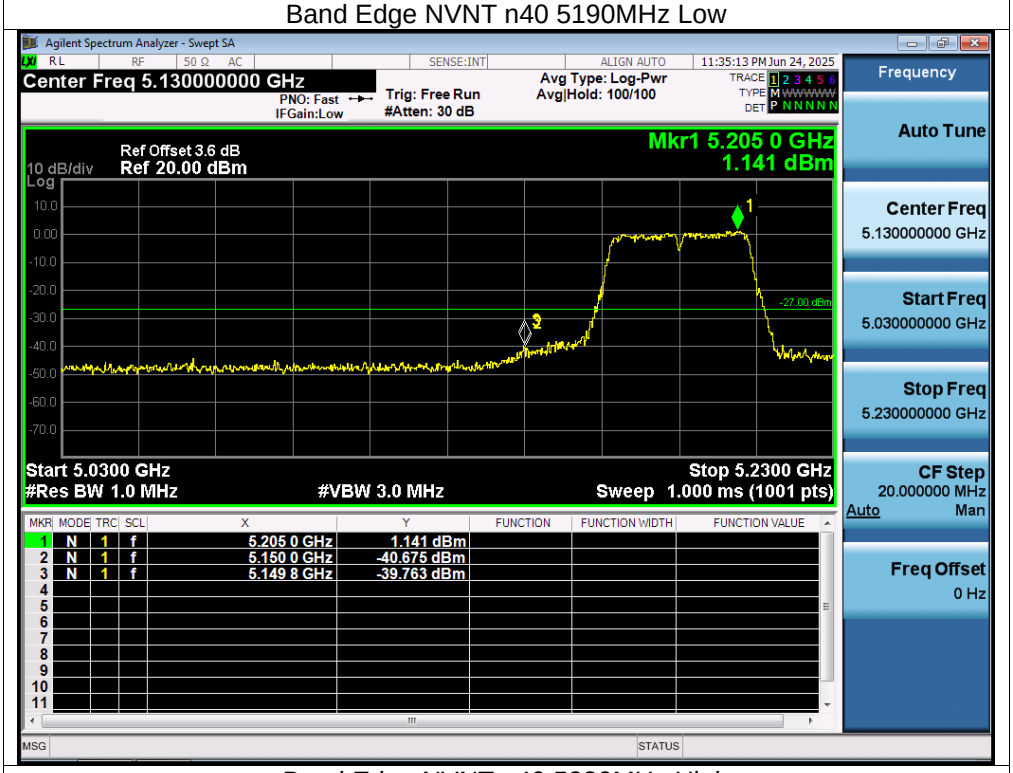
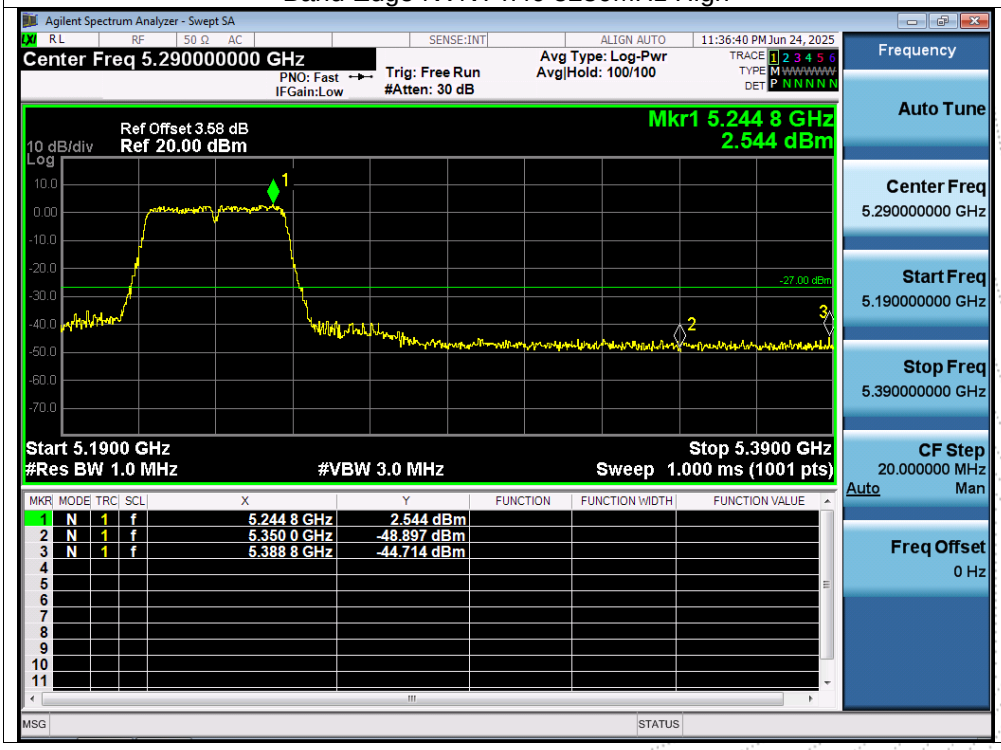
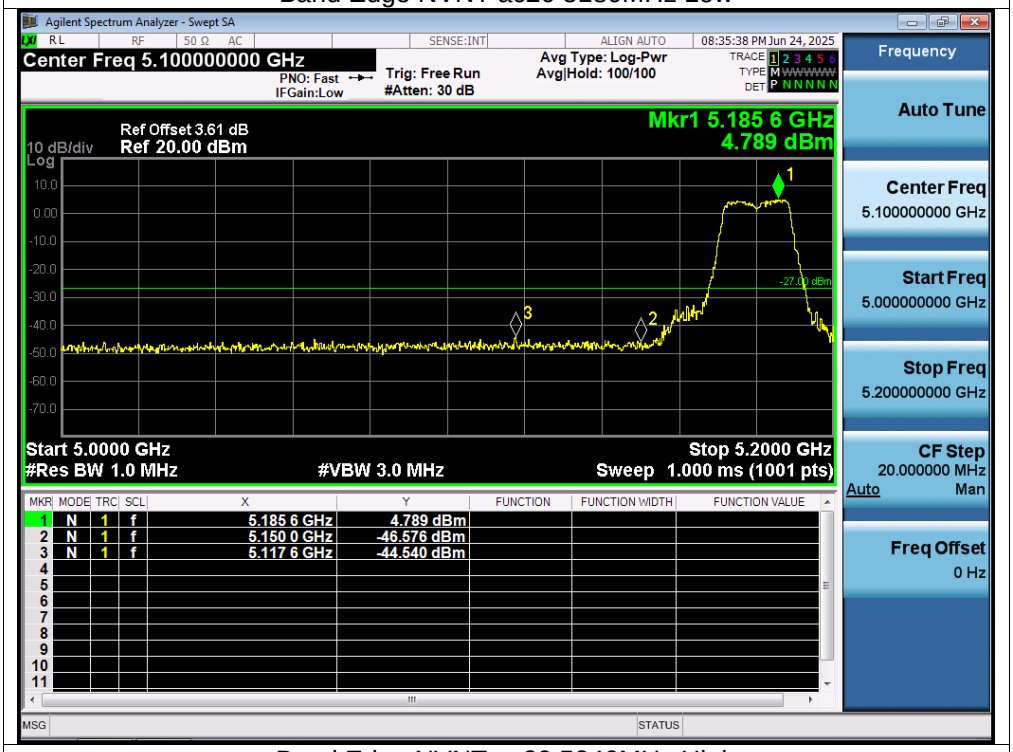
Band Edge NVNT n40 5190MHz Low



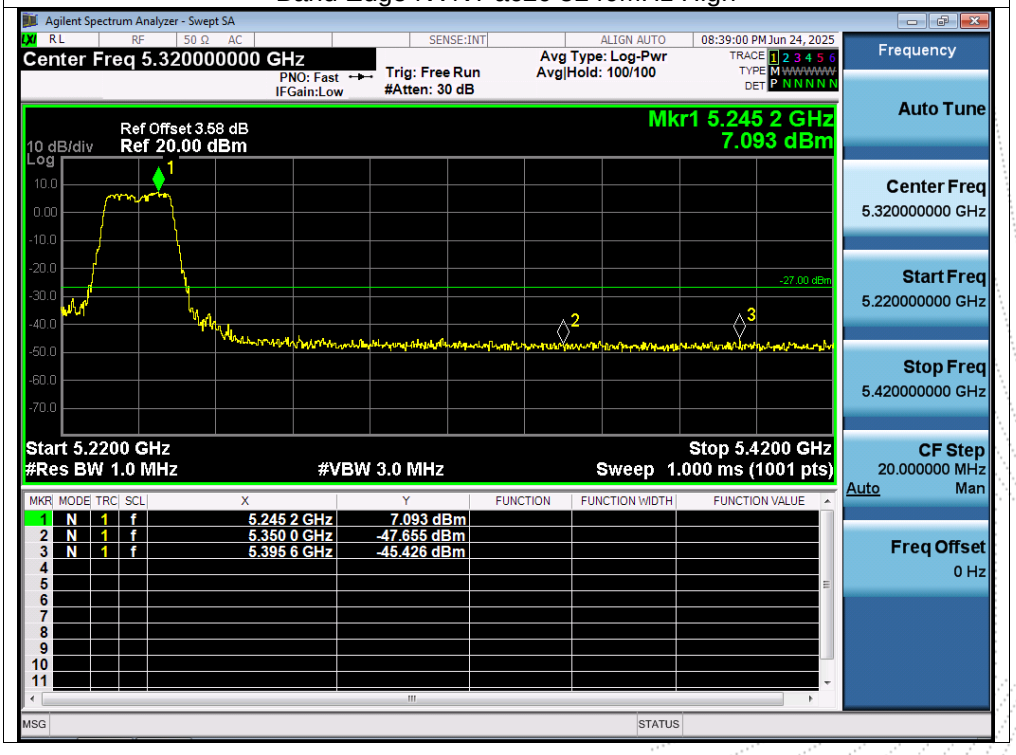
Band Edge NVNT n40 5230MHz High



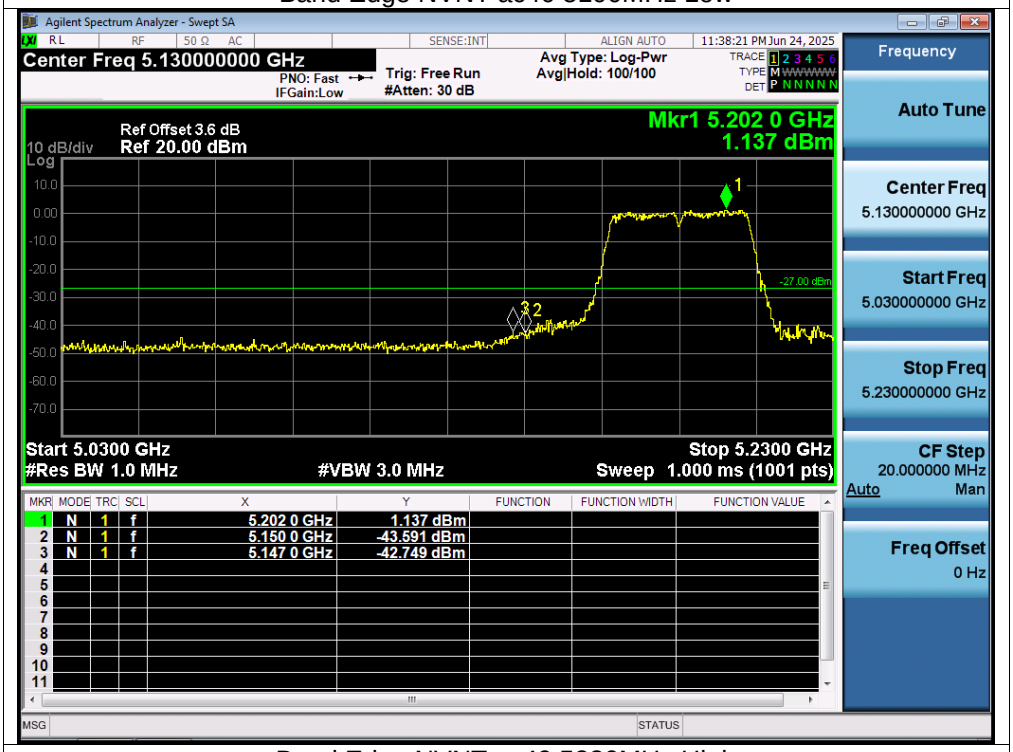
Band Edge NVNT ac20 5180MHz Low



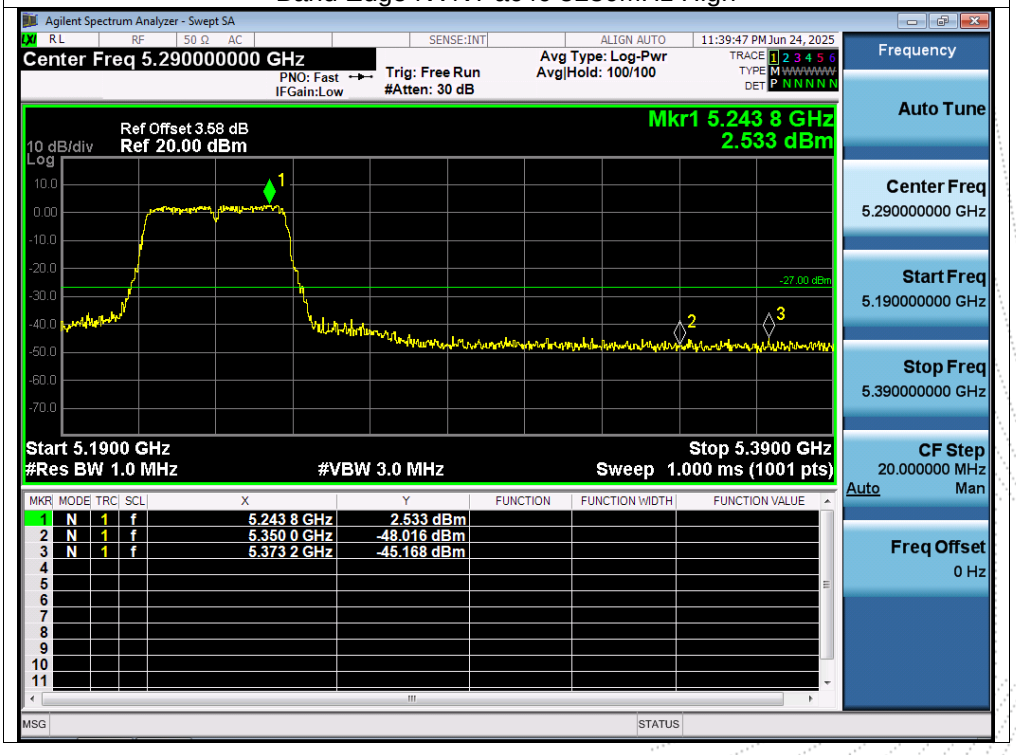
Band Edge NVNT ac20 5240MHz High



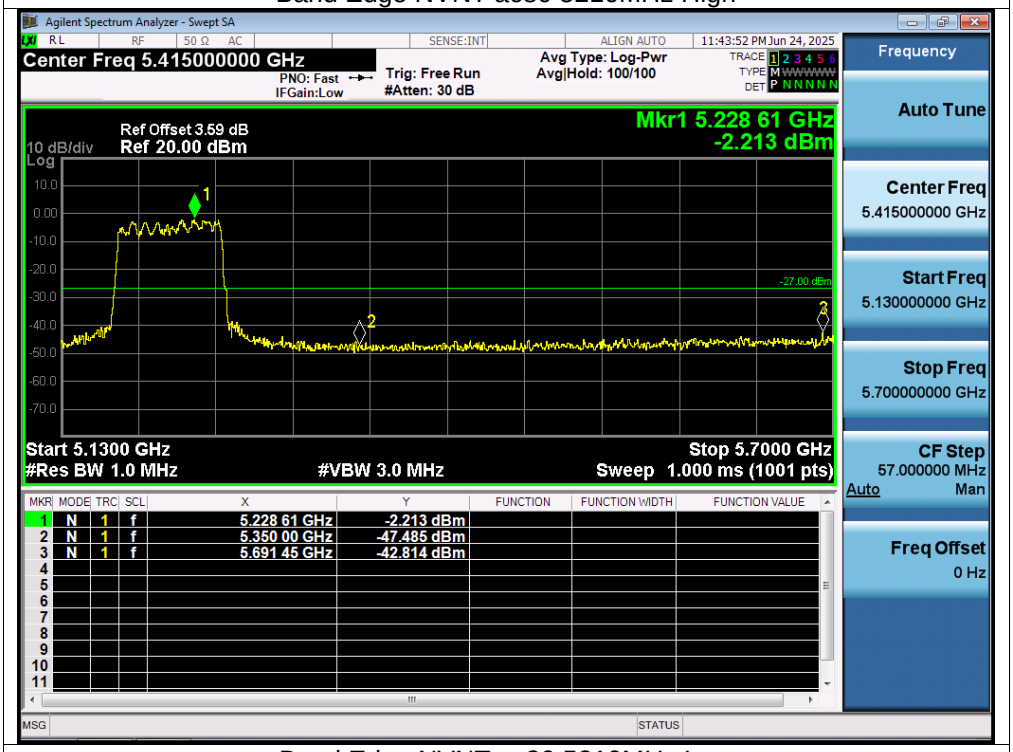
Band Edge NVNT ac40 5190MHz Low



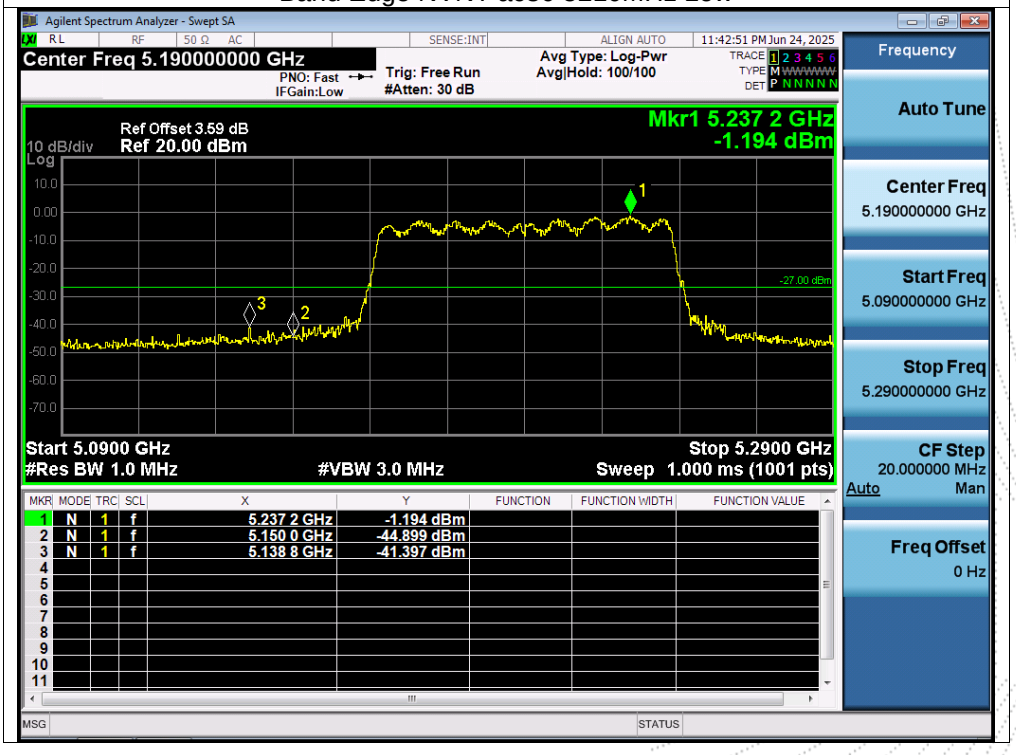
Band Edge NVNT ac40 5230MHz High



Band Edge NVNT ac80 5210MHz High



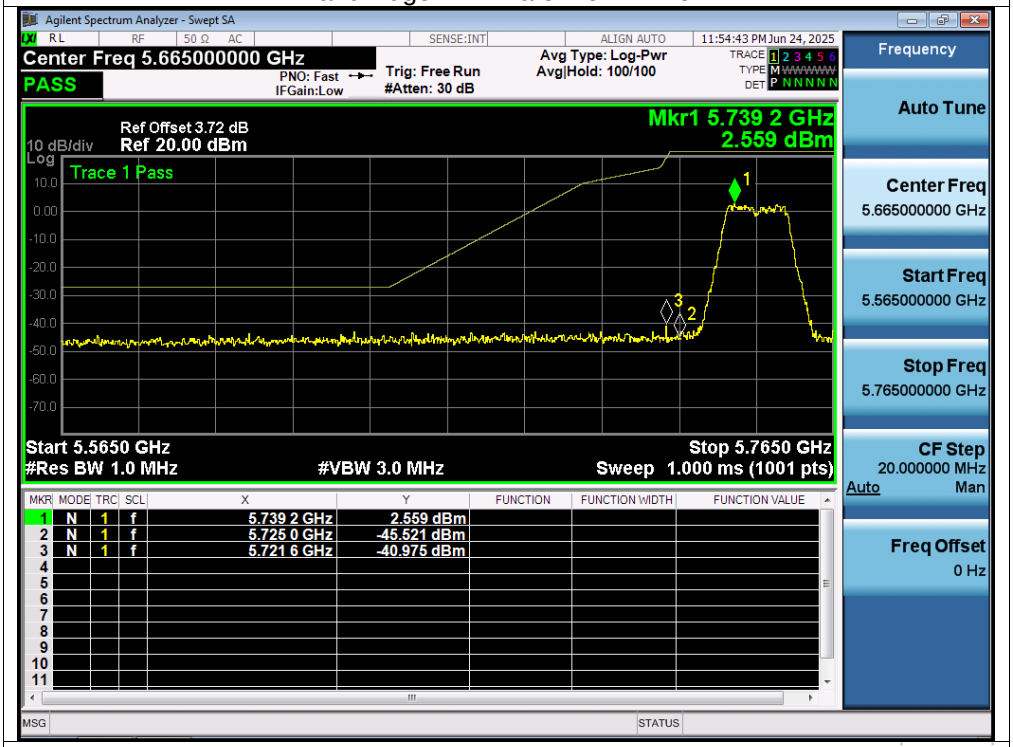
Band Edge NVNT ac80 5210MHz Low



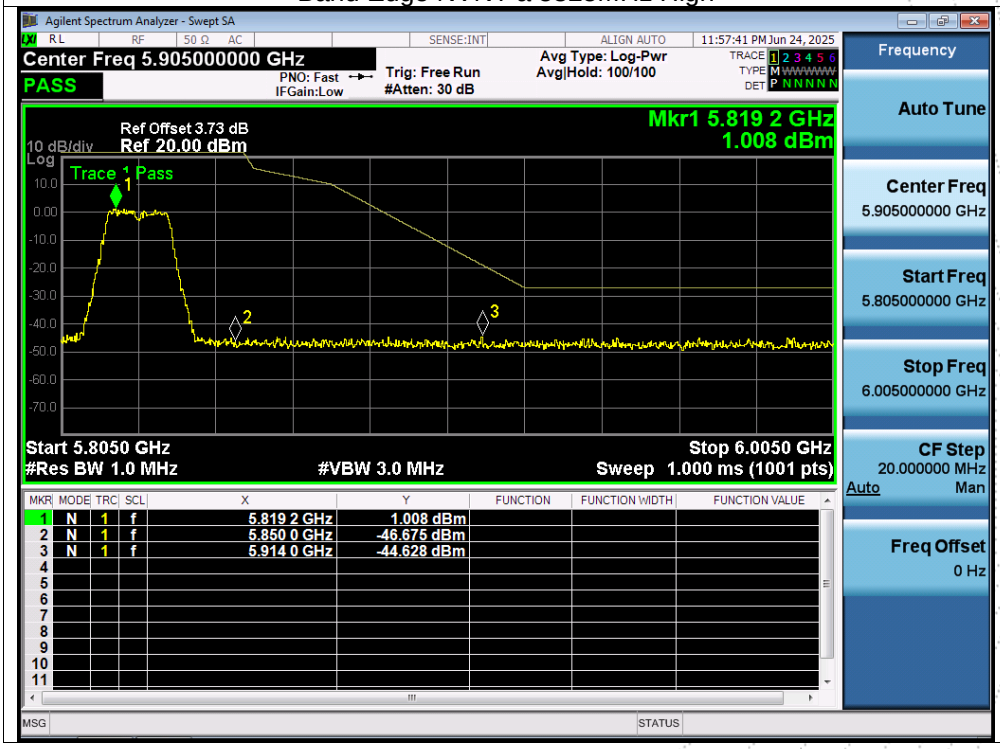
Note: A(B) Represent the value of antenna A and B. The worst data is Antenna A, only shown Antenna A.
Antenna A: 5745-5825MHz

Test Graphs

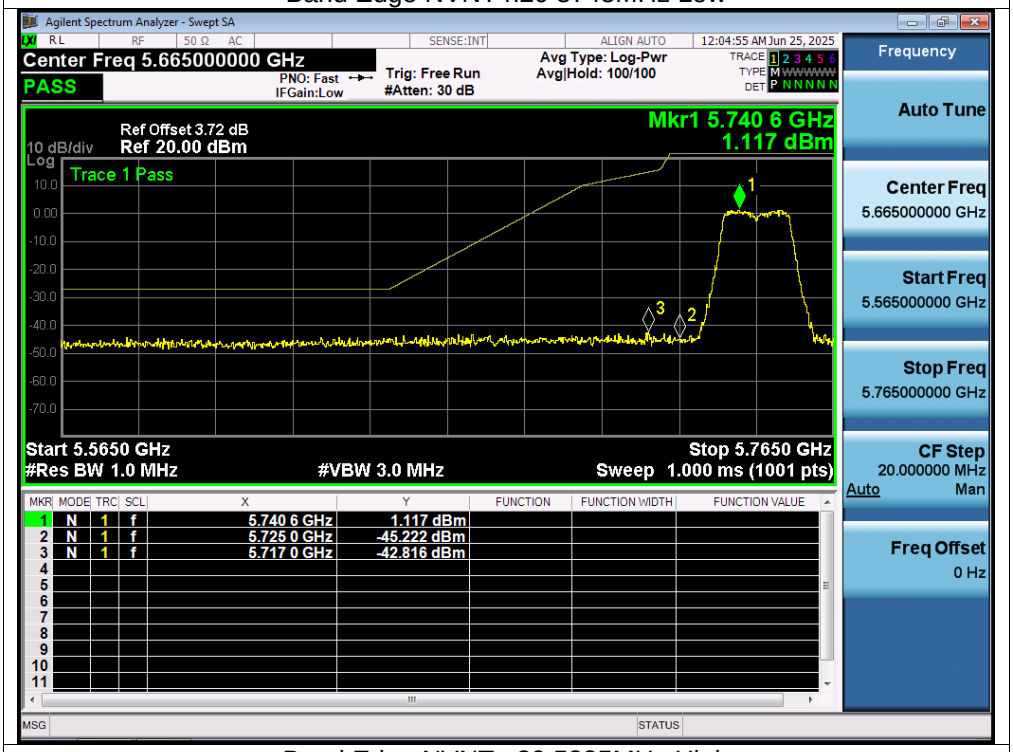
Band Edge NVNT a 5745MHz Low



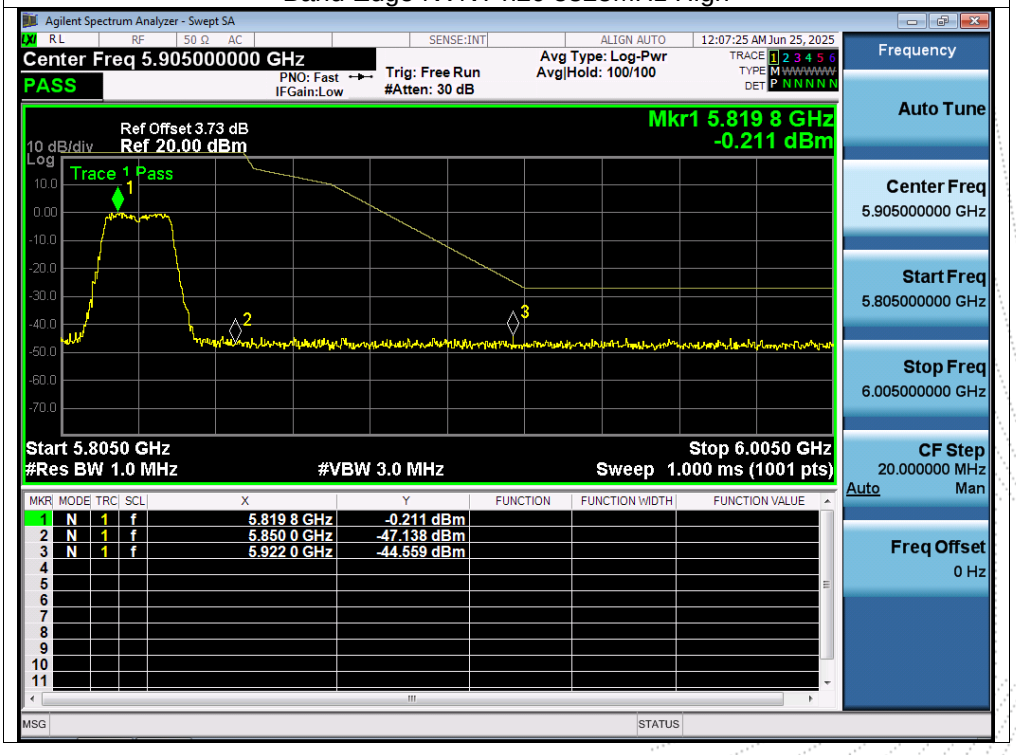
Band Edge NVNT a 5825MHz High



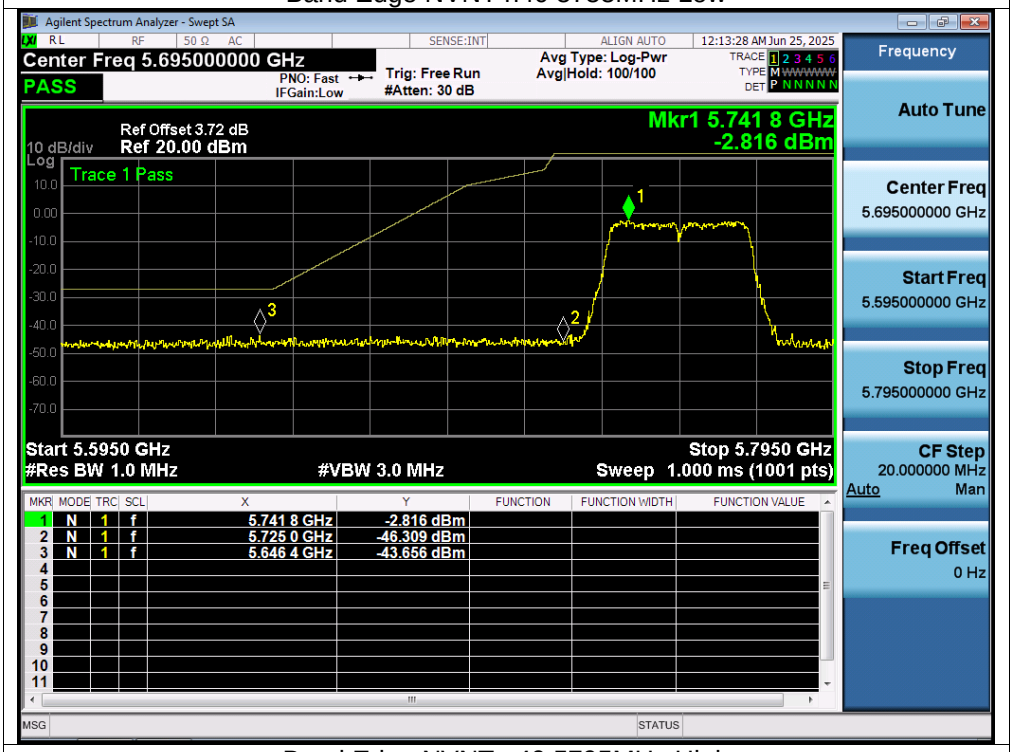
Band Edge NVNT n20 5745MHz Low



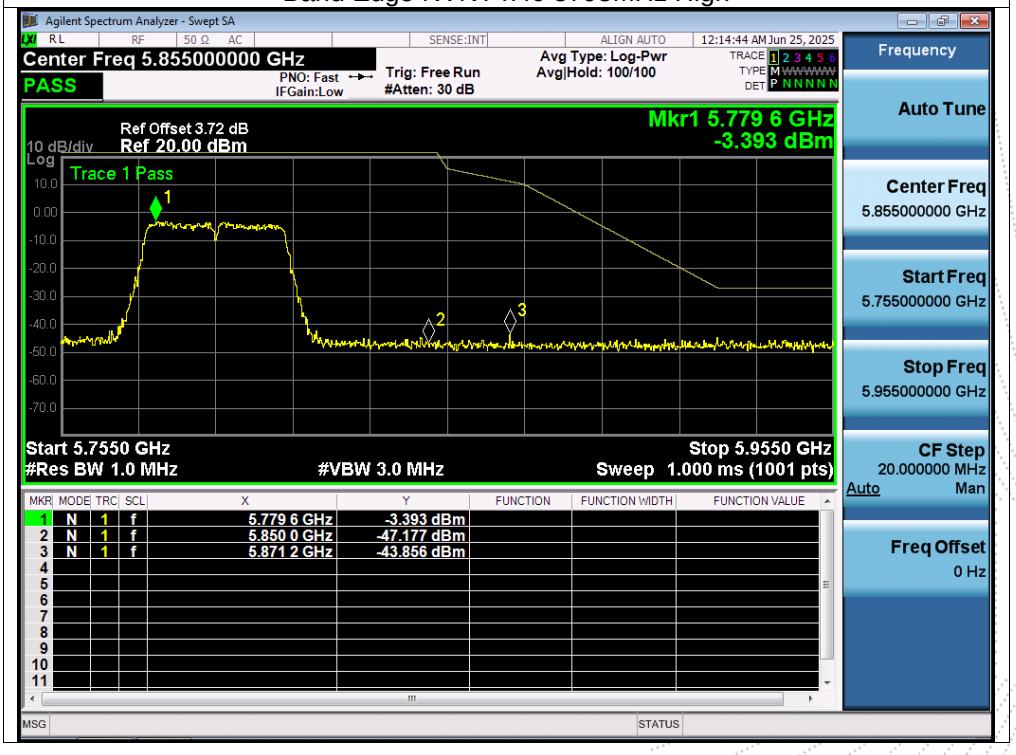
Band Edge NVNT n20 5825MHz High



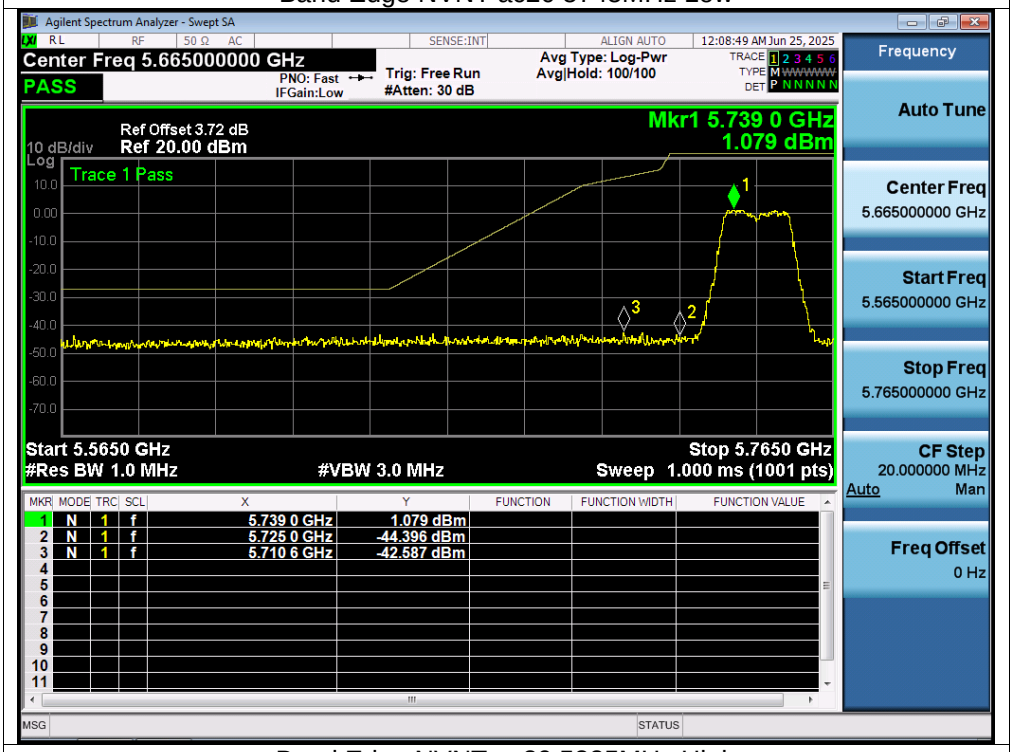
Band Edge NVNT n40 5755MHz Low



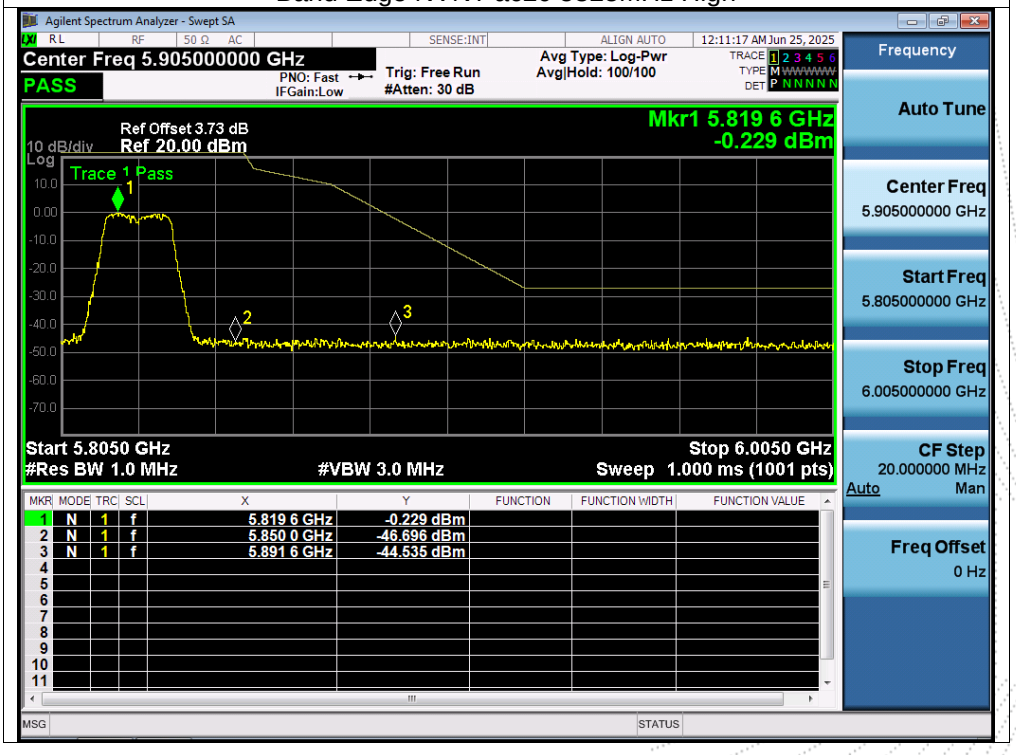
Band Edge NVNT n40 5795MHz High



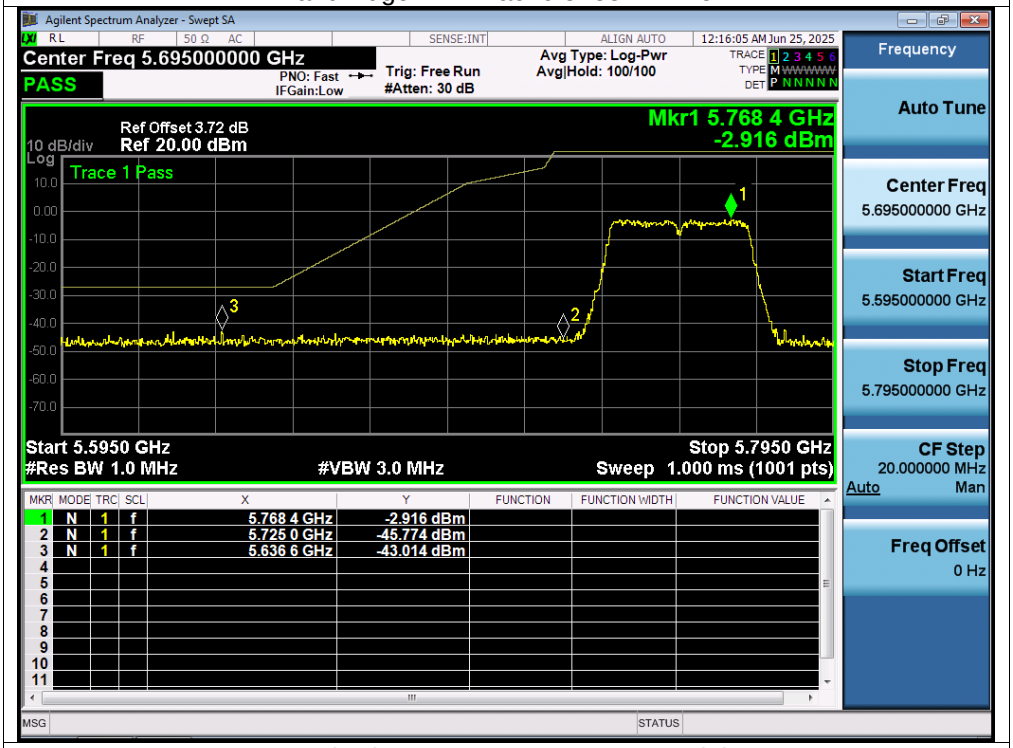
Band Edge NVNT ac20 5745MHz Low



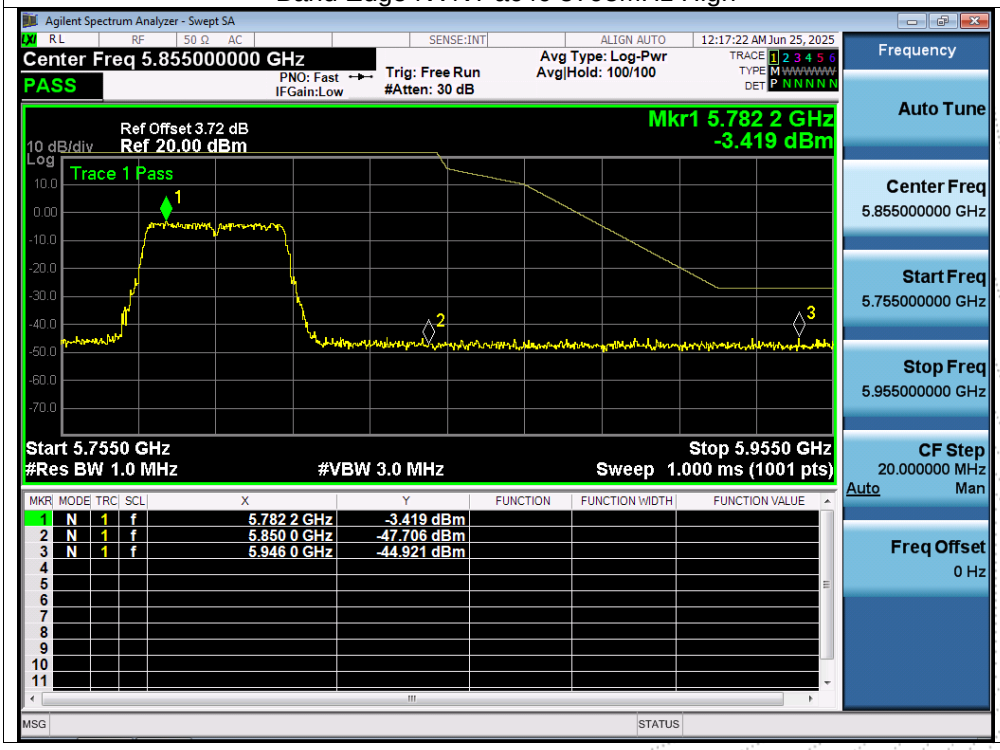
Band Edge NVNT ac20 5825MHz High



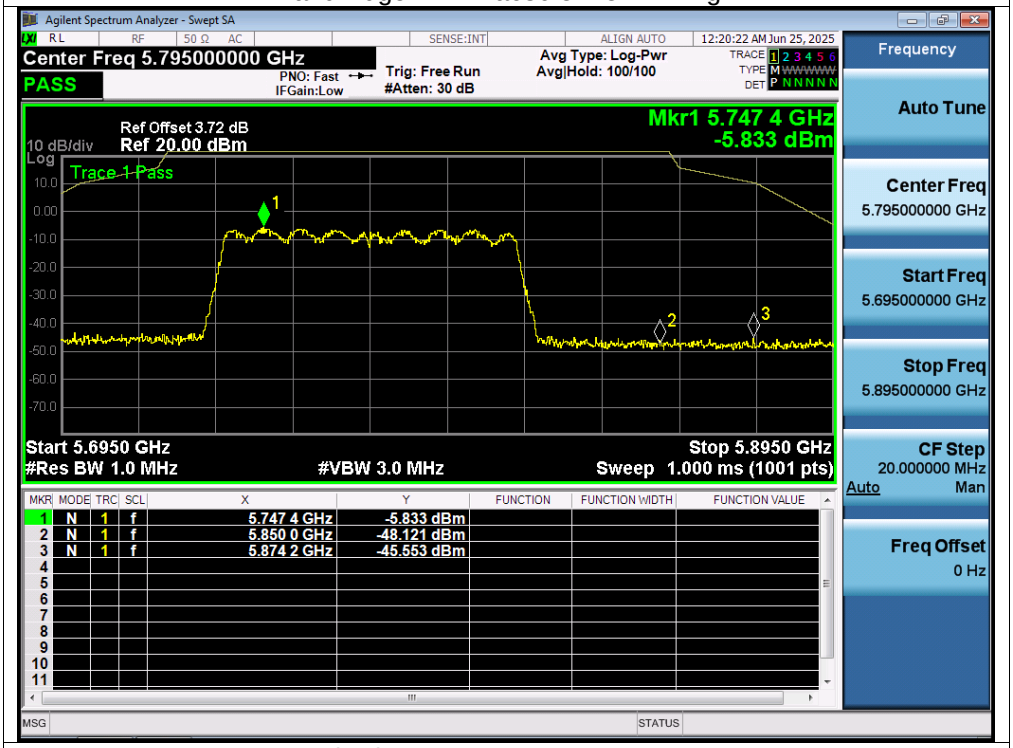
Band Edge NVNT ac40 5755MHz Low



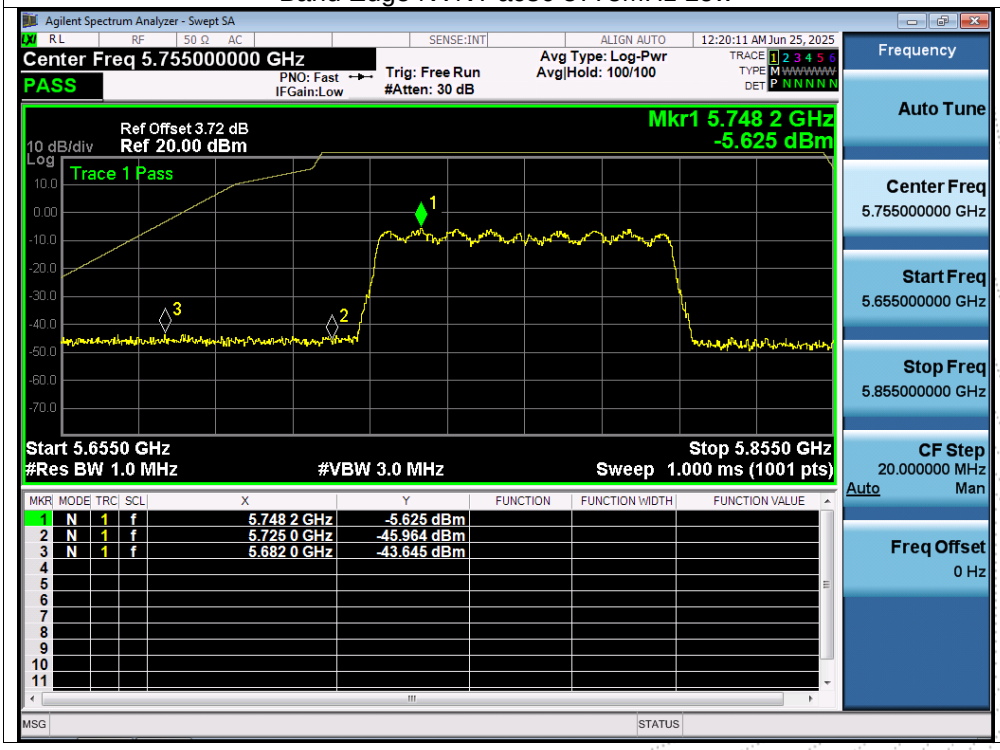
Band Edge NVNT ac40 5795MHz High



Band Edge NVNT ac80 5775MHz High

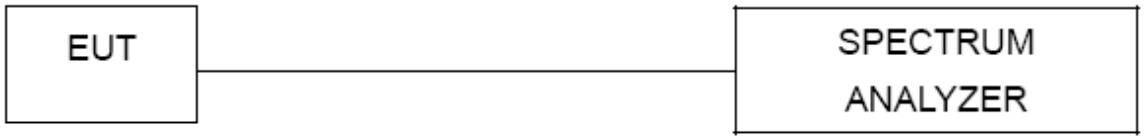


Band Edge NVNT ac80 5775MHz Low



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

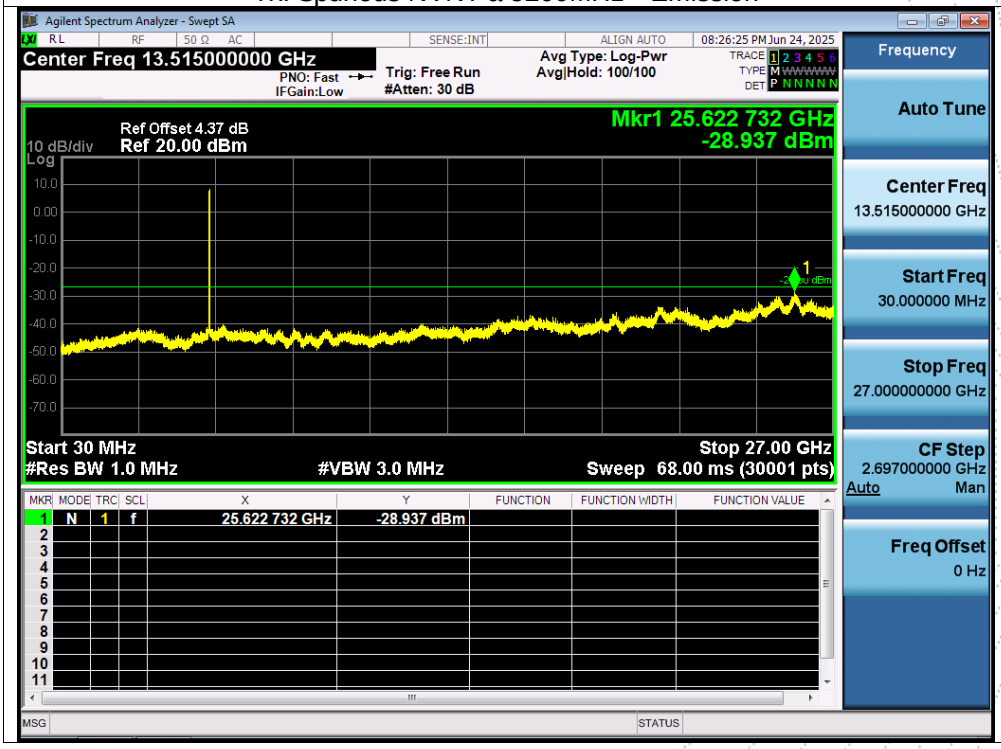
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.
About:26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A.
Plot. Antenna A: 5180-5240MHz

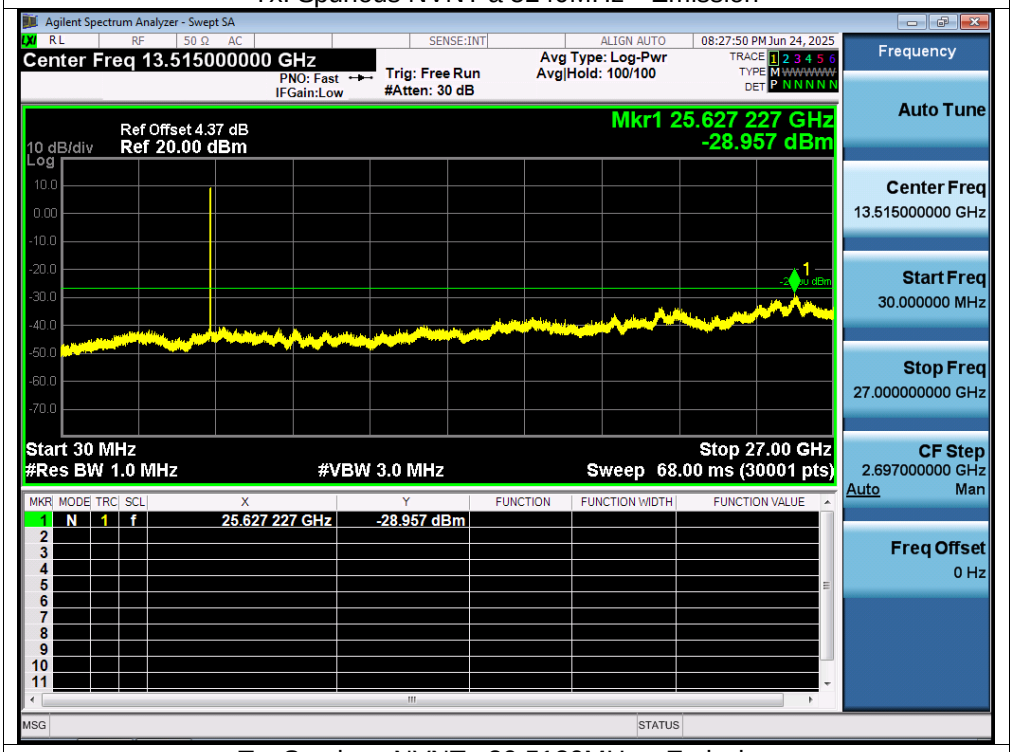
Test Graphs

Tx. Spurious NVNT a 5180MHz Emission

Tx. Spurious NVNT a 5200MHz Emission

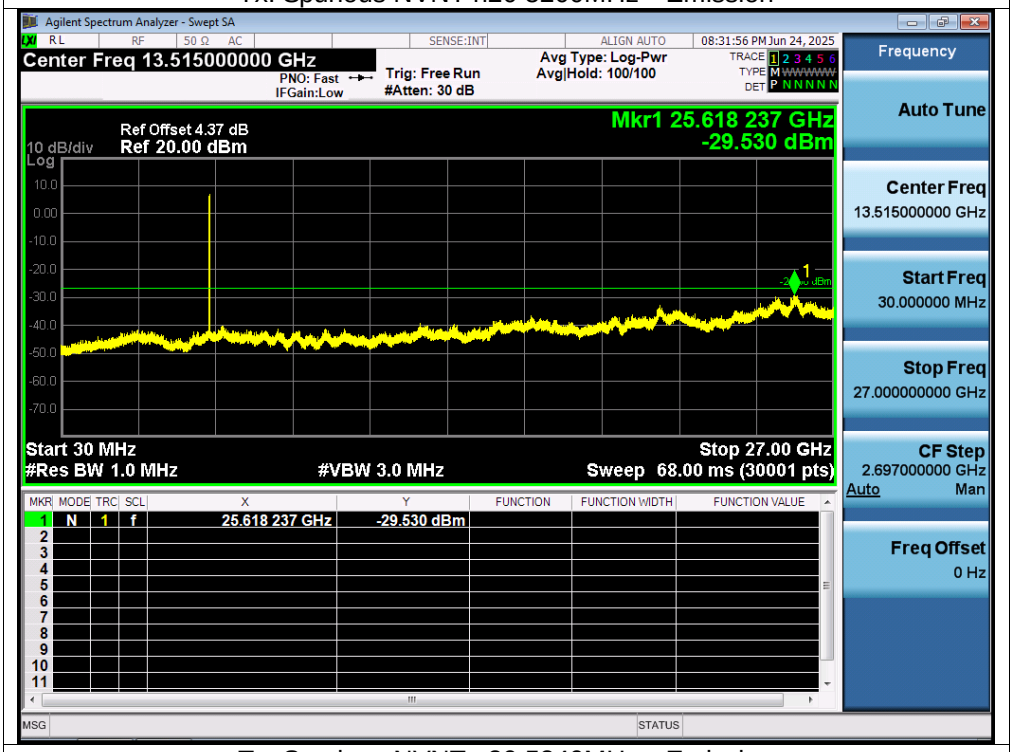


Tx. Spurious NVNT a 5240MHz Emission

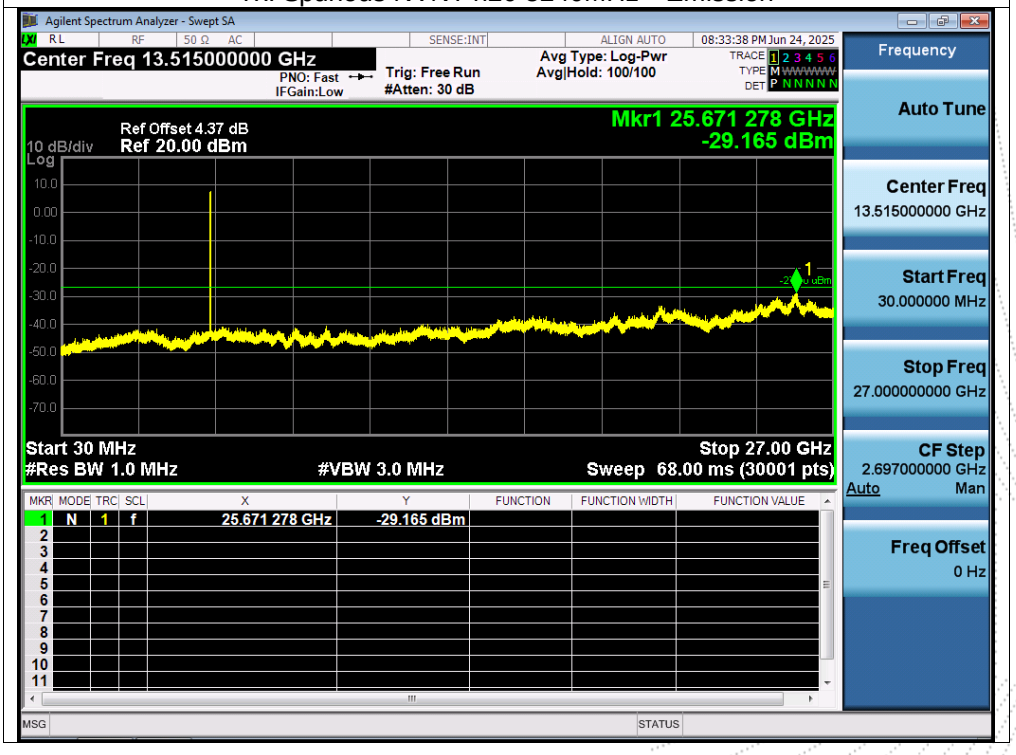


Tx. Spurious NVNT n20 5180MHz Emission

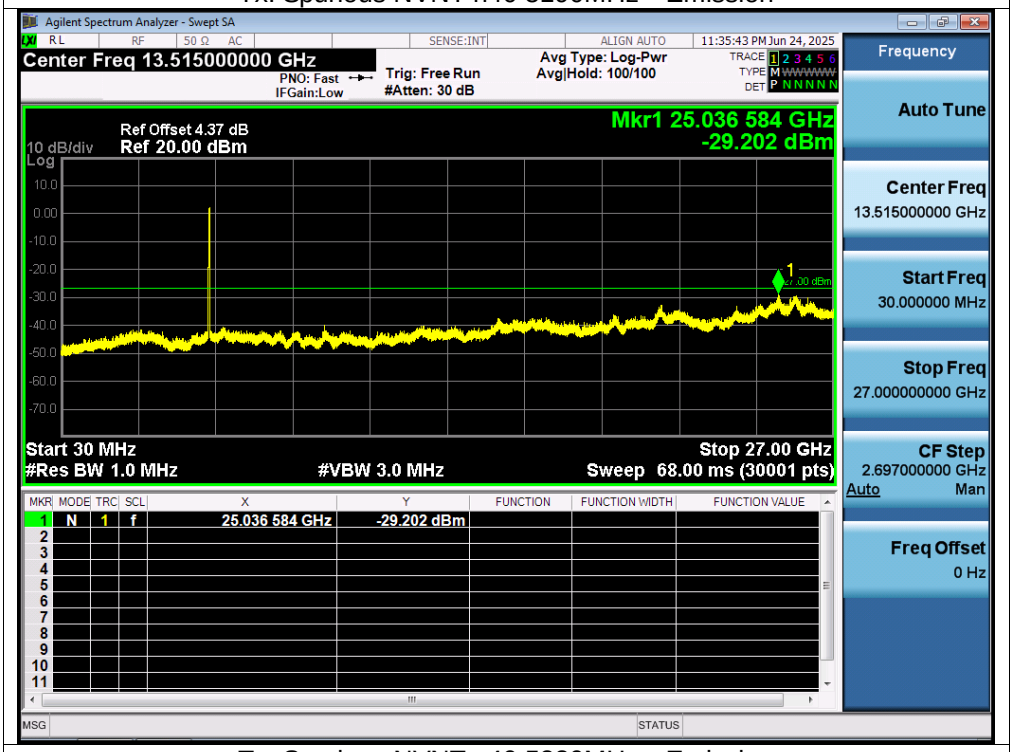
Tx. Spurious NVNT n20 5200MHz Emission



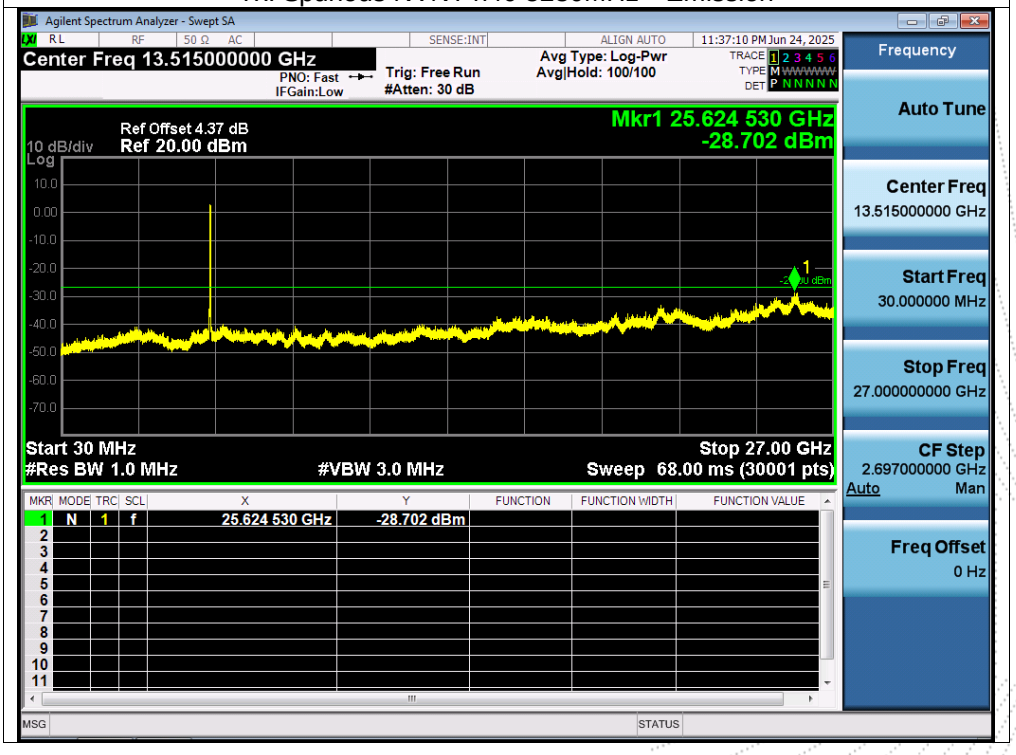
Tx. Spurious NVNT n20 5240MHz Emission



Tx. Spurious NVNT n40 5190MHz Emission

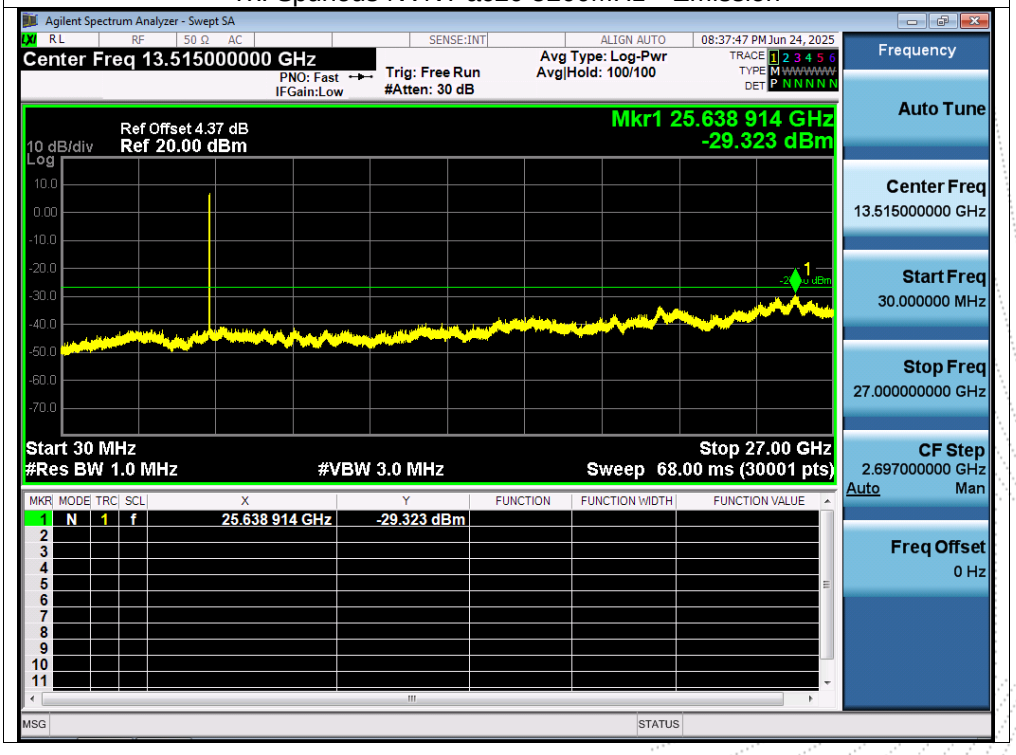


Tx. Spurious NVNT n40 5230MHz Emission

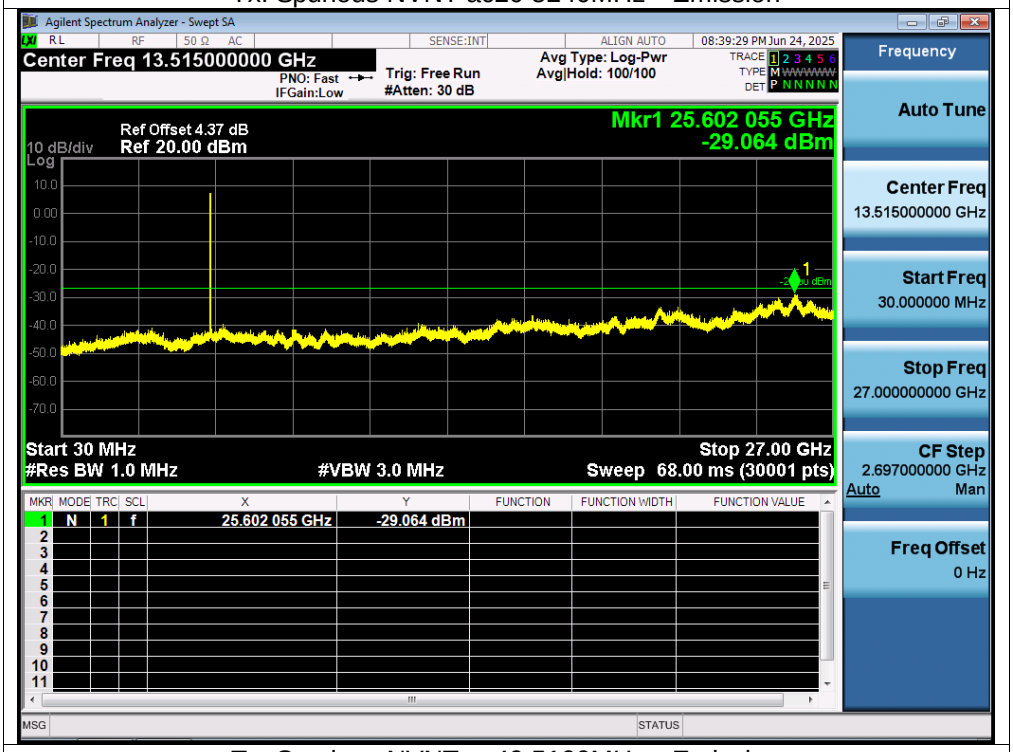


Tx. Spurious NVNT ac20 5180MHz Emission

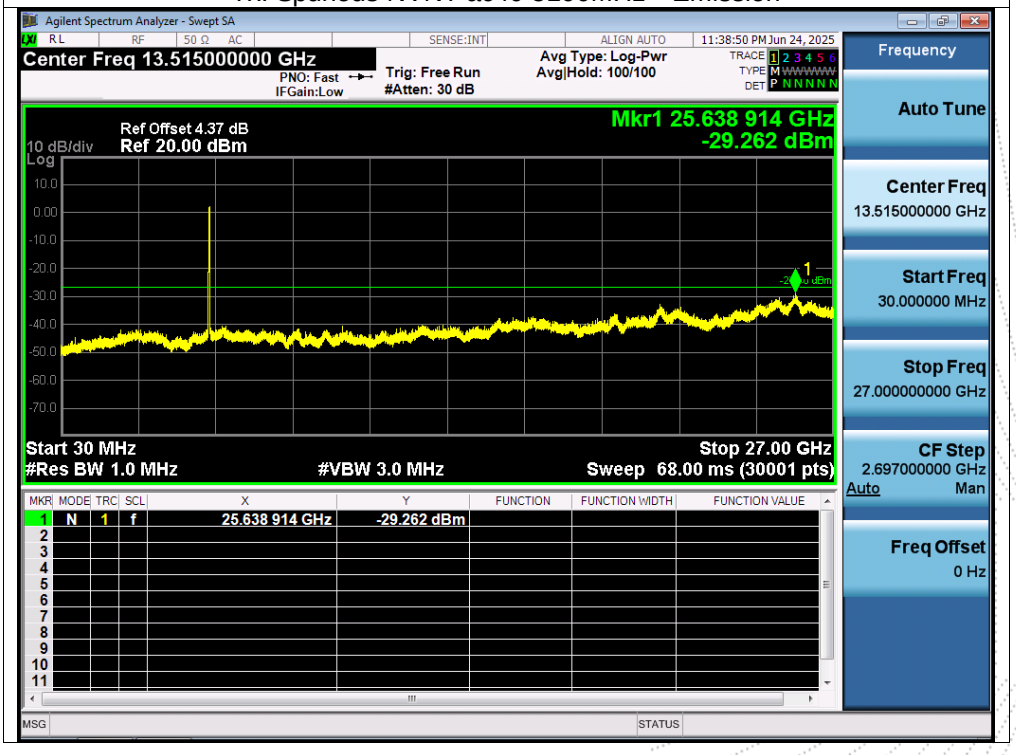
Tx. Spurious NVNT ac20 5200MHz Emission



Tx. Spurious NVNT ac20 5240MHz Emission



Tx. Spurious NVNT ac40 5190MHz Emission



Tx. Spurious NVNT ac40 5230MHz Emission

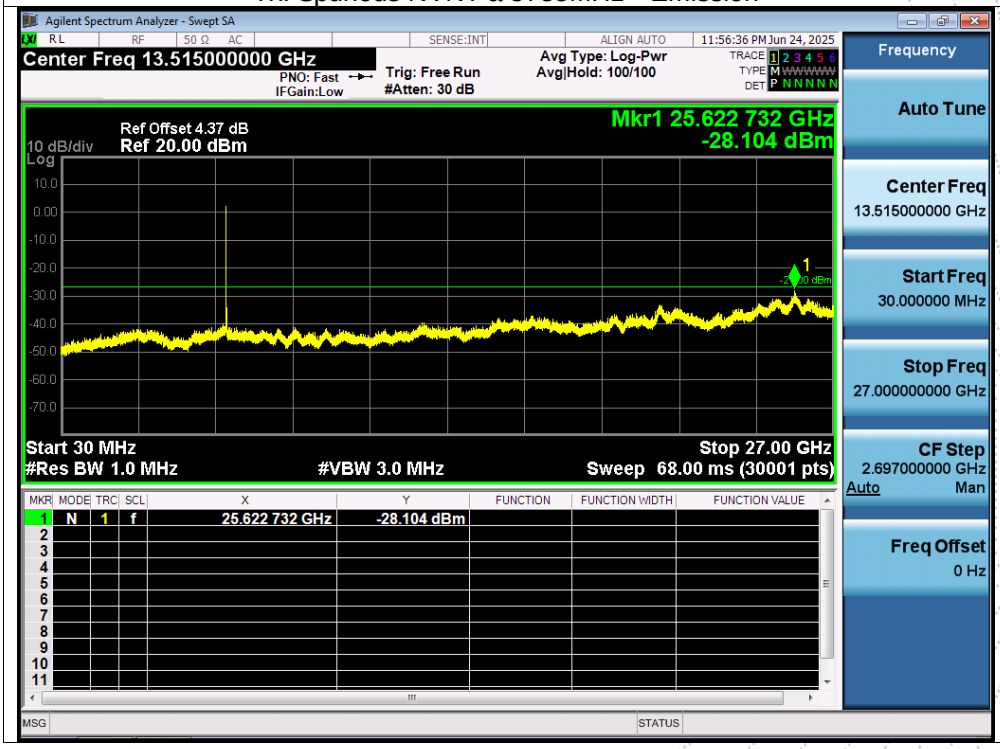
Tx. Spurious NVNT ac80 5210MHz Emission

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A.
Antenna A: 5745-5825MHz

Test Graphs

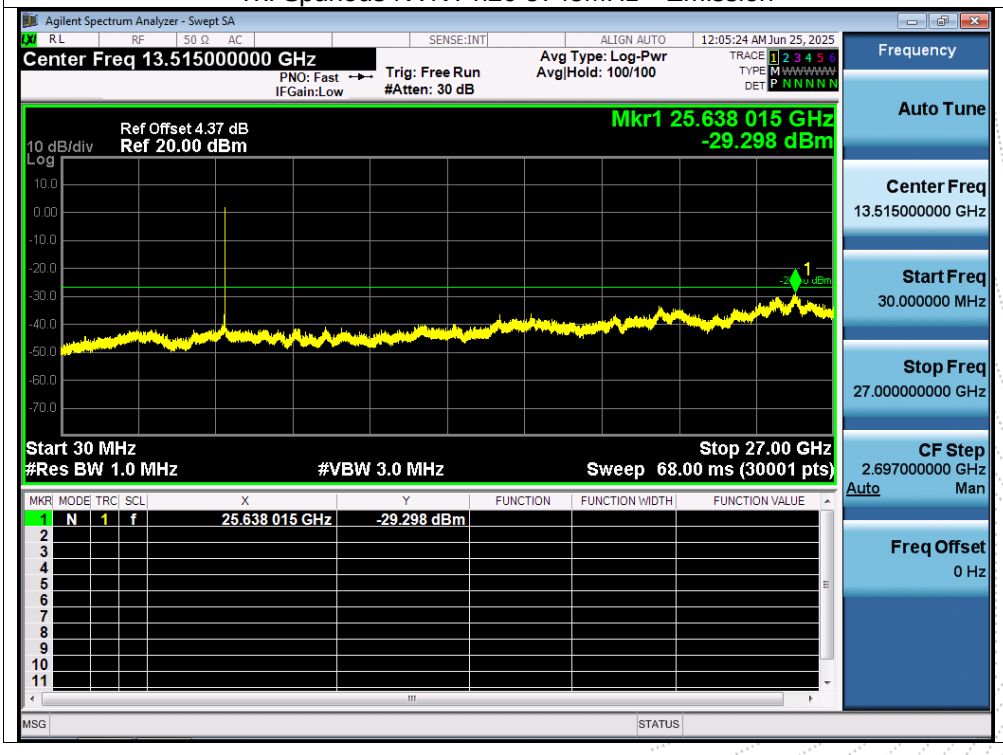
Tx. Spurious NVNT a 5745MHz Emission

Tx. Spurious NVNT a 5785MHz Emission



Tx. Spurious NVNT a 5825MHz Emission

Tx. Spurious NVNT n20 5745MHz Emission

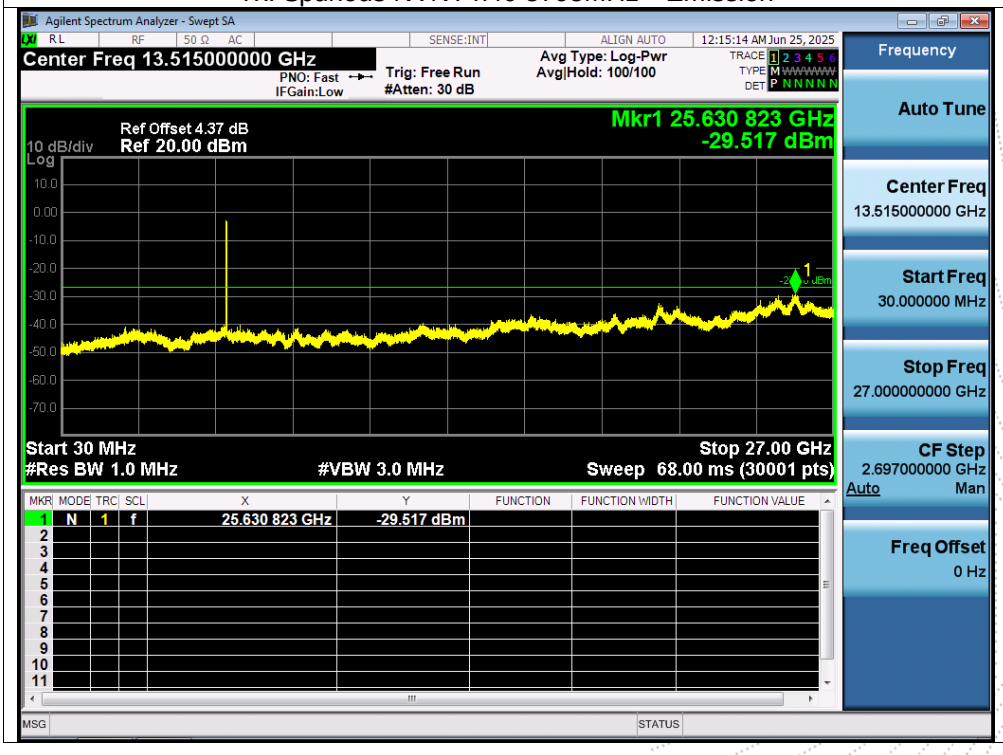


Tx. Spurious NVNT n20 5785MHz Emission

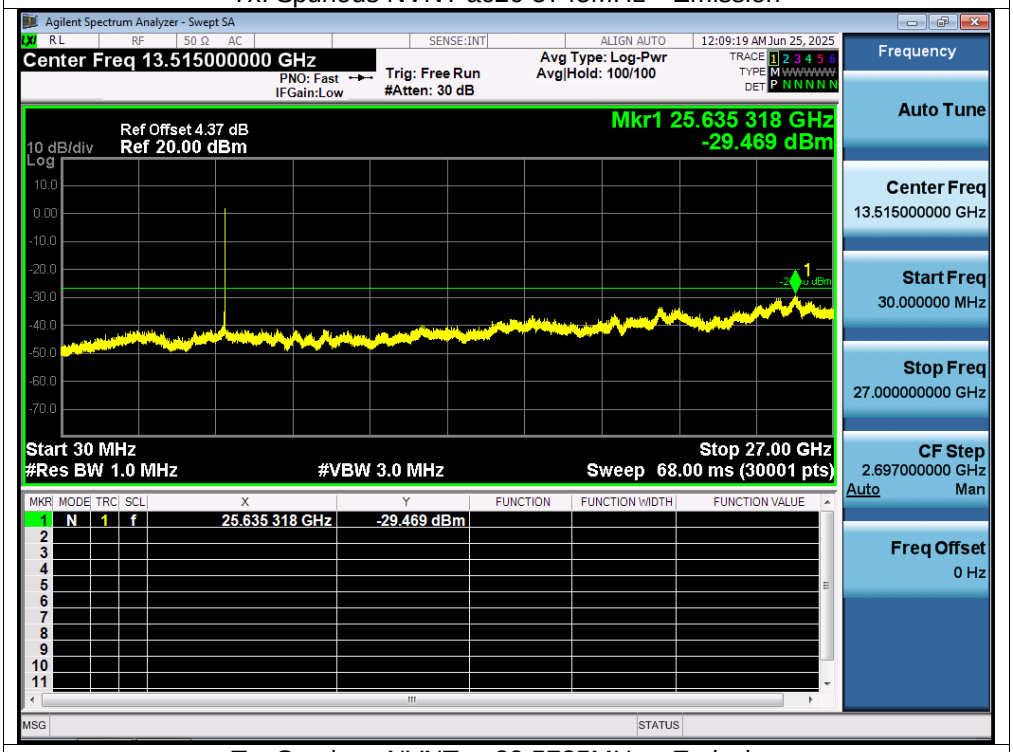
Tx. Spurious NVNT n20 5825MHz Emission

Tx. Spurious NVNT n40 5755MHz Emission

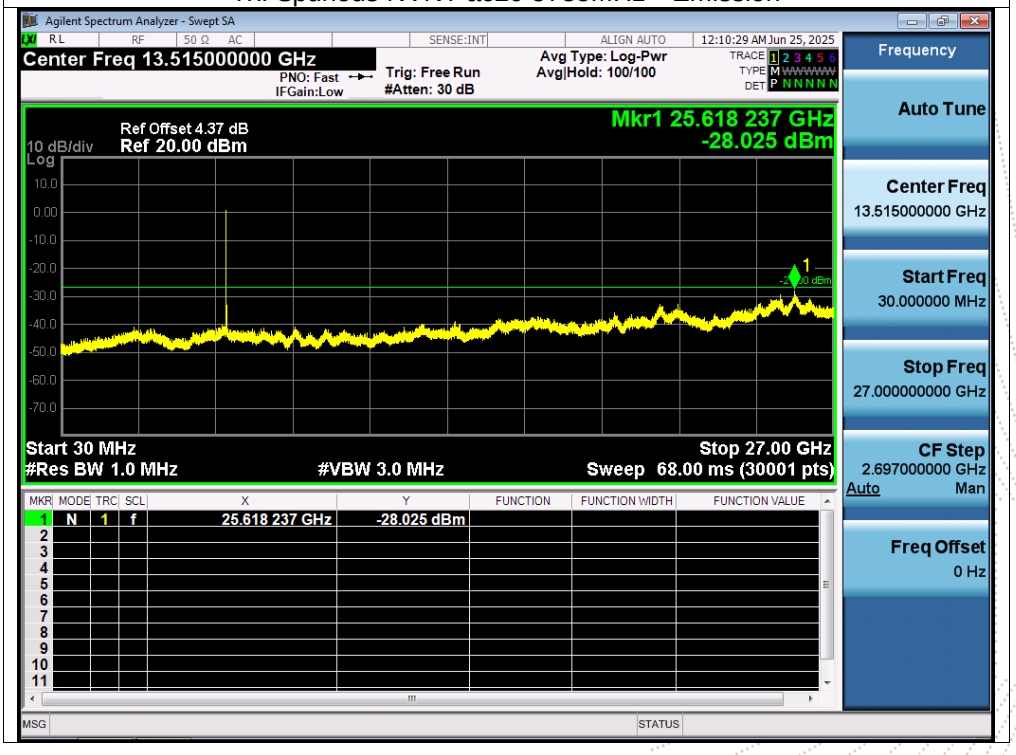
Tx. Spurious NVNT n40 5795MHz Emission



Tx. Spurious NVNT ac20 5745MHz Emission

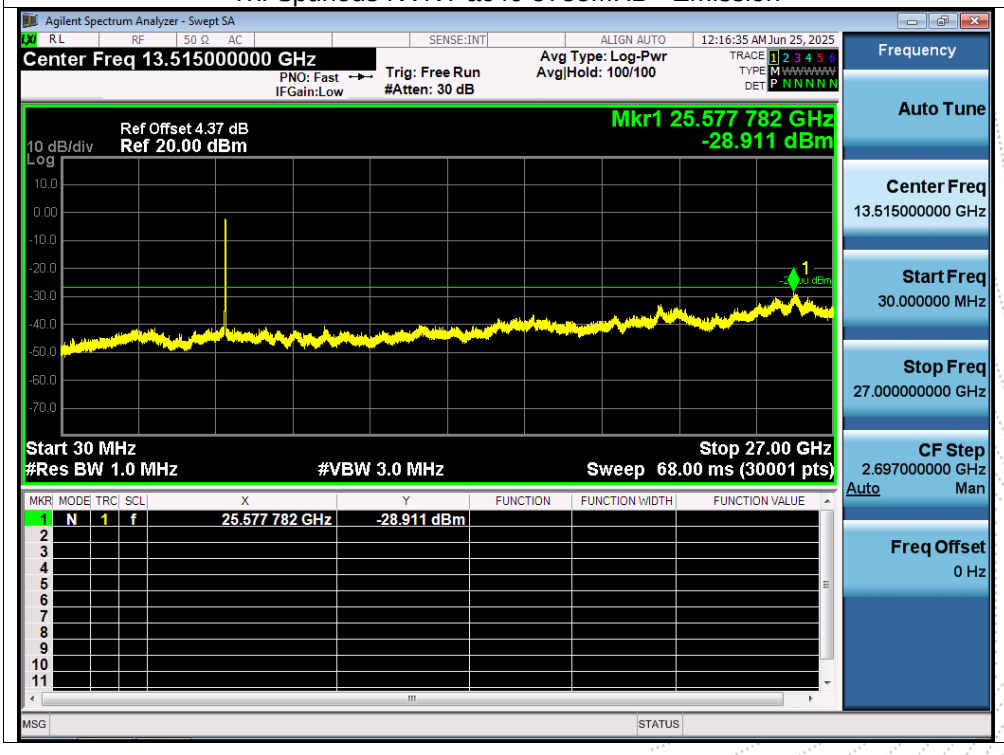


Tx. Spurious NVNT ac20 5785MHz Emission



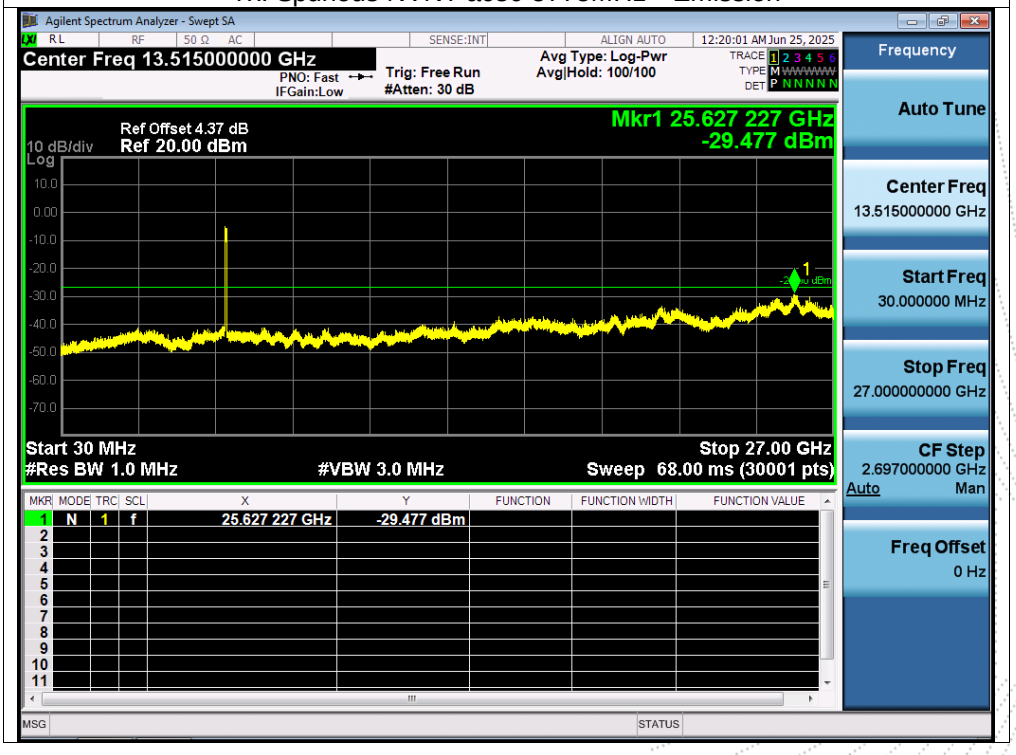
Tx. Spurious NVNT ac20 5825MHz Emission

Tx. Spurious NVNT ac40 5755MHz Emission



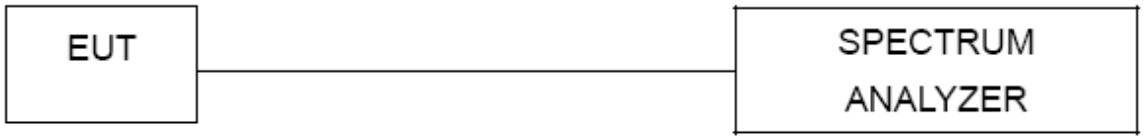
Tx. Spurious NVNT ac40 5795MHz Emission

Tx. Spurious NVNT ac80 5775MHz Emission



13. Frequency Stability Measurement

13.1 Block Diagram Of Test Setup



13.2 Limit

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.
The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification)..

13.3 Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 106 ppm and he limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C~70°C.

13.4 Test Result

Temperature:	26 ℃	Relative Humidity:	54%RH
Pressure:	101kPa	Test Voltage:	DC 11.4V
Test Mode:	TX Frequency U-NII-1 (5180-5240MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency：5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	11.40	5180.0017	5180	0.0017	0.3282
		V max (V)	13.11	5180.0048	5180	0.0048	0.9266
		V min (V)	9.69	5180.0007	5180	0.0007	0.1351
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)	11.4	T (°C)	-20	5180.0061	5180	0.0061	1.1776
		T (°C)	-10	5180.0094	5180	0.0094	1.8147
		T (°C)	0	5180.0072	5180	0.0072	1.3900
		T (°C)	10	5180.0053	5180	0.0053	1.0232
		T (°C)	20	5180.0111	5180	0.0111	2.1429
		T (°C)	30	5180.0008	5180	0.0008	0.1544
		T (°C)	40	5180.0049	5180	0.0049	0.9459
		T (°C)	50	5180.0025	5180	0.0025	0.4826
		T (°C)	60	5180.0046	5180	0.0046	0.8880
		T (°C)	70	5180.0107	5180	0.0107	2.0656
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)	11.40	5200.0035	5200	0.0035	0.6731
		V max (V)	13.11	5200.0118	5200	0.0118	2.2692
		V min (V)	9.69	5200.0013	5200	0.0013	0.2500
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)	11.4	T (°C)	-20	5200.0129	5200	0.0129	2.4808
		T (°C)	-10	5200.0110	5200	0.0110	2.1154
		T (°C)	0	5200.0074	5200	0.0074	1.4231
		T (°C)	10	5200.0099	5200	0.0099	1.9038
		T (°C)	20	5200.0056	5200	0.0056	1.0769
		T (°C)	30	5200.0090	5200	0.0090	1.7308
		T (°C)	40	5200.0027	5200	0.0027	0.5192
		T (°C)	50	5200.0038	5200	0.0038	0.7308
		T (°C)	60	5200.0060	5200	0.0060	1.1538
		T (°C)	70	5200.0024	5200	0.0024	0.4615
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)	11.40	5240.0018	5240	0.0018	0.3435
		V max (V)	13.11	5240.0123	5240	0.0123	2.3473
		V min (V)	9.69	5240.0002	5240	0.0002	0.0382
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)	11.4	T (°C)	-20	5240.0135	5240	0.0135	2.5763
		T (°C)	-10	5240.0107	5240	0.0107	2.0420
		T (°C)	0	5240.0077	5240	0.0077	1.4695
		T (°C)	10	5240.0130	5240	0.0130	2.4809
		T (°C)	20	5240.0016	5240	0.0016	0.3053
		T (°C)	30	5240.0088	5240	0.0088	1.6794
		T (°C)	40	5240.0111	5240	0.0111	2.1183
		T (°C)	50	5240.0123	5240	0.0123	2.3473
		T (°C)	60	5240.0082	5240	0.0082	1.5649
		T (°C)	70	5240.0126	5240	0.0126	2.4046
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%RH
Pressure:	101kPa	Test Voltage:	DC 11.4V
Test Mode:	TX 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)	11.40	5745.0062	5745	0.0062	1.0792
		V max (V)	13.11	5745.0105	5745	0.0105	1.8277
		V min (V)	9.69	5745.0133	5745	0.0133	2.3151
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)	11.4	T (°C)	-20	5745.0049	5745	0.0049	0.8529
		T (°C)	-10	5745.0100	5745	0.0100	1.7406
		T (°C)	0	5745.0103	5745	0.0103	1.7929
		T (°C)	10	5745.0060	5745	0.0060	1.0444
		T (°C)	20	5745.0039	5745	0.0039	0.6789
		T (°C)	30	5745.0086	5745	0.0086	1.4970
		T (°C)	40	5745.0060	5745	0.0060	1.0444
		T (°C)	50	5745.0081	5745	0.0081	1.4099
		T (°C)	60	5745.0112	5745	0.0112	1.9495
		T (°C)	70	5745.0038	5745	0.0038	0.6614
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)	11.40	5785.0063	5785	0.0063	1.0890
		V max (V)	13.11	5785.0089	5785	0.0089	1.5385
		V min (V)	9.69	5785.0003	5785	0.0003	0.0519
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)	11.4	T (°C)	-20	5785.0134	5785	0.0134	2.3163
		T (°C)	-10	5785.0132	5785	0.0132	2.2818
		T (°C)	0	5785.0111	5785	0.0111	1.9188
		T (°C)	10	5785.0014	5785	0.0014	0.2420
		T (°C)	20	5785.0030	5785	0.0030	0.5186
		T (°C)	30	5785.0018	5785	0.0018	0.3111
		T (°C)	40	5785.0092	5785	0.0092	1.5903
		T (°C)	50	5785.0057	5785	0.0057	0.9853
		T (°C)	60	5785.0102	5785	0.0102	1.7632
		T (°C)	70	5785.0038	5785	0.0038	0.6569
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)	11.40	5825.0112	5825	0.0112	1.9227
		V max (V)	13.11	5825.0034	5825	0.0034	0.5837
		V min (V)	9.69	5825.0079	5825	0.0079	1.3562
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)	11.4	T (°C)	-20	5825.0030	5825	0.0030	0.5150
		T (°C)	-10	5825.0124	5825	0.0124	2.1288
		T (°C)	0	5825.0091	5825	0.0091	1.5622
		T (°C)	10	5825.0112	5825	0.0112	1.9227
		T (°C)	20	5825.0107	5825	0.0107	1.8369
		T (°C)	30	5825.0069	5825	0.0069	1.1845
		T (°C)	40	5825.0094	5825	0.0094	1.6137
		T (°C)	50	5825.0063	5825	0.0063	1.0815
		T (°C)	60	5825.0119	5825	0.0119	2.0429
		T (°C)	70	5825.0094	5825	0.0094	1.6137
Limits				5725-5850 MHz			
Result				Complies			

14. Duty Cycle Of Test Signal

14.1 Standard Requirement

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

14.2 Formula

Duty Cycle = Ton / (Ton+Toff)

14.3 Test Procedure

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

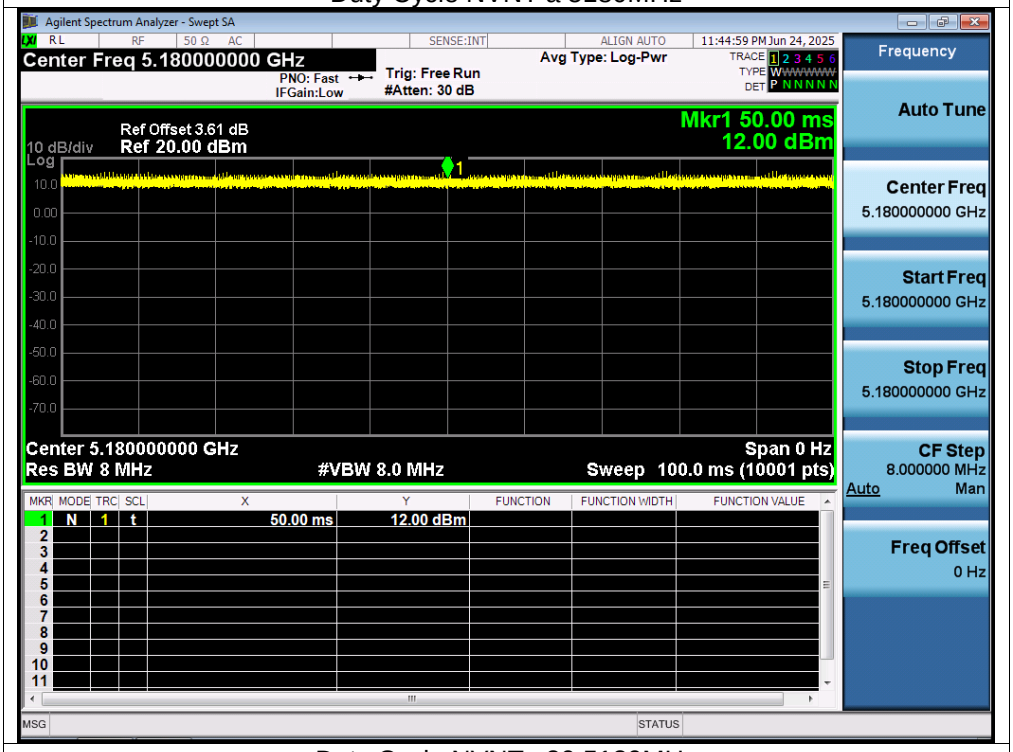
14.4 Test Result

ANT A

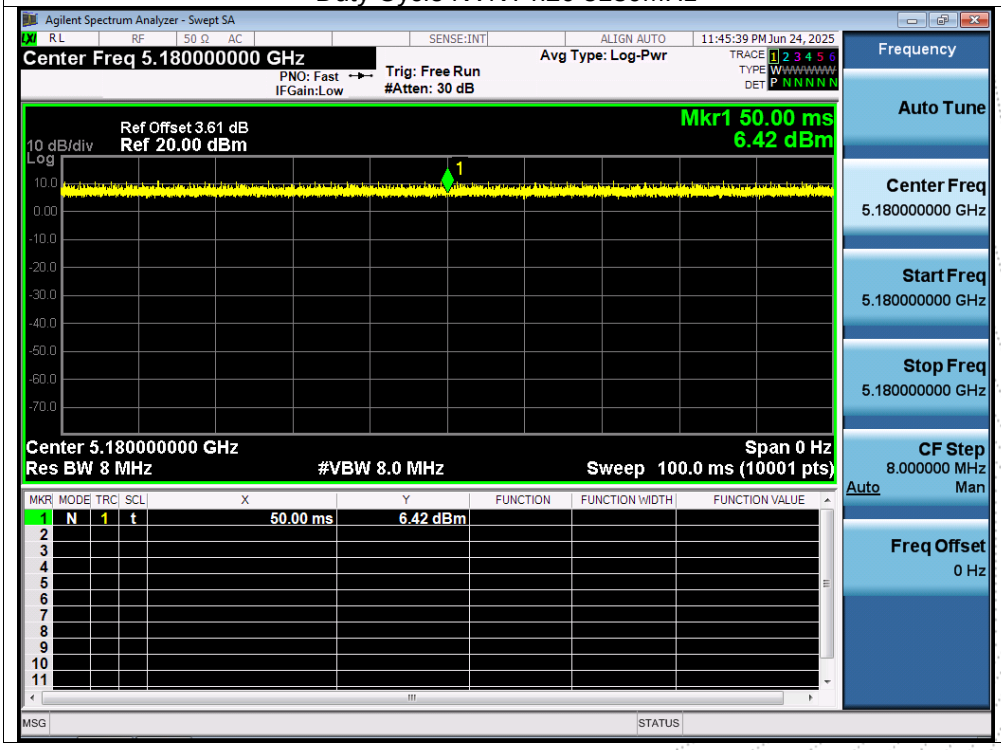
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Duty Fator(dB)
NVNT	a	5180	100	0
NVNT	n20	5180	100	0
NVNT	n40	5190	100	0
NVNT	ac20	5180	100	0
NVNT	ac40	5190	100	0
NVNT	ac80	5210	100	0

Test Graphs

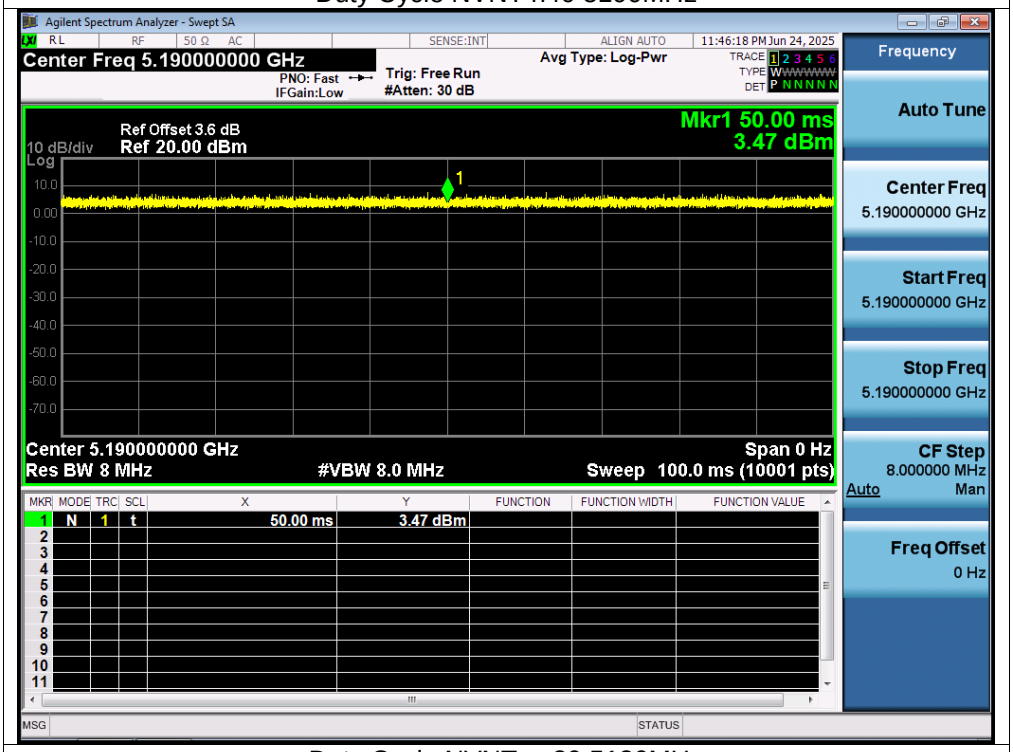
Duty Cycle NVNT a 5180MHz



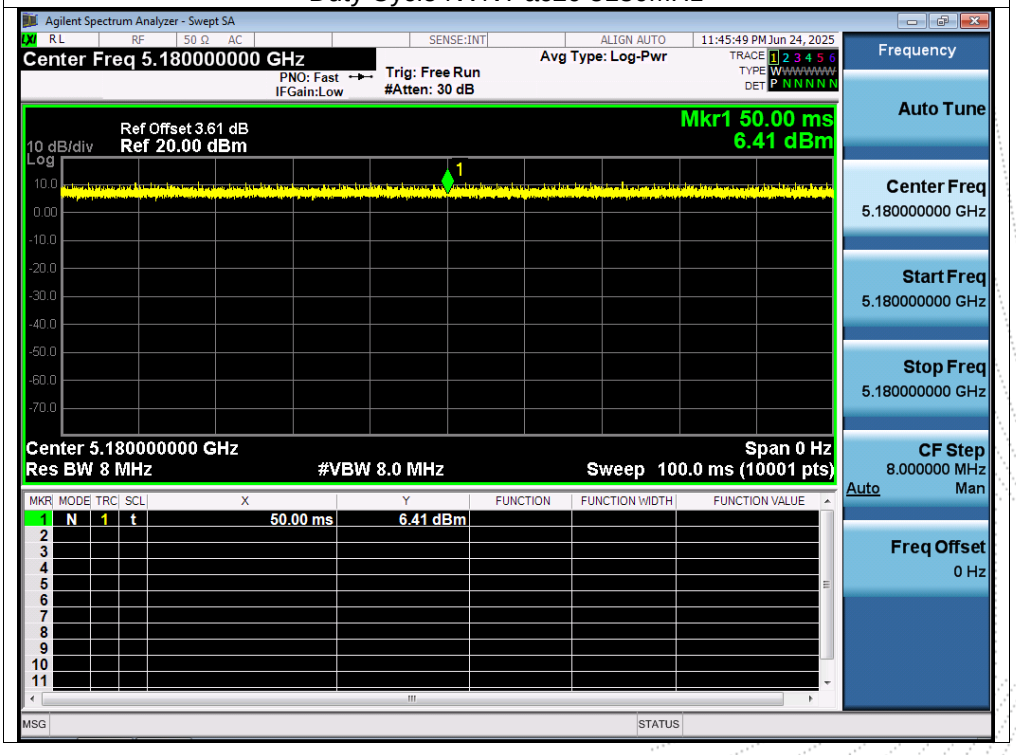
Duty Cycle NVNT n20 5180MHz



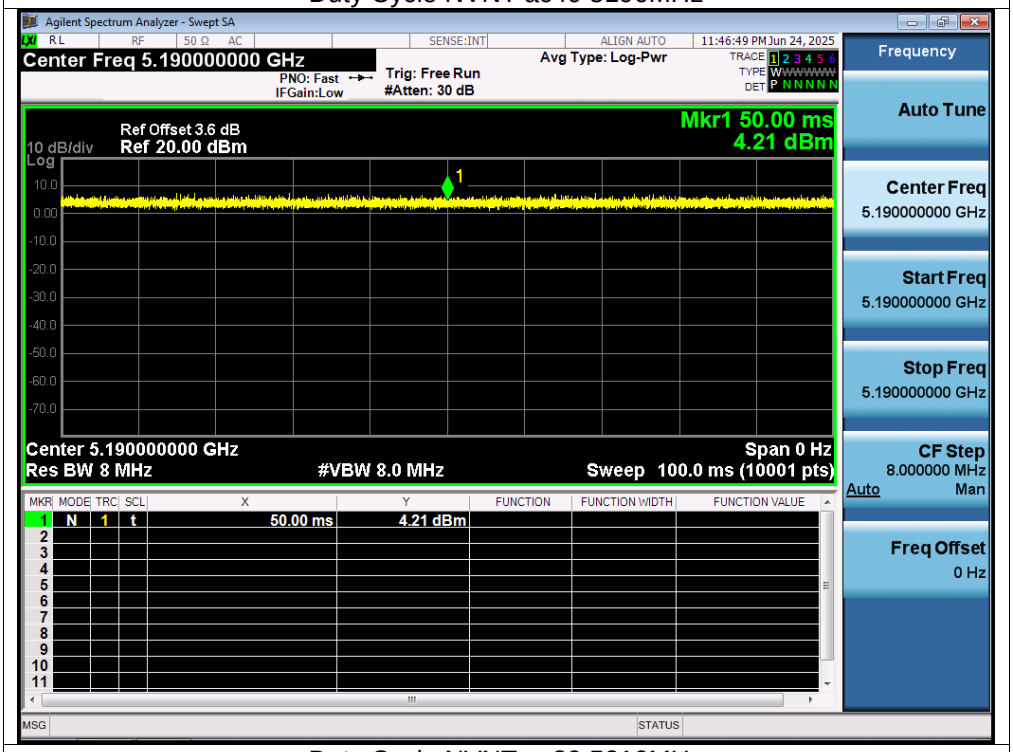
Duty Cycle NVNT n40 5190MHz



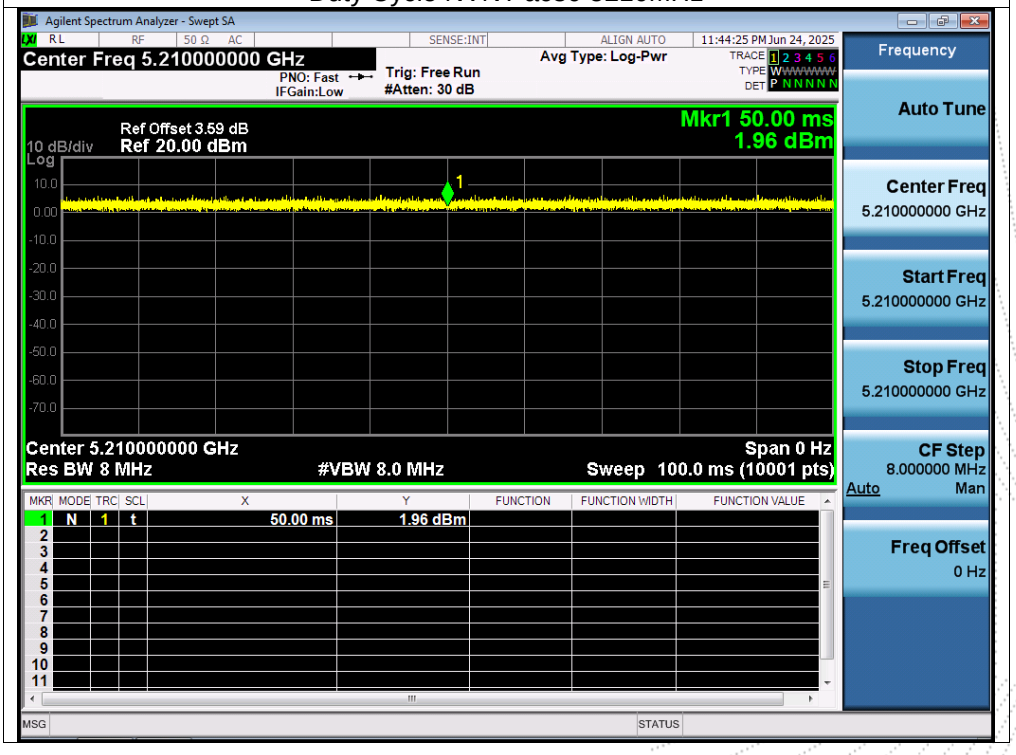
Duty Cycle NVNT ac20 5180MHz



Duty Cycle NVNT ac40 5190MHz



Duty Cycle NVNT ac80 5210MHz



ANT B

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Duty Fator(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

Test Graphs

Duty Cycle NVNT a 5180MHz

Duty Cycle NVNT n20 5180MHz