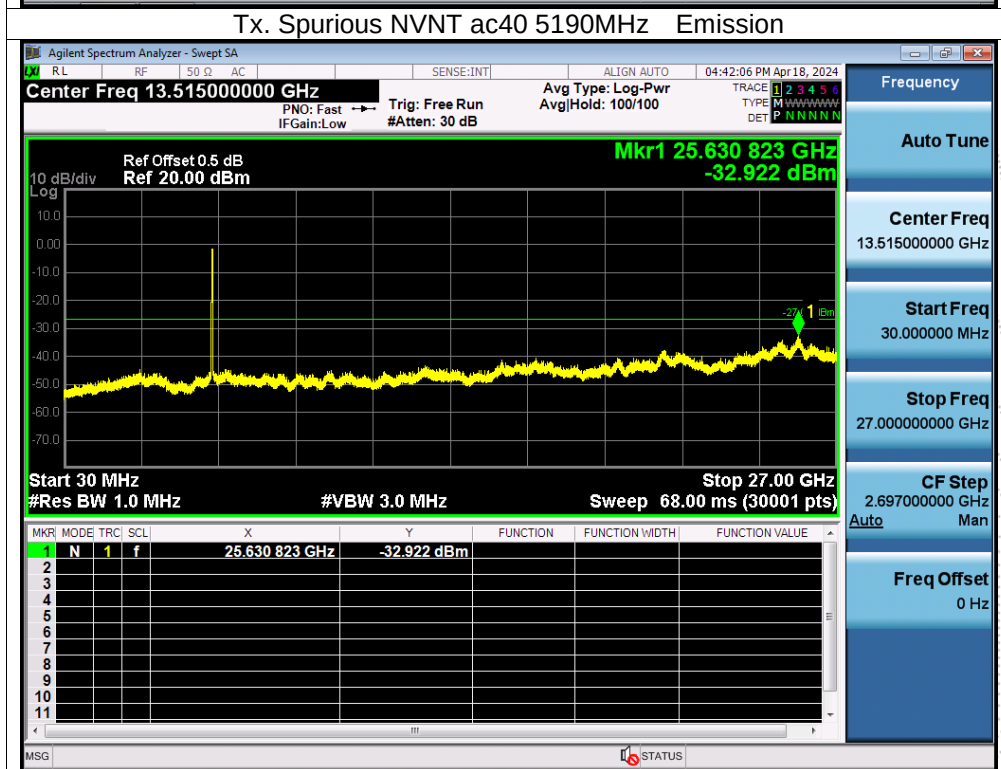
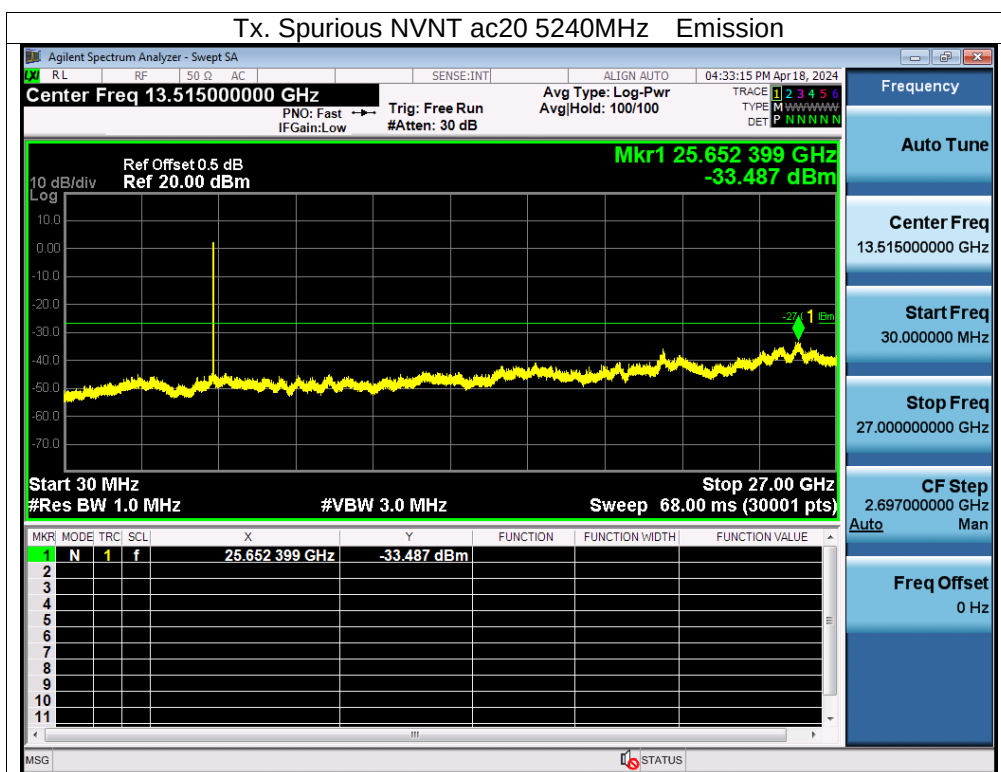
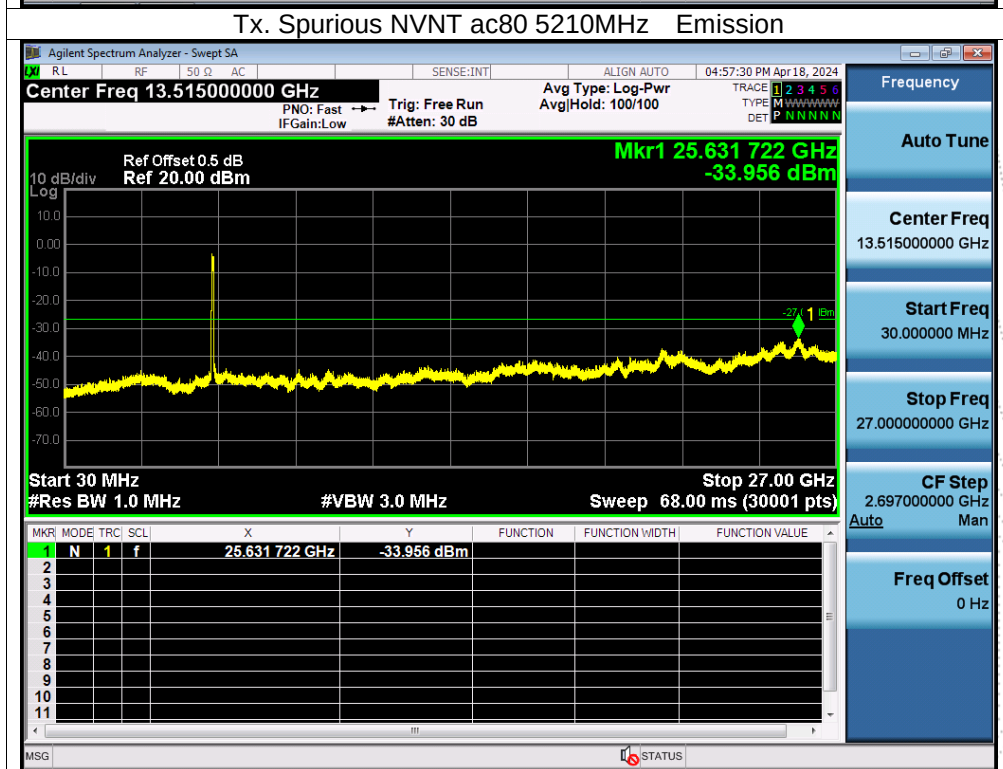
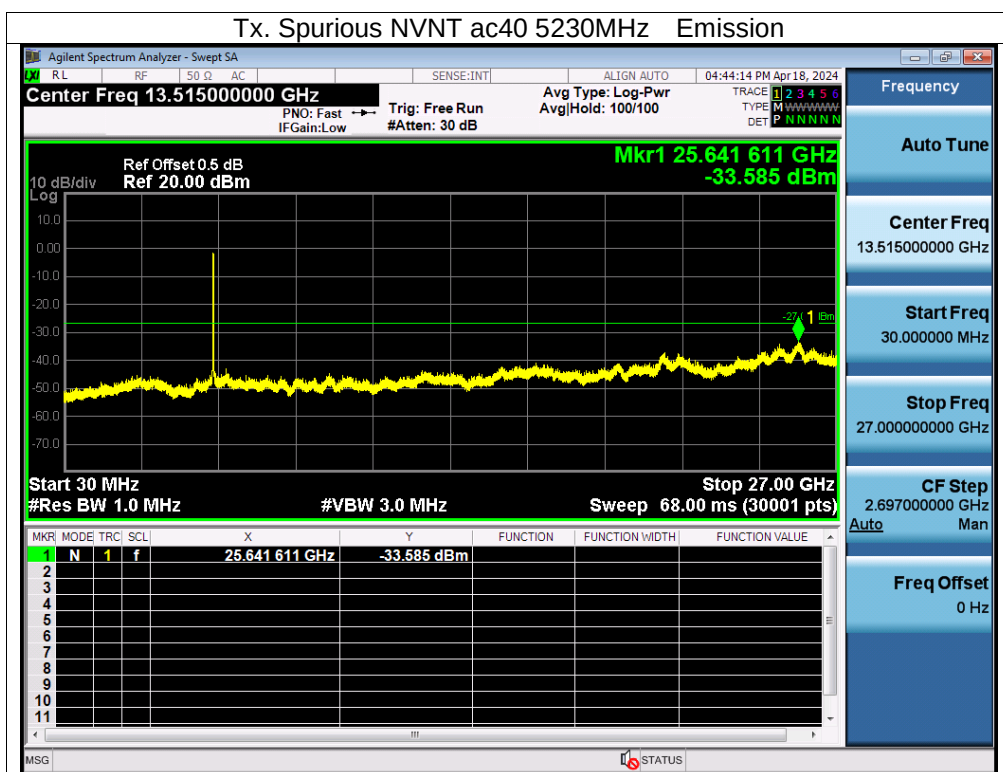
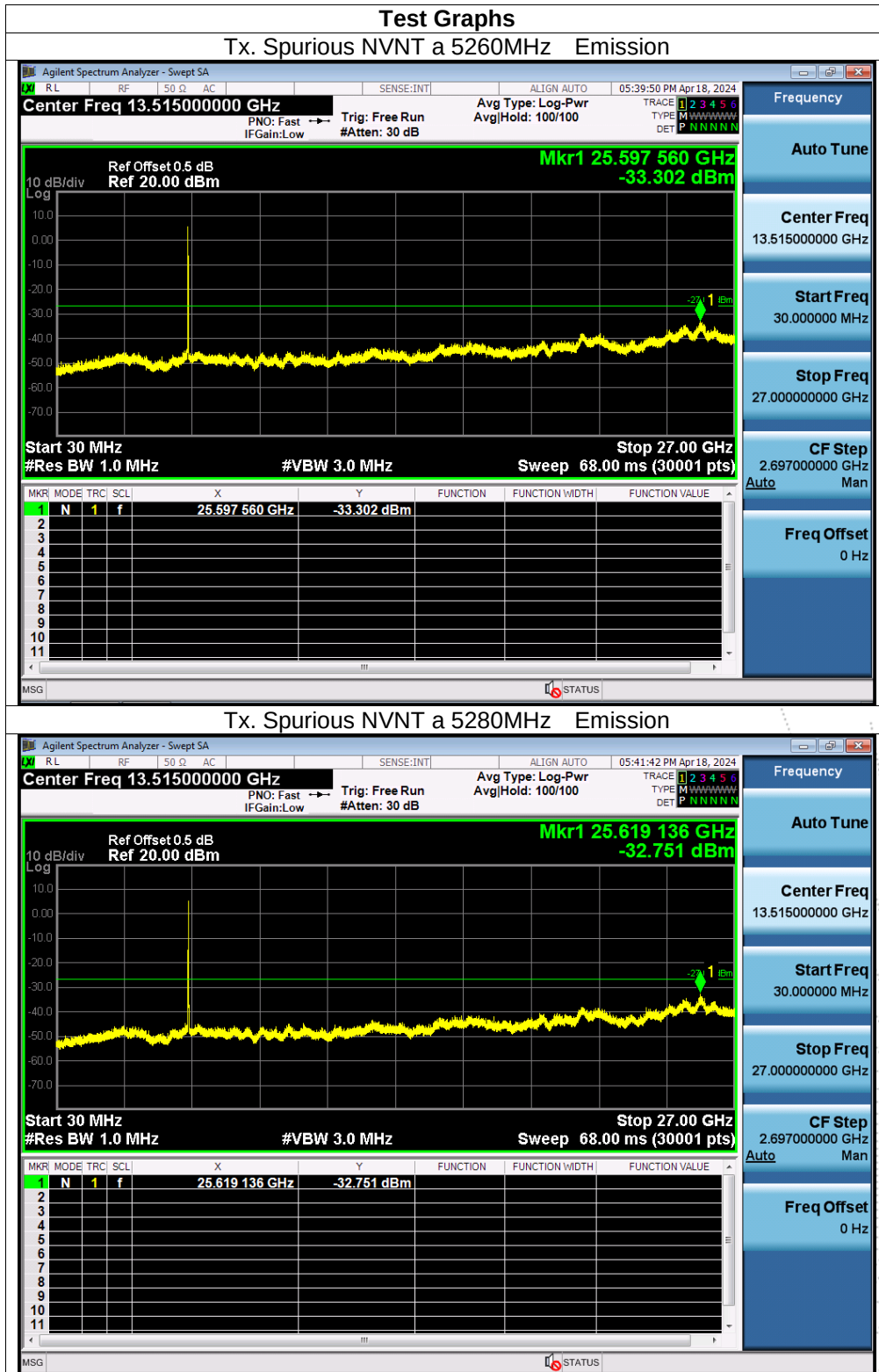
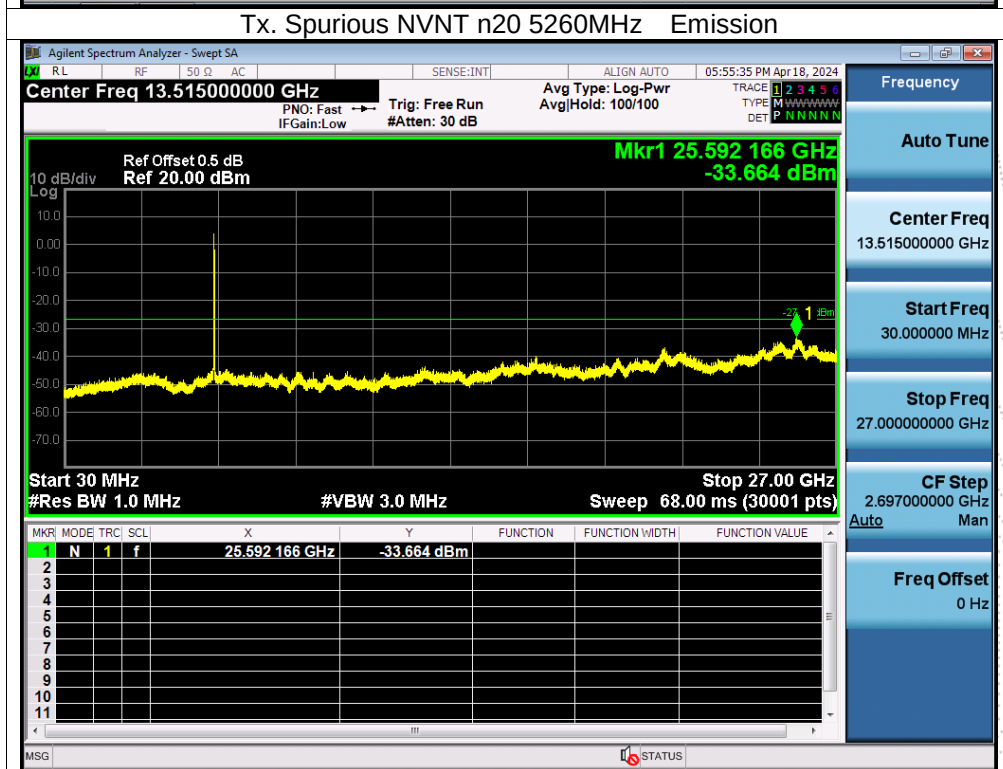
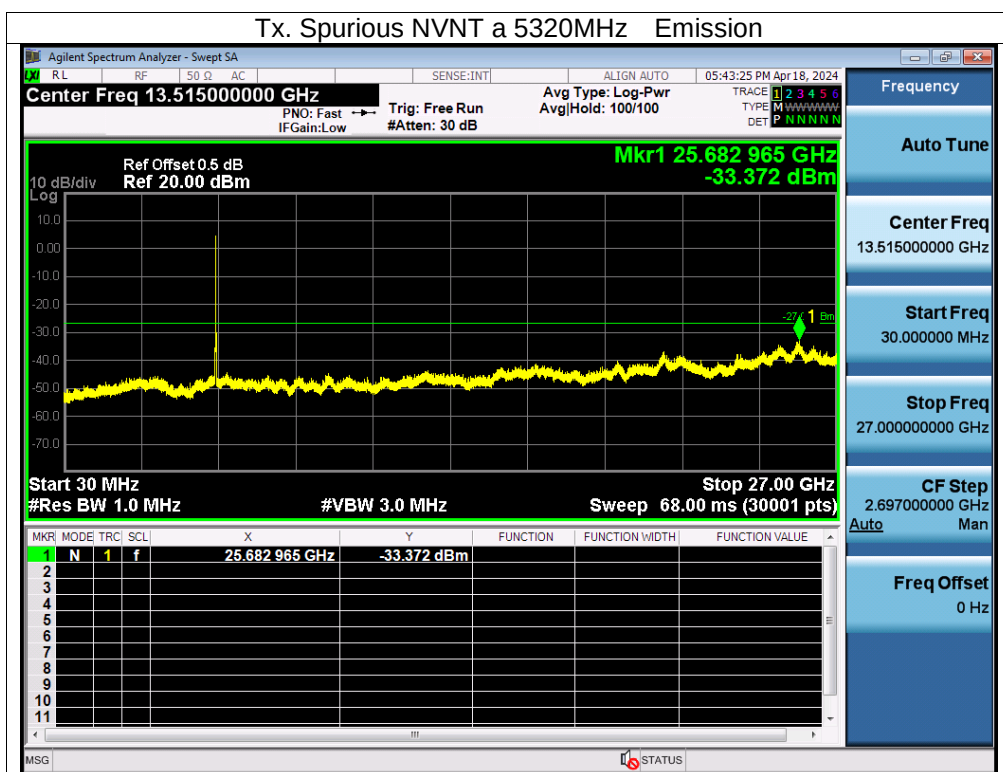


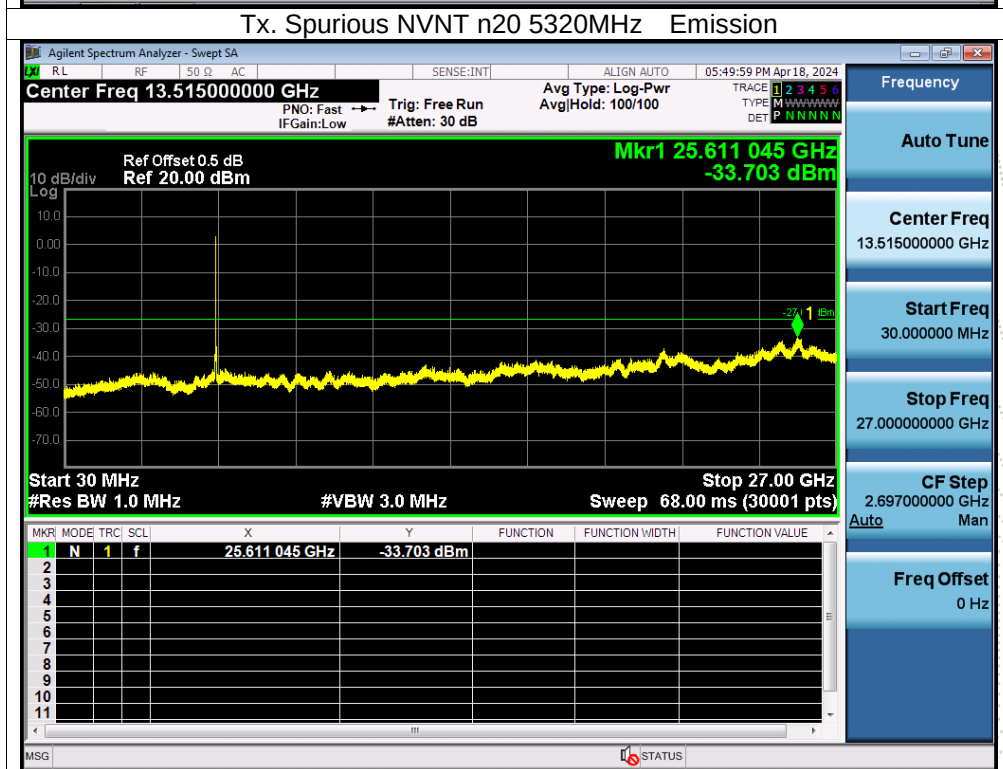
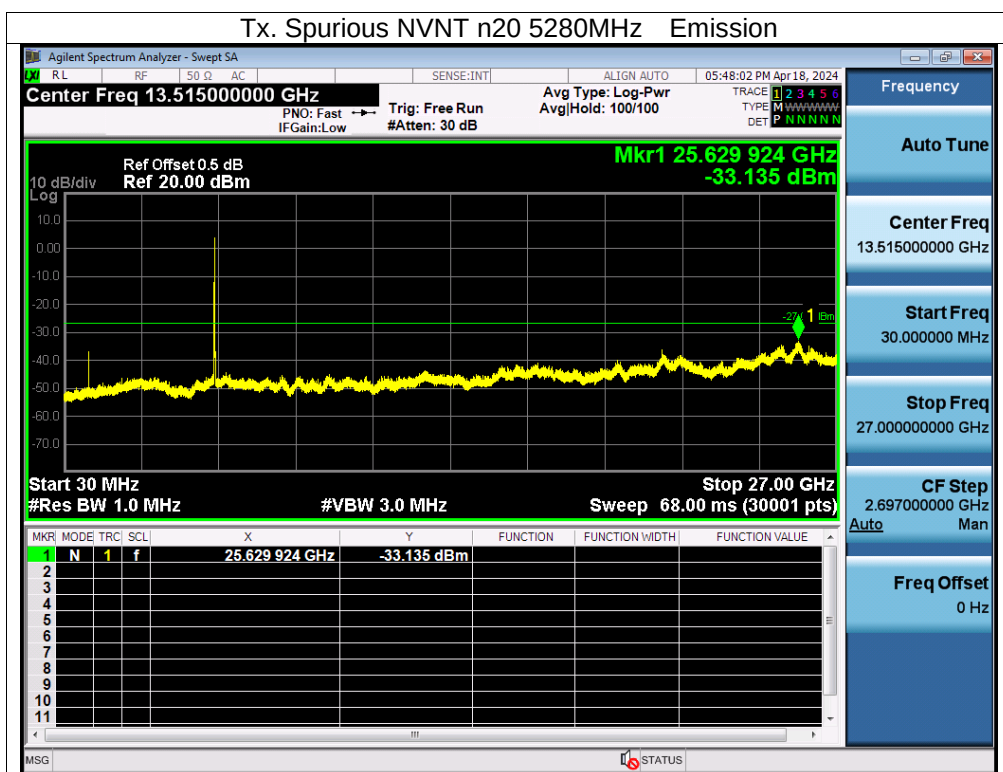


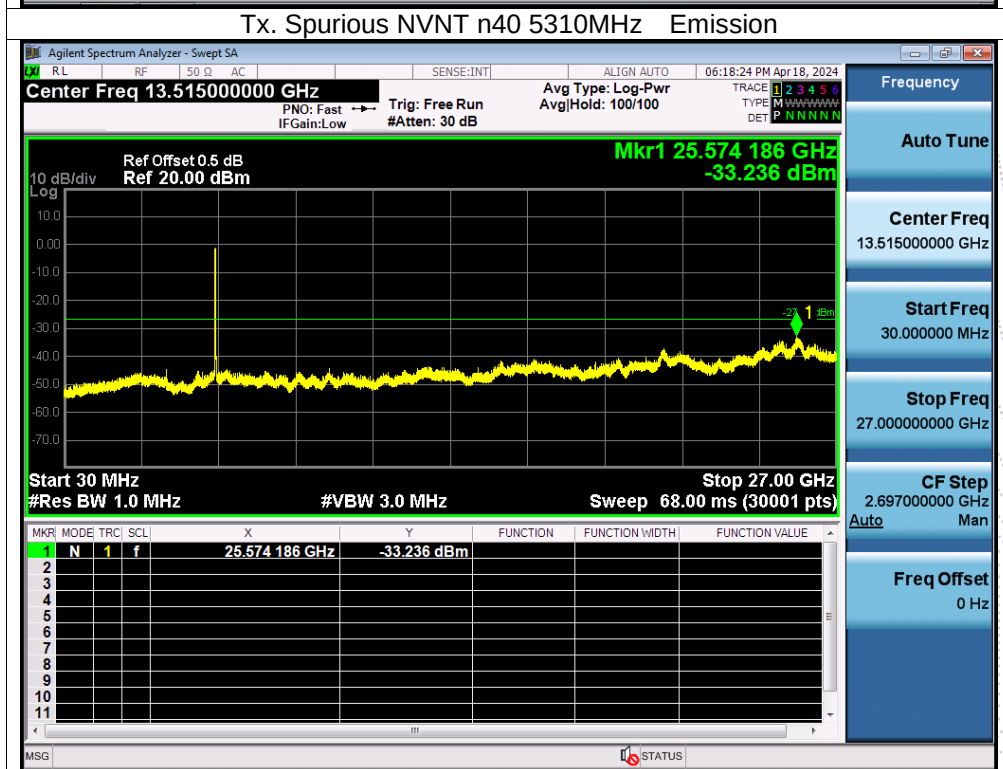
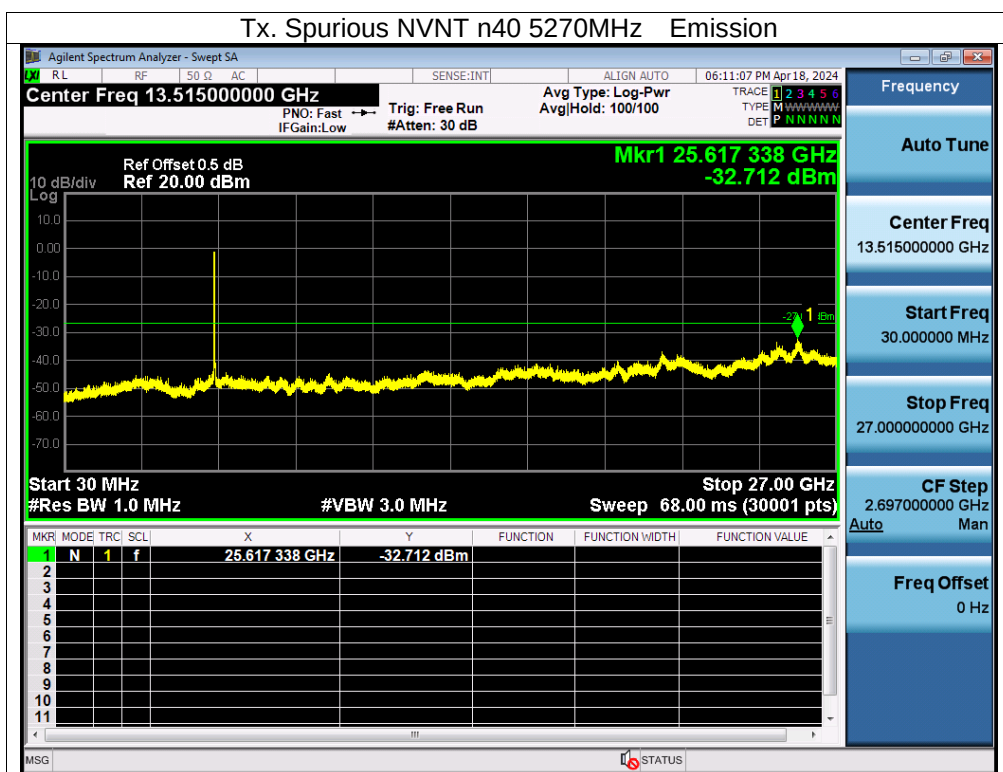


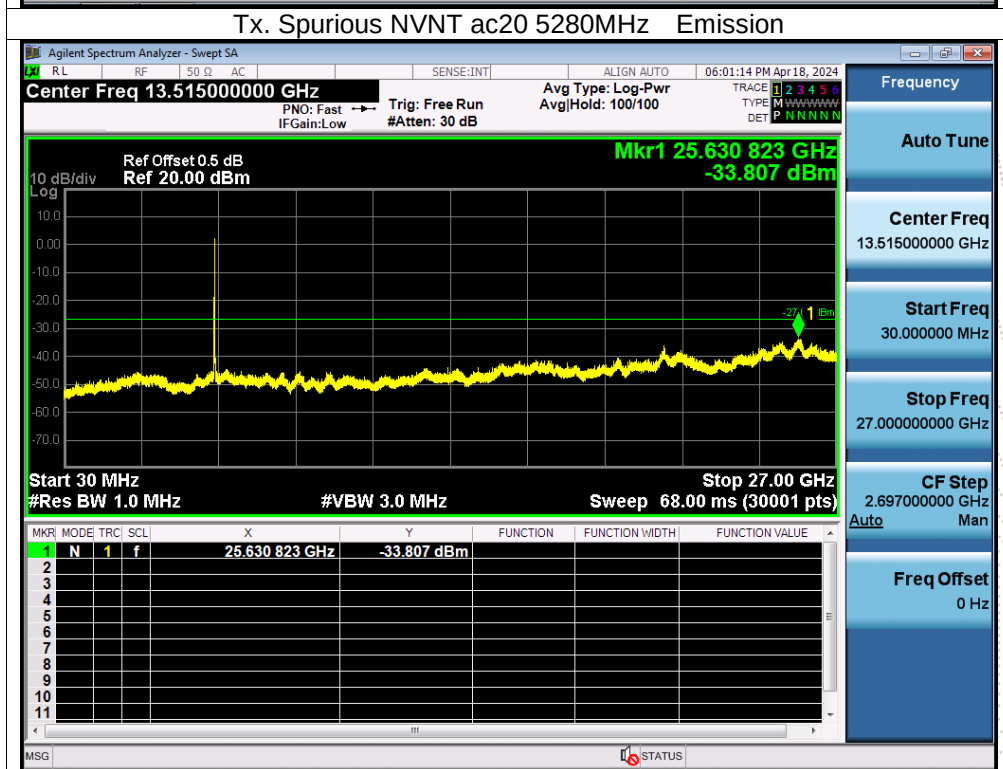
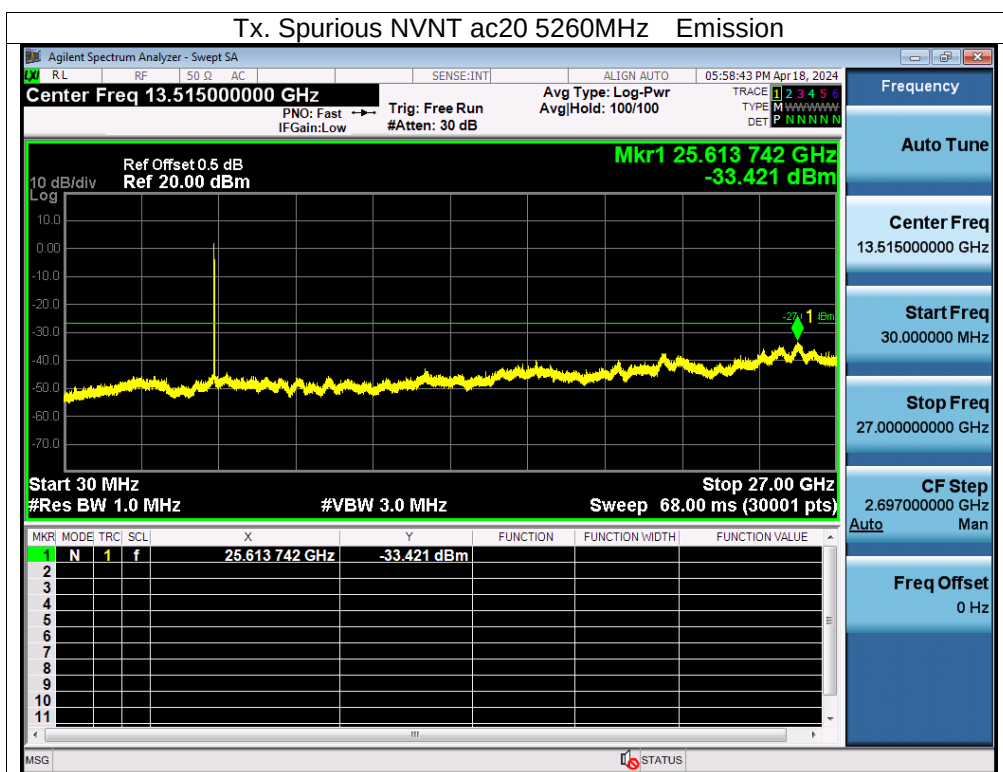
5260-5320MHz

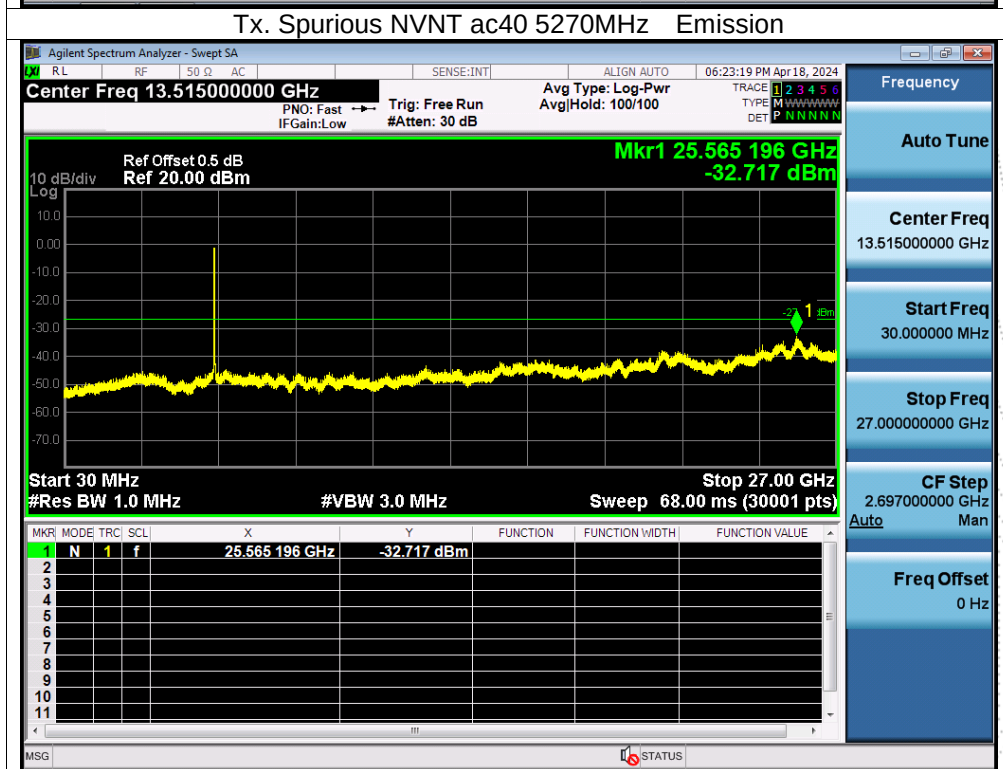
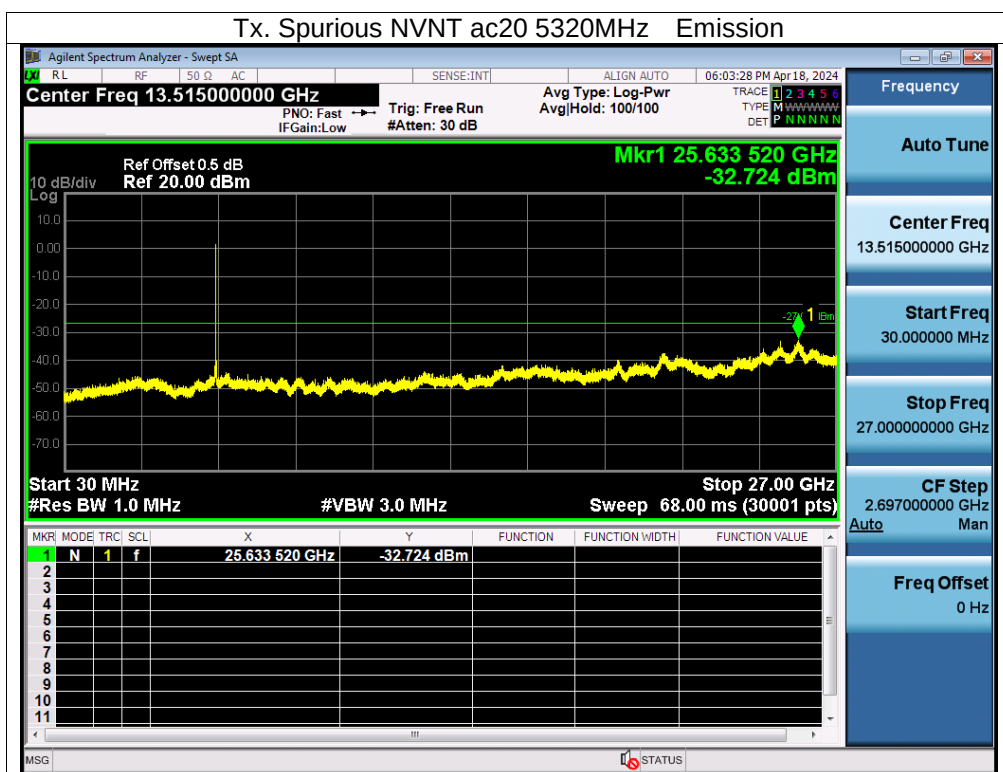


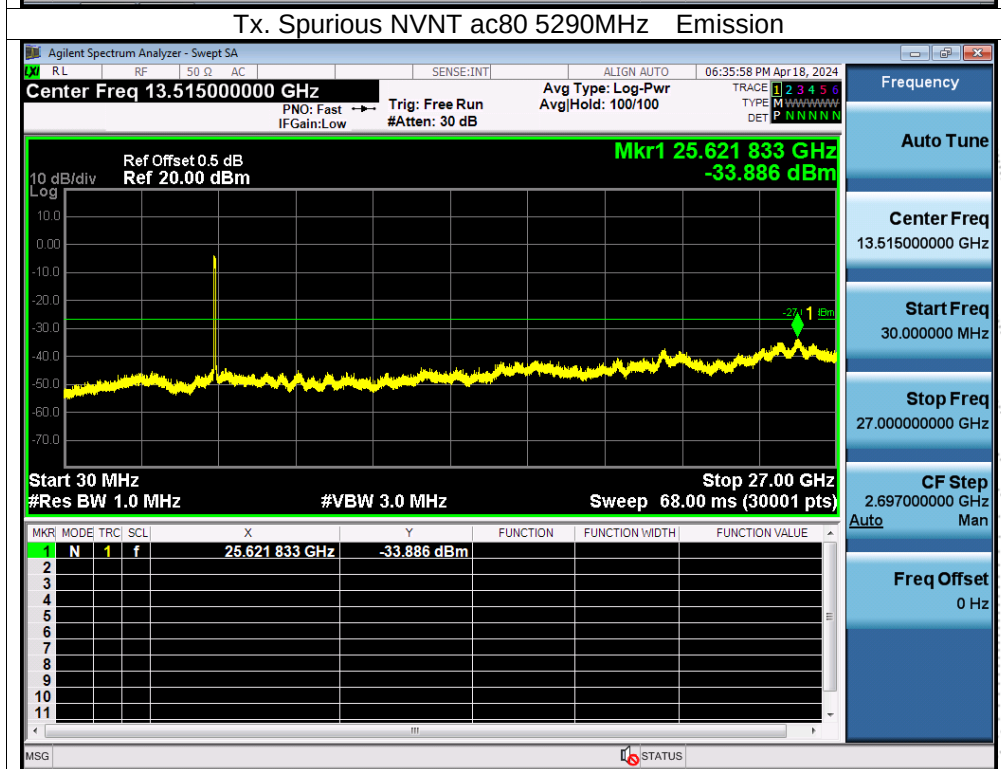
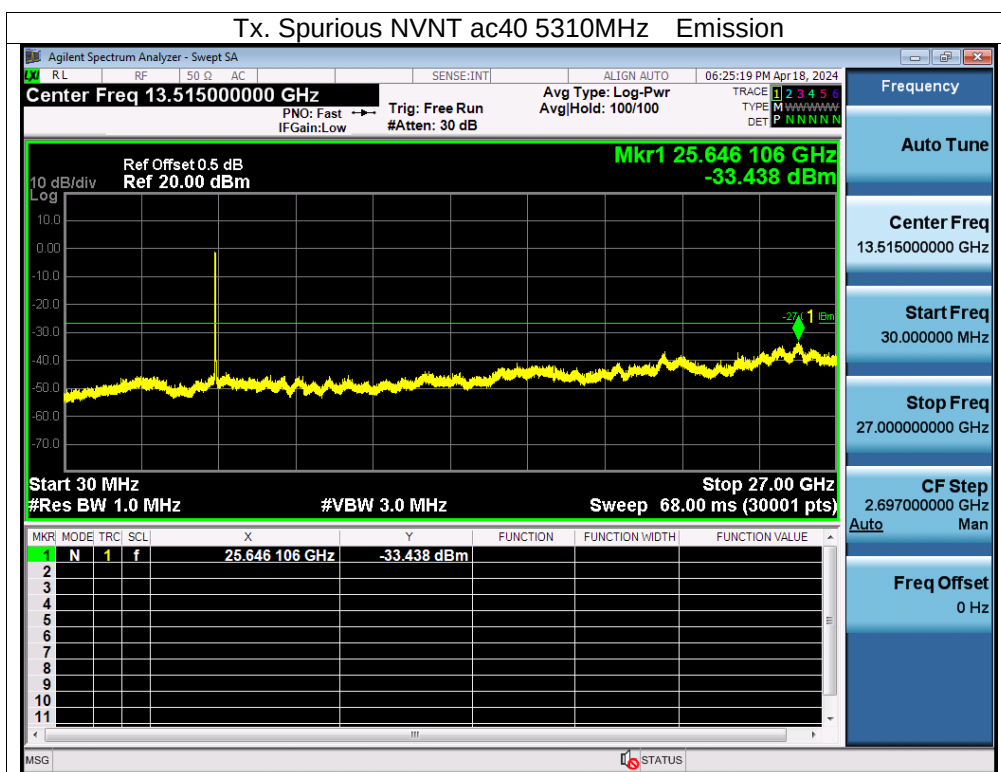




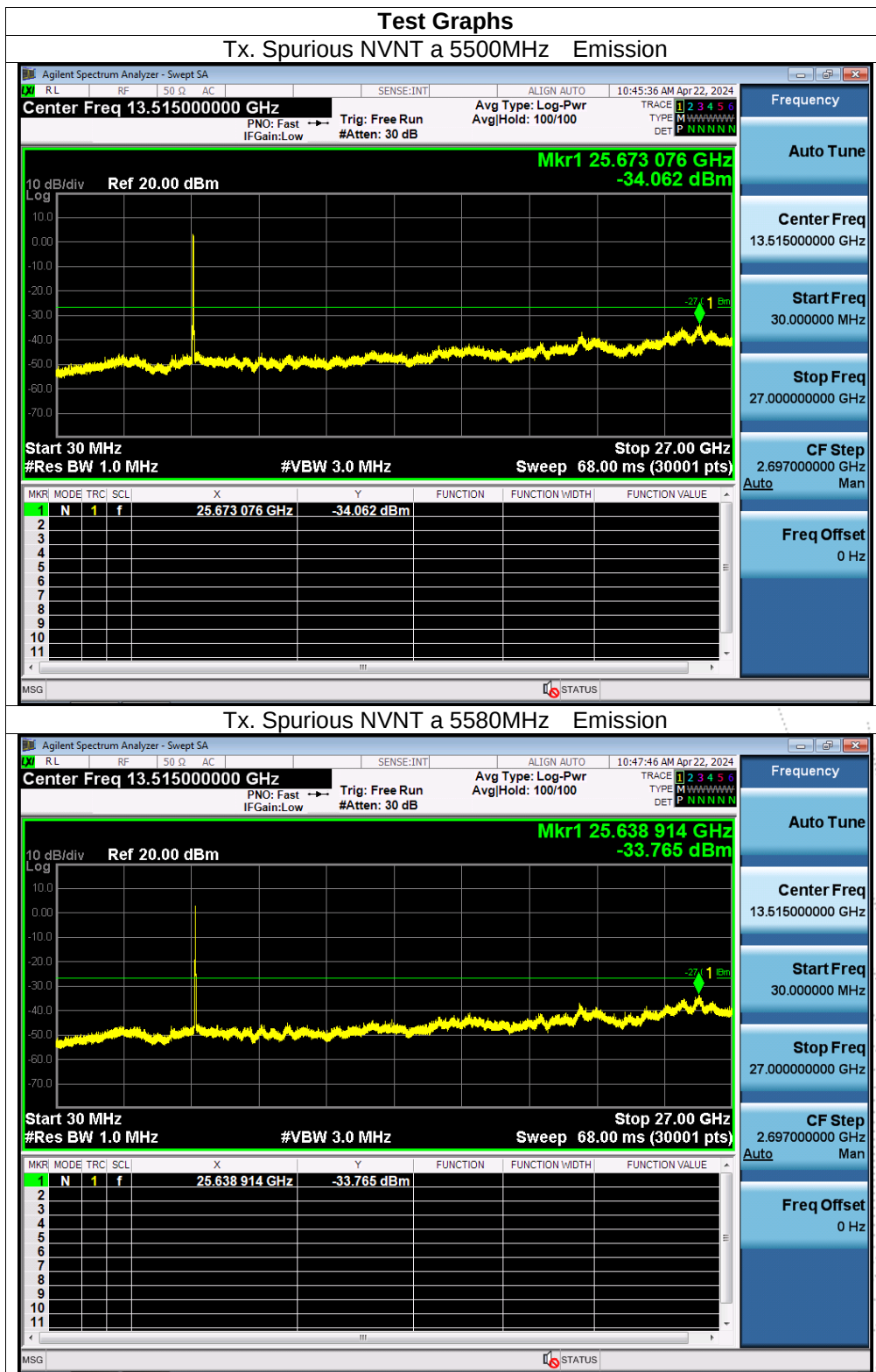


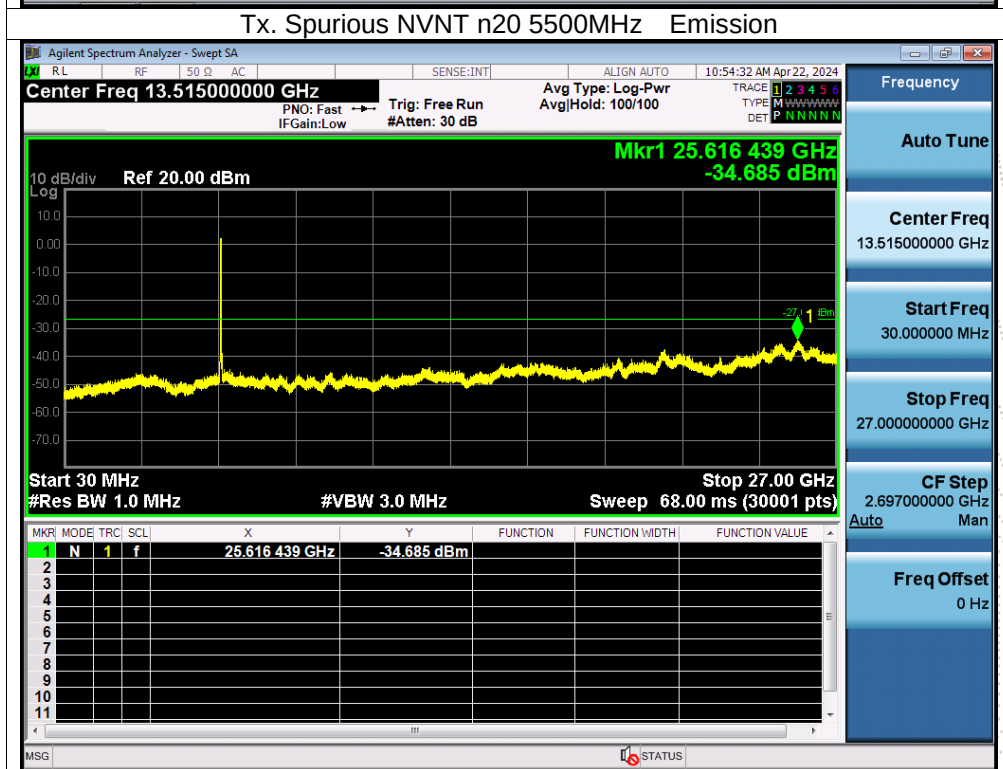
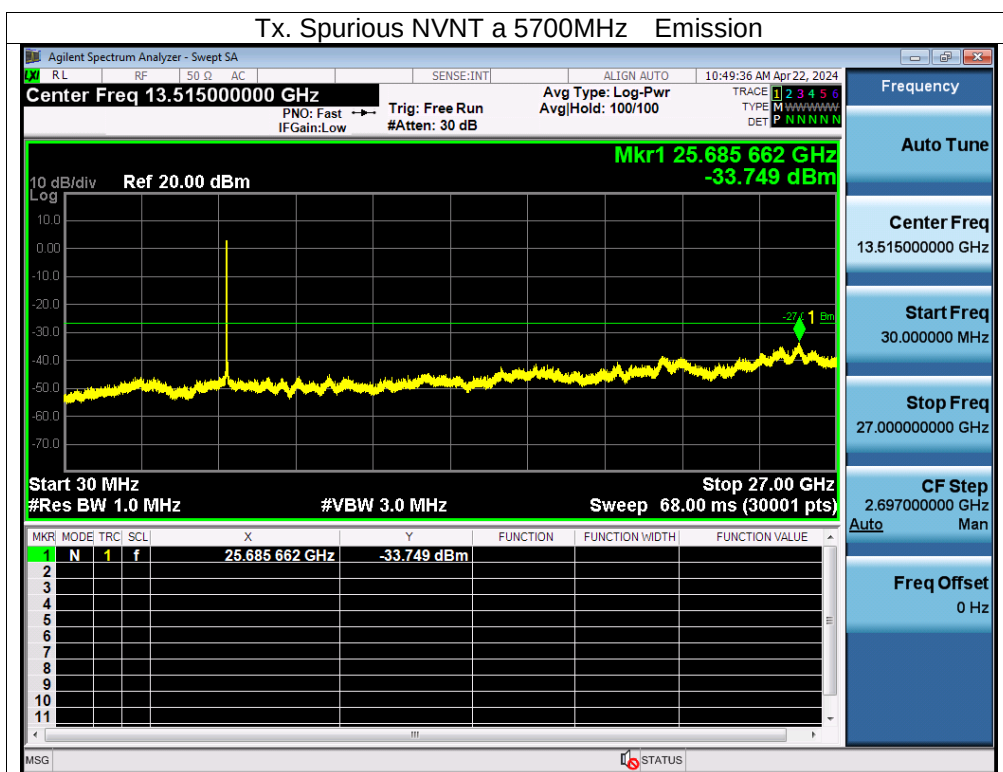


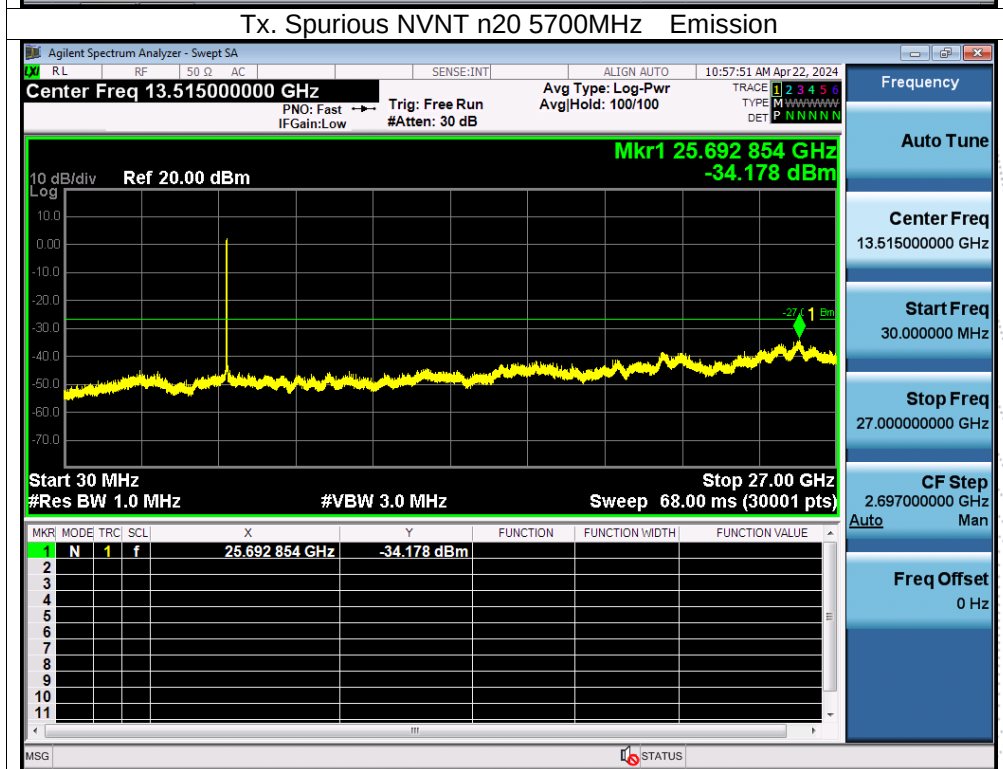
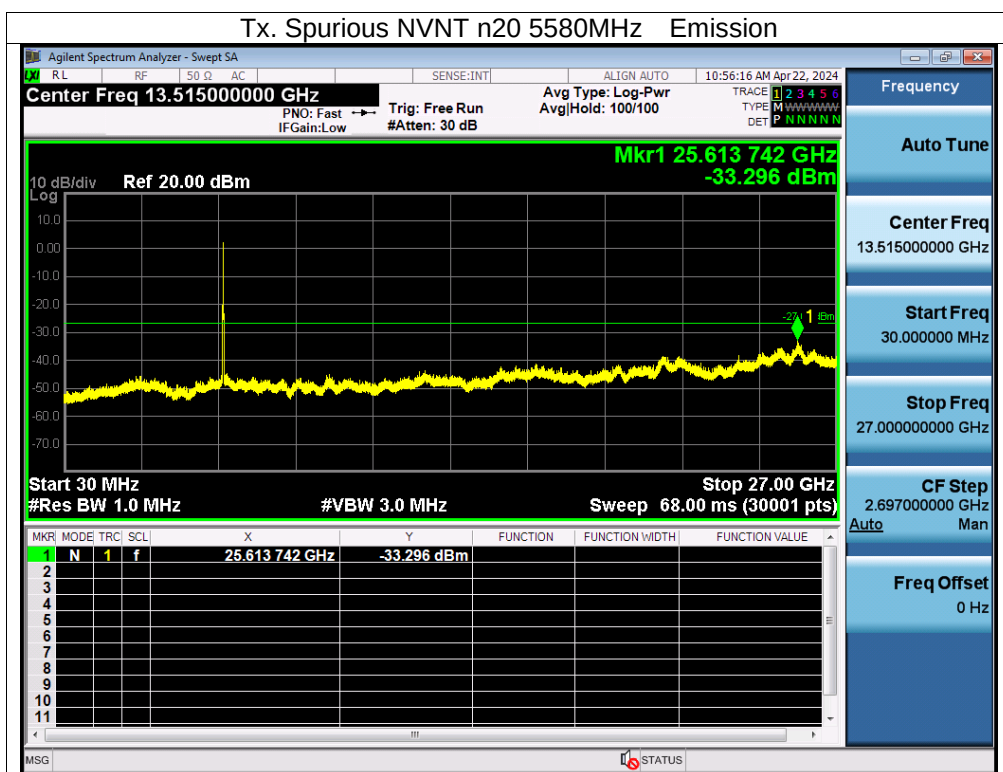


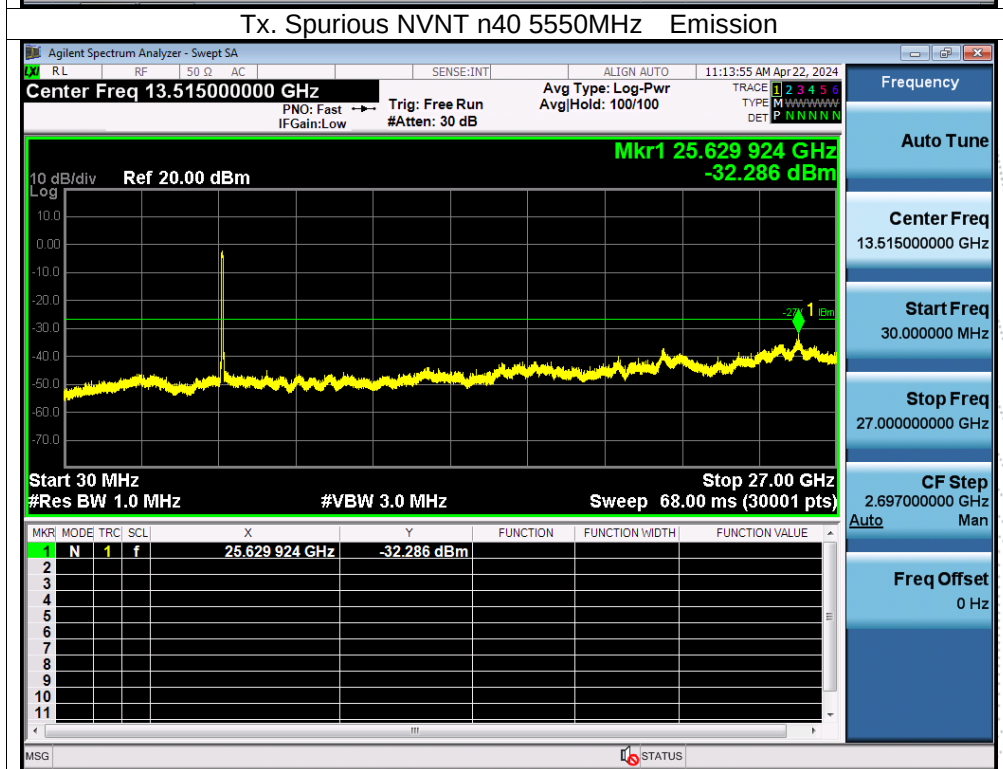
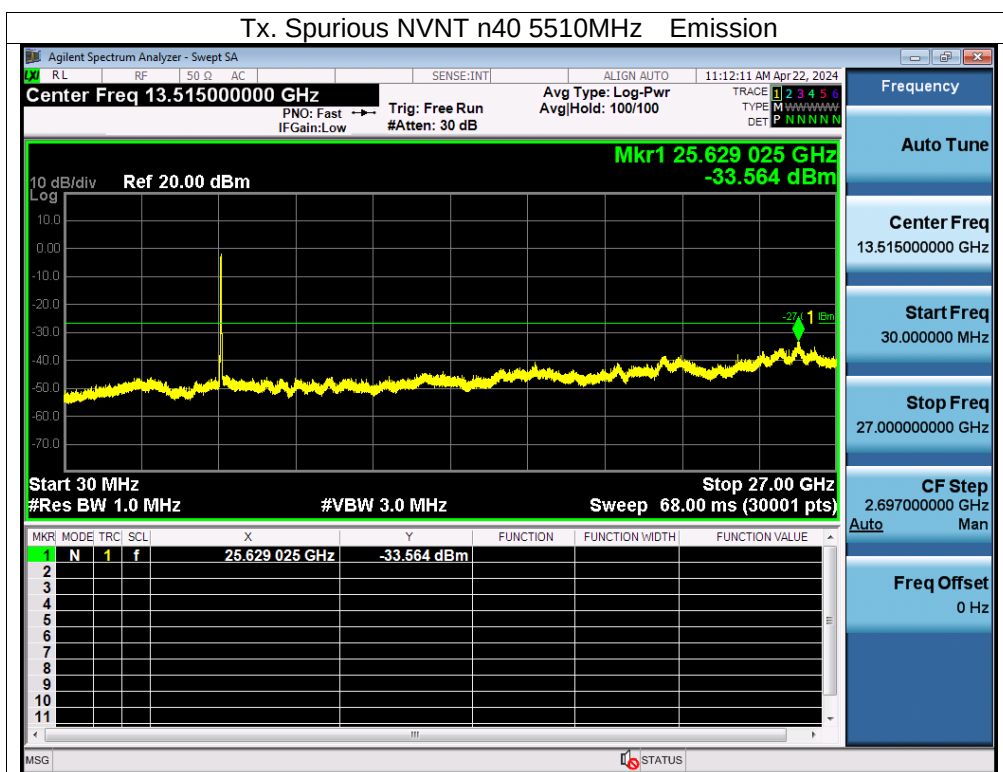


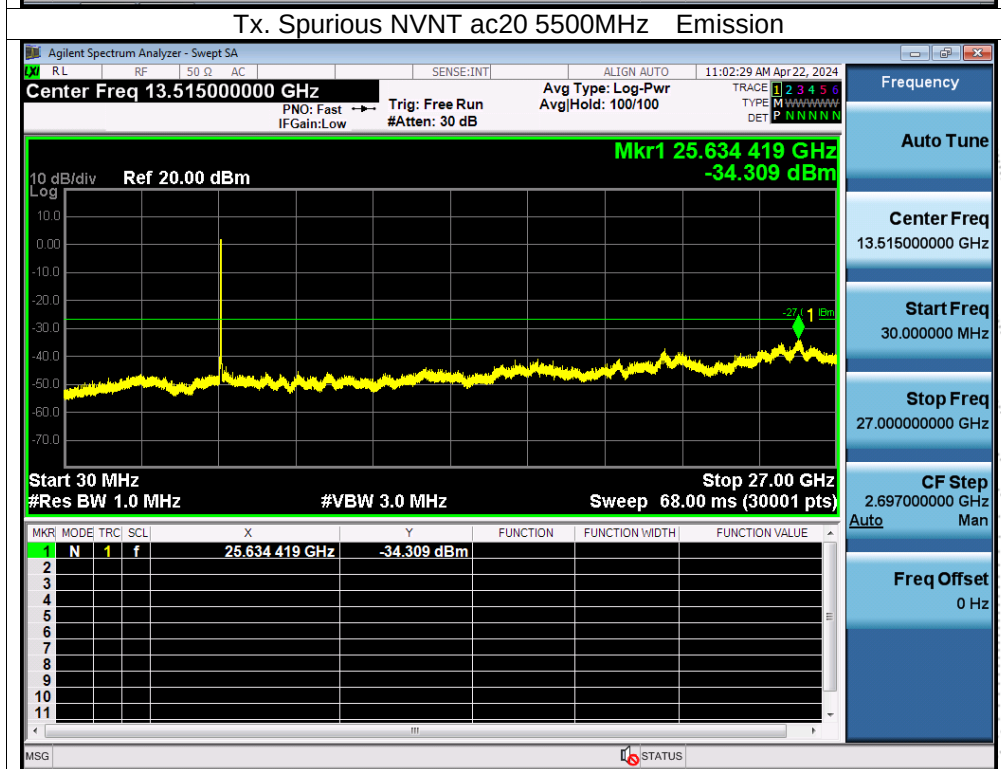
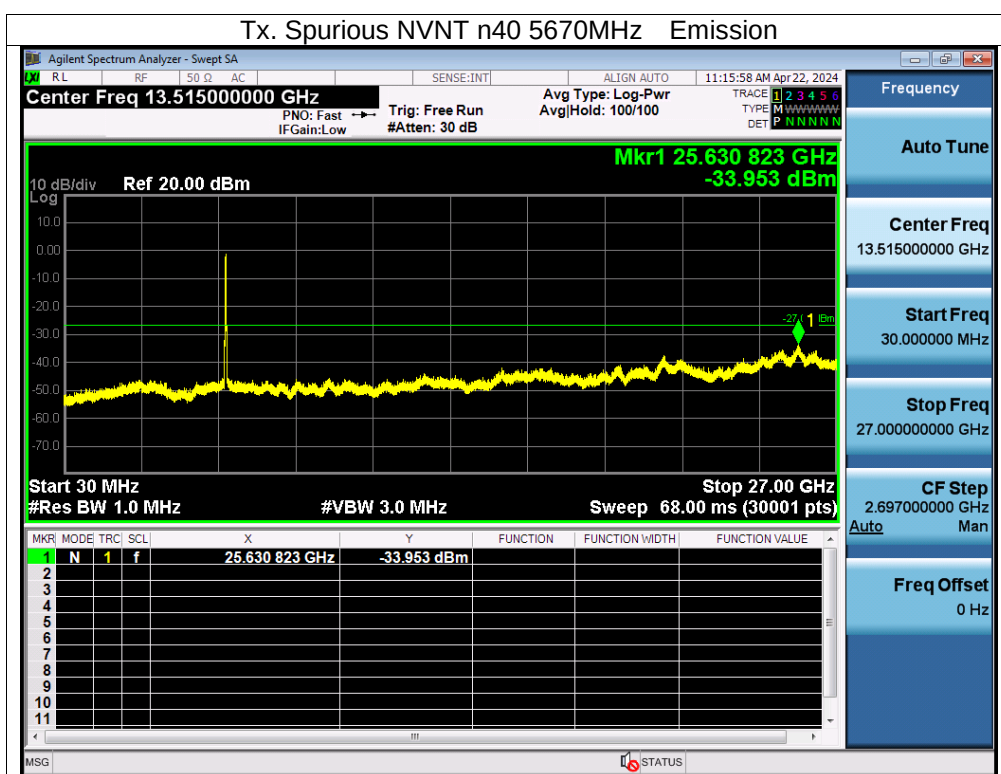
5500-5700MHz

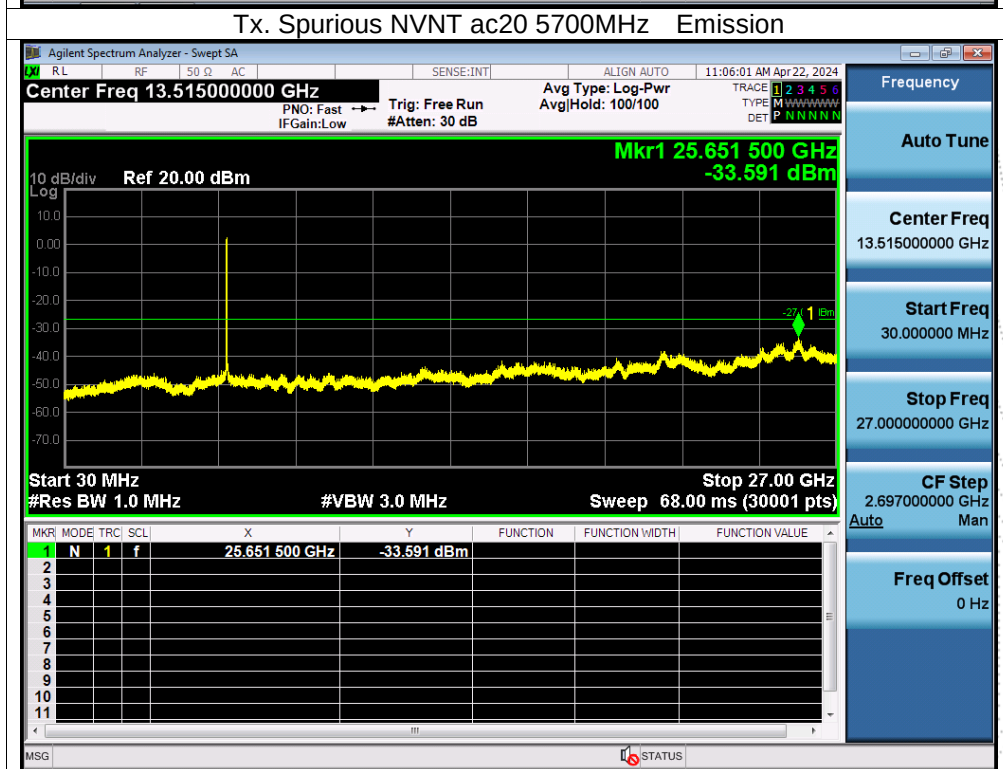
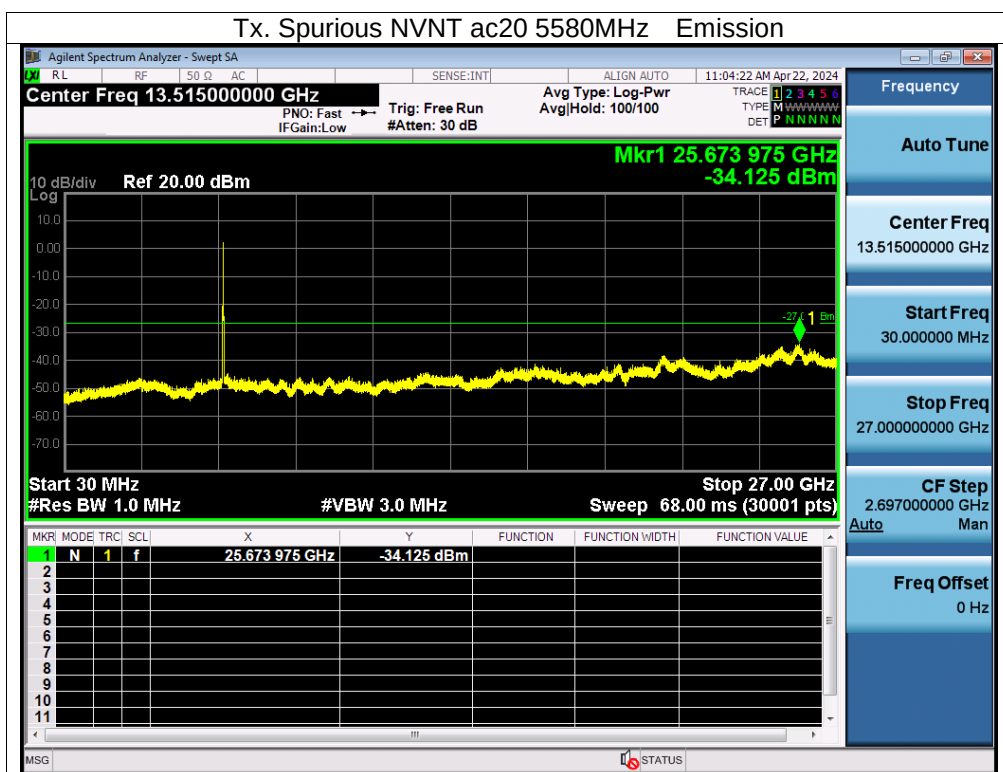


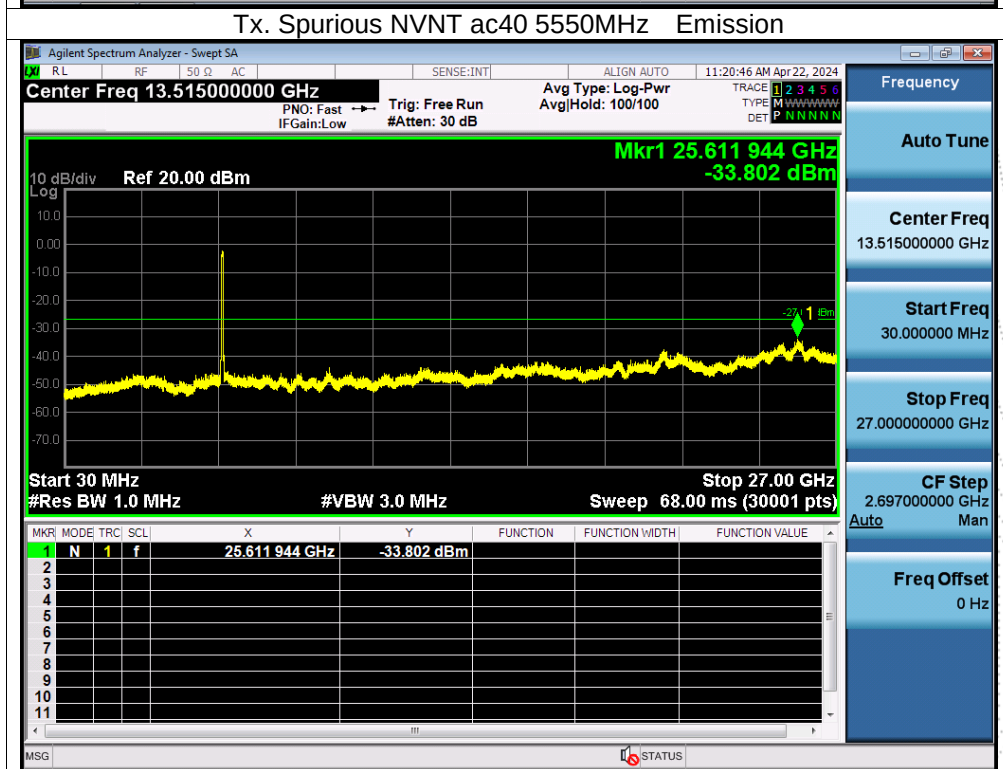
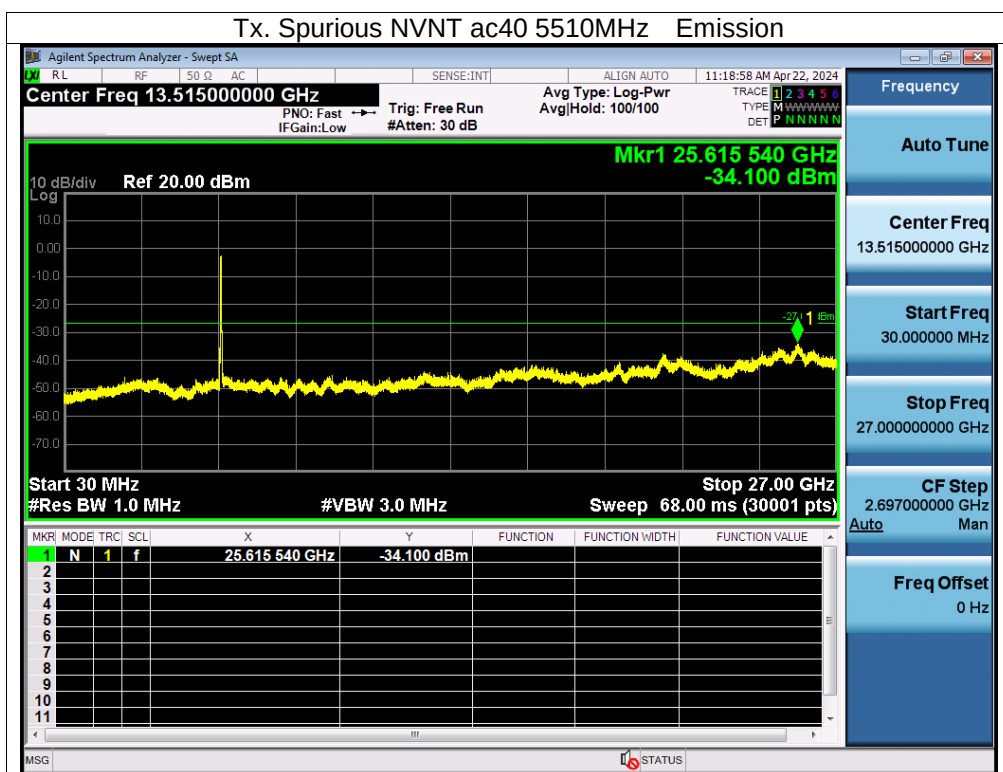


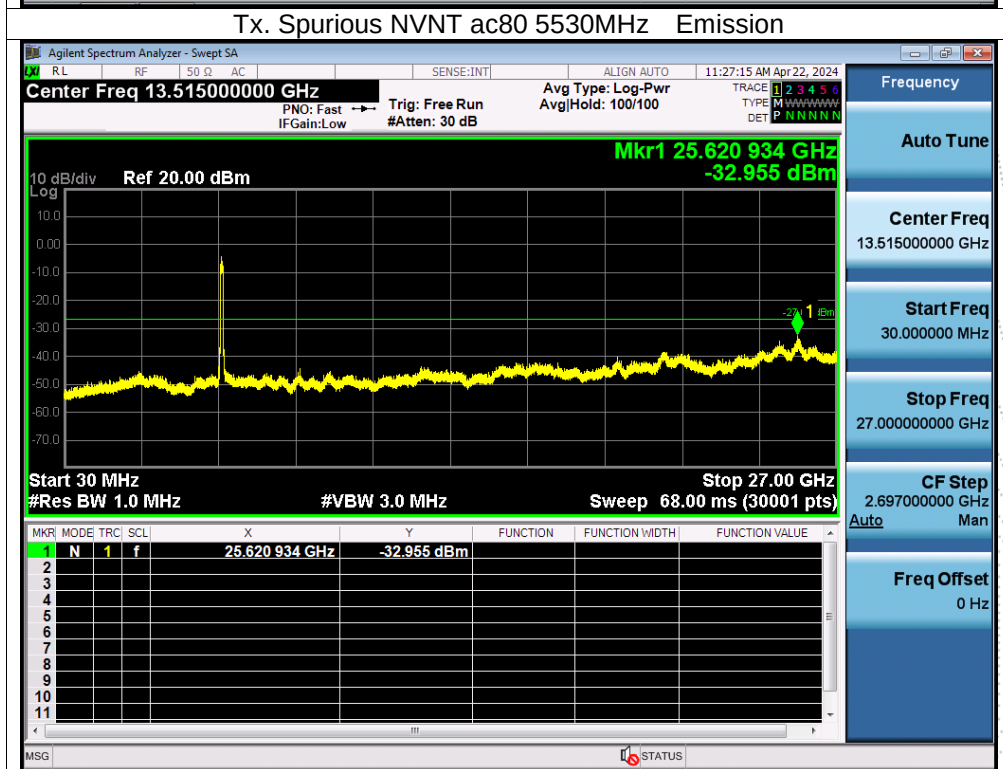
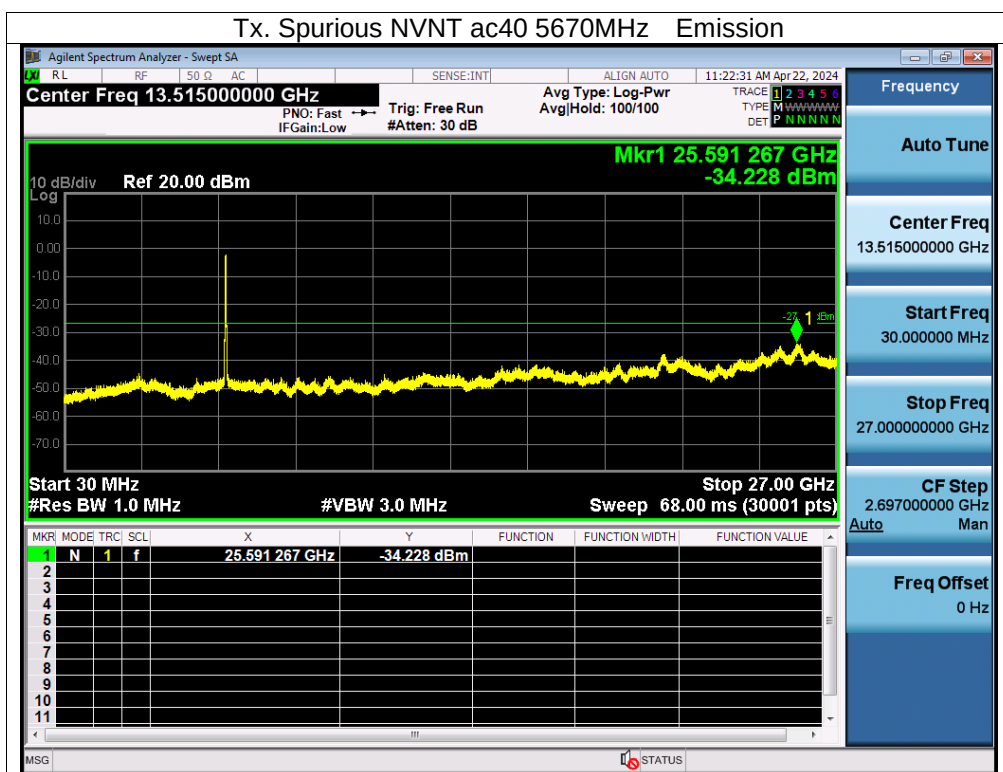




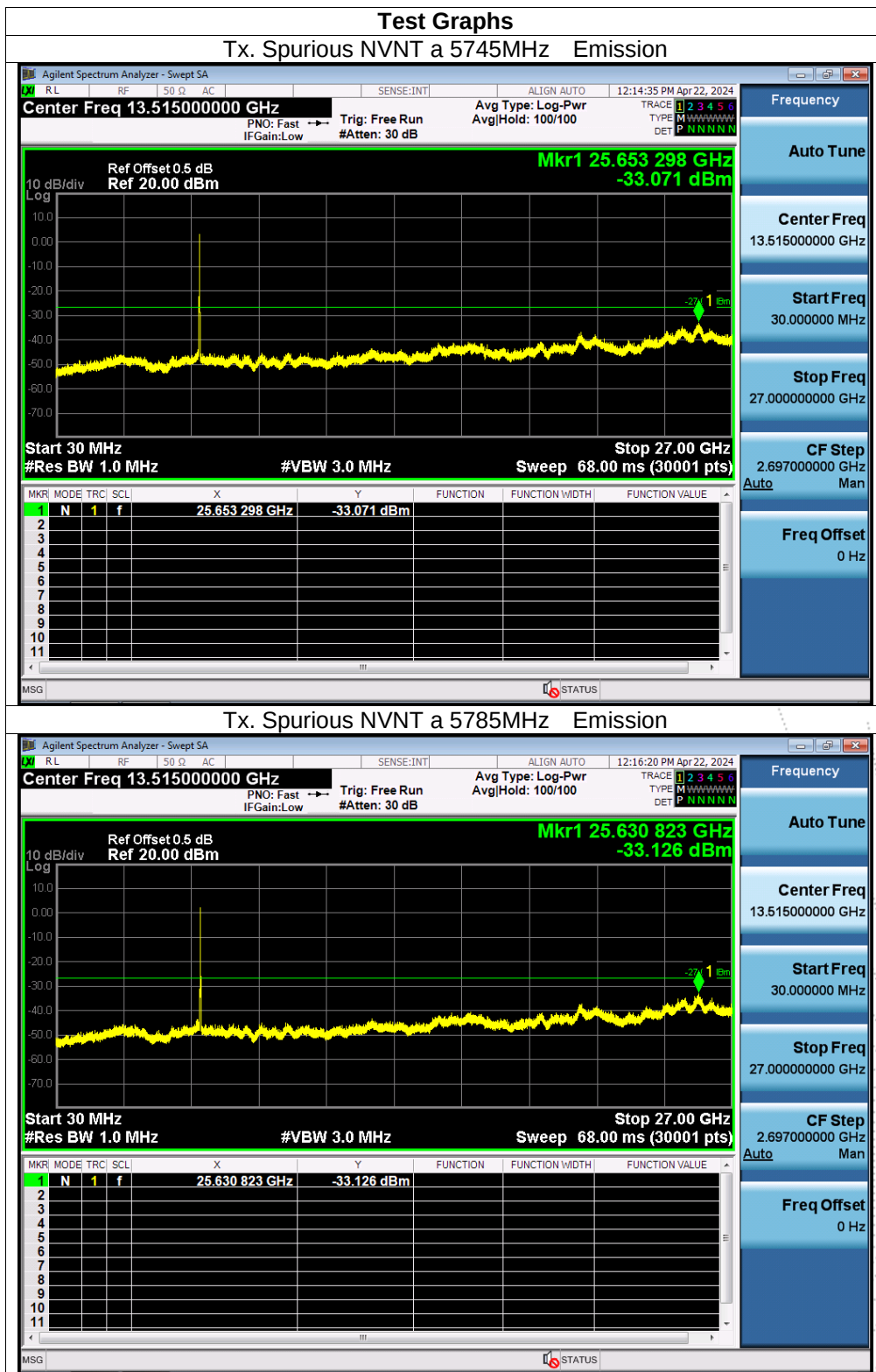


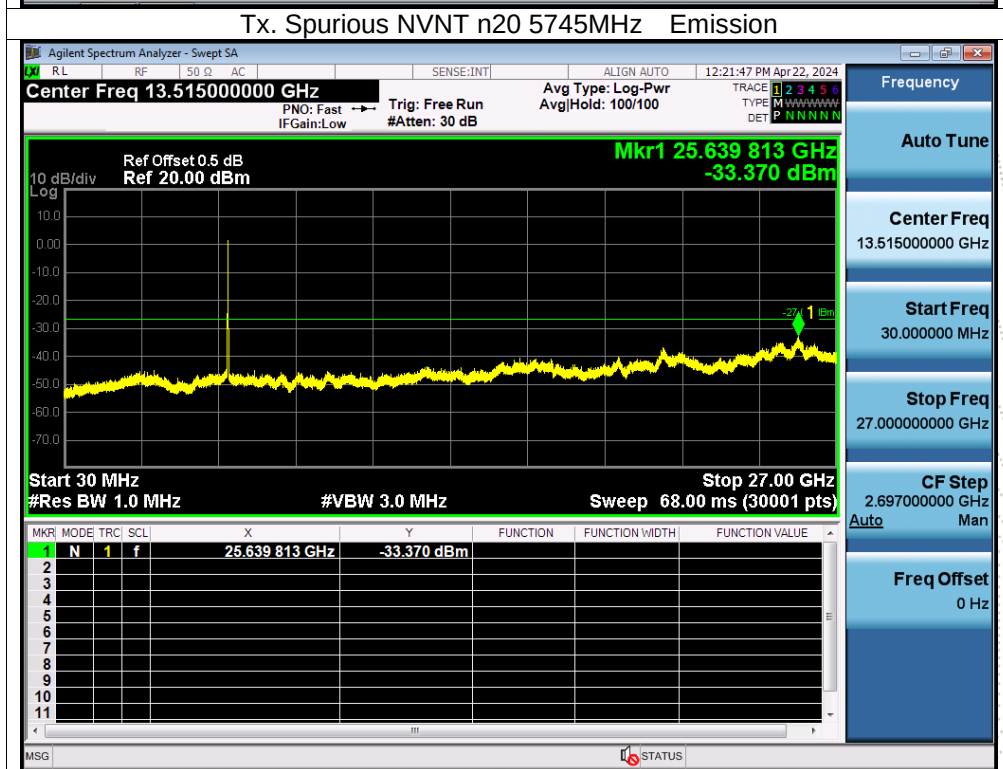
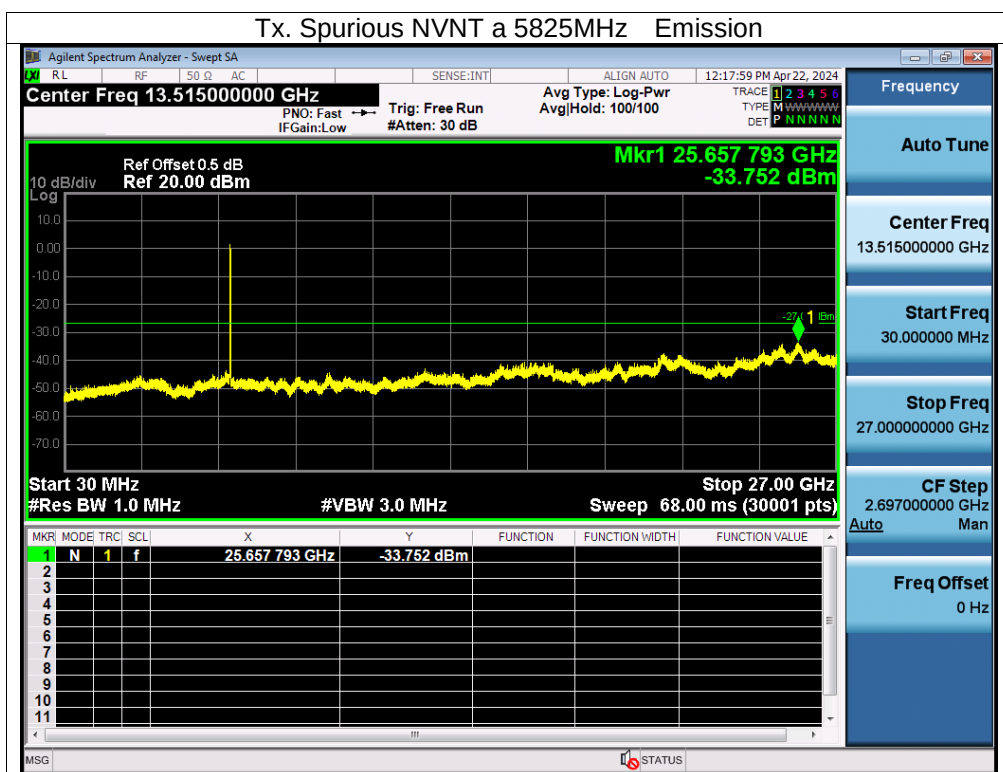


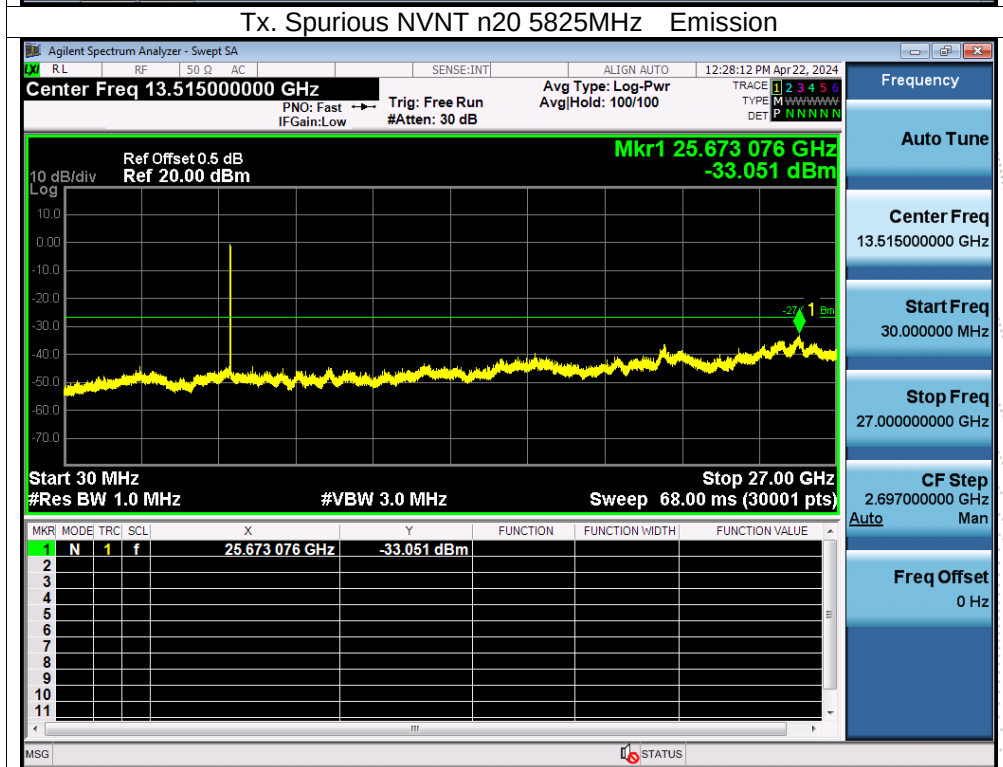
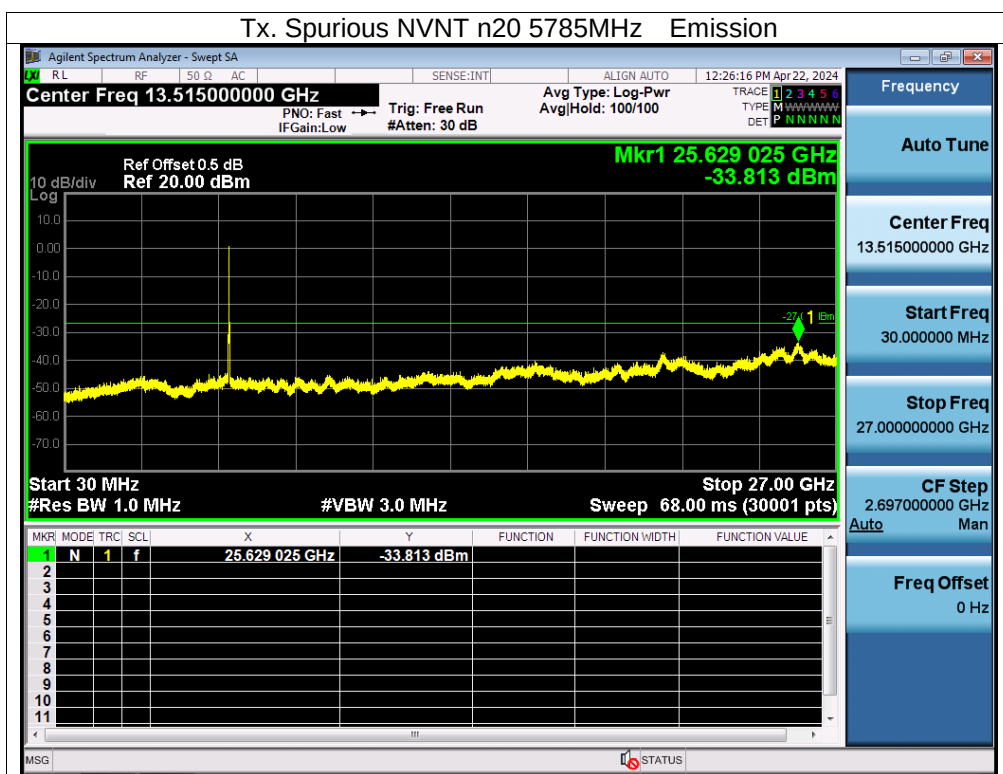


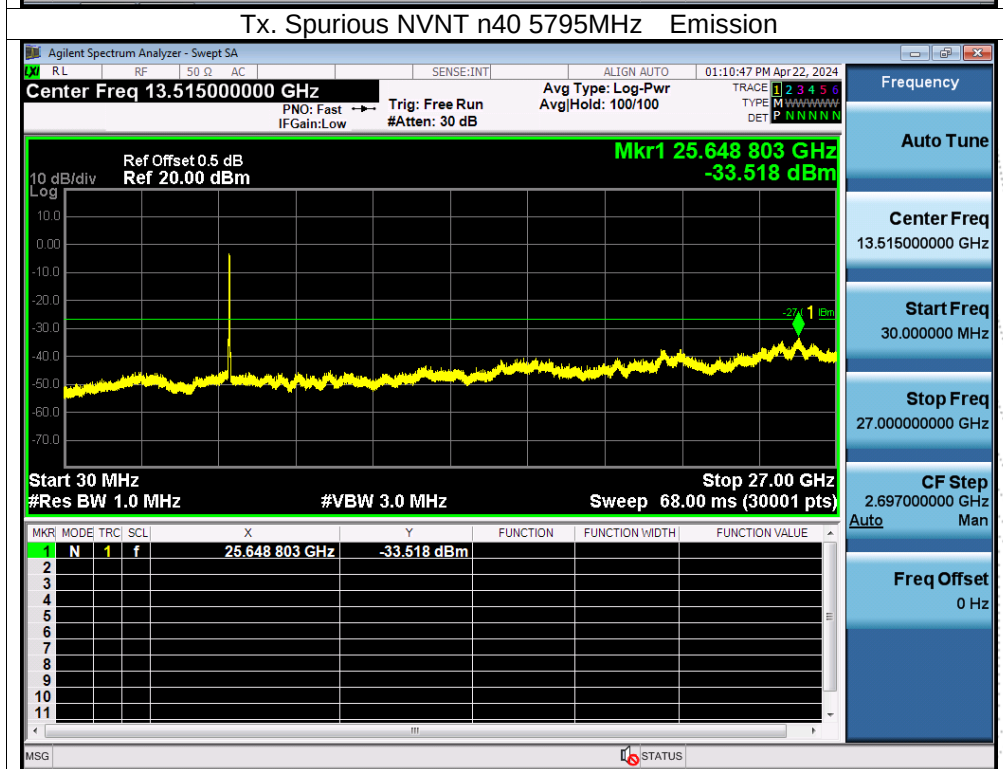
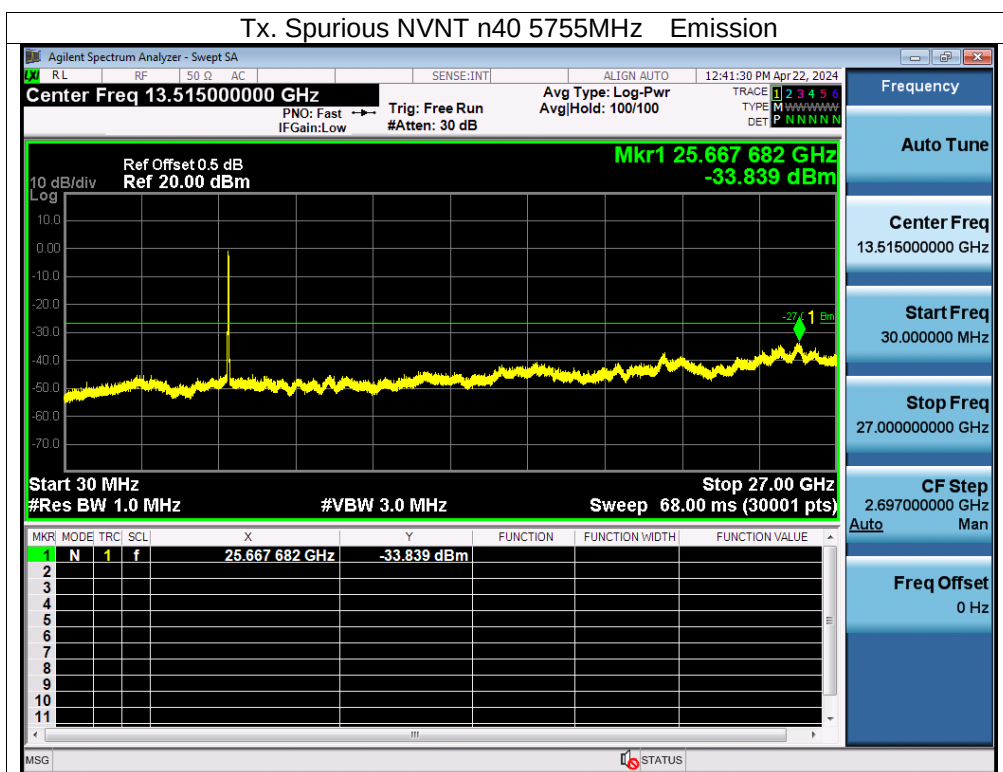


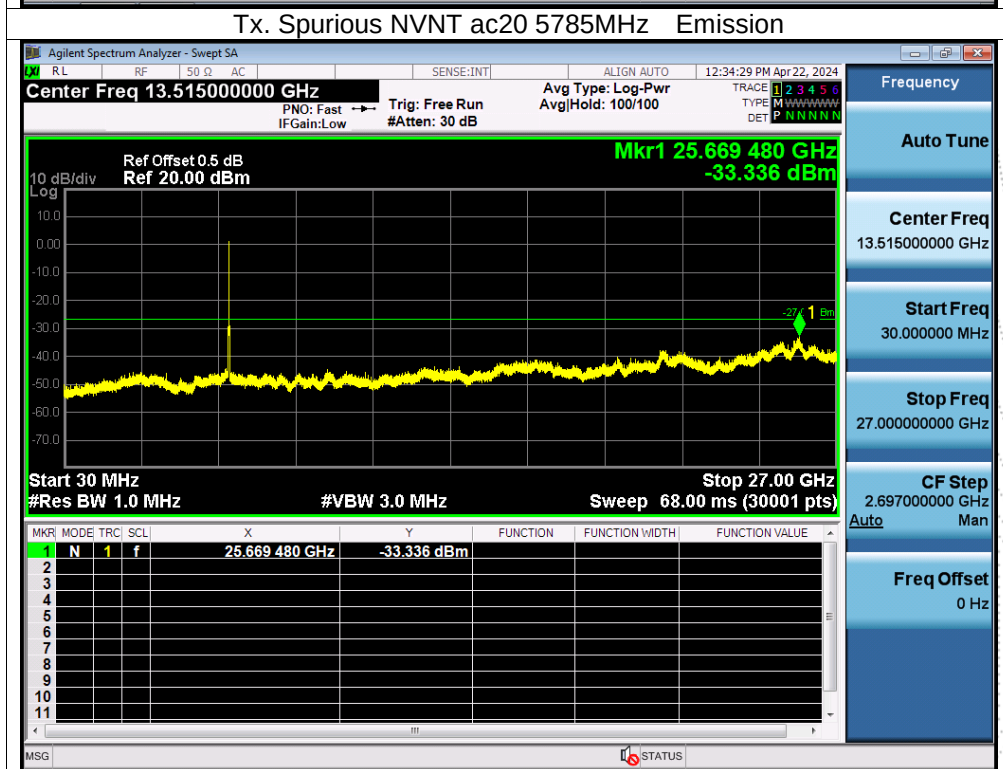
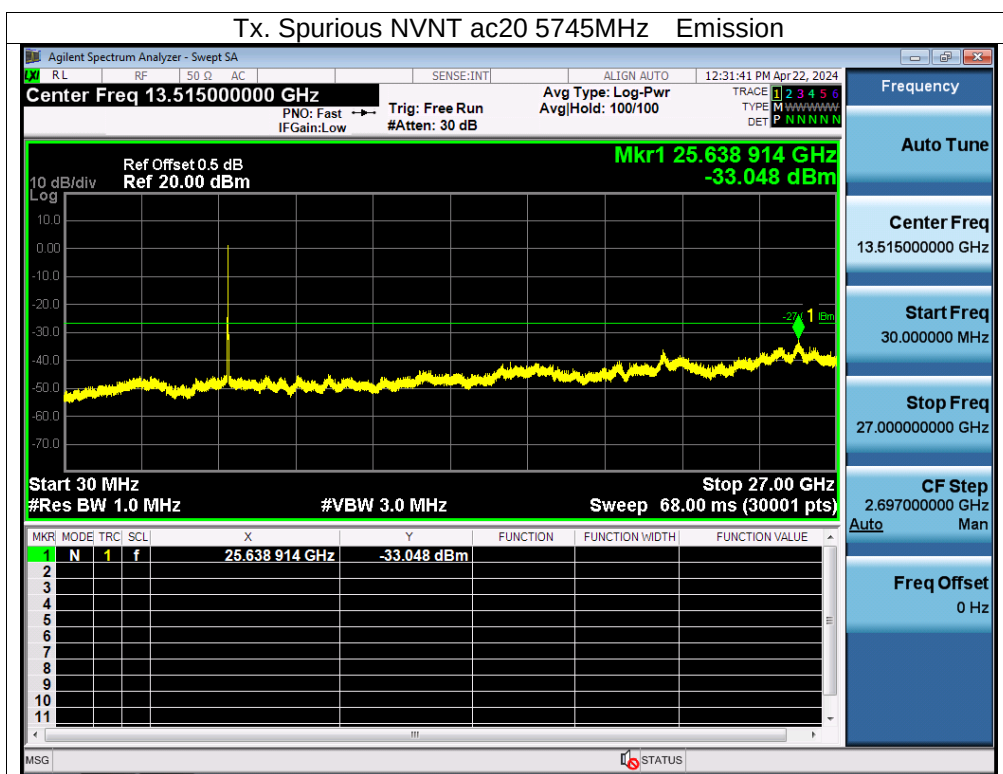
5745-5825 MHz

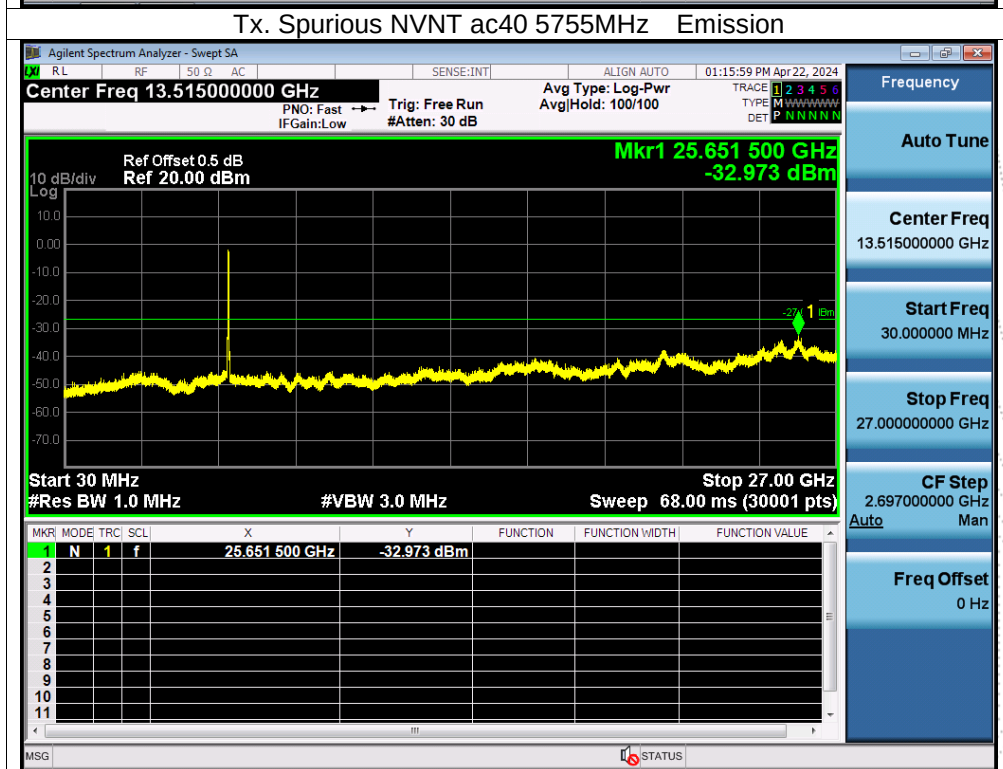
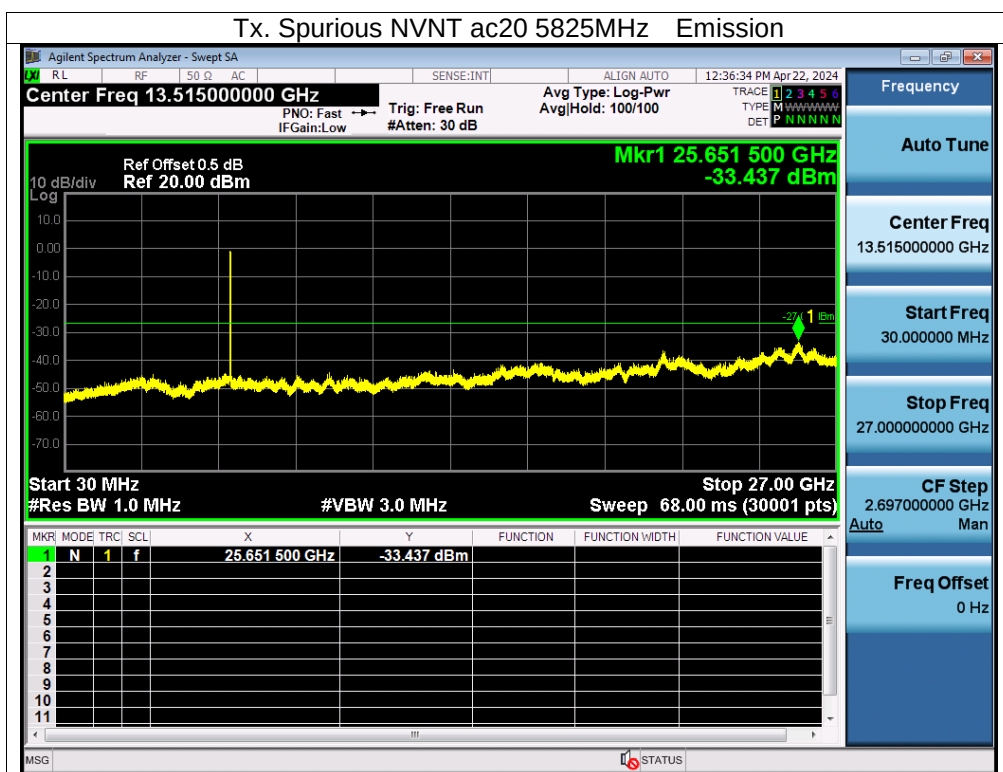


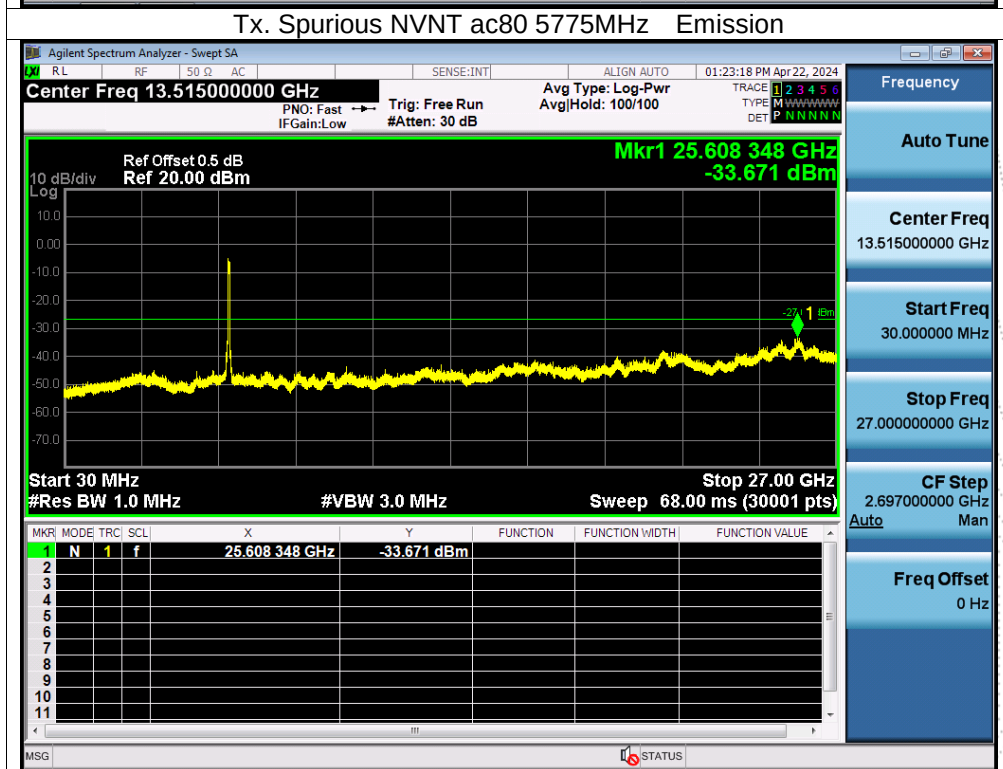
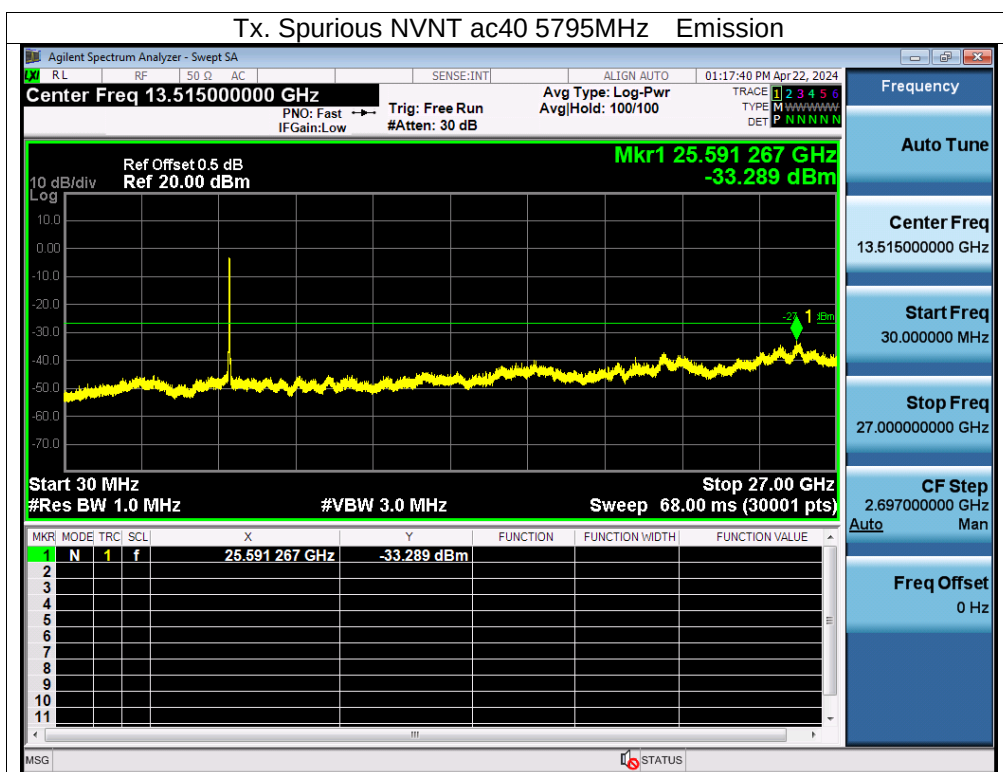












13. Frequency Stability Measurement

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. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and he limit is less than ± 20 ppm (IEEE 802.11n specification).
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 $-20^\circ\text{C} \sim 70^\circ\text{C}$.

13.4 Test Result

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 24V
Test Mode:	TX (5.1G) Mode Frequency U-NII-1 (5180-5240MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency : 5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	24.00	5180.0069	5180	0.0069	1.3320
		V max (V)	27.60	5180.0130	5180	0.0130	2.5097
		V min (V)	20.40	5180.0023	5180	0.0023	0.4440
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency : 5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	24	T (°C)	-20	5180.0096	5180	0.0096	1.8533
		T (°C)	-10	5180.0040	5180	0.0040	0.7722
		T (°C)	0	5180.0091	5180	0.0091	1.7568
		T (°C)	10	5180.0114	5180	0.0114	2.2008
		T (°C)	20	5180.0124	5180	0.0124	2.3938
		T (°C)	30	5180.0043	5180	0.0043	0.8301
		T (°C)	40	5180.0046	5180	0.0046	0.8880
		T (°C)	50	5180.0054	5180	0.0054	1.0425
		T (°C)	60	5180.0095	5180	0.0095	1.8340
		T (°C)	70	5180.0058	5180	0.0058	1.1197
Limits				5150-5250 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	24.00	5200.0019	5200	0.0019	0.3654
		V max (V)	27.60	5200.0092	5200	0.0092	1.7692
		V min (V)	20.40	5200.0025	5200	0.0025	0.4808
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	24	T (°C)	-20	5200.00940	5200	0.00940	1.8077
		T (°C)	-10	5200.00580	5200	0.00580	1.1154
		T (°C)	0	5200.00350	5200	0.00350	0.6731
		T (°C)	10	5200.00510	5200	0.00510	0.9808
		T (°C)	20	5200.00820	5200	0.00820	1.5769
		T (°C)	30	5200.00420	5200	0.00420	0.8077
		T (°C)	40	5200.00950	5200	0.00950	1.8269
		T (°C)	50	5200.00090	5200	0.00090	0.1731
		T (°C)	60	5200.00490	5200	0.00490	0.9423
		T (°C)	70	5200.00720	5200	0.00720	1.3846
Limits				5150-5250 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	24.00	5240.0088	5240	0.0088	1.6794
		V max (V)	27.60	5240.0051	5240	0.0051	0.9733
		V min (V)	20.40	5240.0110	5240	0.0110	2.0992
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	24	T (°C)	-20	5240.0134	5240	0.0134	2.5573
		T (°C)	-10	5240.0050	5240	0.0050	0.9542
		T (°C)	0	5240.0013	5240	0.0013	0.2481
		T (°C)	10	5240.0036	5240	0.0036	0.6870
		T (°C)	20	5240.0048	5240	0.0048	0.9160
		T (°C)	30	5240.0112	5240	0.0112	2.1374
		T (°C)	40	5240.0084	5240	0.0084	1.6031
		T (°C)	50	5240.0088	5240	0.0088	1.6794
		T (°C)	60	5240.0107	5240	0.0107	2.0420
		T (°C)	70	5240.0084	5240	0.0084	1.6031
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 24V
Test Mode:	TX (5.3G) Mode Frequency U-NII-2A (5260-5320MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	24.00	5260.0088	5260	0.0088	1.6730
		V max (V)	27.60	5260.0129	5260	0.0129	2.4525
		V min (V)	20.40	5260.0056	5260	0.0056	1.0646
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5260MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	24	T (°C)	-20	5260.0116	5260	0.0116	2.2053
		T (°C)	-10	5260.0069	5260	0.0069	1.3118
		T (°C)	0	5260.0089	5260	0.0089	1.6920
		T (°C)	10	5260.0081	5260	0.0081	1.5399
		T (°C)	20	5260.0119	5260	0.0119	2.2624
		T (°C)	30	5260.0068	5260	0.0068	1.2928
		T (°C)	40	5260.0059	5260	0.0059	1.1217
		T (°C)	50	5260.0043	5260	0.0043	0.8175
		T (°C)	60	5260.0128	5260	0.0128	2.4335
		T (°C)	70	5260.0044	5260	0.0044	0.8365
Limits				5260-5320 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	24.00	5280.0038	5280	0.0038	0.7197
		V max (V)	27.60	5280.0106	5280	0.0106	2.0076
		V min (V)	20.40	5280.0044	5280	0.0044	0.8333
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency : 5280MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	24	T (°C)	-20	5280.01180	5280	0.01180	2.2348
		T (°C)	-10	5280.00090	5280	0.00090	0.1705
		T (°C)	0	5280.01100	5280	0.01100	2.0833
		T (°C)	10	5280.00500	5280	0.00500	0.9470
		T (°C)	20	5280.00170	5280	0.00170	0.3220
		T (°C)	30	5280.00270	5280	0.00270	0.5114
		T (°C)	40	5280.00880	5280	0.00880	1.6667
		T (°C)	50	5280.01340	5280	0.01340	2.5379
		T (°C)	60	5280.00170	5280	0.00170	0.3220
		T (°C)	70	5280.00190	5280	0.00190	0.3598
Limits				5260-5320 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	24.00	5320.0079	5320	0.0079	1.4850
		V max (V)	27.60	5320.0053	5320	0.0053	0.9962
		V min (V)	20.40	5320.0097	5320	0.0097	1.8233
Limits				5260-5320 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5320MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	24	T (°C)	-20	5320.0032	5320	0.0032	0.6015
		T (°C)	-10	5320.0104	5320	0.0104	1.9549
		T (°C)	0	5320.0081	5320	0.0081	1.5226
		T (°C)	10	5320.0042	5320	0.0042	0.7895
		T (°C)	20	5320.0005	5320	0.0005	0.0940
		T (°C)	30	5320.0025	5320	0.0025	0.4699
		T (°C)	40	5320.0098	5320	0.0098	1.8421
		T (°C)	50	5320.0001	5320	0.0001	0.0188
		T (°C)	60	5320.0068	5320	0.0068	1.2782
		T (°C)	70	5320.0104	5320	0.0104	1.9549
Limits				5260-5320 MHz			
Result				Complies			

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 24V
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)	24.00	5500.0015	5500	0.0015	0.2727
		V max (V)	27.60	5500.0070	5500	0.0070	1.2727
		V min (V)	20.40	5500.0017	5500	0.0017	0.3091
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)	24	T (°C)	-20	5500.0005	5500	0.0005	0.0909
		T (°C)	-10	5500.0079	5500	0.0079	1.4364
		T (°C)	0	5500.0114	5500	0.0114	2.0727
		T (°C)	10	5500.0115	5500	0.0115	2.0909
		T (°C)	20	5500.0049	5500	0.0049	0.8909
		T (°C)	30	5500.0115	5500	0.0115	2.0909
		T (°C)	40	5500.0018	5500	0.0018	0.3273
		T (°C)	50	5500.0088	5500	0.0088	1.6000
		T (°C)	60	5500.0056	5500	0.0056	1.0182
		T (°C)	70	5500.0015	5500	0.0015	0.2727
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)	24.00	5580.0079	5580	0.0079	1.4158
		V max (V)	27.60	5580.0114	5580	0.0114	2.0430
		V min (V)	20.40	5580.0024	5580	0.0024	0.4301
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)	24	T (°C)	-20	5580.00220	5580	0.00220	0.3943
		T (°C)	-10	5580.00400	5580	0.00400	0.7168
		T (°C)	0	5580.00580	5580	0.00580	1.0394
		T (°C)	10	5580.01240	5580	0.01240	2.2222
		T (°C)	20	5580.00580	5580	0.00580	1.0394
		T (°C)	30	5580.00140	5580	0.00140	0.2509
		T (°C)	40	5580.00030	5580	0.00030	0.0538
		T (°C)	50	5580.00810	5580	0.00810	1.4516
		T (°C)	60	5580.01070	5580	0.01070	1.9176
		T (°C)	70	5580.00850	5580	0.00850	1.5233
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)	24.00	5700.0076	5700	0.0076	1.3333
		V max (V)	27.60	5700.0001	5700	0.0001	0.0175
		V min (V)	20.40	5700.0130	5700	0.0130	2.2807
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5700MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	24	T (°C)	-20	5700.0014	5700	0.0014	0.2456
		T (°C)	-10	5700.0071	5700	0.0071	1.2456
		T (°C)	0	5700.0072	5700	0.0072	1.2632
		T (°C)	10	5700.0088	5700	0.0088	1.5439
		T (°C)	20	5700.0075	5700	0.0075	1.3158
		T (°C)	30	5700.0049	5700	0.0049	0.8596
		T (°C)	40	5700.0098	5700	0.0098	1.7193
		T (°C)	50	5700.0024	5700	0.0024	0.4211
		T (°C)	60	5700.0052	5700	0.0052	0.9123
		T (°C)	70	5700.0124	5700	0.0124	2.1754
Limits				5725-5850 MHz			
Result				Complies			

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 24V
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)	24.00	5745.01010	5745	0.01010	1.7581
		V max (V)	27.60	5745.01270	5745	0.01270	2.2106
		V min (V)	20.40	5745.00640	5745	0.00640	1.1140
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)	24	T (°C)	-20	5745.00770	5745	0.00770	1.3403
		T (°C)	-10	5745.01120	5745	0.01120	1.9495
		T (°C)	0	5745.00360	5745	0.00360	0.6266
		T (°C)	10	5745.01020	5745	0.01020	1.7755
		T (°C)	20	5745.00760	5745	0.00760	1.3229
		T (°C)	30	5745.01030	5745	0.01030	1.7929
		T (°C)	40	5745.01260	5745	0.01260	2.1932
		T (°C)	50	5745.00570	5745	0.00570	0.9922
		T (°C)	60	5745.00800	5745	0.00800	1.3925
		T (°C)	70	5745.01200	5745	0.01200	2.0888
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)	24.00	5785.00390	5785	0.00390	0.6742
		V max (V)	27.60	5785.00450	5785	0.00450	0.7779
		V min (V)	20.40	5785.00060	5785	0.00060	0.1037
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)	24	T (°C)	-20	5785.00310	5785	0.00310	0.5359
		T (°C)	-10	5785.00200	5785	0.00200	0.3457
		T (°C)	0	5785.00100	5785	0.00100	0.1729
		T (°C)	10	5785.01010	5785	0.01010	1.7459
		T (°C)	20	5785.01180	5785	0.01180	2.0398
		T (°C)	30	5785.01000	5785	0.01000	1.7286
		T (°C)	40	5785.00220	5785	0.00220	0.3803
		T (°C)	50	5785.00980	5785	0.00980	1.6940
		T (°C)	60	5785.00070	5785	0.00070	0.1210
		T (°C)	70	5785.01110	5785	0.01110	1.9188
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)	24.00	5825.00540	5825	0.00540	0.9270
		V max (V)	27.60	5825.01020	5825	0.01020	1.7511
		V min (V)	20.40	5825.00630	5825	0.00630	1.0815
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)	24	T (°C)	-20	5825.00630	5825	0.00630	1.0815
		T (°C)	-10	5825.00080	5825	0.00080	0.1373
		T (°C)	0	5825.00060	5825	0.00060	0.1030
		T (°C)	10	5825.01030	5825	0.01030	1.7682
		T (°C)	20	5825.00050	5825	0.00050	0.0858
		T (°C)	30	5825.00780	5825	0.00780	1.3391
		T (°C)	40	5825.00200	5825	0.00200	0.3433
		T (°C)	50	5825.01310	5825	0.01310	2.2489
		T (°C)	60	5825.01030	5825	0.01030	1.7682
		T (°C)	70	5825.01170	5825	0.01170	2.0086
Limits				5725-5850 MHz			
Result				Complies			

14. Duty Cycle Of Test Signal

14.1 Standard Requirement

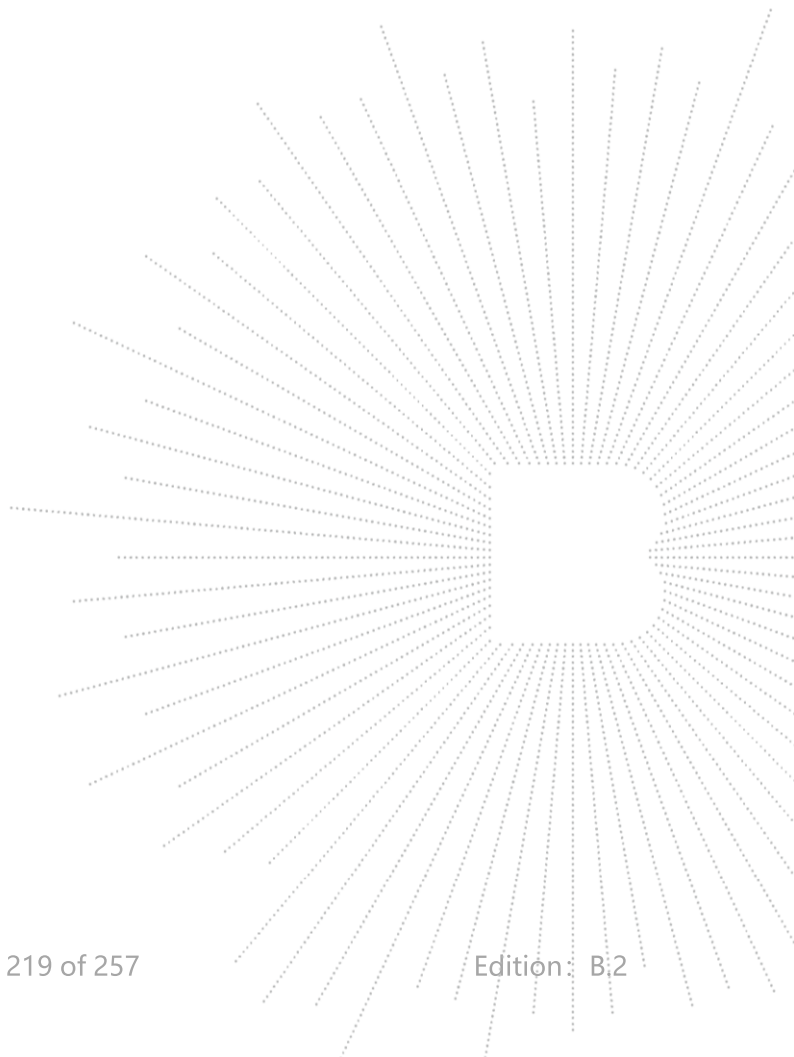
Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative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

14.2 Formula

Duty Cycle = $T_{on} / (T_{on} + T_{off})$

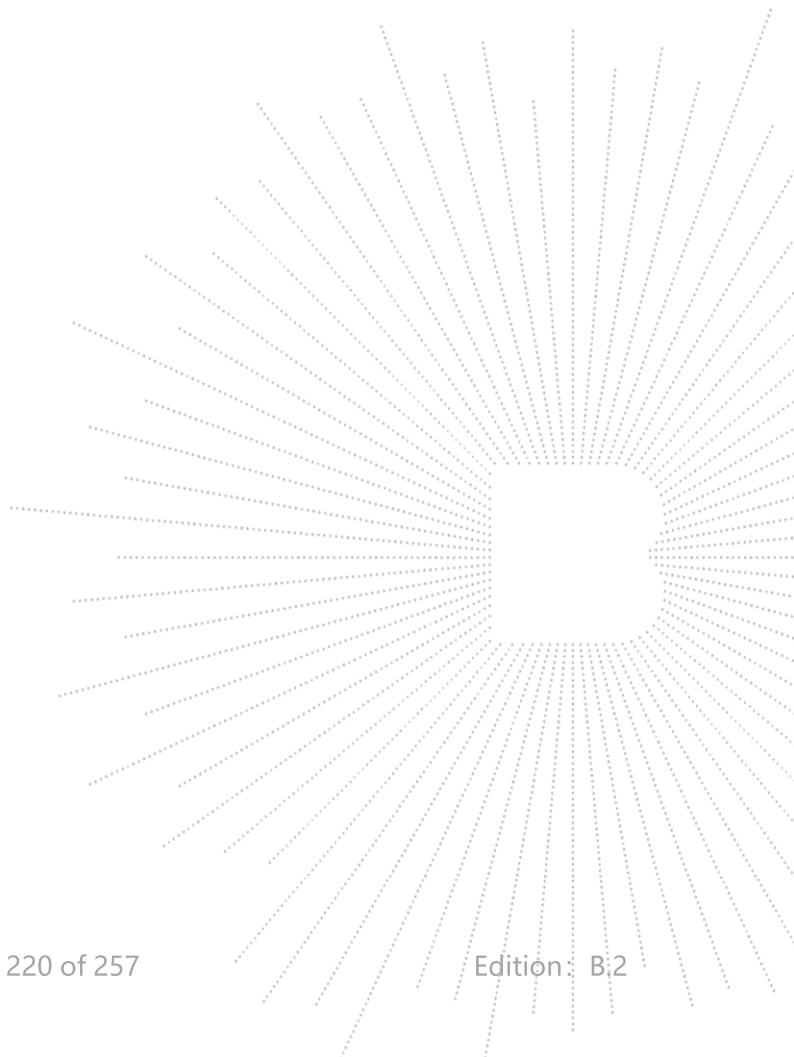
14.3 Test Procedure

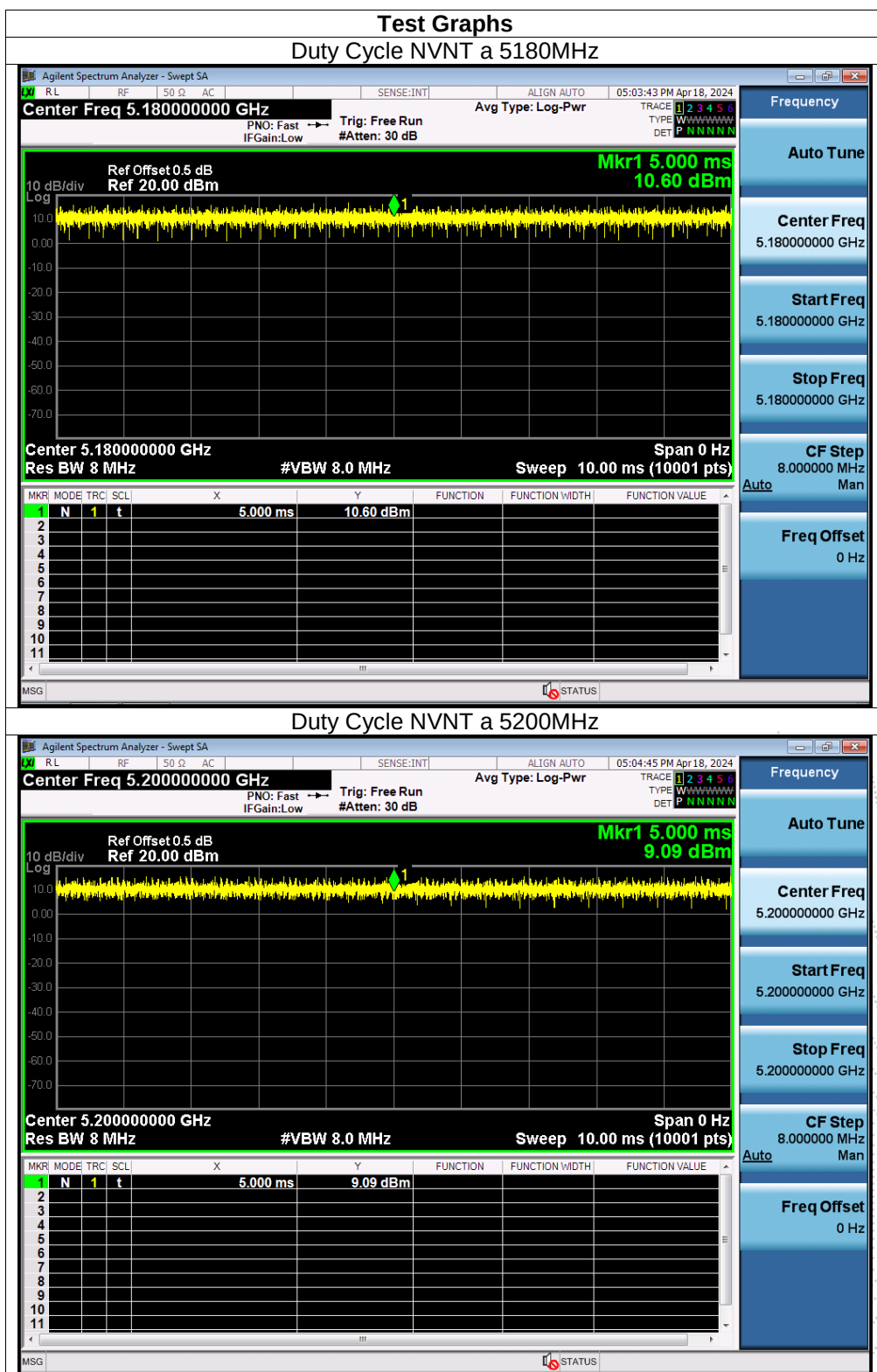
1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

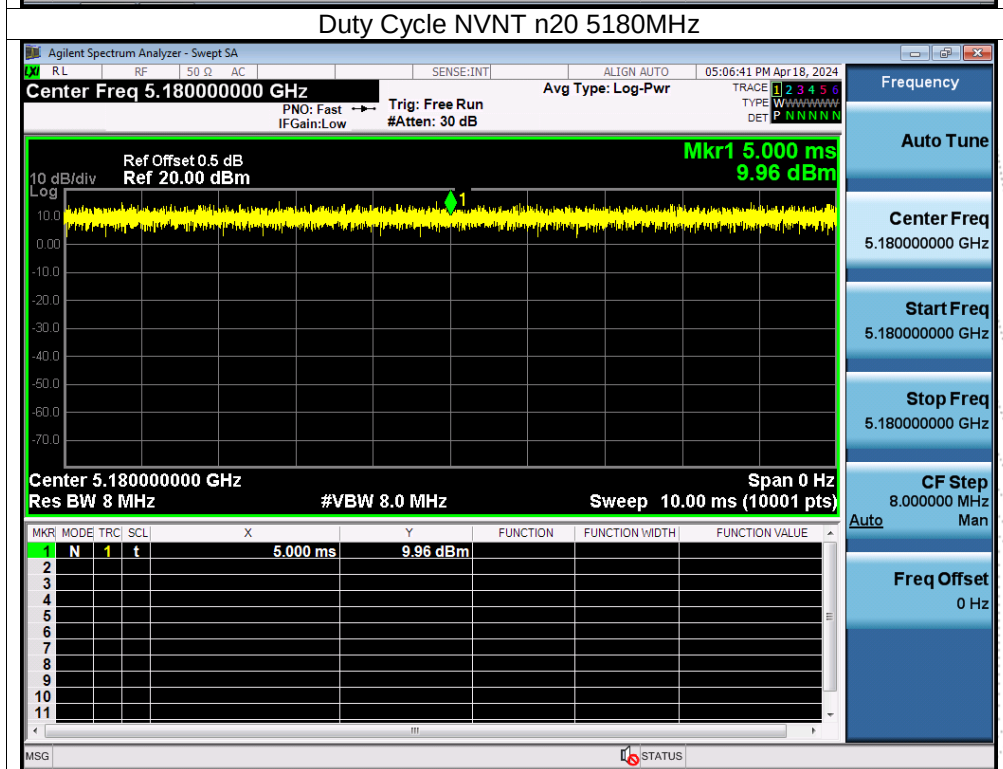
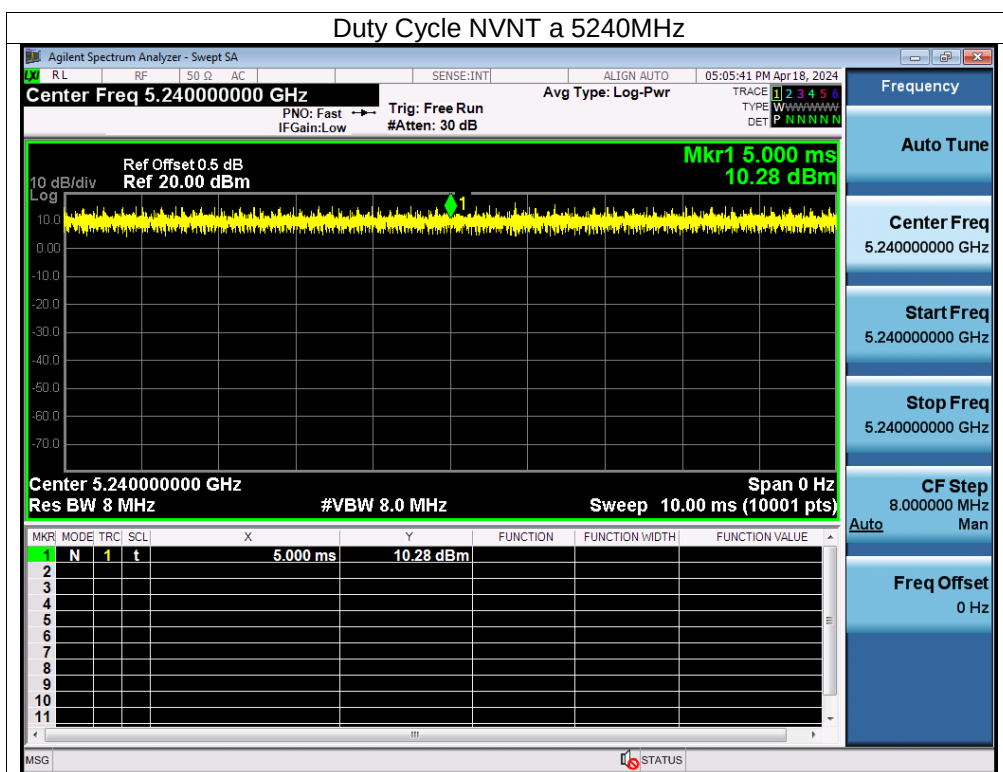


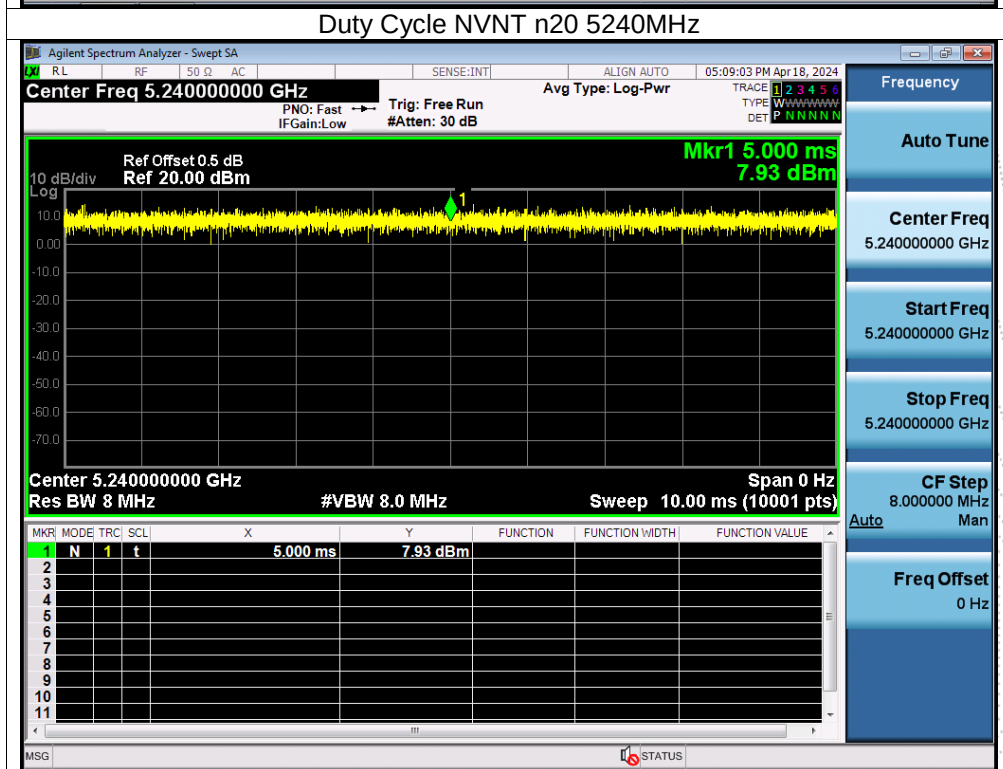
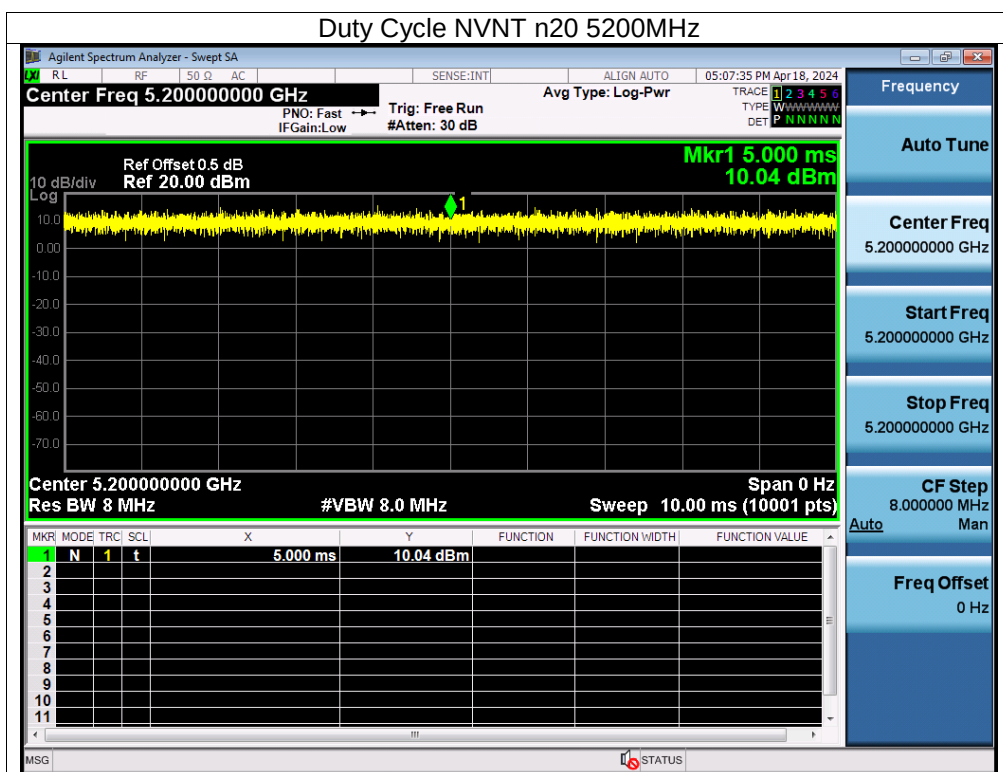
14.4 Test Result

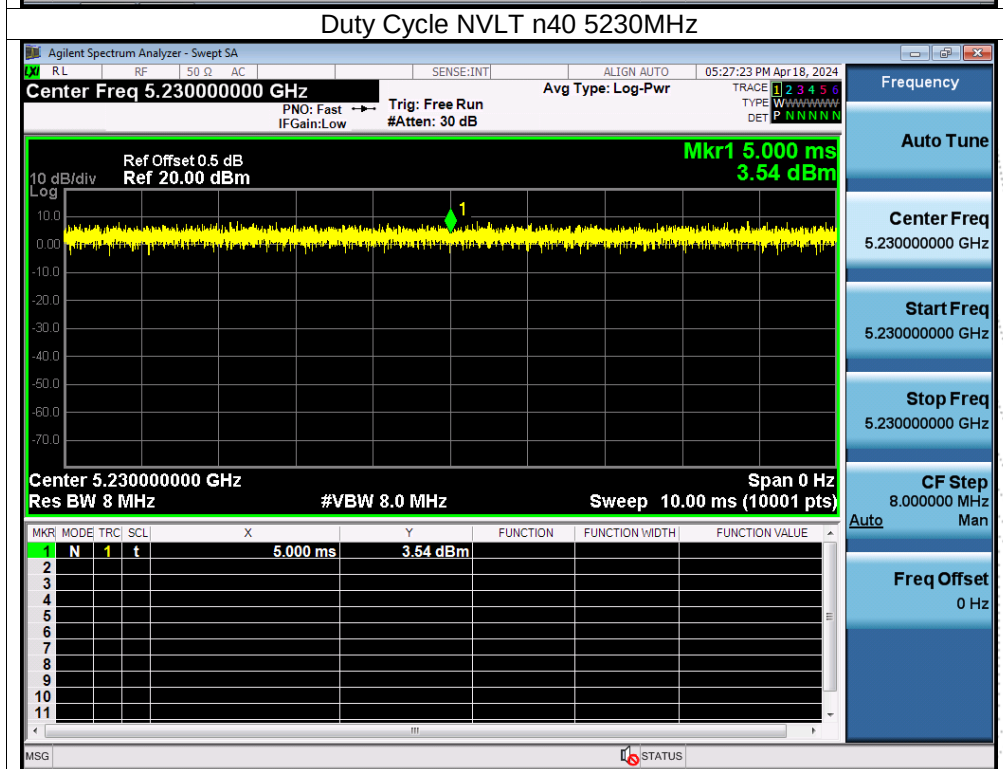
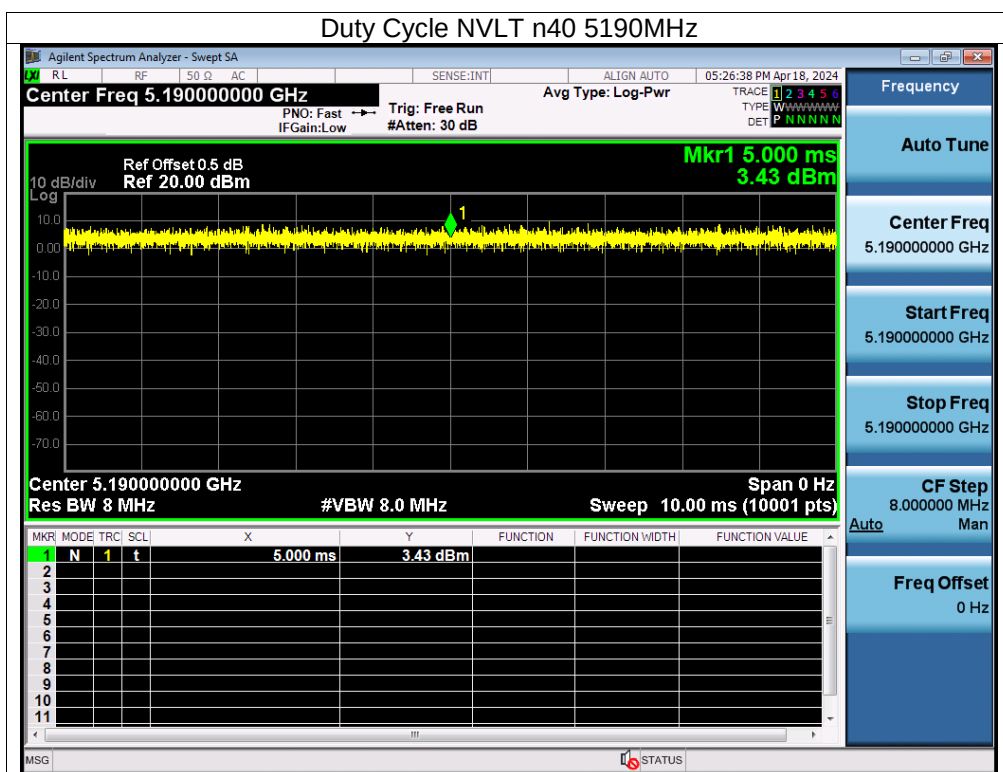
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5180	100	0	0
NVNT	a	5200	100	0	0
NVNT	a	5240	100	0	0
NVNT	n20	5180	100	0	0
NVNT	n20	5200	100	0	0
NVNT	n20	5240	100	0	0
NVNT	n40	5190	100	0	0
NVNT	n40	5230	100	0	0
NVNT	ac20	5180	100	0	0
NVNT	ac20	5200	100	0	0
NVNT	ac20	5240	100	0	0
NVNT	ac40	5190	100	0	0
NVNT	ac40	5230	100	0	0
NVNT	ac80	5210	100	0	0

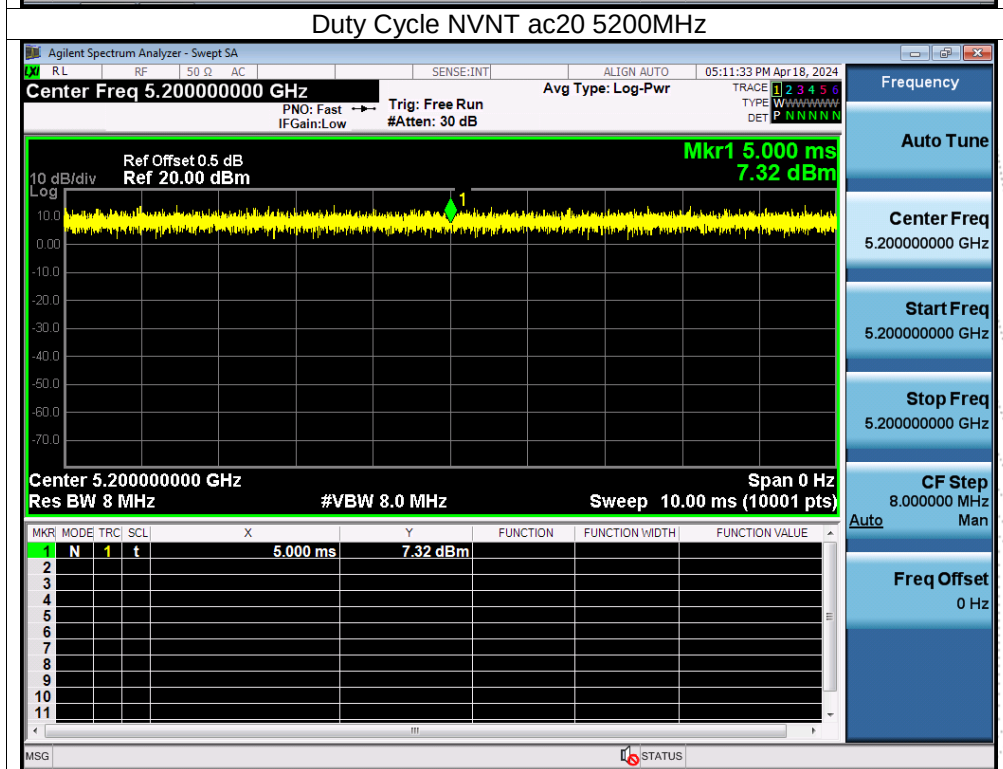
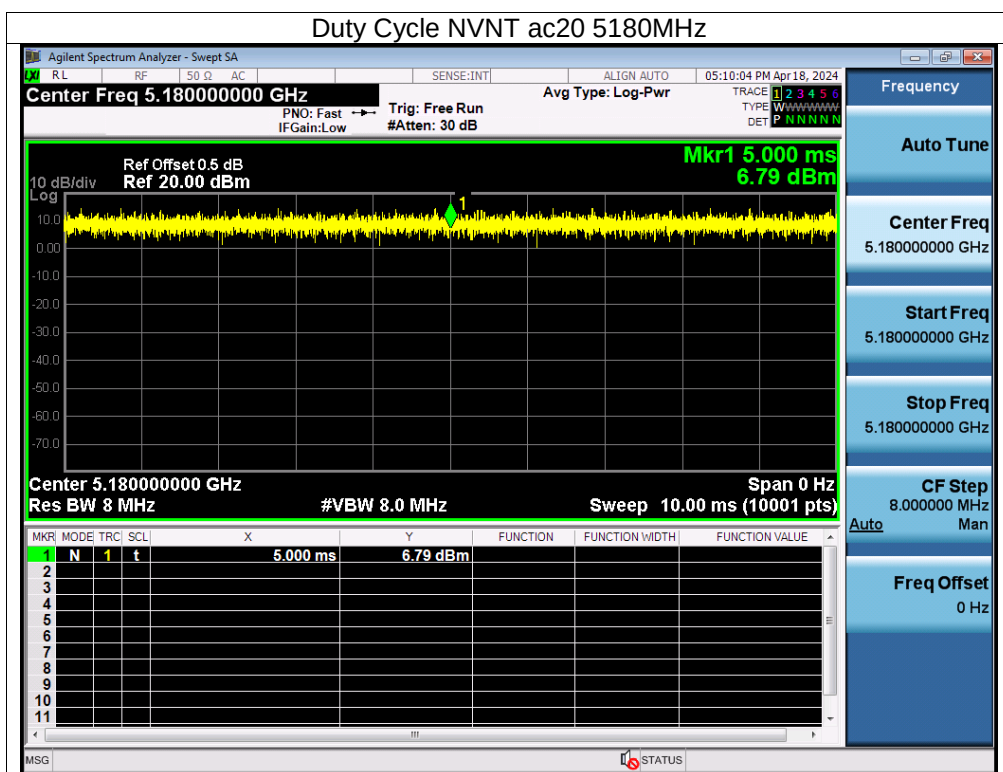


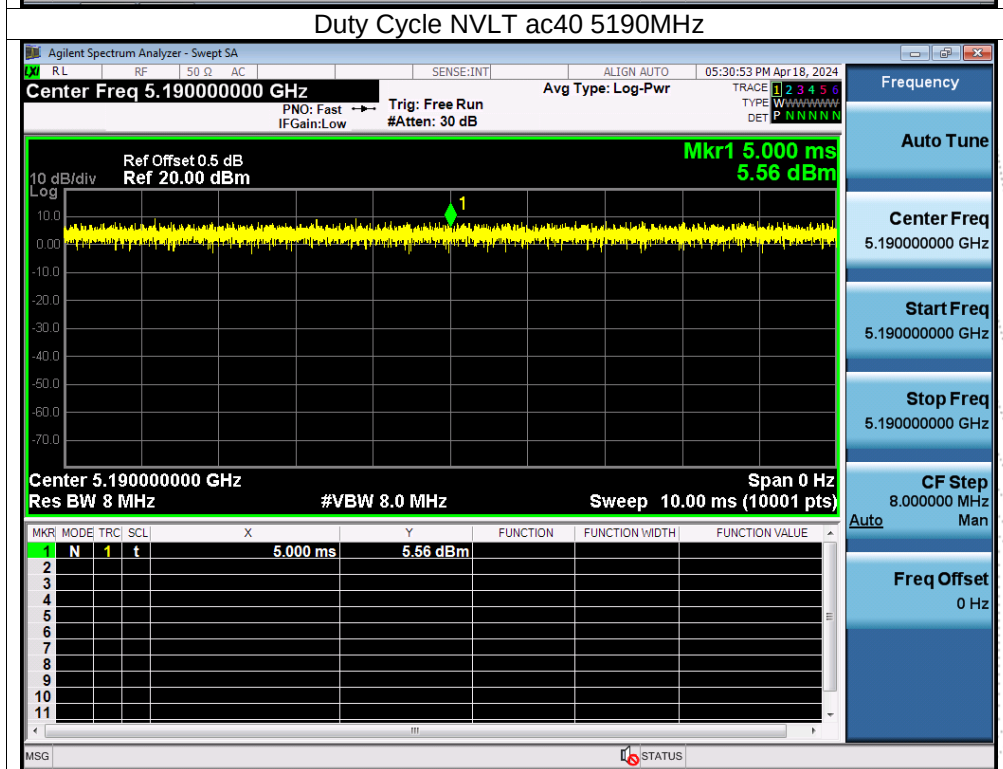
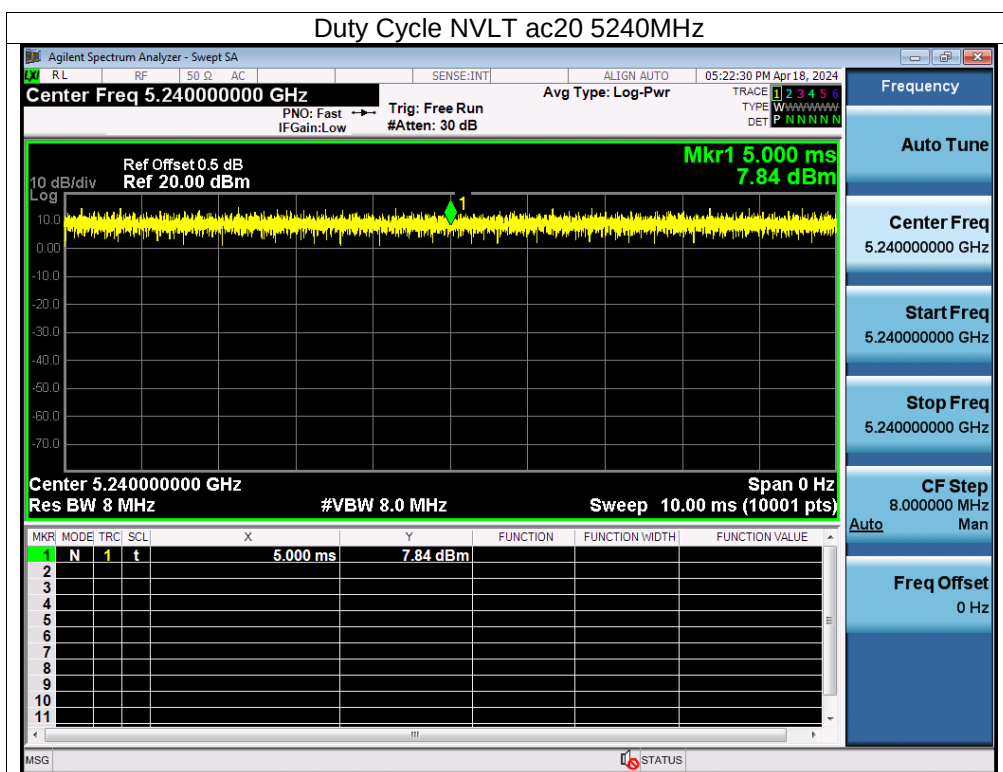


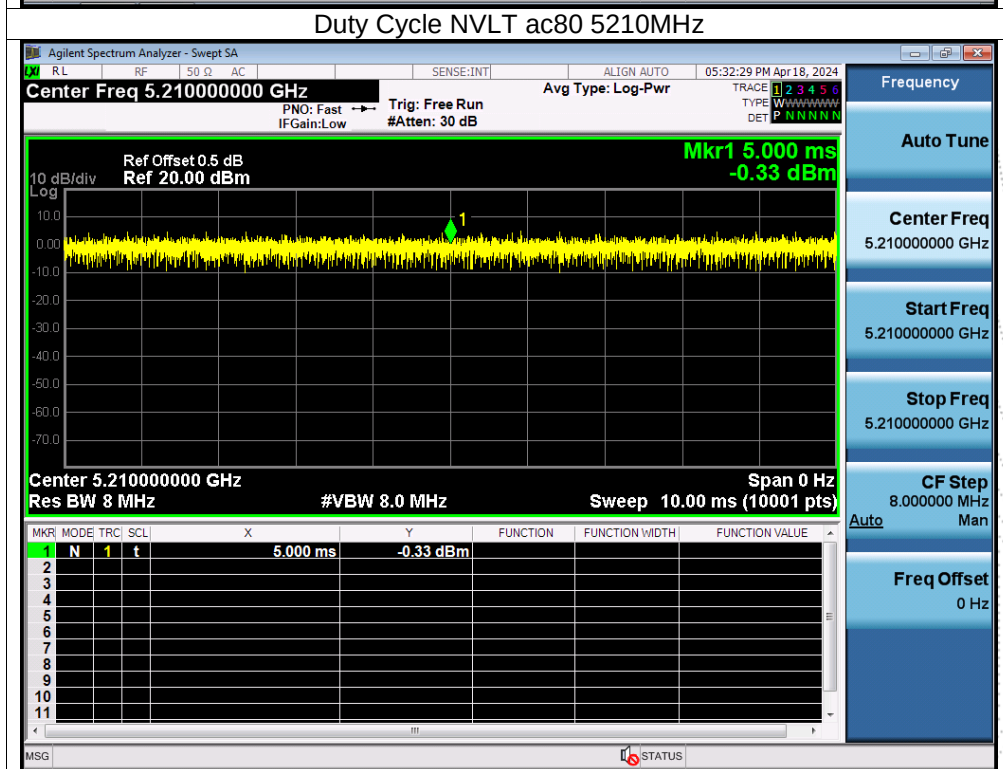
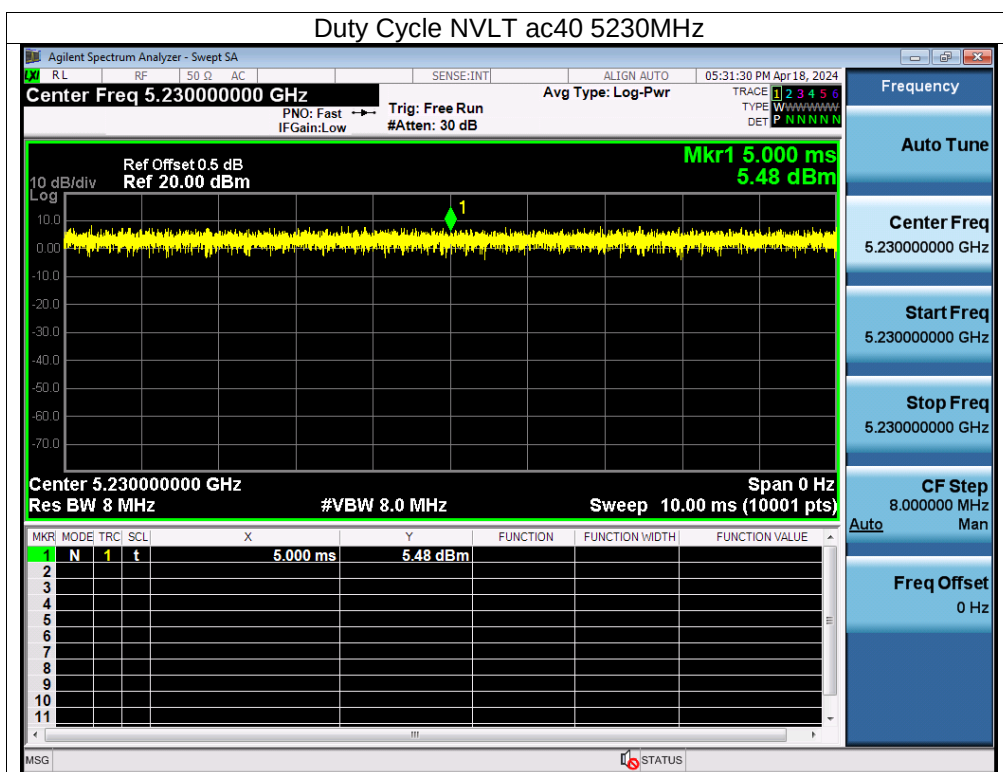




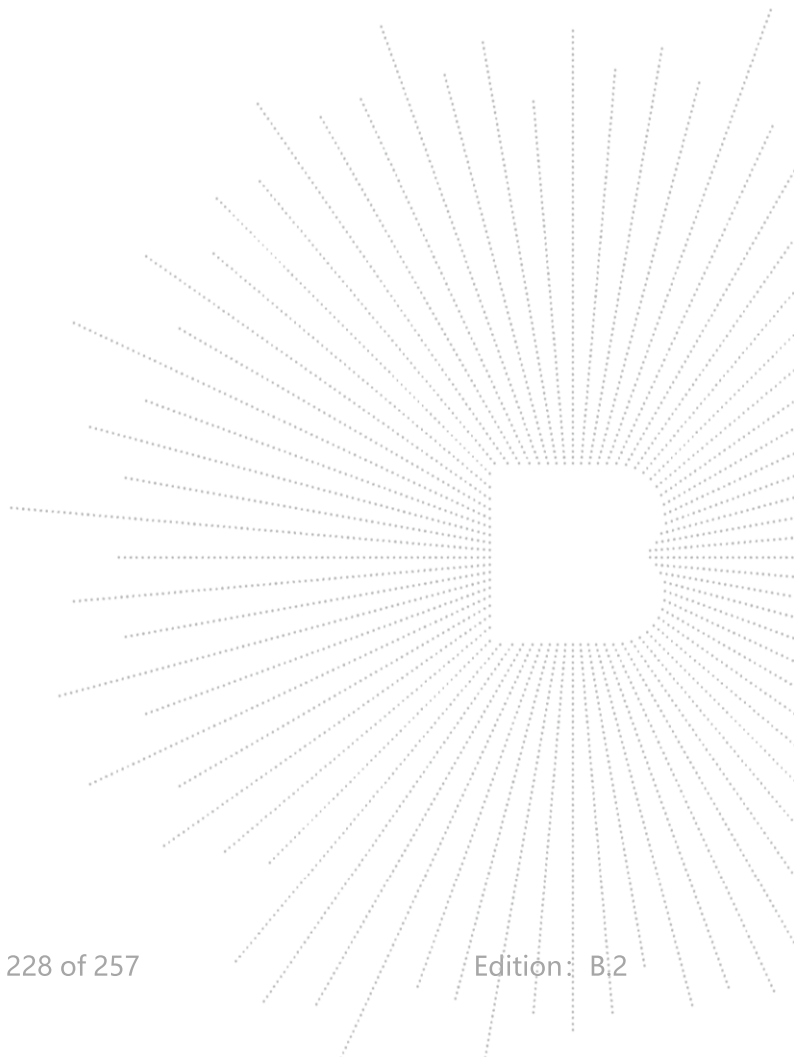


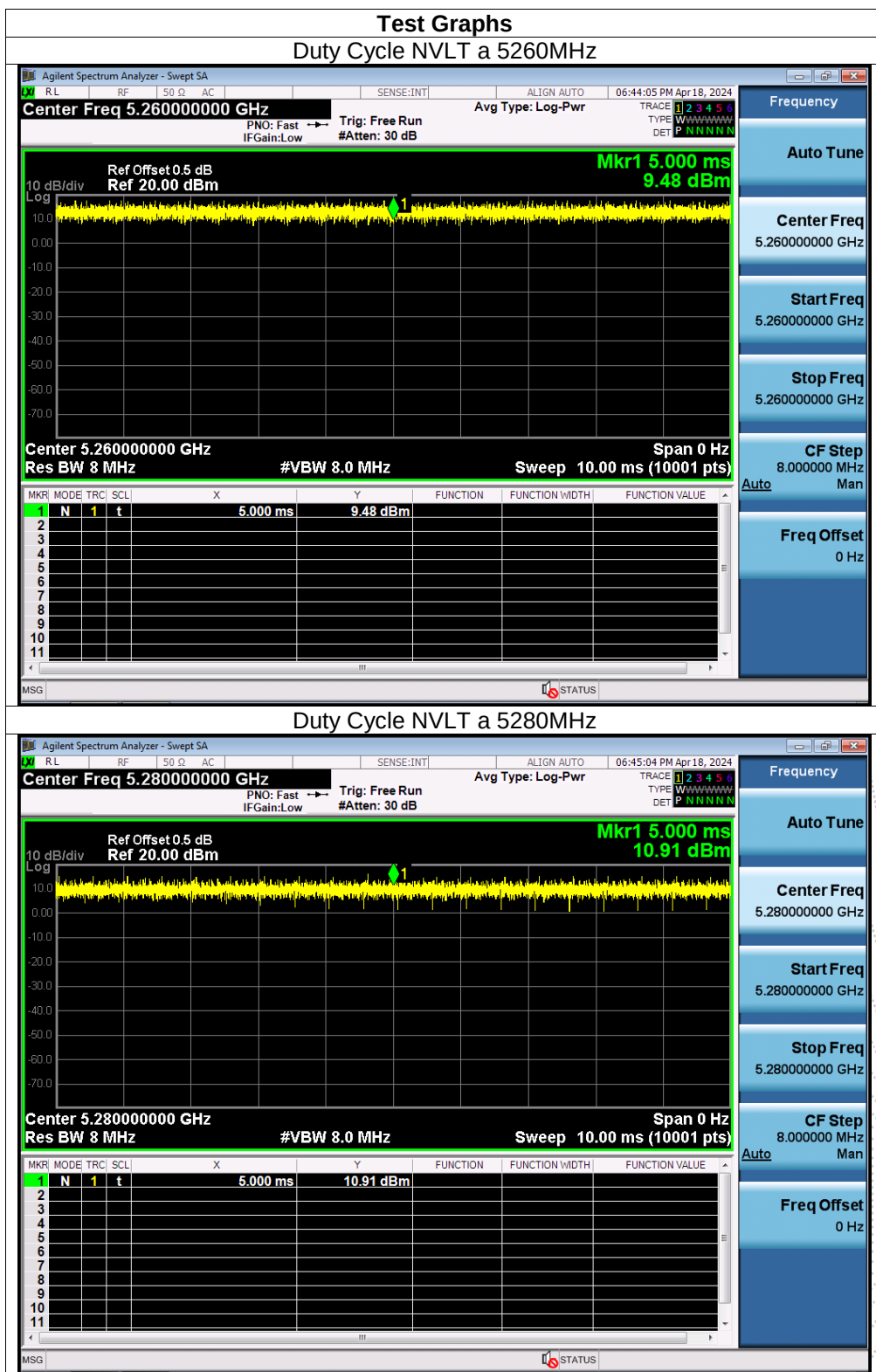


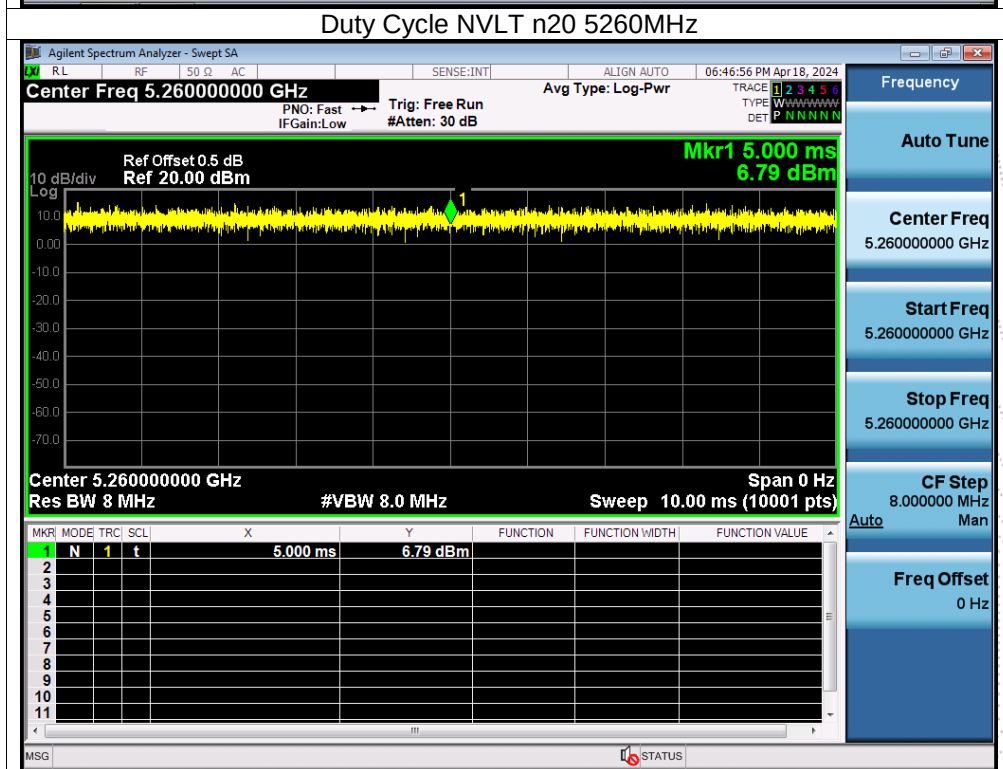
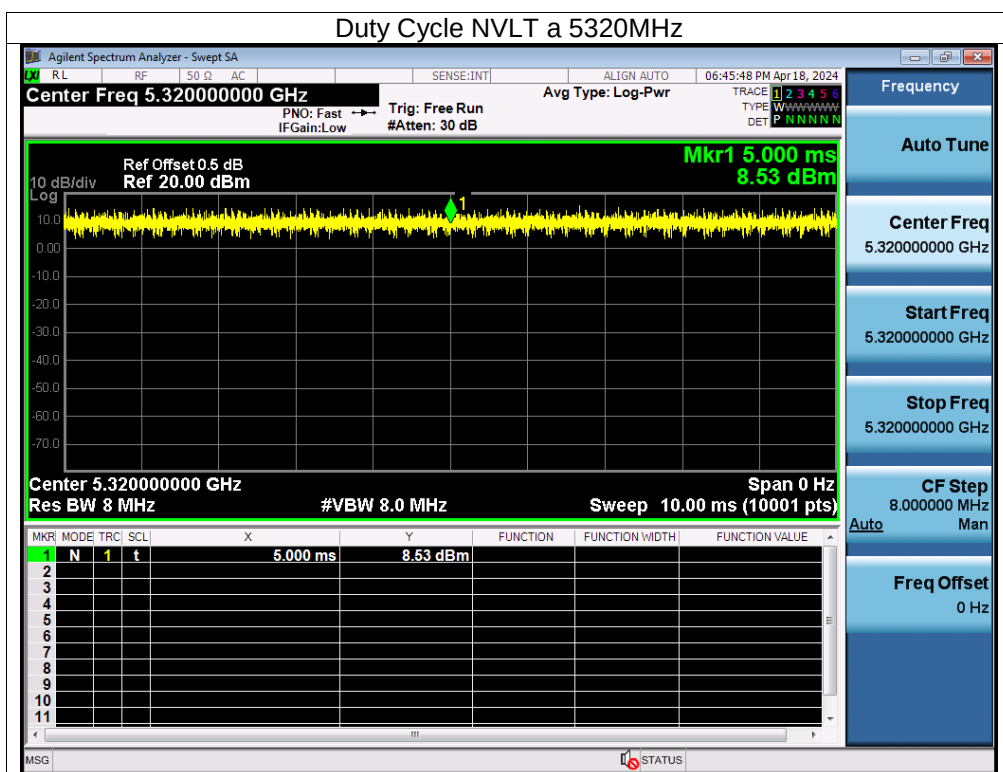


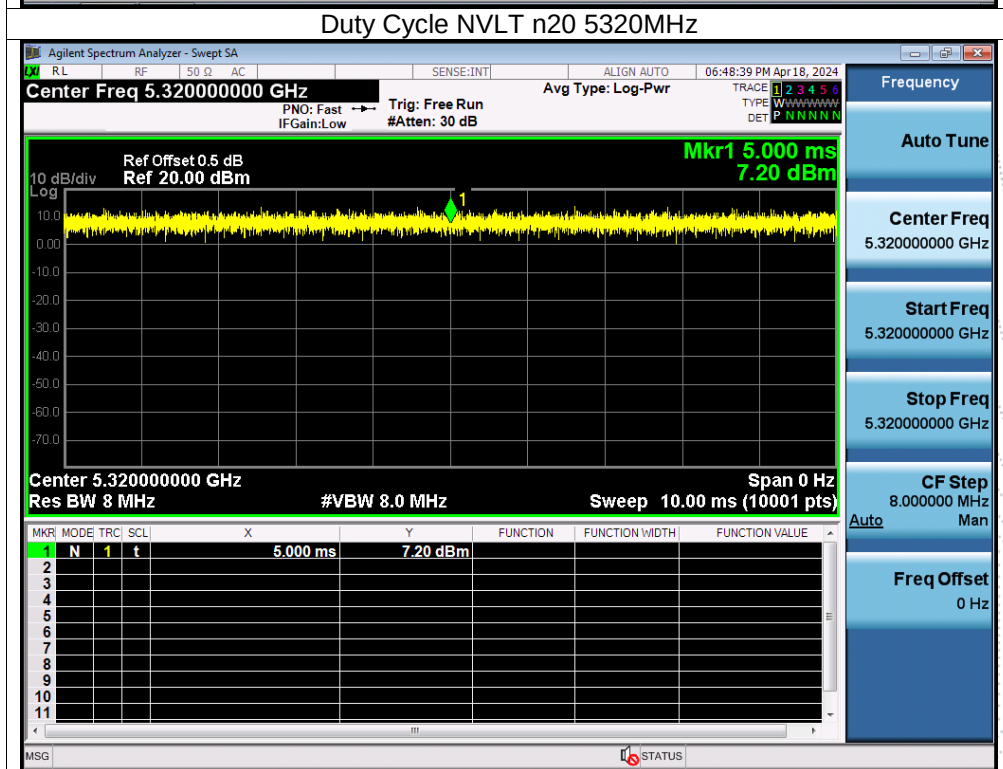
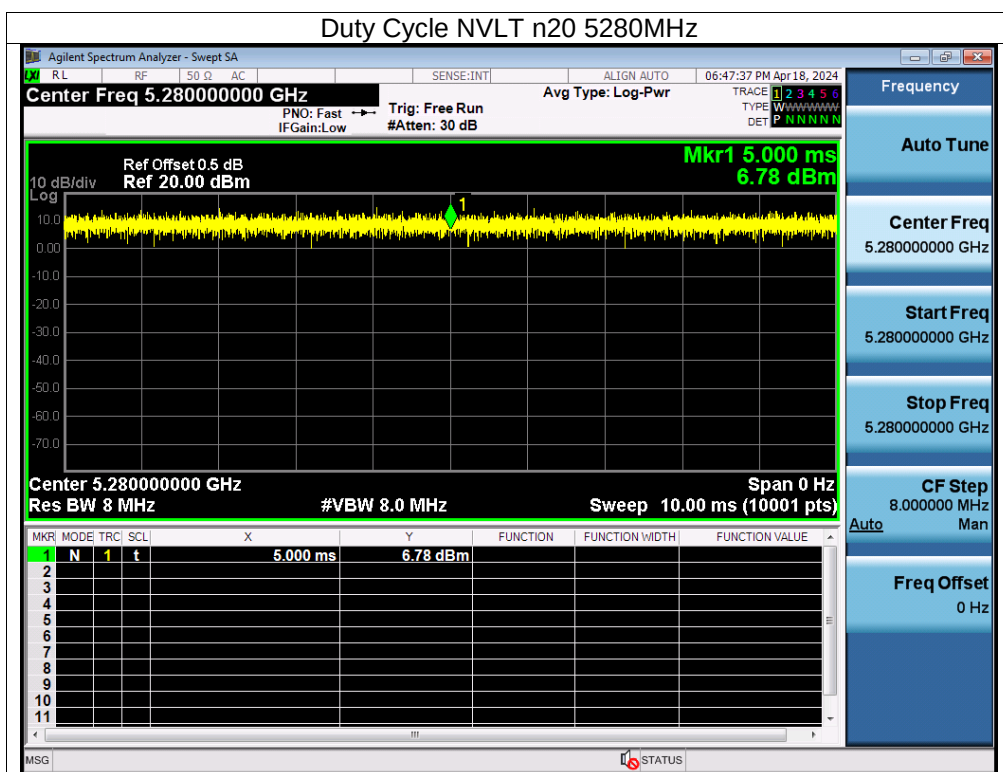


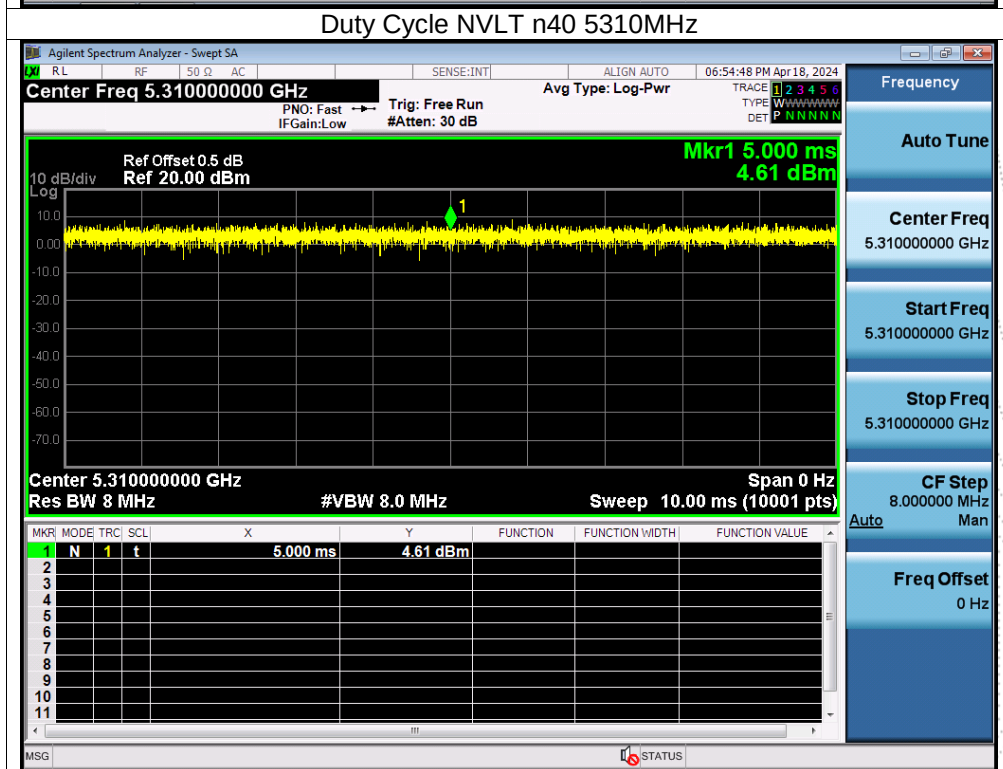
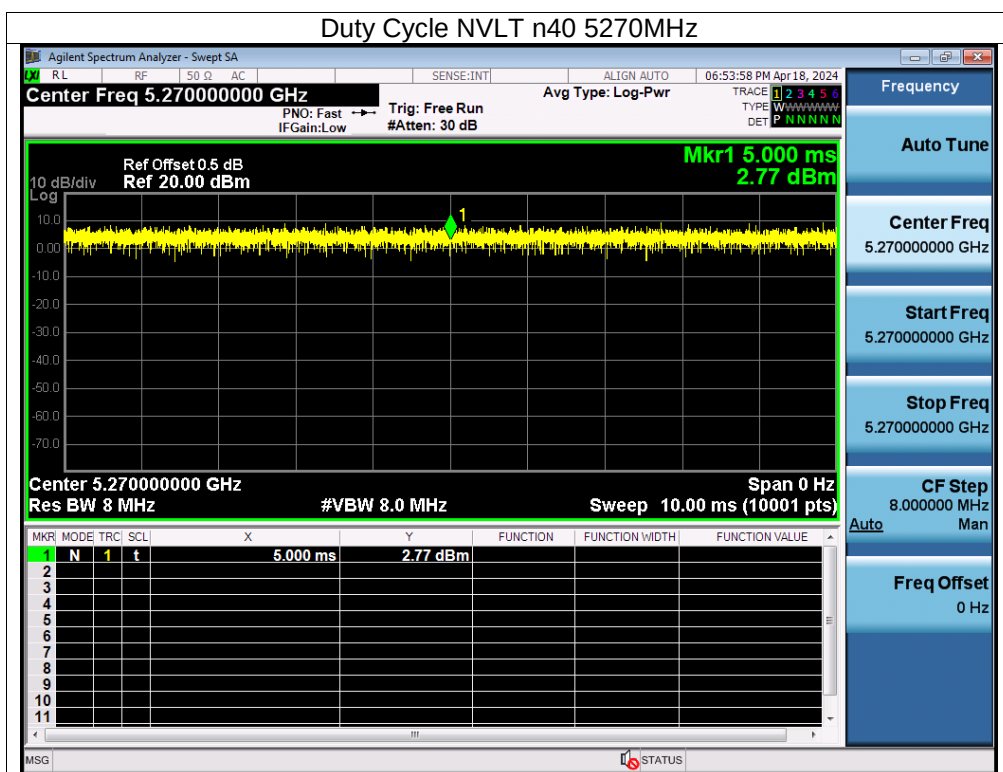
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5260	100	0	0
NVNT	a	5280	100	0	0
NVNT	a	5320	100	0	0
NVNT	n20	5260	100	0	0
NVNT	n20	5280	100	0	0
NVNT	n20	5320	100	0	0
NVNT	n40	5270	100	0	0
NVNT	n40	5310	100	0	0
NVNT	ac20	5260	100	0	0
NVNT	ac20	5280	100	0	0
NVNT	ac20	5320	100	0	0
NVNT	ac40	5270	100	0	0
NVNT	ac40	5310	100	0	0
NVNT	ac80	5290	100	0	0

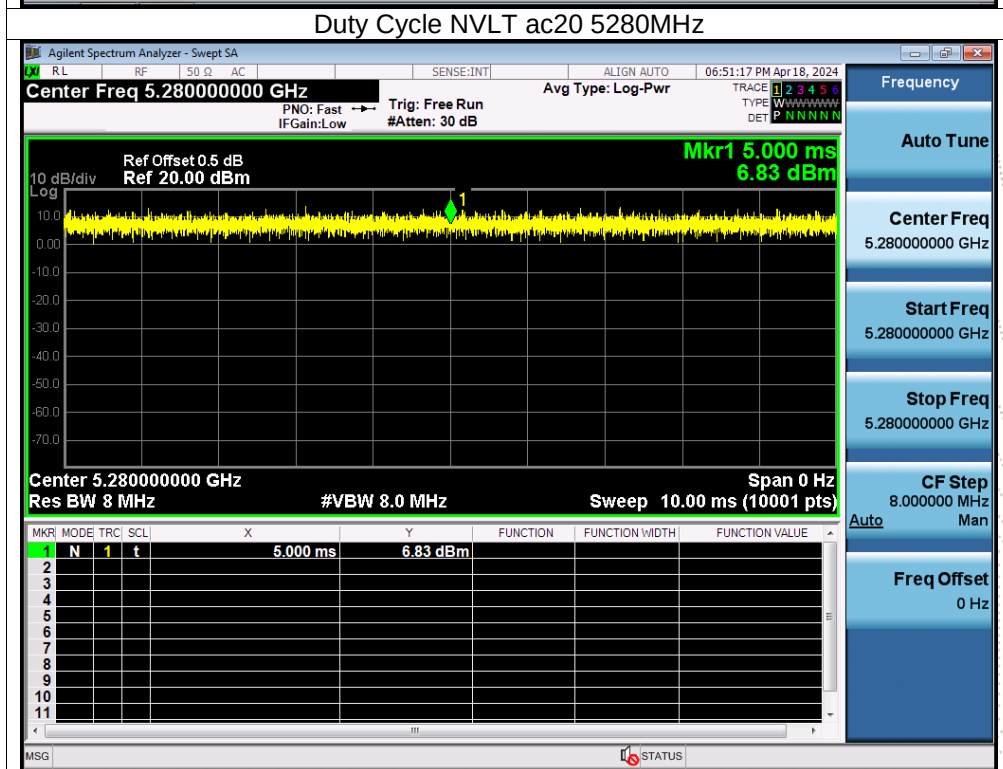
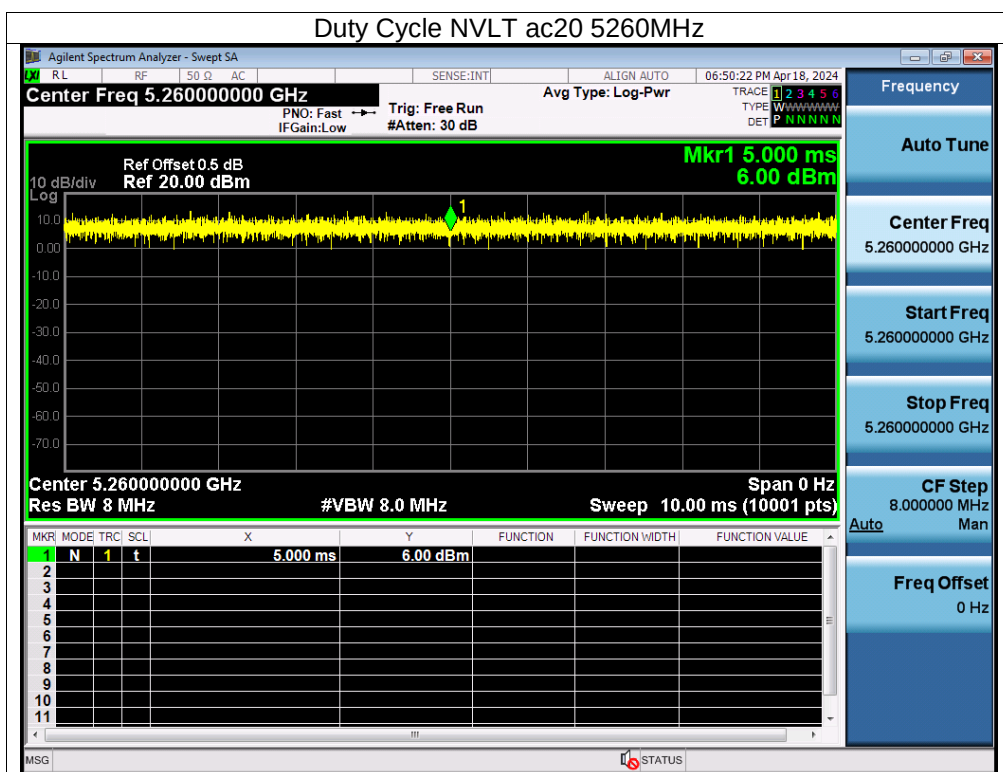


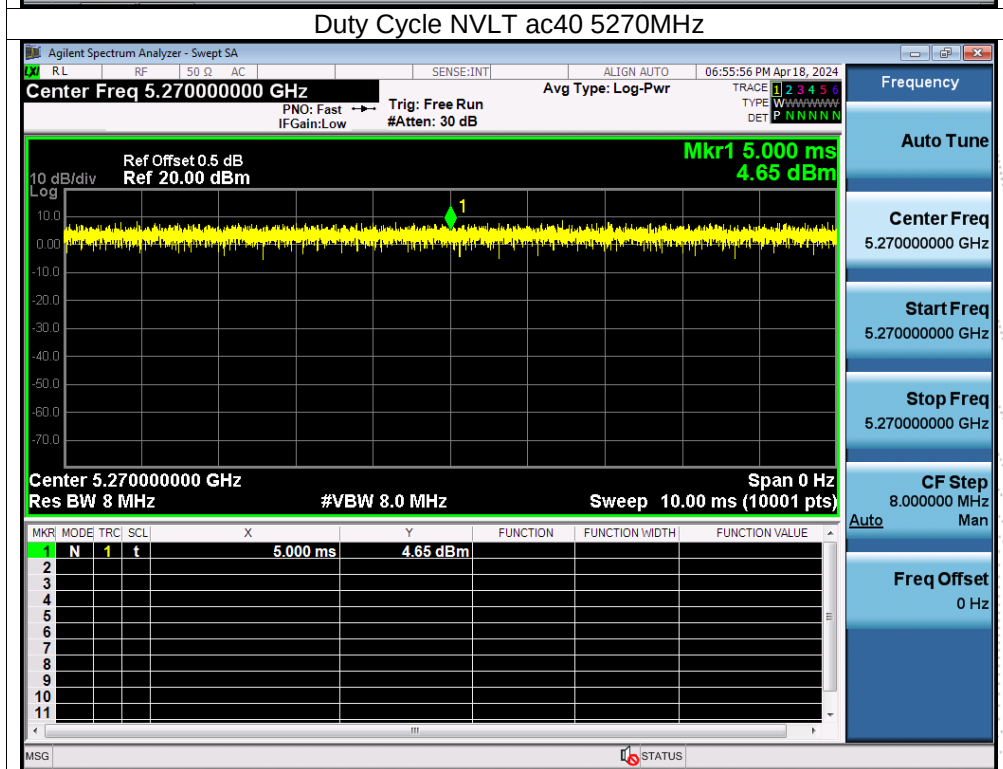
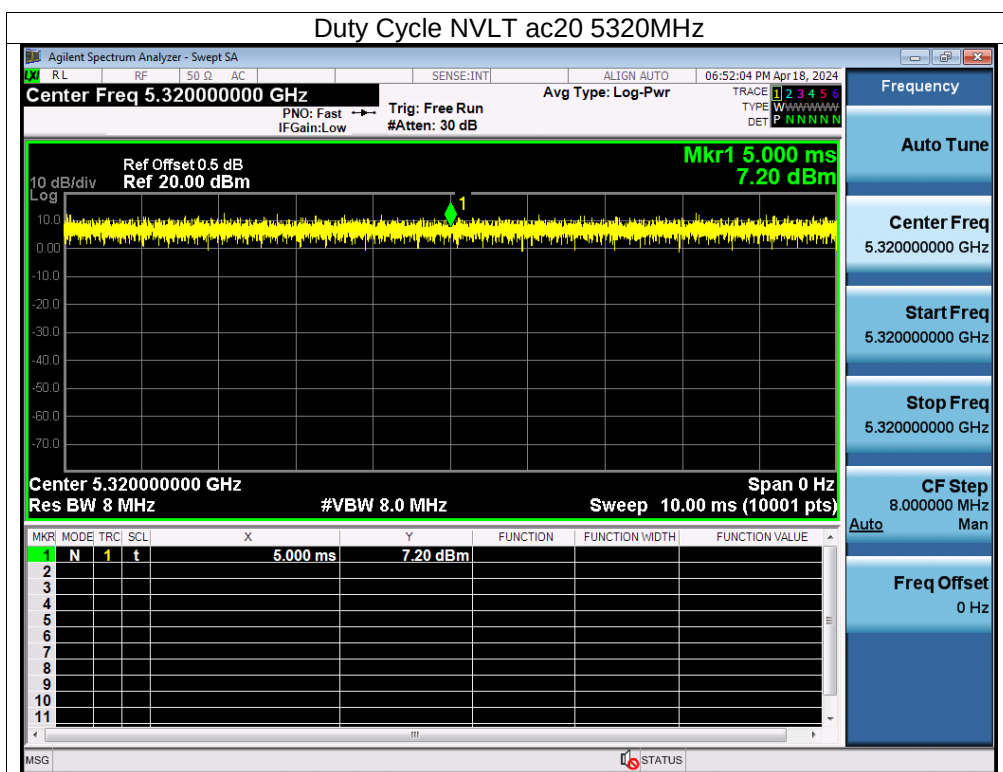


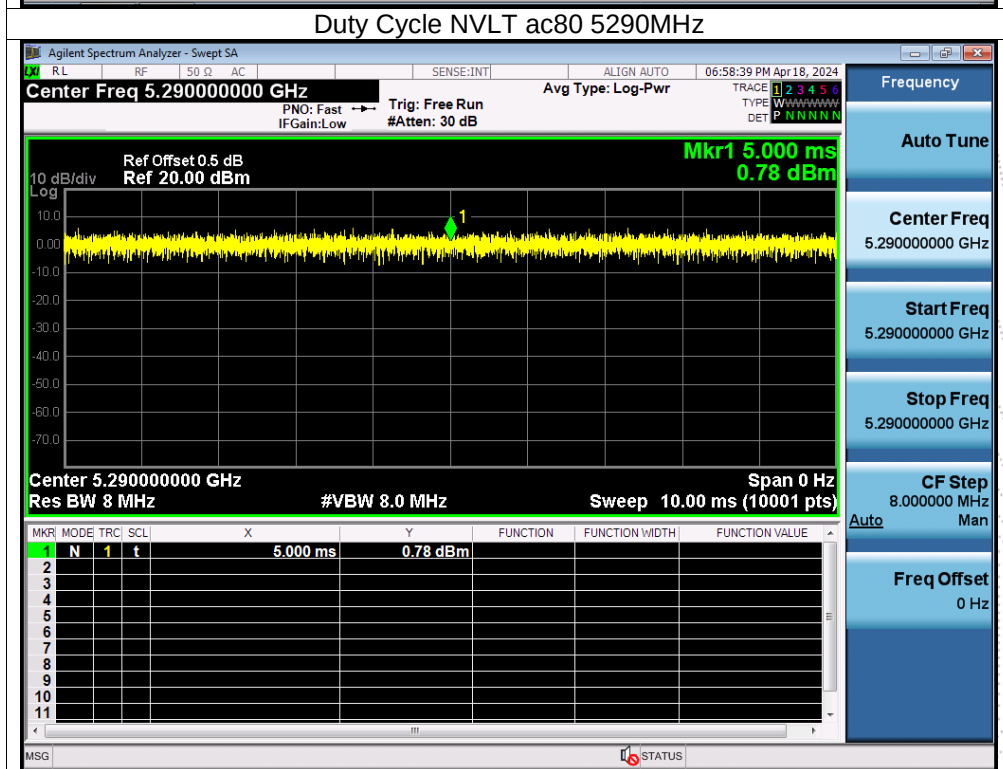
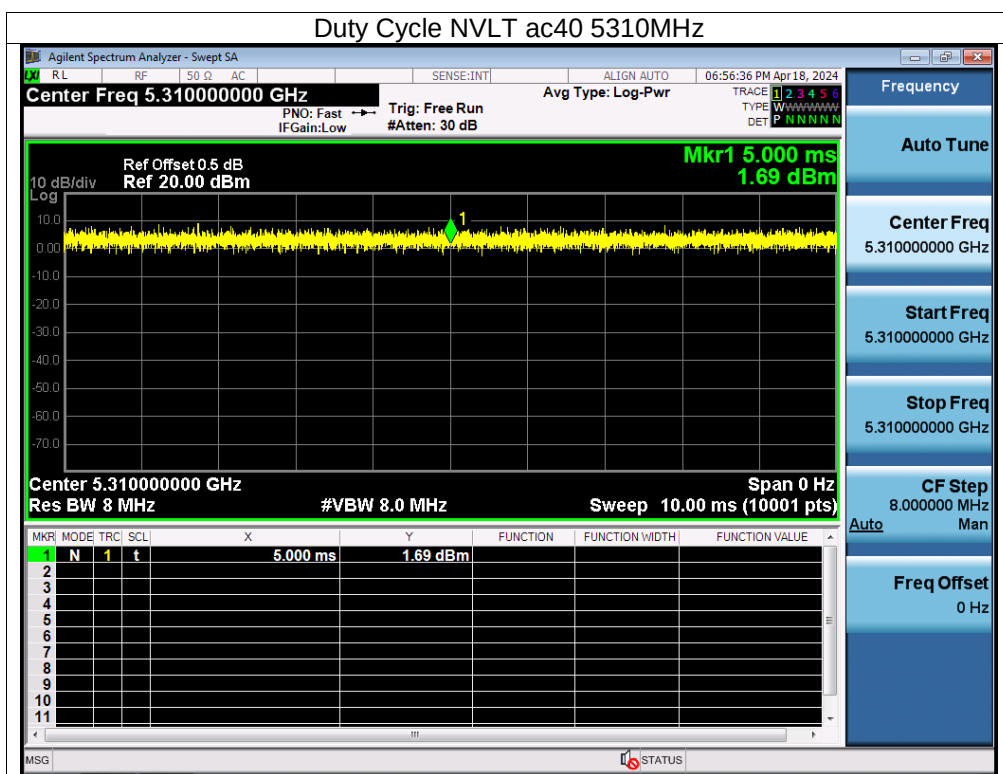












Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5500	100	0	0
NVNT	a	5580	100	0	0
NVNT	a	5700	100	0	0
NVNT	n20	5500	100	0	0
NVNT	n20	5580	100	0	0
NVNT	n20	5700	100	0	0
NVNT	n40	5510	100	0	0
NVNT	n40	5550	100	0	0
NVNT	n40	5670	100	0	0
NVNT	ac20	5500	100	0	0
NVNT	ac20	5580	100	0	0
NVNT	ac20	5700	100	0	0
NVNT	ac40	5510	100	0	0
NVNT	ac40	5550	100	0	0
NVNT	ac40	5670	100	0	0
NVNT	ac80	5530	100	0	0

