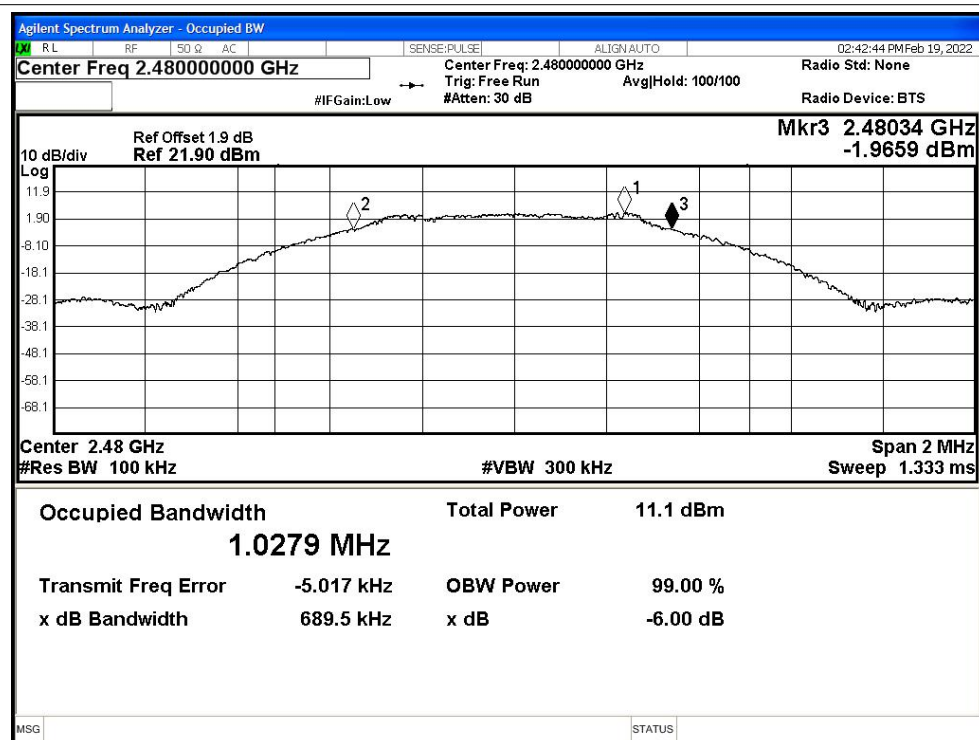


-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1

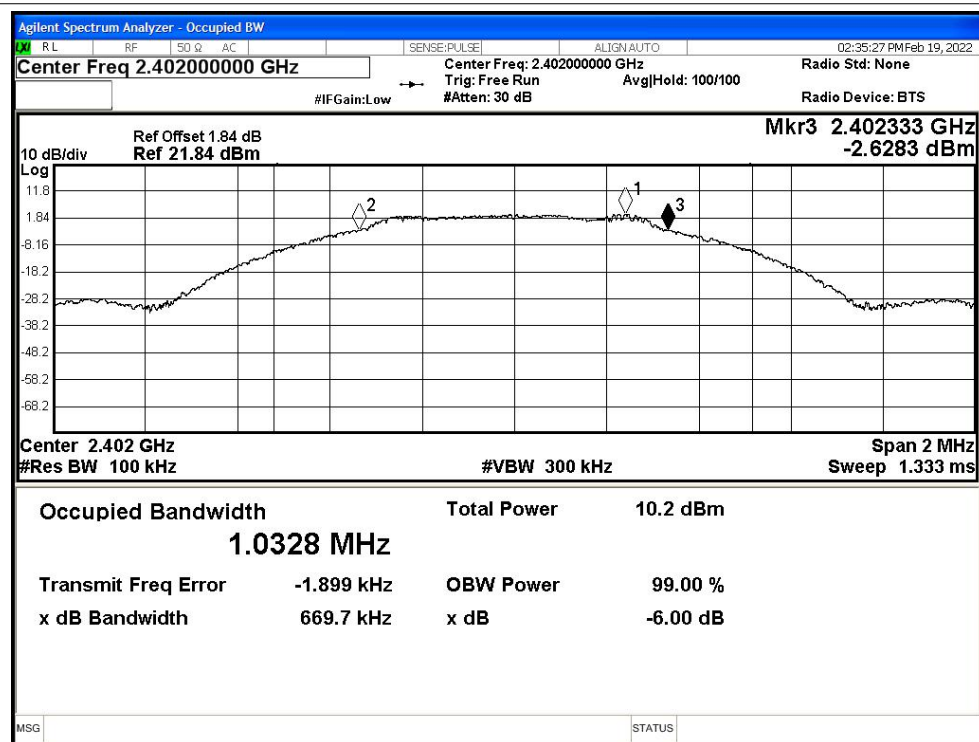




## -6dB Bandwidth NVNT BLE 1M 2480MHz Ant1

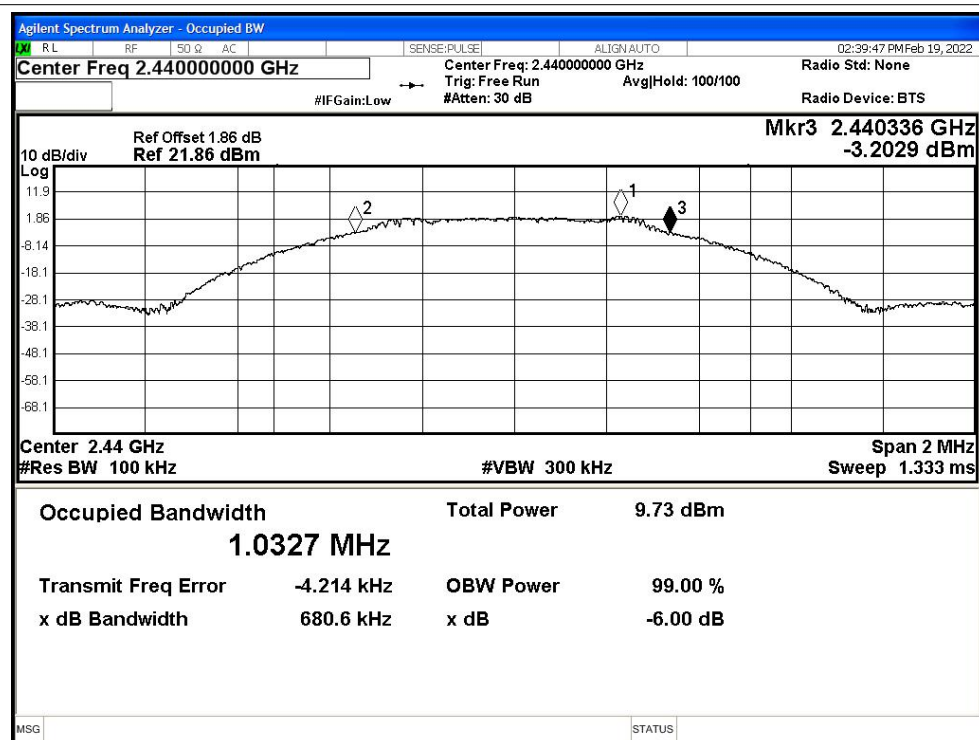


## -6dB Bandwidth NVNT BLE 1M 2402MHz Ant1

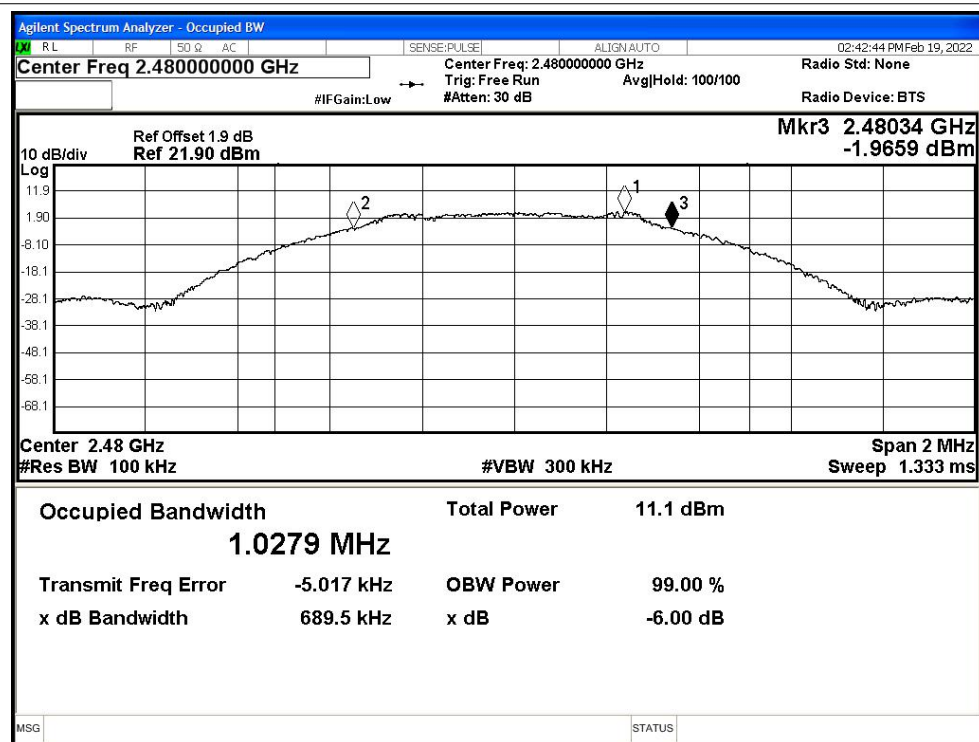




## -6dB Bandwidth NVNT BLE 1M 2440MHz Ant1

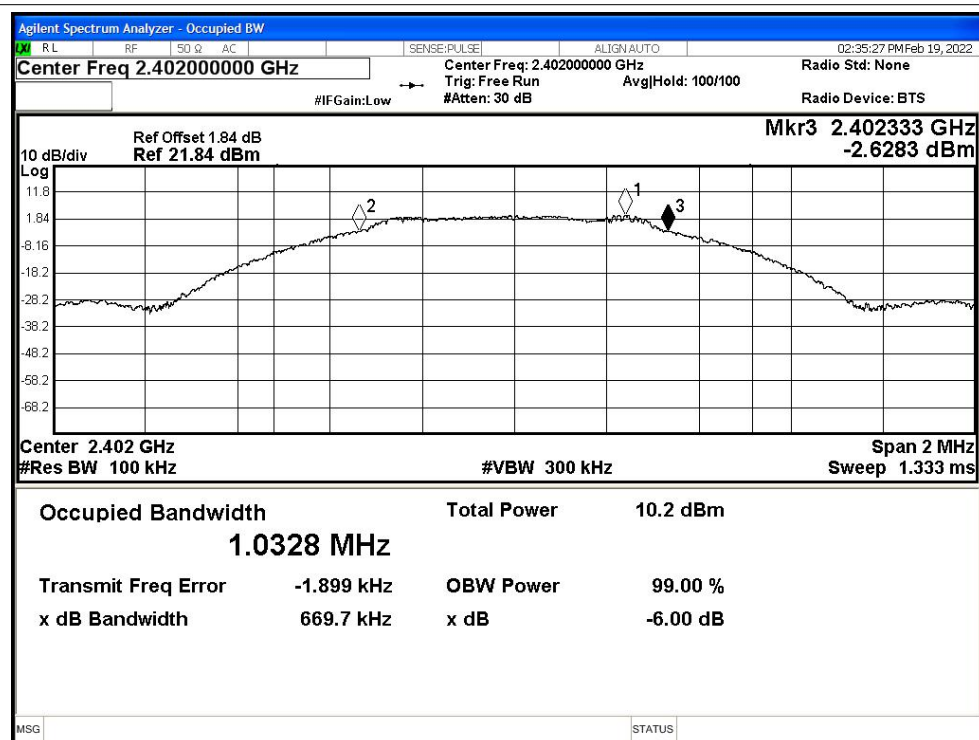


## -6dB Bandwidth NVNT BLE 1M 2480MHz Ant1

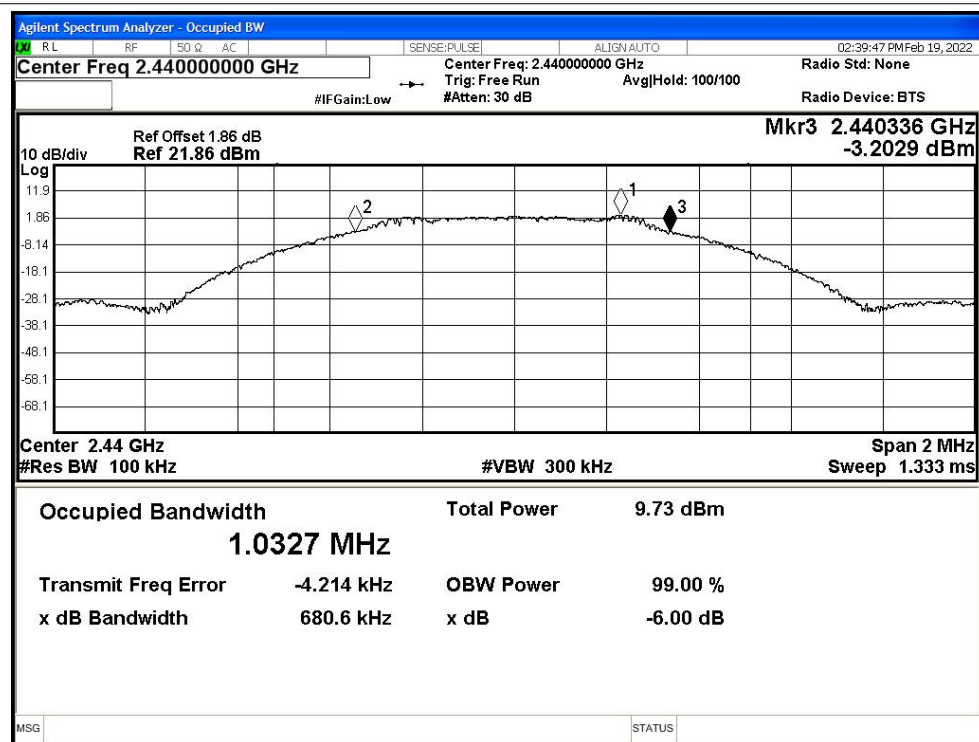


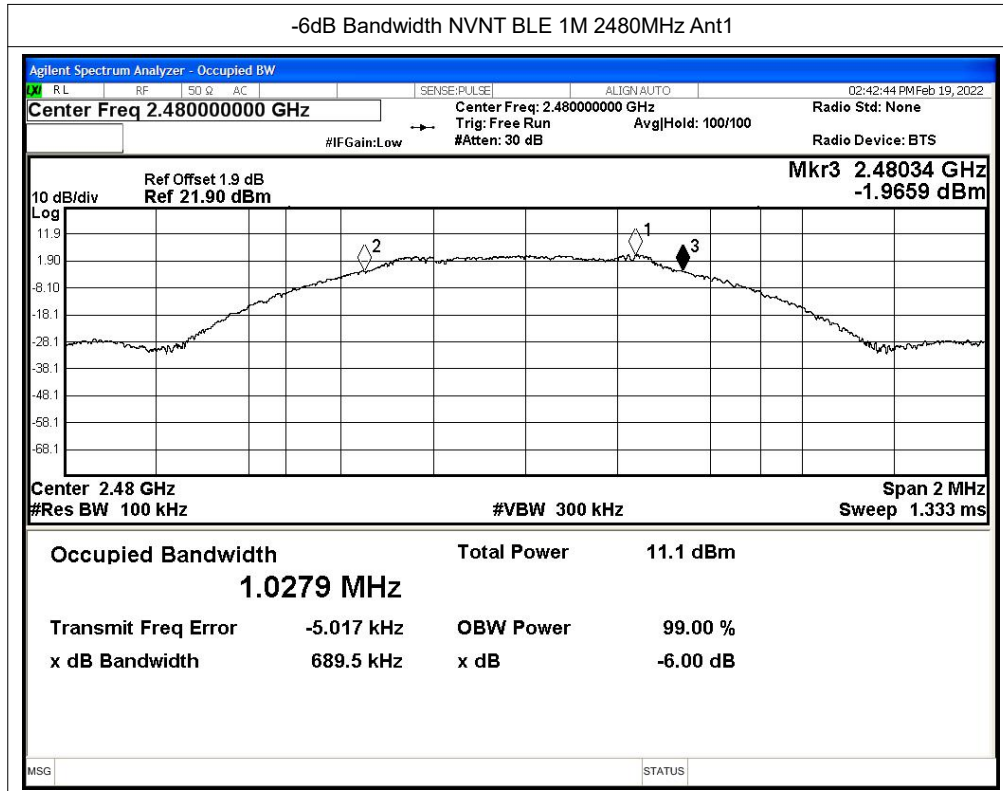


## -6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



## -6dB Bandwidth NVNT BLE 1M 2440MHz Ant1







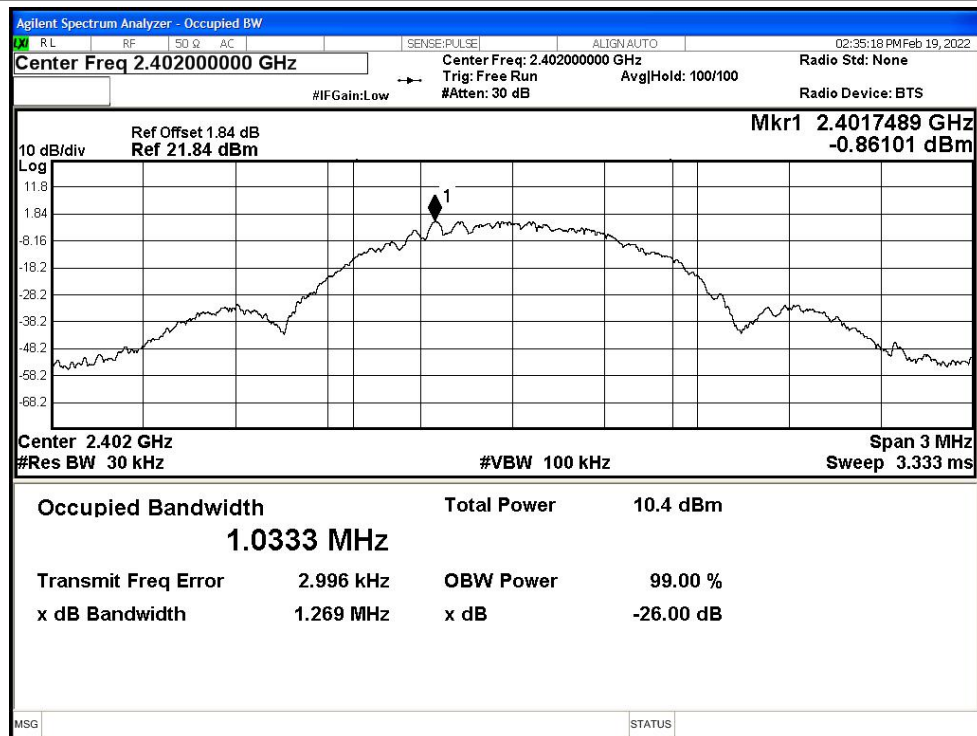
## A.2 Occupied Channel Bandwidth

| Condition | Mode   | Frequency (MHz) | Antenna | 99% OBW (MHz) |
|-----------|--------|-----------------|---------|---------------|
| NVNT      | BLE 1M | 2402            | Ant1    | 1.033         |
| NVNT      | BLE 1M | 2440            | Ant1    | 1.031         |
| NVNT      | BLE 1M | 2480            | Ant1    | 1.033         |

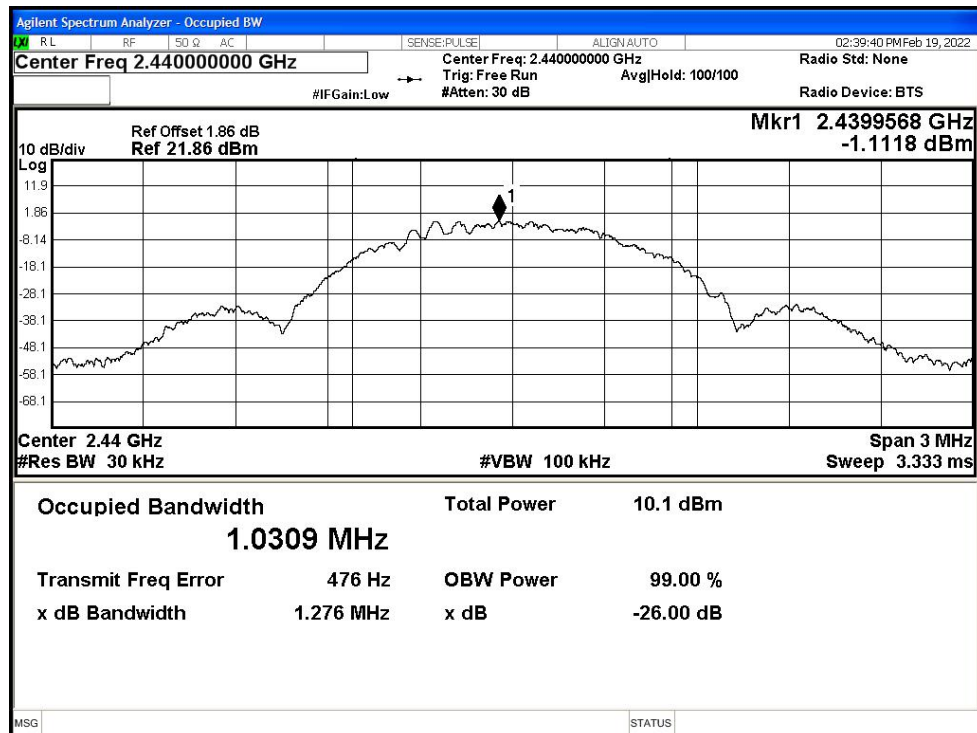


## Test Graphs

## OBW NVNT BLE 1M 2402MHz Ant1

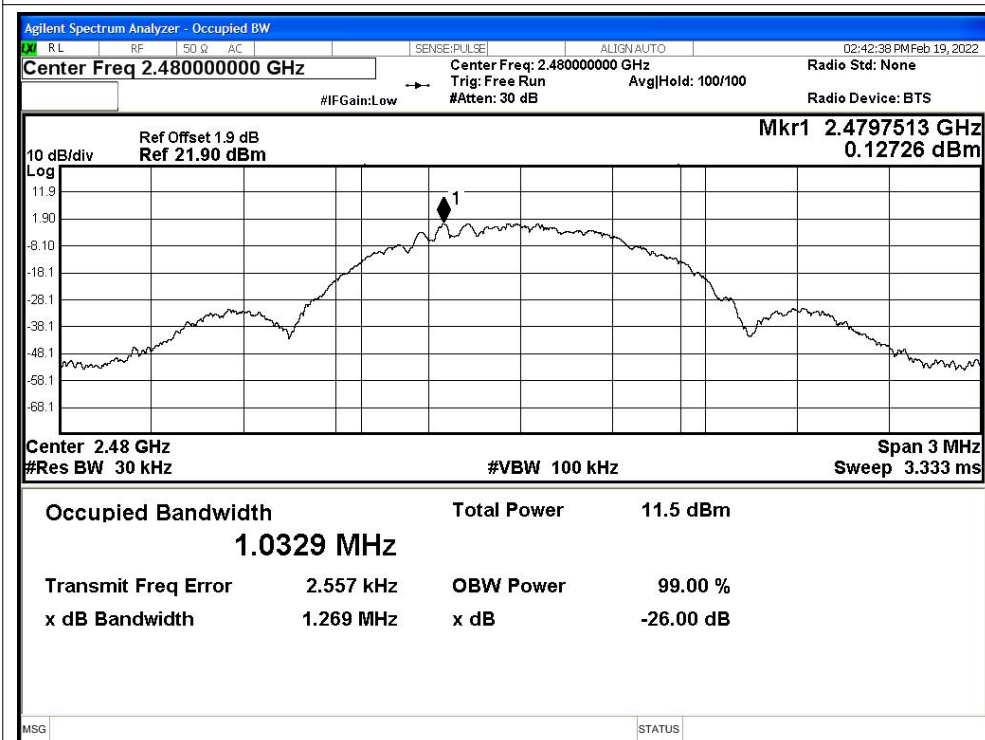


## OBW NVNT BLE 1M 2440MHz Ant1

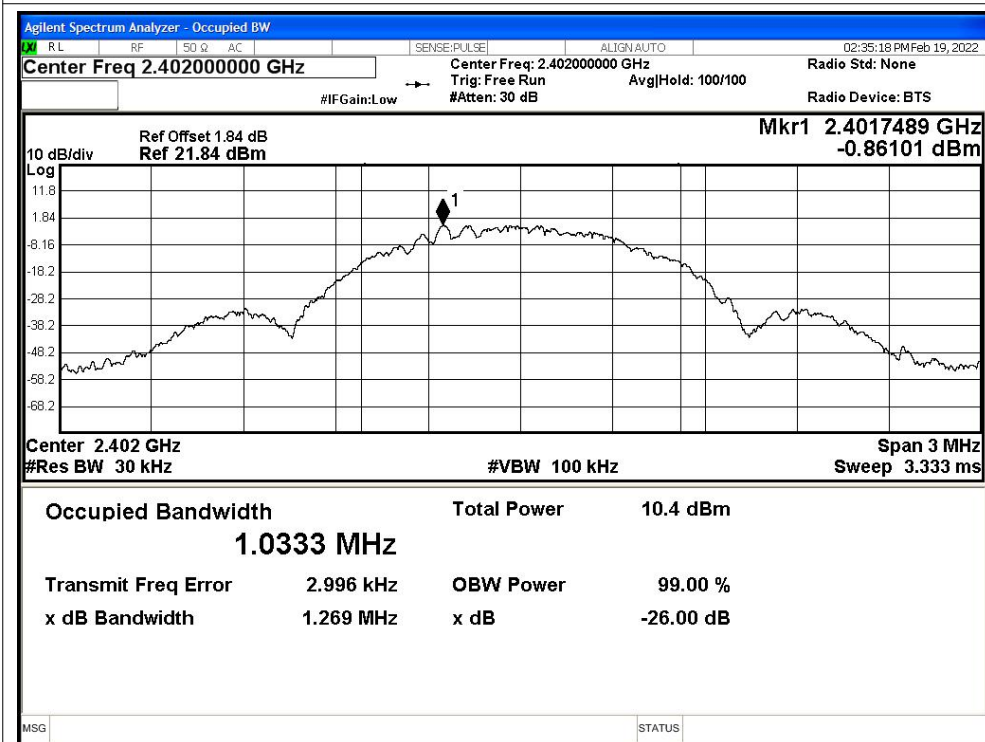




## OBW NVNT BLE 1M 2480MHz Ant1

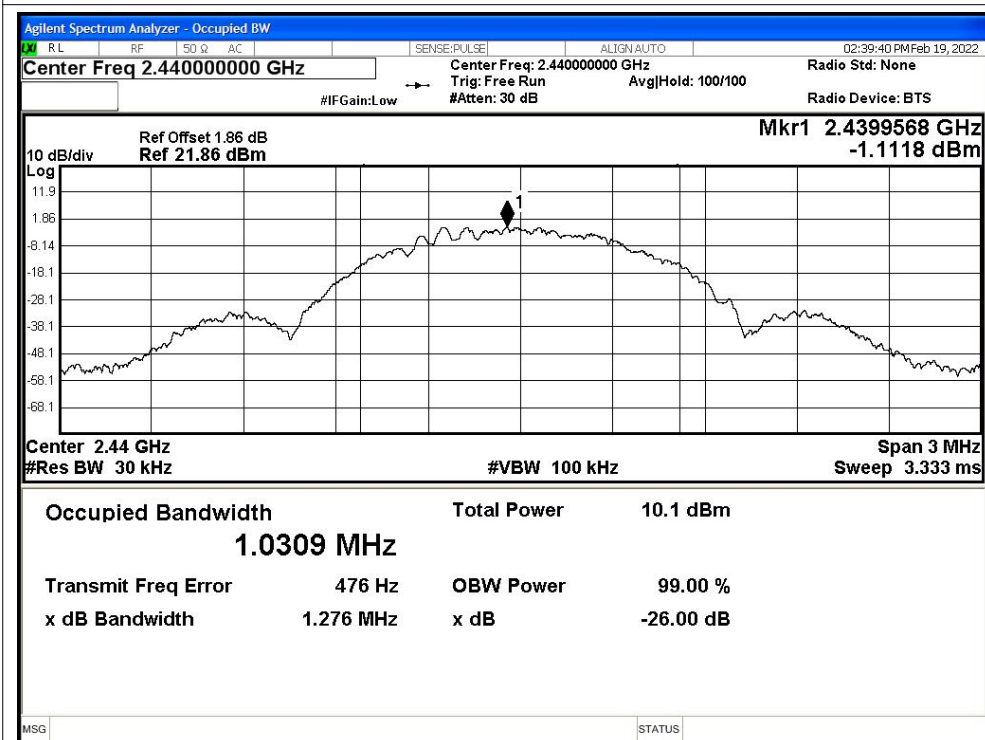


## OBW NVNT BLE 1M 2402MHz Ant1

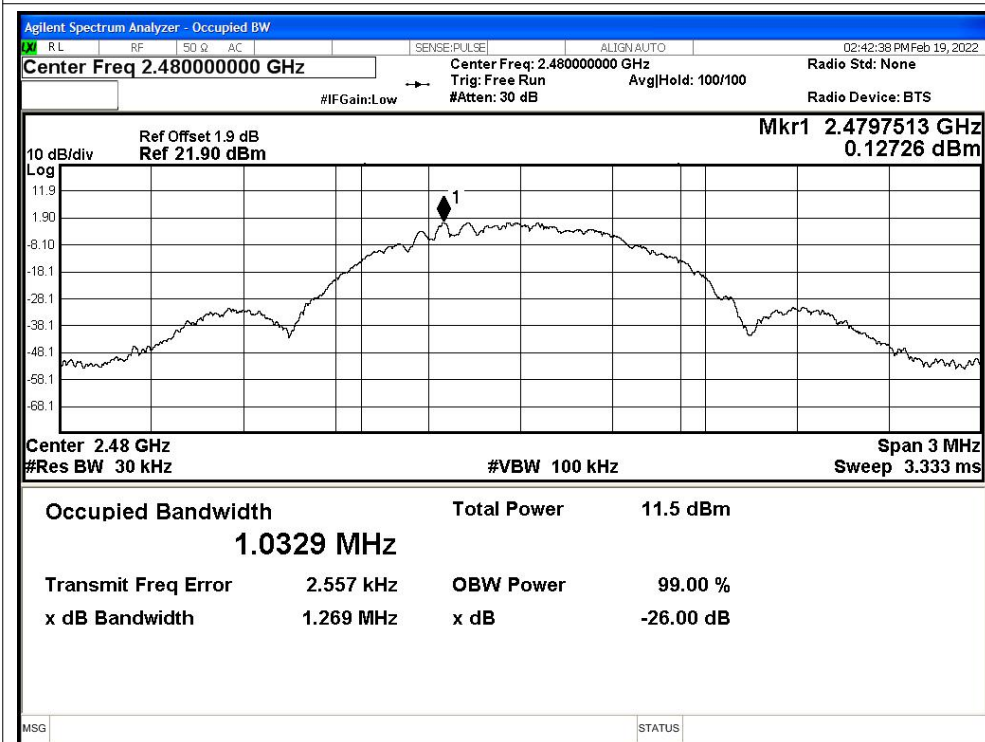




## OBW NVNT BLE 1M 2440MHz Ant1

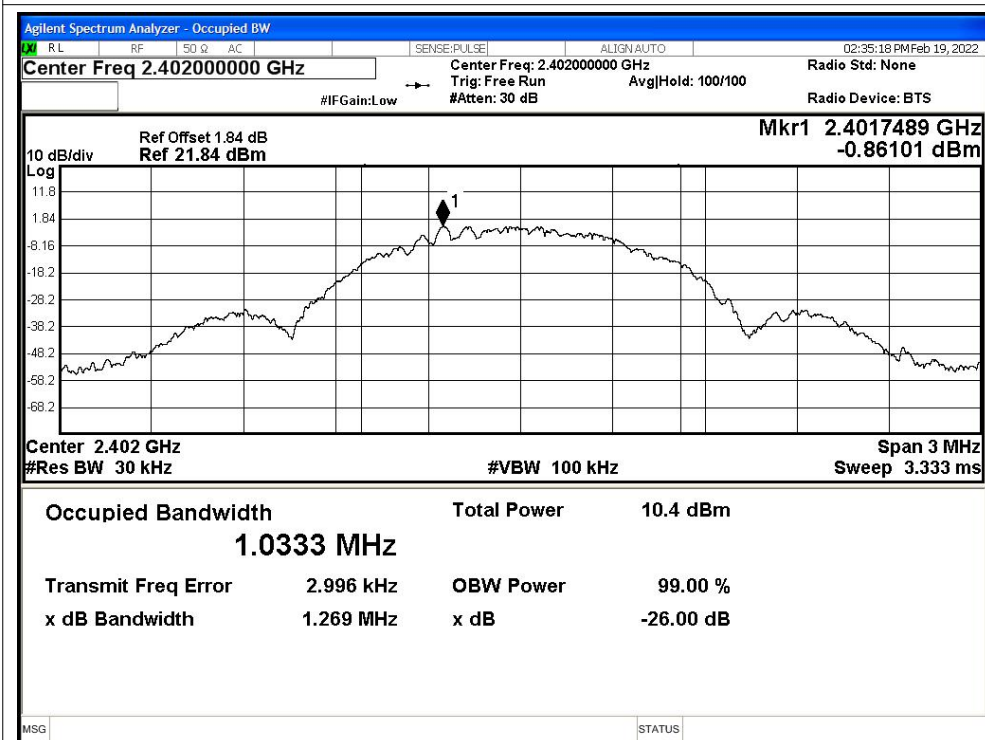


## OBW NVNT BLE 1M 2480MHz Ant1

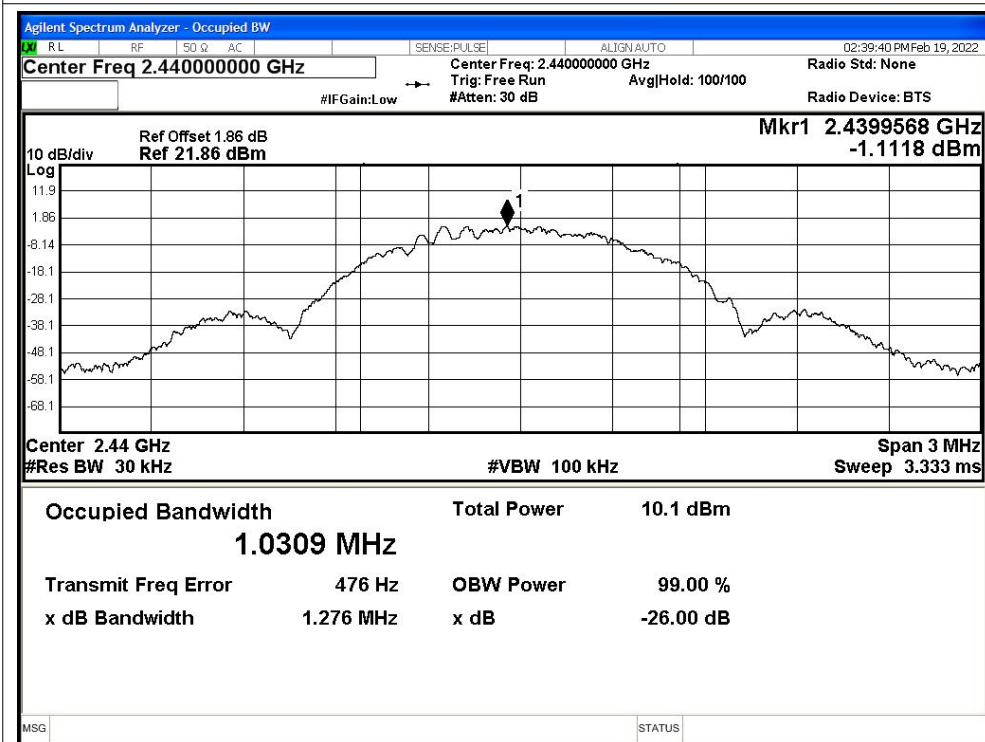


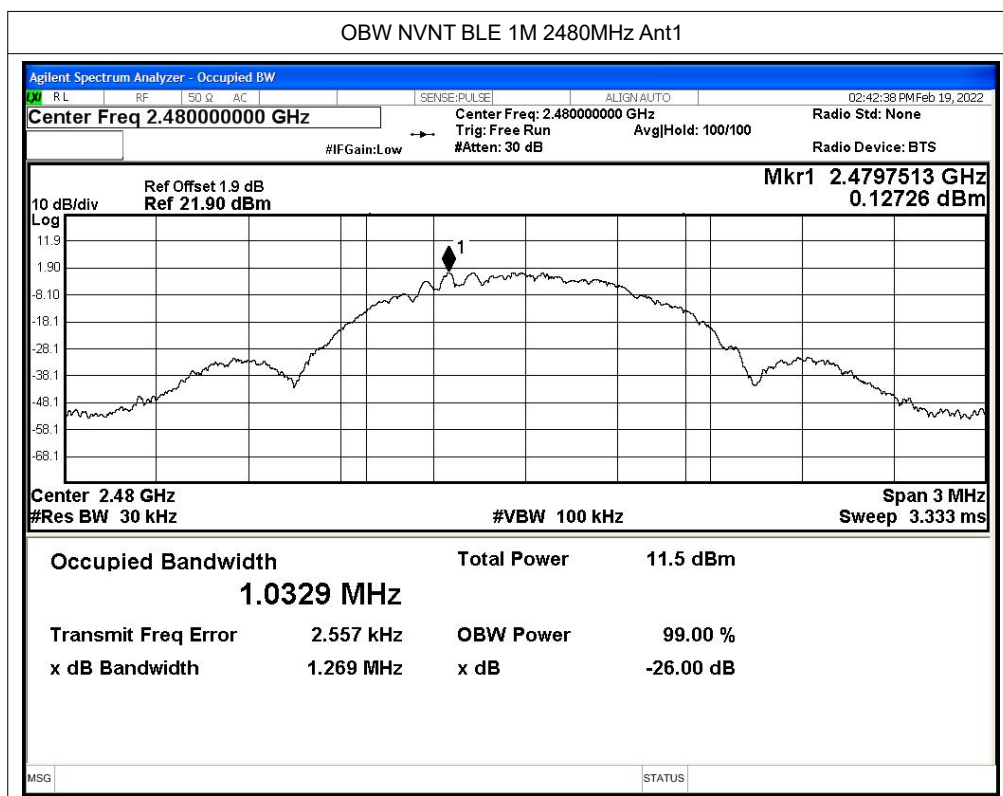


## OBW NVNT BLE 1M 2402MHz Ant1



## OBW NVNT BLE 1M 2440MHz Ant1







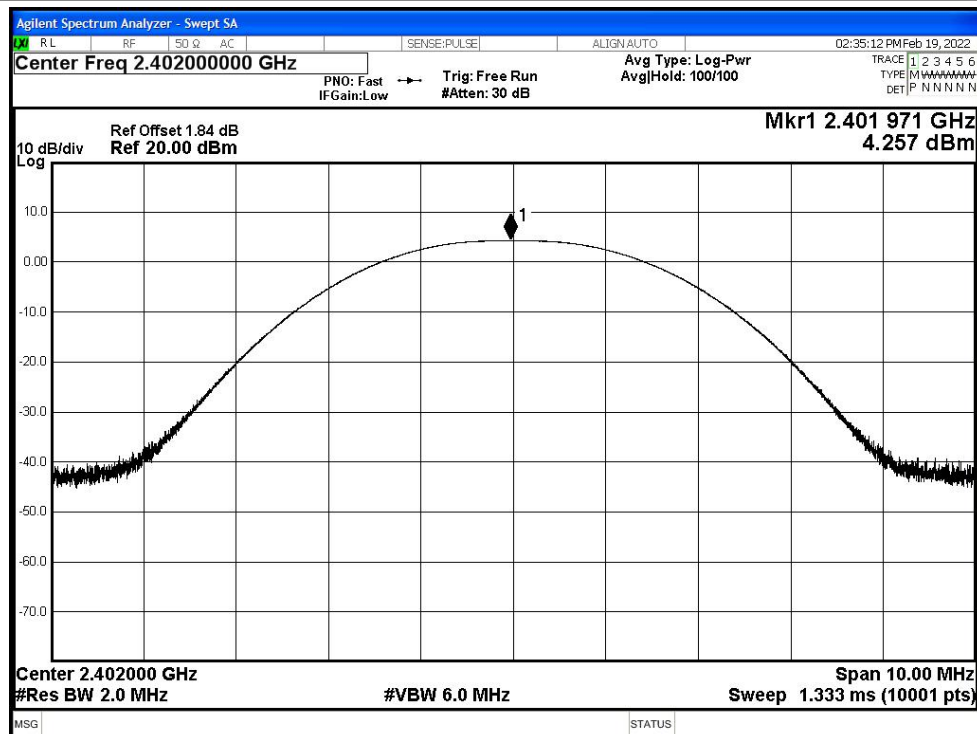
### A.3 Maximum Conducted Output Power

| Condition | Mode   | Frequency<br>(MHz) | Antenna | Conducted Power<br>(dBm) | Duty Factor<br>(dB) | Total Power<br>(dBm) | Limit<br>(dBm) | Verdict |
|-----------|--------|--------------------|---------|--------------------------|---------------------|----------------------|----------------|---------|
| NVNT      | BLE 1M | 2402               | Ant1    | 4.26                     | 0                   | 4.26                 | 30             | Pass    |
| NVNT      | BLE 1M | 2440               | Ant1    | 3.9                      | 0                   | 3.9                  | 30             | Pass    |
| NVNT      | BLE 1M | 2480               | Ant1    | 5.25                     | 0                   | 5.25                 | 30             | Pass    |

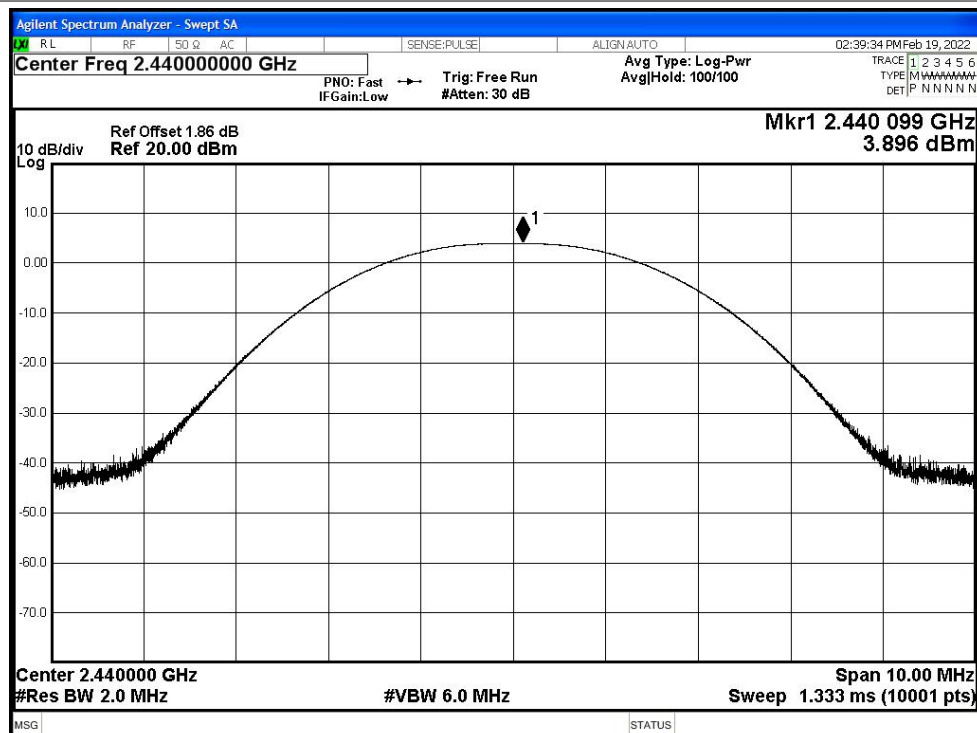


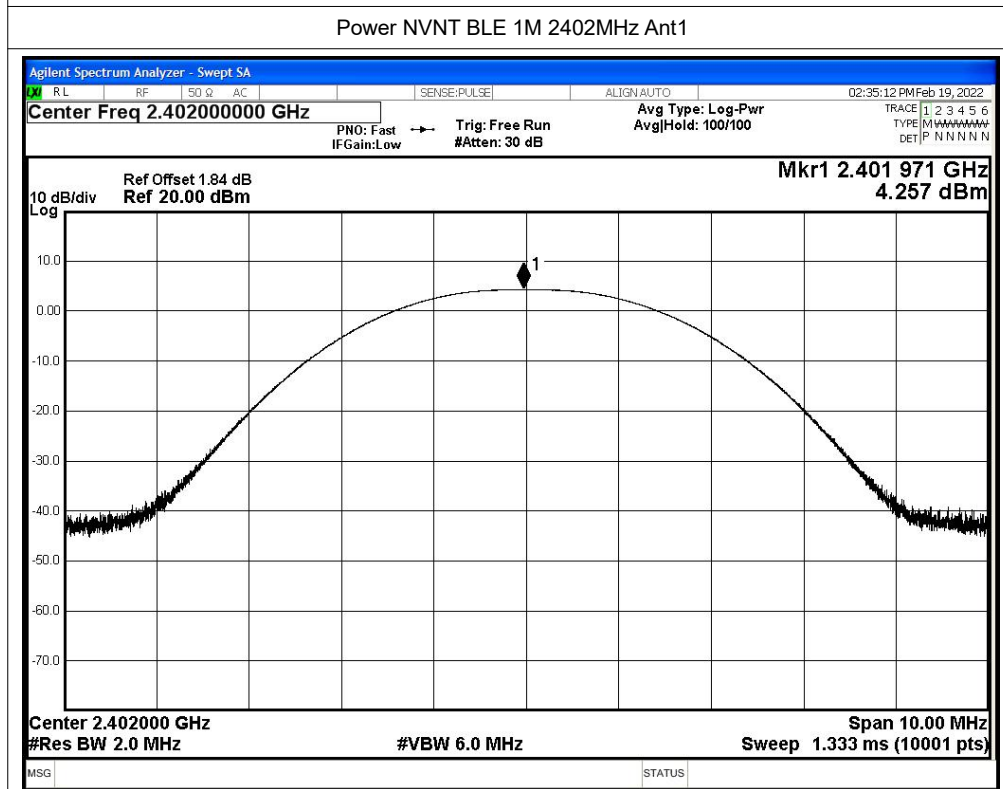
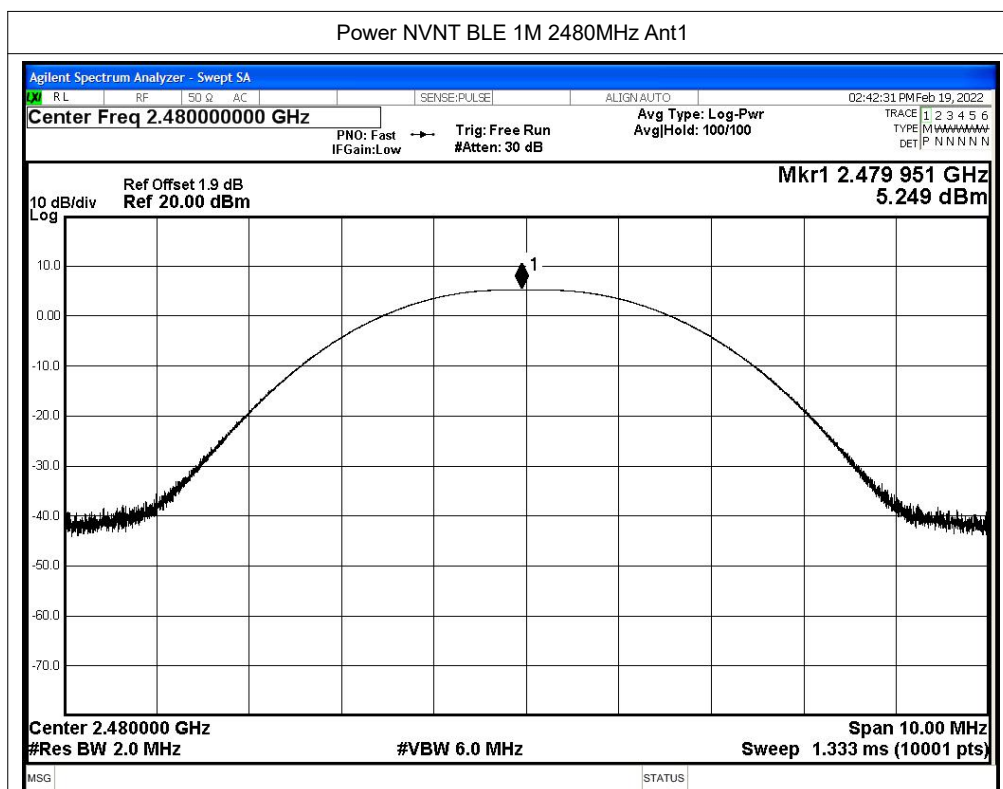
## Test Graphs

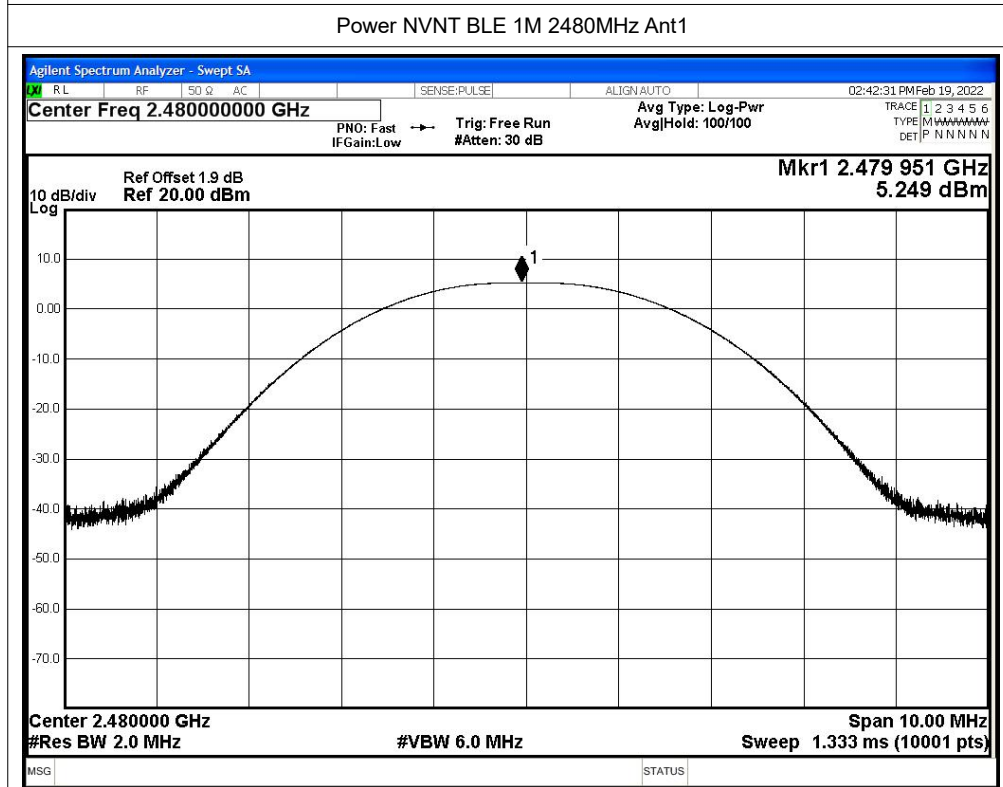
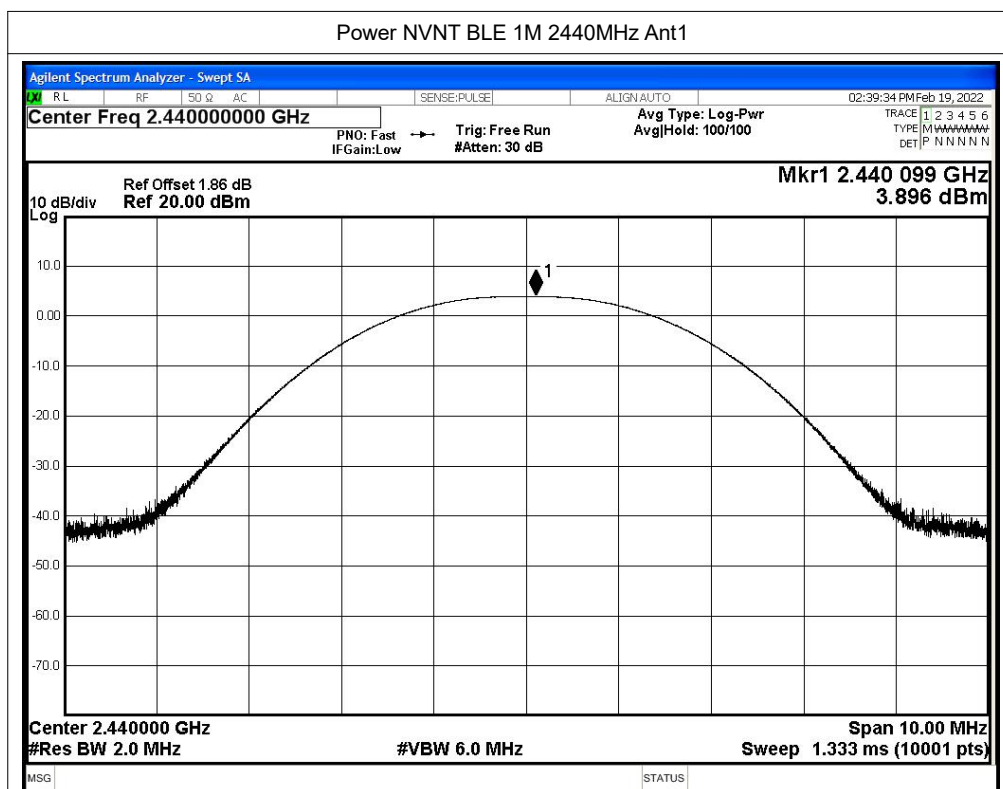
## Power NVNT BLE 1M 2402MHz Ant1

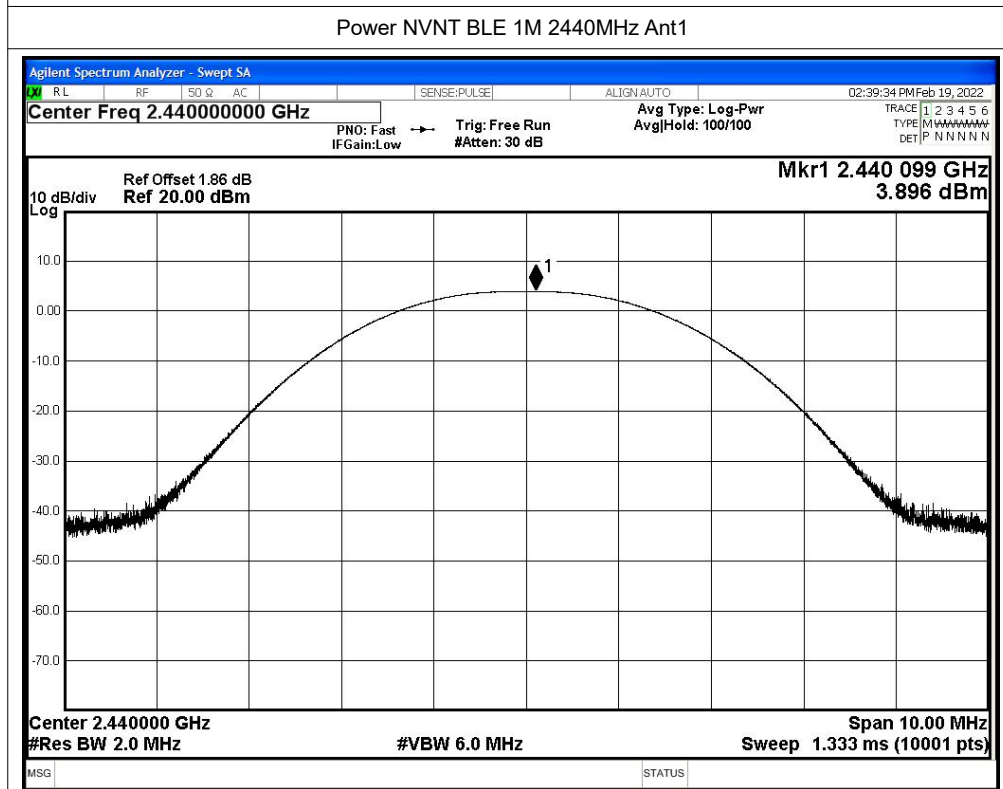
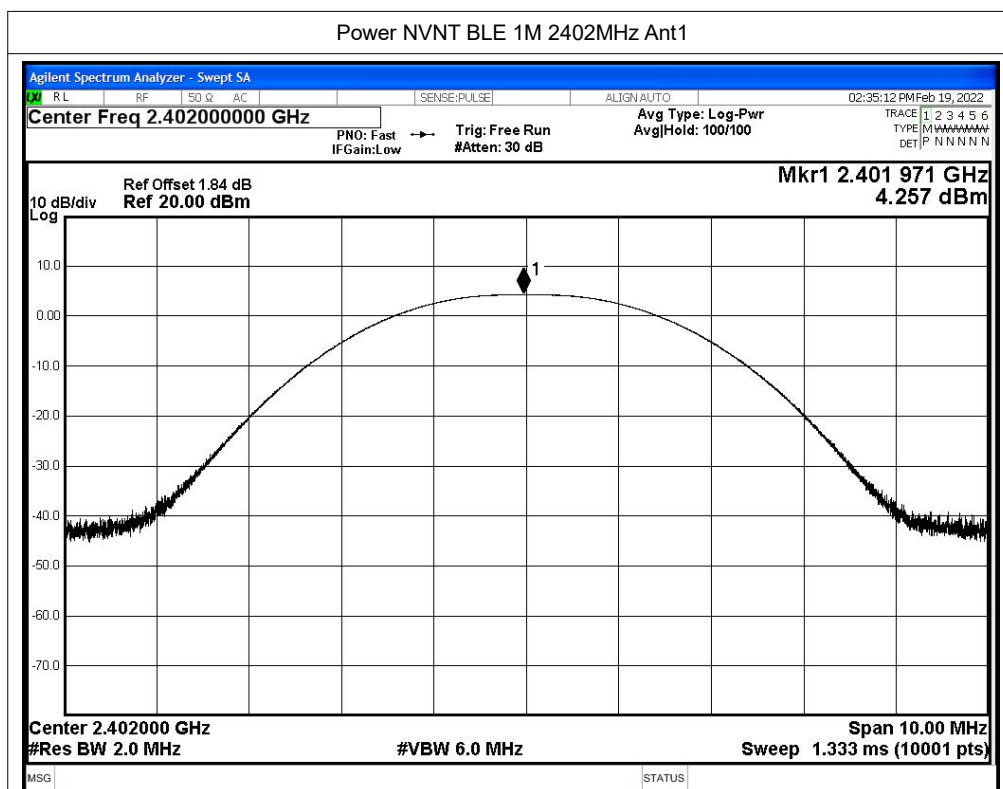


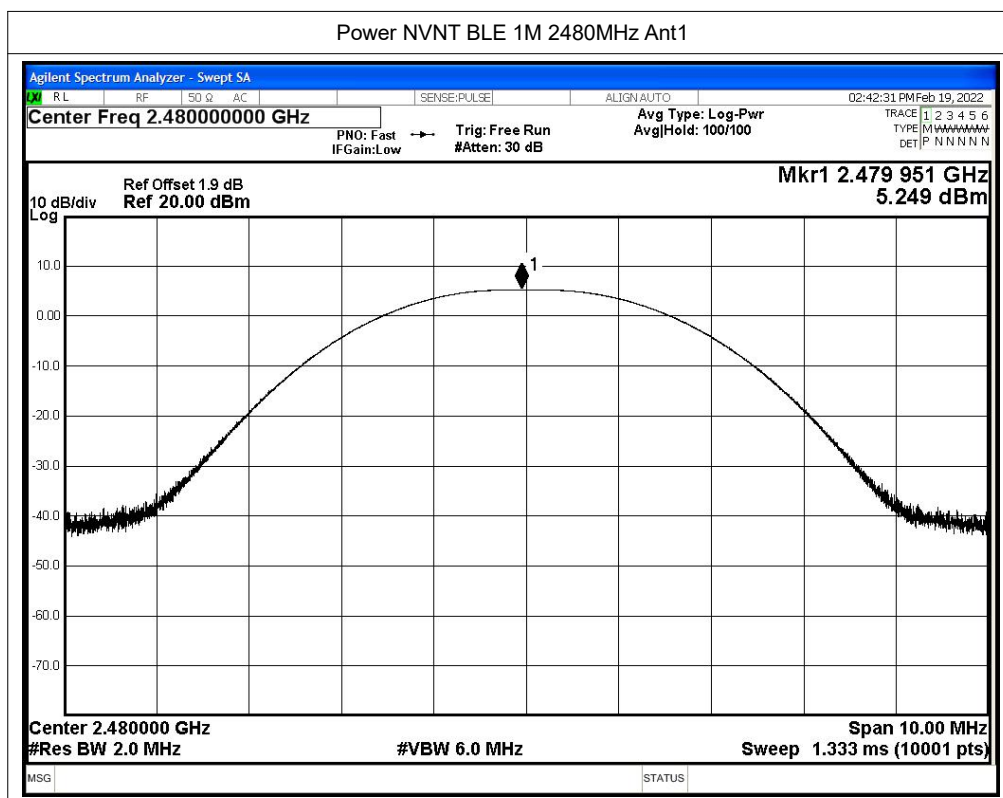
## Power NVNT BLE 1M 2440MHz Ant1













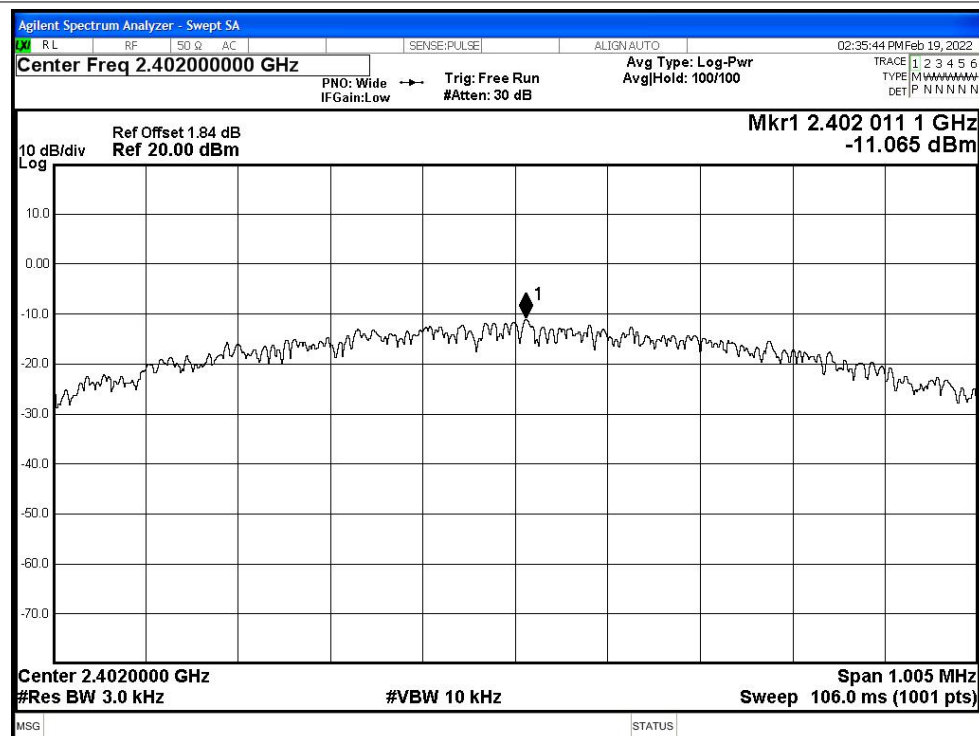
## A.4 Maximum Power Spectral Density Level

| 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<br>1M | 2402               | Ant1    | -11.07                      | 0                   | -11.07                  | 8                   | Pass    |
| NVNT      | BLE<br>1M | 2440               | Ant1    | -11.53                      | 0                   | -11.53                  | 8                   | Pass    |
| NVNT      | BLE<br>1M | 2480               | Ant1    | -10.2                       | 0                   | -10.2                   | 8                   | Pass    |

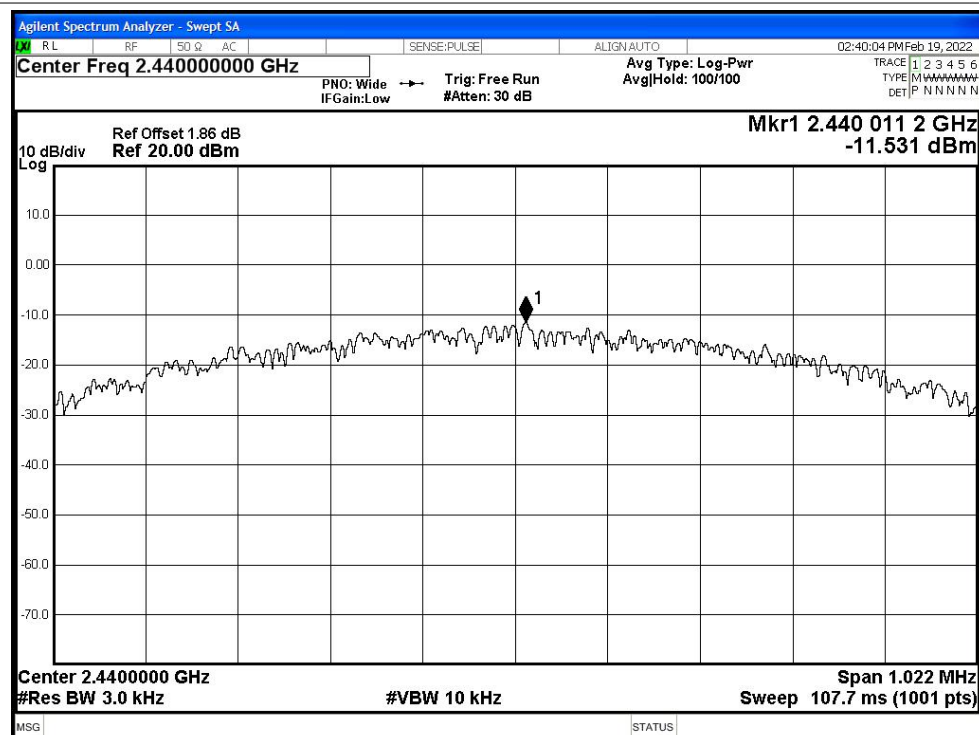


## Test Graphs

## PSD NVNT BLE 1M 2402MHz Ant1

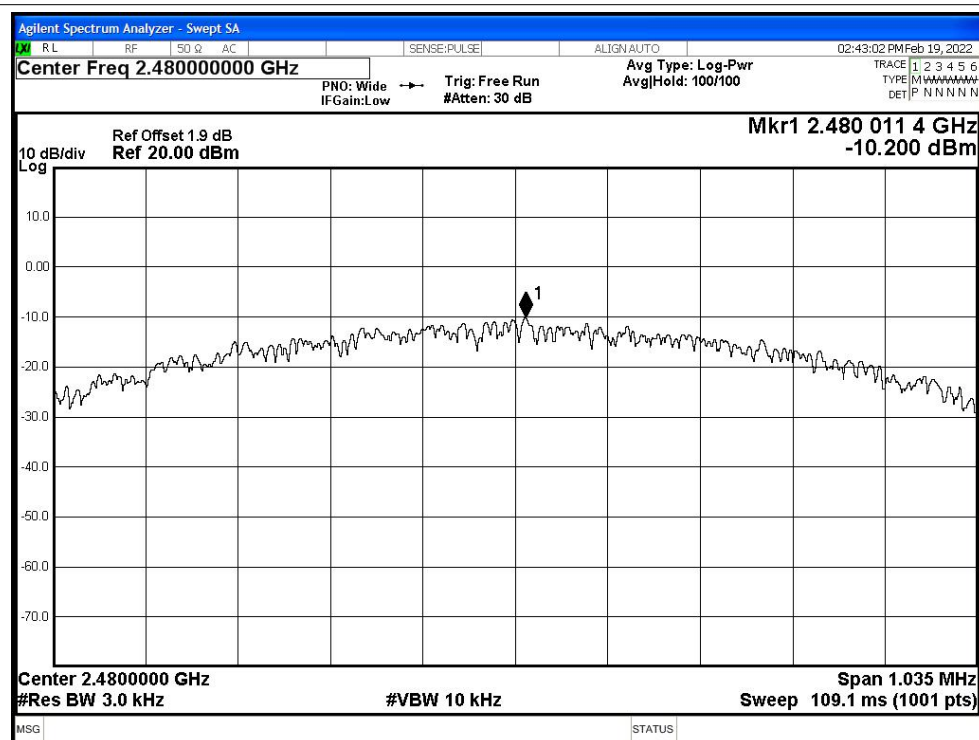


## PSD NVNT BLE 1M 2440MHz Ant1

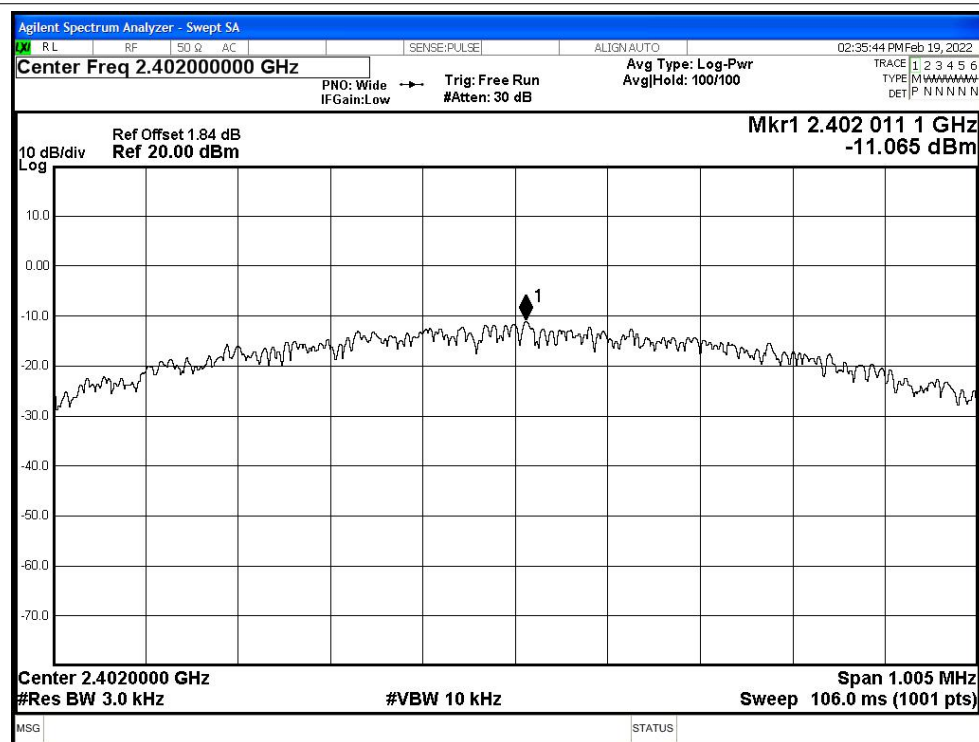




PSD NVNT BLE 1M 2480MHz Ant1

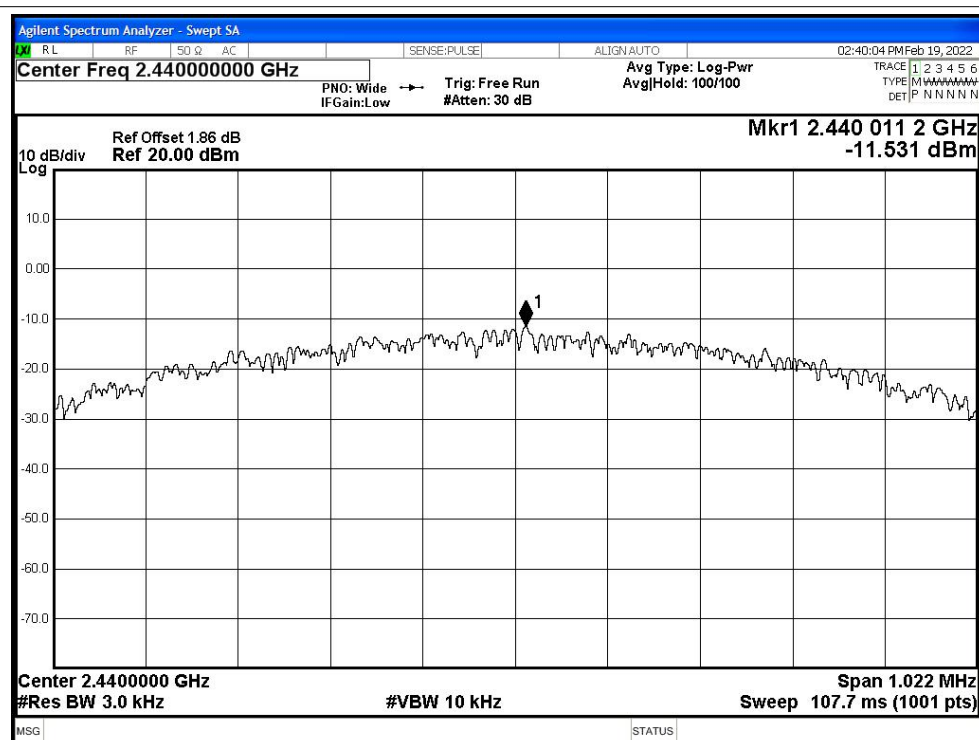


PSD NVNT BLE 1M 2402MHz Ant1

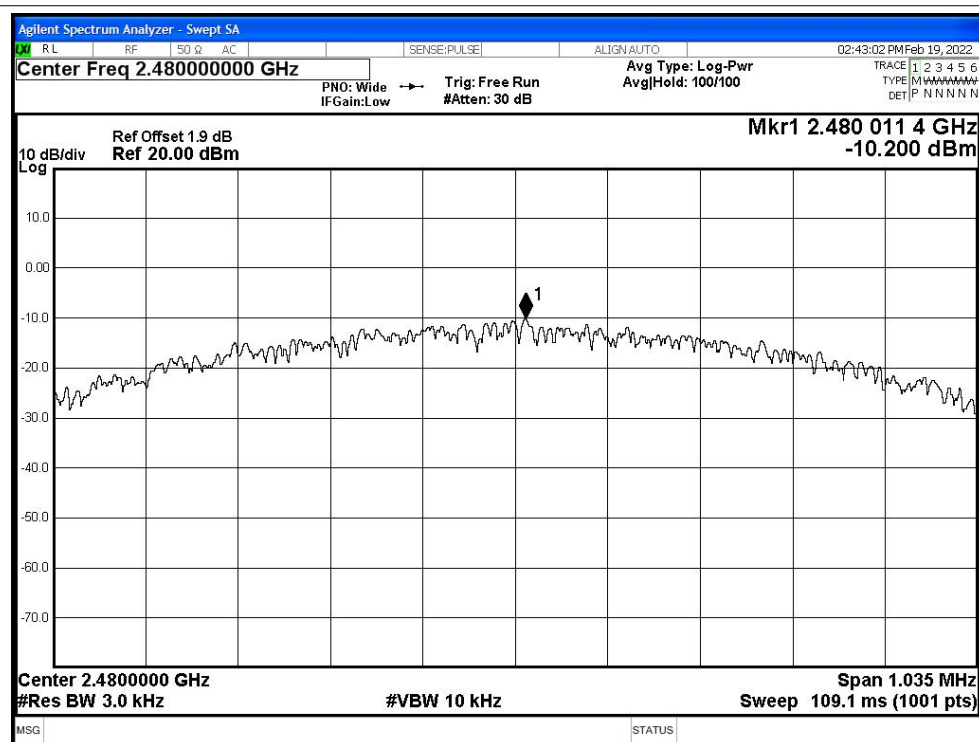




PSD NVNT BLE 1M 2440MHz Ant1

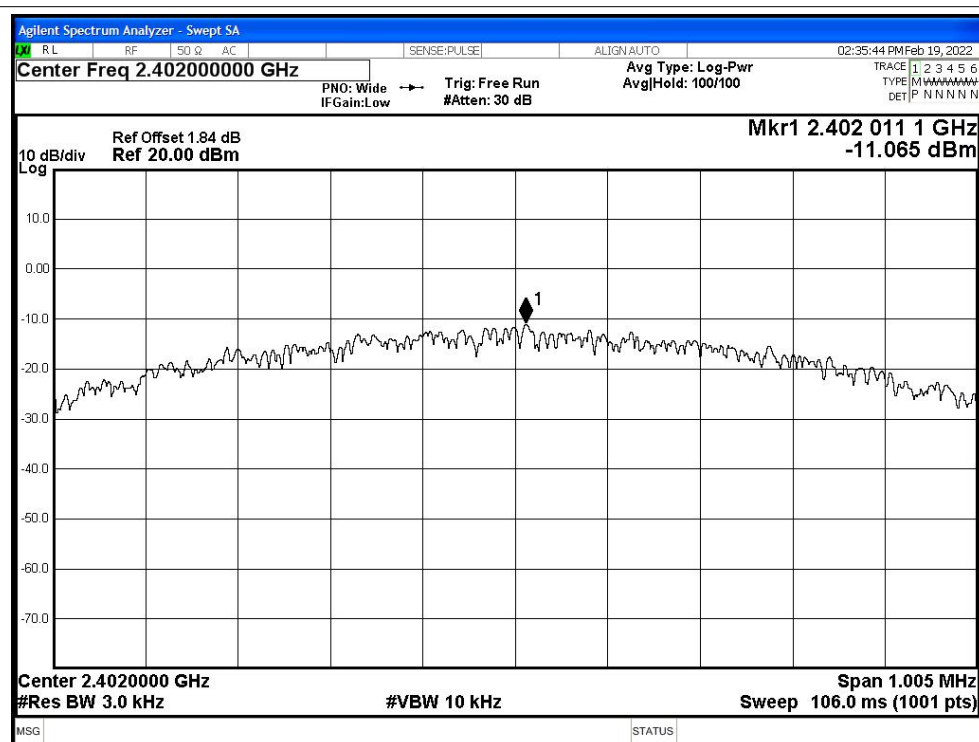


PSD NVNT BLE 1M 2480MHz Ant1

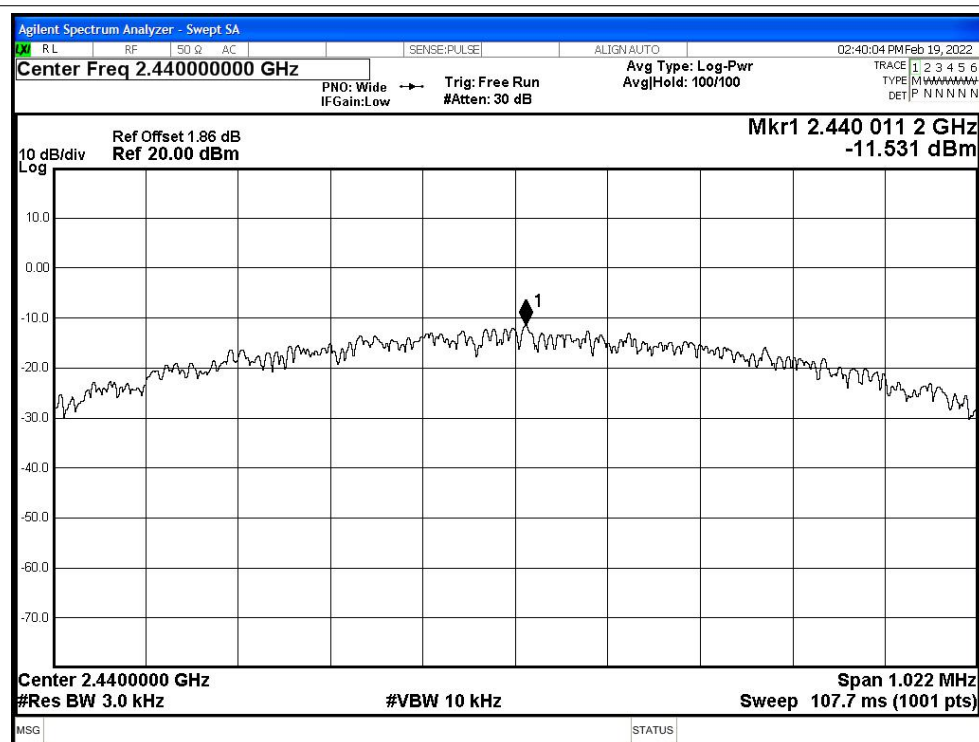


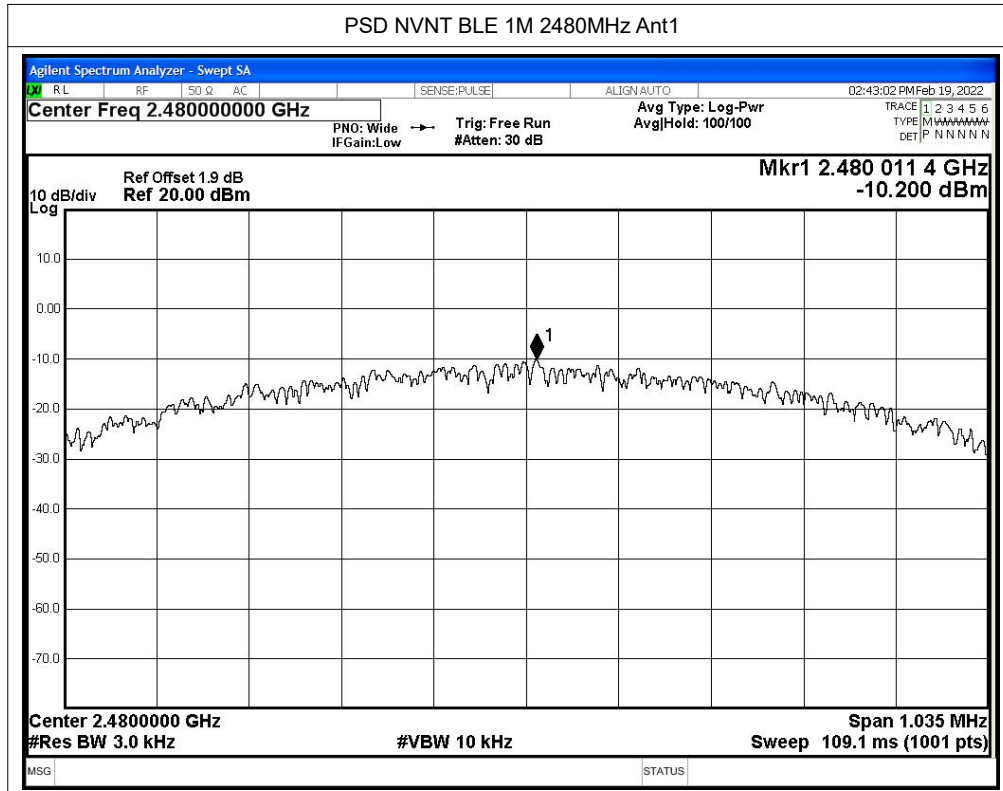


PSD NVNT BLE 1M 2402MHz Ant1



PSD NVNT BLE 1M 2440MHz Ant1







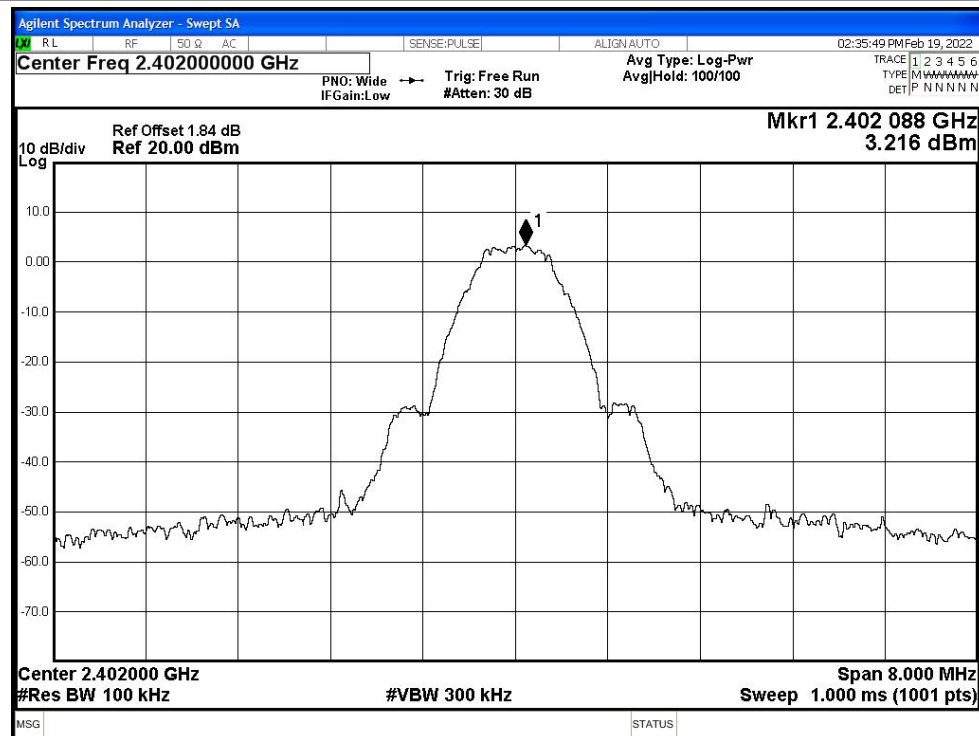
## A.5 Band Edge

| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -53.68          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -53.17          | -20         | Pass    |

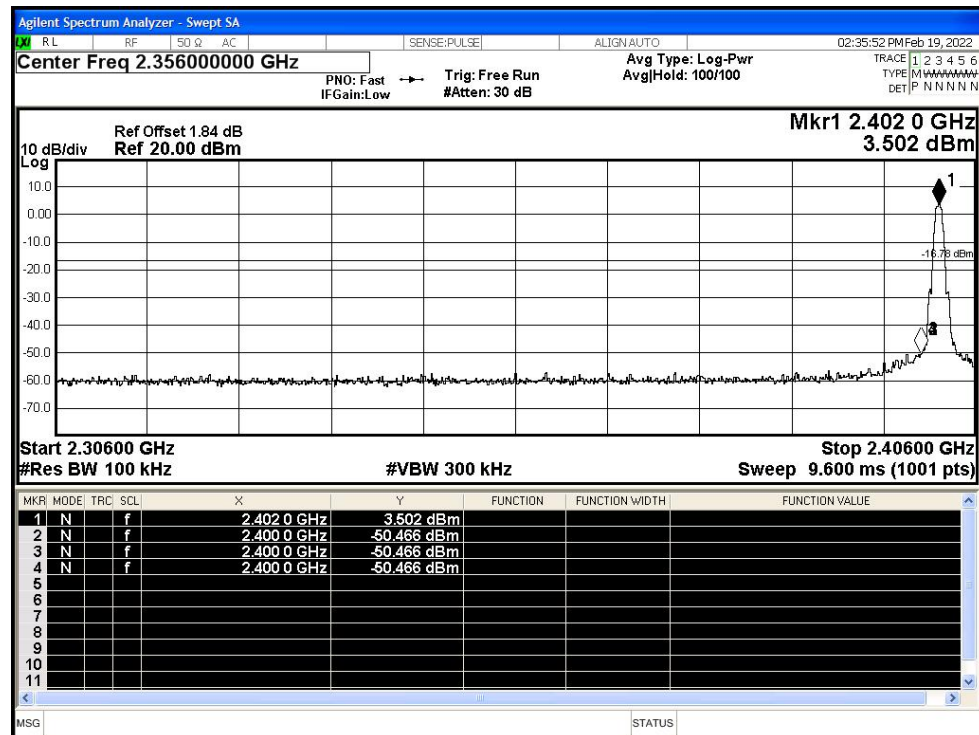


## Test Graphs

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

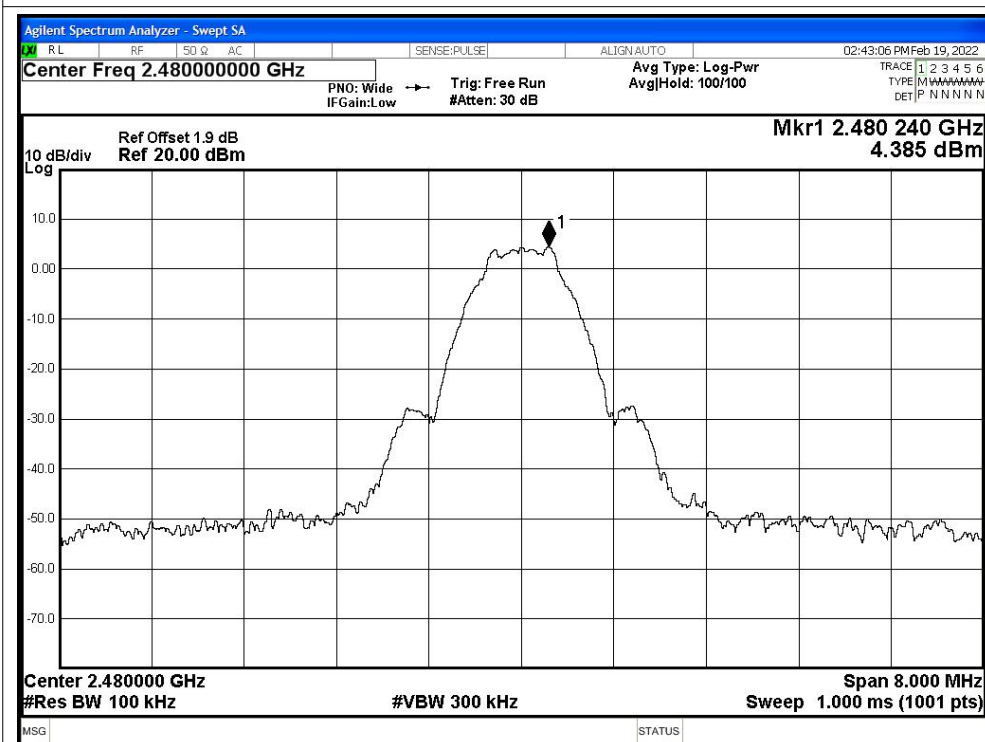


## Band Edge NVNT BLE 1M 2402MHz Ant1 Emission

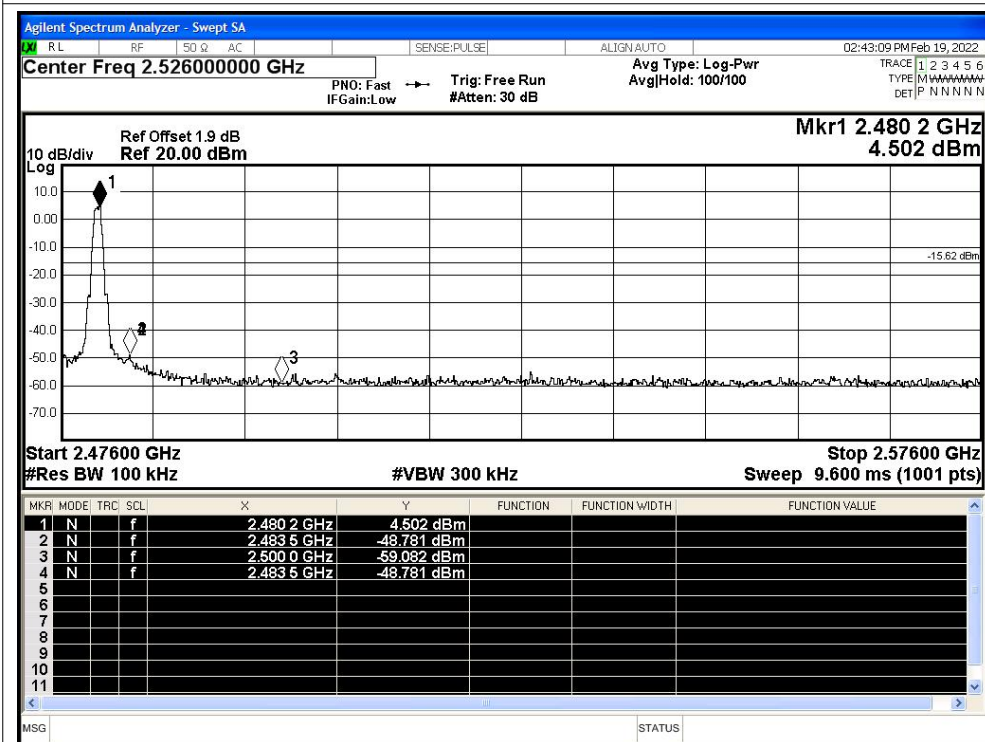


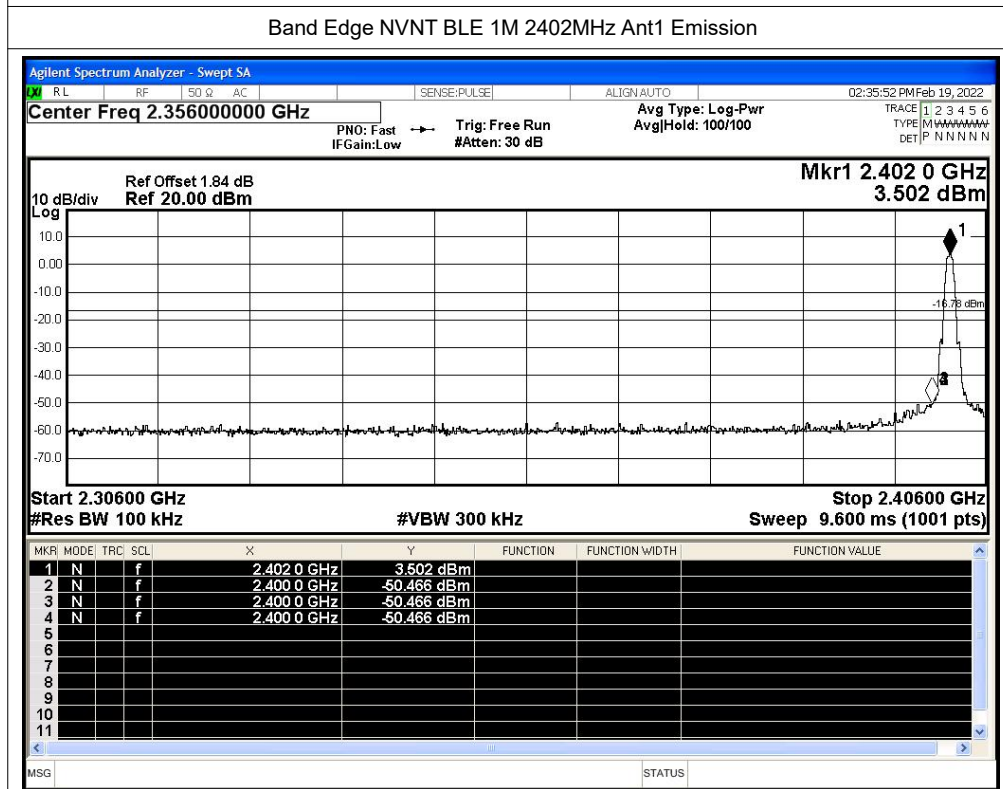
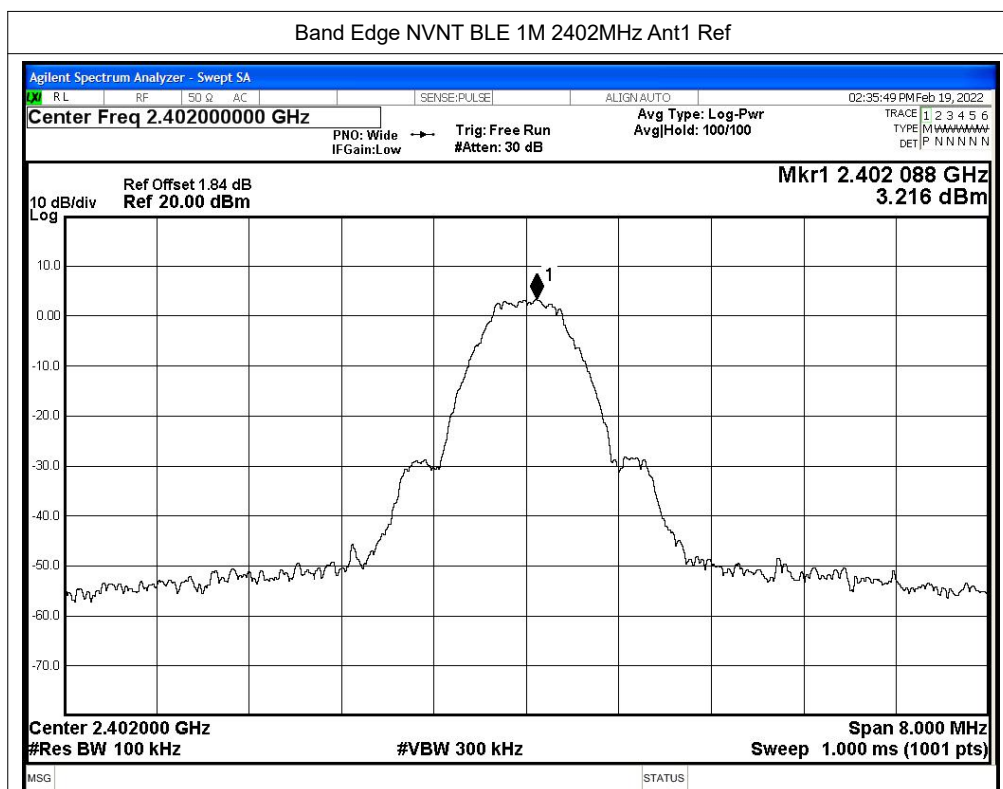


## Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



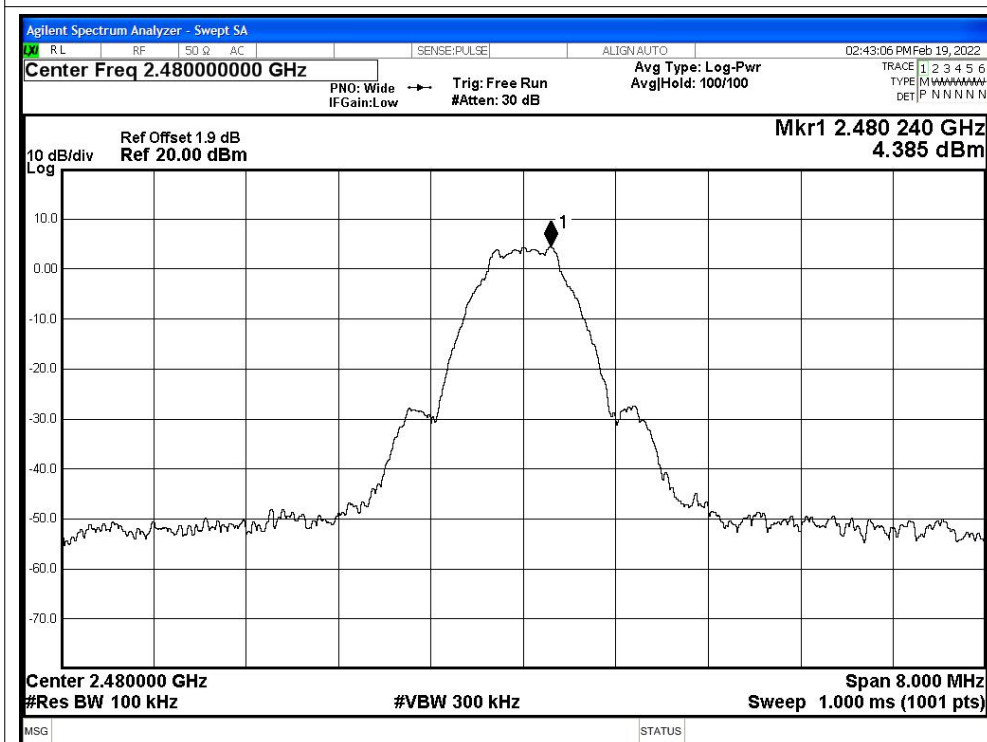
## Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



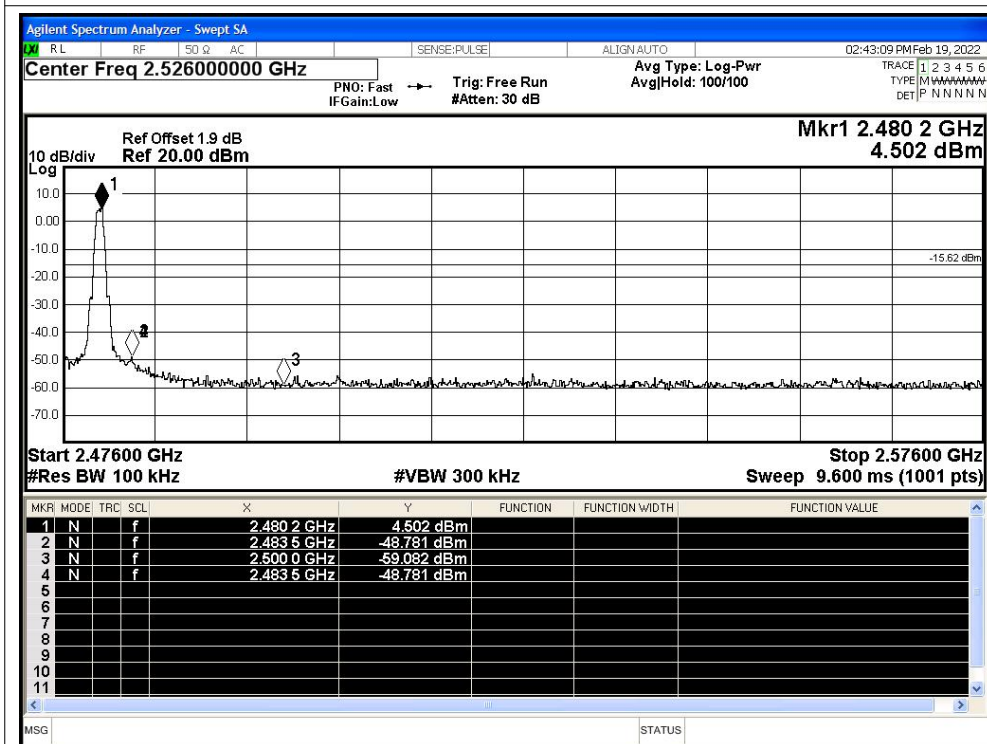


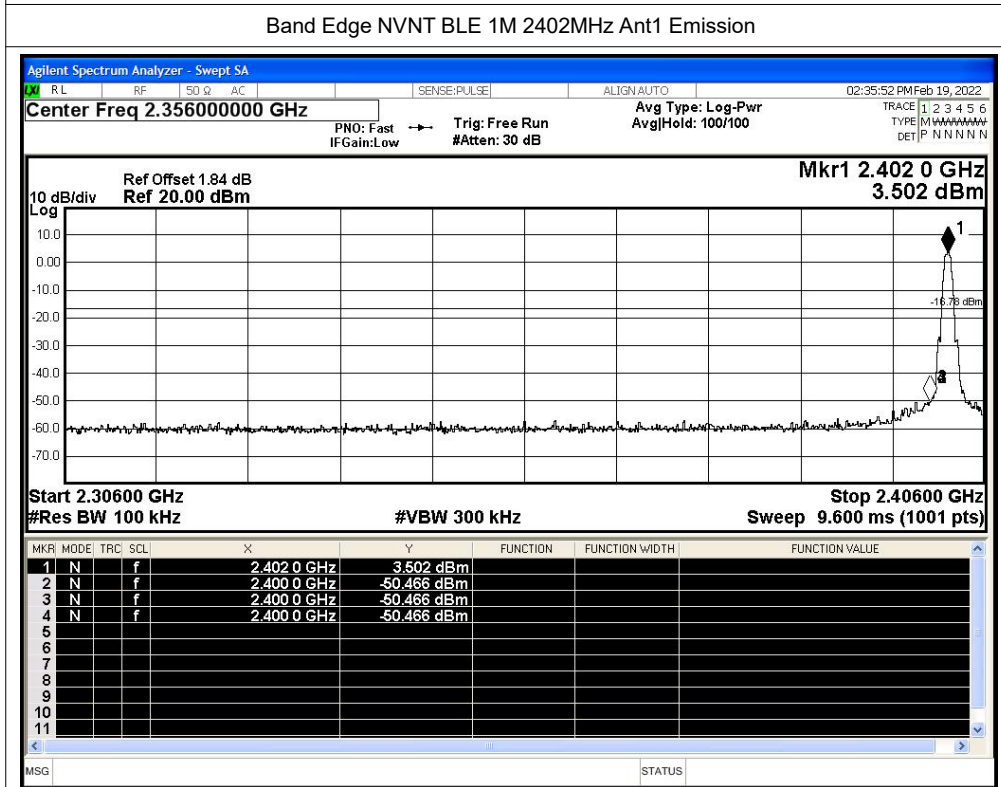
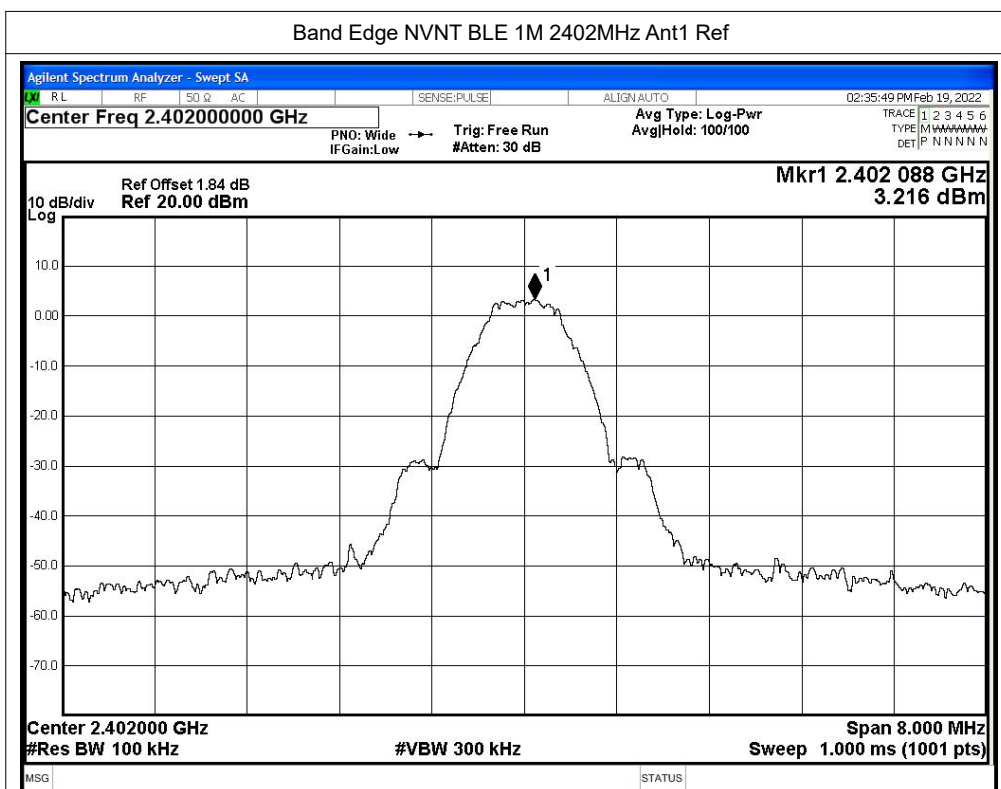


## Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



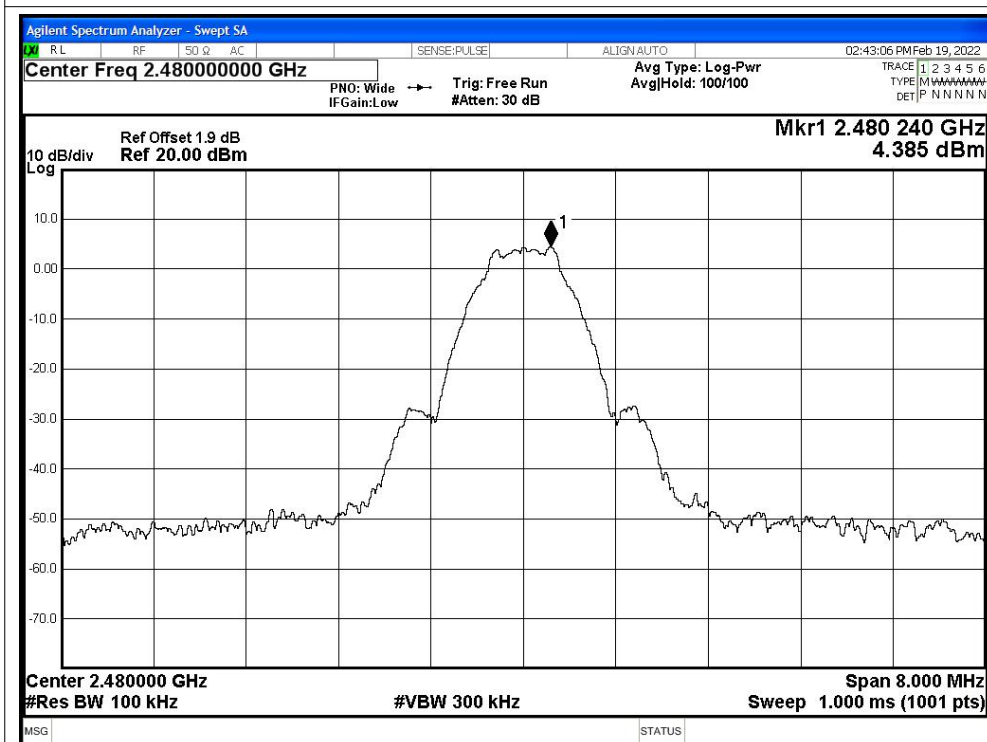
## Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



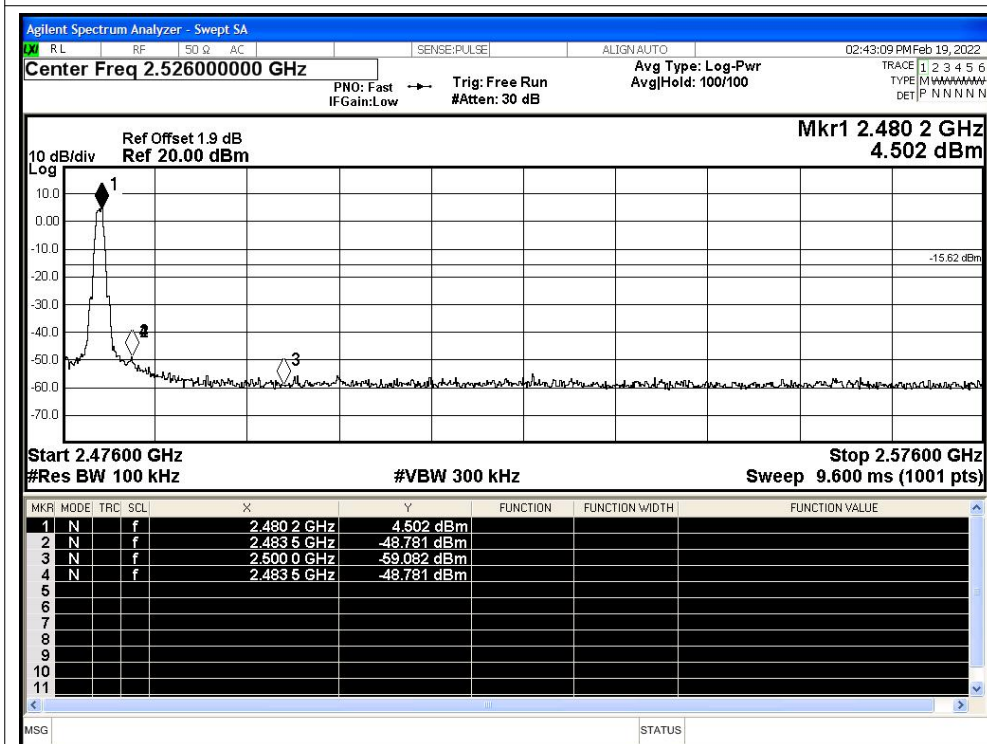




## Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



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





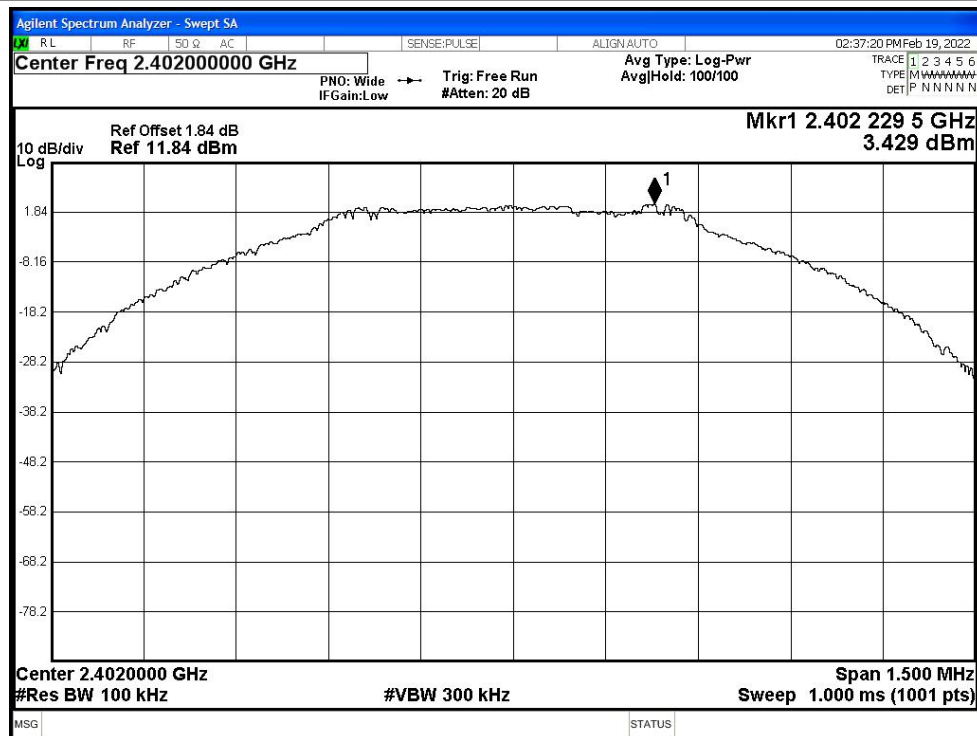
## A.6 Conducted RF Spurious Emission

| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -59.11          | -20         | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -58.41          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -55.65          | -20         | Pass    |

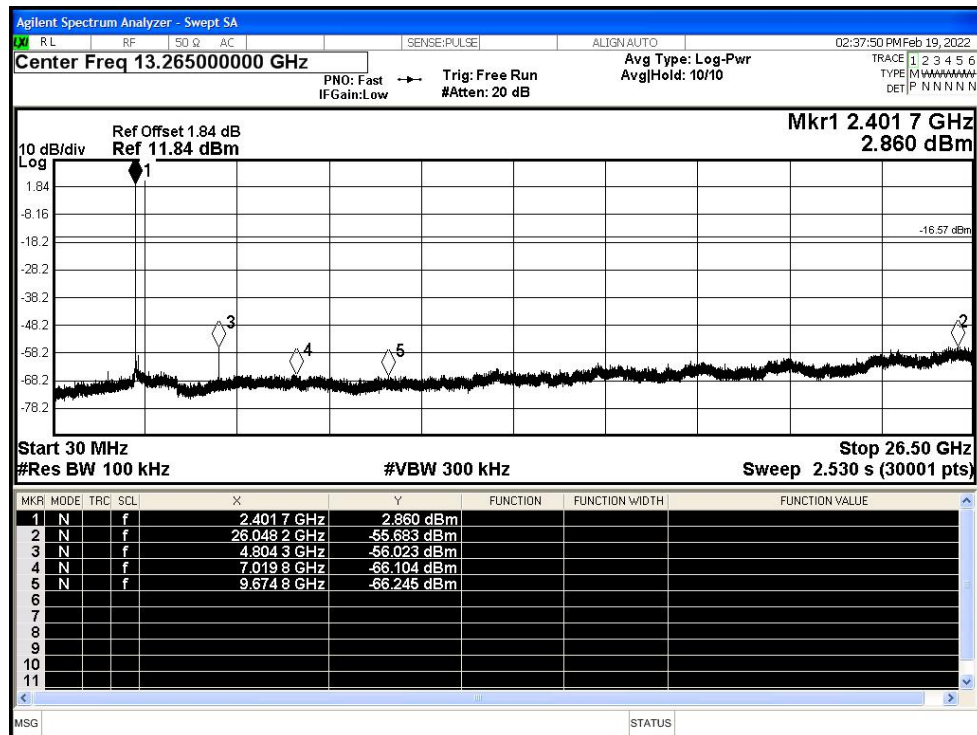


## Test Graphs

## Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref

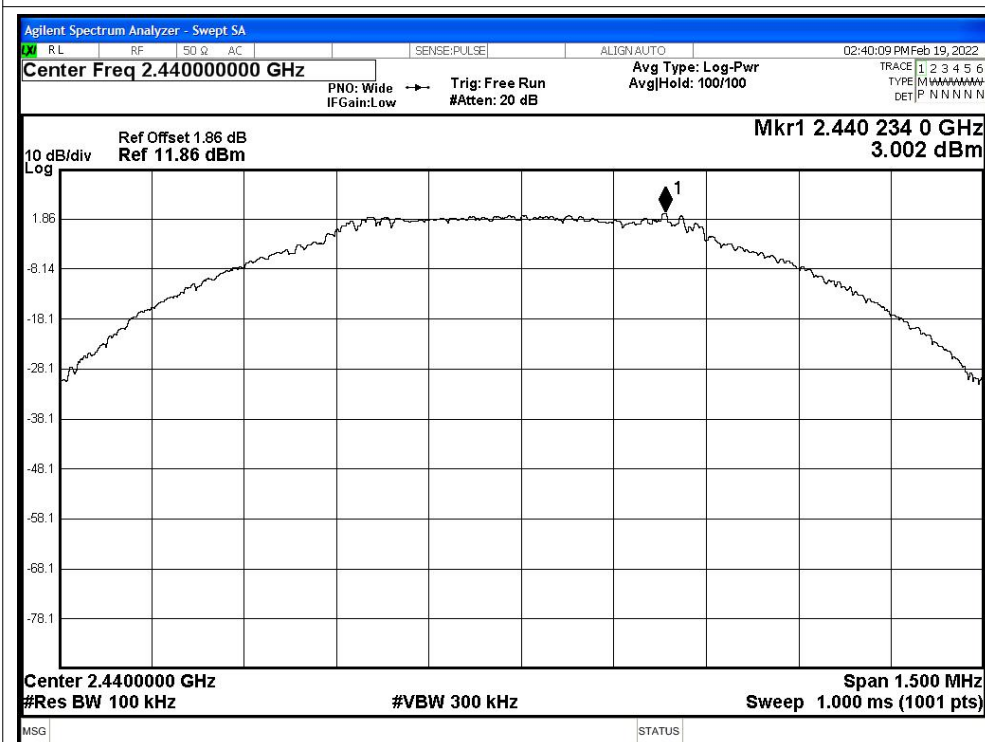


## Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

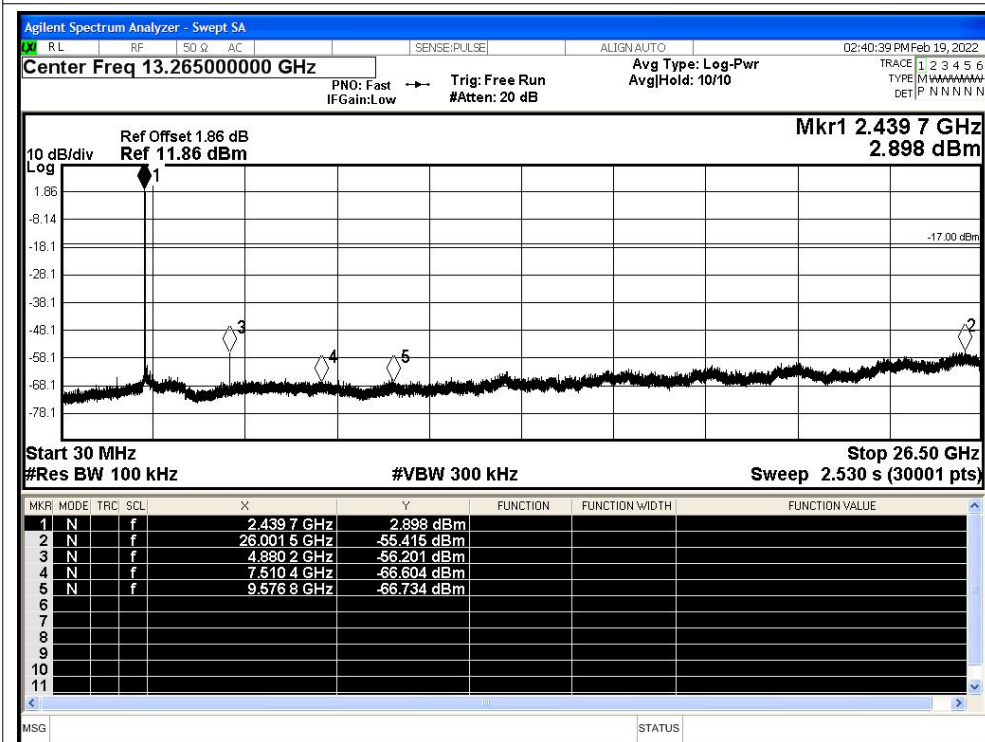




## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref

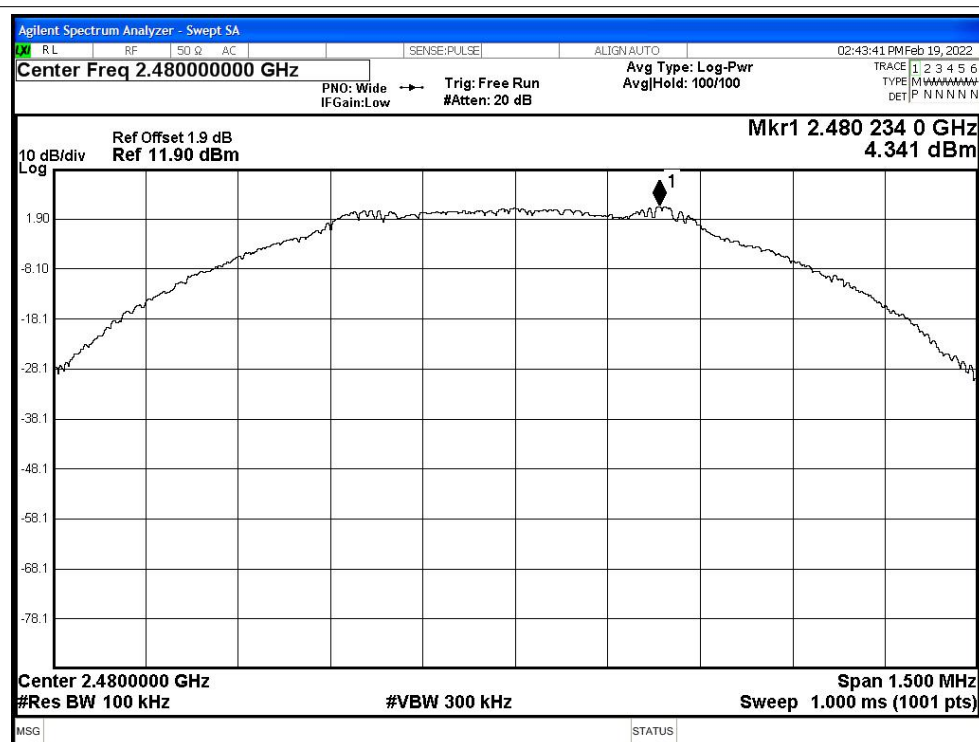


## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission

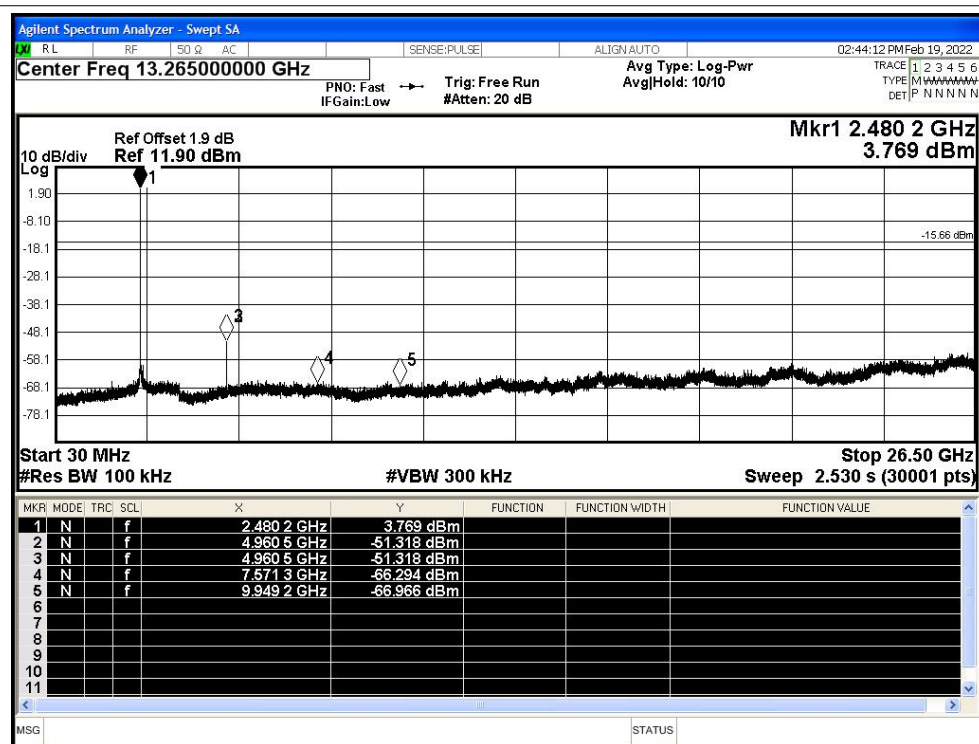




## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref

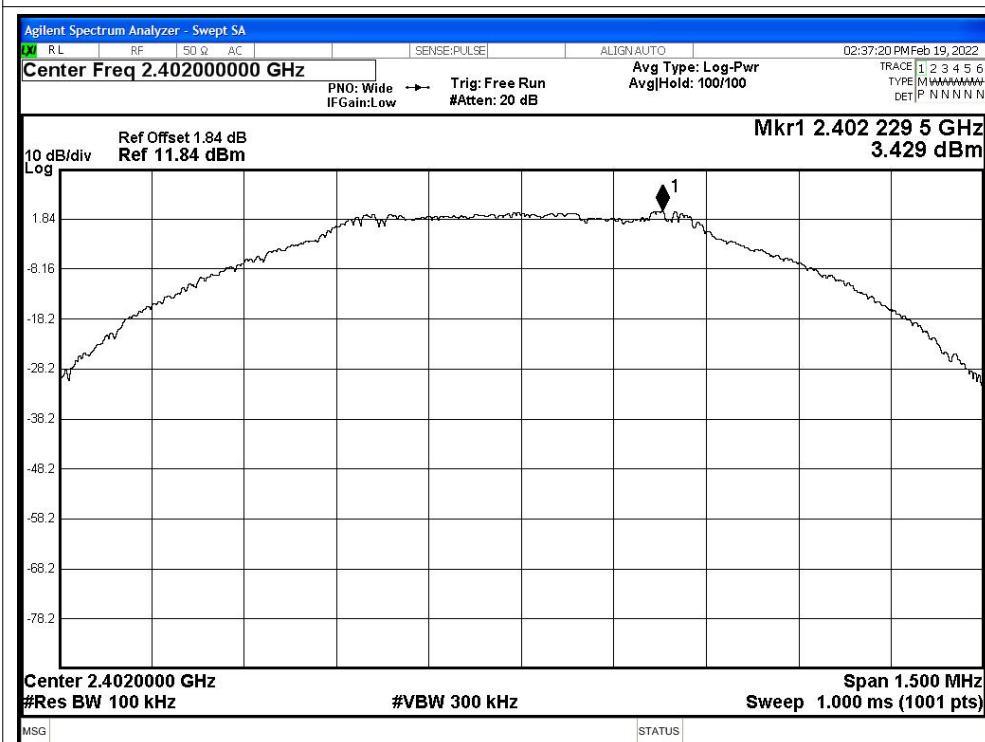


## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission

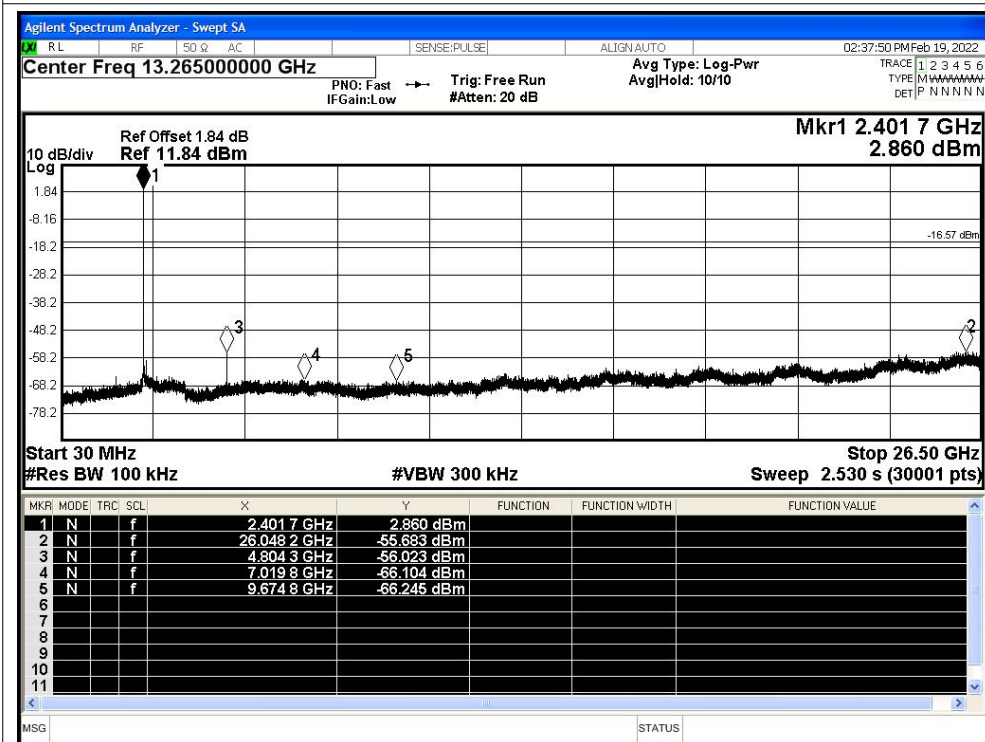




## Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref

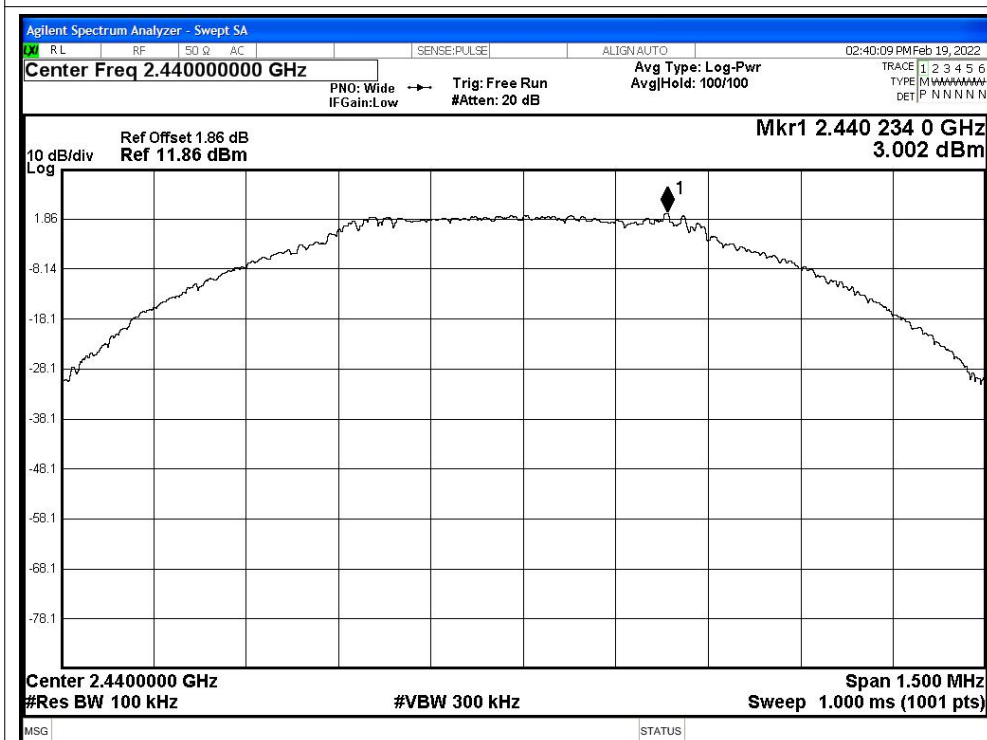


## Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

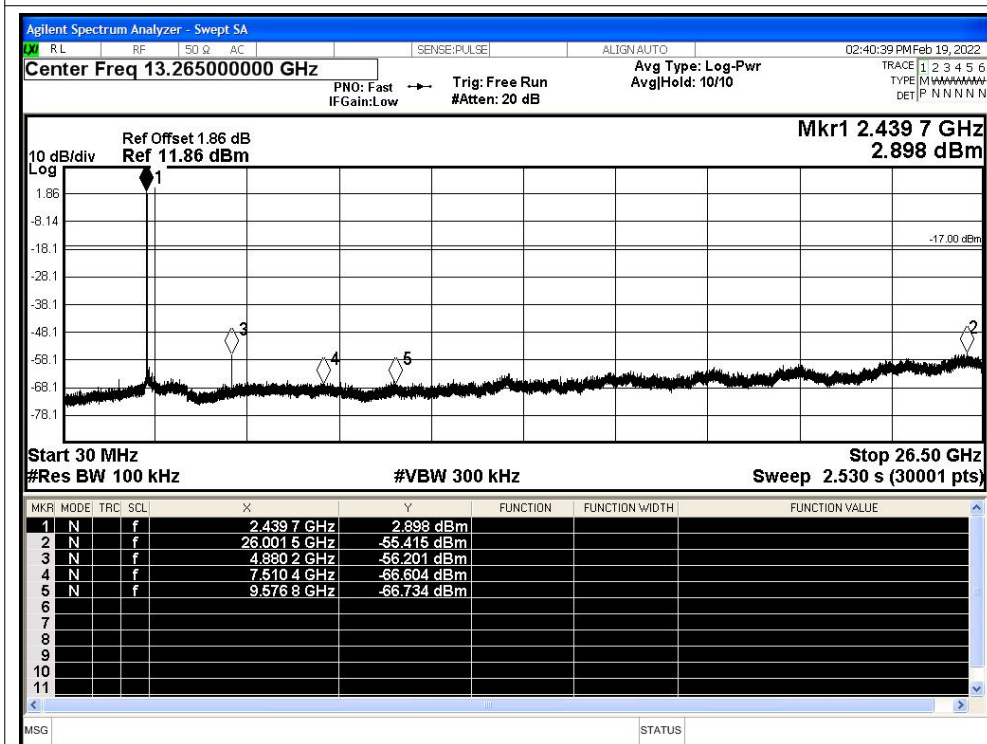




## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref

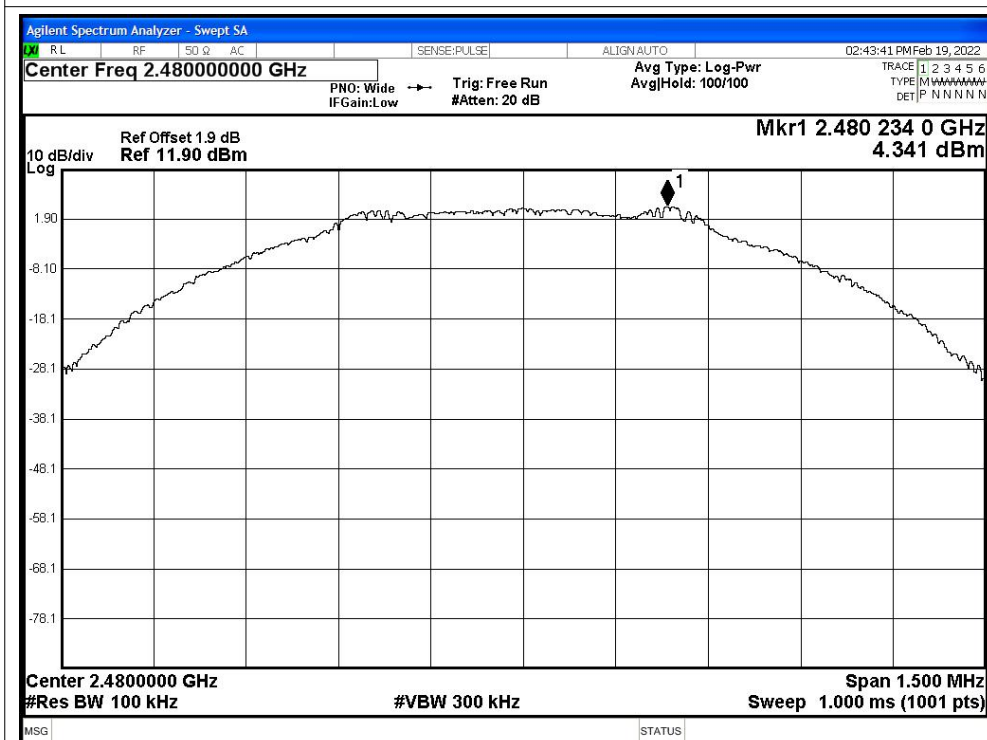


## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission

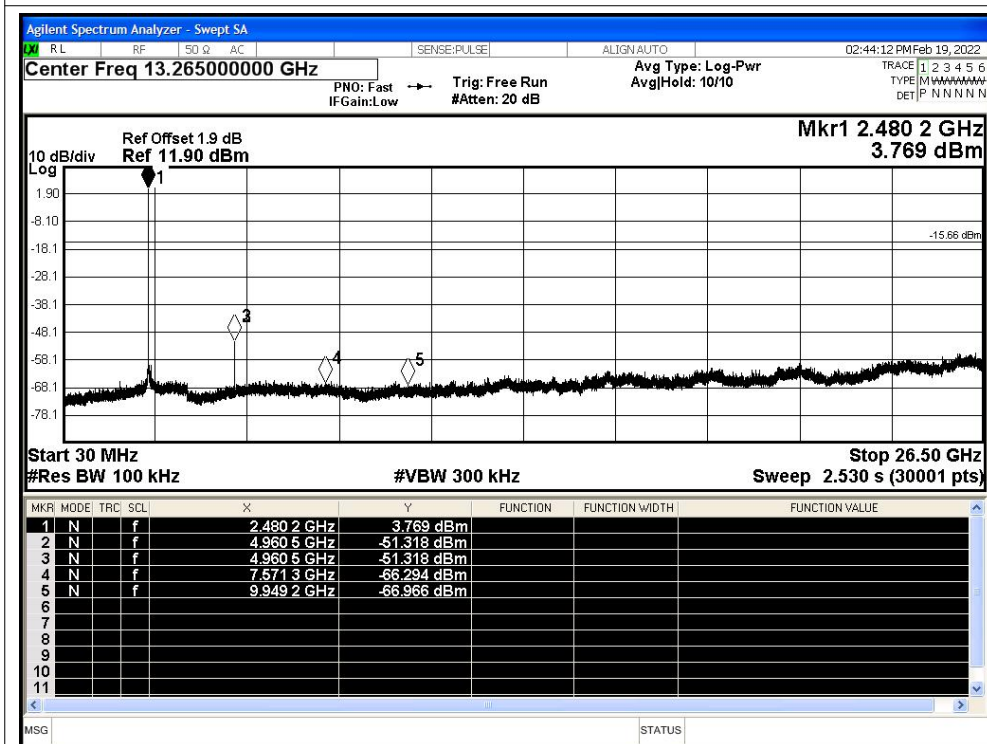




## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref

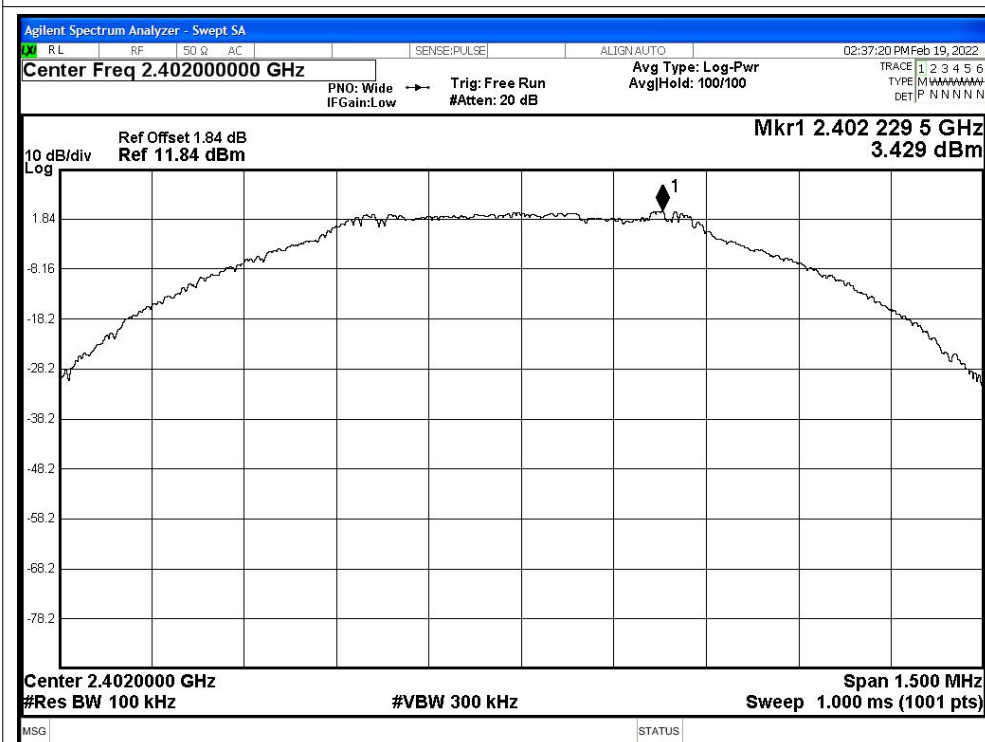


## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission

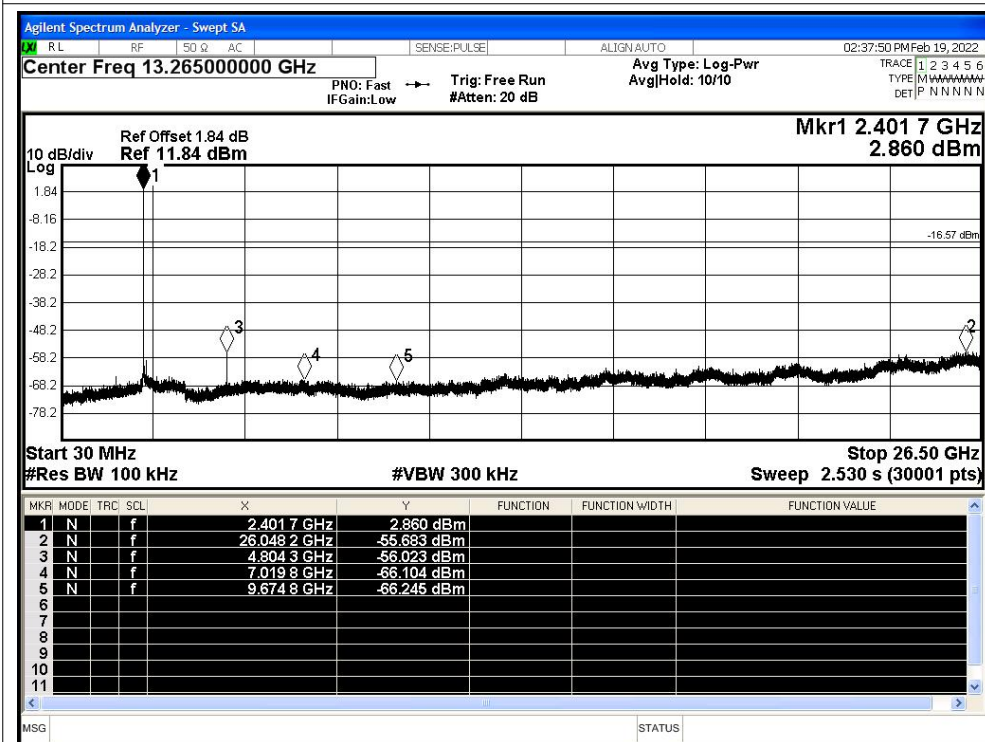




## Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref

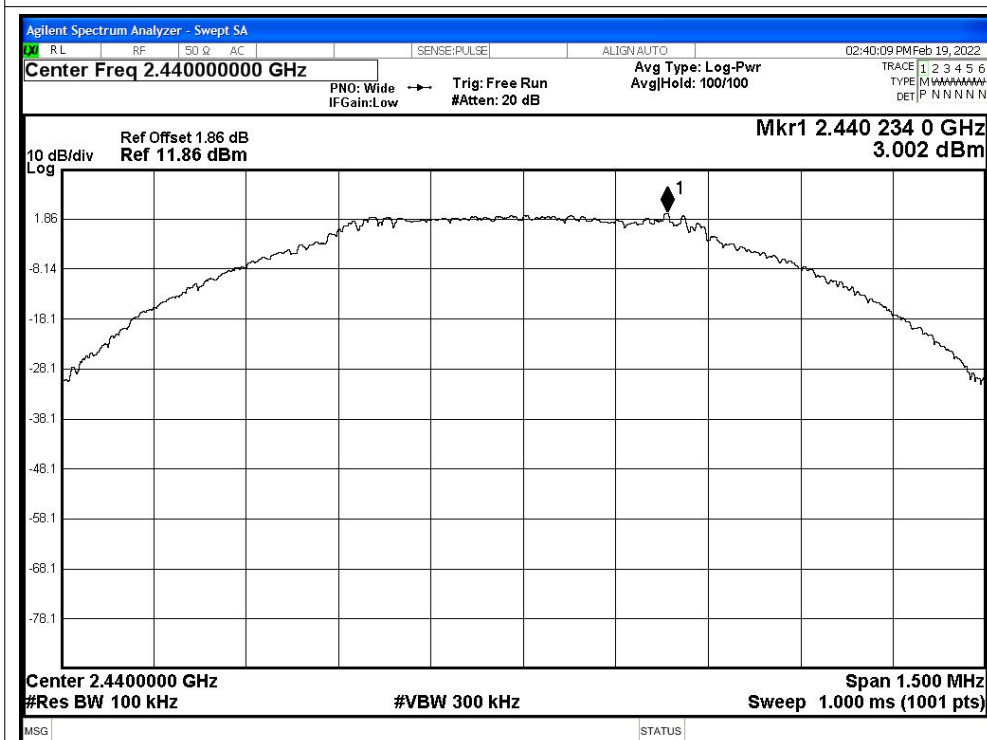


## Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

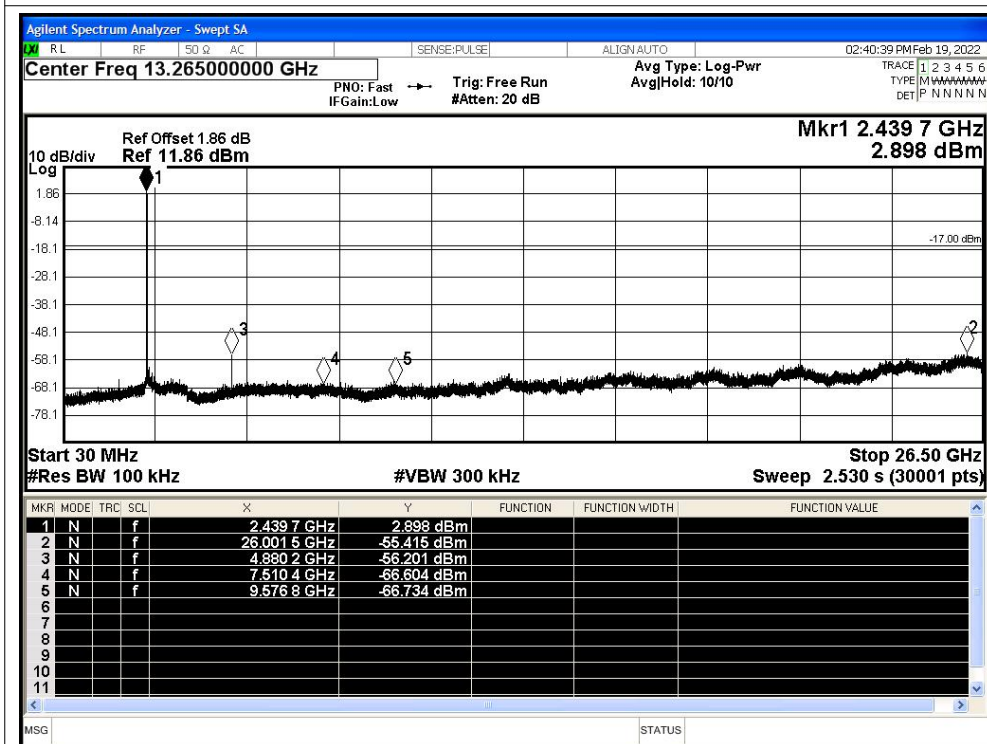




## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref

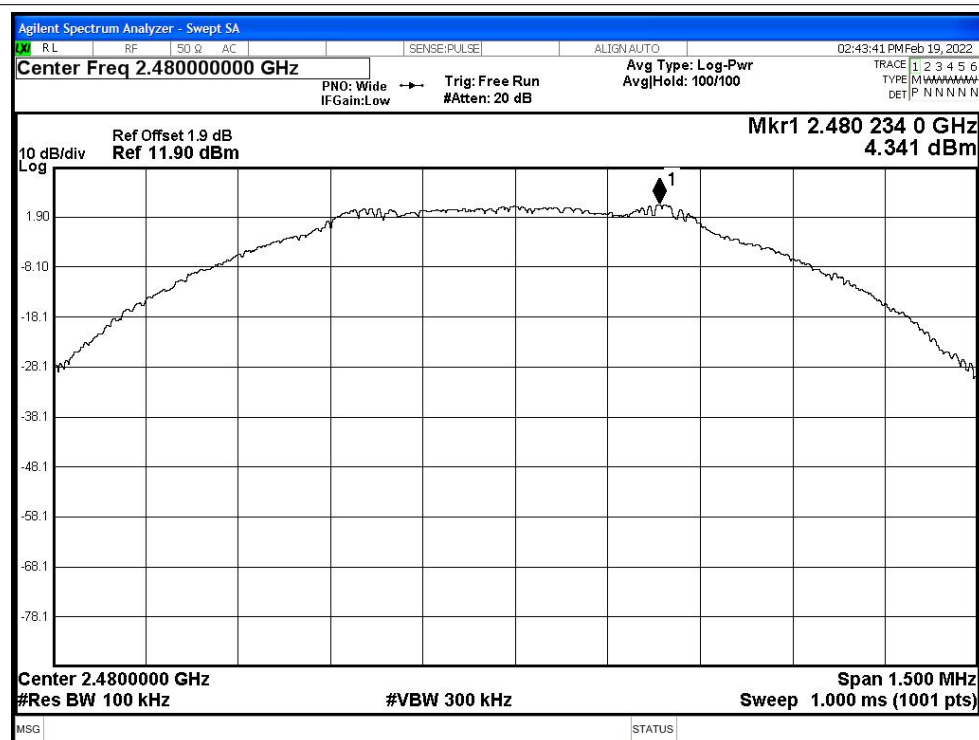


## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission

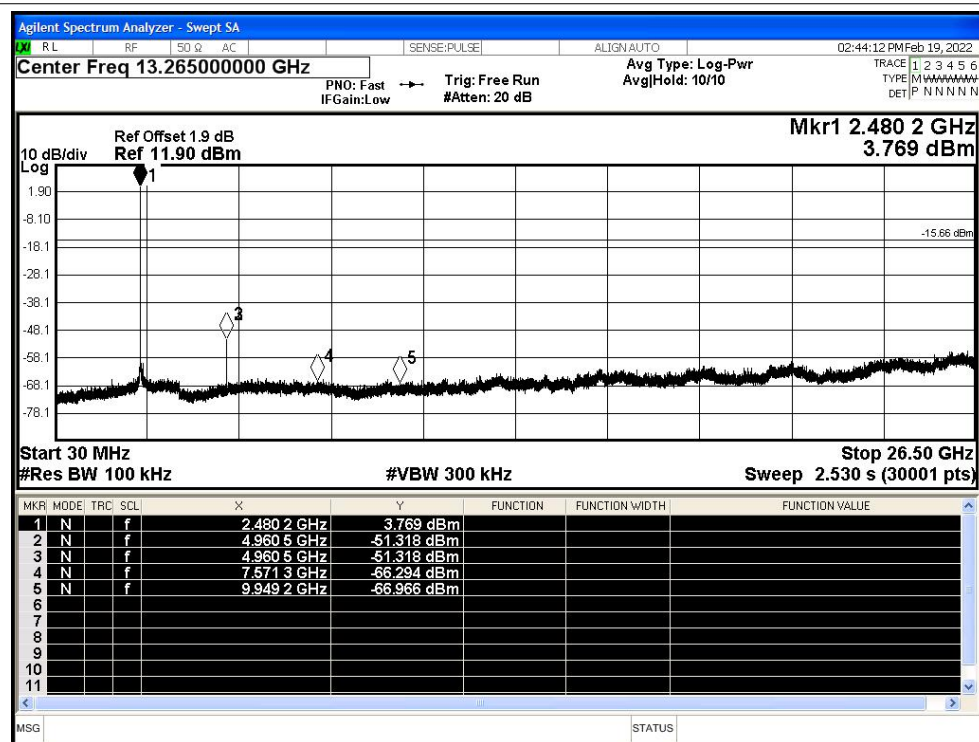




## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



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





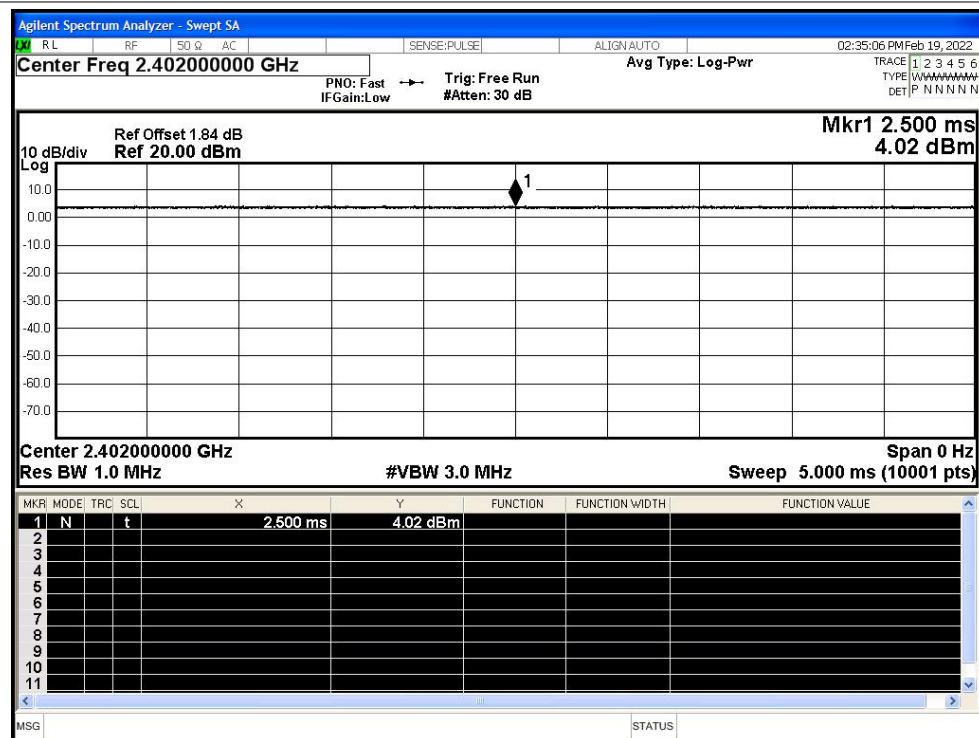
## A.7 Duty Cycle

| 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         |

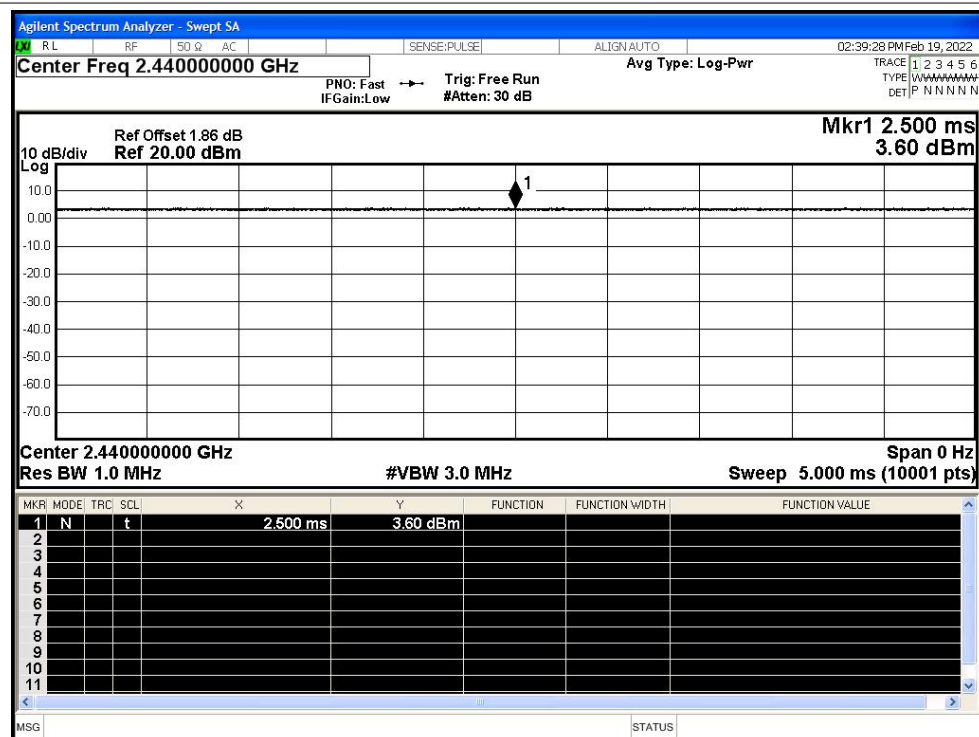


## Test Graphs

## Duty Cycle NVNT BLE 1M 2402MHz Ant1

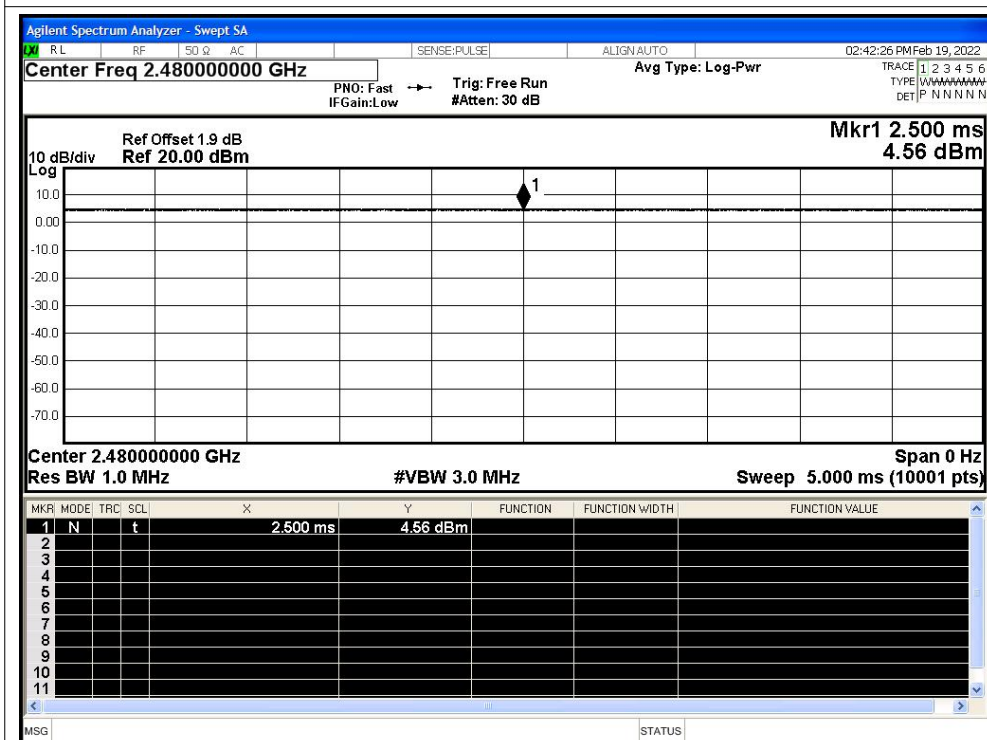


## Duty Cycle NVNT BLE 1M 2440MHz Ant1

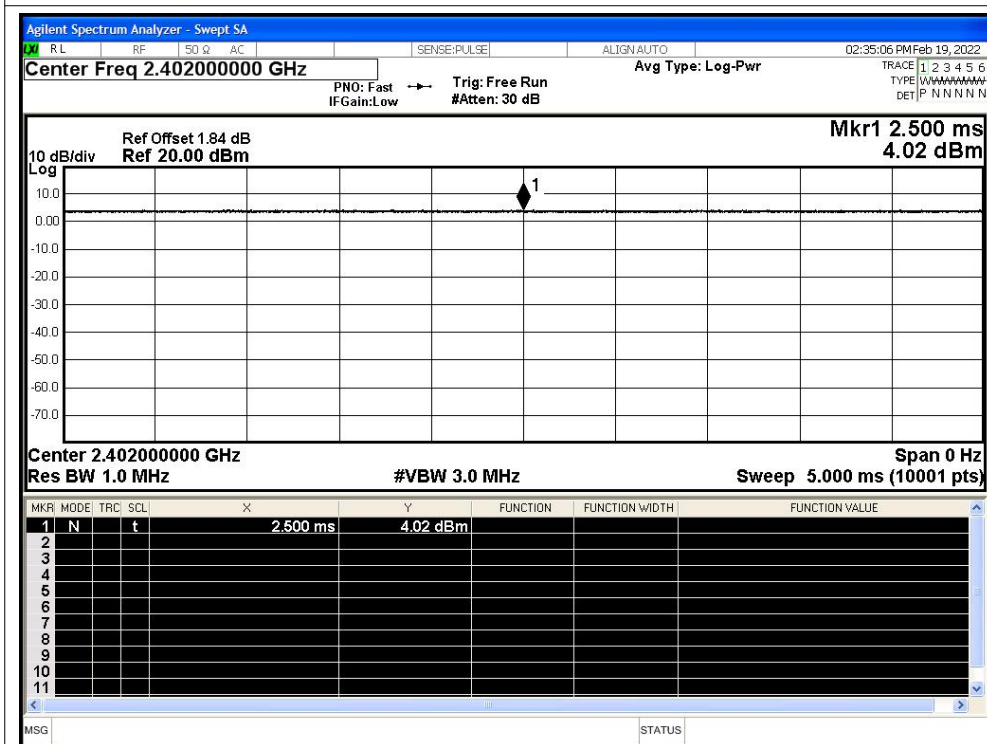




## Duty Cycle NVNT BLE 1M 2480MHz Ant1

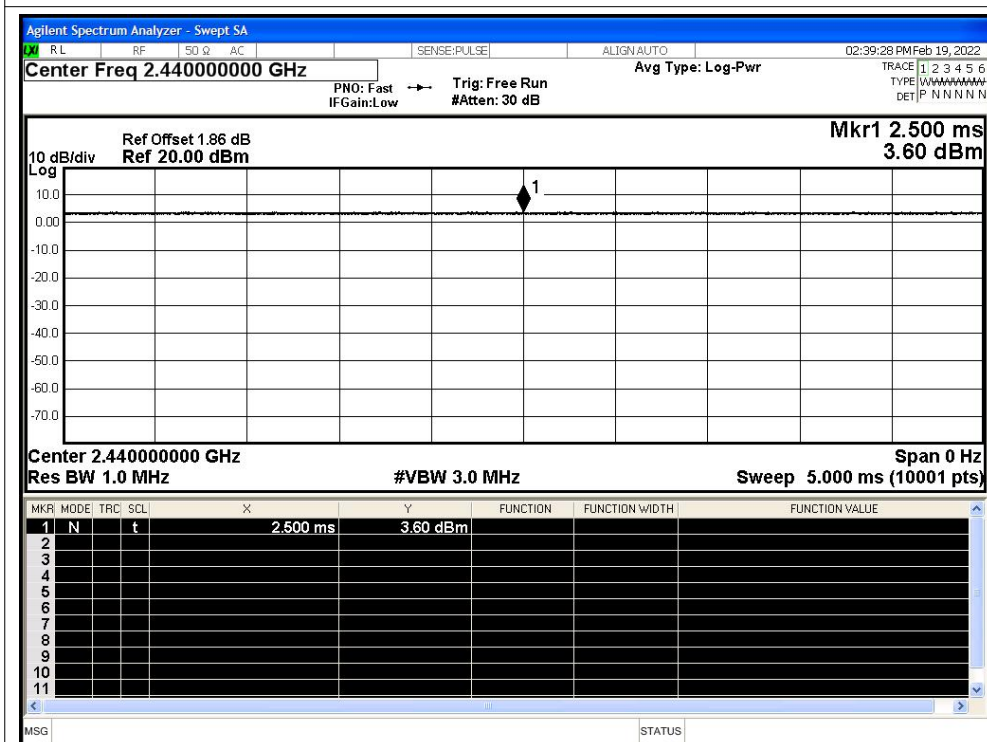


## Duty Cycle NVNT BLE 1M 2402MHz Ant1

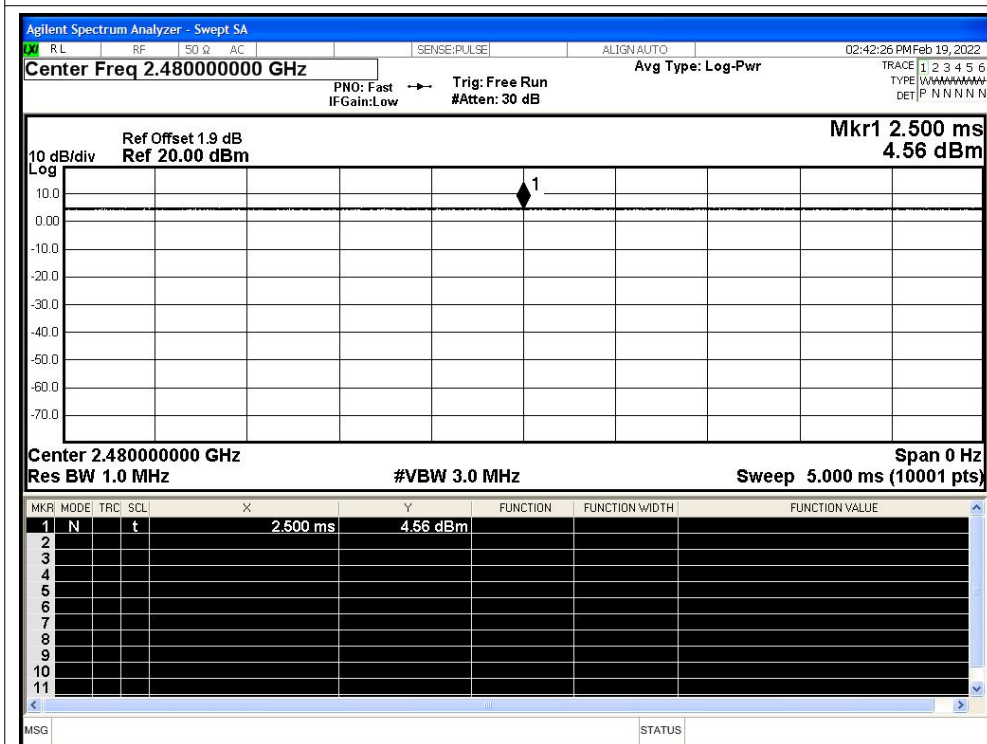




## Duty Cycle NVNT BLE 1M 2440MHz Ant1

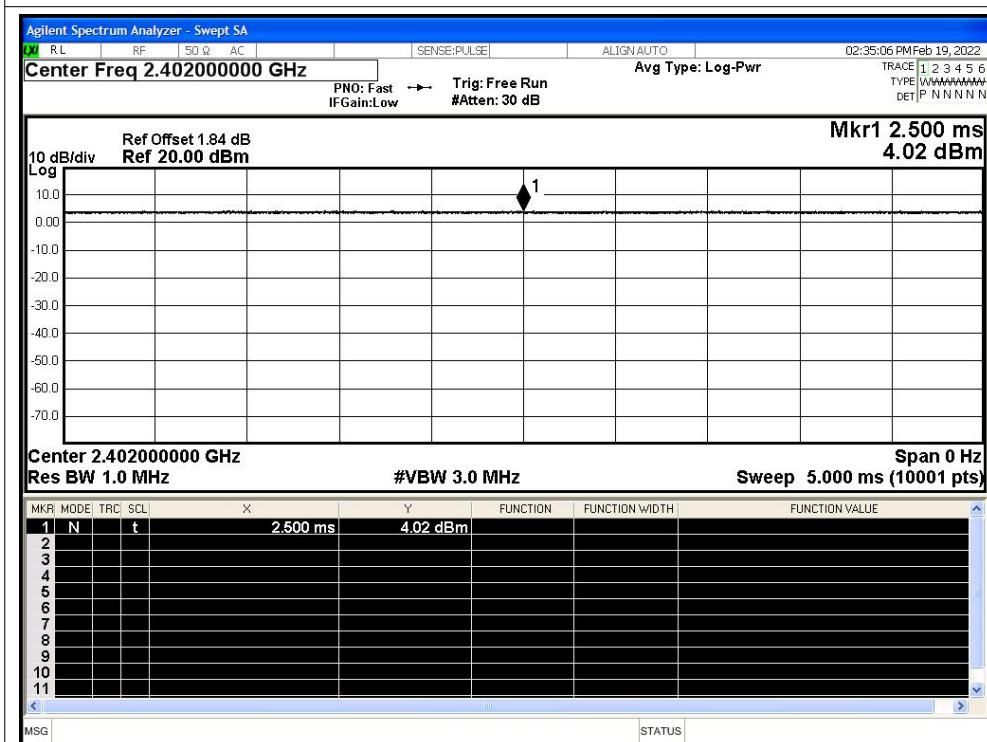


## Duty Cycle NVNT BLE 1M 2480MHz Ant1

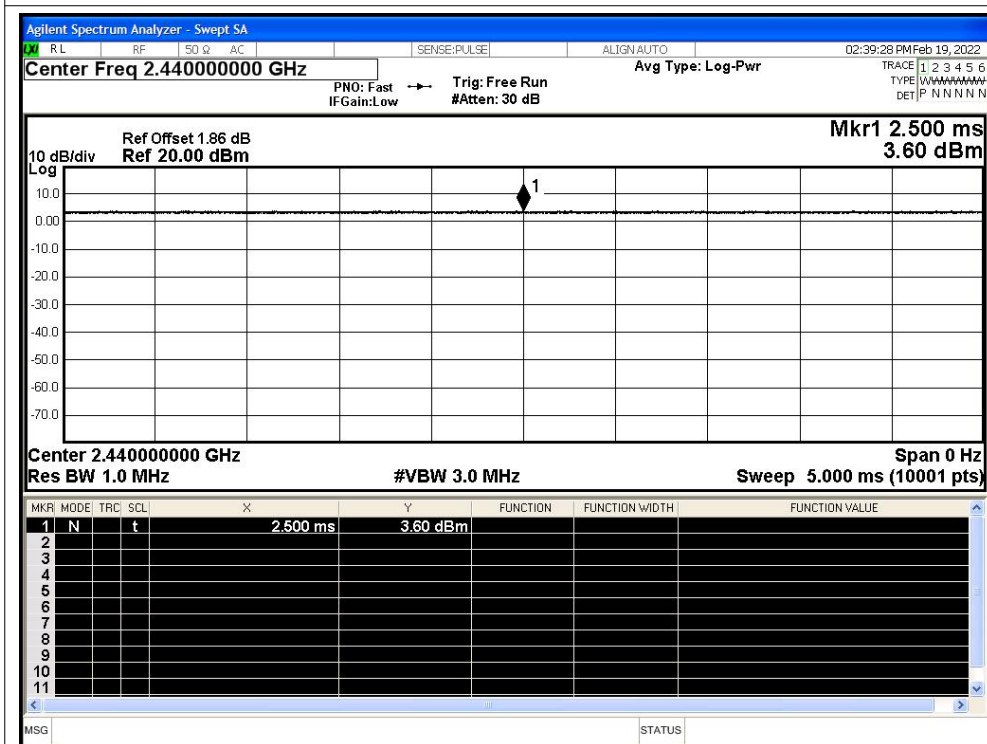


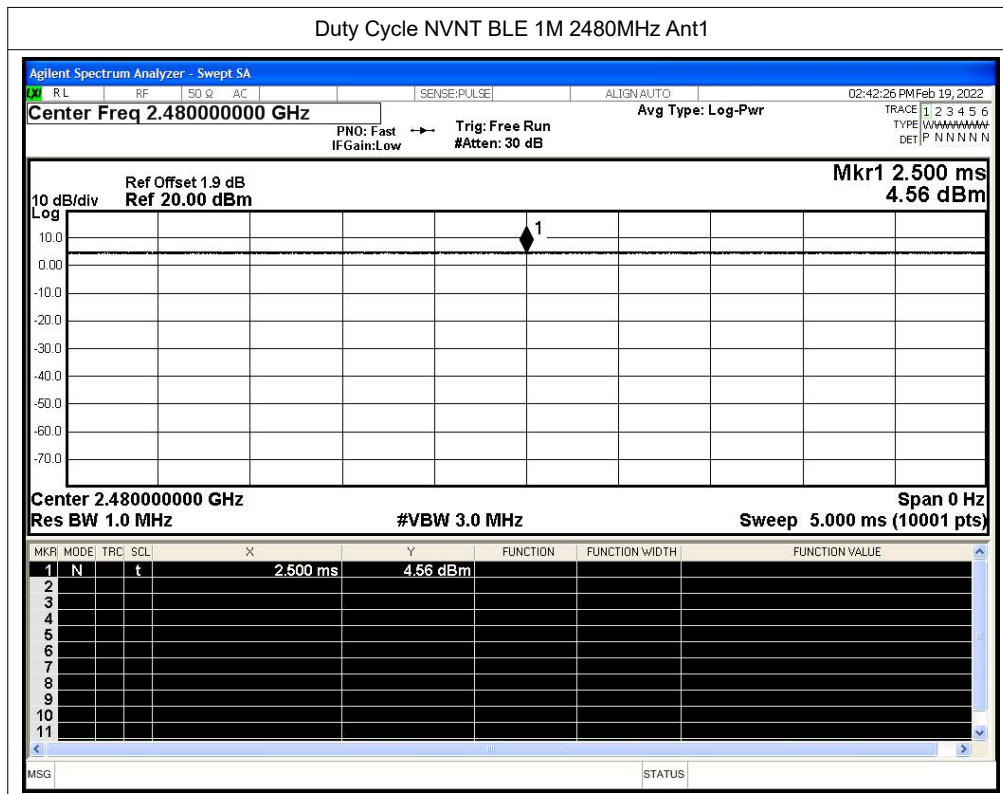


## Duty Cycle NVNT BLE 1M 2402MHz Ant1



## Duty Cycle NVNT BLE 1M 2440MHz Ant1







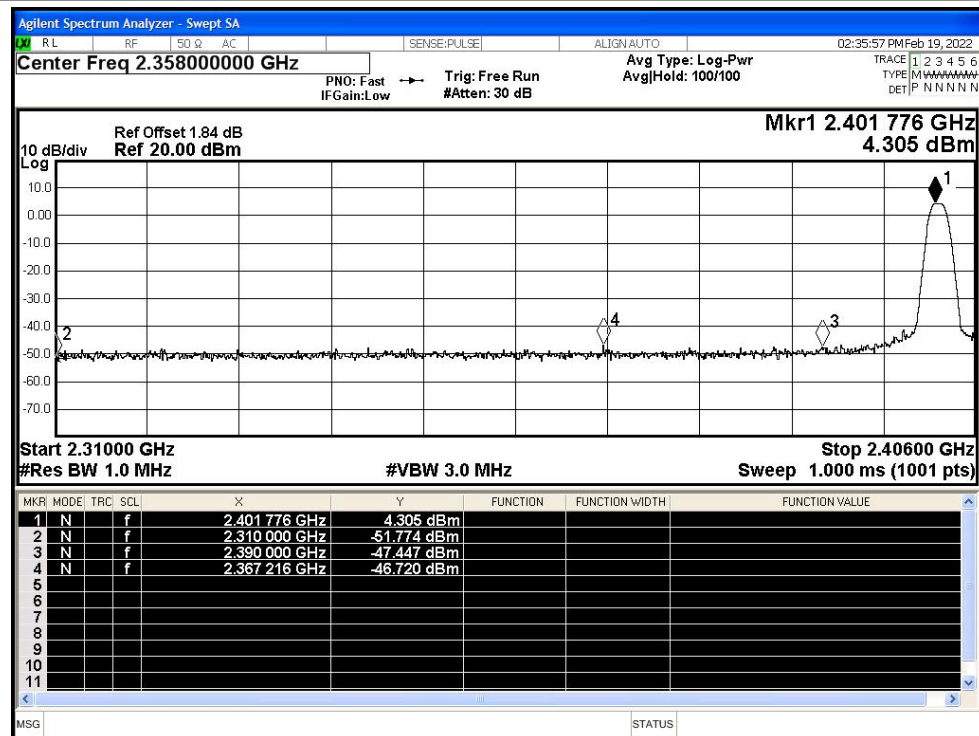
## A.8 Restrict Band

| 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            | -51.77      | 2          | 45.49      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -60.81      | 2          | 36.45      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2367.216        | -46.71      | 2          | 50.55      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2389.776        | -59.43      | 2          | 37.83      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -48.57      | 2          | 48.69      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -59.44      | 2          | 37.82      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -40.91      | 2          | 56.35      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -51.53      | 2          | 45.73      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.512        | -40.91      | 2          | 56.35      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.512        | -51.53      | 2          | 45.73      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -48.4       | 2          | 48.86      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -59.04      | 2          | 38.22      | Average  | 54             | Pass    |

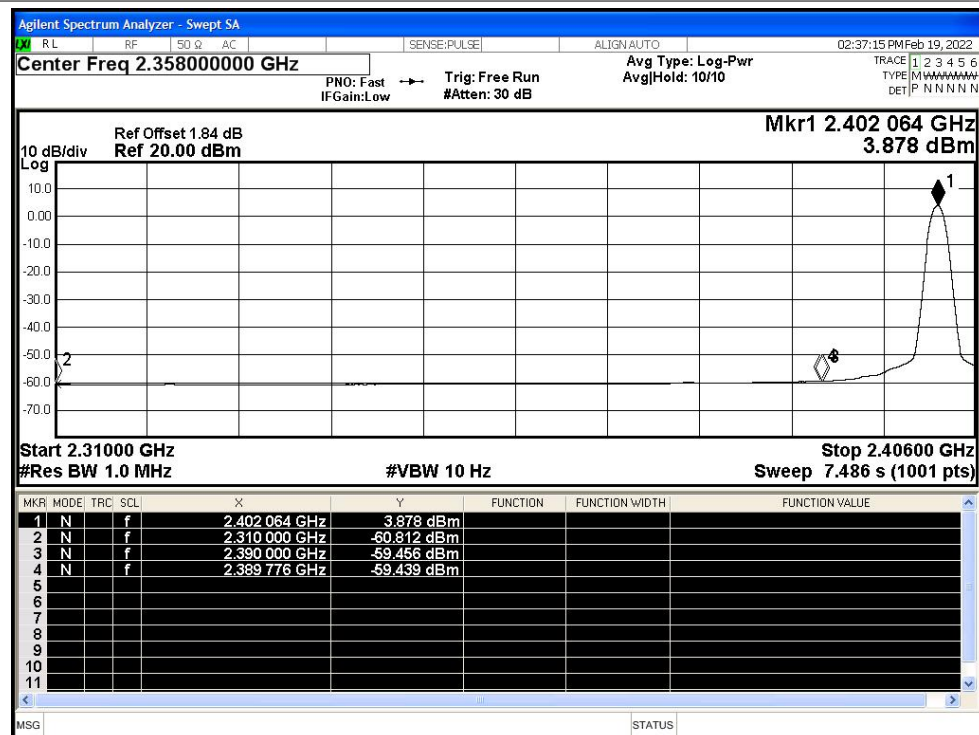


## Test Graphs

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

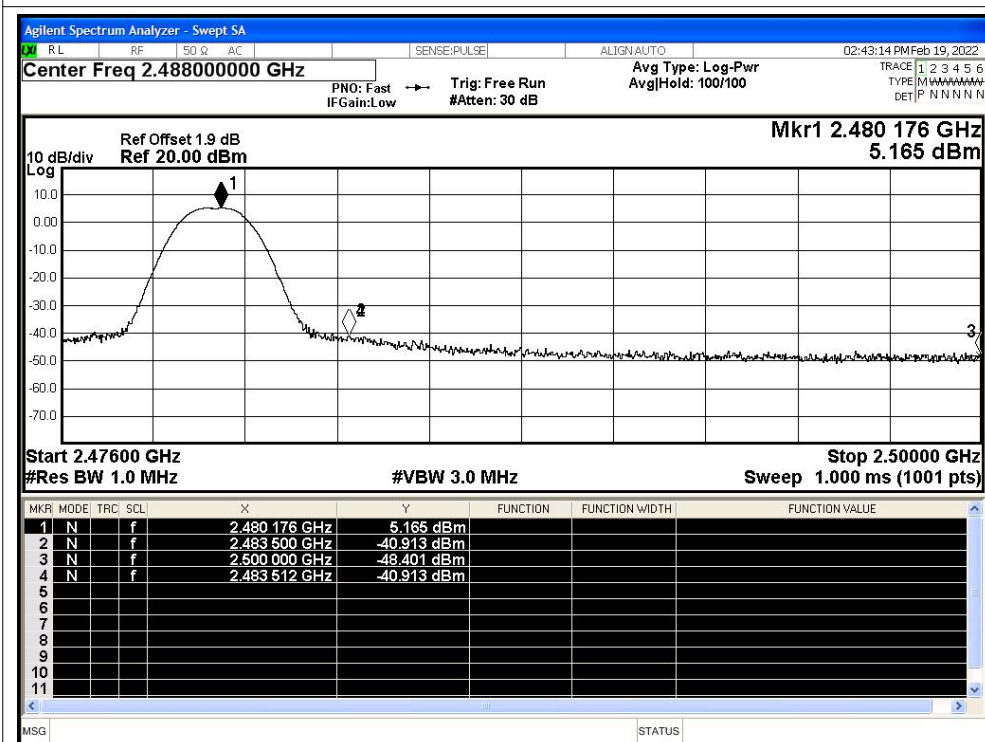


## Restrict Band NVNT BLE 1M 2402MHz Ant1 Average

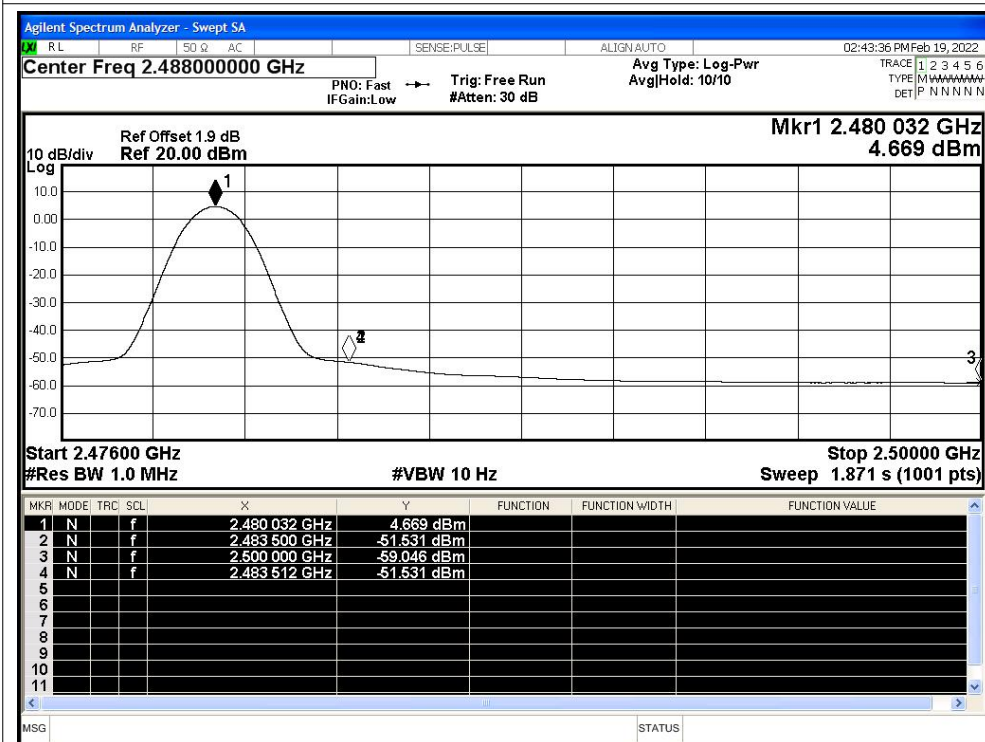




## Restrict Band NVNT BLE 1M 2480MHz Ant1 Peak

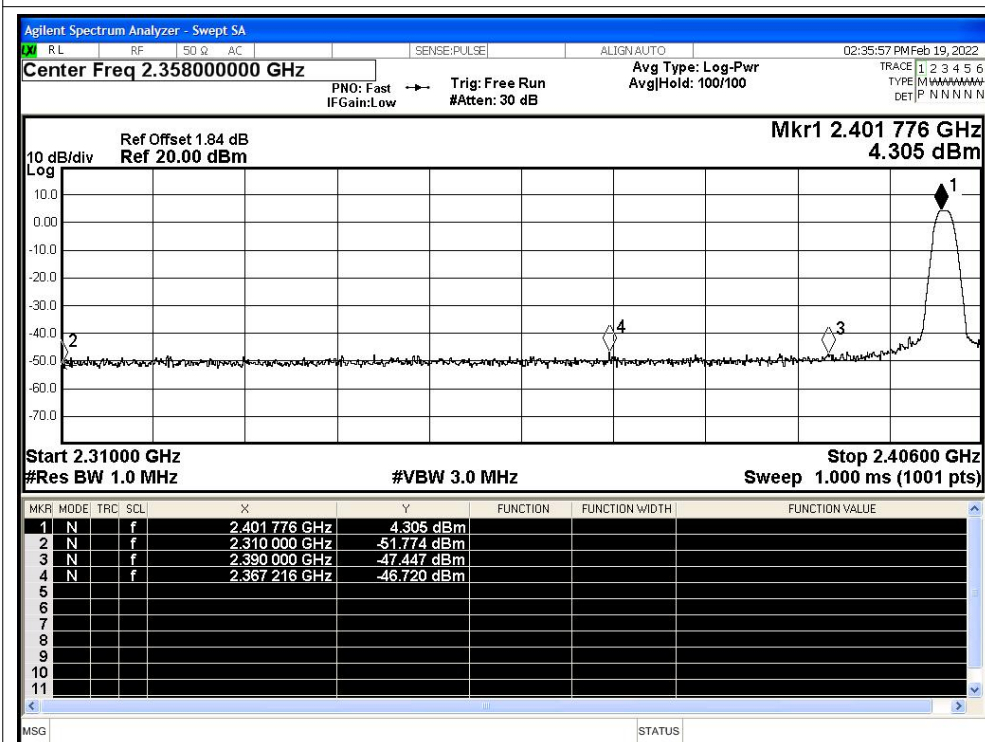


## Restrict Band NVNT BLE 1M 2480MHz Ant1 Average

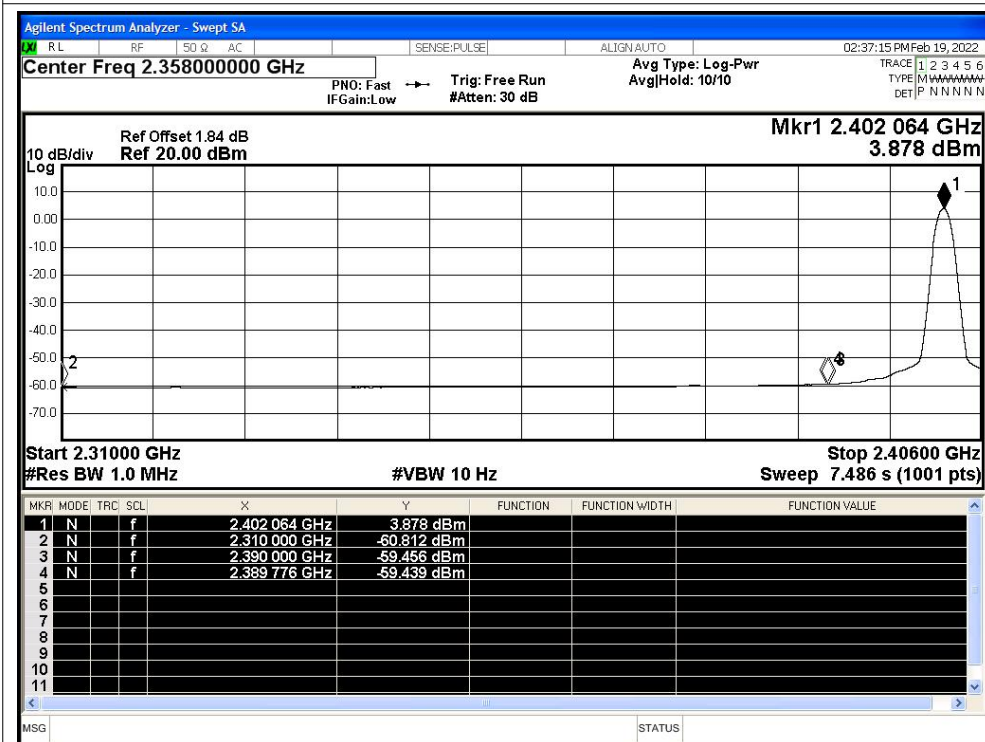




## Restrict Band NVNT BLE 1M 2402MHz Ant1 Peak

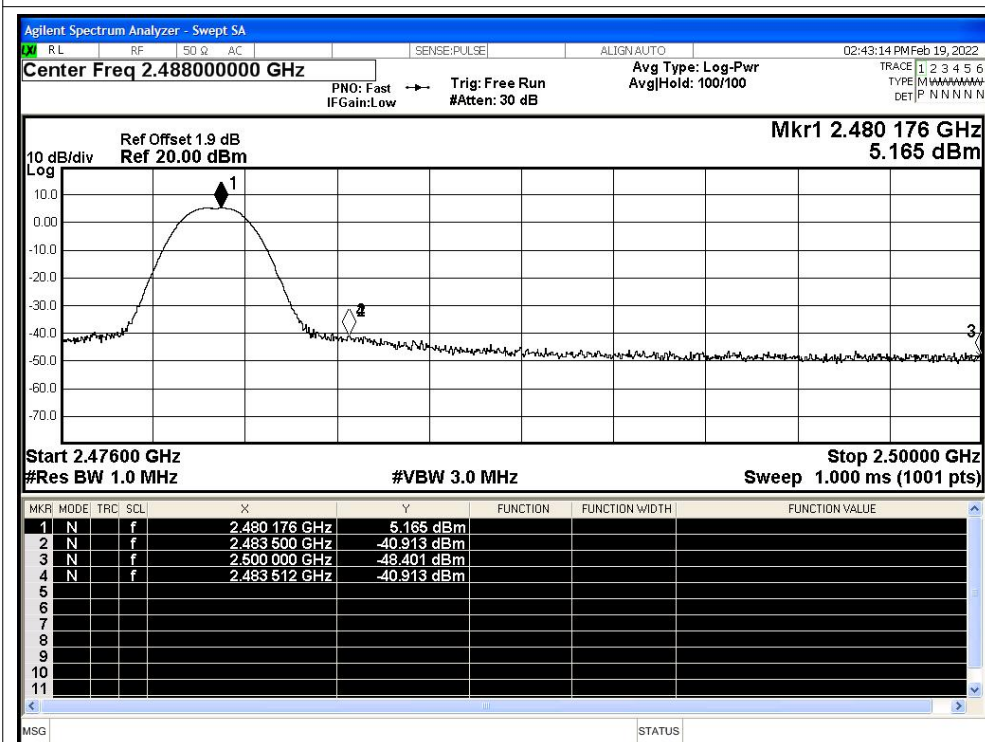


## Restrict Band NVNT BLE 1M 2402MHz Ant1 Average

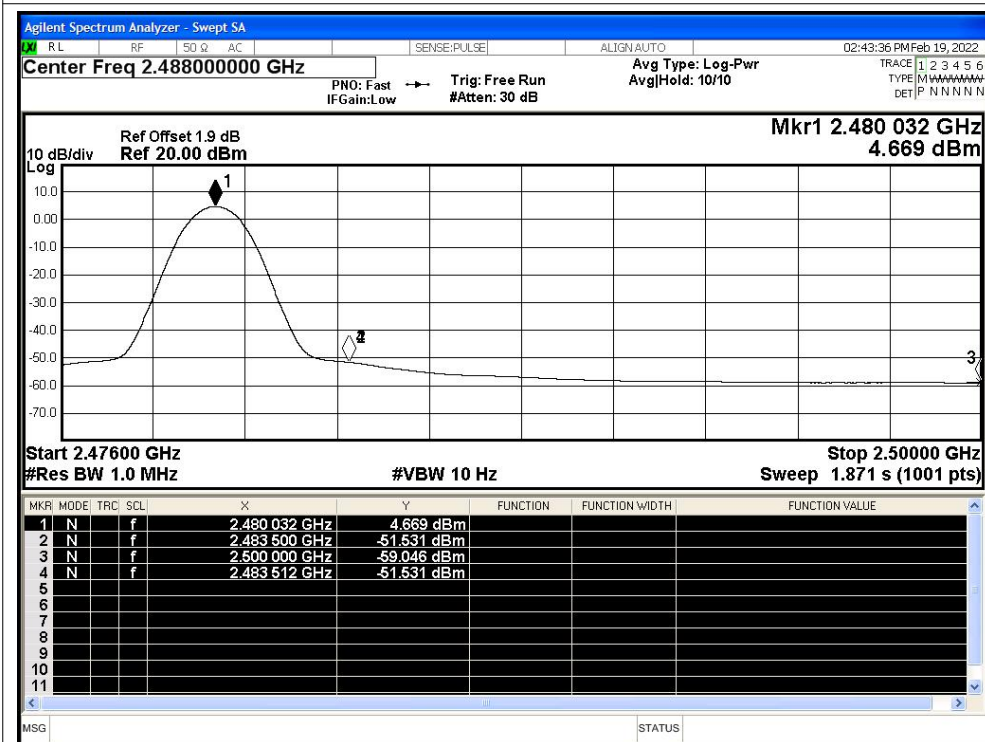




## Restrict Band NVNT BLE 1M 2480MHz Ant1 Peak

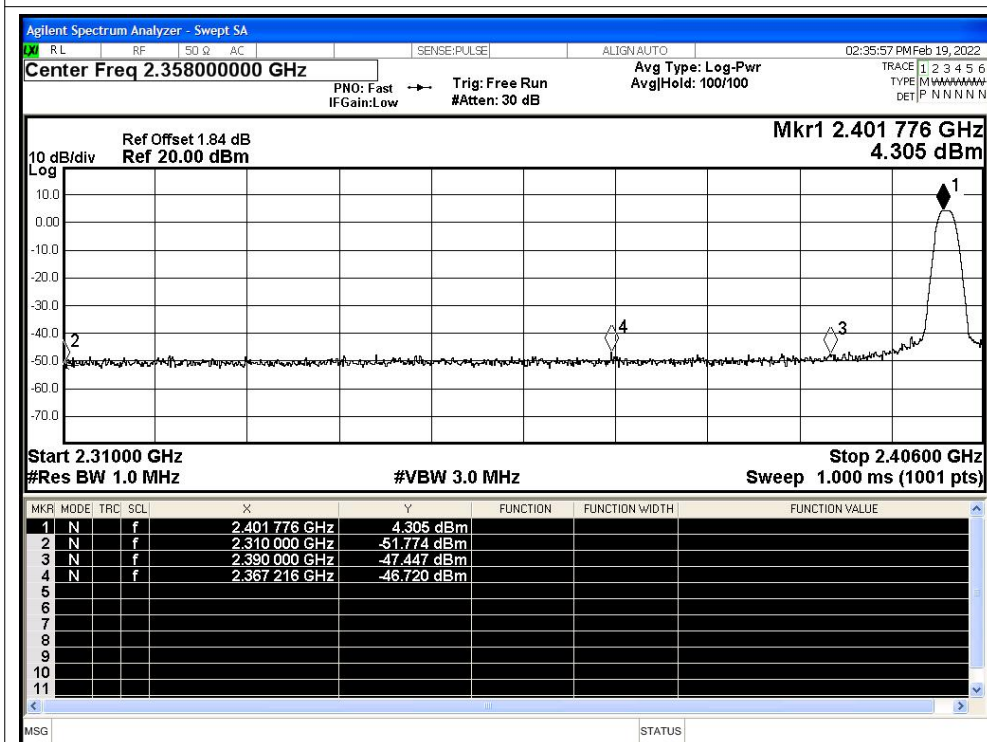


## Restrict Band NVNT BLE 1M 2480MHz Ant1 Average

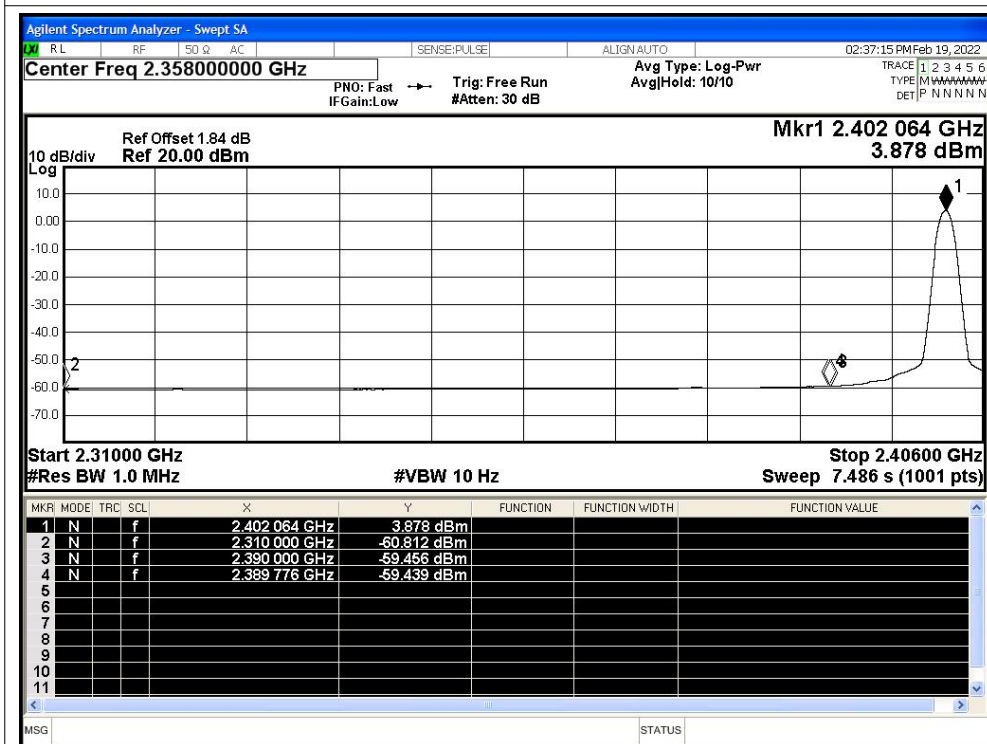




## Restrict Band NVNT BLE 1M 2402MHz Ant1 Peak

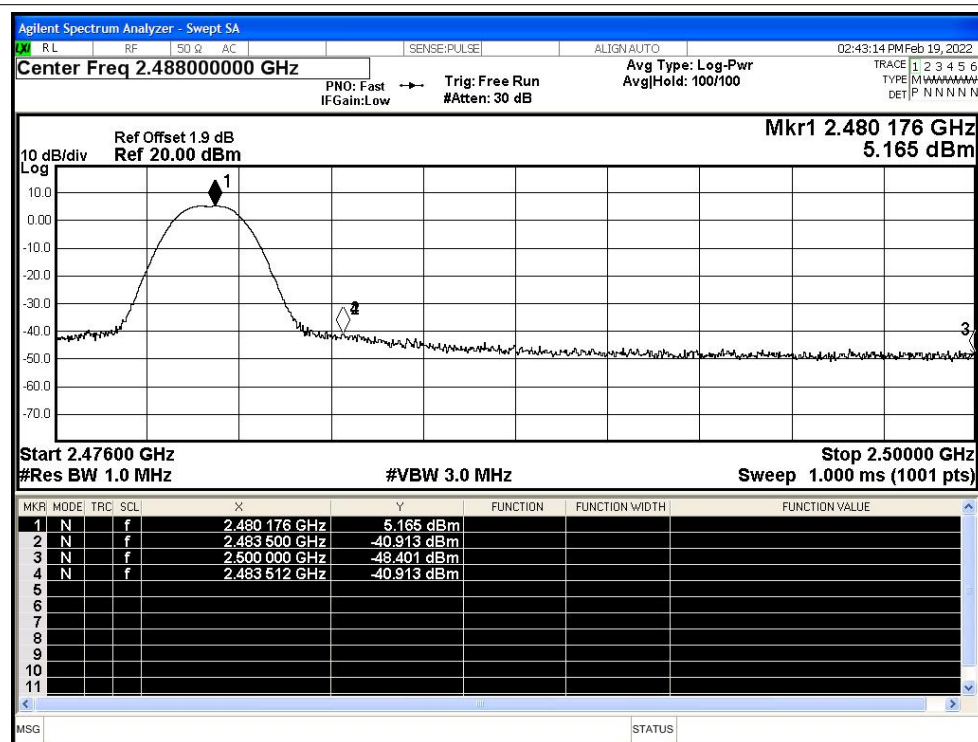


## Restrict Band NVNT BLE 1M 2402MHz Ant1 Average





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



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

