8.3 Test Procedure

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:
a) Set RBW ≥ 1/T, where T is defined in section II.B.I.a).
b) Set VBW ≥ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.
Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

8.4 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.

8.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 11.4V
Test Mode:	TX Frequency U-NII-1 (5180-5240MHz)		

Condition	Mode	Frequency (MHz)	Measured Power Density (dBm/MHz)			Limit (dBm/MHz)	Result
			ANT A	ANT B	Total		
NVNT	a	5180	0.50	0.76	/	11	PASS
NVNT	a	5200	0.27	0.13	/	11	PASS
NVNT	a	5240	0.22	1.21	/	11	PASS
NVNT	n20	5180	-1.28	-0.02	2.41	8.57	PASS
NVNT	n20	5200	-1.44	-0.90	1.85	8.57	PASS
NVNT	n20	5240	-0.85	-0.32	2.43	8.57	PASS
NVNT	n40	5190	-6.63	-5.69	-3.12	8.57	PASS
NVNT	n40	5230	-5.79	-5.59	-2.68	8.57	PASS
NVNT	ac20	5180	-0.88	-0.11	2.53	8.57	PASS
NVNT	ac20	5200	-1.27	-0.85	1.96	8.57	PASS
NVNT	ac20	5240	-1.03	-0.34	2.34	8.57	PASS
NVNT	ac40	5190	-6.99	-5.63	-3.25	8.57	PASS
NVNT	ac40	5230	-5.88	-5.34	-2.59	8.57	PASS
NVNT	ac80	5210	-10.73	-10.63	-7.67	8.57	PASS
NVNT	ax20	5180	-1.08	0.06	2.54	8.57	PASS
NVNT	ax20	5200	-1.32	-0.44	2.15	8.57	PASS
NVNT	ax20	5240	-1.23	-0.76	2.02	8.57	PASS
NVNT	ax40	5190	-6.83	-5.84	-3.30	8.57	PASS
NVNT	ax40	5230	-6.59	-6.14	-3.35	8.57	PASS
NVNT	ax80	5210	-11.44	-11.44	-8.43	8.57	PASS

Note:
Antenna A gain: 1.96 dBi, Antenna B gain: 5.42 dBi, Directional gain=[GainANT + 10 log(NANT) dBi] =8.43 dbi>6dbi, so power limit=11-(8.43-6.0)=8.57
Limit=11 dBm/MHz

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

Test Graphs

PSD NVNT a 5180MHz

PSD NVNT a 5200MHz

PSD NVNT a 5240MHz

PSD NVNT n20 5180MHz

PSD NVNT n20 5200MHz

PSD NVNT n20 5240MHz

PSD NVNT n40 5190MHz

PSD NVNT n40 5230MHz

PSD NVNT ac20 5180MHz

PSD NVNT ac20 5200MHz

PSD NVNT ac20 5240MHz

PSD NVNT ac40 5190MHz

PSD NVNT ac40 5230MHz

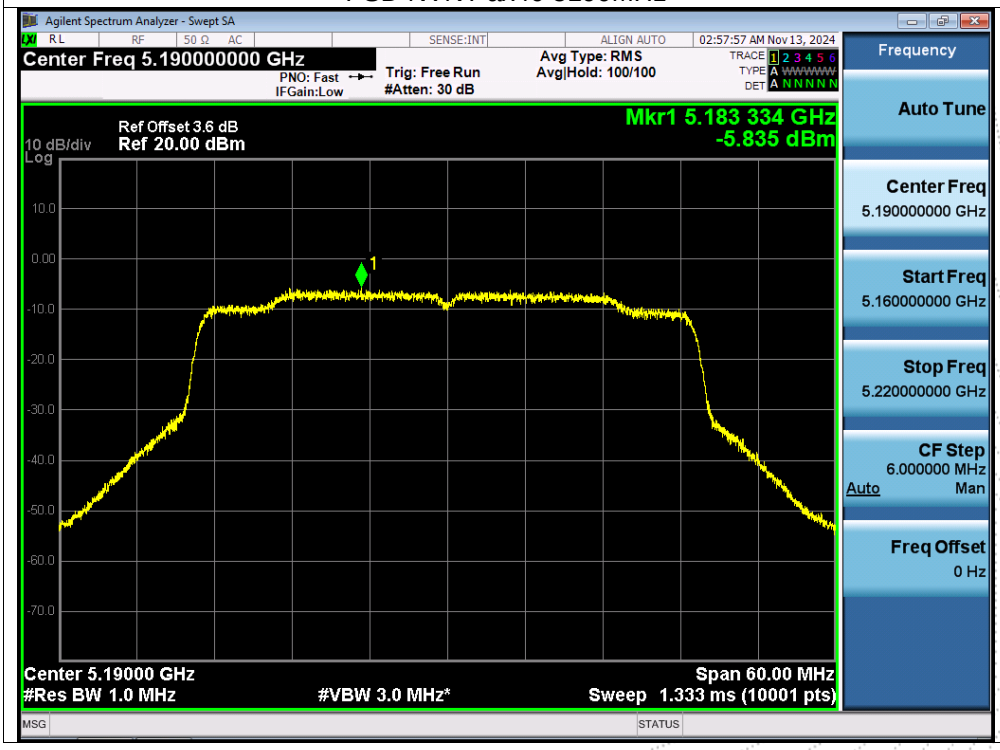
PSD NVNT ac80 5210MHz

PSD NVNT ax20 5180MHz

PSD NVNT ax20 5200MHz

PSD NVNT ax20 5240MHz

PSD NVNT ax40 5190MHz



PSD NVNT ax40 5230MHz

PSD NVNT ax80 5210MHz

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 11.4V
Test Mode:	TX Frequency U-NII-3 (5745-5825MHz)		

Condition	Mode	Frequency (MHz)	Measured Power Density (dBm/MHz)			Limit (dBm/MHz)	Result
			ANT A	ANT B	Total		
NVNT	a	5745	-6.17	-5.85	/	30	PASS
NVNT	a	5785	-6.43	-6.44	/	30	PASS
NVNT	a	5825	-6.57	-6.63	/	30	PASS
NVNT	n20	5745	-7.59	-7.43	-4.50	29.43	PASS
NVNT	n20	5785	-7.76	-7.67	-4.70	29.43	PASS
NVNT	n20	5825	-7.92	-7.83	-4.86	29.43	PASS
NVNT	n40	5755	-11.13	-11.16	-8.13	29.43	PASS
NVNT	n40	5795	-11.08	-11.66	-8.35	29.43	PASS
NVNT	ac20	5745	-7.57	-7.22	-4.38	29.43	PASS
NVNT	ac20	5785	-7.77	-7.62	-4.68	29.43	PASS
NVNT	ac20	5825	-7.81	-7.83	-4.81	29.43	PASS
NVNT	ac40	5755	-11.18	-11.30	-8.23	29.43	PASS
NVNT	ac40	5795	-11.46	-11.41	-8.42	29.43	PASS
NVNT	ac80	5775	-14.63	-14.41	-11.51	29.43	PASS
NVNT	ax20	5745	-7.84	-7.69	-4.75	29.43	PASS
NVNT	ax20	5785	-8.03	-7.97	-4.99	29.43	PASS
NVNT	ax20	5825	-8.30	-8.11	-5.19	29.43	PASS
NVNT	ax40	5755	-11.67	-11.36	-8.50	29.43	PASS
NVNT	ax40	5795	-11.80	-11.84	-8.81	29.43	PASS
NVNT	ax80	5775	-14.85	-14.82	-11.82	29.43	PASS

Note:
Antenna A gain: 3.56 dBi, Antenna B gain: 2.93 dBi, Directional gain=[GainANT + 10 log(NANT) dBi] =6.57 dbi>6dbi, so power limit=30-(6.57-6.0)=29.43
Limit=30dBm/MHz

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

Test Graphs

PSD NVNT a 5745MHz

PSD NVNT a 5785MHz

PSD NVNT a 5825MHz

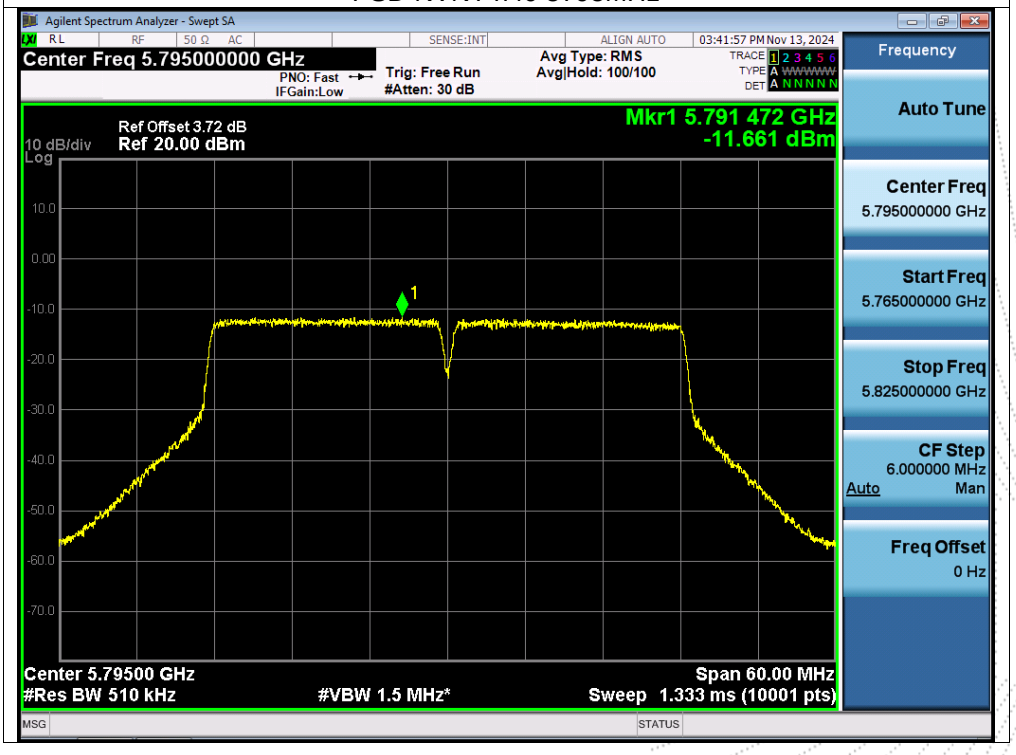
PSD NVNT n20 5745MHz

PSD NVNT n20 5785MHz

PSD NVNT n20 5825MHz

PSD NVNT n40 5755MHz

PSD NVNT n40 5795MHz

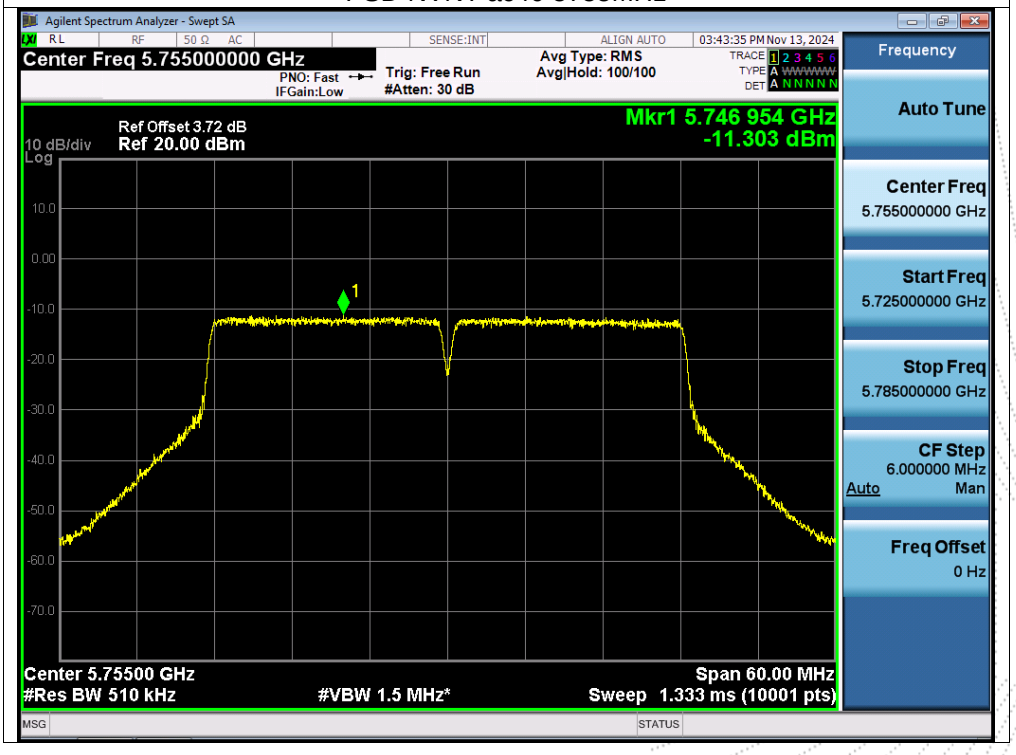


PSD NVNT ac20 5745MHz

PSD NVNT ac20 5785MHz

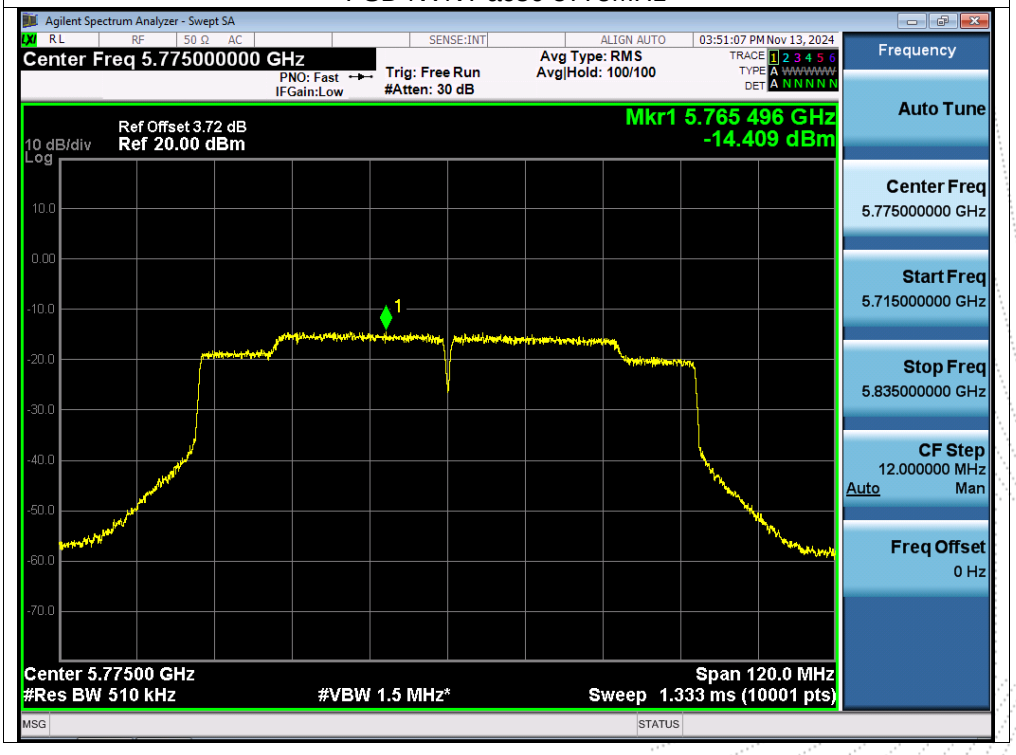
PSD NVNT ac20 5825MHz

PSD NVNT ac40 5755MHz



PSD NVNT ac40 5795MHz

PSD NVNT ac80 5775MHz



PSD NVNT ax20 5745MHz

PSD NVNT ax20 5785MHz

PSD NVNT ax20 5825MHz

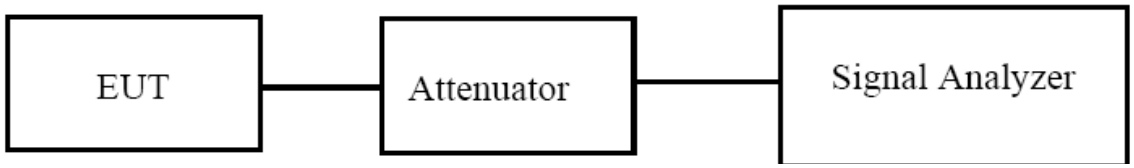
PSD NVNT ax40 5755MHz

PSD NVNT ax40 5795MHz

PSD NVNT ax80 5775MHz

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

9.1 Block Diagram Of Test Setup



9.2 Limit

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power
is integrated over the full reference bandwidth.
(6dB bandwidth)>500kHz

9.3 Test Procedure

a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) 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:
1. 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 ≥ 3 · 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.

6dB
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.

6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

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

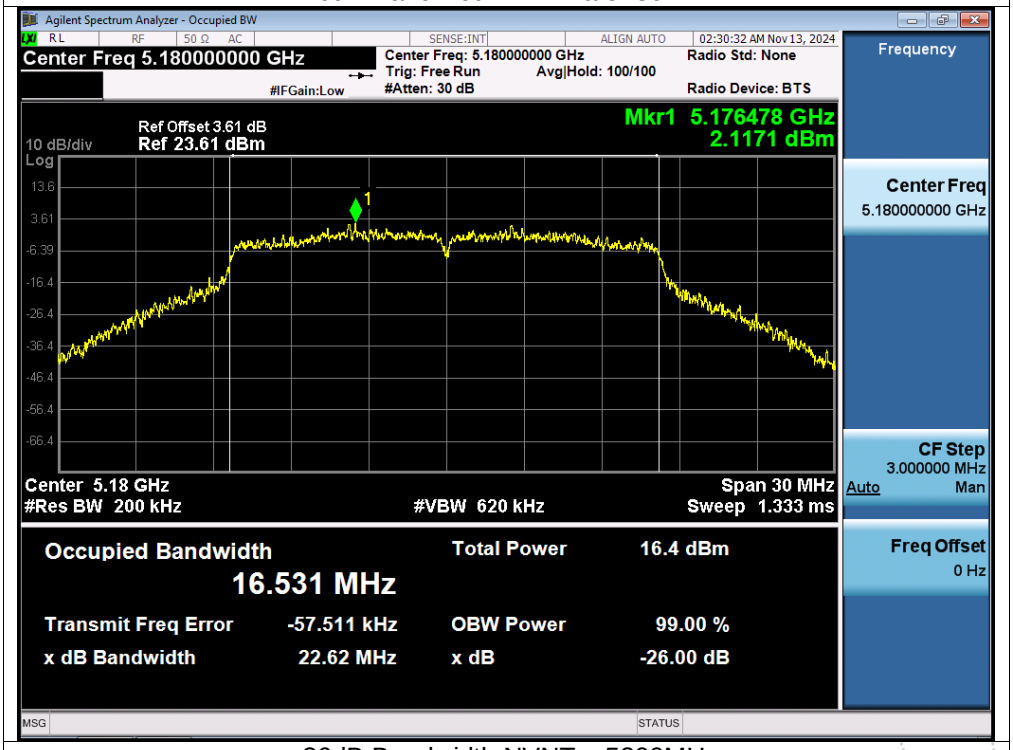
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 11.4V
Test Mode:	TX Frequency U-NII-1 (5180-5240MHz)		

Mode	Channel	Frequency (MHz)	99% OBW (MHz)		26dB bandwidth (MHz)		Result
			ANT A	ANT B	ANT A	ANT B	
NVNT	a	5180	16.519	16.522	23.139	22.618	Pass
NVNT	a	5200	16.559	16.559	22.088	22.349	Pass
NVNT	a	5240	16.471	16.519	23.146	21.756	Pass
NVNT	n20	5180	17.656	17.648	23.246	22.497	Pass
NVNT	n20	5200	17.676	17.664	22.683	23.097	Pass
NVNT	n20	5240	17.656	17.651	22.584	23.081	Pass
NVNT	n40	5190	36.003	36.071	42.571	42.713	Pass
NVNT	n40	5230	35.993	36.016	42.370	42.259	Pass
NVNT	ac20	5180	17.679	17.668	22.544	23.153	Pass
NVNT	ac20	5200	17.724	17.677	22.438	22.898	Pass
NVNT	ac20	5240	17.654	17.653	22.815	23.415	Pass
NVNT	ac40	5190	36.033	36.078	42.132	42.023	Pass
NVNT	ac40	5230	35.975	36.021	42.815	42.392	Pass
NVNT	ac80	5210	75.029	75.085	84.518	85.330	Pass
NVNT	ax20	5180	18.855	18.897	22.939	22.456	Pass
NVNT	ax20	5200	18.893	18.865	22.806	23.349	Pass
NVNT	ax20	5240	18.843	18.823	22.366	23.566	Pass
NVNT	ax40	5190	37.578	37.512	41.956	41.658	Pass
NVNT	ax40	5230	37.546	37.463	41.631	42.130	Pass
NVNT	ax80	5210	76.557	76.624	82.678	83.121	Pass

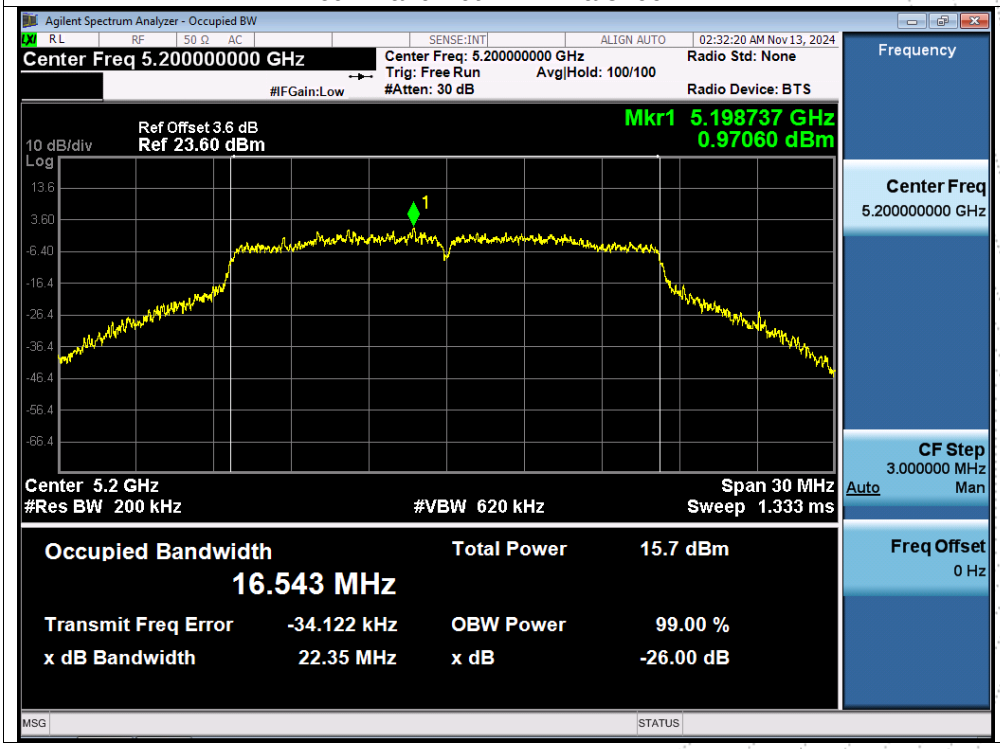
Note: A(B) Represent the value of antenna A and B. The worst data is Antenna B, only shown Antenna B Plot.

Test Graphs

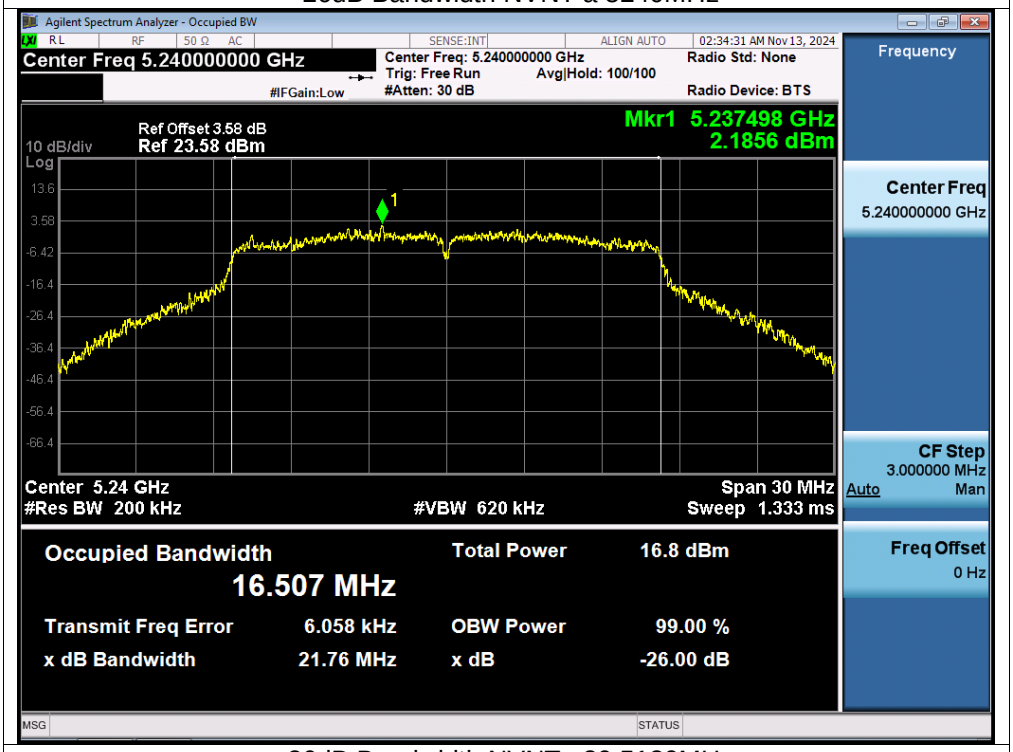
-26dB Bandwidth NVNT a 5180MHz



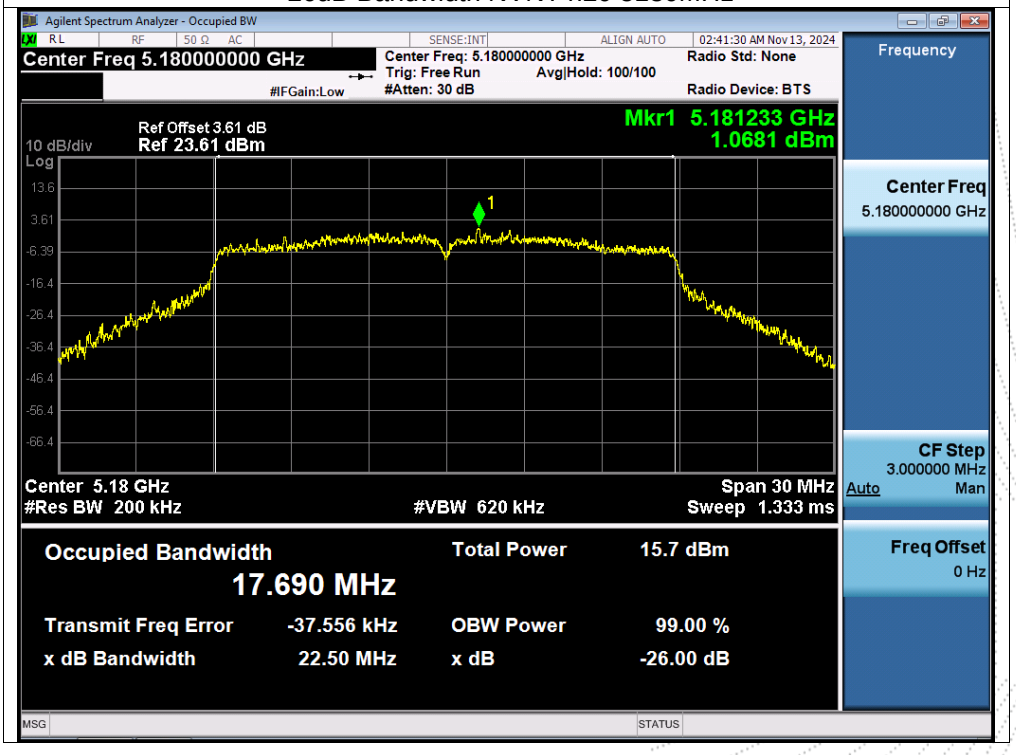
-26dB Bandwidth NVNT a 5200MHz



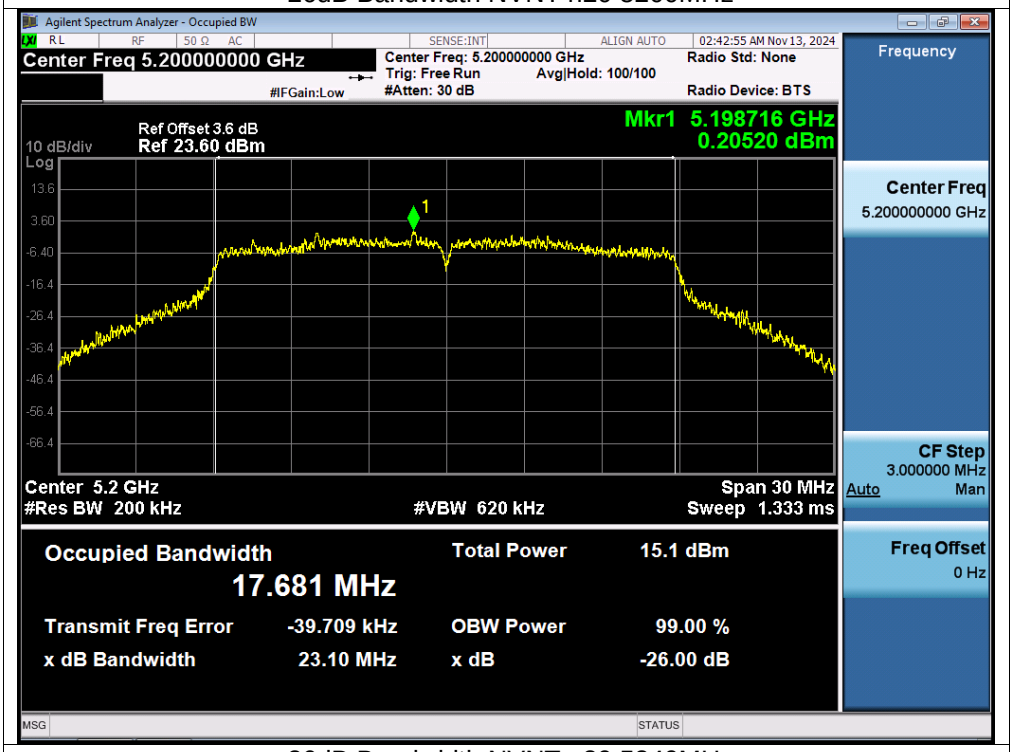
-26dB Bandwidth NVNT a 5240MHz



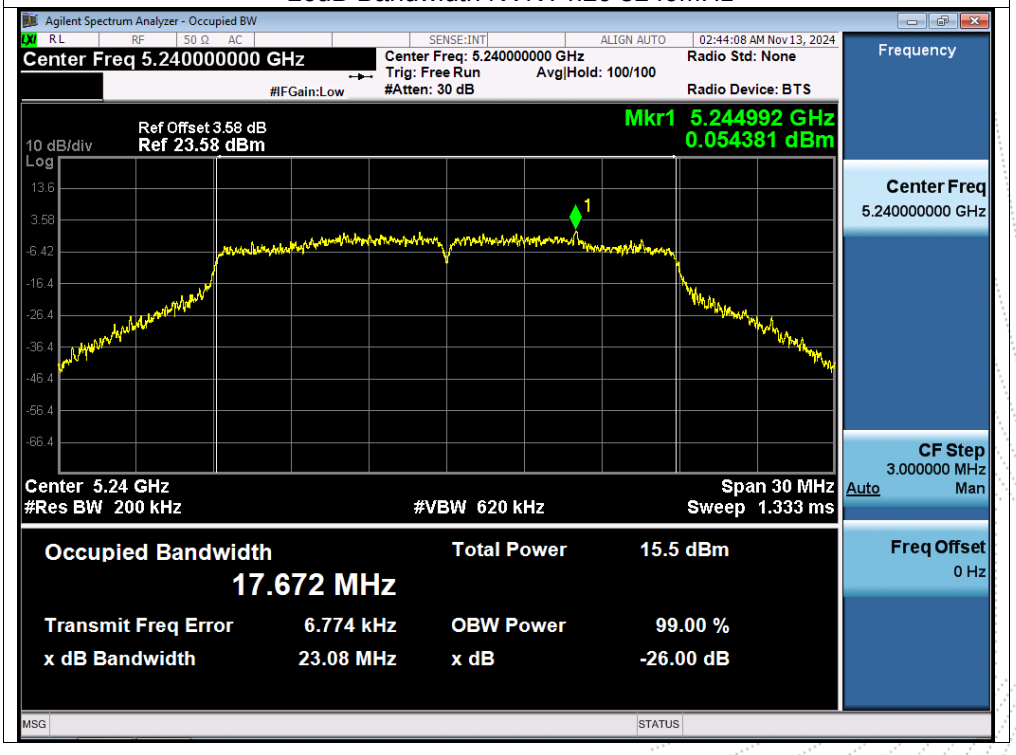
-26dB Bandwidth NVNT n20 5180MHz



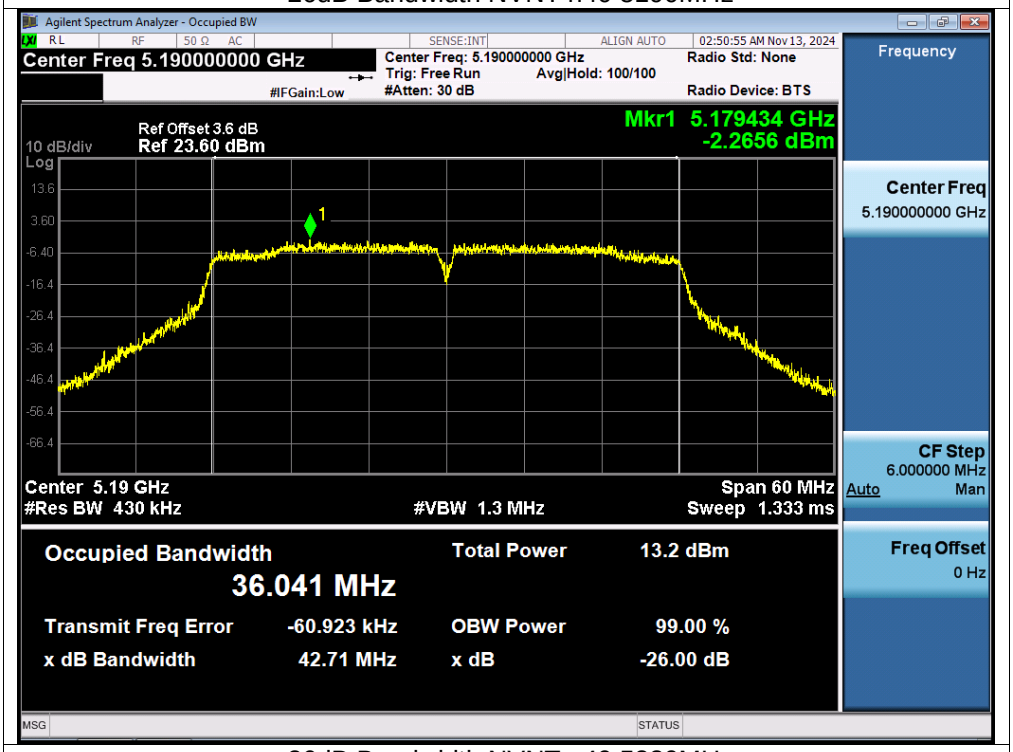
-26dB Bandwidth NVNT n20 5200MHz



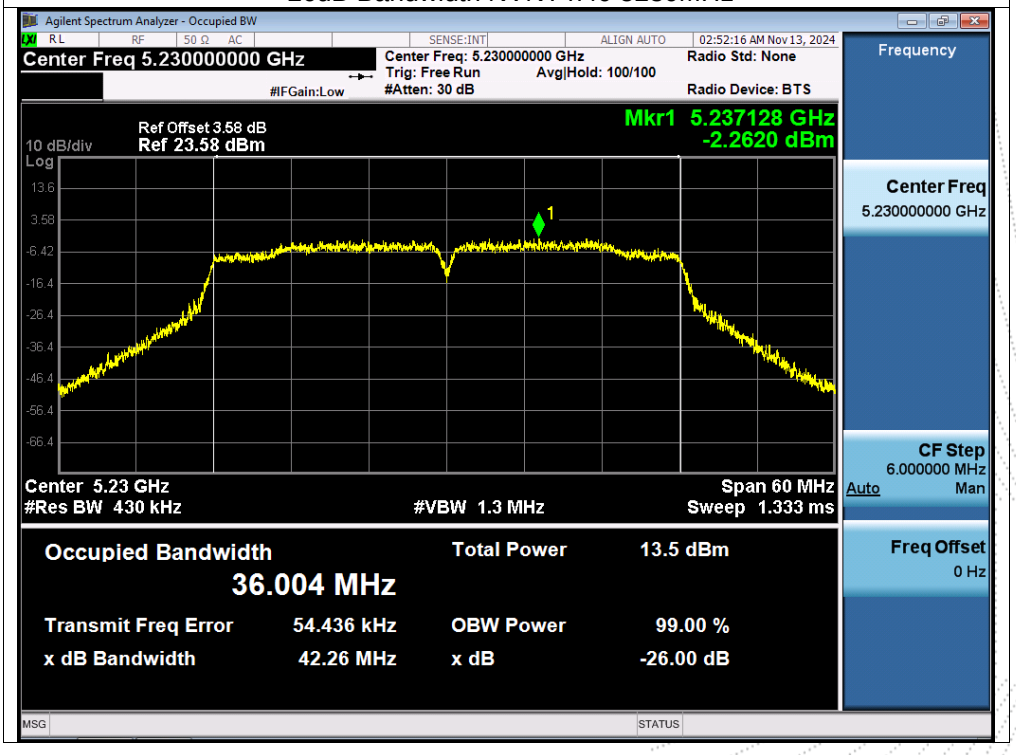
-26dB Bandwidth NVNT n20 5240MHz



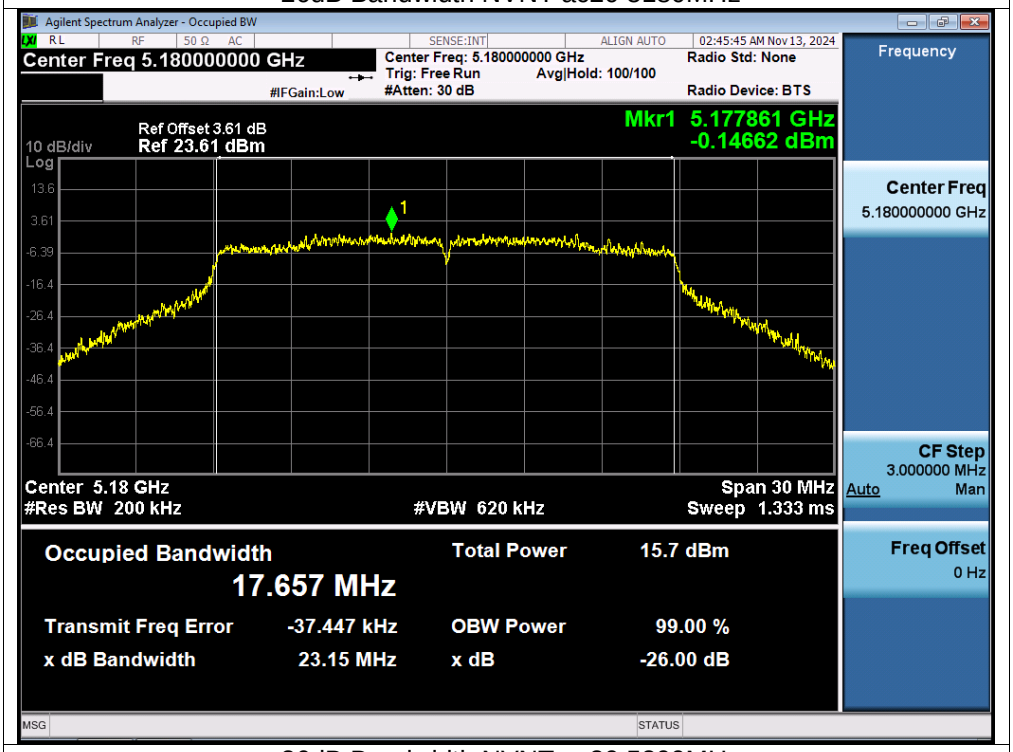
-26dB Bandwidth NVNT n40 5190MHz



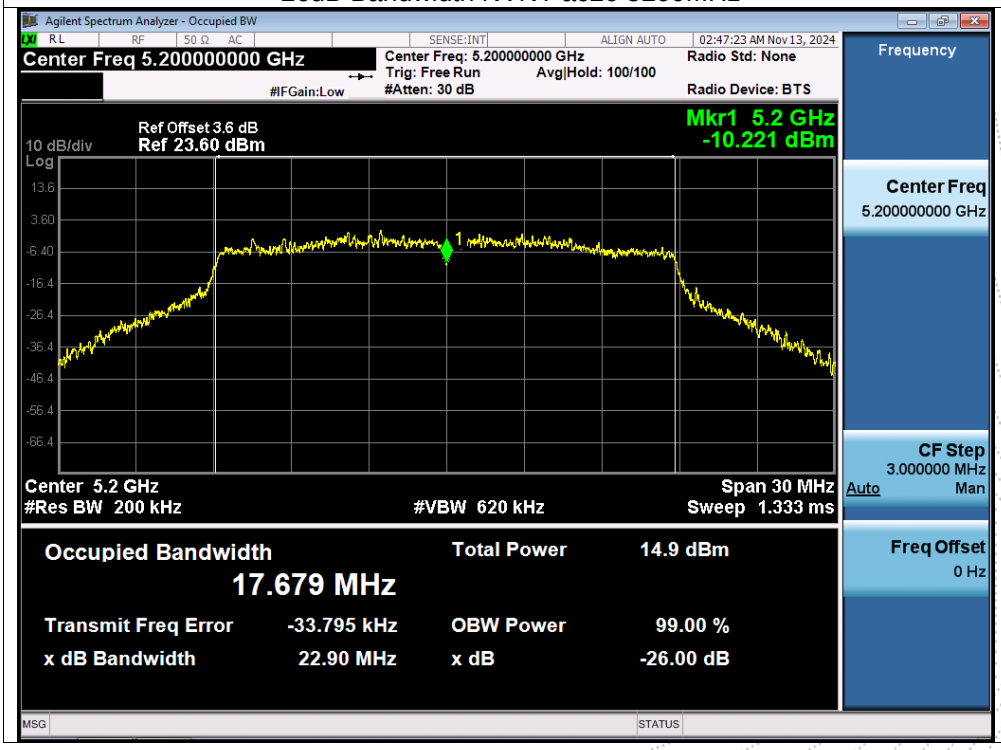
-26dB Bandwidth NVNT n40 5230MHz



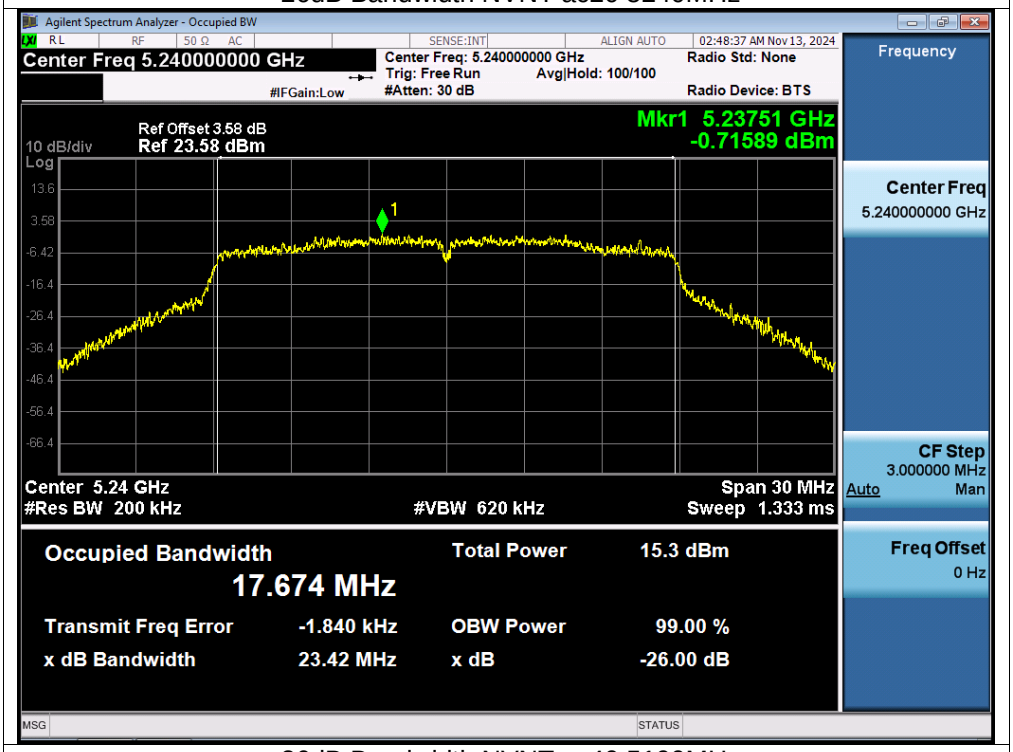
-26dB Bandwidth NVNT ac20 5180MHz



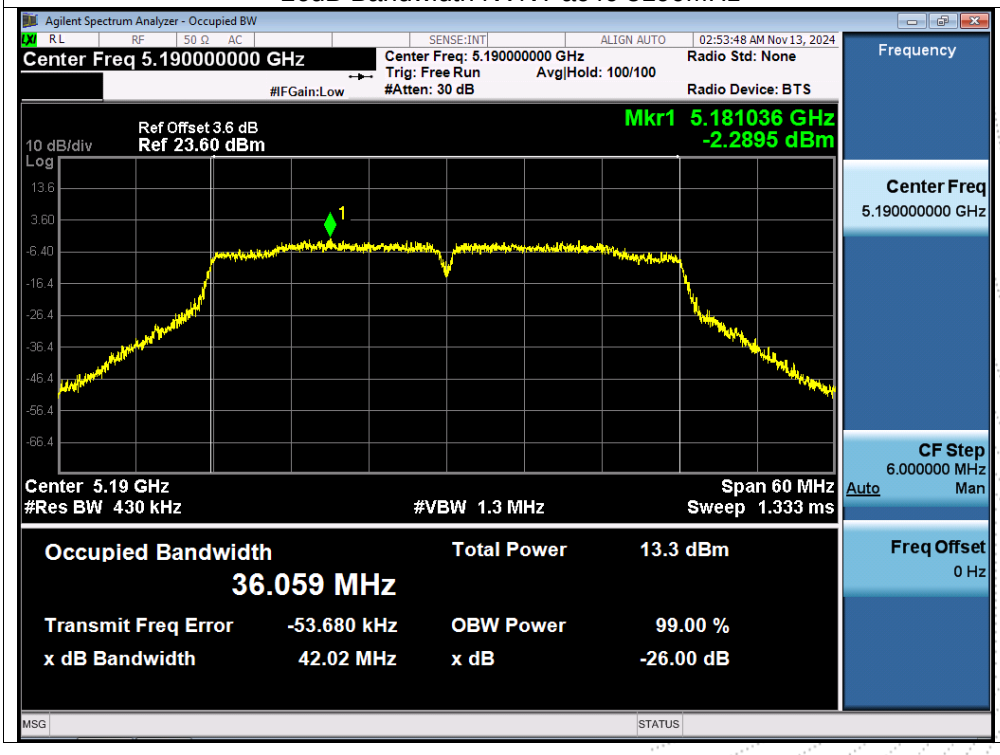
-26dB Bandwidth NVNT ac20 5200MHz



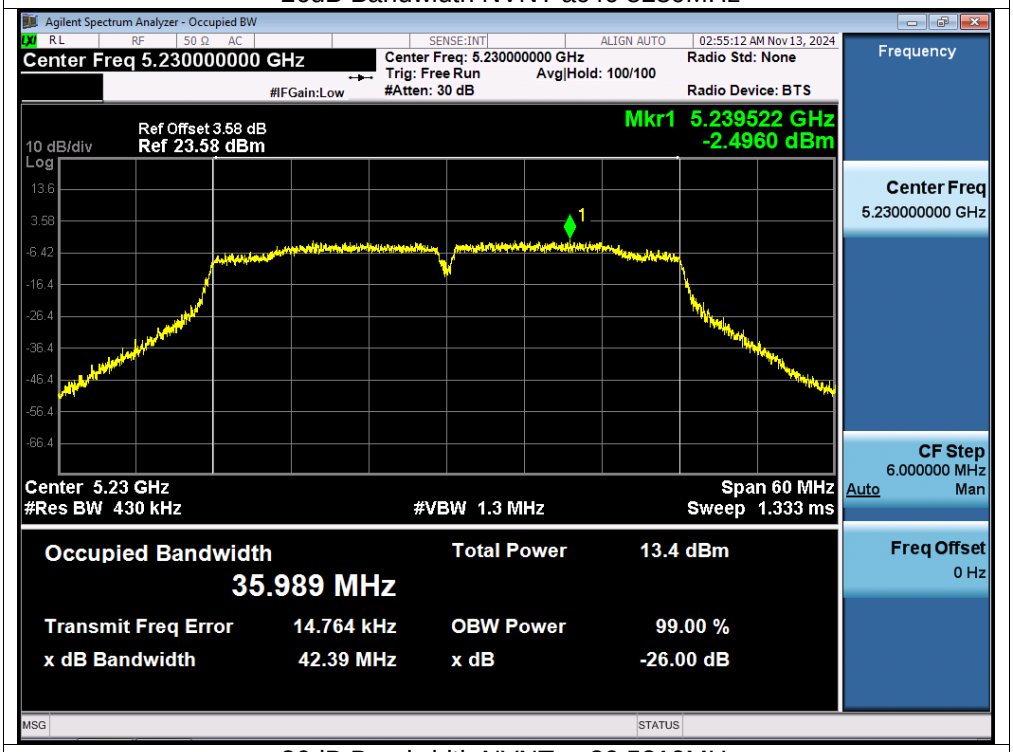
-26dB Bandwidth NVNT ac20 5240MHz



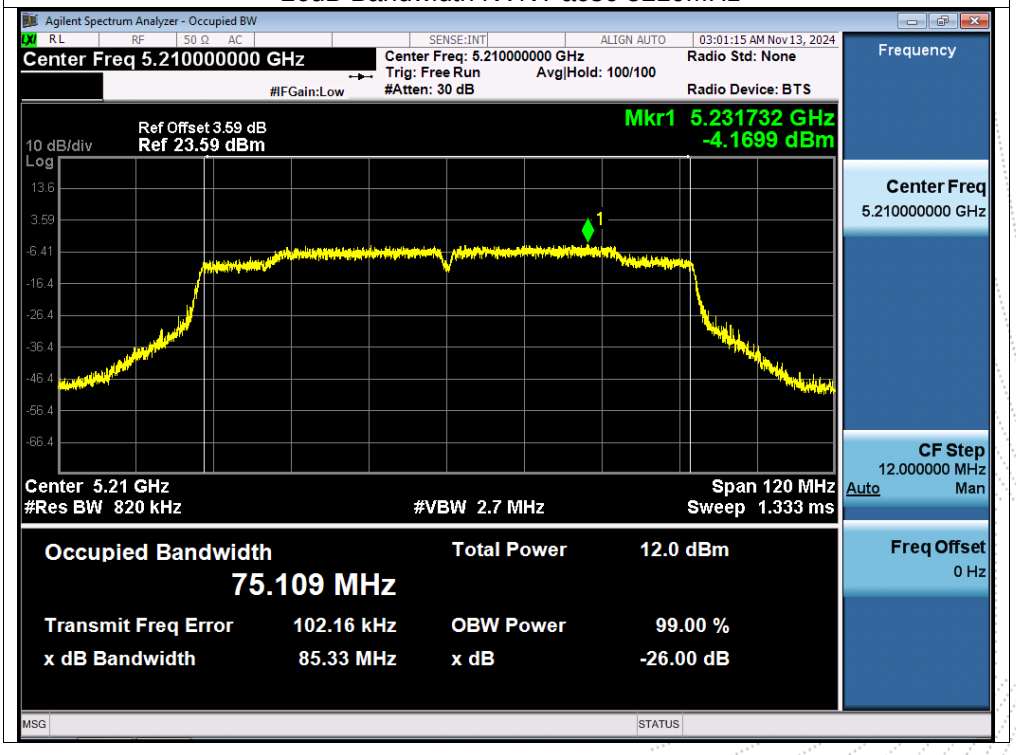
-26dB Bandwidth NVNT ac40 5190MHz



-26dB Bandwidth NVNT ac40 5230MHz

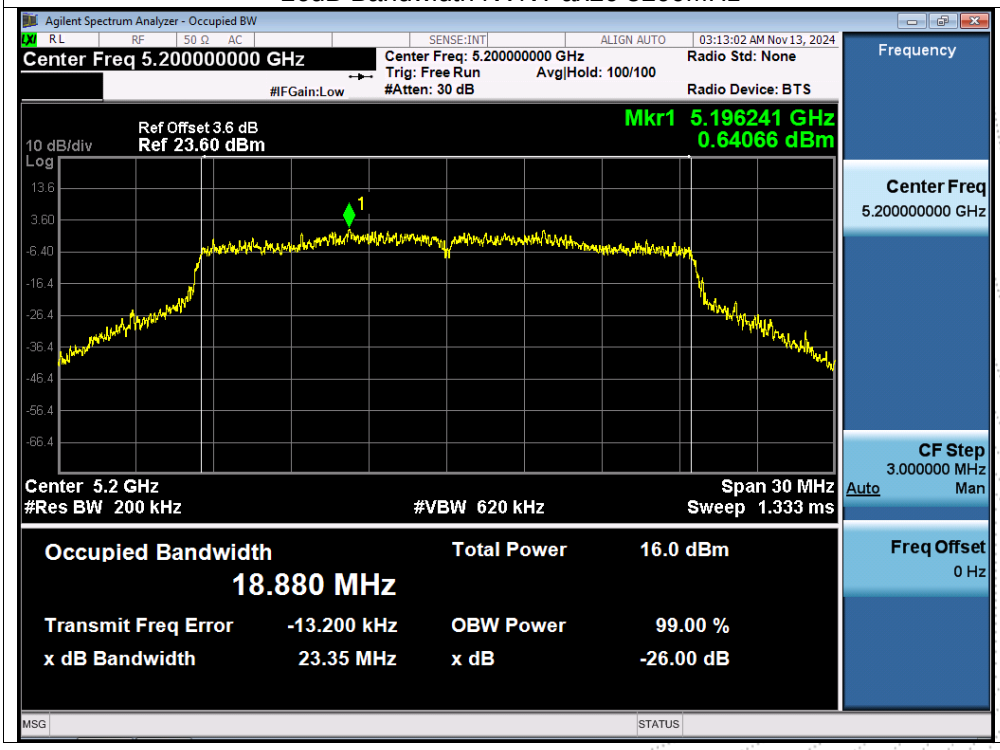


-26dB Bandwidth NVNT ac80 5210MHz

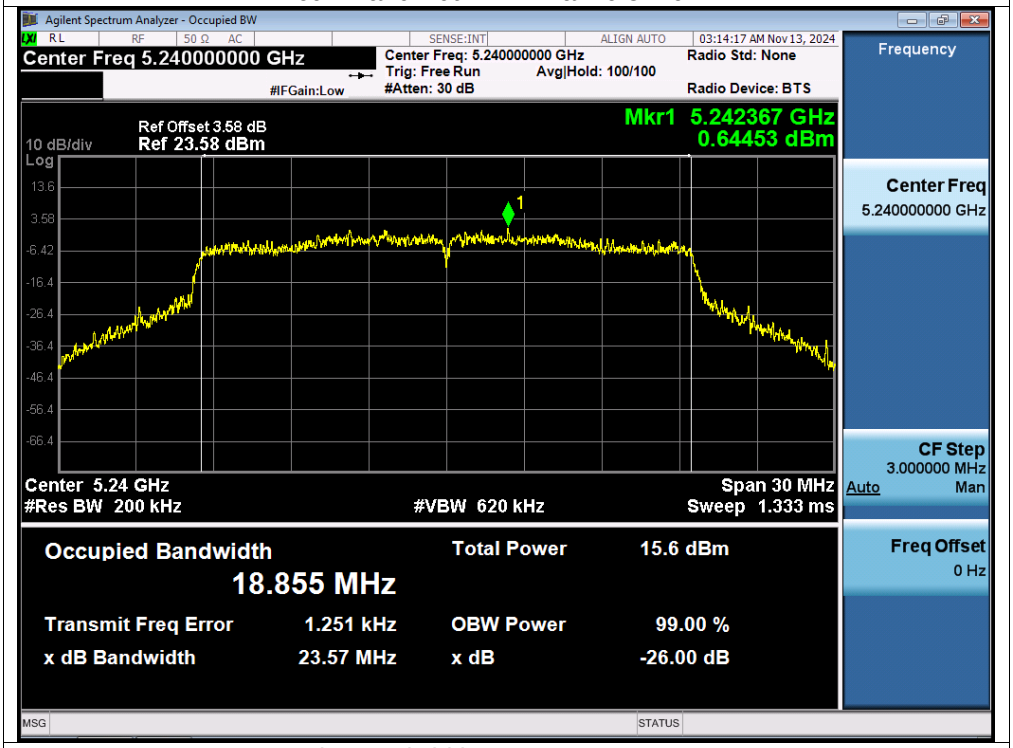


-26dB Bandwidth NVNT ax20 5180MHz

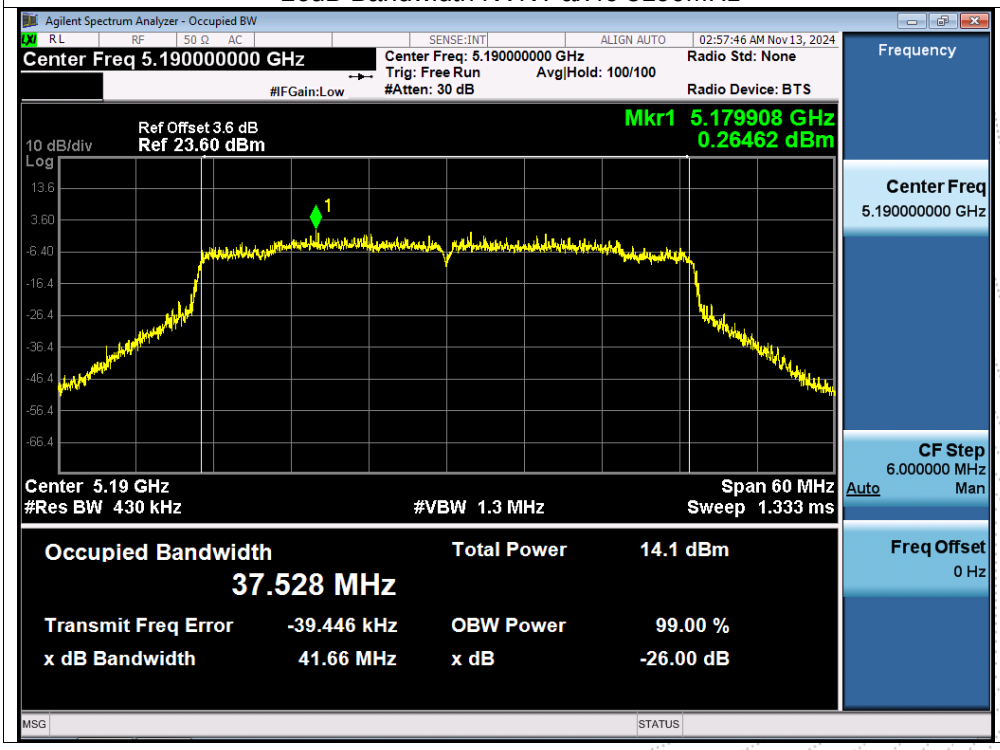
-26dB Bandwidth NVNT ax20 5200MHz



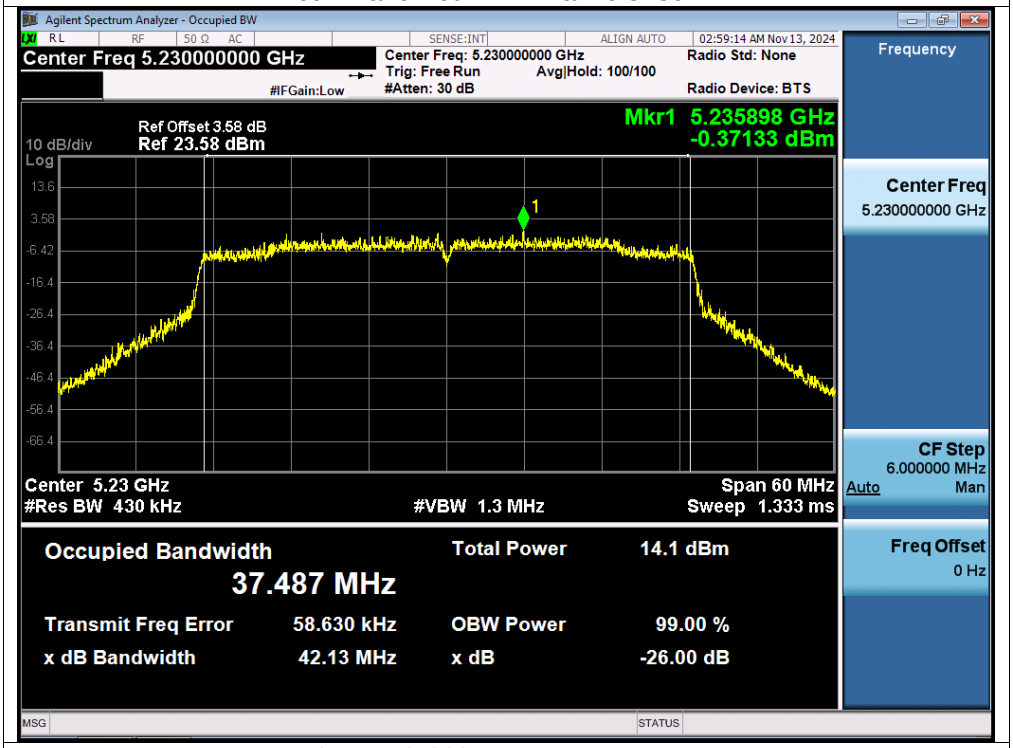
-26dB Bandwidth NVNT ax20 5240MHz



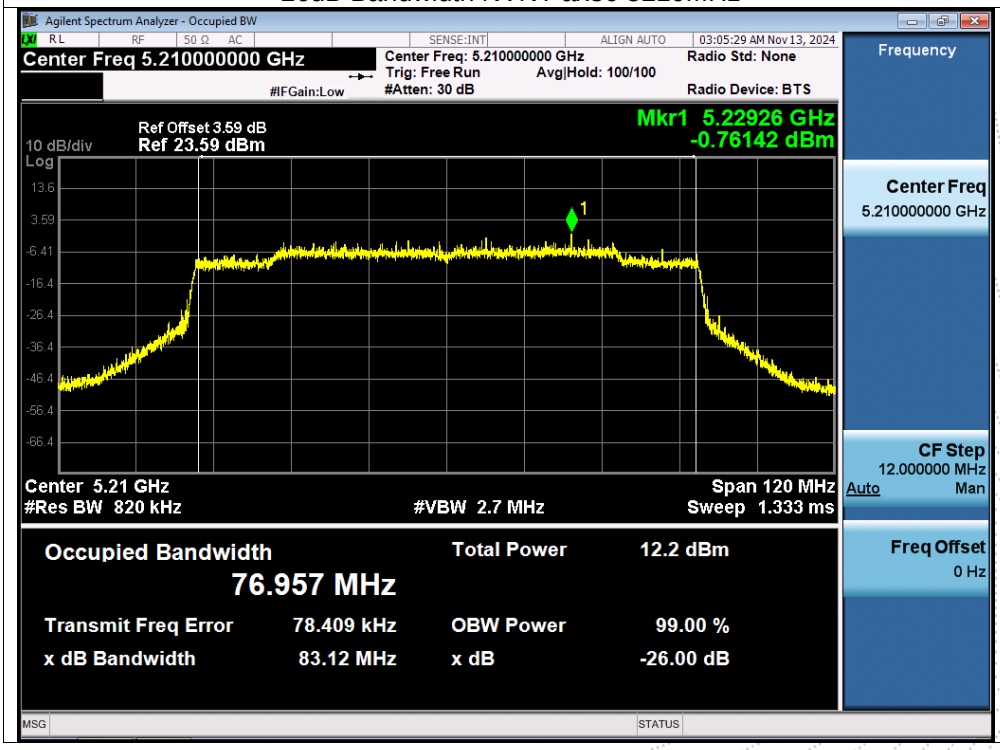
-26dB Bandwidth NVNT ax40 5190MHz



-26dB Bandwidth NVNT ax40 5230MHz

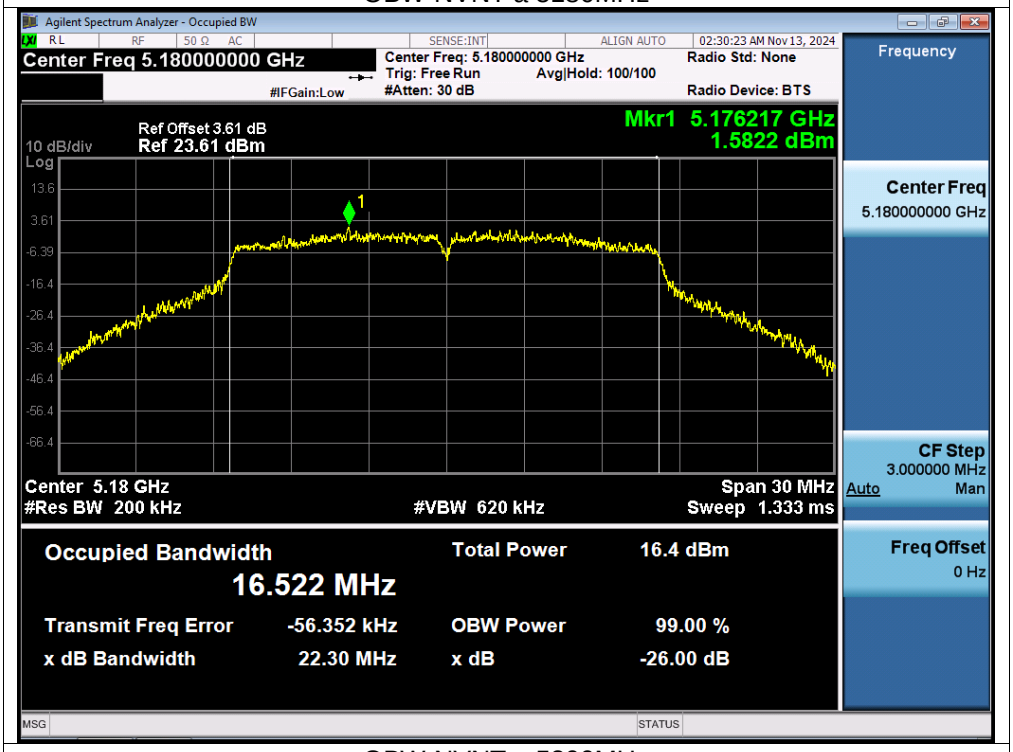


-26dB Bandwidth NVNT ax80 5210MHz

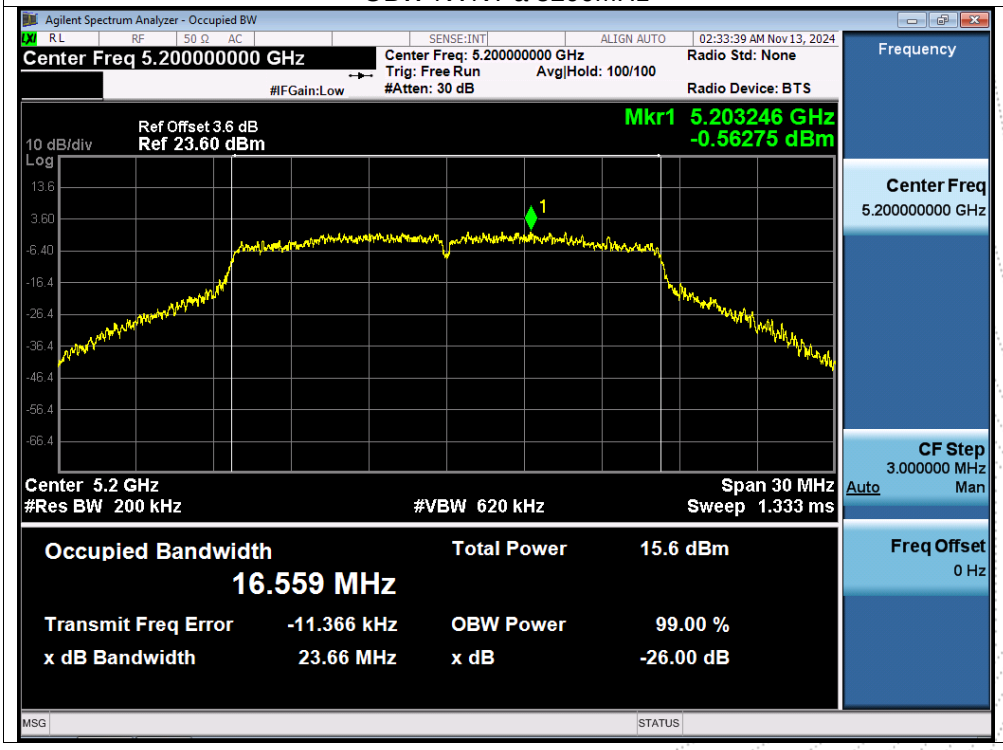


Test Graphs

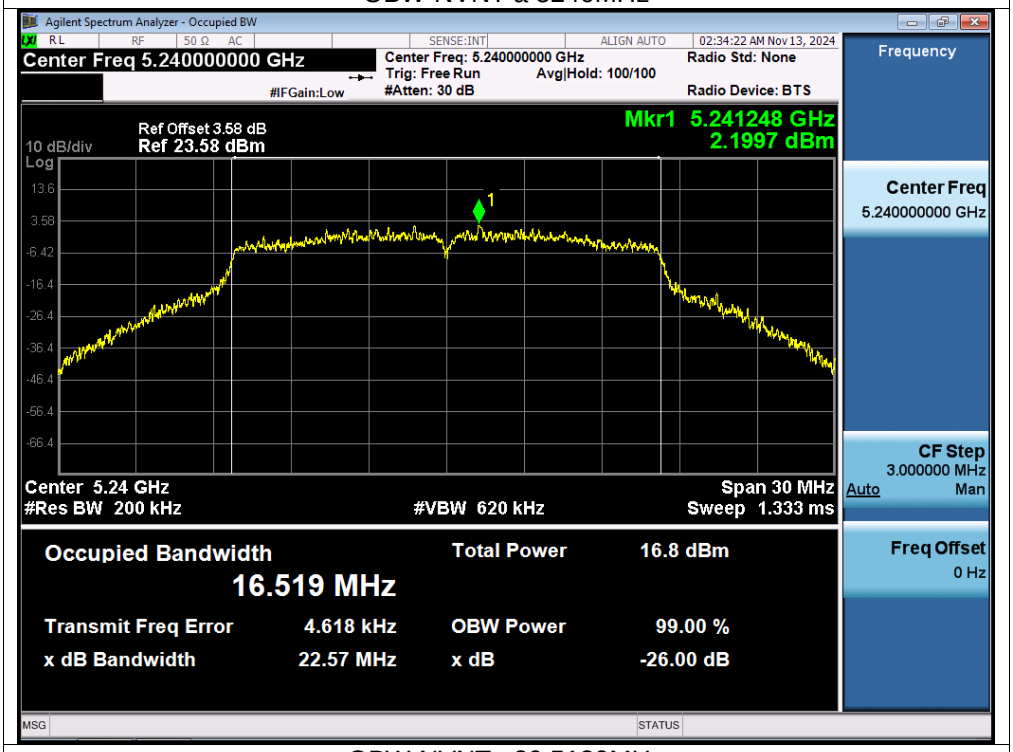
OBW NVNT a 5180MHz



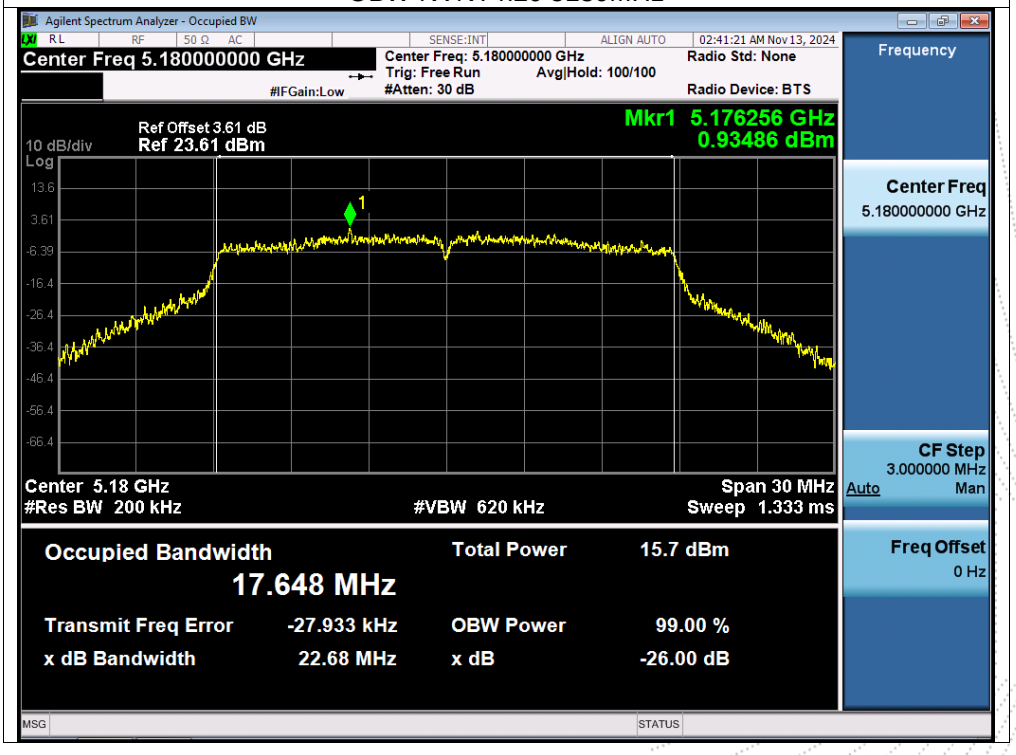
OBW NVNT a 5200MHz



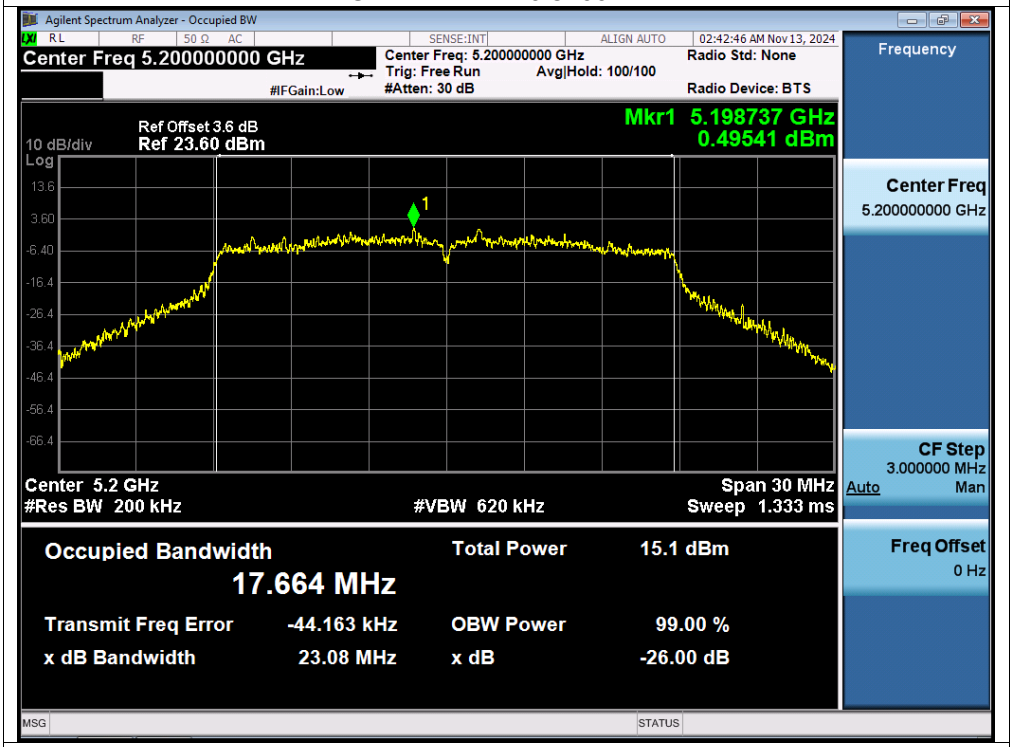
OBW NVNT a 5240MHz



OBW NVNT n20 5180MHz



OBW NVNT n20 5200MHz



OBW NVNT n20 5240MHz