

## 19 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

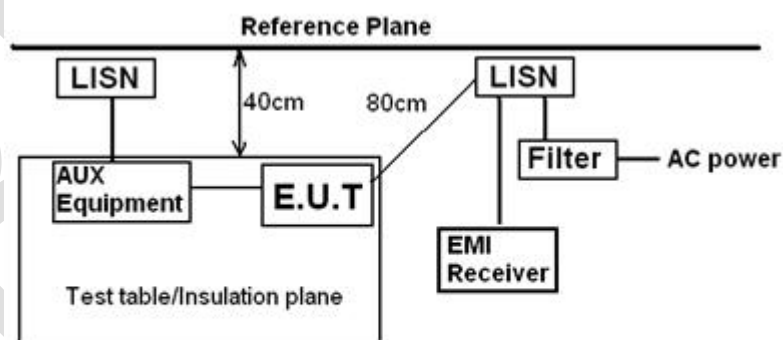
|                        |                                  |
|------------------------|----------------------------------|
| Test Standard          | 47 CFR Part 15, Subpart C 15.247 |
| Test Method            | ANSI C63.10 (2013) Section 6.2   |
| Test Mode (Pre-Scan)   | TX                               |
| Test Mode (Final Test) | TX                               |
| Tester                 | Leo                              |
| Temperature            | 25℃                              |
| Humidity               | 60%                              |

### 19.1 LIMITS

| Frequency of emission(MHz) | Conducted limit(dBμV) |           |
|----------------------------|-----------------------|-----------|
|                            | Quasi-peak            | Average   |
| 0.15-0.5                   | 66 to 56*             | 56 to 46* |
| 0.5-5                      | 56                    | 46        |
| 5-30                       | 60                    | 50        |

\*Decreases with the logarithm of the frequency.

### 19.2 BLOCK DIAGRAM OF TEST SETUP



Remark:  
E.U.T: Equipment Under Test  
LISN: Line Impedance Stabilization Network  
Test table height=0.8m

### 19.3 PROCEDURE

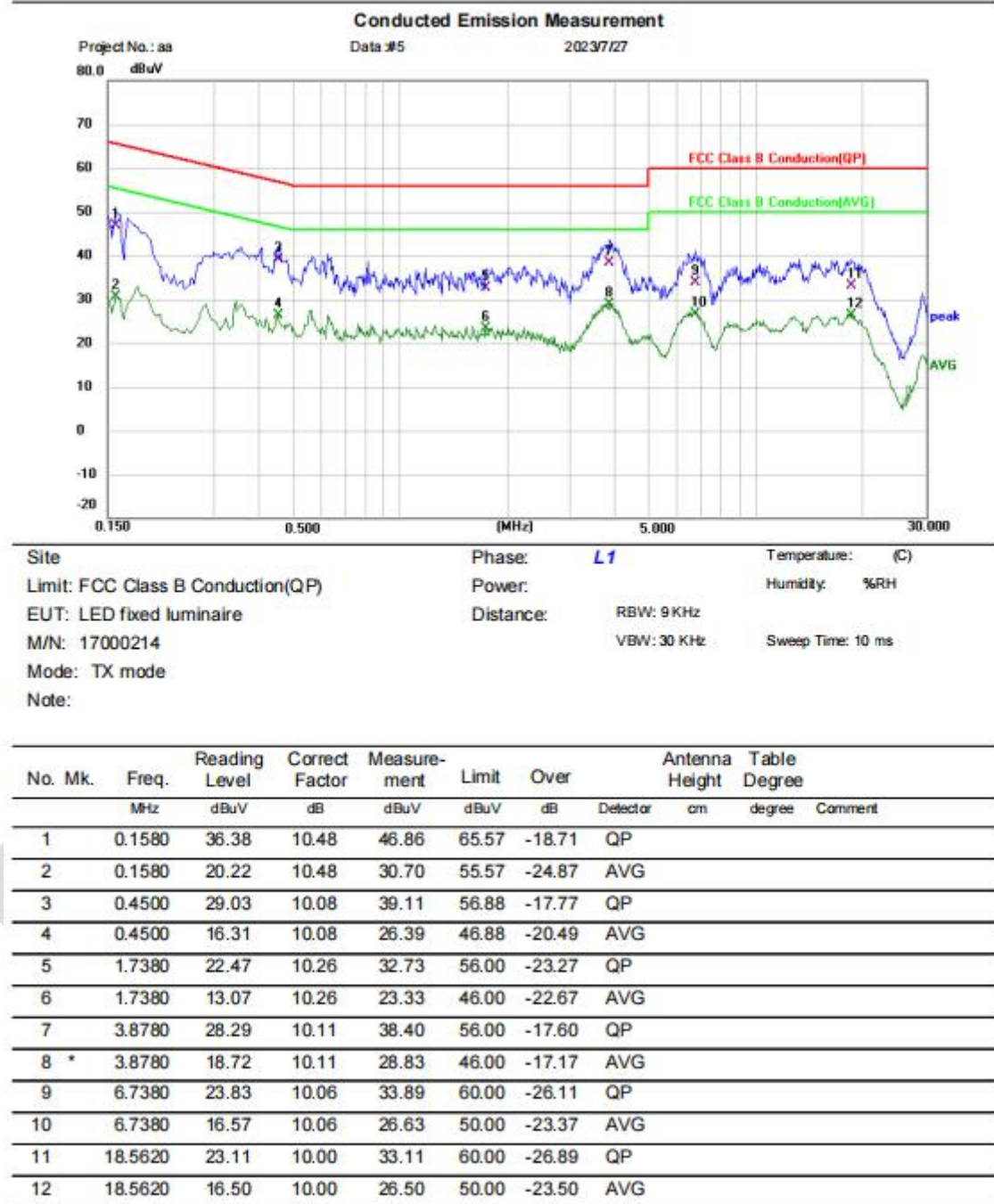
- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark:  $\text{LISN} = \text{Read Level} + \text{Cable Loss} + \text{LISN Factor}$

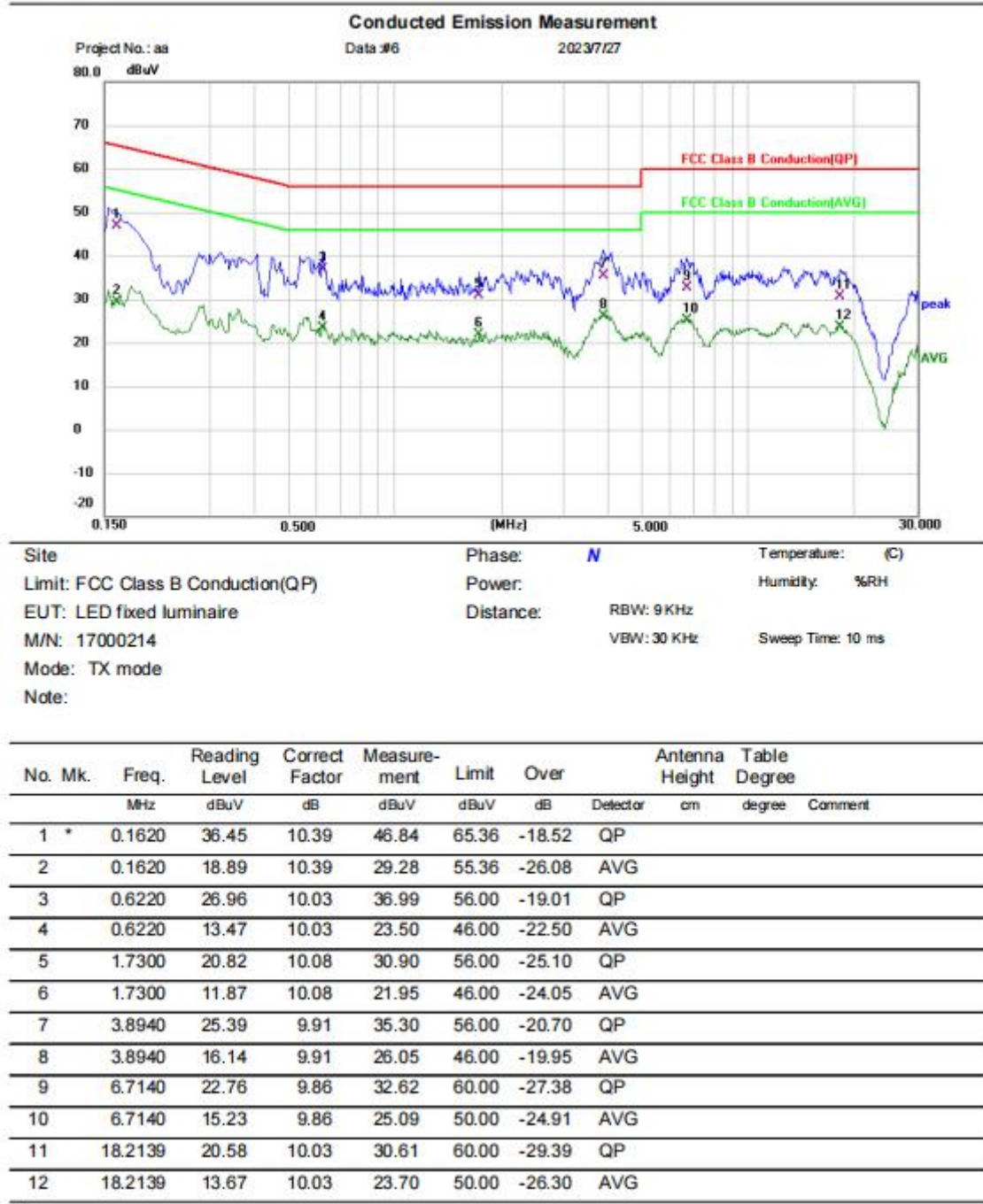
## 19.4 TEST DATA

[TestMode: TX]; [Line: Line]; [Power:AC120V/60Hz]



**Test Result: Pass**

[TestMode: TX]; [Line: Nutral] ;[Power:AC120V/60Hz]



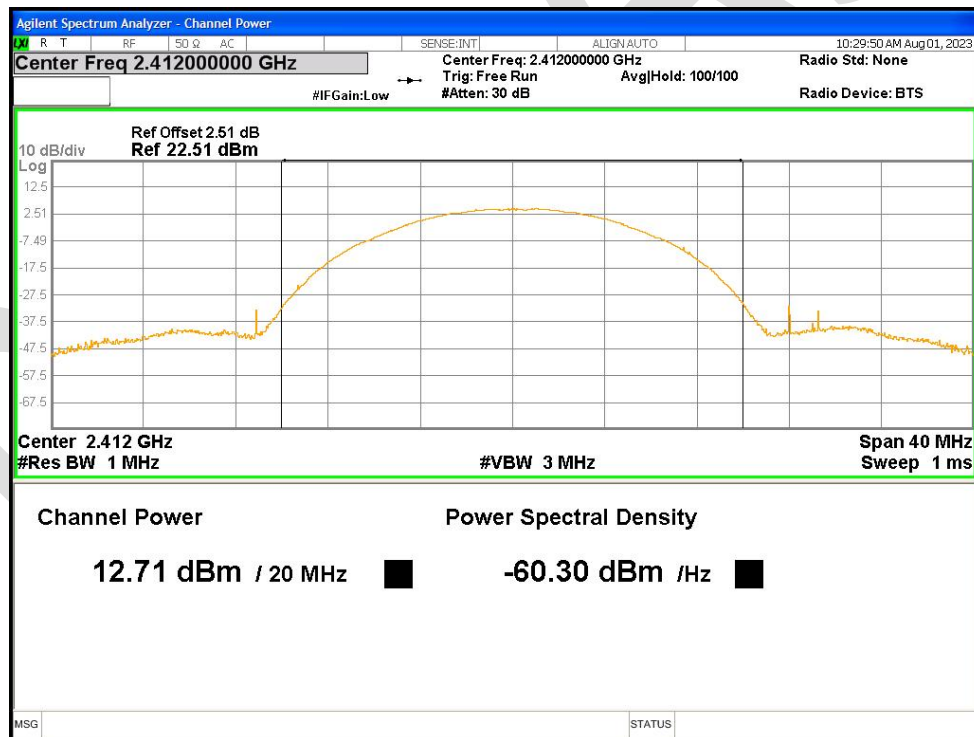
**Test Result: Pass**

## 20 APPENDIX

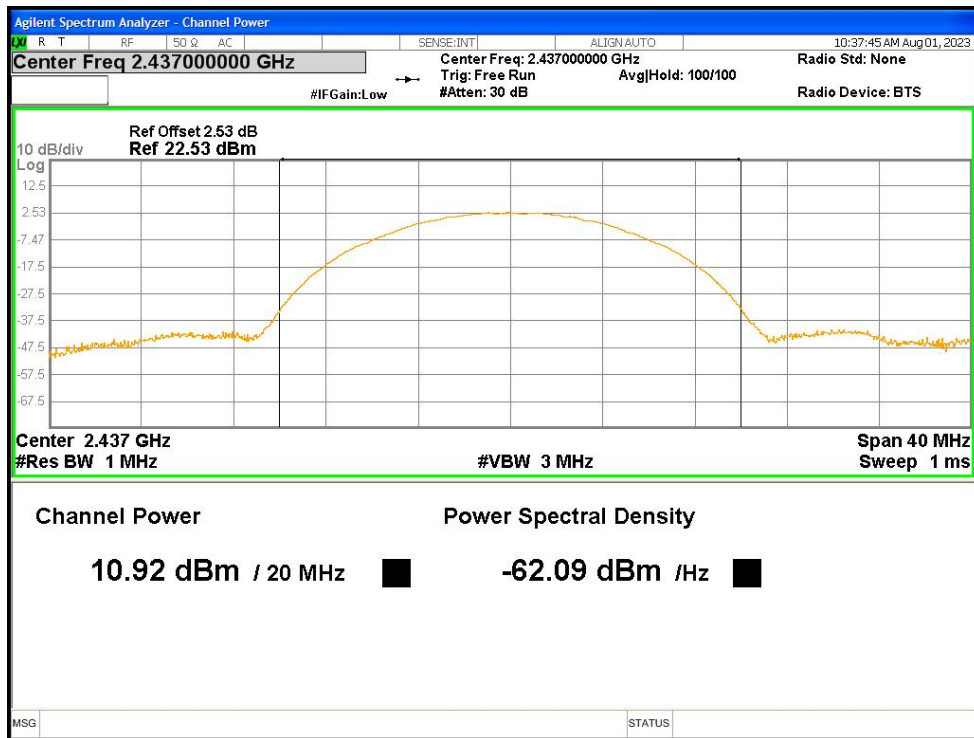
### 20.1 MAXIMUM CONDUCTED OUTPUT POWER

| Condition | Mode | Frequency (MHz) | Antenna | Conducted Power (dBm) | Limit (dBm) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-------------|---------|
| NVNT      | b    | 2412            | Ant1    | 12.714                | 30          | Pass    |
| NVNT      | b    | 2437            | Ant1    | 10.917                | 30          | Pass    |
| NVNT      | b    | 2462            | Ant1    | 12.383                | 30          | Pass    |
| NVNT      | g    | 2412            | Ant1    | 7.887                 | 30          | Pass    |
| NVNT      | g    | 2437            | Ant1    | 8.46                  | 30          | Pass    |
| NVNT      | g    | 2462            | Ant1    | 9.522                 | 30          | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 7.869                 | 30          | Pass    |
| NVNT      | n20  | 2437            | Ant1    | 8.288                 | 30          | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 9.722                 | 30          | Pass    |
| NVNT      | n40  | 2422            | Ant1    | 7.734                 | 30          | Pass    |
| NVNT      | n40  | 2437            | Ant1    | 8.241                 | 30          | Pass    |
| NVNT      | n40  | 2452            | Ant1    | 8.849                 | 30          | Pass    |

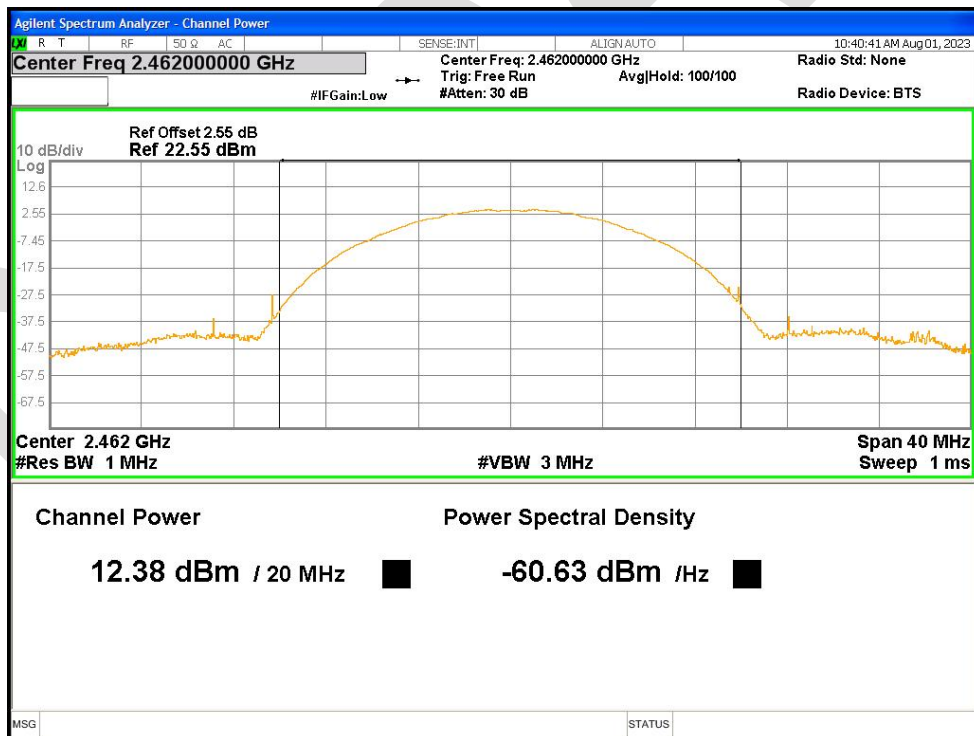
Power NVNT b 2412MHz Ant1



Power NVNT b 2437MHz Ant1

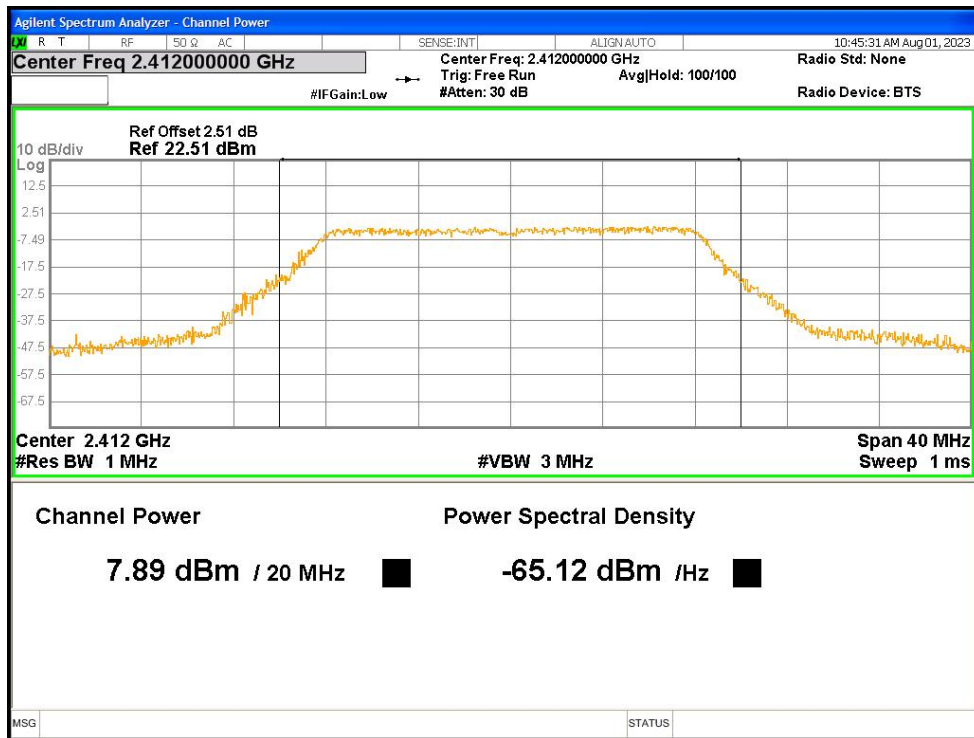


Power NVNT b 2462MHz Ant1

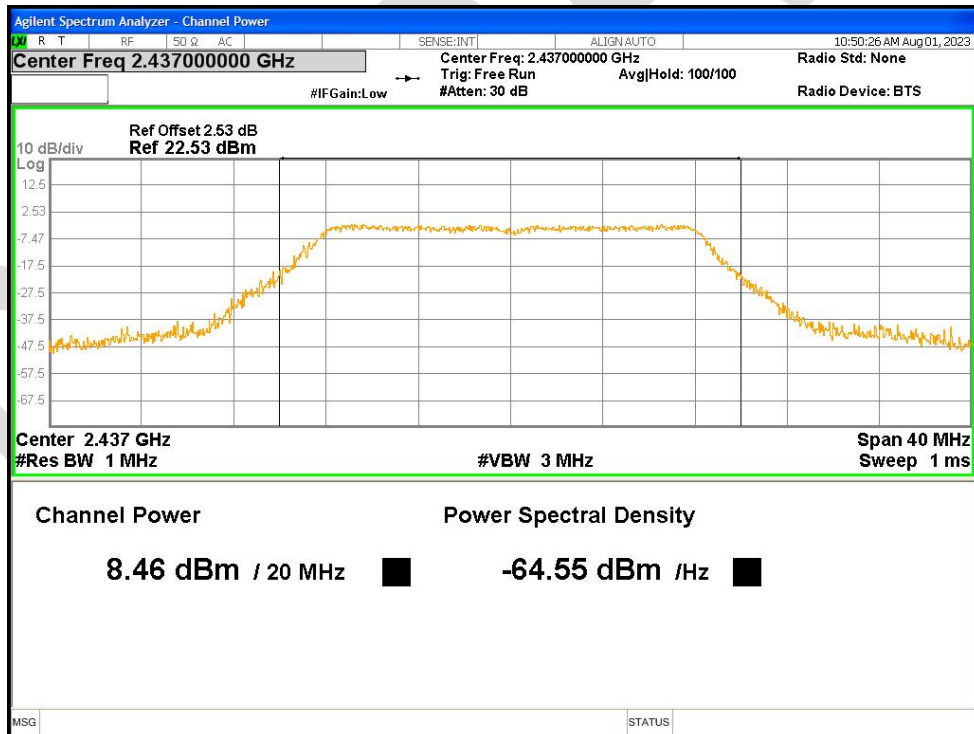


Power NVNT g 2412MHz Ant1

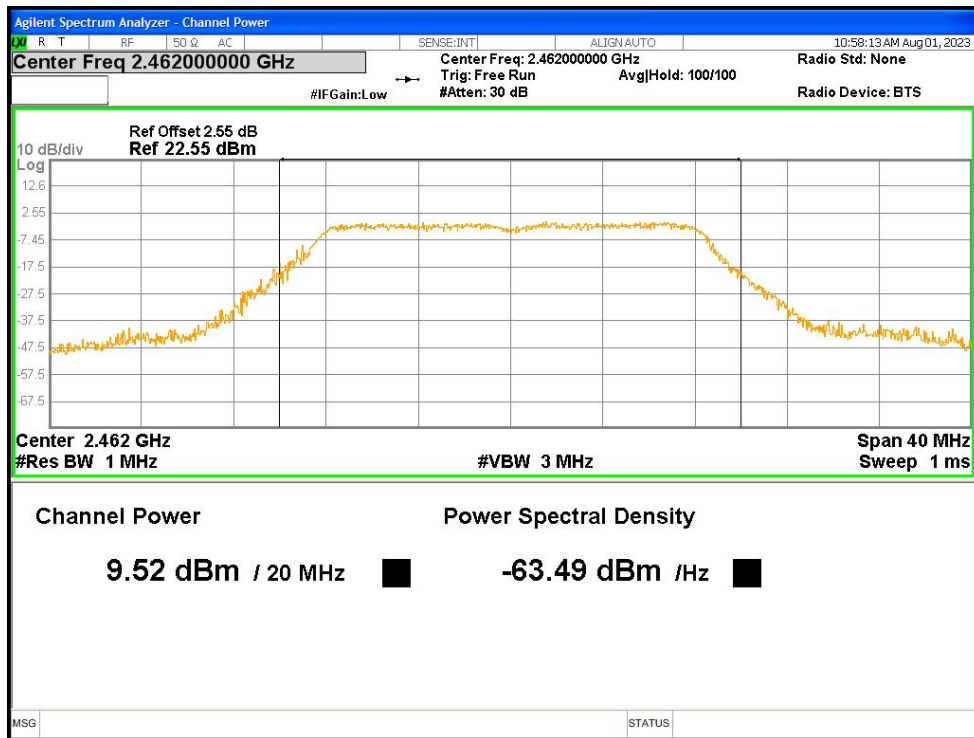




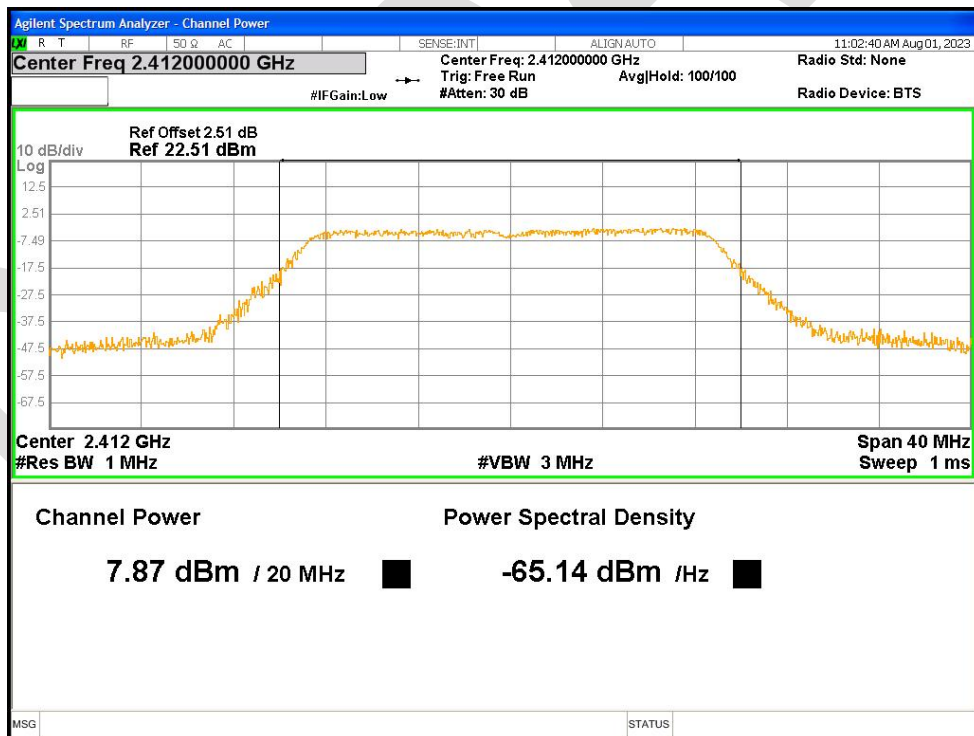
Power NVNT g 2437MHz Ant1



Power NVNT g 2462MHz Ant1

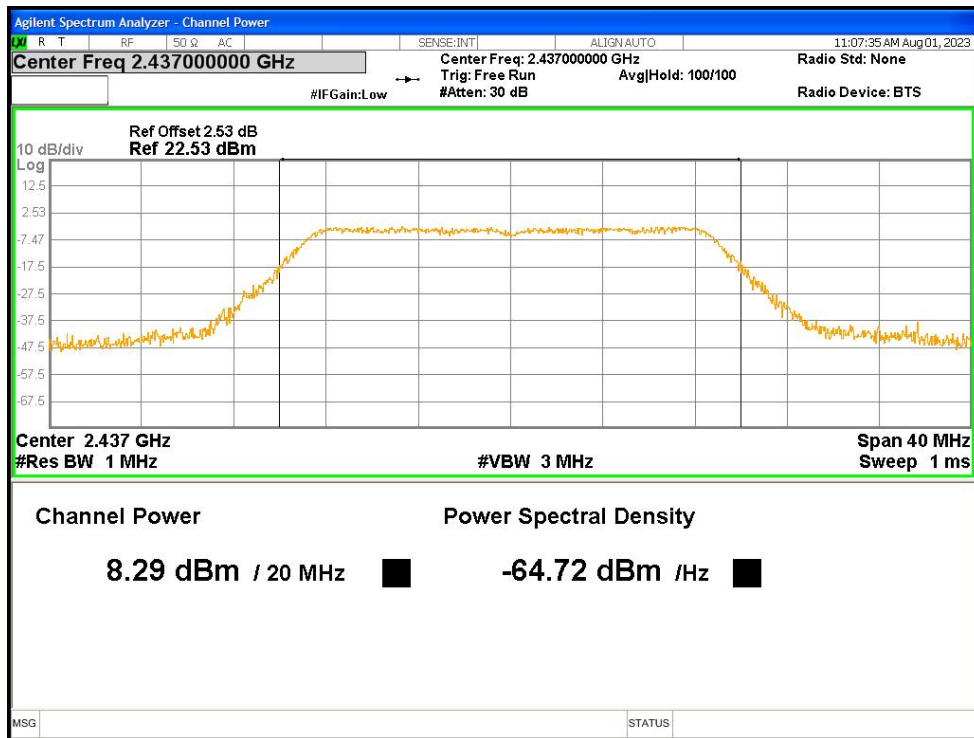


Power NVNT n20 2412MHz Ant1

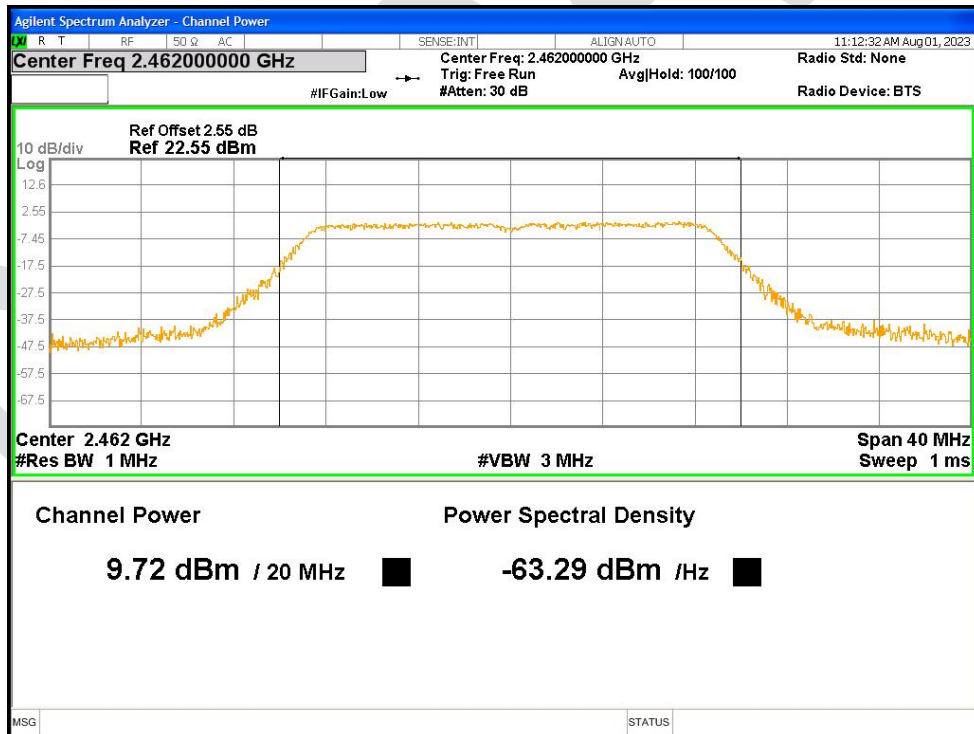


Power NVNT n20 2437MHz Ant1

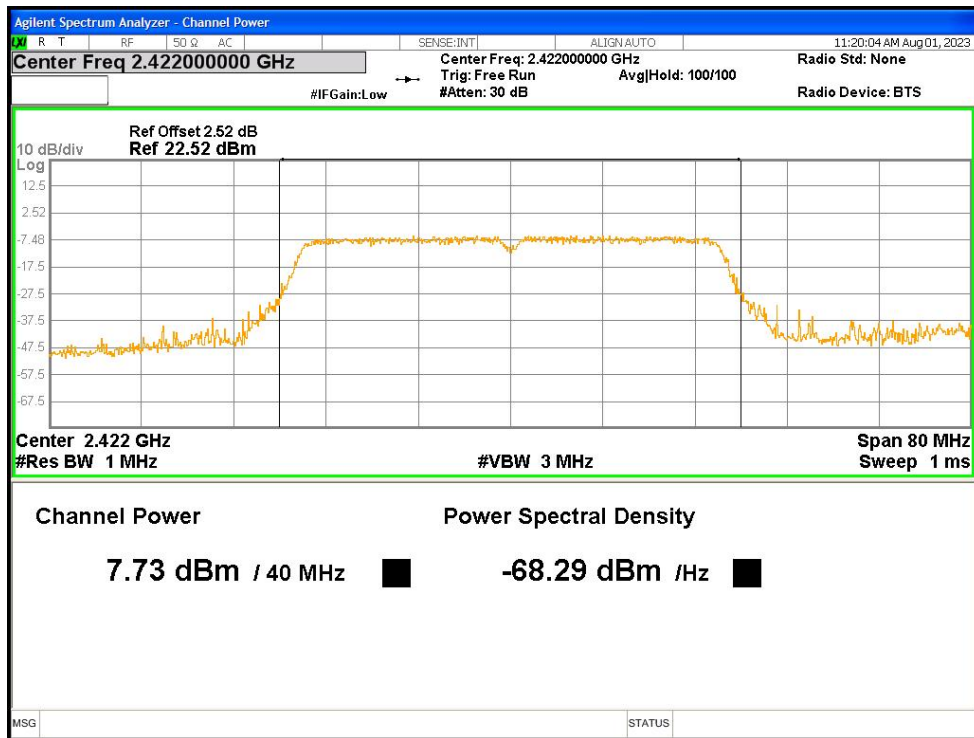




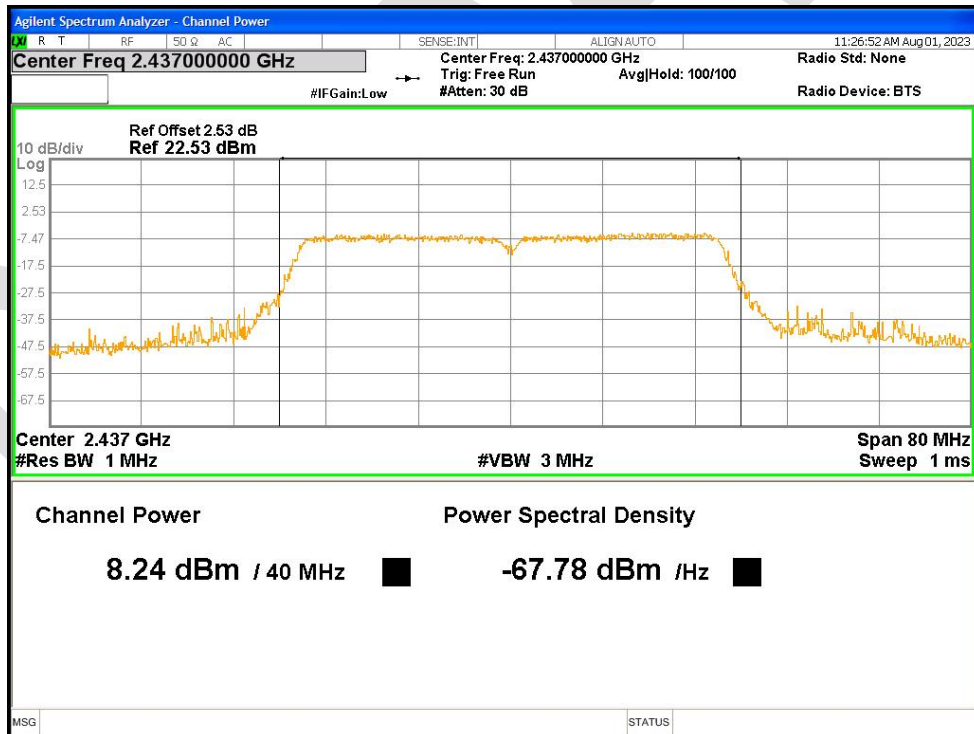
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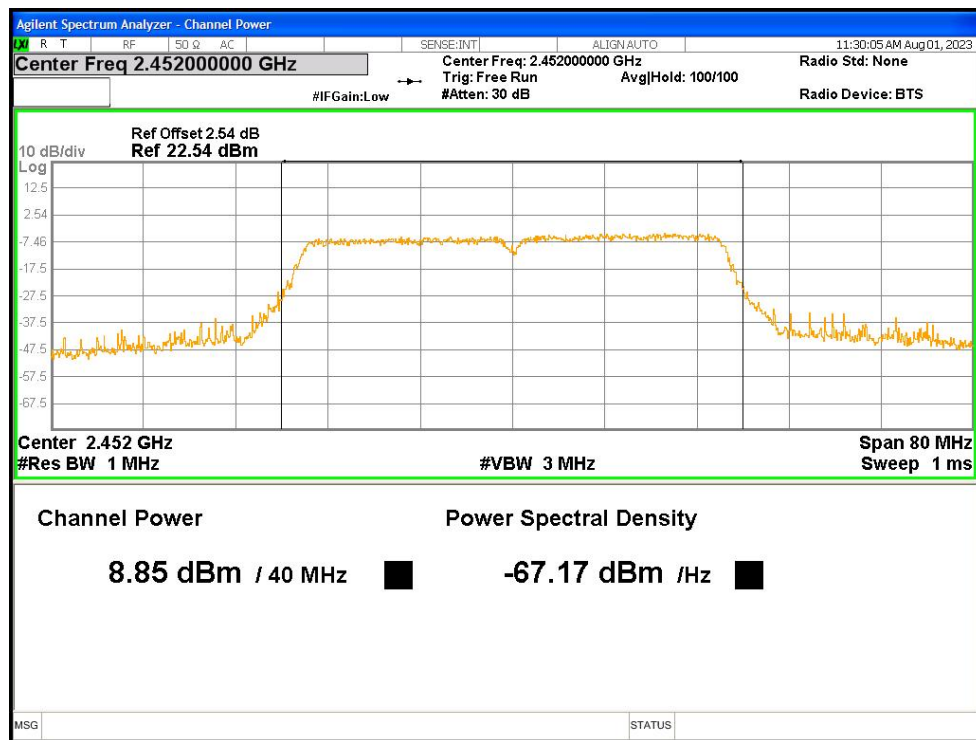
Power NVNT n40 2422MHz Ant1



Power NVNT n40 2437MHz Ant1



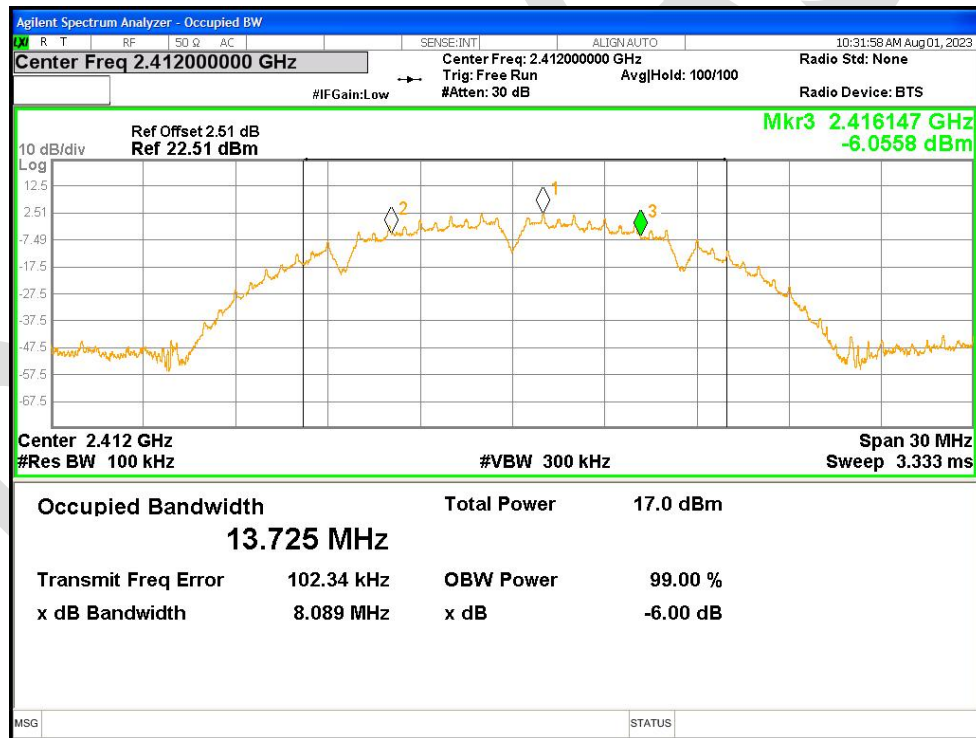
Power NVNT n40 2452MHz Ant1



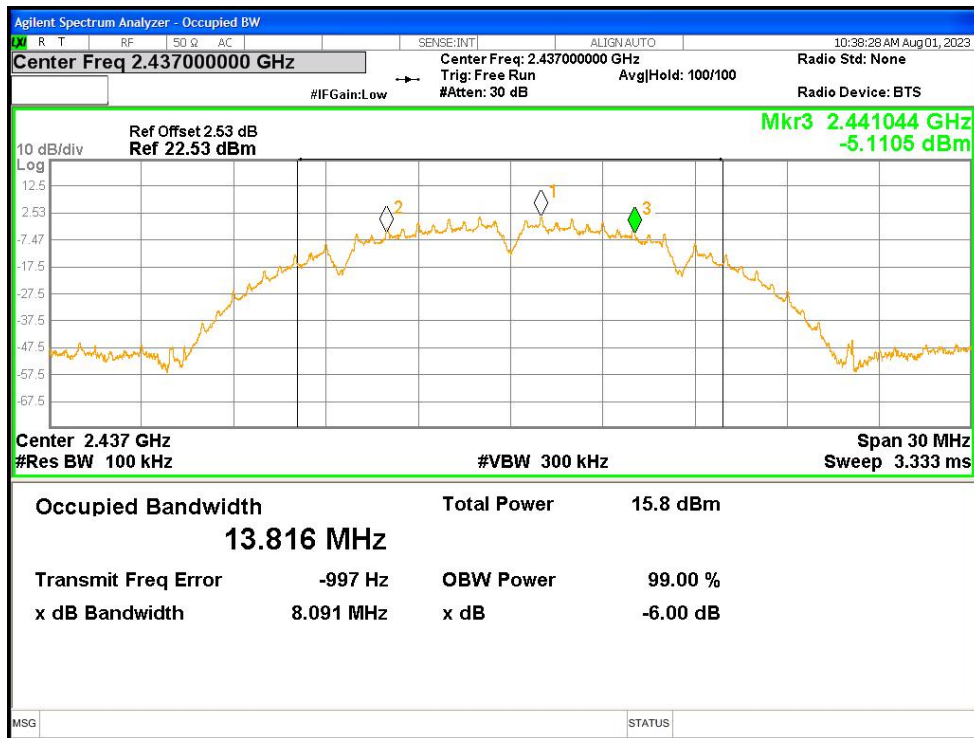
## 20.2 -6DB BANDWIDTH

| Condition | Mode | Frequency (MHz) | Antenna | -6 dB Bandwidth (MHz) | Limit -6 dB Bandwidth (MHz) | Verdict |
|-----------|------|-----------------|---------|-----------------------|-----------------------------|---------|
| NVNT      | b    | 2412            | Ant1    | 8.089                 | 0.5                         | Pass    |
| NVNT      | b    | 2437            | Ant1    | 8.091                 | 0.5                         | Pass    |
| NVNT      | b    | 2462            | Ant1    | 8.088                 | 0.5                         | Pass    |
| NVNT      | g    | 2412            | Ant1    | 16.371                | 0.5                         | Pass    |
| NVNT      | g    | 2437            | Ant1    | 16.338                | 0.5                         | Pass    |
| NVNT      | g    | 2462            | Ant1    | 16.356                | 0.5                         | Pass    |
| NVNT      | n20  | 2412            | Ant1    | 17.58                 | 0.5                         | Pass    |
| NVNT      | n20  | 2437            | Ant1    | 17.572                | 0.5                         | Pass    |
| NVNT      | n20  | 2462            | Ant1    | 17.554                | 0.5                         | Pass    |
| NVNT      | n40  | 2422            | Ant1    | 35.934                | 0.5                         | Pass    |
| NVNT      | n40  | 2437            | Ant1    | 35.903                | 0.5                         | Pass    |
| NVNT      | n40  | 2452            | Ant1    | 35.708                | 0.5                         | Pass    |

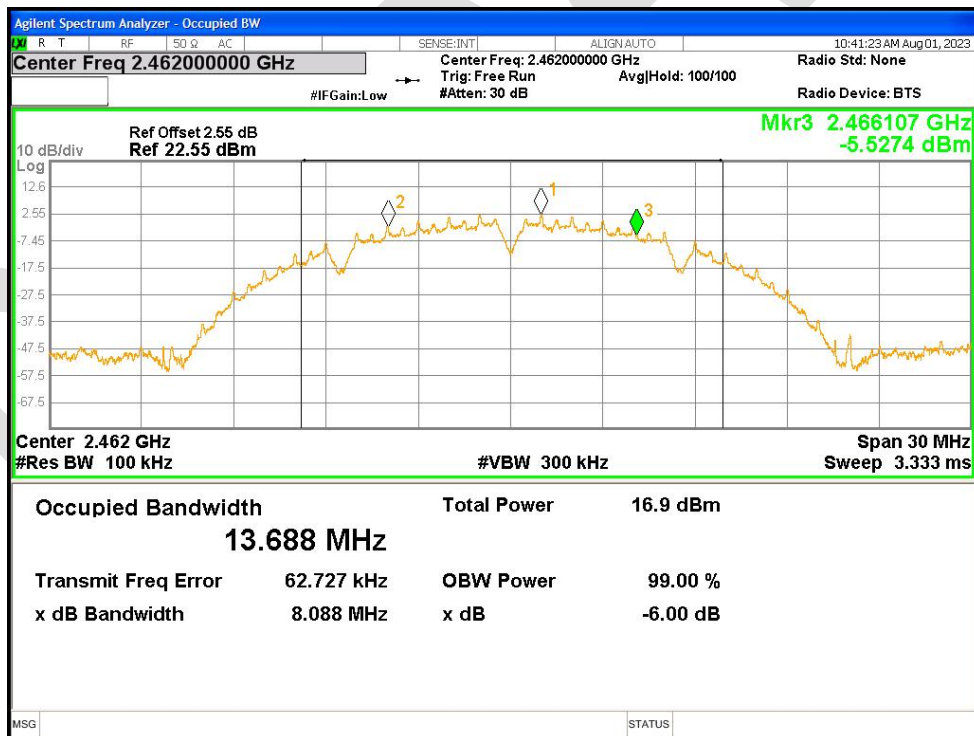
-6dB Bandwidth NVNT b 2412MHz Ant1



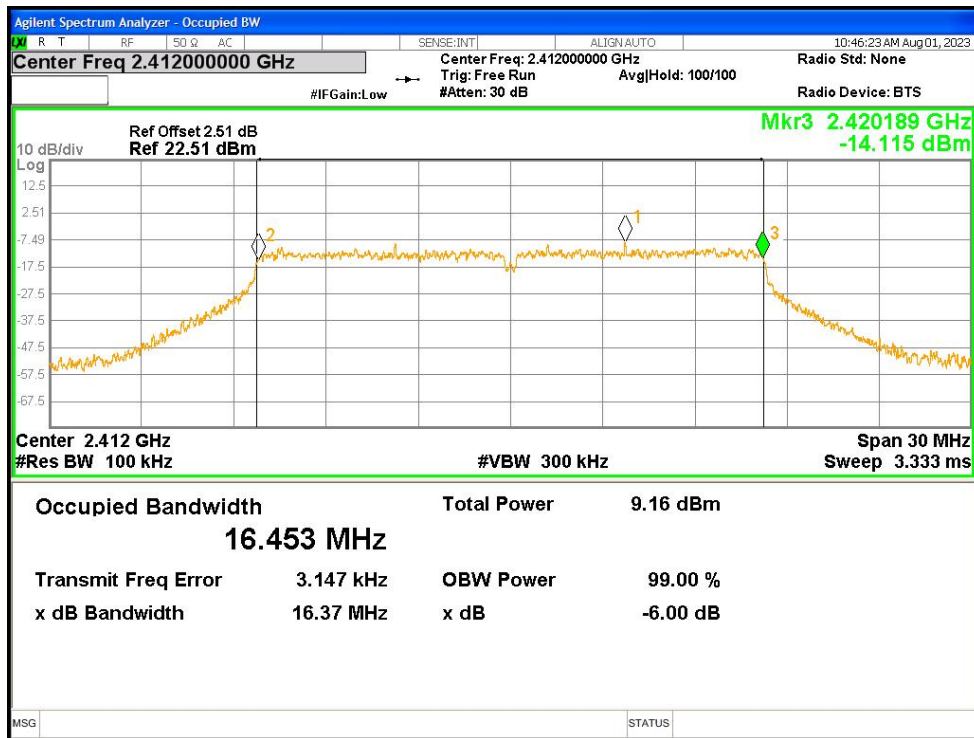
-6dB Bandwidth NVNT b 2437MHz Ant1



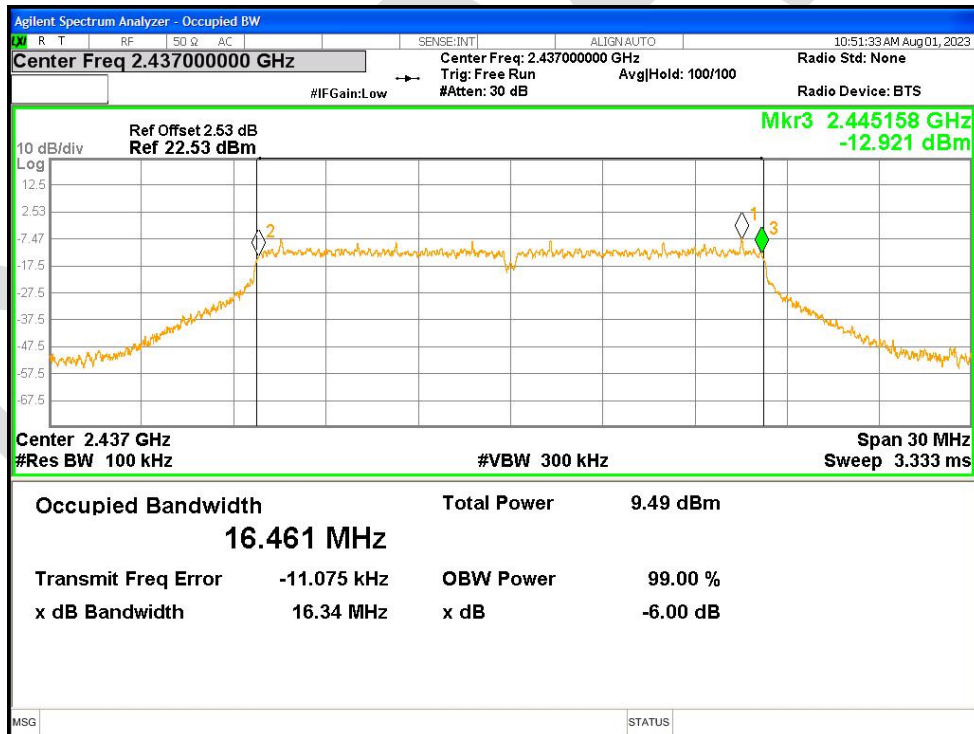
-6dB Bandwidth NVNT b 2462MHz Ant1



-6dB Bandwidth NVNT g 2412MHz Ant1

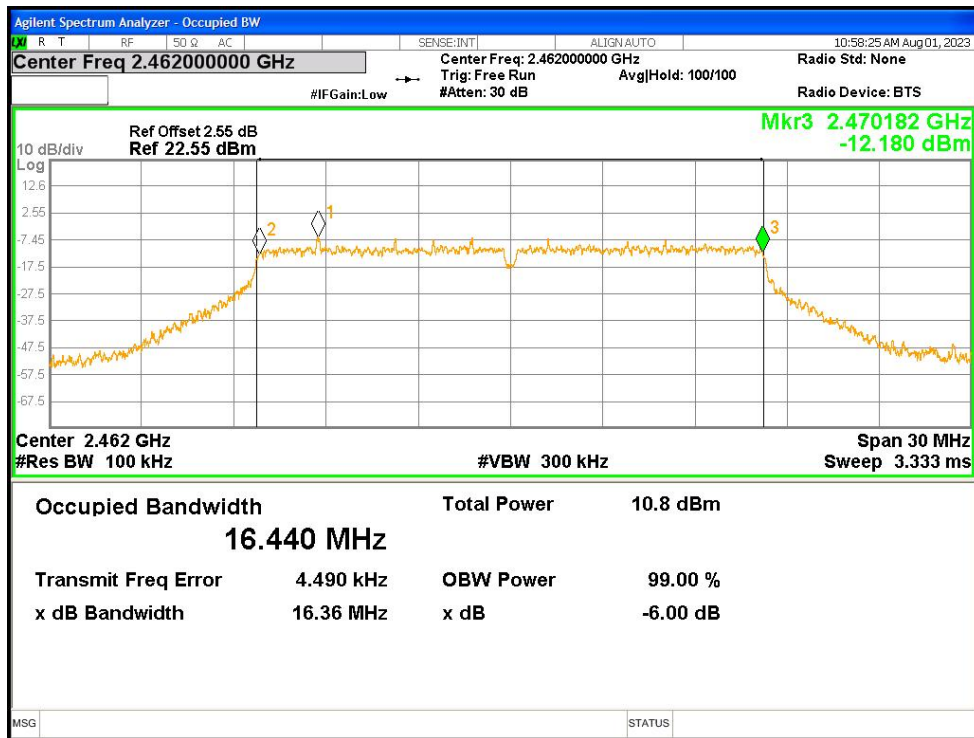


-6dB Bandwidth NVNT g 2437MHz Ant1

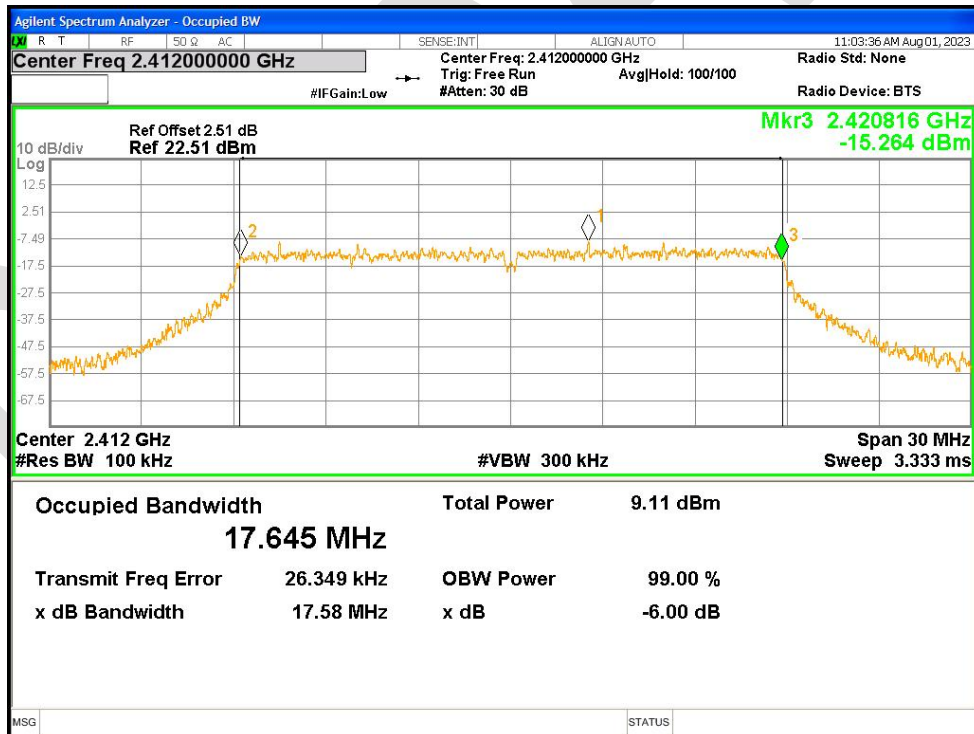


-6dB Bandwidth NVNT g 2462MHz Ant1

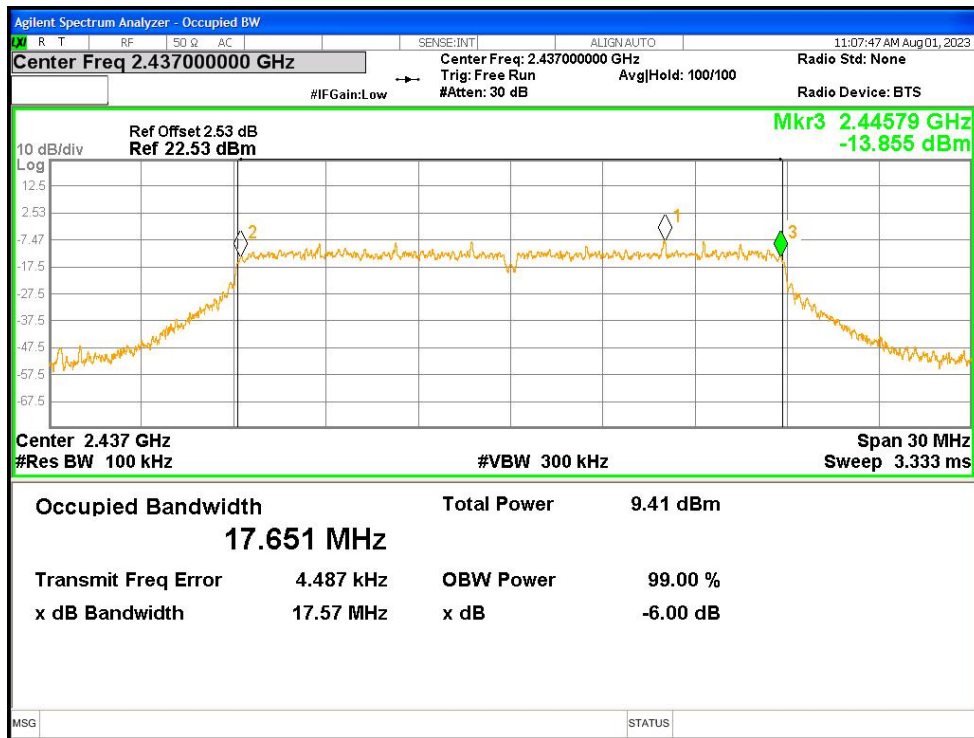




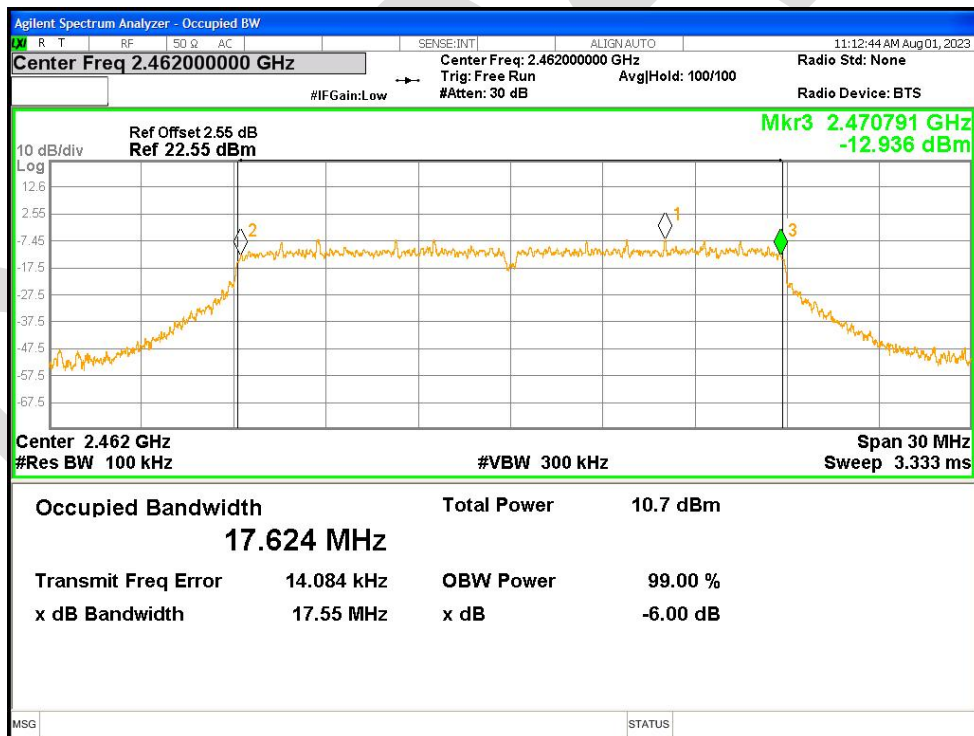
-6dB Bandwidth NVNT n20 2412MHz Ant1



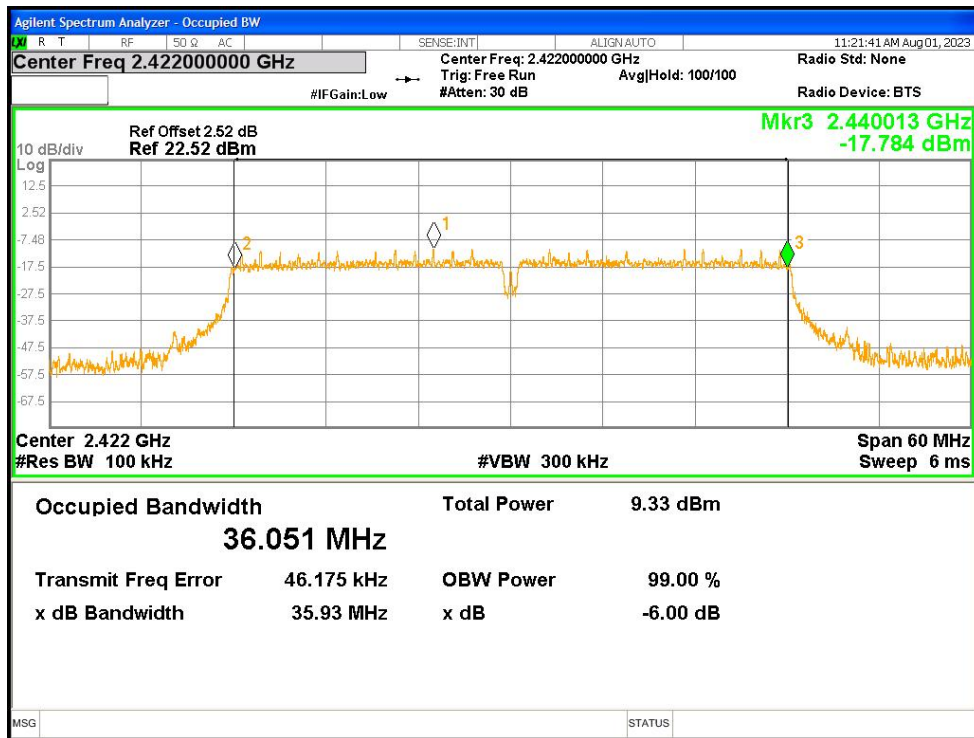
-6dB Bandwidth NVNT n20 2437MHz Ant1



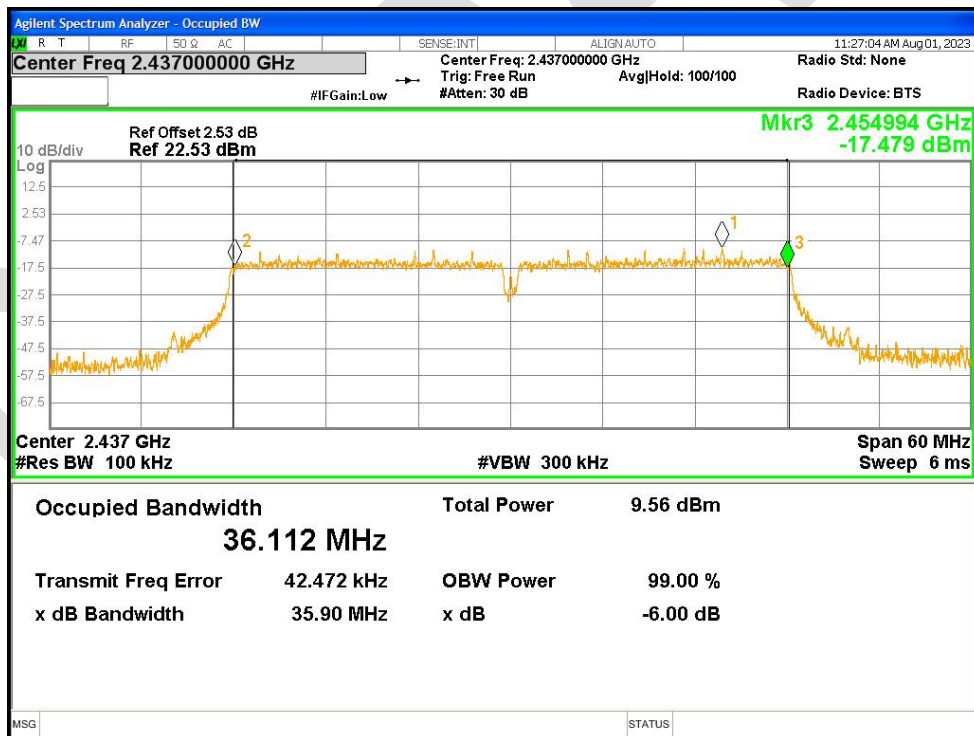
-6dB Bandwidth NVNT n20 2462MHz Ant1



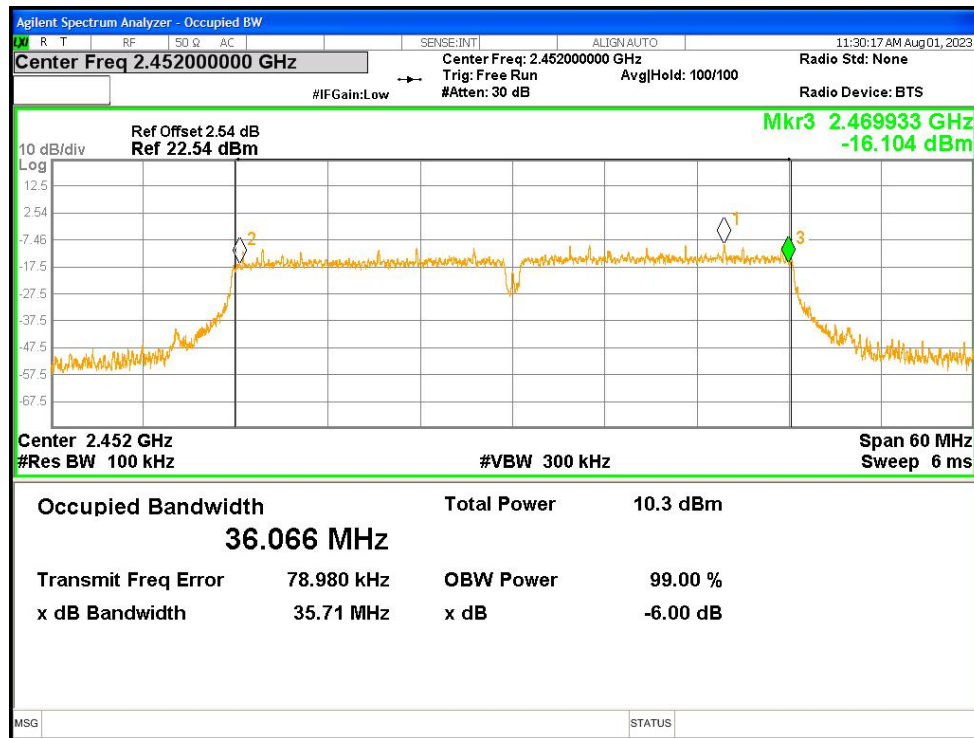
-6dB Bandwidth NVNT n40 2422MHz Ant1



-6dB Bandwidth NVNT n40 2437MHz Ant1



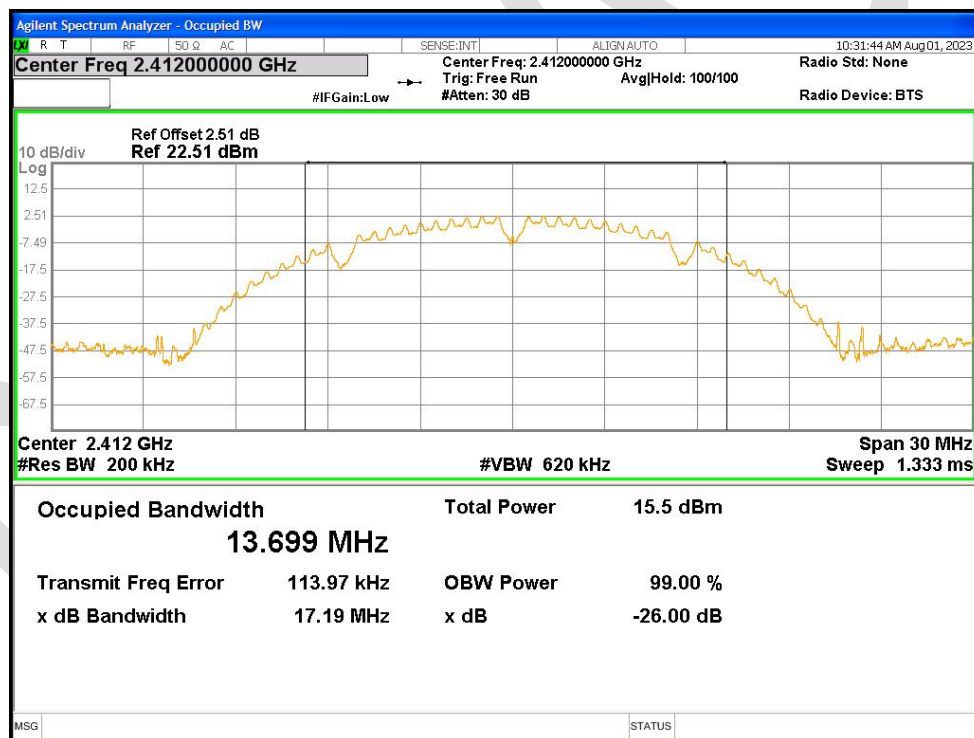
-6dB Bandwidth NVNT n40 2452MHz Ant1



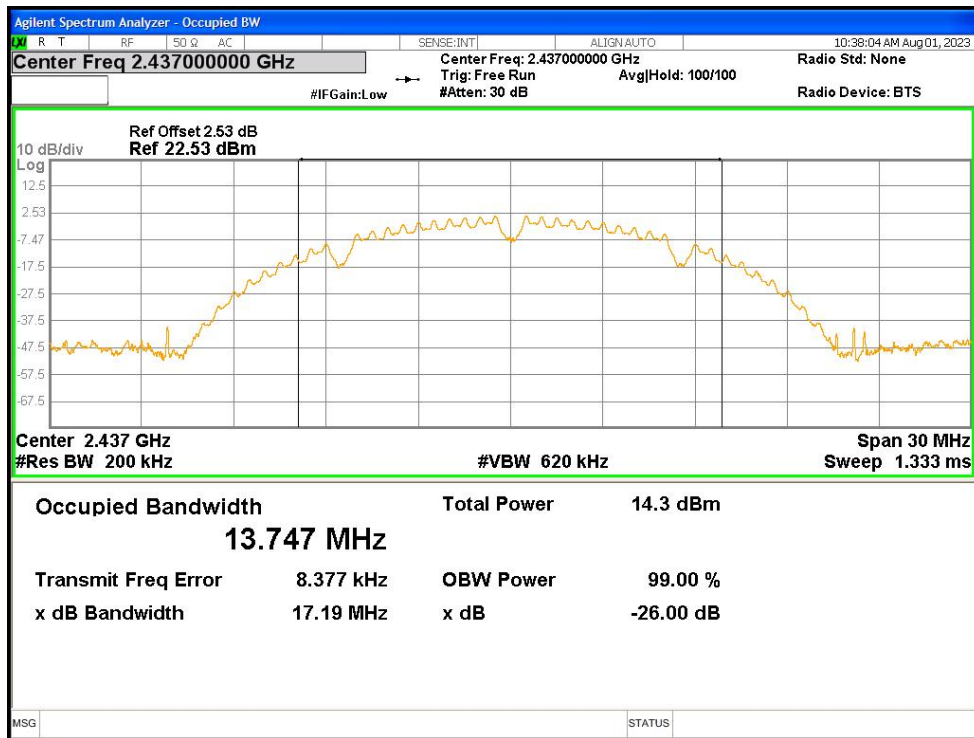
### 20.3 OCCUPIED CHANNEL BANDWIDTH

| Condition | Mode | Frequency (MHz) | Antenna | 99% OBW (MHz) |
|-----------|------|-----------------|---------|---------------|
| NVNT      | b    | 2412            | Ant1    | 13.699        |
| NVNT      | b    | 2437            | Ant1    | 13.747        |
| NVNT      | b    | 2462            | Ant1    | 13.617        |
| NVNT      | g    | 2412            | Ant1    | 16.554        |
| NVNT      | g    | 2437            | Ant1    | 16.554        |
| NVNT      | g    | 2462            | Ant1    | 16.542        |
| NVNT      | n20  | 2412            | Ant1    | 17.728        |
| NVNT      | n20  | 2437            | Ant1    | 17.755        |
| NVNT      | n20  | 2462            | Ant1    | 17.691        |
| NVNT      | n40  | 2422            | Ant1    | 36.128        |
| NVNT      | n40  | 2437            | Ant1    | 36.246        |
| NVNT      | n40  | 2452            | Ant1    | 36.164        |

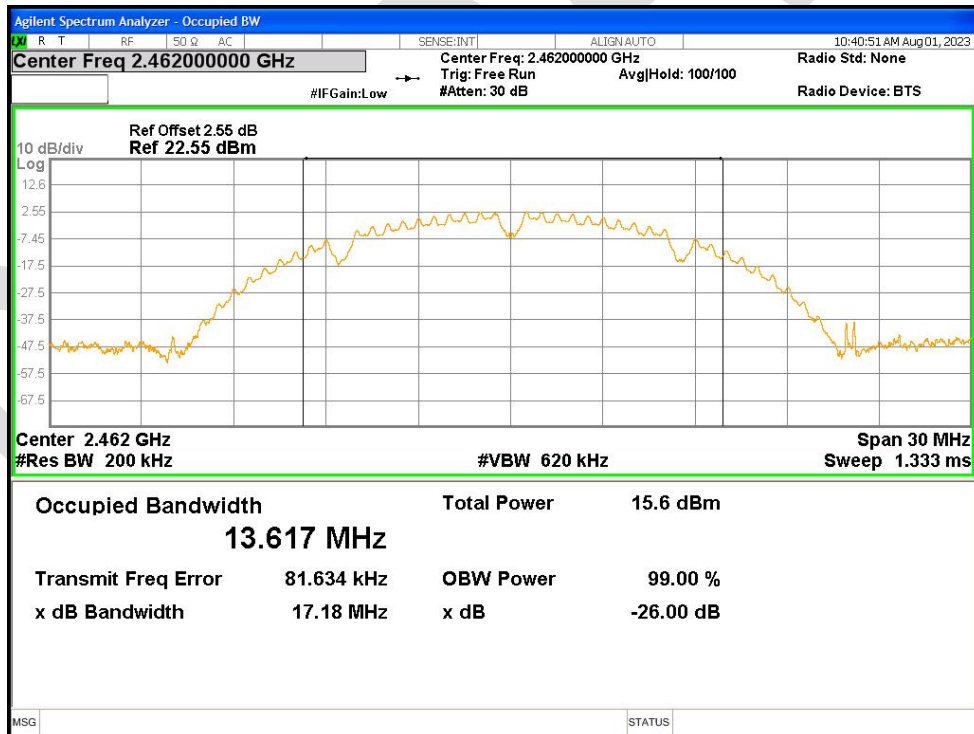
OBW NVNT b 2412MHz Ant1



OBW NVNT b 2437MHz Ant1

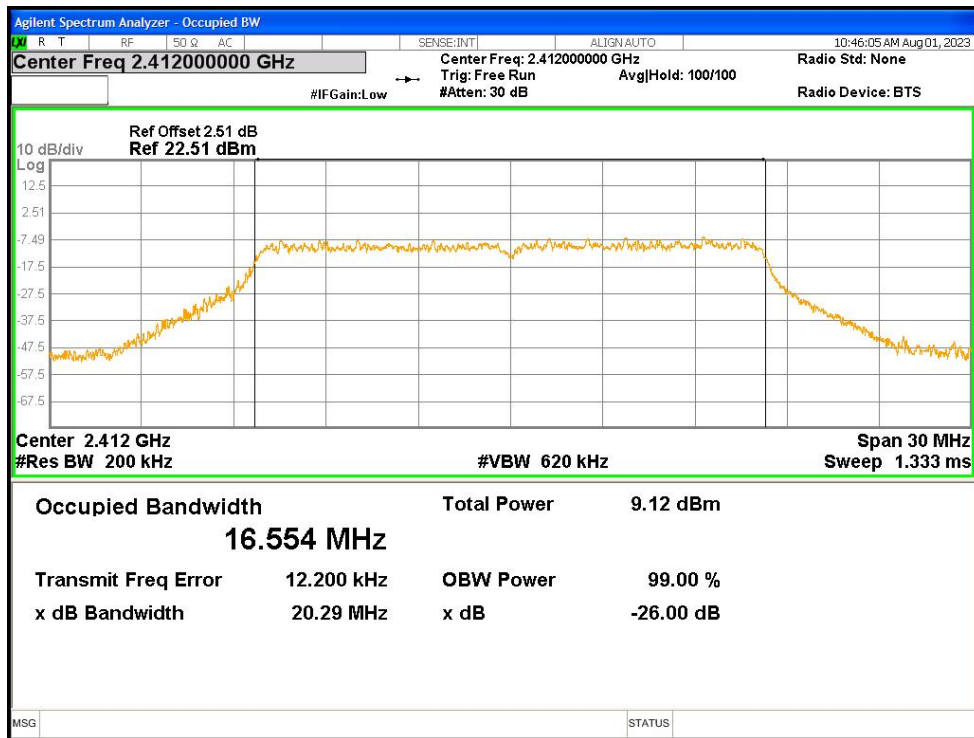


OBW NVNT b 2462MHz Ant1

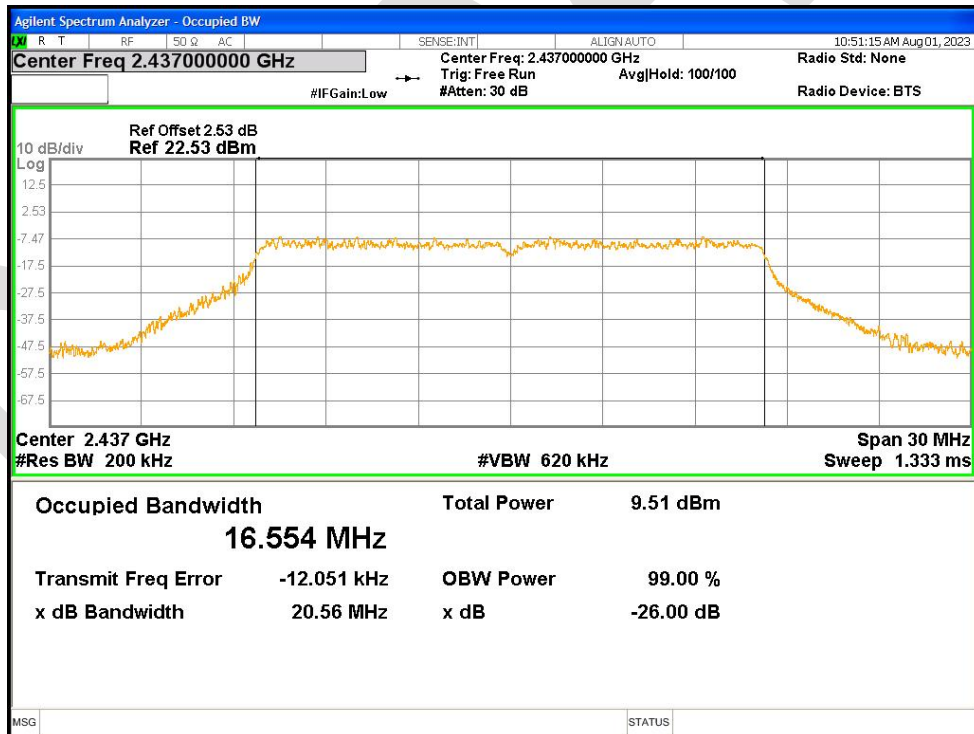


OBW NVNT g 2412MHz Ant1

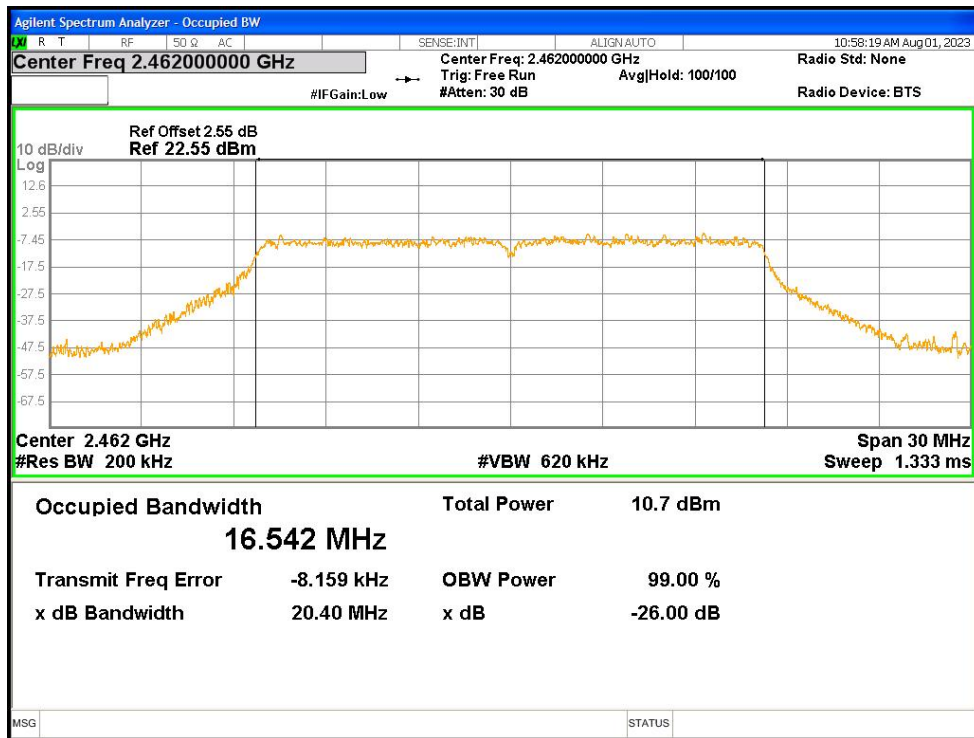




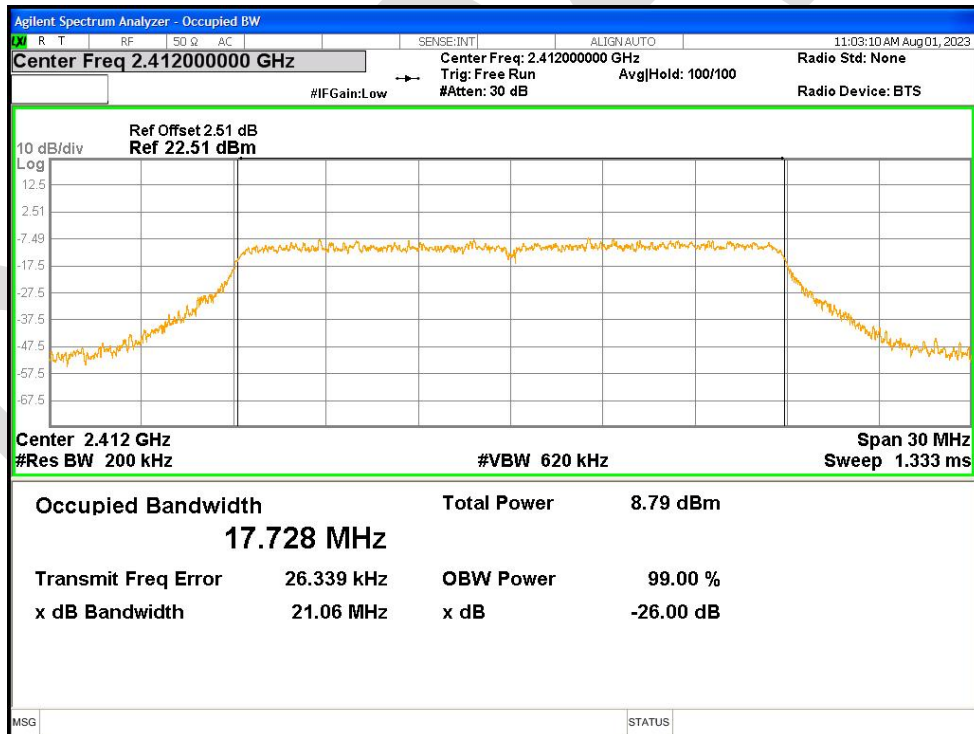
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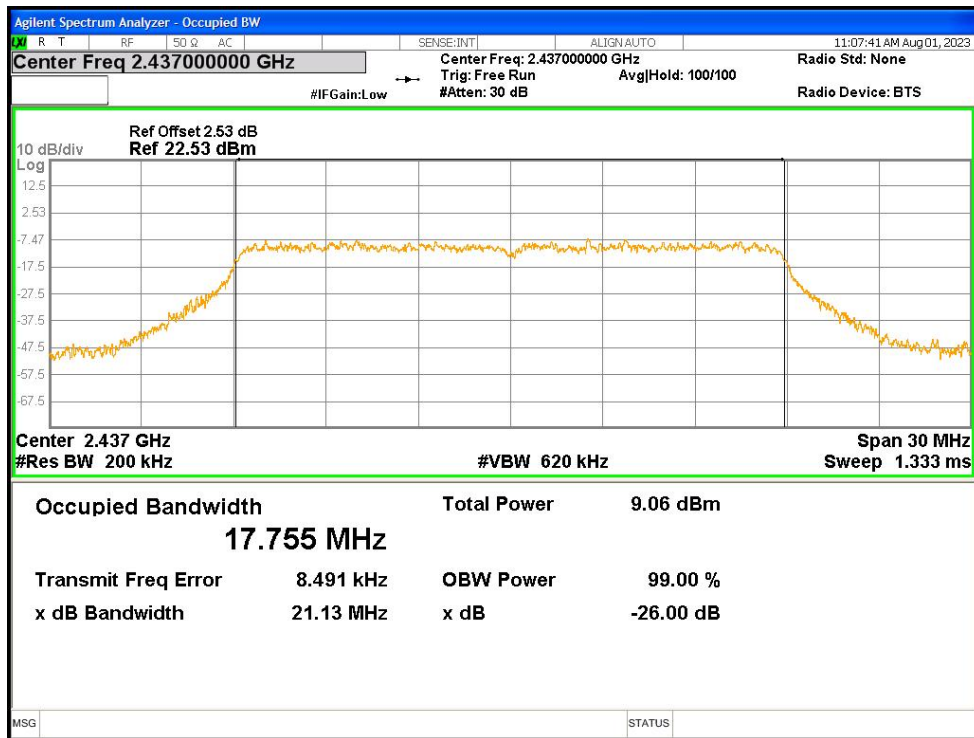
OBW NVNT g 2462MHz Ant1



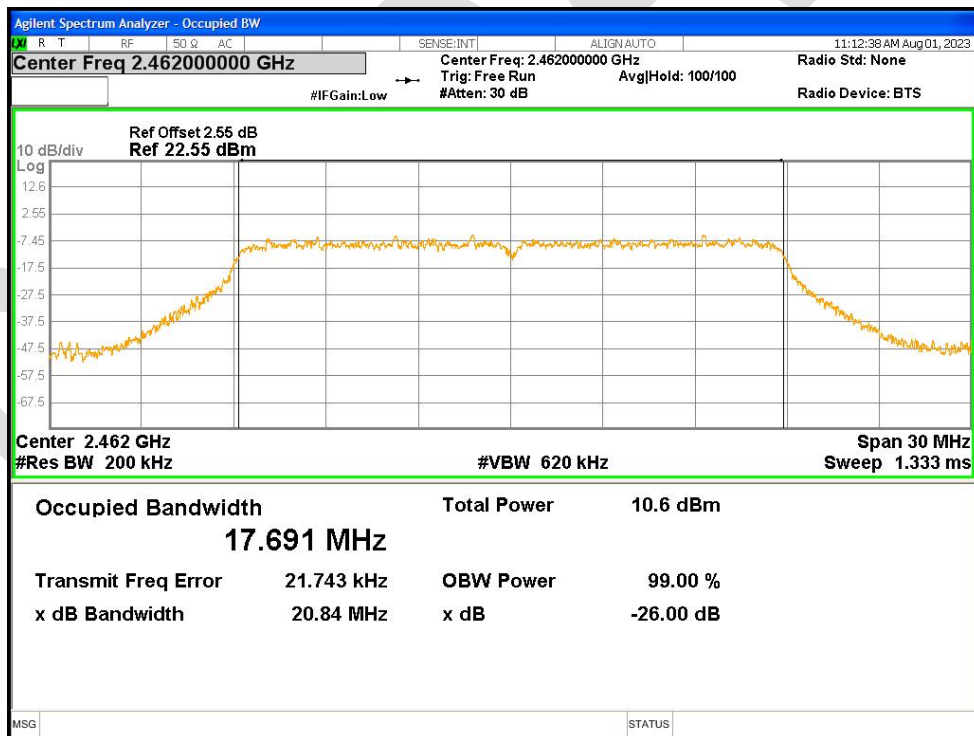
OBW NVNT n20 2412MHz Ant1



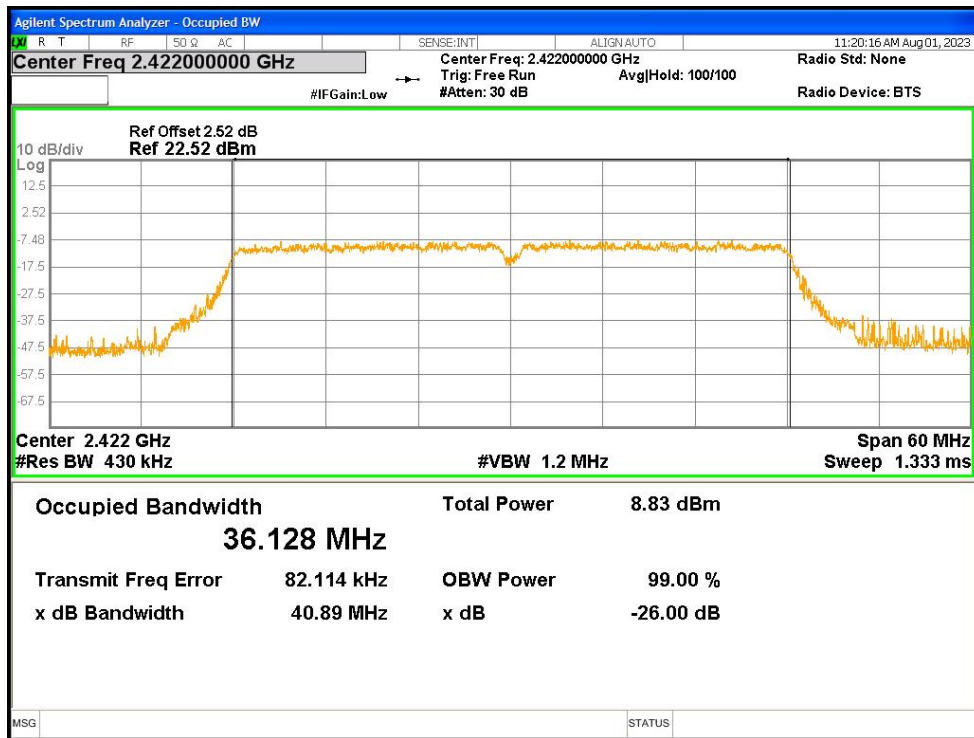
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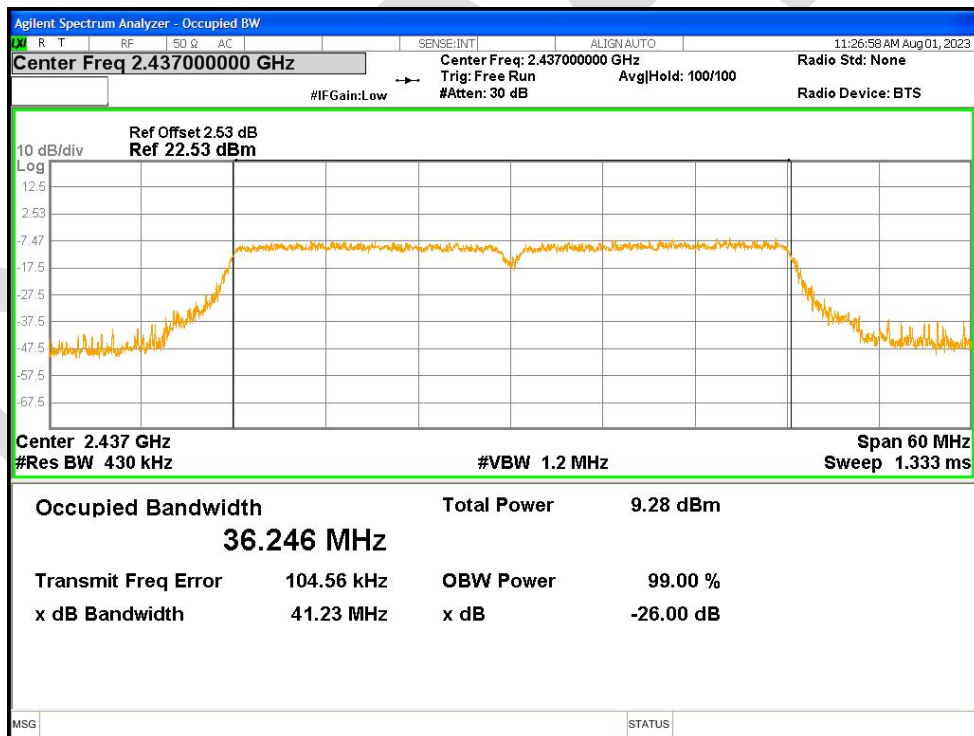
OBW NVNT n20 2462MHz Ant1



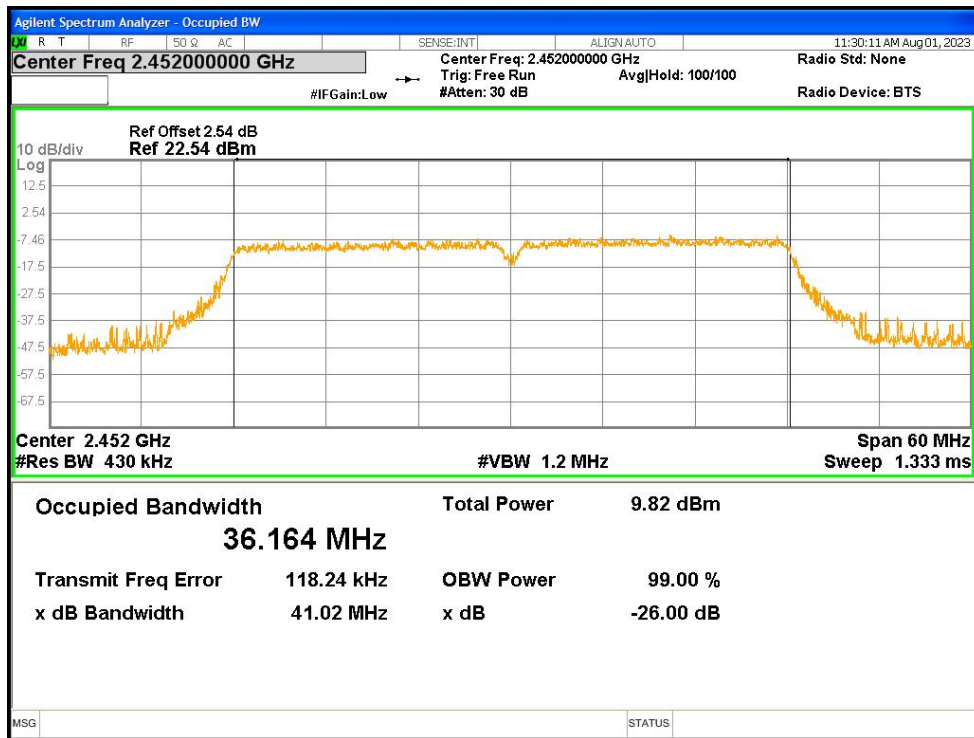
OBW NVNT n40 2422MHz Ant1



OBW NVNT n40 2437MHz Ant1



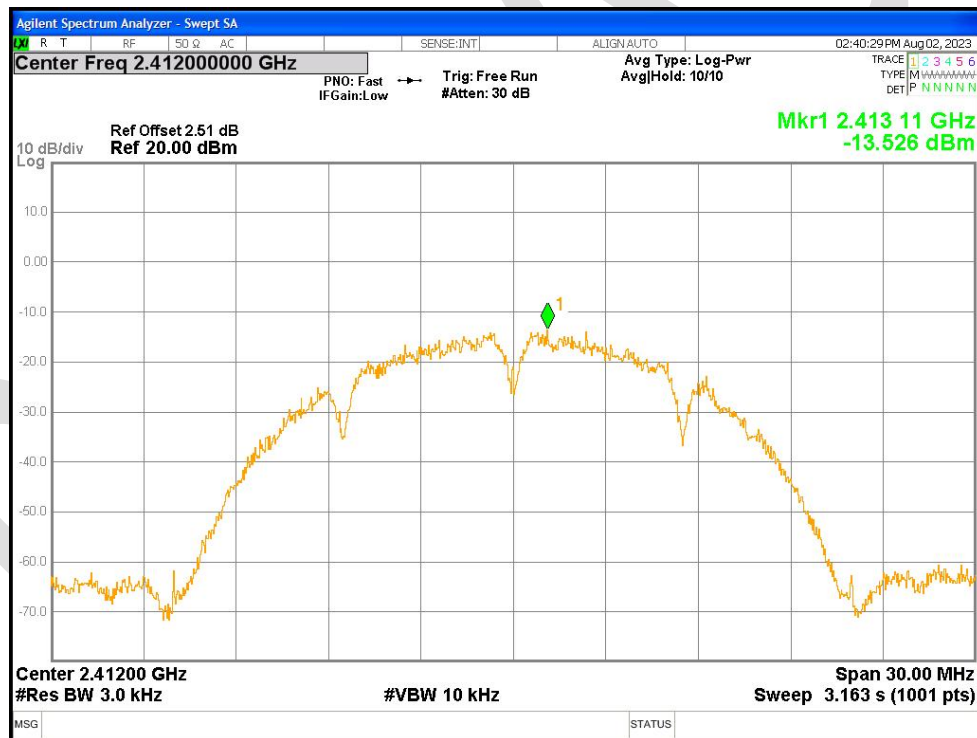
OBW NVNT n40 2452MHz Ant1



#### 20.4 MAXIMUM POWER SPECTRAL DENSITY LEVEL

| Condition | Mode | Frequency (MHz) | Antenna | Max PSD (dBm) | Limit (dBm) | Verdict |
|-----------|------|-----------------|---------|---------------|-------------|---------|
| NVNT      | b    | 2412            | Ant1    | -13.526       | 8           | Pass    |
| NVNT      | b    | 2437            | Ant1    | -13.091       | 8           | Pass    |
| NVNT      | b    | 2462            | Ant1    | -10.745       | 8           | Pass    |
| NVNT      | g    | 2412            | Ant1    | -20.468       | 8           | Pass    |
| NVNT      | g    | 2437            | Ant1    | -20.99        | 8           | Pass    |
| NVNT      | g    | 2462            | Ant1    | -19.345       | 8           | Pass    |
| NVNT      | n20  | 2412            | Ant1    | -20.437       | 8           | Pass    |
| NVNT      | n20  | 2437            | Ant1    | -20.283       | 8           | Pass    |
| NVNT      | n20  | 2462            | Ant1    | -18.582       | 8           | Pass    |
| NVNT      | n40  | 2422            | Ant1    | -20.761       | 8           | Pass    |
| NVNT      | n40  | 2437            | Ant1    | -22.234       | 8           | Pass    |
| NVNT      | n40  | 2452            | Ant1    | -21.391       | 8           | Pass    |

PSD NVNT b 2412MHz Ant1

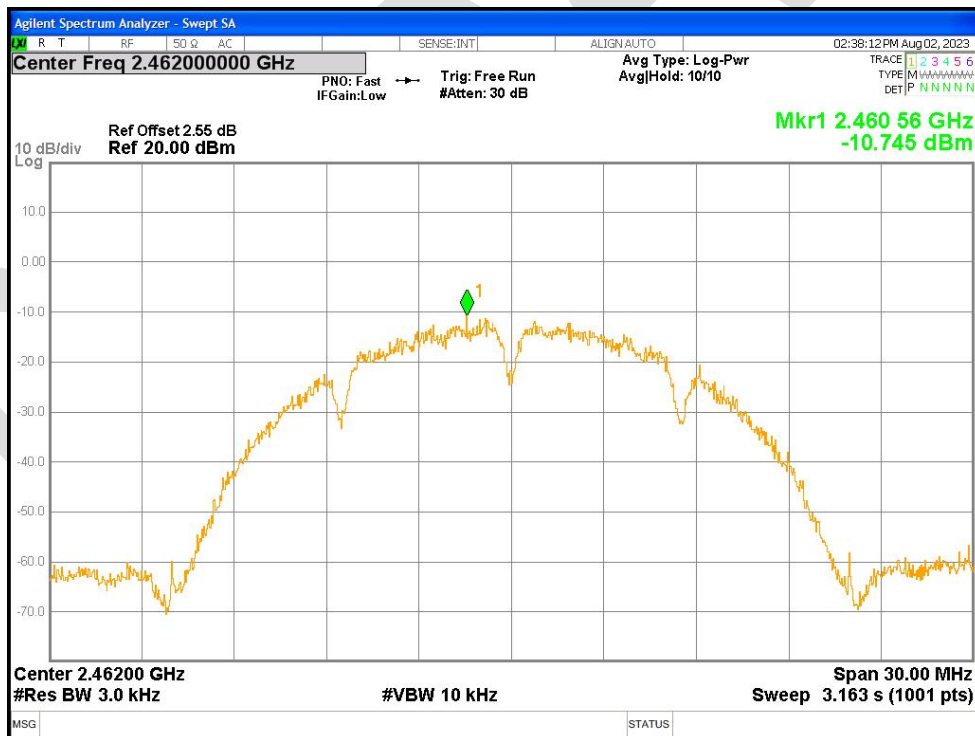


PSD NVNT b 2437MHz Ant1

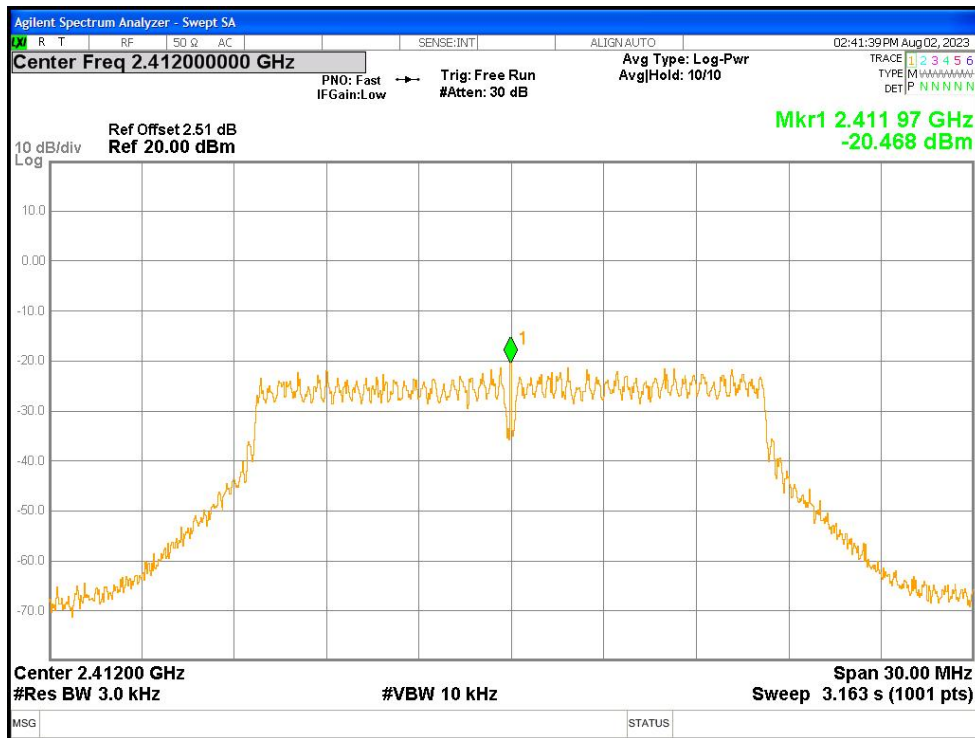




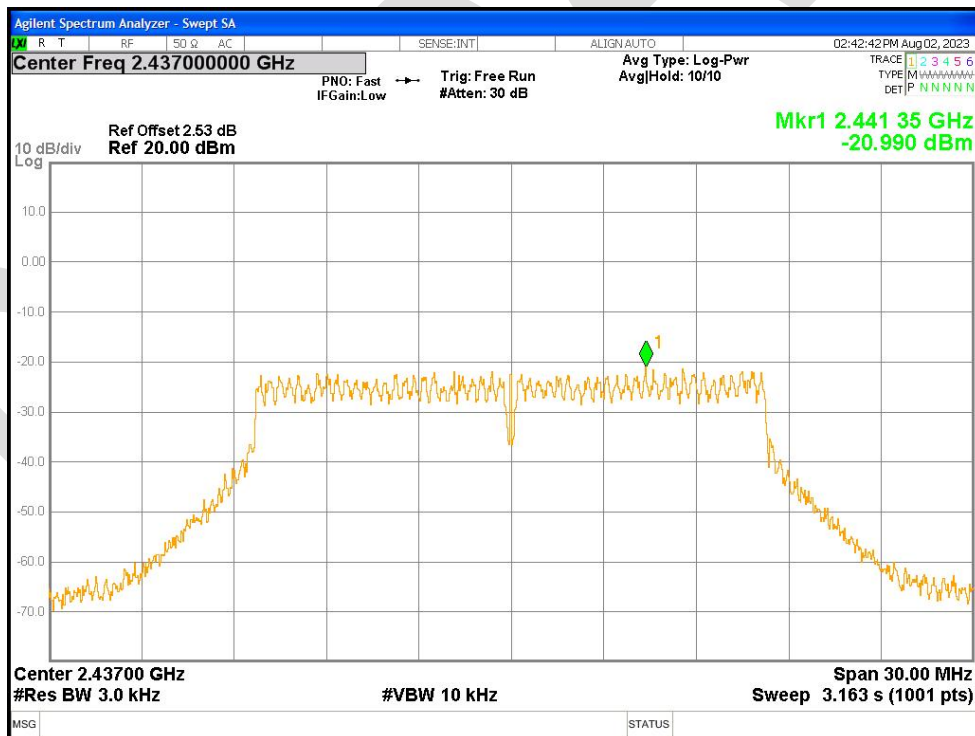
PSD NVNT b 2462MHz Ant1



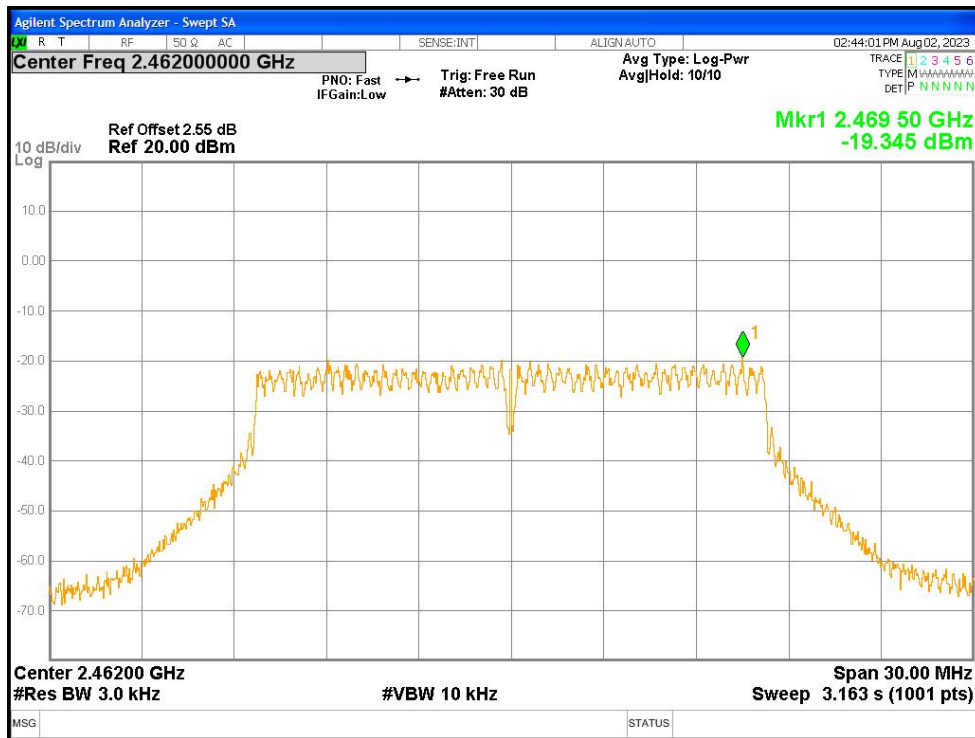
PSD NVNT g 2412MHz Ant1



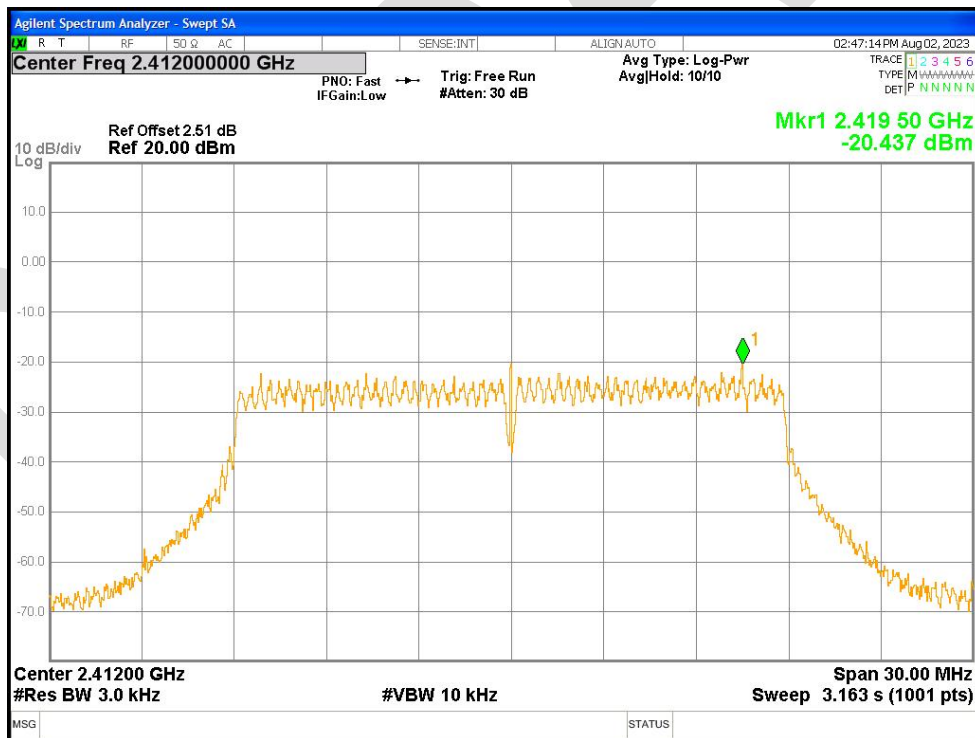
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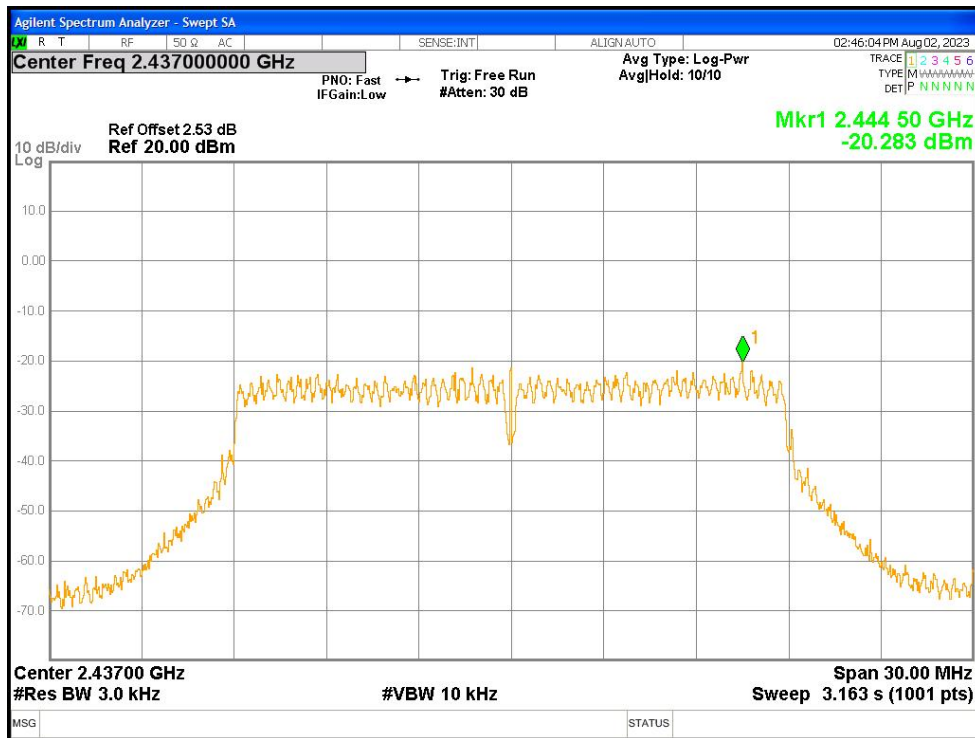
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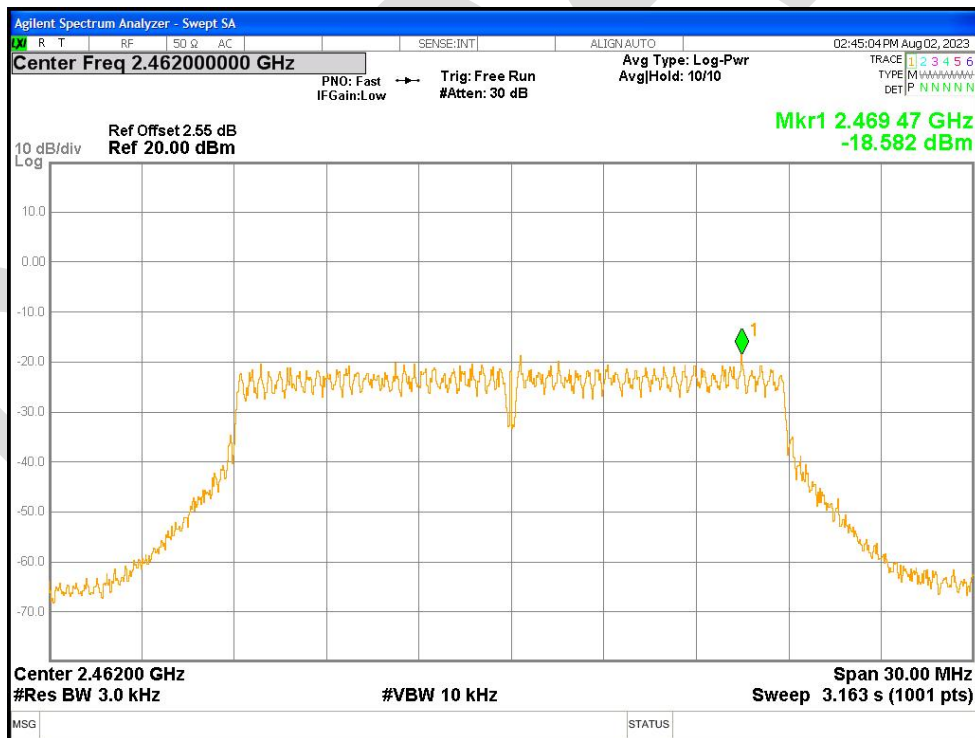
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PSD NVNT n20 2437MHz Ant1



PSD NVNT n20 2462MHz Ant1



PSD NVNT n40 2422MHz Ant1