



## Appendix A

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

Product Name: LED Controller

Test Model: SP530E

#### Environmental Conditions

|                    |            |
|--------------------|------------|
| Temperature:       | 23.8 ° C   |
| Relative Humidity: | 52.1%      |
| ATM Pressure:      | 100.0 kPa  |
| Test Engineer:     | Paddi Chen |
| 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    | 0.647                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 0.663                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 0.651                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 1.161                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 2M | 2440            | Ant1    | 1.137                 | $\geq 0.5$                  | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 1.144                 | $\geq 0.5$                  | Pass    |

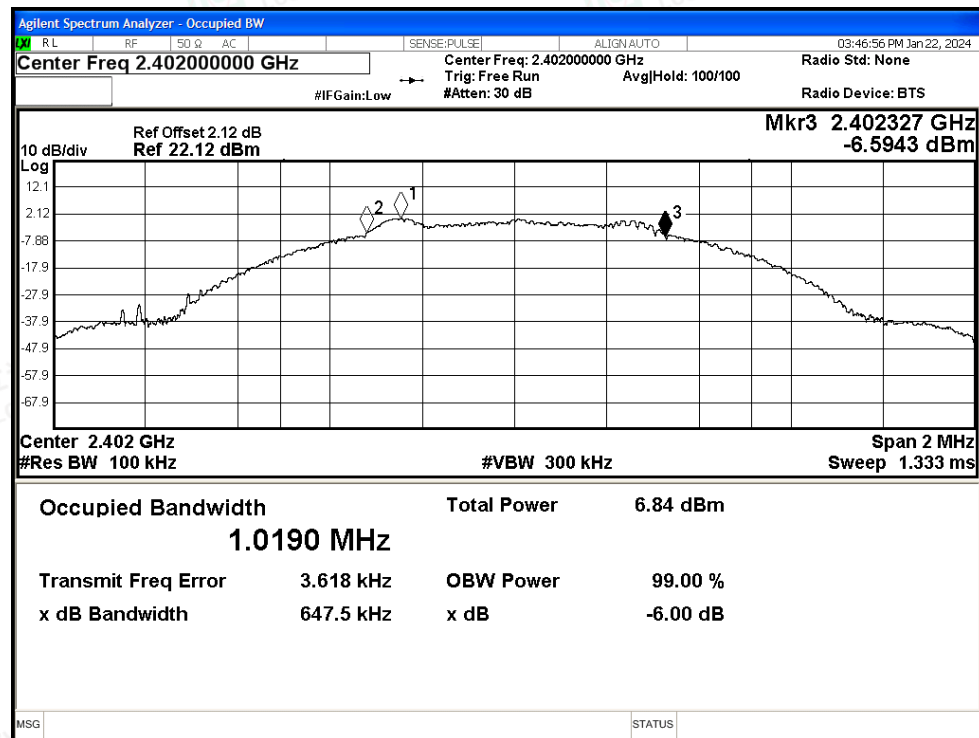


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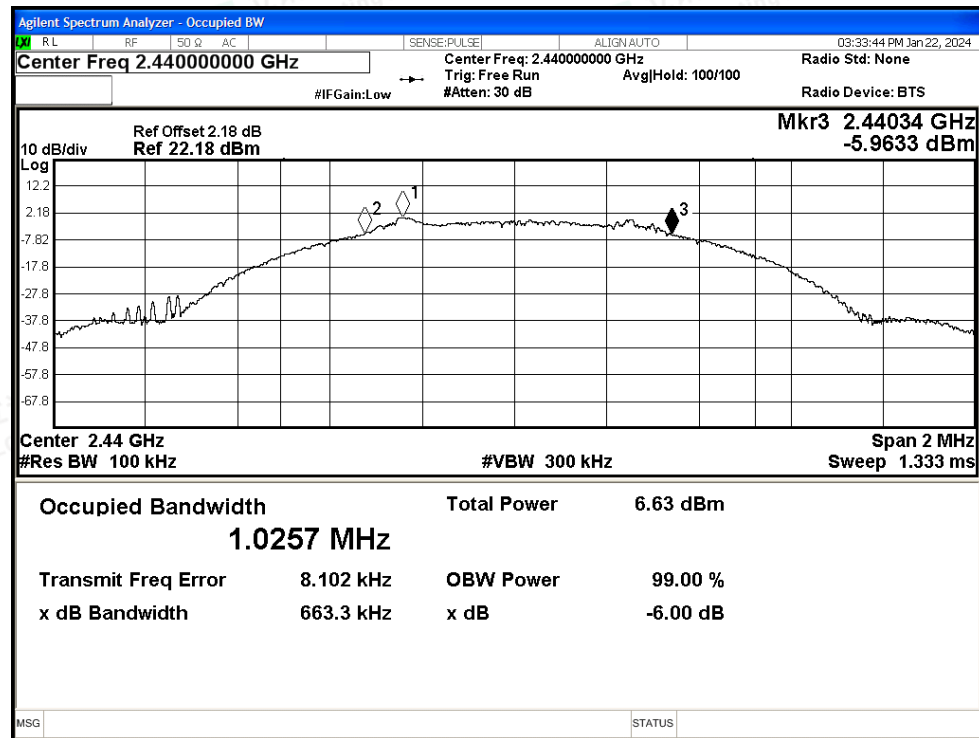


## Test Graphs

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1



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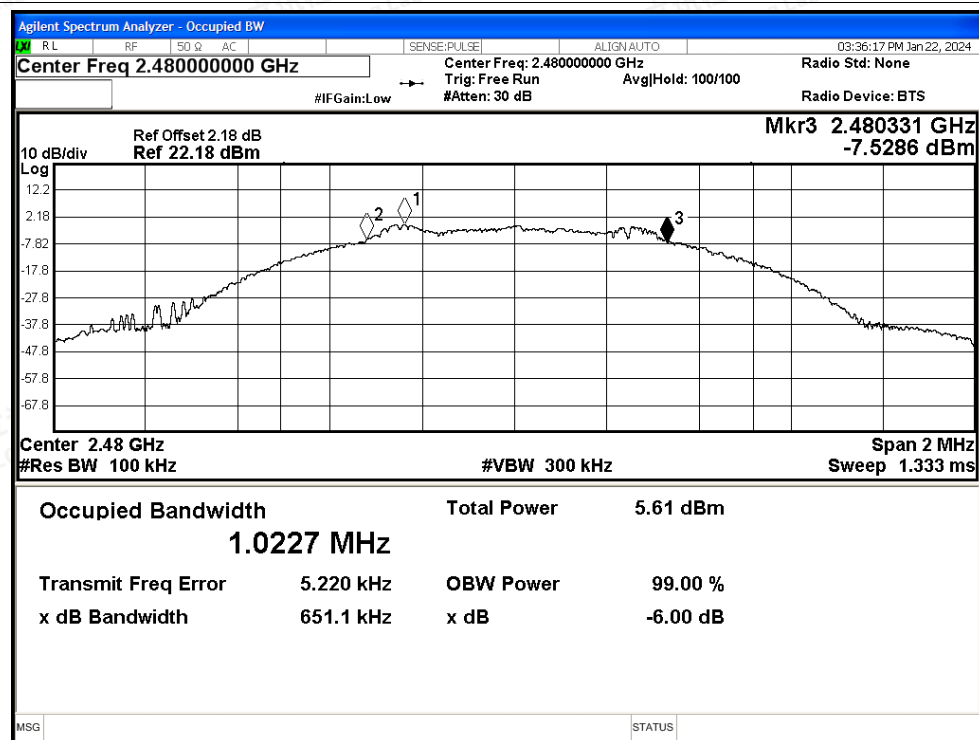
Add: 101, 201 Bldg A &amp; 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

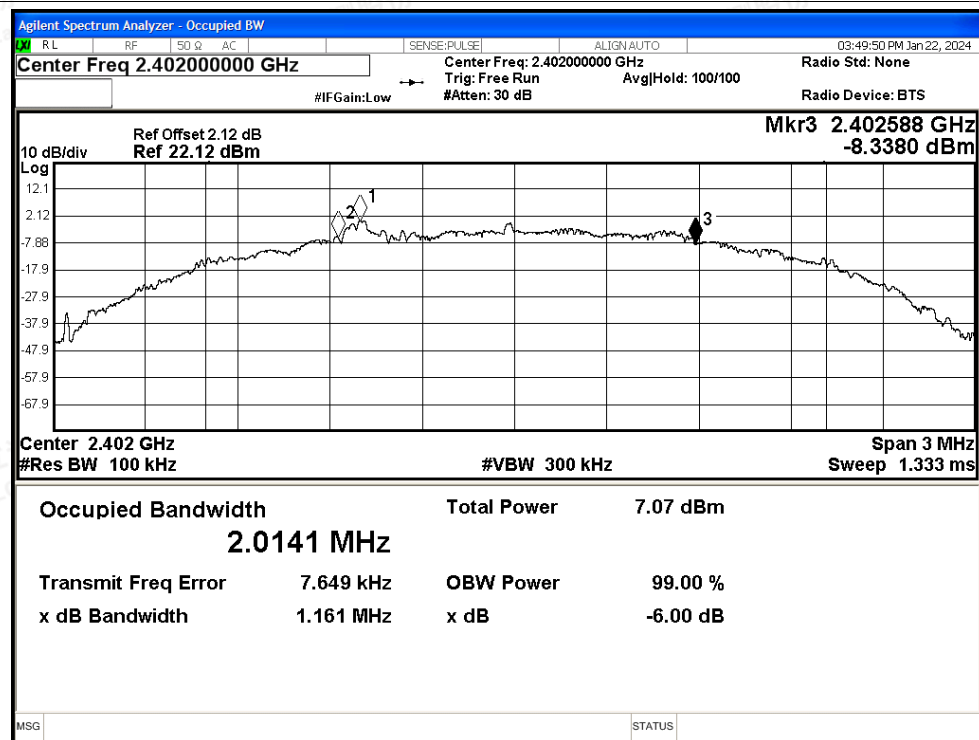
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## -6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



## -6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



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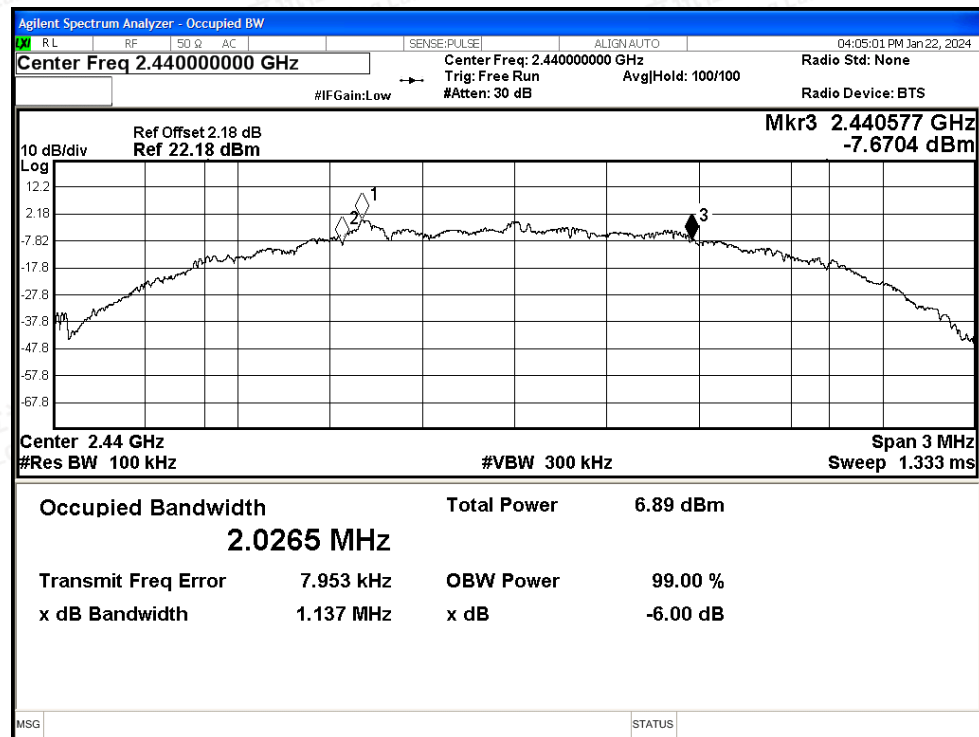
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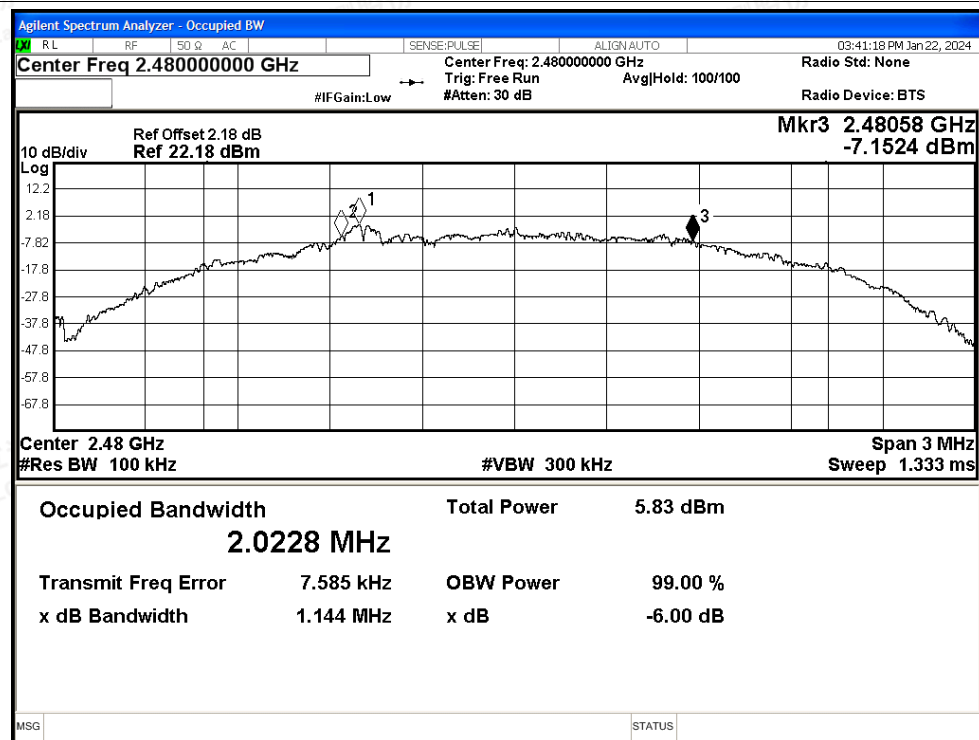
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## -6dB Bandwidth NVNT BLE 2M 2440MHz Ant1



## -6dB Bandwidth NVNT BLE 2M 2480MHz Ant1



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## A.2 Maximum Peak Conducted Output Power

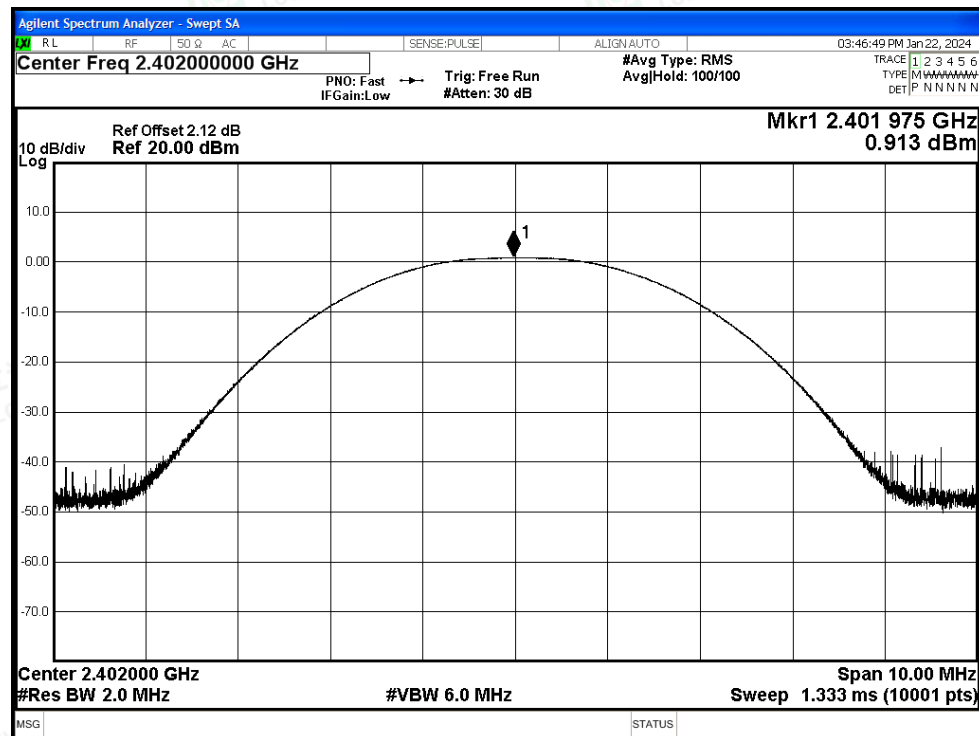
| Condition | Mode   | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|--------|-----------------|---------|-----------------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | 0.91                  | 30          | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | 0.91                  | 30          | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -0.21                 | 30          | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 0.81                  | 30          | Pass    |
| NVNT      | BLE 2M | 2440            | Ant1    | 0.43                  | 30          | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | -0.49                 | 30          | Pass    |



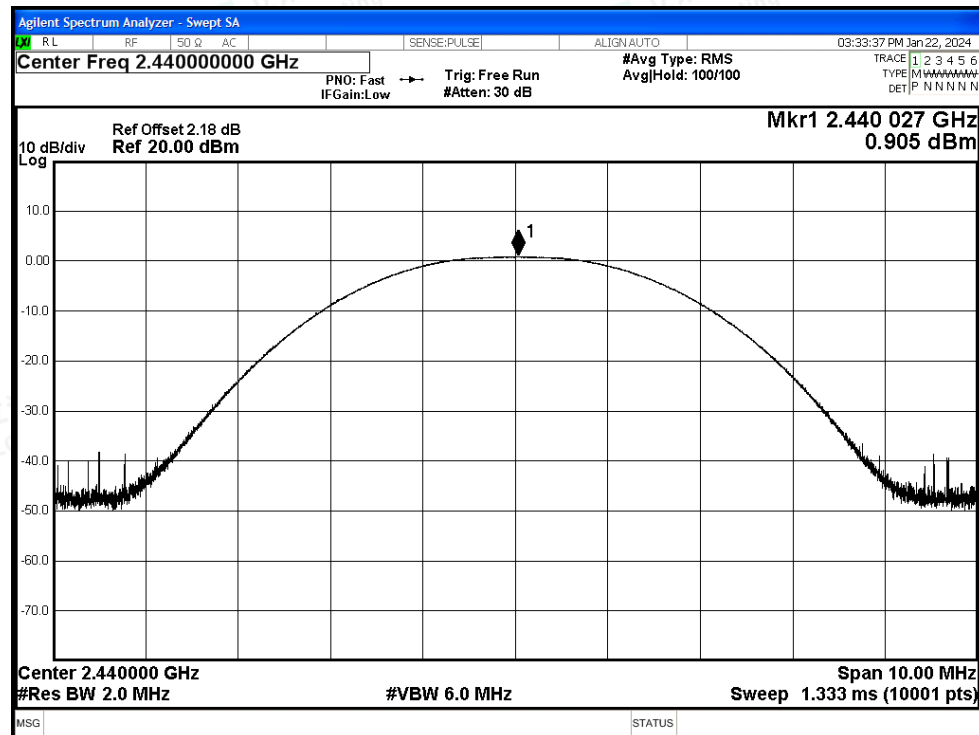


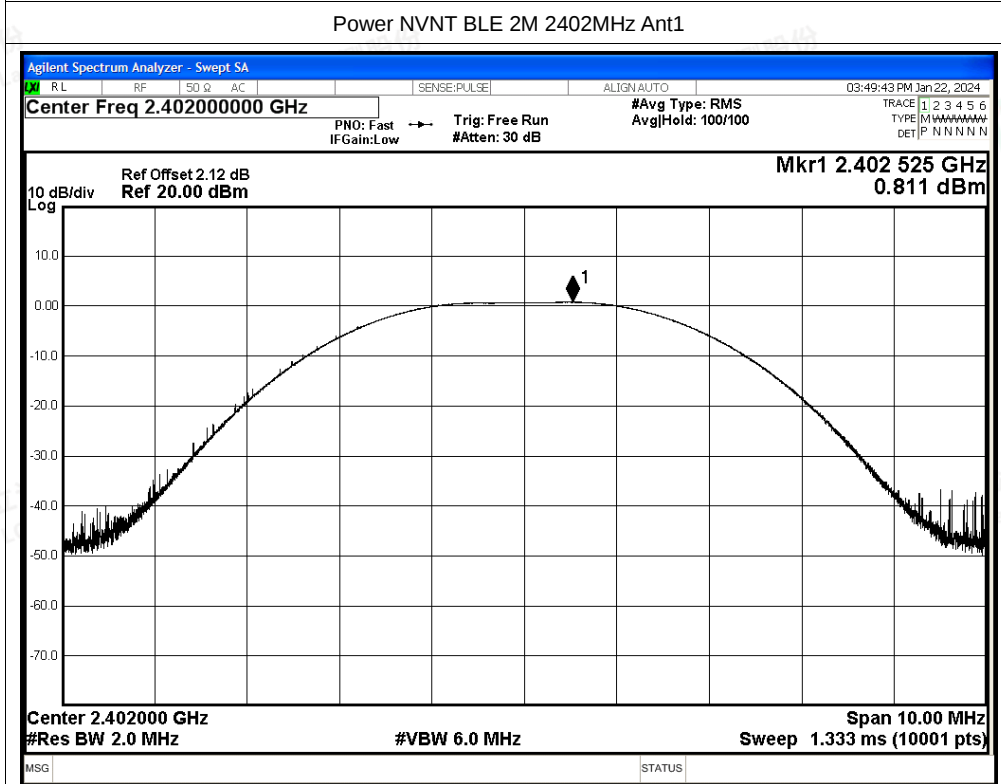
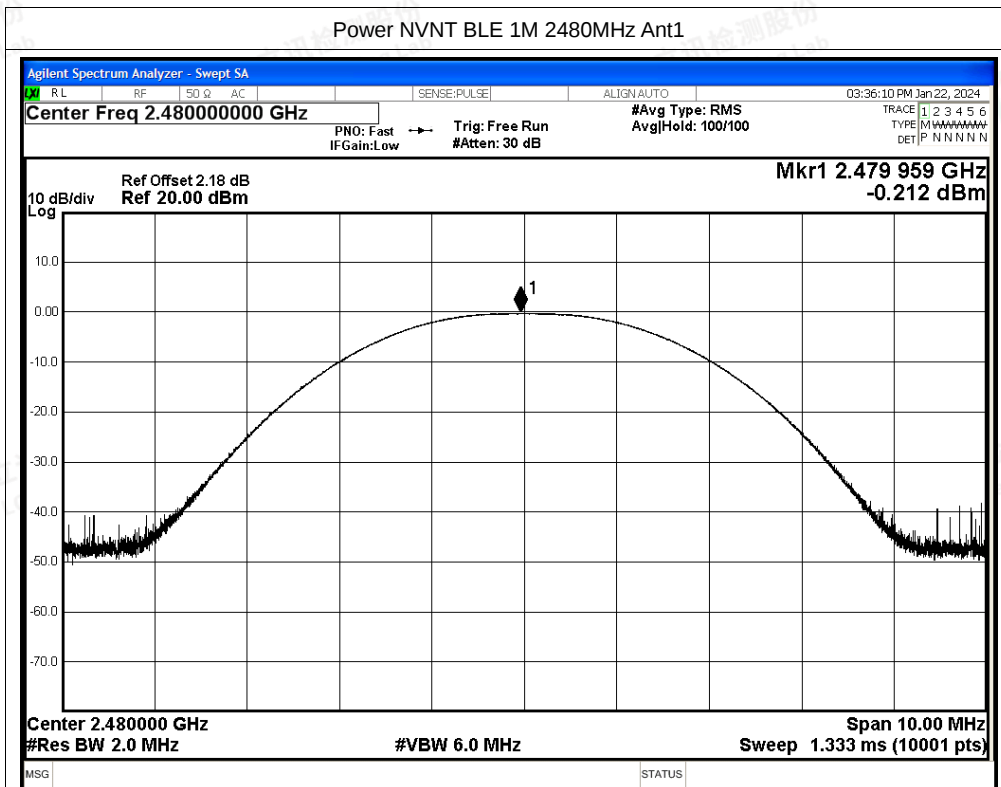
## Test Graphs

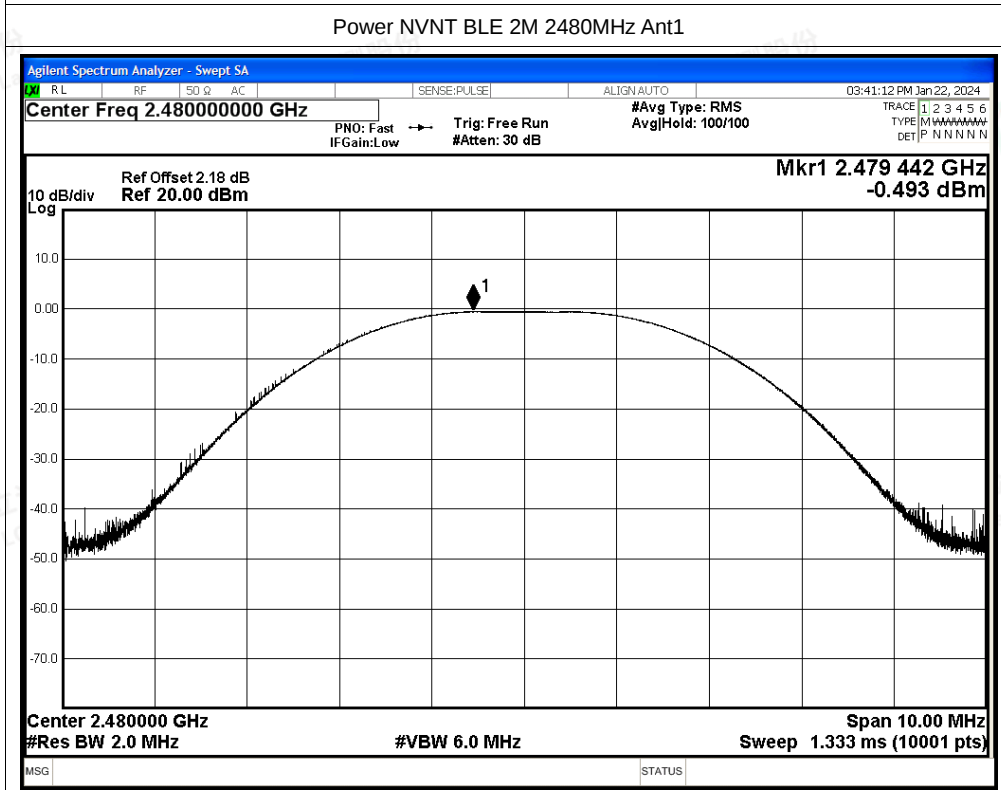
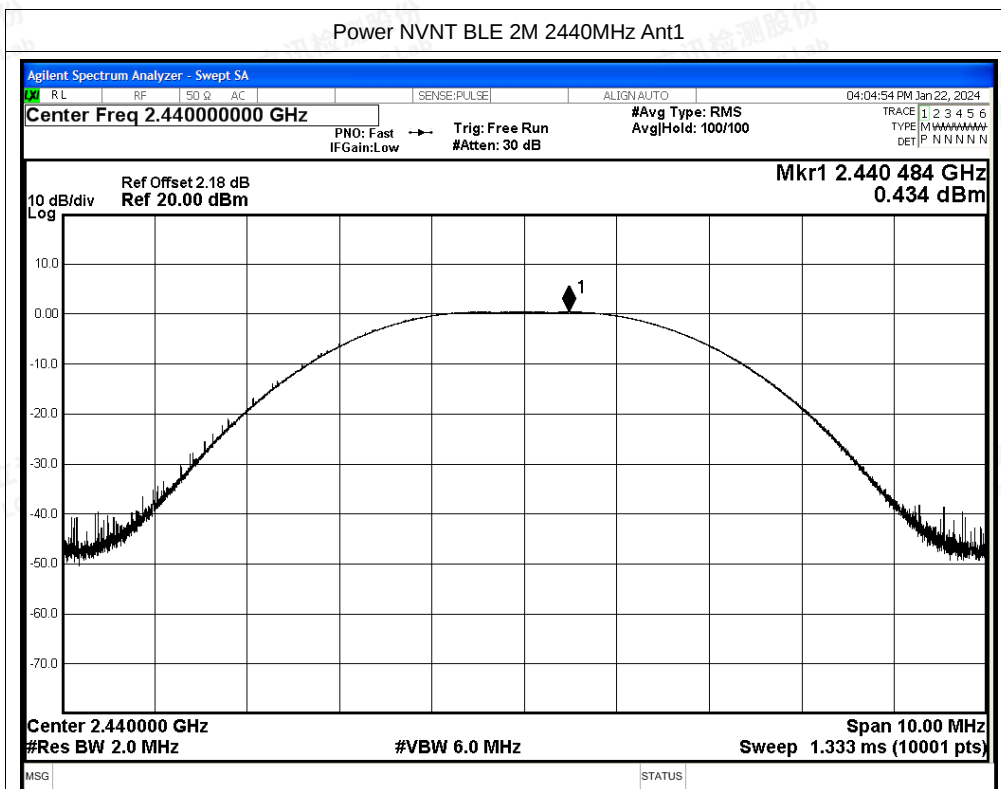
Power NVNT BLE 1M 2402MHz Ant1



Power NVNT BLE 1M 2440MHz Ant1









### A.3 Maximum Power Spectral Density Level

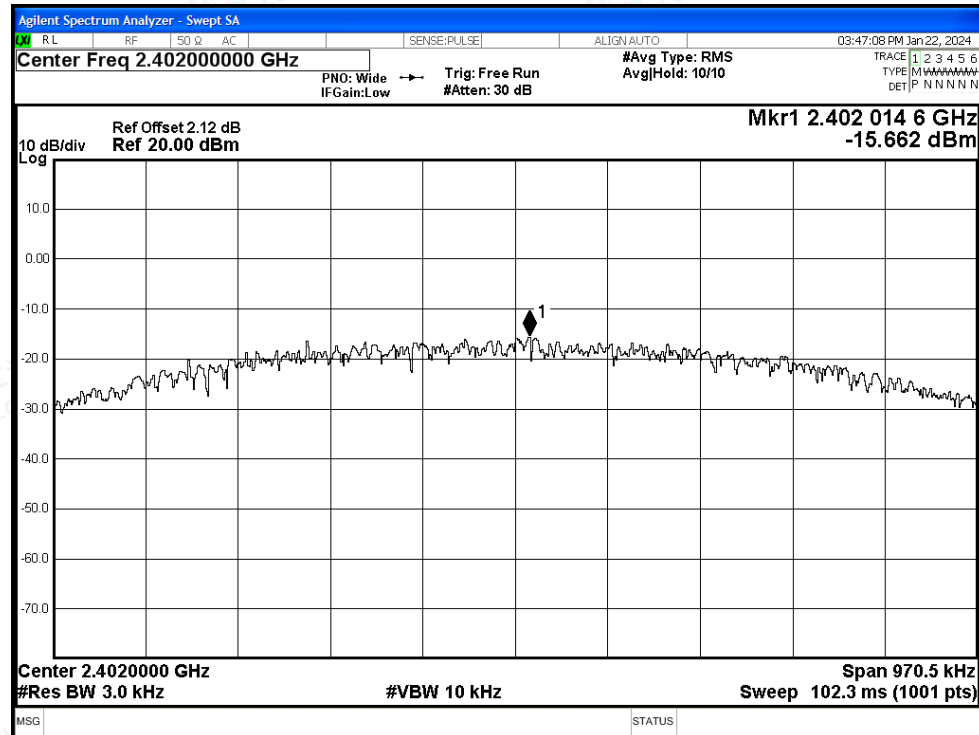
| Condition | Mode   | Frequency (MHz) | Antenna | Conducted PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|-----------|--------|-----------------|---------|--------------------------|------------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -15.66                   | 8                | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -15.86                   | 8                | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -16.8                    | 8                | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | -18.94                   | 8                | Pass    |
| NVNT      | BLE 2M | 2440            | Ant1    | -19.1                    | 8                | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | -20.13                   | 8                | Pass    |



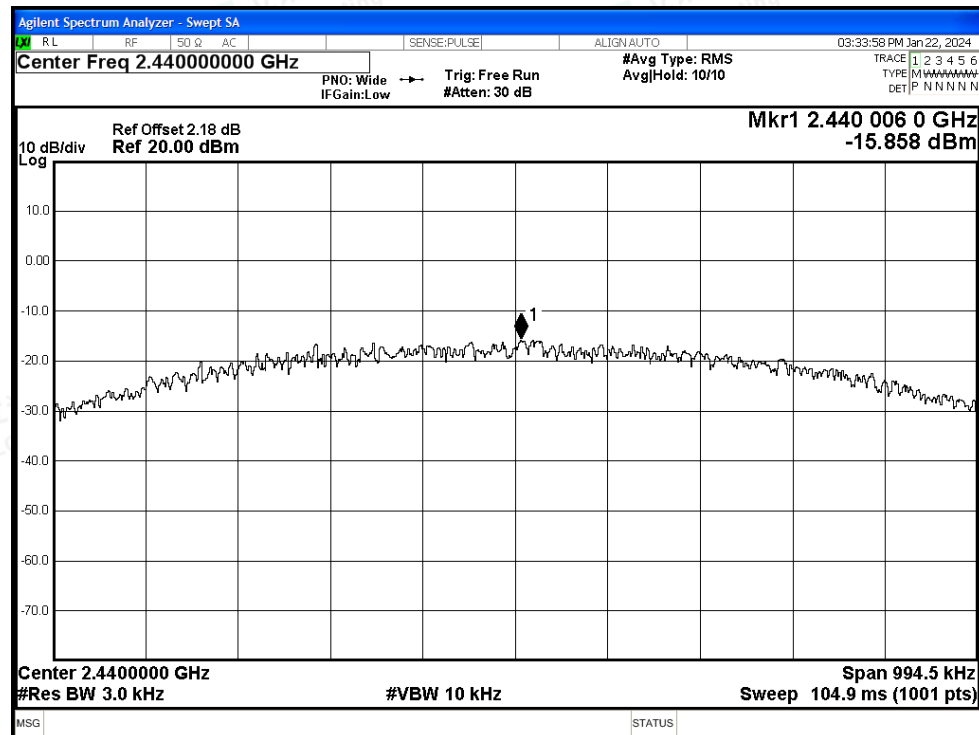


## Test Graphs

PSD NVNT BLE 1M 2402MHz Ant1

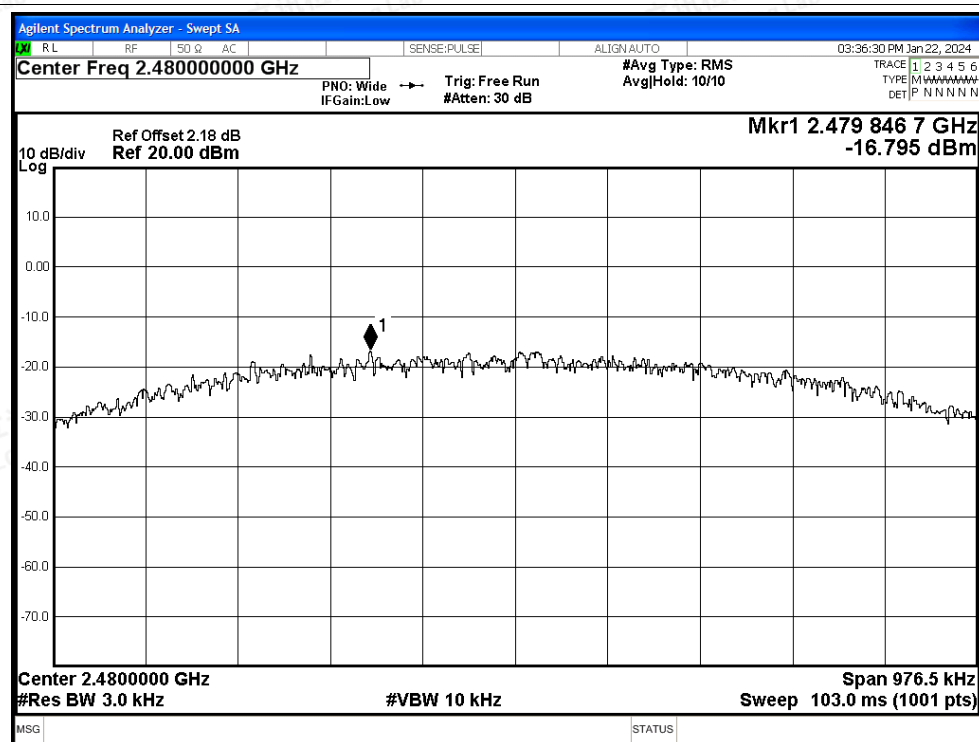


PSD NVNT BLE 1M 2440MHz Ant1

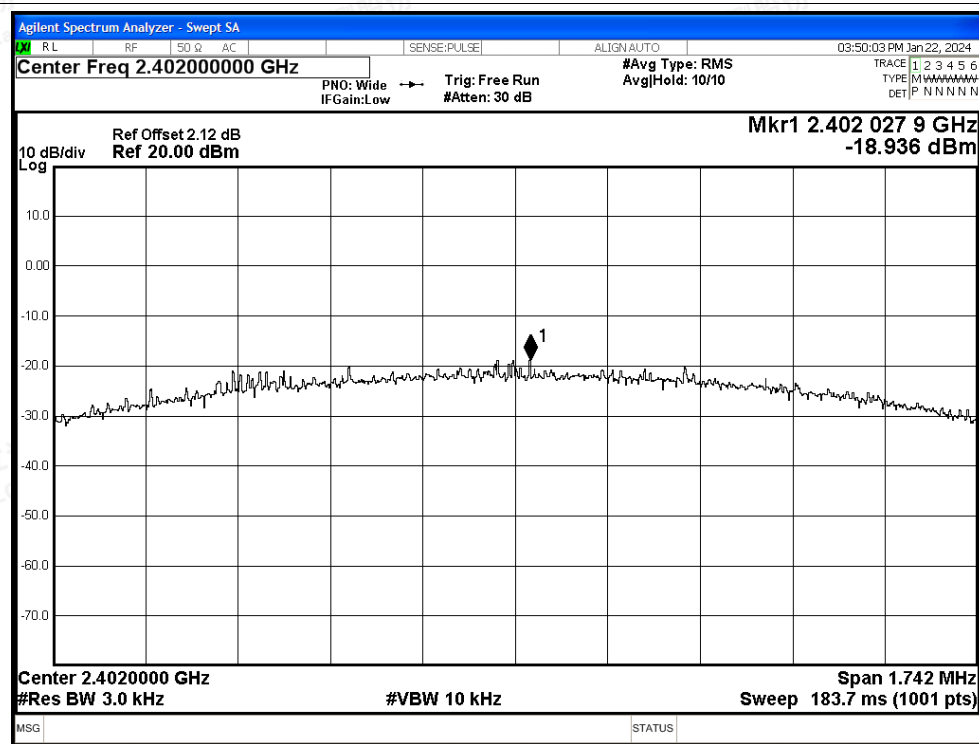




PSD NVNT BLE 1M 2480MHz Ant1

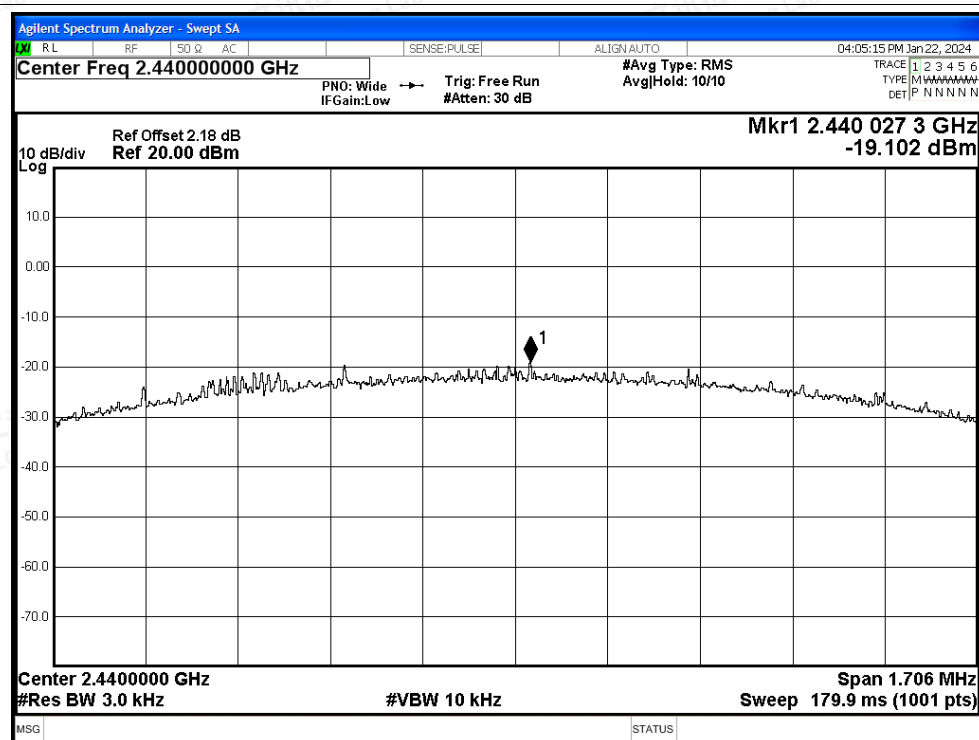


PSD NVNT BLE 2M 2402MHz Ant1

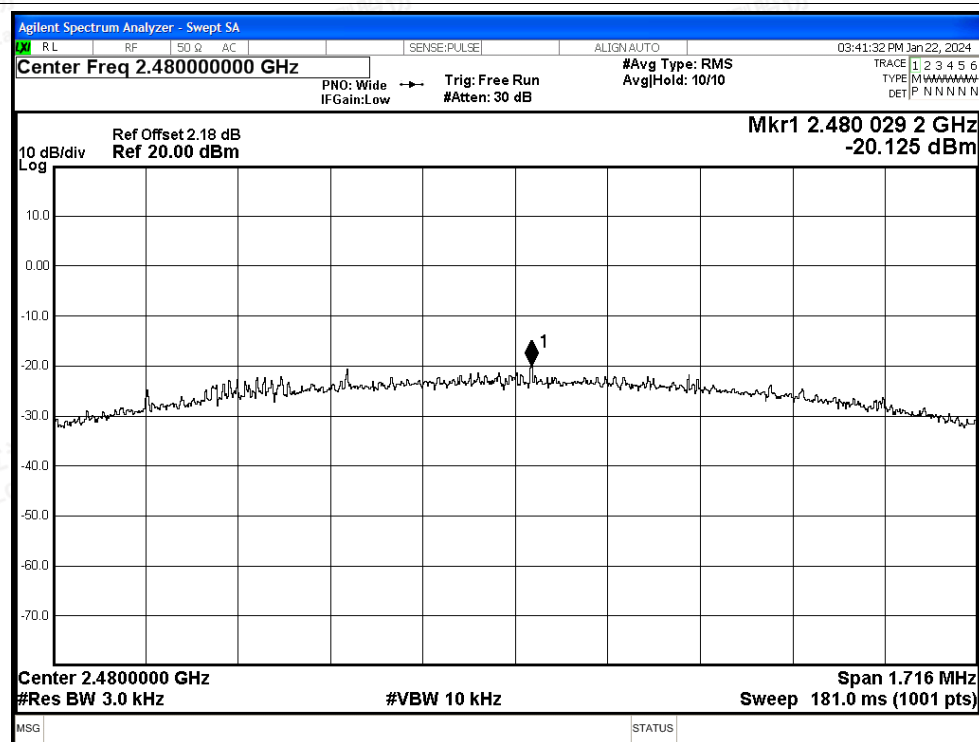




## PSD NVNT BLE 2M 2440MHz Ant1



## PSD NVNT BLE 2M 2480MHz Ant1





## A.4 Band Edge

| Condition | Mode   | Frequency (MHz) | Antenna | Max Value (dBc) | Limit (dBc) | Verdict |
|-----------|--------|-----------------|---------|-----------------|-------------|---------|
| NVNT      | BLE 1M | 2402            | Ant1    | -56.65          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -55.13          | -20         | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | -45.08          | -20         | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | -55.66          | -20         | Pass    |

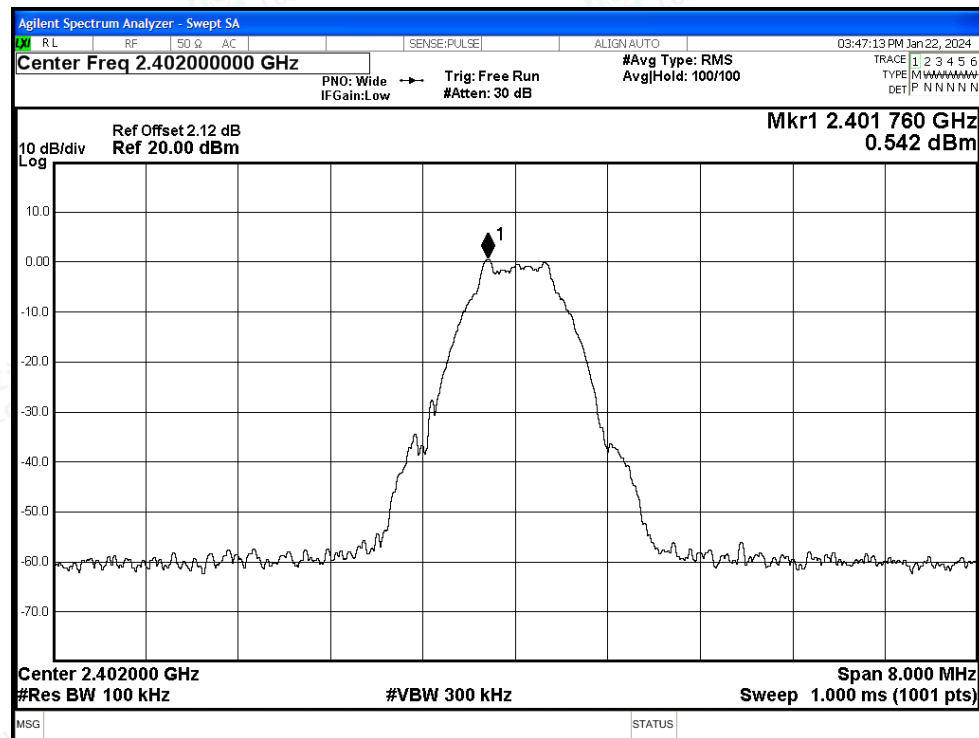


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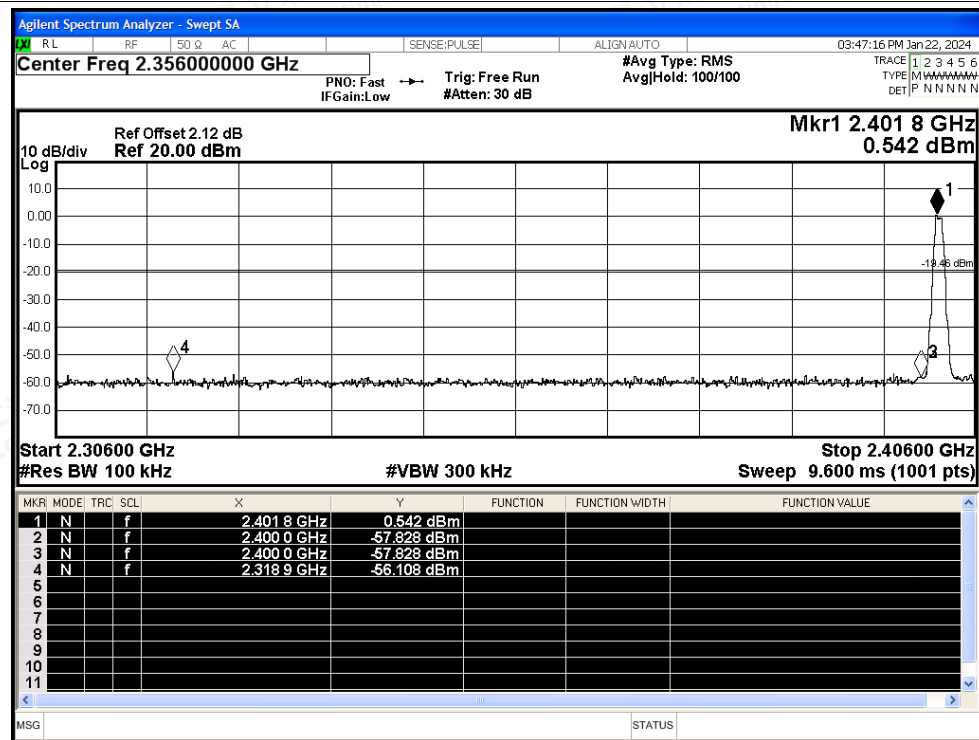


## Test Graphs

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



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



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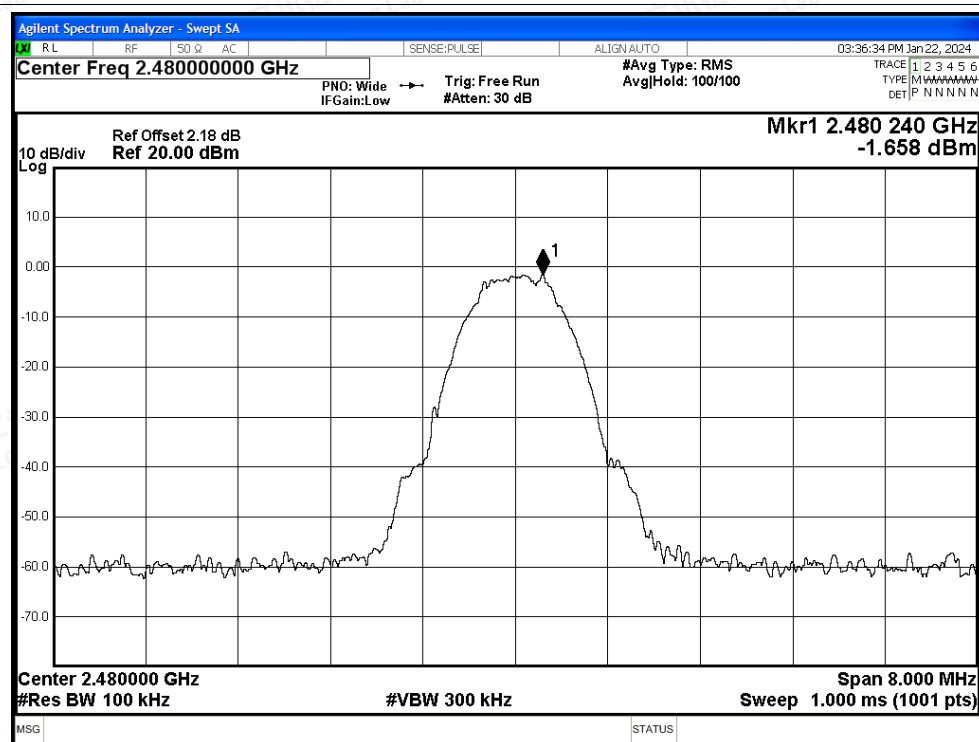
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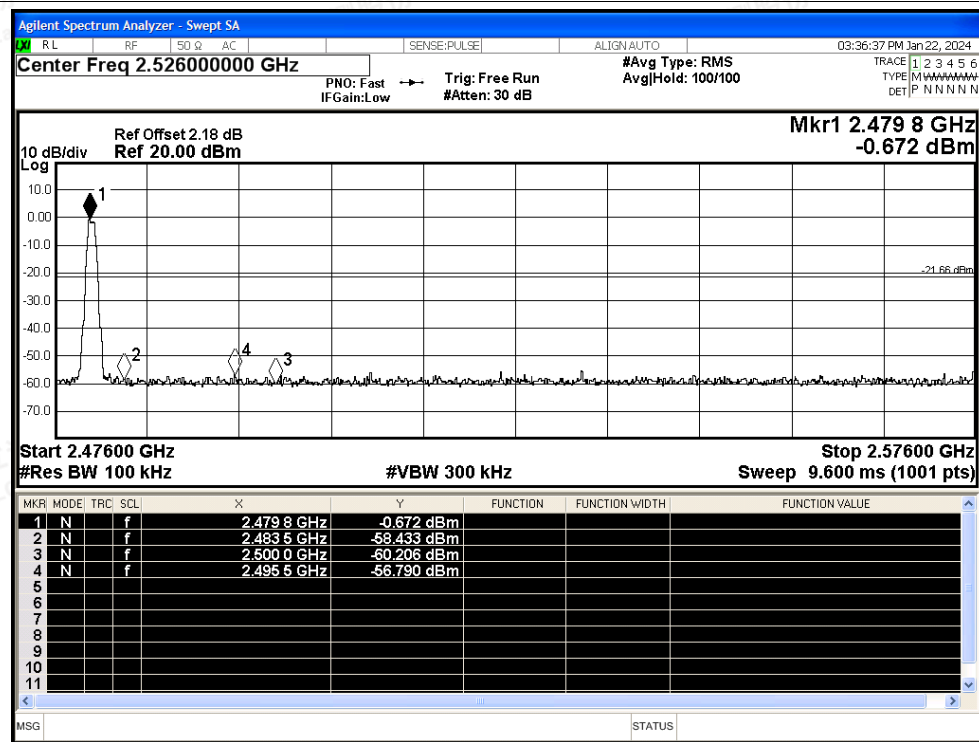
Scan code to check authenticity

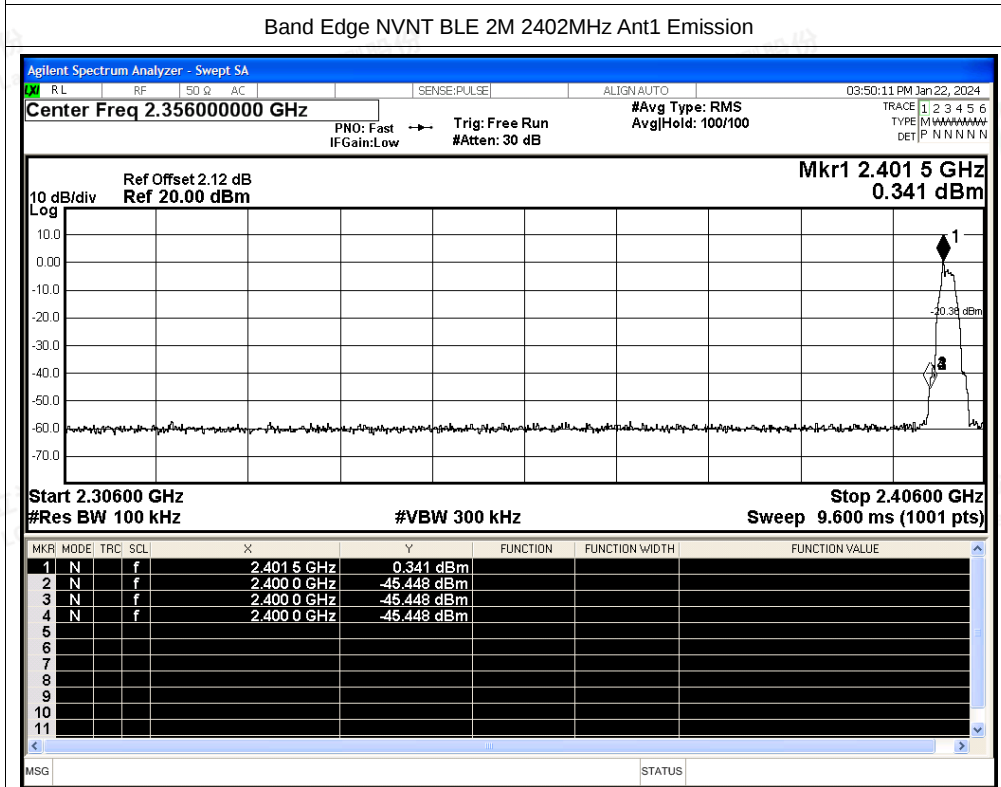
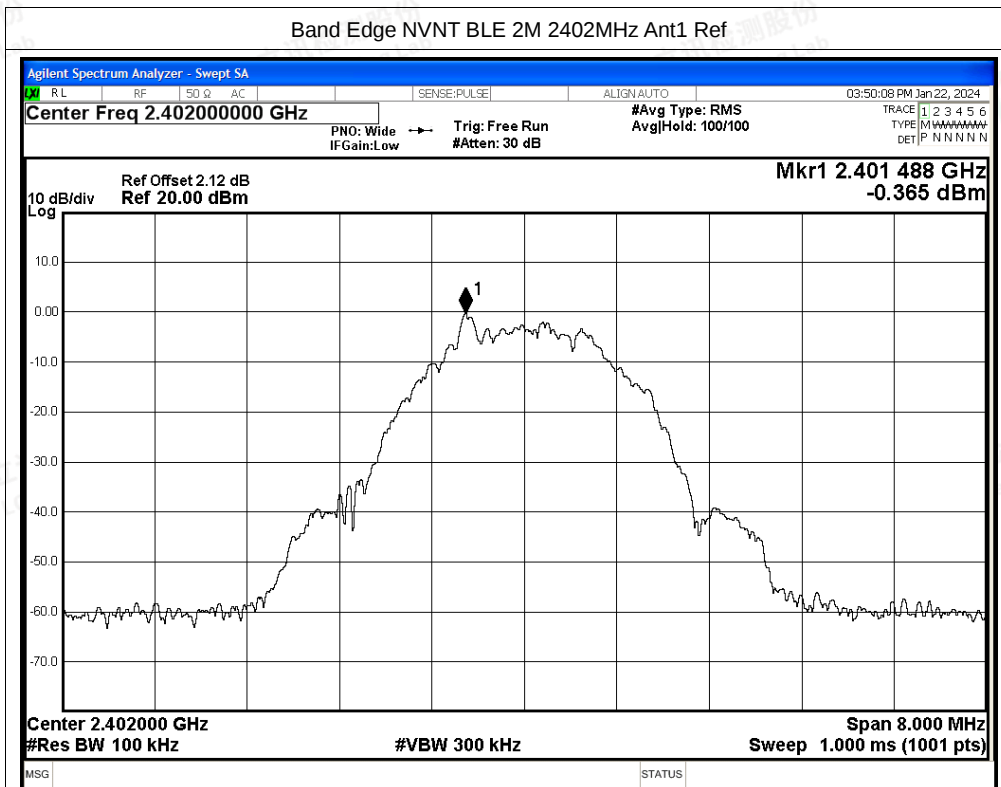


## Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



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





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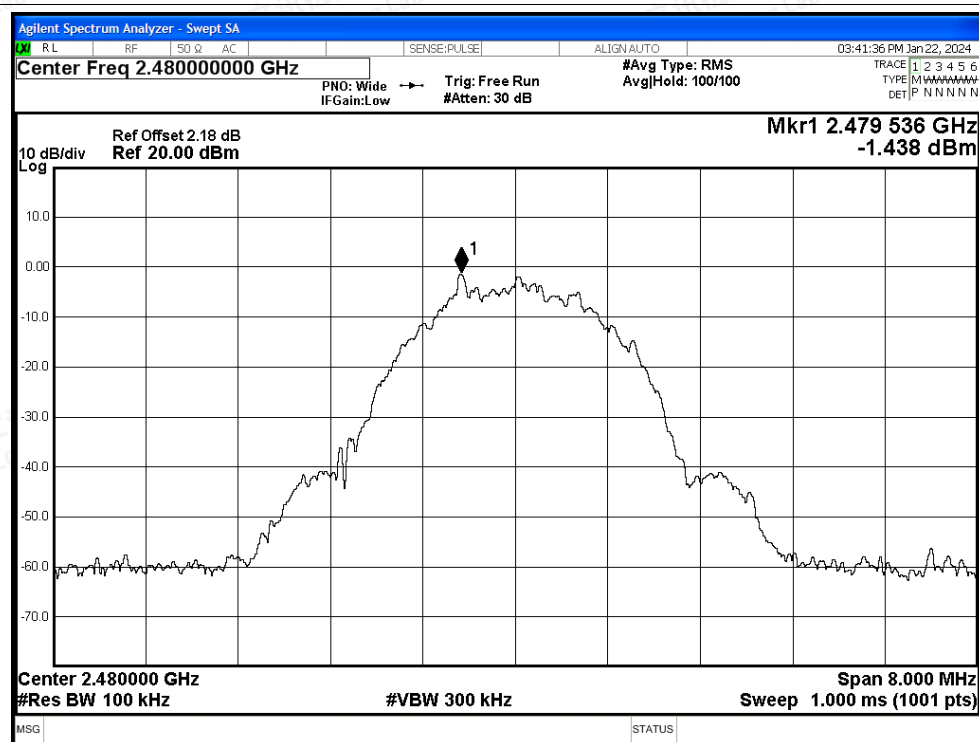
Add: 101, 201 Bldg A &amp; 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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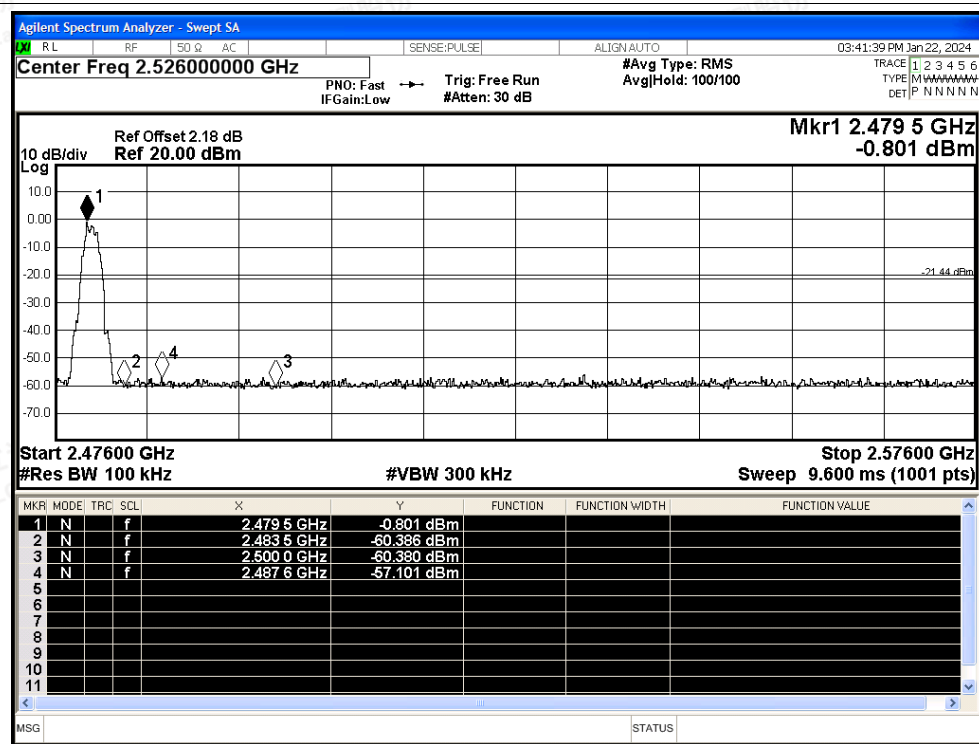
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## Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



## Band Edge NVNT BLE 2M 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    | -56.09          | -20         | Pass    |
| NVNT      | BLE 1M | 2440            | Ant1    | -55.75          | -20         | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | -54.66          | -20         | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | -55.87          | -20         | Pass    |
| NVNT      | BLE 2M | 2440            | Ant1    | -55.19          | -20         | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | -54.7           | -20         | Pass    |

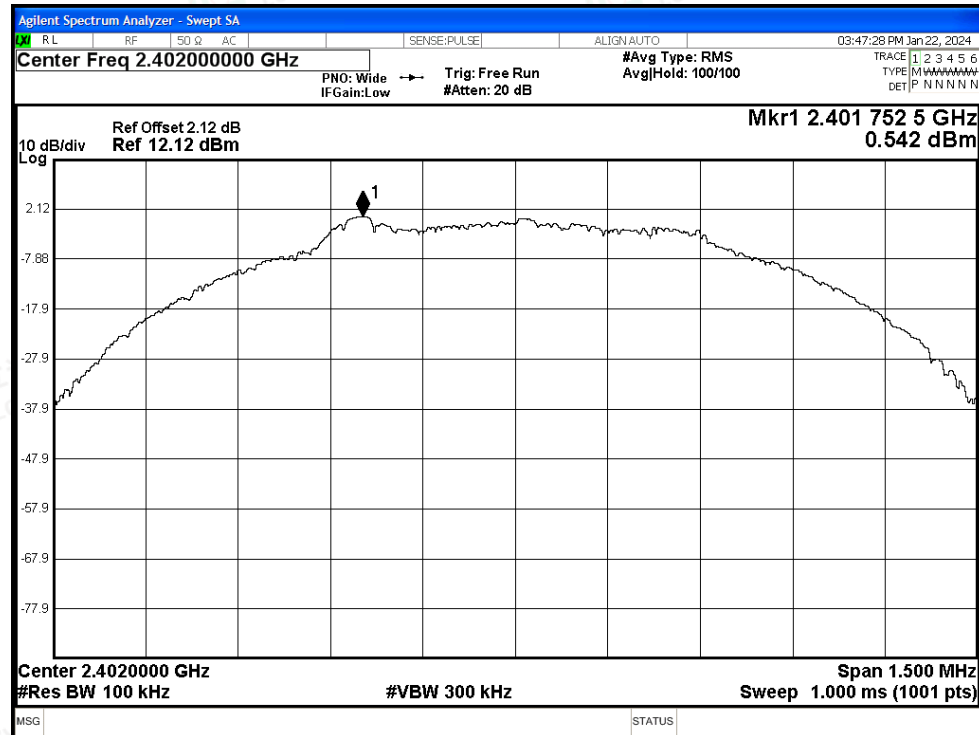


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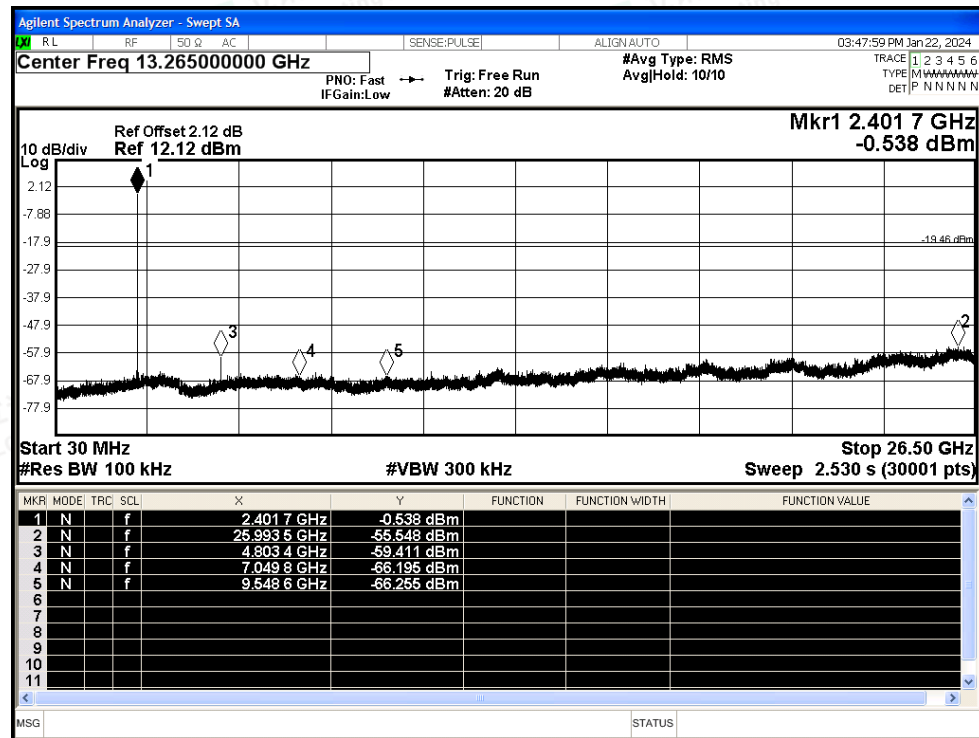


## Test Graphs

Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref

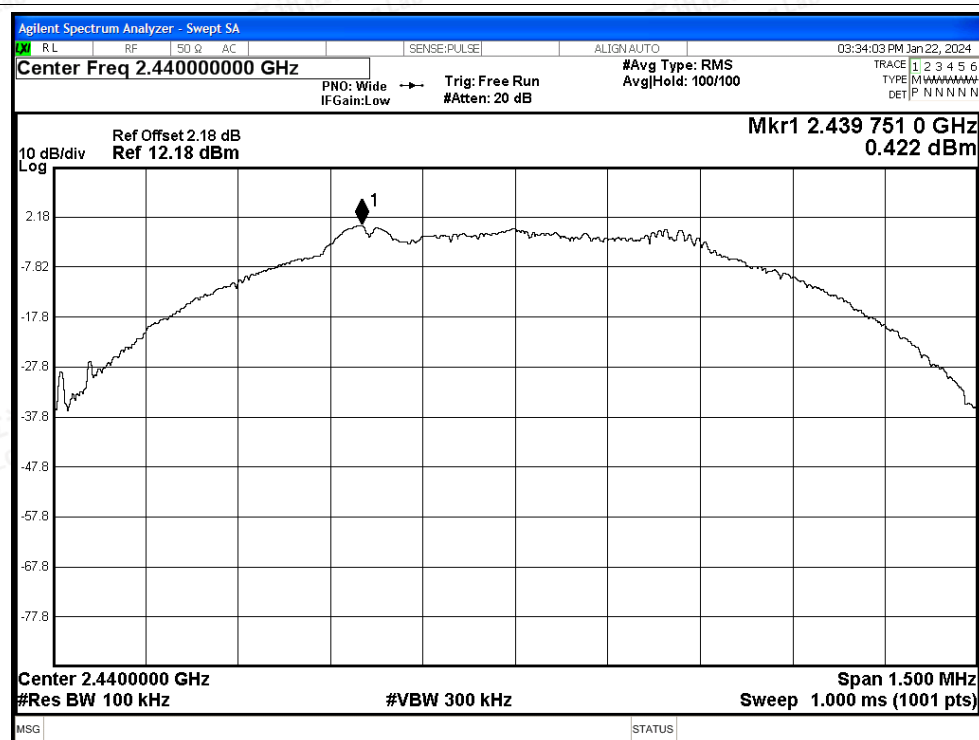


Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission

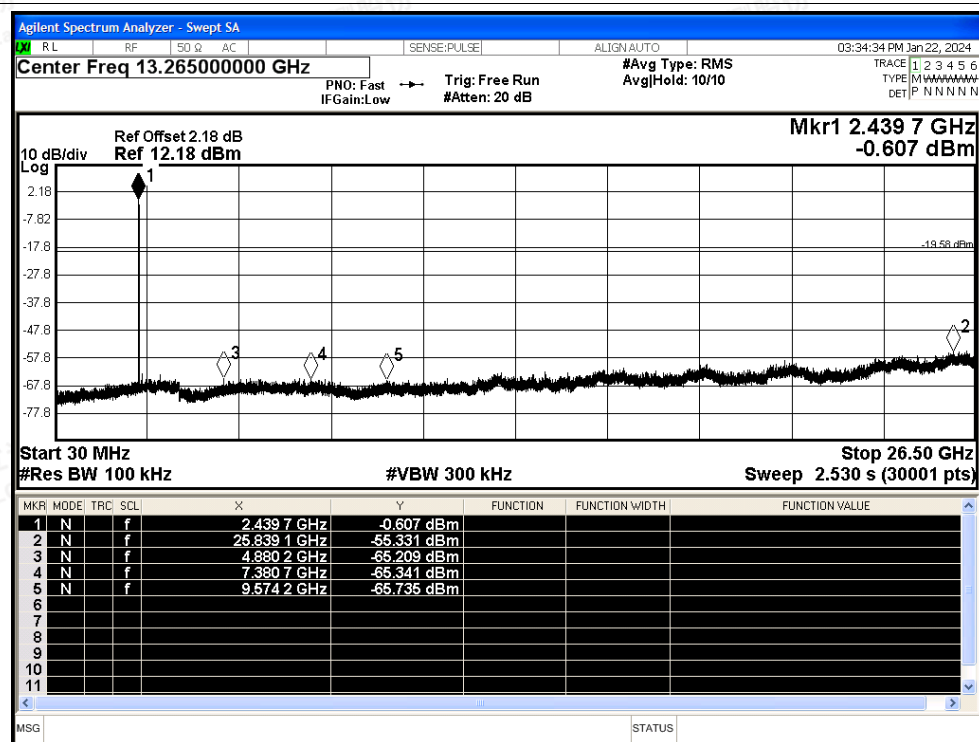




## Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



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



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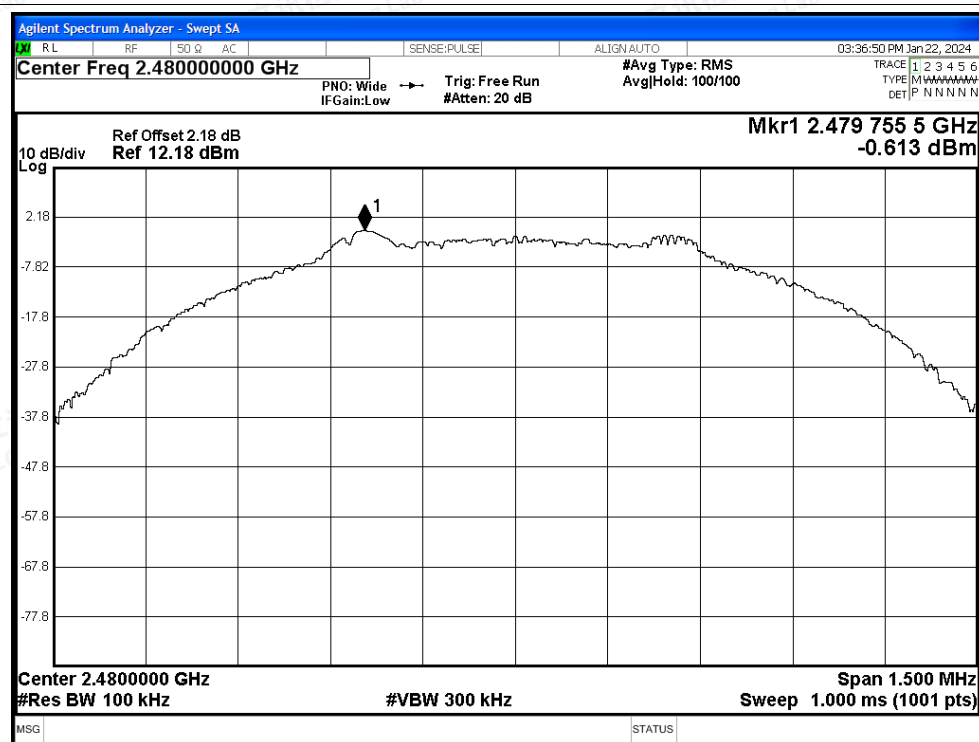
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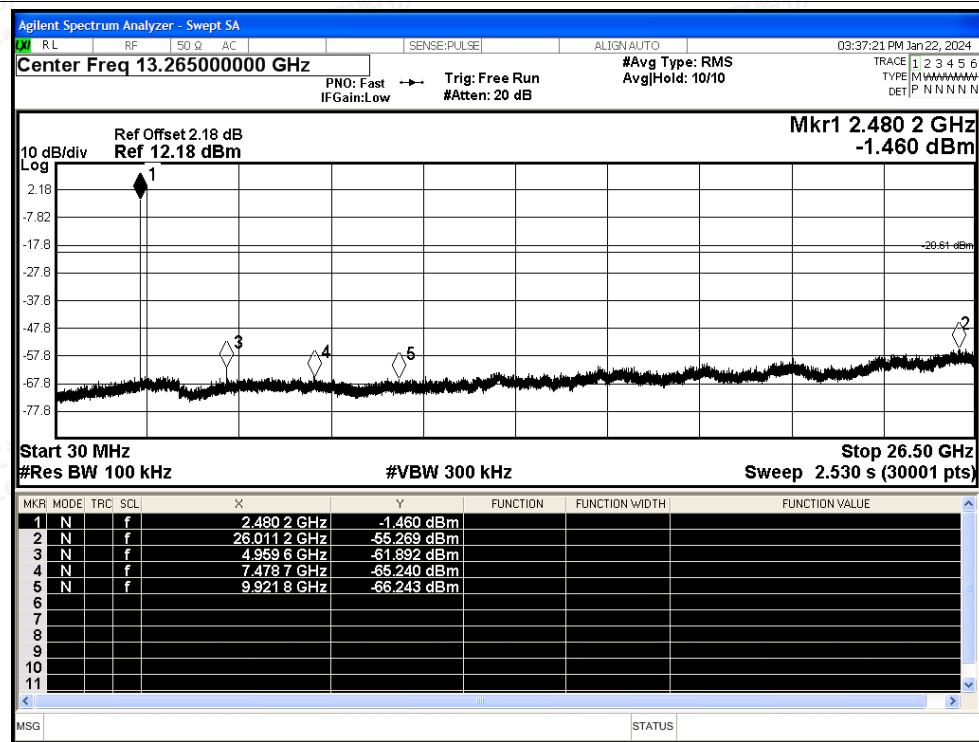
Scan code to check authenticity



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



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



Shenzhen LCS Compliance Testing Laboratory Ltd.

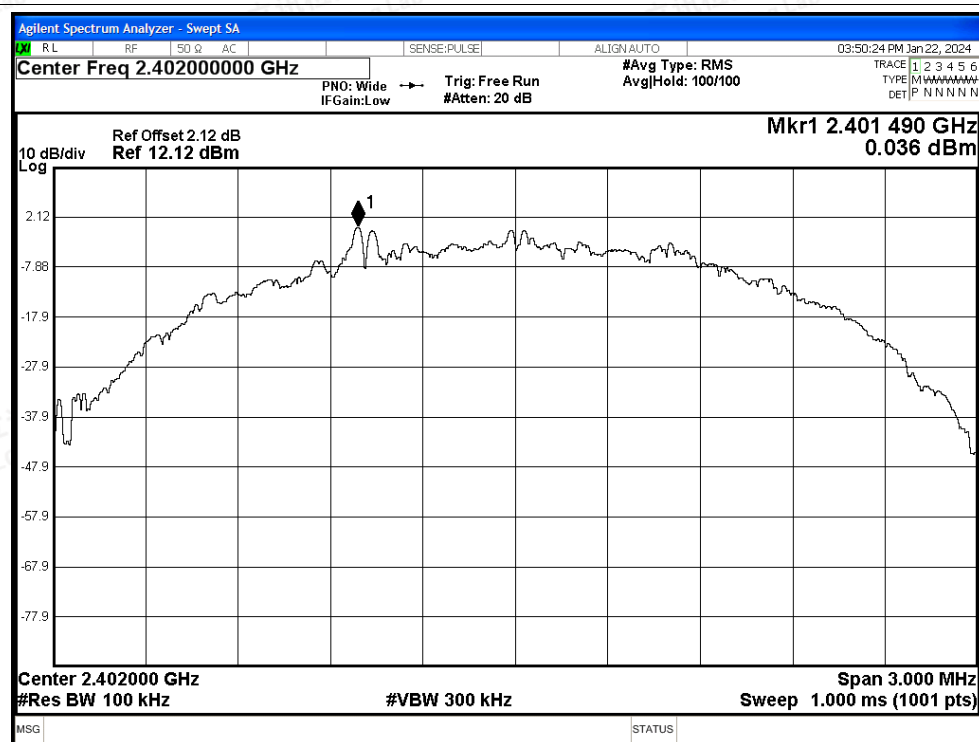
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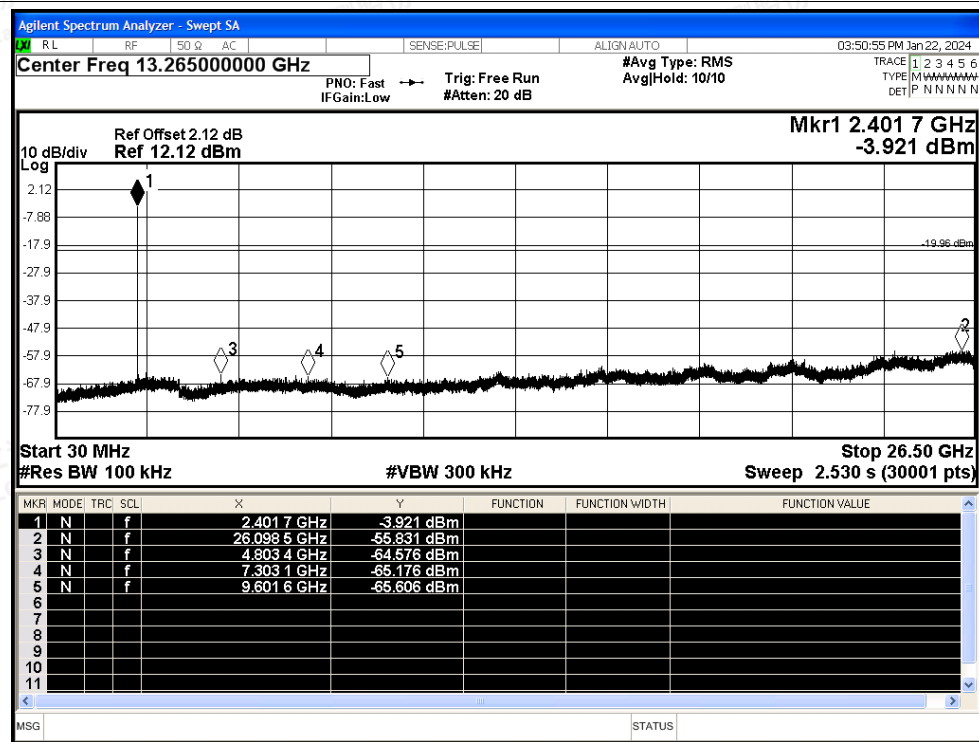
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## Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



## Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission



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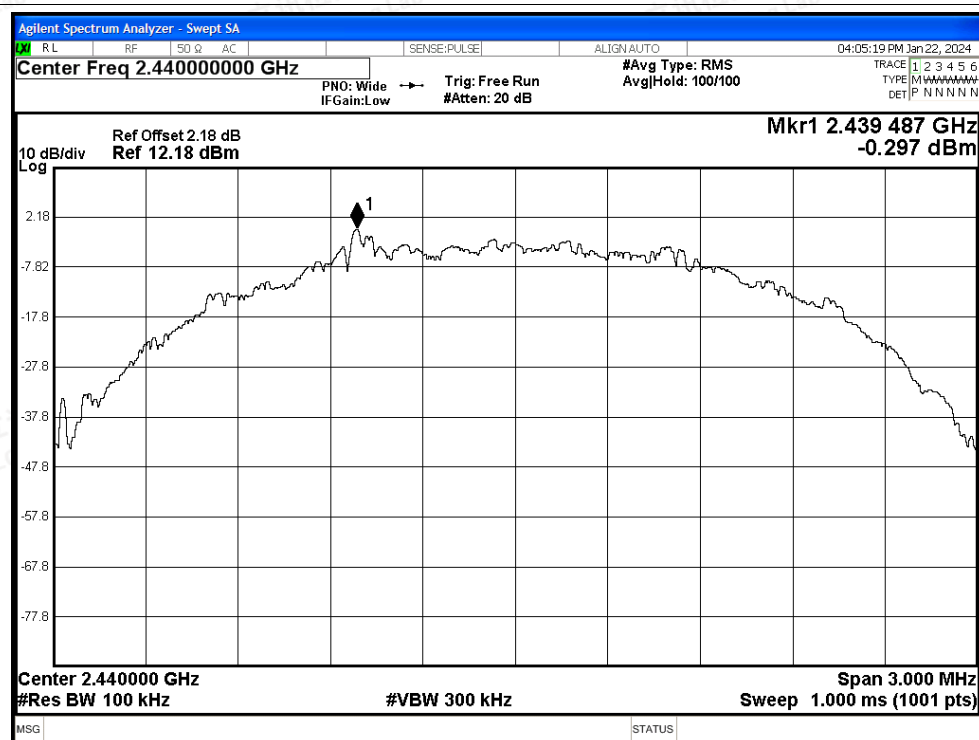
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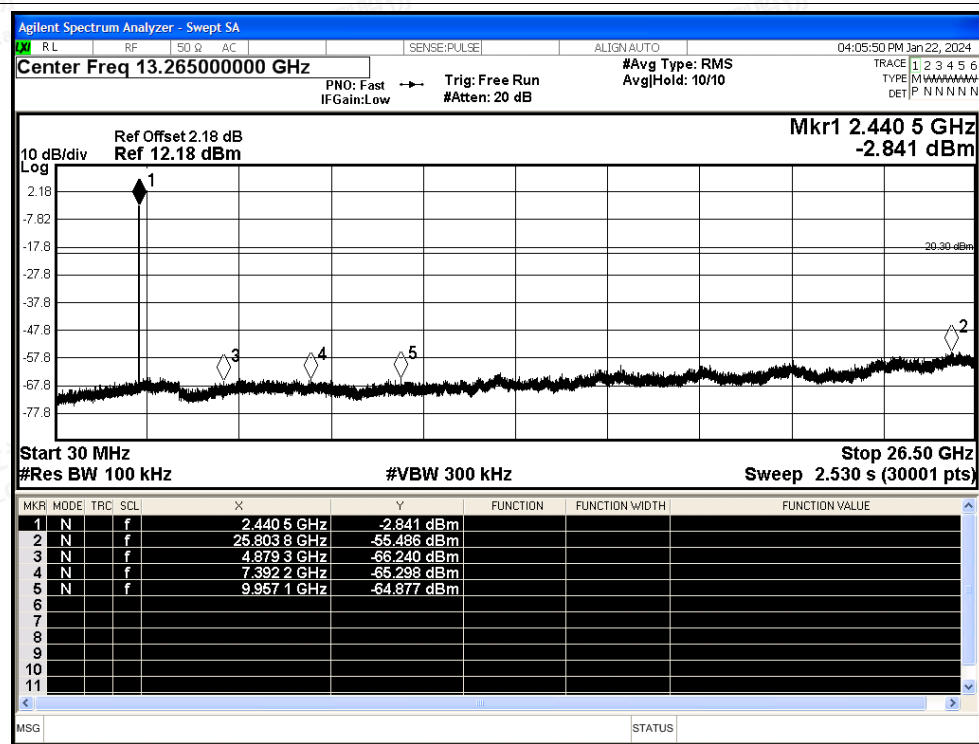
Scan code to check authenticity



## Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Ref



## Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Emission



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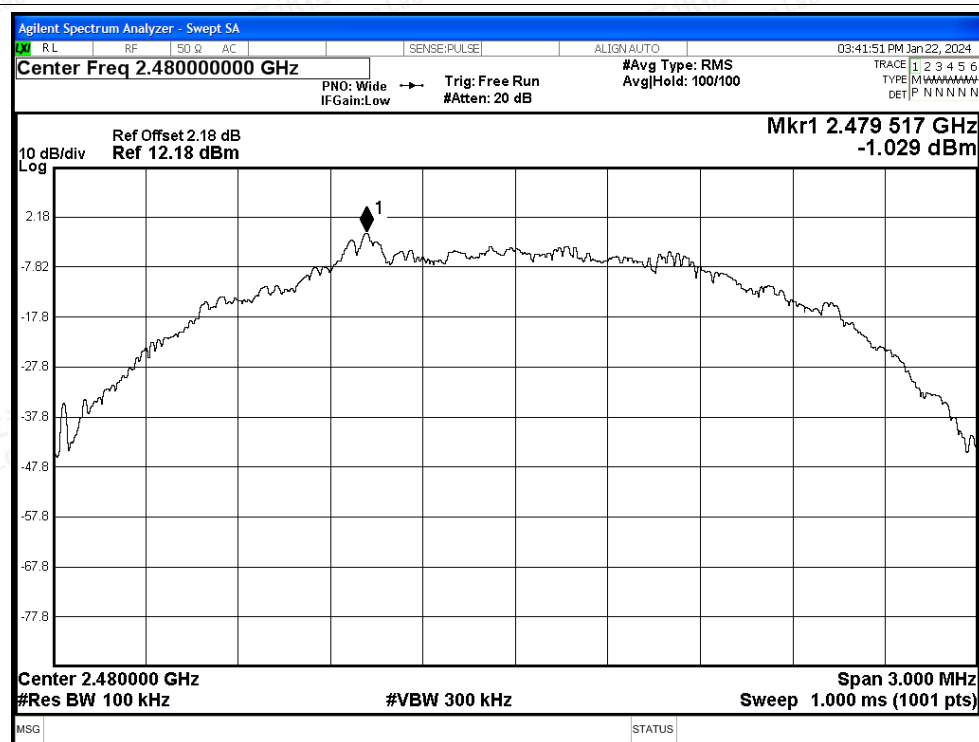
Add: 101, 201 Bldg A &amp; 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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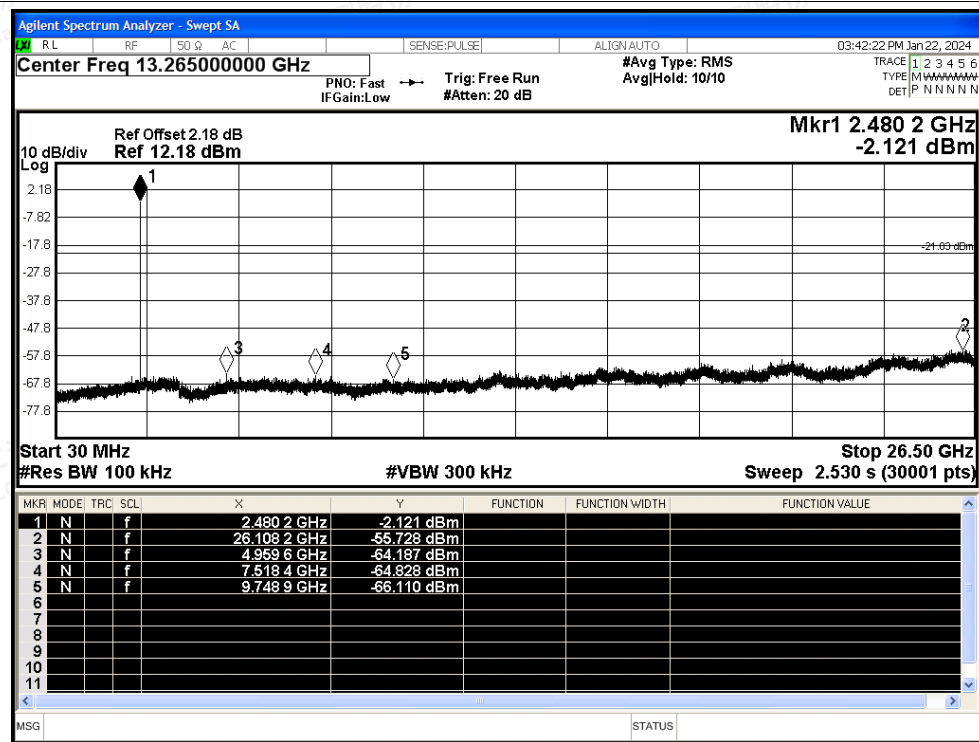
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## Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref



## Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission



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## A.6 Duty Cycle

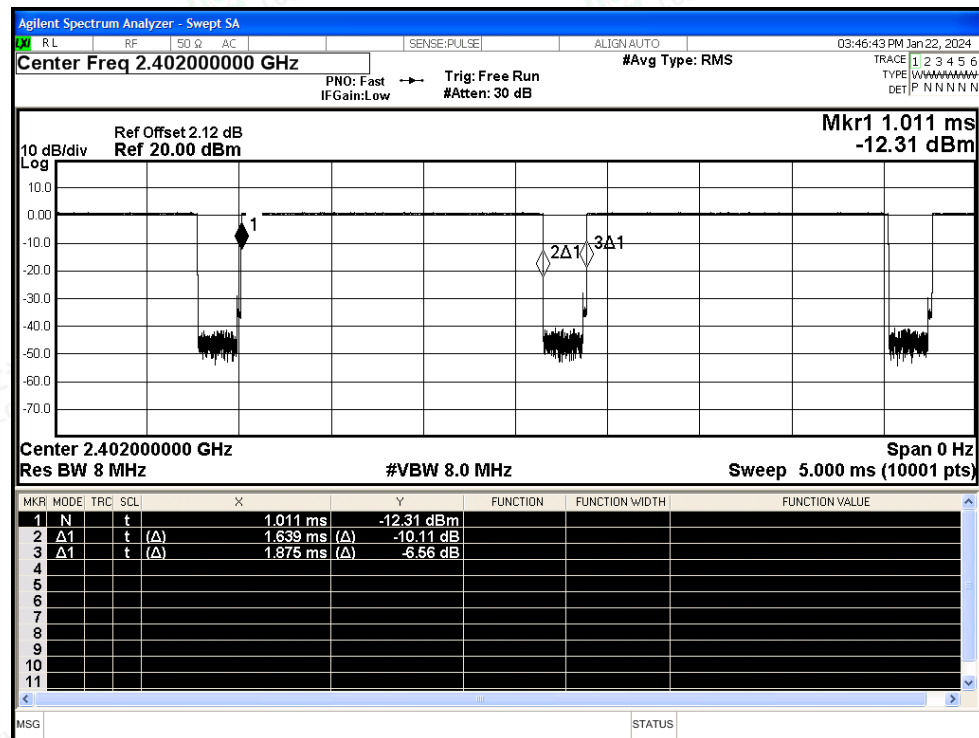
| Condition | Mode   | Frequency (MHz) | Antenna | Duty Cycle (%) | Correction Factor (dB) | 1/T (kHz) |
|-----------|--------|-----------------|---------|----------------|------------------------|-----------|
| NVNT      | BLE 1M | 2402            | Ant1    | 87.39          | 0.59                   | 0.61      |
| NVNT      | BLE 1M | 2440            | Ant1    | 87.39          | 0.59                   | 0.61      |
| NVNT      | BLE 1M | 2480            | Ant1    | 87.39          | 0.59                   | 0.61      |
| NVNT      | BLE 2M | 2402            | Ant1    | 65.92          | 1.81                   | 1.21      |
| NVNT      | BLE 2M | 2440            | Ant1    | 65.92          | 1.81                   | 1.21      |
| NVNT      | BLE 2M | 2480            | Ant1    | 65.96          | 1.81                   | 1.21      |



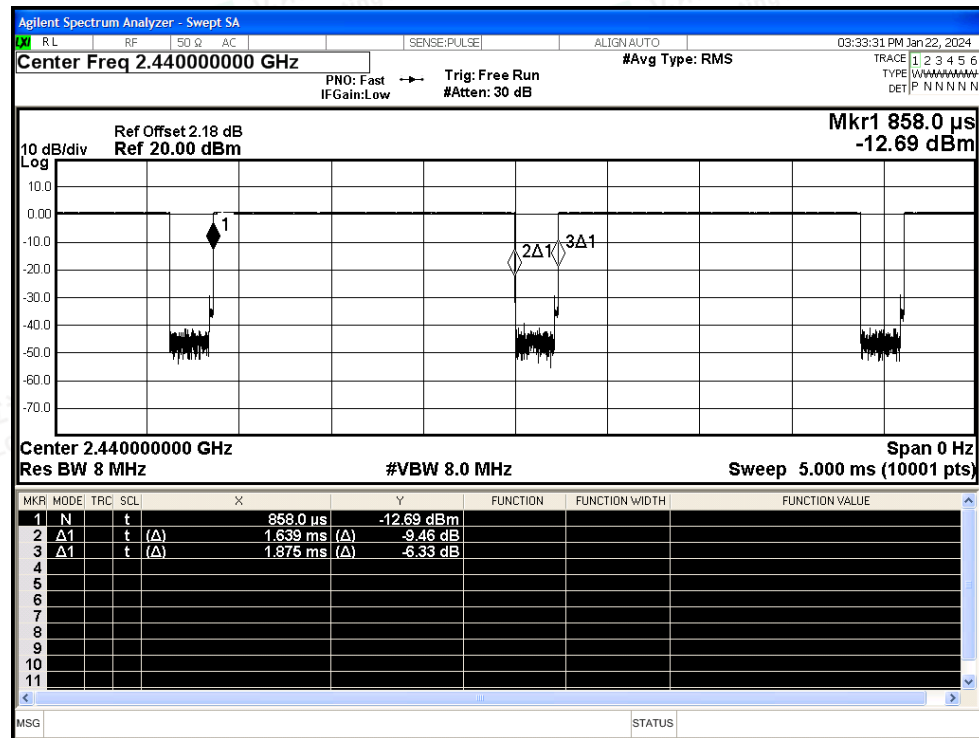


## Test Graphs

## Duty Cycle NVNT BLE 1M 2402MHz Ant1



## Duty Cycle NVNT BLE 1M 2440MHz Ant1



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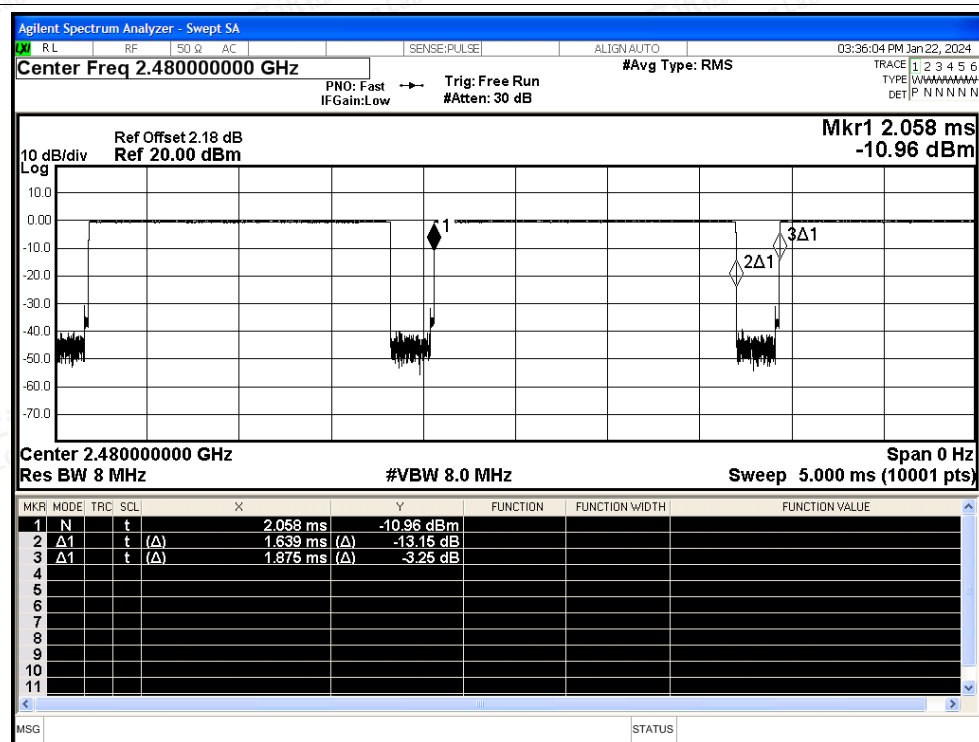
Add: 101, 201 Bldg A &amp; 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

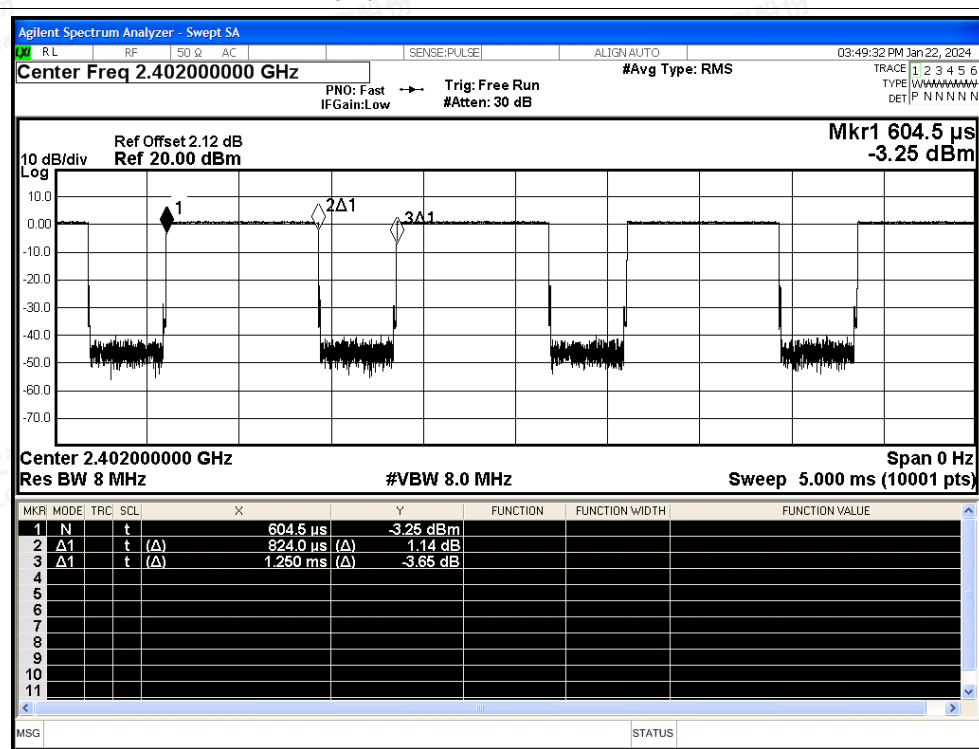
Scan code to check authenticity



## Duty Cycle NVNT BLE 1M 2480MHz Ant1



## Duty Cycle NVNT BLE 2M 2402MHz Ant1



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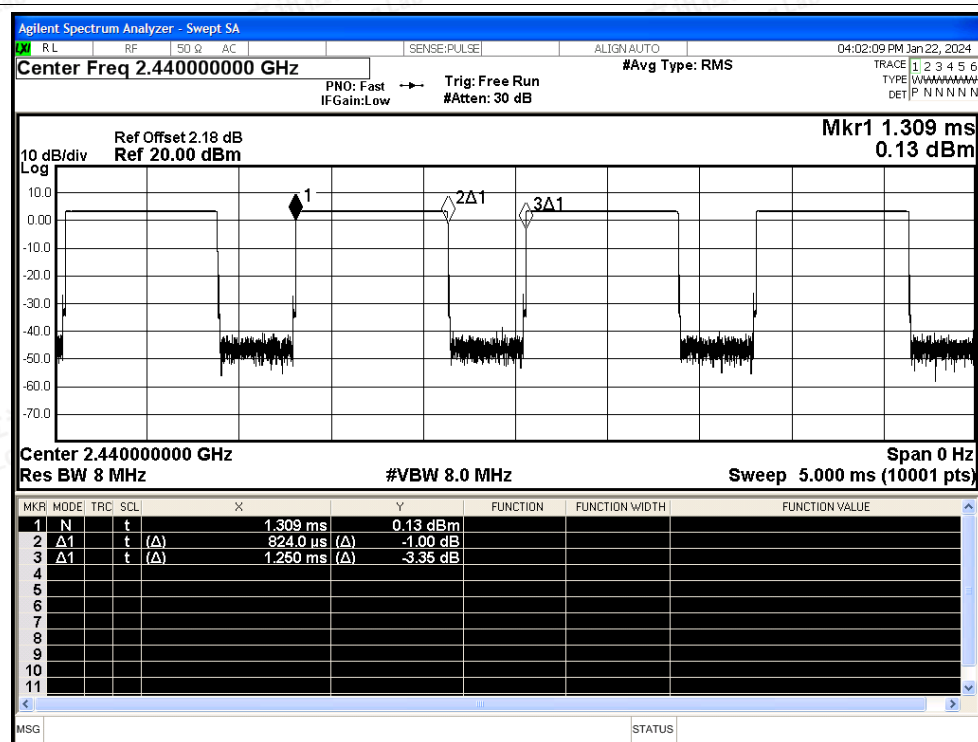
Add: 101, 201 Bldg A &amp; 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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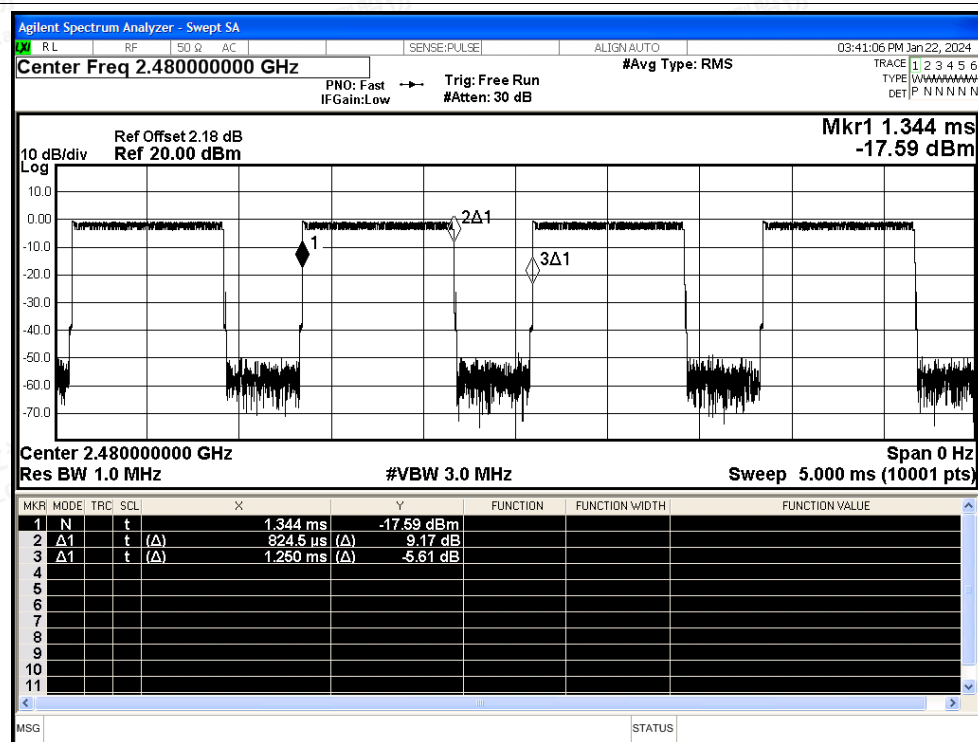
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## Duty Cycle NVNT BLE 2M 2440MHz Ant1



## Duty Cycle NVNT BLE 2M 2480MHz Ant1



Shenzhen LCS Compliance Testing Laboratory Ltd.

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## 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            | -50.8       | 3.42       | -                | 47.88      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2310            | -57.72      | 3.42       | 0.59             | 41.55      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2356.944        | -47.59      | 3.42       | -                | 51.09      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2349.168        | -57.55      | 3.42       | 0.59             | 41.72      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -50.32      | 3.42       | -                | 48.36      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2402            | Ant1    | 2390            | -58.55      | 3.42       | 0.59             | 40.72      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -50.36      | 3.42       | -                | 48.32      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.5          | -57.67      | 3.42       | 0.59             | 41.6       | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.56         | -43.63      | 3.42       | -                | 55.05      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2483.752        | -57.12      | 3.42       | 0.59             | 42.15      | Average  | 54             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -50.59      | 3.42       | -                | 48.09      | Peak     | 74             | Pass    |
| NVNT      | BLE 1M | 2480            | Ant1    | 2500            | -58.17      | 3.42       | 0.59             | 41.1       | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2310            | -49.84      | 3.42       | -                | 48.84      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2310            | -58.64      | 3.42       | 1.81             | 41.85      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2352.816        | -47.07      | 3.42       | -                | 51.61      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2386.896        | -57.49      | 3.42       | 1.81             | 43         | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2390            | -50.97      | 3.42       | -                | 47.71      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2402            | Ant1    | 2390            | -58.42      | 3.42       | 1.81             | 42.07      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2483.5          | -48.24      | 3.42       | -                | 50.44      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2483.5          | -57.48      | 3.42       | 1.81             | 43.01      | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2487.376        | -43.98      | 3.42       | -                | 54.7       | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2483.824        | -57.19      | 3.42       | 1.81             | 43.3       | Average  | 54             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2500            | -49.19      | 3.42       | -                | 49.49      | Peak     | 74             | Pass    |
| NVNT      | BLE 2M | 2480            | Ant1    | 2500            | -58.13      | 3.42       | 1.81             | 42.36      | Average  | 54             | Pass    |

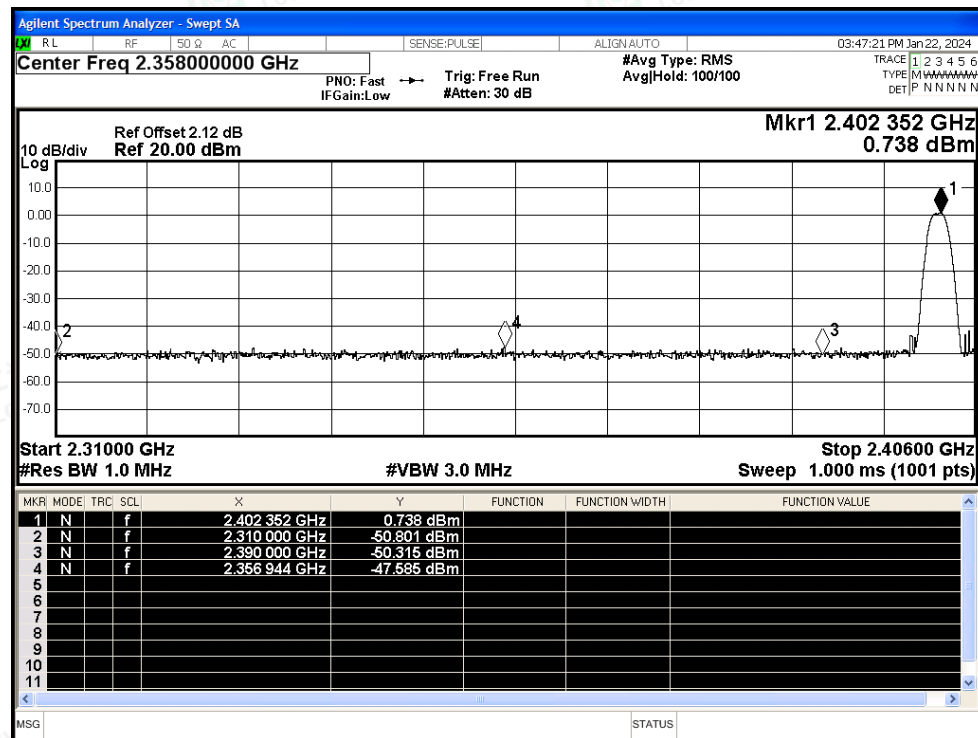


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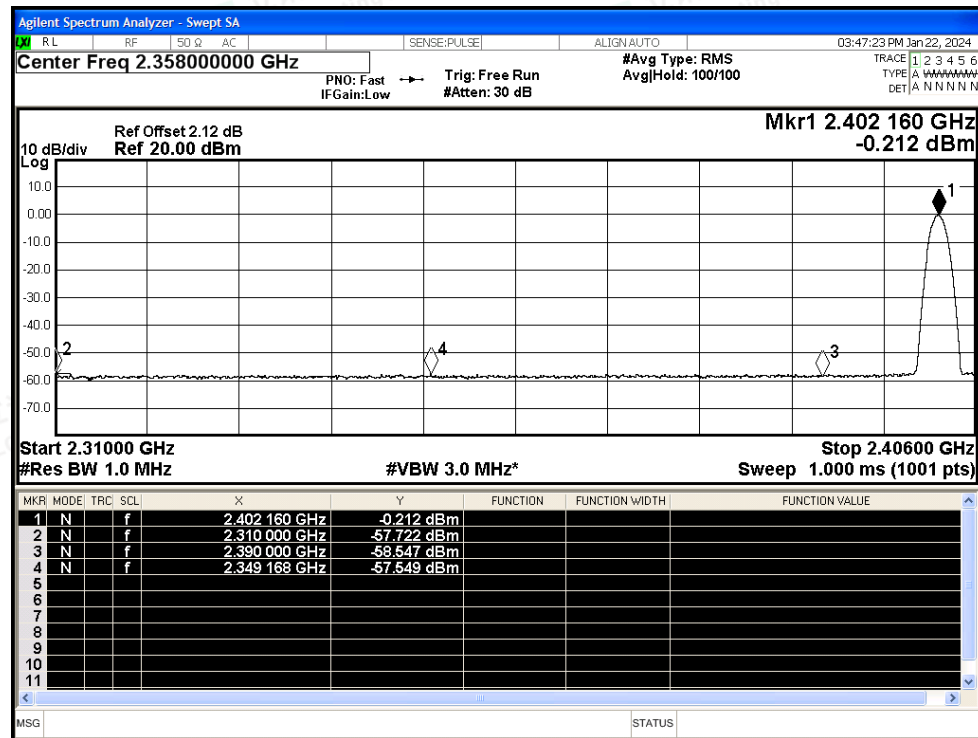


## Test Graphs

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



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



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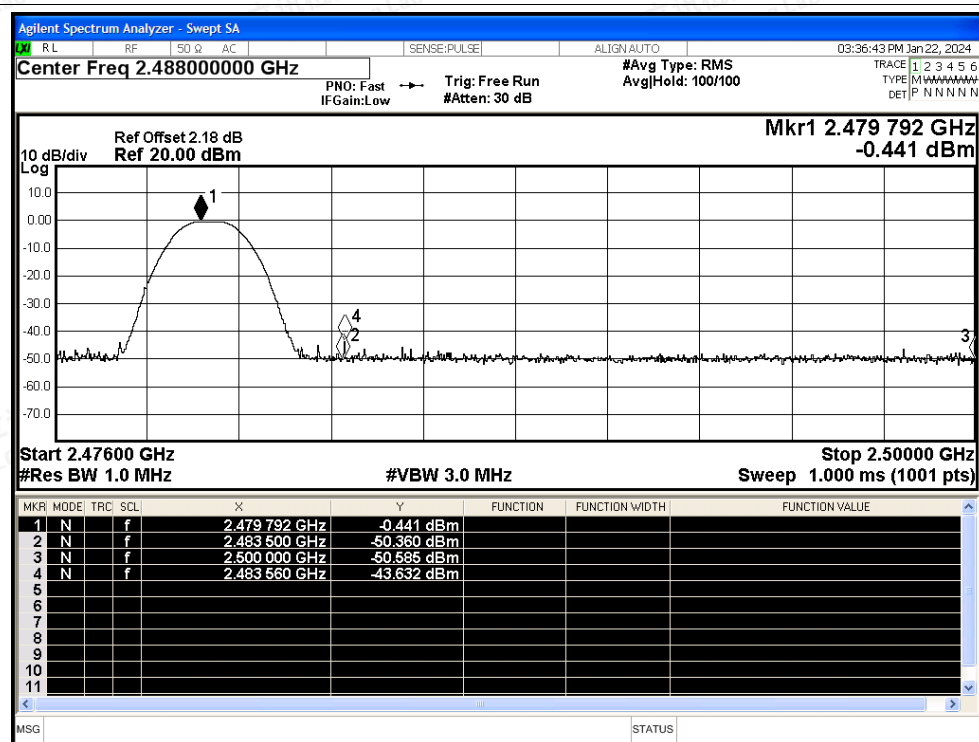
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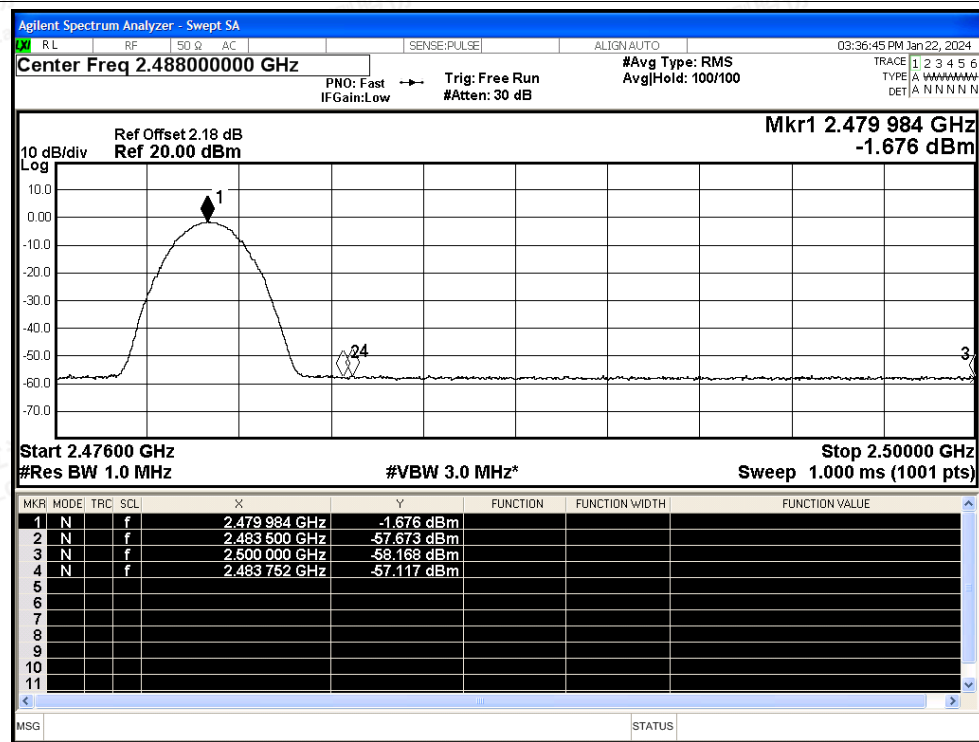
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## Restrict Band NVNT BLE 1M 2480MHz Ant1 Peak



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



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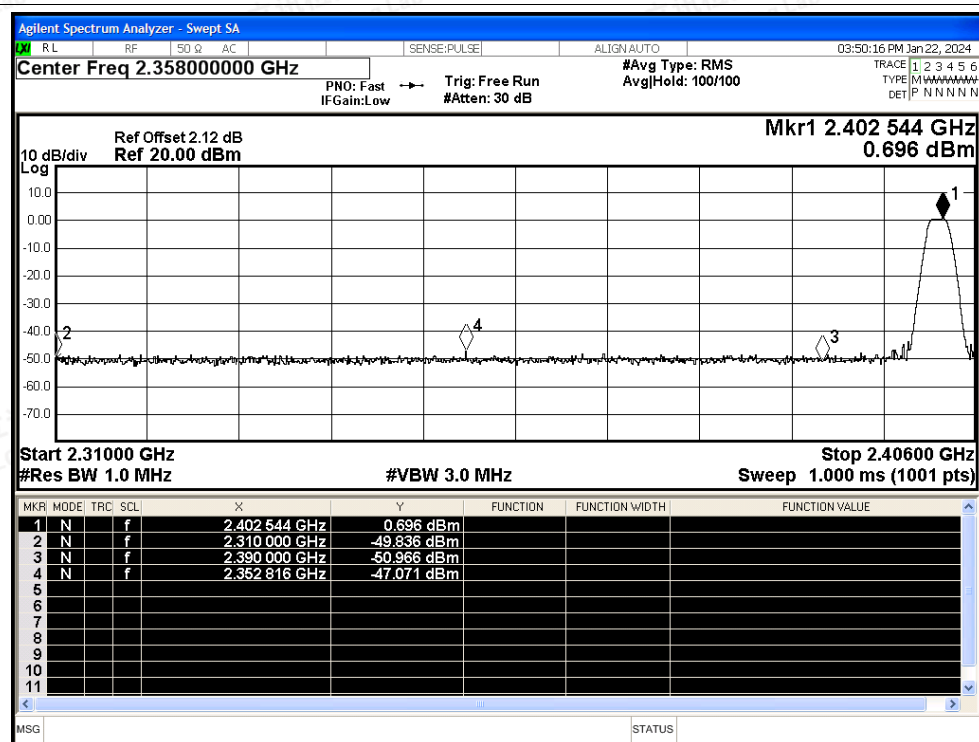
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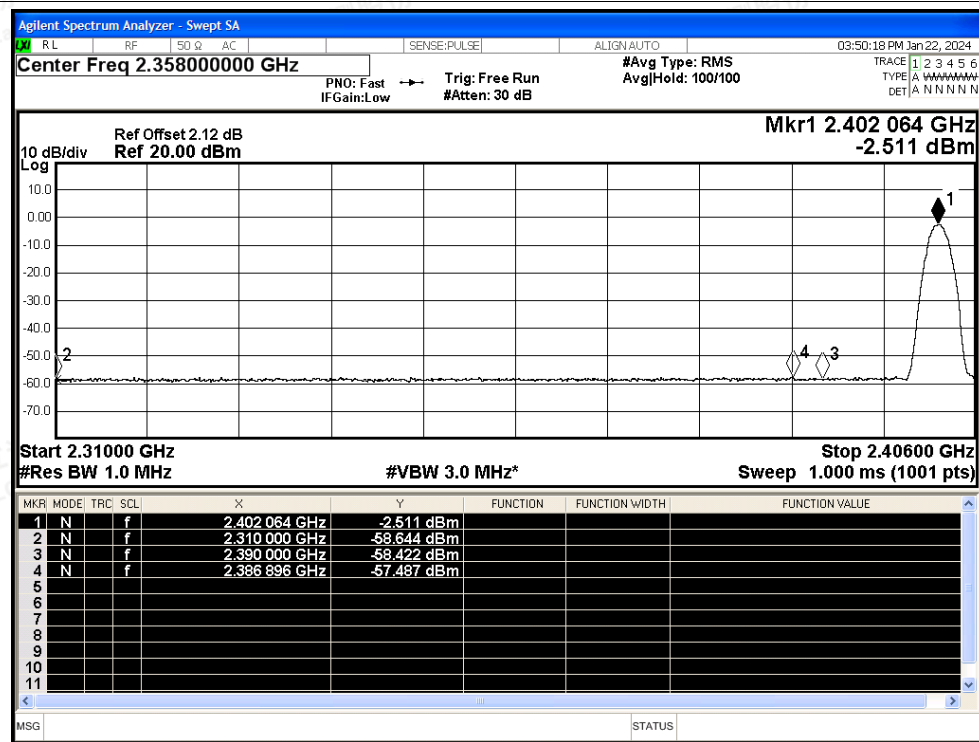
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## Restrict Band NVNT BLE 2M 2402MHz Ant1 Peak



## Restrict Band NVNT BLE 2M 2402MHz Ant1 Average



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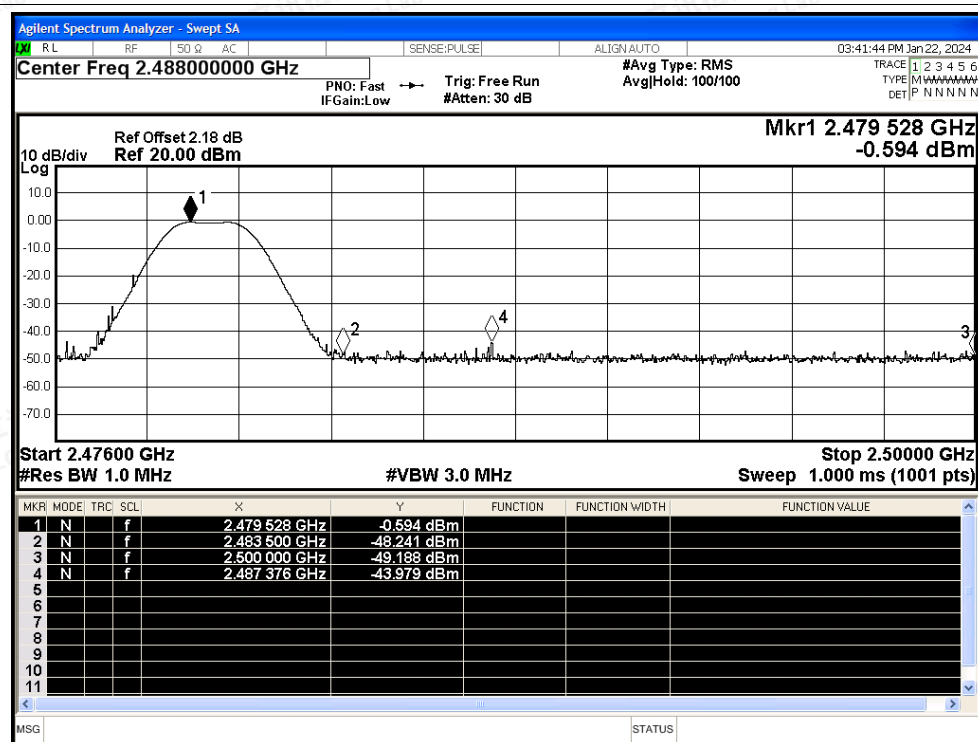
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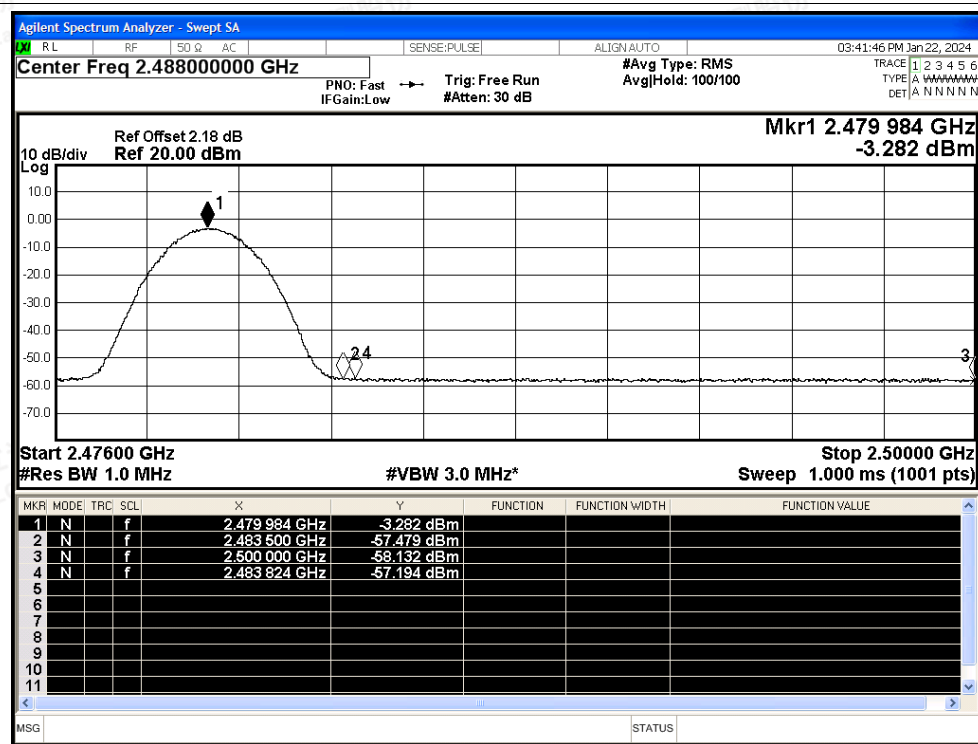
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## Restrict Band NVNT BLE 2M 2480MHz Ant1 Peak



## Restrict Band NVNT BLE 2M 2480MHz Ant1 Average



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