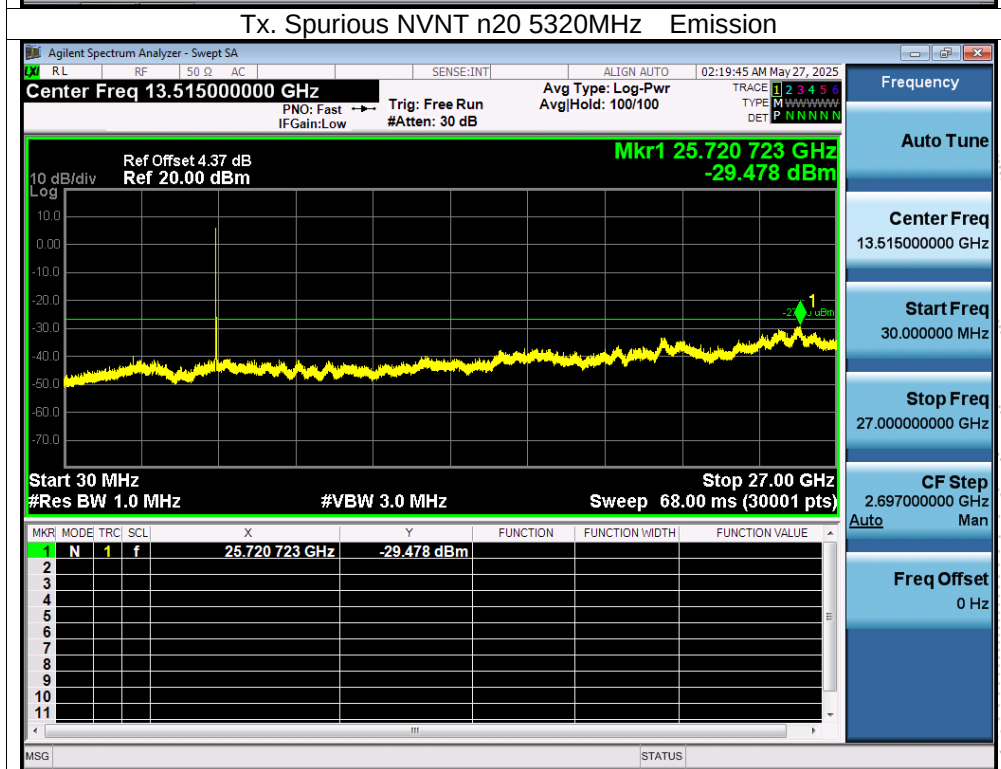
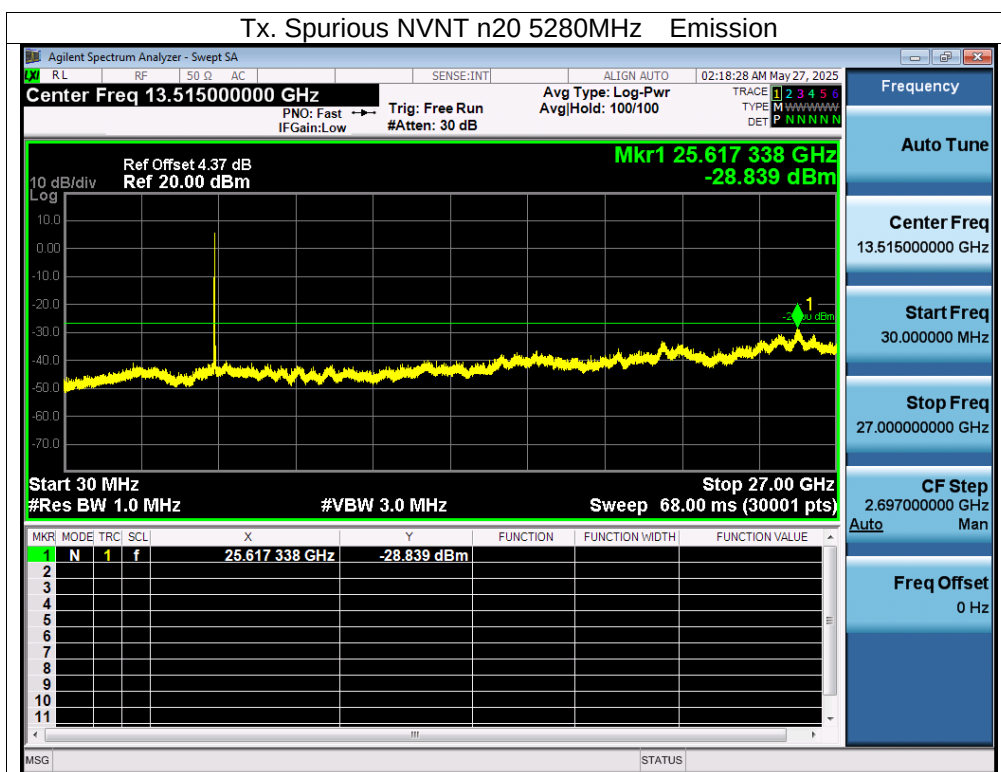
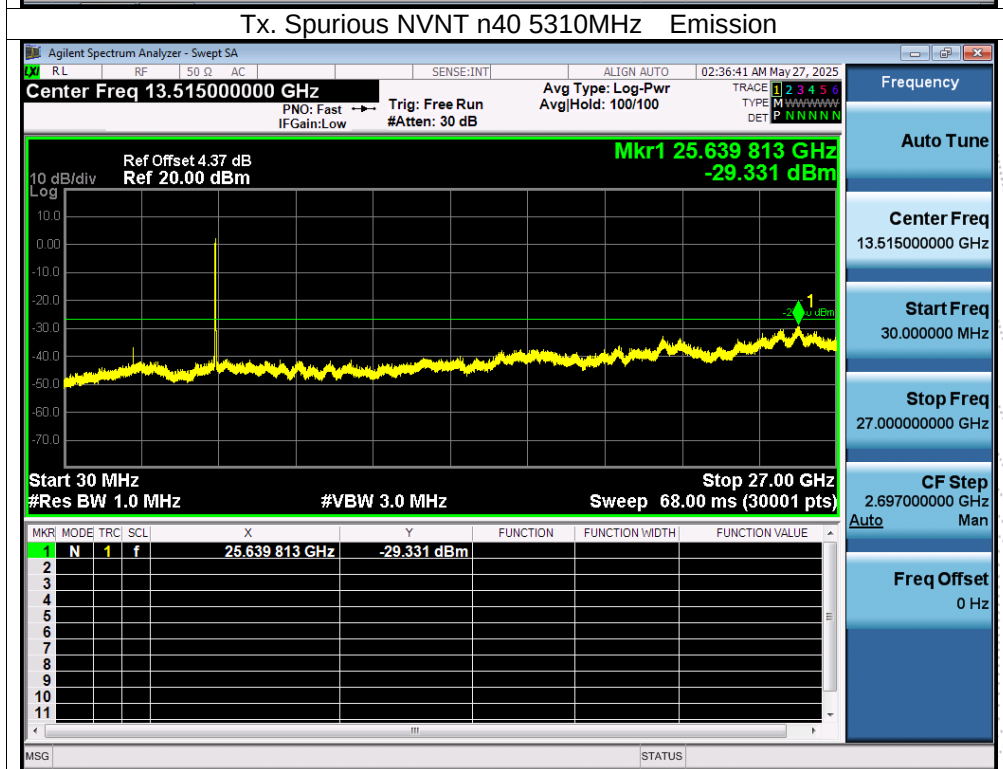
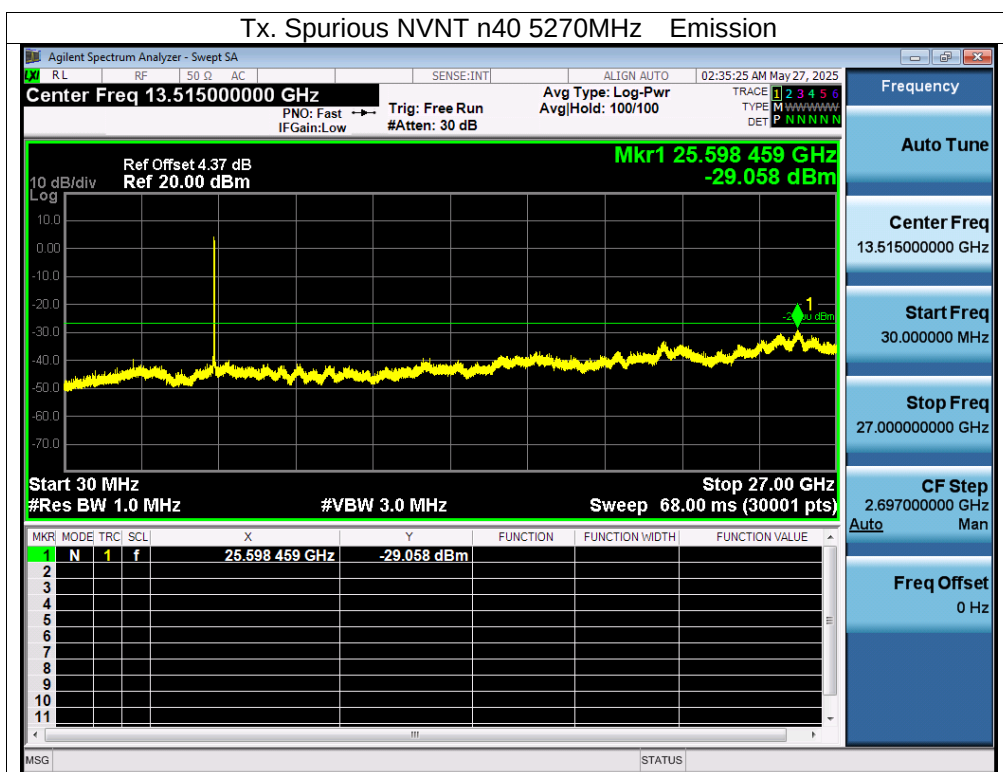
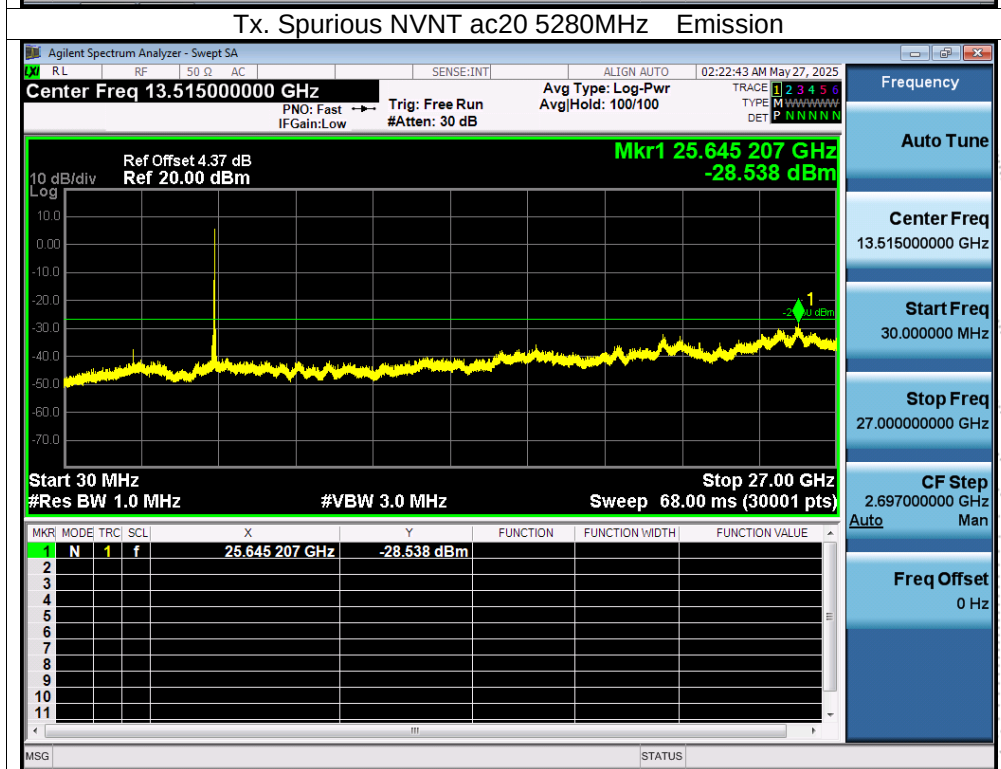
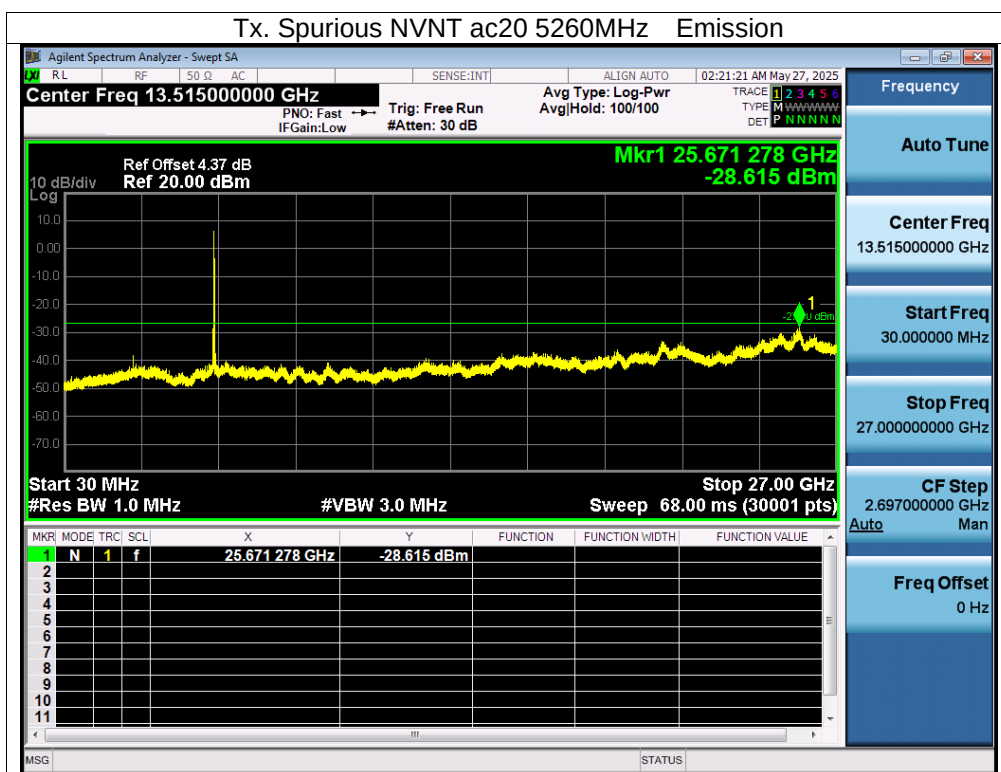
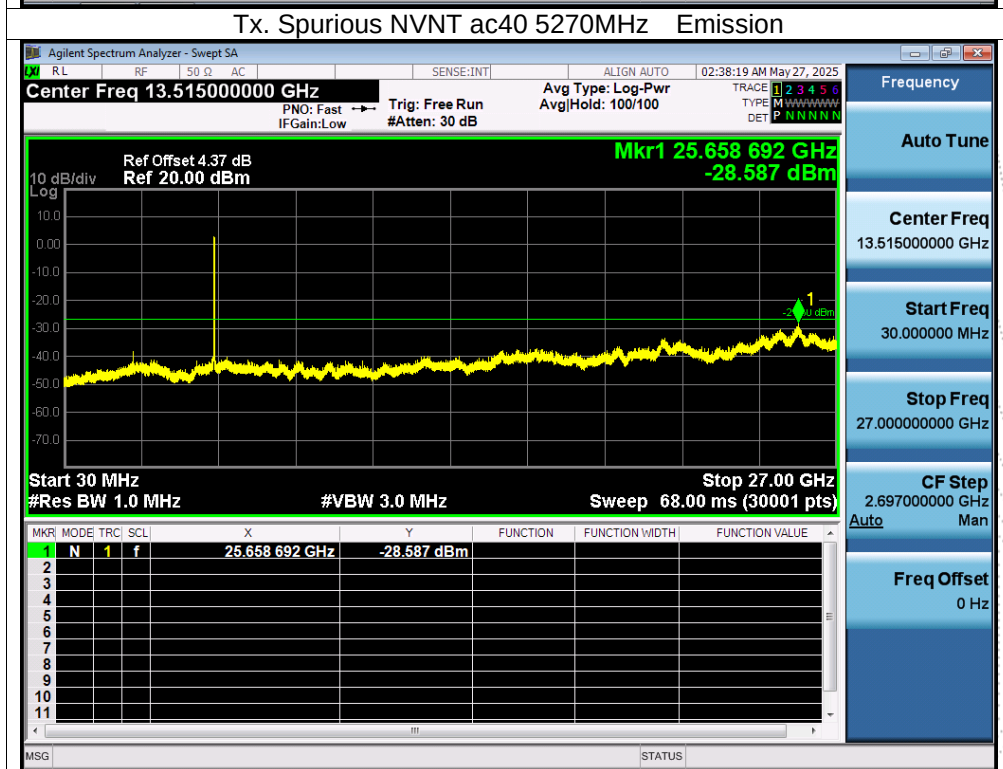
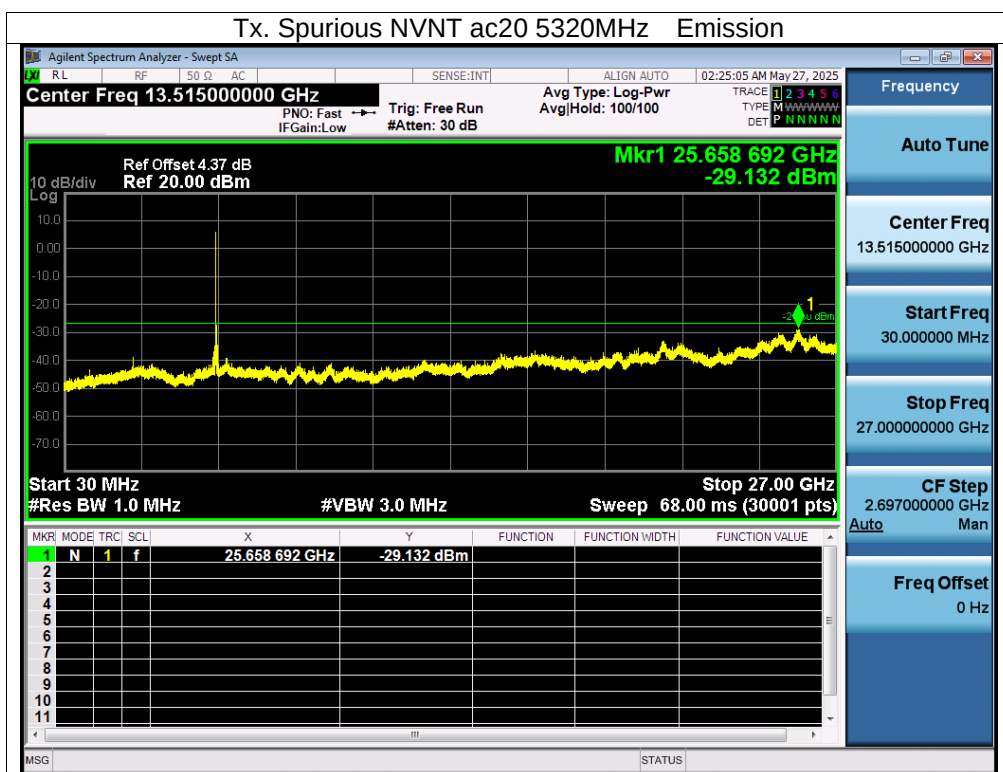
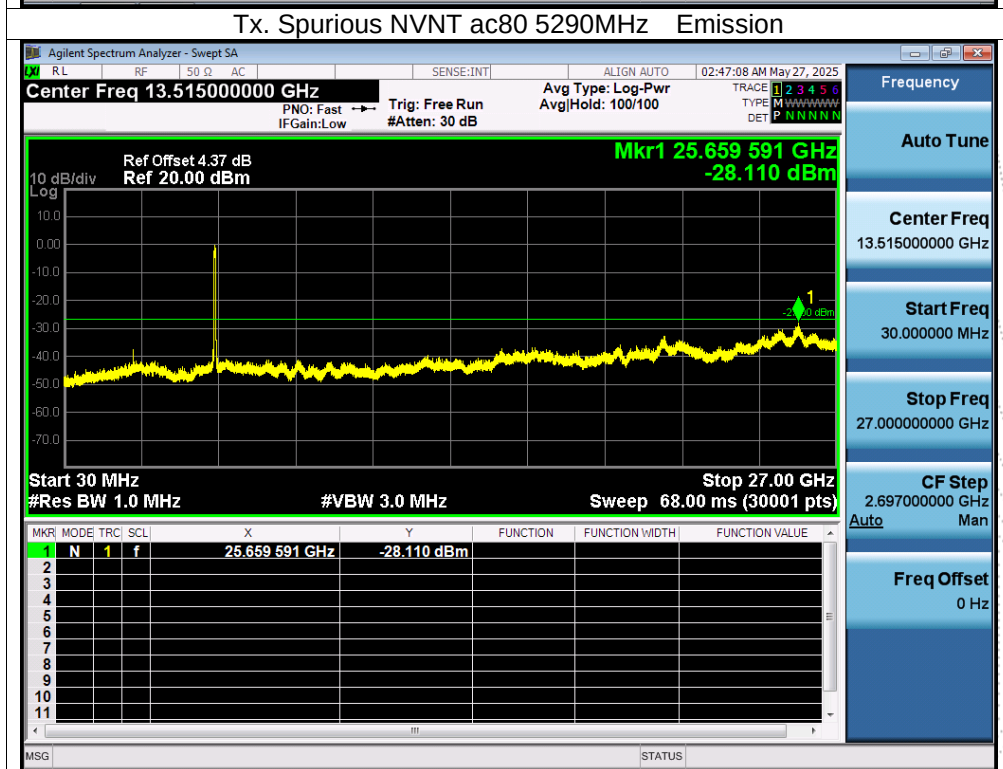
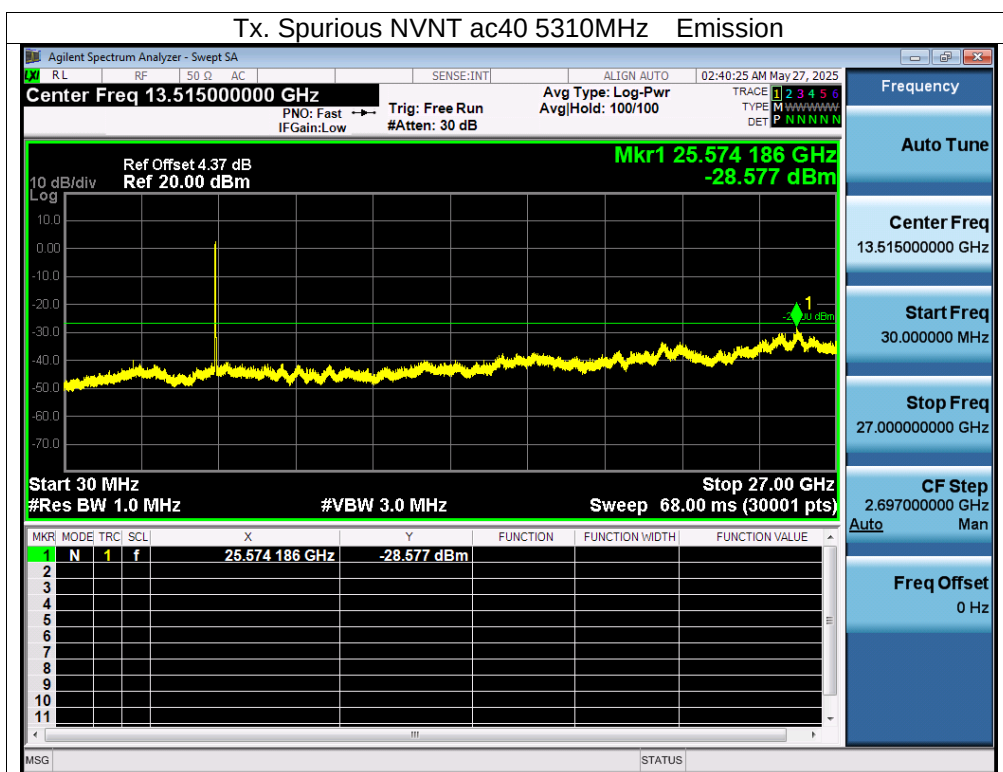


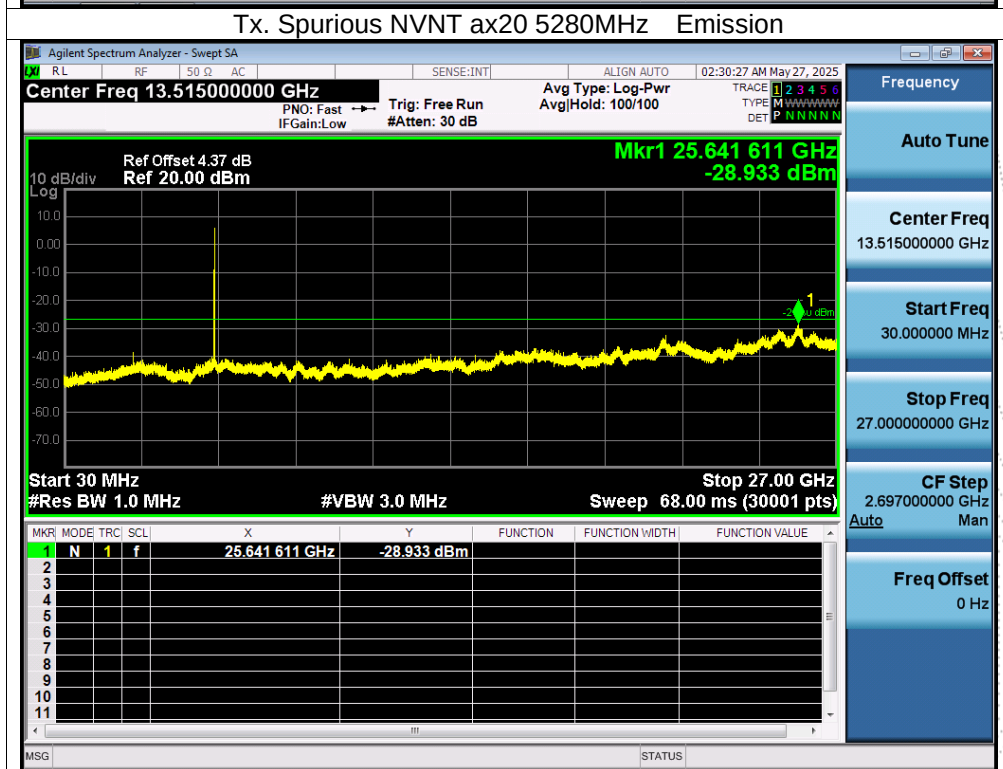
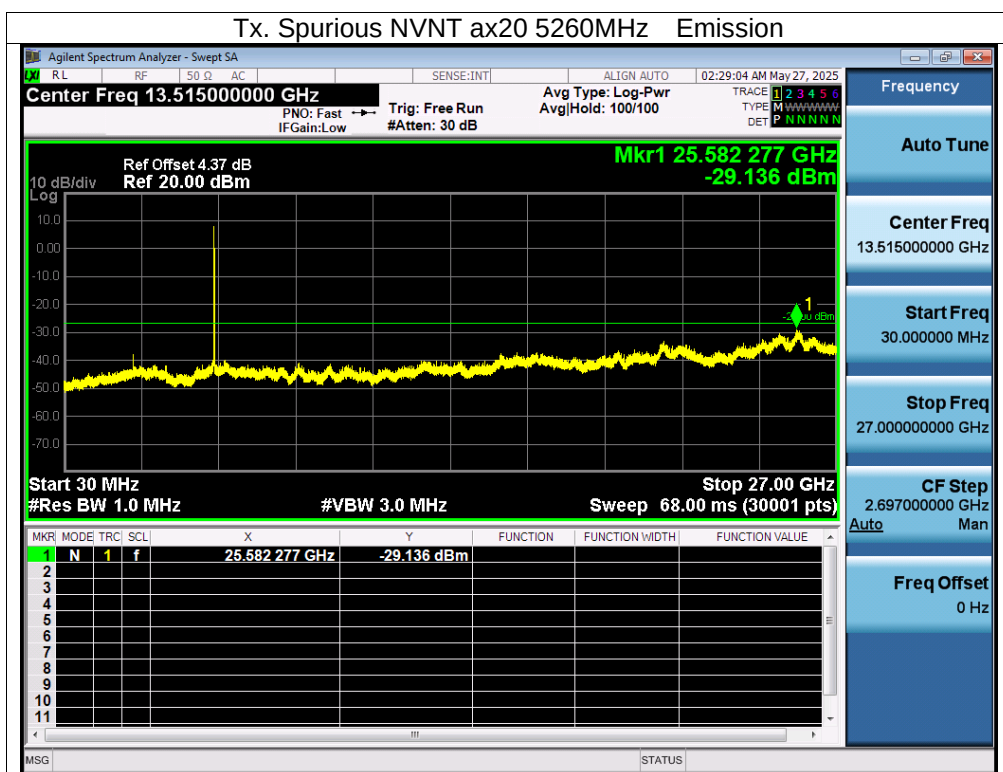


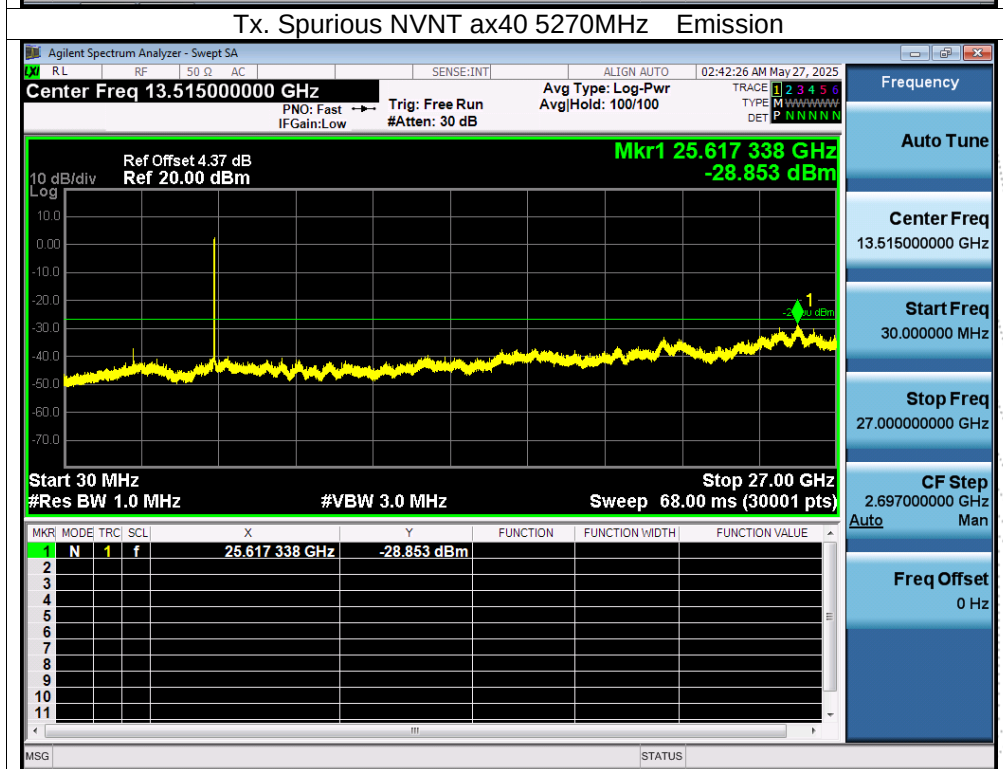
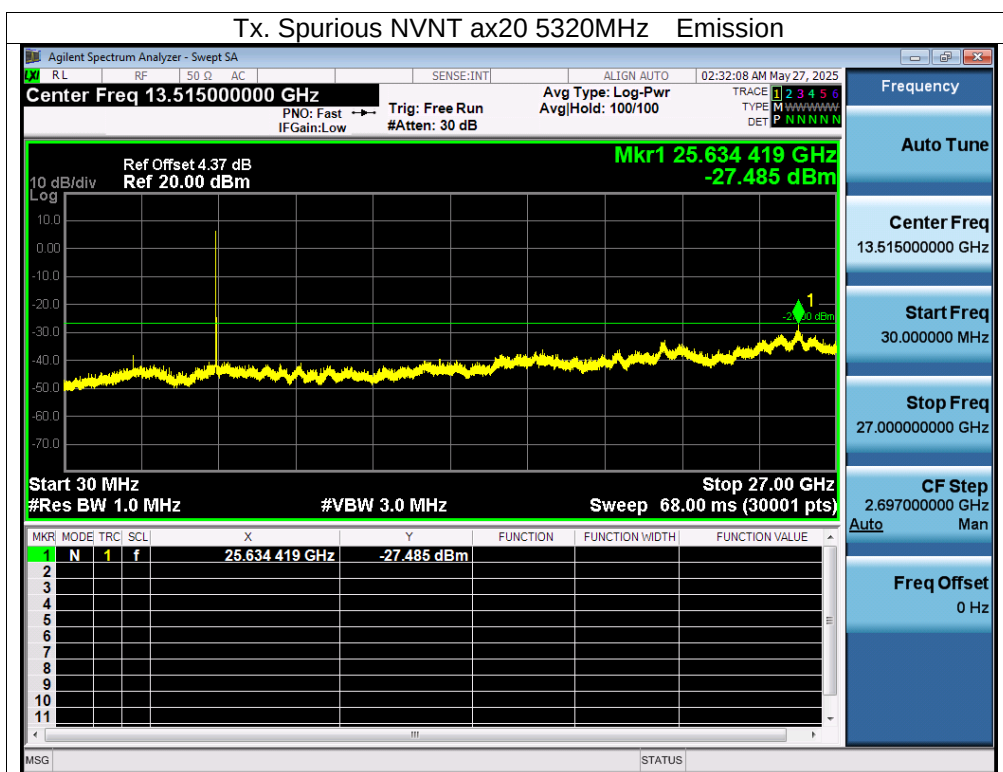


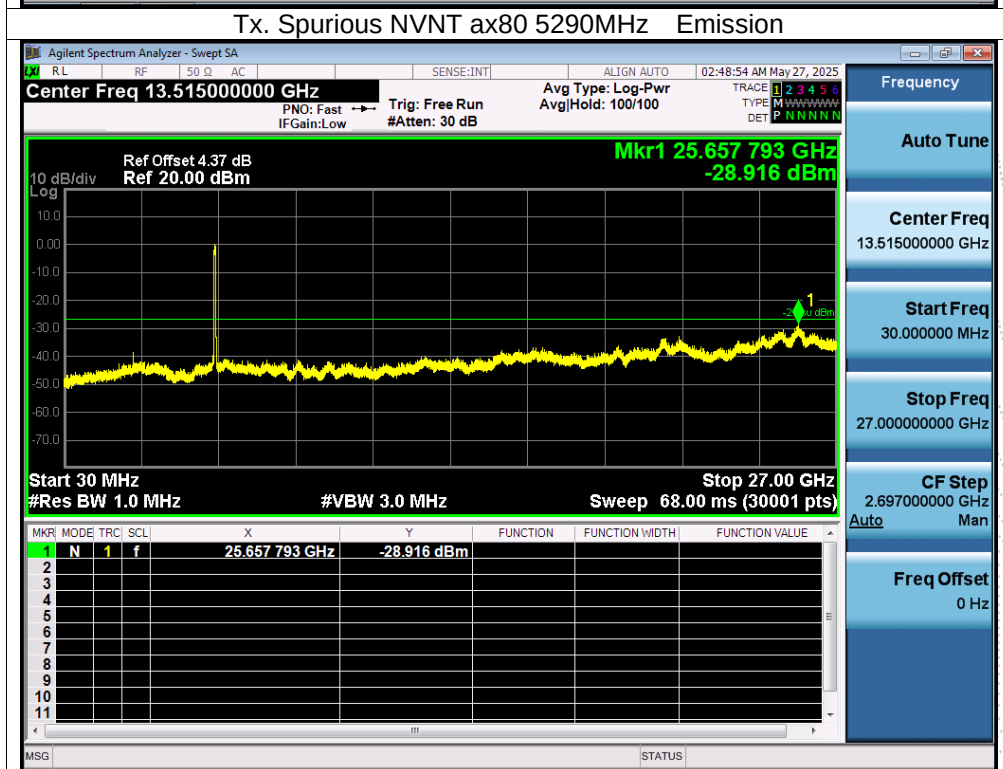
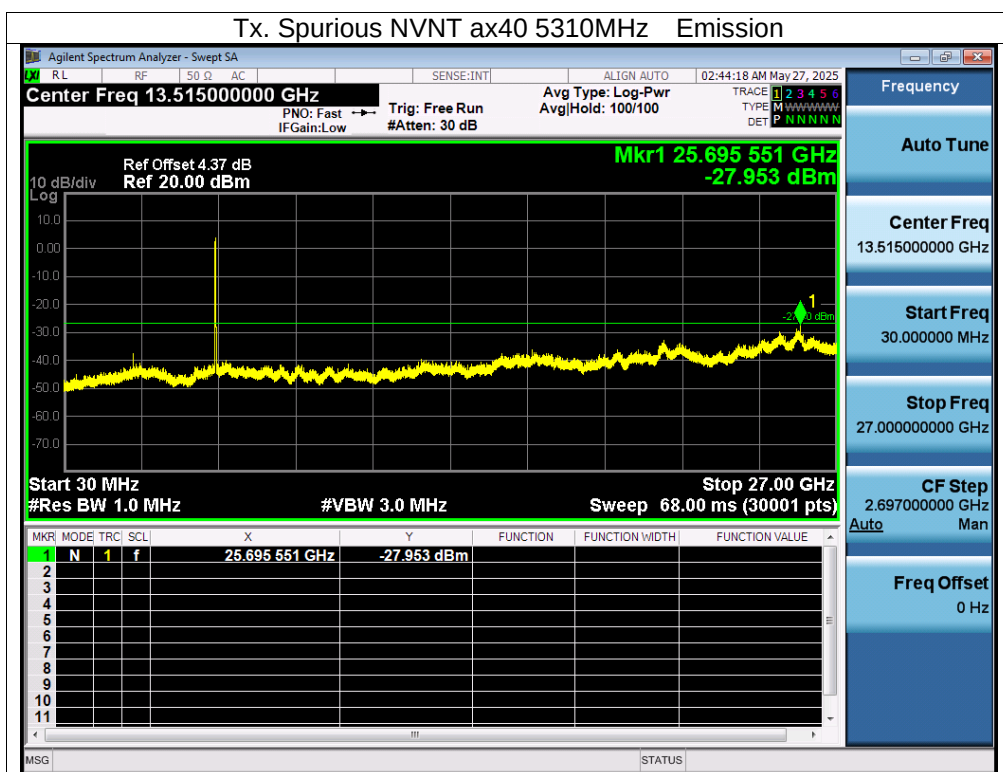




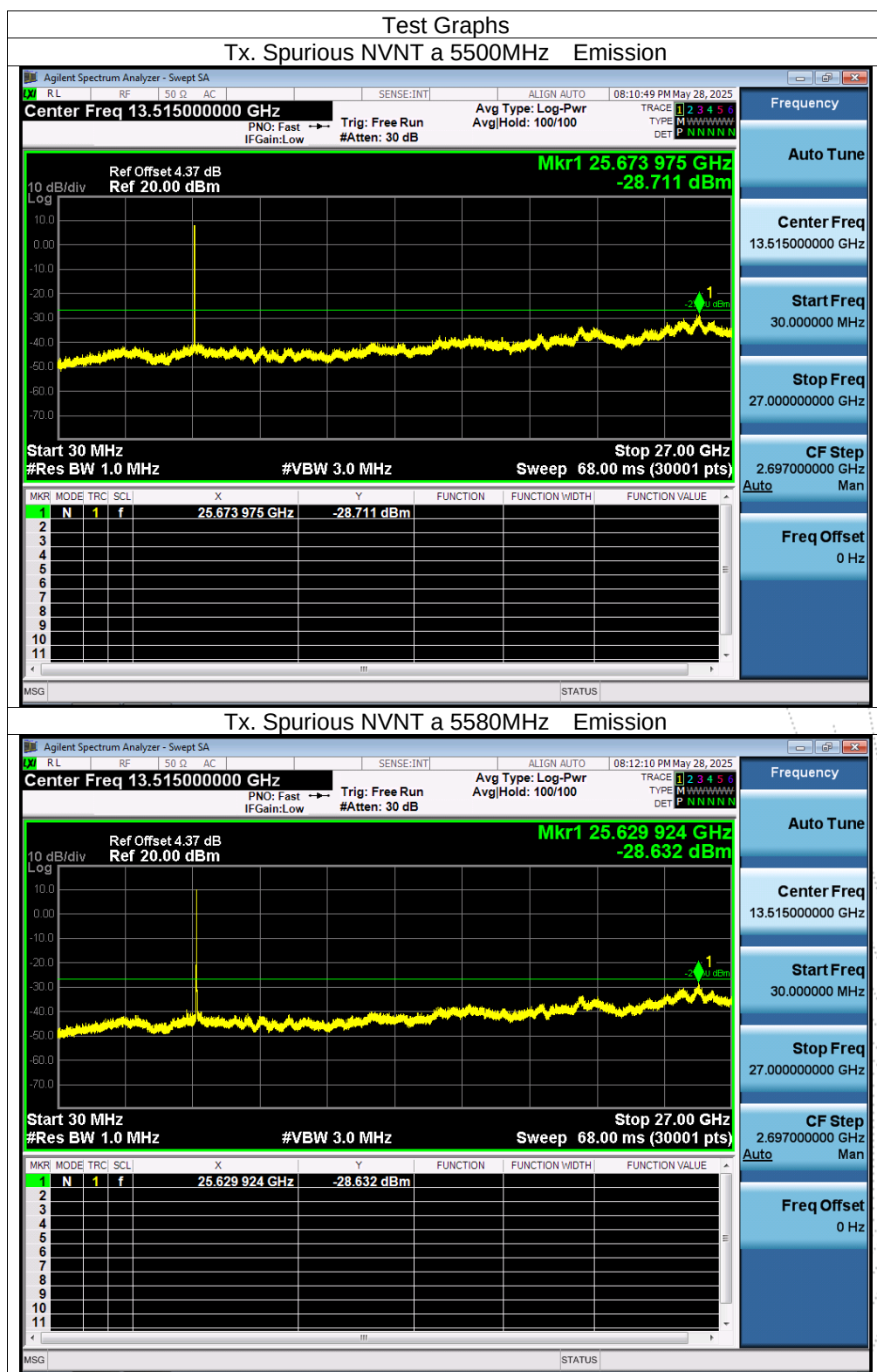


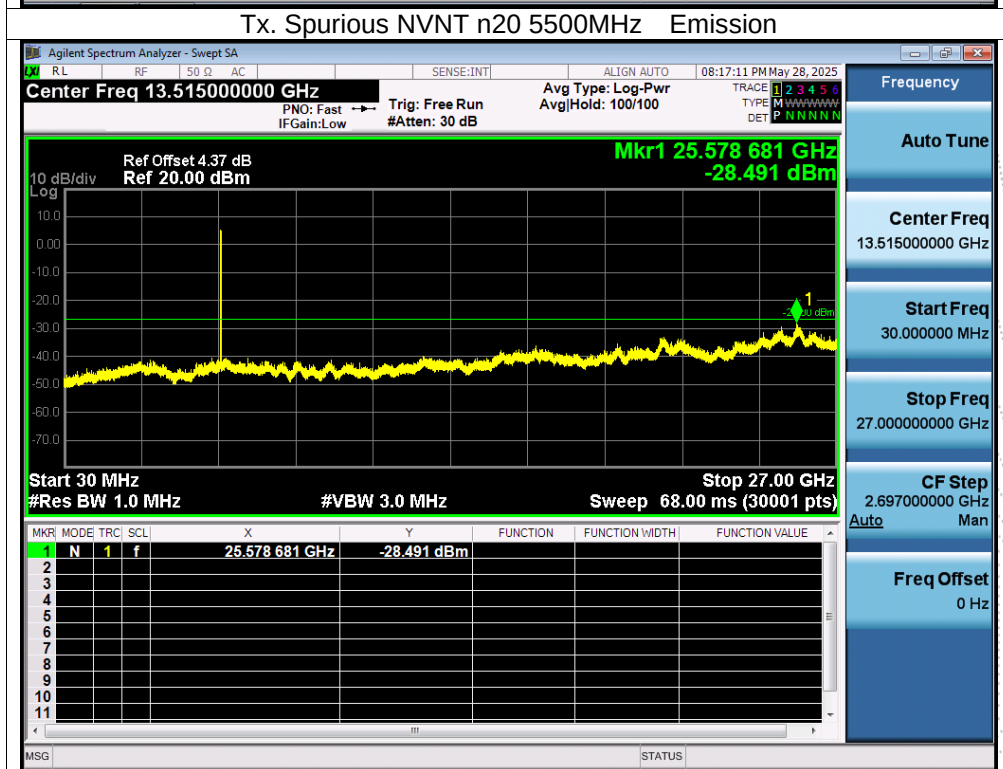
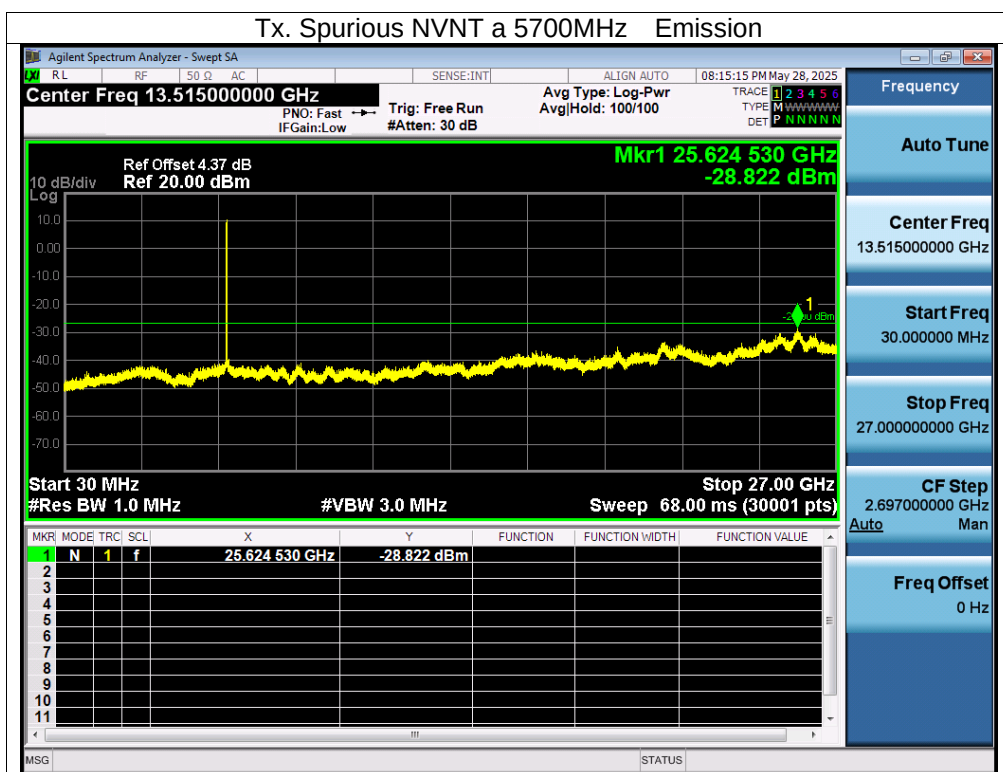


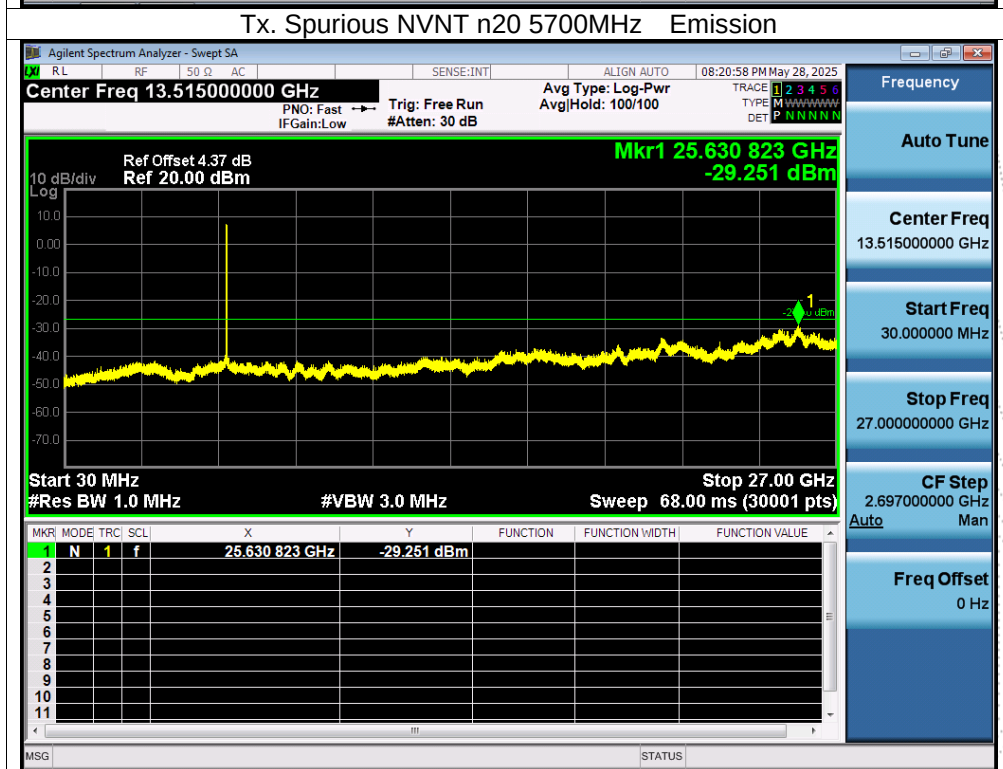
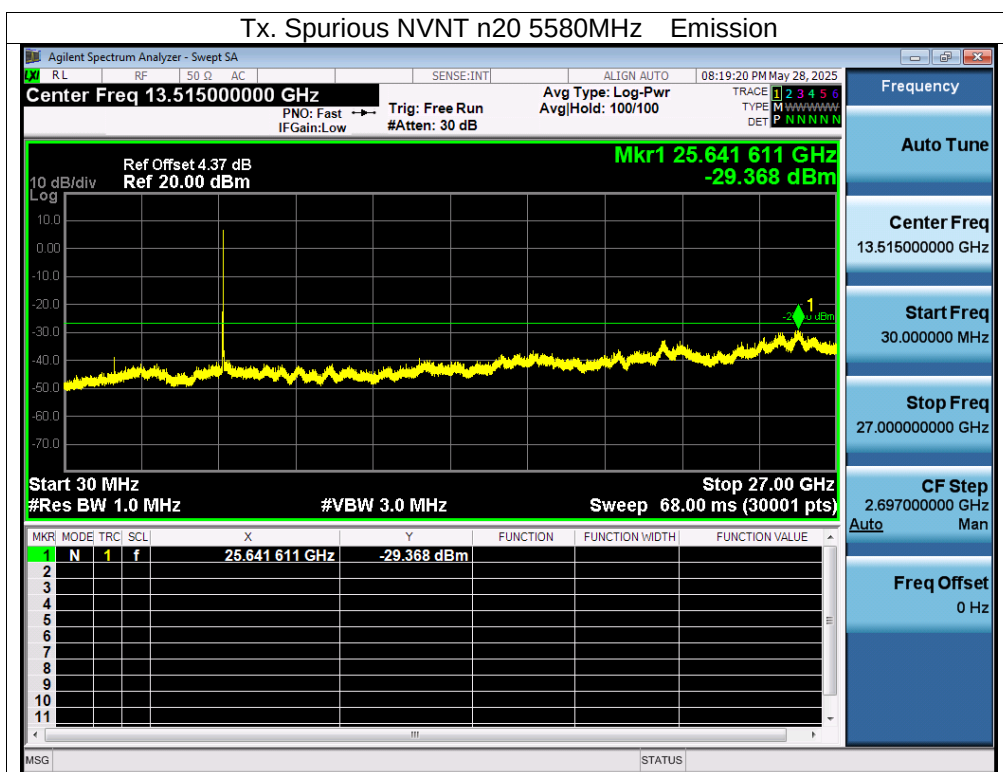


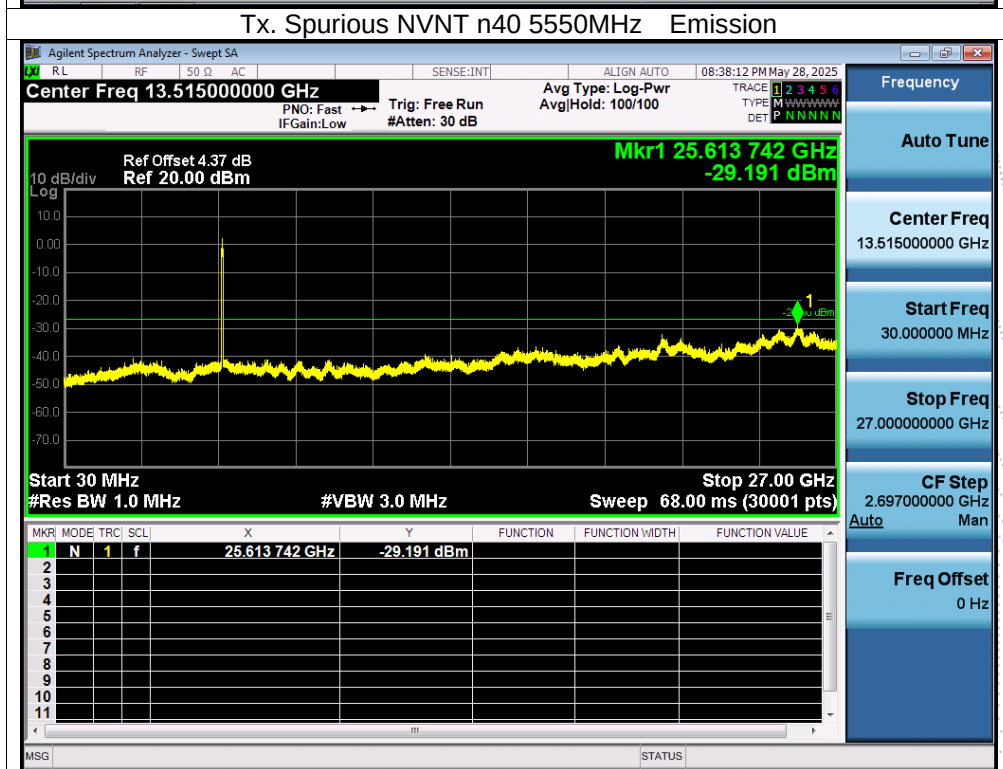
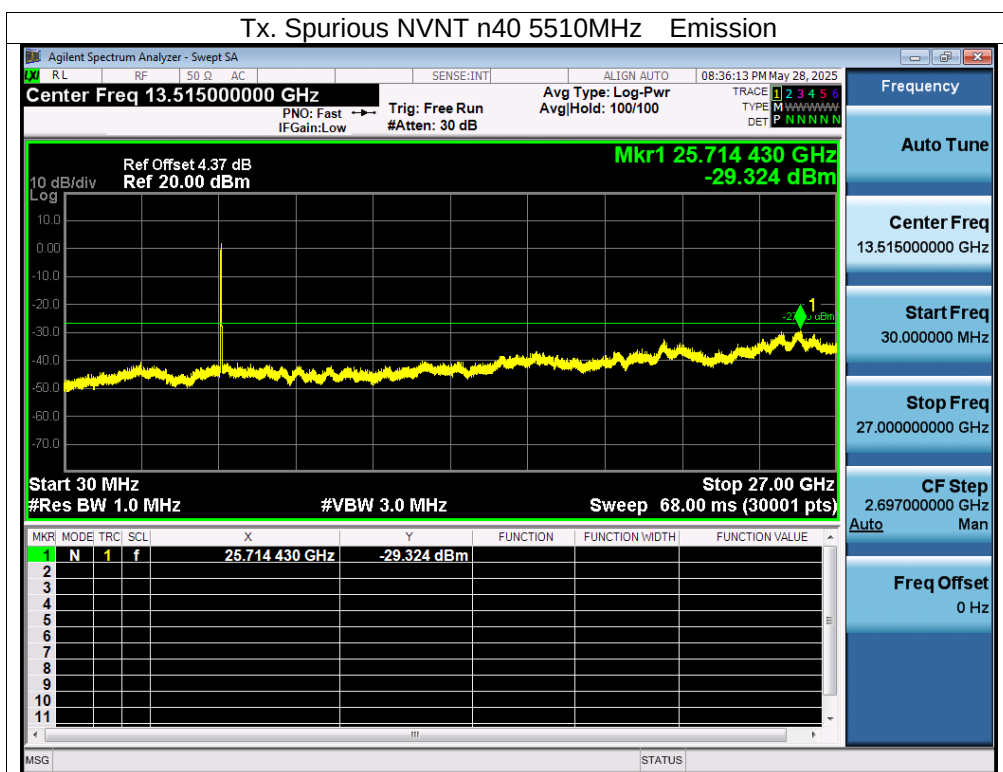


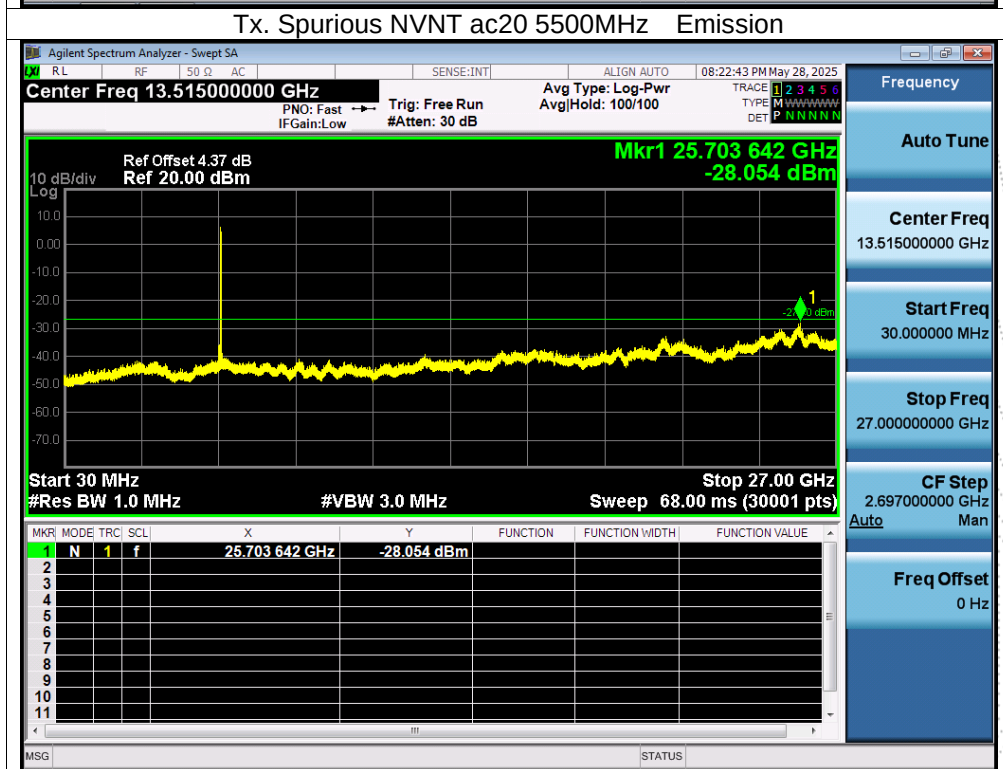
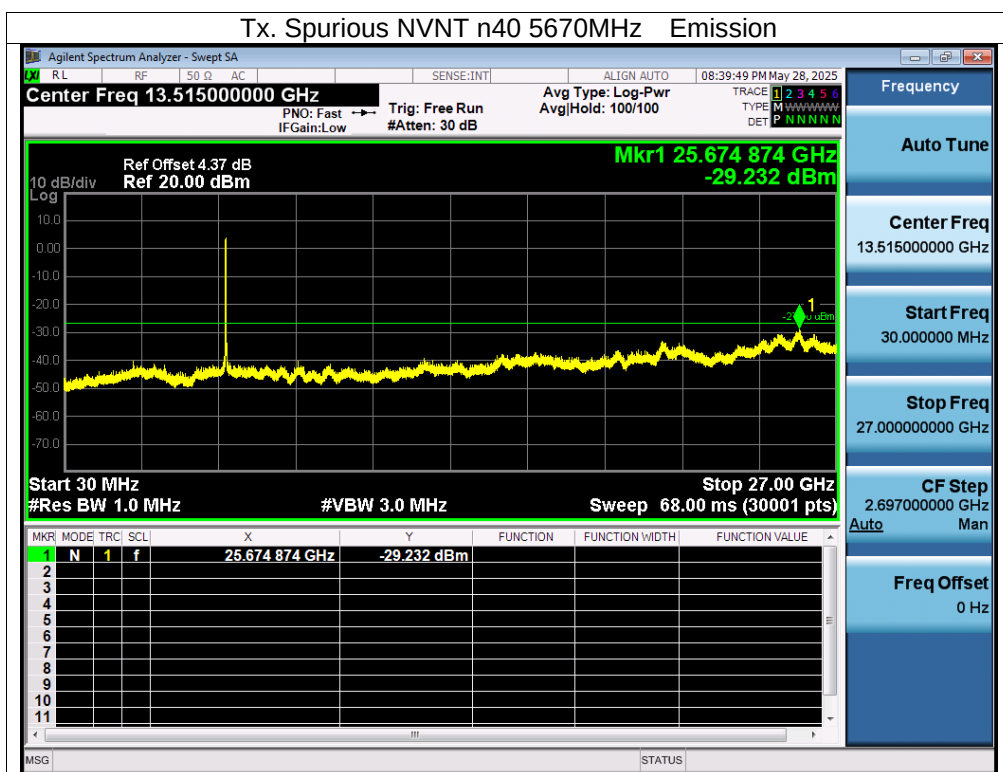
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A. Plot.

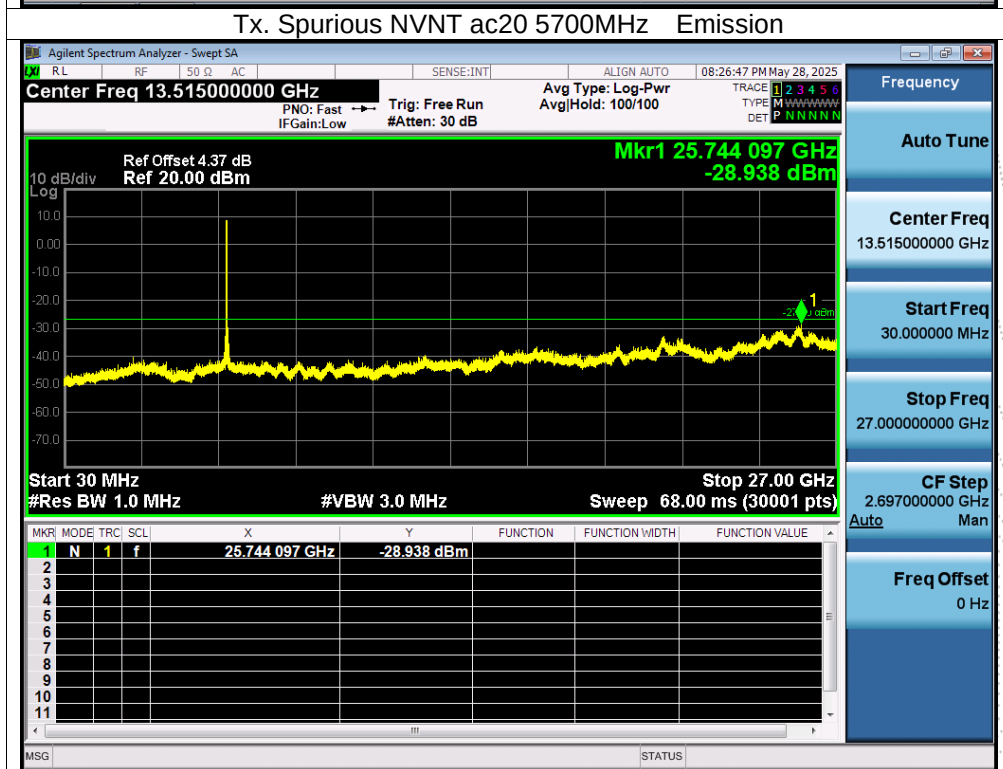
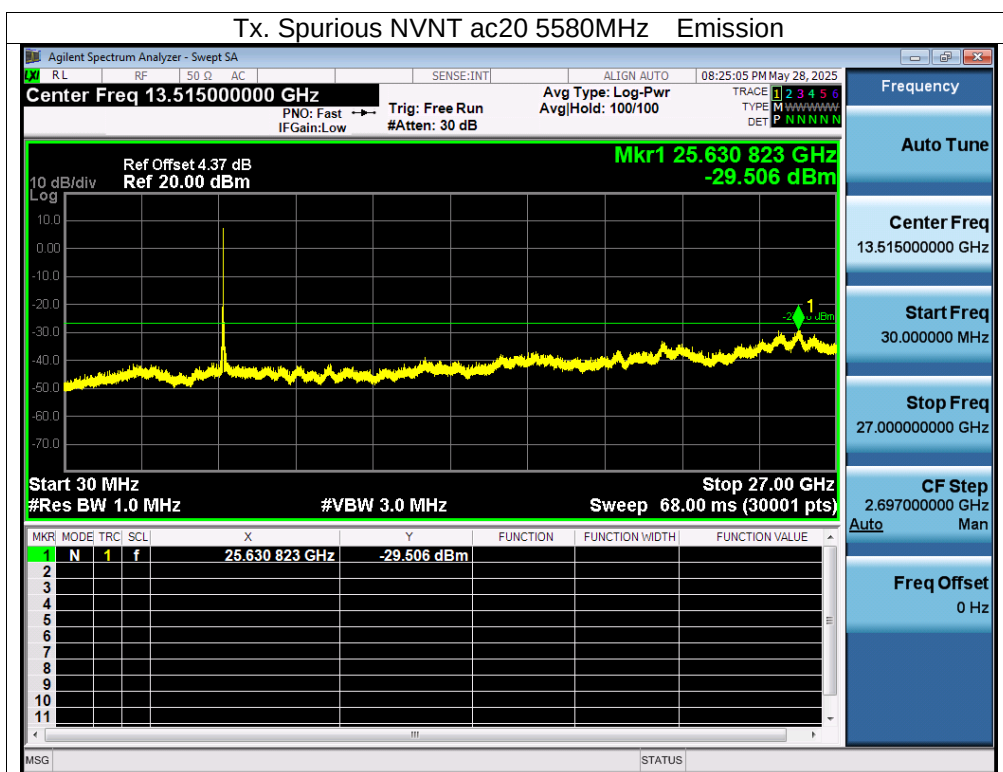


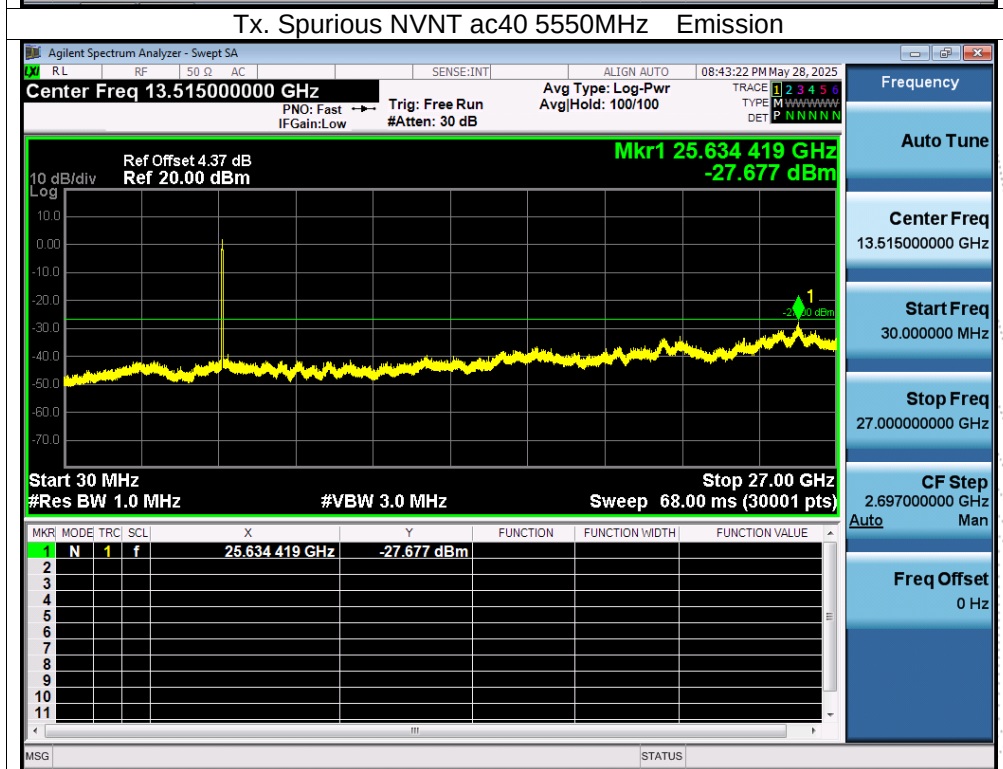
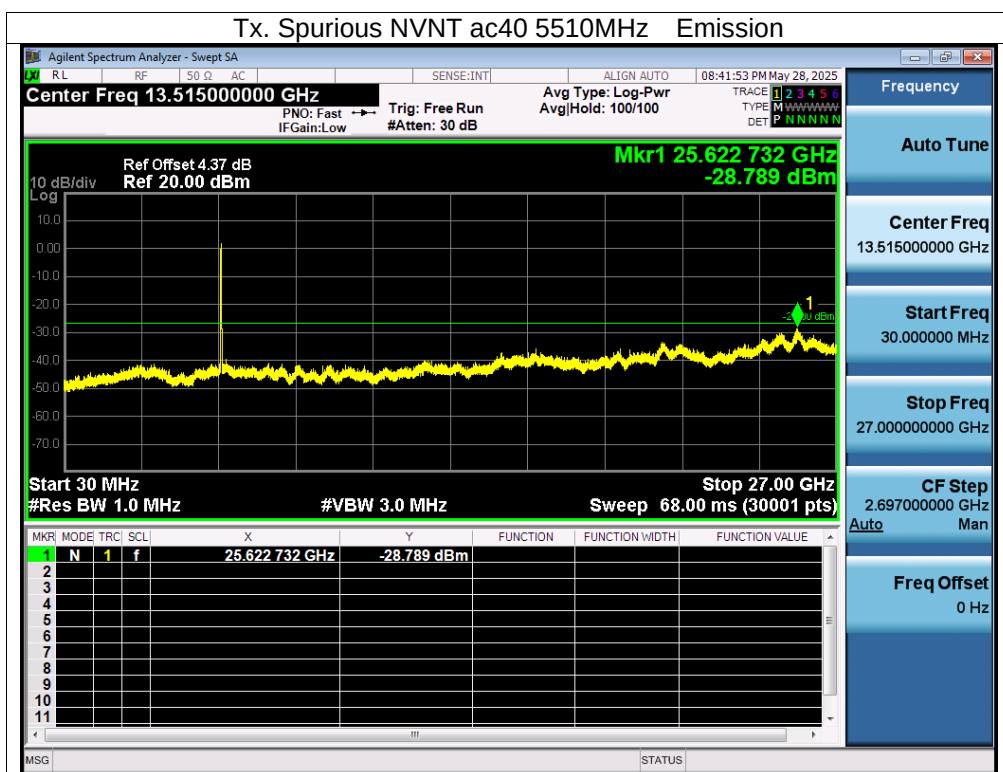


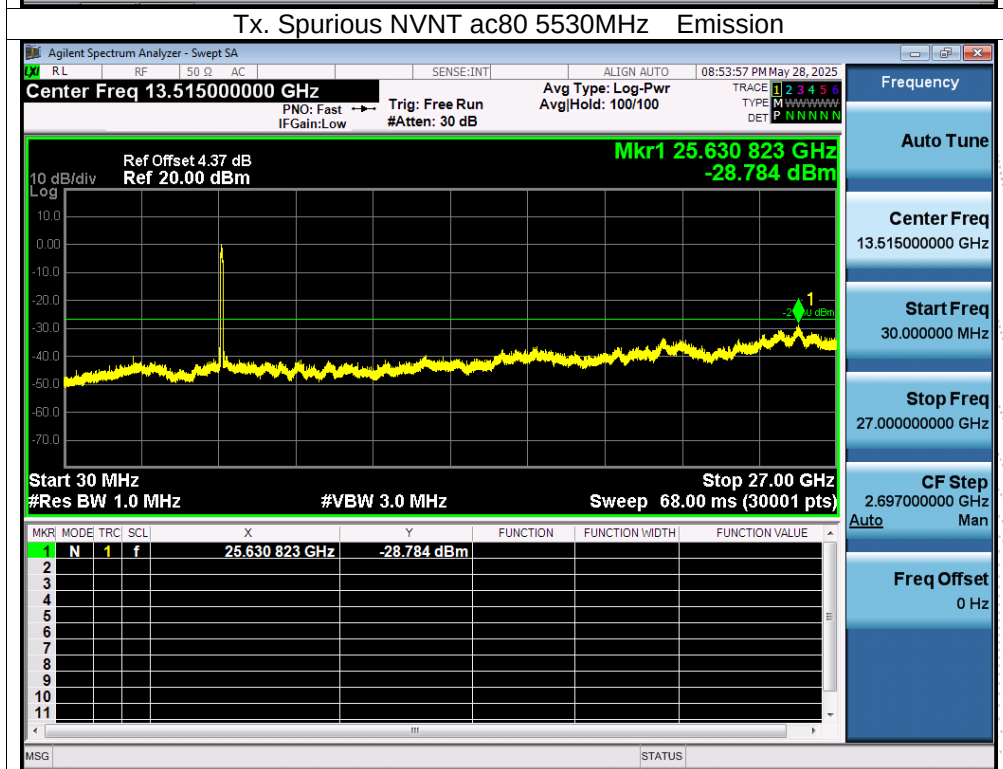
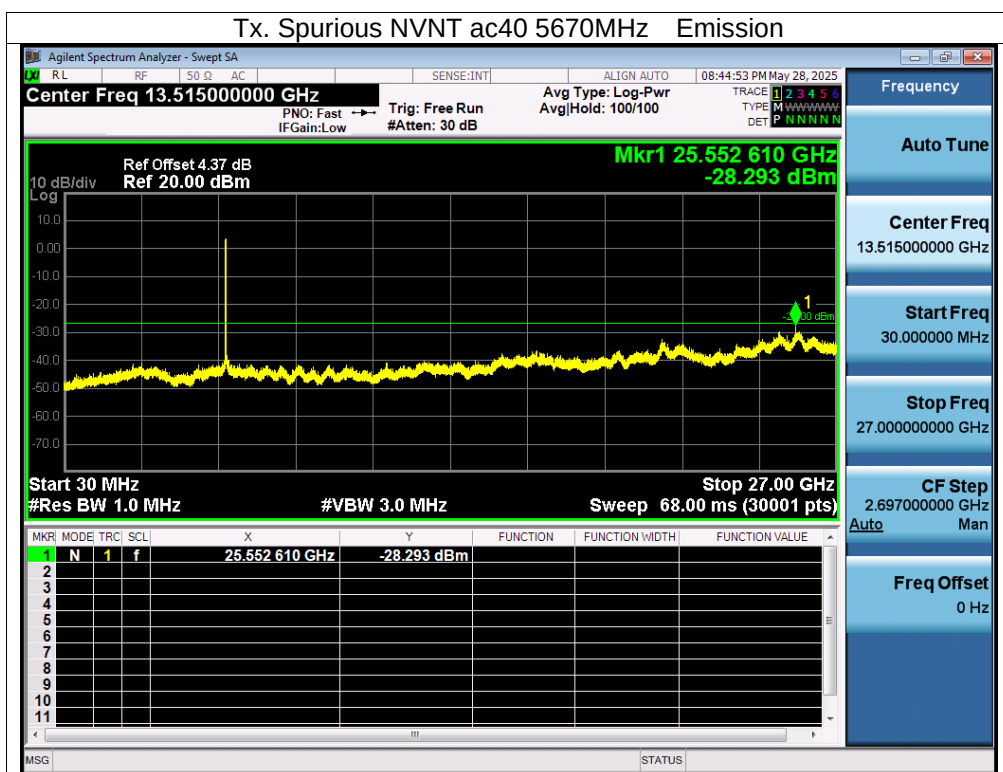


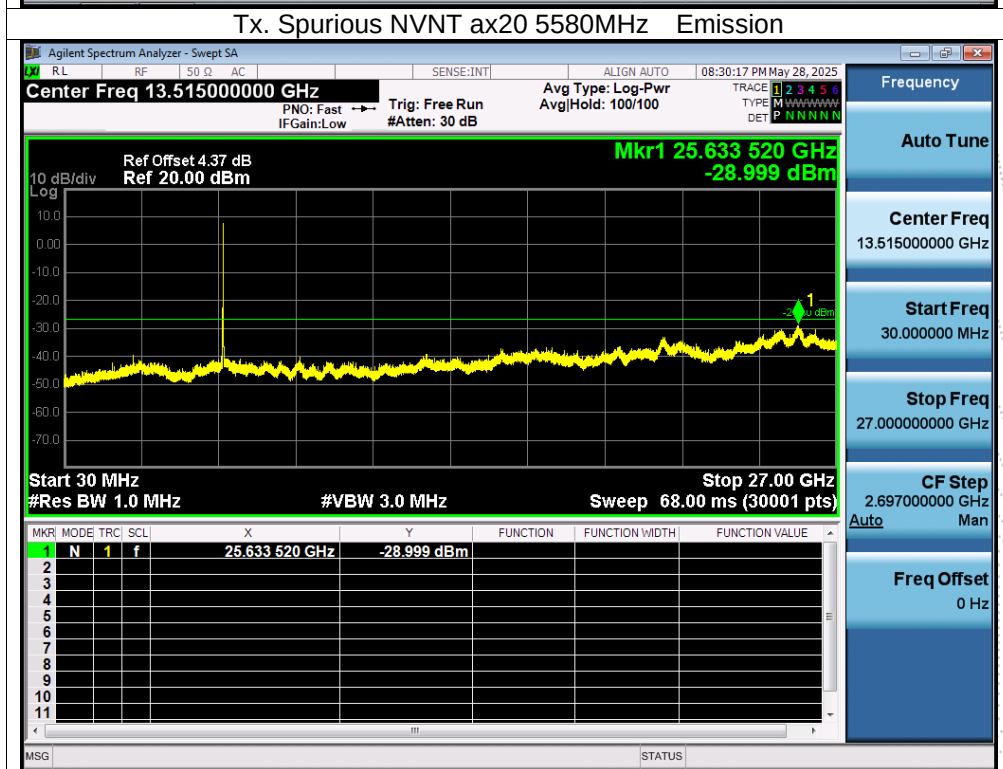
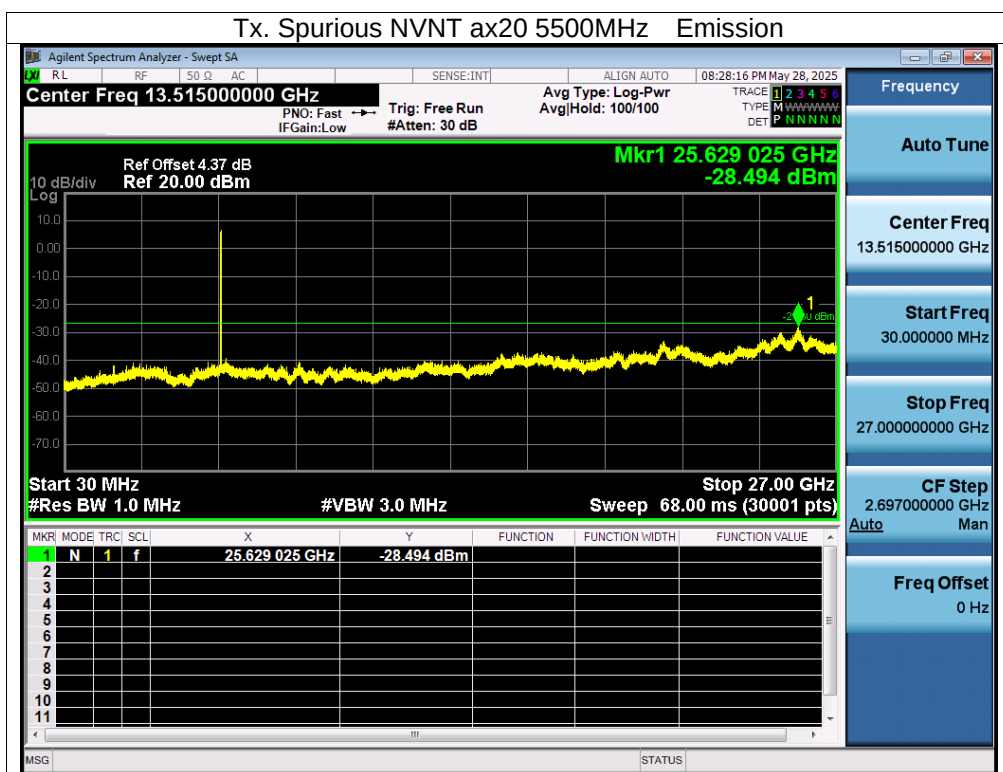


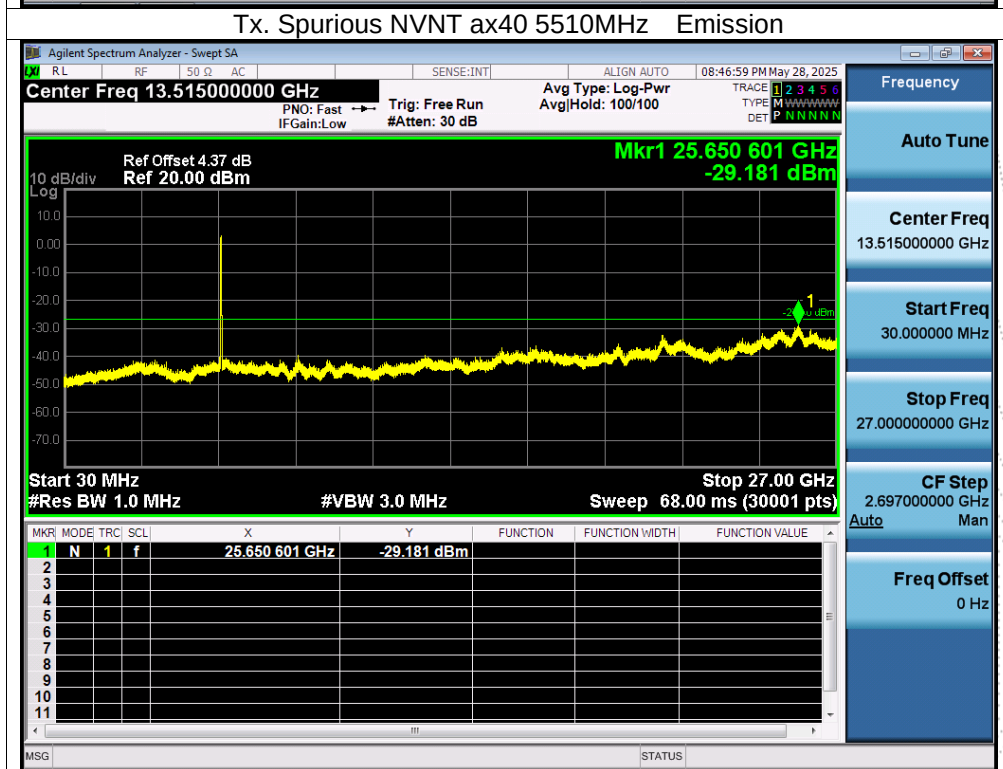
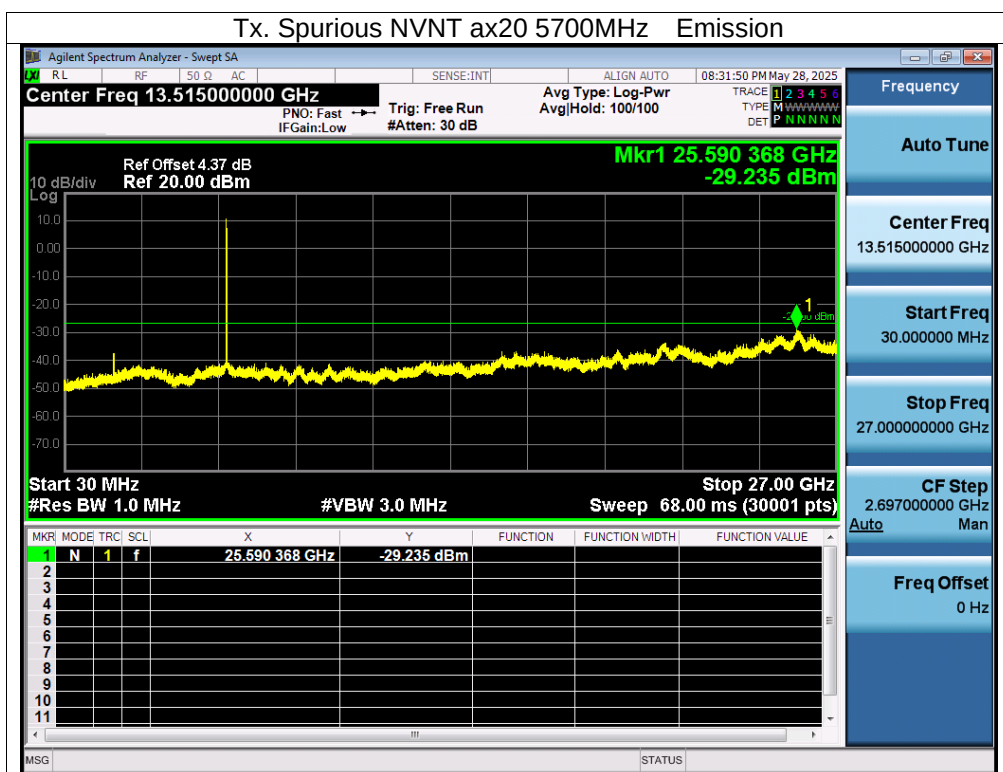


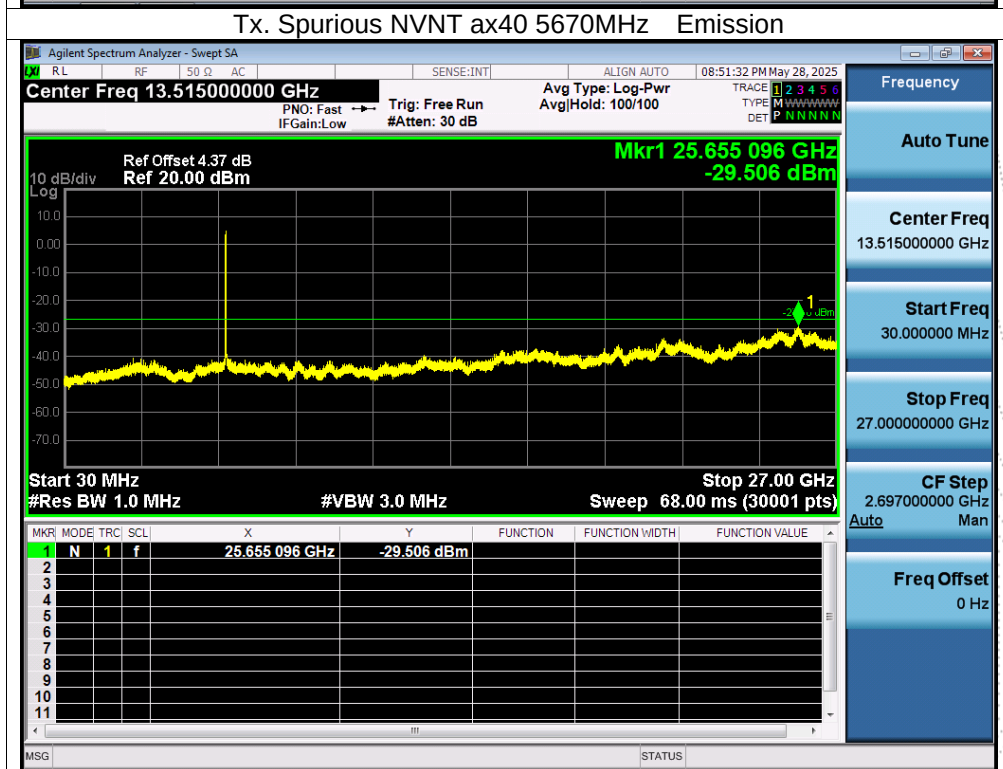
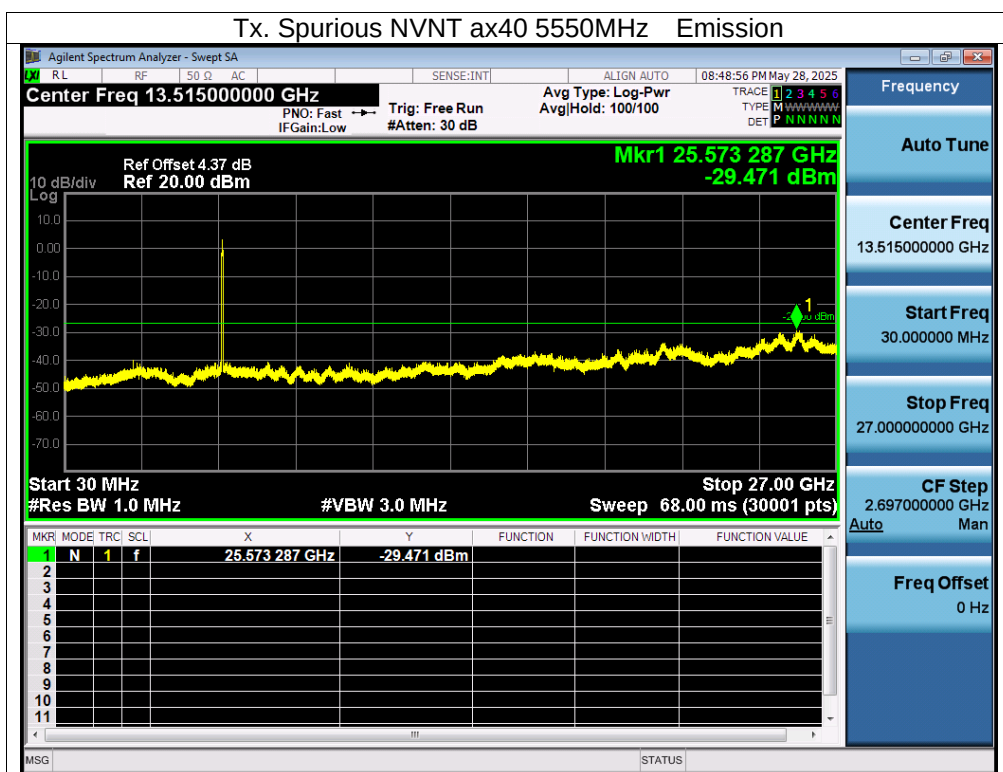


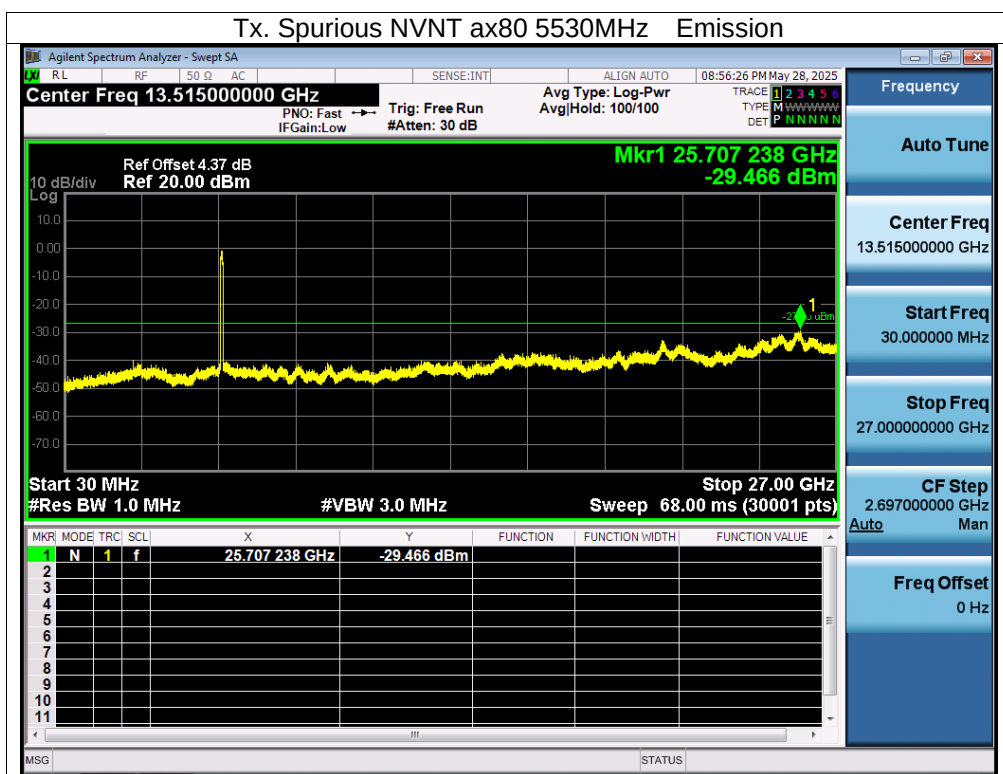




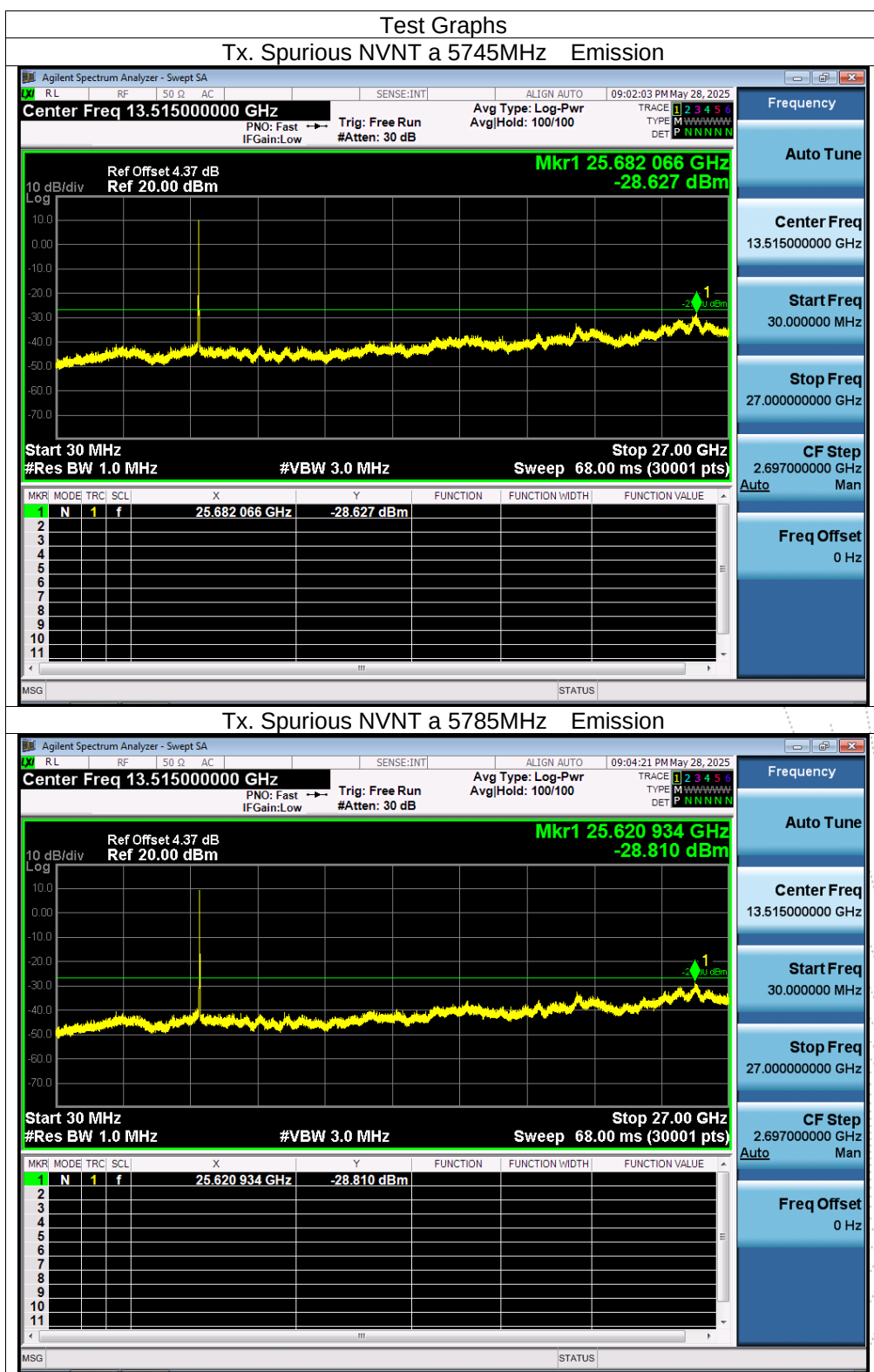


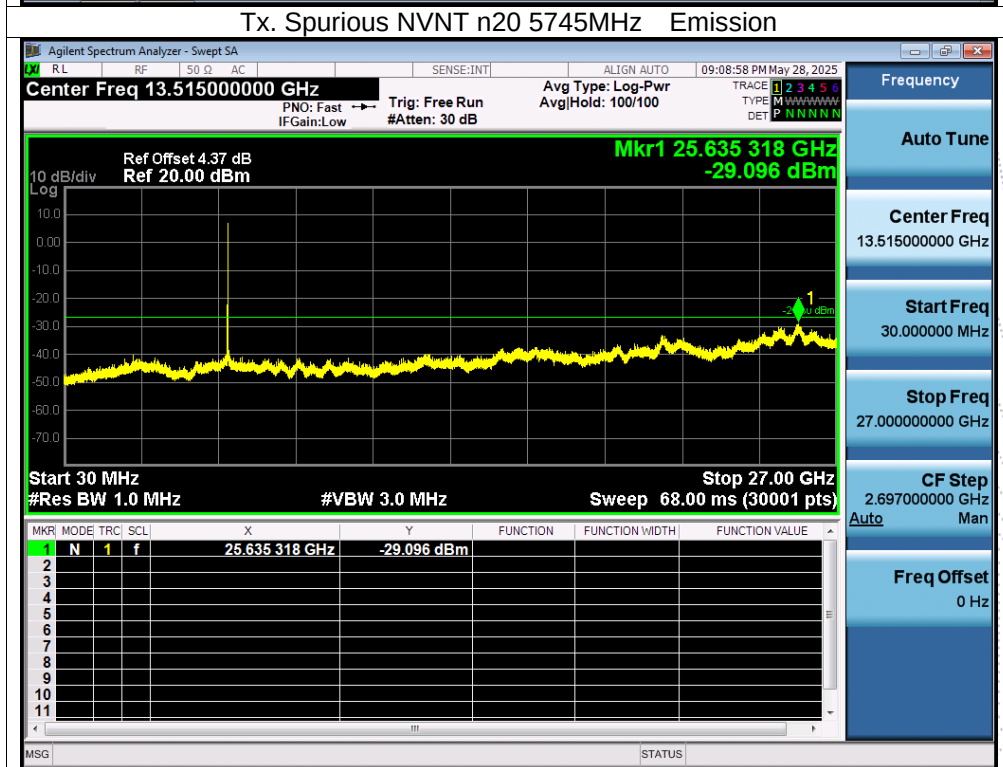
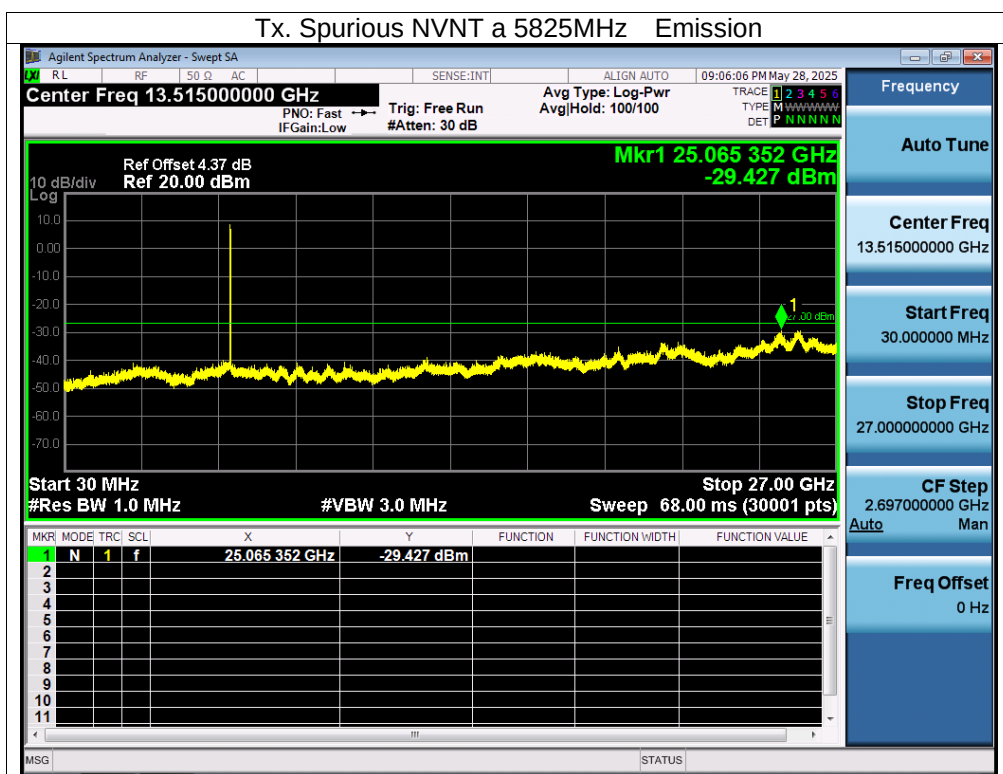


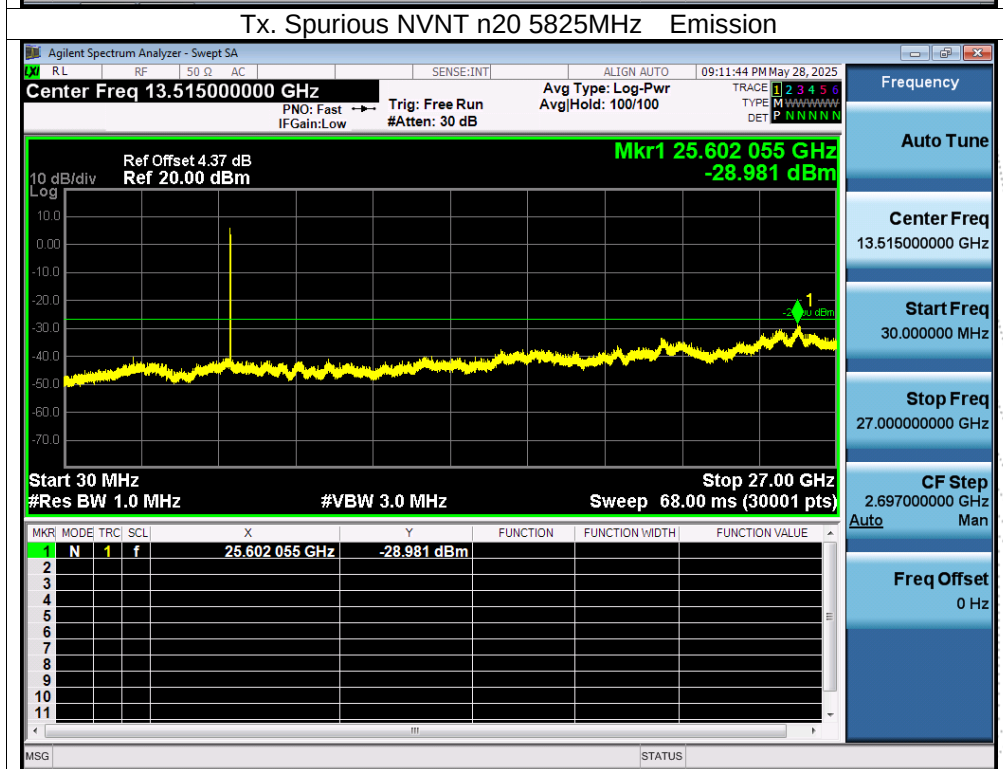
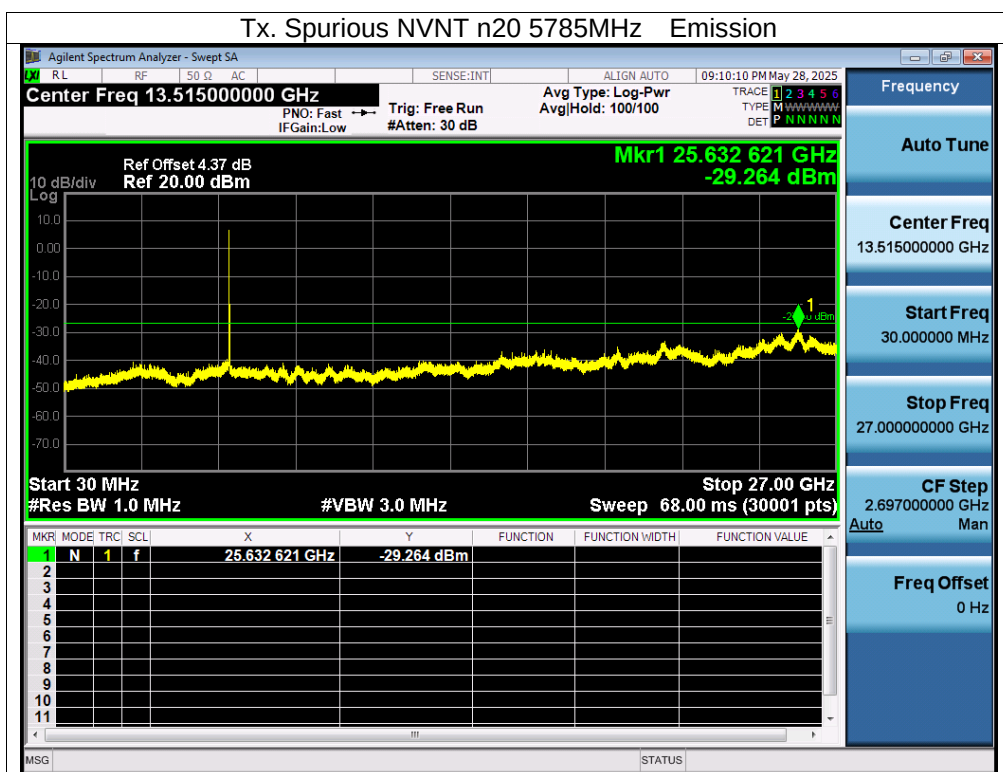


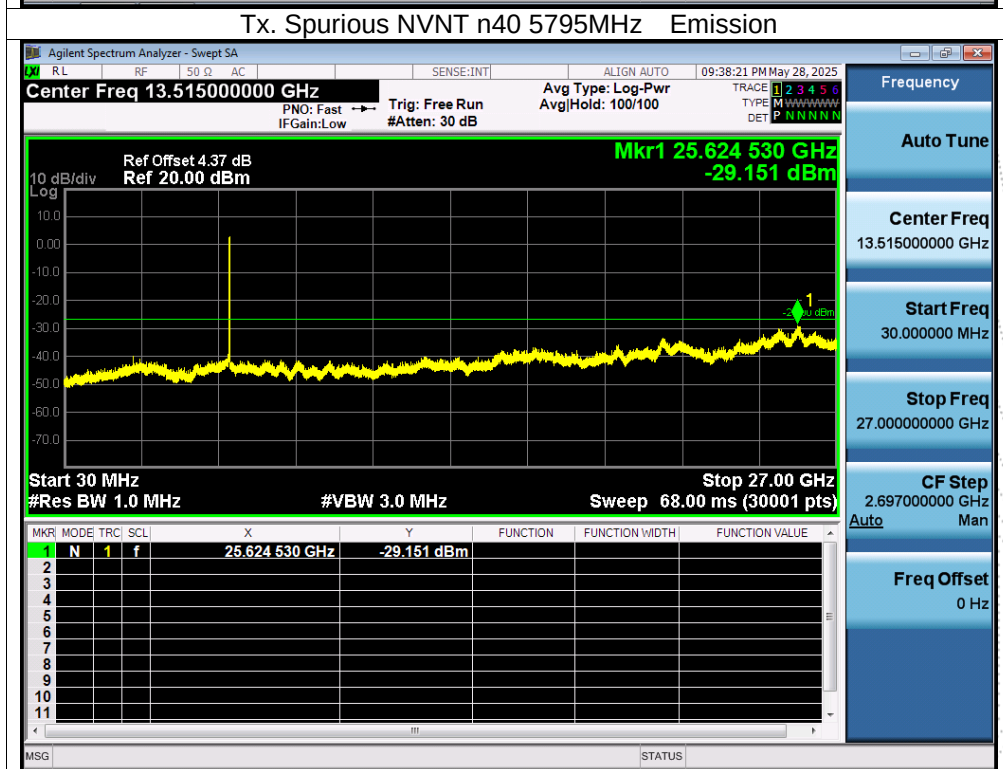
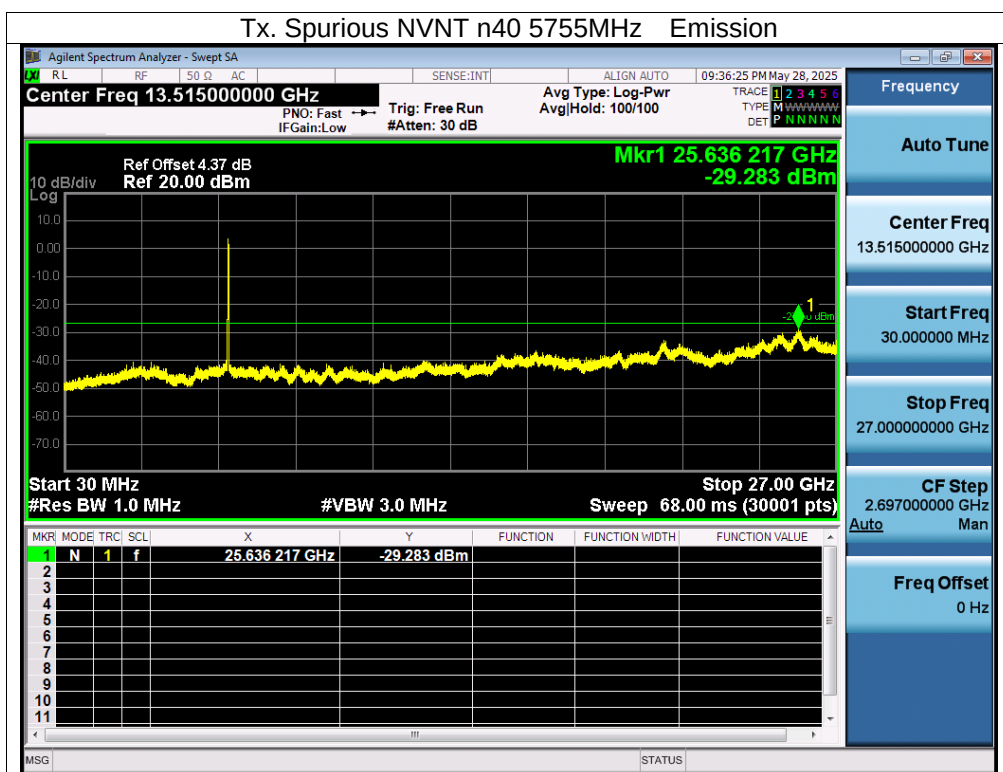


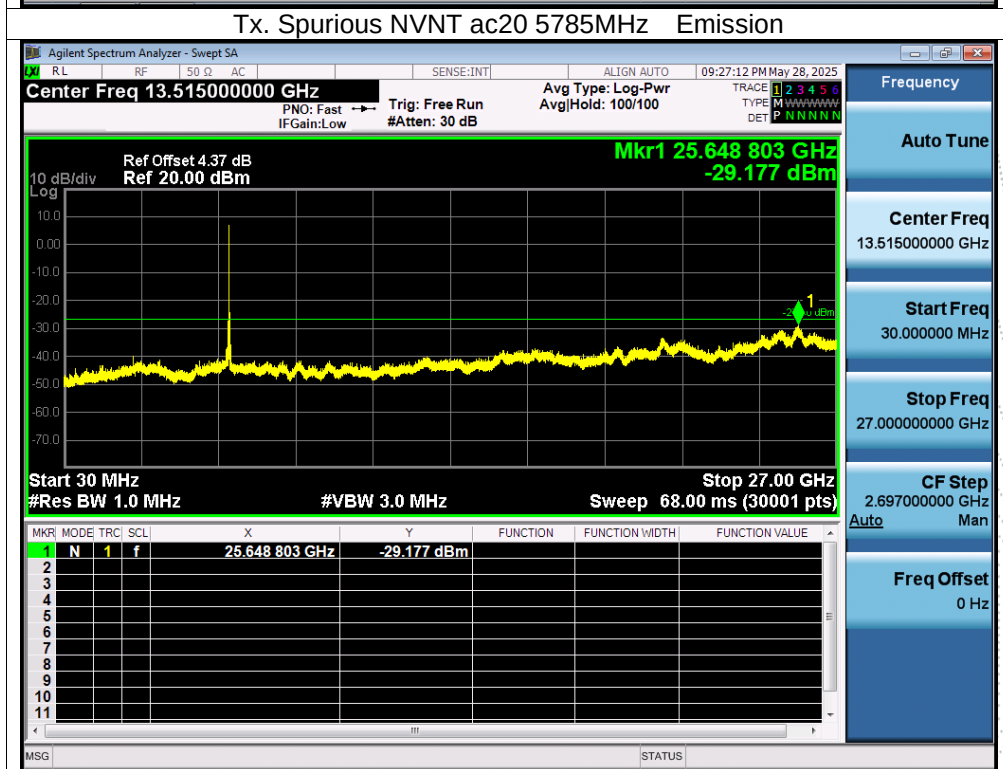
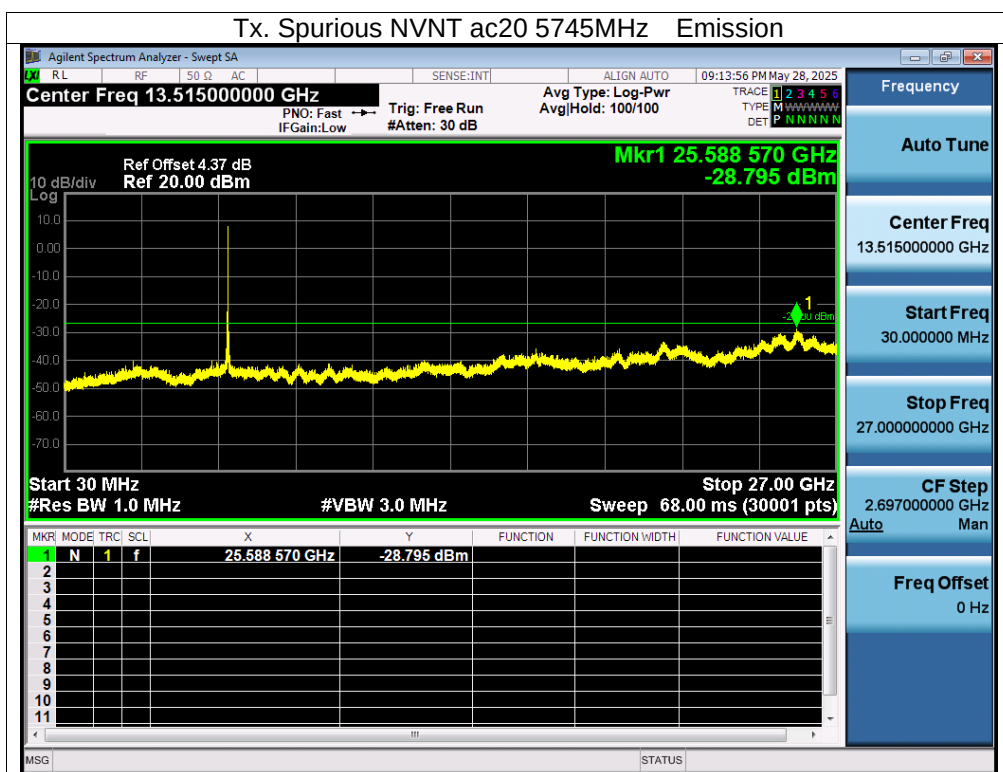
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A. Plot.

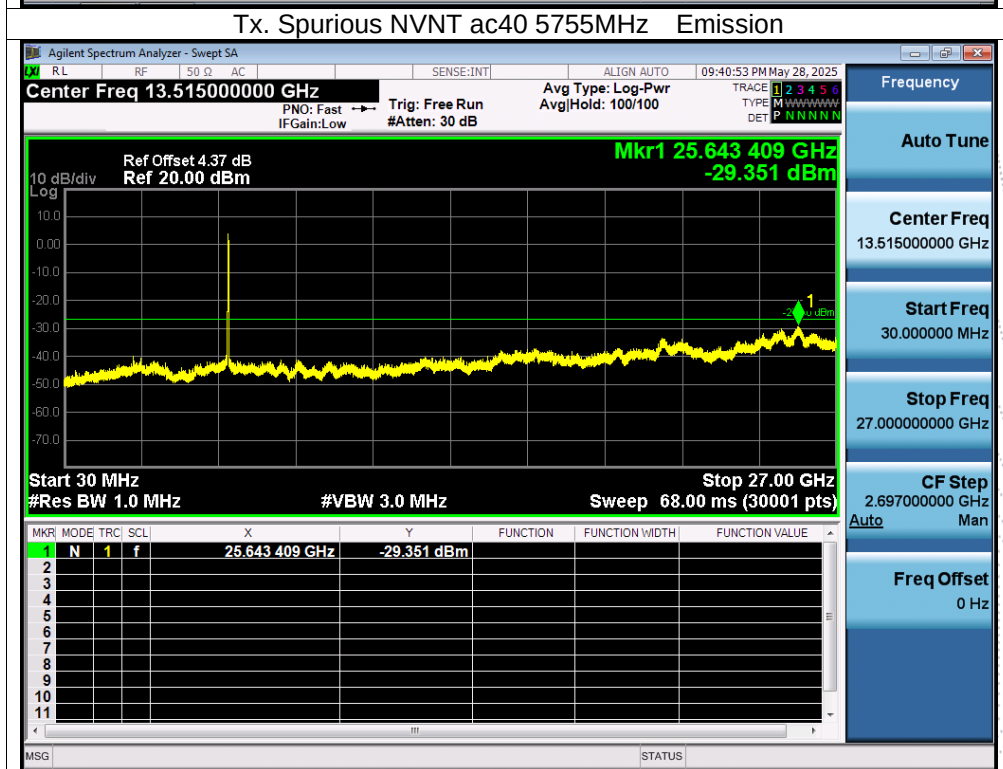
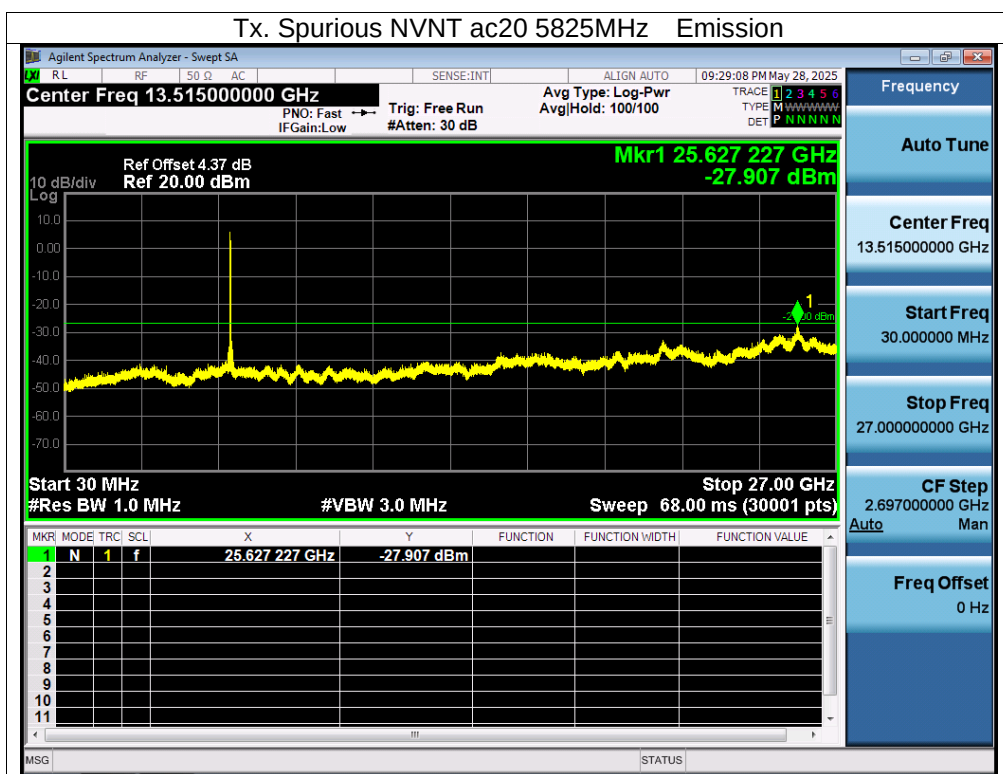


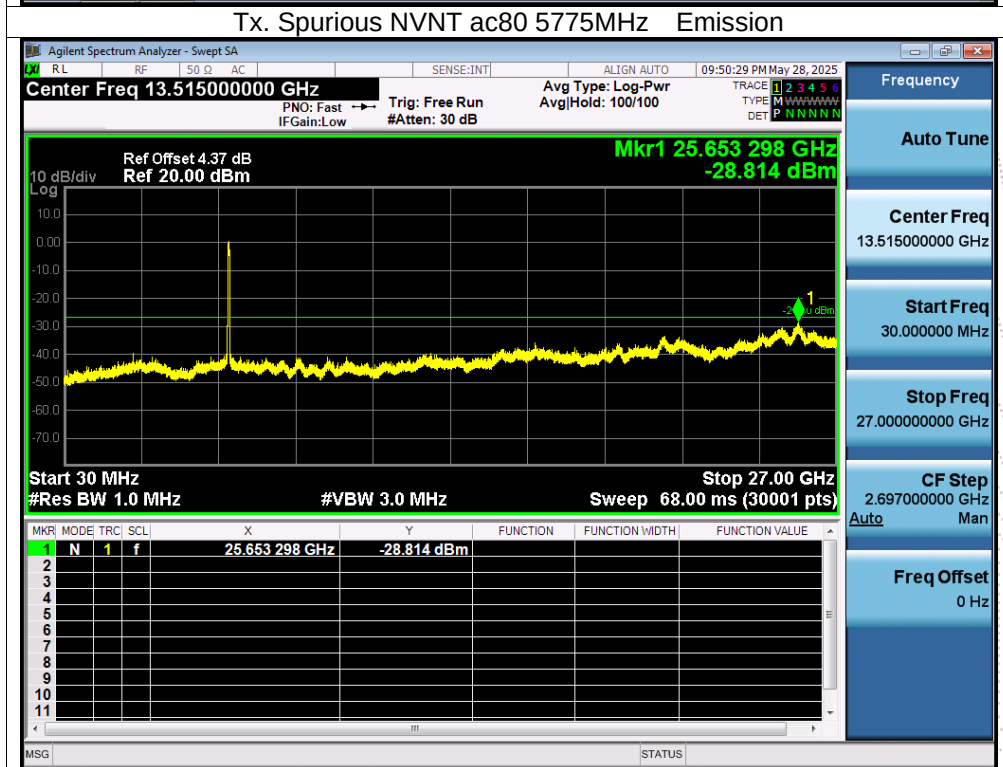
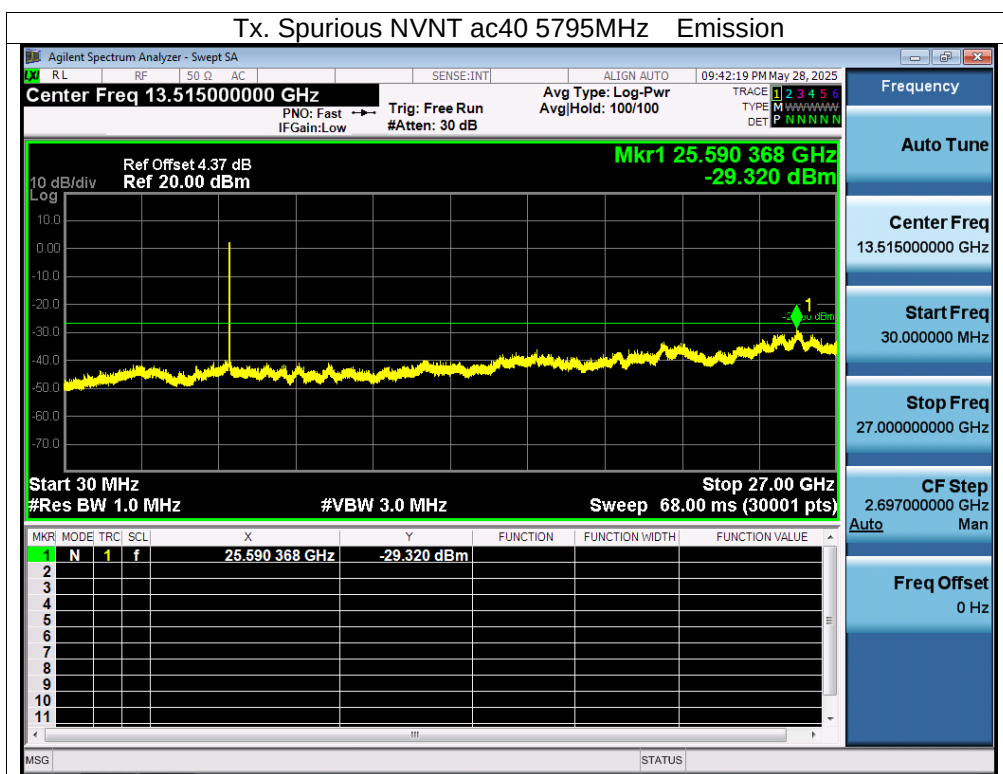


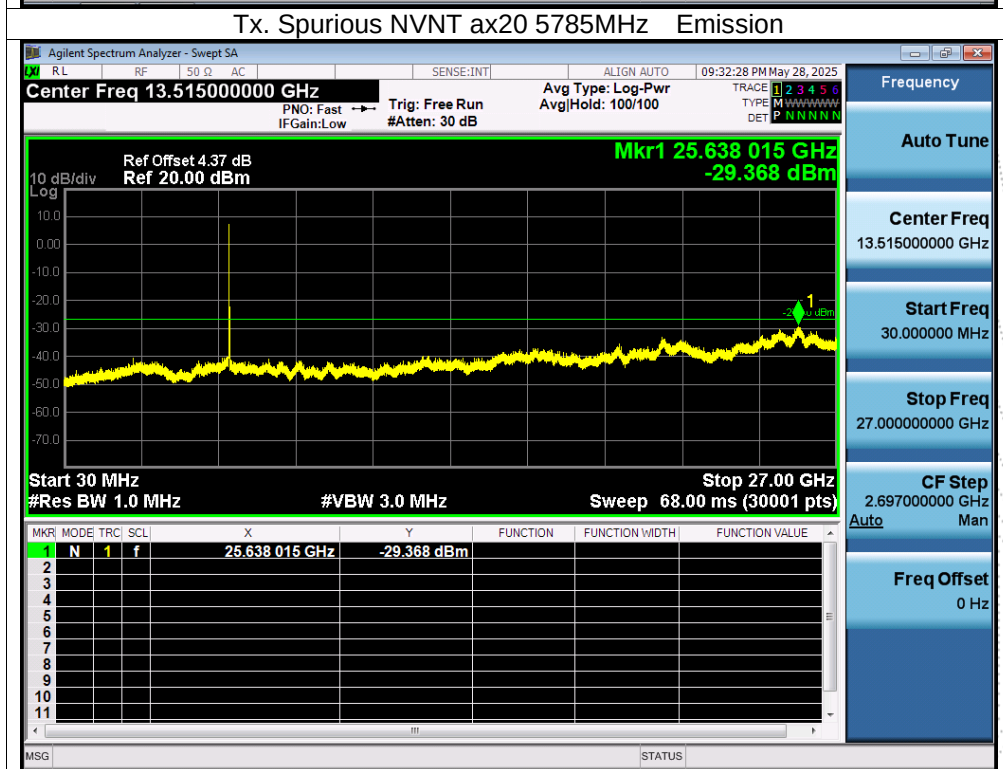
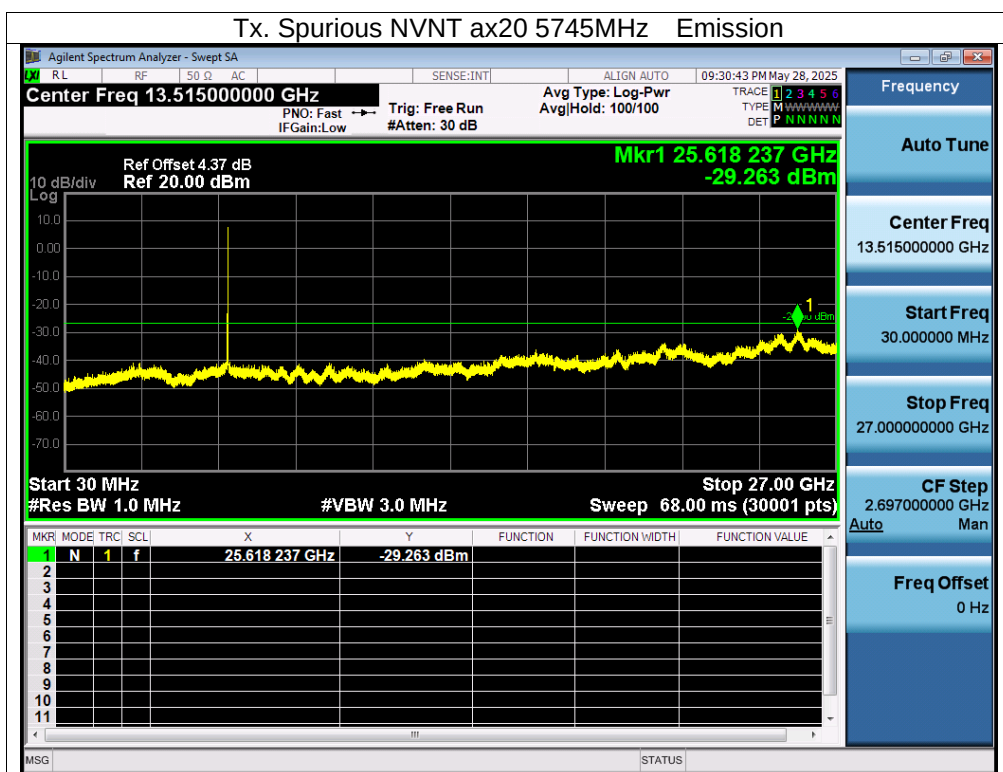


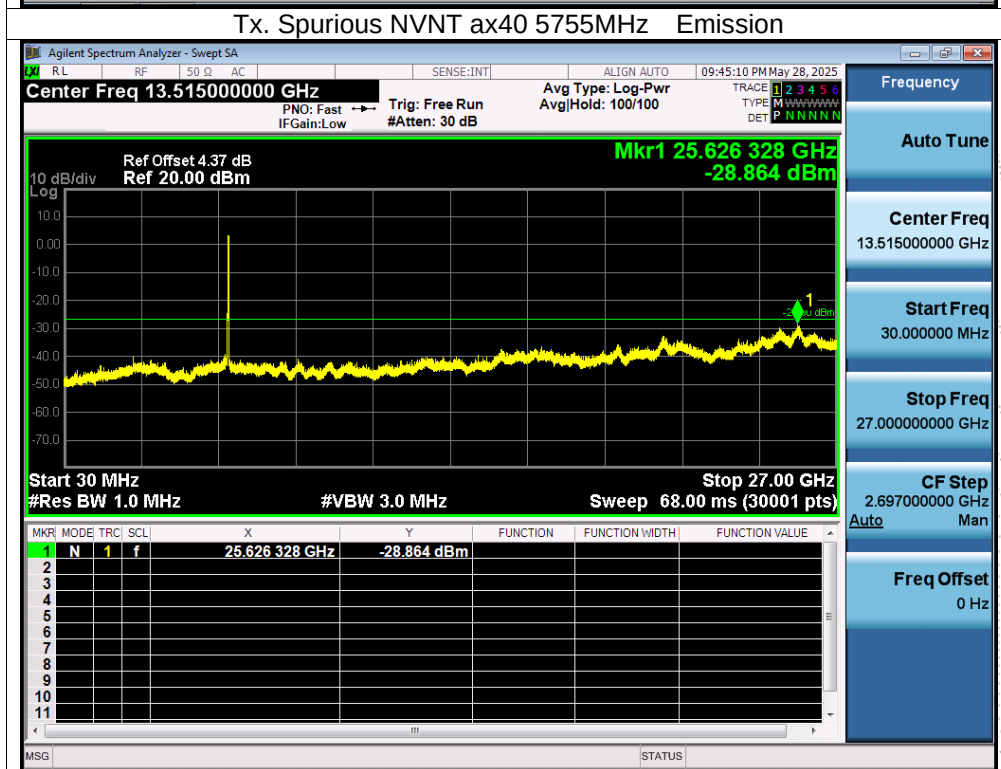
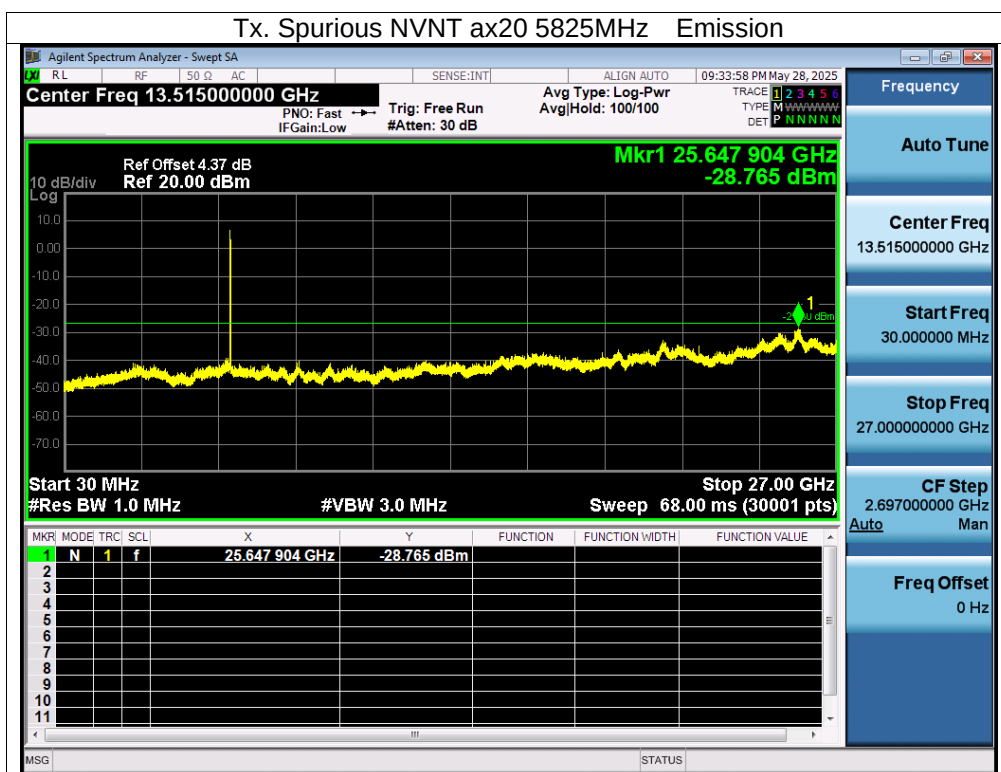


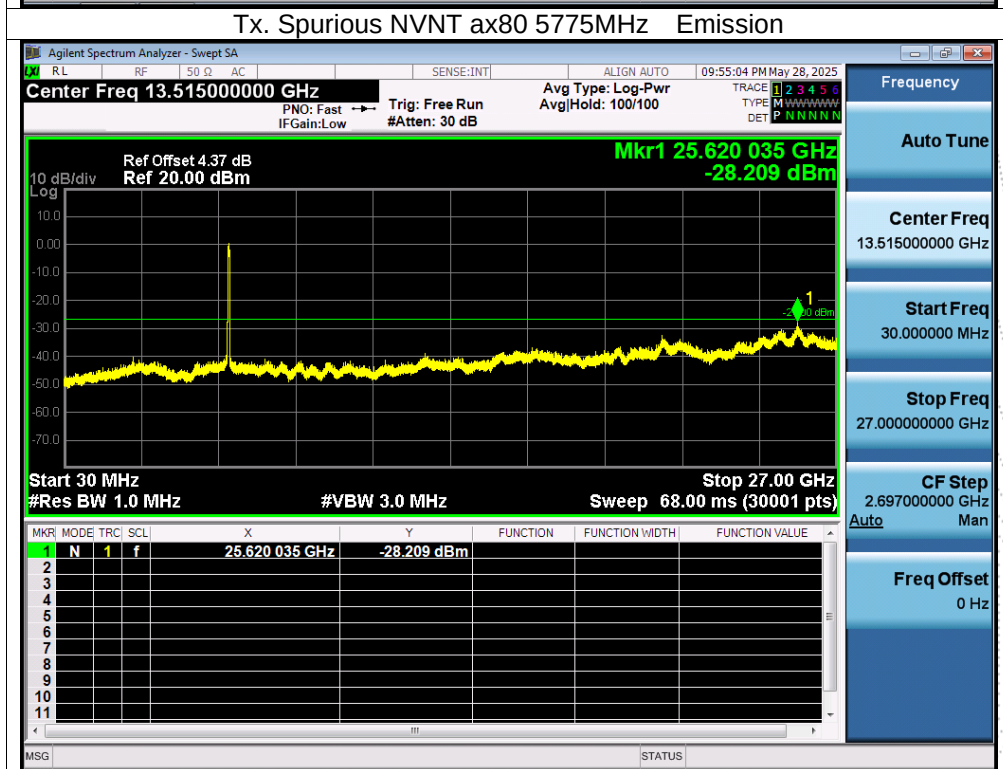
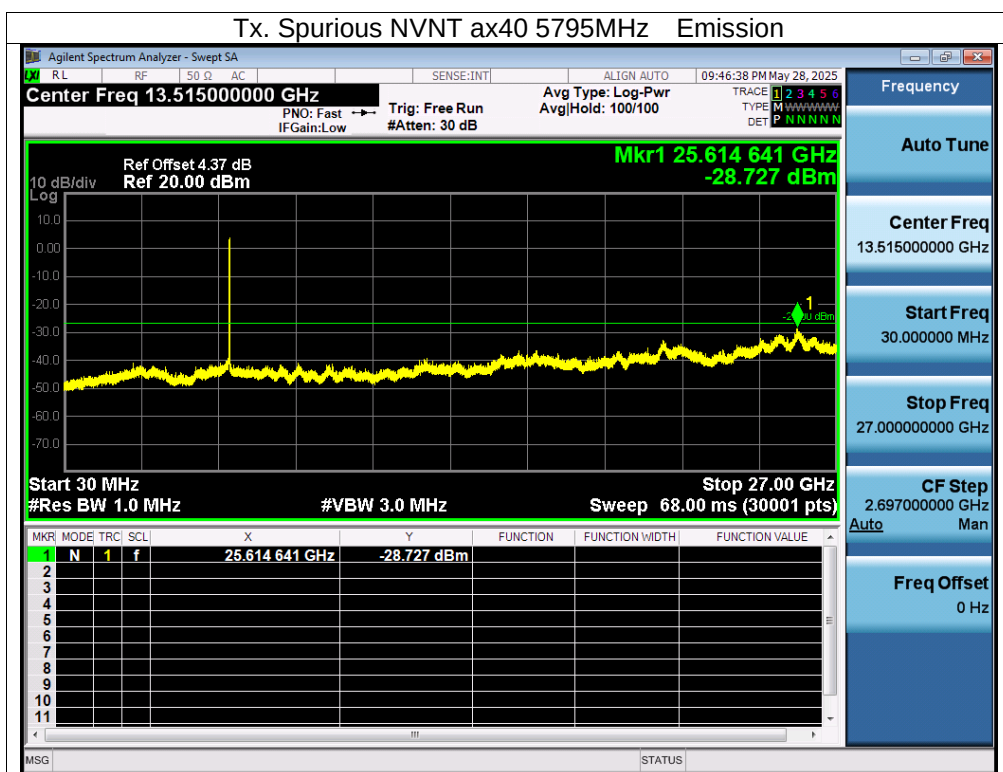












13. Frequency Stability Measurement

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:	
Test Mode:	TX (5.1G) Mode 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)	3.30	5180.0026	5180	0.0026	0.5019
		V max (V)	3.80	5180.0026	5180	0.0026	0.5019
		V min (V)	2.81	5180.0102	5180	0.0102	1.9691
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)	3.3	T (°C)	-20	5180.0042	5180	0.0042	0.8108
		T (°C)	-10	5180.0127	5180	0.0127	2.4517
		T (°C)	0	5180.0091	5180	0.0091	1.7568
		T (°C)	10	5180.0016	5180	0.0016	0.3089
		T (°C)	20	5180.0032	5180	0.0032	0.6178
		T (°C)	30	5180.0009	5180	0.0009	0.1737
		T (°C)	40	5180.0116	5180	0.0116	2.2394
		T (°C)	50	5180.0071	5180	0.0071	1.3707
		T (°C)	60	5180.0055	5180	0.0055	1.0618
		T (°C)	70	5180.0031	5180	0.0031	0.5985
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)	3.30	5200.0003	5200	0.0003	0.0577
		V max (V)	3.80	5200.0071	5200	0.0071	1.3654
		V min (V)	2.81	5200.0022	5200	0.0022	0.4231
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)	3.3	T (°C)	-20	5200.00130	5200	0.00130	0.2500
		T (°C)	-10	5200.00950	5200	0.00950	1.8269
		T (°C)	0	5200.00010	5200	0.00010	0.0192
		T (°C)	10	5200.00330	5200	0.00330	0.6346
		T (°C)	20	5200.00530	5200	0.00530	1.0192
		T (°C)	30	5200.00830	5200	0.00830	1.5962
		T (°C)	40	5200.00250	5200	0.00250	0.4808
		T (°C)	50	5200.01030	5200	0.01030	1.9808
		T (°C)	60	5200.00200	5200	0.00200	0.3846
		T (°C)	70	5200.00120	5200	0.00120	0.2308
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)	3.30	5240.0030	5240	0.0030	0.5725
		V max (V)	3.80	5240.0125	5240	0.0125	2.3855
		V min (V)	2.81	5240.0102	5240	0.0102	1.9466
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)	3.3	T (°C)	-20	5240.0038	5240	0.0038	0.7252
		T (°C)	-10	5240.0019	5240	0.0019	0.3626
		T (°C)	0	5240.0051	5240	0.0051	0.9733
		T (°C)	10	5240.0032	5240	0.0032	0.6107
		T (°C)	20	5240.0017	5240	0.0017	0.3244
		T (°C)	30	5240.0084	5240	0.0084	1.6031
		T (°C)	40	5240.0113	5240	0.0113	2.1565
		T (°C)	50	5240.0047	5240	0.0047	0.8969
		T (°C)	60	5240.0092	5240	0.0092	1.7557
		T (°C)	70	5240.0116	5240	0.0116	2.2137
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.3V
Test Mode:	TX (5.3G) Mode Frequency U-NII-2A (5260-5320MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.30	5260.0046	5260	0.0046	0.8745
		V max (V)	3.80	5260.0020	5260	0.0020	0.3802
		V min (V)	2.81	5260.0089	5260	0.0089	1.6920
Limits				5250-5350 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.3	T (°C)	-20	5260.0083	5260	0.0083	1.5779
		T (°C)	-10	5260.0108	5260	0.0108	2.0532
		T (°C)	0	5260.0039	5260	0.0039	0.7414
		T (°C)	10	5260.0083	5260	0.0083	1.5779
		T (°C)	20	5260.0068	5260	0.0068	1.2928
		T (°C)	30	5260.0113	5260	0.0113	2.1483
		T (°C)	40	5260.0046	5260	0.0046	0.8745
		T (°C)	50	5260.0030	5260	0.0030	0.5703
		T (°C)	60	5260.0086	5260	0.0086	1.6350
		T (°C)	70	5260.0054	5260	0.0054	1.0266
Limits				5250-5350 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)	3.30	5280.0088	5280	0.0088	1.6667
		V max (V)	3.80	5280.0110	5280	0.0110	2.0833
		V min (V)	2.81	5280.0008	5280	0.0008	0.1515
Limits				5250-5350 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.3	T (°C)	-20	5280.01110	5280	0.01110	2.1023
		T (°C)	-10	5280.00340	5280	0.00340	0.6439
		T (°C)	0	5280.01030	5280	0.01030	1.9508
		T (°C)	10	5280.00310	5280	0.00310	0.5871
		T (°C)	20	5280.01070	5280	0.01070	2.0265
		T (°C)	30	5280.00480	5280	0.00480	0.9091
		T (°C)	40	5280.00570	5280	0.00570	1.0795
		T (°C)	50	5280.00960	5280	0.00960	1.8182
		T (°C)	60	5280.00760	5280	0.00760	1.4394
		T (°C)	70	5280.01120	5280	0.01120	2.1212
Limits				5250-5350 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)	3.30	5320.0063	5320	0.0063	1.1842
		V max (V)	3.80	5320.0131	5320	0.0131	2.4624
		V min (V)	2.81	5320.0098	5320	0.0098	1.8421
Limits				5250-5350 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency : 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.3	T (°C)	-20	5320.0103	5320	0.0103	1.9361
		T (°C)	-10	5320.0016	5320	0.0016	0.3008
		T (°C)	0	5320.0036	5320	0.0036	0.6767
		T (°C)	10	5320.0028	5320	0.0028	0.5263
		T (°C)	20	5320.0011	5320	0.0011	0.2068
		T (°C)	30	5320.0064	5320	0.0064	1.2030
		T (°C)	40	5320.0131	5320	0.0131	2.4624
		T (°C)	50	5320.0119	5320	0.0119	2.2368
		T (°C)	60	5320.0035	5320	0.0035	0.6579
		T (°C)	70	5320.0018	5320	0.0018	0.3383
Limits				5250-5350 MHz			
Result				Complies			

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.3V
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)	3.30	5500.0128	5500	0.0128	2.3273
		V max (V)	3.80	5500.0097	5500	0.0097	1.7636
		V min (V)	2.81	5500.0107	5500	0.0107	1.9455
Limits				5470-5725 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency : 5500MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.3	T (°C)	-20	5500.0045	5500	0.0045	0.8182
		T (°C)	-10	5500.0071	5500	0.0071	1.2909
		T (°C)	0	5500.0023	5500	0.0023	0.4182
		T (°C)	10	5500.0088	5500	0.0088	1.6000
		T (°C)	20	5500.0002	5500	0.0002	0.0364
		T (°C)	30	5500.0073	5500	0.0073	1.3273
		T (°C)	40	5500.0003	5500	0.0003	0.0545
		T (°C)	50	5500.0004	5500	0.0004	0.0727
		T (°C)	60	5500.0049	5500	0.0049	0.8909
		T (°C)	70	5500.0107	5500	0.0107	1.9455
Limits				5470-5725 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)	3.30	5580.0110	5580	0.0110	1.9713
		V max (V)	3.80	5580.0053	5580	0.0053	0.9498
		V min (V)	2.81	5580.0031	5580	0.0031	0.5556
Limits				5470-5725 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency : 5580MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.3	T (°C)	-20	5580.01340	5580	0.01340	2.4014
		T (°C)	-10	5580.00950	5580	0.00950	1.7025
		T (°C)	0	5580.00610	5580	0.00610	1.0932
		T (°C)	10	5580.00730	5580	0.00730	1.3082
		T (°C)	20	5580.01020	5580	0.01020	1.8280
		T (°C)	30	5580.00920	5580	0.00920	1.6487
		T (°C)	40	5580.00540	5580	0.00540	0.9677
		T (°C)	50	5580.00310	5580	0.00310	0.5556
		T (°C)	60	5580.00700	5580	0.00700	1.2545
		T (°C)	70	5580.01170	5580	0.01170	2.0968
Limits				5470-5725 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)	3.30	5700.0050	5700	0.0050	0.8772
		V max (V)	3.80	5700.0079	5700	0.0079	1.3860
		V min (V)	2.81	5700.0084	5700	0.0084	1.4737
Limits				5470-5725 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency : 5700MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	3.3	T (°C)	-20	5700.0033	5700	0.0033	0.5789
		T (°C)	-10	5700.0029	5700	0.0029	0.5088
		T (°C)	0	5700.0112	5700	0.0112	1.9649
		T (°C)	10	5700.0043	5700	0.0043	0.7544
		T (°C)	20	5700.0032	5700	0.0032	0.5614
		T (°C)	30	5700.0103	5700	0.0103	1.8070
		T (°C)	40	5700.0052	5700	0.0052	0.9123
		T (°C)	50	5700.0042	5700	0.0042	0.7368
		T (°C)	60	5700.0074	5700	0.0074	1.2982
		T (°C)	70	5700.0055	5700	0.0055	0.9649
Limits				5470-5725 MHz			
Result				Complies			

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.3V
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)	3.30	5745.00030	5745	0.00030	0.0522
		V max (V)	3.80	5745.00390	5745	0.00390	0.6789
		V min (V)	2.81	5745.00100	5745	0.00100	0.1741
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)	3.3	T (°C)	-20	5745.00620	5745	0.00620	1.0792
		T (°C)	-10	5745.01310	5745	0.01310	2.2802
		T (°C)	0	5745.00840	5745	0.00840	1.4621
		T (°C)	10	5745.00910	5745	0.00910	1.5840
		T (°C)	20	5745.00760	5745	0.00760	1.3229
		T (°C)	30	5745.00840	5745	0.00840	1.4621
		T (°C)	40	5745.00550	5745	0.00550	0.9574
		T (°C)	50	5745.00200	5745	0.00200	0.3481
		T (°C)	60	5745.00180	5745	0.00180	0.3133
		T (°C)	70	5745.00840	5745	0.00840	1.4621
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)	3.30	5785.00710	5785	0.00710	1.2273
		V max (V)	3.80	5785.00410	5785	0.00410	0.7087
		V min (V)	2.81	5785.00400	5785	0.00400	0.6914
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)	3.3	T (°C)	-20	5785.00910	5785	0.00910	1.5730
		T (°C)	-10	5785.01210	5785	0.01210	2.0916
		T (°C)	0	5785.00200	5785	0.00200	0.3457
		T (°C)	10	5785.00820	5785	0.00820	1.4175
		T (°C)	20	5785.00420	5785	0.00420	0.7260
		T (°C)	30	5785.01140	5785	0.01140	1.9706
		T (°C)	40	5785.00580	5785	0.00580	1.0026
		T (°C)	50	5785.00490	5785	0.00490	0.8470
		T (°C)	60	5785.00770	5785	0.00770	1.3310
		T (°C)	70	5785.00400	5785	0.00400	0.6914
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)	3.30	5825.00220	5825	0.00220	0.3777
		V max (V)	3.80	5825.00110	5825	0.00110	0.1888
		V min (V)	2.81	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)	3.3	T (°C)	-20	5825.00460	5825	0.00460	0.7897
		T (°C)	-10	5825.01090	5825	0.01090	1.8712
		T (°C)	0	5825.00350	5825	0.00350	0.6009
		T (°C)	10	5825.01190	5825	0.01190	2.0429
		T (°C)	20	5825.00790	5825	0.00790	1.3562
		T (°C)	30	5825.00790	5825	0.00790	1.3562
		T (°C)	40	5825.00310	5825	0.00310	0.5322
		T (°C)	50	5825.00030	5825	0.00030	0.0515
		T (°C)	60	5825.00350	5825	0.00350	0.6009
		T (°C)	70	5825.00080	5825	0.00080	0.1373
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 = $T_{on} / (T_{on} + T_{off})$

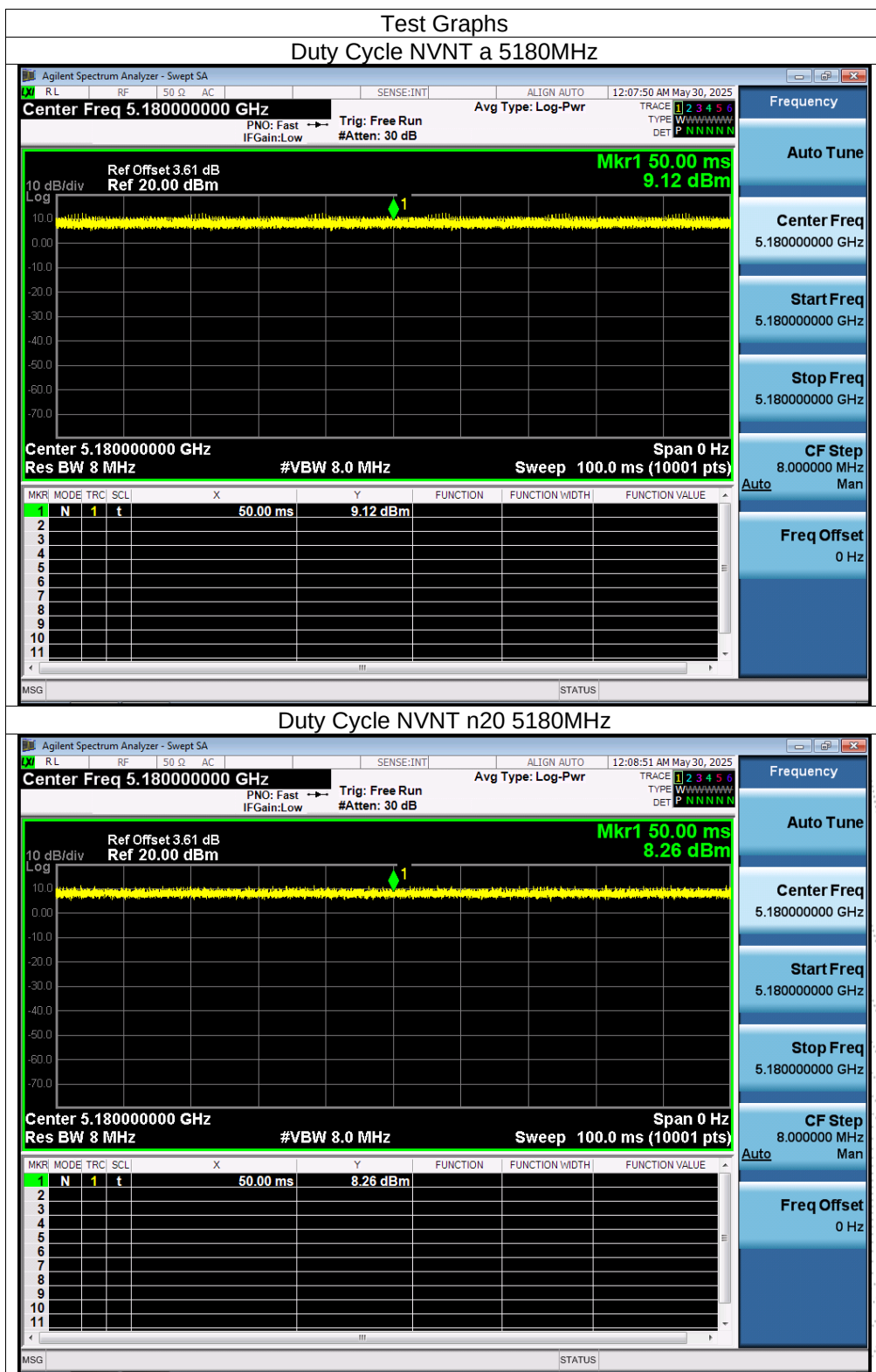
14.3 Test Procedure

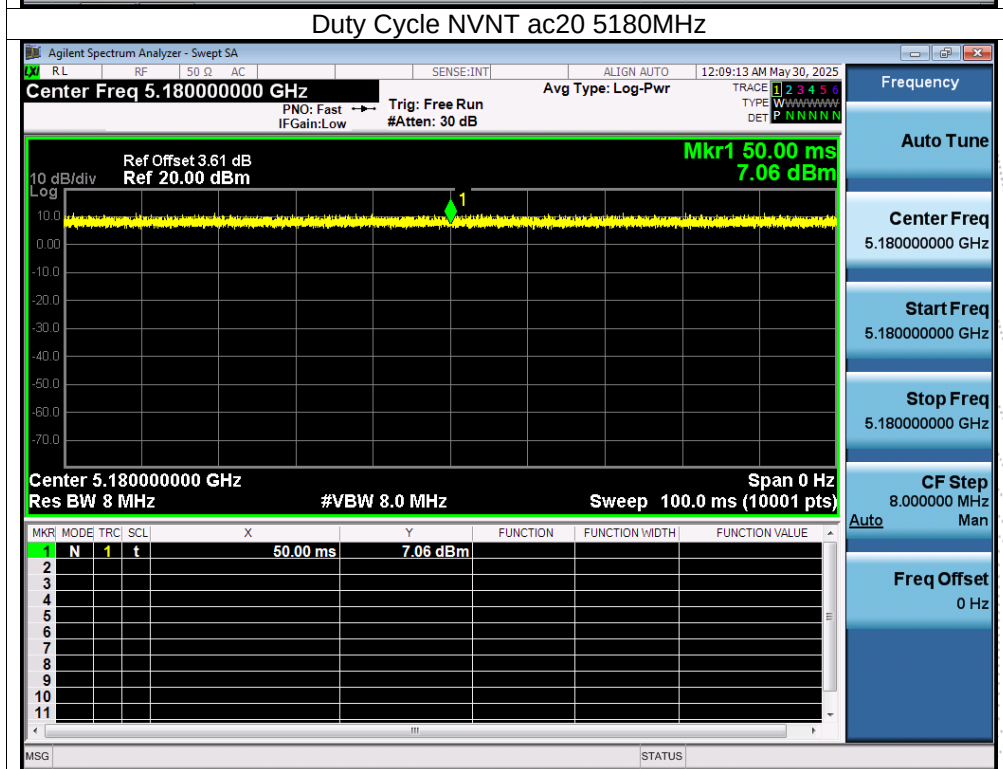
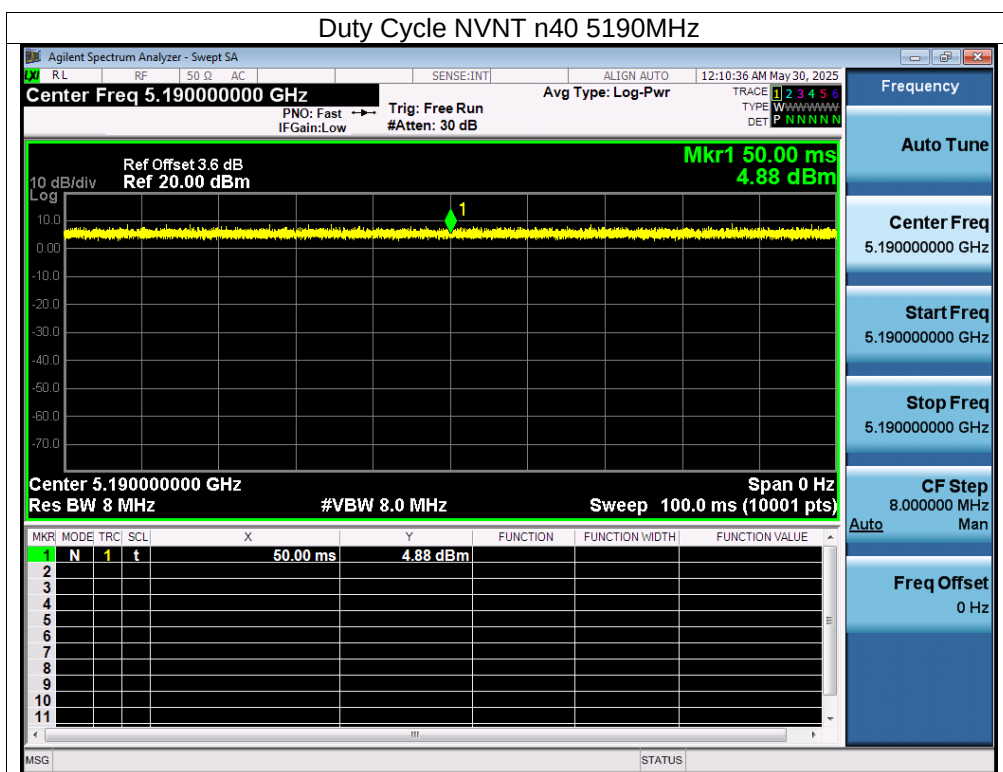
1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

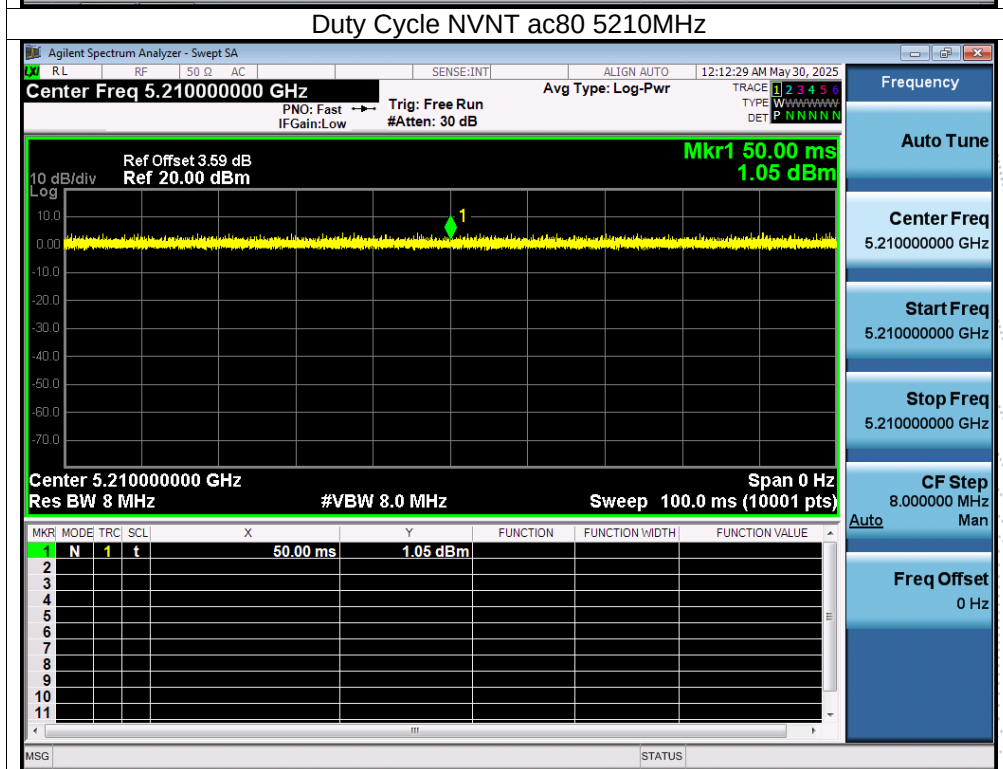
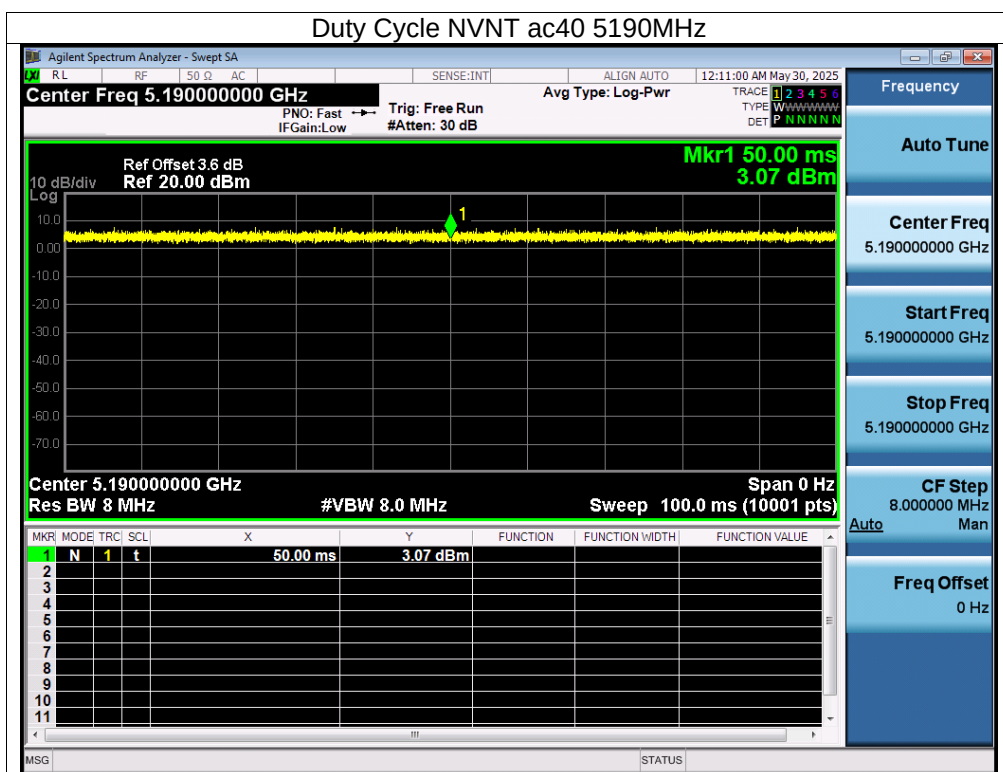
14.4 Test Result

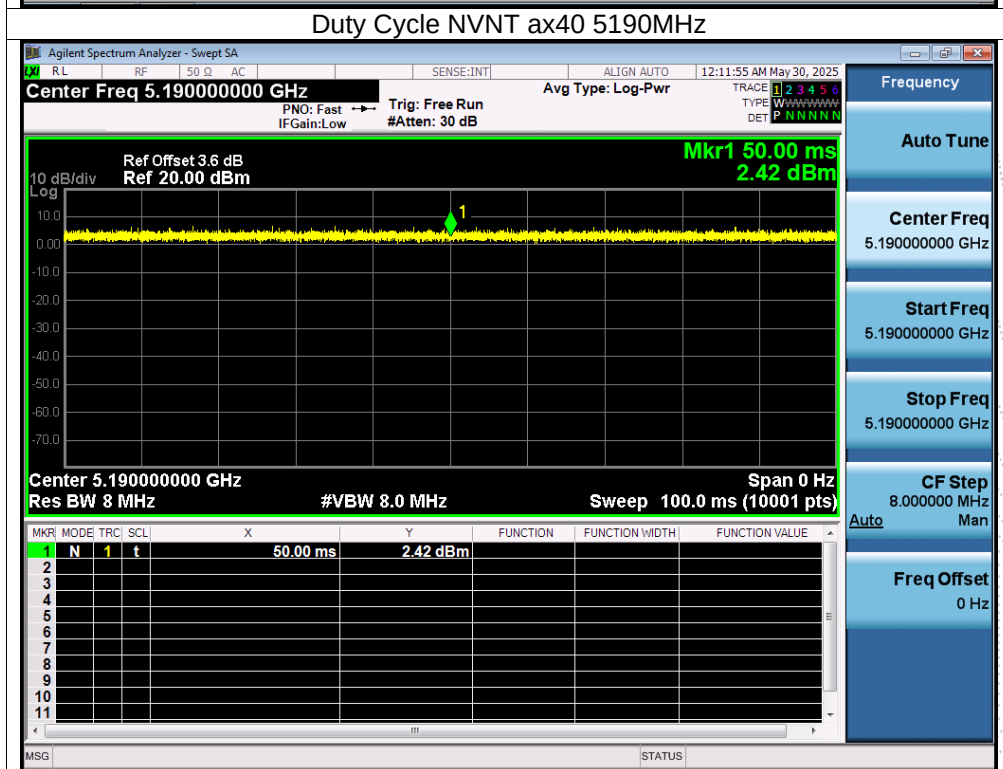
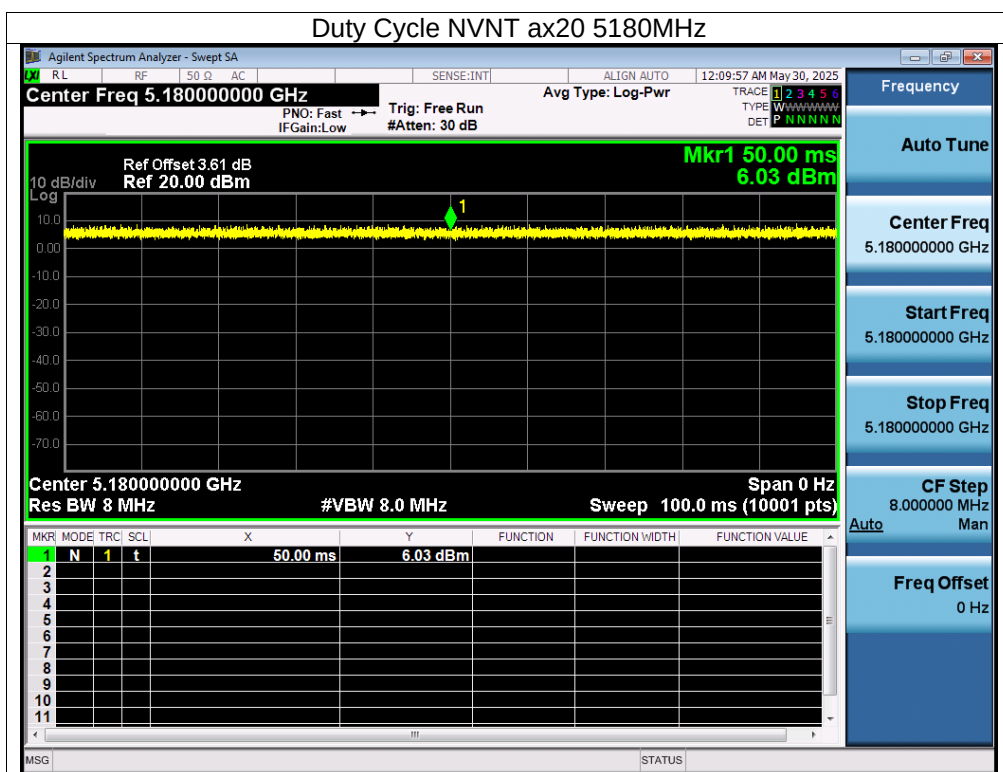
ANT A

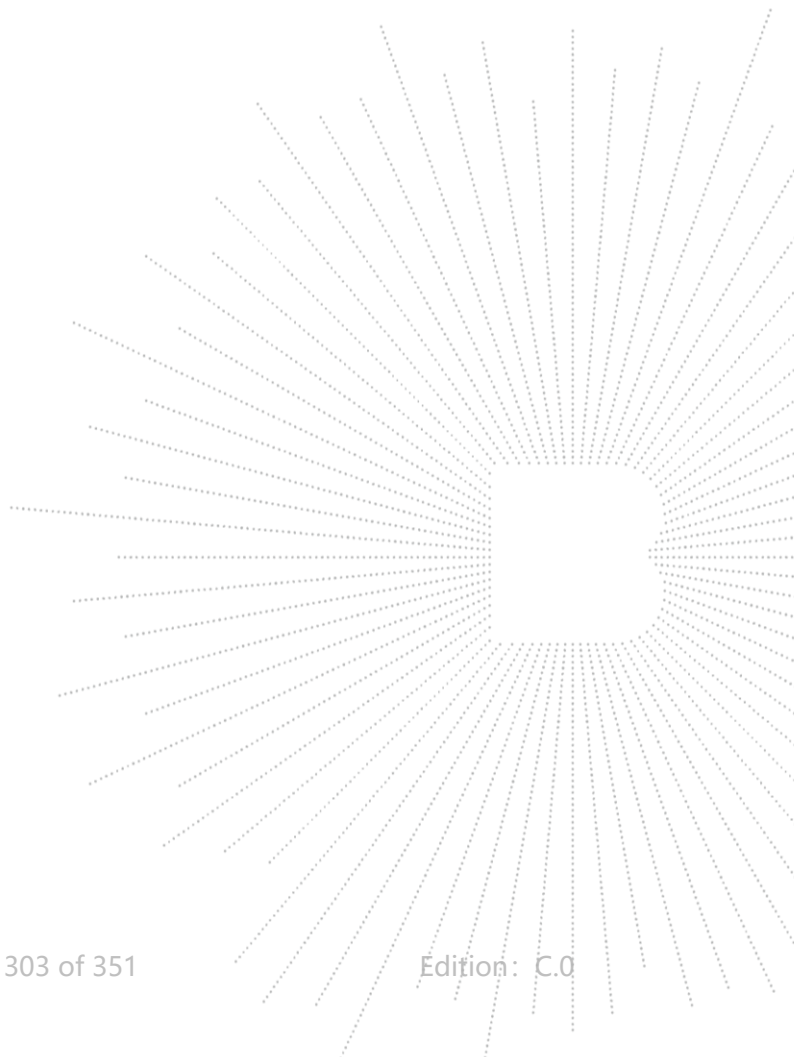
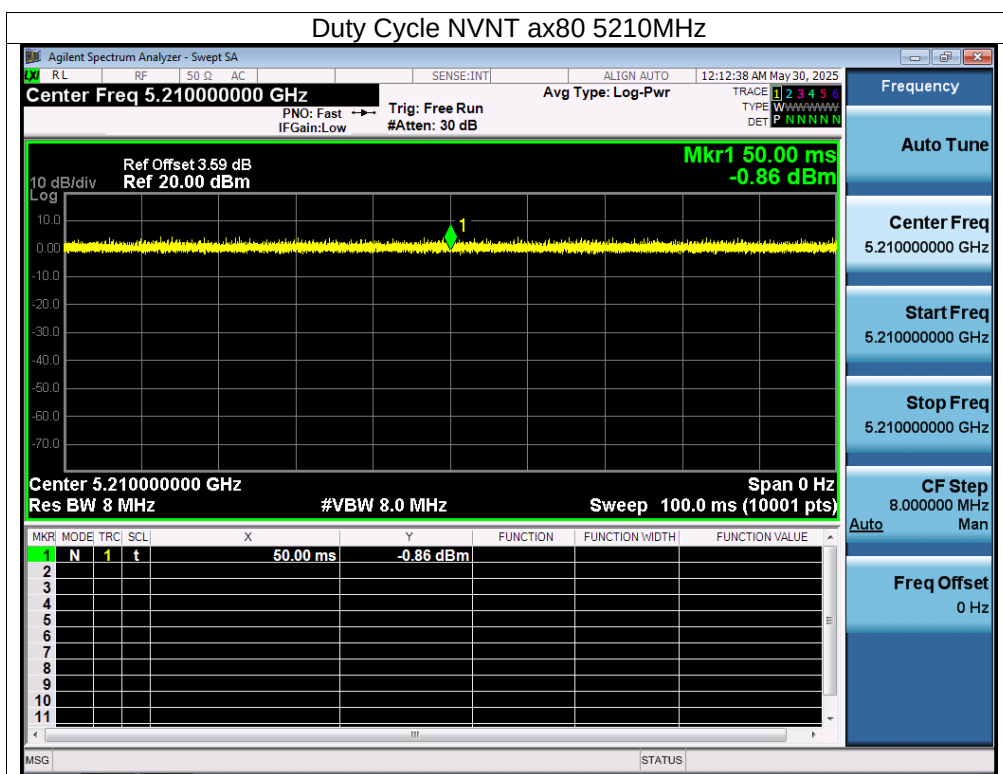
Condition	Mode	Frequency (MHz)	Duty Cycle (%)
NVNT	a	5180	100
NVNT	n20	5180	100
NVNT	n40	5190	100
NVNT	ac20	5180	100
NVNT	ac40	5190	100
NVNT	ac80	5210	100
NVNT	ax20	5180	100
NVNT	ax40	5190	100
NVNT	ax80	5210	100











ANT B

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

