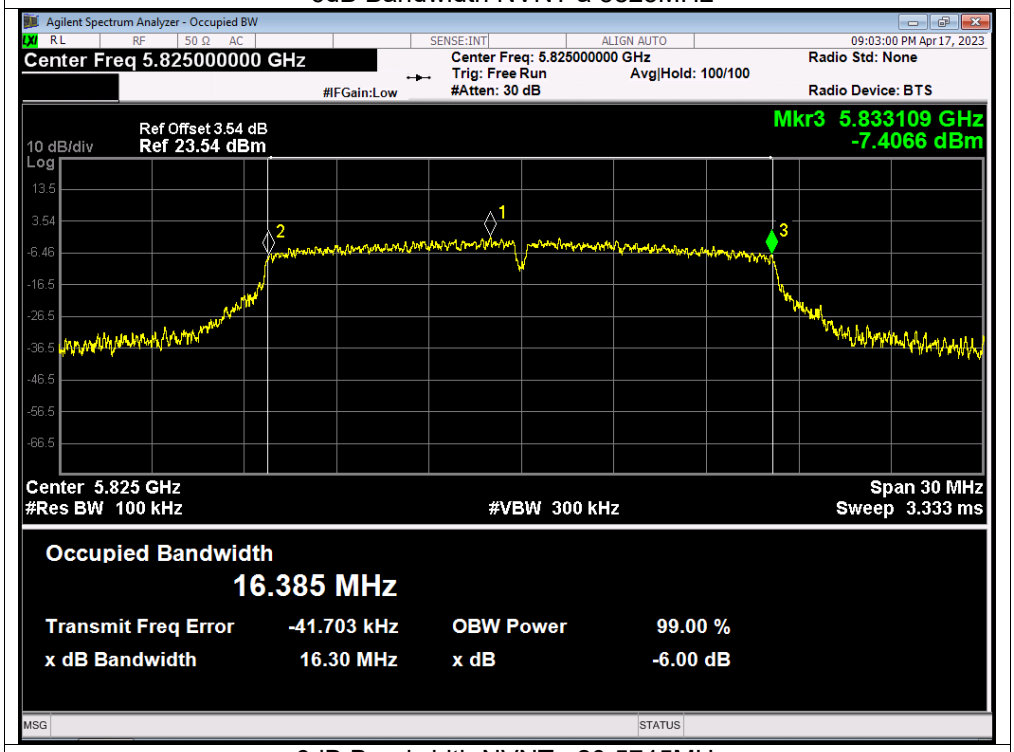
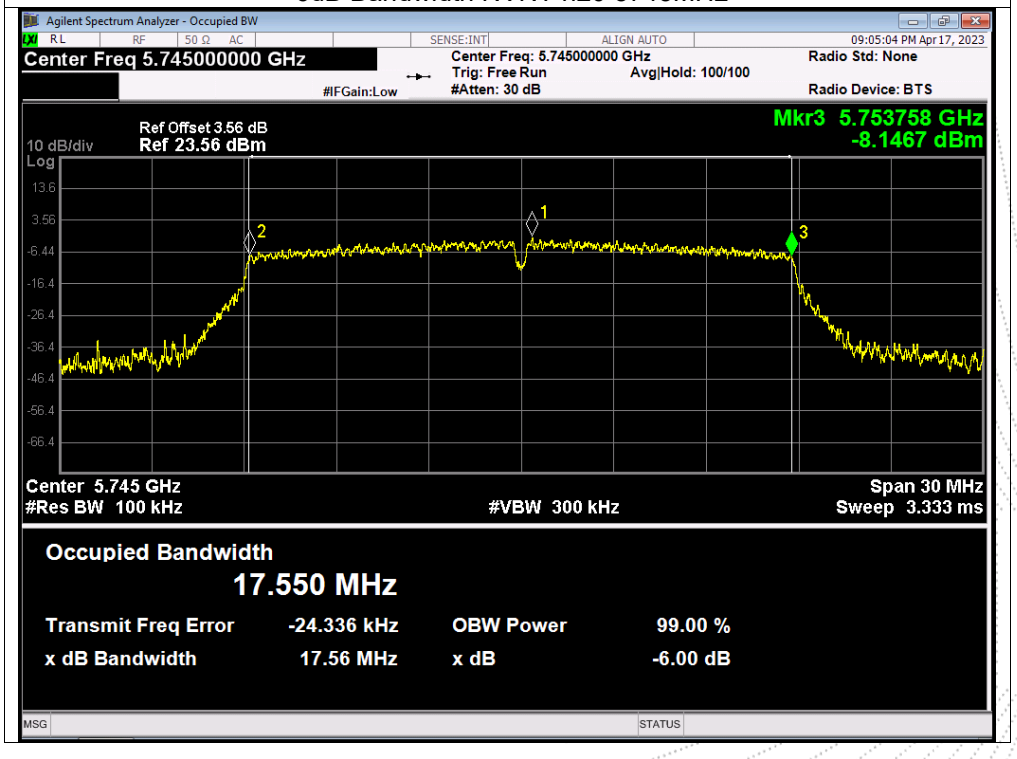
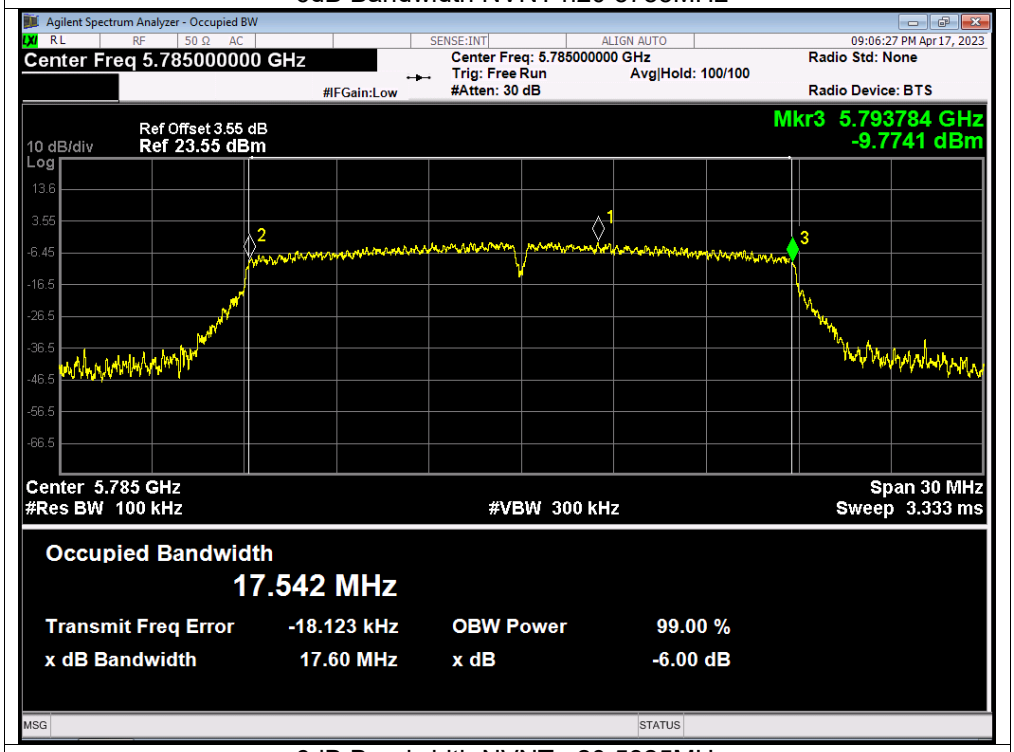
-6dB Bandwidth NVNT a 5825MHz



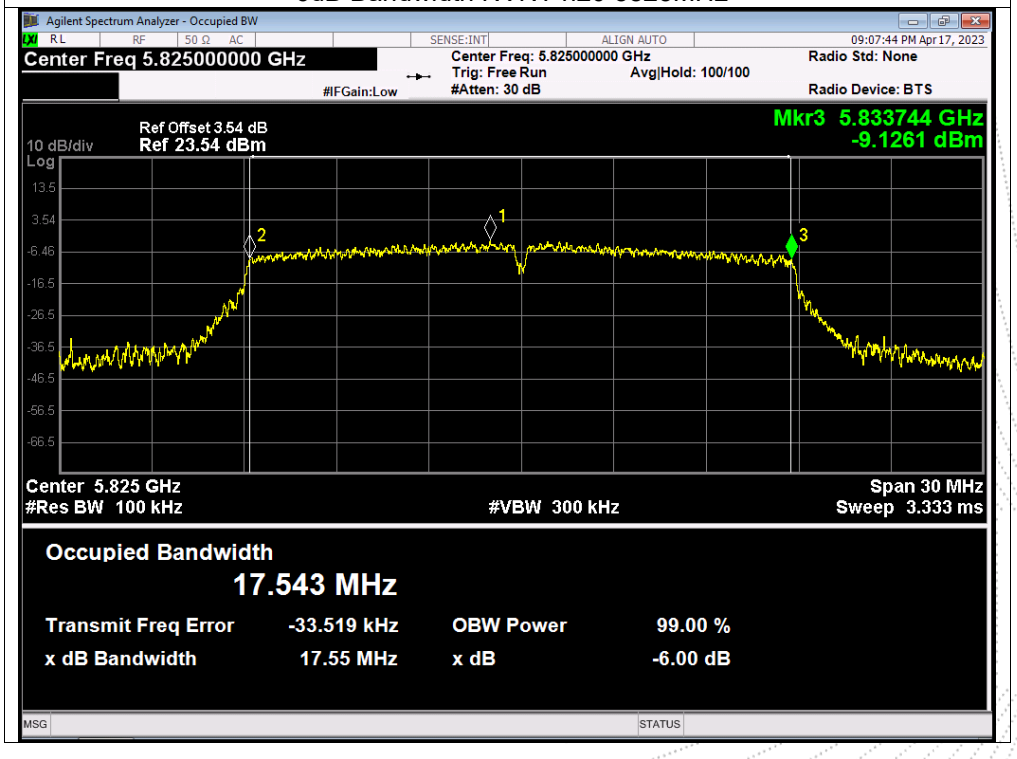

-6dB Bandwidth NVNT n20 5745MHz



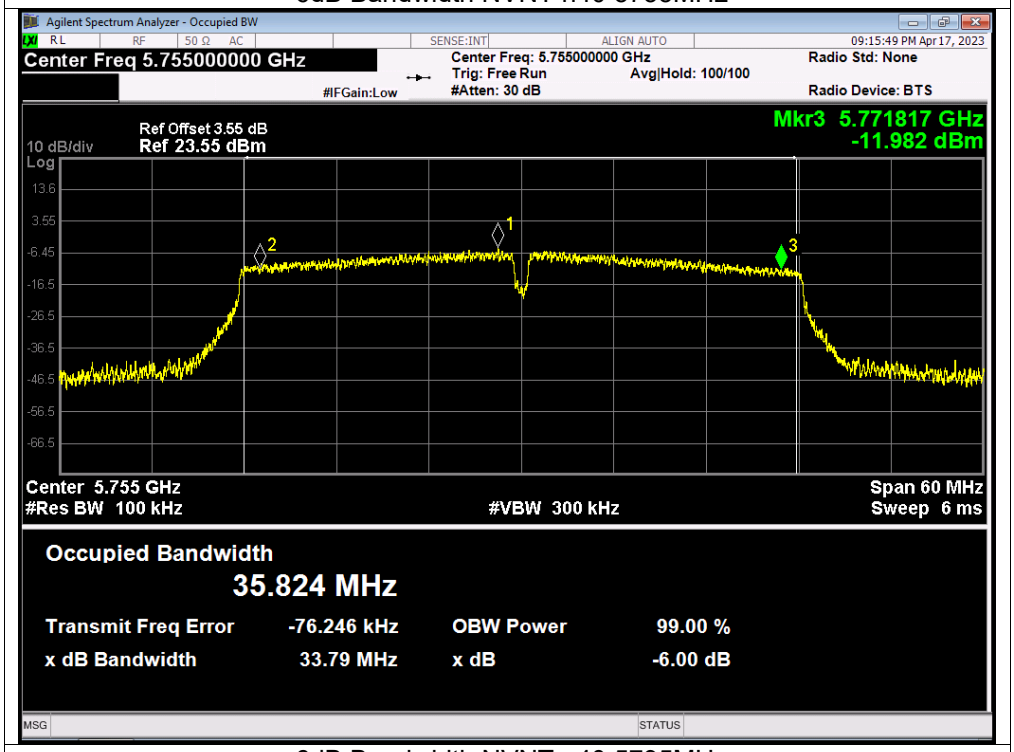
-6dB Bandwidth NVNT n20 5785MHz



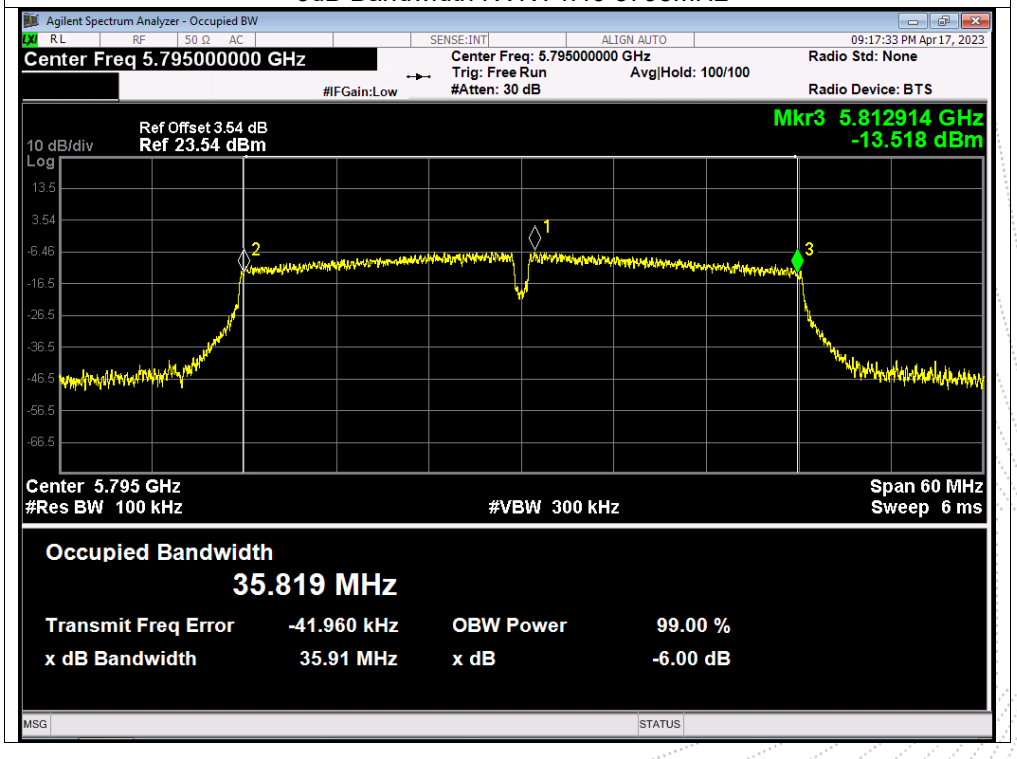

-6dB Bandwidth NVNT n20 5825MHz



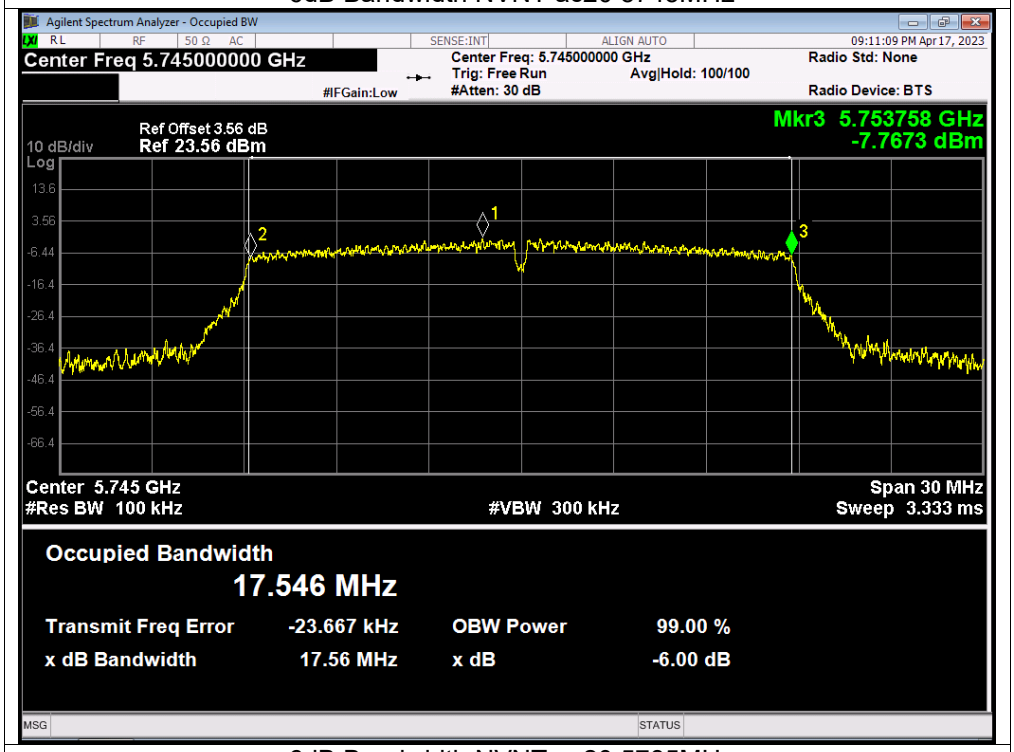
-6dB Bandwidth NVNT n40 5755MHz



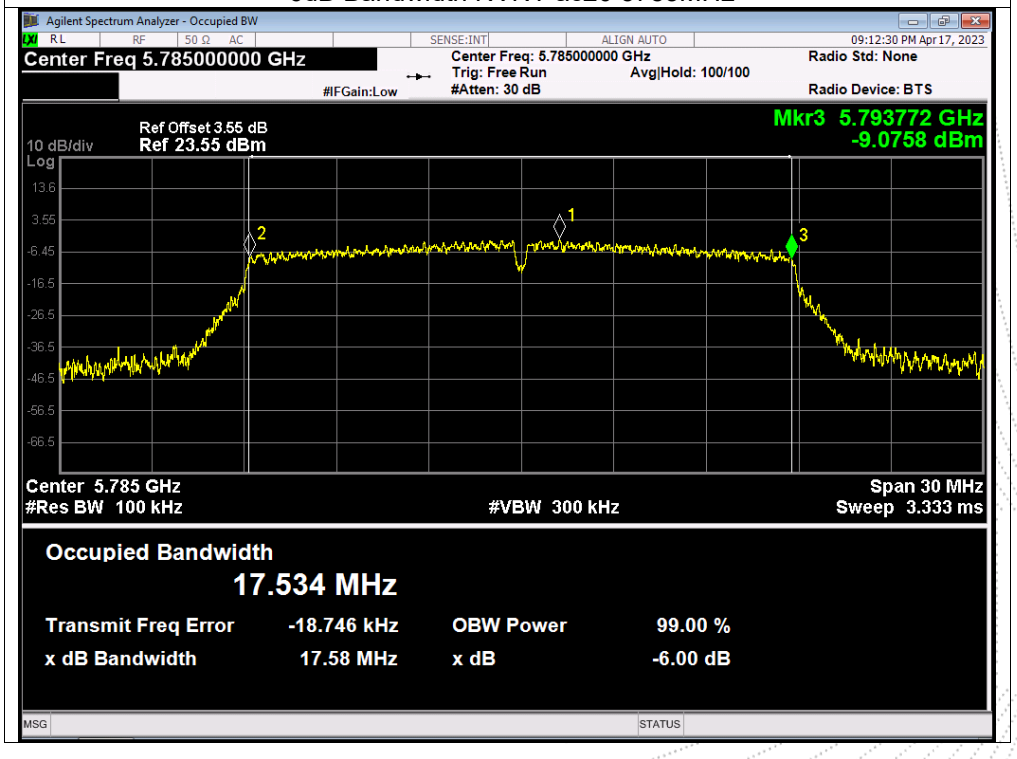

-6dB Bandwidth NVNT n40 5795MHz



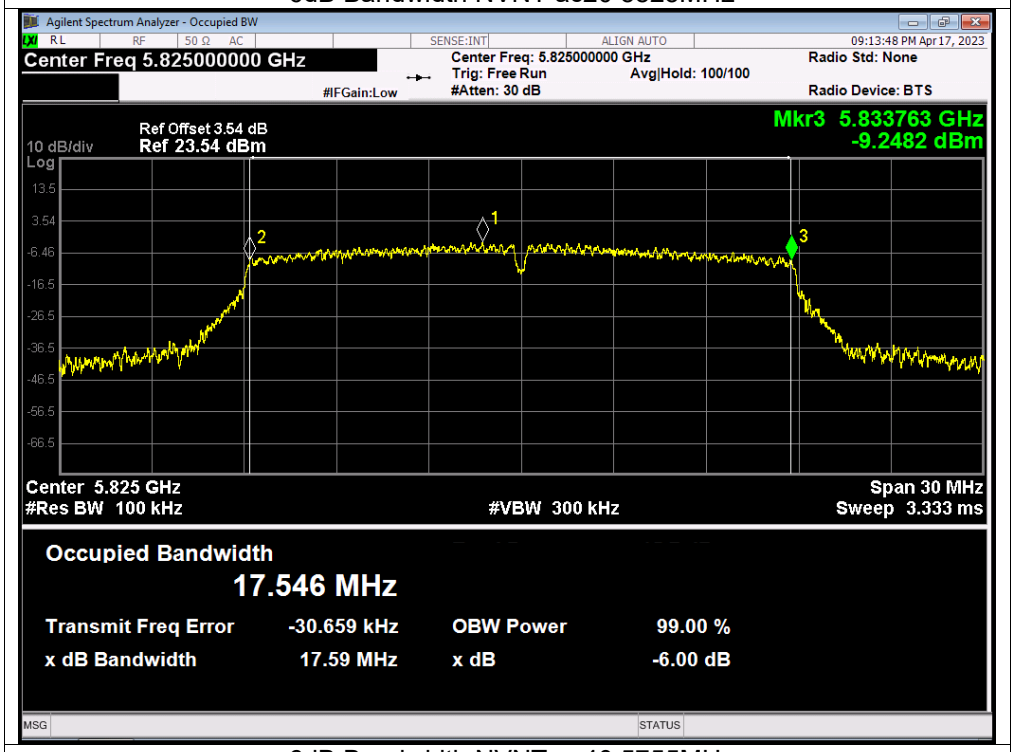
-6dB Bandwidth NVNT ac20 5745MHz



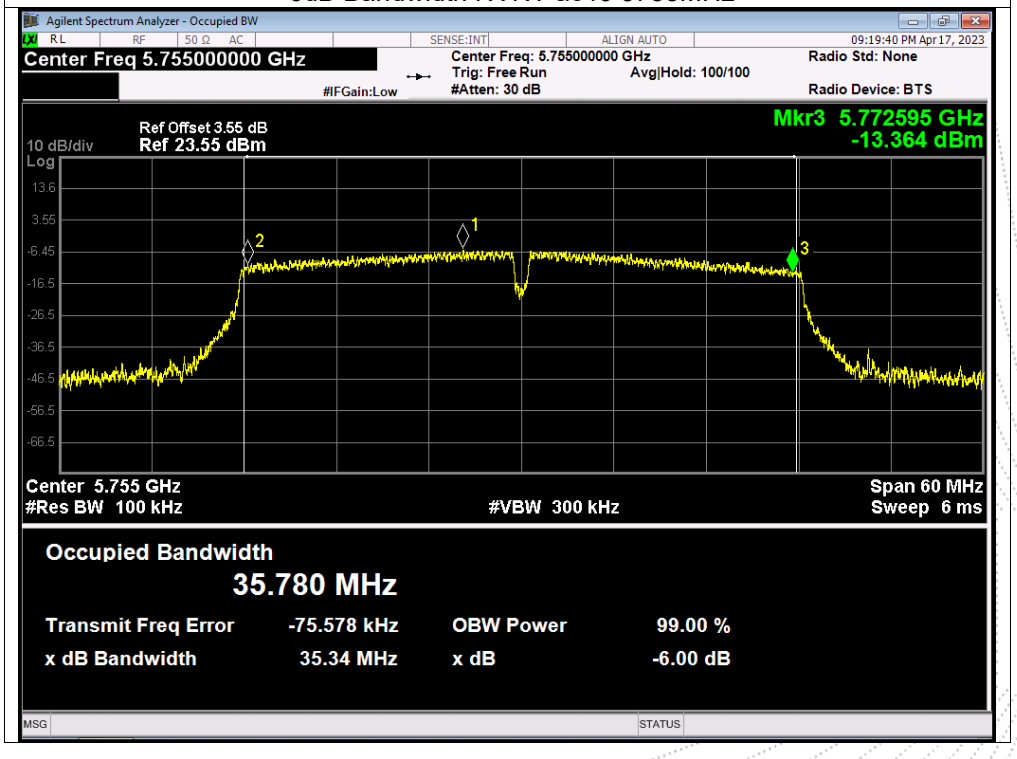

-6dB Bandwidth NVNT ac20 5785MHz



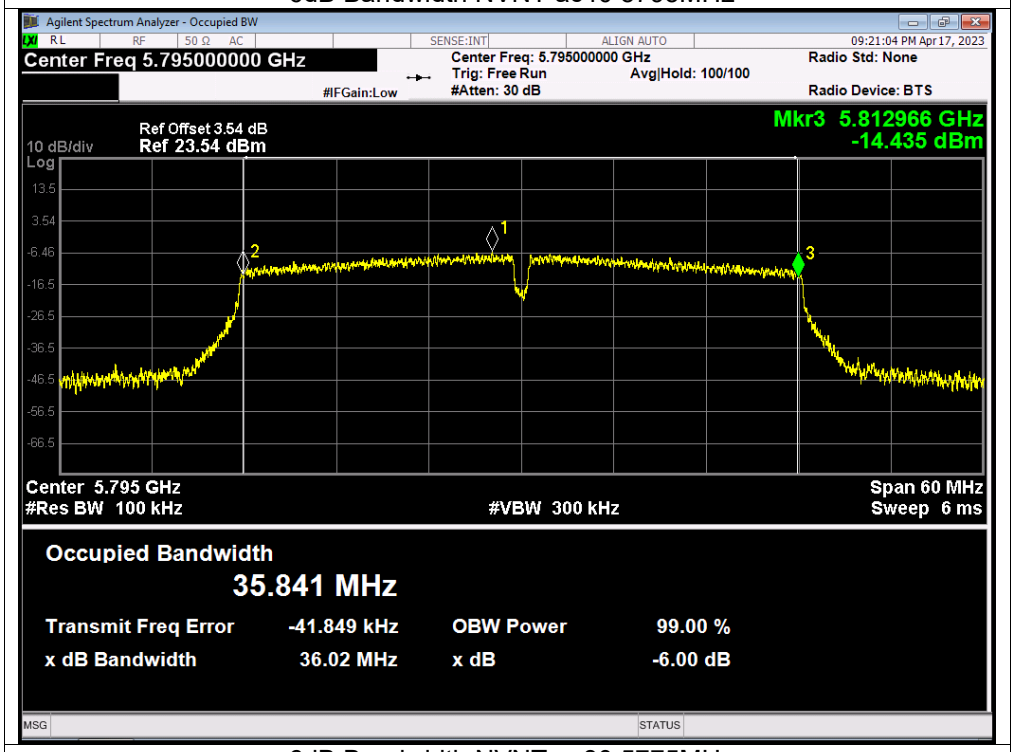
-6dB Bandwidth NVNT ac20 5825MHz



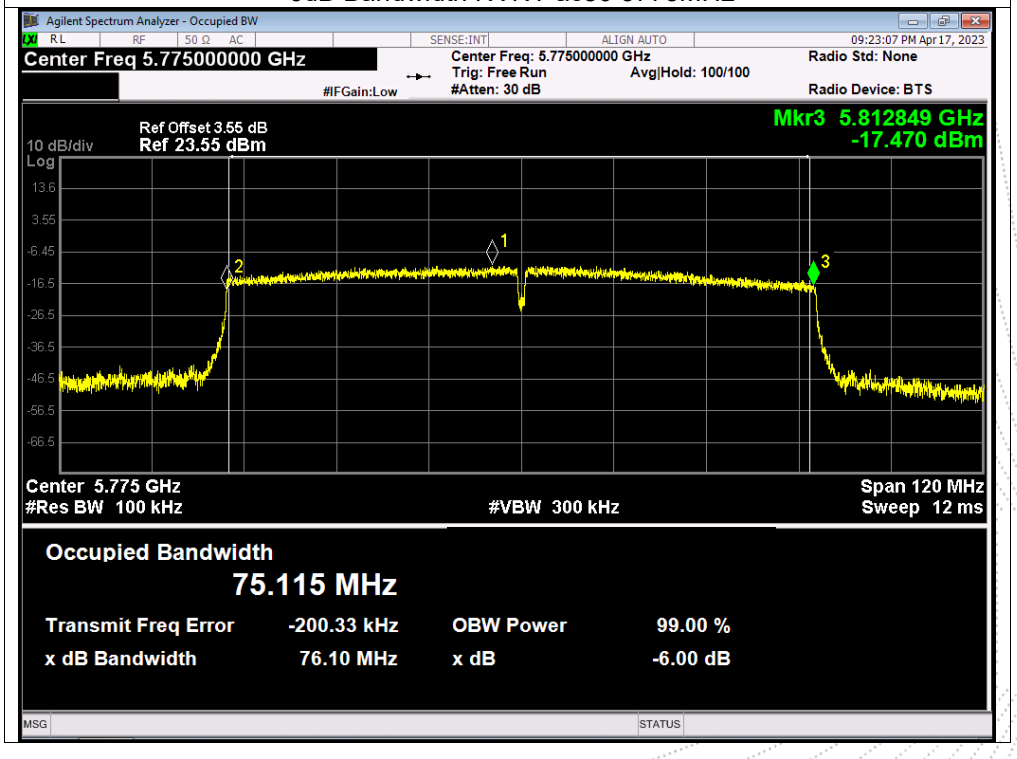

-6dB Bandwidth NVNT ac40 5755MHz



-6dB Bandwidth NVNT ac40 5795MHz

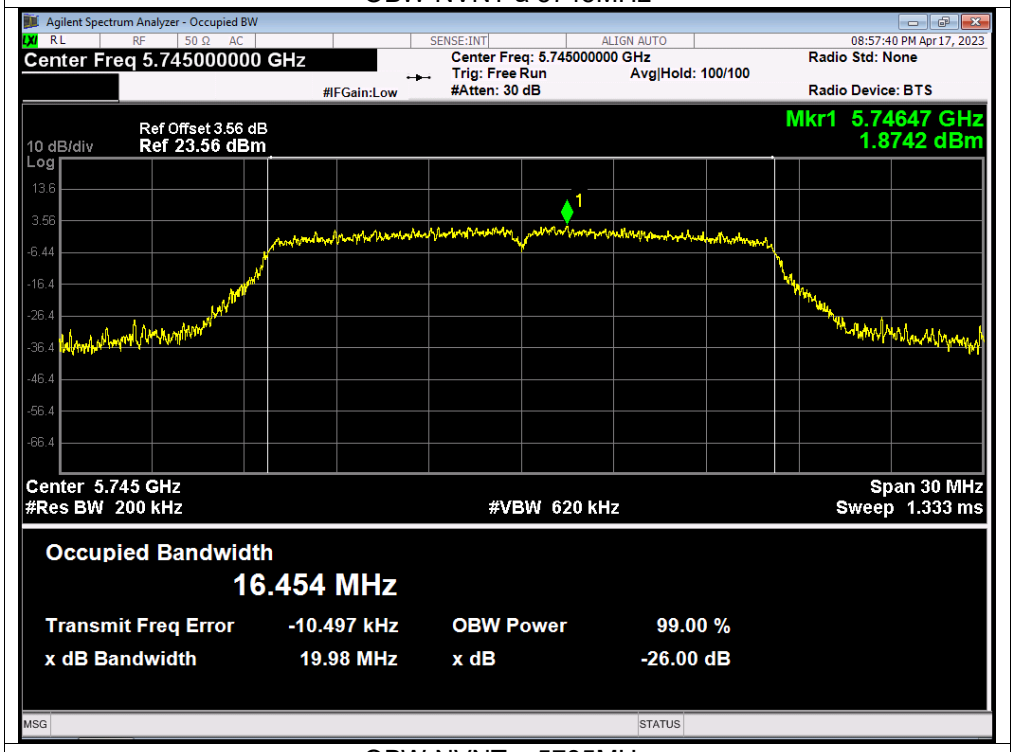



-6dB Bandwidth NVNT ac80 5775MHz

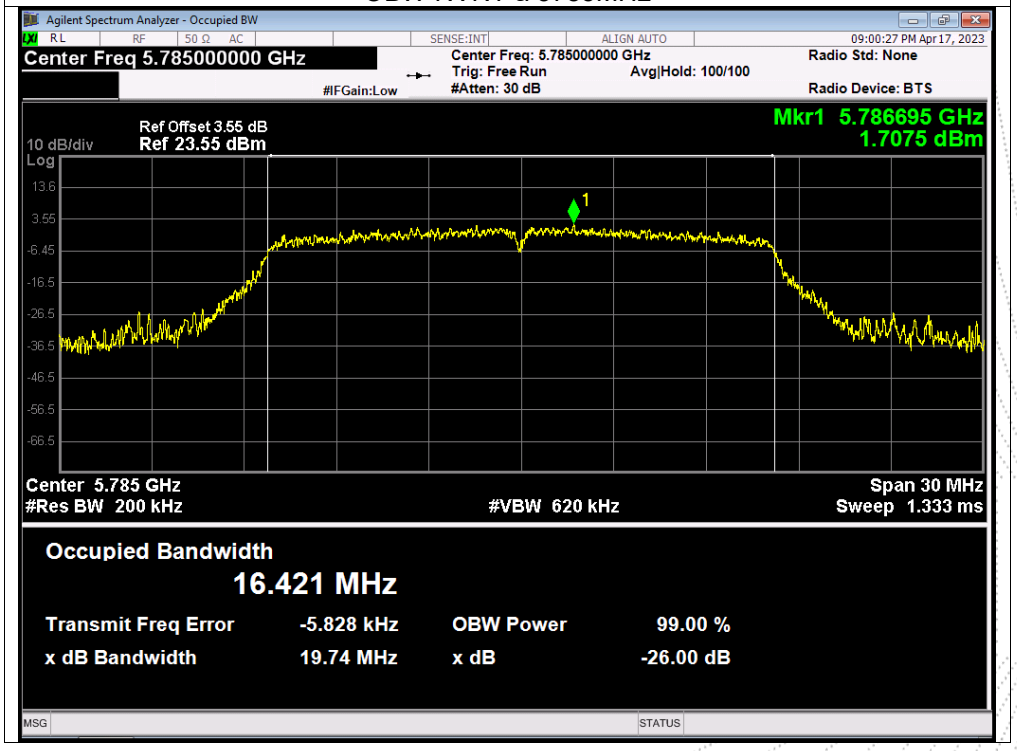


Test Graphs

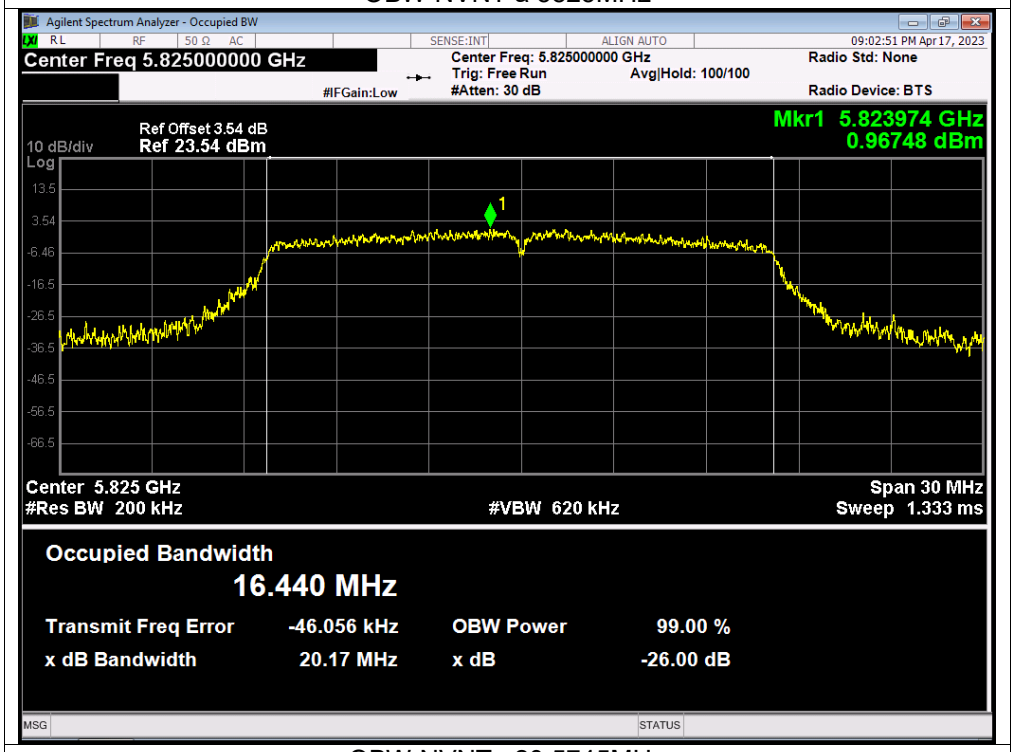
OBW NVNT a 5745MHz



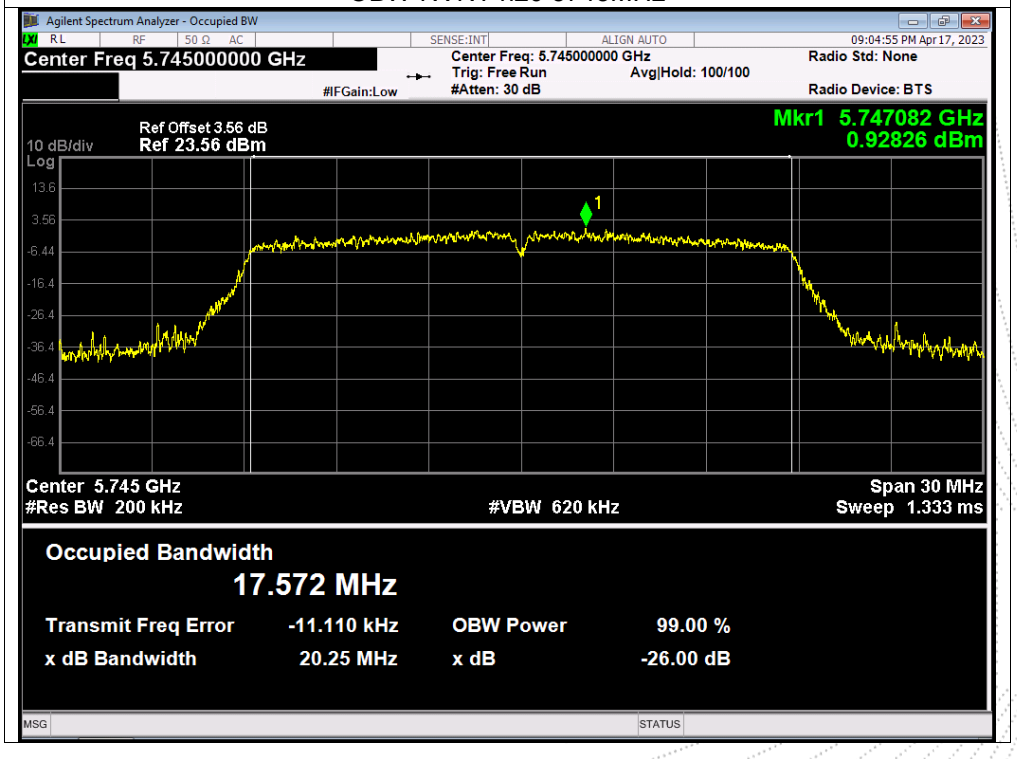

OBW NVNT a 5785MHz



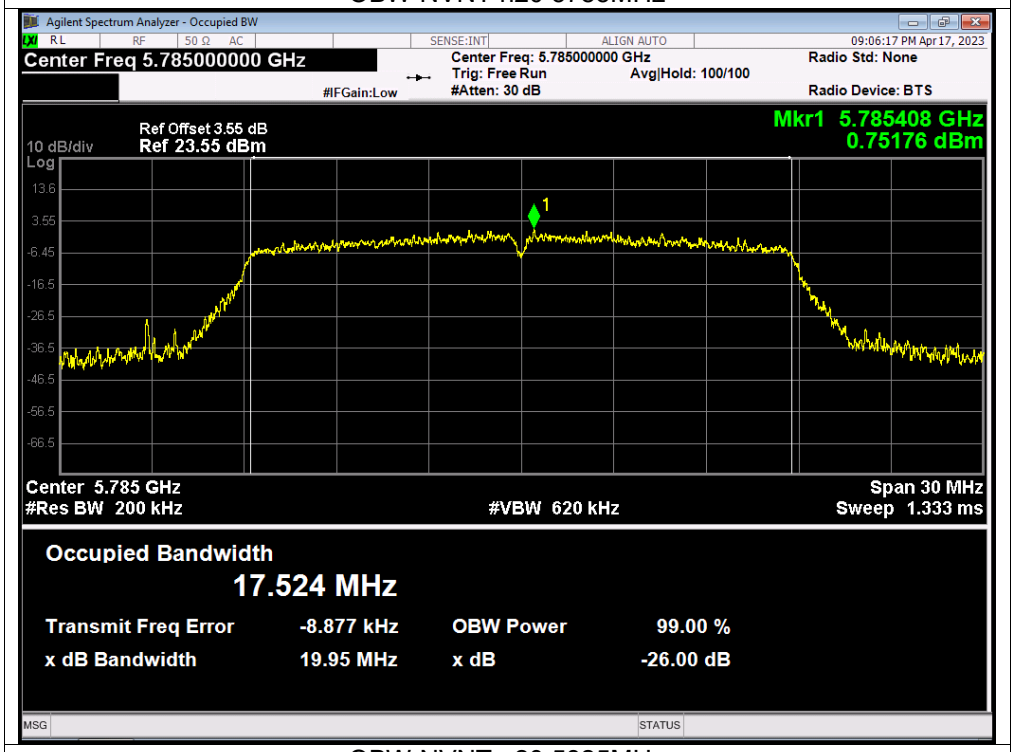
OBW NVNT a 5825MHz



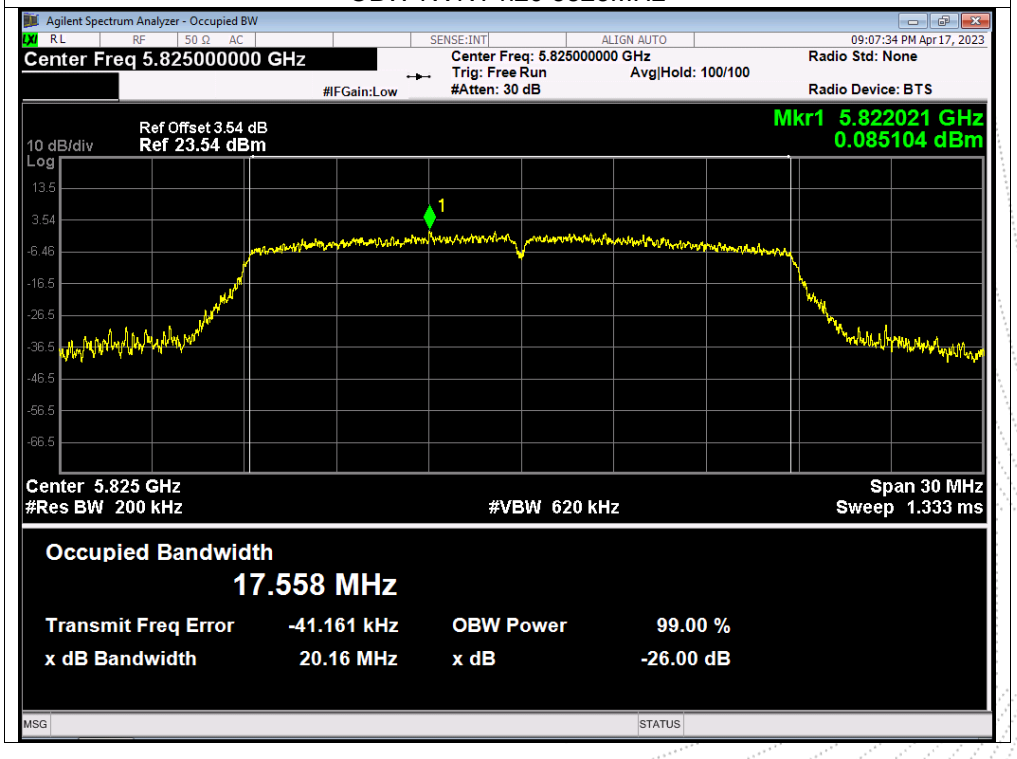

OBW NVNT n20 5745MHz



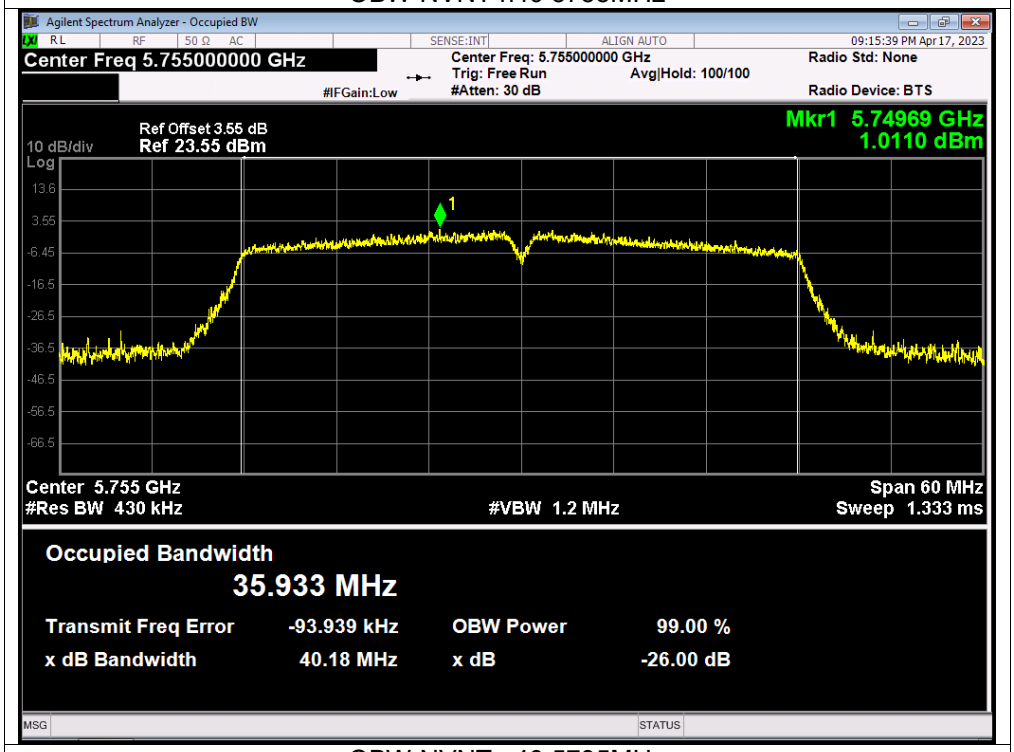
OBW NVNT n20 5785MHz



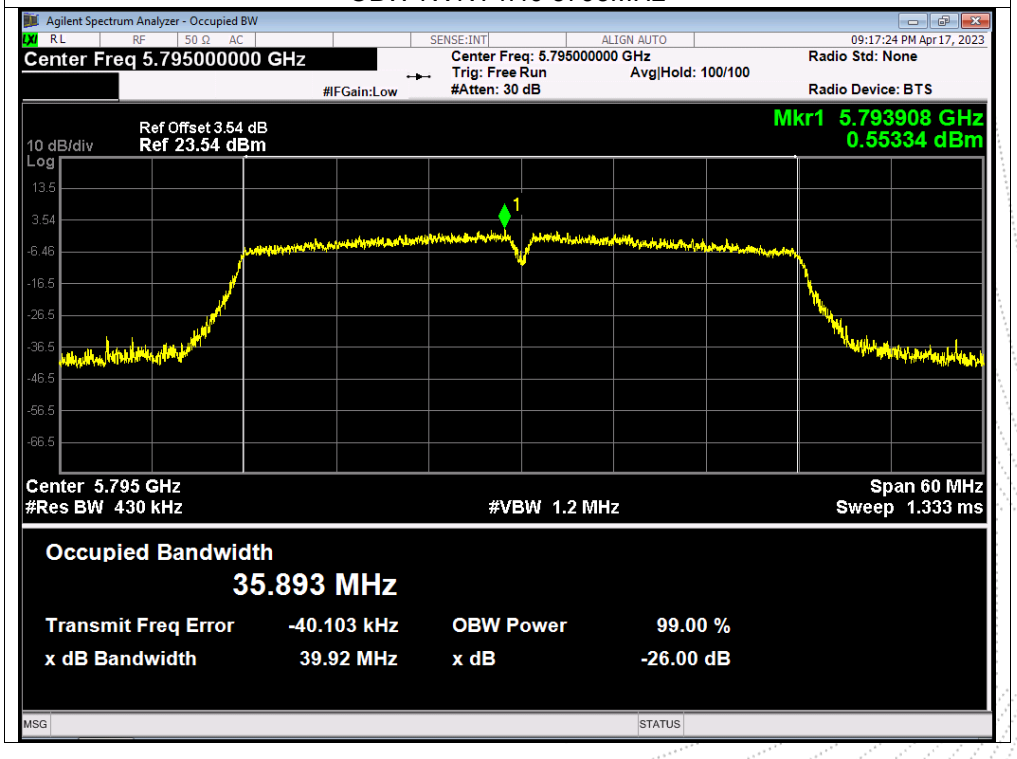

OBW NVNT n20 5825MHz



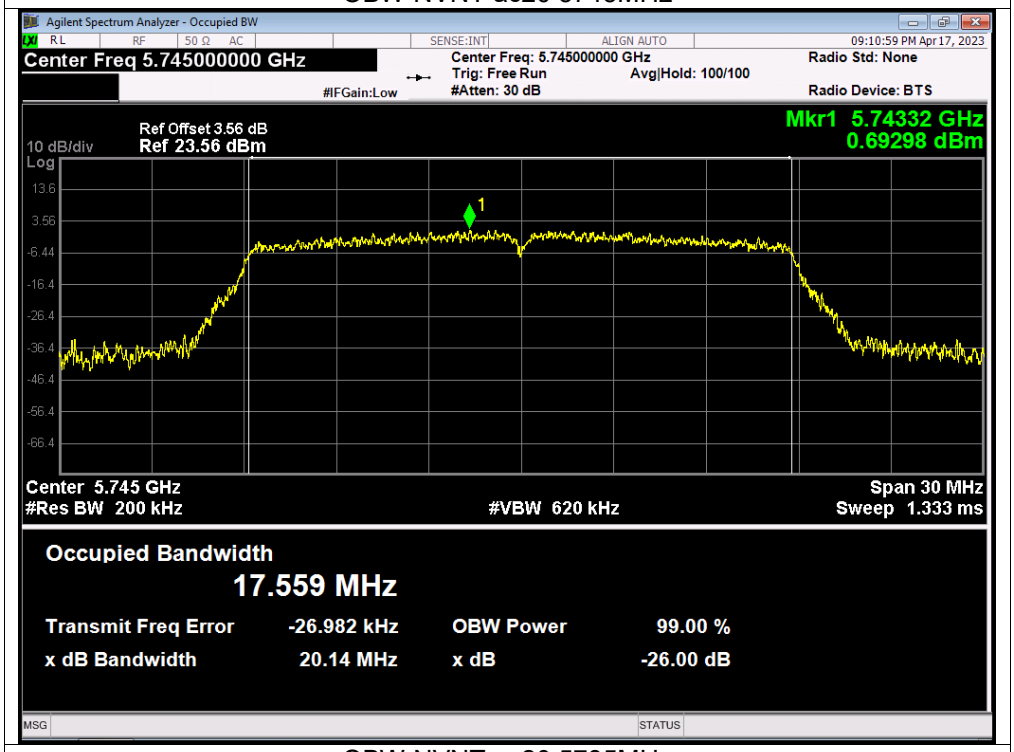
OBW NVNT n40 5755MHz



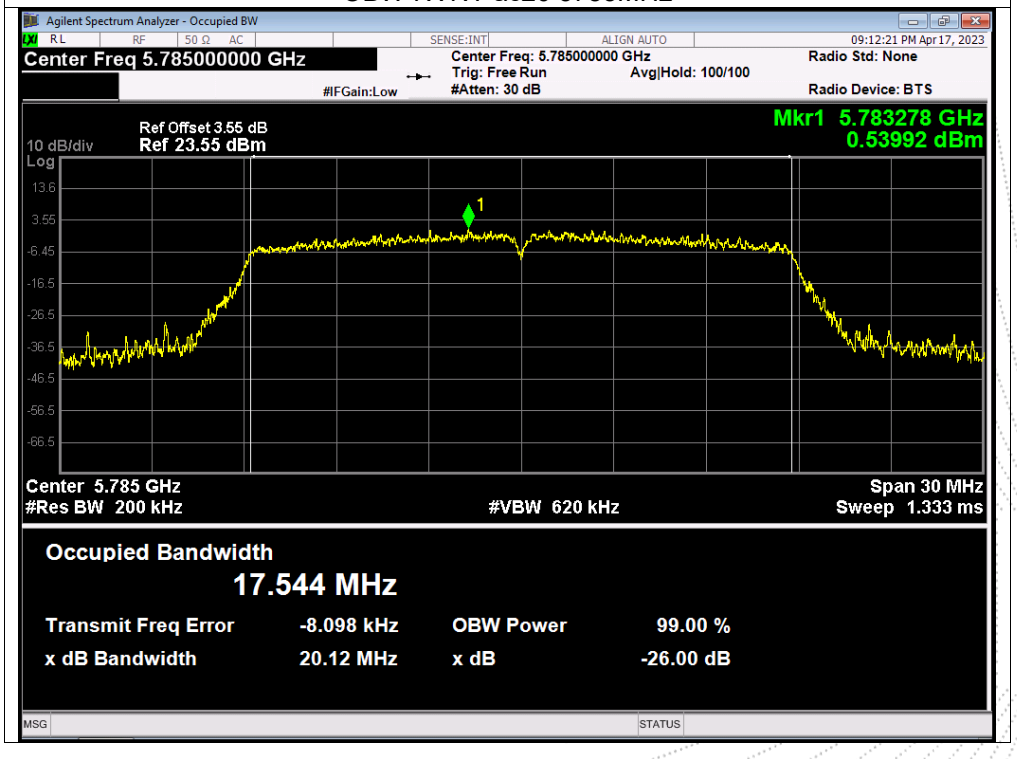

OBW NVNT n40 5795MHz



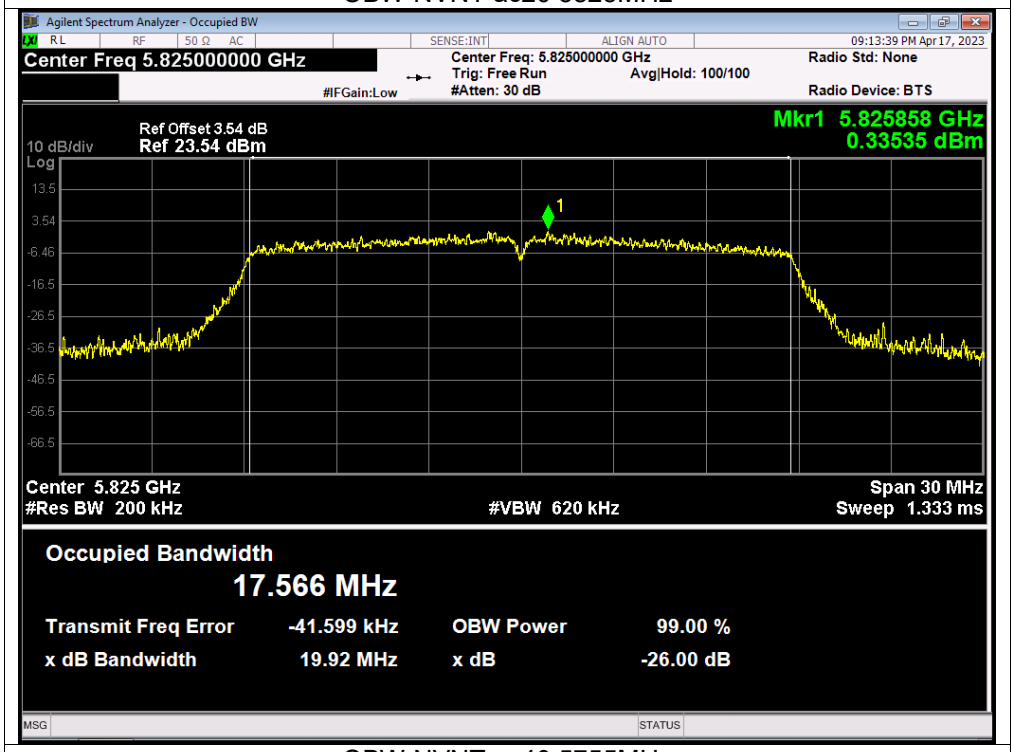
OBW NVNT ac20 5745MHz



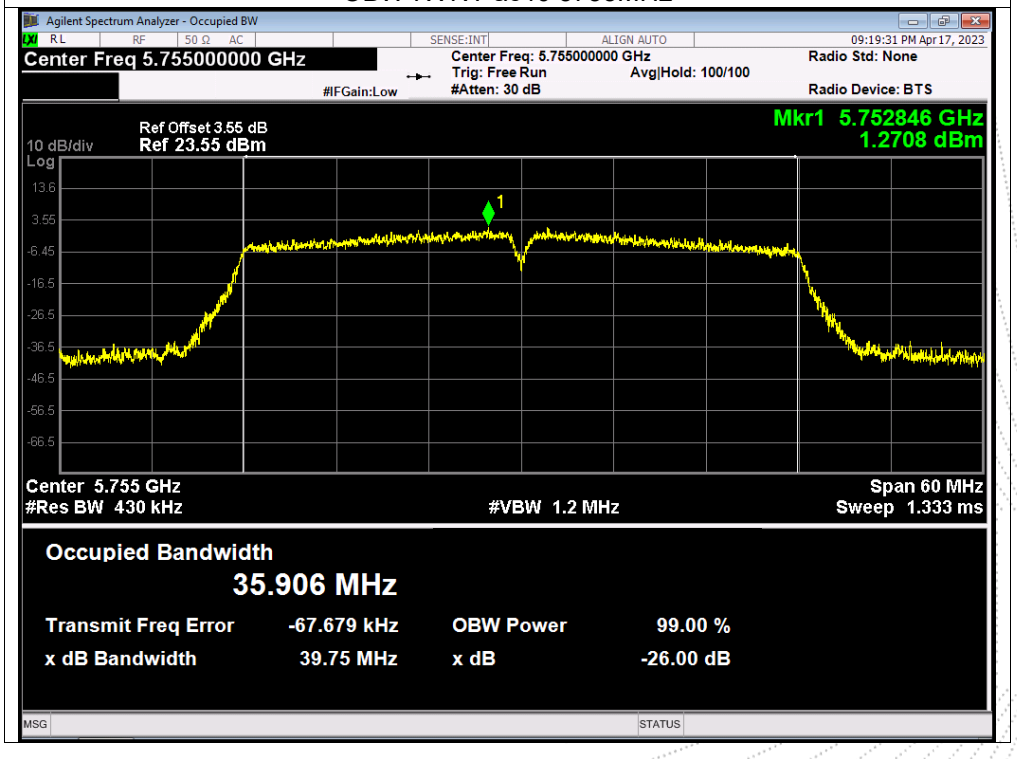

OBW NVNT ac20 5785MHz



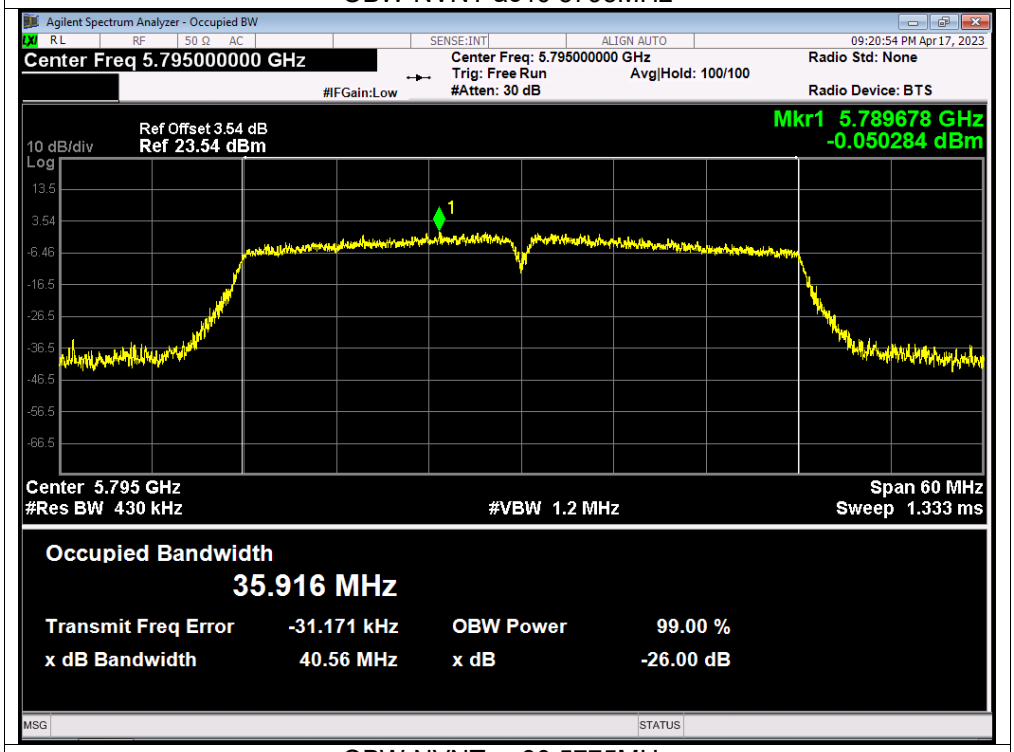
OBW NVNT ac20 5825MHz



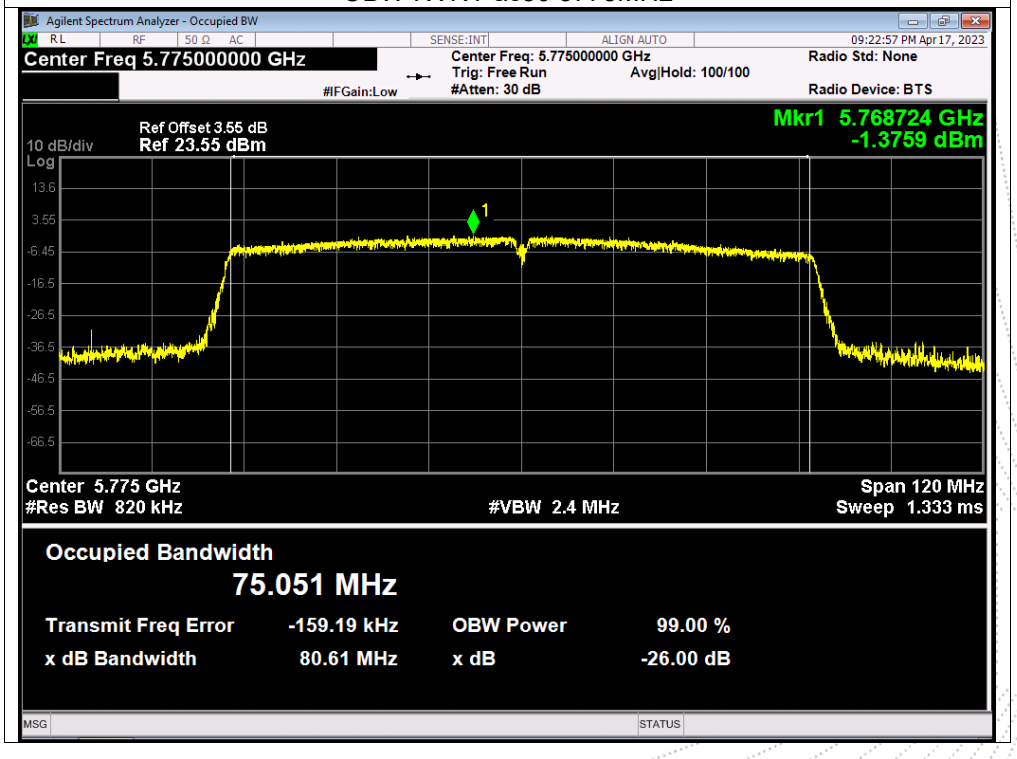

OBW NVNT ac40 5755MHz



OBW NVNT ac40 5795MHz

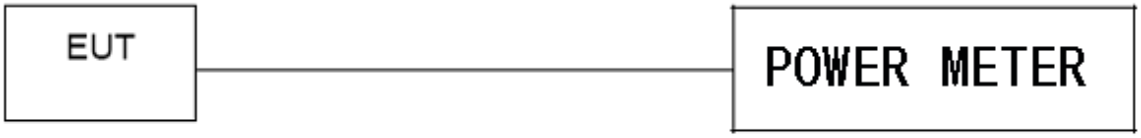



OBW NVNT ac80 5775MHz



# 10. Maximum Conducted Output Power

## 10.1 Block Diagram Of Test Setup




## 10.2 Limit

**According to FCC §15.407**

The maximum conduced output power should not exceed:

| Frequency Band(MHz) | Limit |
|---|---|
| 5150~5250 | 250mW |
| 5725~5850 | 1W |

## 10.3 Test Procedure

Maximum conducted output power may be measured using a spectrum analyzer/EMI receiver or an RF power meter.

1. Device Configuration

If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level (see section II.B.).

a) The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (to no lower than 98 percent) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

b) If continuous transmission (or at least 98 percent duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level with the transmit duration as long as possible and the duty cycle as high as possible.

2. Measurement using a Spectrum Analyzer or EMI Receiver (SA)

Measurement of maximum conducted output power using a spectrum analyzer requires integrating the spectrum across a frequency span that encompasses, at a minimum, either the EBW or the 99-percent occupied bandwidth of the signal.1 However, the EBW must be used to determine bandwidth dependent limits on maximum conducted output power in accordance with § 15.407(a).

a) The test method shall be selected as follows: (i) Method SA-1 or SA-1 Alternative (averaging with the EUT transmitting at full power throughout each sweep) shall be applied if either of the following conditions can be satisfied:

• The EUT transmits continuously (or with a duty cycle ≥ 98 percent).

• Sweep triggering or gating can be implemented in a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the analyzer configured as in Method SA-1, below) is equal to or shorter than the duration T of each transmission from the EUT and if those transmissions exhibit full power throughout their durations.

(ii) Method SA-2 or SA-2 Alternative (averaging across on and off times of the EUT transmissions, followed by duty cycle correction) shall be applied if the conditions of (i) cannot be achieved and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than ± 2 percent.

(iii) Method SA-3 (RMS detection with max hold) or SA-3 Alternative (reduced VBW with max hold) shall be applied if the conditions of (i) and (ii) cannot be achieved.

b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep): (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”.

(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum

## 10.4 EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

## 10.5 Test Result

| | | | |
|---|---|---|---|
| Temperature： | 26 ℃ | Relative Humidity： | 54% |
| Pressure： | 101kPa | Test Voltage ： | DC 5V |
| Test Mode ： | TX (5.1G) Mode Frequency U-NII-1 (5180-5240MHz) | | |

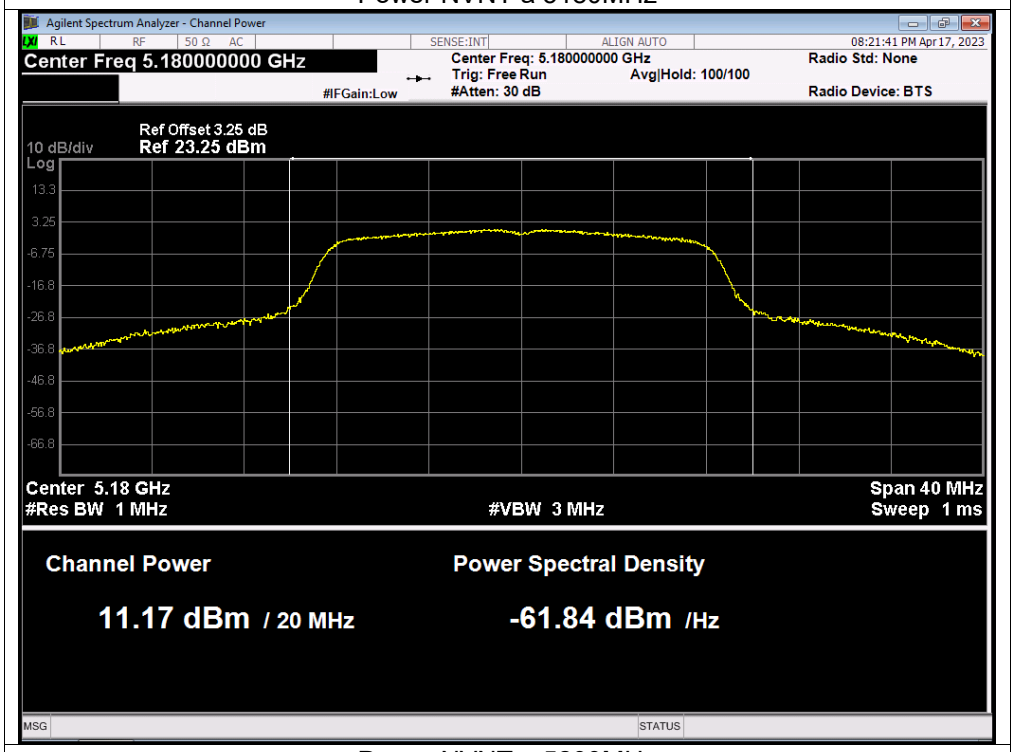
| Condition | Mode | Frequency (MHz) | Conducted Power (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|
| NVNT | a | 5180 | 11.17 | 24 | Pass |
| NVNT | a | 5200 | 11.61 | 24 | Pass |
| NVNT | a | 5240 | 12.64 | 24 | Pass |
| NVNT | n20 | 5180 | 9.91 | 24 | Pass |
| NVNT | n20 | 5200 | 10.22 | 24 | Pass |
| NVNT | n20 | 5240 | 11.65 | 24 | Pass |
| NVNT | n40 | 5190 | 9.52 | 24 | Pass |
| NVNT | n40 | 5230 | 10.8 | 24 | Pass |
| NVNT | ac20 | 5180 | 9.8 | 24 | Pass |
| NVNT | ac20 | 5200 | 10.12 | 24 | Pass |
| NVNT | ac20 | 5240 | 11.53 | 24 | Pass |
| NVNT | ac40 | 5190 | 9.28 | 24 | Pass |
| NVNT | ac40 | 5230 | 10.76 | 24 | Pass |
| NVNT | ac80 | 5210 | 10.37 | 24 | Pass |

| | | | |
|---|---|---|---|
| Temperature： | 26 ℃ | Relative Humidity： | 54% |
| Pressure： | 101kPa | Test Voltage ： | DC 5V |
| Test Mode ： | TX (5.8G) Mode Frequency U-NII-3 (5745-5825MHz) | | |

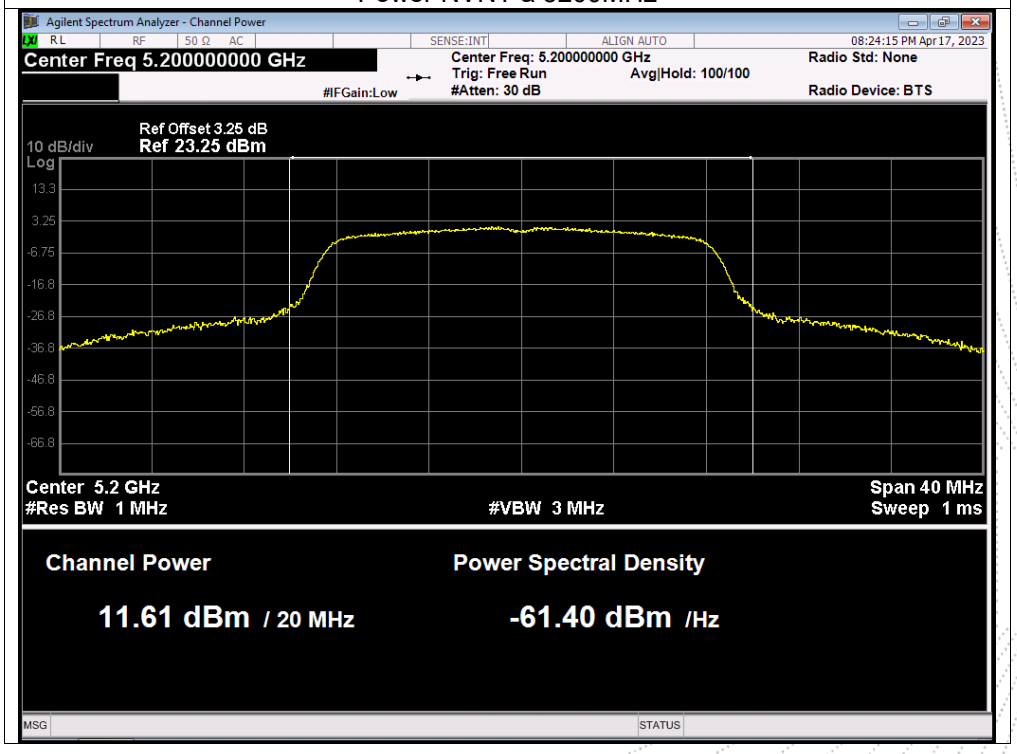
| Condition | Mode | Frequency (MHz) | Conducted Power (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|
| NVNT | a | 5745 | 12.33 | 30 | Pass |
| NVNT | a | 5785 | 11.97 | 30 | Pass |
| NVNT | a | 5825 | 11.42 | 30 | Pass |
| NVNT | n20 | 5745 | 11.15 | 30 | Pass |
| NVNT | n20 | 5785 | 10.76 | 30 | Pass |
| NVNT | n20 | 5825 | 10.31 | 30 | Pass |
| NVNT | n40 | 5755 | 10.24 | 30 | Pass |
| NVNT | n40 | 5795 | 9.81 | 30 | Pass |
| NVNT | ac20 | 5745 | 11.4 | 30 | Pass |
| NVNT | ac20 | 5785 | 10.84 | 30 | Pass |
| NVNT | ac20 | 5825 | 10.28 | 30 | Pass |
| NVNT | ac40 | 5755 | 10.34 | 30 | Pass |
| NVNT | ac40 | 5795 | 9.73 | 30 | Pass |
| NVNT | ac80 | 5775 | 9.09 | 30 | Pass |

Test Graphs

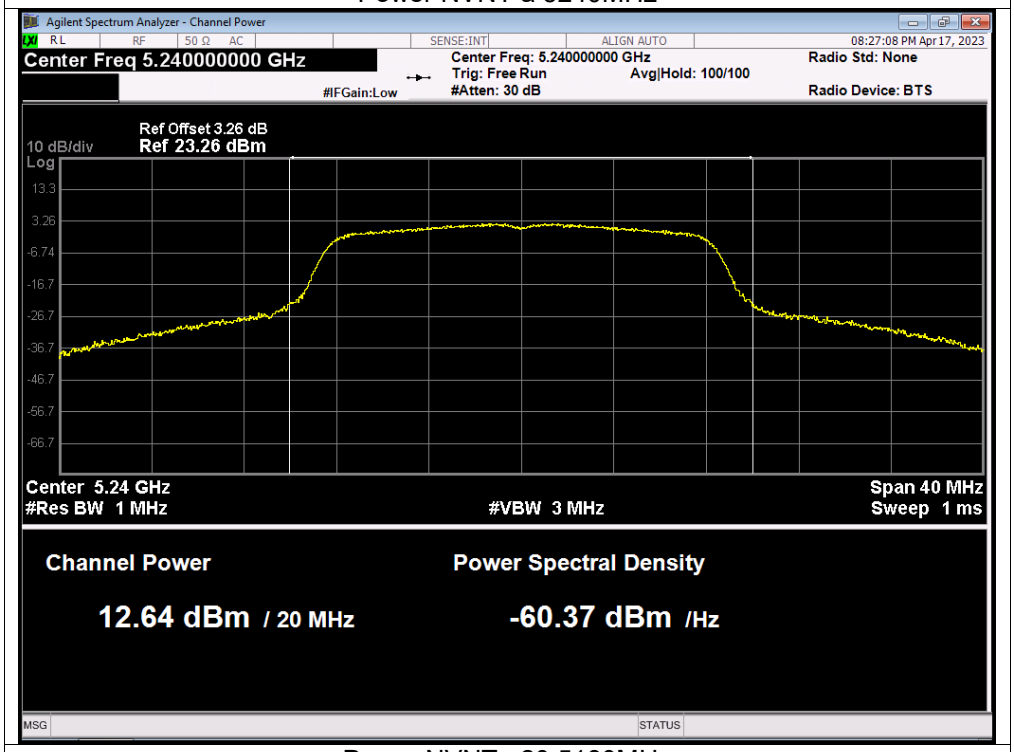
Power NVNT a 5180MHz



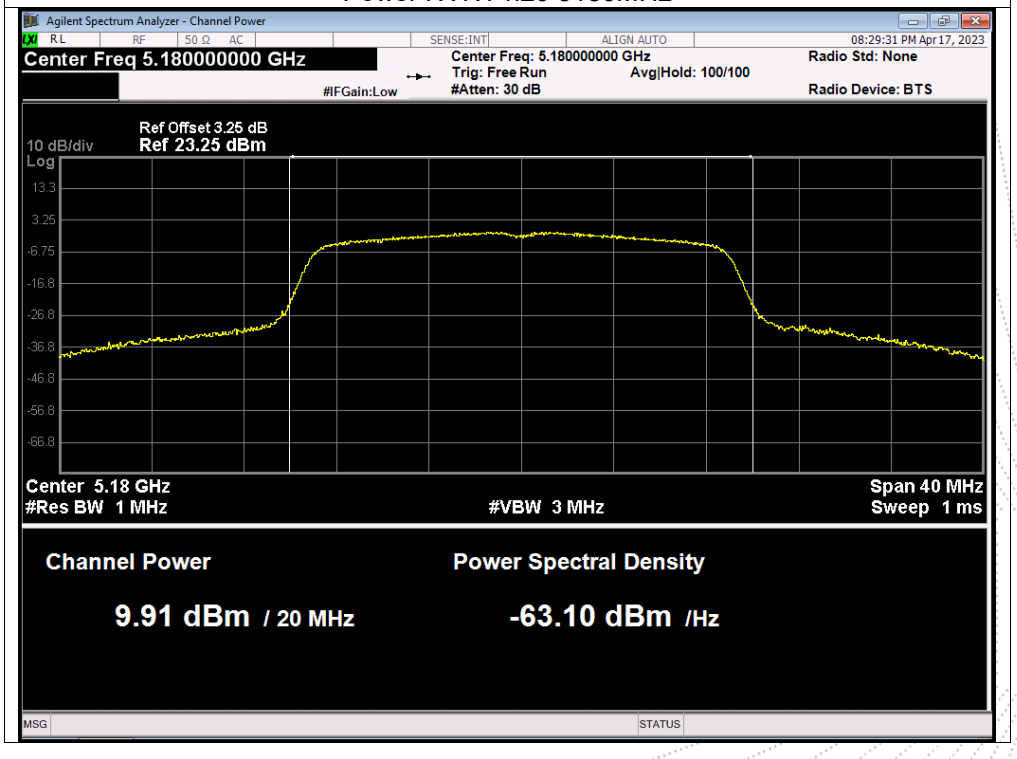

Power NVNT a 5200MHz



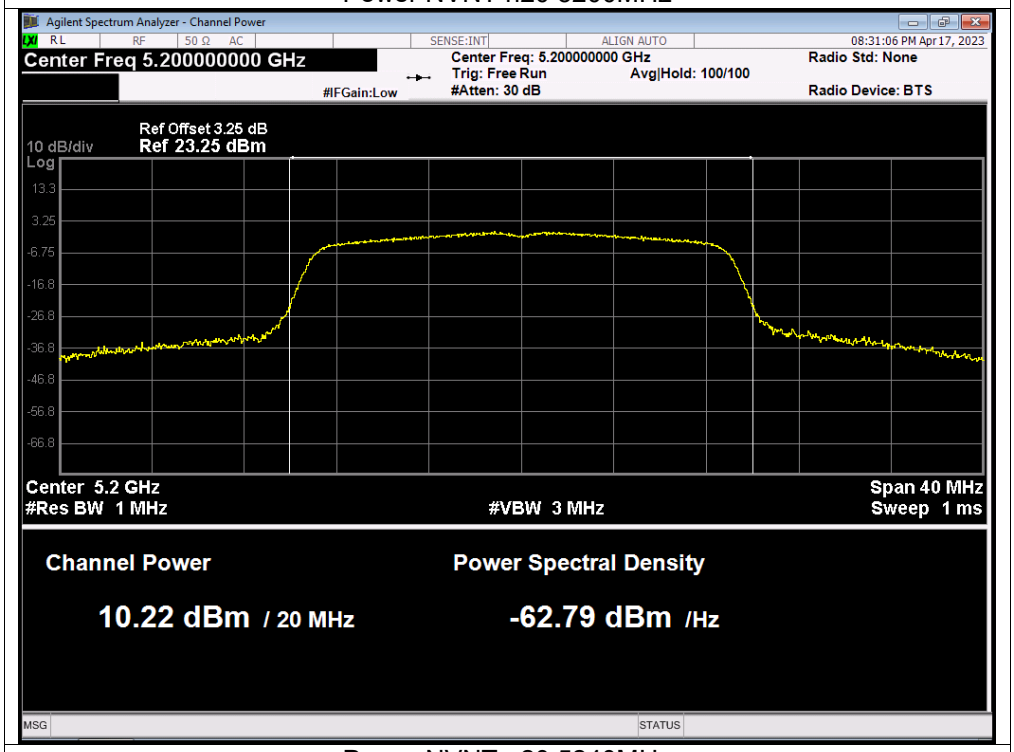
Power NVNT a 5240MHz



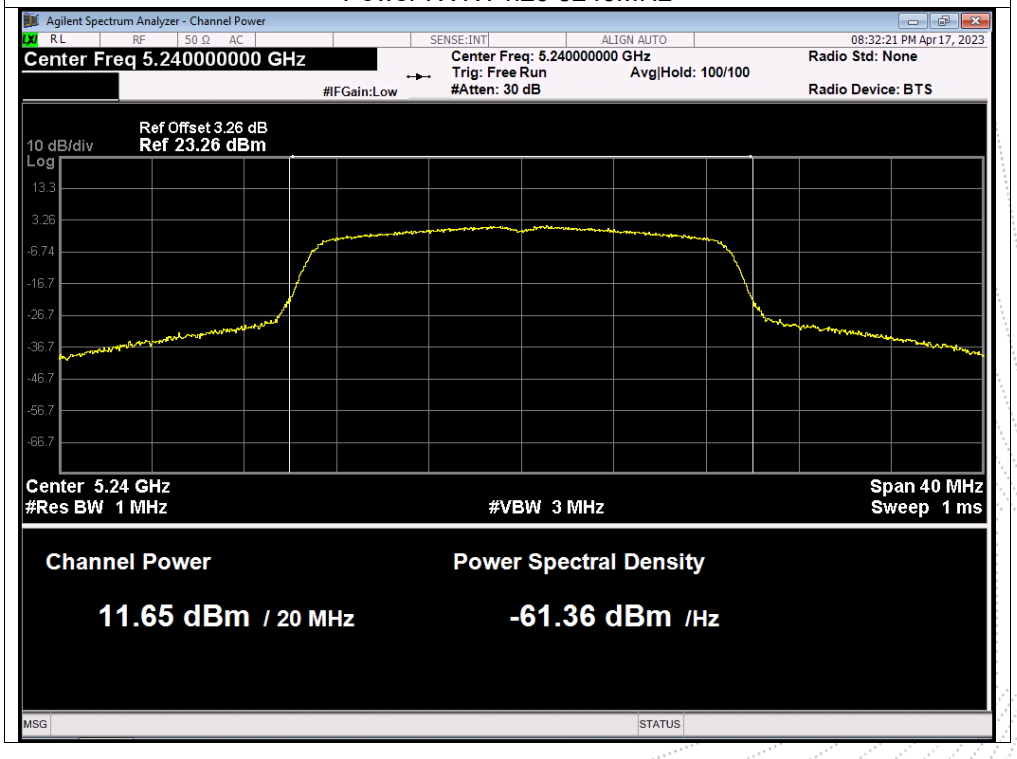

Power NVNT n20 5180MHz



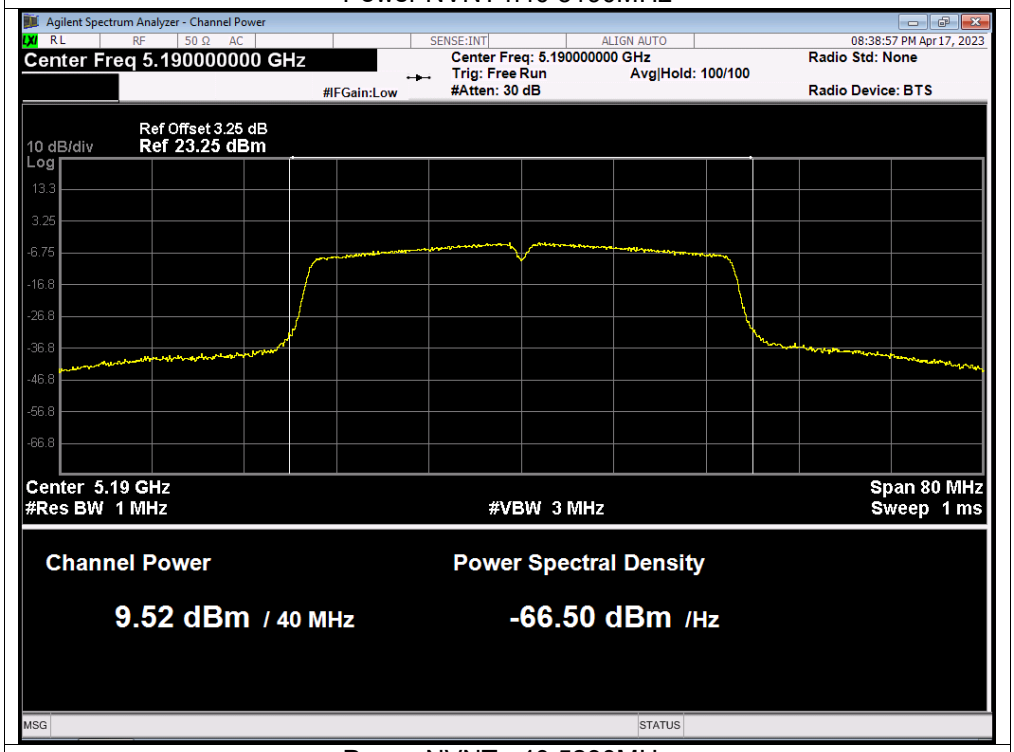
Power NVNT n20 5200MHz



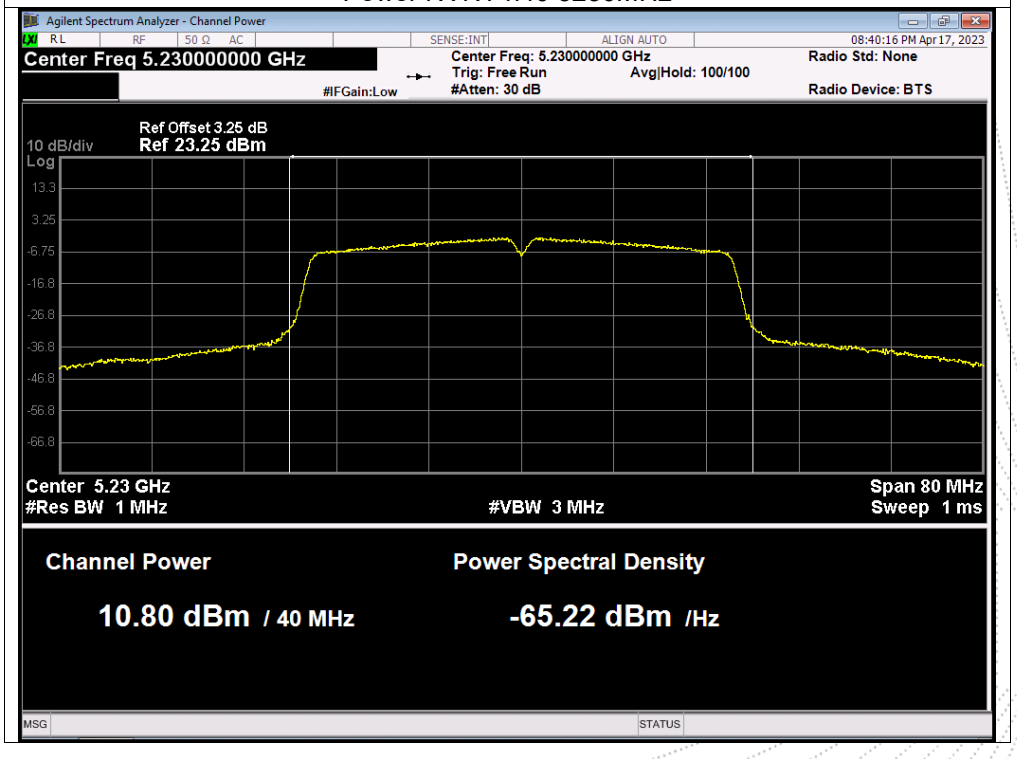

Power NVNT n20 5240MHz



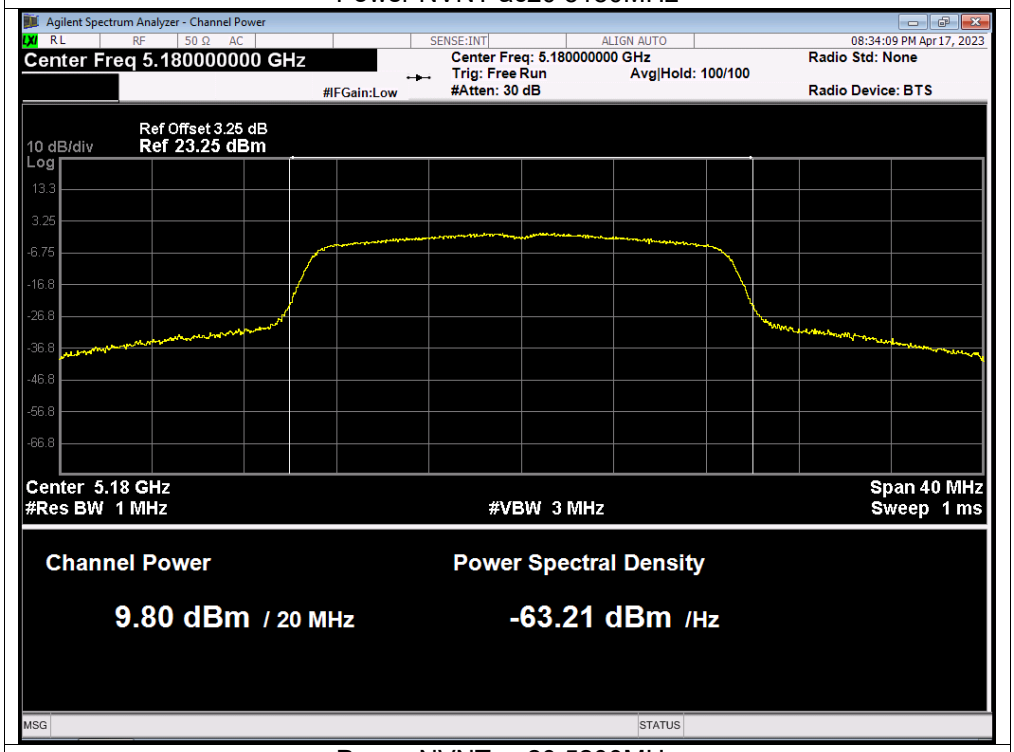
Power NVNT n40 5190MHz



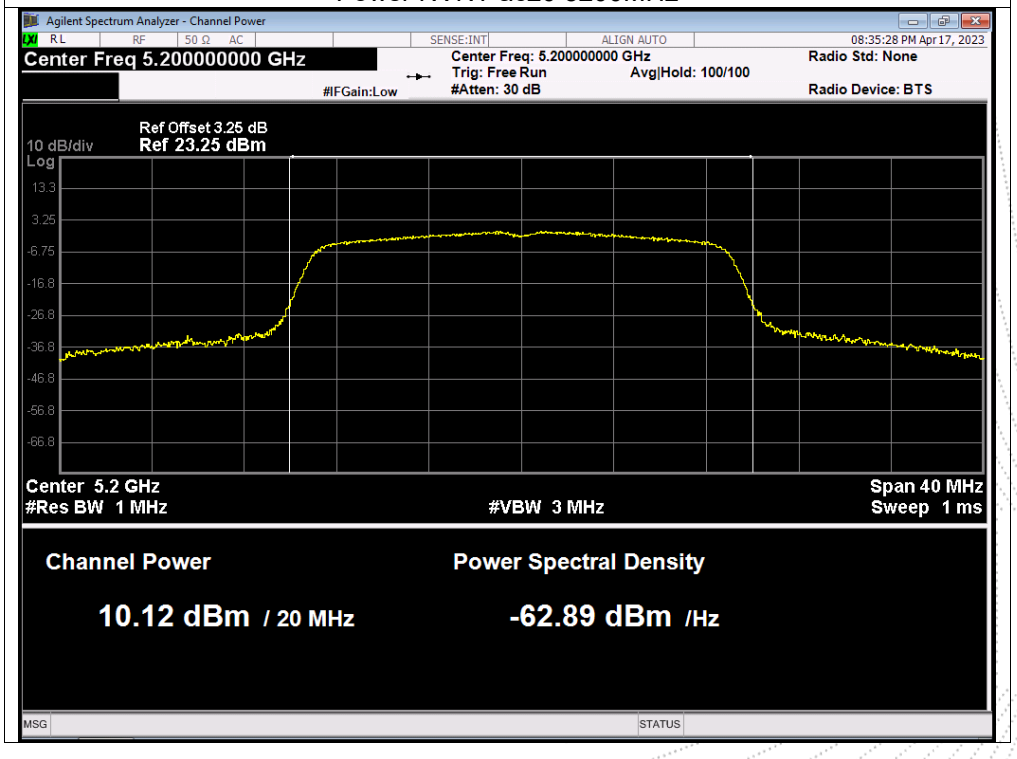

Power NVNT n40 5230MHz



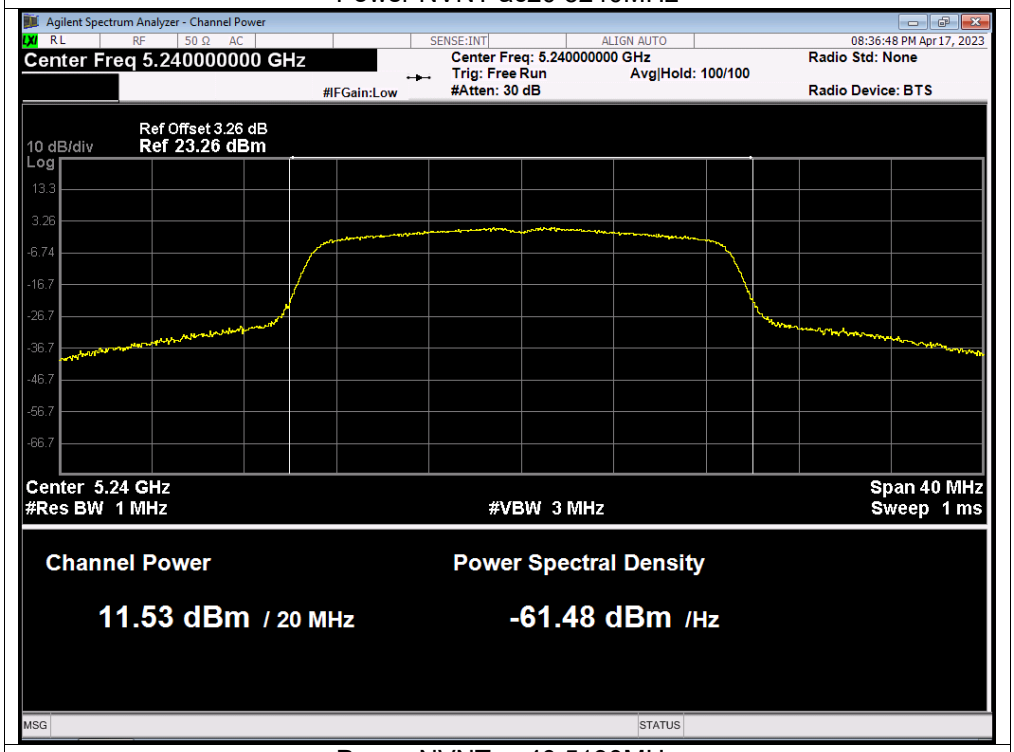
Power NVNT ac20 5180MHz



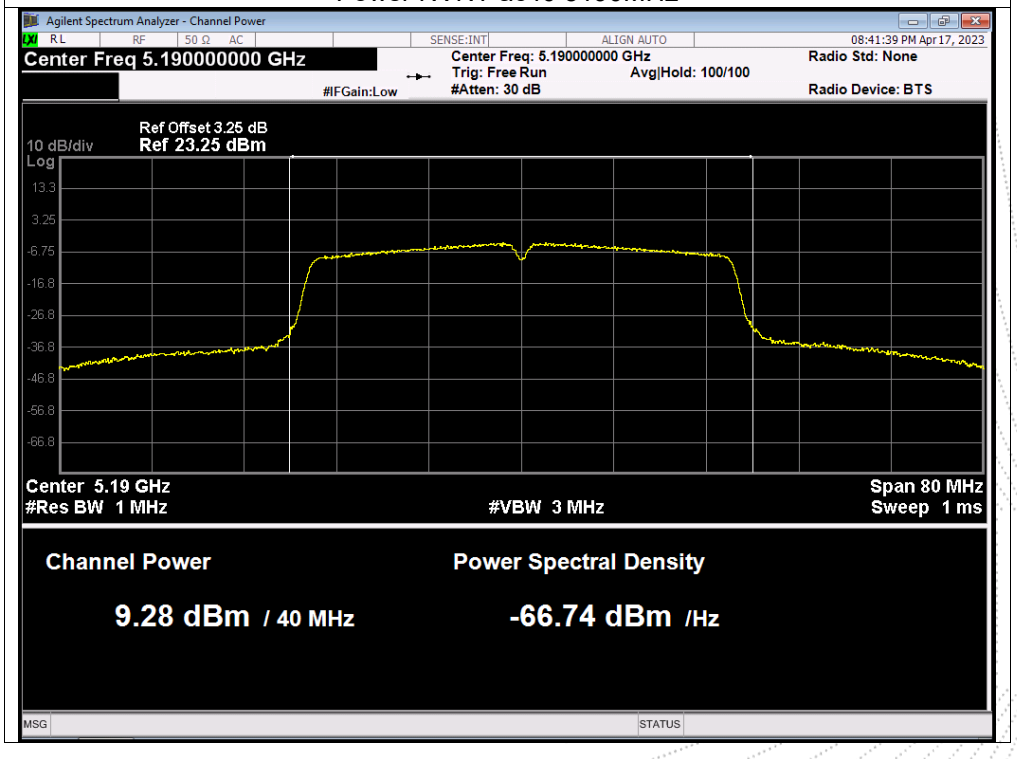

Power NVNT ac20 5200MHz



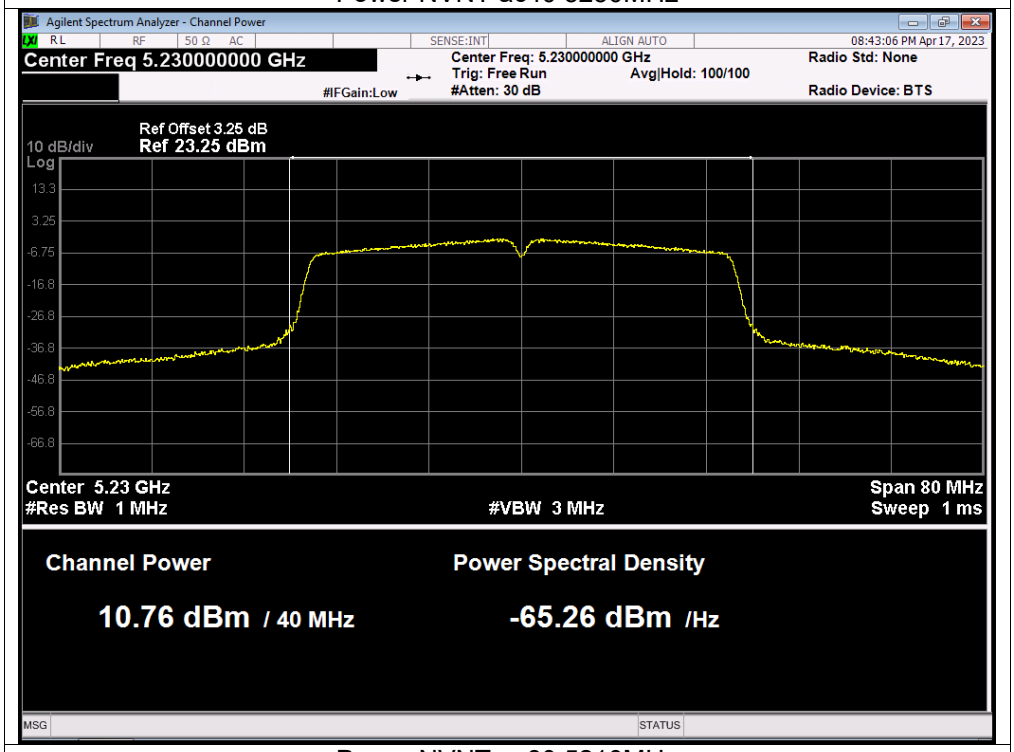
Power NVNT ac20 5240MHz



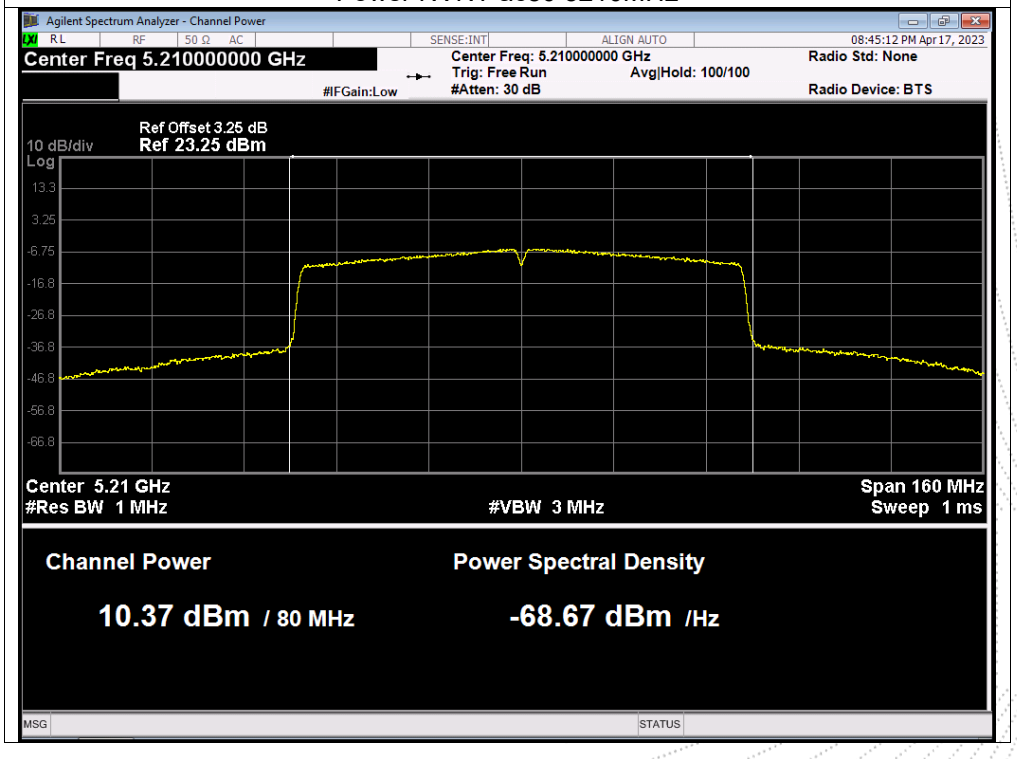

Power NVNT ac40 5190MHz



Power NVNT ac40 5230MHz

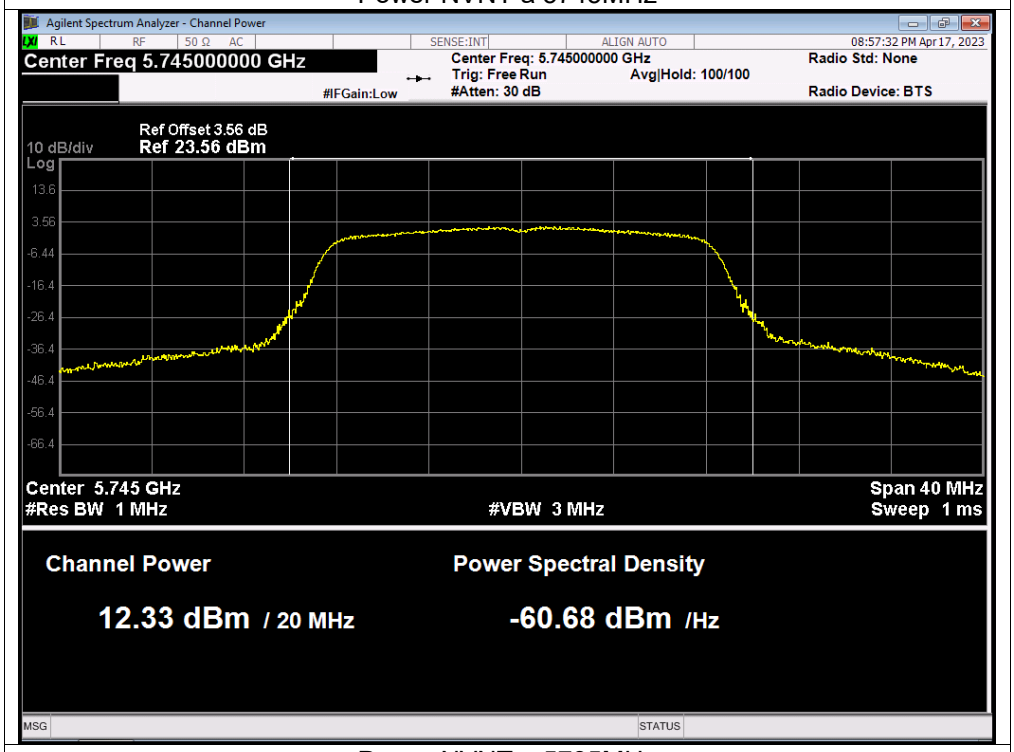



Power NVNT ac80 5210MHz

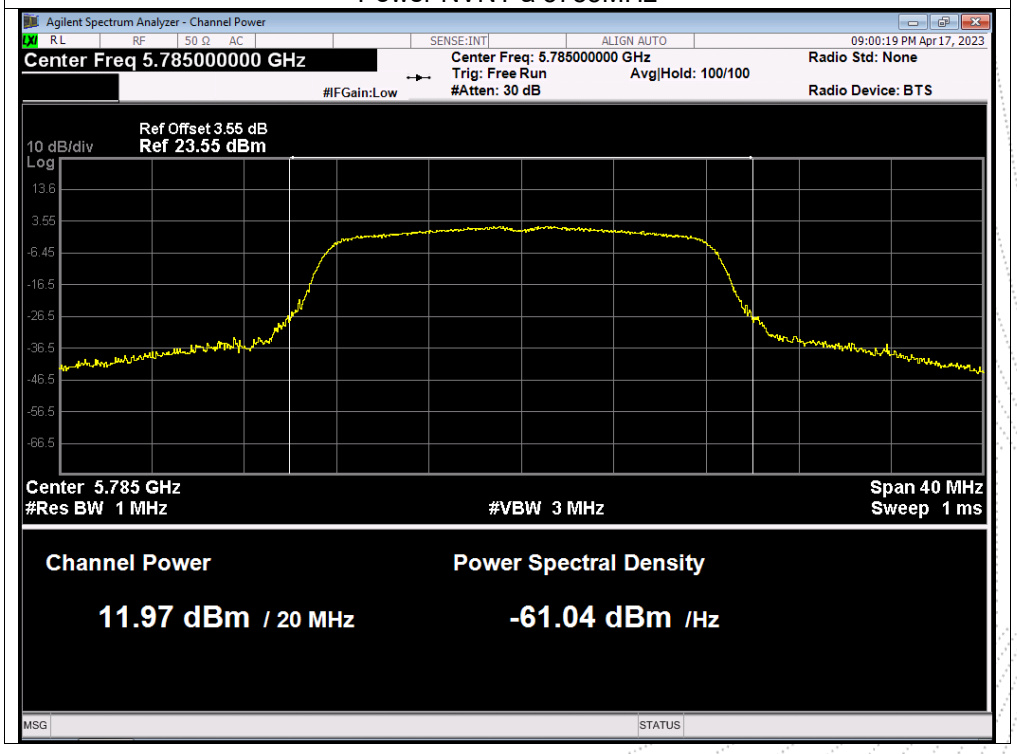


Test Graphs

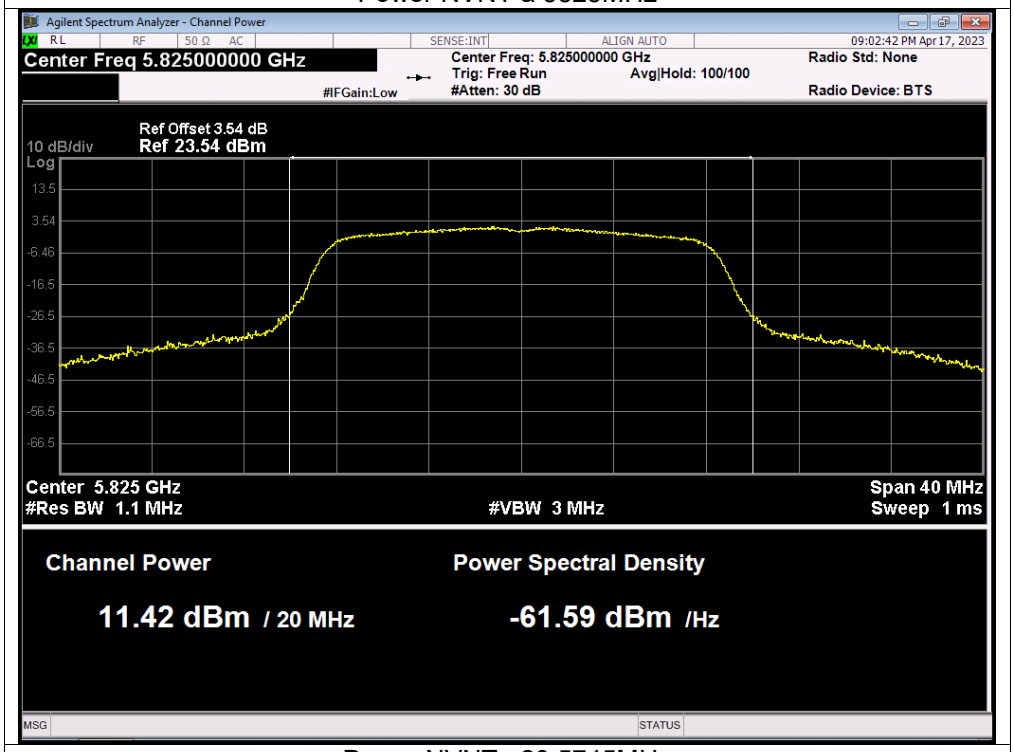
Power NVNT a 5745MHz



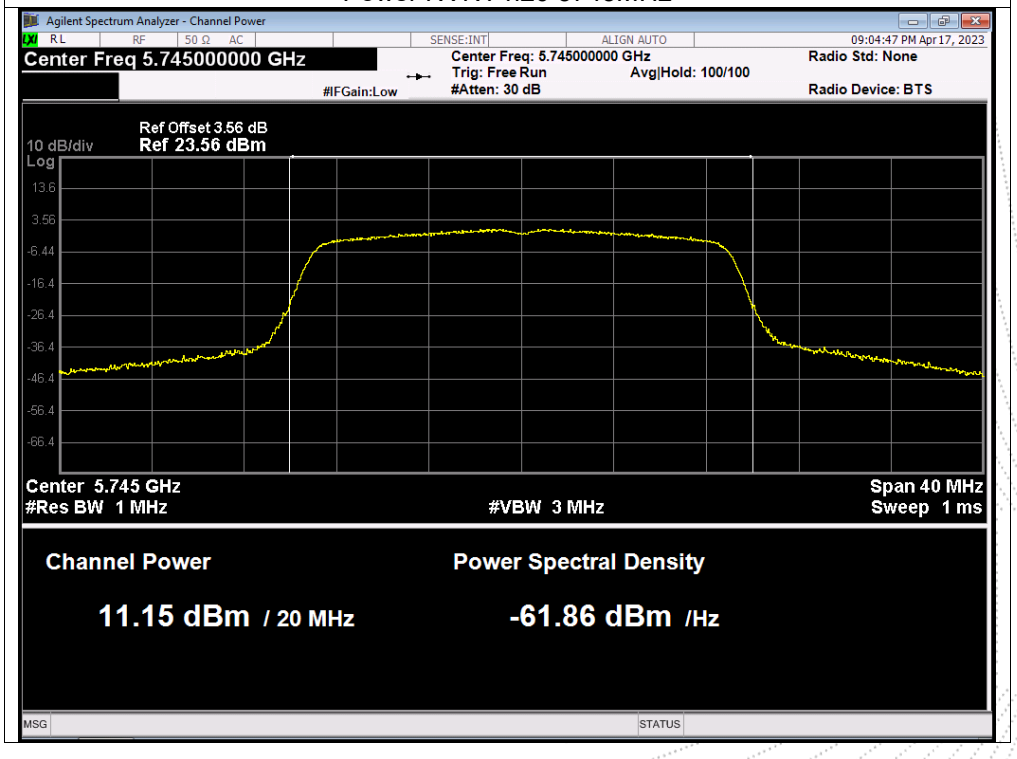

Power NVNT a 5785MHz



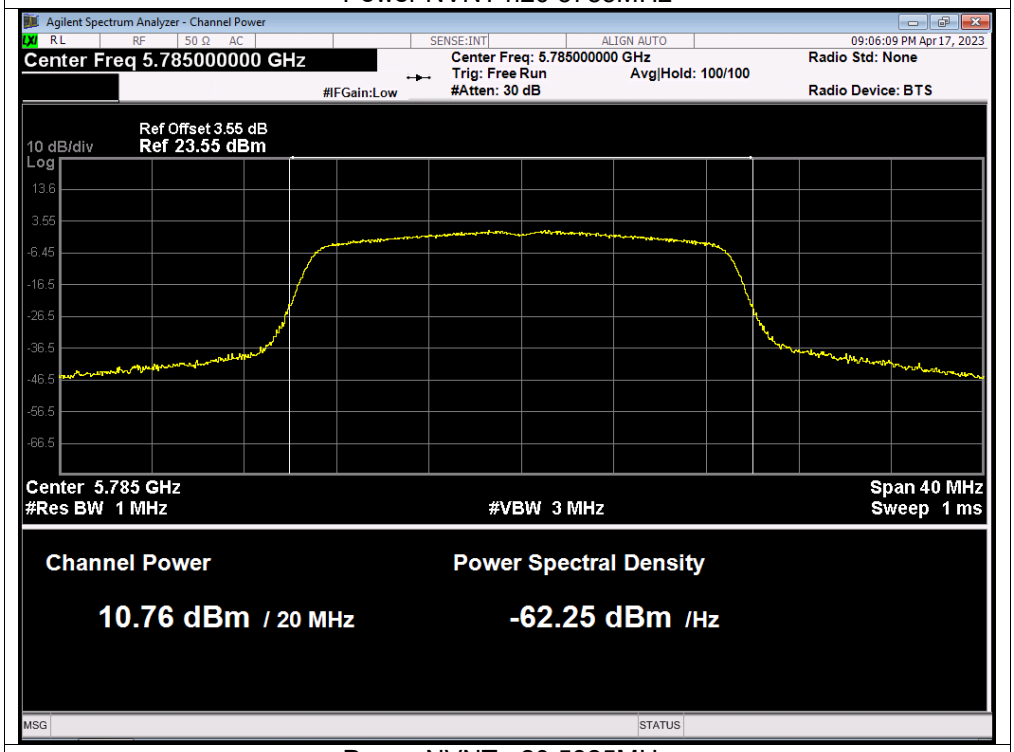
Power NVNT a 5825MHz



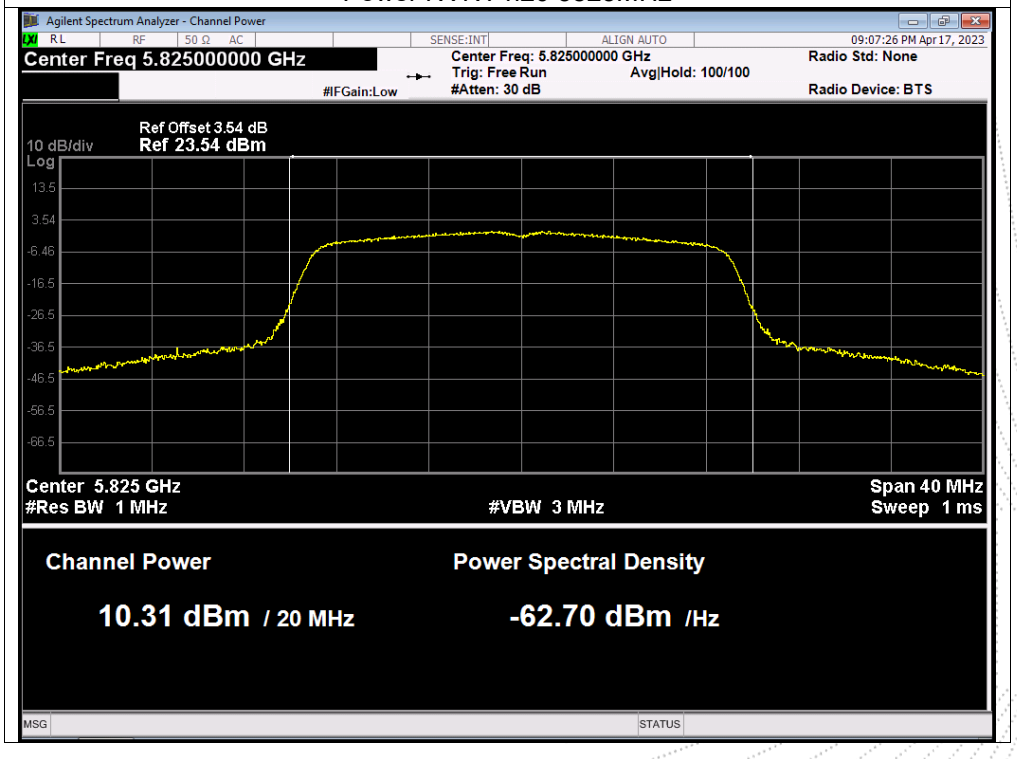

Power NVNT n20 5745MHz



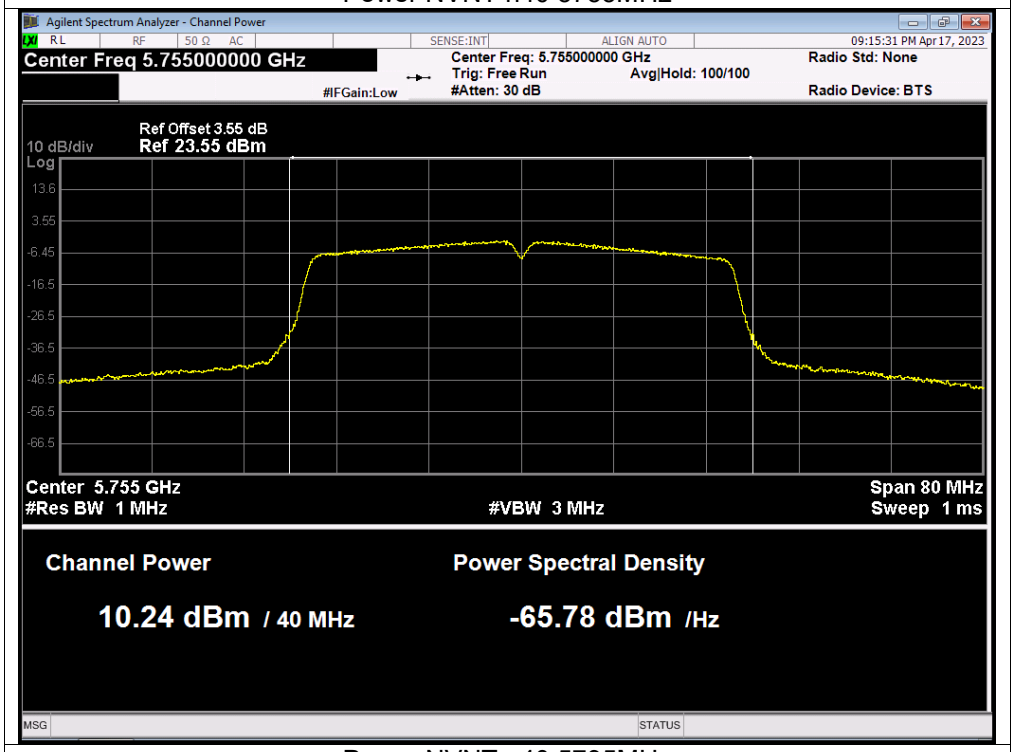
Power NVNT n20 5785MHz



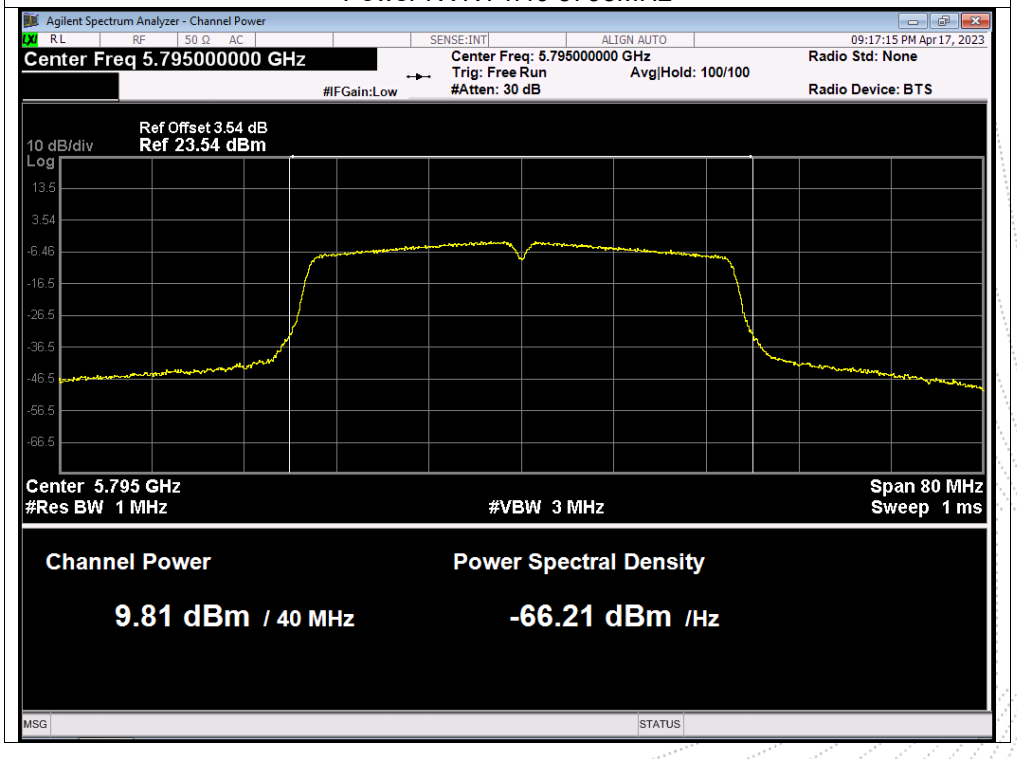

Power NVNT n20 5825MHz



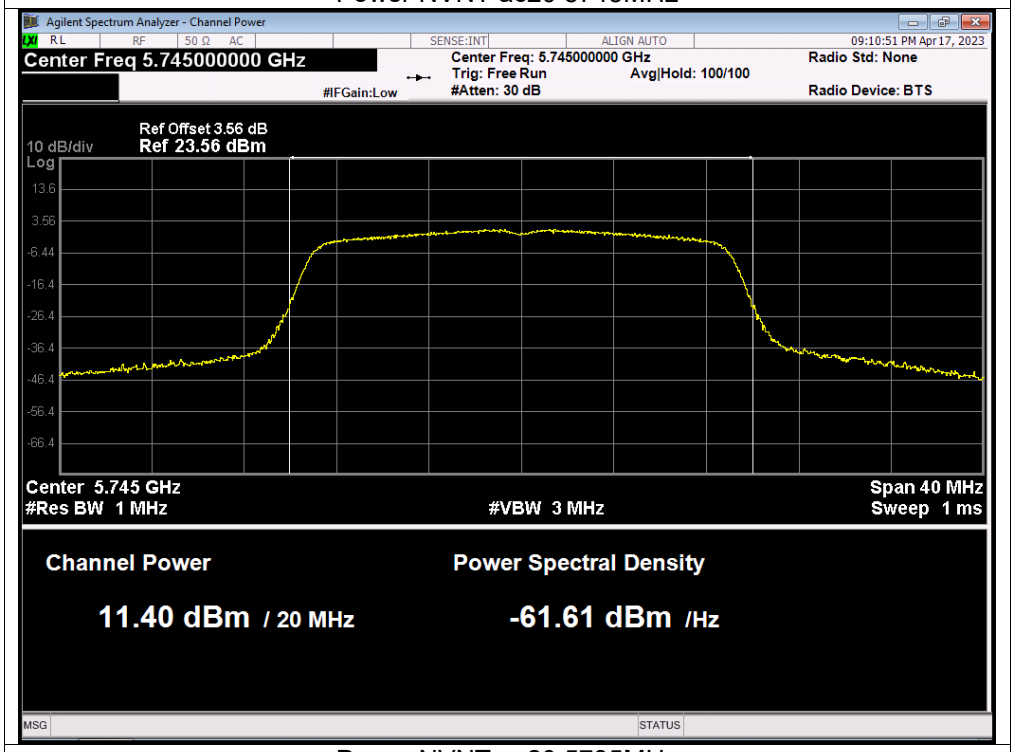
Power NVNT n40 5755MHz



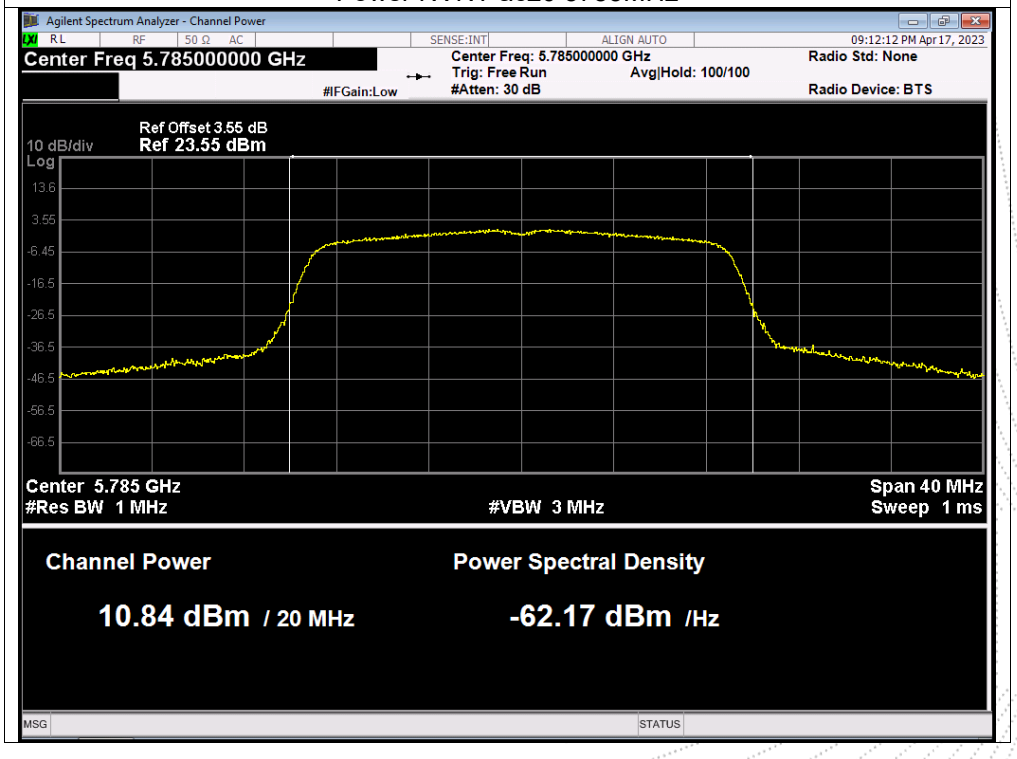

Power NVNT n40 5795MHz



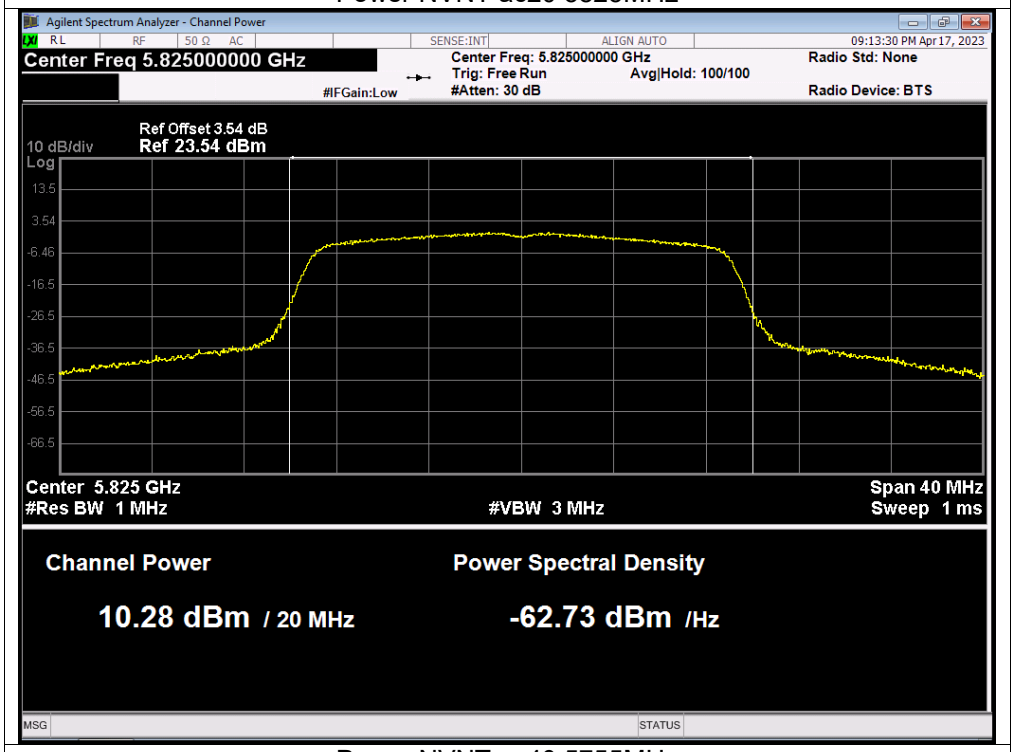
Power NVNT ac20 5745MHz



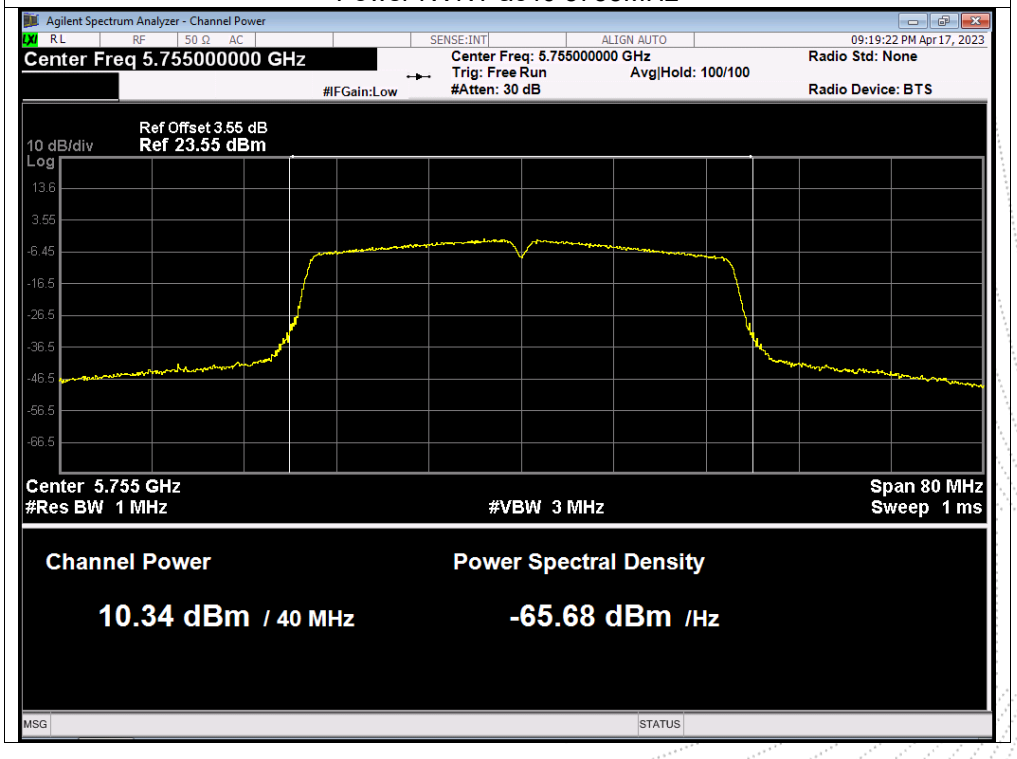

Power NVNT ac20 5785MHz



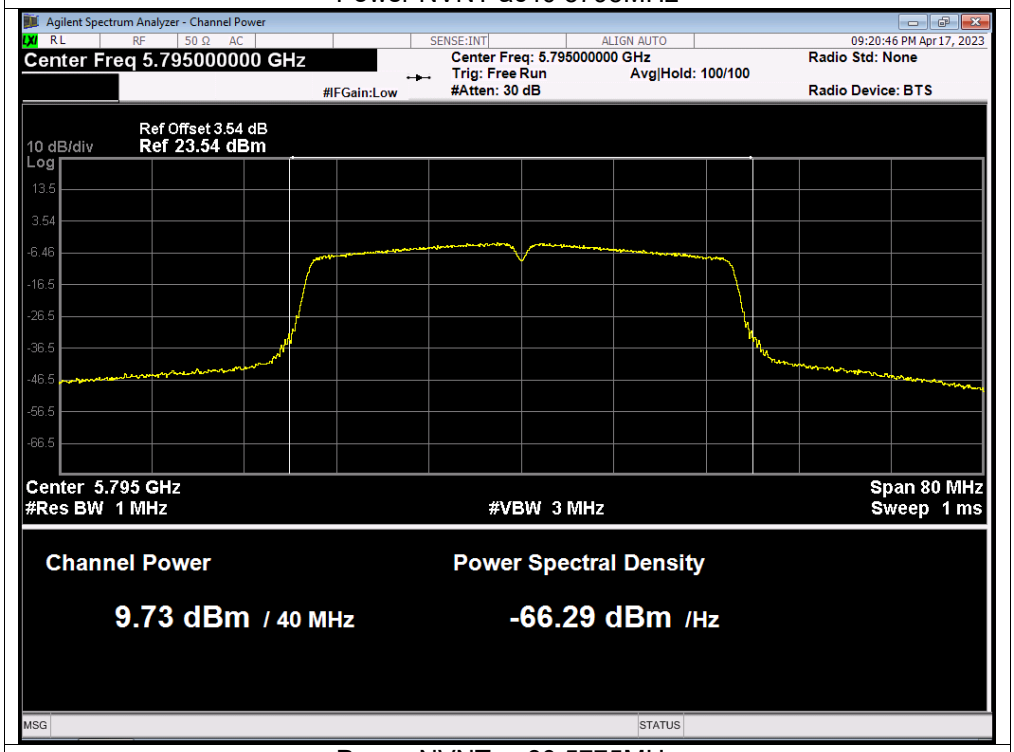
Power NVNT ac20 5825MHz



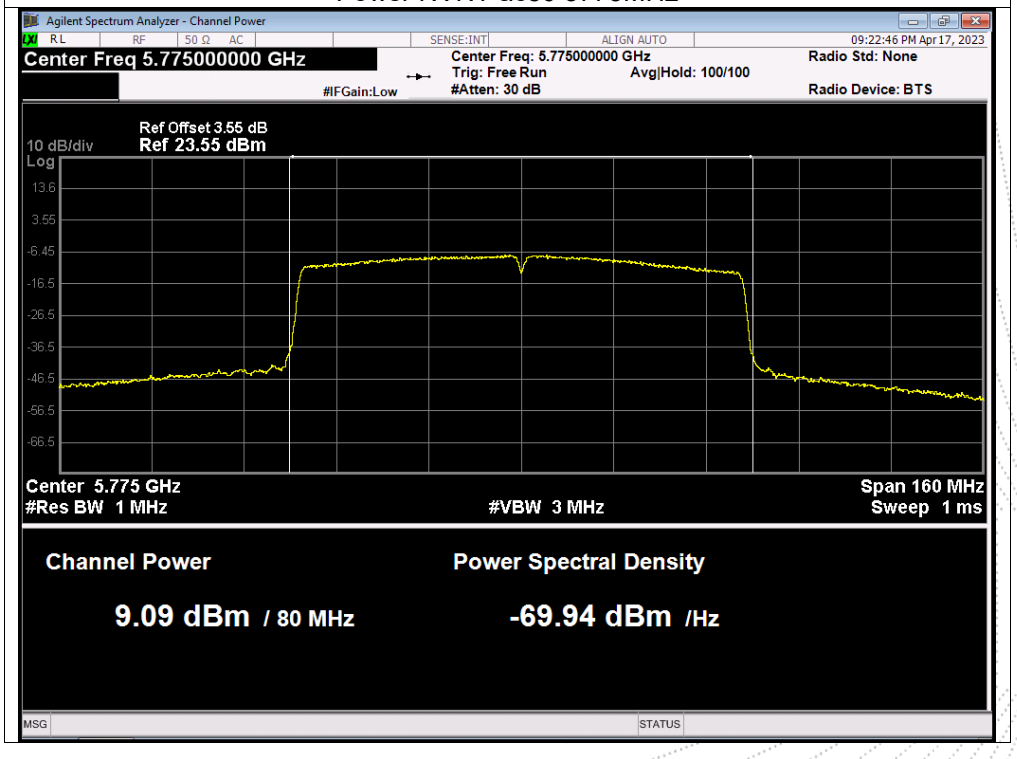

Power NVNT ac40 5755MHz



Power NVNT ac40 5795MHz

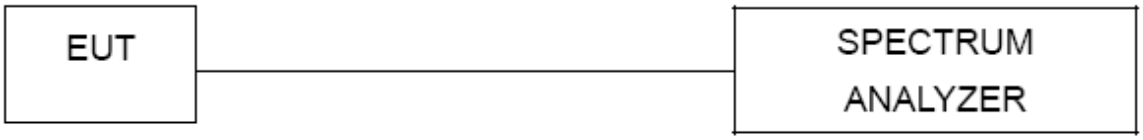



Power NVNT ac80 5775MHz



# 11. Out Of Band Emissions

## 11.1 Block Diagram Of Test Setup




## 11.2 Limit

According to FCC §15.407(b)
Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

## 11.3 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

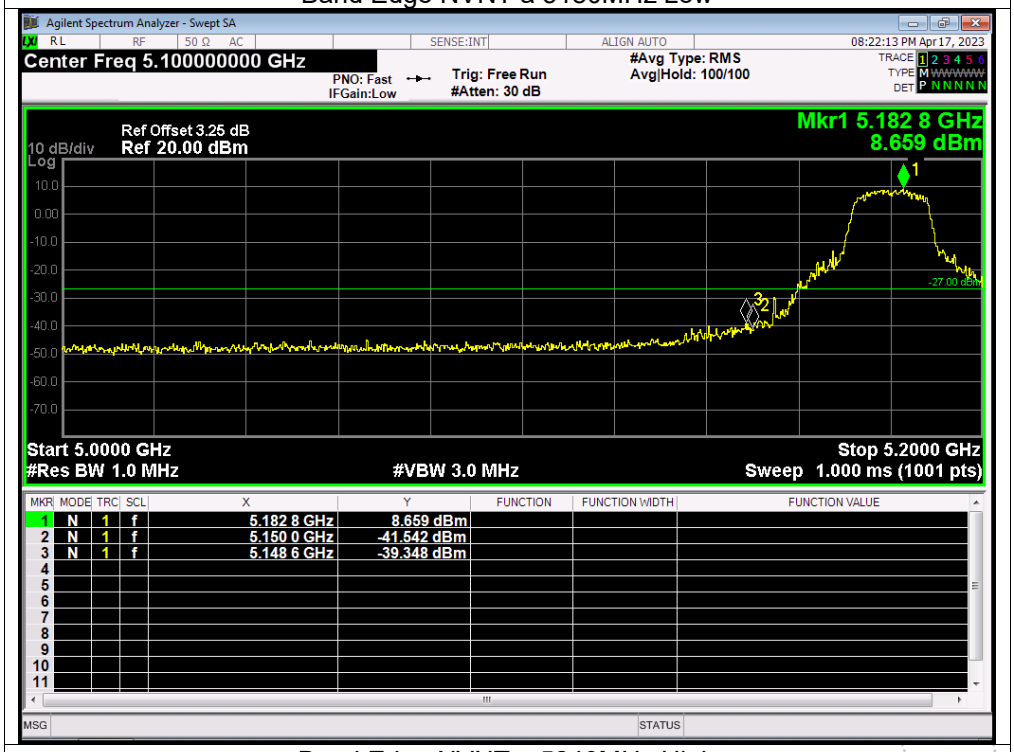
## 11.4 EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data

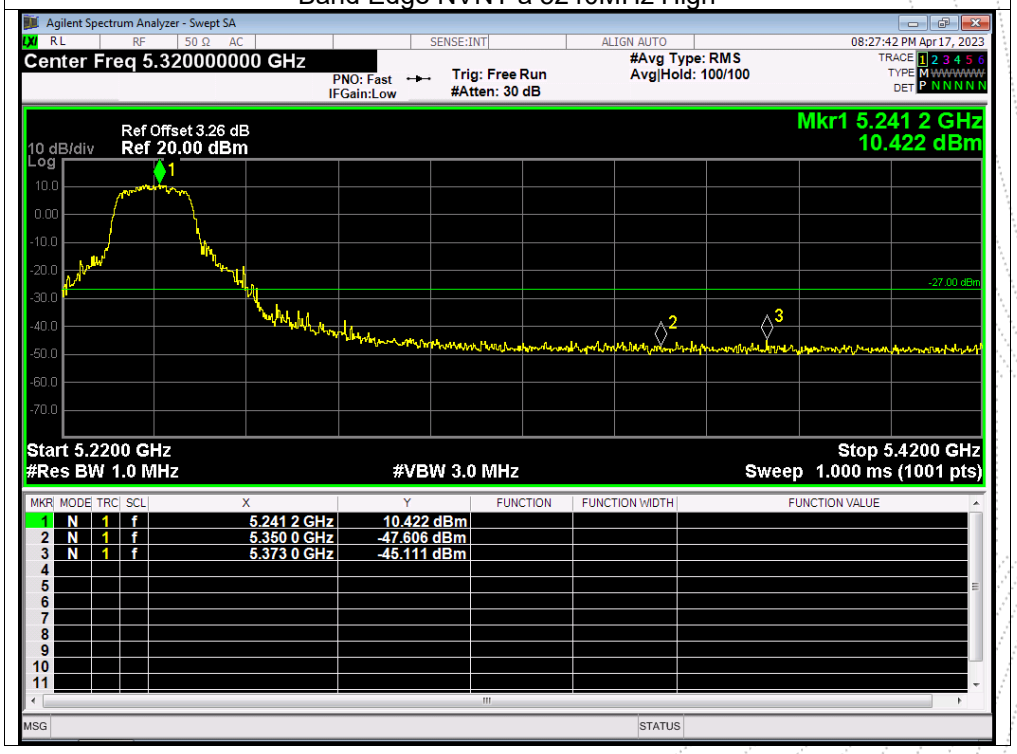
## 11.5 Test Result

Test Graphs

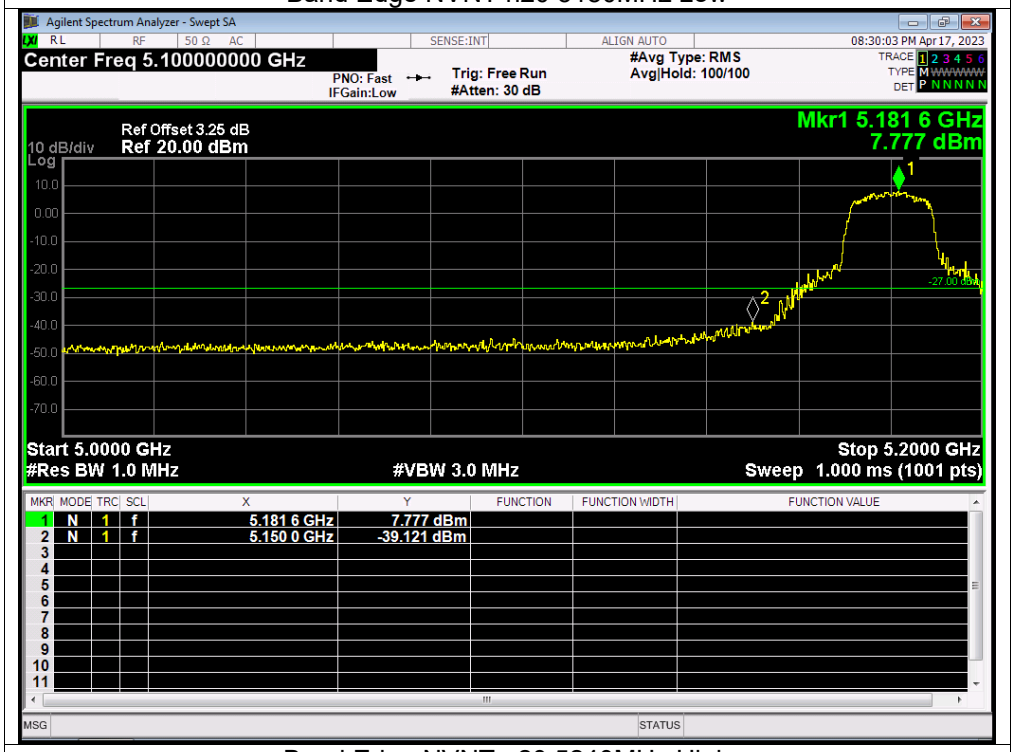
Band Edge NVNT a 5180MHz Low



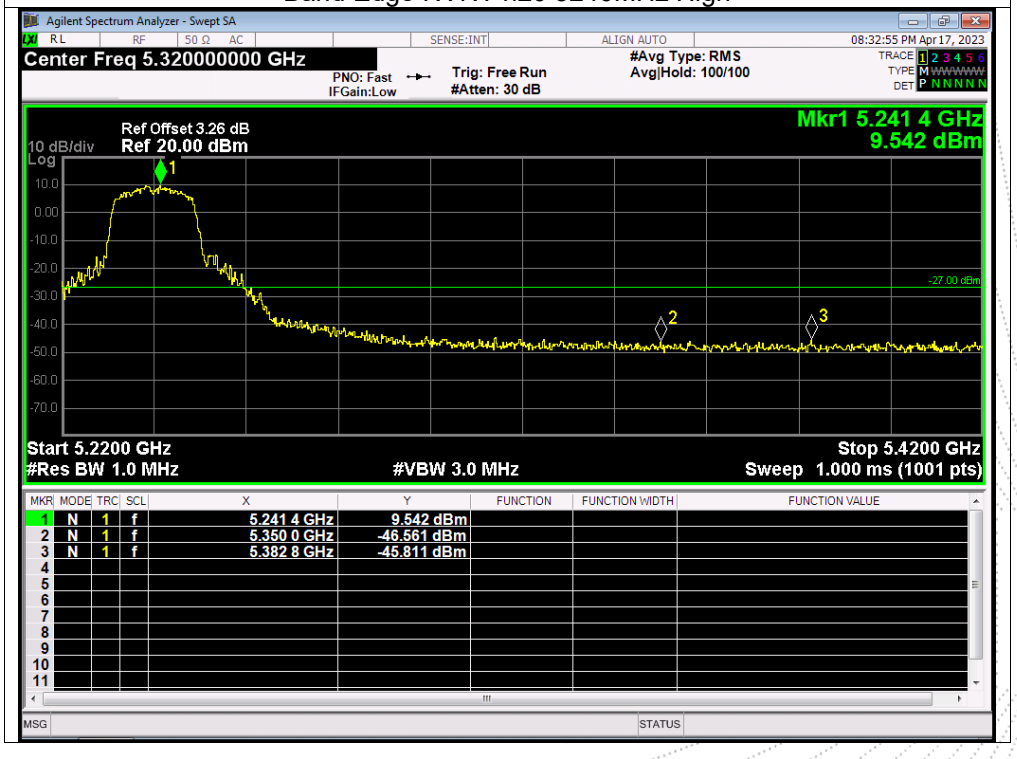

Band Edge NVNT a 5240MHz High



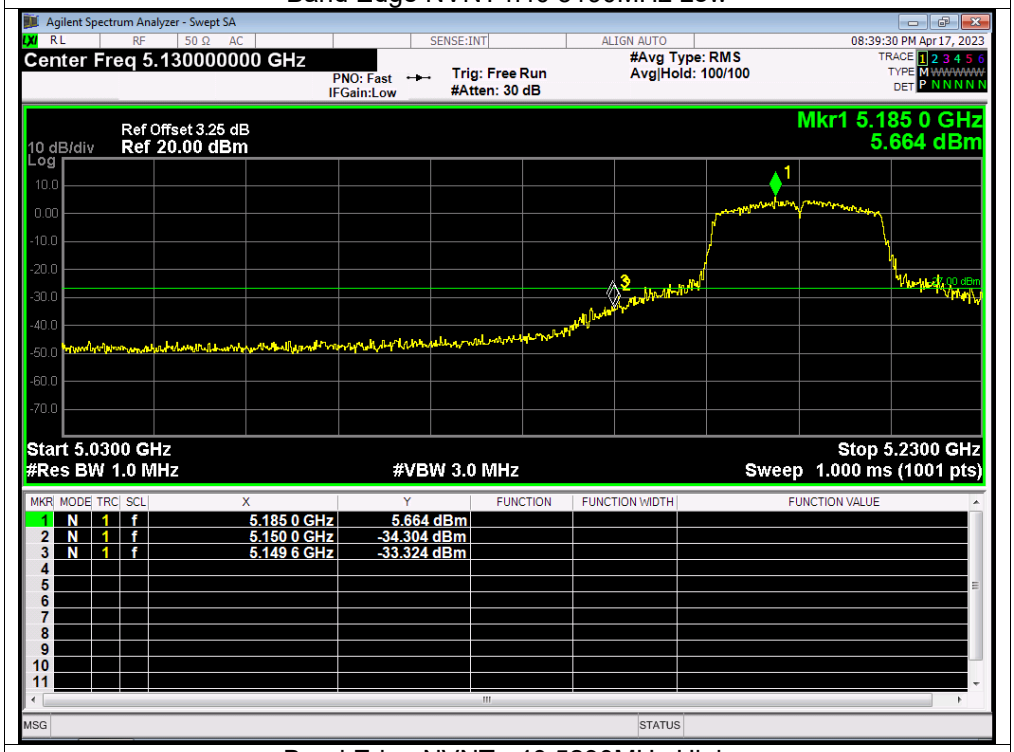
Band Edge NVNT n20 5180MHz Low




Band Edge NVNT n20 5240MHz High

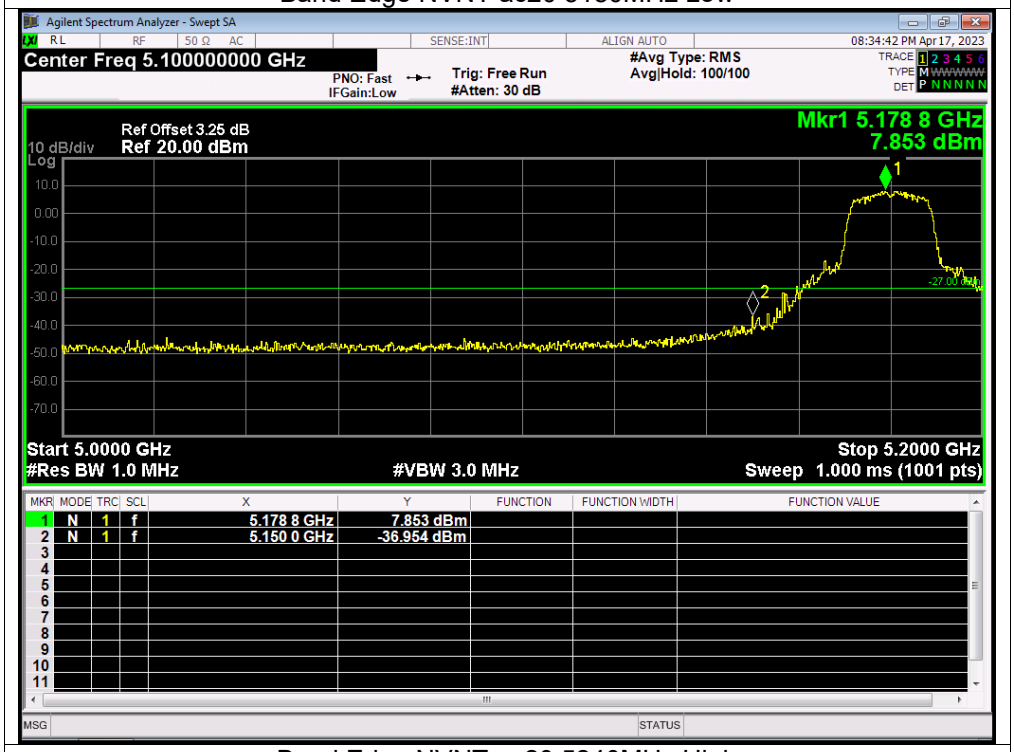


Band Edge NVNT n40 5190MHz Low

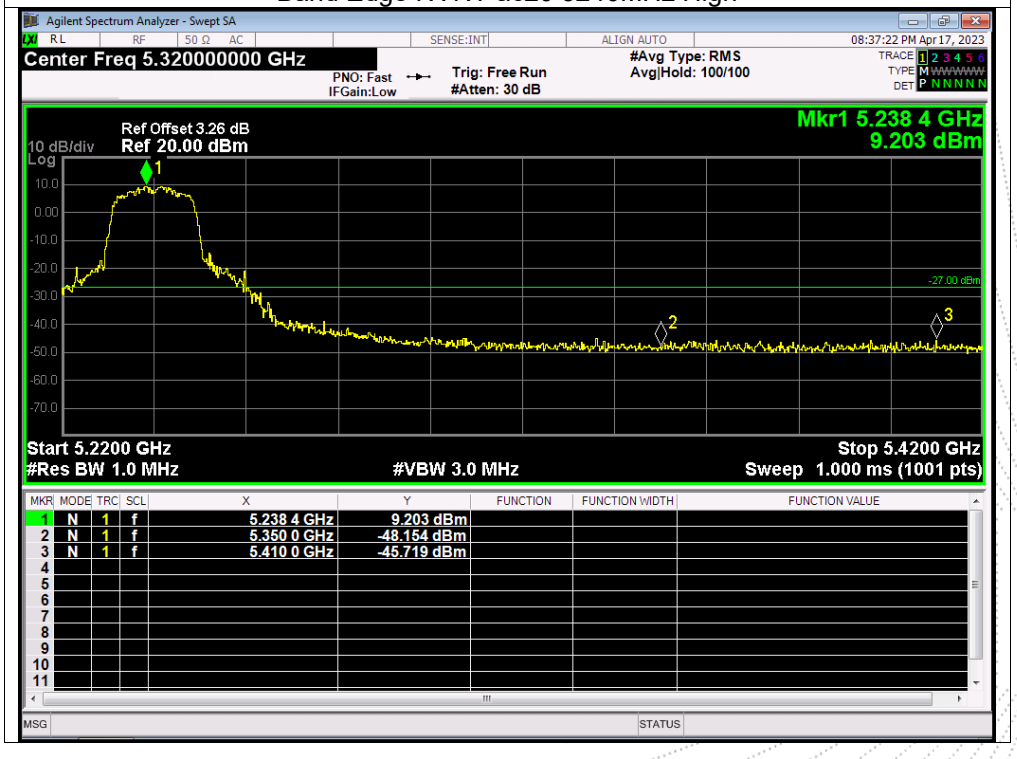



Band Edge NVNT n40 5230MHz High

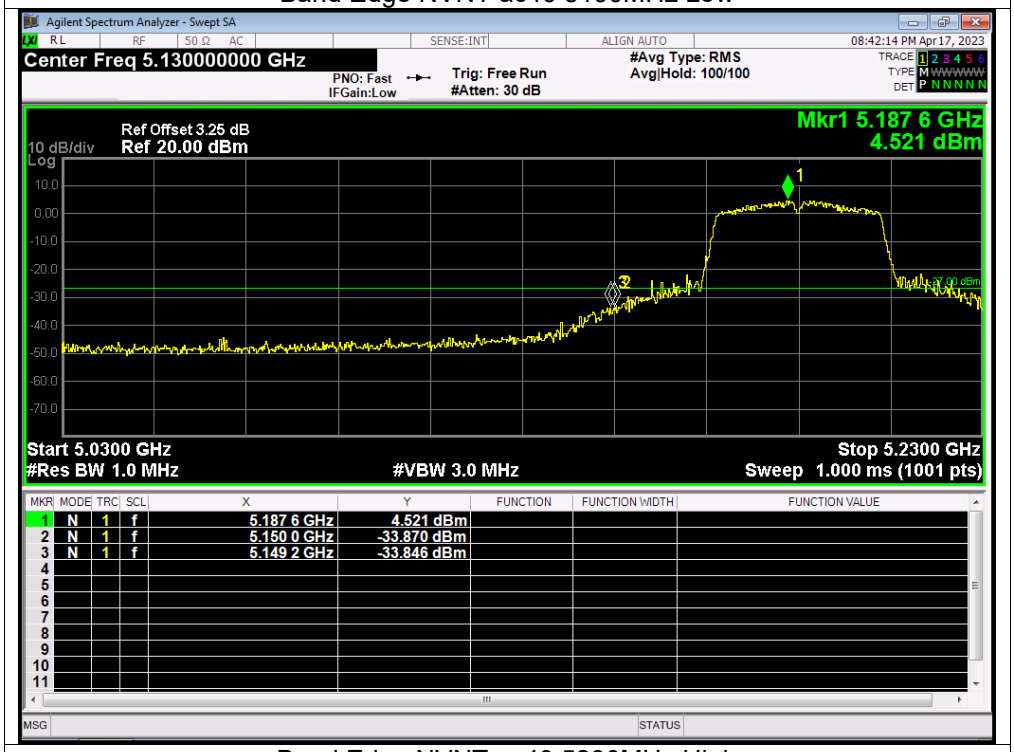
Band Edge NVNT ac20 5180MHz Low



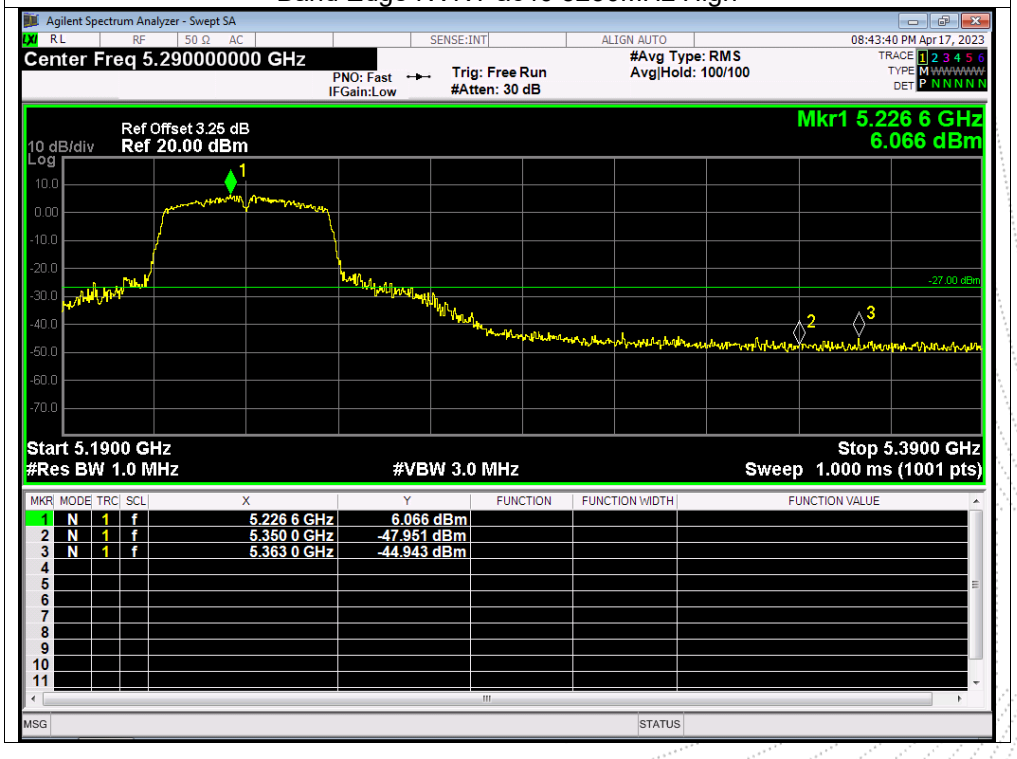

Band Edge NVNT ac20 5240MHz High



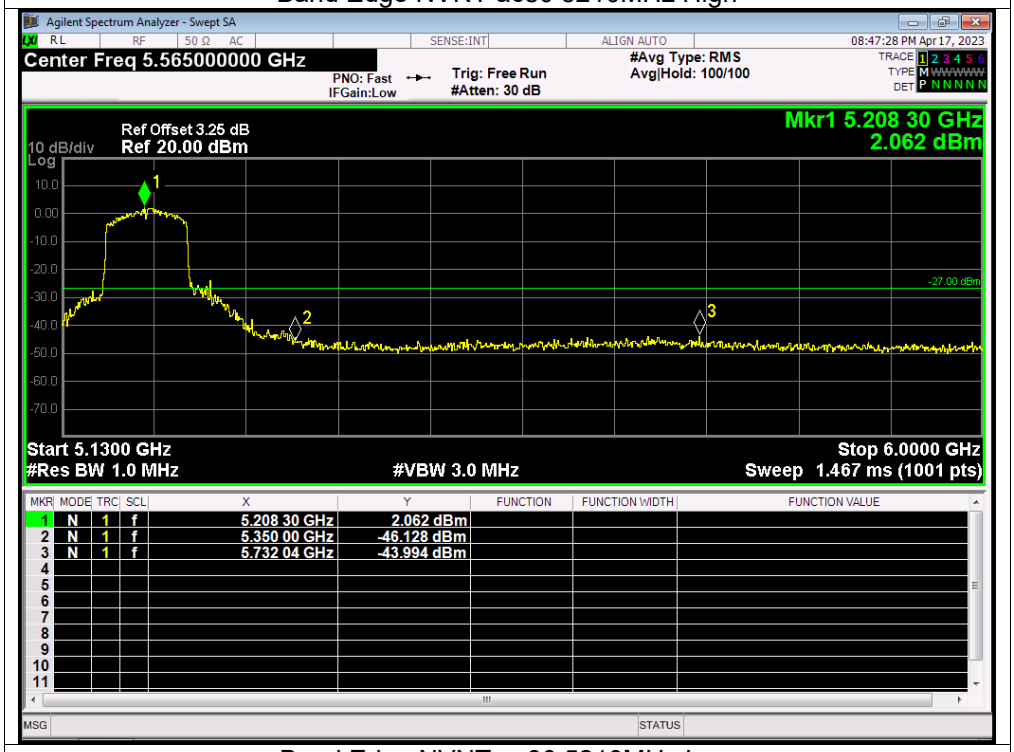
Band Edge NVNT ac40 5190MHz Low



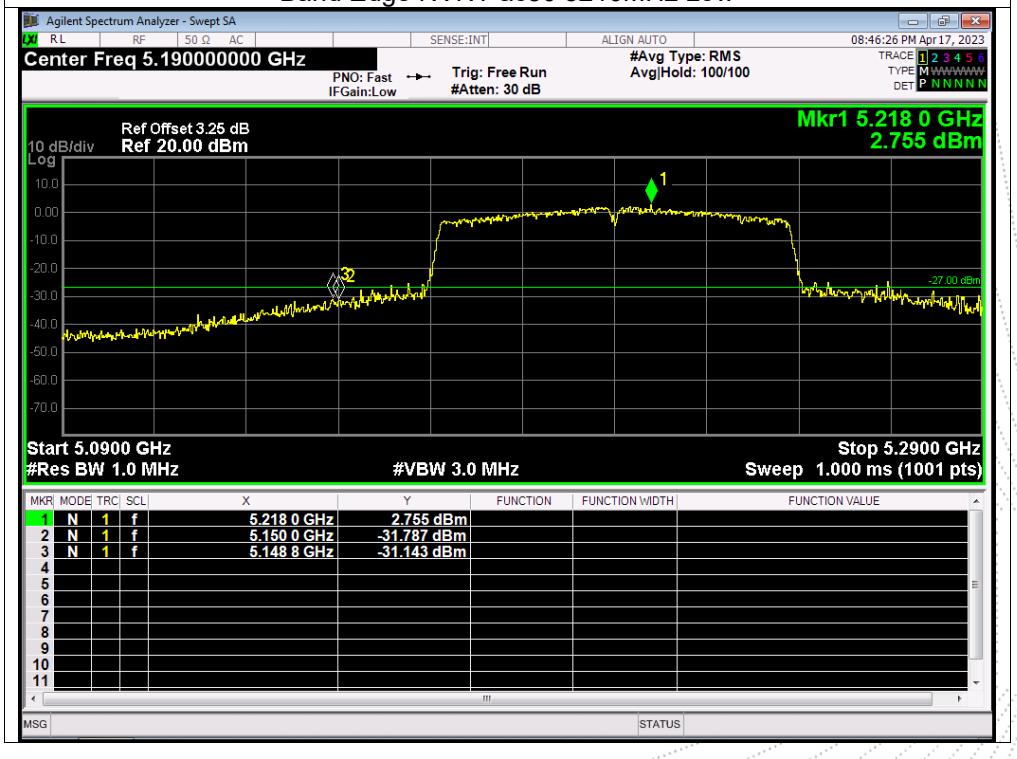

Band Edge NVNT ac40 5230MHz High



Band Edge NVNT ac80 5210MHz High

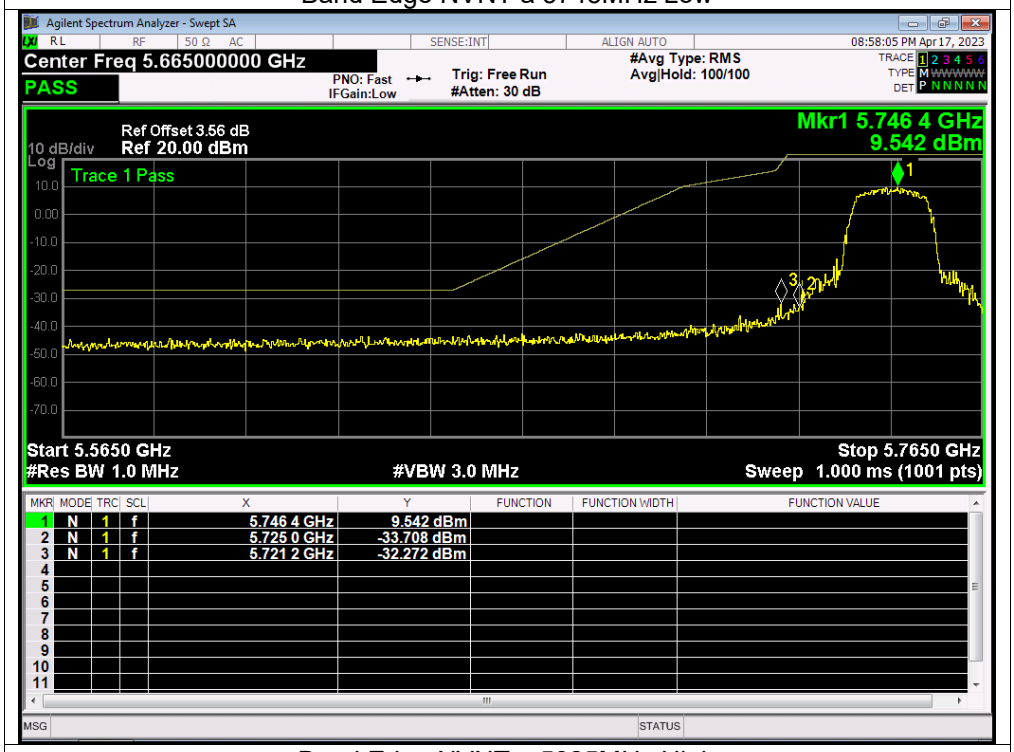



Band Edge NVNT ac80 5210MHz Low

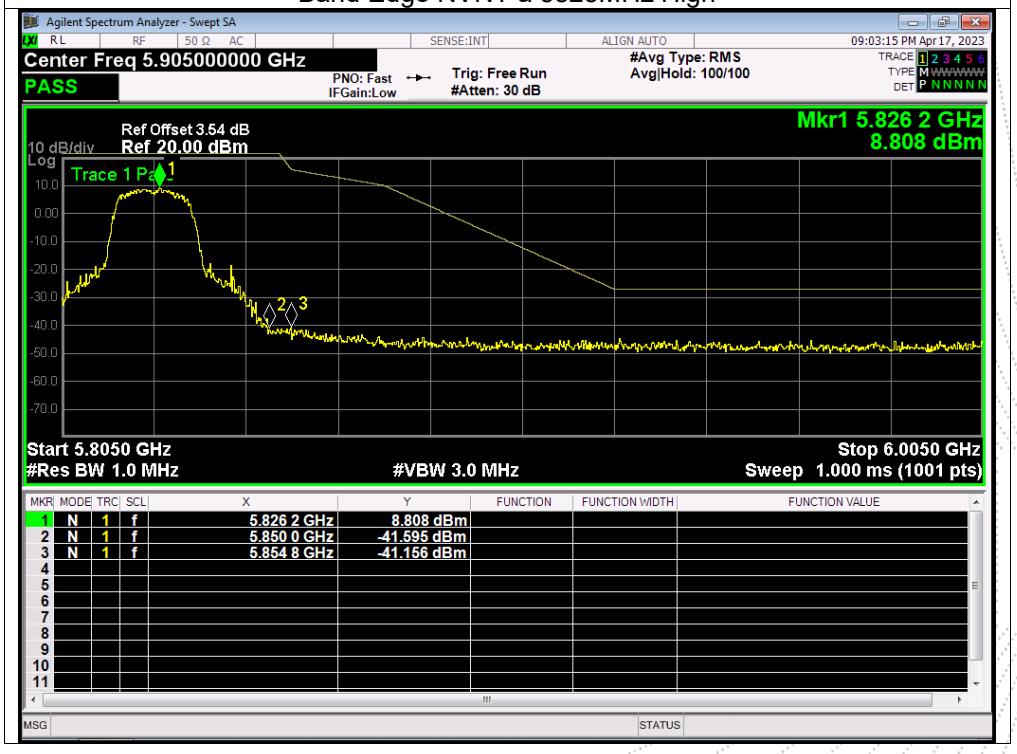


Test Graphs

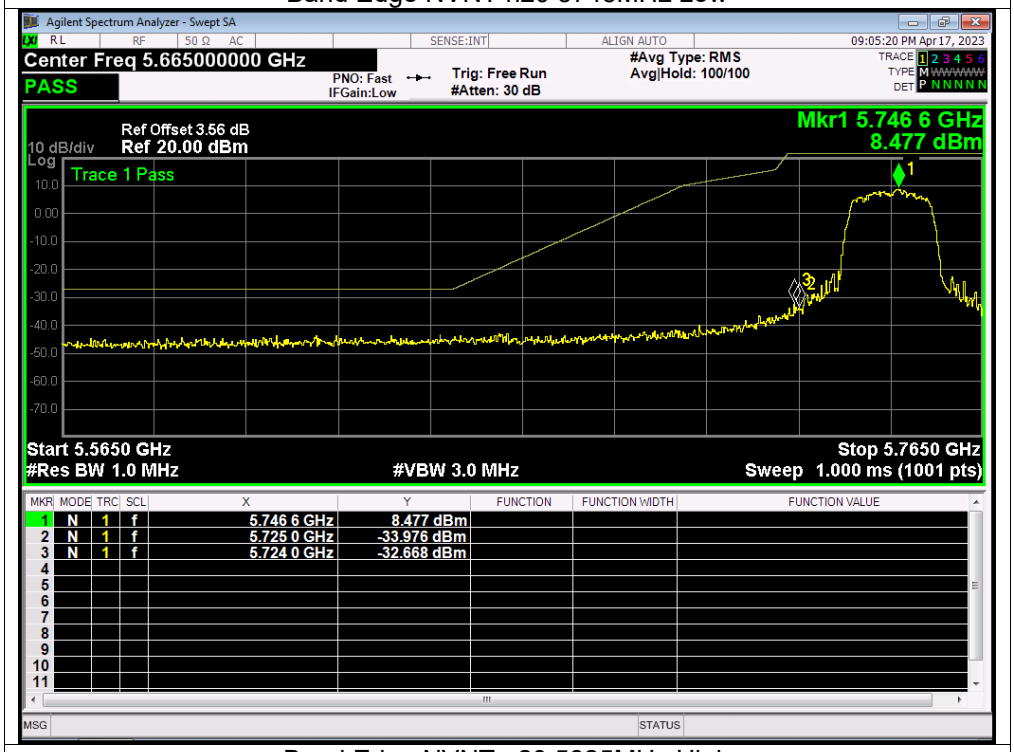
Band Edge NVNT a 5745MHz Low



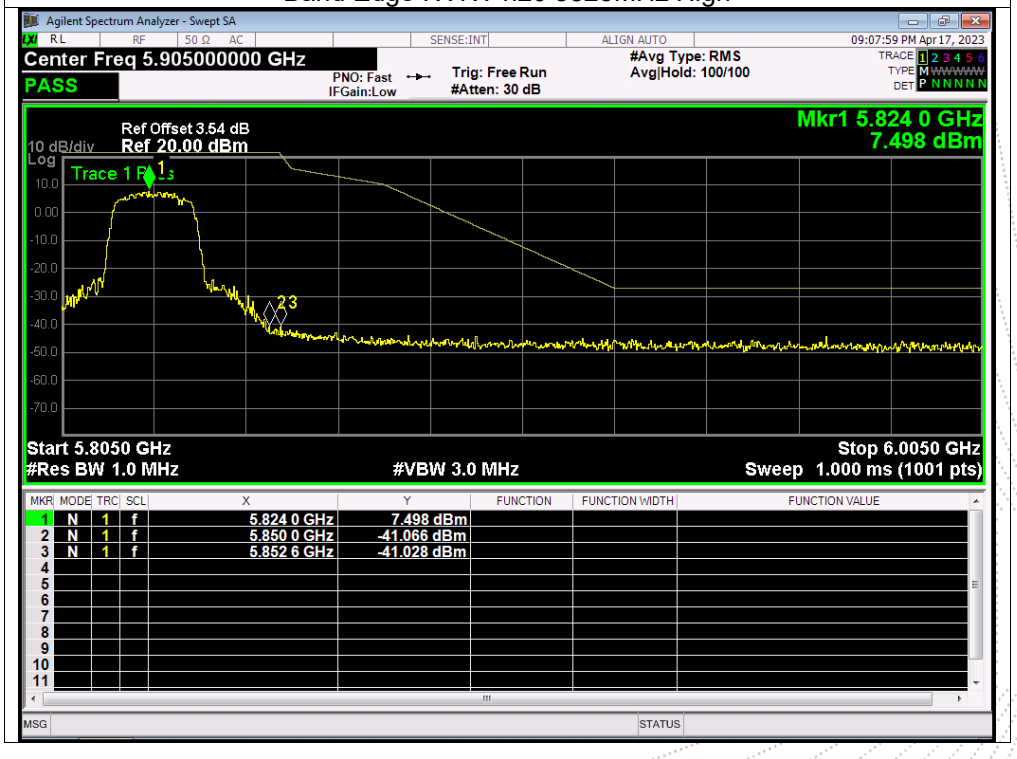

Band Edge NVNT a 5825MHz High



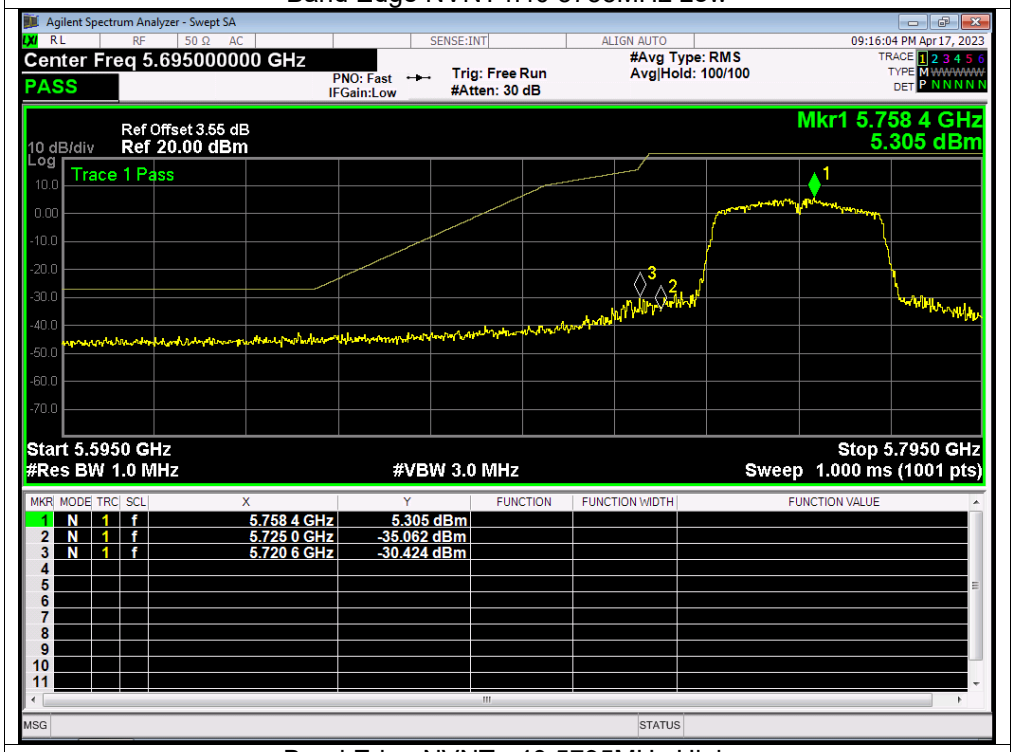
Band Edge NVNT n20 5745MHz Low




Band Edge NVNT n20 5825MHz High

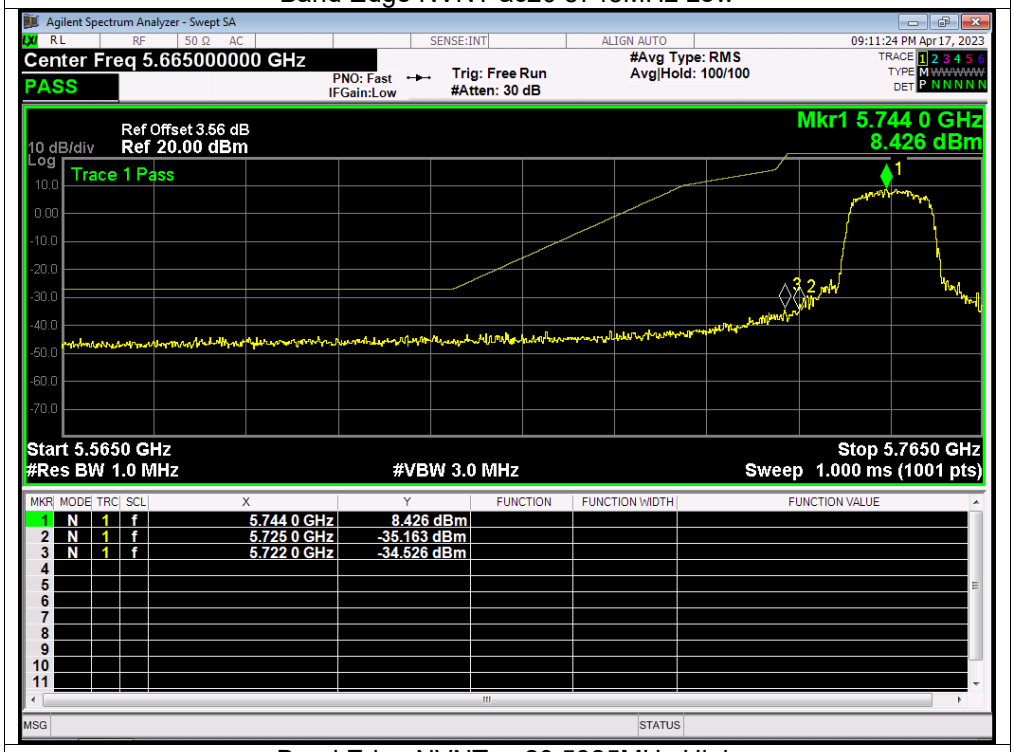


Band Edge NVNT n40 5755MHz Low

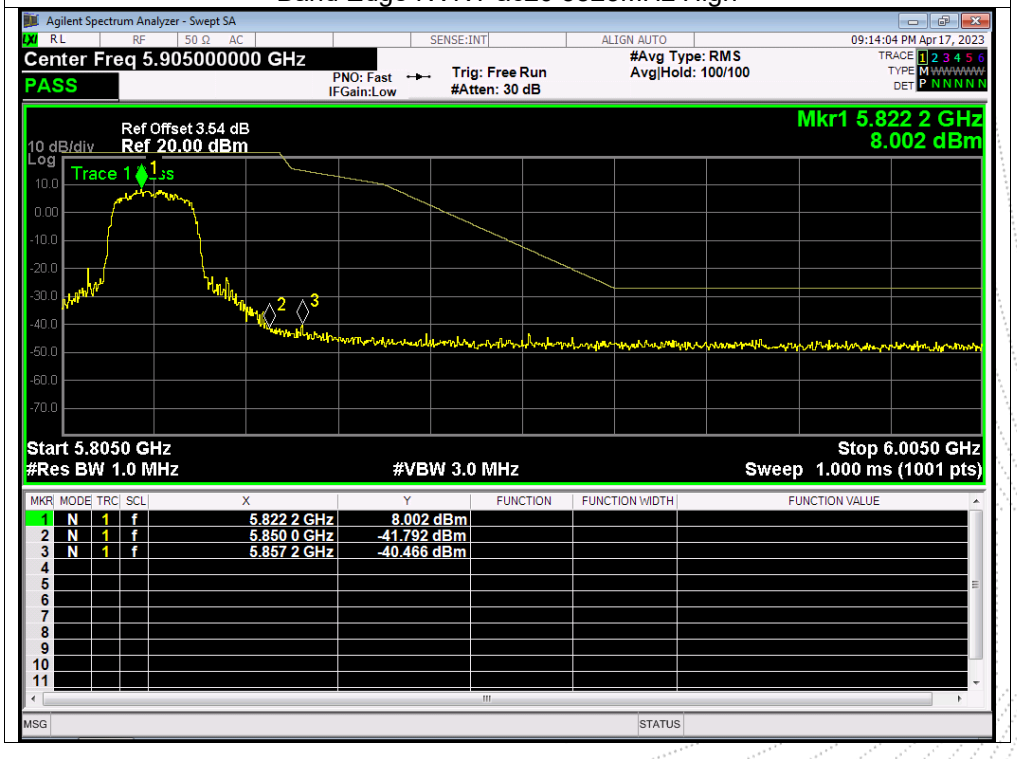



Band Edge NVNT n40 5795MHz High

Band Edge NVNT ac20 5745MHz Low



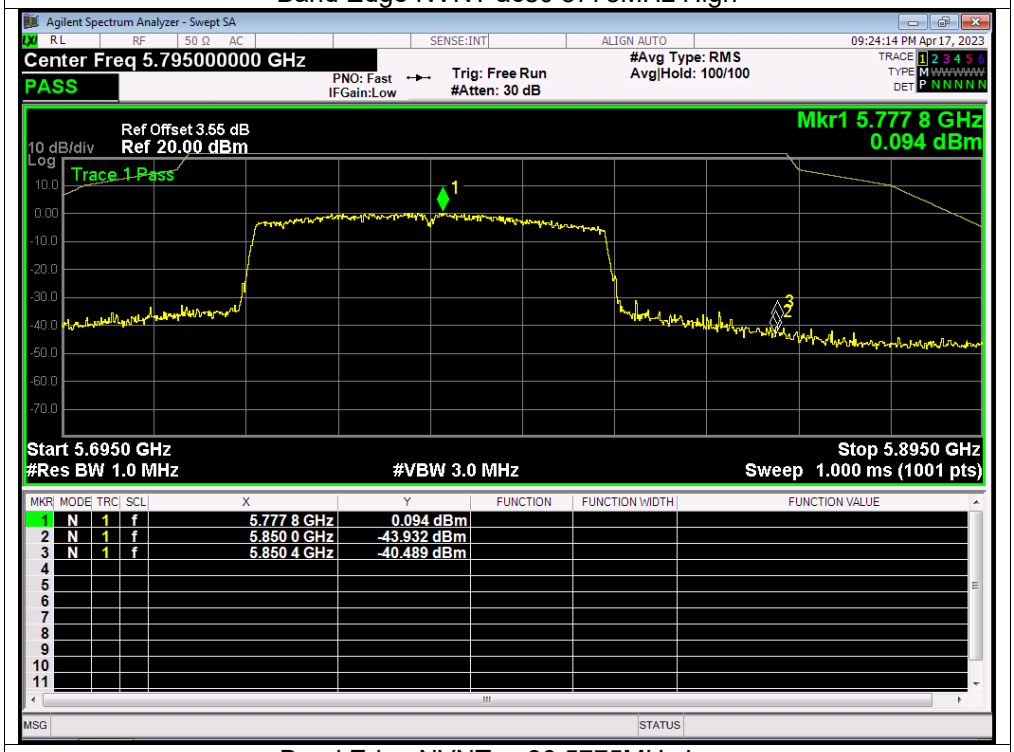

Band Edge NVNT ac20 5825MHz High



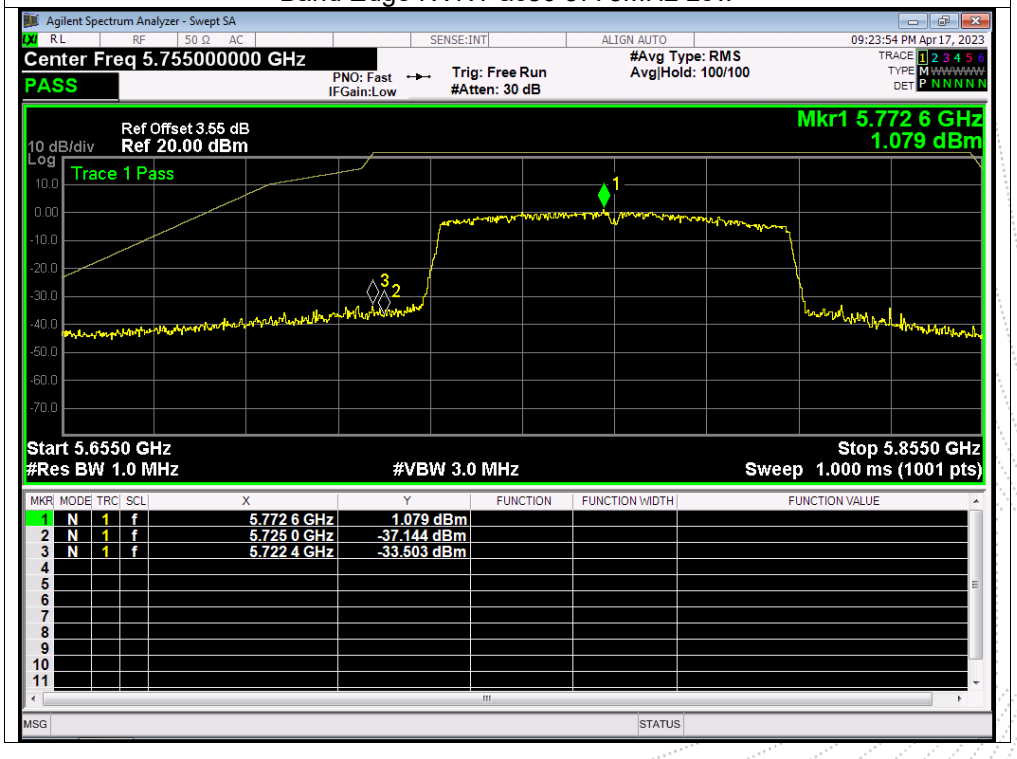
Band Edge NVNT ac40 5755MHz Low

Band Edge NVNT ac40 5795MHz High

Band Edge NVNT ac80 5775MHz High

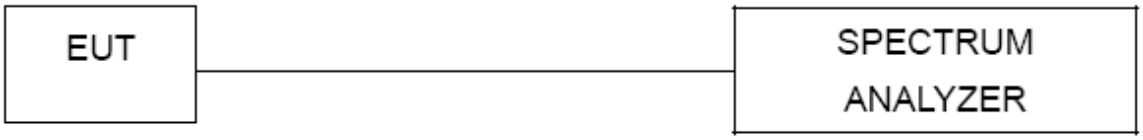



Band Edge NVNT ac80 5775MHz Low



# 12. Spurious RF Conducted Emissions

## 12.1 Block Diagram Of Test Setup




## 12.2 Limit

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1)For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2)For transmitters operating in the 5.725-5.85 GHz band(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge..

## 12.3 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

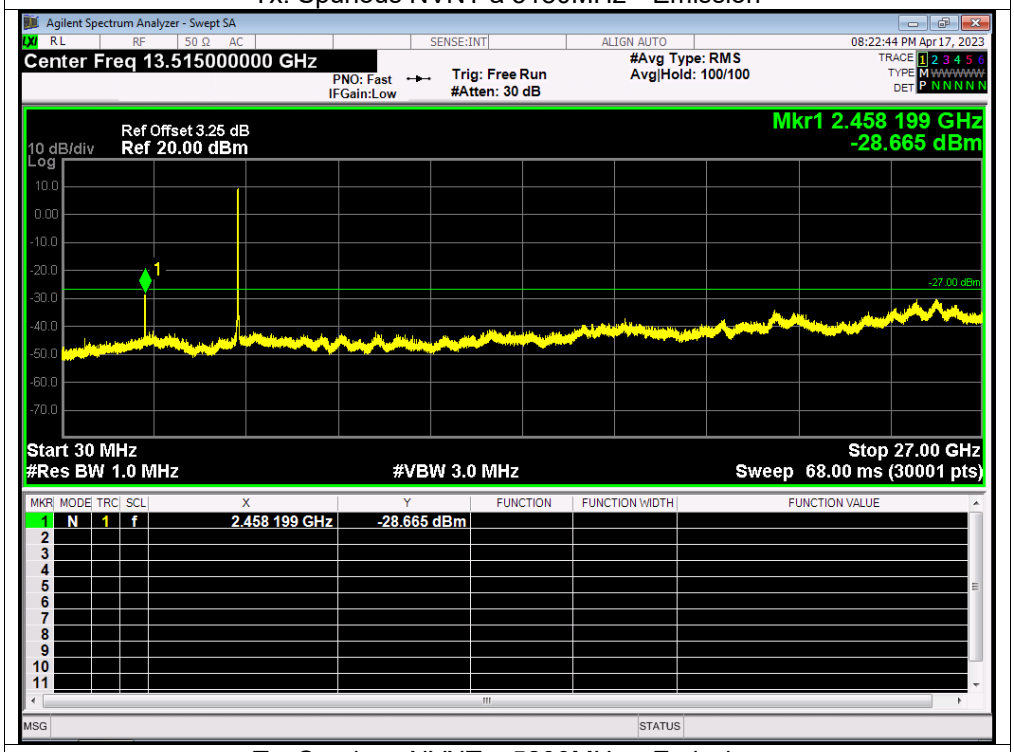
## 12.4 Test Result

Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

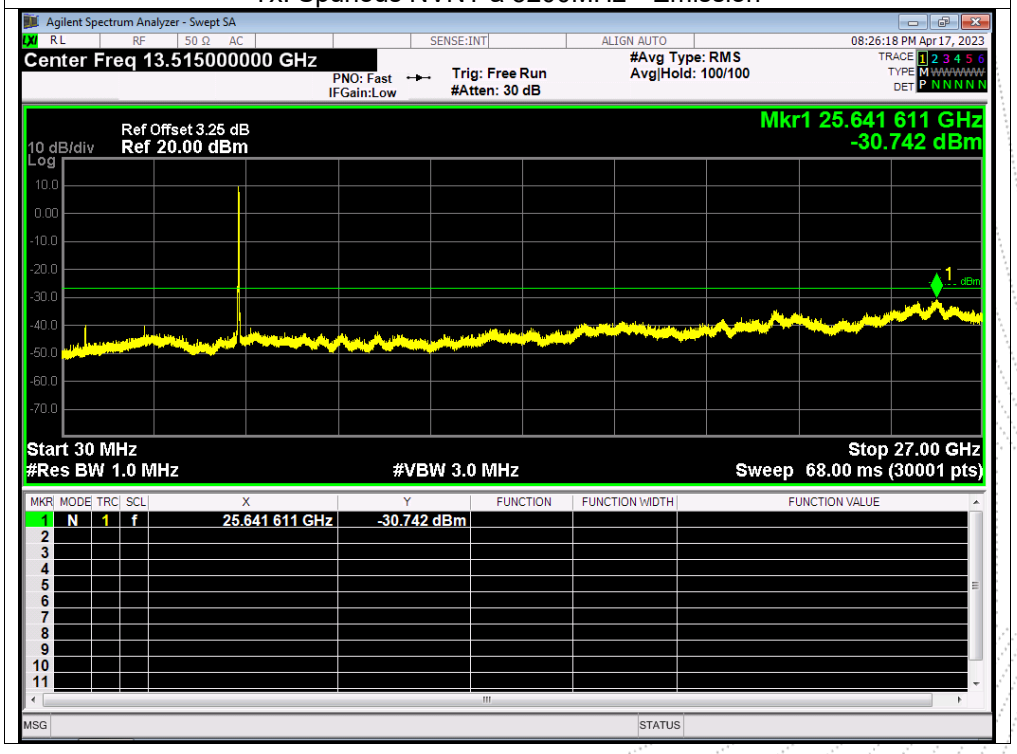
About:26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Test Graphs

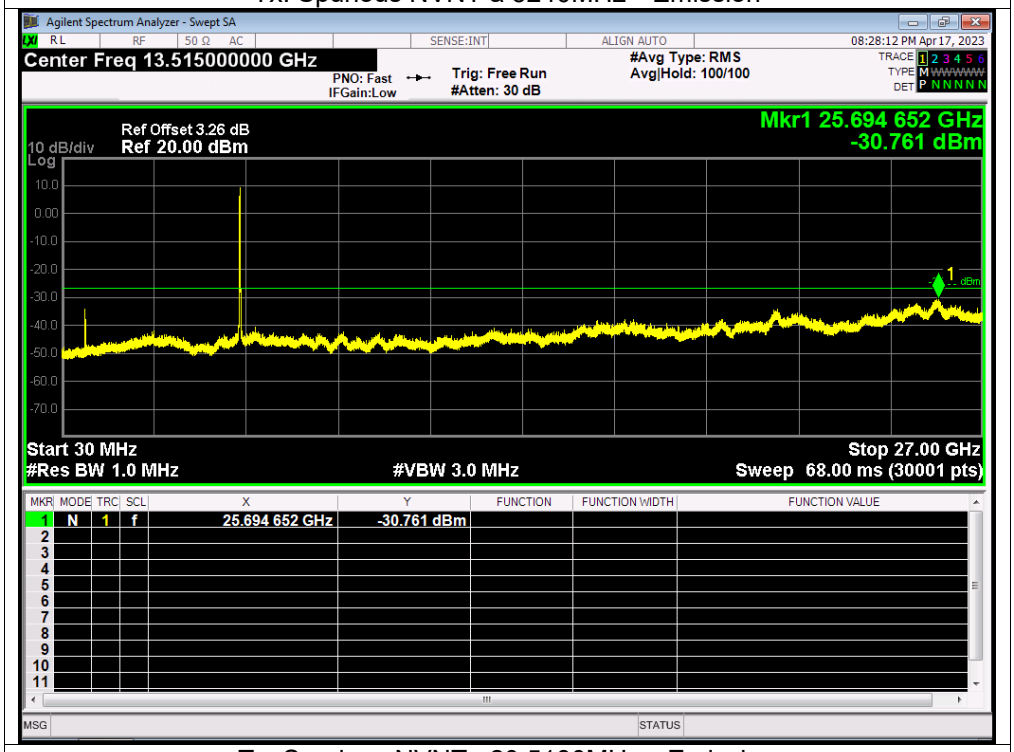
Tx. Spurious NVNT a 5180MHz Emission



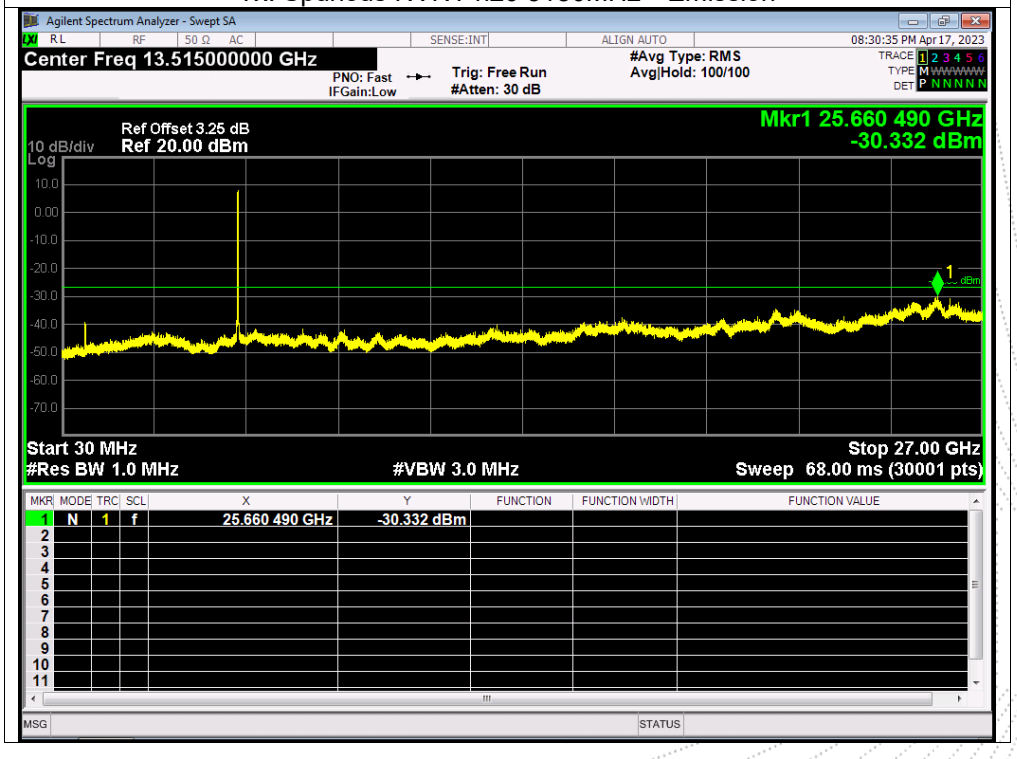

Tx. Spurious NVNT a 5200MHz Emission



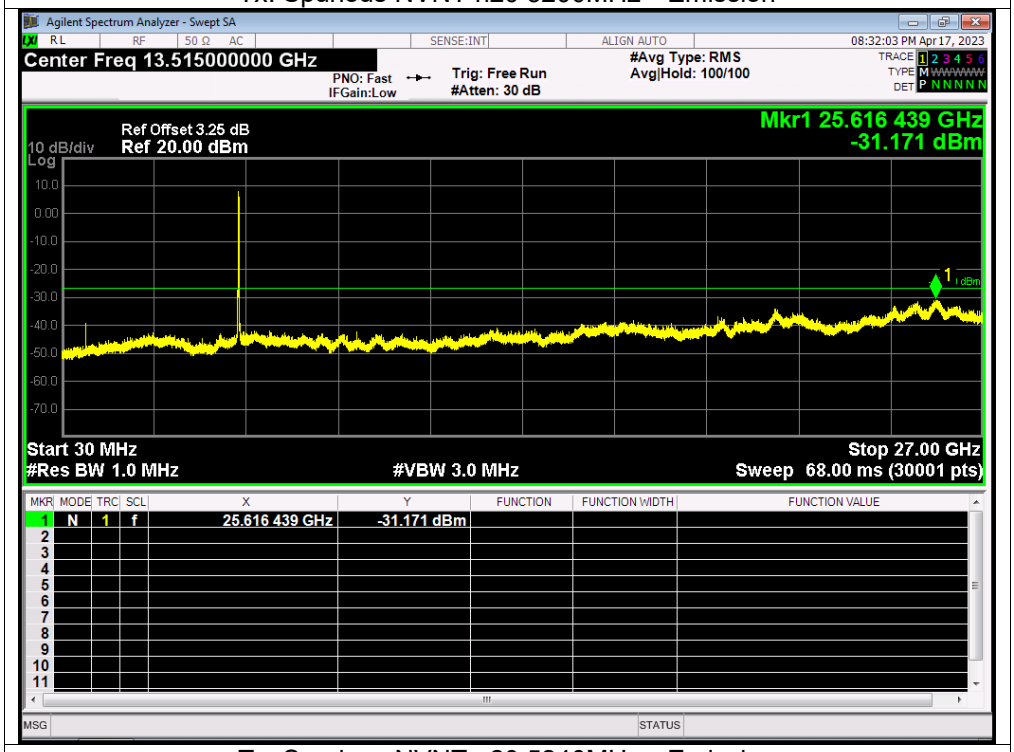
Tx. Spurious NVNT a 5240MHz Emission



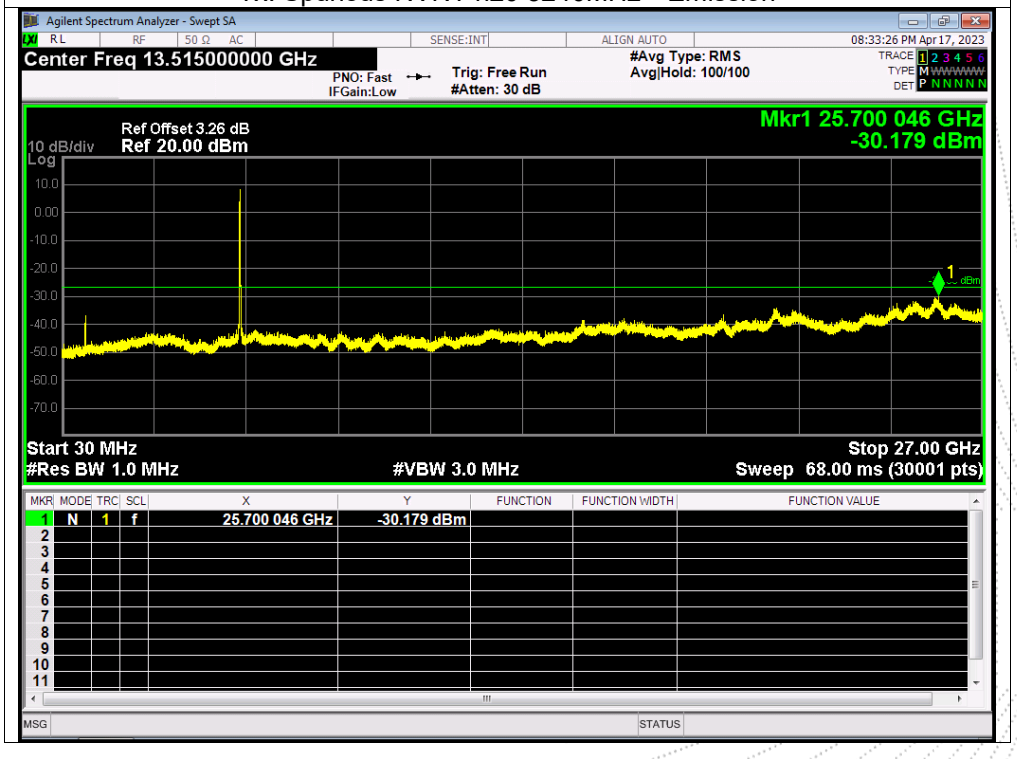

Tx. Spurious NVNT n20 5180MHz Emission



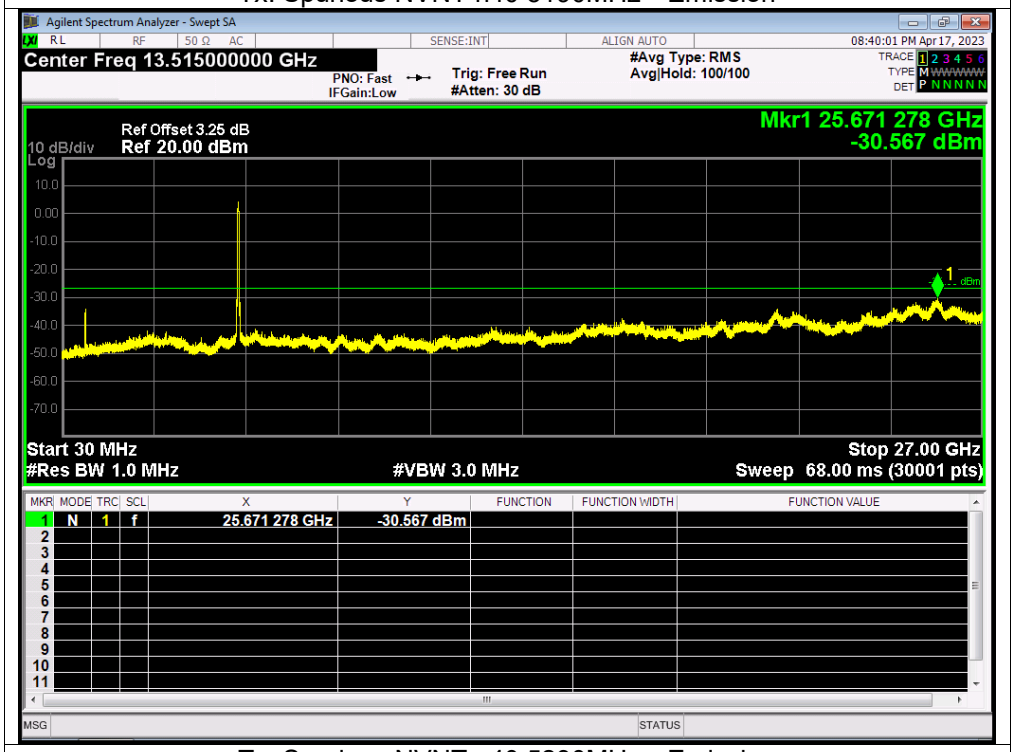
Tx. Spurious NVNT n20 5200MHz Emission



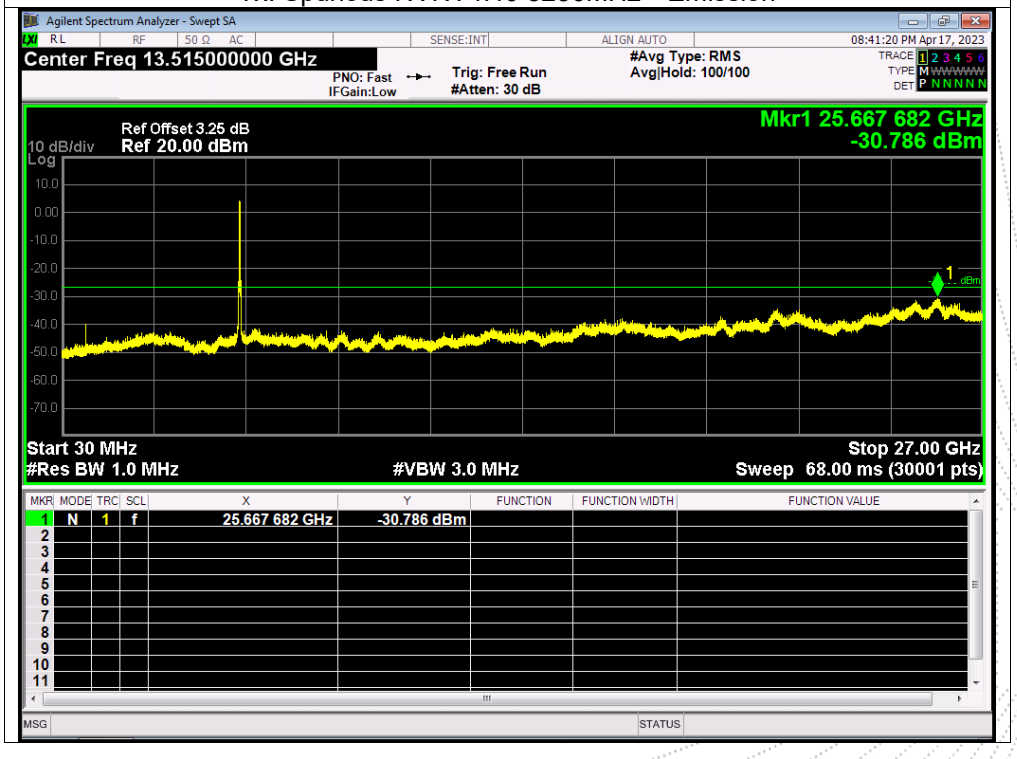

Tx. Spurious NVNT n20 5240MHz Emission



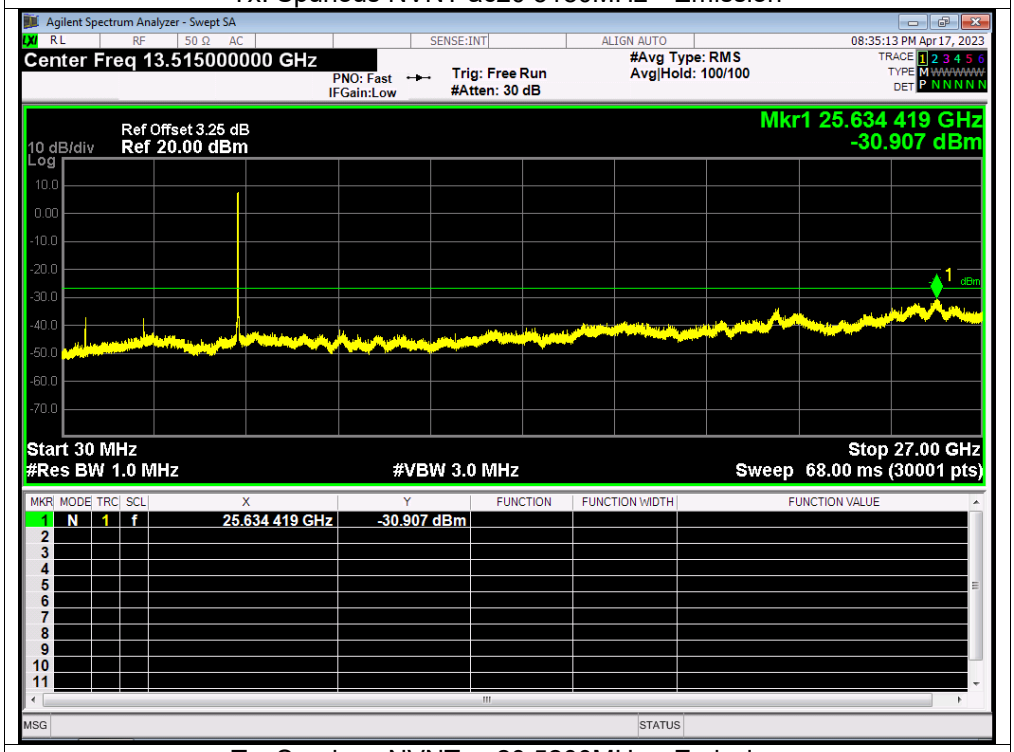
Tx. Spurious NVNT n40 5190MHz Emission



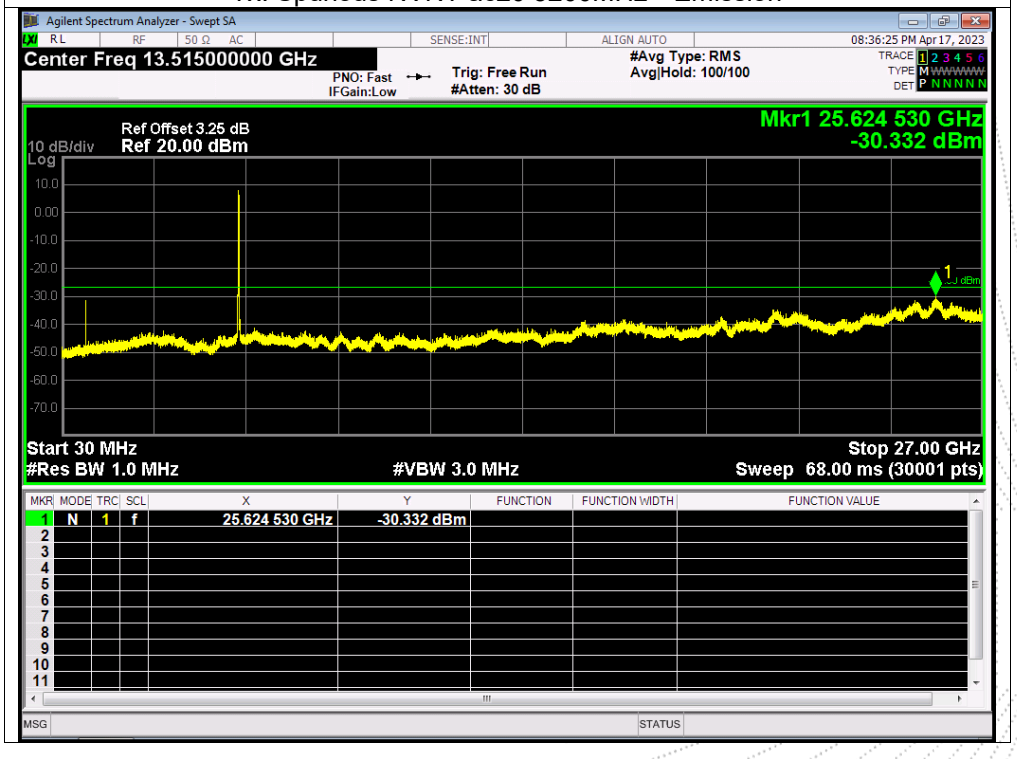

Tx. Spurious NVNT n40 5230MHz Emission



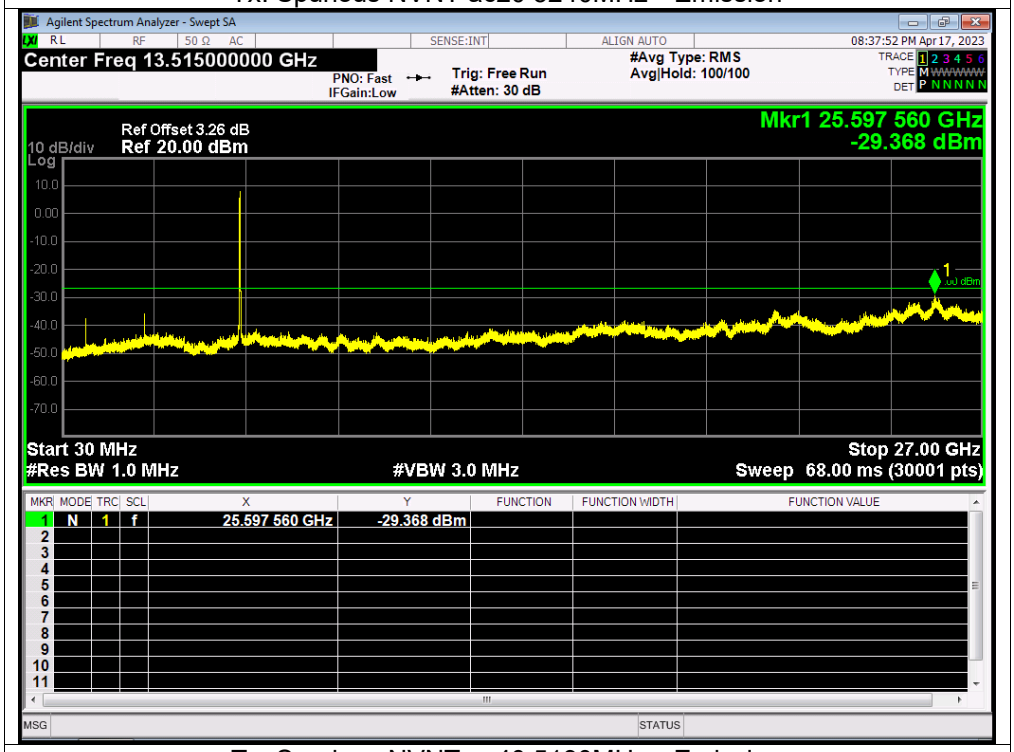
Tx. Spurious NVNT ac20 5180MHz Emission



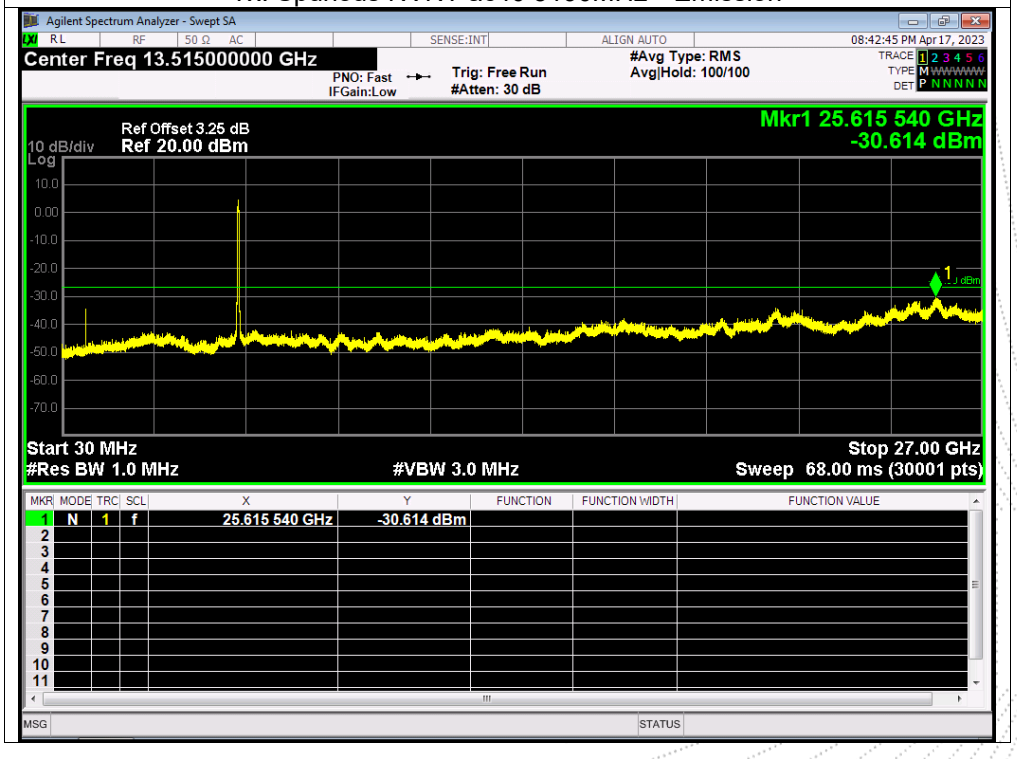

Tx. Spurious NVNT ac20 5200MHz Emission



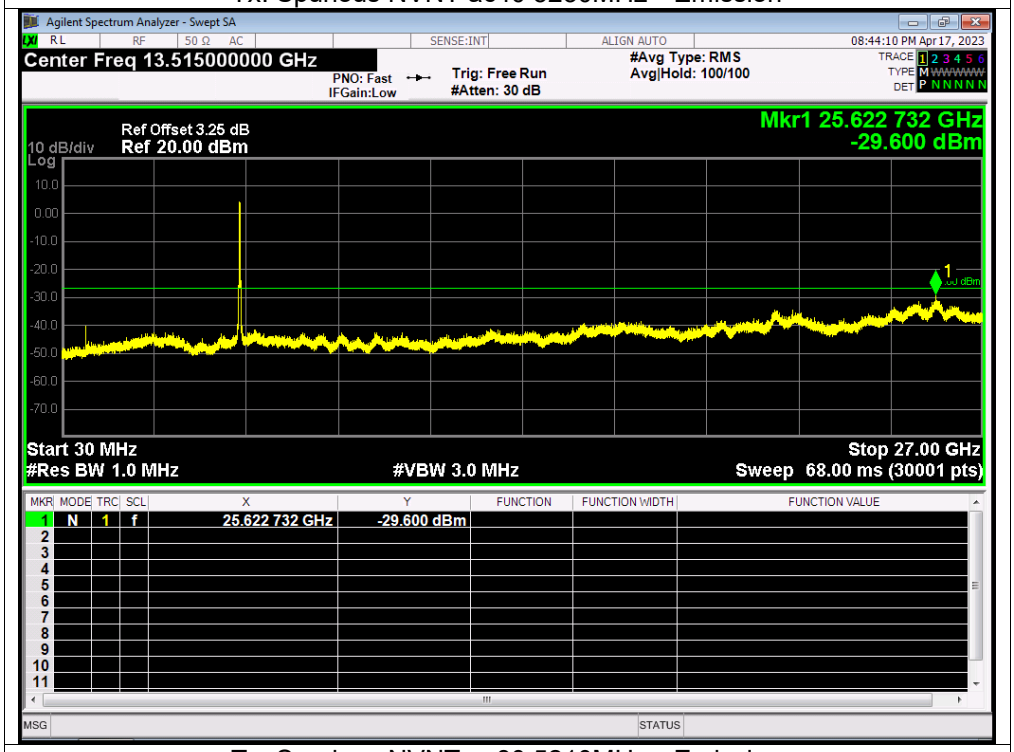
Tx. Spurious NVNT ac20 5240MHz Emission



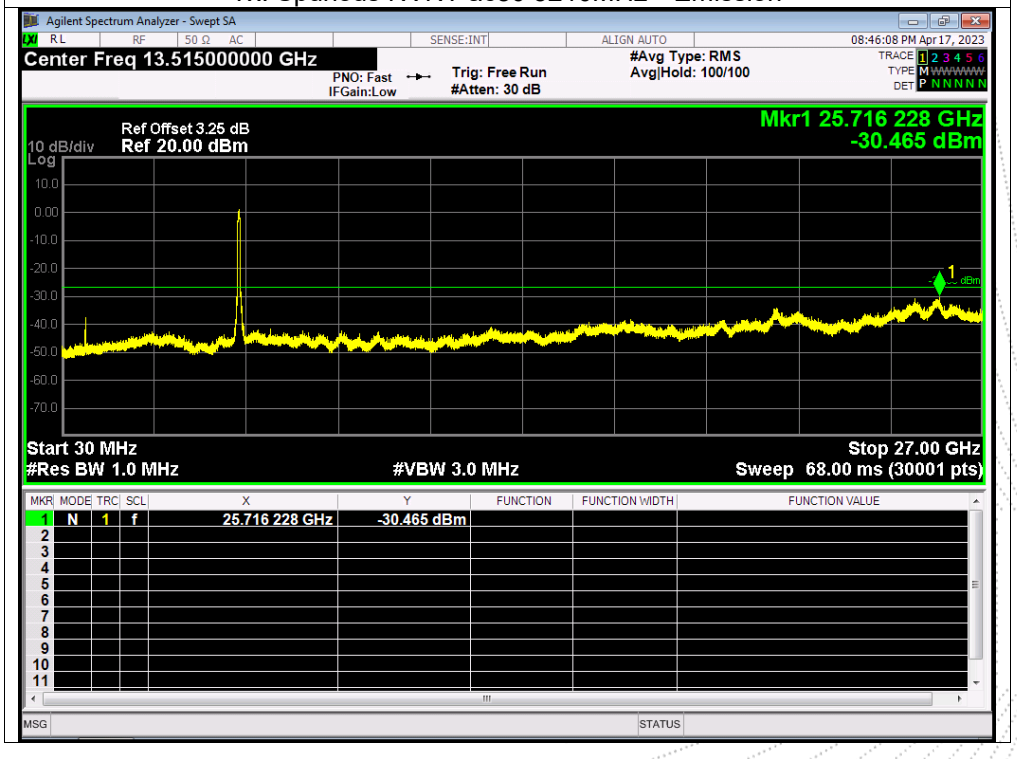

Tx. Spurious NVNT ac40 5190MHz Emission



Tx. Spurious NVNT ac40 5230MHz Emission

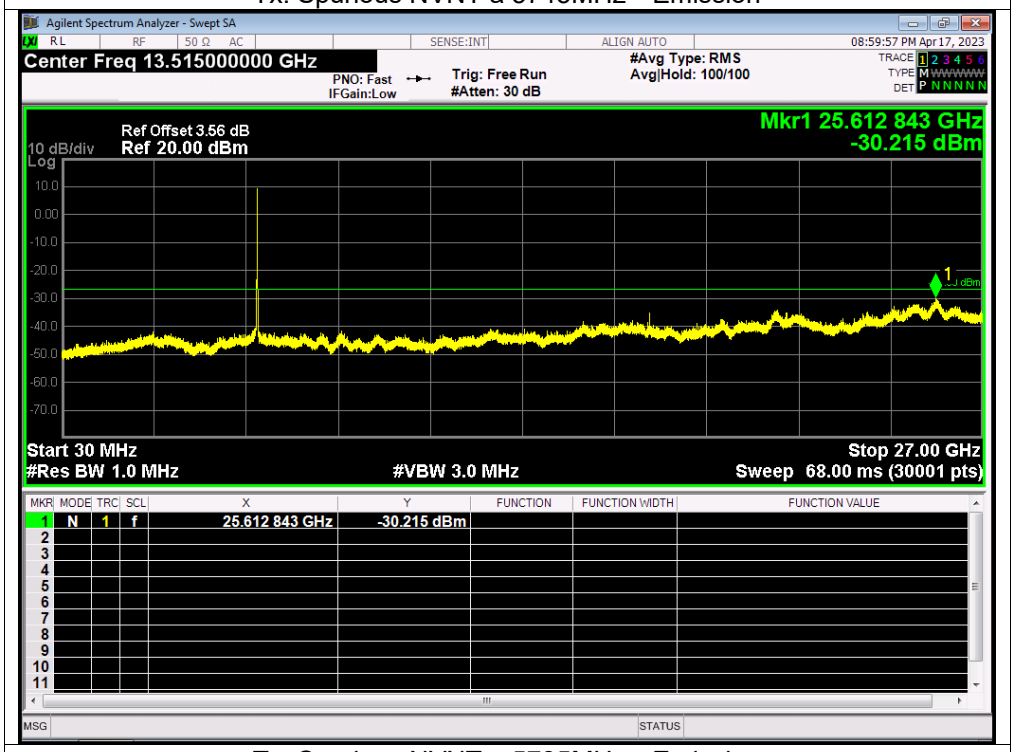


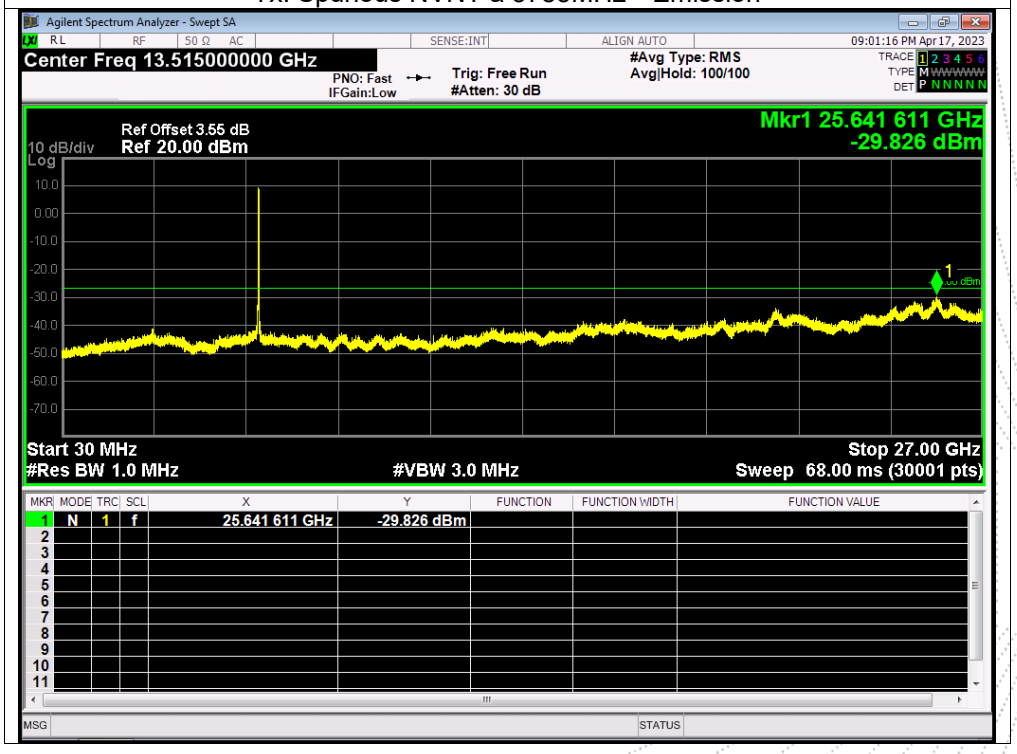

Tx. Spurious NVNT ac80 5210MHz Emission



Test Graphs

Tx. Spurious NVNT a 5745MHz Emission




Tx. Spurious NVNT a 5785MHz Emission