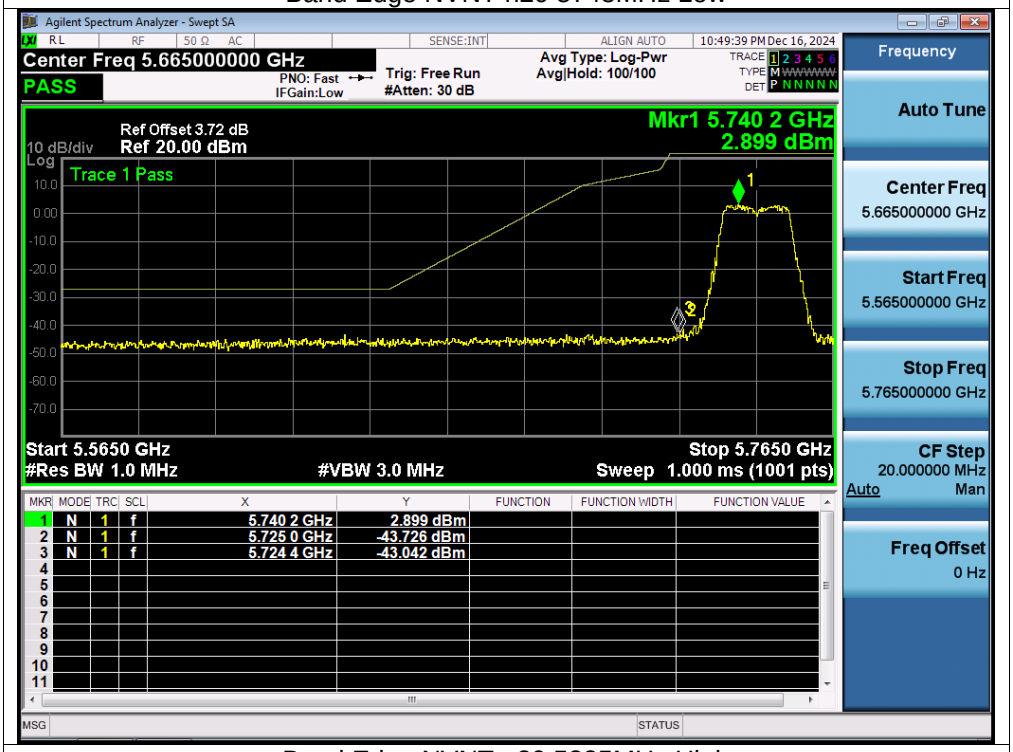
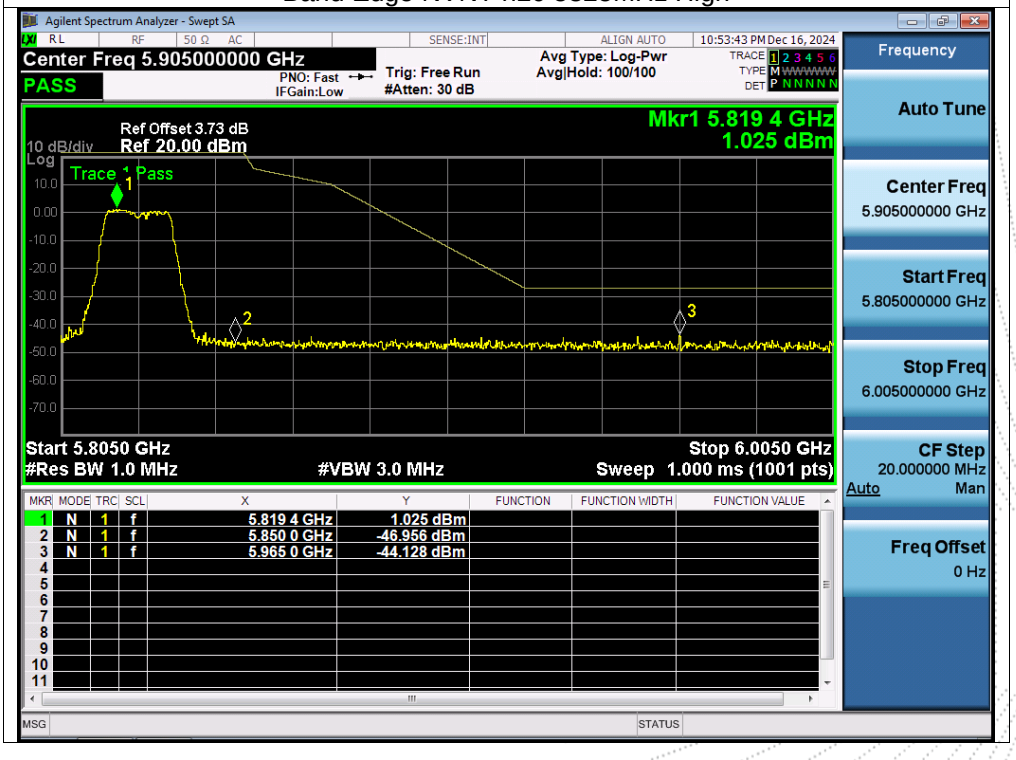
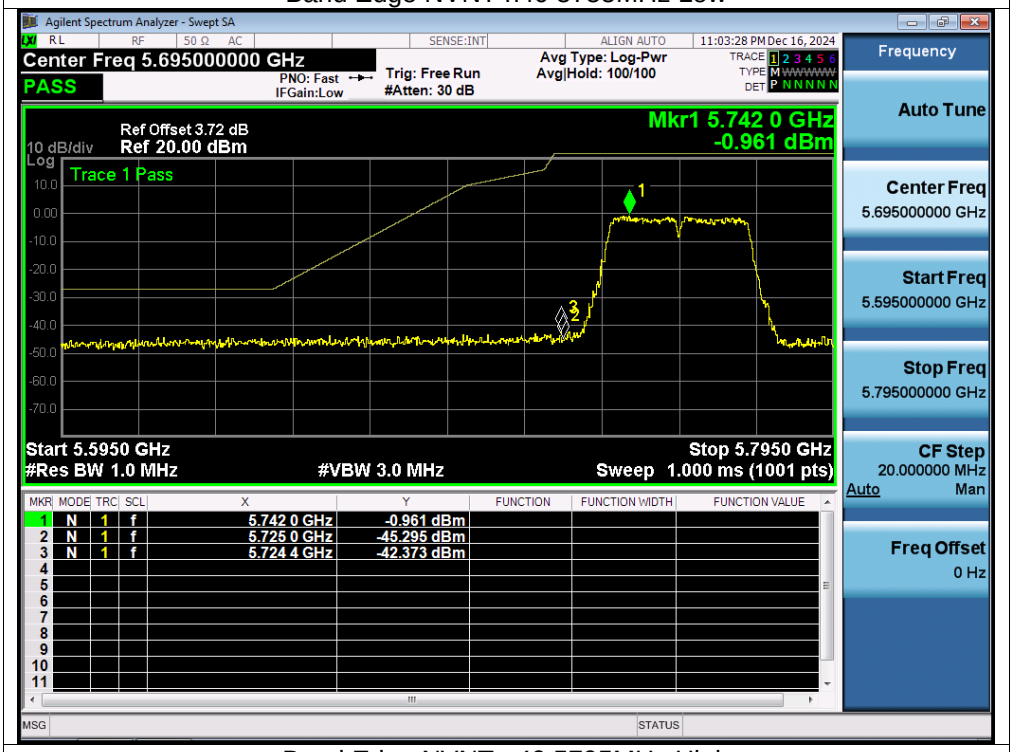
Band Edge NVNT n20 5745MHz Low



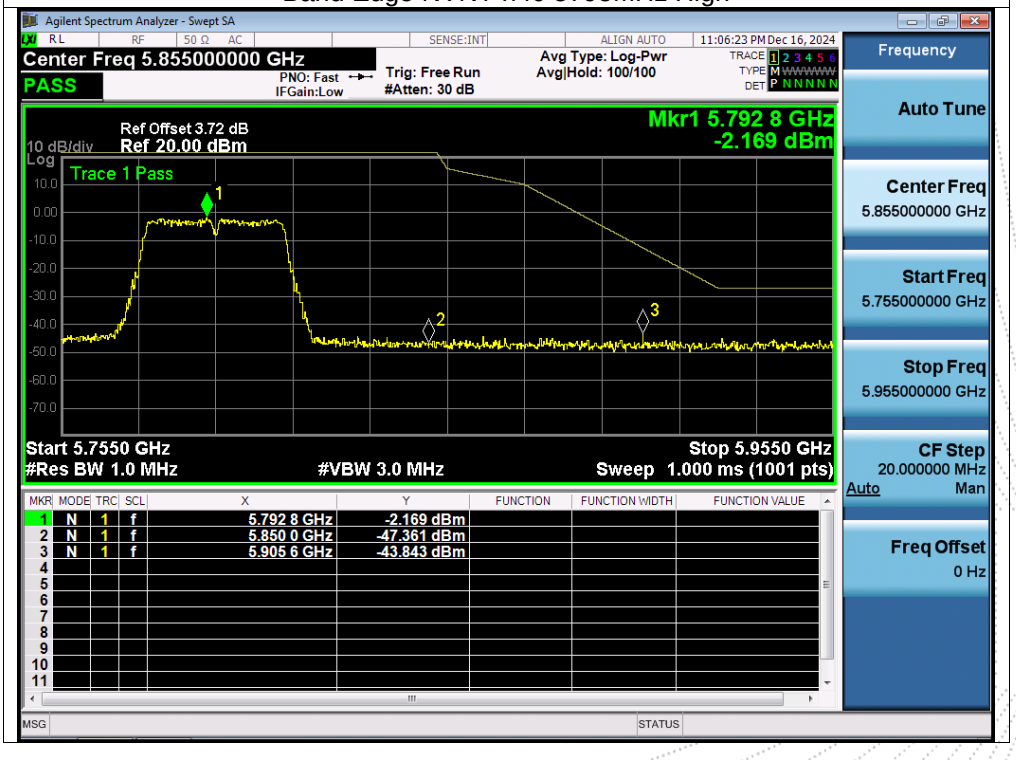
Band Edge NVNT n20 5825MHz High



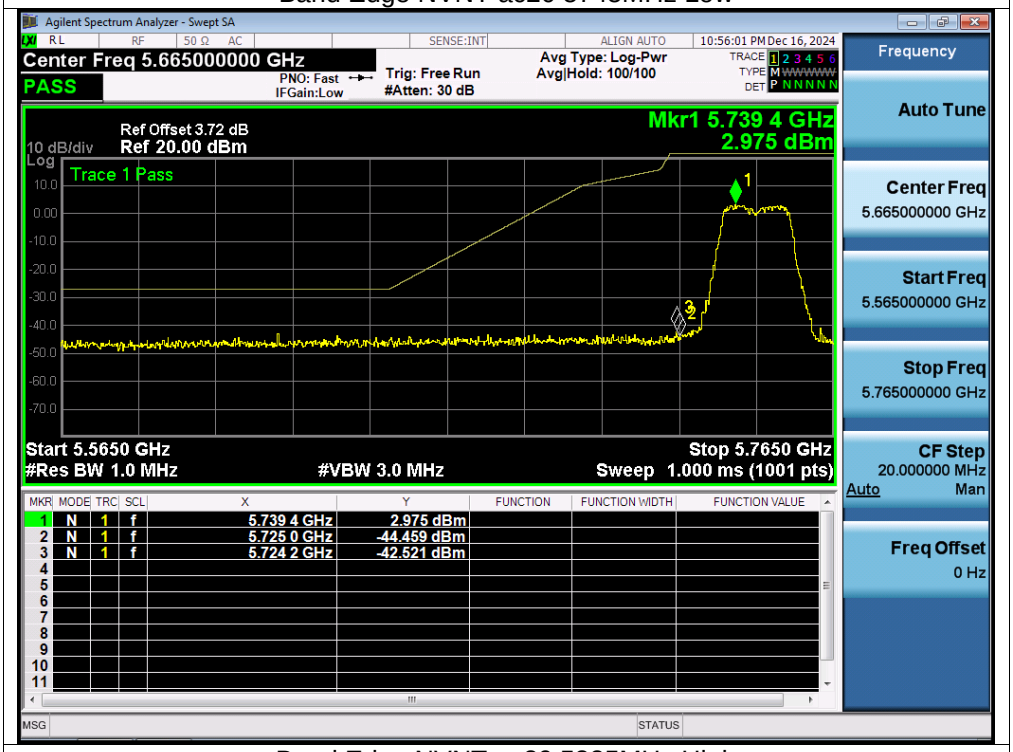
Band Edge NVNT n40 5755MHz Low



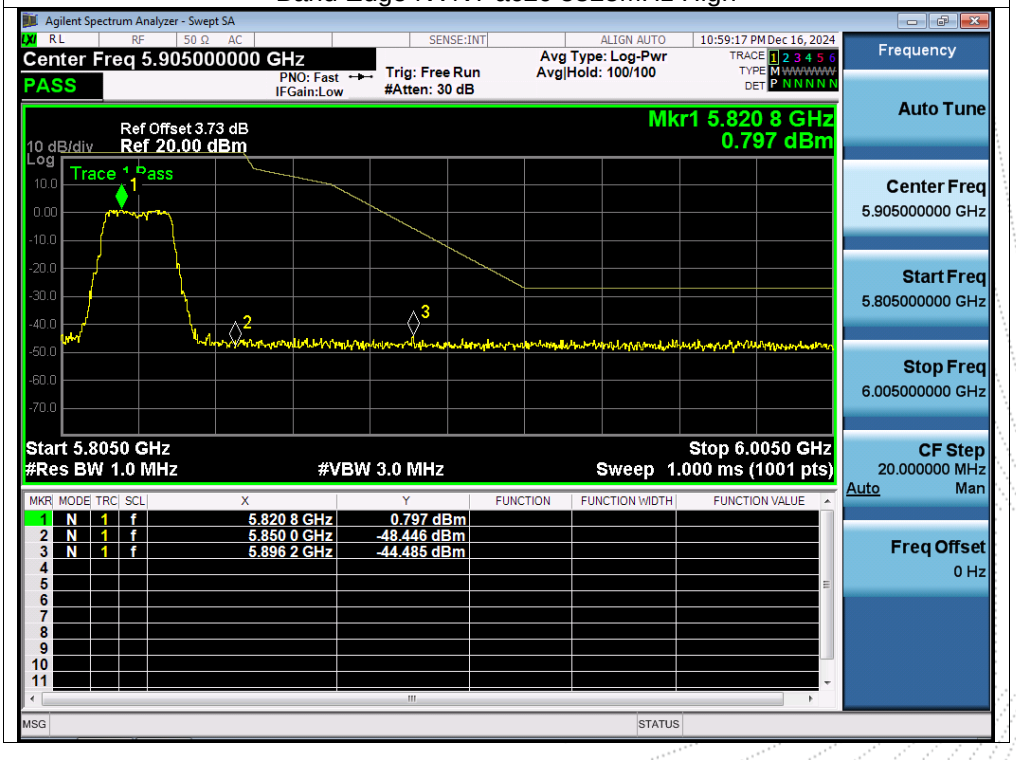
Band Edge NVNT n40 5795MHz High



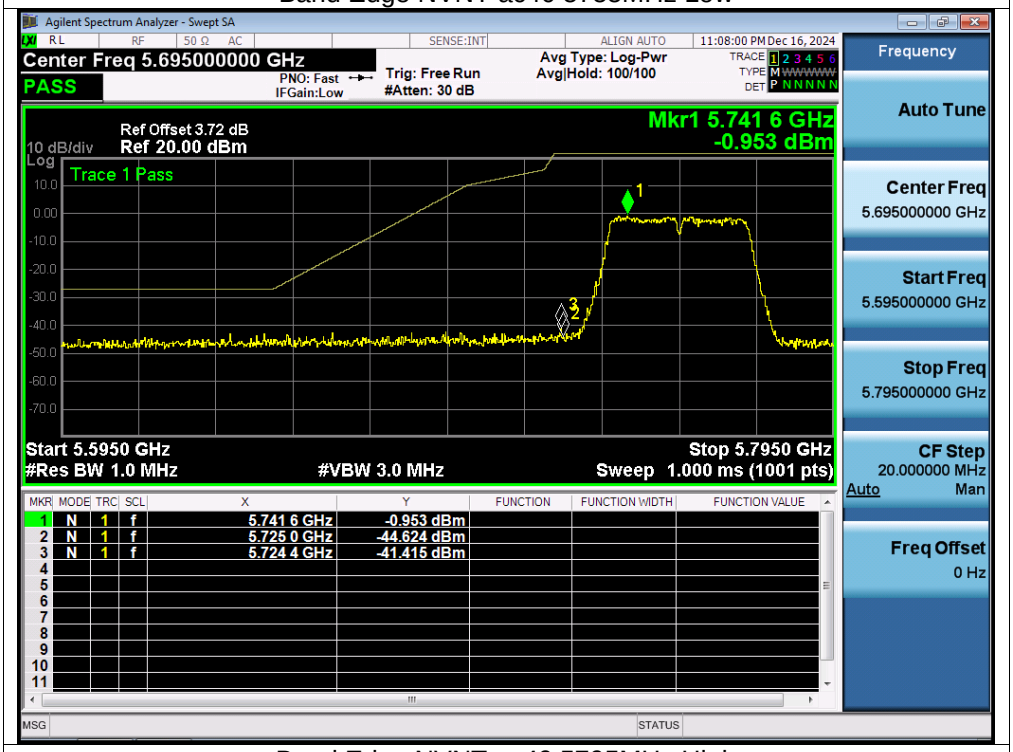
Band Edge NVNT ac20 5745MHz Low



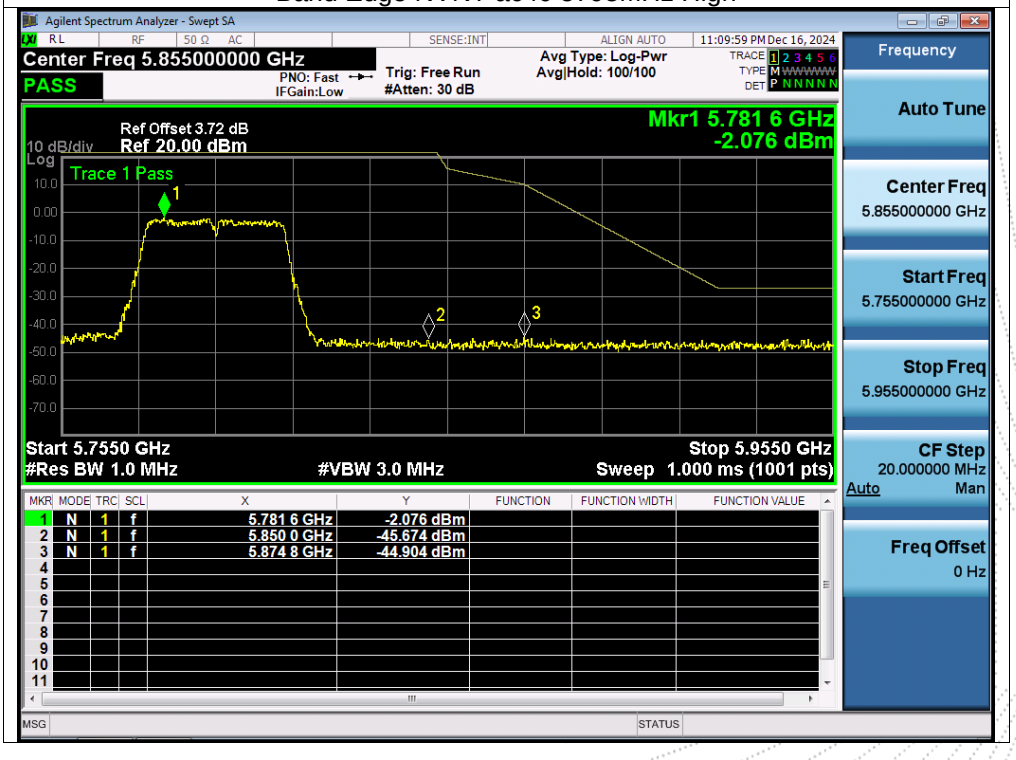
Band Edge NVNT ac20 5825MHz High



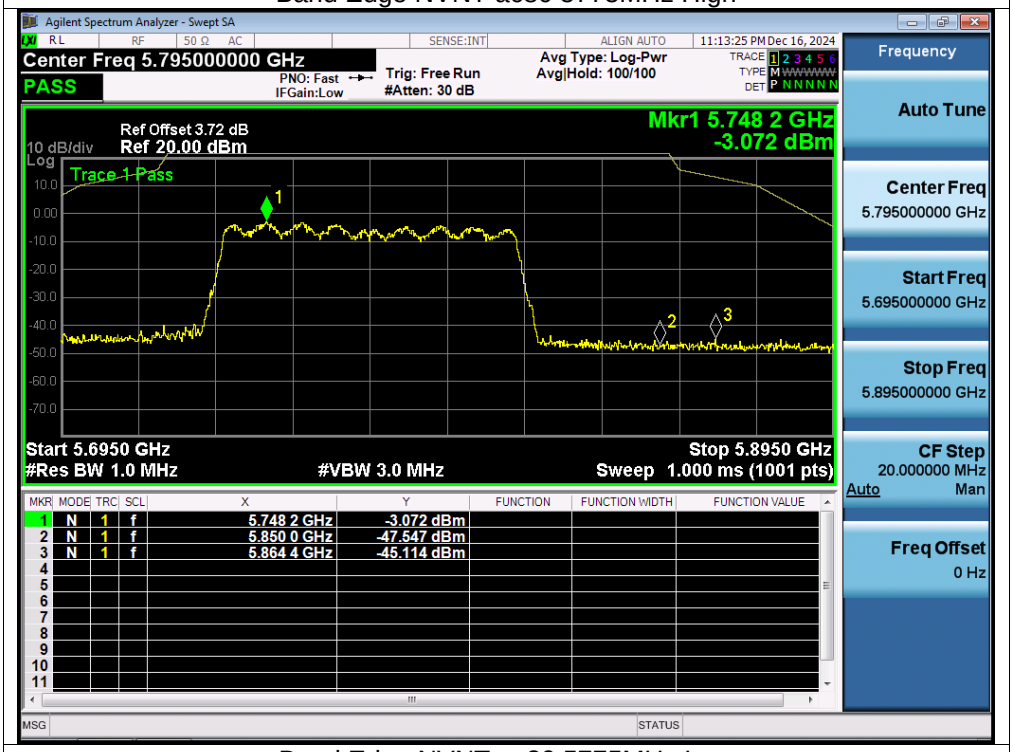
Band Edge NVNT ac40 5755MHz Low



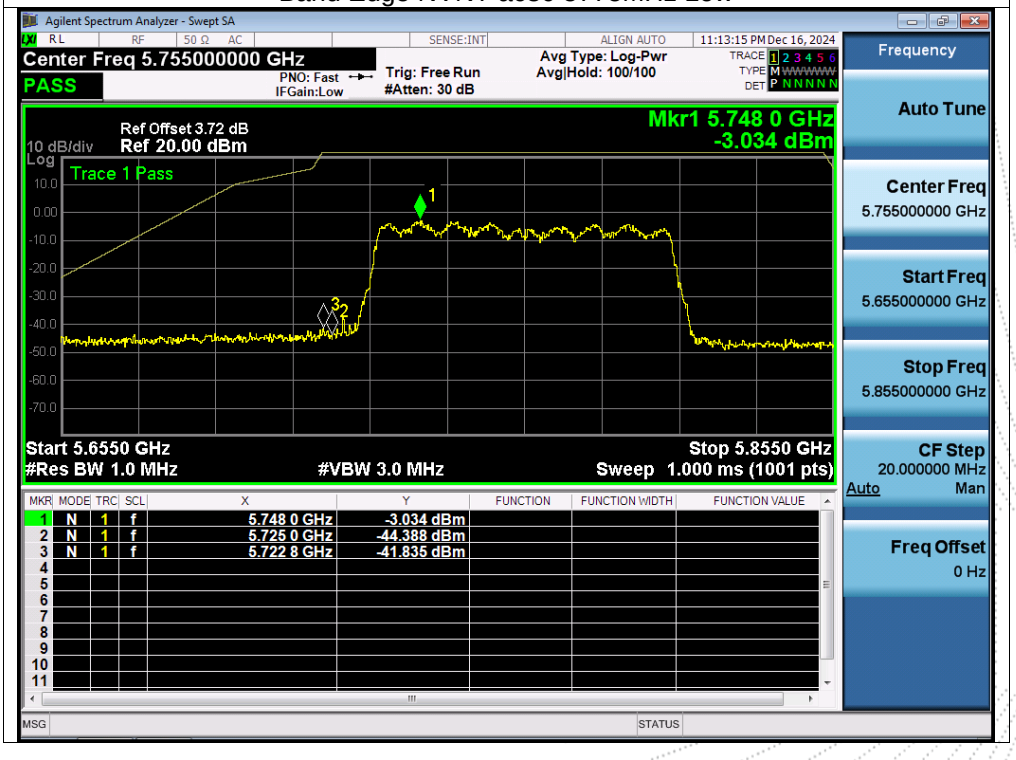
Band Edge NVNT ac40 5795MHz High



Band Edge NVNT ac80 5775MHz High

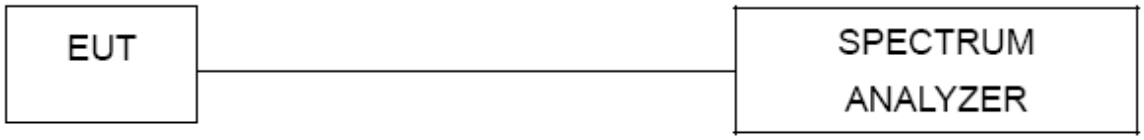


Band Edge NVNT ac80 5775MHz Low



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.

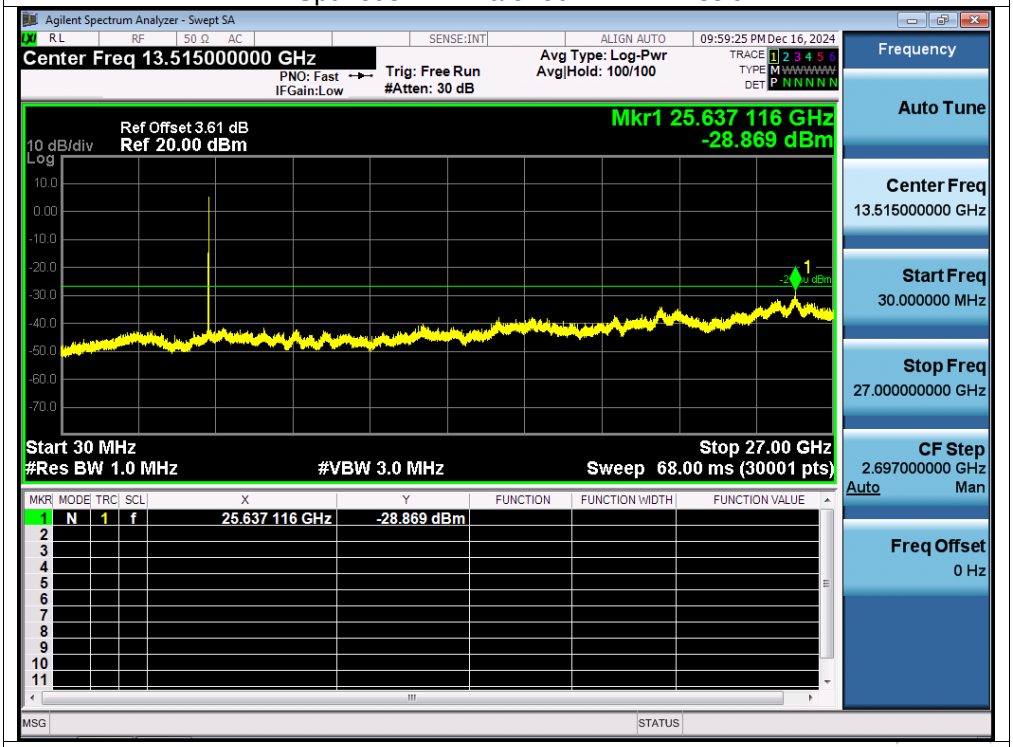
12.4 Test Result

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 bandage 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.

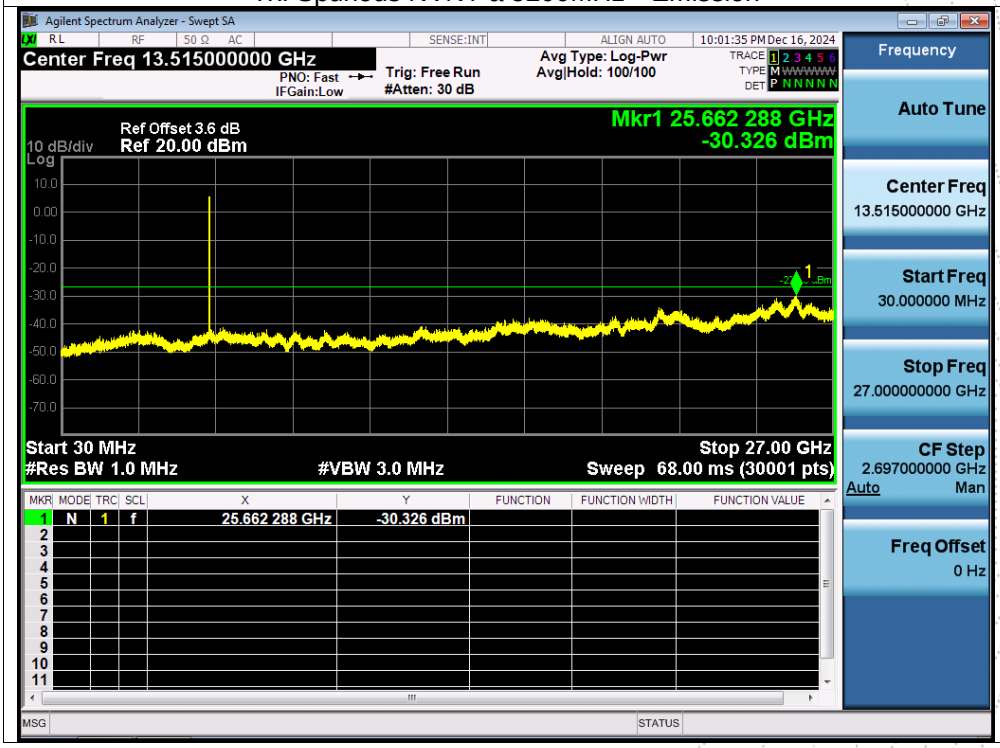
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A.
Plot. 5180-5240MHz

Test Graphs

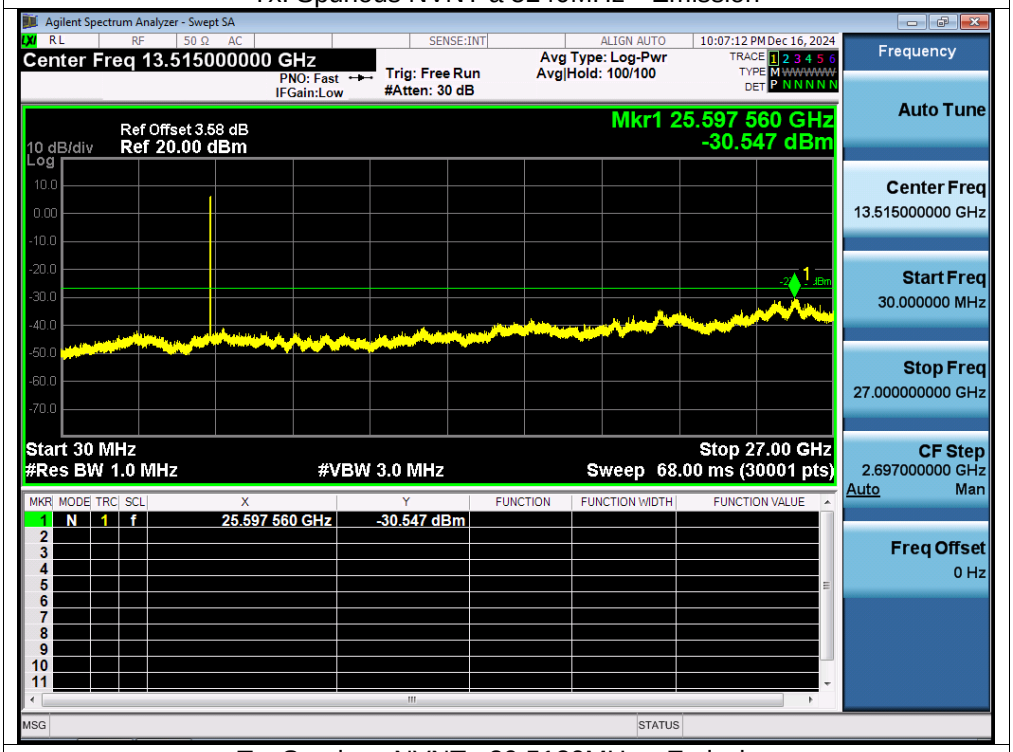
Tx. Spurious NVNT a 5180MHz Emission



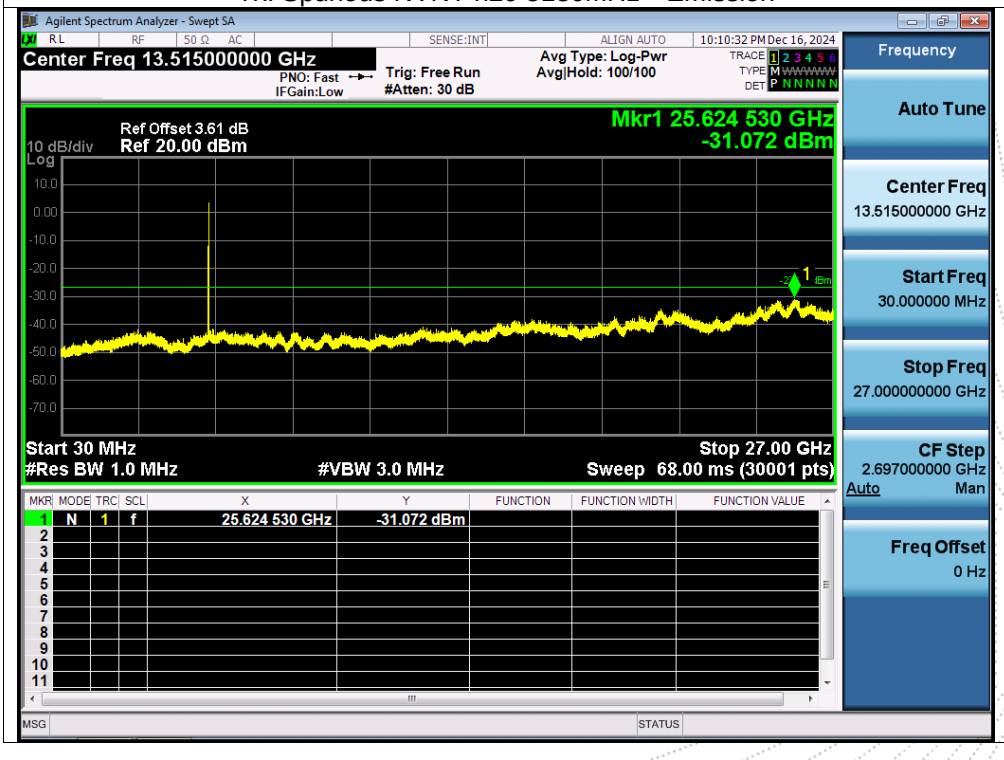
Tx. Spurious NVNT a 5200MHz Emission



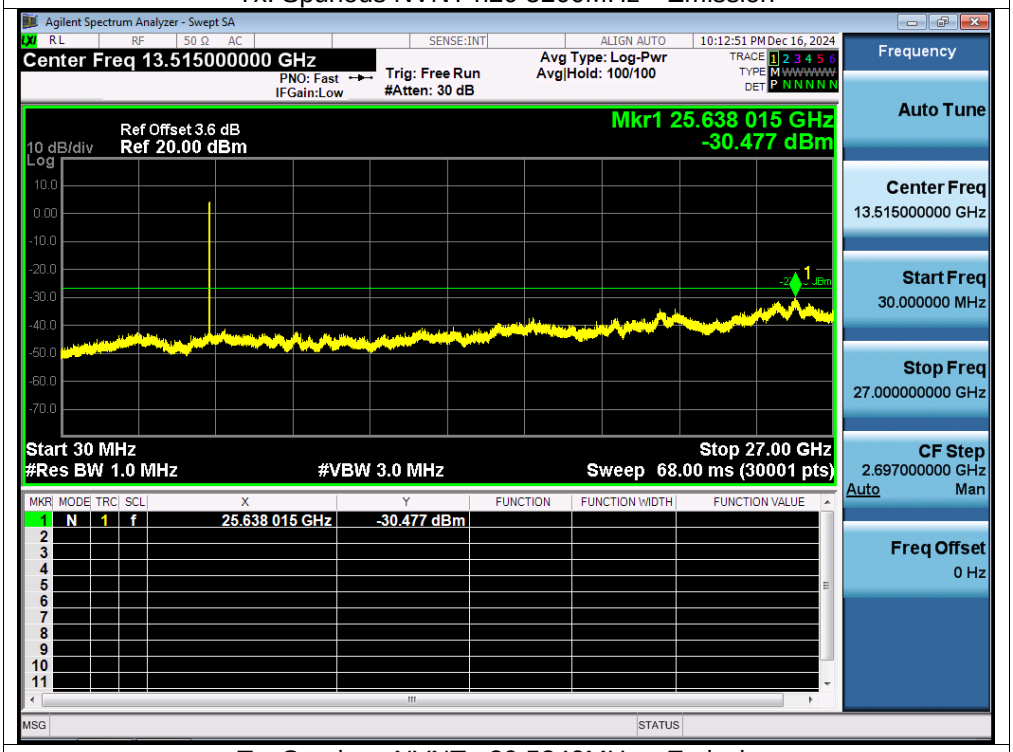
Tx. Spurious NVNT a 5240MHz Emission



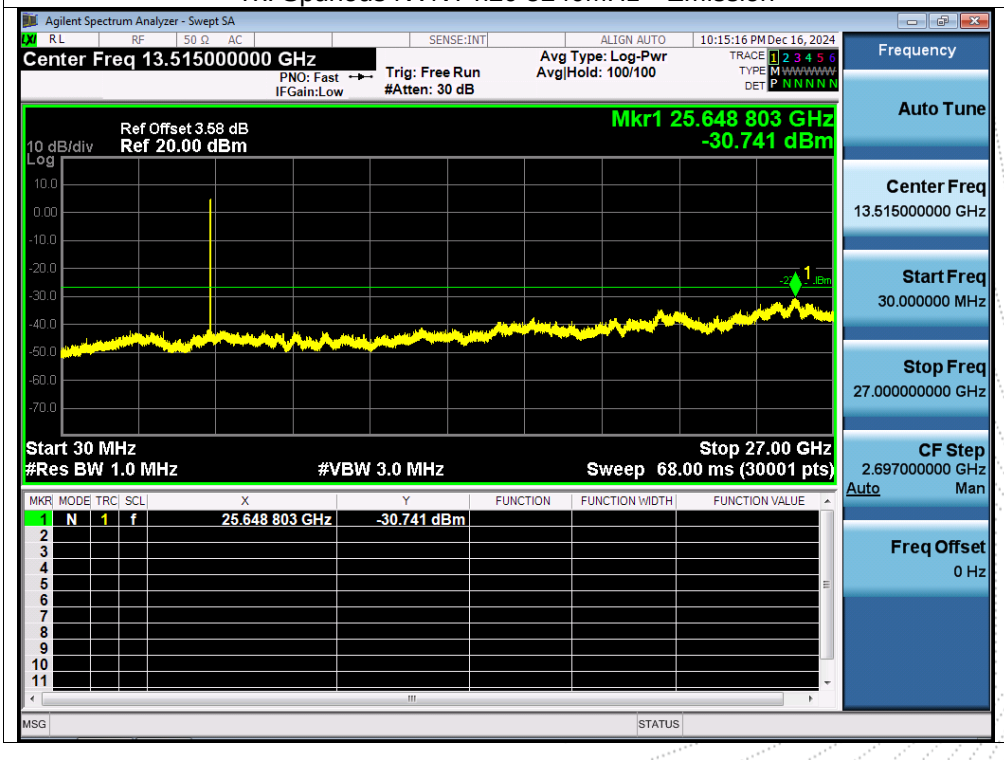
Tx. Spurious NVNT n20 5180MHz Emission



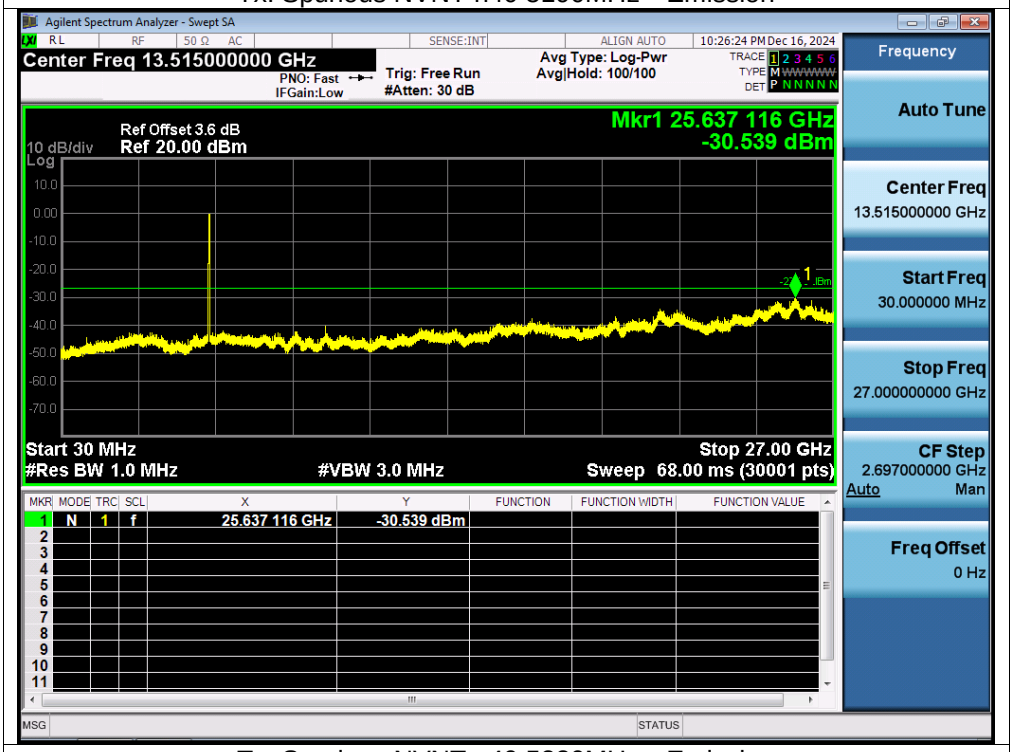
Tx. Spurious NVNT n20 5200MHz Emission



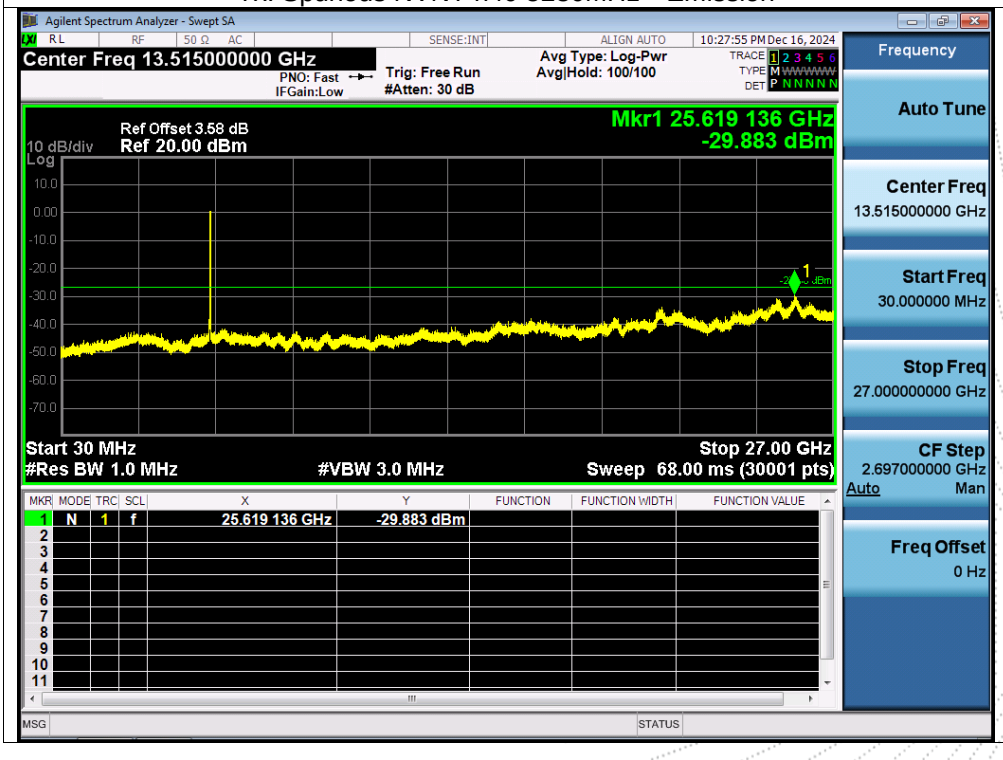
Tx. Spurious NVNT n20 5240MHz Emission



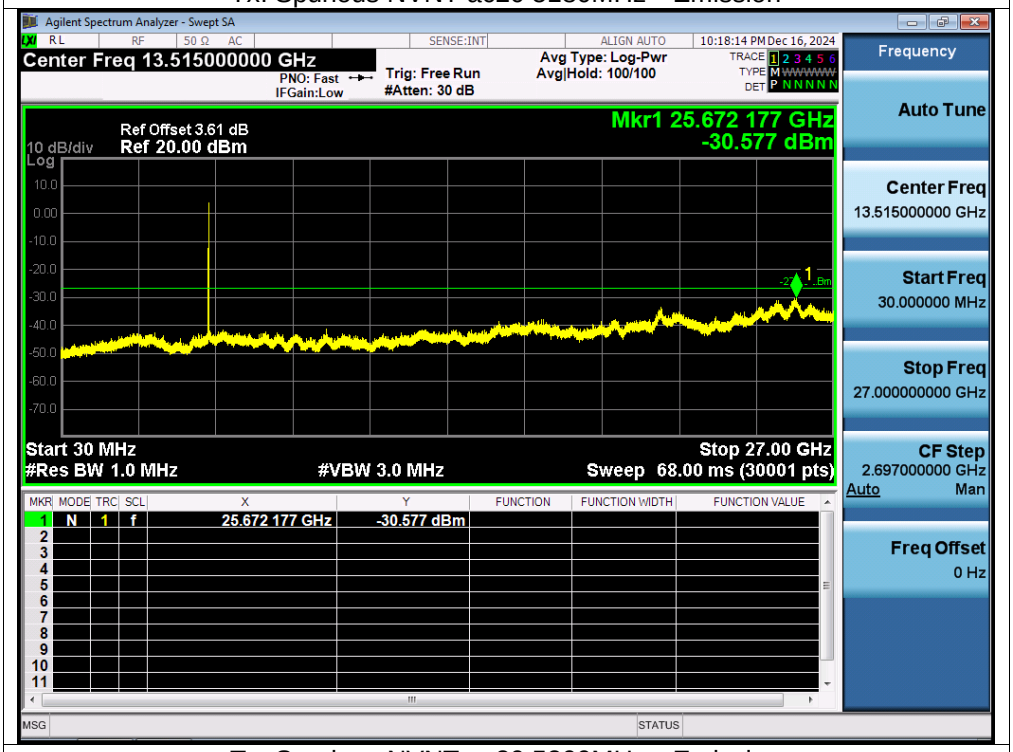
Tx. Spurious NVNT n40 5190MHz Emission



Tx. Spurious NVNT n40 5230MHz Emission

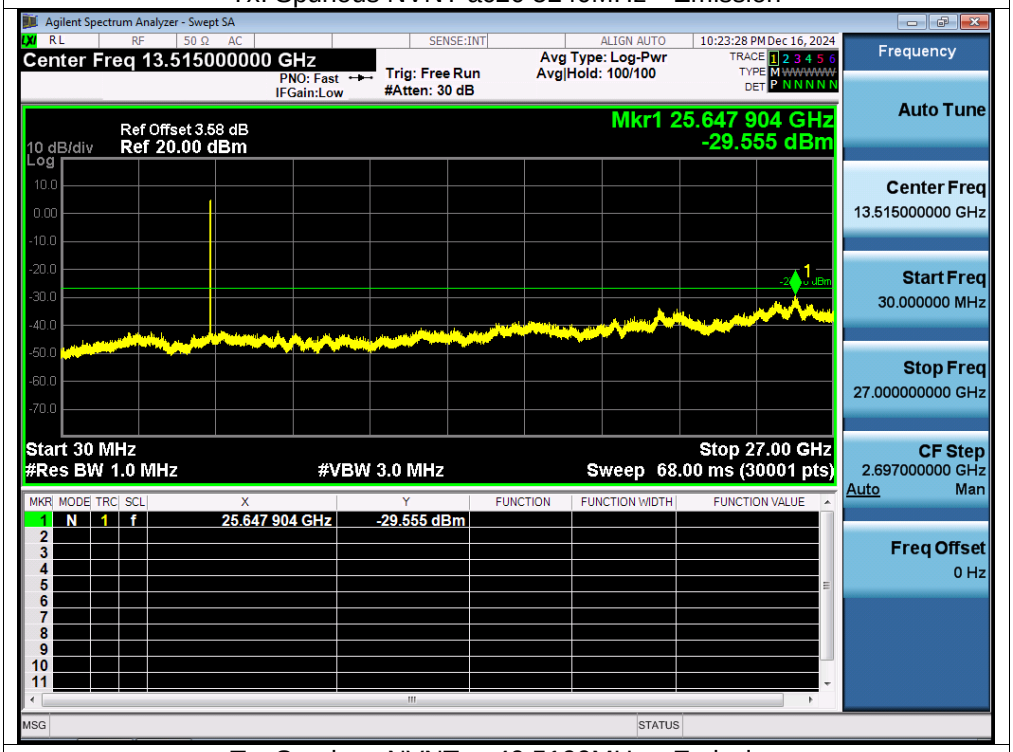


Tx. Spurious NVNT ac20 5180MHz Emission



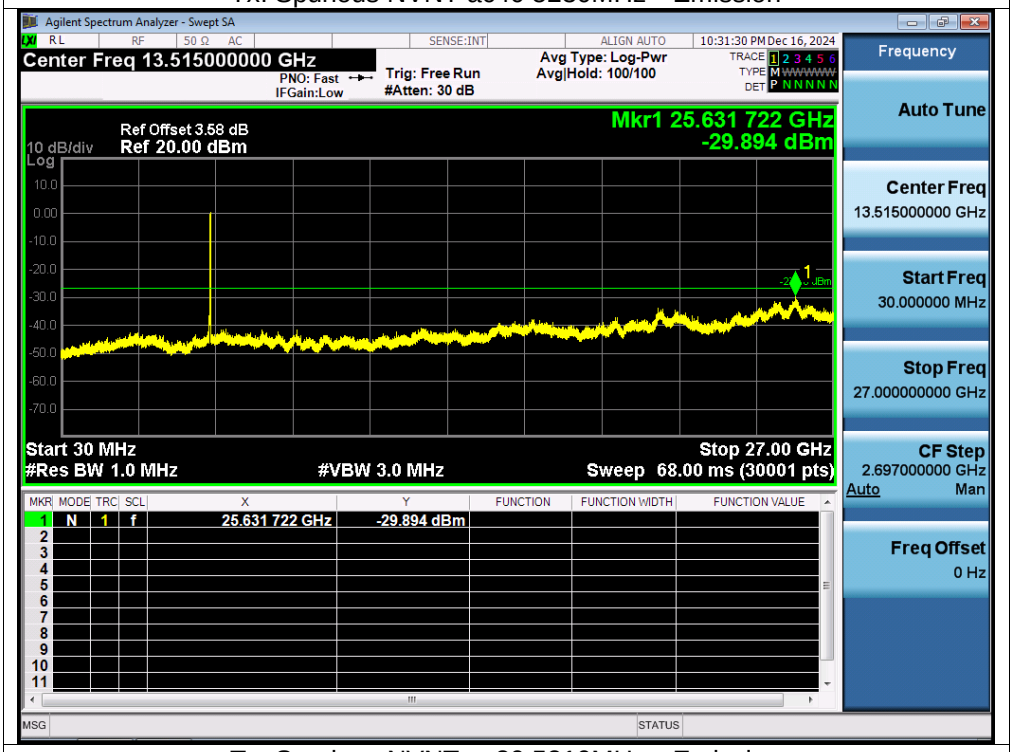
Tx. Spurious NVNT ac20 5200MHz Emission

Tx. Spurious NVNT ac20 5240MHz Emission



Tx. Spurious NVNT ac40 5190MHz Emission

Tx. Spurious NVNT ac40 5230MHz Emission

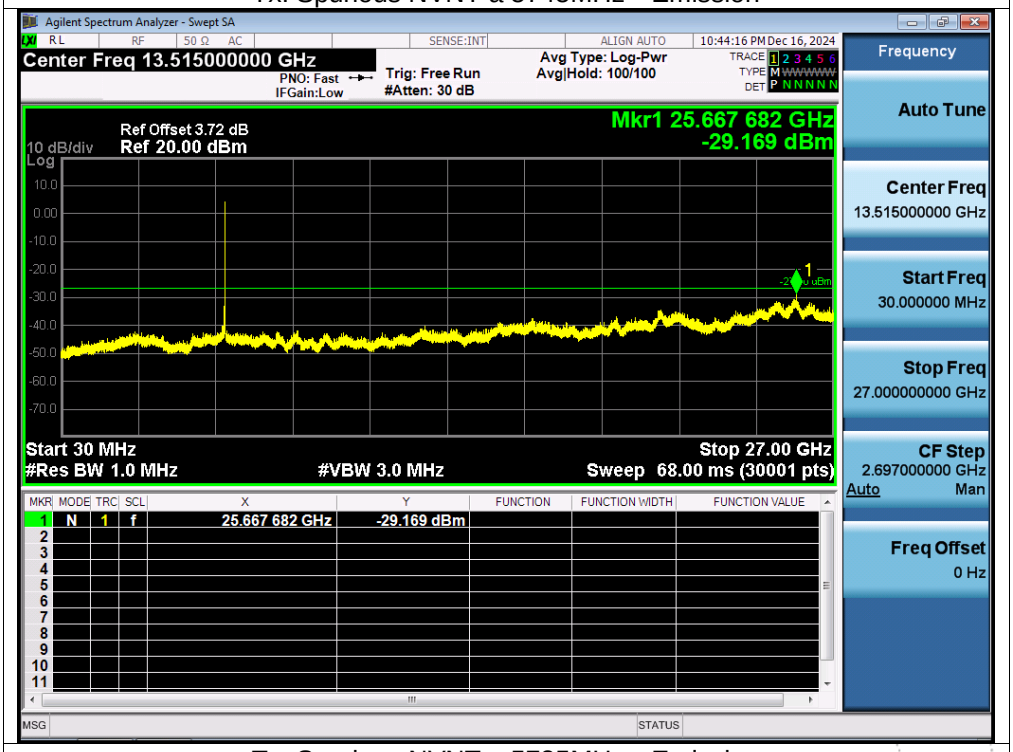


Tx. Spurious NVNT ac80 5210MHz Emission

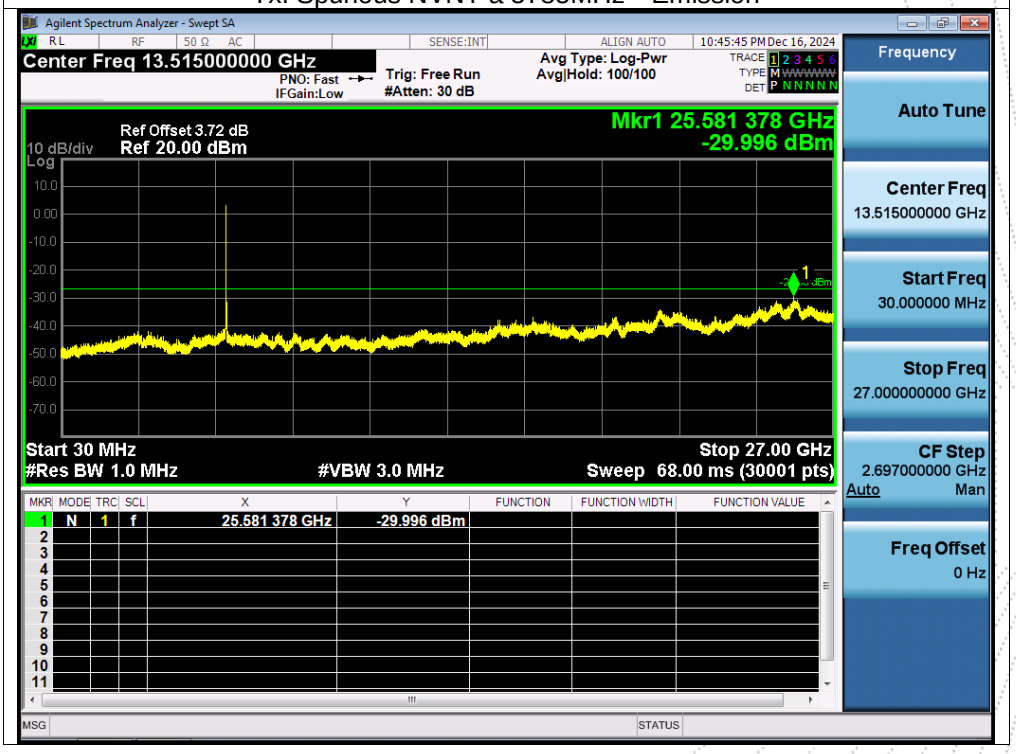
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A Plot. 5745-58250MHz

Test Graphs

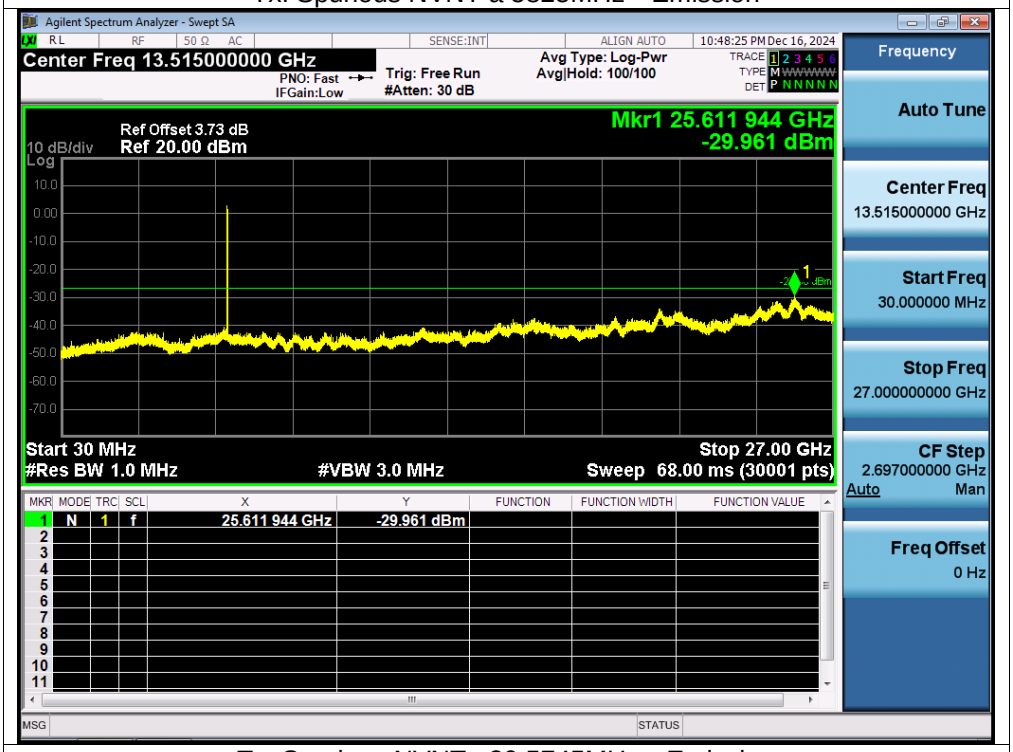
Tx. Spurious NVNT a 5745MHz Emission



Tx. Spurious NVNT a 5785MHz Emission

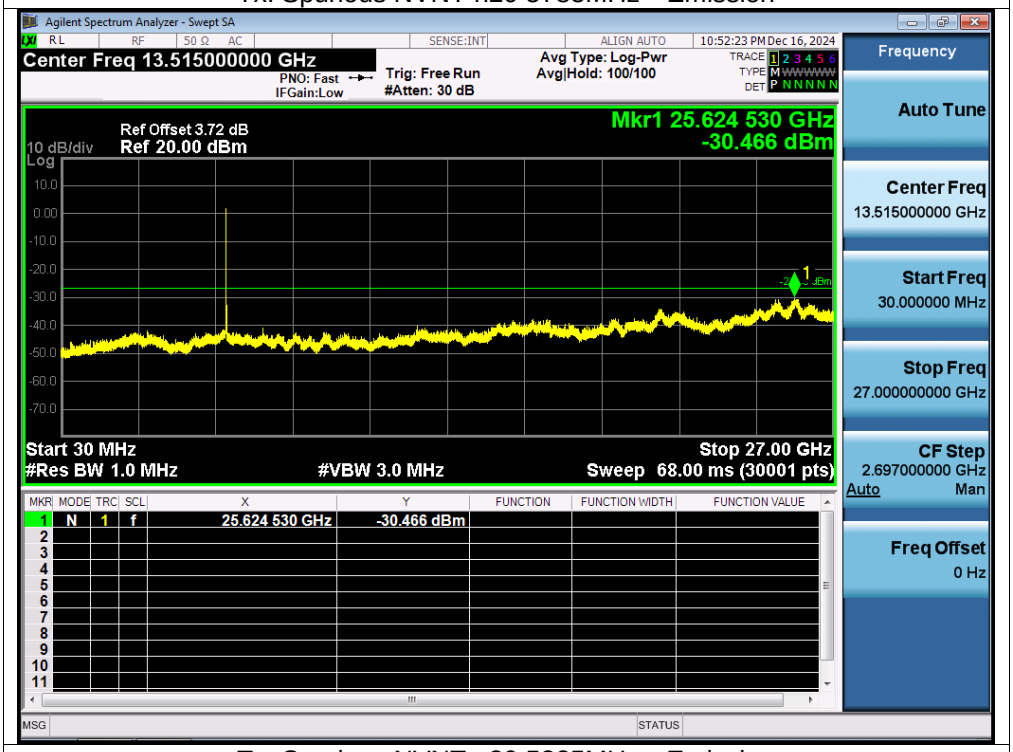


Tx. Spurious NVNT a 5825MHz Emission

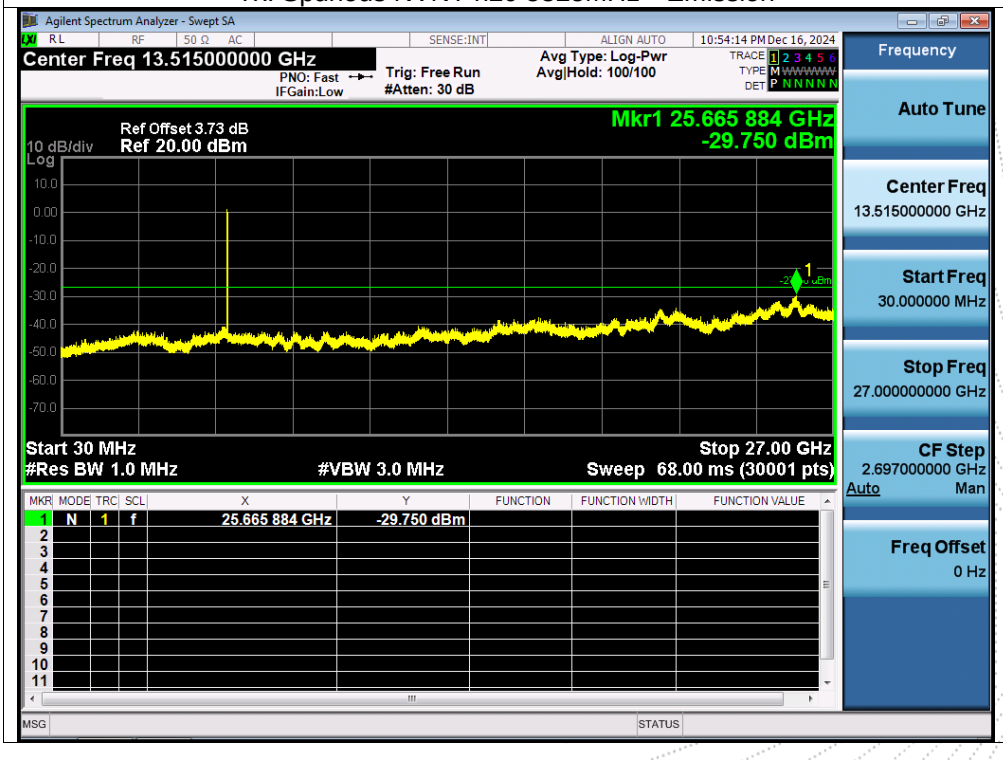


Tx. Spurious NVNT n20 5745MHz Emission

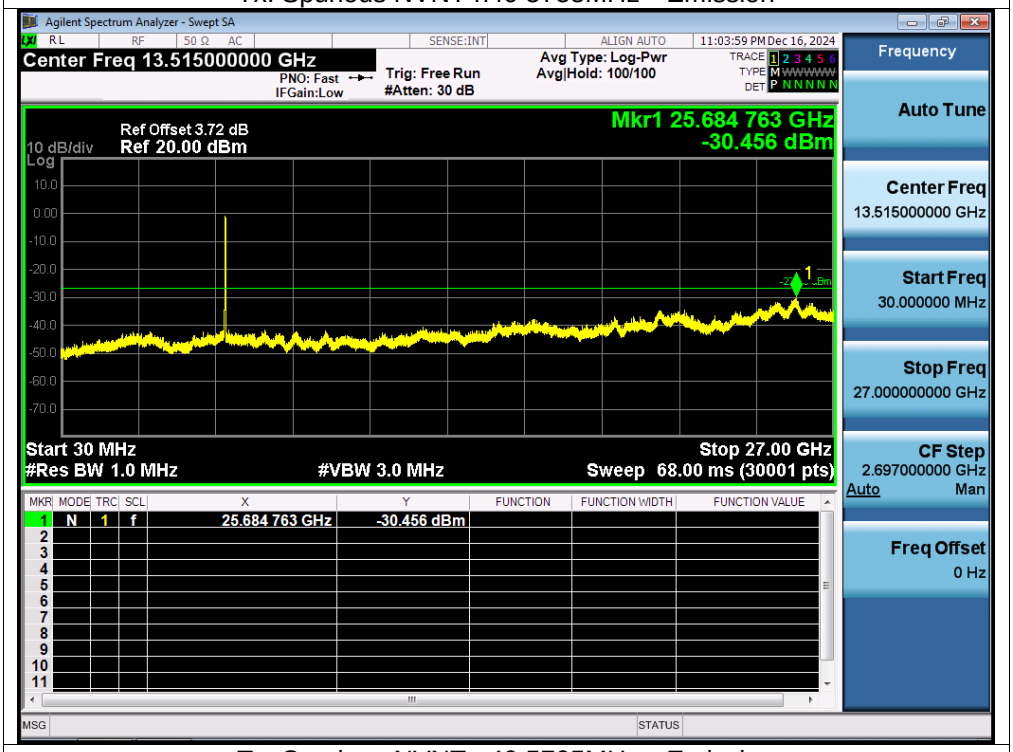
Tx. Spurious NVNT n20 5785MHz Emission



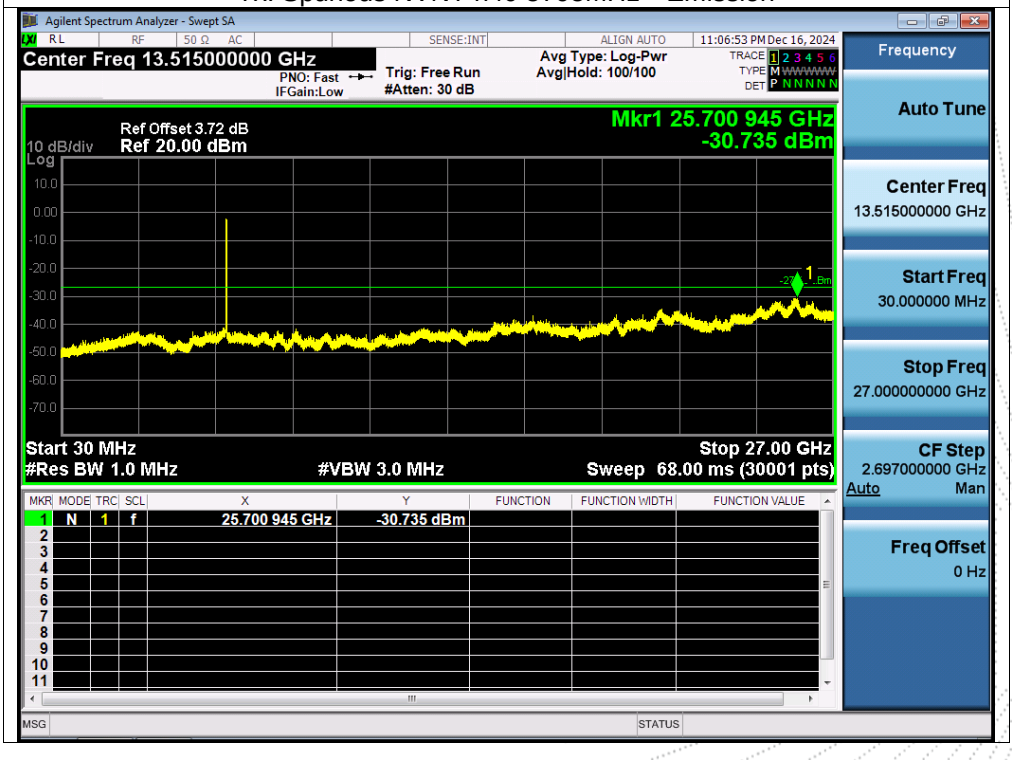
Tx. Spurious NVNT n20 5825MHz Emission



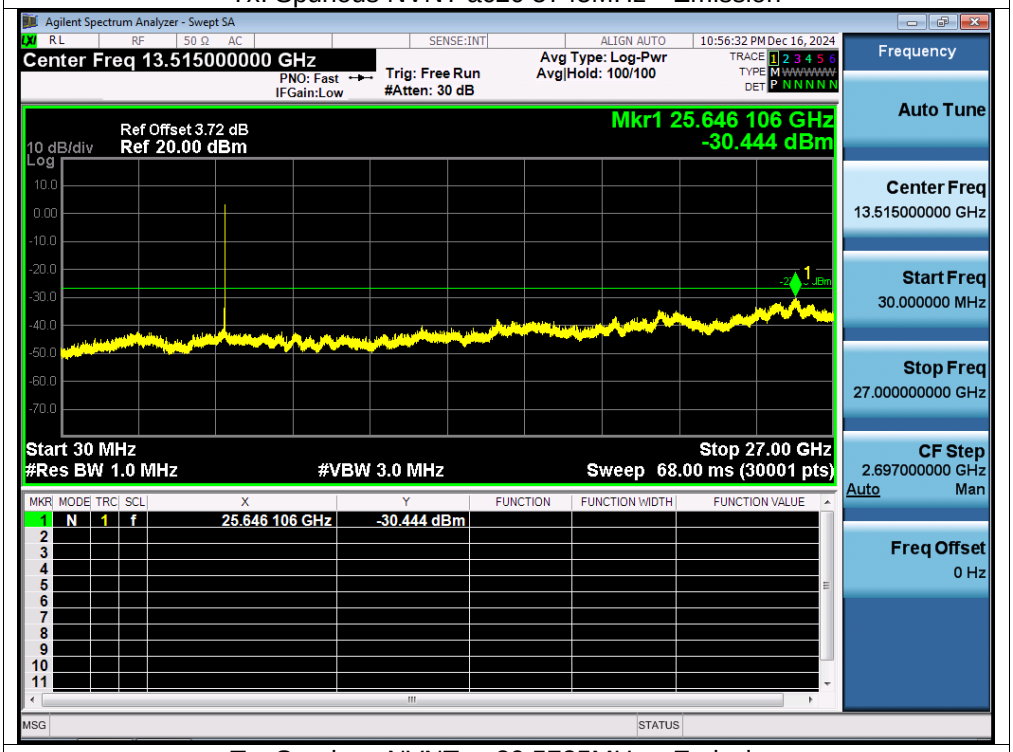
Tx. Spurious NVNT n40 5755MHz Emission



Tx. Spurious NVNT n40 5795MHz Emission

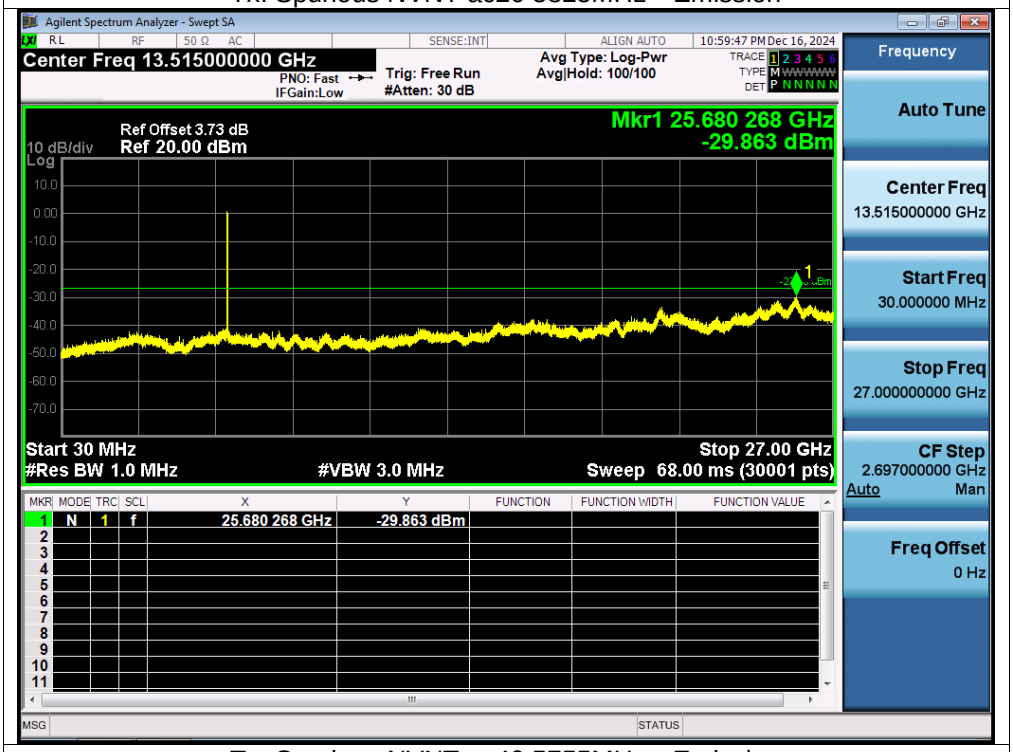


Tx. Spurious NVNT ac20 5745MHz Emission



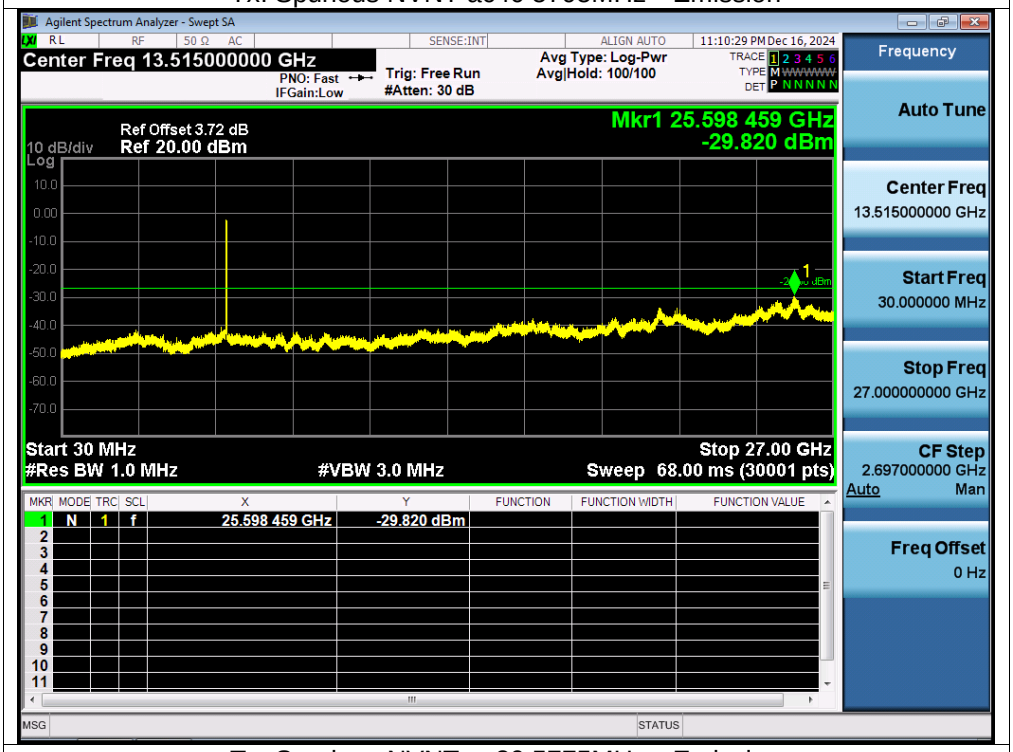
Tx. Spurious NVNT ac20 5785MHz Emission

Tx. Spurious NVNT ac20 5825MHz Emission



Tx. Spurious NVNT ac40 5755MHz Emission

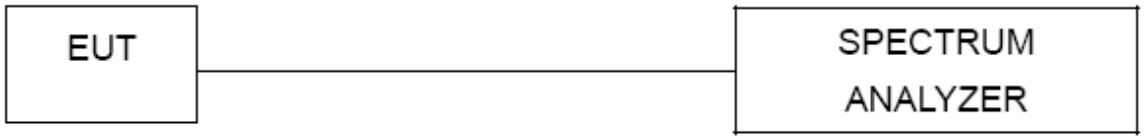
Tx. Spurious NVNT ac40 5795MHz Emission



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 7.6V
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)	7.60	5180.0028	5180	0.0028	0.5405
		V max (V)	8.74	5180.0095	5180	0.0095	1.8340
		V min (V)	6.46	5180.0110	5180	0.0110	2.1236
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)	7.6	T (°C)	-20	5180.0004	5180	0.0004	0.0772
		T (°C)	-10	5180.0109	5180	0.0109	2.1042
		T (°C)	0	5180.0076	5180	0.0076	1.4672
		T (°C)	10	5180.0074	5180	0.0074	1.4286
		T (°C)	20	5180.0011	5180	0.0011	0.2124
		T (°C)	30	5180.0072	5180	0.0072	1.3900
		T (°C)	40	5180.0116	5180	0.0116	2.2394
		T (°C)	50	5180.0085	5180	0.0085	1.6409
		T (°C)	60	5180.0042	5180	0.0042	0.8108
		T (°C)	70	5180.0025	5180	0.0025	0.4826
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)	7.60	5200.0006	5200	0.0006	0.1154
		V max (V)	8.74	5200.0064	5200	0.0064	1.2308
		V min (V)	6.46	5200.0120	5200	0.0120	2.3077
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)	7.6	T (°C)	-20	5200.01010	5200	0.01010	1.9423
		T (°C)	-10	5200.00210	5200	0.00210	0.4038
		T (°C)	0	5200.00790	5200	0.00790	1.5192
		T (°C)	10	5200.01160	5200	0.01160	2.2308
		T (°C)	20	5200.00770	5200	0.00770	1.4808
		T (°C)	30	5200.00020	5200	0.00020	0.0385
		T (°C)	40	5200.00930	5200	0.00930	1.7885
		T (°C)	50	5200.00830	5200	0.00830	1.5962
		T (°C)	60	5200.00330	5200	0.00330	0.6346
		T (°C)	70	5200.00820	5200	0.00820	1.5769
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)	7.60	5240.0009	5240	0.0009	0.1718
		V max (V)	8.74	5240.0019	5240	0.0019	0.3626
		V min (V)	6.46	5240.0132	5240	0.0132	2.5191
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)	7.6	T (°C)	-20	5240.0113	5240	0.0113	2.1565
		T (°C)	-10	5240.0004	5240	0.0004	0.0763
		T (°C)	0	5240.0068	5240	0.0068	1.2977
		T (°C)	10	5240.0097	5240	0.0097	1.8511
		T (°C)	20	5240.0020	5240	0.0020	0.3817
		T (°C)	30	5240.0086	5240	0.0086	1.6412
		T (°C)	40	5240.0106	5240	0.0106	2.0229
		T (°C)	50	5240.0098	5240	0.0098	1.8702
		T (°C)	60	5240.0108	5240	0.0108	2.0611
		T (°C)	70	5240.0063	5240	0.0063	1.2023
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 7.6V
Test Mode:	TX Frequency U-NII-3 (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)	7.60	5745.00890	5745	0.00890	1.5492
		V max (V)	8.74	5745.00460	5745	0.00460	0.8007
		V min (V)	6.46	5745.00050	5745	0.00050	0.0870
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)	7.6	T (°C)	-20	5745.00560	5745	0.00560	0.9748
		T (°C)	-10	5745.00900	5745	0.00900	1.5666
		T (°C)	0	5745.00150	5745	0.00150	0.2611
		T (°C)	10	5745.00090	5745	0.00090	0.1567
		T (°C)	20	5745.01330	5745	0.01330	2.3151
		T (°C)	30	5745.00040	5745	0.00040	0.0696
		T (°C)	40	5745.01300	5745	0.01300	2.2628
		T (°C)	50	5745.00850	5745	0.00850	1.4795
		T (°C)	60	5745.01290	5745	0.01290	2.2454
		T (°C)	70	5745.00830	5745	0.00830	1.4447
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)	7.60	5785.00580	5785	0.00580	1.0026
		V max (V)	8.74	5785.01310	5785	0.01310	2.2645
		V min (V)	6.46	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)	7.6	T (°C)	-20	5785.00590	5785	0.00590	1.0199
		T (°C)	-10	5785.00640	5785	0.00640	1.1063
		T (°C)	0	5785.00690	5785	0.00690	1.1927
		T (°C)	10	5785.00510	5785	0.00510	0.8816
		T (°C)	20	5785.00090	5785	0.00090	0.1556
		T (°C)	30	5785.00980	5785	0.00980	1.6940
		T (°C)	40	5785.00410	5785	0.00410	0.7087
		T (°C)	50	5785.00790	5785	0.00790	1.3656
		T (°C)	60	5785.00580	5785	0.00580	1.0026
		T (°C)	70	5785.00680	5785	0.00680	1.1755
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)	7.60	5825.00710	5825	0.00710	1.2189
		V max (V)	8.74	5825.00060	5825	0.00060	0.1030
		V min (V)	6.46	5825.00510	5825	0.00510	0.8755
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)	7.6	T (°C)	-20	5825.01140	5825	0.01140	1.9571
		T (°C)	-10	5825.00140	5825	0.00140	0.2403
		T (°C)	0	5825.00060	5825	0.00060	0.1030
		T (°C)	10	5825.01040	5825	0.01040	1.7854
		T (°C)	20	5825.00680	5825	0.00680	1.1674
		T (°C)	30	5825.00840	5825	0.00840	1.4421
		T (°C)	40	5825.01120	5825	0.01120	1.9227
		T (°C)	50	5825.00980	5825	0.00980	1.6824
		T (°C)	60	5825.00490	5825	0.00490	0.8412
		T (°C)	70	5825.00970	5825	0.00970	1.6652
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

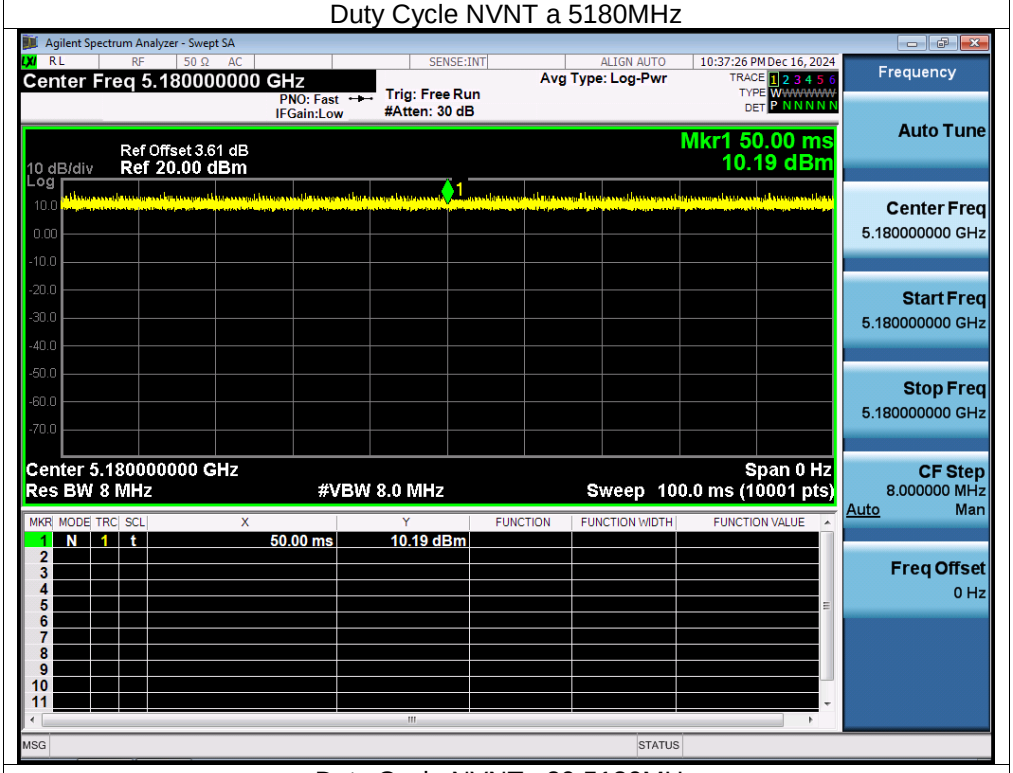
14.4 Test Result

ANT A

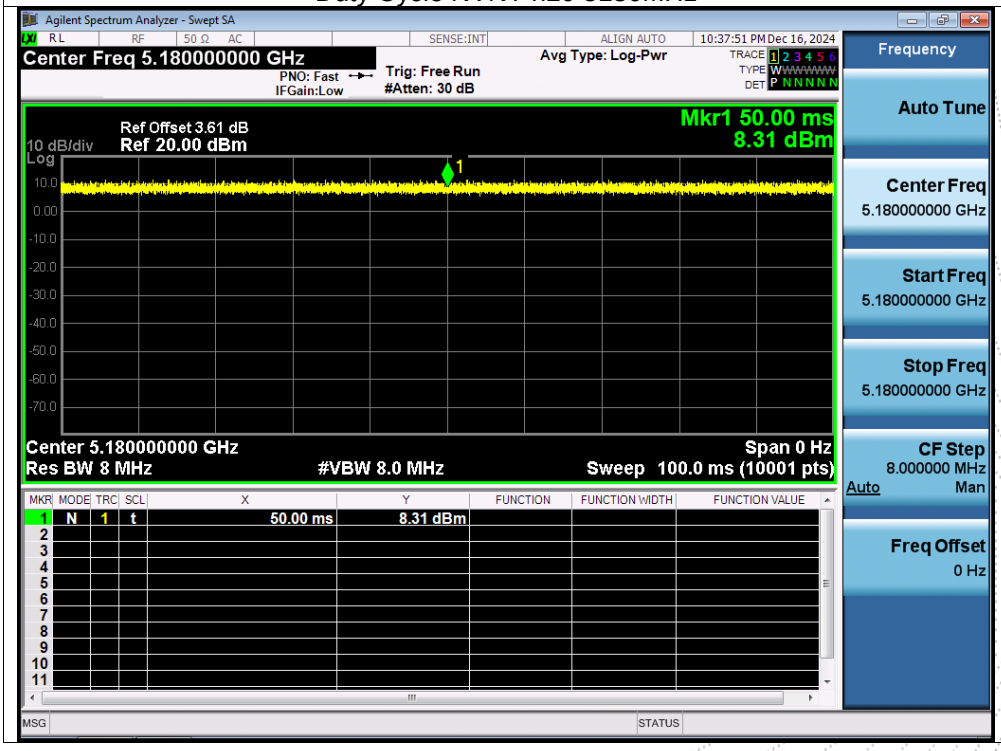
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5200	100	0	0
NVNT	n20	5200	100	0	0
NVNT	n40	5190	100	0	0
NVNT	ac20	5200	100	0	0
NVNT	ac40	5190	100	0	0
NVNT	ac80	5210	100	0	0

Test Graphs

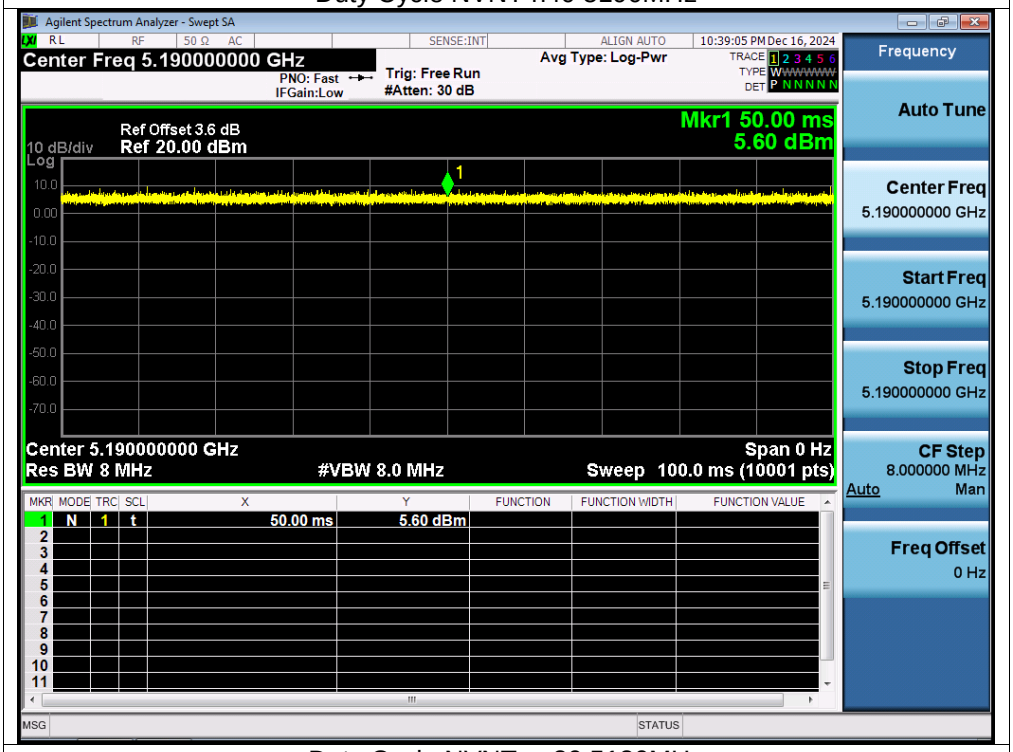
Duty Cycle NVNT a 5180MHz



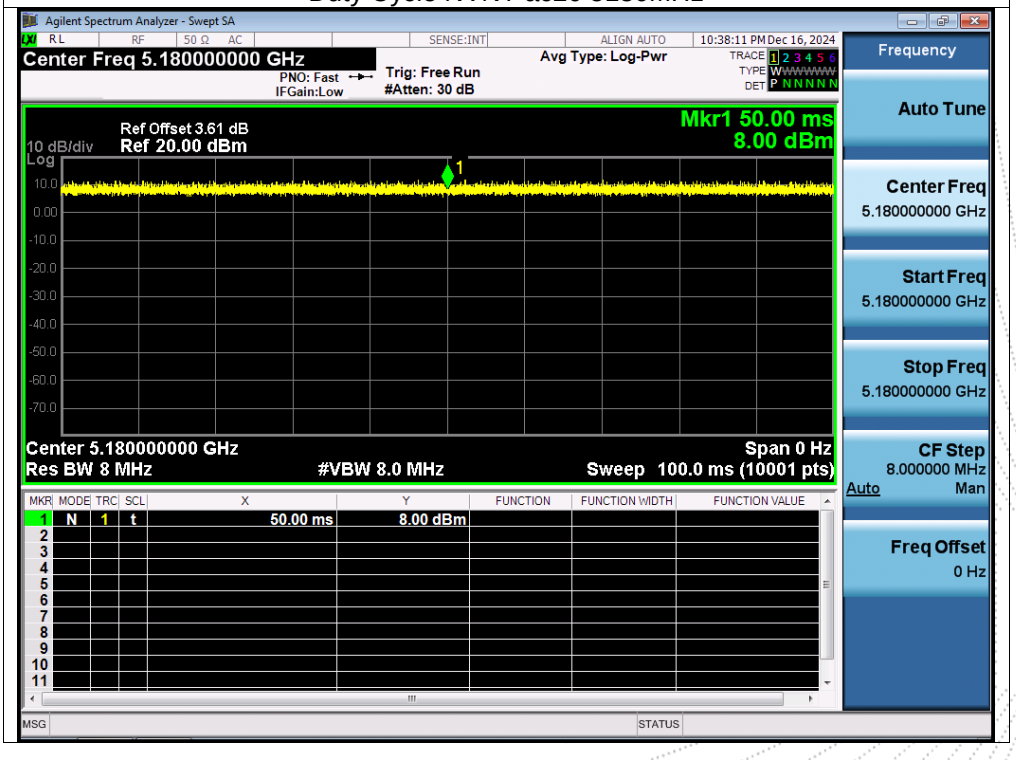
Duty Cycle NVNT n20 5180MHz



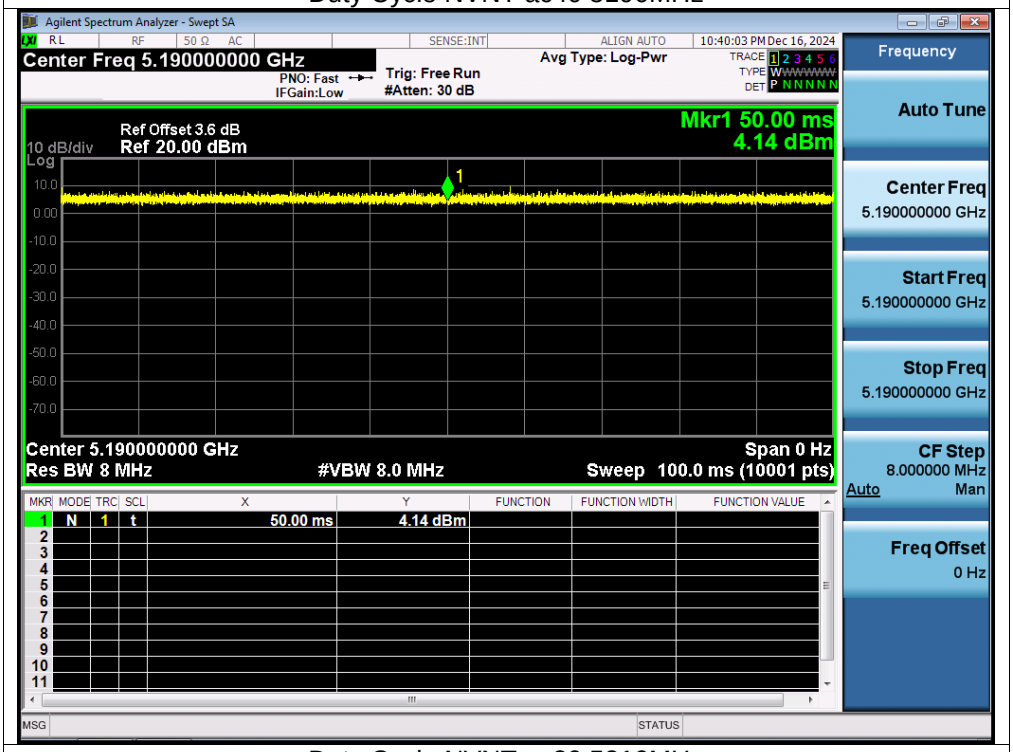
Duty Cycle NVNT n40 5190MHz



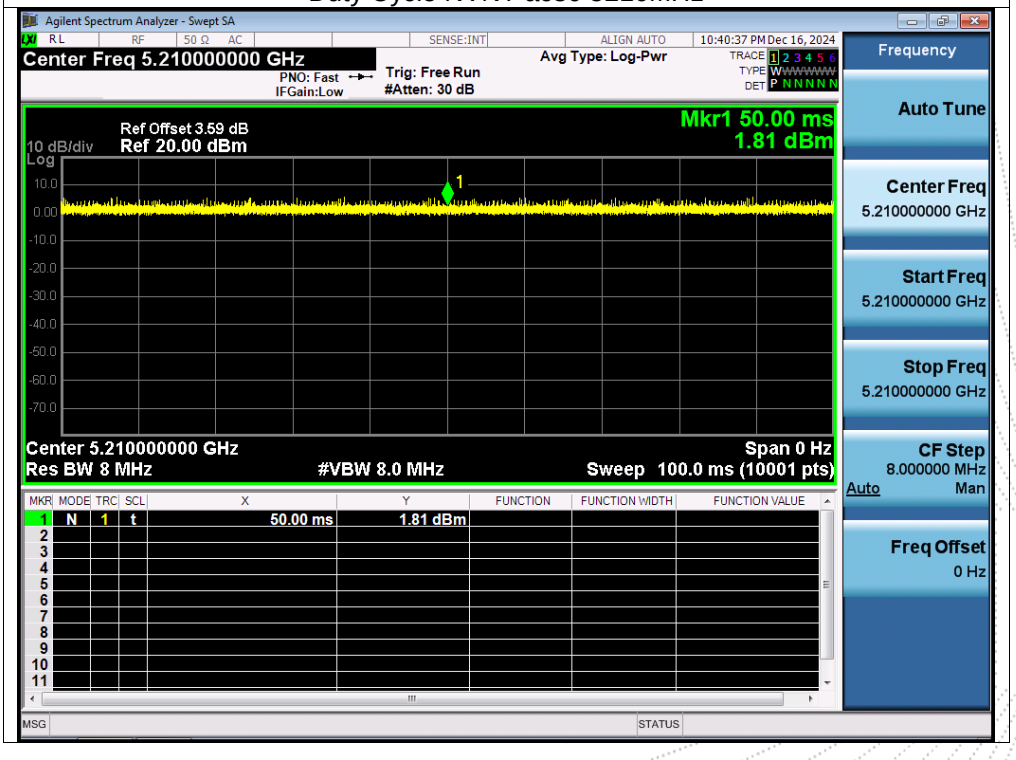
Duty Cycle NVNT ac20 5180MHz



Duty Cycle NVNT ac40 5190MHz



Duty Cycle NVNT ac80 5210MHz

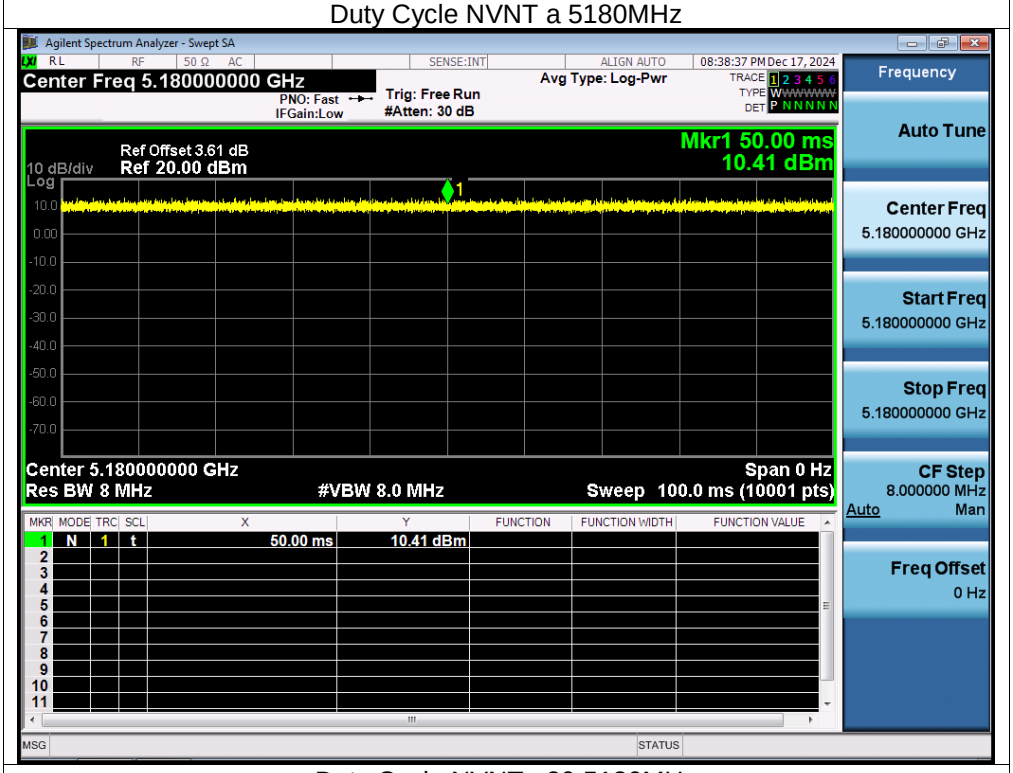


ANT B

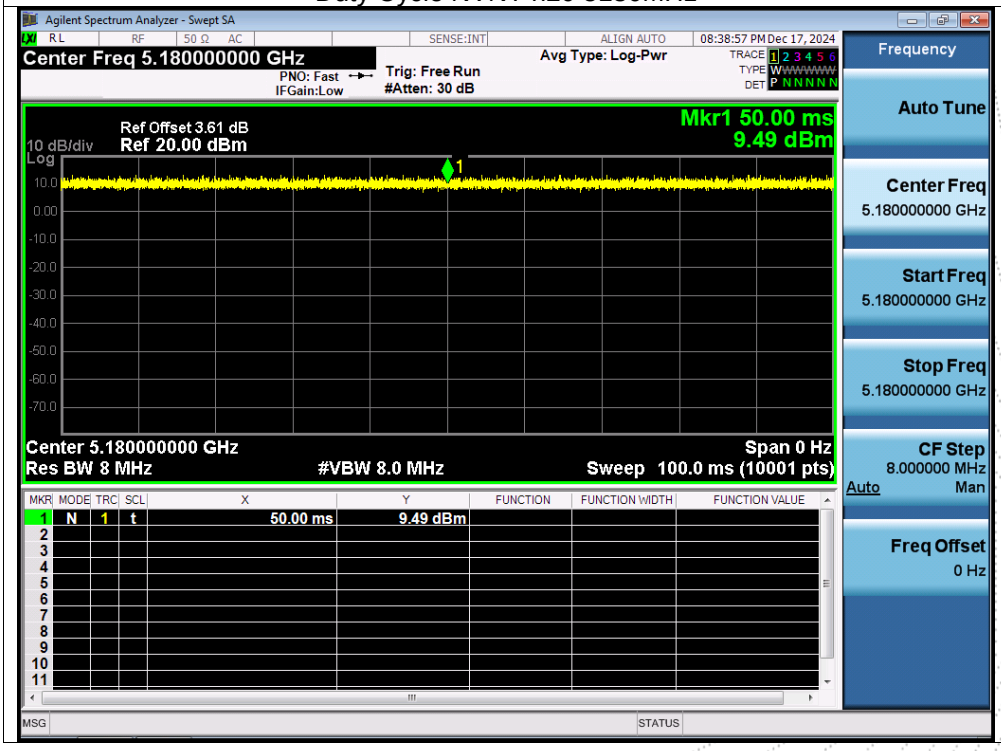
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5200	100	0	0
NVNT	n20	5200	100	0	0
NVNT	n40	5190	100	0	0
NVNT	ac20	5200	100	0	0
NVNT	ac40	5190	100	0	0
NVNT	ac80	5210	100	0	0

Test Graphs

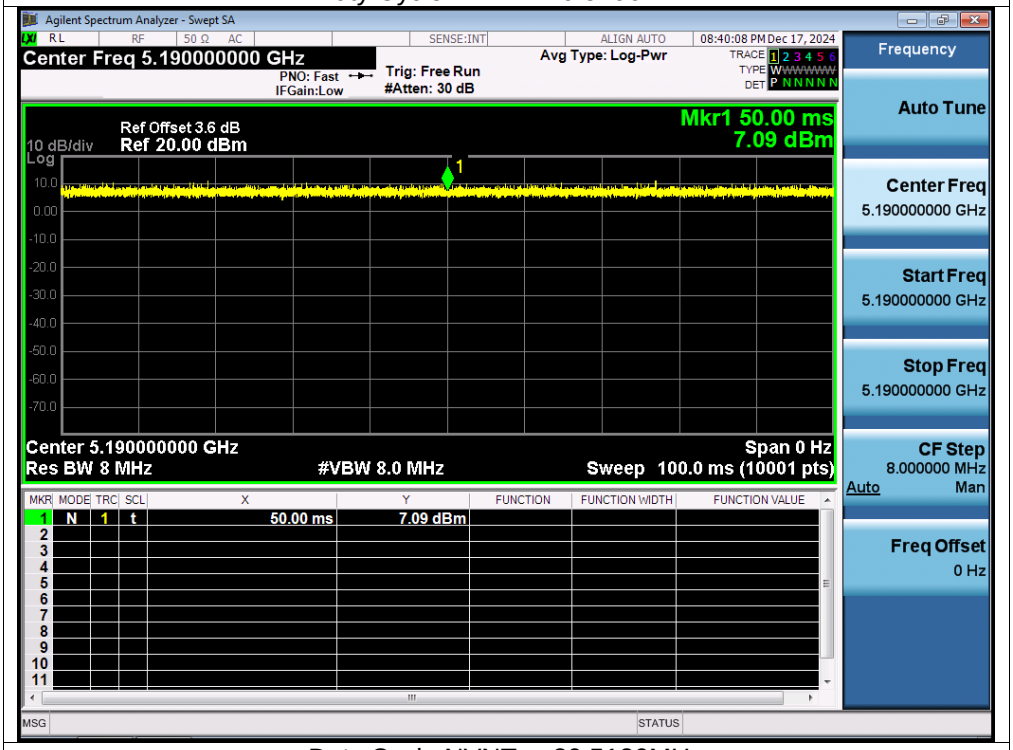
Duty Cycle NVNT a 5180MHz



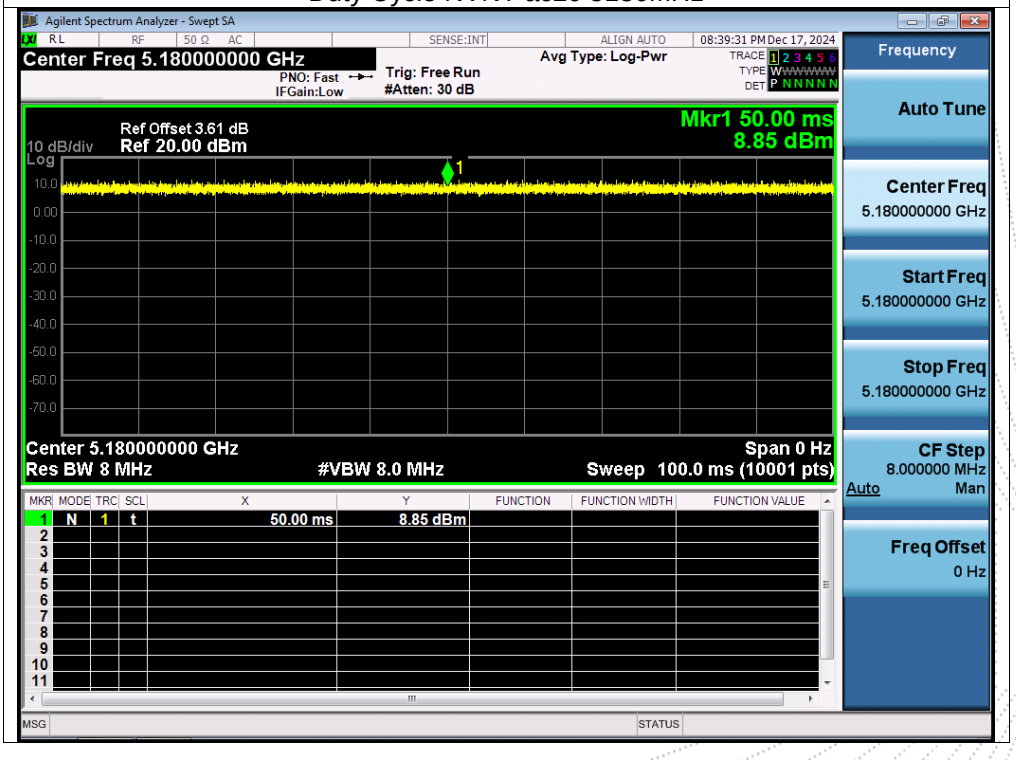
Duty Cycle NVNT n20 5180MHz



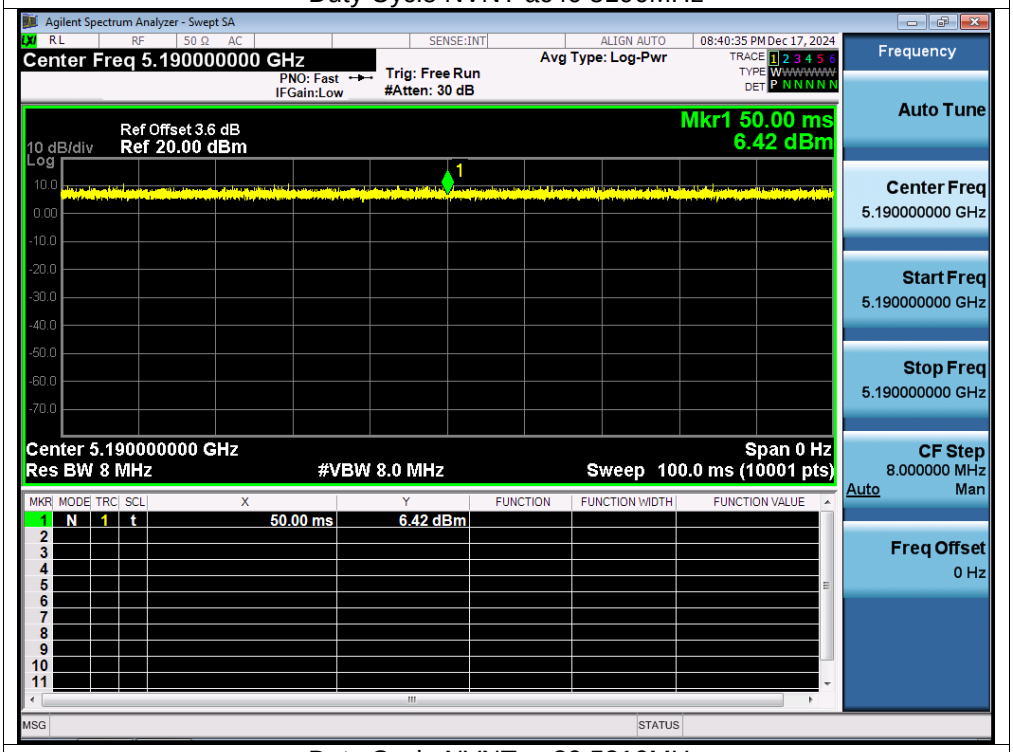
Duty Cycle NVNT n40 5190MHz



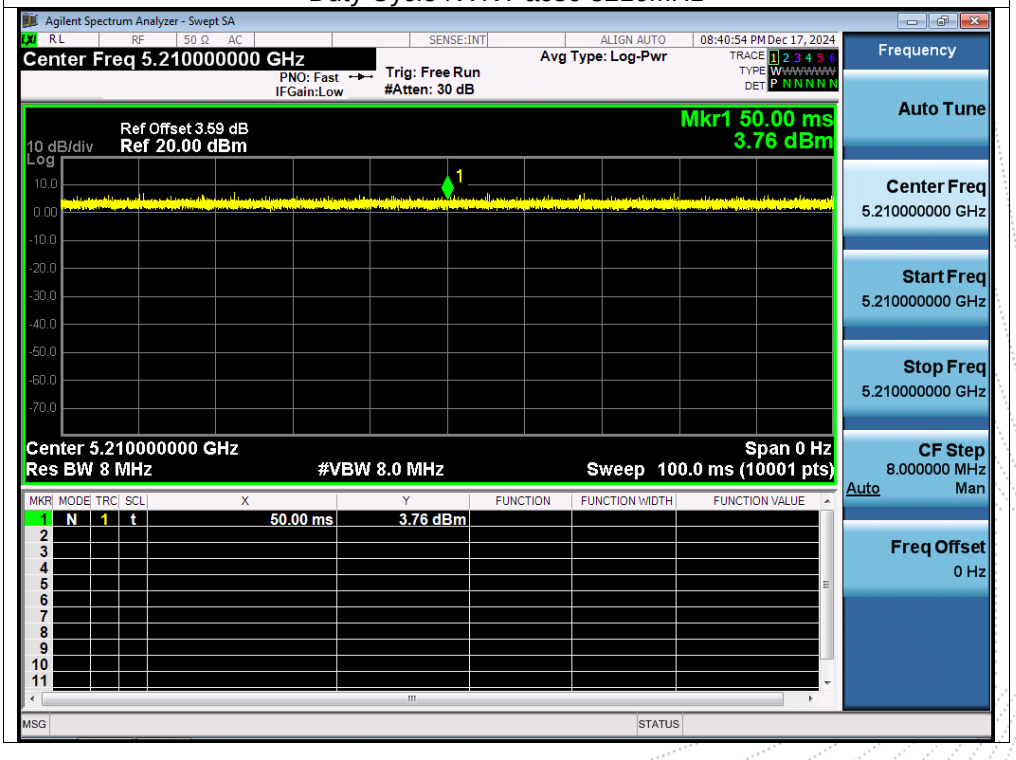
Duty Cycle NVNT ac20 5180MHz



Duty Cycle NVNT ac40 5190MHz



Duty Cycle NVNT ac80 5210MHz

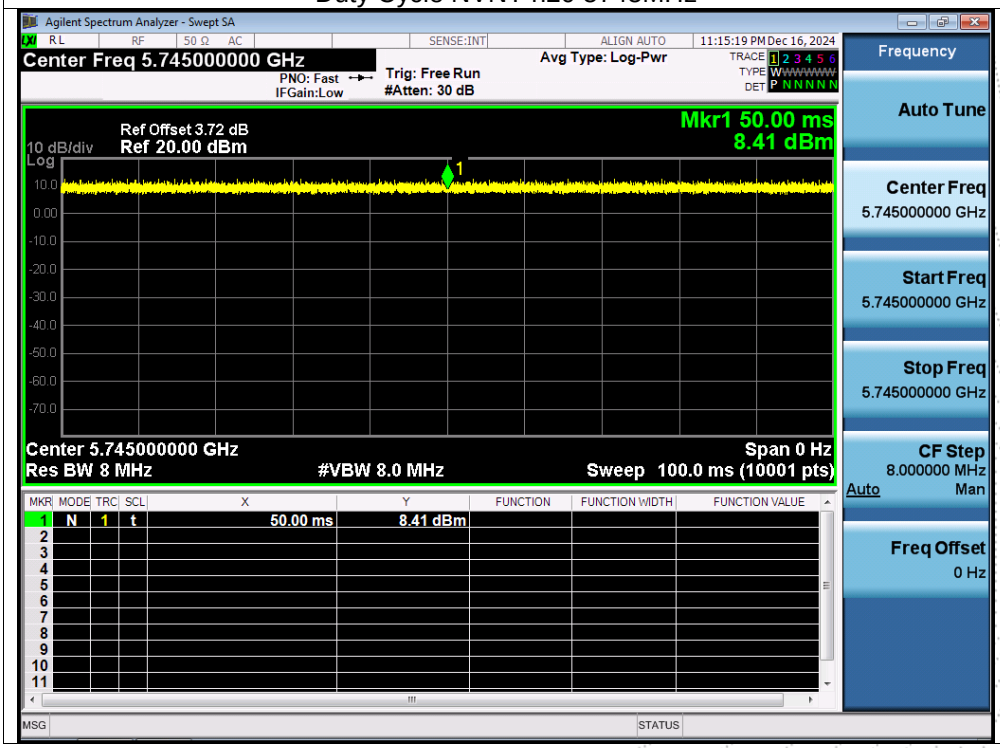


ANT A

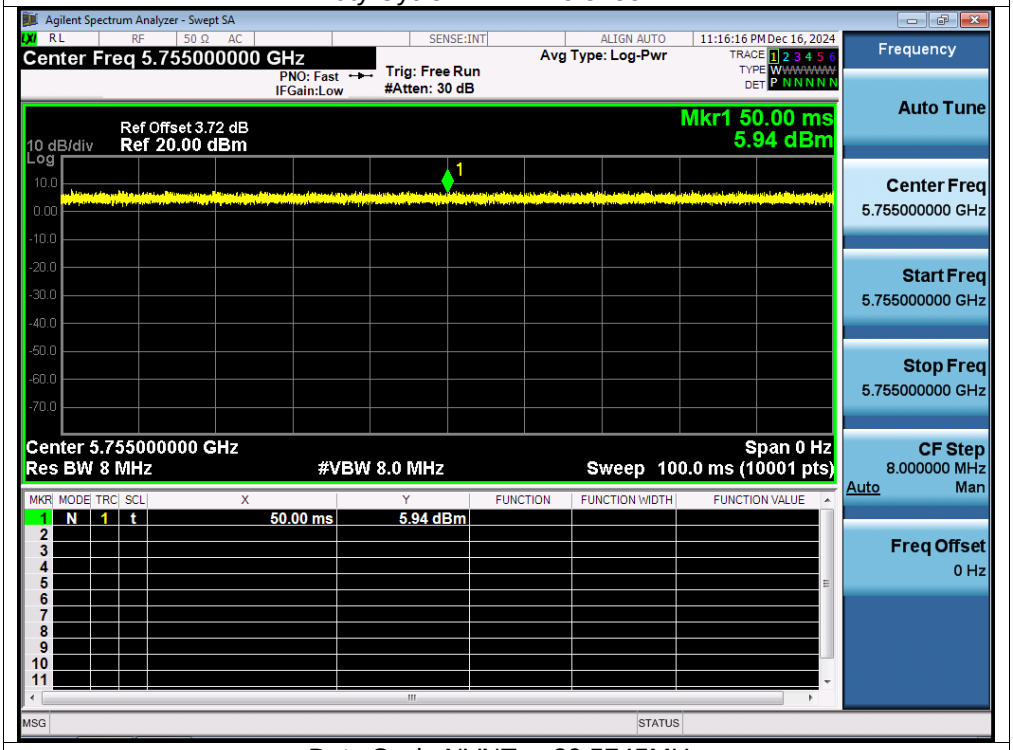
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5785	100	0	0
NVNT	n20	5785	100	0	0
NVNT	n40	5755	100	0	0
NVNT	ac20	5785	100	0	0
NVNT	ac40	5755	100	0	0
NVNT	ac80	5775	100	0	0

Test Graphs
Duty Cycle NVNT a 5745MHz

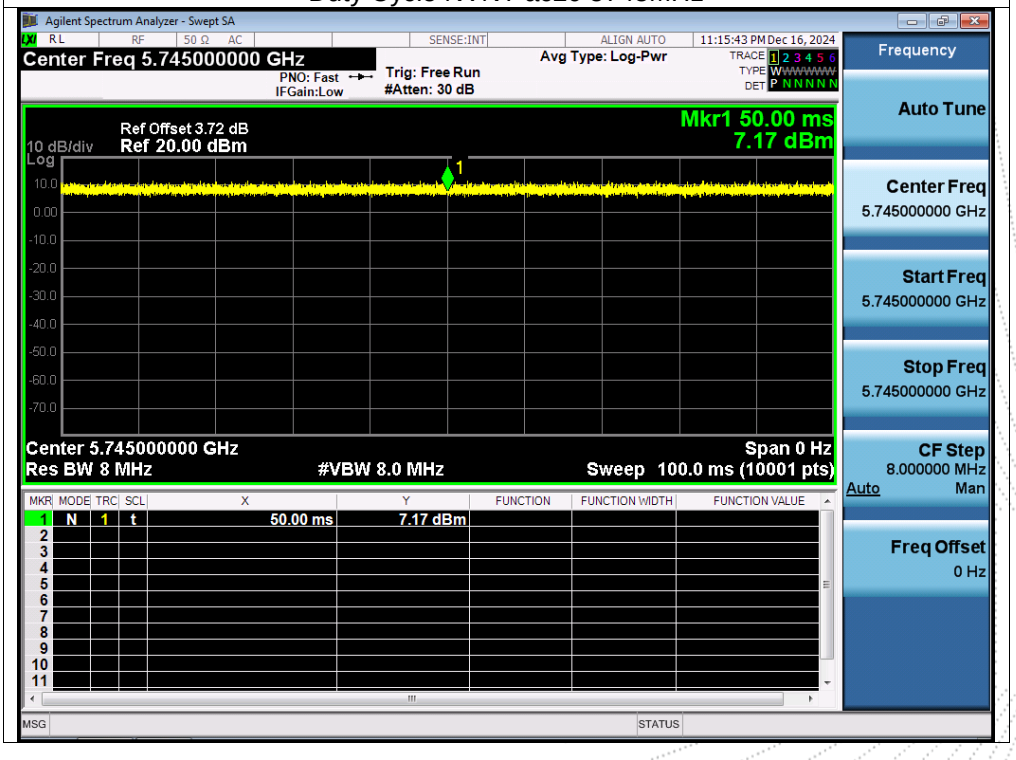
Duty Cycle NVNT n20 5745MHz



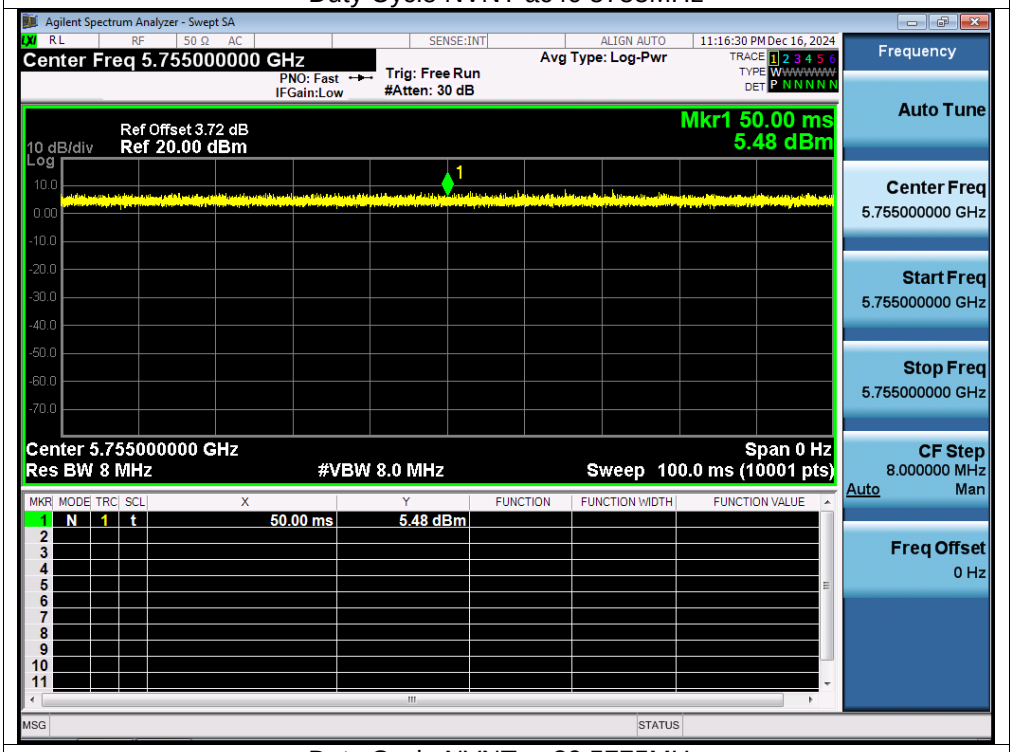
Duty Cycle NVNT n40 5755MHz



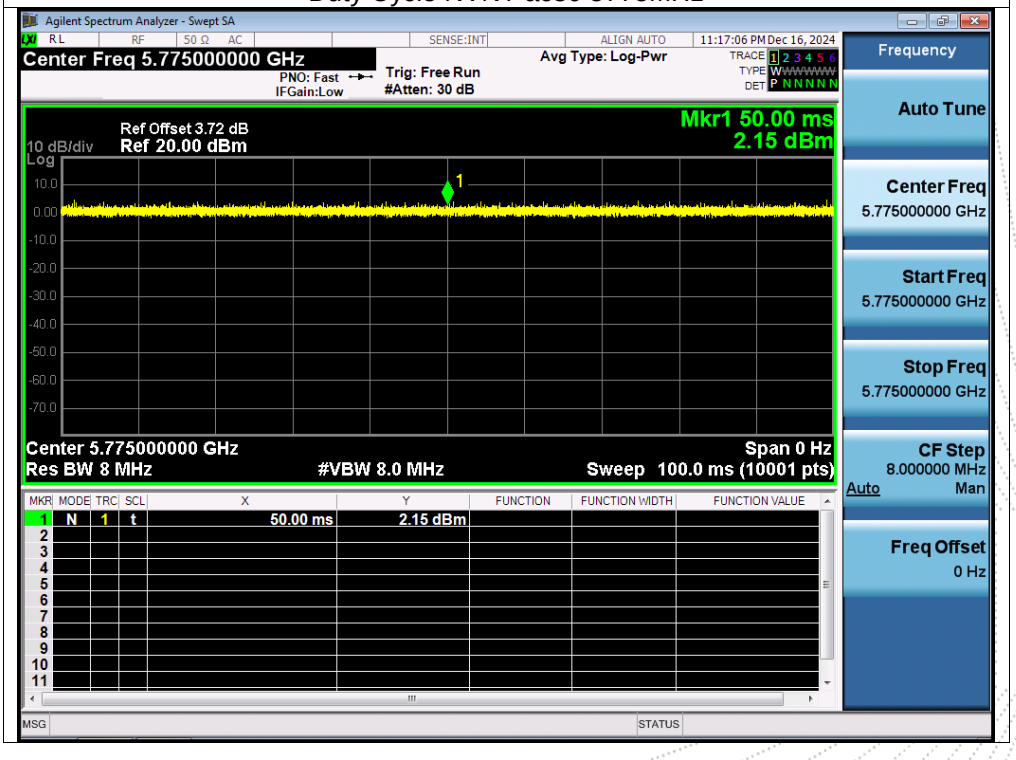
Duty Cycle NVNT ac20 5745MHz



Duty Cycle NVNT ac40 5755MHz



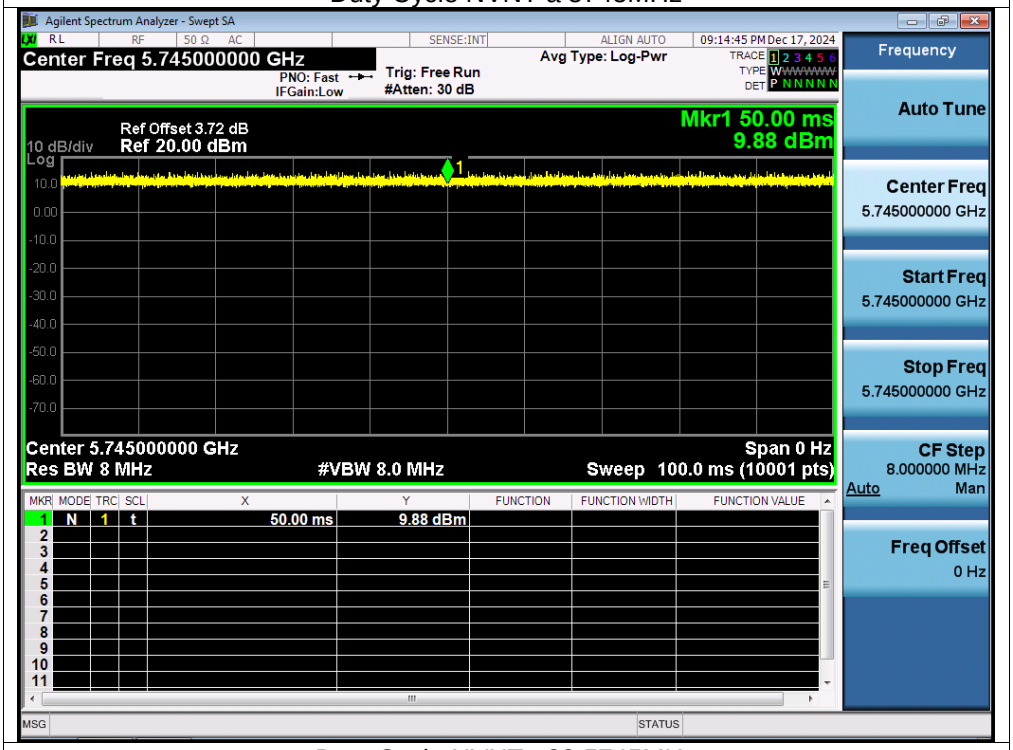
Duty Cycle NVNT ac80 5775MHz



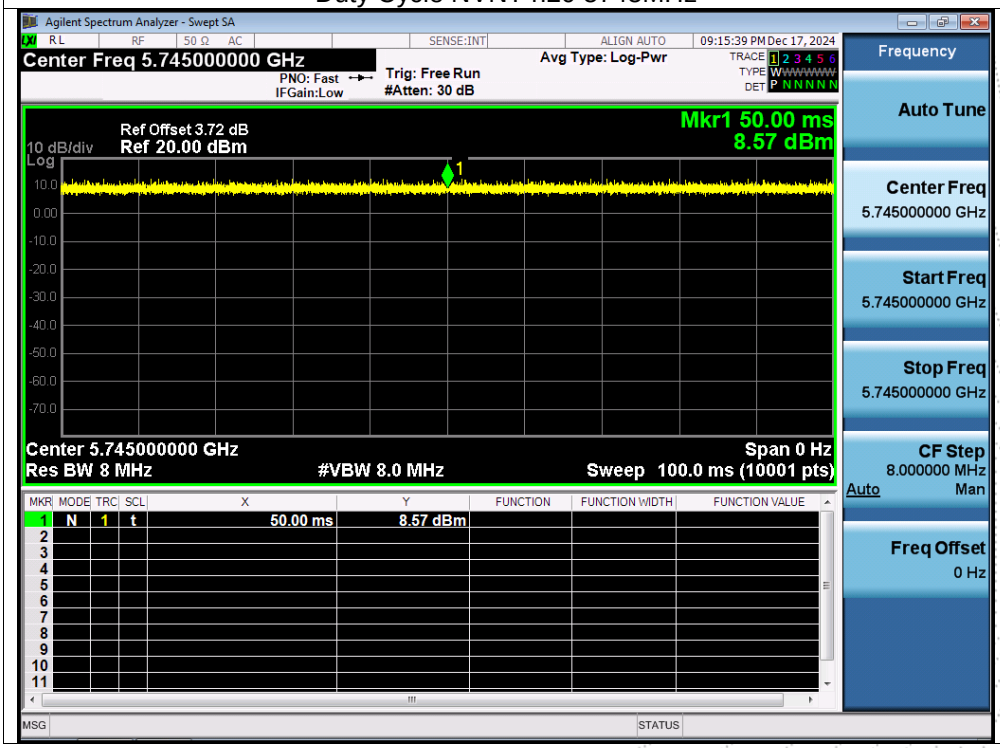
ANT B

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5785	100	0	0
NVNT	n20	5785	100	0	0
NVNT	n40	5755	100	0	0
NVNT	ac20	5785	100	0	0
NVNT	ac40	5755	100	0	0
NVNT	ac80	5775	100	0	0

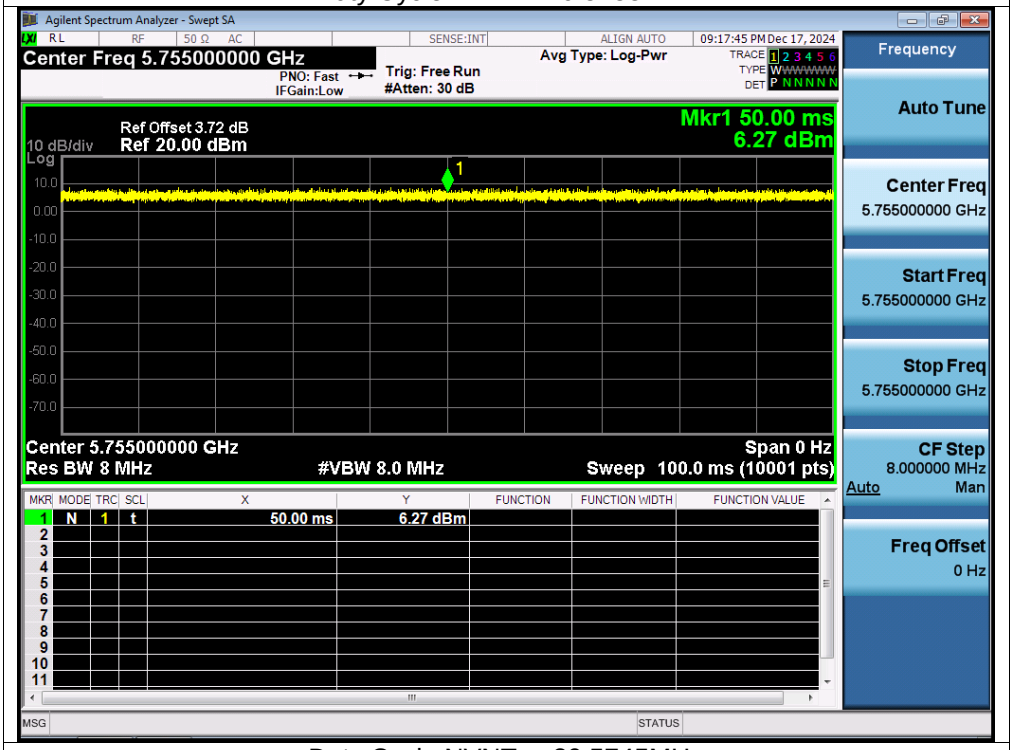
Test Graphs
Duty Cycle NVNT a 5745MHz



Duty Cycle NVNT n20 5745MHz



Duty Cycle NVNT n40 5755MHz



Duty Cycle NVNT ac20 5745MHz