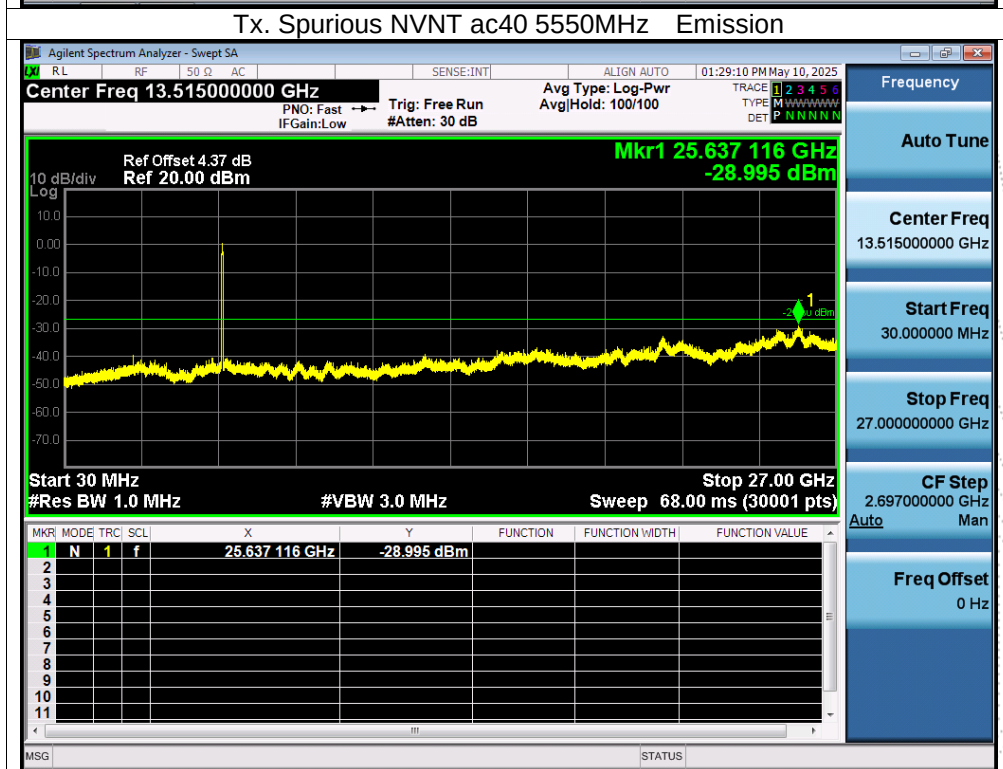
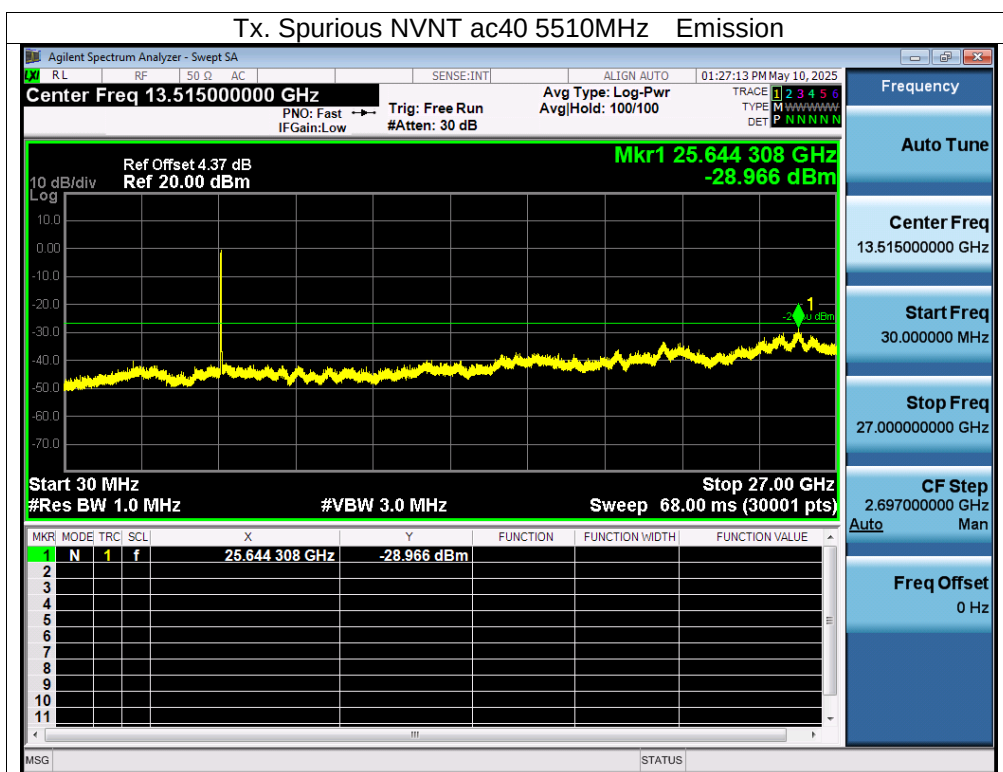
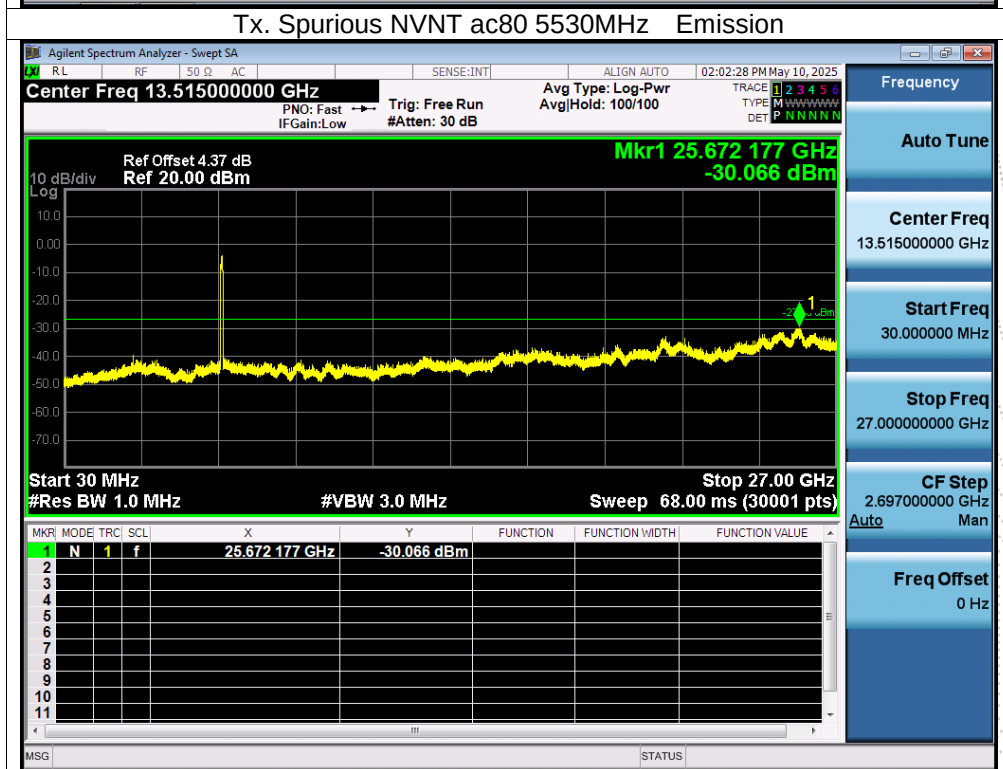
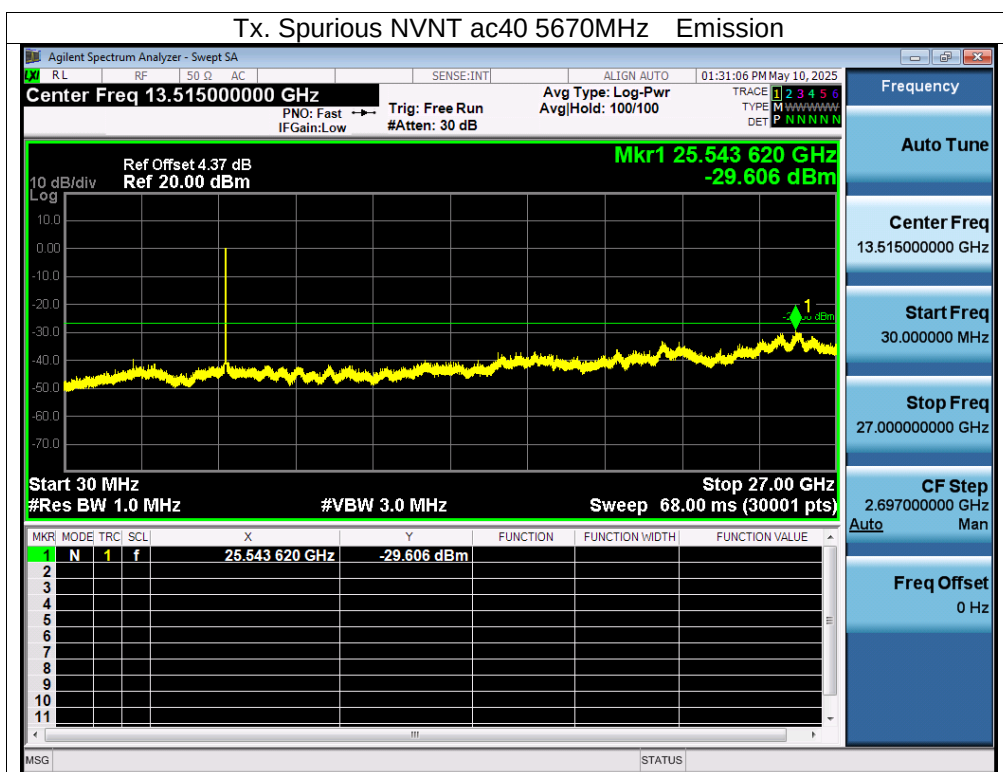
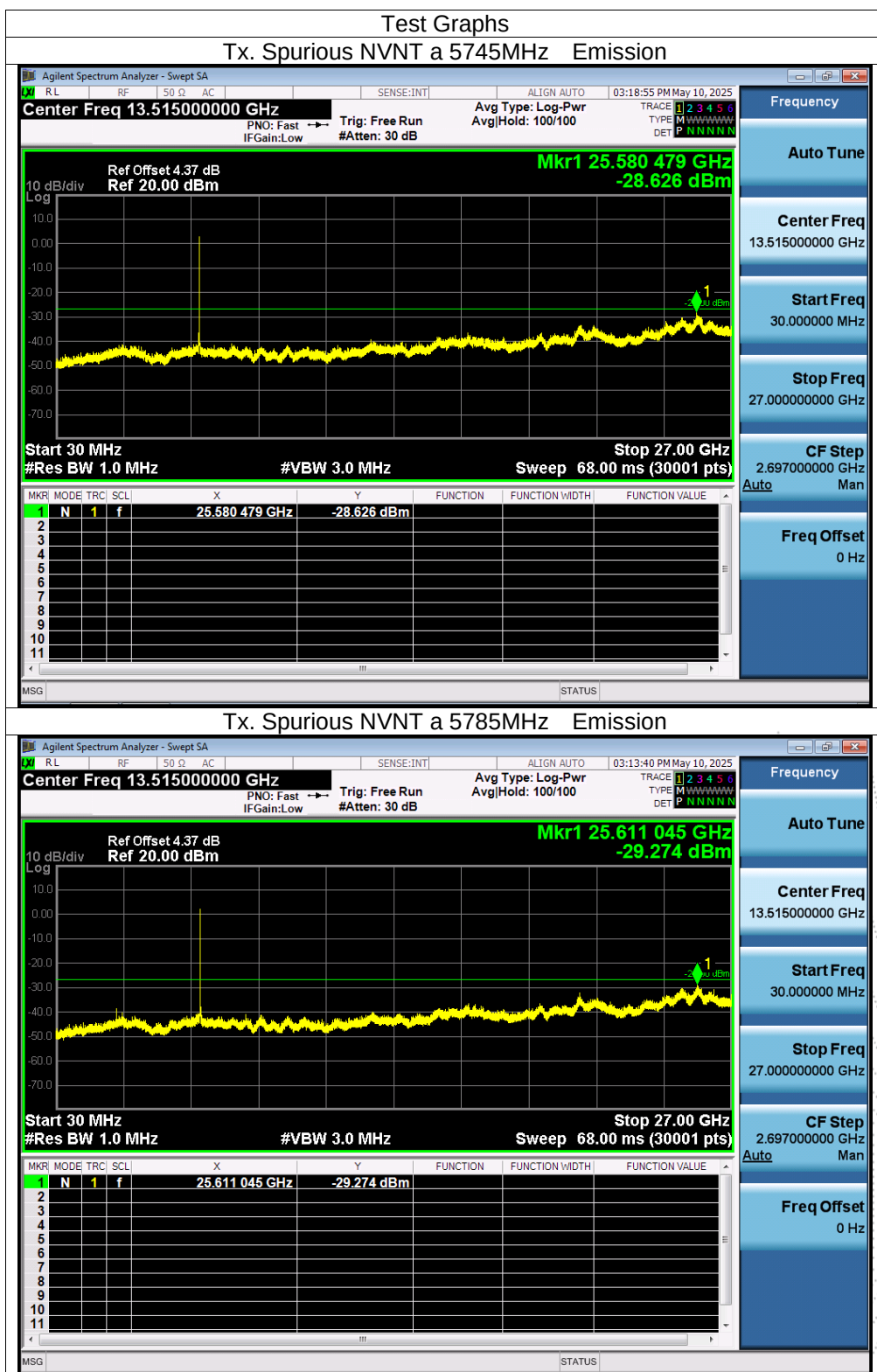
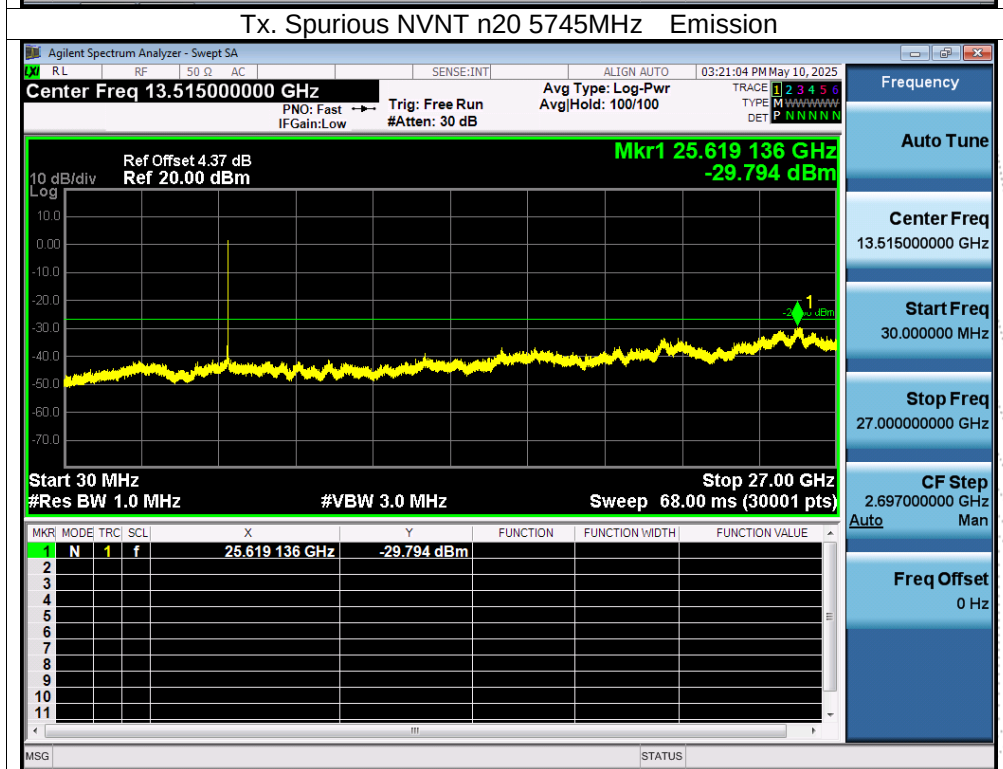
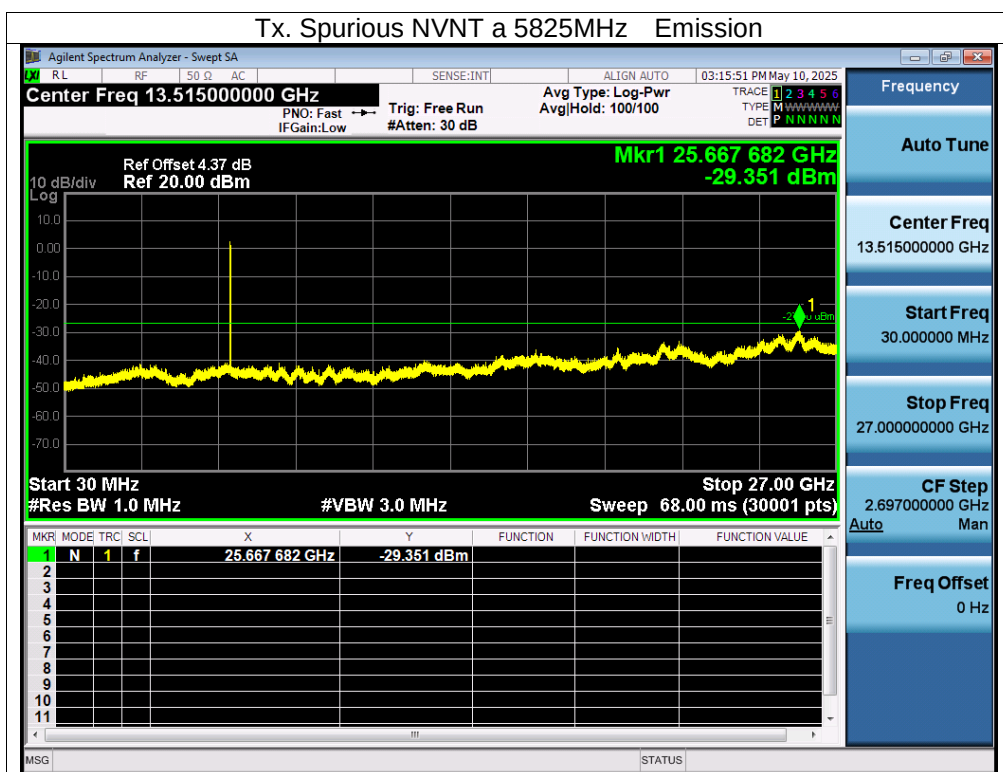
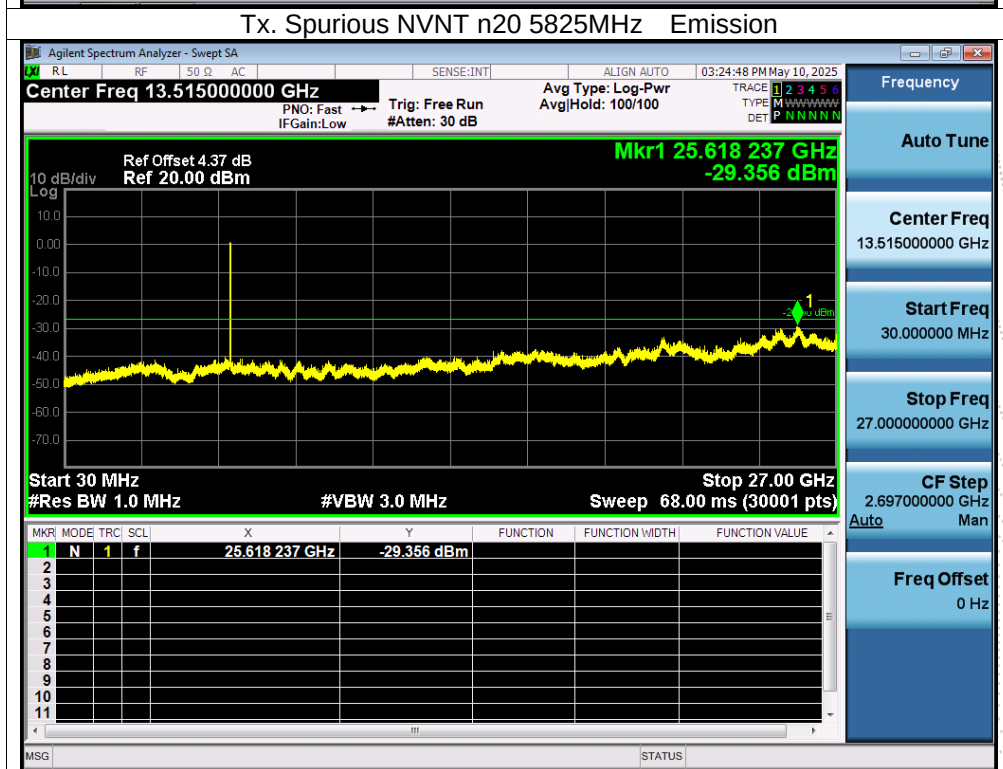
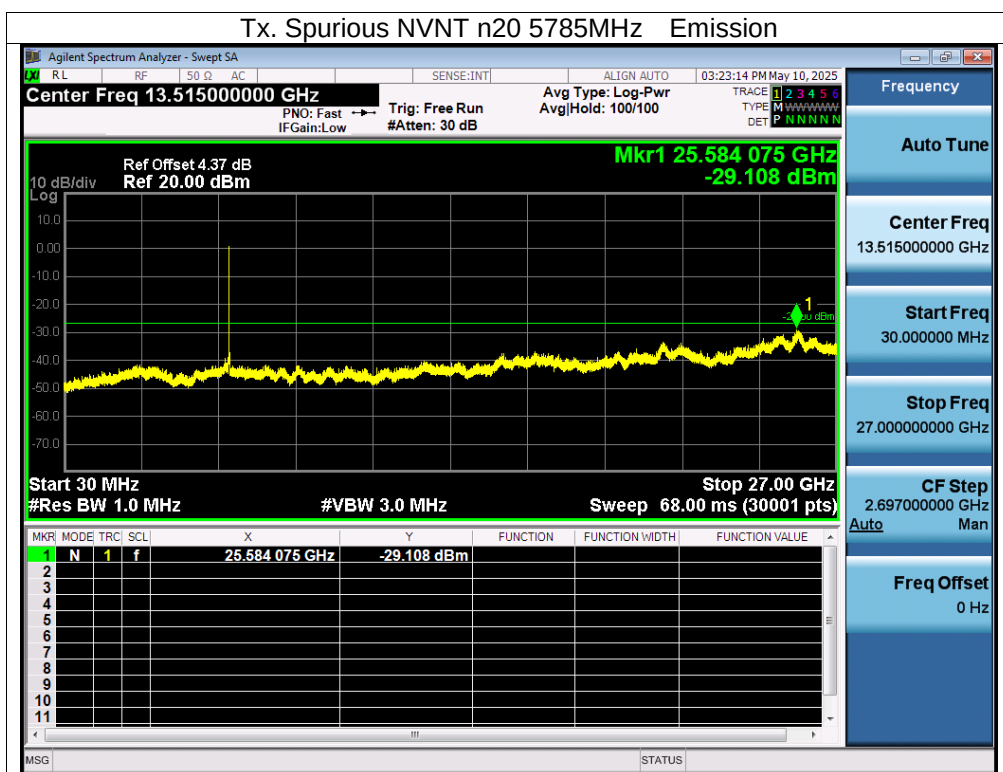


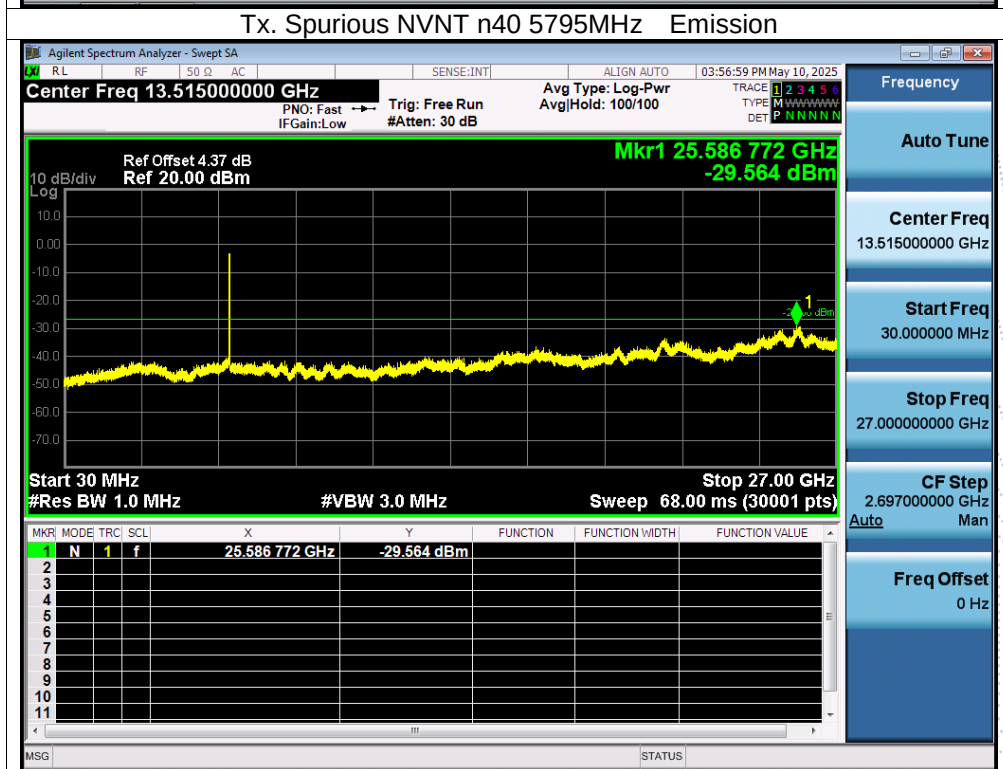
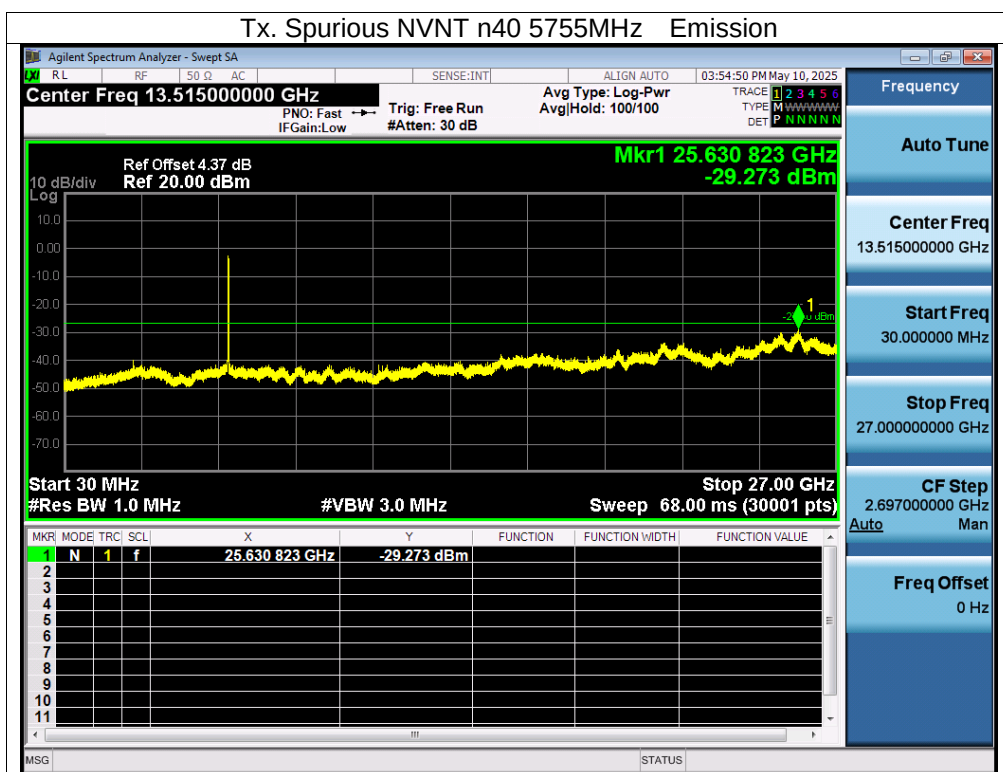


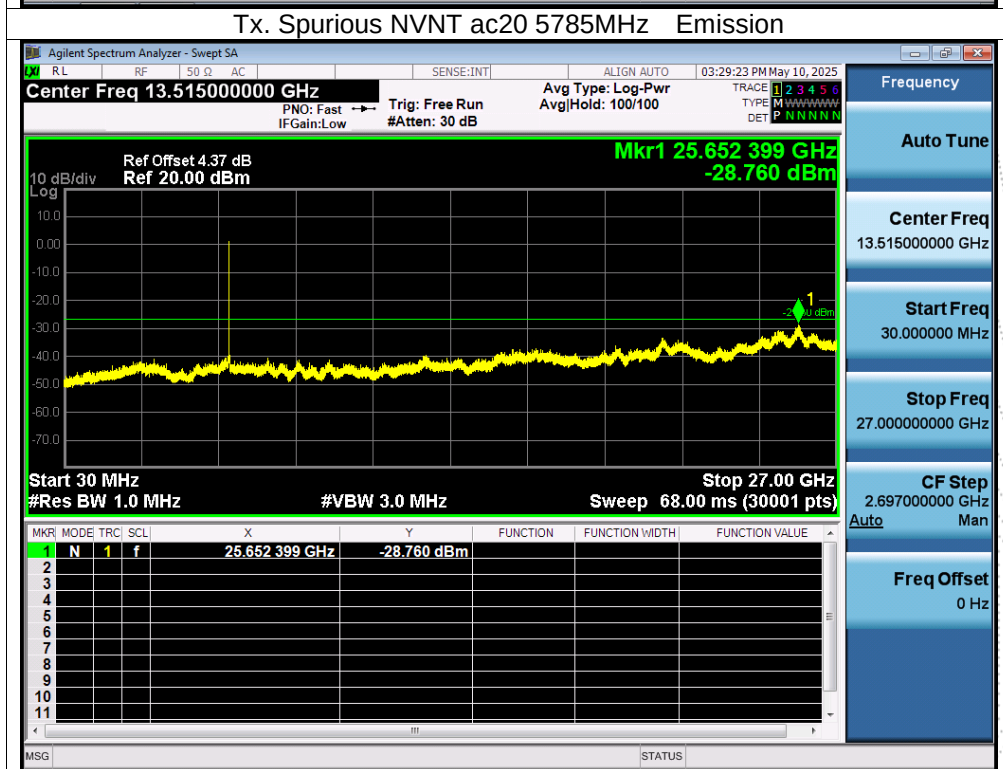
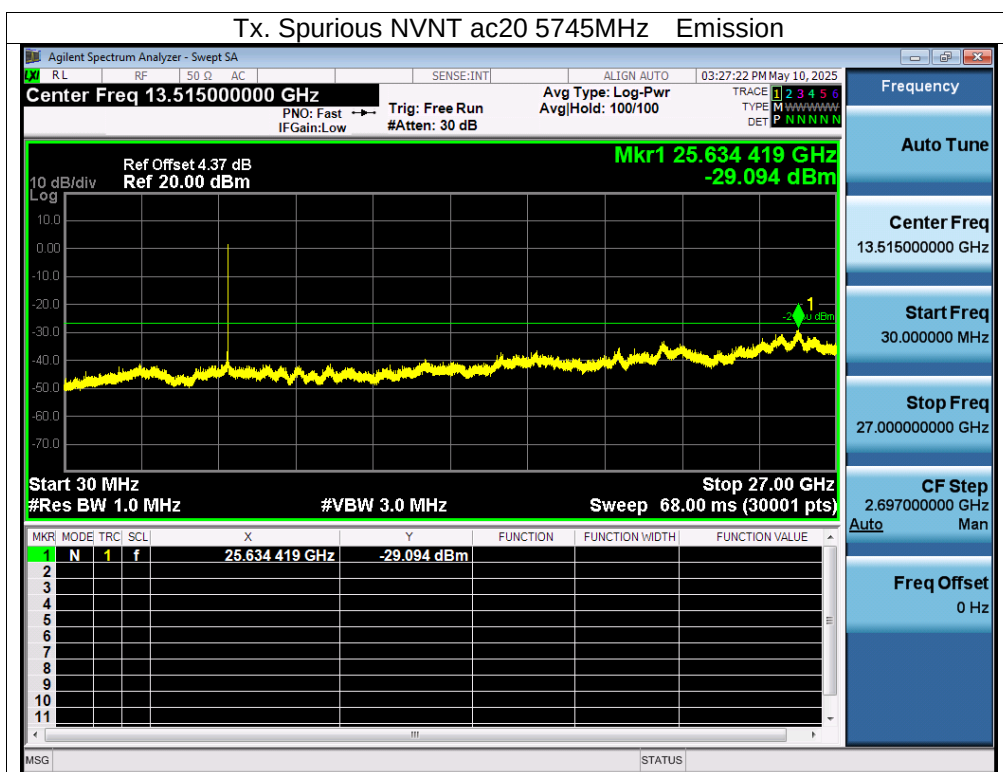


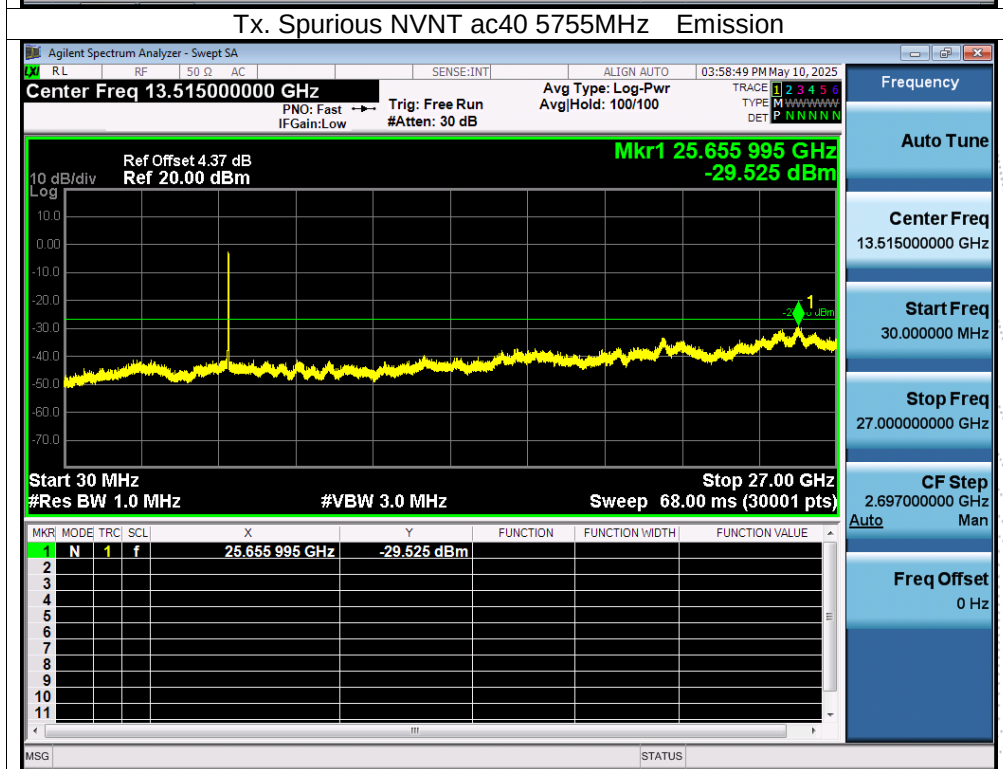
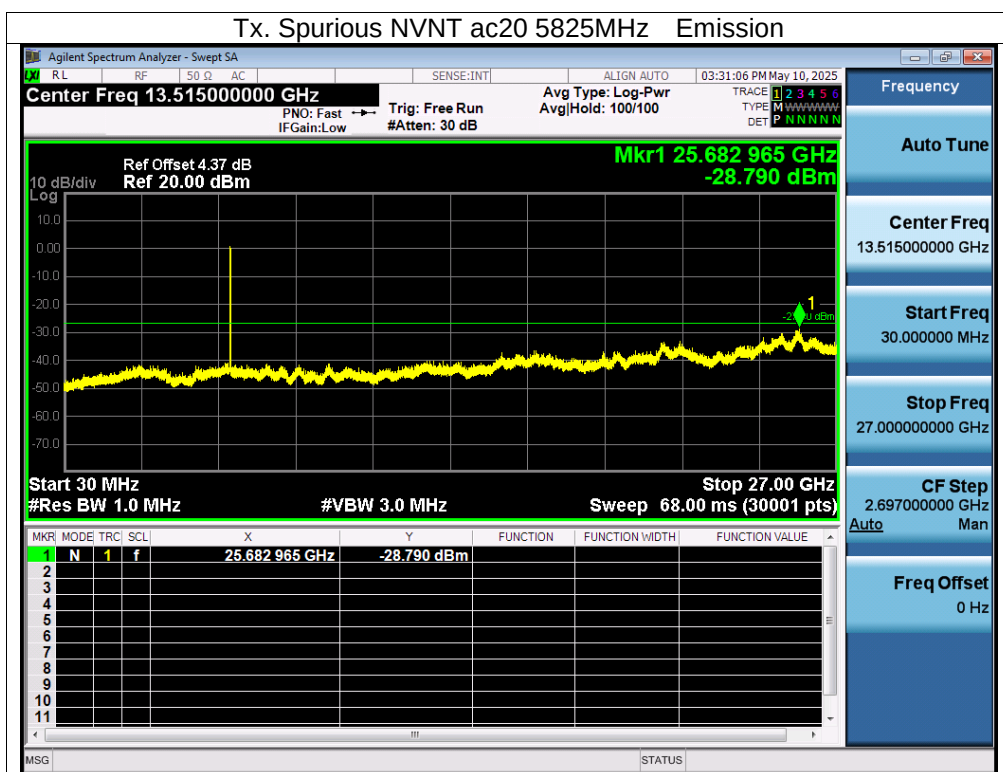


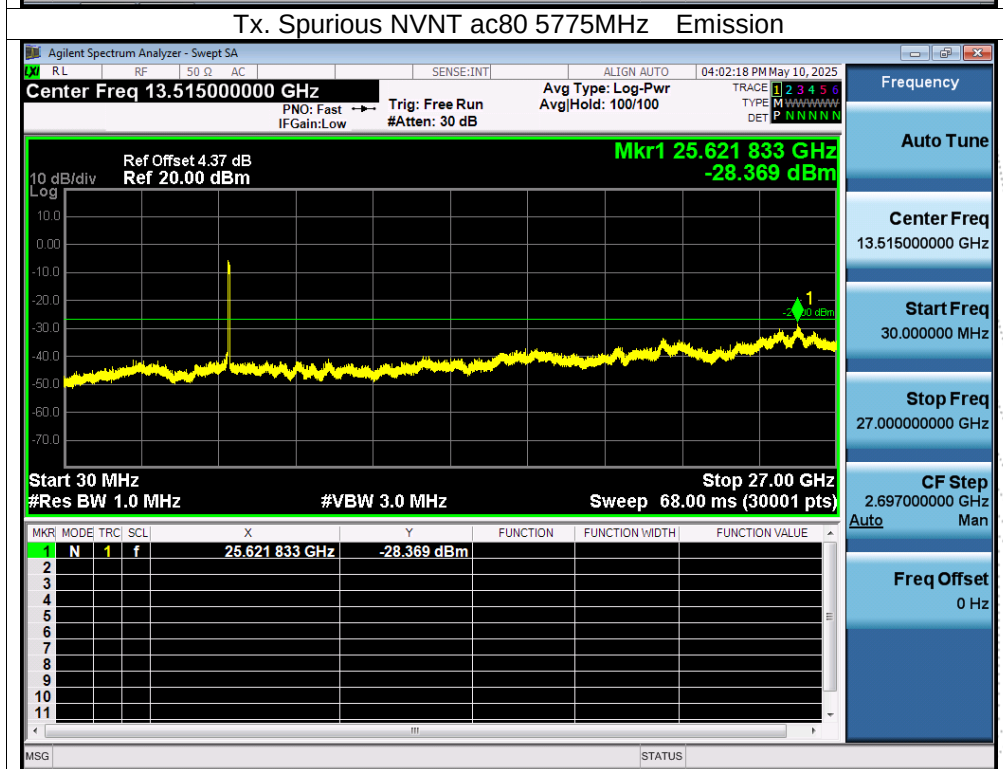
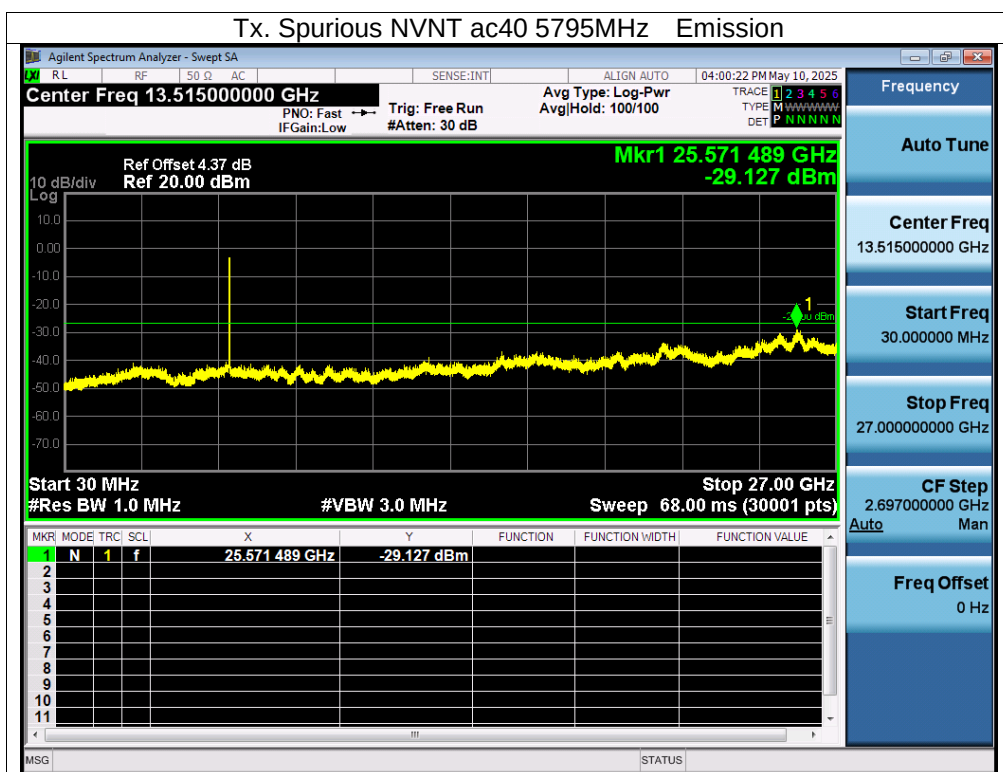












13. Frequency Stability Measurement

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 3.3V
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	5180.0079	5180	0.0079	1.5251
		V max (V)	3.80	5180.0116	5180	0.0116	2.2394
		V min (V)	2.81	5180.0004	5180	0.0004	0.0772
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	5180.0070	5180	0.0070	1.3514
		T (°C)	-10	5180.0116	5180	0.0116	2.2394
		T (°C)	0	5180.0110	5180	0.0110	2.1236
		T (°C)	10	5180.0135	5180	0.0135	2.6062
		T (°C)	20	5180.0051	5180	0.0051	0.9846
		T (°C)	30	5180.0056	5180	0.0056	1.0811
		T (°C)	40	5180.0077	5180	0.0077	1.4865
		T (°C)	50	5180.0095	5180	0.0095	1.8340
		T (°C)	60	5180.0098	5180	0.0098	1.8919
		T (°C)	70	5180.0040	5180	0.0040	0.7722
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	5200.0124	5200	0.0124	2.3846
		V max (V)	3.80	5200.0063	5200	0.0063	1.2115
		V min (V)	2.81	5200.0064	5200	0.0064	1.2308
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	5200.01240	5200	0.01240	2.3846
		T (°C)	-10	5200.00560	5200	0.00560	1.0769
		T (°C)	0	5200.01020	5200	0.01020	1.9615
		T (°C)	10	5200.01060	5200	0.01060	2.0385
		T (°C)	20	5200.00520	5200	0.00520	1.0000
		T (°C)	30	5200.00200	5200	0.00200	0.3846
		T (°C)	40	5200.00320	5200	0.00320	0.6154
		T (°C)	50	5200.01240	5200	0.01240	2.3846
		T (°C)	60	5200.00850	5200	0.00850	1.6346
		T (°C)	70	5200.00720	5200	0.00720	1.3846
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	5240.0001	5240	0.0001	0.0191
		V max (V)	3.80	5240.0073	5240	0.0073	1.3931
		V min (V)	2.81	5240.0096	5240	0.0096	1.8321
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	5240.0047	5240	0.0047	0.8969
		T (°C)	-10	5240.0025	5240	0.0025	0.4771
		T (°C)	0	5240.0040	5240	0.0040	0.7634
		T (°C)	10	5240.0050	5240	0.0050	0.9542
		T (°C)	20	5240.0117	5240	0.0117	2.2328
		T (°C)	30	5240.0134	5240	0.0134	2.5573
		T (°C)	40	5240.0019	5240	0.0019	0.3626
		T (°C)	50	5240.0102	5240	0.0102	1.9466
		T (°C)	60	5240.0069	5240	0.0069	1.3168
		T (°C)	70	5240.0091	5240	0.0091	1.7366
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	5260.0095	5260	0.0095	1.8061
		V max (V)	3.80	5260.0055	5260	0.0055	1.0456
		V min (V)	2.81	5260.0027	5260	0.0027	0.5133
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	5260.0090	5260	0.0090	1.7110
		T (°C)	-10	5260.0095	5260	0.0095	1.8061
		T (°C)	0	5260.0008	5260	0.0008	0.1521
		T (°C)	10	5260.0048	5260	0.0048	0.9125
		T (°C)	20	5260.0032	5260	0.0032	0.6084
		T (°C)	30	5260.0131	5260	0.0131	2.4905
		T (°C)	40	5260.0106	5260	0.0106	2.0152
		T (°C)	50	5260.0126	5260	0.0126	2.3954
		T (°C)	60	5260.0007	5260	0.0007	0.1331
		T (°C)	70	5260.0133	5260	0.0133	2.5285
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	5280.0083	5280	0.0083	1.5720
		V max (V)	3.80	5280.0084	5280	0.0084	1.5909
		V min (V)	2.81	5280.0097	5280	0.0097	1.8371
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	5280.00990	5280	0.00990	1.8750
		T (°C)	-10	5280.01020	5280	0.01020	1.9318
		T (°C)	0	5280.01260	5280	0.01260	2.3864
		T (°C)	10	5280.00790	5280	0.00790	1.4962
		T (°C)	20	5280.01200	5280	0.01200	2.2727
		T (°C)	30	5280.00030	5280	0.00030	0.0568
		T (°C)	40	5280.01090	5280	0.01090	2.0644
		T (°C)	50	5280.00020	5280	0.00020	0.0379
		T (°C)	60	5280.01320	5280	0.01320	2.5000
		T (°C)	70	5280.00060	5280	0.00060	0.1136
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	5320.0088	5320	0.0088	1.6541
		V max (V)	3.80	5320.0009	5320	0.0009	0.1692
		V min (V)	2.81	5320.0013	5320	0.0013	0.2444
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	5320.0080	5320	0.0080	1.5038
		T (°C)	-10	5320.0027	5320	0.0027	0.5075
		T (°C)	0	5320.0029	5320	0.0029	0.5451
		T (°C)	10	5320.0047	5320	0.0047	0.8835
		T (°C)	20	5320.0131	5320	0.0131	2.4624
		T (°C)	30	5320.0065	5320	0.0065	1.2218
		T (°C)	40	5320.0005	5320	0.0005	0.0940
		T (°C)	50	5320.0115	5320	0.0115	2.1617
		T (°C)	60	5320.0044	5320	0.0044	0.8271
		T (°C)	70	5320.0071	5320	0.0071	1.3346
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	5500.0049	5500	0.0049	0.8909
		V max (V)	3.80	5500.0064	5500	0.0064	1.1636
		V min (V)	2.81	5500.0080	5500	0.0080	1.4545
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	5500.0023	5500	0.0023	0.4182
		T (°C)	-10	5500.0113	5500	0.0113	2.0545
		T (°C)	0	5500.0092	5500	0.0092	1.6727
		T (°C)	10	5500.0049	5500	0.0049	0.8909
		T (°C)	20	5500.0029	5500	0.0029	0.5273
		T (°C)	30	5500.0055	5500	0.0055	1.0000
		T (°C)	40	5500.0025	5500	0.0025	0.4545
		T (°C)	50	5500.0113	5500	0.0113	2.0545
		T (°C)	60	5500.0016	5500	0.0016	0.2909
		T (°C)	70	5500.0015	5500	0.0015	0.2727
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	5580.0085	5580	0.0085	1.5233
		V max (V)	3.80	5580.0062	5580	0.0062	1.1111
		V min (V)	2.81	5580.0028	5580	0.0028	0.5018
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	5580.00940	5580	0.00940	1.6846
		T (°C)	-10	5580.01260	5580	0.01260	2.2581
		T (°C)	0	5580.00880	5580	0.00880	1.5771
		T (°C)	10	5580.00990	5580	0.00990	1.7742
		T (°C)	20	5580.01340	5580	0.01340	2.4014
		T (°C)	30	5580.00620	5580	0.00620	1.1111
		T (°C)	40	5580.01180	5580	0.01180	2.1147
		T (°C)	50	5580.00200	5580	0.00200	0.3584
		T (°C)	60	5580.00360	5580	0.00360	0.6452
		T (°C)	70	5580.00380	5580	0.00380	0.6810
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	5700.0117	5700	0.0117	2.0526
		V max (V)	3.80	5700.0101	5700	0.0101	1.7719
		V min (V)	2.81	5700.0103	5700	0.0103	1.8070
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	5700.0088	5700	0.0088	1.5439
		T (°C)	-10	5700.0102	5700	0.0102	1.7895
		T (°C)	0	5700.0038	5700	0.0038	0.6667
		T (°C)	10	5700.0044	5700	0.0044	0.7719
		T (°C)	20	5700.0121	5700	0.0121	2.1228
		T (°C)	30	5700.0012	5700	0.0012	0.2105
		T (°C)	40	5700.0093	5700	0.0093	1.6316
		T (°C)	50	5700.0022	5700	0.0022	0.3860
		T (°C)	60	5700.0038	5700	0.0038	0.6667
		T (°C)	70	5700.0133	5700	0.0133	2.3333
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	5745.00200	5745	0.00200	0.3481
		V max (V)	3.80	5745.01330	5745	0.01330	2.3151
		V min (V)	2.81	5745.00370	5745	0.00370	0.6440
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	5745.00140	5745	0.00140	0.2437
		T (°C)	-10	5745.01290	5745	0.01290	2.2454
		T (°C)	0	5745.00730	5745	0.00730	1.2707
		T (°C)	10	5745.01290	5745	0.01290	2.2454
		T (°C)	20	5745.00110	5745	0.00110	0.1915
		T (°C)	30	5745.01170	5745	0.01170	2.0366
		T (°C)	40	5745.00440	5745	0.00440	0.7659
		T (°C)	50	5745.01100	5745	0.01100	1.9147
		T (°C)	60	5745.01230	5745	0.01230	2.1410
		T (°C)	70	5745.00760	5745	0.00760	1.3229
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	5785.01190	5785	0.01190	2.0570
		V max (V)	3.80	5785.00980	5785	0.00980	1.6940
		V min (V)	2.81	5785.00600	5785	0.00600	1.0372
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	5785.00300	5785	0.00300	0.5186
		T (°C)	-10	5785.00040	5785	0.00040	0.0691
		T (°C)	0	5785.01140	5785	0.01140	1.9706
		T (°C)	10	5785.00970	5785	0.00970	1.6768
		T (°C)	20	5785.00560	5785	0.00560	0.9680
		T (°C)	30	5785.00970	5785	0.00970	1.6768
		T (°C)	40	5785.00750	5785	0.00750	1.2965
		T (°C)	50	5785.00150	5785	0.00150	0.2593
		T (°C)	60	5785.01120	5785	0.01120	1.9360
		T (°C)	70	5785.00740	5785	0.00740	1.2792
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	5825.00990	5825	0.00990	1.6996
		V max (V)	3.80	5825.00230	5825	0.00230	0.3948
		V min (V)	2.81	5825.01270	5825	0.01270	2.1803
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	5825.00100	5825	0.00100	0.1717
		T (°C)	-10	5825.01310	5825	0.01310	2.2489
		T (°C)	0	5825.00300	5825	0.00300	0.5150
		T (°C)	10	5825.01070	5825	0.01070	1.8369
		T (°C)	20	5825.00550	5825	0.00550	0.9442
		T (°C)	30	5825.00740	5825	0.00740	1.2704
		T (°C)	40	5825.01130	5825	0.01130	1.9399
		T (°C)	50	5825.01170	5825	0.01170	2.0086
		T (°C)	60	5825.01190	5825	0.01190	2.0429
		T (°C)	70	5825.00850	5825	0.00850	1.4592
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 = $T_{on} / (T_{on} + T_{off})$

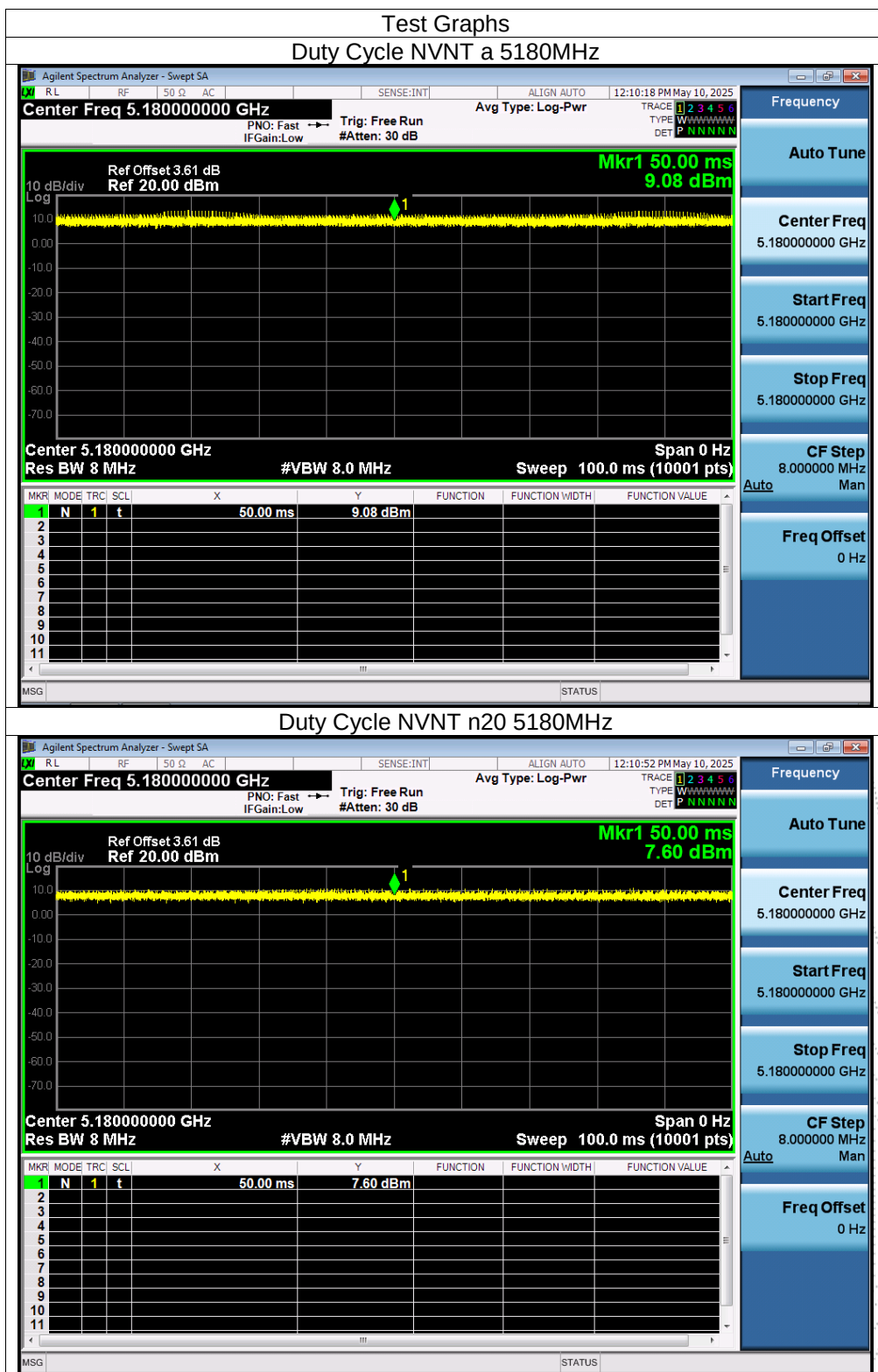
14.3 Test Procedure

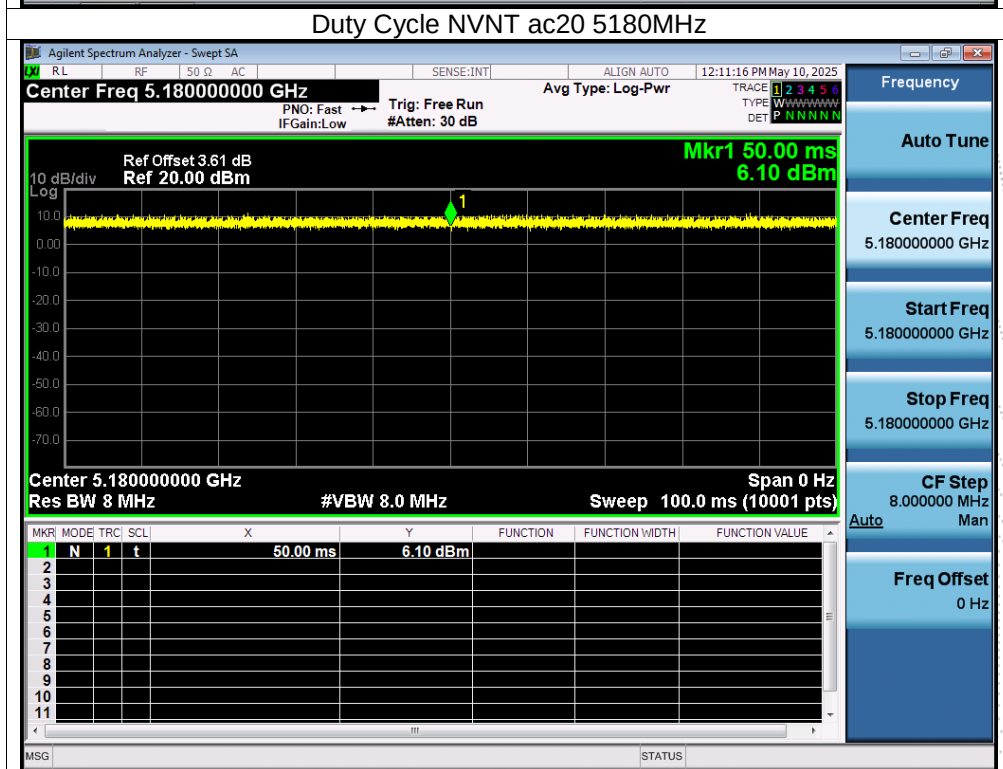
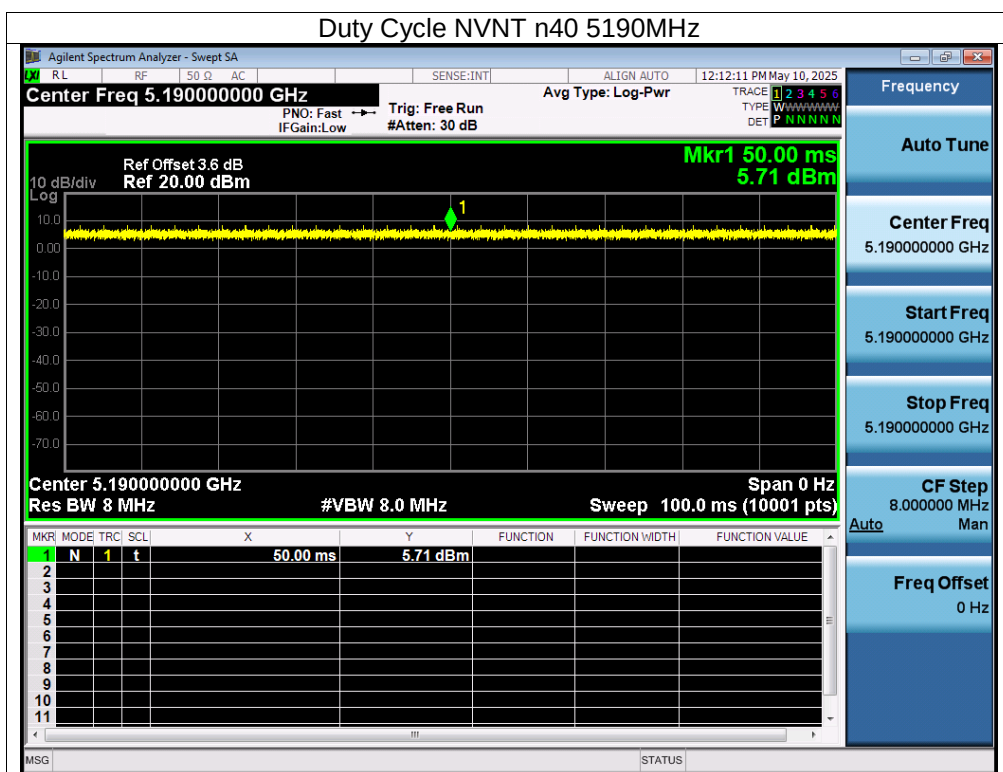
1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

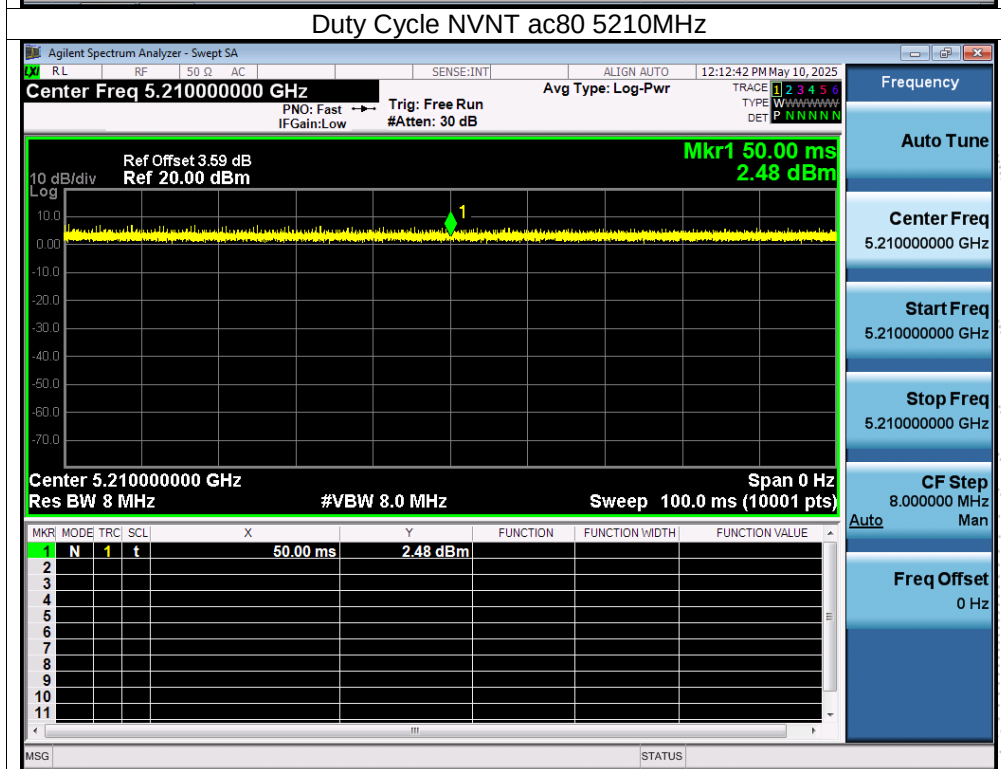
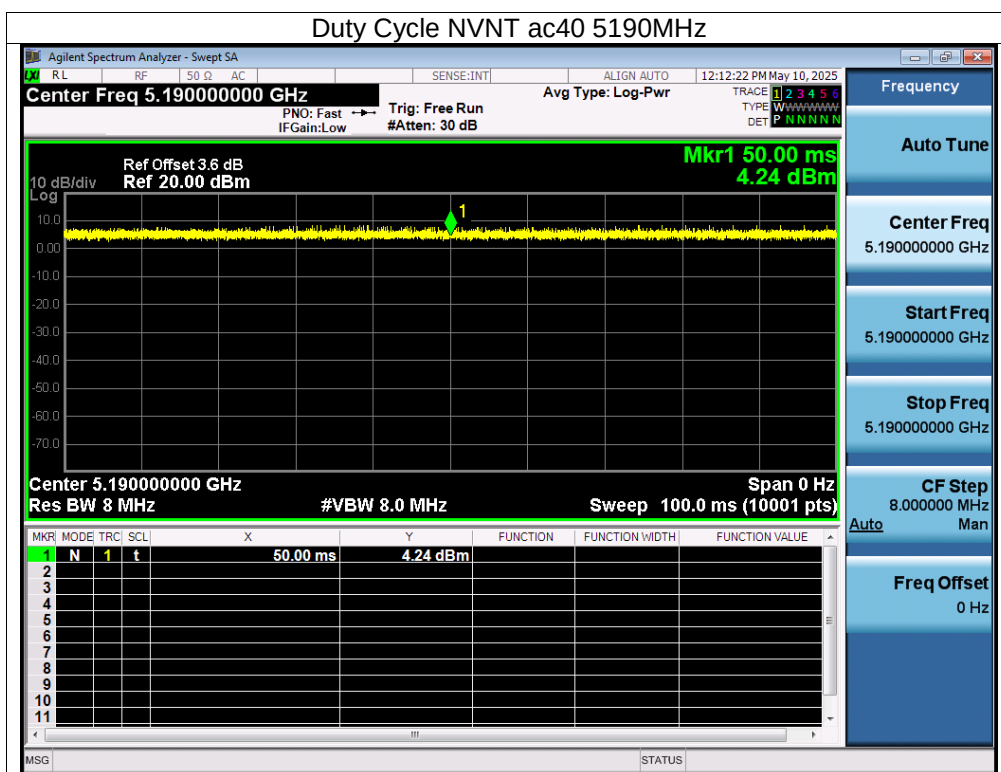
14.4 Test Result

ANT A

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	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

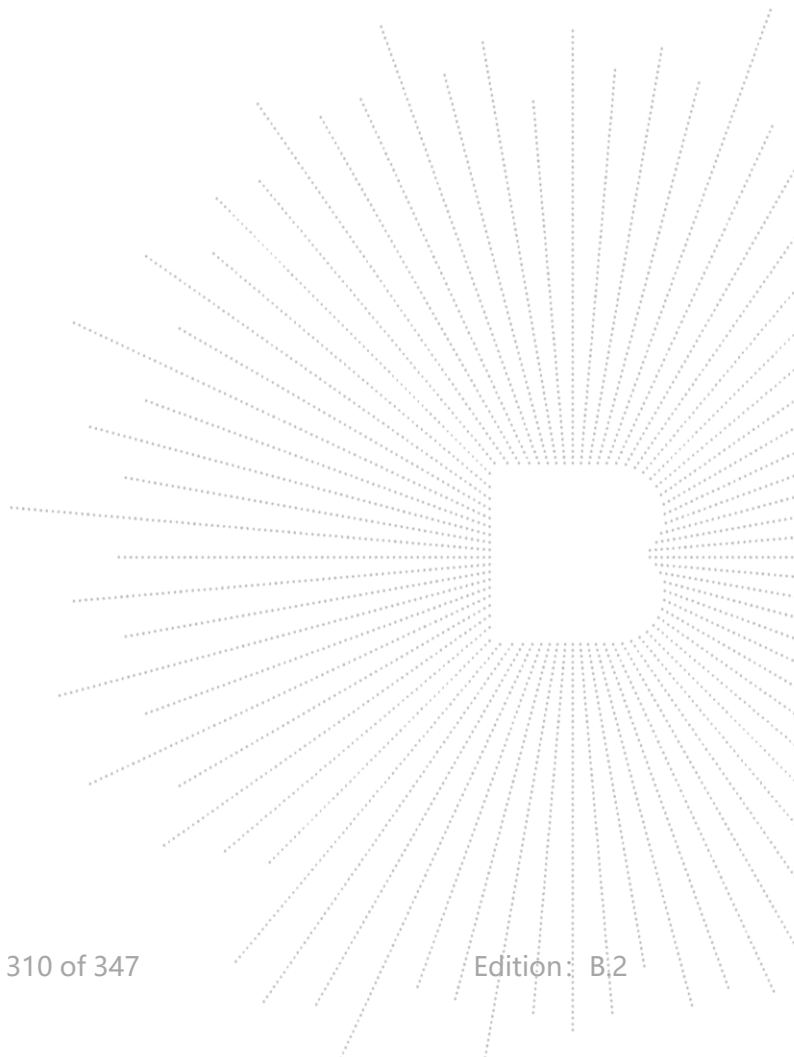


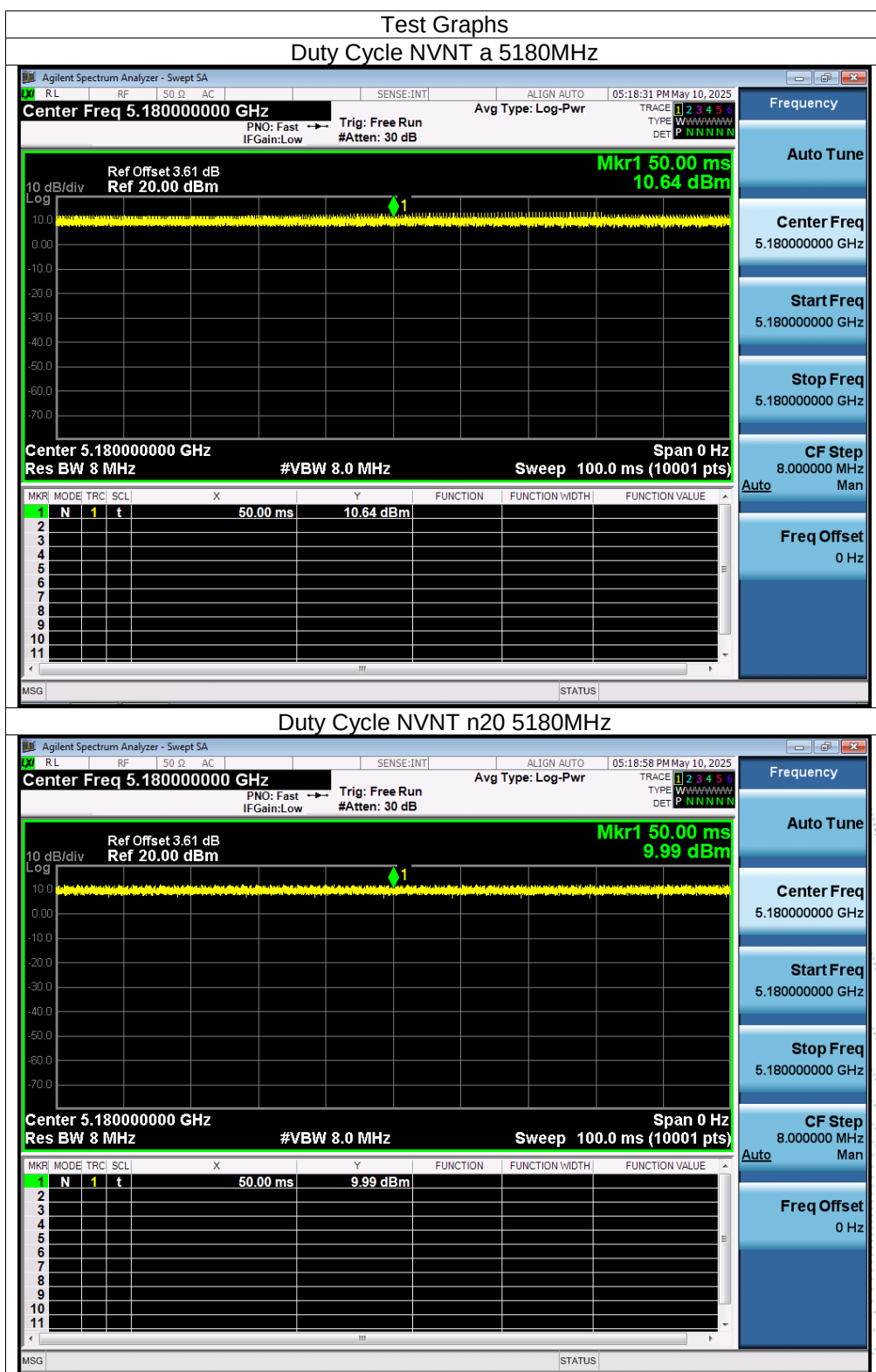


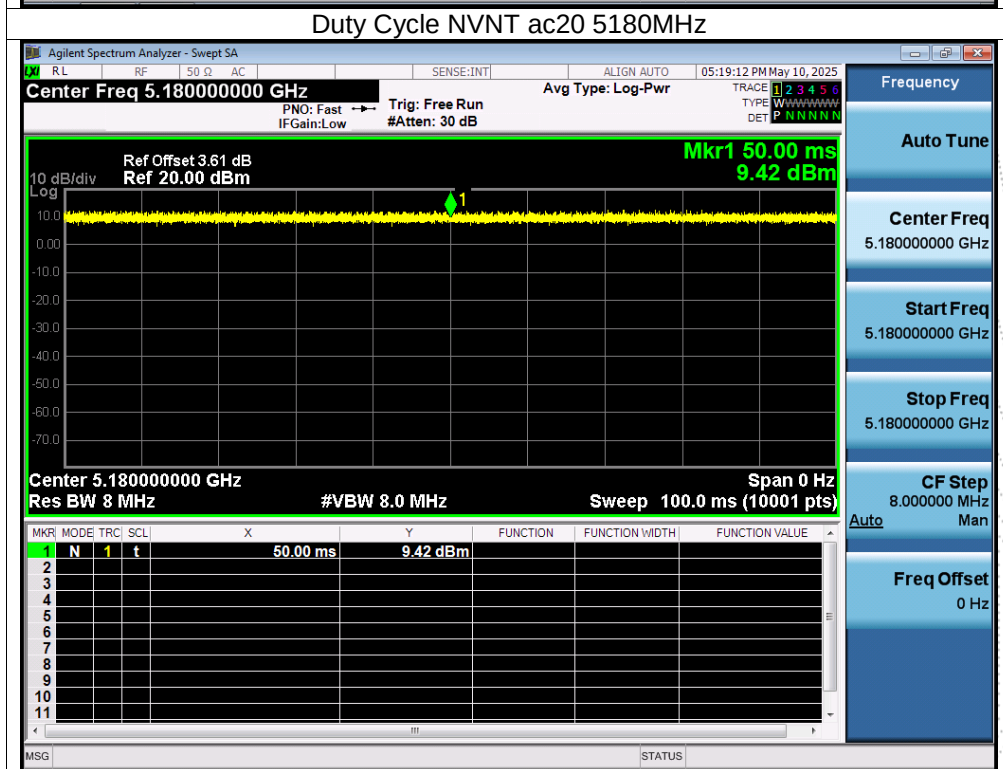
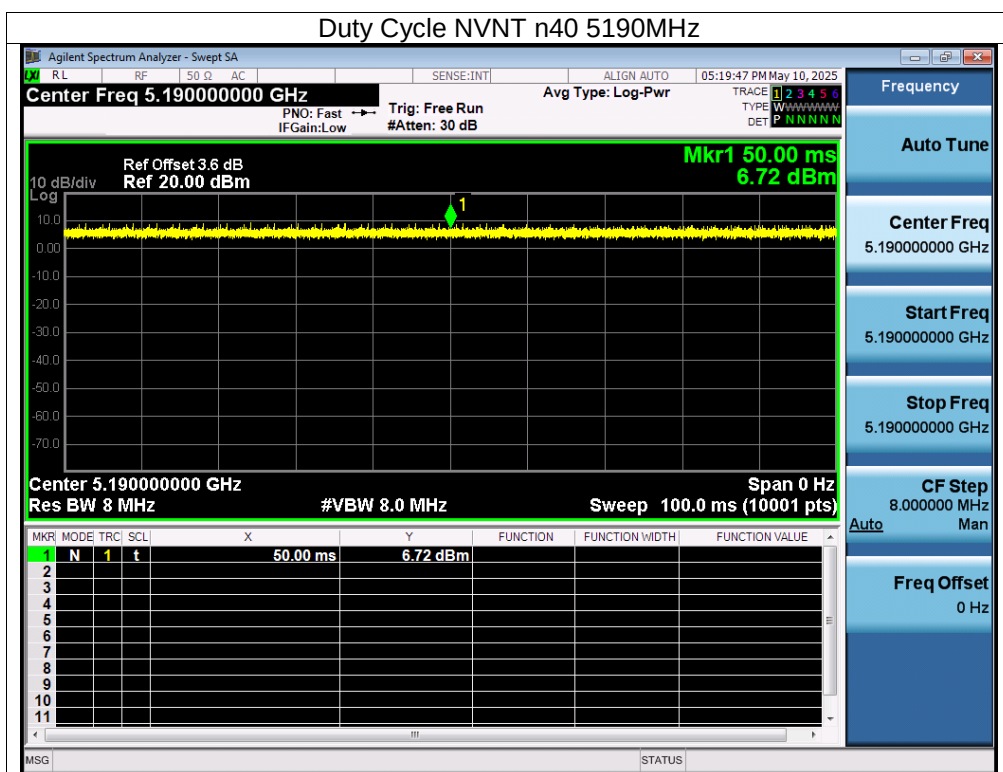


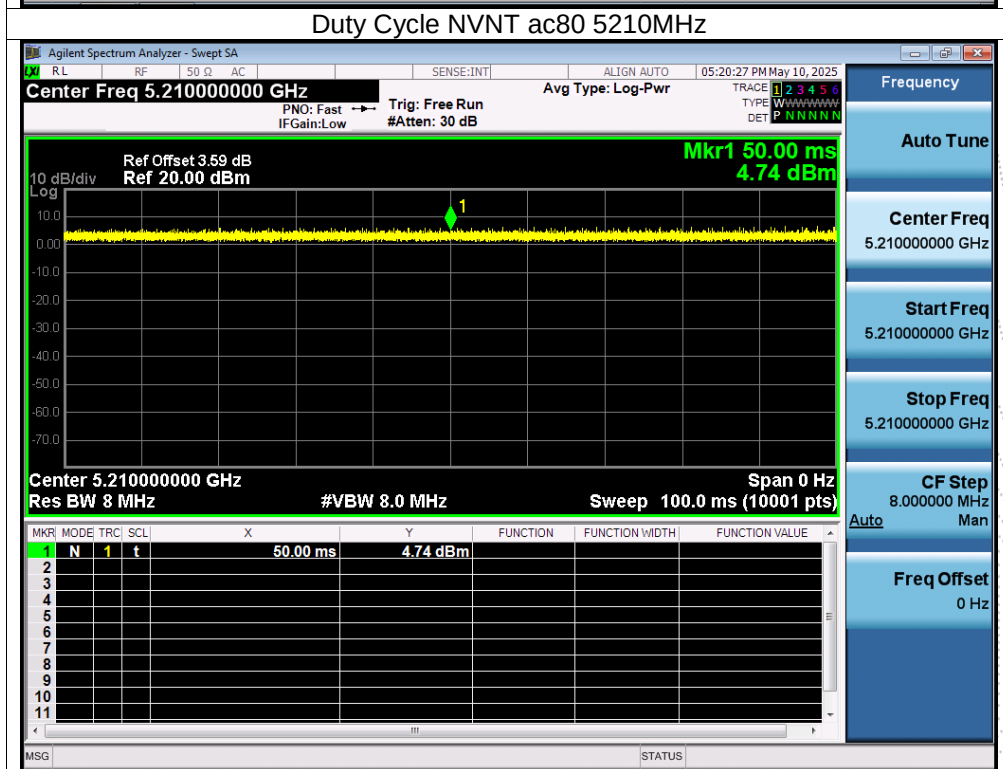
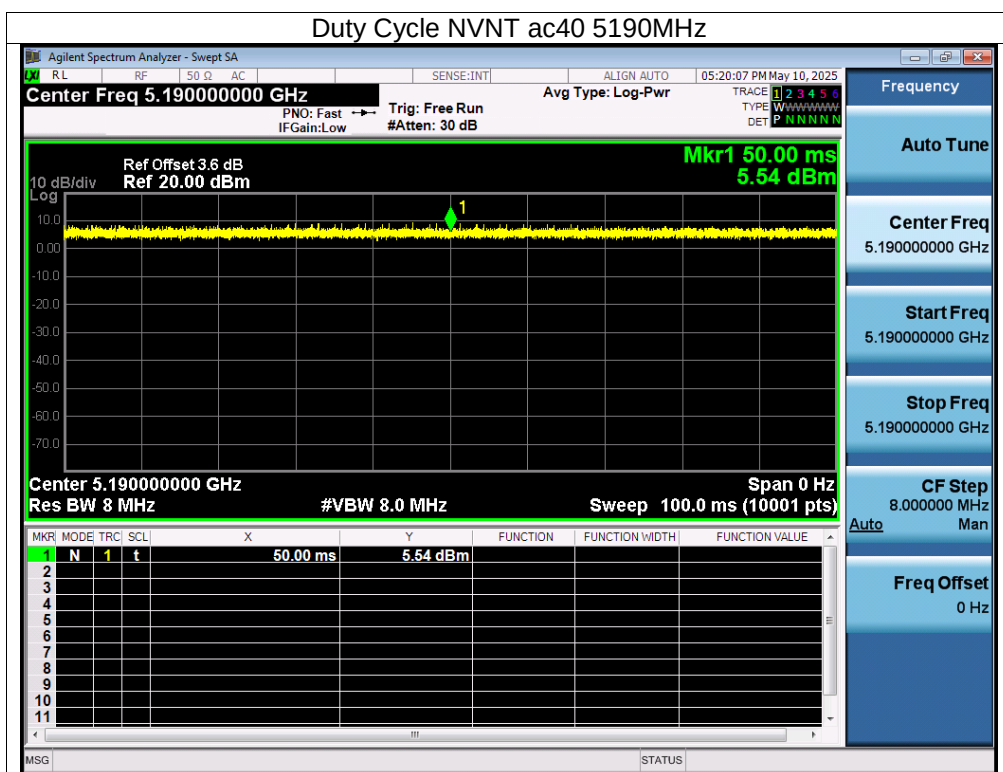
ANT B

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



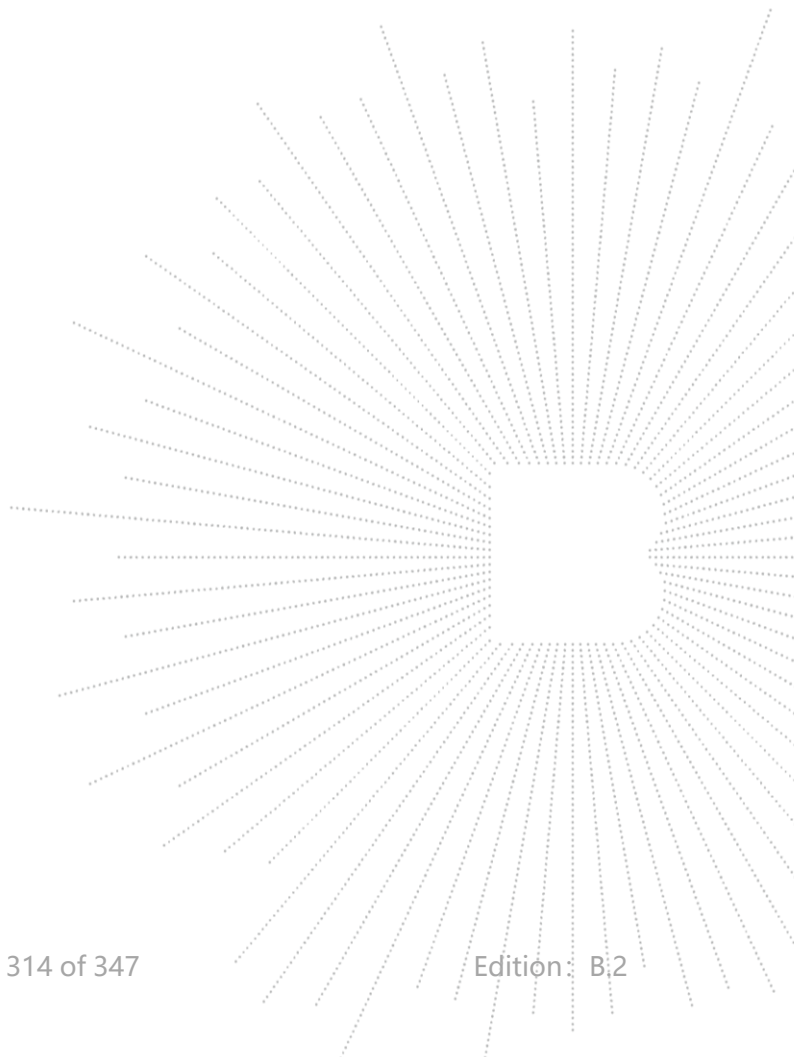


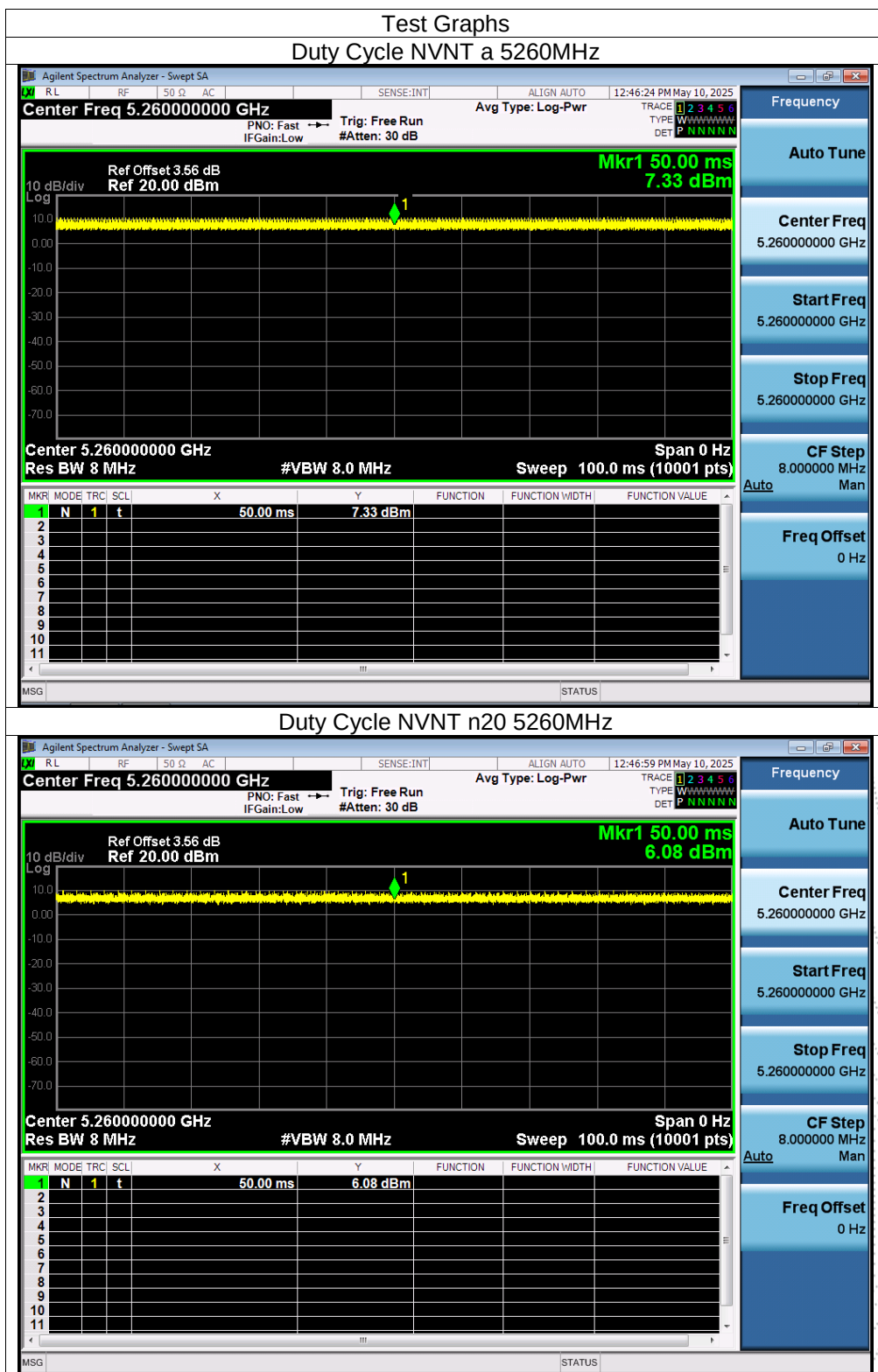


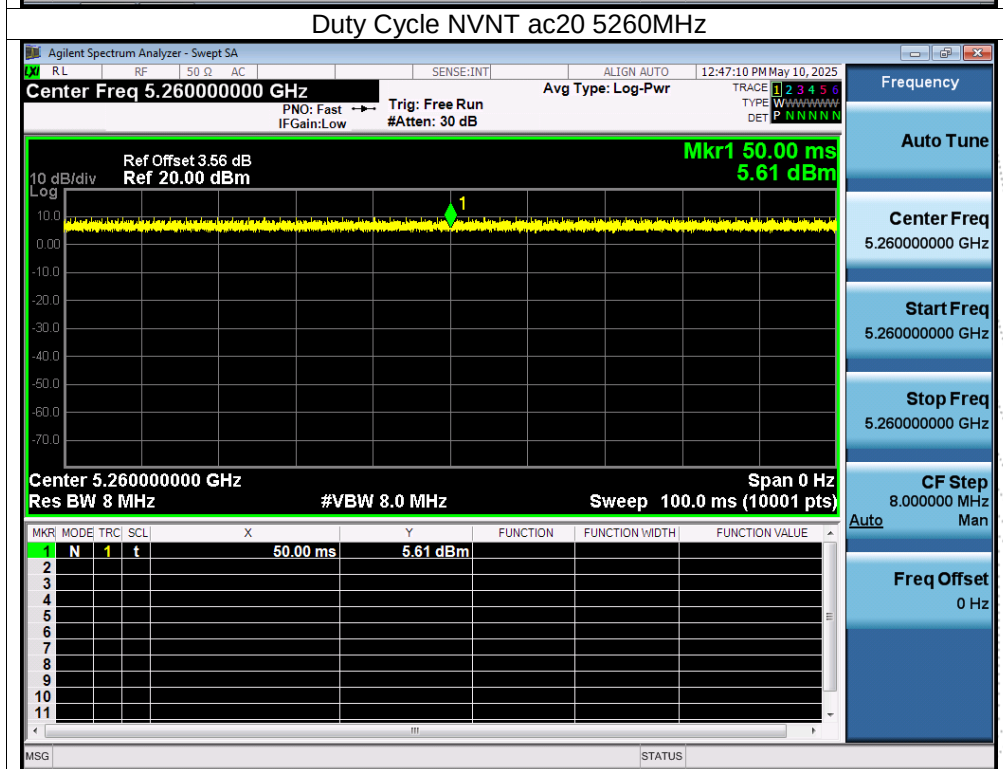
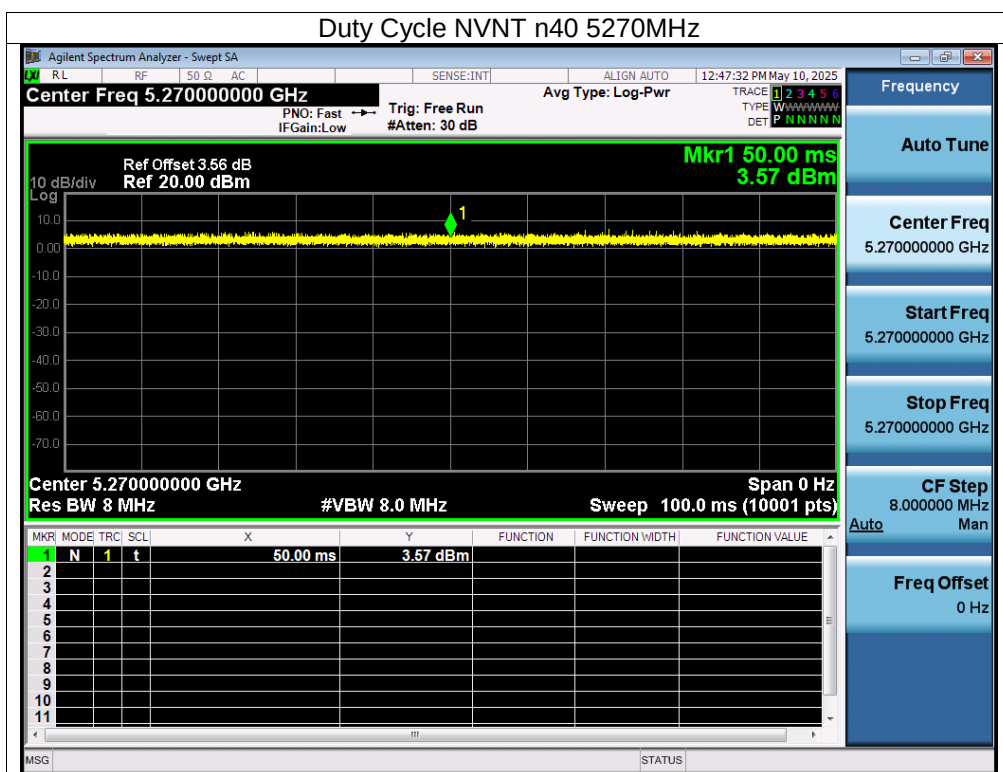


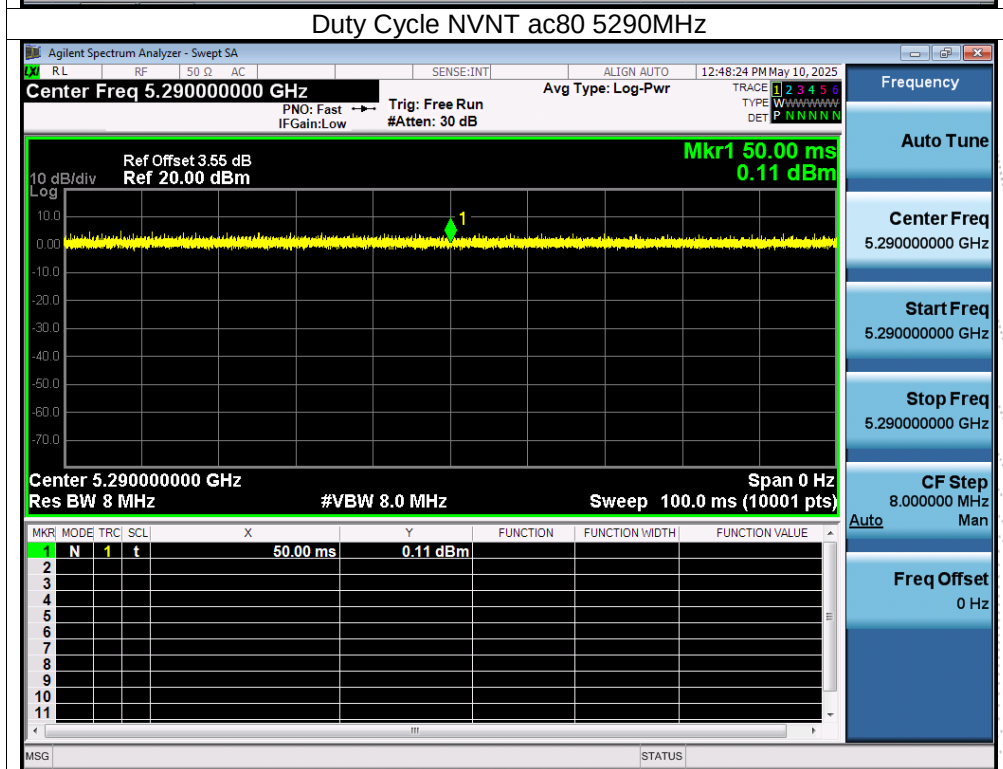
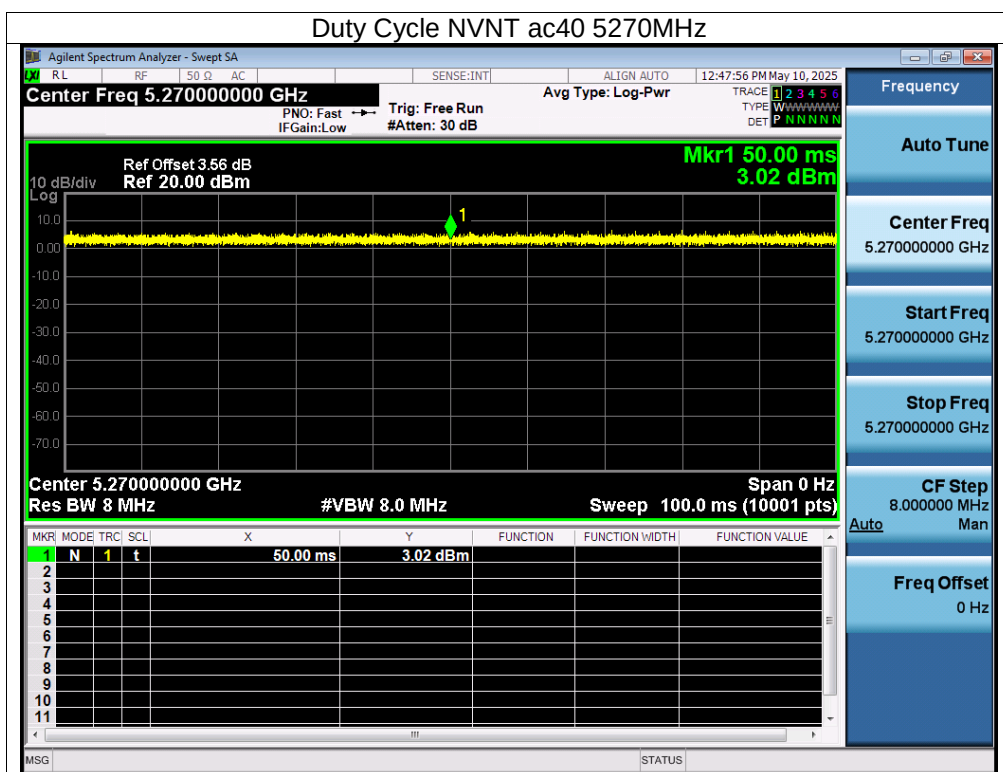
ANT A

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	a	5260	100	0
NVNT	n20	5260	100	0
NVNT	n40	5270	100	0
NVNT	ac20	5260	100	0
NVNT	ac40	5270	100	0
NVNT	ac80	5290	100	0



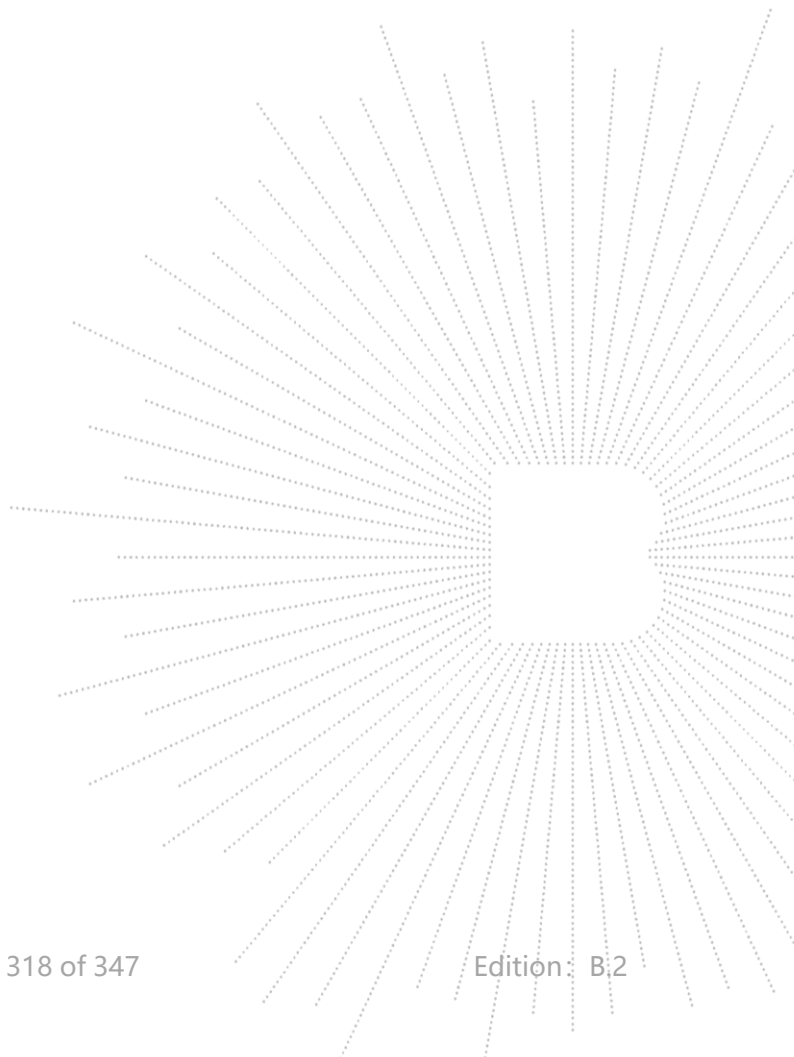


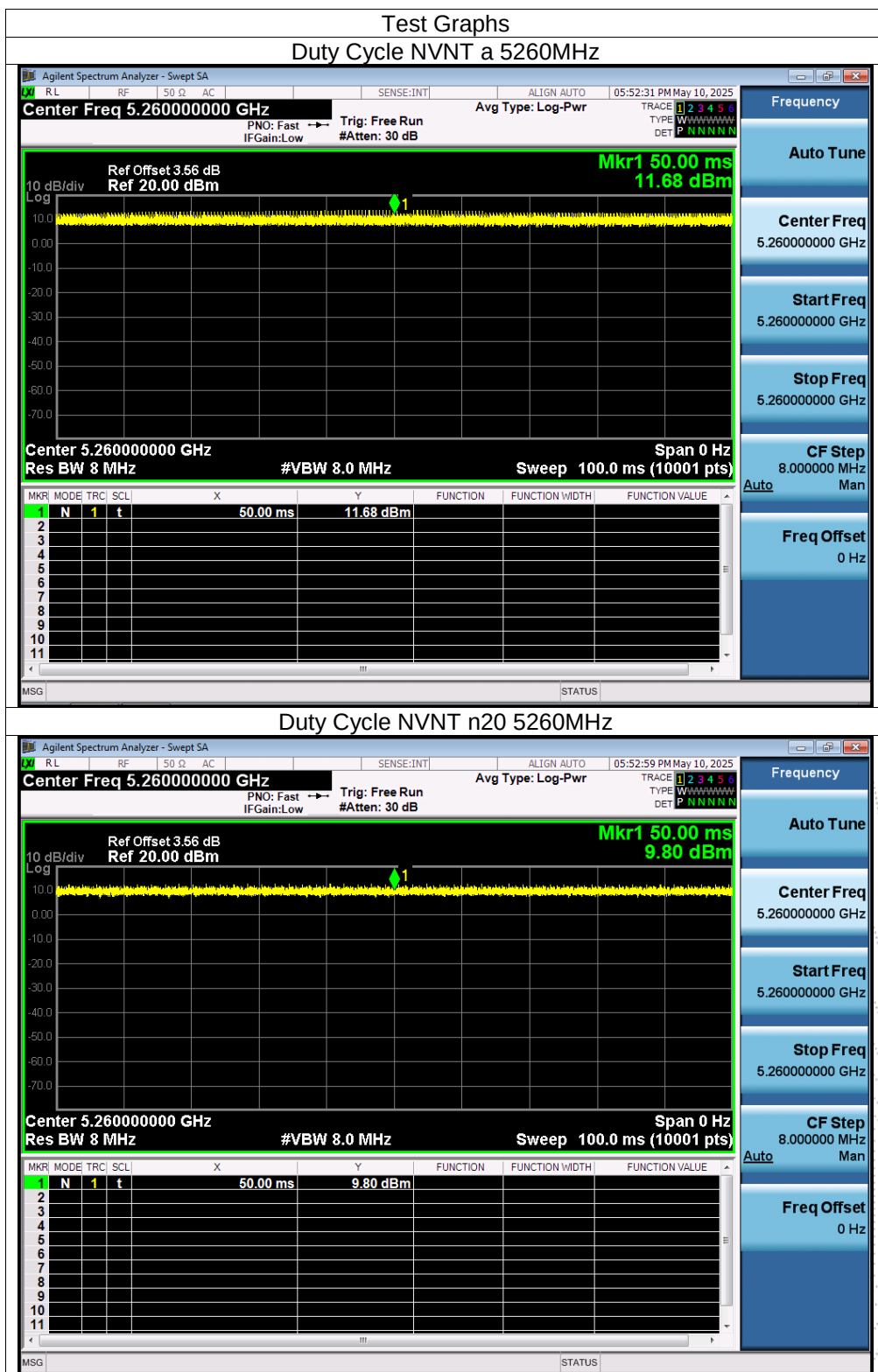


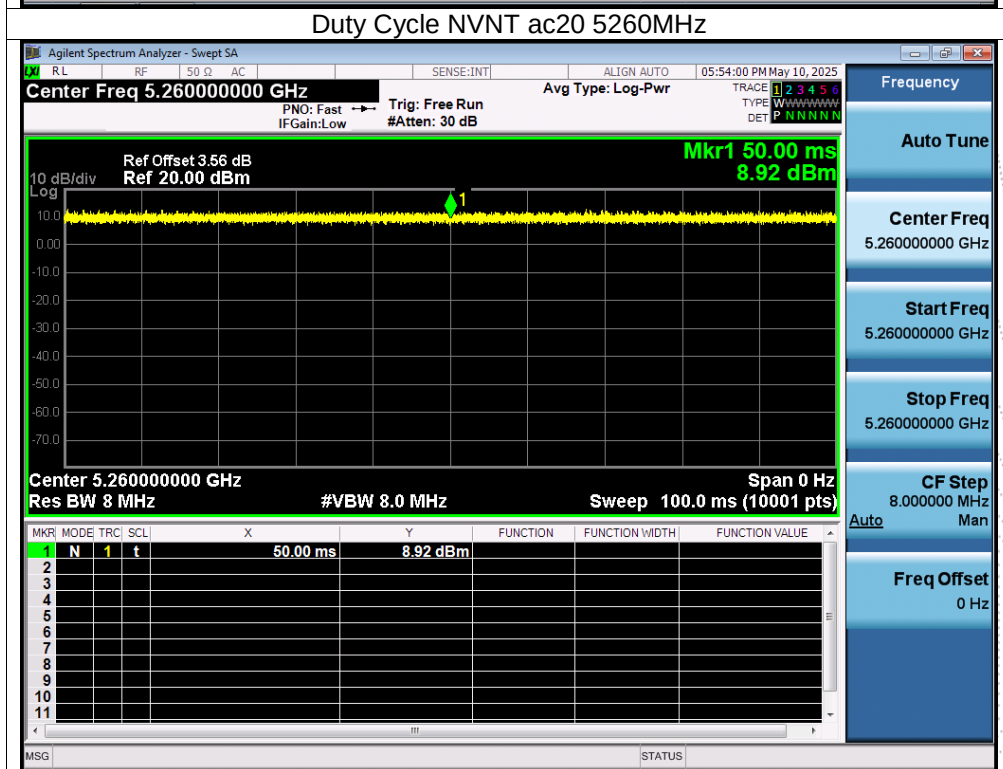
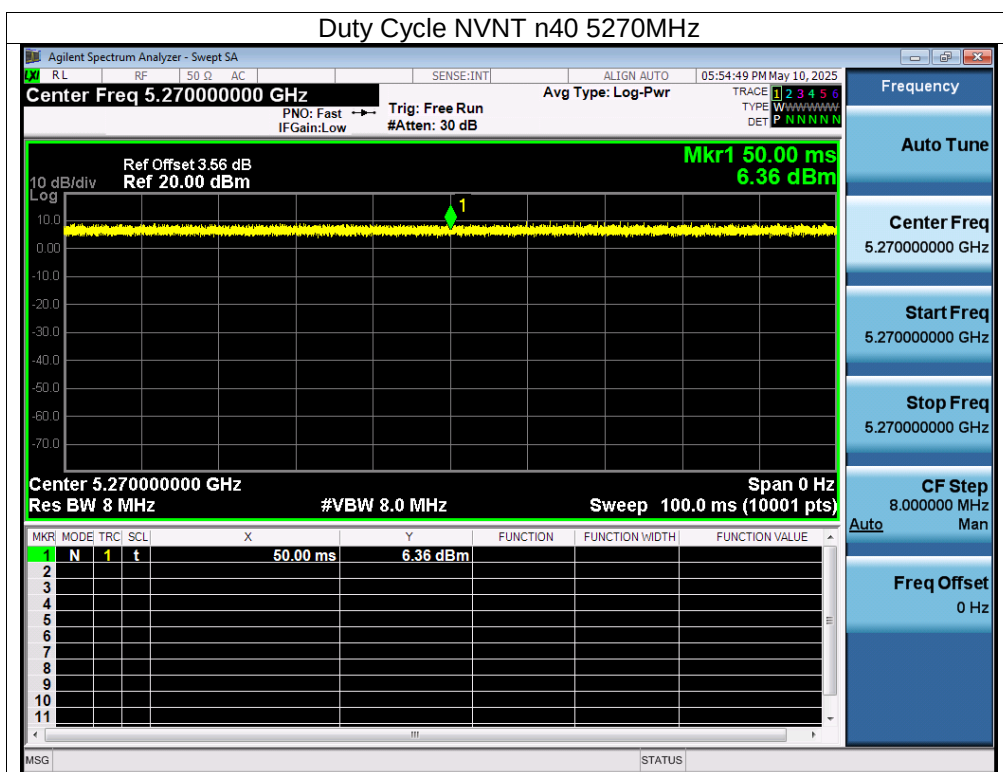


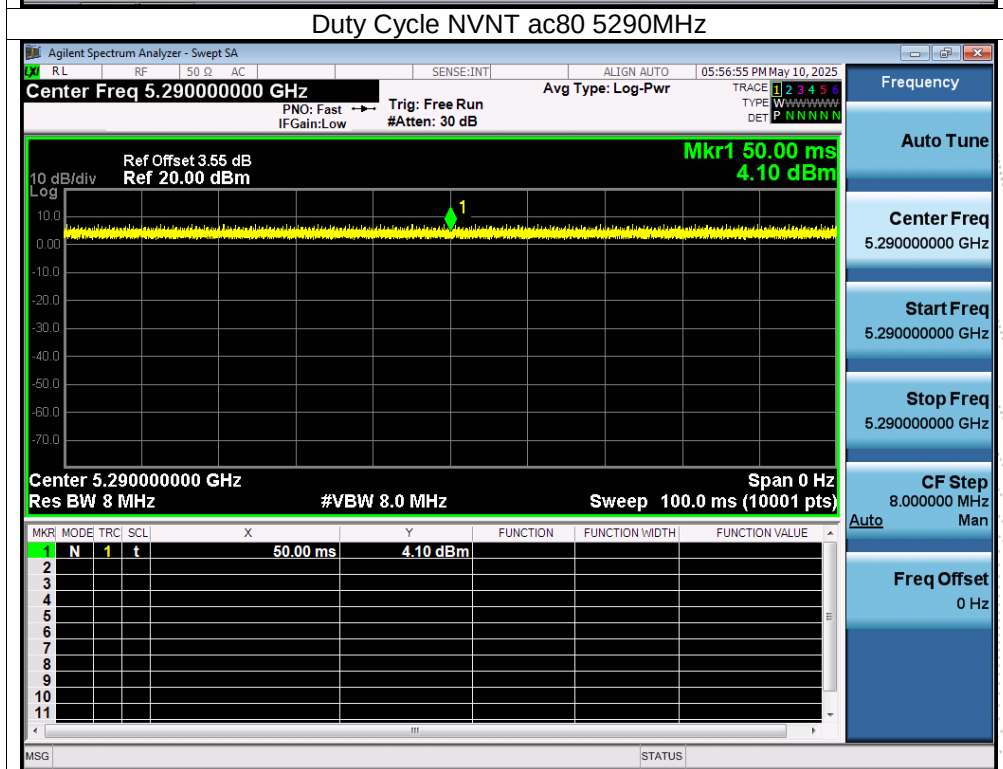
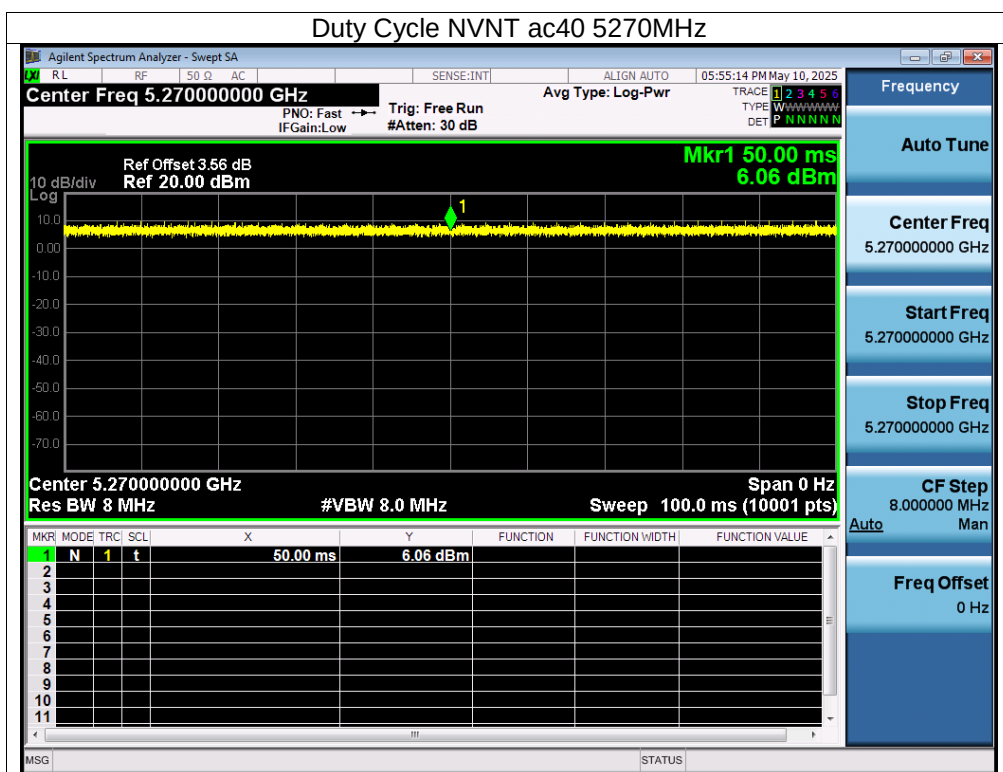
ANT B

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	a	5260	100	0
NVNT	n20	5260	100	0
NVNT	n40	5270	100	0
NVNT	ac20	5260	100	0
NVNT	ac40	5270	100	0
NVNT	ac80	5290	100	0



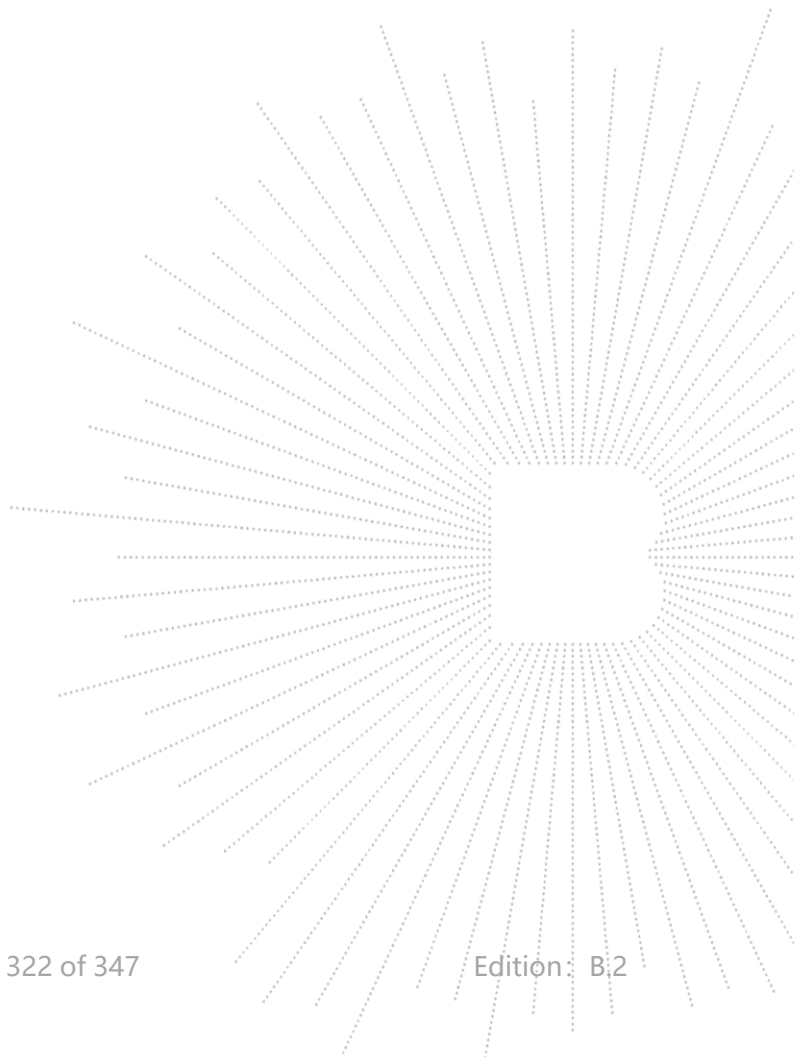


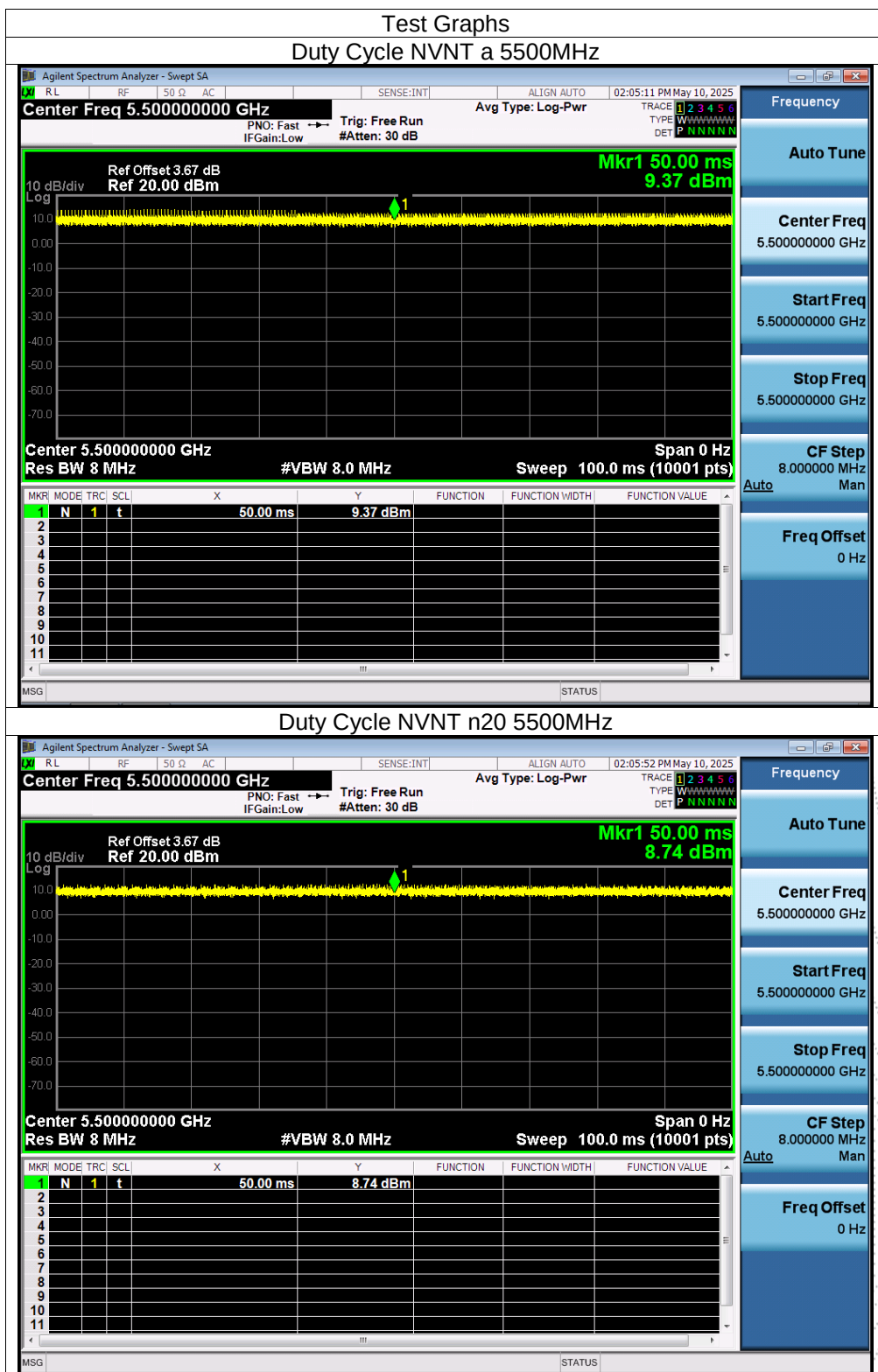


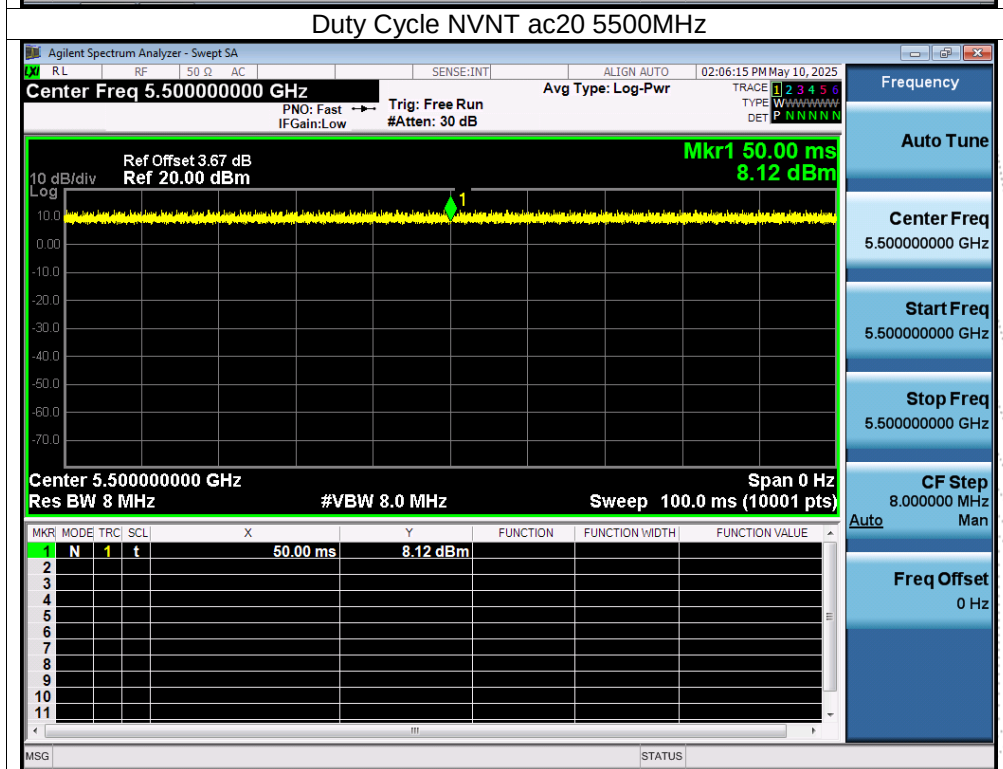
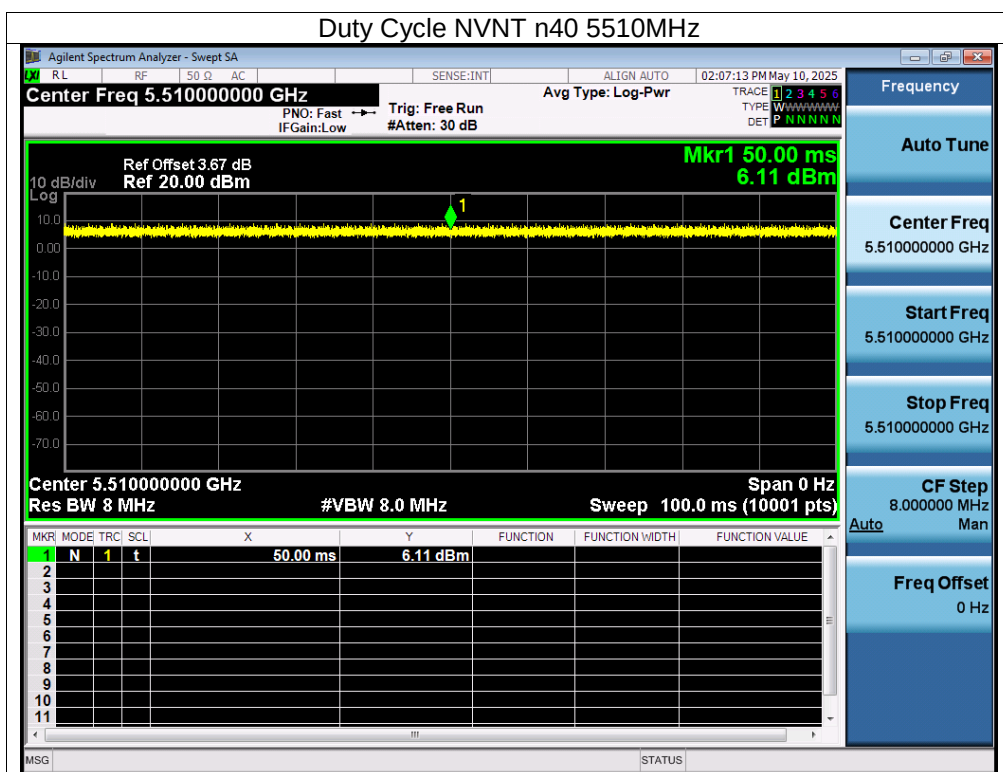


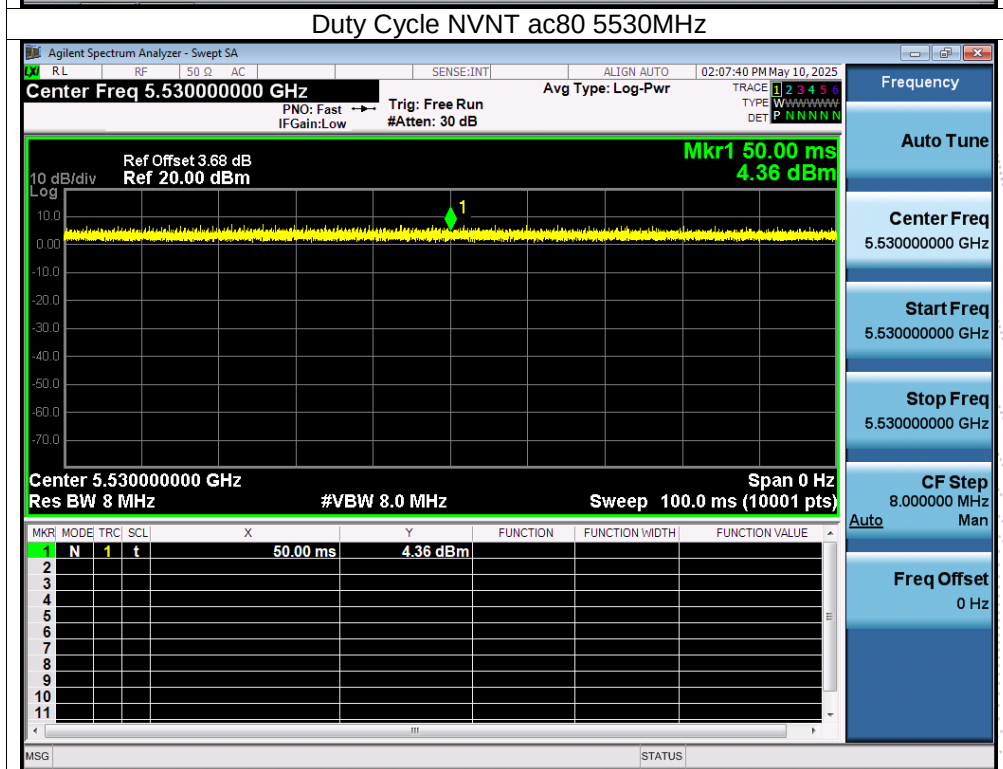
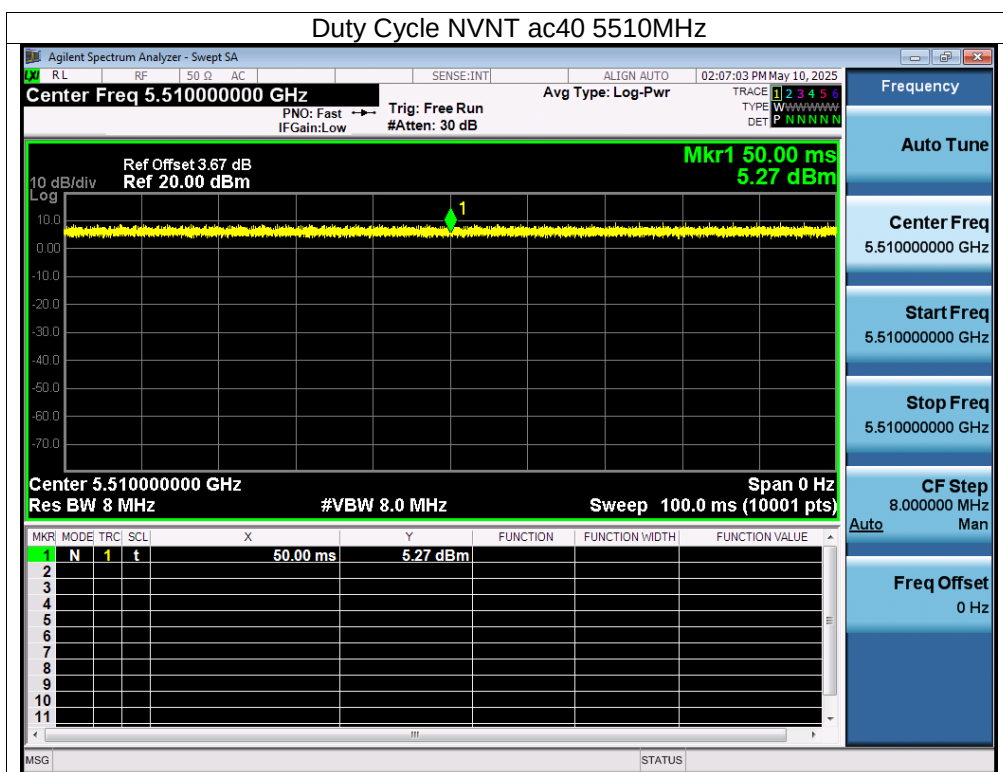
ANT A

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	a	5500	100	0
NVNT	n20	5500	100	0
NVNT	n40	5510	100	0
NVNT	ac20	5500	100	0
NVNT	ac40	5510	100	0
NVNT	ac80	5530	100	0



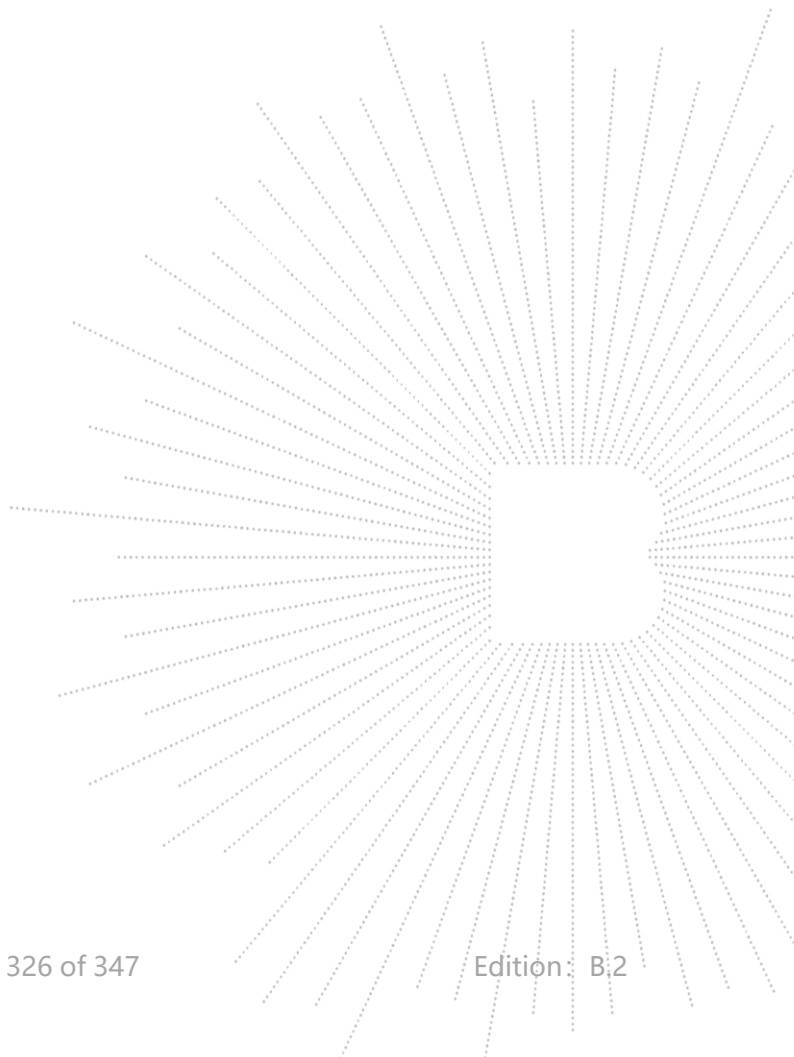


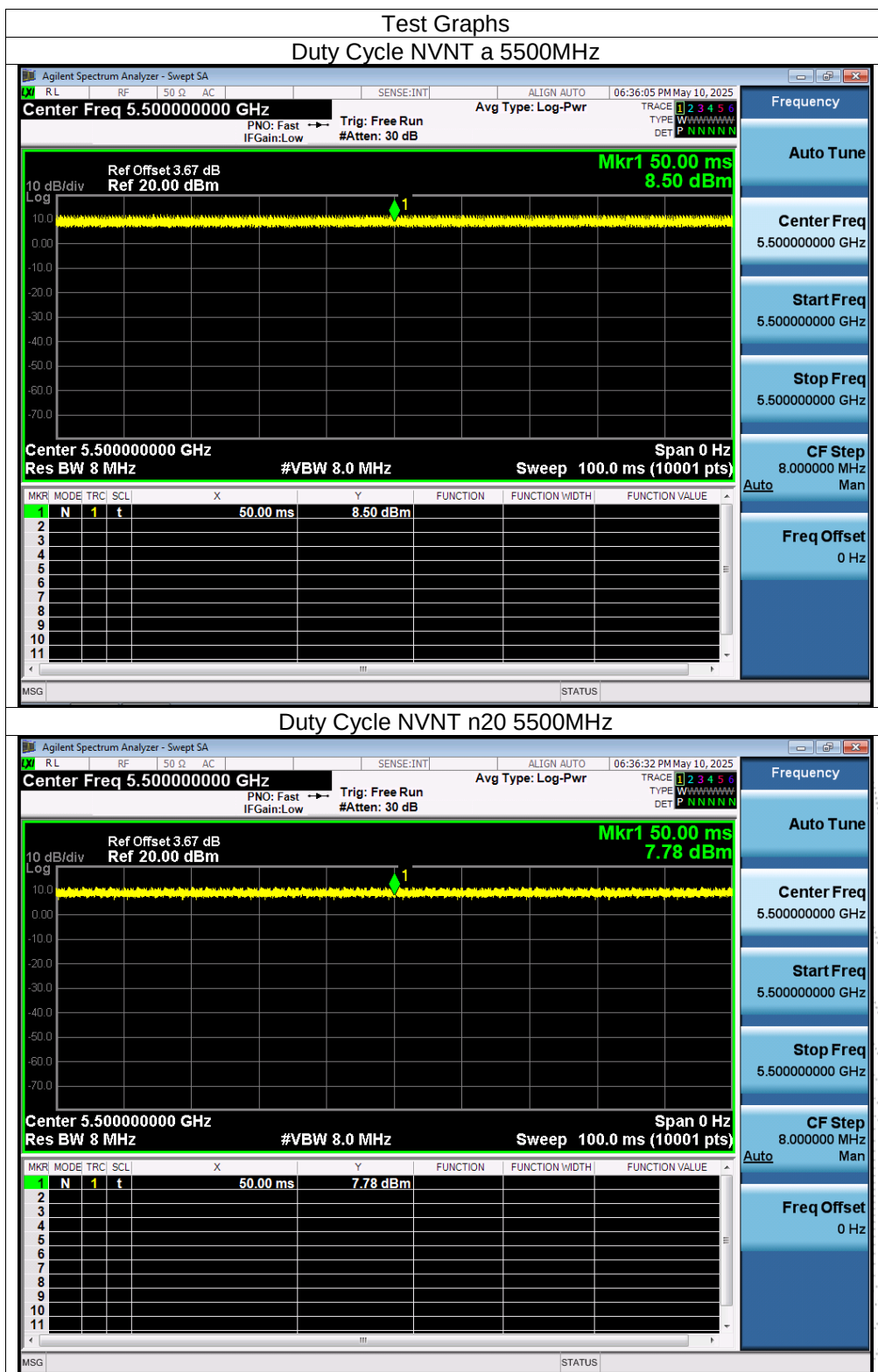


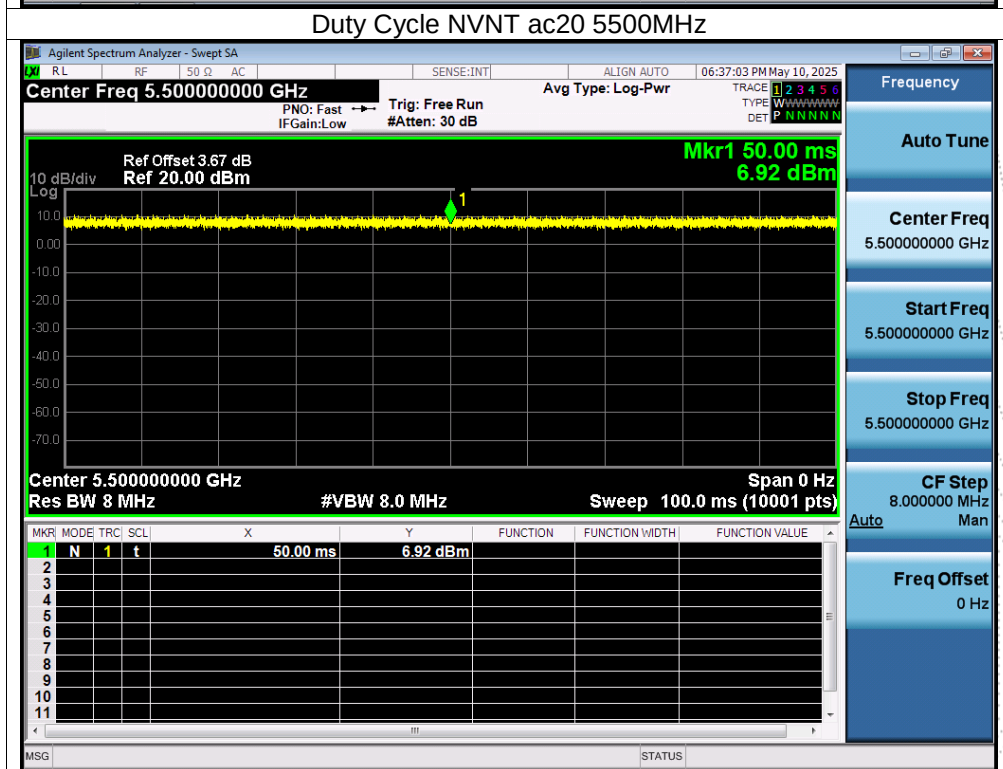
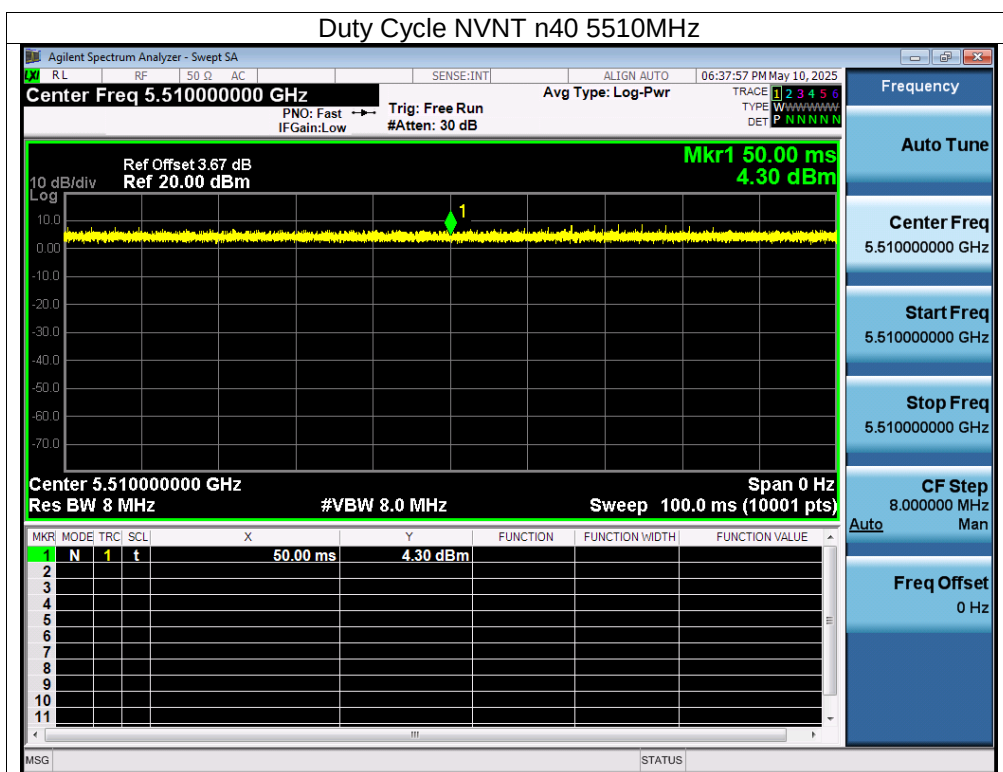


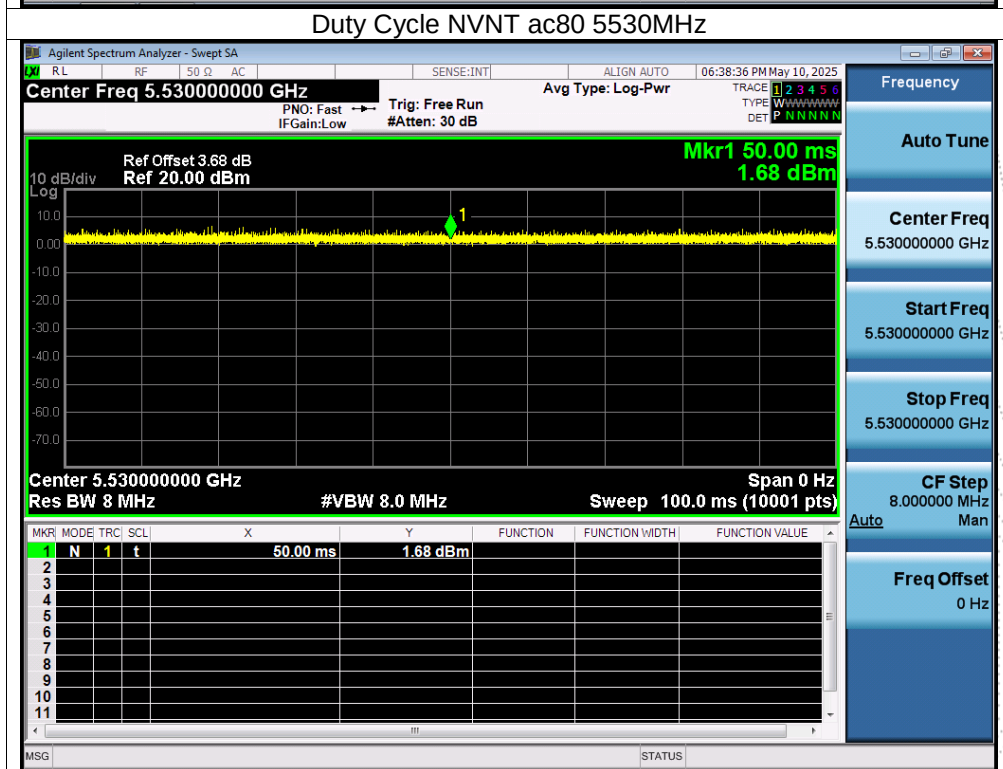
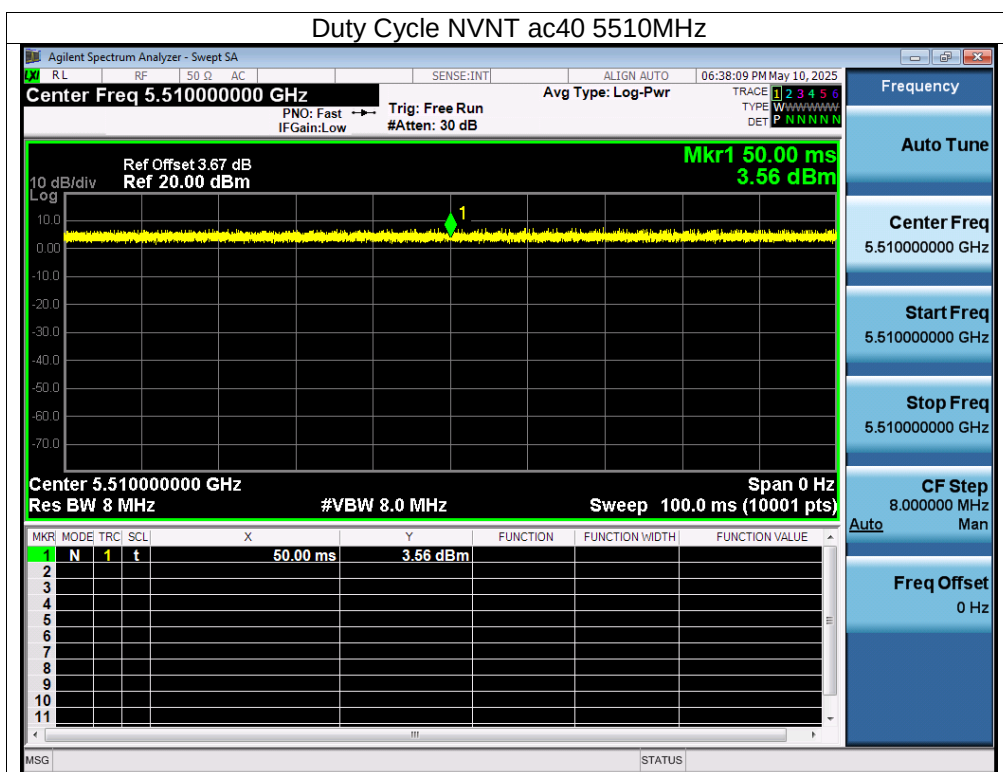
ANT B

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	a	5500	100	0
NVNT	n20	5500	100	0
NVNT	n40	5510	100	0
NVNT	ac20	5500	100	0
NVNT	ac40	5510	100	0
NVNT	ac80	5530	100	0



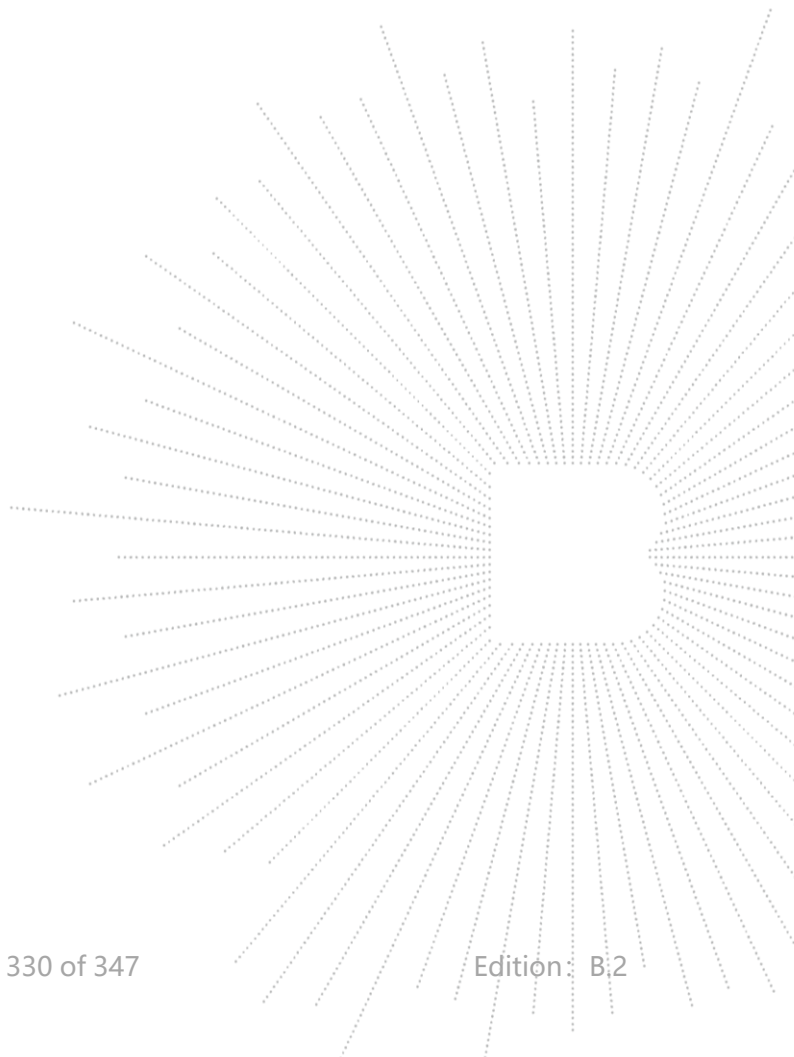


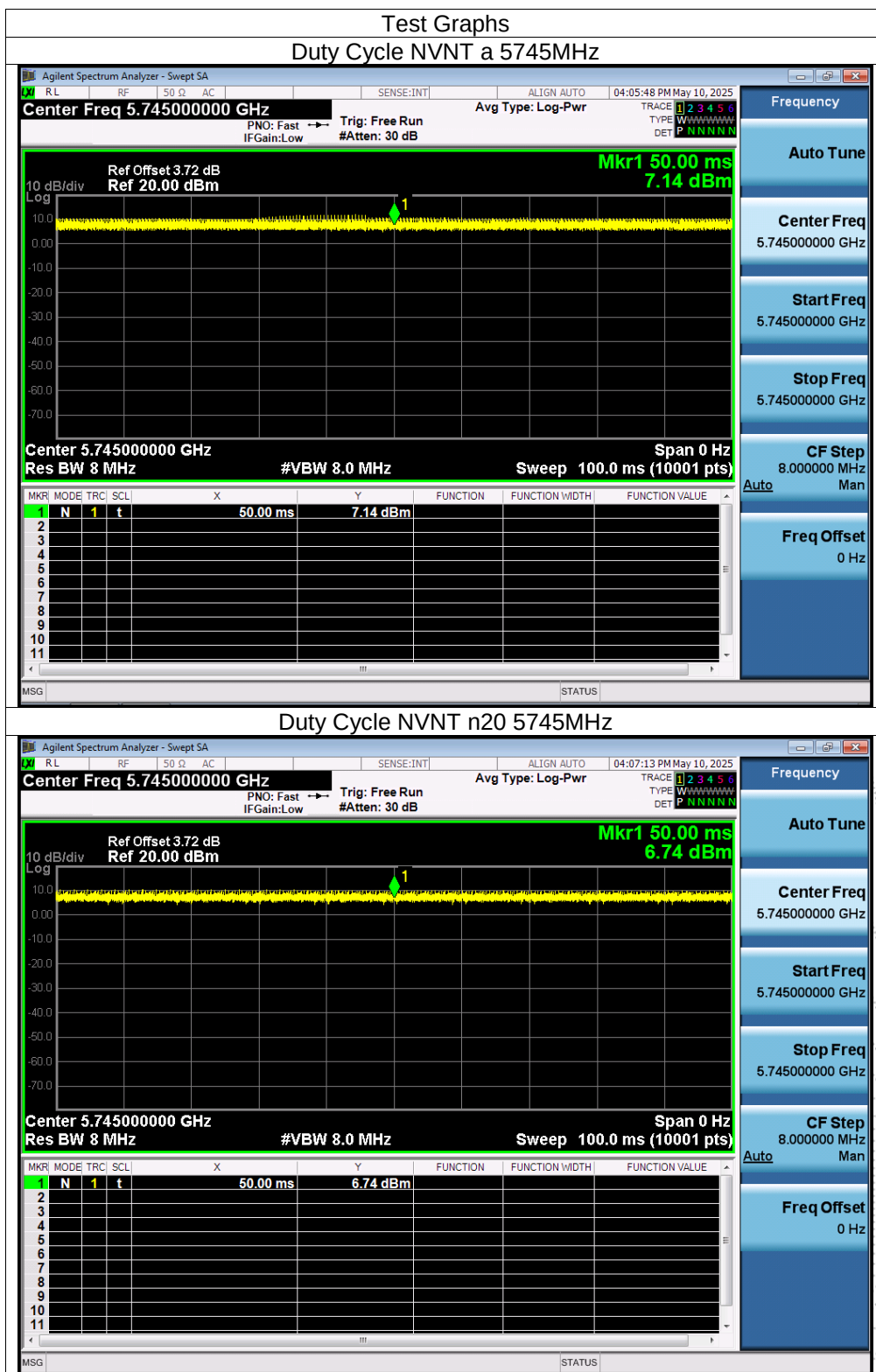


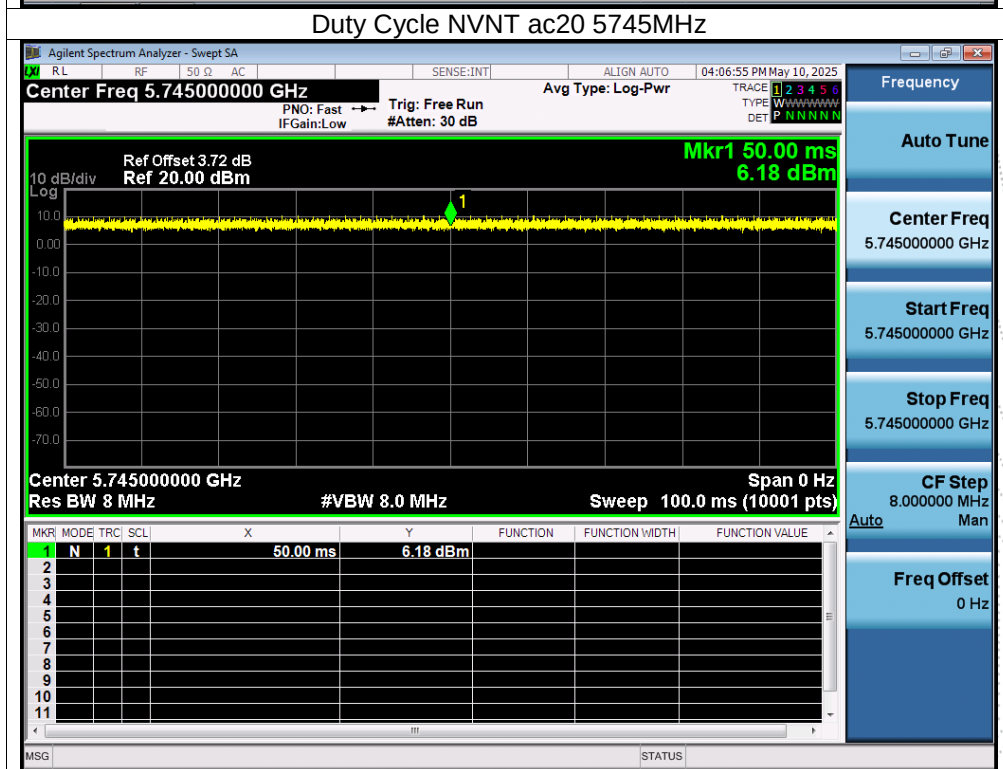
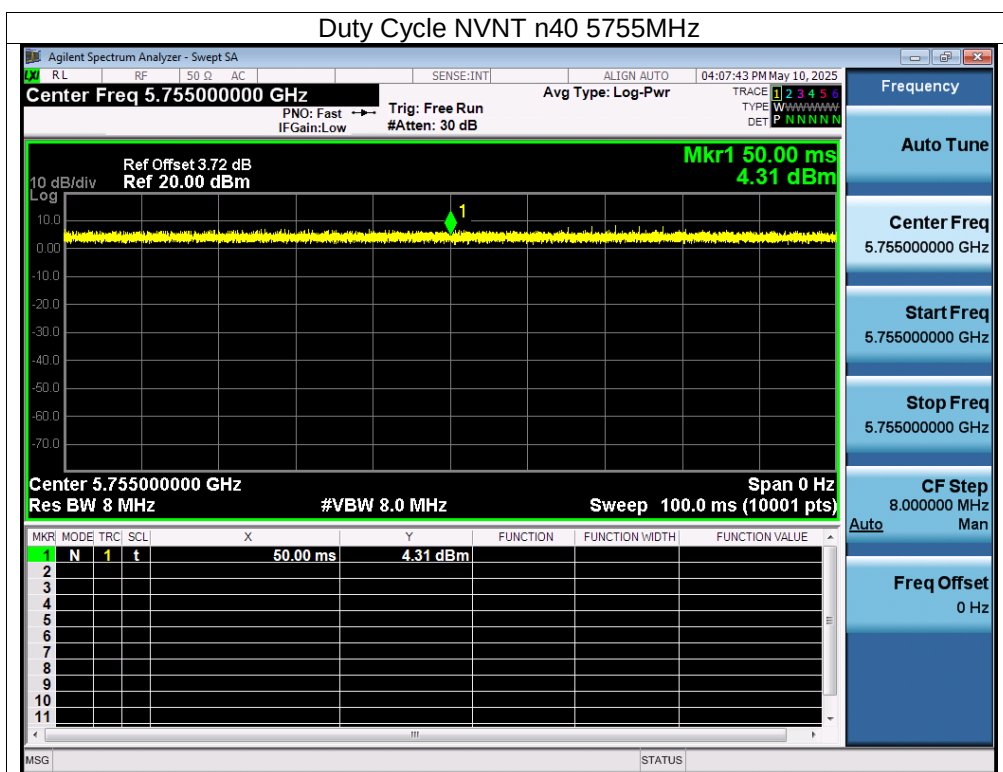


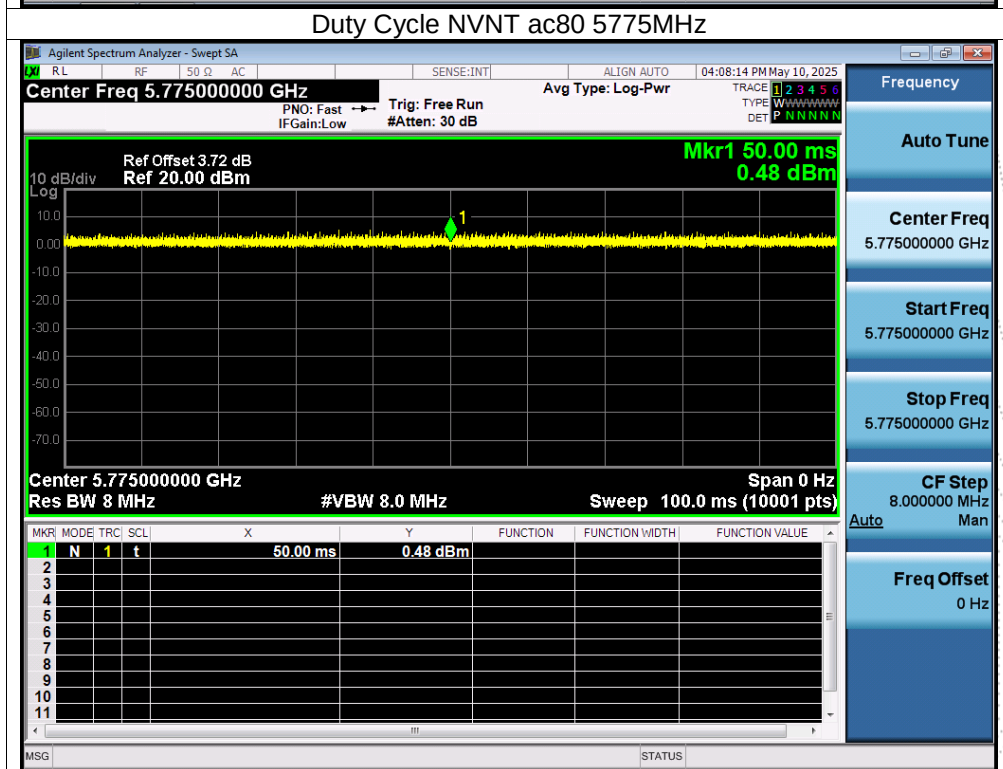
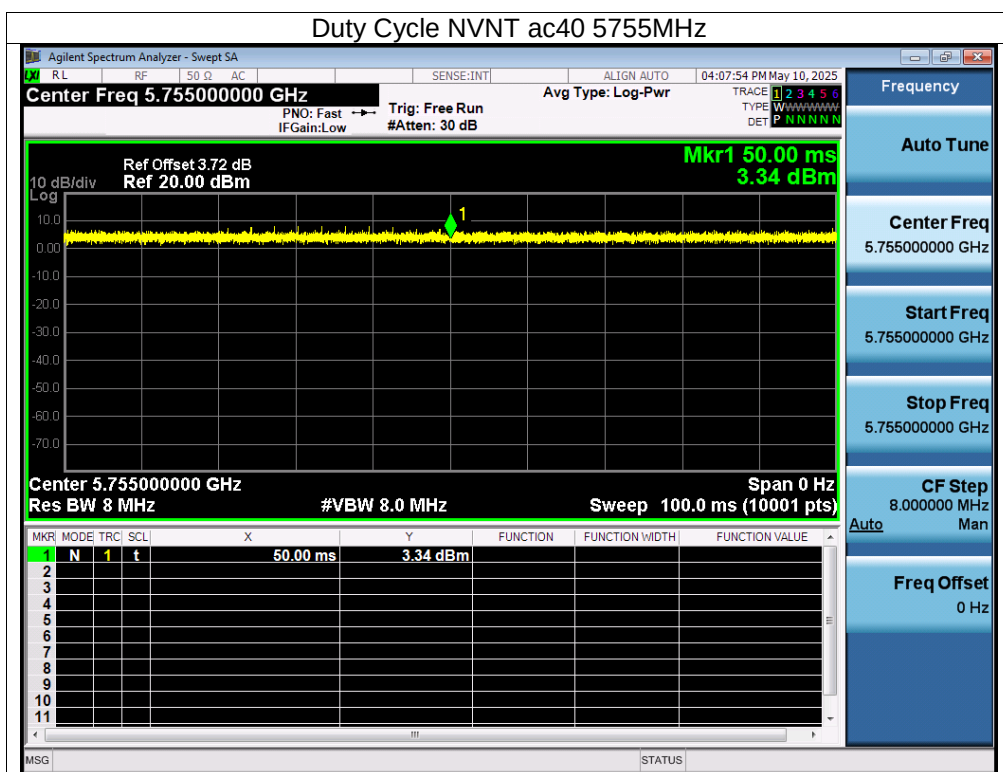
ANT A

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









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

