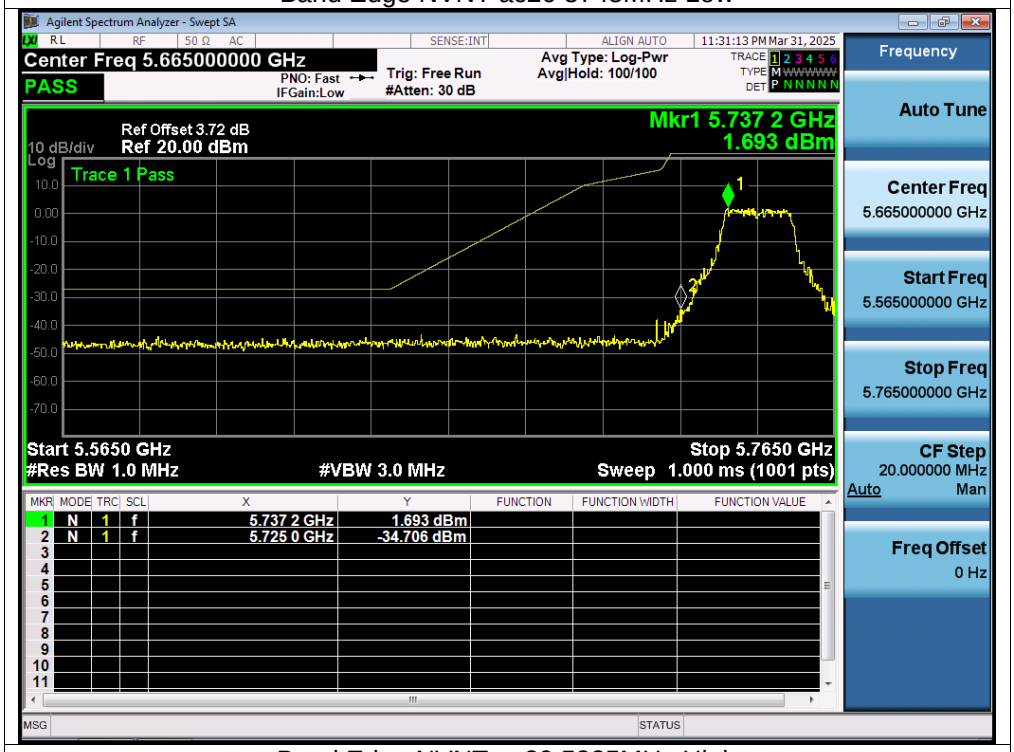
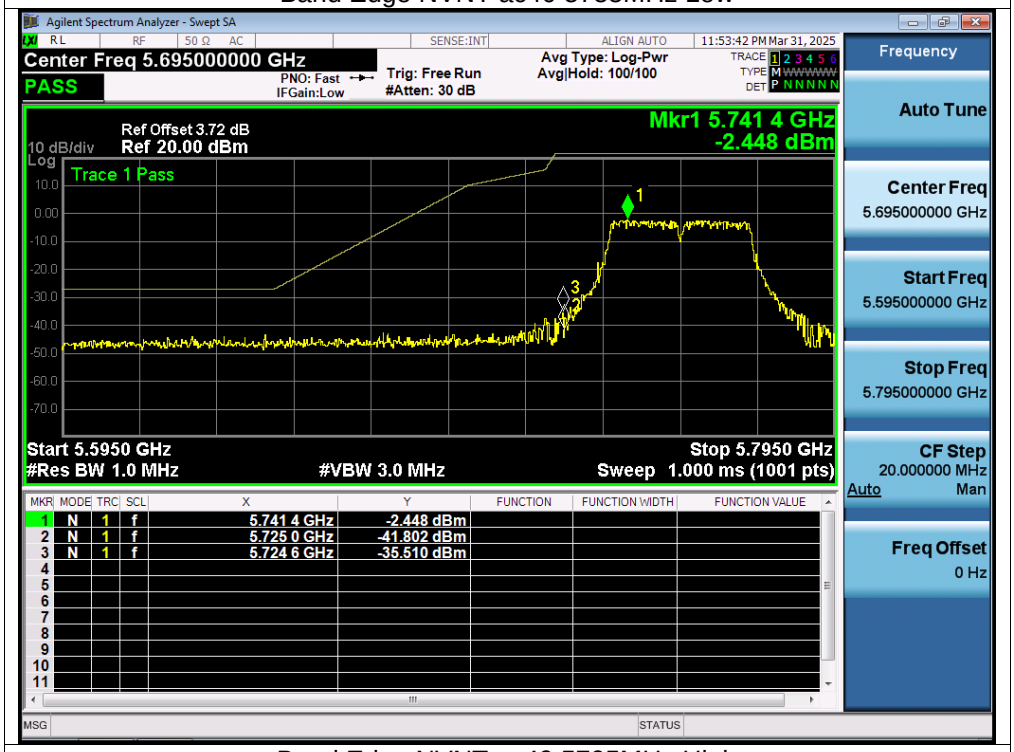
Band Edge NVNT ac20 5745MHz Low



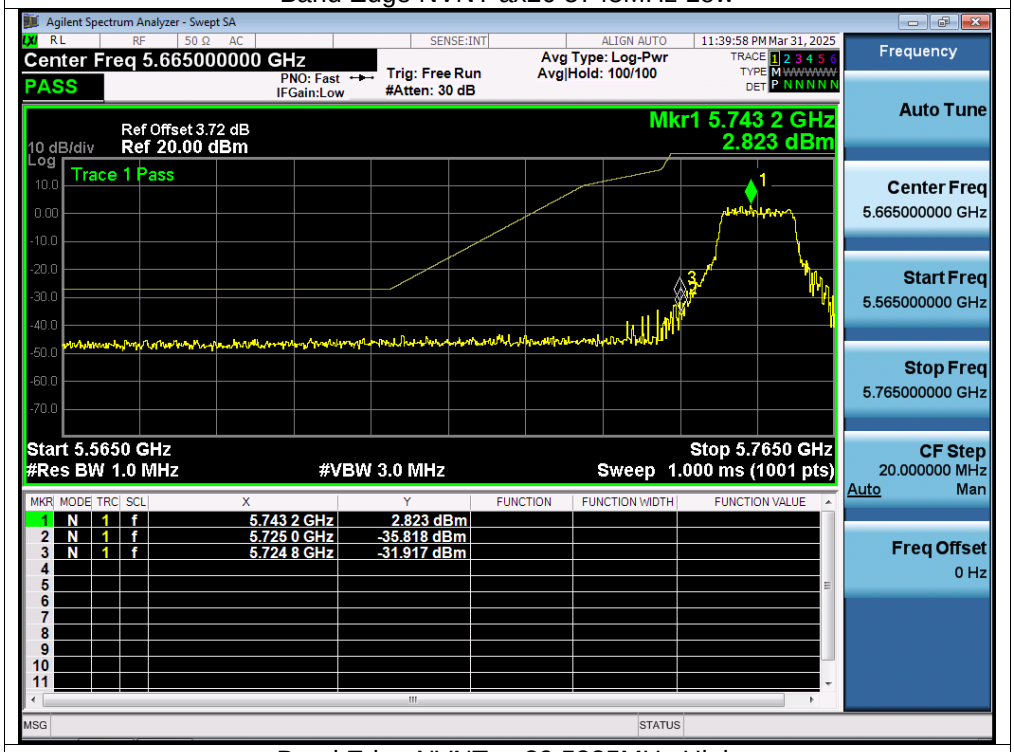
Band Edge NVNT ac20 5825MHz High

Band Edge NVNT ac40 5755MHz Low



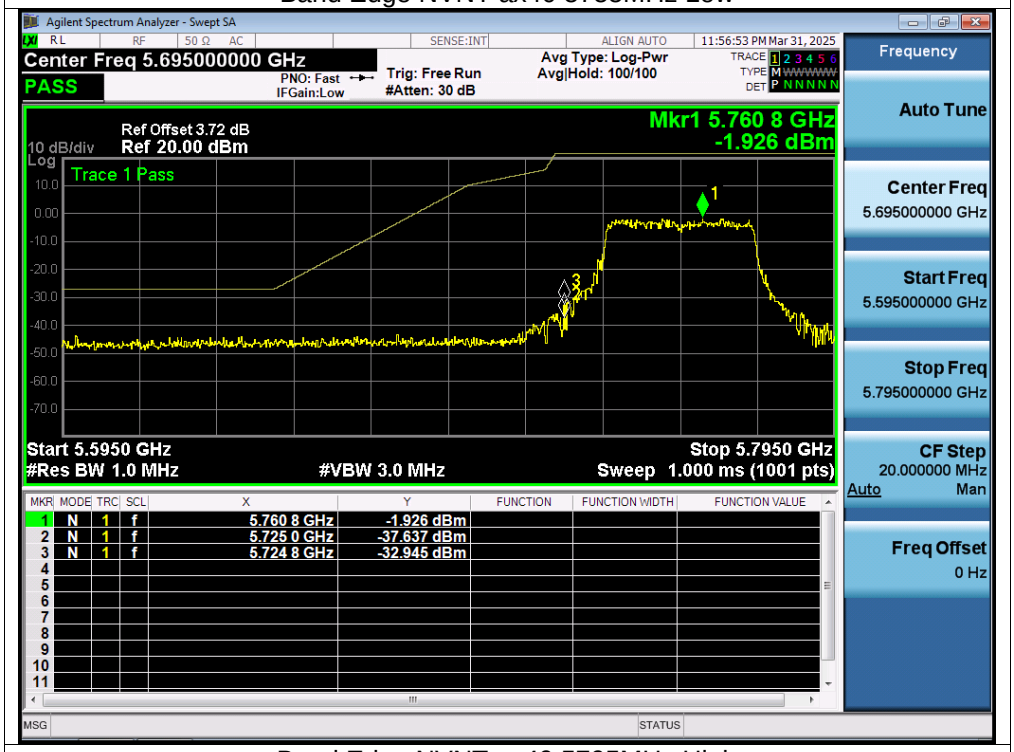
Band Edge NVNT ac40 5795MHz High

Band Edge NVNT ax20 5745MHz Low



Band Edge NVNT ax20 5825MHz High

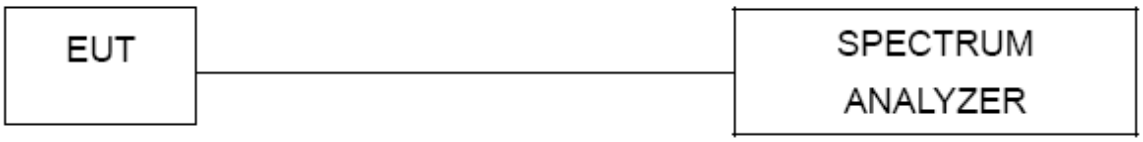
Band Edge NVNT ax40 5755MHz Low



Band Edge NVNT ax40 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..

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.

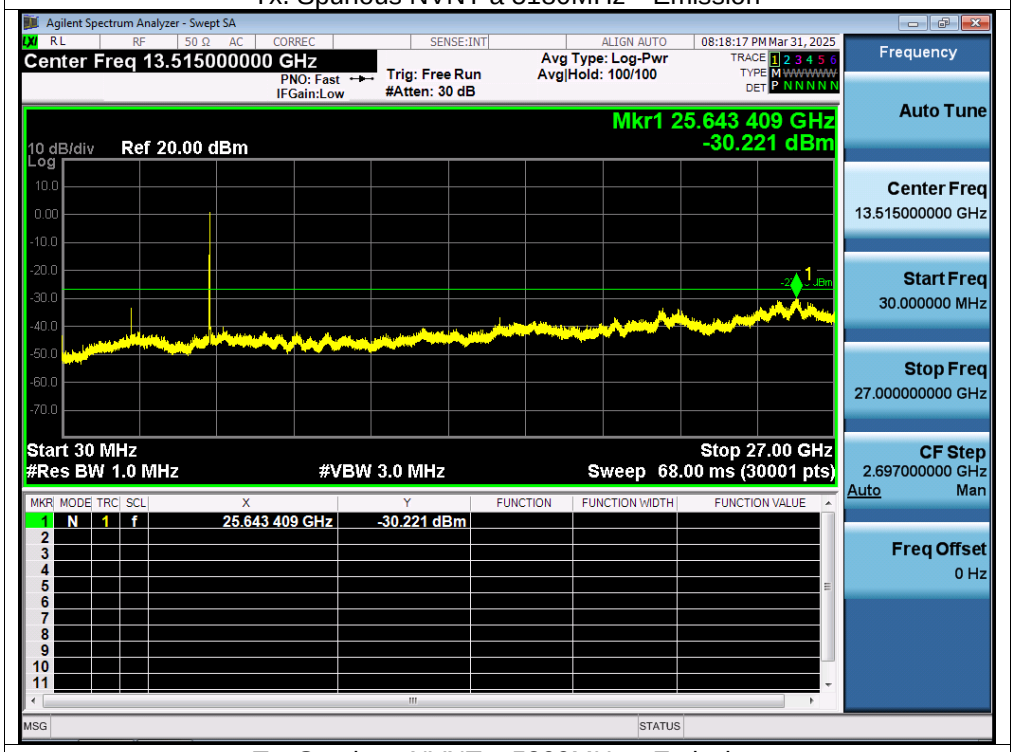
12.4 Test Result

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.

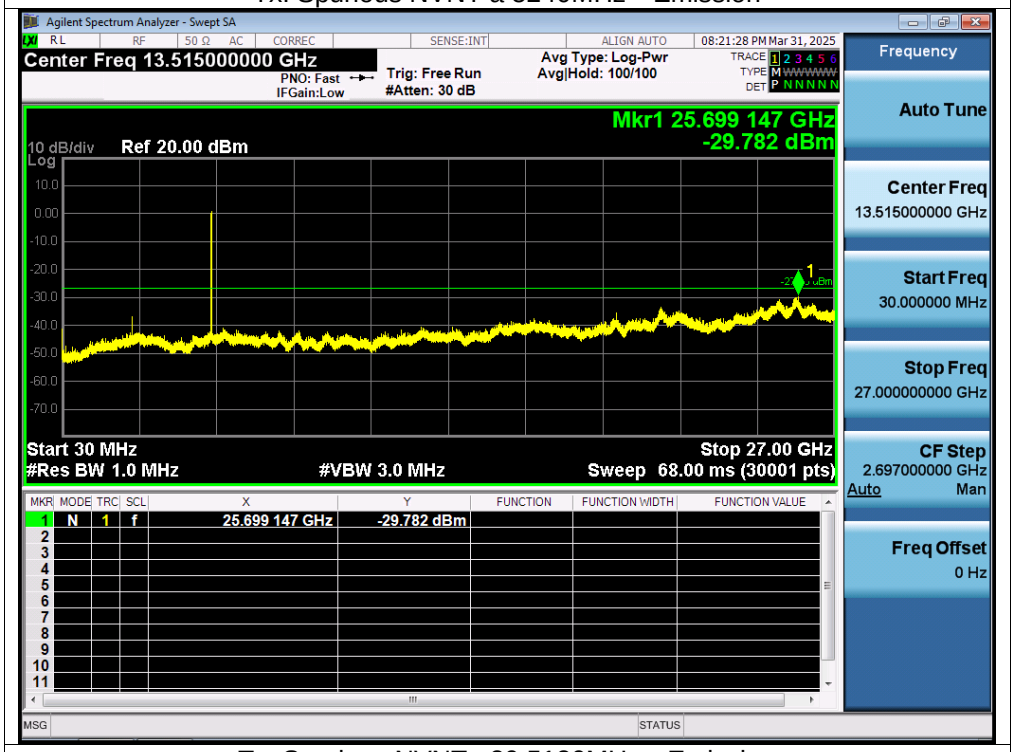
Test Graphs

Tx. Spurious NVNT a 5180MHz Emission



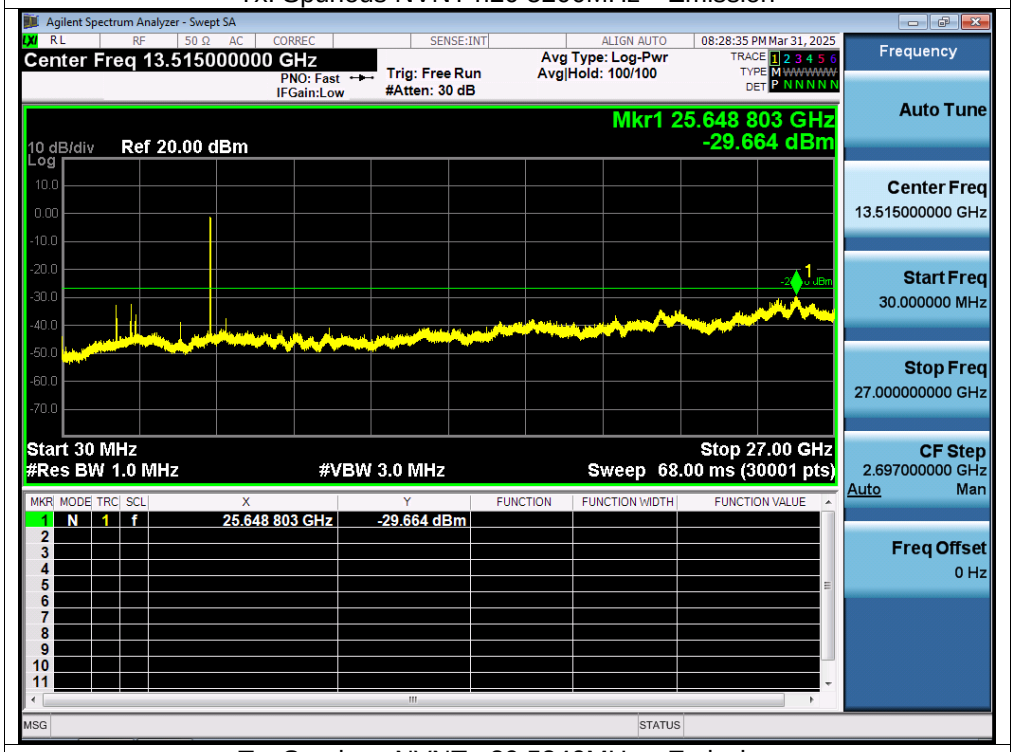
Tx. Spurious NVNT a 5200MHz Emission

Tx. Spurious NVNT a 5240MHz Emission



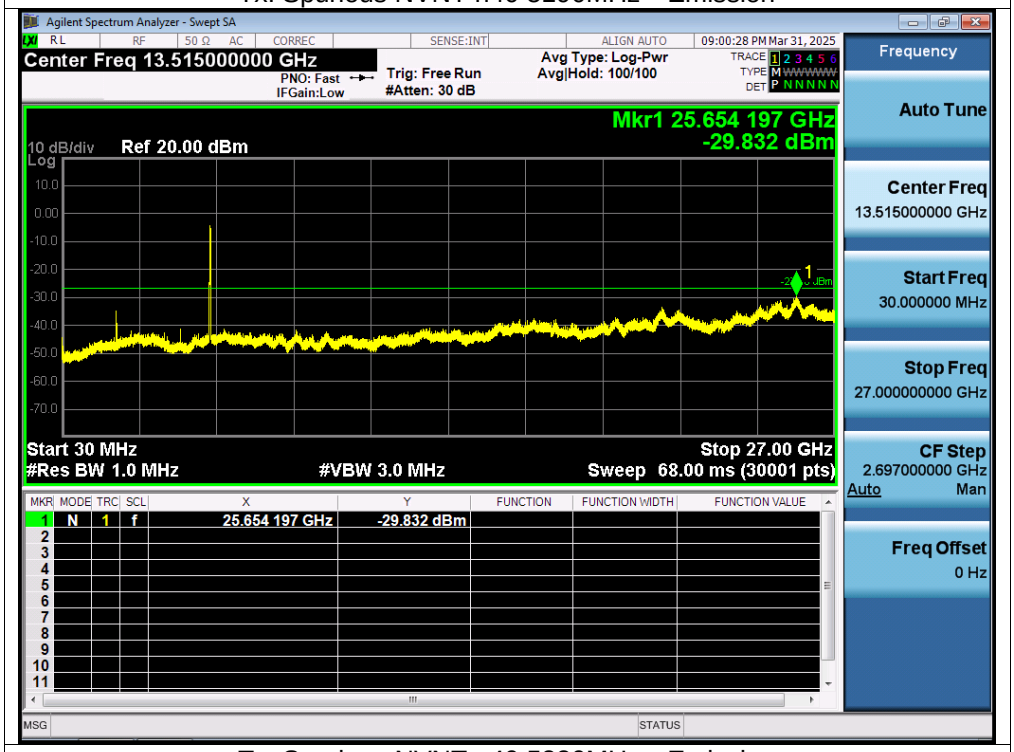
Tx. Spurious NVNT n20 5180MHz Emission

Tx. Spurious NVNT n20 5200MHz Emission



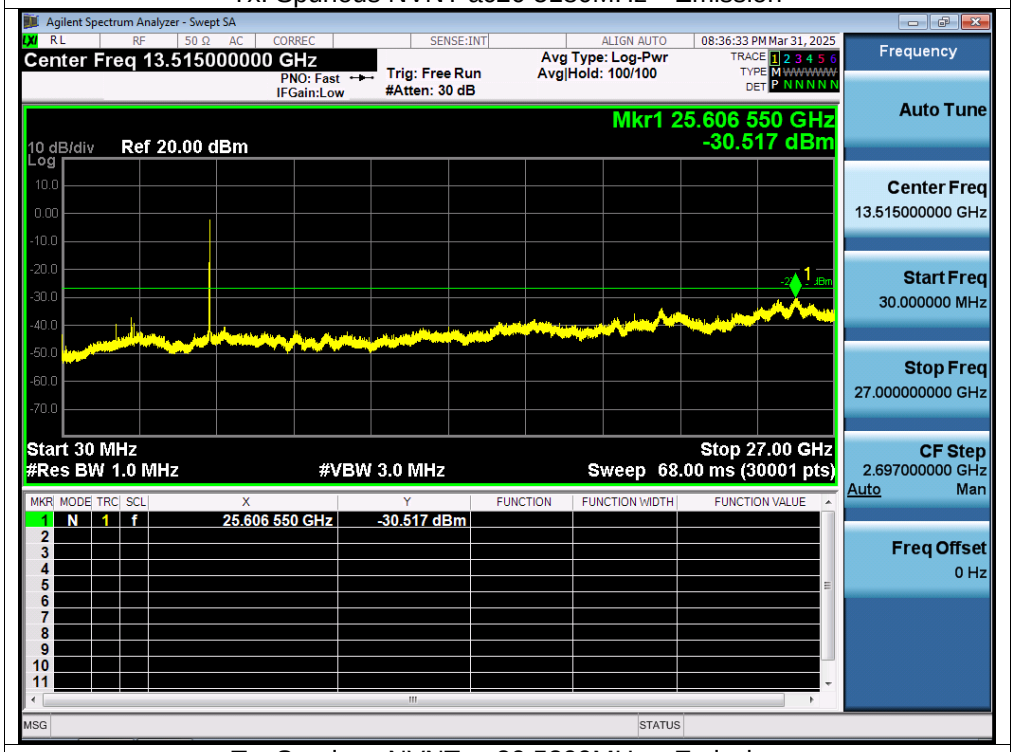
Tx. Spurious NVNT n20 5240MHz Emission

Tx. Spurious NVNT n40 5190MHz Emission



Tx. Spurious NVNT n40 5230MHz Emission

Tx. Spurious NVNT ac20 5180MHz Emission

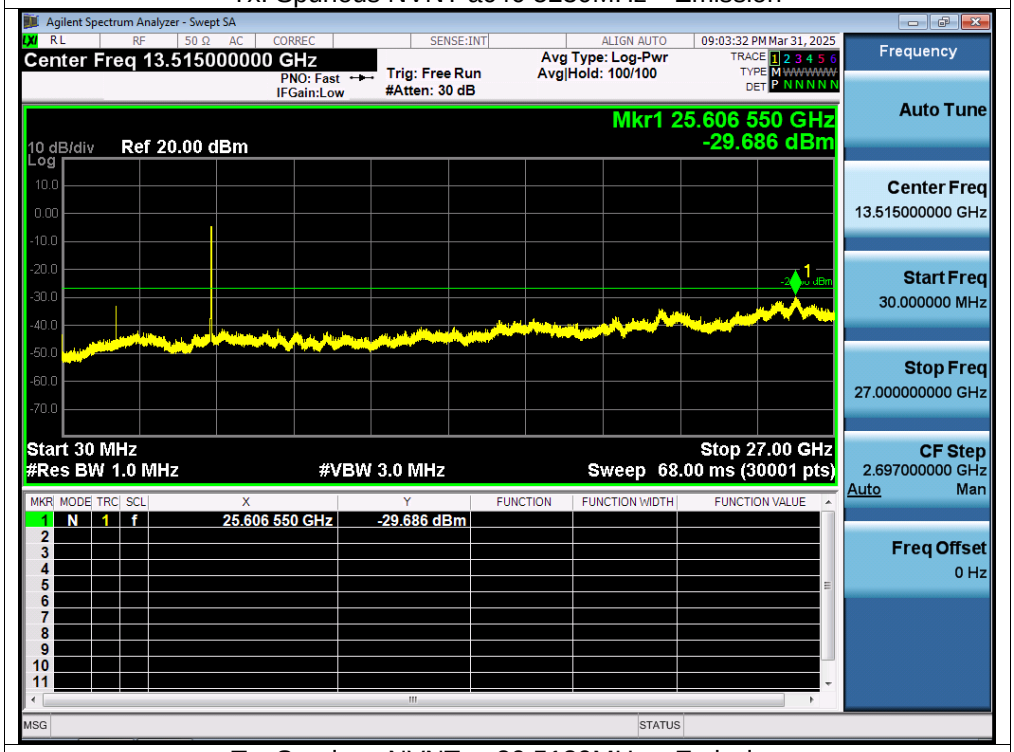


Tx. Spurious NVNT ac20 5200MHz Emission

Tx. Spurious NVNT ac20 5240MHz Emission

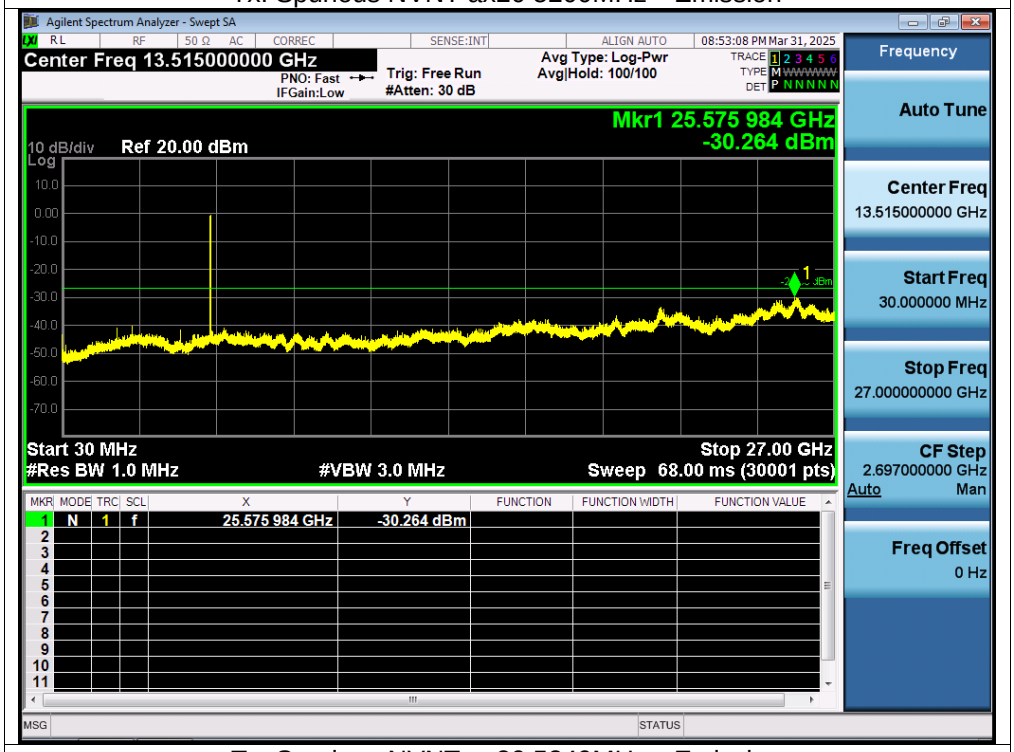
Tx. Spurious NVNT ac40 5190MHz Emission

Tx. Spurious NVNT ac40 5230MHz Emission



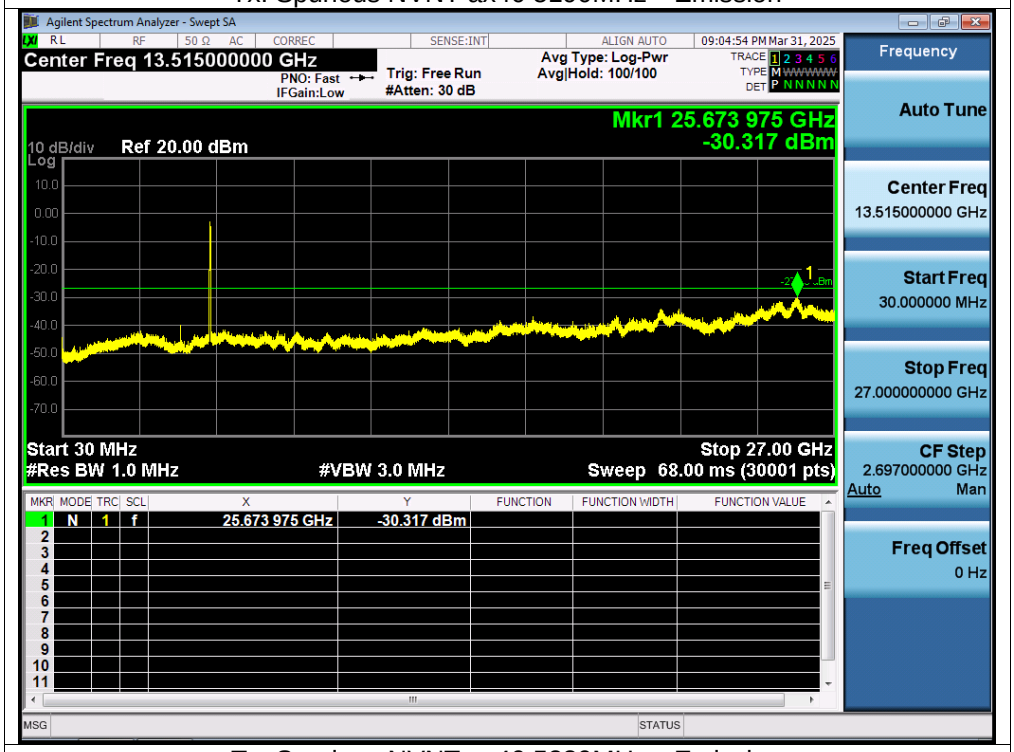
Tx. Spurious NVNT ax20 5180MHz Emission

Tx. Spurious NVNT ax20 5200MHz Emission



Tx. Spurious NVNT ax20 5240MHz Emission

Tx. Spurious NVNT ax40 5190MHz Emission



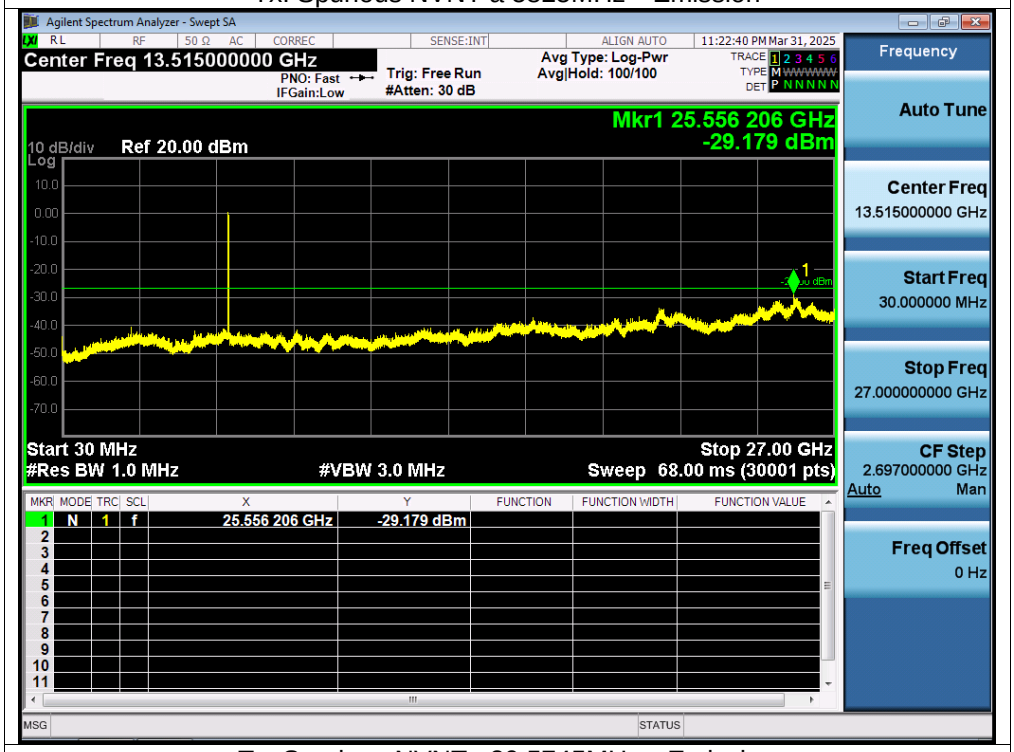
Tx. Spurious NVNT ax40 5230MHz Emission

Test Graphs

Tx. Spurious NVNT a 5745MHz Emission

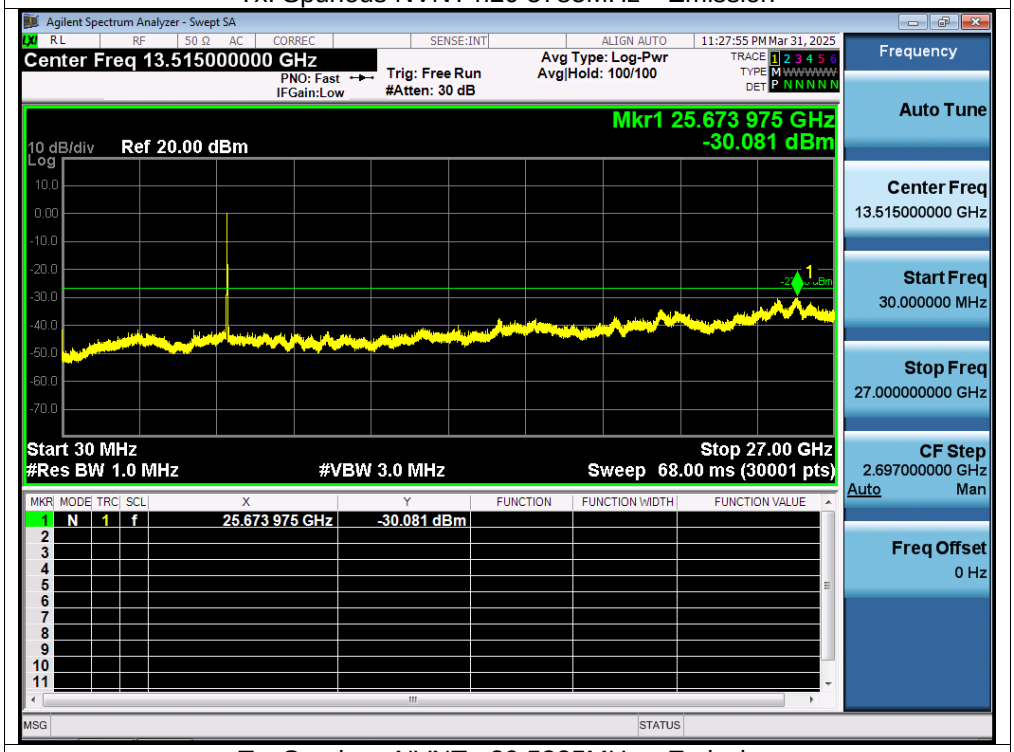
Tx. Spurious NVNT a 5785MHz Emission

Tx. Spurious NVNT a 5825MHz Emission



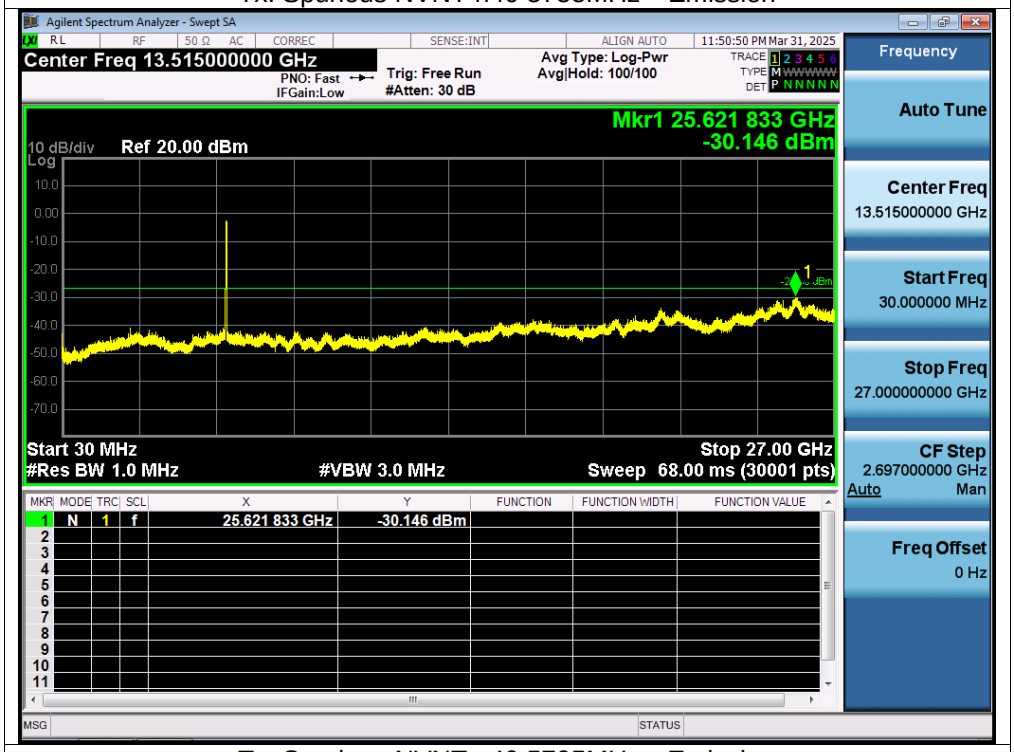
Tx. Spurious NVNT n20 5745MHz Emission

Tx. Spurious NVNT n20 5785MHz Emission



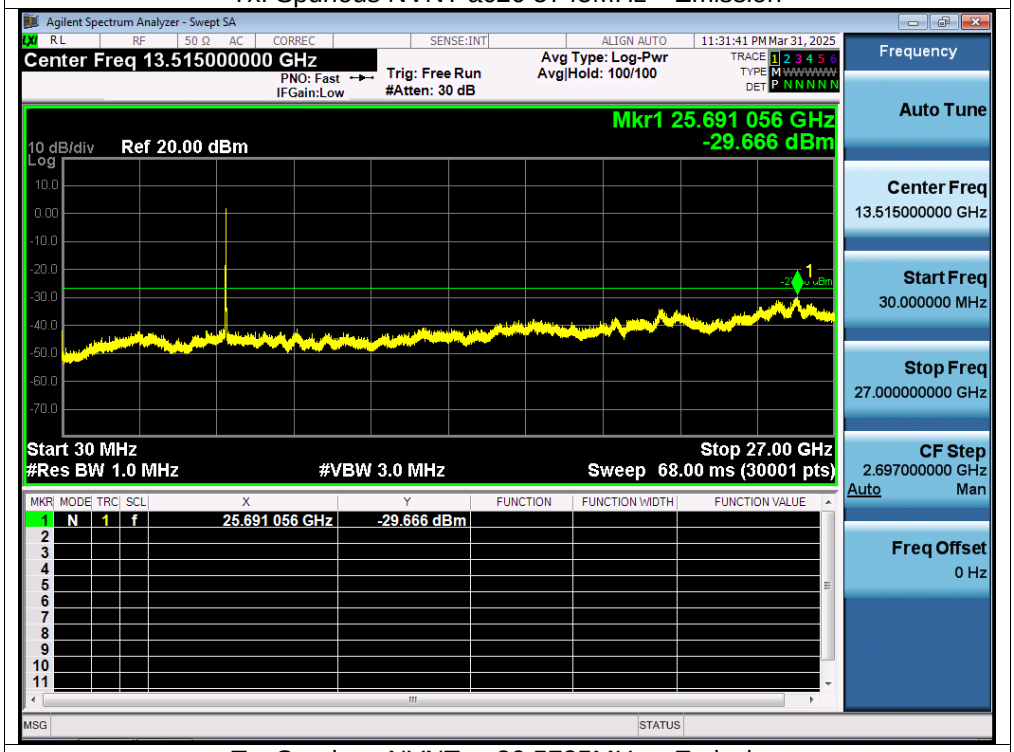
Tx. Spurious NVNT n20 5825MHz Emission

Tx. Spurious NVNT n40 5755MHz Emission



Tx. Spurious NVNT n40 5795MHz Emission

Tx. Spurious NVNT ac20 5745MHz Emission



Tx. Spurious NVNT ac20 5785MHz Emission

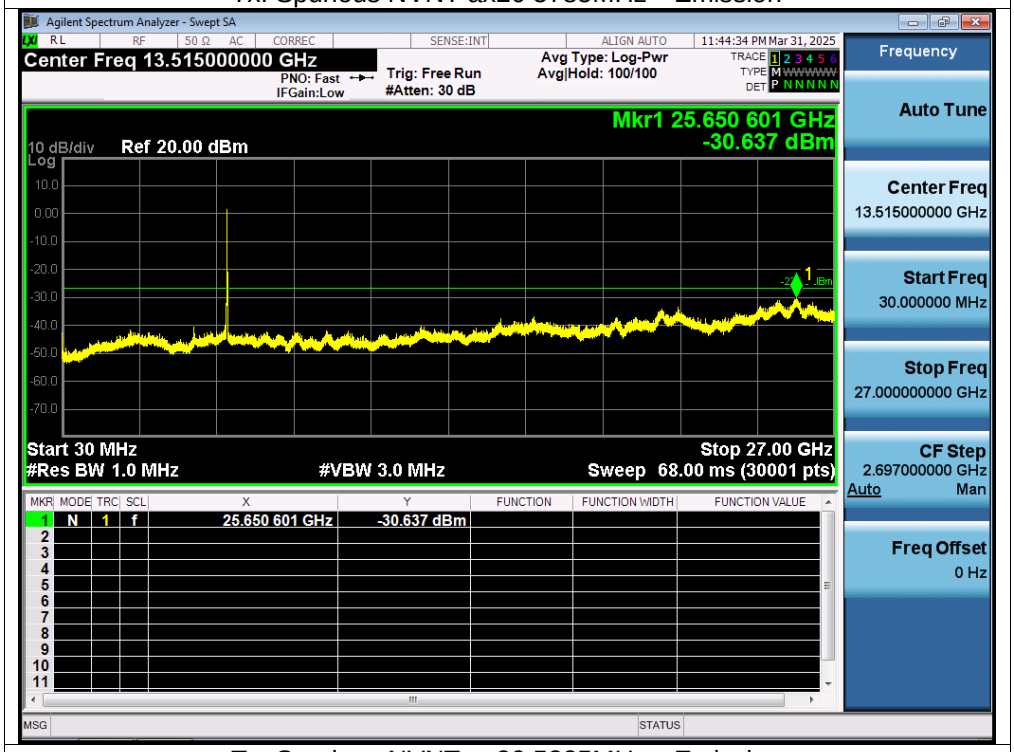
Tx. Spurious NVNT ac20 5825MHz Emission

Tx. Spurious NVNT ac40 5755MHz Emission

Tx. Spurious NVNT ac40 5795MHz Emission

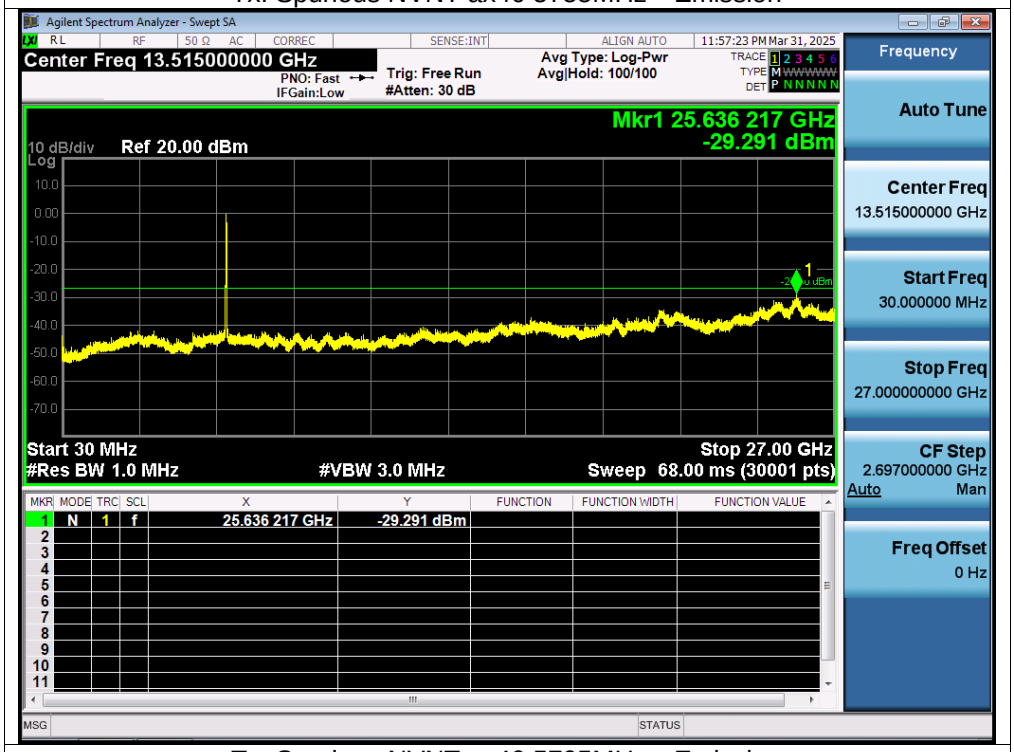
Tx. Spurious NVNT ax20 5745MHz Emission

Tx. Spurious NVNT ax20 5785MHz Emission



Tx. Spurious NVNT ax20 5825MHz Emission

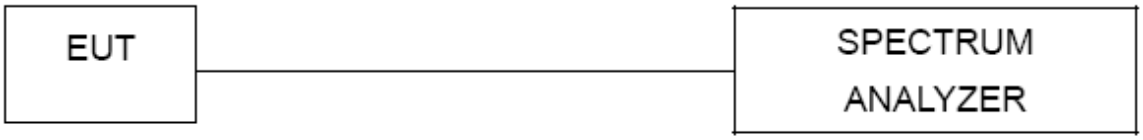
Tx. Spurious NVNT ax40 5755MHz Emission



Tx. Spurious NVNT ax40 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:	DC 3.7V
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)	3.70	5180.0119	5180	0.0119	2.2973
		V max (V)	4.26	5180.0048	5180	0.0048	0.9266
		V min (V)	3.15	5180.0029	5180	0.0029	0.5598
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)	3.7	T (°C)	-20	5180.0042	5180	0.0042	0.8108
		T (°C)	-10	5180.0130	5180	0.0130	2.5097
		T (°C)	0	5180.0063	5180	0.0063	1.2162
		T (°C)	10	5180.0028	5180	0.0028	0.5405
		T (°C)	20	5180.0026	5180	0.0026	0.5019
		T (°C)	30	5180.0094	5180	0.0094	1.8147
		T (°C)	40	5180.0088	5180	0.0088	1.6988
		T (°C)	50	5180.0053	5180	0.0053	1.0232
		T (°C)	60	5180.0082	5180	0.0082	1.5830
		T (°C)	70	5180.0019	5180	0.0019	0.3668
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)	3.70	5200.0121	5200	0.0121	2.3269
		V max (V)	4.26	5200.0004	5200	0.0004	0.0769
		V min (V)	3.15	5200.0087	5200	0.0087	1.6731
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)	3.7	T (°C)	-20	5200.00750	5200	0.00750	1.4423
		T (°C)	-10	5200.00840	5200	0.00840	1.6154
		T (°C)	0	5200.01120	5200	0.01120	2.1538
		T (°C)	10	5200.01310	5200	0.01310	2.5192
		T (°C)	20	5200.00780	5200	0.00780	1.5000
		T (°C)	30	5200.00670	5200	0.00670	1.2885
		T (°C)	40	5200.00120	5200	0.00120	0.2308
		T (°C)	50	5200.00710	5200	0.00710	1.3654
		T (°C)	60	5200.01290	5200	0.01290	2.4808
		T (°C)	70	5200.00820	5200	0.00820	1.5769
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)	3.70	5240.0057	5240	0.0057	1.0878
		V max (V)	4.26	5240.0019	5240	0.0019	0.3626
		V min (V)	3.15	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)	3.7	T (°C)	-20	5240.0092	5240	0.0092	1.7557
		T (°C)	-10	5240.0107	5240	0.0107	2.0420
		T (°C)	0	5240.0088	5240	0.0088	1.6794
		T (°C)	10	5240.0048	5240	0.0048	0.9160
		T (°C)	20	5240.0062	5240	0.0062	1.1832
		T (°C)	30	5240.0026	5240	0.0026	0.4962
		T (°C)	40	5240.0127	5240	0.0127	2.4237
		T (°C)	50	5240.0061	5240	0.0061	1.1641
		T (°C)	60	5240.0081	5240	0.0081	1.5458
		T (°C)	70	5240.0018	5240	0.0018	0.3435
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.7V
Test Mode:	TX (5.8G) Mode Frequency U-NII-3 (5745-5825MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency:5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	3.70	5745.00730	5745	0.00730	1.2707
		V max (V)	4.26	5745.01260	5745	0.01260	2.1932
		V min (V)	3.15	5745.00190	5745	0.00190	0.3307
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)	3.7	T (°C)	-20	5745.00470	5745	0.00470	0.8181
		T (°C)	-10	5745.00240	5745	0.00240	0.4178
		T (°C)	0	5745.01320	5745	0.01320	2.2977
		T (°C)	10	5745.00210	5745	0.00210	0.3655
		T (°C)	20	5745.00150	5745	0.00150	0.2611
		T (°C)	30	5745.01250	5745	0.01250	2.1758
		T (°C)	40	5745.00950	5745	0.00950	1.6536
		T (°C)	50	5745.00980	5745	0.00980	1.7058
		T (°C)	60	5745.00650	5745	0.00650	1.1314
		T (°C)	70	5745.00530	5745	0.00530	0.9225
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)	3.70	5785.00710	5785	0.00710	1.2273
		V max (V)	4.26	5785.00540	5785	0.00540	0.9334
		V min (V)	3.15	5785.01080	5785	0.01080	1.8669
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)	3.7	T (°C)	-20	5785.01110	5785	0.01110	1.9188
		T (°C)	-10	5785.00900	5785	0.00900	1.5557
		T (°C)	0	5785.01190	5785	0.01190	2.0570
		T (°C)	10	5785.00310	5785	0.00310	0.5359
		T (°C)	20	5785.00100	5785	0.00100	0.1729
		T (°C)	30	5785.00760	5785	0.00760	1.3137
		T (°C)	40	5785.01180	5785	0.01180	2.0398
		T (°C)	50	5785.00750	5785	0.00750	1.2965
		T (°C)	60	5785.00370	5785	0.00370	0.6396
		T (°C)	70	5785.01230	5785	0.01230	2.1262
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)	3.70	5825.00800	5825	0.00800	1.3734
		V max (V)	4.26	5825.00140	5825	0.00140	0.2403
		V min (V)	3.15	5825.00480	5825	0.00480	0.8240
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)	3.7	T (°C)	-20	5825.01190	5825	0.01190	2.0429
		T (°C)	-10	5825.00090	5825	0.00090	0.1545
		T (°C)	0	5825.00110	5825	0.00110	0.1888
		T (°C)	10	5825.00830	5825	0.00830	1.4249
		T (°C)	20	5825.01350	5825	0.01350	2.3176
		T (°C)	30	5825.01170	5825	0.01170	2.0086
		T (°C)	40	5825.00340	5825	0.00340	0.5837
		T (°C)	50	5825.00460	5825	0.00460	0.7897
		T (°C)	60	5825.00510	5825	0.00510	0.8755
		T (°C)	70	5825.00600	5825	0.00600	1.0300
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

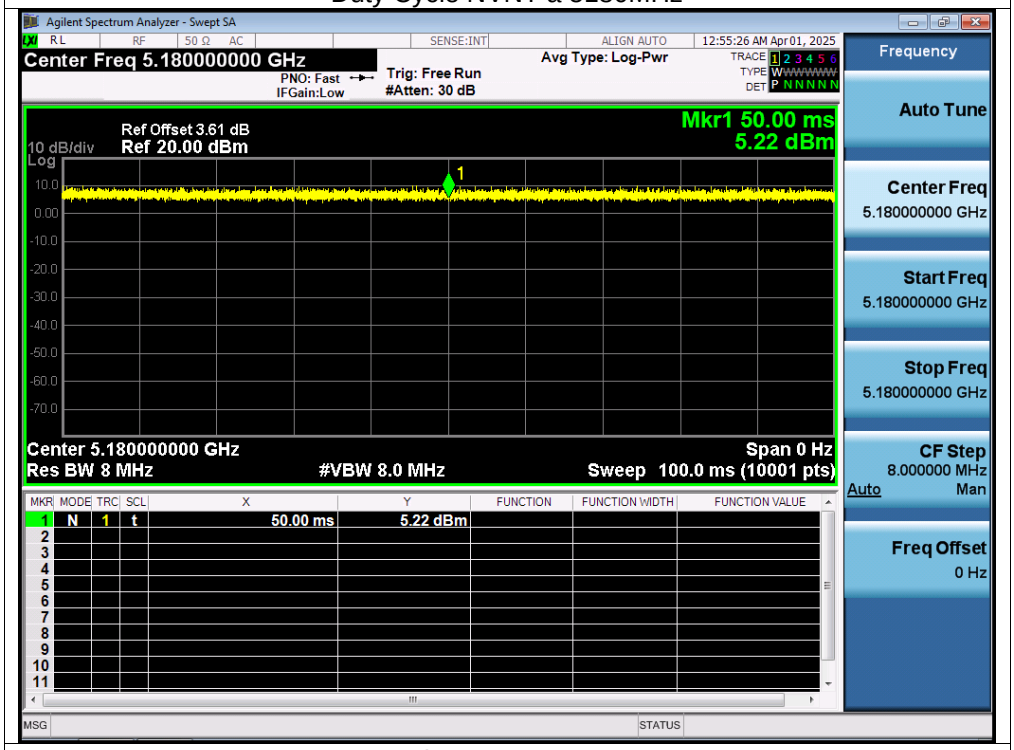
14.4 Test Result

5.1G

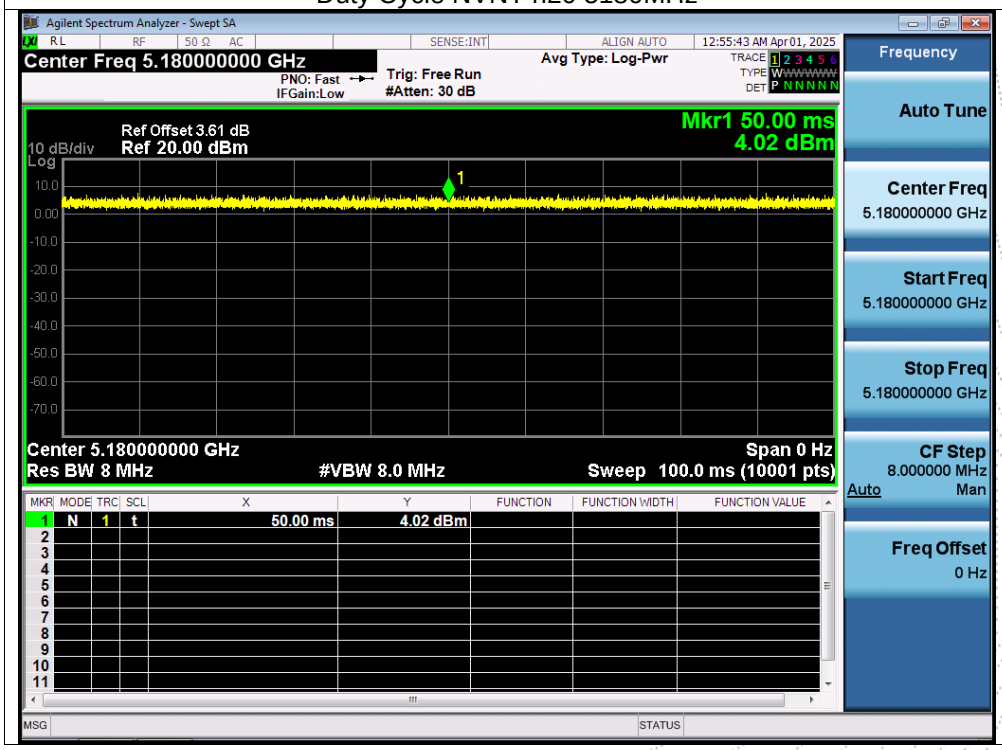
Condition	Mode	Frequency (MHz)	Duty Cycle (%)
NVNT	a	5180	100
NVNT	n20	5180	100
NVNT	n40	5190	100
NVNT	ac20	5180	100
NVNT	ac40	5190	100
NVNT	ax20	5180	100
NVNT	ax40	5190	100

Test Graphs

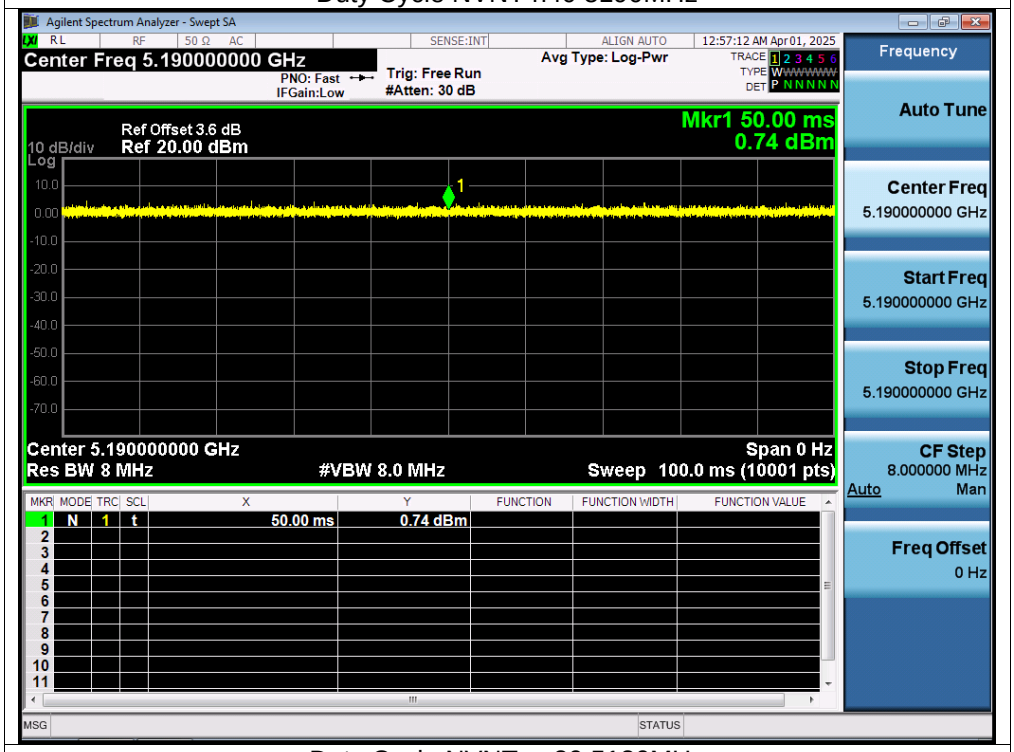
Duty Cycle NVNT a 5180MHz



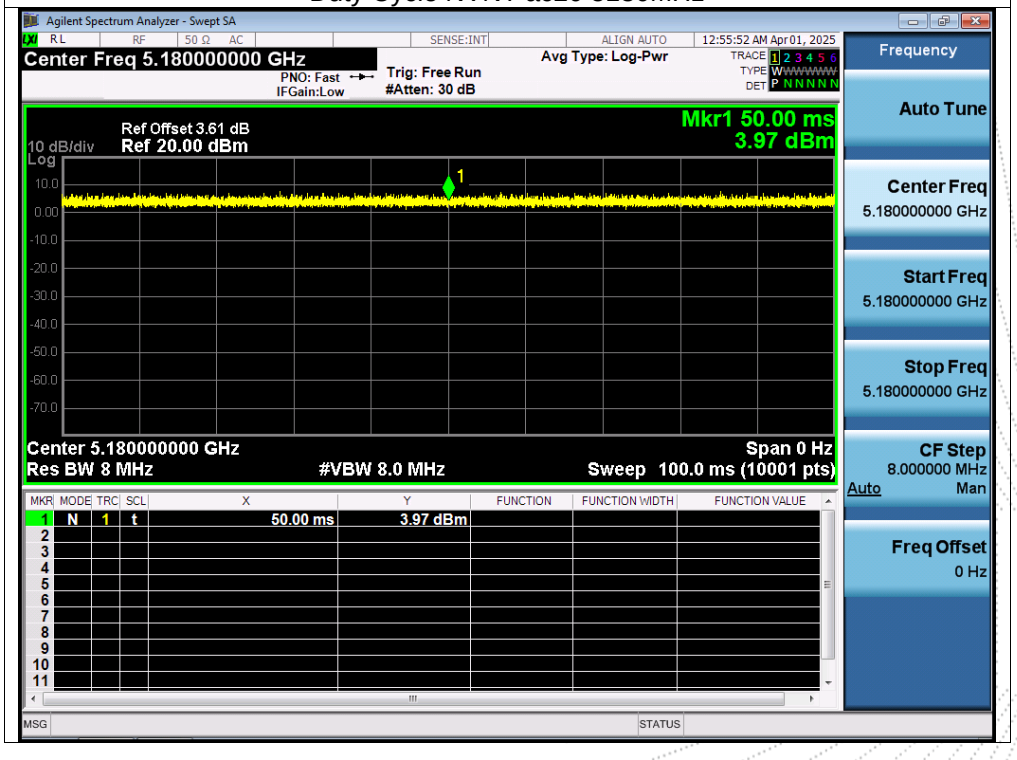
Duty Cycle NVNT n20 5180MHz



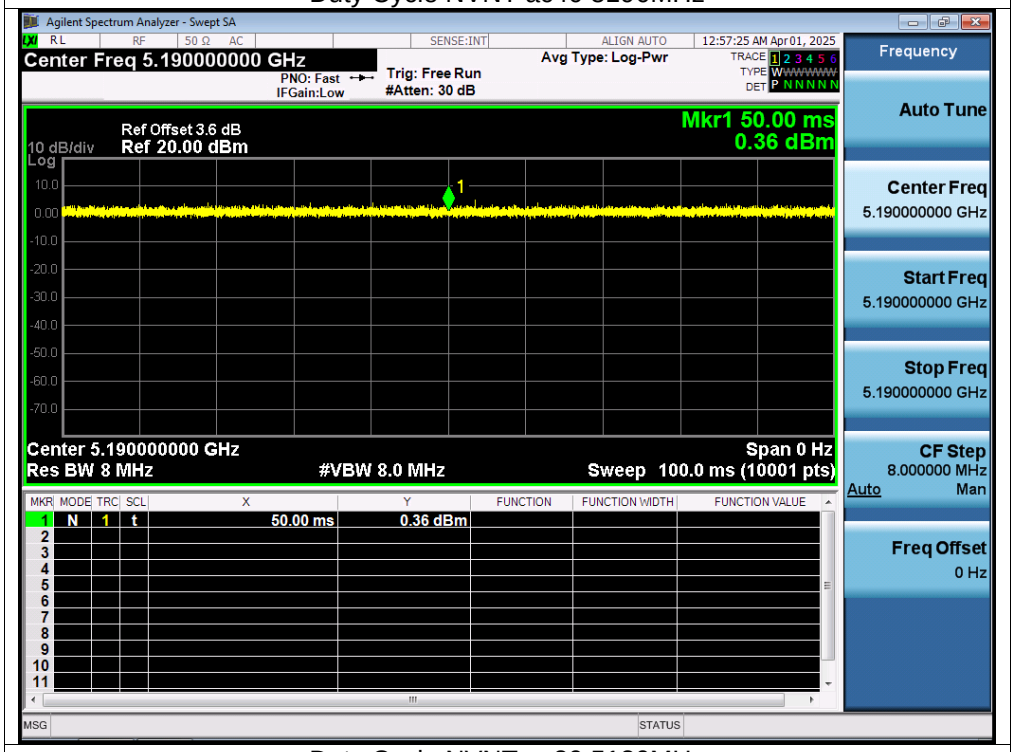
Duty Cycle NVNT n40 5190MHz



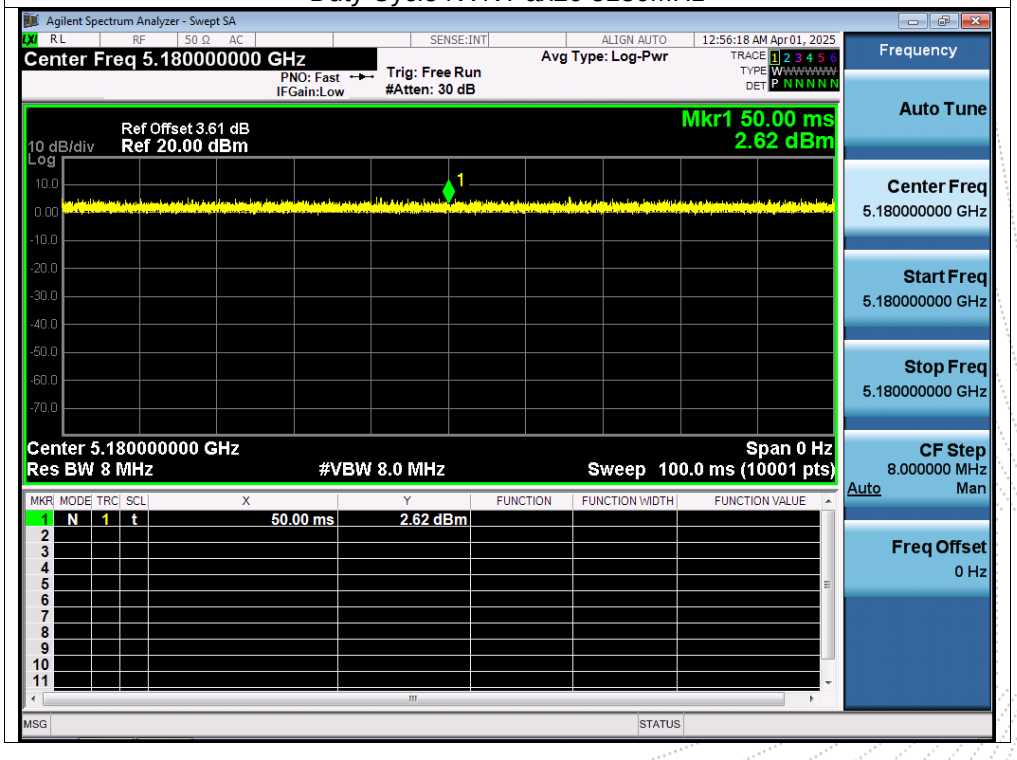
Duty Cycle NVNT ac20 5180MHz



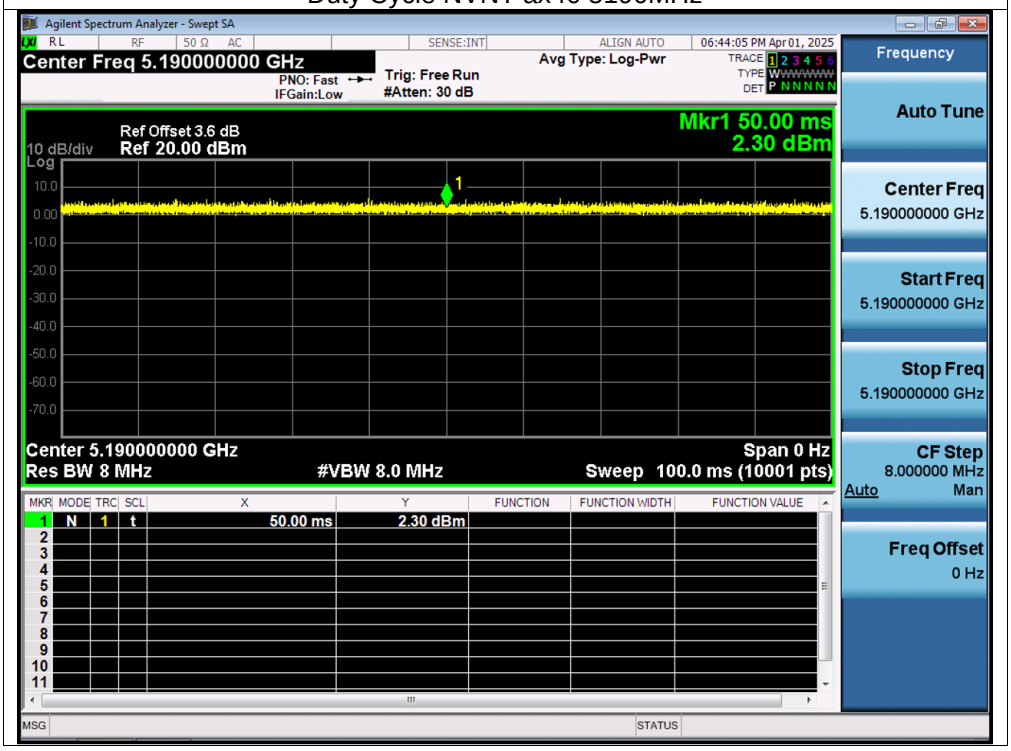
Duty Cycle NVNT ac40 5190MHz



Duty Cycle NVNT ax20 5180MHz



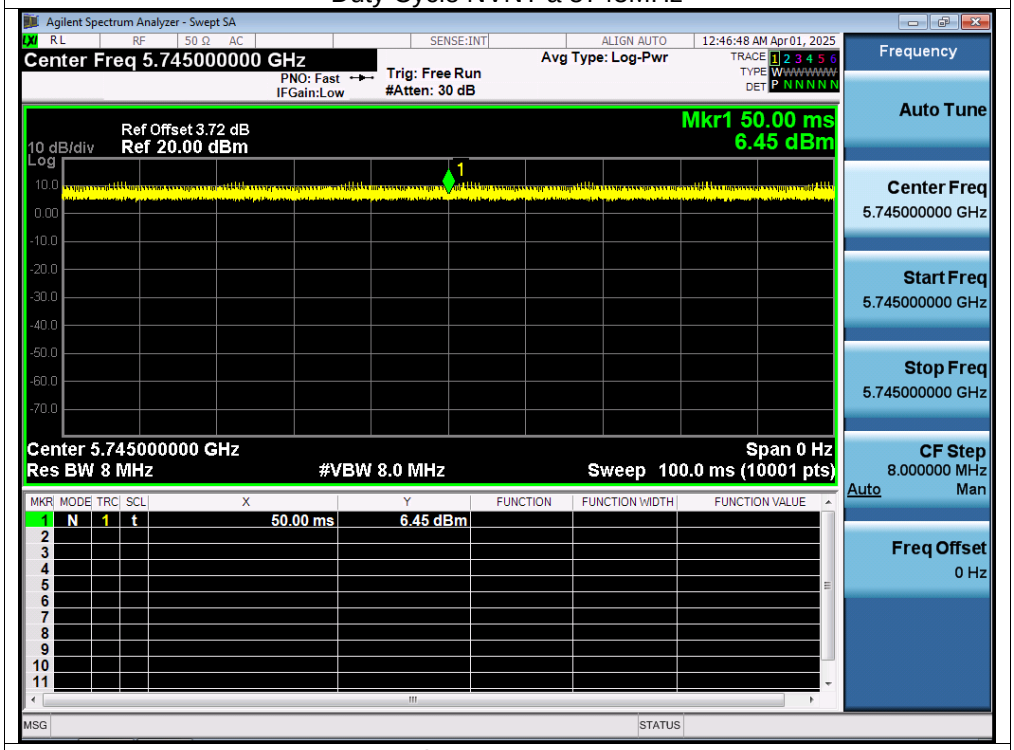
Duty Cycle NVNT ax40 5190MHz



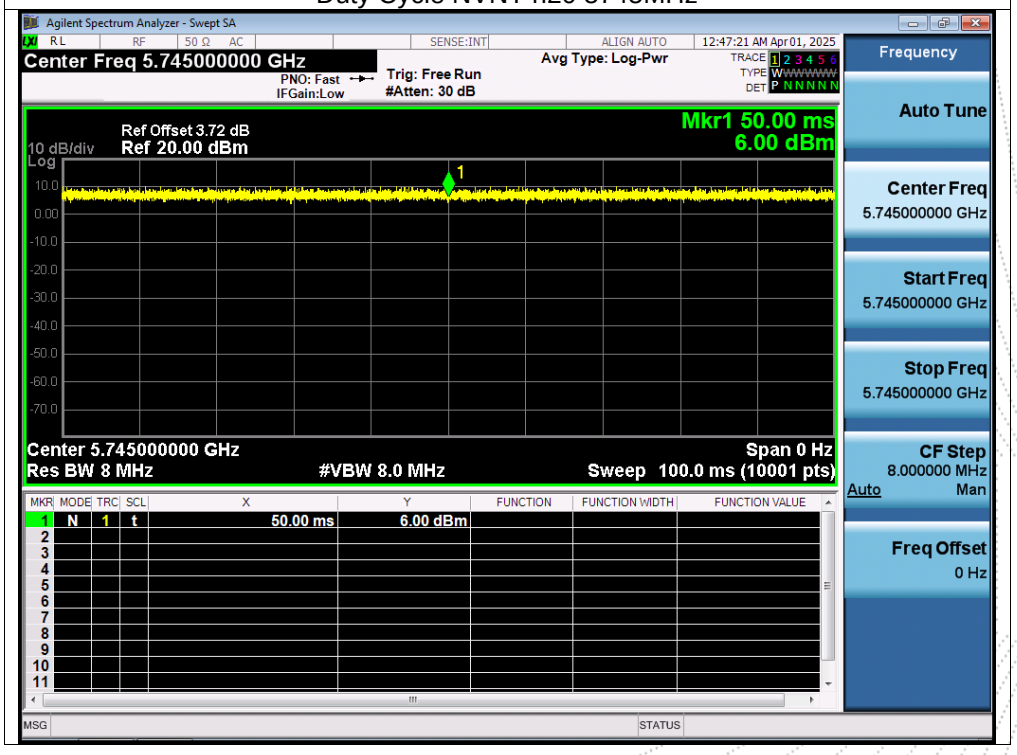
Condition	Mode	Frequency (MHz)	Duty Cycle (%)
NVNT	a	5745	100
NVNT	n20	5745	100
NVNT	n40	5755	100
NVNT	ac20	5745	100
NVNT	ac40	5755	100
NVNT	ax20	5745	100
NVNT	ax40	5755	100

Test Graphs

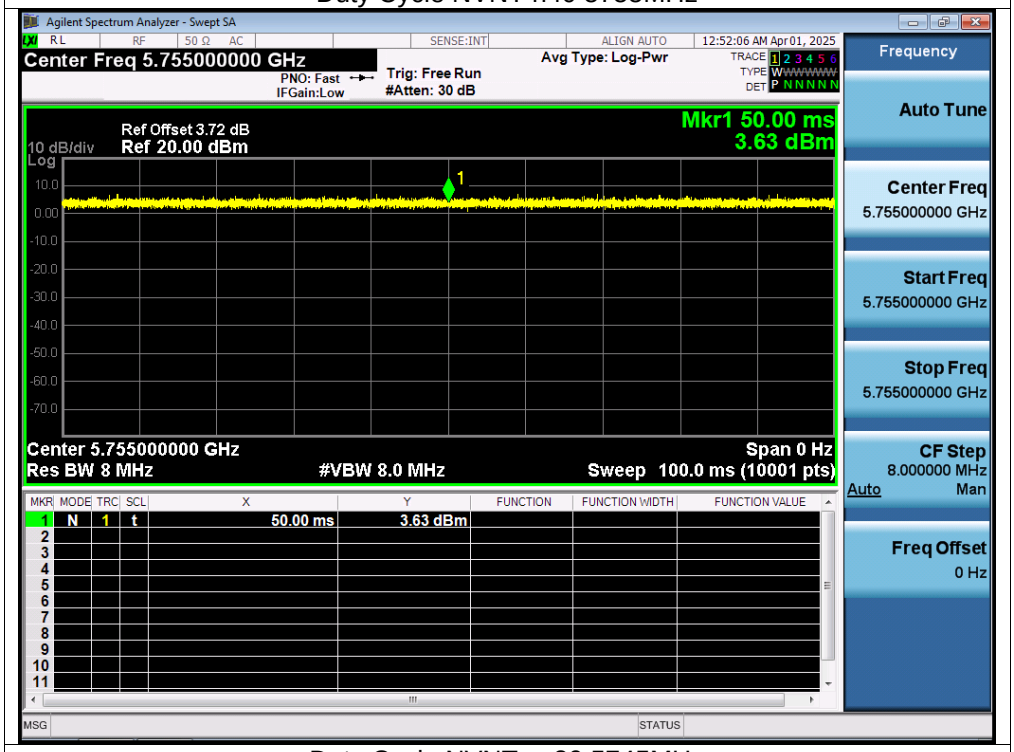
Duty Cycle NVNT a 5745MHz



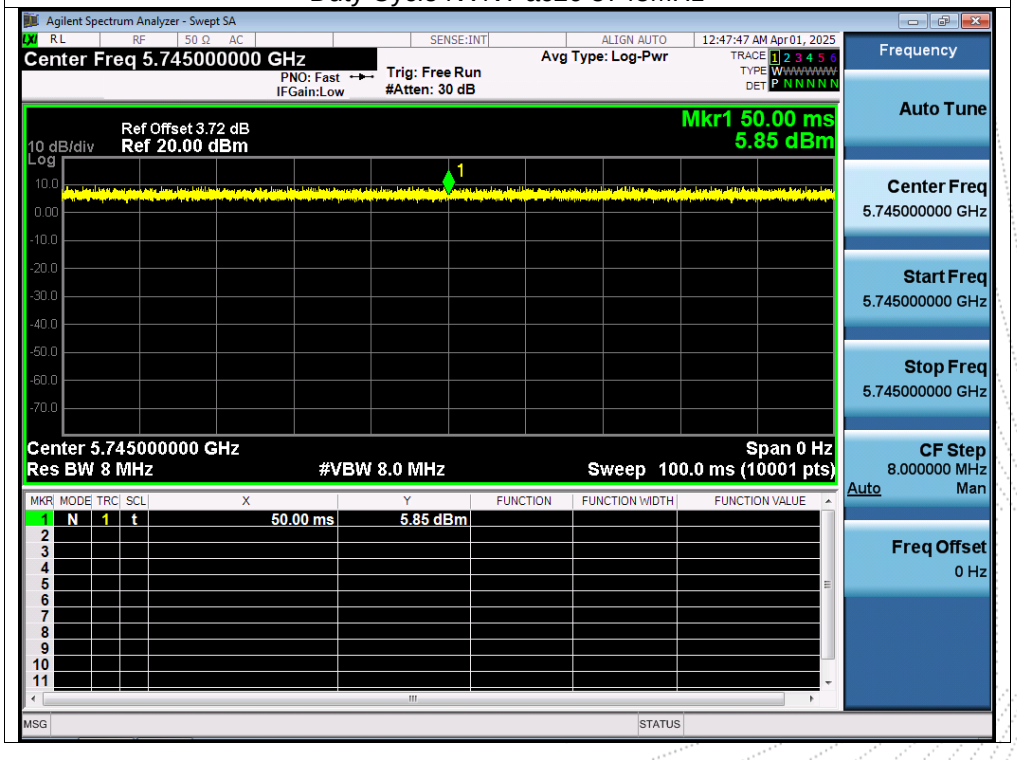
Duty Cycle NVNT n20 5745MHz



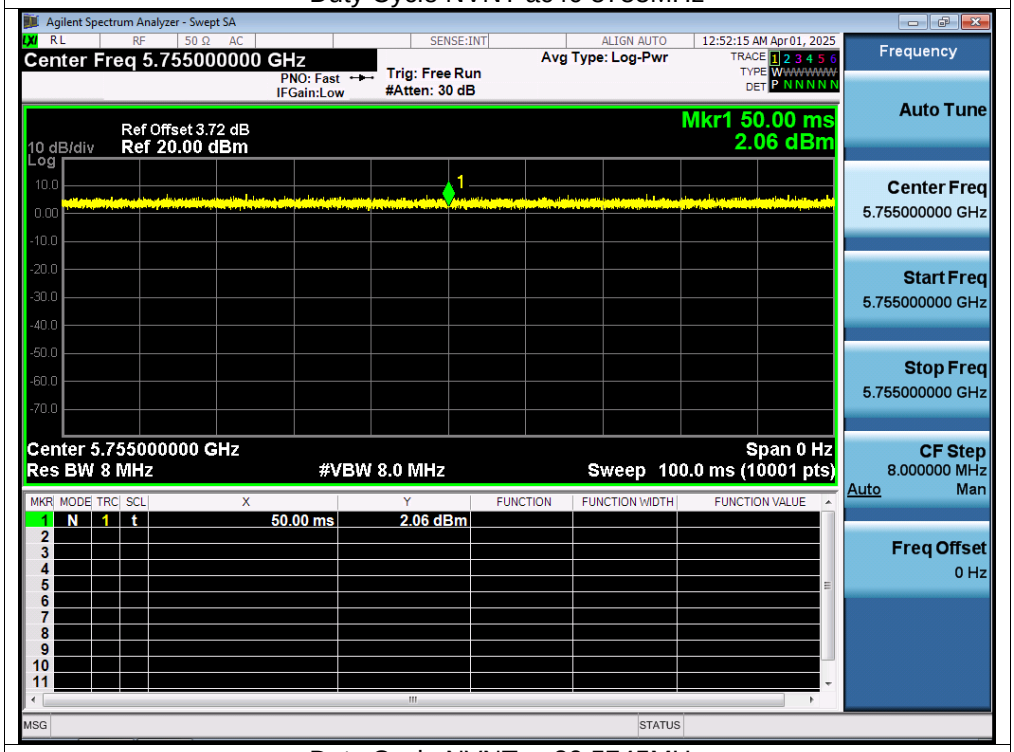
Duty Cycle NVNT n40 5755MHz



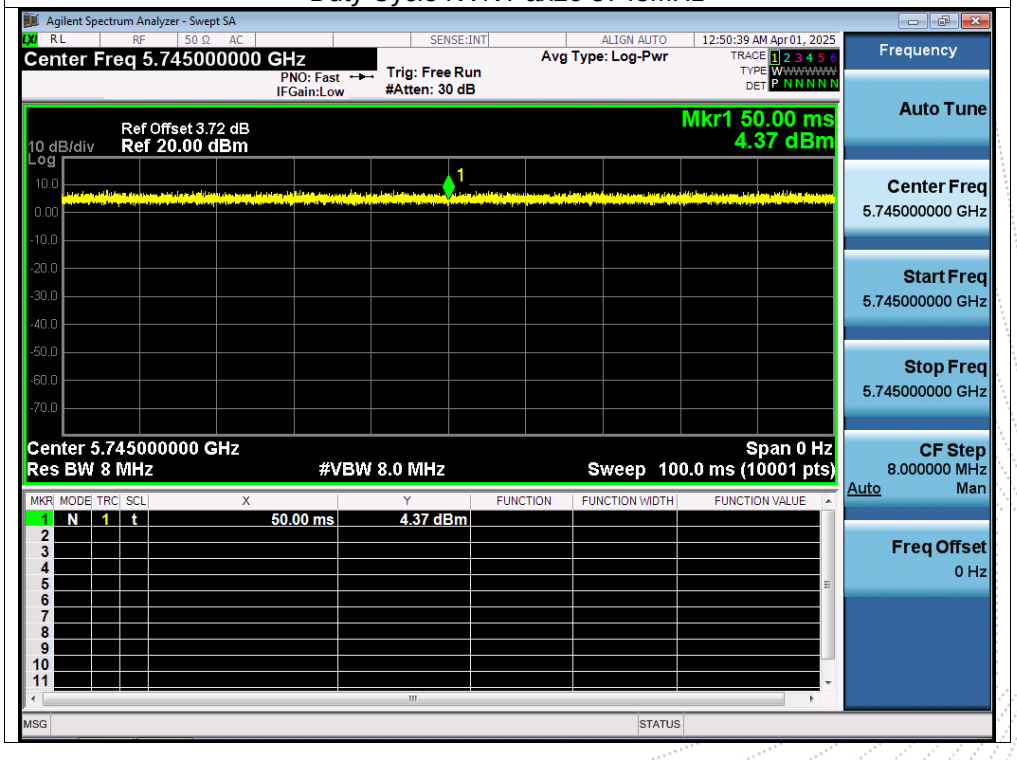
Duty Cycle NVNT ac20 5745MHz



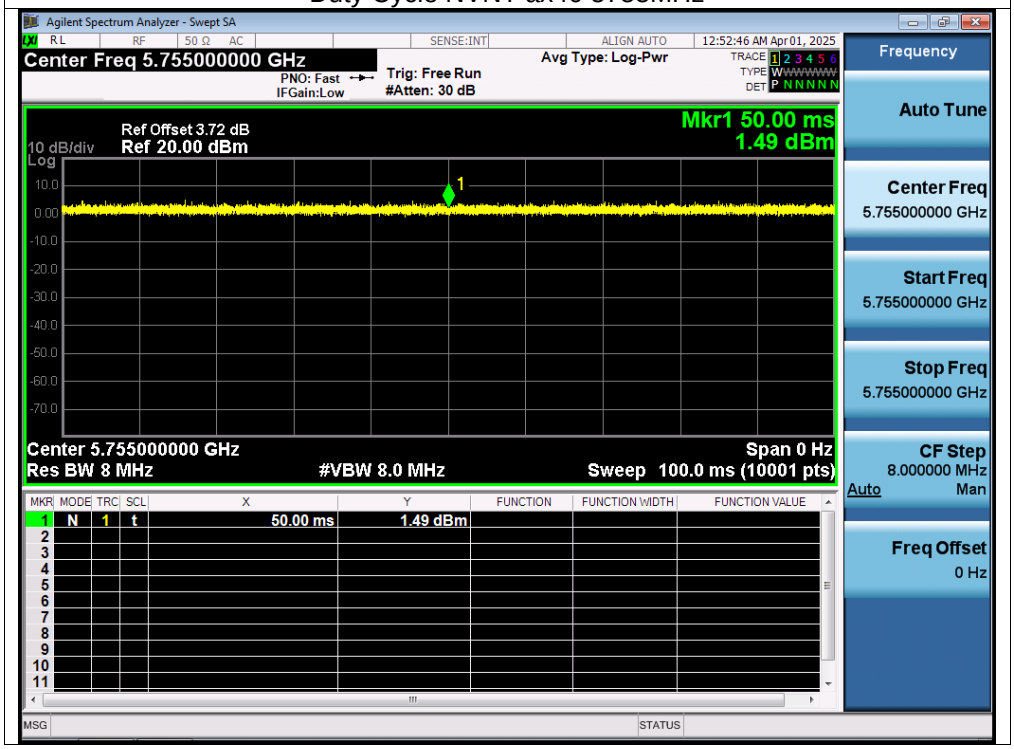
Duty Cycle NVNT ac40 5755MHz



Duty Cycle NVNT ax20 5745MHz



Duty Cycle NVNT ax40 5755MHz



15. Antenna Requirement

15.1 Limit

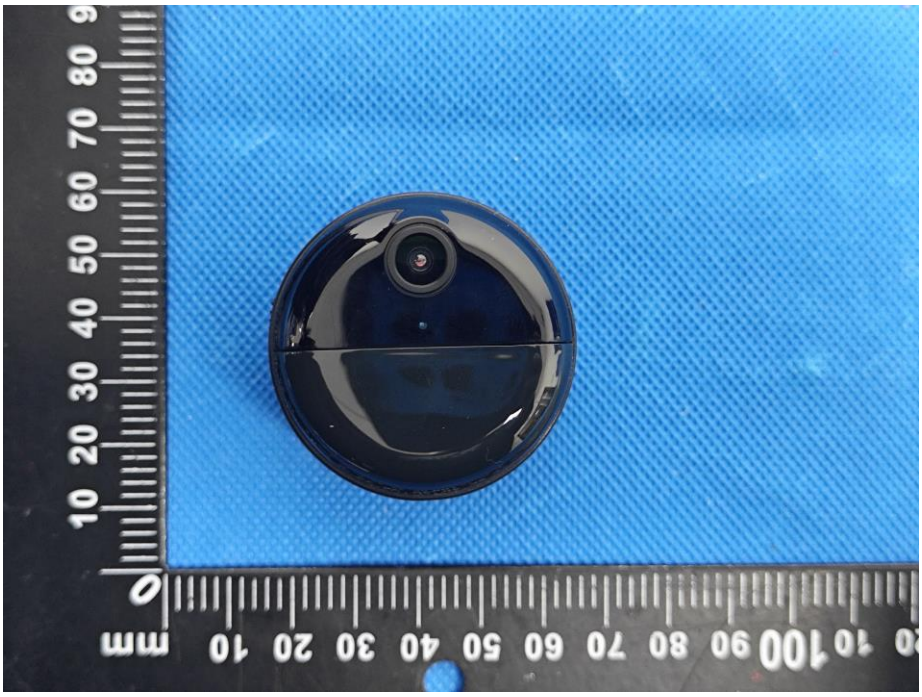
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

15.2 Test Result

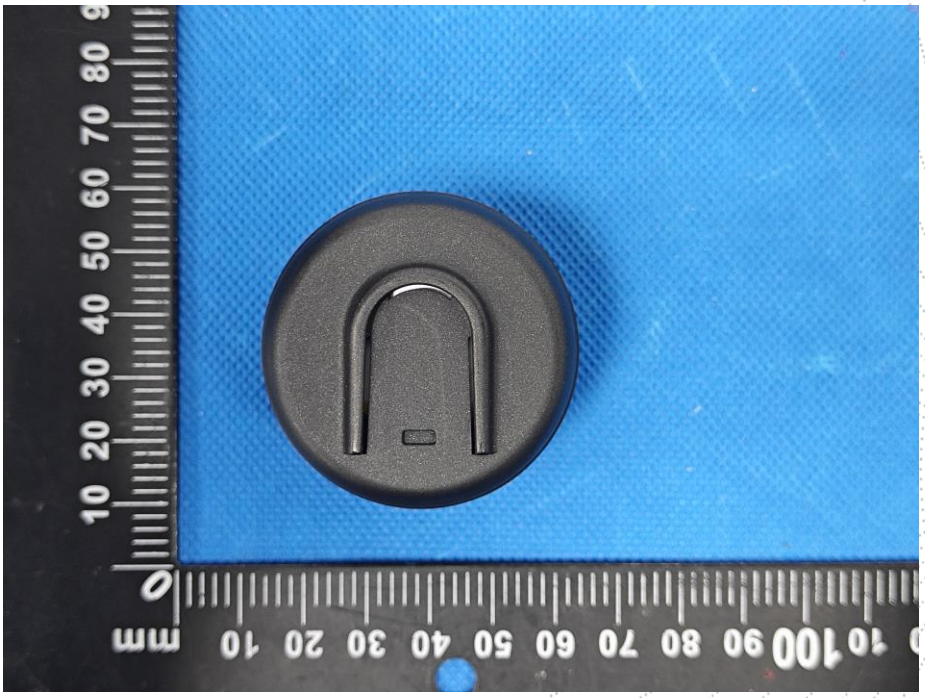
The EUT antenna is FPC antenna. It comply with the standard requirement.

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.

Address:
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TEL: 400-788-9558

P.C.: 518103

FAX: 0755-33229357

Website: http://www.chnbctc.com

Consultation E-mail: bctc@bctc-lab.com.cn

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

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