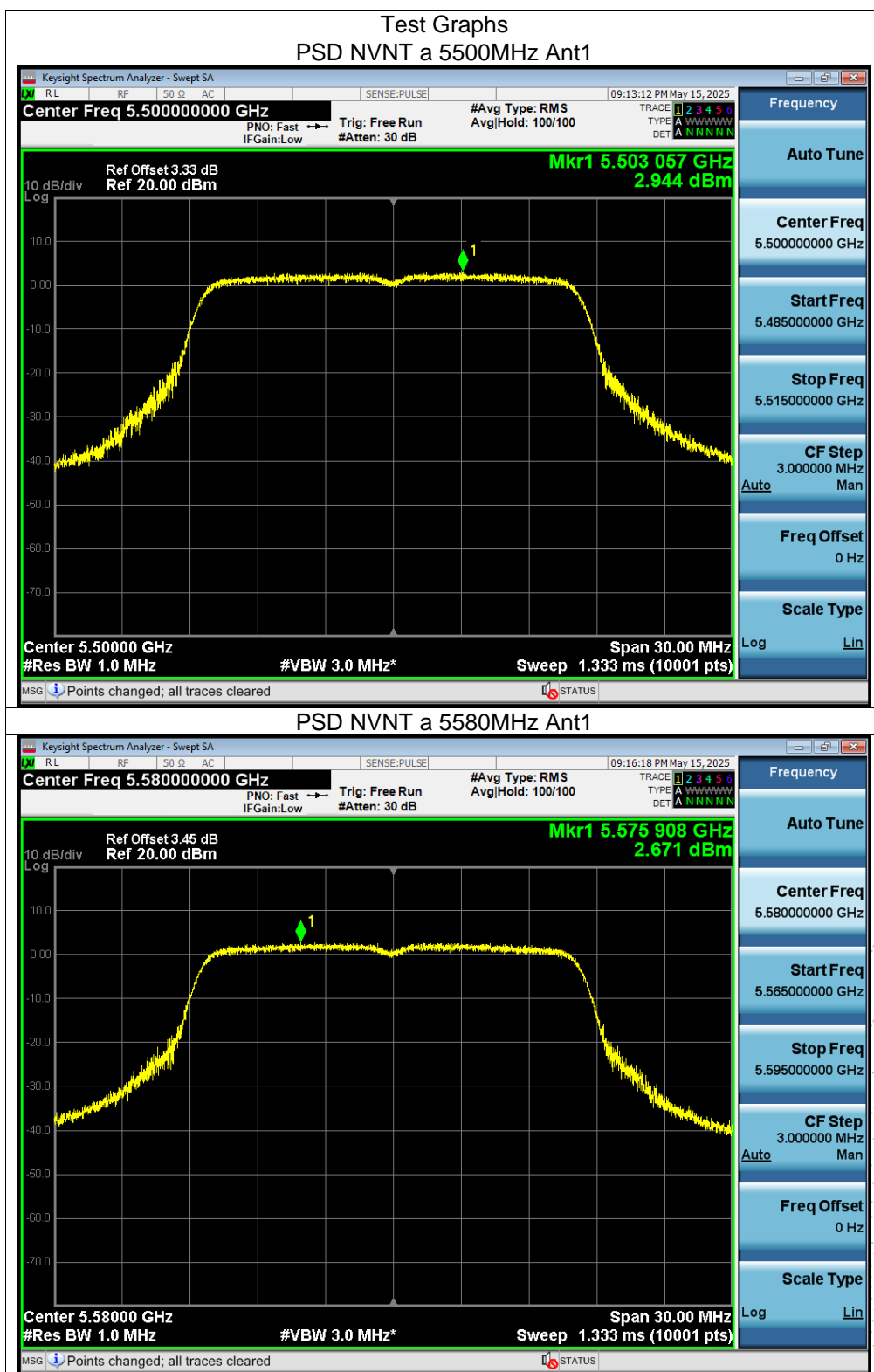
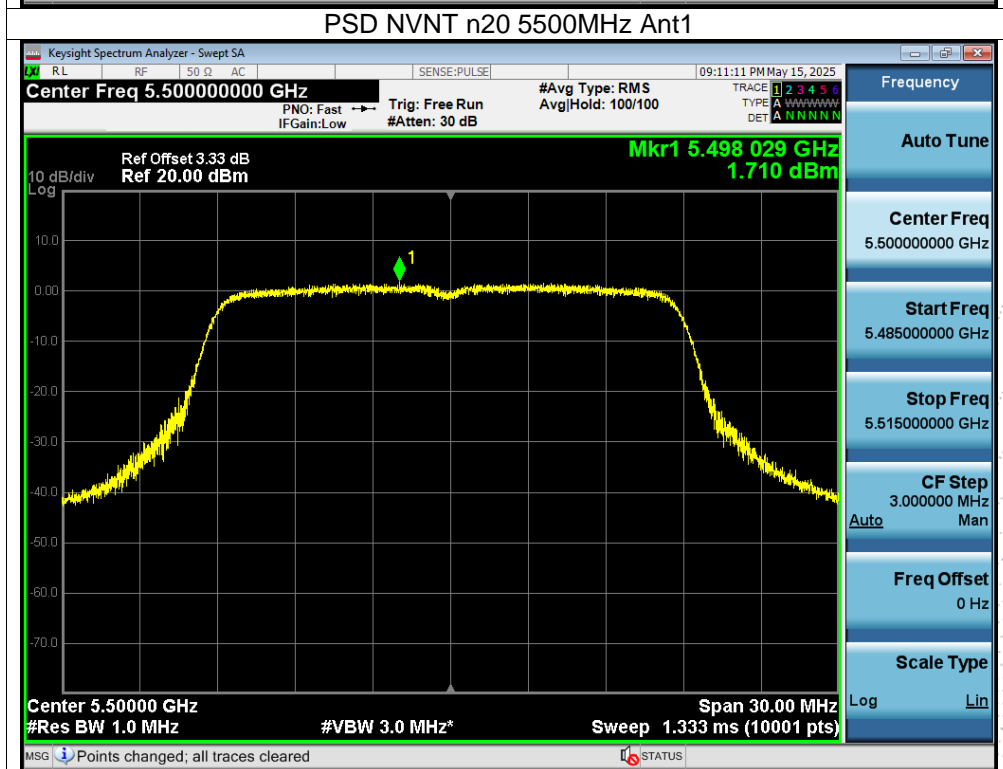
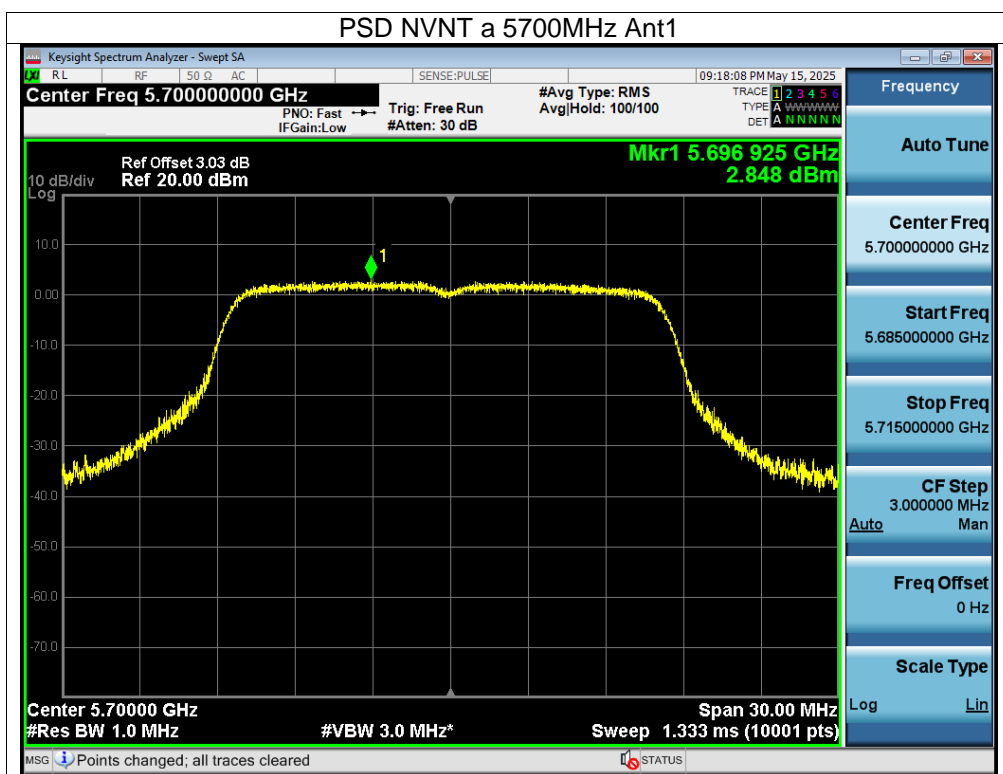


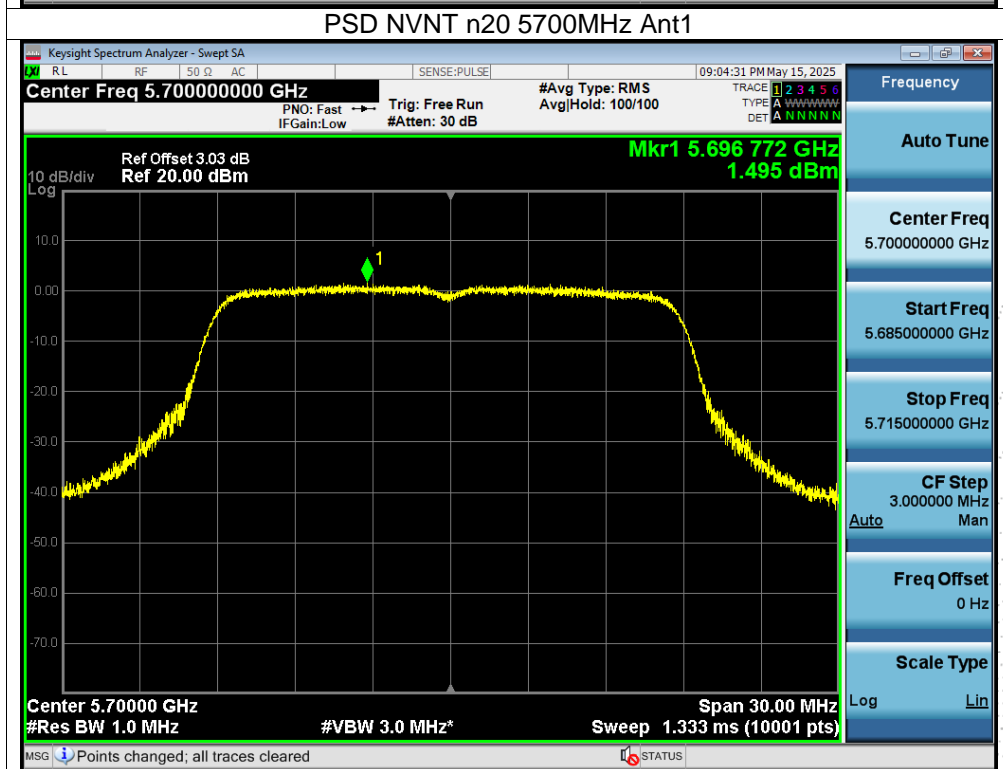
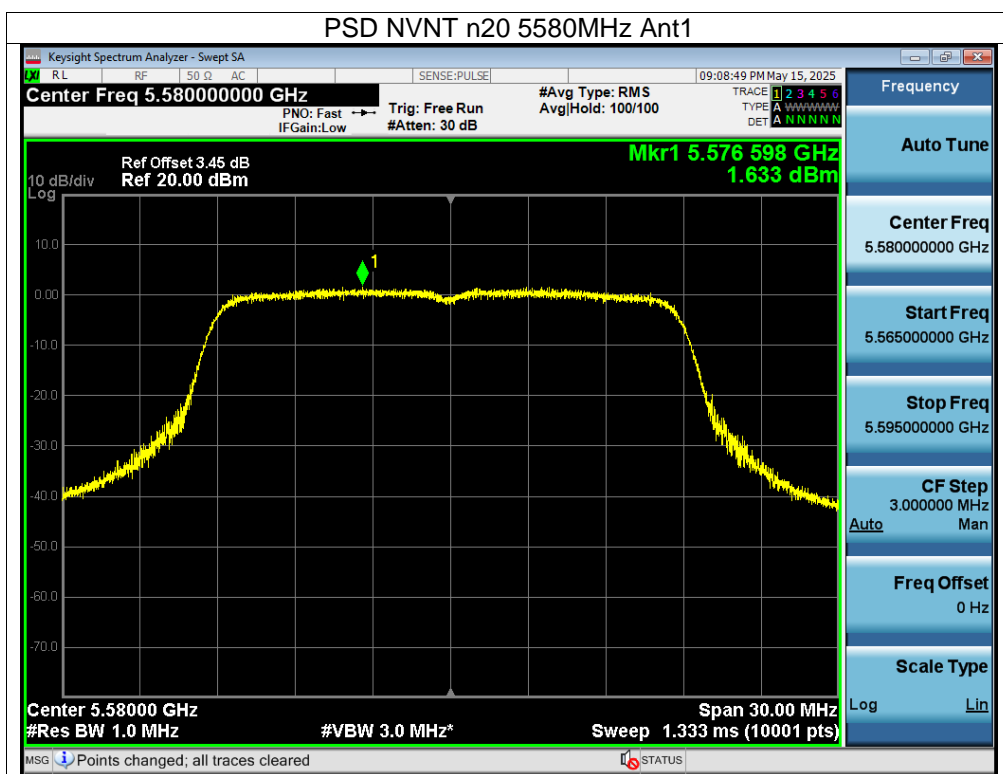
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Pressure:	101KPa	Test Voltage:	DC 3.3V
Test Mode:	(5500-5700MHz)		

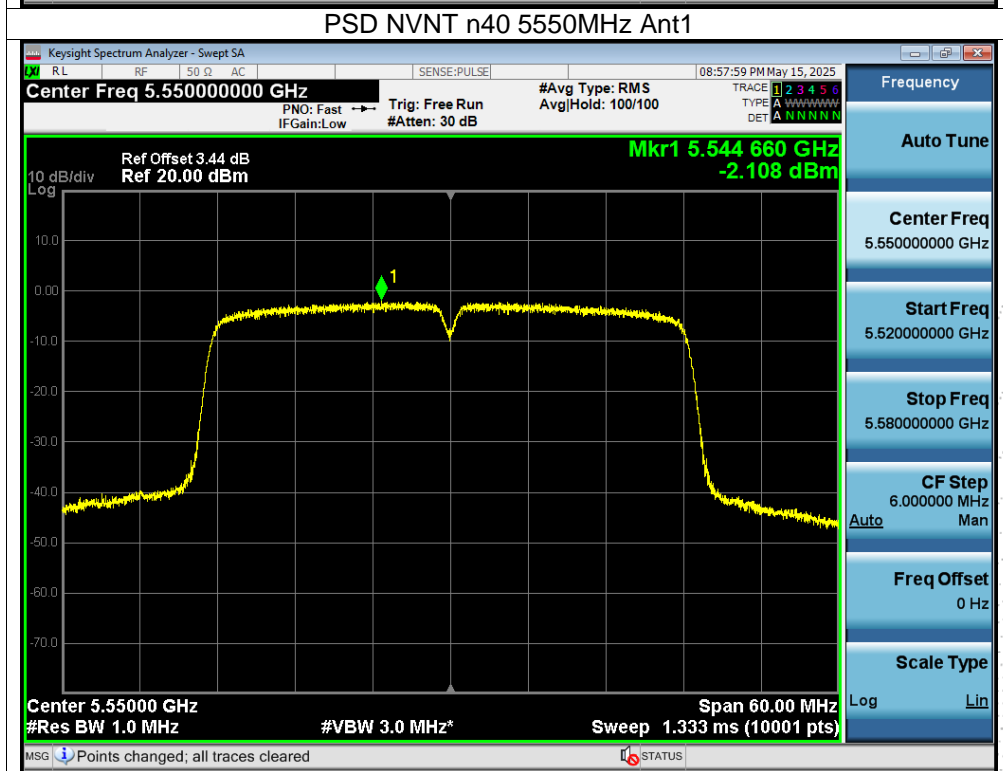
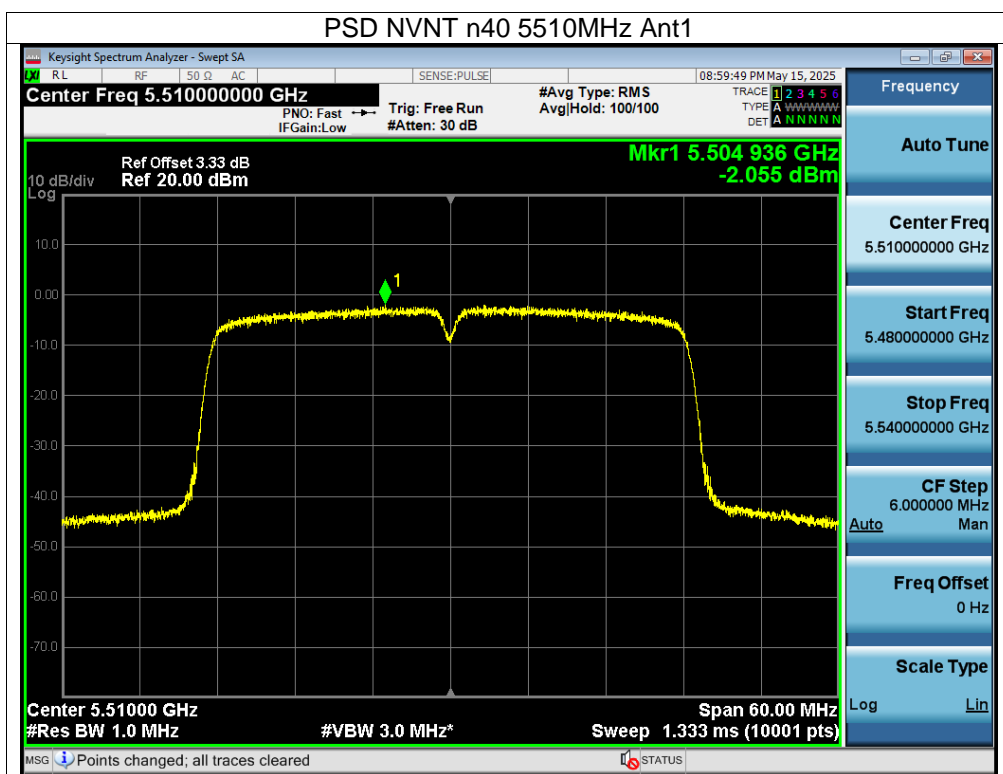
Condition	Mode	Frequency (MHz)	Conducted PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	a	5500	2.94	11	Pass
NVNT	a	5580	2.67	11	Pass
NVNT	a	5700	2.85	11	Pass
NVNT	n20	5500	1.71	11	Pass
NVNT	n20	5580	1.63	11	Pass
NVNT	n20	5700	1.5	11	Pass
NVNT	n40	5510	-2.06	11	Pass
NVNT	n40	5550	-2.11	11	Pass
NVNT	n40	5670	-1.75	11	Pass

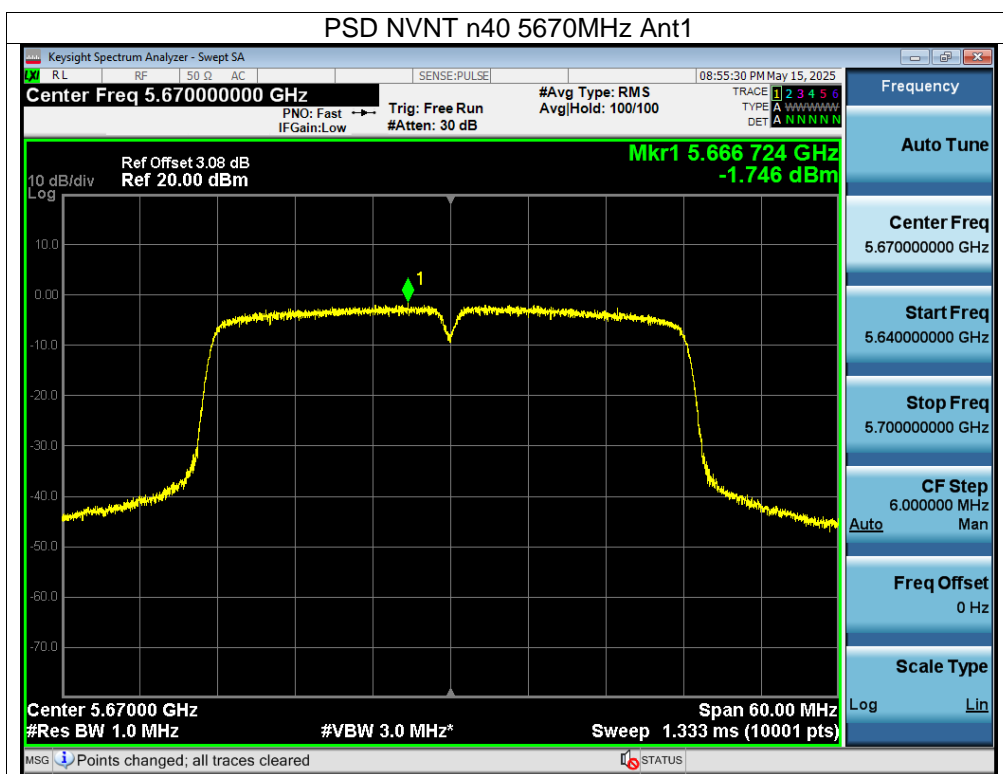








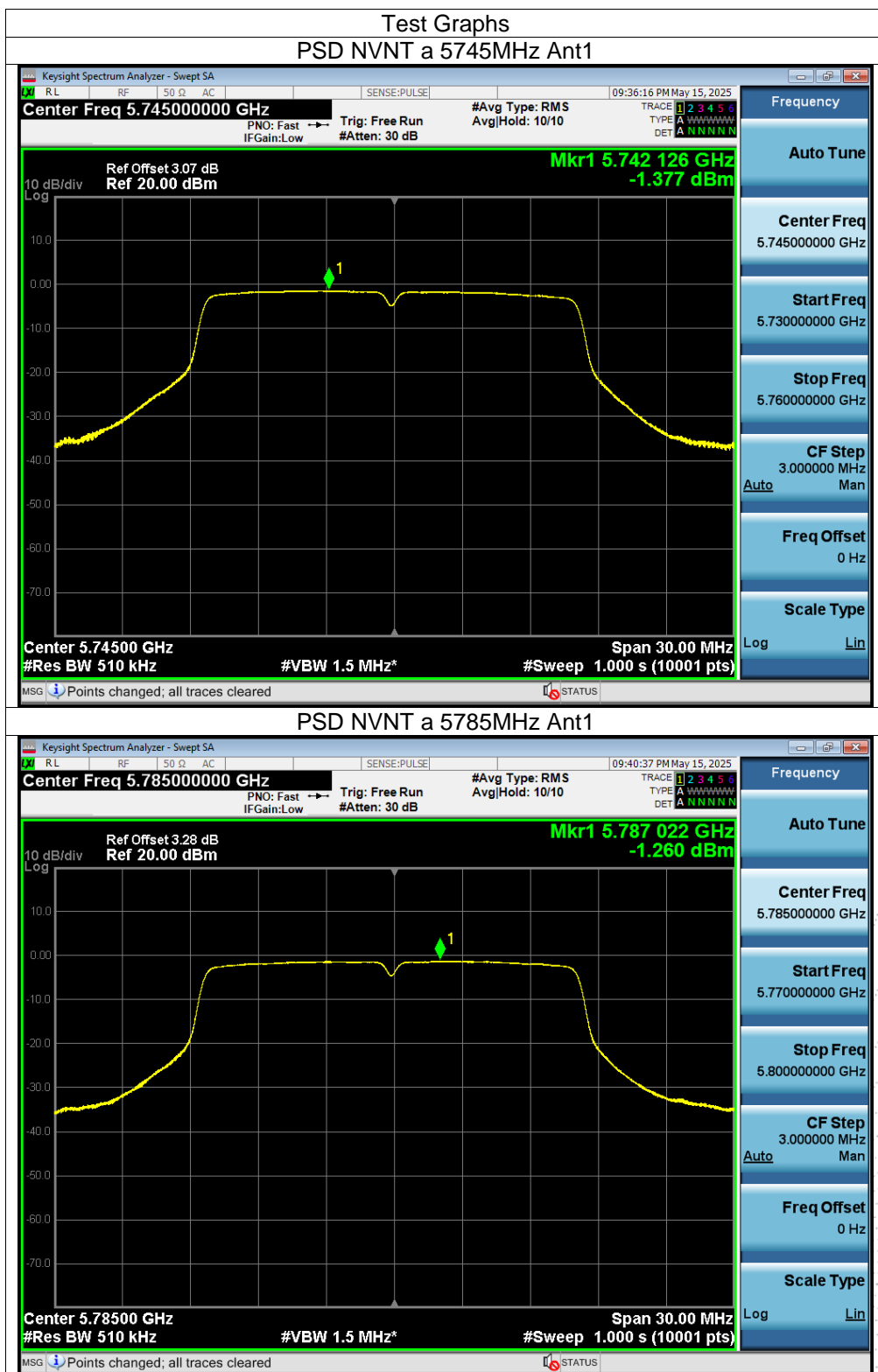


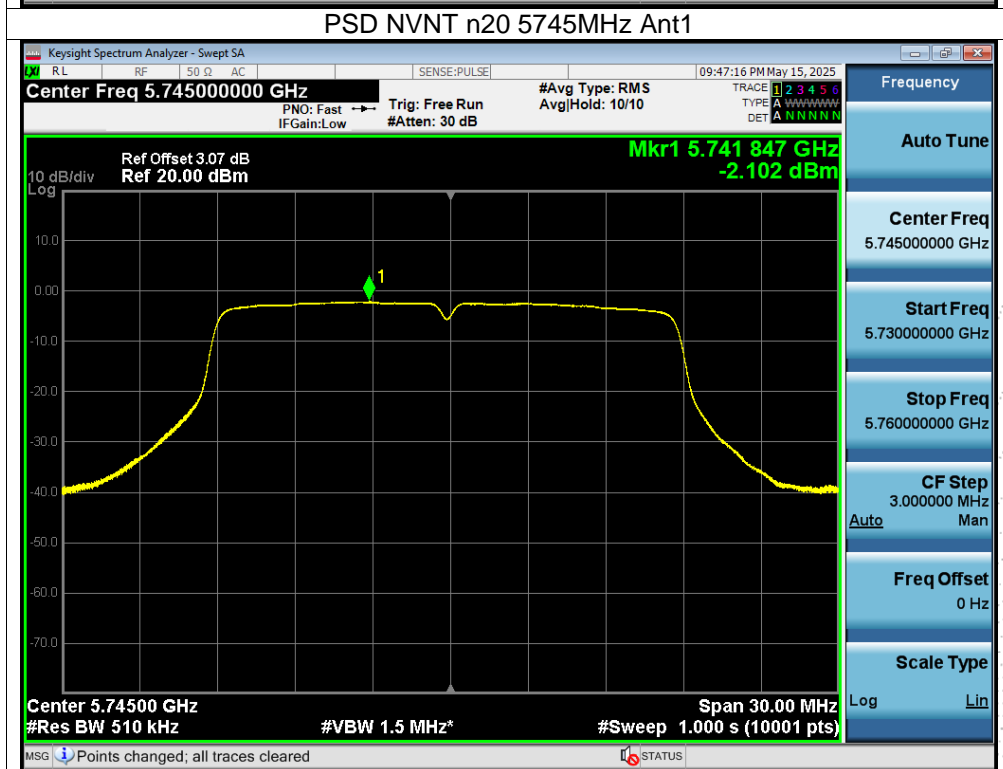
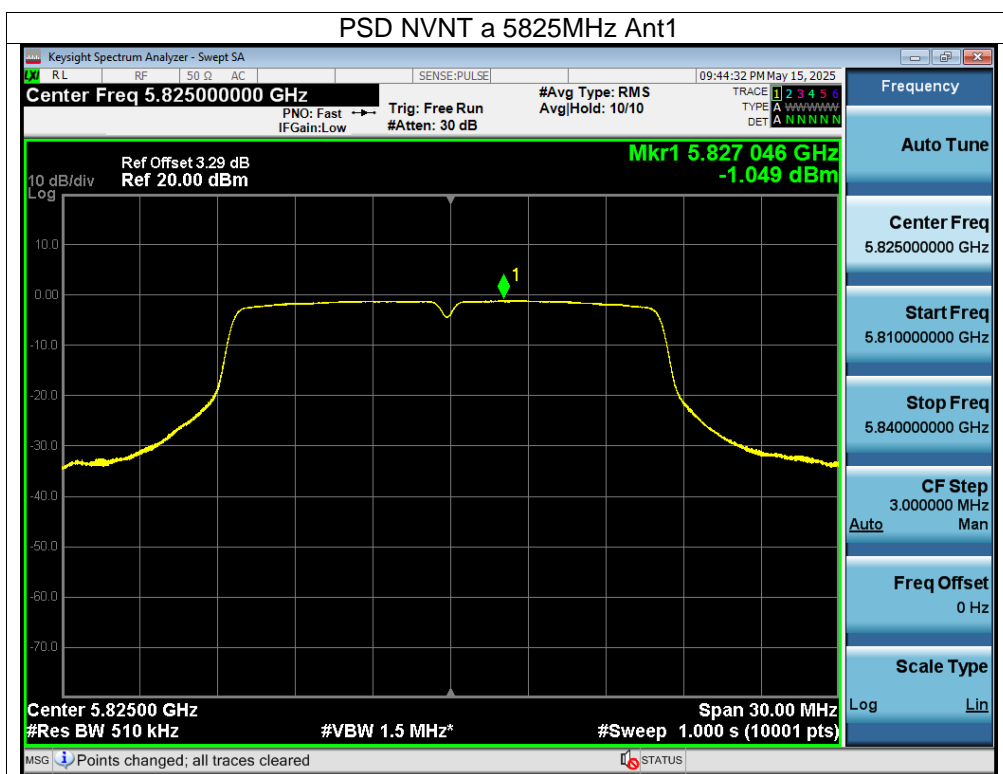


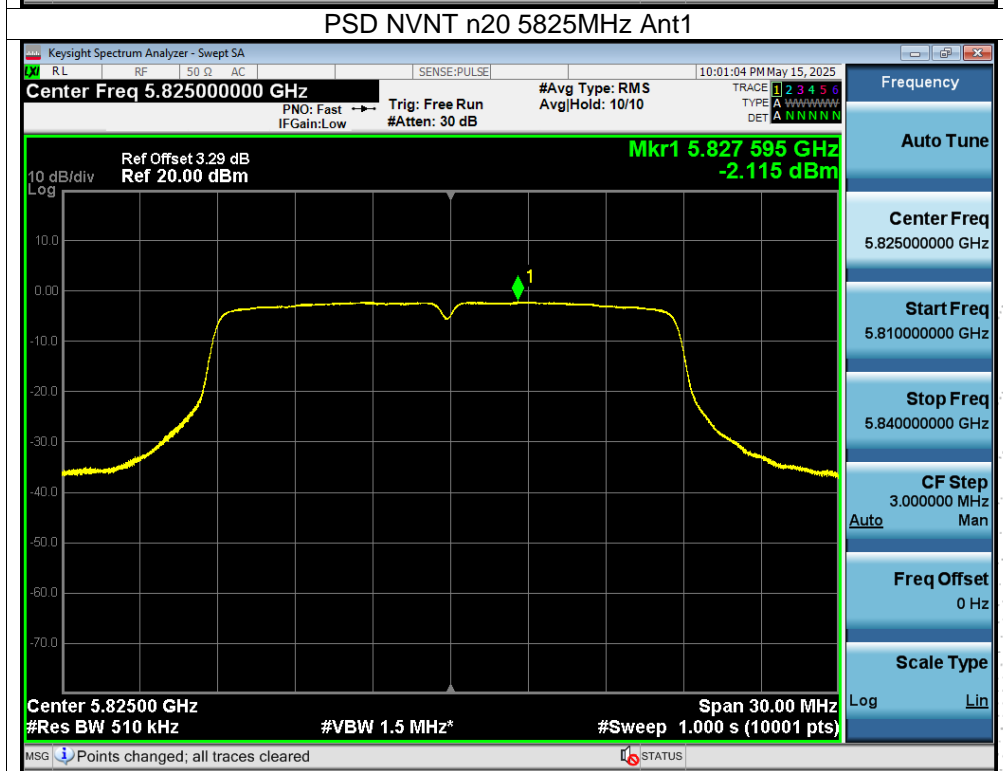
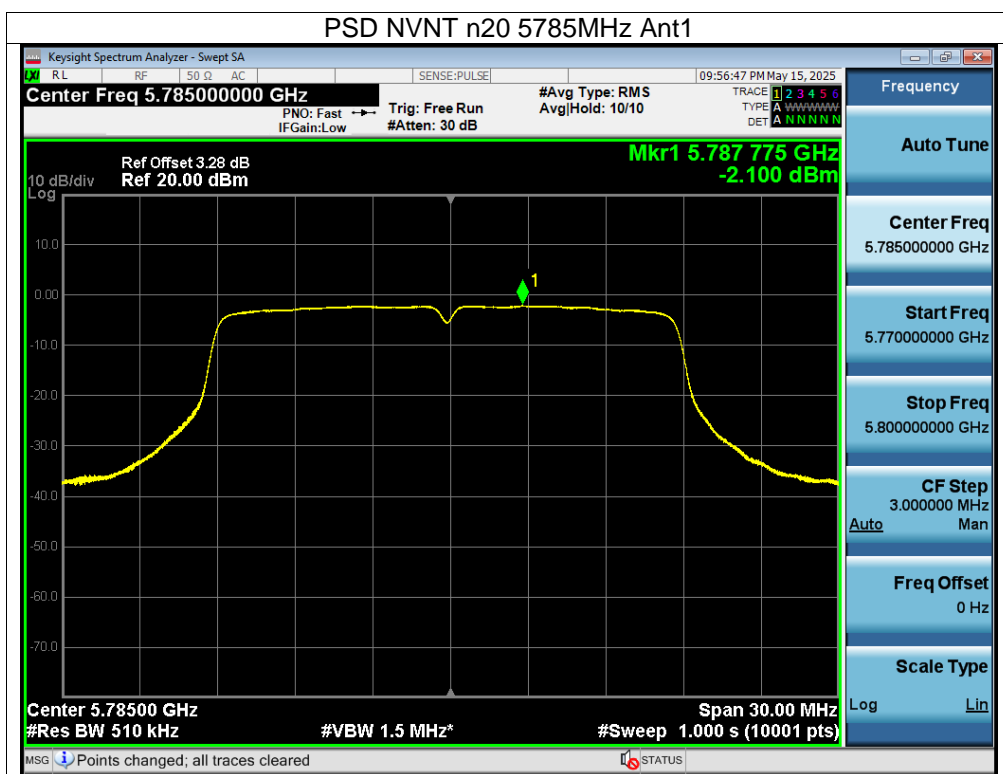
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Pressure:	101KPa	Test Voltage:	DC 3.3V
Test Mode:	(5745-5825MHz)		

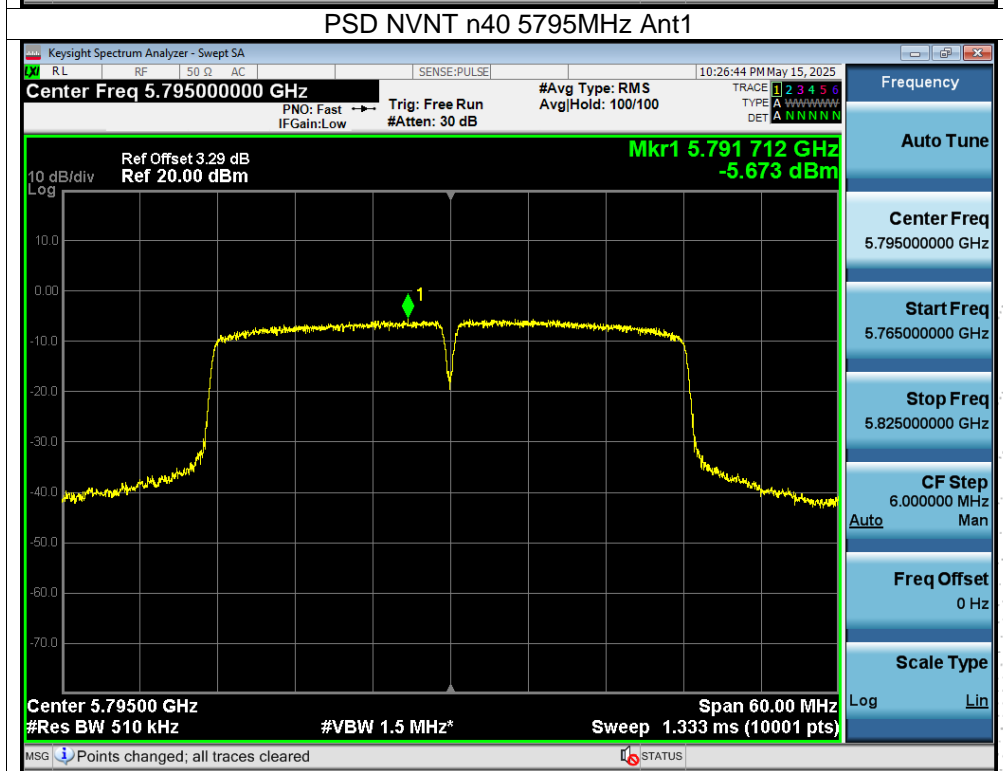
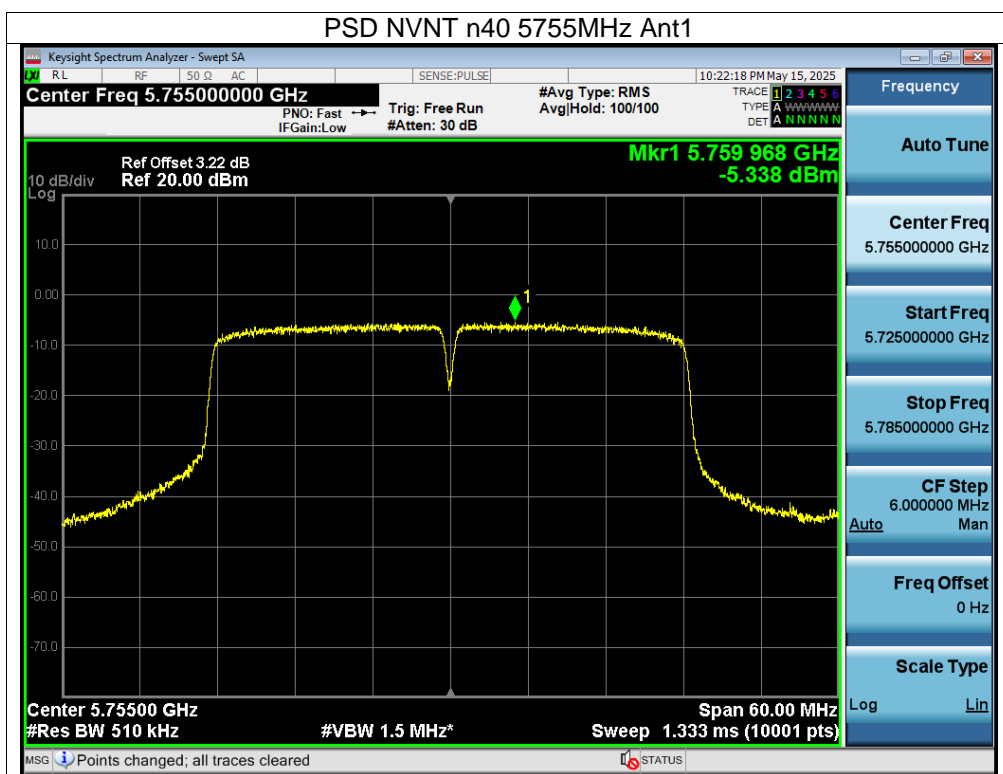
Condition	Mode	Frequency (MHz)	Conducted PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	a	5745	-1.38	30	Pass
NVNT	a	5785	-1.26	30	Pass
NVNT	a	5825	-1.05	30	Pass
NVNT	n20	5745	-2.1	30	Pass
NVNT	n20	5785	-2.1	30	Pass
NVNT	n20	5825	-2.12	30	Pass
NVNT	n40	5755	-5.34	30	Pass
NVNT	n40	5795	-5.67	30	Pass





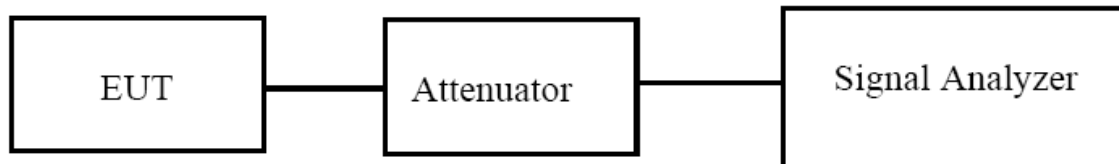






9. 26dB & 6dB & 99% Emission Bandwidth

9.1 Block Diagram Of Test Setup



9.2 Limit

(1) For the band 5.15-5.25 GHz.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

9.3 Test Procedure

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

The following procedure shall be used for measuring (99 %) power bandwidth:

- Set center frequency to the nominal EUT channel center frequency.

2. Set span = 1.5 times to 5.0 times the OBW.

3. Set RBW = 1 % to 5 % of the OBW

4. Set VBW $\geq 3 \cdot$ RBW

5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

6. Use the 99 % power bandwidth function of the instrument (if available).

7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

9.4 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.

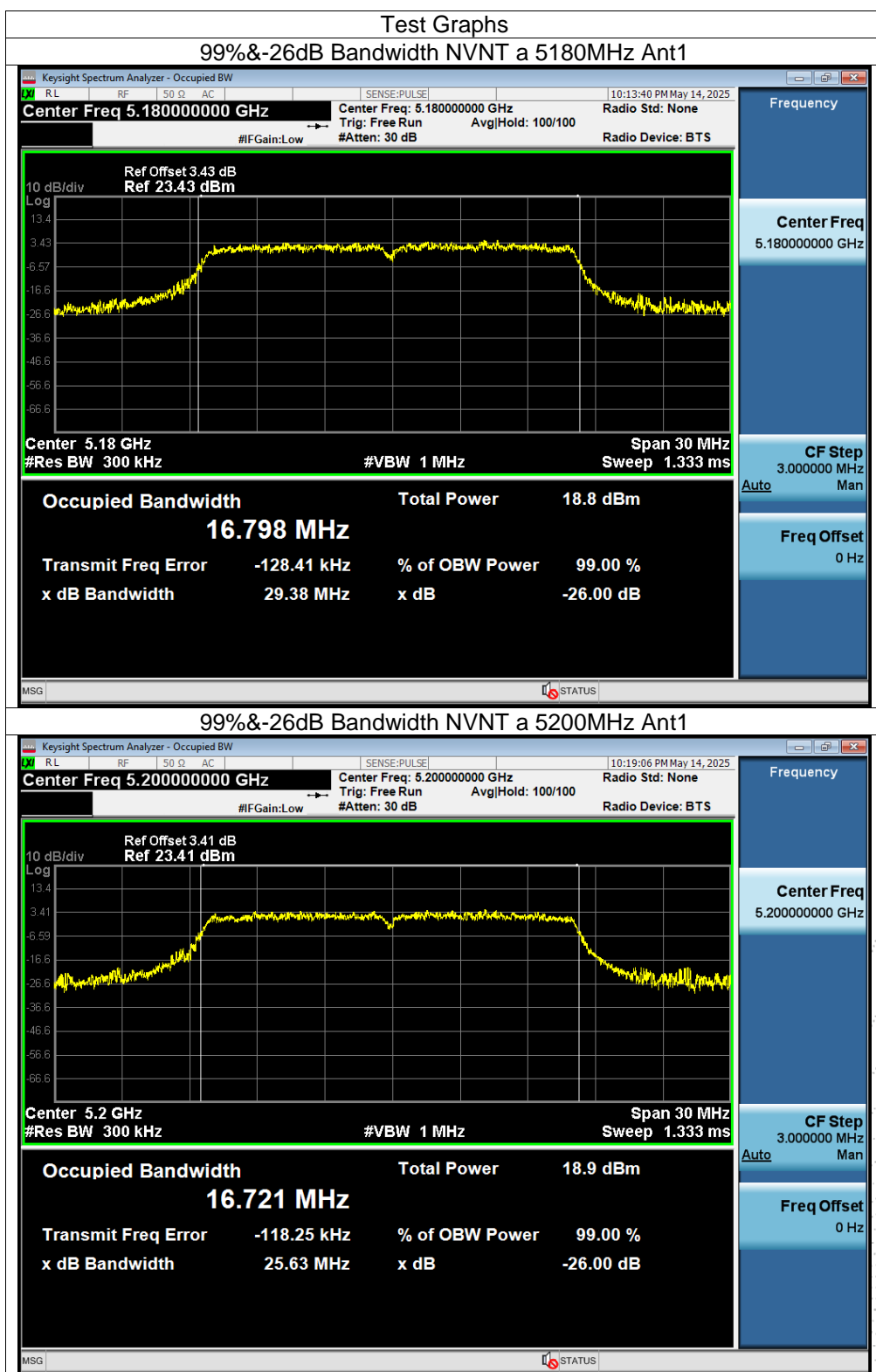


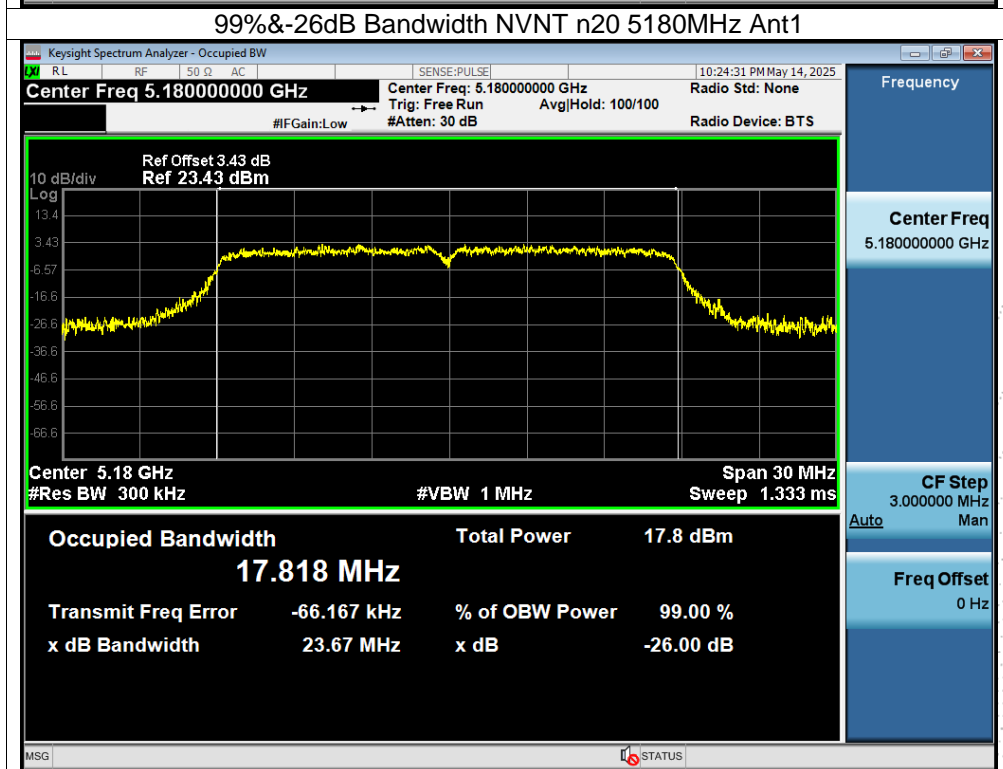
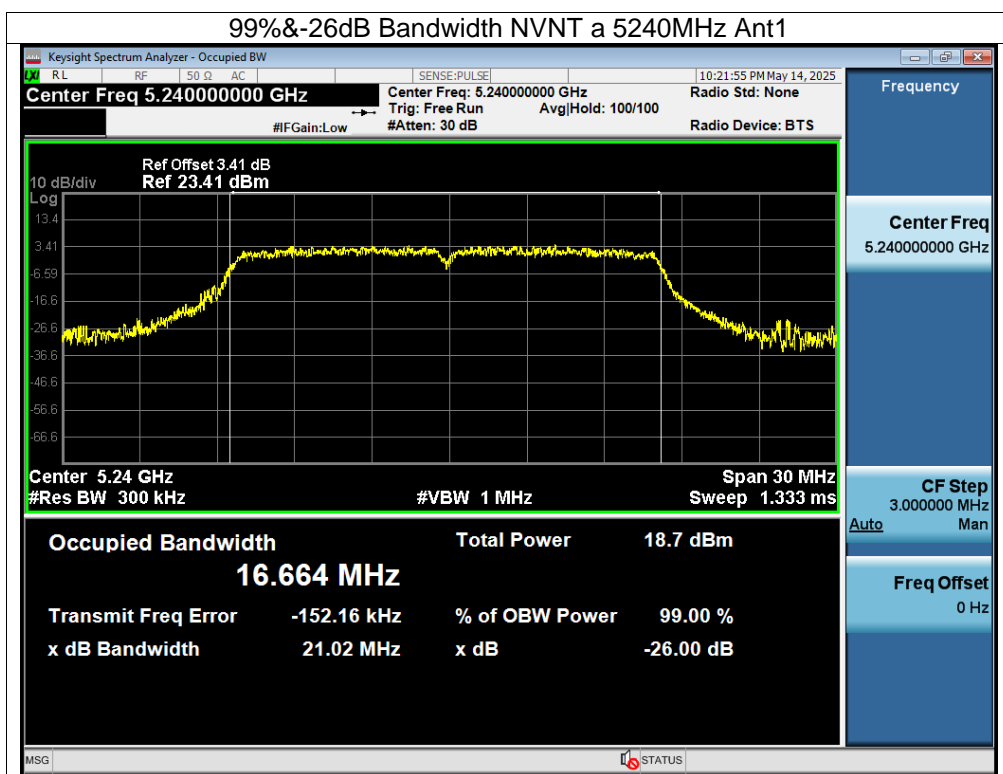
9.5 Test Result

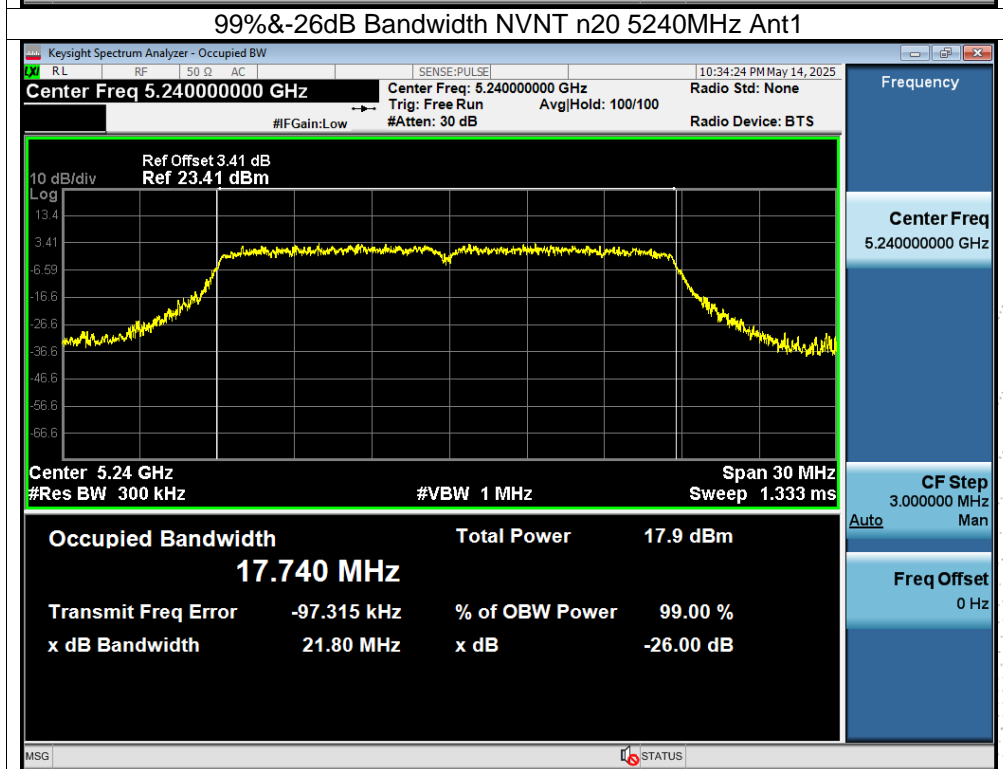
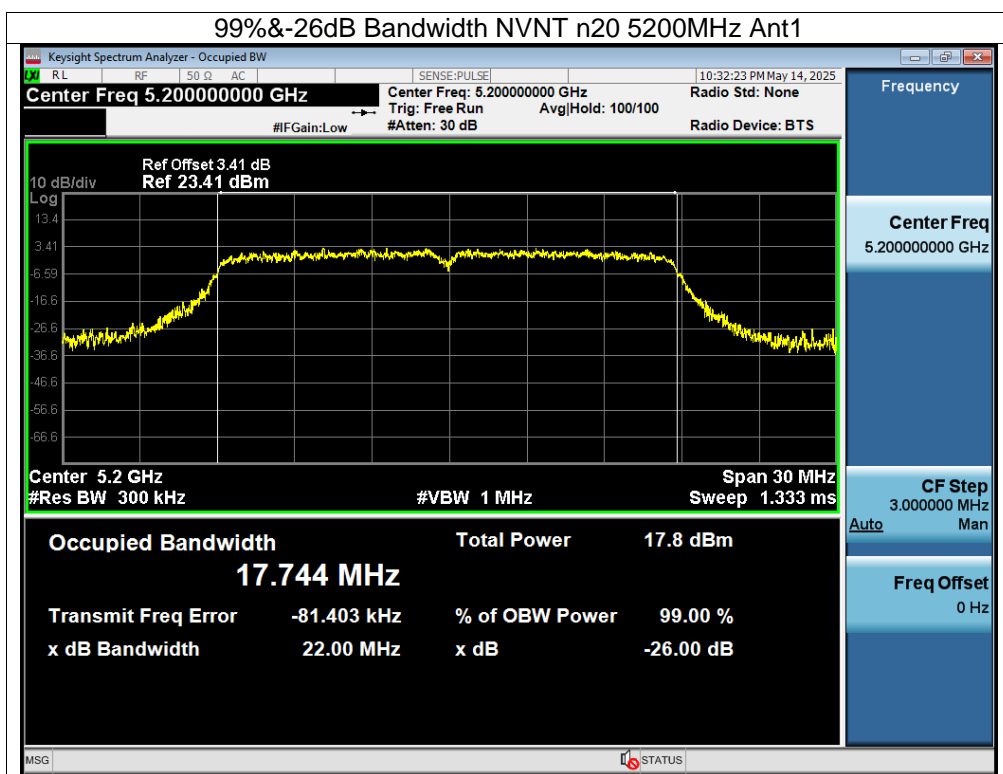
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.3V
Test Mode:	(5180-5240MHz)		

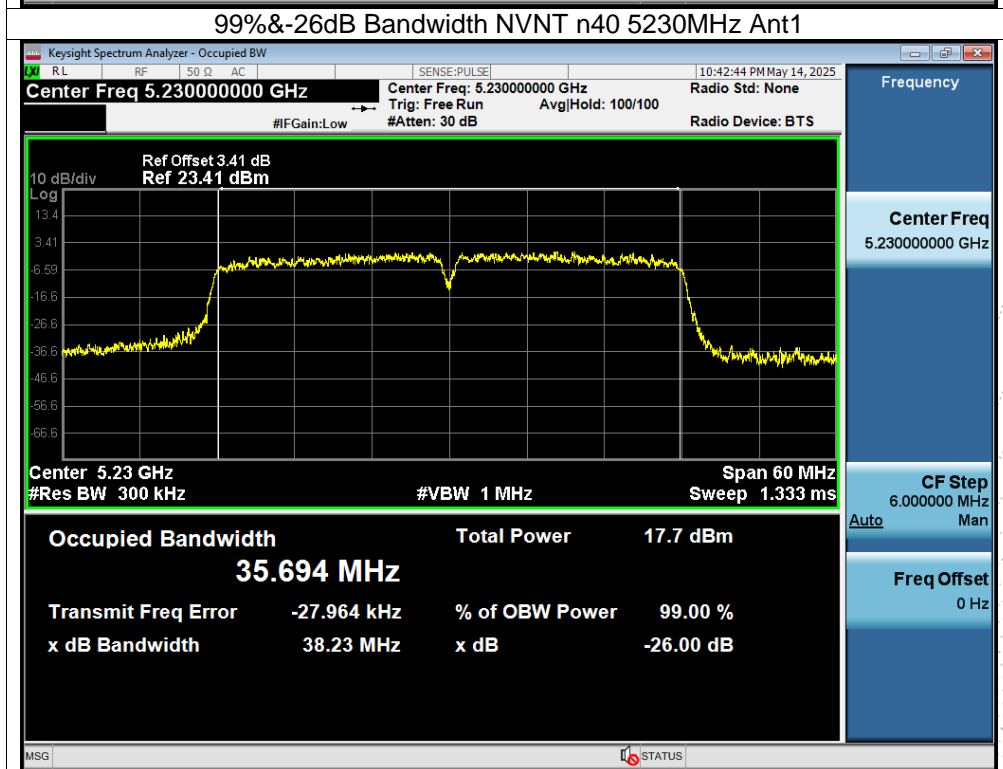
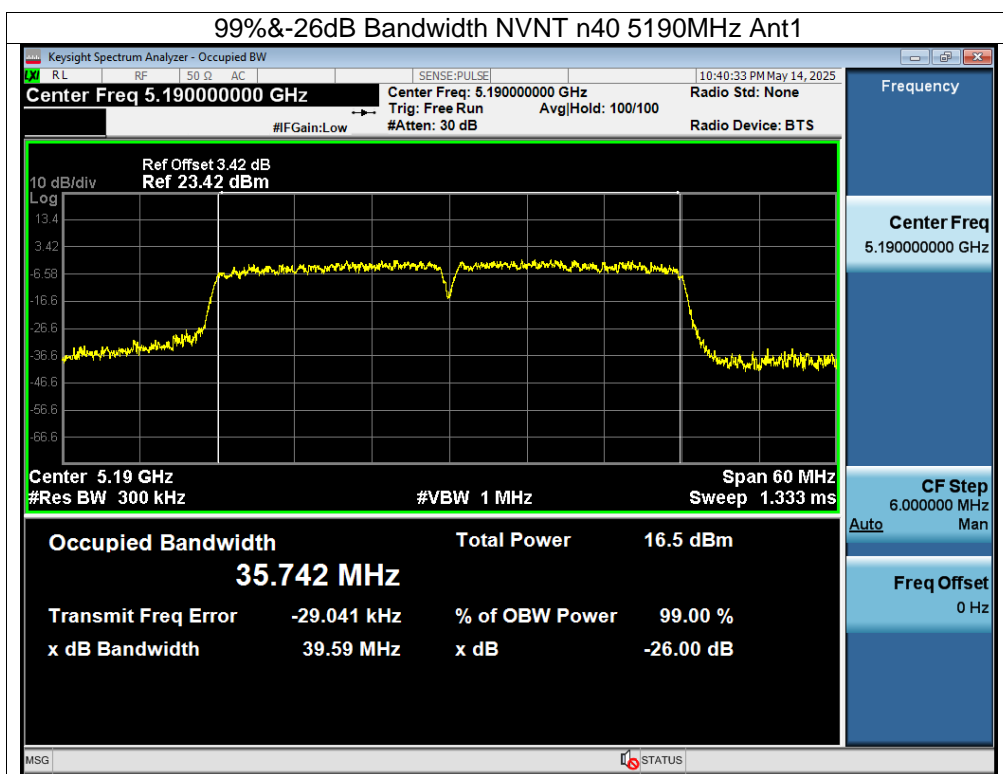
Condition	Mode	Frequency (MHz)	-26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	29.38	Pass
NVNT	a	5200	25.632	Pass
NVNT	a	5240	21.024	Pass
NVNT	n20	5180	23.666	Pass
NVNT	n20	5200	22.002	Pass
NVNT	n20	5240	21.799	Pass
NVNT	n40	5190	39.589	Pass
NVNT	n40	5230	38.225	Pass

Condition	Mode	Frequency (MHz)	99% OBW (MHz)
NVNT	a	5180	16.798
NVNT	a	5200	16.721
NVNT	a	5240	16.664
NVNT	n20	5180	17.818
NVNT	n20	5200	17.744
NVNT	n20	5240	17.740
NVNT	n40	5190	35.742
NVNT	n40	5230	35.694







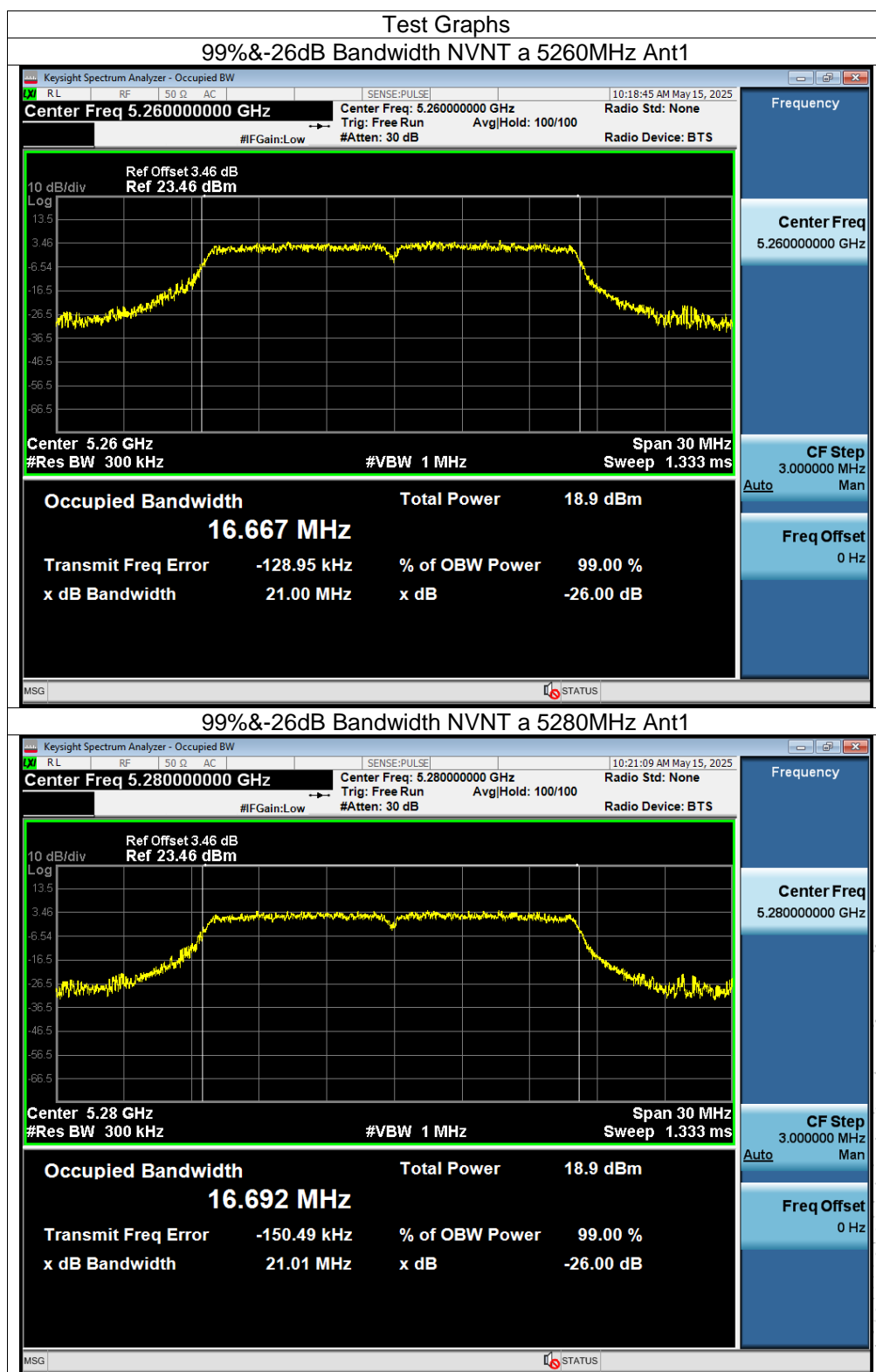


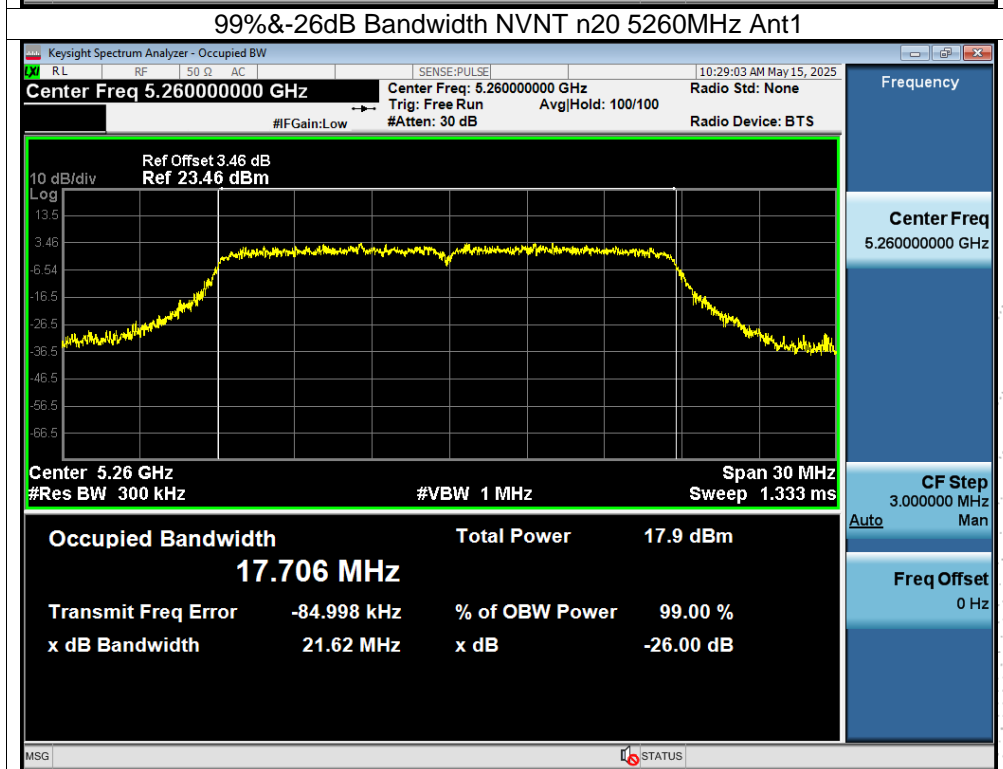
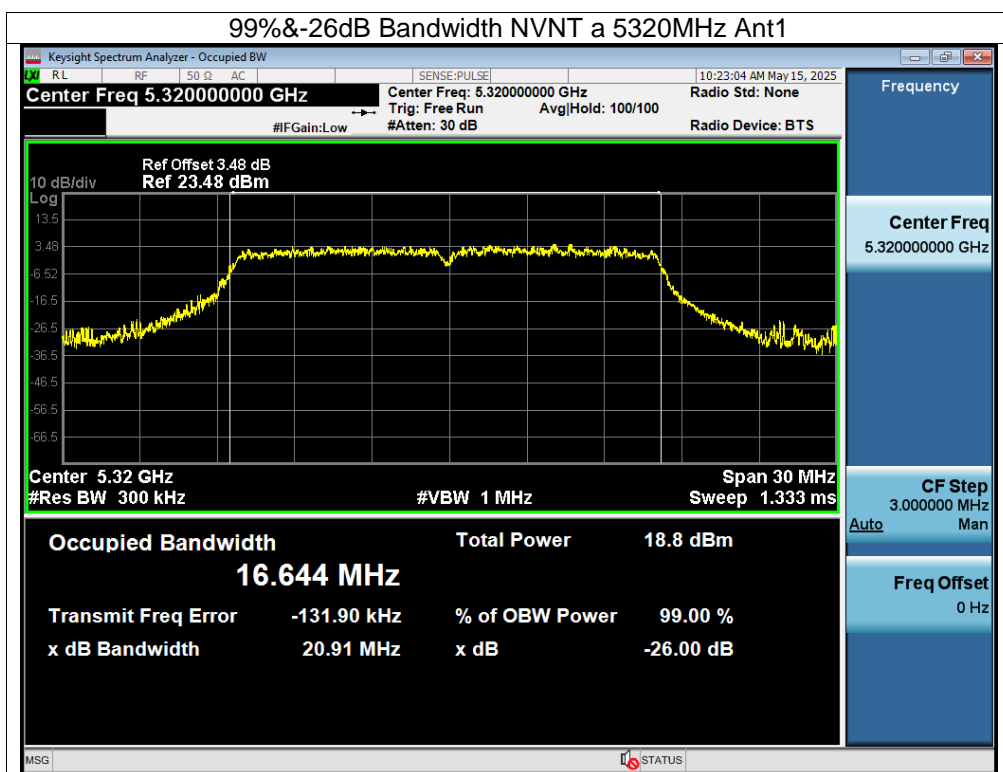
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.3V
Test Mode:	(5260-5320MHz)		

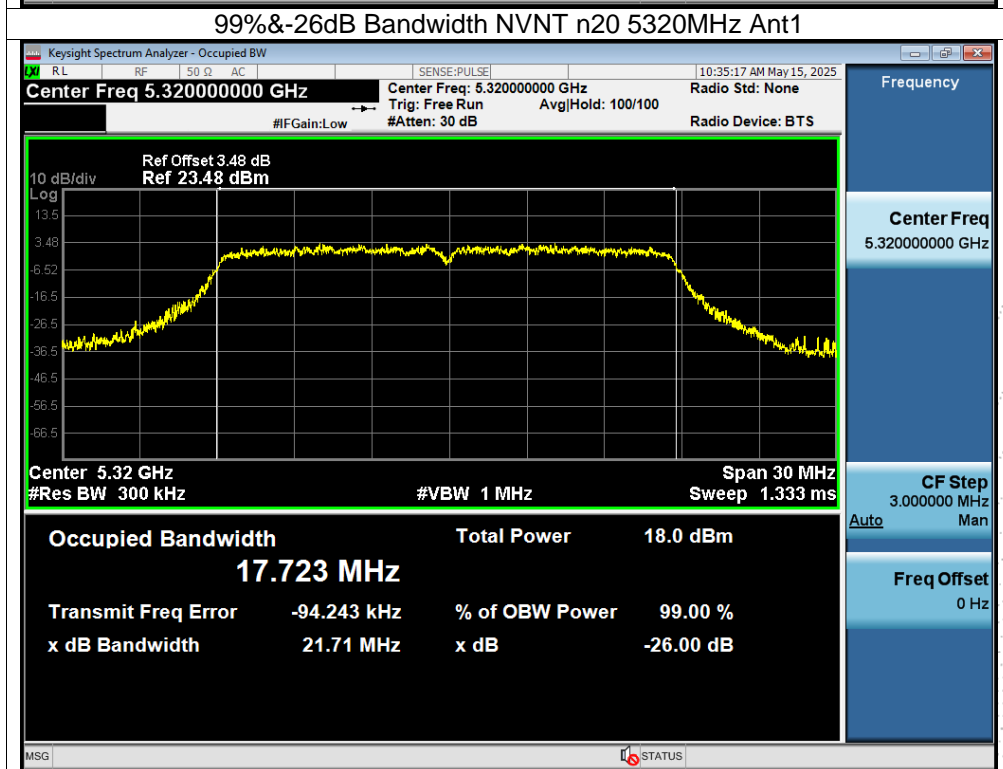
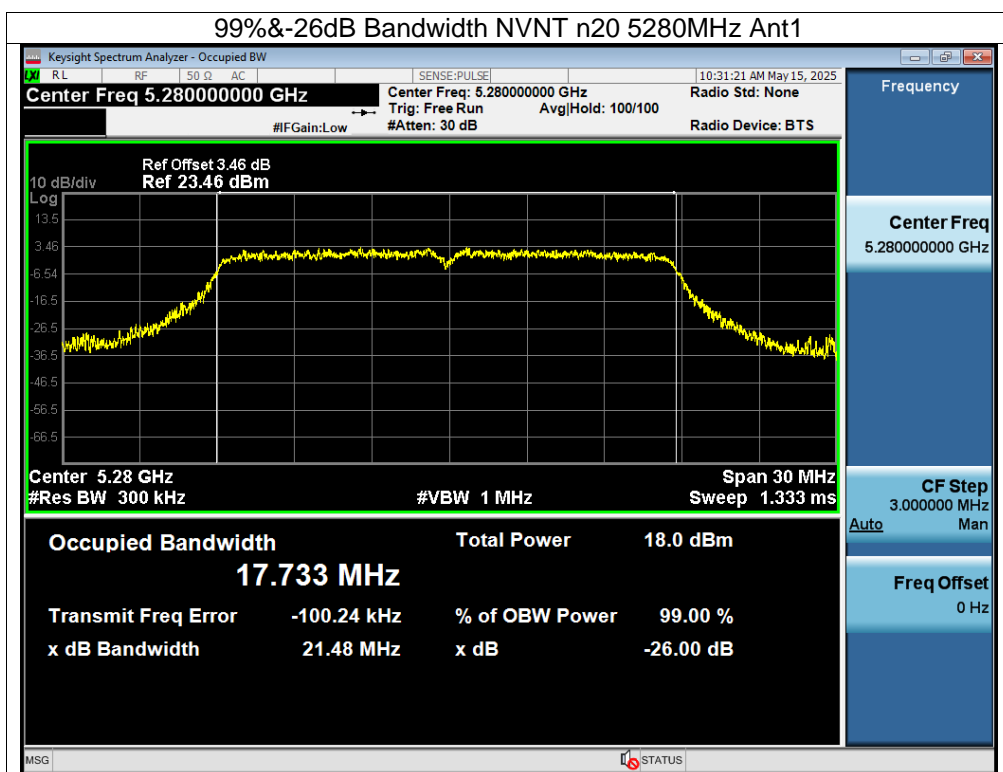
Condition	Mode	Frequency (MHz)	-26 dB Bandwidth (MHz)	Verdict
NVNT	a	5260	20.998	Pass
NVNT	a	5280	21.012	Pass
NVNT	a	5320	20.913	Pass
NVNT	n20	5260	21.617	Pass
NVNT	n20	5280	21.478	Pass
NVNT	n20	5320	21.71	Pass
NVNT	n40	5270	38.123	Pass
NVNT	n40	5310	38.406	Pass

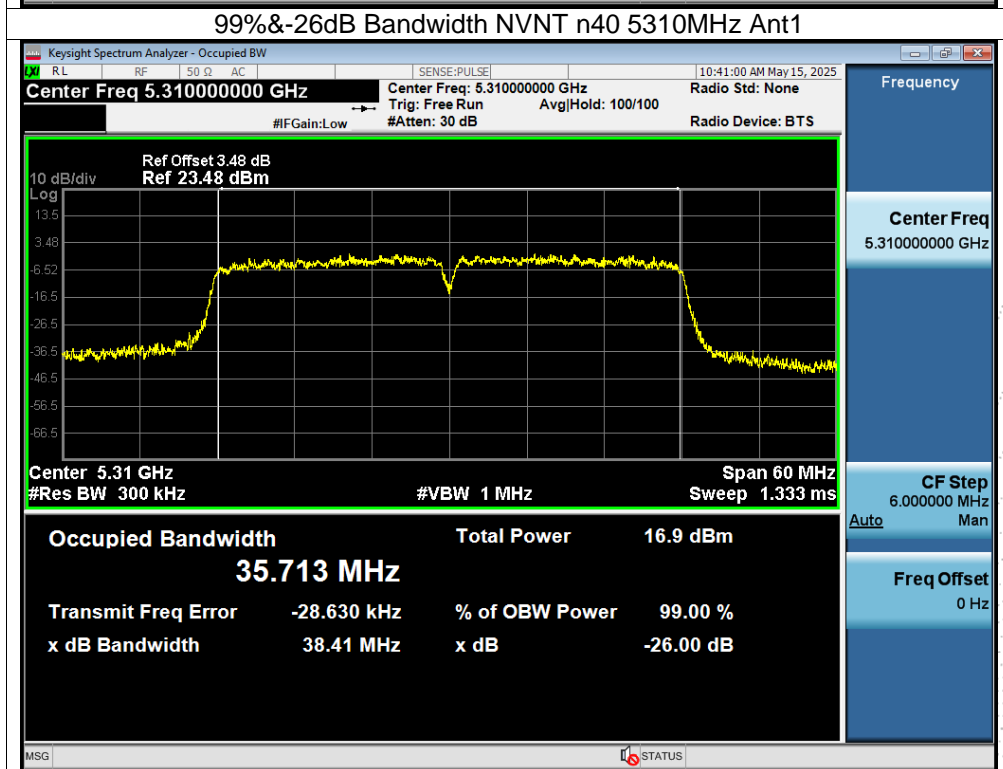
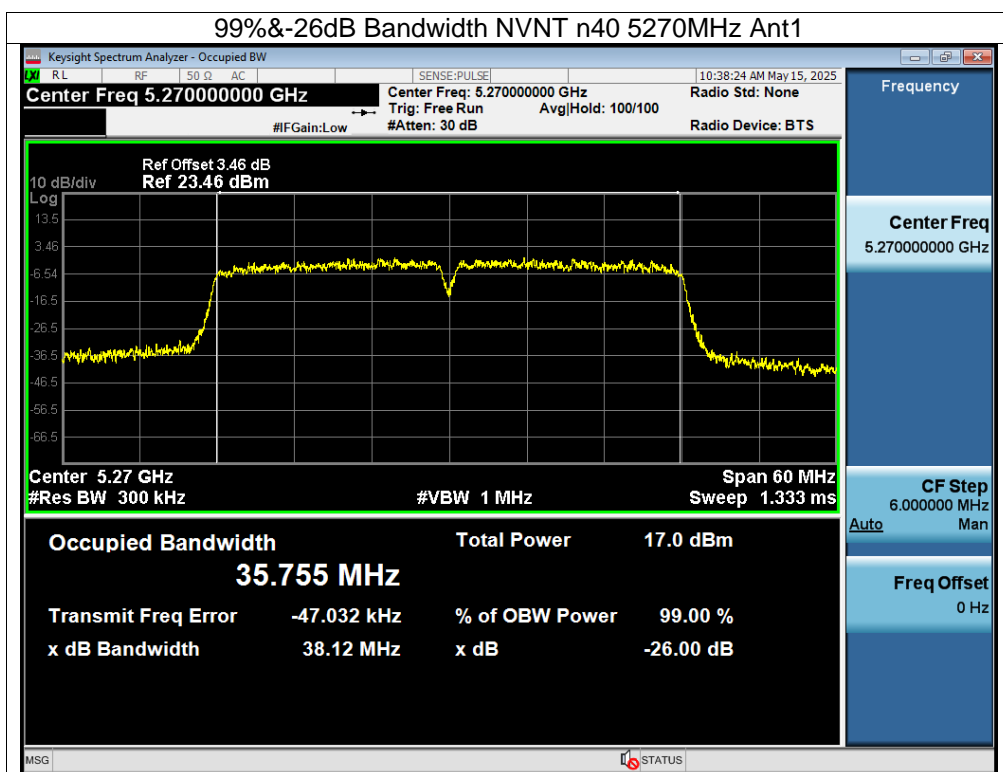
Condition	Mode	Frequency (MHz)	99% OBW (MHz)
NVNT	a	5260	16.667
NVNT	a	5280	16.692
NVNT	a	5320	16.644
NVNT	n20	5260	17.706
NVNT	n20	5280	17.733
NVNT	n20	5320	17.723
NVNT	n40	5270	35.755
NVNT	n40	5310	35.713







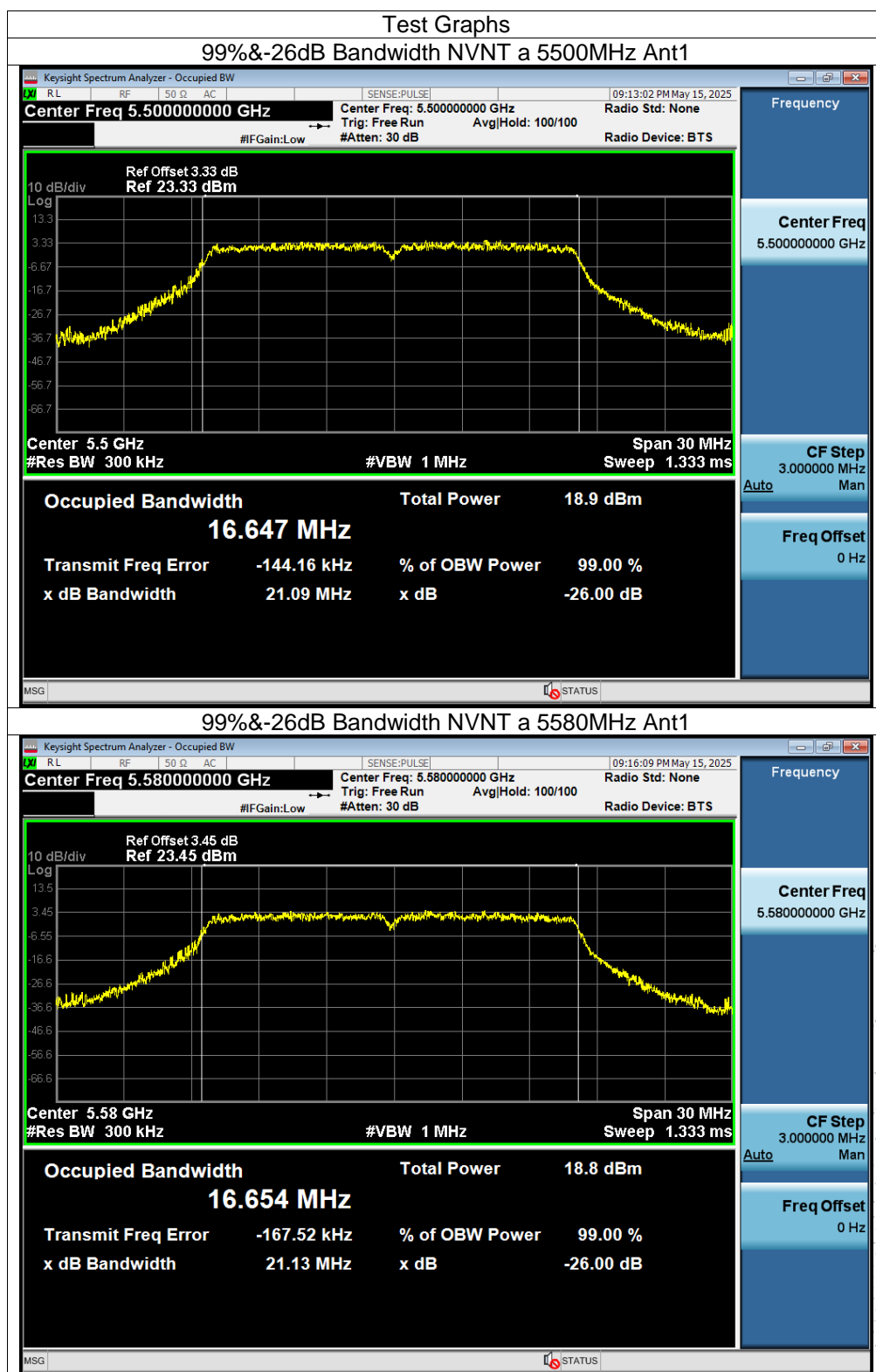


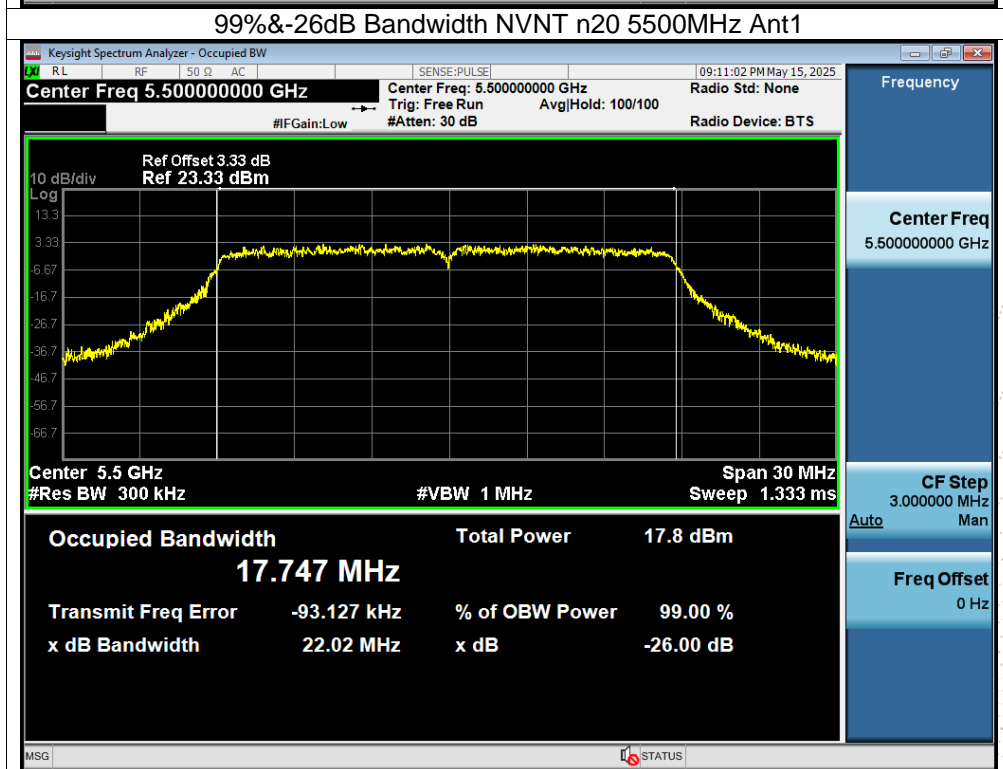
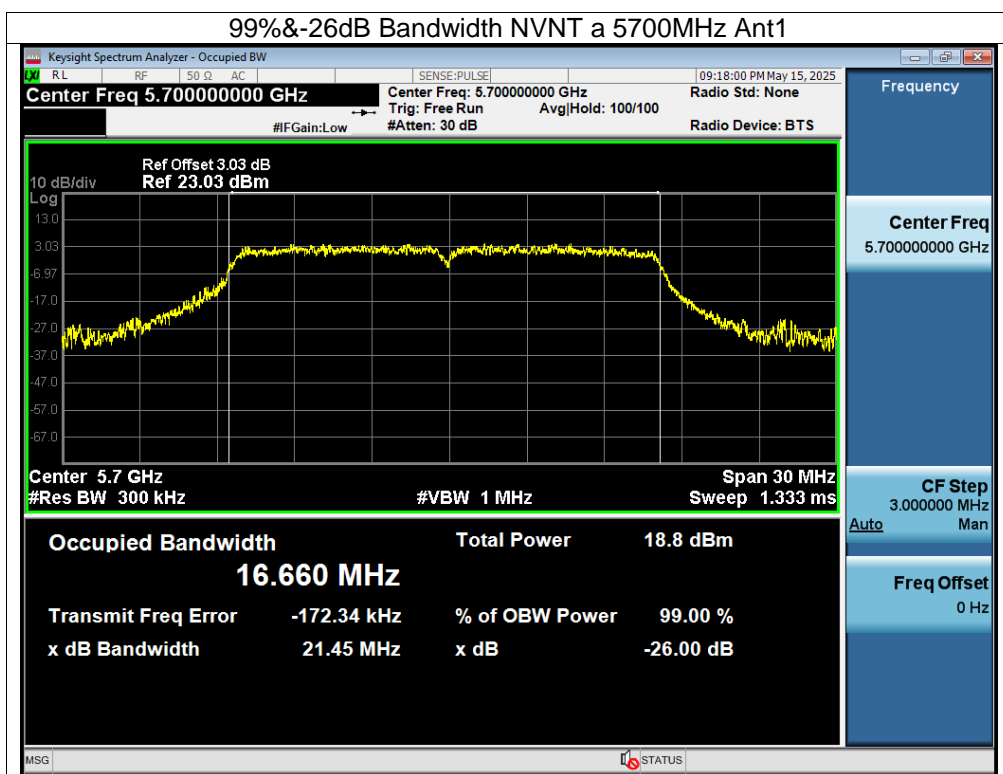


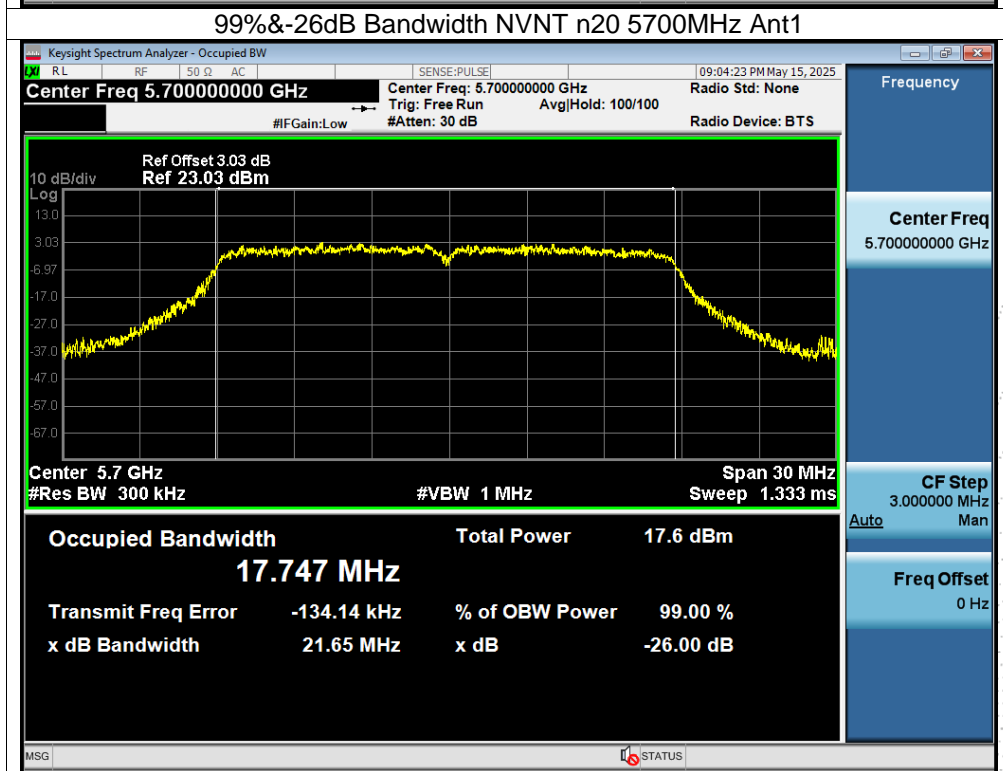
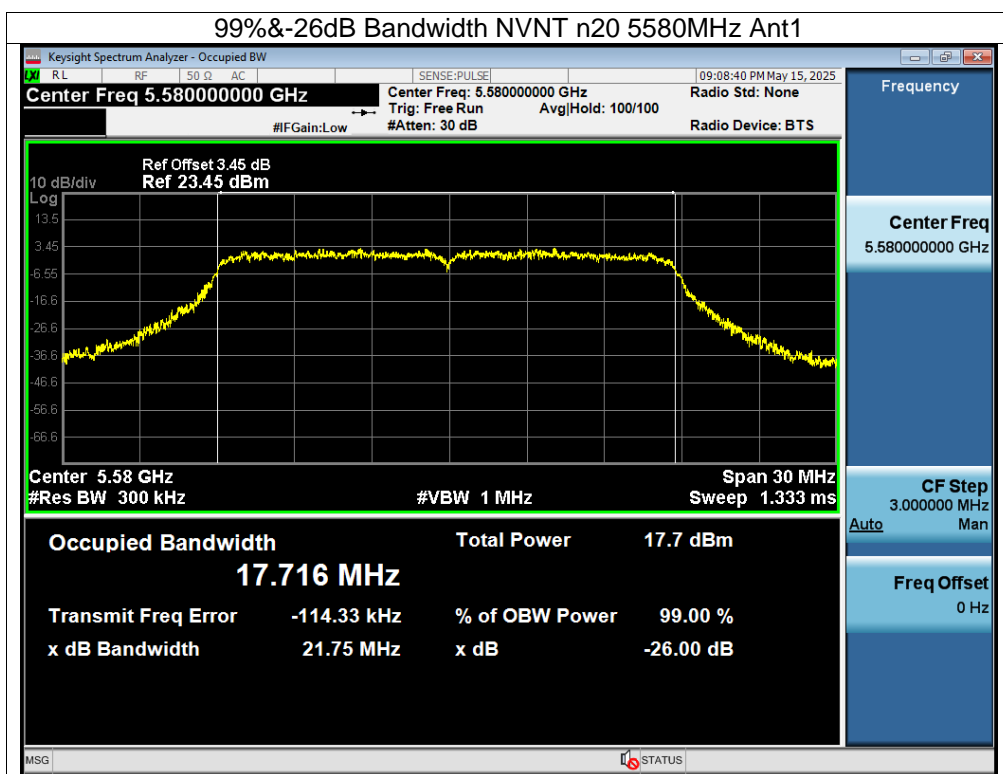
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.3V
Test Mode:	(5500-5700MHz)		

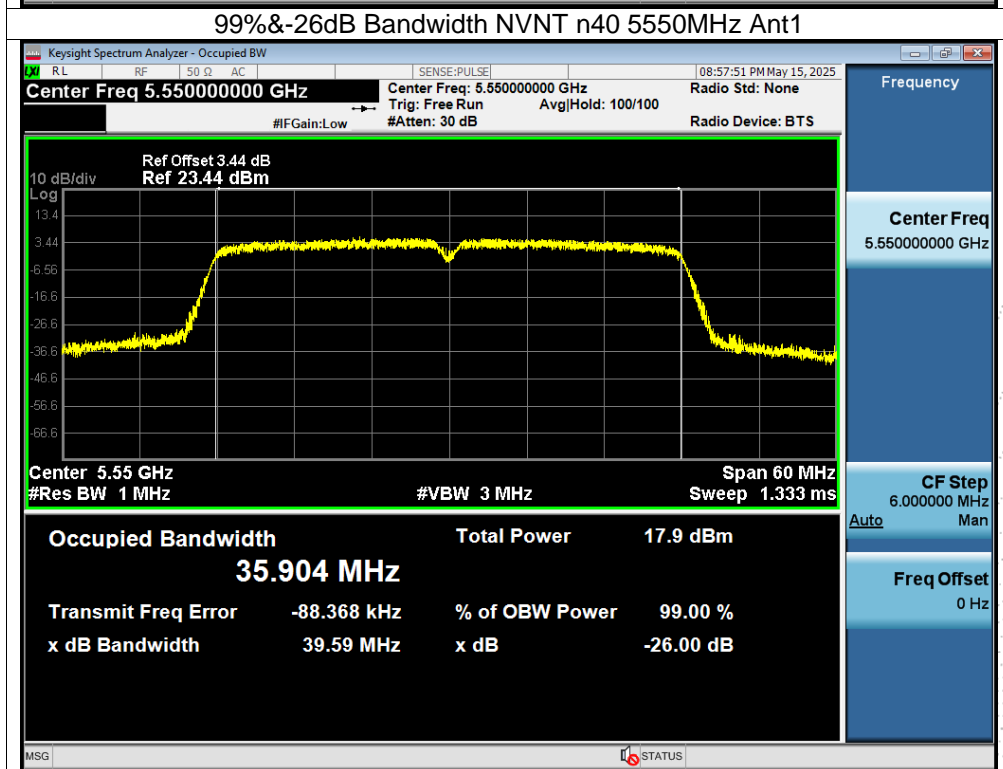
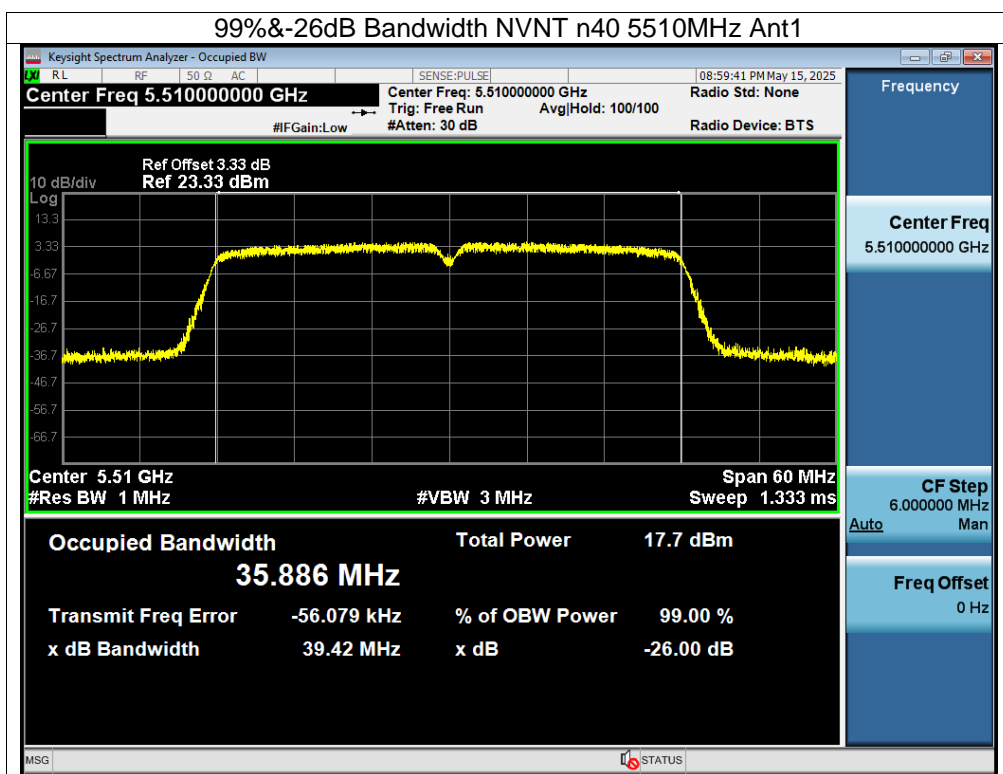
Condition	Mode	Frequency (MHz)	-26 dB Bandwidth (MHz)	Verdict
NVNT	a	5500	21.094	Pass
NVNT	a	5580	21.131	Pass
NVNT	a	5700	21.446	Pass
NVNT	n20	5500	22.015	Pass
NVNT	n20	5580	21.75	Pass
NVNT	n20	5700	21.655	Pass
NVNT	n40	5510	39.423	Pass
NVNT	n40	5550	39.589	Pass
NVNT	n40	5670	39.368	Pass

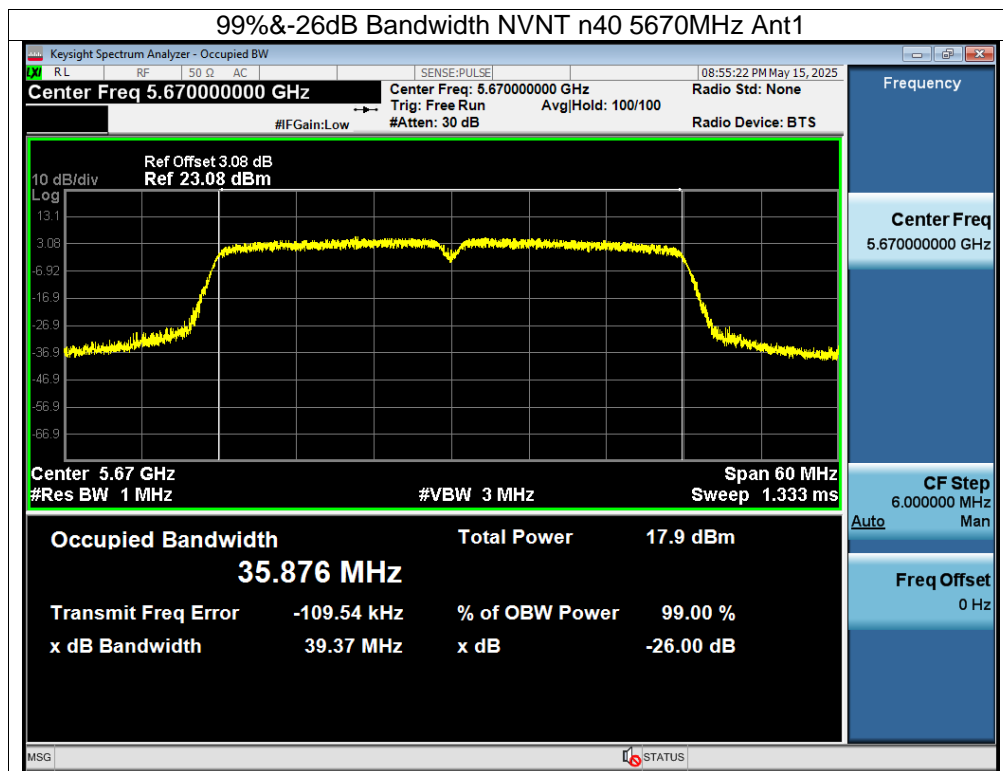
Condition	Mode	Frequency (MHz)	99% OBW (MHz)
NVNT	a	5500	16.647
NVNT	a	5580	16.654
NVNT	a	5700	16.660
NVNT	n20	5500	17.747
NVNT	n20	5580	17.716
NVNT	n20	5700	17.747
NVNT	n40	5510	35.886
NVNT	n40	5550	35.904
NVNT	n40	5670	35.876







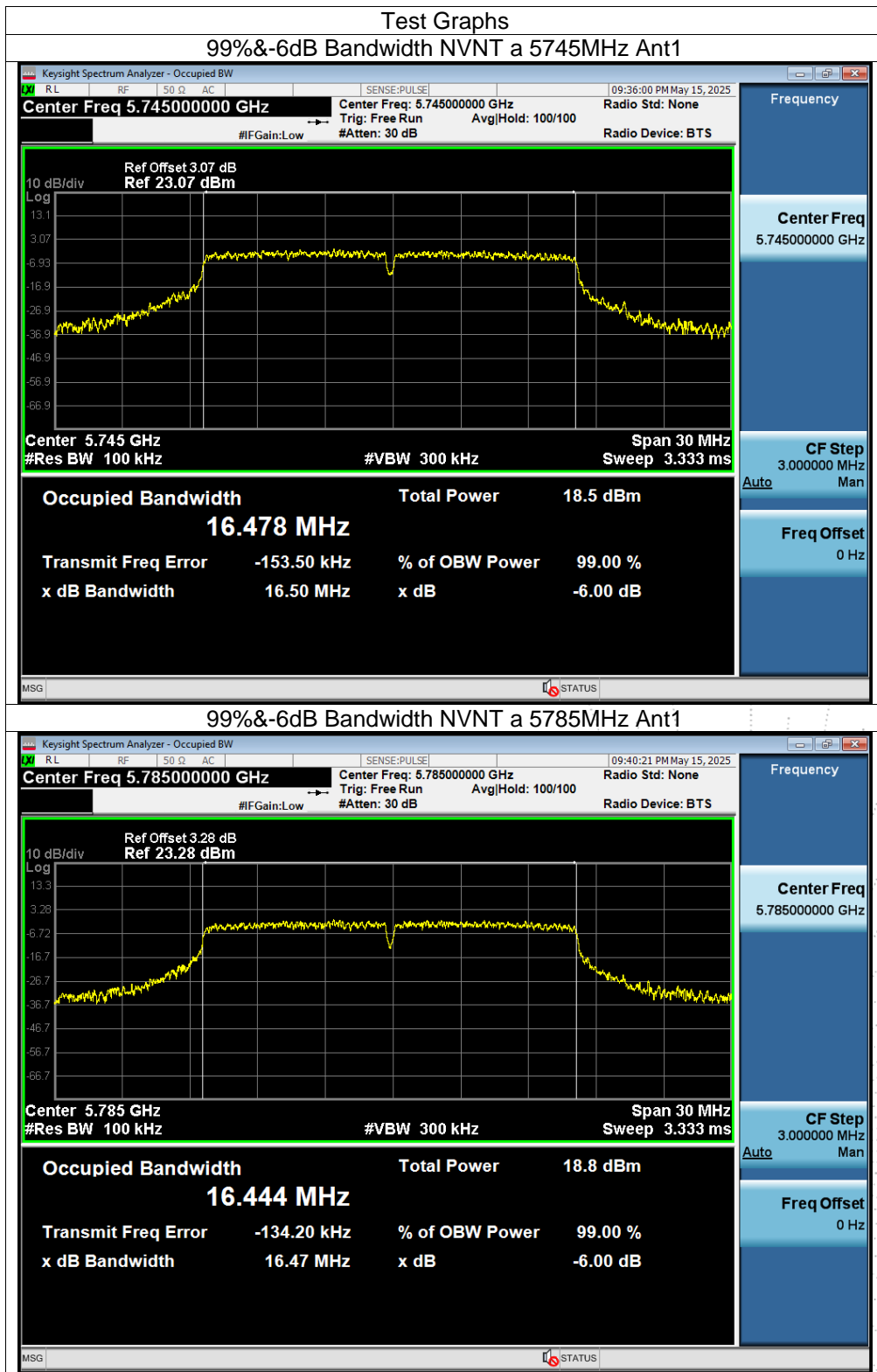


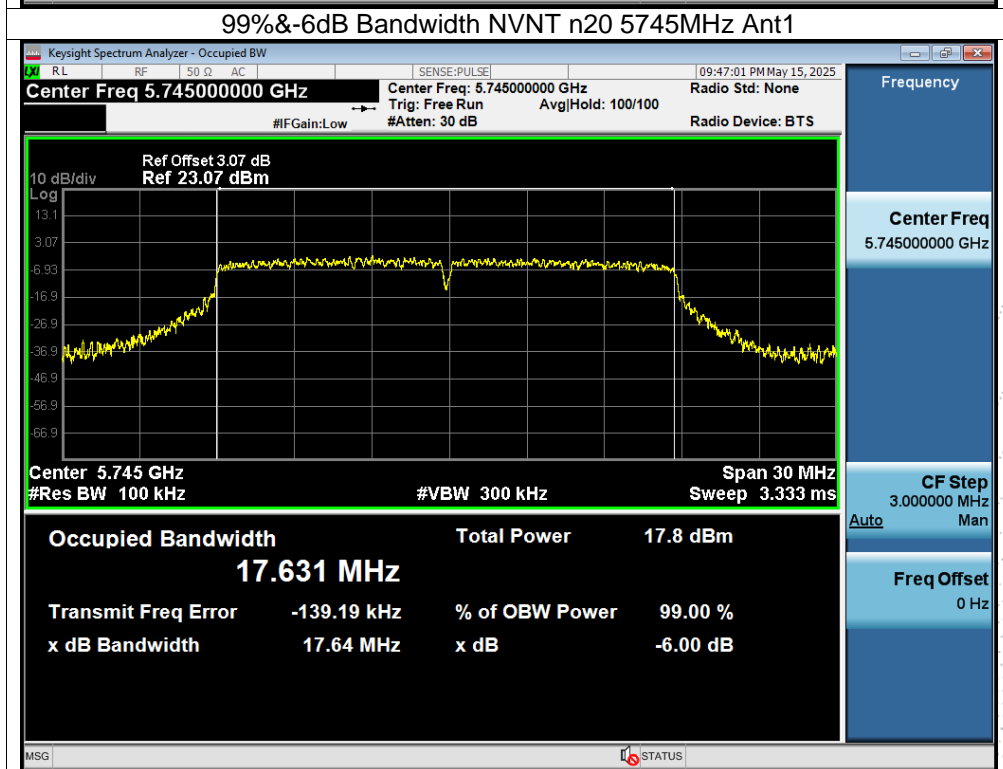
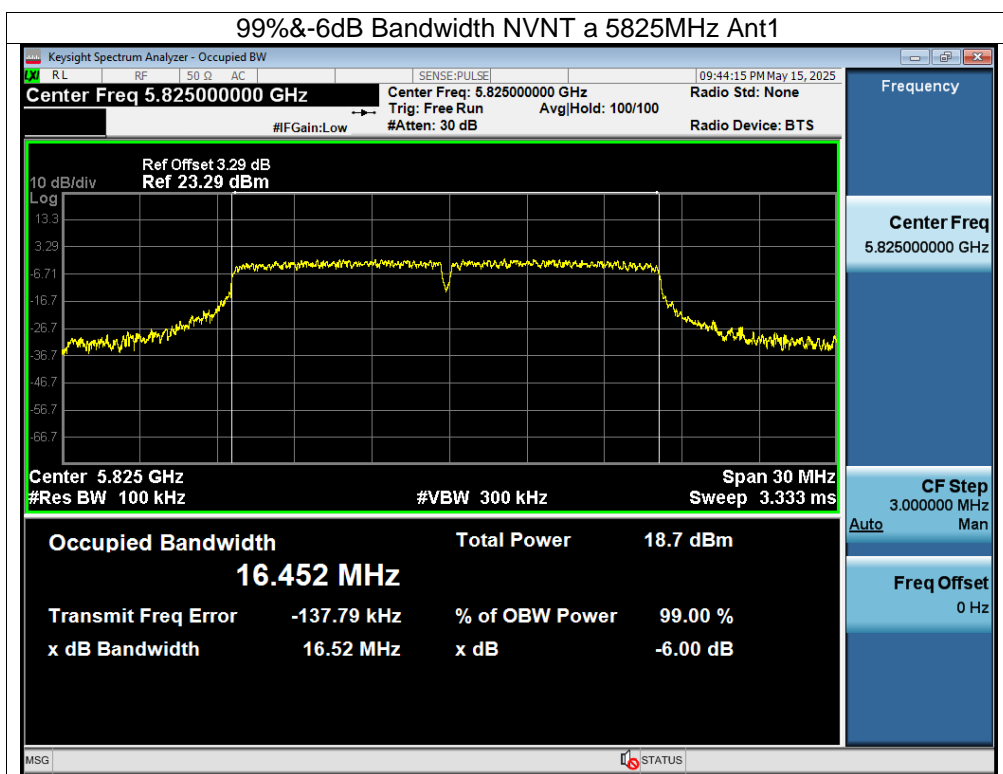


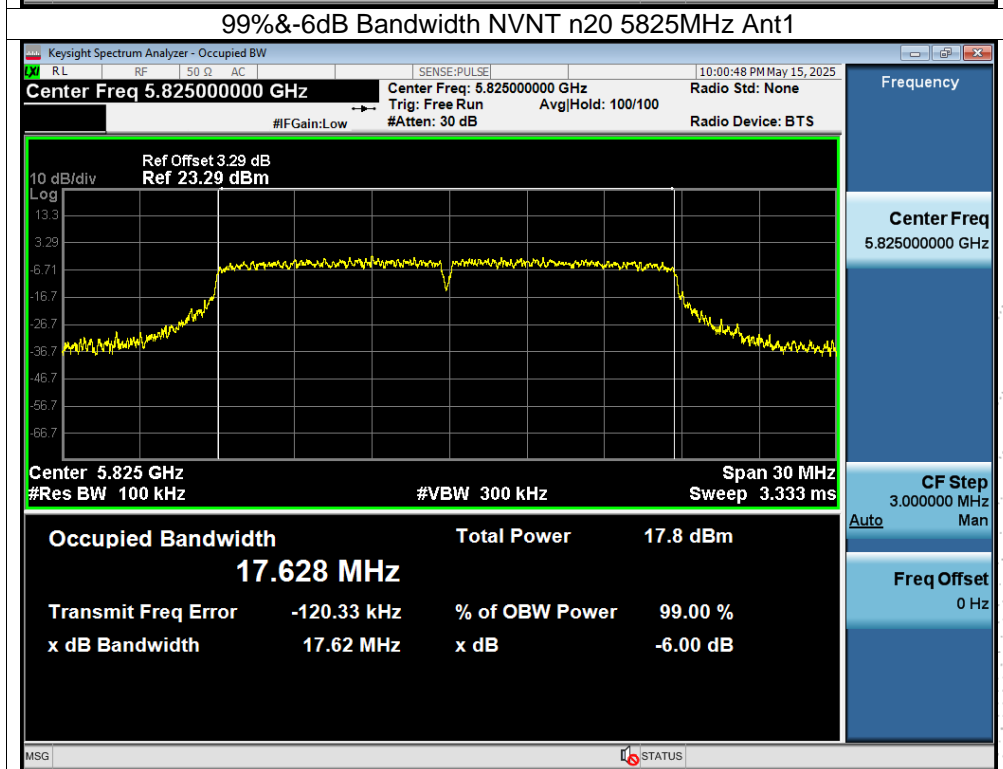
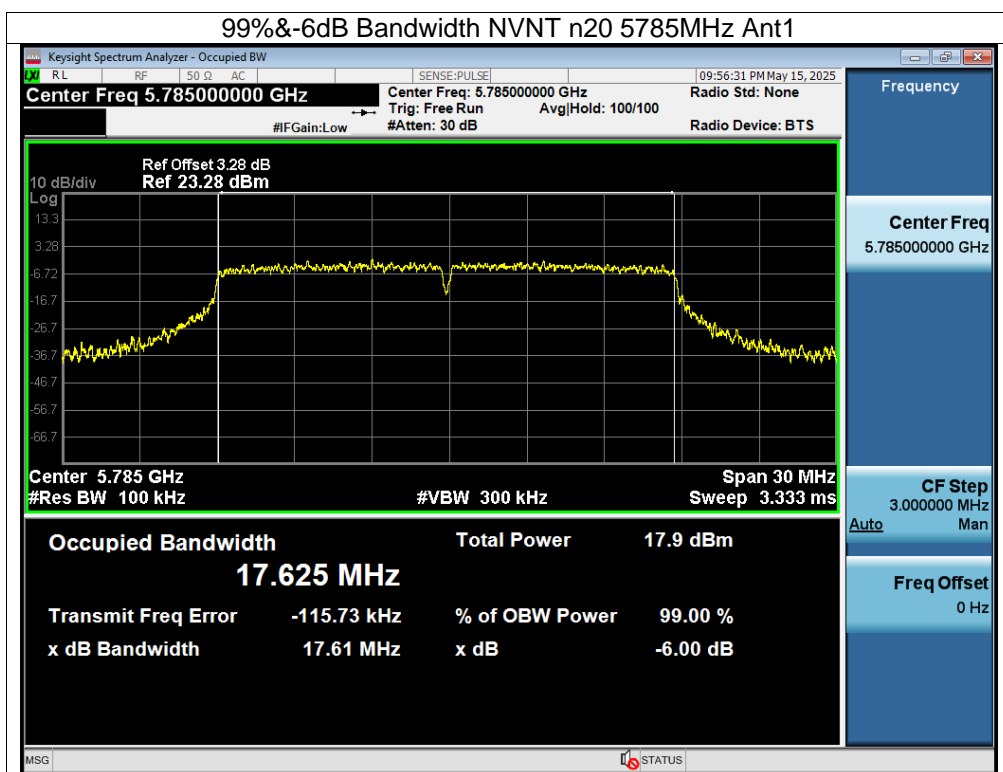
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.3V
Test Mode:	(5745-5825MHz)		

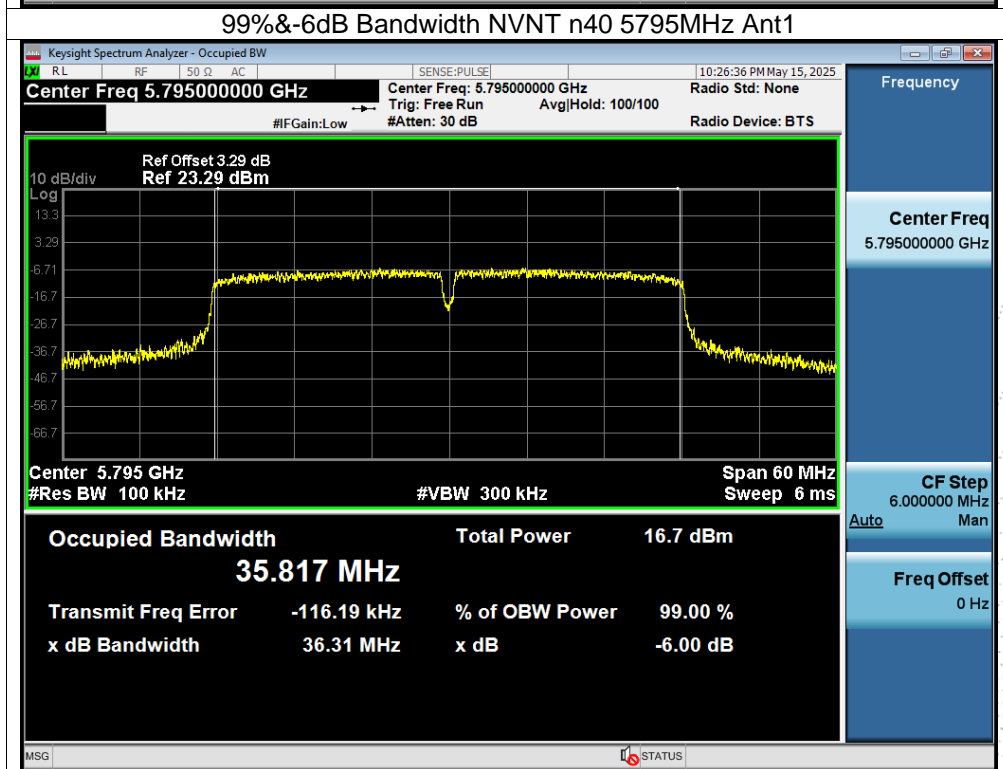
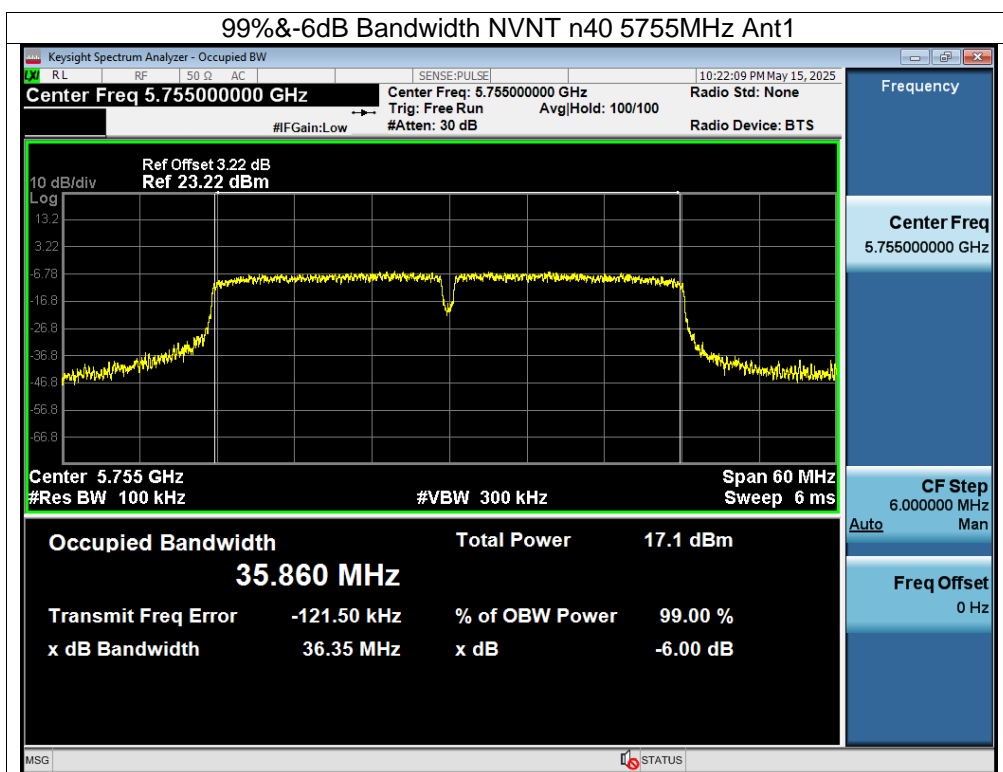
Condition	Mode	Frequency (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	a	5745	16.498	0.5	Pass
NVNT	a	5785	16.469	0.5	Pass
NVNT	a	5825	16.516	0.5	Pass
NVNT	n20	5745	17.638	0.5	Pass
NVNT	n20	5785	17.614	0.5	Pass
NVNT	n20	5825	17.615	0.5	Pass
NVNT	n40	5755	36.348	0.5	Pass
NVNT	n40	5795	36.313	0.5	Pass

Condition	Mode	Frequency (MHz)	99% OBW (MHz)
NVNT	a	5745	16.478
NVNT	a	5785	16.444
NVNT	a	5825	16.452
NVNT	n20	5745	17.631
NVNT	n20	5785	17.625
NVNT	n20	5825	17.628
NVNT	n40	5755	35.860
NVNT	n40	5795	35.817









10. Maximum Conducted Output Power

10.1 Block Diagram Of Test Setup



10.2 Limit

According to FCC §15.407

The maximum conducted output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	0.25W
5250~5350	0.25W
5500~5700	0.25W
5725~5850	1W

10.3 Test Procedure

Maximum conducted output power may be measured using a spectrum analyzer/EMI receiver or an RF power meter.

1. Device Configuration

If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level (see section II.B.).

a) The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (to no lower than 98 percent) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

b) If continuous transmission (or at least 98 percent duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level with the transmit duration as long as possible and the duty cycle as high as possible.

2. Measurement using a Spectrum Analyzer or EMI Receiver (SA)

Measurement of maximum conducted output power using a spectrum analyzer requires integrating the spectrum across a frequency span that encompasses, at a minimum, either the EBW or the 99-percent occupied bandwidth of the signal.¹ However, the EBW must be used to determine bandwidth dependent limits on maximum conducted output power in accordance with § 15.407(a).

a) The test method shall be selected as follows: (i) Method SA-1 or SA-1 Alternative (averaging with the EUT transmitting at full power throughout each sweep) shall be applied if either of the following conditions can be satisfied:

- The EUT transmits continuously (or with a duty cycle ≥ 98 percent).
- Sweep triggering or gating can be implemented in a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the analyzer configured as in Method SA-1, below) is equal to or shorter than the duration T of each transmission from the EUT and if those transmissions exhibit full power throughout their durations.

(ii) Method SA-2 or SA-2 Alternative (averaging across on and off times of the EUT transmissions, followed by duty cycle correction) shall be applied if the conditions of (i) cannot be achieved and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than ± 2 percent.

(iii) Method SA-3 (RMS detection with max hold) or SA-3 Alternative (reduced VBW with max hold) shall be applied if the conditions of (i) and (ii) cannot be achieved.

b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep): (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is \leq RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".

(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum

10.4 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.

10.5 Test Result

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.3V
Test Mode:	5180-5240MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	13.21	24	Pass
NVNT	a	5200	13.46	24	Pass
NVNT	a	5240	13.26	24	Pass
NVNT	n20	5180	12.38	24	Pass
NVNT	n20	5200	12.4	24	Pass
NVNT	n20	5240	12.58	24	Pass
NVNT	n40	5190	10.97	24	Pass
NVNT	n40	5230	12.23	24	Pass



Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.3V
Test Mode:	5260-5320MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	11 + 10 logB (dBm)	Limit (dBm)	Verdict
NVNT	a	5260	13.42	23.22	24	Pass
NVNT	a	5280	13.55	23.23	24	Pass
NVNT	a	5320	13.34	23.21	24	Pass
NVNT	n20	5260	12.55	23.48	24	Pass
NVNT	n20	5280	12.58	23.49	24	Pass
NVNT	n20	5320	12.52	23.49	24	Pass
NVNT	n40	5270	11.42	26.53	24	Pass
NVNT	n40	5310	11.4	26.53	24	Pass

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.3V
Test Mode:	5500-5700MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	11 + 10 logB (dBm)	Limit (dBm)	Verdict
NVNT	a	5500	13.54	23.21	24	Pass
NVNT	a	5580	13.35	23.22	24	Pass
NVNT	a	5700	13.38	23.22	24	Pass
NVNT	n20	5500	12.39	23.49	24	Pass
NVNT	n20	5580	12.26	23.48	24	Pass
NVNT	n20	5700	12.24	23.49	24	Pass
NVNT	n40	5510	11.46	26.55	24	Pass
NVNT	n40	5550	11.62	26.55	24	Pass
NVNT	n40	5670	11.61	26.55	24	Pass

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.3V
Test Mode:	5745-5825MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5745	13.12	30	Pass
NVNT	a	5785	13.21	30	Pass
NVNT	a	5825	13.24	30	Pass
NVNT	n20	5745	12.33	30	Pass
NVNT	n20	5785	12.4	30	Pass
NVNT	n20	5825	12.34	30	Pass
NVNT	n40	5755	11.41	30	Pass
NVNT	n40	5795	11.15	30	Pass

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.
- (3) 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.
- (4) 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

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.

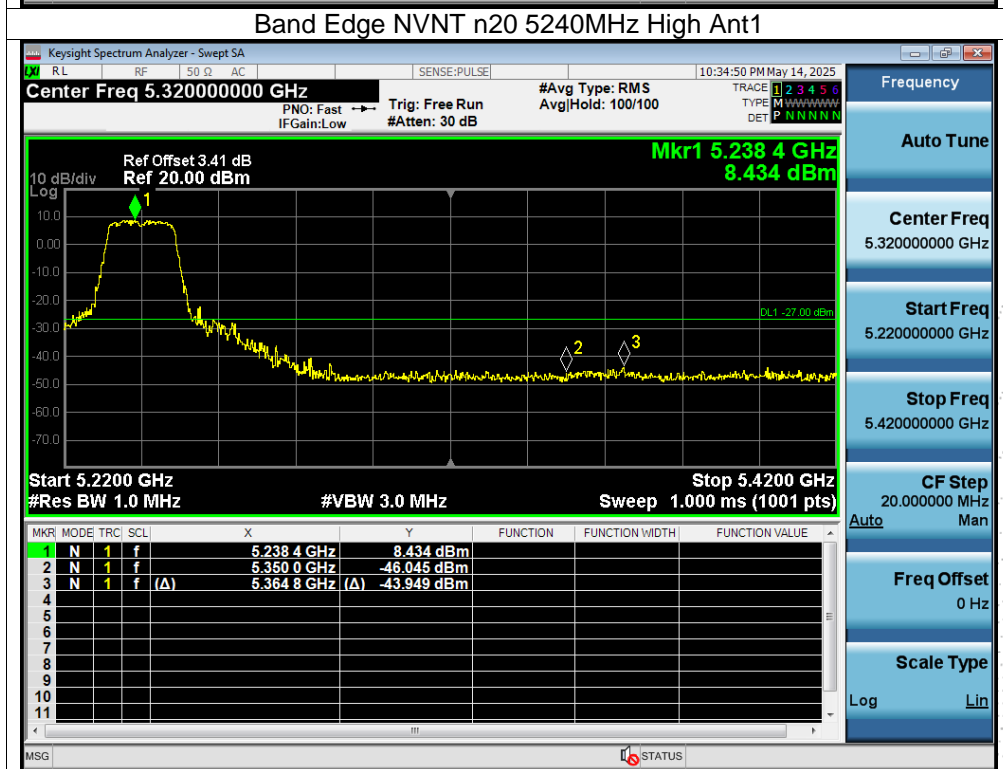
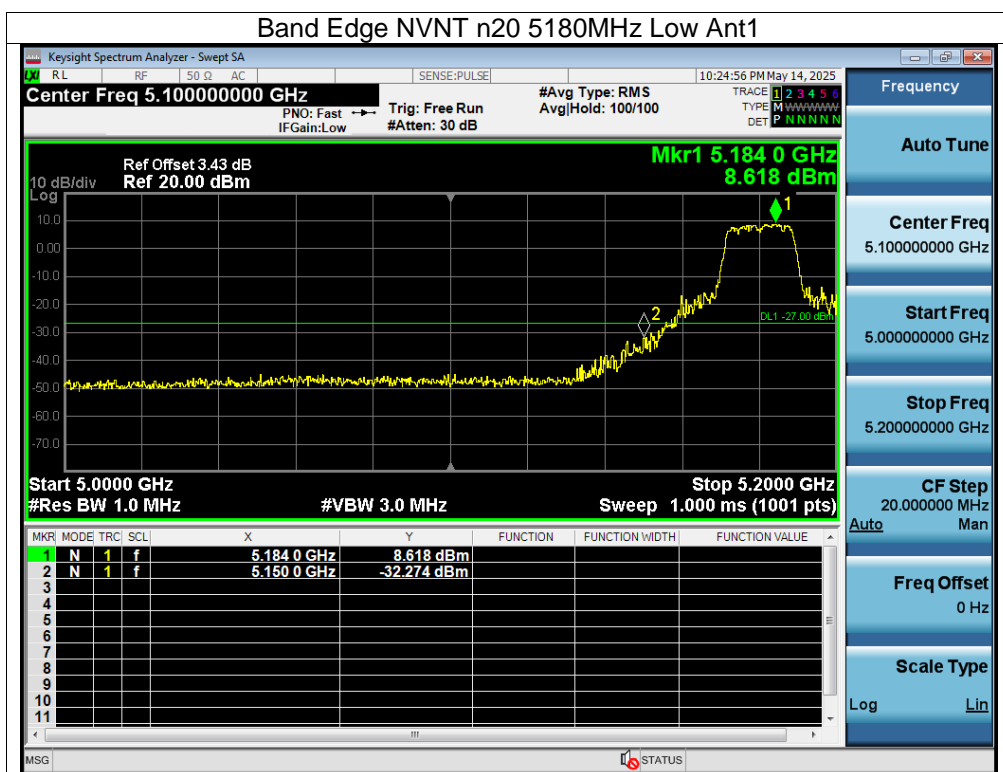
11.4 EUT Operating Conditions

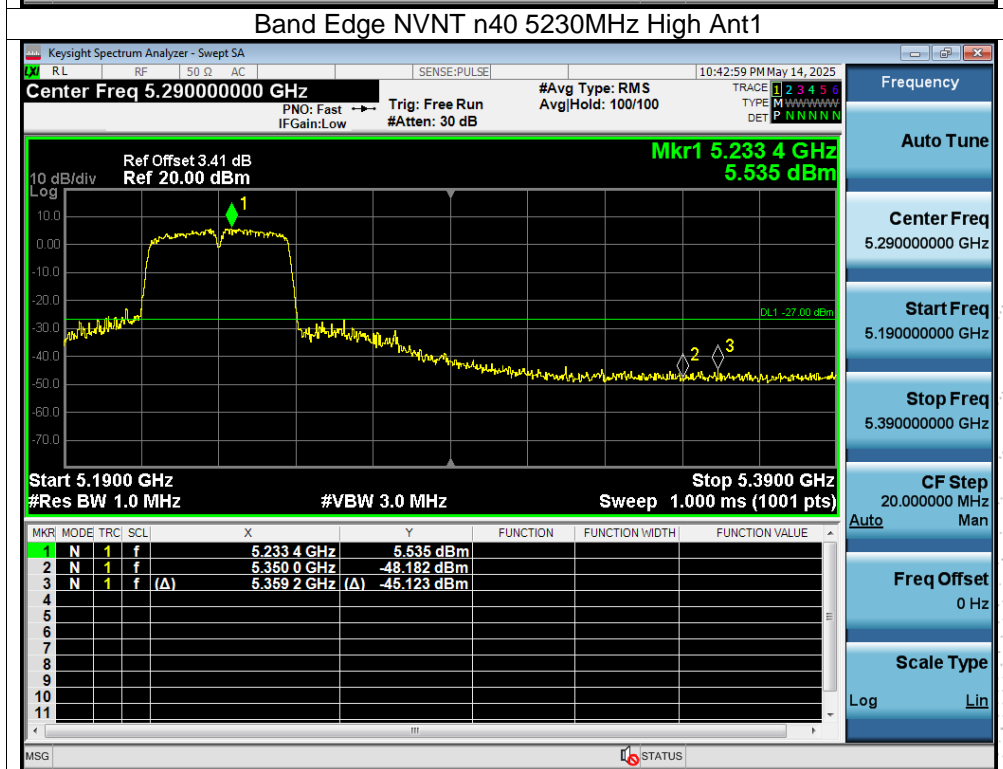
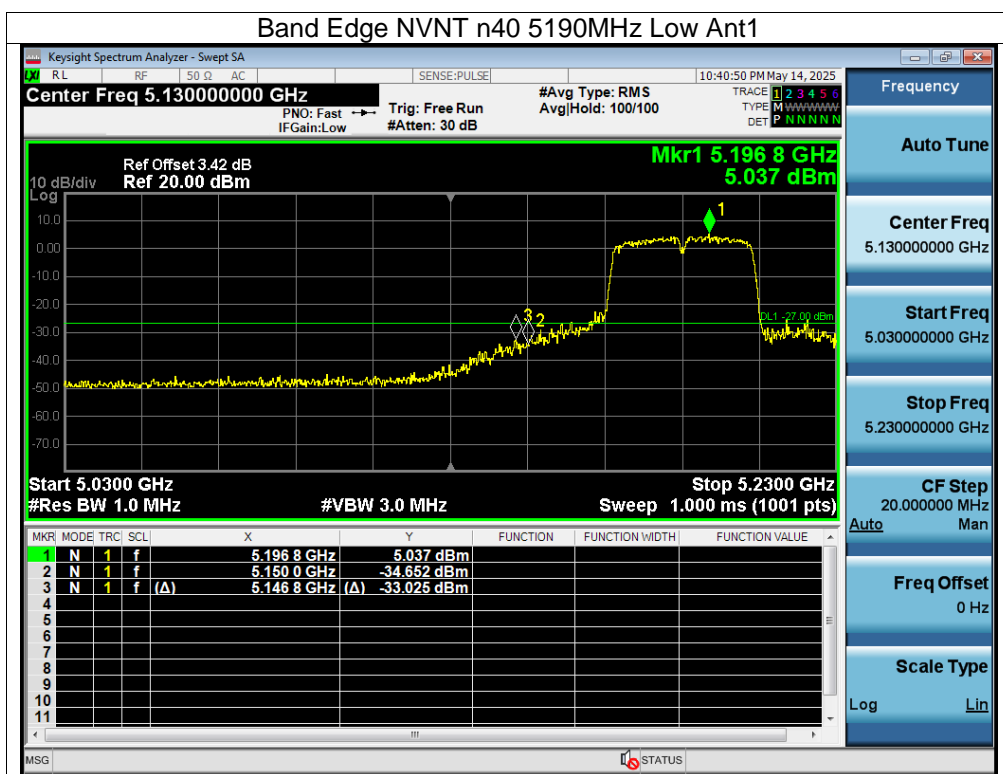
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data

11.5 Test Result

Test Mode:	5180-5240MHz
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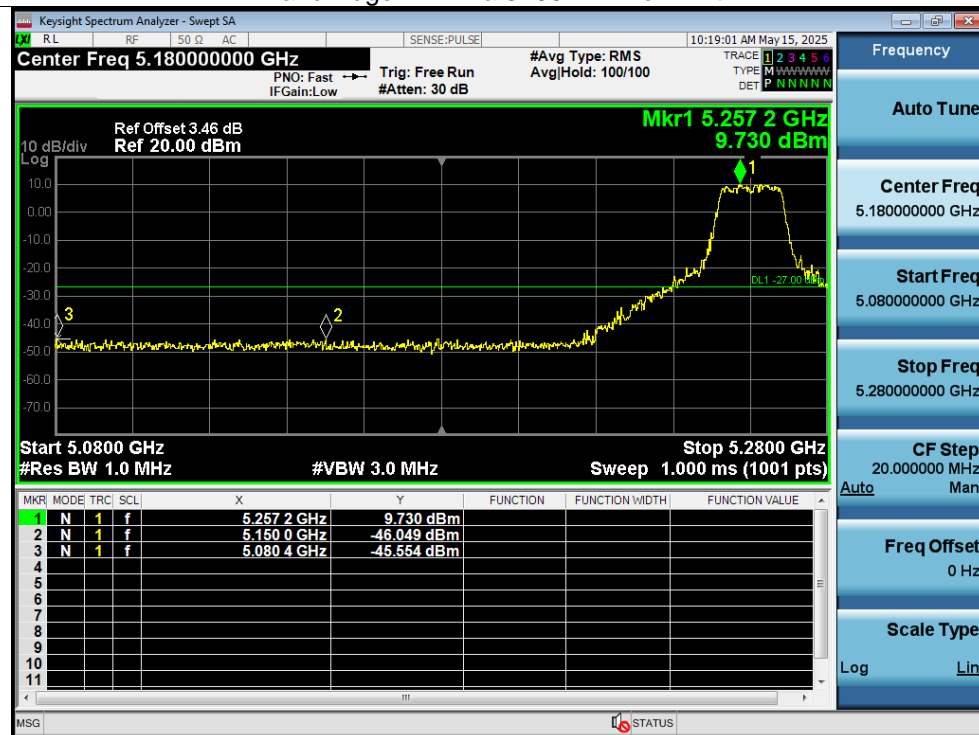




Test Mode: 5260-5230MHz

Test Graphs

Band Edge NVNT a 5260MHz Low Ant1



Band Edge NVNT a 5320MHz High Ant1

