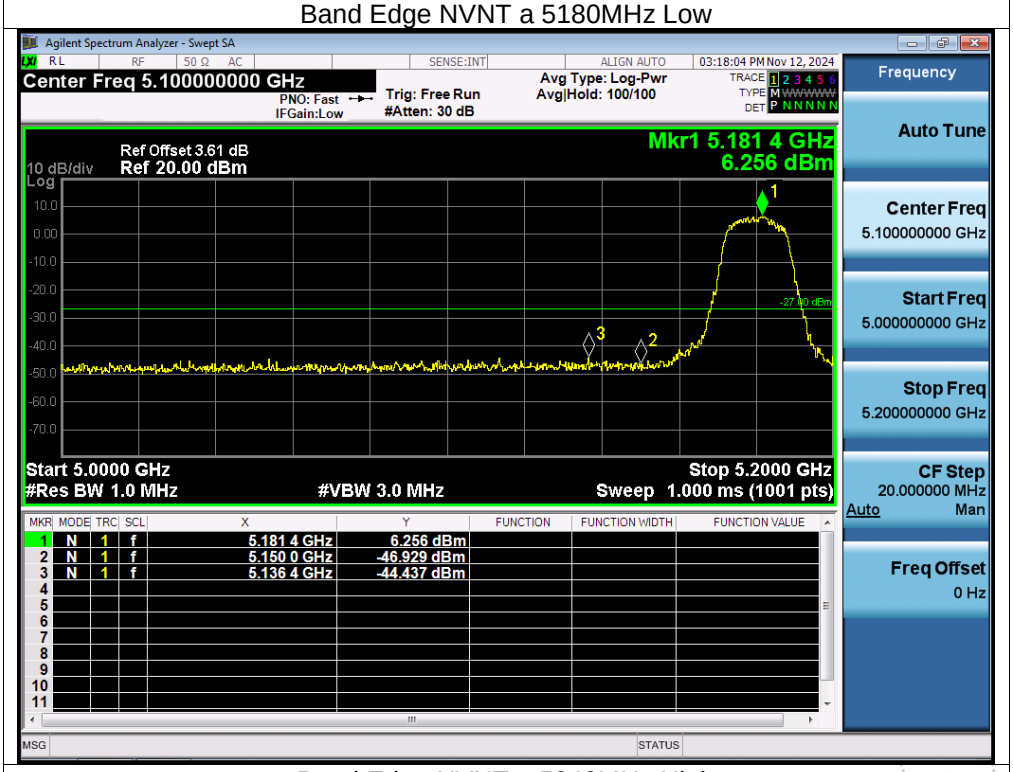
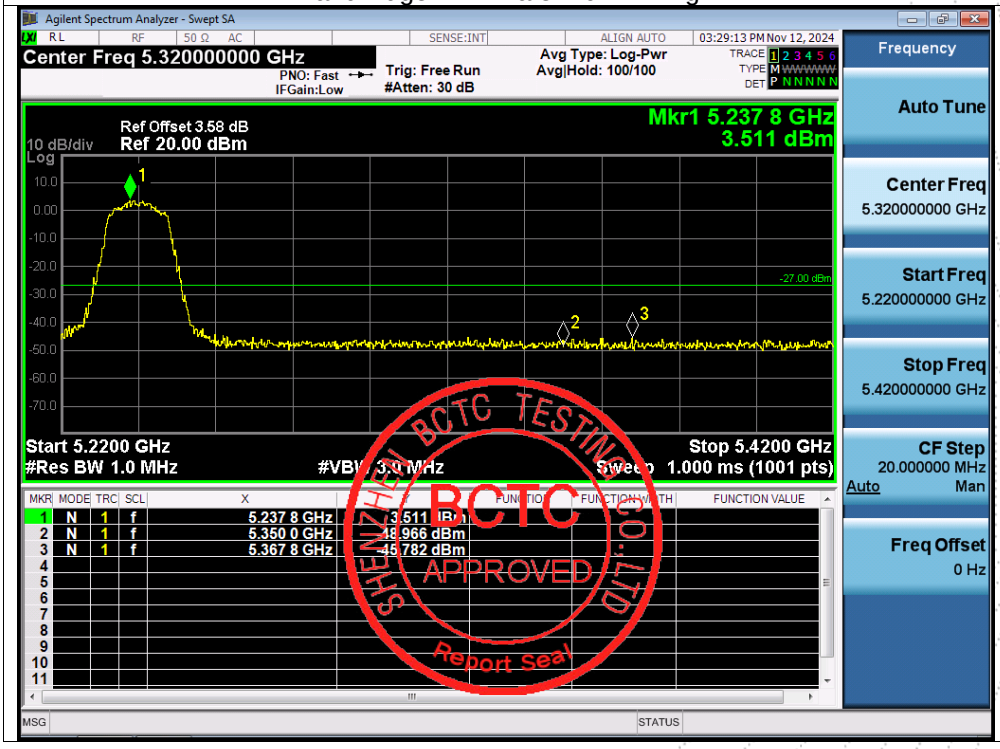
11.5 Test Result

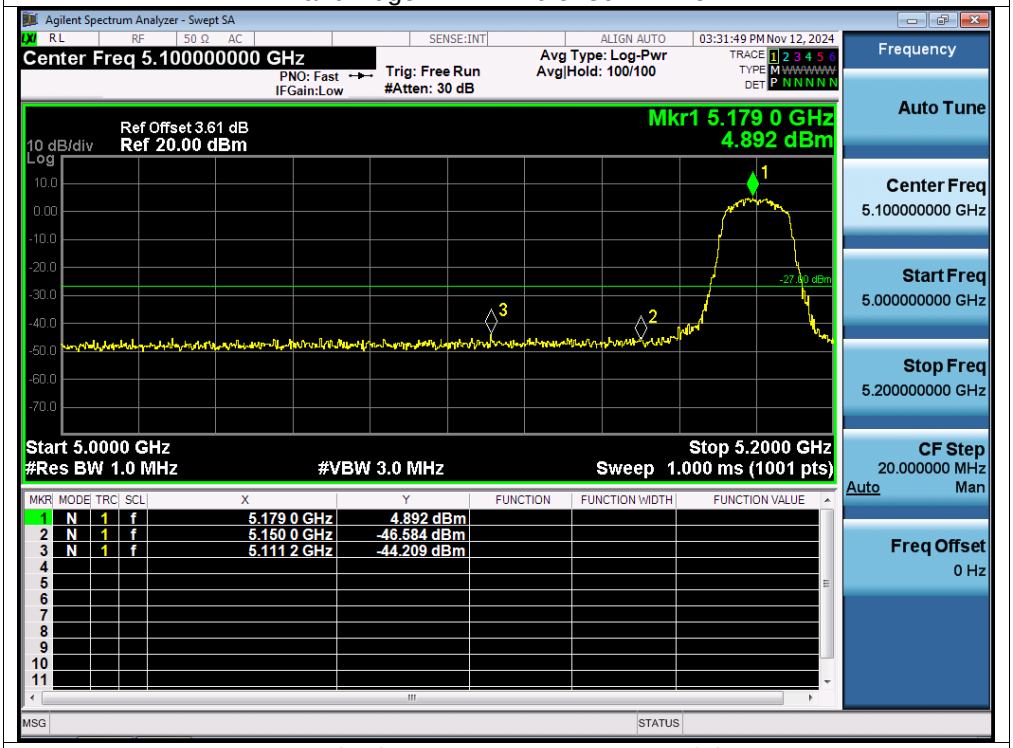
Test Graphs
Band Edge NVNT a 5180MHz Low



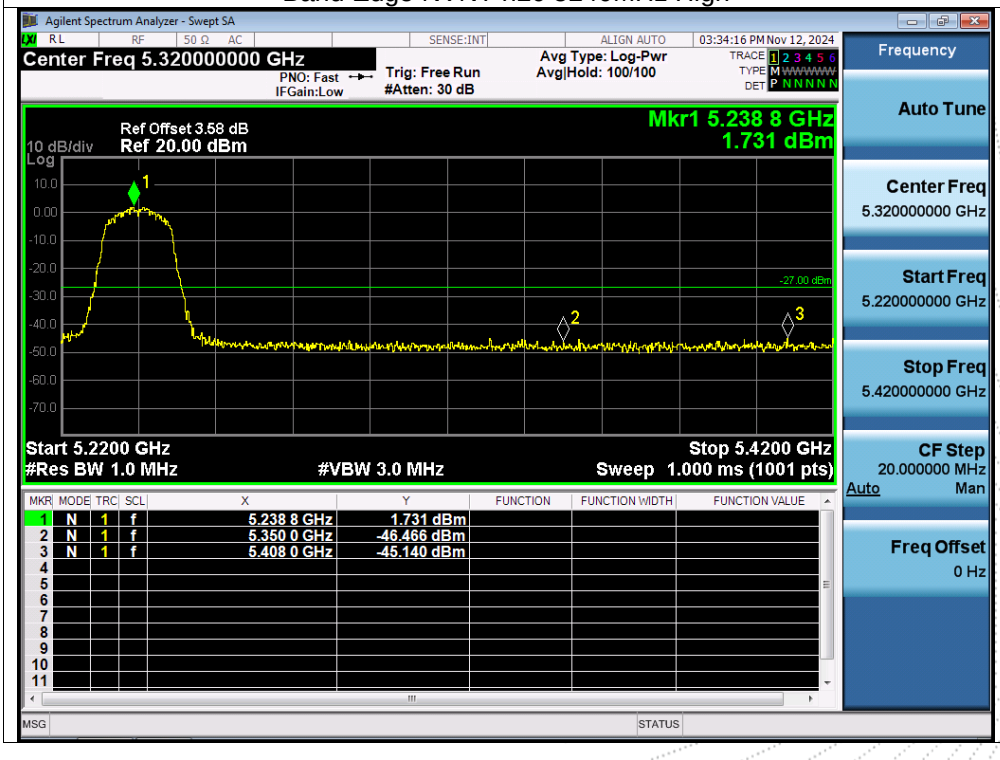
Band Edge NVNT a 5240MHz High



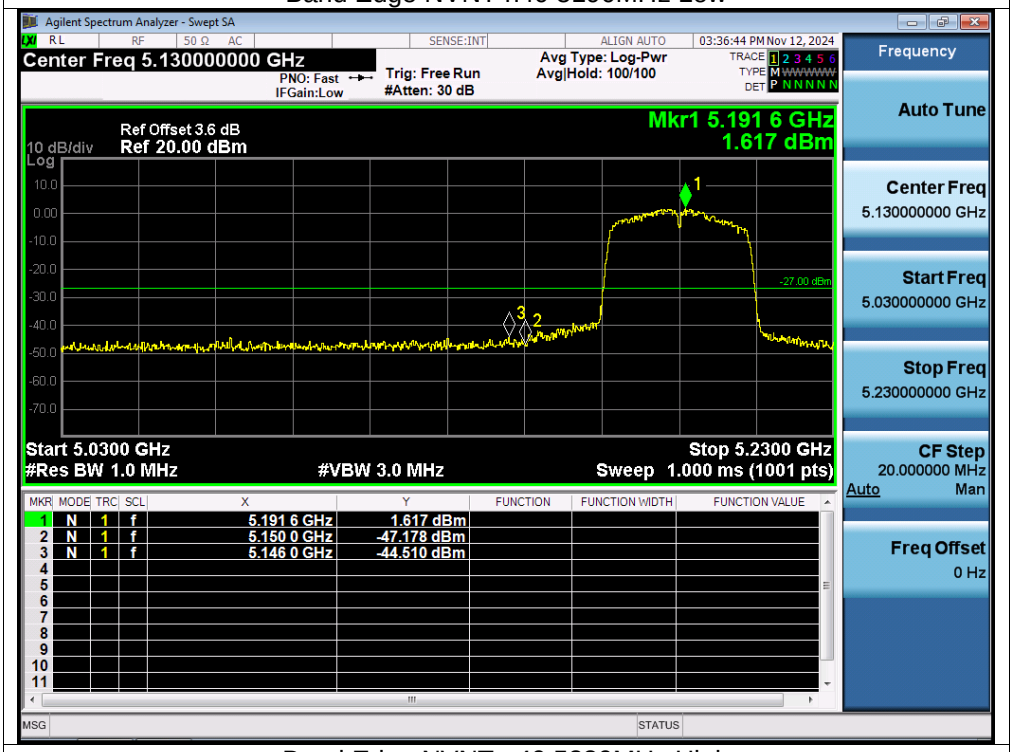
Band Edge NVNT n20 5180MHz Low



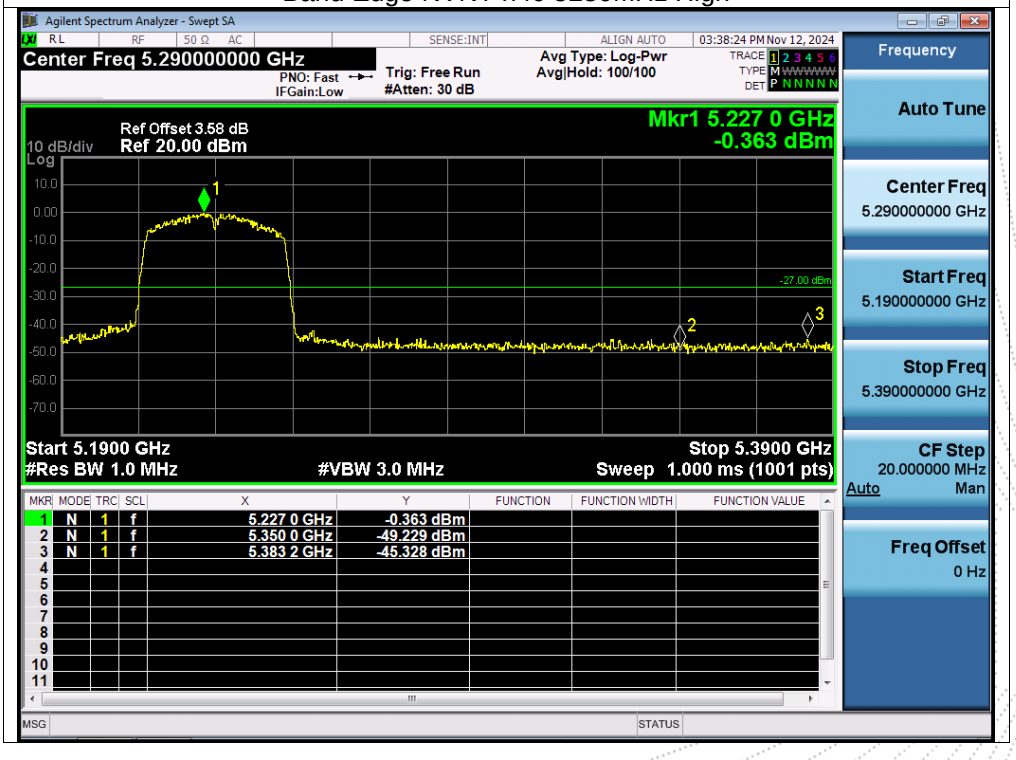
Band Edge NVNT n20 5240MHz High



Band Edge NVNT n40 5190MHz Low

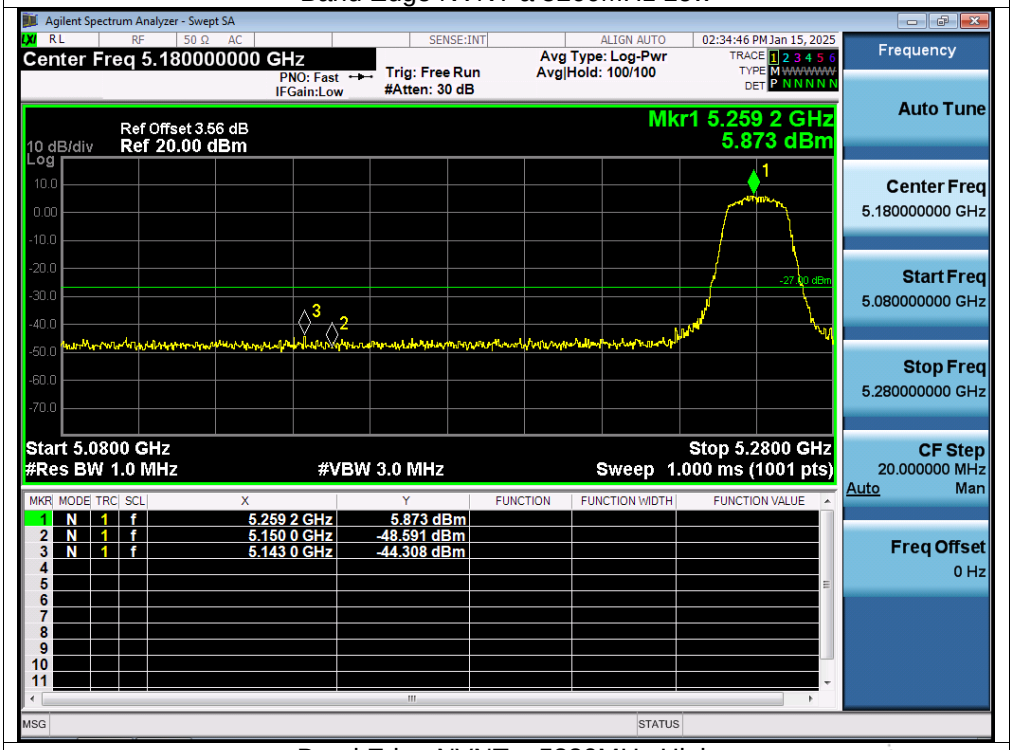


Band Edge NVNT n40 5230MHz High

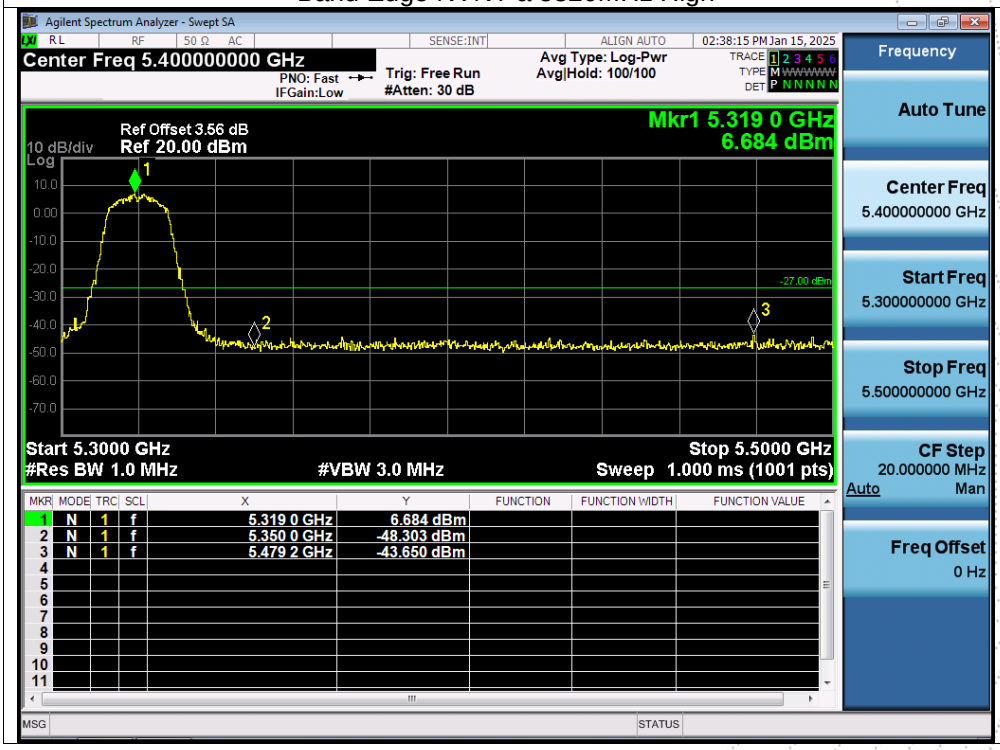


Test Graphs

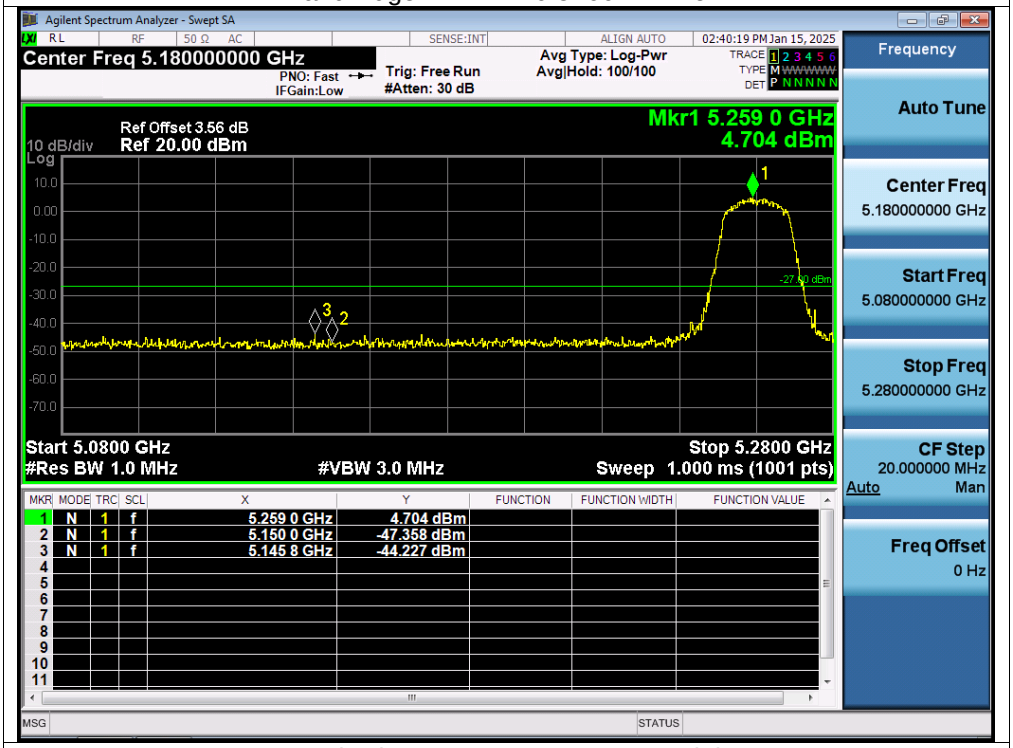
Band Edge NVNT a 5260MHz Low



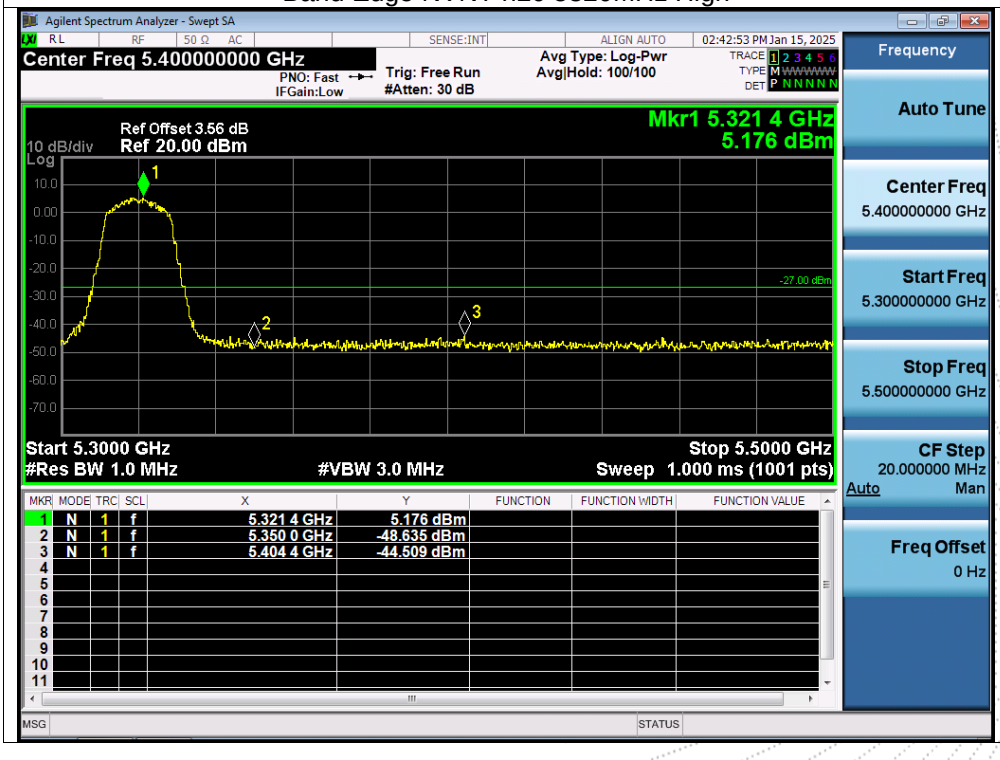
Band Edge NVNT a 5320MHz High



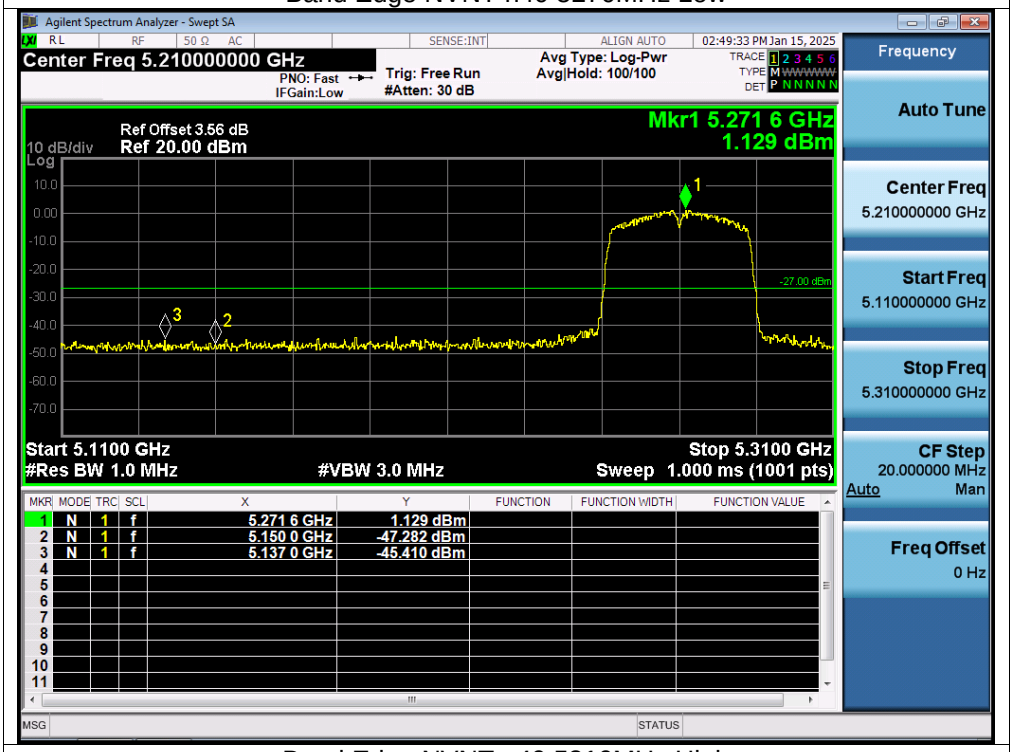
Band Edge NVNT n20 5260MHz Low



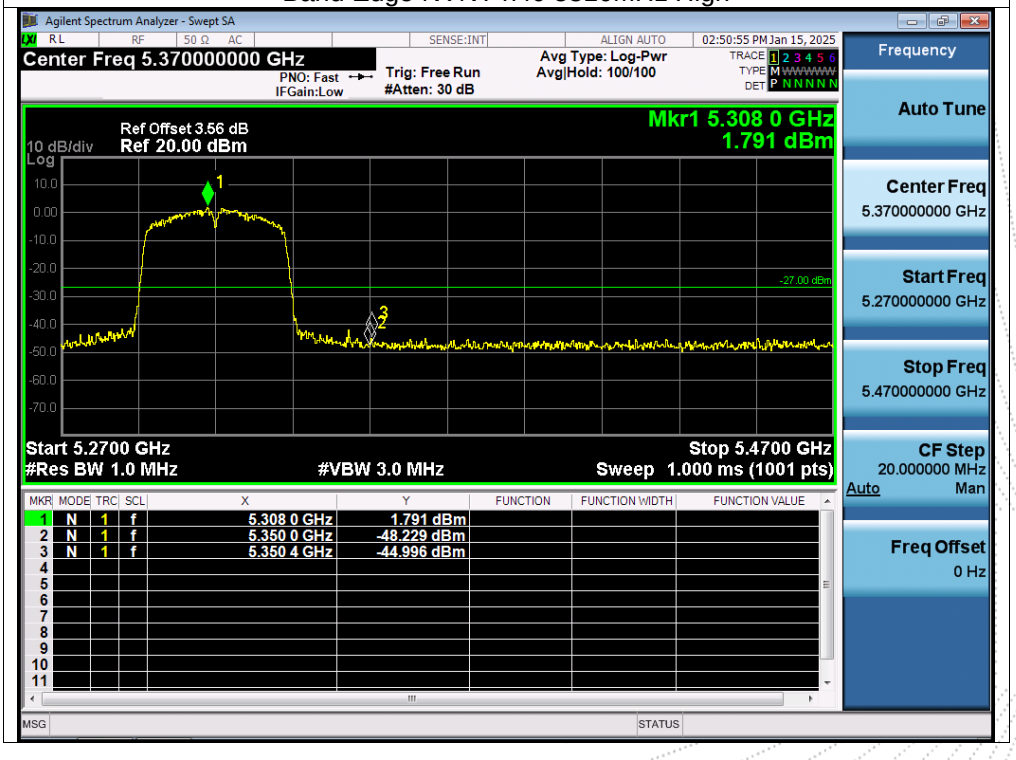
Band Edge NVNT n20 5320MHz High



Band Edge NVNT n40 5270MHz Low

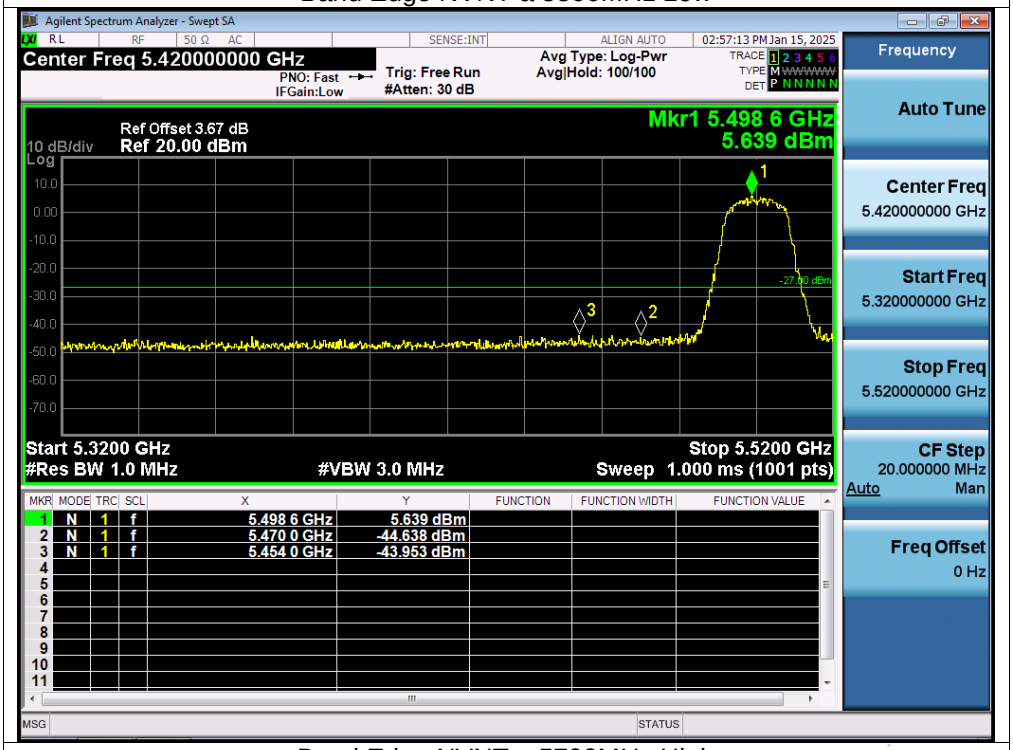


Band Edge NVNT n40 5310MHz High

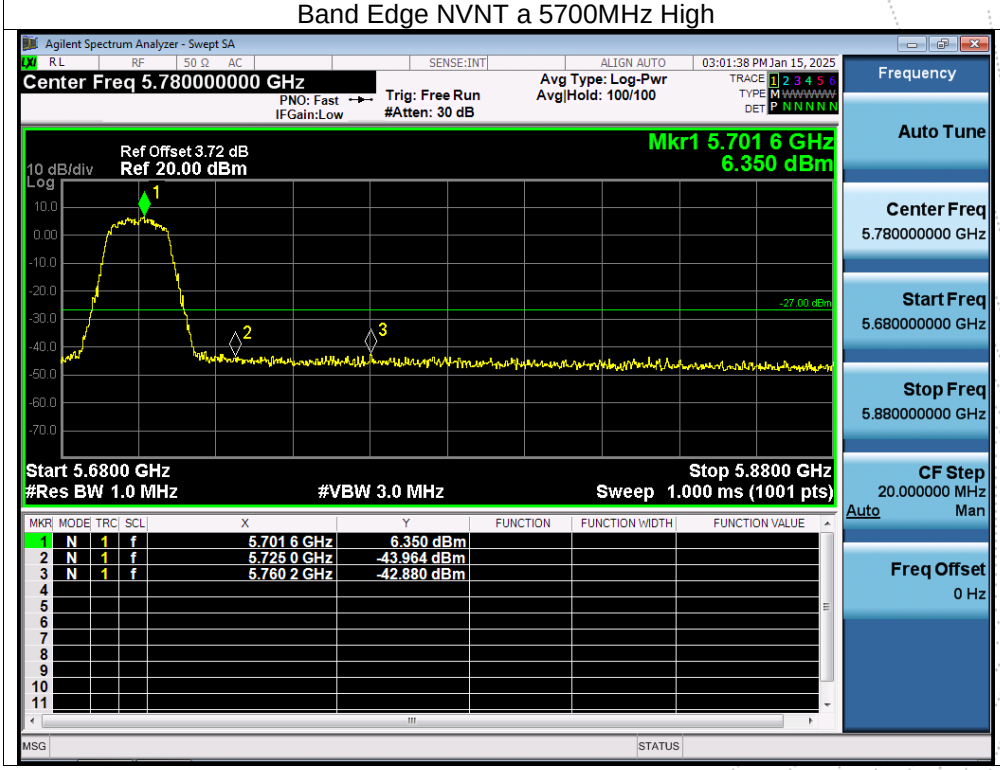


Test Graphs

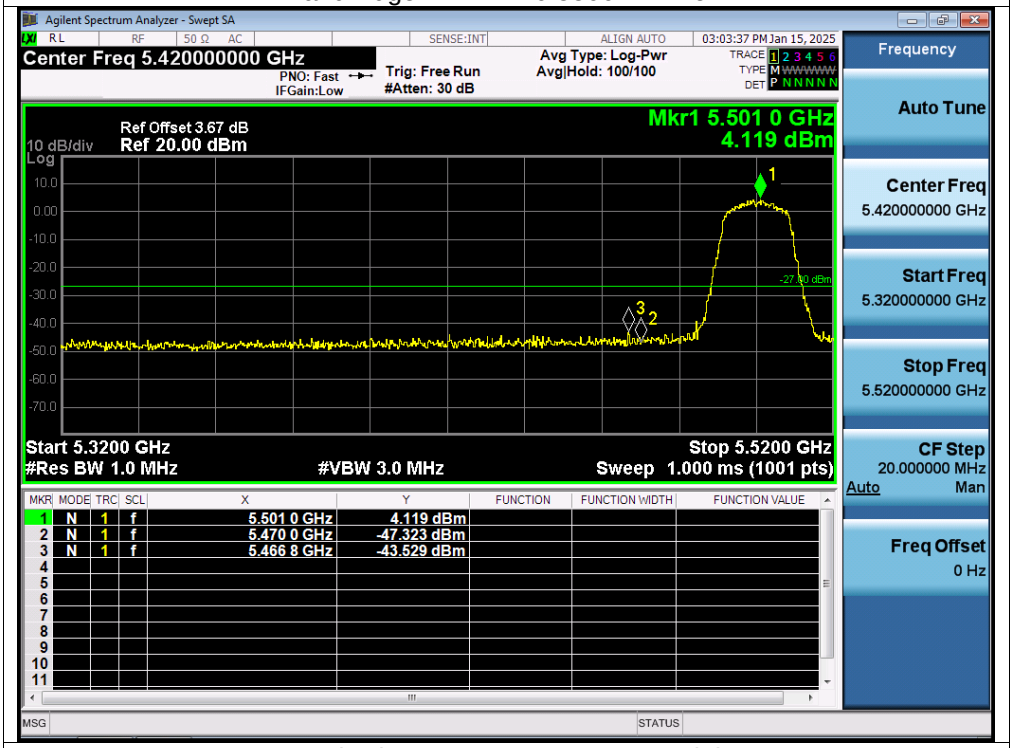
Band Edge NVNT a 5500MHz Low



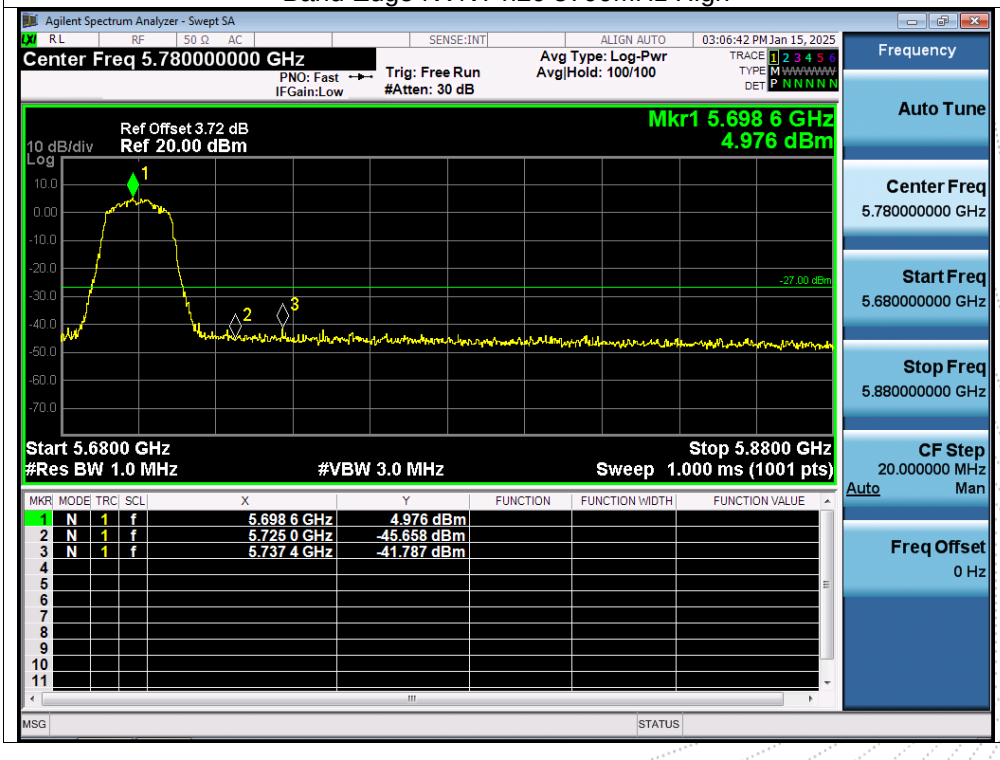
Band Edge NVNT a 5700MHz High



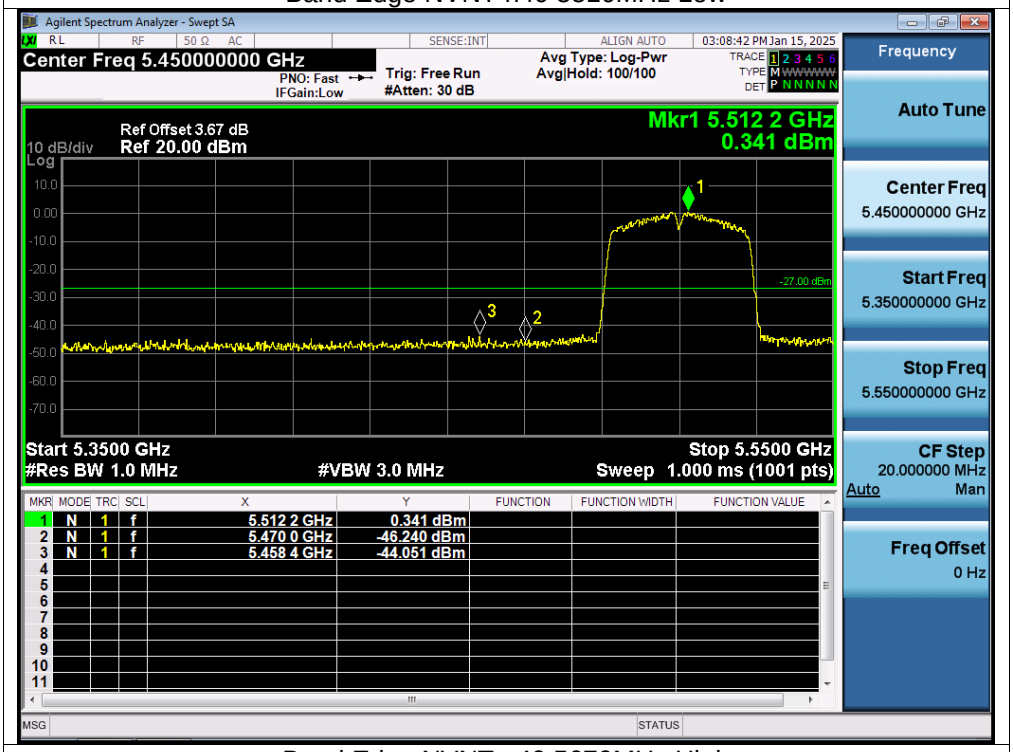
Band Edge NVNT n20 5500MHz Low



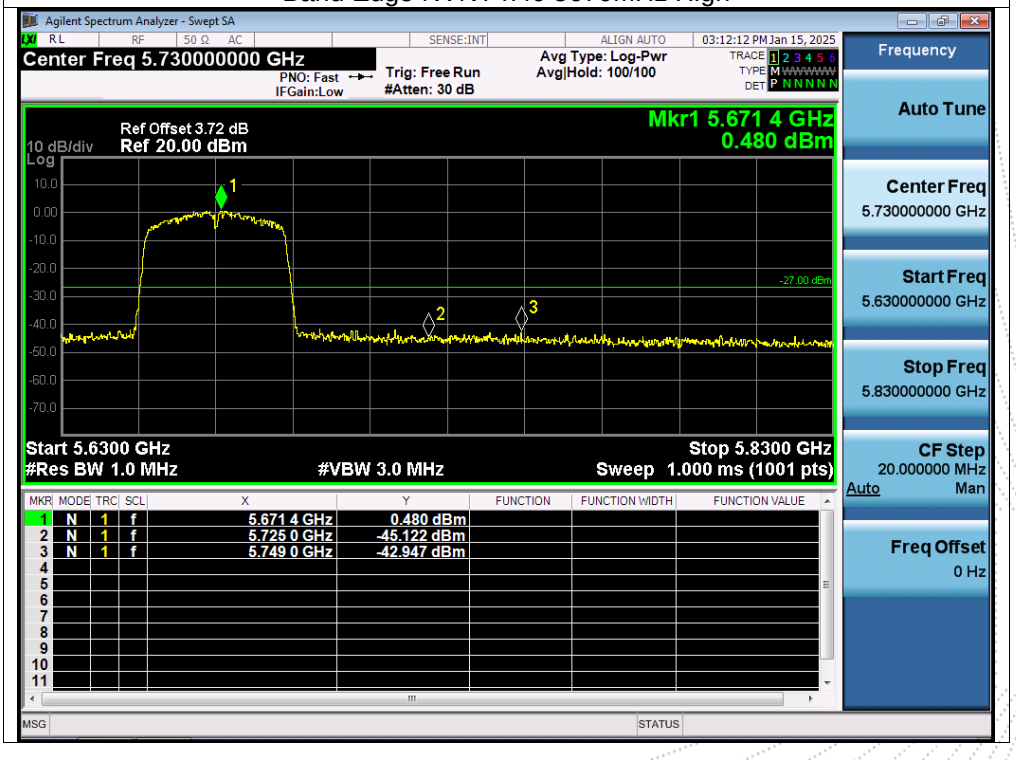
Band Edge NVNT n20 5700MHz High



Band Edge NVNT n40 5510MHz Low

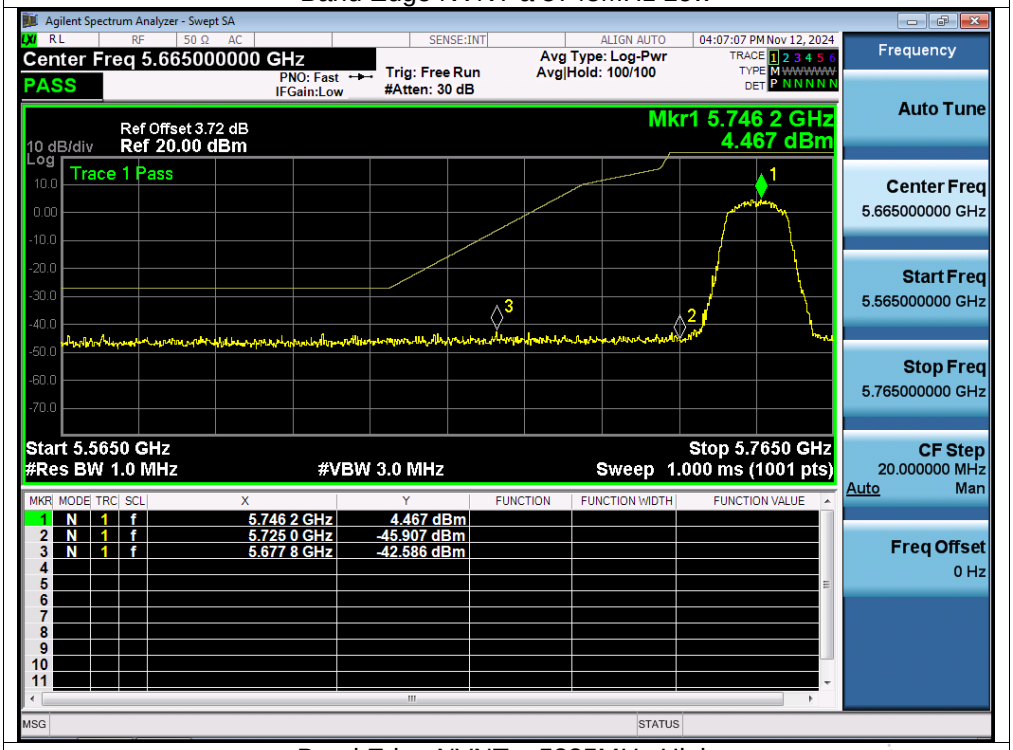


Band Edge NVNT n40 5670MHz High

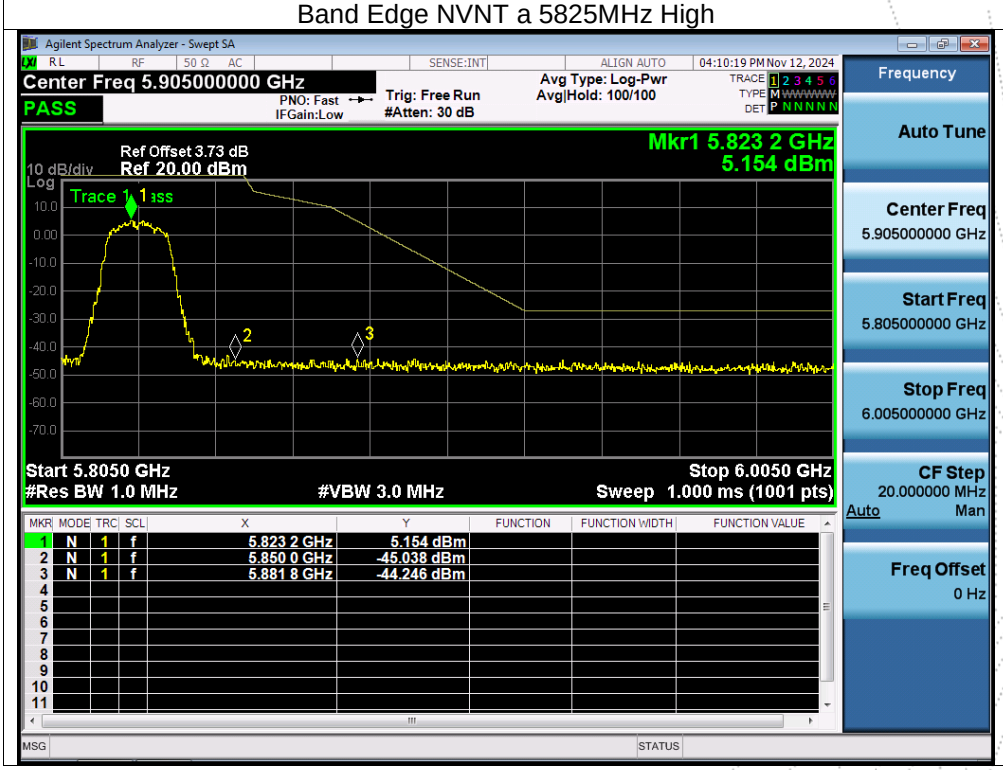


Test Graphs

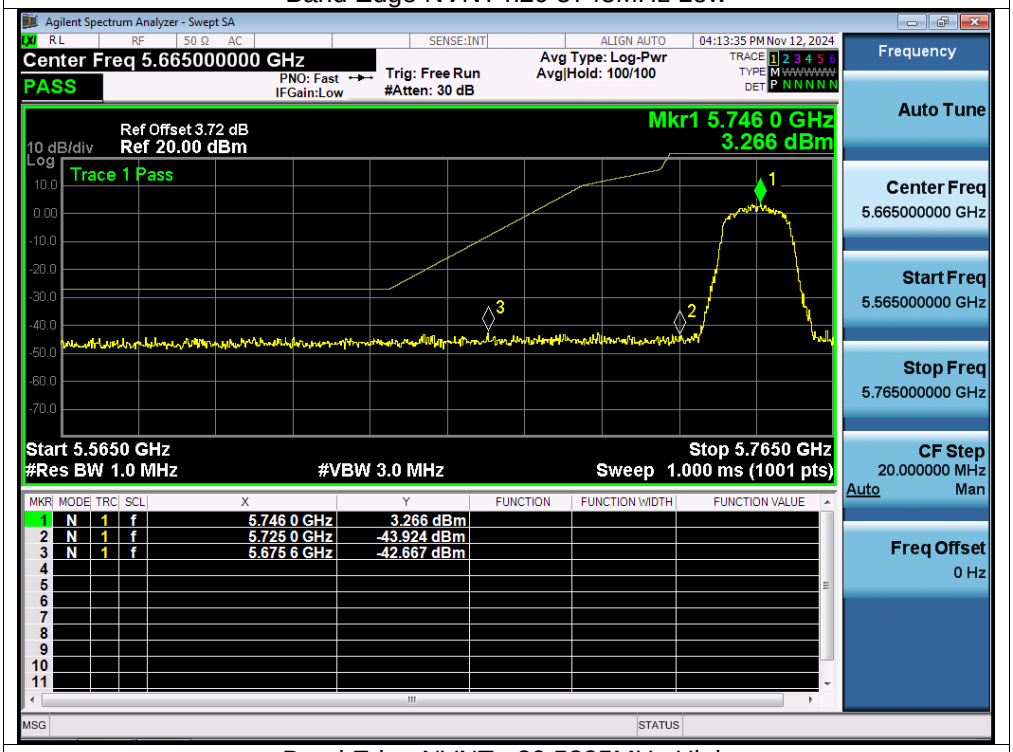
Band Edge NVNT a 5745MHz Low



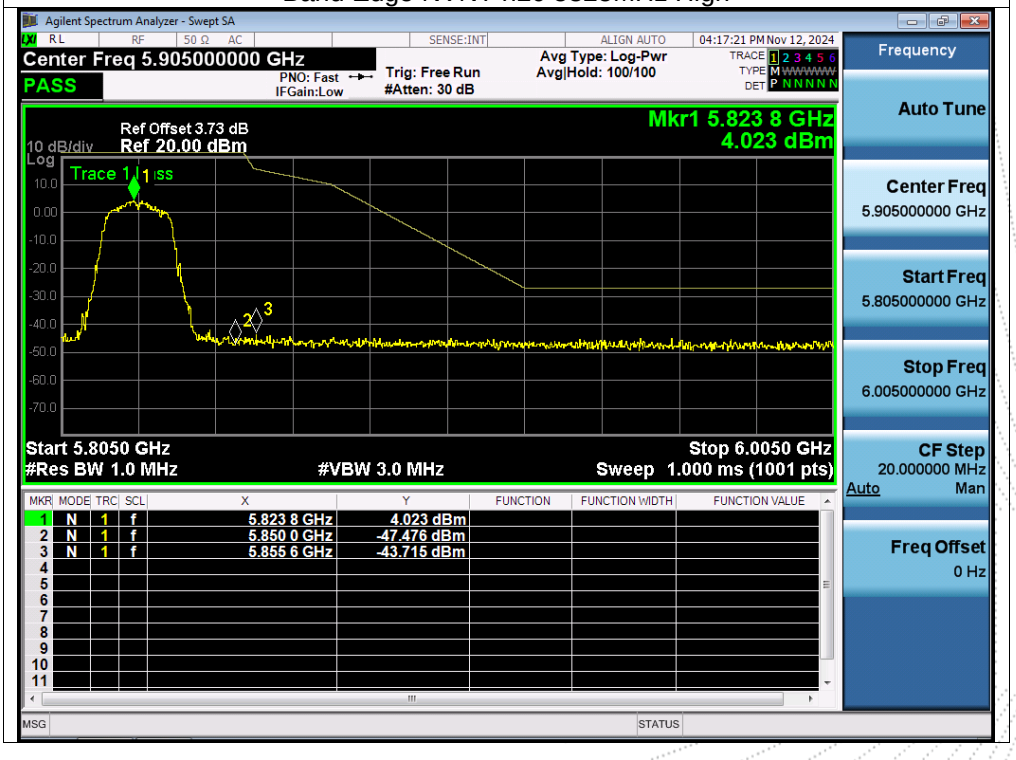
Band Edge NVNT a 5825MHz High



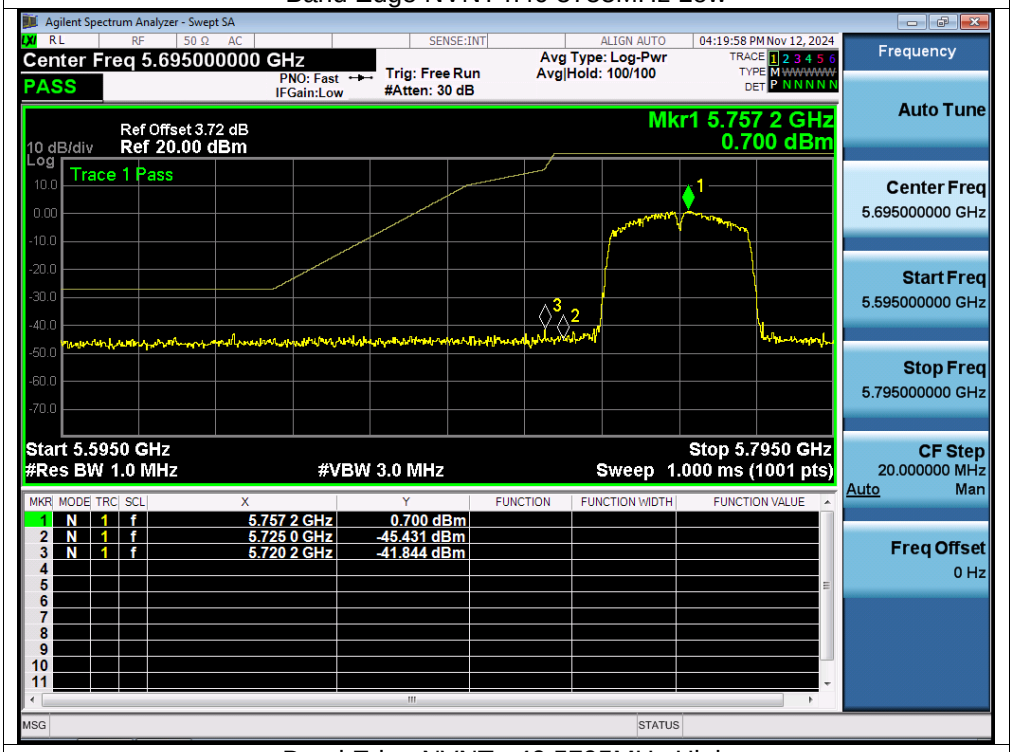
Band Edge NVNT n20 5745MHz Low



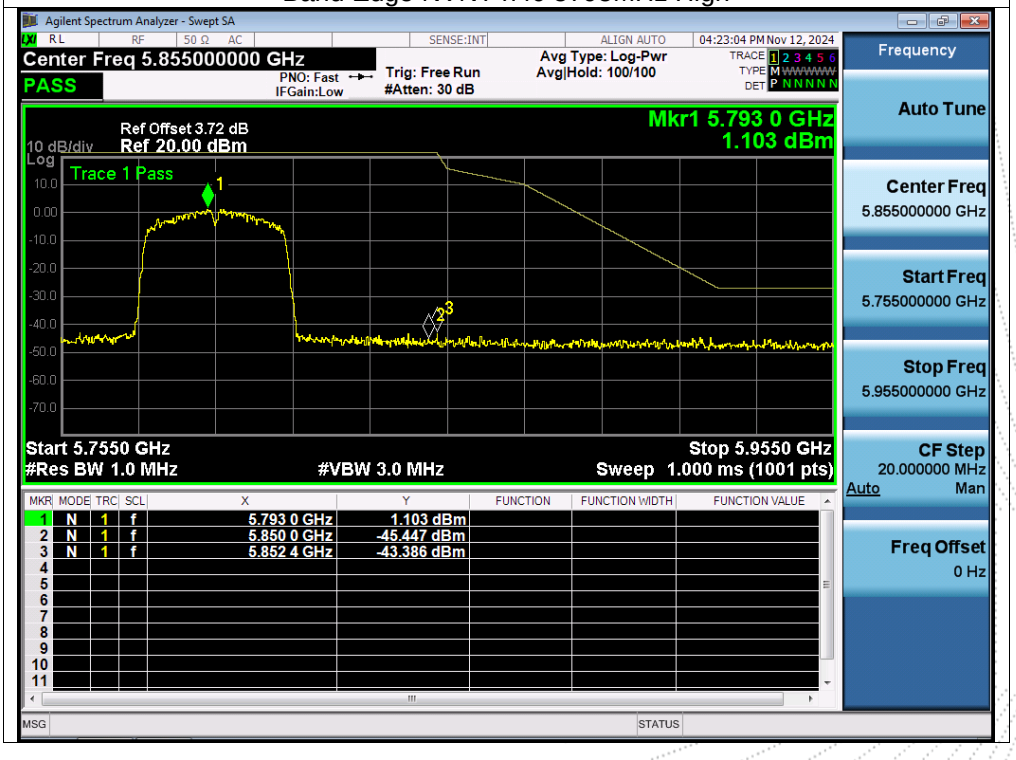
Band Edge NVNT n20 5825MHz High



Band Edge NVNT n40 5755MHz Low

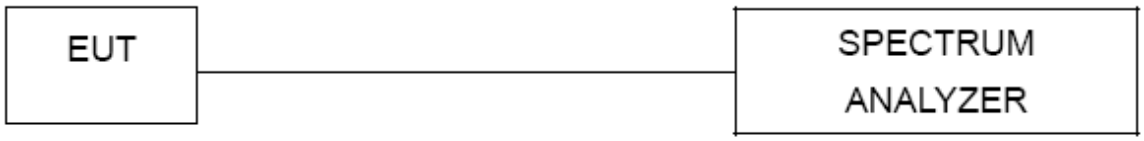


Band Edge NVNT n40 5795MHz High



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.

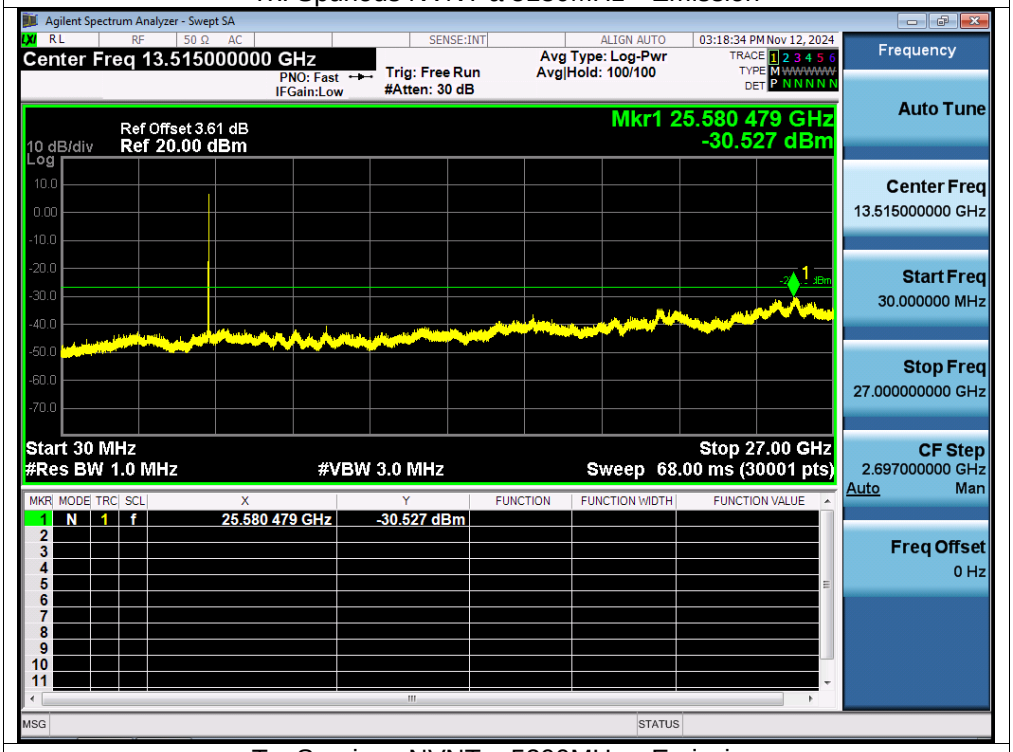
12.4 Test Result

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.

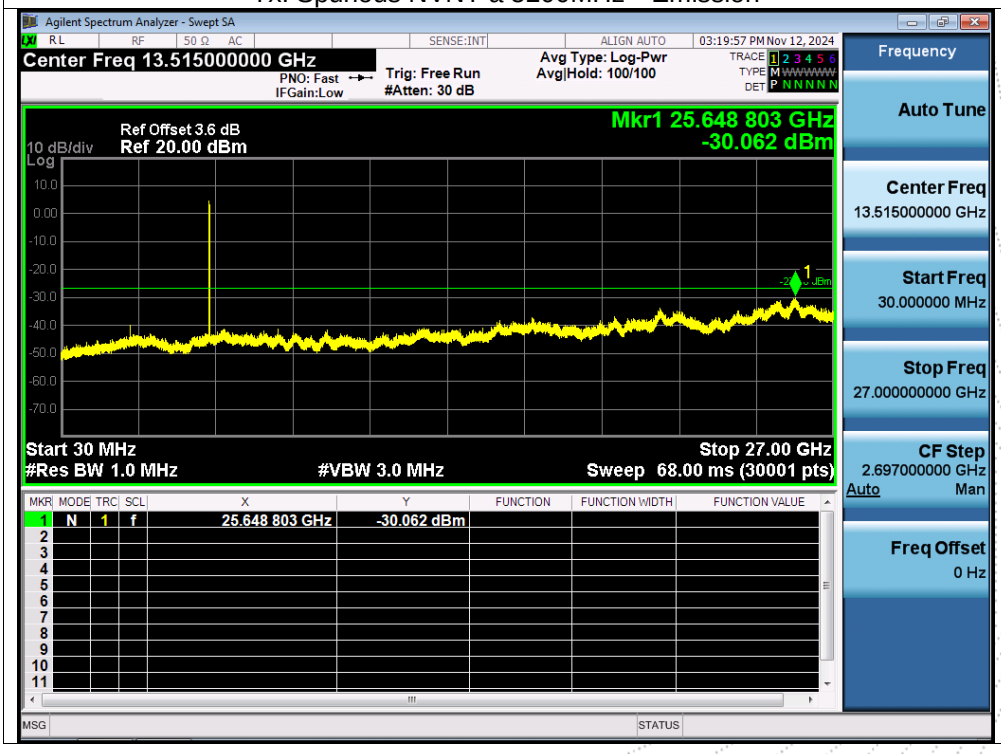
About:26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Test Graphs

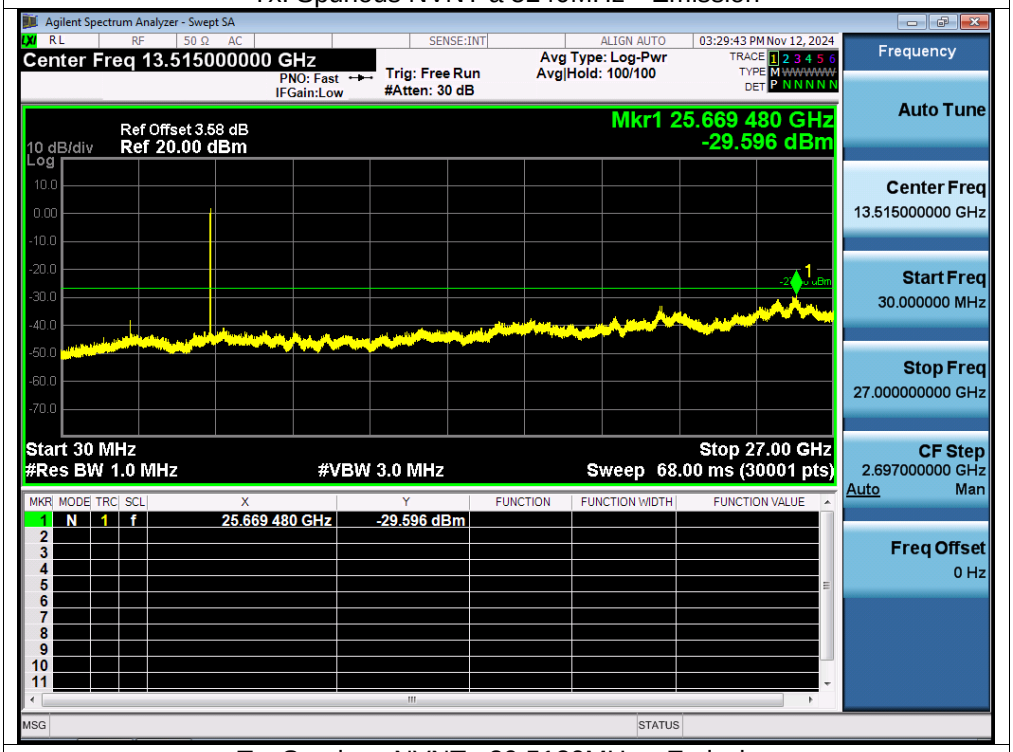
Tx. Spurious NVNT a 5180MHz Emission



Tx. Spurious NVNT a 5200MHz Emission

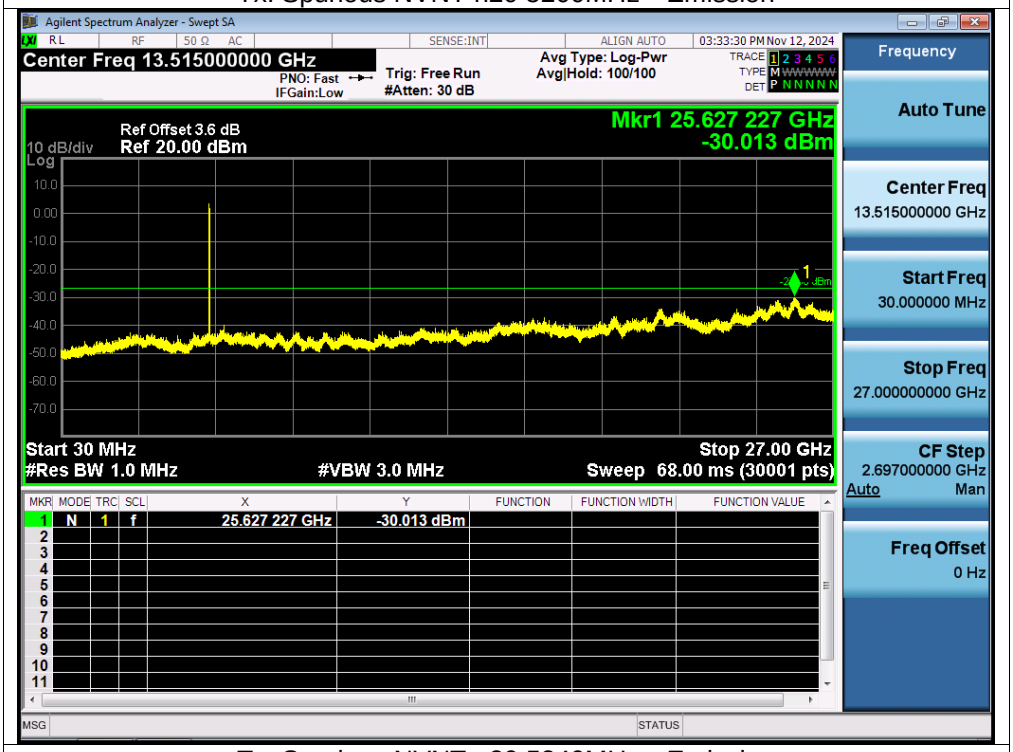


Tx. Spurious NVNT a 5240MHz Emission



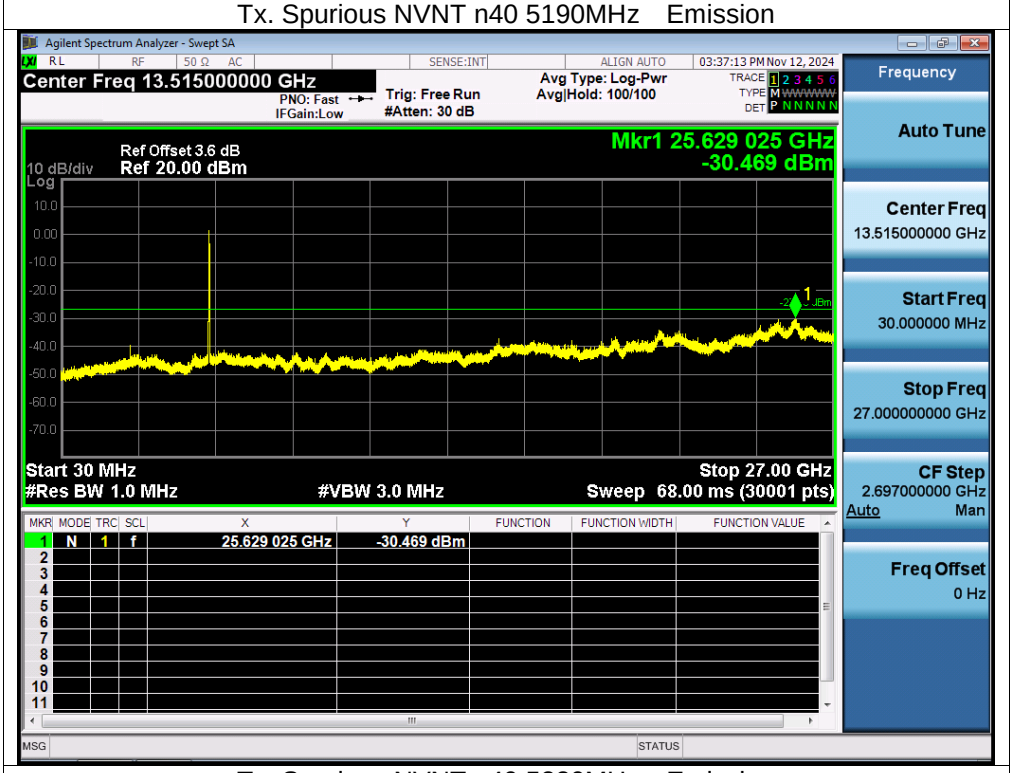
Tx. Spurious NVNT n20 5180MHz Emission

Tx. Spurious NVNT n20 5200MHz Emission

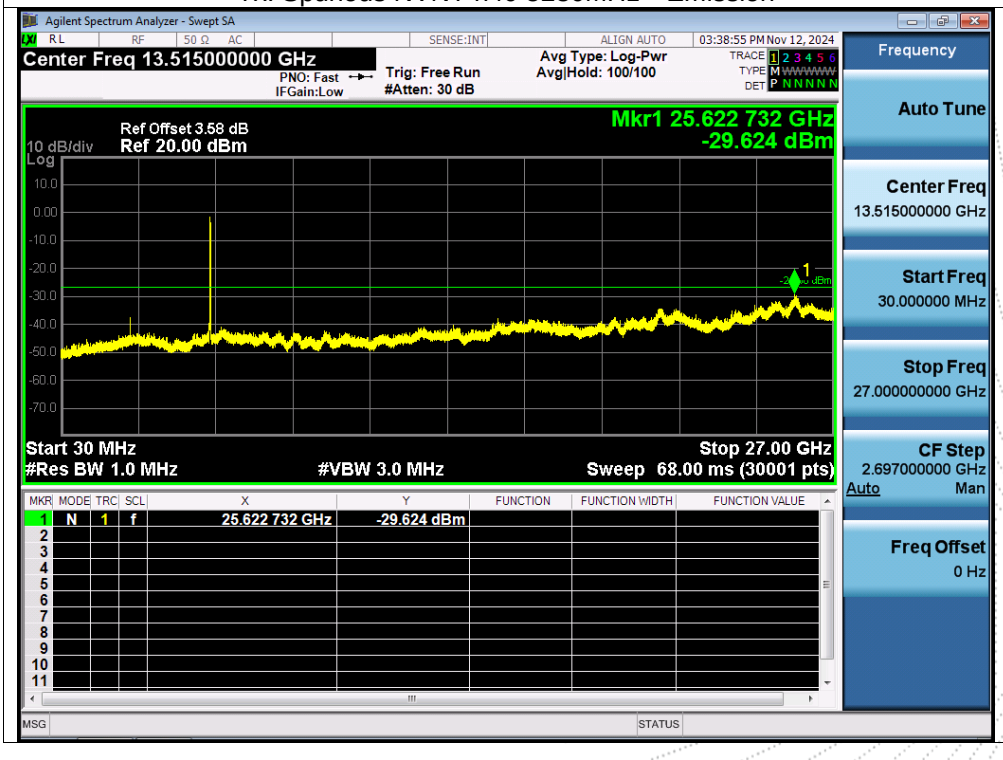


Tx. Spurious NVNT n20 5240MHz Emission

Tx. Spurious NVNT n40 5190MHz Emission

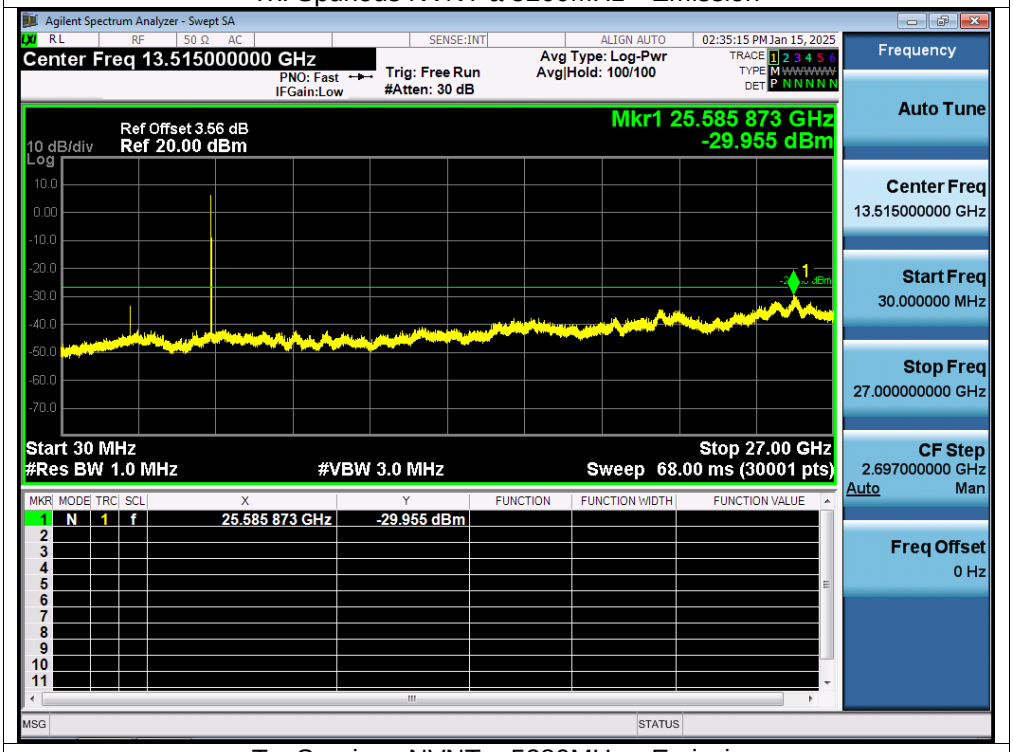


Tx. Spurious NVNT n40 5230MHz Emission

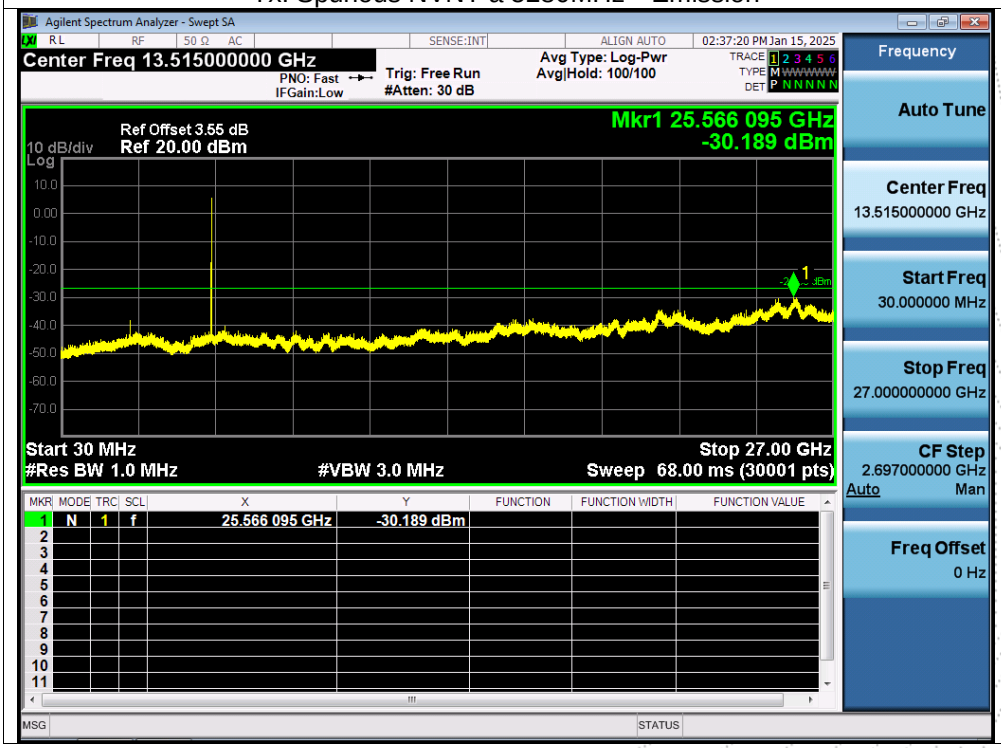


Test Graphs

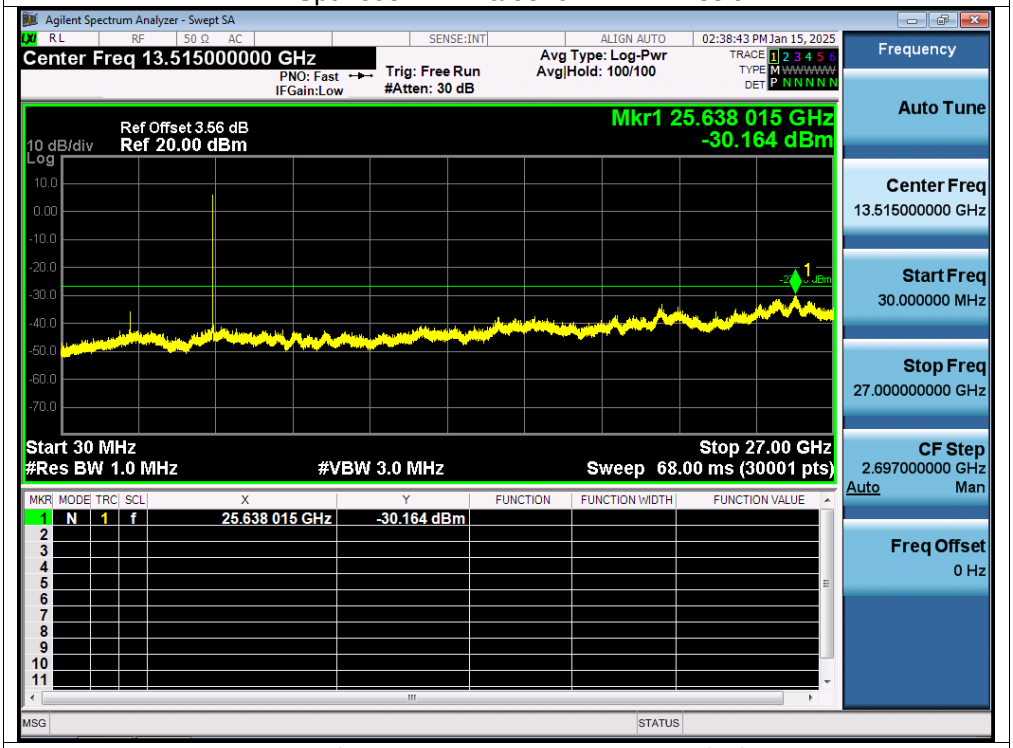
Tx. Spurious NVNT a 5260MHz Emission



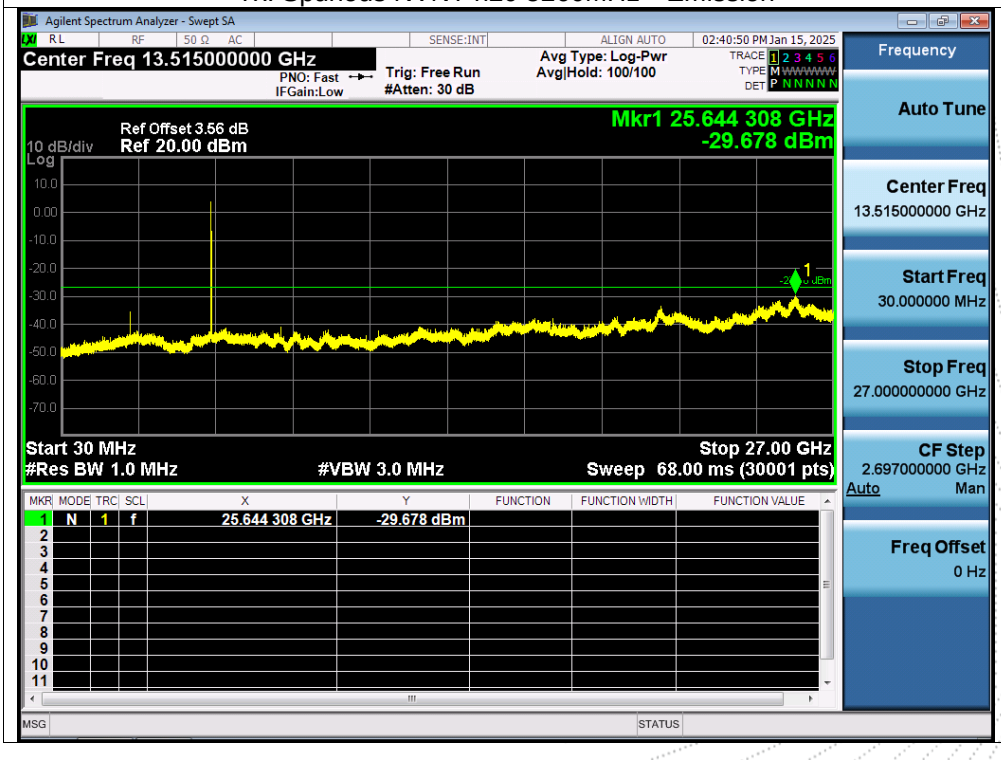
Tx. Spurious NVNT a 5280MHz Emission



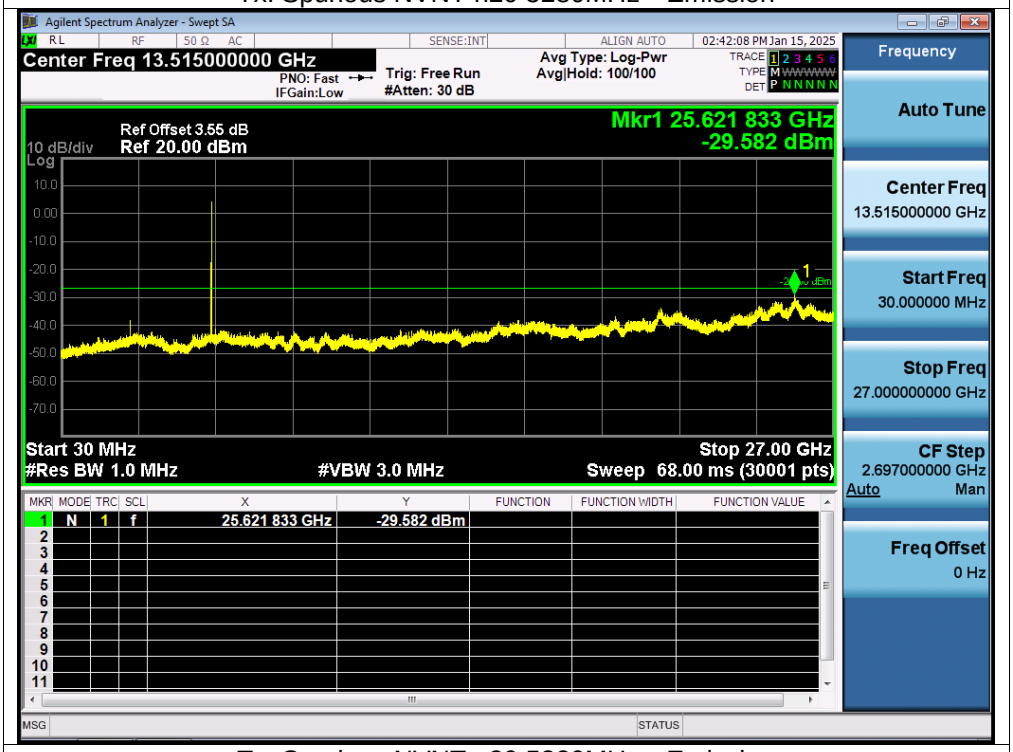
Tx. Spurious NVNT a 5320MHz Emission



Tx. Spurious NVNT n20 5260MHz Emission

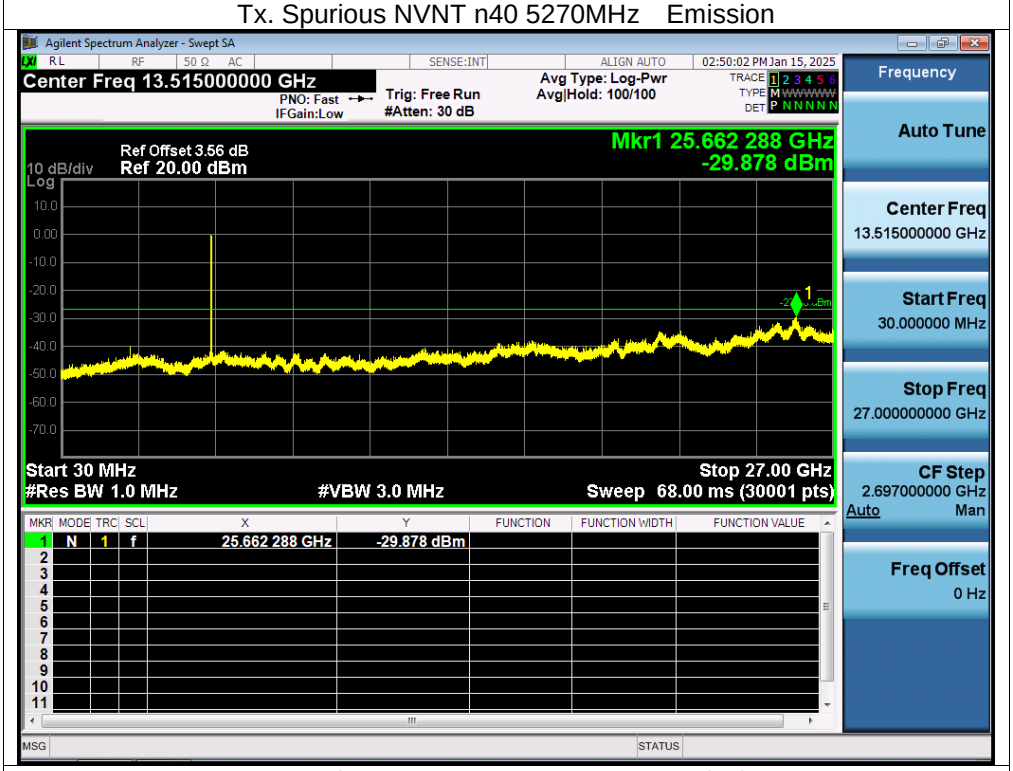


Tx. Spurious NVNT n20 5280MHz Emission

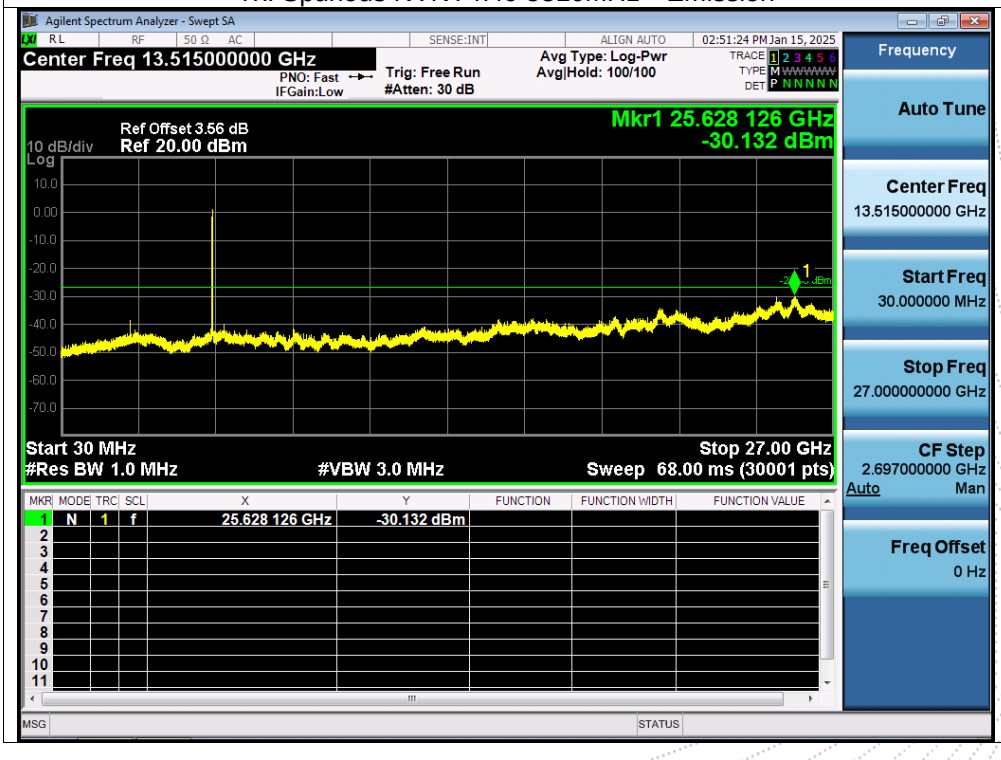


Tx. Spurious NVNT n20 5320MHz Emission

Tx. Spurious NVNT n40 5270MHz Emission

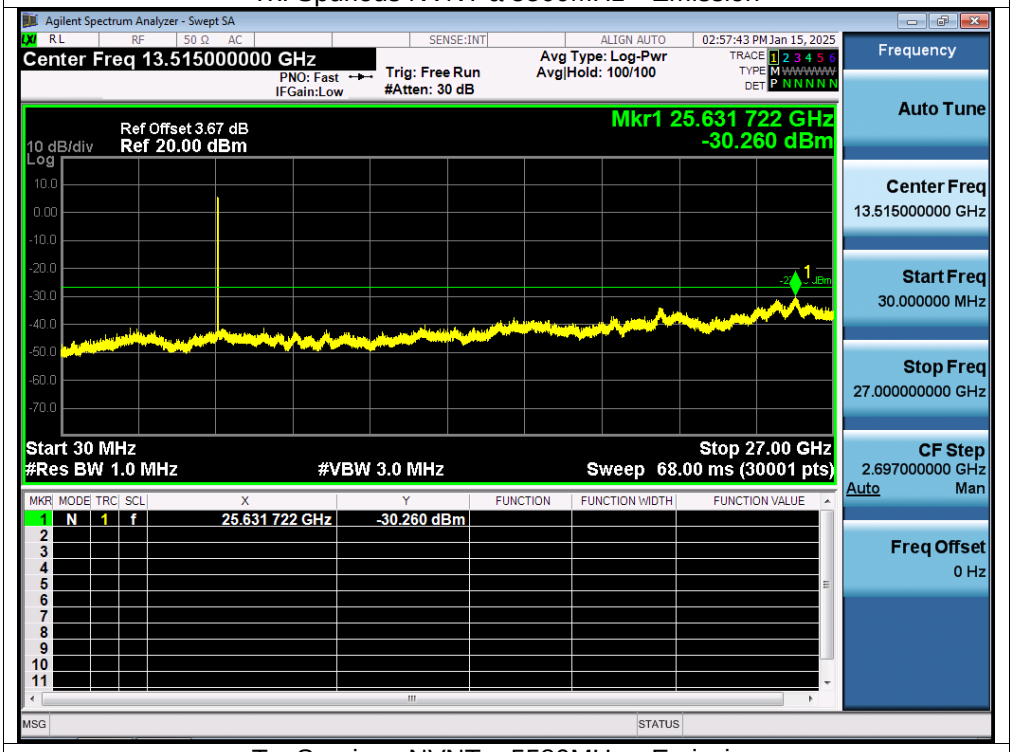


Tx. Spurious NVNT n40 5310MHz Emission

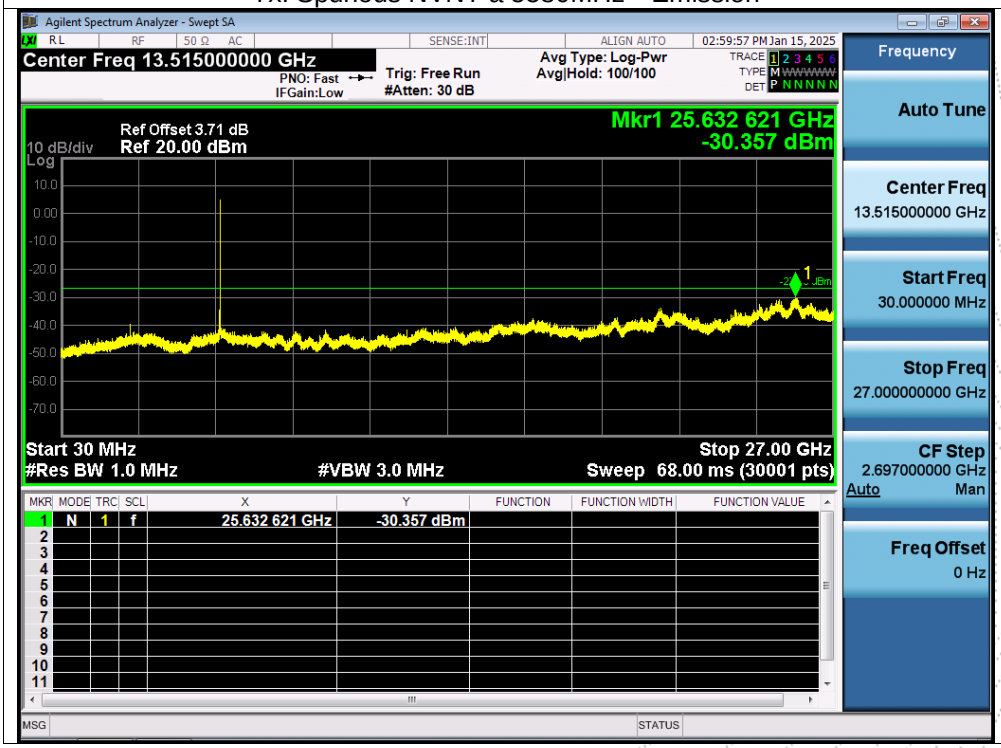


Test Graphs

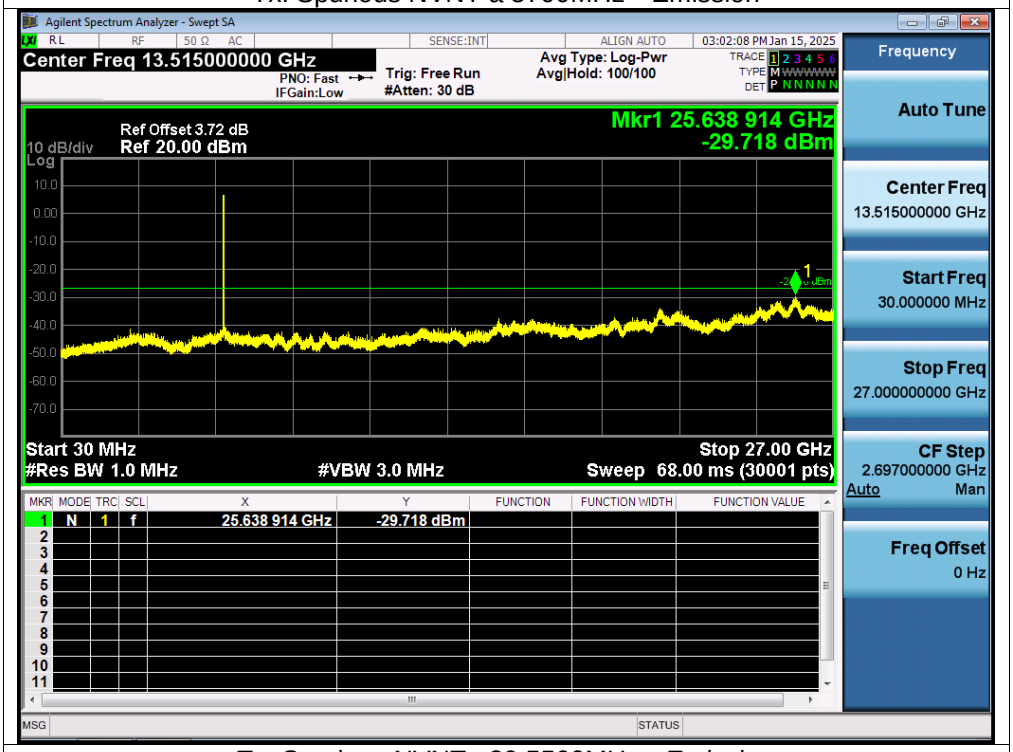
Tx. Spurious NVNT a 5500MHz Emission



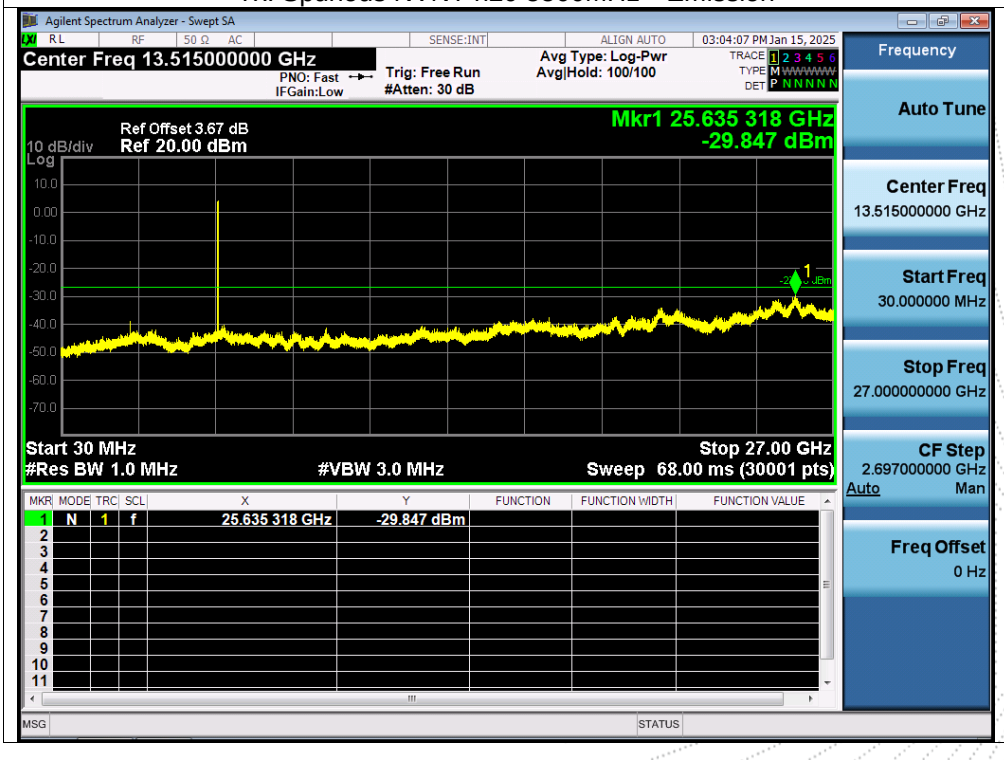
Tx. Spurious NVNT a 5580MHz Emission



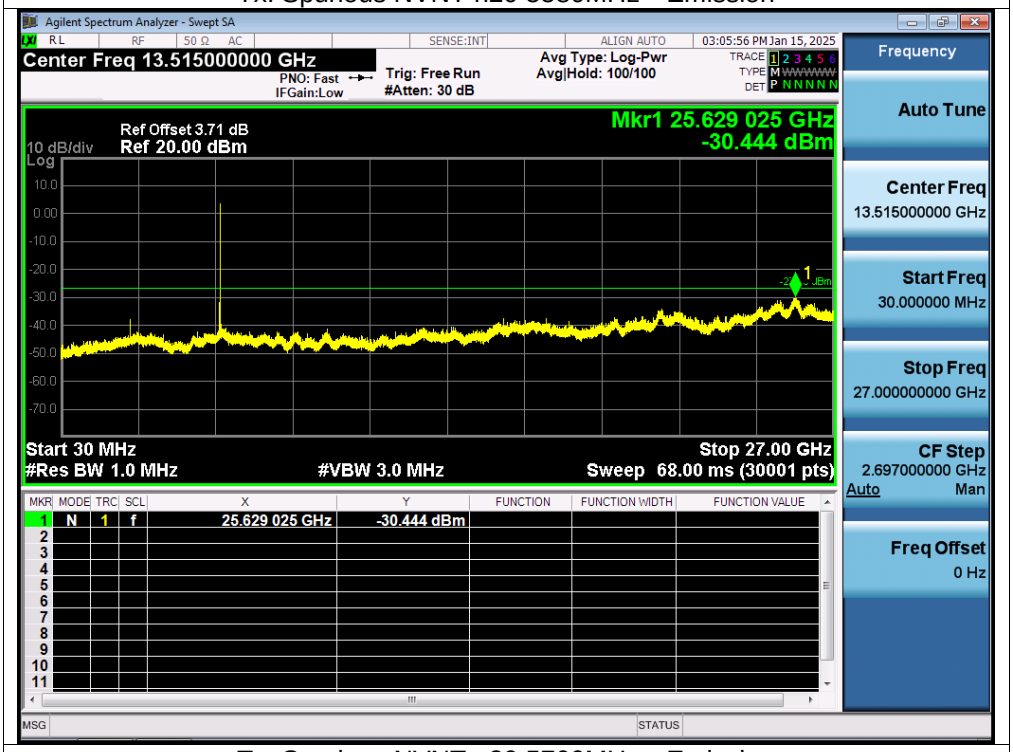
Tx. Spurious NVNT a 5700MHz Emission



Tx. Spurious NVNT n20 5500MHz Emission

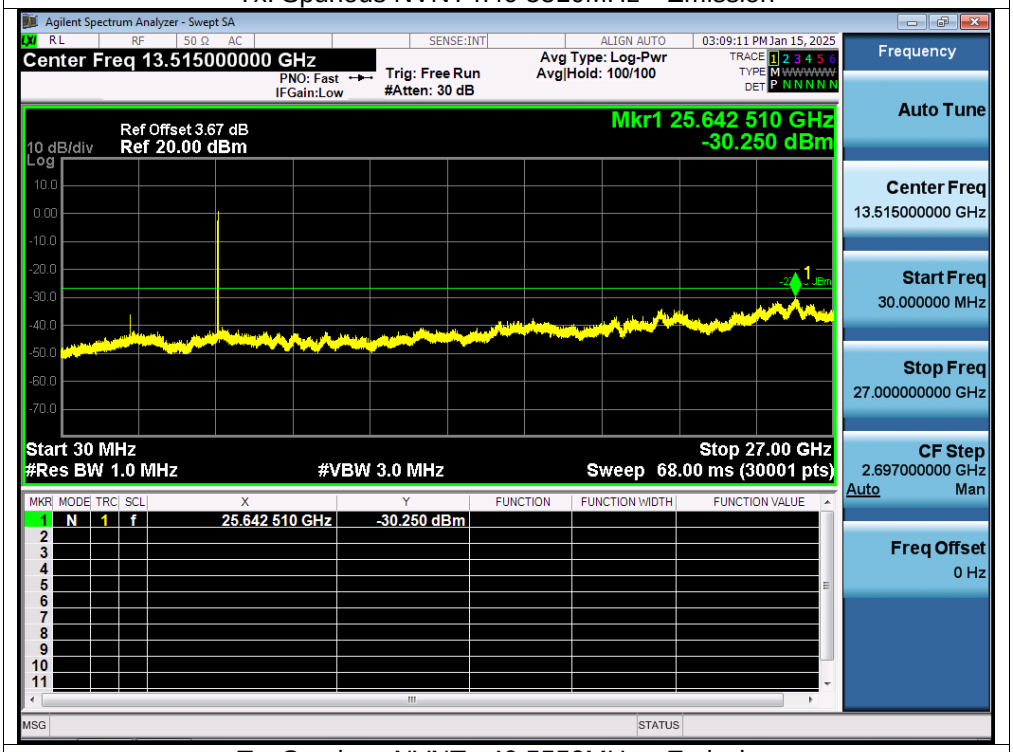


Tx. Spurious NVNT n20 5580MHz Emission



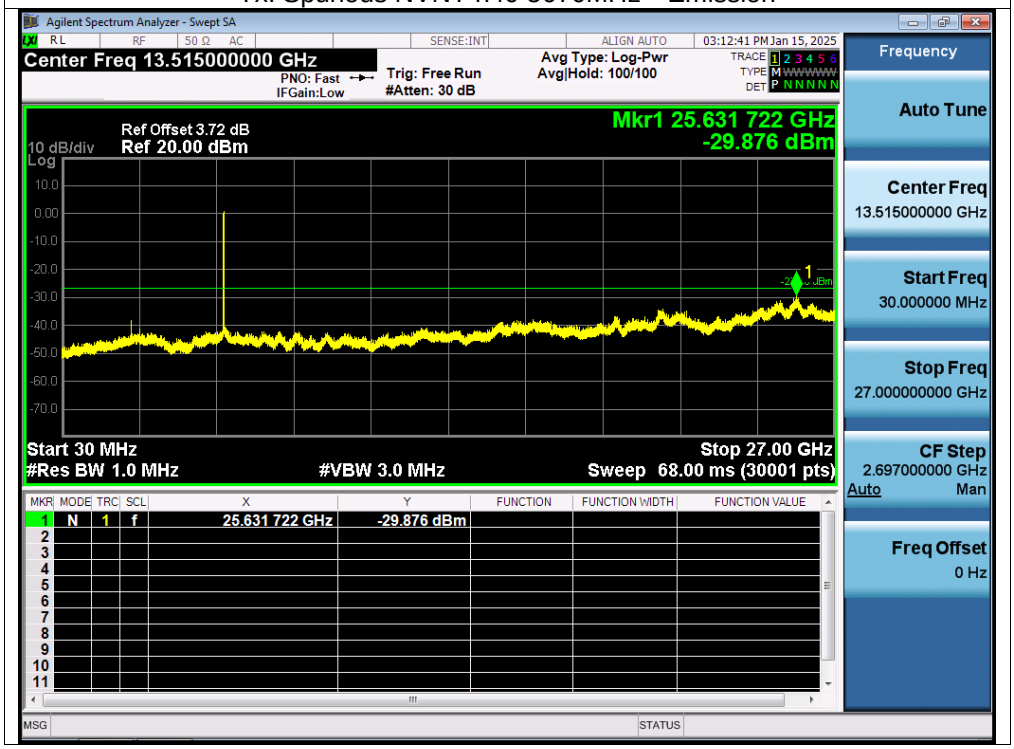
Tx. Spurious NVNT n20 5700MHz Emission

Tx. Spurious NVNT n40 5510MHz Emission

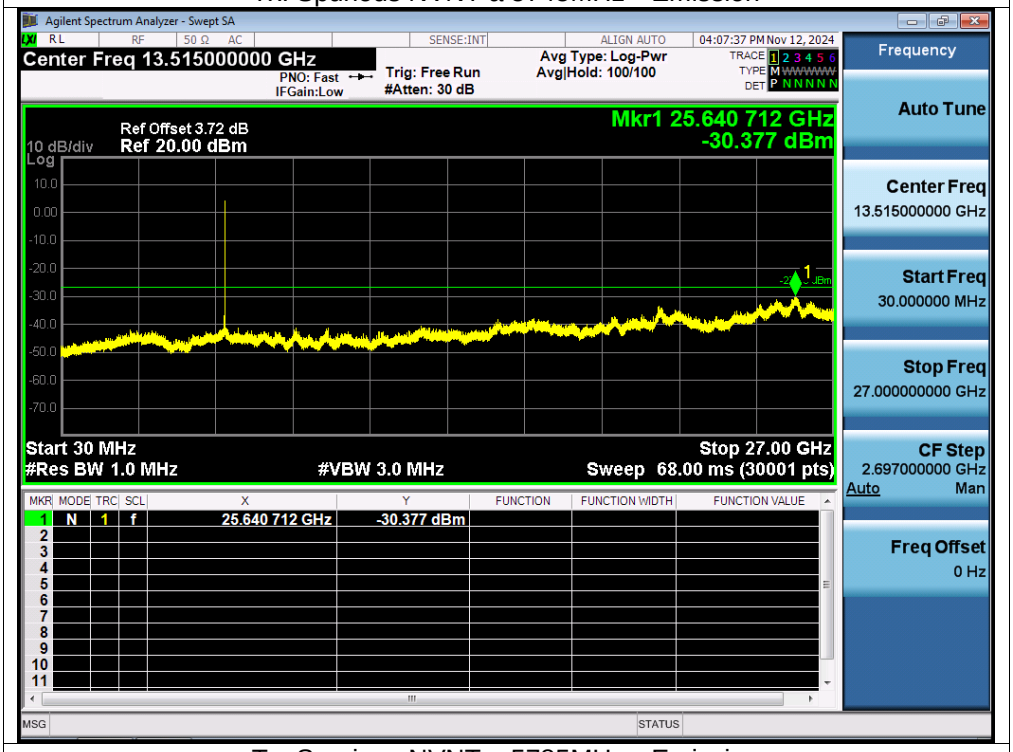


Tx. Spurious NVNT n40 5550MHz Emission

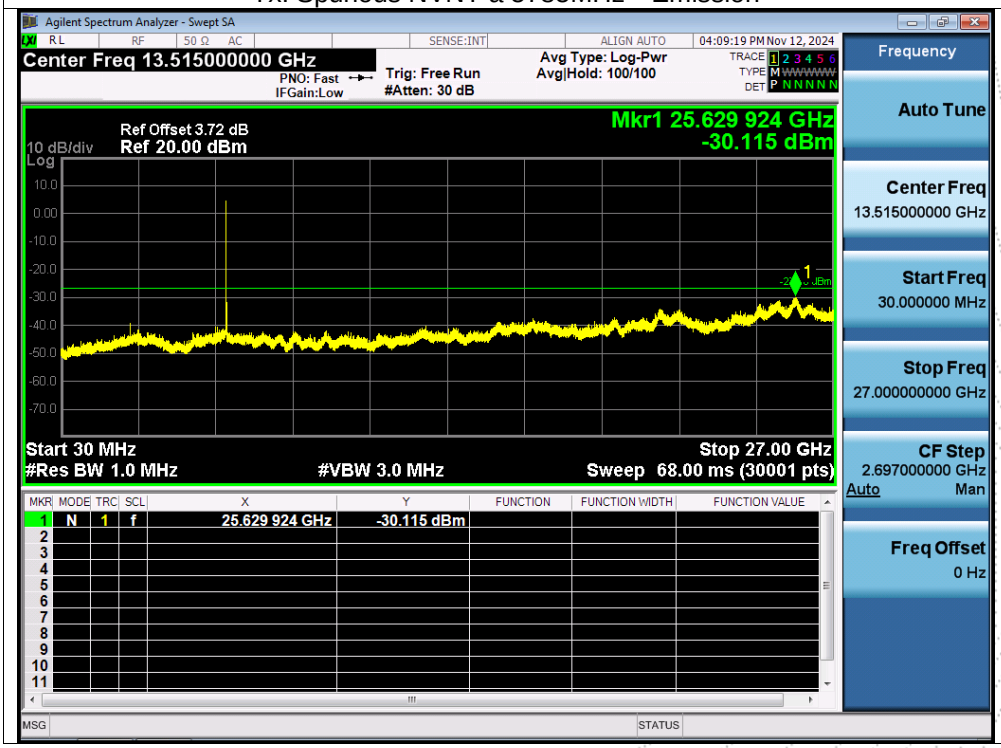
Tx. Spurious NVNT n40 5670MHz Emission



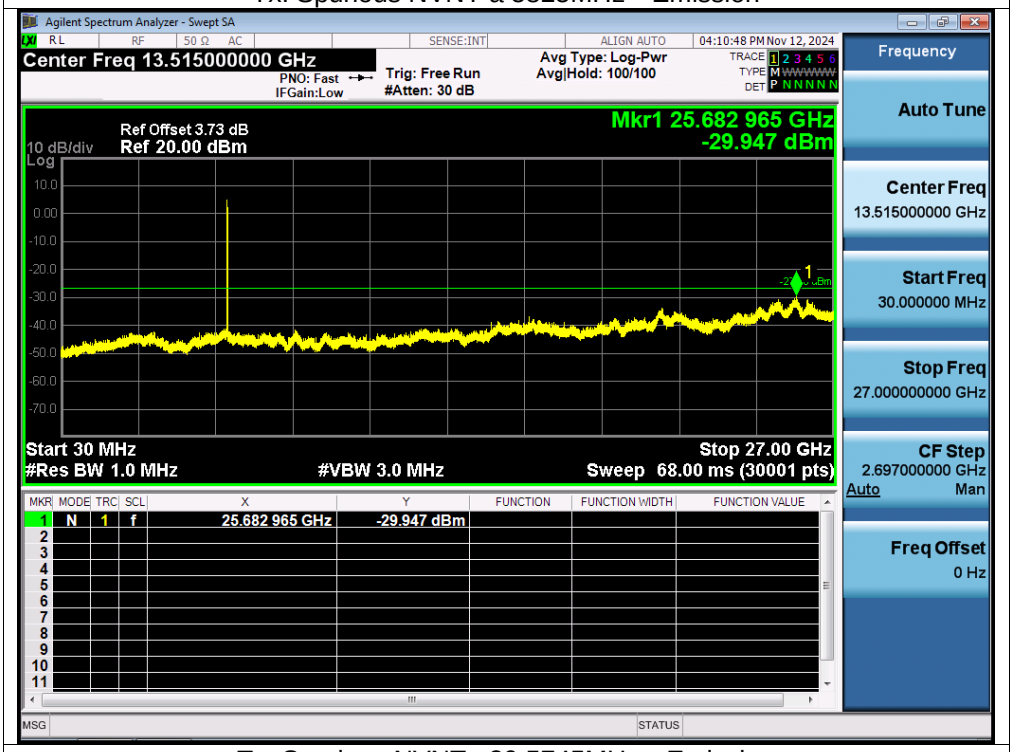
Test Graphs
Tx. Spurious NVNT a 5745MHz Emission



Tx. Spurious NVNT a 5785MHz Emission

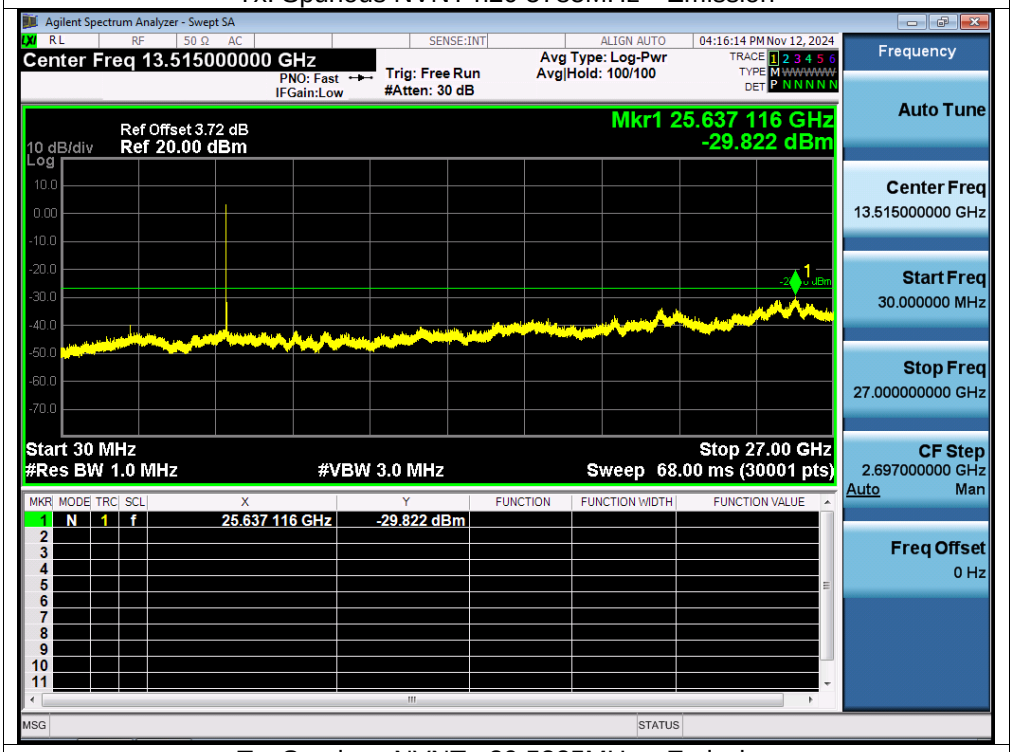


Tx. Spurious NVNT a 5825MHz Emission

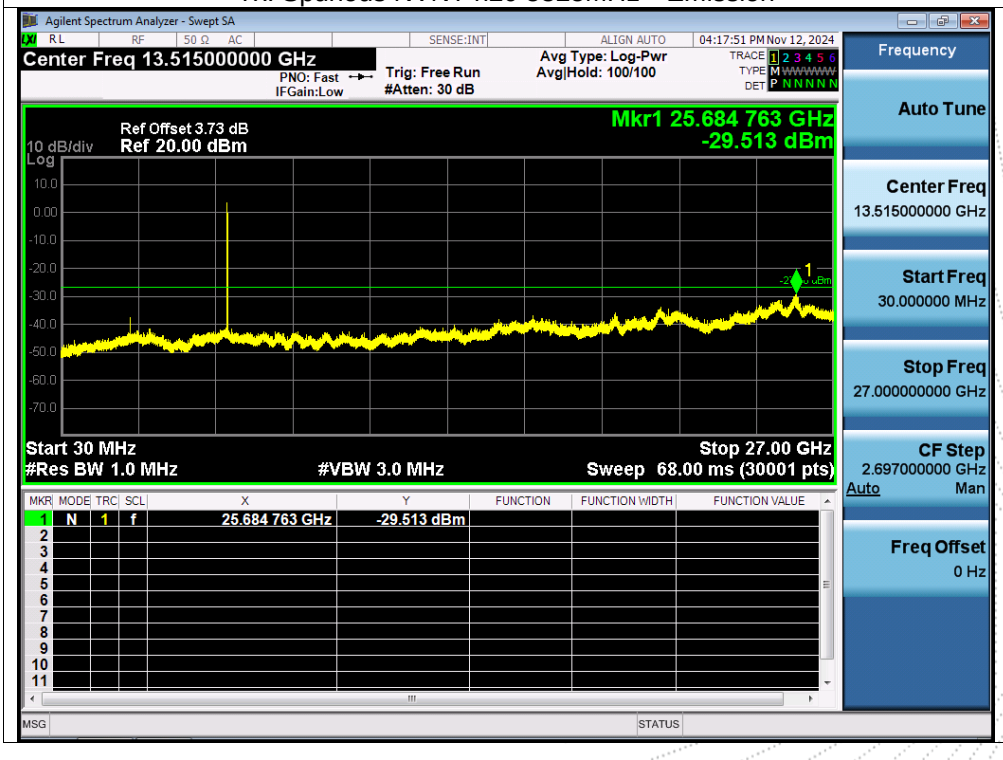


Tx. Spurious NVNT n20 5745MHz Emission

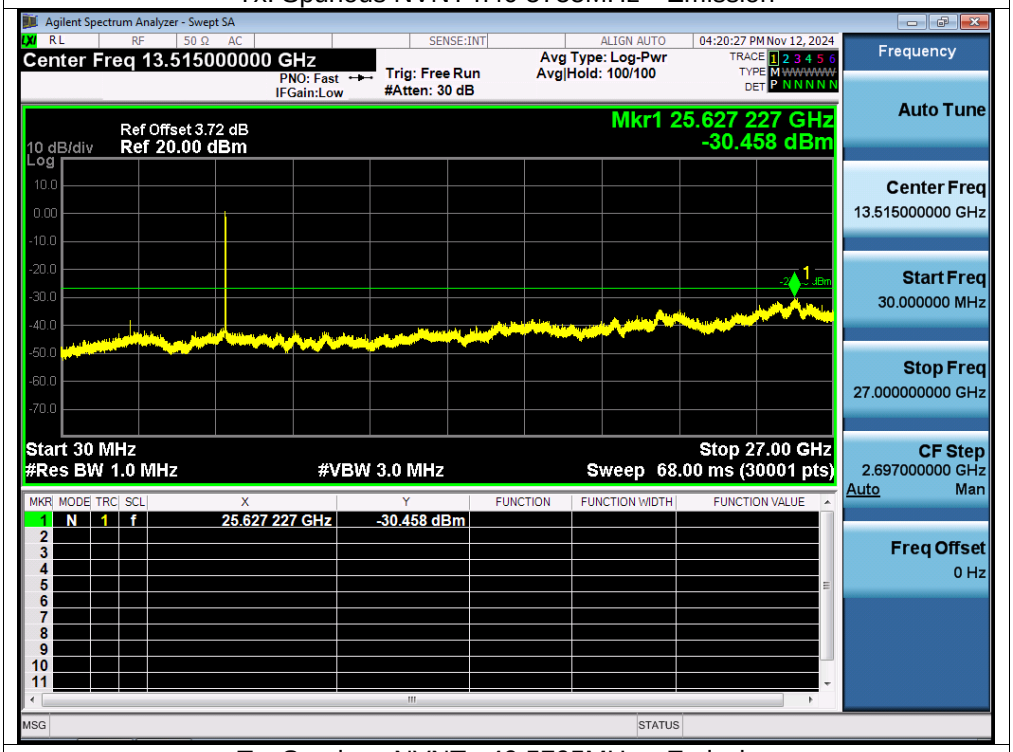
Tx. Spurious NVNT n20 5785MHz Emission



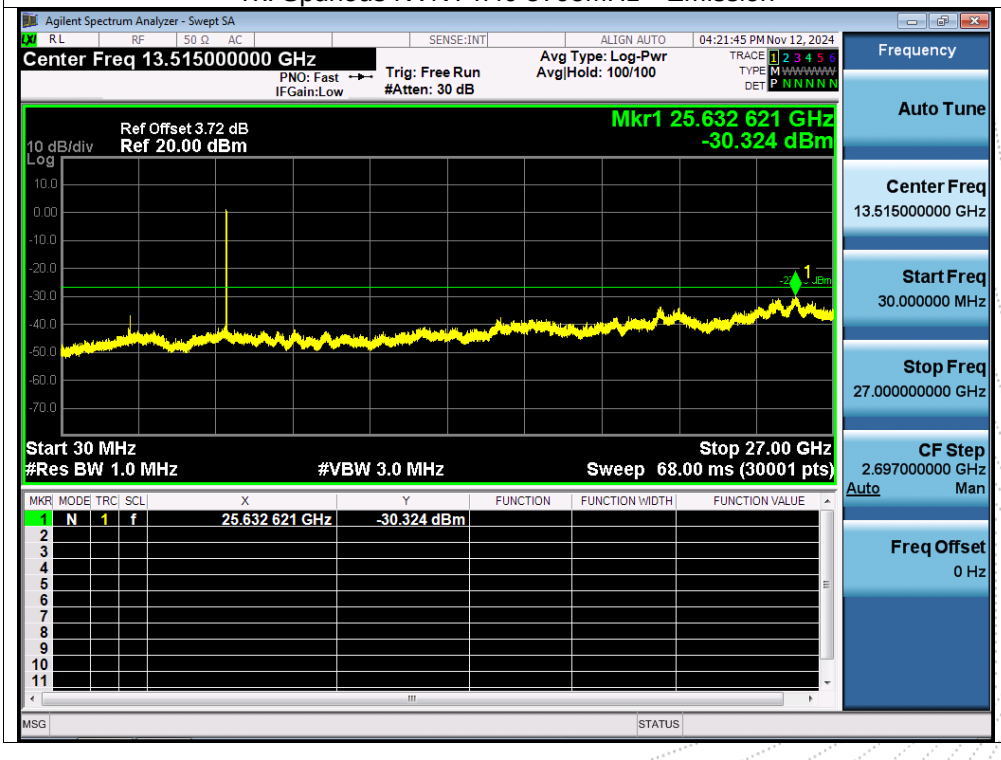
Tx. Spurious NVNT n20 5825MHz Emission



Tx. Spurious NVNT n40 5755MHz Emission

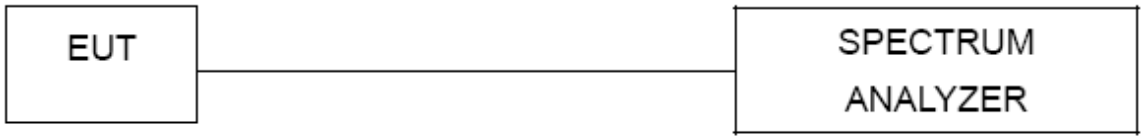


Tx. Spurious NVNT n40 5795MHz Emission



13. Frequency Stability Measurement

13.1 Block Diagram Of Test Setup



13.2 Limit

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.
The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification)..

13.3 Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 106 ppm and he limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C~70°C.

13.4 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	AC 120V
Test Mode:	TX Frequency U-NII-1 (5180-5240MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency:5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5180.0083	5180	0.0083	1.6023
		V max (V)	138.00	5180.0112	5180	0.0112	2.1622
		V min (V)	102.00	5180.0030	5180	0.0030	0.5792
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency:5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5180.0093	5180	0.0093	1.7954
		T (°C)	-10	5180.0097	5180	0.0097	1.8726
		T (°C)	0	5180.0049	5180	0.0049	0.9459
		T (°C)	10	5180.0020	5180	0.0020	0.3861
		T (°C)	20	5180.0080	5180	0.0080	1.5444
		T (°C)	30	5180.0114	5180	0.0114	2.2008
		T (°C)	40	5180.0105	5180	0.0105	2.0270
		T (°C)	50	5180.0038	5180	0.0038	0.7336
		T (°C)	60	5180.0063	5180	0.0063	1.2162
		T (°C)	70	5180.0092	5180	0.0092	1.7761
Limits				5150-5250 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5200.0133	5200	0.0133	2.5577
		V max (V)	138.00	5200.0077	5200	0.0077	1.4808
		V min (V)	102.00	5200.0012	5200	0.0012	0.2308
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5200.00710	5200	0.00710	1.3654
		T (°C)	-10	5200.00480	5200	0.00480	0.9231
		T (°C)	0	5200.00840	5200	0.00840	1.6154
		T (°C)	10	5200.00940	5200	0.00940	1.8077
		T (°C)	20	5200.00090	5200	0.00090	0.1731
		T (°C)	30	5200.01130	5200	0.01130	2.1731
		T (°C)	40	5200.00870	5200	0.00870	1.6731
		T (°C)	50	5200.00500	5200	0.00500	0.9615
		T (°C)	60	5200.00670	5200	0.00670	1.2885
		T (°C)	70	5200.00480	5200	0.00480	0.9231
Limits				5150-5250 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5240.0090	5240	0.0090	1.7176
		V max (V)	138.00	5240.0097	5240	0.0097	1.8511
		V min (V)	102.00	5240.0056	5240	0.0056	1.0687
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5240.0133	5240	0.0133	2.5382
		T (°C)	-10	5240.0048	5240	0.0048	0.9160
		T (°C)	0	5240.0009	5240	0.0009	0.1718
		T (°C)	10	5240.0027	5240	0.0027	0.5153
		T (°C)	20	5240.0129	5240	0.0129	2.4618
		T (°C)	30	5240.0133	5240	0.0133	2.5382
		T (°C)	40	5240.0010	5240	0.0010	0.1908
		T (°C)	50	5240.0012	5240	0.0012	0.2290
		T (°C)	60	5240.0065	5240	0.0065	1.2405
		T (°C)	70	5240.0015	5240	0.0015	0.2863
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 120V
Test Mode:	TX (5.3G) Mode Frequency U-NII-2A (5260-5320MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency:5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5260.0039	5260	0.0039	0.7414
		V max (V)	138.00	5260.0114	5260	0.0114	2.1673
		V min (V)	102.00	5260.0094	5260	0.0094	1.7871
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency:5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5260.0026	5260	0.0026	0.4943
		T (°C)	-10	5260.0086	5260	0.0086	1.6350
		T (°C)	0	5260.0112	5260	0.0112	2.1293
		T (°C)	10	5260.0058	5260	0.0058	1.1027
		T (°C)	20	5260.0004	5260	0.0004	0.0760
		T (°C)	30	5260.0014	5260	0.0014	0.2662
		T (°C)	40	5260.0067	5260	0.0067	1.2738
		T (°C)	50	5260.0011	5260	0.0011	0.2091
		T (°C)	60	5260.0069	5260	0.0069	1.3118
		T (°C)	70	5260.0047	5260	0.0047	0.8935
Limits				5260-5320 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5280.0017	5280	0.0017	0.3220
		V max (V)	138.00	5280.0029	5280	0.0029	0.5492
		V min (V)	102.00	5280.0072	5280	0.0072	1.3636
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5280.01210	5280	0.01210	2.2917
		T (°C)	-10	5280.00600	5280	0.00600	1.1364
		T (°C)	0	5280.01260	5280	0.01260	2.3864
		T (°C)	10	5280.01130	5280	0.01130	2.1402
		T (°C)	20	5280.00570	5280	0.00570	1.0795
		T (°C)	30	5280.01070	5280	0.01070	2.0265
		T (°C)	40	5280.00480	5280	0.00480	0.9091
		T (°C)	50	5280.00380	5280	0.00380	0.7197
		T (°C)	60	5280.01310	5280	0.01310	2.4811
		T (°C)	70	5280.01230	5280	0.01230	2.3295
Limits				5260-5320 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5320.0063	5320	0.0063	1.1842
		V max (V)	138.00	5320.0086	5320	0.0086	1.6165
		V min (V)	102.00	5320.0052	5320	0.0052	0.9774
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5320.0126	5320	0.0126	2.3684
		T (°C)	-10	5320.0081	5320	0.0081	1.5226
		T (°C)	0	5320.0054	5320	0.0054	1.0150
		T (°C)	10	5320.0043	5320	0.0043	0.8083
		T (°C)	20	5320.0034	5320	0.0034	0.6391
		T (°C)	30	5320.0055	5320	0.0055	1.0338
		T (°C)	40	5320.0050	5320	0.0050	0.9398
		T (°C)	50	5320.0133	5320	0.0133	2.5000
		T (°C)	60	5320.0014	5320	0.0014	0.2632
		T (°C)	70	5320.0111	5320	0.0111	2.0865
Limits				5260-5320 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 120V
Test Mode:	TX (5.6G) Mode Frequency U-NII-2C (5500-5700MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency:5500MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5500.0027	5500	0.0027	0.4909
		V max (V)	138.00	5500.0011	5500	0.0011	0.2000
		V min (V)	102.00	5500.0061	5500	0.0061	1.1091
Limits				5500-5700 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency:5500MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5500.0059	5500	0.0059	1.0727
		T (°C)	-10	5500.0102	5500	0.0102	1.8545
		T (°C)	0	5500.0024	5500	0.0024	0.4364
		T (°C)	10	5500.0058	5500	0.0058	1.0545
		T (°C)	20	5500.0017	5500	0.0017	0.3091
		T (°C)	30	5500.0053	5500	0.0053	0.9636
		T (°C)	40	5500.0021	5500	0.0021	0.3818
		T (°C)	50	5500.0025	5500	0.0025	0.4545
		T (°C)	60	5500.0092	5500	0.0092	1.6727
		T (°C)	70	5500.0053	5500	0.0053	0.9636
Limits				5500-5700 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5580MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5580.0010	5580	0.0010	0.1792
		V max (V)	138.00	5580.0047	5580	0.0047	0.8423
		V min (V)	102.00	5580.0093	5580	0.0093	1.6667
Limits				5500-5700 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5580MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5580.00820	5580	0.00820	1.4695
		T (°C)	-10	5580.00930	5580	0.00930	1.6667
		T (°C)	0	5580.00220	5580	0.00220	0.3943
		T (°C)	10	5580.00120	5580	0.00120	0.2151
		T (°C)	20	5580.00510	5580	0.00510	0.9140
		T (°C)	30	5580.01100	5580	0.01100	1.9713
		T (°C)	40	5580.00910	5580	0.00910	1.6308
		T (°C)	50	5580.00450	5580	0.00450	0.8065
		T (°C)	60	5580.00840	5580	0.00840	1.5054
		T (°C)	70	5580.00740	5580	0.00740	1.3262
Limits				5500-5700 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency:5700MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5700.0092	5700	0.0092	1.6140
		V max (V)	138.00	5700.0027	5700	0.0027	0.4737
		V min (V)	102.00	5700.0127	5700	0.0127	2.2281
Limits				5500-5700 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency:5700MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5700.0070	5700	0.0070	1.2281
		T (°C)	-10	5700.0100	5700	0.0100	1.7544
		T (°C)	0	5700.0010	5700	0.0010	0.1754
		T (°C)	10	5700.0132	5700	0.0132	2.3158
		T (°C)	20	5700.0134	5700	0.0134	2.3509
		T (°C)	30	5700.0071	5700	0.0071	1.2456
		T (°C)	40	5700.0109	5700	0.0109	1.9123
		T (°C)	50	5700.0046	5700	0.0046	0.8070
		T (°C)	60	5700.0041	5700	0.0041	0.7193
		T (°C)	70	5700.0127	5700	0.0127	2.2281
Limits				5500-5700 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 120V
Test Mode:	TX (5.8G) Mode Frequency U-NII-3 (5745-5825MHz)		

Voltage vs. Frequency Stabilit

TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120.00	5745.01260	5745	0.01260	2.1932
		V max (V)	138.00	5745.00940	5745	0.00940	1.6362
		V min (V)	102.00	5745.00440	5745	0.00440	0.7659
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5745.00350	5745	0.00350	0.6092
		T (°C)	-10	5745.00650	5745	0.00650	1.1314
		T (°C)	0	5745.01290	5745	0.01290	2.2454
		T (°C)	10	5745.01080	5745	0.01080	1.8799
		T (°C)	20	5745.00230	5745	0.00230	0.4003
		T (°C)	30	5745.00830	5745	0.00830	1.4447
		T (°C)	40	5745.00700	5745	0.00700	1.2185
		T (°C)	50	5745.00930	5745	0.00930	1.6188
		T (°C)	60	5745.00580	5745	0.00580	1.0096
		T (°C)	70	5745.01150	5745	0.01150	2.0017
Limits				5725-5850 MHz			
Result				Complies			