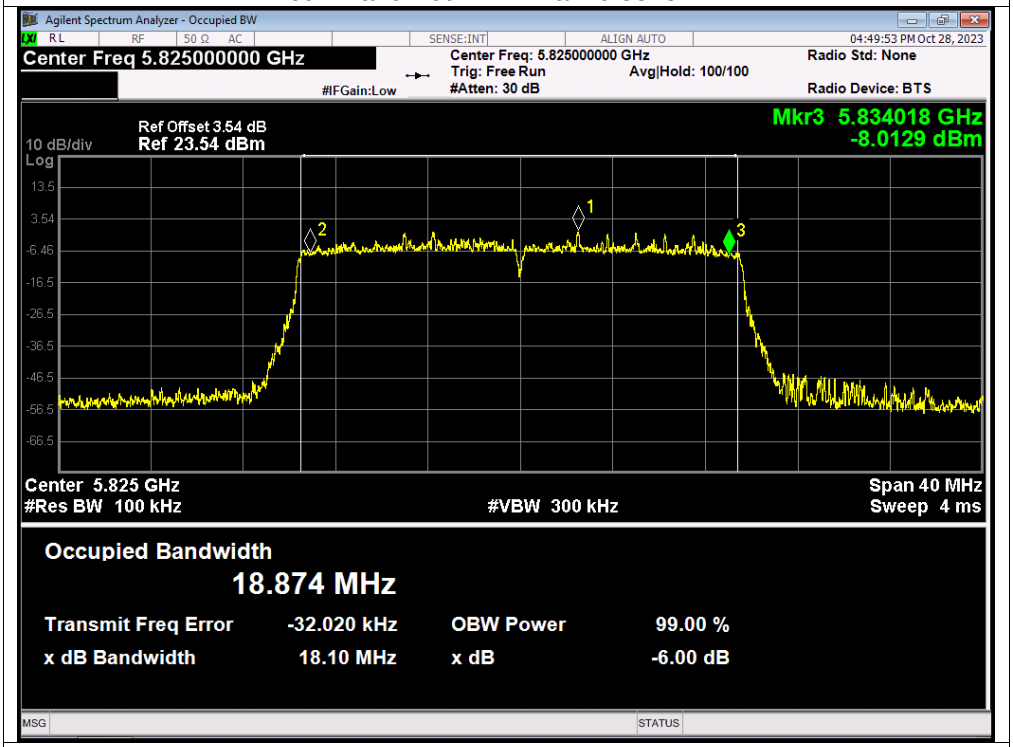
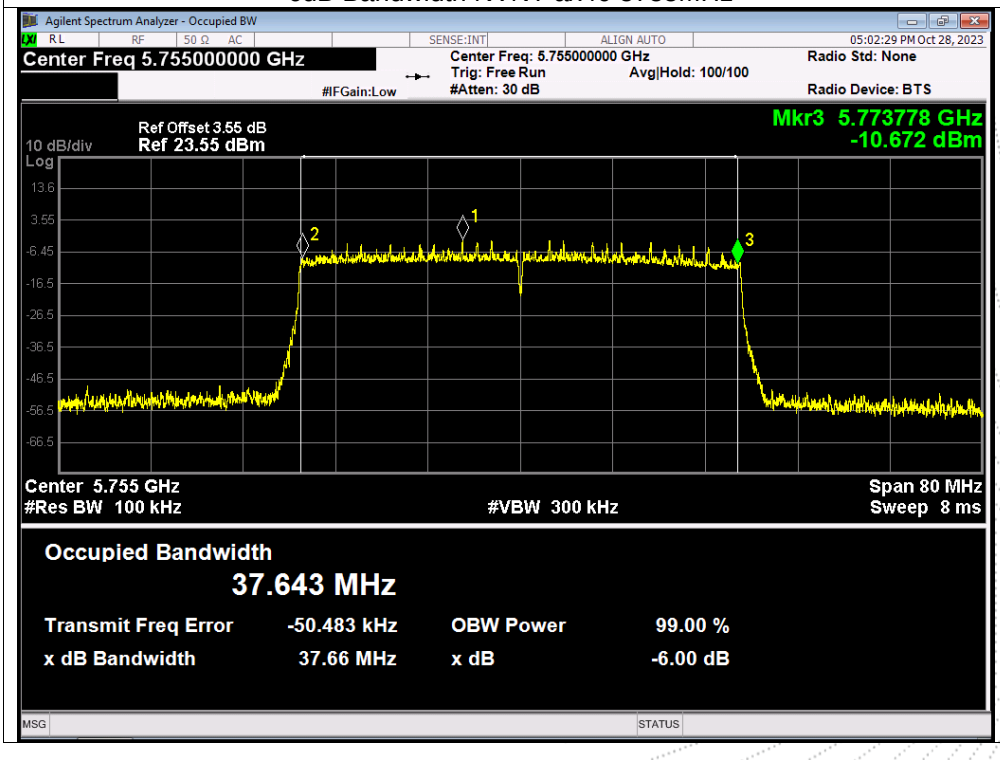
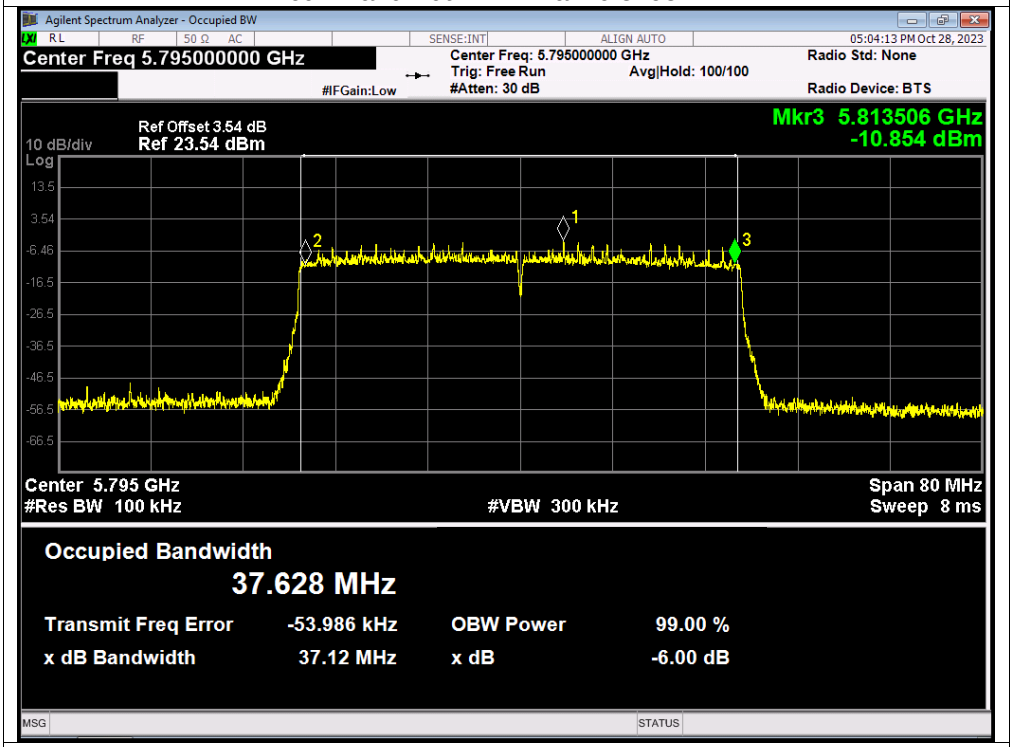
-6dB Bandwidth NVNT ax20 5825MHz



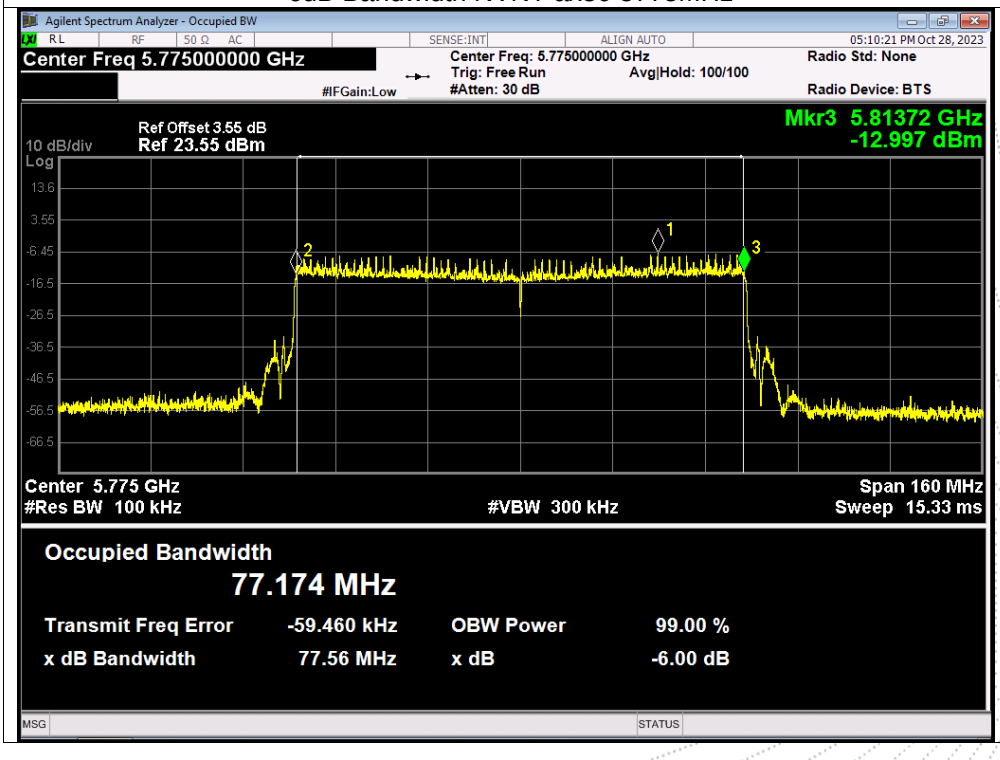
-6dB Bandwidth NVNT ax40 5755MHz



-6dB Bandwidth NVNT ax40 5795MHz

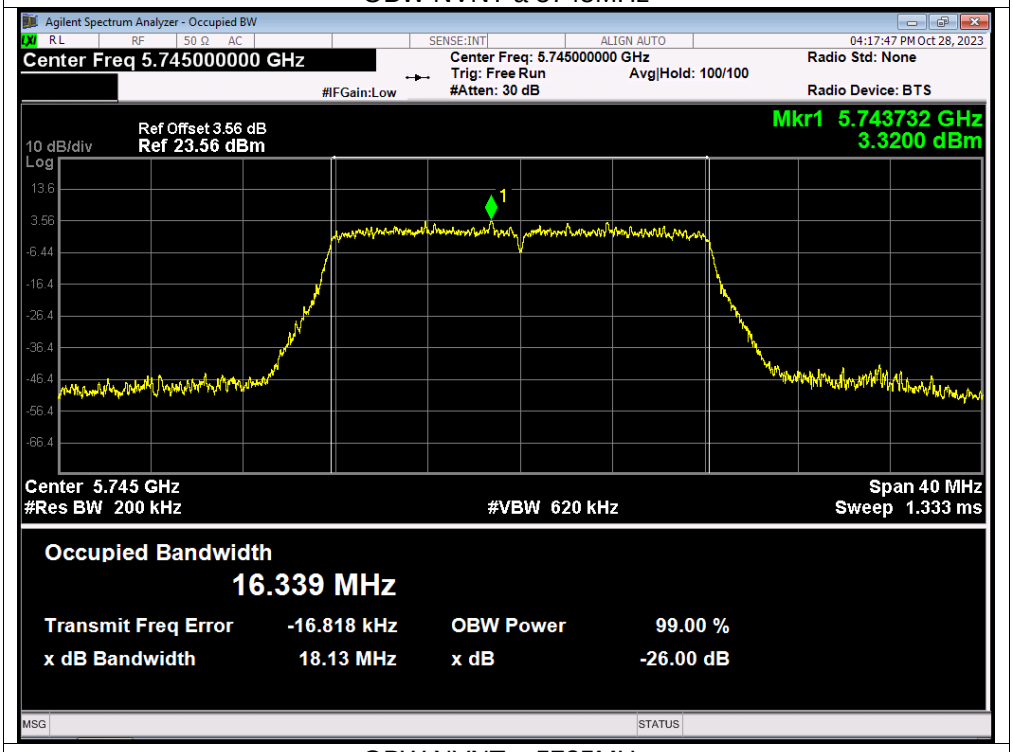


-6dB Bandwidth NVNT ax80 5775MHz

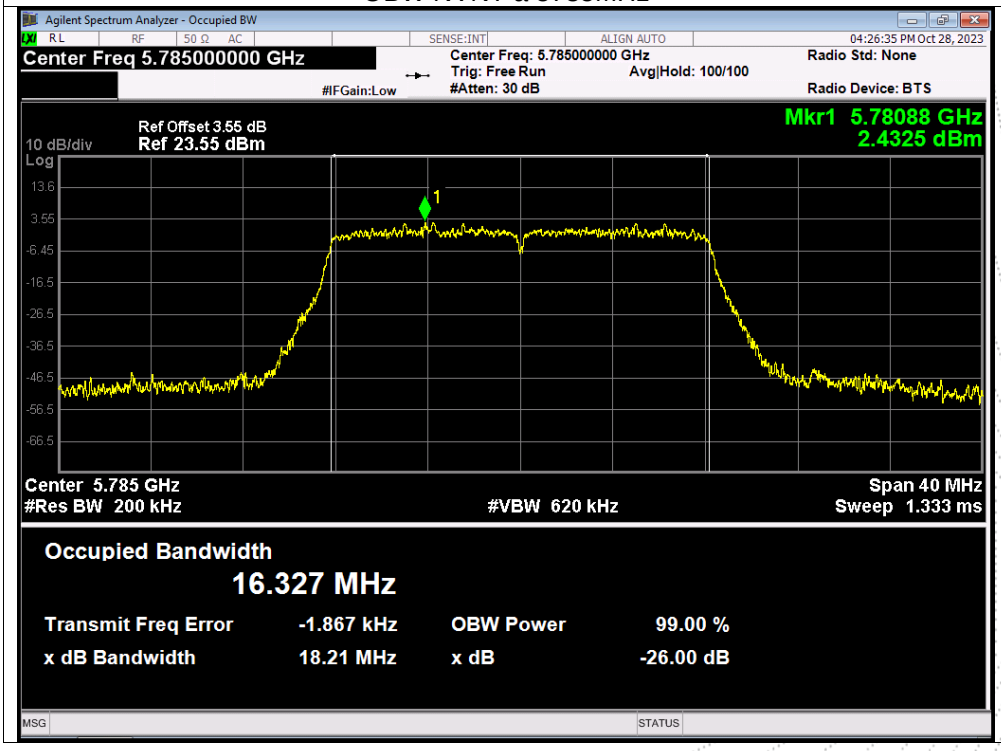


Test Graphs

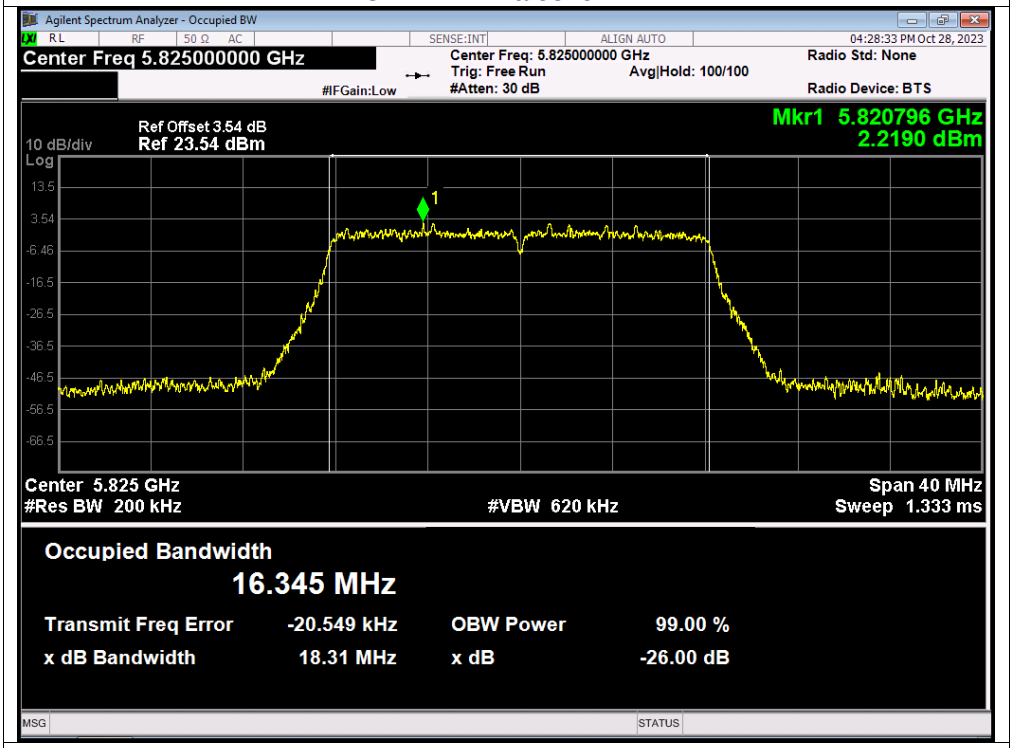
OBW NVNT a 5745MHz



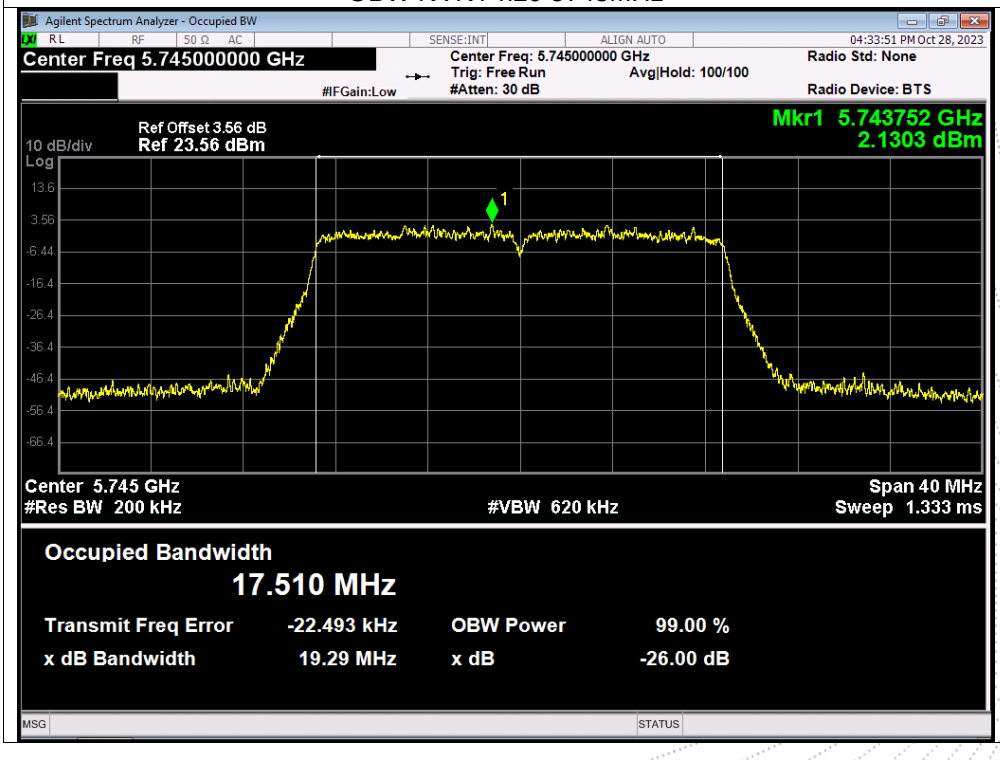
OBW NVNT a 5785MHz



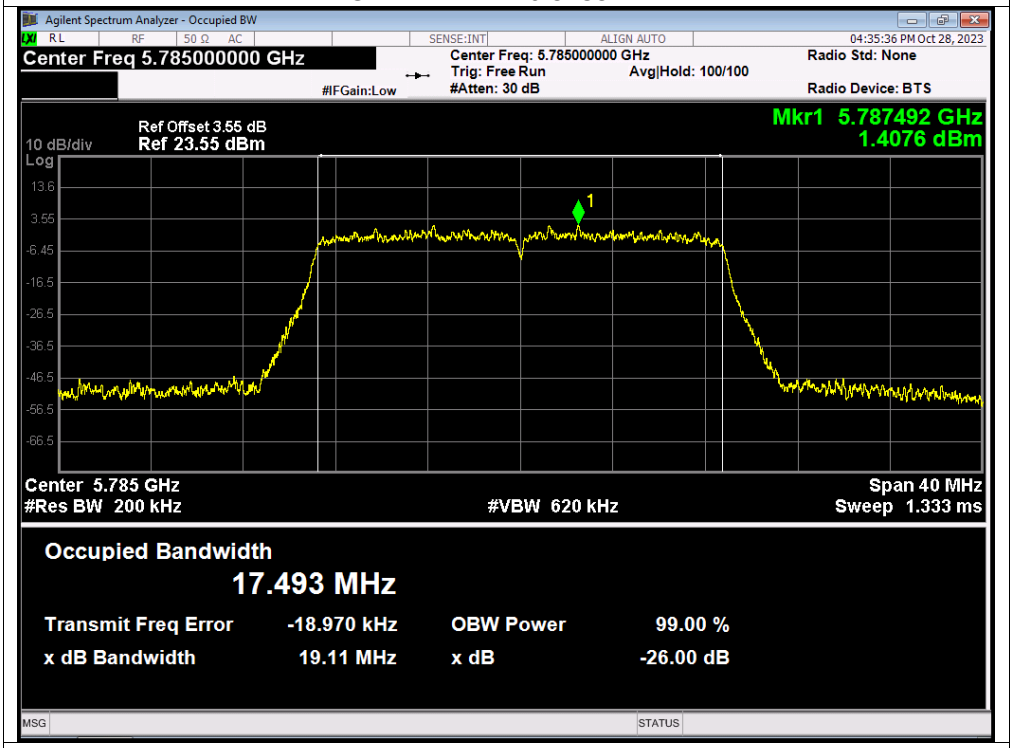
OBW NVNT a 5825MHz



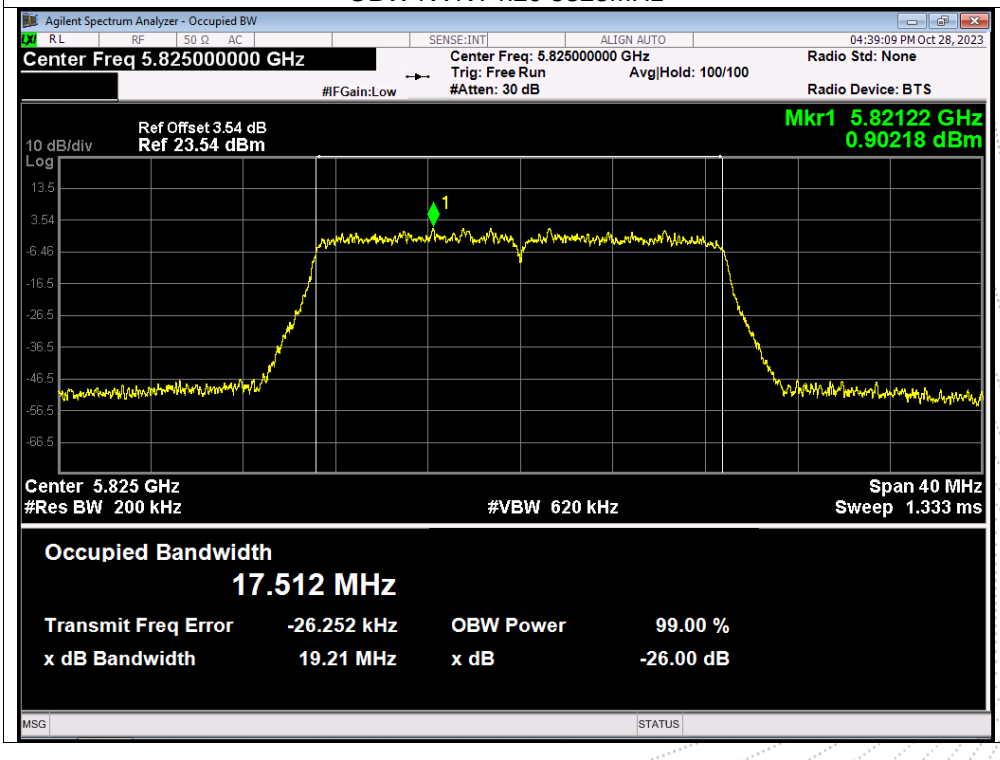
OBW NVNT n20 5745MHz



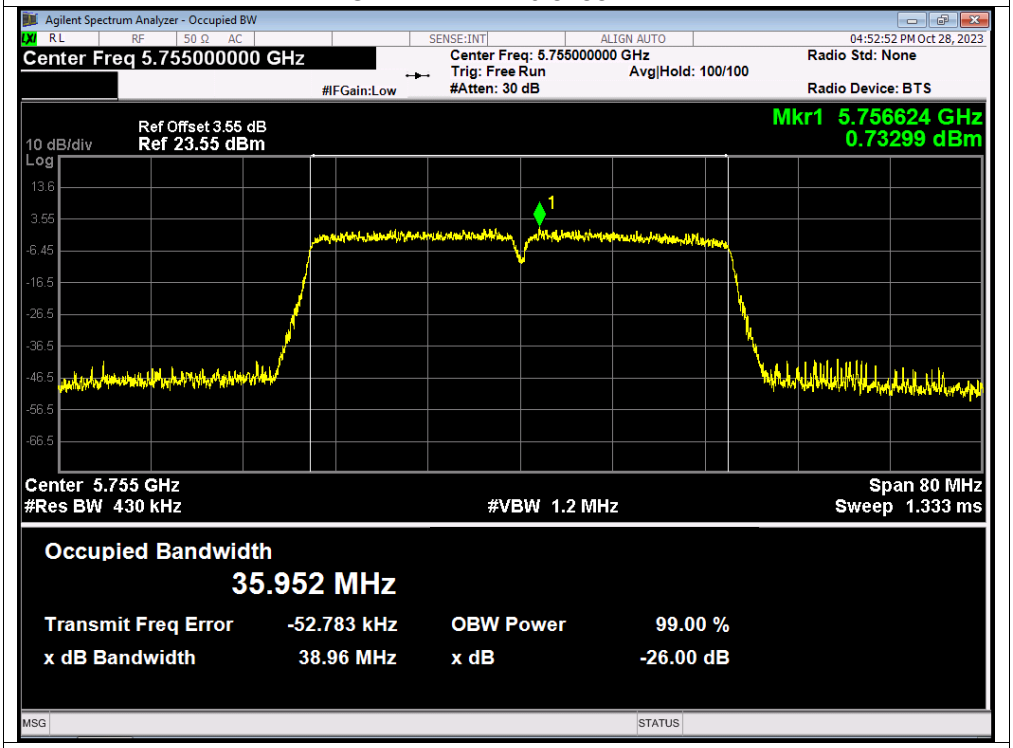
OBW NVNT n20 5785MHz



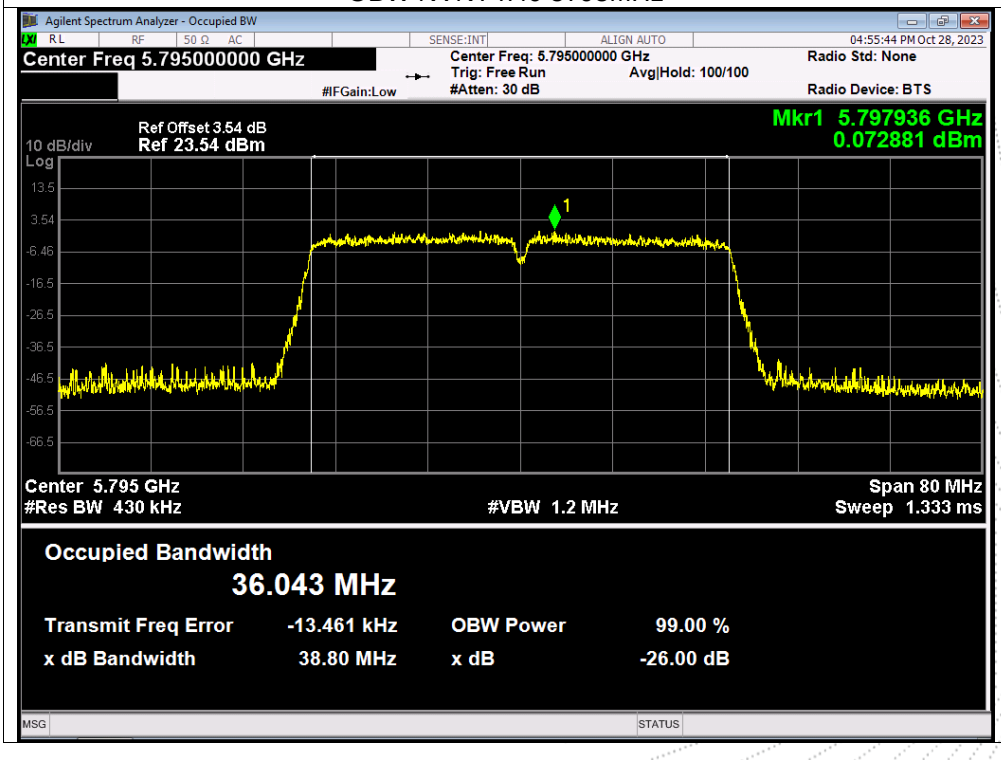
OBW NVNT n20 5825MHz



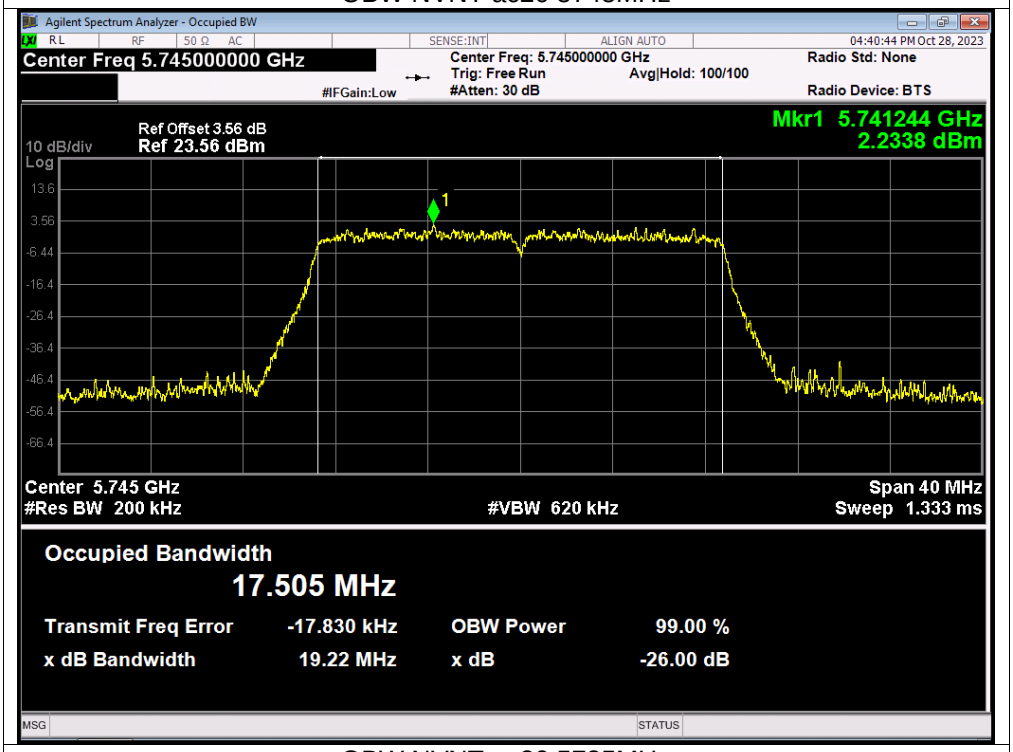
OBW NVNT n40 5755MHz



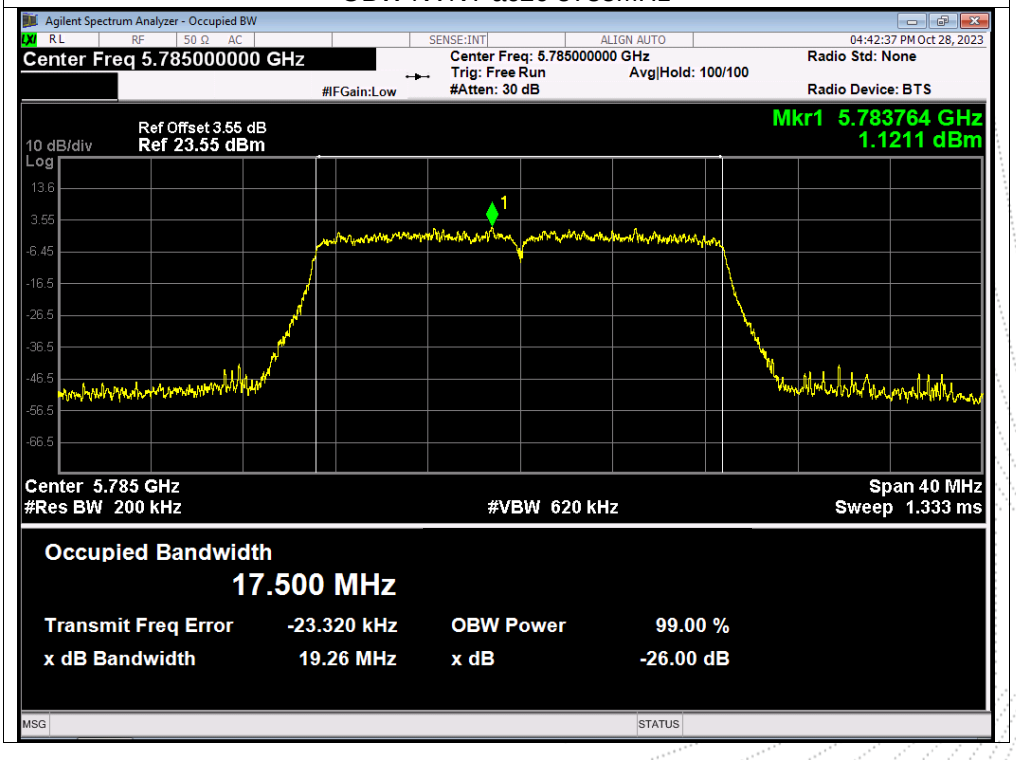
OBW NVNT n40 5795MHz



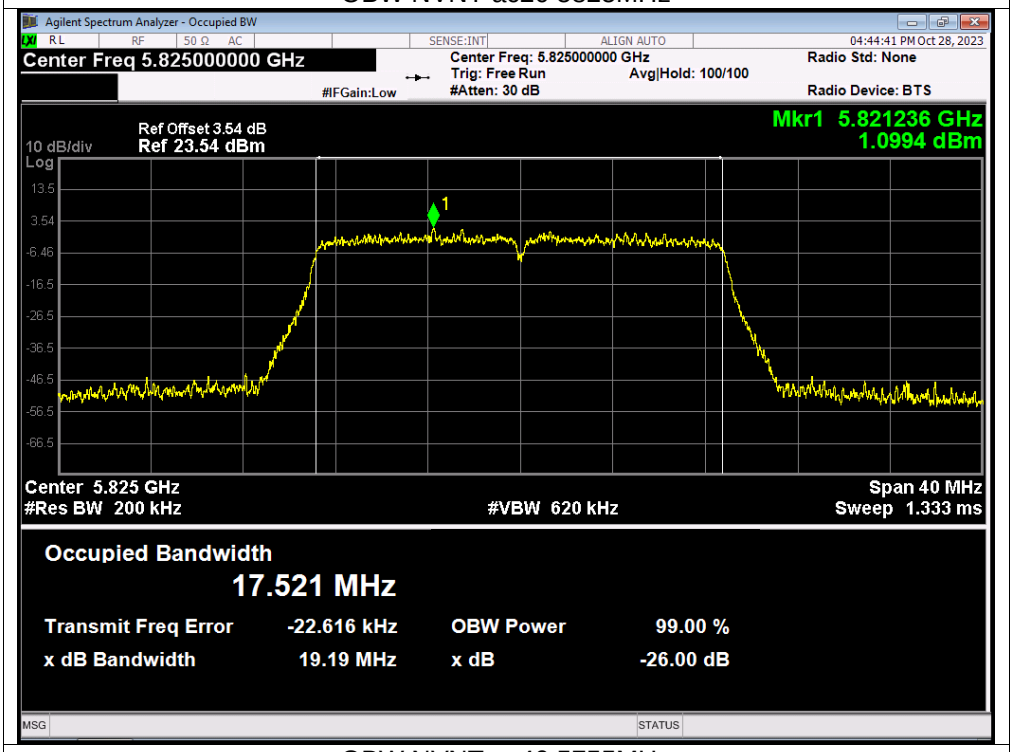
OBW NVNT ac20 5745MHz



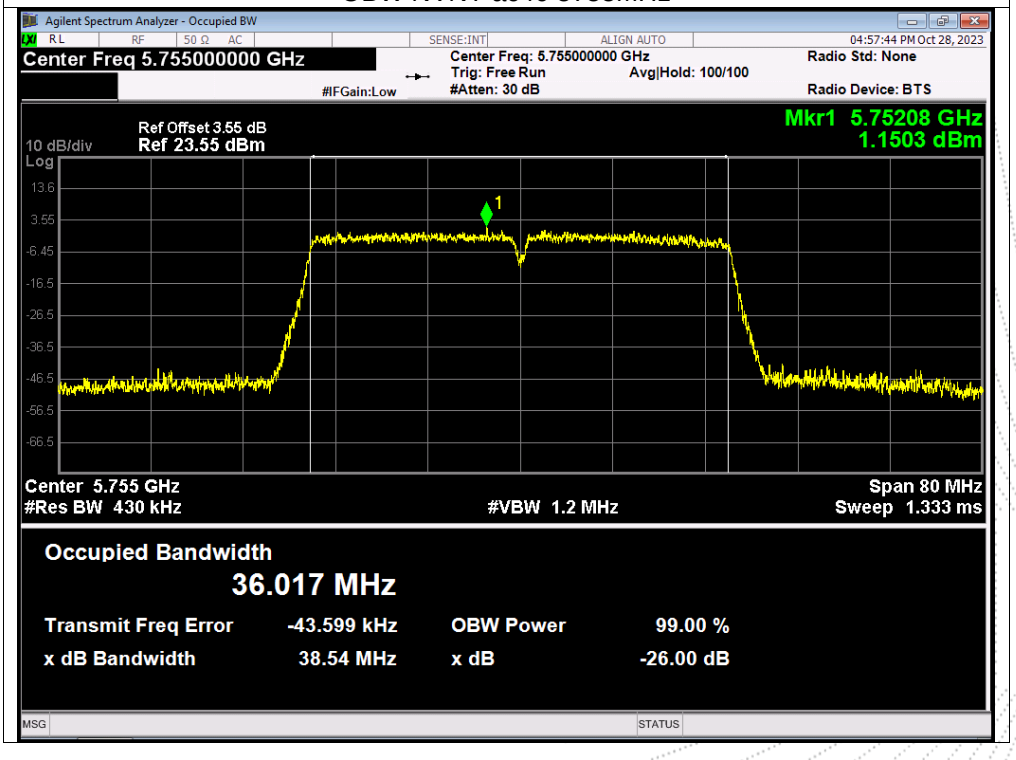
OBW NVNT ac20 5785MHz



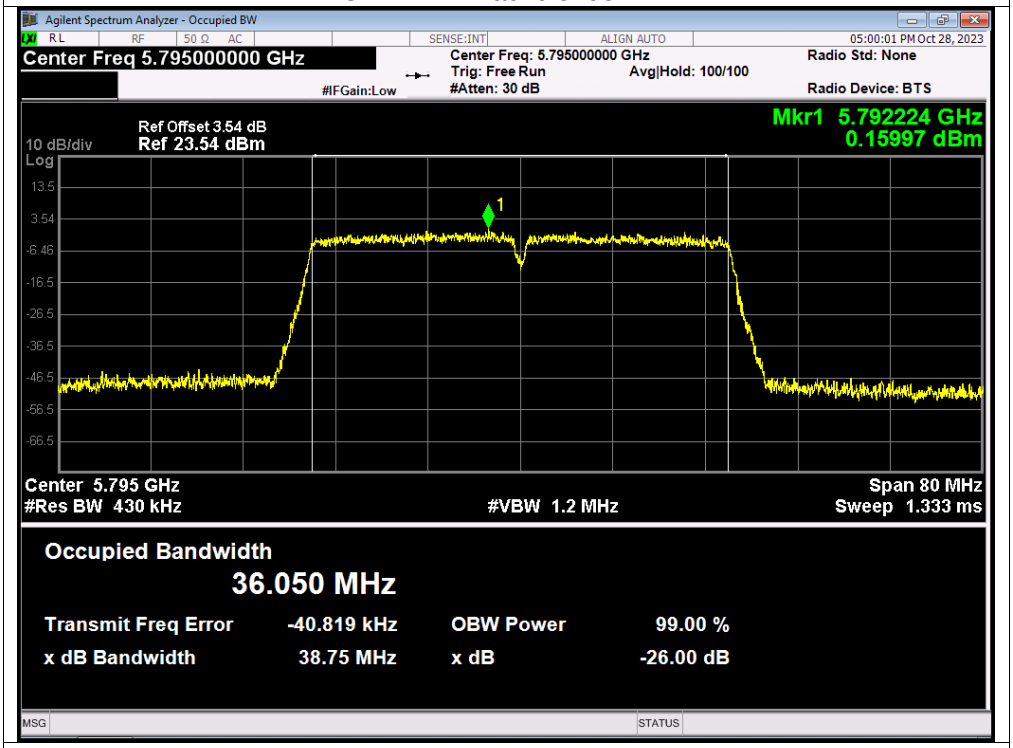
OBW NVNT ac20 5825MHz



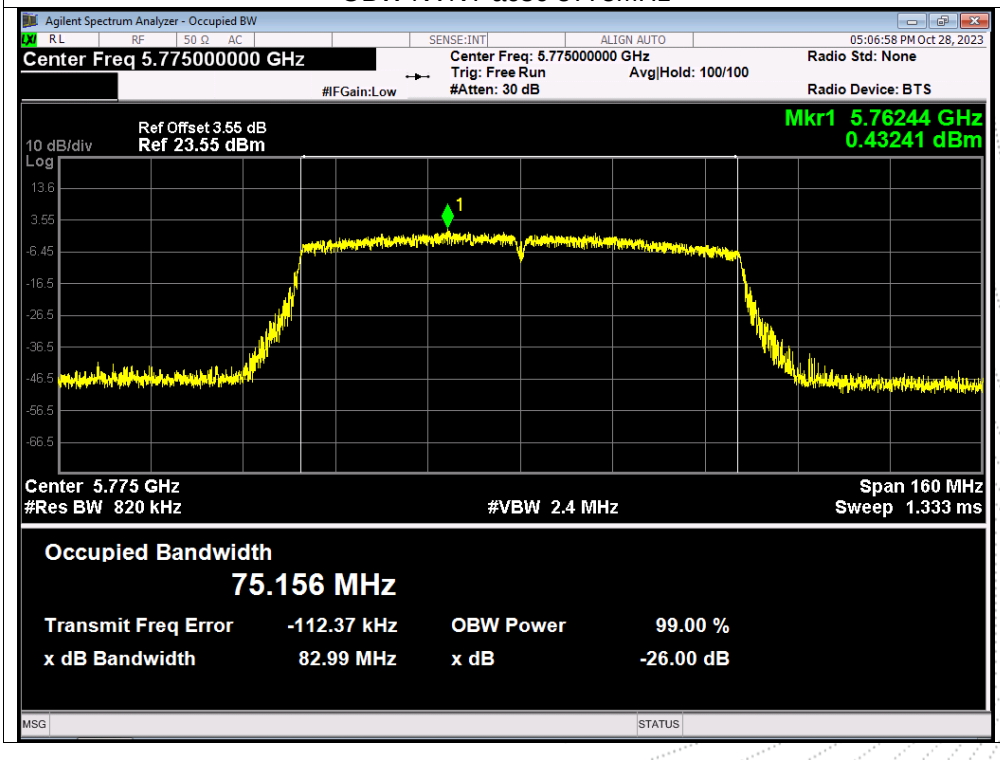
OBW NVNT ac40 5755MHz



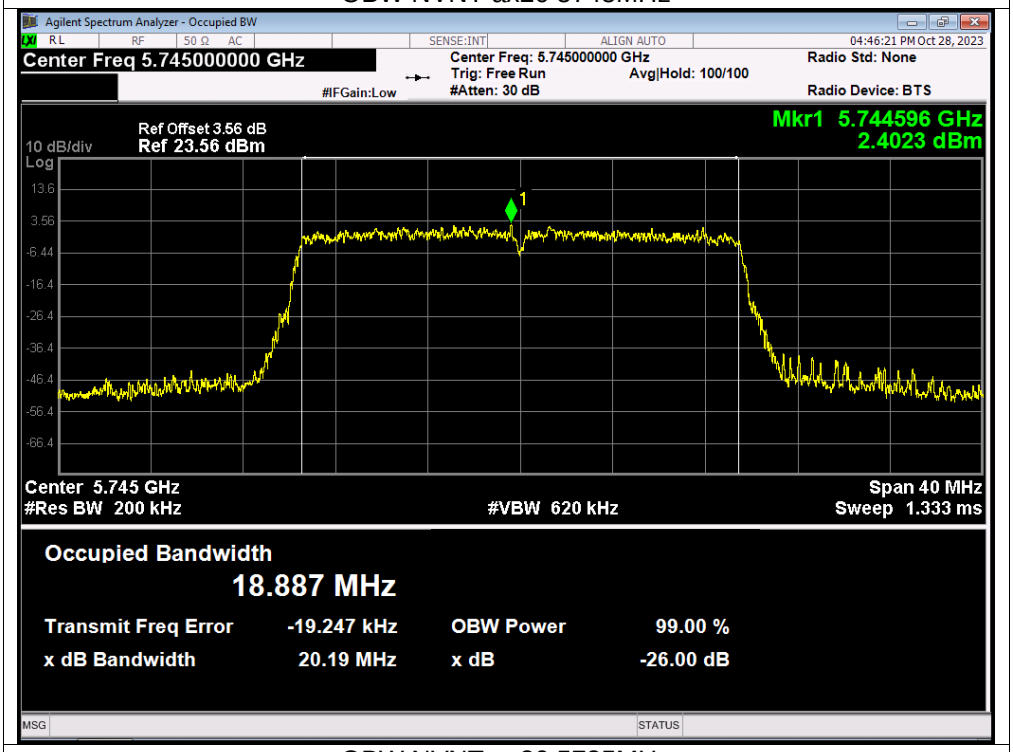
OBW NVNT ac40 5795MHz



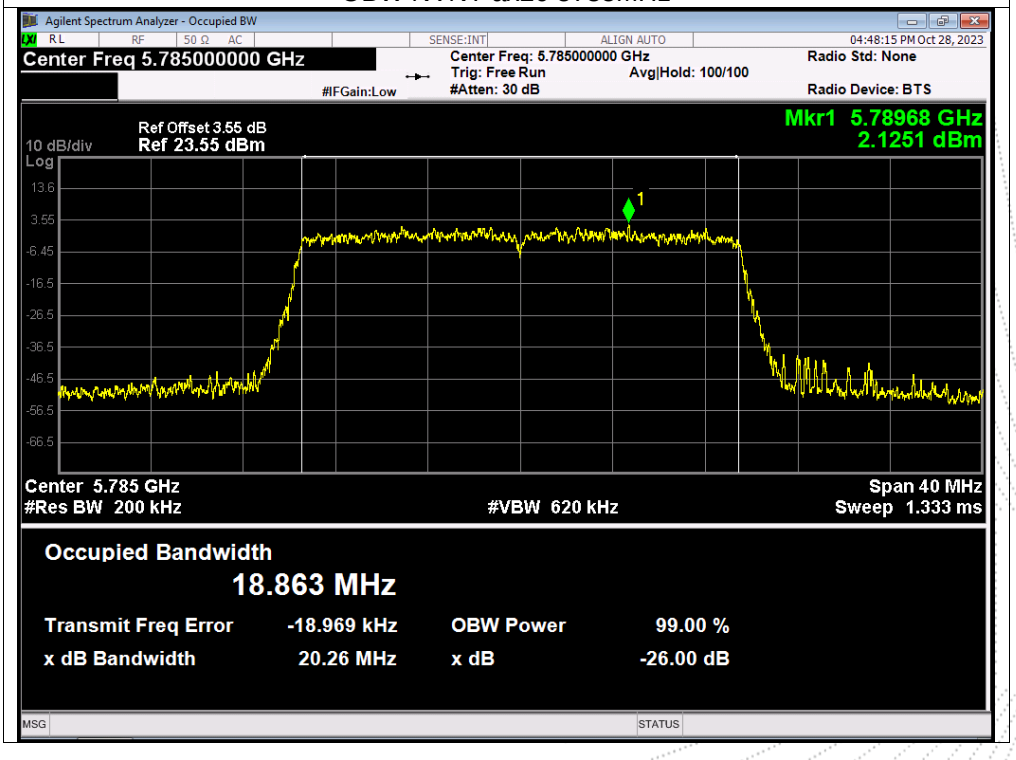
OBW NVNT ac80 5775MHz



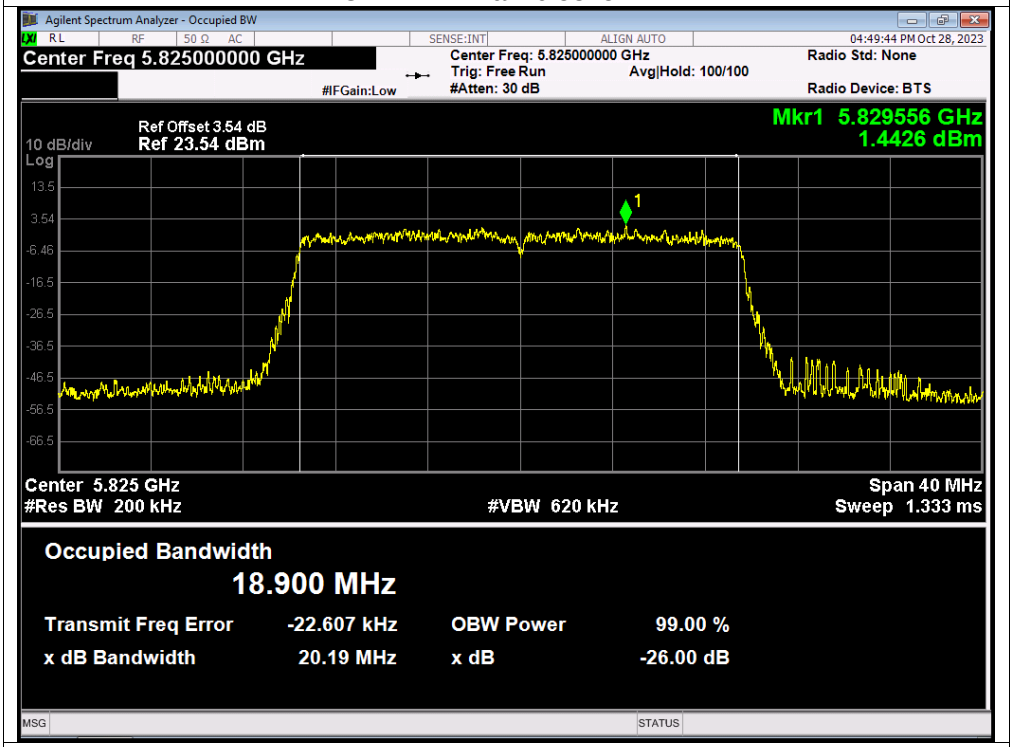
OBW NVNT ax20 5745MHz



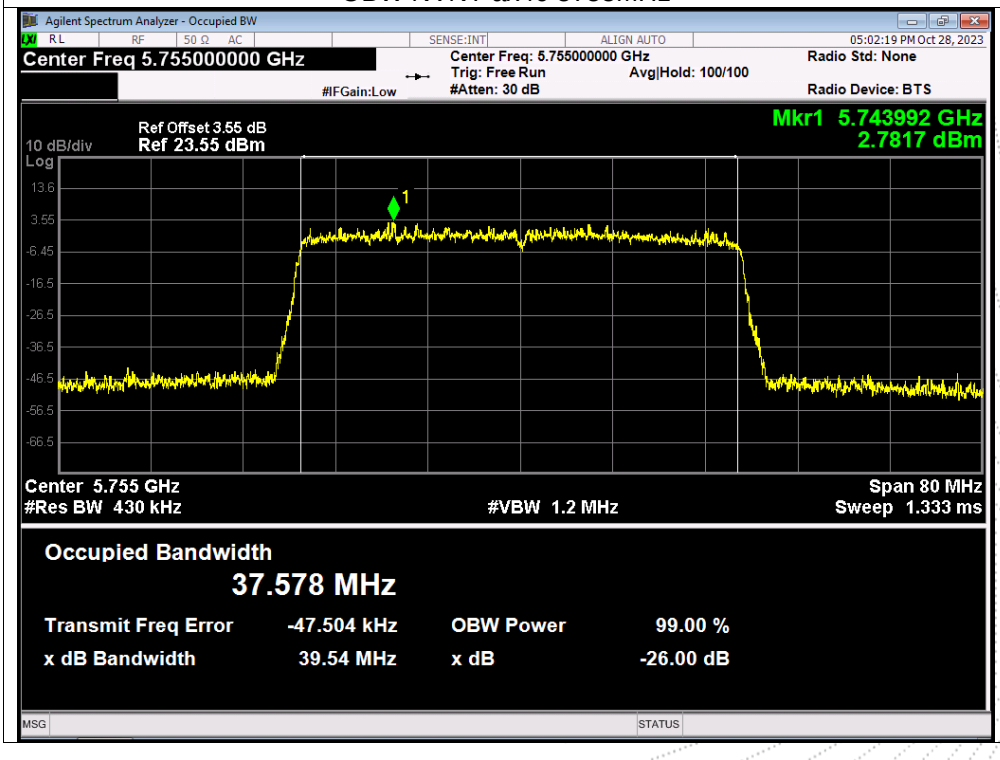
OBW NVNT ax20 5785MHz



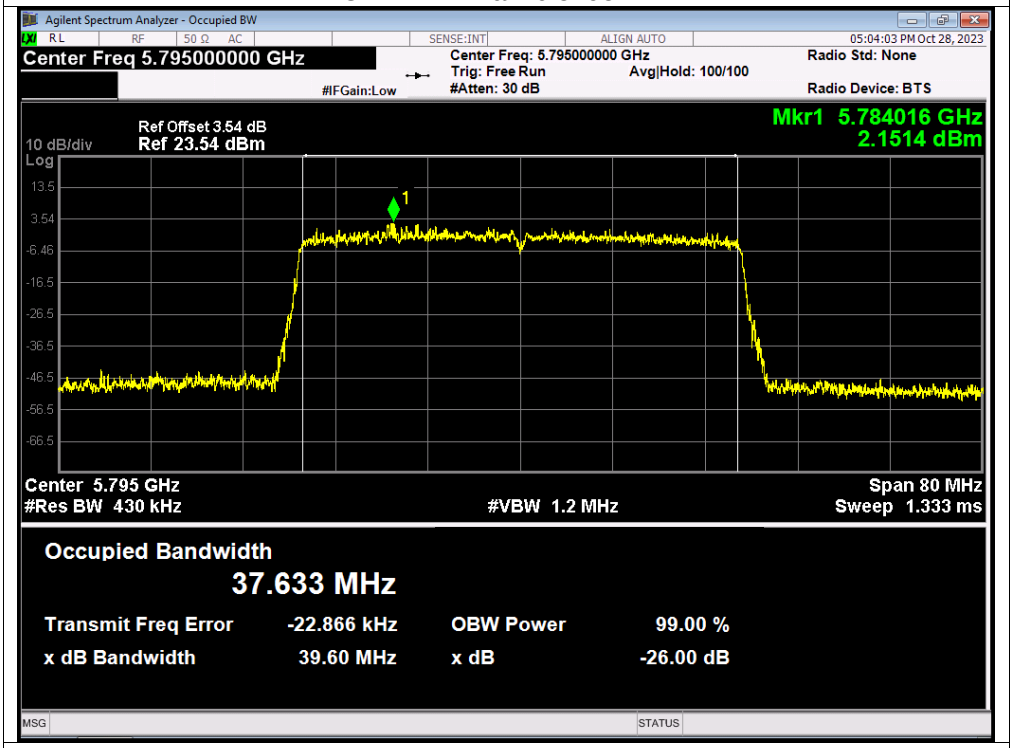
OBW NVNT ax20 5825MHz



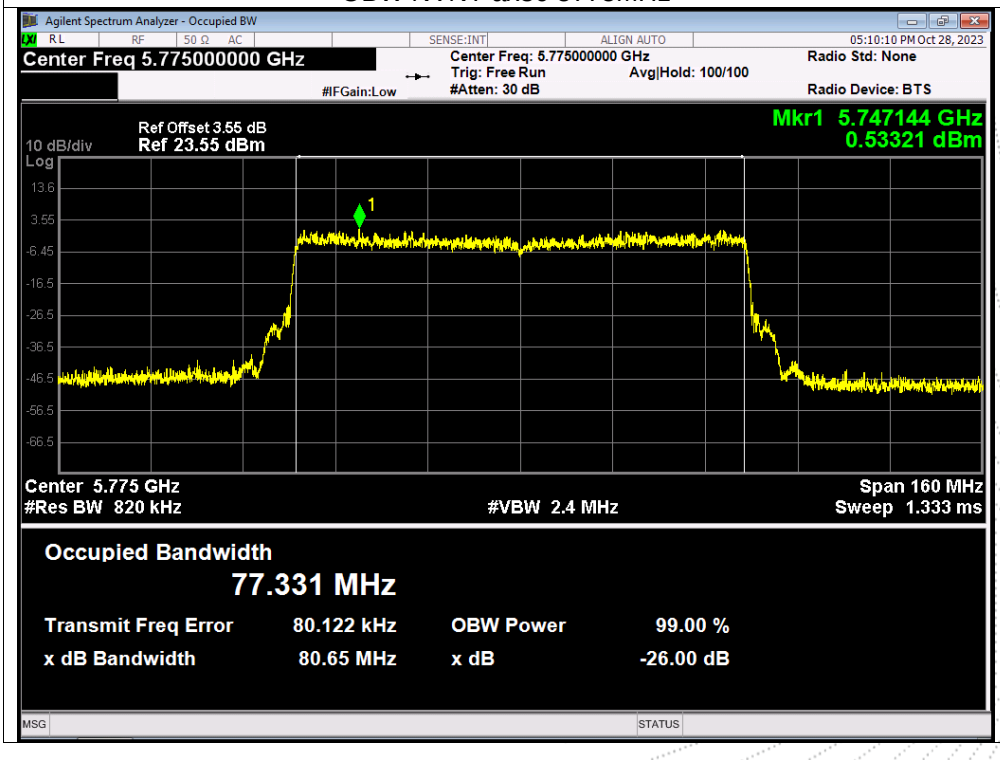
OBW NVNT ax40 5755MHz



OBW NVNT ax40 5795MHz

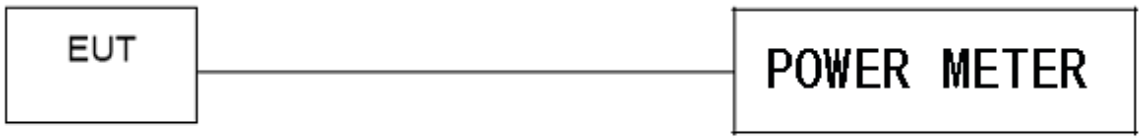


OBW NVNT ax80 5775MHz



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	0.25W
5250~5350	0.25W
5500~5700	0.25W
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 12V
Test Mode:	5180-5240MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)		Total(dBm)	Limit (dBm)	Verdict
			Ant A	Ant B			
NVNT	a	5180	11.93	12.67	/	24	Pass
NVNT	a	5200	11.84	12.92	/	24	Pass
NVNT	a	5240	11.7	11.89	/	24	Pass
NVNT	n20	5180	10.43	11.8	14.18	23.22	Pass
NVNT	n20	5200	10.56	11.42	14.02	23.22	Pass
NVNT	n20	5240	9.67	10.87	13.32	23.22	Pass
NVNT	n40	5190	8.72	9.74	12.27	23.22	Pass
NVNT	n40	5230	8.63	9.19	11.93	23.22	Pass
NVNT	ac20	5180	10.59	11.9	14.30	23.22	Pass
NVNT	ac20	5200	9.94	11.71	13.92	23.22	Pass
NVNT	ac20	5240	10.08	10.87	13.50	23.22	Pass
NVNT	ac40	5190	8.25	9.99	12.22	23.22	Pass
NVNT	ac40	5230	8.59	9.43	12.04	23.22	Pass
NVNT	ac80	5210	6.96	8.06	10.56	23.22	Pass
NVNT	ax20	5180	10.97	11.83	14.43	23.22	Pass
NVNT	ax20	5200	10.79	11.83	14.35	23.22	Pass
NVNT	ax20	5240	10.36	10.72	13.55	23.22	Pass
NVNT	ax40	5190	8.2	10.01	12.21	23.22	Pass
NVNT	ax40	5230	8.54	9.33	11.96	23.22	Pass
NVNT	ax80	5210	6.36	7.67	10.07	23.22	Pass

Note:
Antenna A gain:3.77dBi, Antenna B gain: 3.77dBi, Directional gain=[GainANT + 10 log(NANT) dBi] =6.78dbi>6dbi
Limit=24-(6.78-6)=23.22 dbi

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 12V
Test Mode:	5260-5320MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)		Total(dBm)	Limit (dBm)	Verdict
			Ant A	Ant B			
NVNT	a	5260	11.62	12.77	/	24	Pass
NVNT	a	5280	11.01	12.62	/	24	Pass
NVNT	a	5320	11.53	13.04	/	24	Pass
NVNT	n20	5260	9.98	11.51	13.82	22.33	Pass
NVNT	n20	5280	10.4	11.74	14.13	22.33	Pass
NVNT	n20	5320	10.34	11.87	14.18	22.33	Pass
NVNT	n40	5270	9	10.14	12.62	22.33	Pass
NVNT	n40	5310	9.06	10.42	12.80	22.33	Pass
NVNT	ac20	5260	10.17	11.61	13.96	22.33	Pass
NVNT	ac20	5280	10.49	11.59	14.09	22.33	Pass
NVNT	ac20	5320	10.54	11.93	14.30	22.33	Pass
NVNT	ac40	5270	9.05	10.42	12.80	22.33	Pass
NVNT	ac40	5310	9.06	10.52	12.86	22.33	Pass
NVNT	ac80	5290	7.46	8.75	11.16	22.33	Pass
NVNT	ax20	5260	10.35	11.4	13.92	22.33	Pass
NVNT	ax20	5280	10.61	11.69	14.19	22.33	Pass
NVNT	ax20	5320	10.44	11.66	14.10	22.33	Pass
NVNT	ax40	5270	9.06	10.01	12.57	22.33	Pass
NVNT	ax40	5310	8.94	10.17	12.61	22.33	Pass
NVNT	ax80	5290	7.41	8.42	10.95	22.33	Pass

Note:
Antenna A gain:4.66dBi, Antenna B gain: 4.66dBi, Directional gain=[GainANT + 10 log(NANT) dBi] =7.67dbi>6dbi
Limit=24-(7.67-6)=22.33 dbi

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 12V
Test Mode:	5500-5700MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)		Total(dBm)	Limit (dBm)	Verdict
			Ant A	Ant B			
NVNT	a	5500	11.49	13.21	/	24	Pass
NVNT	a	5580	11.86	13.42	/	24	Pass
NVNT	a	5700	12.85	14.64	/	24	Pass
NVNT	n20	5500	10.27	12.04	14.25	22.54	Pass
NVNT	n20	5580	10.72	12.28	14.58	22.54	Pass
NVNT	n20	5700	11.66	13.43	15.64	22.54	Pass
NVNT	n40	5510	8.81	10.53	12.76	22.54	Pass
NVNT	n40	5550	9.17	10.53	12.91	22.54	Pass
NVNT	n40	5670	9.73	11.42	13.67	22.54	Pass
NVNT	ac20	5500	10.07	11.9	14.09	22.54	Pass
NVNT	ac20	5580	10.62	12.33	14.57	22.54	Pass
NVNT	ac20	5700	11.7	13.46	15.68	22.54	Pass
NVNT	ac40	5510	8.64	10.43	12.64	22.54	Pass
NVNT	ac40	5550	9.29	10.43	12.91	22.54	Pass
NVNT	ac40	5670	9.64	11.48	13.67	22.54	Pass
NVNT	ac80	5530	8.22	9.59	11.97	22.54	Pass
NVNT	ax20	5500	10.03	12.14	14.22	22.54	Pass
NVNT	ax20	5580	10.46	12.27	14.47	22.54	Pass
NVNT	ax20	5700	11.68	13.29	15.57	22.54	Pass
NVNT	ax40	5510	8.74	10.34	12.62	22.54	Pass
NVNT	ax40	5550	8.96	10.29	12.69	22.54	Pass
NVNT	ax40	5670	9.7	11.35	13.61	22.54	Pass
NVNT	ax80	5530	8.2	9.6	11.97	22.54	Pass

Note:
Antenna A gain:4.45dBi, Antenna B gain: 4.45dBi, Directional gain=[GainANT + 10 log(NANT) dBi] =7.46dbi>6dbi
Limit=24-(7.46-6)=22.54 dbi

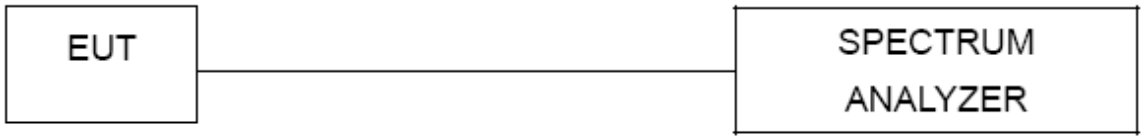
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 12V
Test Mode:	5745-5825MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)		Total(dBm)	Limit (dBm)	Verdict
			Ant A	Ant B			
NVNT	a	5745	13.13	12.39	/	30	Pass
NVNT	a	5785	12.39	11.72	/	30	Pass
NVNT	a	5825	11.92	11.15	/	30	Pass
NVNT	n20	5745	11.88	11.33	14.62	29.17	Pass
NVNT	n20	5785	11.08	10.82	13.96	29.17	Pass
NVNT	n20	5825	10.62	10.06	13.36	29.17	Pass
NVNT	n40	5755	10.37	9.58	13.00	29.17	Pass
NVNT	n40	5795	9.67	8.91	12.32	29.17	Pass
NVNT	ac20	5745	11.86	11.21	14.56	29.17	Pass
NVNT	ac20	5785	11.06	10.76	13.92	29.17	Pass
NVNT	ac20	5825	10.6	9.87	13.26	29.17	Pass
NVNT	ac40	5755	10.26	9.5	12.91	29.17	Pass
NVNT	ac40	5795	9.52	8.86	12.21	29.17	Pass
NVNT	ac80	5775	7.97	7.23	10.63	29.17	Pass
NVNT	ax20	5745	11.59	11.22	14.42	29.17	Pass
NVNT	ax20	5785	10.94	10.36	13.67	29.17	Pass
NVNT	ax20	5825	10.19	9.77	13.00	29.17	Pass
NVNT	ax40	5755	10.15	9.4	12.80	29.17	Pass
NVNT	ax40	5795	9.52	8.78	12.18	29.17	Pass
NVNT	ax80	5775	7.94	7.31	10.65	29.17	Pass

Note:
Antenna A gain:3.82dBi, Antenna B gain: 3.82dBi, Directional gain=[GainANT + 10 log(NANT) dBi]
=6.83dbi>6dbi
Limit=30-(6.83-6)=29.17 dbi

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.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) 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

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

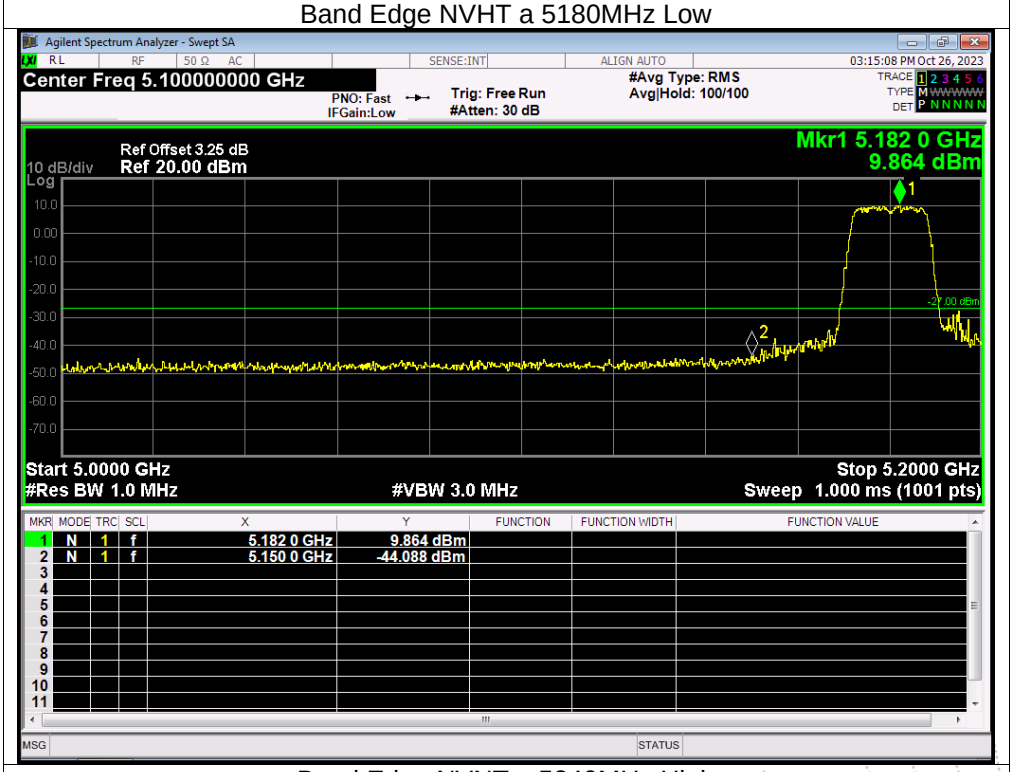
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data

11.5 Test Result

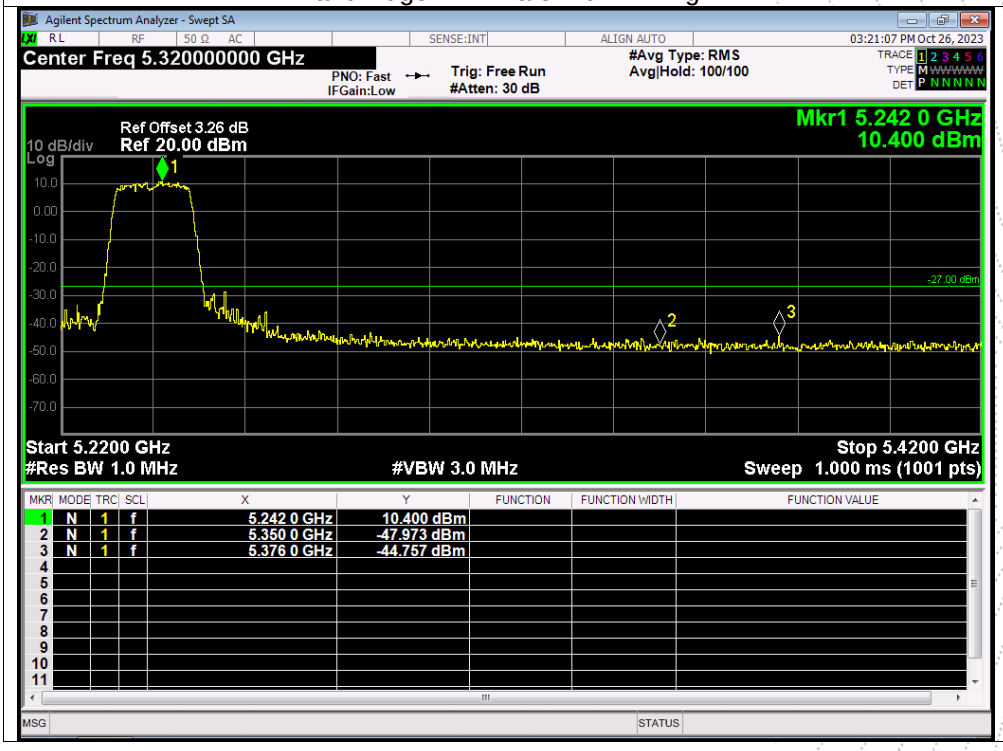
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna B, only shown Antenna B Plot.

Test Graphs

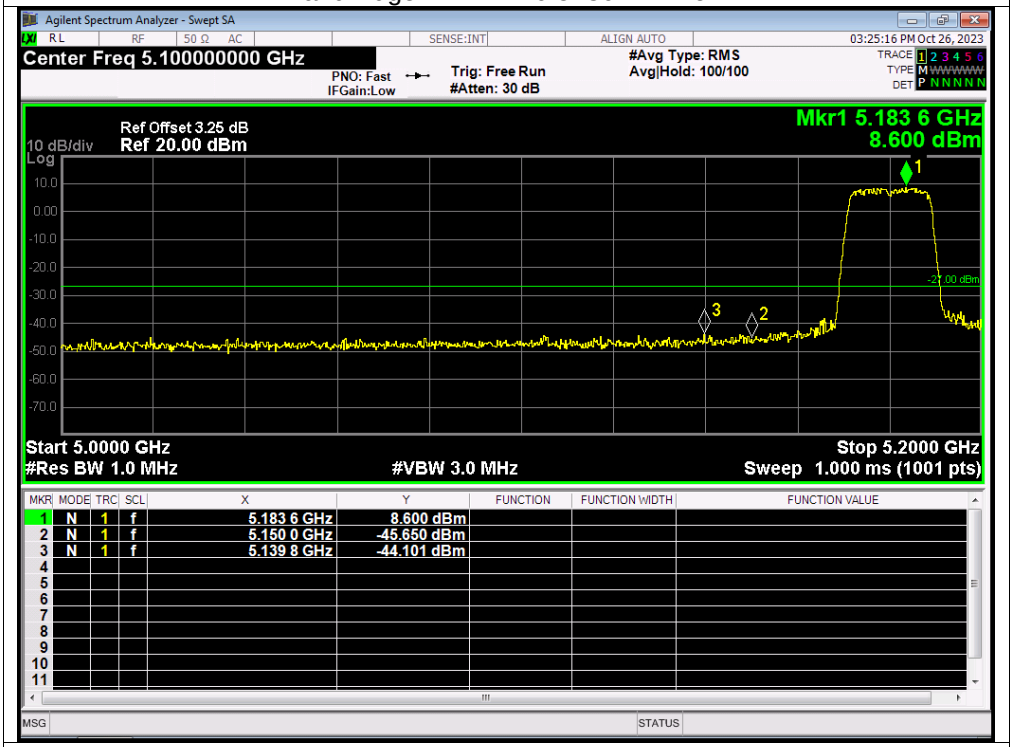
Band Edge NVHT a 5180MHz Low



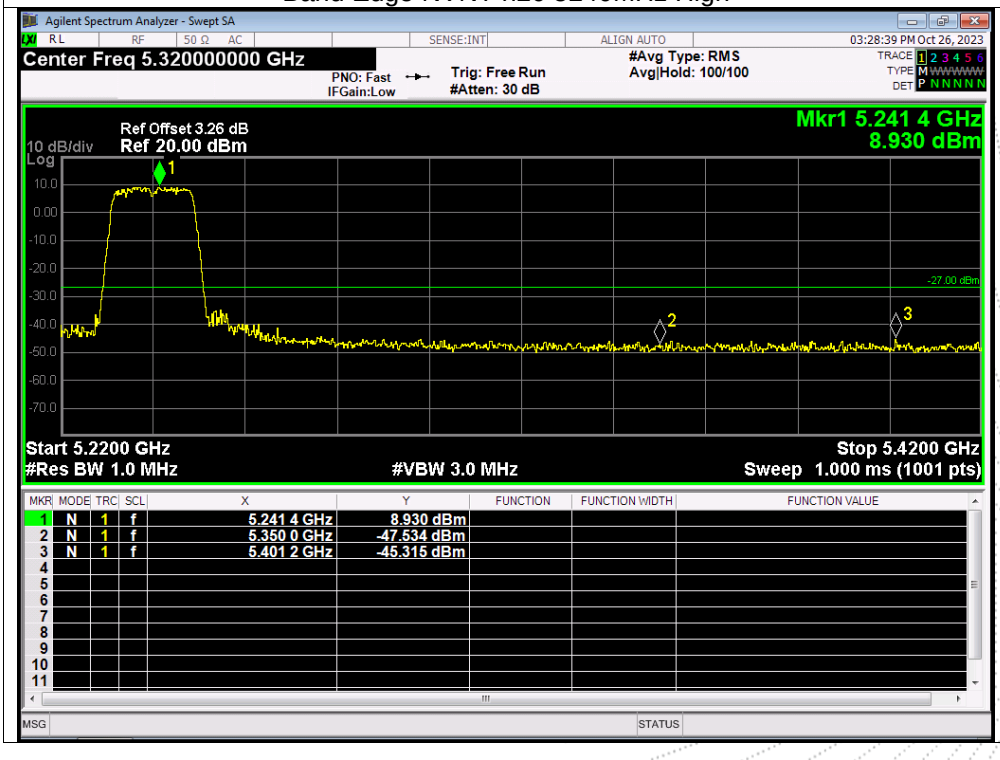
Band Edge NVNT a 5240MHz High



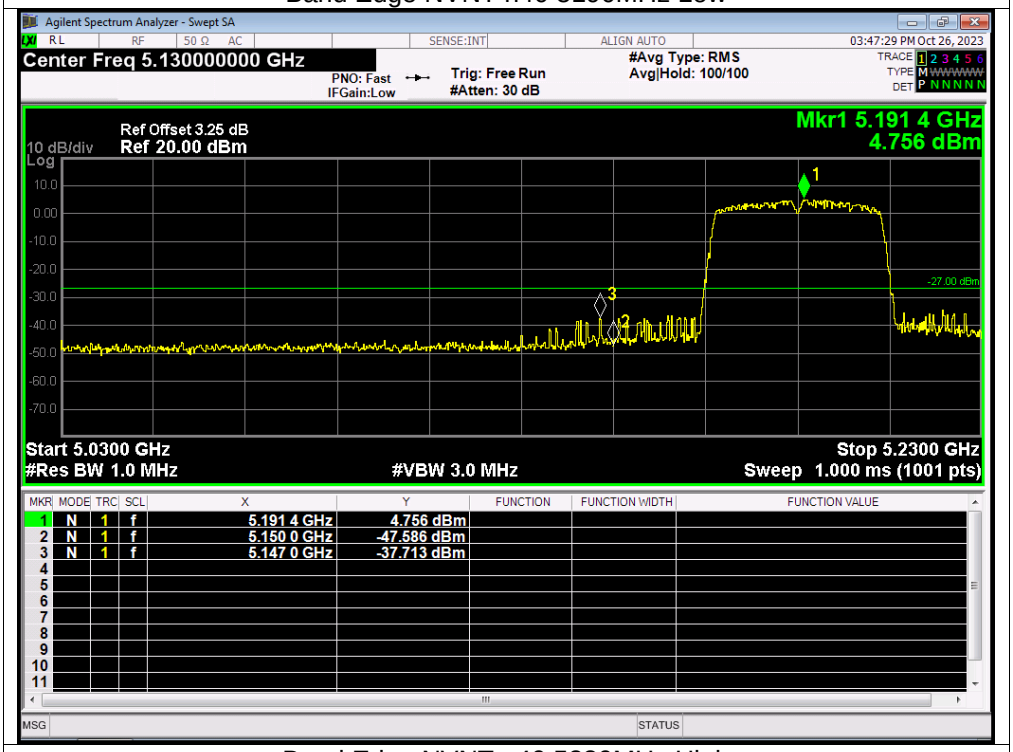
Band Edge NVNT n20 5180MHz Low



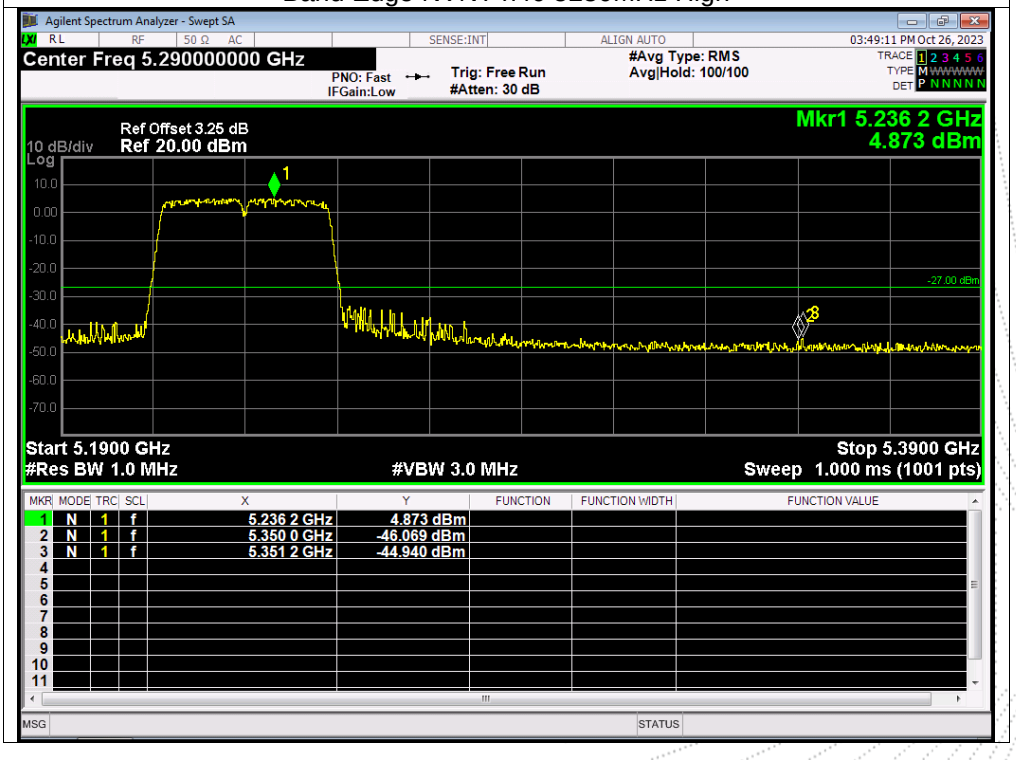
Band Edge NVNT n20 5240MHz High



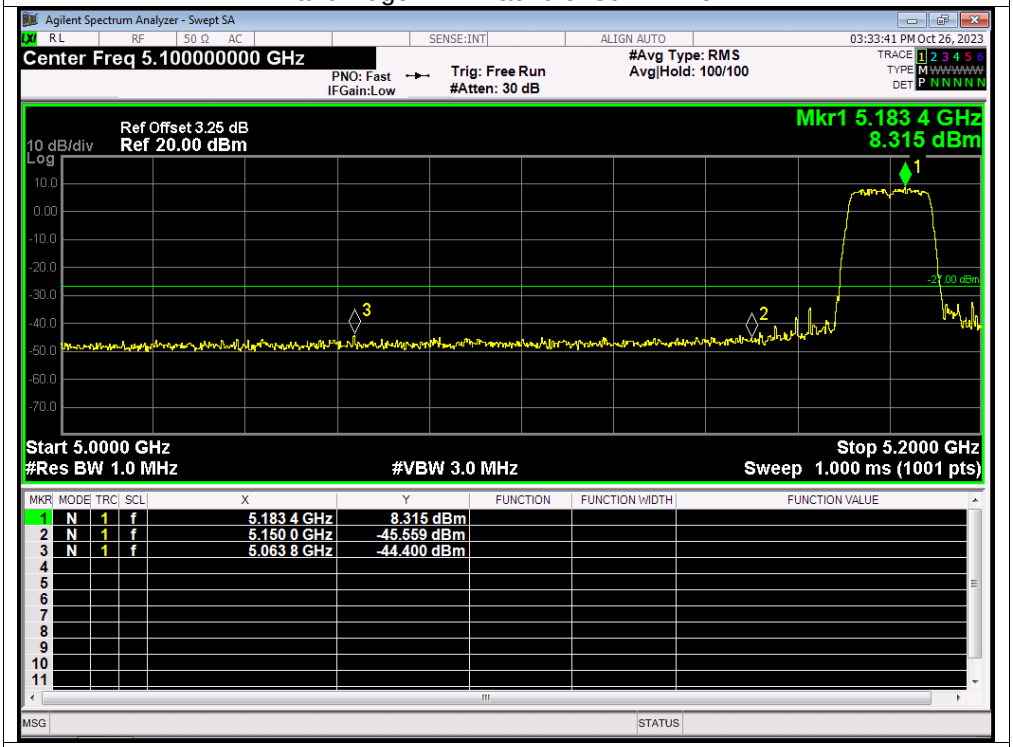
Band Edge NVNT n40 5190MHz Low



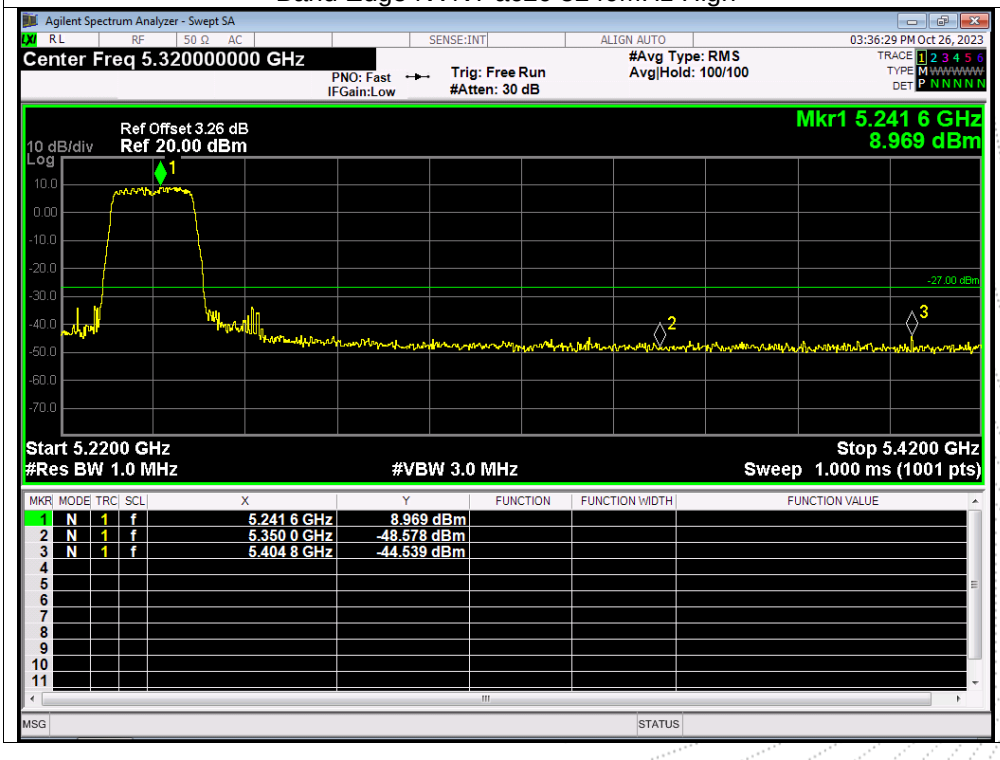
Band Edge NVNT n40 5230MHz High



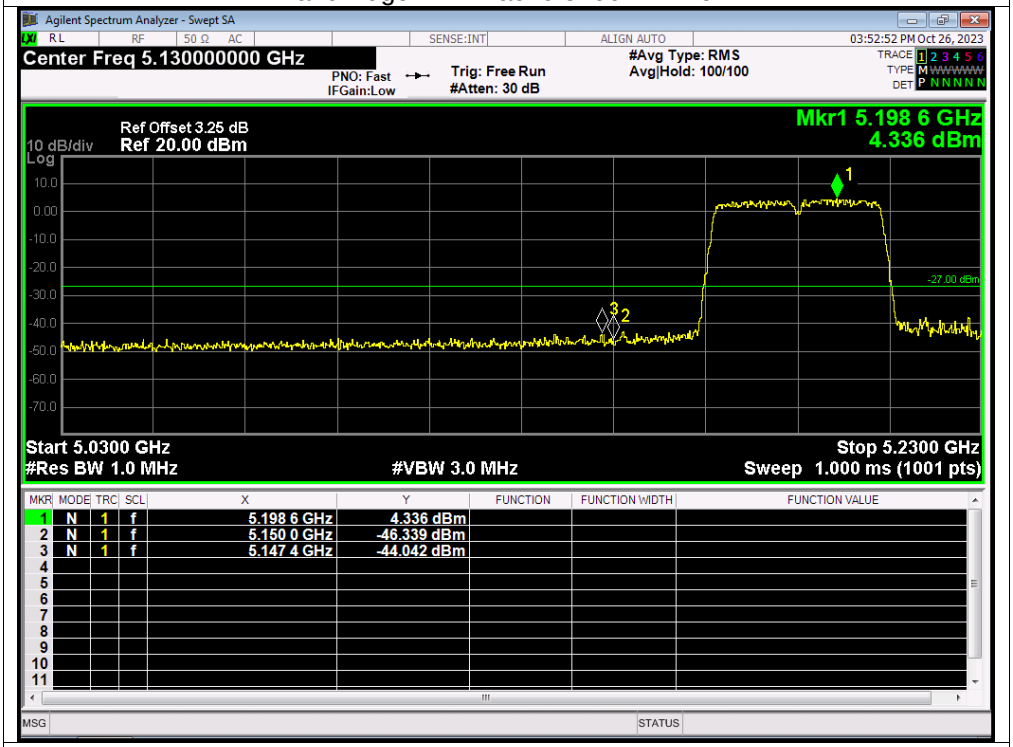
Band Edge NVNT ac20 5180MHz Low



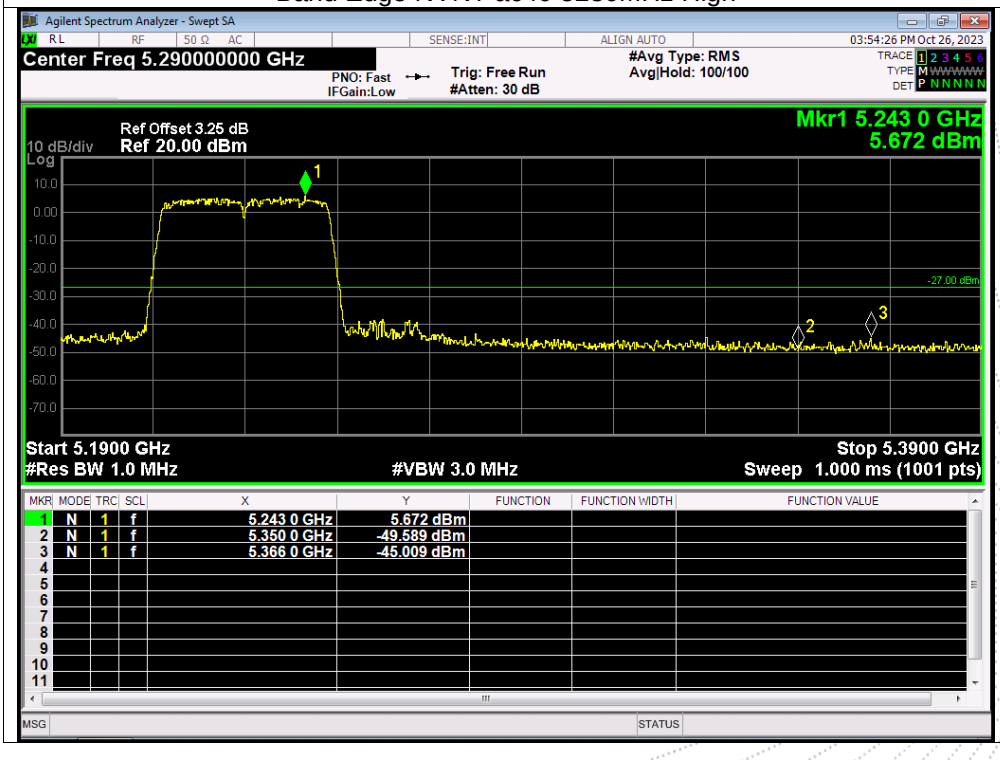
Band Edge NVNT ac20 5240MHz High



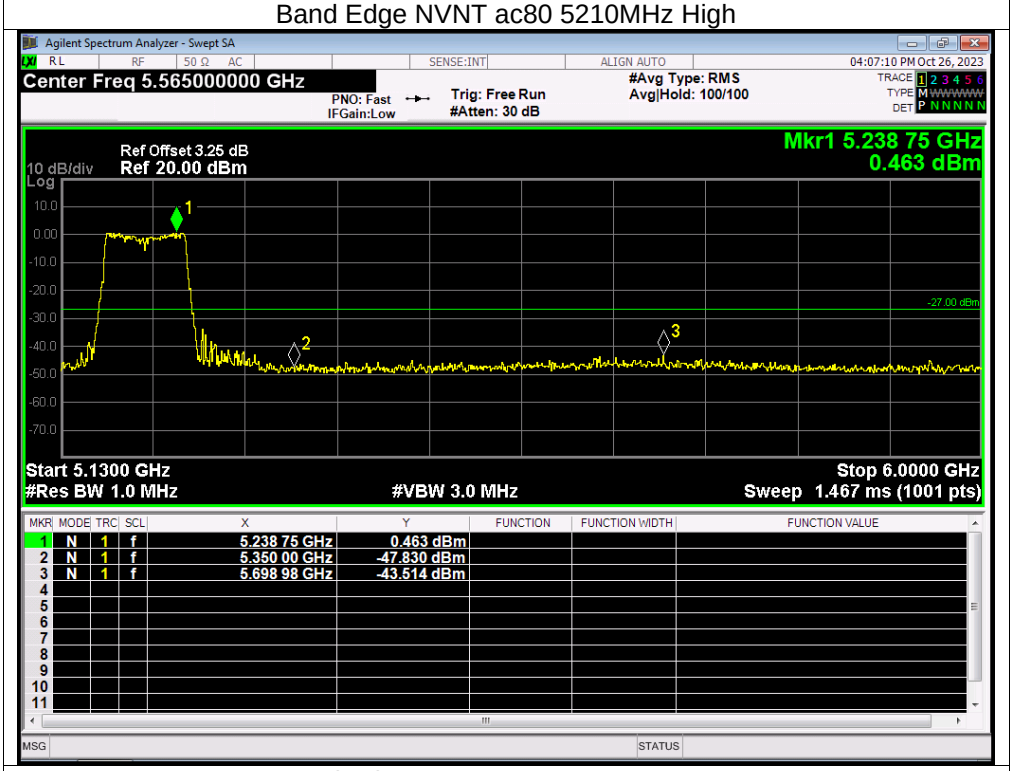
Band Edge NVNT ac40 5190MHz Low



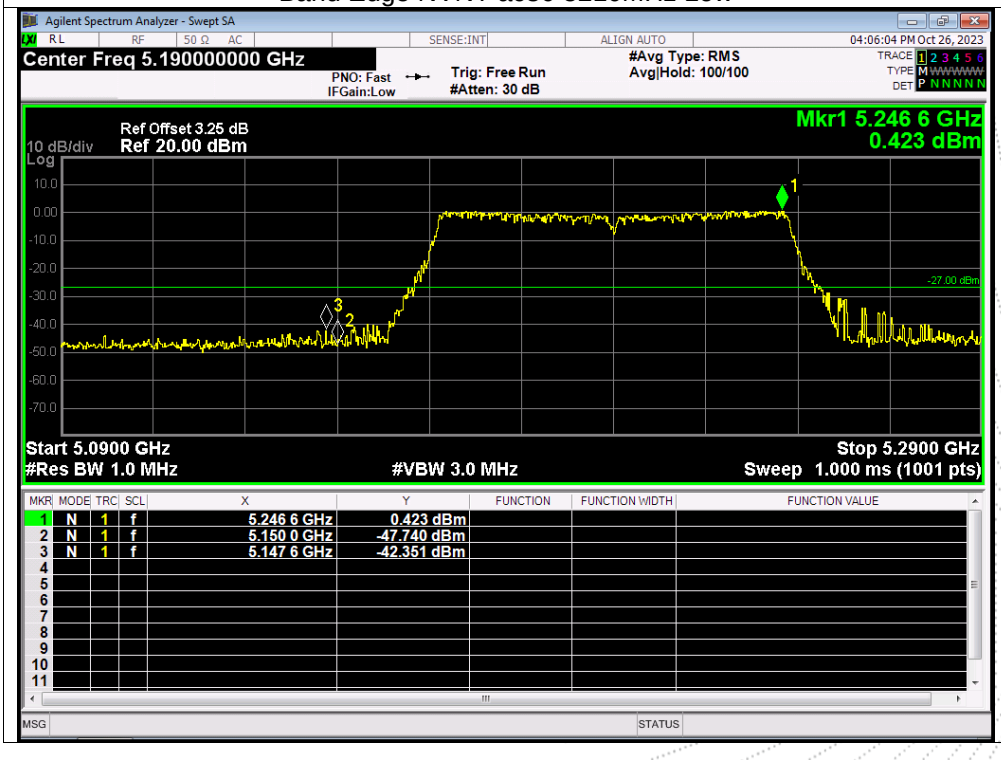
Band Edge NVNT ac40 5230MHz High



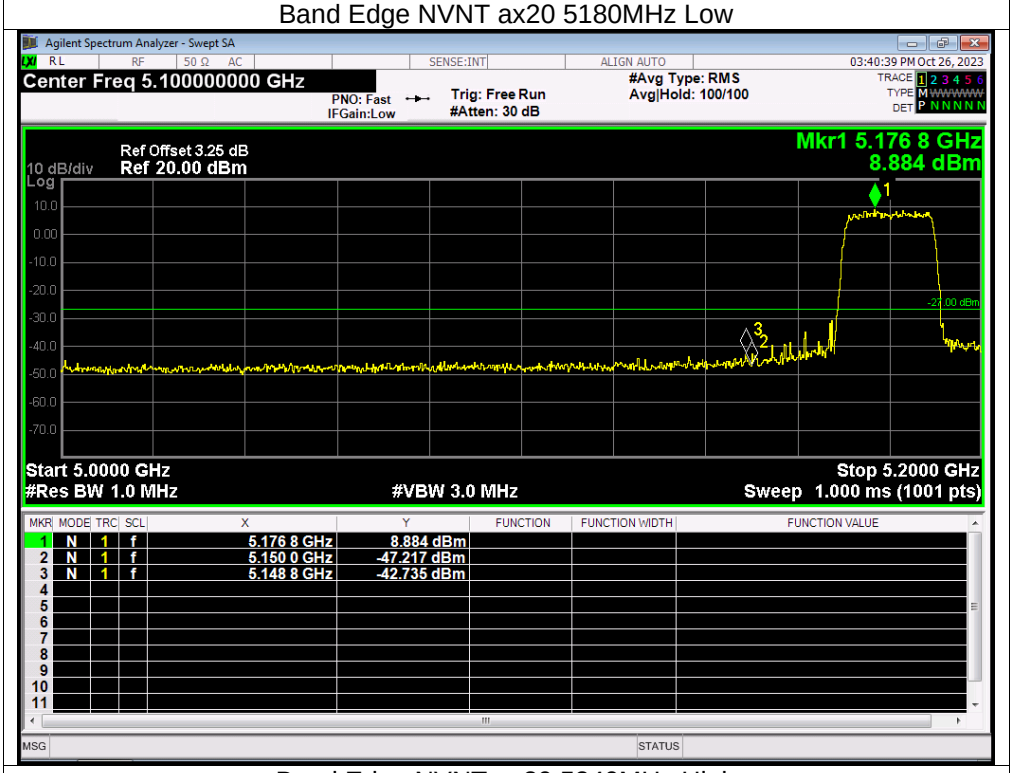
Band Edge NVNT ac80 5210MHz High



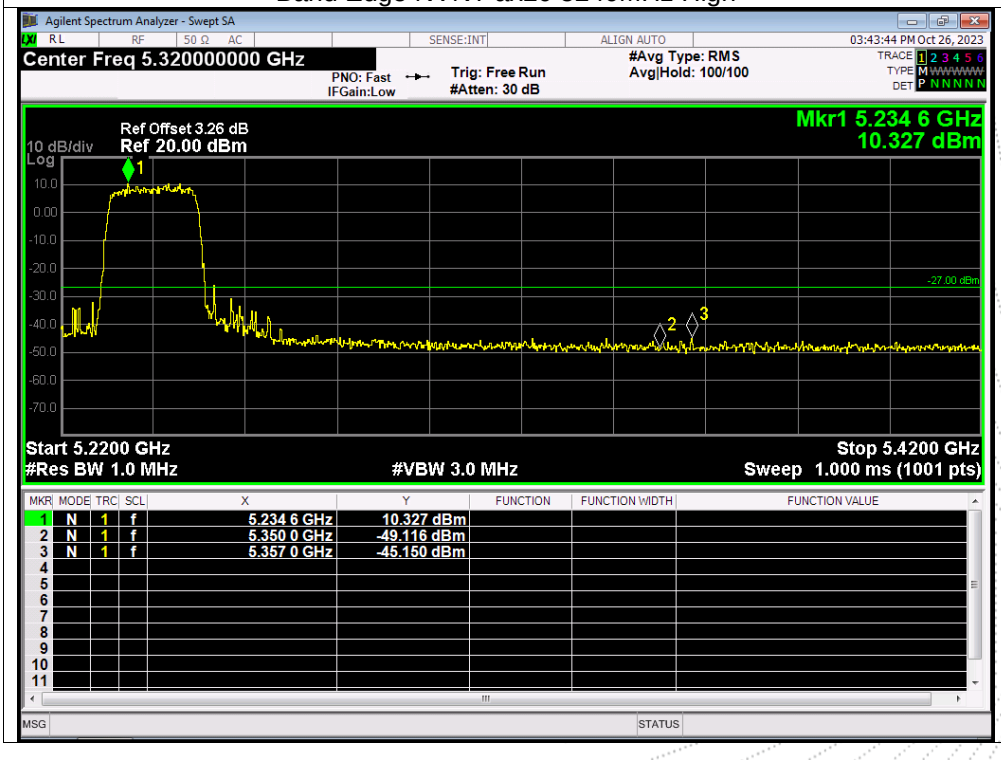
Band Edge NVNT ac80 5210MHz Low



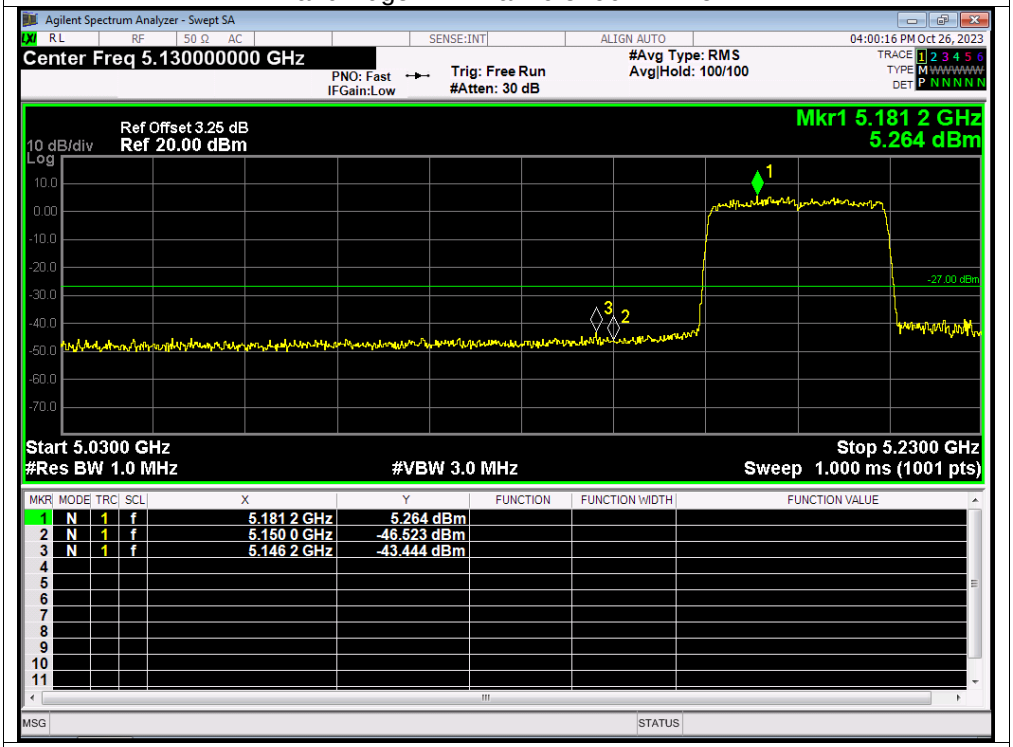
Band Edge NVNT ax20 5180MHz Low



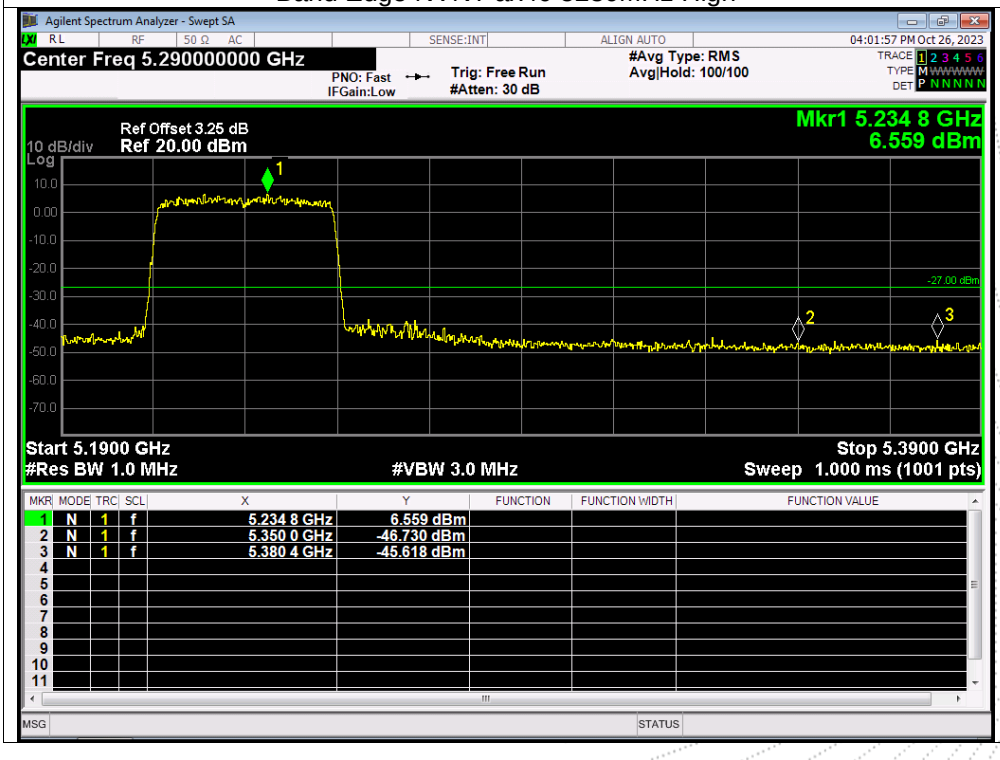
Band Edge NVNT ax20 5240MHz High



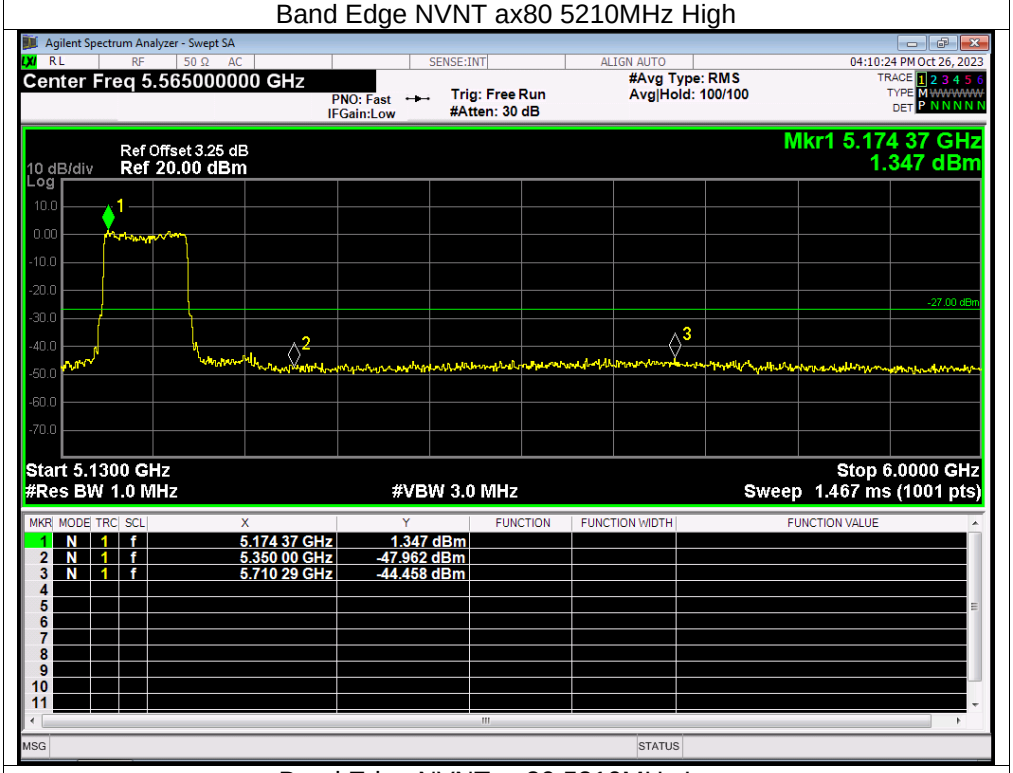
Band Edge NVNT ax40 5190MHz Low



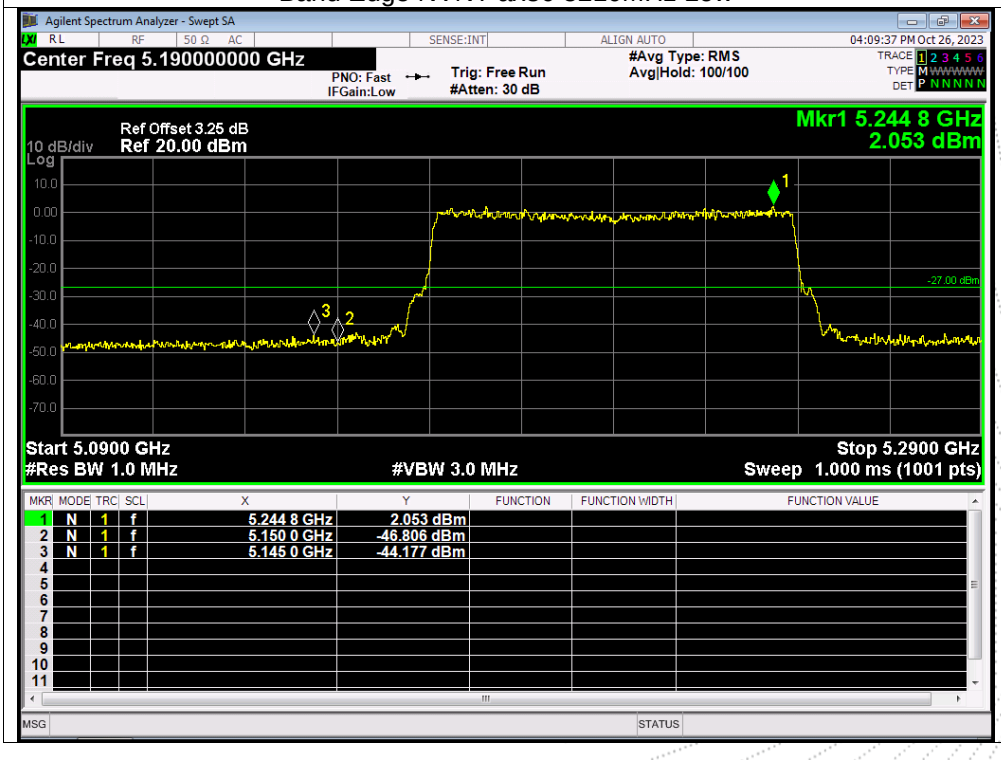
Band Edge NVNT ax40 5230MHz High



Band Edge NVNT ax80 5210MHz High



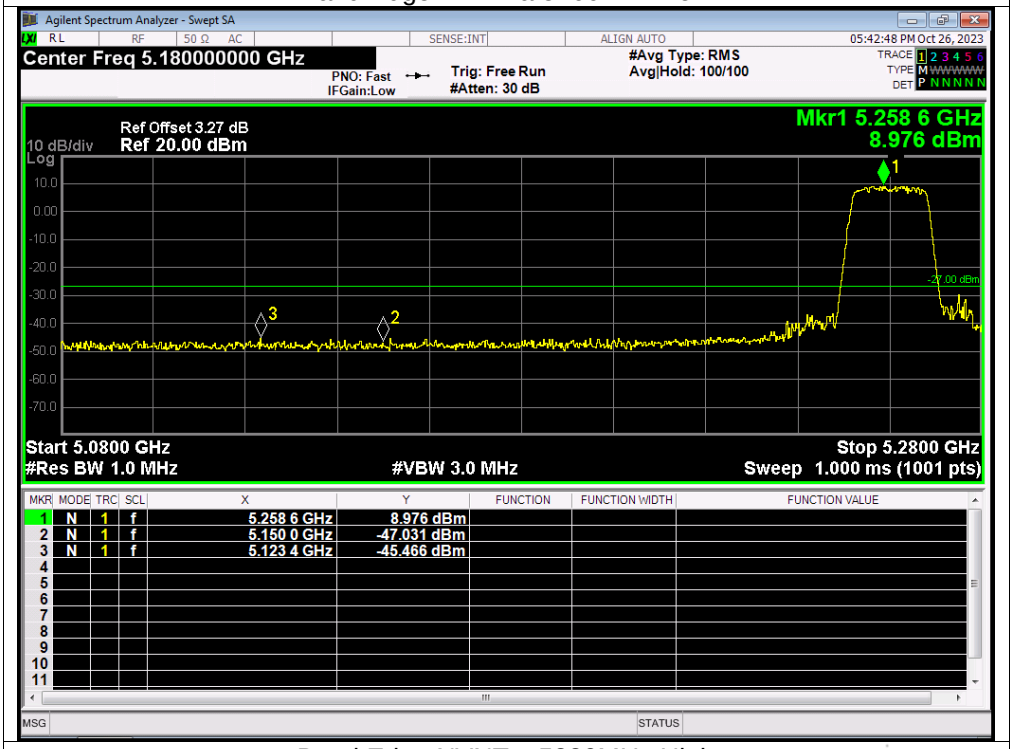
Band Edge NVNT ax80 5210MHz Low



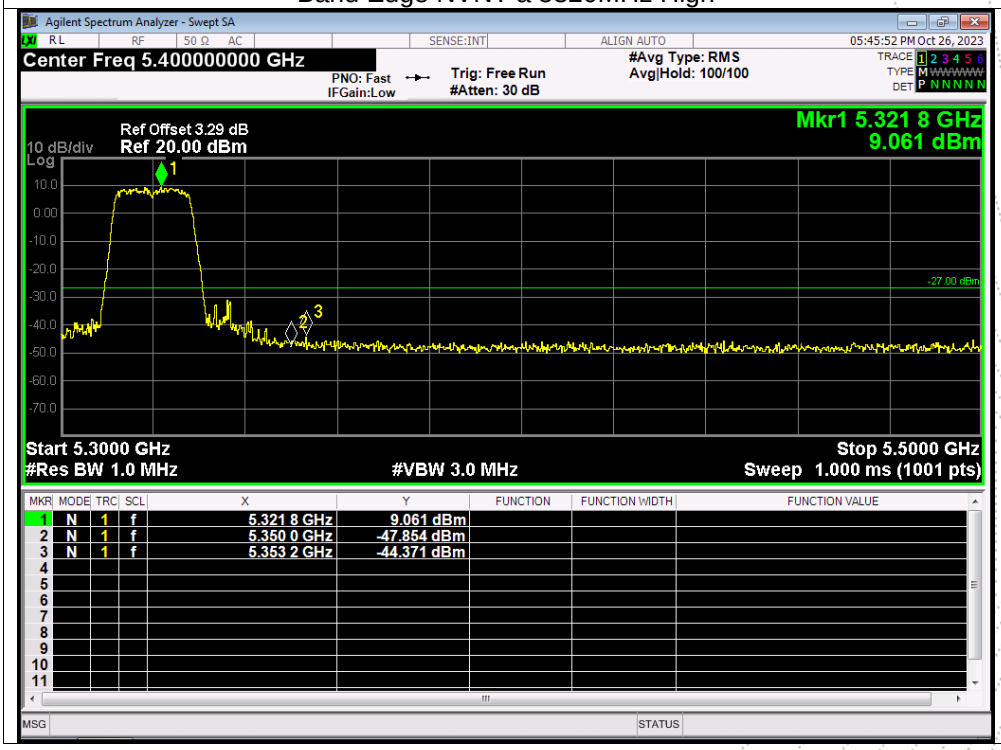
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A Plot.

Test Graphs

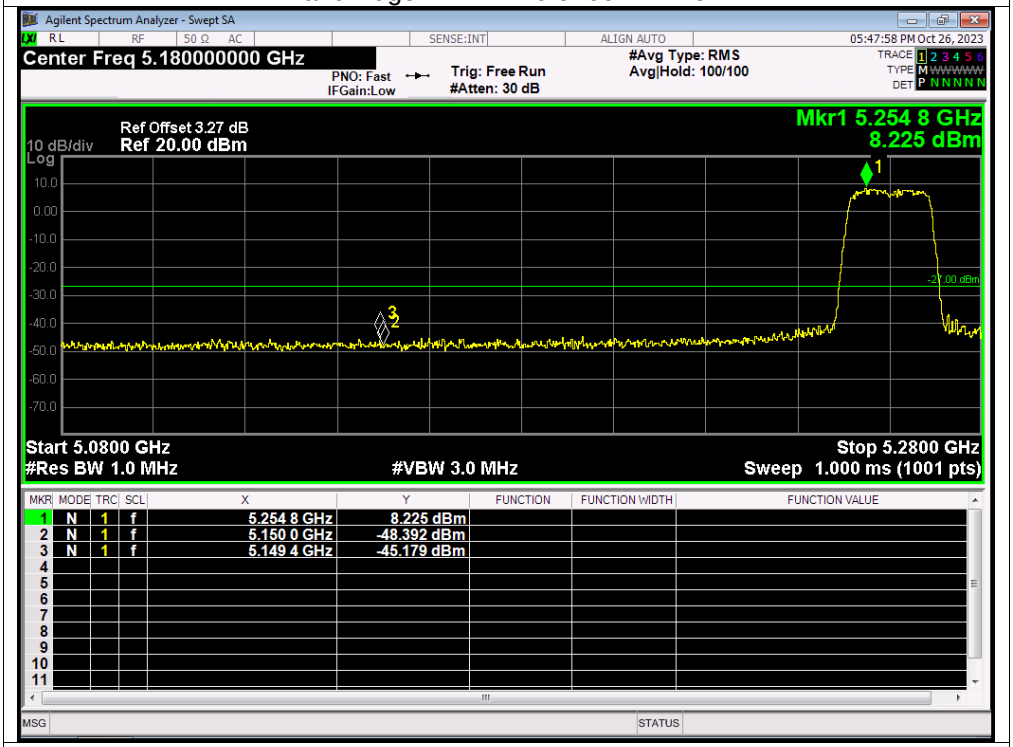
Band Edge NVNT a 5260MHz Low



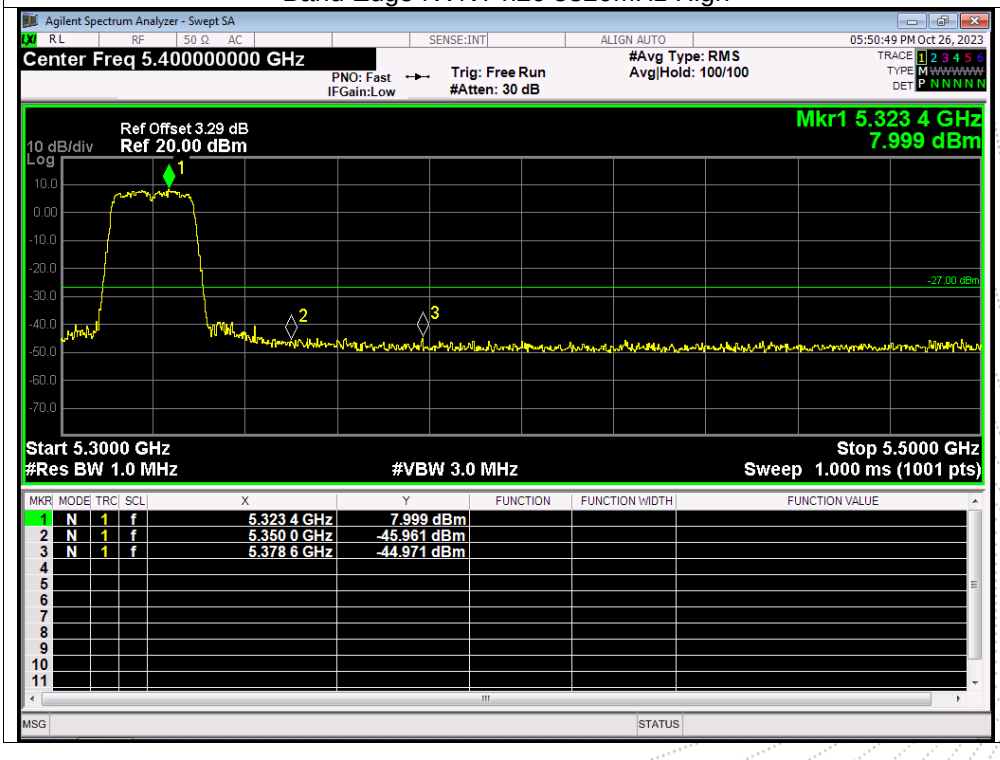
Band Edge NVNT a 5320MHz High



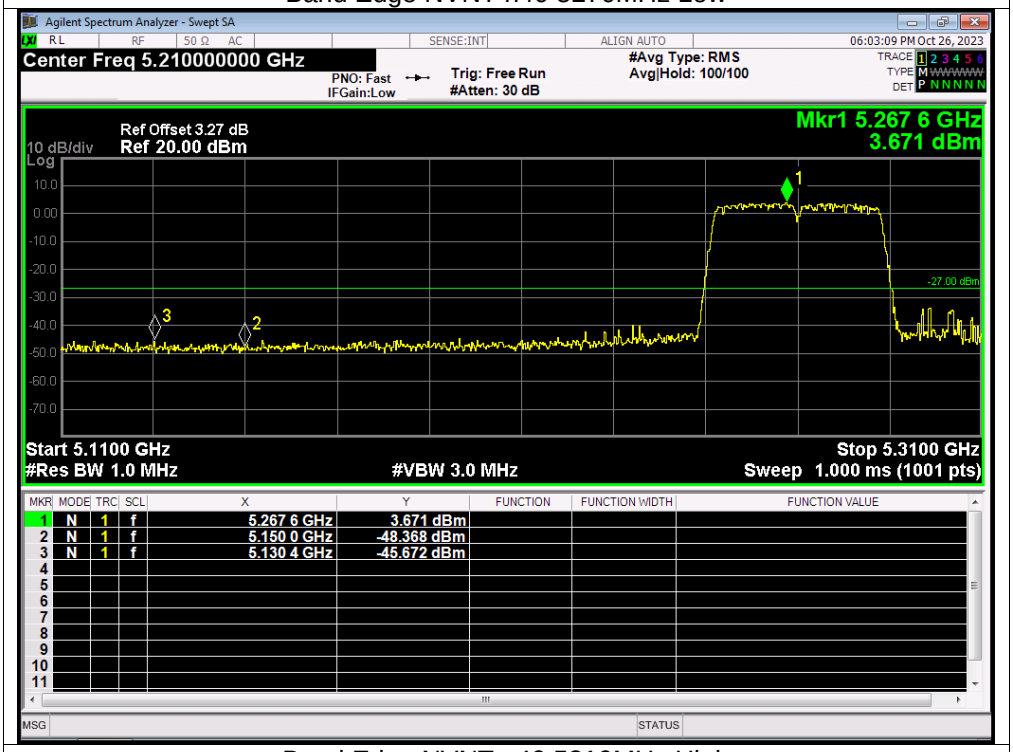
Band Edge NVNT n20 5260MHz Low



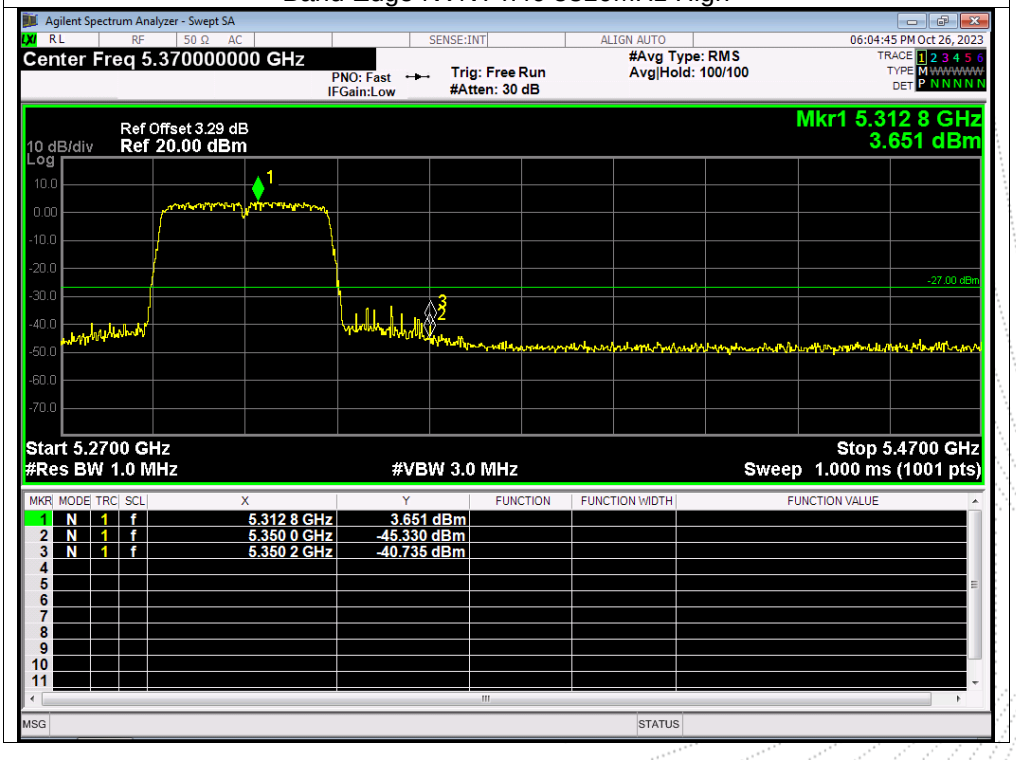
Band Edge NVNT n20 5320MHz High



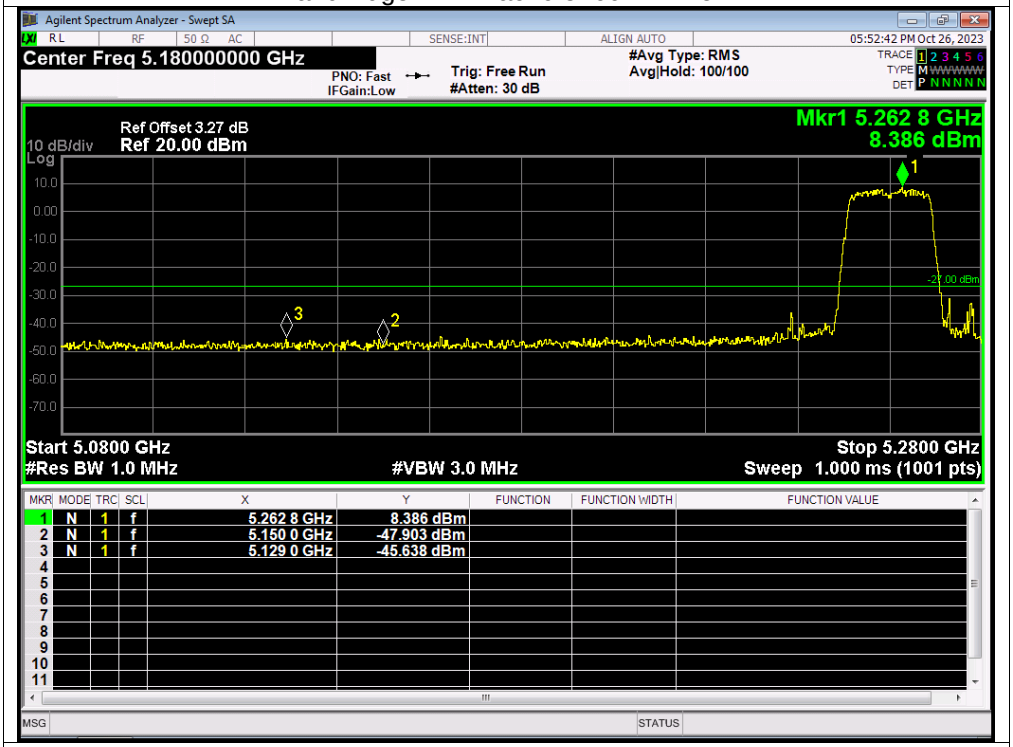
Band Edge NVNT n40 5270MHz Low



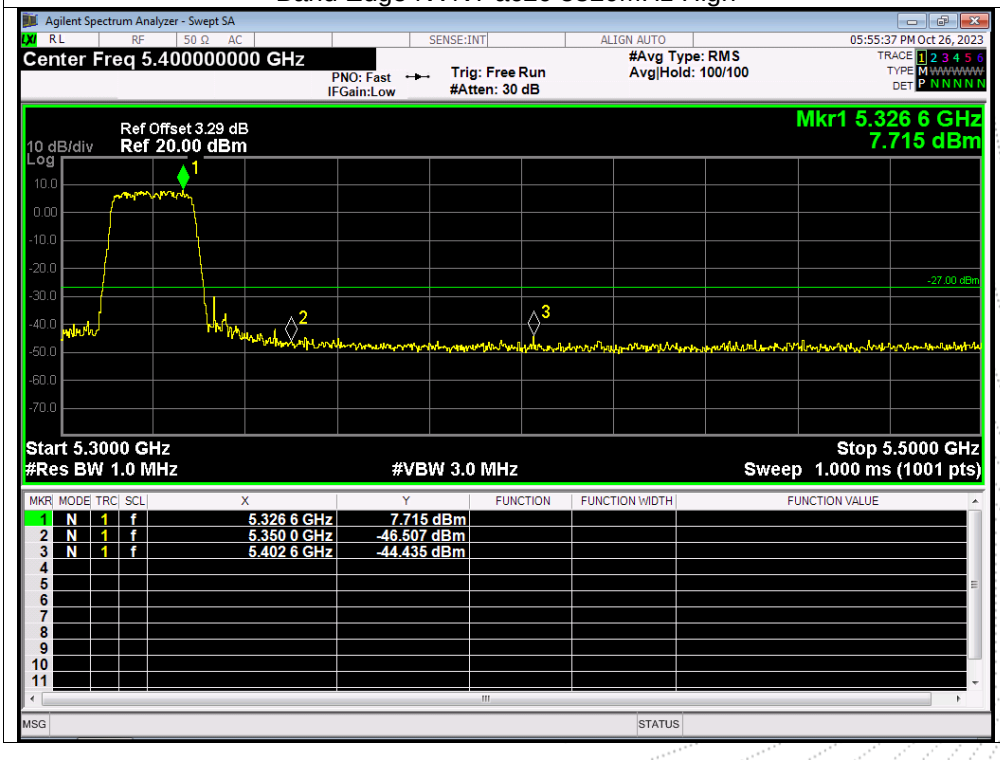
Band Edge NVNT n40 5310MHz High



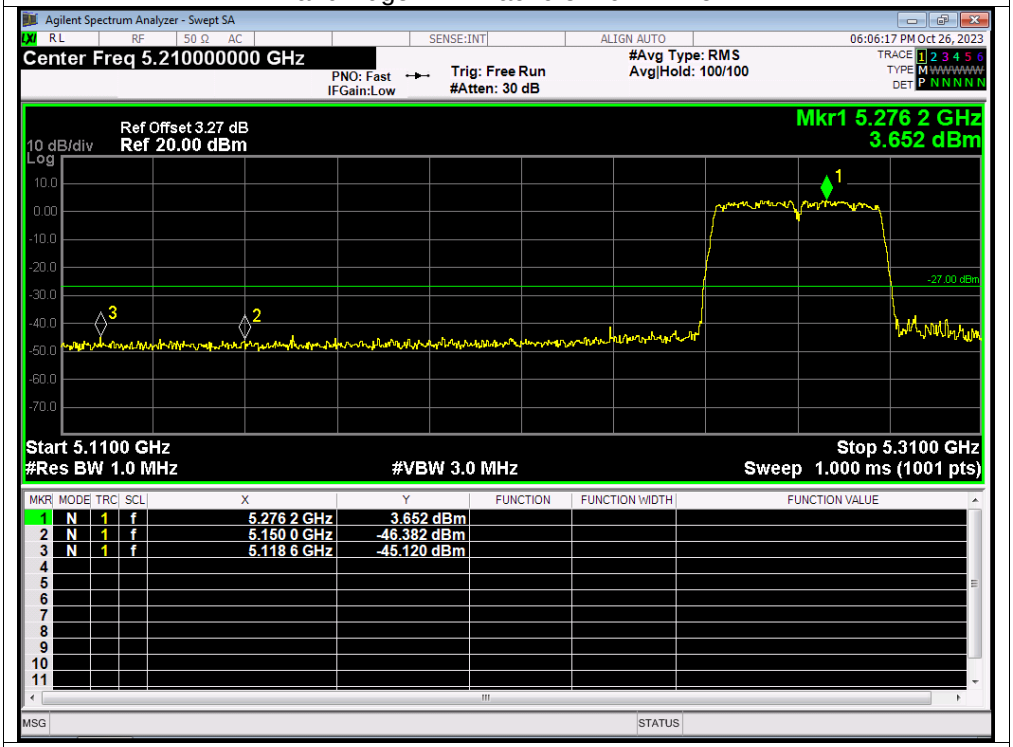
Band Edge NVNT ac20 5260MHz Low



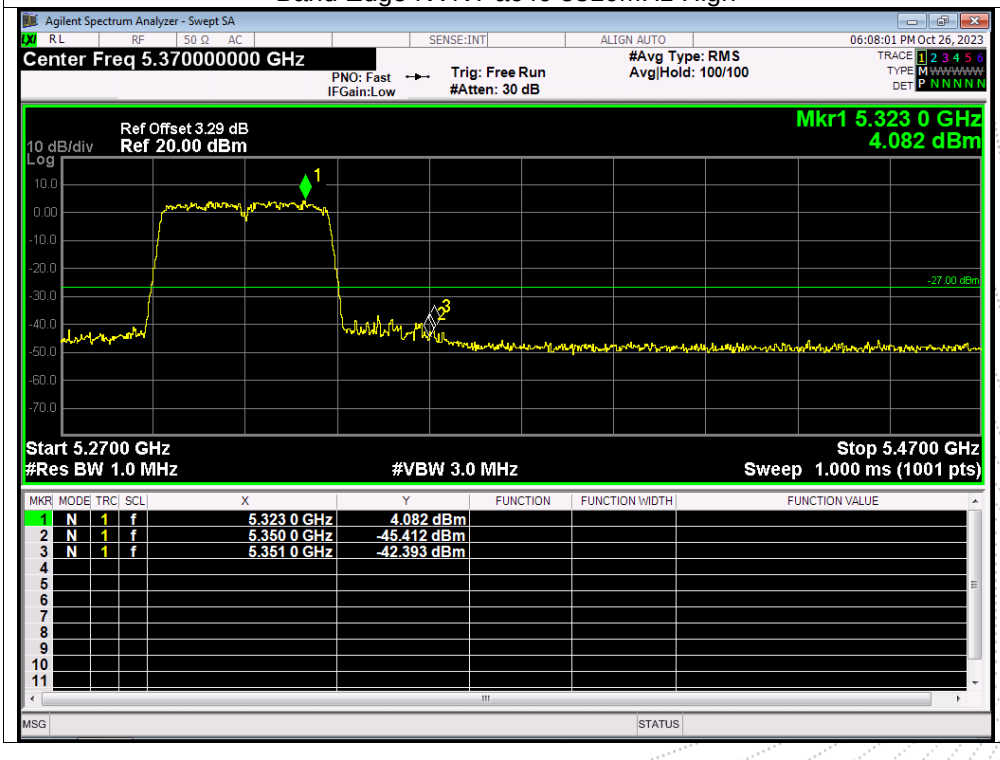
Band Edge NVNT ac20 5320MHz High



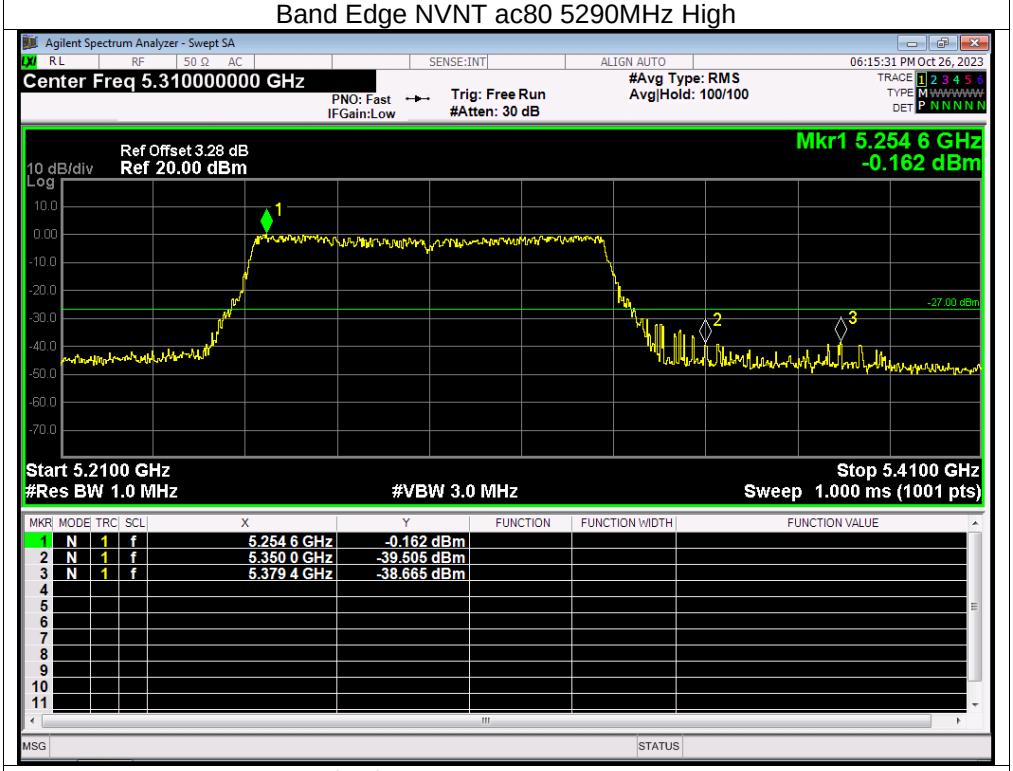
Band Edge NVNT ac40 5270MHz Low



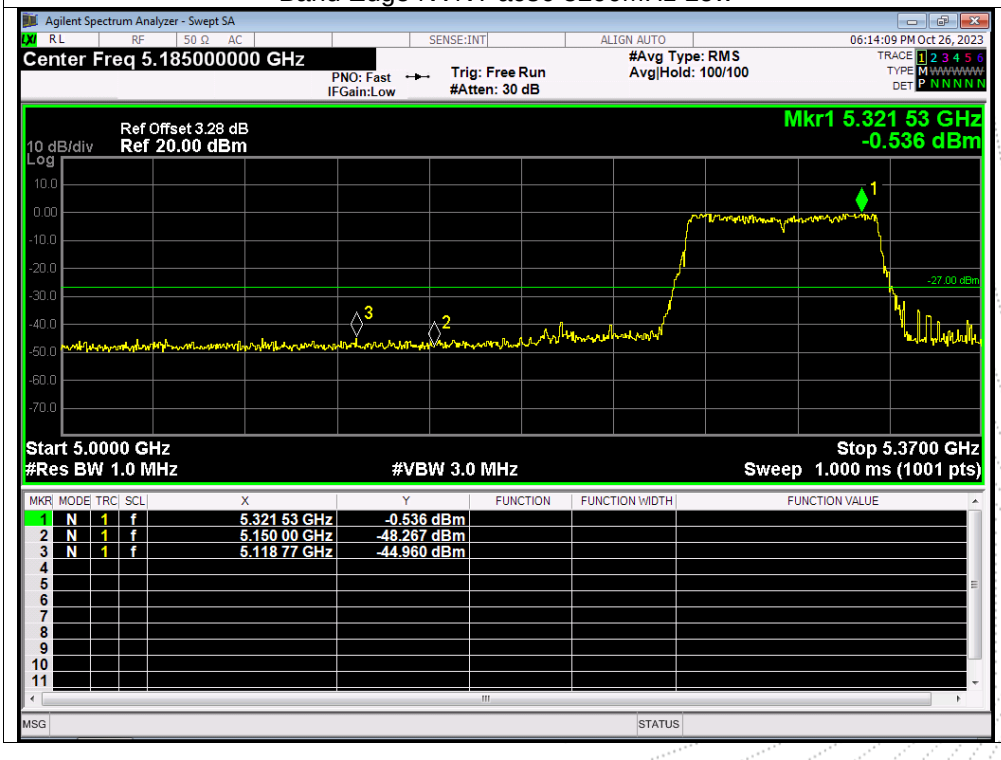
Band Edge NVNT ac40 5310MHz High



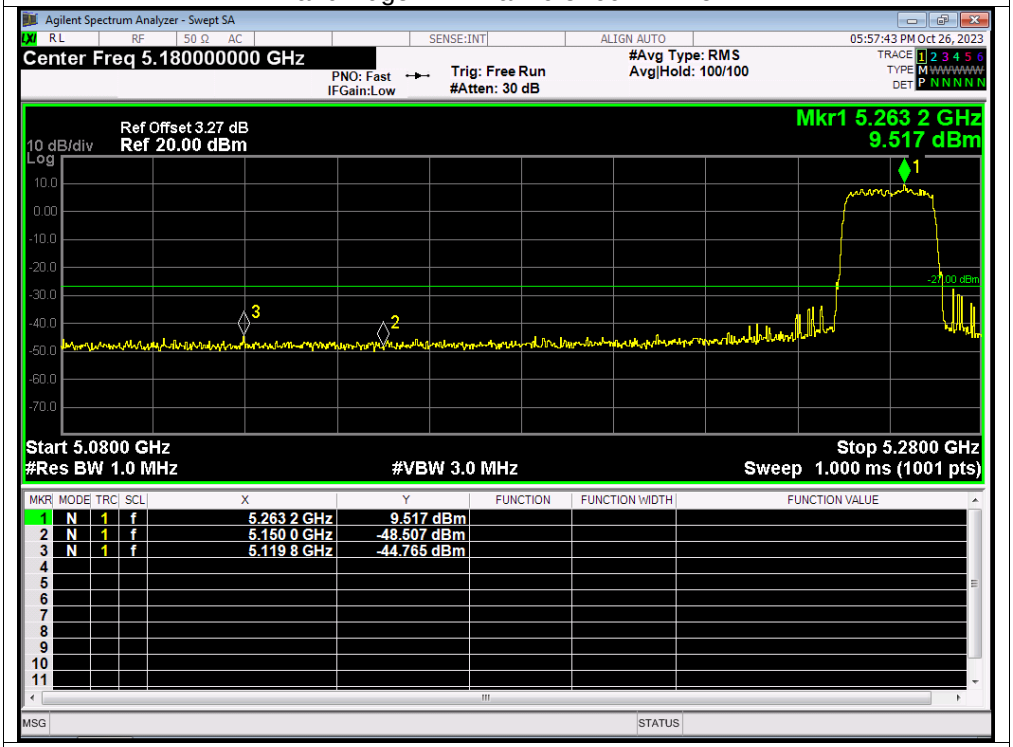
Band Edge NVNT ac80 5290MHz High



Band Edge NVNT ac80 5290MHz Low



Band Edge NVNT ax20 5260MHz Low



Band Edge NVNT ax20 5320MHz High