



## Appendix A

### RF Test Data for 2.4G (Conducted Measurement)

Product Name: Smart Radio

Test Model: RM-2450-2J

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23.8° C   |
| Relative Humidity: | 52.1%     |
| ATM Pressure:      | 100.0 kPa |
| Test Engineer:     | Taylor Hu |
| Supervised by:     | Li huan   |



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## A.1 -6dB Bandwidth

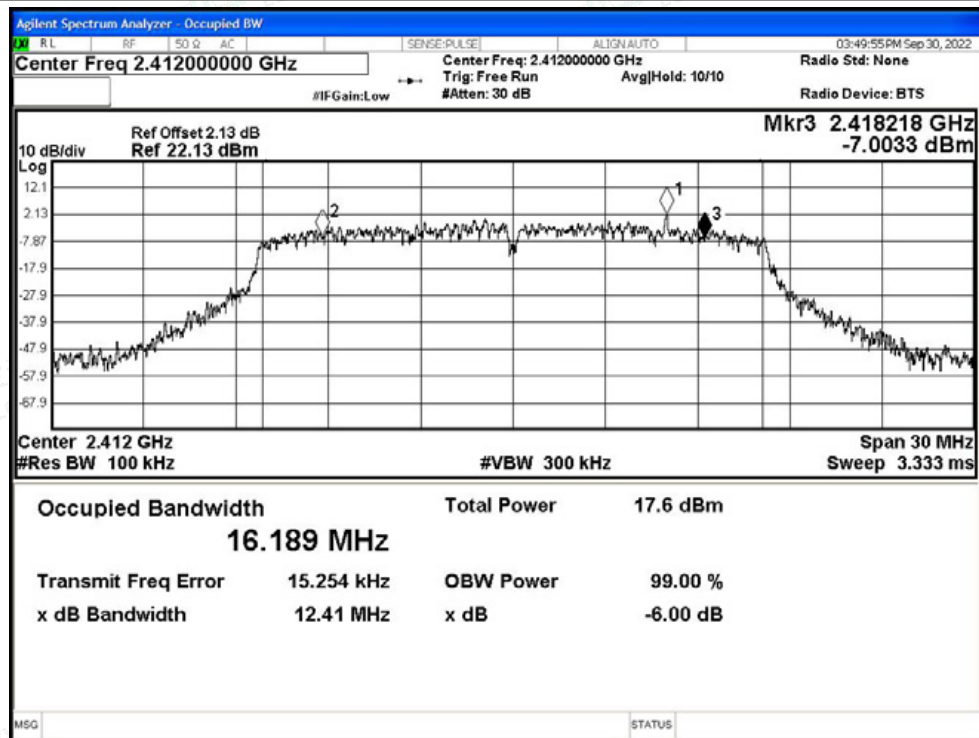
| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-----------------------------|---------|
| NVNT      | g    | 2412            | Ant0    | 12.406                | $\geq 0.5$                  | Pass    |
| NVNT      | g    | 2437            | Ant0    | 15.424                | $\geq 0.5$                  | Pass    |
| NVNT      | g    | 2462            | Ant0    | 16.042                | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2412            | Ant0    | 16.320                | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2437            | Ant0    | 16.065                | $\geq 0.5$                  | Pass    |
| NVNT      | n20  | 2462            | Ant0    | 11.919                | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2422            | Ant0    | 32.568                | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2437            | Ant0    | 26.260                | $\geq 0.5$                  | Pass    |
| NVNT      | n40  | 2452            | Ant0    | 32.565                | $\geq 0.5$                  | Pass    |



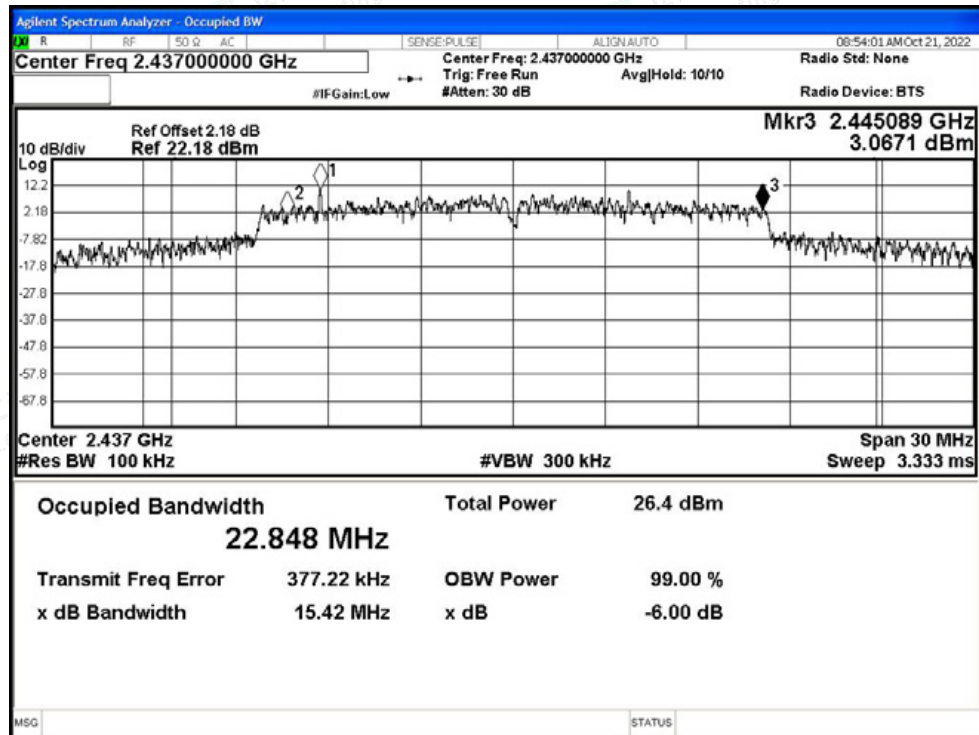


## Test Graphs

-6dB Bandwidth NVNT g 2412MHz Ant0



-6dB Bandwidth NVNT g 2437MHz Ant0



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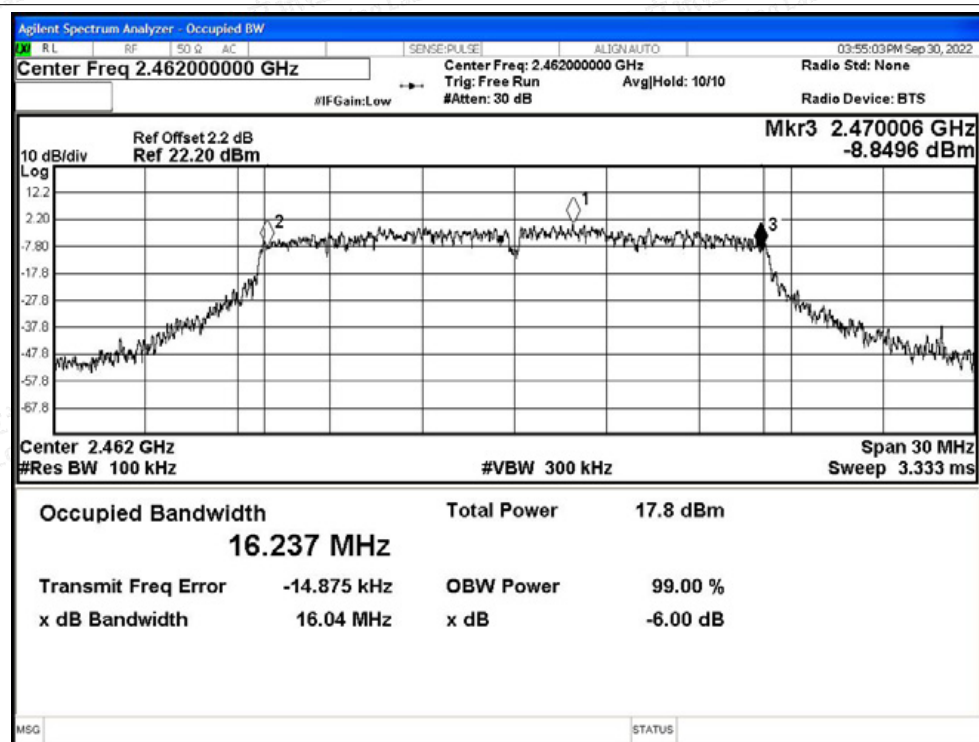
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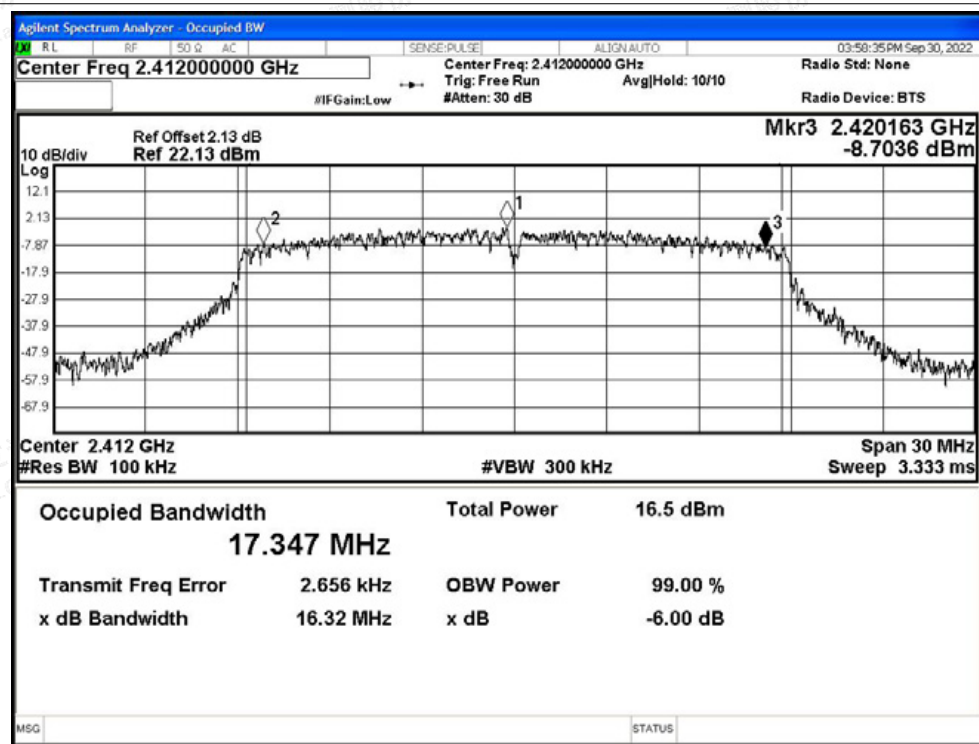
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-6dB Bandwidth NVNT g 2462MHz Ant0



-6dB Bandwidth NVNT n20 2412MHz Ant0



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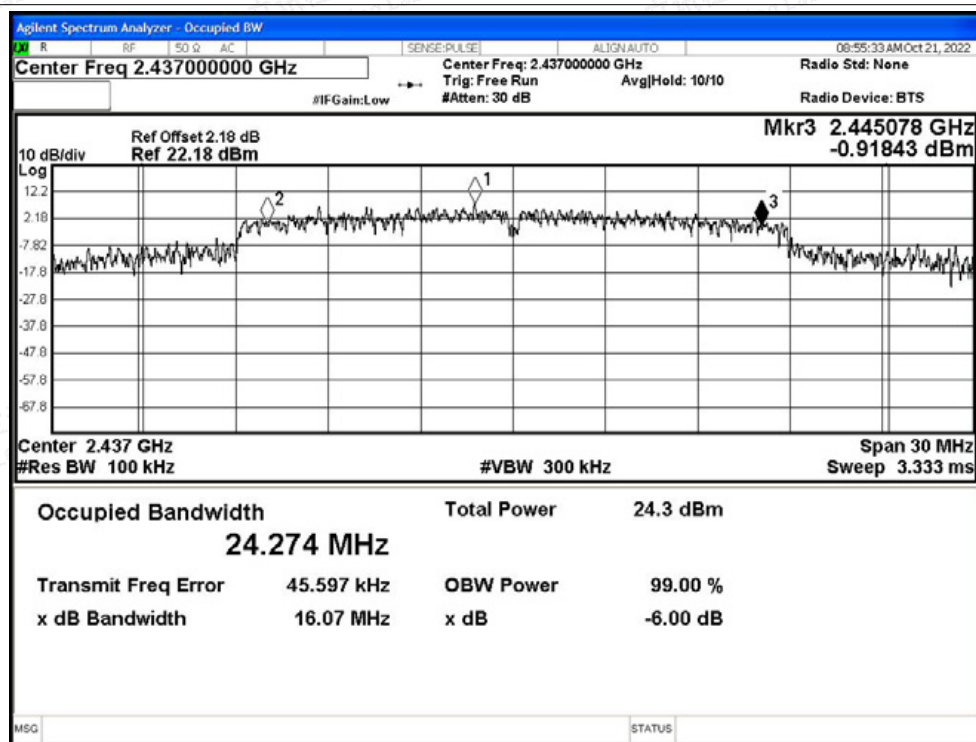
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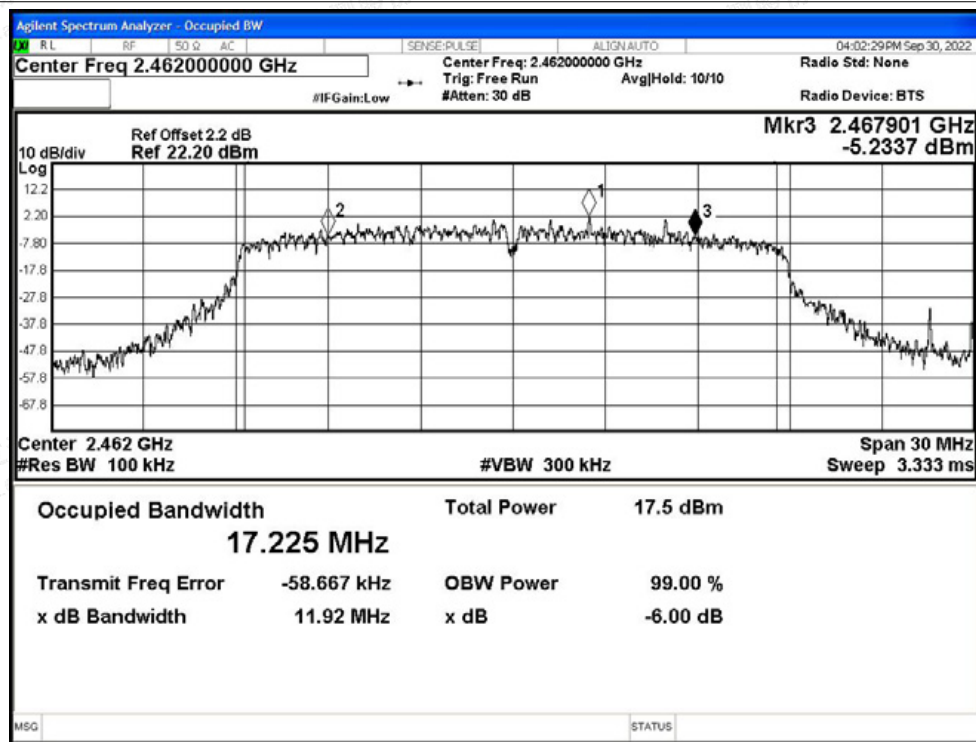
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-6dB Bandwidth NVNT n20 2437MHz Ant0



-6dB Bandwidth NVNT n20 2462MHz Ant0



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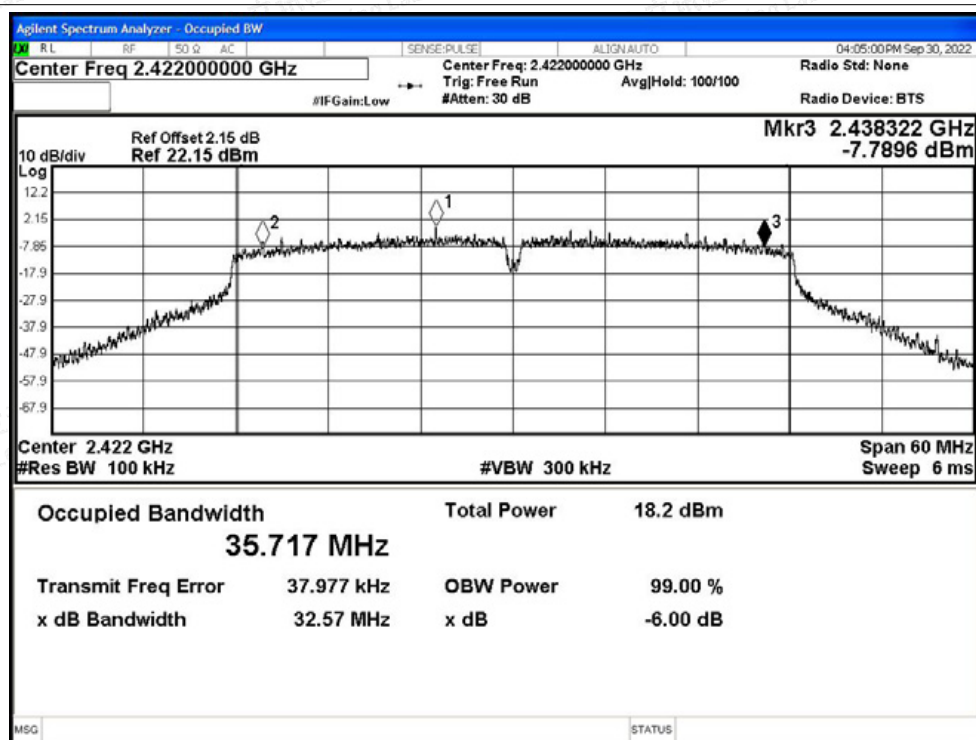
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Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

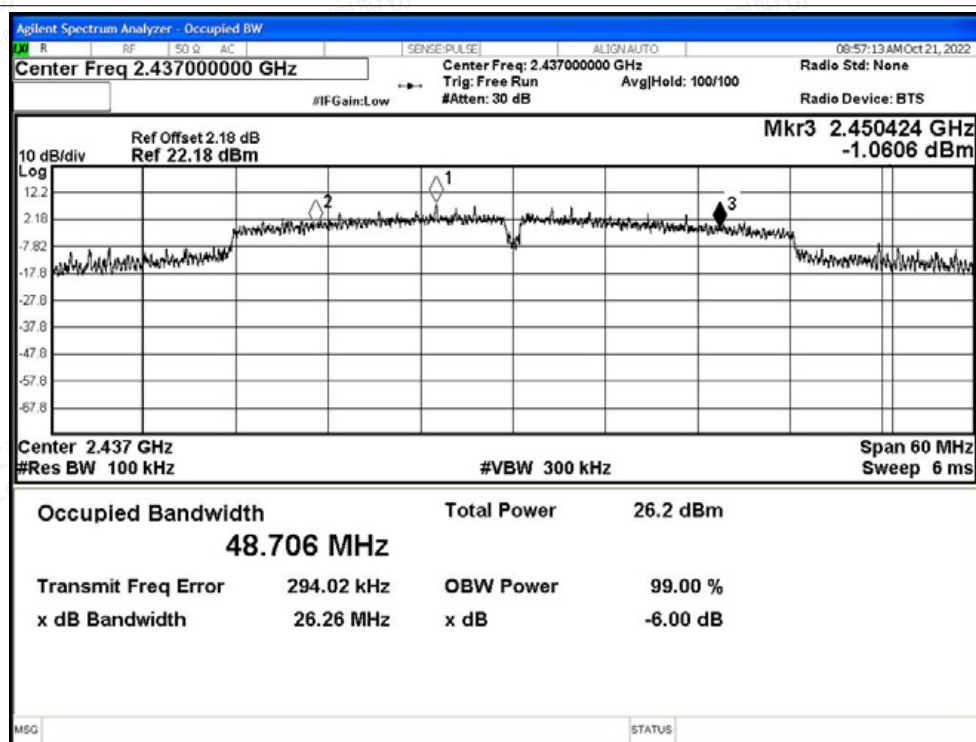
Scan code to check authenticity

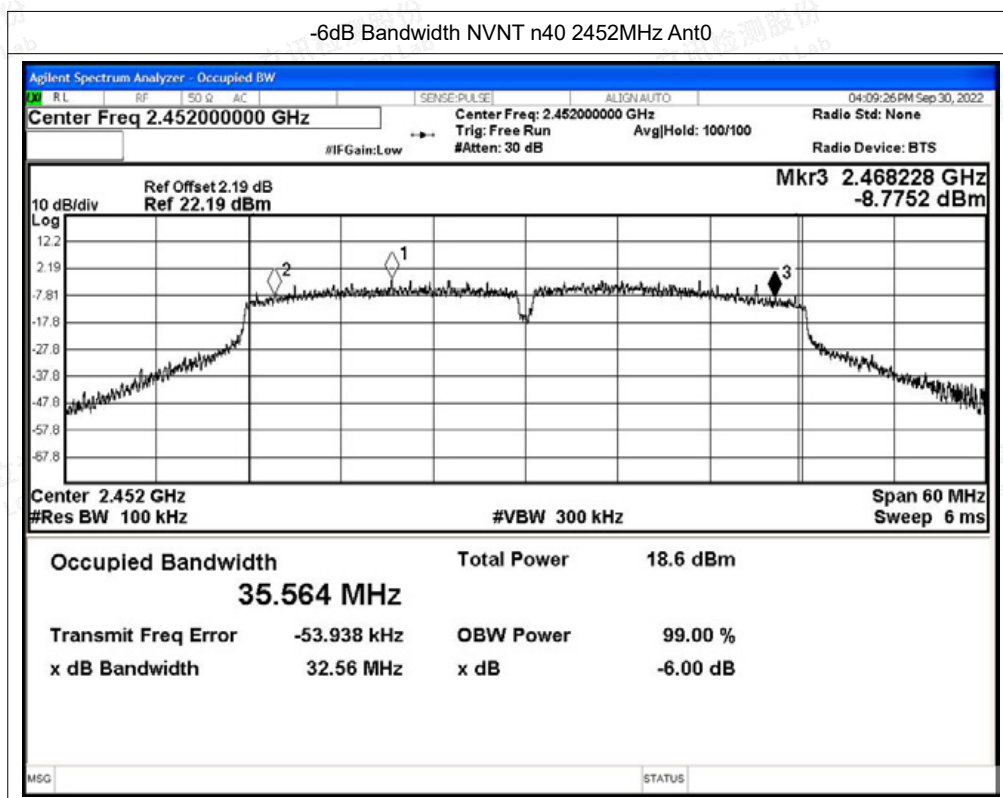


-6dB Bandwidth NVNT n40 2422MHz Ant0



-6dB Bandwidth NVNT n40 2437MHz Ant0





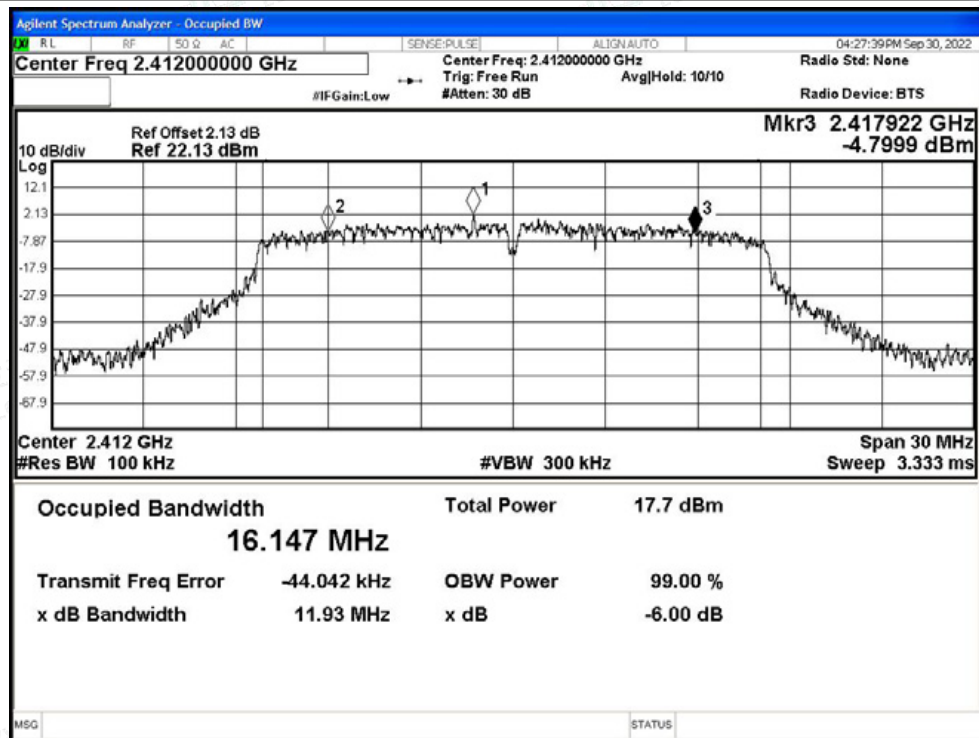
| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-----------------------------|---------|
| NVNT      | g    | 2412            | Ant1    | 11.932                | >=0.5                       | Pass    |
| NVNT      | g    | 2437            | Ant1    | 15.879                | >=0.5                       | Pass    |
| NVNT      | g    | 2462            | Ant1    | 14.270                | >=0.5                       | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 13.810                | >=0.5                       | Pass    |
| NVNT      | n20  | 2437            | Ant1    | 17.534                | >=0.5                       | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 13.085                | >=0.5                       | Pass    |
| NVNT      | n40  | 2422            | Ant1    | 33.674                | >=0.5                       | Pass    |
| NVNT      | n40  | 2437            | Ant1    | 30.075                | >=0.5                       | Pass    |
| NVNT      | n40  | 2452            | Ant1    | 30.717                | >=0.5                       | Pass    |



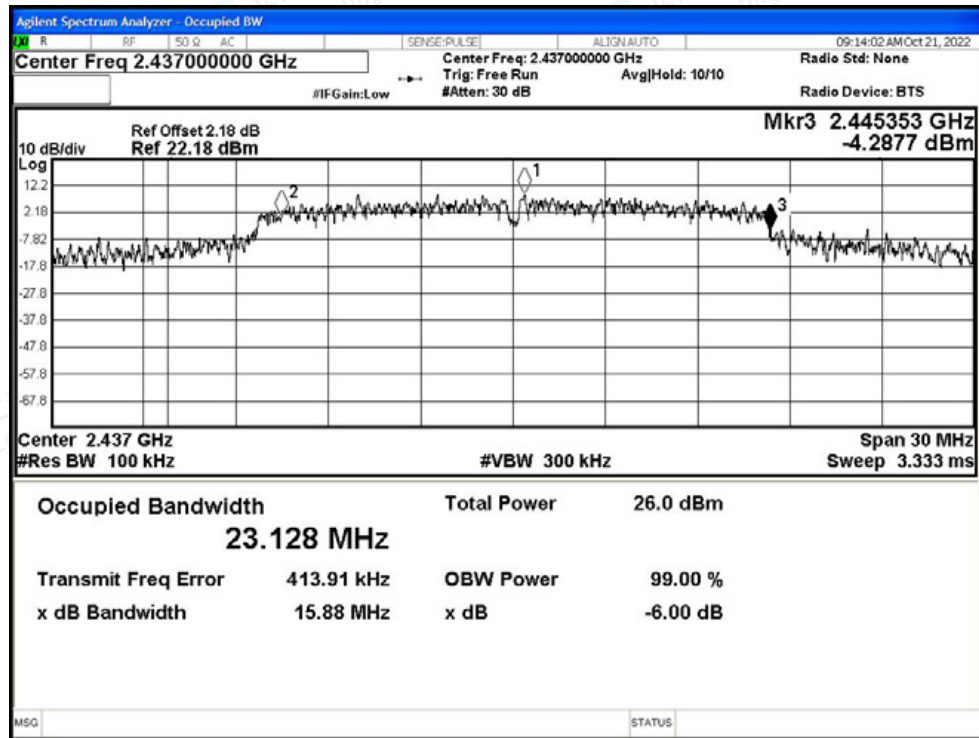


## Test Graphs

-6dB Bandwidth NVNT g 2412MHz Ant1



-6dB Bandwidth NVNT g 2437MHz Ant1



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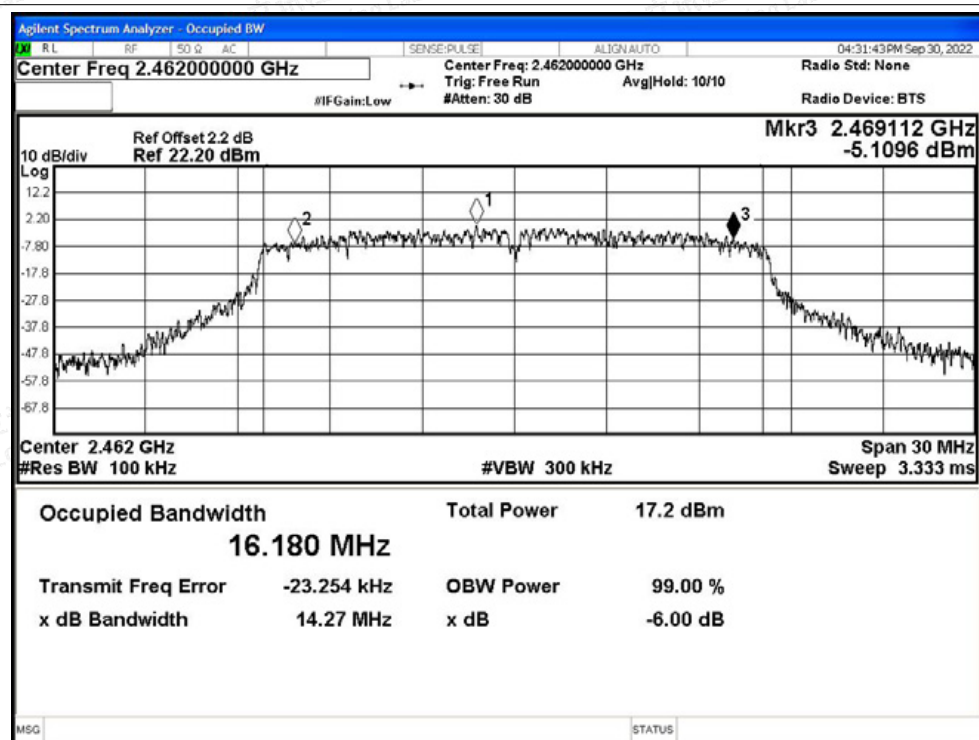
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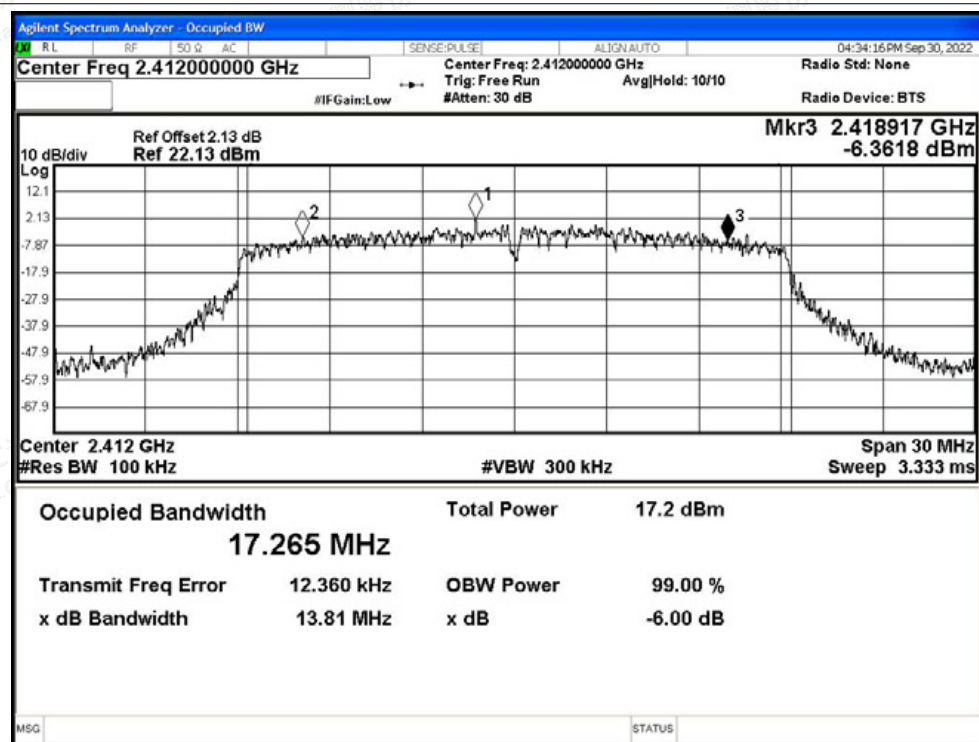
Scan code to check authenticity



-6dB Bandwidth NVNT g 2462MHz Ant1

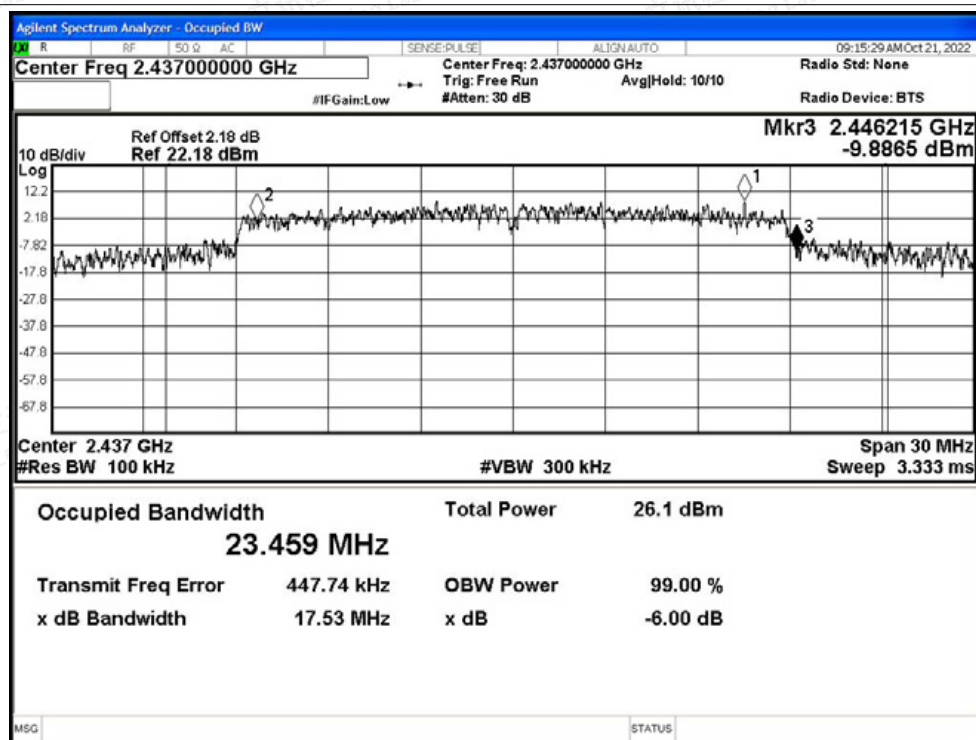


-6dB Bandwidth NVNT n20 2412MHz Ant1

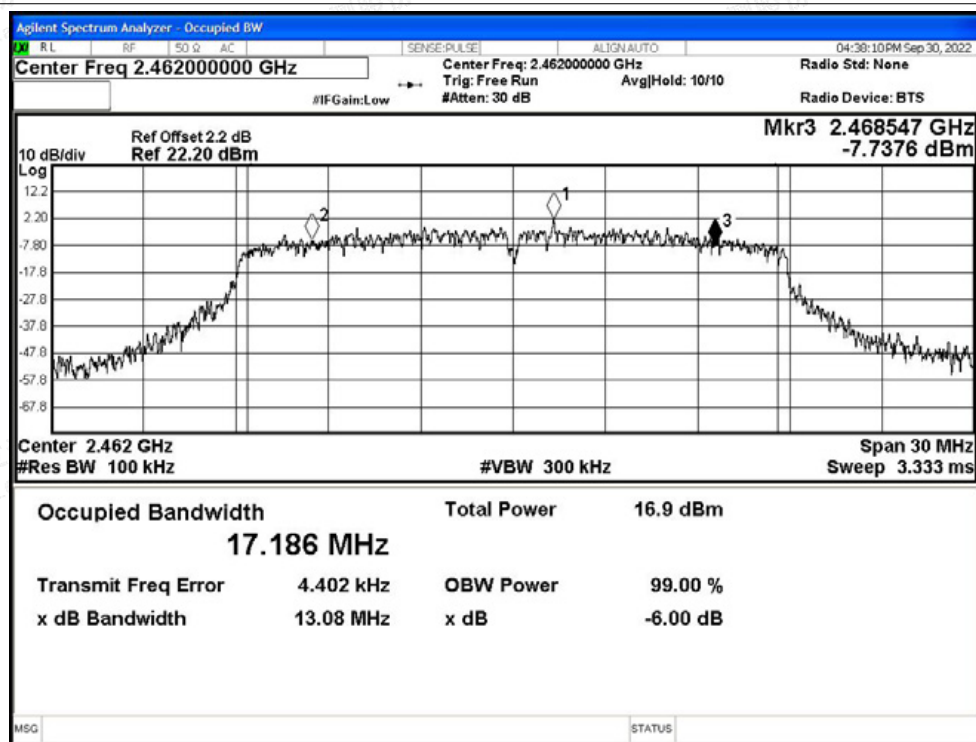




-6dB Bandwidth NVNT n20 2437MHz Ant1

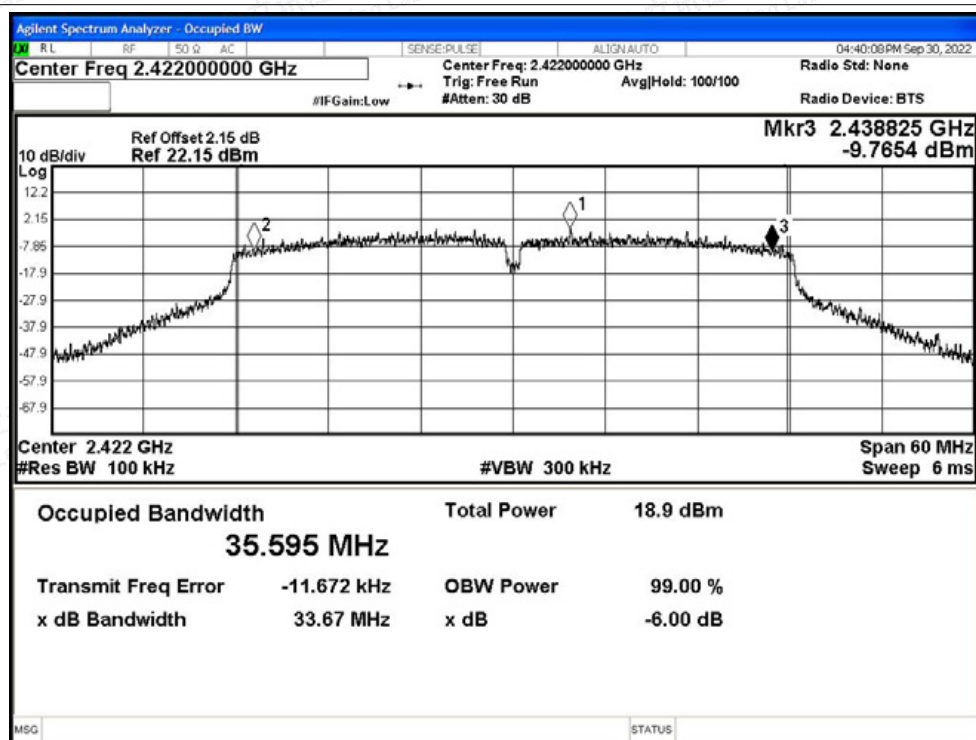


-6dB Bandwidth NVNT n20 2462MHz Ant1

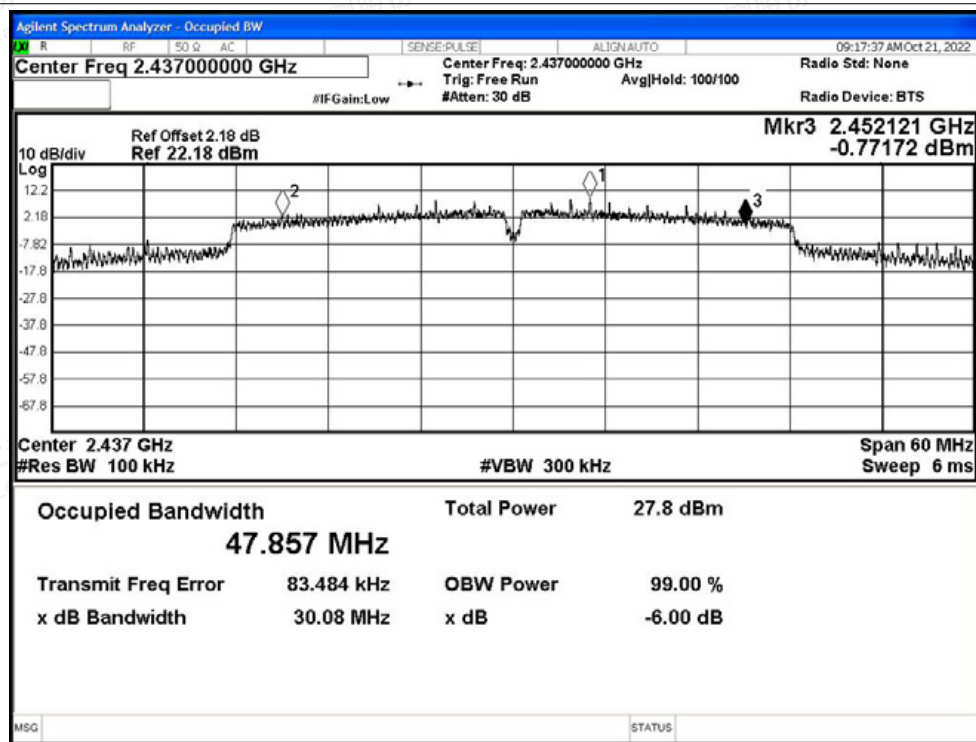




-6dB Bandwidth NVNT n40 2422MHz Ant1



-6dB Bandwidth NVNT n40 2437MHz Ant1

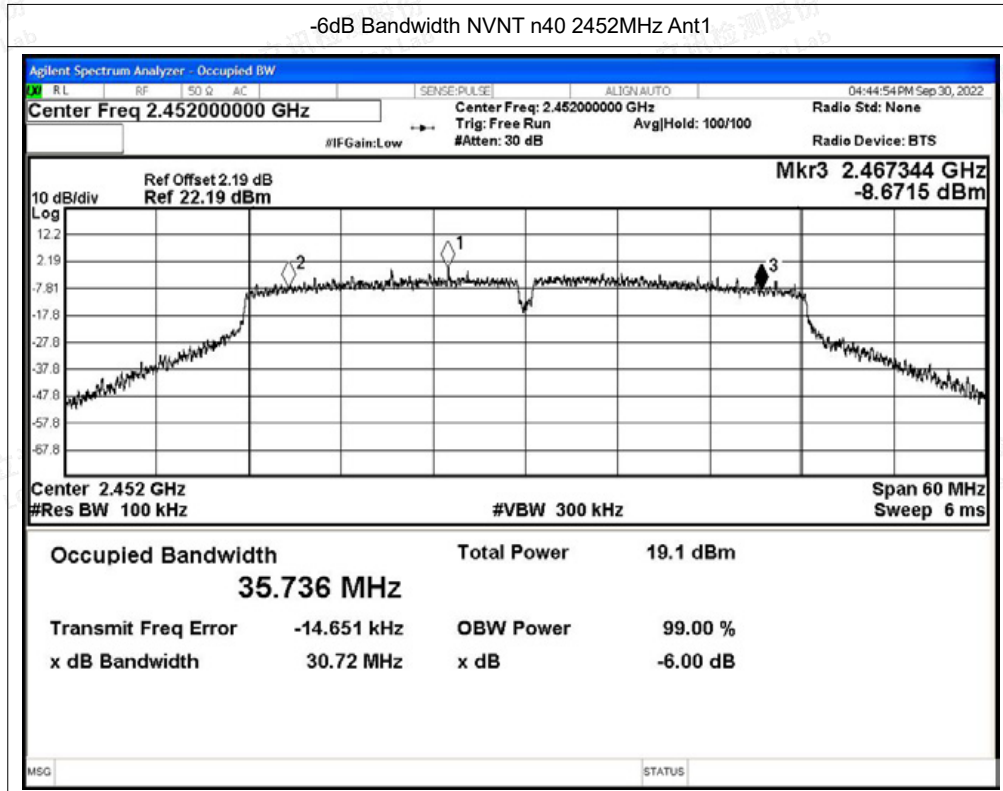


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## A.2 Occupied Channel Bandwidth

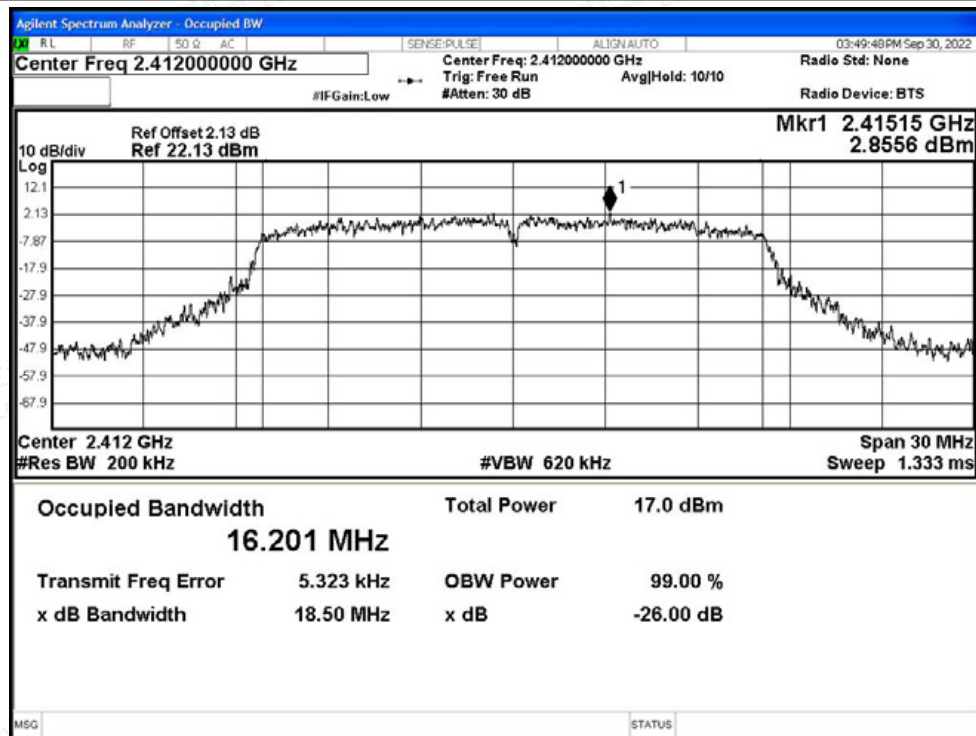
| Condition | Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) |
|-----------|------|-----------------|---------|---------------|
| NVNT      | g    | 2412            | Ant0    | 16.201        |
| NVNT      | g    | 2437            | Ant0    | 23.447        |
| NVNT      | g    | 2462            | Ant0    | 16.217        |
| NVNT      | n20  | 2412            | Ant0    | 17.281        |
| NVNT      | n20  | 2437            | Ant0    | 24.528        |
| NVNT      | n20  | 2462            | Ant0    | 17.243        |
| NVNT      | n40  | 2422            | Ant0    | 35.701        |
| NVNT      | n40  | 2437            | Ant0    | 48.092        |
| NVNT      | n40  | 2452            | Ant0    | 35.609        |



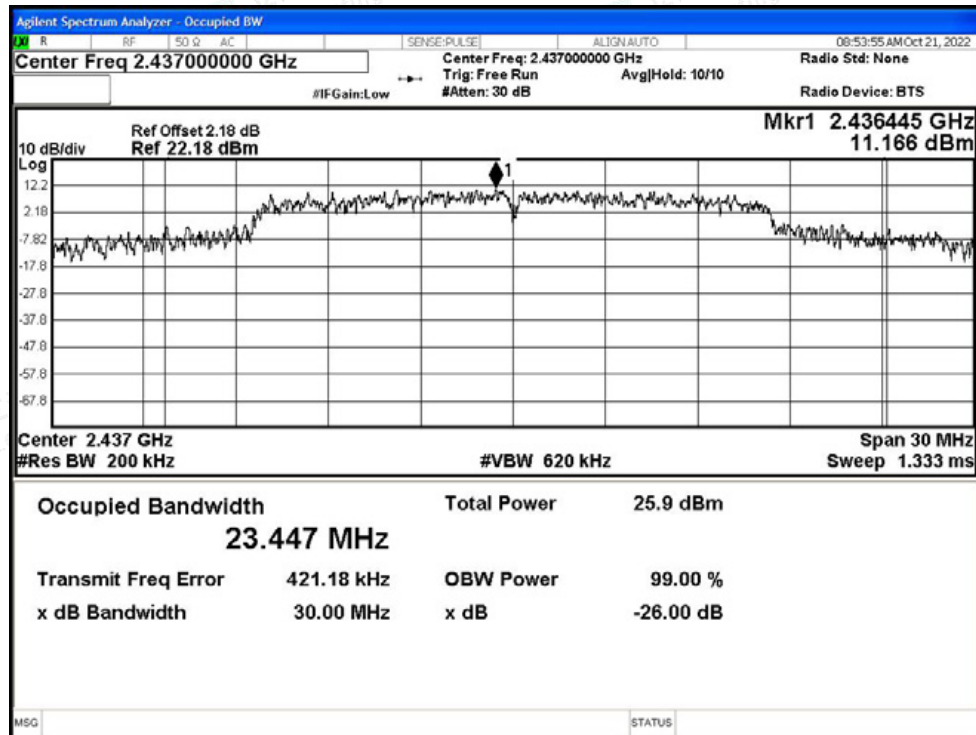


## Test Graphs

OBW NVNT g 2412MHz Ant0



OBW NVNT g 2437MHz Ant0



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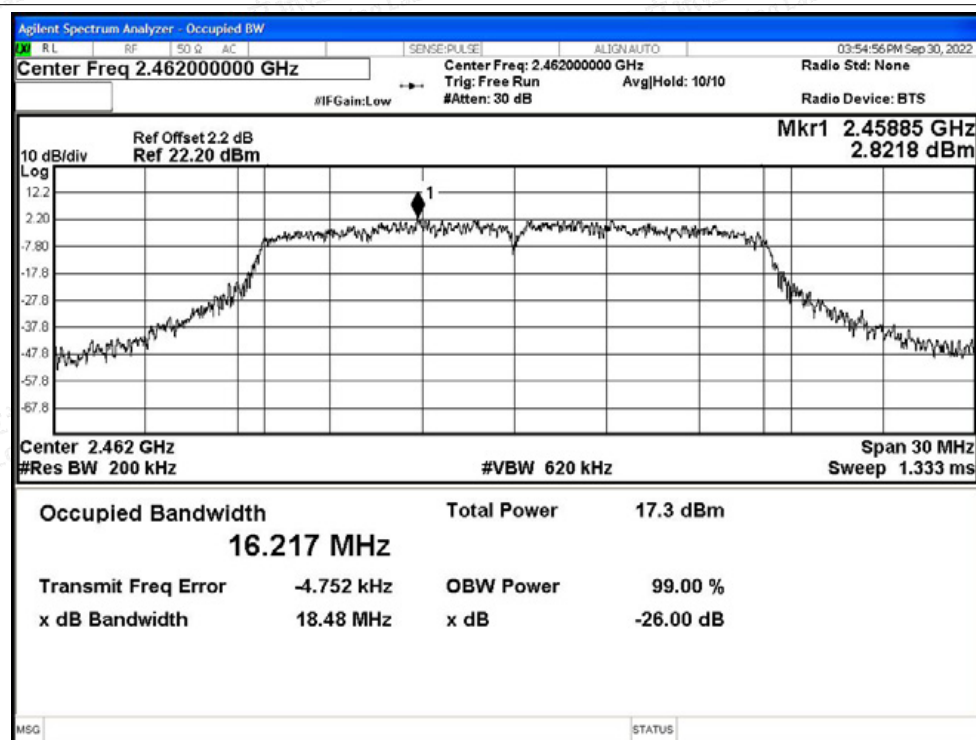
Add: 101, 201 Bldg A &amp; 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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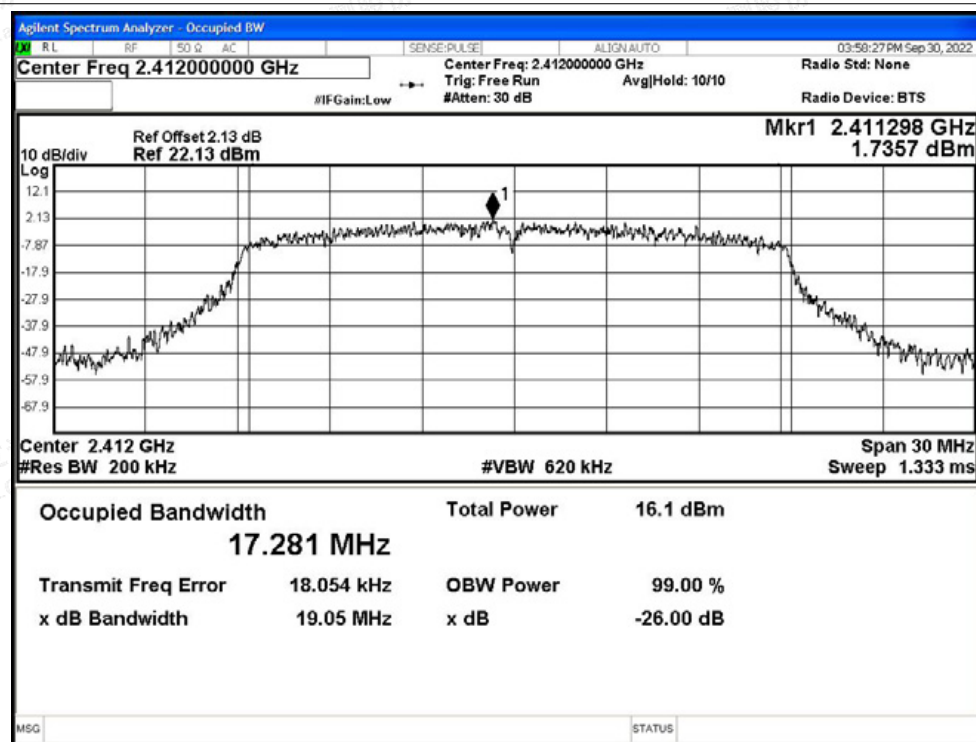
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## OBW NVNT g 2462MHz Ant0

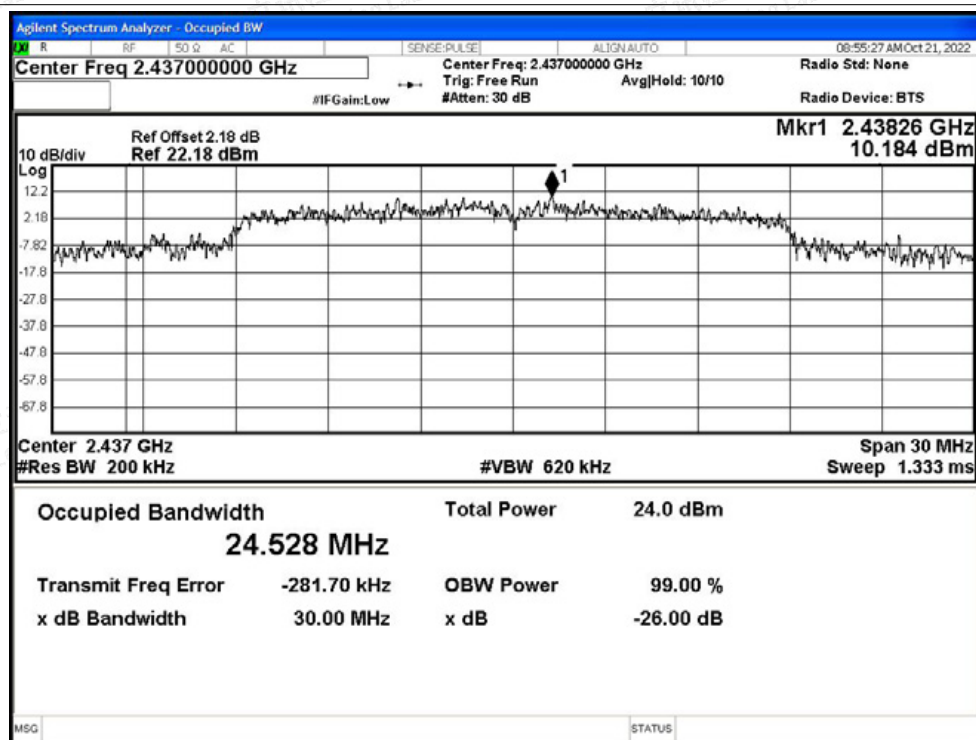


## OBW NVNT n20 2412MHz Ant0

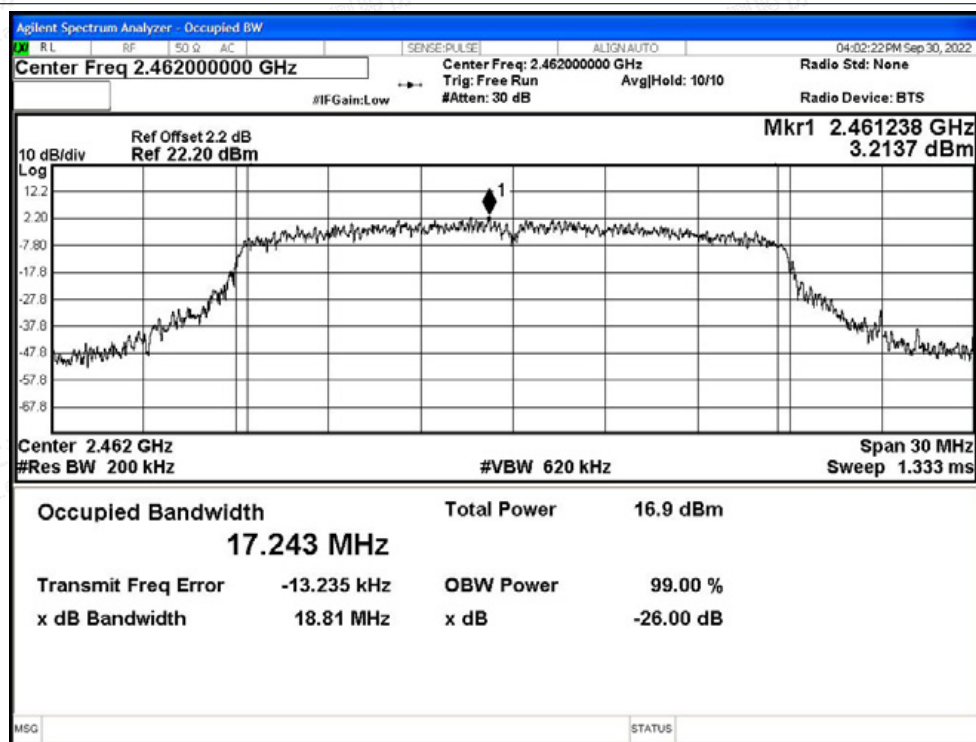




## OBW NVNT n20 2437MHz Ant0

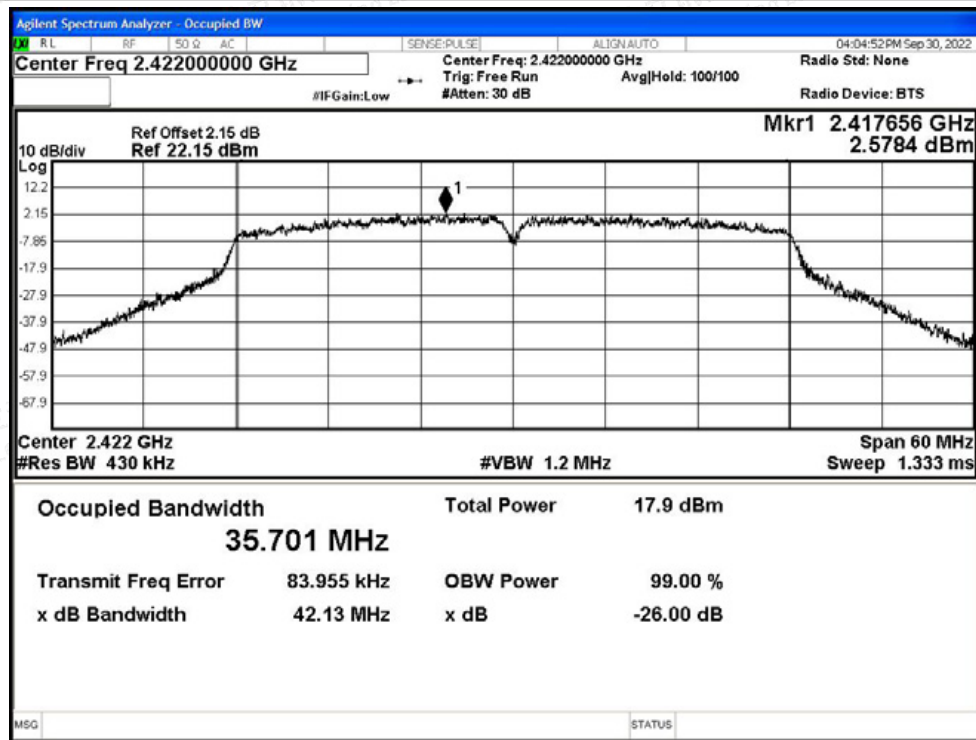


## OBW NVNT n20 2462MHz Ant0

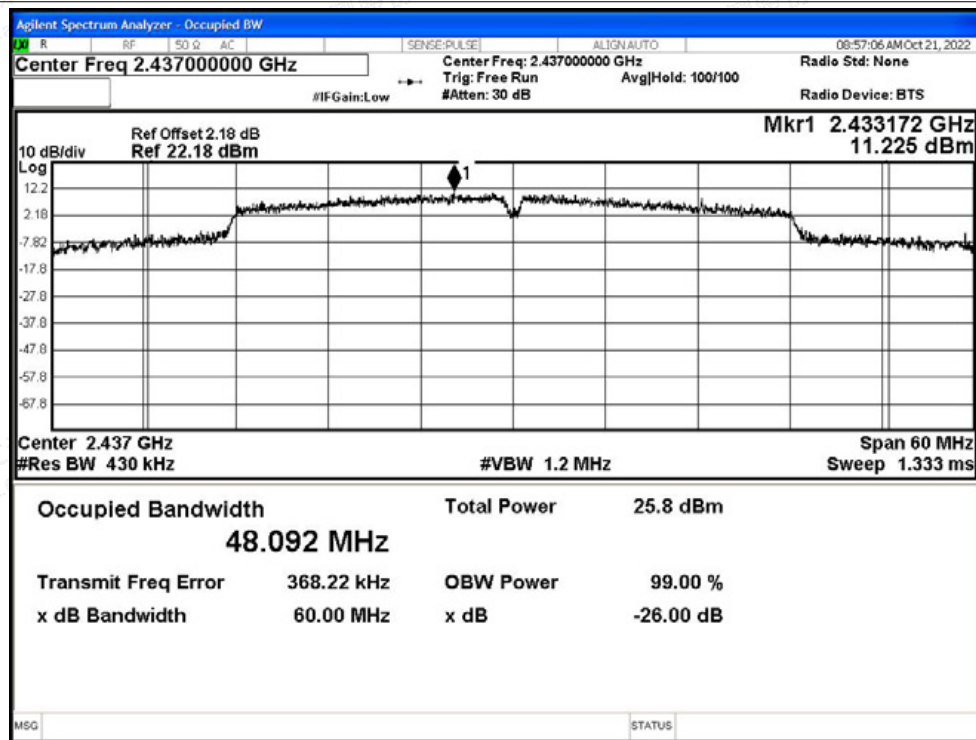




OBW NVNT n40 2422MHz Ant0



OBW NVNT n40 2437MHz Ant0

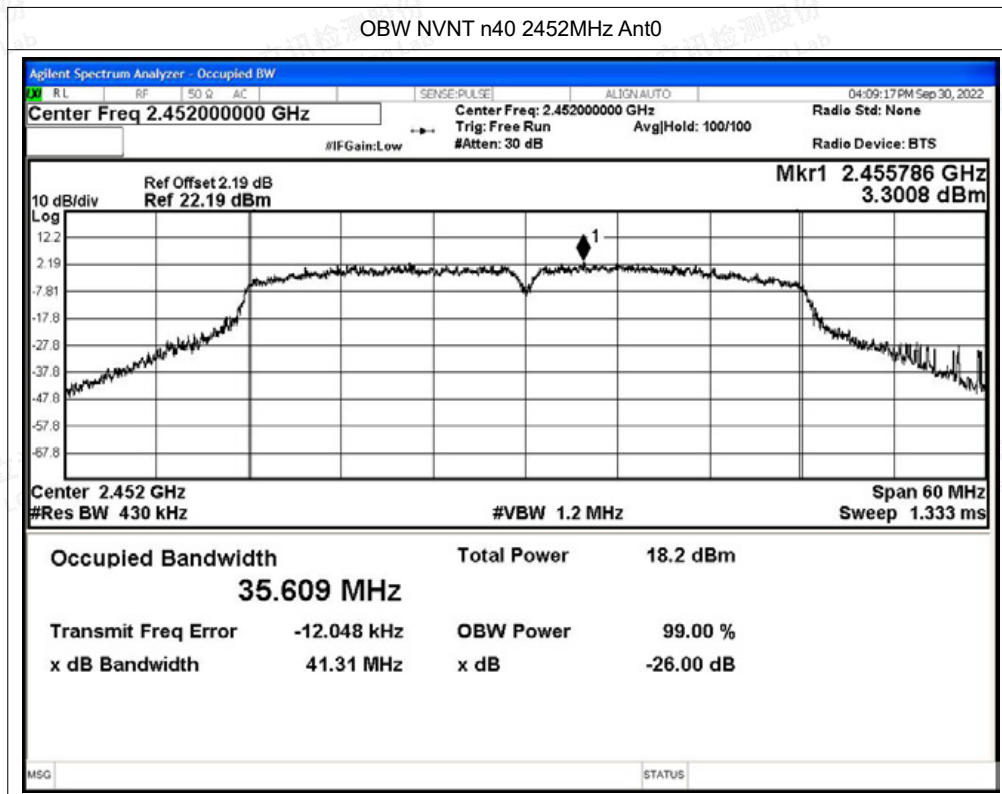


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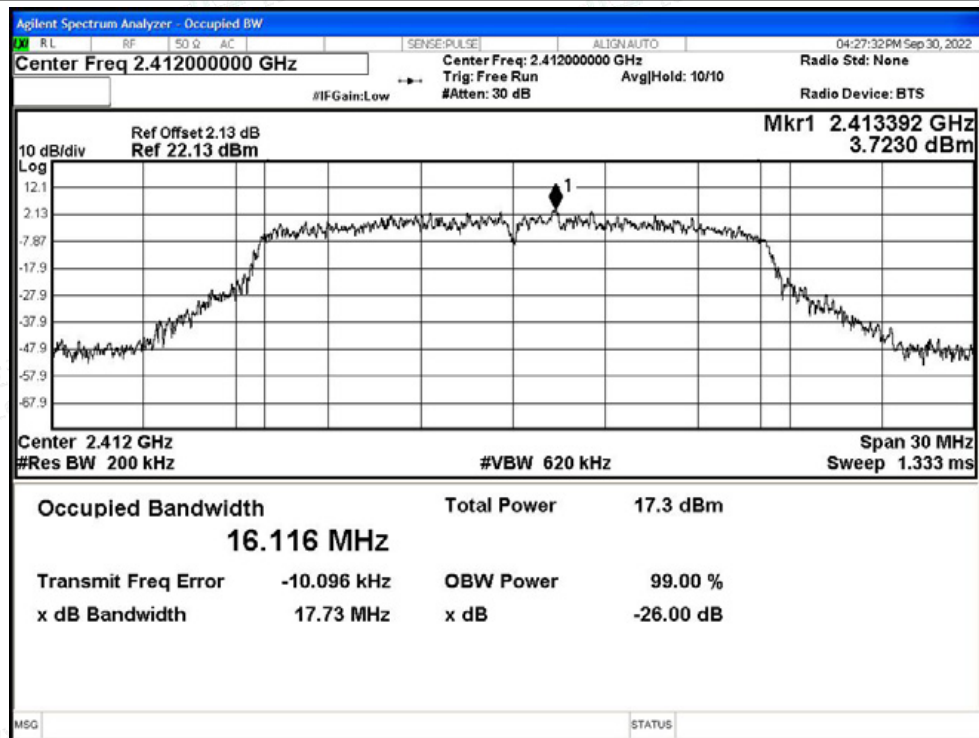
| Condition | Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) |
|-----------|------|-----------------|---------|---------------|
| NVNT      | g    | 2412            | Ant1    | 16.116        |
| NVNT      | g    | 2437            | Ant1    | 23.962        |
| NVNT      | g    | 2462            | Ant1    | 16.144        |
| NVNT      | n20  | 2412            | Ant1    | 17.239        |
| NVNT      | n20  | 2437            | Ant1    | 23.822        |
| NVNT      | n20  | 2462            | Ant1    | 17.235        |
| NVNT      | n40  | 2422            | Ant1    | 35.630        |
| NVNT      | n40  | 2437            | Ant1    | 47.252        |
| NVNT      | n40  | 2452            | Ant1    | 35.757        |



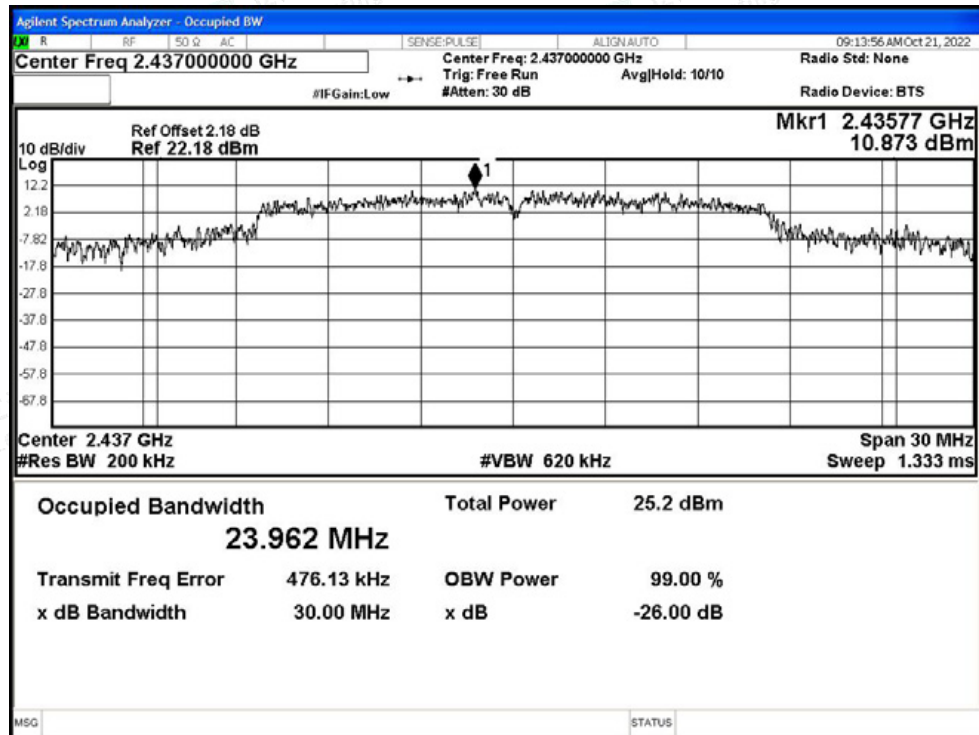


## Test Graphs

## OBW NVNT g 2412MHz Ant1

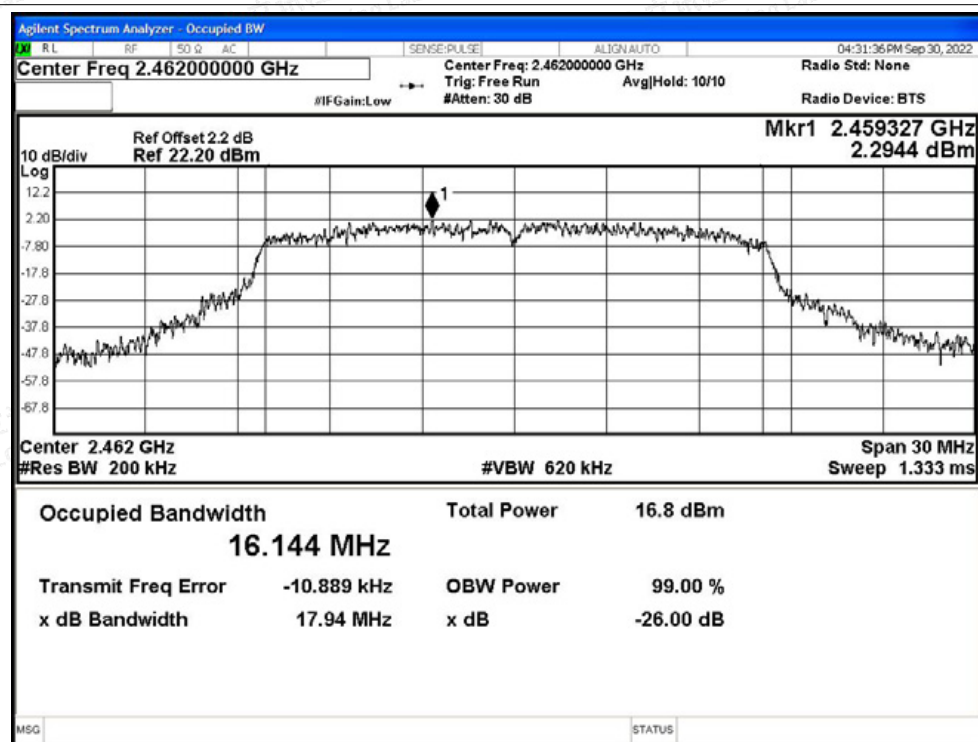


## OBW NVNT g 2437MHz Ant1

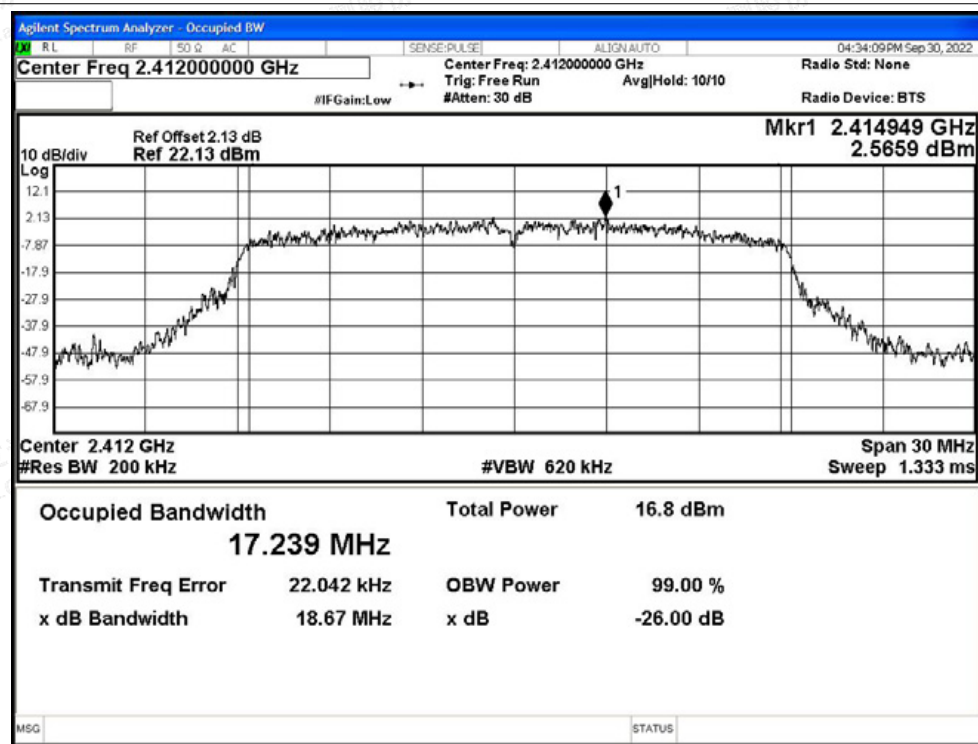




OBW NVNT g 2462MHz Ant1

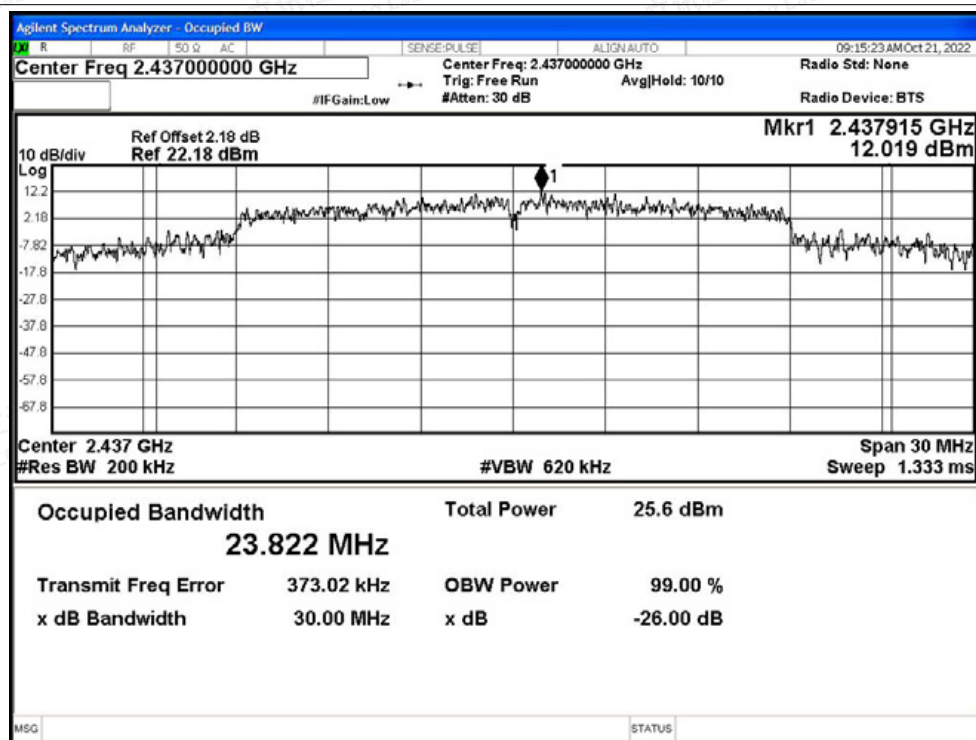


OBW NVNT n20 2412MHz Ant1

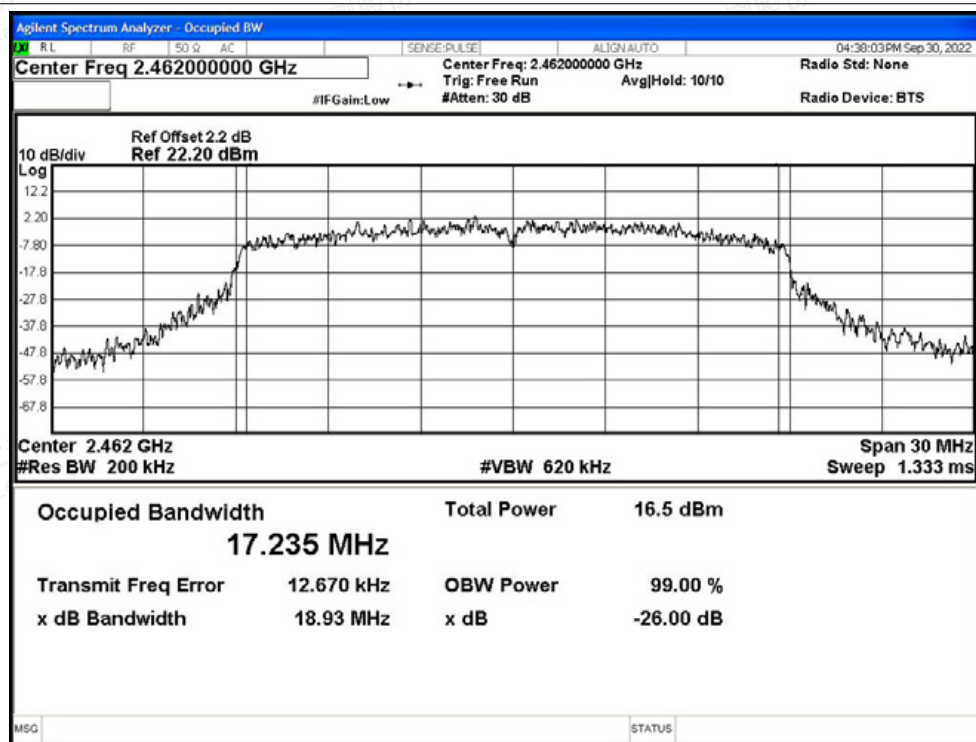




OBW NVNT n20 2437MHz Ant1



OBW NVNT n20 2462MHz Ant1



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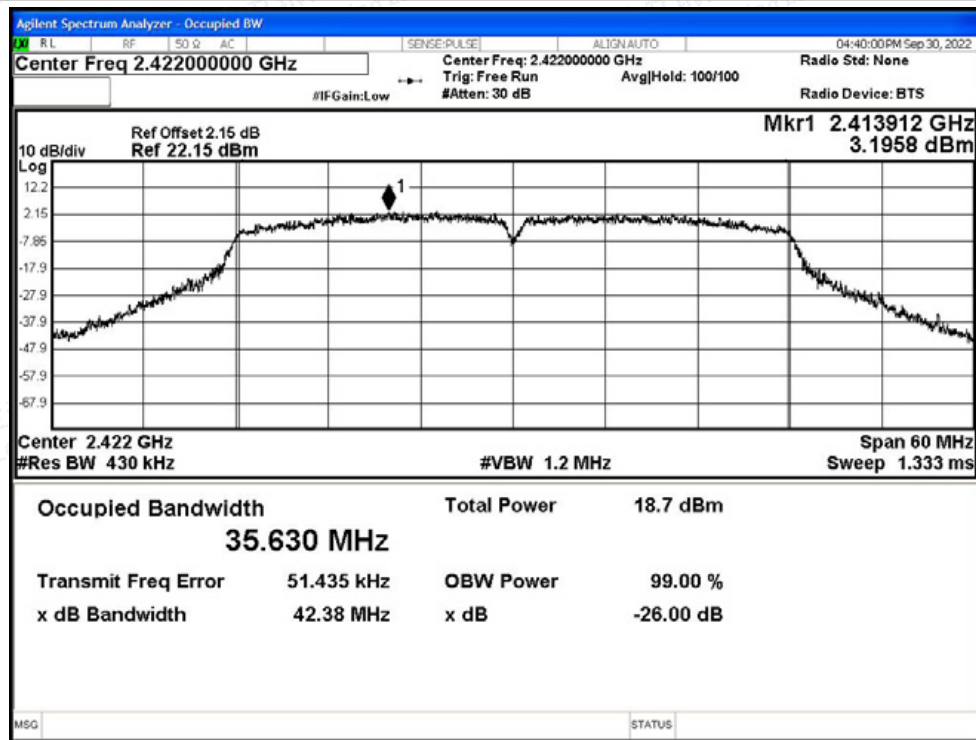
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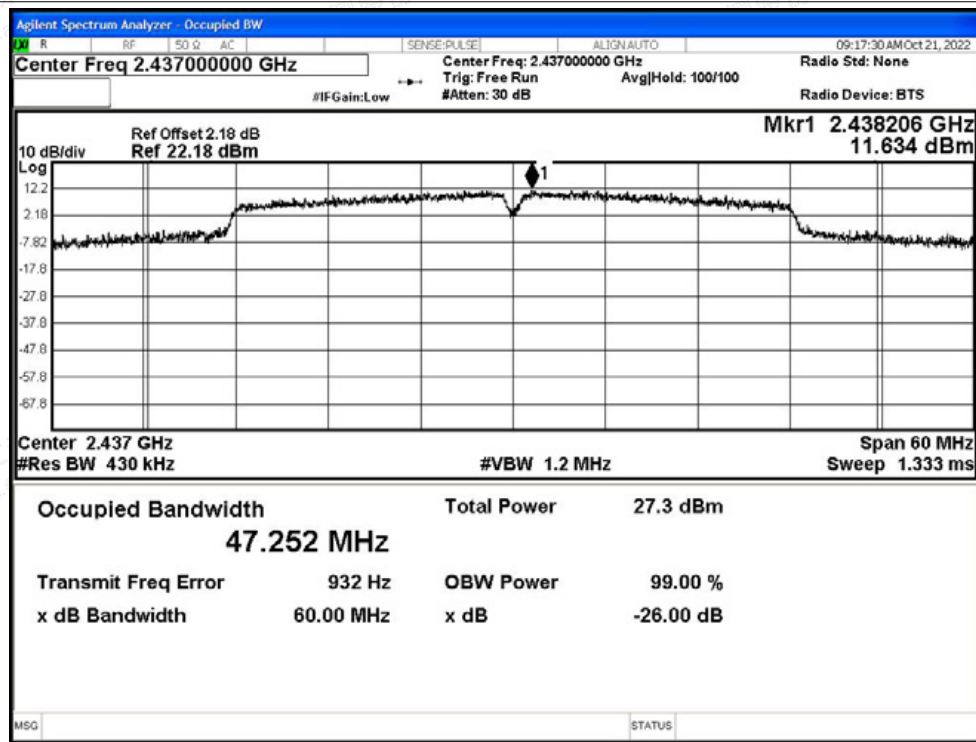
Scan code to check authenticity

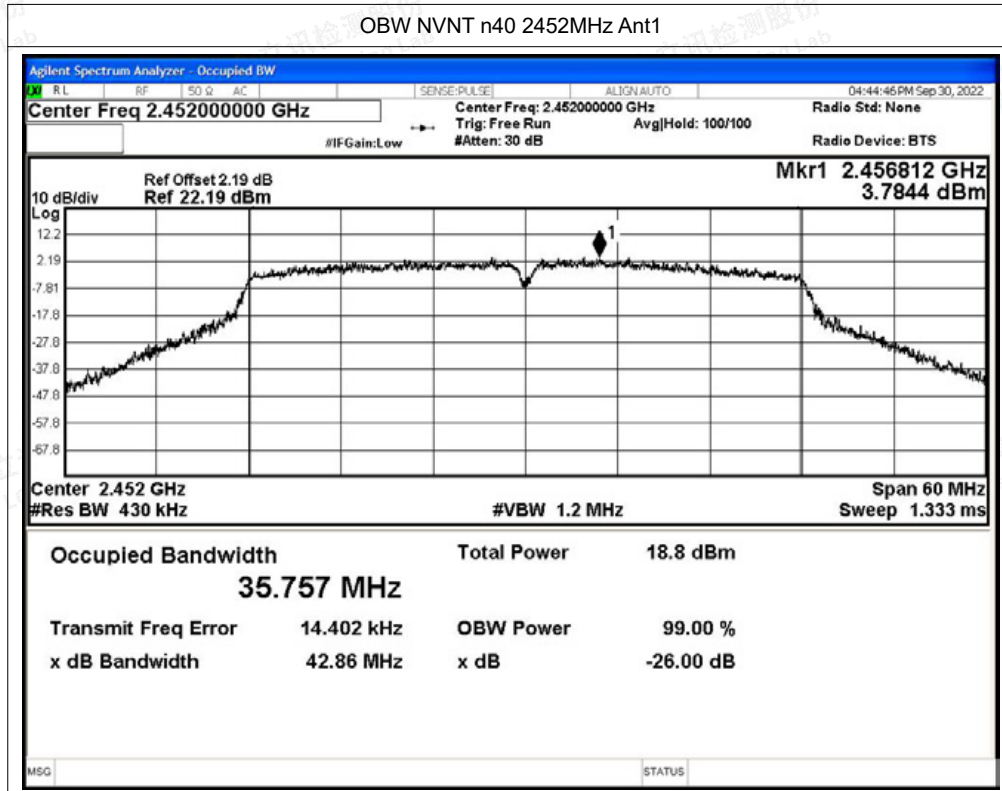


OBW NVNT n40 2422MHz Ant1



OBW NVNT n40 2437MHz Ant1







### A.3 Maximum Conducted Output Power

| Condition | Mode | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-------------|---------|
| NVNT      | g    | 2412            | Ant0    | 16.27                 | 30          | Pass    |
| NVNT      | g    | 2437            | Ant0    | 24.81                 | 30          | Pass    |
| NVNT      | g    | 2462            | Ant0    | 16.66                 | 30          | Pass    |
| NVNT      | n20  | 2412            | Ant0    | 15.38                 | 30          | Pass    |
| NVNT      | n20  | 2437            | Ant0    | 24.46                 | 30          | Pass    |
| NVNT      | n20  | 2462            | Ant0    | 17.88                 | 30          | Pass    |
| NVNT      | n40  | 2422            | Ant0    | 16.81                 | 30          | Pass    |
| NVNT      | n40  | 2437            | Ant0    | 24.46                 | 30          | Pass    |
| NVNT      | n40  | 2452            | Ant0    | 16.99                 | 30          | Pass    |

| Condition | Mode | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-------------|---------|
| NVNT      | g    | 2412            | Ant1    | 16.23                 | 30          | Pass    |
| NVNT      | g    | 2437            | Ant1    | 24.40                 | 30          | Pass    |
| NVNT      | g    | 2462            | Ant1    | 15.96                 | 30          | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 16.12                 | 30          | Pass    |
| NVNT      | n20  | 2437            | Ant1    | 24.35                 | 30          | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 17.22                 | 30          | Pass    |
| NVNT      | n40  | 2422            | Ant1    | 17.44                 | 30          | Pass    |
| NVNT      | n40  | 2437            | Ant1    | 24.78                 | 30          | Pass    |
| NVNT      | n40  | 2452            | Ant1    | 17.68                 | 30          | Pass    |

#### MIMO

| Condition | Mode | Frequency (MHz) | Total Power (dBm) |       |           | Limit (dBm) | Verdict |
|-----------|------|-----------------|-------------------|-------|-----------|-------------|---------|
|           |      |                 | Ant0              | Ant1  | Ant0+Ant1 |             |         |
| NVNT      | n20  | 2412            | 15.38             | 16.12 | 18.78     | 30          | Pass    |
| NVNT      | n20  | 2437            | 24.46             | 24.35 | 27.42     | 30          | Pass    |
| NVNT      | n20  | 2462            | 17.88             | 17.22 | 20.57     | 30          | Pass    |
| NVNT      | n40  | 2422            | 16.81             | 17.44 | 20.15     | 30          | Pass    |
| NVNT      | n40  | 2437            | 24.46             | 24.78 | 27.63     | 30          | Pass    |
| NVNT      | n40  | 2452            | 16.99             | 17.68 | 20.36     | 30          | Pass    |





## A.4 Maximum Power Spectral Density Level

| Condition | Mode | Frequency (MHz) | Antenna | Conducted PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|-----------|------|-----------------|---------|--------------------------|------------------|---------|
| NVNT      | g    | 2412            | Ant0    | -13.63                   | $\leq 8$         | Pass    |
| NVNT      | g    | 2437            | Ant0    | -2.24                    | $\leq 8$         | Pass    |
| NVNT      | g    | 2462            | Ant0    | -10.35                   | $\leq 8$         | Pass    |
| NVNT      | n20  | 2412            | Ant0    | -14.06                   | $\leq 8$         | Pass    |
| NVNT      | n20  | 2437            | Ant0    | -3.43                    | $\leq 8$         | Pass    |
| NVNT      | n20  | 2462            | Ant0    | -13.06                   | $\leq 8$         | Pass    |
| NVNT      | n40  | 2422            | Ant0    | -15.56                   | $\leq 8$         | Pass    |
| NVNT      | n40  | 2437            | Ant0    | -7.75                    | $\leq 8$         | Pass    |
| NVNT      | n40  | 2452            | Ant0    | -16.07                   | $\leq 8$         | Pass    |

| Condition | Mode | Frequency (MHz) | Antenna | Conducted PSD (dBm/3kHz) | Limit (dBm/3kHz) | Verdict |
|-----------|------|-----------------|---------|--------------------------|------------------|---------|
| NVNT      | g    | 2412            | Ant1    | -13.20                   | $\leq 8$         | Pass    |
| NVNT      | g    | 2437            | Ant1    | -2.73                    | $\leq 8$         | Pass    |
| NVNT      | g    | 2462            | Ant1    | -11.98                   | $\leq 8$         | Pass    |
| NVNT      | n20  | 2412            | Ant1    | -10.91                   | $\leq 8$         | Pass    |
| NVNT      | n20  | 2437            | Ant1    | -2.88                    | $\leq 8$         | Pass    |
| NVNT      | n20  | 2462            | Ant1    | -13.62                   | $\leq 8$         | Pass    |
| NVNT      | n40  | 2422            | Ant1    | -15.45                   | $\leq 8$         | Pass    |
| NVNT      | n40  | 2437            | Ant1    | -6.68                    | $\leq 8$         | Pass    |
| NVNT      | n40  | 2452            | Ant1    | -15.86                   | $\leq 8$         | Pass    |

## MIMO

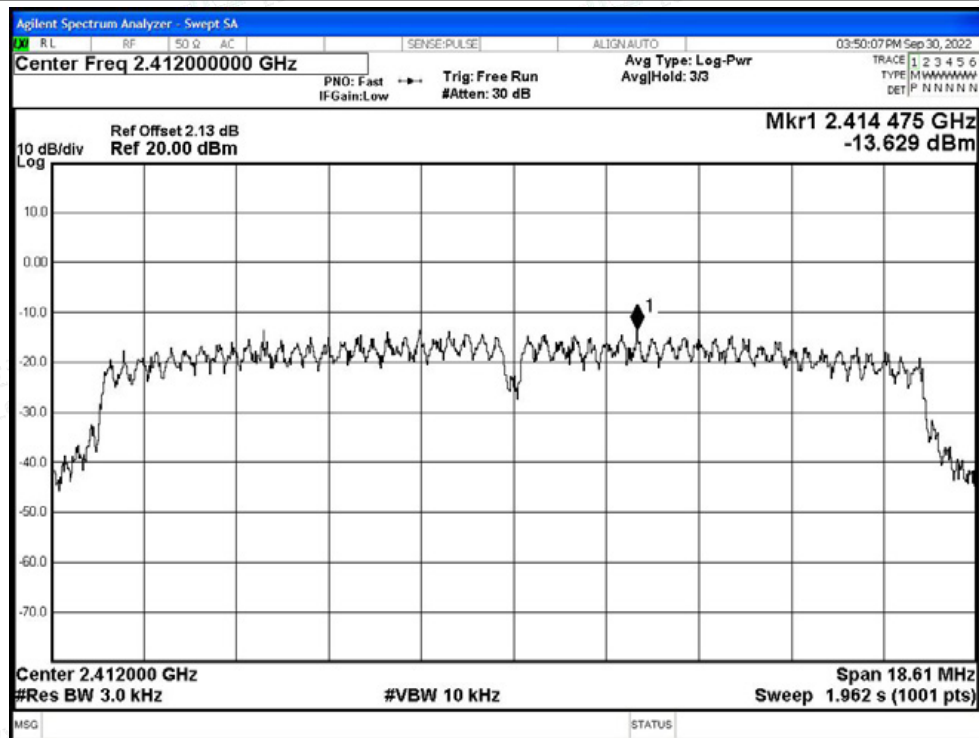
| Condition | Mode | Frequency (MHz) | Total PSD (dBm/3kHz) |        |           | Limit (dBm/3kHz) | Verdict |
|-----------|------|-----------------|----------------------|--------|-----------|------------------|---------|
|           |      |                 | Ant0                 | Ant1   | Ant0+Ant1 |                  |         |
| NVNT      | n20  | 2412            | -14.06               | -10.91 | -9.20     | $\leq 8$         | Pass    |
| NVNT      | n20  | 2437            | -3.43                | -2.88  | -0.14     | $\leq 8$         | Pass    |
| NVNT      | n20  | 2462            | -13.06               | -13.62 | -10.32    | $\leq 8$         | Pass    |
| NVNT      | n40  | 2422            | -15.56               | -15.45 | -12.49    | $\leq 8$         | Pass    |
| NVNT      | n40  | 2437            | -7.75                | -6.68  | -4.17     | $\leq 8$         | Pass    |
| NVNT      | n40  | 2452            | -16.07               | -15.86 | -12.95    | $\leq 8$         | Pass    |



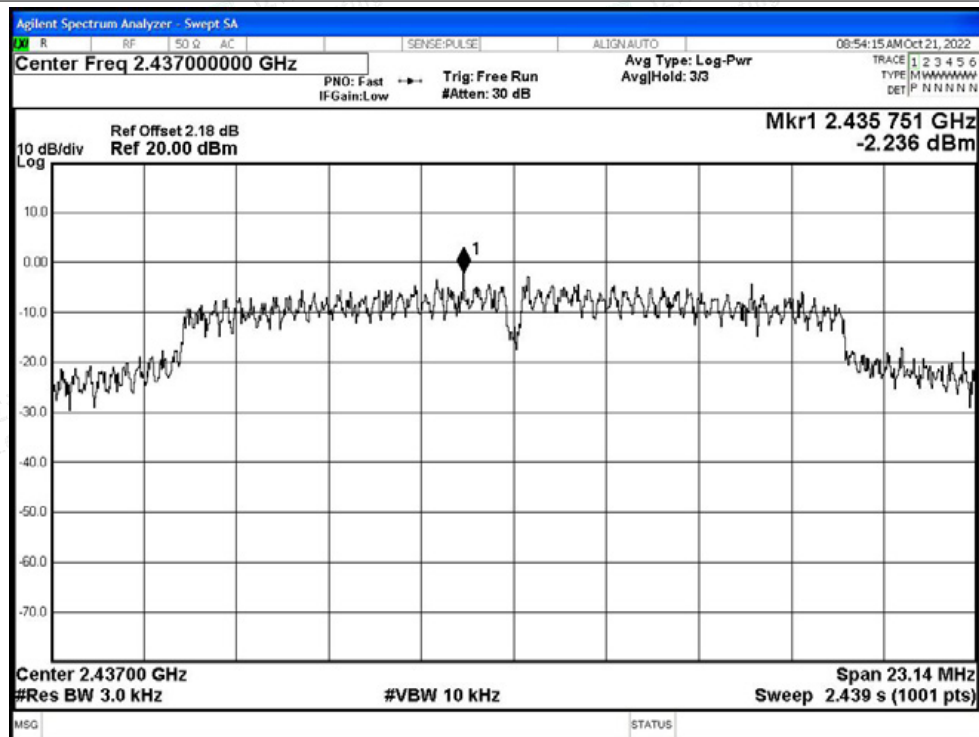


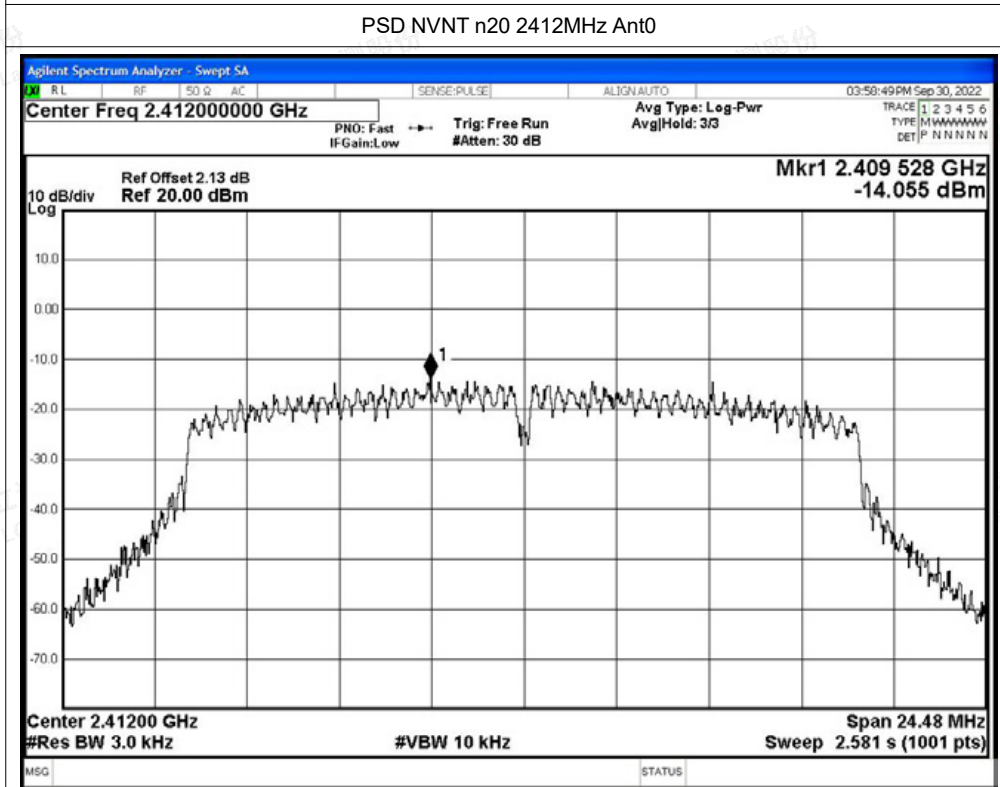
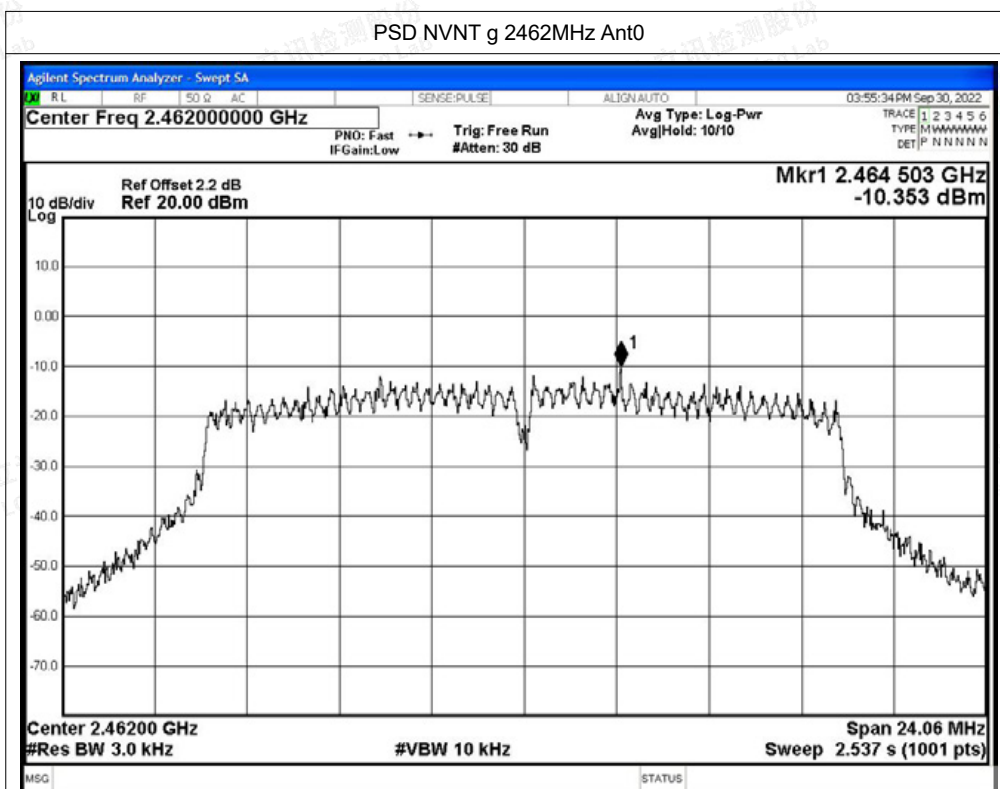
## Test Graphs

PSD NVNT g 2412MHz Ant0

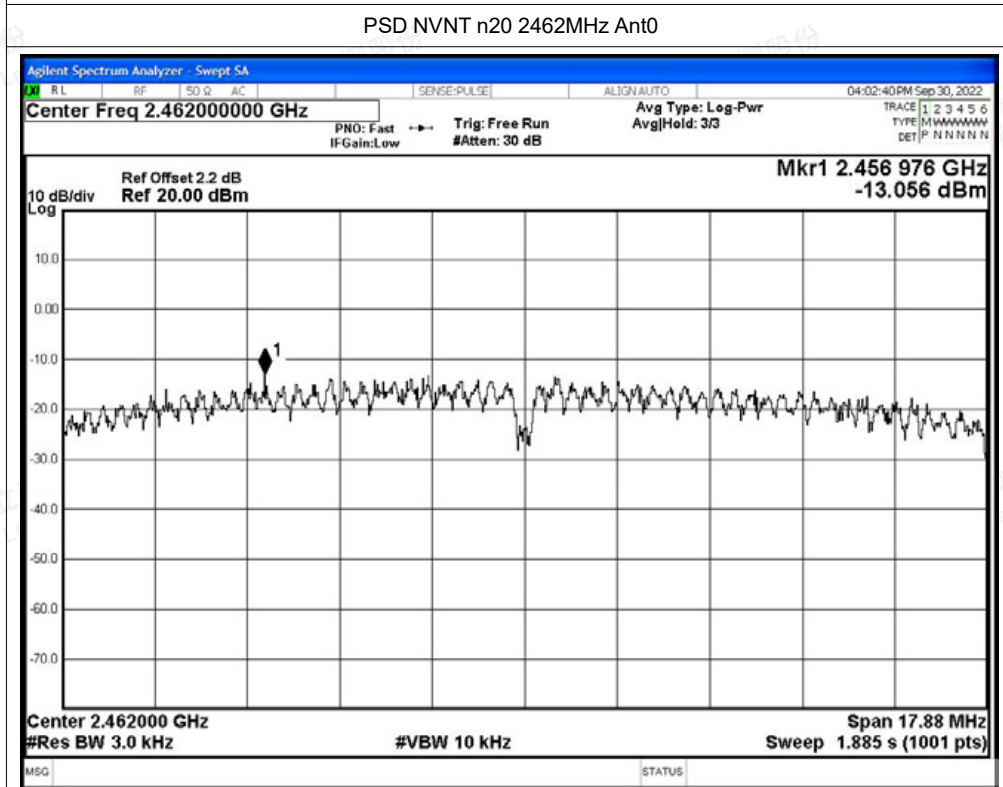
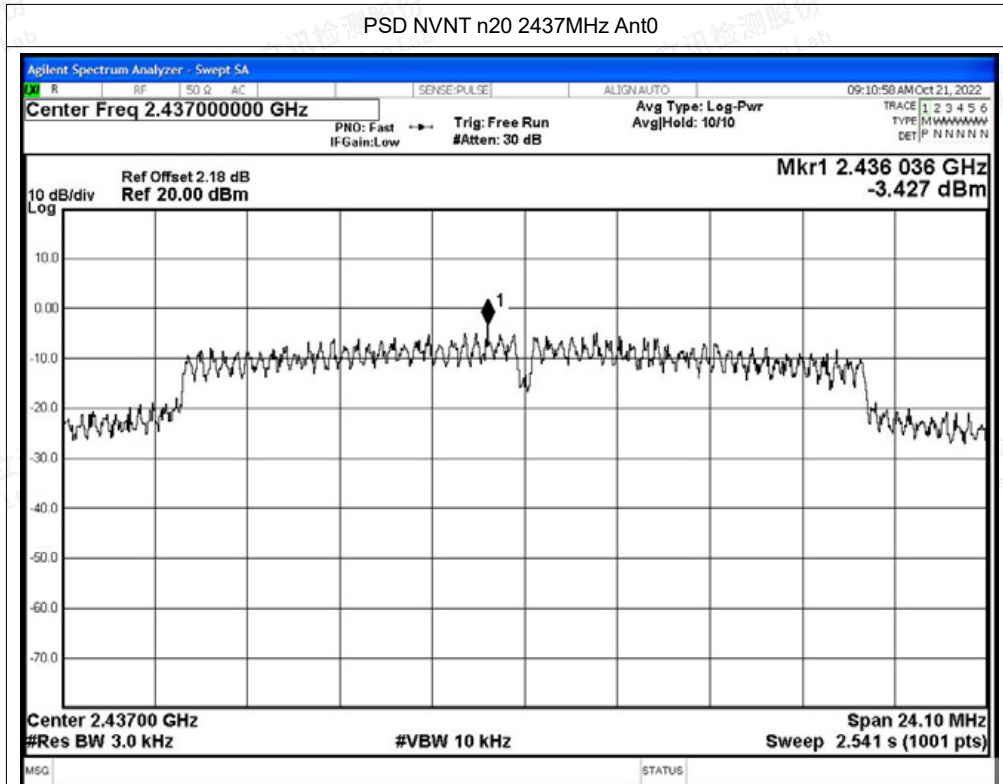


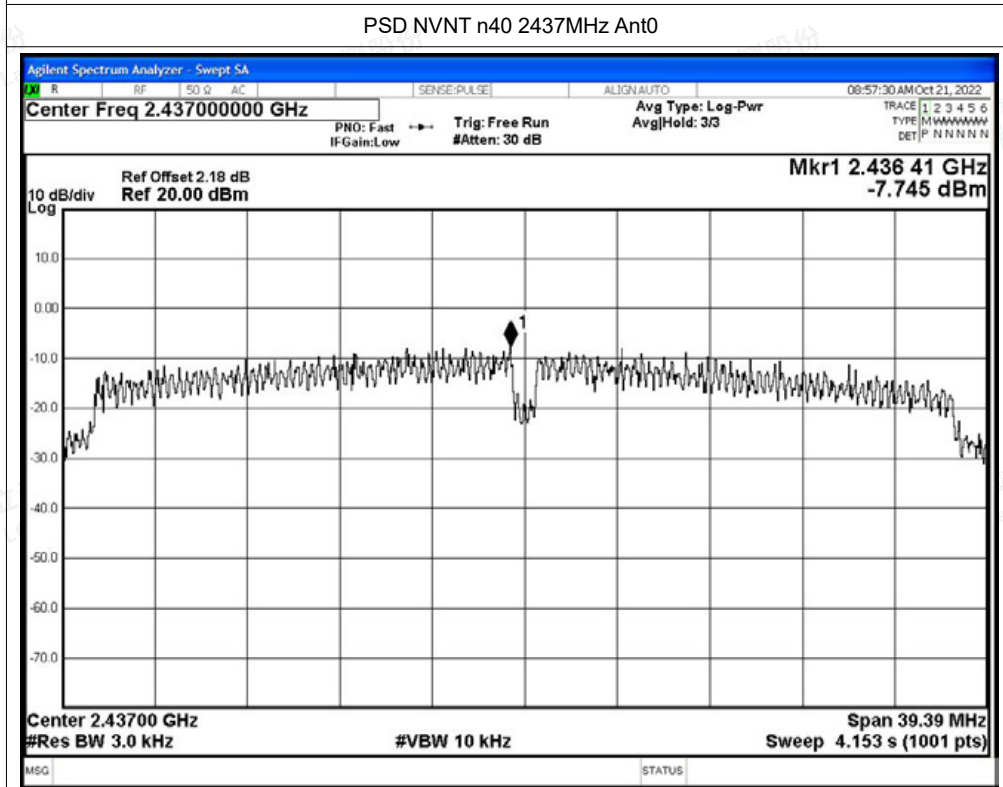
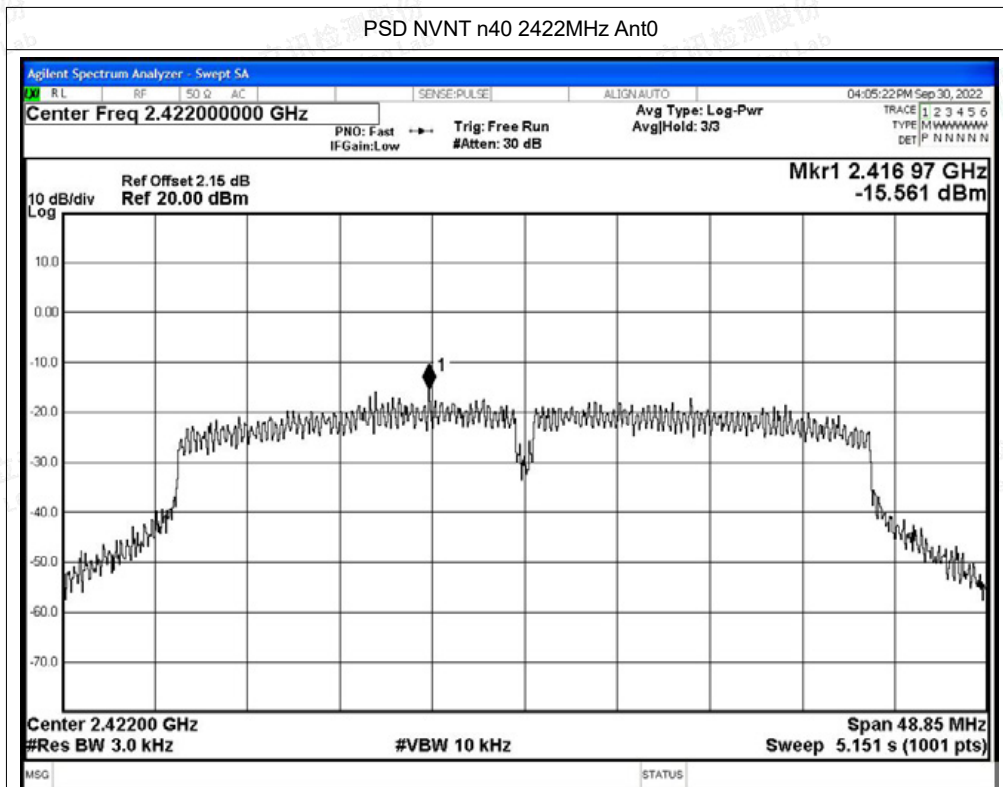
PSD NVNT g 2437MHz Ant0

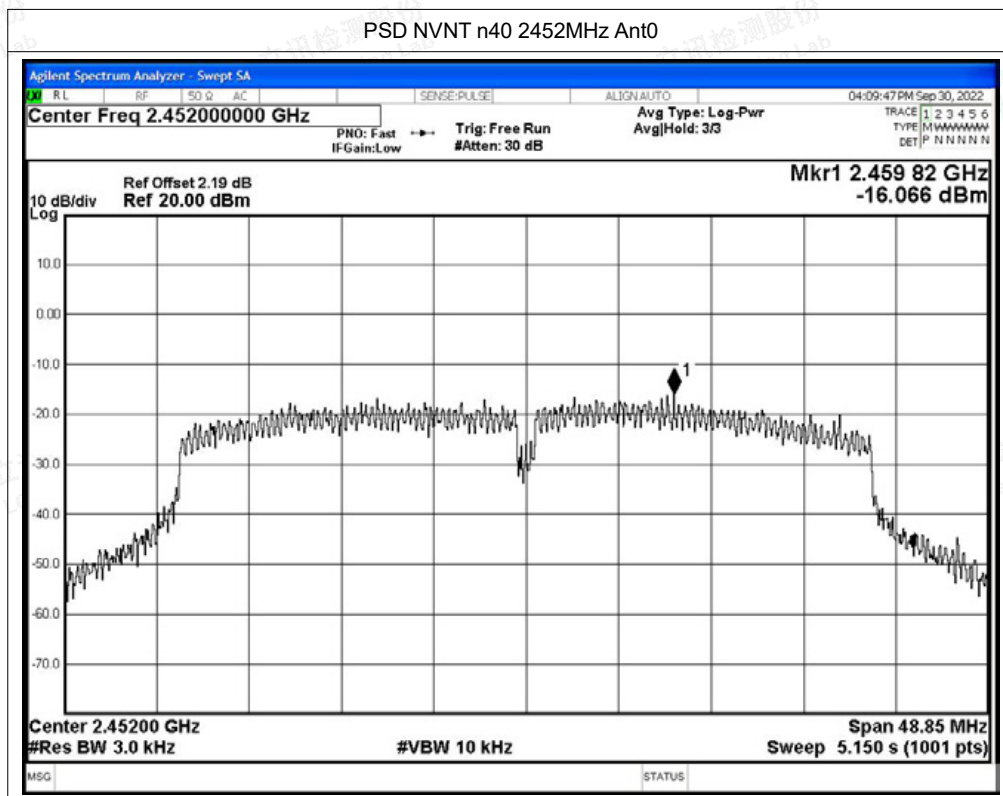




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Scan code to check authenticity



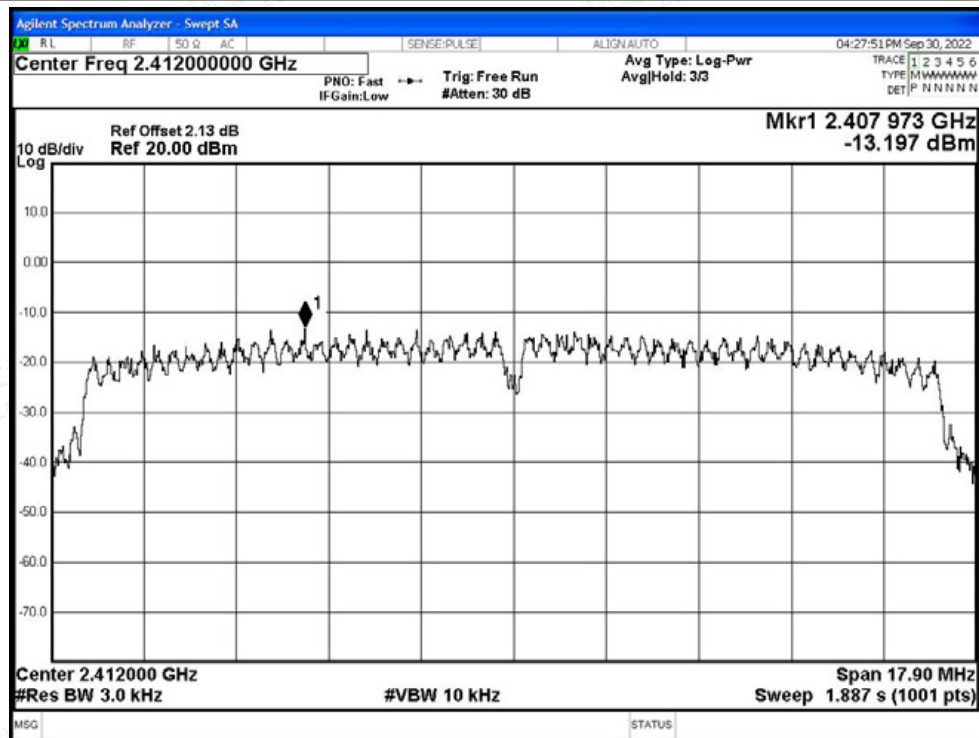




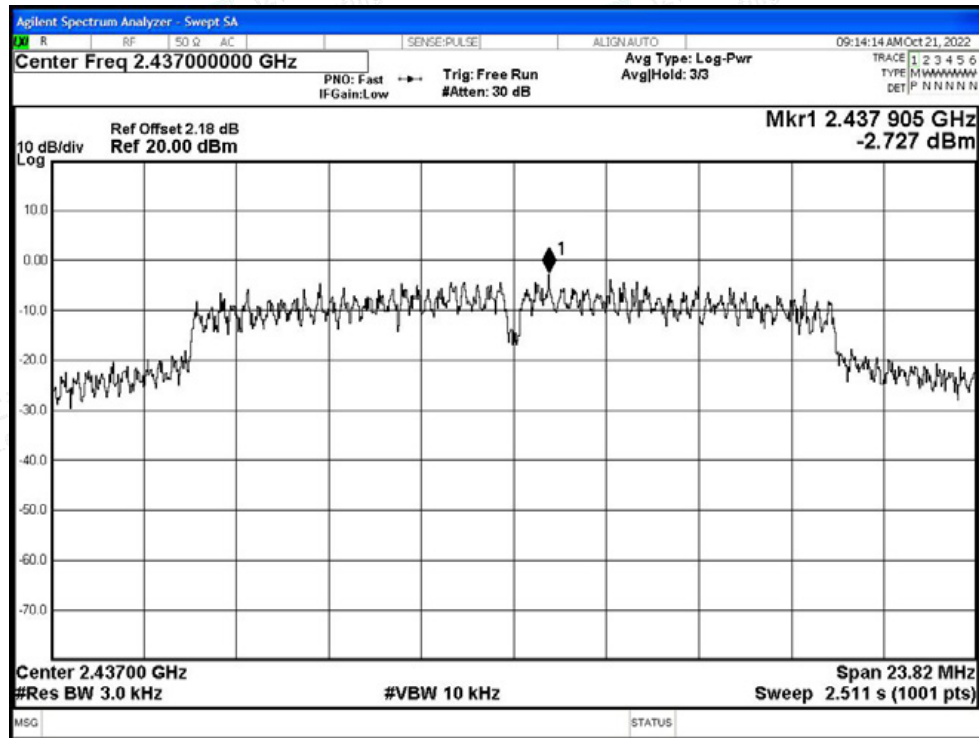


## Test Graphs

PSD NVNT g 2412MHz Ant1



PSD NVNT g 2437MHz Ant1



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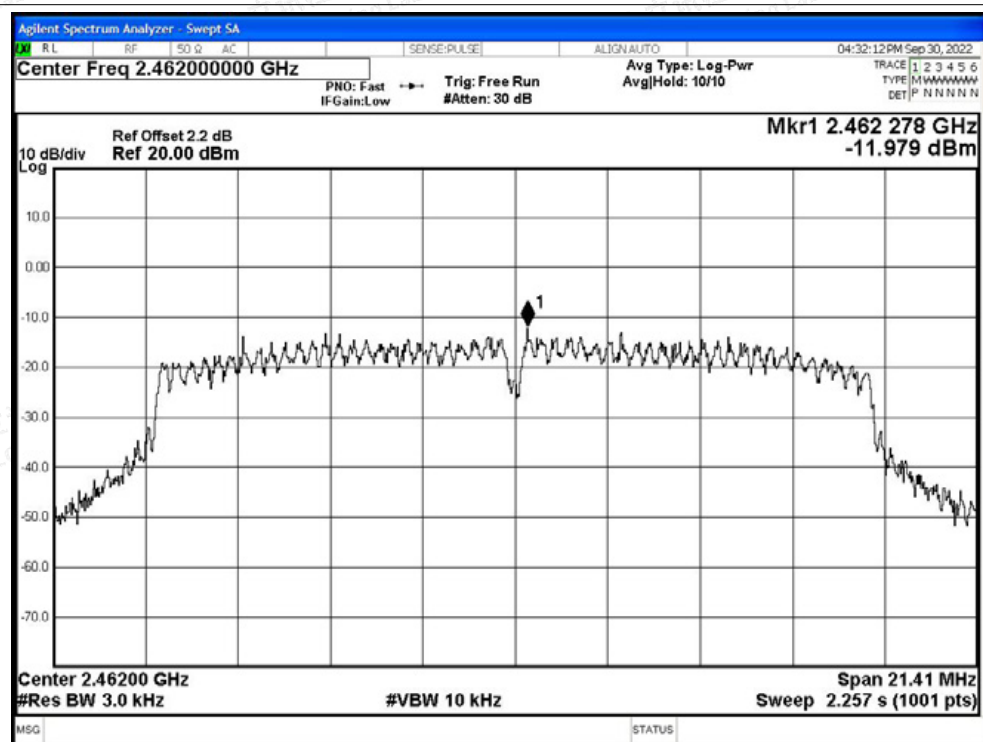
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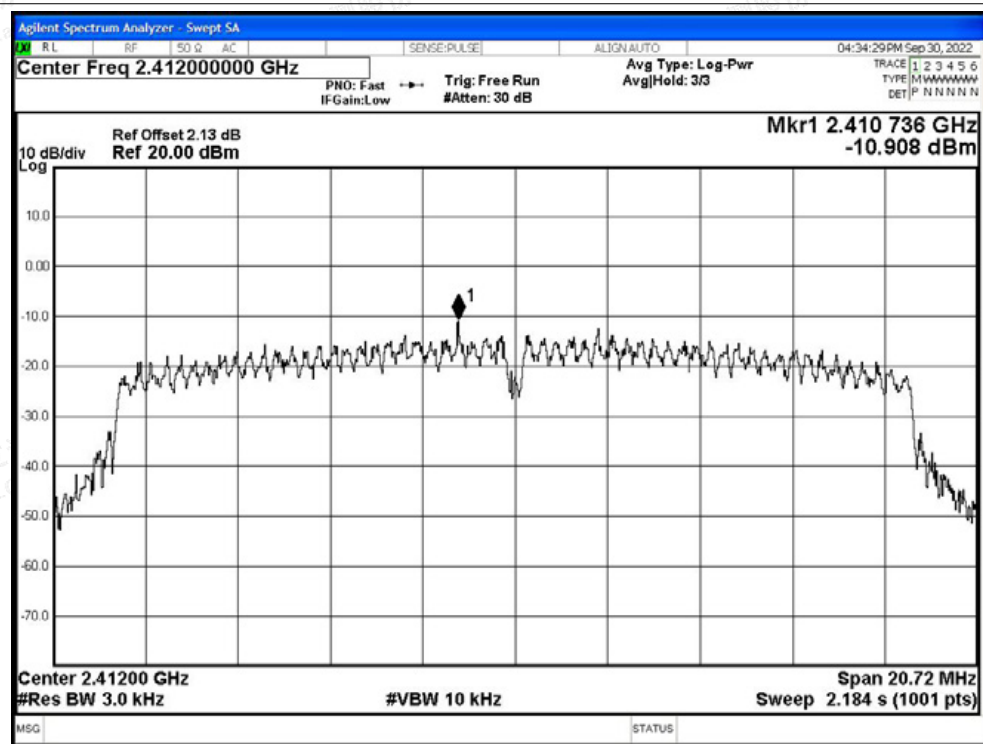
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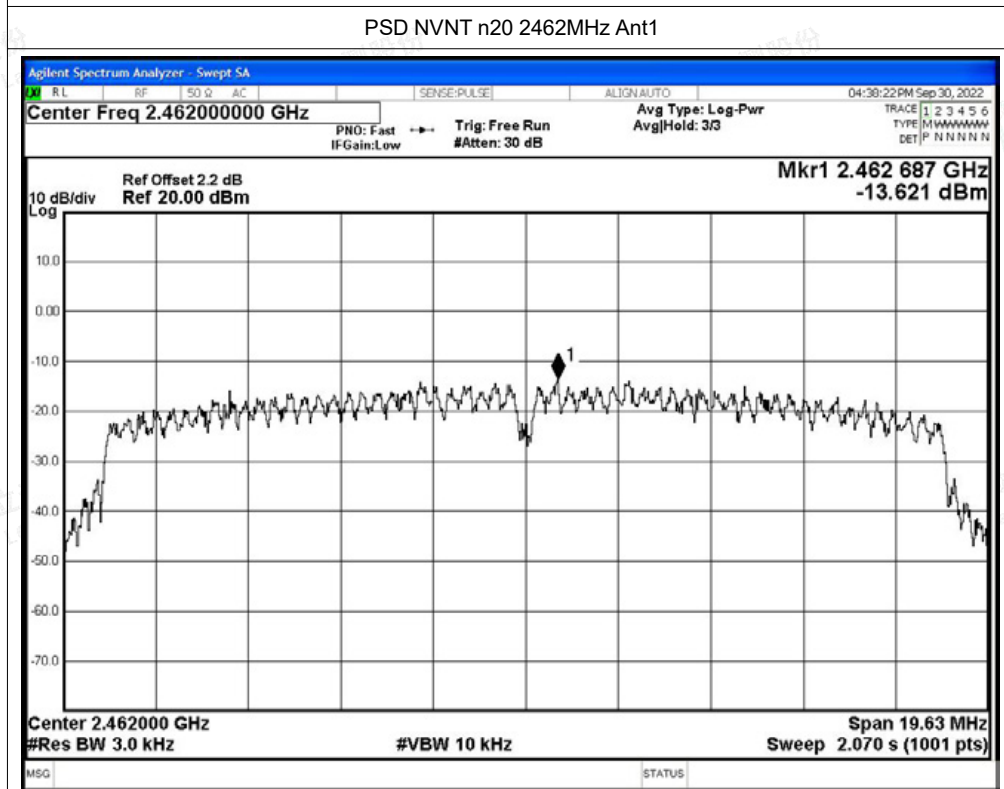
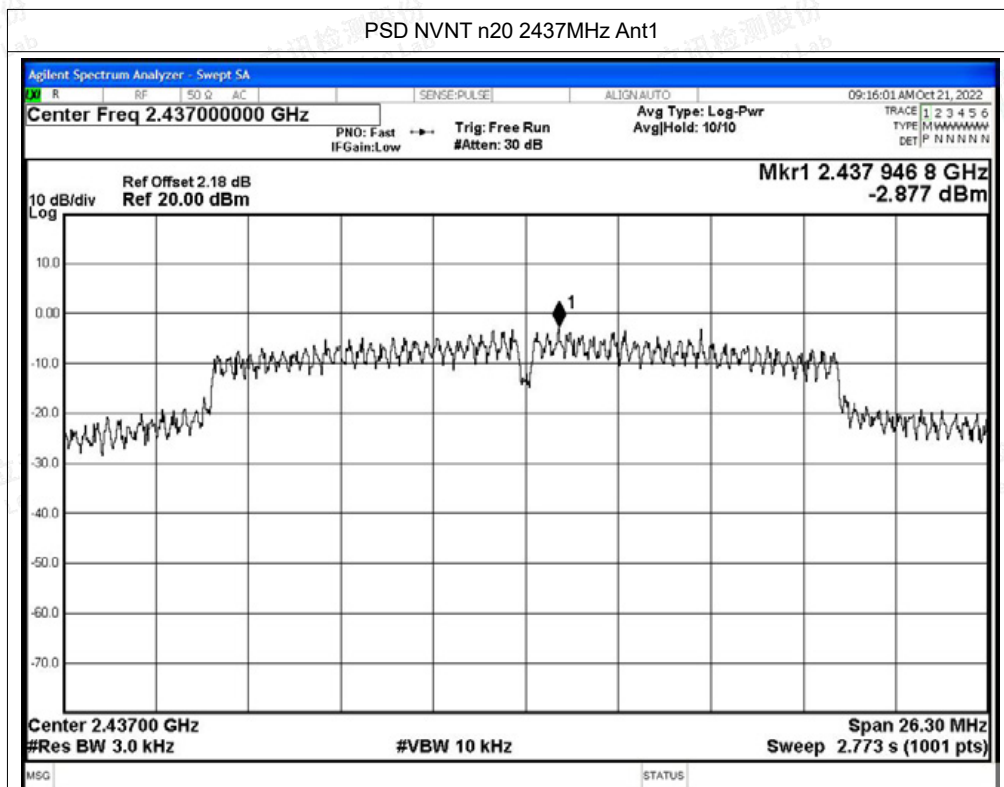


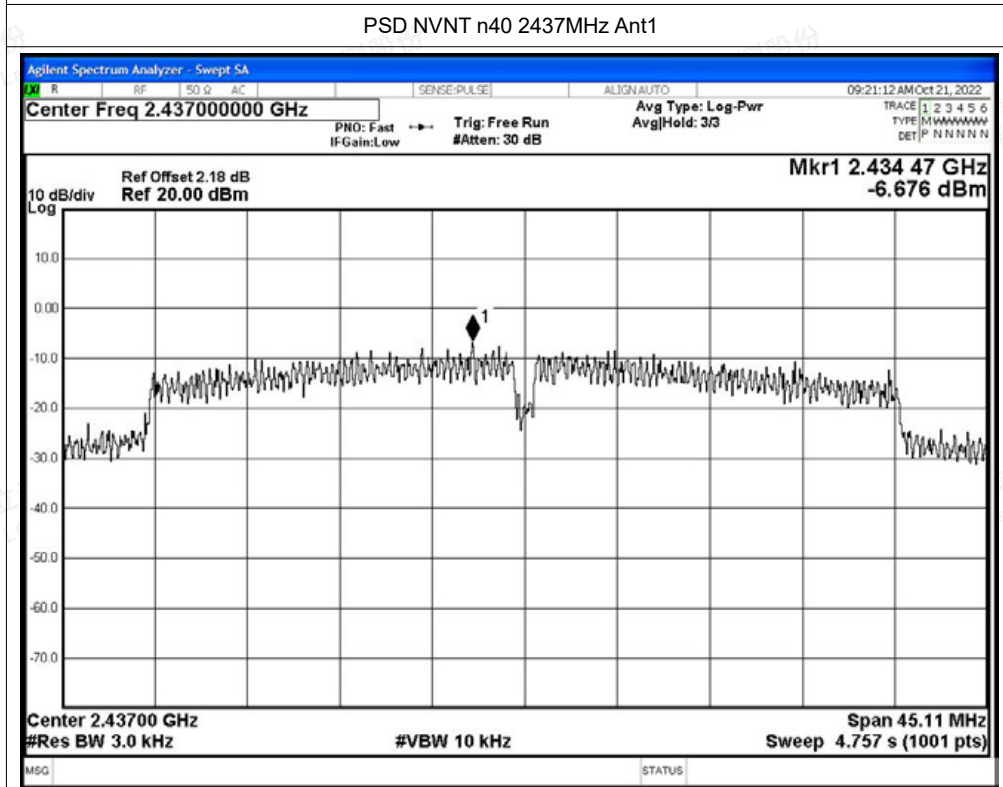
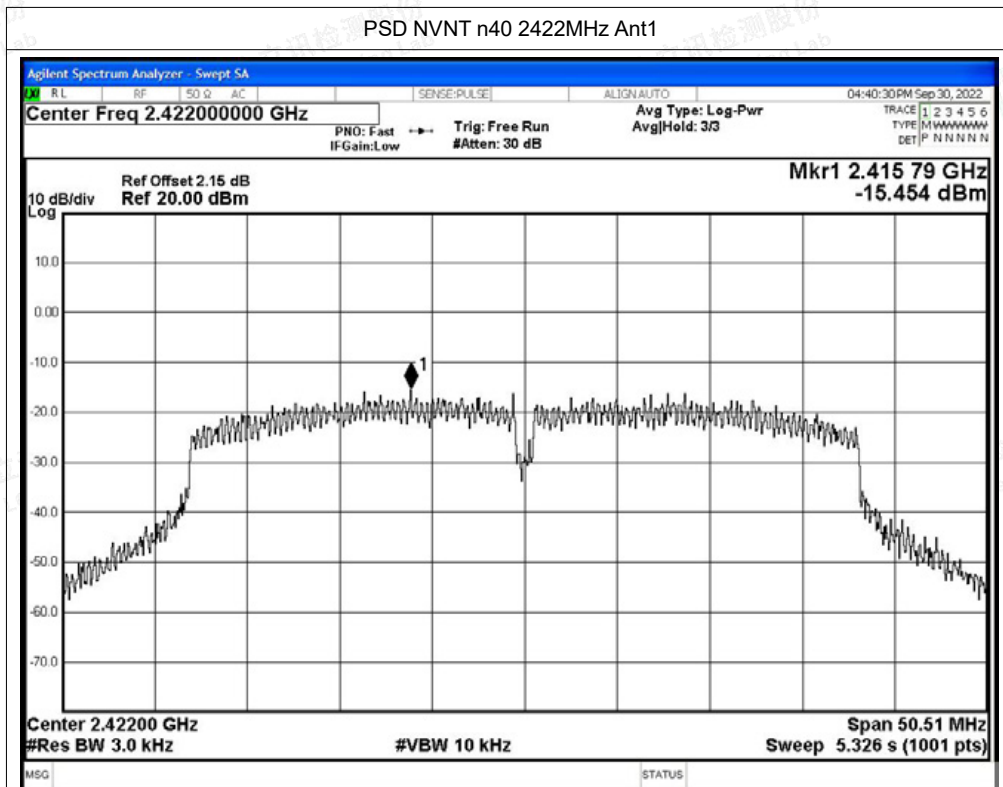
PSD NVNT g 2462MHz Ant1

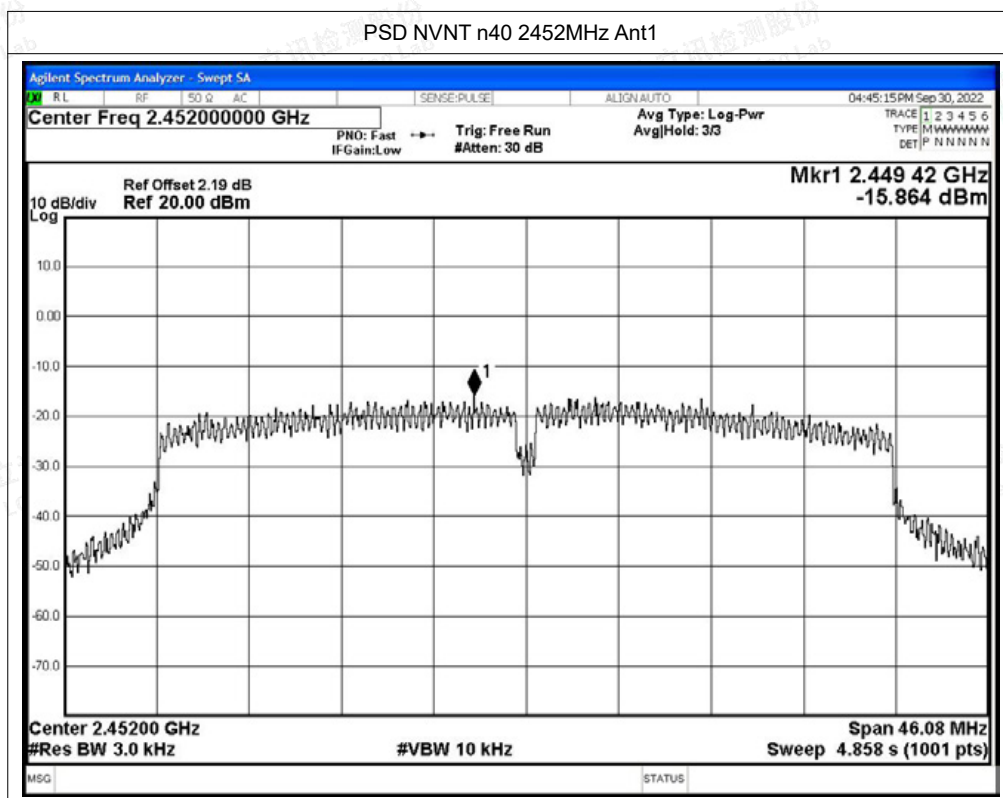


PSD NVNT n20 2412MHz Ant1









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