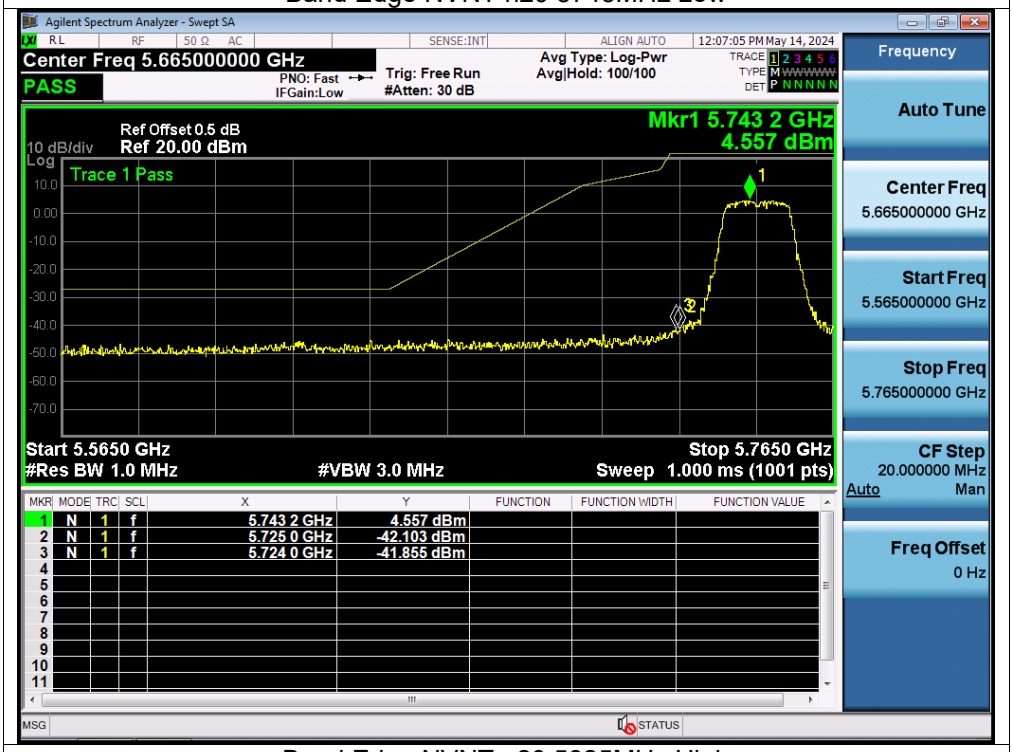
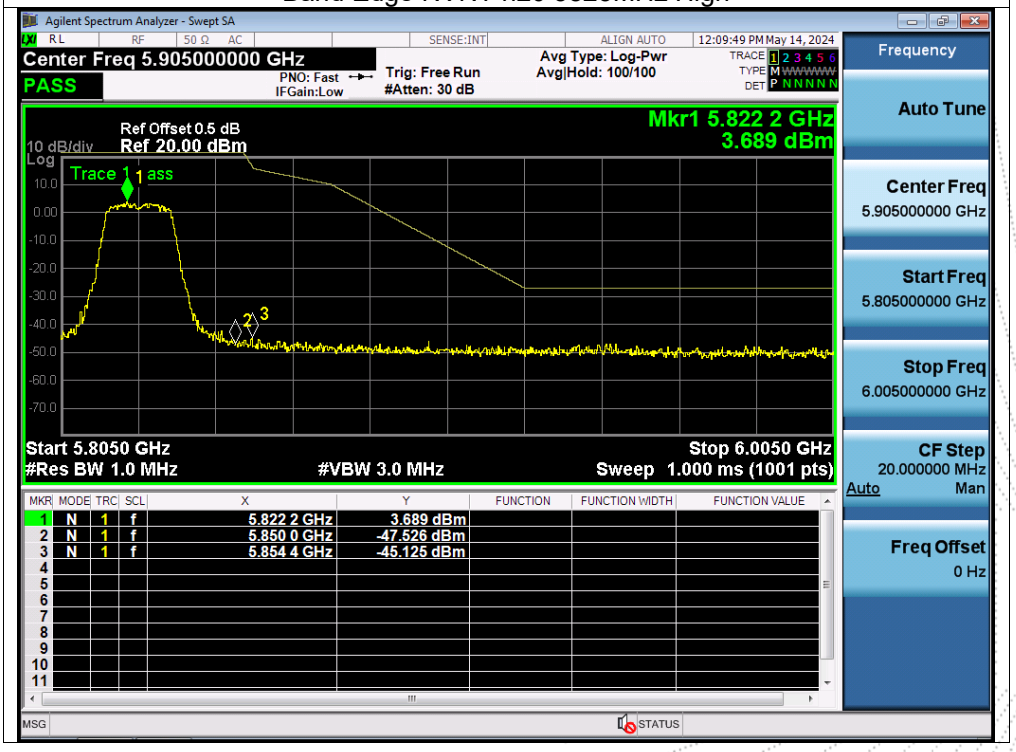
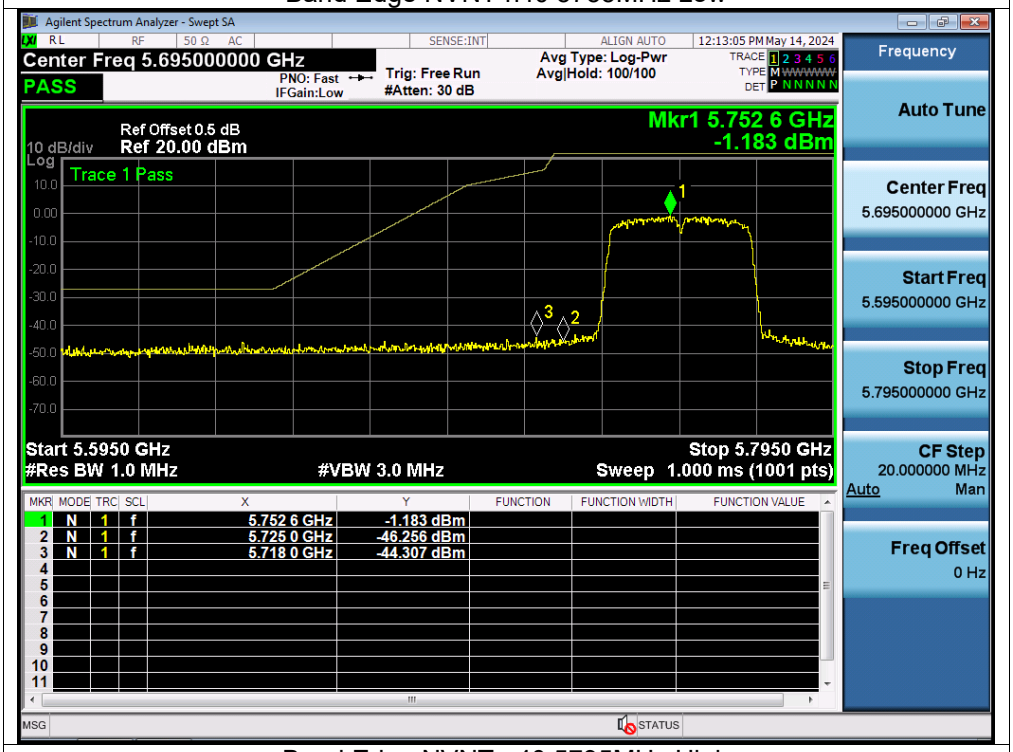
Band Edge NVNT n20 5745MHz Low



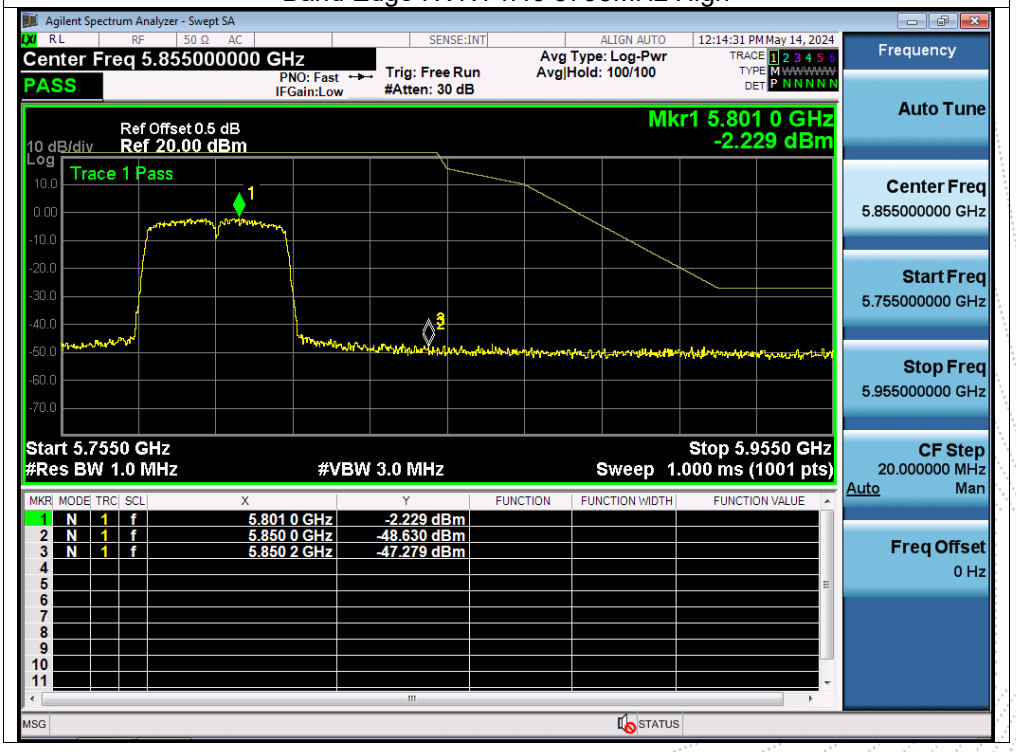
Band Edge NVNT n20 5825MHz High



Band Edge NVNT n40 5755MHz Low

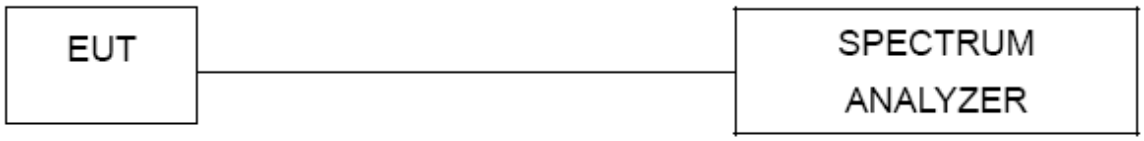


Band Edge NVNT n40 5795MHz High



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..
(3)For transmitters operating in the 5.25-5.35 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.
(4)For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

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.

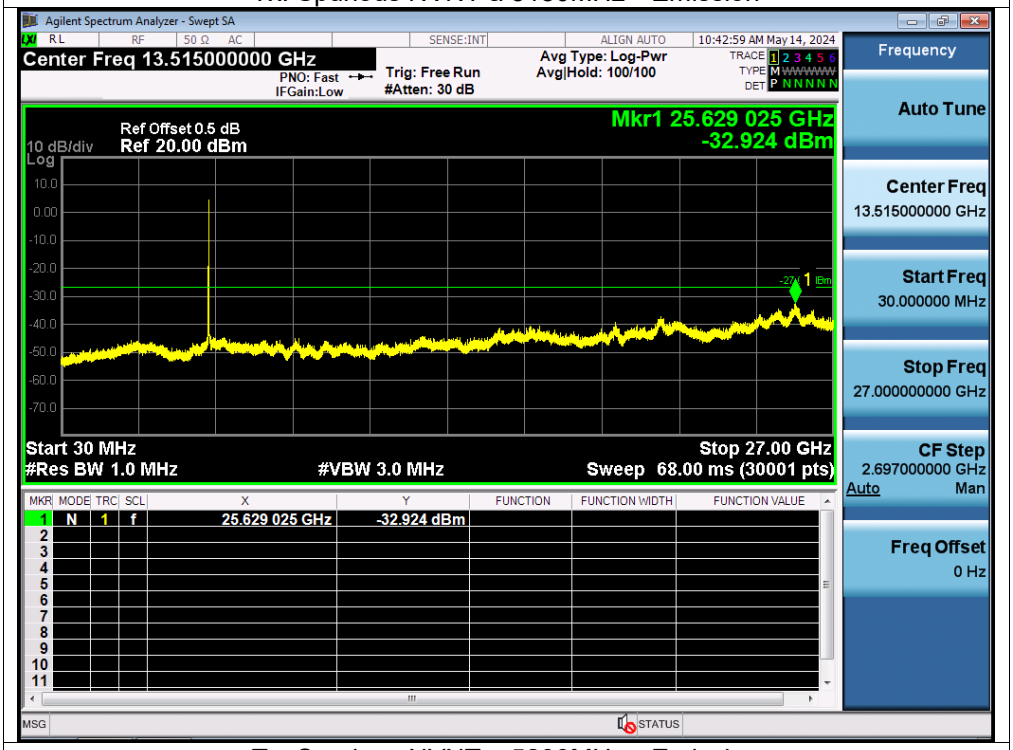
12.4 Test Result

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.

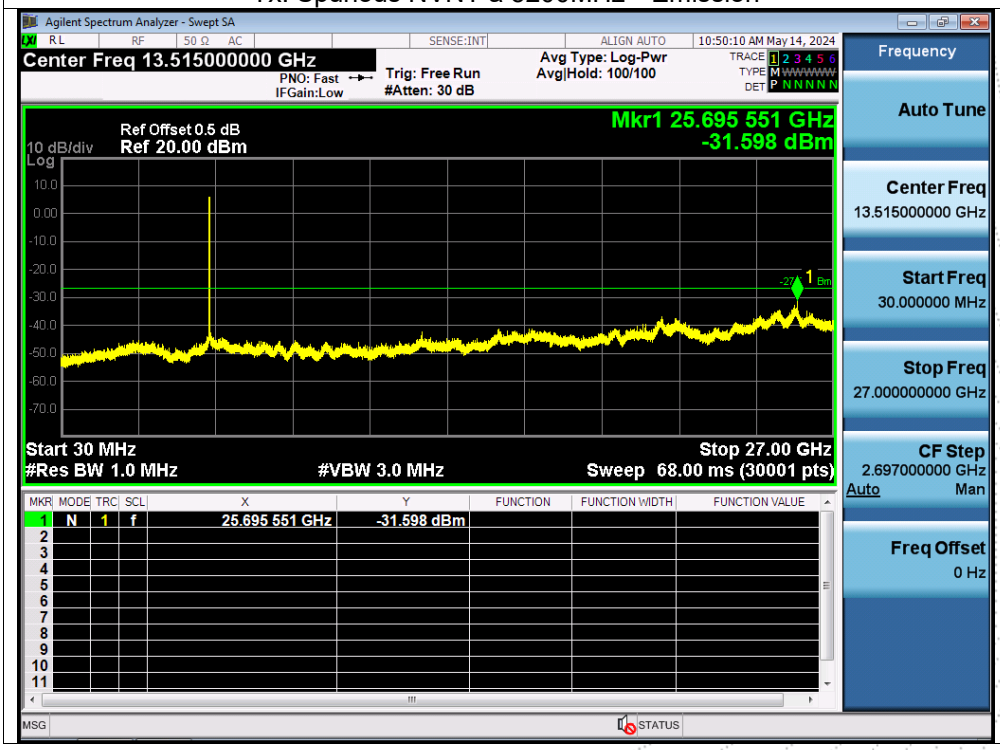
About:26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Test Graphs

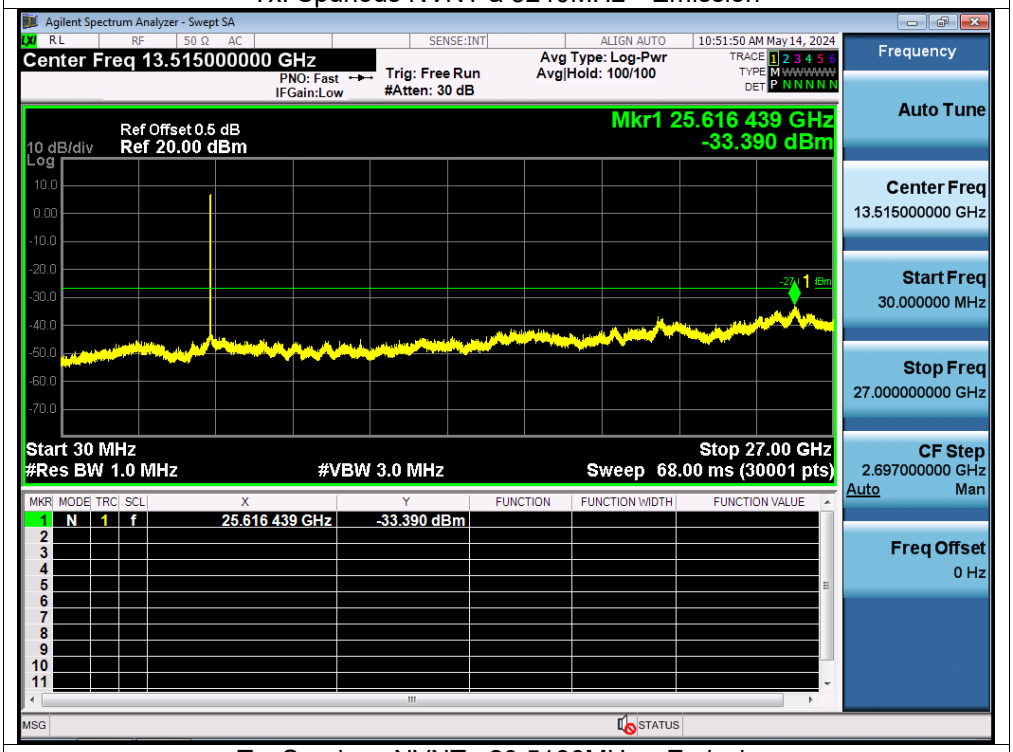
Tx. Spurious NVNT a 5180MHz Emission



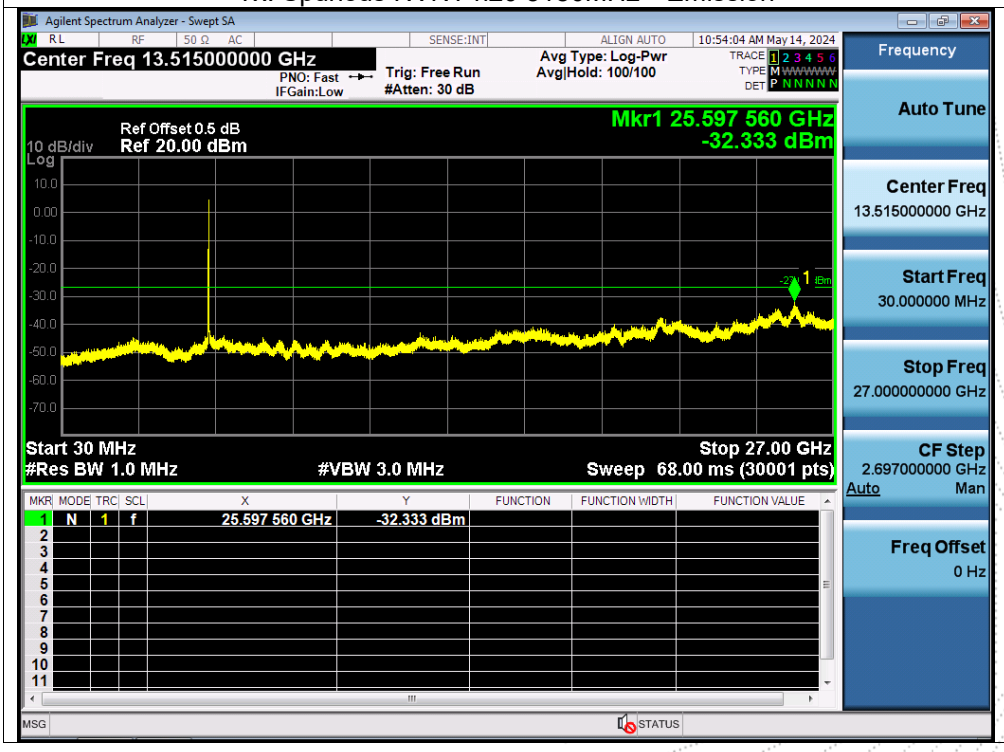
Tx. Spurious NVNT a 5200MHz Emission



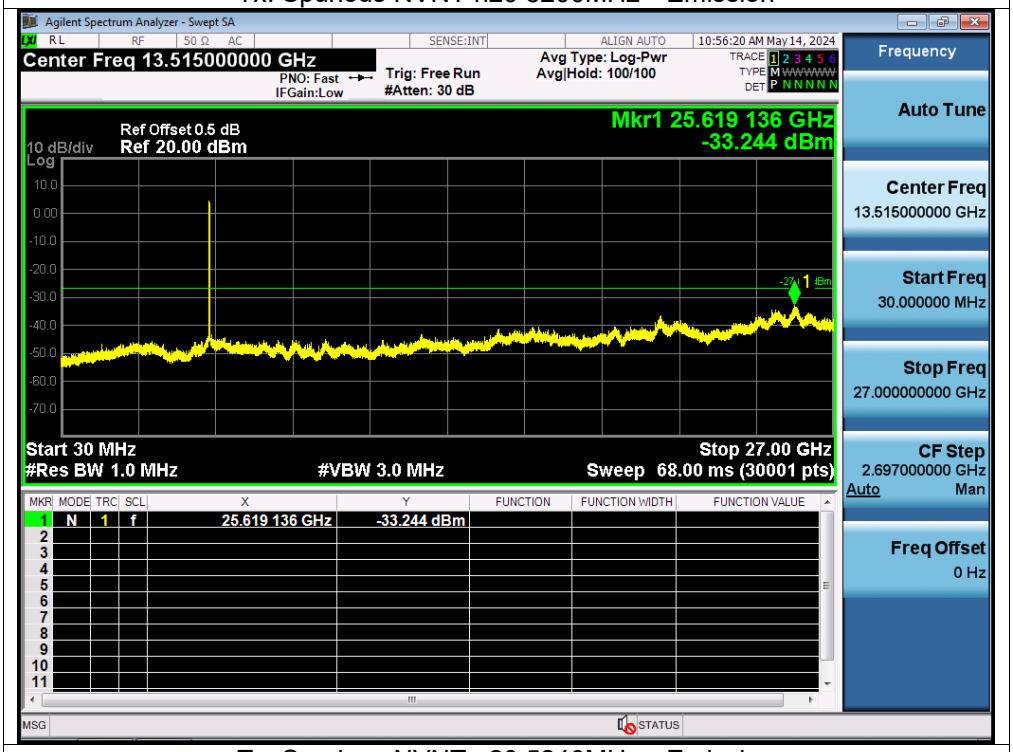
Tx. Spurious NVNT a 5240MHz Emission



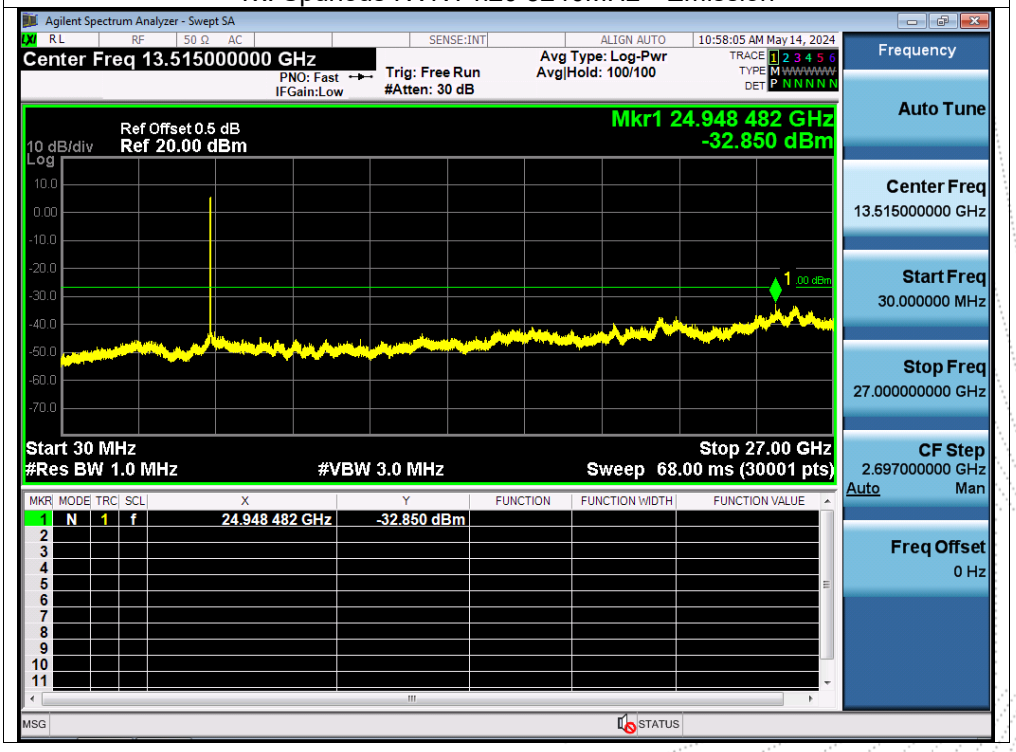
Tx. Spurious NVNT n20 5180MHz Emission



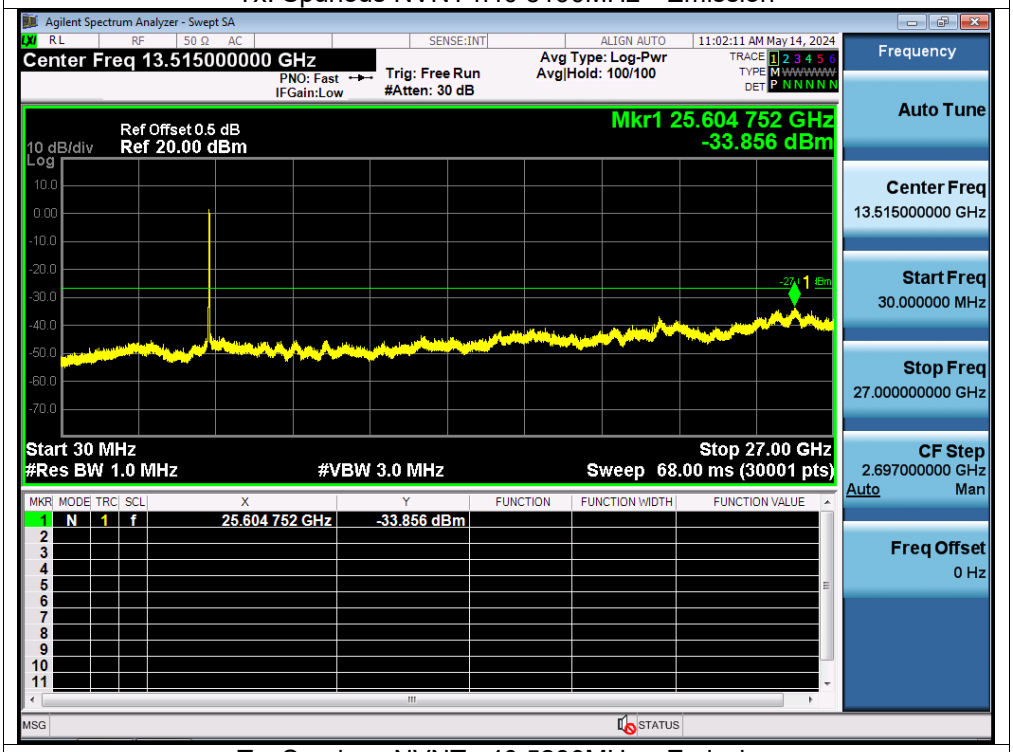
Tx. Spurious NVNT n20 5200MHz Emission



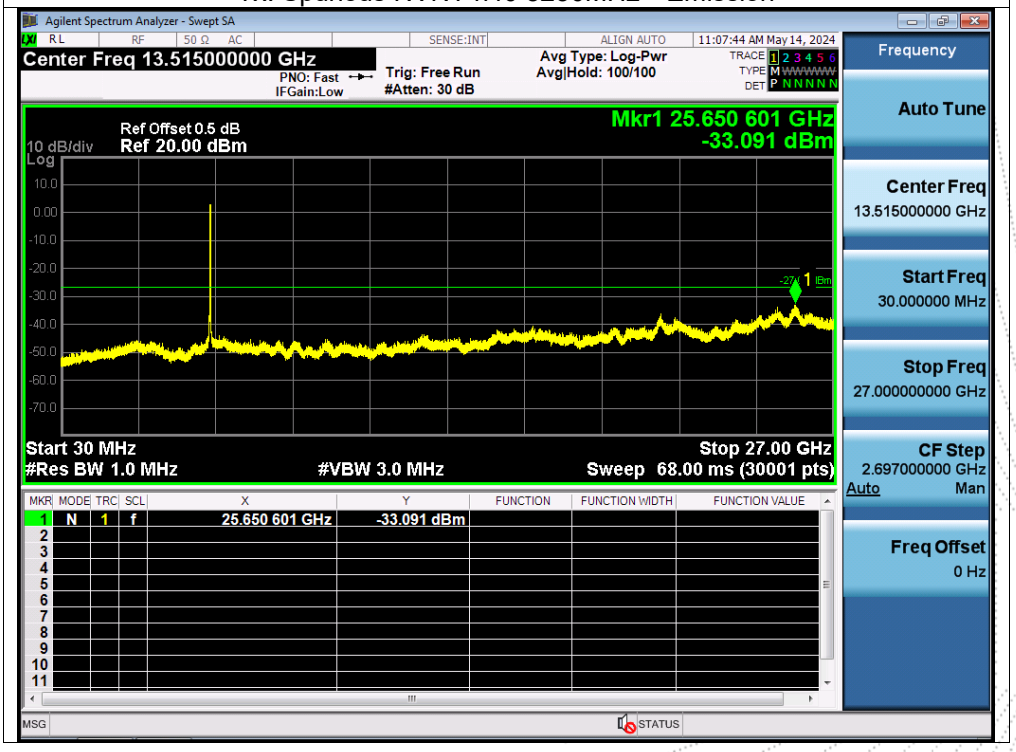
Tx. Spurious NVNT n20 5240MHz Emission



Tx. Spurious NVNT n40 5190MHz Emission

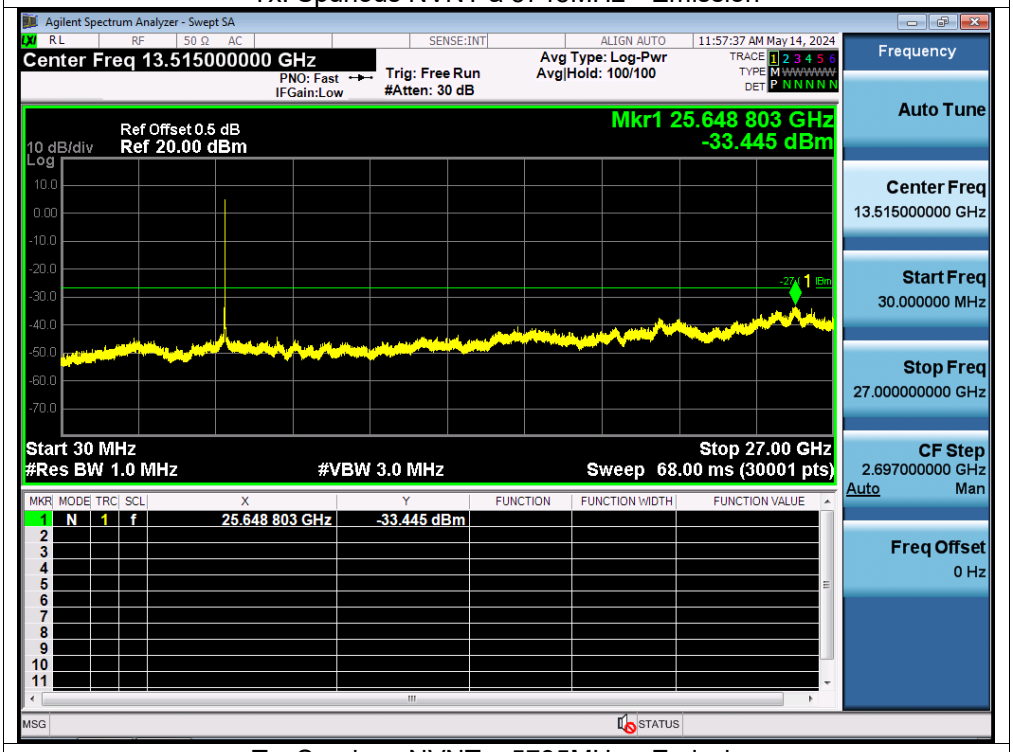


Tx. Spurious NVNT n40 5230MHz Emission

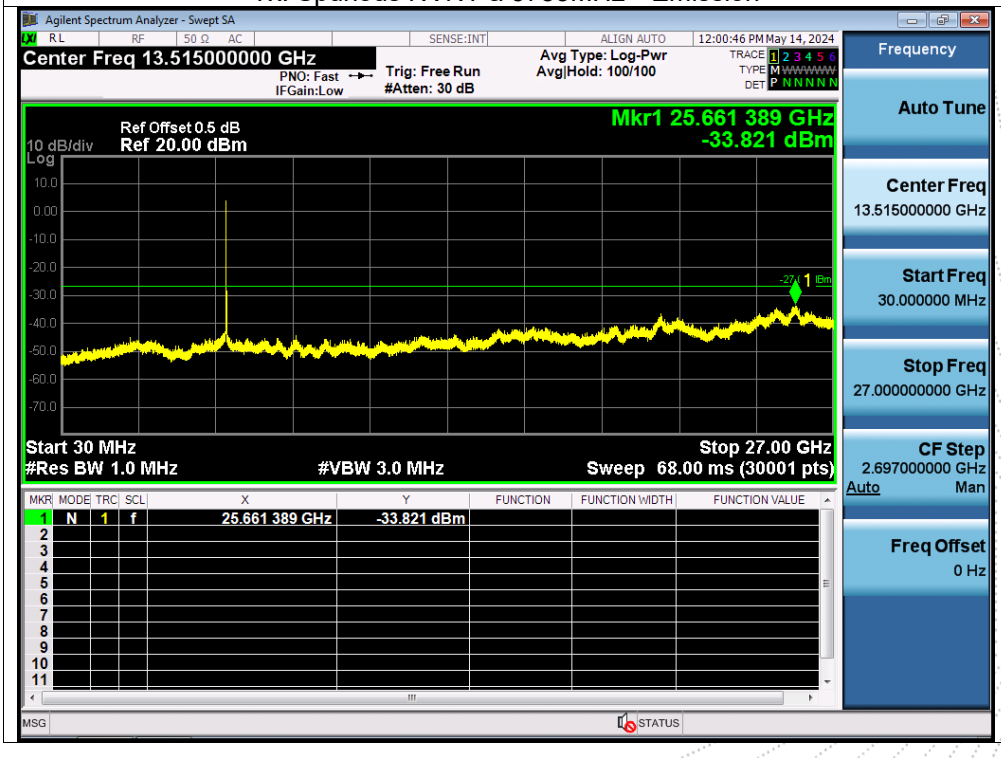


Test Graphs

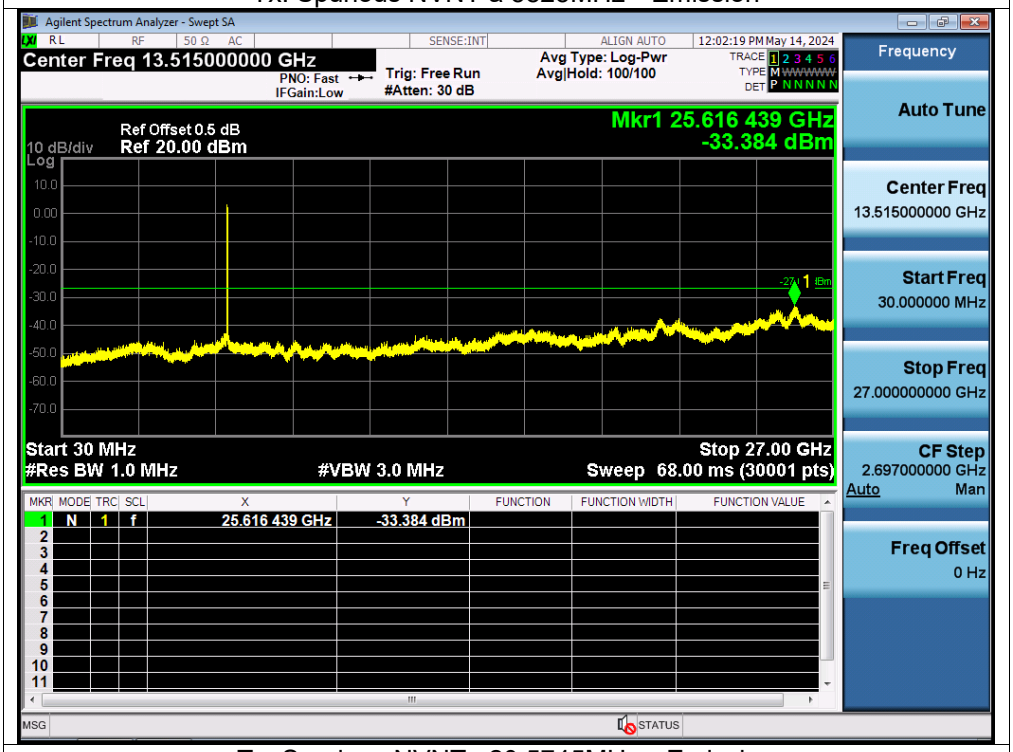
Tx. Spurious NVNT a 5745MHz Emission



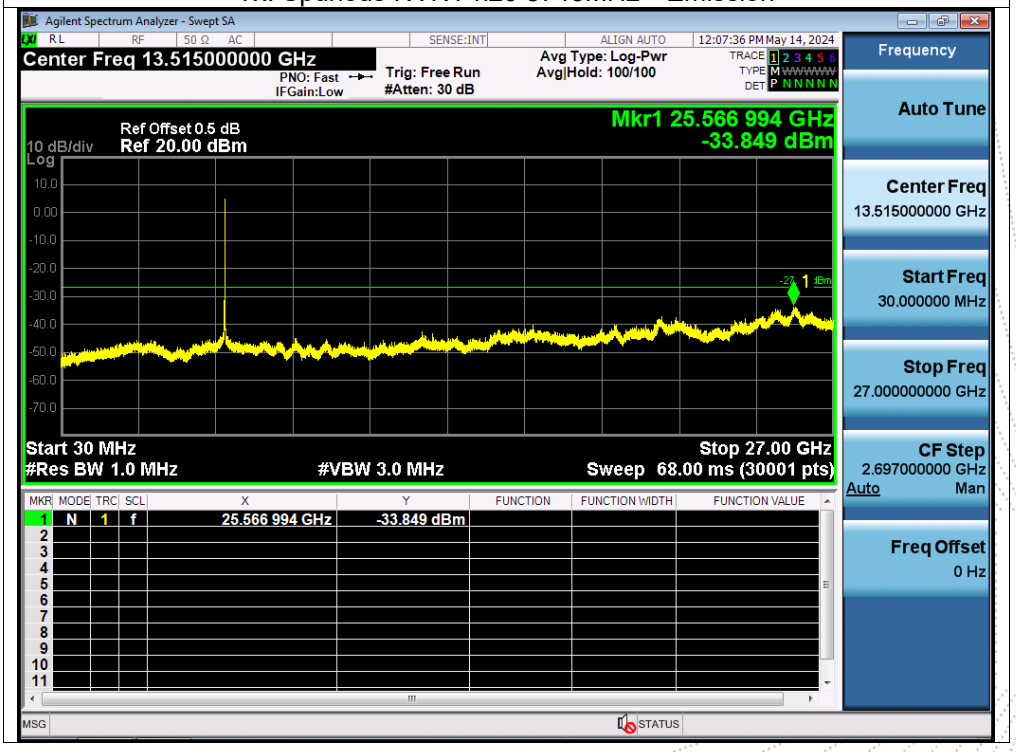
Tx. Spurious NVNT a 5785MHz Emission



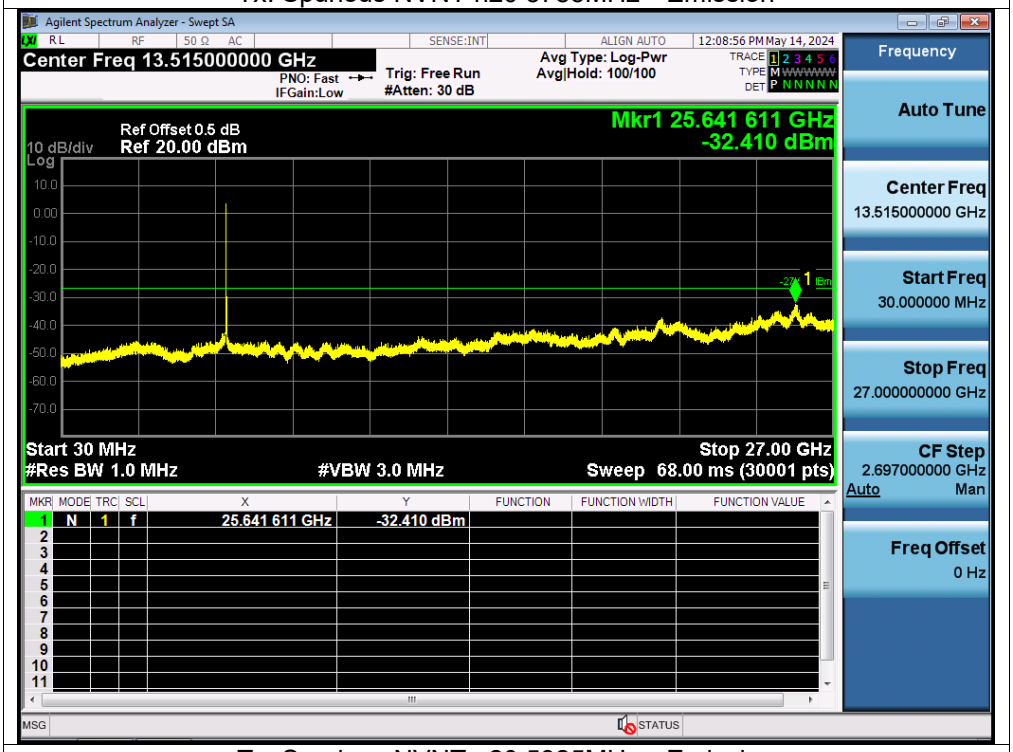
Tx. Spurious NVNT a 5825MHz Emission



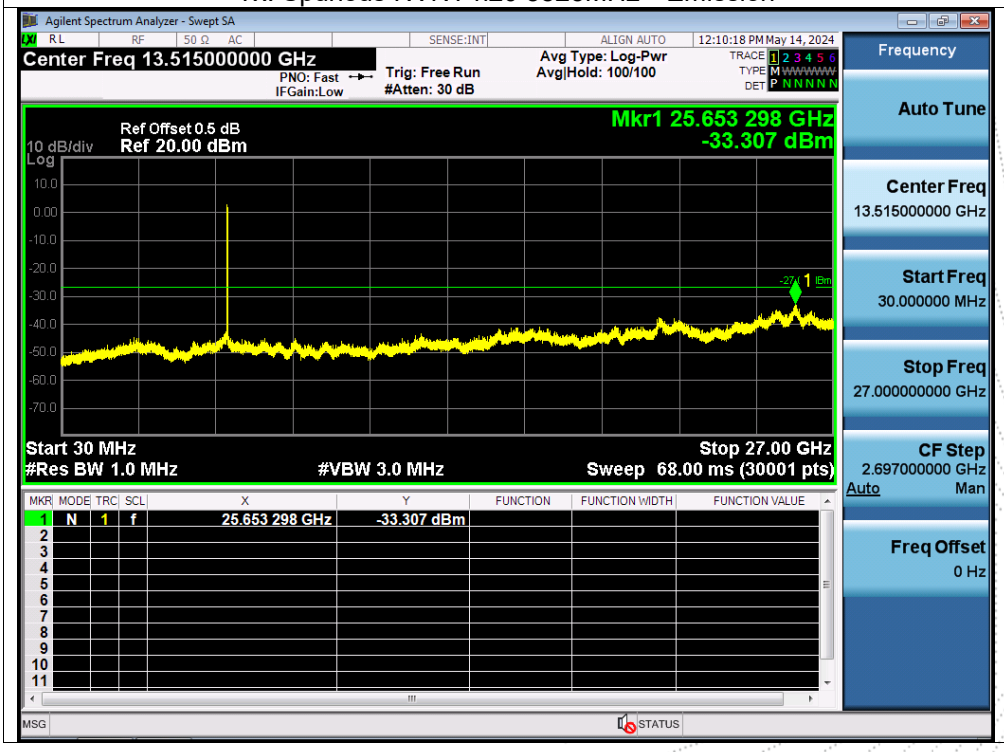
Tx. Spurious NVNT n20 5745MHz Emission



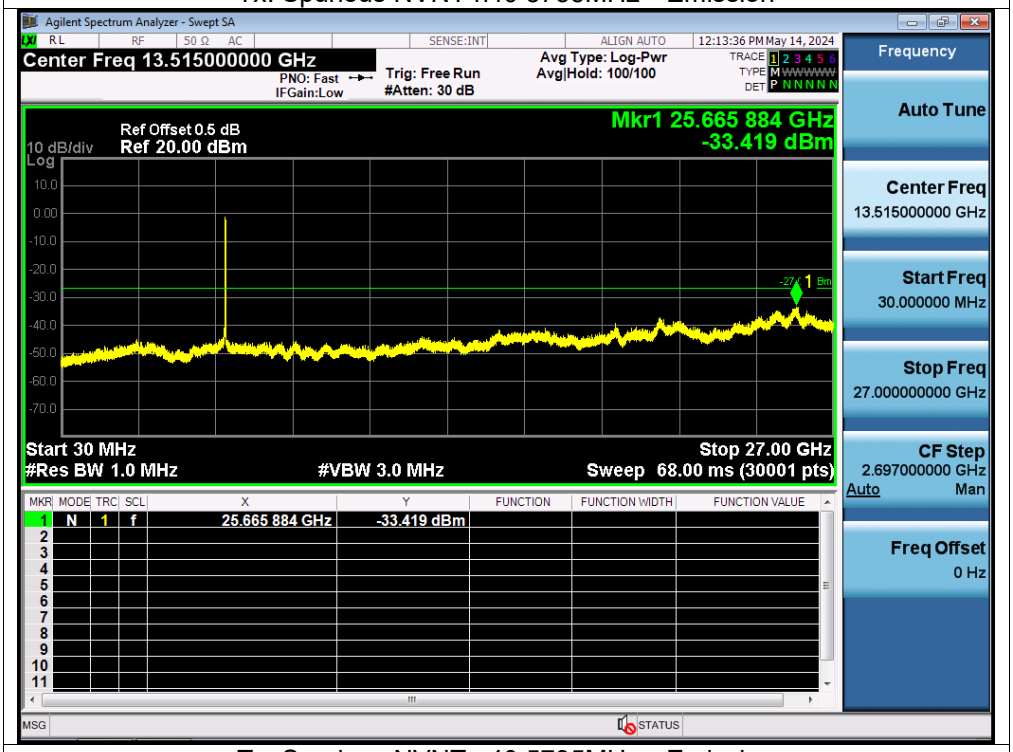
Tx. Spurious NVNT n20 5785MHz Emission



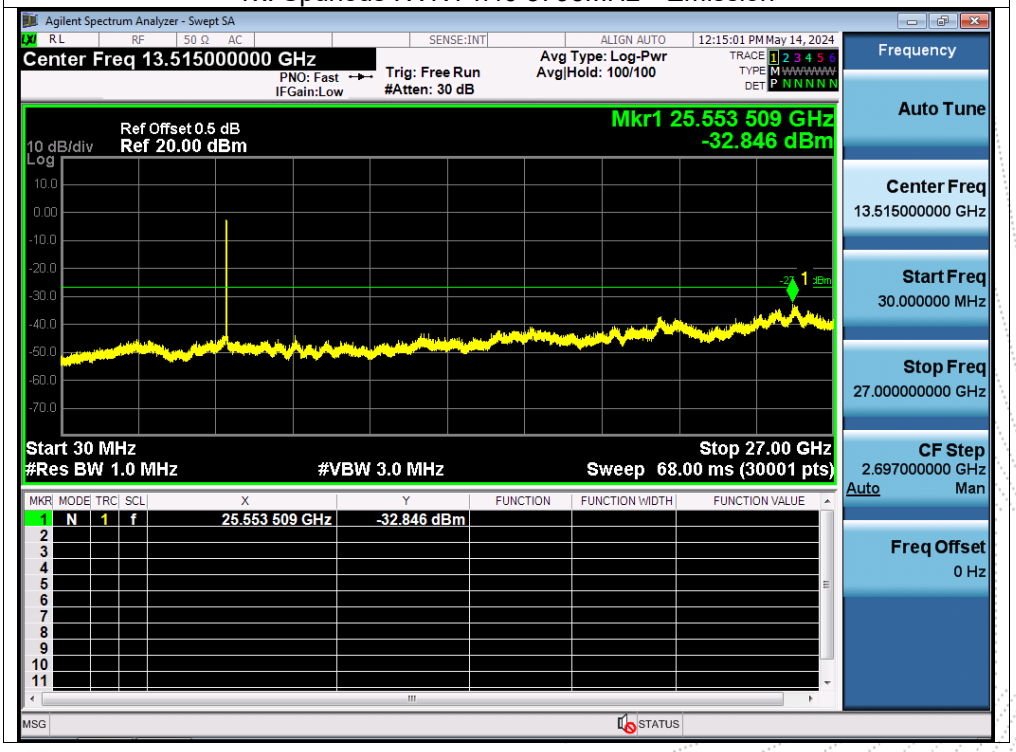
Tx. Spurious NVNT n20 5825MHz Emission



Tx. Spurious NVNT n40 5755MHz Emission

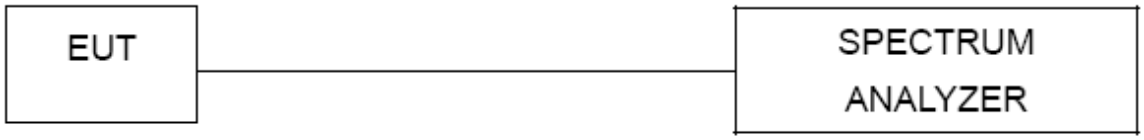


Tx. Spurious NVNT n40 5795MHz Emission



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:	AC 24V/60Hz
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)	24.00	5180.0010	5180	0.0010	0.1931
		V max (V)	27.60	5180.0010	5180	0.0010	0.1931
		V min (V)	20.40	5180.0071	5180	0.0071	1.3707
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)	24	T (°C)	-20	5180.0135	5180	0.0135	2.6062
		T (°C)	-10	5180.0040	5180	0.0040	0.7722
		T (°C)	0	5180.0102	5180	0.0102	1.9691
		T (°C)	10	5180.0083	5180	0.0083	1.6023
		T (°C)	20	5180.0002	5180	0.0002	0.0386
		T (°C)	30	5180.0044	5180	0.0044	0.8494
		T (°C)	40	5180.0041	5180	0.0041	0.7915
		T (°C)	50	5180.0085	5180	0.0085	1.6409
		T (°C)	60	5180.0043	5180	0.0043	0.8301
		T (°C)	70	5180.0113	5180	0.0113	2.1815
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)	24.00	5200.0003	5200	0.0003	0.0577
		V max (V)	27.60	5200.0048	5200	0.0048	0.9231
		V min (V)	20.40	5200.0049	5200	0.0049	0.9423
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)	24	T (°C)	-20	5200.00480	5200	0.00480	0.9231
		T (°C)	-10	5200.01270	5200	0.01270	2.4423
		T (°C)	0	5200.00260	5200	0.00260	0.5000
		T (°C)	10	5200.00880	5200	0.00880	1.6923
		T (°C)	20	5200.01100	5200	0.01100	2.1154
		T (°C)	30	5200.00580	5200	0.00580	1.1154
		T (°C)	40	5200.00910	5200	0.00910	1.7500
		T (°C)	50	5200.00390	5200	0.00390	0.7500
		T (°C)	60	5200.00790	5200	0.00790	1.5192
		T (°C)	70	5200.00950	5200	0.00950	1.8269
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)	24.00	5240.0016	5240	0.0016	0.3053
		V max (V)	27.60	5240.0032	5240	0.0032	0.6107
		V min (V)	20.40	5240.0045	5240	0.0045	0.8588
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)	24	T (°C)	-20	5240.0132	5240	0.0132	2.5191
		T (°C)	-10	5240.0051	5240	0.0051	0.9733
		T (°C)	0	5240.0108	5240	0.0108	2.0611
		T (°C)	10	5240.0066	5240	0.0066	1.2595
		T (°C)	20	5240.0020	5240	0.0020	0.3817
		T (°C)	30	5240.0121	5240	0.0121	2.3092
		T (°C)	40	5240.0031	5240	0.0031	0.5916
		T (°C)	50	5240.0095	5240	0.0095	1.8130
		T (°C)	60	5240.0112	5240	0.0112	2.1374
		T (°C)	70	5240.0125	5240	0.0125	2.3855
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 24V/60Hz
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)	24.00	5745.00410	5745	0.00410	0.7137
		V max (V)	27.60	5745.00220	5745	0.00220	0.3829
		V min (V)	20.40	5745.01100	5745	0.01100	1.9147
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)	24	T (°C)	-20	5745.00310	5745	0.00310	0.5396
		T (°C)	-10	5745.00400	5745	0.00400	0.6963
		T (°C)	0	5745.00610	5745	0.00610	1.0618
		T (°C)	10	5745.01140	5745	0.01140	1.9843
		T (°C)	20	5745.00890	5745	0.00890	1.5492
		T (°C)	30	5745.00810	5745	0.00810	1.4099
		T (°C)	40	5745.00700	5745	0.00700	1.2185
		T (°C)	50	5745.01310	5745	0.01310	2.2802
		T (°C)	60	5745.01100	5745	0.01100	1.9147
		T (°C)	70	5745.01340	5745	0.01340	2.3325
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)	24.00	5785.00850	5785	0.00850	1.4693
		V max (V)	27.60	5785.01280	5785	0.01280	2.2126
		V min (V)	20.40	5785.01090	5785	0.01090	1.8842
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)	24	T (°C)	-20	5785.01120	5785	0.01120	1.9360
		T (°C)	-10	5785.00130	5785	0.00130	0.2247
		T (°C)	0	5785.00920	5785	0.00920	1.5903
		T (°C)	10	5785.00270	5785	0.00270	0.4667
		T (°C)	20	5785.00780	5785	0.00780	1.3483
		T (°C)	30	5785.00430	5785	0.00430	0.7433
		T (°C)	40	5785.01030	5785	0.01030	1.7805
		T (°C)	50	5785.00620	5785	0.00620	1.0717
		T (°C)	60	5785.00460	5785	0.00460	0.7952
		T (°C)	70	5785.00990	5785	0.00990	1.7113
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)	24.00	5825.00150	5825	0.00150	0.2575
		V max (V)	27.60	5825.00120	5825	0.00120	0.2060
		V min (V)	20.40	5825.00520	5825	0.00520	0.8927
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)	24	T (°C)	-20	5825.00260	5825	0.00260	0.4464
		T (°C)	-10	5825.00430	5825	0.00430	0.7382
		T (°C)	0	5825.00130	5825	0.00130	0.2232
		T (°C)	10	5825.00500	5825	0.00500	0.8584
		T (°C)	20	5825.01110	5825	0.01110	1.9056
		T (°C)	30	5825.00490	5825	0.00490	0.8412
		T (°C)	40	5825.00050	5825	0.00050	0.0858
		T (°C)	50	5825.00220	5825	0.00220	0.3777
		T (°C)	60	5825.00010	5825	0.00010	0.0172
		T (°C)	70	5825.00740	5825	0.00740	1.2704
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)

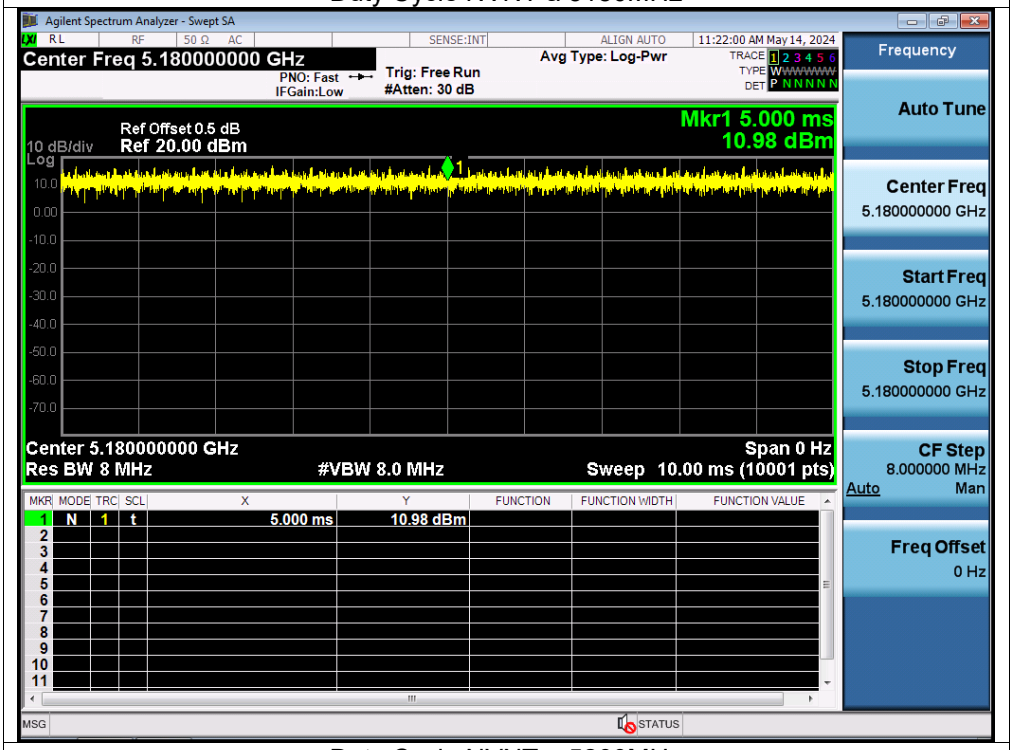
14.3 Test Procedure

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

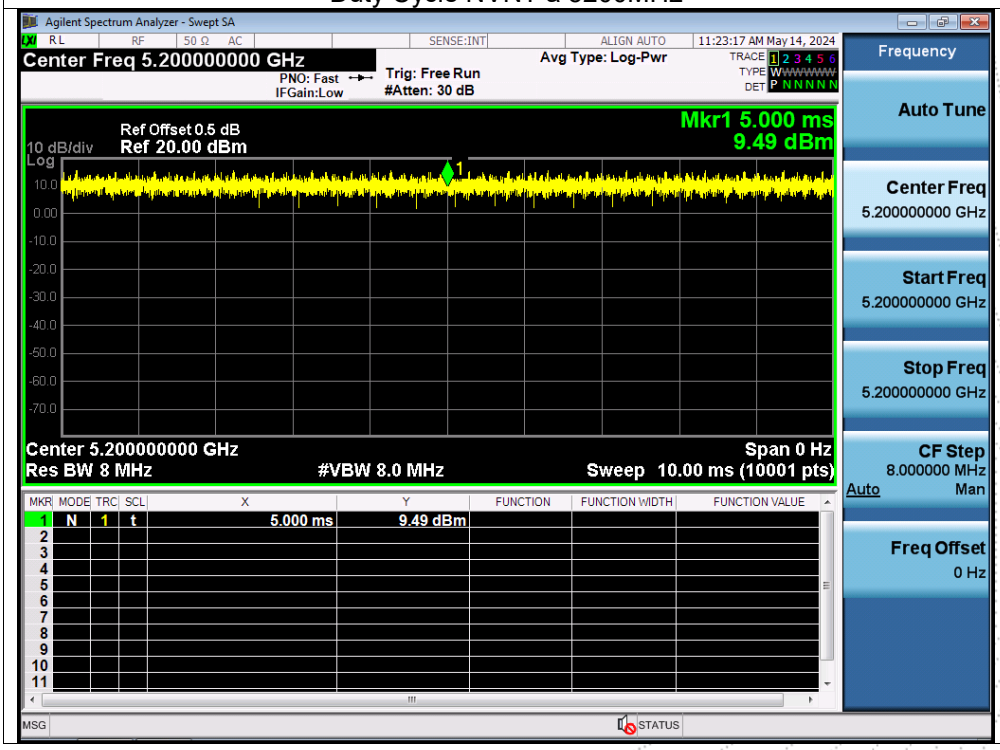
14.4 Test Result

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

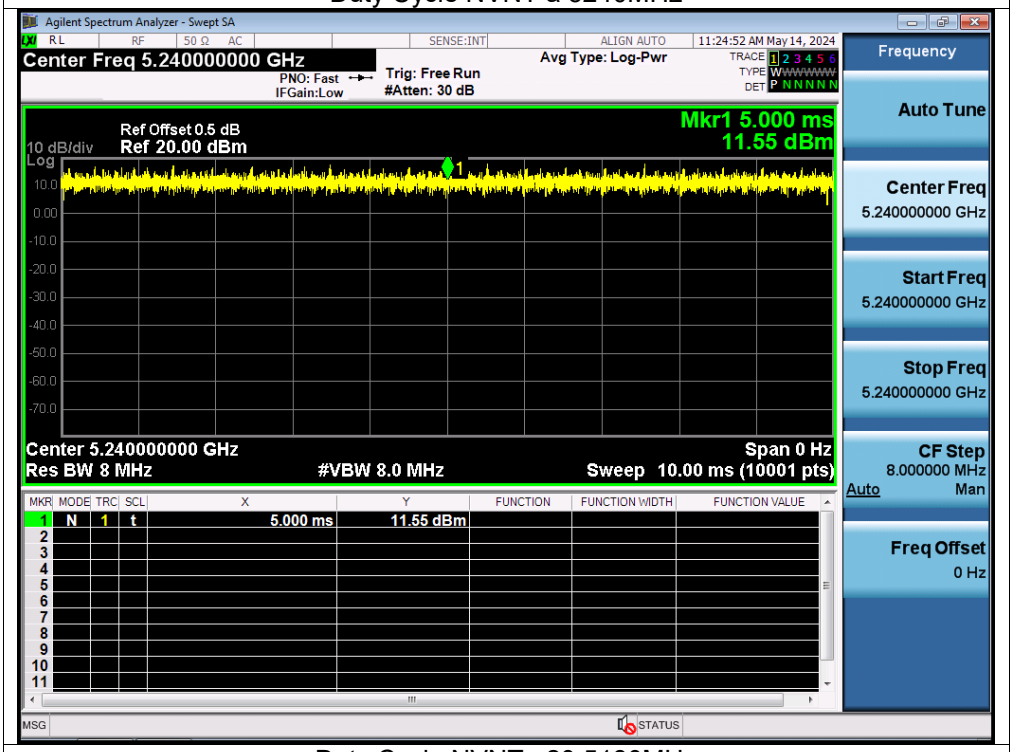
Test Graphs
Duty Cycle NVNT a 5180MHz



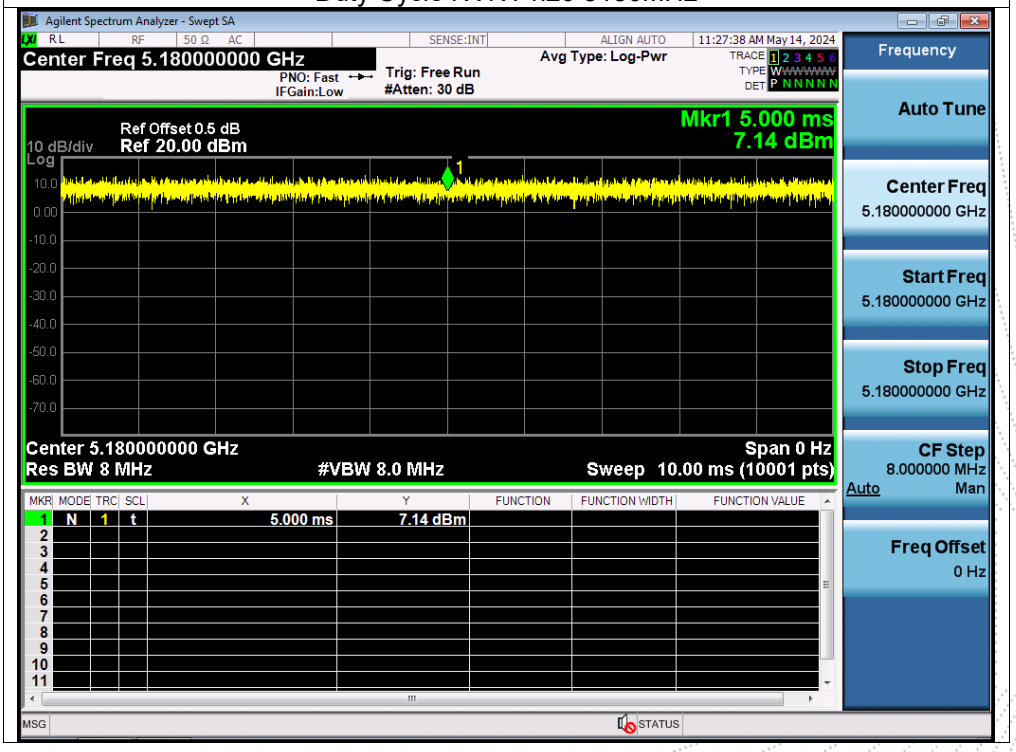
Duty Cycle NVNT a 5200MHz



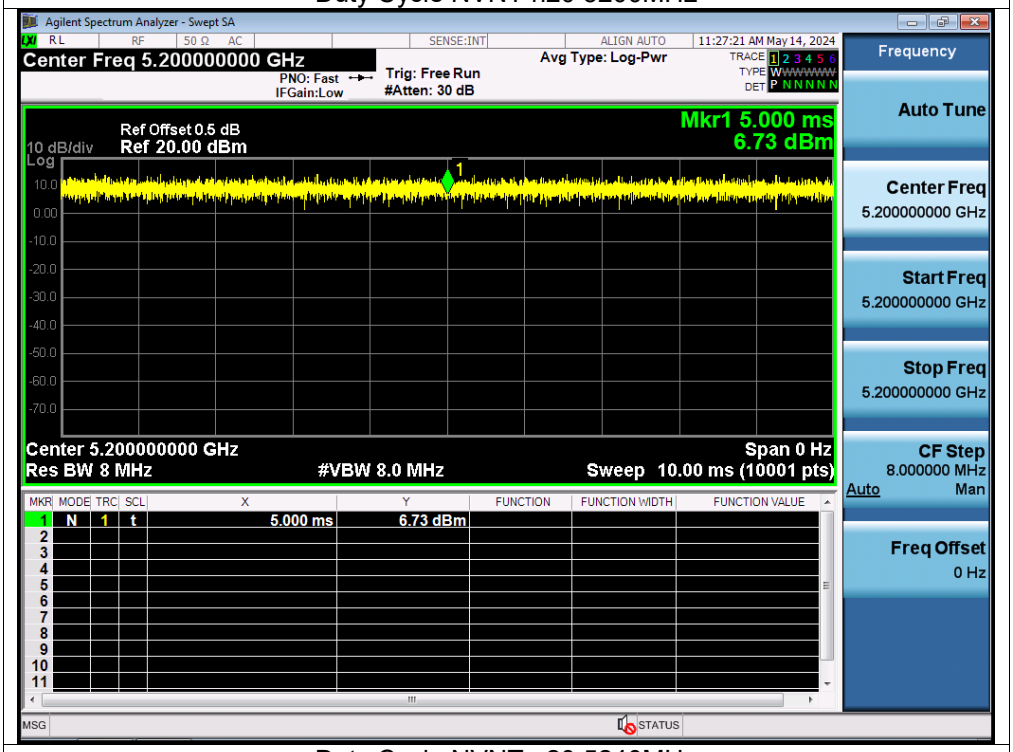
Duty Cycle NVNT a 5240MHz



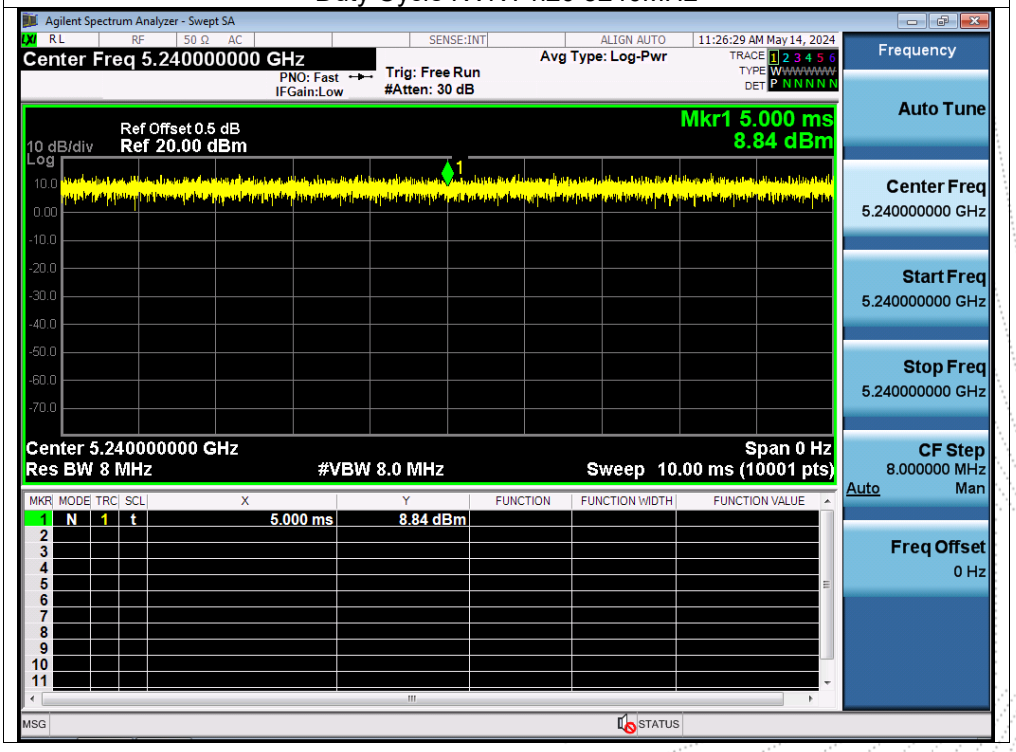
Duty Cycle NVNT n20 5180MHz



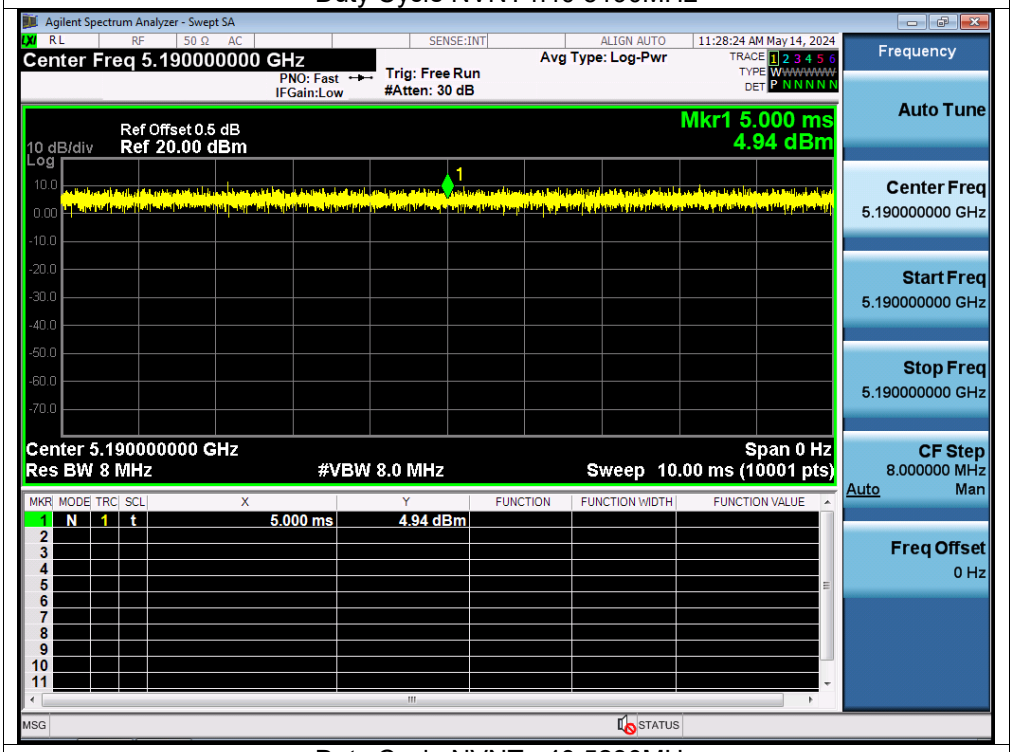
Duty Cycle NVNT n20 5200MHz



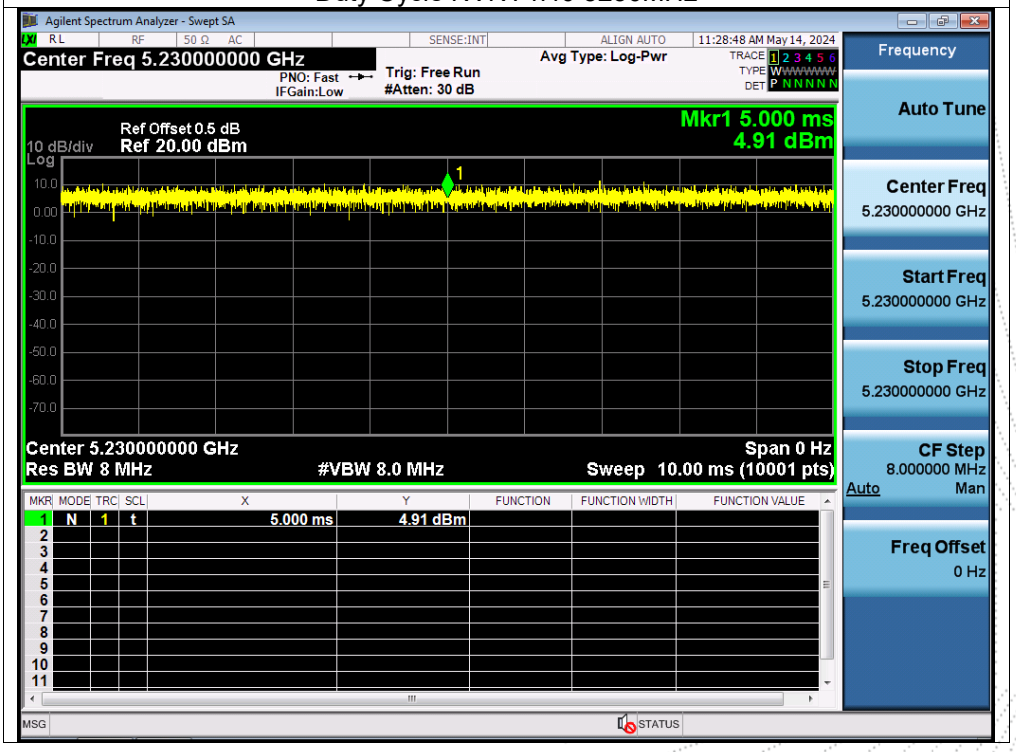
Duty Cycle NVNT n20 5240MHz



Duty Cycle NVNT n40 5190MHz



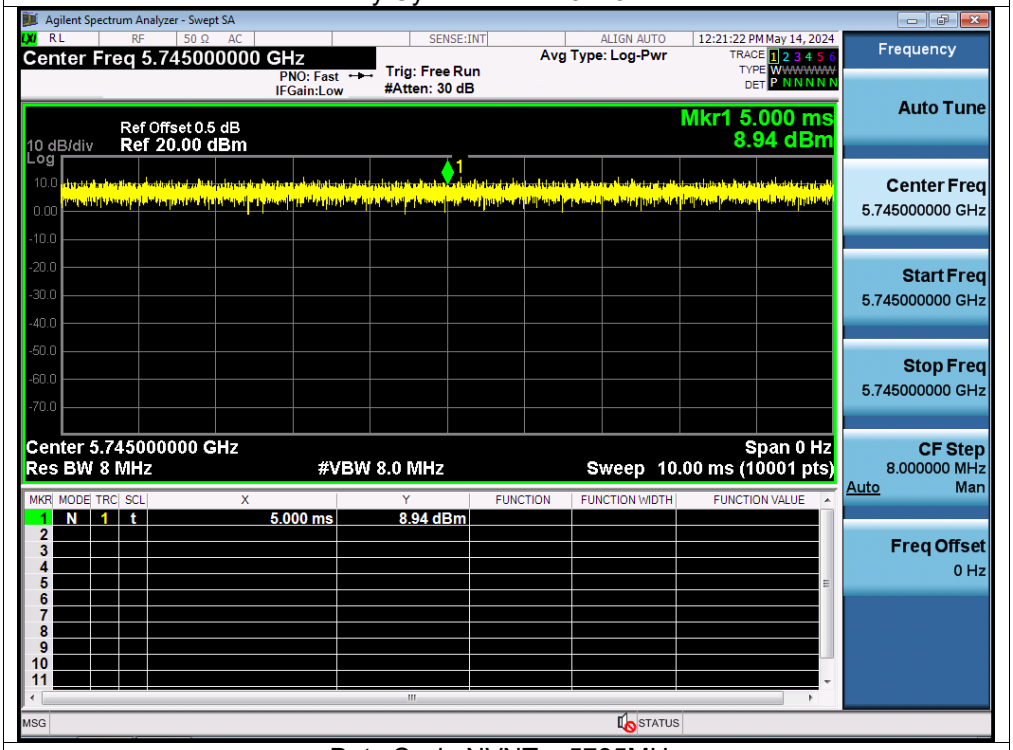
Duty Cycle NVNT n40 5230MHz



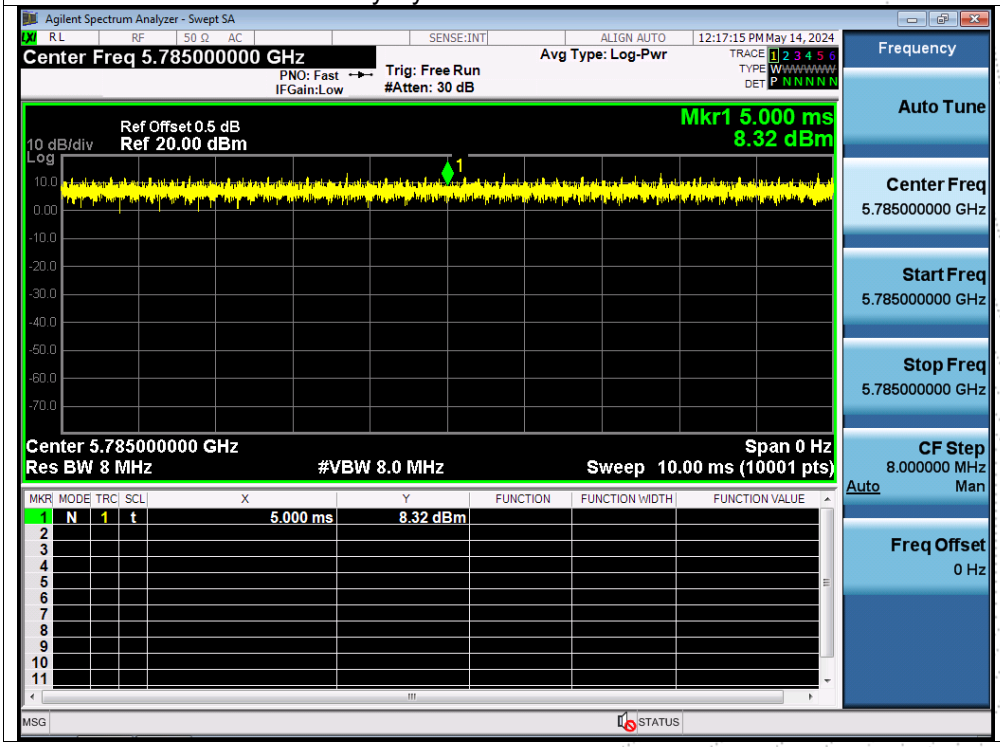
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5745	100	0	0
NVNT	a	5785	100	0	0
NVNT	a	5825	100	0	0
NVNT	n20	5745	100	0	0
NVNT	n20	5785	100	0	0
NVNT	n20	5825	100	0	0
NVNT	n40	5755	100	0	0
NVNT	n40	5795	100	0	0

Test Graphs

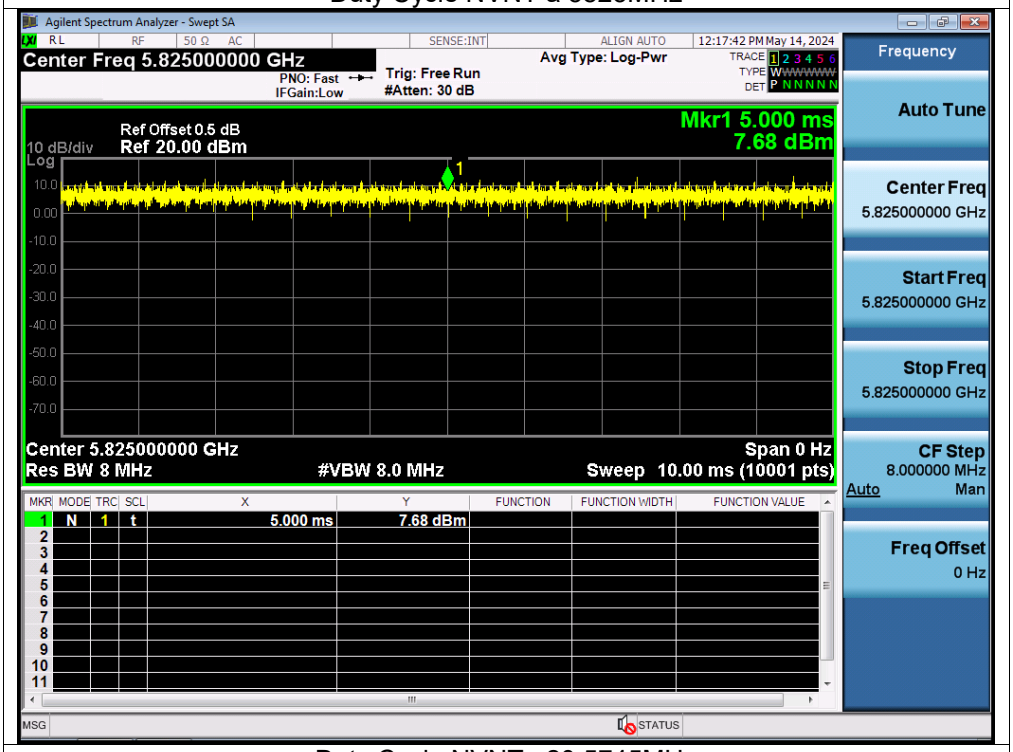
Duty Cycle NVNT a 5745MHz



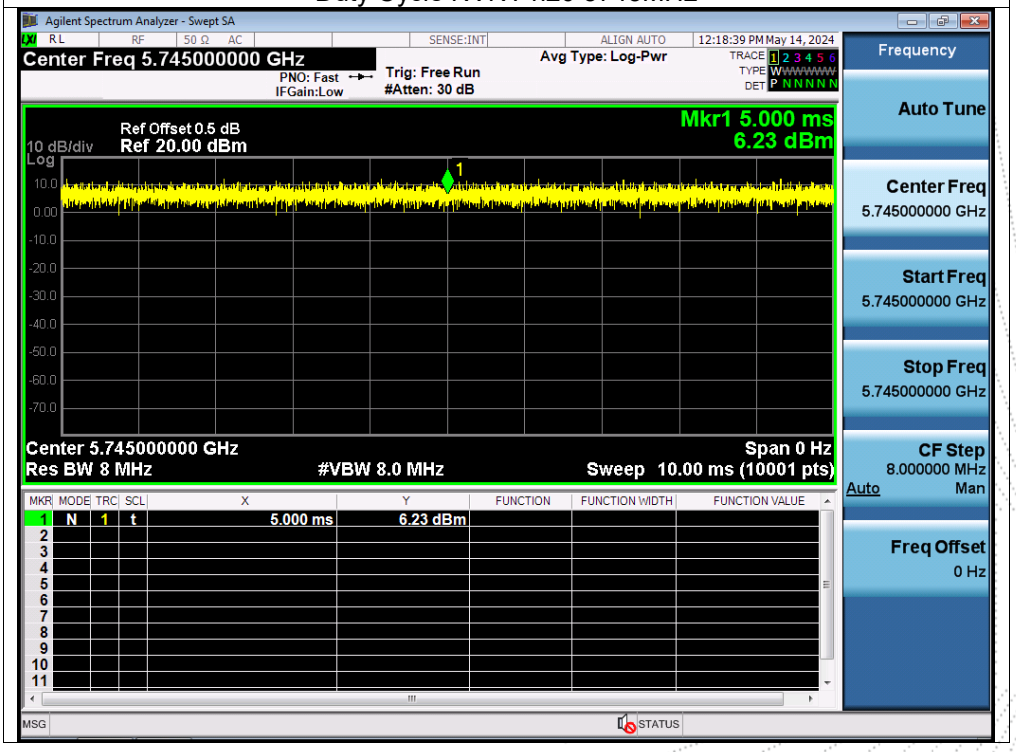
Duty Cycle NVNT a 5785MHz



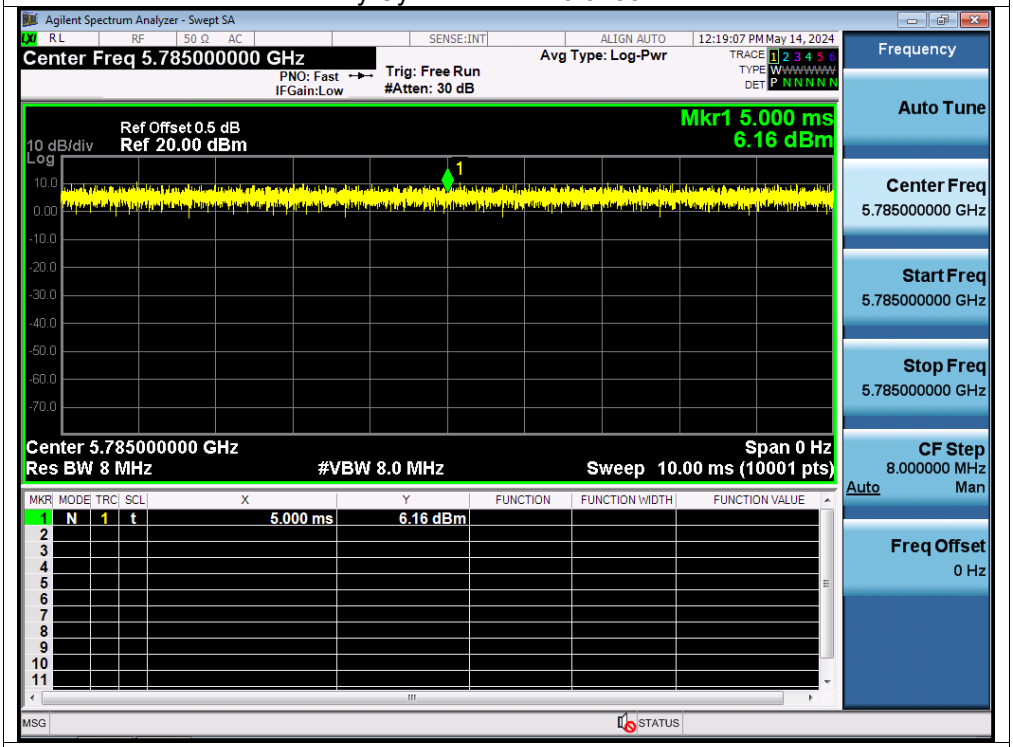
Duty Cycle NVNT a 5825MHz



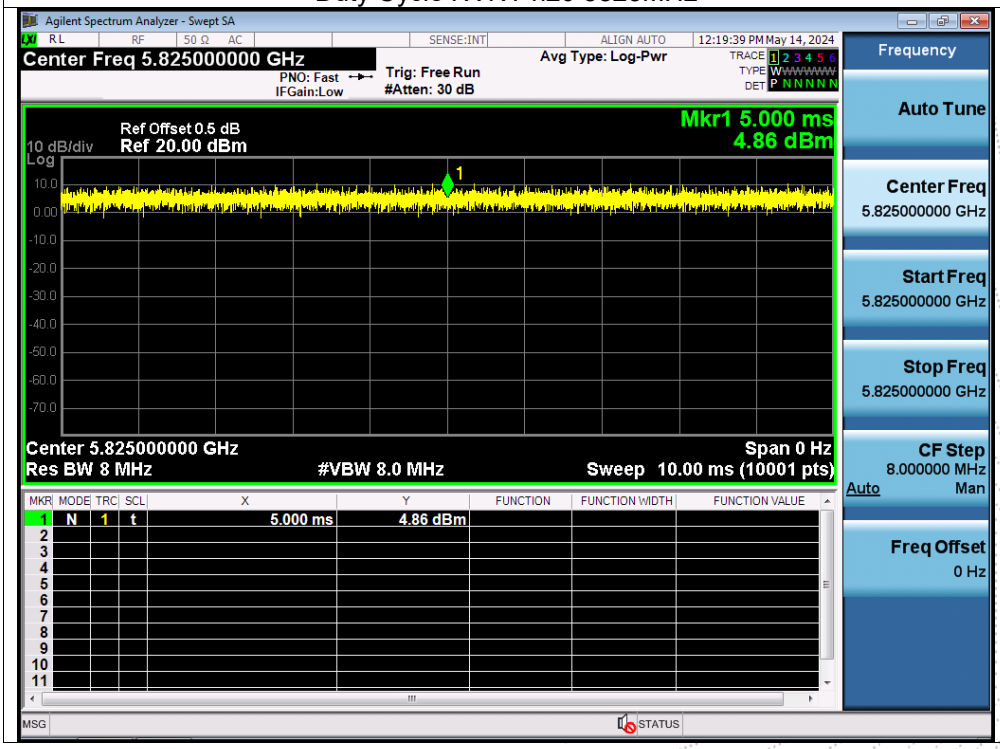
Duty Cycle NVNT n20 5745MHz



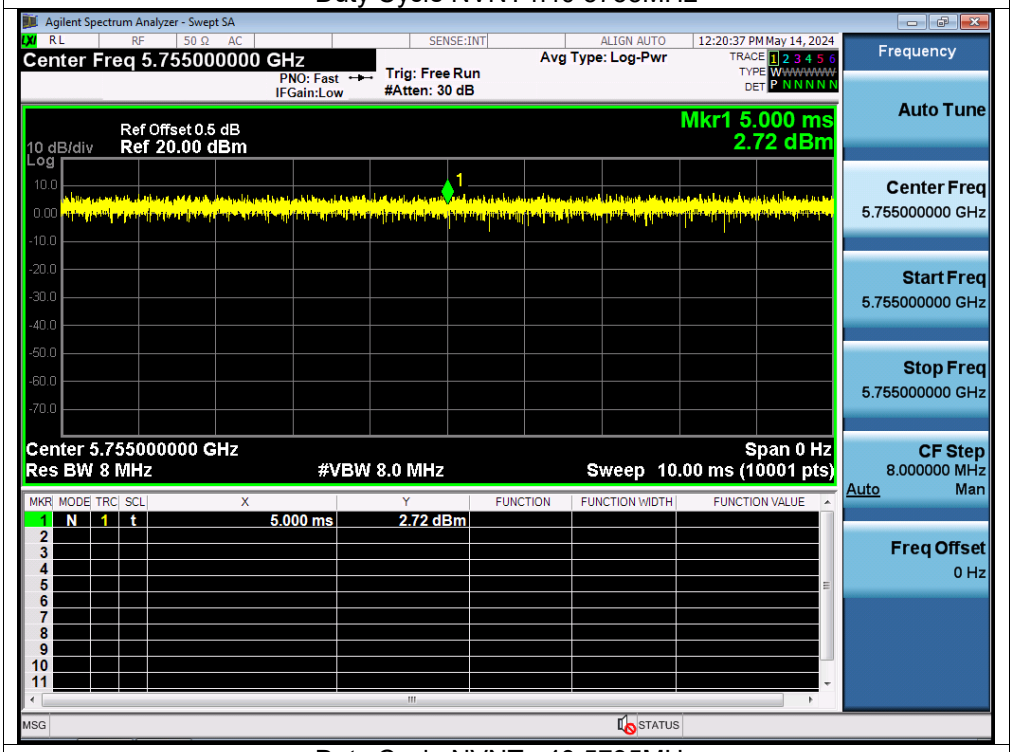
Duty Cycle NVNT n20 5785MHz



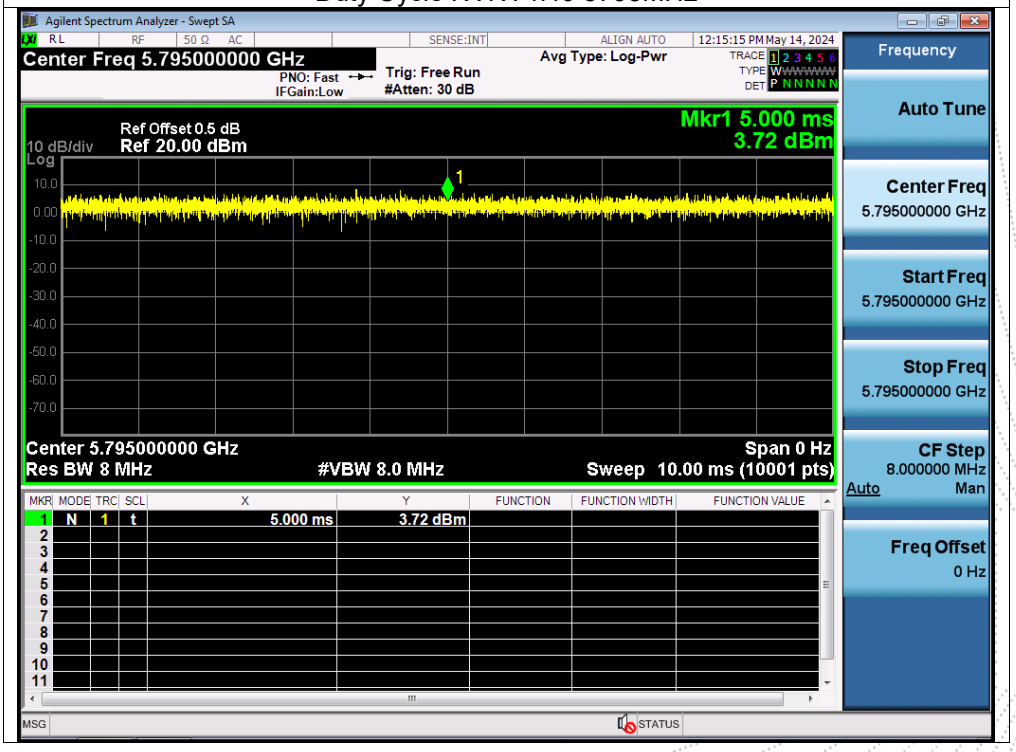
Duty Cycle NVNT n20 5825MHz



Duty Cycle NVNT n40 5755MHz



Duty Cycle NVNT n40 5795MHz



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.

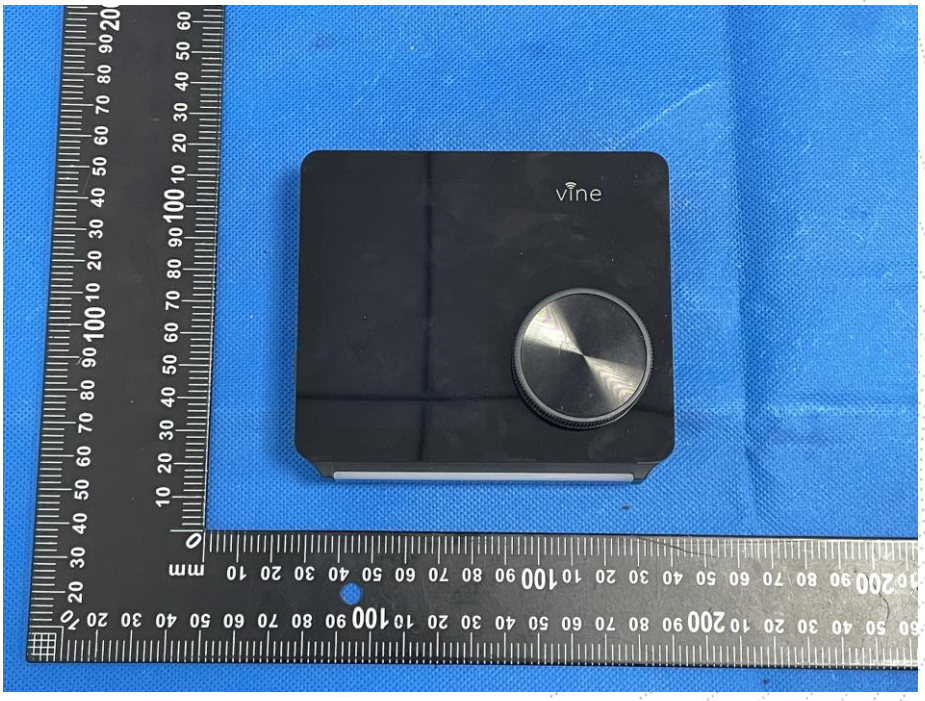
15.2 Test Result

The EUT antenna is Internal antenna (antenna gain: 5.1dBi). It comply with the standard requirement.

16. EUT Photographs

EUT Photo 1

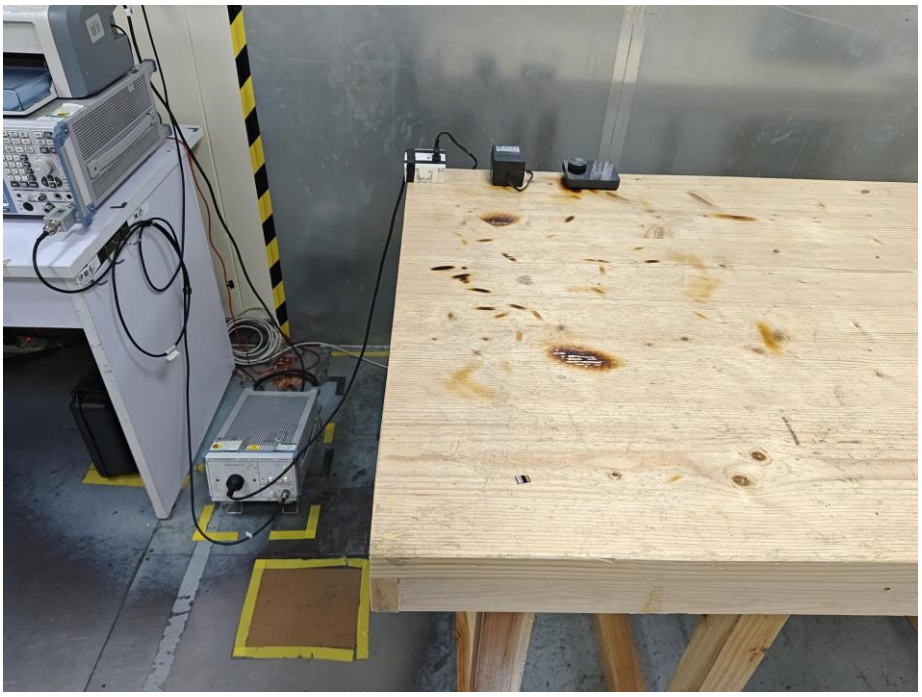
EUT Photo 2



NOTE: Appendix-Photographs Of EUT Constructional Details

17. EUT Test Setup Photographs

Conducted Emissions Photo



Radiated Measurement Photos


BCTC
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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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Complaint/Advice E-mail: advice@bctc-lab.com.cn

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