10.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 7.6V
Test Mode:	5180-5240MHz		

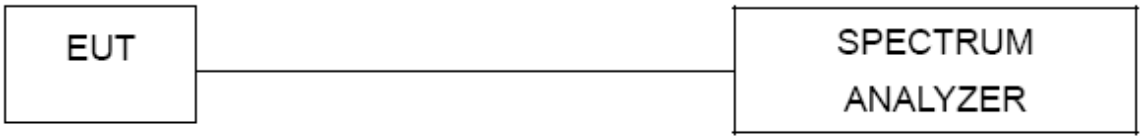
Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	5.31	24	Pass
NVNT	a	5200	5.90	24	Pass
NVNT	a	5240	5.71	24	Pass
NVNT	n20	5180	5.01	24	Pass
NVNT	n20	5200	5.77	24	Pass
NVNT	n20	5240	5.21	24	Pass
NVNT	n40	5190	2.33	24	Pass
NVNT	n40	5230	**6.22**	24	Pass
NVNT	ac20	5180	5.09	24	Pass
NVNT	ac20	5200	5.81	24	Pass
NVNT	ac20	5240	5.58	24	Pass
NVNT	ac40	5190	2.35	24	Pass
NVNT	ac40	5230	6.20	24	Pass
NVNT	ac80	5210	4.12	24	Pass

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 7.6V
Test Mode:	5745-5825MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5745	**5.44**	30	Pass
NVNT	a	5785	5.26	30	Pass
NVNT	a	5825	4.74	30	Pass
NVNT	n20	5745	5.37	30	Pass
NVNT	n20	5785	5.22	30	Pass
NVNT	n20	5825	4.56	30	Pass
NVNT	n40	5755	5.26	30	Pass
NVNT	n40	5795	5.11	30	Pass
NVNT	ac20	5745	5.31	30	Pass
NVNT	ac20	5785	4.82	30	Pass
NVNT	ac20	5825	4.45	30	Pass
NVNT	ac40	5755	5.14	30	Pass
NVNT	ac40	5795	5.19	30	Pass
NVNT	ac80	5775	4.79	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

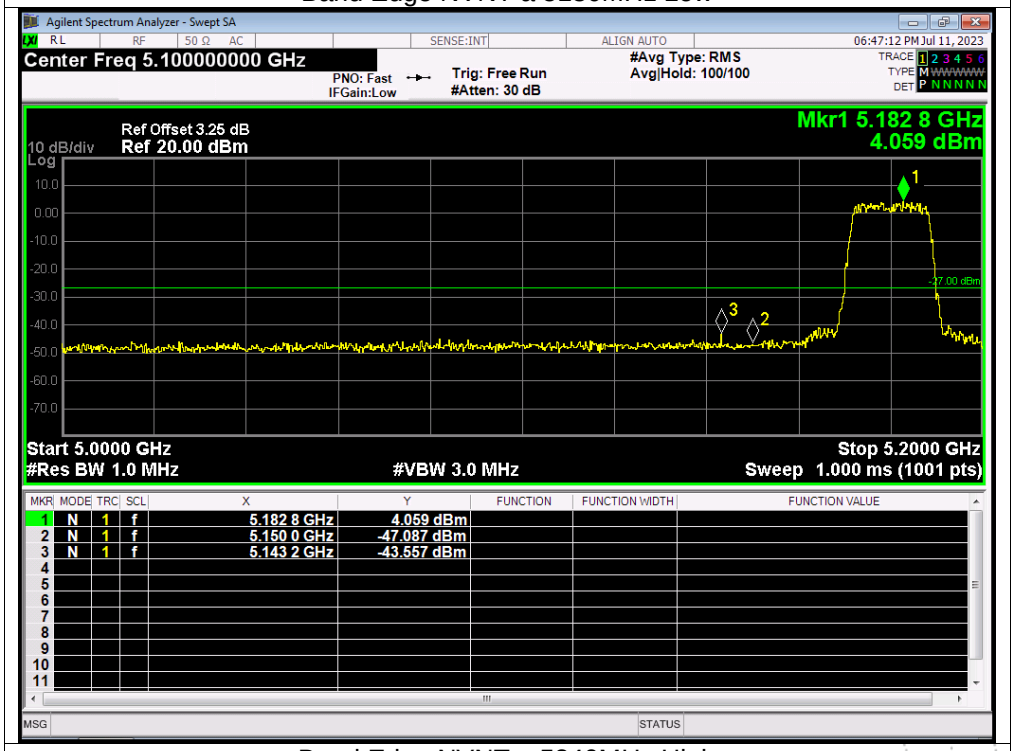
11.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 7.6V

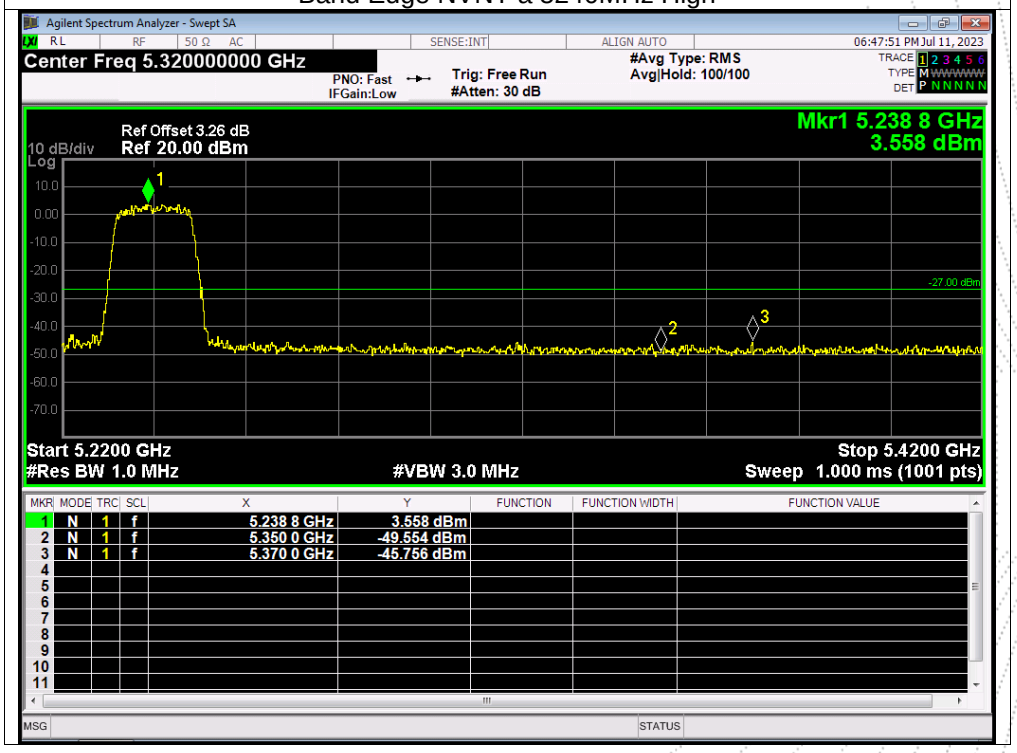
Plot.: 5180-5240MHz

Test Graphs

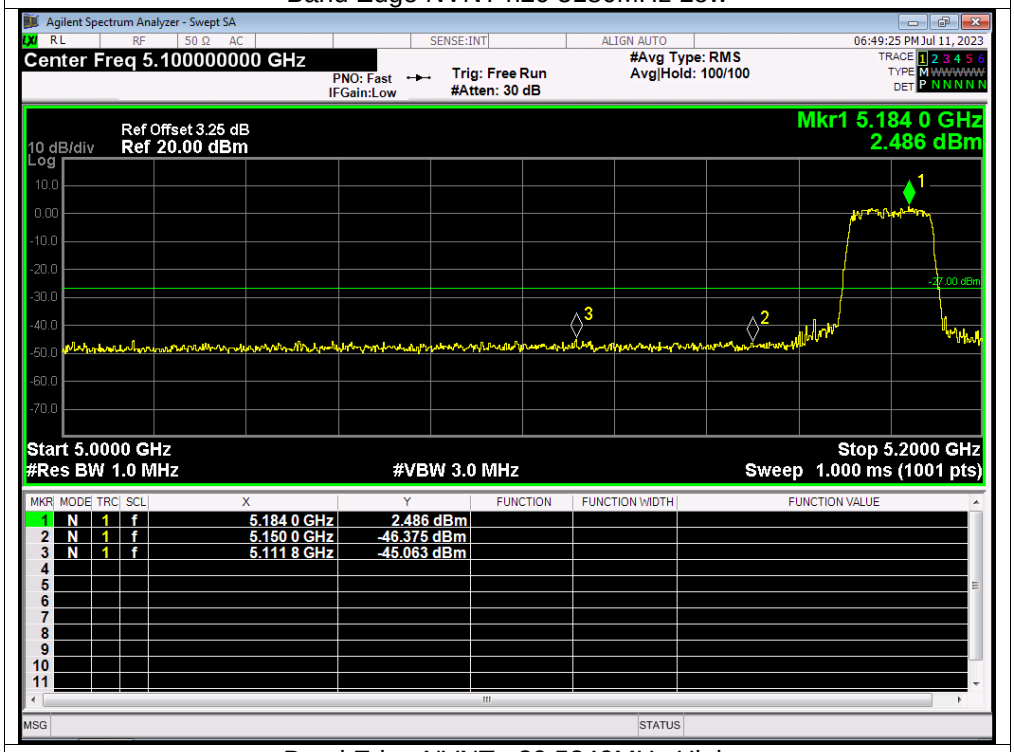
Band Edge NVNT a 5180MHz Low



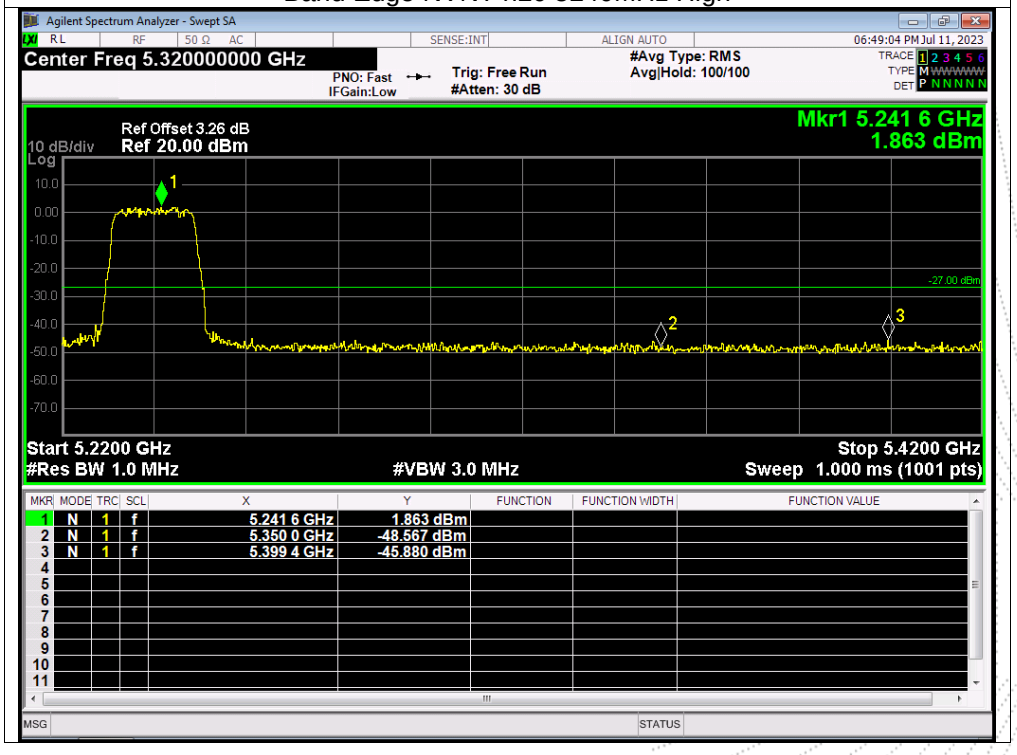
Band Edge NVNT a 5240MHz High



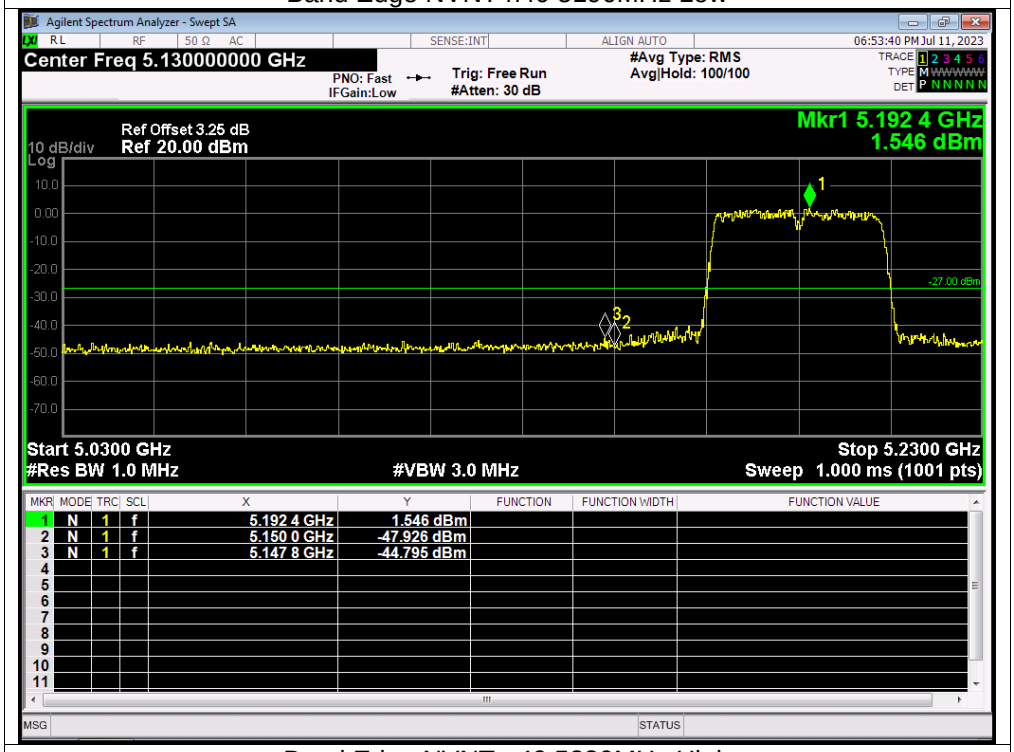
Band Edge NVNT n20 5180MHz Low



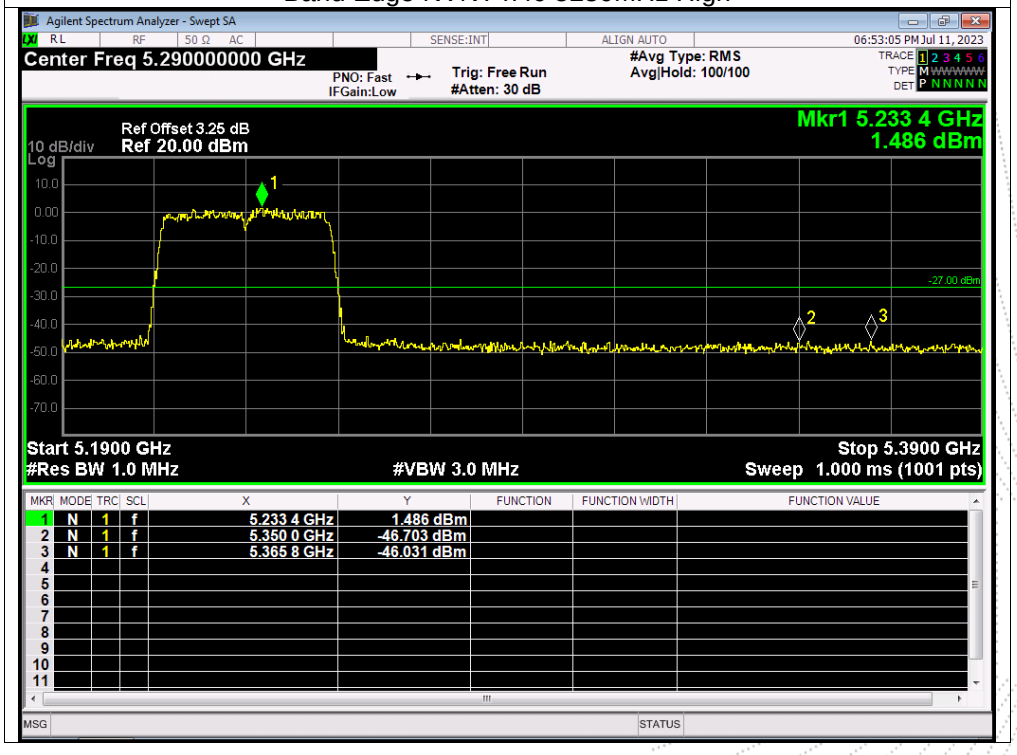
Band Edge NVNT n20 5240MHz High



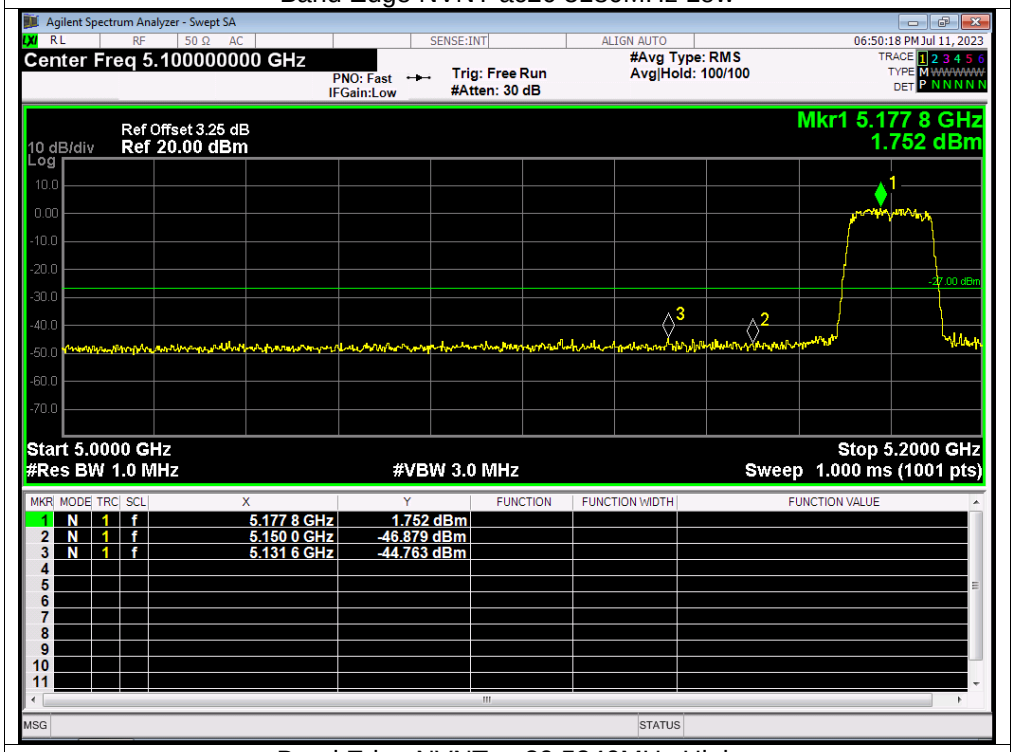
Band Edge NVNT n40 5190MHz Low



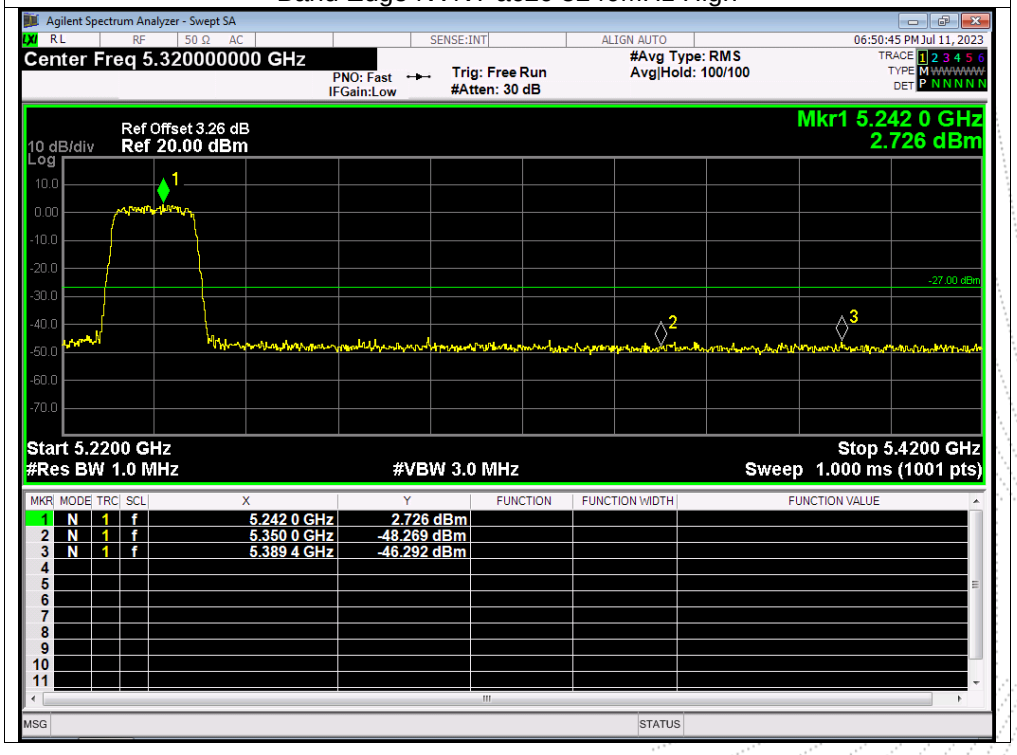
Band Edge NVNT n40 5230MHz High



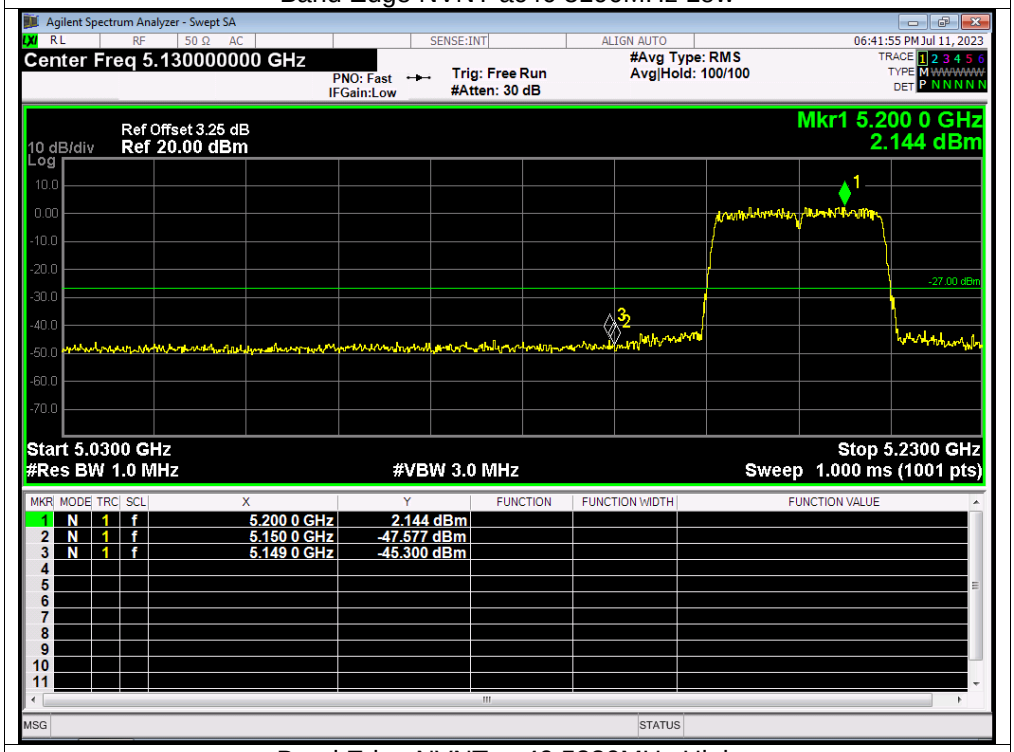
Band Edge NVNT ac20 5180MHz Low



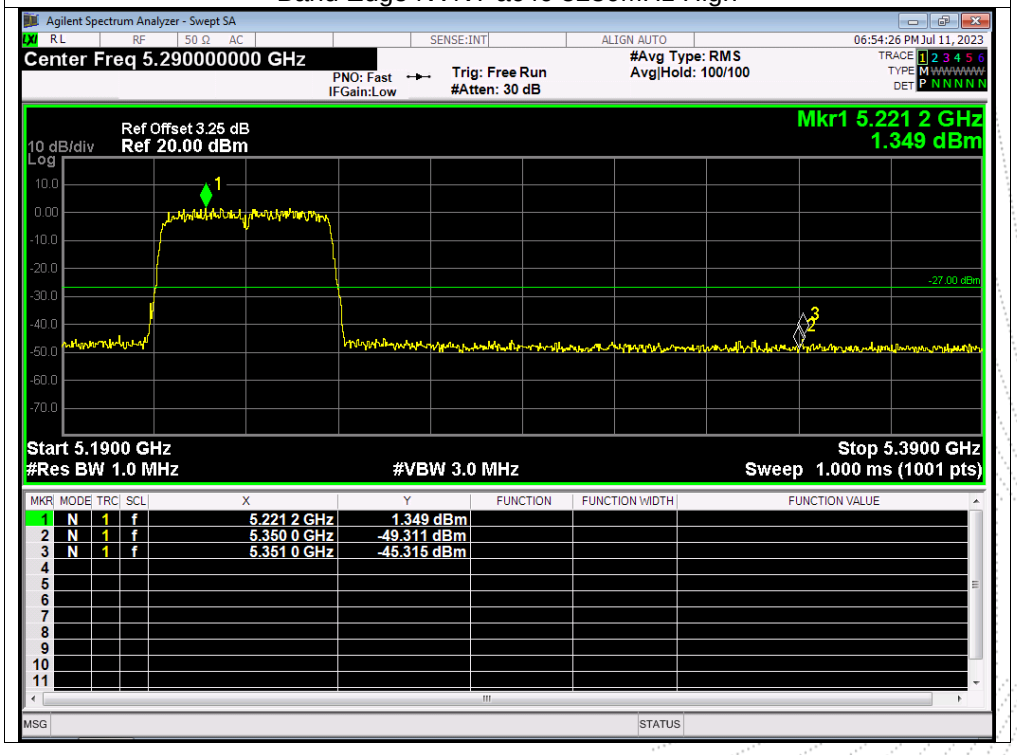
Band Edge NVNT ac20 5240MHz High



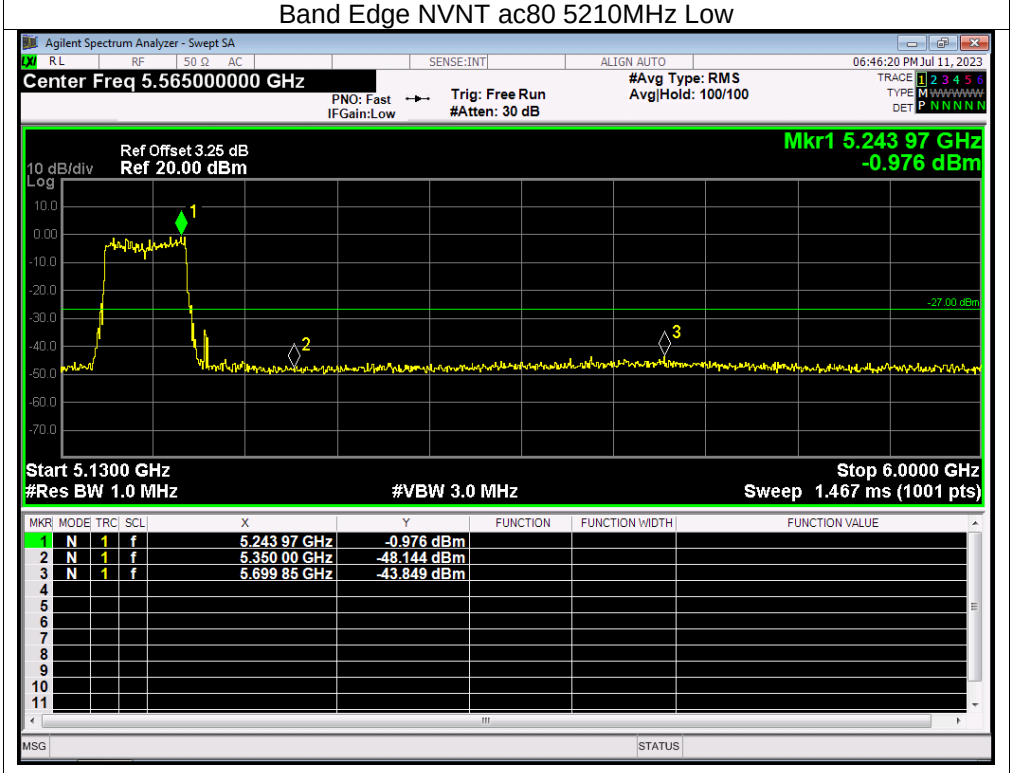
Band Edge NVNT ac40 5190MHz Low

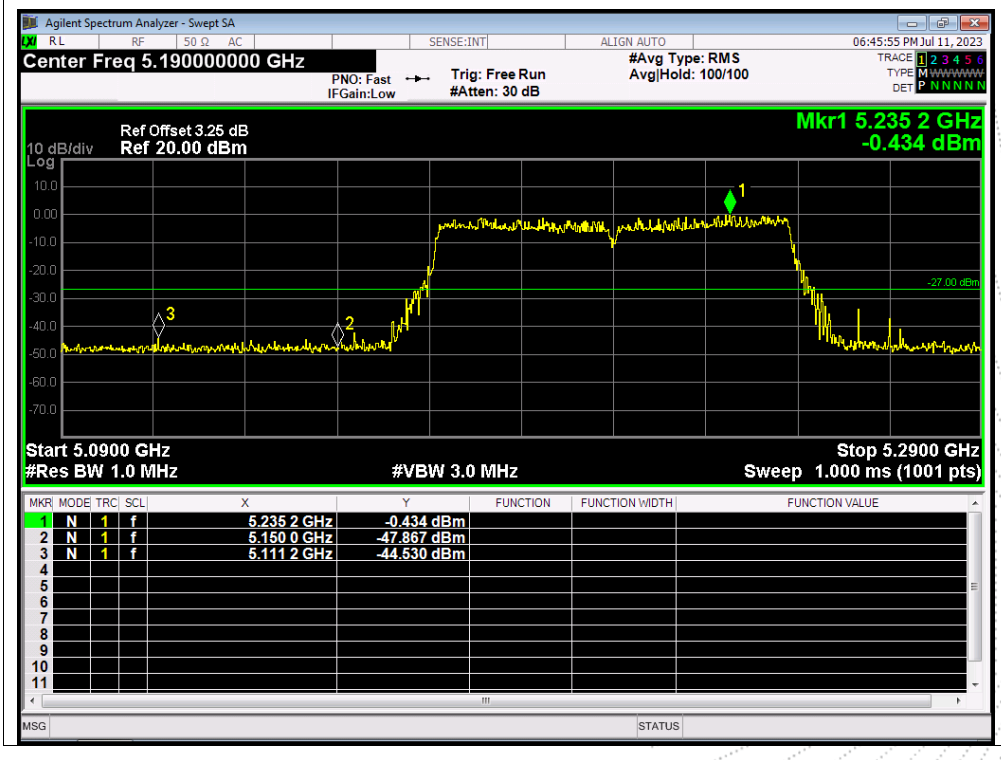


Band Edge NVNT ac40 5230MHz High



Band Edge NVNT ac80 5210MHz Low

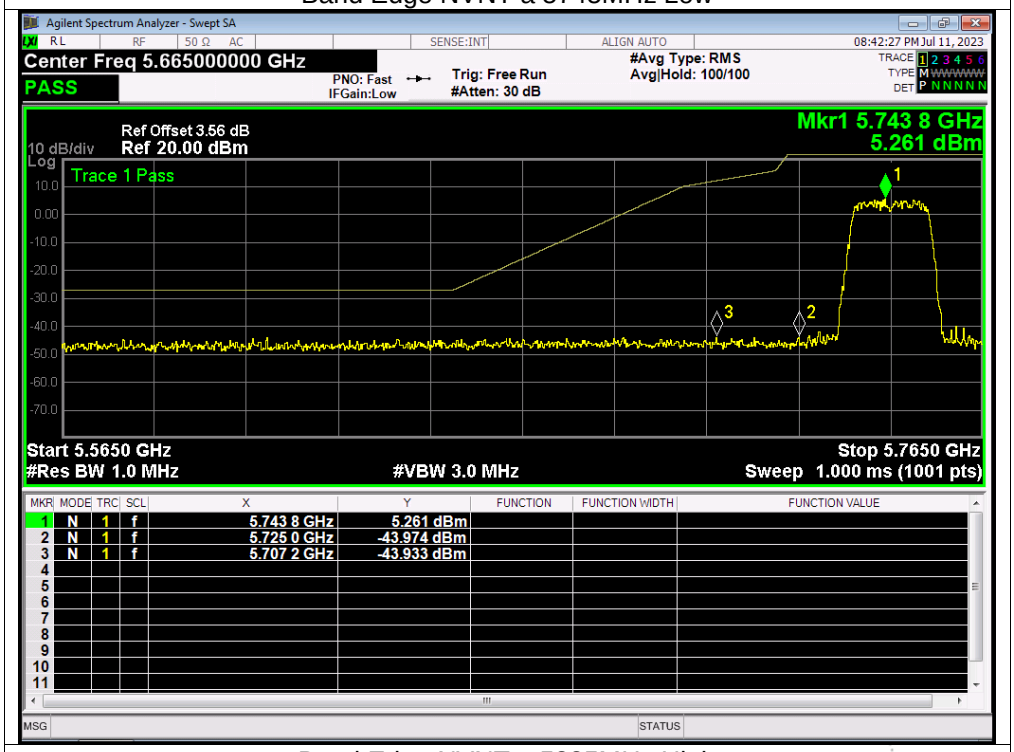




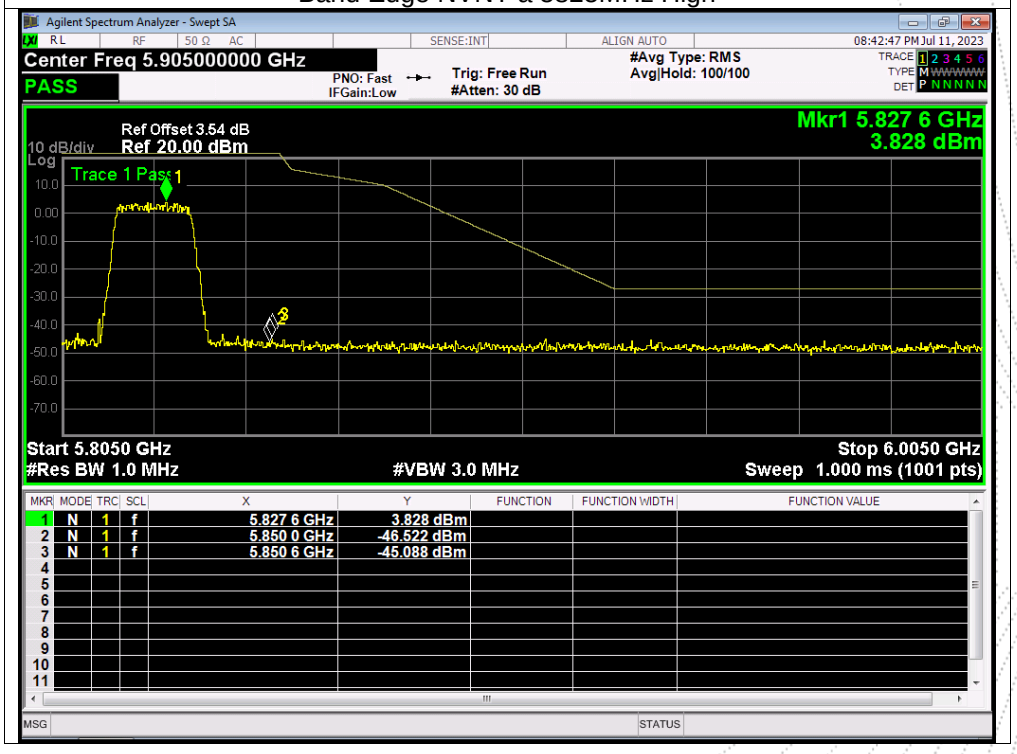
: 5745-5825MHz

Test Graphs

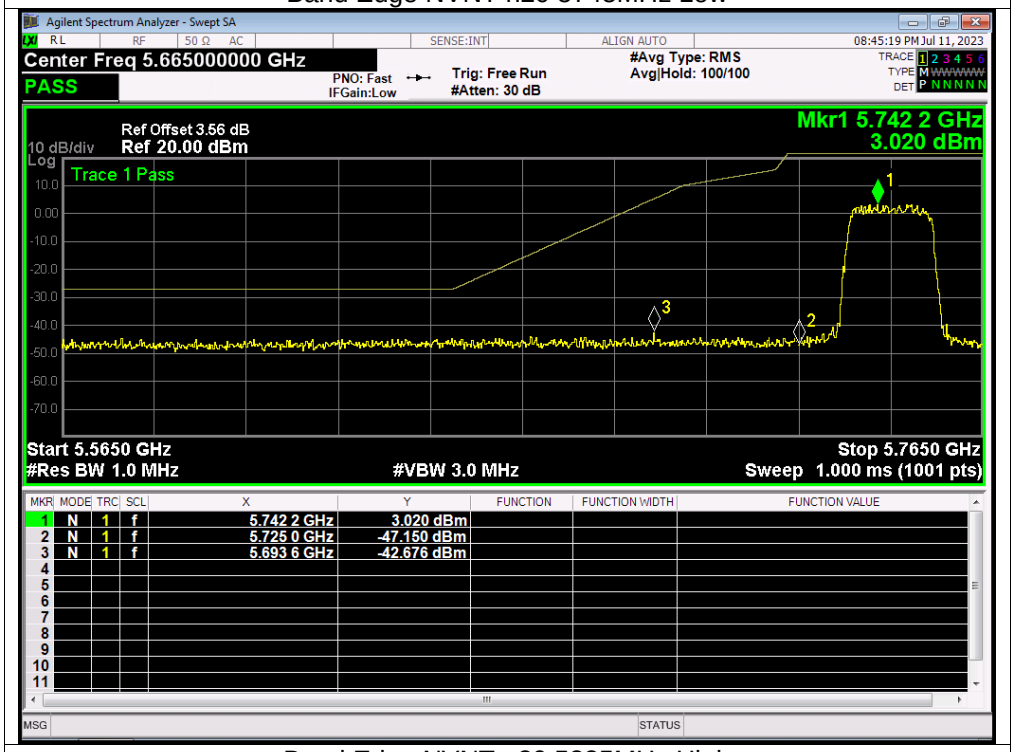
Band Edge NVNT a 5745MHz Low



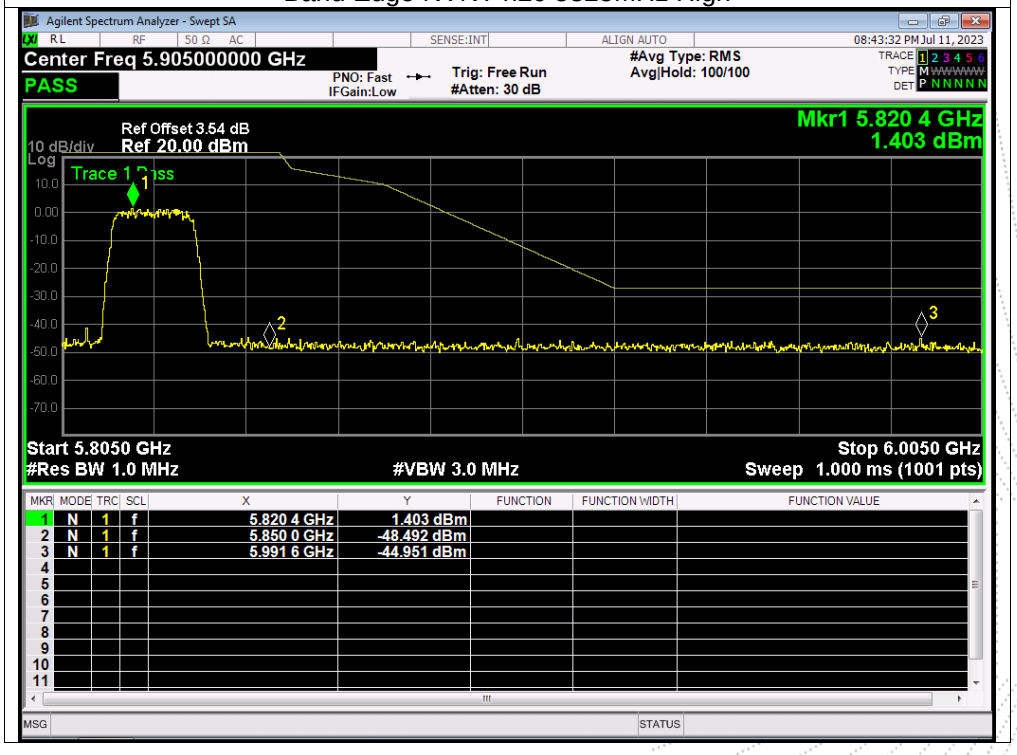
Band Edge NVNT a 5825MHz High



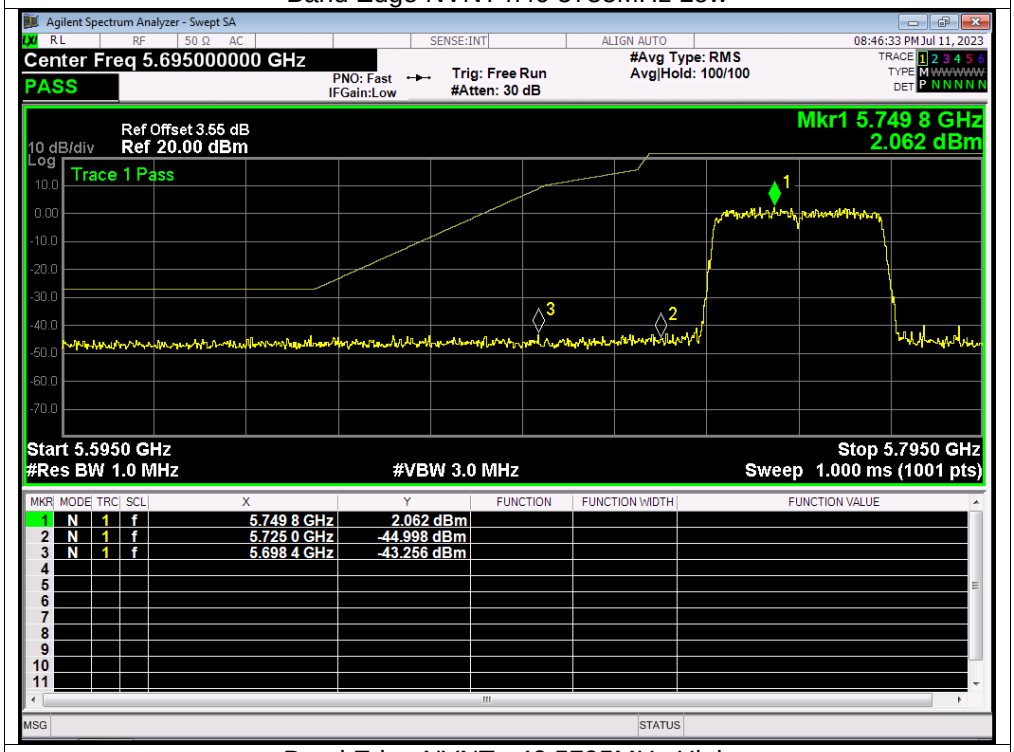
Band Edge NVNT n20 5745MHz Low



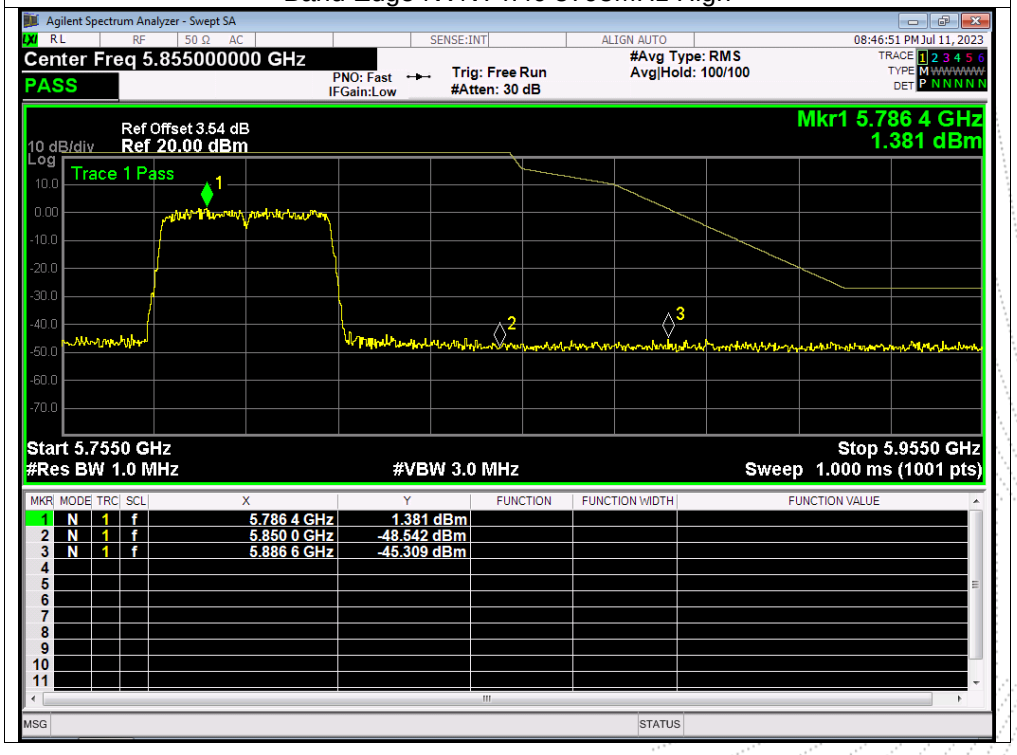
Band Edge NVNT n20 5825MHz High



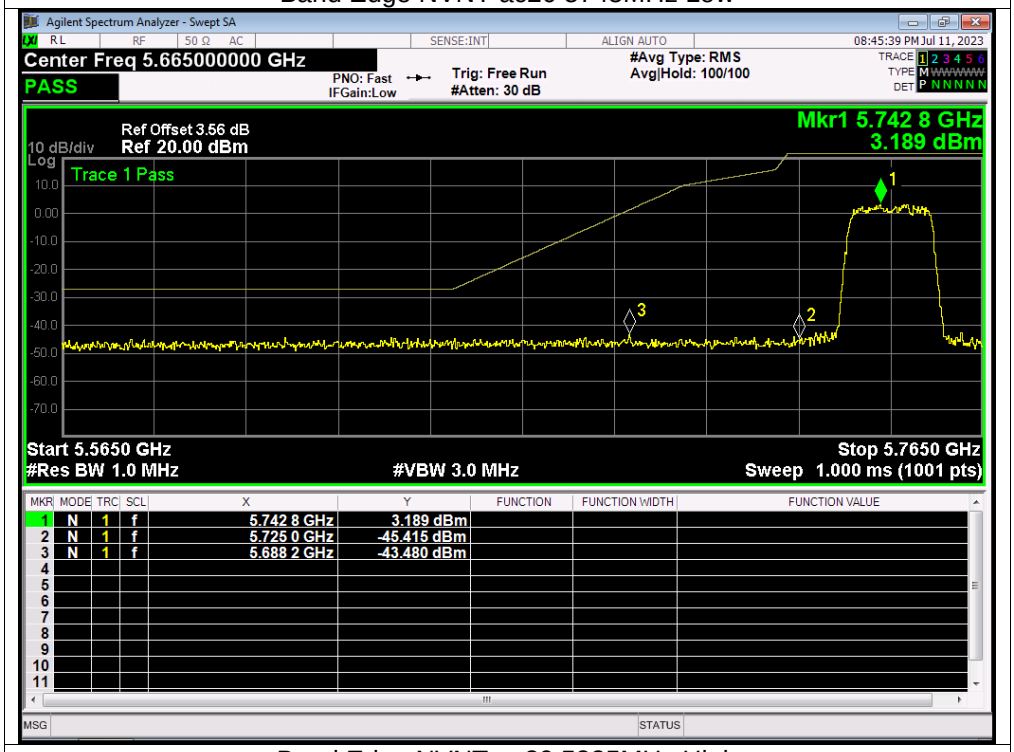
Band Edge NVNT n40 5755MHz Low



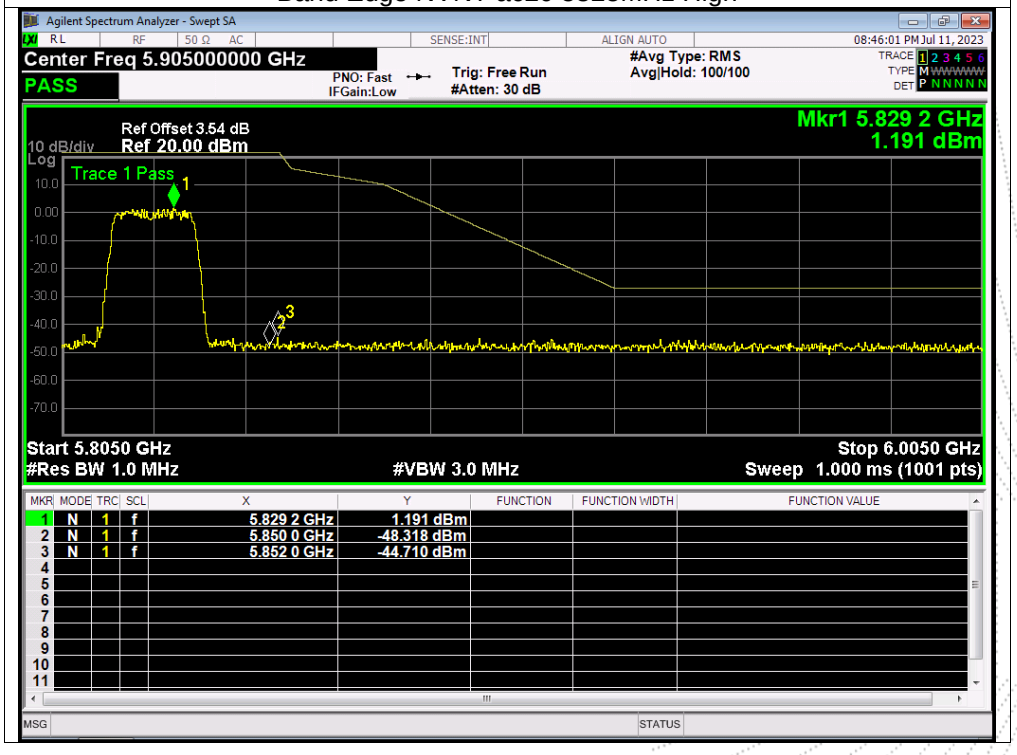
Band Edge NVNT n40 5795MHz High



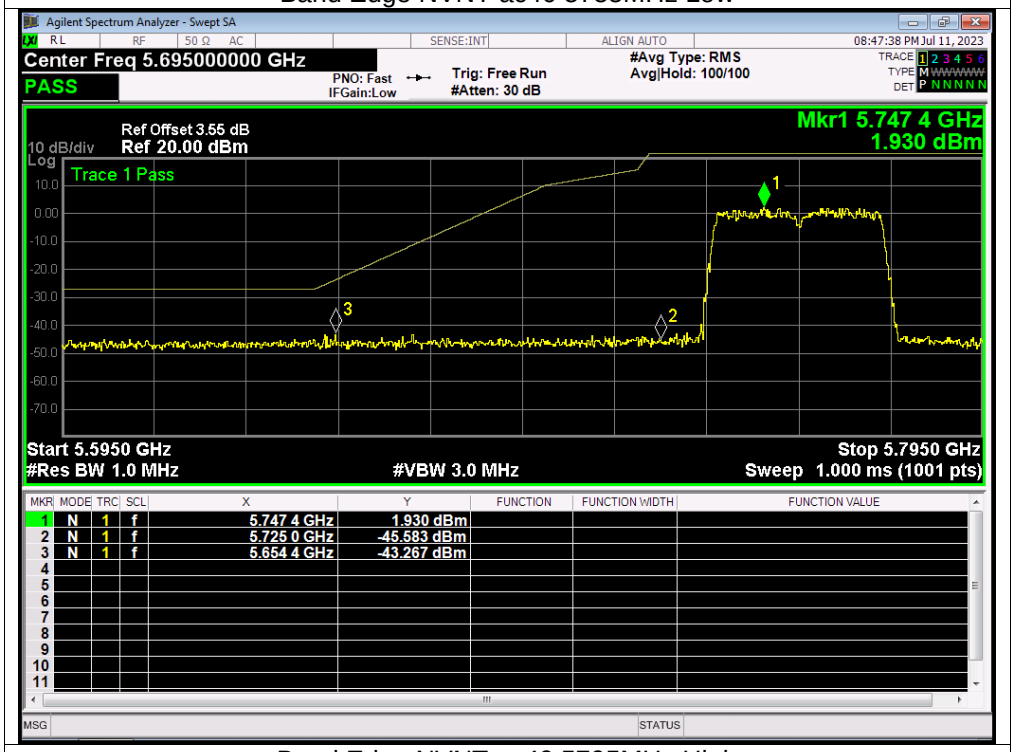
Band Edge NVNT ac20 5745MHz Low



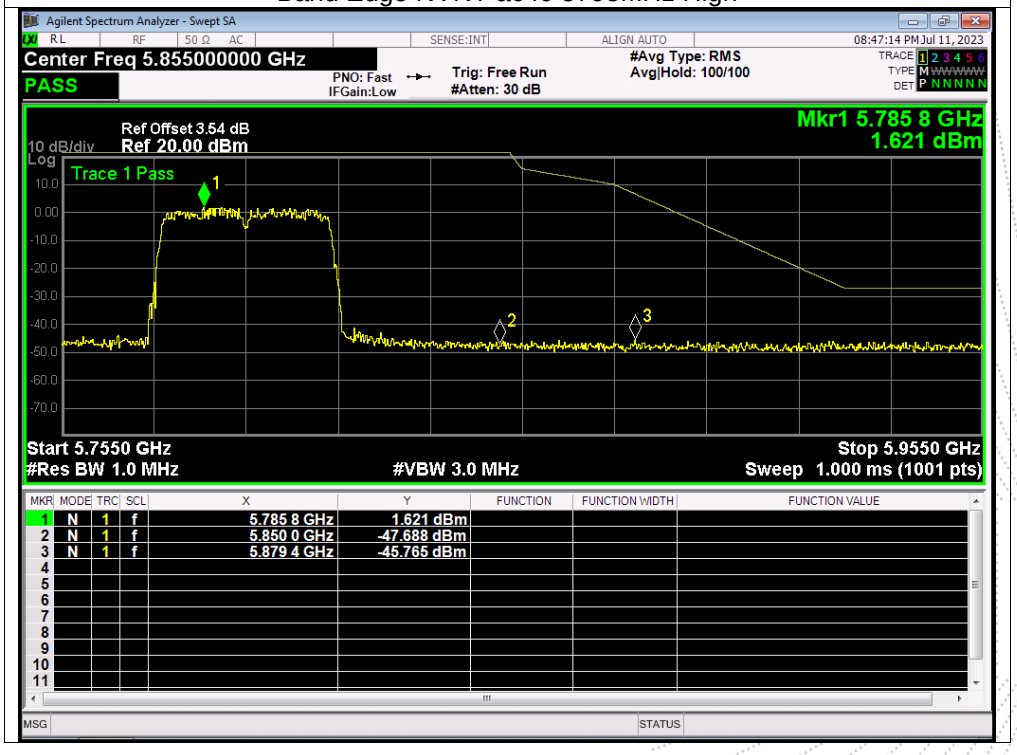
Band Edge NVNT ac20 5825MHz High



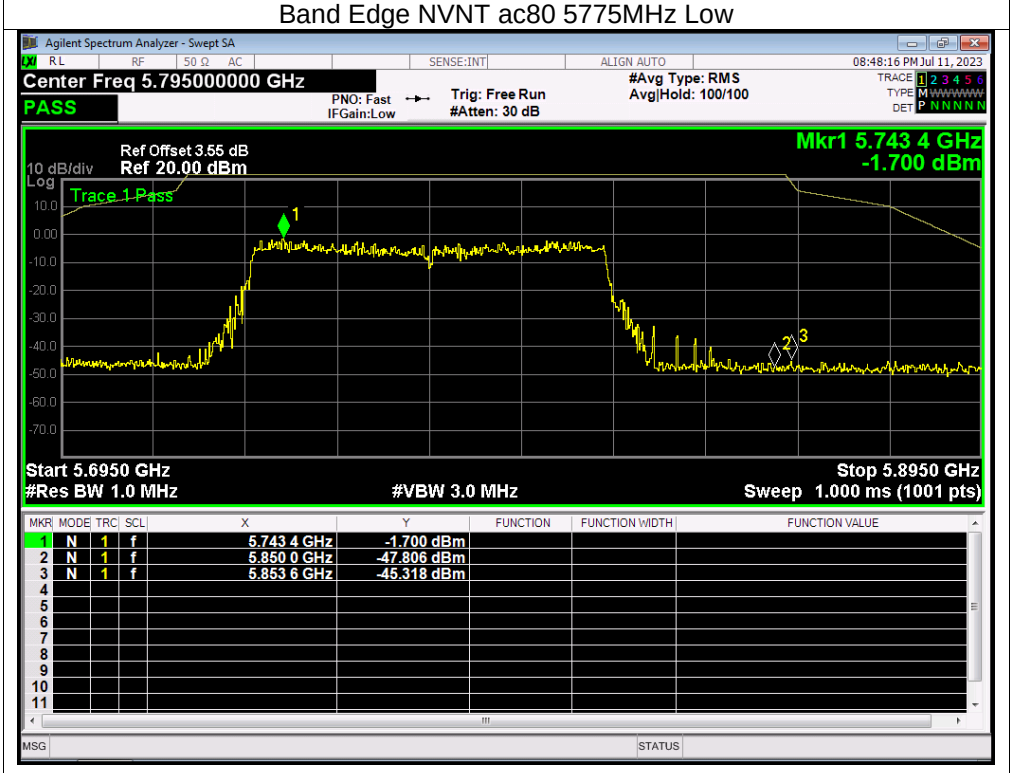
Band Edge NVNT ac40 5755MHz Low

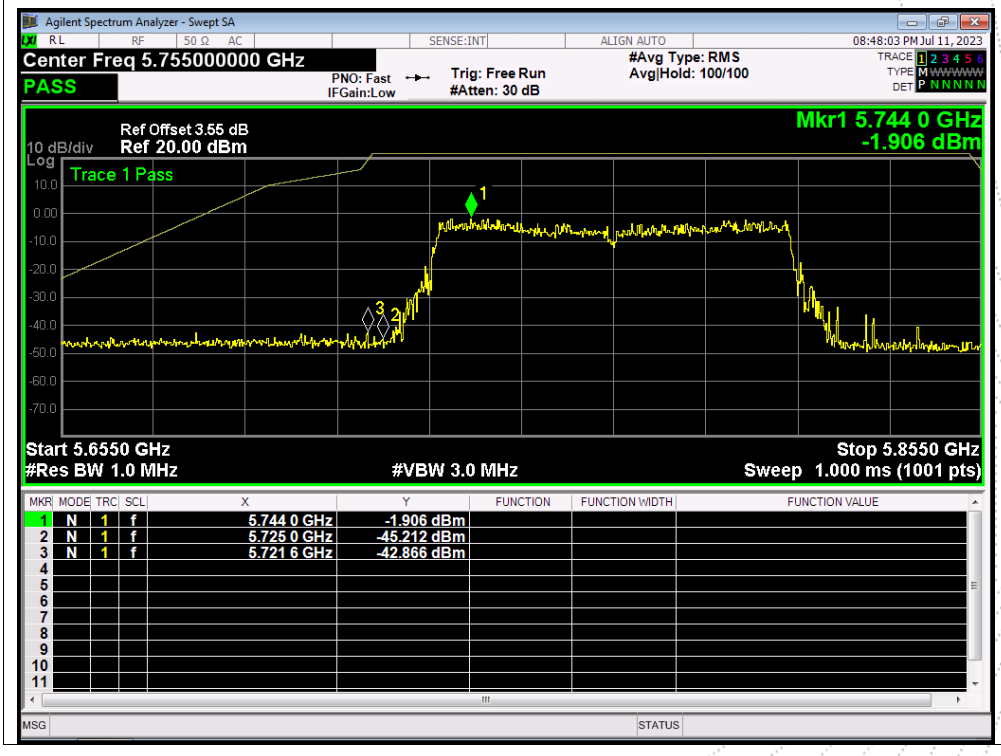


Band Edge NVNT ac40 5795MHz High



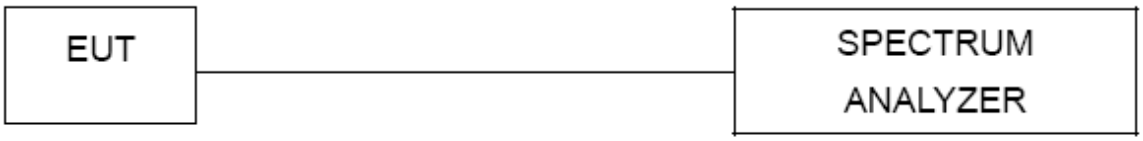
Band Edge NVNT ac80 5775MHz Low





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.

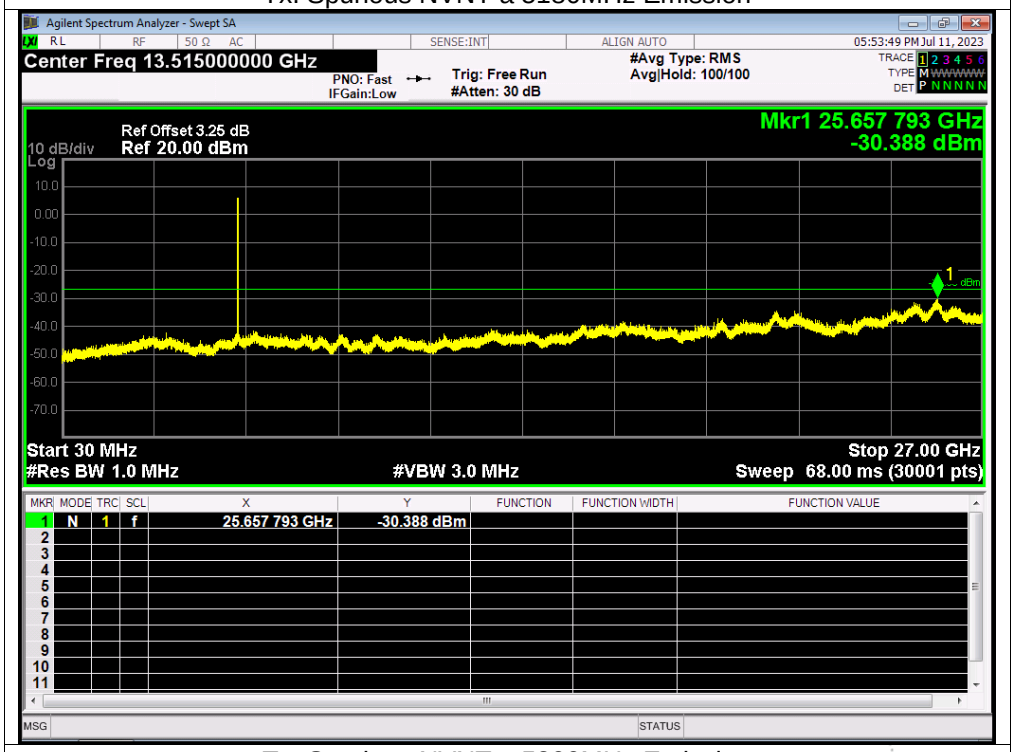
About:26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

.

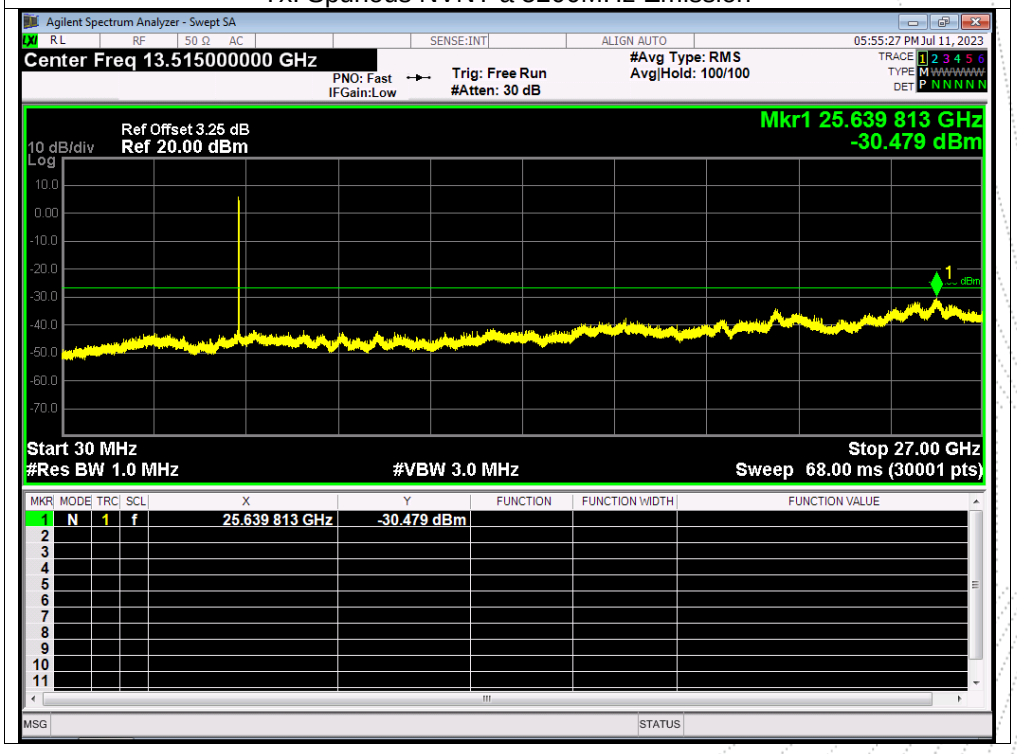
Plot.: 5180-5240MHz

Test Graphs

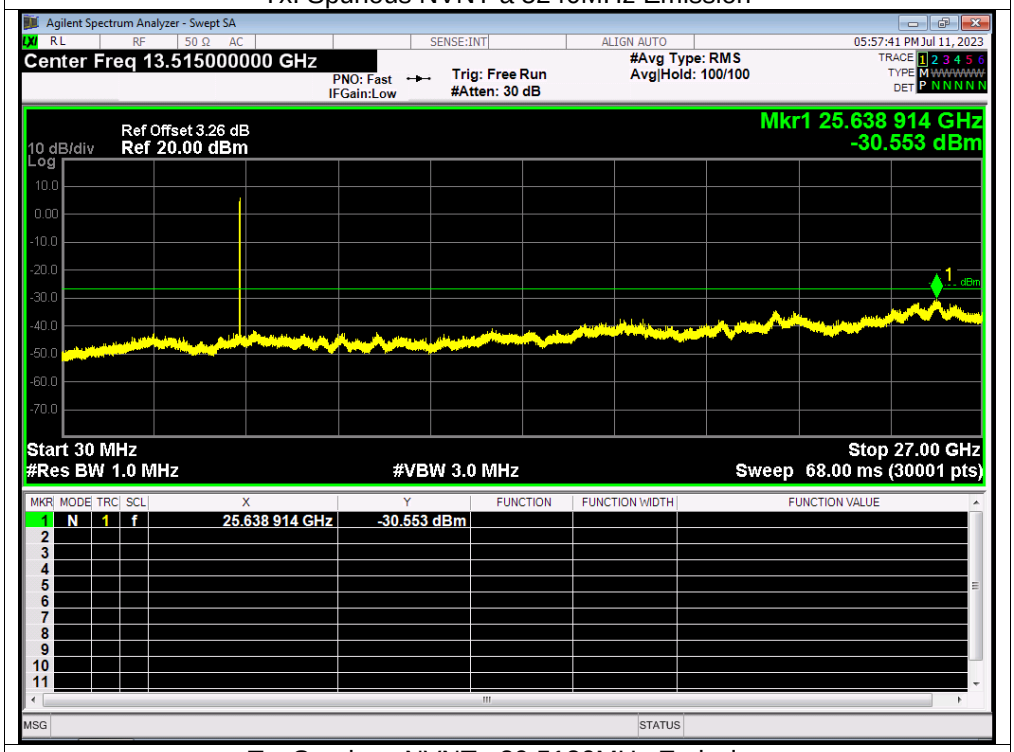
Tx. Spurious NVNT a 5180MHz Emission



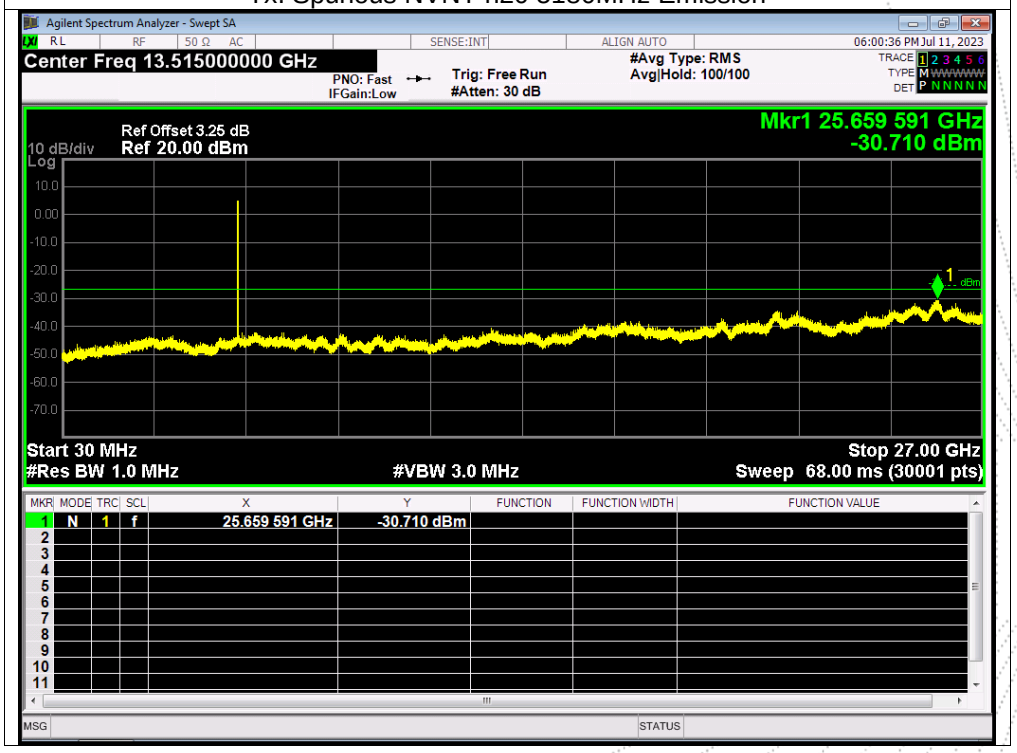
Tx. Spurious NVNT a 5200MHz Emission



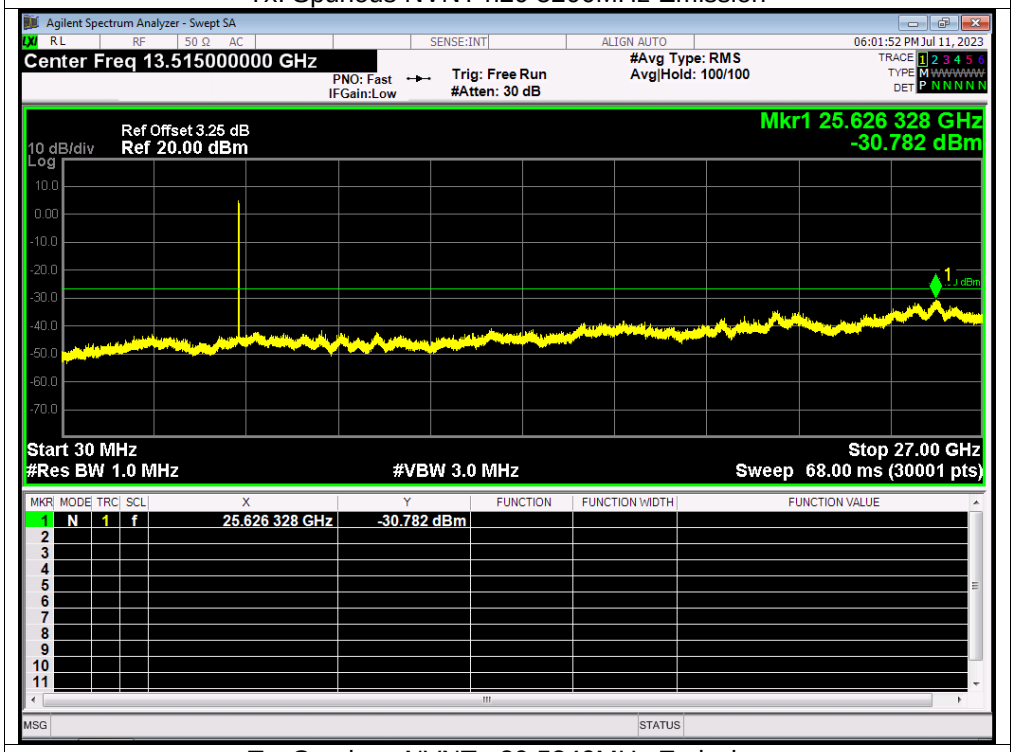
Tx. Spurious NVNT a 5240MHz Emission



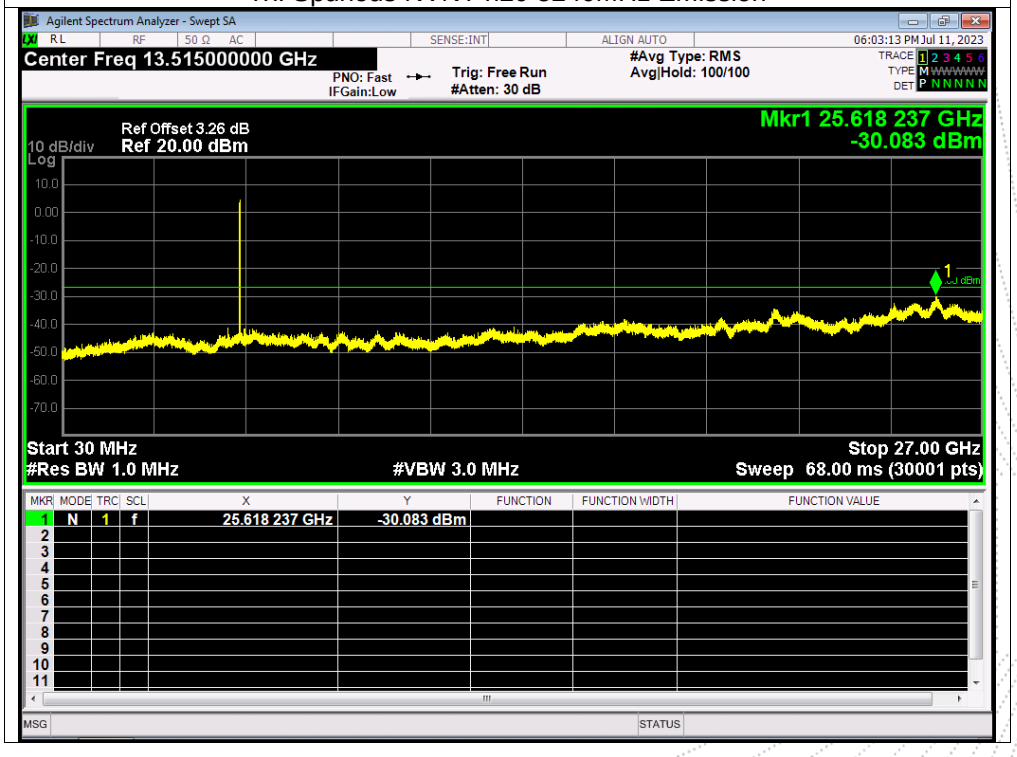
Tx. Spurious NVNT n20 5180MHz Emission



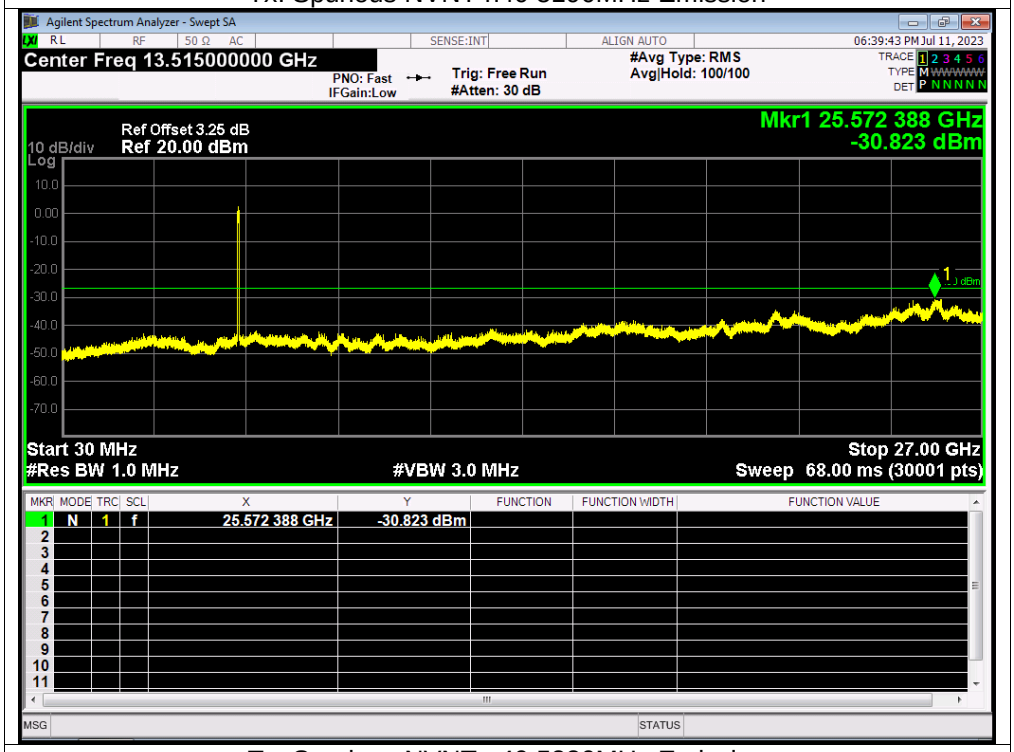
Tx. Spurious NVNT n20 5200MHz Emission



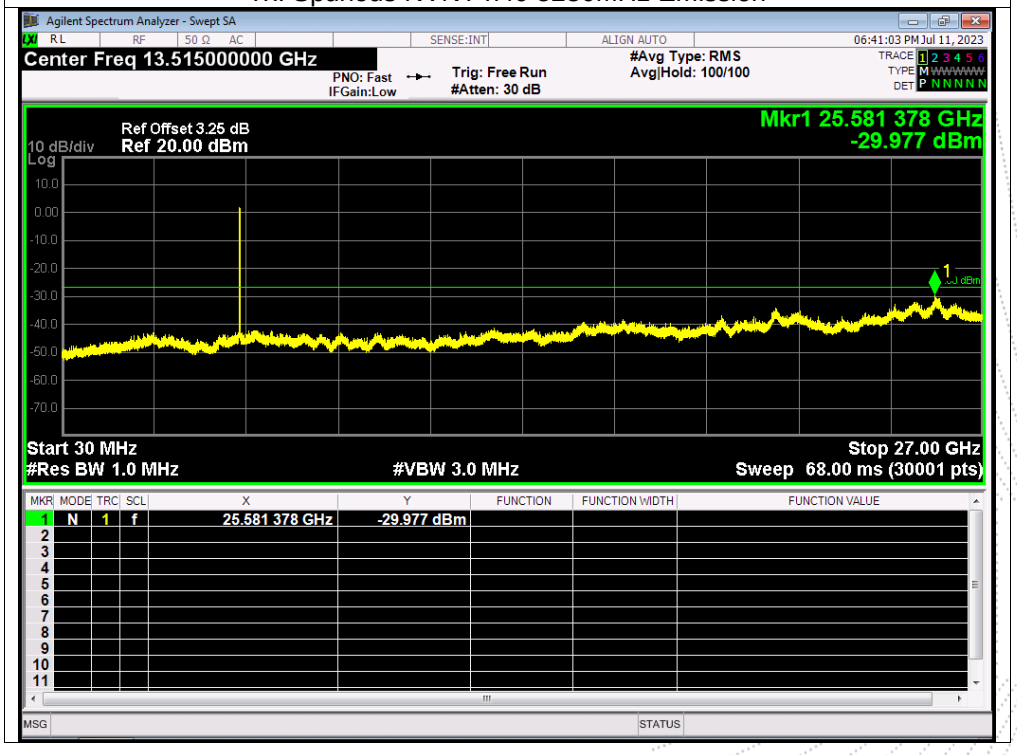
Tx. Spurious NVNT n20 5240MHz Emission



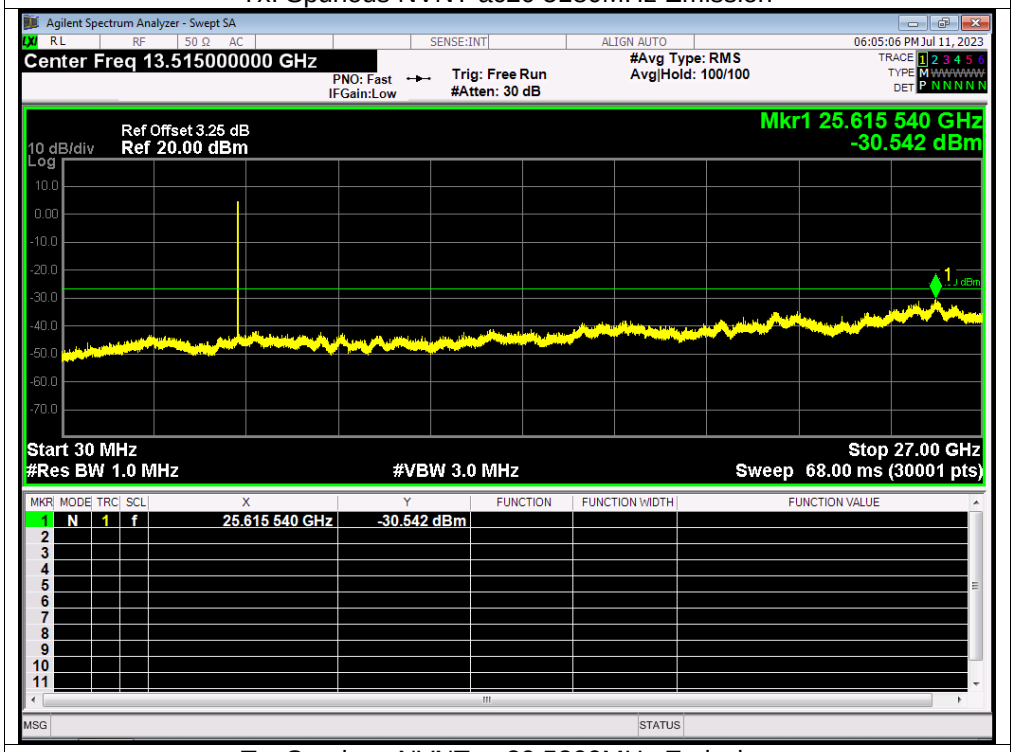
Tx. Spurious NVNT n40 5190MHz Emission



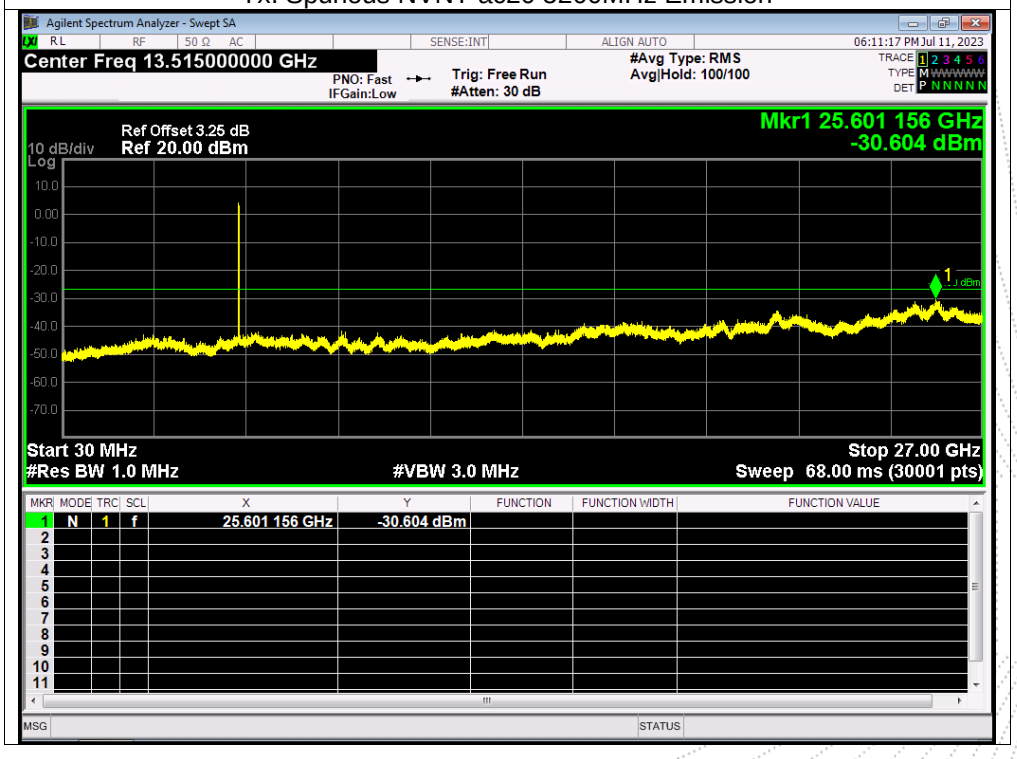
Tx. Spurious NVNT n40 5230MHz Emission



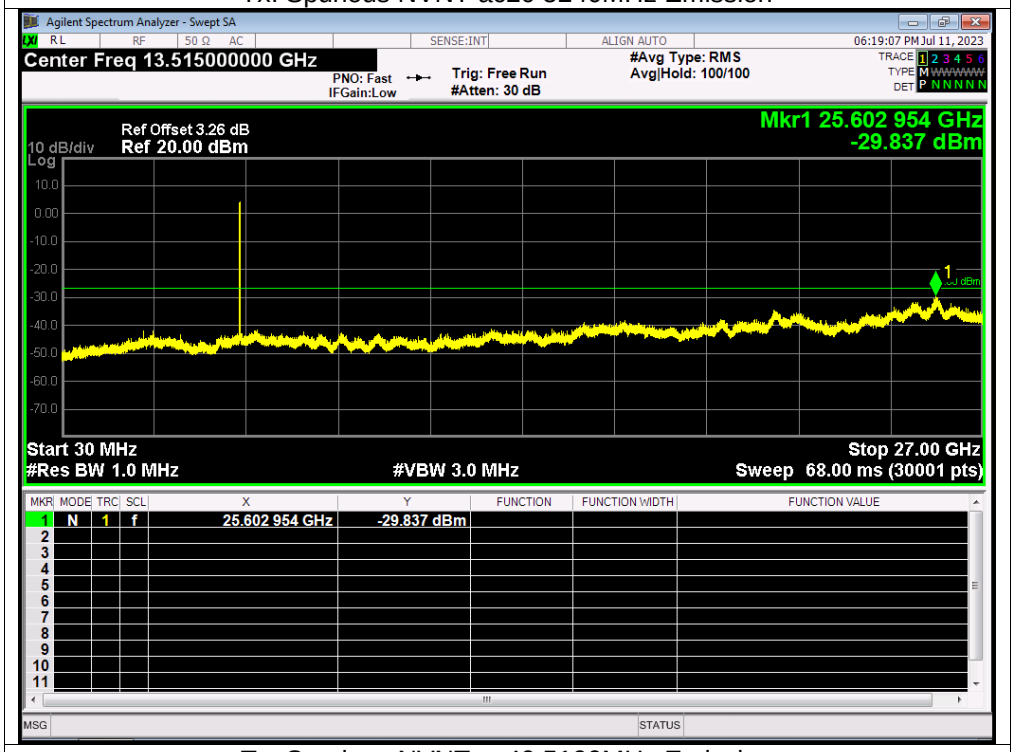
Tx. Spurious NVNT ac20 5180MHz Emission



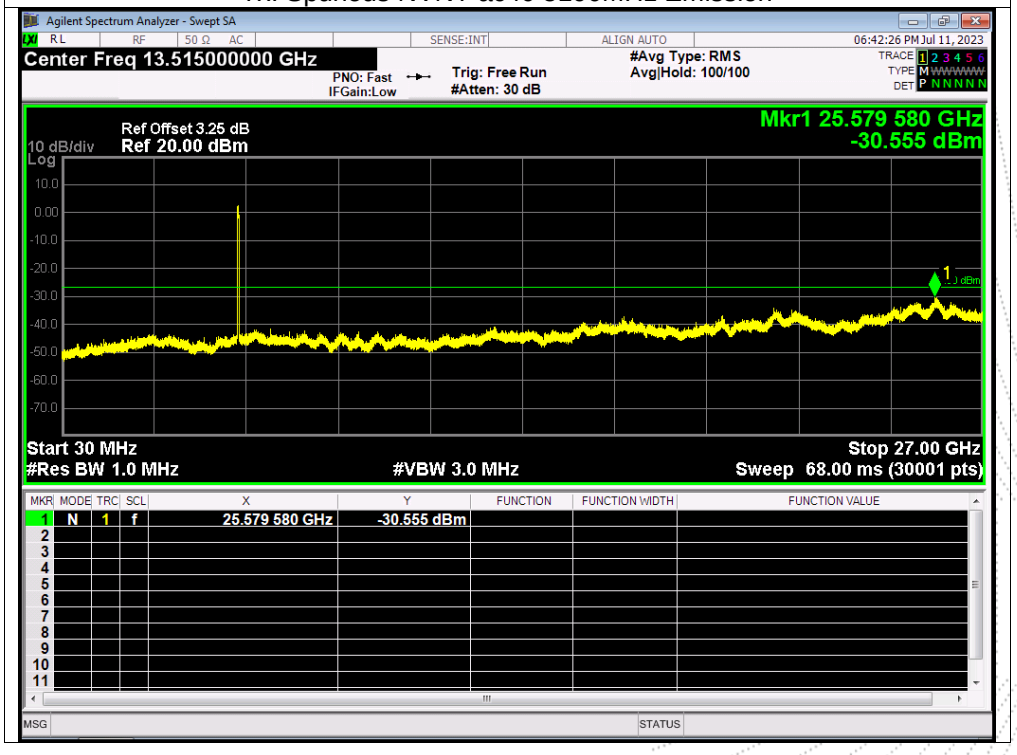
Tx. Spurious NVNT ac20 5200MHz Emission



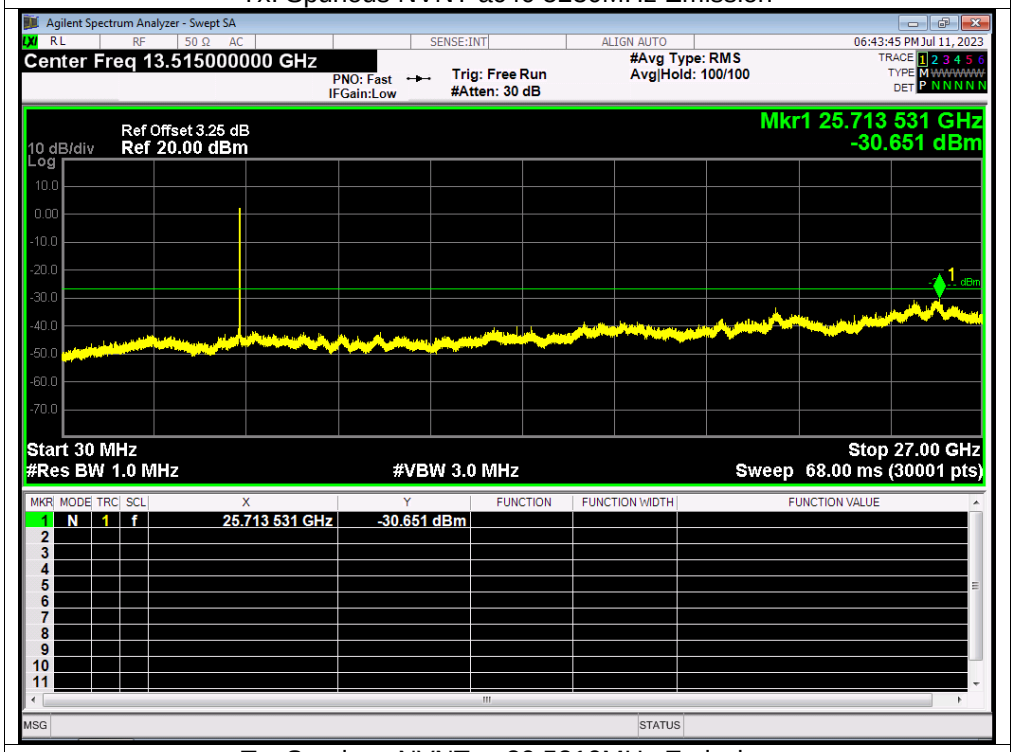
Tx. Spurious NVNT ac20 5240MHz Emission



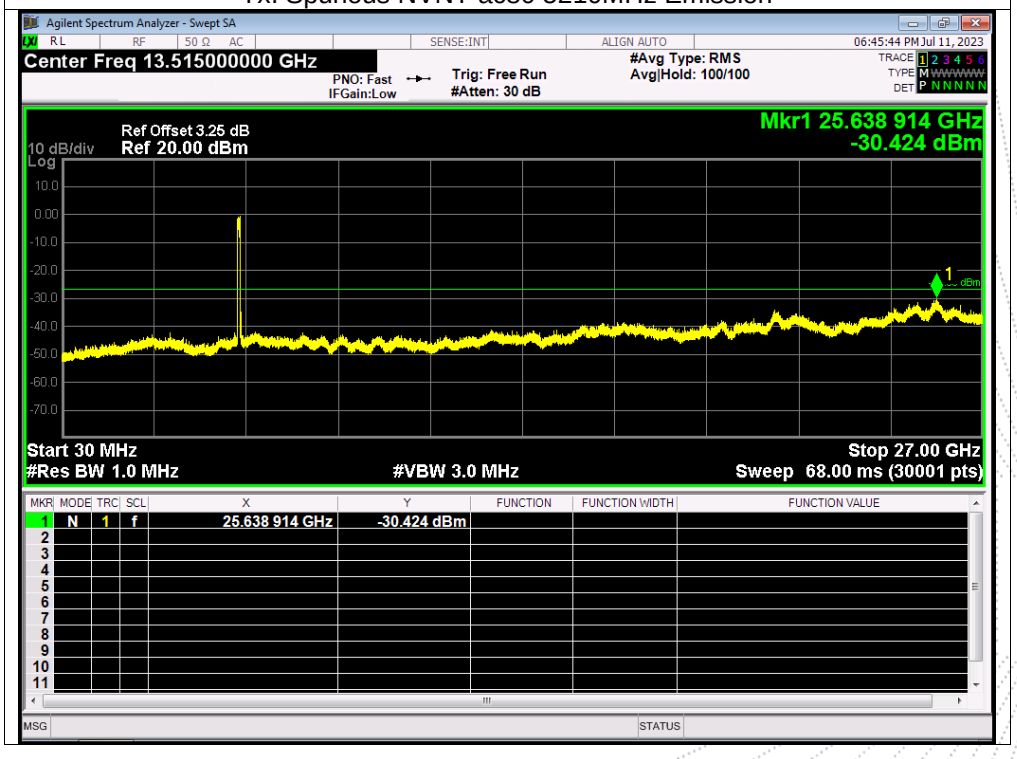
Tx. Spurious NVNT ac40 5190MHz Emission



Tx. Spurious NVNT ac40 5230MHz Emission



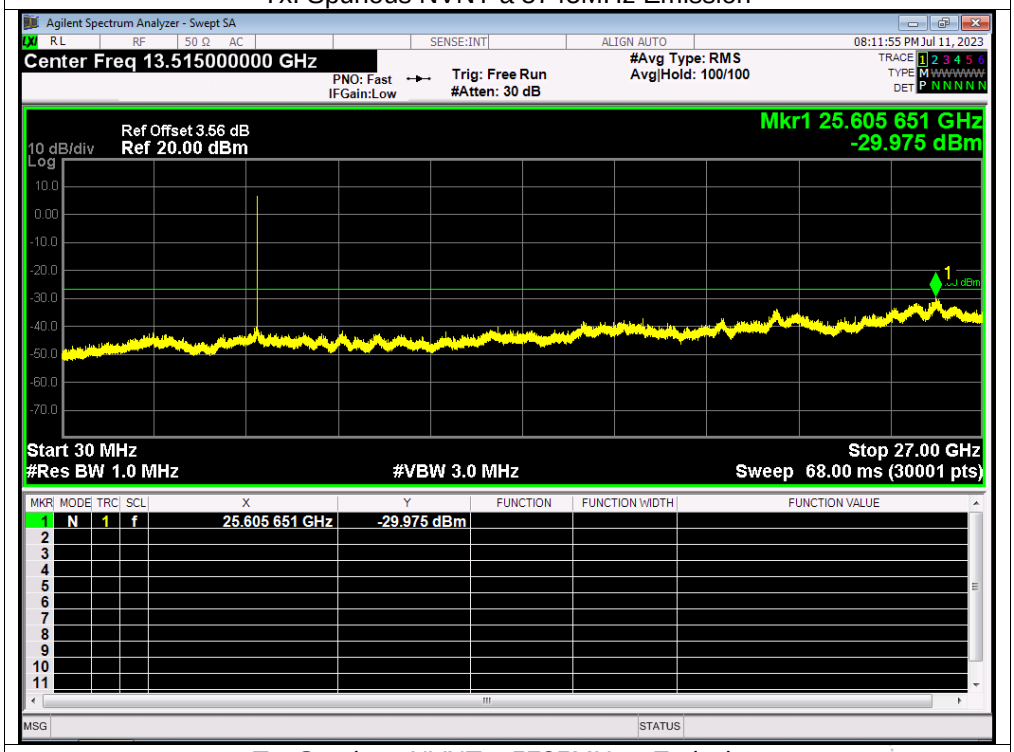
Tx. Spurious NVNT ac80 5210MHz Emission



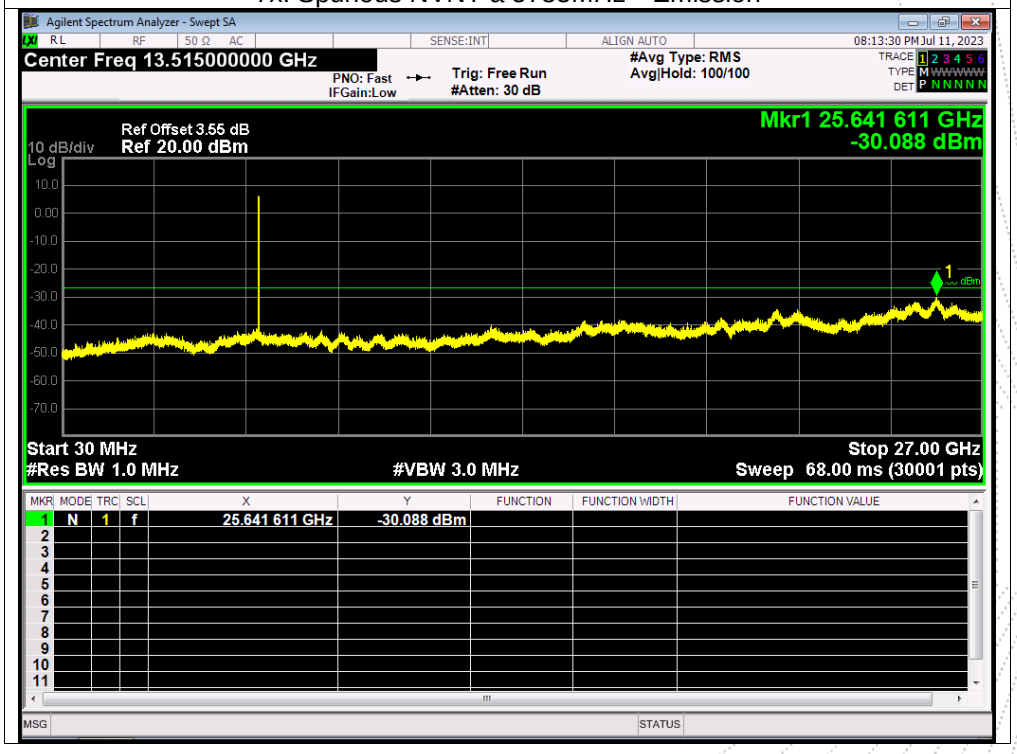
: 5745-58250MHz

Test Graphs

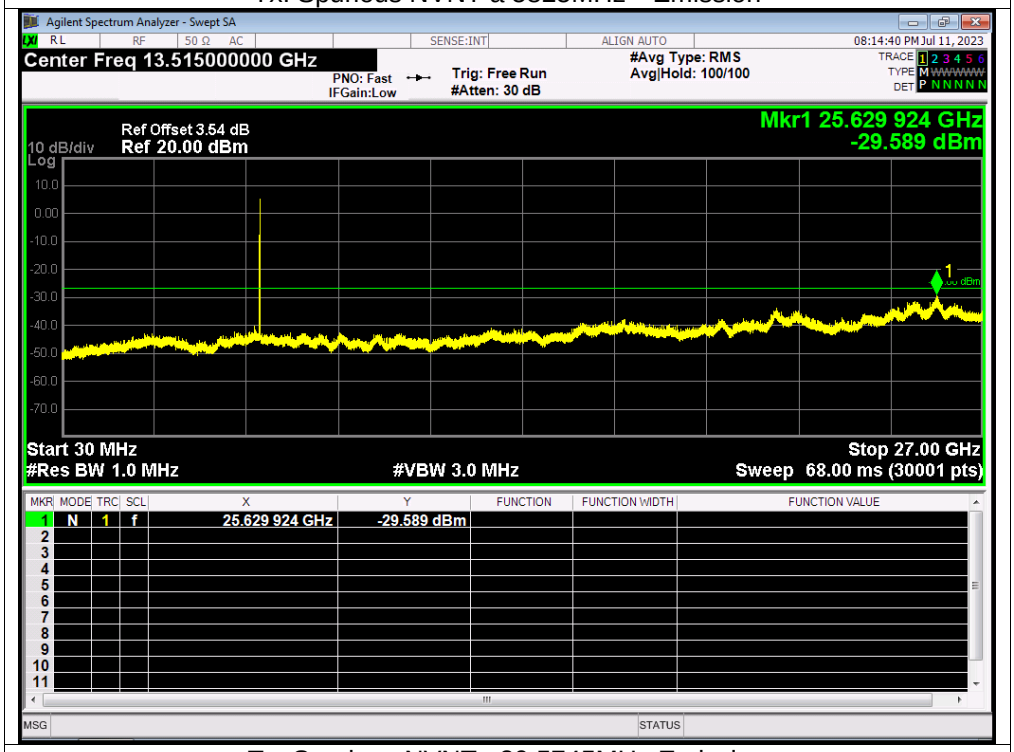
Tx. Spurious NVNT a 5745MHz Emission



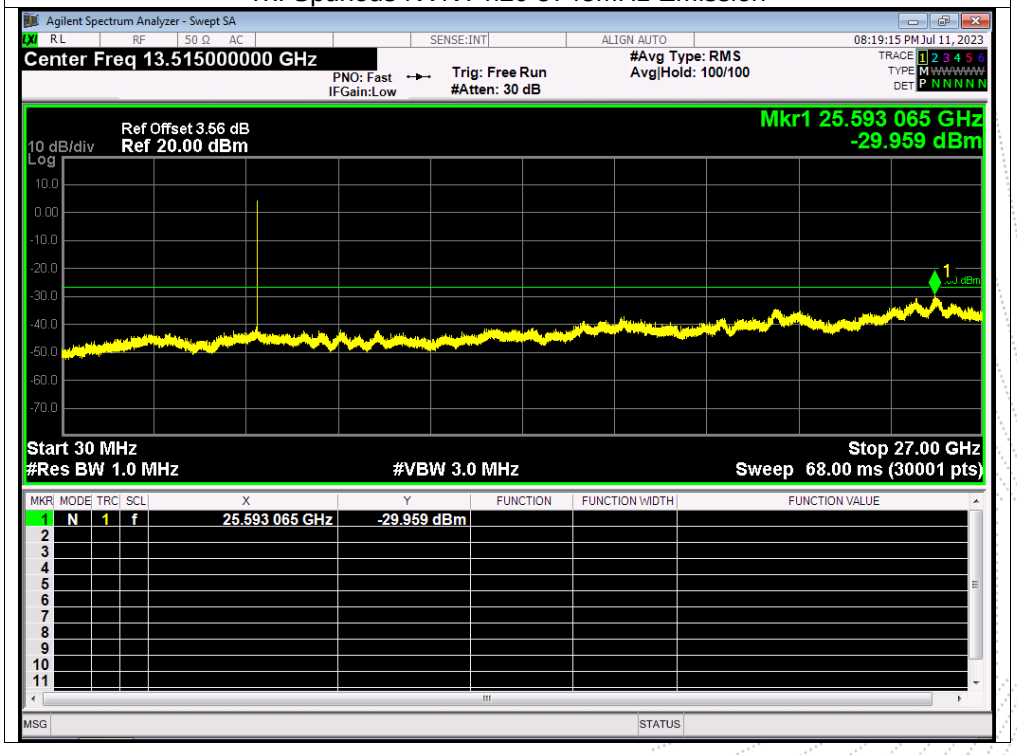
Tx. Spurious NVNT a 5785MHz Emission



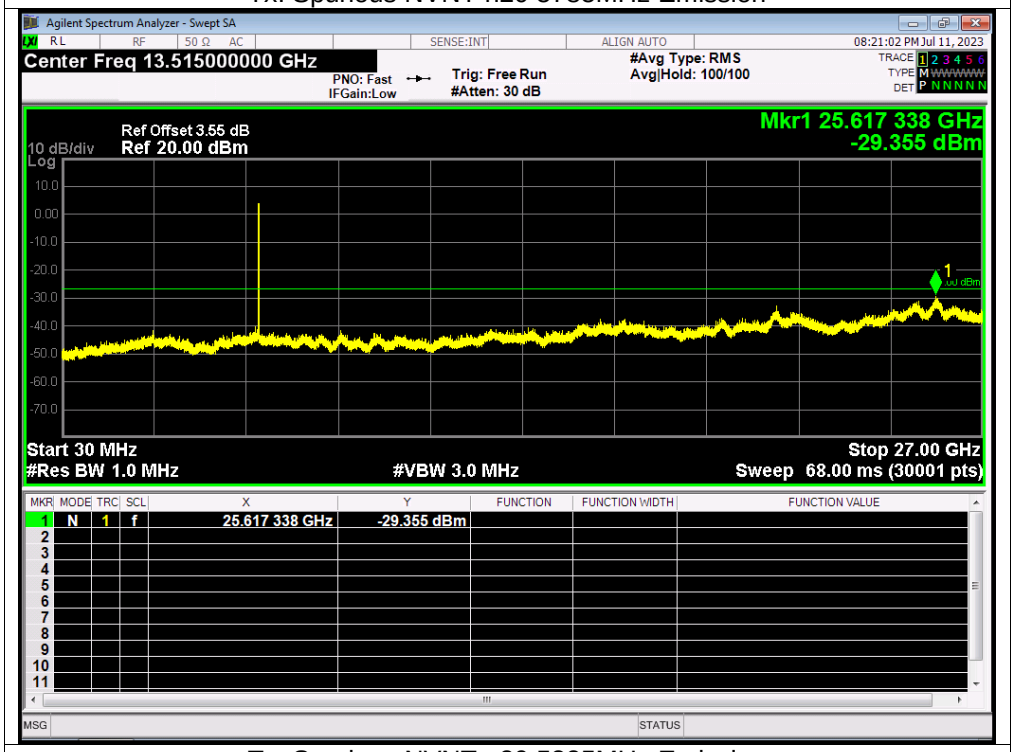
Tx. Spurious NVNT a 5825MHz Emission



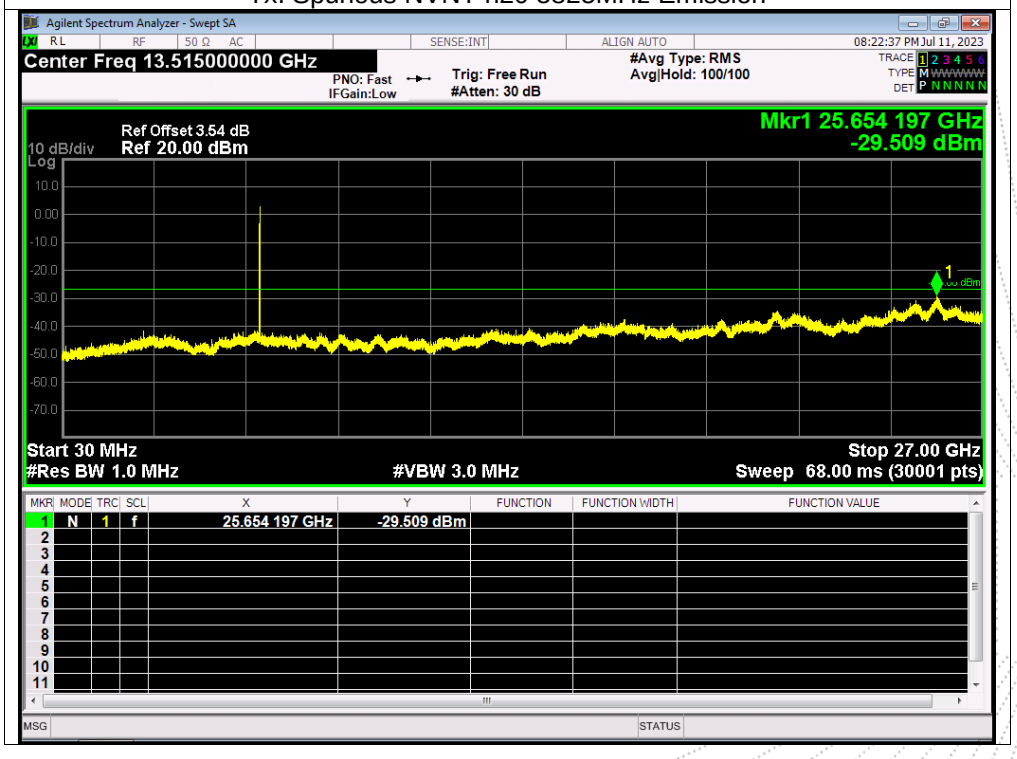
Tx. Spurious NVNT n20 5745MHz Emission



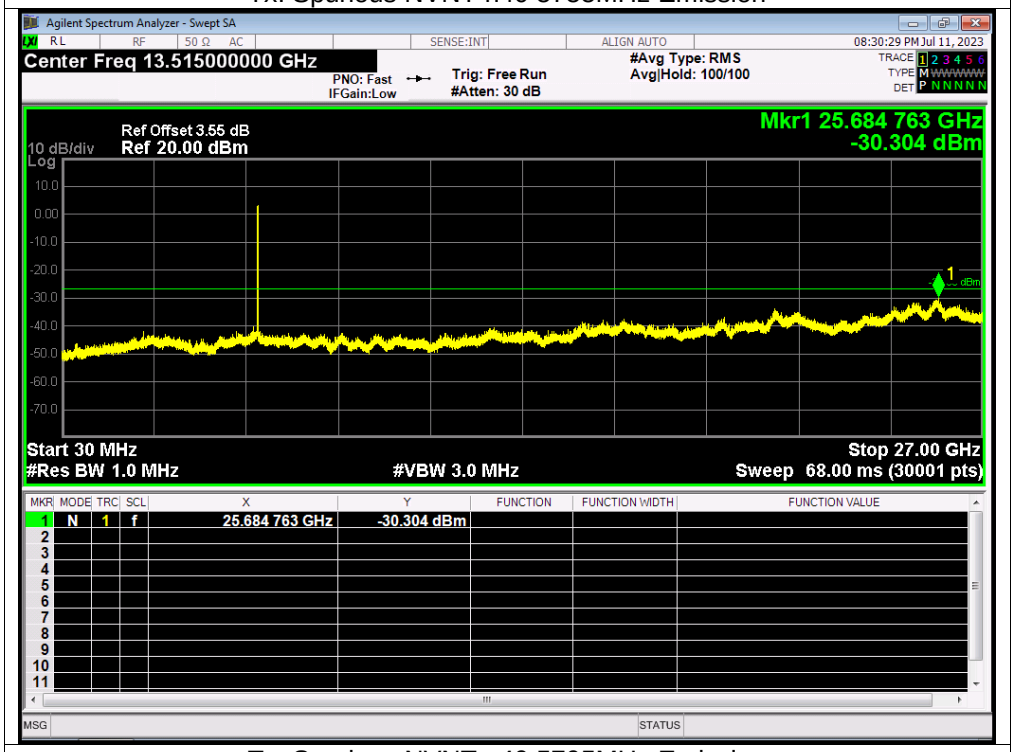
Tx. Spurious NVNT n20 5785MHz Emission



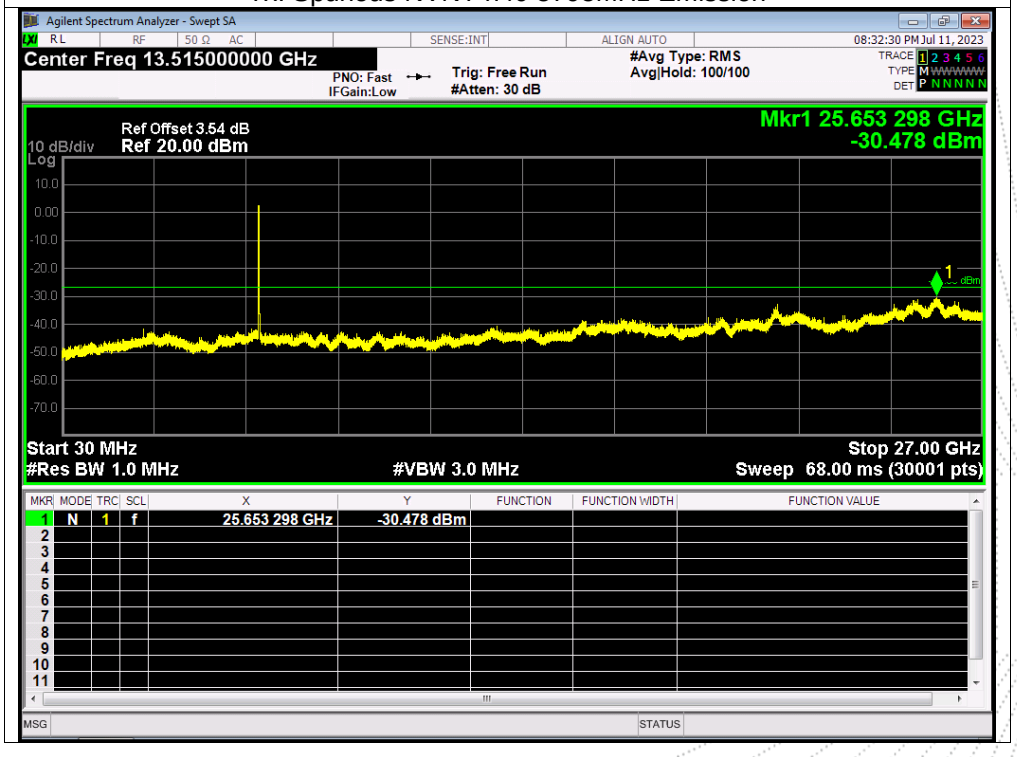
Tx. Spurious NVNT n20 5825MHz Emission



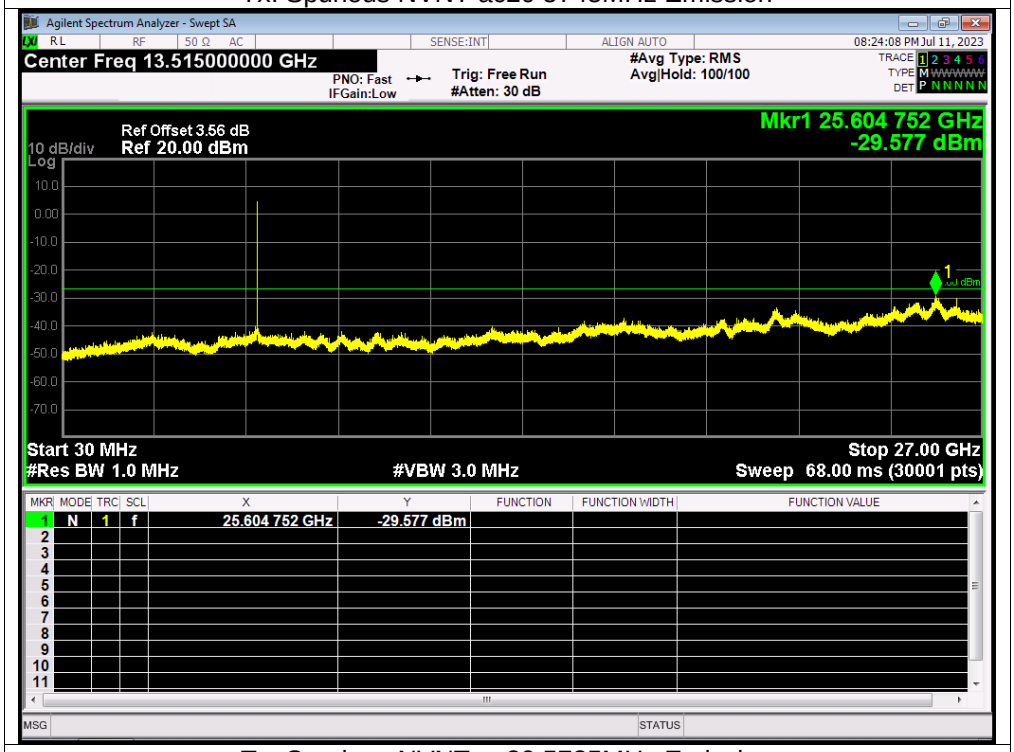
Tx. Spurious NVNT n40 5755MHz Emission



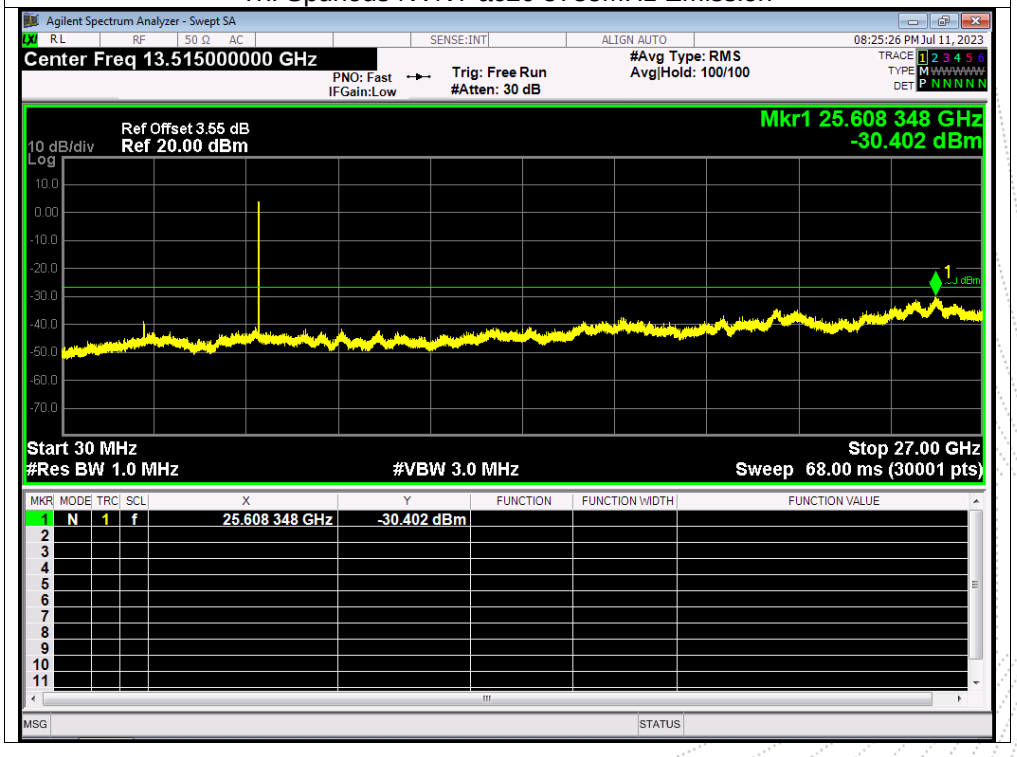
Tx. Spurious NVNT n40 5795MHz Emission



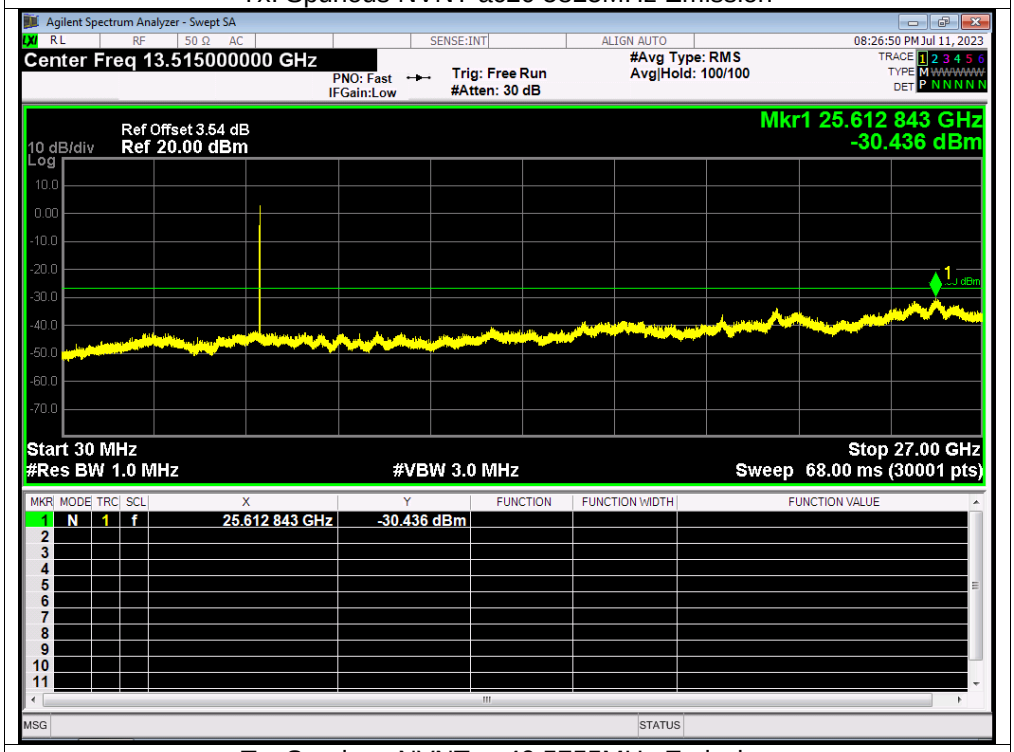
Tx. Spurious NVNT ac20 5745MHz Emission



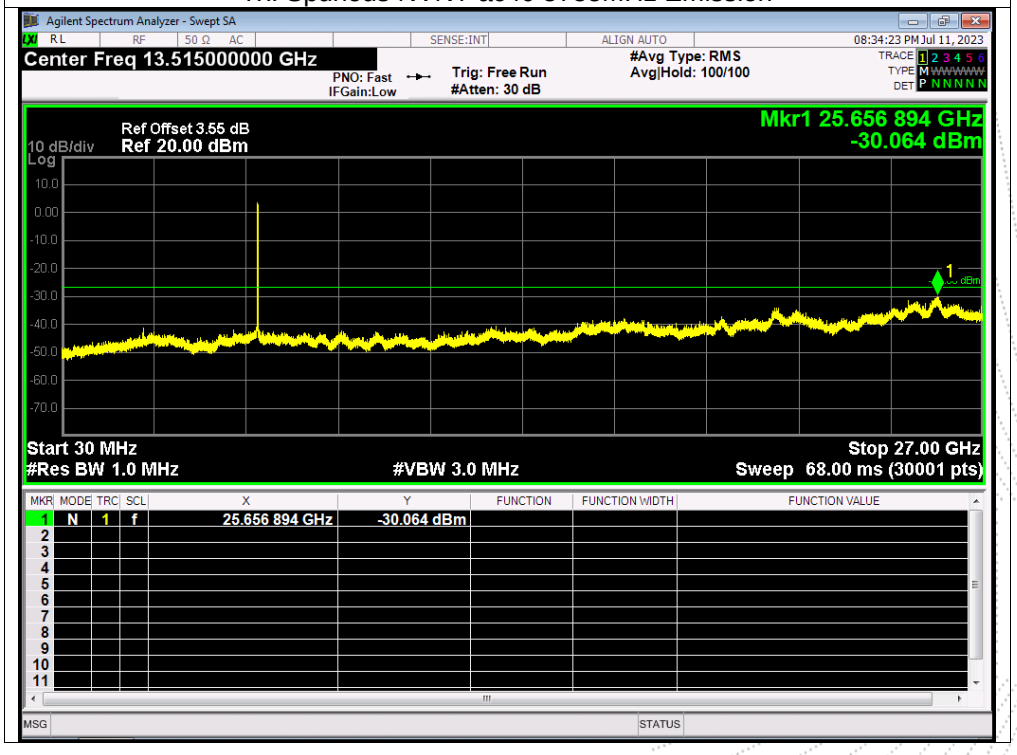
Tx. Spurious NVNT ac20 5785MHz Emission



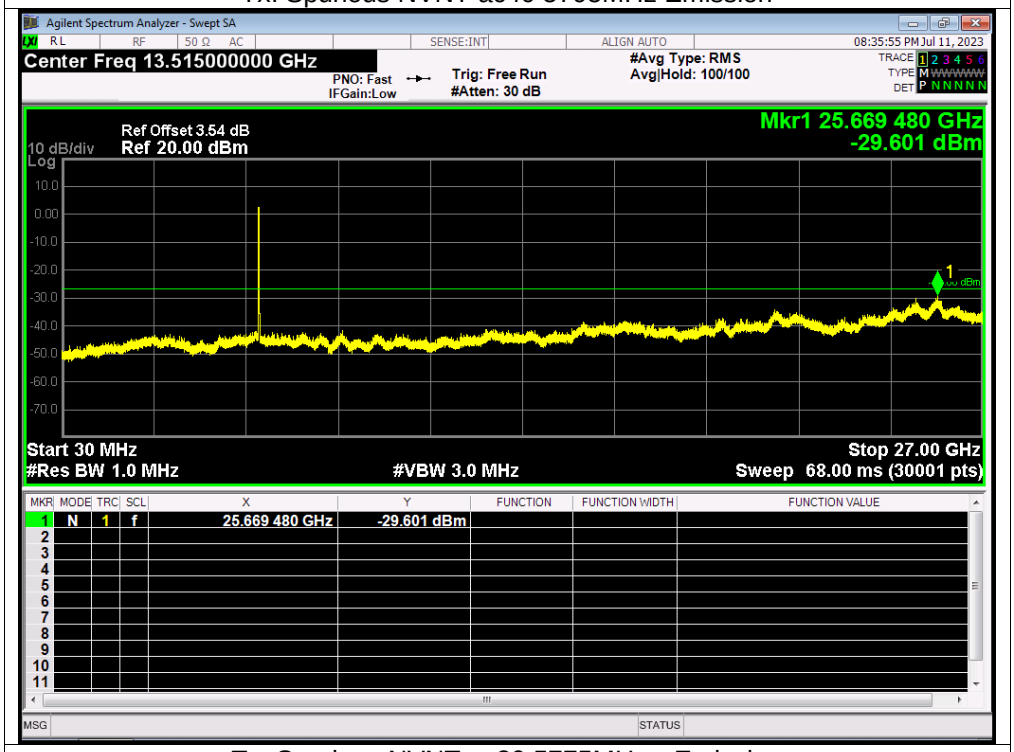
Tx. Spurious NVNT ac20 5825MHz Emission



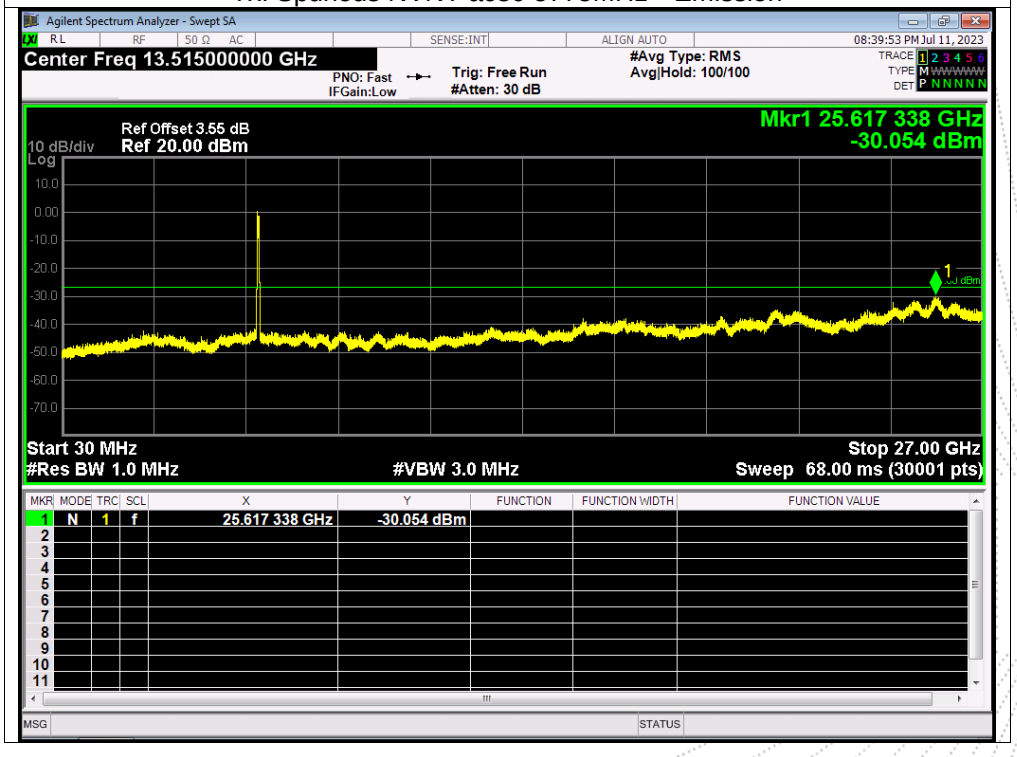
Tx. Spurious NVNT ac40 5755MHz Emission



Tx. Spurious NVNT ac40 5795MHz Emission

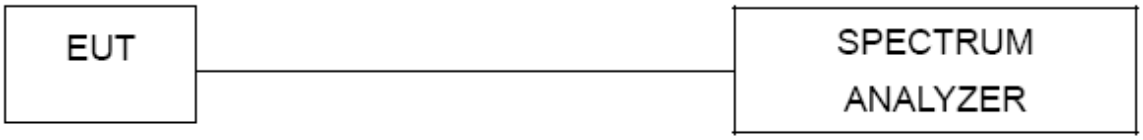


Tx. Spurious NVNT ac80 5775MHz Emission



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%
Pressure:	101KPa	Test Voltage:	DC 7.6V
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)	7.6	5180.0052	5180	0.0052	0.9985
		V max (V)	9.4	5180.0202	5180	0.0202	3.8957
		V min (V)	5.8	5180.0049	5180	0.0049	0.9376
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)	7.6	T (°C)	-20	5180.0061	5180	0.0061	1.1704
		T (°C)	-10	5180.0107	5180	0.0107	2.0651
		T (°C)	0	5180.0073	5180	0.0073	1.4002
		T (°C)	10	5180.0123	5180	0.0123	2.3662
		T (°C)	20	5180.0052	5180	0.0052	1.0024
		T (°C)	30	5180.0105	5180	0.0105	2.0298
		T (°C)	40	5180.0023	5180	0.0023	0.4455
		T (°C)	50	5180.0010	5180	0.0010	0.1913
		T (°C)	60	5180.0024	5180	0.0024	0.4660
		T (°C)	70	5180.0041	5180	0.0041	0.7912
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)	7.6	5200.0043	5200	0.0043	0.8239
		V max (V)	9.4	5200.0093	5200	0.0093	1.7861
		V min (V)	5.8	5200.0078	5200	0.0078	1.5013
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency:5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	7.6	T (°C)	-20	5200.01140	5200	0.01140	2.1927
		T (°C)	-10	5200.00504	5200	0.00504	0.9694
		T (°C)	0	5200.00614	5200	0.00614	1.1804
		T (°C)	10	5200.00995	5200	0.00995	1.9142
		T (°C)	20	5200.00067	5200	0.00067	0.1296
		T (°C)	30	5200.00055	5200	0.00055	0.1049
		T (°C)	40	5200.00478	5200	0.00478	0.9187
		T (°C)	50	5200.01053	5200	0.01053	2.0248
		T (°C)	60	5200.00546	5200	0.00546	1.0497
		T (°C)	70	5200.00184	5200	0.00184	0.3542
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)	7.6	5240.0097	5240	0.0097	1.8445
		V max (V)	9.4	5240.0062	5240	0.0062	1.1860
		V min (V)	5.8	5240.0069	5240	0.0069	1.3188
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)	7.6	T (°C)	-20	5240.0093	5240	0.0093	1.7715
		T (°C)	-10	5240.0091	5240	0.0091	1.7460
		T (°C)	0	5240.0038	5240	0.0038	0.7308
		T (°C)	10	5240.0088	5240	0.0088	1.6839
		T (°C)	20	5240.0123	5240	0.0123	2.3409
		T (°C)	30	5240.0099	5240	0.0099	1.8949
		T (°C)	40	5240.0082	5240	0.0082	1.5644
		T (°C)	50	5240.0014	5240	0.0014	0.2719
		T (°C)	60	5240.0076	5240	0.0076	1.4533
		T (°C)	70	5240.0088	5240	0.0088	1.6751
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 7.6V
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)	7.6	5745.01119	5745	0.01119	1.9475
		V max (V)	9.4	5745.00298	5745	0.00298	0.5192
		V min (V)	5.8	5745.00795	5745	0.00795	1.3835
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)	7.6	T (°C)	-20	5745.00081	5745	0.00081	0.1413
		T (°C)	-10	5745.01271	5745	0.01271	2.2131
		T (°C)	0	5745.00917	5745	0.00917	1.5955
		T (°C)	10	5745.00703	5745	0.00703	1.2236
		T (°C)	20	5745.01216	5745	0.01216	2.1164
		T (°C)	30	5745.00702	5745	0.00702	1.2222
		T (°C)	40	5745.00647	5745	0.00647	1.1265
		T (°C)	50	5745.01165	5745	0.01165	2.0274
		T (°C)	60	5745.01331	5745	0.01331	2.3174
		T (°C)	70	5745.00590	5745	0.00590	1.0267
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)	7.6	5785.00029	5785	0.00029	0.0501
		V max (V)	9.4	5785.00361	5785	0.00361	0.6240
		V min (V)	5.8	5785.01166	5785	0.01166	2.0154
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)	7.6	T (°C)	-20	5785.00672	5785	0.00672	1.1624
		T (°C)	-10	5785.00929	5785	0.00929	1.6051
		T (°C)	0	5785.01140	5785	0.01140	1.9713
		T (°C)	10	5785.00893	5785	0.00893	1.5440
		T (°C)	20	5785.00347	5785	0.00347	0.6004
		T (°C)	30	5785.00638	5785	0.00638	1.1026
		T (°C)	40	5785.00541	5785	0.00541	0.9360
		T (°C)	50	5785.00421	5785	0.00421	0.7286
		T (°C)	60	5785.00376	5785	0.00376	0.6505
		T (°C)	70	5785.00445	5785	0.00445	0.7689
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)	7.6	5825.00702	5825	0.00702	1.2048
		V max (V)	9.4	5825.00214	5825	0.00214	0.3673
		V min (V)	5.8	5825.00837	5825	0.00837	1.4376
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)	7.6	T (°C)	-20	5825.01102	5825	0.01102	1.8915
		T (°C)	-10	5825.00971	5825	0.00971	1.6668
		T (°C)	0	5825.00444	5825	0.00444	0.7625
		T (°C)	10	5825.00271	5825	0.00271	0.4644
		T (°C)	20	5825.00352	5825	0.00352	0.6042
		T (°C)	30	5825.00913	5825	0.00913	1.5675
		T (°C)	40	5825.00383	5825	0.00383	0.6567
		T (°C)	50	5825.01258	5825	0.01258	2.1604
		T (°C)	60	5825.00084	5825	0.00084	0.1437
		T (°C)	70	5825.00304	5825	0.00304	0.5215
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

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

15. Antenna Requirement

15.1 Limit

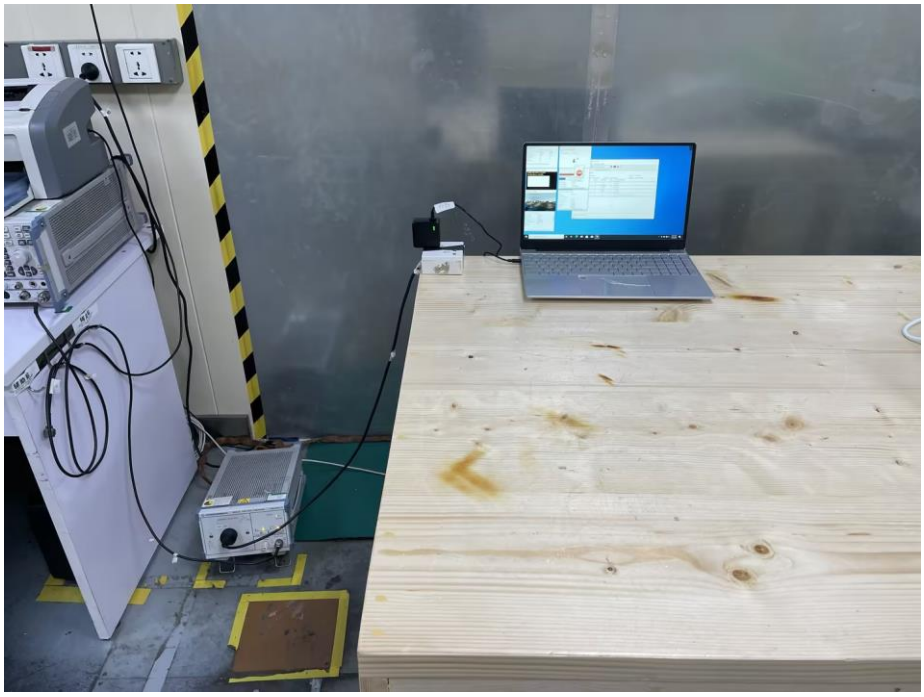
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

15.2 Test Result

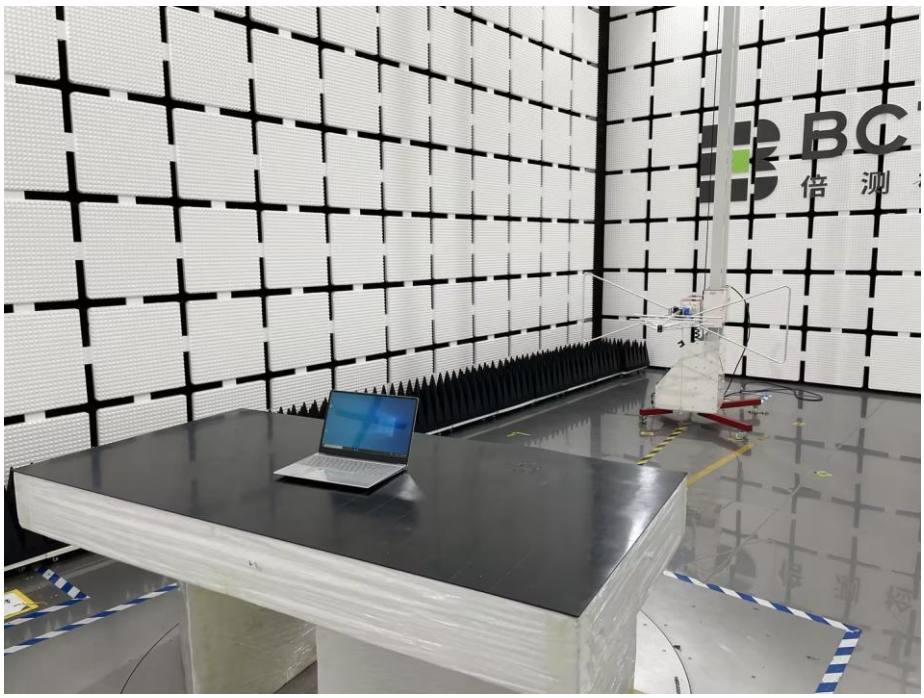
The EUT antenna is built-in antenna, fulfill the requirement of this section.

16. EUT Test Setup Photographs

Conducted emissions



Radiated Measurement Photos



STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:
1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL：400-788-9558

P.C.: 518103

FAX：0755-33229357

Website：http://www.chnbctc.com

E-Mail：bctc@bctc-lab.com.cn

※※※※※ **END** ※※※※※