

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

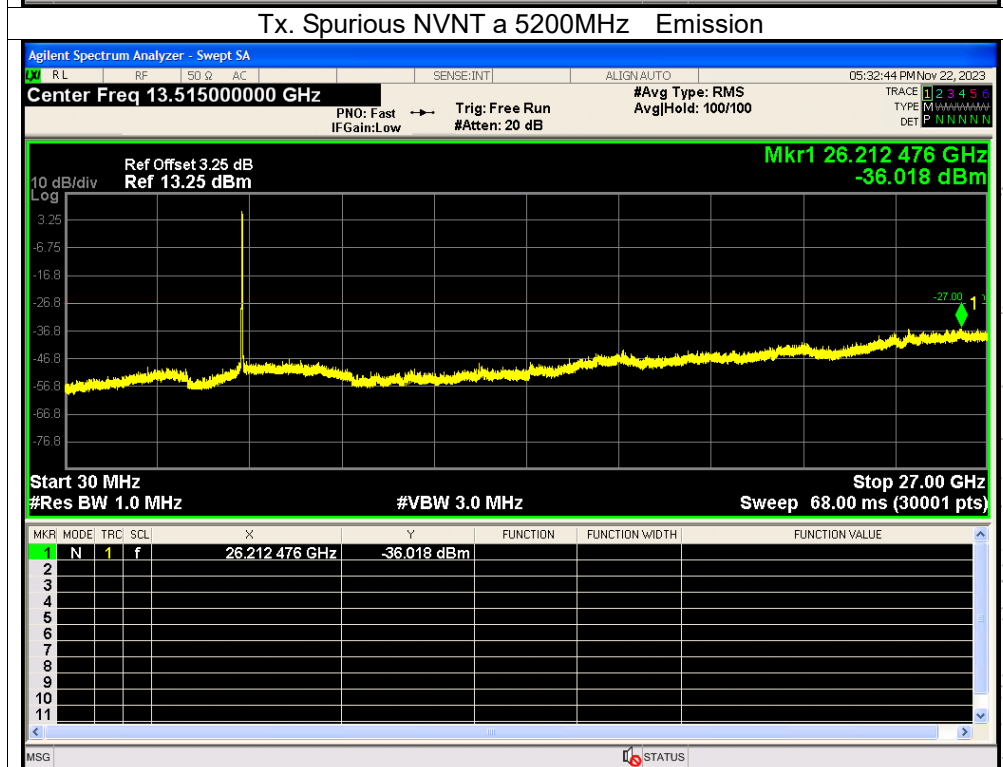
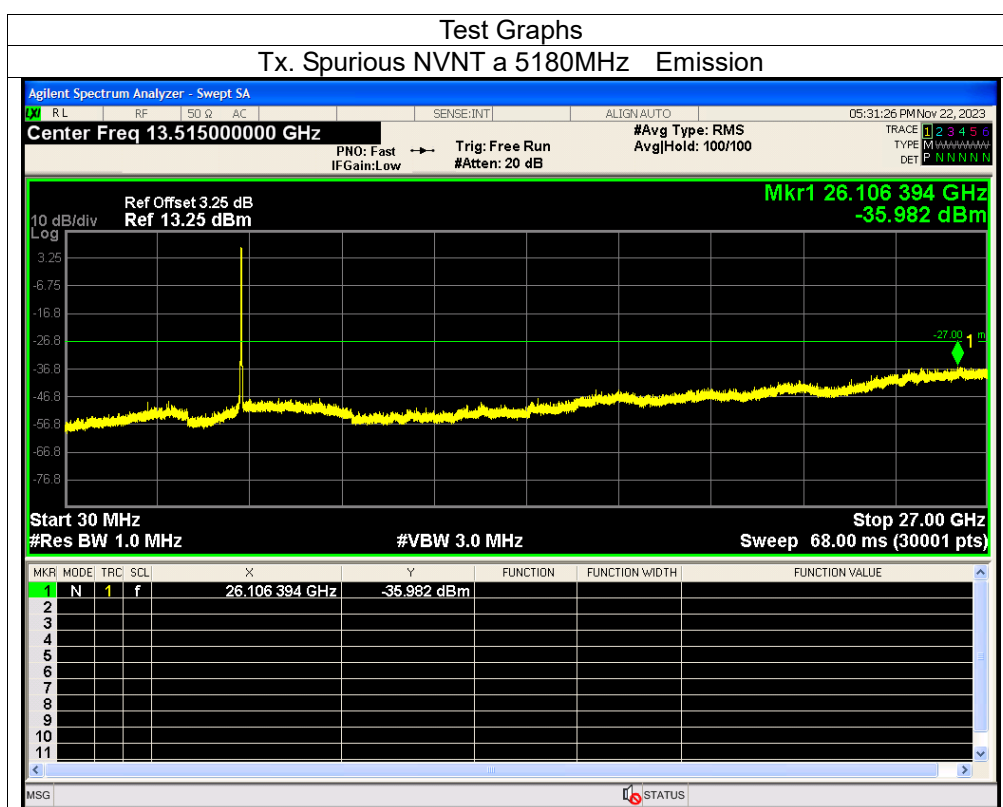
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then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

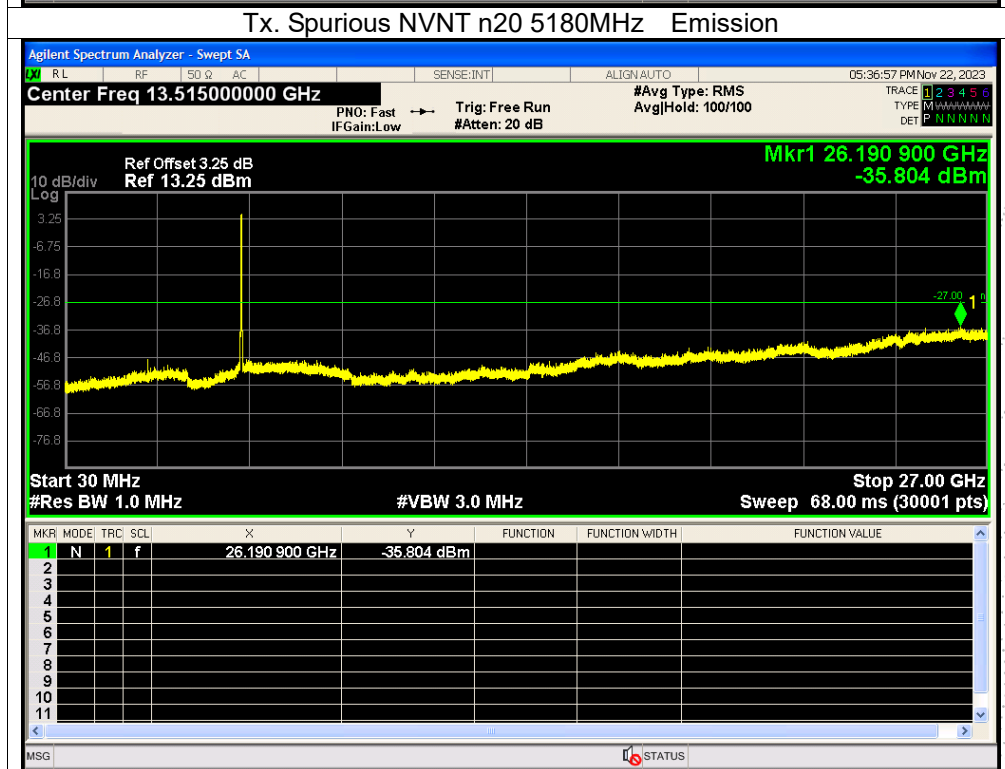
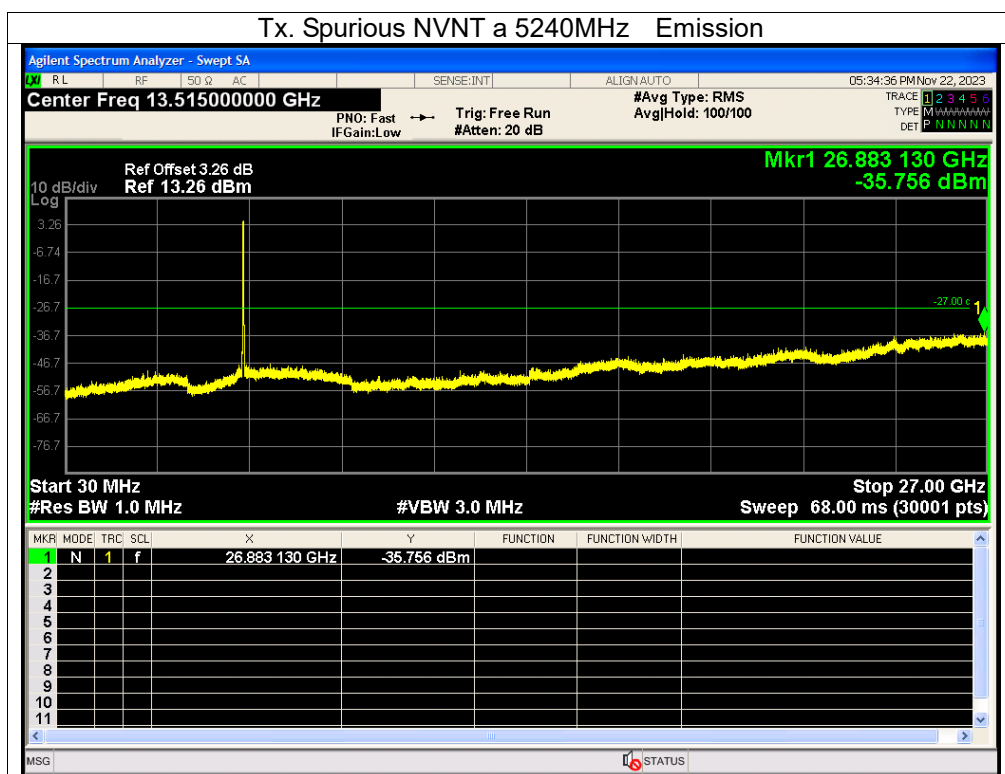
12.4 Test Result

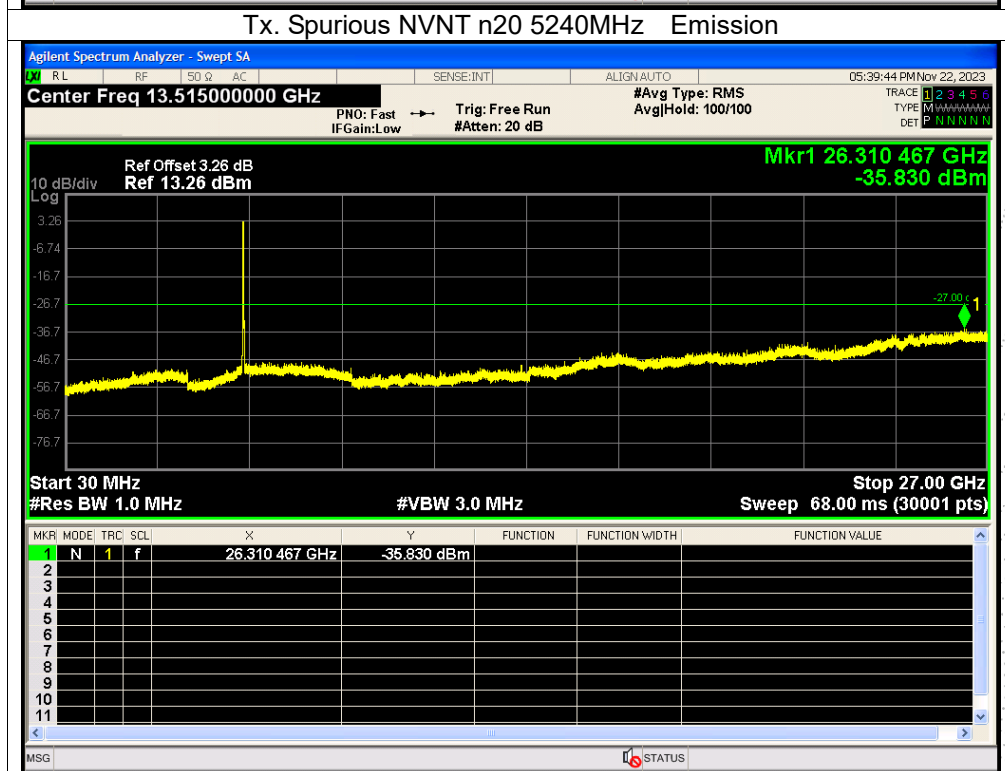
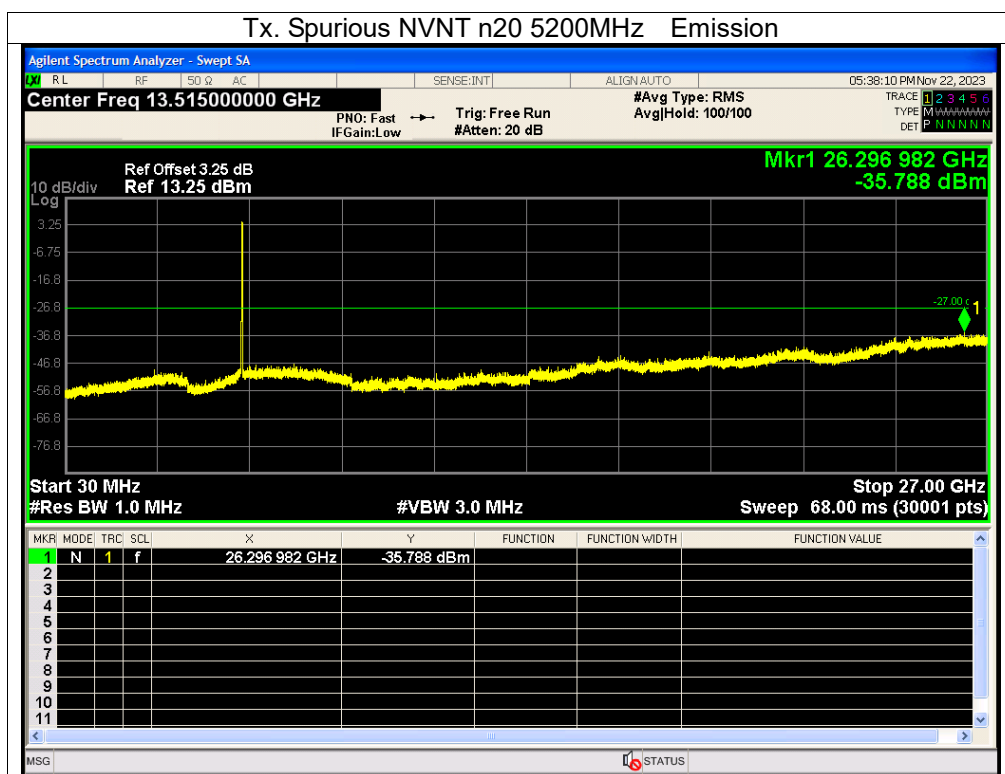
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandedge measurement data.

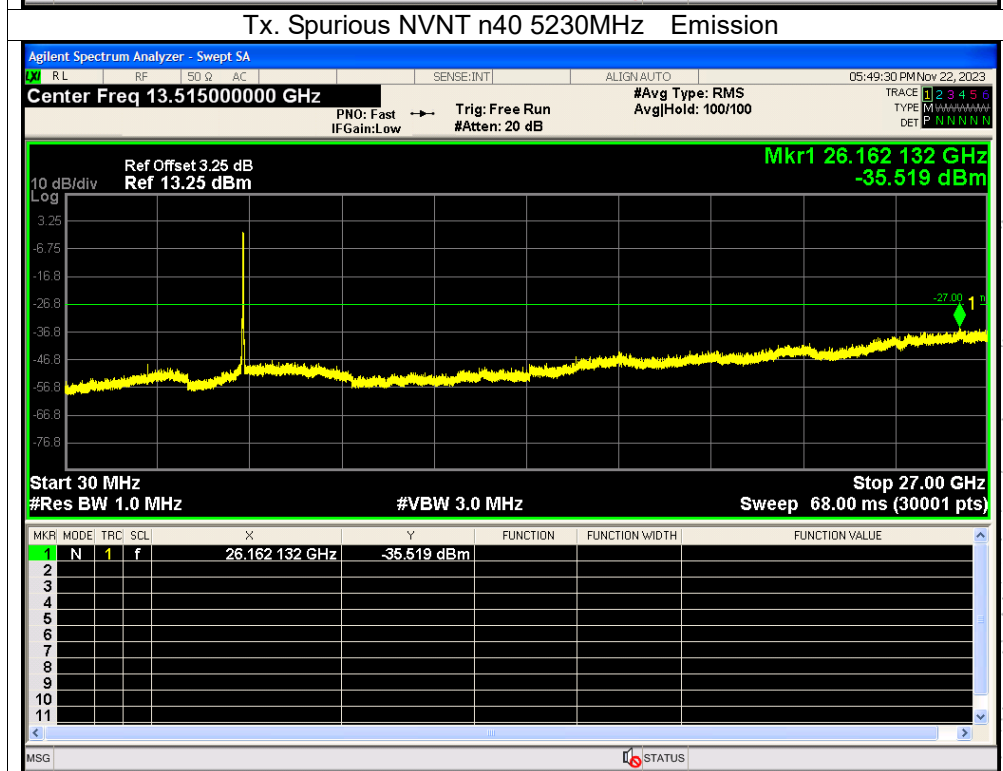
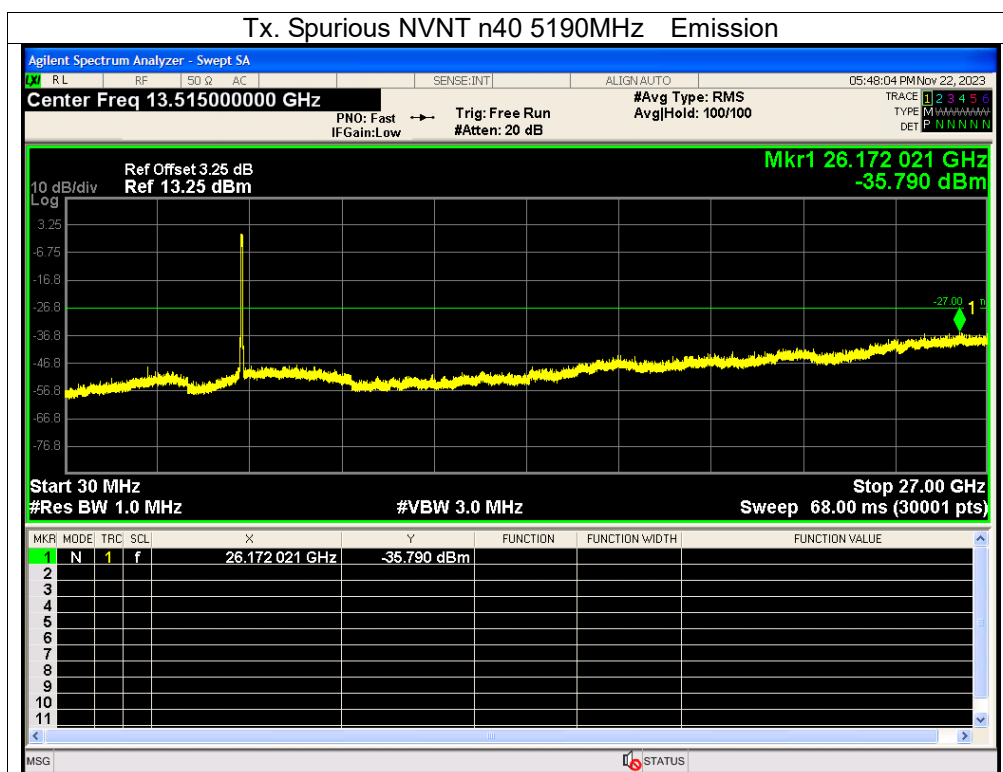
About: 26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

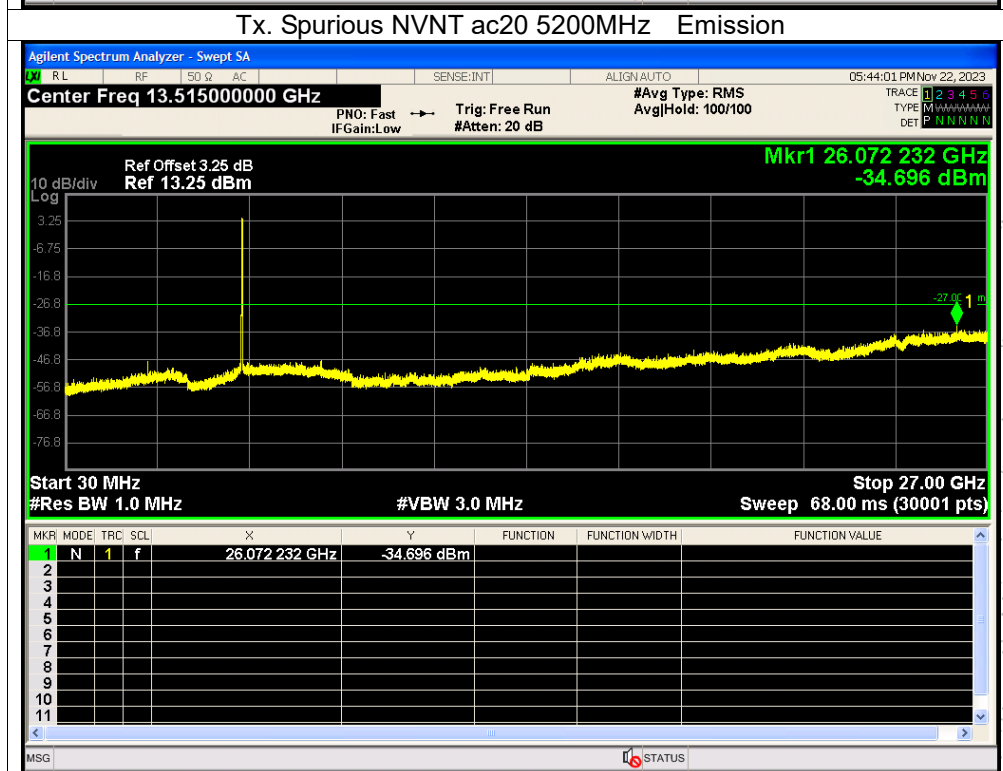
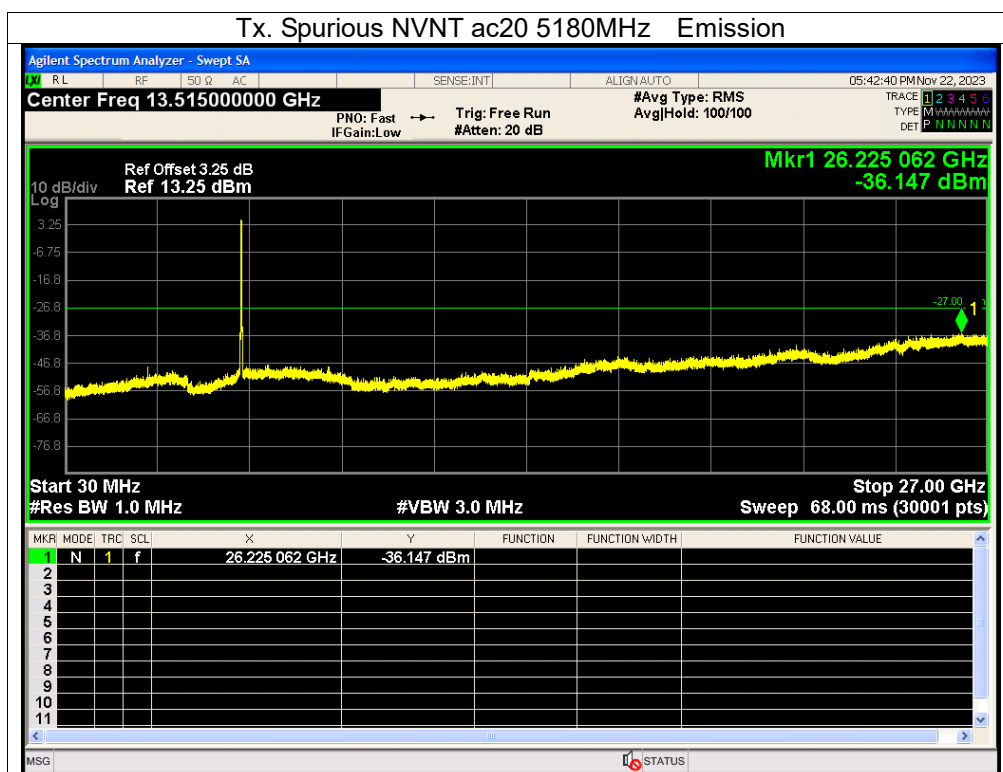
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A Plot.

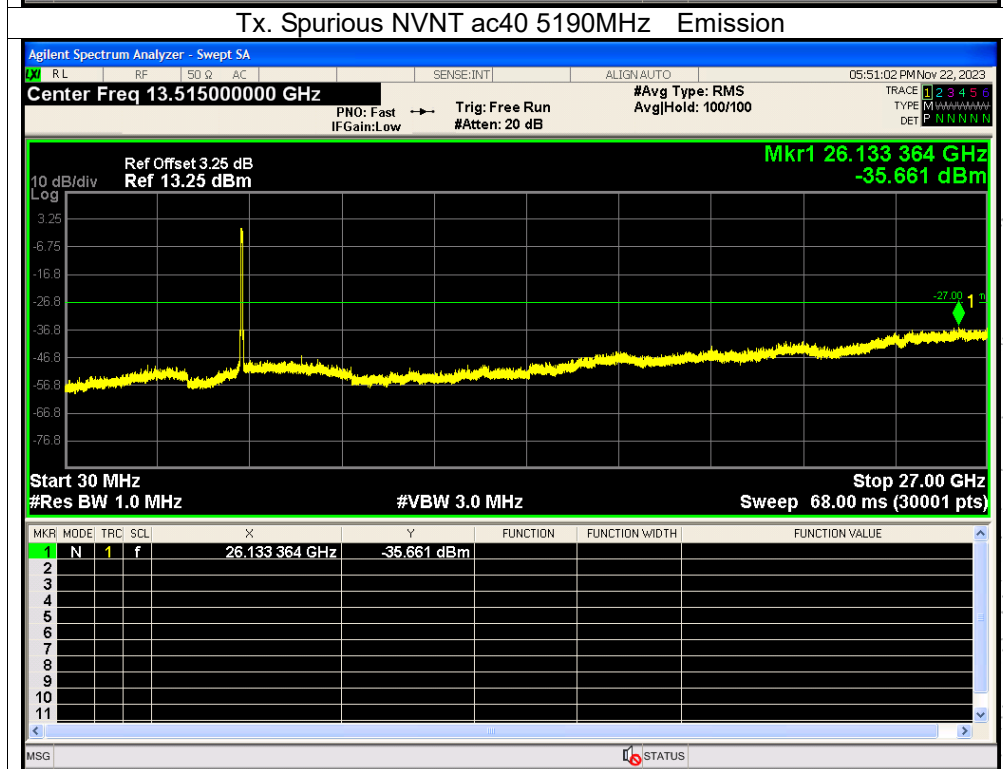
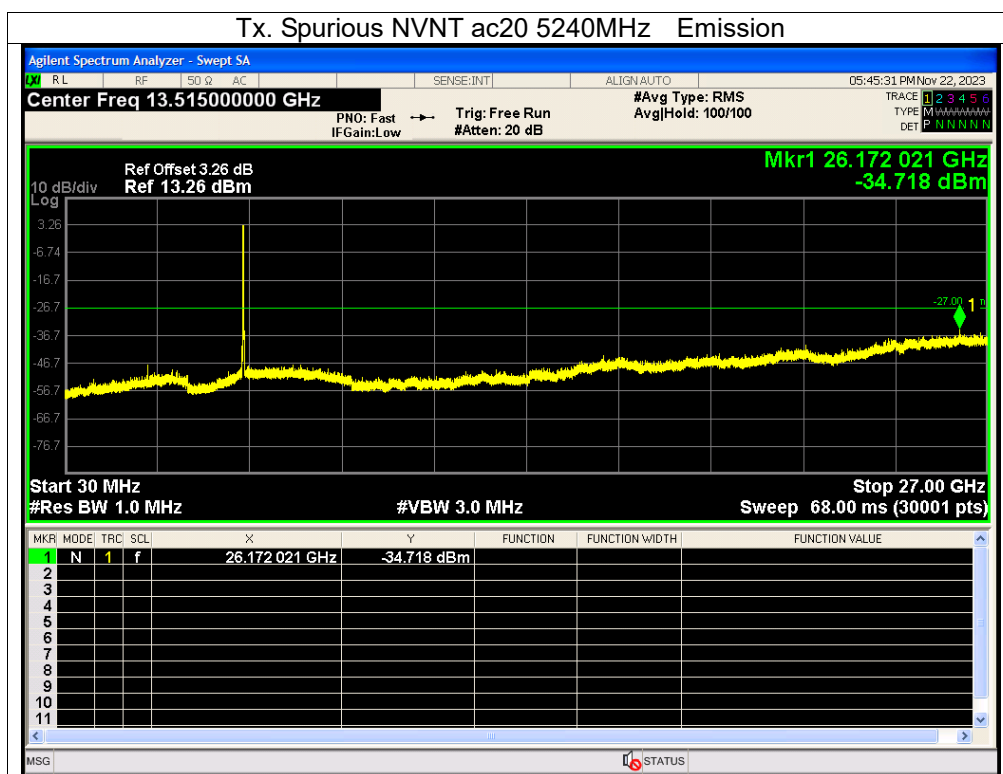


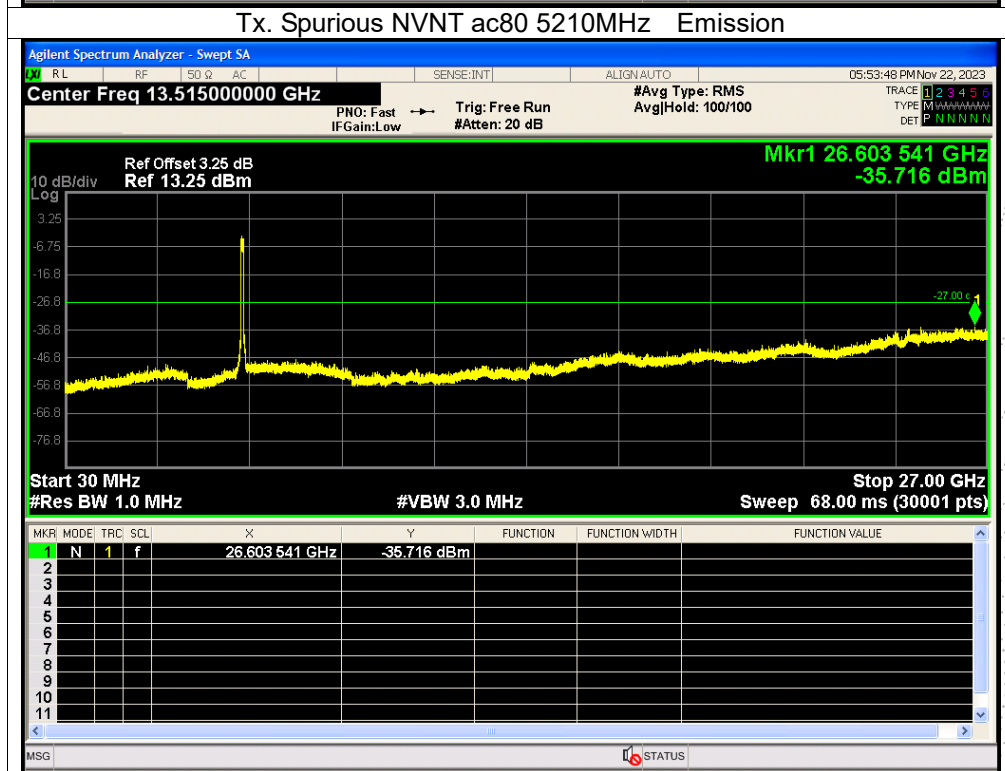
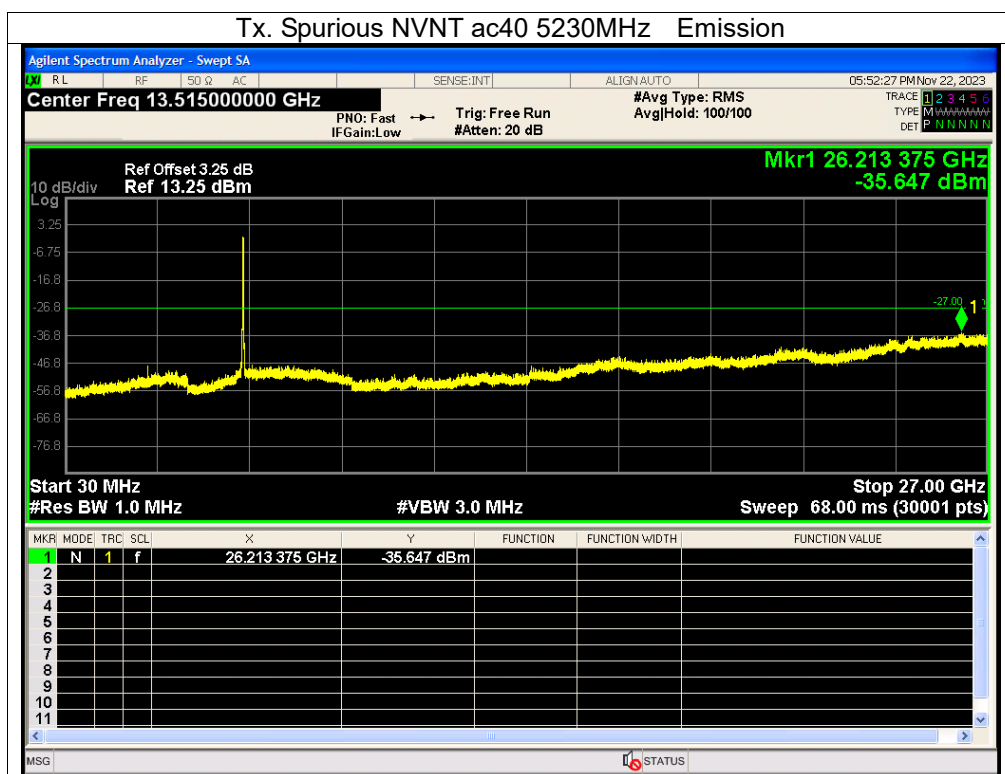


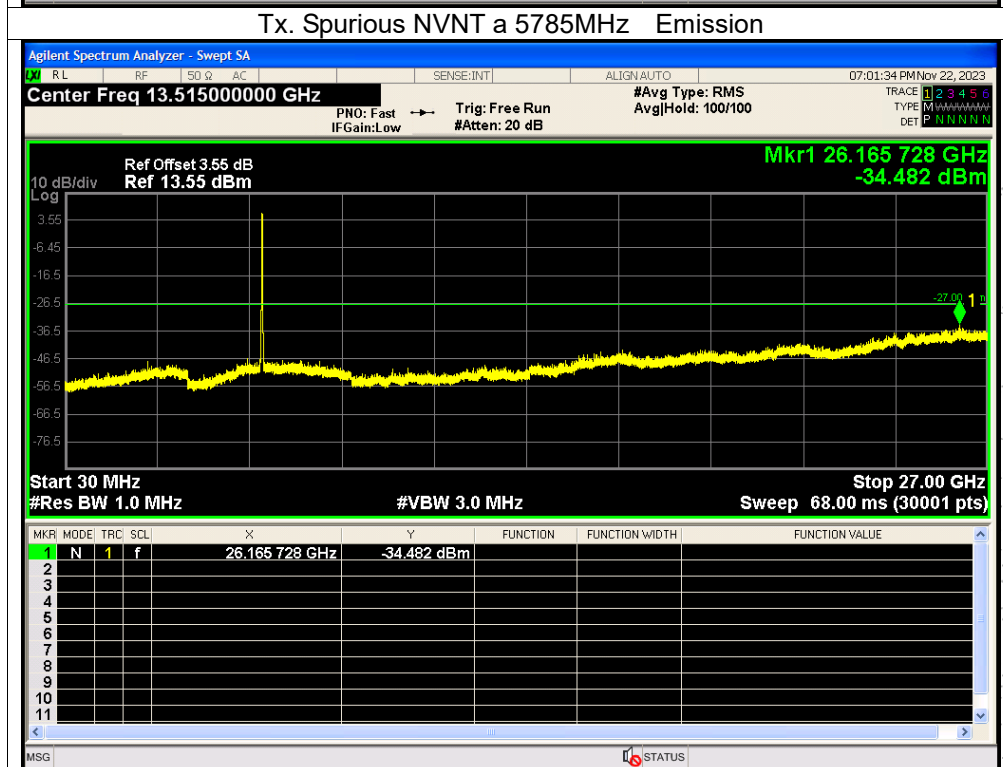
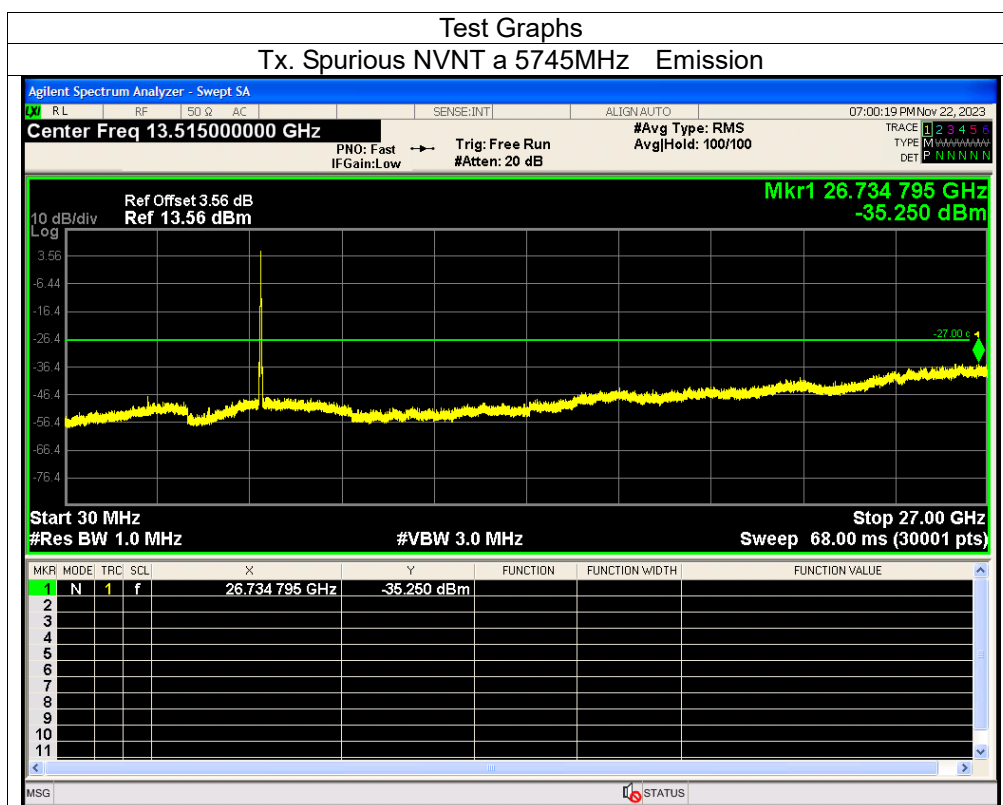


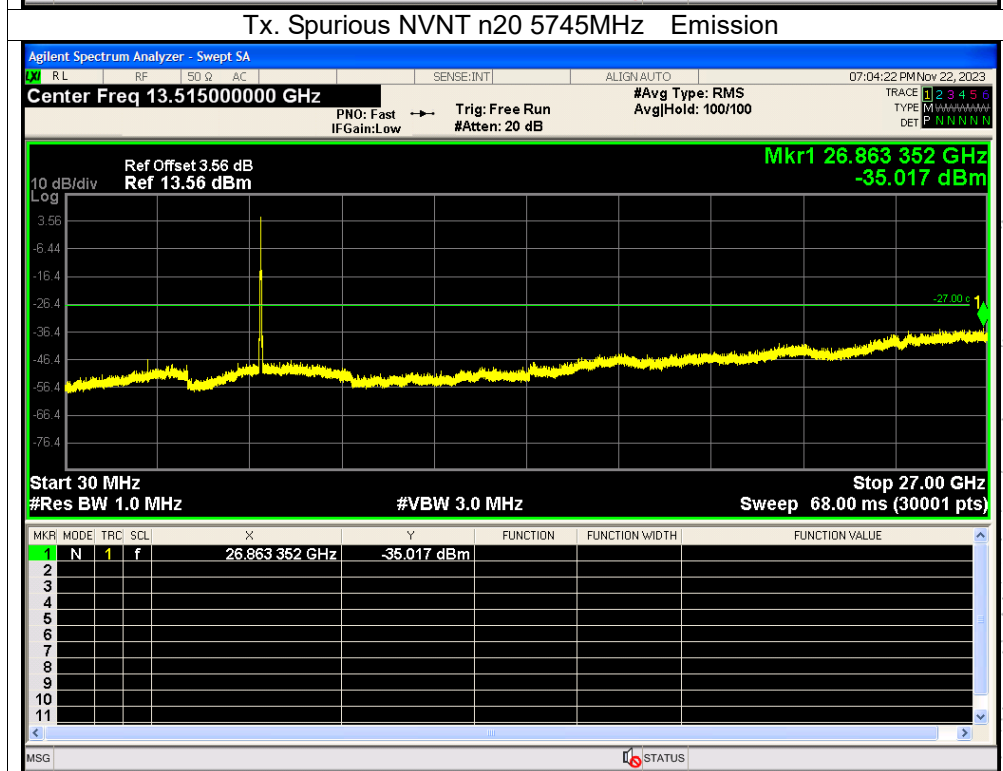
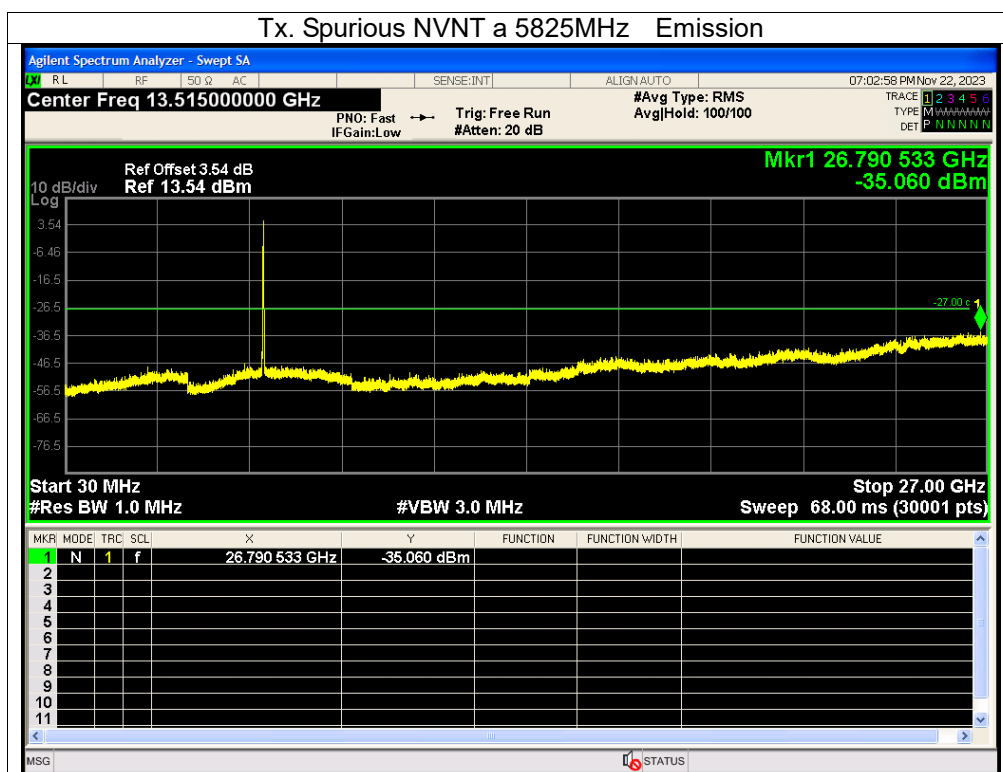


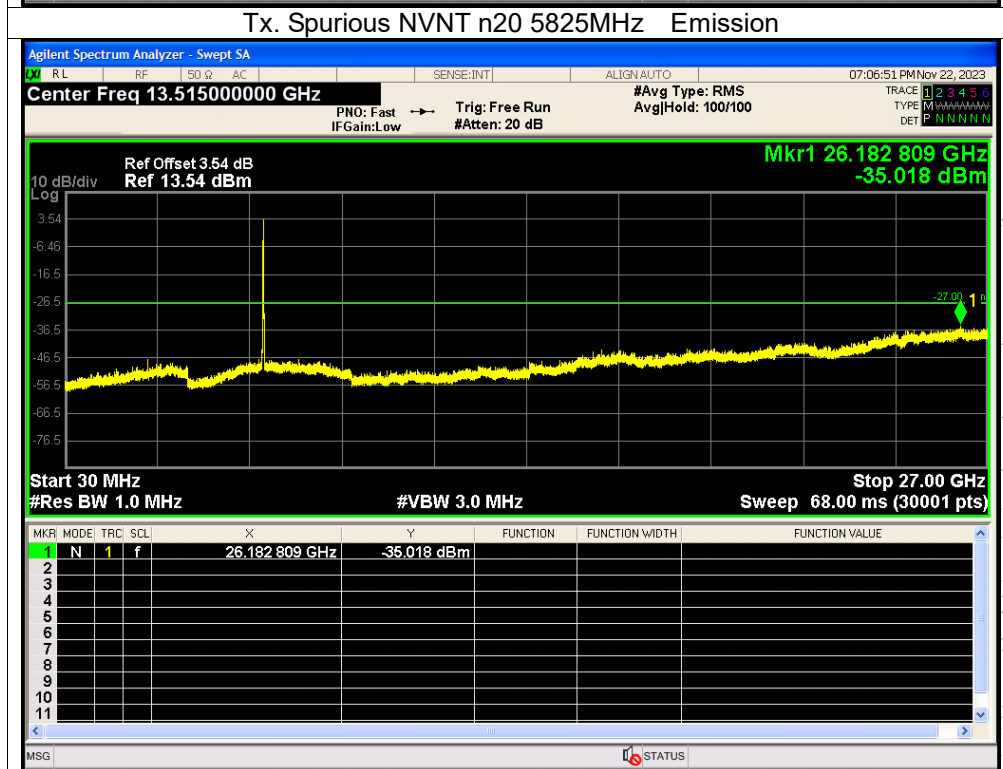
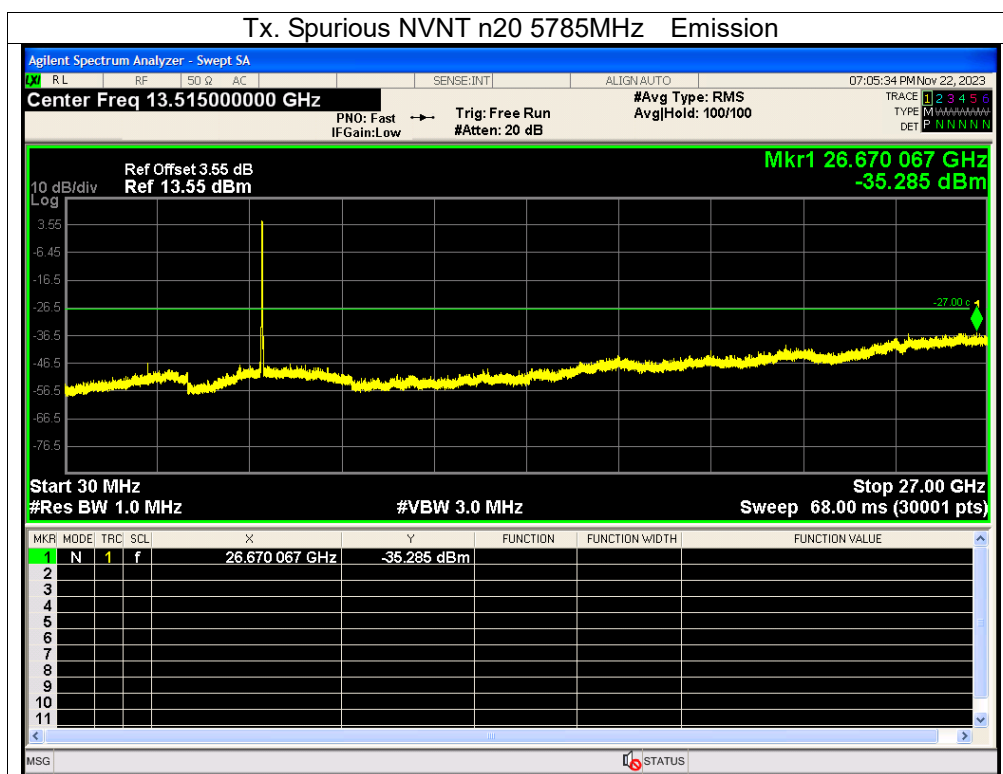


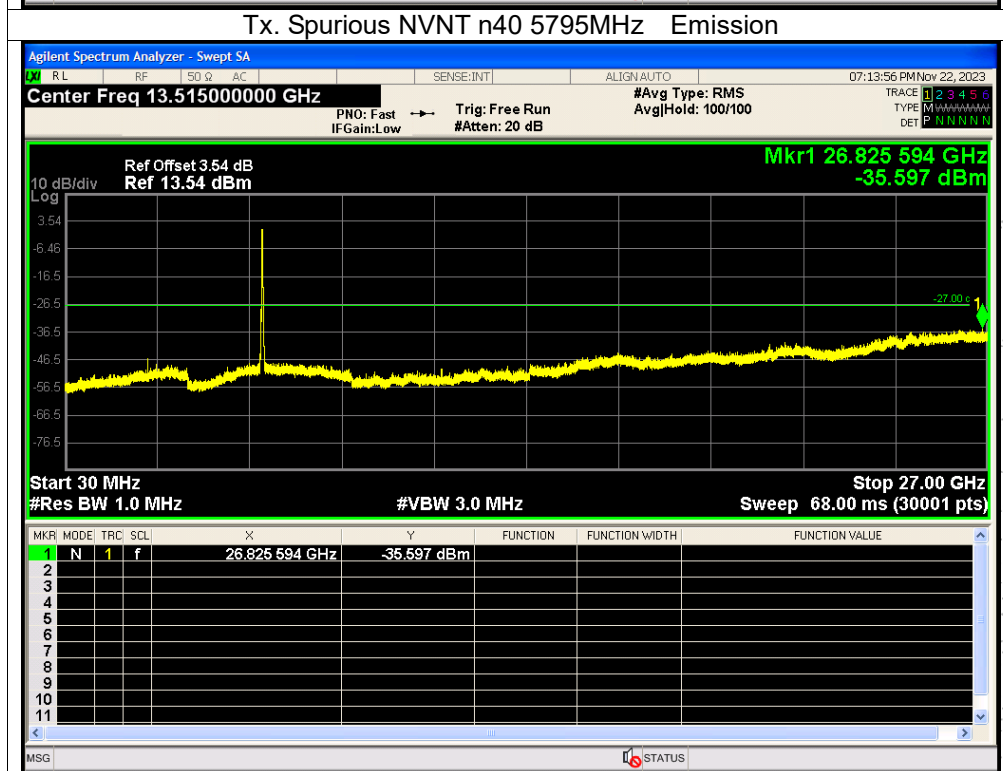
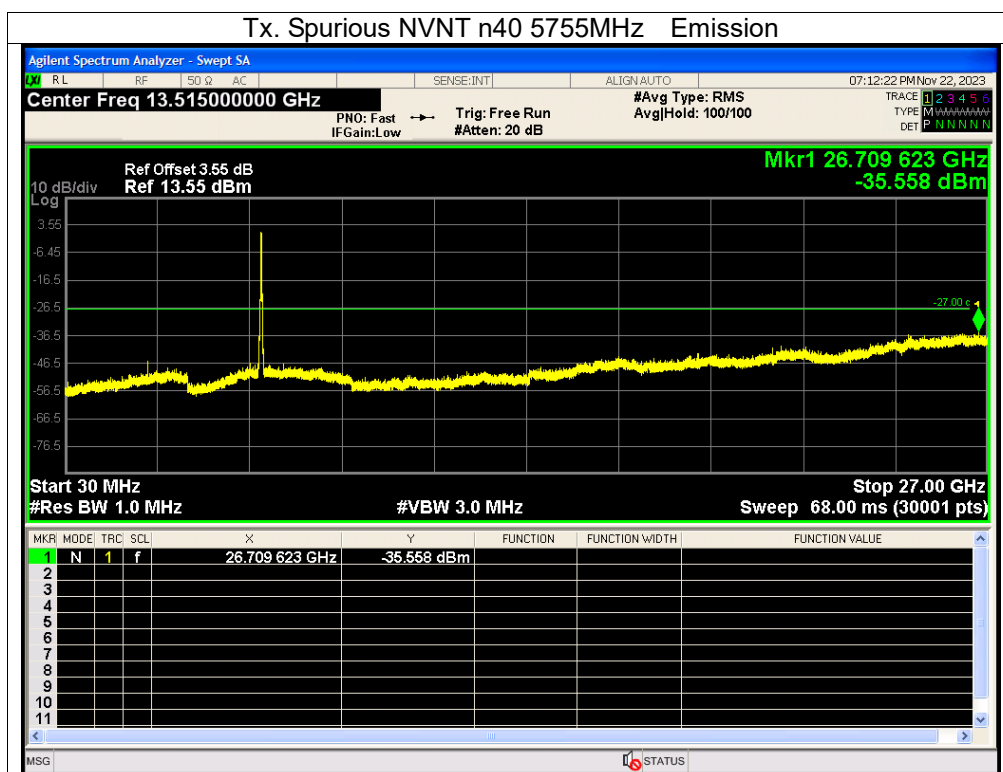


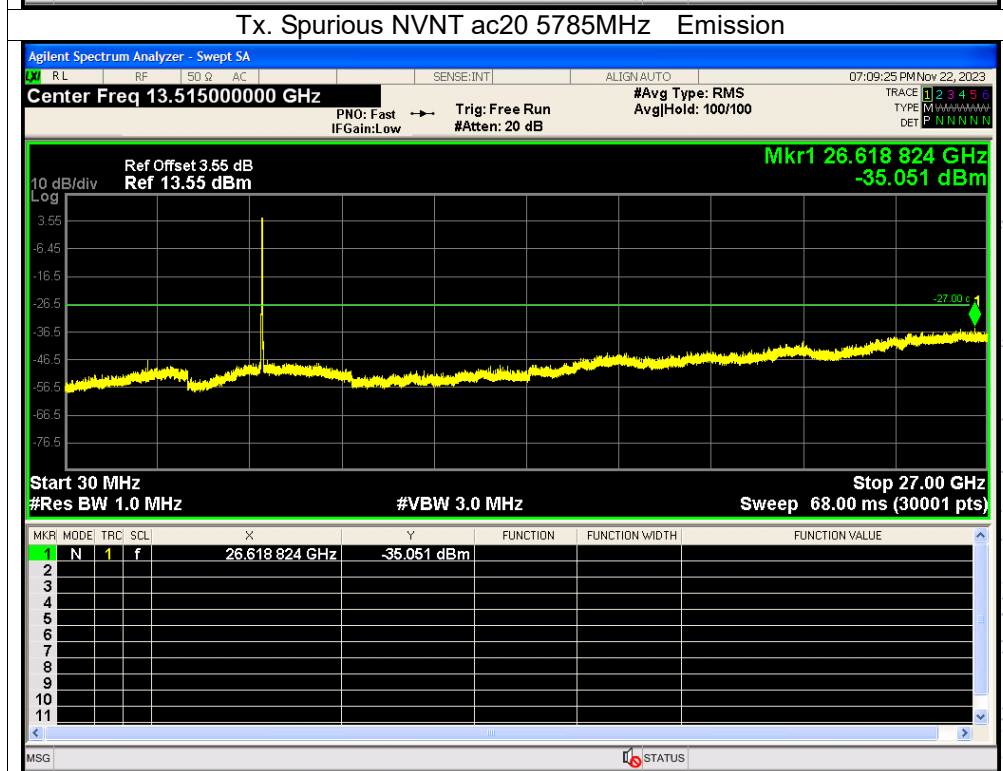
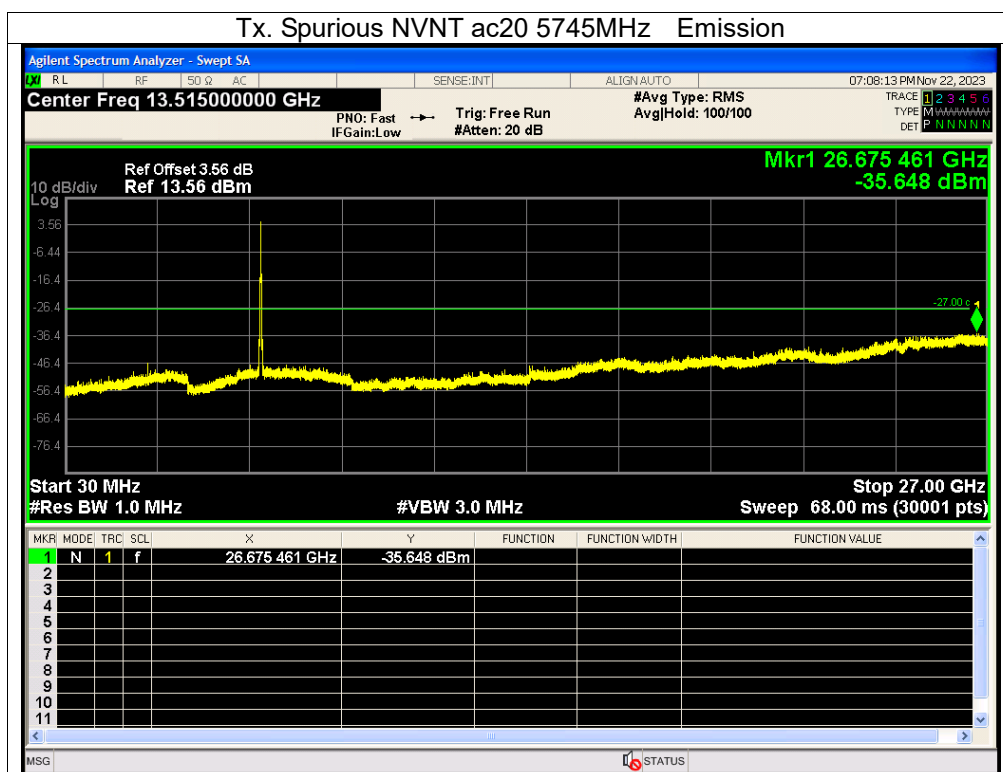


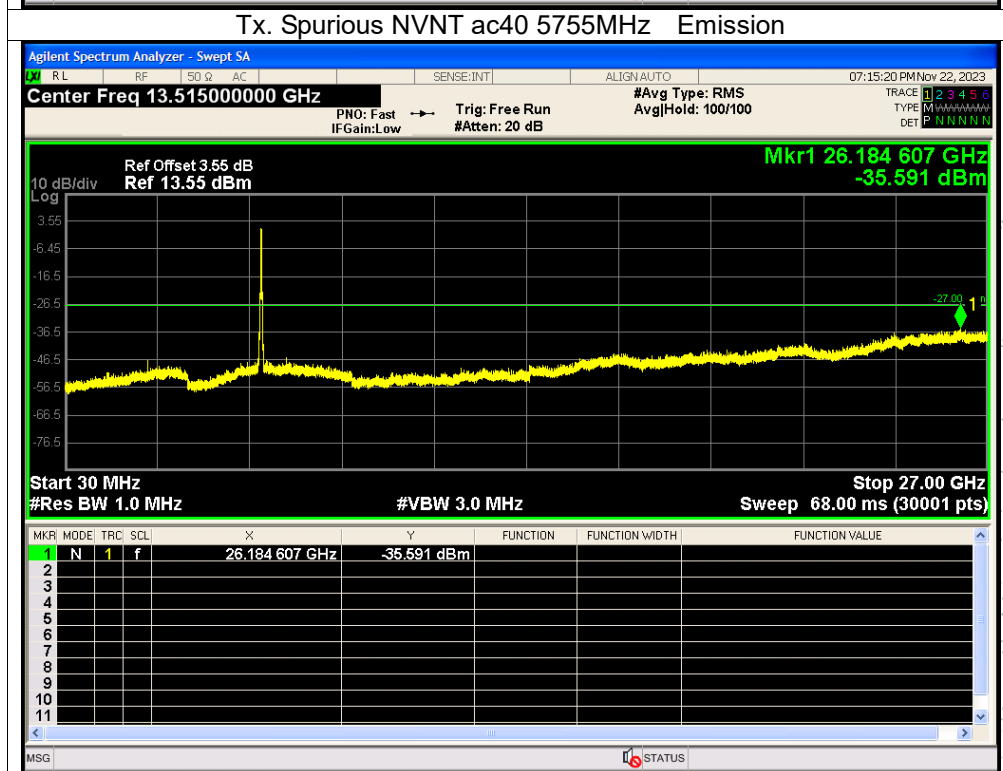
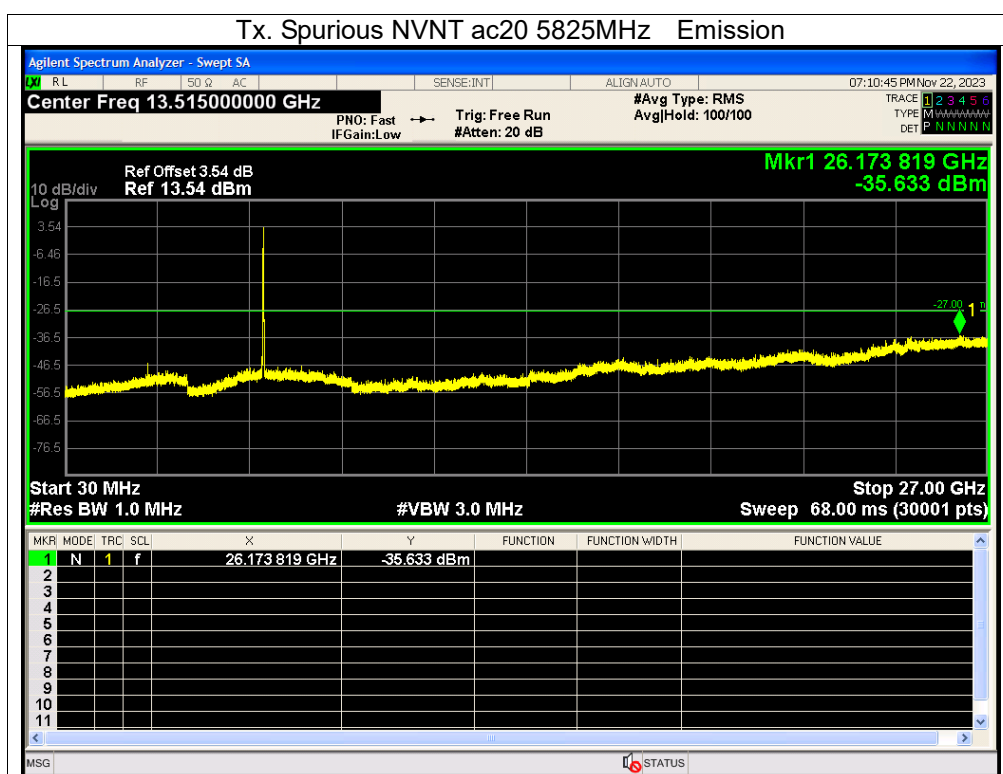


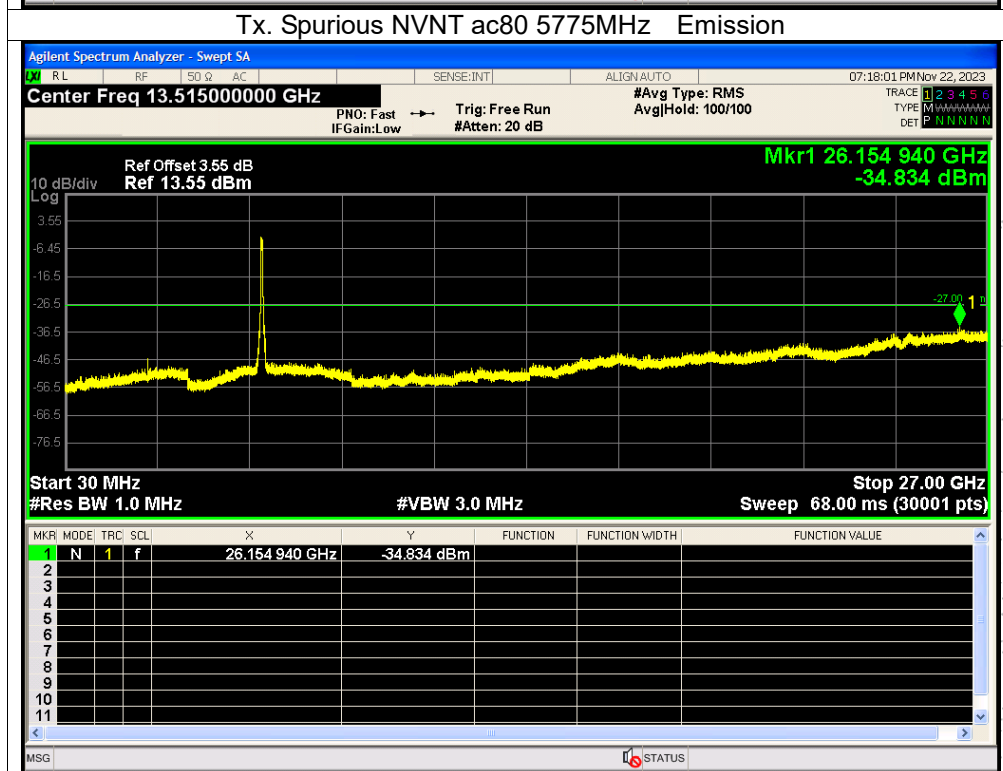
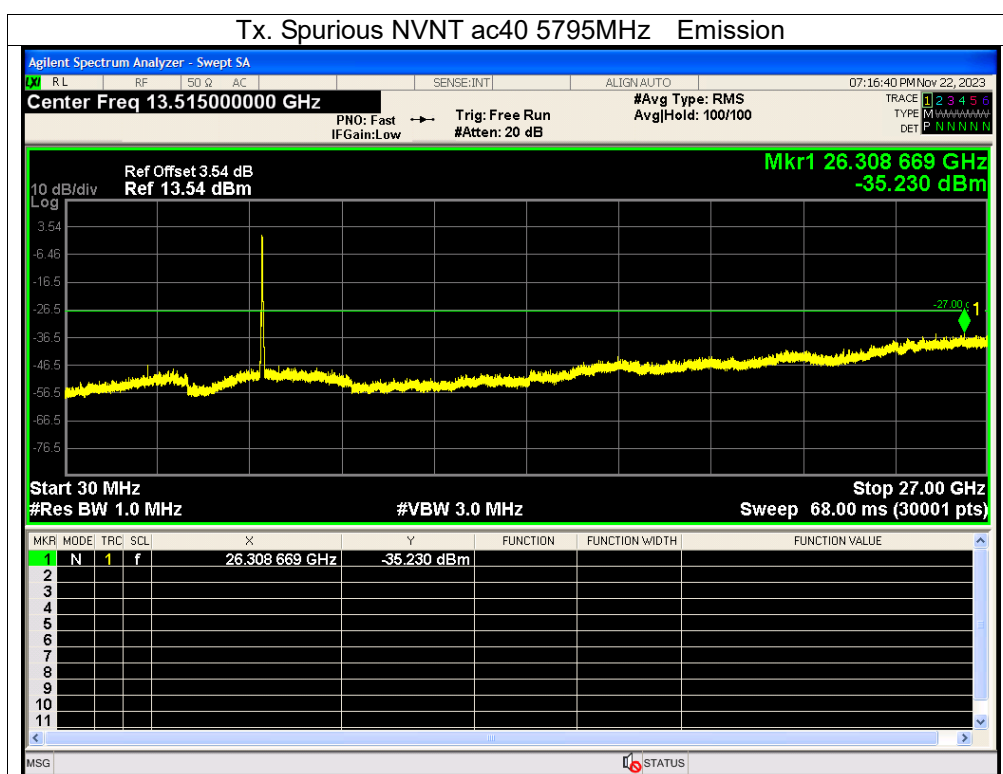












13. Frequency Stability Measurement

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:	AC 120V/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)	16.15	5180.0170	5180	0.0170	3.2735
		V max (V)	19	5180.0093	5180	0.0093	1.8022
		V min (V)	21.85	5180.0092	5180	0.0092	1.7699
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

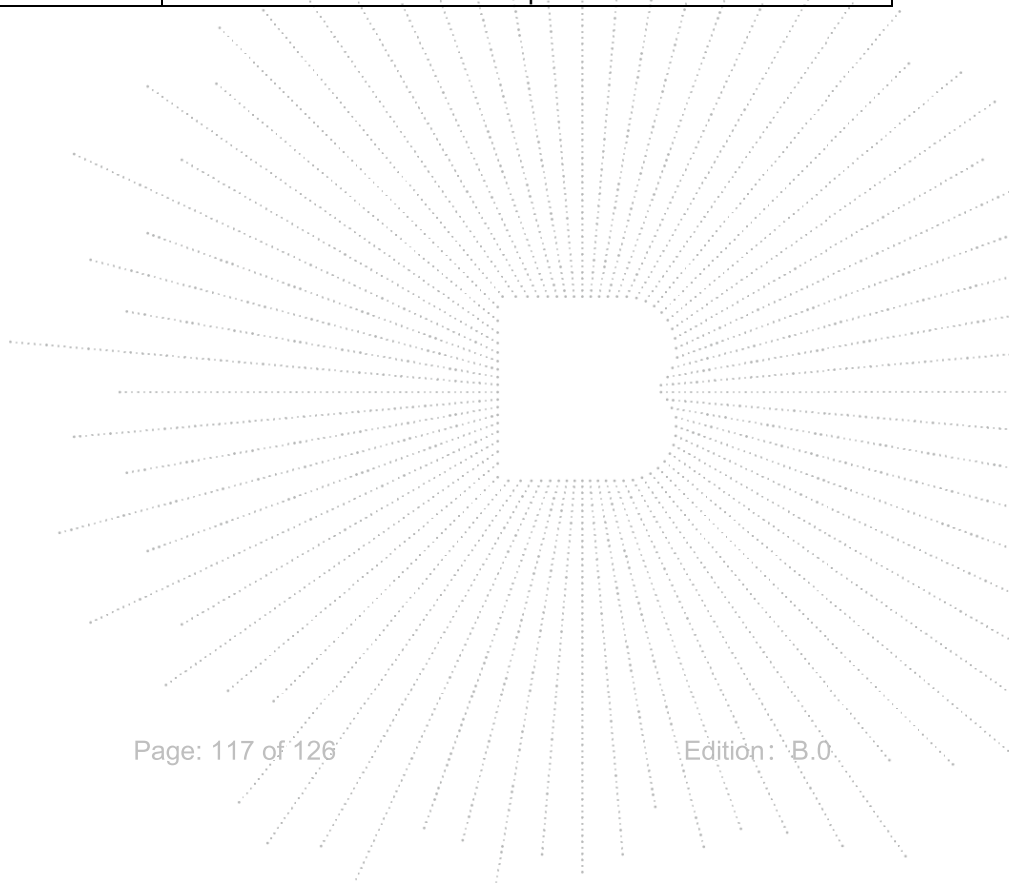
TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	DC 19V	T (°C)	-20	5180.0124	5180	0.0124	2.3978
		T (°C)	-10	5180.0130	5180	0.0130	2.5179
		T (°C)	0	5180.0016	5180	0.0016	0.3083
		T (°C)	10	5180.0106	5180	0.0106	2.0480
		T (°C)	20	5180.0124	5180	0.0124	2.4011
		T (°C)	30	5180.0028	5180	0.0028	0.5346
		T (°C)	40	5180.0020	5180	0.0020	0.3911
		T (°C)	50	5180.0100	5180	0.0100	1.9356
		T (°C)	60	5180.0043	5180	0.0043	0.8335
		T (°C)	70	5180.0085	5180	0.0085	1.6486
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)	16.15	5200.0001	5200	0.0001	0.0098
		V max (V)	19	5200.0116	5200	0.0116	2.2402
		V min (V)	21.85	5200.0035	5200	0.0035	0.6779
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)	DC 19V	T (°C)	-20	5200.00380	5200	0.00380	0.7302
		T (°C)	-10	5200.01115	5200	0.01115	2.1441
		T (°C)	0	5200.01250	5200	0.01250	2.4039
		T (°C)	10	5200.00908	5200	0.00908	1.7464
		T (°C)	20	5200.00730	5200	0.00730	1.4043
		T (°C)	30	5200.00825	5200	0.00825	1.5874
		T (°C)	40	5200.00428	5200	0.00428	0.8223
		T (°C)	50	5200.01279	5200	0.01279	2.4590
		T (°C)	60	5200.00819	5200	0.00819	1.5756
		T (°C)	70	5200.00674	5200	0.00674	1.2965
Limits				5150-5250 MHz			
Result				Complies			

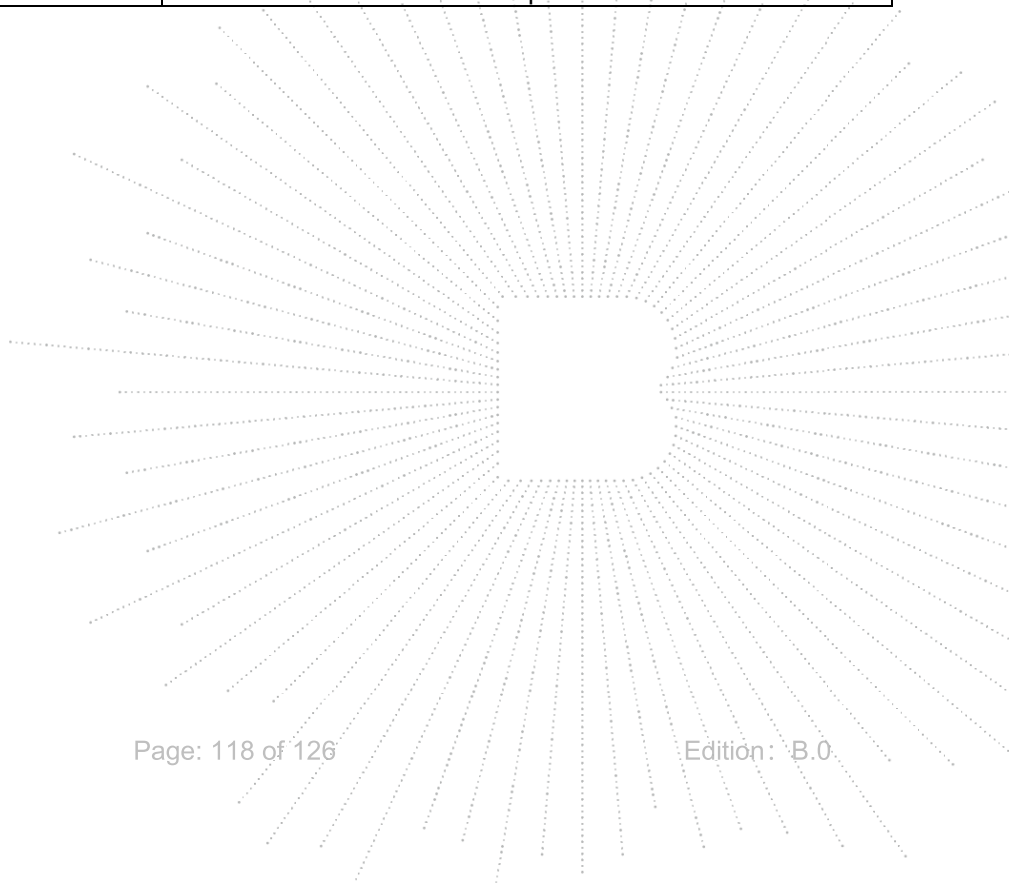


Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	16.15	5240.0079	5240	0.0079	1.5016
		V max (V)	19	5240.0062	5240	0.0062	1.1796
		V min (V)	21.85	5240.0084	5240	0.0084	1.6051
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)	DC 19V	T (°C)	-20	5240.0093	5240	0.0093	1.7658
		T (°C)	-10	5240.0033	5240	0.0033	0.6255
		T (°C)	0	5240.0084	5240	0.0084	1.6123
		T (°C)	10	5240.0119	5240	0.0119	2.2763
		T (°C)	20	5240.0036	5240	0.0036	0.6857
		T (°C)	30	5240.0044	5240	0.0044	0.8306
		T (°C)	40	5240.0005	5240	0.0005	0.0959
		T (°C)	50	5240.0021	5240	0.0021	0.3925
		T (°C)	60	5240.0078	5240	0.0078	1.4979
		T (°C)	70	5240.0126	5240	0.0126	2.3989
Limits				5150-5250 MHz			
Result				Complies			



Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC120V/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)	16.15	5745.00974	5745	0.00974	1.6955
		V max (V)	19	5745.00854	5745	0.00854	1.4870
		V min (V)	21.85	5745.00491	5745	0.00491	0.8546
Limits				5725-5850 MHz			
Result				Complies			

Temperature vs. Frequency Stability

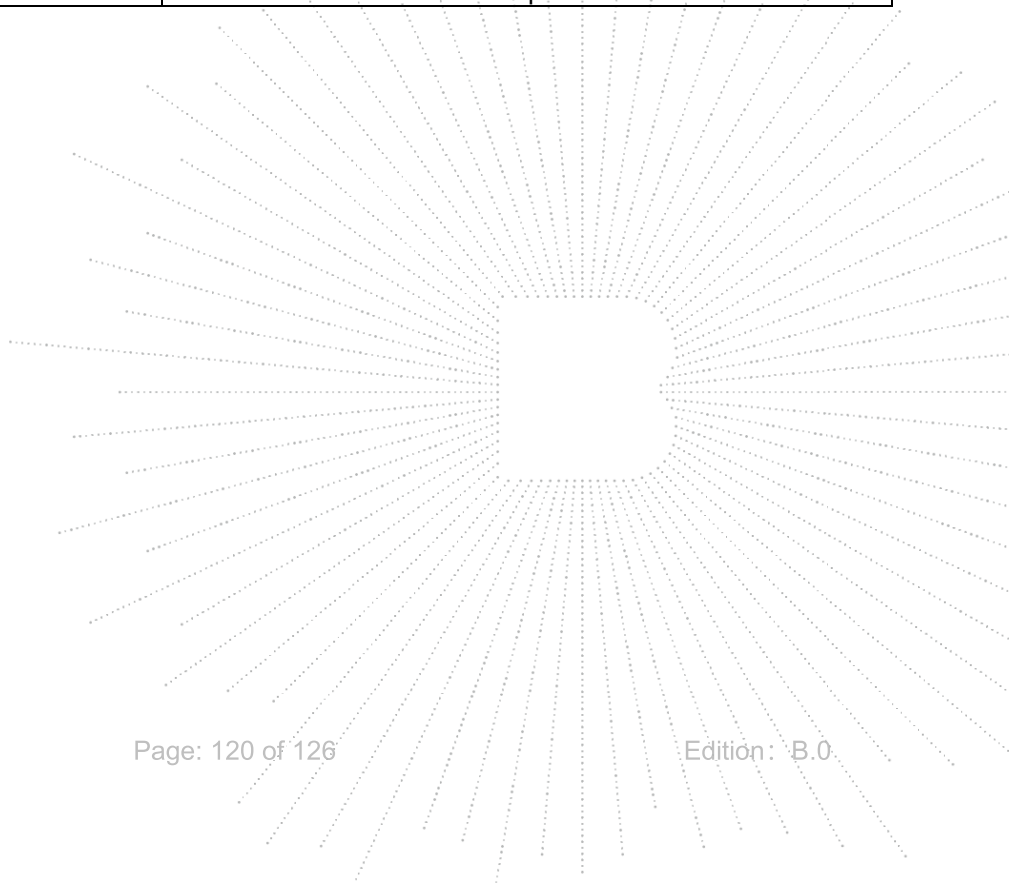
TEST CONDITIONS				Reference Frequency: 5745MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	DC 19V	T (°C)	-20	5745.00055	5745	0.00055	0.0952
		T (°C)	-10	5745.00904	5745	0.00904	1.5733
		T (°C)	0	5745.00831	5745	0.00831	1.4473
		T (°C)	10	5745.00502	5745	0.00502	0.8737
		T (°C)	20	5745.01116	5745	0.01116	1.9422
		T (°C)	30	5745.00857	5745	0.00857	1.4913
		T (°C)	40	5745.00052	5745	0.00052	0.0898
		T (°C)	50	5745.00169	5745	0.00169	0.2941
		T (°C)	60	5745.00078	5745	0.00078	0.1363
		T (°C)	70	5745.00492	5745	0.00492	0.8569
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)	16.15	5785.00263	5785	0.00263	0.4551
		V max (V)	19	5785.00603	5785	0.00603	1.0417
		V min (V)	21.85	5785.00579	5785	0.00579	1.0012
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)	DC 19V	T (°C)	-20	5785.00735	5785	0.00735	1.2702
		T (°C)	-10	5785.00984	5785	0.00984	1.7011
		T (°C)	0	5785.00600	5785	0.00600	1.0363
		T (°C)	10	5785.00023	5785	0.00023	0.0392
		T (°C)	20	5785.00455	5785	0.00455	0.7867
		T (°C)	30	5785.00486	5785	0.00486	0.8408
		T (°C)	40	5785.00849	5785	0.00849	1.4671
		T (°C)	50	5785.00856	5785	0.00856	1.4792
		T (°C)	60	5785.00716	5785	0.00716	1.2378
		T (°C)	70	5785.00050	5785	0.00050	0.0870
Limits				5725-5850 MHz			
Result				Complies			

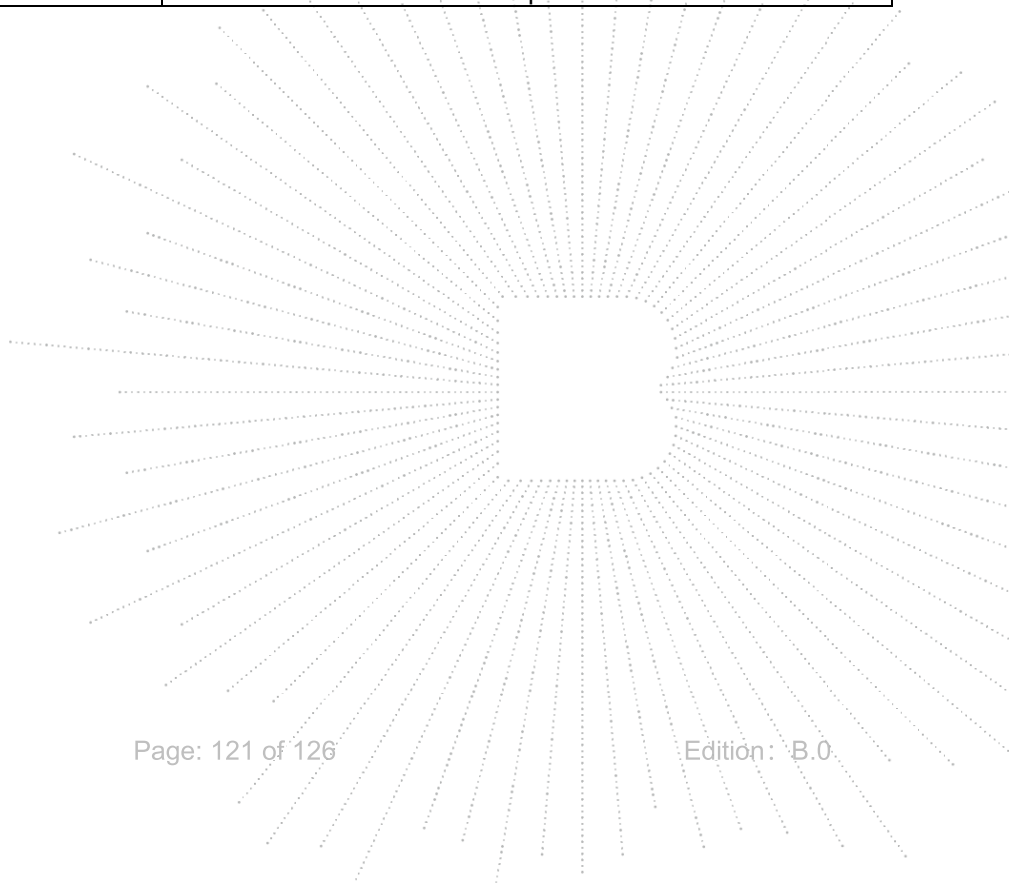


Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5825MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	16.15	5825.00225	5825	0.00225	0.3858
		V max (V)	19	5825.00541	5825	0.00541	0.9293
		V min (V)	21.85	5825.01283	5825	0.01283	2.2029
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)	DC 19V	T (°C)	-20	5825.00507	5825	0.00507	0.8699
		T (°C)	-10	5825.00730	5825	0.00730	1.2538
		T (°C)	0	5825.01034	5825	0.01034	1.7747
		T (°C)	10	5825.00031	5825	0.00031	0.0532
		T (°C)	20	5825.00878	5825	0.00878	1.5068
		T (°C)	30	5825.00496	5825	0.00496	0.8522
		T (°C)	40	5825.00513	5825	0.00513	0.8811
		T (°C)	50	5825.01178	5825	0.01178	2.0228
		T (°C)	60	5825.00631	5825	0.00631	1.0832
		T (°C)	70	5825.01350	5825	0.01350	2.3178
Limits				5725-5850 MHz			
Result				Complies			



14. Antenna Requirement

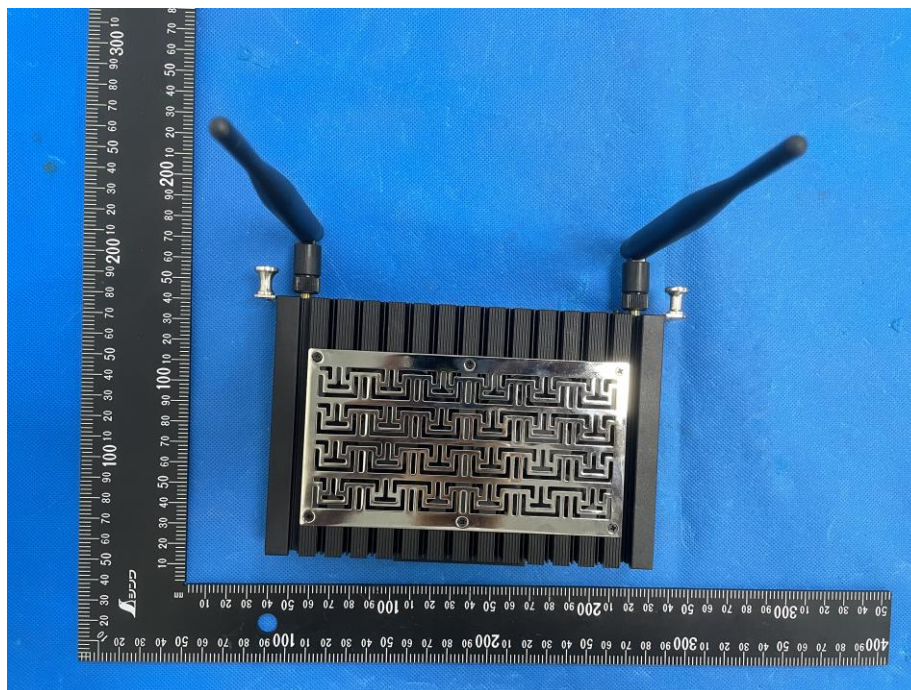
14.1 Limit

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.

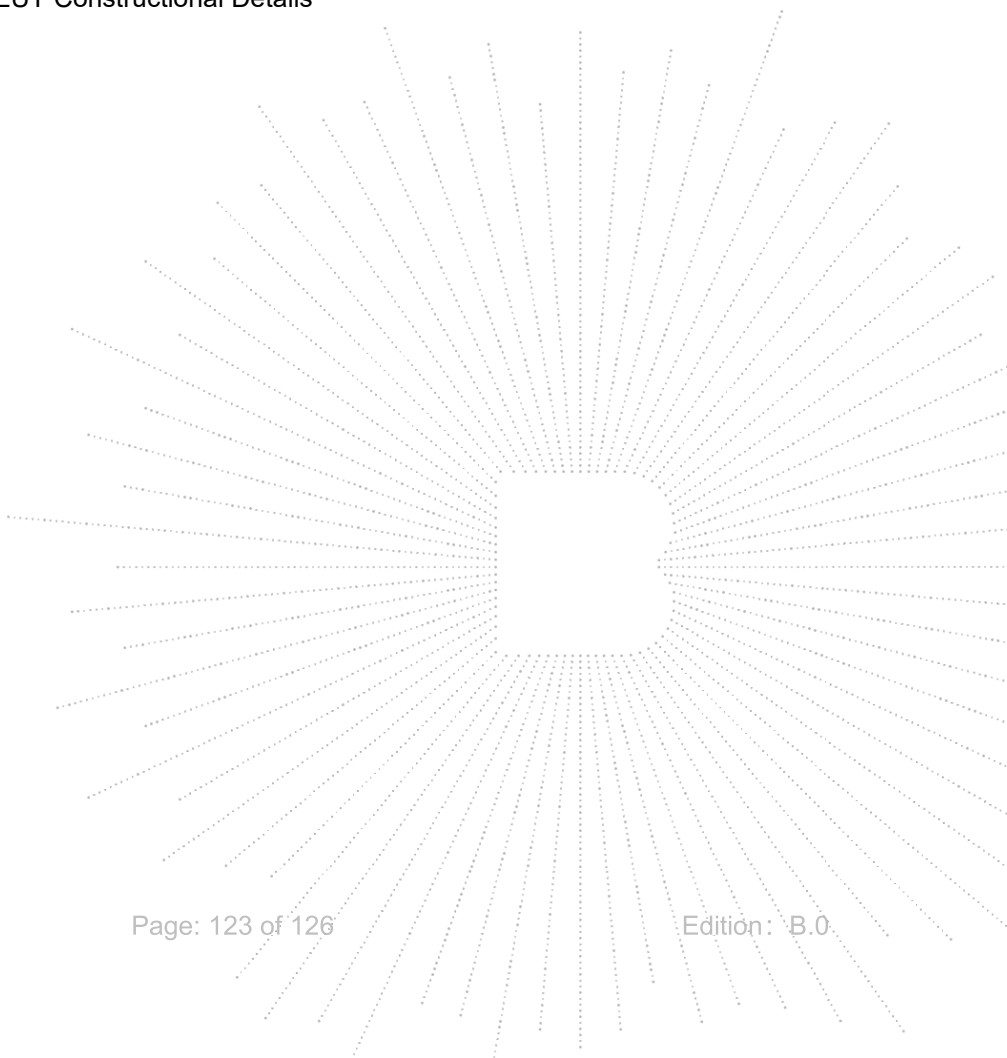
14.2 Test Antenna

The EUT antenna is External antenna, Use SMA reverse polarity, fulfill the requirement of this section.

15. EUT Photographs



Appendix-Photographs Of EUT Constructional Details

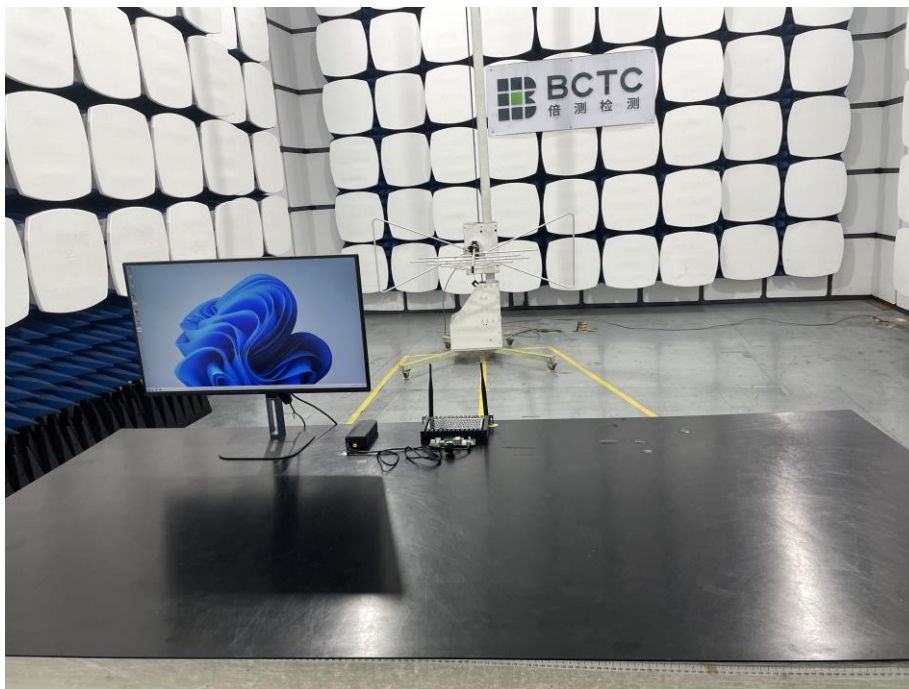


16. EUT Test Setup Photographs

Conducted emissions



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.

Address:

1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

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FAX: 0755-33229357

Website: <http://www.chnbctc.com>

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***** END *****