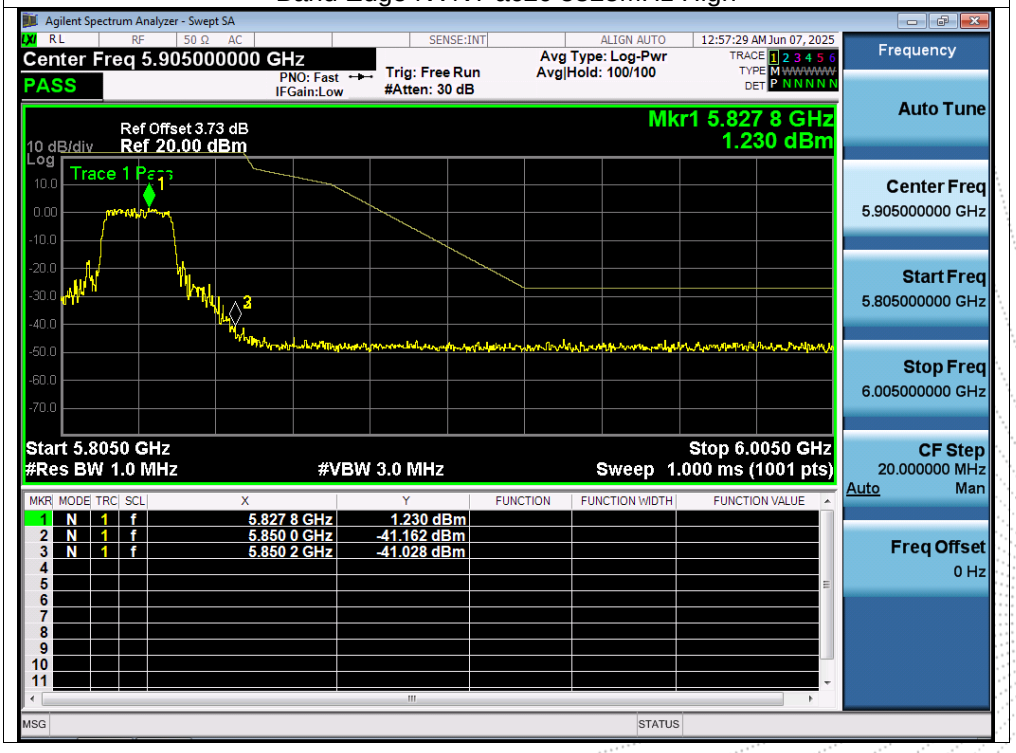
Band Edge NVNT ac20 5745MHz Low

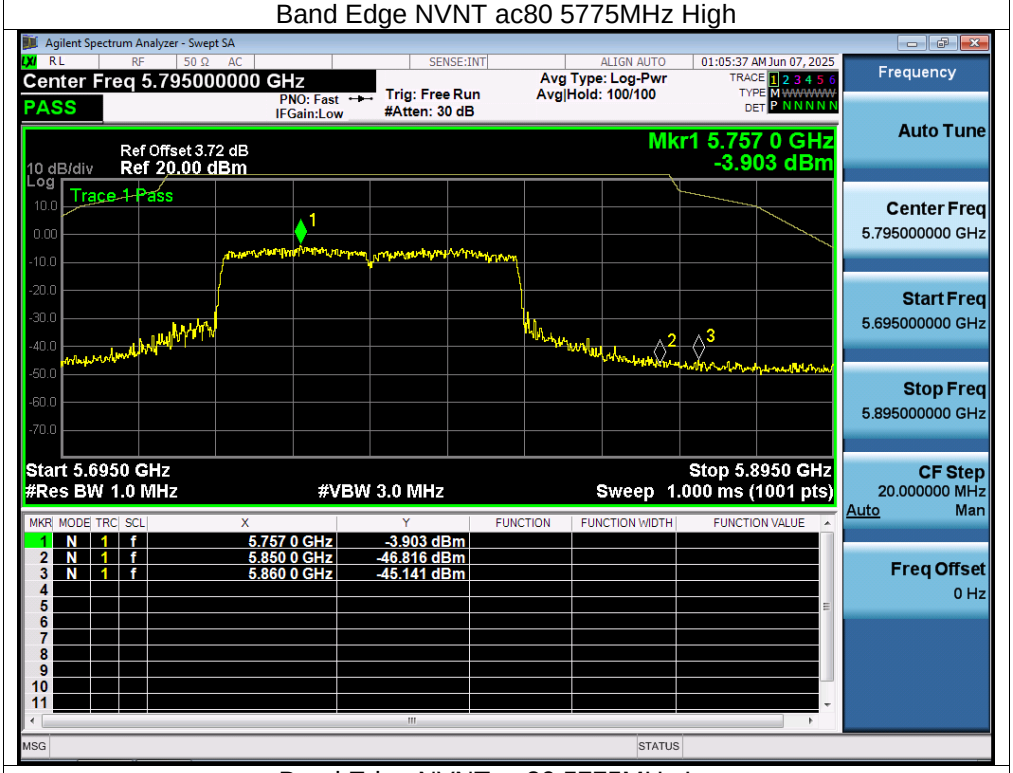
Band Edge NVNT ac20 5825MHz High



Band Edge NVNT ac40 5755MHz Low

Band Edge NVNT ac40 5795MHz High

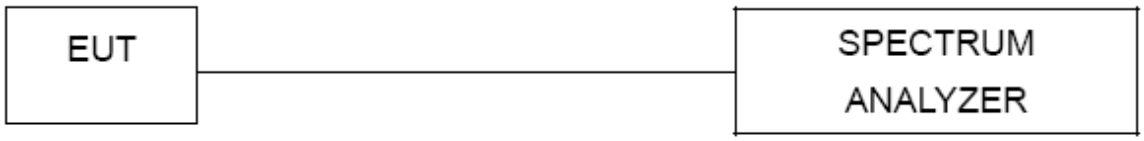
Band Edge NVNT ac80 5775MHz High



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

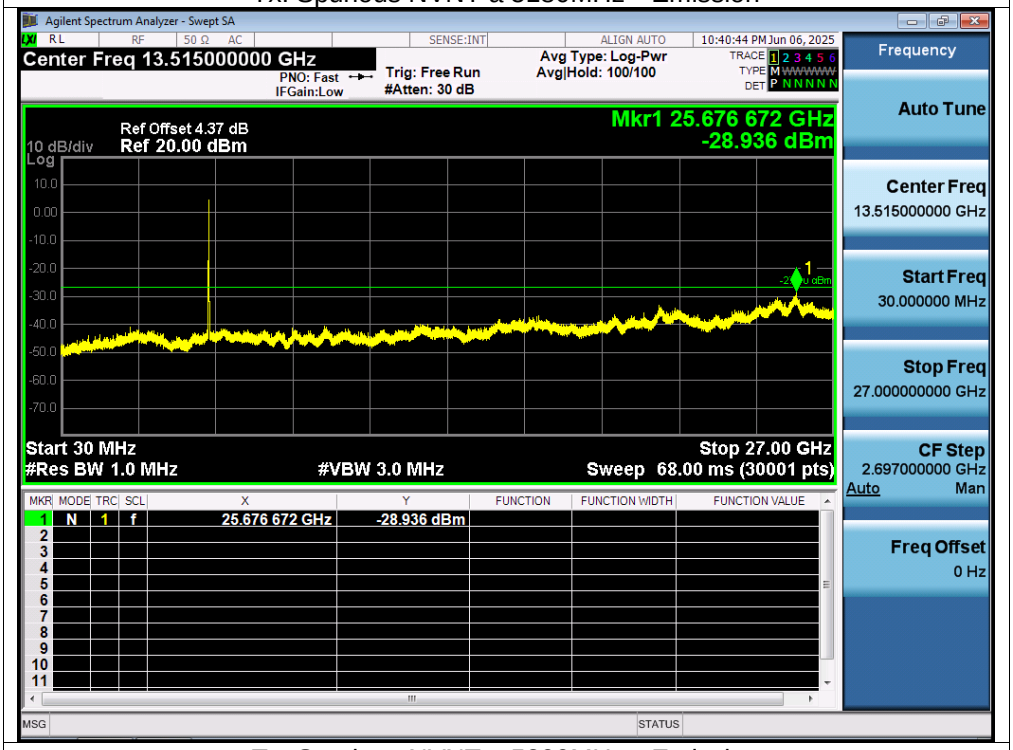
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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

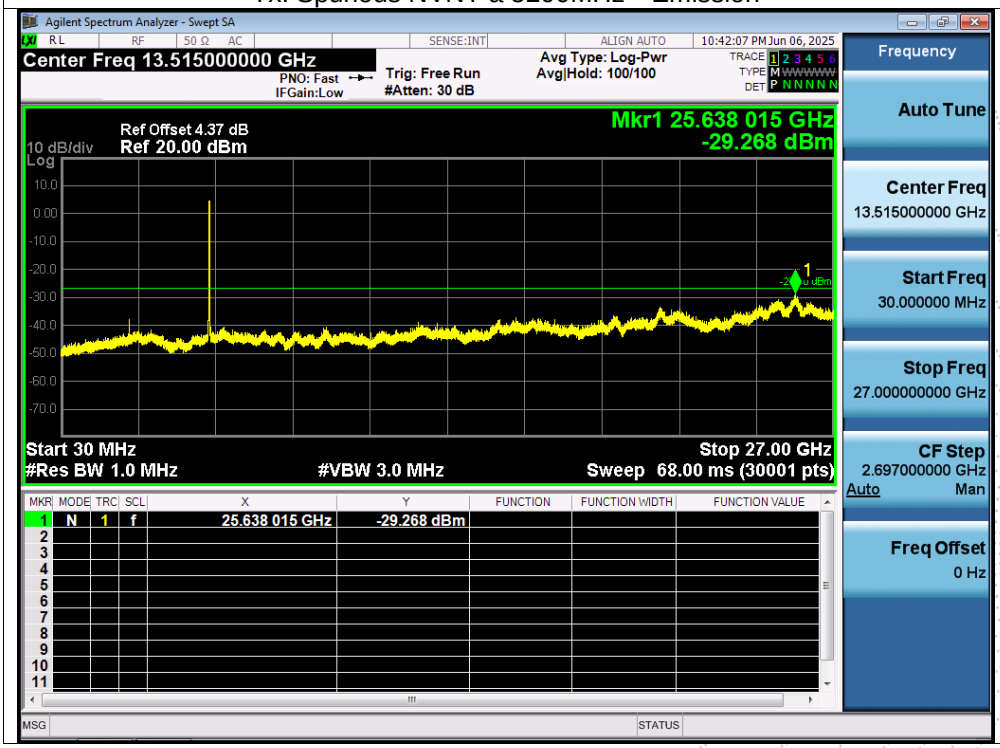
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

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

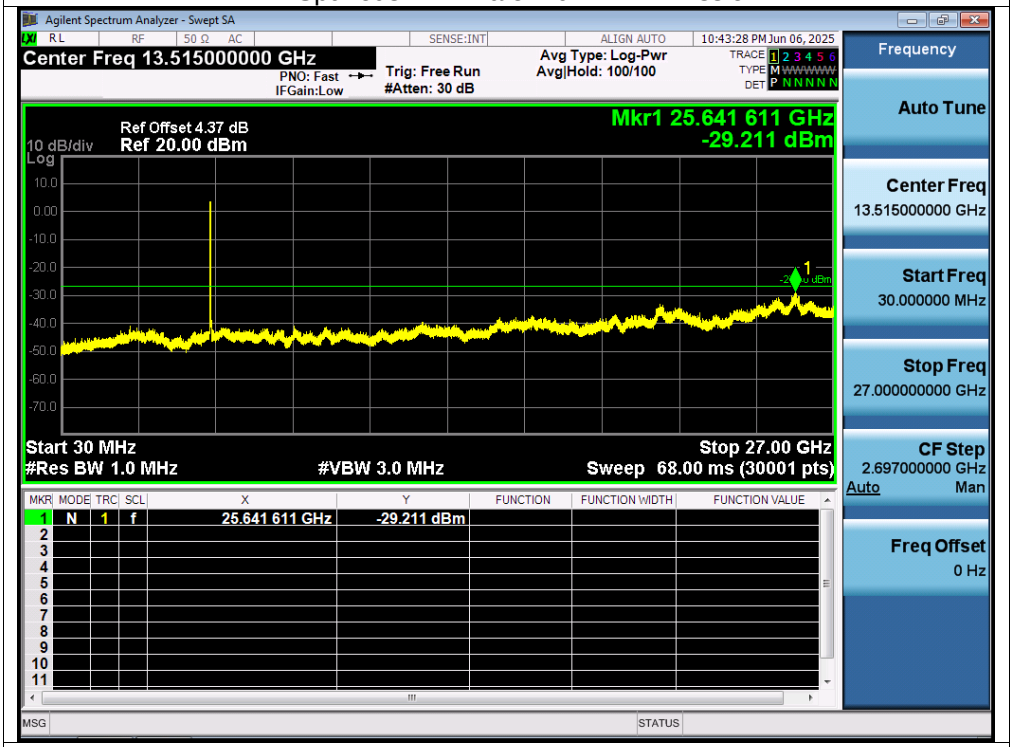
Test Graphs
Tx. Spurious NVNT a 5180MHz Emission



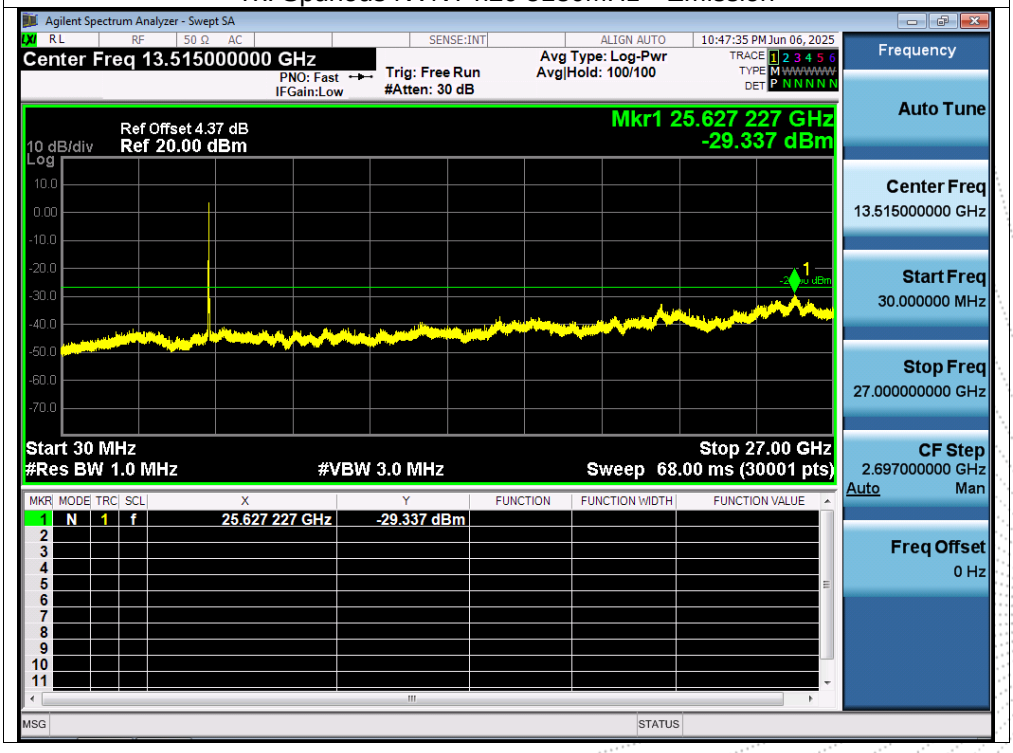
Tx. Spurious NVNT a 5200MHz Emission



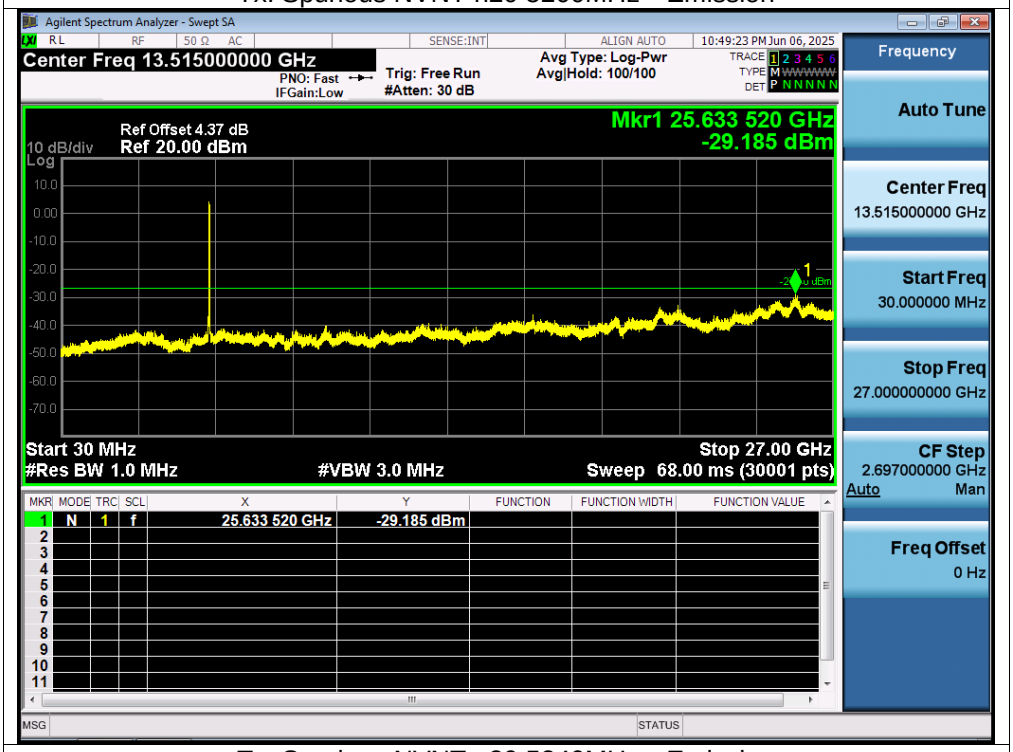
Tx. Spurious NVNT a 5240MHz Emission



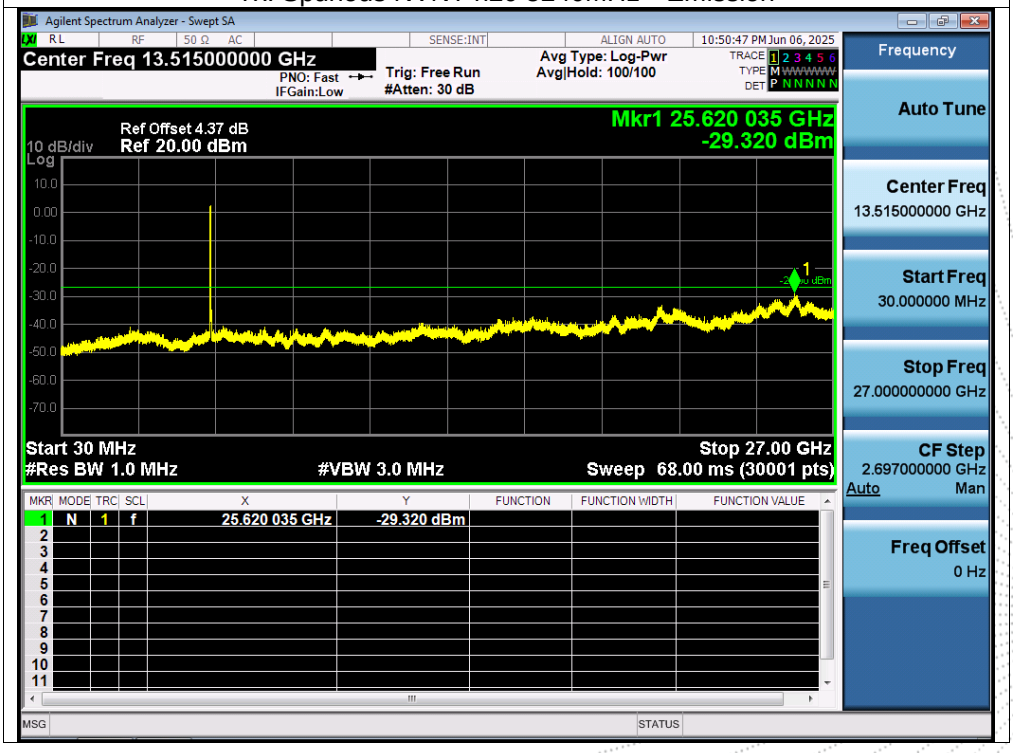
Tx. Spurious NVNT n20 5180MHz Emission



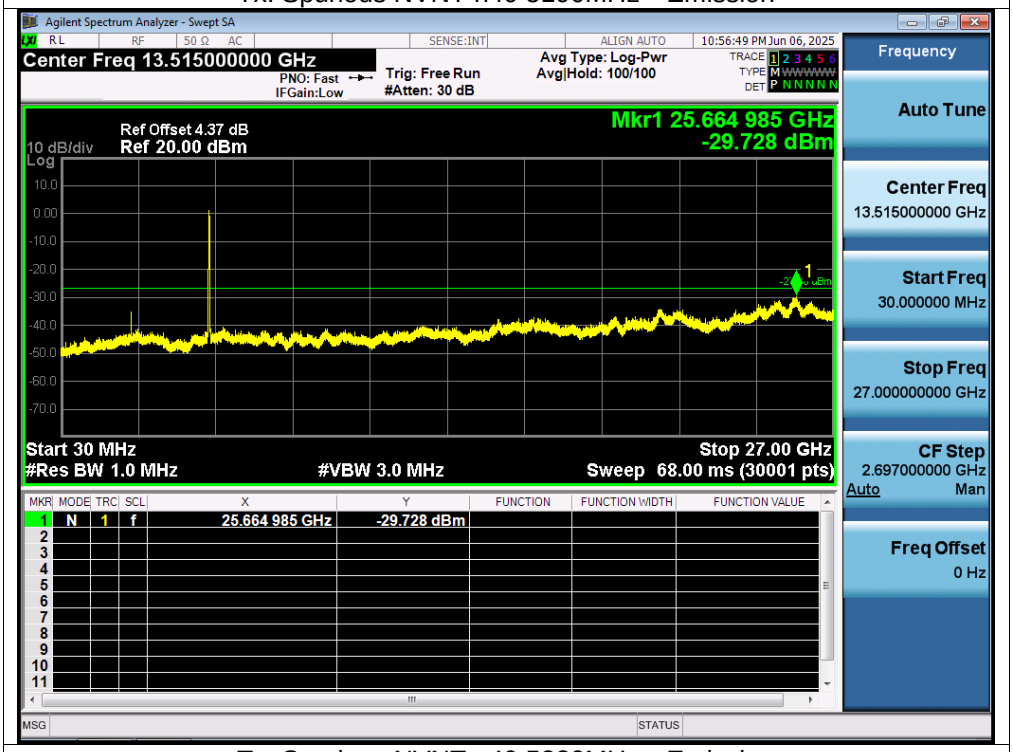
Tx. Spurious NVNT n20 5200MHz Emission



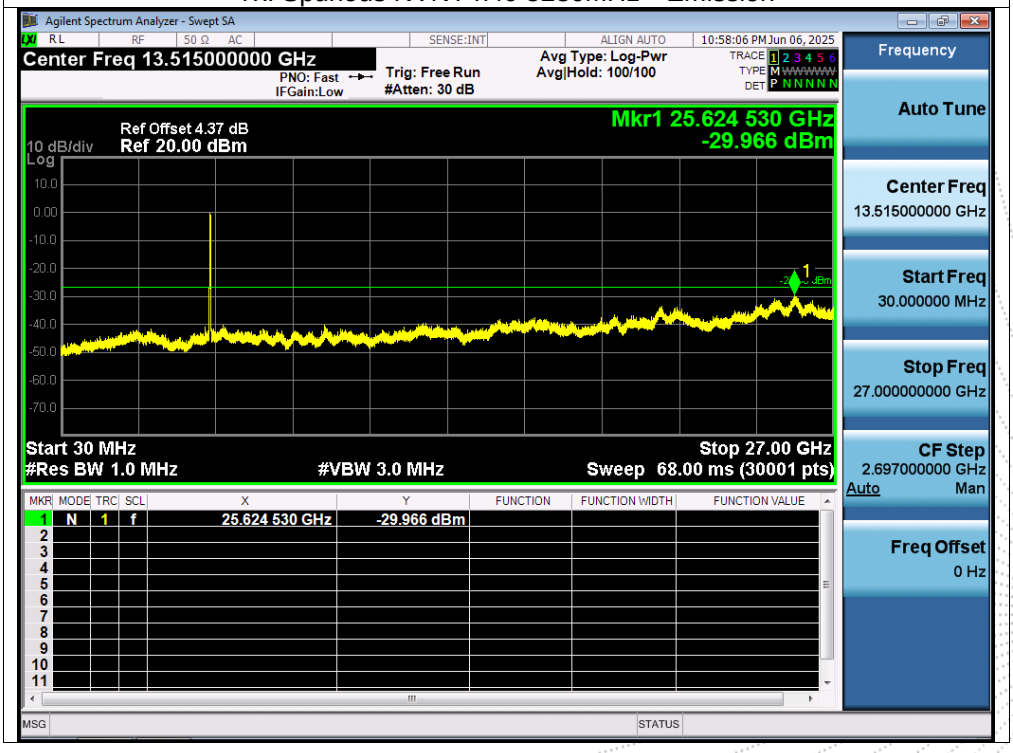
Tx. Spurious NVNT n20 5240MHz Emission



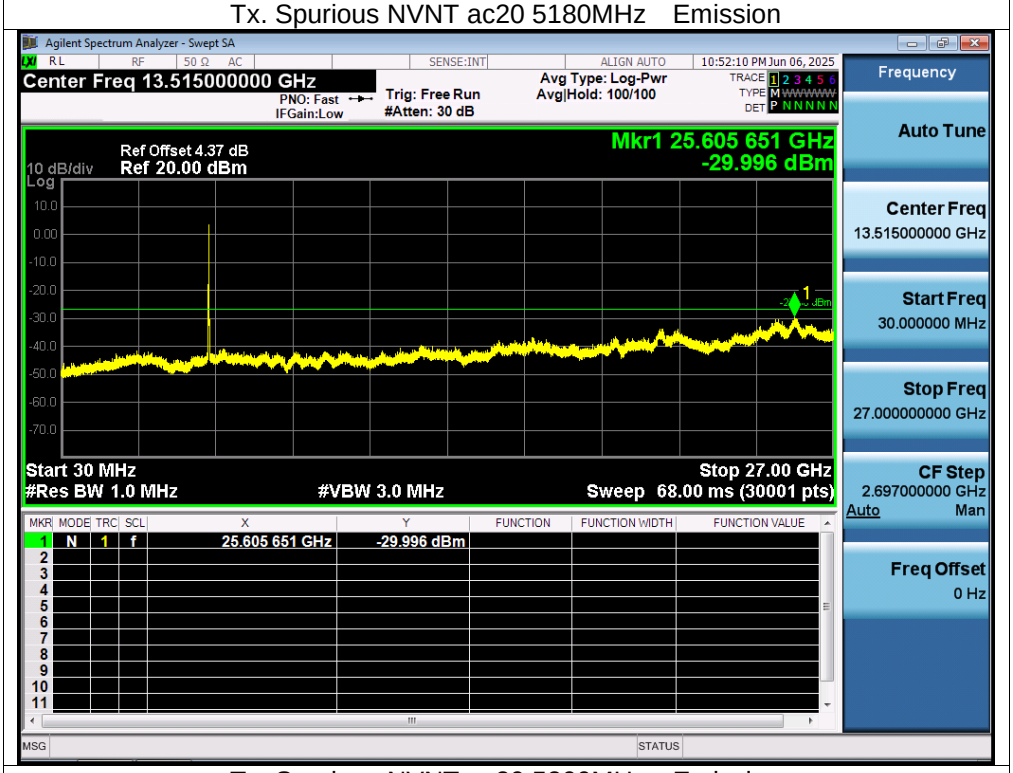
Tx. Spurious NVNT n40 5190MHz Emission



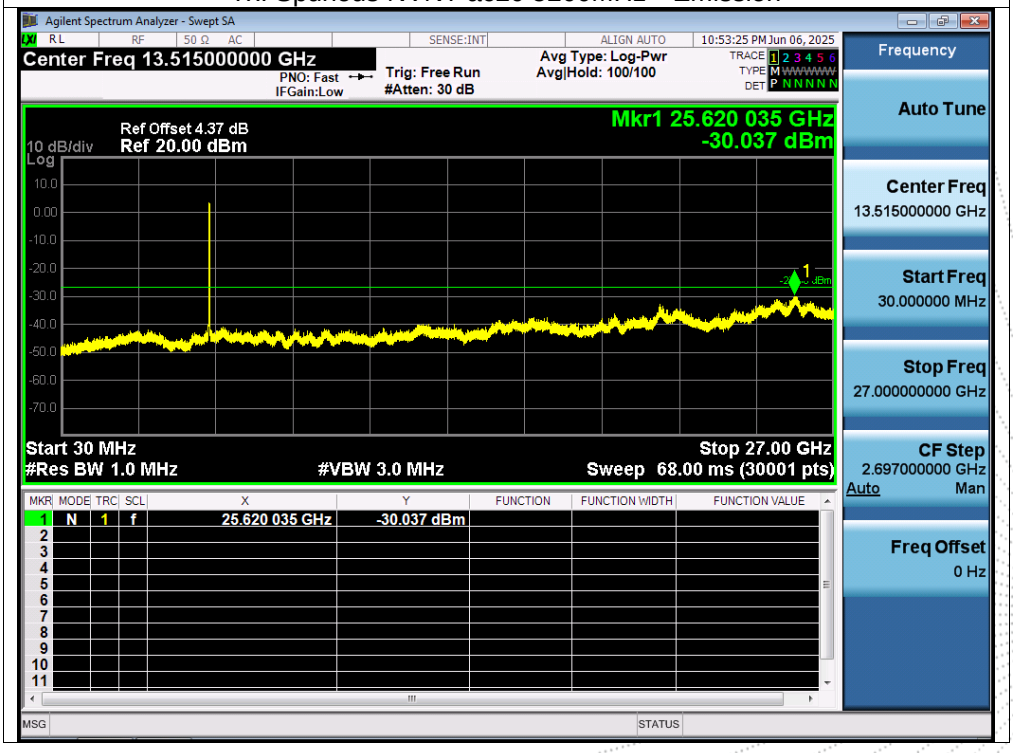
Tx. Spurious NVNT n40 5230MHz Emission



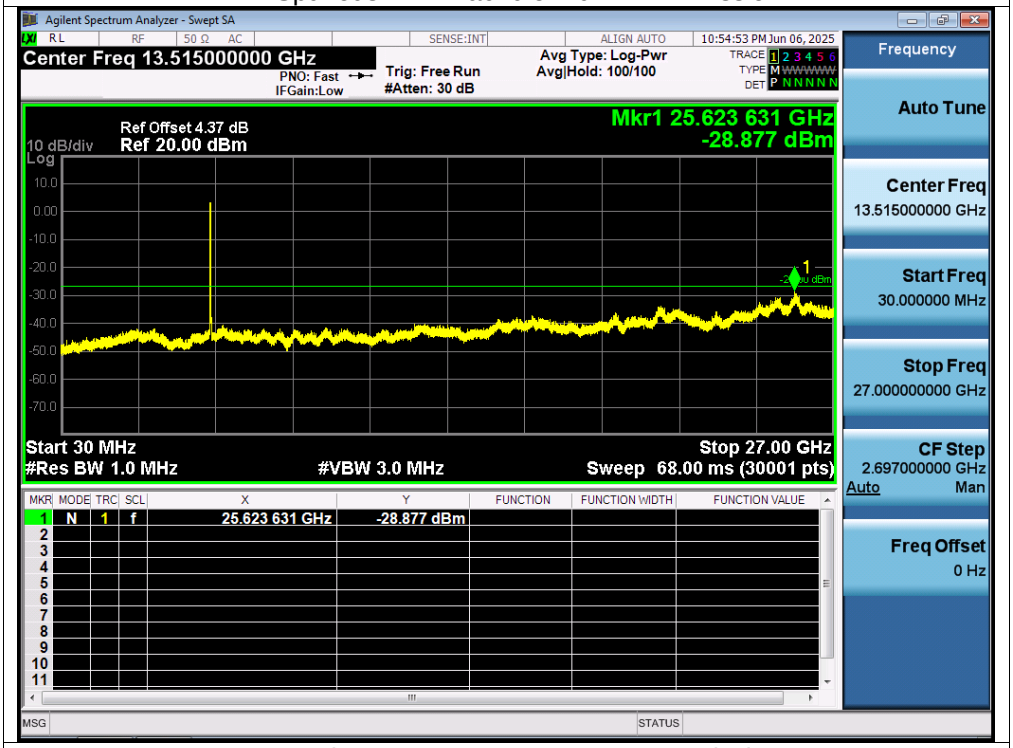
Tx. Spurious NVNT ac20 5180MHz Emission



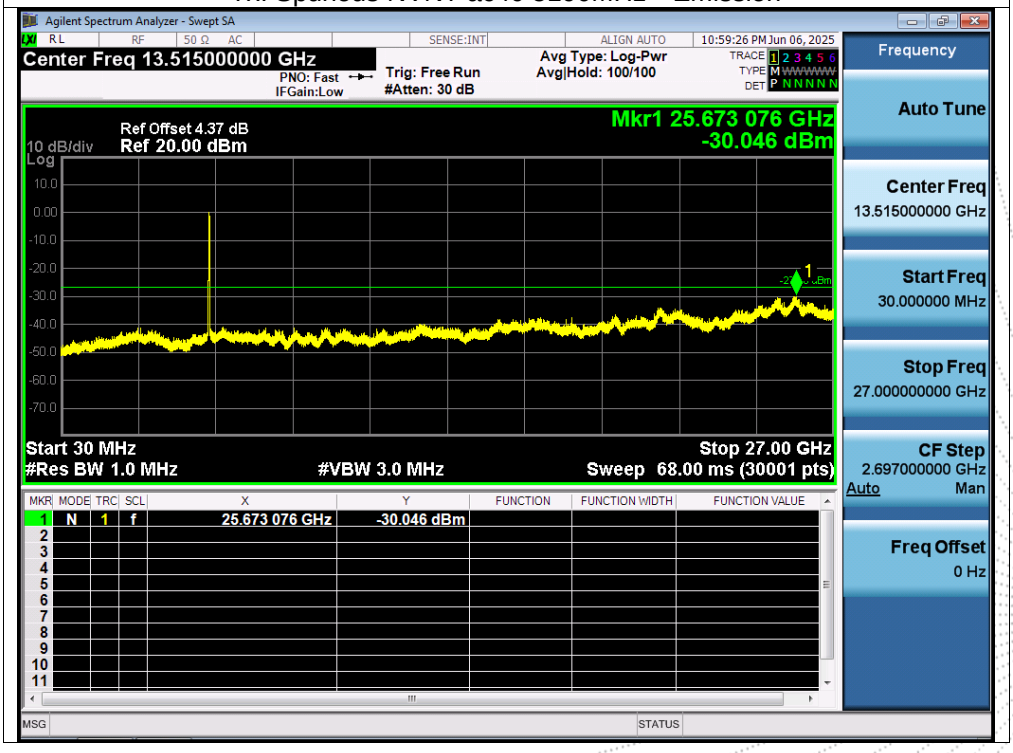
Tx. Spurious NVNT ac20 5200MHz Emission



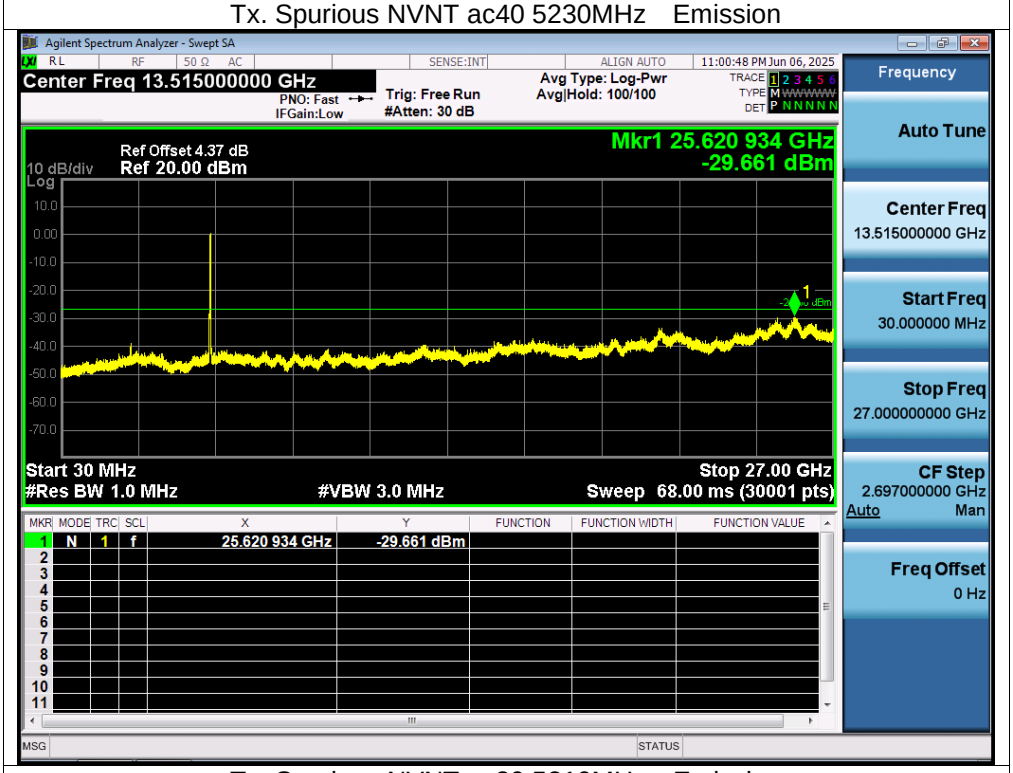
Tx. Spurious NVNT ac20 5240MHz Emission



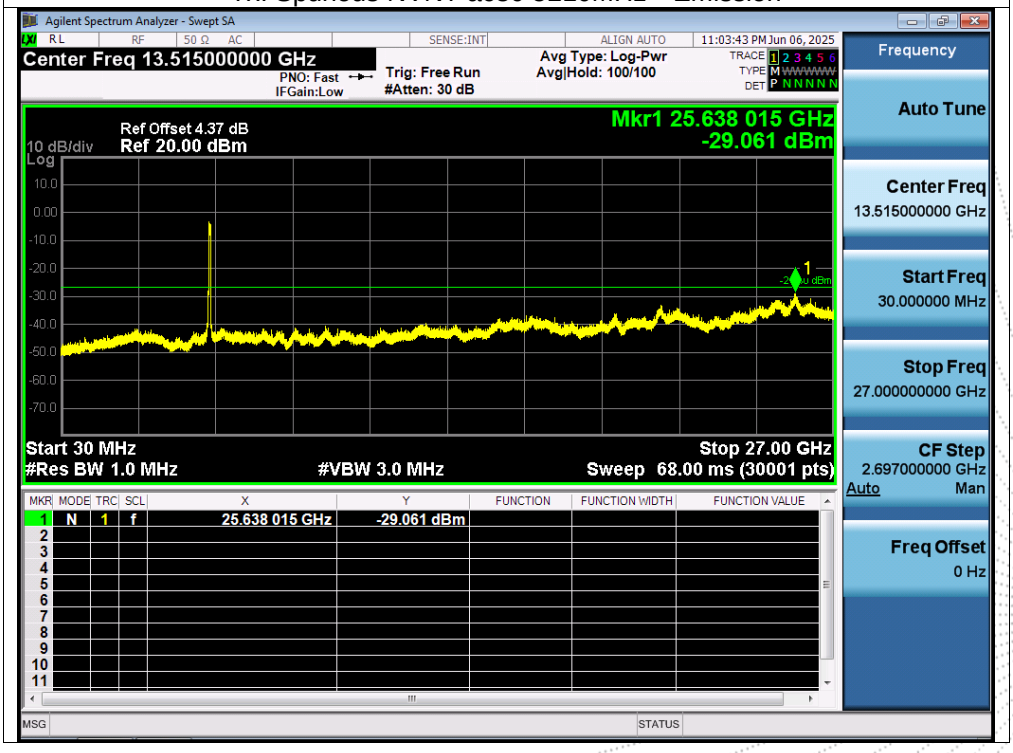
Tx. Spurious NVNT ac40 5190MHz Emission



Tx. Spurious NVNT ac40 5230MHz Emission

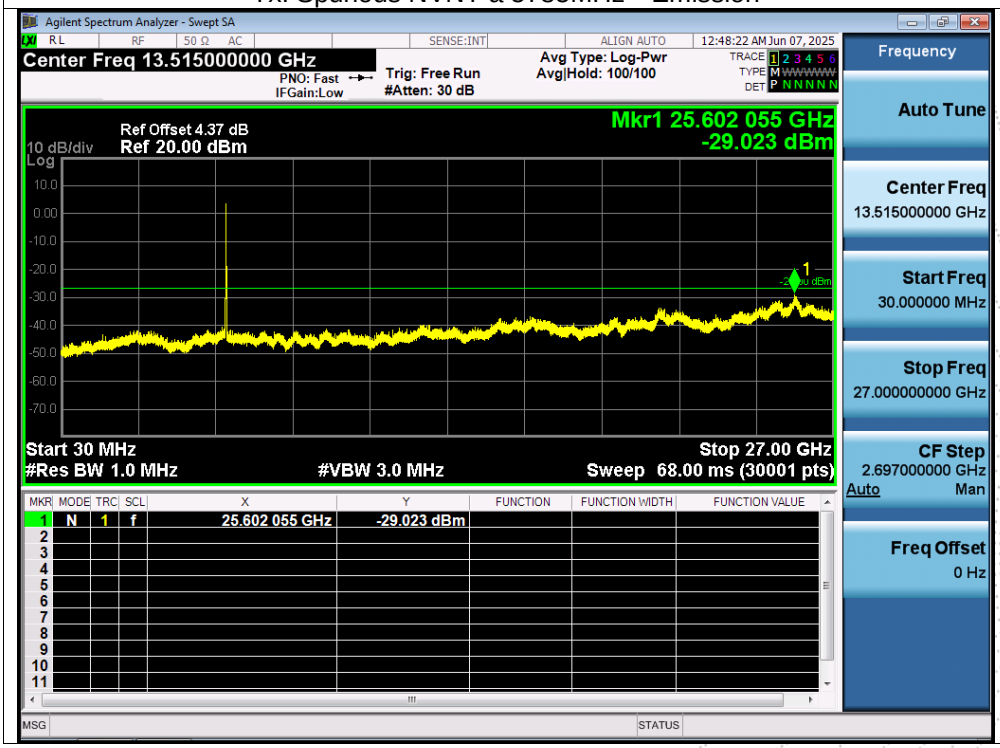


Tx. Spurious NVNT ac80 5210MHz Emission

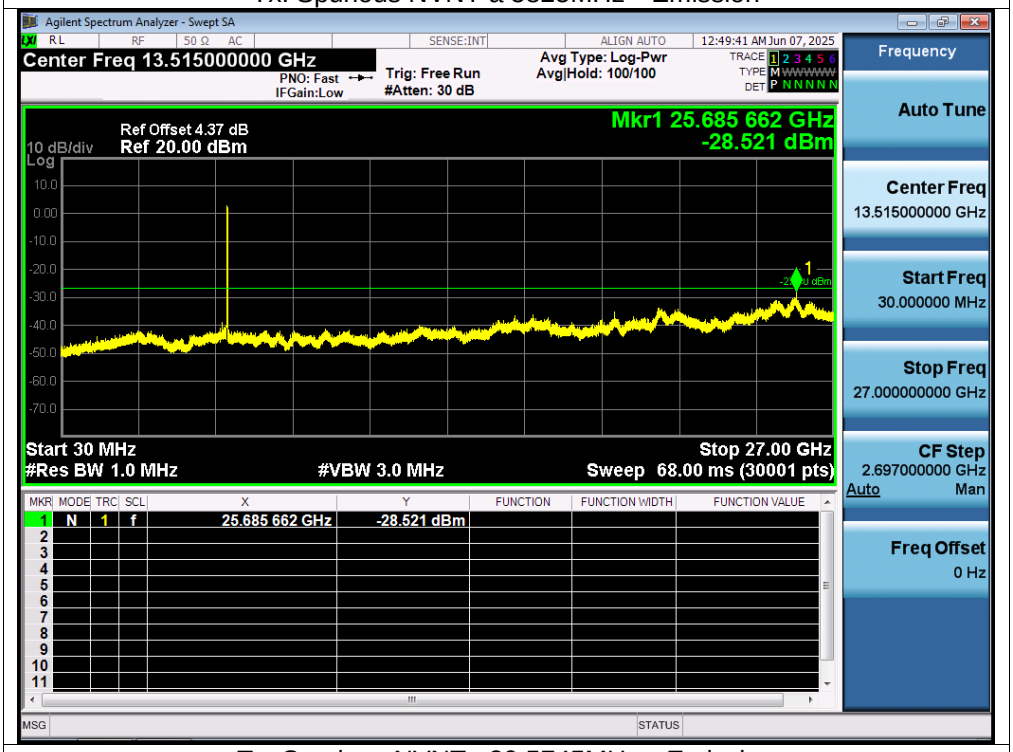


Test Graphs
Tx. Spurious NVNT a 5745MHz Emission

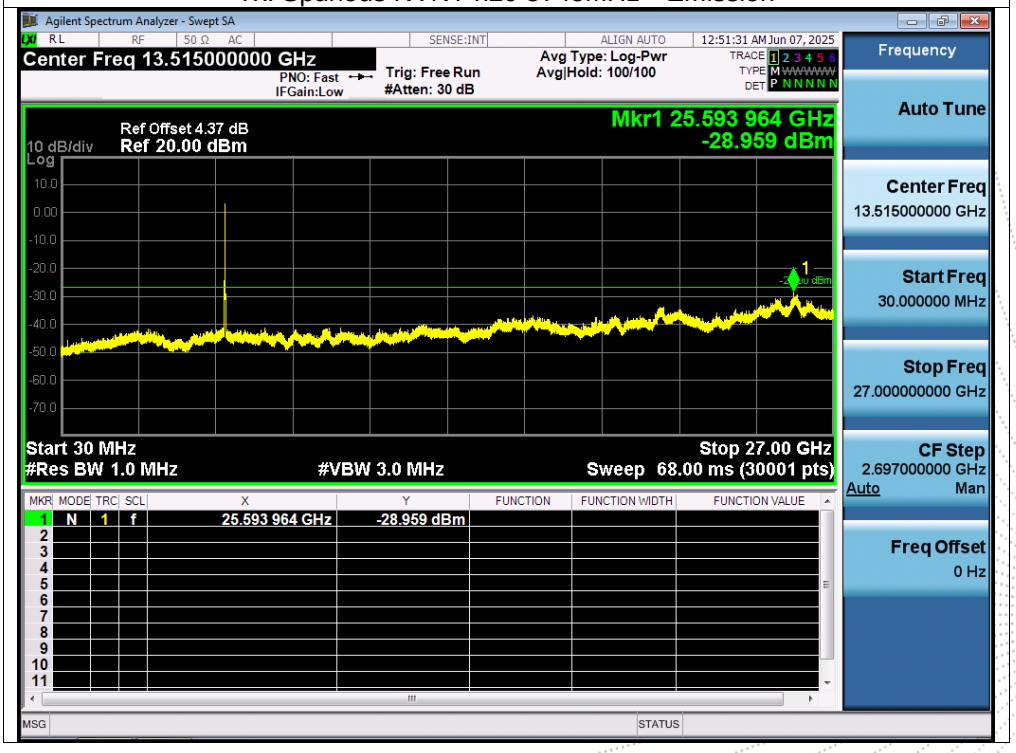
Tx. Spurious NVNT a 5785MHz Emission



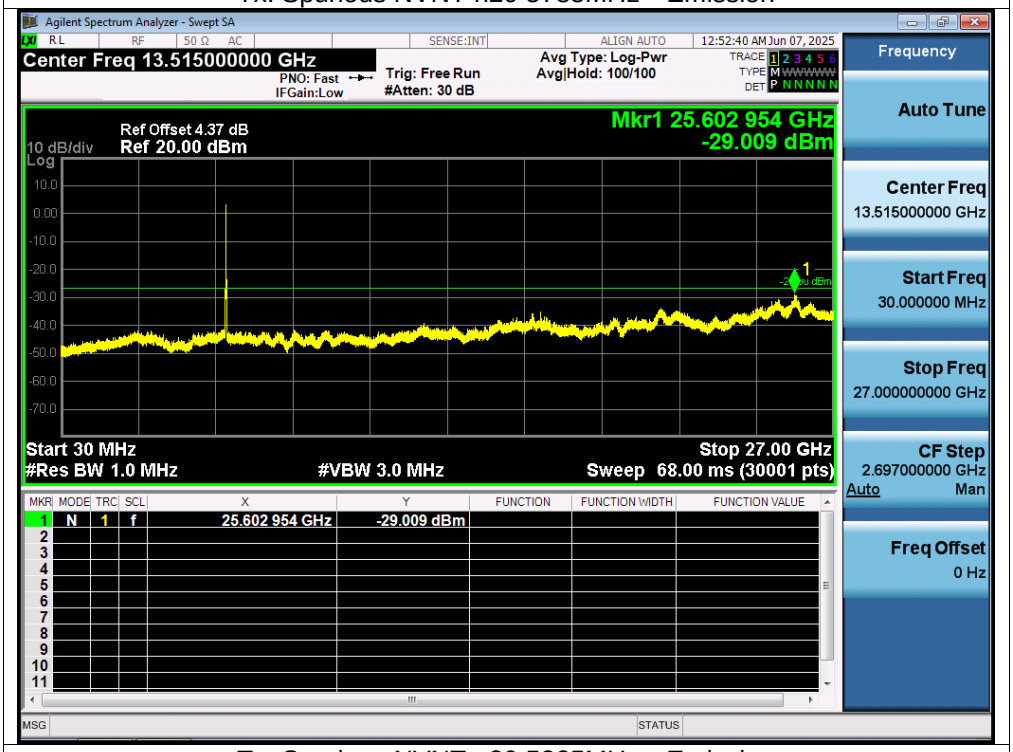
Tx. Spurious NVNT a 5825MHz Emission



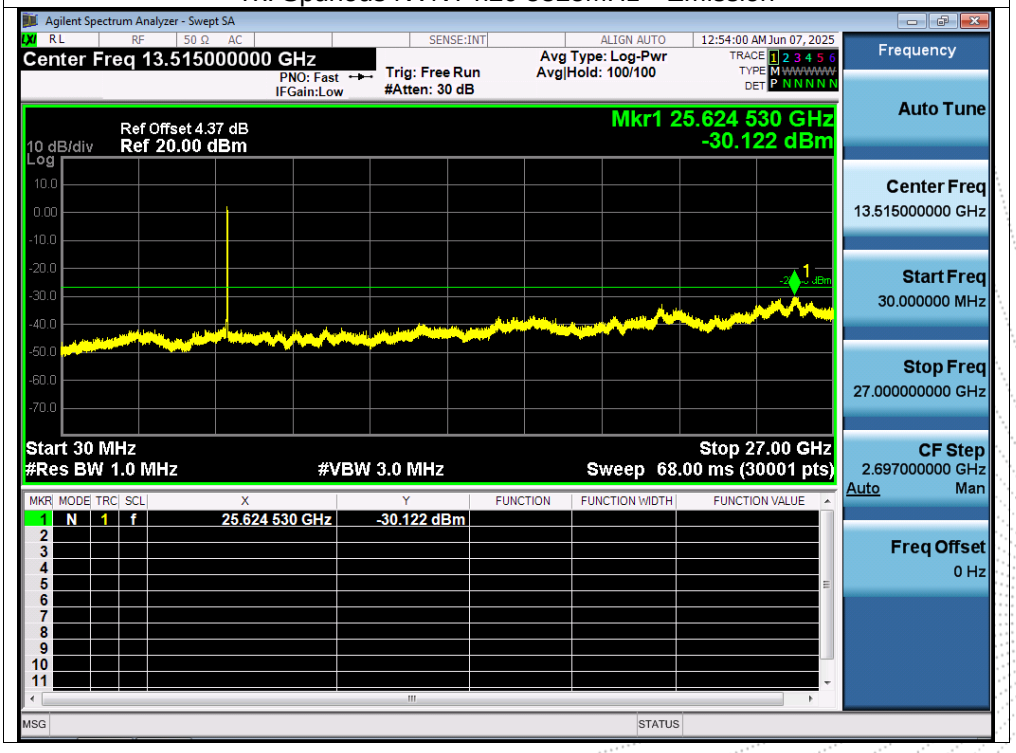
Tx. Spurious NVNT n20 5745MHz Emission



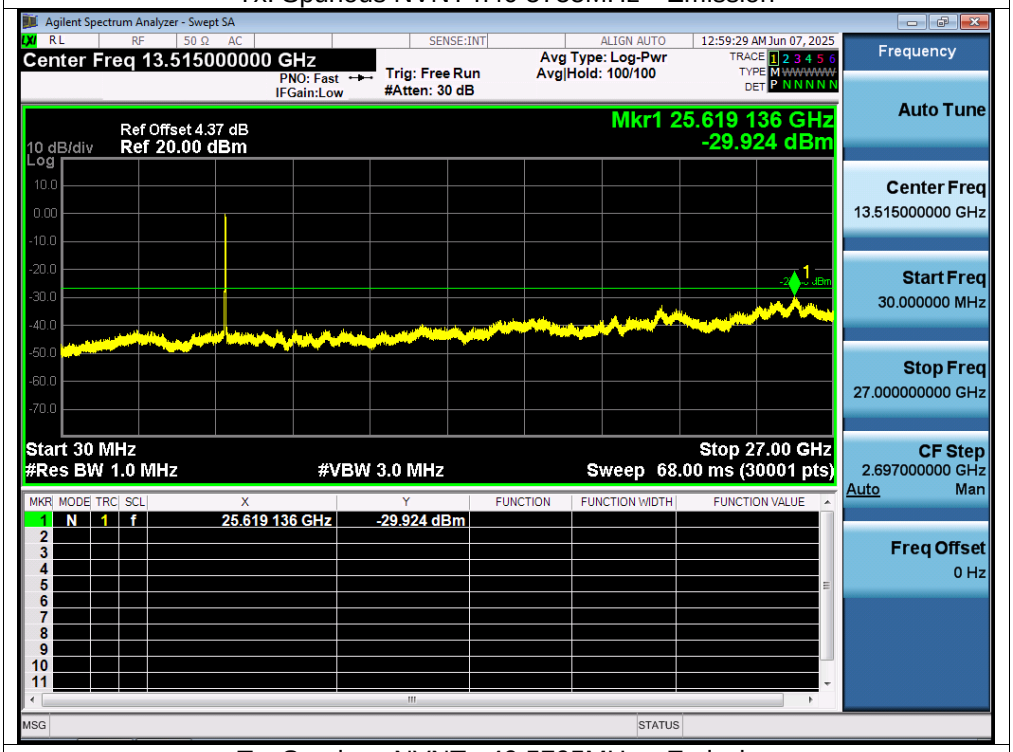
Tx. Spurious NVNT n20 5785MHz Emission



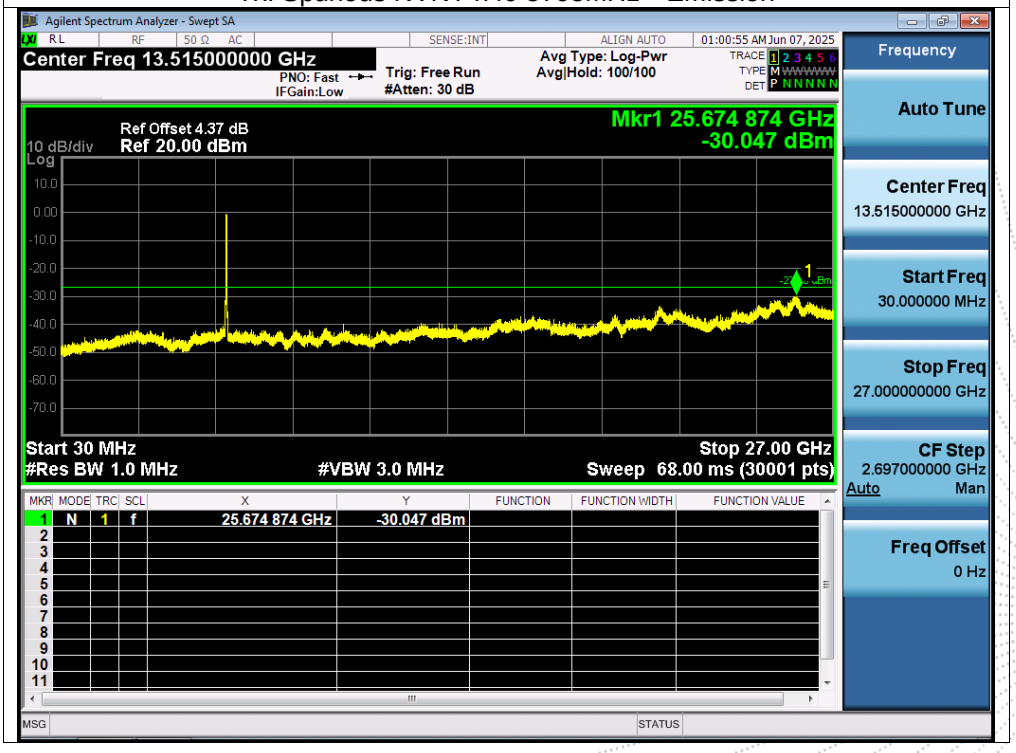
Tx. Spurious NVNT n20 5825MHz Emission



Tx. Spurious NVNT n40 5755MHz Emission

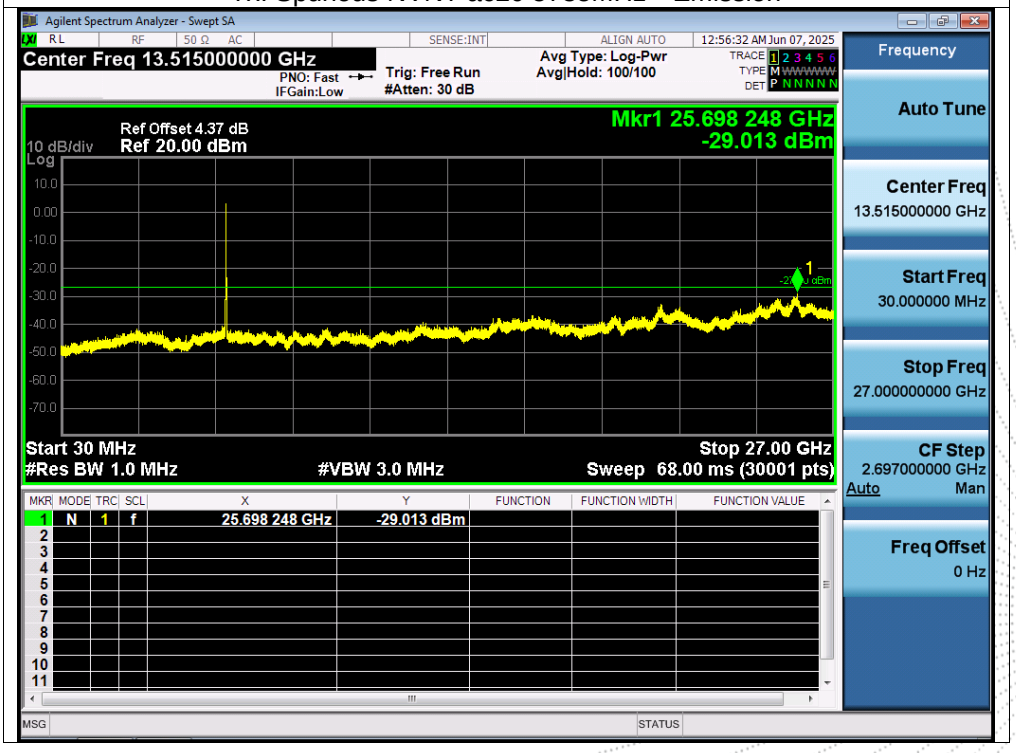


Tx. Spurious NVNT n40 5795MHz Emission

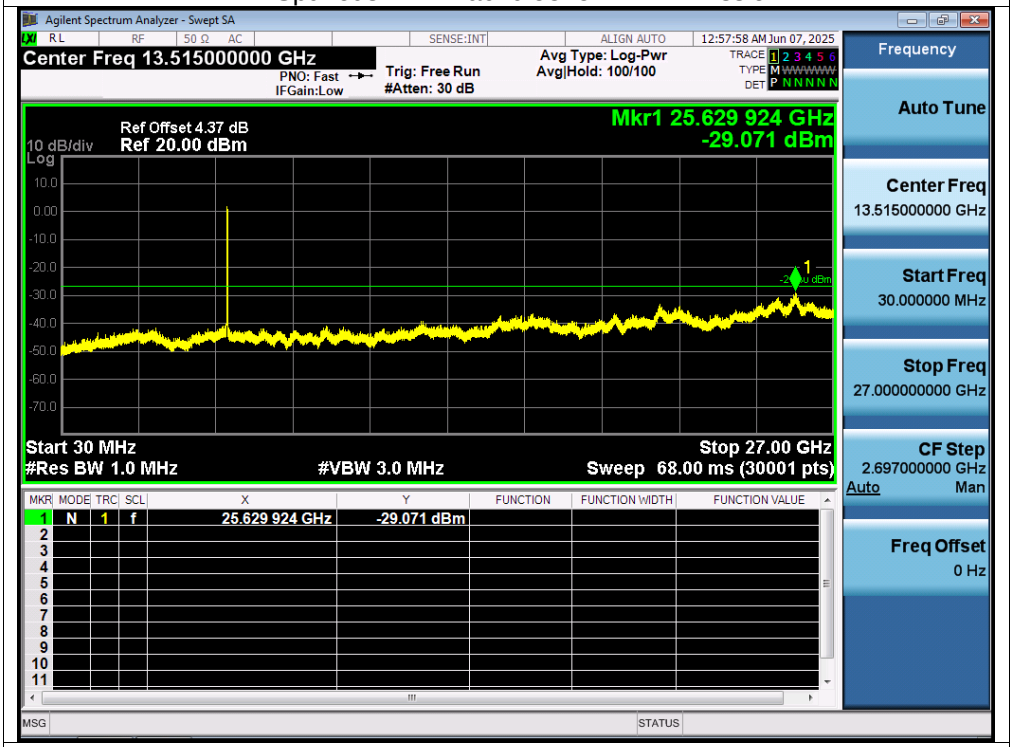


Tx. Spurious NVNT ac20 5745MHz Emission

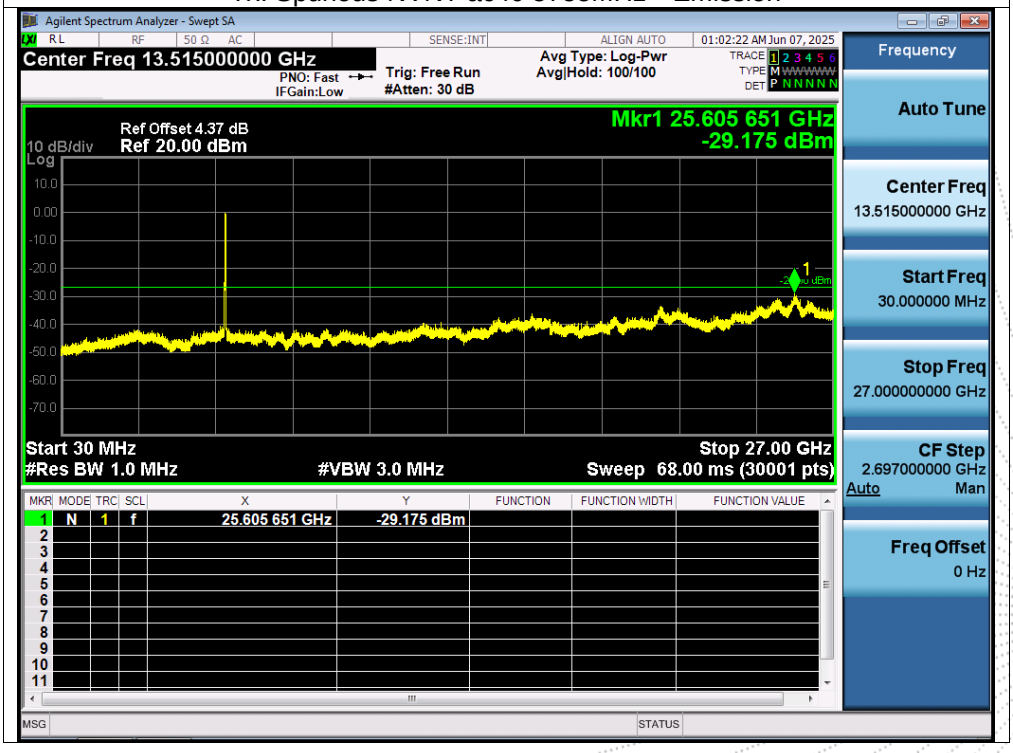
Tx. Spurious NVNT ac20 5785MHz Emission



Tx. Spurious NVNT ac20 5825MHz Emission

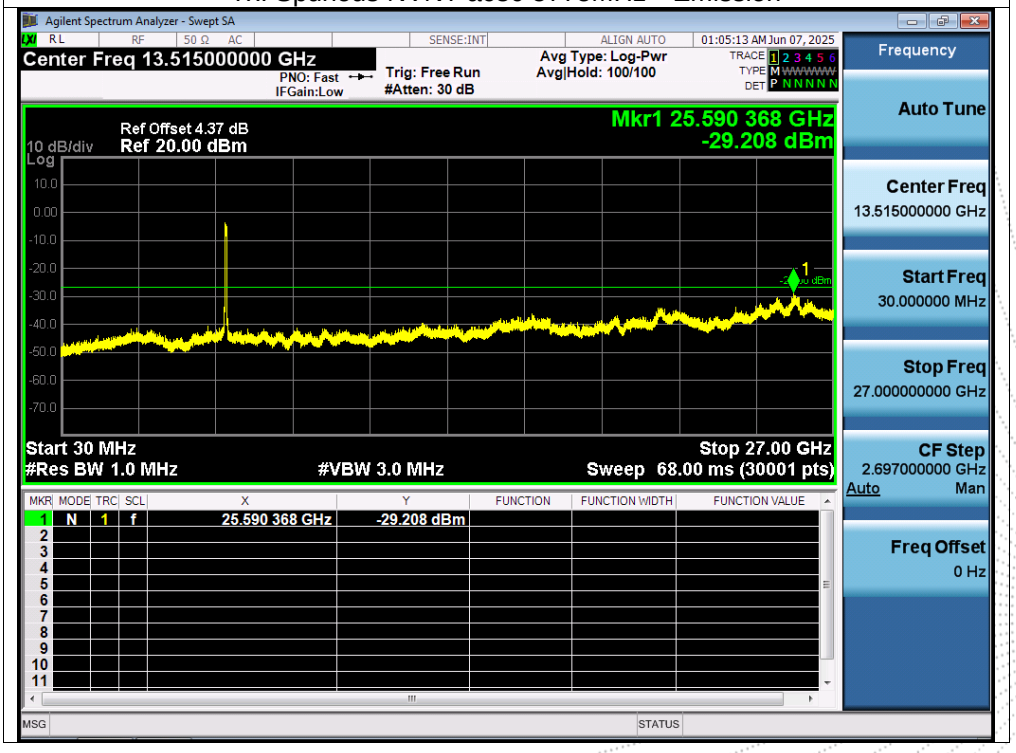


Tx. Spurious NVNT ac40 5755MHz Emission



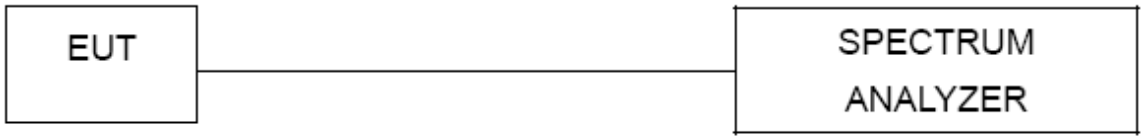
Tx. Spurious NVNT ac40 5795MHz Emission

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 3.87V
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)	3.87	5180.0052	5180	0.0052	1.0039
		V max (V)	4.45	5180.0026	5180	0.0026	0.5019
		V min (V)	3.29	5180.0114	5180	0.0114	2.2008
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)	3.87	T (°C)	-20	5180.0123	5180	0.0123	2.3745
		T (°C)	-10	5180.0114	5180	0.0114	2.2008
		T (°C)	0	5180.0105	5180	0.0105	2.0270
		T (°C)	10	5180.0114	5180	0.0114	2.2008
		T (°C)	20	5180.0135	5180	0.0135	2.6062
		T (°C)	30	5180.0130	5180	0.0130	2.5097
		T (°C)	40	5180.0045	5180	0.0045	0.8687
		T (°C)	50	5180.0071	5180	0.0071	1.3707
		T (°C)	60	5180.0120	5180	0.0120	2.3166
		T (°C)	70	5180.0004	5180	0.0004	0.0772
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)	3.87	5200.0115	5200	0.0115	2.2115
		V max (V)	4.45	5200.0109	5200	0.0109	2.0962
		V min (V)	3.29	5200.0038	5200	0.0038	0.7308
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)	3.87	T (°C)	-20	5200.00580	5200	0.00580	1.1154
		T (°C)	-10	5200.01340	5200	0.01340	2.5769
		T (°C)	0	5200.00300	5200	0.00300	0.5769
		T (°C)	10	5200.00420	5200	0.00420	0.8077
		T (°C)	20	5200.00490	5200	0.00490	0.9423
		T (°C)	30	5200.01220	5200	0.01220	2.3462
		T (°C)	40	5200.00780	5200	0.00780	1.5000
		T (°C)	50	5200.01180	5200	0.01180	2.2692
		T (°C)	60	5200.01130	5200	0.01130	2.1731
		T (°C)	70	5200.00310	5200	0.00310	0.5962
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)	3.87	5240.0070	5240	0.0070	1.3359
		V max (V)	4.45	5240.0095	5240	0.0095	1.8130
		V min (V)	3.29	5240.0007	5240	0.0007	0.1336
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)	3.87	T (°C)	-20	5240.0053	5240	0.0053	1.0115
		T (°C)	-10	5240.0016	5240	0.0016	0.3053
		T (°C)	0	5240.0104	5240	0.0104	1.9847
		T (°C)	10	5240.0010	5240	0.0010	0.1908
		T (°C)	20	5240.0135	5240	0.0135	2.5763
		T (°C)	30	5240.0073	5240	0.0073	1.3931
		T (°C)	40	5240.0104	5240	0.0104	1.9847
		T (°C)	50	5240.0047	5240	0.0047	0.8969
		T (°C)	60	5240.0066	5240	0.0066	1.2595
		T (°C)	70	5240.0008	5240	0.0008	0.1527
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 3.87V
Test Mode:	TX Frequency(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)	3.87	5745.01350	5745	0.01350	2.3499
		V max (V)	4.45	5745.01220	5745	0.01220	2.1236
		V min (V)	3.29	5745.00900	5745	0.00900	1.5666
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)	3.87	T (°C)	-20	5745.01000	5745	0.01000	1.7406
		T (°C)	-10	5745.00890	5745	0.00890	1.5492
		T (°C)	0	5745.00170	5745	0.00170	0.2959
		T (°C)	10	5745.00250	5745	0.00250	0.4352
		T (°C)	20	5745.00140	5745	0.00140	0.2437
		T (°C)	30	5745.00710	5745	0.00710	1.2359
		T (°C)	40	5745.00040	5745	0.00040	0.0696
		T (°C)	50	5745.01180	5745	0.01180	2.0540
		T (°C)	60	5745.00730	5745	0.00730	1.2707
		T (°C)	70	5745.00220	5745	0.00220	0.3829
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)	3.87	5785.00200	5785	0.00200	0.3457
		V max (V)	4.45	5785.01000	5785	0.01000	1.7286
		V min (V)	3.29	5785.00810	5785	0.00810	1.4002
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)	3.87	T (°C)	-20	5785.00620	5785	0.00620	1.0717
		T (°C)	-10	5785.01030	5785	0.01030	1.7805
		T (°C)	0	5785.00470	5785	0.00470	0.8124
		T (°C)	10	5785.00600	5785	0.00600	1.0372
		T (°C)	20	5785.00690	5785	0.00690	1.1927
		T (°C)	30	5785.00990	5785	0.00990	1.7113
		T (°C)	40	5785.00200	5785	0.00200	0.3457
		T (°C)	50	5785.00540	5785	0.00540	0.9334
		T (°C)	60	5785.00270	5785	0.00270	0.4667
		T (°C)	70	5785.00780	5785	0.00780	1.3483
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)	3.87	5825.00610	5825	0.00610	1.0472
		V max (V)	4.45	5825.00800	5825	0.00800	1.3734
		V min (V)	3.29	5825.01000	5825	0.01000	1.7167
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)	3.87	T (°C)	-20	5825.00250	5825	0.00250	0.4292
		T (°C)	-10	5825.01090	5825	0.01090	1.8712
		T (°C)	0	5825.00260	5825	0.00260	0.4464
		T (°C)	10	5825.00690	5825	0.00690	1.1845
		T (°C)	20	5825.01340	5825	0.01340	2.3004
		T (°C)	30	5825.01200	5825	0.01200	2.0601
		T (°C)	40	5825.00320	5825	0.00320	0.5494
		T (°C)	50	5825.00300	5825	0.00300	0.5150
		T (°C)	60	5825.01060	5825	0.01060	1.8197
		T (°C)	70	5825.01200	5825	0.01200	2.0601
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

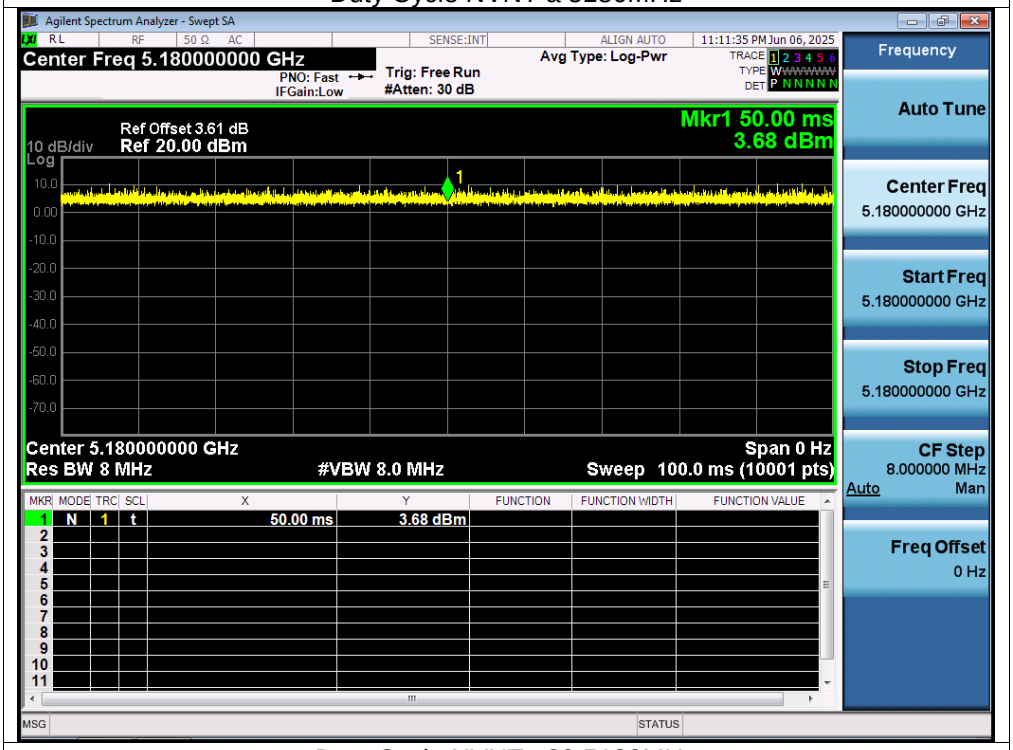
1.Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

14.4 Test Result

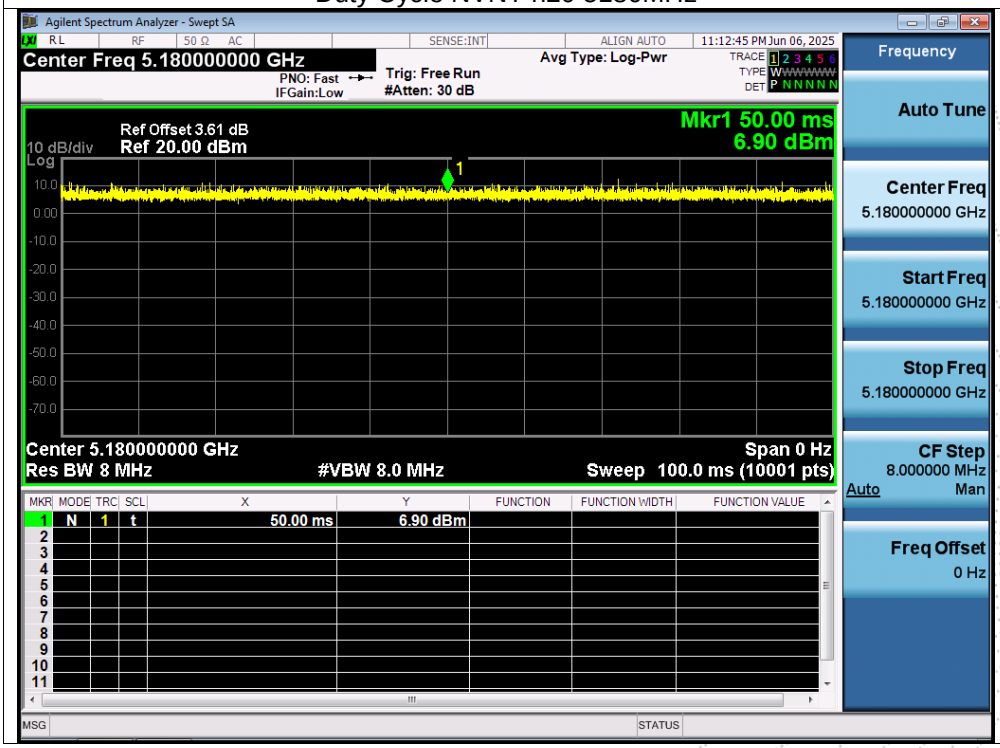
5.1G

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

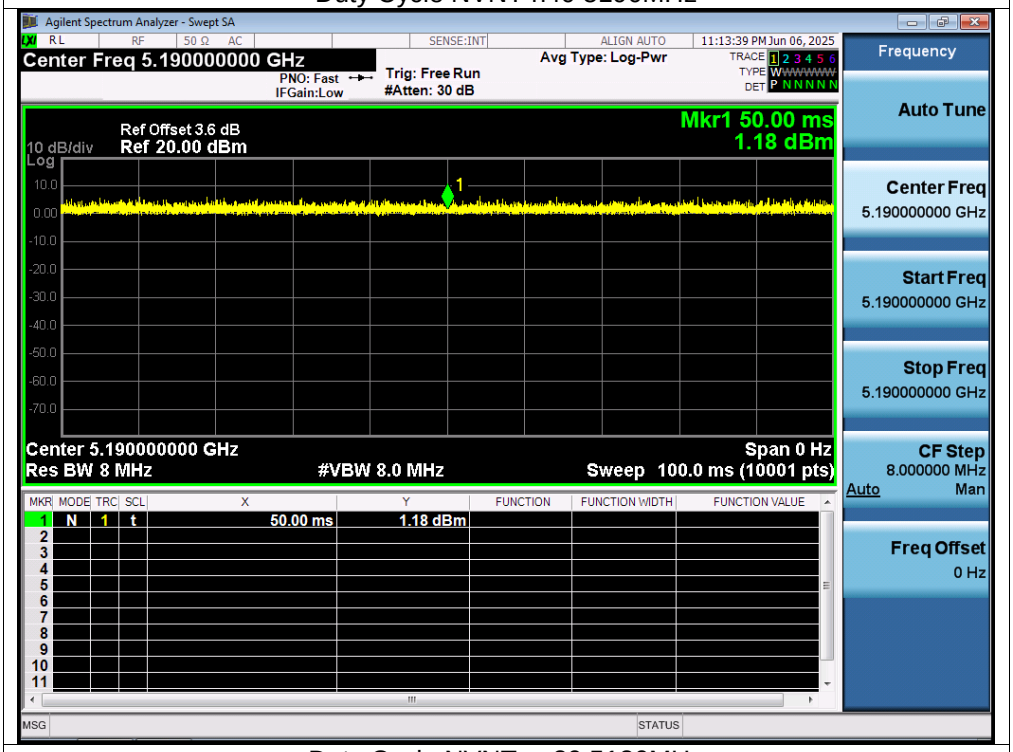
Test Graphs
Duty Cycle NVNT a 5180MHz



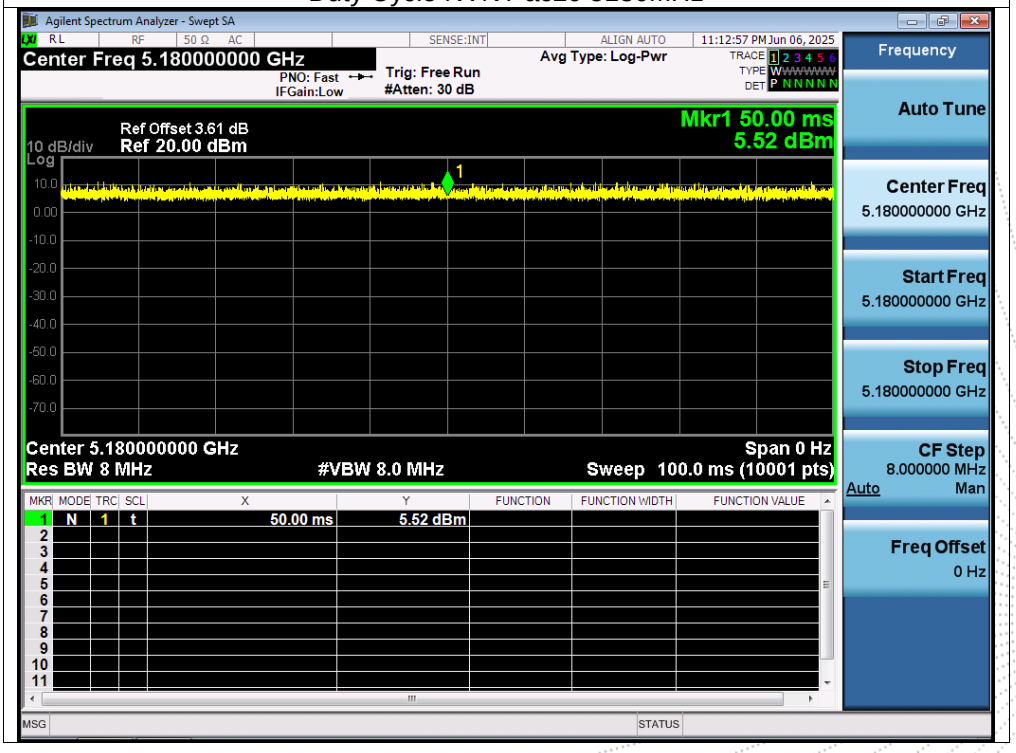
Duty Cycle NVNT n20 5180MHz



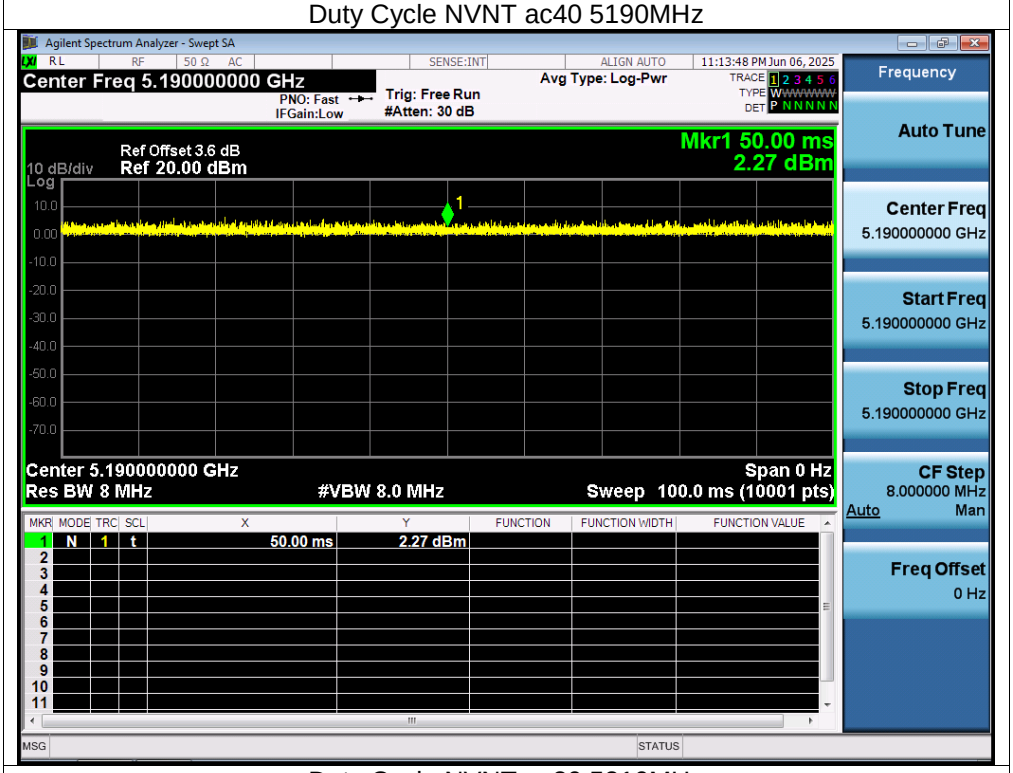
Duty Cycle NVNT n40 5190MHz



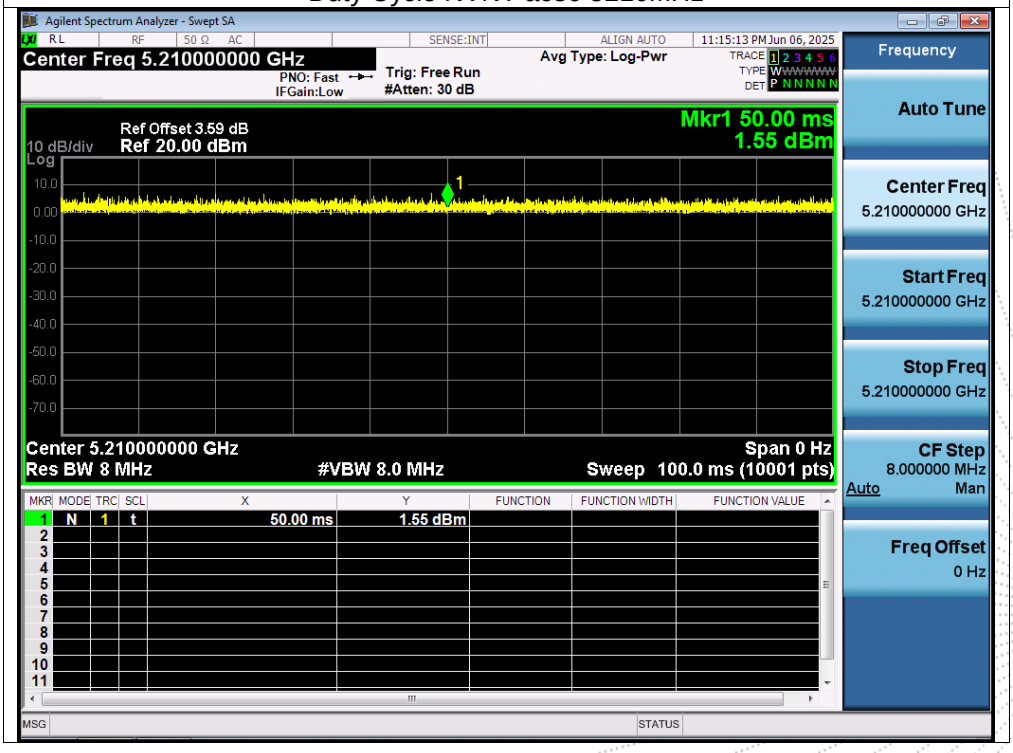
Duty Cycle NVNT ac20 5180MHz



Duty Cycle NVNT ac40 5190MHz



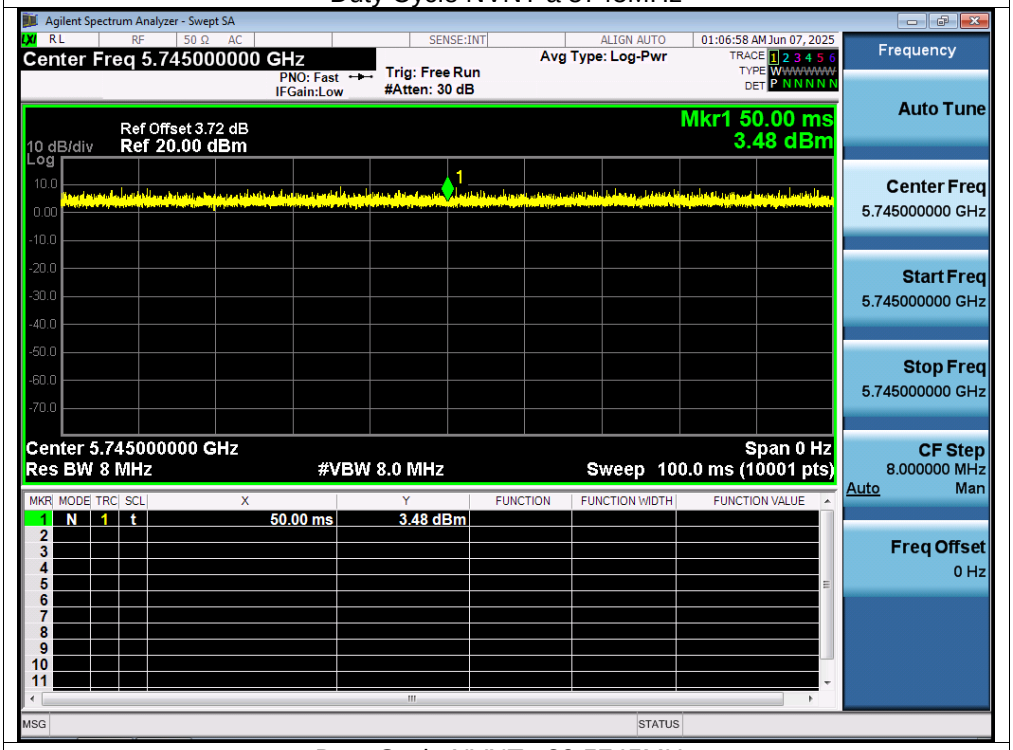
Duty Cycle NVNT ac80 5210MHz



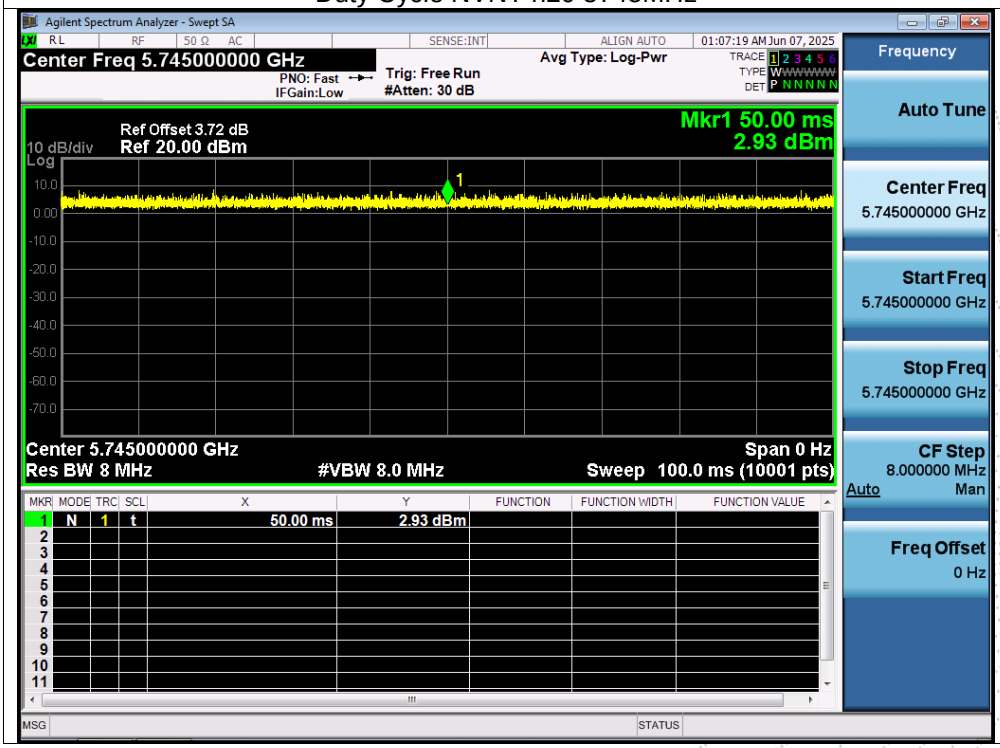
5.8G

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

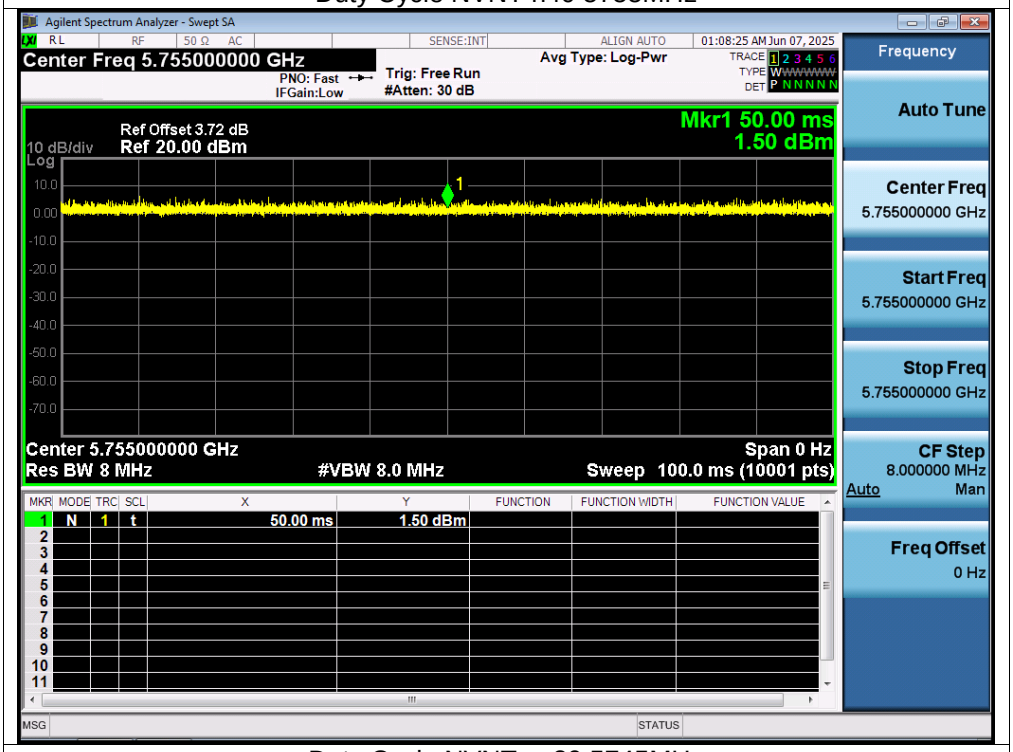
Test Graphs
Duty Cycle NVNT a 5745MHz



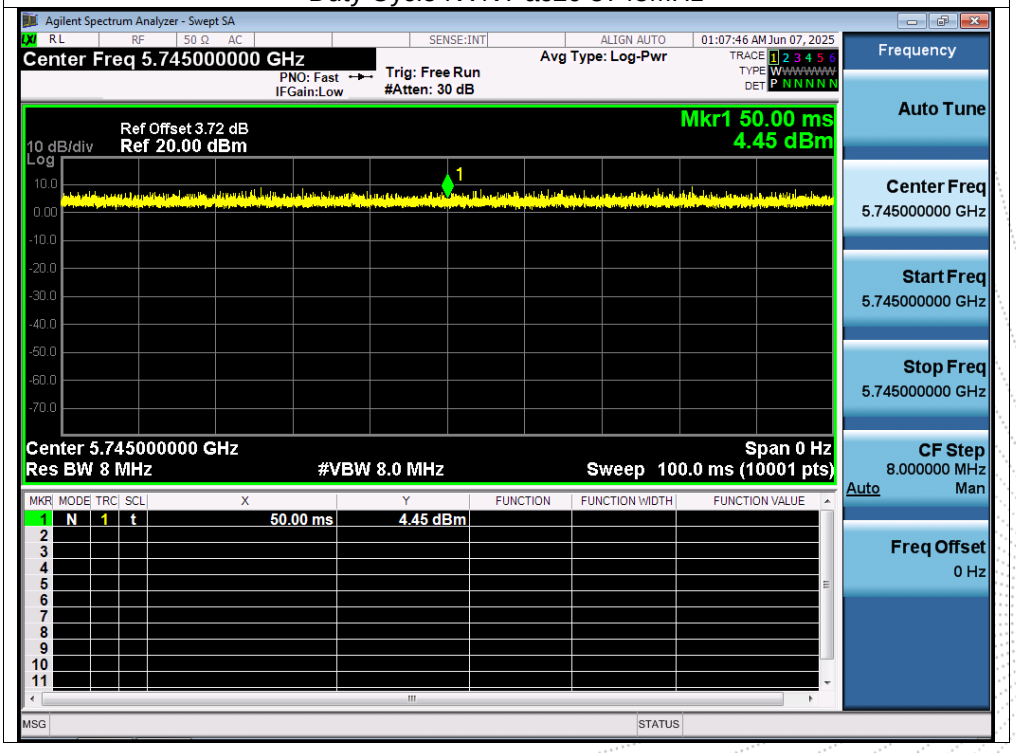
Duty Cycle NVNT n20 5745MHz



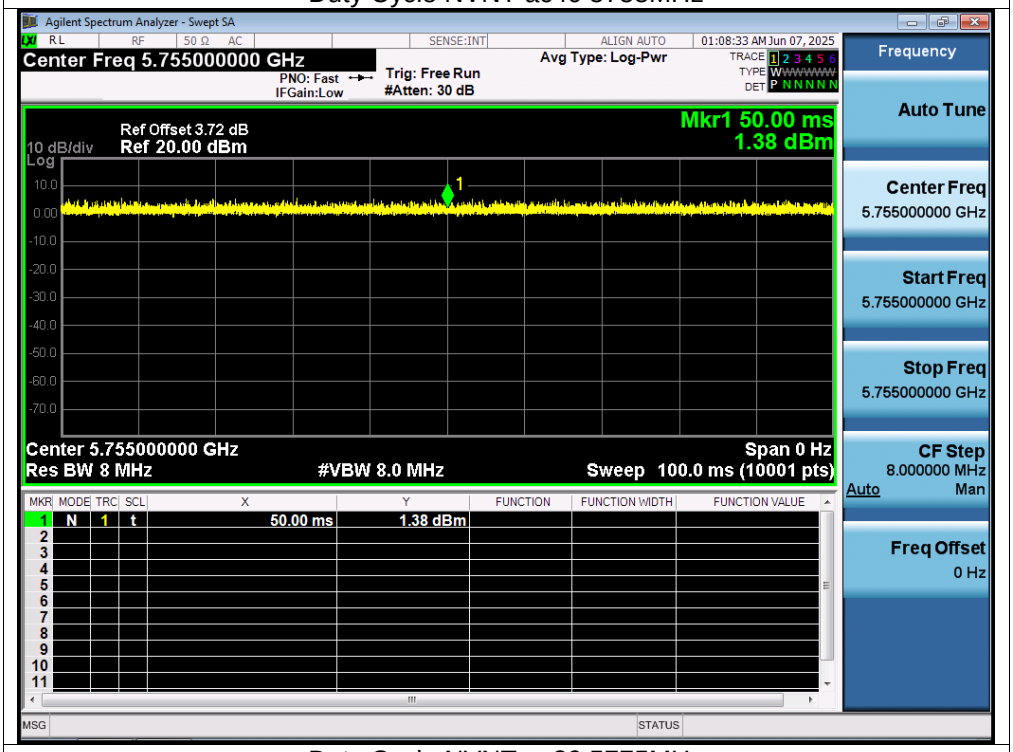
Duty Cycle NVNT n40 5755MHz



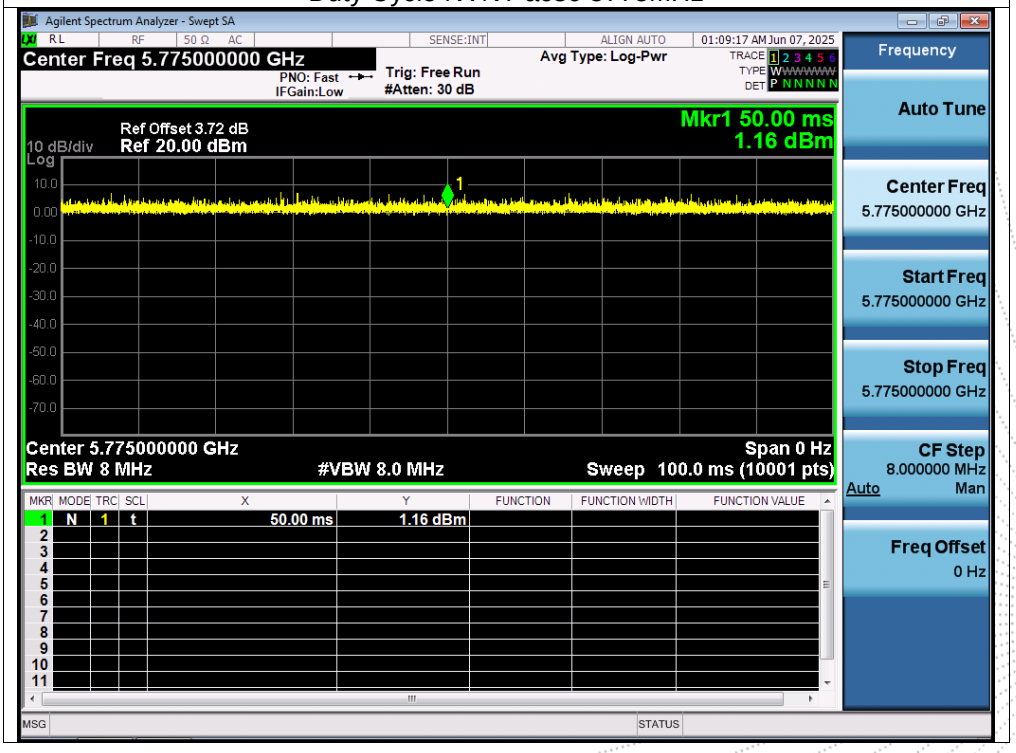
Duty Cycle NVNT ac20 5745MHz



Duty Cycle NVNT ac40 5755MHz



Duty Cycle NVNT ac80 5775MHz



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 Internal antenna (antenna gain: 0.30 dBi). It comply with the standard requirement.

16. EUT Photographs

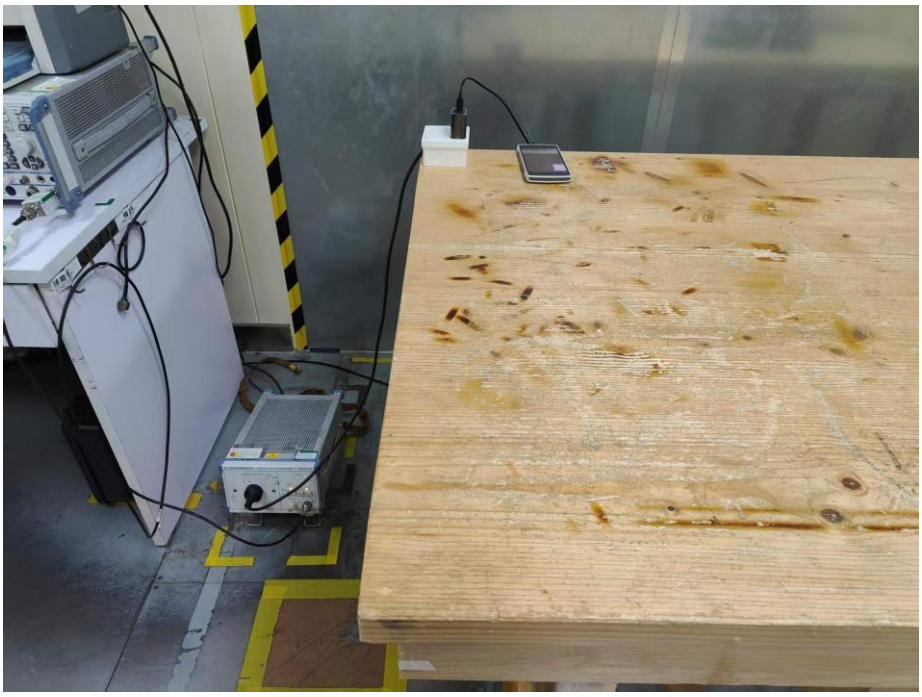
EUT Photo 1

EUT Photo 2

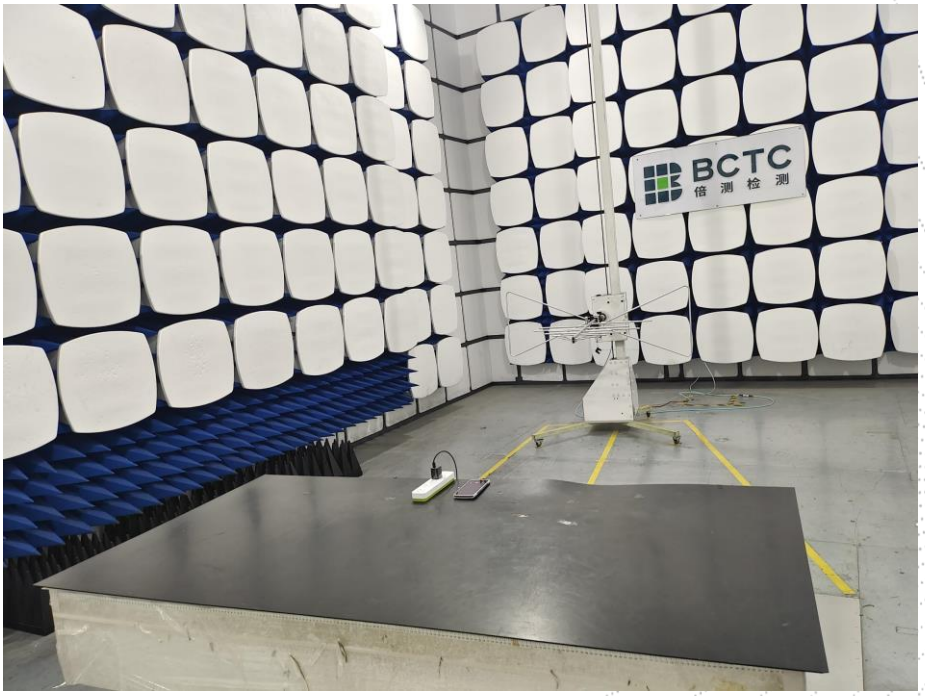
NOTE: Appendix-Photographs Of EUT Constructional Details.

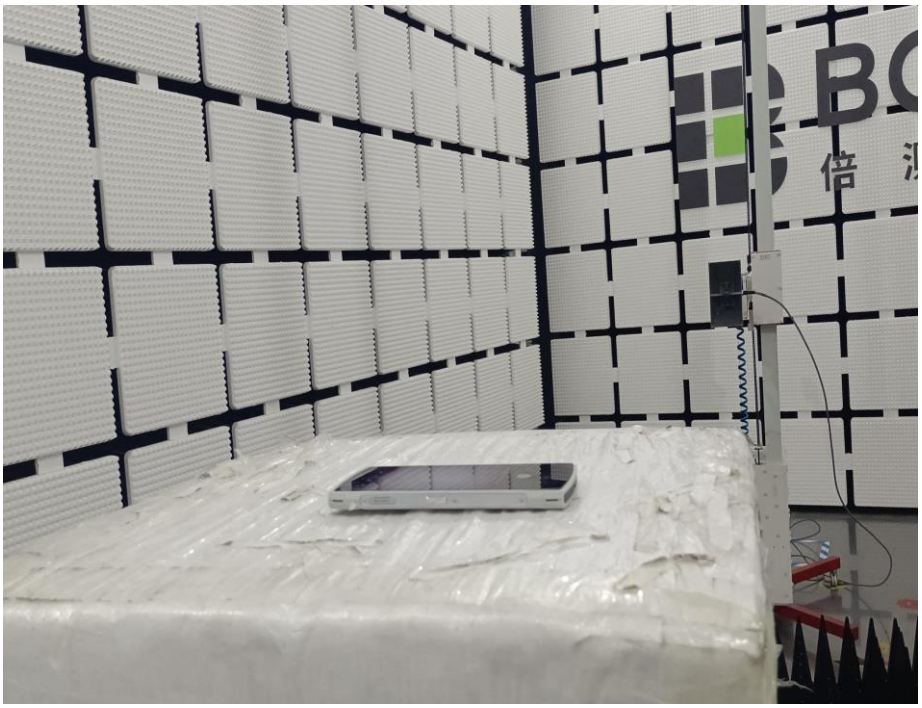
17. EUT Test Setup Photographs

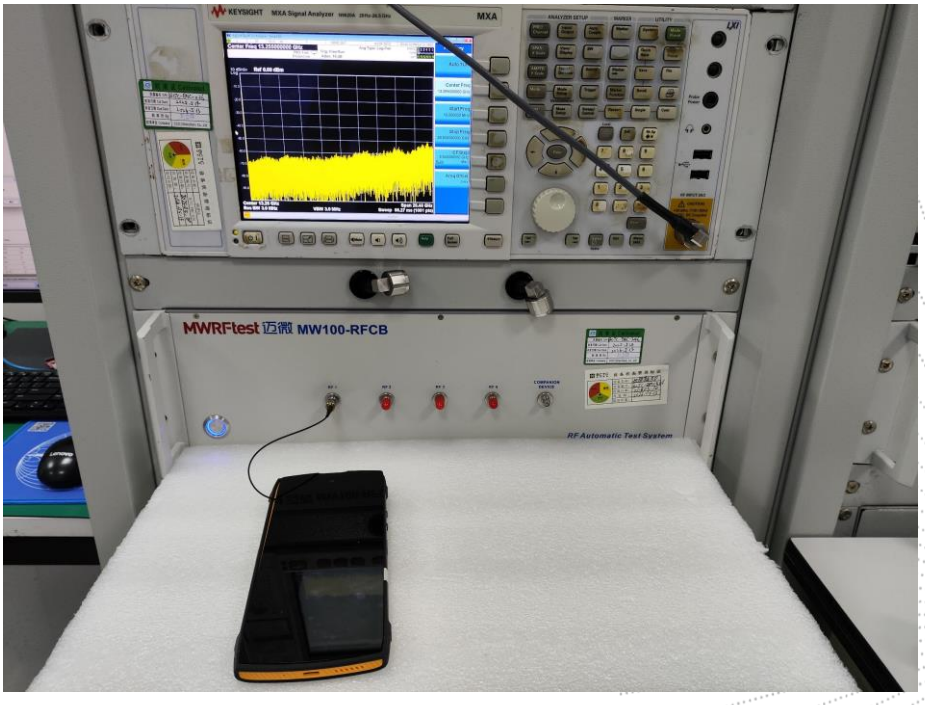
Conducted Measurement Photos



Radiated Measurement Photos






KEYSIGHT
MXA Signal Analyzer
MXA
MWRFtest 迈微 MW100-RFCB
RF Automatic Test System

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.

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