



## Appendix A

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

Product Name: Wireless tag

Test Model: AUTHOR KEYFOB

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23.8°C    |
| Relative Humidity: | 52.1%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Jerry Chu |
| 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    | 0.662                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 0.656                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 0.661                 | $\geq 0.5$                  | Pass    |

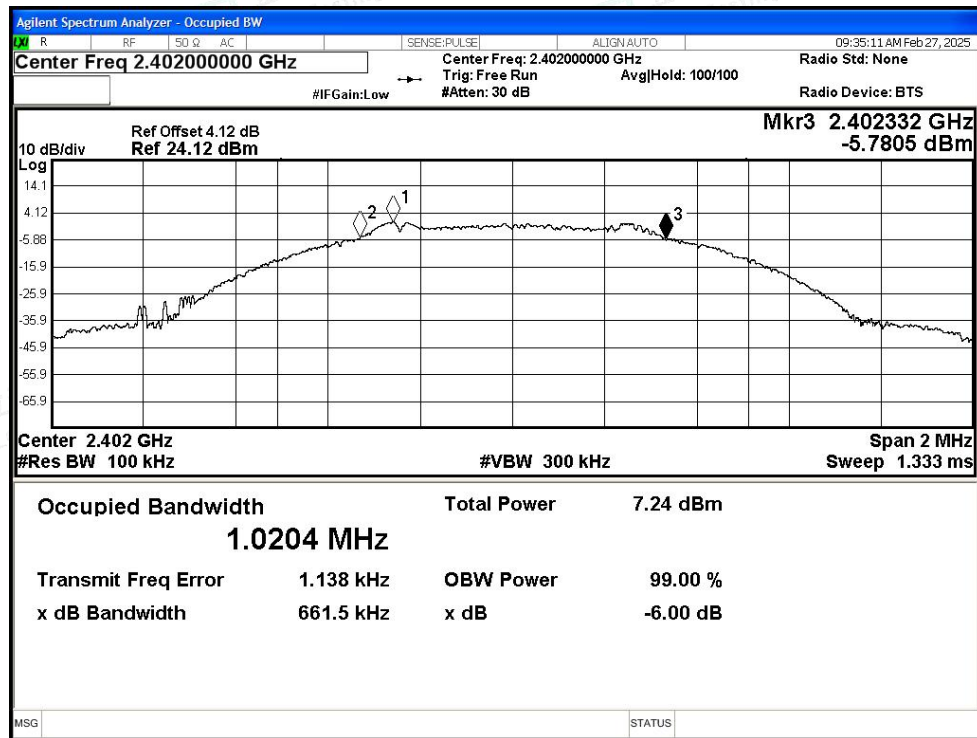


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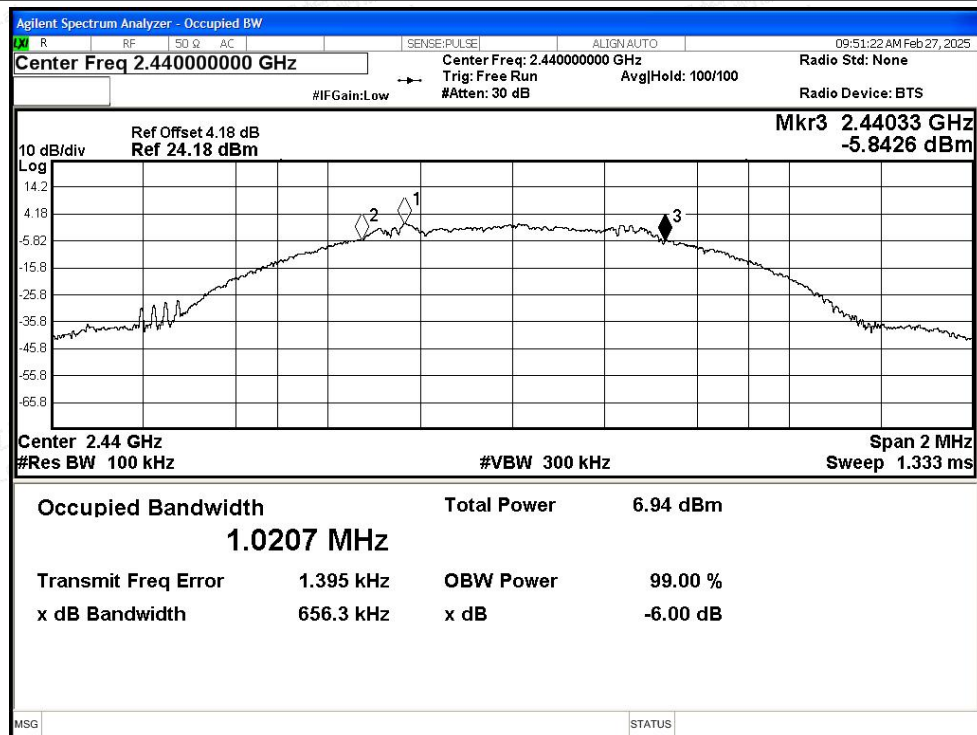


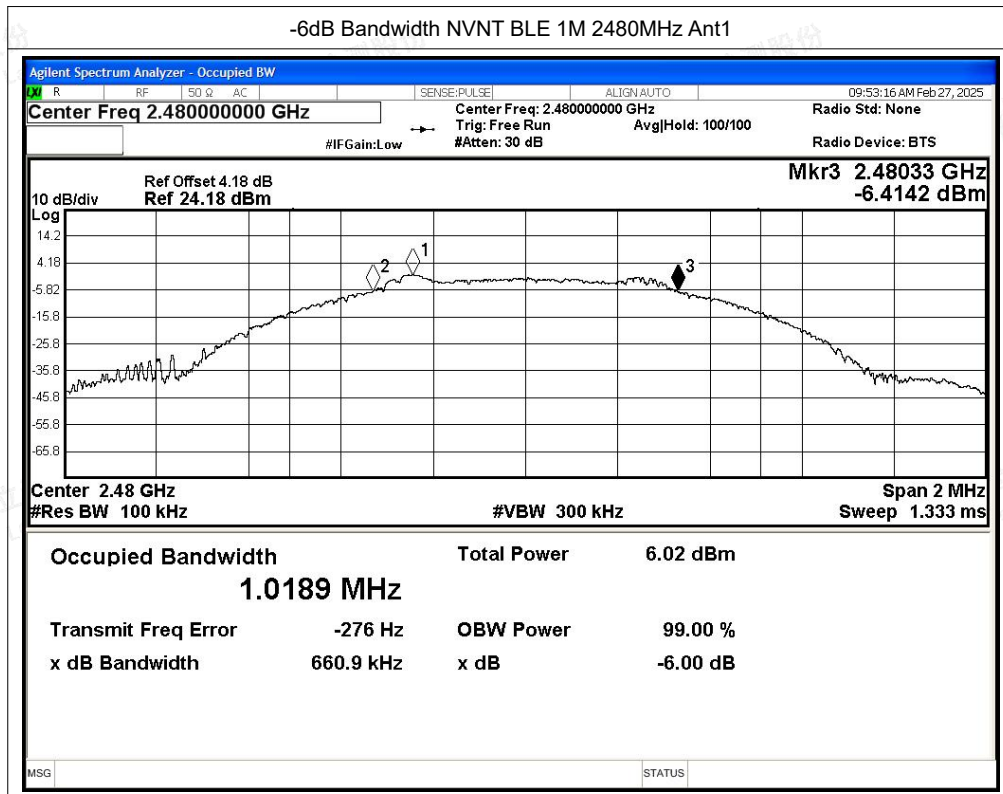
## Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1







## A.2 Maximum Peak Conducted Output Power

| Condition | Mode   | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|--------|-----------------|---------|-----------------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 1.41                  | 30          | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 1.2                   | 30          | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 0.1                   | 30          | Pass    |

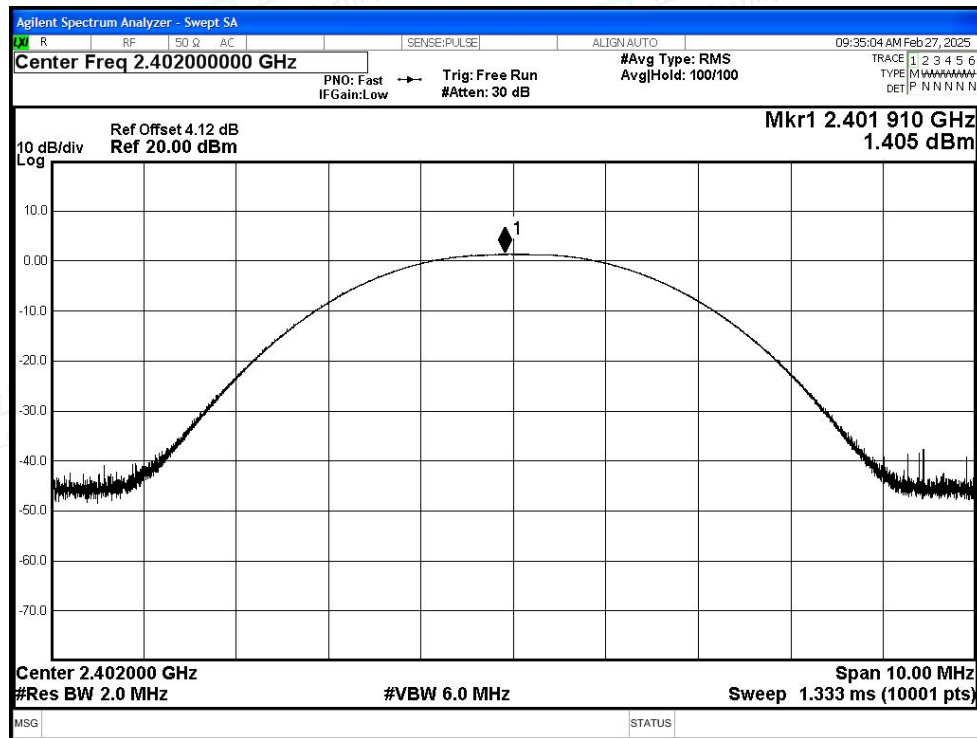


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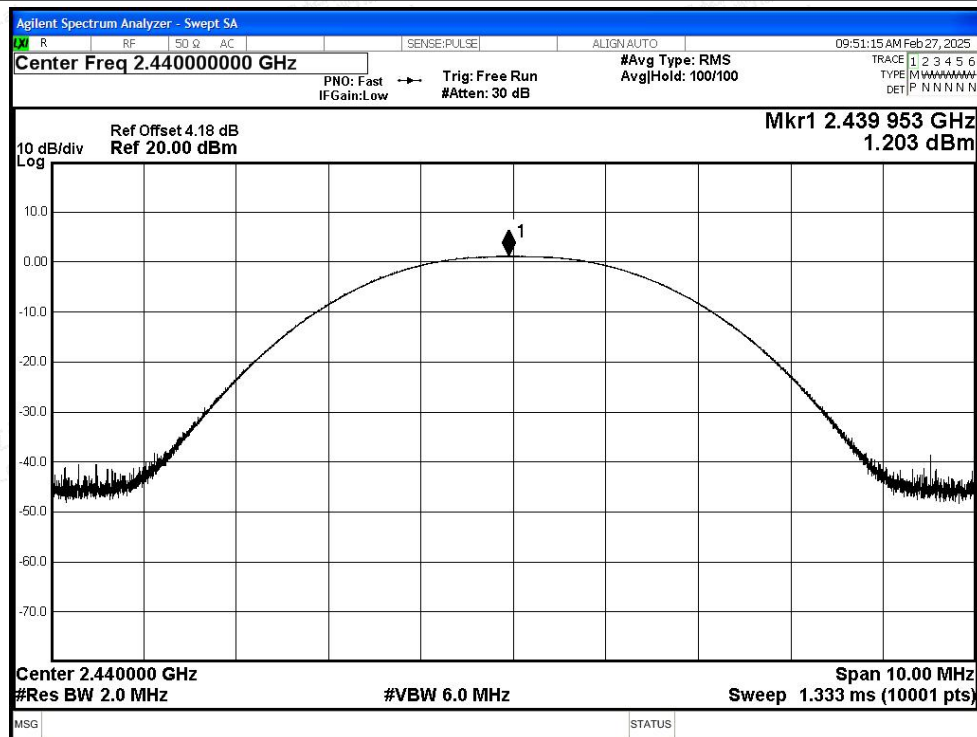


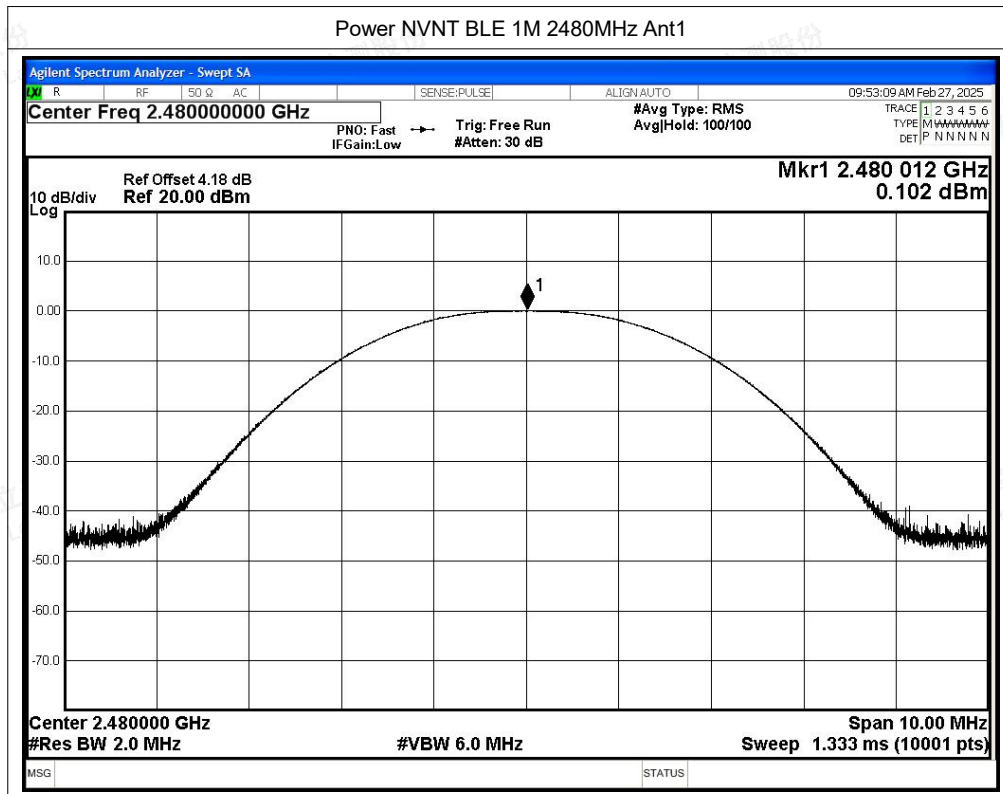
## Test Graphs

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    | -15.19                   | 8                | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -15.51                   | 8                | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -16.43                   | 8                | Pass    |

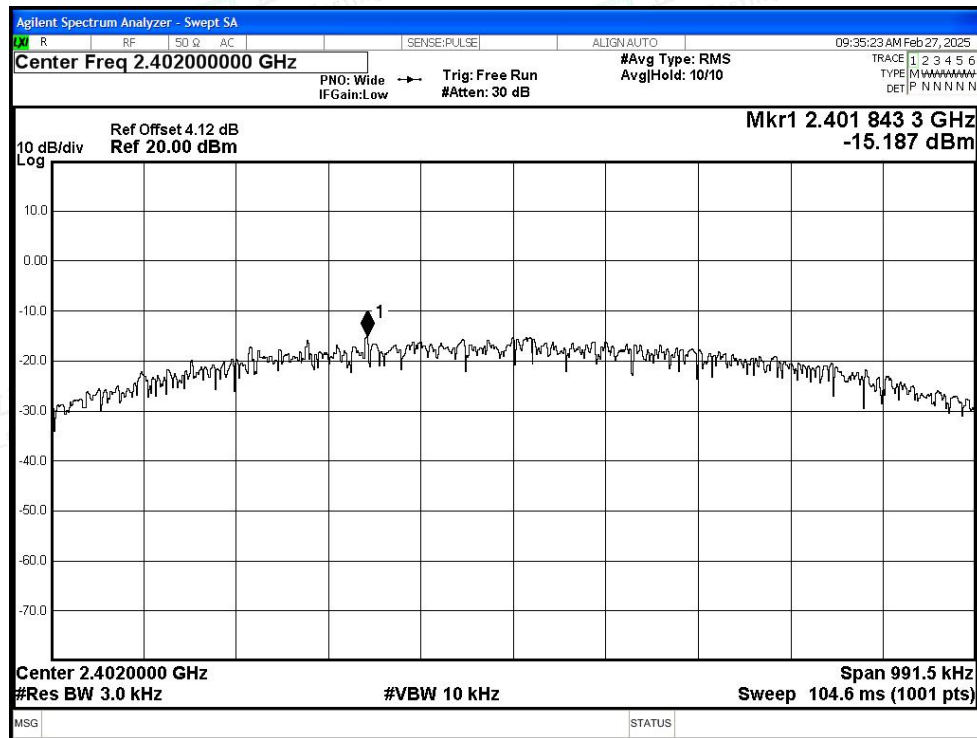


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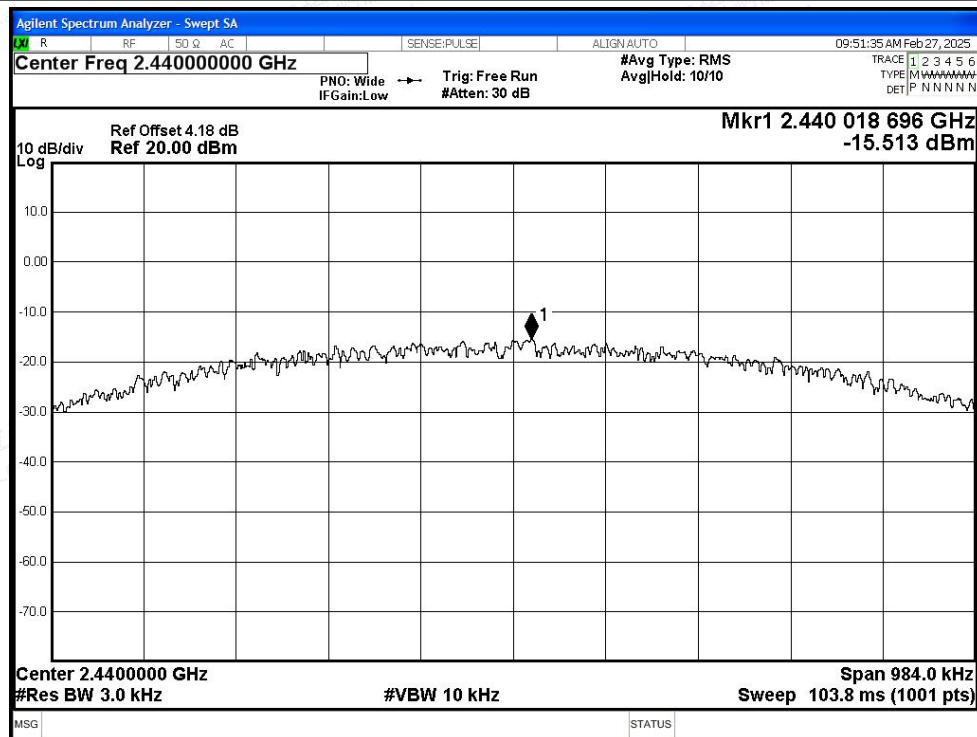


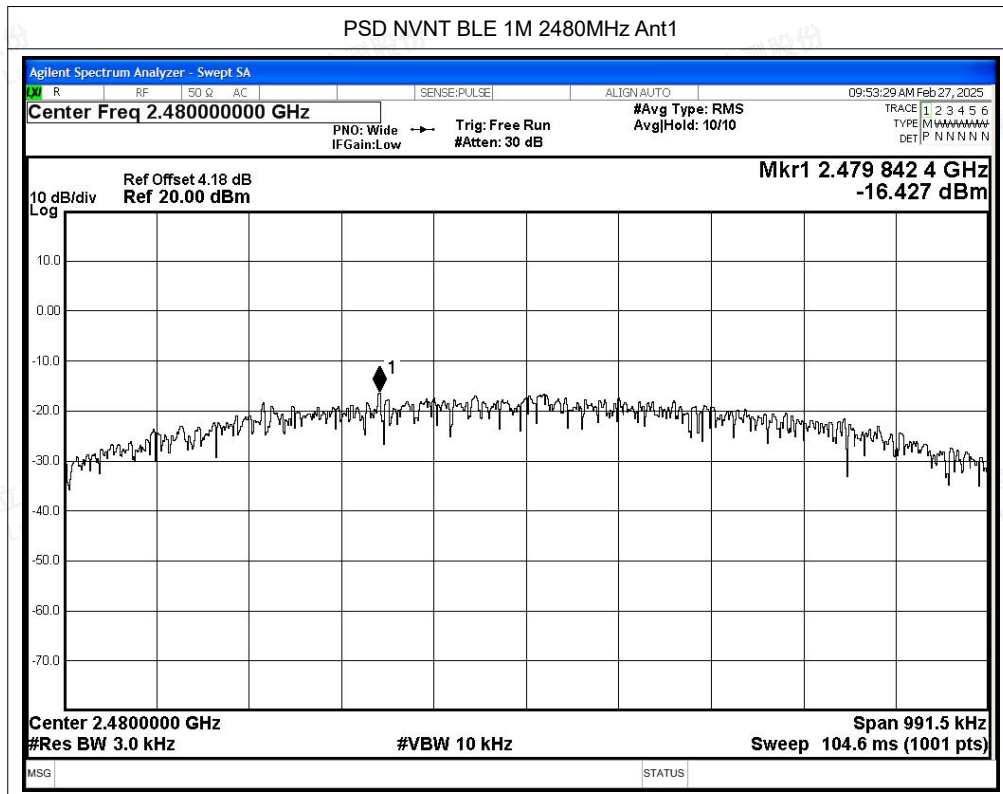
## Test Graphs

PSD NVNT BLE 1M 2402MHz Ant1



PSD NVNT BLE 1M 2440MHz Ant1







### A.4 Band Edge

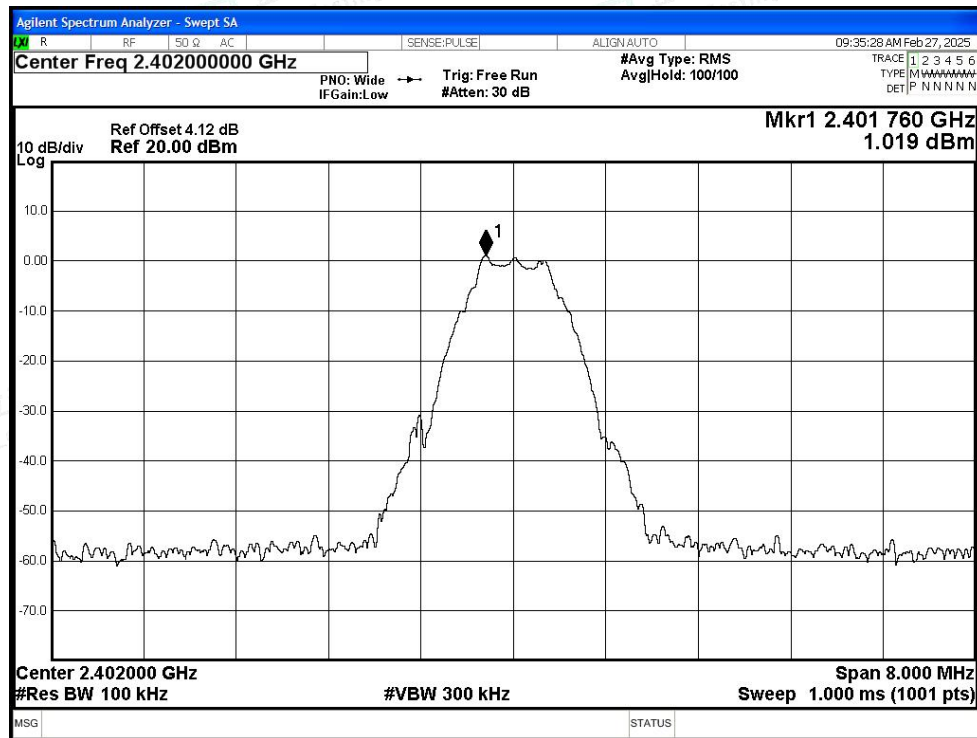
| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -55.68          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -54.33          | -20         | Pass    |



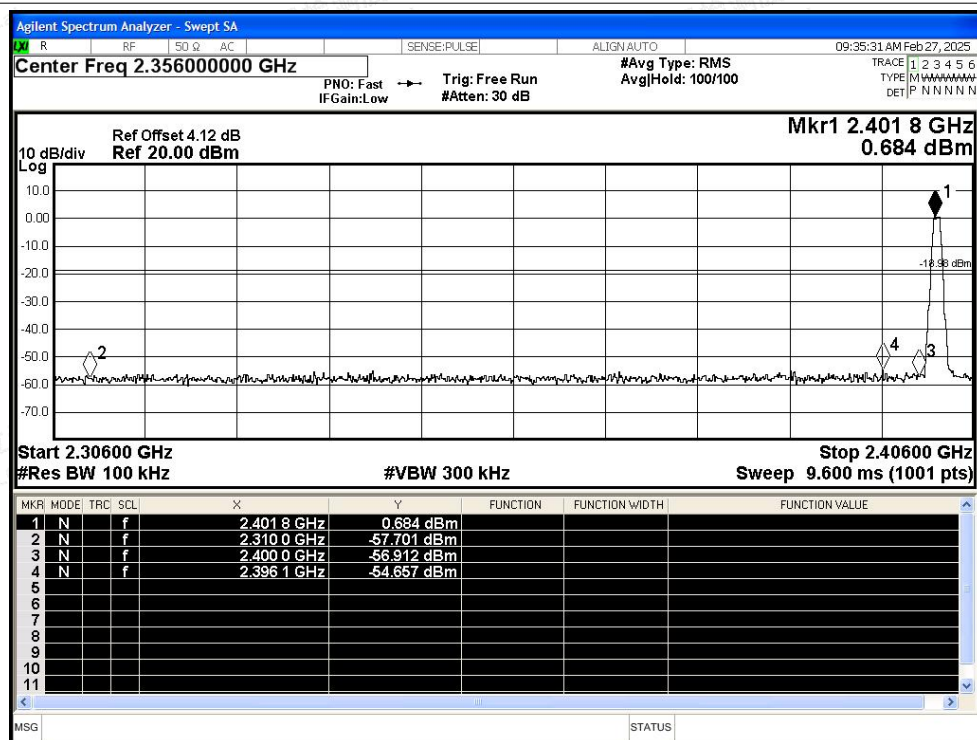


## Test Graphs

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

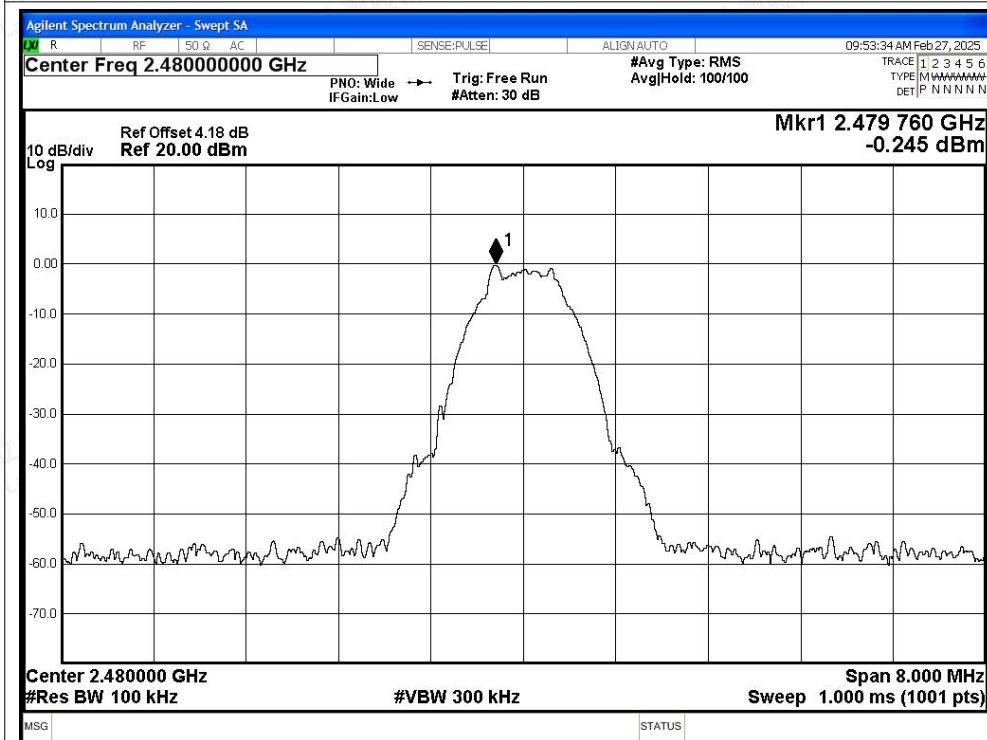


## Band Edge NVNT BLE 1M 2402MHz Ant1 Emission

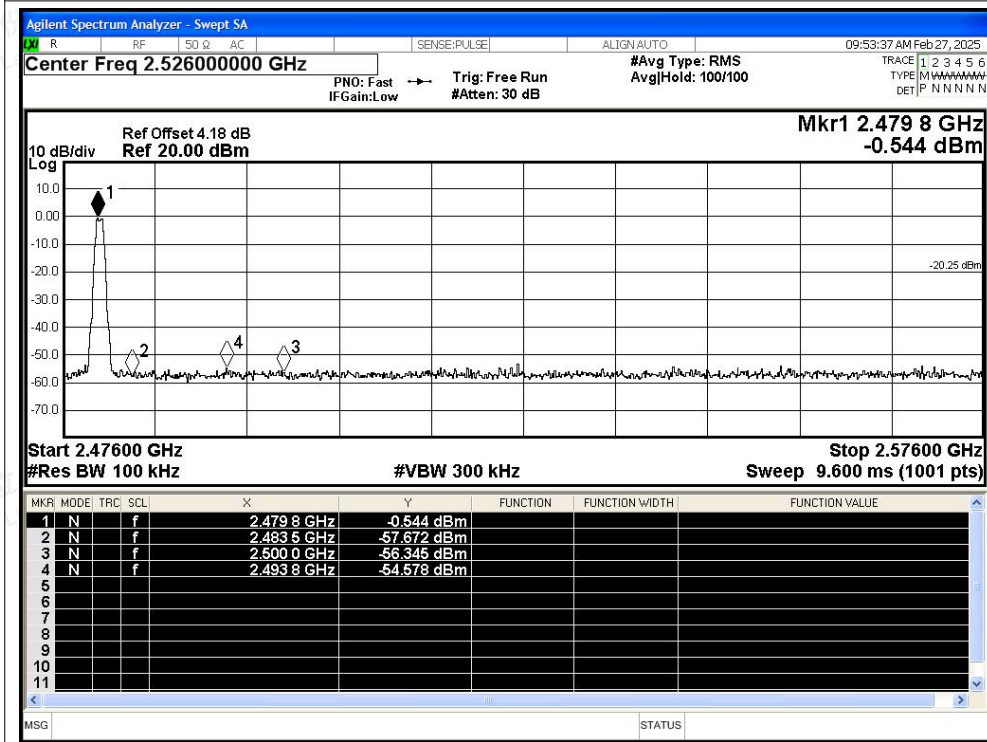




## Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



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





## A.5 Conducted RF Spurious Emission

| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -54.5           | -20         | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -54.33          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -53             | -20         | Pass    |

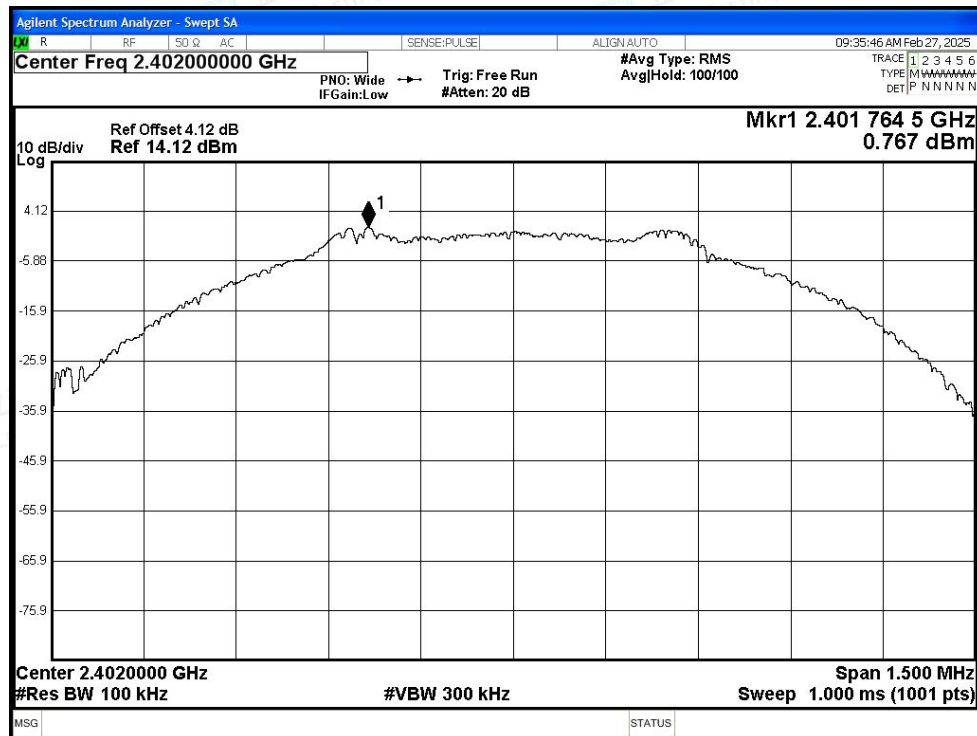


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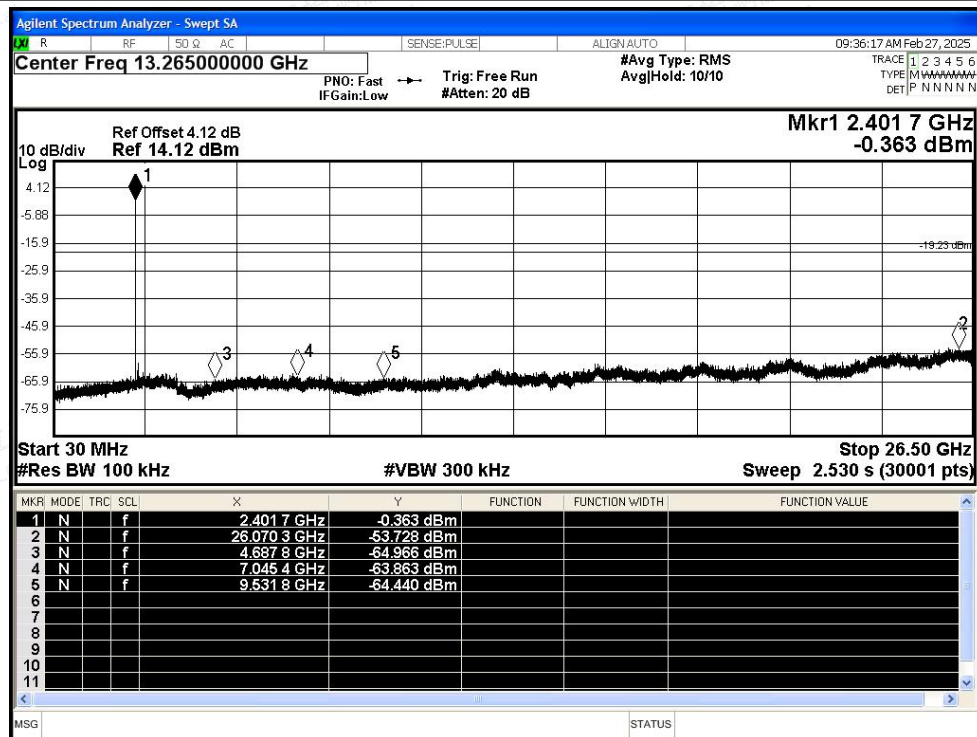


## Test Graphs

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

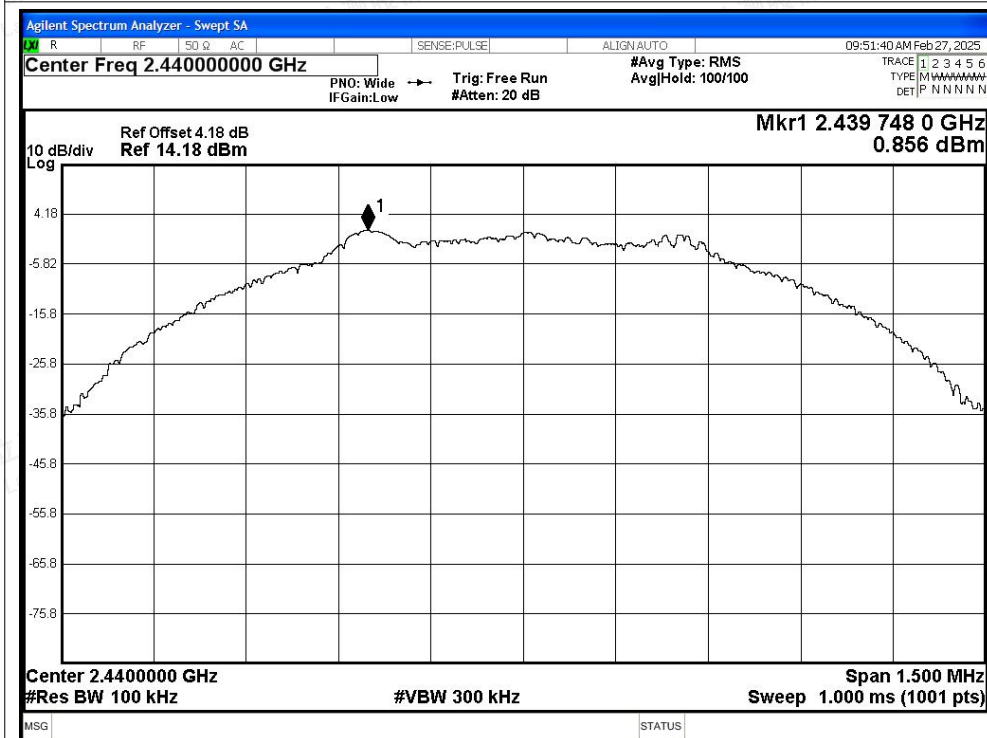


## Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

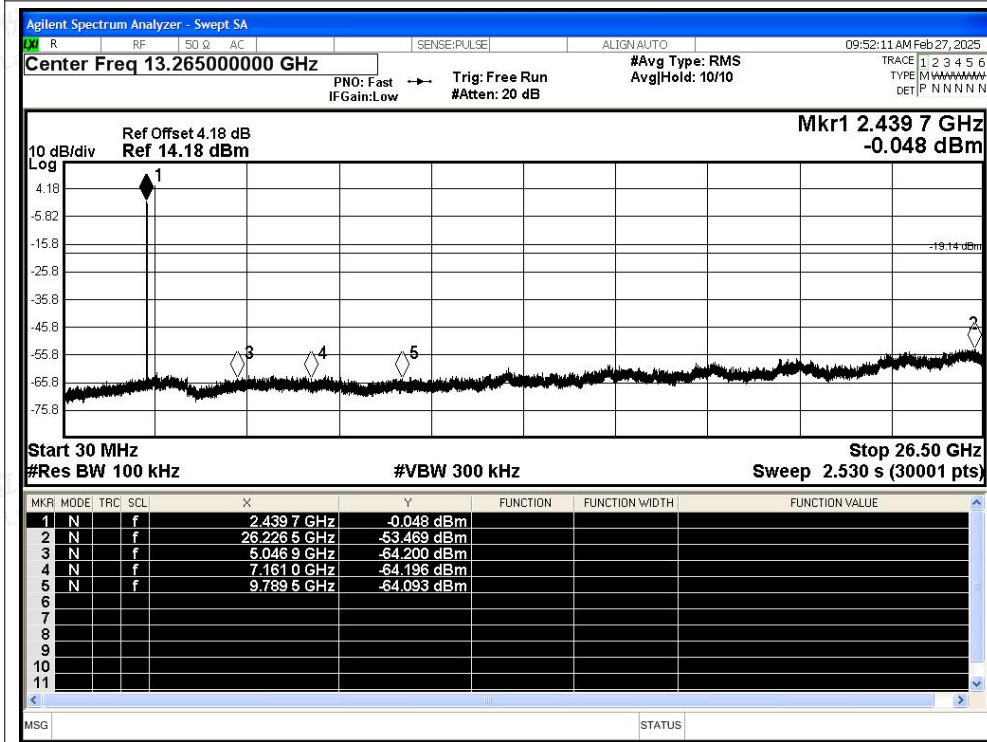




## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref

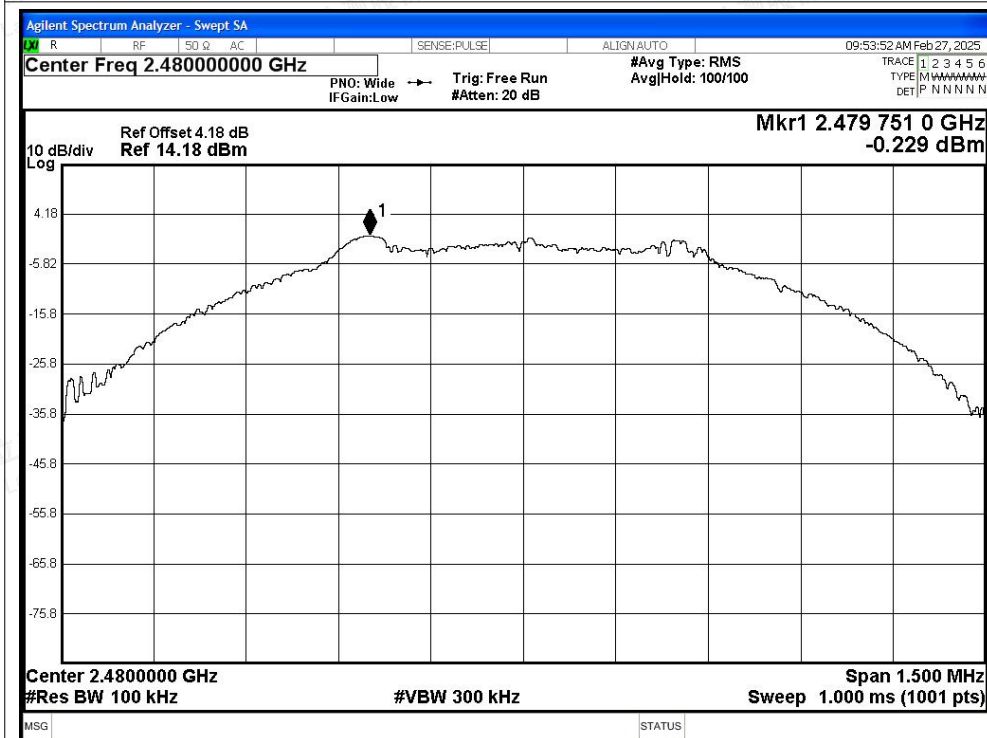


## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission

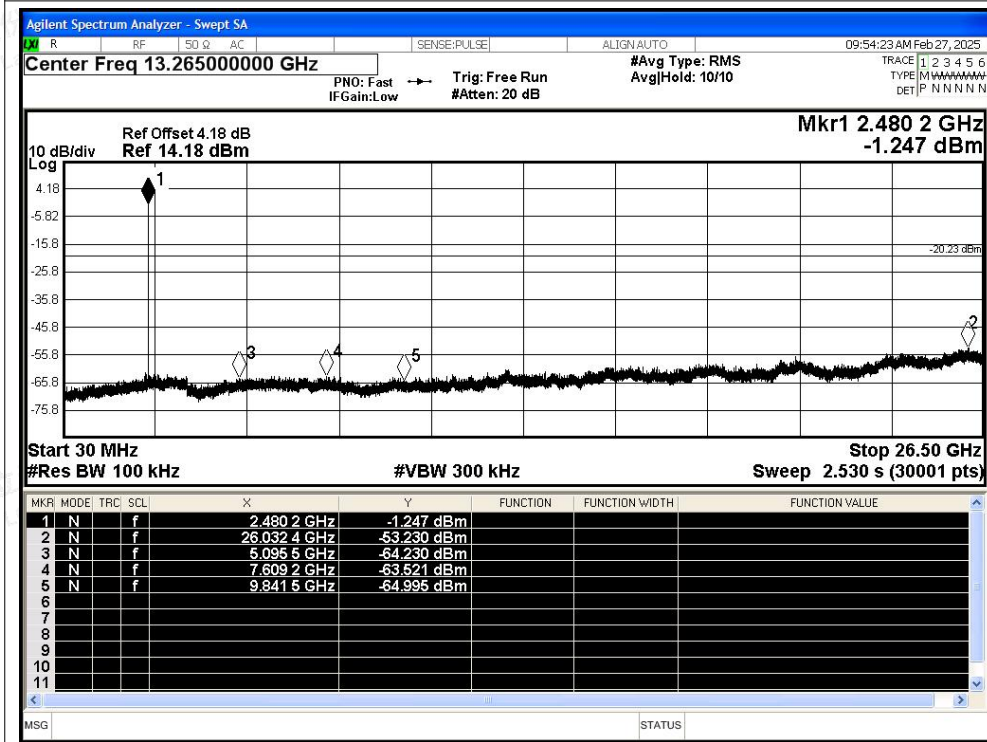




## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



## 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    | 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      |

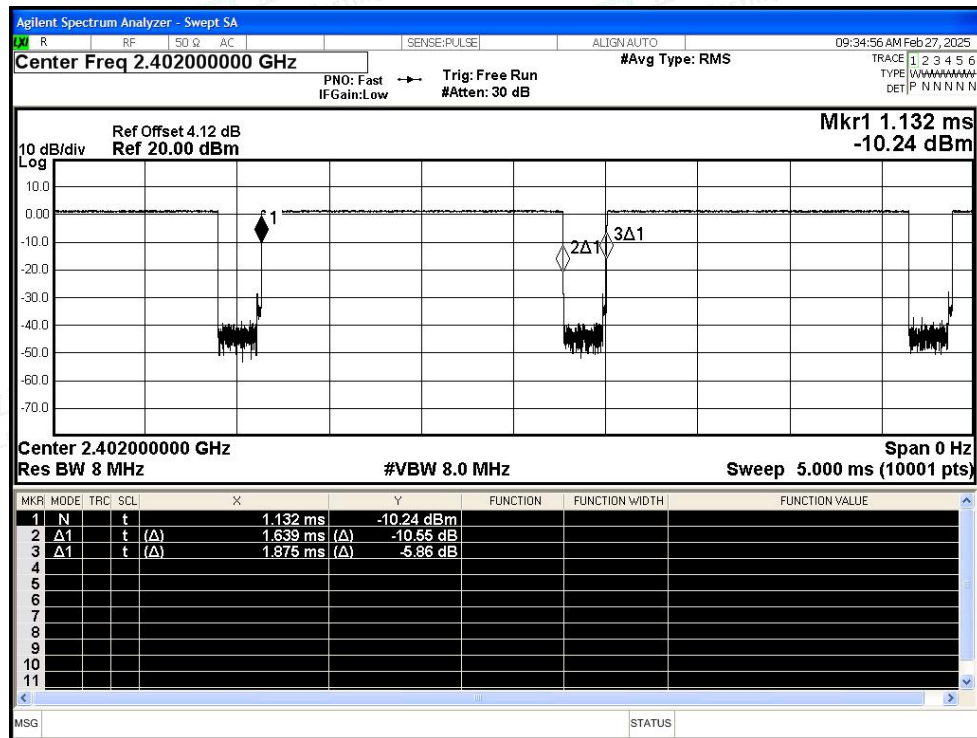


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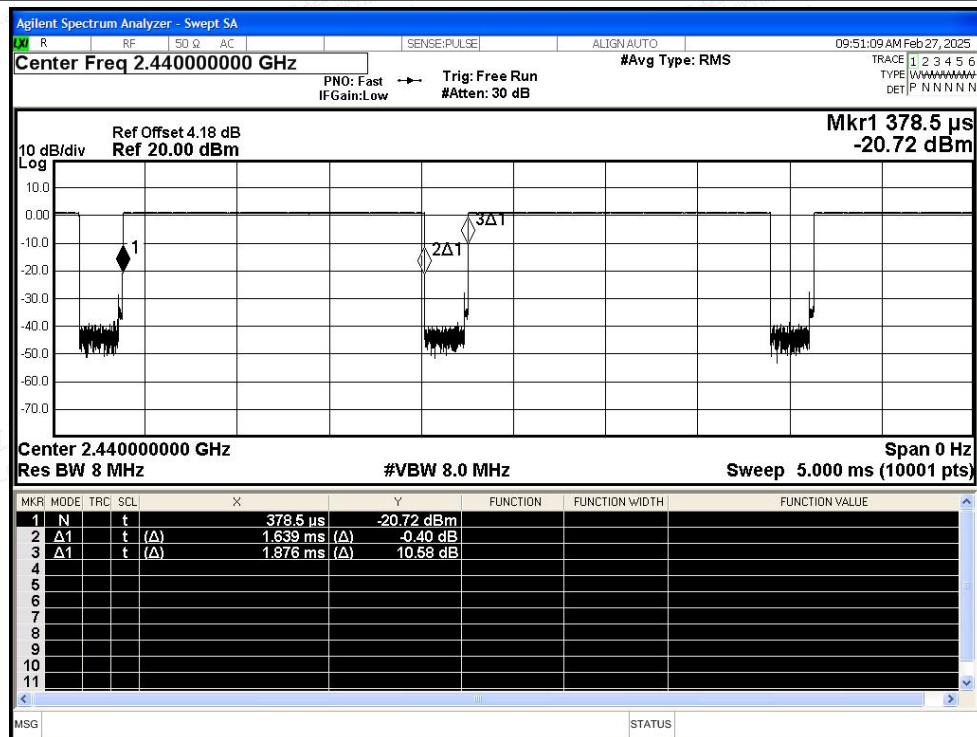


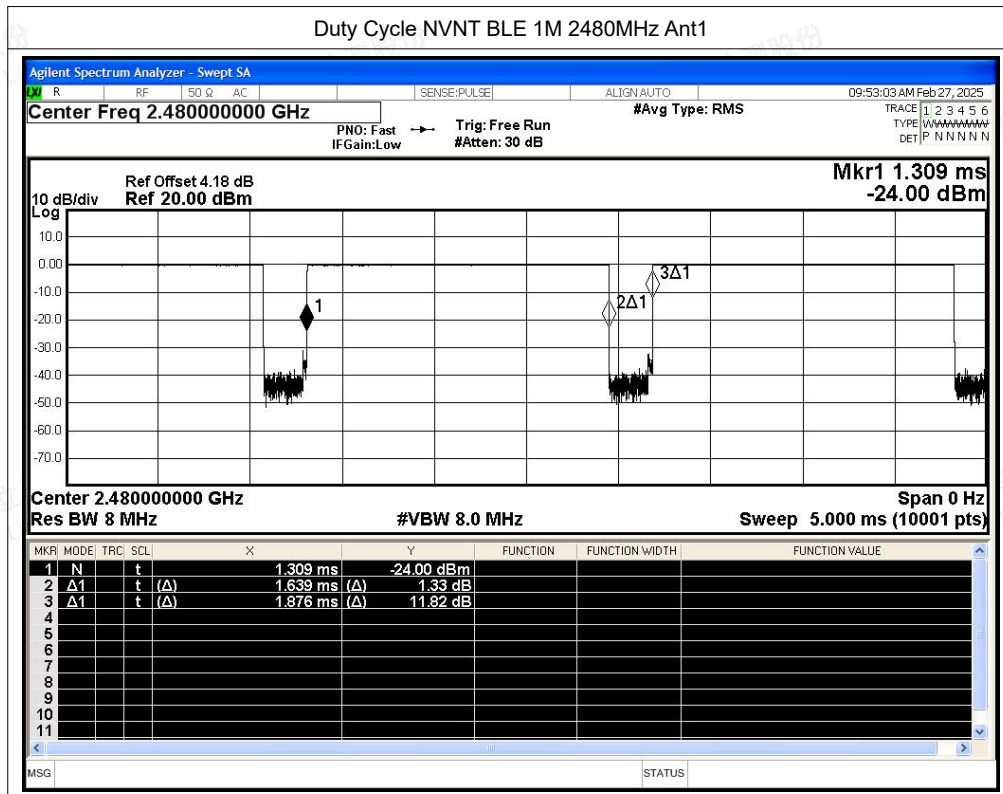
## Test Graphs

## 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) | Duty Factor (dB) | E (dBuV/m) | Detector | Limit (dBuV/m) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|------------|------------------|------------|----------|----------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -47.34      | 2.26       | -                | 50.18      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -56.54      | 2.26       | 0.59             | 41.57      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2380.08         | -45.75      | 2.26       | -                | 51.77      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2387.664        | -55.96      | 2.26       | 0.59             | 42.15      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -47.65      | 2.26       | -                | 49.87      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -56.35      | 2.26       | 0.59             | 41.76      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -47.59      | 2.26       | -                | 49.93      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -55.73      | 2.26       | 0.59             | 42.38      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2487.856        | -44.82      | 2.26       | -                | 52.70      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2496.28         | -55.42      | 2.26       | 0.59             | 42.69      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -48.58      | 2.26       | -                | 48.94      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -55.76      | 2.26       | 0.59             | 42.35      | Average  | 54             | Pass    |

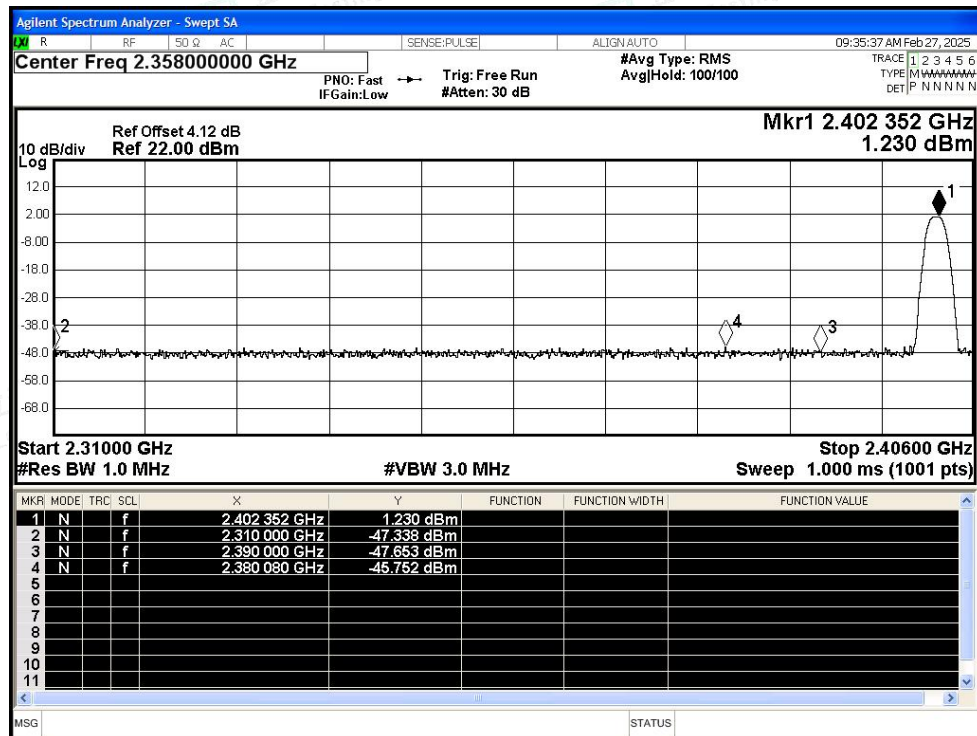


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## Test Graphs

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



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

