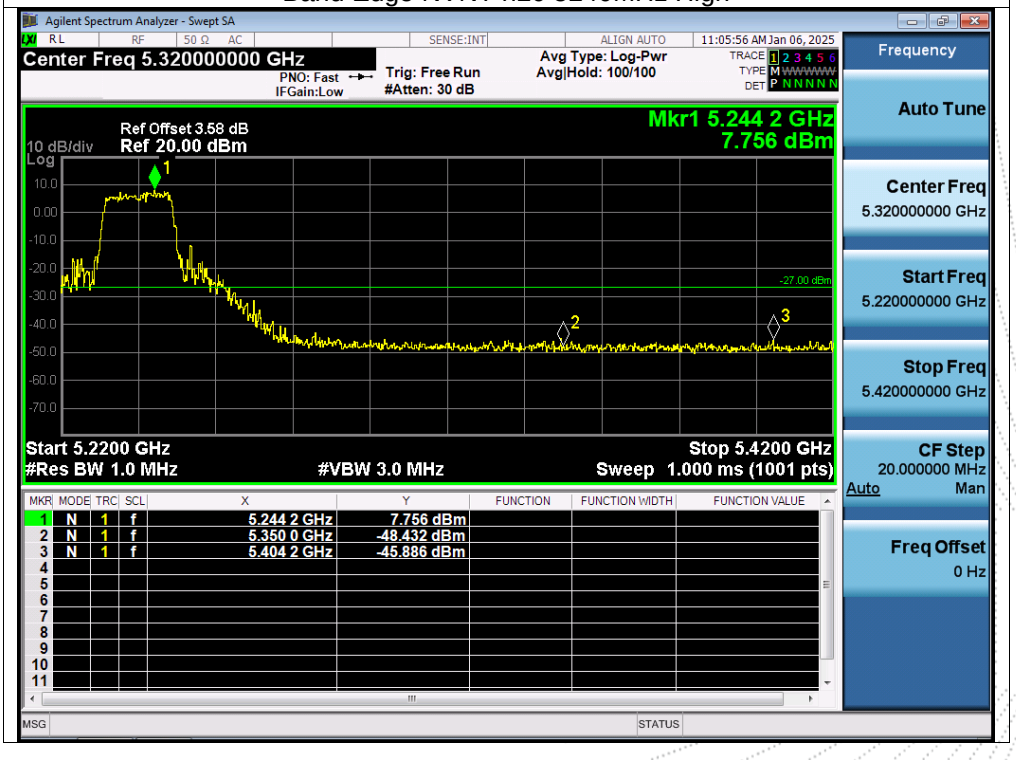
Band Edge NVNT n20 5180MHz Low

Band Edge NVNT n20 5240MHz High

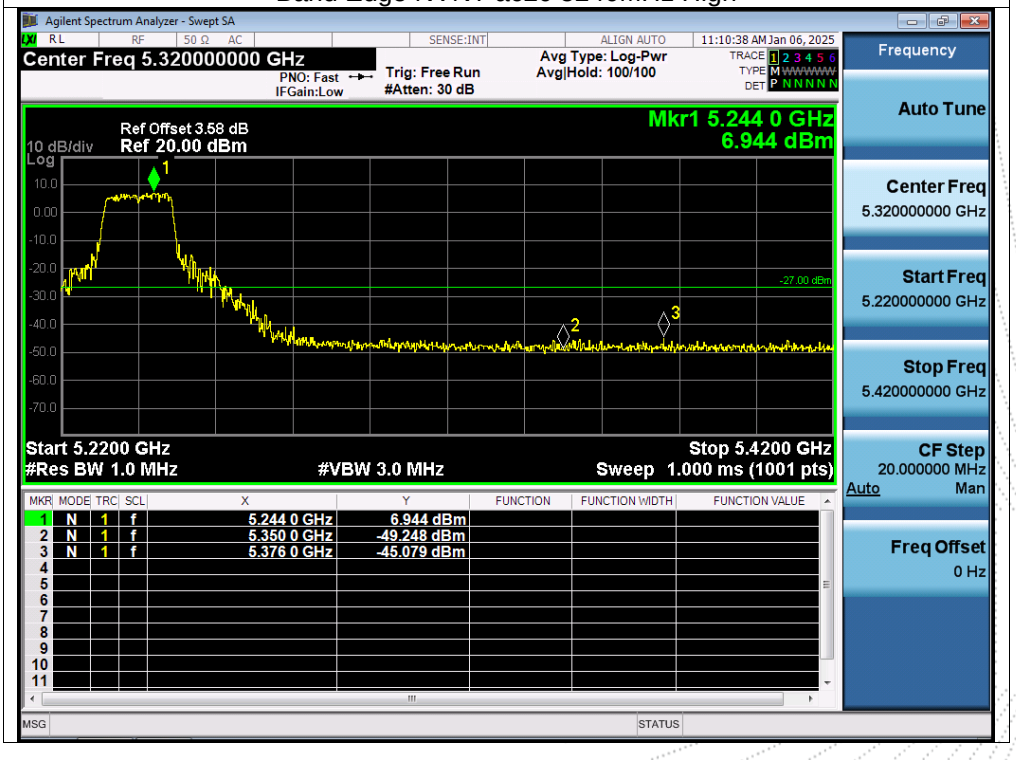


Band Edge NVNT n40 5190MHz Low

Band Edge NVNT n40 5230MHz High

Band Edge NVNT ac20 5180MHz Low

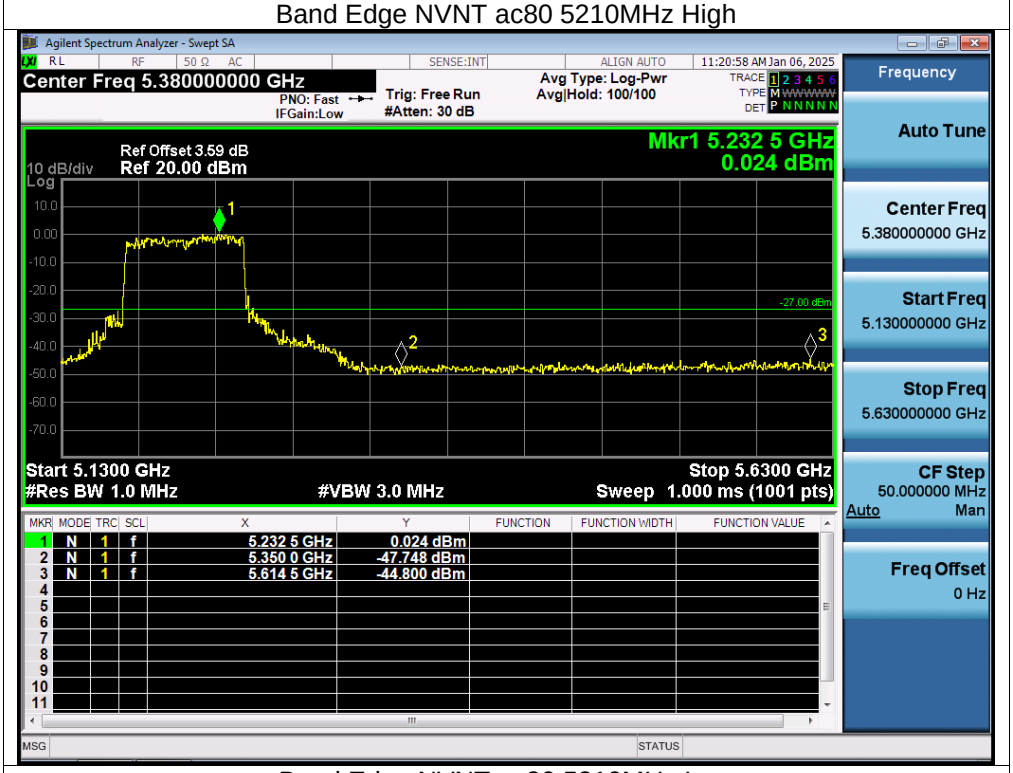
Band Edge NVNT ac20 5240MHz High



Band Edge NVNT ac40 5190MHz Low

Band Edge NVNT ac40 5230MHz High

Band Edge NVNT ac80 5210MHz High

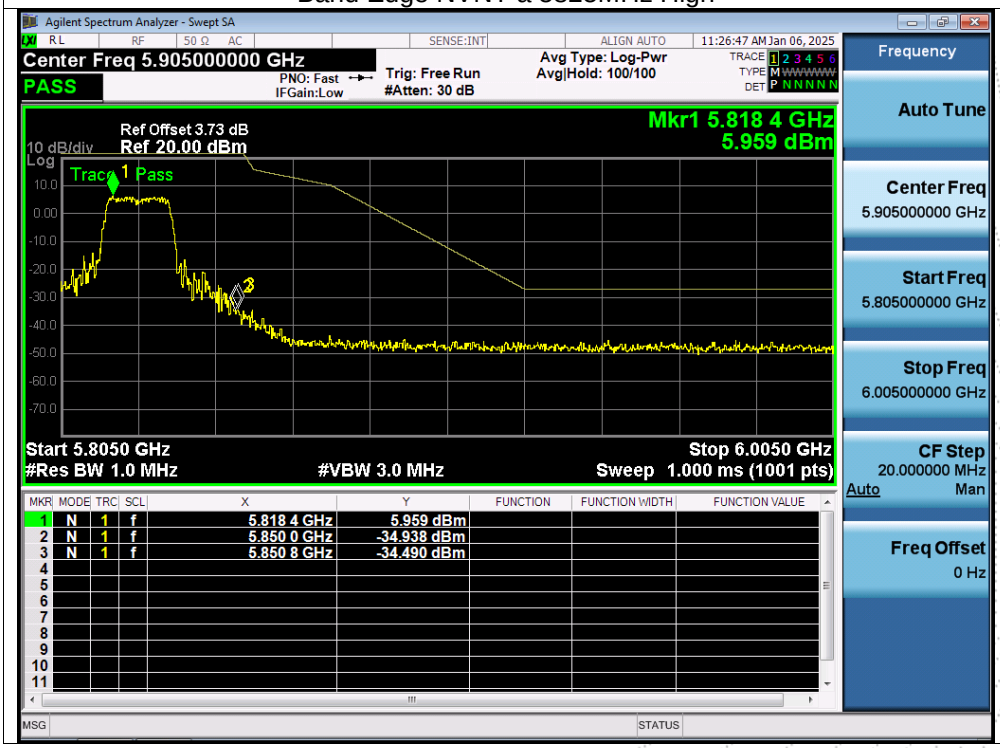


Band Edge NVNT ac80 5210MHz Low

Test Graphs

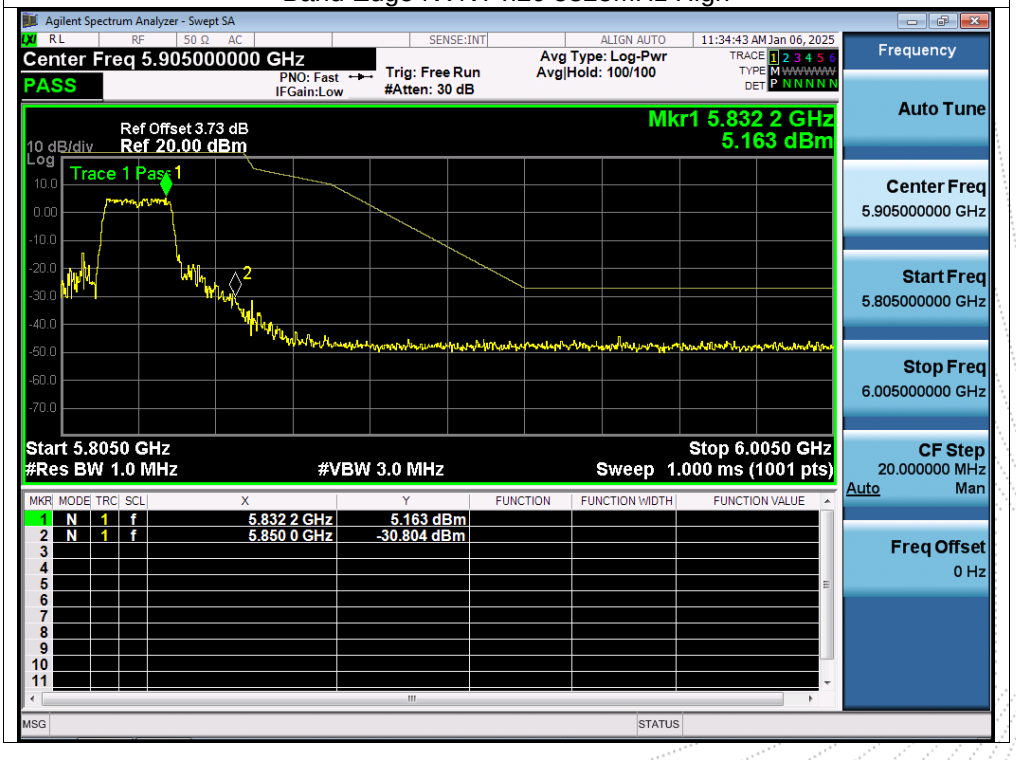
Band Edge NVNT a 5745MHz Low

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

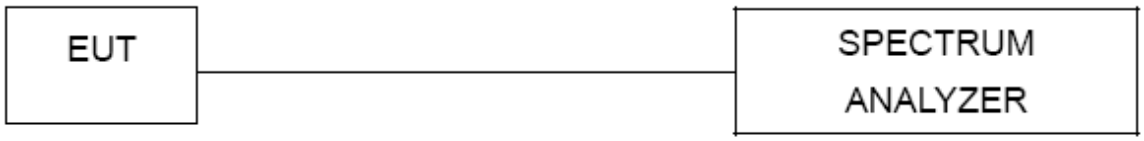
Band Edge NVNT ac40 5795MHz High

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.

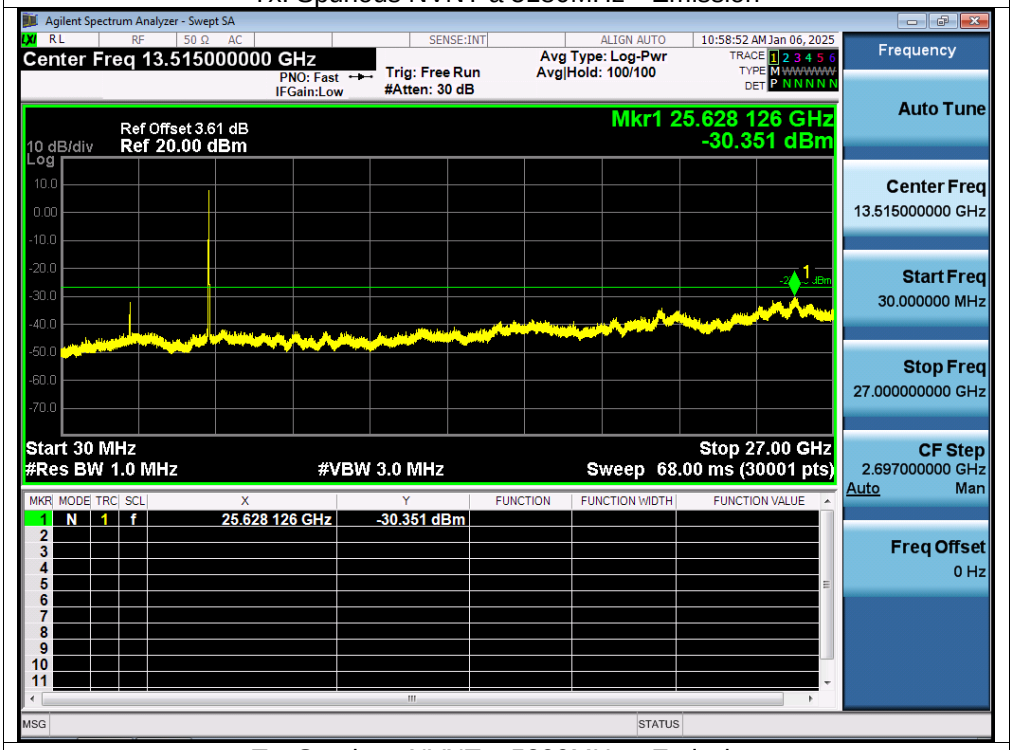
12.4 Test Result

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.

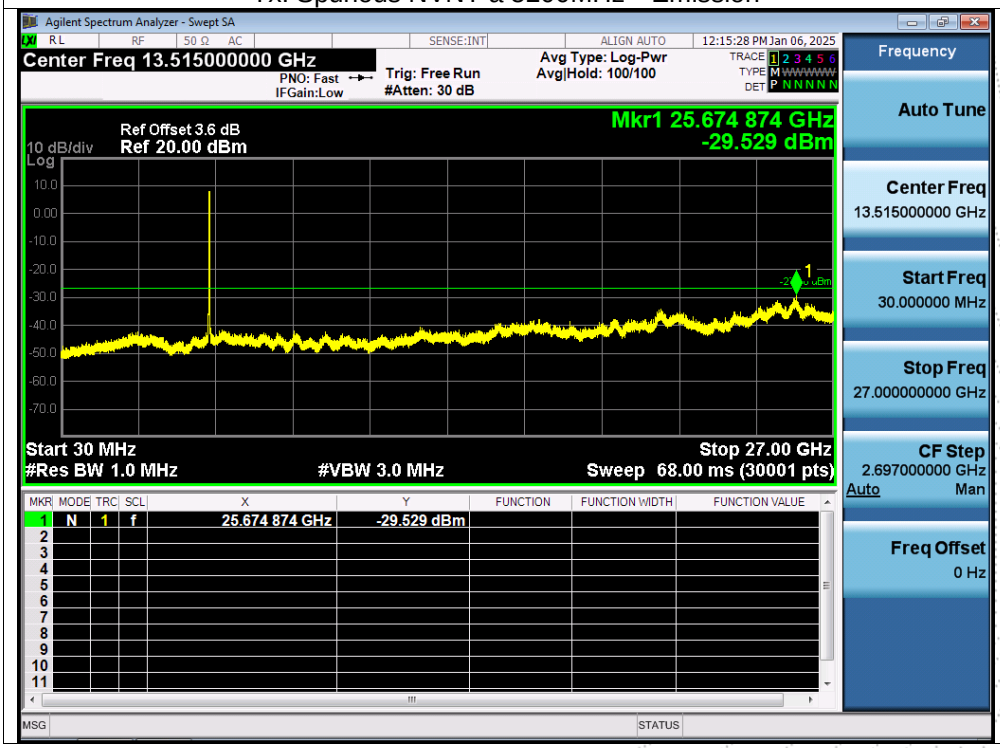
About:26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Test Graphs

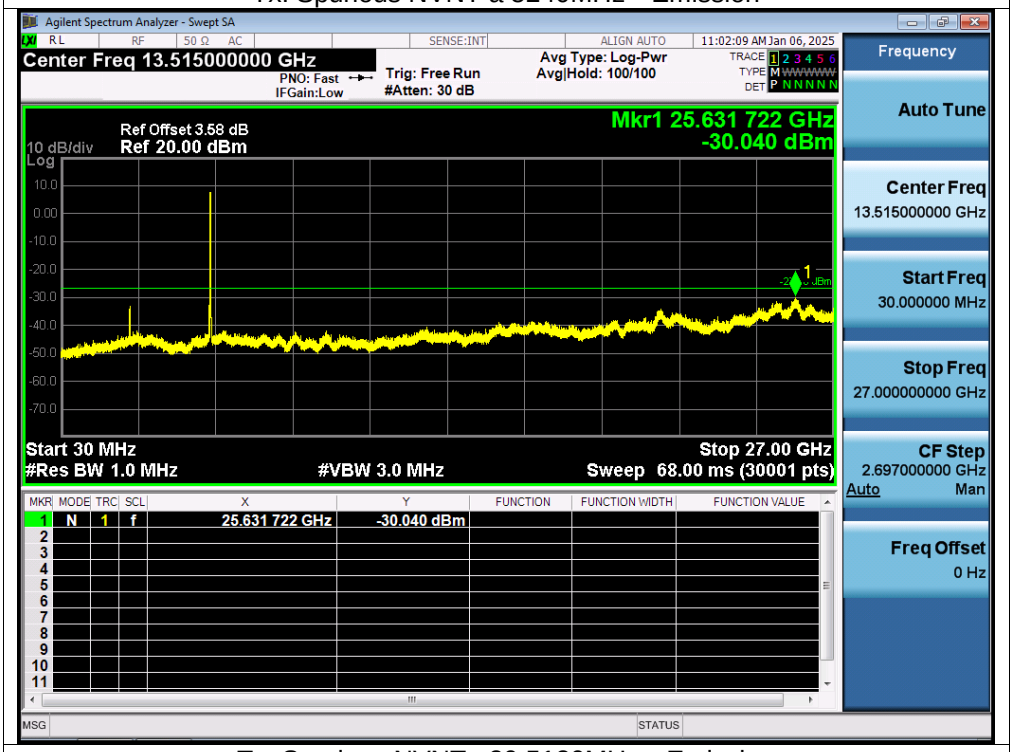
Tx. Spurious NVNT a 5180MHz Emission



Tx. Spurious NVNT a 5200MHz Emission

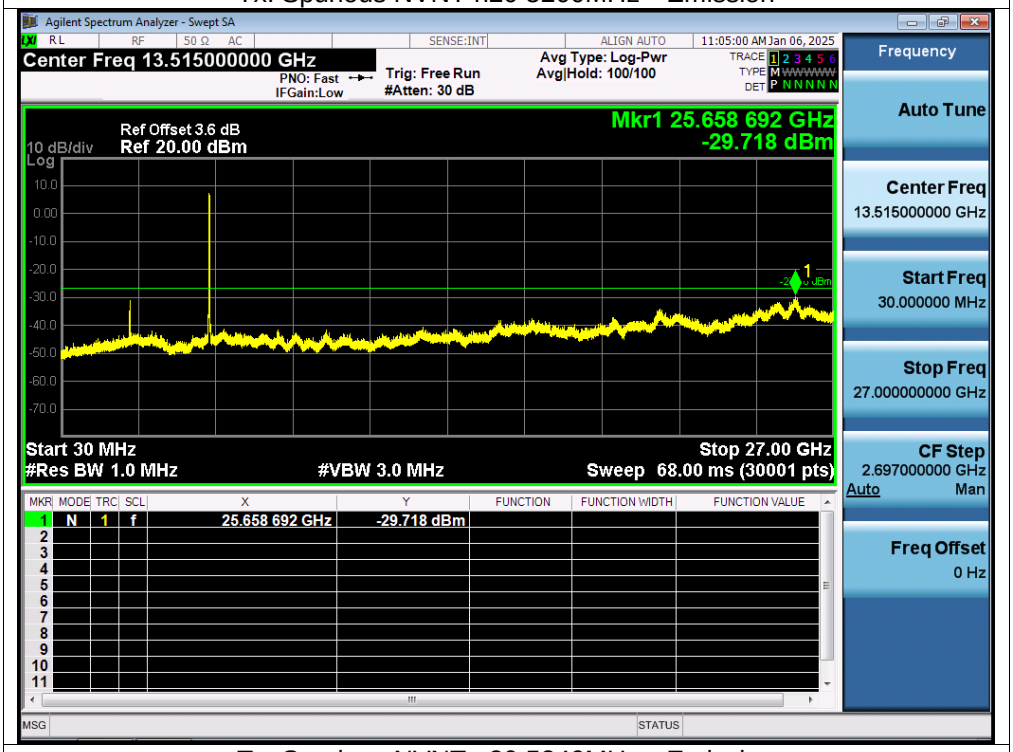


Tx. Spurious NVNT a 5240MHz Emission



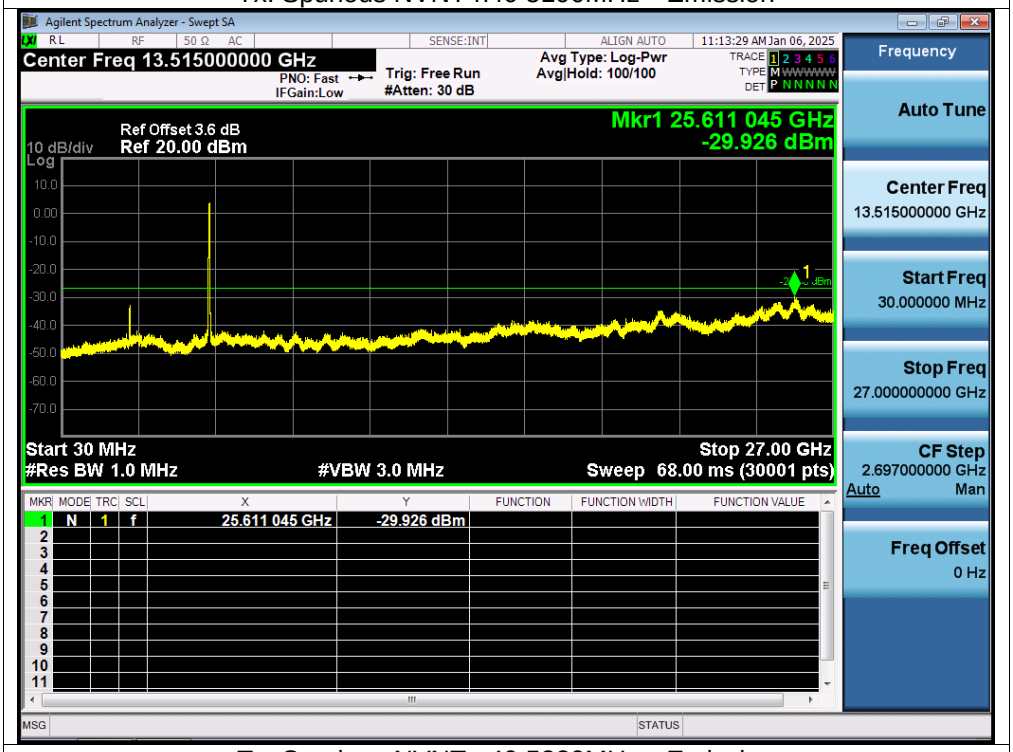
Tx. Spurious NVNT n20 5180MHz Emission

Tx. Spurious NVNT n20 5200MHz Emission



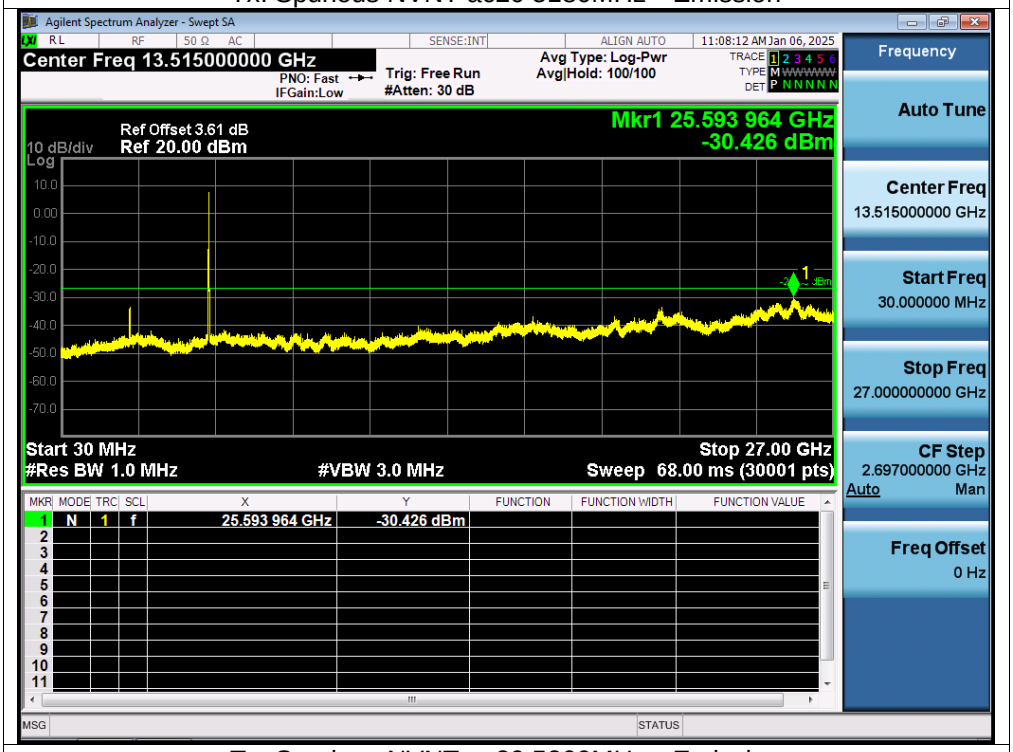
Tx. Spurious NVNT n20 5240MHz Emission

Tx. Spurious NVNT n40 5190MHz Emission



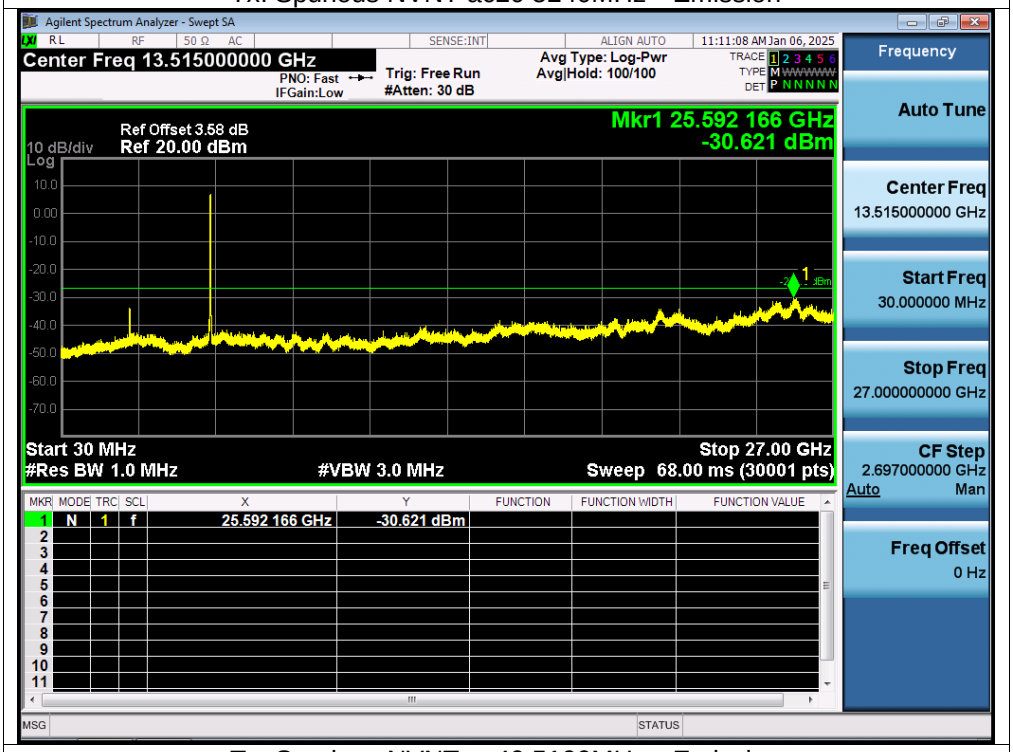
Tx. Spurious NVNT n40 5230MHz Emission

Tx. Spurious NVNT ac20 5180MHz Emission

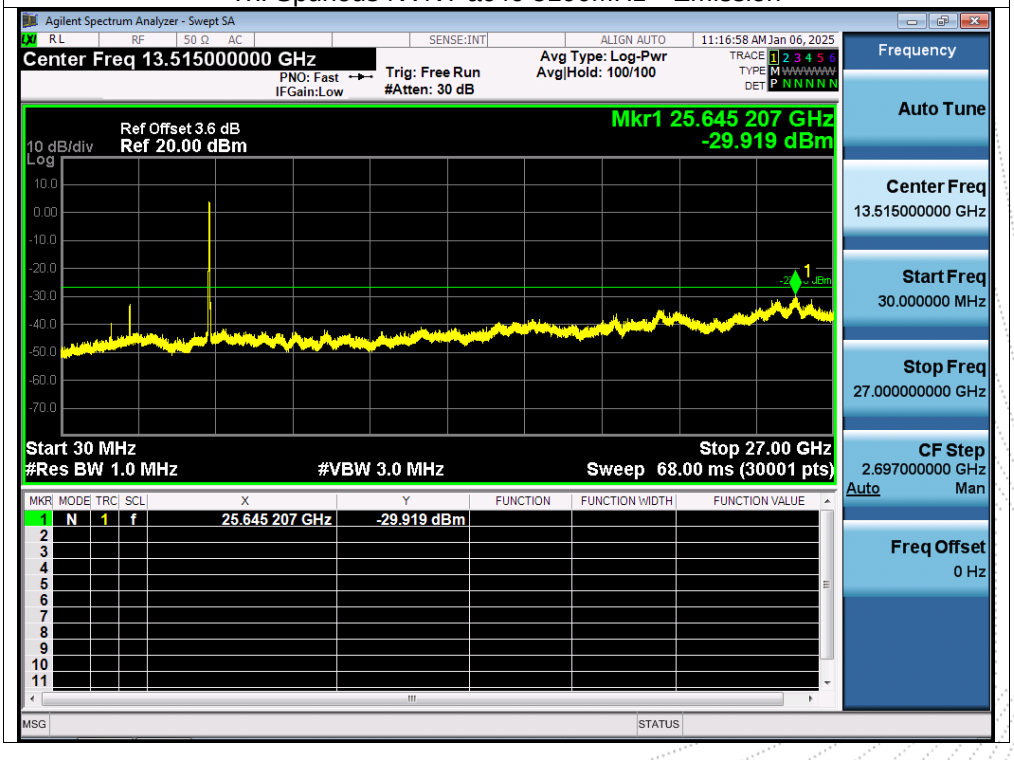


Tx. Spurious NVNT ac20 5200MHz Emission

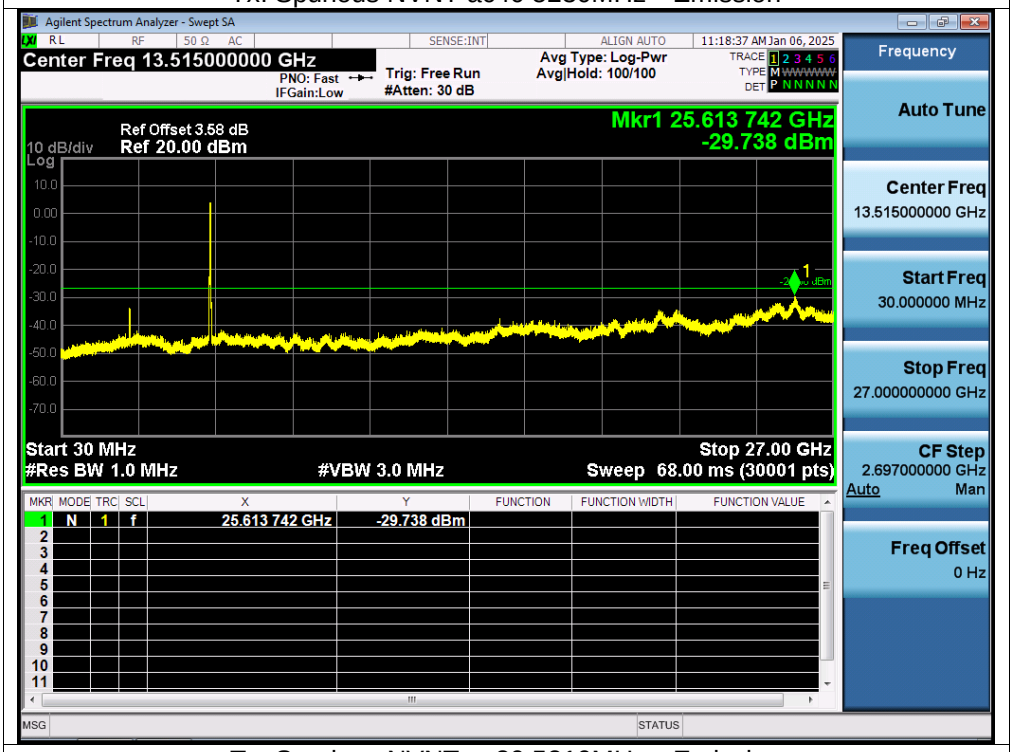
Tx. Spurious NVNT ac20 5240MHz Emission



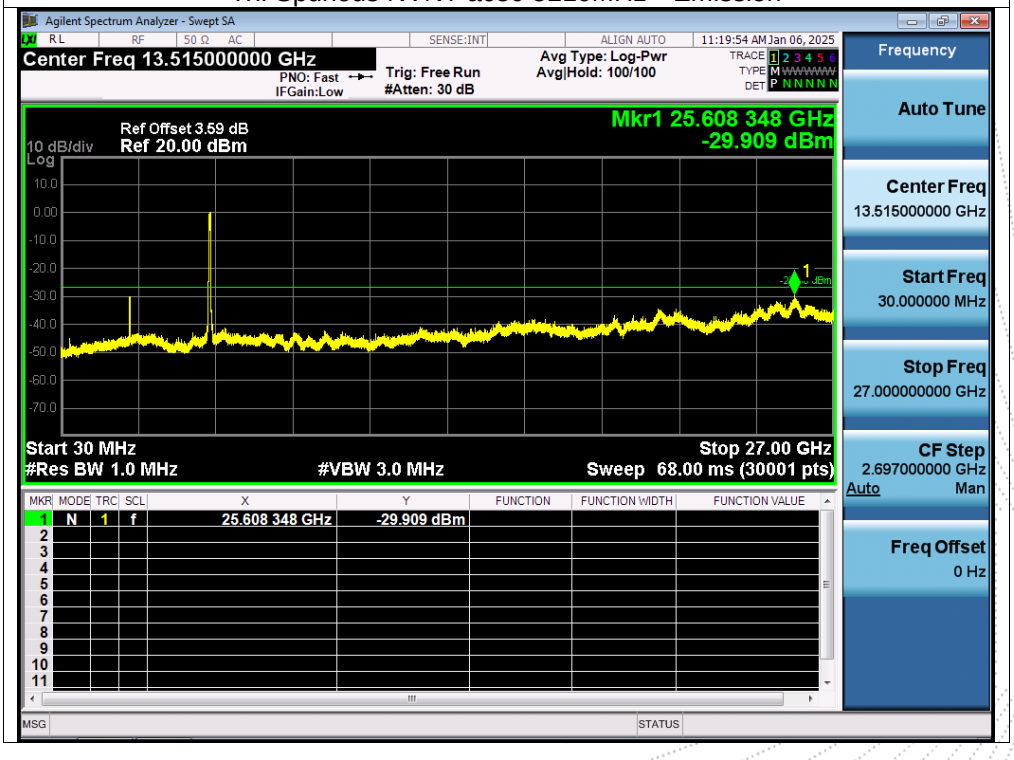
Tx. Spurious NVNT ac40 5190MHz Emission



Tx. Spurious NVNT ac40 5230MHz Emission



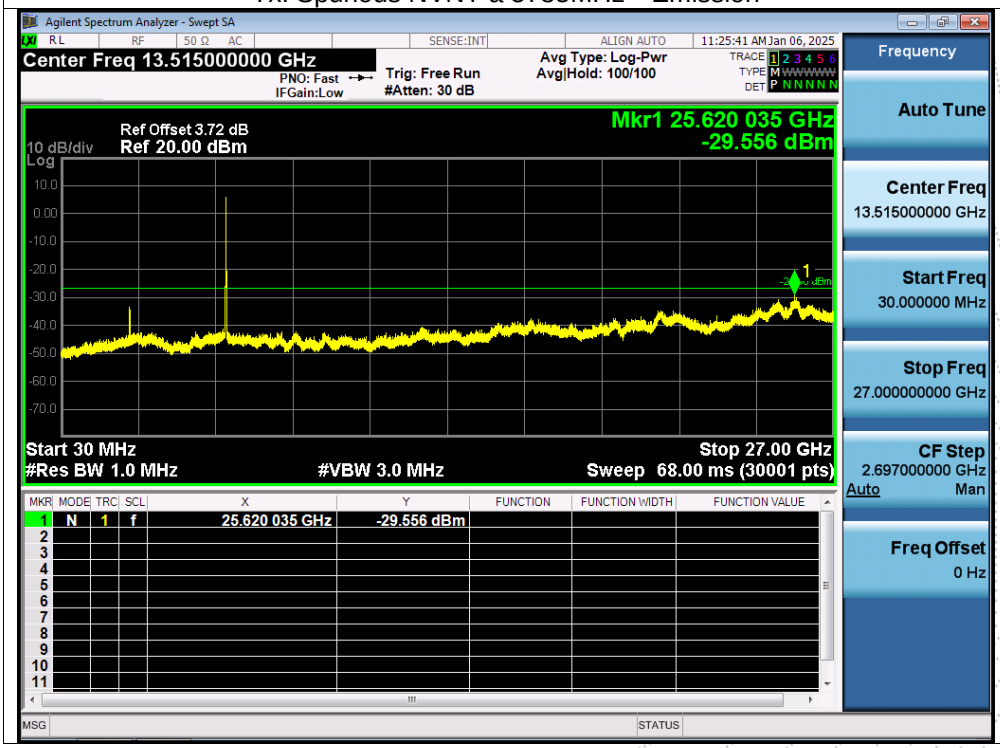
Tx. Spurious NVNT ac80 5210MHz Emission



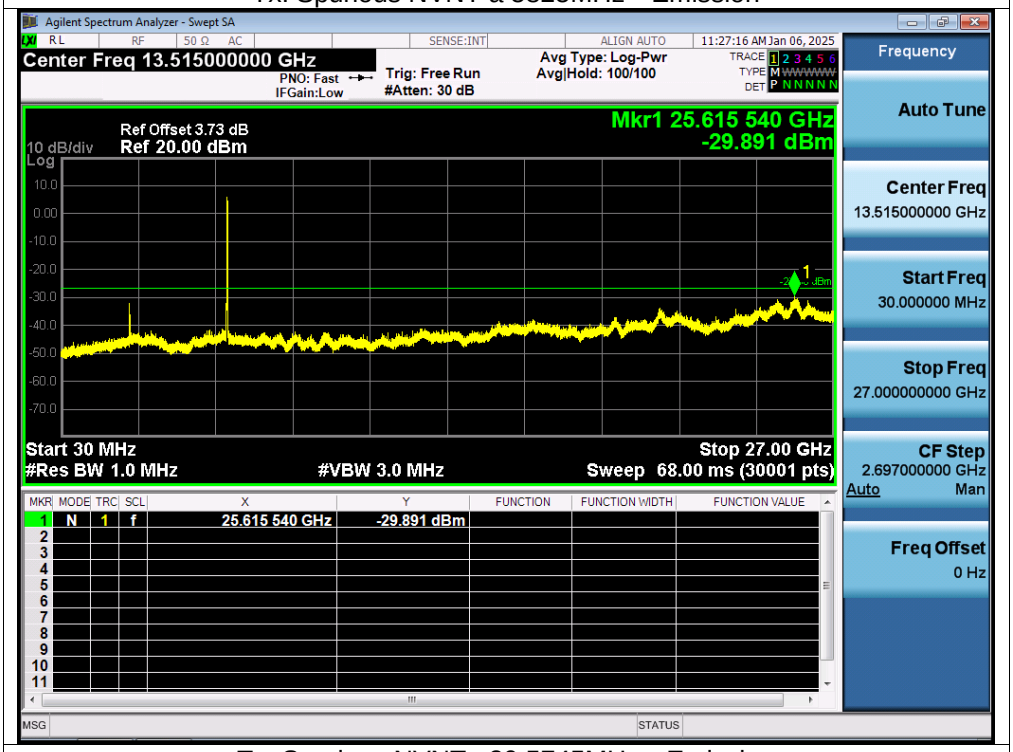
Test Graphs

Tx. Spurious NVNT a 5745MHz Emission

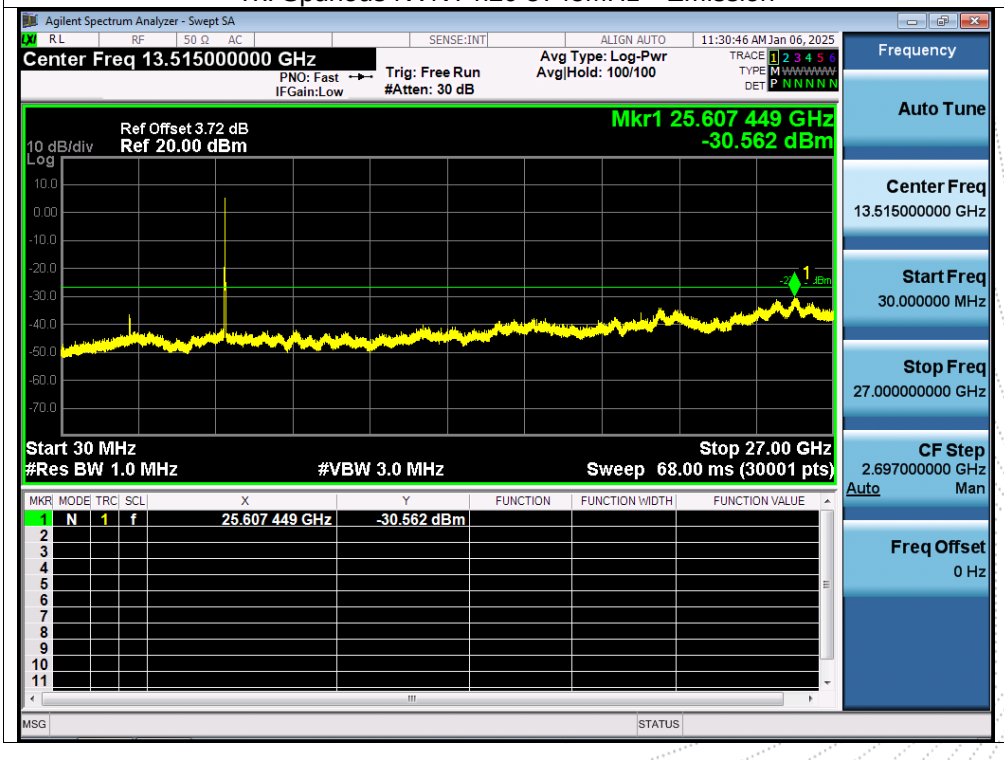
Tx. Spurious NVNT a 5785MHz Emission



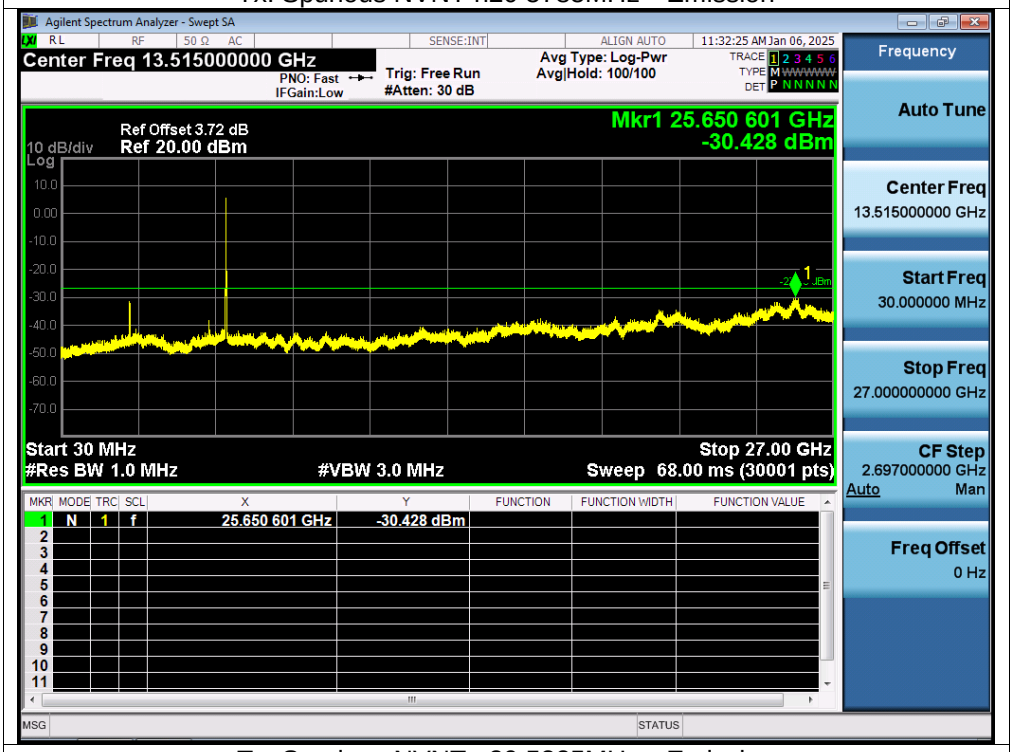
Tx. Spurious NVNT a 5825MHz Emission



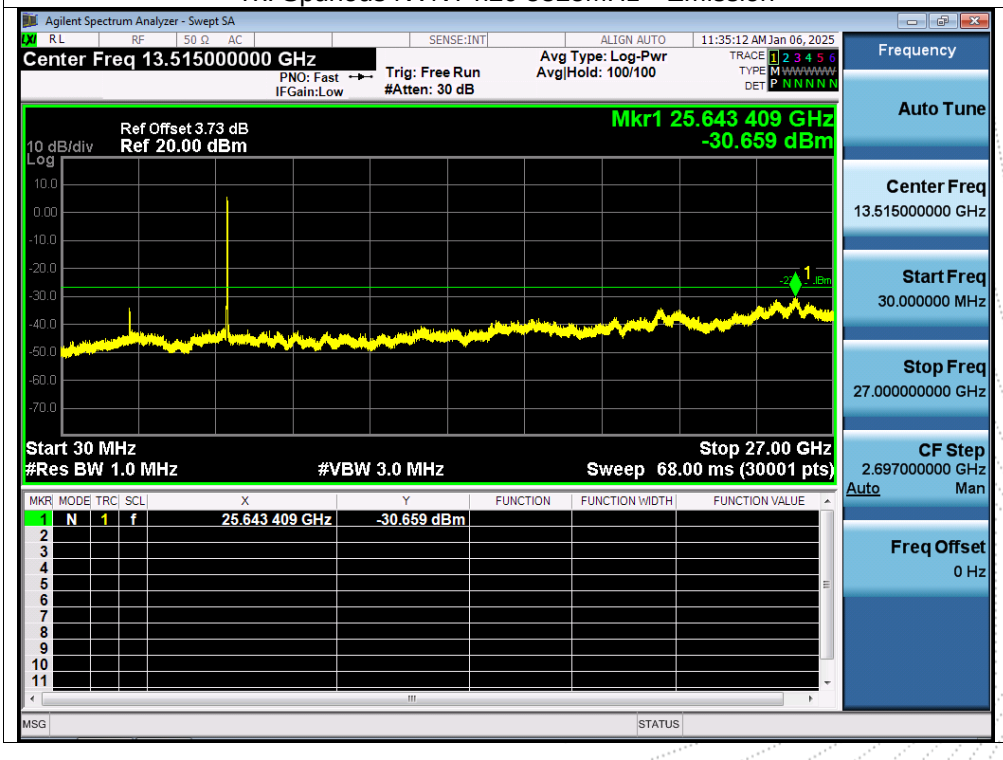
Tx. Spurious NVNT n20 5745MHz Emission



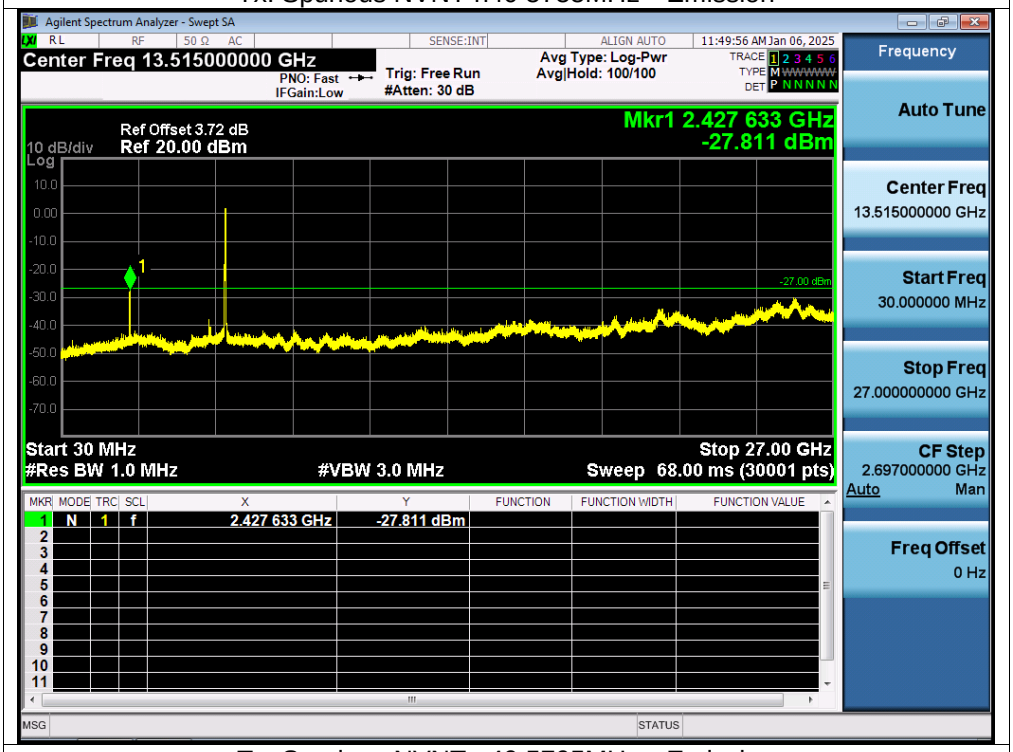
Tx. Spurious NVNT n20 5785MHz Emission



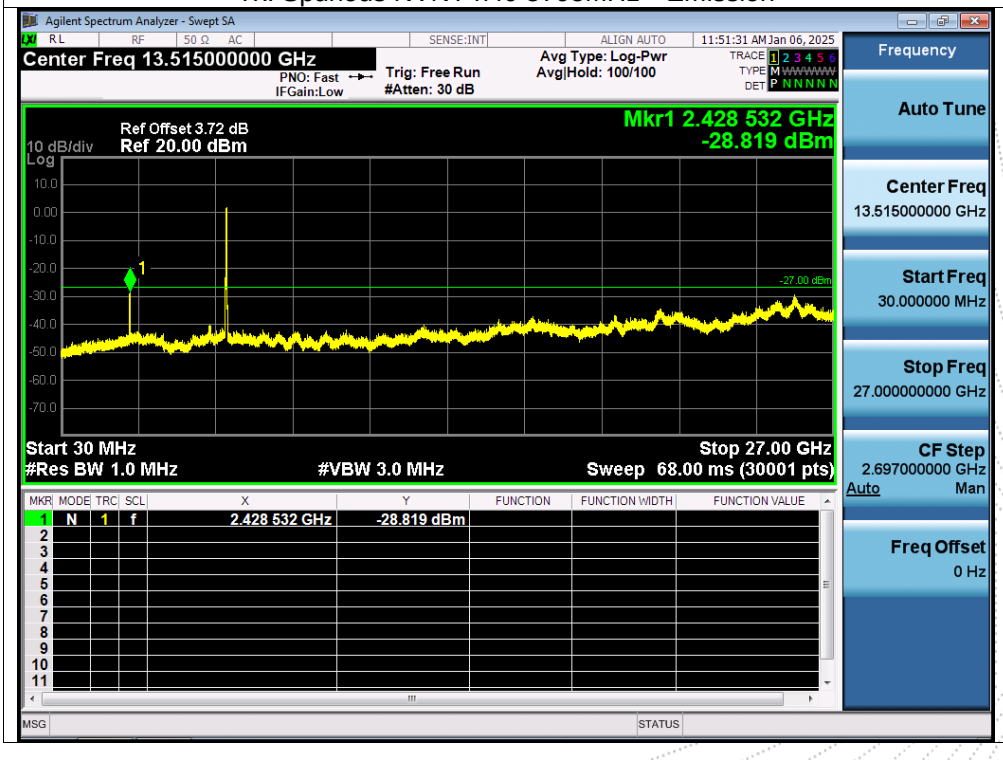
Tx. Spurious NVNT n20 5825MHz Emission



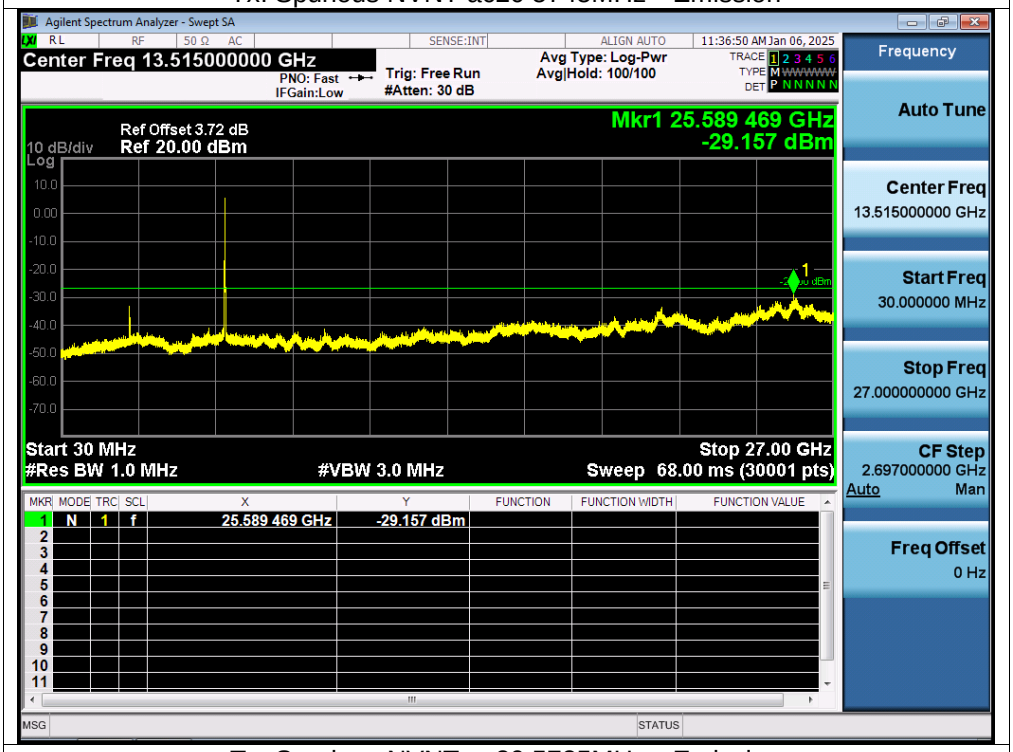
Tx. Spurious NVNT n40 5755MHz Emission



Tx. Spurious NVNT n40 5795MHz Emission

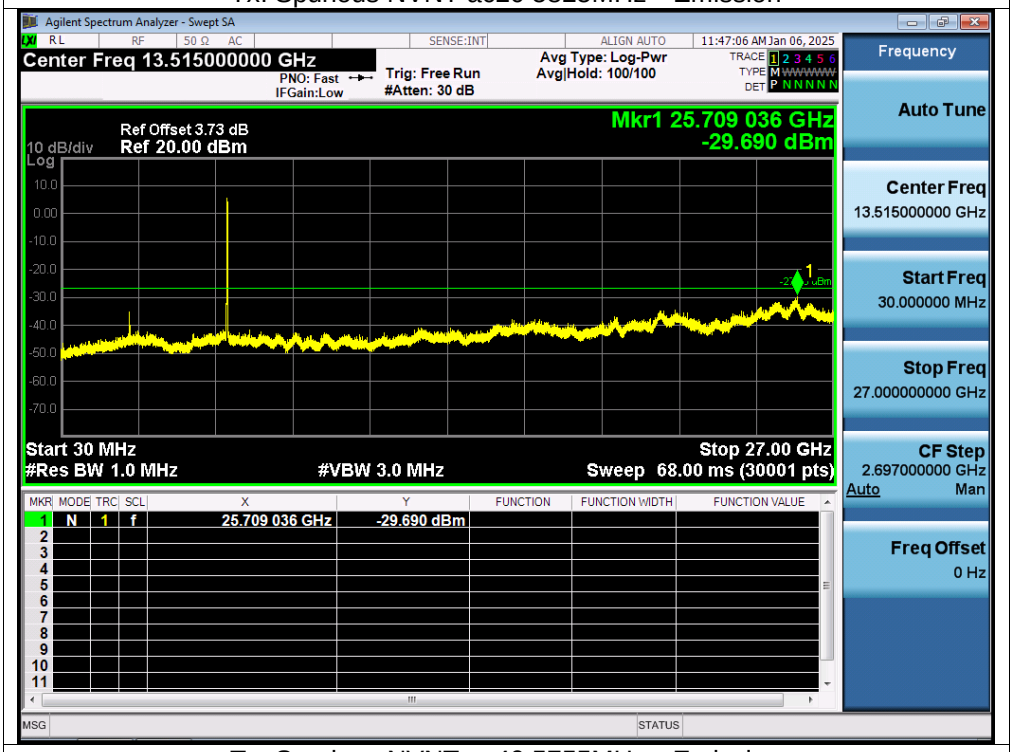


Tx. Spurious NVNT ac20 5745MHz Emission

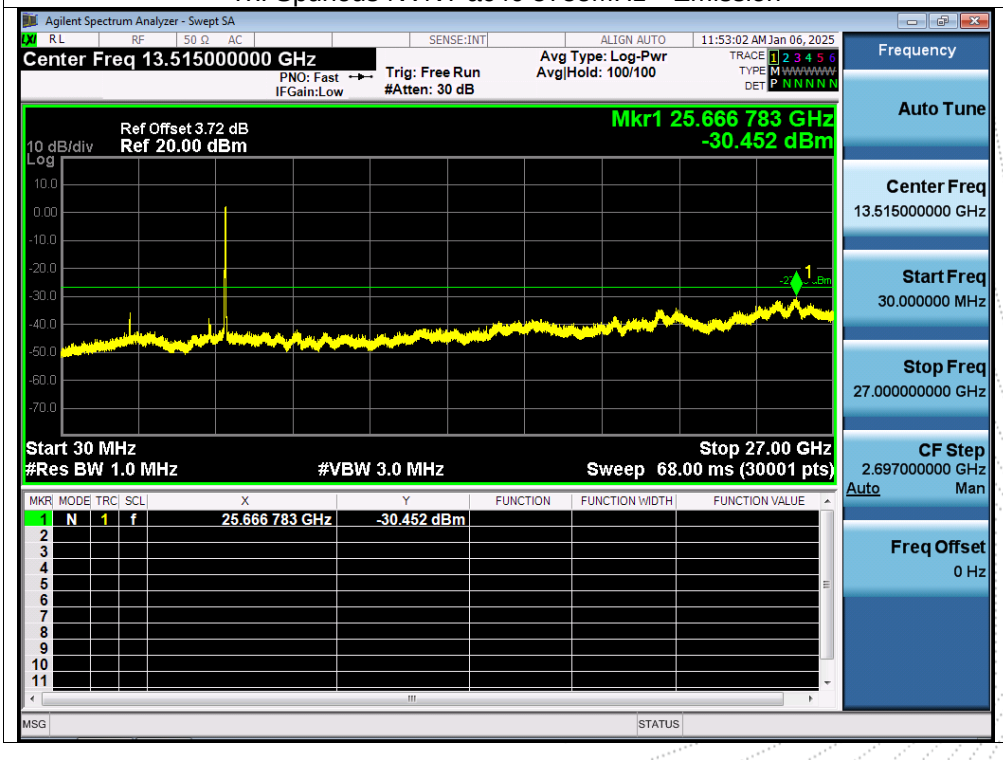


Tx. Spurious NVNT ac20 5785MHz Emission

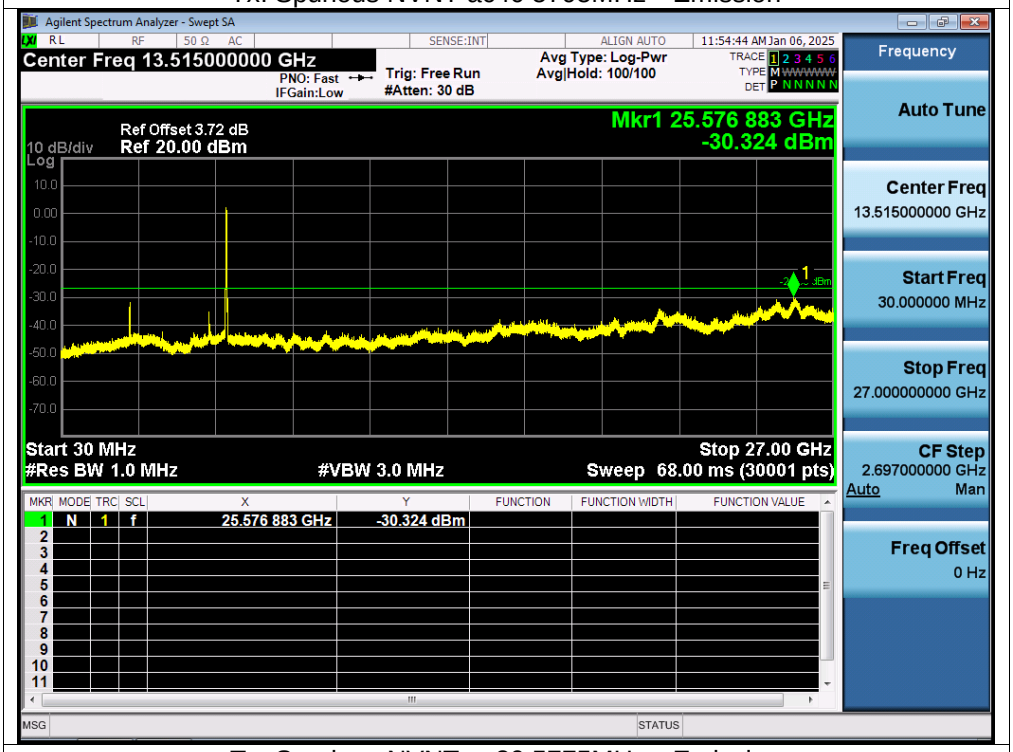
Tx. Spurious NVNT ac20 5825MHz Emission



Tx. Spurious NVNT ac40 5755MHz Emission



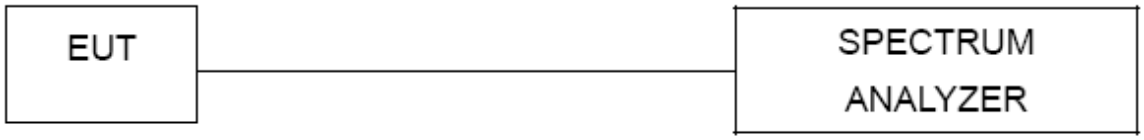
Tx. Spurious NVNT ac40 5795MHz Emission



Tx. Spurious NVNT ac80 5775MHz 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:	DC 3.87V
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)	3.90	5180.0062	5180	0.0062	1.1969
		V max (V)	4.49	5180.0014	5180	0.0014	0.2703
		V min (V)	3.32	5180.0060	5180	0.0060	1.1583
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)	3.9	T (°C)	-20	5180.0118	5180	0.0118	2.2780
		T (°C)	-10	5180.0082	5180	0.0082	1.5830
		T (°C)	0	5180.0115	5180	0.0115	2.2201
		T (°C)	10	5180.0028	5180	0.0028	0.5405
		T (°C)	20	5180.0040	5180	0.0040	0.7722
		T (°C)	30	5180.0068	5180	0.0068	1.3127
		T (°C)	40	5180.0000	5180	0.0000	0.0000
		T (°C)	50	5180.0047	5180	0.0047	0.9073
		T (°C)	60	5180.0078	5180	0.0078	1.5058
		T (°C)	70	5180.0003	5180	0.0003	0.0579
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)	3.90	5200.0003	5200	0.0003	0.0577
		V max (V)	4.49	5200.0071	5200	0.0071	1.3654
		V min (V)	3.32	5200.0032	5200	0.0032	0.6154
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.9	T (°C)	-20	5200.01190	5200	0.01190	2.2885
		T (°C)	-10	5200.00980	5200	0.00980	1.8846
		T (°C)	0	5200.00120	5200	0.00120	0.2308
		T (°C)	10	5200.00450	5200	0.00450	0.8654
		T (°C)	20	5200.01000	5200	0.01000	1.9231
		T (°C)	30	5200.00260	5200	0.00260	0.5000
		T (°C)	40	5200.00990	5200	0.00990	1.9038
		T (°C)	50	5200.00380	5200	0.00380	0.7308
		T (°C)	60	5200.00730	5200	0.00730	1.4038
		T (°C)	70	5200.00570	5200	0.00570	1.0962
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)	3.90	5240.0123	5240	0.0123	2.3473
		V max (V)	4.49	5240.0081	5240	0.0081	1.5458
		V min (V)	3.32	5240.0010	5240	0.0010	0.1908
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)	3.9	T (°C)	-20	5240.0026	5240	0.0026	0.4962
		T (°C)	-10	5240.0059	5240	0.0059	1.1260
		T (°C)	0	5240.0058	5240	0.0058	1.1069
		T (°C)	10	5240.0135	5240	0.0135	2.5763
		T (°C)	20	5240.0103	5240	0.0103	1.9656
		T (°C)	30	5240.0074	5240	0.0074	1.4122
		T (°C)	40	5240.0128	5240	0.0128	2.4427
		T (°C)	50	5240.0053	5240	0.0053	1.0115
		T (°C)	60	5240.0130	5240	0.0130	2.4809
		T (°C)	70	5240.0125	5240	0.0125	2.3855
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 3.87V
Test Mode:	TX Frequency(5745-5825MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.90	5745.00370	5745	0.00370	0.6440
		V max (V)	4.49	5745.01010	5745	0.01010	1.7581
		V min (V)	3.32	5745.00430	5745	0.00430	0.7485
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)	3.9	T (°C)	-20	5745.00480	5745	0.00480	0.8355
		T (°C)	-10	5745.01130	5745	0.01130	1.9669
		T (°C)	0	5745.01220	5745	0.01220	2.1236
		T (°C)	10	5745.01290	5745	0.01290	2.2454
		T (°C)	20	5745.00820	5745	0.00820	1.4273
		T (°C)	30	5745.01300	5745	0.01300	2.2628
		T (°C)	40	5745.00720	5745	0.00720	1.2533
		T (°C)	50	5745.00810	5745	0.00810	1.4099
		T (°C)	60	5745.00960	5745	0.00960	1.6710
		T (°C)	70	5745.00380	5745	0.00380	0.6614
Limits				5725-5850 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.90	5785.00830	5785	0.00830	1.4347
		V max (V)	4.49	5785.00390	5785	0.00390	0.6742
		V min (V)	3.32	5785.00430	5785	0.00430	0.7433
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5785MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.9	T (°C)	-20	5785.00100	5785	0.00100	0.1729
		T (°C)	-10	5785.00670	5785	0.00670	1.1582
		T (°C)	0	5785.00600	5785	0.00600	1.0372
		T (°C)	10	5785.01120	5785	0.01120	1.9360
		T (°C)	20	5785.01330	5785	0.01330	2.2990
		T (°C)	30	5785.00300	5785	0.00300	0.5186
		T (°C)	40	5785.01030	5785	0.01030	1.7805
		T (°C)	50	5785.01170	5785	0.01170	2.0225
		T (°C)	60	5785.01230	5785	0.01230	2.1262
		T (°C)	70	5785.00340	5785	0.00340	0.5877
Limits				5725-5850 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.90	5825.00610	5825	0.00610	1.0472
		V max (V)	4.49	5825.00380	5825	0.00380	0.6524
		V min (V)	3.32	5825.01130	5825	0.01130	1.9399
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.9	T (°C)	-20	5825.01220	5825	0.01220	2.0944
		T (°C)	-10	5825.01250	5825	0.01250	2.1459
		T (°C)	0	5825.00750	5825	0.00750	1.2876
		T (°C)	10	5825.01010	5825	0.01010	1.7339
		T (°C)	20	5825.00170	5825	0.00170	0.2918
		T (°C)	30	5825.01330	5825	0.01330	2.2833
		T (°C)	40	5825.00190	5825	0.00190	0.3262
		T (°C)	50	5825.01170	5825	0.01170	2.0086
		T (°C)	60	5825.00670	5825	0.00670	1.1502
		T (°C)	70	5825.00740	5825	0.00740	1.2704
Limits				5725-5850 MHz			
Result				Complies			

14. Duty Cycle Of Test Signal

14.1 Standard Requirement

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

14.2 Formula

Duty Cycle = Ton / (Ton+Toff)

14.3 Test Procedure

1.Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

14.4 Test Result

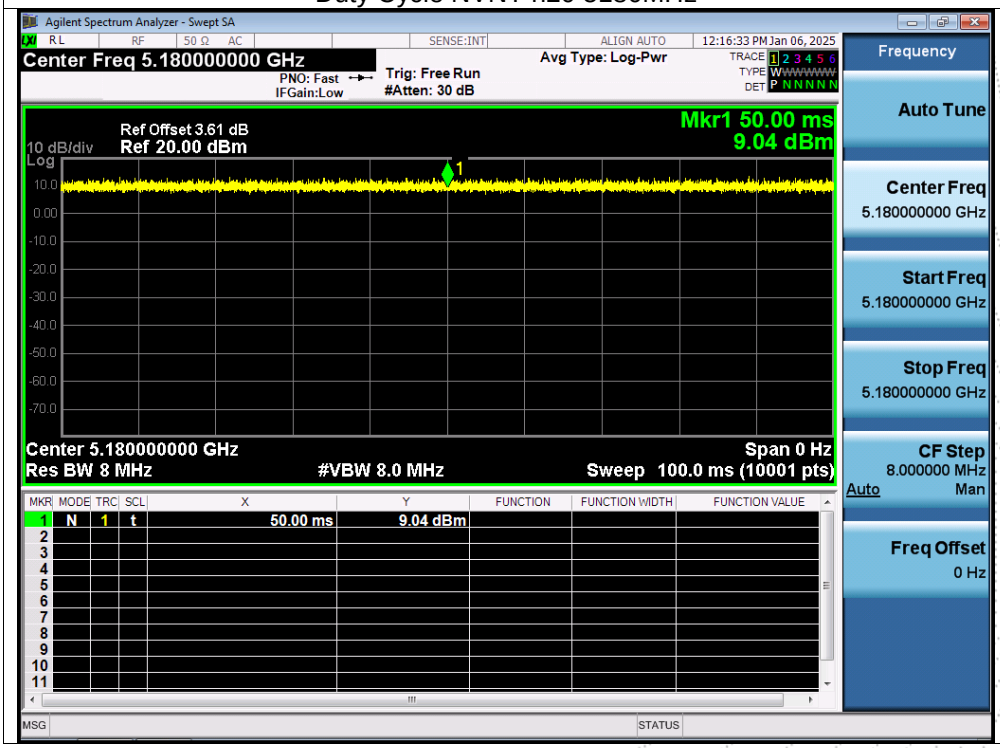
5.1G

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5180	100	0	0
NVNT	n20	5180	100	0	0
NVNT	n40	5190	100	0	0
NVNT	ac20	5180	100	0	0
NVNT	ac40	5190	100	0	0
NVNT	ac80	5210	100	0	0

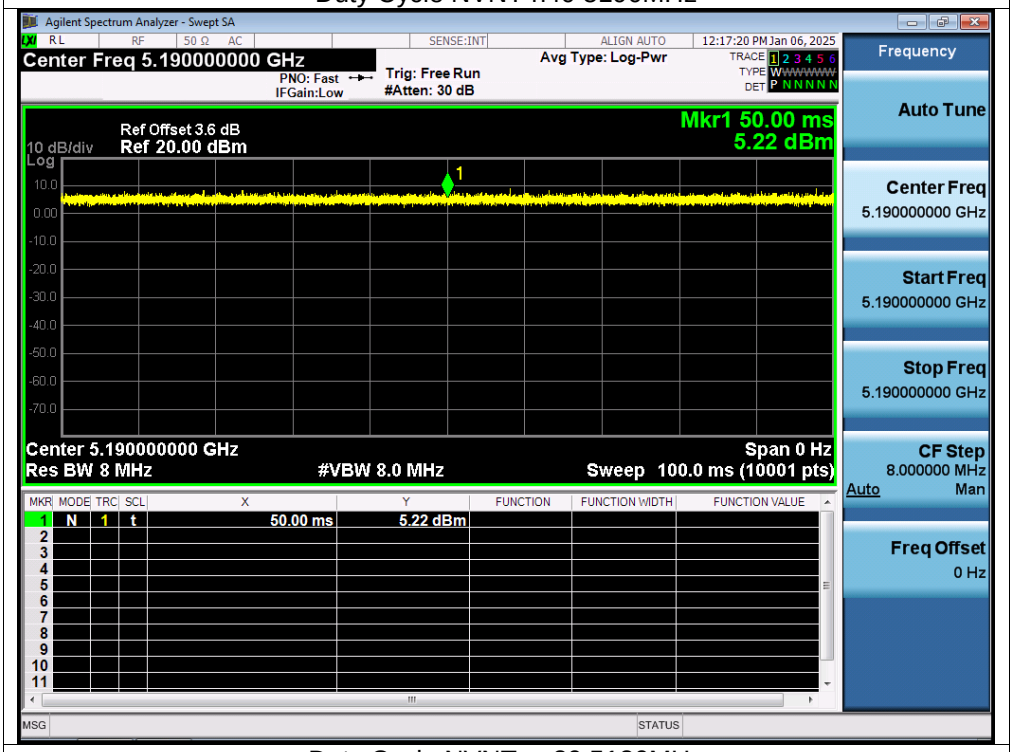
Test Graphs

Duty Cycle NVNT a 5180MHz

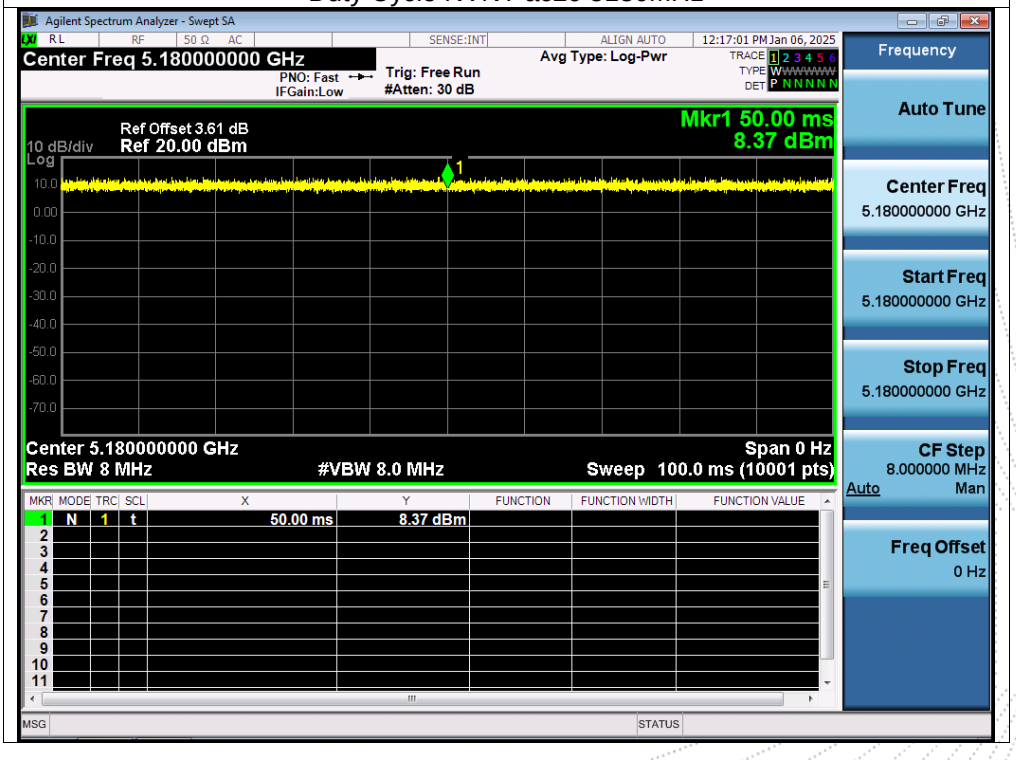
Duty Cycle NVNT n20 5180MHz



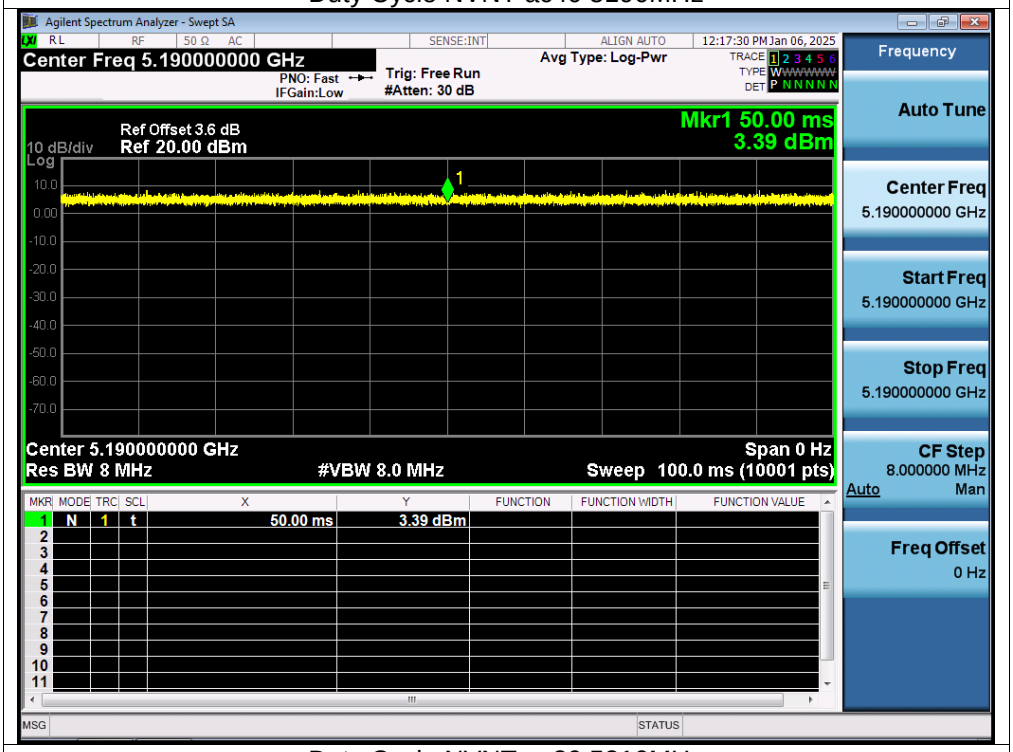
Duty Cycle NVNT n40 5190MHz



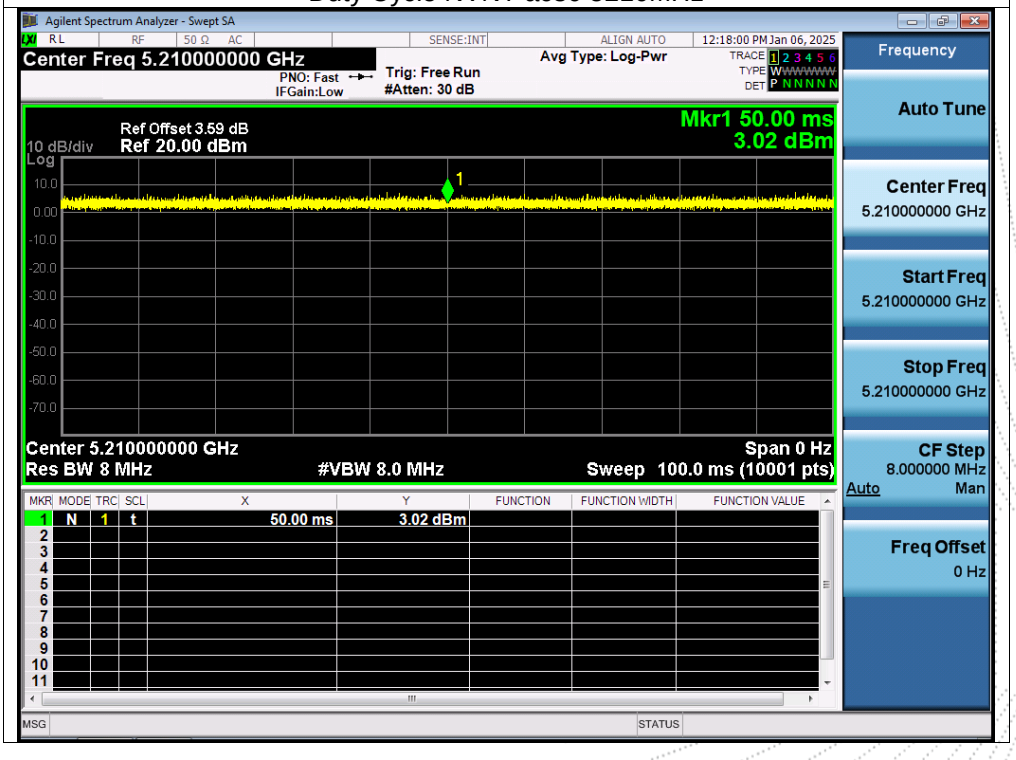
Duty Cycle NVNT ac20 5180MHz



Duty Cycle NVNT ac40 5190MHz



Duty Cycle NVNT ac80 5210MHz

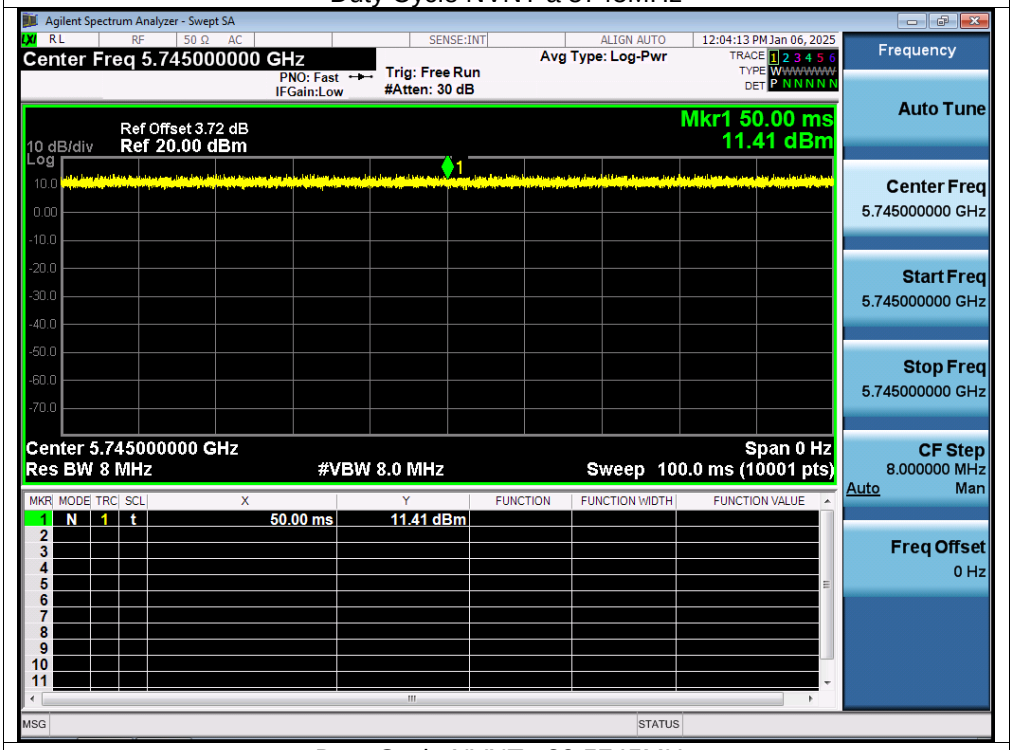


5.8G

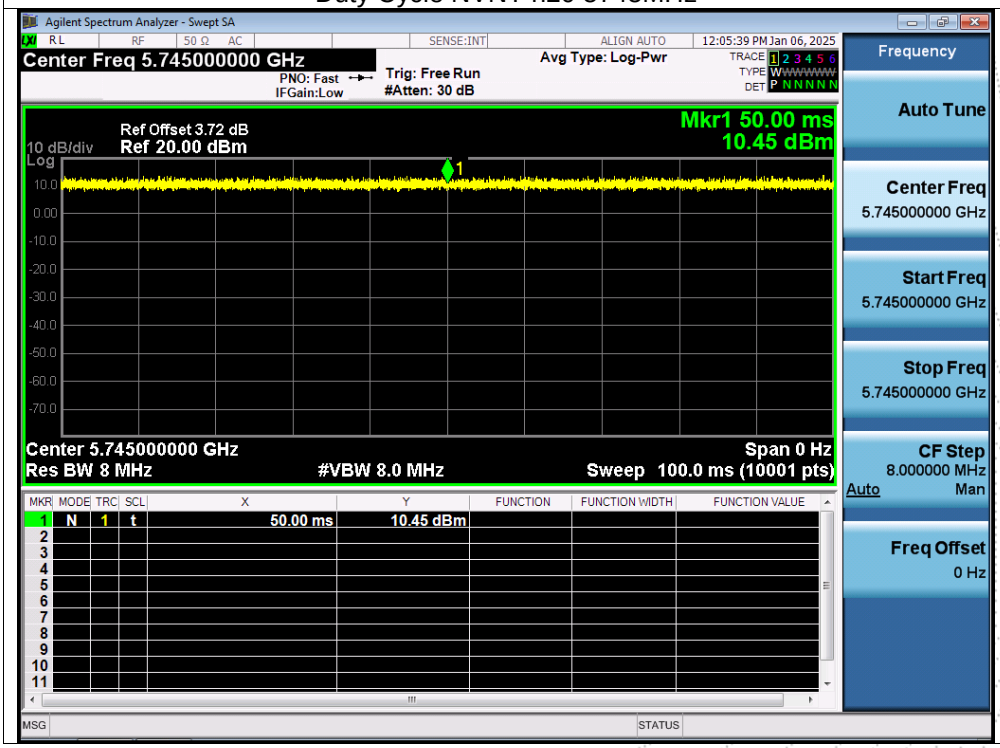
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5745	100	0	0
NVNT	n20	5745	100	0	0
NVNT	n40	5755	100	0	0
NVNT	ac20	5745	100	0	0
NVNT	ac40	5755	100	0	0
NVNT	ac80	5775	100	0	0

Test Graphs

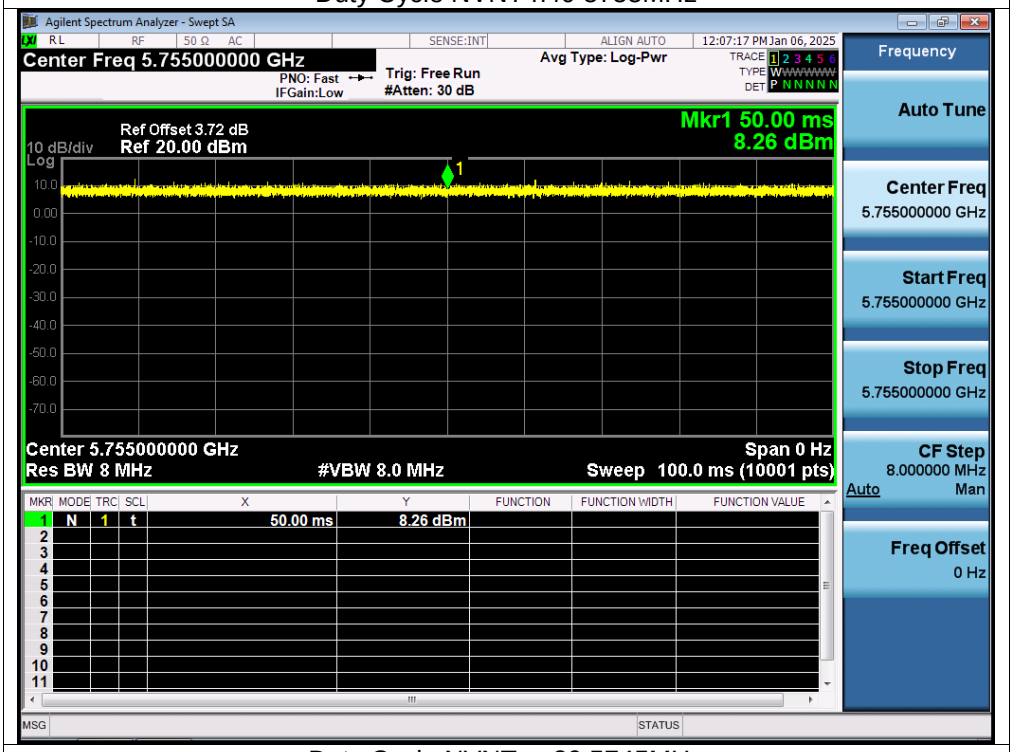
Duty Cycle NVNT a 5745MHz



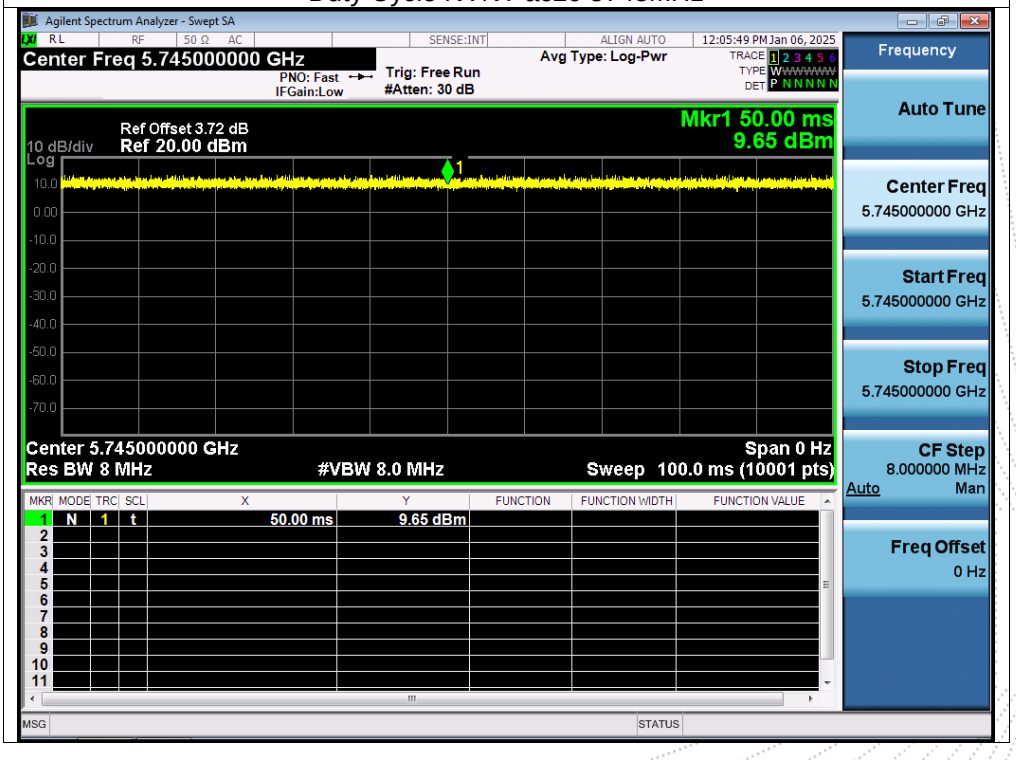
Duty Cycle NVNT n20 5745MHz



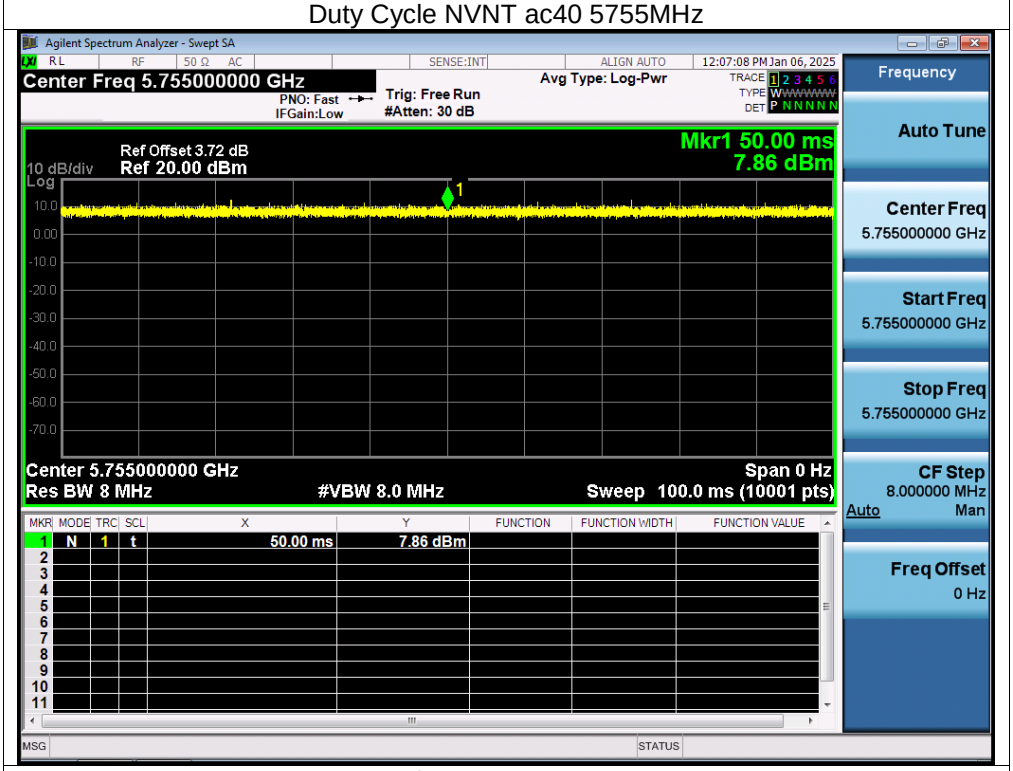
Duty Cycle NVNT n40 5755MHz



Duty Cycle NVNT ac20 5745MHz



Duty Cycle NVNT ac40 5755MHz



Duty Cycle NVNT ac80 5775MHz