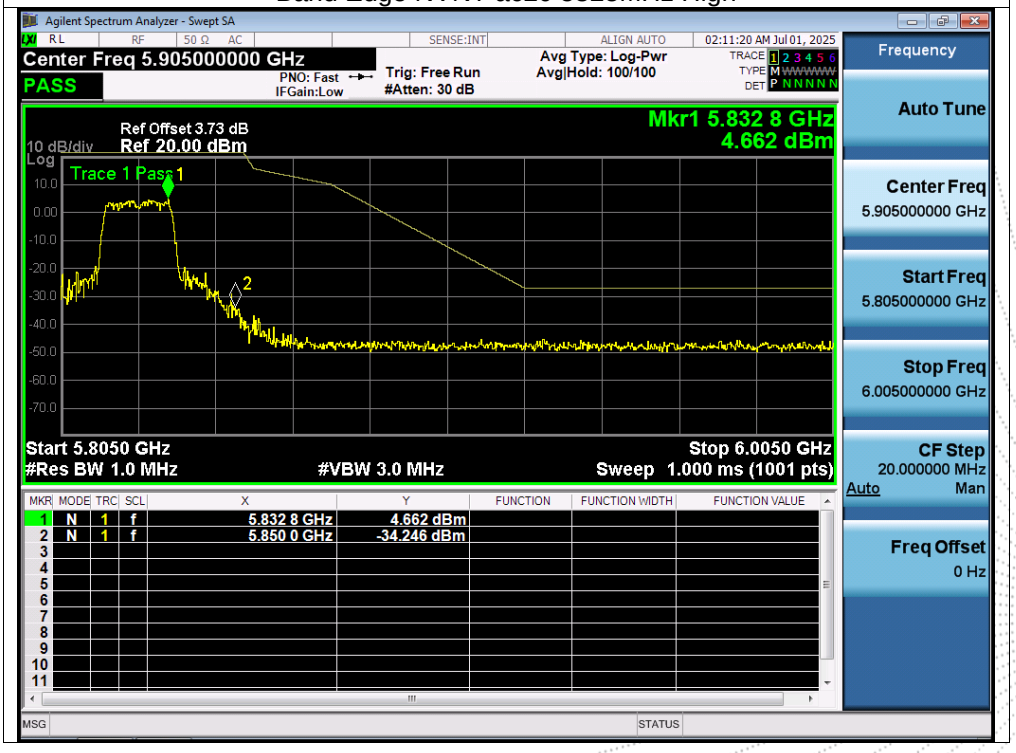
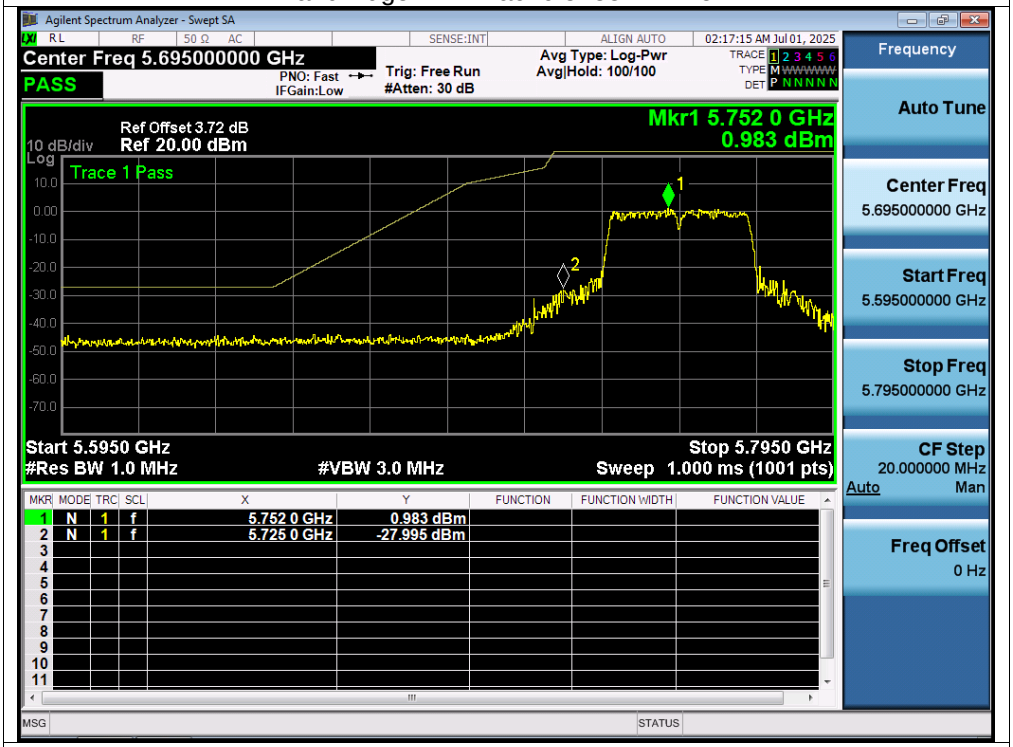
Band Edge NVNT ac20 5745MHz Low

Band Edge NVNT ac20 5825MHz High

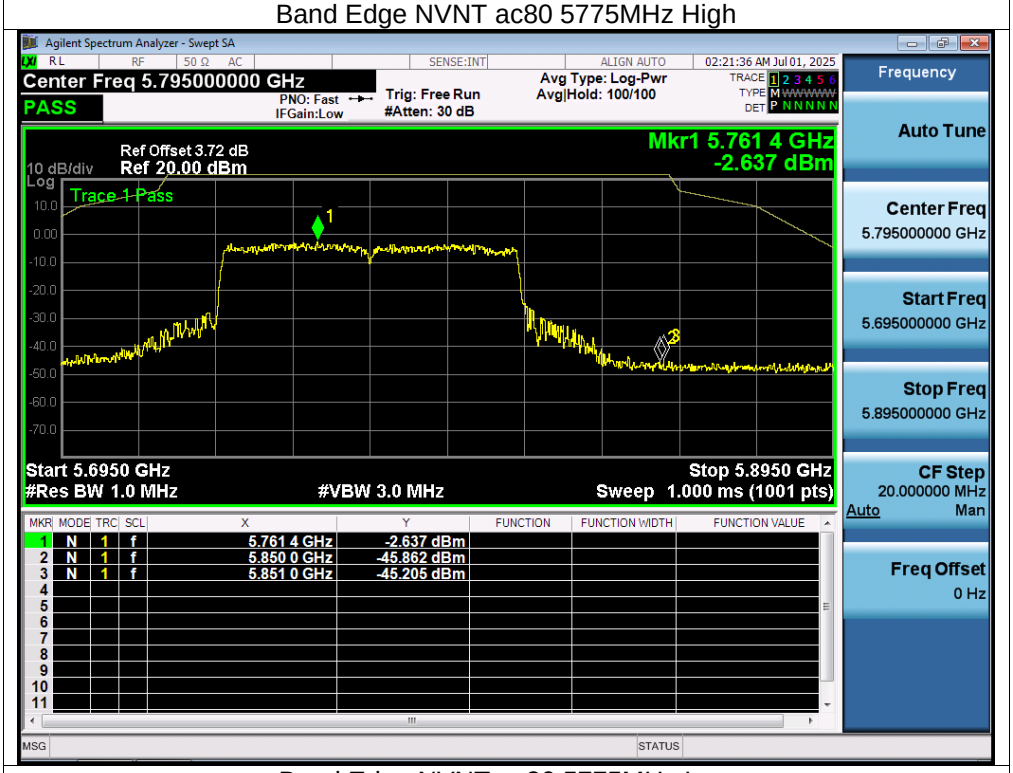


Band Edge NVNT ac40 5755MHz Low



Band Edge NVNT ac40 5795MHz High

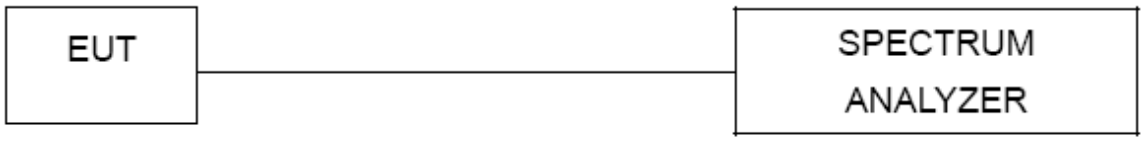
Band Edge NVNT ac80 5775MHz High



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

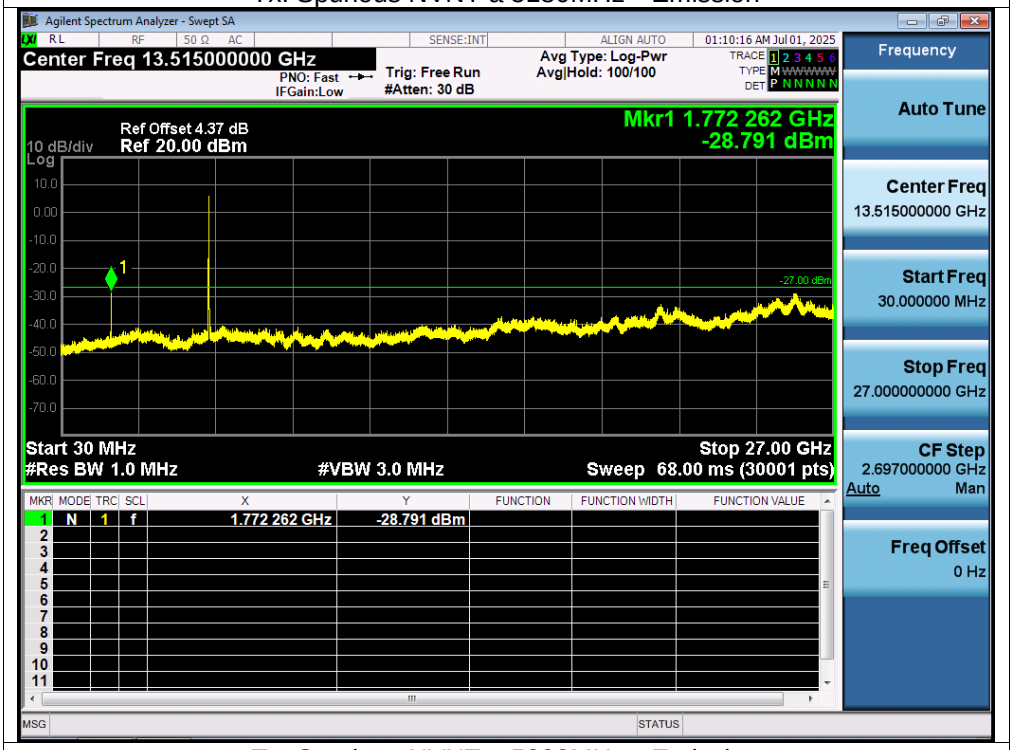
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then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

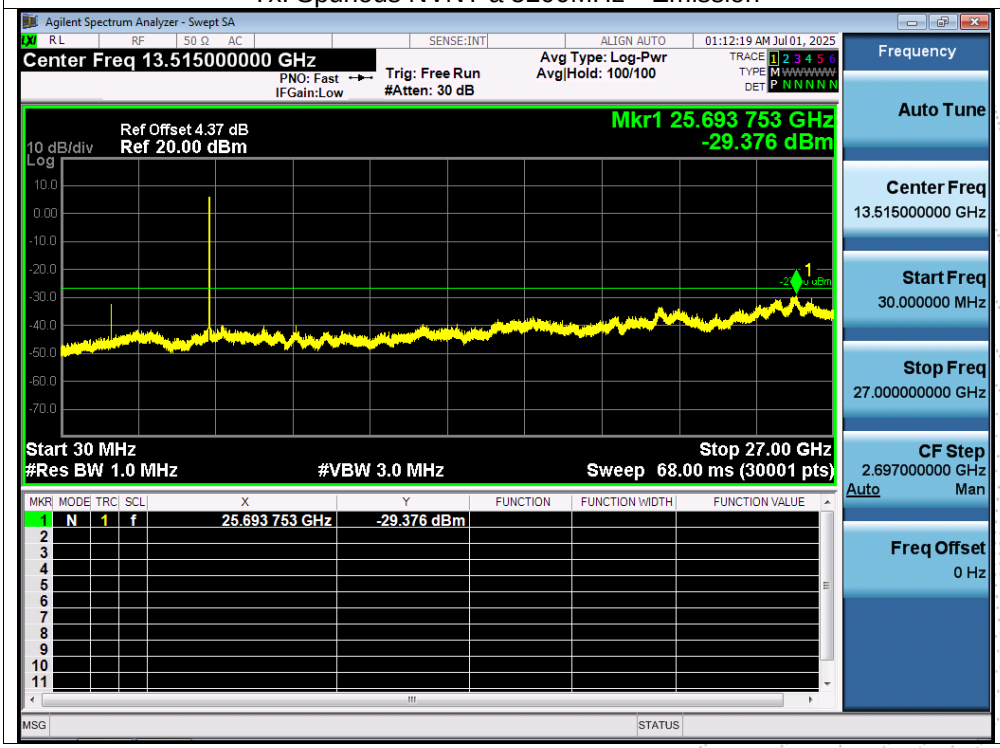
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

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.

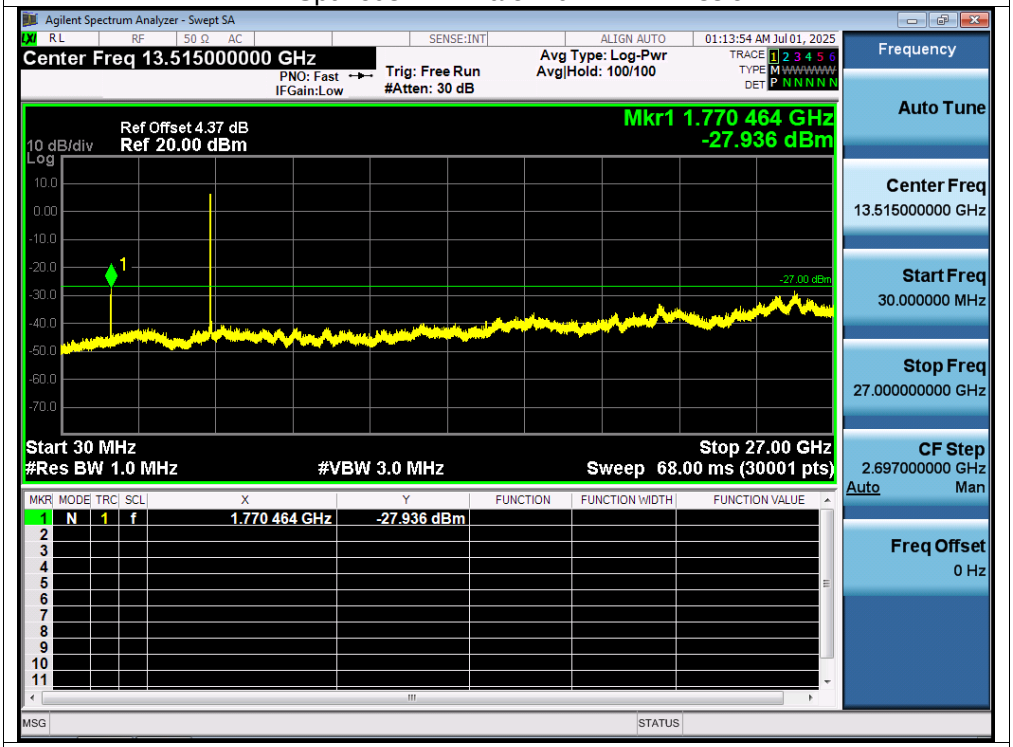
Test Graphs
Tx. Spurious NVNT a 5180MHz Emission



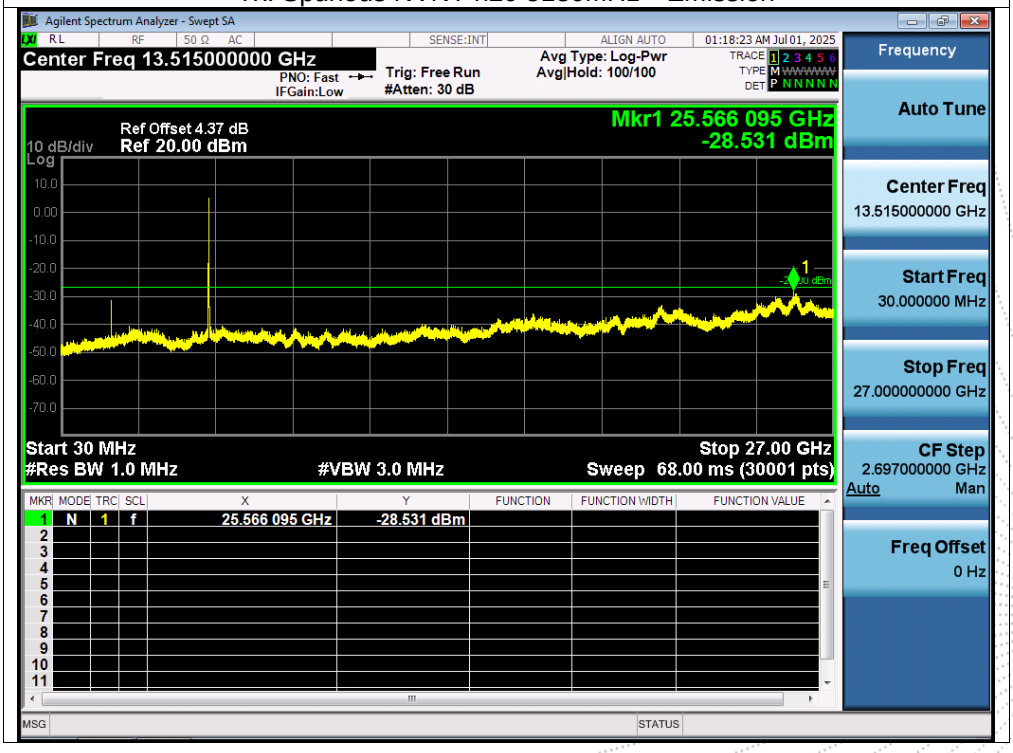
Tx. Spurious NVNT a 5200MHz Emission



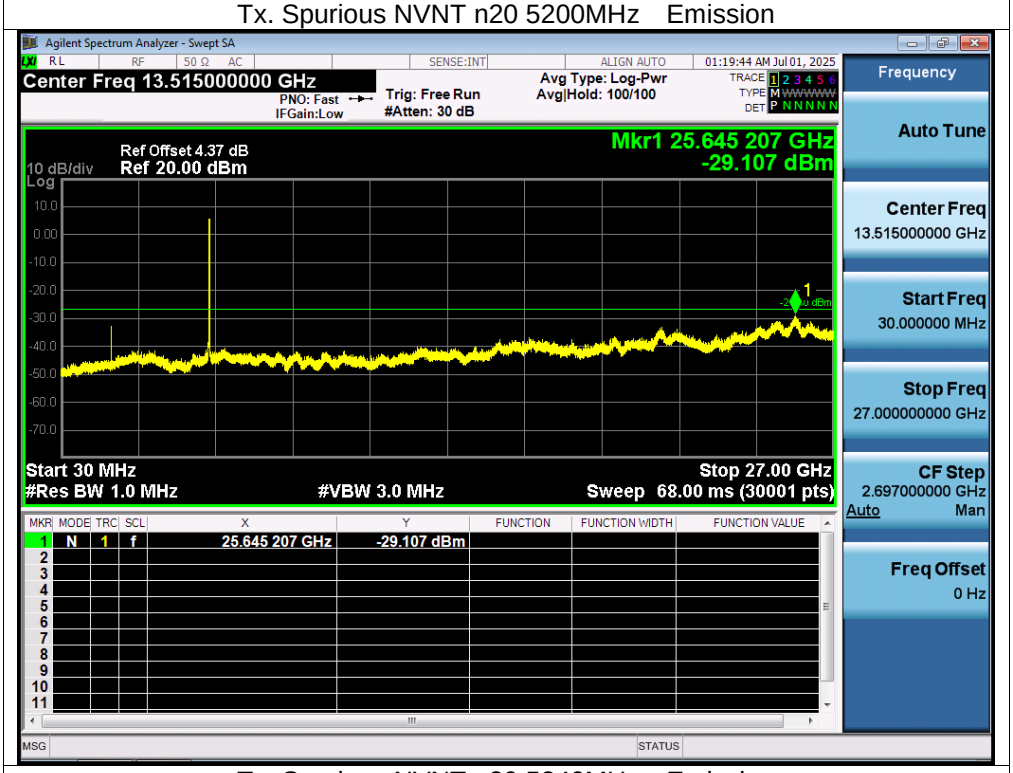
Tx. Spurious NVNT a 5240MHz Emission



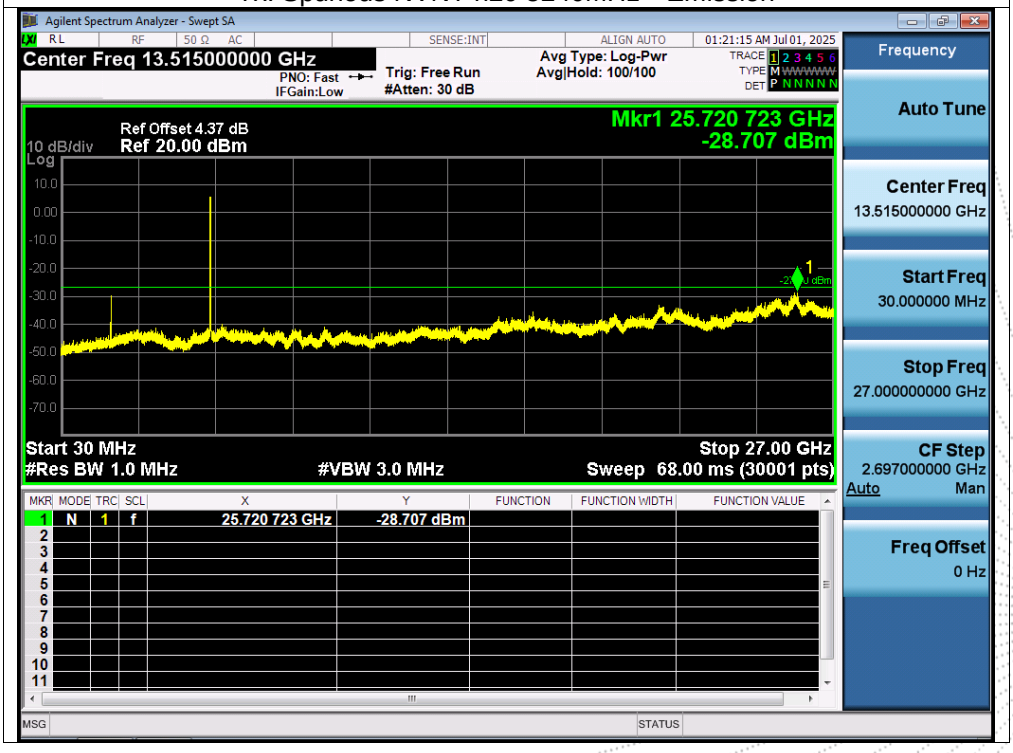
Tx. Spurious NVNT n20 5180MHz Emission



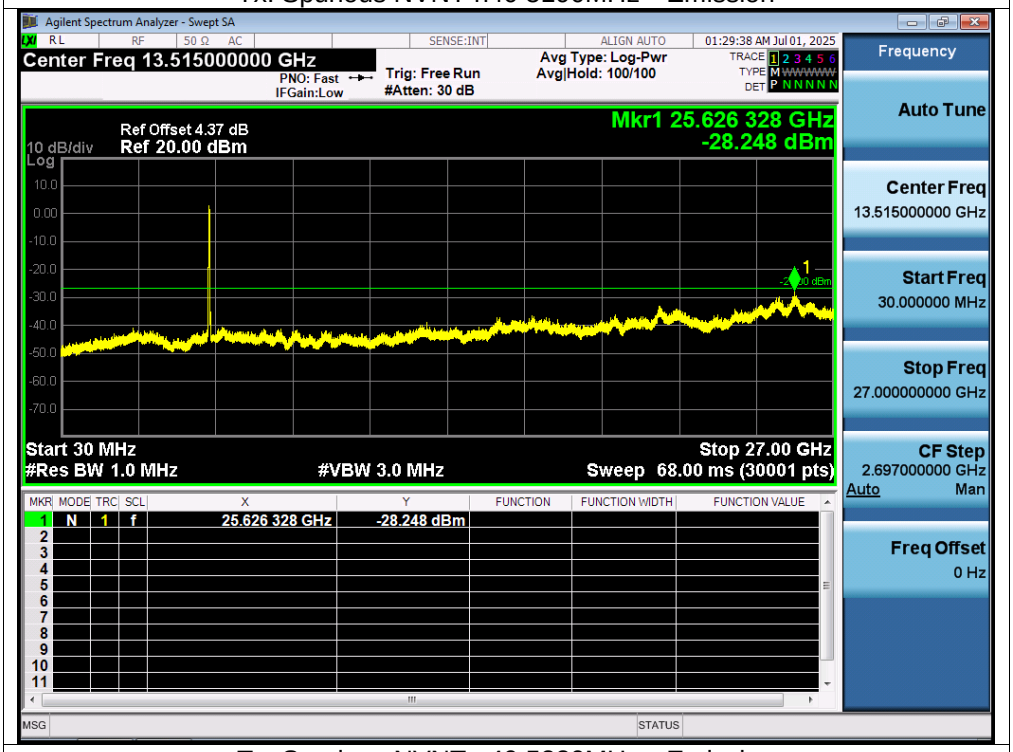
Tx. Spurious NVNT n20 5200MHz Emission



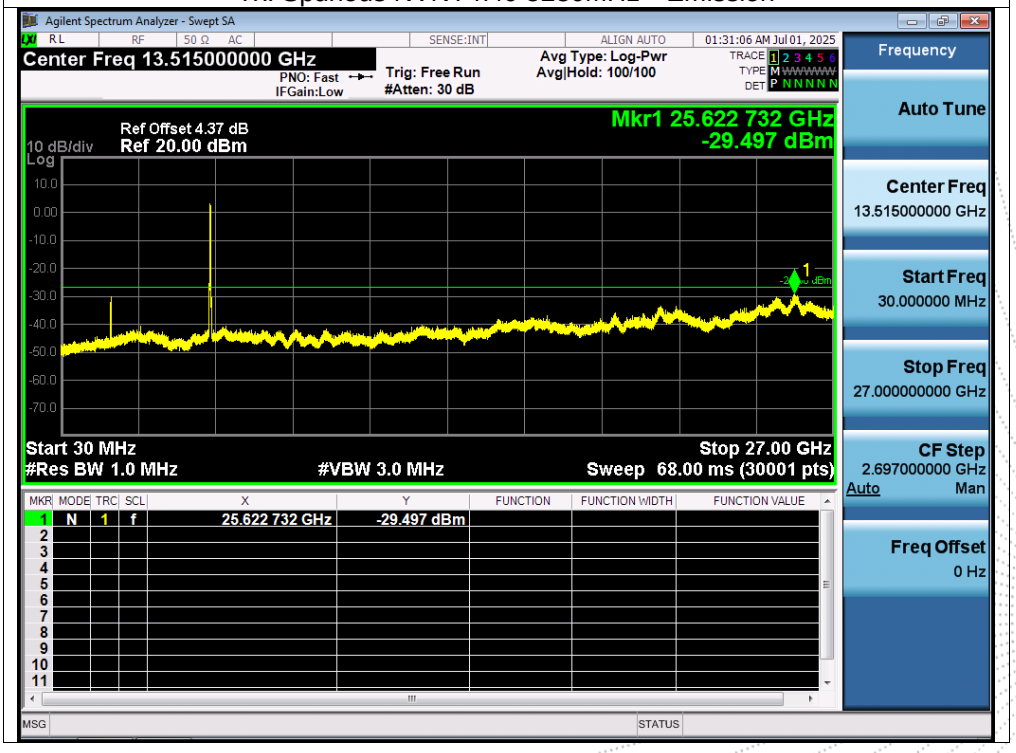
Tx. Spurious NVNT n20 5240MHz Emission



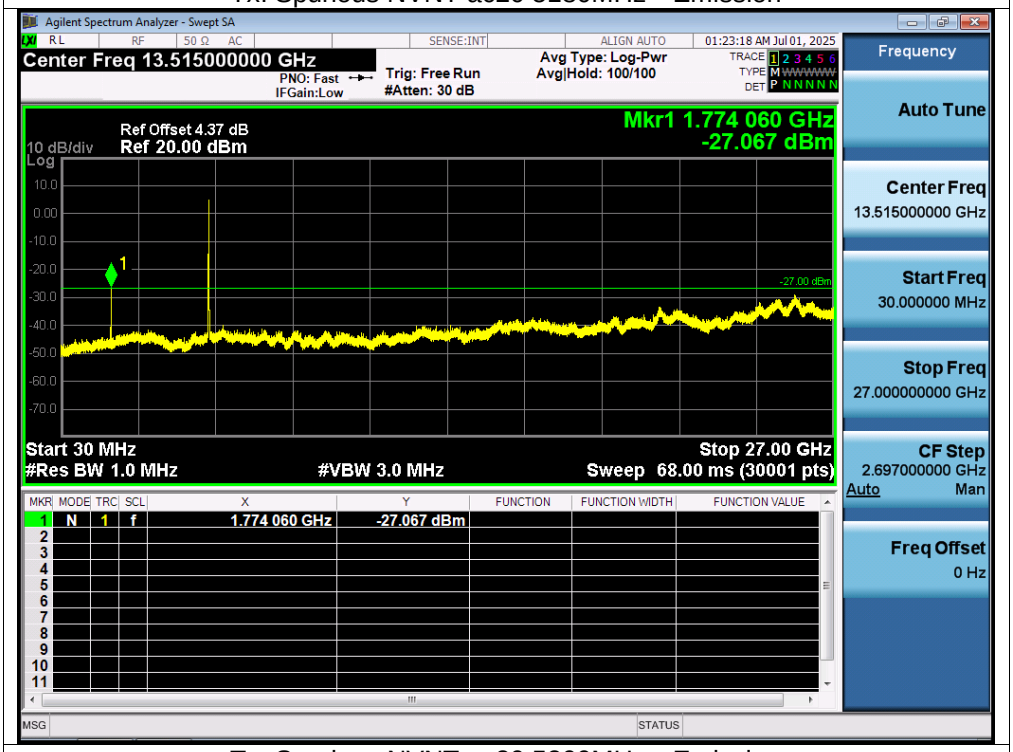
Tx. Spurious NVNT n40 5190MHz Emission



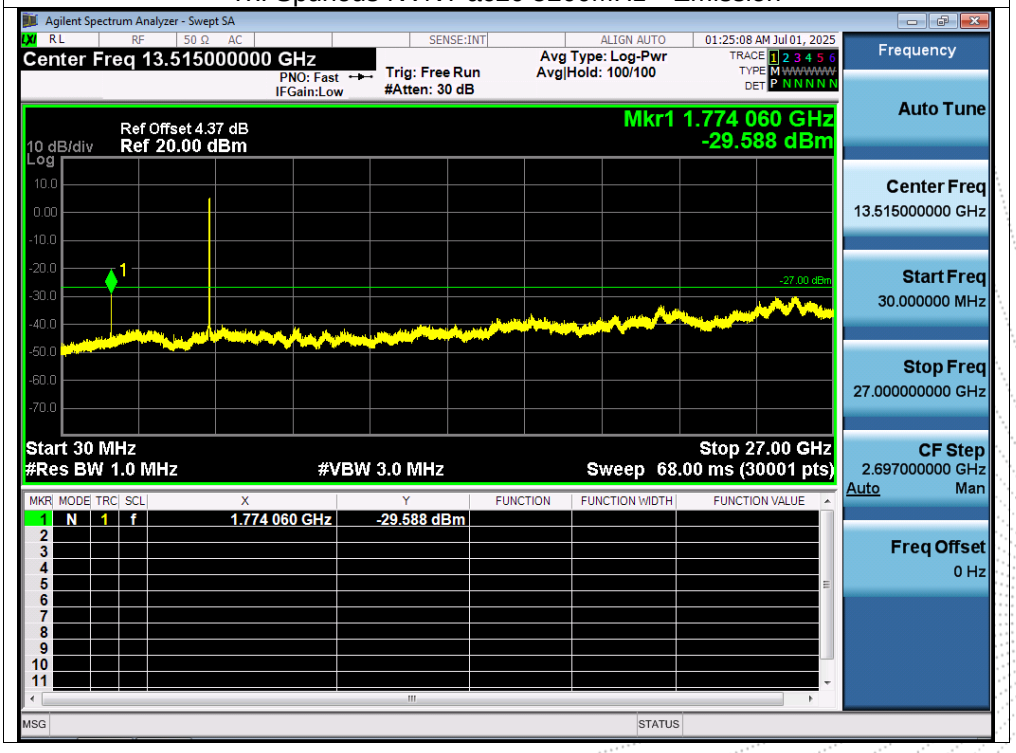
Tx. Spurious NVNT n40 5230MHz Emission



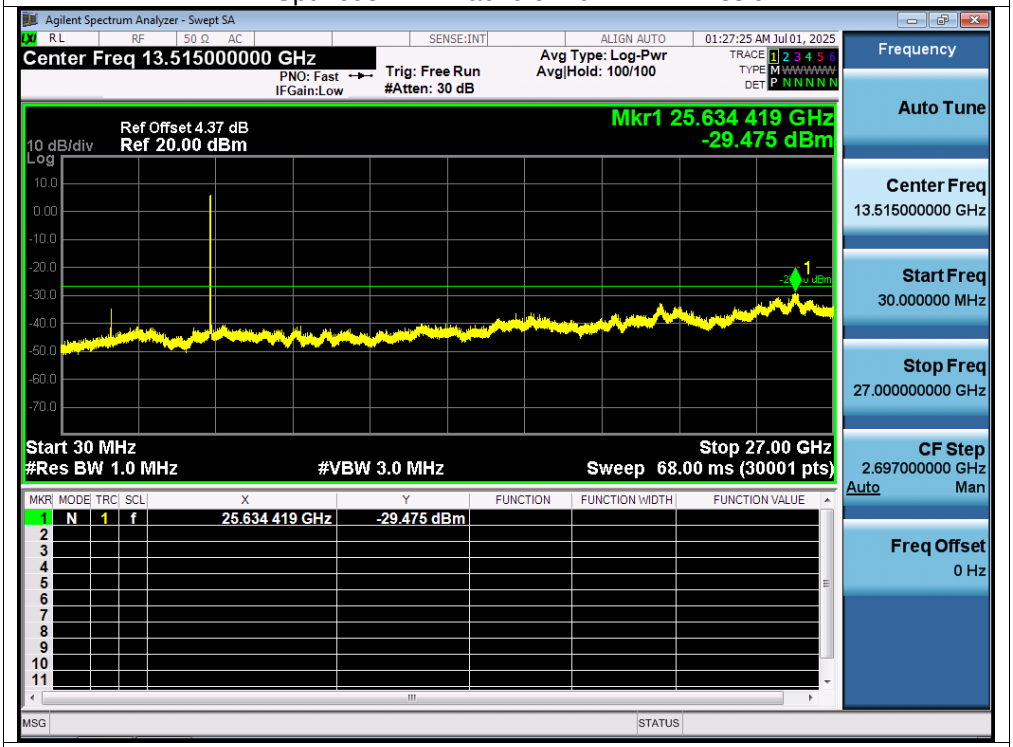
Tx. Spurious NVNT ac20 5180MHz Emission



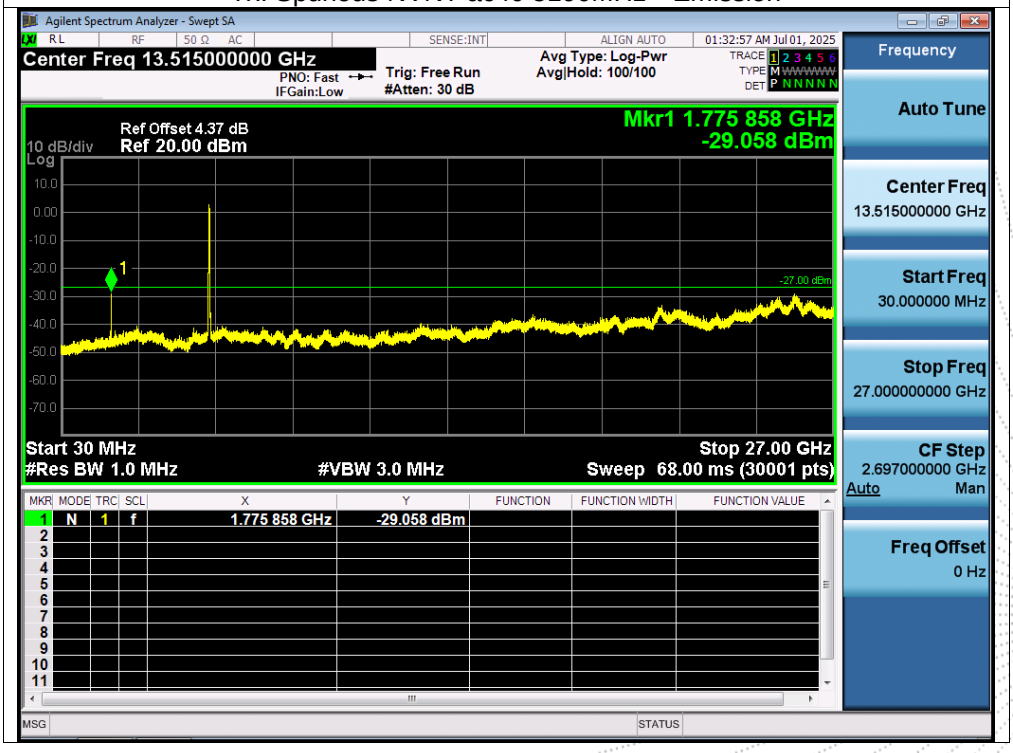
Tx. Spurious NVNT ac20 5200MHz Emission



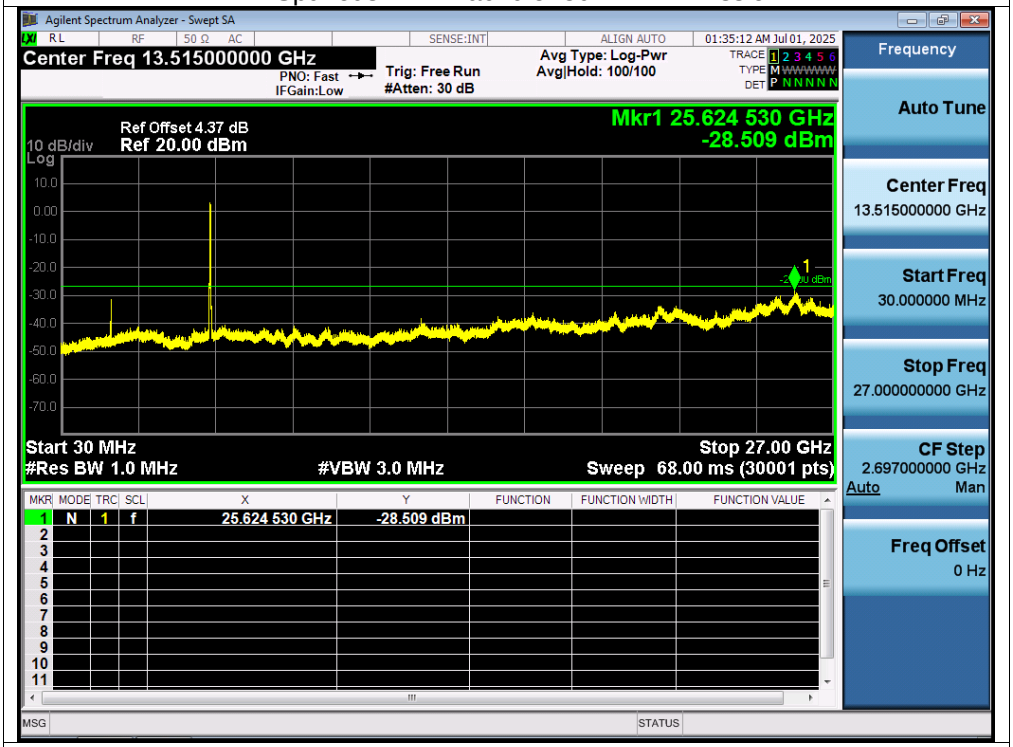
Tx. Spurious NVNT ac20 5240MHz Emission



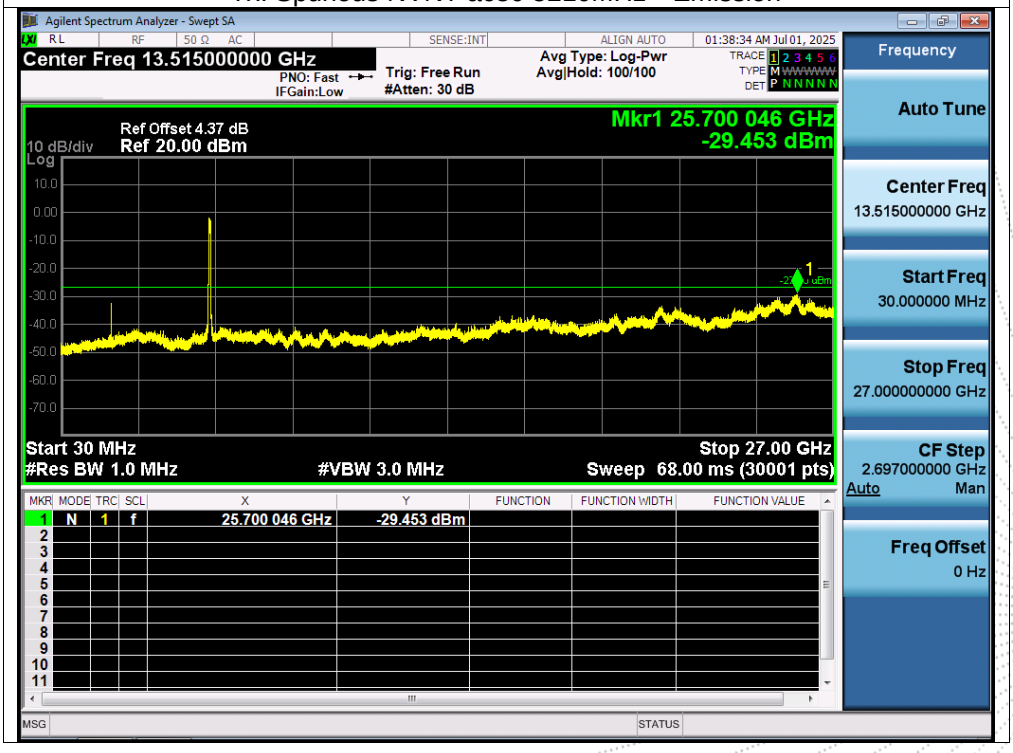
Tx. Spurious NVNT ac40 5190MHz Emission



Tx. Spurious NVNT ac40 5230MHz Emission

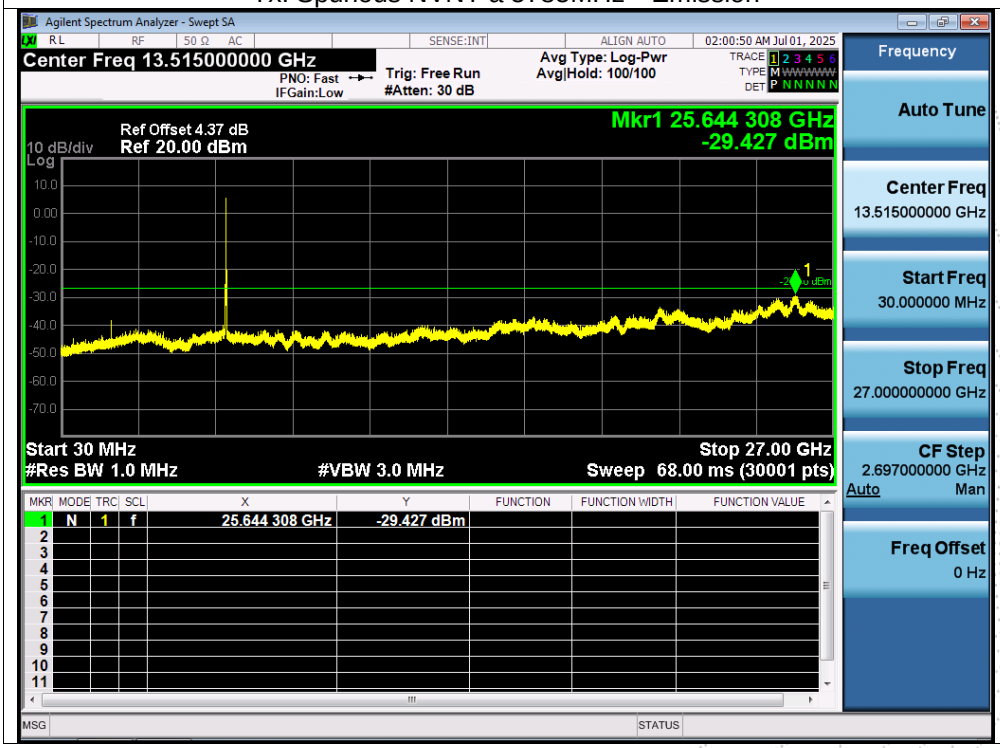


Tx. Spurious NVNT ac80 5210MHz Emission

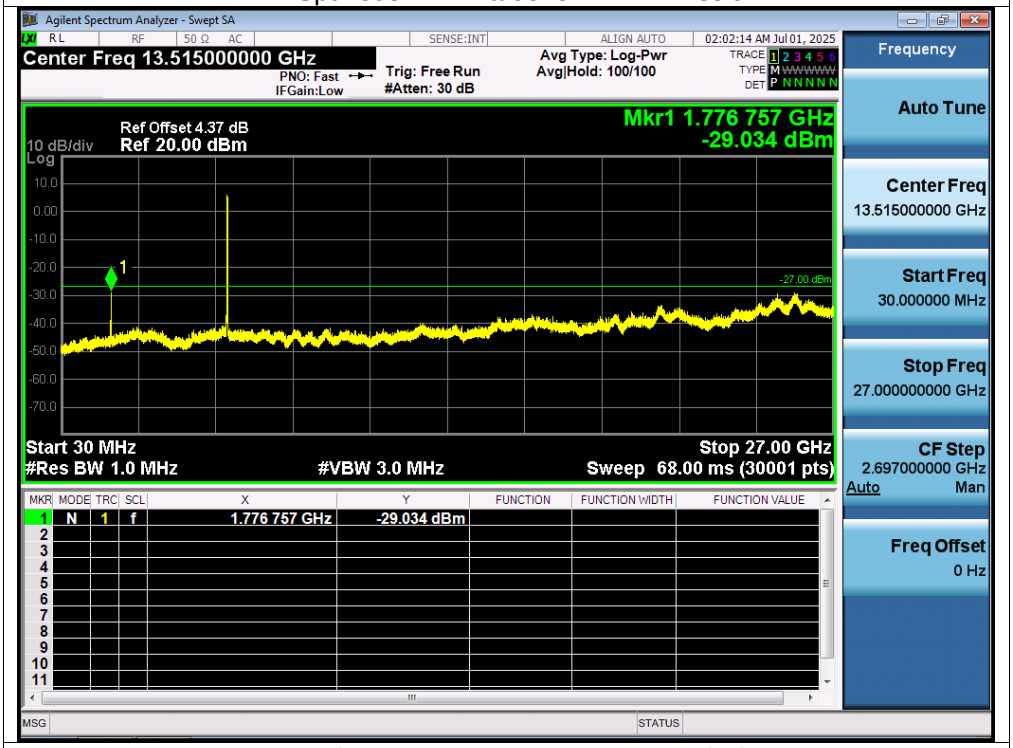


Test Graphs
Tx. Spurious NVNT a 5745MHz Emission

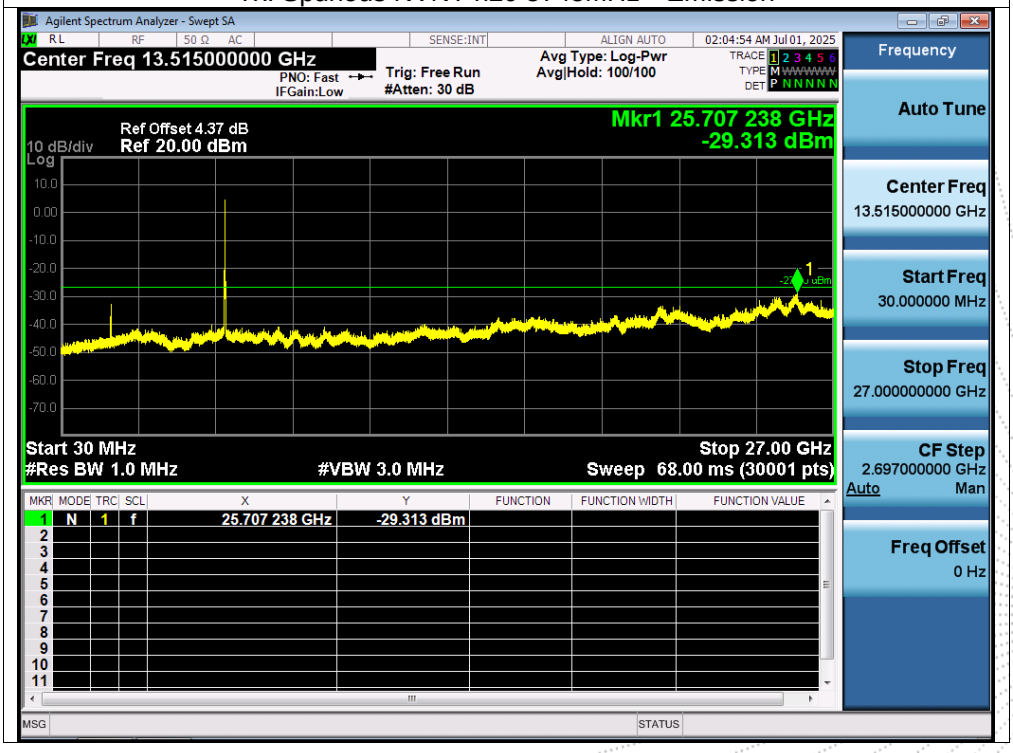
Tx. Spurious NVNT a 5785MHz Emission



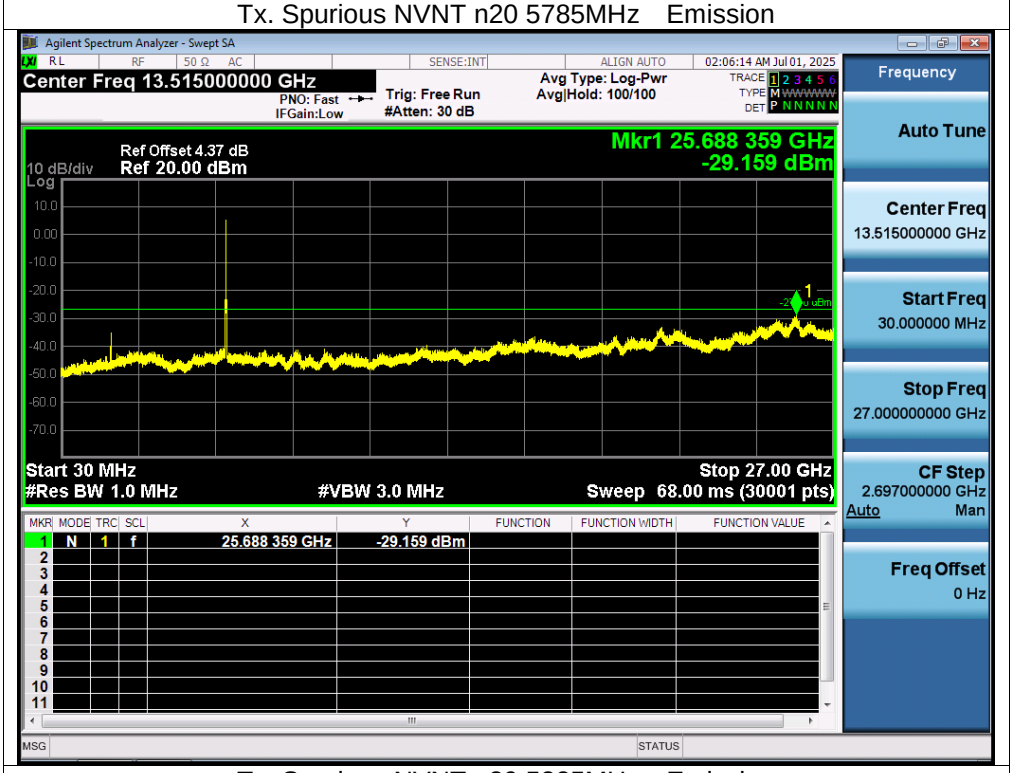
Tx. Spurious NVNT a 5825MHz Emission



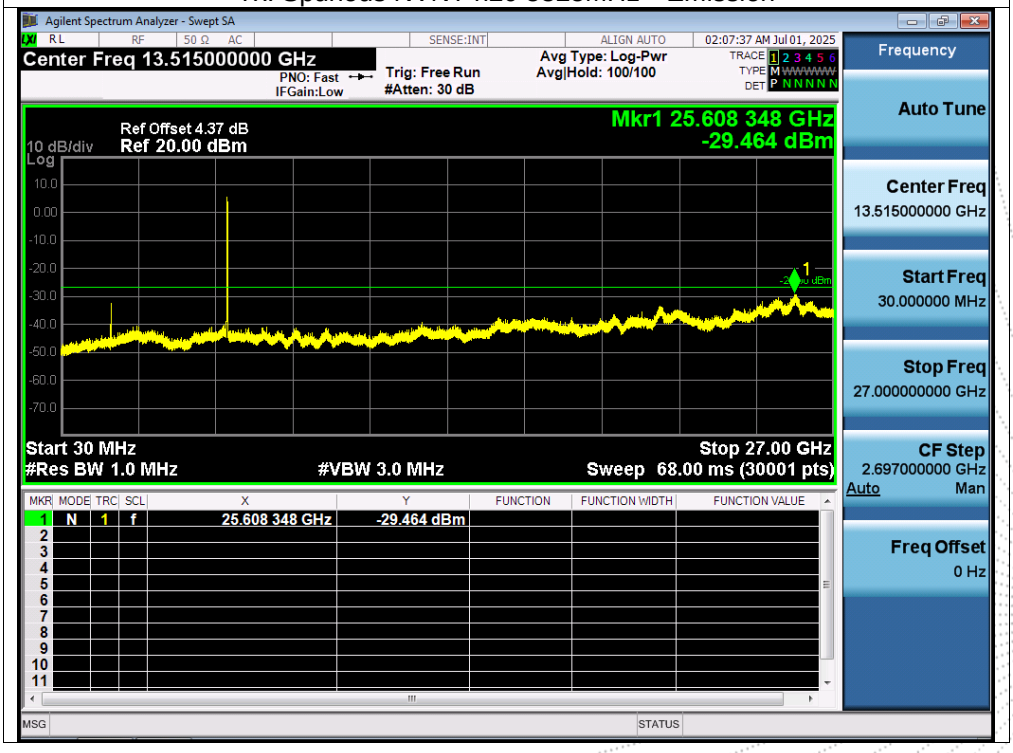
Tx. Spurious NVNT n20 5745MHz Emission



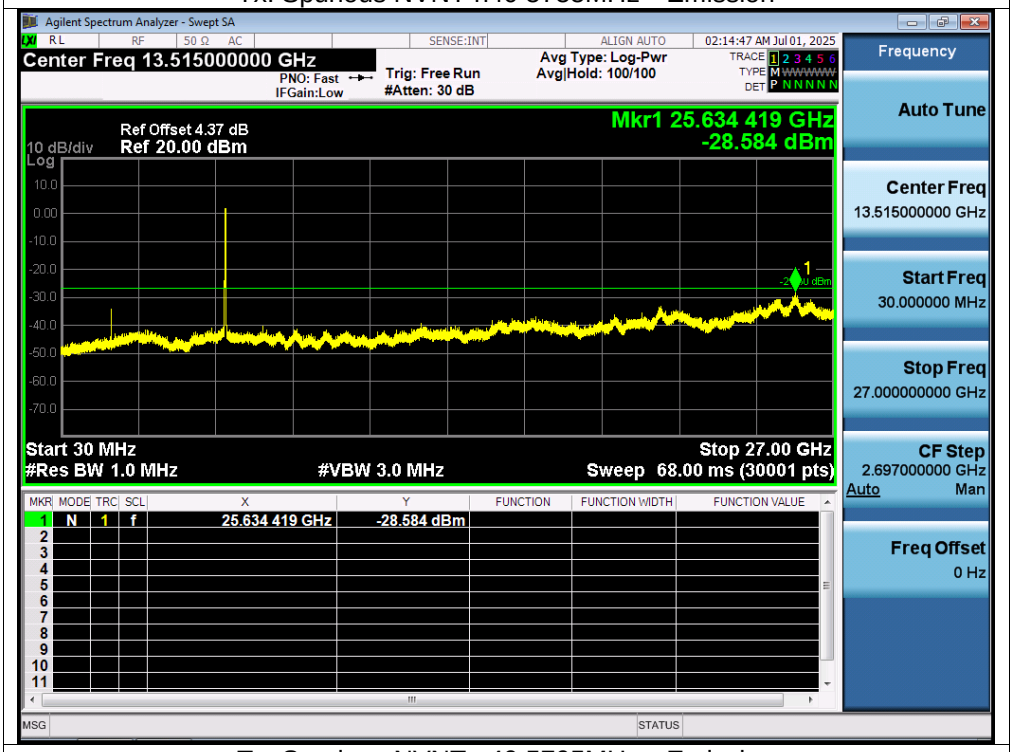
Tx. Spurious NVNT n20 5785MHz Emission



Tx. Spurious NVNT n20 5825MHz Emission

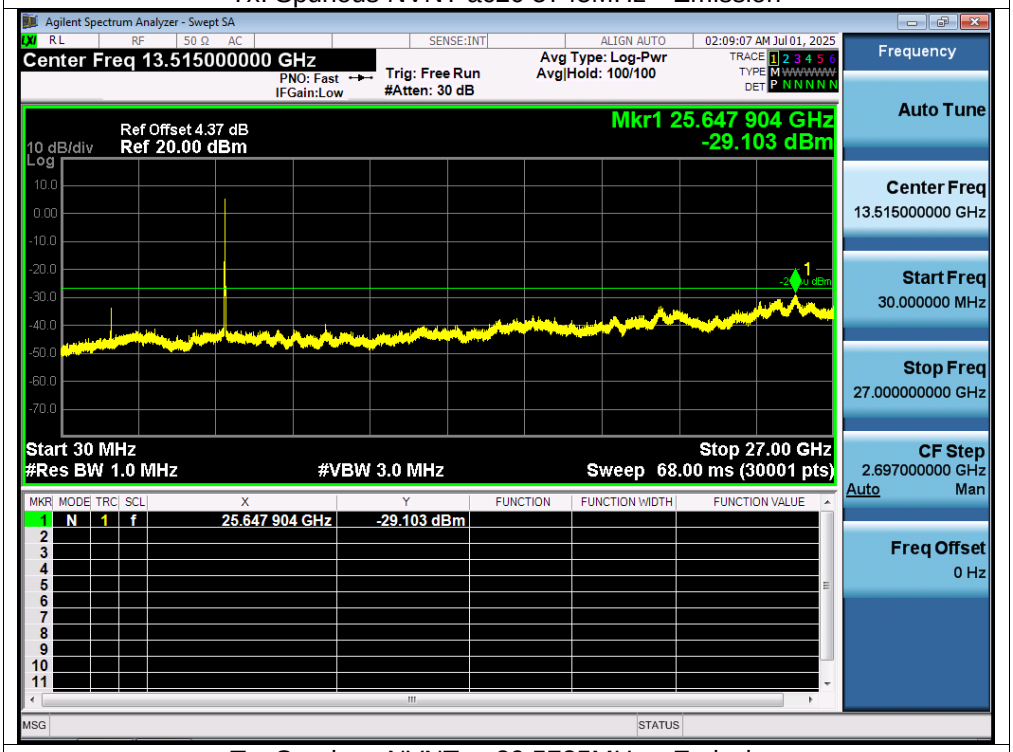


Tx. Spurious NVNT n40 5755MHz Emission

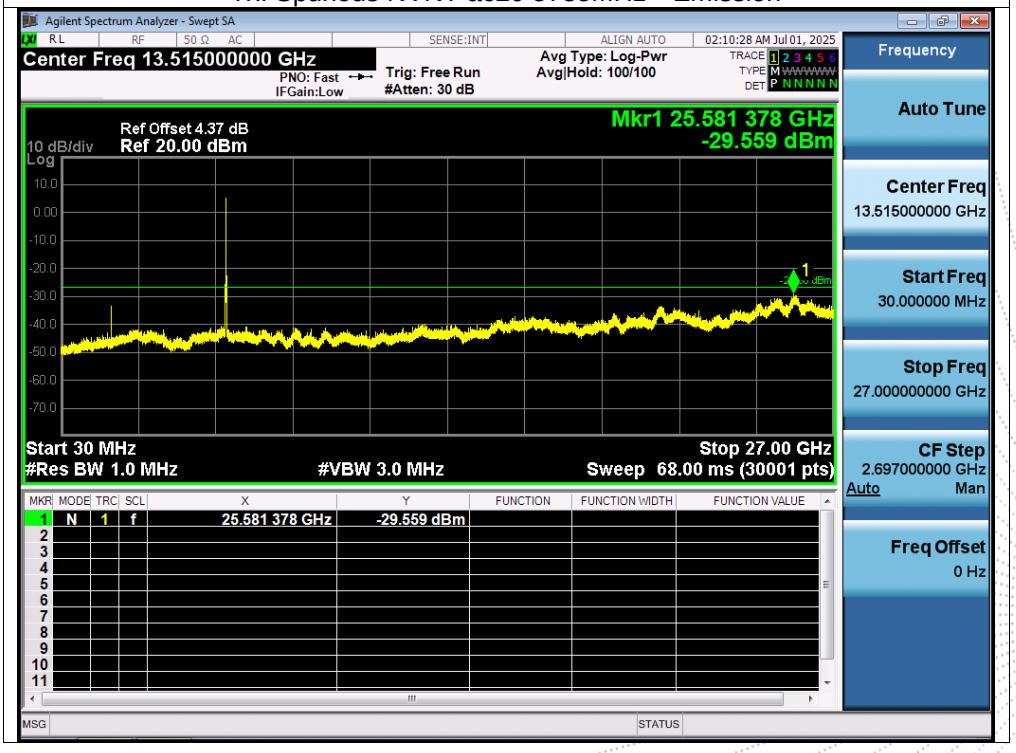


Tx. Spurious NVNT n40 5795MHz Emission

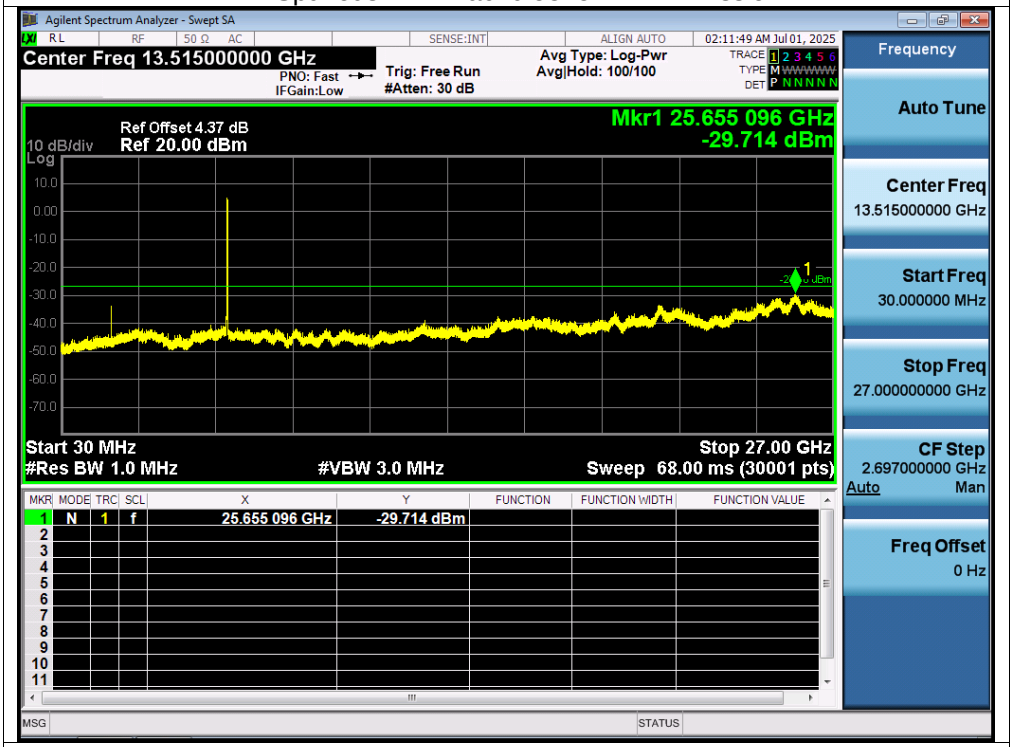
Tx. Spurious NVNT ac20 5745MHz Emission



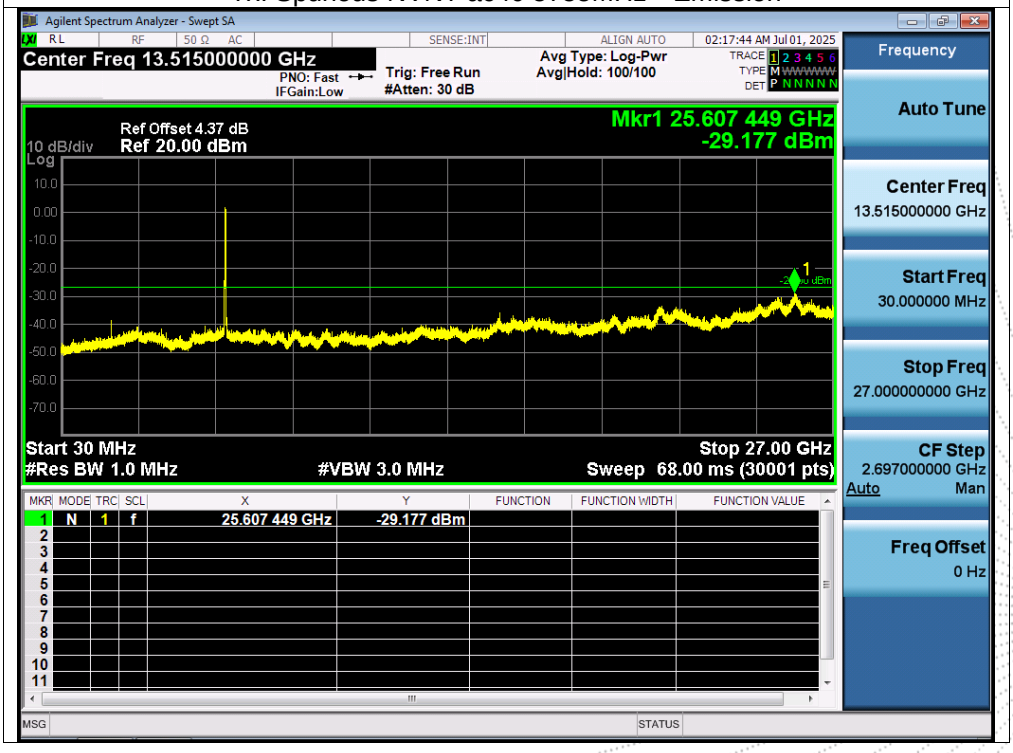
Tx. Spurious NVNT ac20 5785MHz Emission



Tx. Spurious NVNT ac20 5825MHz Emission

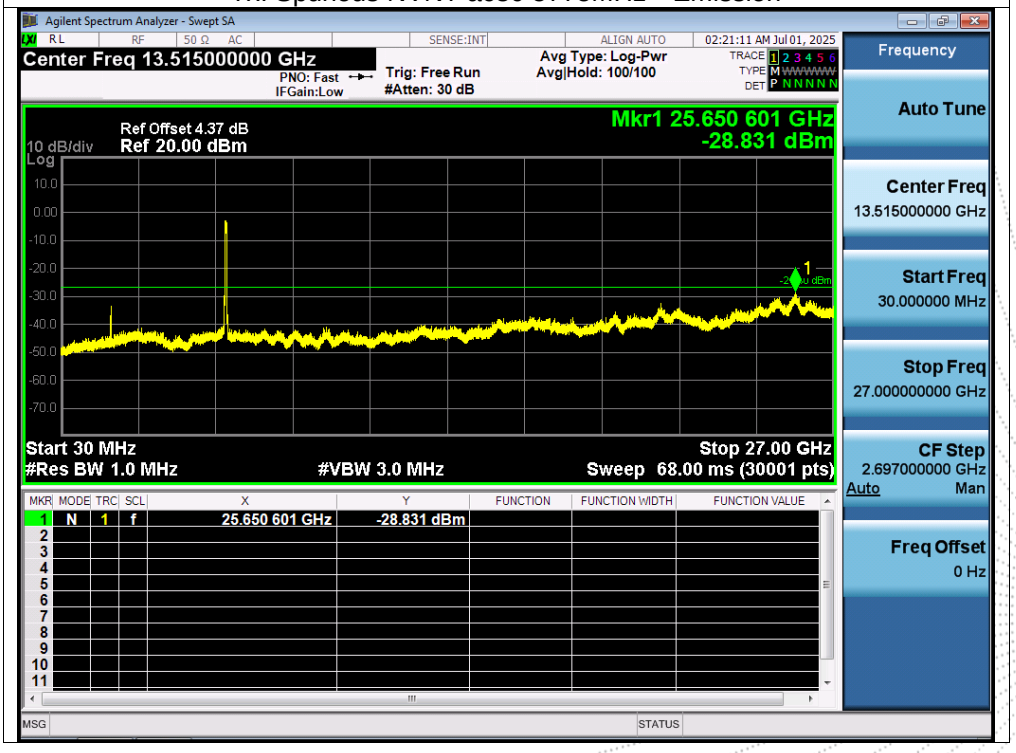


Tx. Spurious NVNT ac40 5755MHz Emission



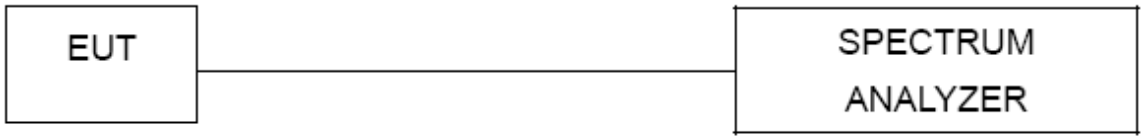
Tx. Spurious NVNT ac40 5795MHz Emission

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 3.93V
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)	3.93	5180.0005	5180	0.0005	0.0965
		V max (V)	4.52	5180.0027	5180	0.0027	0.5212
		V min (V)	3.34	5180.0129	5180	0.0129	2.4903
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)	3.93	T (°C)	-20	5180.0030	5180	0.0030	0.5792
		T (°C)	-10	5180.0064	5180	0.0064	1.2355
		T (°C)	0	5180.0096	5180	0.0096	1.8533
		T (°C)	10	5180.0000	5180	0.0000	0.0000
		T (°C)	20	5180.0017	5180	0.0017	0.3282
		T (°C)	30	5180.0094	5180	0.0094	1.8147
		T (°C)	40	5180.0066	5180	0.0066	1.2741
		T (°C)	50	5180.0080	5180	0.0080	1.5444
		T (°C)	60	5180.0078	5180	0.0078	1.5058
		T (°C)	70	5180.0085	5180	0.0085	1.6409
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)	3.93	5200.0039	5200	0.0039	0.7500
		V max (V)	4.52	5200.0026	5200	0.0026	0.5000
		V min (V)	3.34	5200.0067	5200	0.0067	1.2885
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)	3.93	T (°C)	-20	5200.00950	5200	0.00950	1.8269
		T (°C)	-10	5200.00120	5200	0.00120	0.2308
		T (°C)	0	5200.00550	5200	0.00550	1.0577
		T (°C)	10	5200.00440	5200	0.00440	0.8462
		T (°C)	20	5200.01340	5200	0.01340	2.5769
		T (°C)	30	5200.00160	5200	0.00160	0.3077
		T (°C)	40	5200.00920	5200	0.00920	1.7692
		T (°C)	50	5200.00840	5200	0.00840	1.6154
		T (°C)	60	5200.00160	5200	0.00160	0.3077
		T (°C)	70	5200.01010	5200	0.01010	1.9423
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)	3.93	5240.0122	5240	0.0122	2.3282
		V max (V)	4.52	5240.0063	5240	0.0063	1.2023
		V min (V)	3.34	5240.0072	5240	0.0072	1.3740
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)	3.93	T (°C)	-20	5240.0101	5240	0.0101	1.9275
		T (°C)	-10	5240.0083	5240	0.0083	1.5840
		T (°C)	0	5240.0114	5240	0.0114	2.1756
		T (°C)	10	5240.0112	5240	0.0112	2.1374
		T (°C)	20	5240.0012	5240	0.0012	0.2290
		T (°C)	30	5240.0061	5240	0.0061	1.1641
		T (°C)	40	5240.0081	5240	0.0081	1.5458
		T (°C)	50	5240.0098	5240	0.0098	1.8702
		T (°C)	60	5240.0001	5240	0.0001	0.0191
		T (°C)	70	5240.0065	5240	0.0065	1.2405
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 3.93V
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)	3.93	5745.00190	5745	0.00190	0.3307
		V max (V)	4.52	5745.00820	5745	0.00820	1.4273
		V min (V)	3.34	5745.00770	5745	0.00770	1.3403
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)	3.93	T (°C)	-20	5745.01140	5745	0.01140	1.9843
		T (°C)	-10	5745.00340	5745	0.00340	0.5918
		T (°C)	0	5745.00550	5745	0.00550	0.9574
		T (°C)	10	5745.00700	5745	0.00700	1.2185
		T (°C)	20	5745.01080	5745	0.01080	1.8799
		T (°C)	30	5745.00700	5745	0.00700	1.2185
		T (°C)	40	5745.00360	5745	0.00360	0.6266
		T (°C)	50	5745.00660	5745	0.00660	1.1488
		T (°C)	60	5745.00300	5745	0.00300	0.5222
		T (°C)	70	5745.00860	5745	0.00860	1.4970
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)	3.93	5785.00000	5785	0.00000	0.0000
		V max (V)	4.52	5785.00800	5785	0.00800	1.3829
		V min (V)	3.34	5785.01160	5785	0.01160	2.0052
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)	3.93	T (°C)	-20	5785.00800	5785	0.00800	1.3829
		T (°C)	-10	5785.00080	5785	0.00080	0.1383
		T (°C)	0	5785.01070	5785	0.01070	1.8496
		T (°C)	10	5785.00350	5785	0.00350	0.6050
		T (°C)	20	5785.00850	5785	0.00850	1.4693
		T (°C)	30	5785.01140	5785	0.01140	1.9706
		T (°C)	40	5785.01160	5785	0.01160	2.0052
		T (°C)	50	5785.00250	5785	0.00250	0.4322
		T (°C)	60	5785.00930	5785	0.00930	1.6076
		T (°C)	70	5785.00220	5785	0.00220	0.3803
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)	3.93	5825.00070	5825	0.00070	0.1202
		V max (V)	4.52	5825.01220	5825	0.01220	2.0944
		V min (V)	3.34	5825.01060	5825	0.01060	1.8197
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)	3.93	T (°C)	-20	5825.00450	5825	0.00450	0.7725
		T (°C)	-10	5825.01200	5825	0.01200	2.0601
		T (°C)	0	5825.01000	5825	0.01000	1.7167
		T (°C)	10	5825.00810	5825	0.00810	1.3906
		T (°C)	20	5825.00080	5825	0.00080	0.1373
		T (°C)	30	5825.00940	5825	0.00940	1.6137
		T (°C)	40	5825.00110	5825	0.00110	0.1888
		T (°C)	50	5825.00890	5825	0.00890	1.5279
		T (°C)	60	5825.00550	5825	0.00550	0.9442
		T (°C)	70	5825.00450	5825	0.00450	0.7725
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

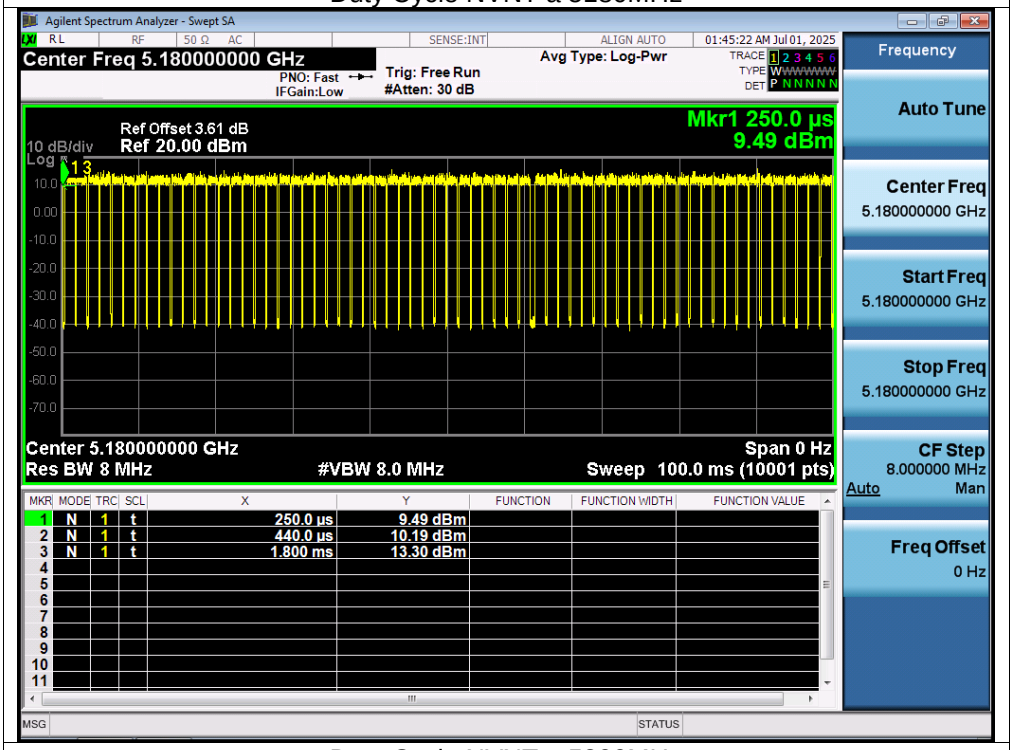
1.Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

14.4 Test Result

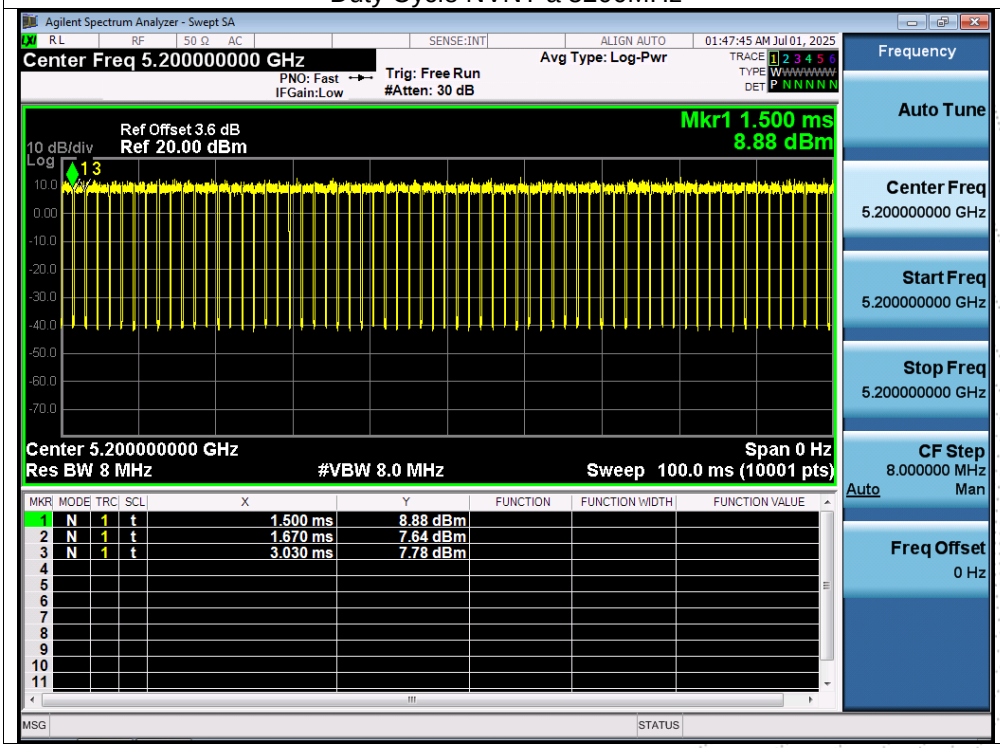
5.1G

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	a	5180	87.74	0.57
NVNT	n20	5180	88.89	0.51
NVNT	n40	5190	88.89	0.51
NVNT	ac20	5180	78.38	1.06
NVNT	ac40	5190	74.03	1.31
NVNT	ac80	5210	63.04	2

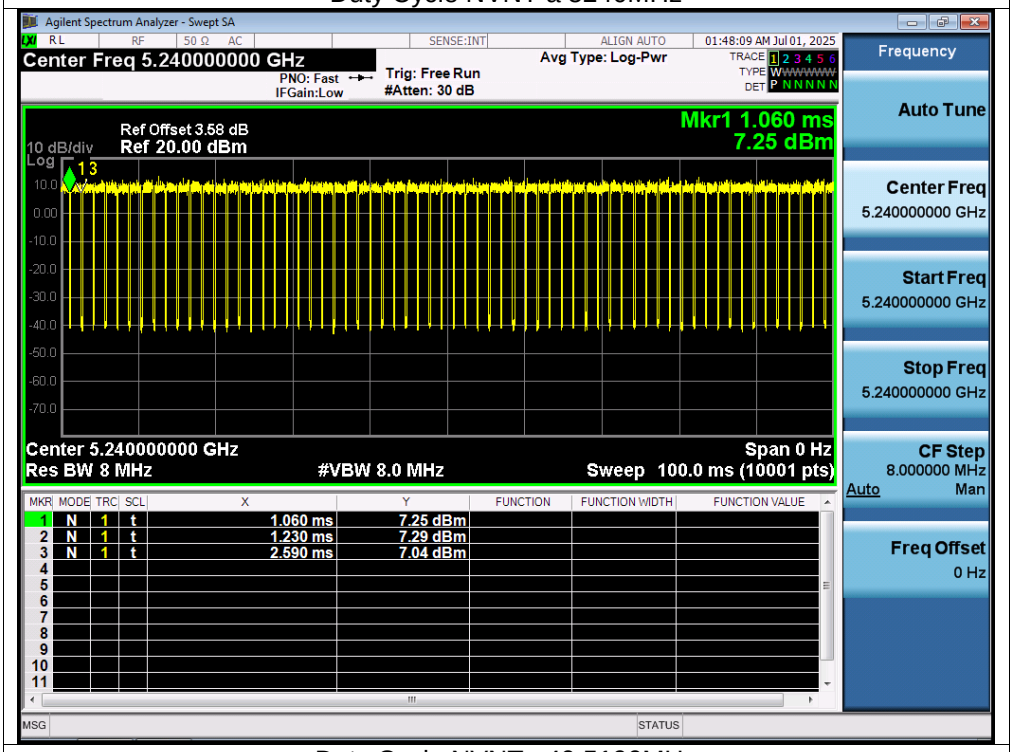
Test Graphs
Duty Cycle NVNT a 5180MHz



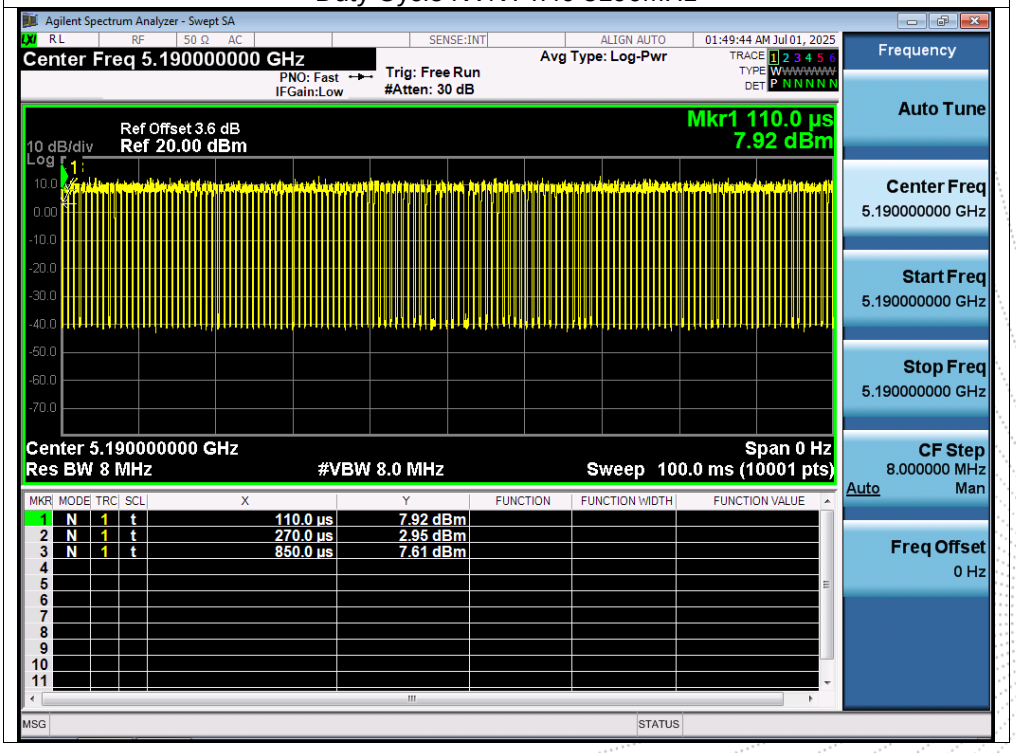
Duty Cycle NVNT a 5200MHz



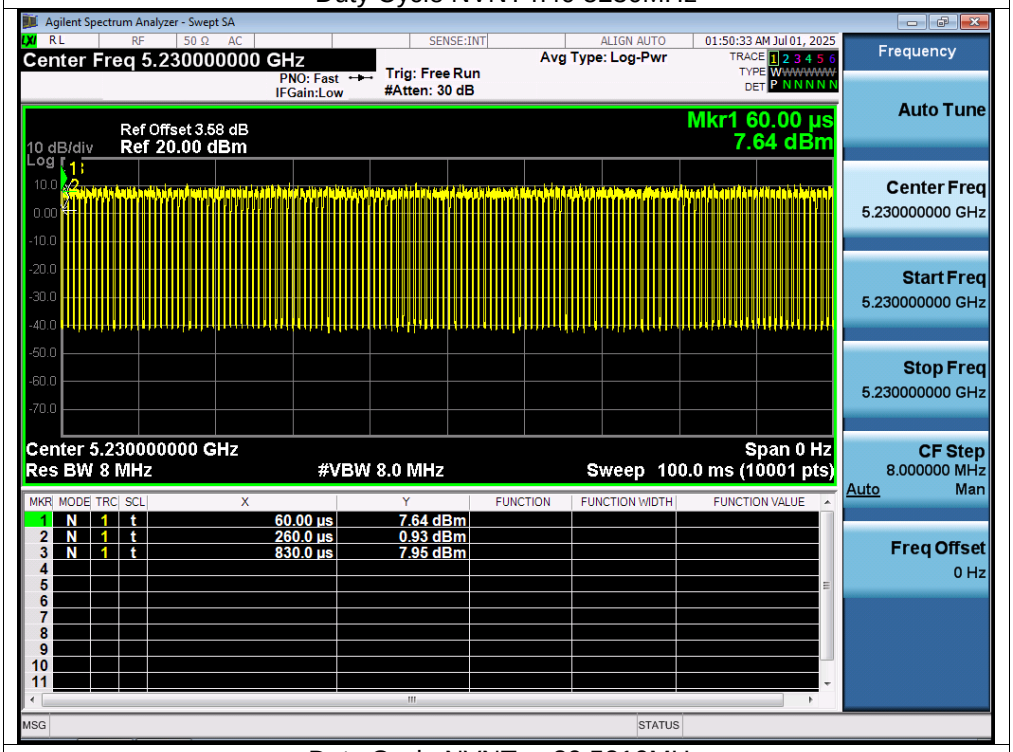
Duty Cycle NVNT a 5240MHz



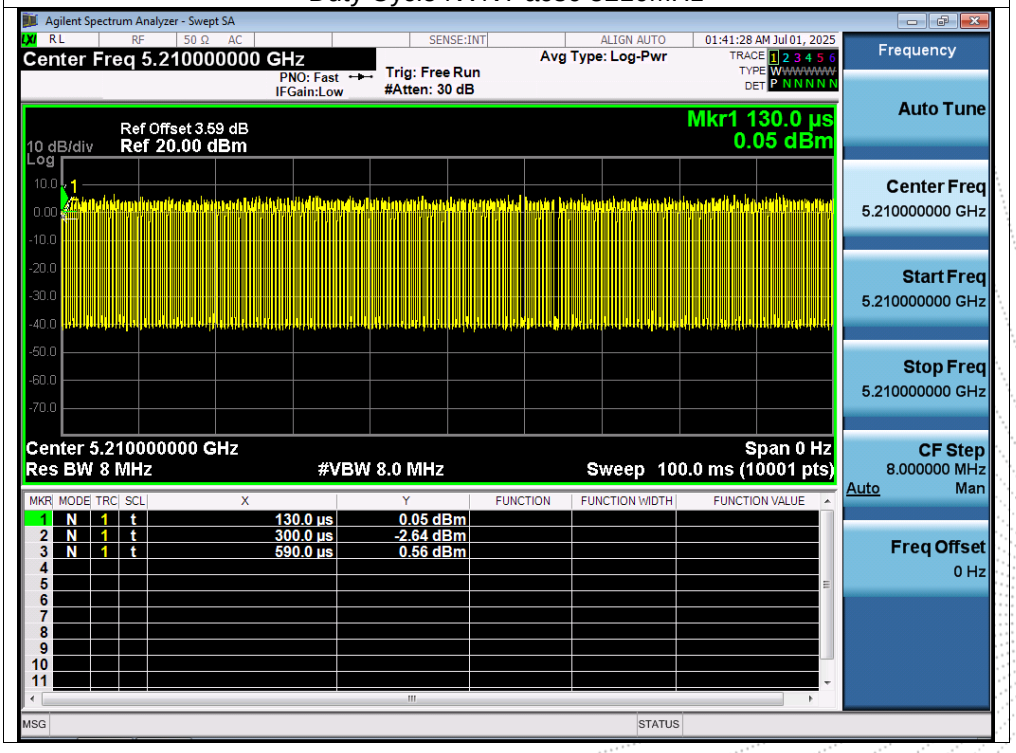
Duty Cycle NVNT n40 5190MHz



Duty Cycle NVNT n40 5230MHz



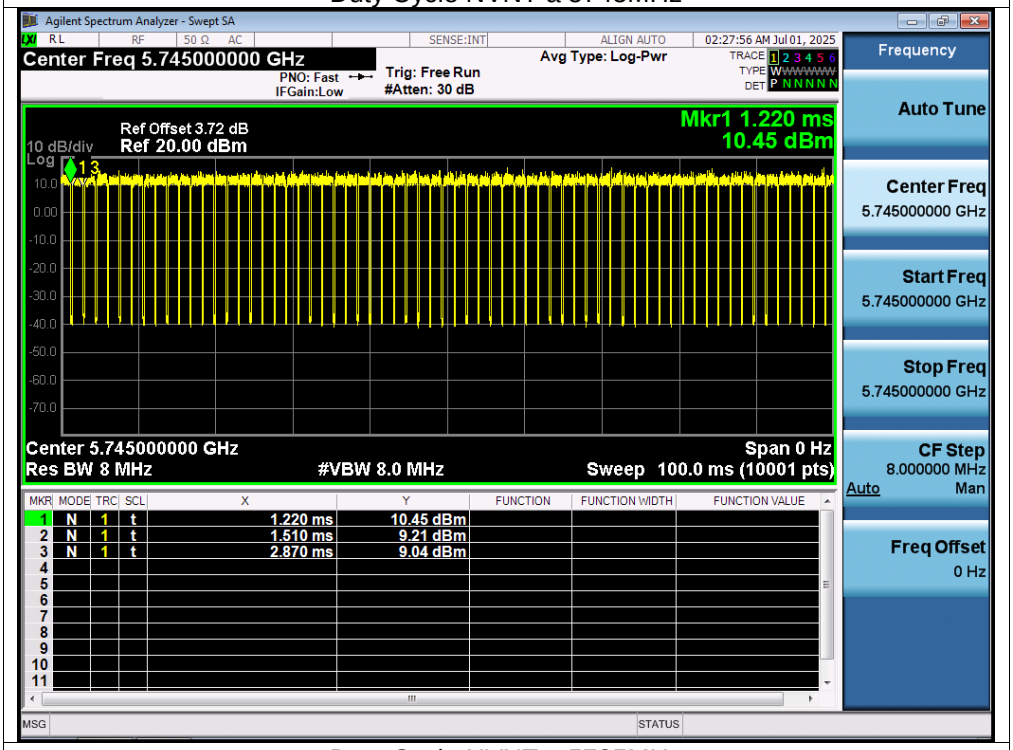
Duty Cycle NVNT ac80 5210MHz



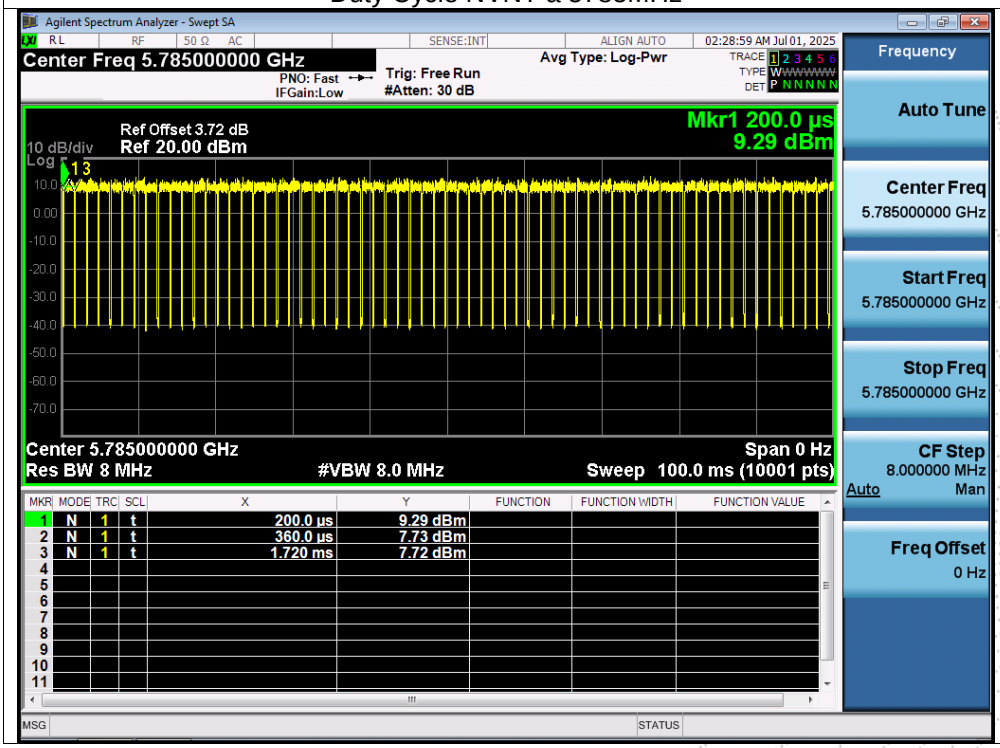
5.8G

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	a	5745	82.42	0.84
NVNT	n20	5745	89.47	0.48
NVNT	n40	5755	88.89	0.51
NVNT	ac20	5745	75	1.25
NVNT	ac40	5755	77.03	1.13
NVNT	ac80	5775	60.87	2.16

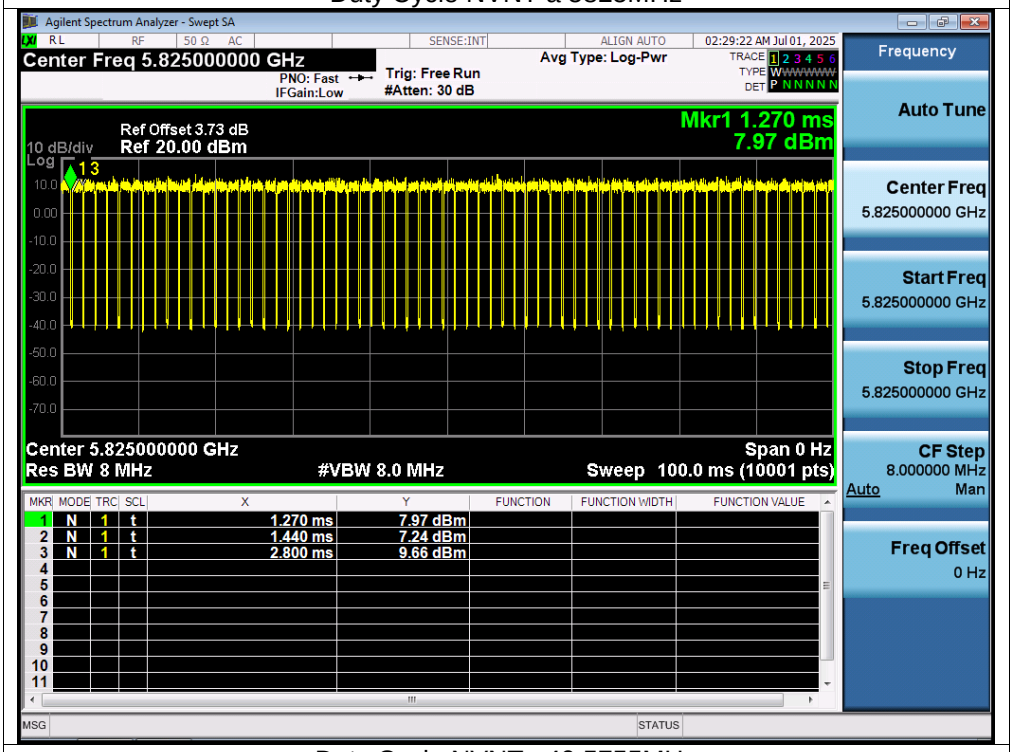
Test Graphs
Duty Cycle NVNT a 5745MHz



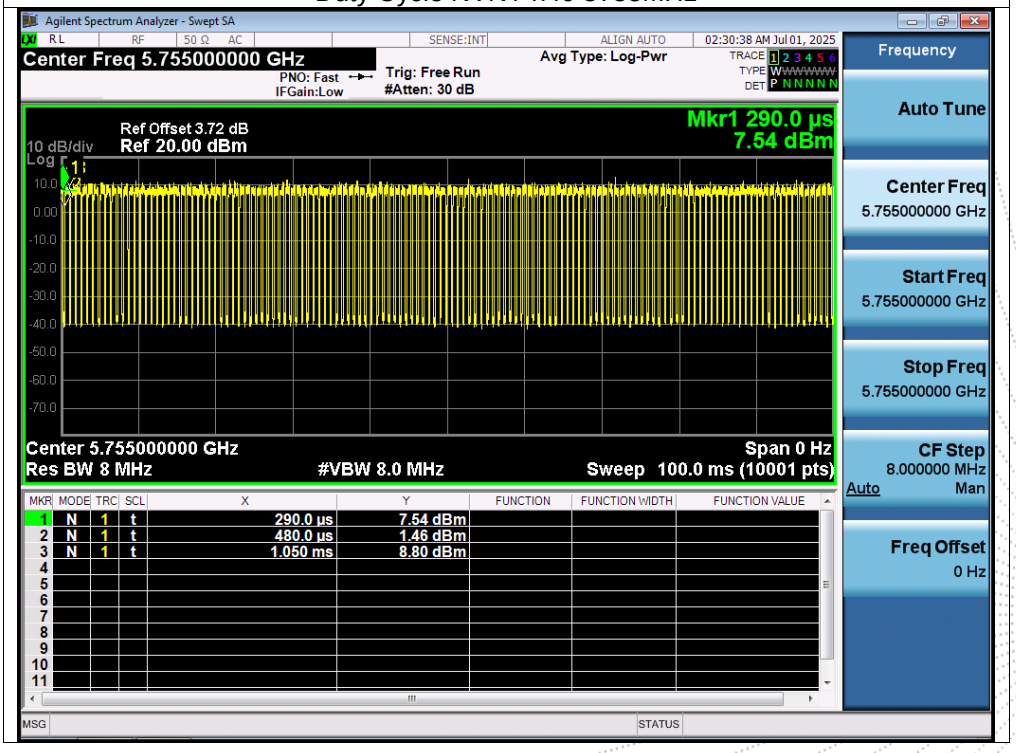
Duty Cycle NVNT a 5785MHz



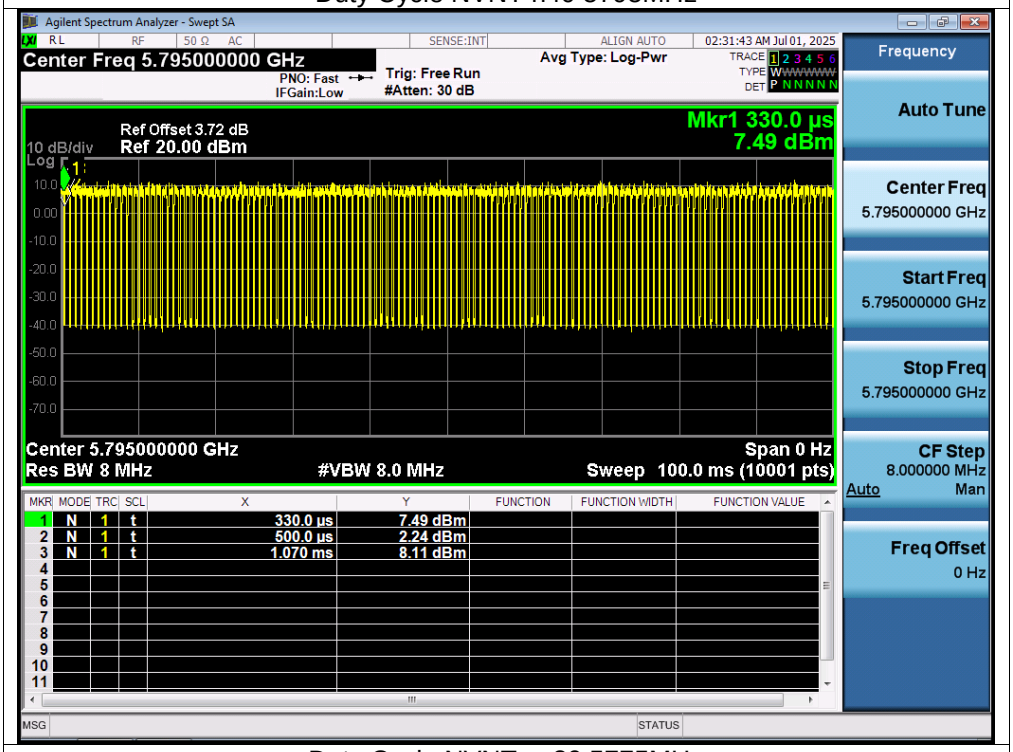
Duty Cycle NVNT a 5825MHz



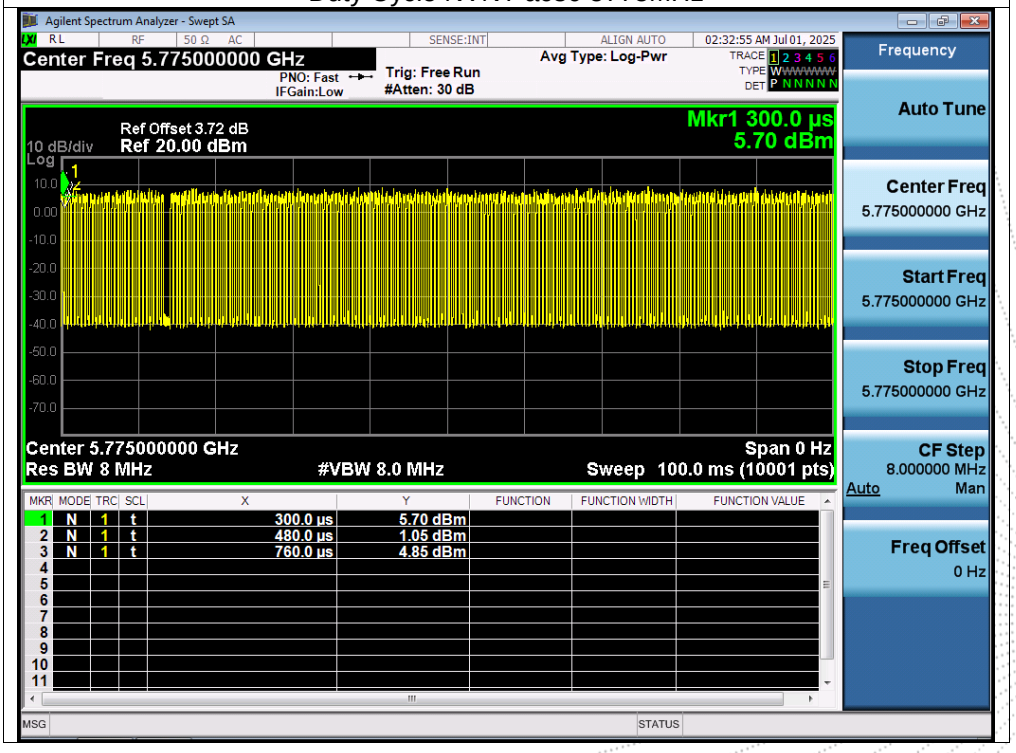
Duty Cycle NVNT n40 5755MHz



Duty Cycle NVNT n40 5795MHz



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: 0.88 dBi). It comply with the standard requirement.

16. EUT Photographs

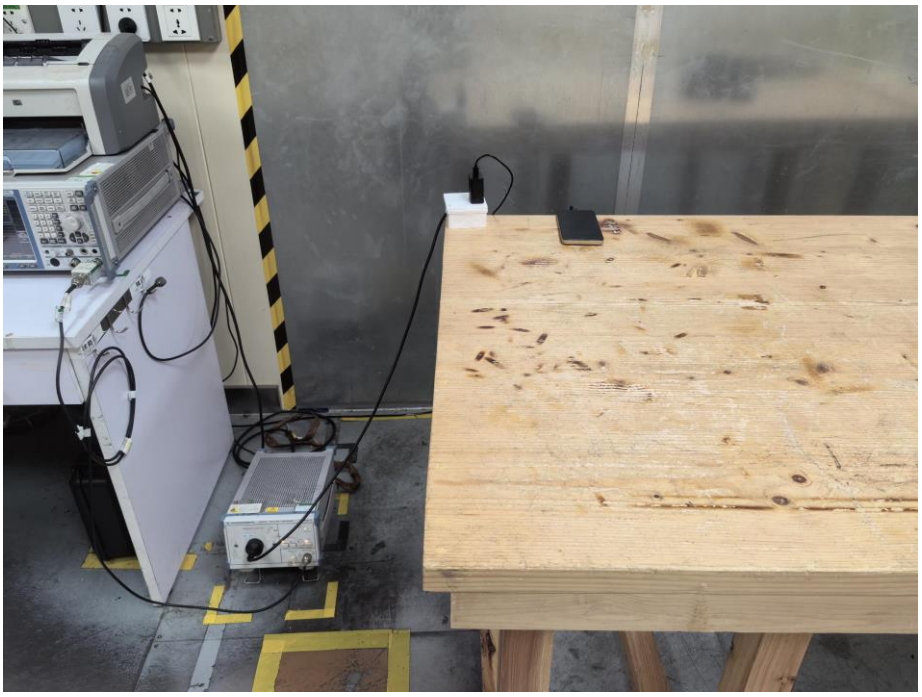
EUT Photo 1

EUT Photo 2

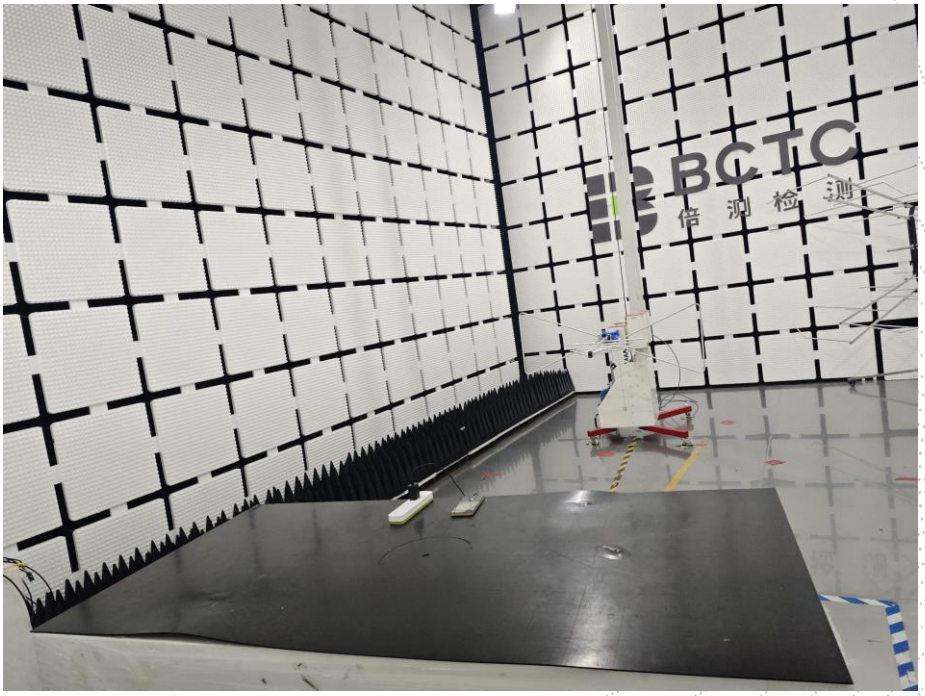
NOTE: Appendix-Photographs Of EUT Constructional Details.

17. EUT Test Setup Photographs

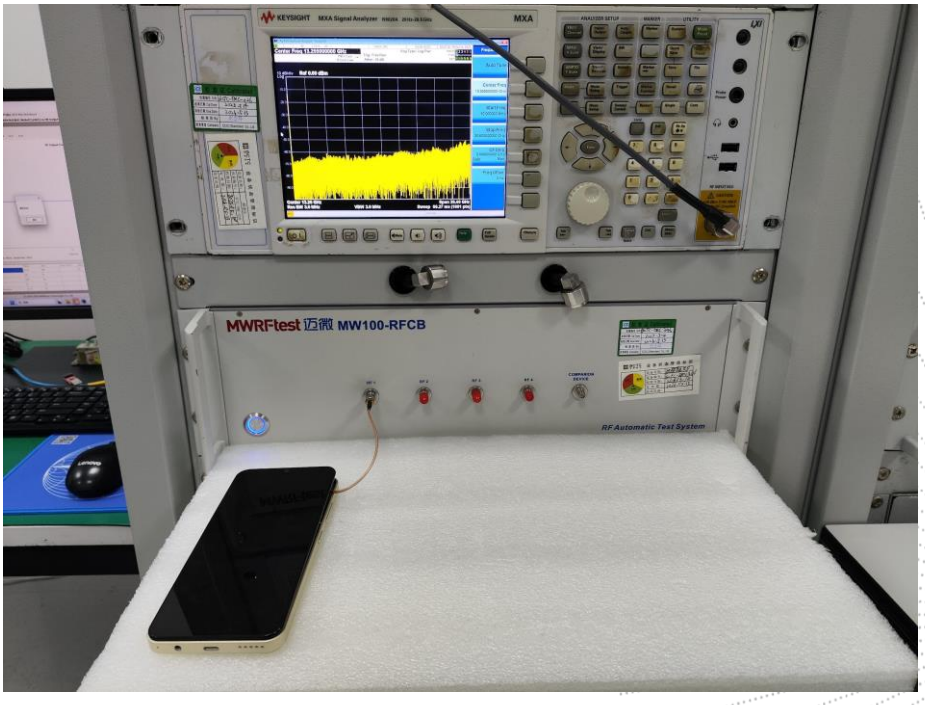
Conducted Measurement Photos



Radiated Measurement Photos




BCTC
倍 测 检 测


KEYSIGHT
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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