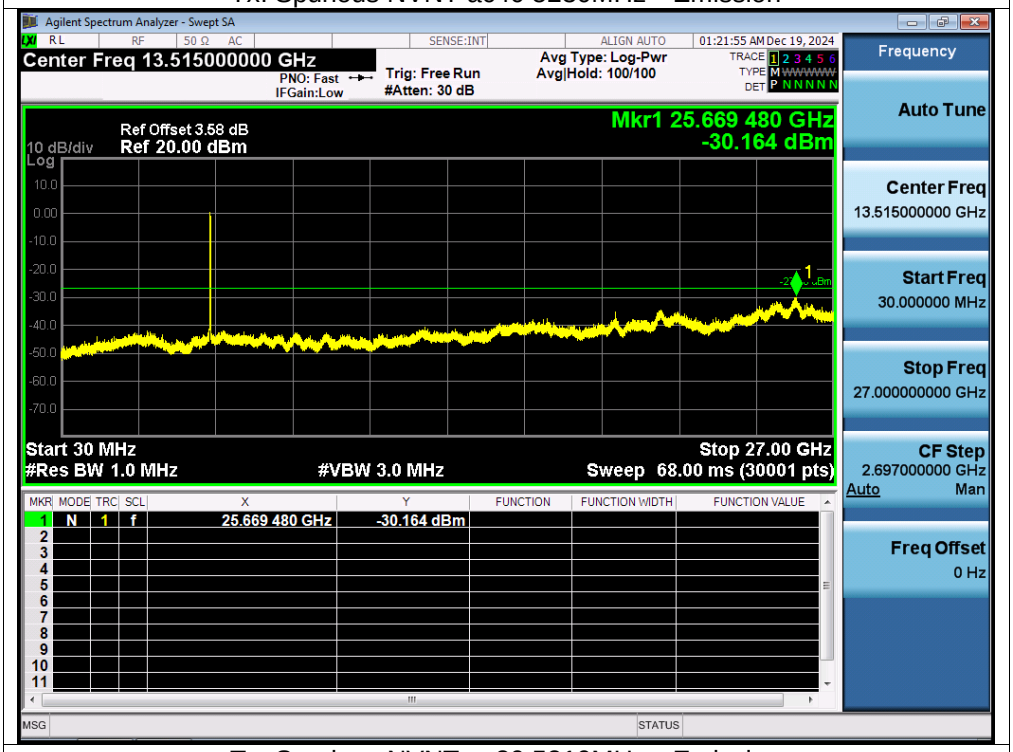
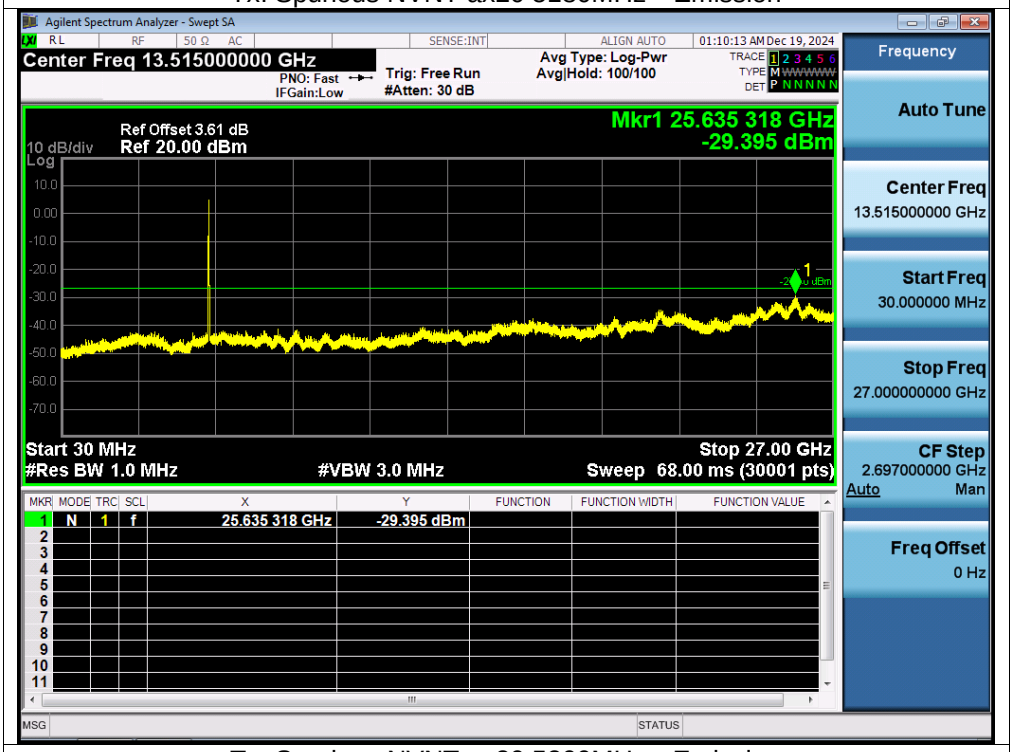
Tx. Spurious NVNT ac40 5230MHz Emission



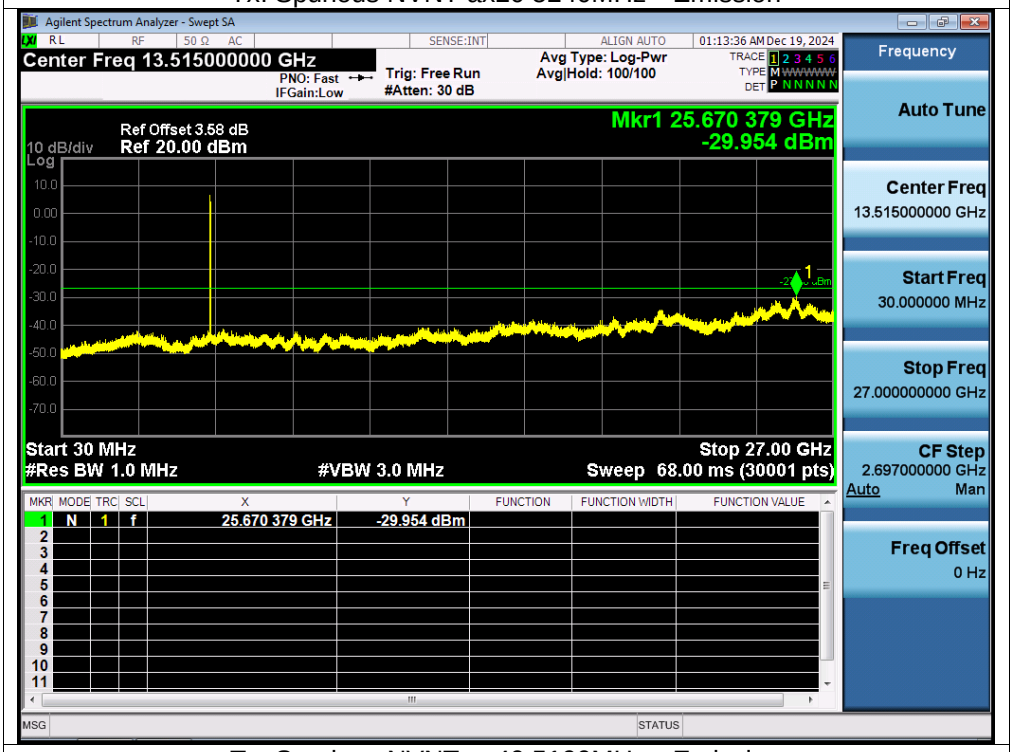
Tx. Spurious NVNT ac80 5210MHz Emission

Tx. Spurious NVNT ax20 5180MHz Emission



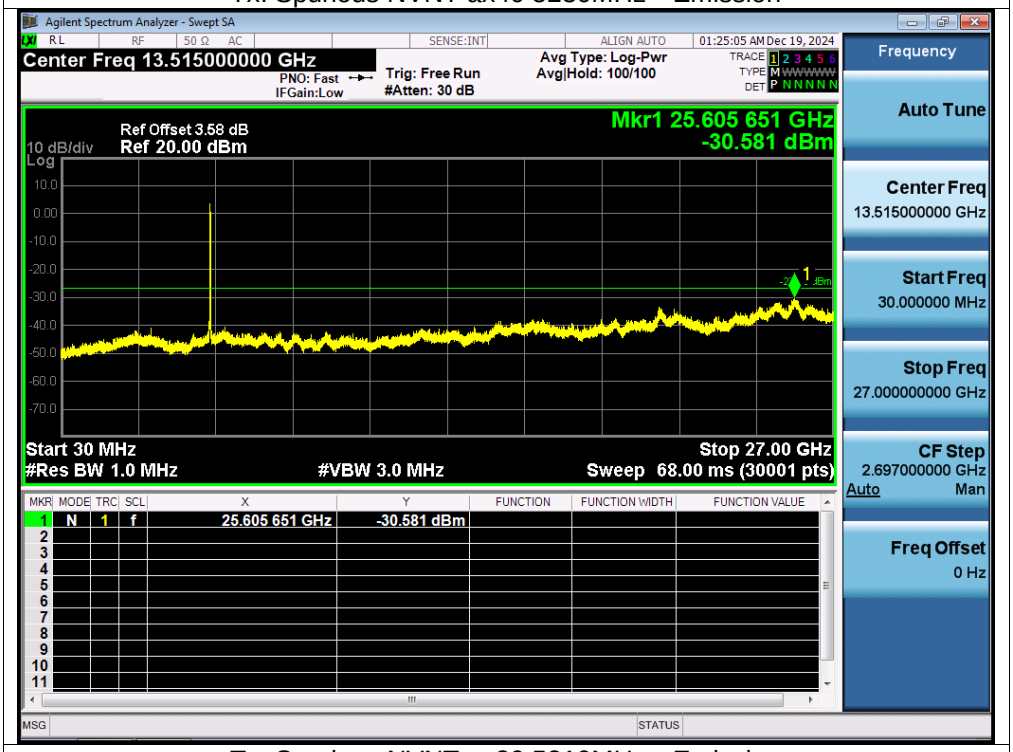
Tx. Spurious NVNT ax20 5200MHz Emission

Tx. Spurious NVNT ax20 5240MHz Emission



Tx. Spurious NVNT ax40 5190MHz Emission

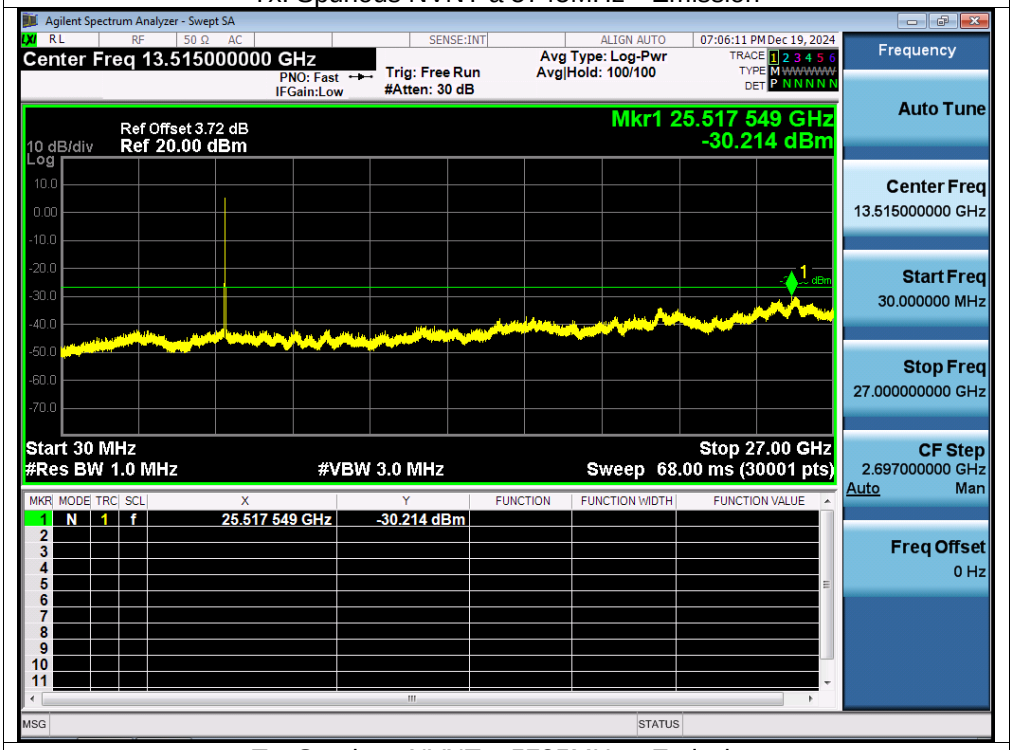
Tx. Spurious NVNT ax40 5230MHz Emission



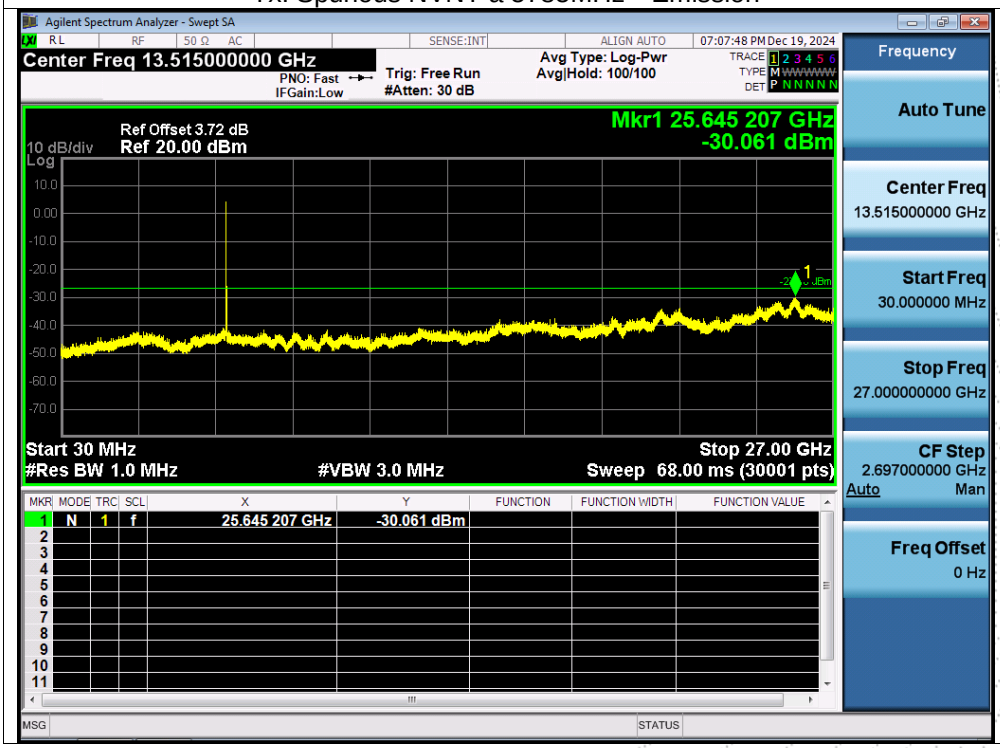
Tx. Spurious NVNT ax80 5210MHz Emission

Test Graphs

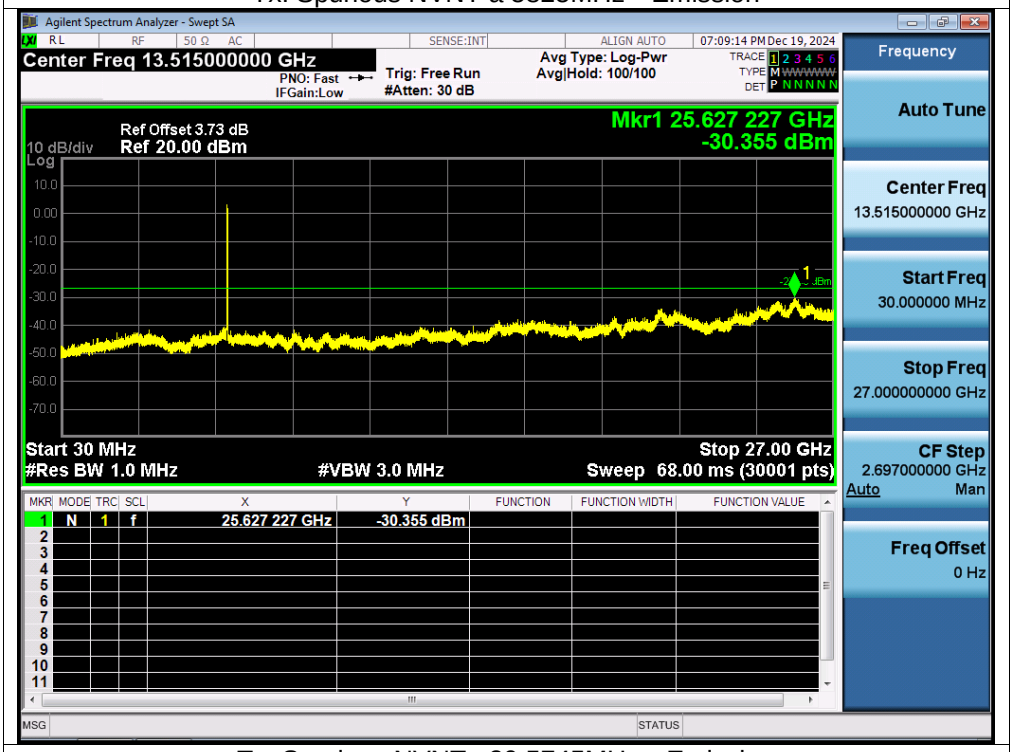
Tx. Spurious NVNT a 5745MHz Emission



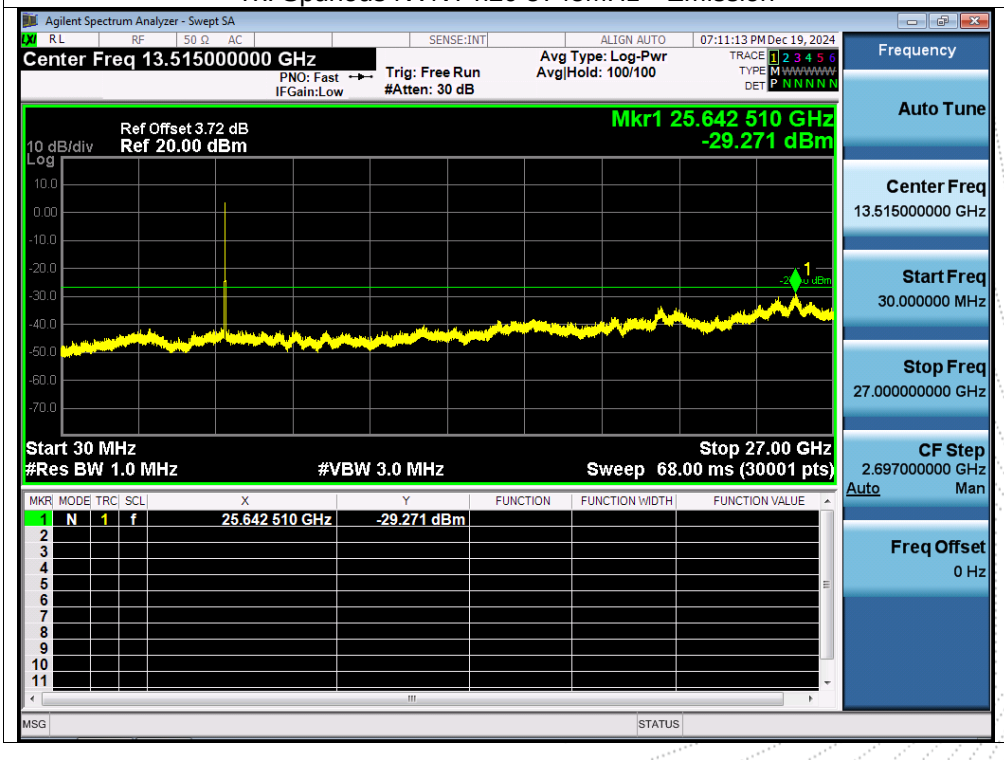
Tx. Spurious NVNT a 5785MHz Emission



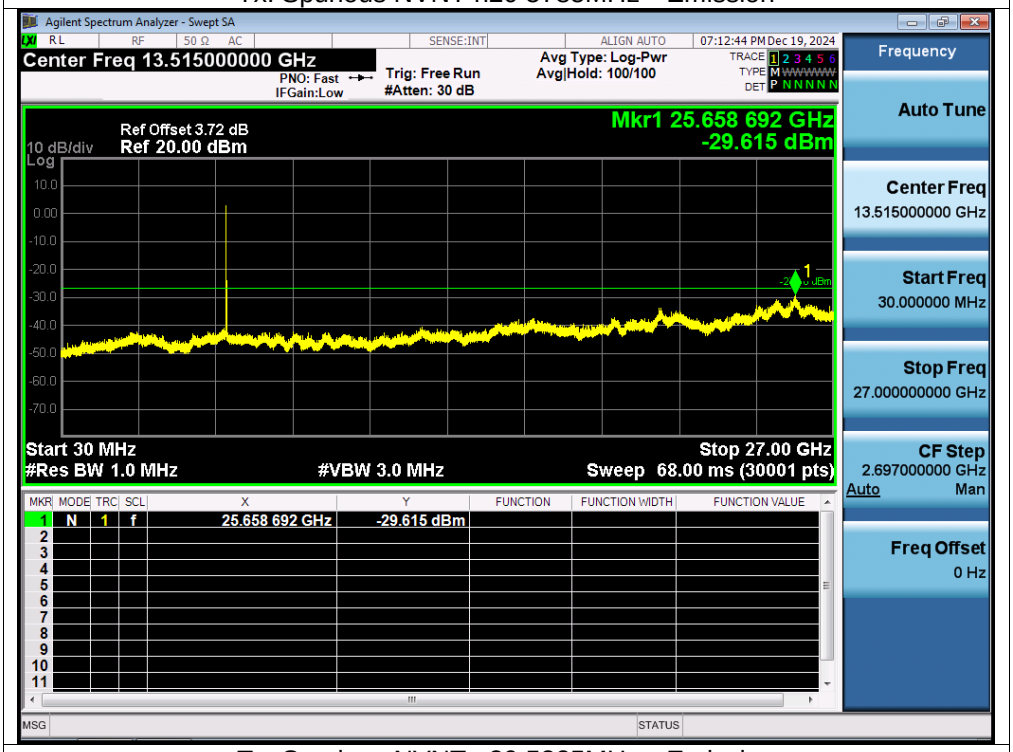
Tx. Spurious NVNT a 5825MHz Emission



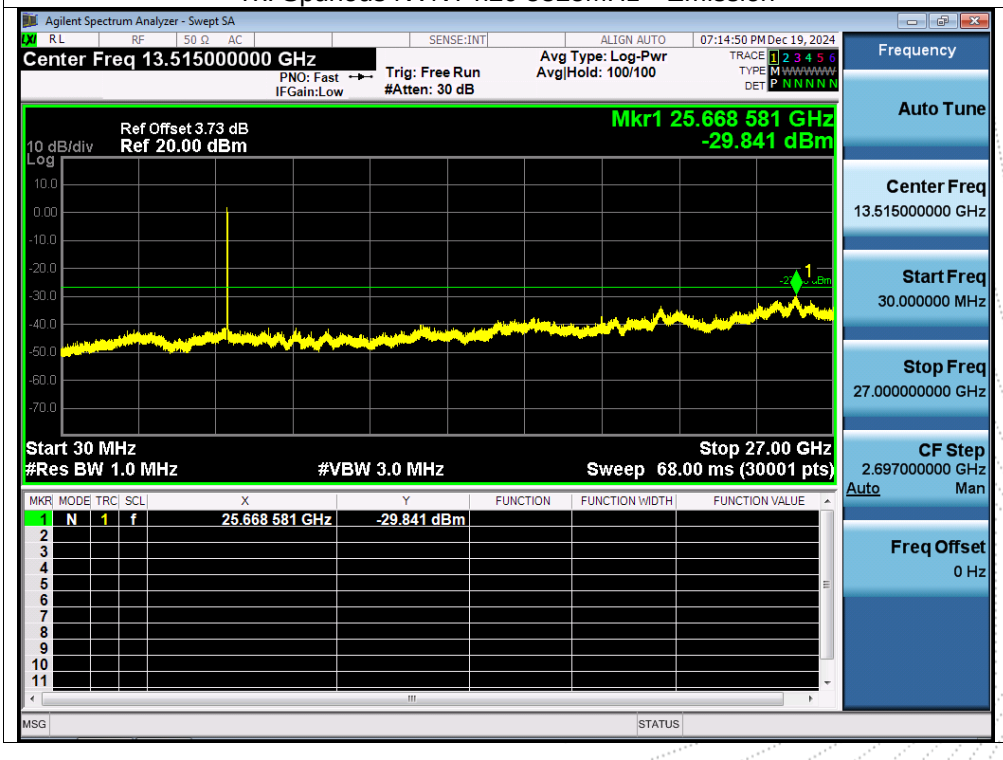
Tx. Spurious NVNT n20 5745MHz Emission



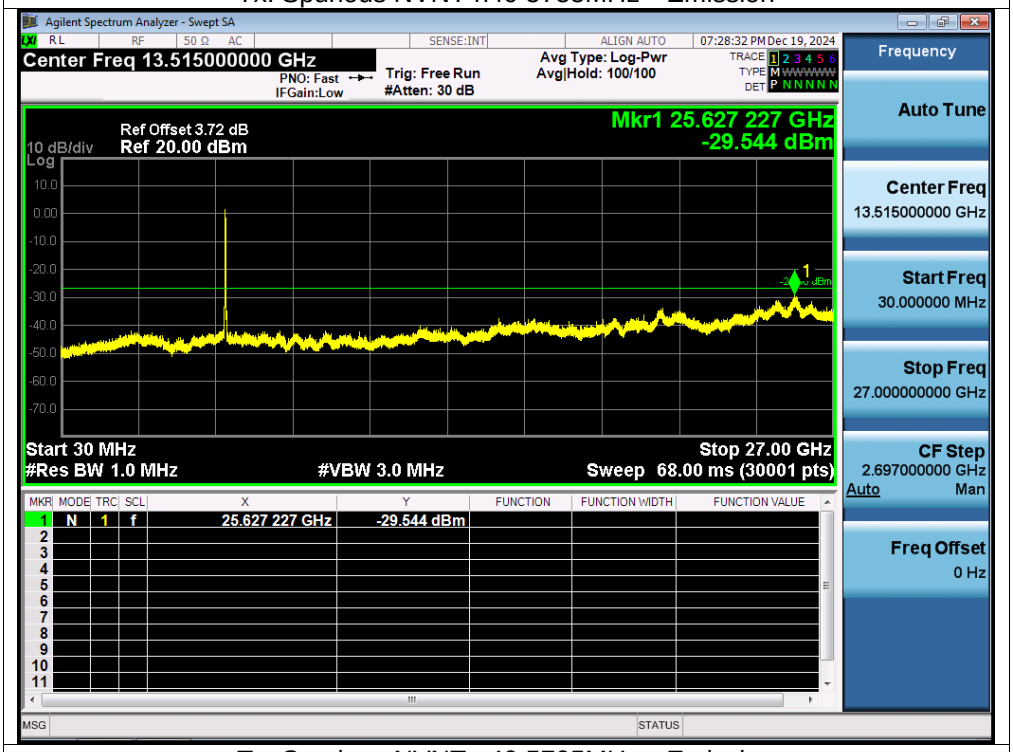
Tx. Spurious NVNT n20 5785MHz Emission



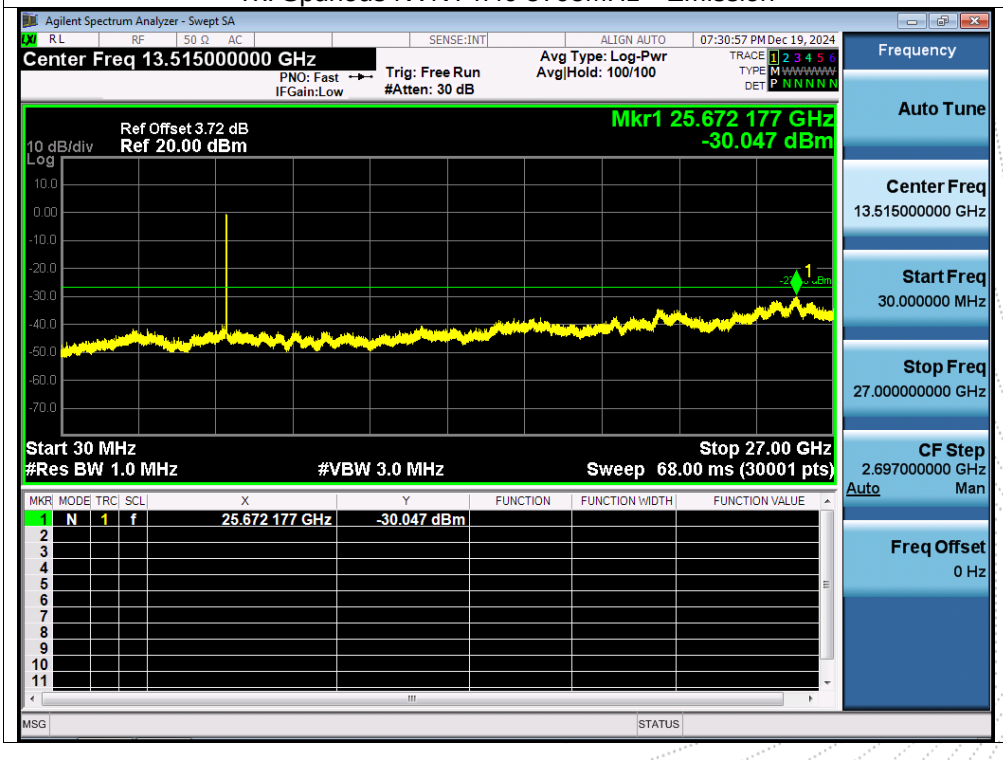
Tx. Spurious NVNT n20 5825MHz Emission



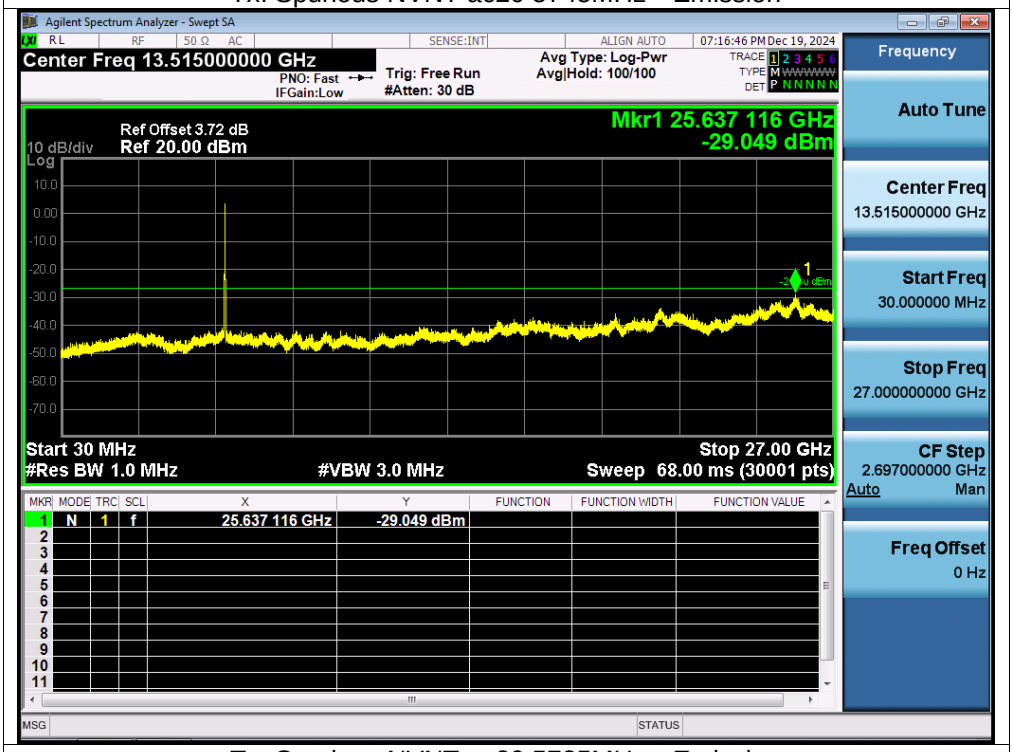
Tx. Spurious NVNT n40 5755MHz Emission



Tx. Spurious NVNT n40 5795MHz Emission

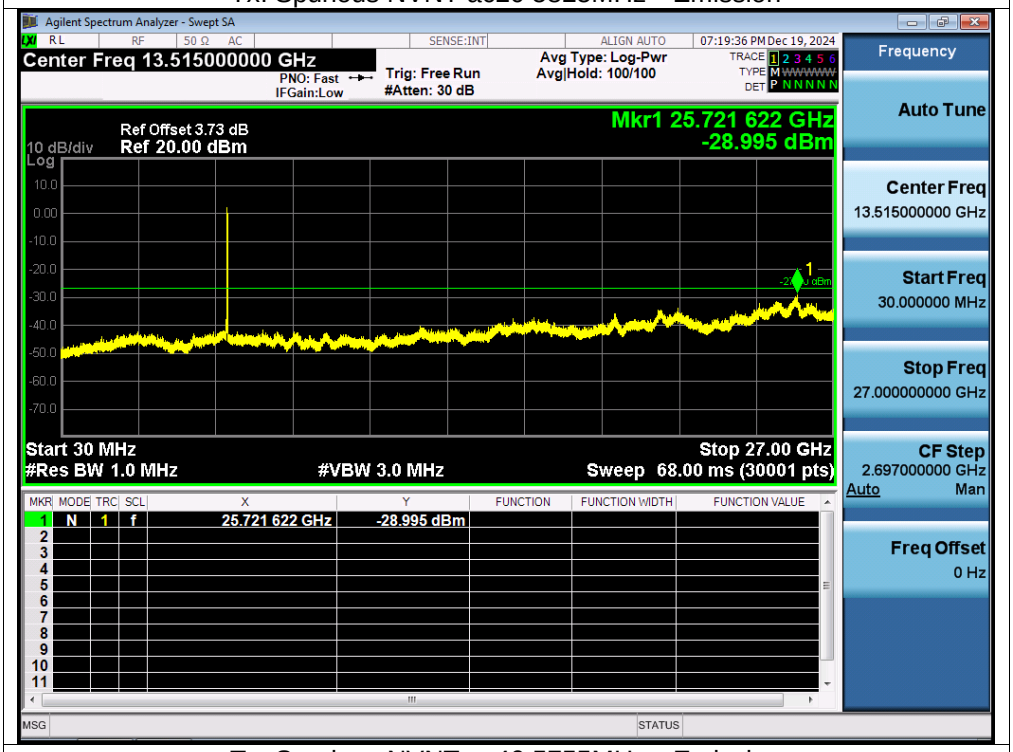


Tx. Spurious NVNT ac20 5745MHz Emission



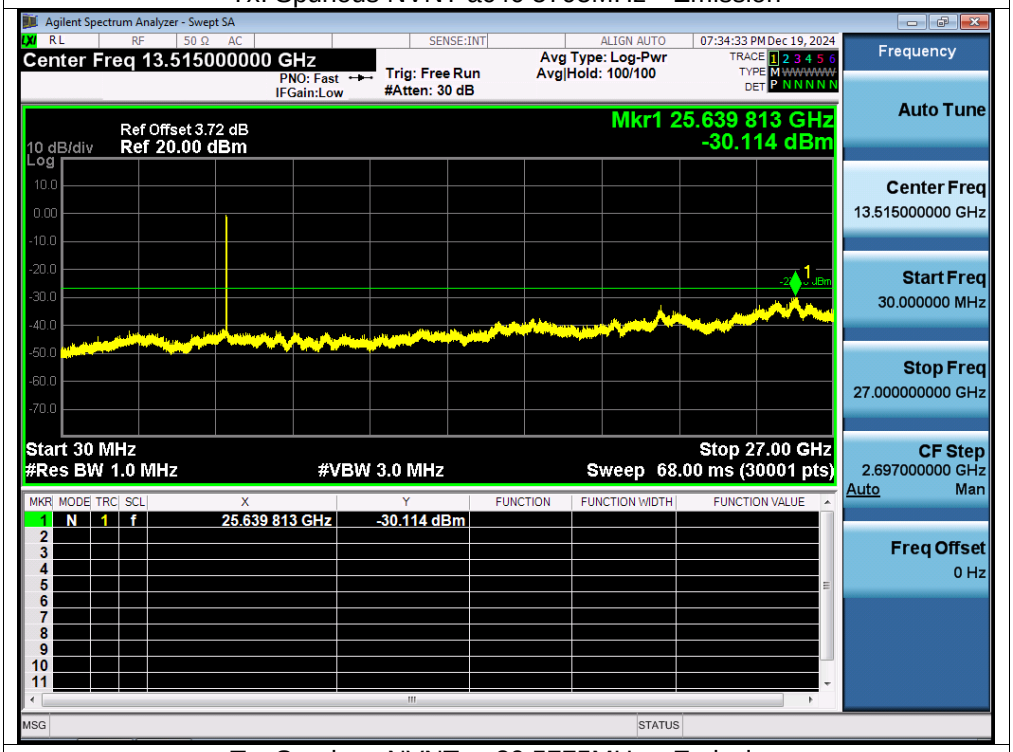
Tx. Spurious NVNT ac20 5785MHz Emission

Tx. Spurious NVNT ac20 5825MHz Emission

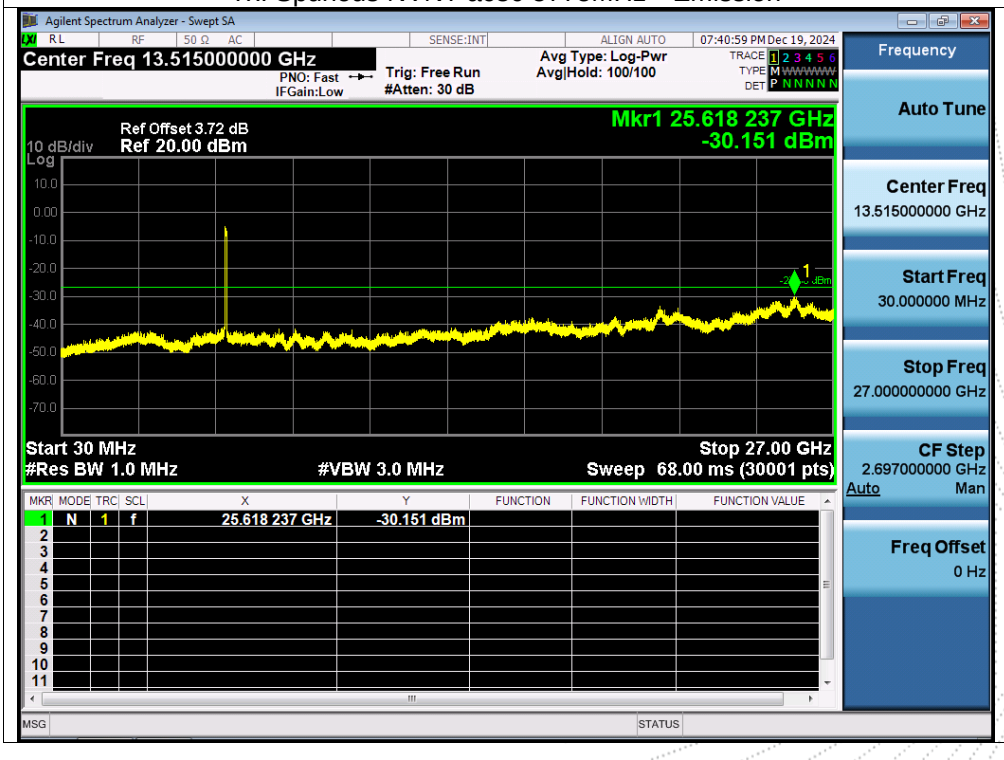


Tx. Spurious NVNT ac40 5755MHz Emission

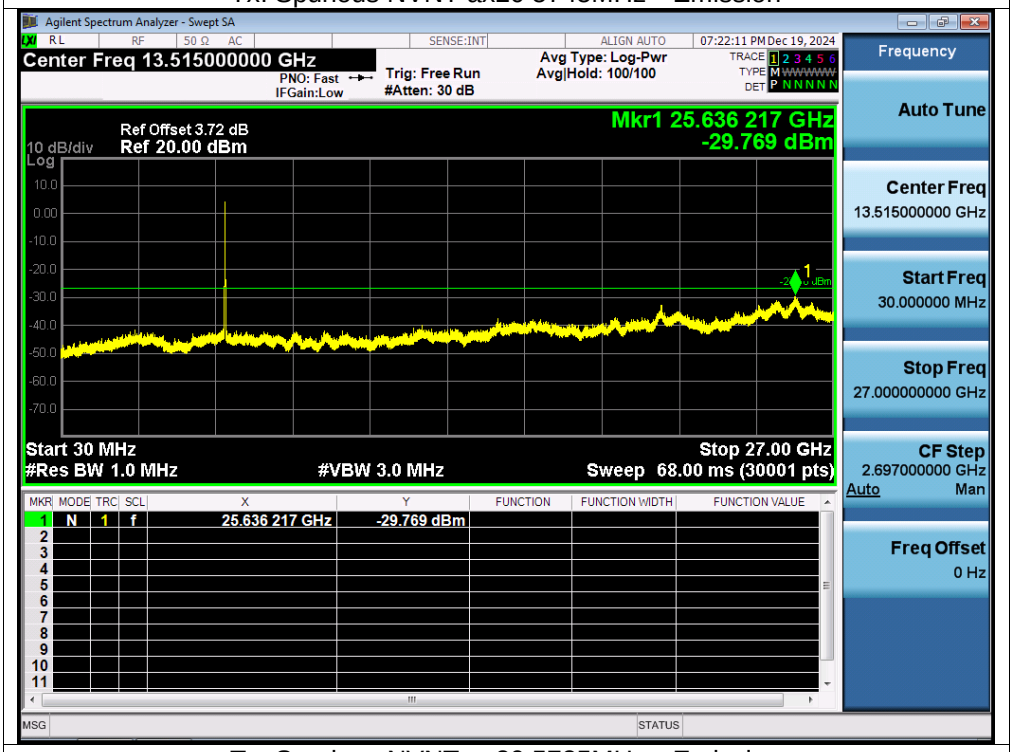
Tx. Spurious NVNT ac40 5795MHz Emission



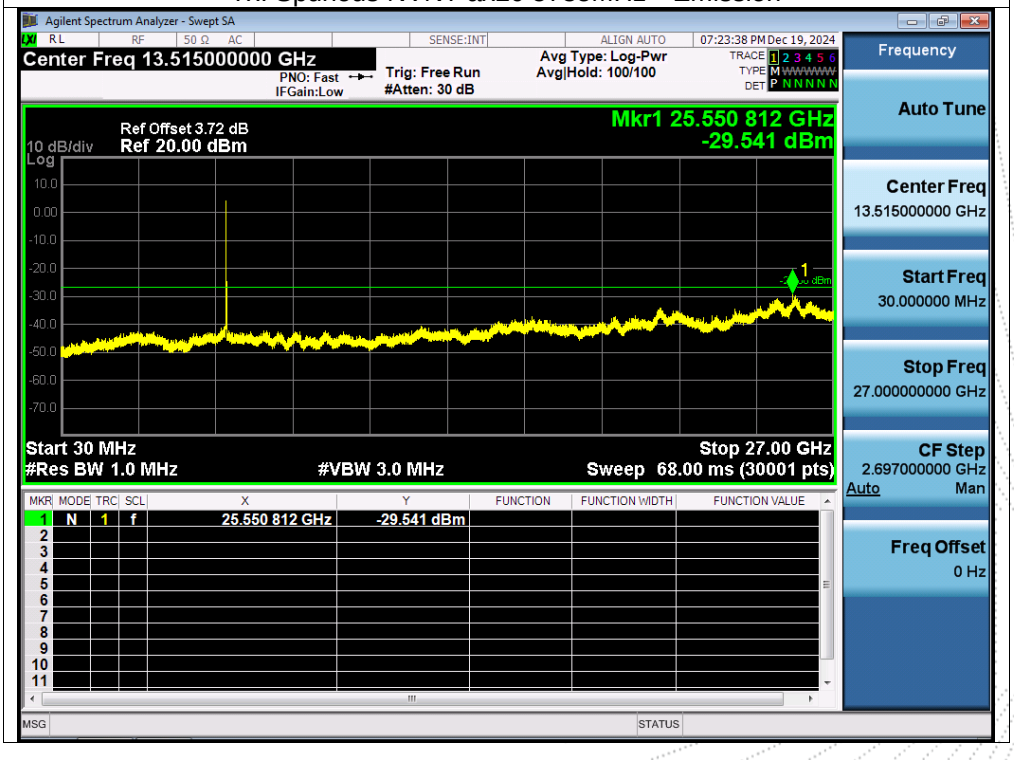
Tx. Spurious NVNT ac80 5775MHz Emission



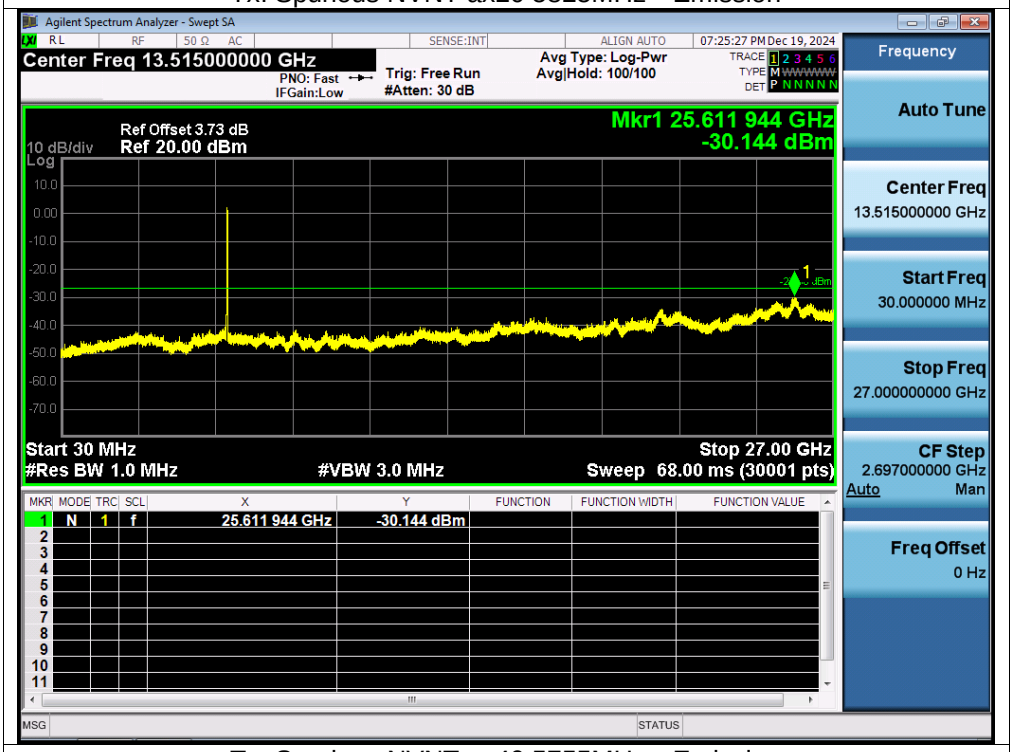
Tx. Spurious NVNT ax20 5745MHz Emission



Tx. Spurious NVNT ax20 5785MHz Emission

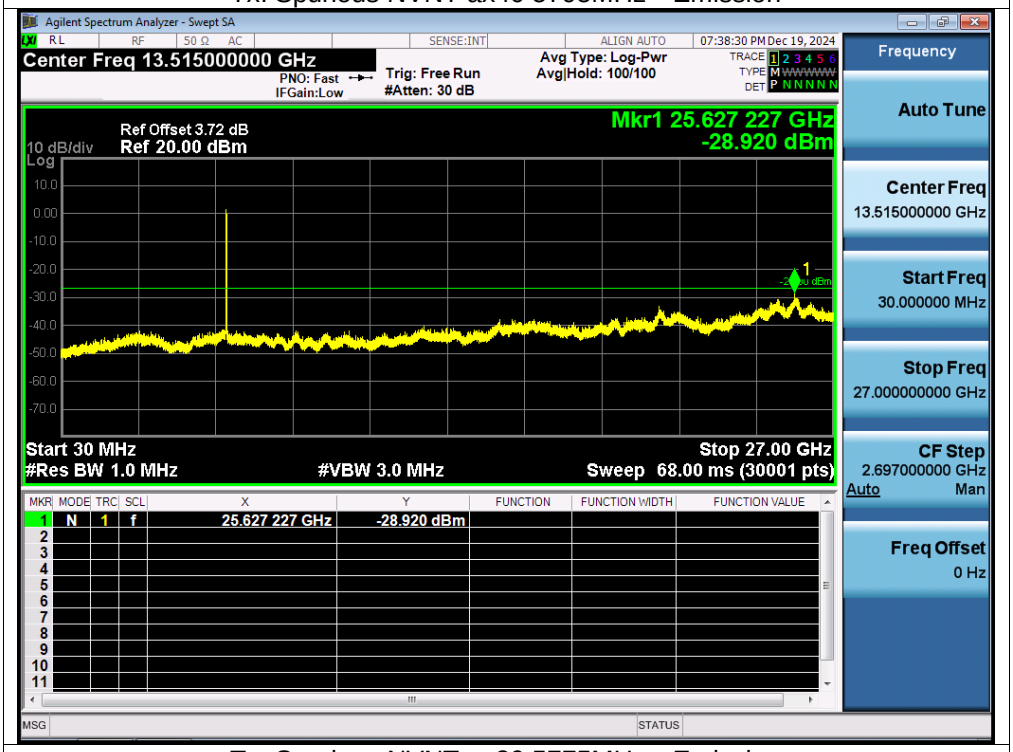


Tx. Spurious NVNT ax20 5825MHz Emission



Tx. Spurious NVNT ax40 5755MHz Emission

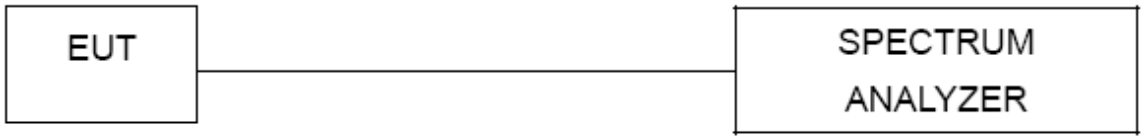
Tx. Spurious NVNT ax40 5795MHz Emission



Tx. Spurious NVNT ax80 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)	3.87	5180.0111	5180	0.0111	2.1429
		V max (V)	4.45	5180.0120	5180	0.0120	2.3166
		V min (V)	3.29	5180.0006	5180	0.0006	0.1158
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)	3.87	T (°C)	-20	5180.0010	5180	0.0010	0.1931
		T (°C)	-10	5180.0084	5180	0.0084	1.6216
		T (°C)	0	5180.0135	5180	0.0135	2.6062
		T (°C)	10	5180.0083	5180	0.0083	1.6023
		T (°C)	20	5180.0135	5180	0.0135	2.6062
		T (°C)	30	5180.0018	5180	0.0018	0.3475
		T (°C)	40	5180.0088	5180	0.0088	1.6988
		T (°C)	50	5180.0057	5180	0.0057	1.1004
		T (°C)	60	5180.0027	5180	0.0027	0.5212
		T (°C)	70	5180.0058	5180	0.0058	1.1197
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)	3.87	5200.0048	5200	0.0048	0.9231
		V max (V)	4.45	5200.0089	5200	0.0089	1.7115
		V min (V)	3.29	5200.0037	5200	0.0037	0.7115
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)	3.87	T (°C)	-20	5200.00090	5200	0.00090	0.1731
		T (°C)	-10	5200.00630	5200	0.00630	1.2115
		T (°C)	0	5200.01230	5200	0.01230	2.3654
		T (°C)	10	5200.00910	5200	0.00910	1.7500
		T (°C)	20	5200.00600	5200	0.00600	1.1538
		T (°C)	30	5200.00640	5200	0.00640	1.2308
		T (°C)	40	5200.00510	5200	0.00510	0.9808
		T (°C)	50	5200.00330	5200	0.00330	0.6346
		T (°C)	60	5200.01090	5200	0.01090	2.0962
		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)	3.87	5240.0070	5240	0.0070	1.3359
		V max (V)	4.45	5240.0091	5240	0.0091	1.7366
		V min (V)	3.29	5240.0130	5240	0.0130	2.4809
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)	3.87	T (°C)	-20	5240.0121	5240	0.0121	2.3092
		T (°C)	-10	5240.0070	5240	0.0070	1.3359
		T (°C)	0	5240.0090	5240	0.0090	1.7176
		T (°C)	10	5240.0116	5240	0.0116	2.2137
		T (°C)	20	5240.0001	5240	0.0001	0.0191
		T (°C)	30	5240.0039	5240	0.0039	0.7443
		T (°C)	40	5240.0015	5240	0.0015	0.2863
		T (°C)	50	5240.0007	5240	0.0007	0.1336
		T (°C)	60	5240.0026	5240	0.0026	0.4962
		T (°C)	70	5240.0038	5240	0.0038	0.7252
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.87V
Test Mode:	TX (5.8G) Mode 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)	3.87	5745.00520	5745	0.00520	0.9051
		V max (V)	4.45	5745.00200	5745	0.00200	0.3481
		V min (V)	3.29	5745.00540	5745	0.00540	0.9399
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)	3.87	T (°C)	-20	5745.00040	5745	0.00040	0.0696
		T (°C)	-10	5745.00800	5745	0.00800	1.3925
		T (°C)	0	5745.00030	5745	0.00030	0.0522
		T (°C)	10	5745.00880	5745	0.00880	1.5318
		T (°C)	20	5745.00690	5745	0.00690	1.2010
		T (°C)	30	5745.01260	5745	0.01260	2.1932
		T (°C)	40	5745.00900	5745	0.00900	1.5666
		T (°C)	50	5745.01250	5745	0.01250	2.1758
		T (°C)	60	5745.00550	5745	0.00550	0.9574
		T (°C)	70	5745.00150	5745	0.00150	0.2611
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)	3.87	5785.01250	5785	0.01250	2.1608
		V max (V)	4.45	5785.00570	5785	0.00570	0.9853
		V min (V)	3.29	5785.00610	5785	0.00610	1.0545
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)	3.87	T (°C)	-20	5785.00660	5785	0.00660	1.1409
		T (°C)	-10	5785.00800	5785	0.00800	1.3829
		T (°C)	0	5785.01140	5785	0.01140	1.9706
		T (°C)	10	5785.01350	5785	0.01350	2.3336
		T (°C)	20	5785.00130	5785	0.00130	0.2247
		T (°C)	30	5785.01170	5785	0.01170	2.0225
		T (°C)	40	5785.00410	5785	0.00410	0.7087
		T (°C)	50	5785.01300	5785	0.01300	2.2472
		T (°C)	60	5785.00200	5785	0.00200	0.3457
		T (°C)	70	5785.00050	5785	0.00050	0.0864
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)	3.87	5825.01120	5825	0.01120	1.9227
		V max (V)	4.45	5825.01040	5825	0.01040	1.7854
		V min (V)	3.29	5825.00310	5825	0.00310	0.5322
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)	3.87	T (°C)	-20	5825.00490	5825	0.00490	0.8412
		T (°C)	-10	5825.01170	5825	0.01170	2.0086
		T (°C)	0	5825.00980	5825	0.00980	1.6824
		T (°C)	10	5825.01020	5825	0.01020	1.7511
		T (°C)	20	5825.00350	5825	0.00350	0.6009
		T (°C)	30	5825.01200	5825	0.01200	2.0601
		T (°C)	40	5825.00800	5825	0.00800	1.3734
		T (°C)	50	5825.00590	5825	0.00590	1.0129
		T (°C)	60	5825.00320	5825	0.00320	0.5494
		T (°C)	70	5825.01340	5825	0.01340	2.3004
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

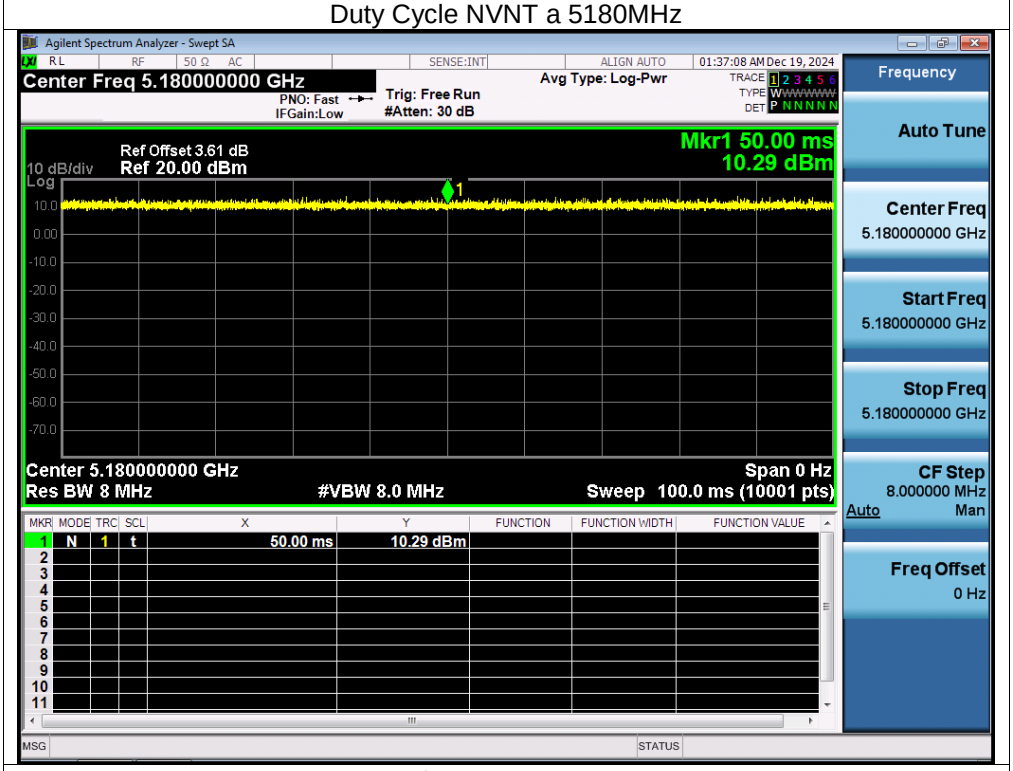
14.4 Test Result

ANT A

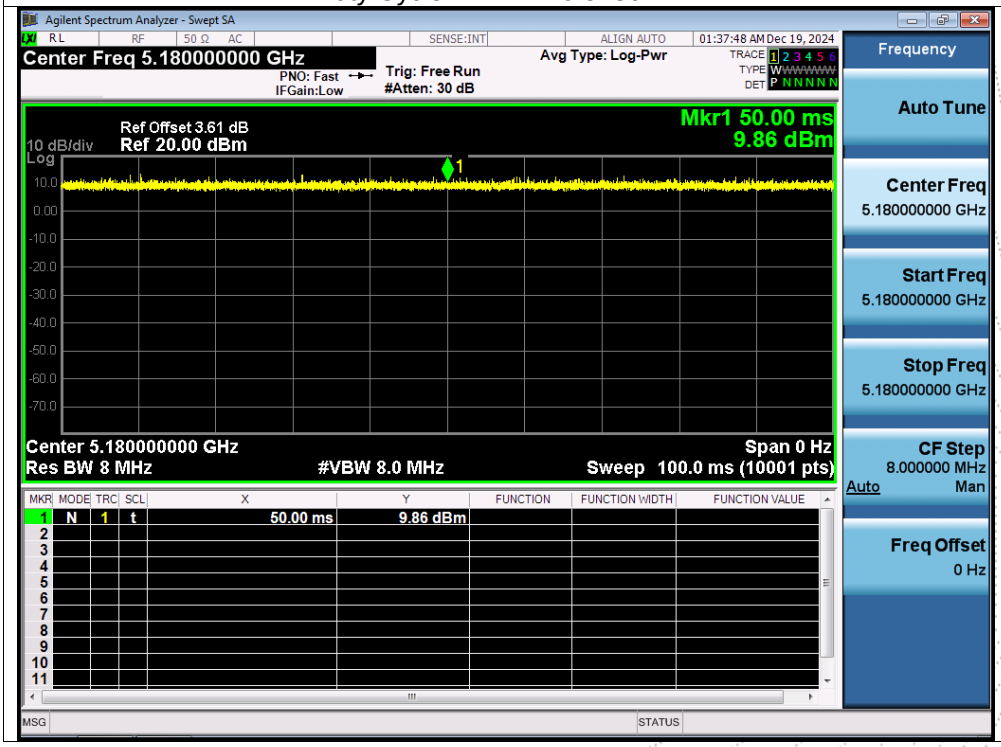
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	a	5180	100	0
NVNT	n20	5180	100	0
NVNT	n40	5190	100	0
NVNT	ac20	5180	100	0
NVNT	ac40	5190	100	0
NVNT	ac80	5210	100	0
NVNT	ax20	5180	100	0
NVNT	ax40	5190	100	0
NVNT	ax80	5210	100	0

Test Graphs

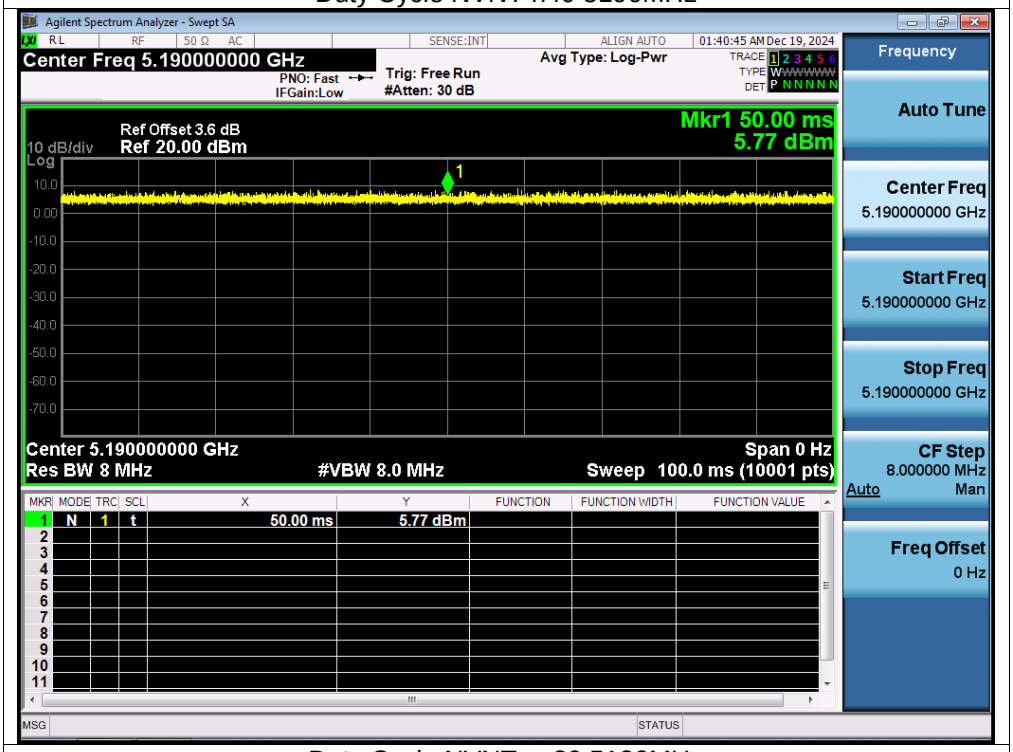
Duty Cycle NVNT a 5180MHz



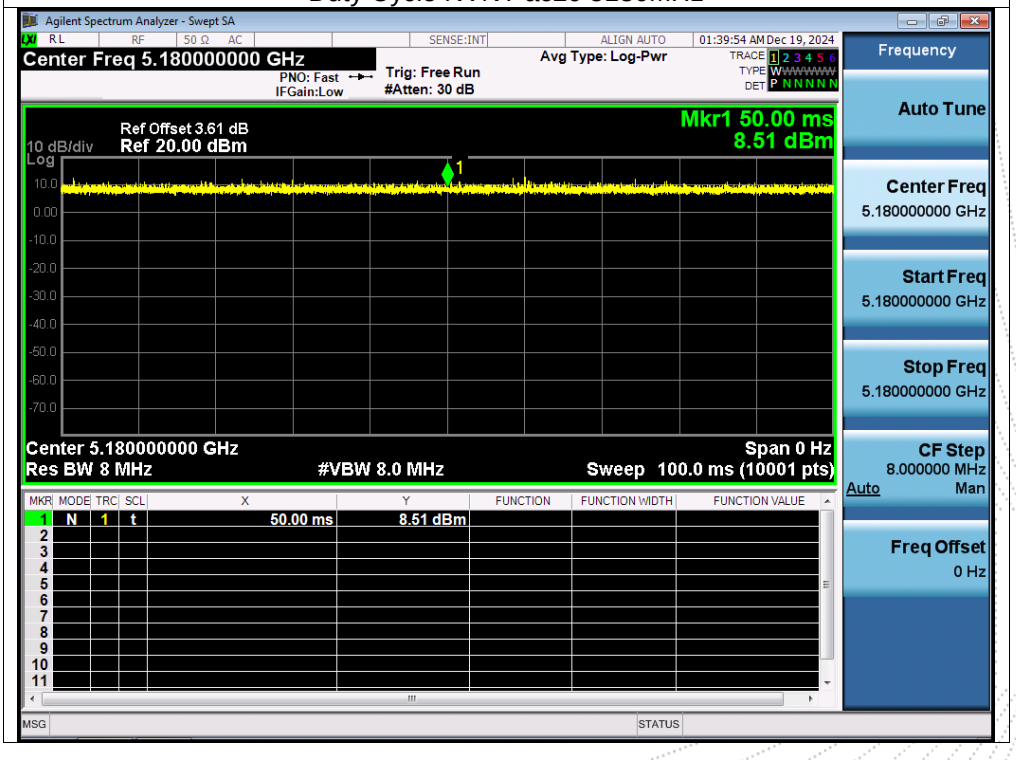
Duty Cycle NVNT n20 5180MHz



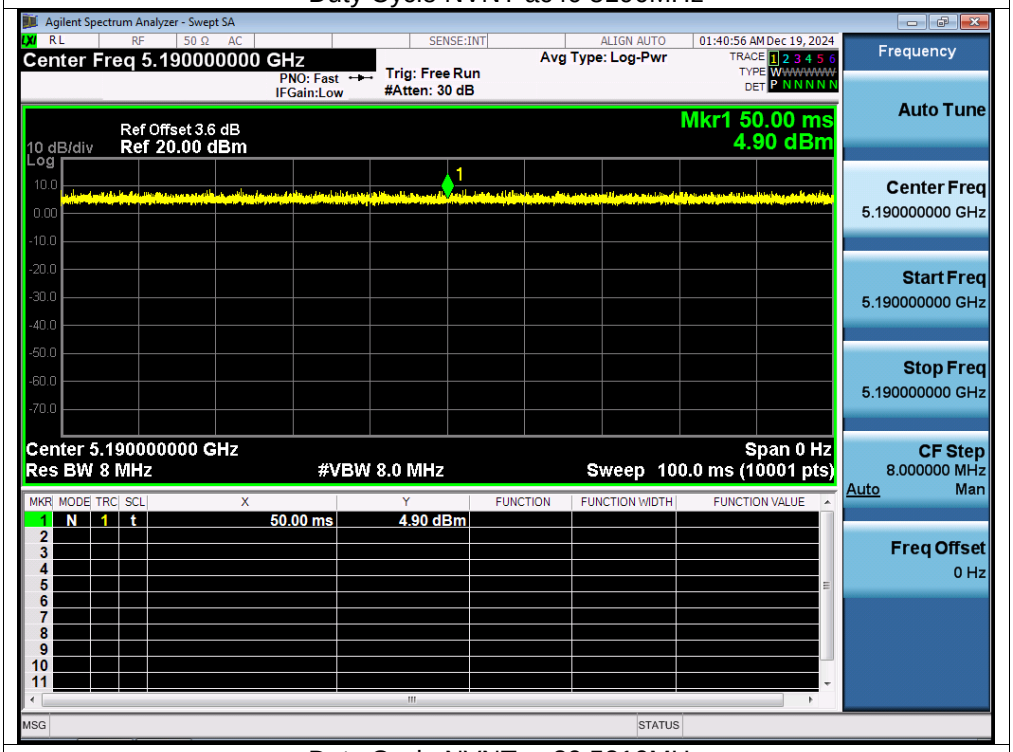
Duty Cycle NVNT n40 5190MHz



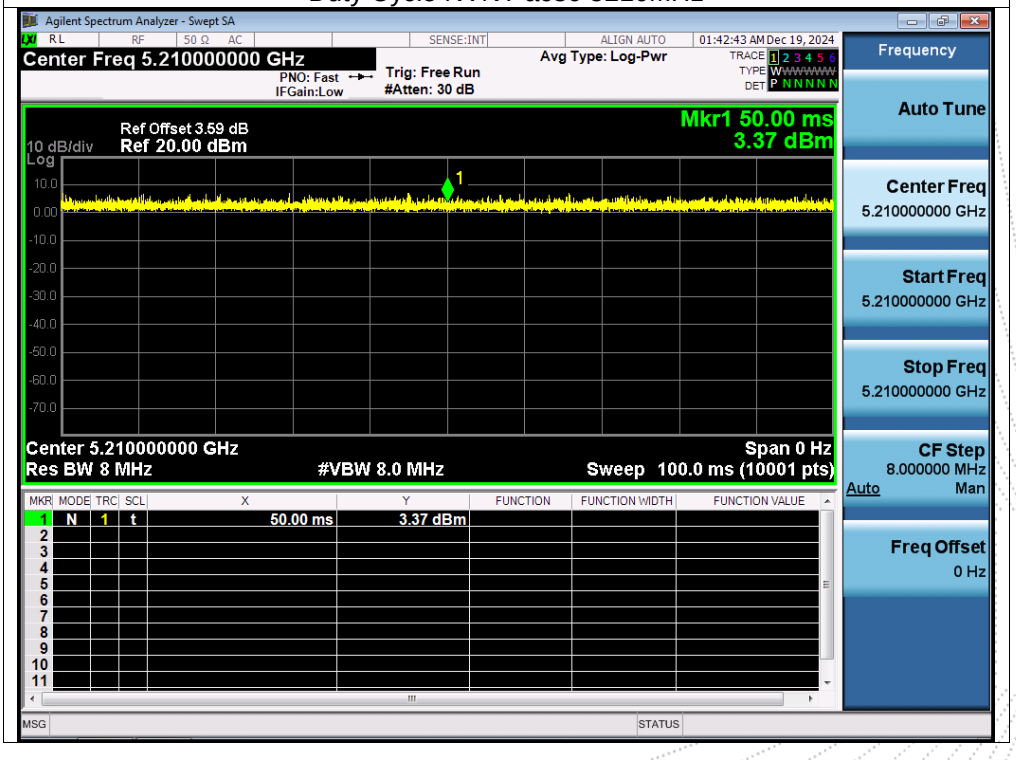
Duty Cycle NVNT ac20 5180MHz



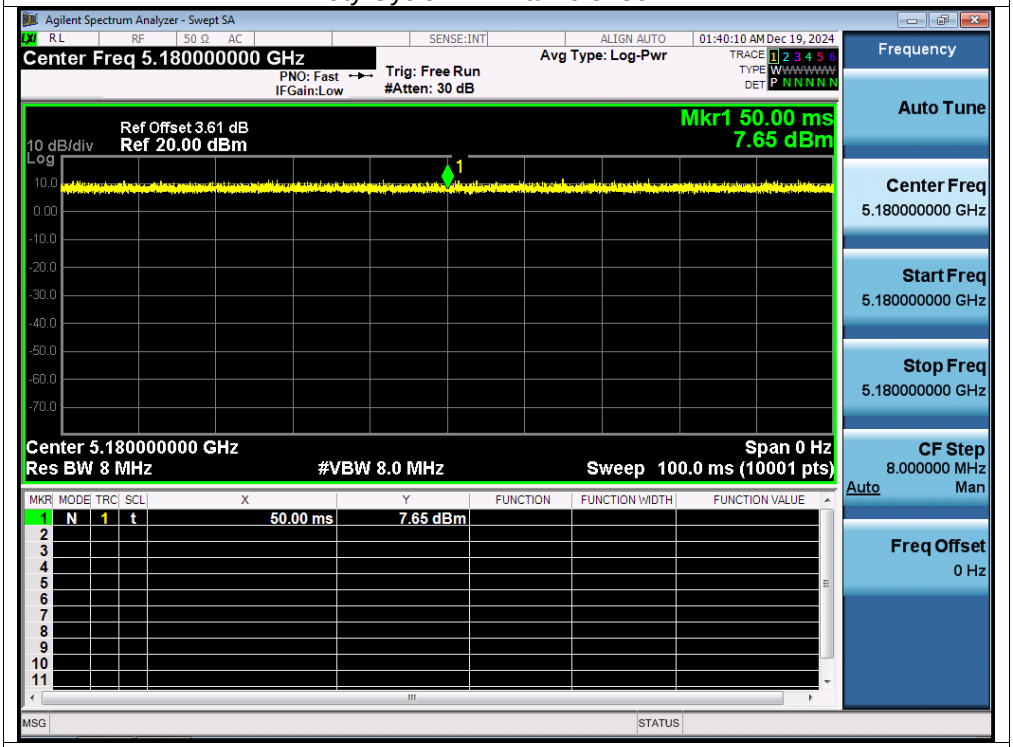
Duty Cycle NVNT ac40 5190MHz



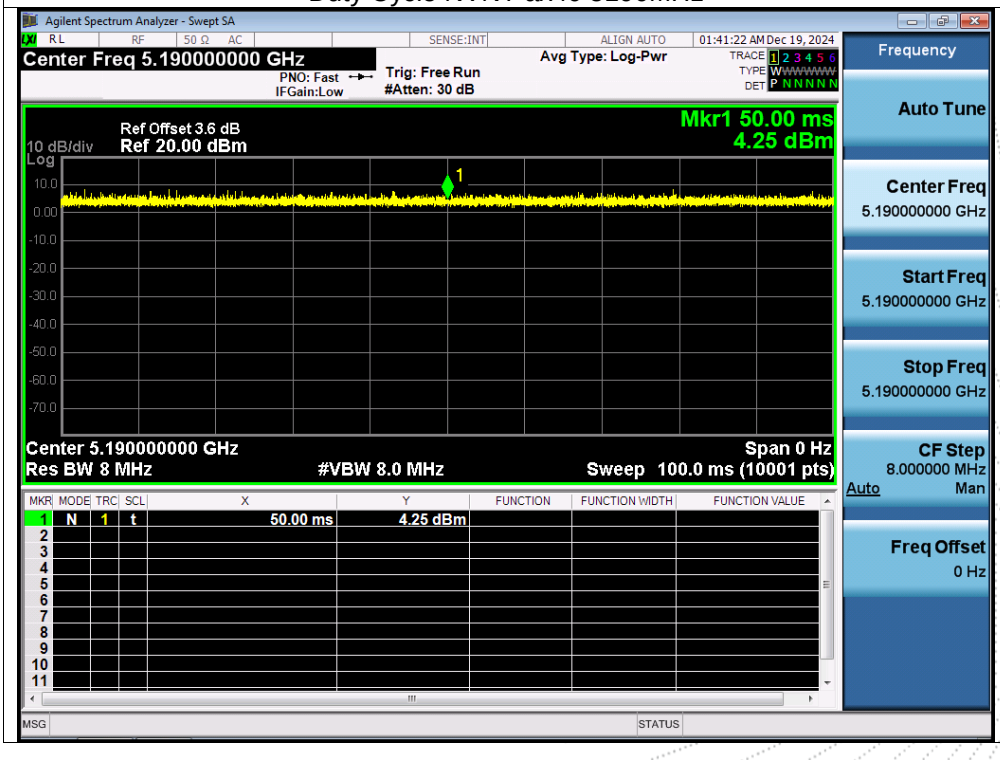
Duty Cycle NVNT ac80 5210MHz



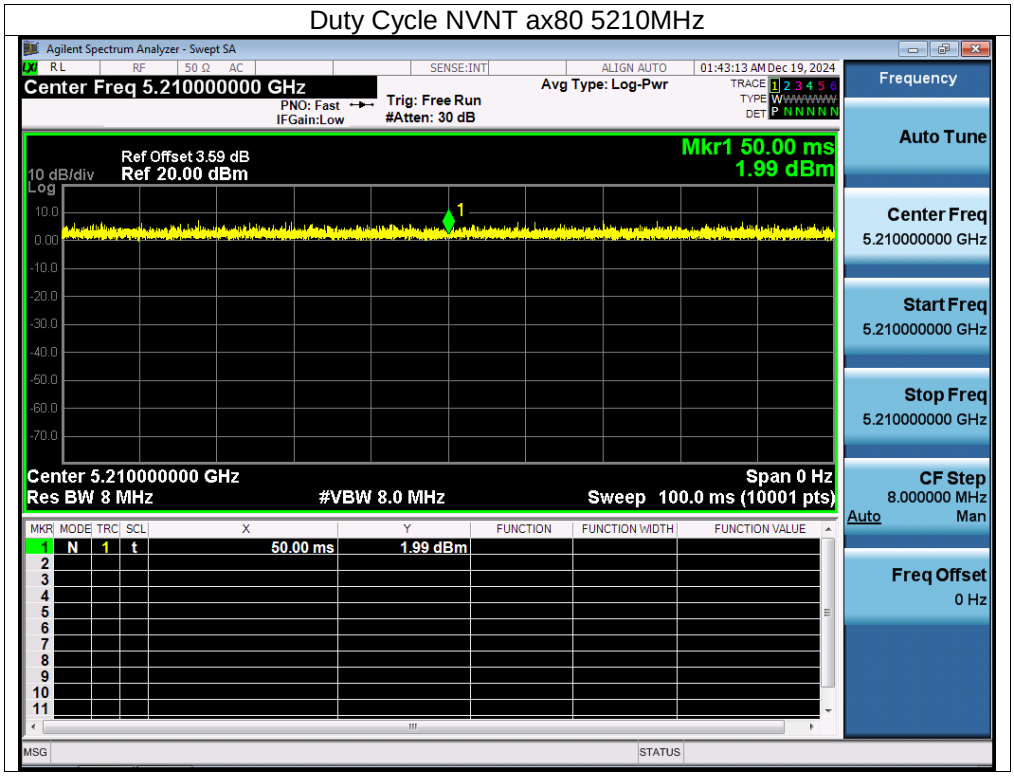
Duty Cycle NVNT ax20 5180MHz



Duty Cycle NVNT ax40 5190MHz



Duty Cycle NVNT ax80 5210MHz

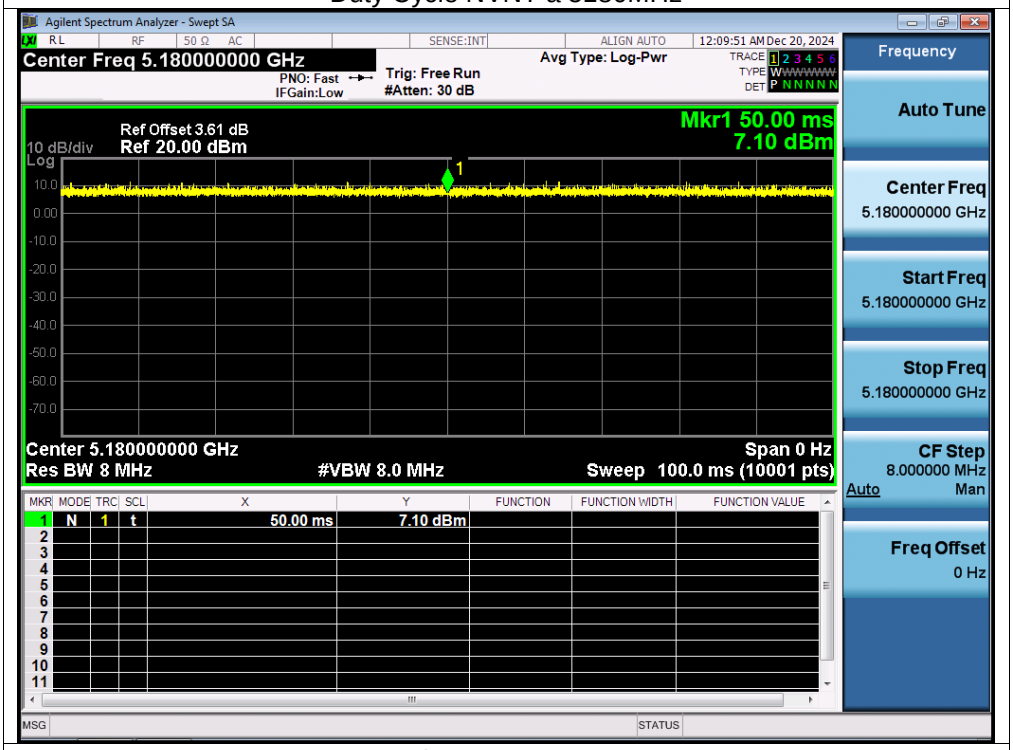


ANT B

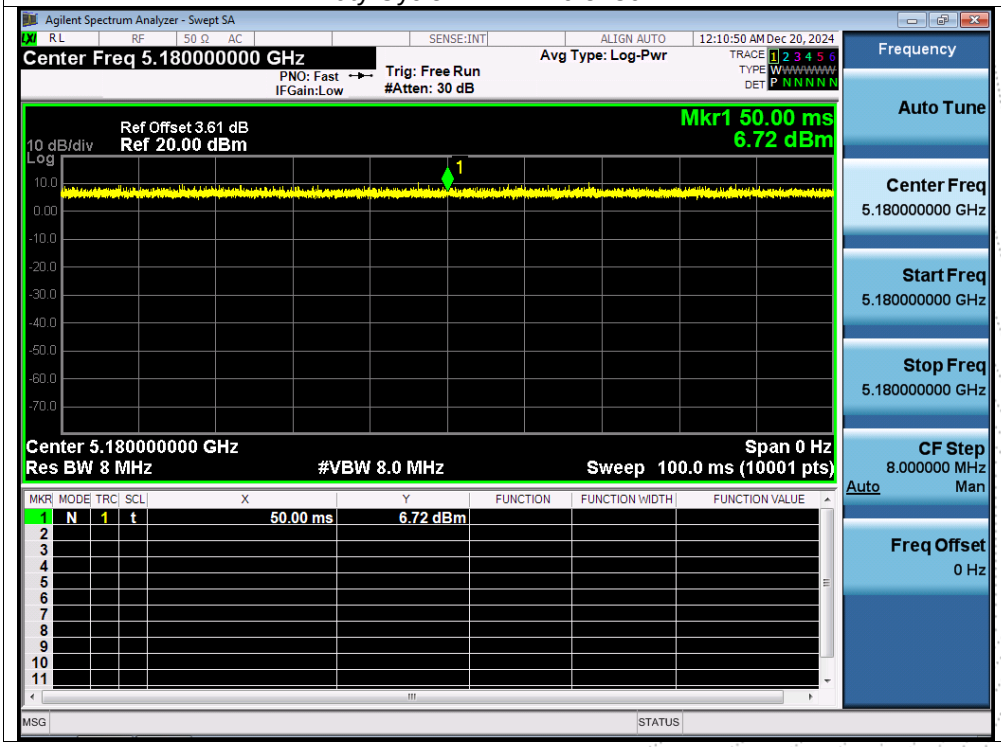
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	a	5180	100	0
NVNT	n20	5180	100	0
NVNT	n40	5190	100	0
NVNT	ac20	5180	100	0
NVNT	ac40	5190	100	0
NVNT	ac80	5210	100	0
NVNT	ax20	5180	100	0
NVNT	ax40	5190	100	0
NVNT	ax80	5210	100	0

Test Graphs

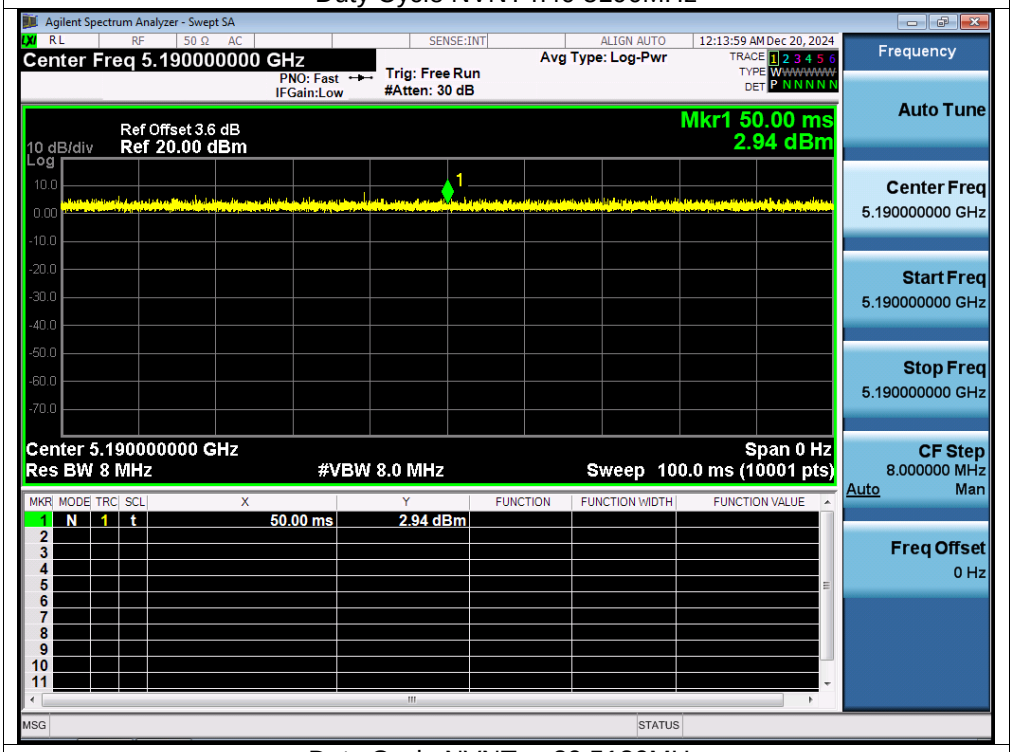
Duty Cycle NVNT a 5180MHz



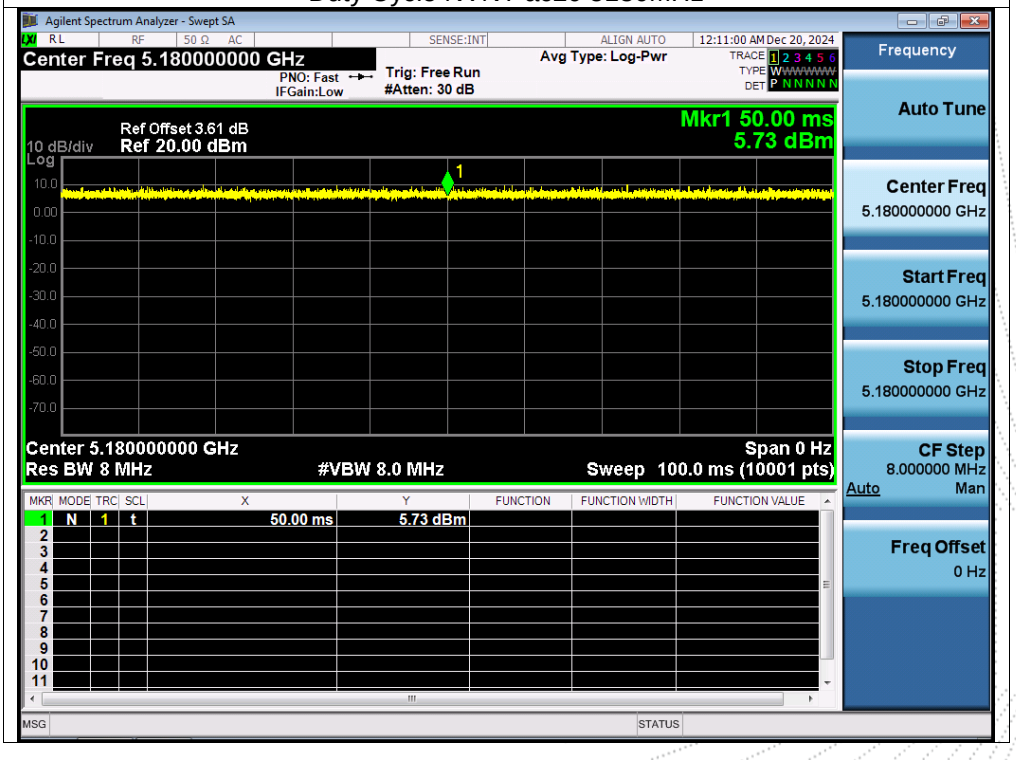
Duty Cycle NVNT n20 5180MHz



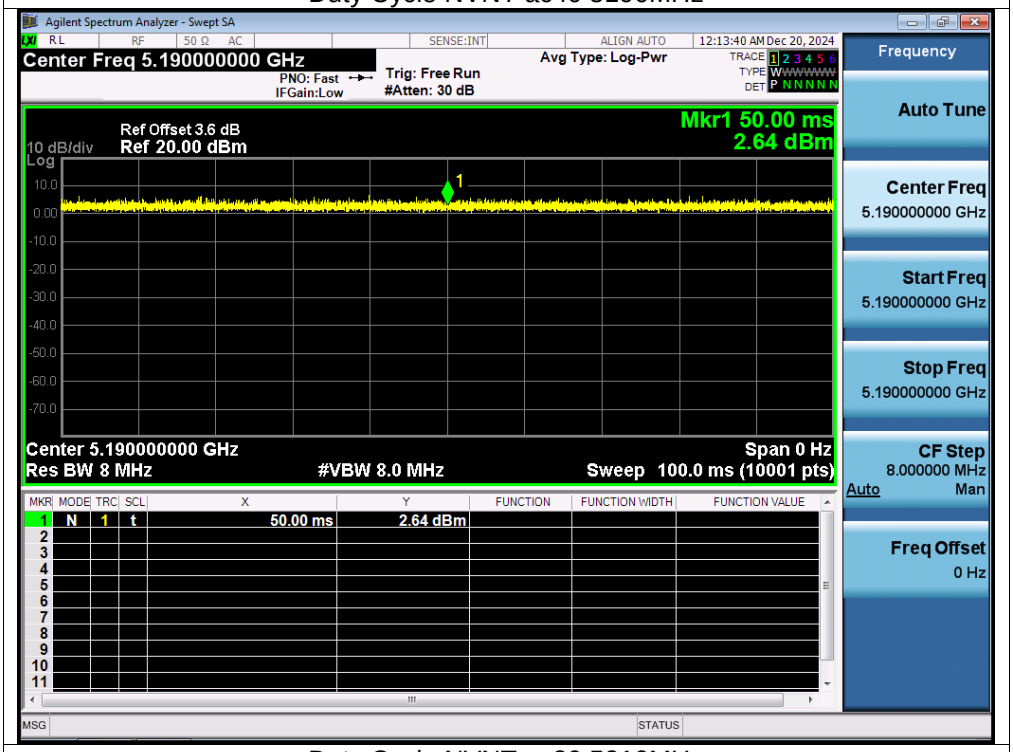
Duty Cycle NVNT n40 5190MHz



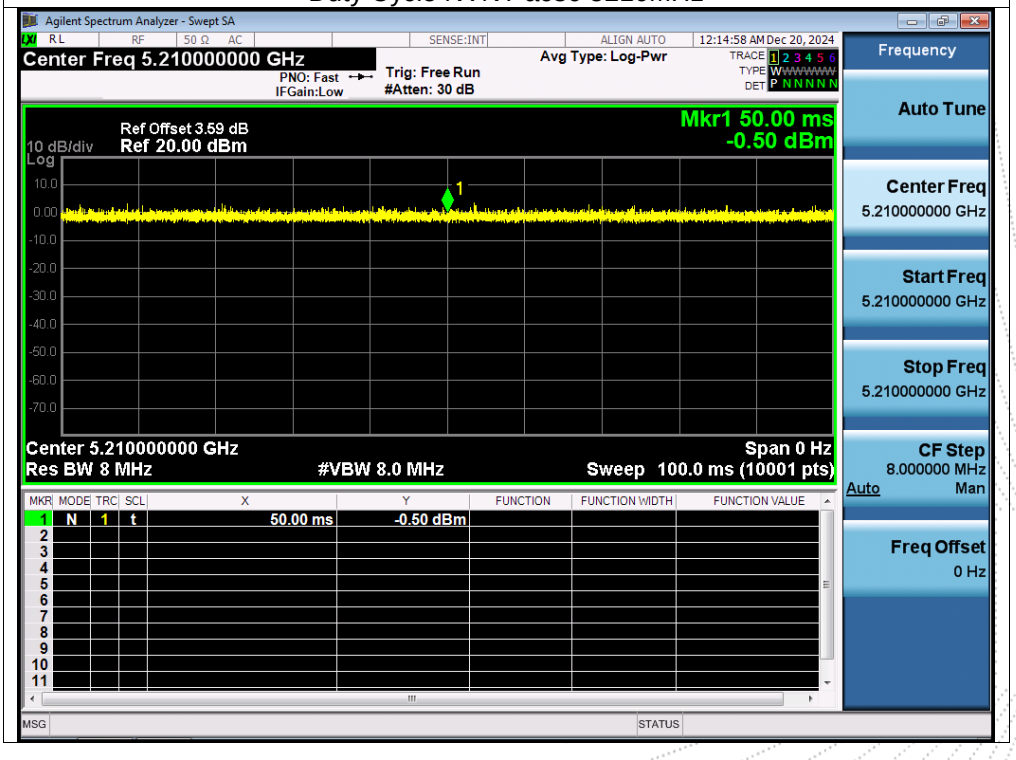
Duty Cycle NVNT ac20 5180MHz



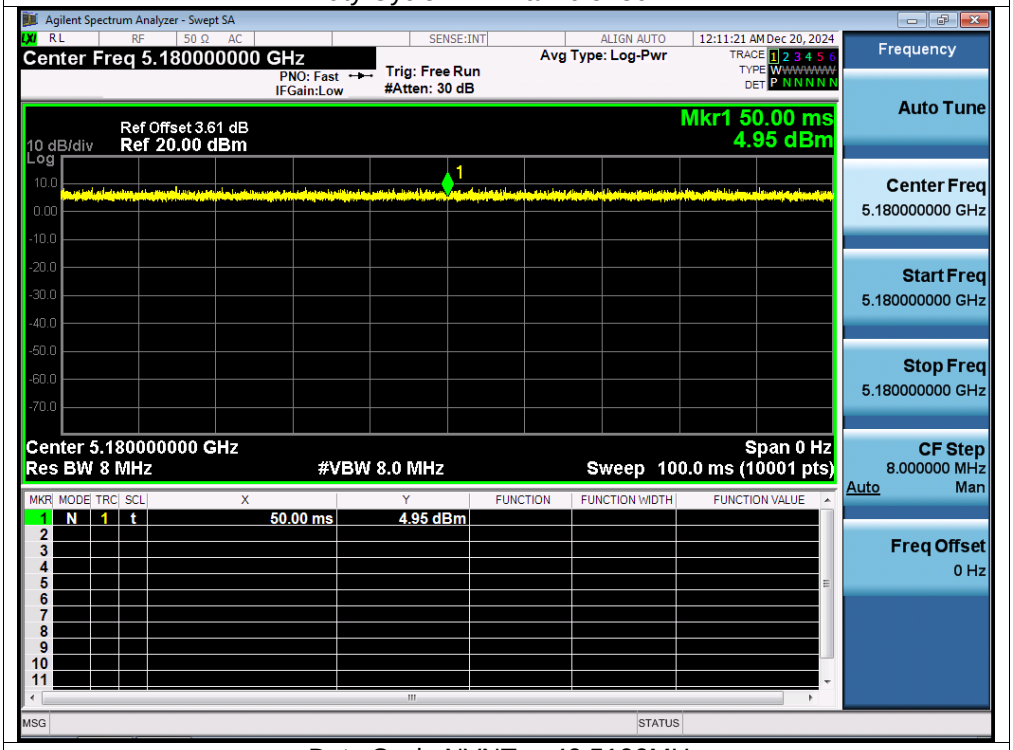
Duty Cycle NVNT ac40 5190MHz



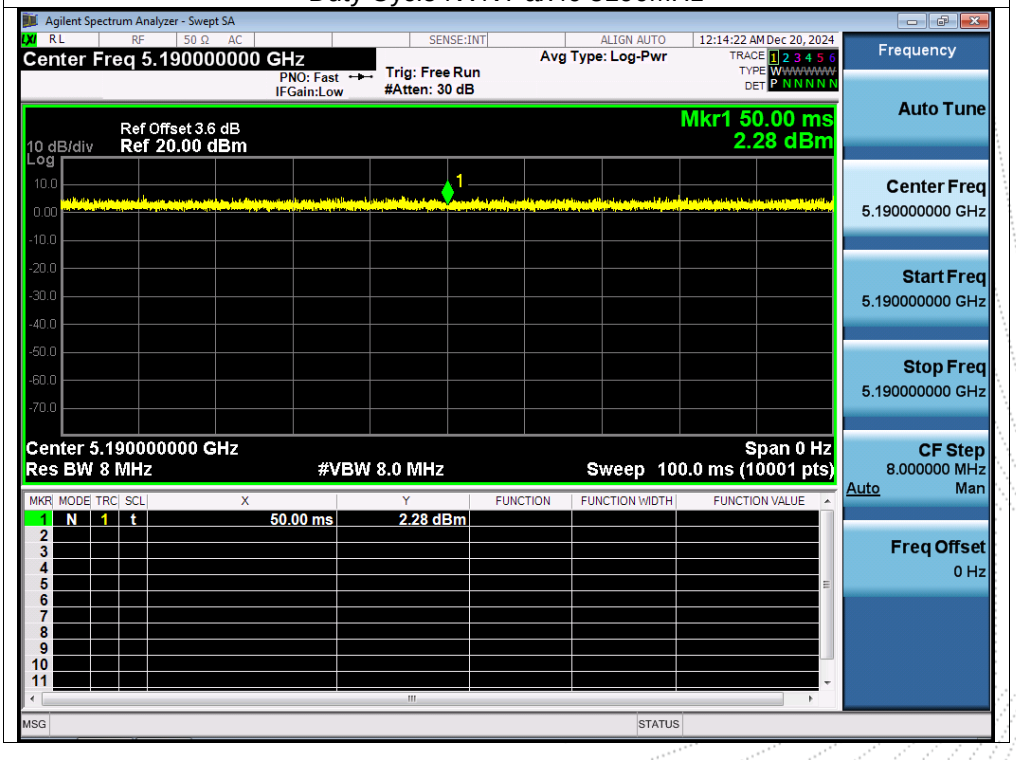
Duty Cycle NVNT ac80 5210MHz



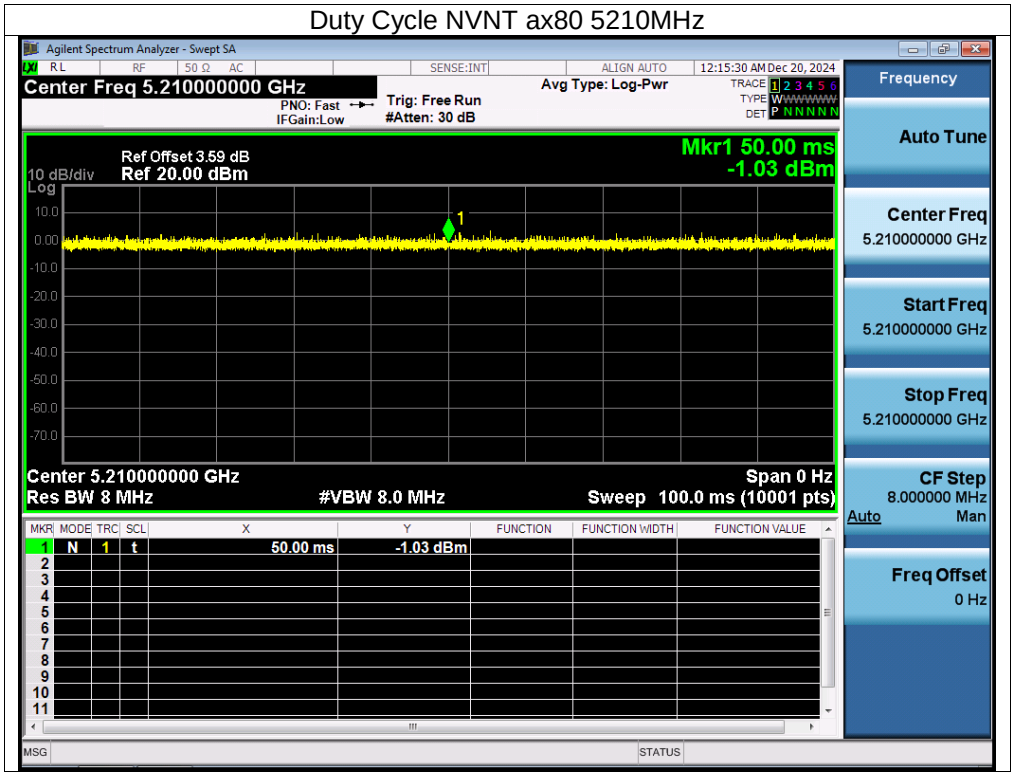
Duty Cycle NVNT ax20 5180MHz



Duty Cycle NVNT ax40 5190MHz



Duty Cycle NVNT ax80 5210MHz

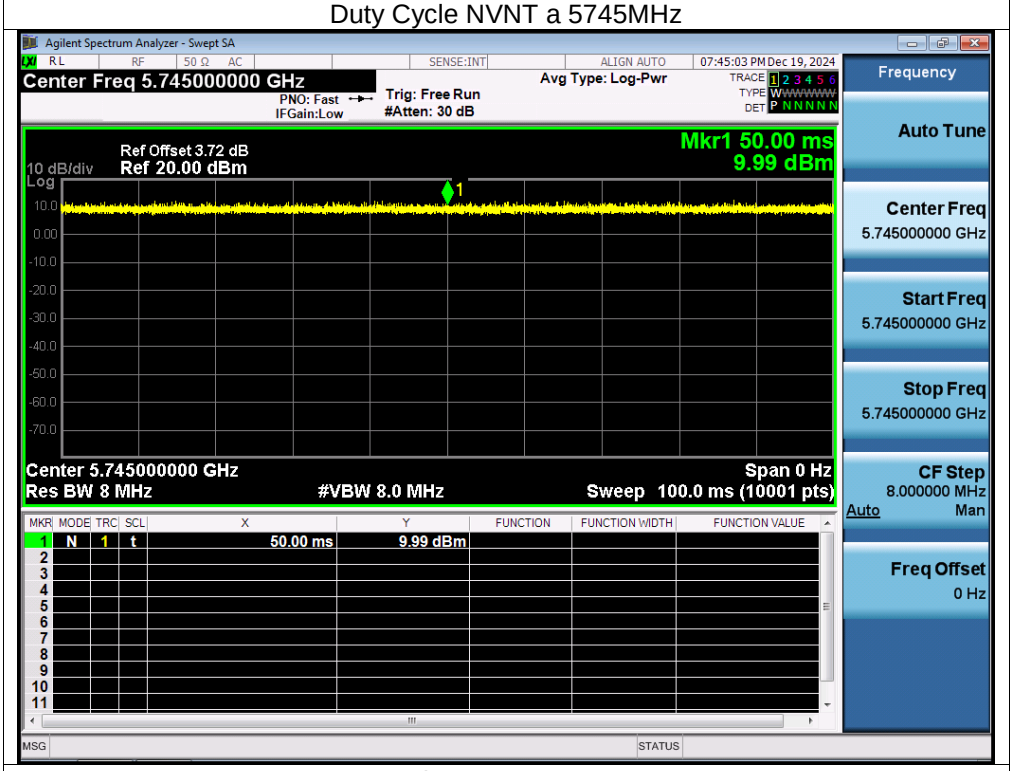


ANT A

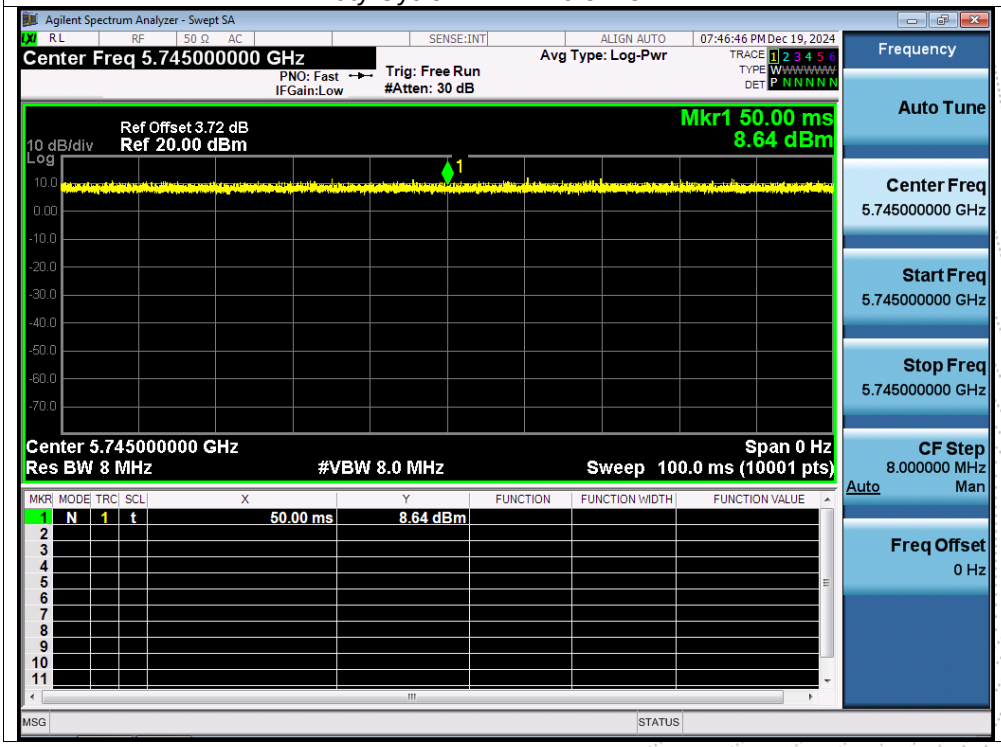
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	a	5745	100	0
NVNT	n20	5745	100	0
NVNT	n40	5755	100	0
NVNT	ac20	5745	100	0
NVNT	ac40	5755	100	0
NVNT	ac80	5775	100	0
NVNT	ax20	5745	100	0
NVNT	ax40	5755	100	0
NVNT	ax80	5775	100	0

Test Graphs

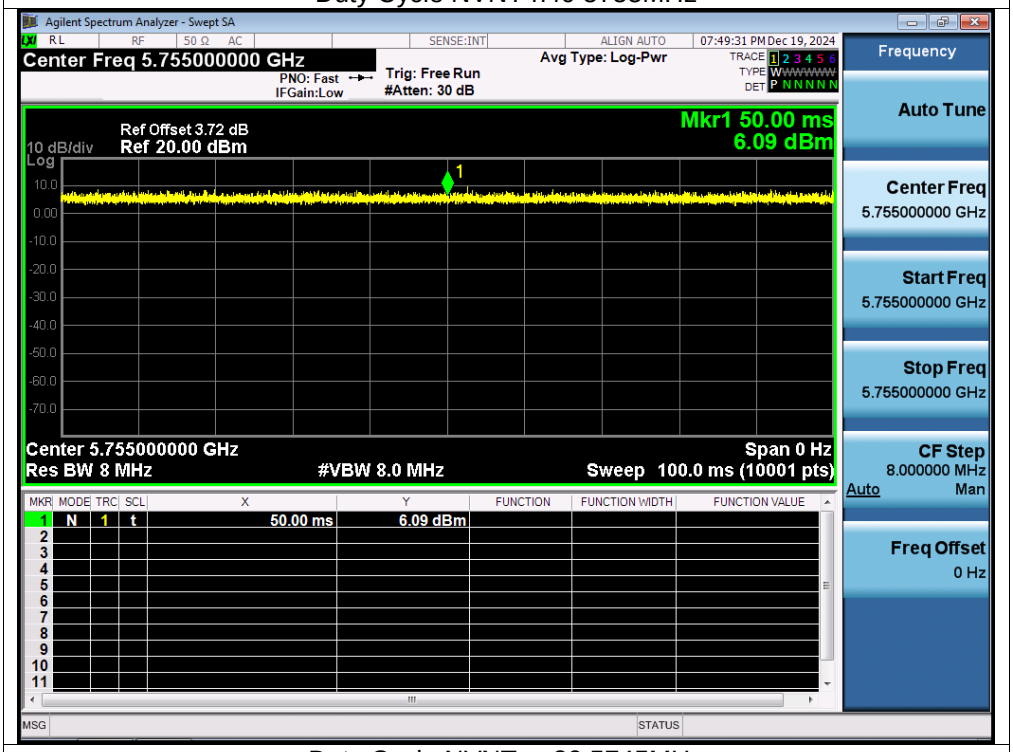
Duty Cycle NVNT a 5745MHz



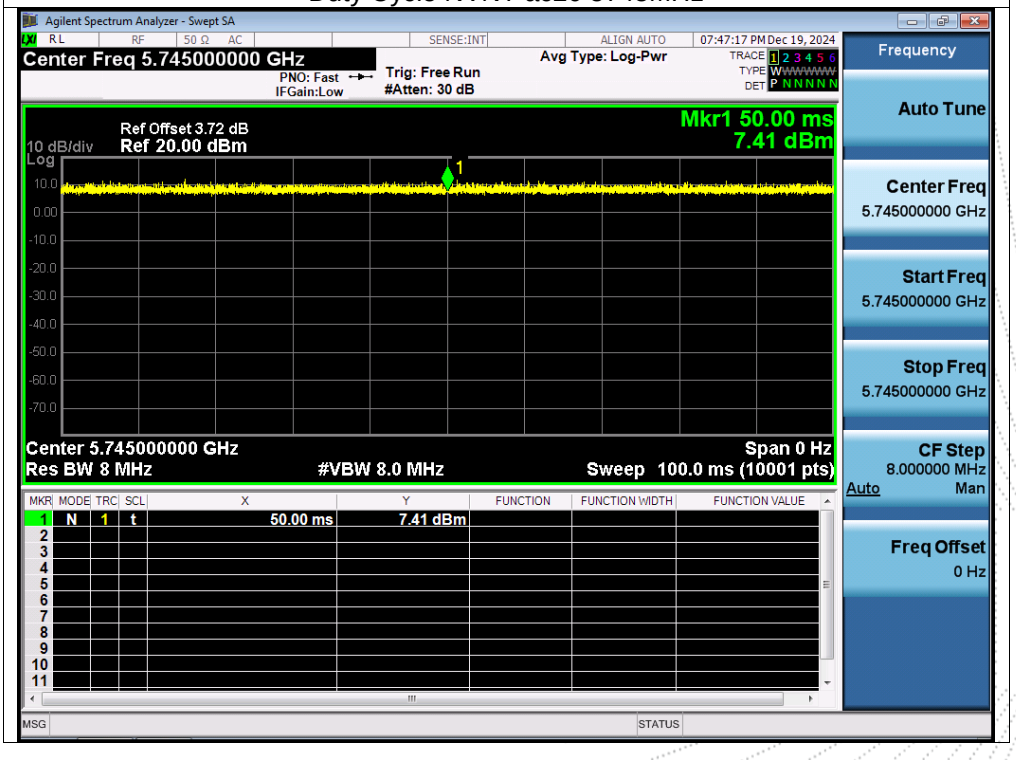
Duty Cycle NVNT n20 5745MHz



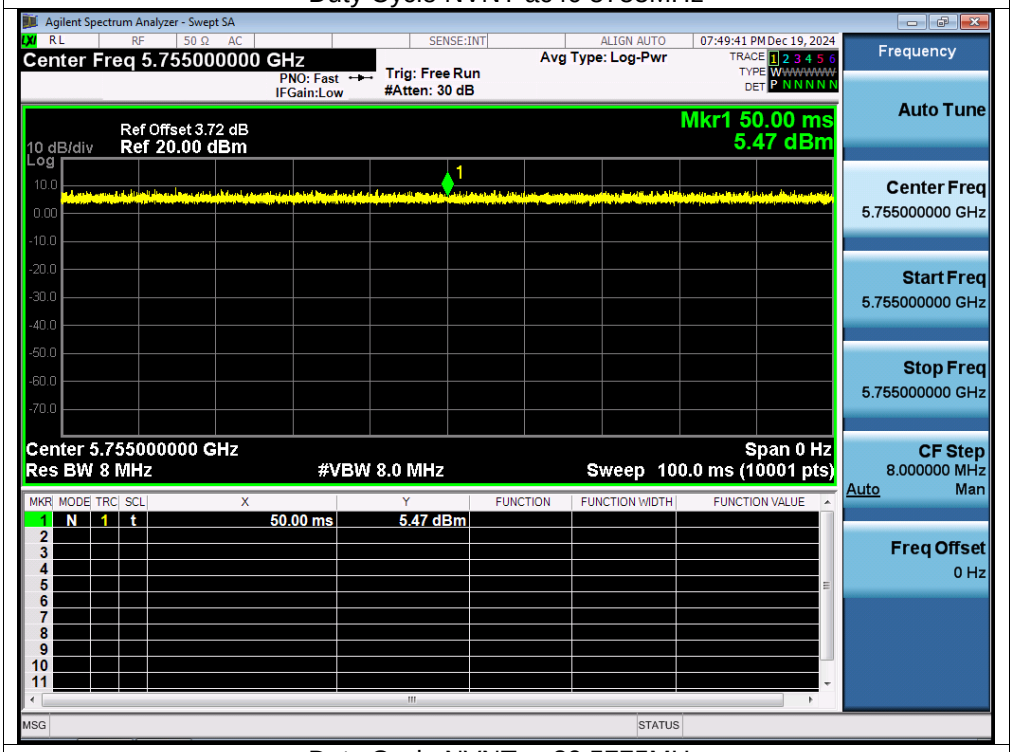
Duty Cycle NVNT n40 5755MHz



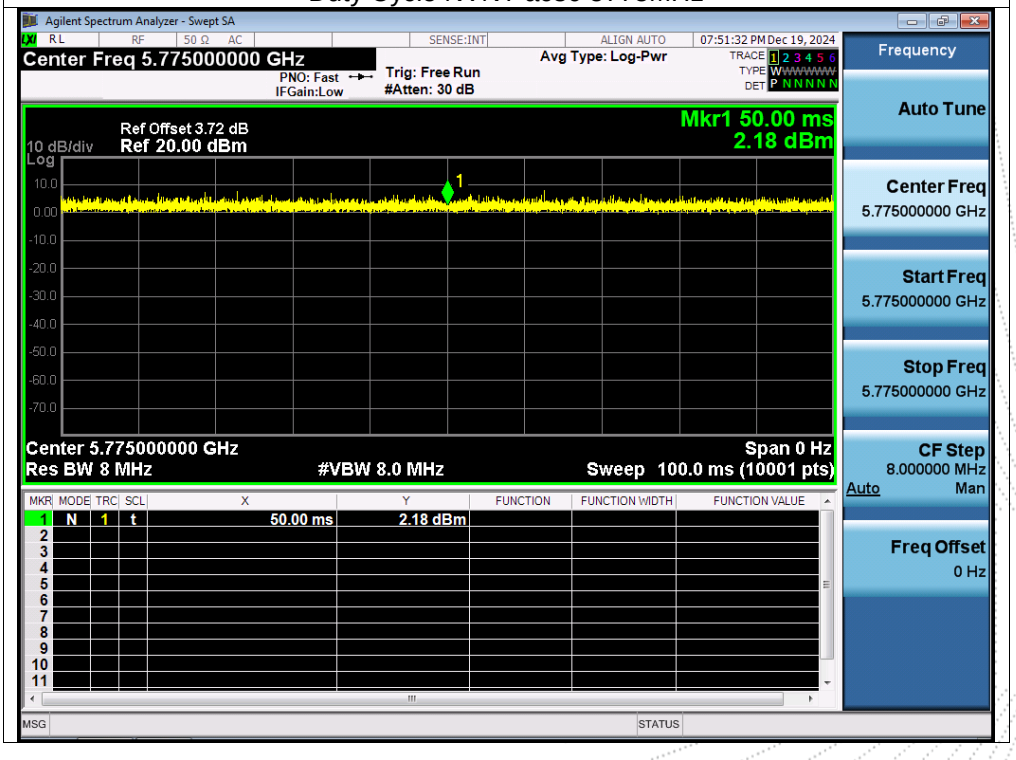
Duty Cycle NVNT ac20 5745MHz



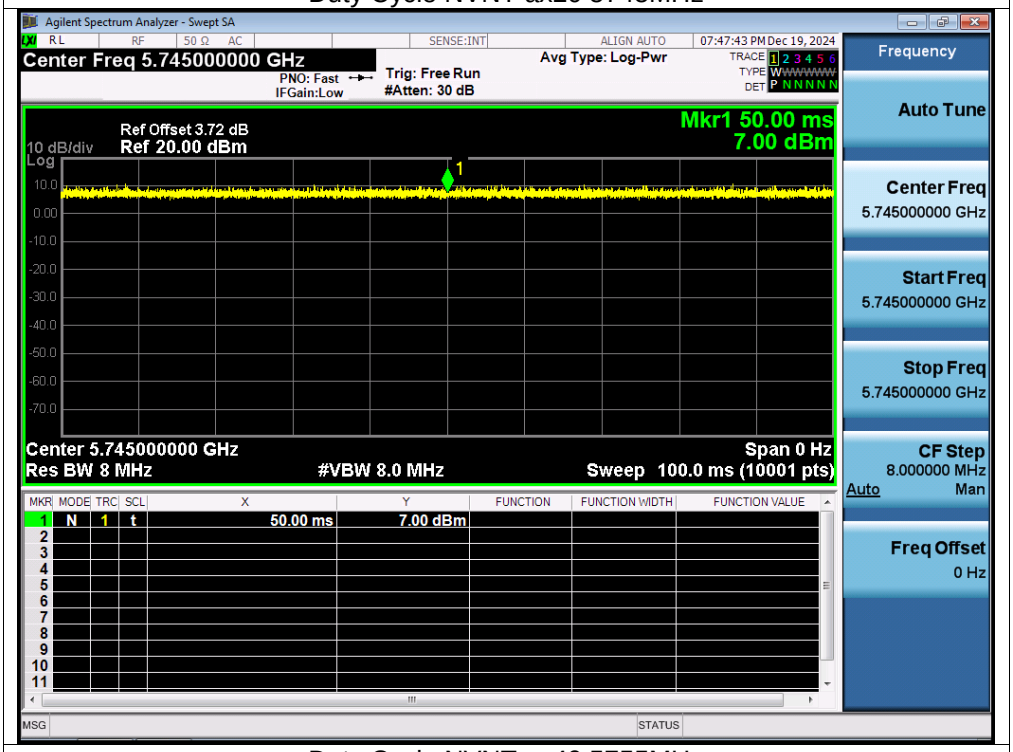
Duty Cycle NVNT ac40 5755MHz



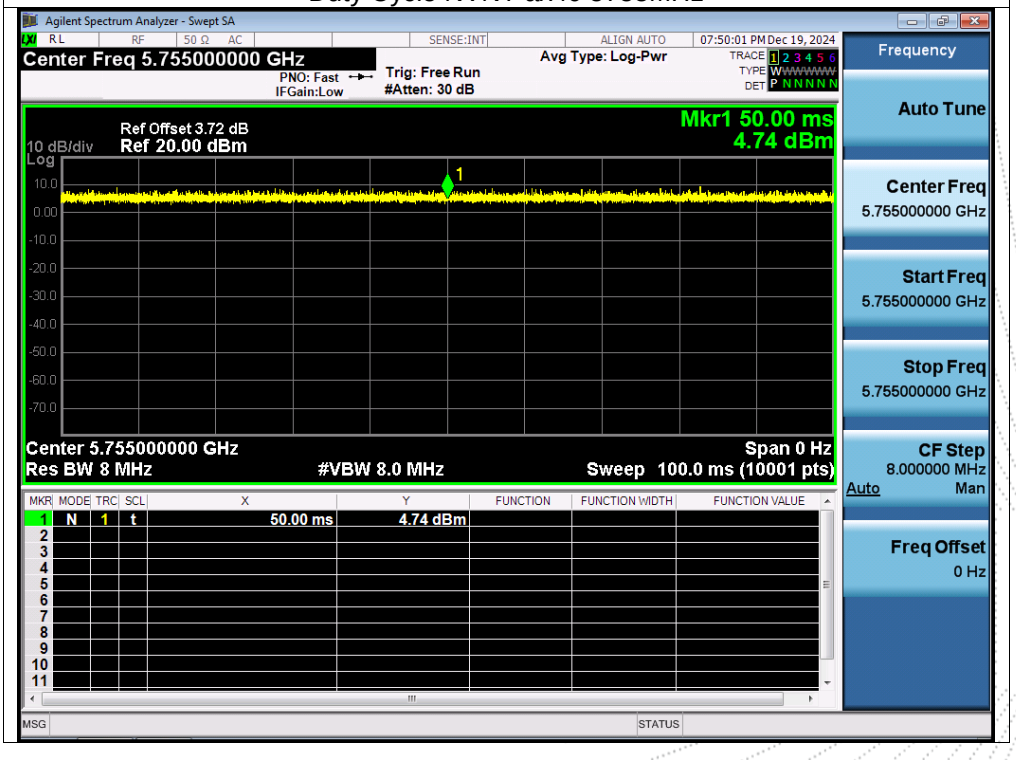
Duty Cycle NVNT ac80 5775MHz



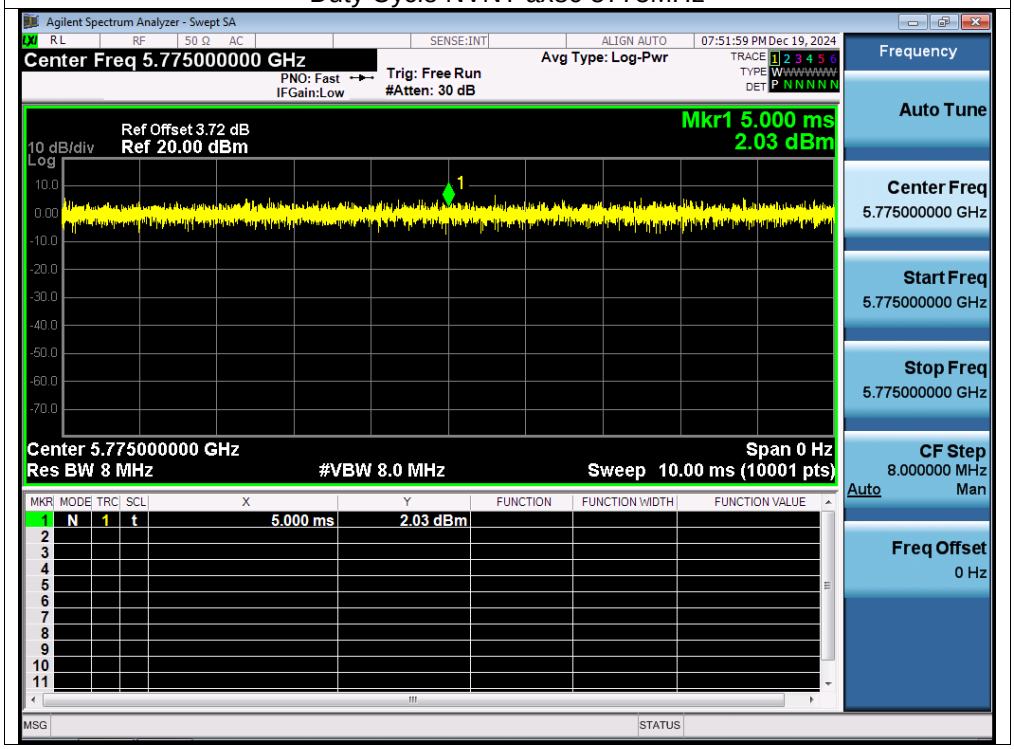
Duty Cycle NVNT ax20 5745MHz



Duty Cycle NVNT ax40 5755MHz



Duty Cycle NVNT ax80 5775MHz

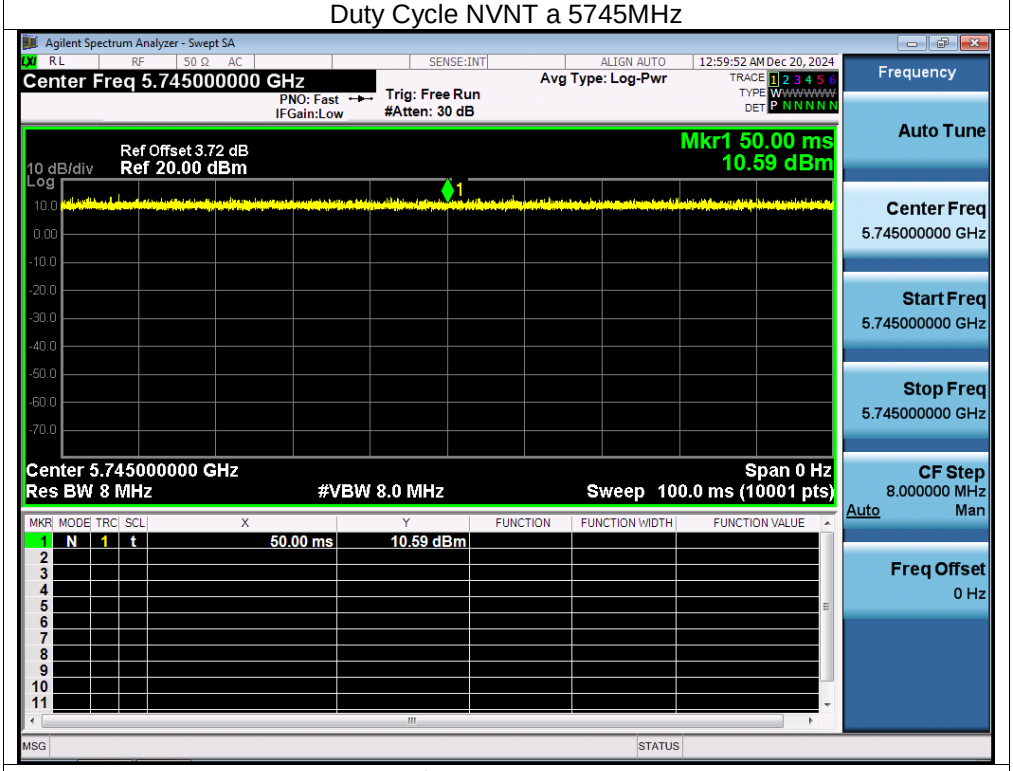


ANT B

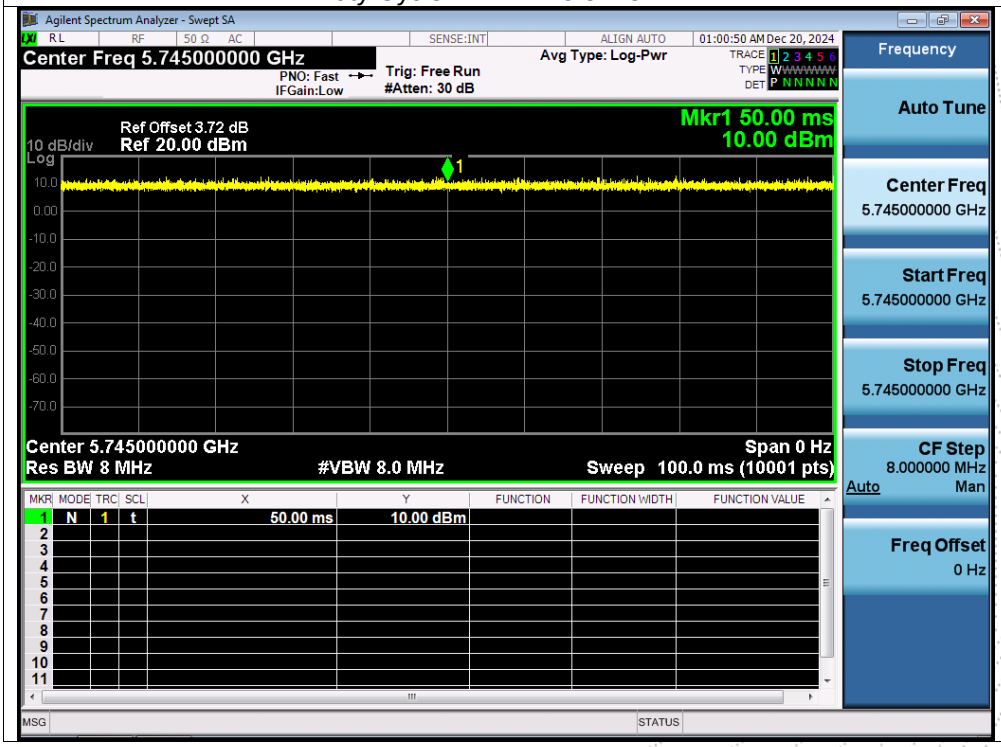
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	a	5745	100	0
NVNT	n20	5745	100	0
NVNT	n40	5755	100	0
NVNT	ac20	5745	100	0
NVNT	ac40	5755	100	0
NVNT	ac80	5775	100	0
NVNT	ax20	5745	100	0
NVNT	ax40	5755	100	0
NVNT	ax80	5775	100	0

Test Graphs

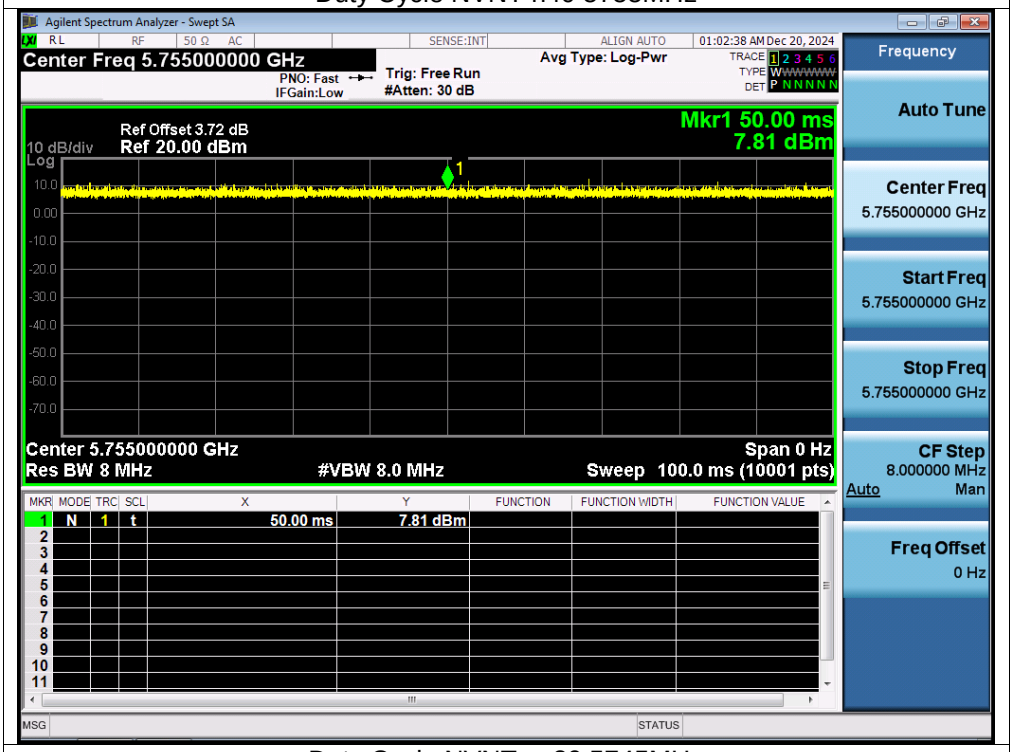
Duty Cycle NVNT a 5745MHz



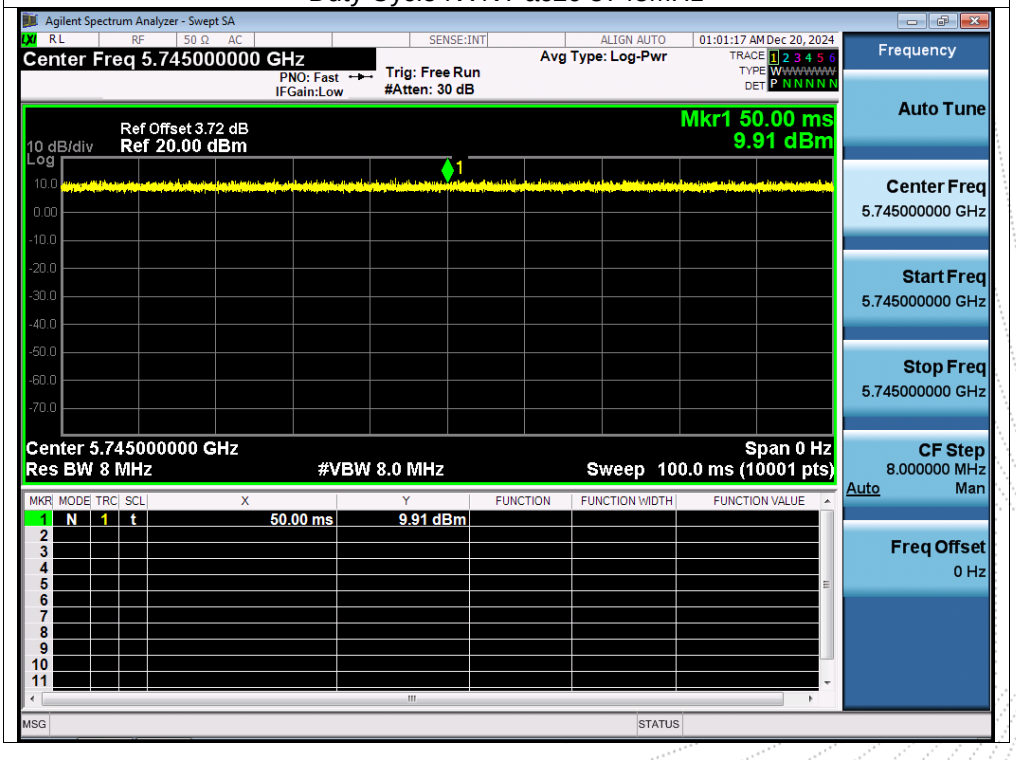
Duty Cycle NVNT n20 5745MHz



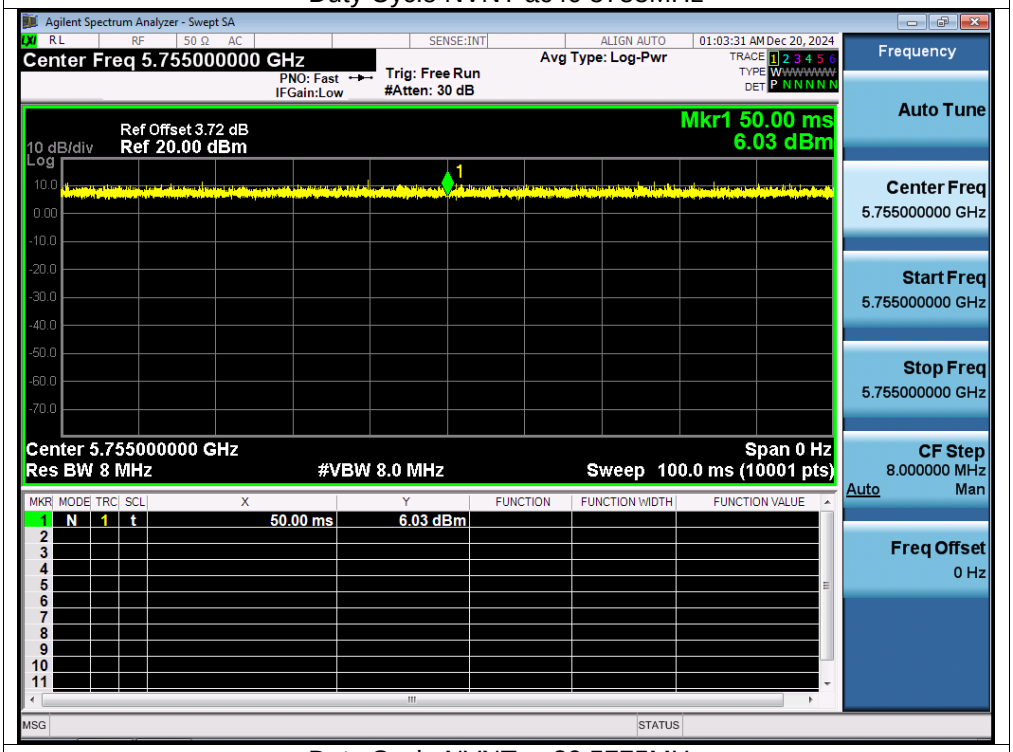
Duty Cycle NVNT n40 5755MHz



Duty Cycle NVNT ac20 5745MHz



Duty Cycle NVNT ac40 5755MHz



Duty Cycle NVNT ac80 5775MHz