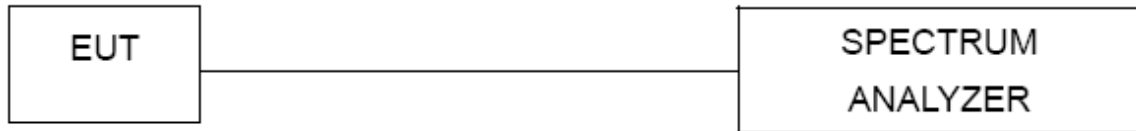


11. Out Of Band Emissions

11.1 Block Diagram Of Test Setup



11.2 Limit

According to FCC §15.407(b)

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

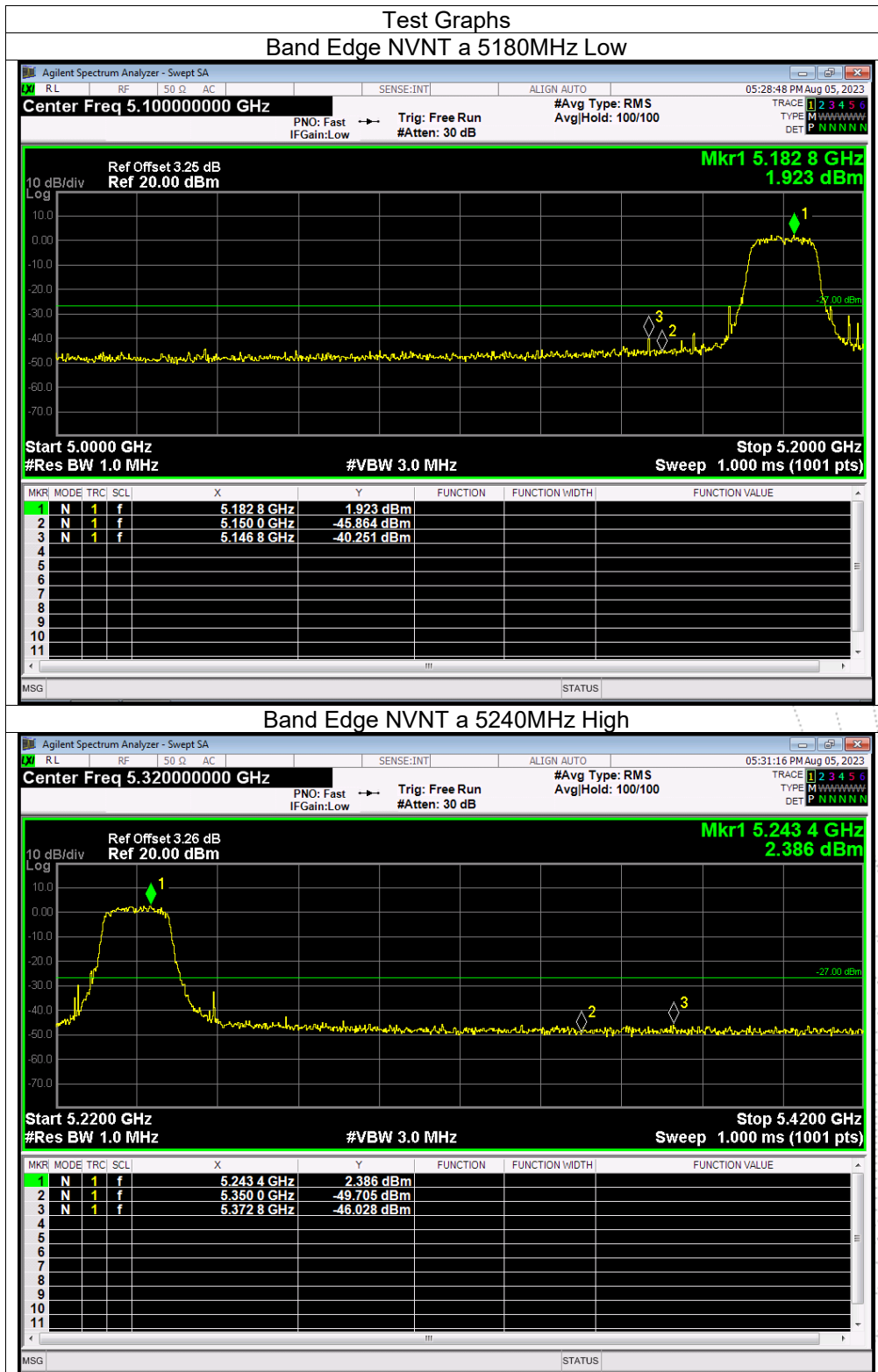
11.3 Test Procedure

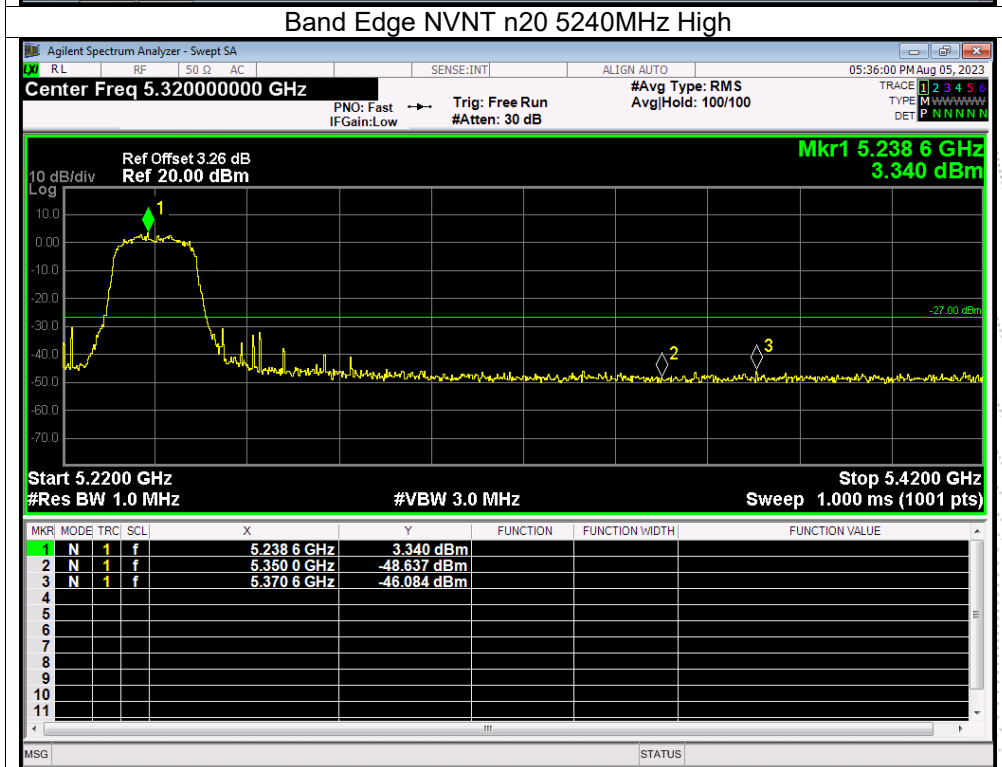
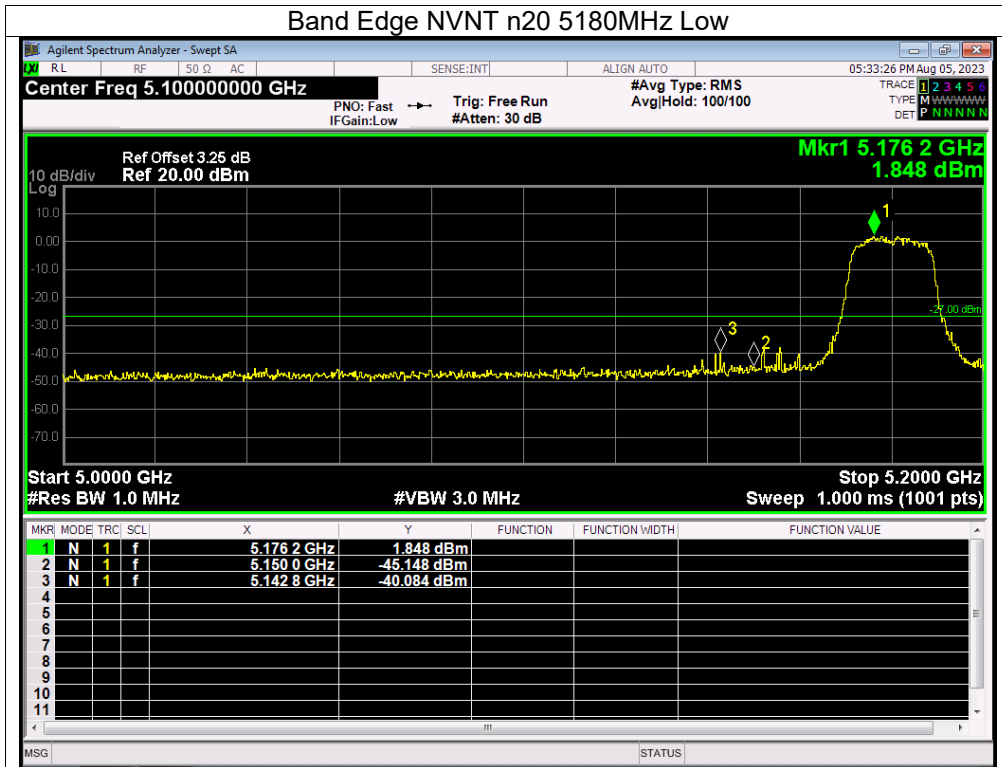
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

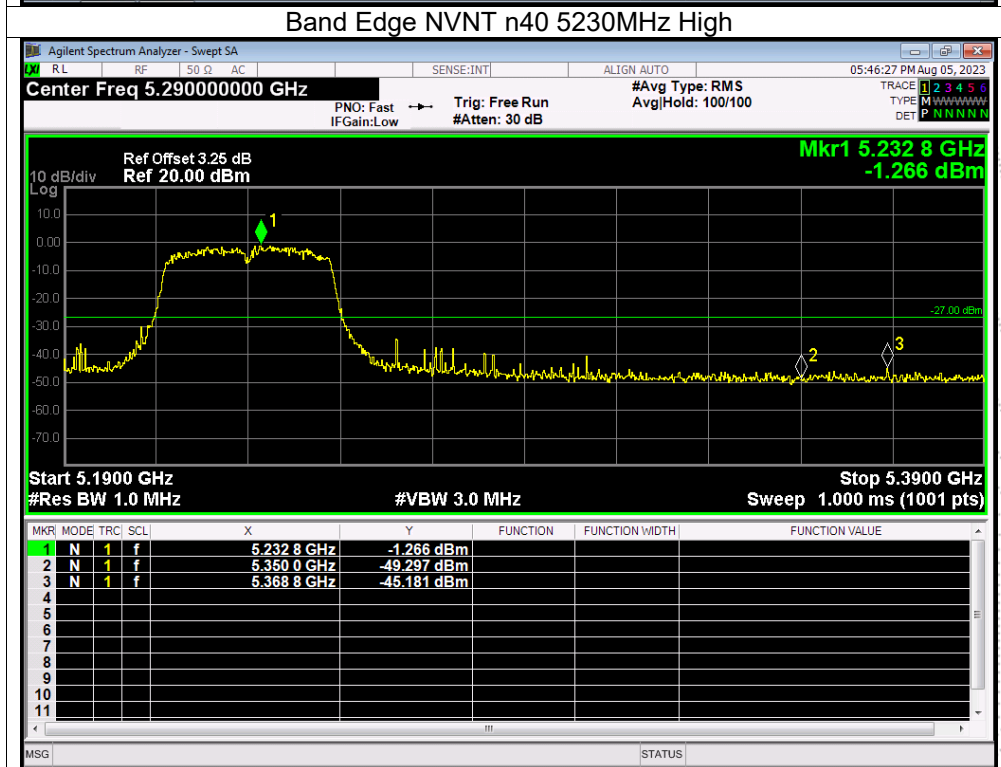
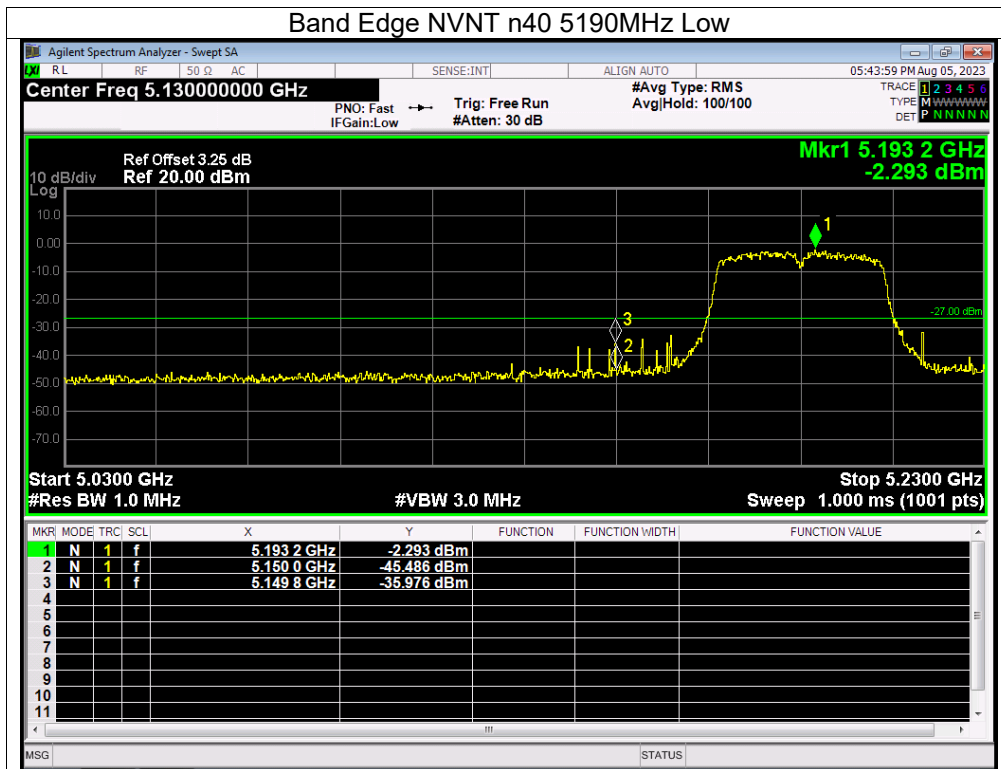
11.4 EUT Operating Conditions

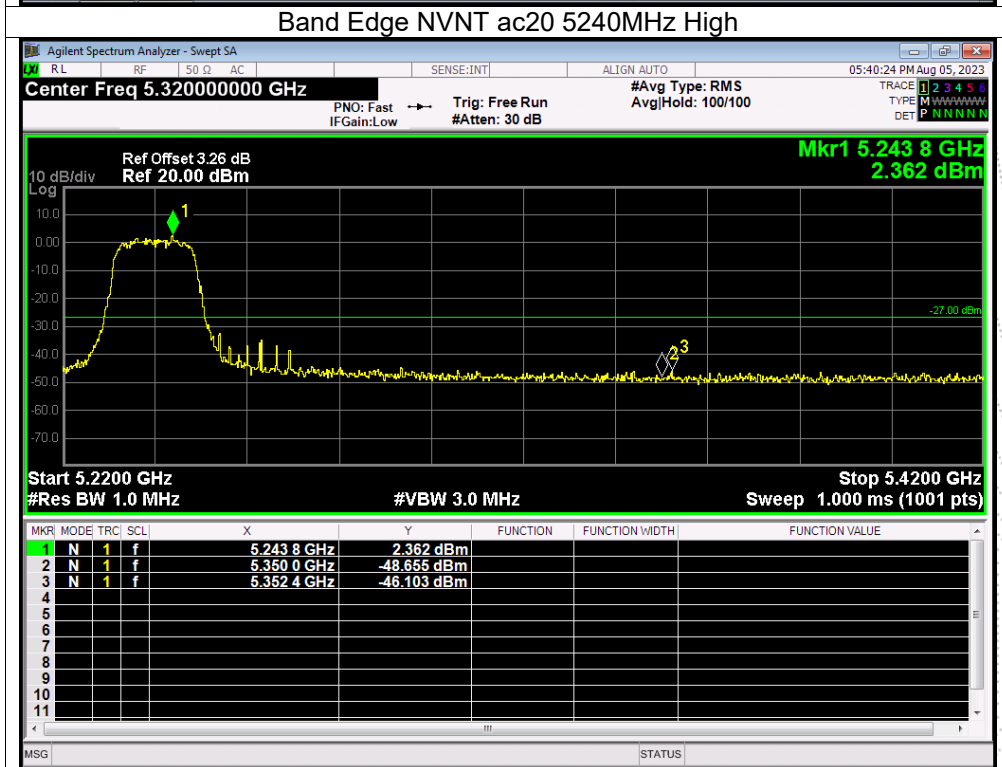
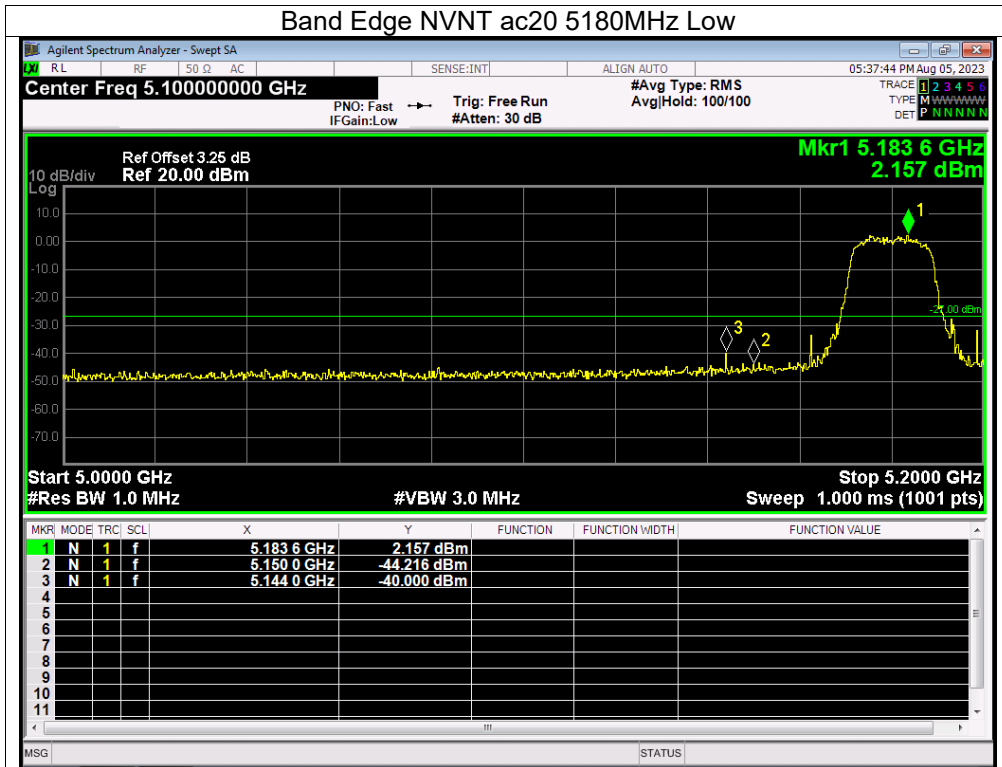
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data

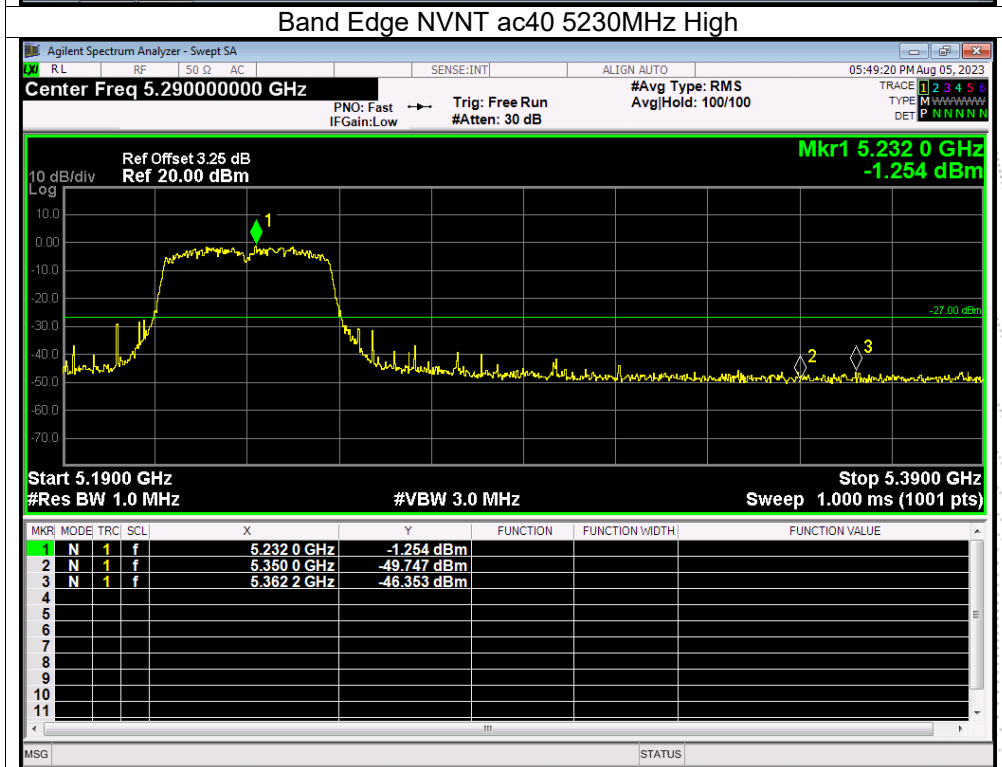
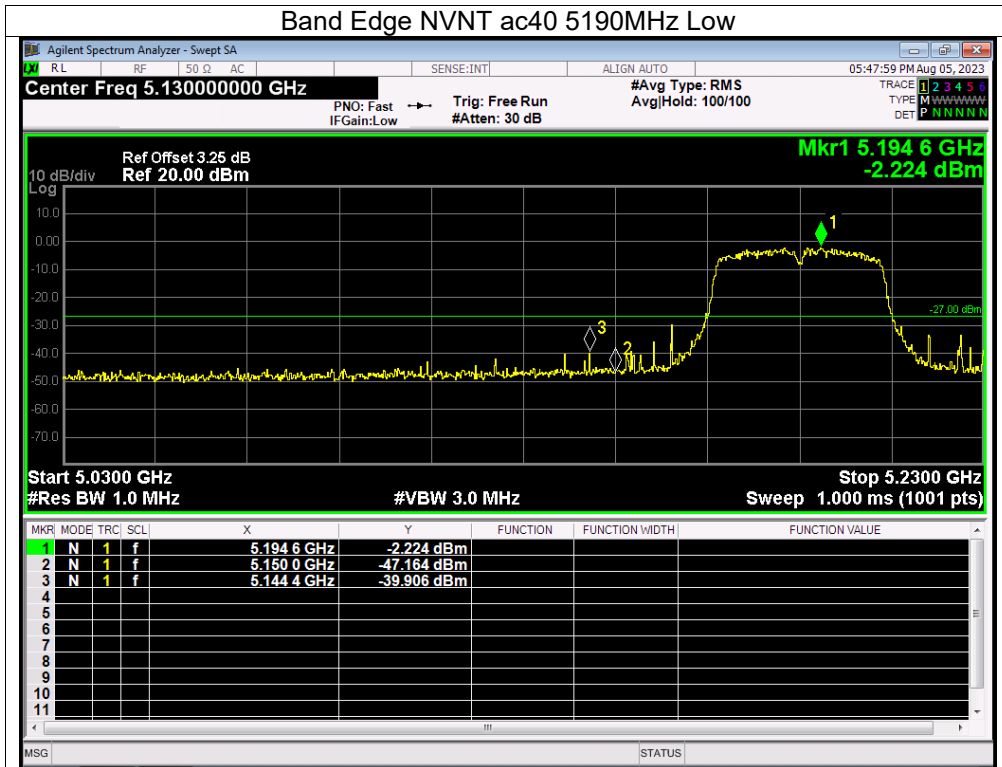
11.5 Test Result

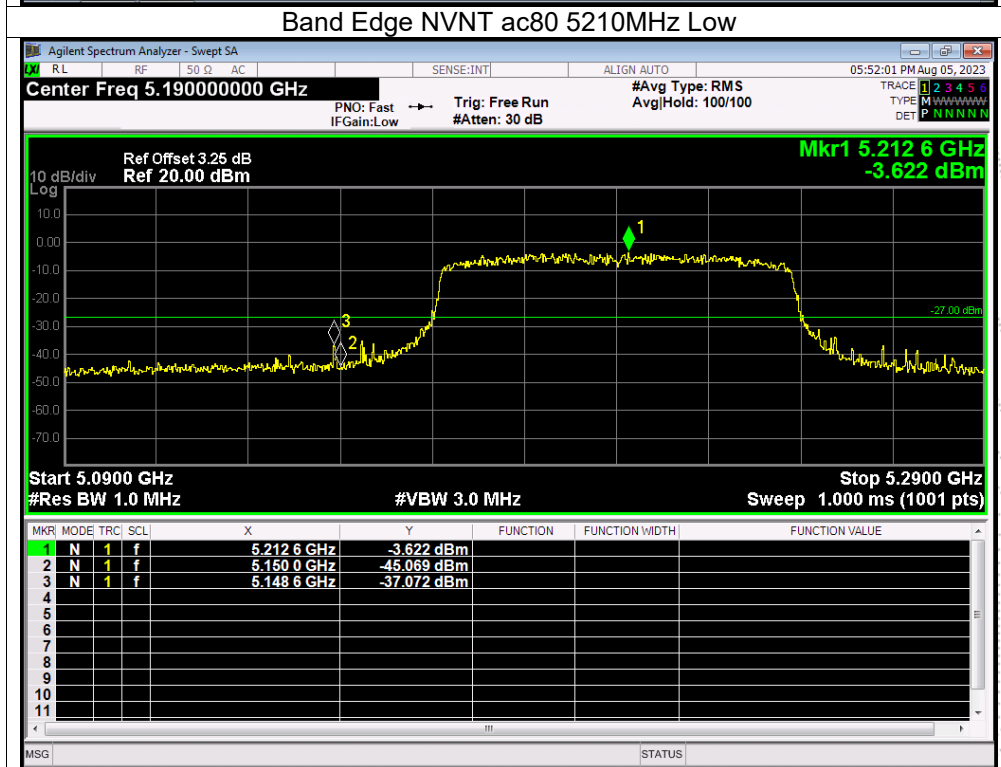
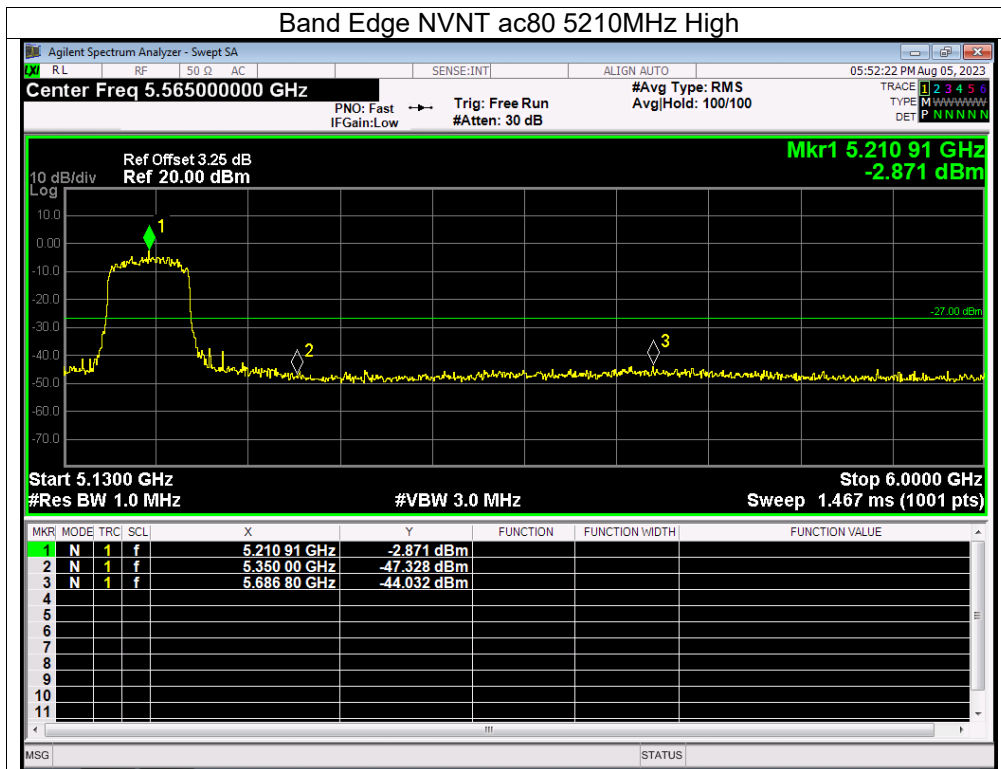


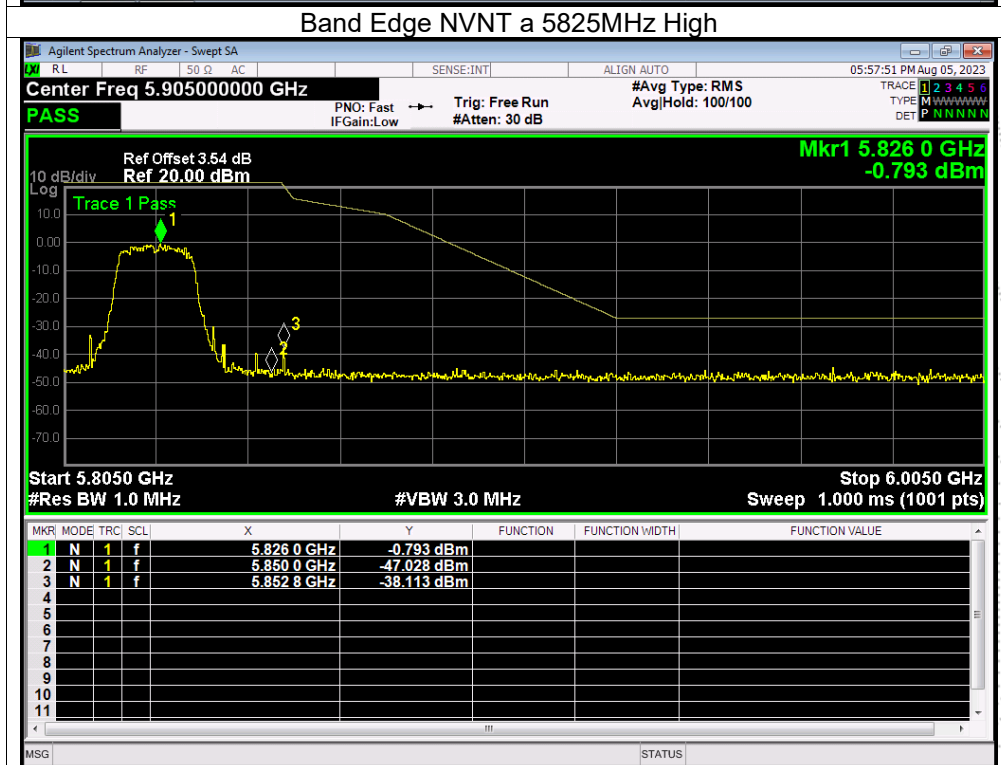
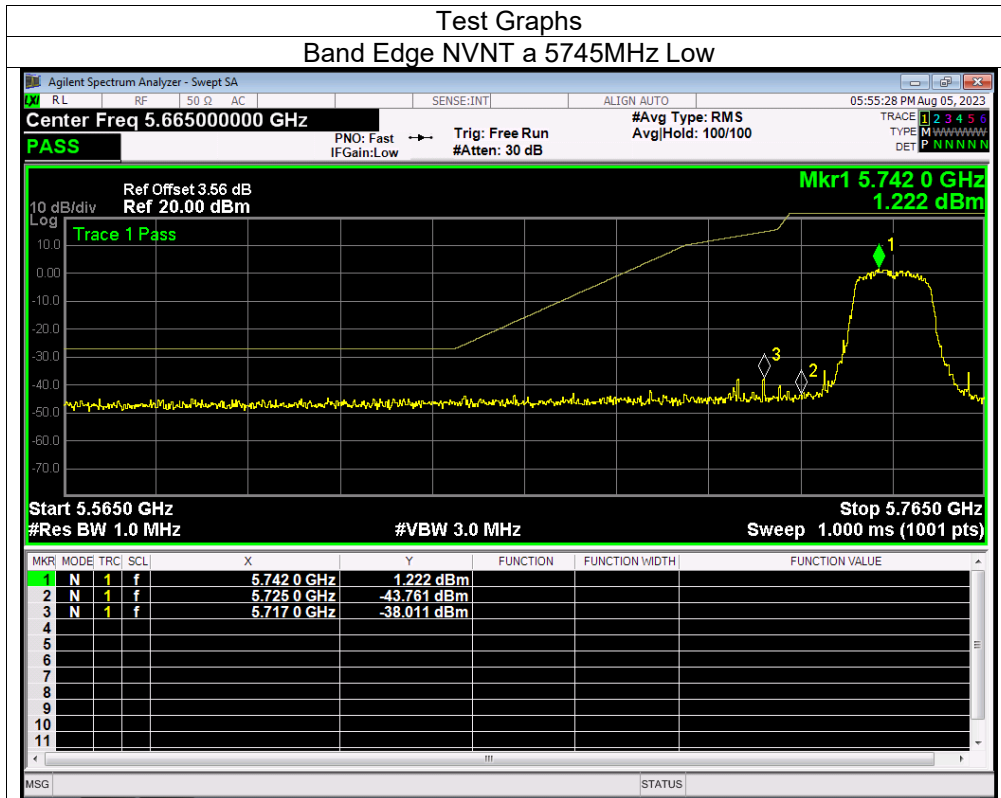


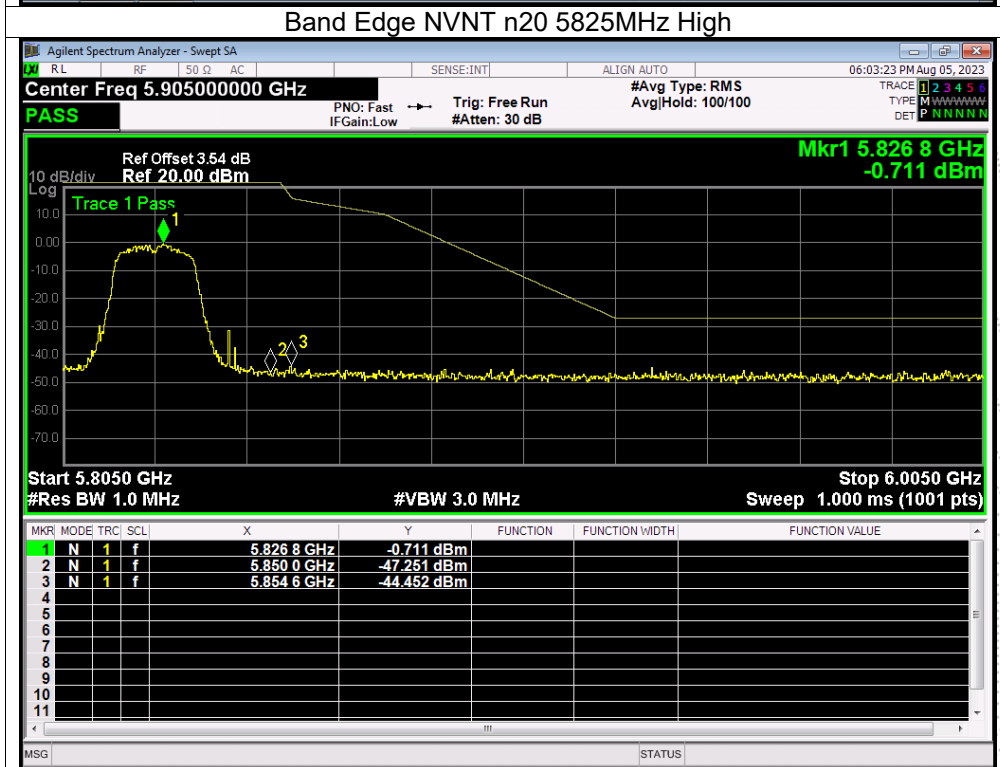
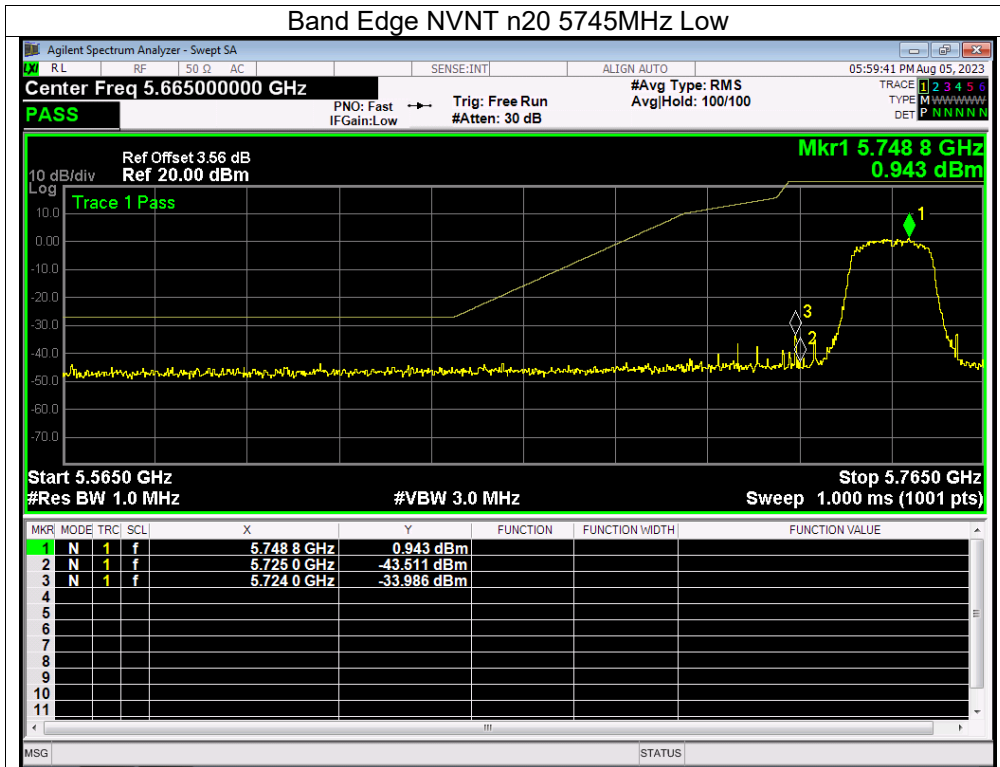


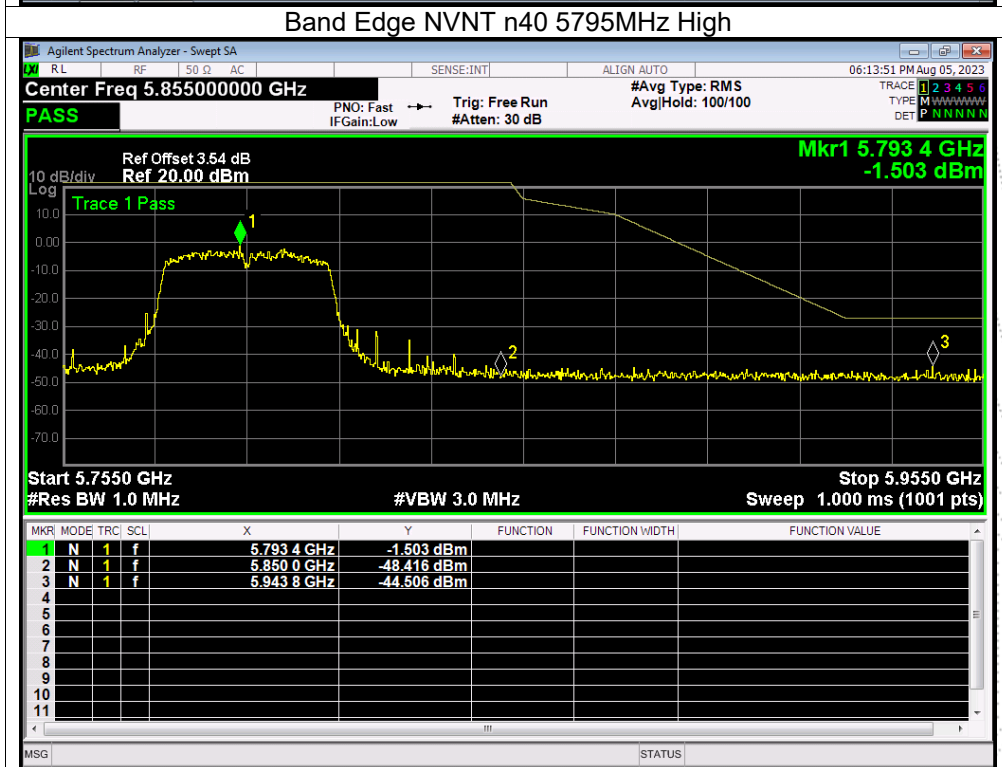
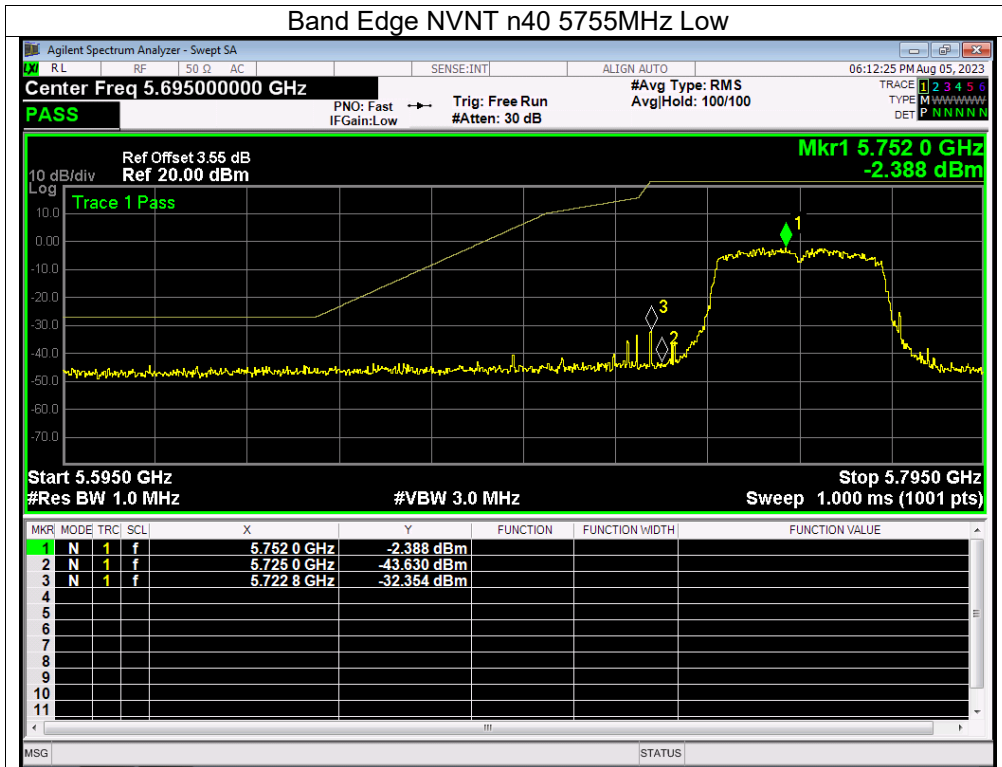


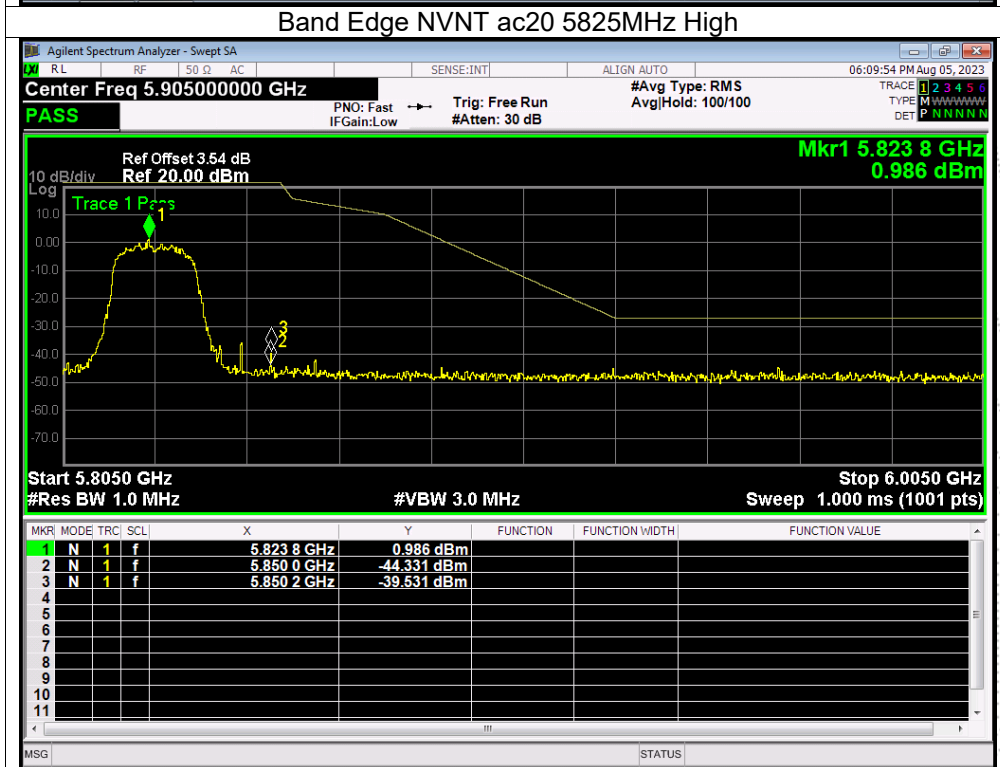
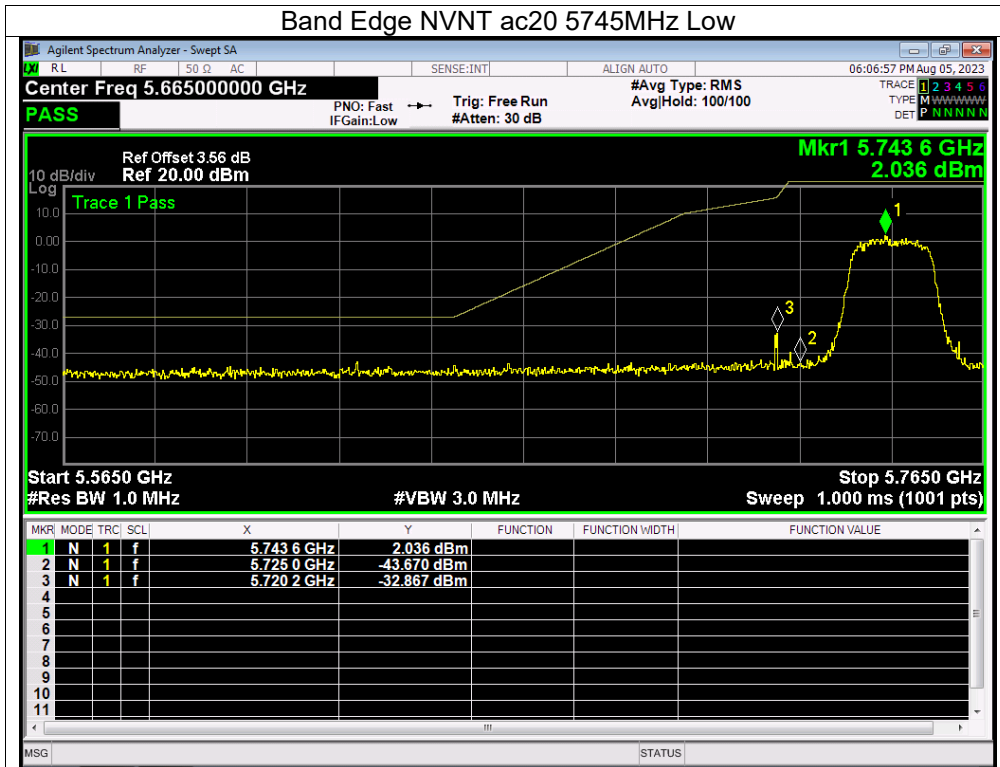


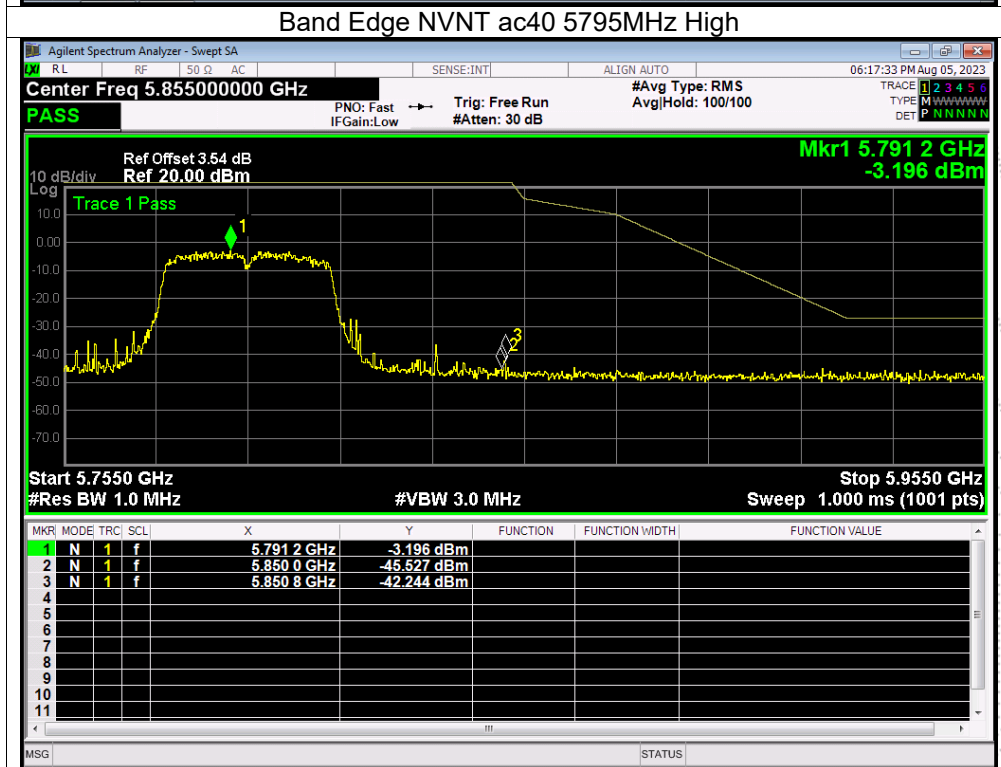
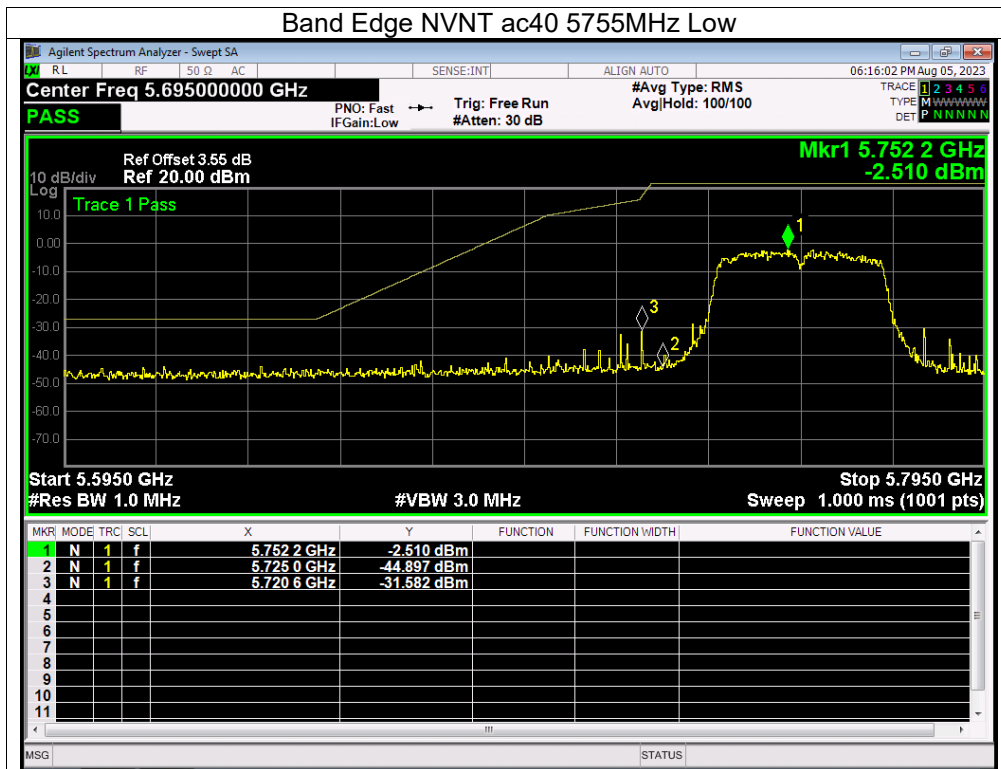


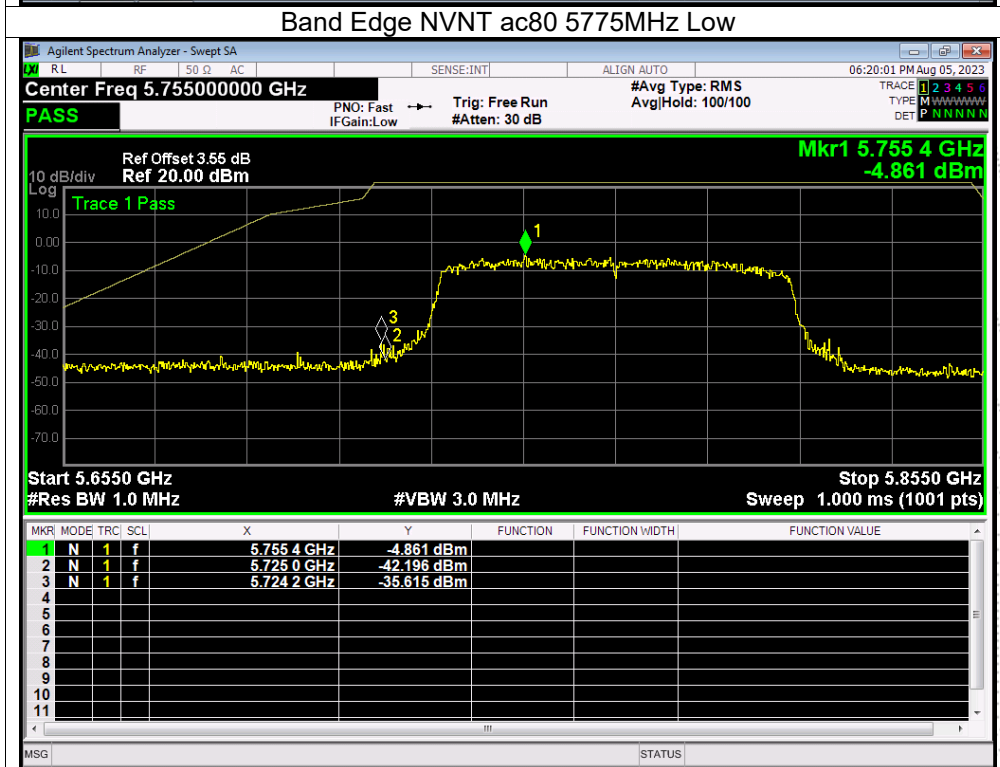
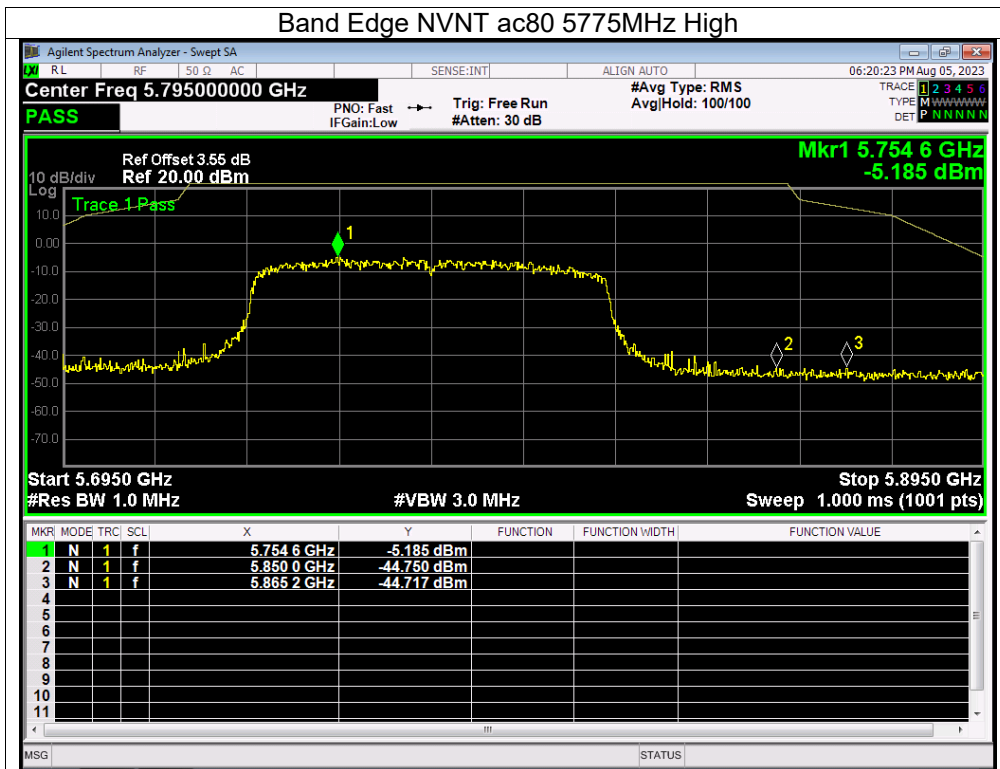












12. Spurious RF Conducted Emissions

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..

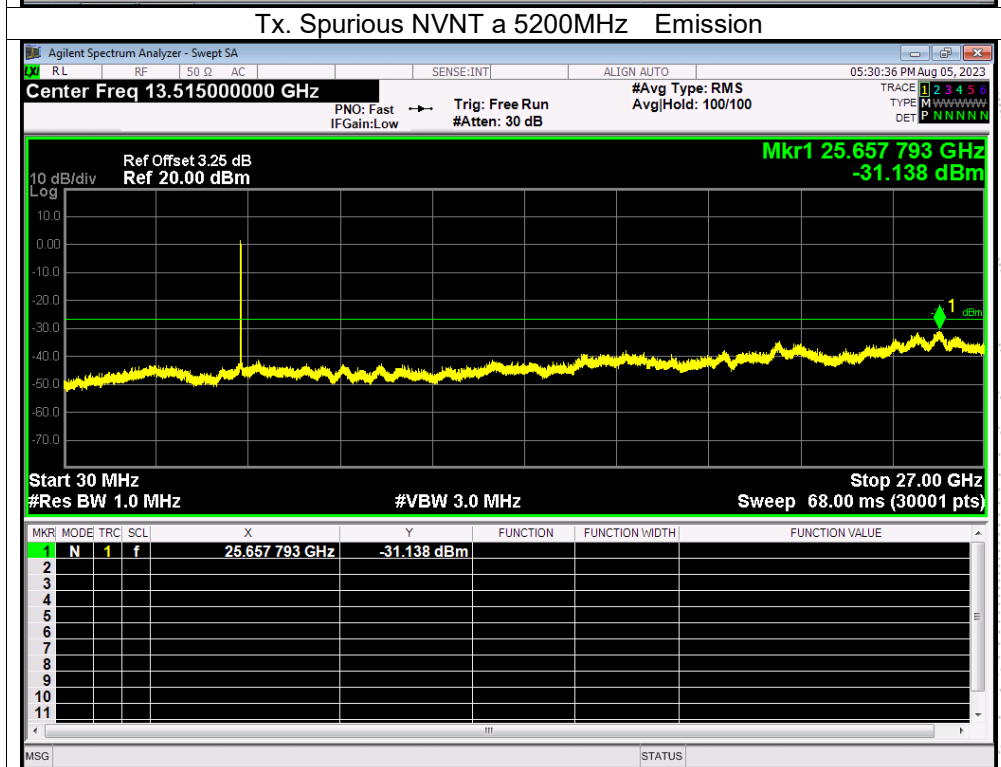
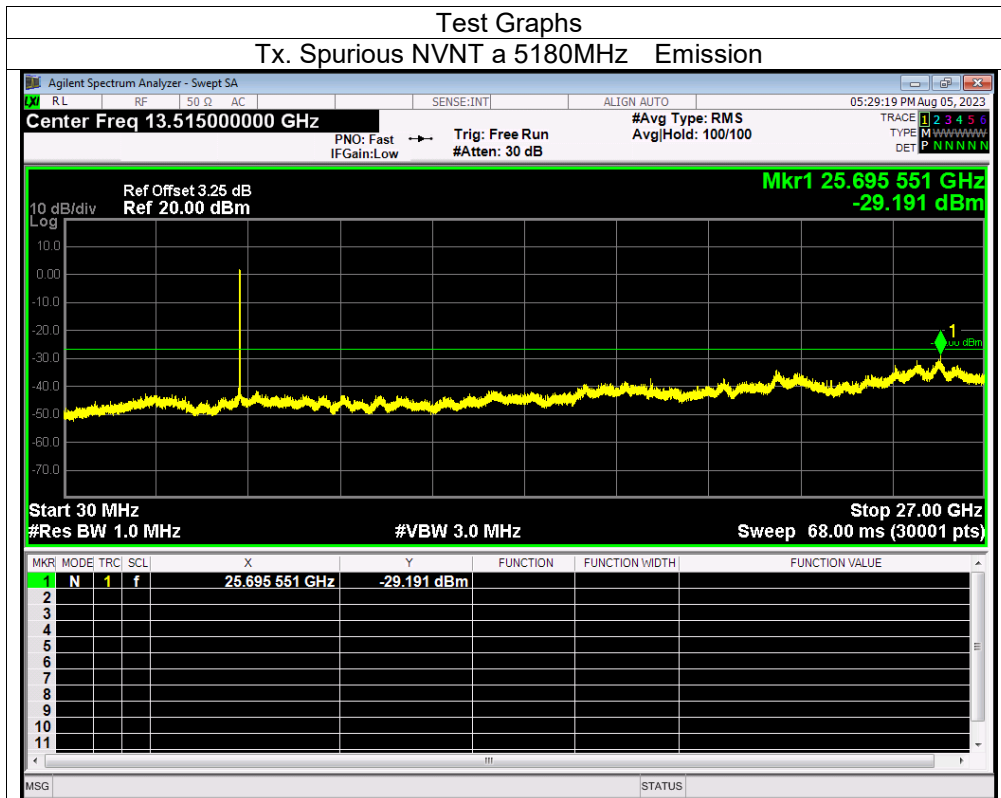
12.3 Test Procedure

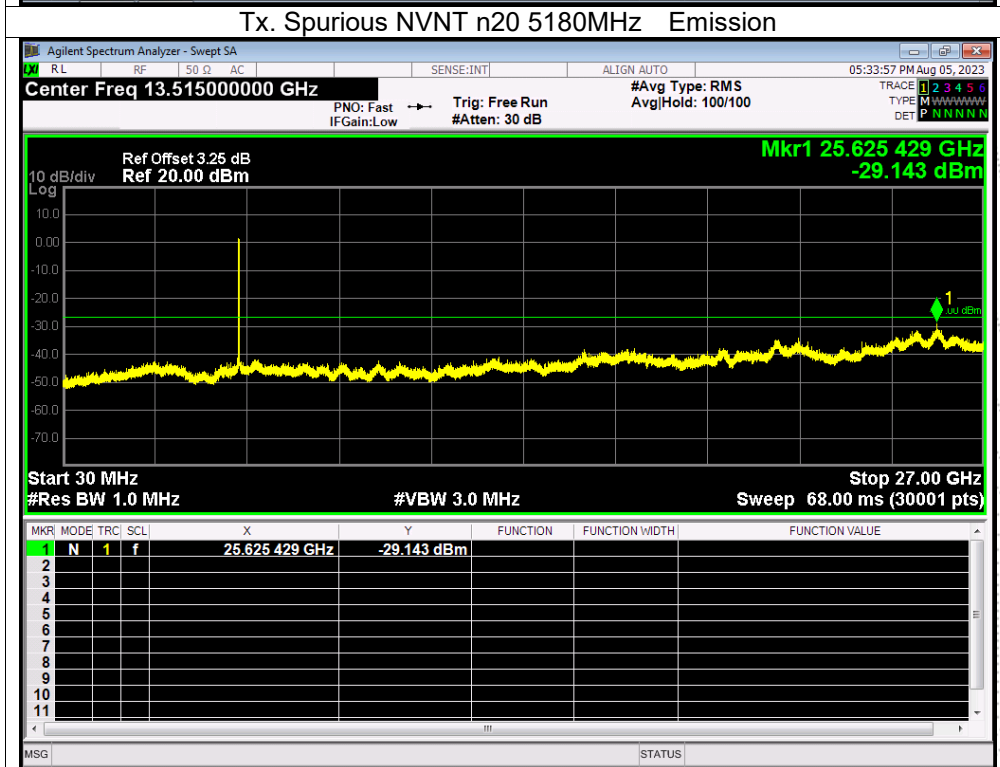
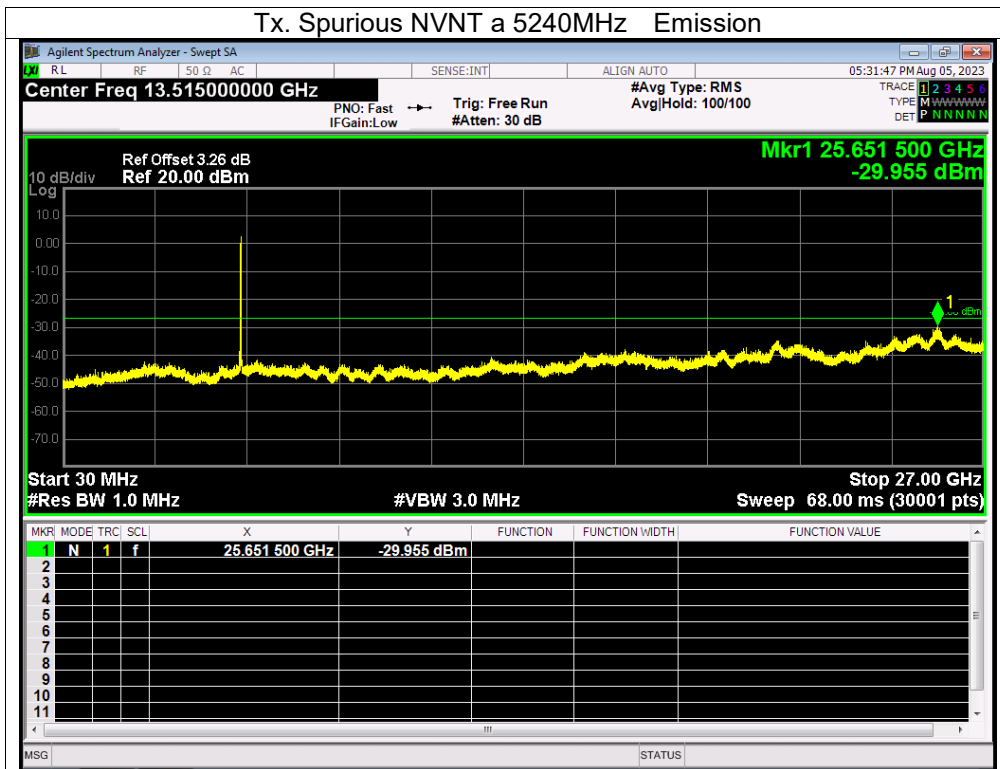
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then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

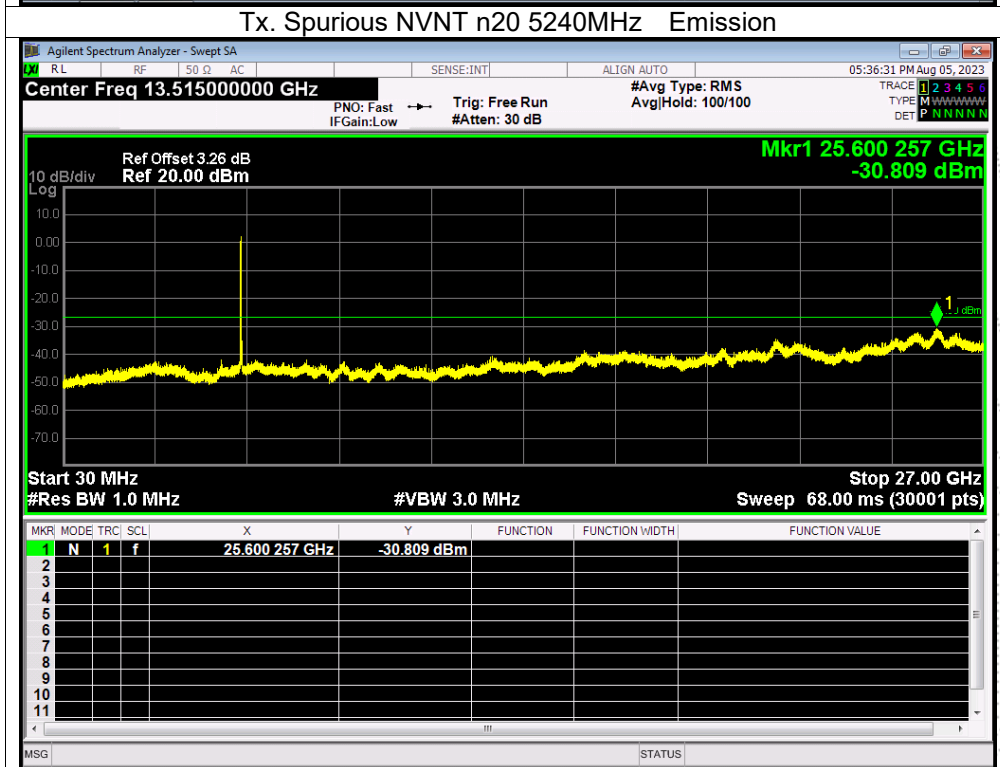
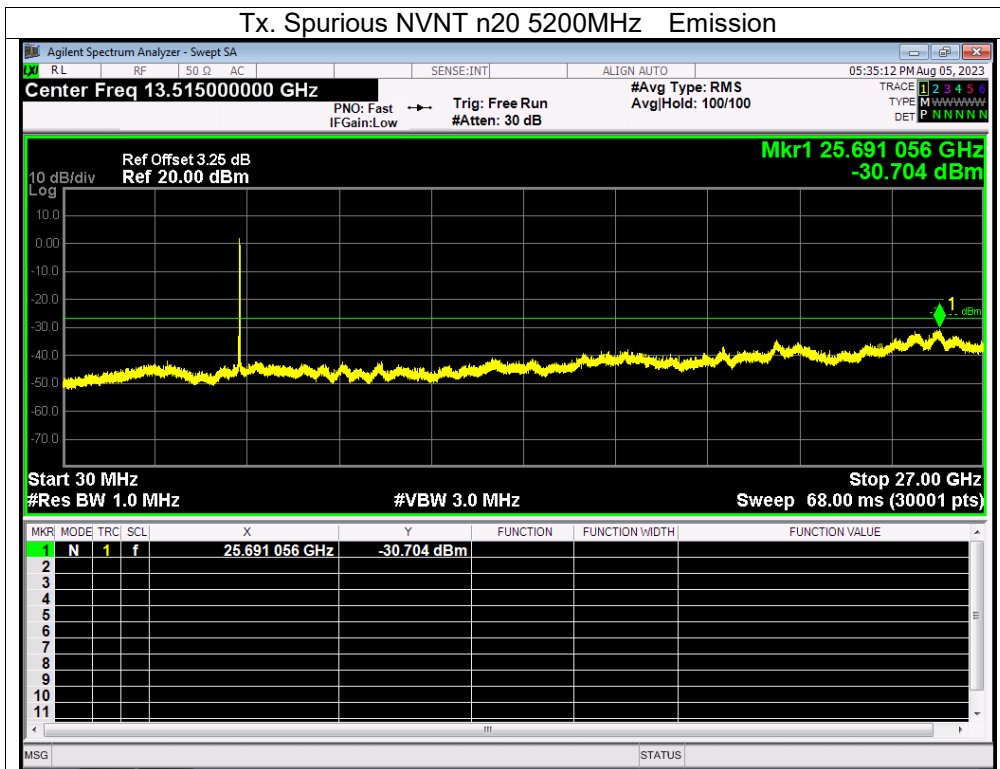
12.4 Test Result

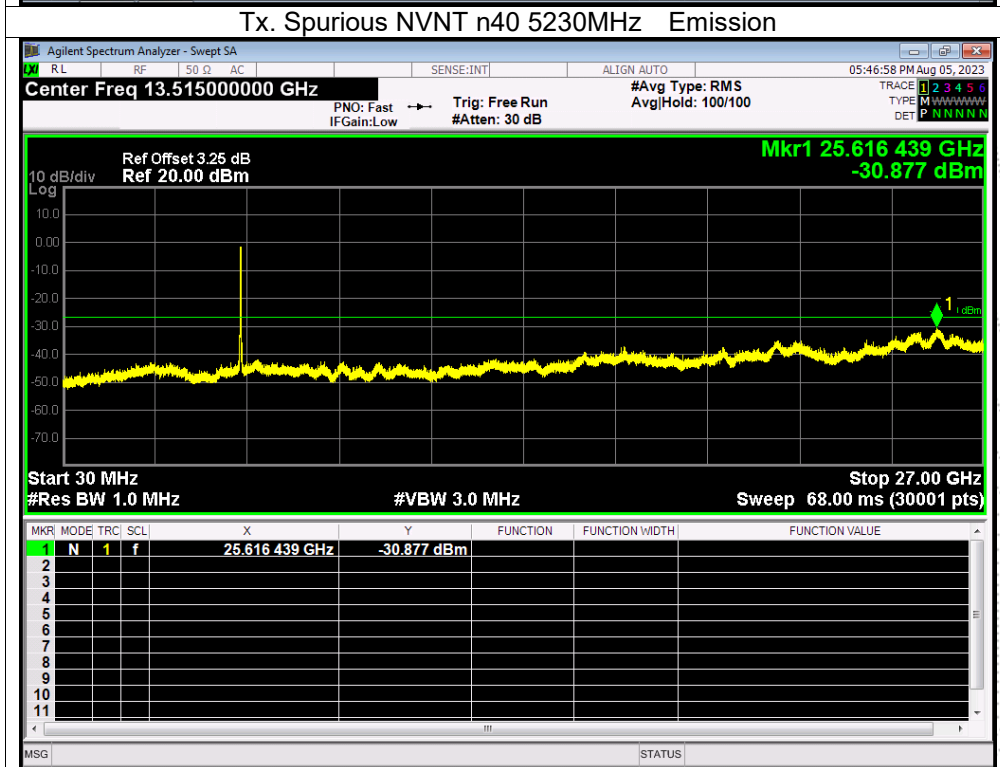
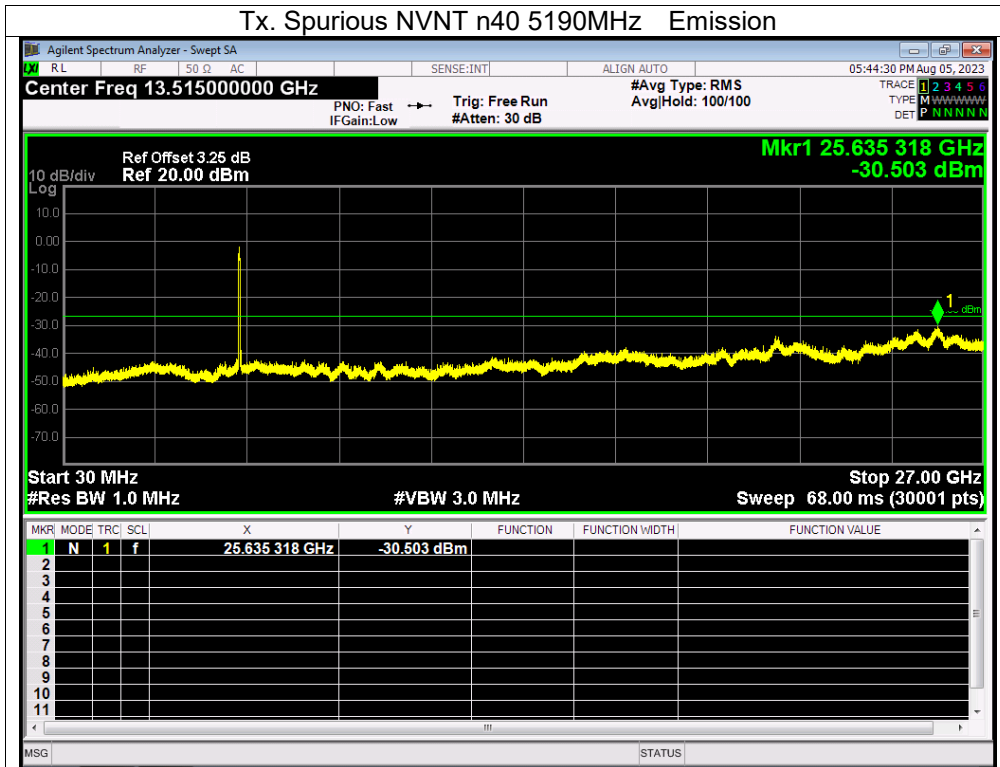
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.

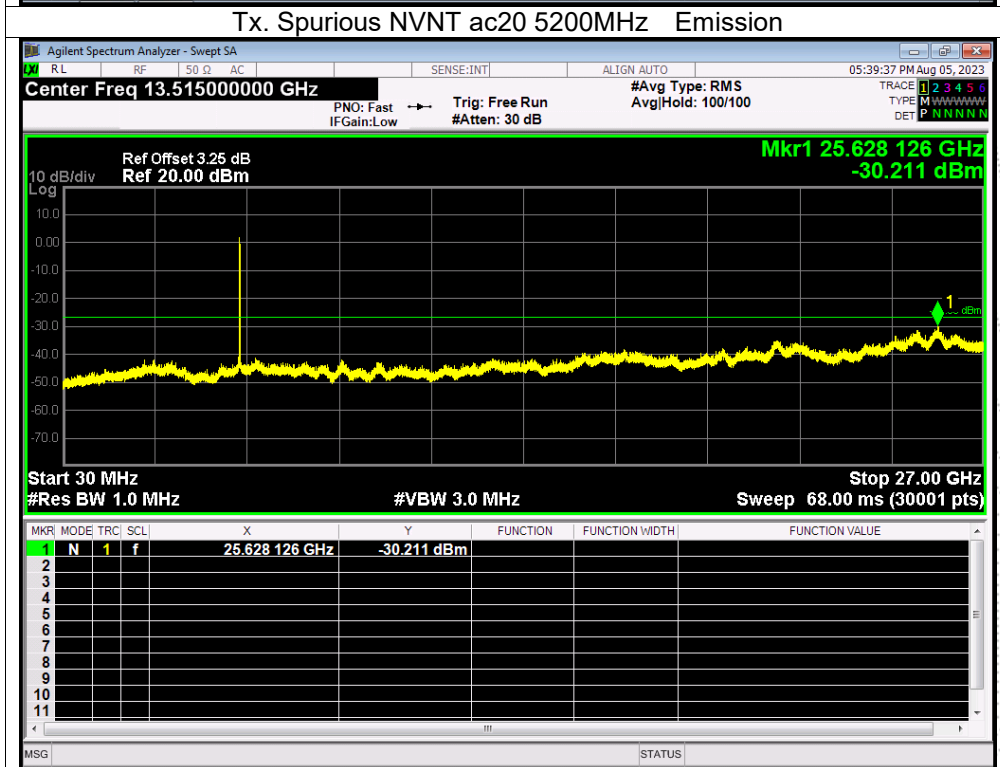
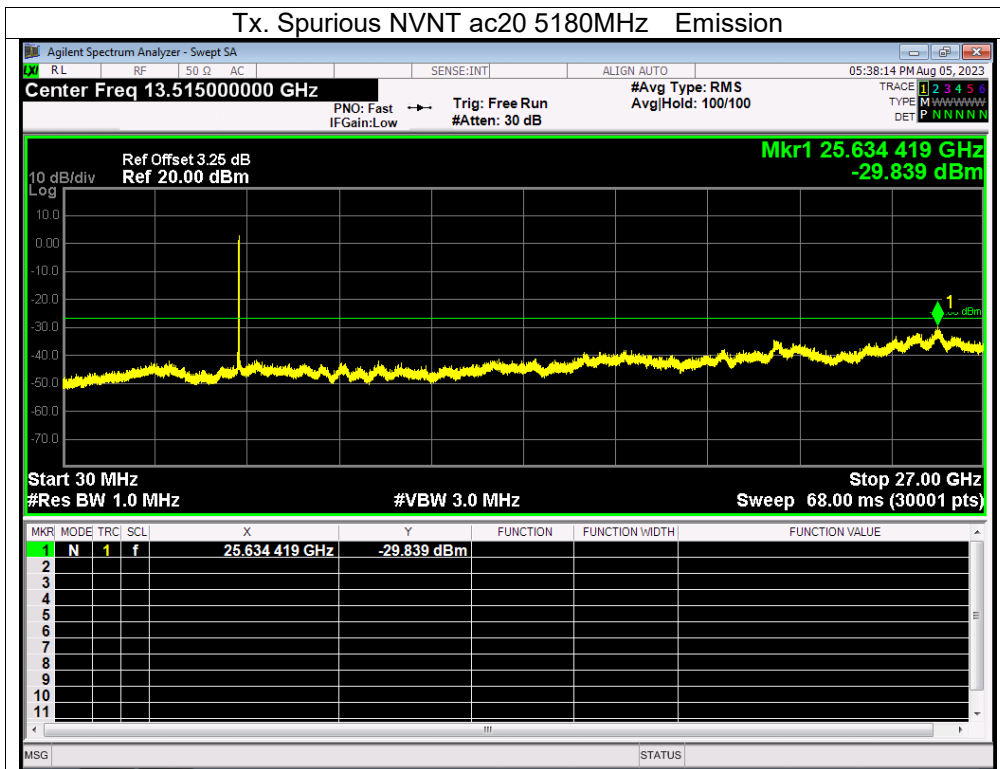
About: 26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

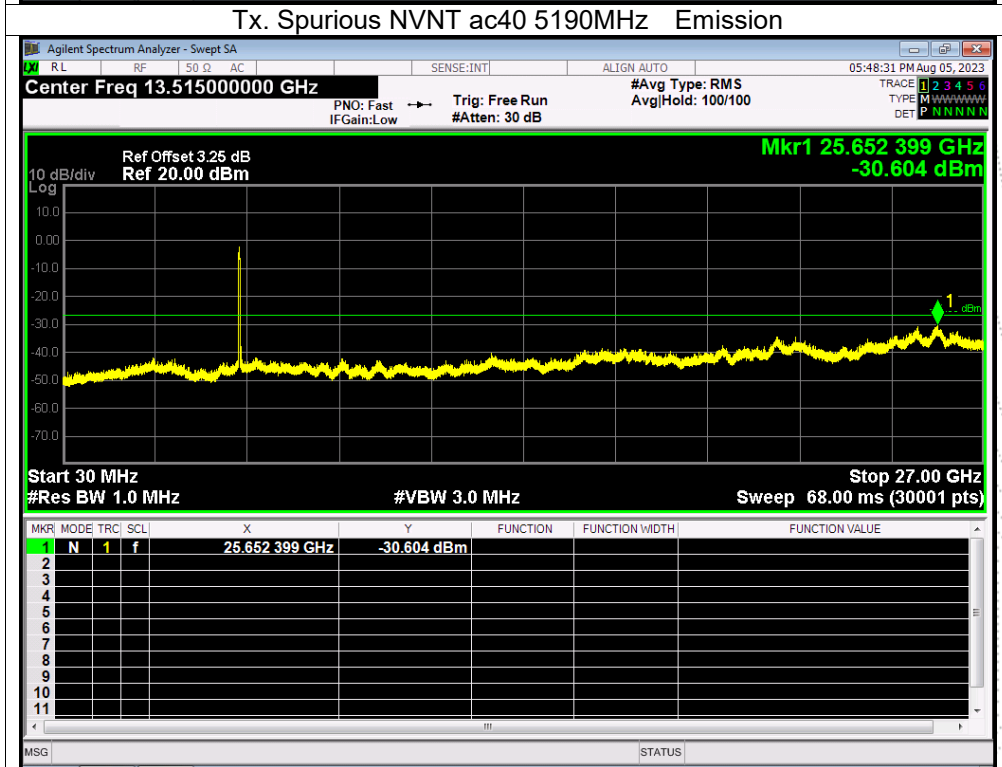
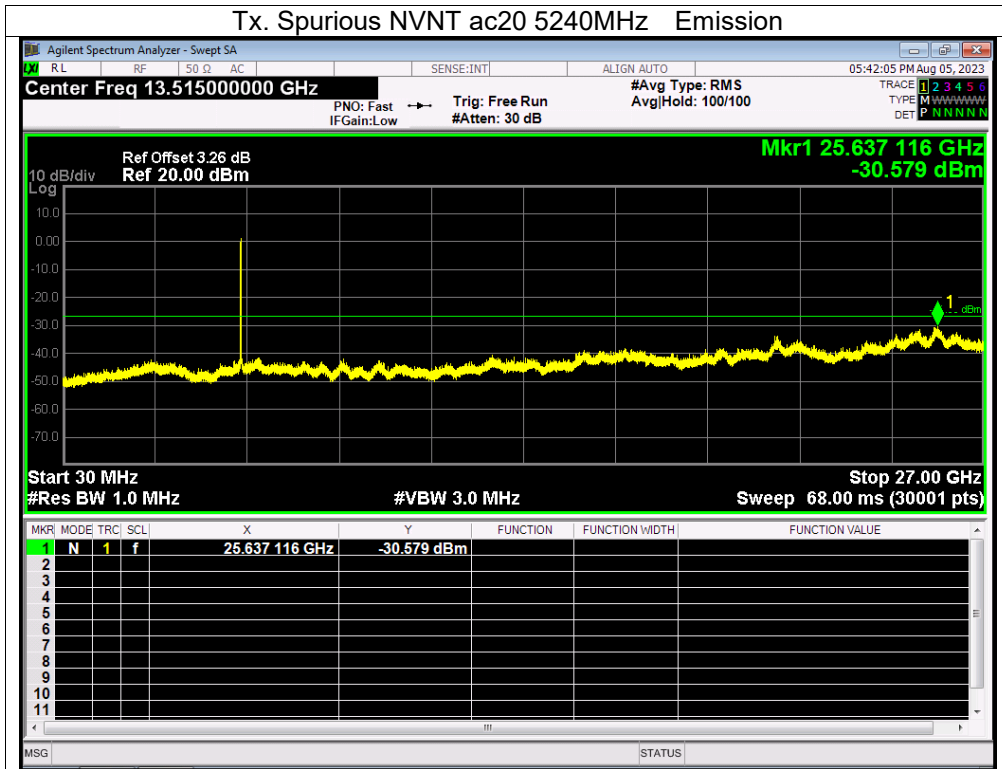


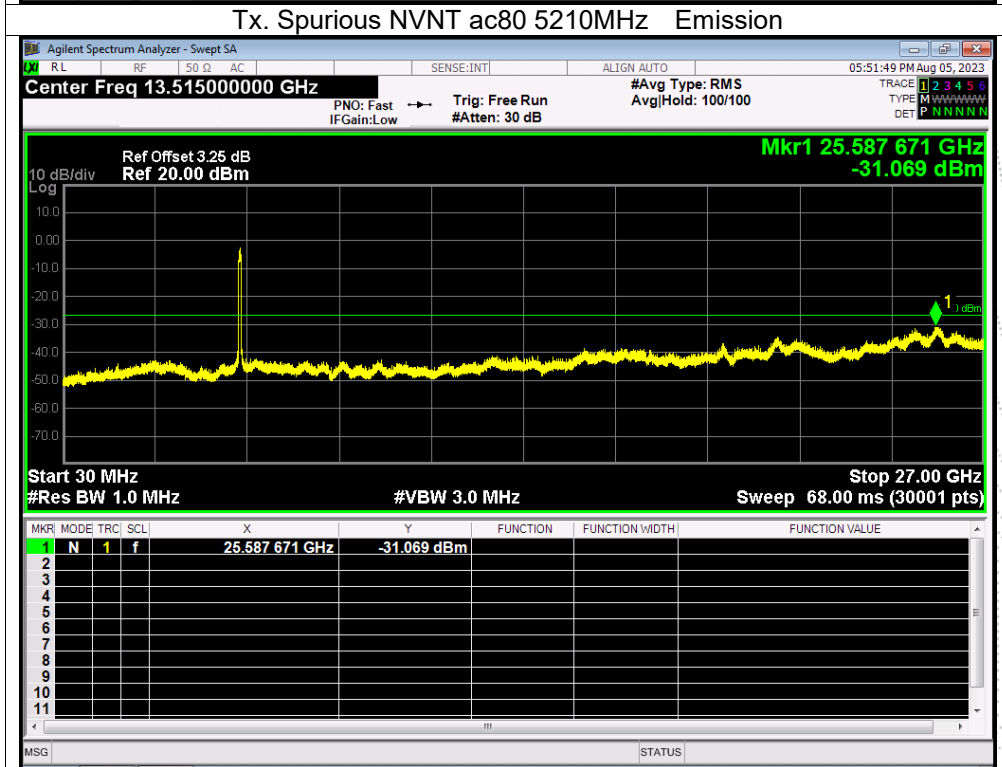
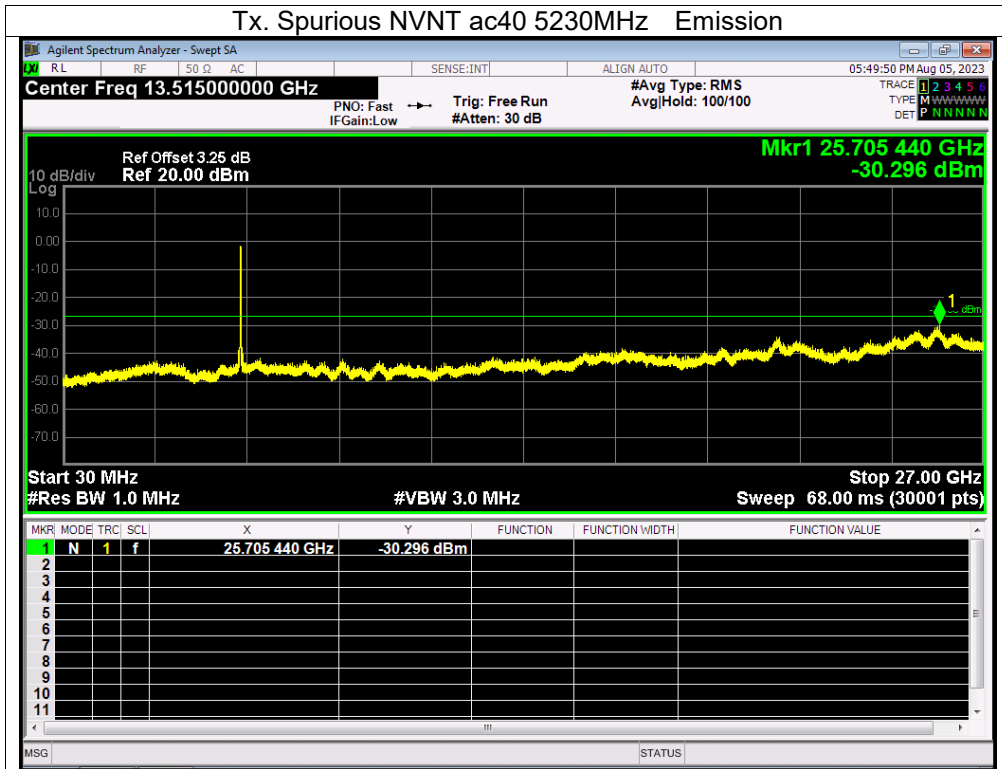


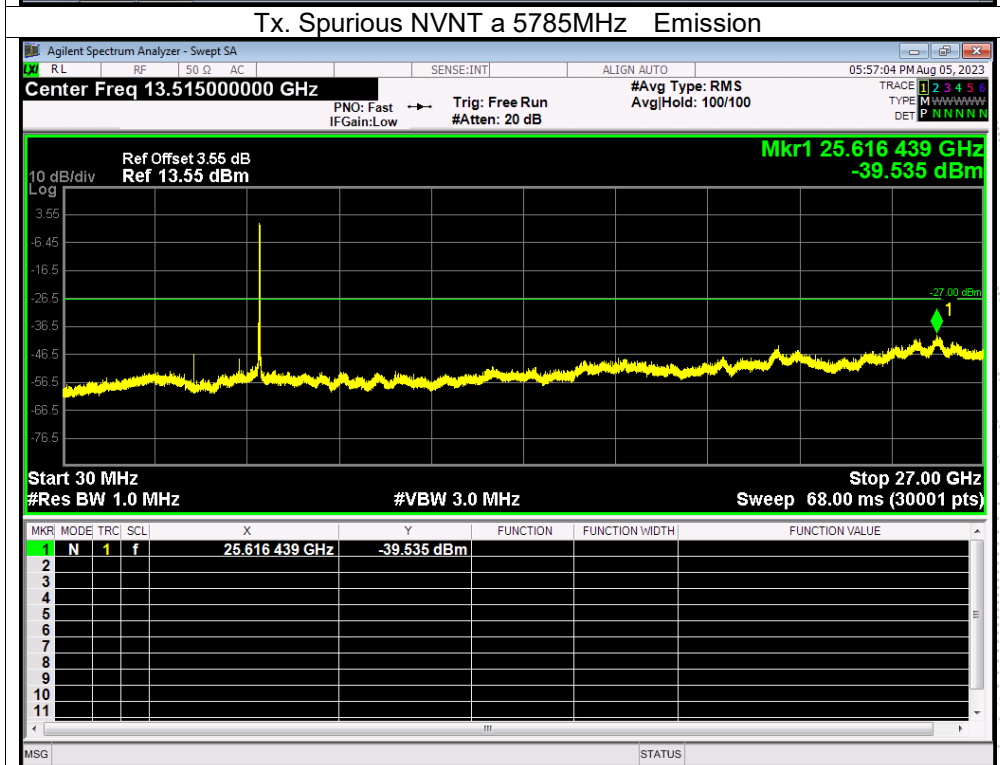
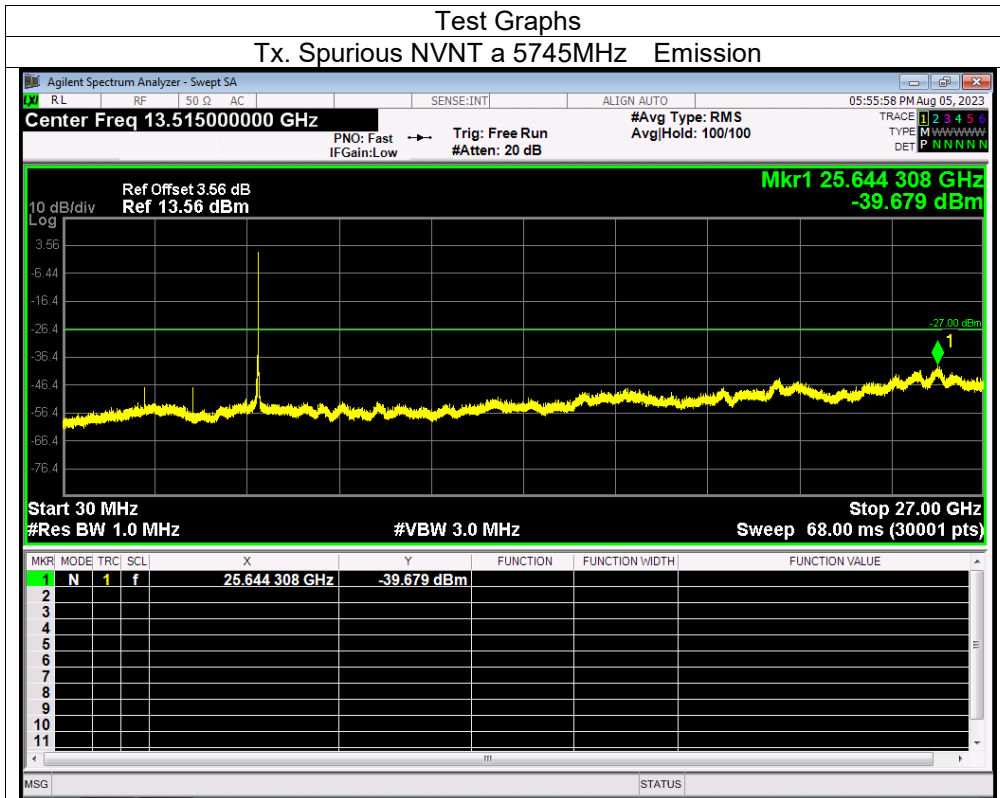


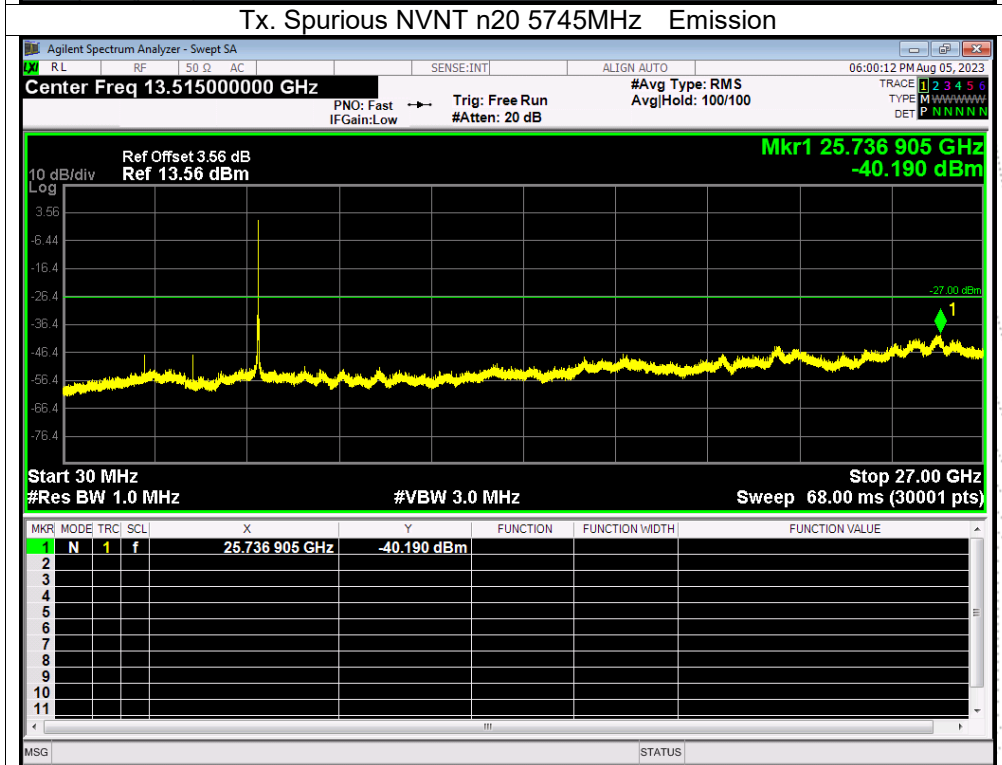
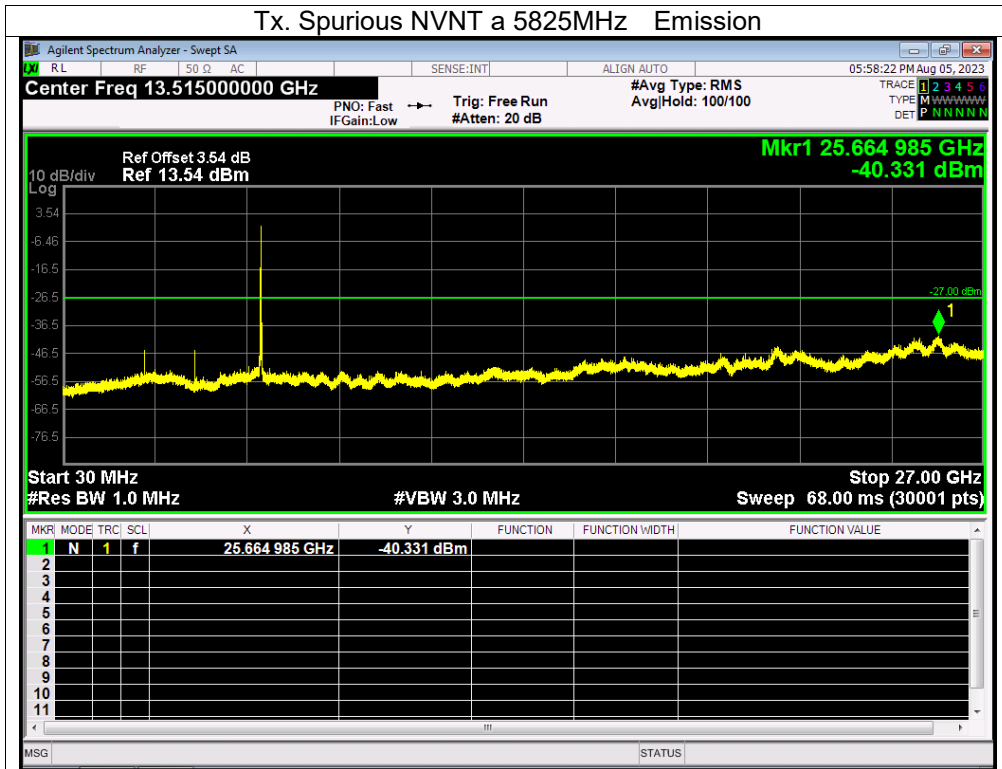


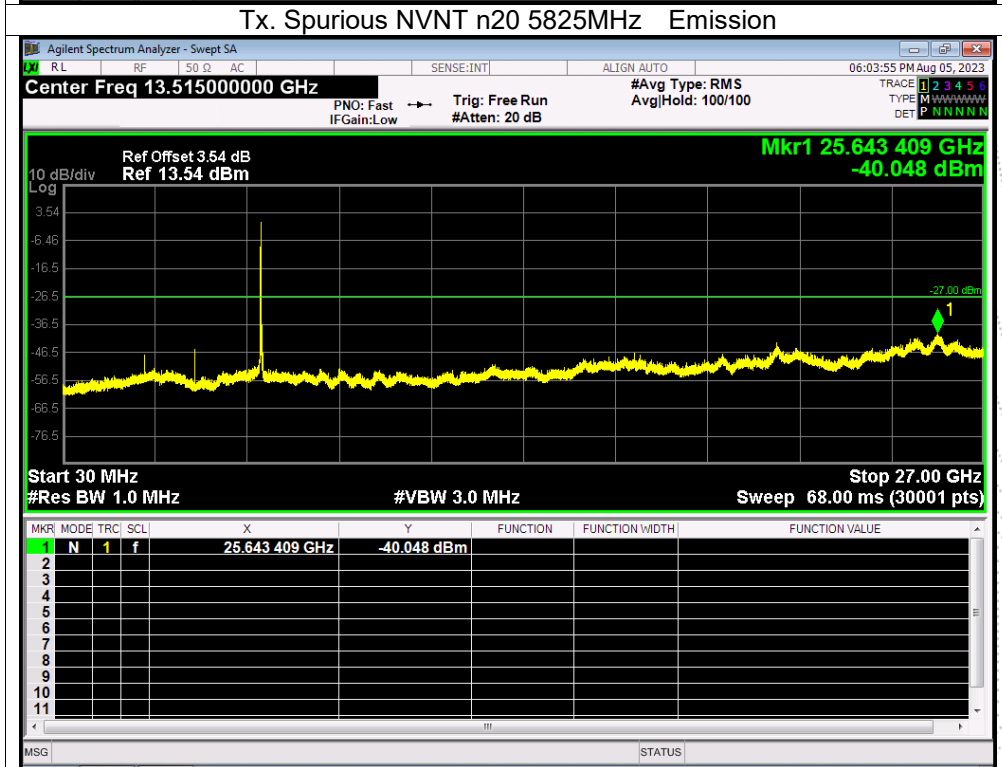
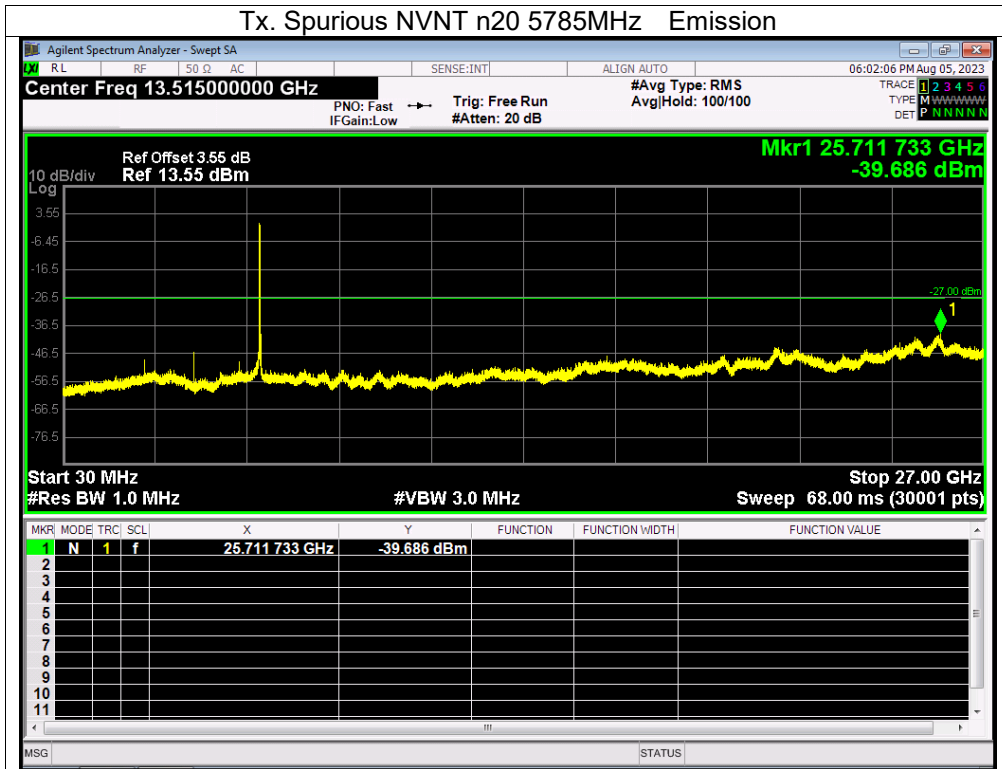


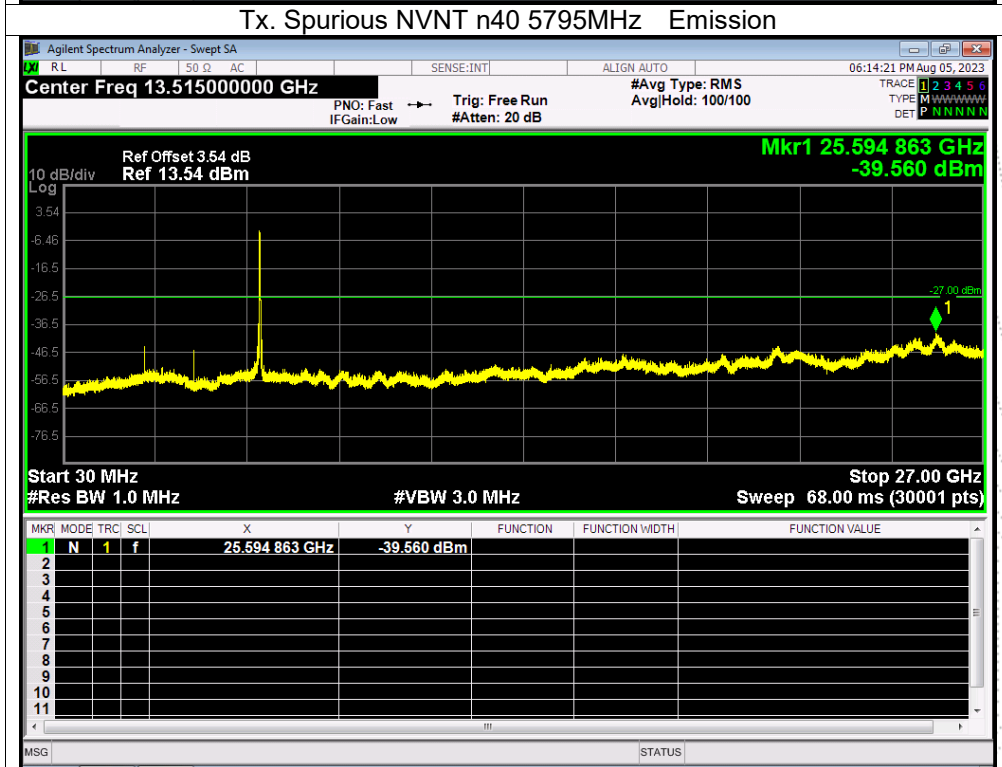
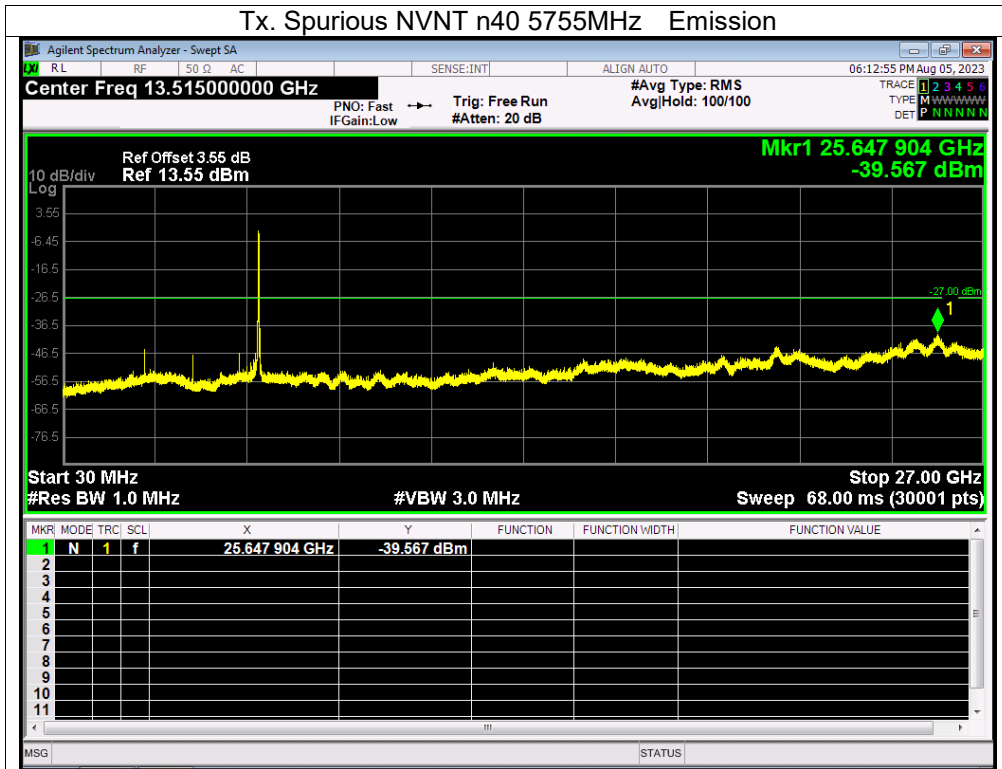


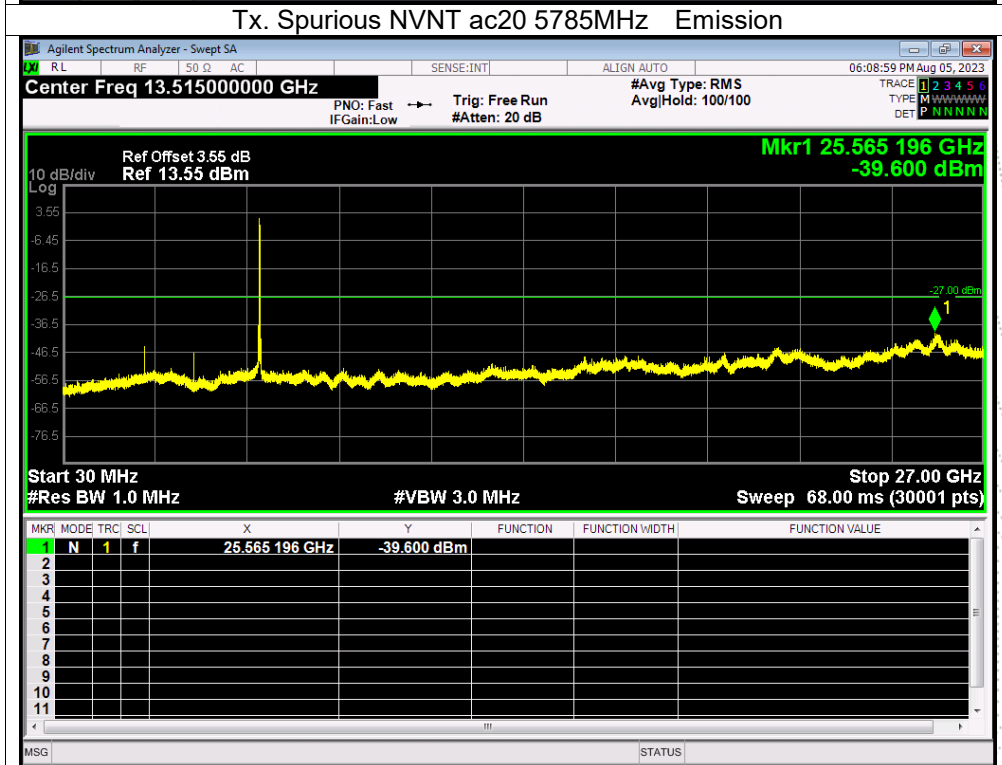
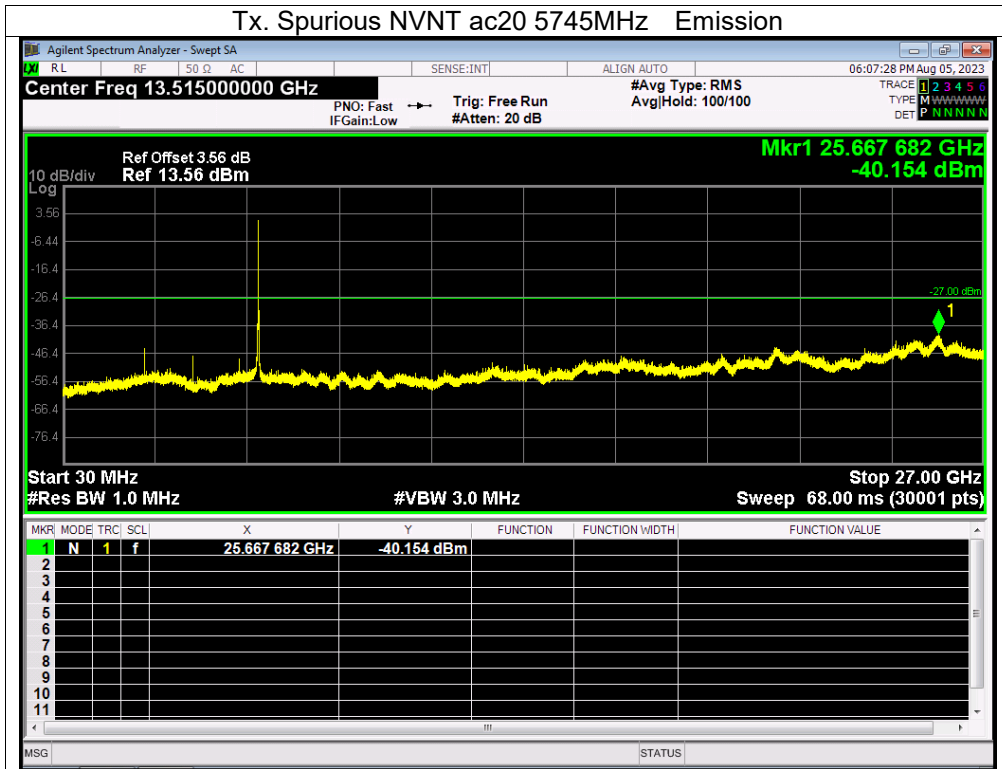


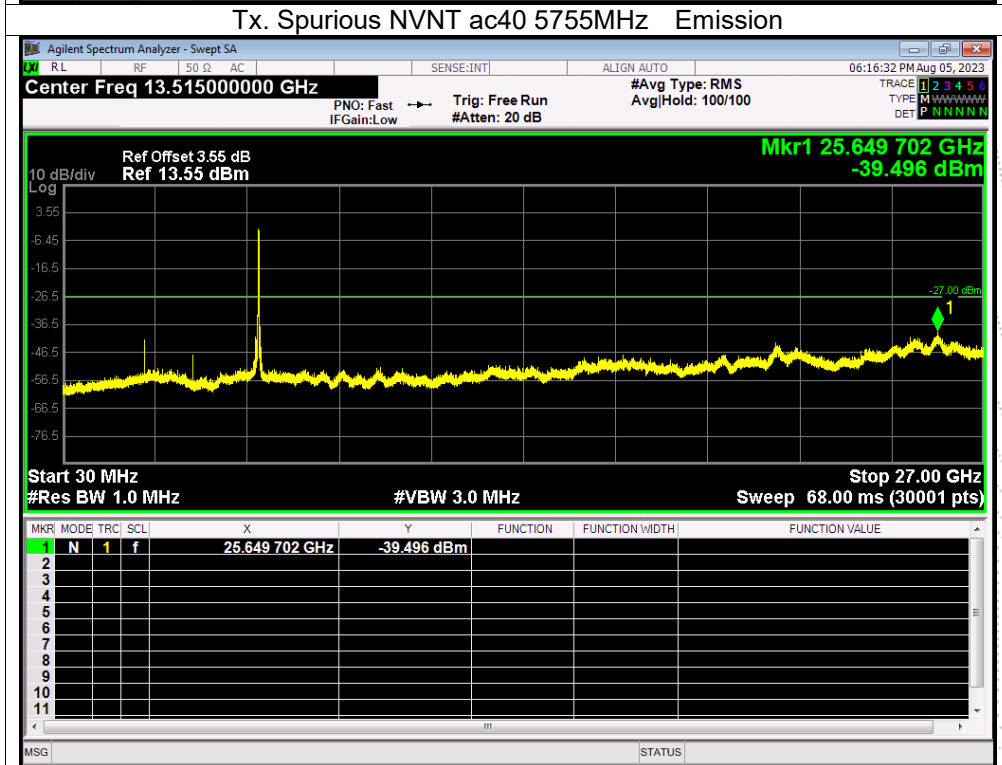
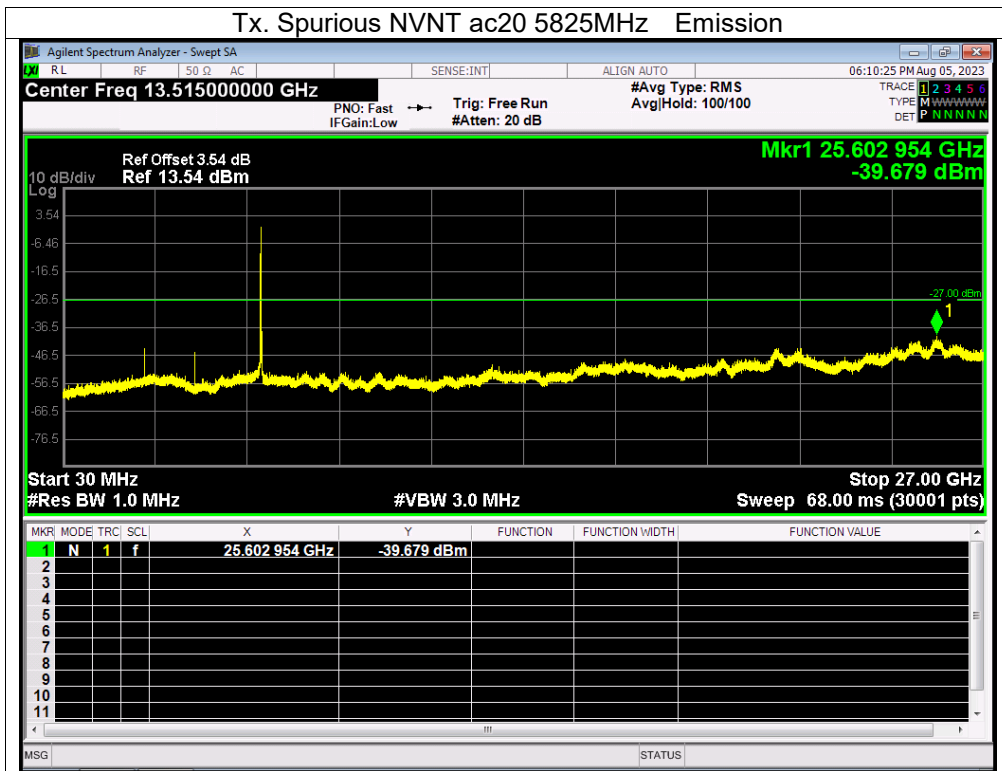


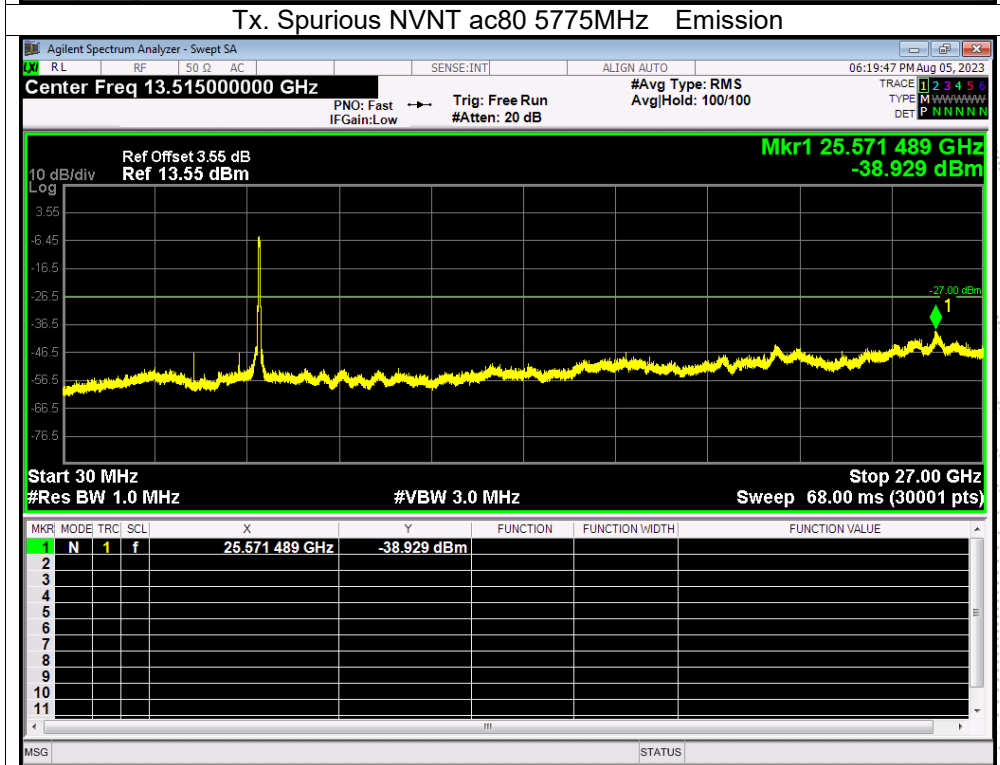
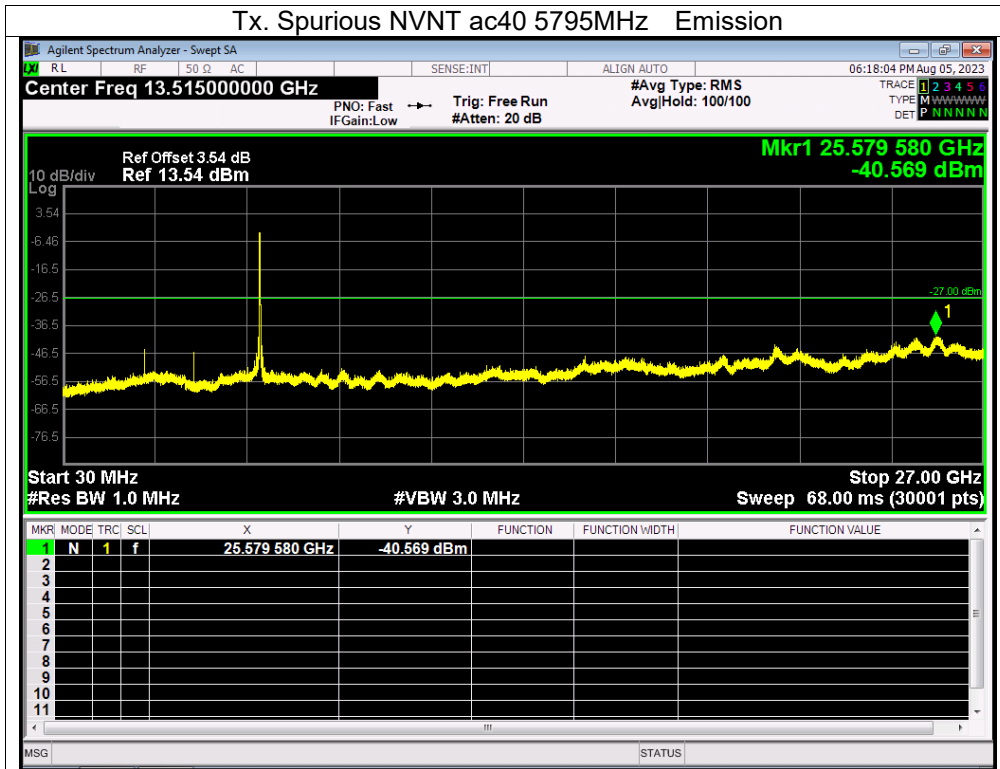






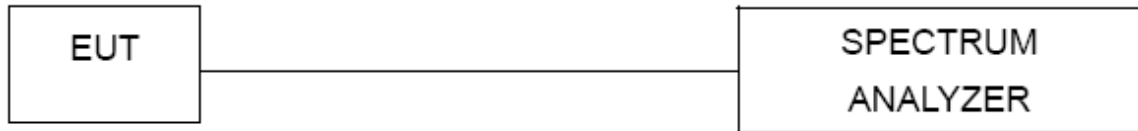






13. Frequency Stability Measurement

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. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f) / f_c \times 10^6$ ppm and he limit is less than ± 20 ppm (IEEE 802.11n specification).
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 $-20^\circ\text{C} \sim 70^\circ\text{C}$.

13.4 Test Result

Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 12V
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)	12.00	5180.0117	5180	0.0117	2.2518
		V max (V)	13.80	5180.0076	5180	0.0076	1.4649
		V min (V)	10.20	5180.0015	5180	0.0015	0.2860
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

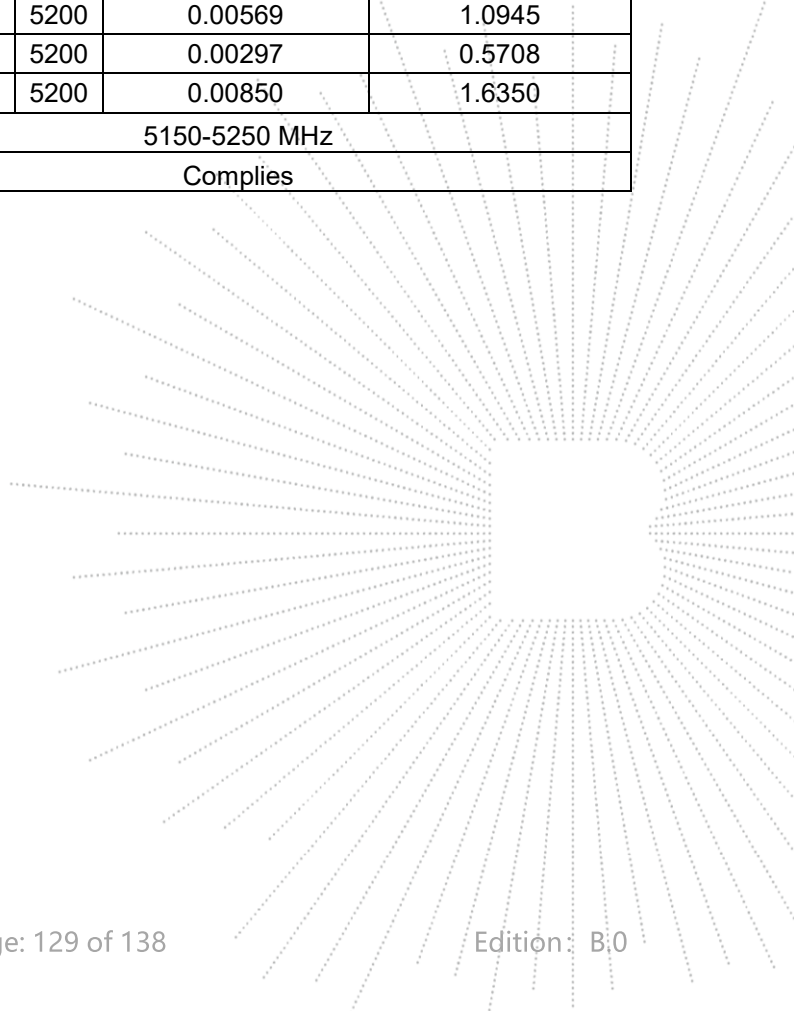
TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5180.0095	5180	0.0095	1.8327
		T (°C)	-10	5180.0019	5180	0.0019	0.3584
		T (°C)	0	5180.0114	5180	0.0114	2.2073
		T (°C)	10	5180.0065	5180	0.0065	1.2583
		T (°C)	20	5180.0133	5180	0.0133	2.5727
		T (°C)	30	5180.0101	5180	0.0101	1.9578
		T (°C)	40	5180.0118	5180	0.0118	2.2780
		T (°C)	50	5180.0026	5180	0.0026	0.5011
		T (°C)	60	5180.0096	5180	0.0096	1.8489
		T (°C)	70	5180.0069	5180	0.0069	1.3349
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)	12.00	5200.0001	5200	0.0001	0.0261
		V max (V)	13.80	5200.0046	5200	0.0046	0.8761
		V min (V)	10.20	5200.0046	5200	0.0046	0.8937
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)	12	T (°C)	-20	5200.00227	5200	0.00227	0.4374
		T (°C)	-10	5200.00731	5200	0.00731	1.4056
		T (°C)	0	5200.00018	5200	0.00018	0.0346
		T (°C)	10	5200.00846	5200	0.00846	1.6274
		T (°C)	20	5200.00411	5200	0.00411	0.7909
		T (°C)	30	5200.01040	5200	0.01040	1.9993
		T (°C)	40	5200.00268	5200	0.00268	0.5154
		T (°C)	50	5200.00569	5200	0.00569	1.0945
		T (°C)	60	5200.00297	5200	0.00297	0.5708
		T (°C)	70	5200.00850	5200	0.00850	1.6350
Limits				5150-5250 MHz			
Result				Complies			

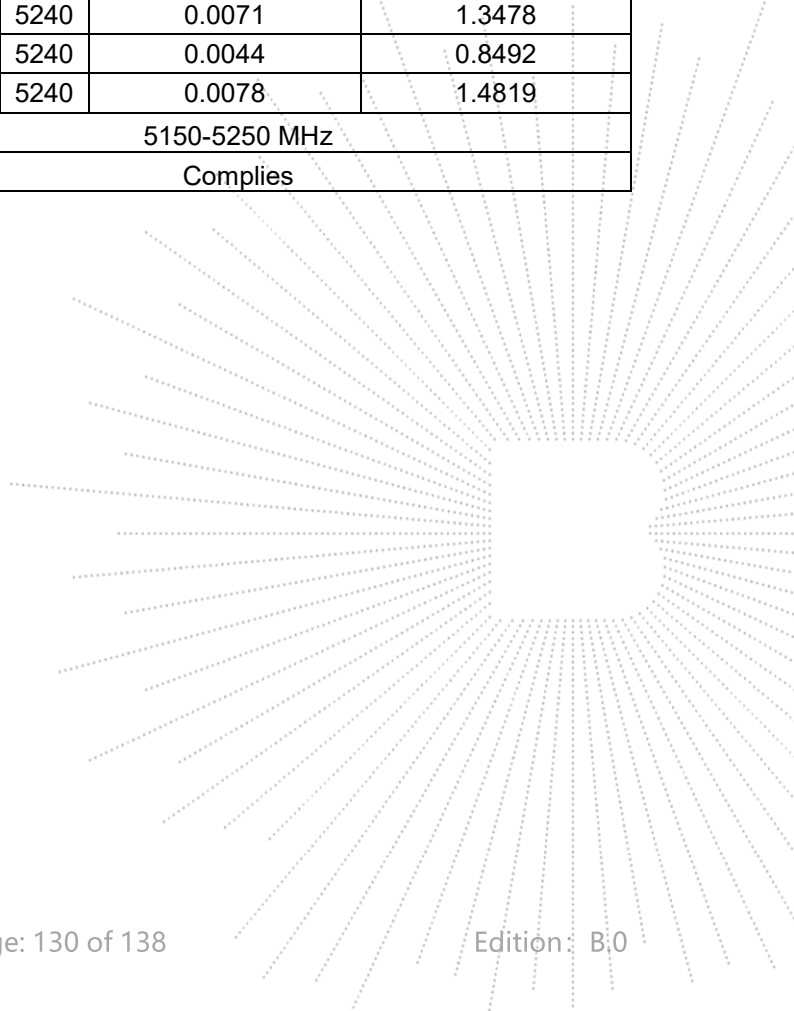


Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5240.0082	5240	0.0082	1.5660
		V max (V)	13.80	5240.0119	5240	0.0119	2.2778
		V min (V)	10.20	5240.0082	5240	0.0082	1.5682
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)	12	T (°C)	-20	5240.0075	5240	0.0075	1.4392
		T (°C)	-10	5240.0130	5240	0.0130	2.4727
		T (°C)	0	5240.0048	5240	0.0048	0.9230
		T (°C)	10	5240.0109	5240	0.0109	2.0765
		T (°C)	20	5240.0005	5240	0.0005	0.0926
		T (°C)	30	5240.0075	5240	0.0075	1.4241
		T (°C)	40	5240.0134	5240	0.0134	2.5609
		T (°C)	50	5240.0071	5240	0.0071	1.3478
		T (°C)	60	5240.0044	5240	0.0044	0.8492
		T (°C)	70	5240.0078	5240	0.0078	1.4819
Limits				5150-5250 MHz			
Result				Complies			



Temperature :	26 °C	Relative Humidity :	54%
Pressure :	101kPa	Test Voltage :	DC 12V
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)	12.00	5745.00361	5745	0.00361	0.6278
		V max (V)	13.80	5745.00590	5745	0.00590	1.0274
		V min (V)	10.20	5745.00255	5745	0.00255	0.4443
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

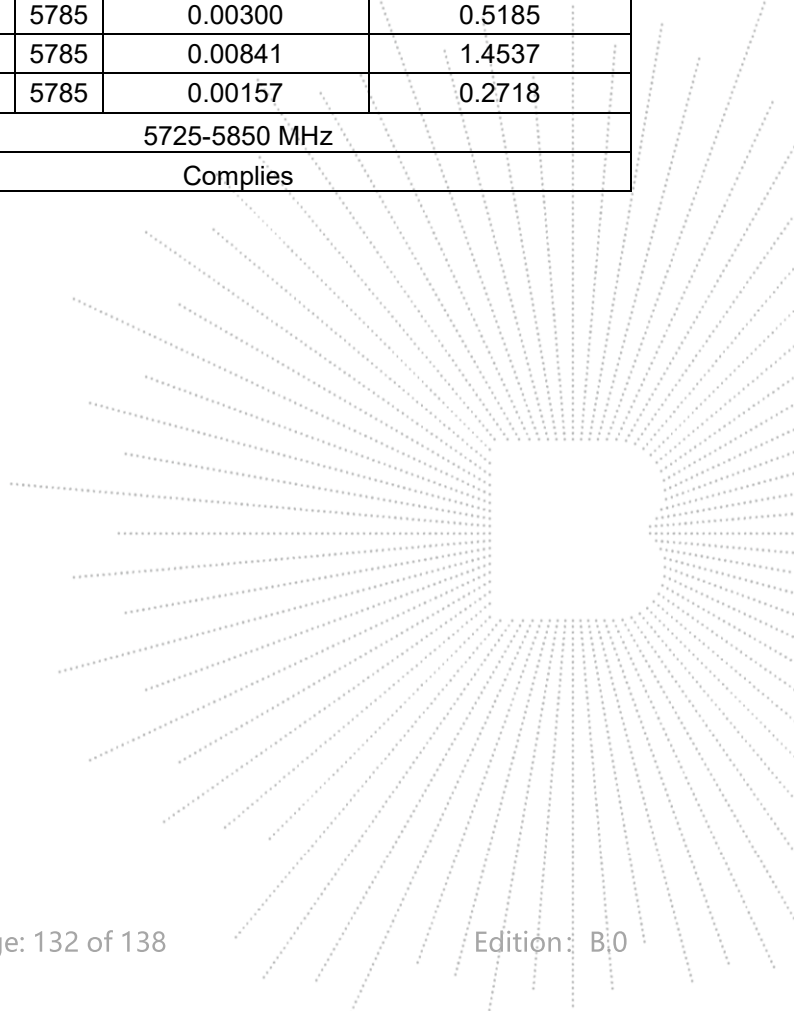
TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5745.00096	5745	0.00096	0.1678
		T (°C)	-10	5745.00246	5745	0.00246	0.4276
		T (°C)	0	5745.01116	5745	0.01116	1.9432
		T (°C)	10	5745.00333	5745	0.00333	0.5798
		T (°C)	20	5745.01178	5745	0.01178	2.0513
		T (°C)	30	5745.01154	5745	0.01154	2.0092
		T (°C)	40	5745.00457	5745	0.00457	0.7950
		T (°C)	50	5745.00613	5745	0.00613	1.0669
		T (°C)	60	5745.00205	5745	0.00205	0.3566
		T (°C)	70	5745.01237	5745	0.01237	2.1530
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)	12.00	5785.01202	5785	0.01202	2.0786
		V max (V)	13.80	5785.00176	5785	0.00176	0.3048
		V min (V)	10.20	5785.00760	5785	0.00760	1.3136
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)	12	T (°C)	-20	5785.00682	5785	0.00682	1.1793
		T (°C)	-10	5785.01295	5785	0.01295	2.2393
		T (°C)	0	5785.00384	5785	0.00384	0.6631
		T (°C)	10	5785.00529	5785	0.00529	0.9143
		T (°C)	20	5785.00387	5785	0.00387	0.6687
		T (°C)	30	5785.01033	5785	0.01033	1.7855
		T (°C)	40	5785.00496	5785	0.00496	0.8566
		T (°C)	50	5785.00300	5785	0.00300	0.5185
		T (°C)	60	5785.00841	5785	0.00841	1.4537
		T (°C)	70	5785.00157	5785	0.00157	0.2718
Limits				5725-5850 MHz			
Result				Complies			

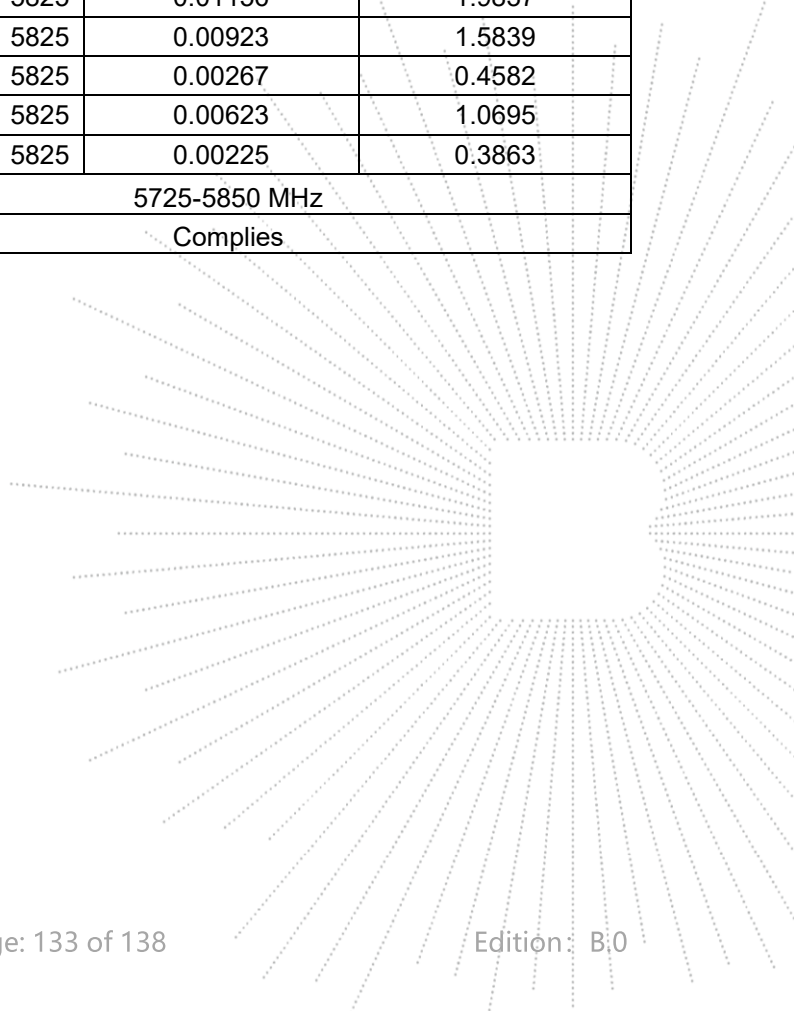


Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5825.00144	5825	0.00144	0.2472
		V max (V)	13.80	5825.00947	5825	0.00947	1.6262
		V min (V)	10.20	5825.00536	5825	0.00536	0.9208
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)	12	T (°C)	-20	5825.00104	5825	0.00104	0.1781
		T (°C)	-10	5825.01281	5825	0.01281	2.1993
		T (°C)	0	5825.01330	5825	0.01330	2.2839
		T (°C)	10	5825.00333	5825	0.00333	0.5713
		T (°C)	20	5825.00572	5825	0.00572	0.9818
		T (°C)	30	5825.01156	5825	0.01156	1.9837
		T (°C)	40	5825.00923	5825	0.00923	1.5839
		T (°C)	50	5825.00267	5825	0.00267	0.4582
		T (°C)	60	5825.00623	5825	0.00623	1.0695
		T (°C)	70	5825.00225	5825	0.00225	0.3863
Limits				5725-5850 MHz			
Result				Complies			



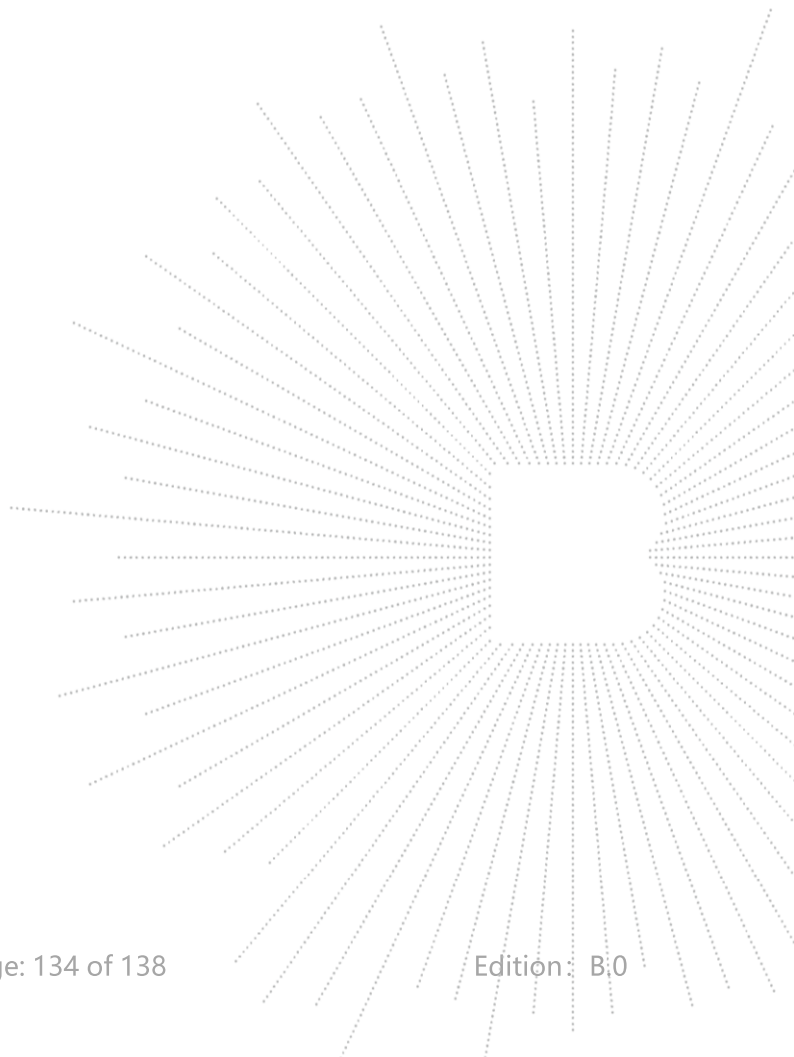
14. Antenna Requirement

14.1 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.

14.2 Test Result

The EUT antenna is Internal antenna (antenna gain: 2.67dBi). It comply with the standard requirement.



15. EUT Photographs

EUT Photo 1

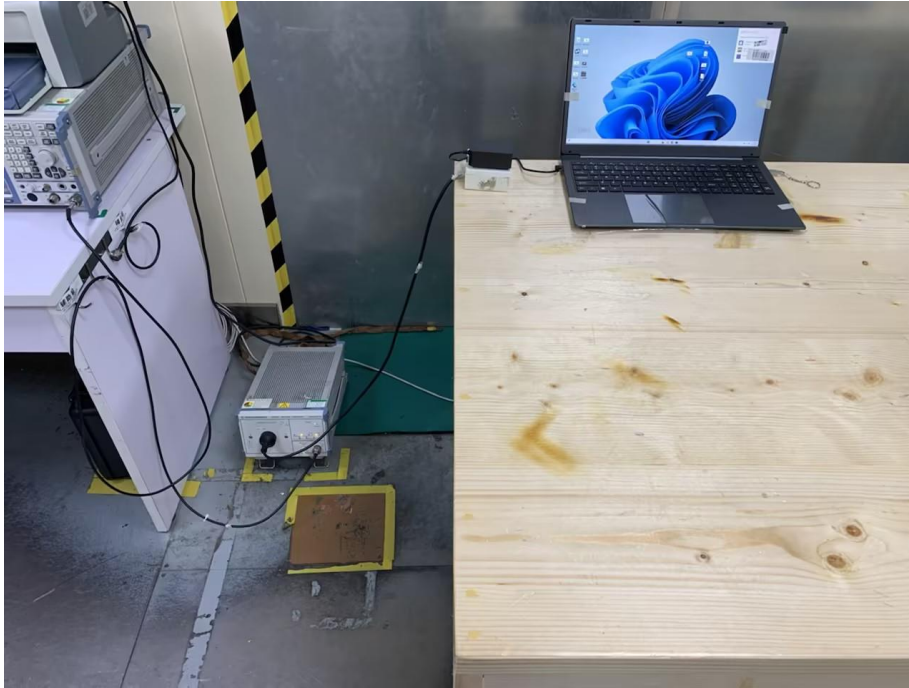


EUT Photo 2

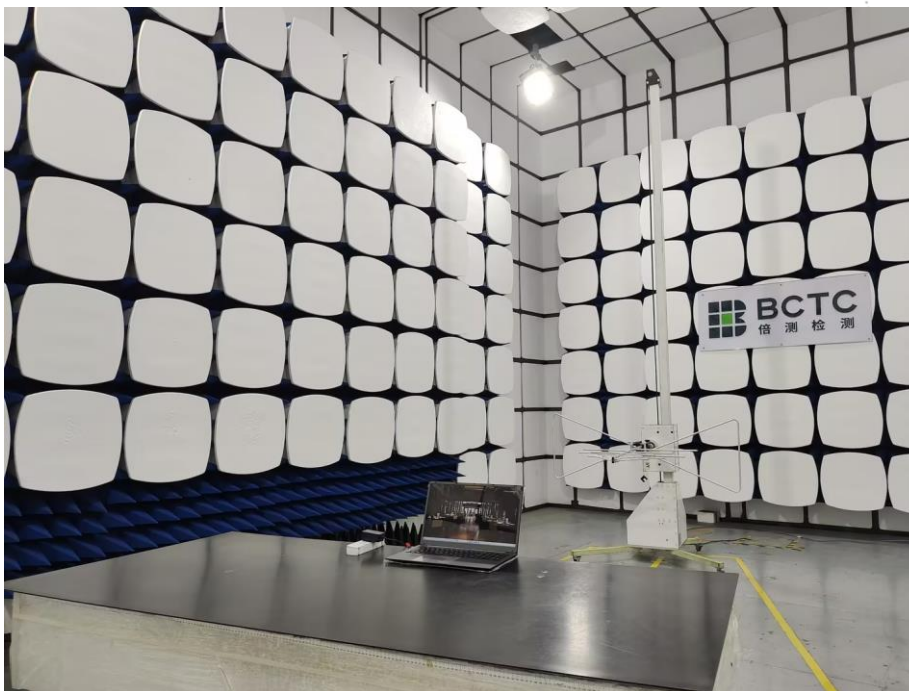


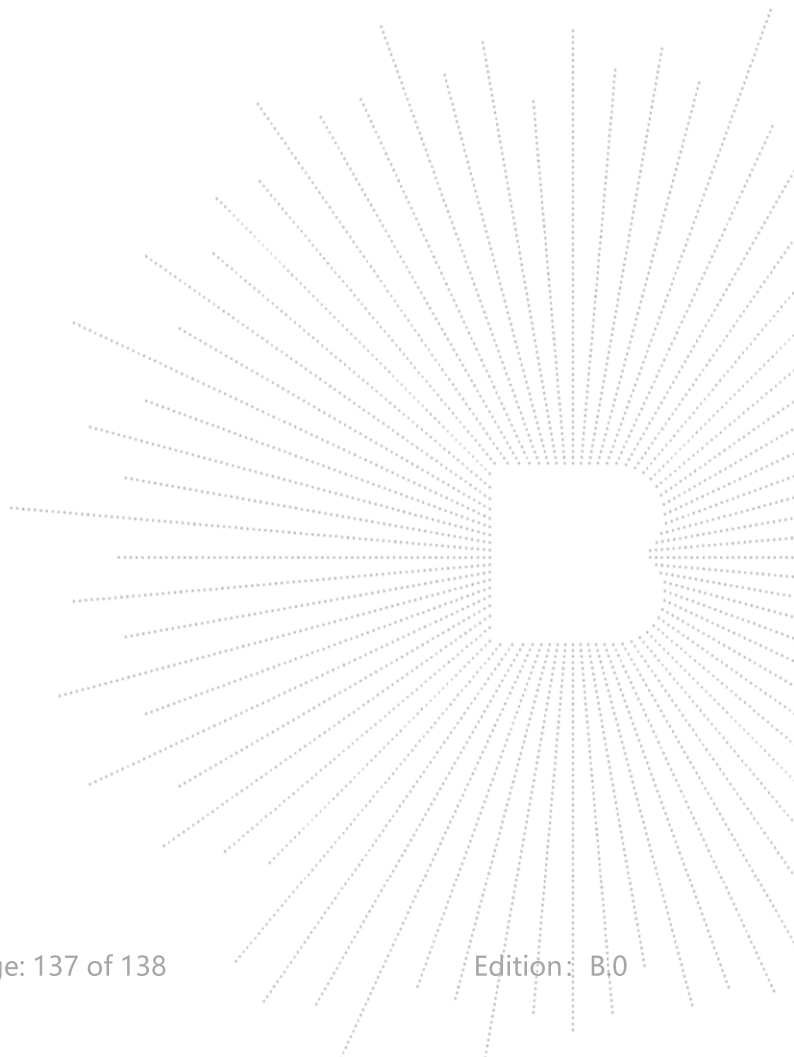
16. EUT Test Setup Photographs

Conducted Measurement Photo



Radiated Measurement Photos





STATEMENT

1. The equipment lists are traceable to the national reference standards.
2. The test report can not be partially copied unless prior written approval is issued from our lab.
3. The test report is invalid without the "special seal for inspection and testing".
4. The test report is invalid without the signature of the approver.
5. The test process and test result is only related to the Unit Under Test.
6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.
7. The quality system of our laboratory is in accordance with ISO/IEC17025.
8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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******* END *******

