



Appendix A

RF Test Data for BLE (Conducted Measurement)

Product Name: CLAMP MULTIMETER  
Test Model: HP-7200-APP

Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23.5° C   |
| Relative Humidity: | 52.2%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Nick Peng |
| Supervised by:     | Ling Zhu  |





### A.1 6dB Bandwidth

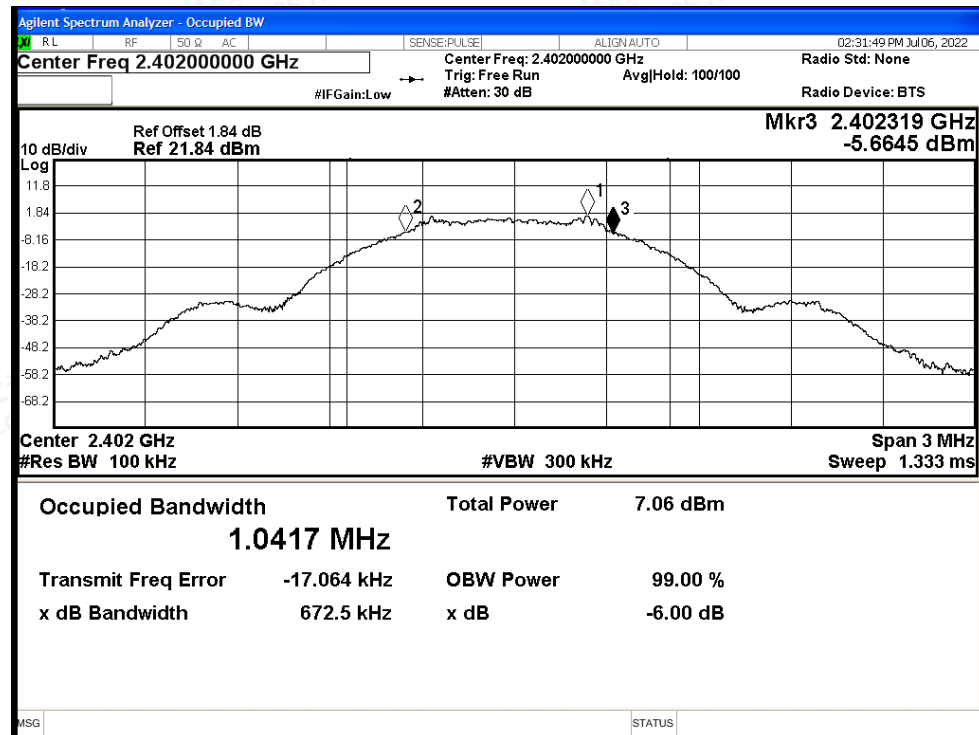
| Condition | Mode   | Frequency (MHz) | Antenna | 6 dB Bandwidth (MHz) | Limit 6 dB Bandwidth (MHz) | Verdict |
|-----------|--------|-----------------|---------|----------------------|----------------------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 0.673                | $\geq 0.5$                 | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 0.661                | $\geq 0.5$                 | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 0.697                | $\geq 0.5$                 | Pass    |



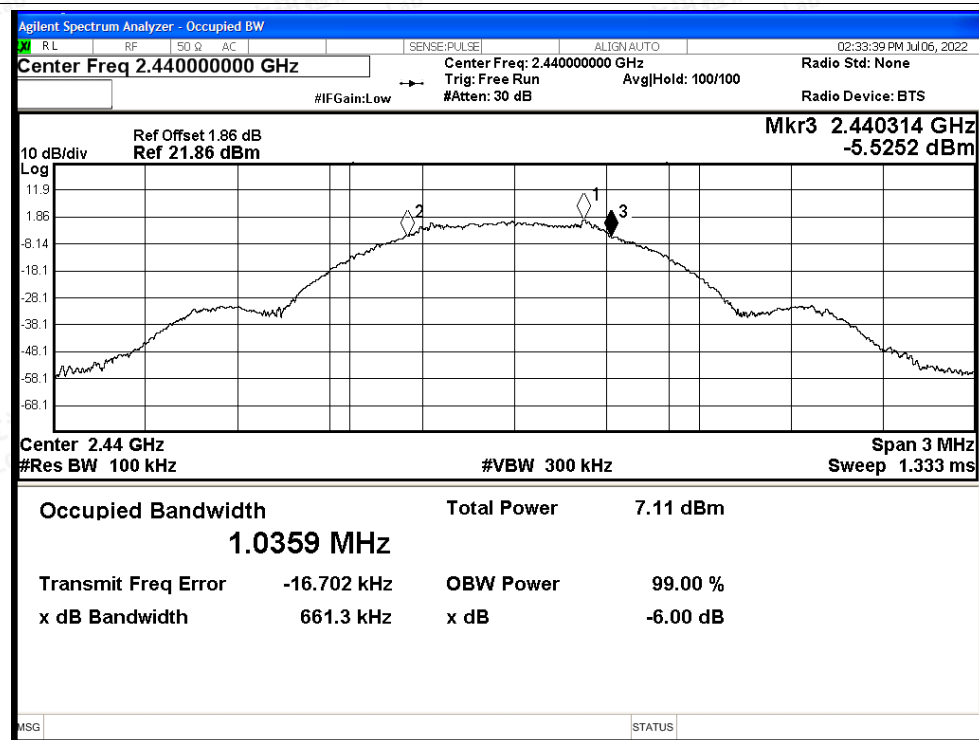


## Test Graphs

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



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

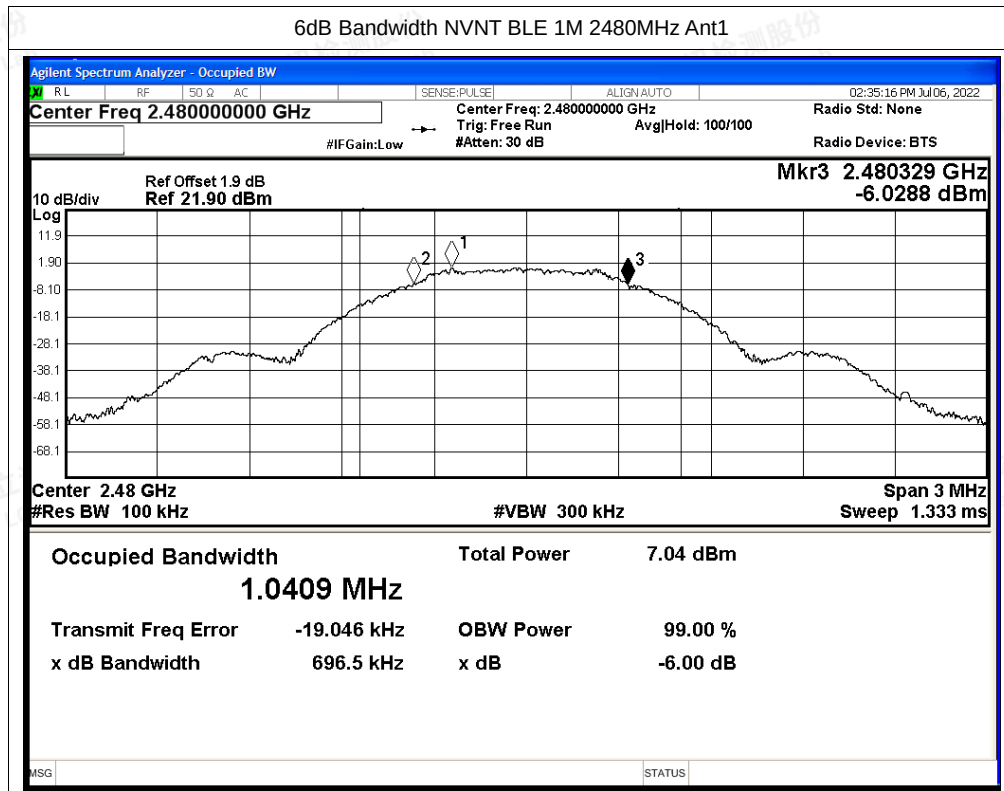


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## A.2 Maximum Conducted Output Power

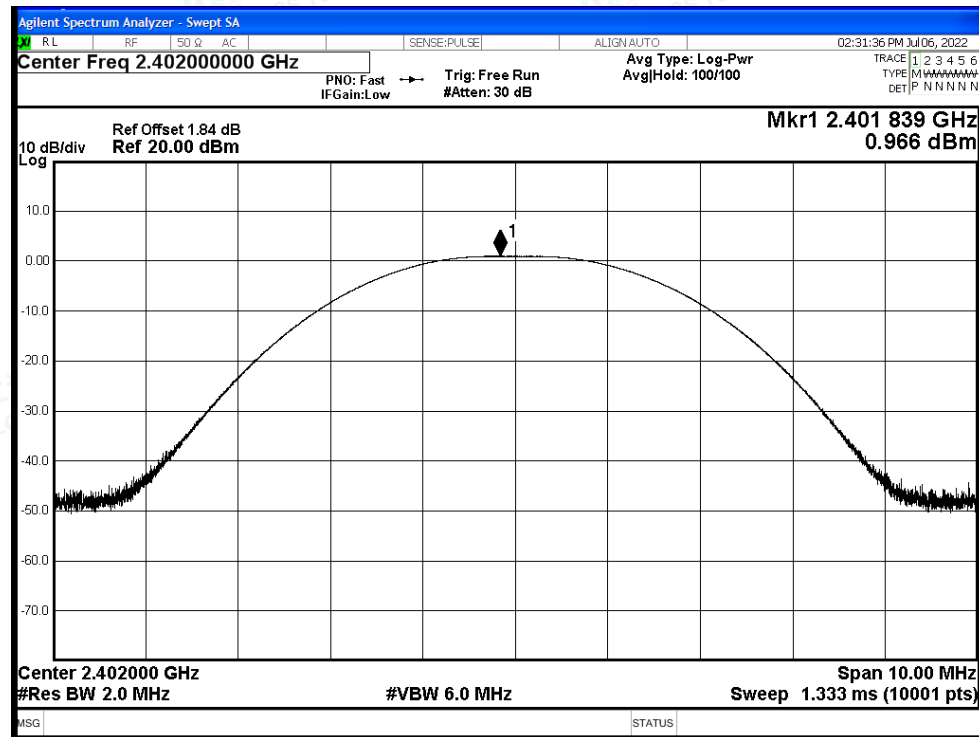
| Condition | Mode   | Frequency (MHz) | Antenna | Total Power (dBm) | Limit (dBm) | Verdict |
|-----------|--------|-----------------|---------|-------------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 0.97              | 30          | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 1.06              | 30          | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 1.14              | 30          | Pass    |



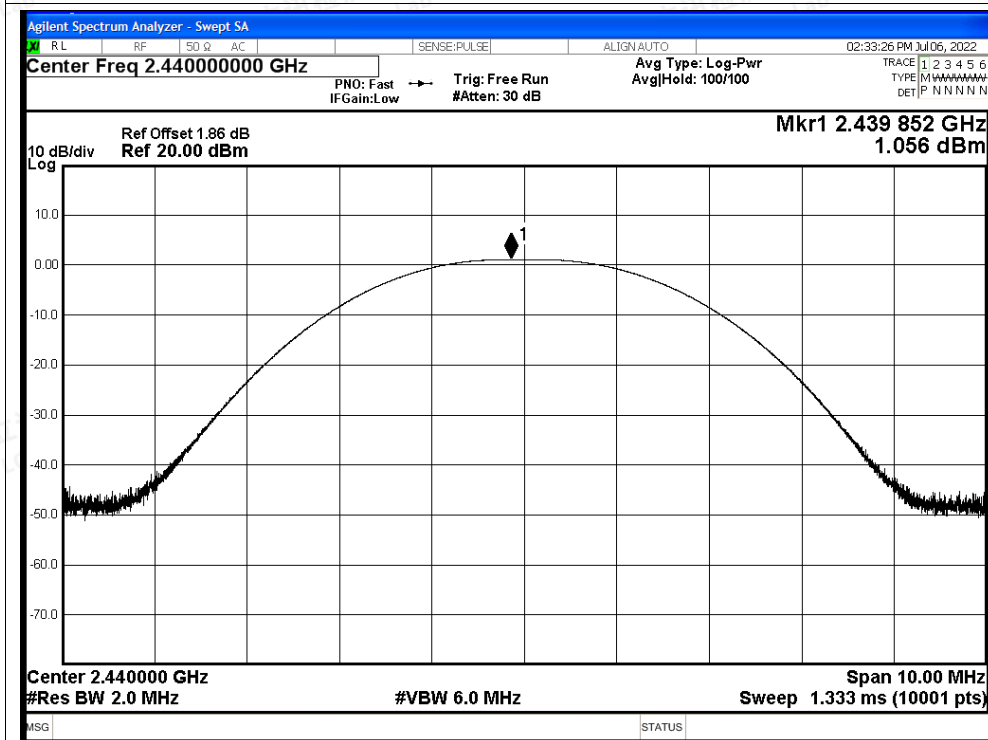


## Test Graphs

Power NVNT BLE 1M 2402MHz Ant1



Power NVNT BLE 1M 2440MHz Ant1

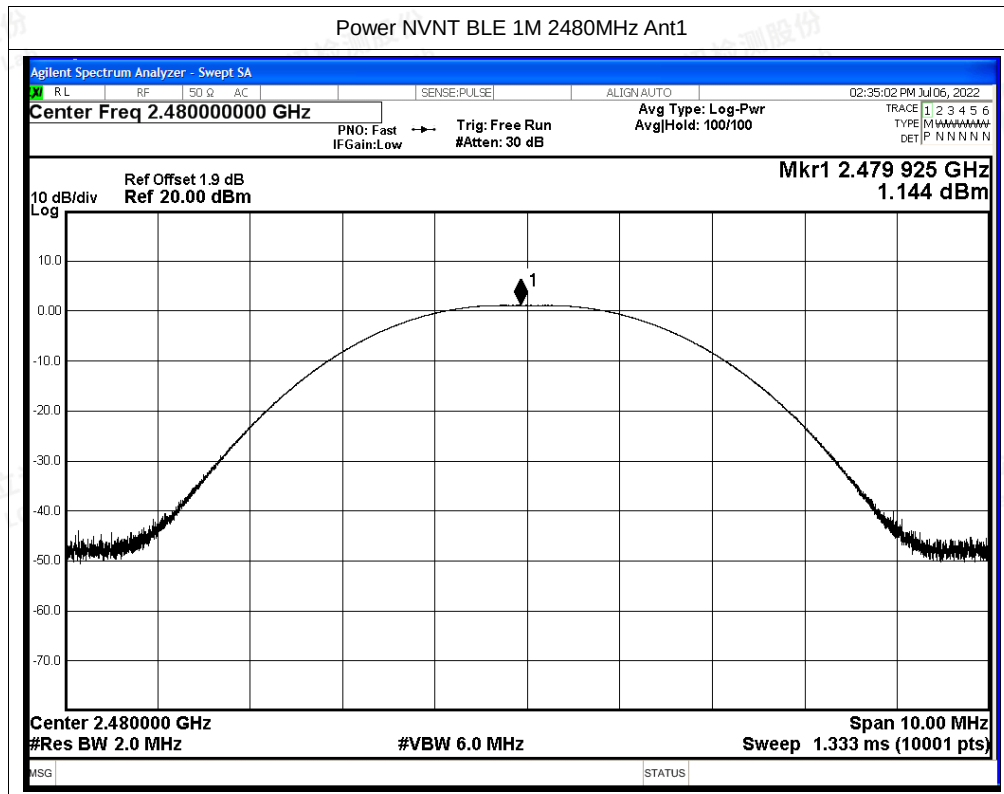


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### A.3 Maximum Power Spectral Density Level

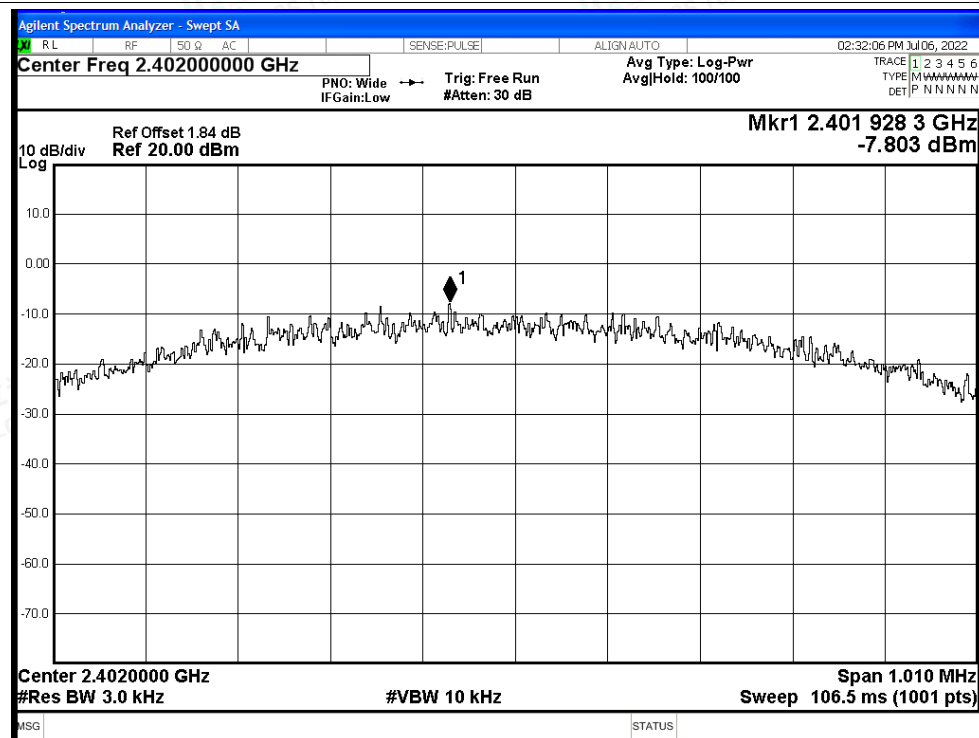
| Condition | Mode   | Frequency (MHz) | Antenna | Conducted PSD (dBm/3kHz) | Duty Factor (dB) | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|-----------|--------|-----------------|---------|--------------------------|------------------|----------------------|------------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -7.8                     | 0                | -7.8                 | 8                | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -8.78                    | 0                | -8.78                | 8                | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -8.3                     | 0                | -8.3                 | 8                | Pass    |



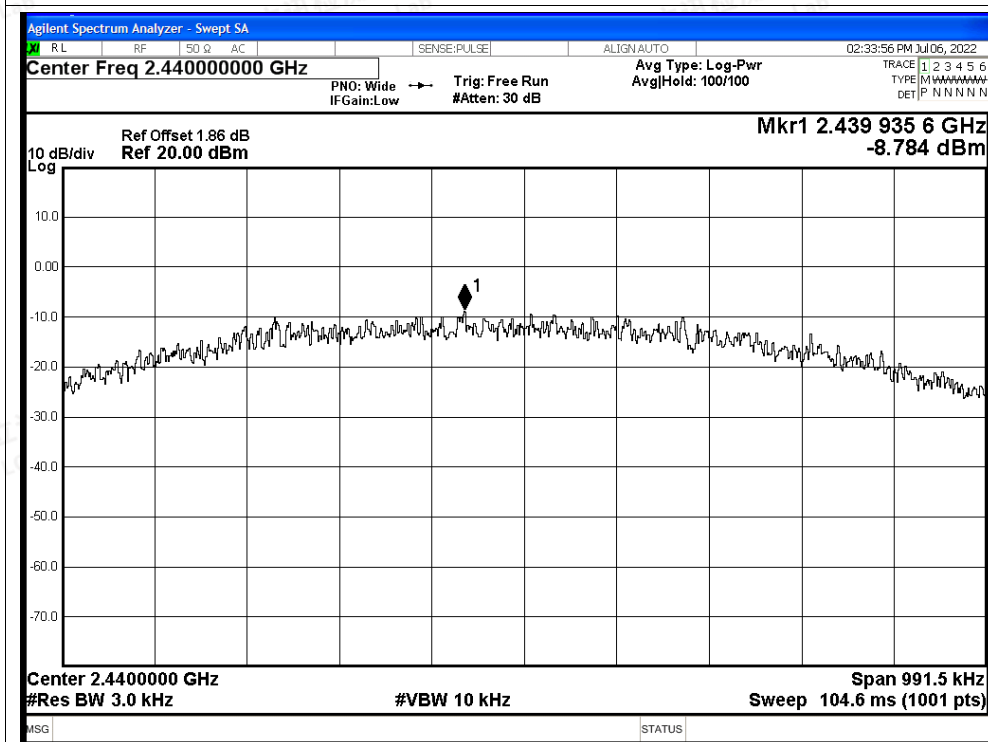


## Test Graphs

PSD NVNT BLE 1M 2402MHz Ant1



PSD NVNT BLE 1M 2440MHz Ant1

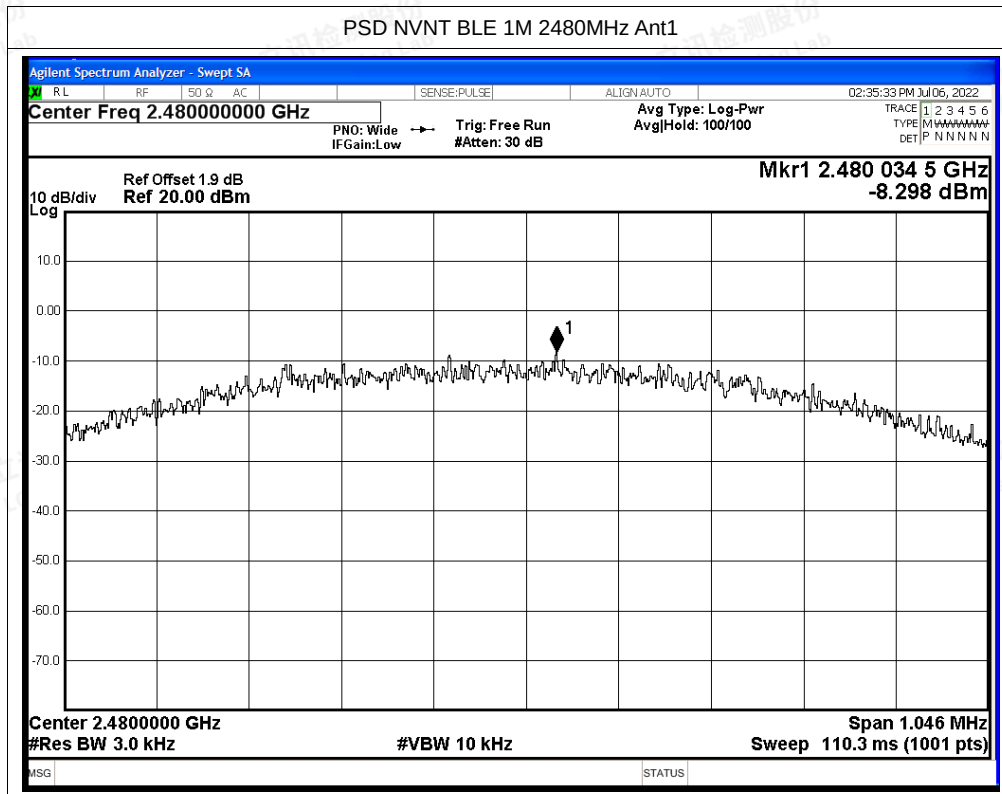


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### A.4 Band Edge

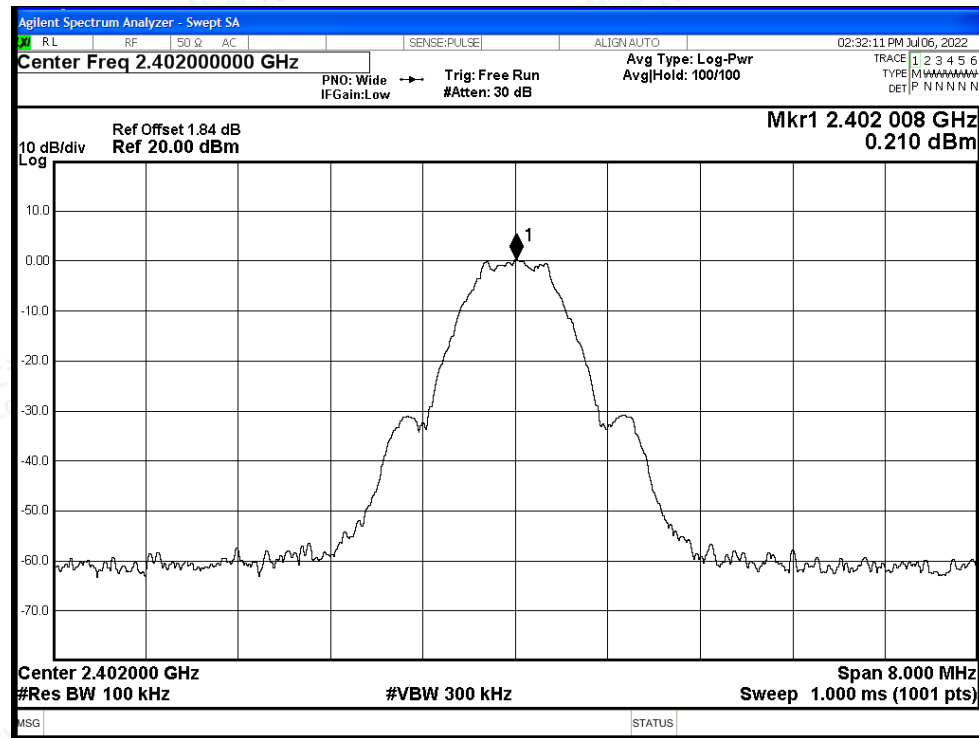
| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -57.35          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -57.98          | -20         | Pass    |



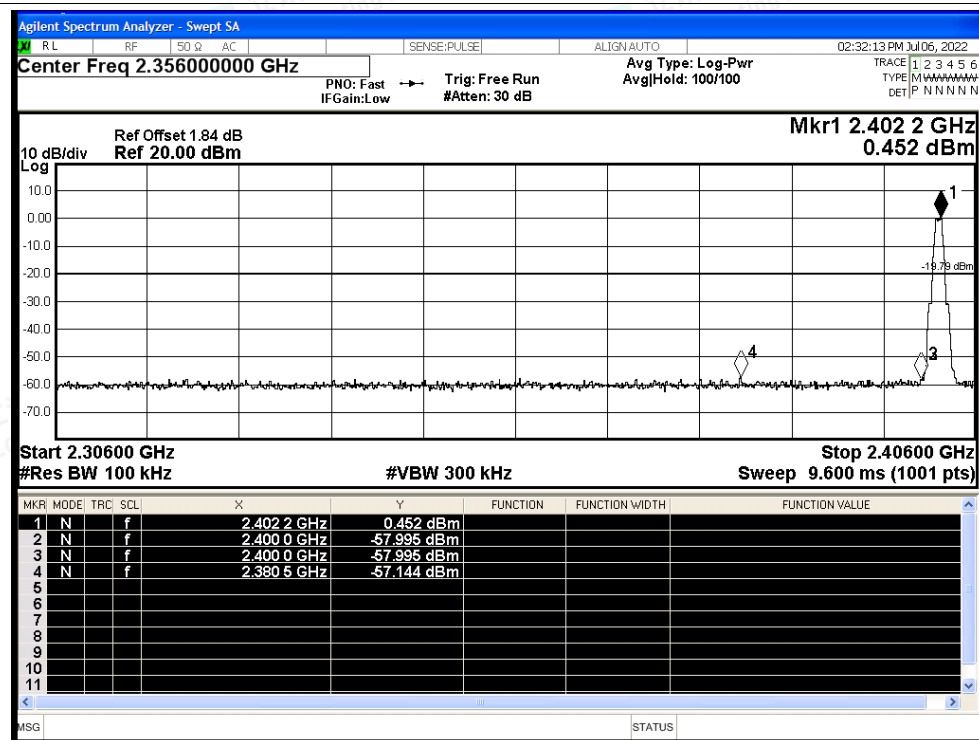


## Test Graphs

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



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



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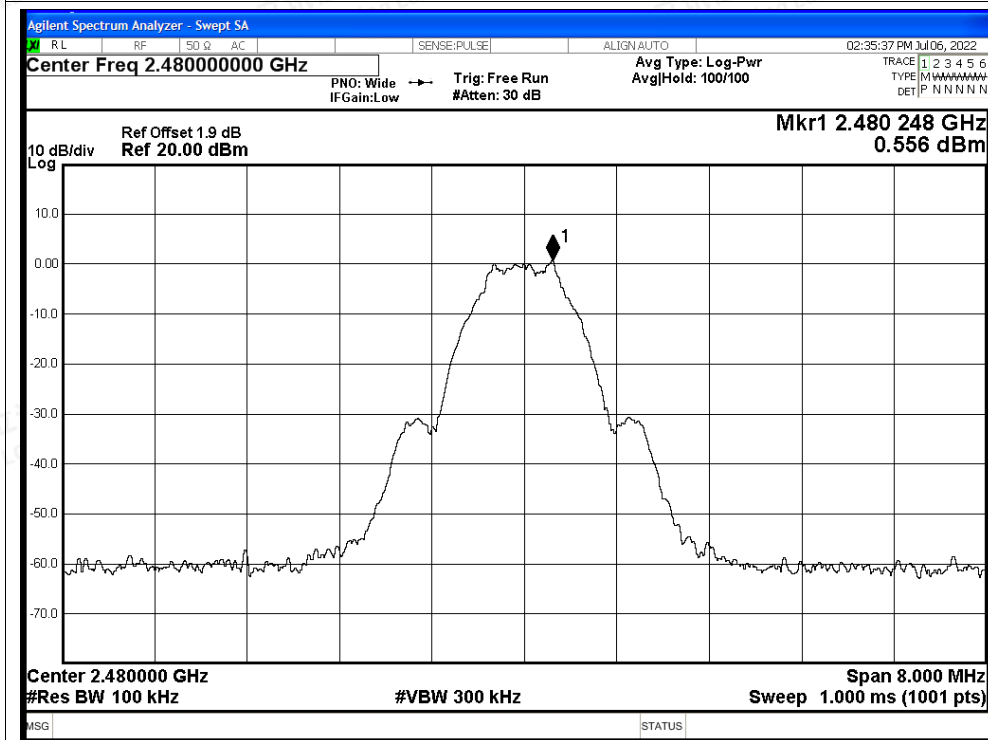
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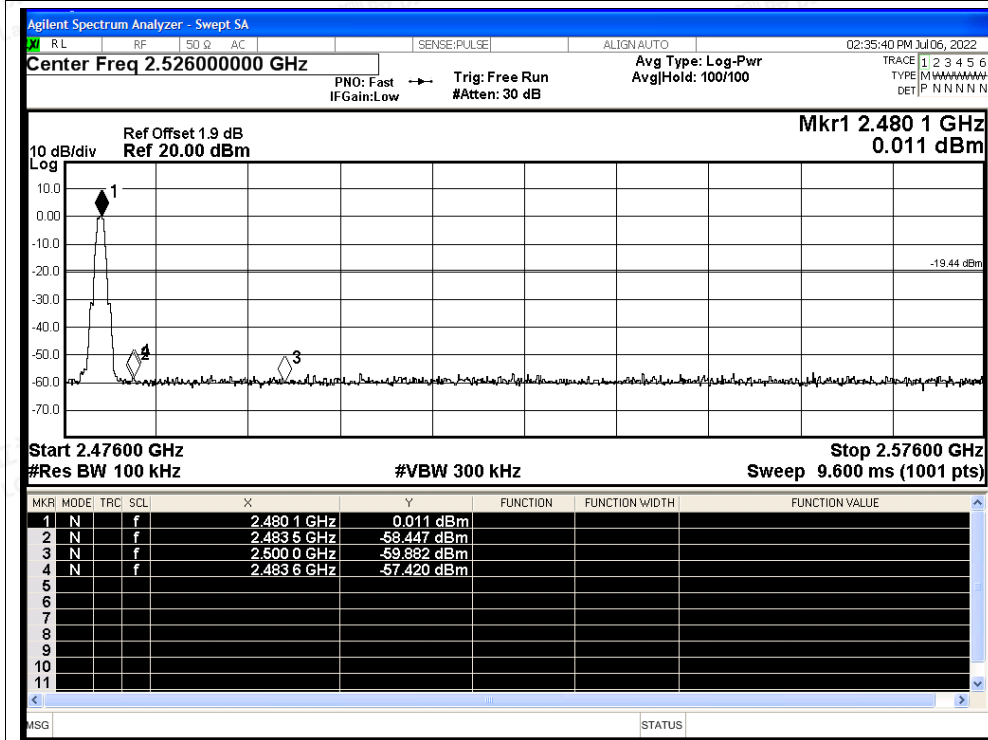
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## Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



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



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## A.5 Conducted RF Spurious Emission

| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -52.51          | -20         | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -54.53          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -55.79          | -20         | Pass    |



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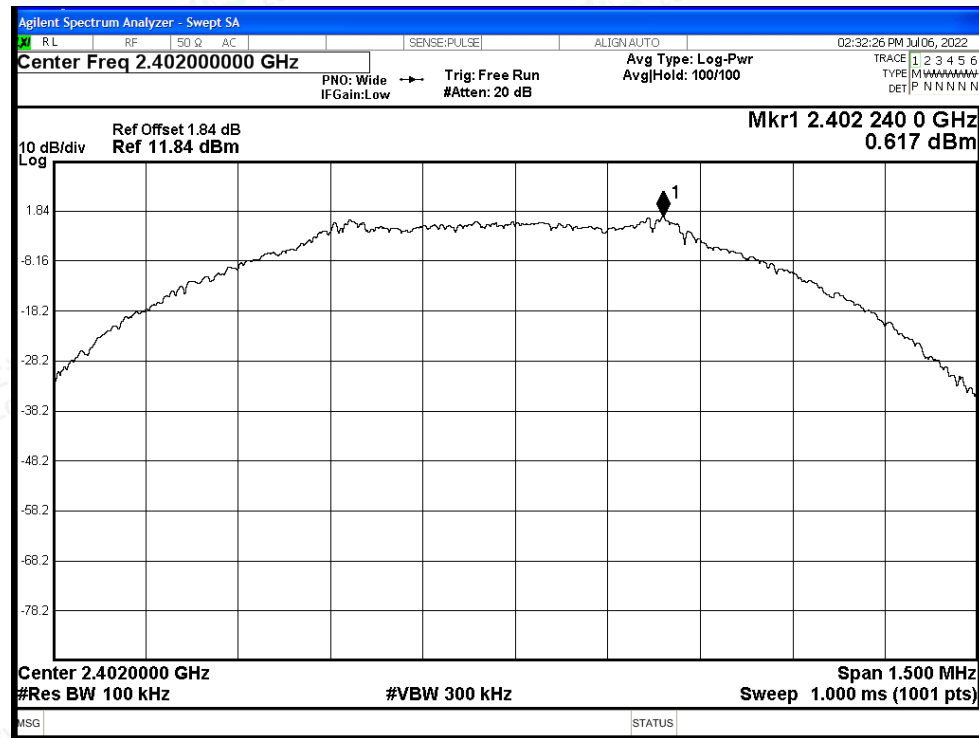
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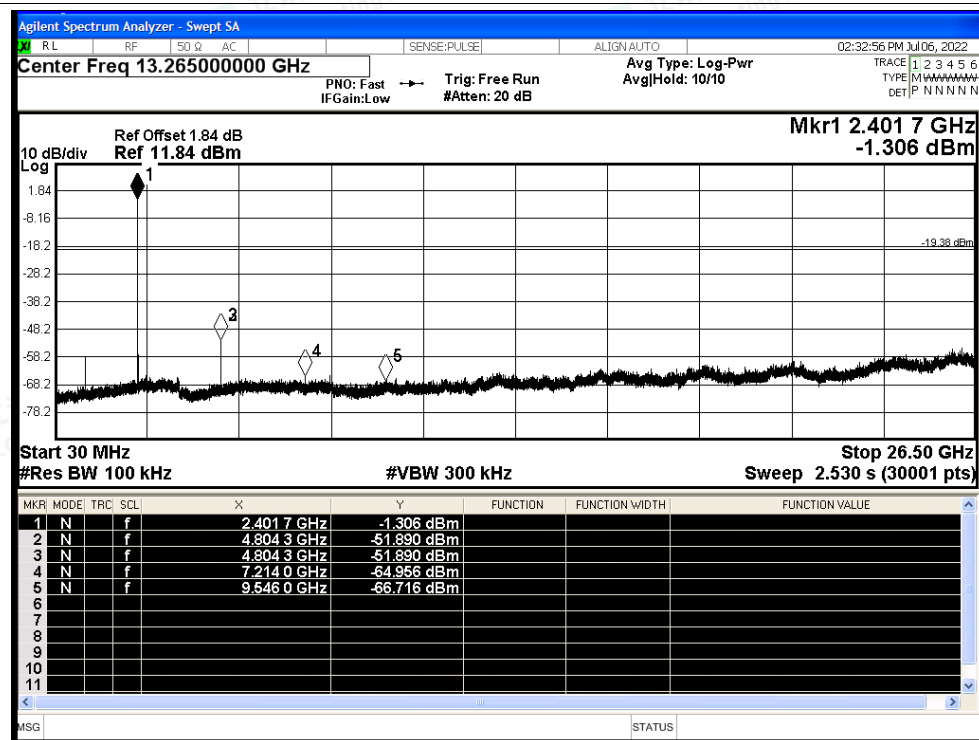


## Test Graphs

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



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



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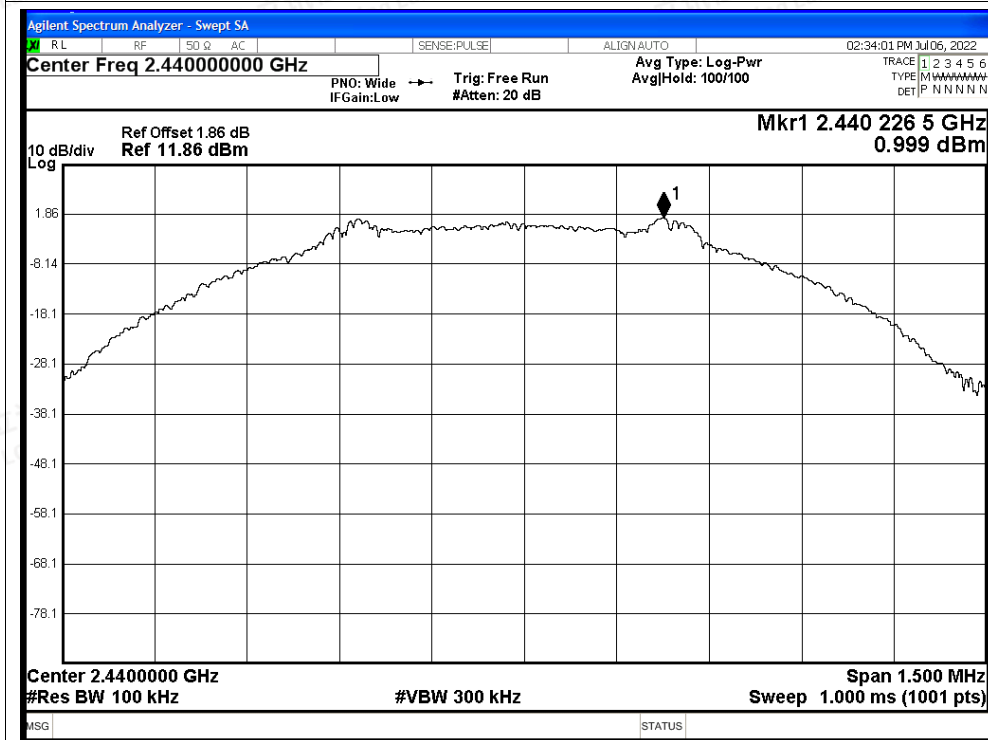
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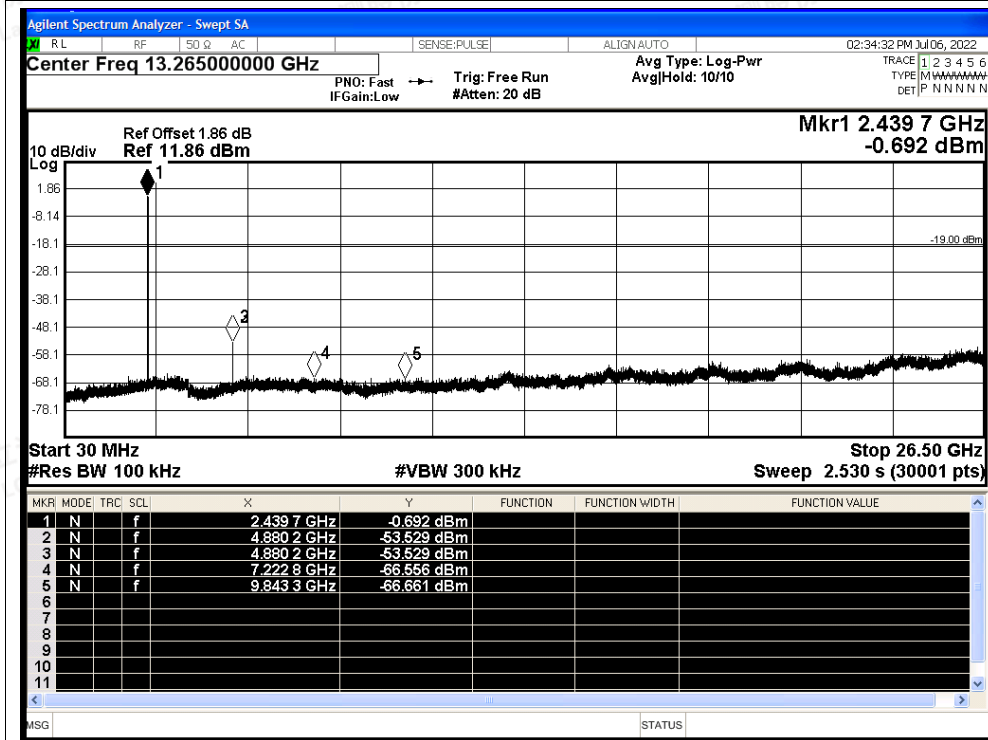
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## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



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



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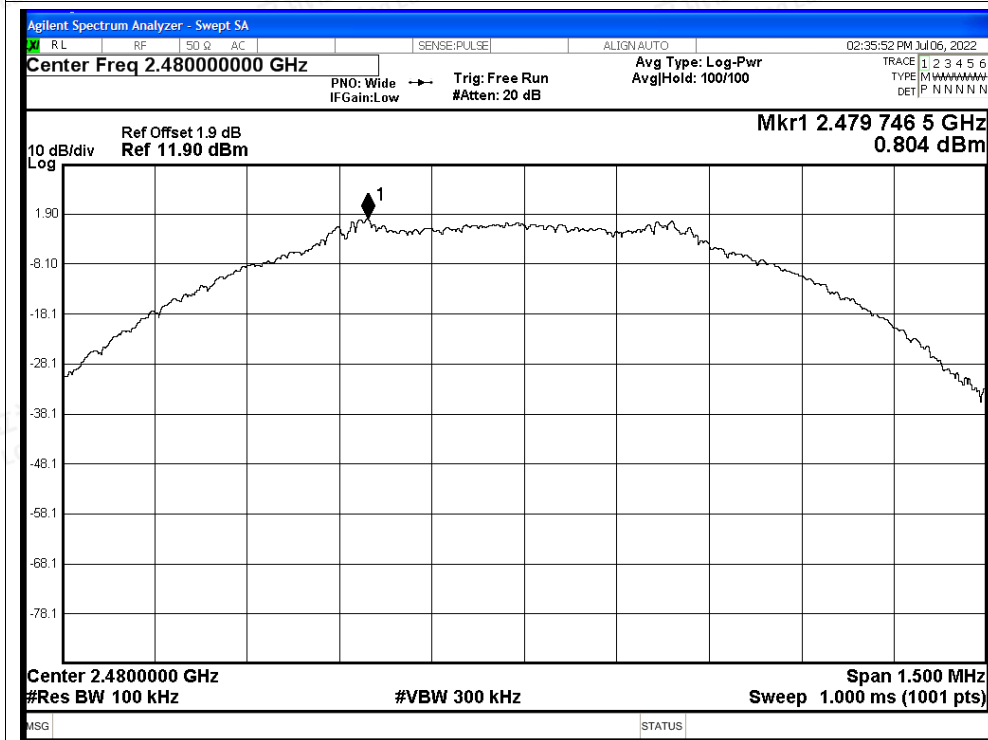
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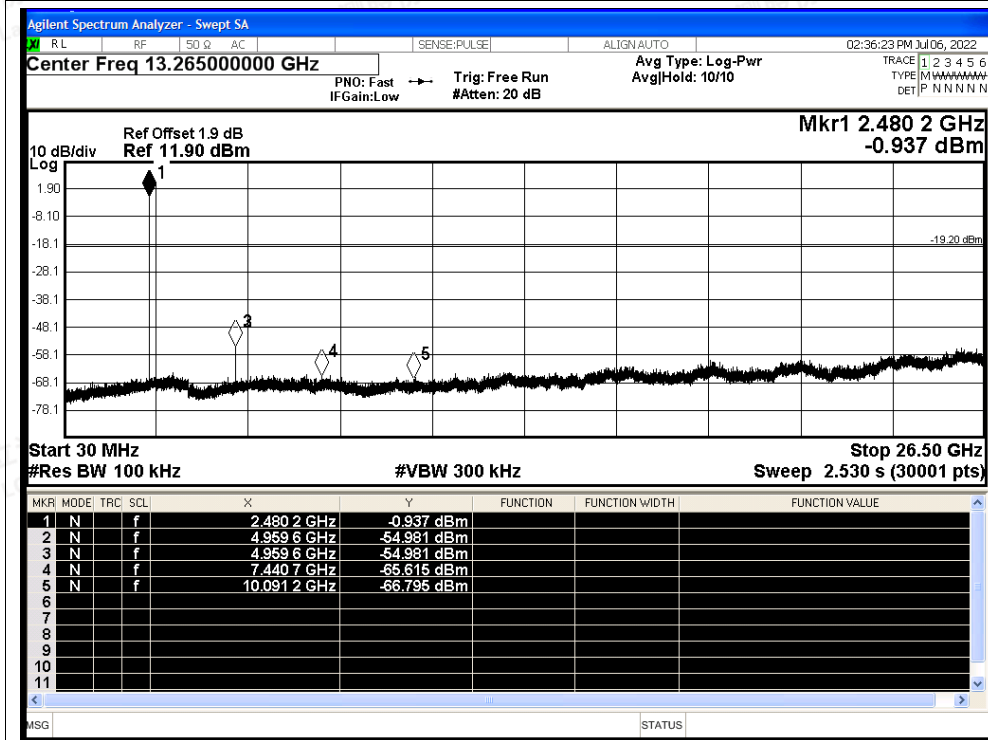
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## Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



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



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## A.6 Duty Cycle

| Condition | Mode   | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|-----------|--------|-----------------|---------|----------------|------------------------|-----------|
| NVNT      | BLE 1M | 2402            | Ant1    | 85.12          | 0.7                    | 0.47      |
| NVNT      | BLE 1M | 2440            | Ant1    | 85.12          | 0.7                    | 0.47      |
| NVNT      | BLE 1M | 2480            | Ant1    | 85.12          | 0.7                    | 0.47      |



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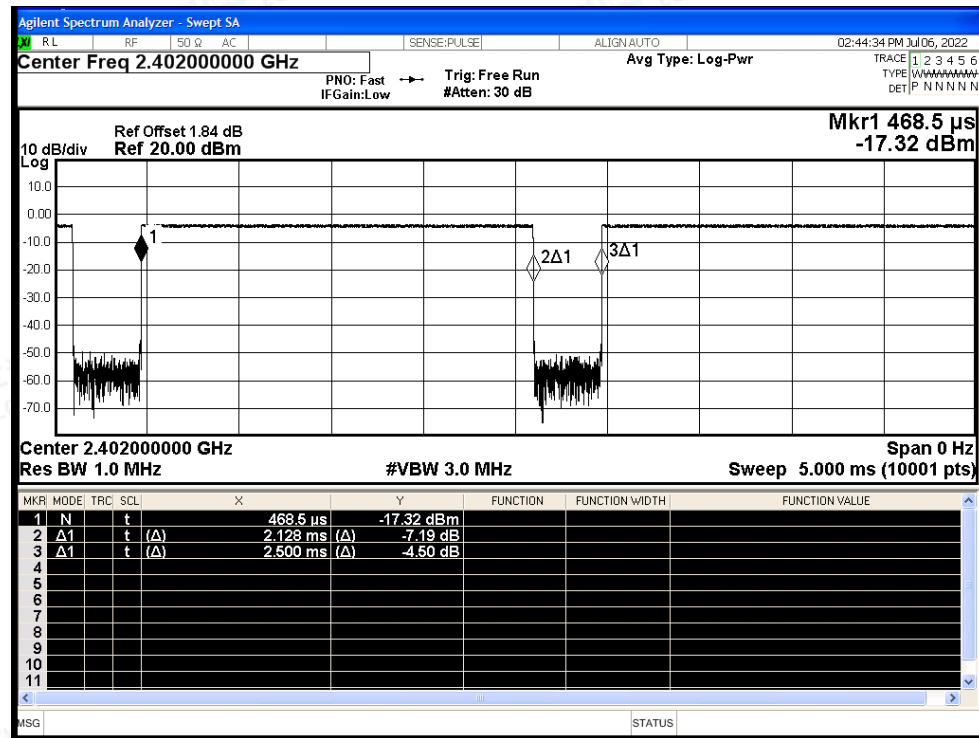
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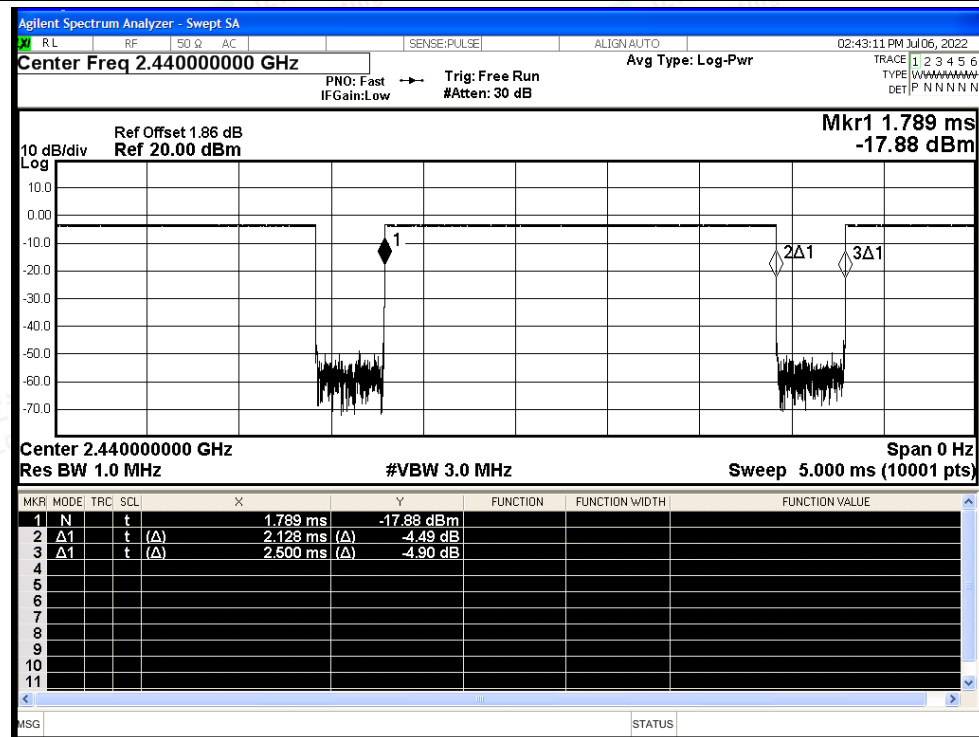


## Test Graphs

## Duty Cycle NVNT BLE 1M 2402MHz Ant1



## Duty Cycle NVNT BLE 1M 2440MHz Ant1

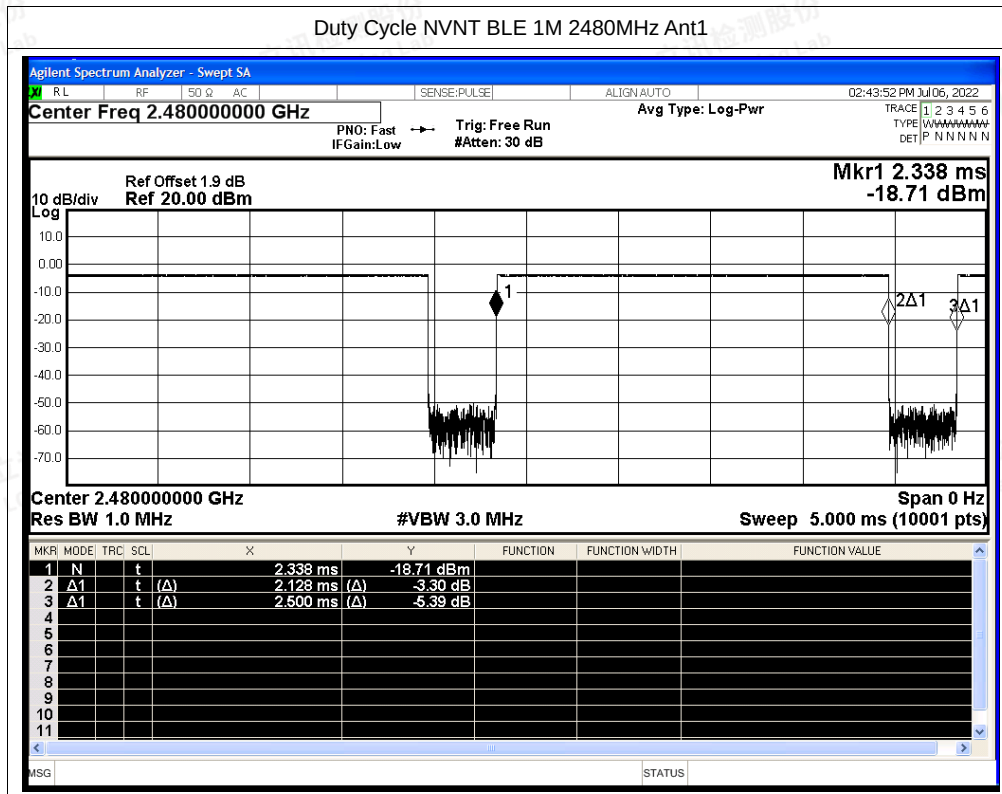


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## A.7 Restrict Band

| 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            | -51.02      | 2          | 46.24      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -60.26      | 2          | 37         | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2334.384        | -47.78      | 2          | 49.48      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2379.024        | -59.11      | 2          | 38.15      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -51.73      | 2          | 45.53      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -59.74      | 2          | 37.52      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -48.8       | 2          | 48.46      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -59.68      | 2          | 37.58      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2495.752        | -47.94      | 2          | 49.32      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2494.312        | -58.71      | 2          | 38.55      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -51.24      | 2          | 46.02      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -59.31      | 2          | 37.95      | Average  | 54             | Pass    |



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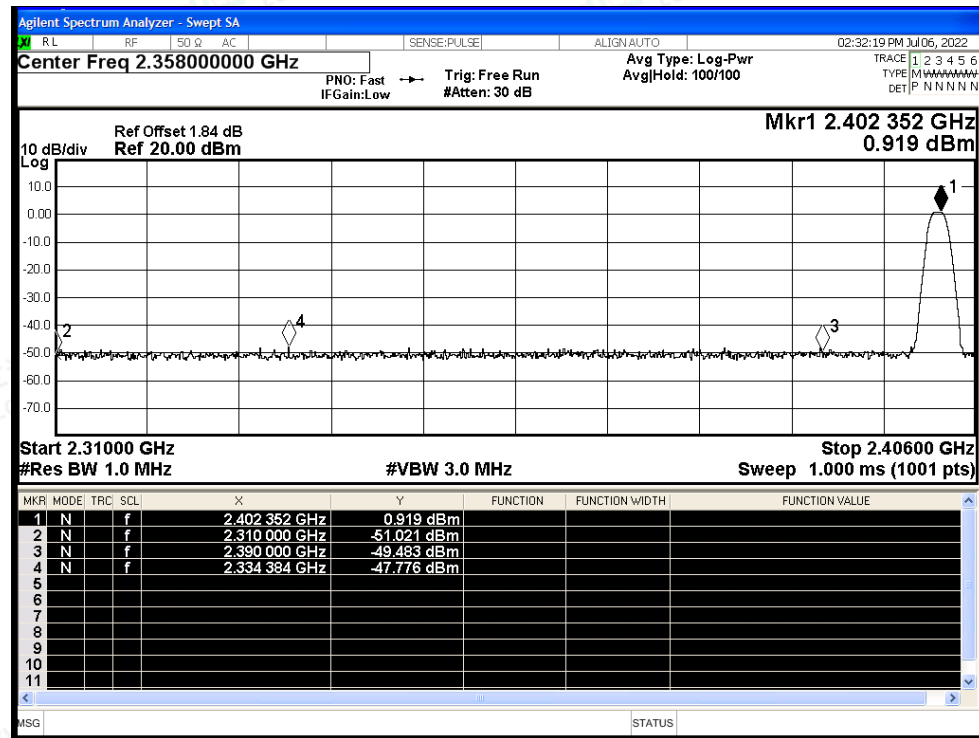
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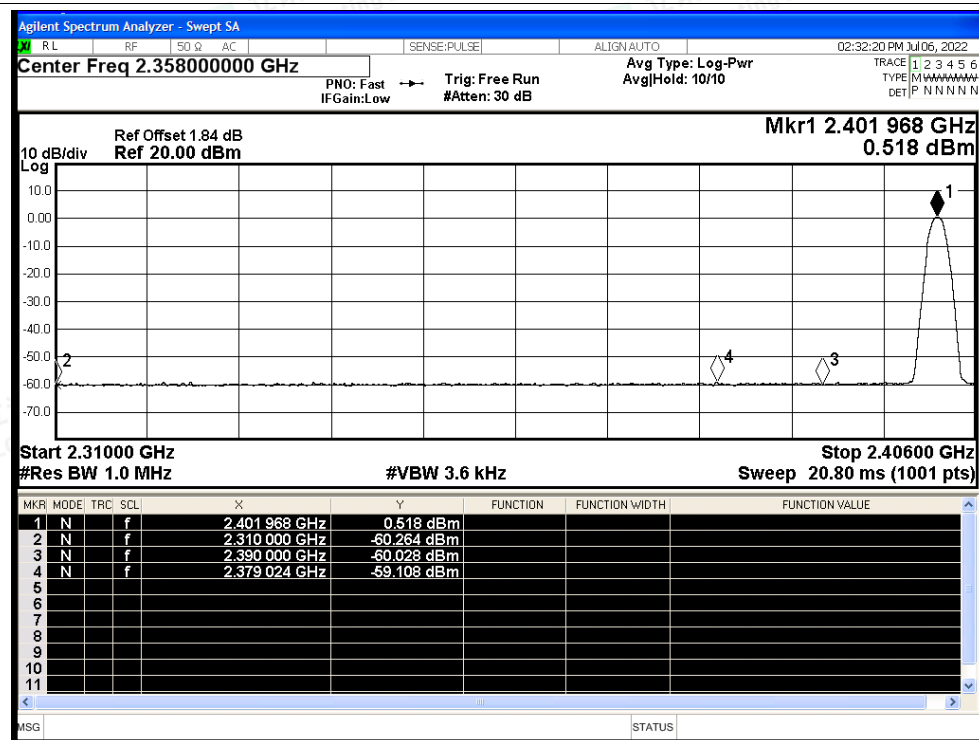


## Test Graphs

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



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



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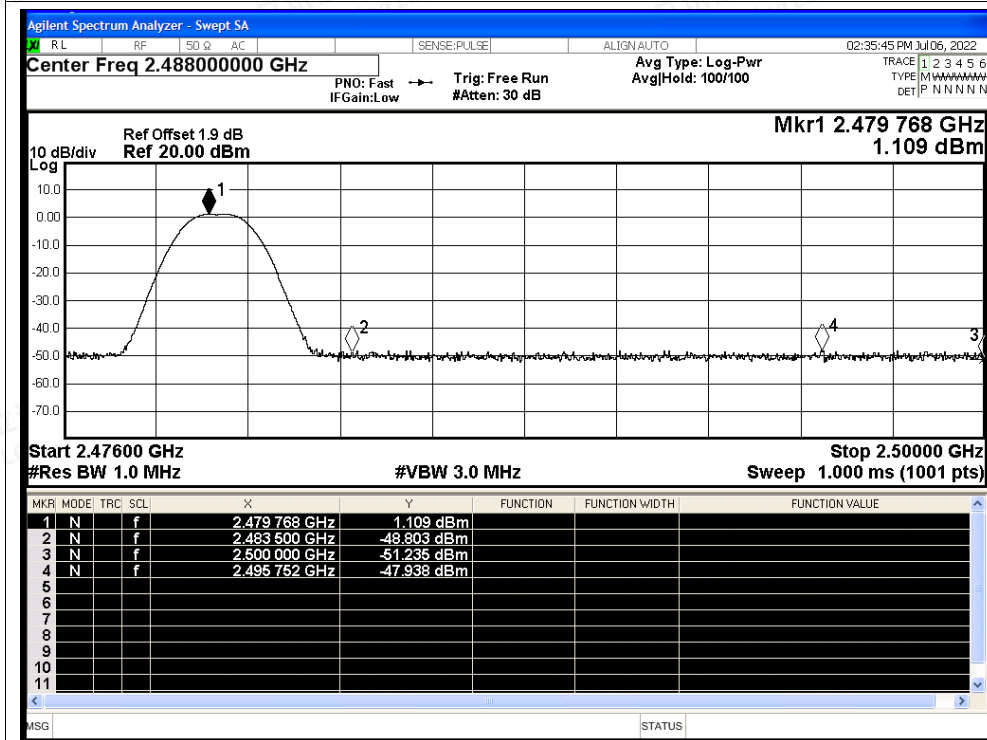
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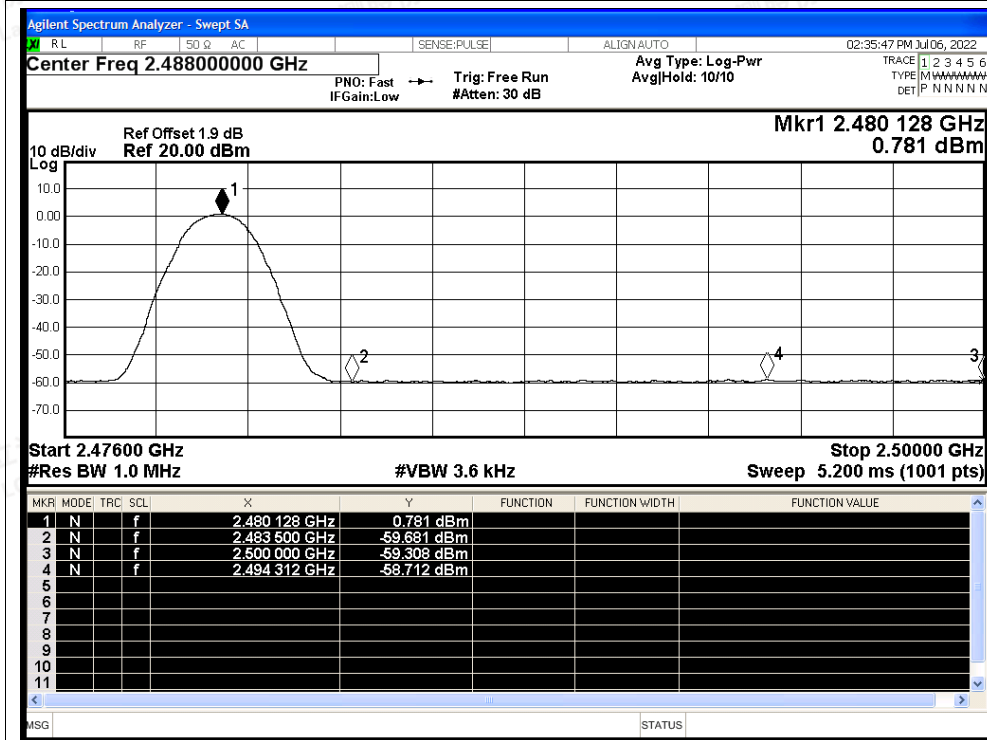
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## Restrict Band NVNT BLE 1M 2480MHz Ant1 Peak



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



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