



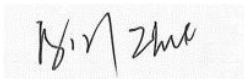
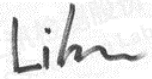
## Appendix B

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

Product Name: Smart switch

Test Model: Shelly Plus 1PM

#### Environmental Conditions

|                    |                                                                                                 |
|--------------------|-------------------------------------------------------------------------------------------------|
| Temperature:       | 23.5 ° C                                                                                        |
| Relative Humidity: | 52.2%                                                                                           |
| ATM Pressure:      | 100.0 kPa                                                                                       |
| Test Engineer:     | <br>Bill Zhu  |
| Supervised by:     | <br>Li Huan |





### B.1 -6dB Bandwidth

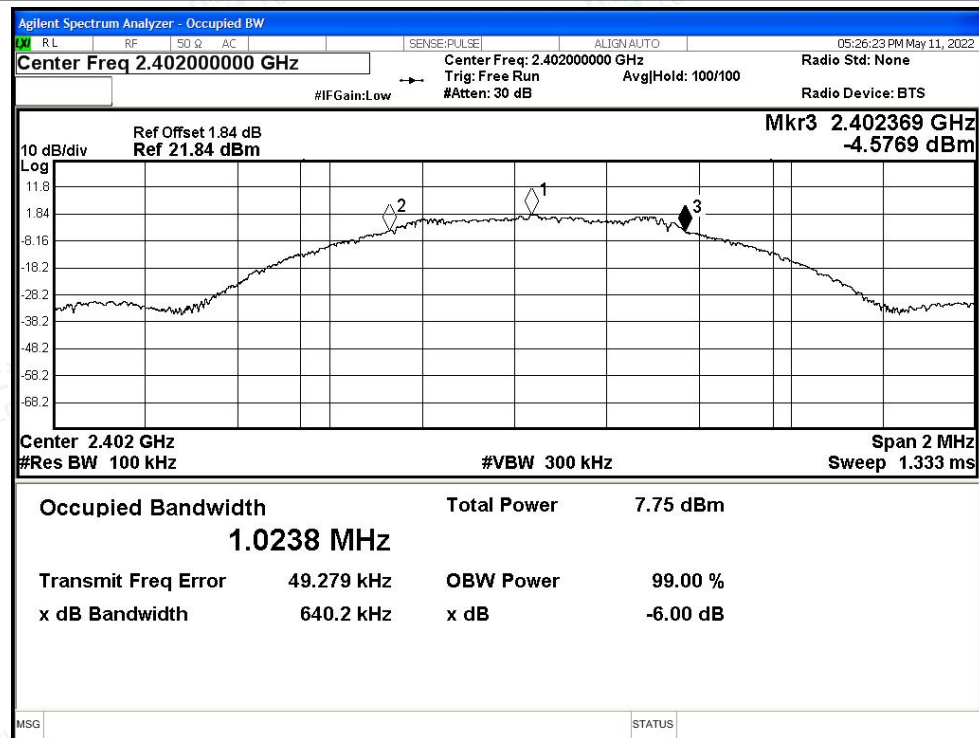
| Condition | Mode   | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|--------|-----------------|---------|-----------------------|-----------------------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 0.64                  | 0.5                         | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 0.64                  | 0.5                         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 0.639                 | 0.5                         | Pass    |



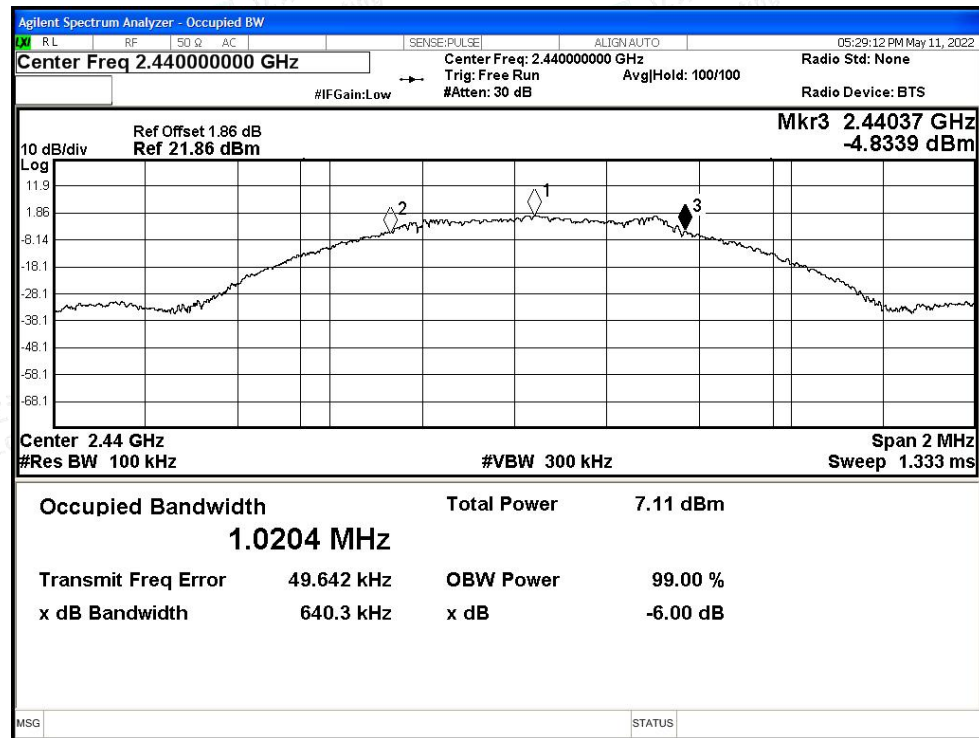


## Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1

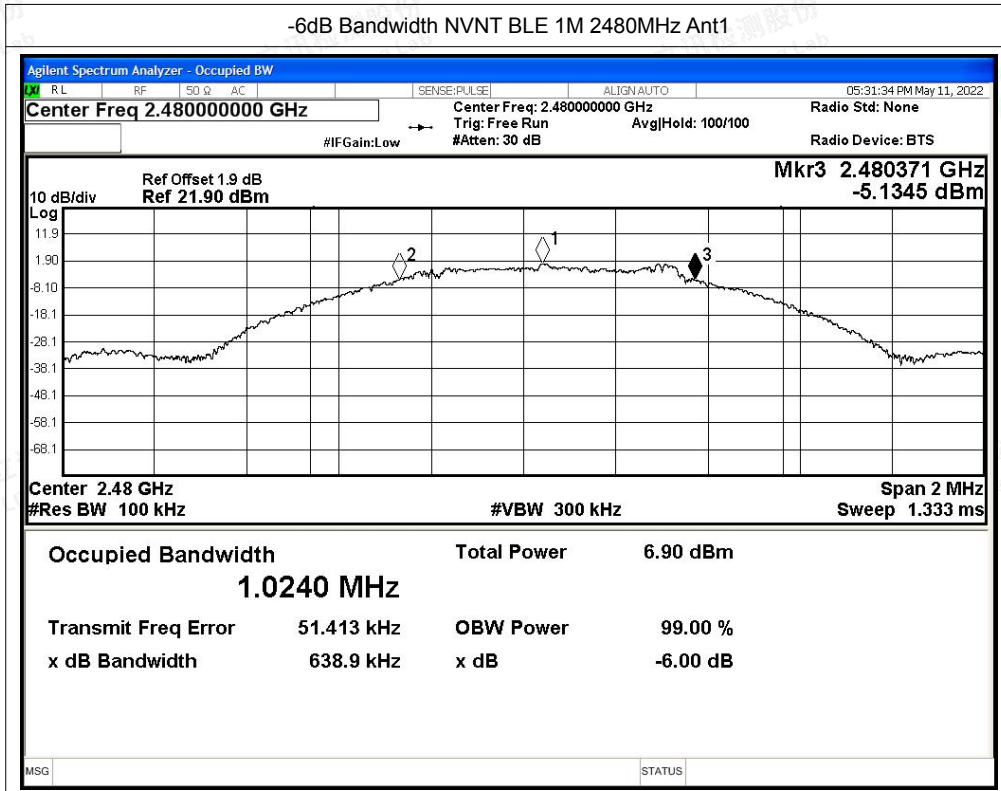


Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A &amp; 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





## B.2 Maximum Peak Conducted Output Power

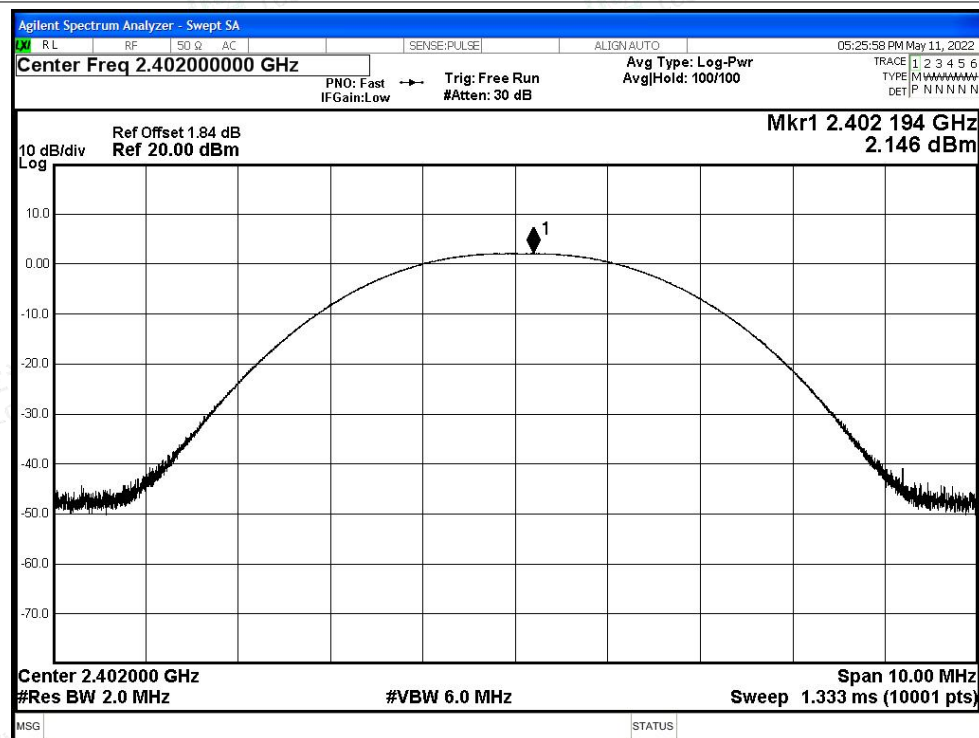
| Condition | Mode   | Frequency<br>(MHz) | Antenna | Total Power<br>(dBm) | Limit<br>(dBm) | Verdict |
|-----------|--------|--------------------|---------|----------------------|----------------|---------|
| NVNT      | BLE 1M | 2402               | Ant1    | 2.15                 | 30             | Pass    |
| NVNT      | BLE 1M | 2440               | Ant1    | 1.43                 | 30             | Pass    |
| NVNT      | BLE 1M | 2480               | Ant1    | 1.16                 | 30             | Pass    |



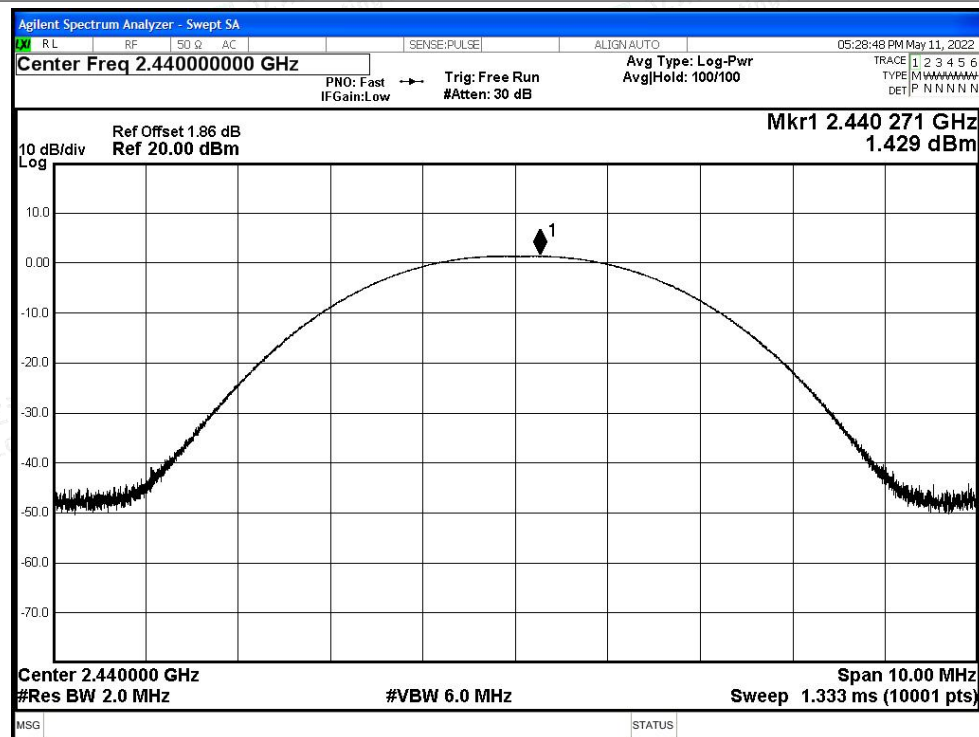


## Test Graphs

Power NVNT BLE 1M 2402MHz Ant1



Power NVNT BLE 1M 2440MHz Ant1

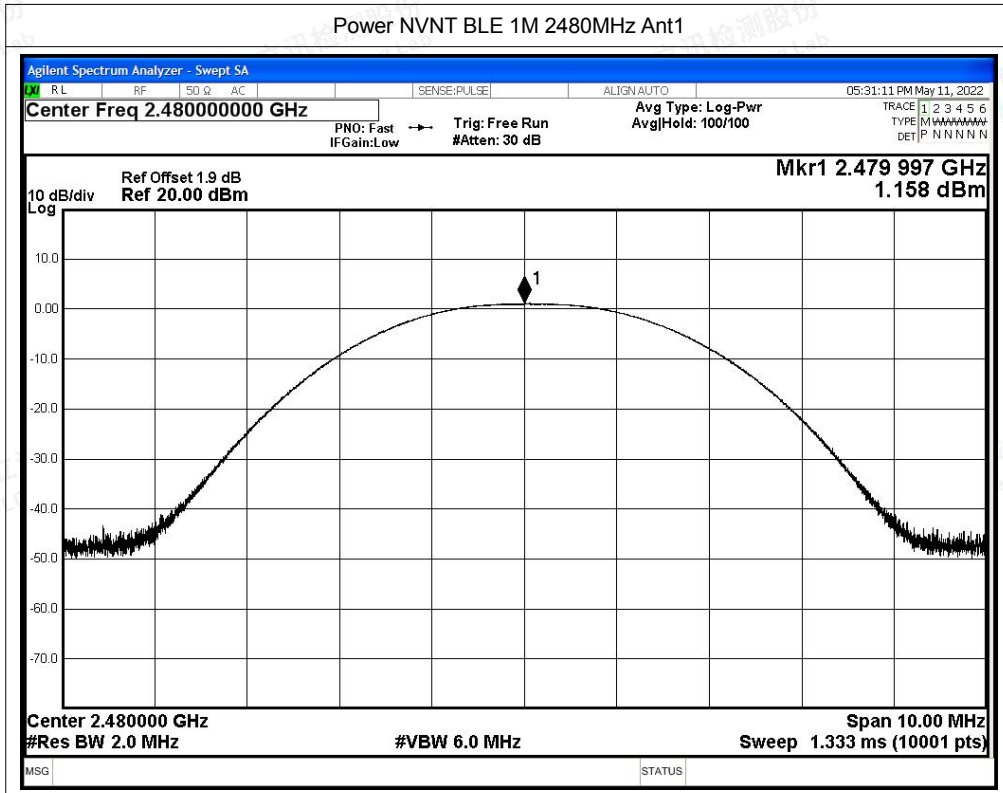


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### B.3 Maximum Power Spectral Density Level

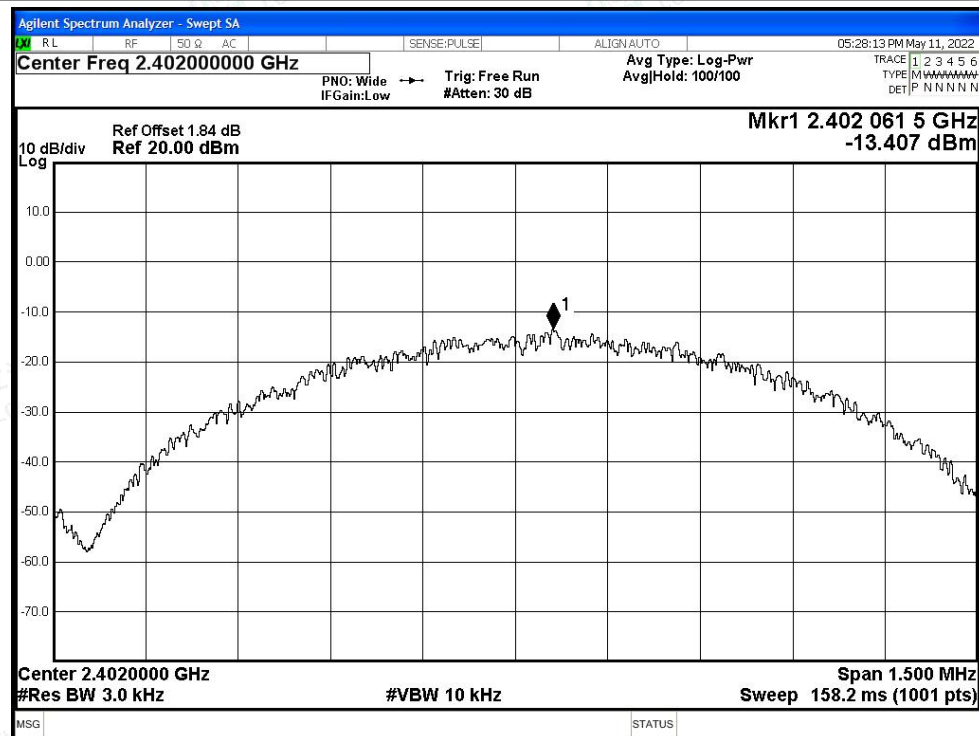
| Condition | Mode   | Frequency (MHz) | Antenna | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|-----------|--------|-----------------|---------|----------------------|------------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -13.41               | 8                | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -13.02               | 8                | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -13.22               | 8                | Pass    |



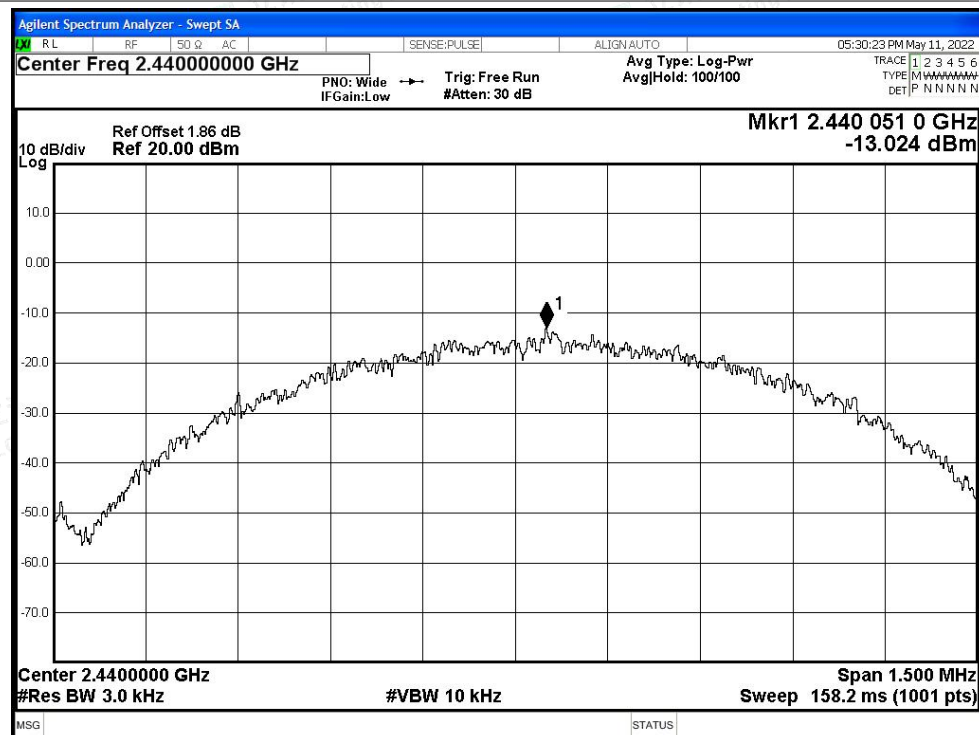


## Test Graphs

PSD NVNT BLE 1M 2402MHz Ant1



PSD NVNT BLE 1M 2440MHz Ant1

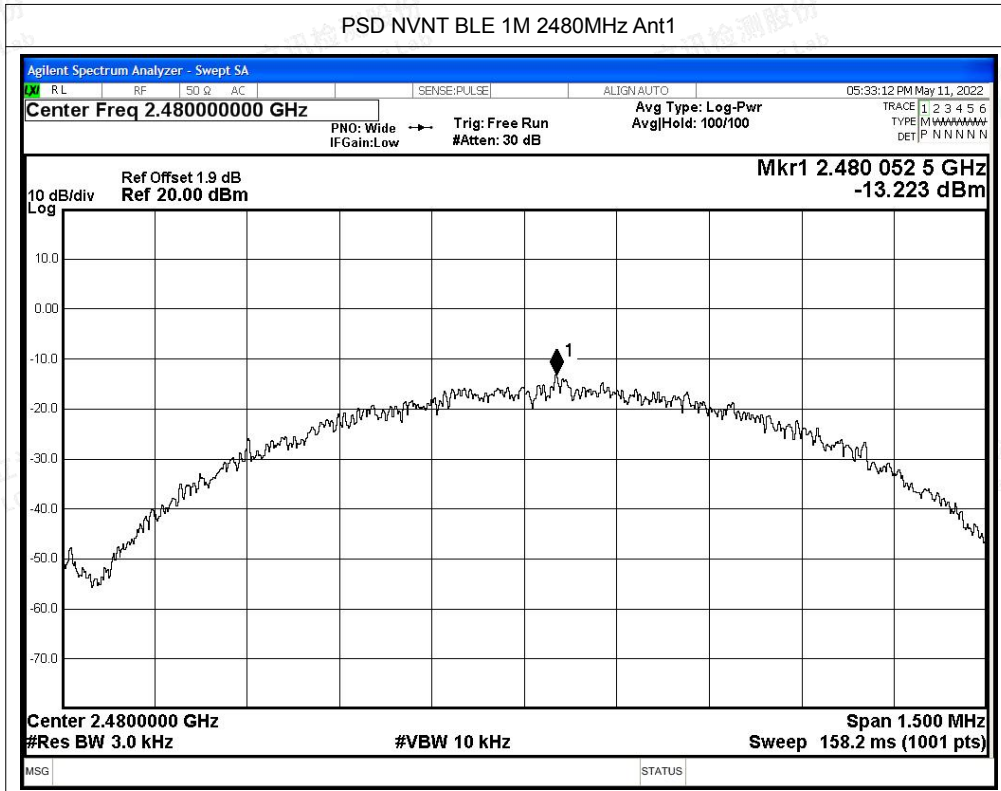


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### B.4 Band Edge

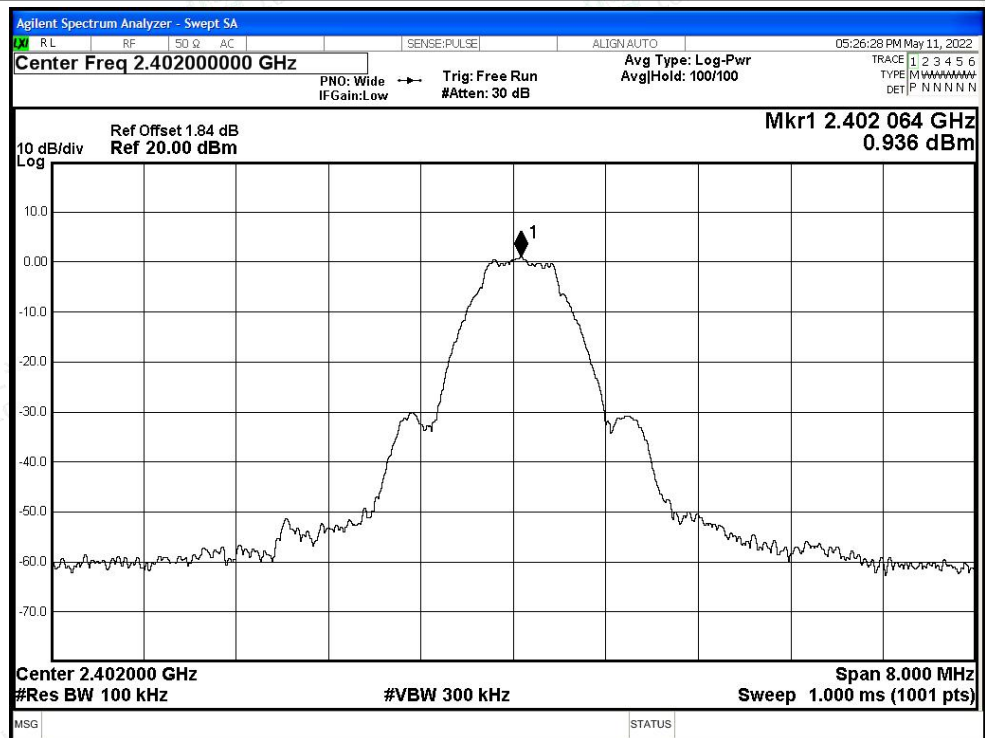
| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -52.49          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -58.35          | -20         | Pass    |



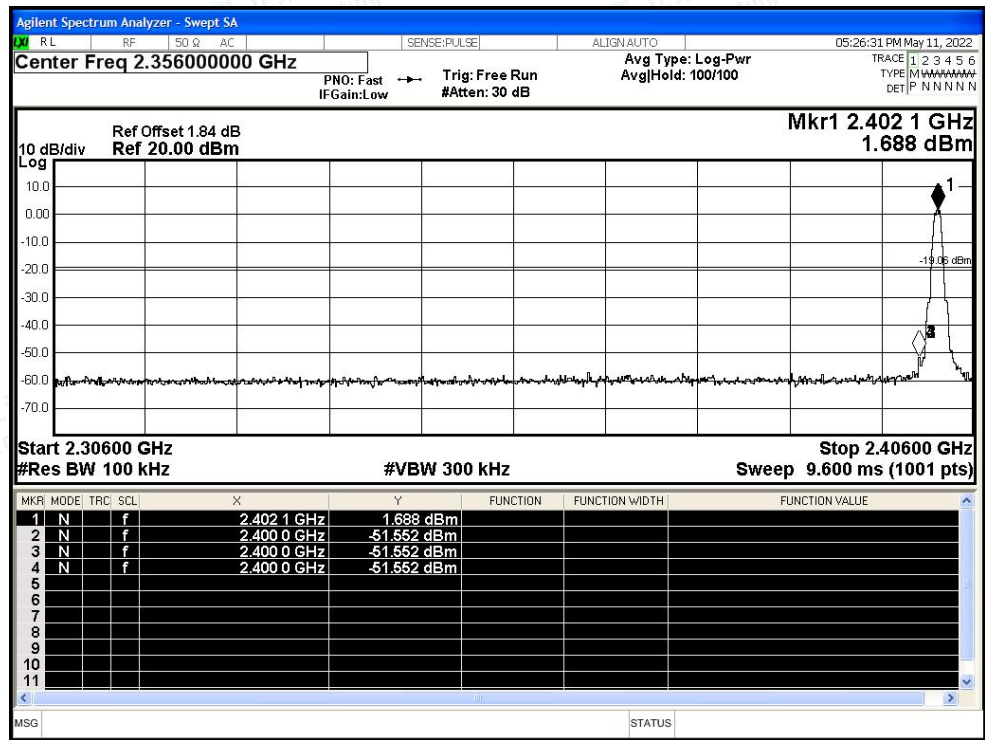


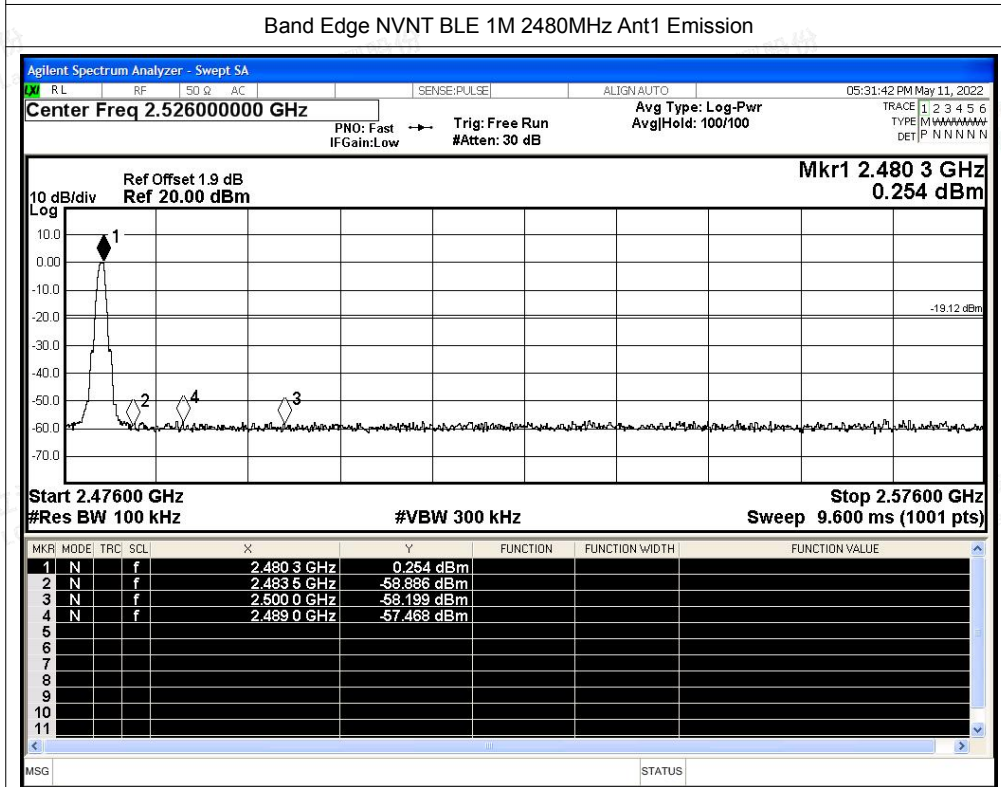
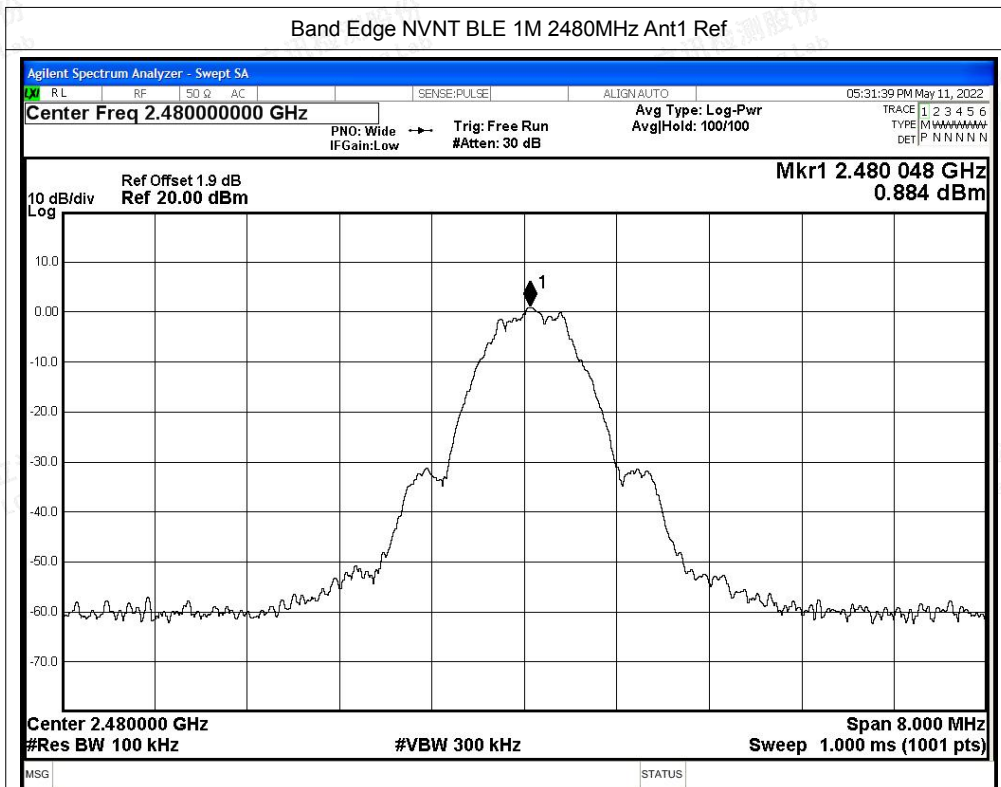
Test Graphs

Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



Band Edge NVNT BLE 1M 2402MHz Ant1 Emission







### B.5 Conducted RF Spurious Emission

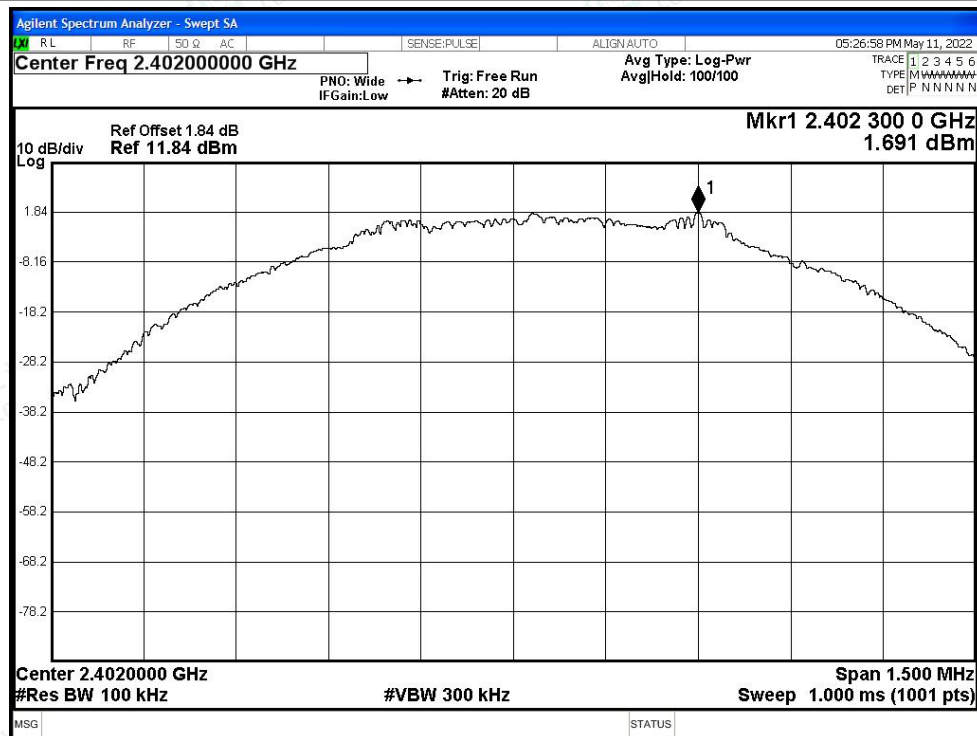
| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -47.93          | -20         | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -46.93          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -48.07          | -20         | Pass    |



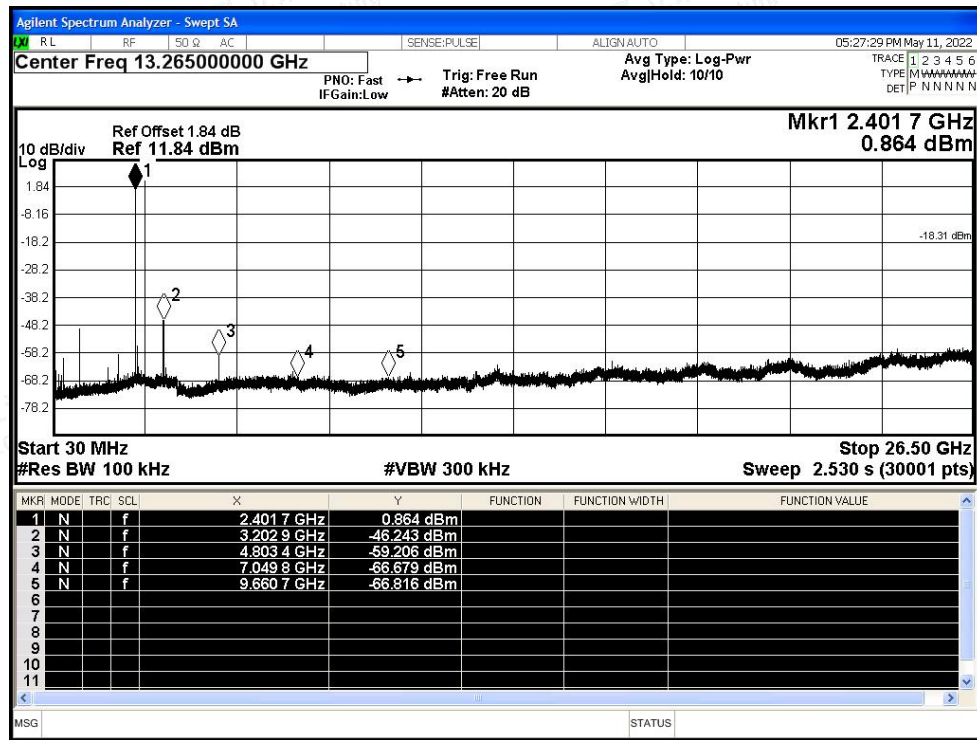


Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref

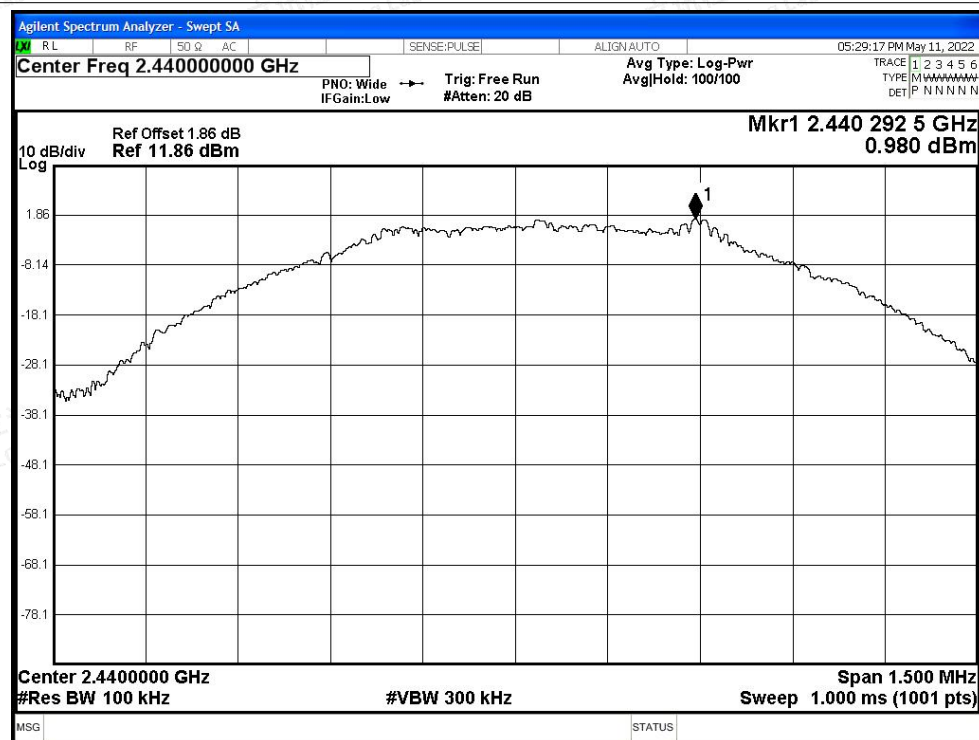


Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

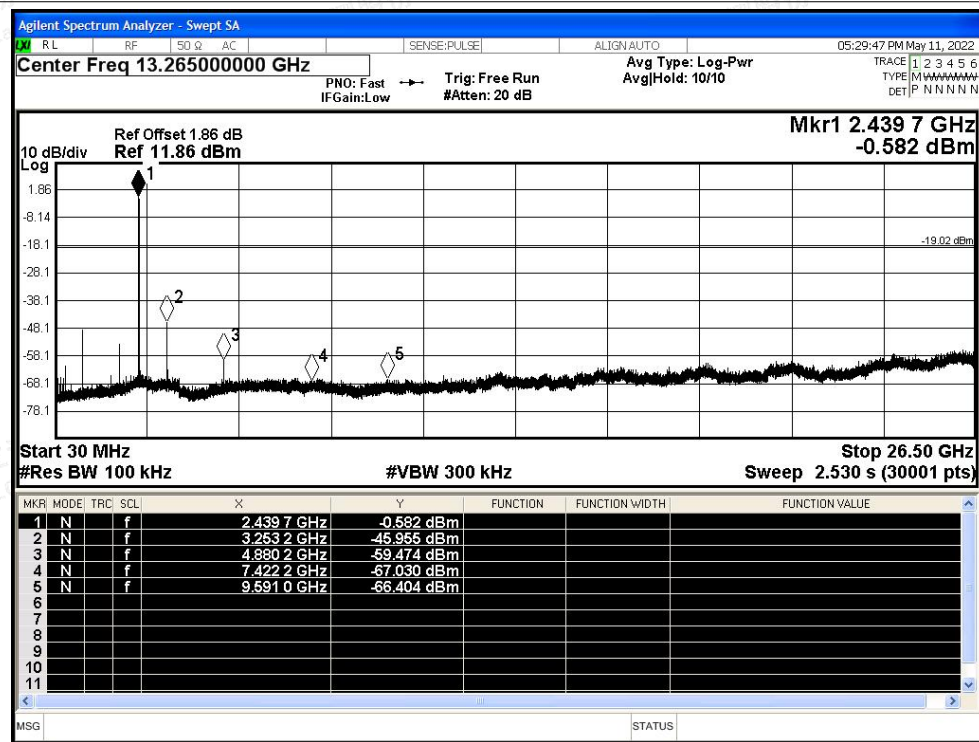


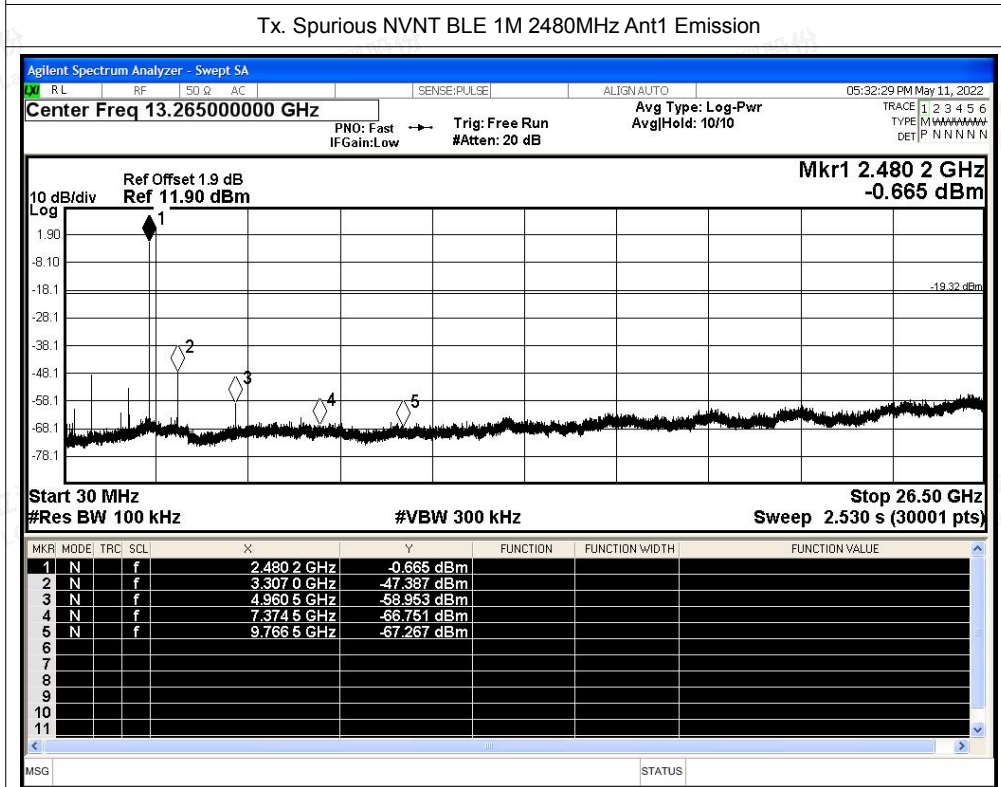
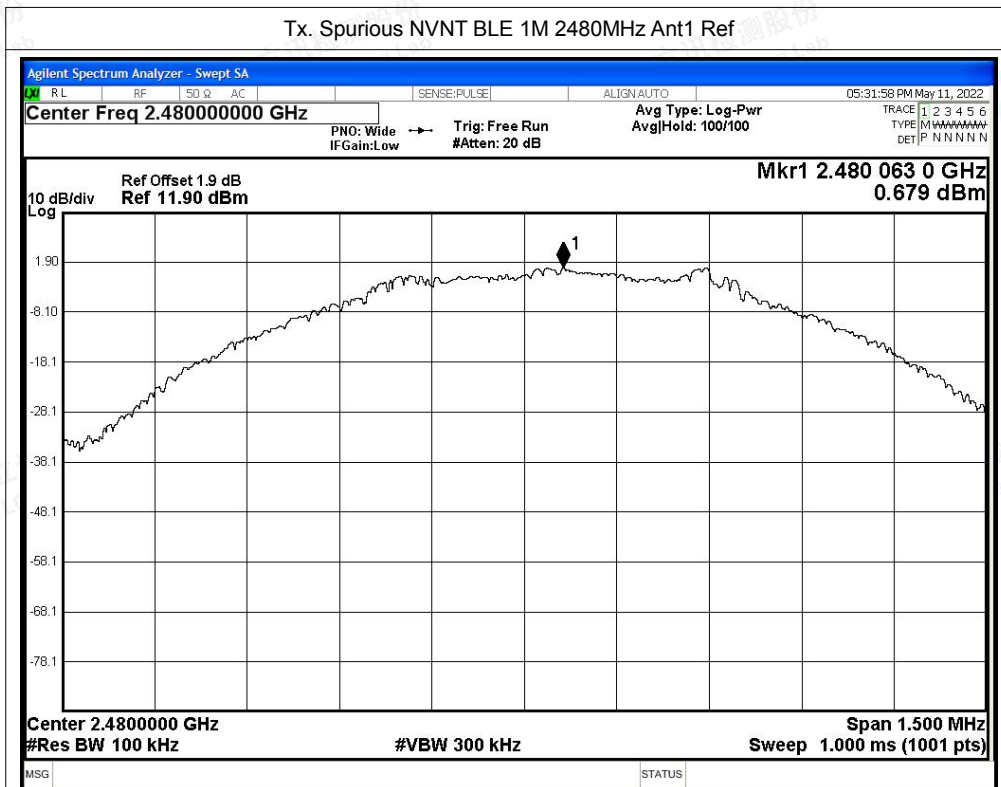


Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission







### B.6 Duty Cycle

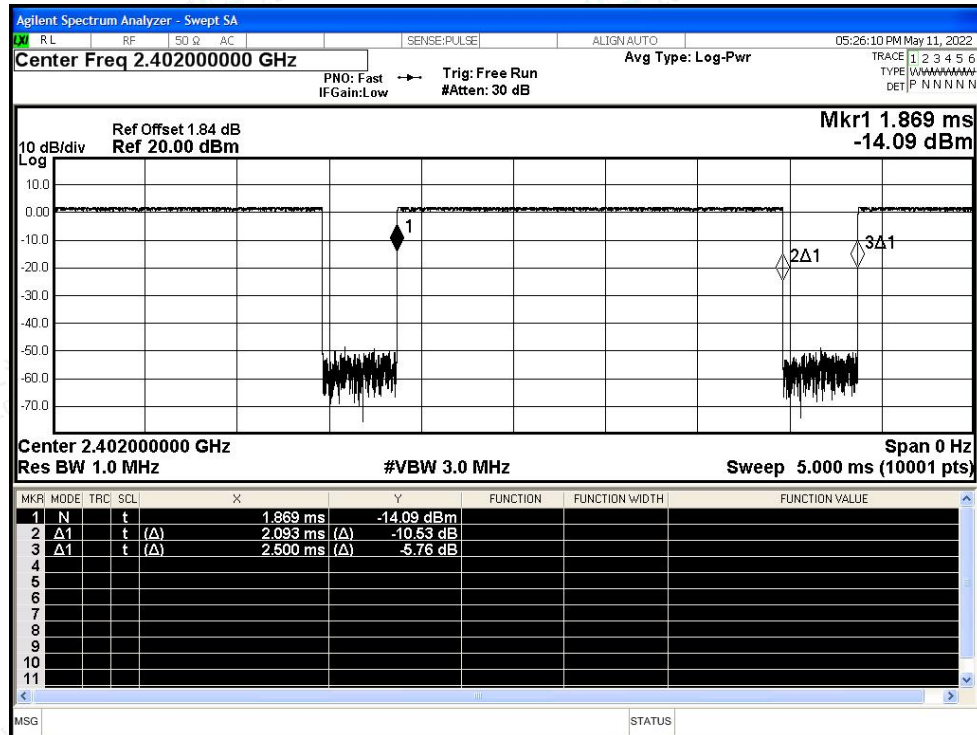
| Condition | Mode   | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|-----------|--------|-----------------|---------|----------------|------------------------|-----------|
| NVNT      | BLE 1M | 2402            | Ant1    | 83.72          | 0.77                   | 0.48      |
| NVNT      | BLE 1M | 2440            | Ant1    | 83.7           | 0.77                   | 0.48      |
| NVNT      | BLE 1M | 2480            | Ant1    | 83.7           | 0.77                   | 0.48      |



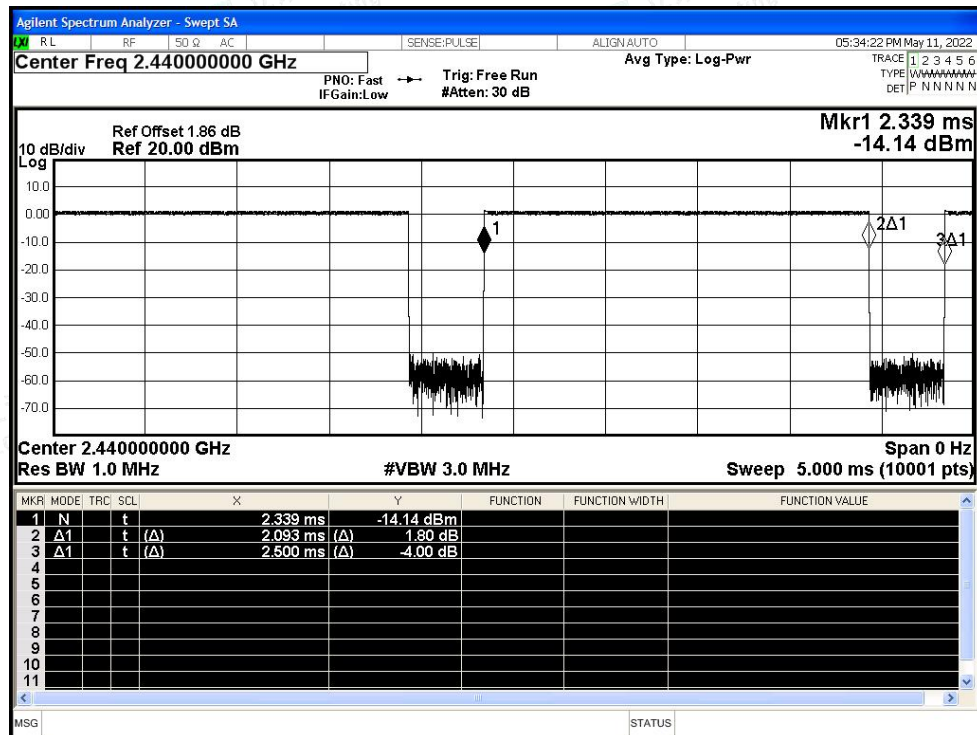


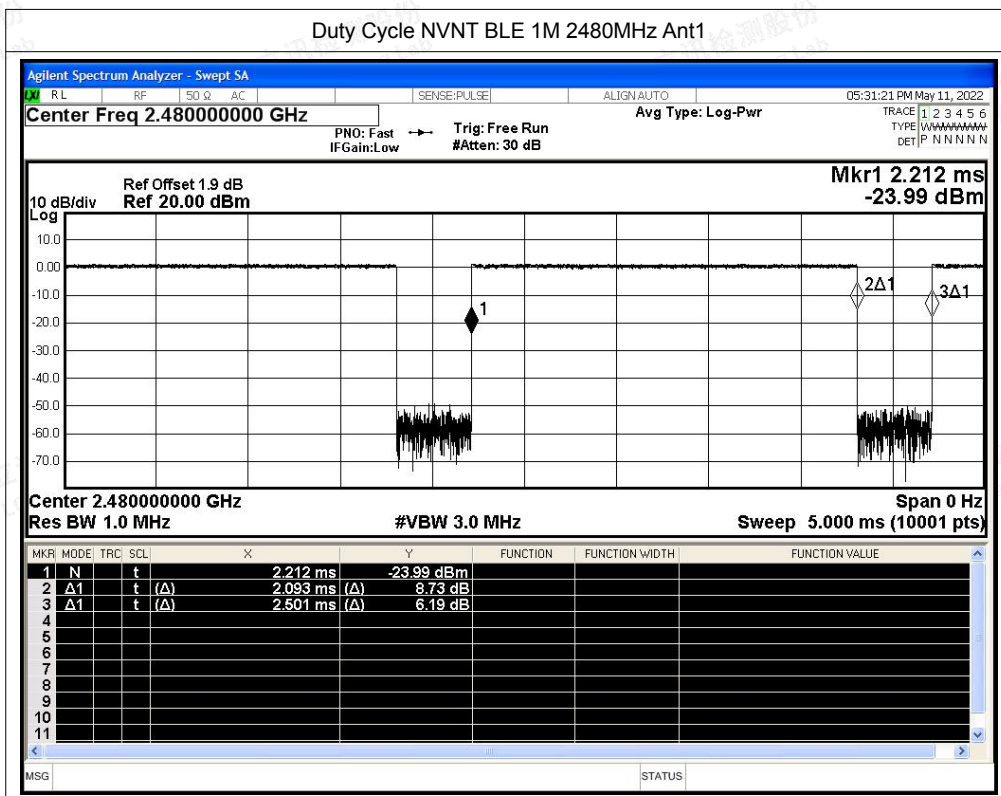
### Test Graphs

Duty Cycle NVNT BLE 1M 2402MHz Ant1



Duty Cycle NVNT BLE 1M 2440MHz Ant1







## B.7 Restrict Band

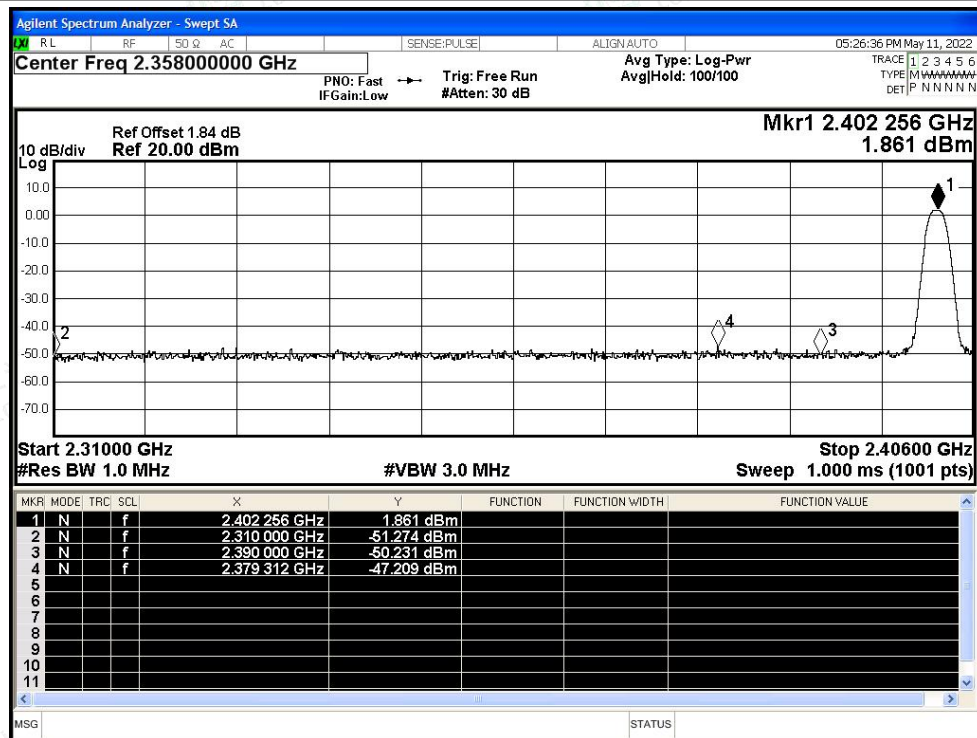
| Condition | Mode   | Frequency (MHz) | Antenna | Spur Freq (MHz) | Power (dBm) | Gain (dBi) | E (dBuV/m) | Detector | Limit (dBuV/m) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|------------|------------|----------|----------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -51.27      | 2          | 45.99      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -60.45      | 2          | 36.81      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2379.312        | -47.21      | 2          | 50.05      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2381.616        | -59.77      | 2          | 37.49      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -50.34      | 2          | 46.92      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -59.87      | 2          | 37.39      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -49         | 2          | 48.26      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -59.11      | 2          | 38.15      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2493.904        | -47         | 2          | 50.26      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.656        | -59.05      | 2          | 38.21      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -49.89      | 2          | 47.37      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -59.5       | 2          | 37.76      | Average  | 54             | Pass    |





### Test Graphs

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



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

