

10.5 Test Result

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.8V
Test Mode:	5180-5240MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	12.88	24	Pass
NVNT	a	5200	12.44	24	Pass
NVNT	a	5240	12.67	24	Pass
NVNT	n20	5180	12.56	24	Pass
NVNT	n20	5200	12.42	24	Pass
NVNT	n20	5240	12.56	24	Pass
NVNT	n40	5190	12.34	24	Pass
NVNT	n40	5230	12.55	24	Pass
NVNT	ac20	5180	12.65	24	Pass
NVNT	ac20	5200	12.48	24	Pass
NVNT	ac20	5240	12.63	24	Pass
NVNT	ac40	5190	12.56	24	Pass
NVNT	ac40	5230	12.49	24	Pass
NVNT	ax20	5180	8.49	24	Pass
NVNT	ax20	5200	8.49	24	Pass
NVNT	ax20	5240	9.00	24	Pass
NVNT	ax40	5190	7.85	24	Pass
NVNT	ax40	5230	8.35	24	Pass

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.8V
Test Mode:	5745-5825MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5745	9.94	30	Pass
NVNT	a	5785	10.01	30	Pass
NVNT	a	5825	9.83	30	Pass
NVNT	n20	5745	9.74	30	Pass
NVNT	n20	5785	9.79	30	Pass
NVNT	n20	5825	9.69	30	Pass
NVNT	n40	5755	10.03	30	Pass
NVNT	n40	5795	9.77	30	Pass
NVNT	ac20	5745	9.88	30	Pass
NVNT	ac20	5785	9.94	30	Pass
NVNT	ac20	5825	9.81	30	Pass
NVNT	ac40	5755	9.74	30	Pass
NVNT	ac40	5795	9.81	30	Pass
NVNT	ax20	5745	8.01	30	Pass
NVNT	ax20	5785	7.74	30	Pass
NVNT	ax20	5825	7.14	30	Pass
NVNT	ax40	5755	7.61	30	Pass
NVNT	ax40	5795	6.92	30	Pass

11. Out Of Band Emissions

11.1 Block Diagram Of Test Setup



11.2 Limit

According to FCC §15.407(b)

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(2) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

11.3 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

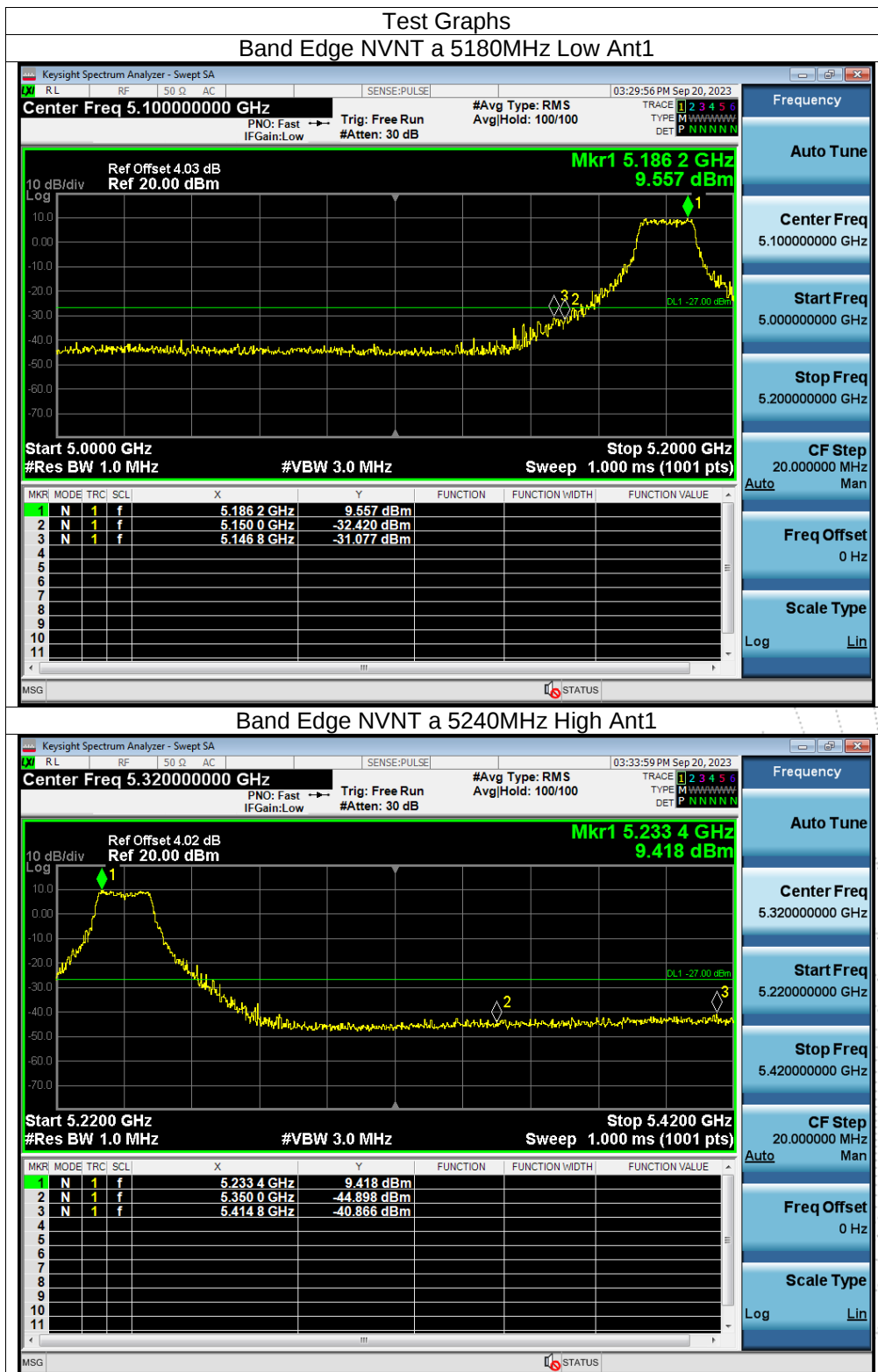
11.4 EUT Operating Conditions

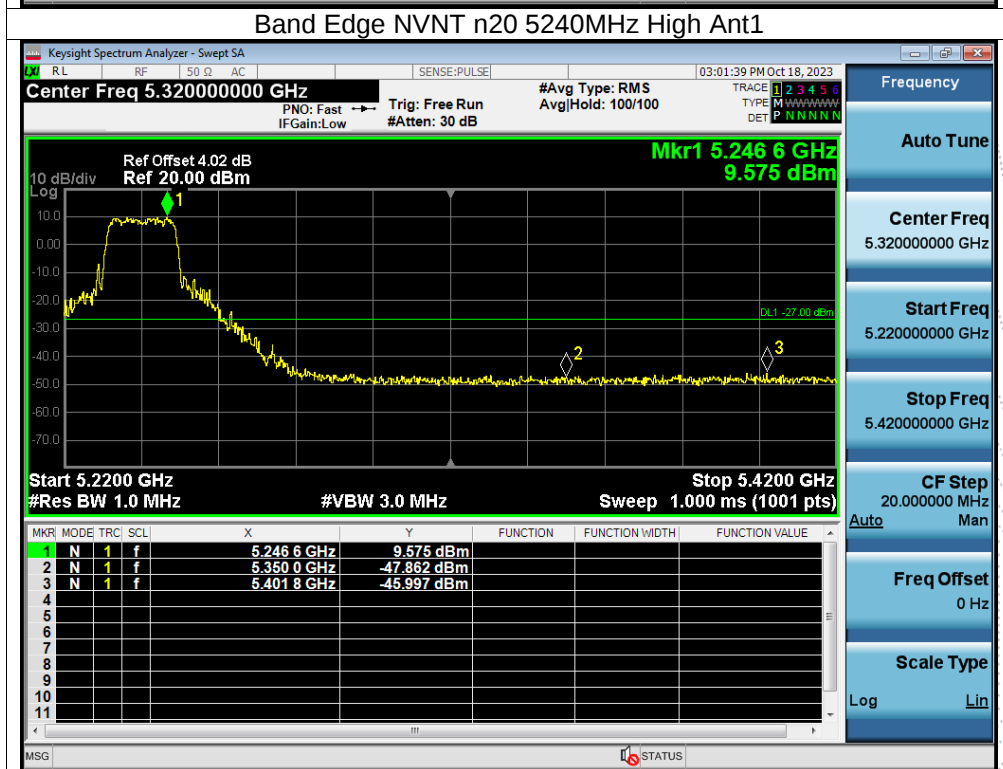
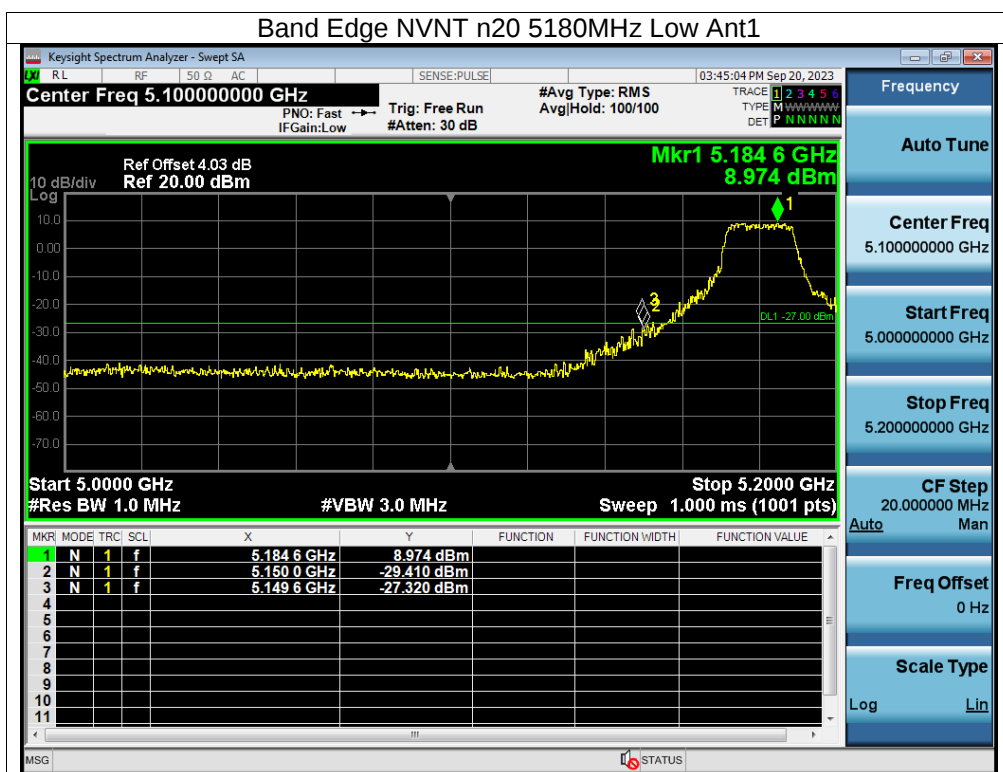
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data

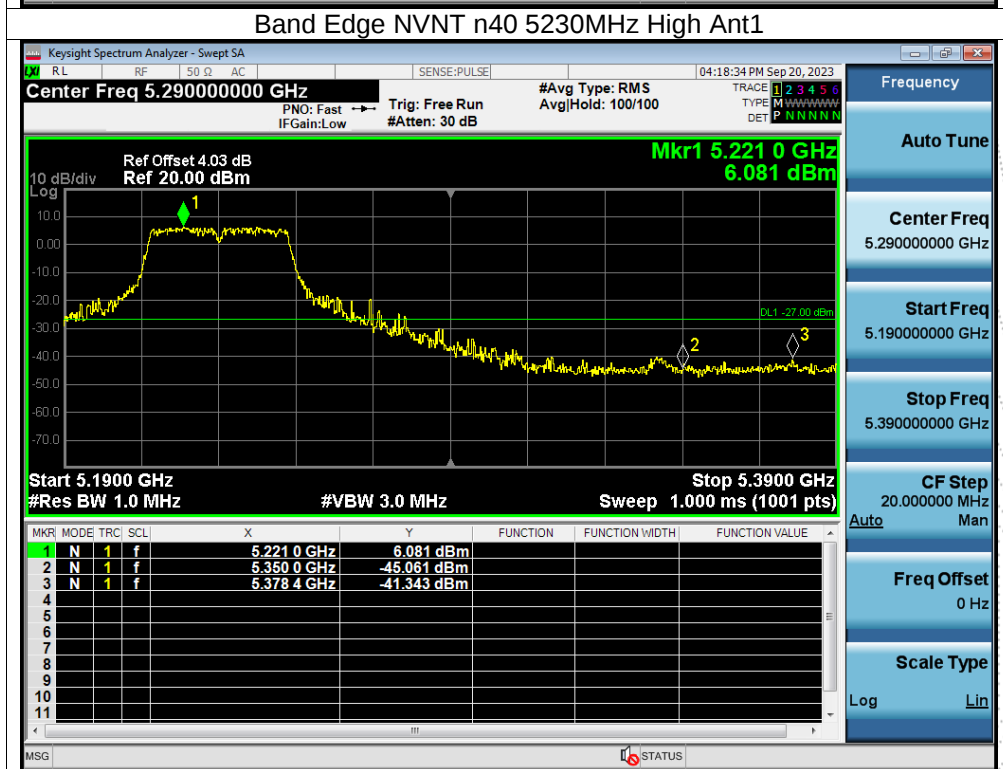
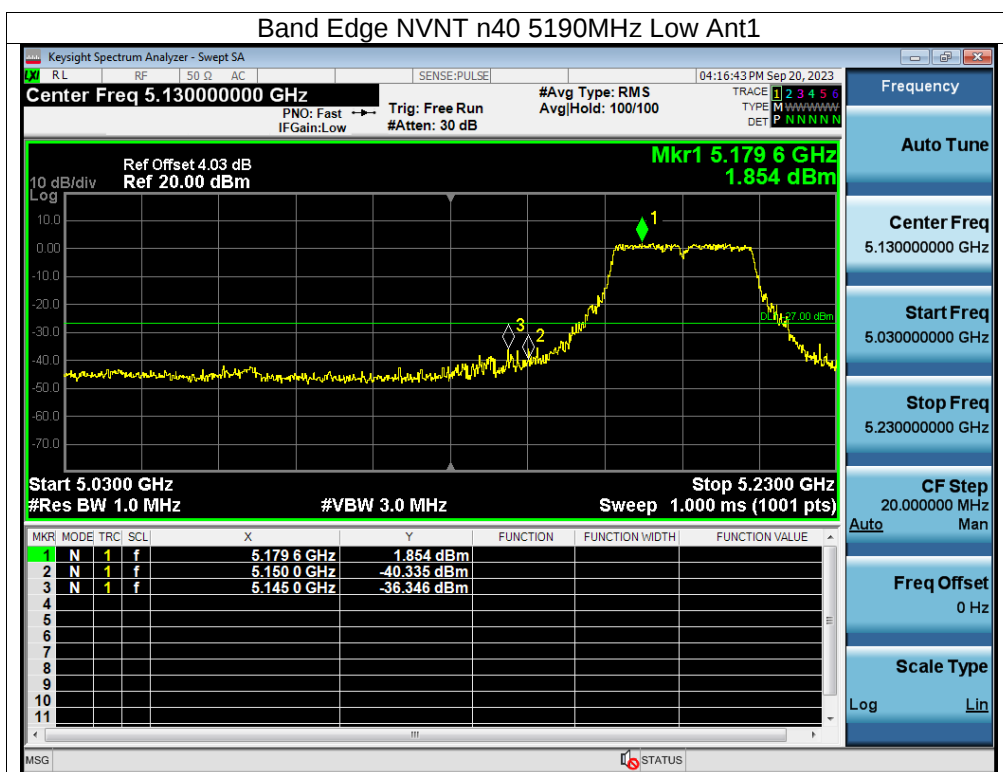
11.5 Test Result

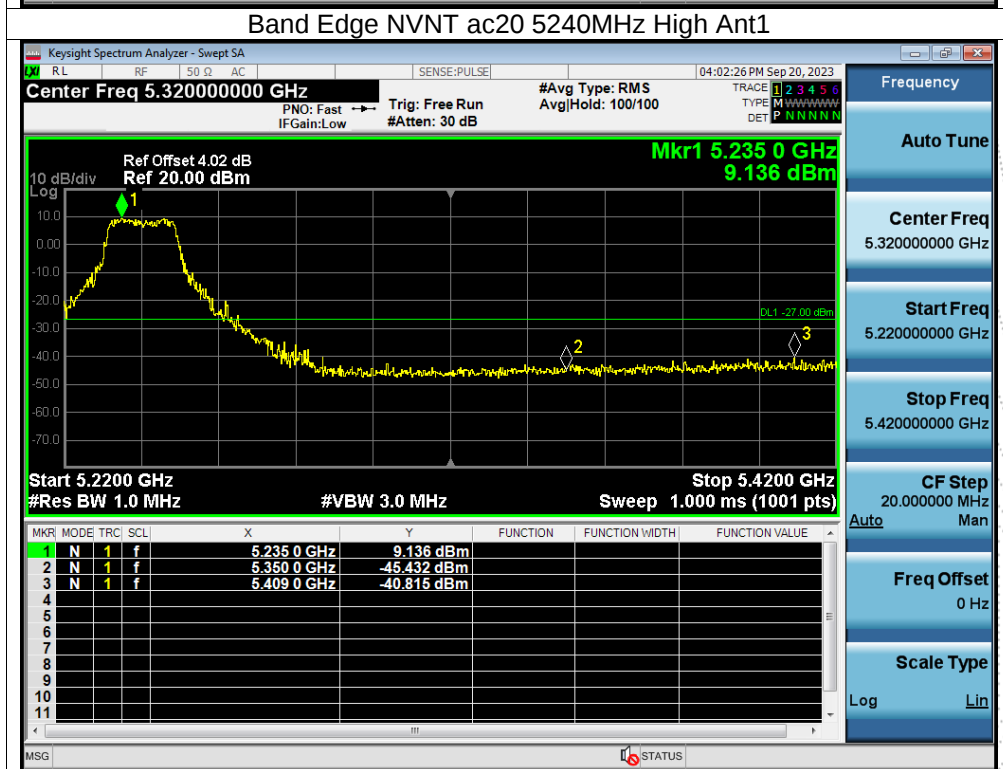
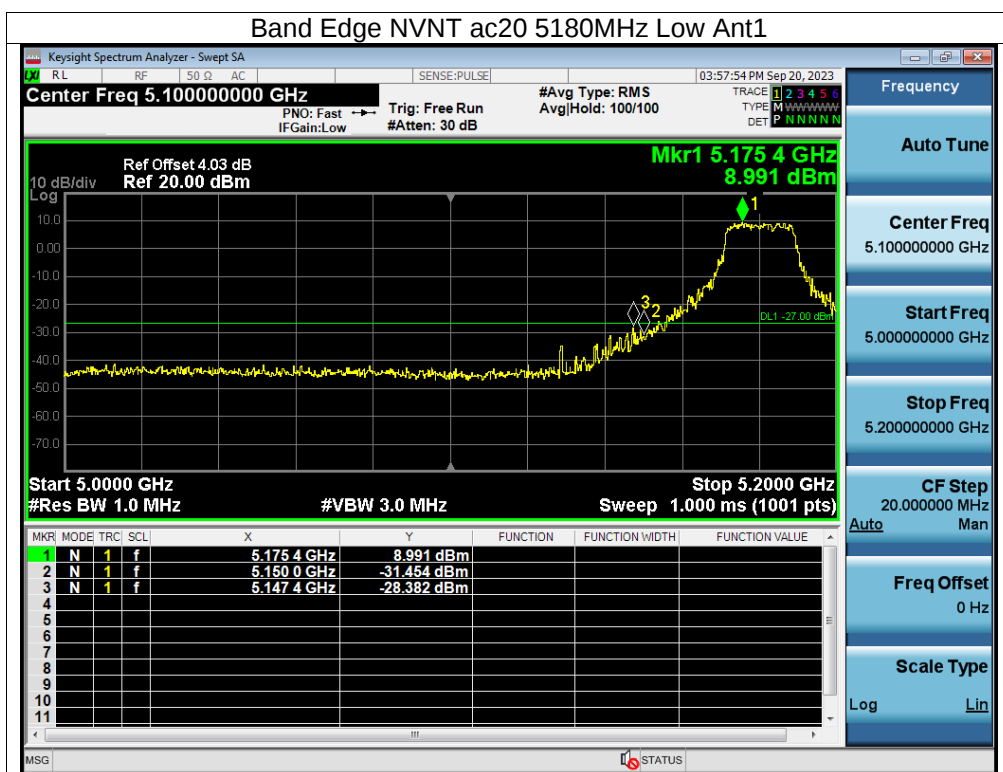
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 3.8V

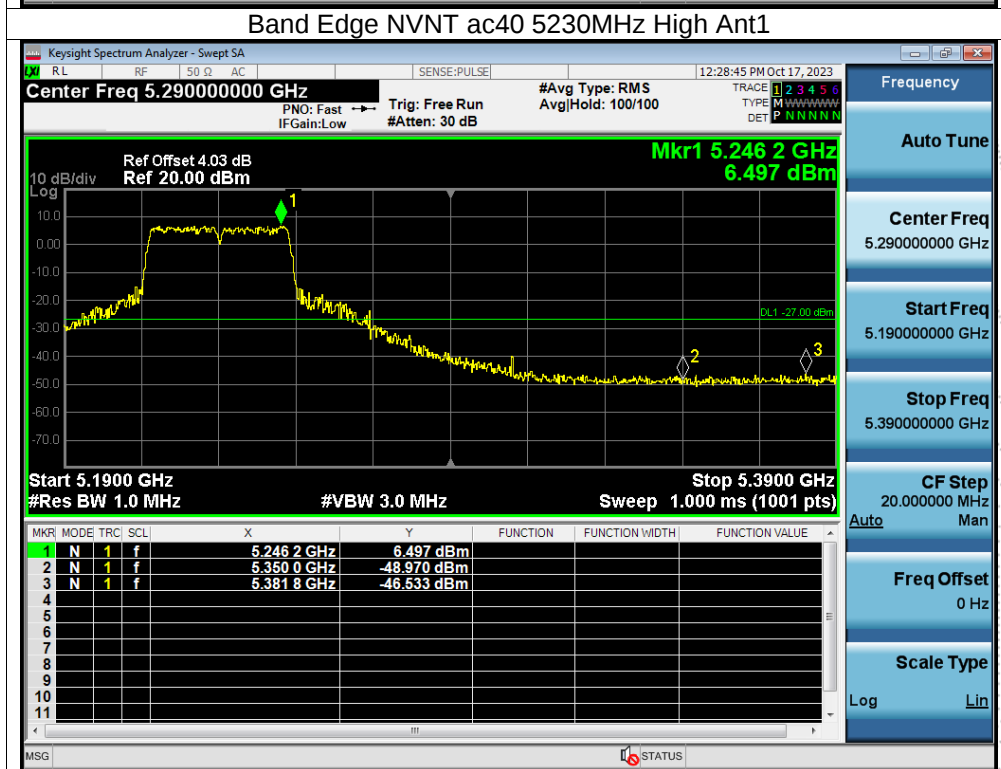
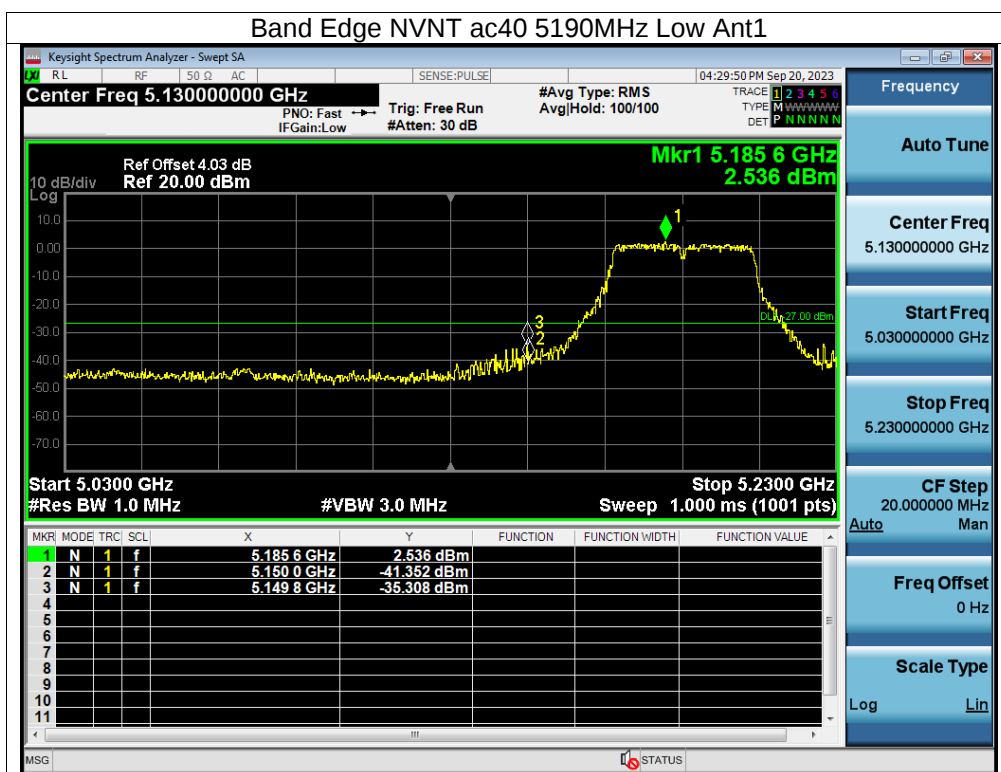
5180-5240MHz

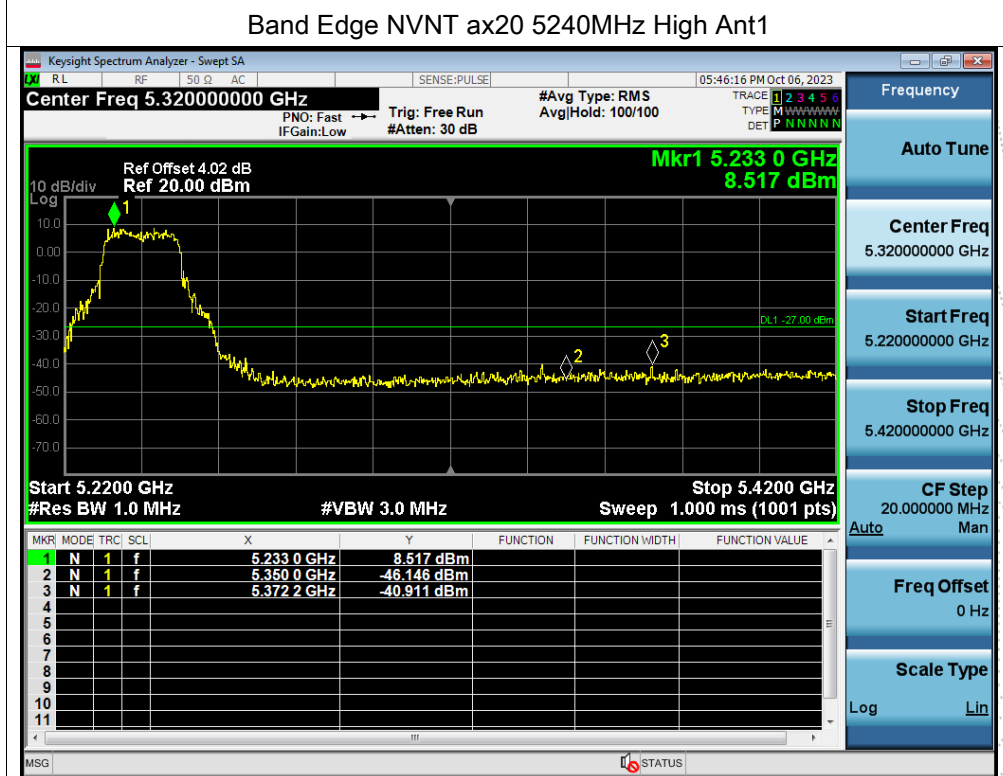
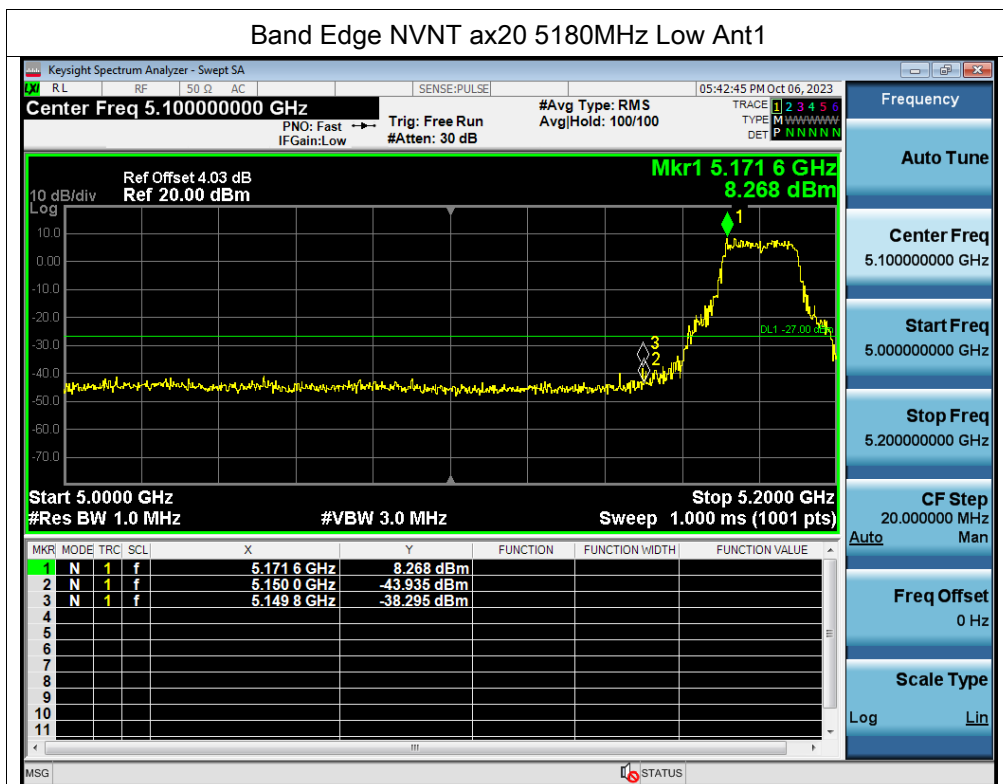


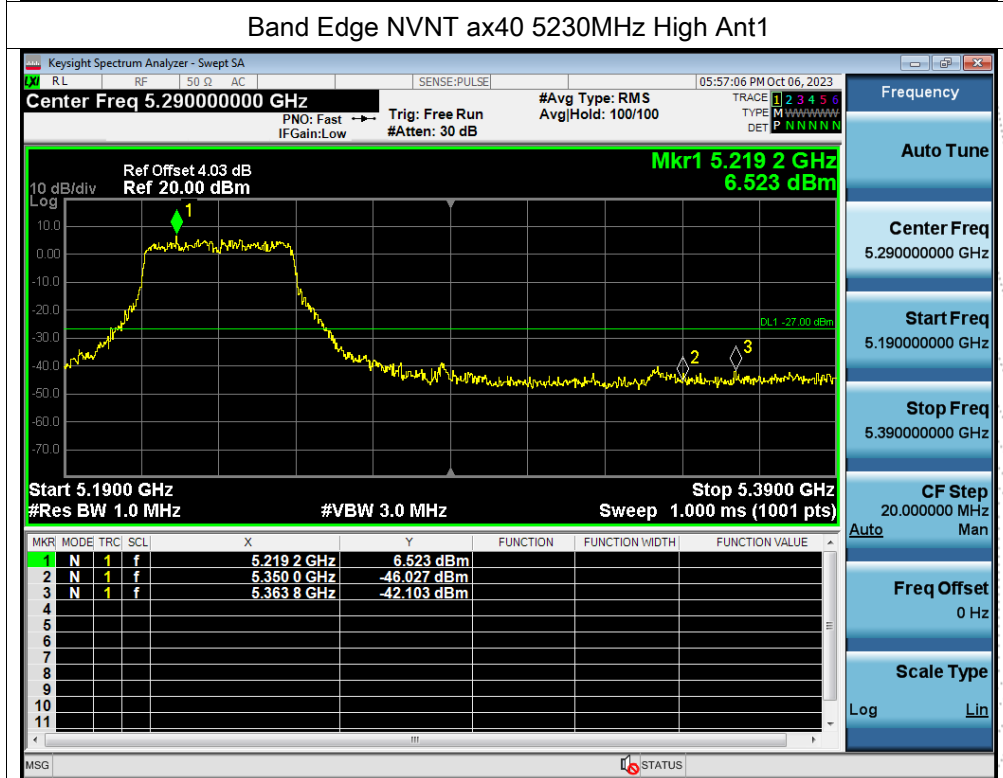
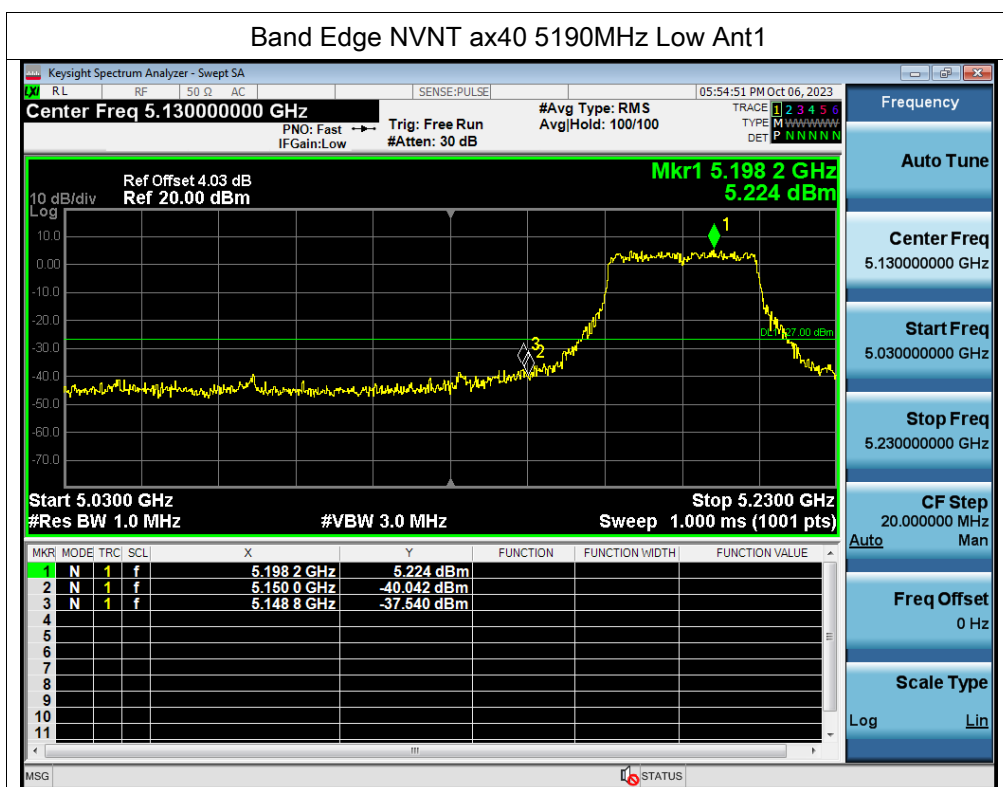






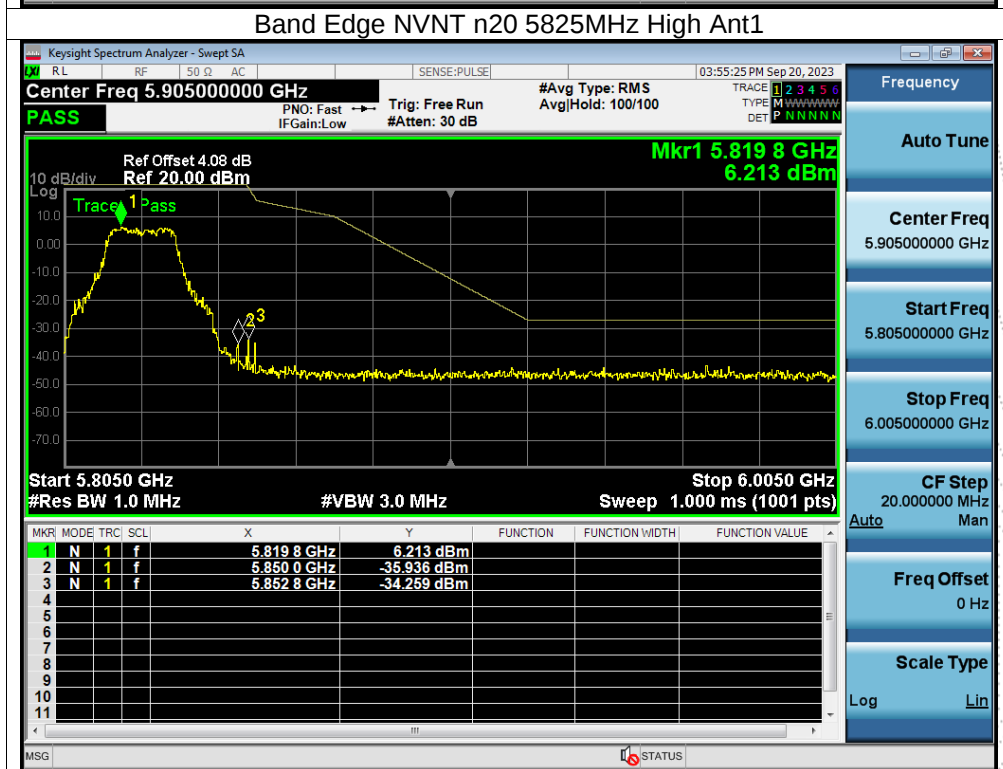
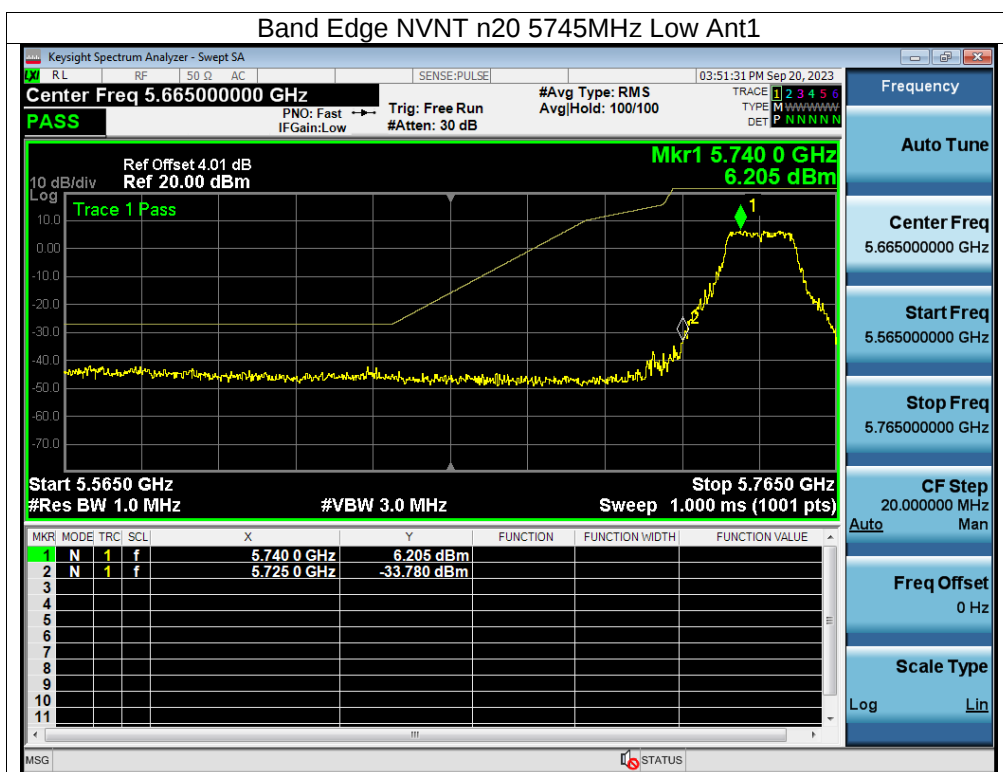


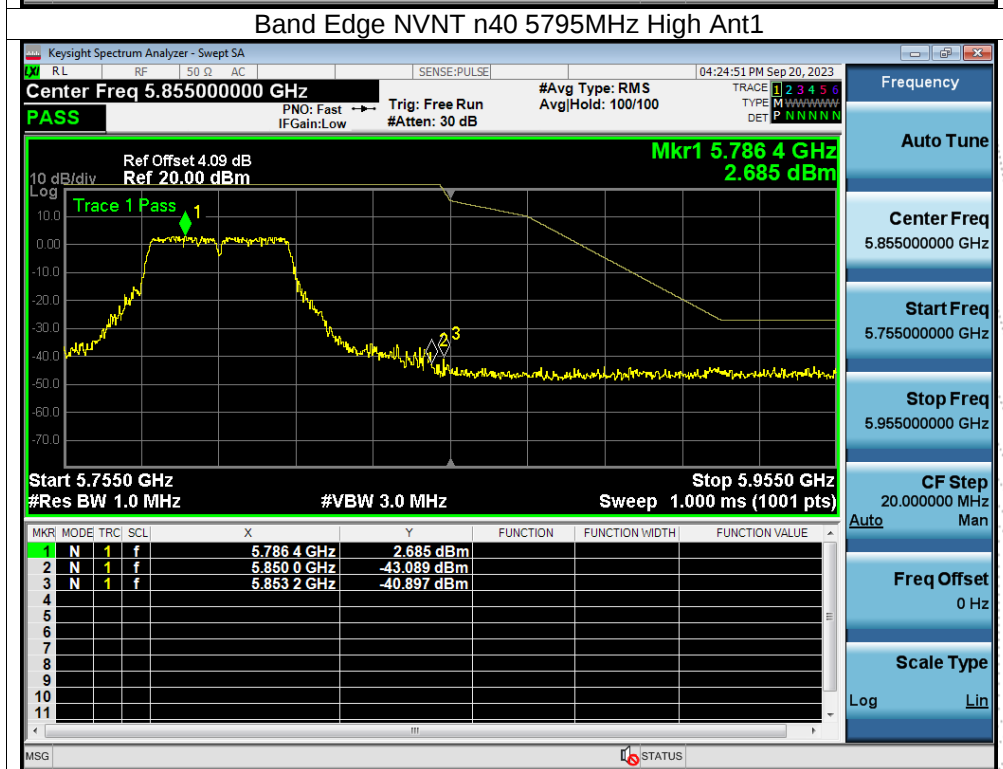
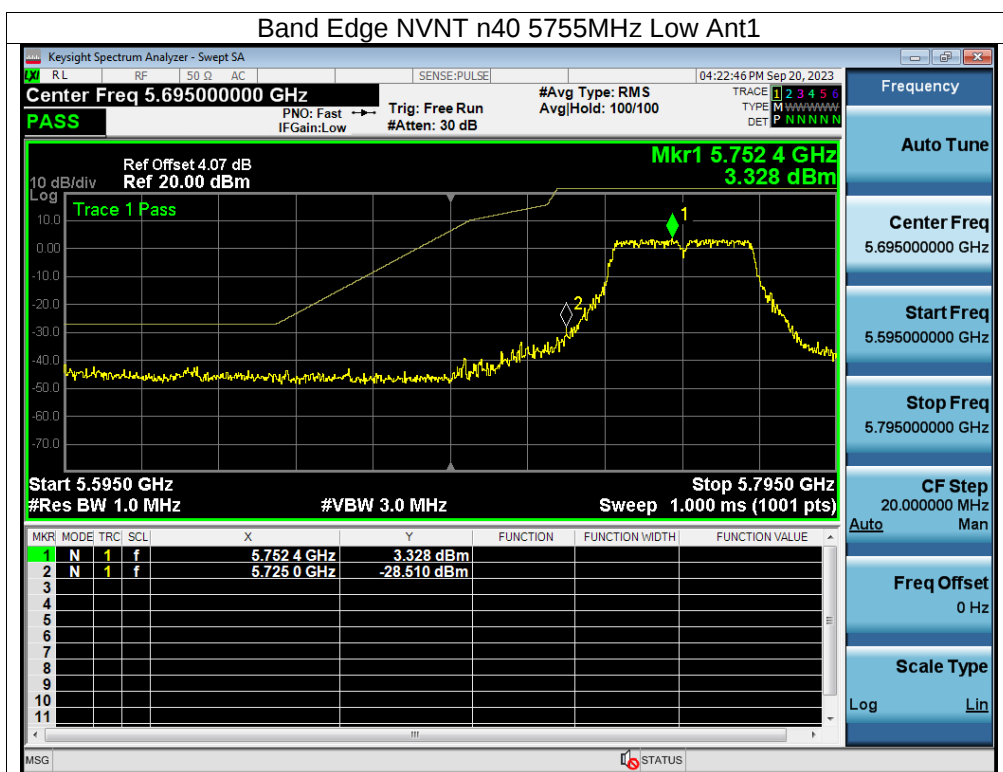


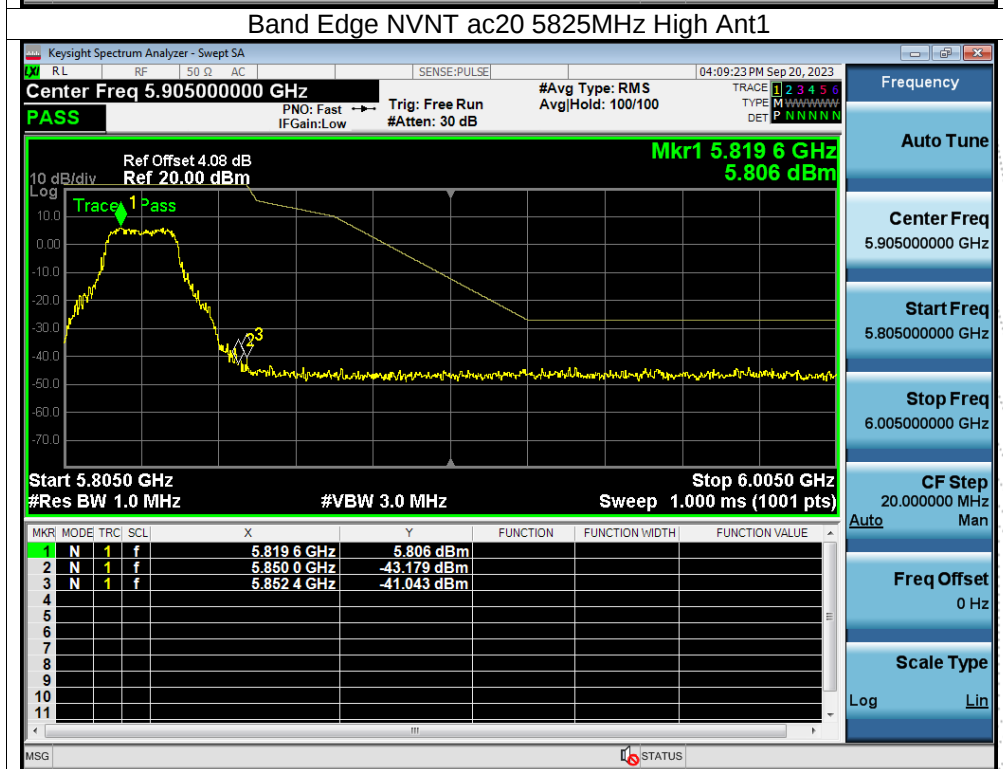
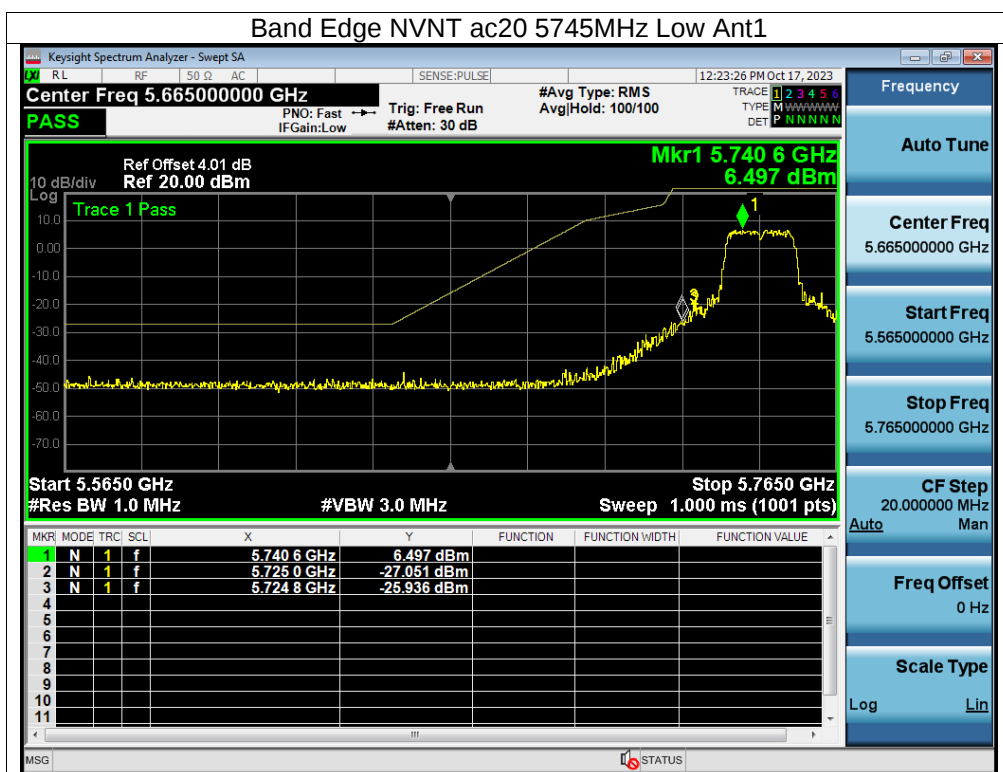


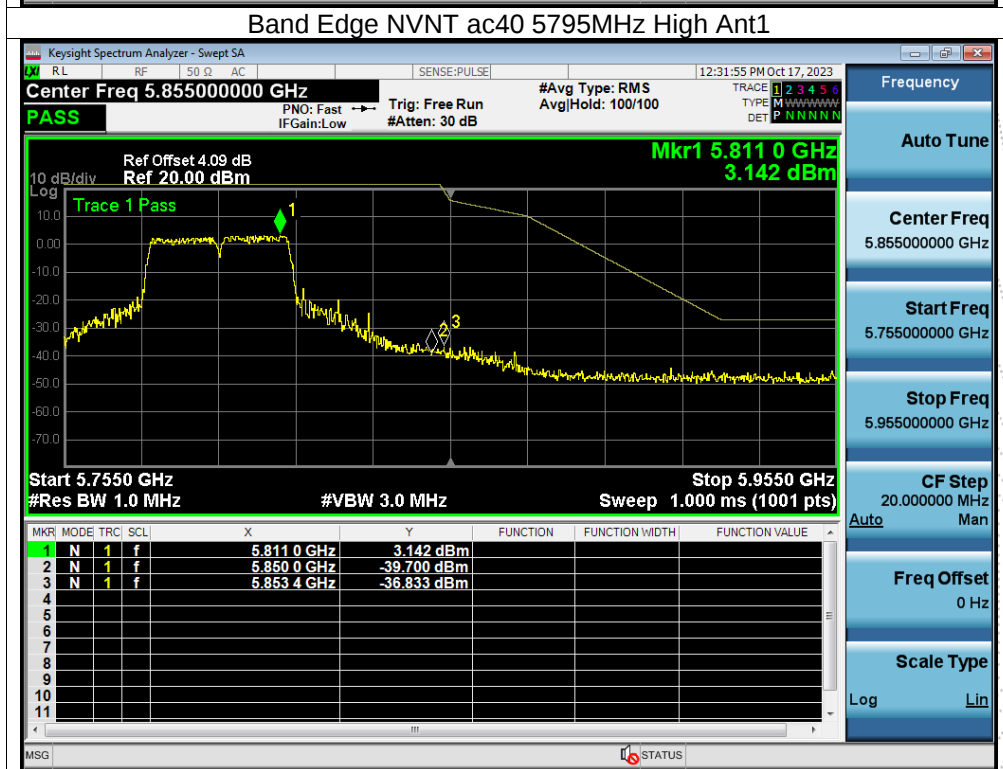
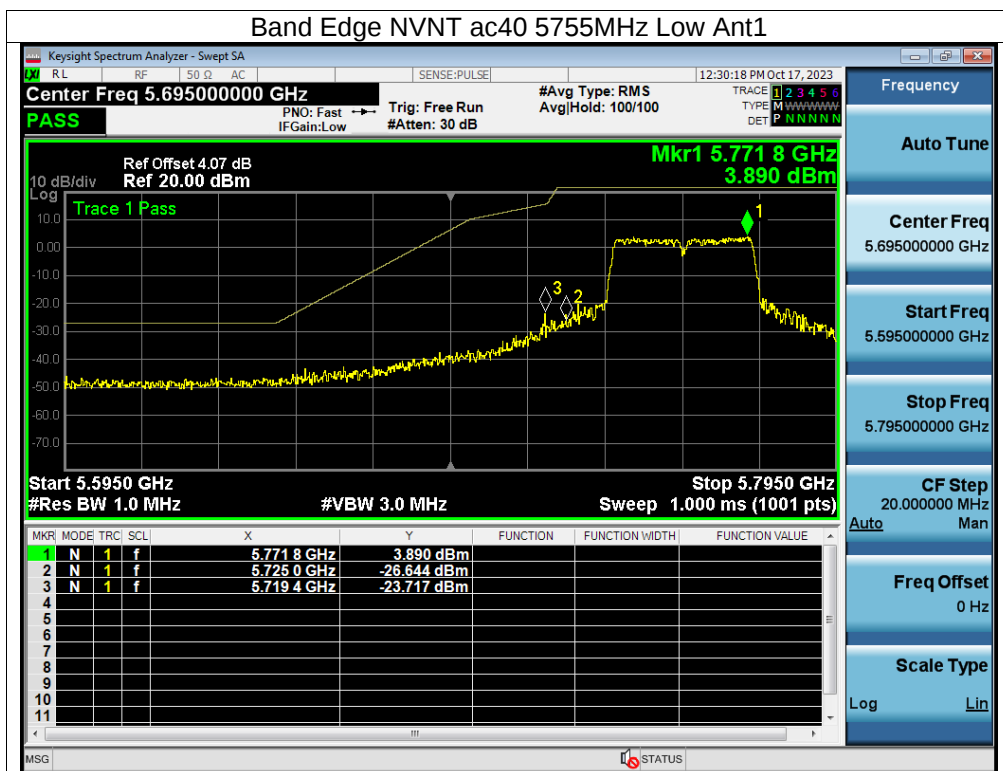
5745-5825MHz

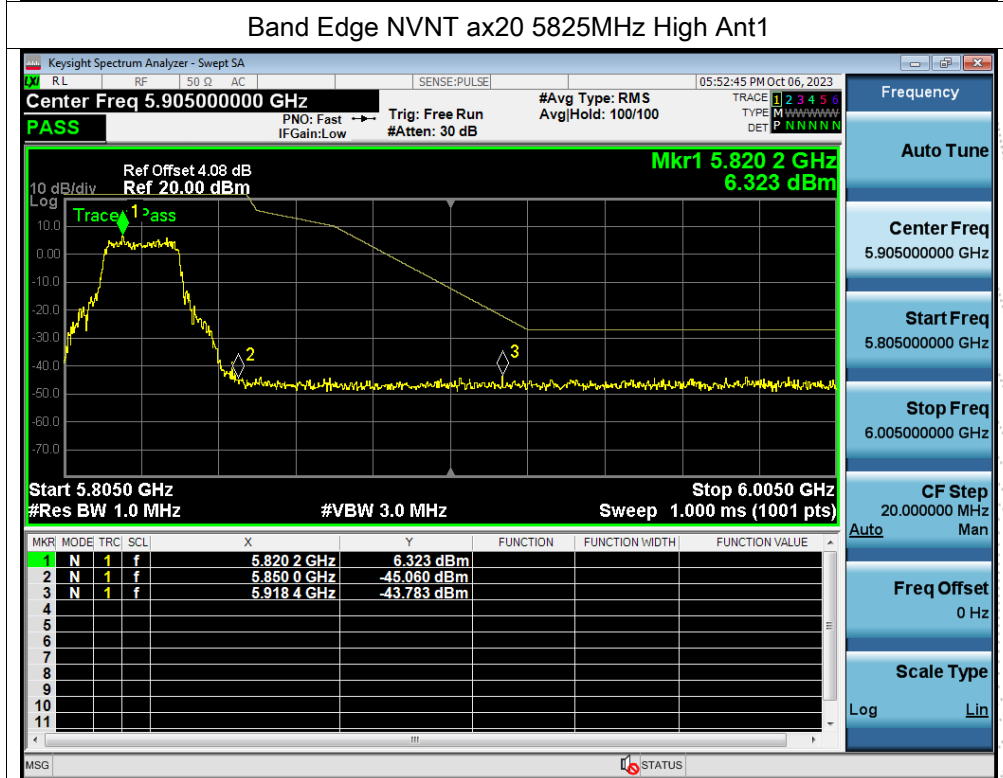
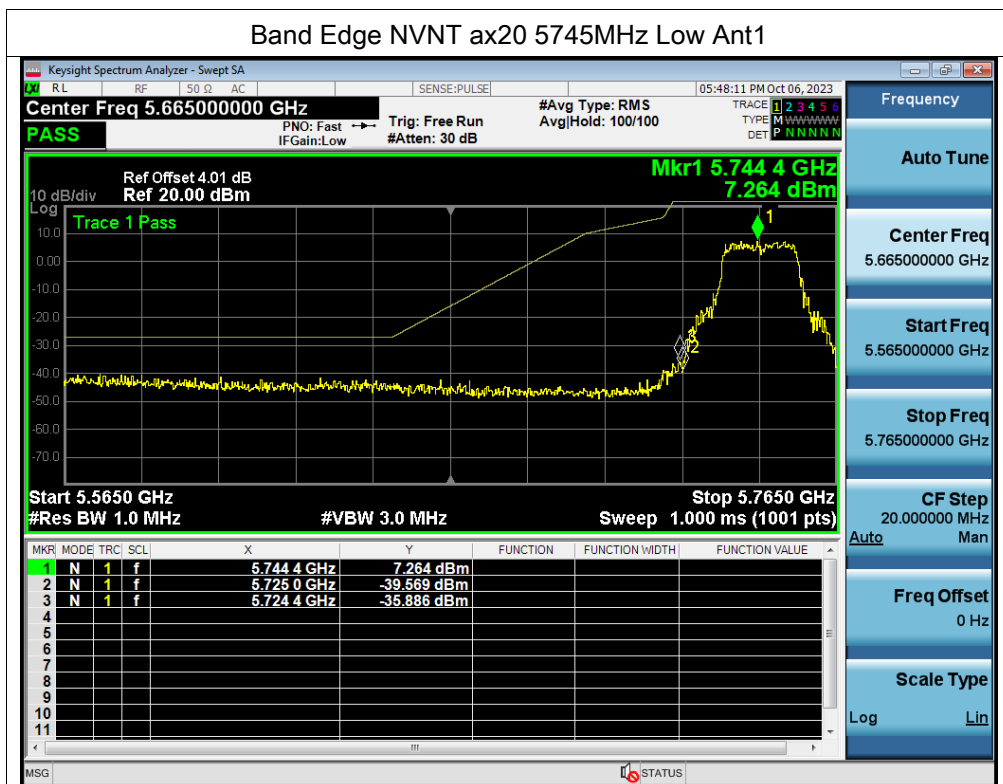




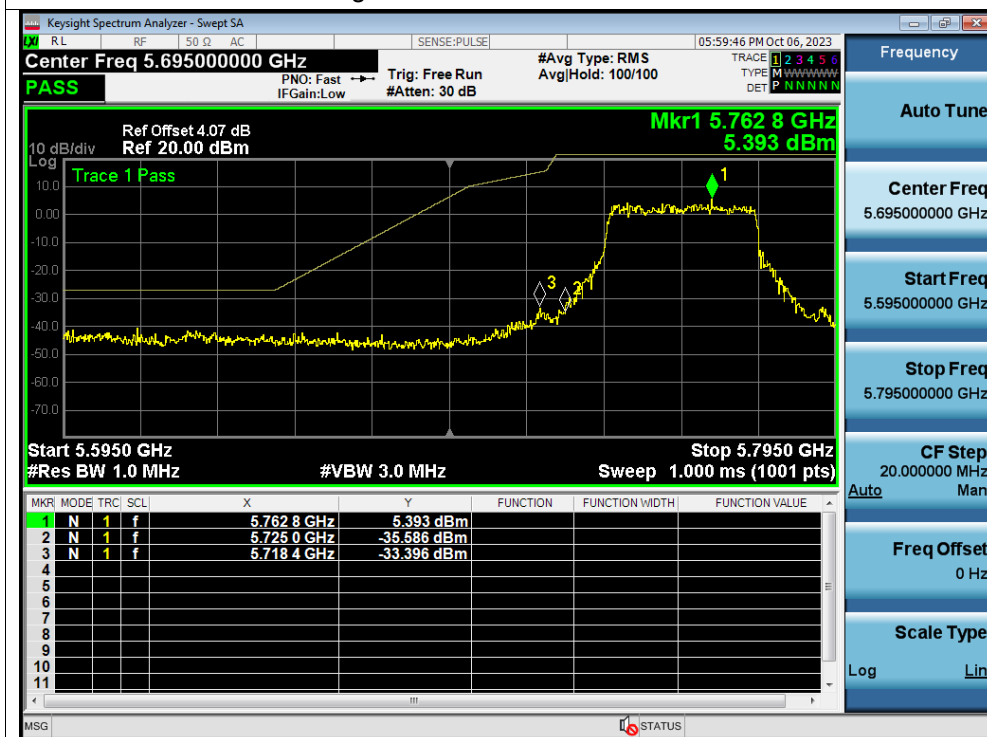




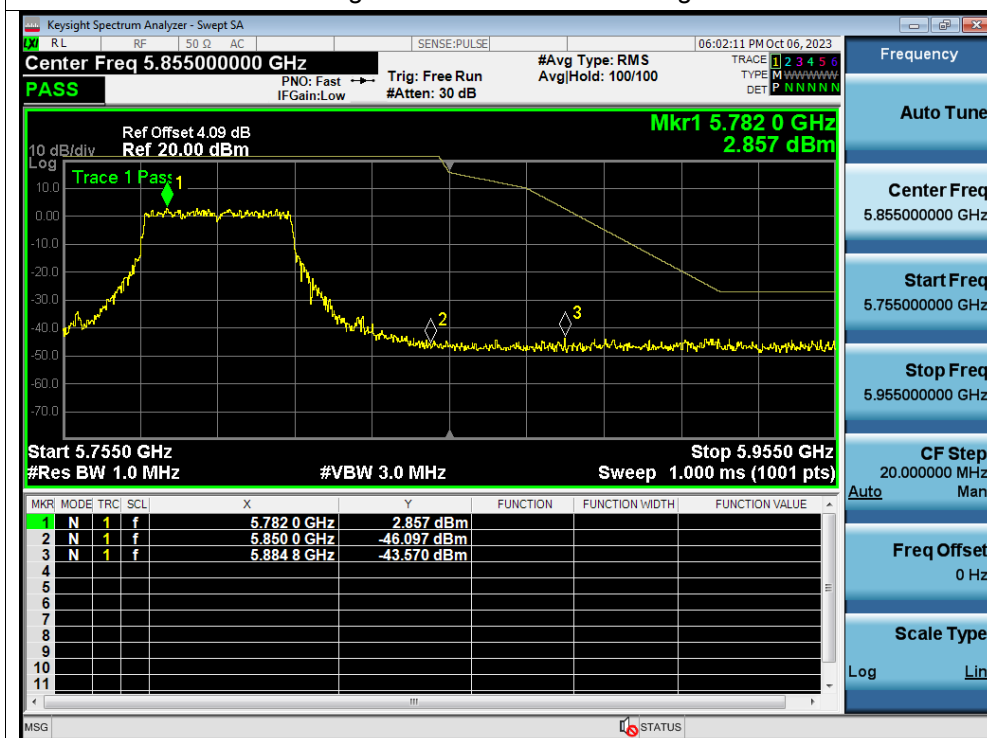




Band Edge NVNT ax40 5755MHz Low Ant1



Band Edge NVNT ax40 5795MHz High Ant1



12. Spurious RF Conducted Emissions

12.1 Block Diagram Of Test Setup



12.2 Limit

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(2) For transmitters operating in the 5.725-5.85 GHz band (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge..

12.3 Test Procedure

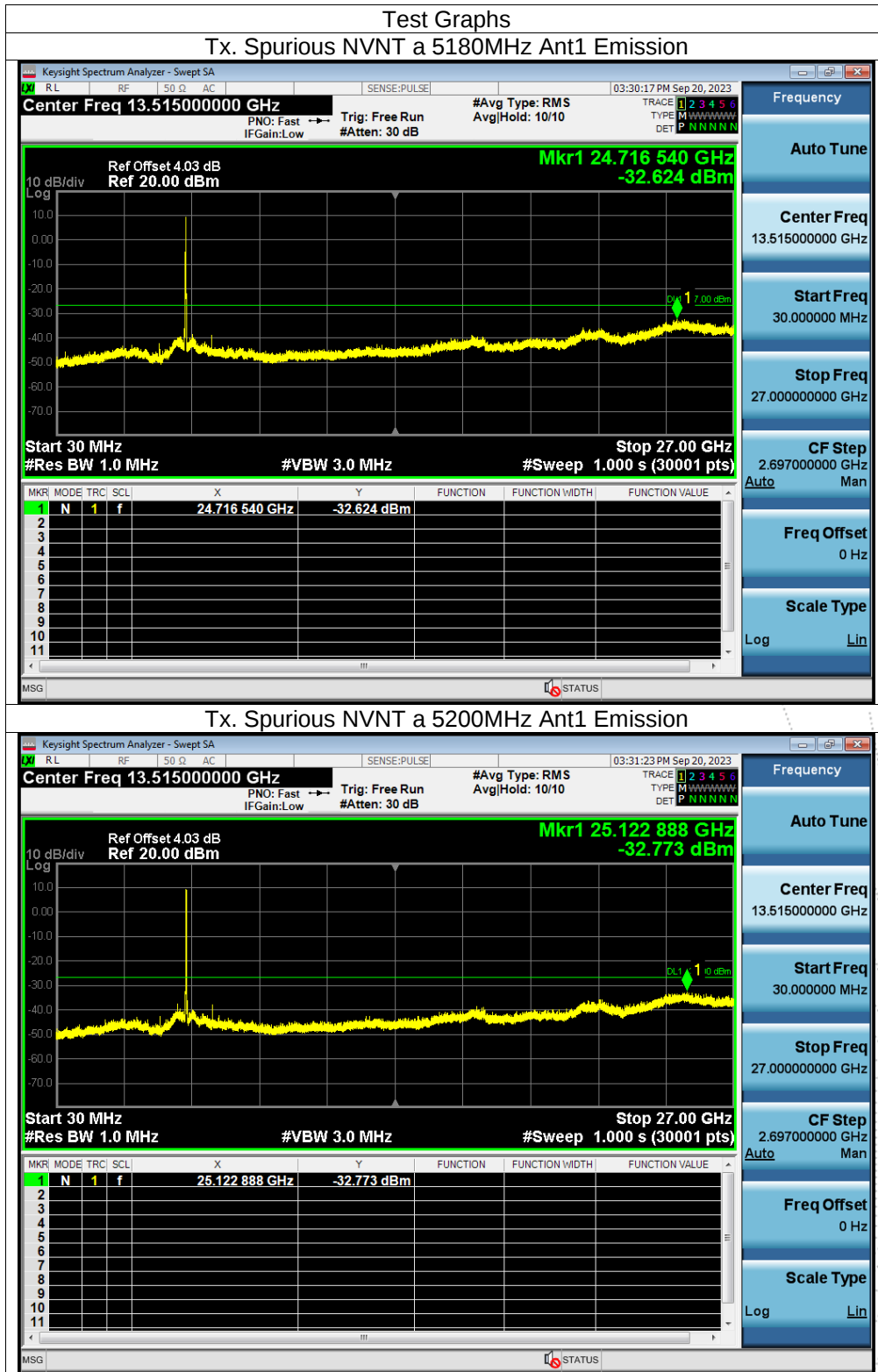
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

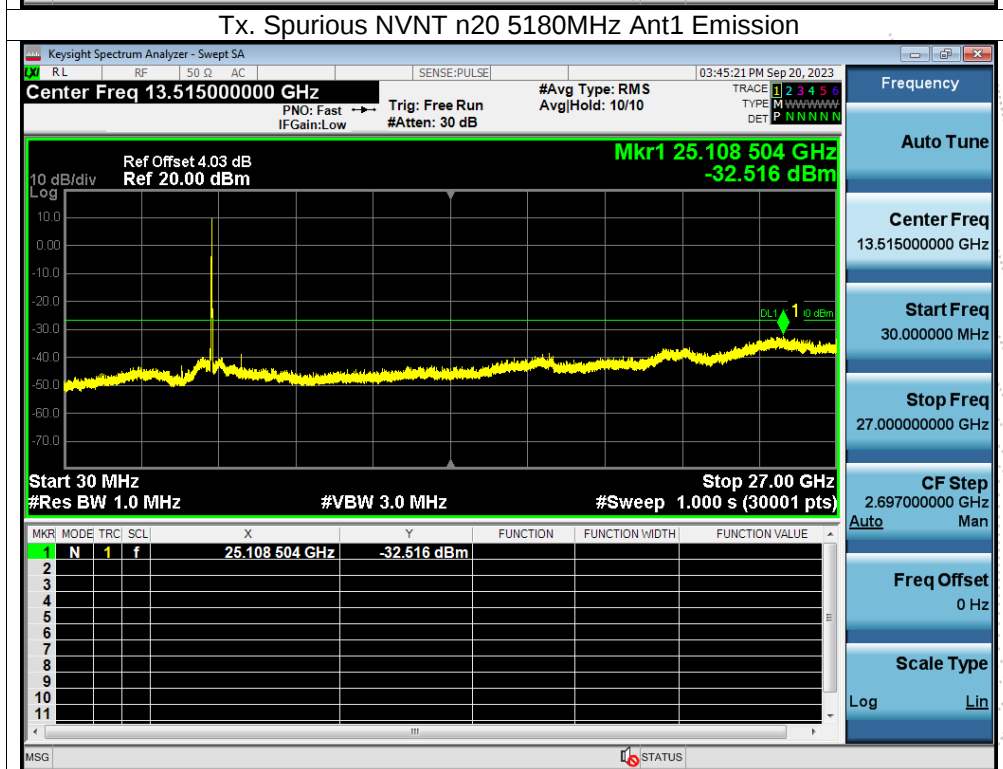
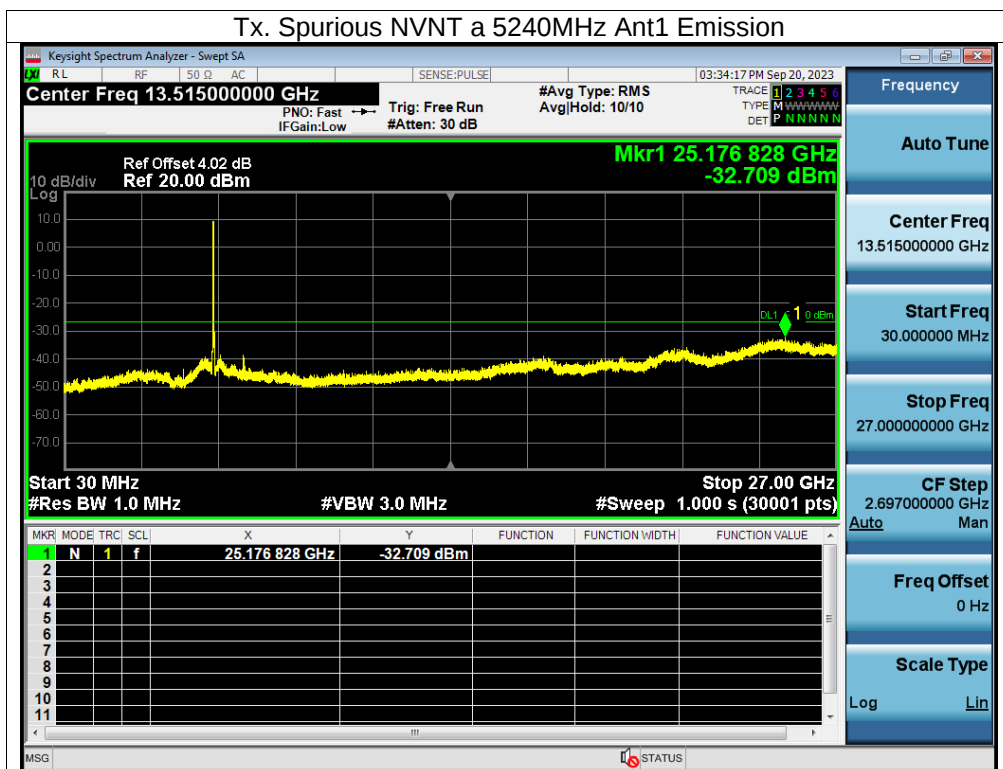
12.4 Test Result

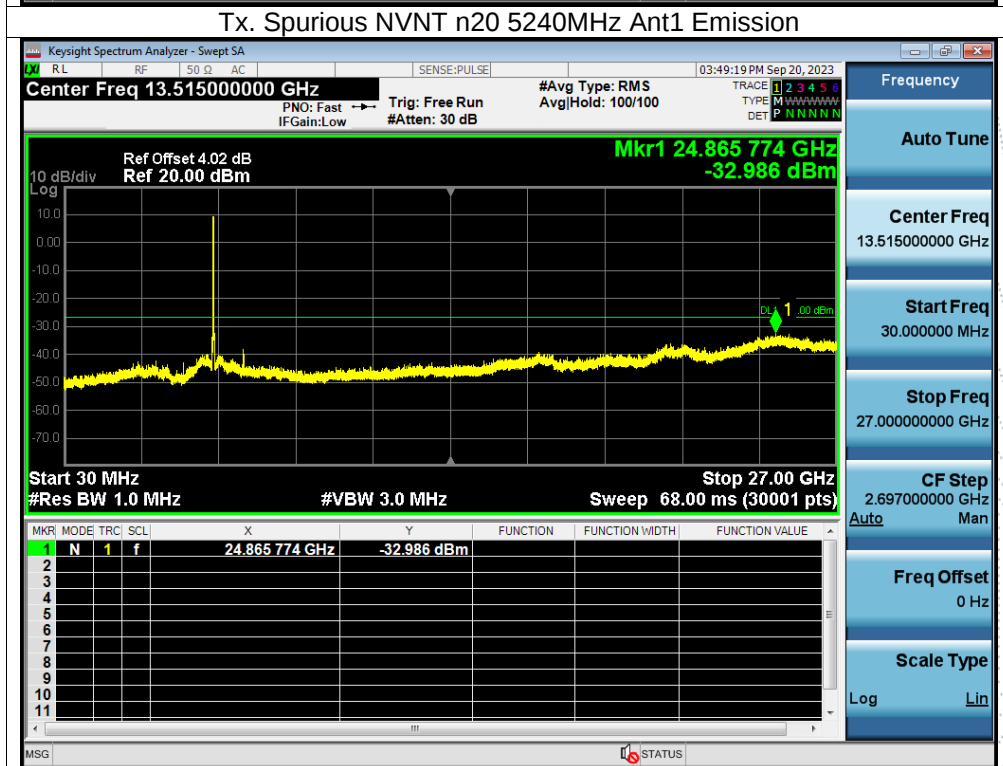
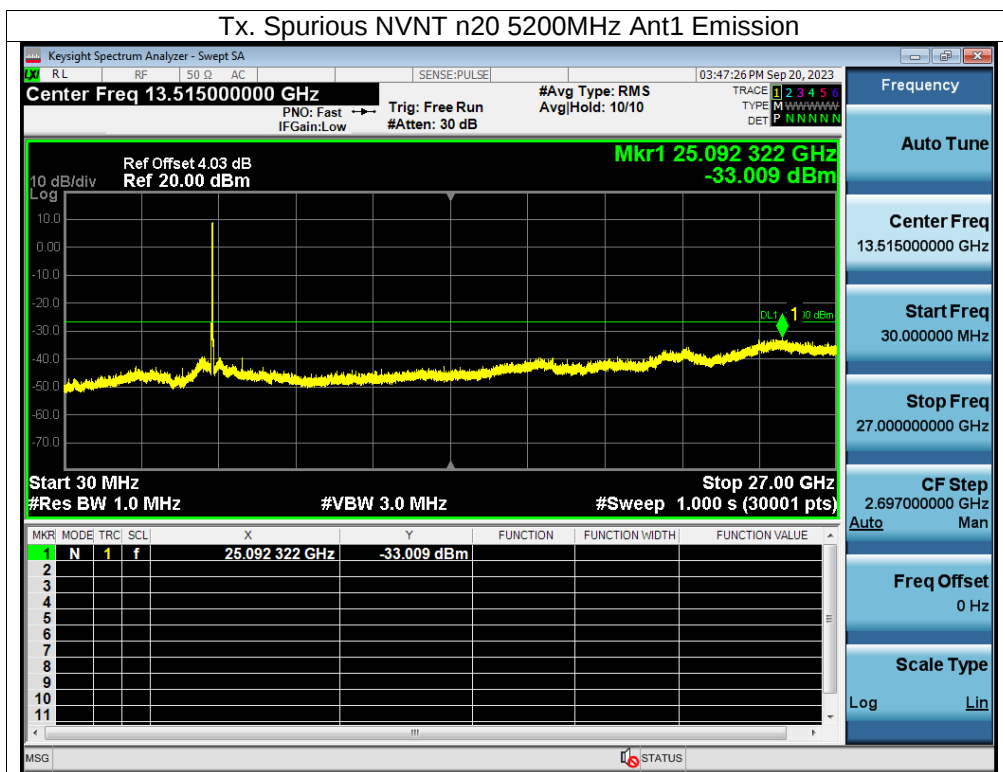
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.

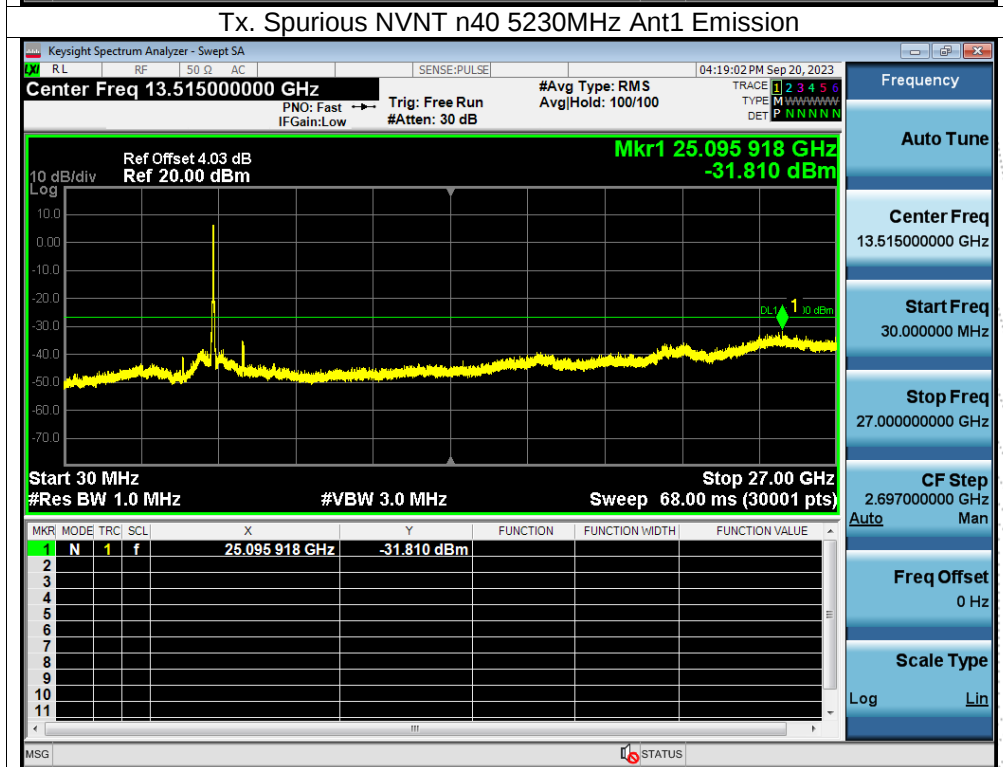
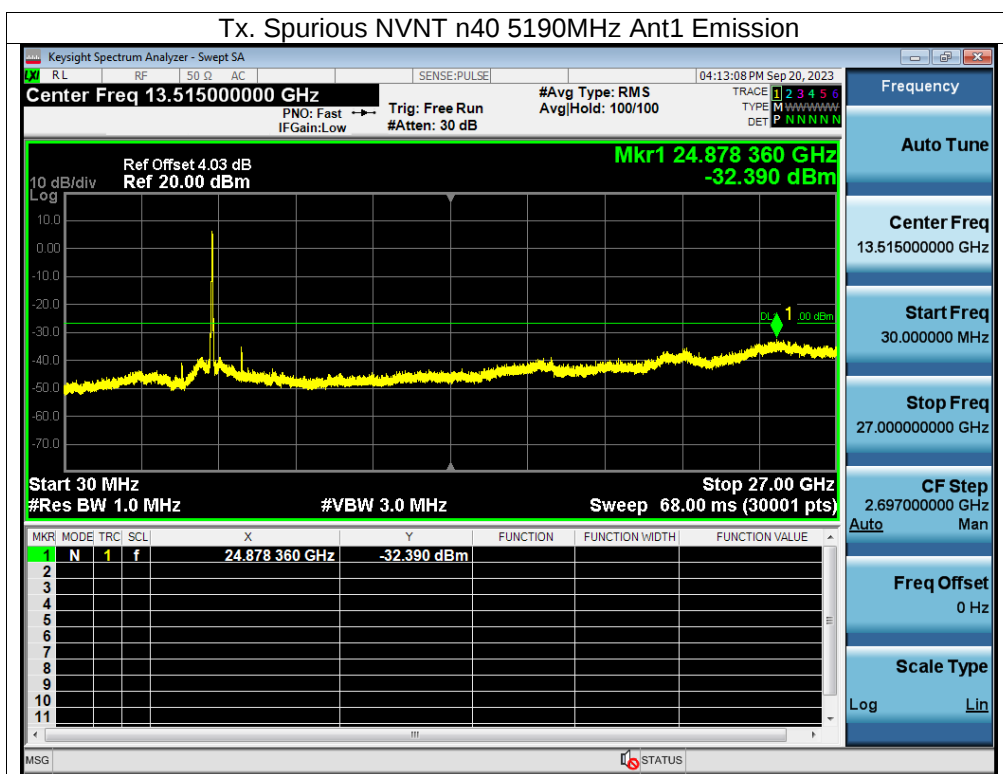
About: 26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

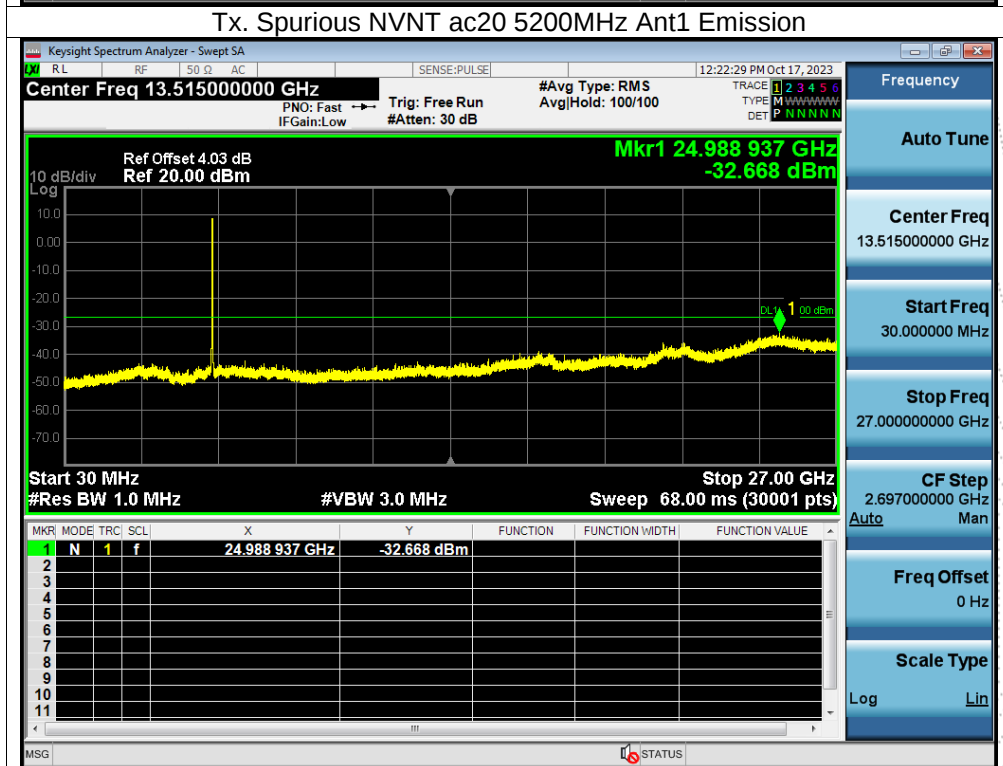
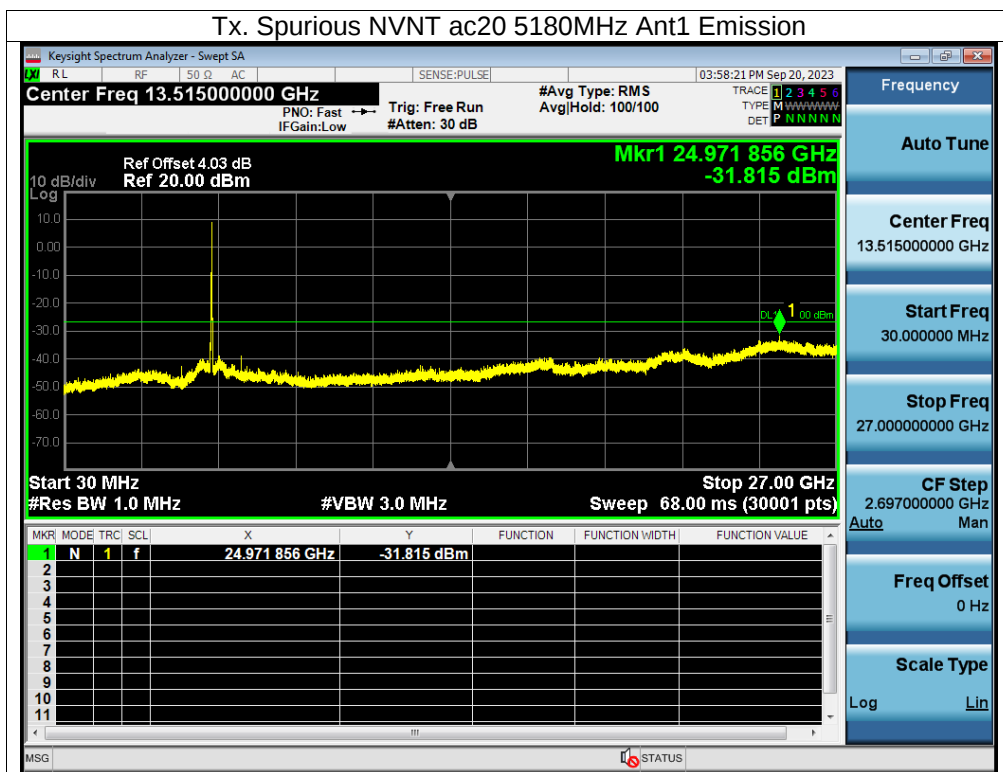
5180-5240MHz

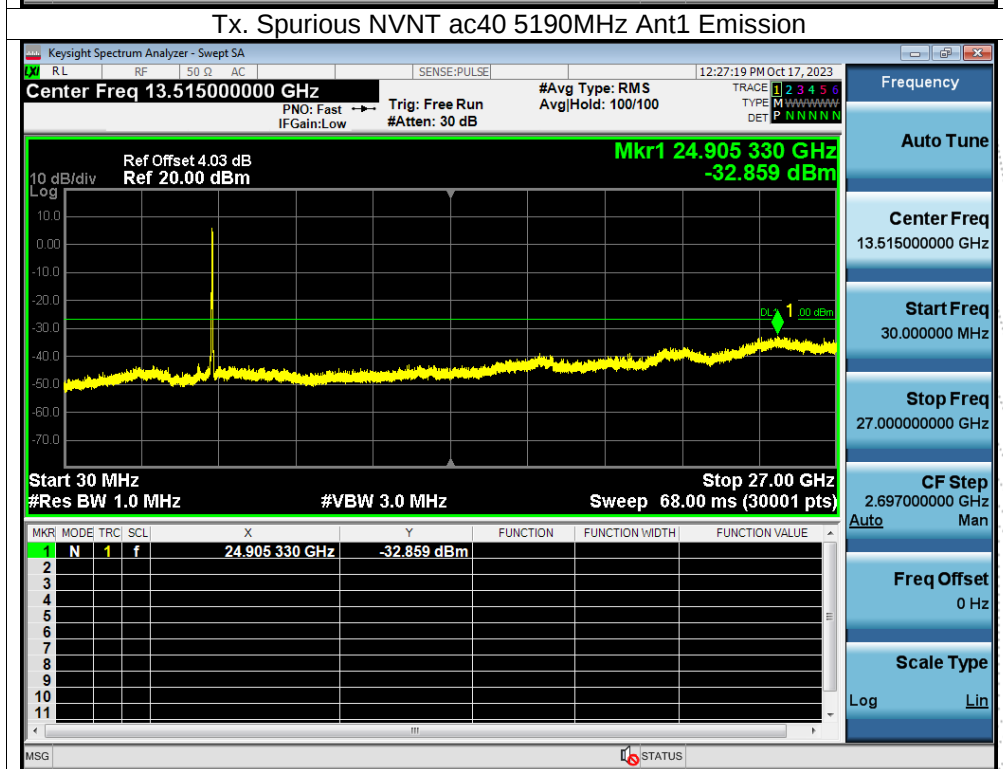
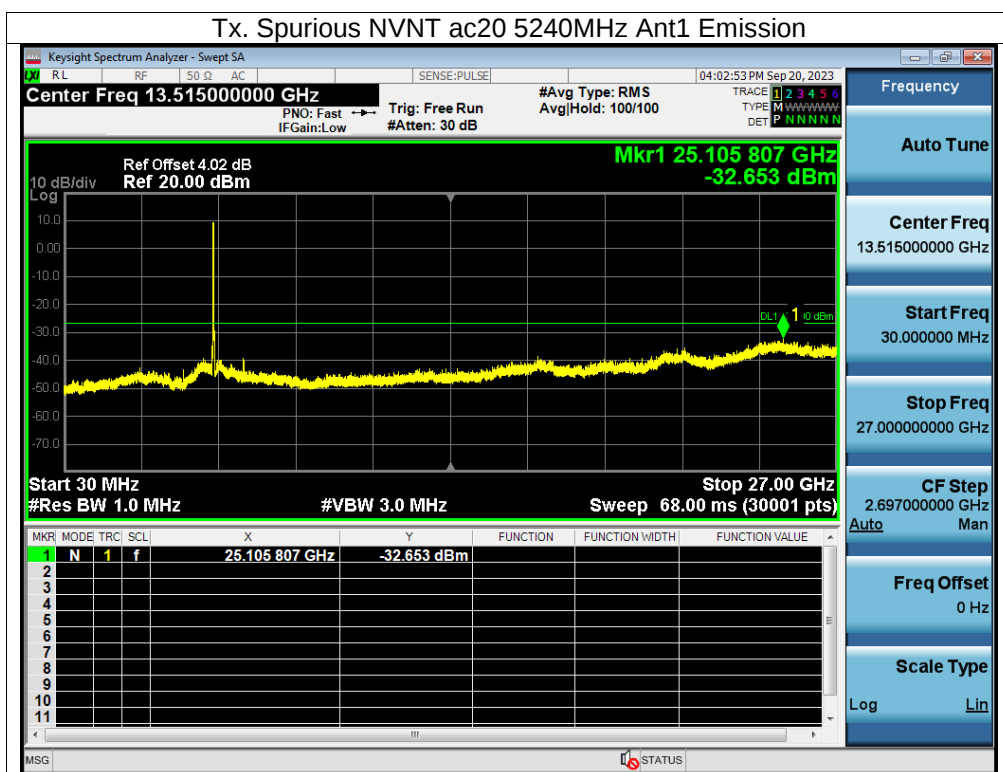


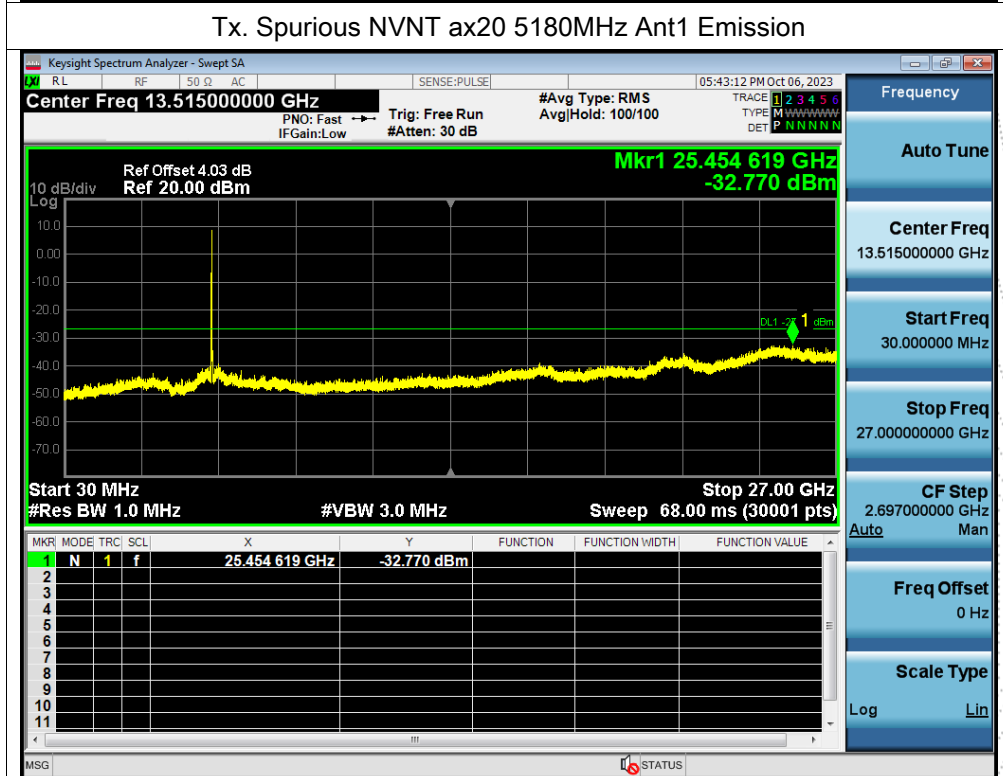
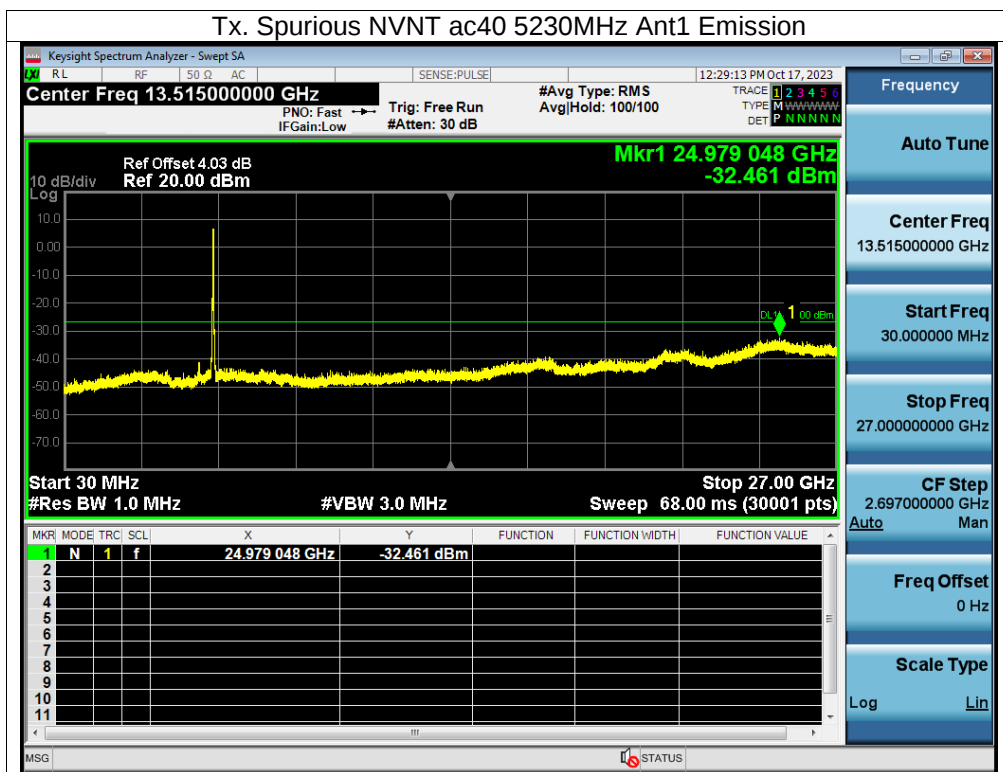


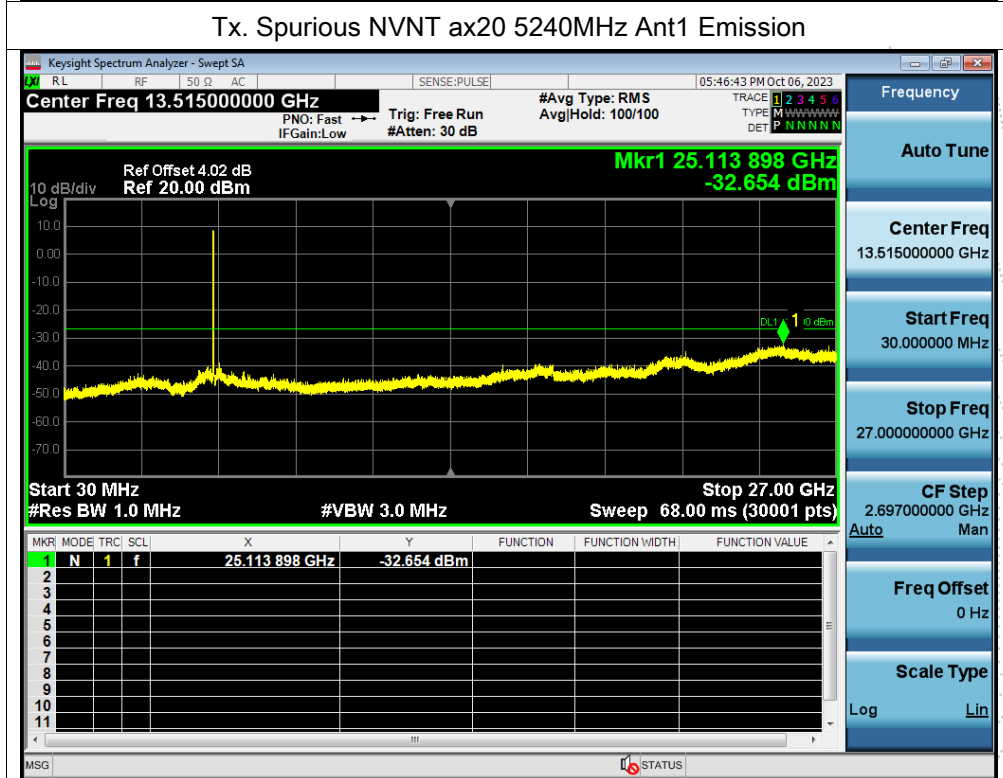
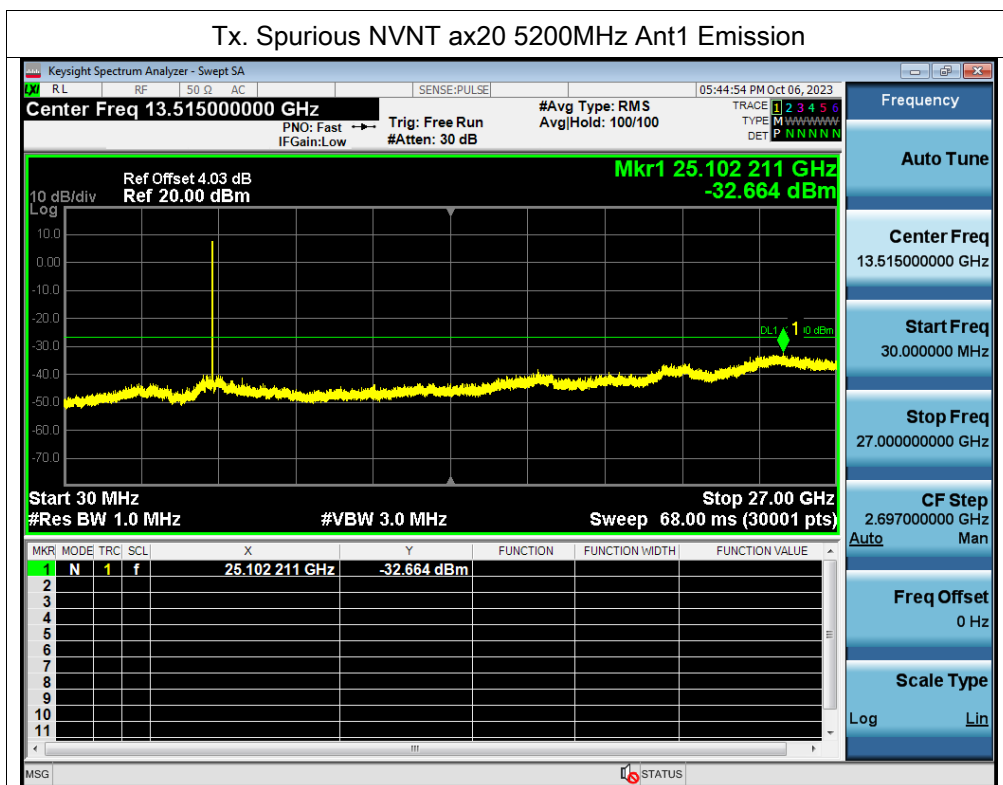


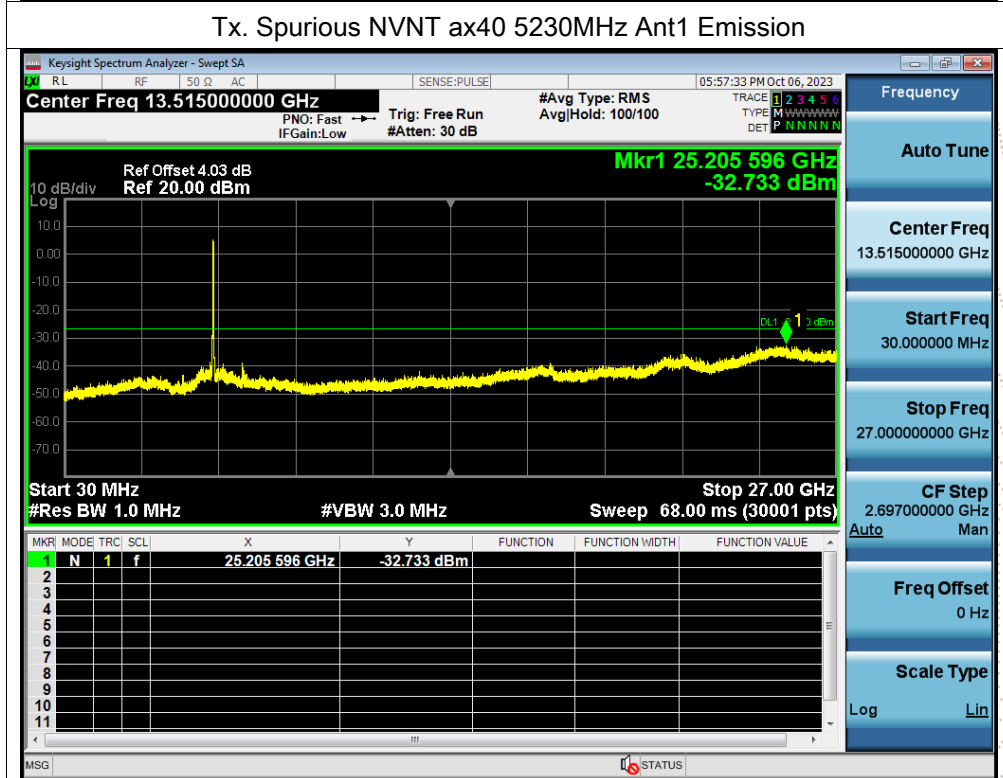
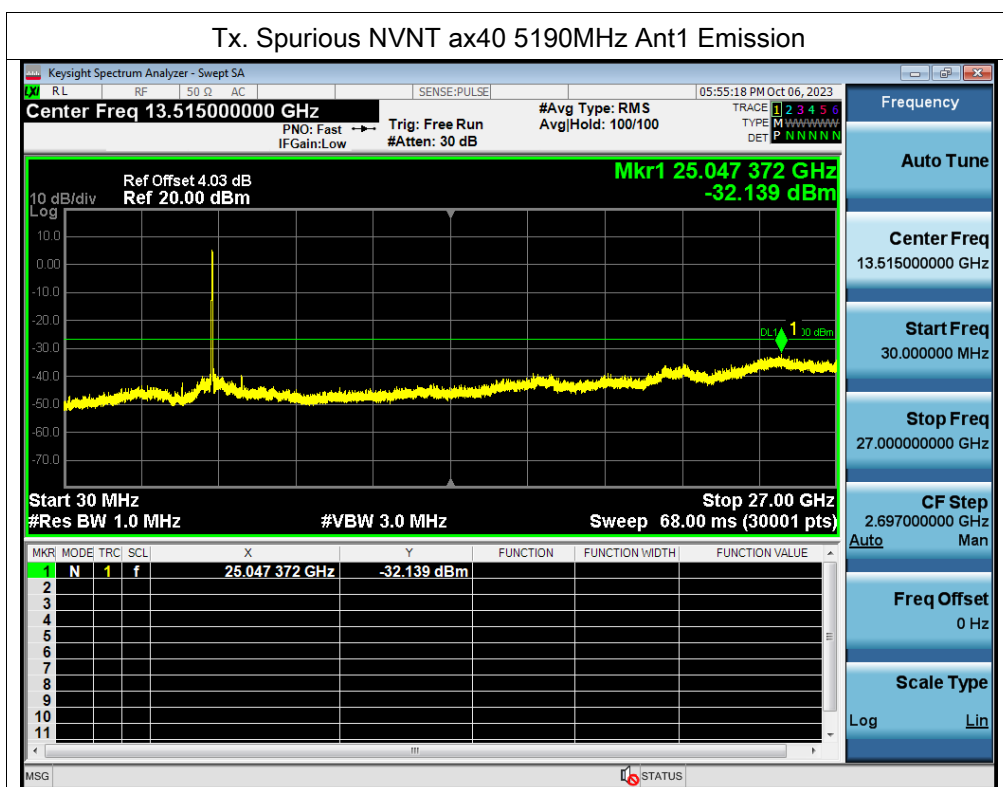




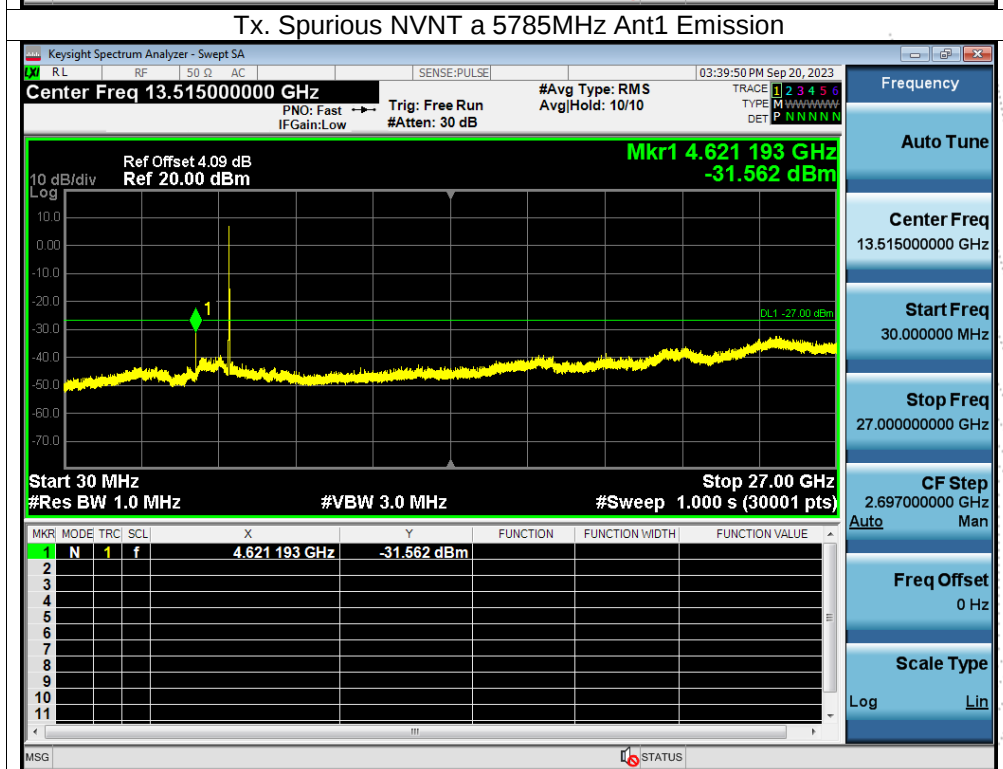
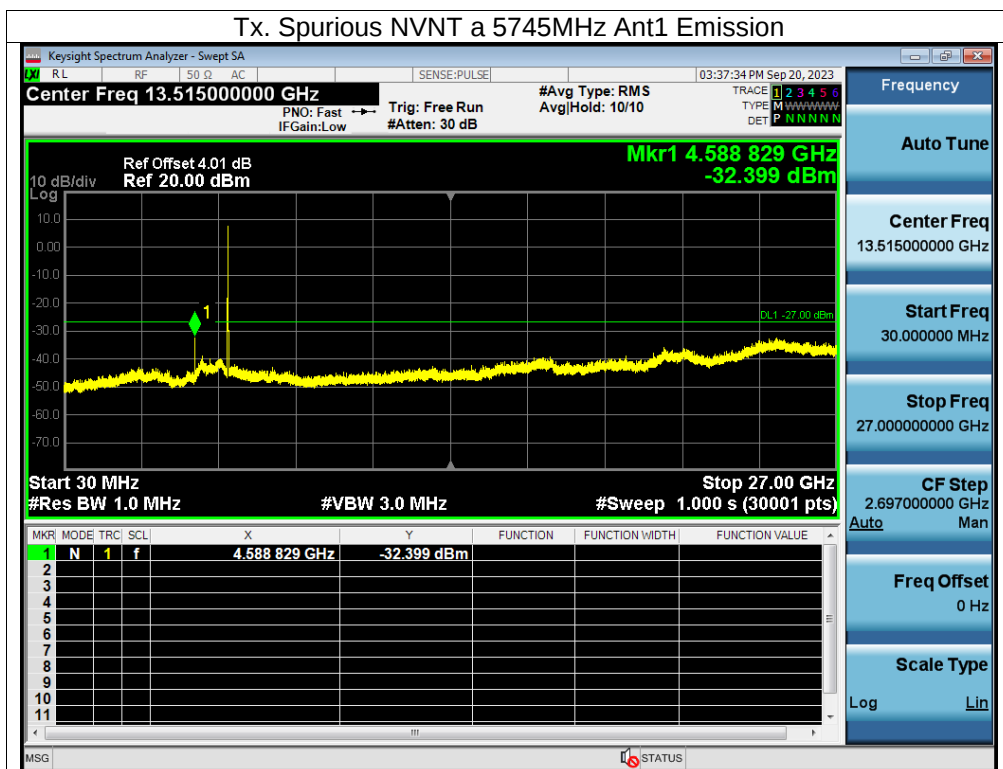


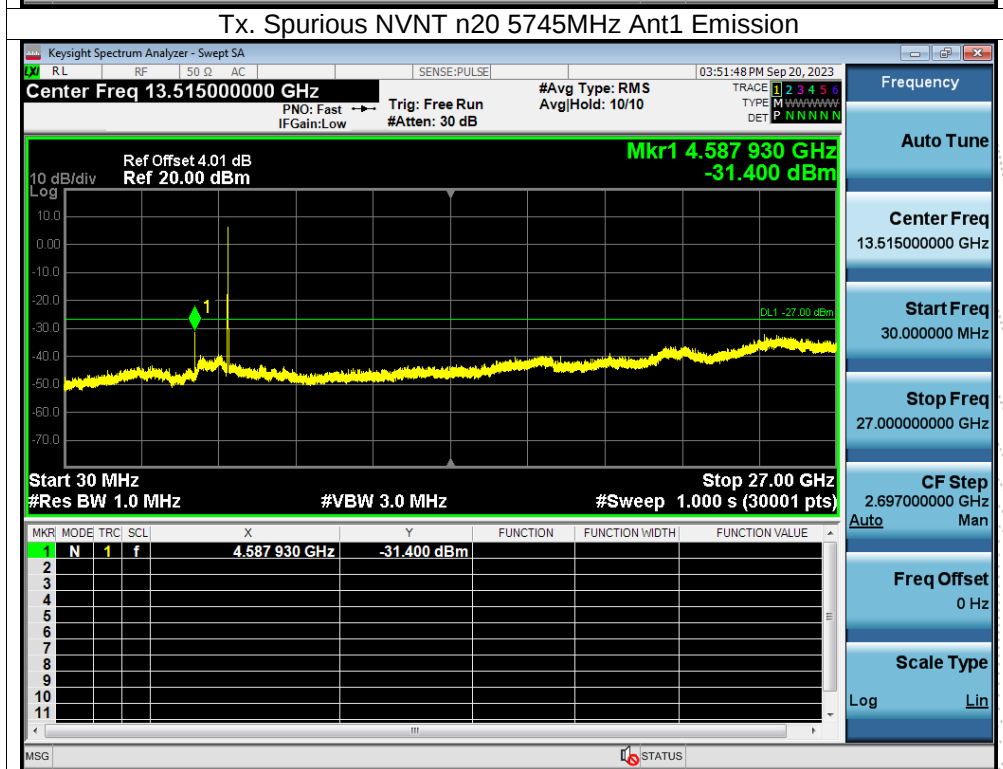
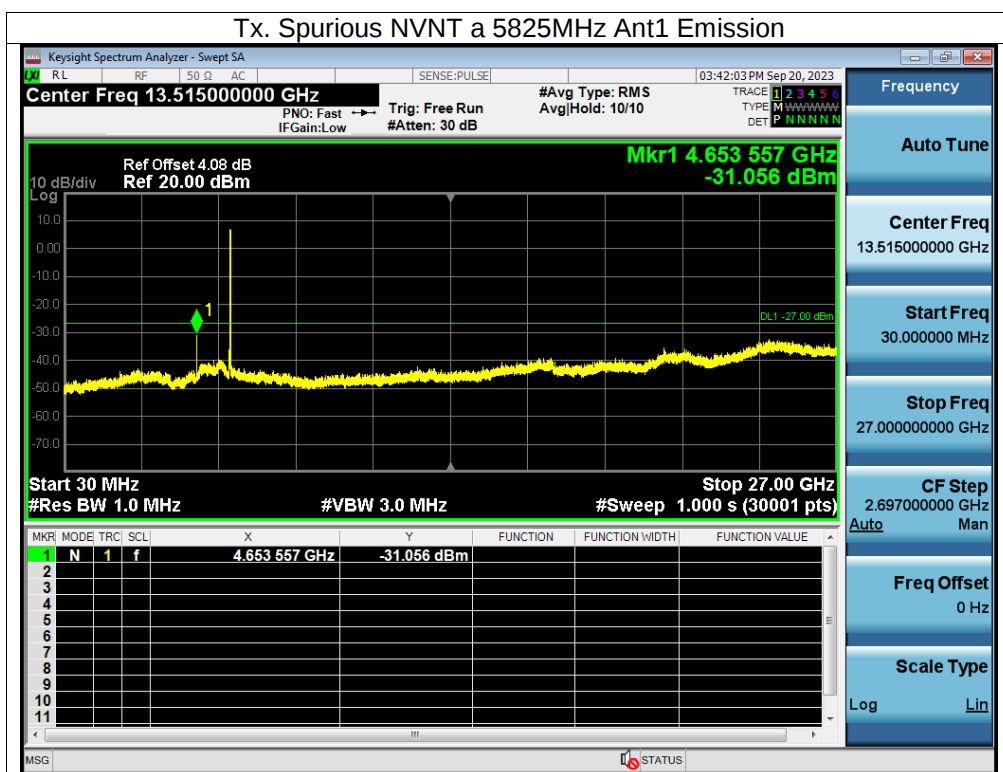


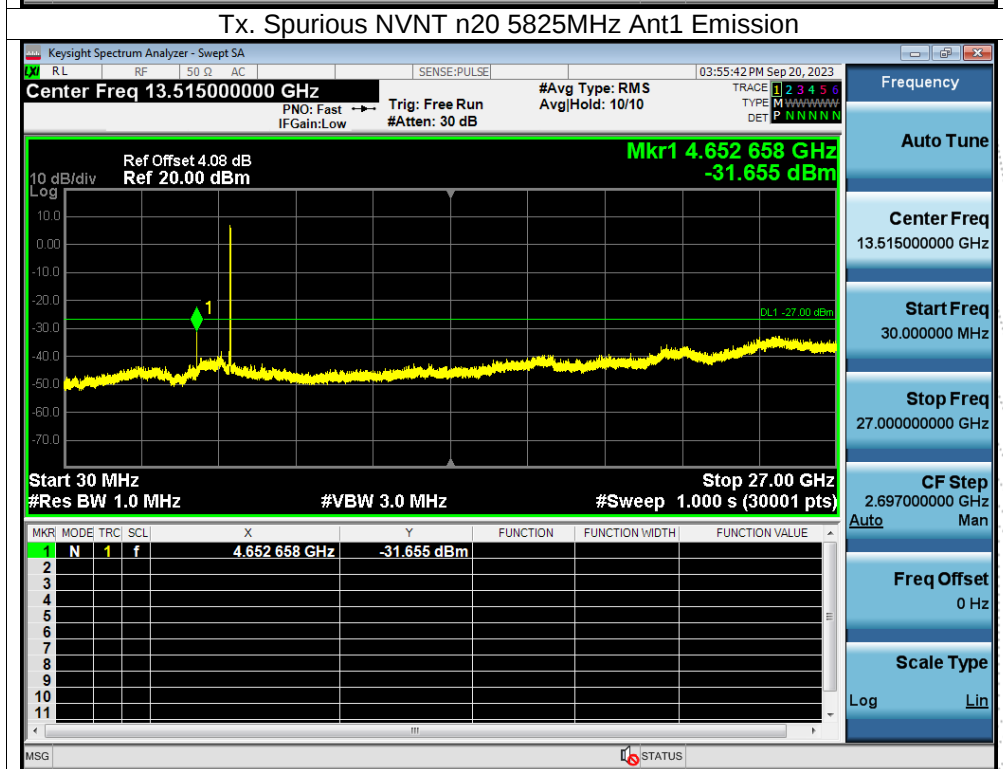
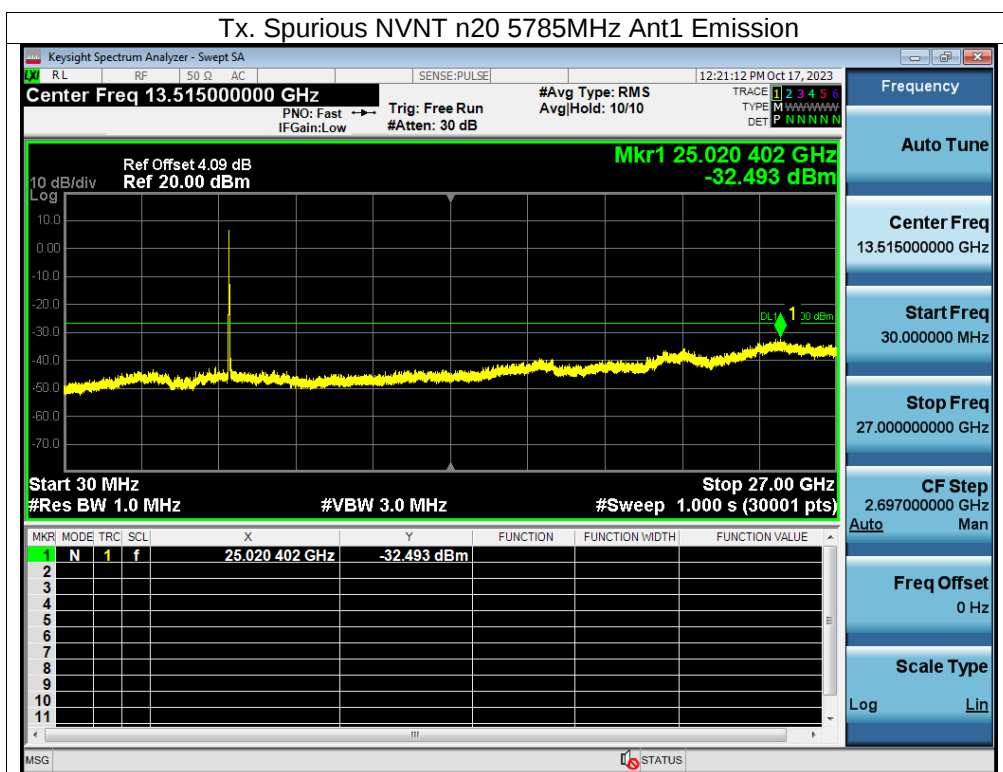


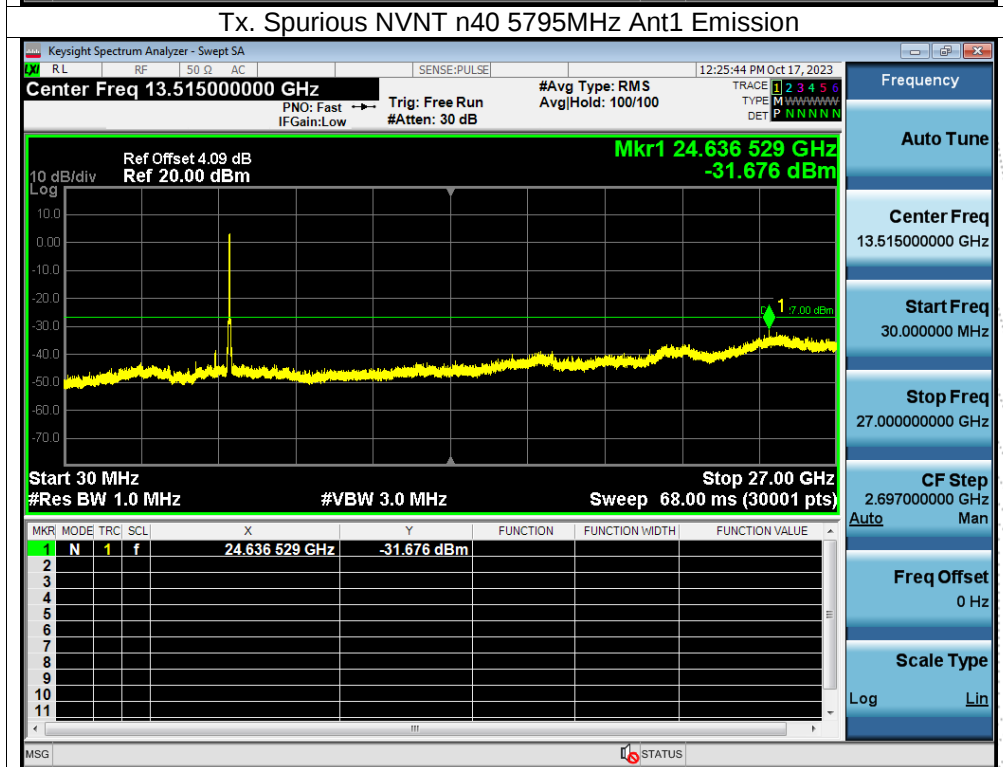
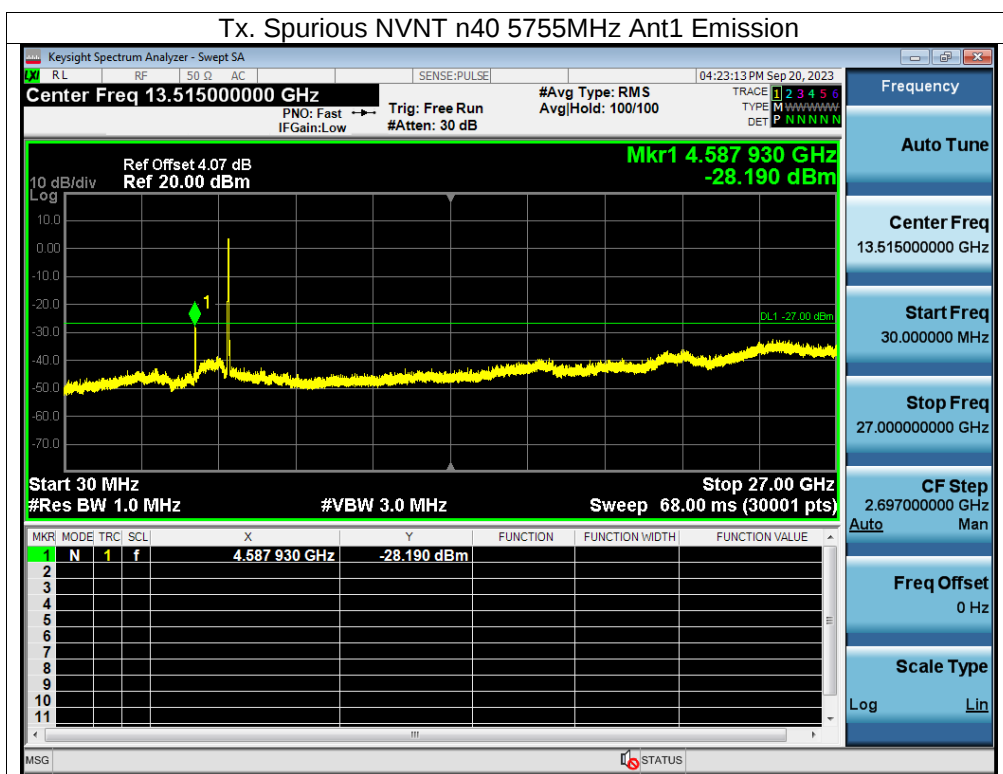


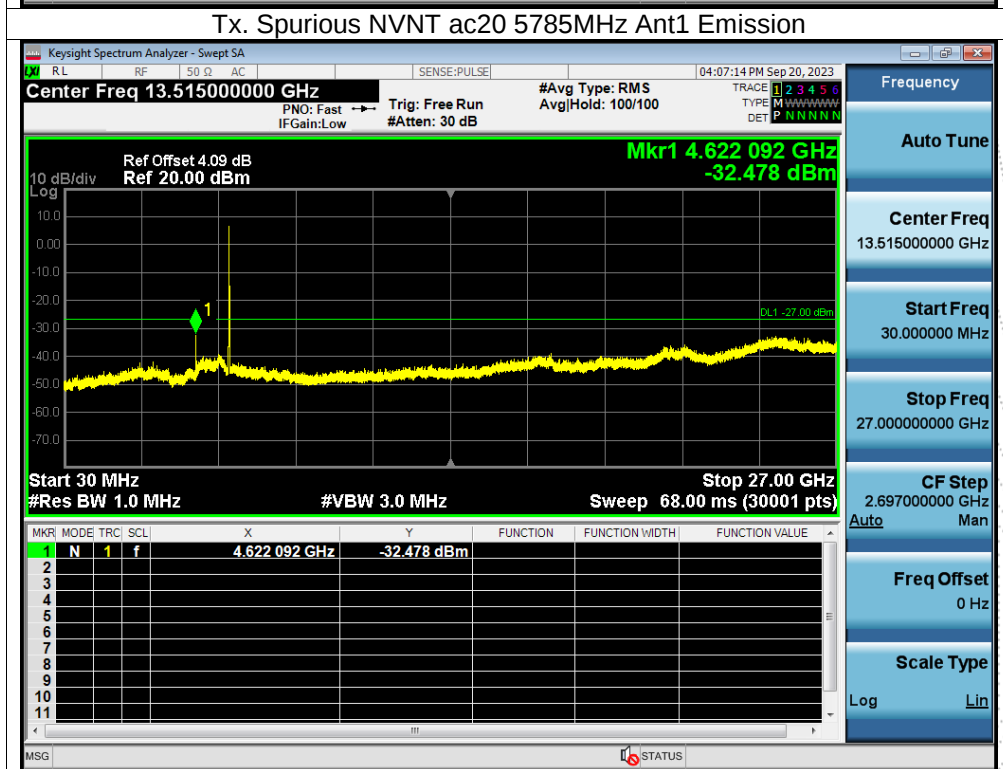
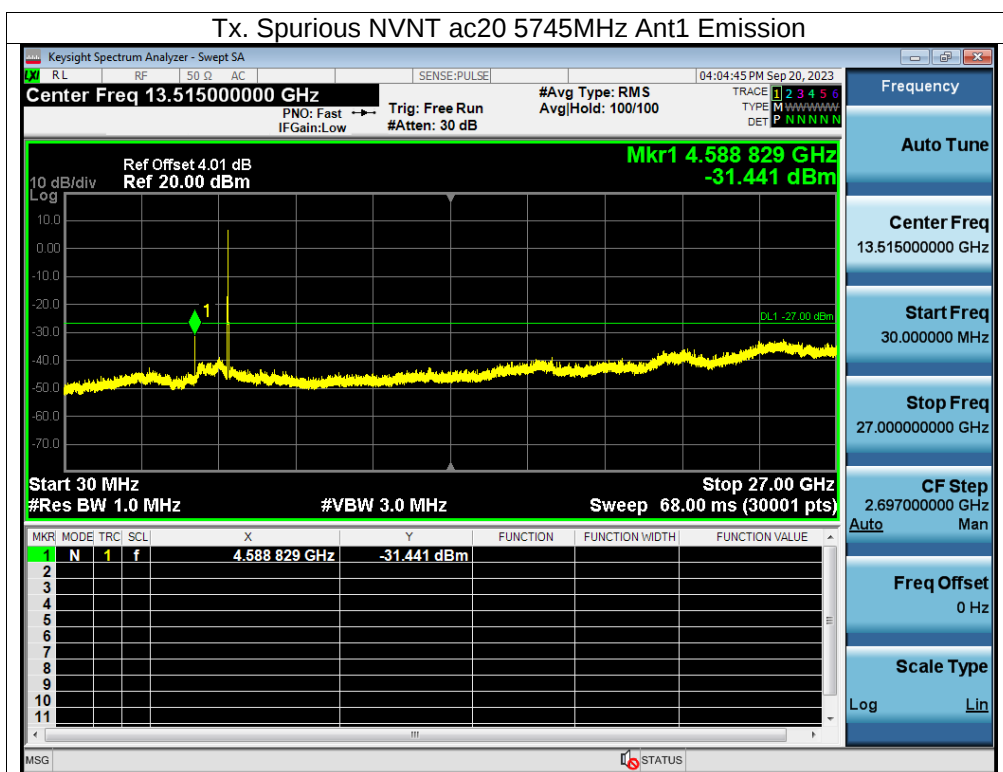
5745-58250MHz

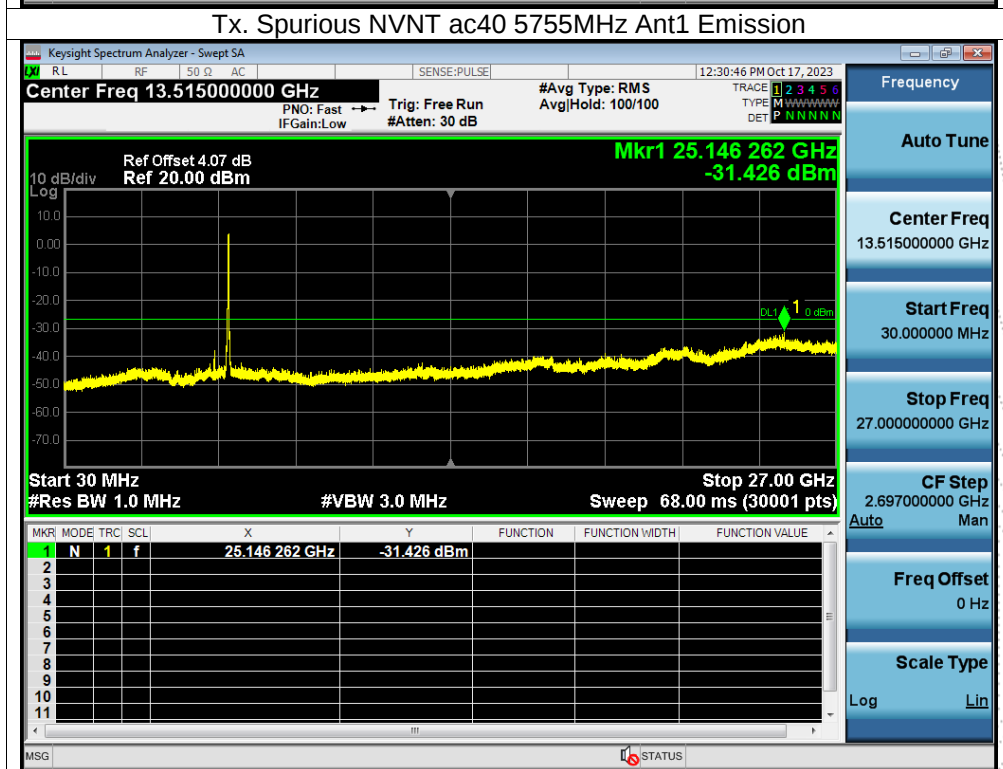
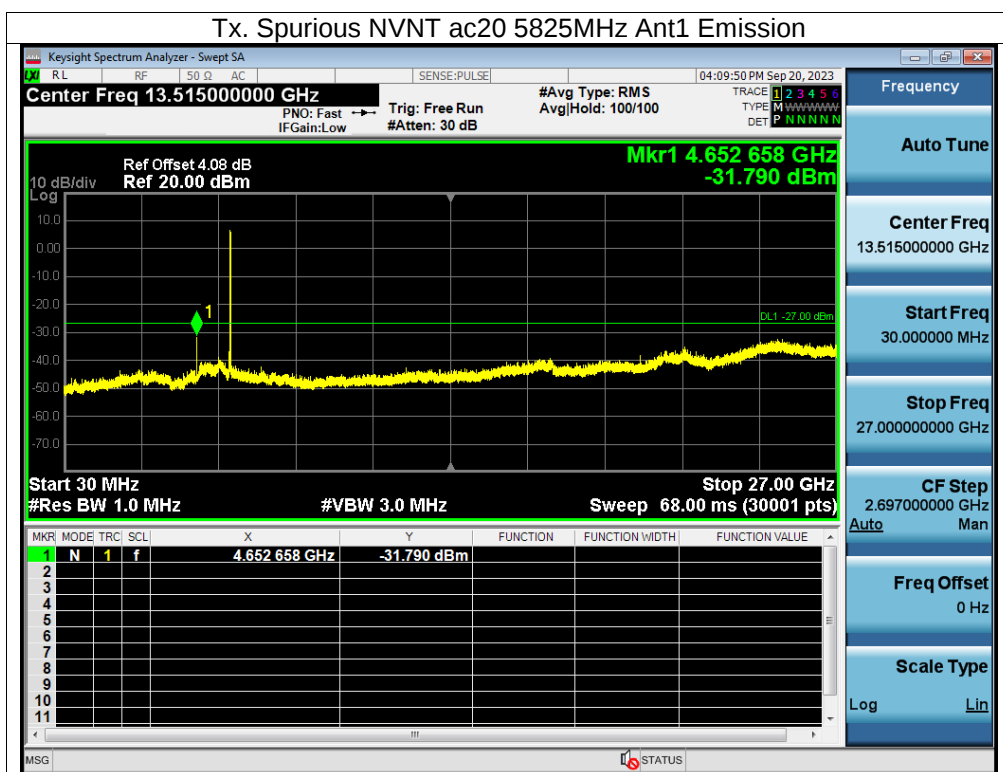


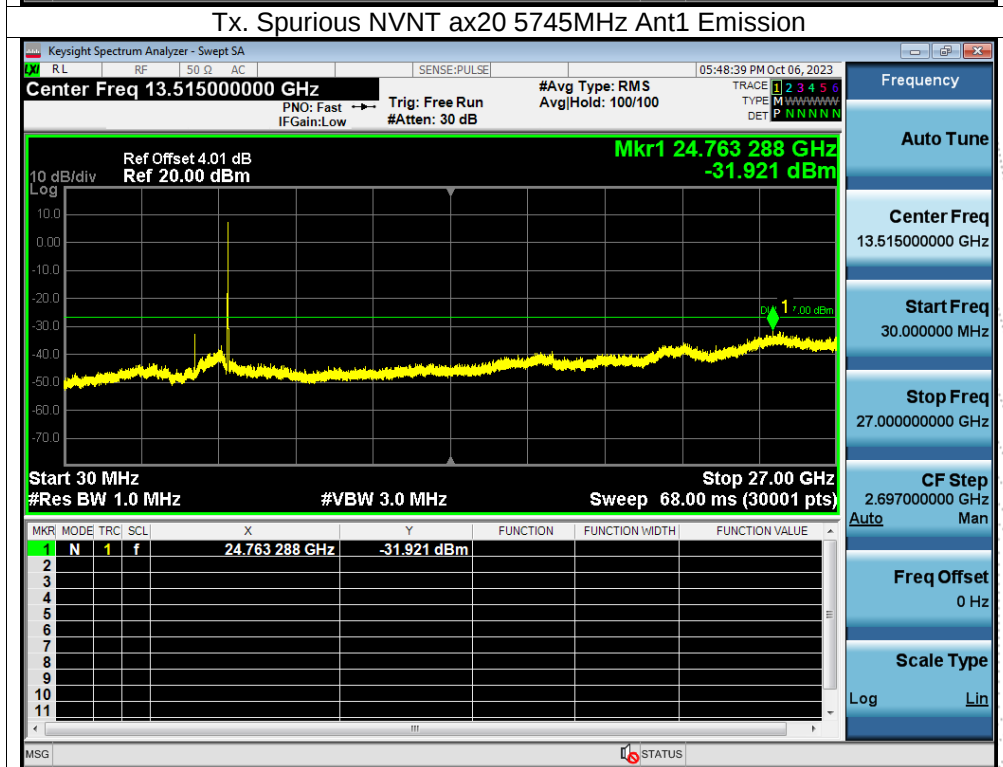
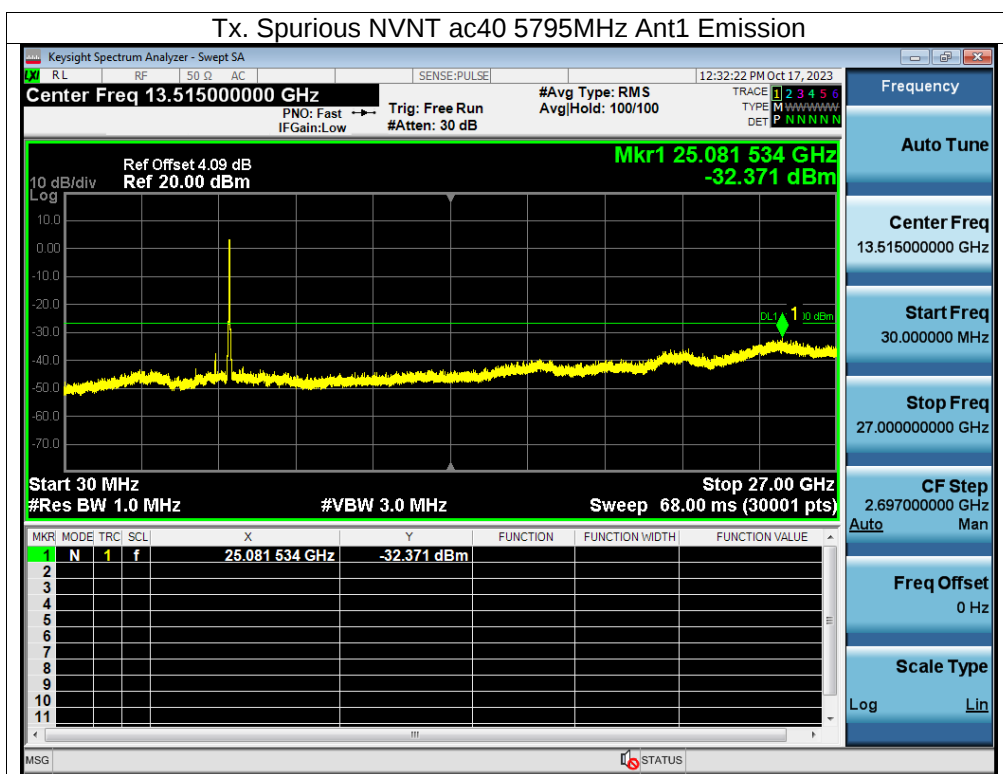


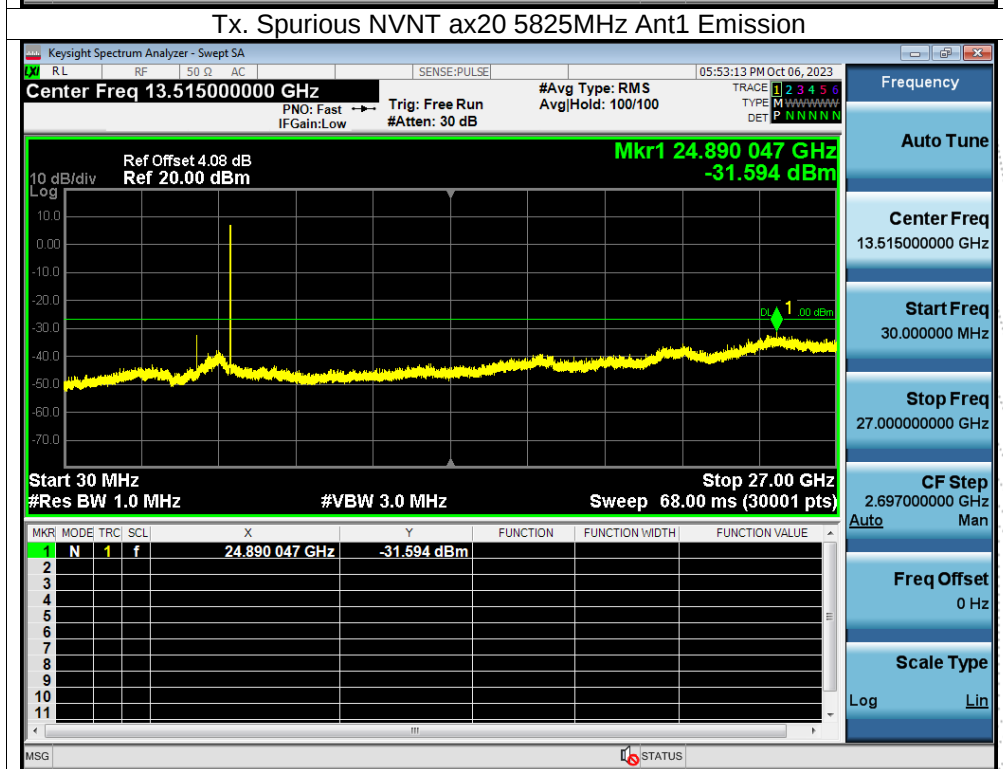
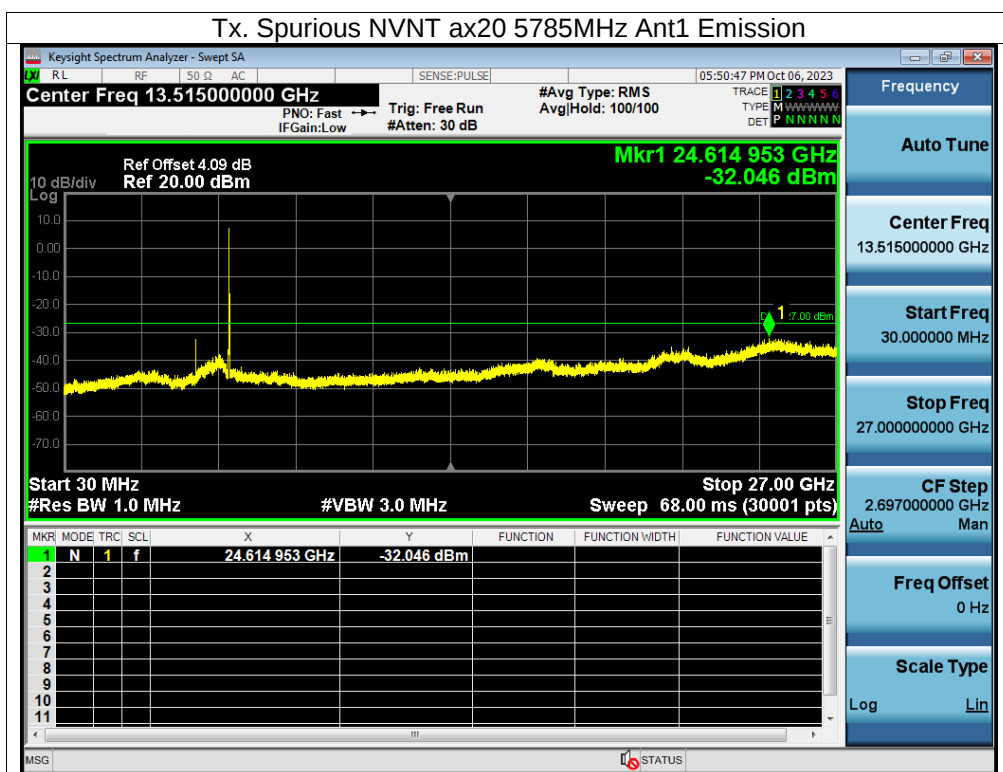


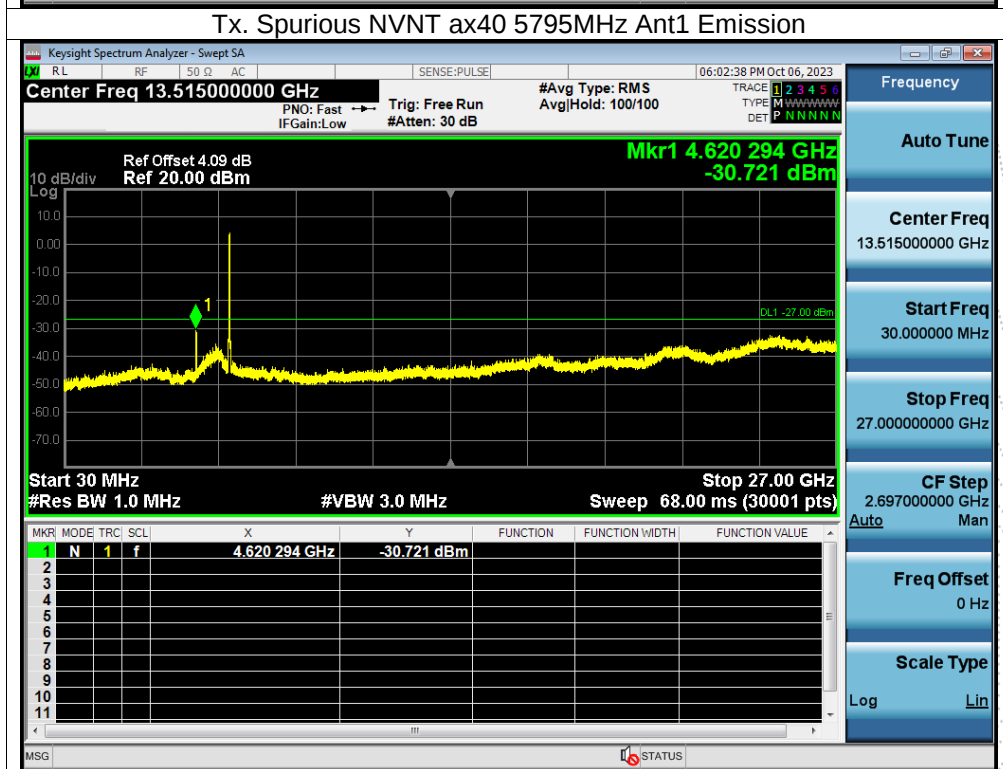
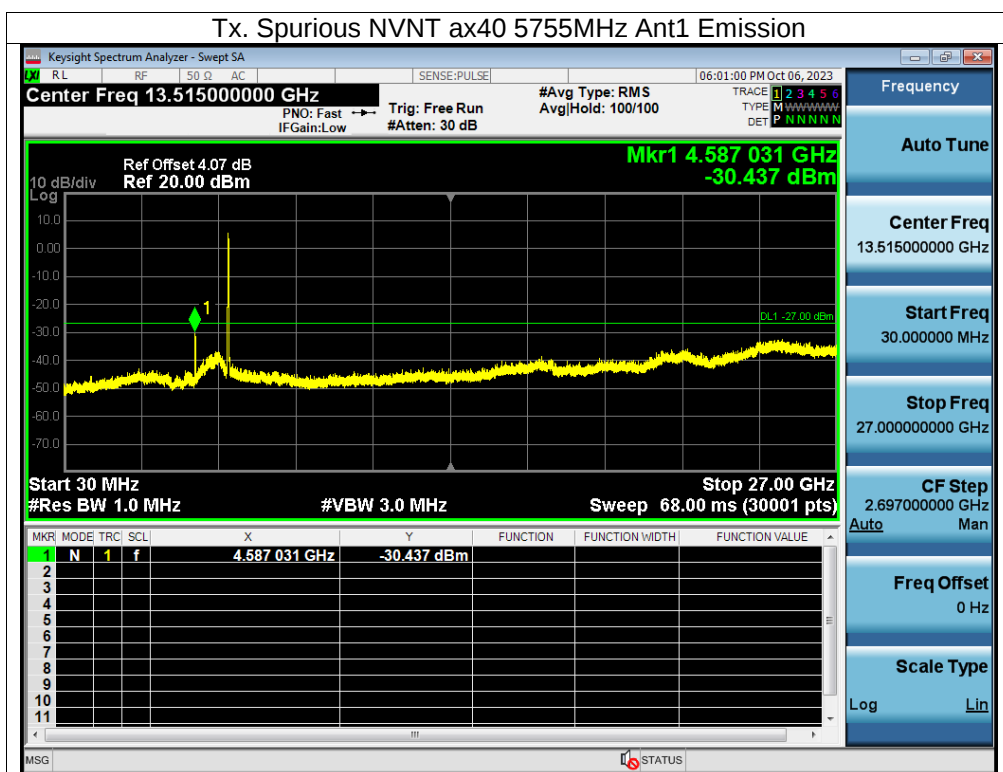












13. Frequency Stability Measurement

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°C ~ 70°C .

13.4 Test Result

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.8V
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)	3.8	5179.9845	5180	0.0155	-2.99
		V max (V)	4.2	5179.9804	5180	0.0196	-3.78
		V min (V)	3.3	5179.9821	5180	0.0179	-3.46
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)	3.8	T (°C)	-20	5179.9829	5180	0.0171	-3.30
		T (°C)	-10	5179.9879	5180	0.0121	-2.34
		T (°C)	0	5179.9813	5180	0.0187	-3.61
		T (°C)	10	5179.9842	5180	0.0158	-3.05
		T (°C)	20	5179.9874	5180	0.0126	-2.43
		T (°C)	30	5179.9813	5180	0.0187	-3.61
		T (°C)	40	5179.9876	5180	0.0124	-2.39
		T (°C)	50	5179.9871	5180	0.0129	-2.49
		T (°C)	60	5179.9876	5180	0.0124	-2.39
		T (°C)	70	5179.9886	5180	0.0114	-2.20
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)	3.8	5199.9864	5200	0.0136	-2.62
		V max (V)	4.2	5199.9882	5200	0.0118	-2.27
		V min (V)	3.3	5199.9801	5200	0.0199	-3.83
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)	3.8	T (°C)	-20	5199.9831	5200	0.0169	-3.25
		T (°C)	-10	5199.9888	5200	0.0112	-2.15
		T (°C)	0	5199.9881	5200	0.0119	-2.29
		T (°C)	10	5199.9866	5200	0.0134	-2.58
		T (°C)	20	5199.9802	5200	0.0198	-3.81
		T (°C)	30	5199.9867	5200	0.0133	-2.56
		T (°C)	40	5199.9804	5200	0.0196	-3.77
		T (°C)	50	5199.9869	5200	0.0131	-2.52
		T (°C)	60	5199.9846	5200	0.0154	-2.96
		T (°C)	70	5199.9811	5200	0.0189	-3.63
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)	3.8	5239.9867	5240	0.0133	-2.54
		V max (V)	4.2	5239.9812	5240	0.0188	-3.59
		V min (V)	3.3	5239.9843	5240	0.0157	-3.00
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)	3.8	T (°C)	-20	5239.9831	5240	0.0169	-3.23
		T (°C)	-10	5239.9814	5240	0.0186	-3.55
		T (°C)	0	5239.9801	5240	0.0199	-3.80
		T (°C)	10	5239.9825	5240	0.0175	-3.34
		T (°C)	20	5239.9864	5240	0.0136	-2.60
		T (°C)	30	5239.9856	5240	0.0144	-2.75
		T (°C)	40	5239.9879	5240	0.0121	-2.31
		T (°C)	50	5239.9839	5240	0.0161	-3.07
		T (°C)	60	5239.9837	5240	0.0163	-3.11
		T (°C)	70	5239.9845	5240	0.0155	-2.96
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC3.8V
Test Mode:	TX (5.8G) Mode Frequency U-NII-3 (5745-5825MHz)		

Voltage vs. Frequency Stabilit

TEST CONDITIONS				Reference Frequency:5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.8	5744.9848	5745	0.0152	-2.65
		V max (V)	4.2	5744.9837	5745	0.0163	-2.84
		V min (V)	3.3	5744.9861	5745	0.0139	-2.42
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)	3.8	T (°C)	-20	5744.9884	5745	0.0116	-2.02
		T (°C)	-10	5744.9862	5745	0.0138	-2.40
		T (°C)	0	5744.9864	5745	0.0136	-2.37
		T (°C)	10	5744.9874	5745	0.0126	-2.19
		T (°C)	20	5744.989	5745	0.011	-1.91
		T (°C)	30	5744.9824	5745	0.0176	-3.06
		T (°C)	40	5744.9869	5745	0.0131	-2.28
		T (°C)	50	5744.9857	5745	0.0143	-2.49
		T (°C)	60	5744.9842	5745	0.0158	-2.75
		T (°C)	70	5744.9847	5745	0.0153	-2.66
Limits				5725-5850 MHz			
Result				Complies			