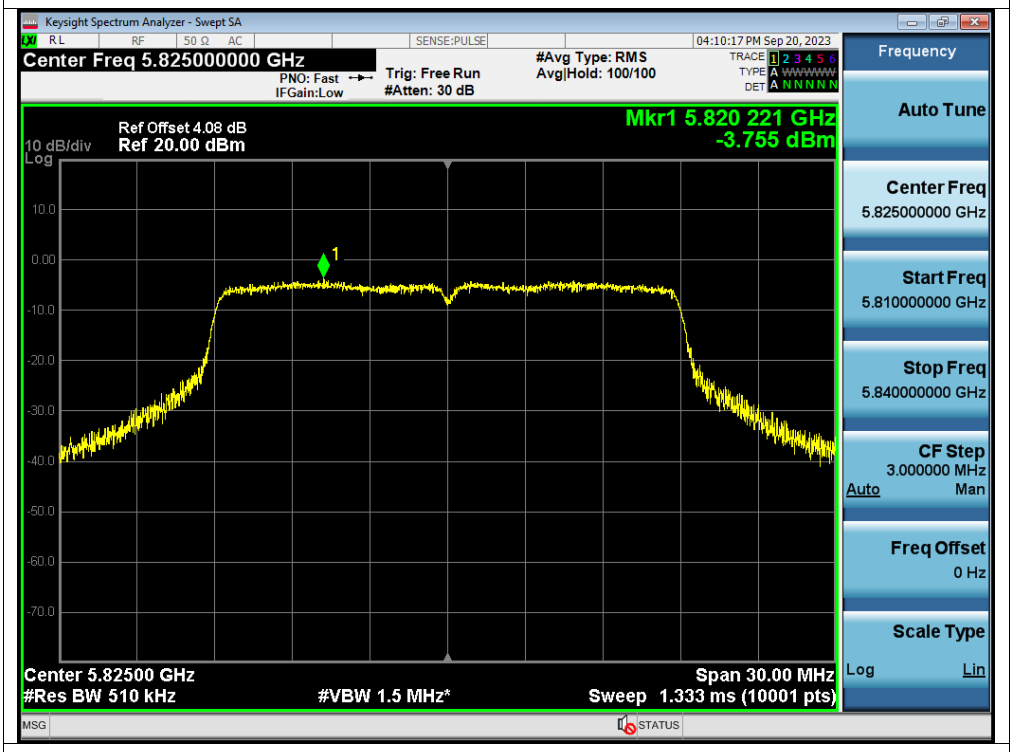
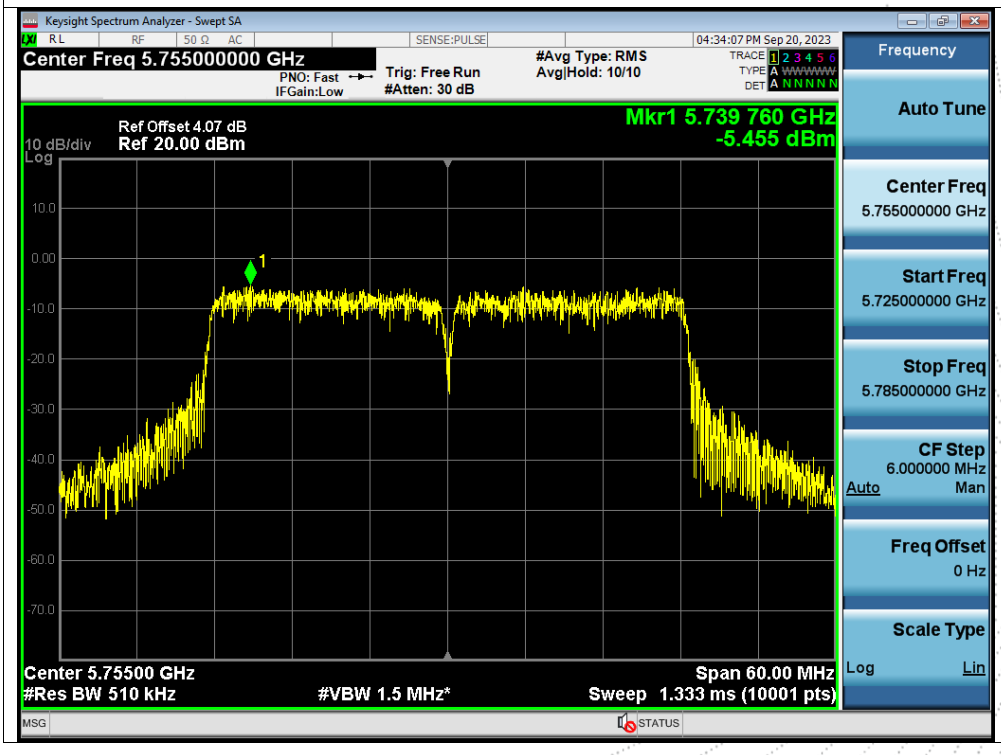
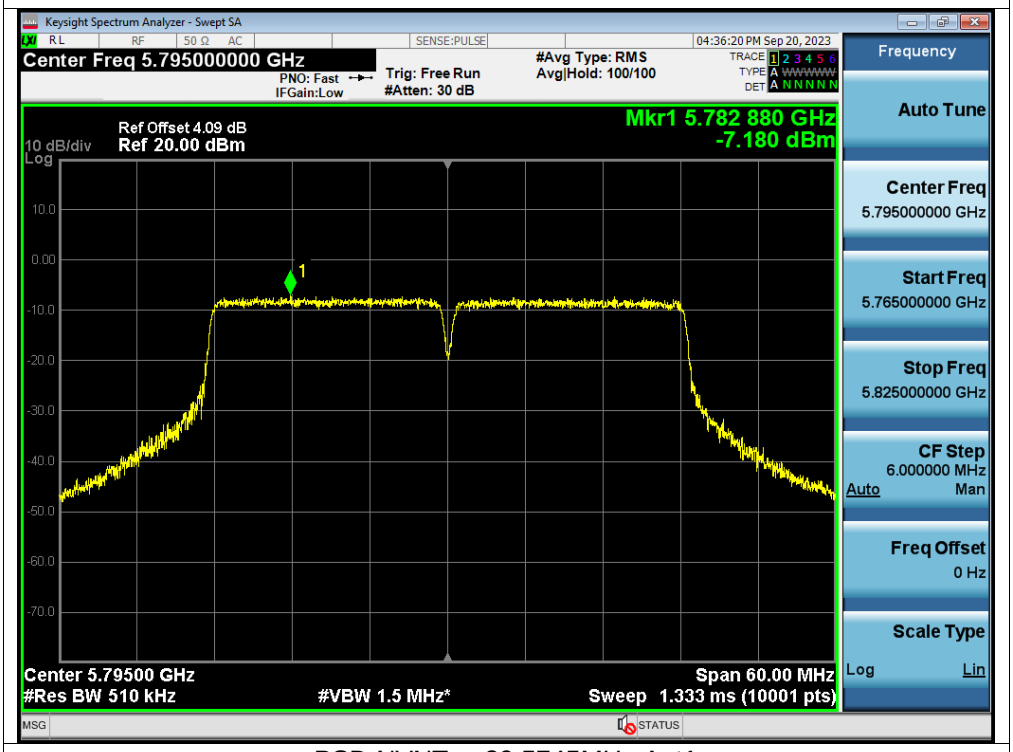
PSD NVNT ac20 5825MHz Ant1



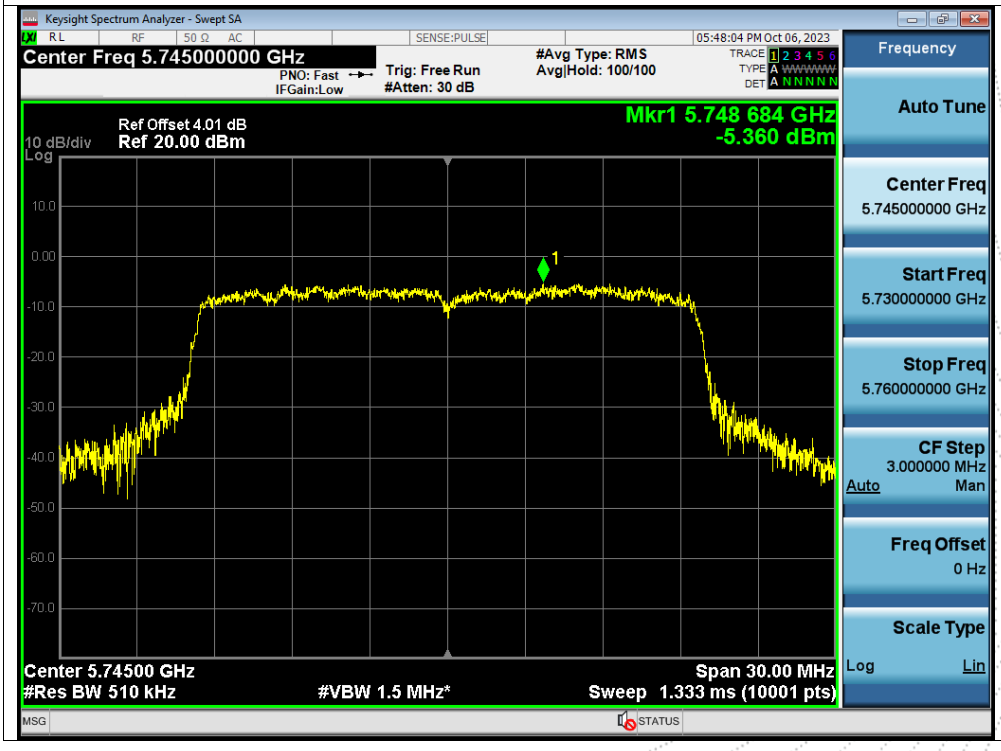
PSD NVNT ac40 5755MHz Ant1



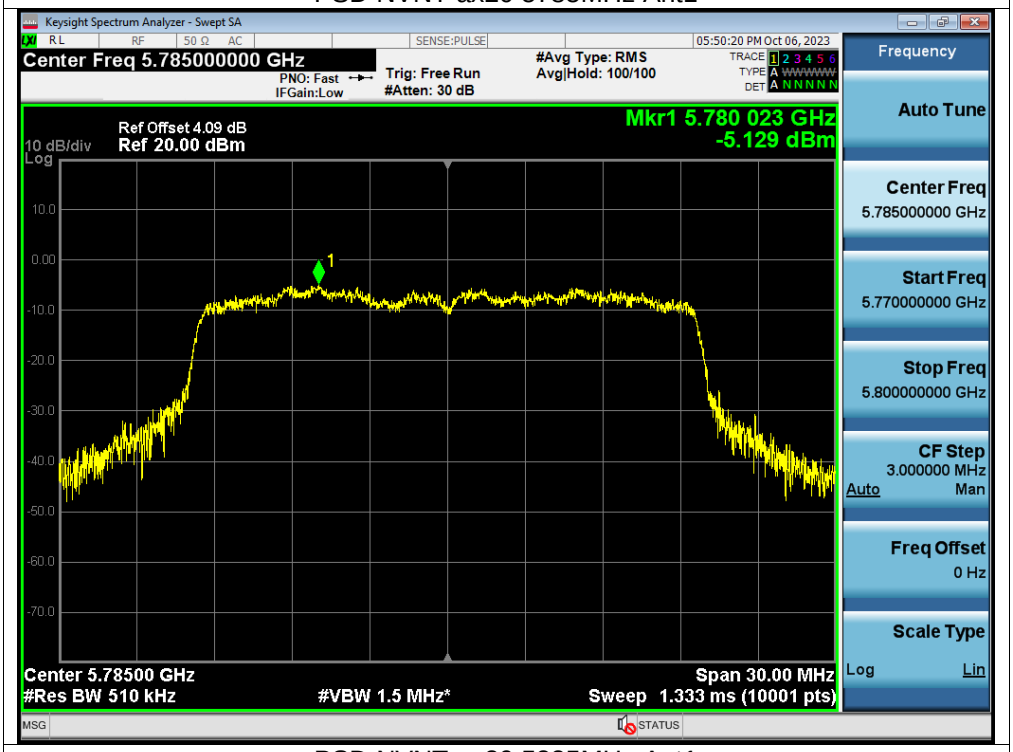
PSD NVNT ac40 5795MHz Ant1



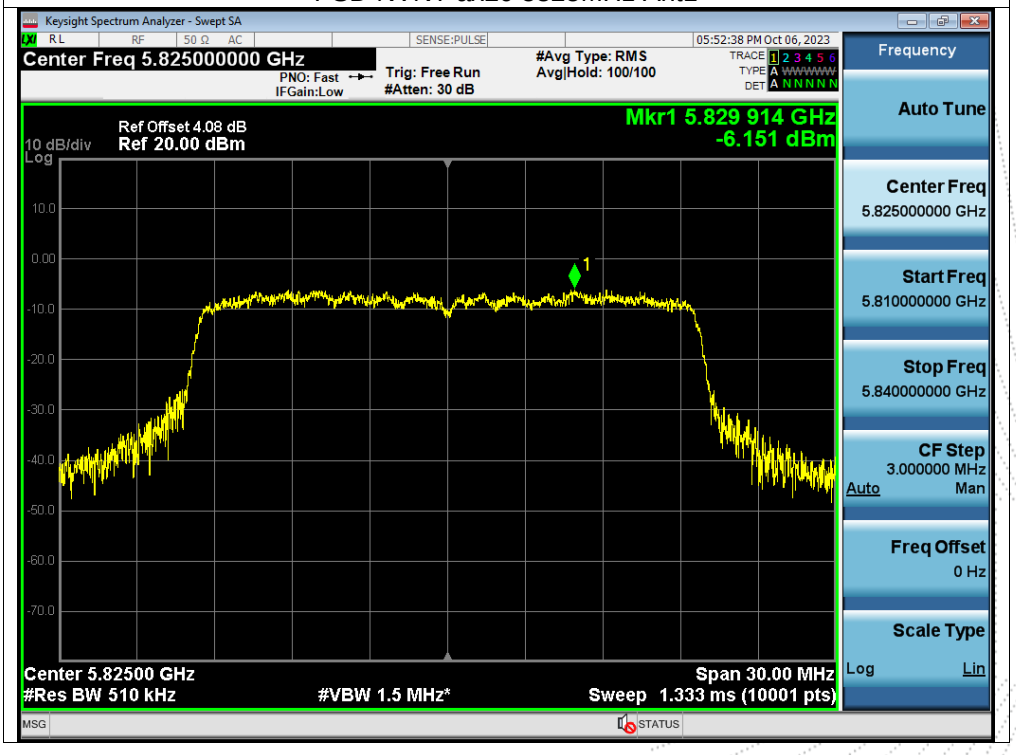
PSD NVNT ax20 5745MHz Ant1



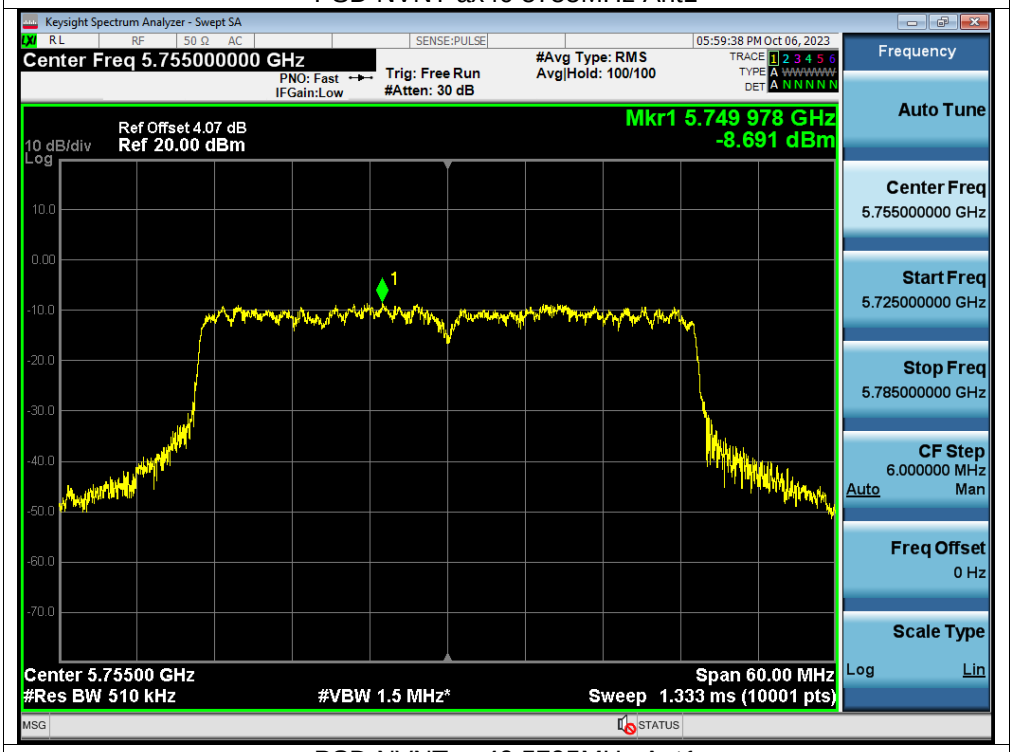
PSD NVNT ax20 5785MHz Ant1



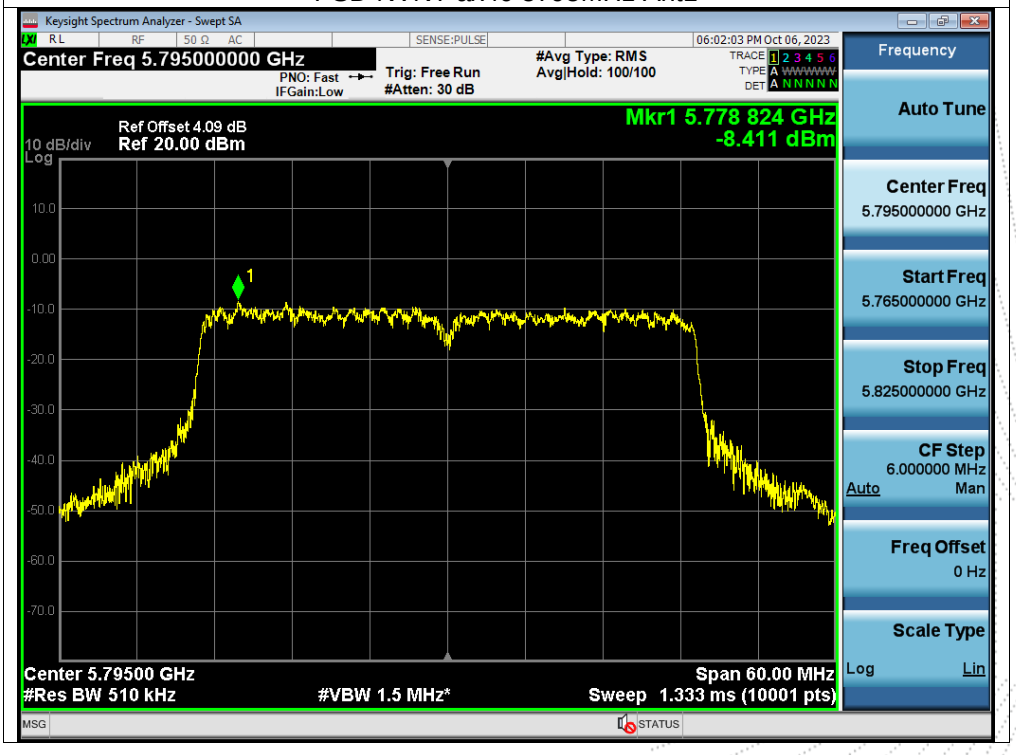
PSD NVNT ax20 5825MHz Ant1



PSD NVNT ax40 5755MHz Ant1

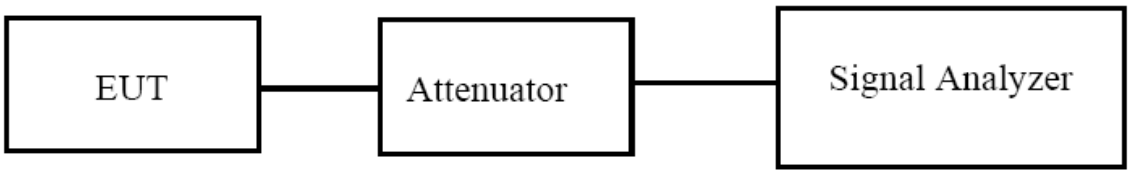


PSD NVNT ax40 5795MHz Ant1



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.

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.

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.

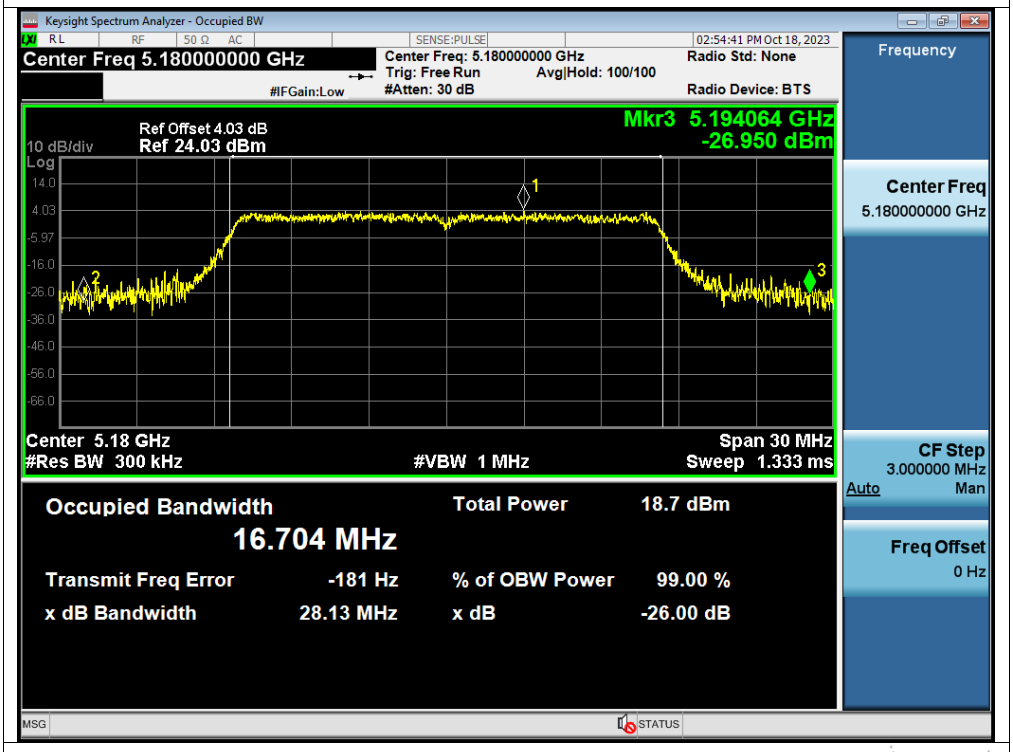
9.5 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.8V
Test Mode:	(5180-5240MHz)		

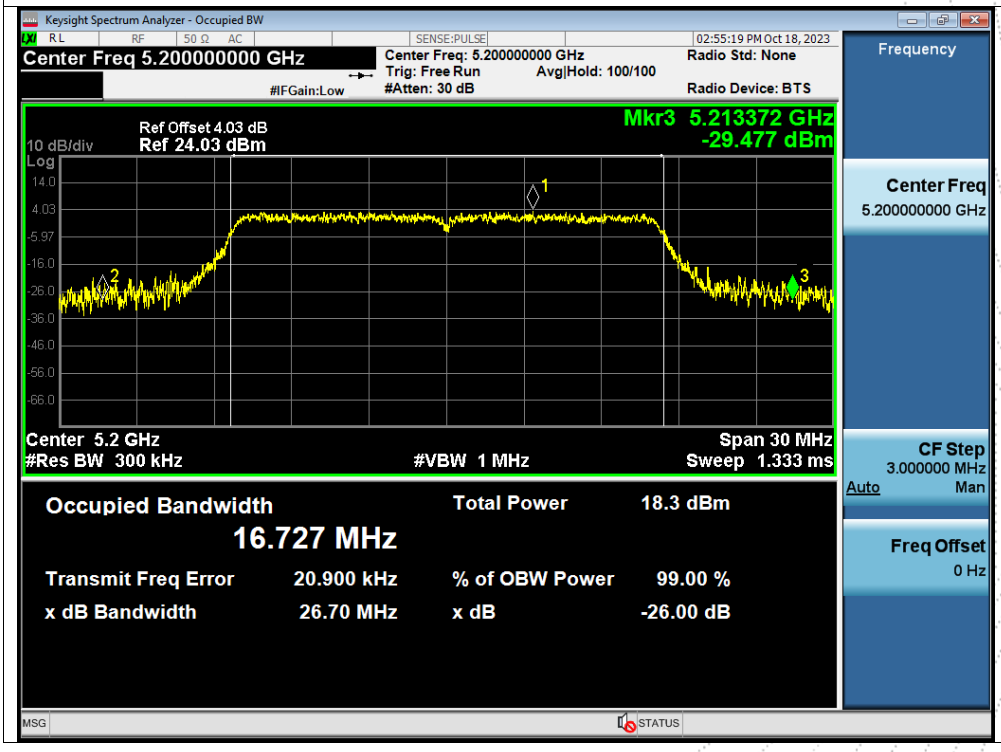
Condition	Mode	Frequency (MHz)	-26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	28.129	Pass
NVNT	a	5200	26.702	Pass
NVNT	a	5240	27.222	Pass
NVNT	n20	5180	27.063	Pass
NVNT	n20	5200	27.650	Pass
NVNT	n20	5240	25.231	Pass
NVNT	n40	5190	39.758	Pass
NVNT	n40	5230	39.73	Pass
NVNT	ac20	5180	26.544	Pass
NVNT	ac20	5200	26.826	Pass
NVNT	ac20	5240	26.951	Pass
NVNT	ac40	5190	39.19	Pass
NVNT	ac40	5230	39.713	Pass
NVNT	ax20	5180	25.426	Pass
NVNT	ax20	5200	24.985	Pass
NVNT	ax20	5240	25.099	Pass
NVNT	ax40	5190	43.901	Pass
NVNT	ax40	5230	44.070	Pass

Condition	Mode	Frequency (MHz)	99% OBW (MHz)
NVNT	a	5180	16.799
NVNT	a	5200	16.774
NVNT	a	5240	16.72
NVNT	n20	5180	17.99
NVNT	n20	5200	17.974
NVNT	n20	5240	17.962
NVNT	n40	5190	36.637
NVNT	n40	5230	36.567
NVNT	ac20	5180	18.023
NVNT	ac20	5200	17.979
NVNT	ac20	5240	17.977
NVNT	ac40	5190	36.659
NVNT	ac40	5230	36.529
NVNT	ax20	5180	19.064
NVNT	ax20	5200	19.051
NVNT	ax20	5240	19.055
NVNT	ax40	5190	37.978
NVNT	ax40	5230	37.939

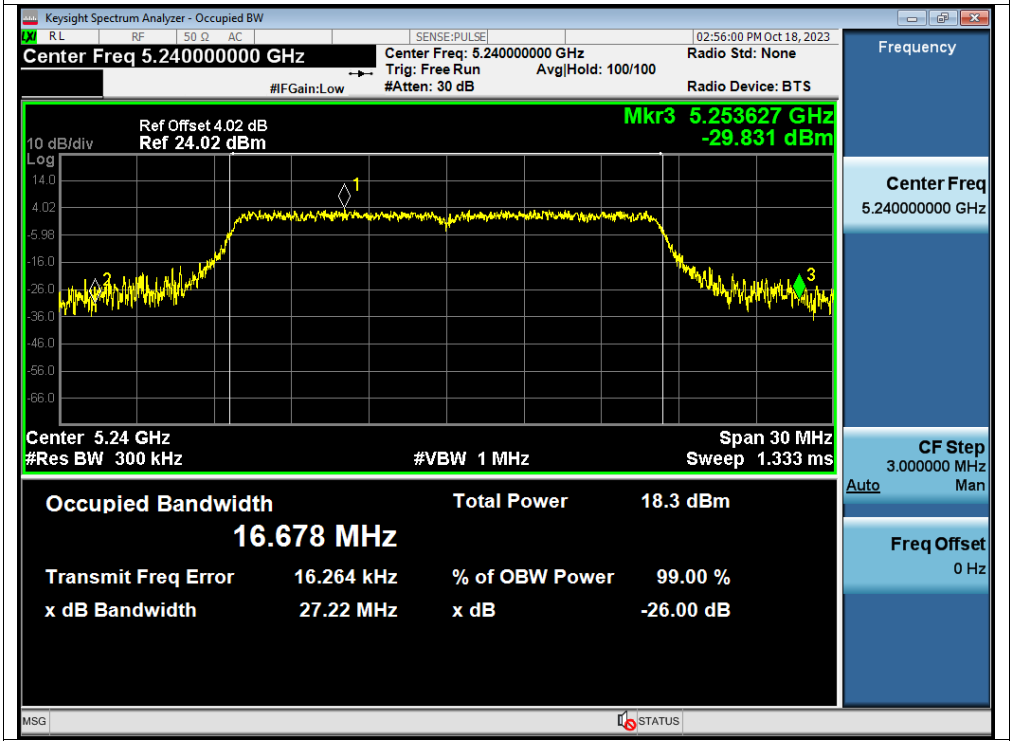
Test Graphs
-26dB Bandwidth NVNT a 5180MHz Ant1



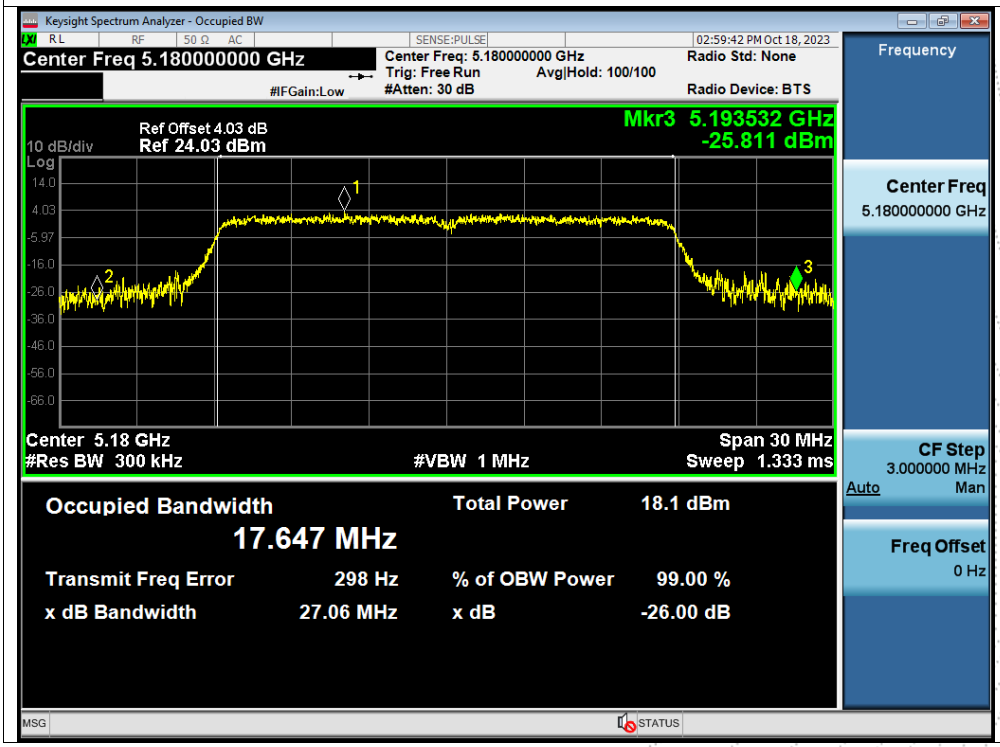
-26dB Bandwidth NVNT a 5200MHz Ant1



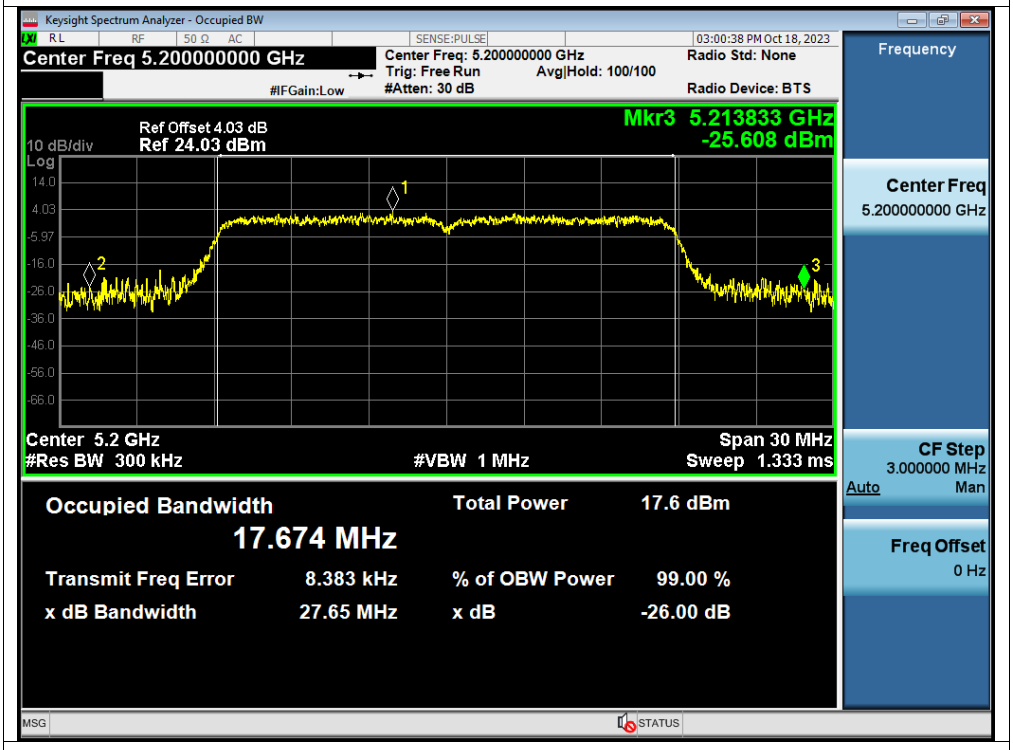
-26dB Bandwidth NVNT a 5240MHz Ant1



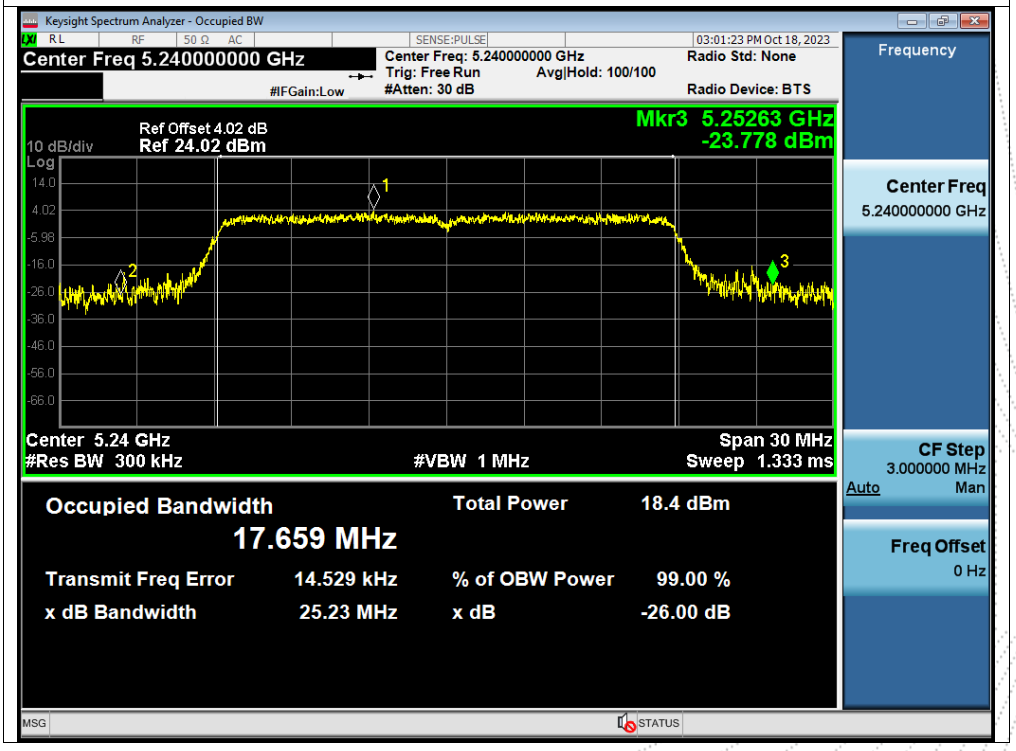
-26dB Bandwidth NVNT n20 5180MHz Ant1



-26dB Bandwidth NVNT n20 5200MHz Ant1



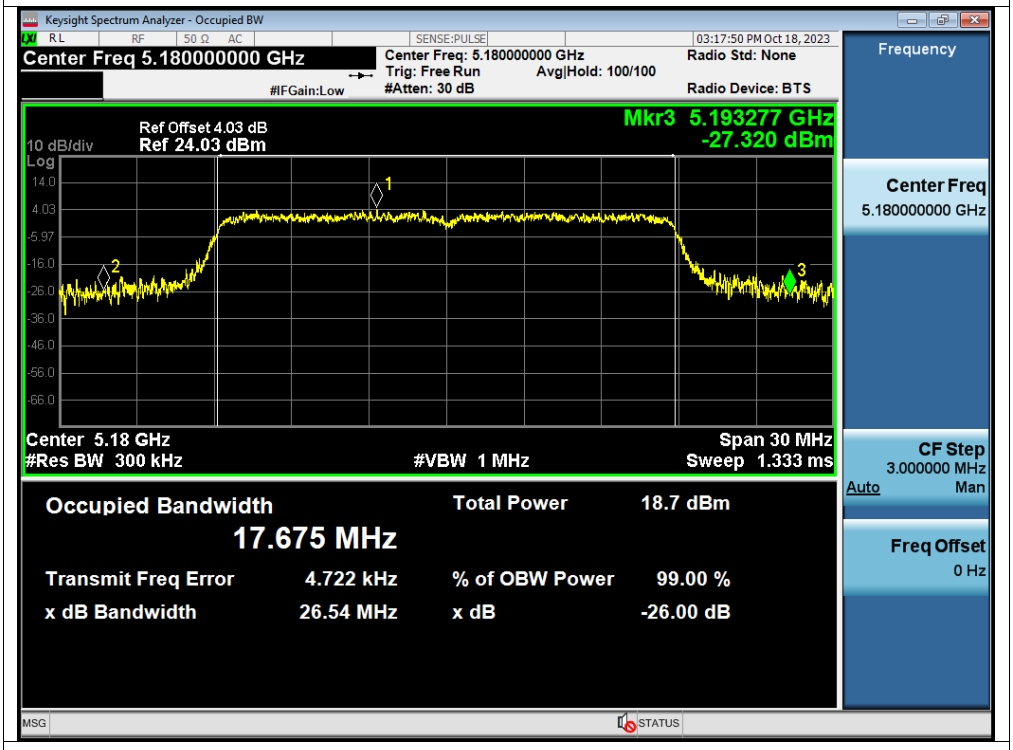
-26dB Bandwidth NVNT n20 5240MHz Ant1



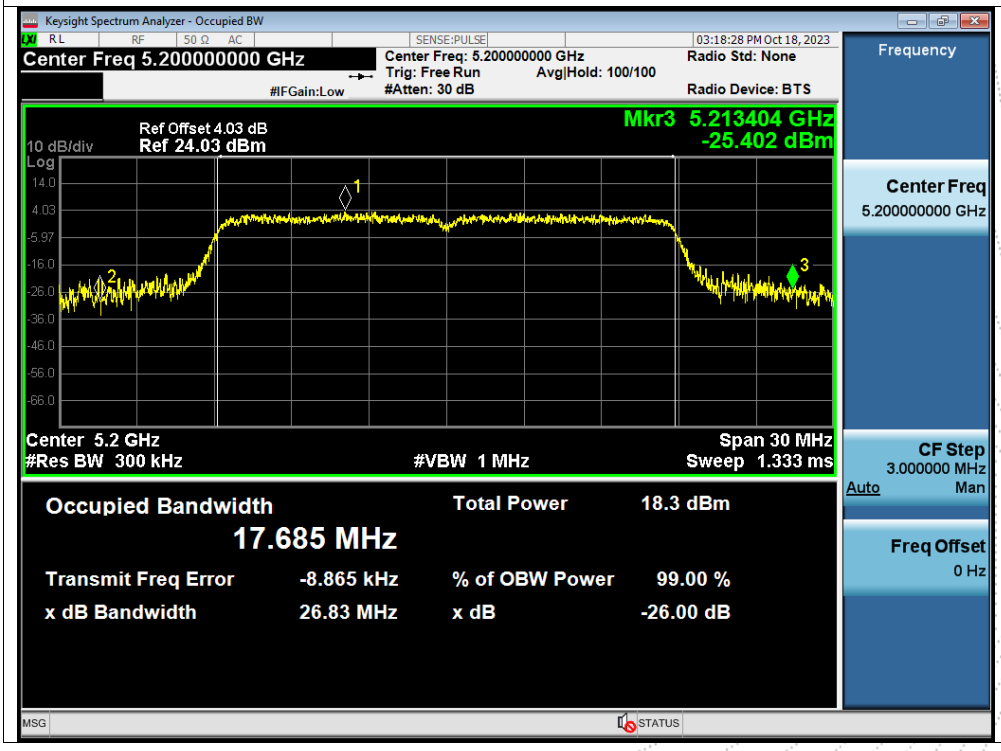
-26dB Bandwidth NVNT n40 5190MHz Ant1

-26dB Bandwidth NVNT n40 5230MHz Ant1

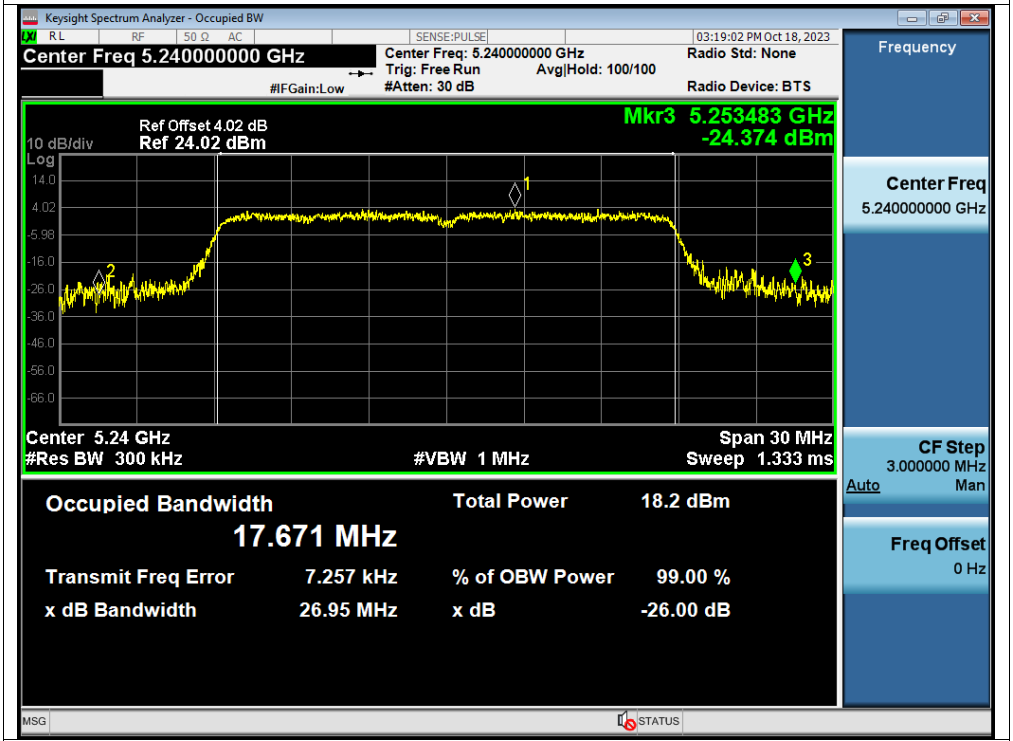
-26dB Bandwidth NVNT ac20 5180MHz Ant1



-26dB Bandwidth NVNT ac20 5200MHz Ant1

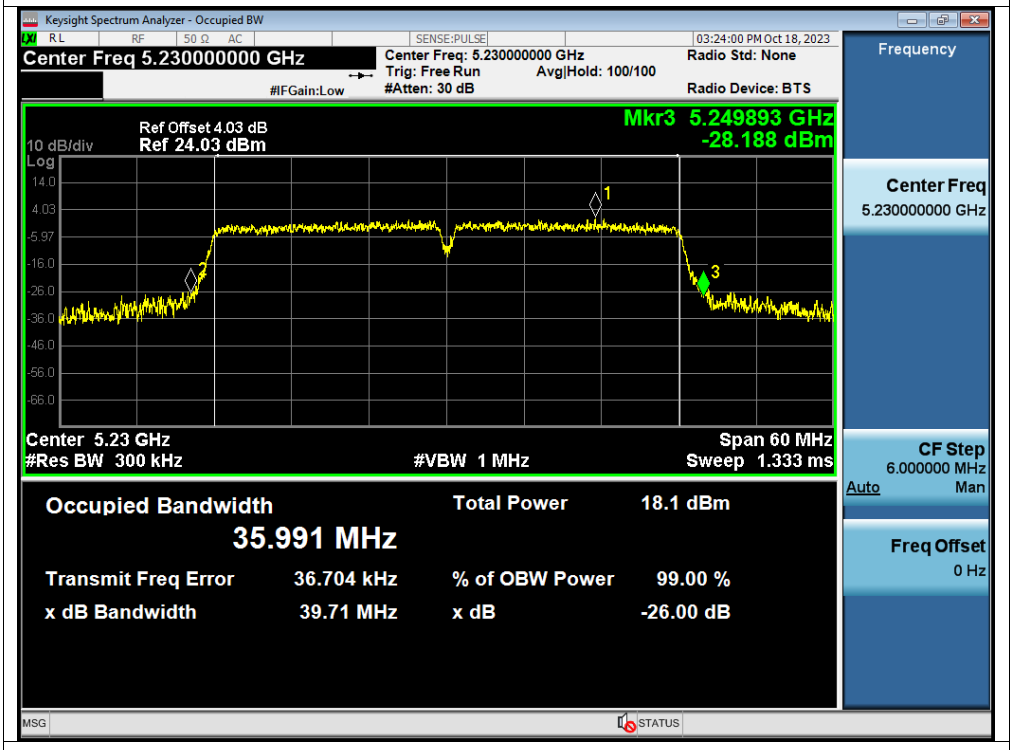


-26dB Bandwidth NVNT ac20 5240MHz Ant1

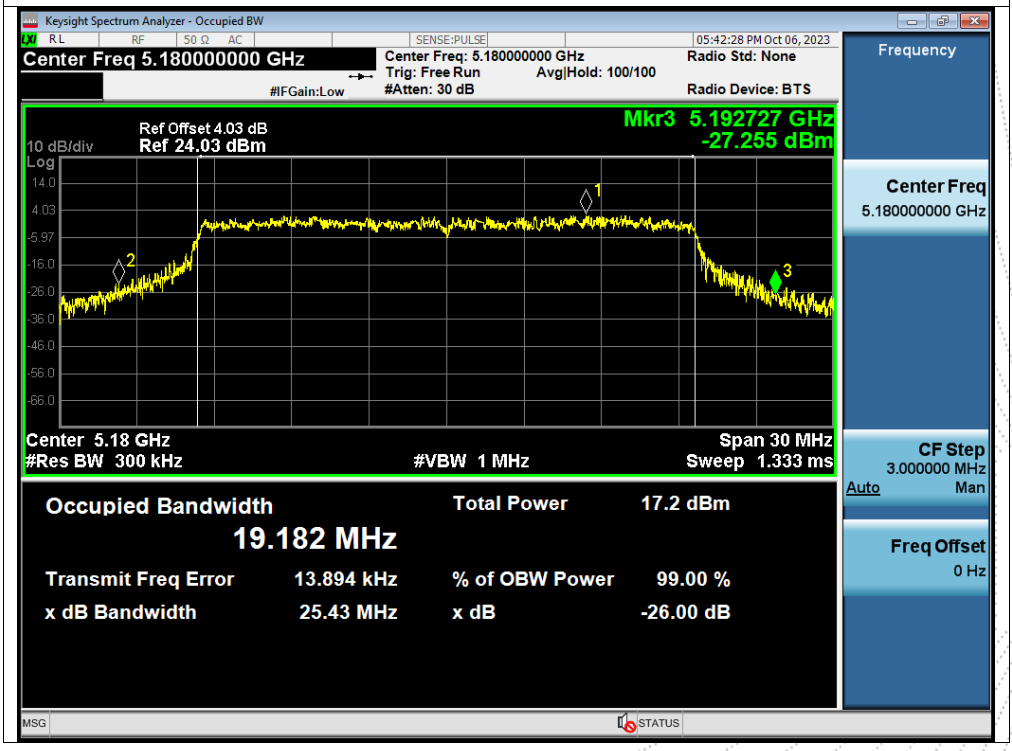


-26dB Bandwidth NVNT ac40 5190MHz Ant1

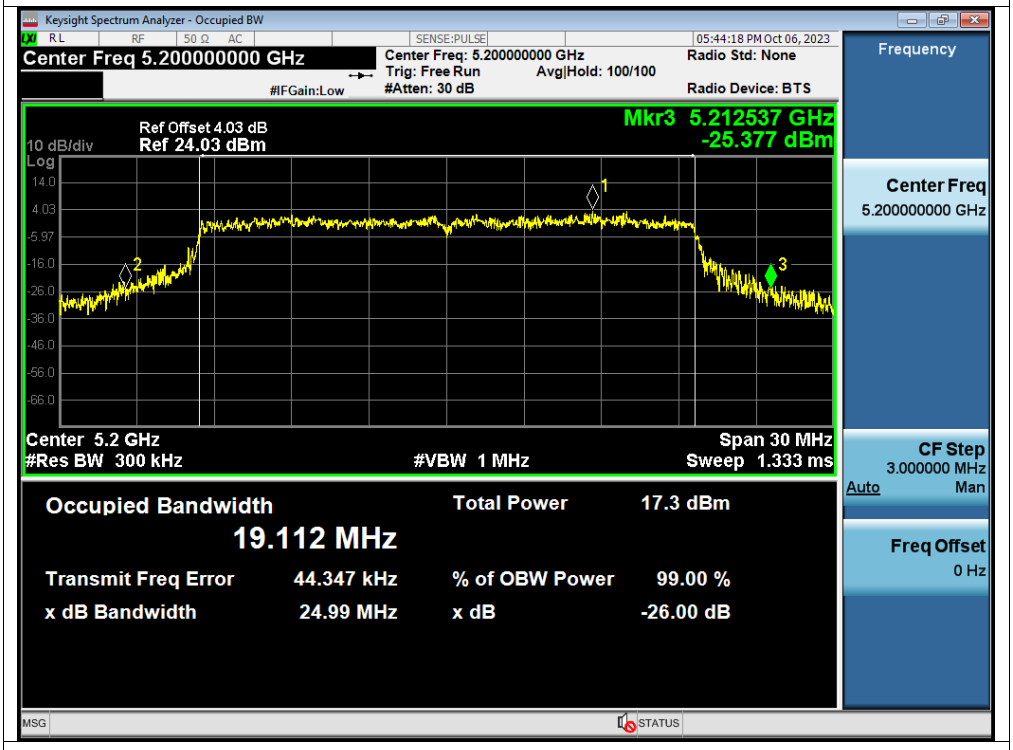
-26dB Bandwidth NVNT ac40 5230MHz Ant1



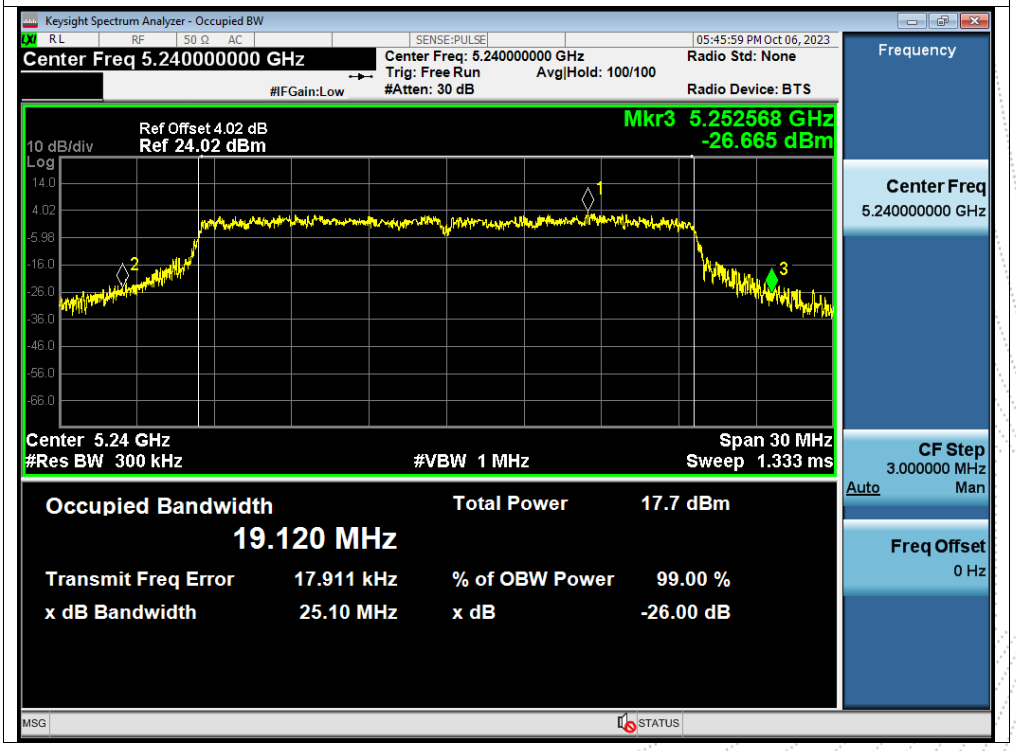
-26dB Bandwidth NVNT ax20 5180MHz Ant1



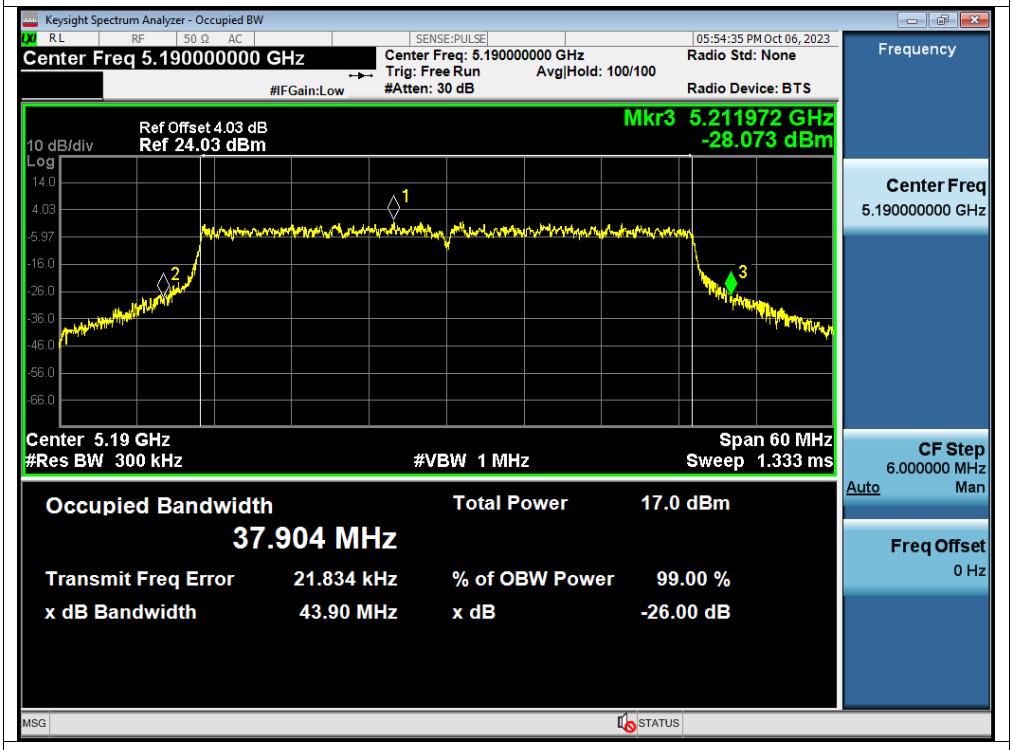
-26dB Bandwidth NVNT ax20 5200MHz Ant1



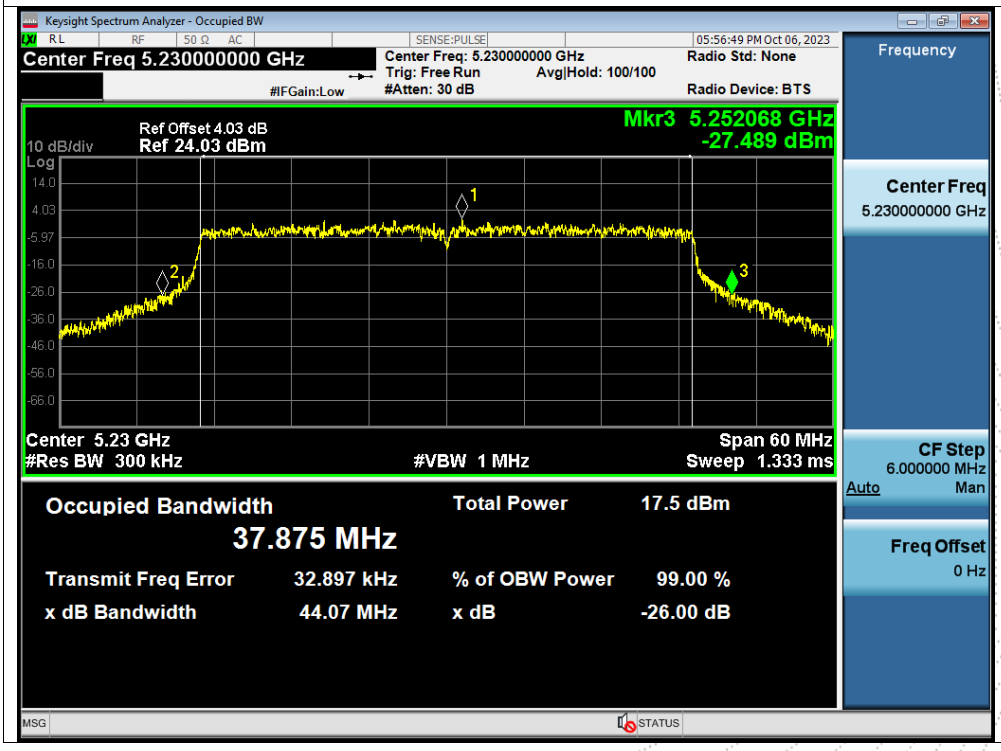
-26dB Bandwidth NVNT ax20 5240MHz Ant1



-26dB Bandwidth NVNT ax40 5190MHz Ant1

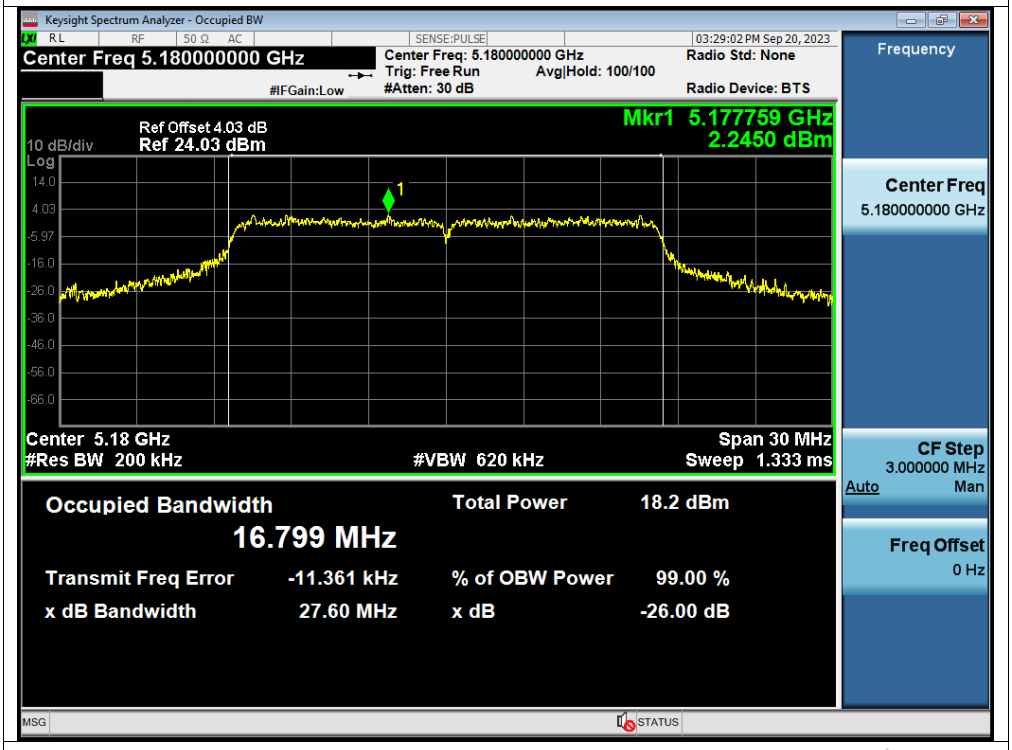


-26dB Bandwidth NVNT ax40 5230MHz Ant1

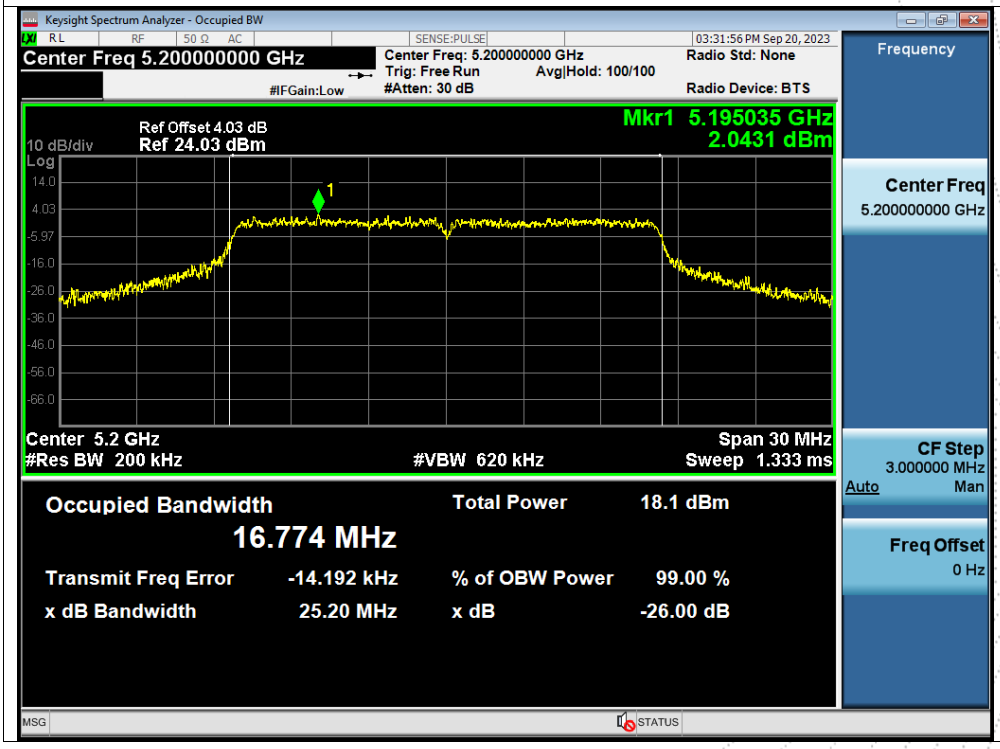


Test Graphs

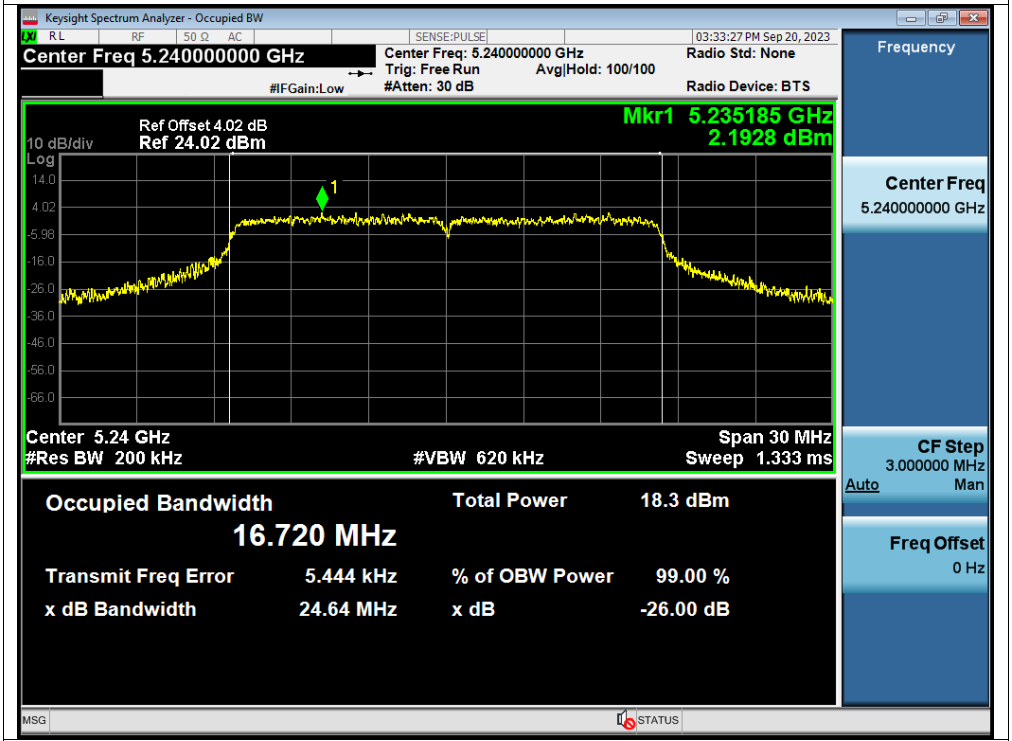
OBW NVNT a 5180MHz Ant1



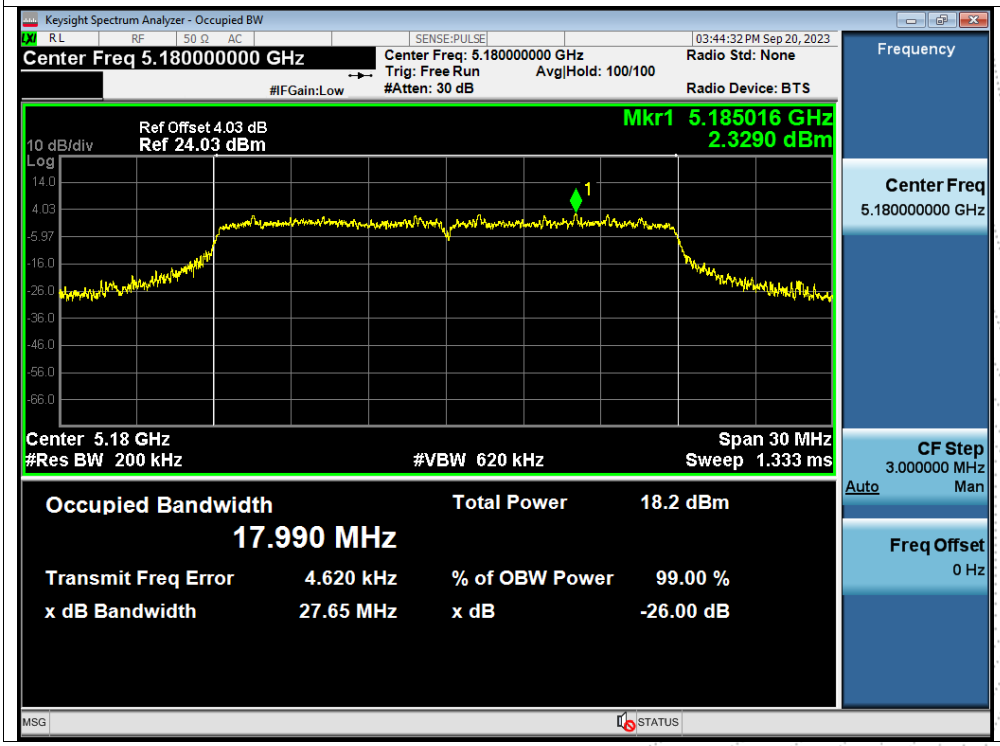
OBW NVNT a 5200MHz Ant1



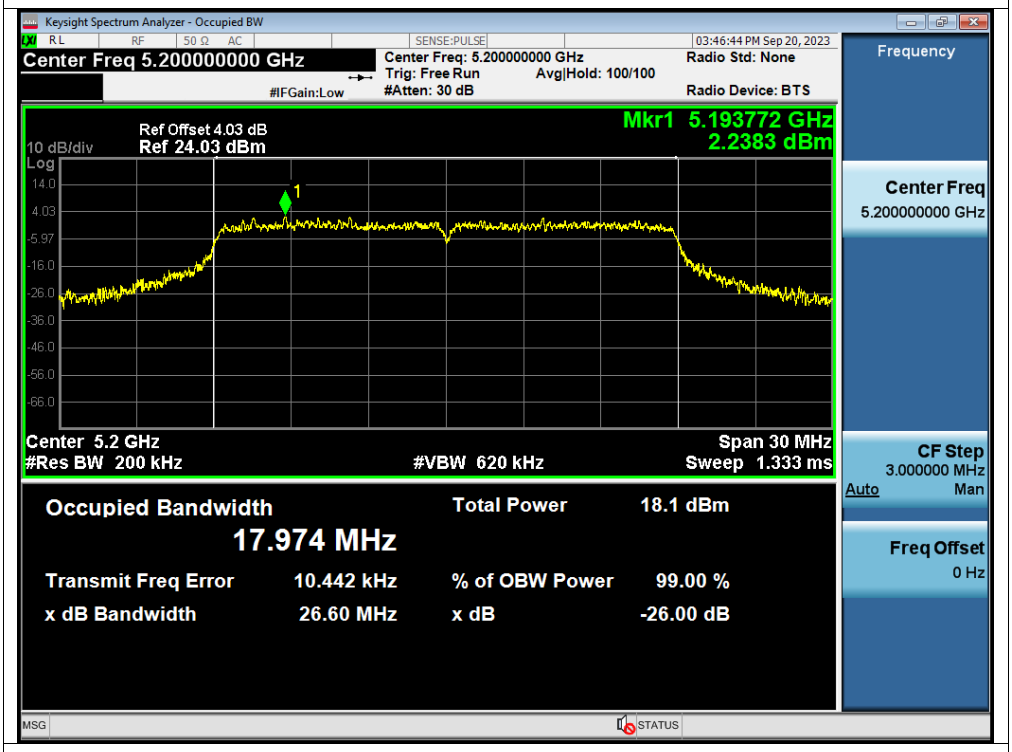
OBW NVNT a 5240MHz Ant1



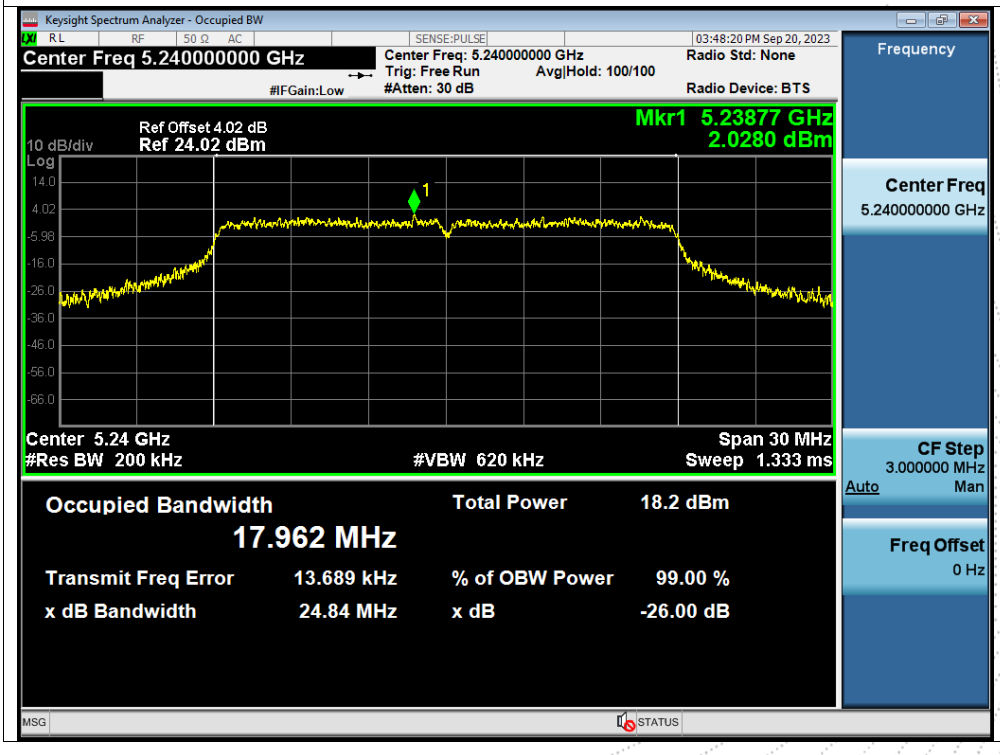
OBW NVNT n20 5180MHz Ant1



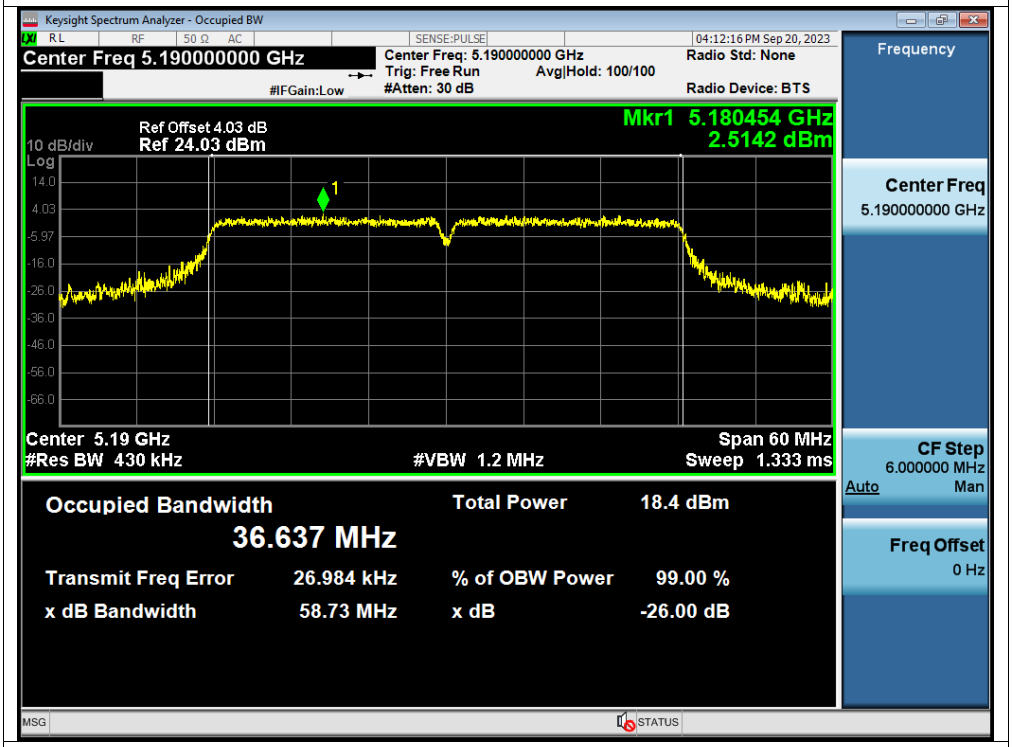
OBW NVNT n20 5200MHz Ant1



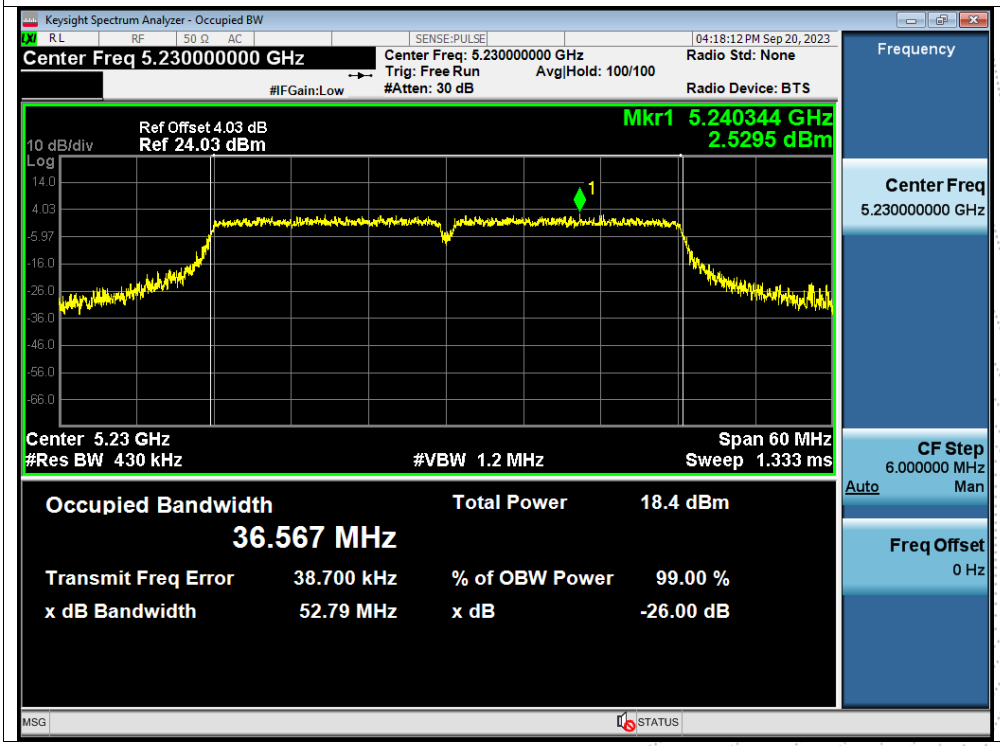
OBW NVNT n20 5240MHz Ant1



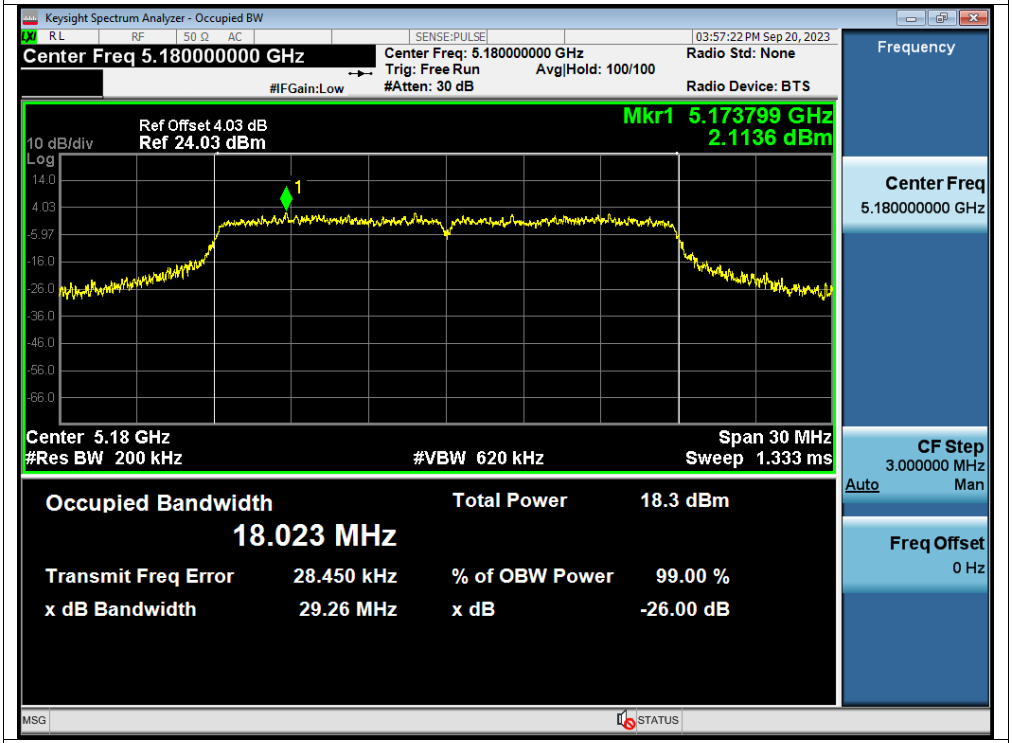
OBW NVNT n40 5190MHz Ant1



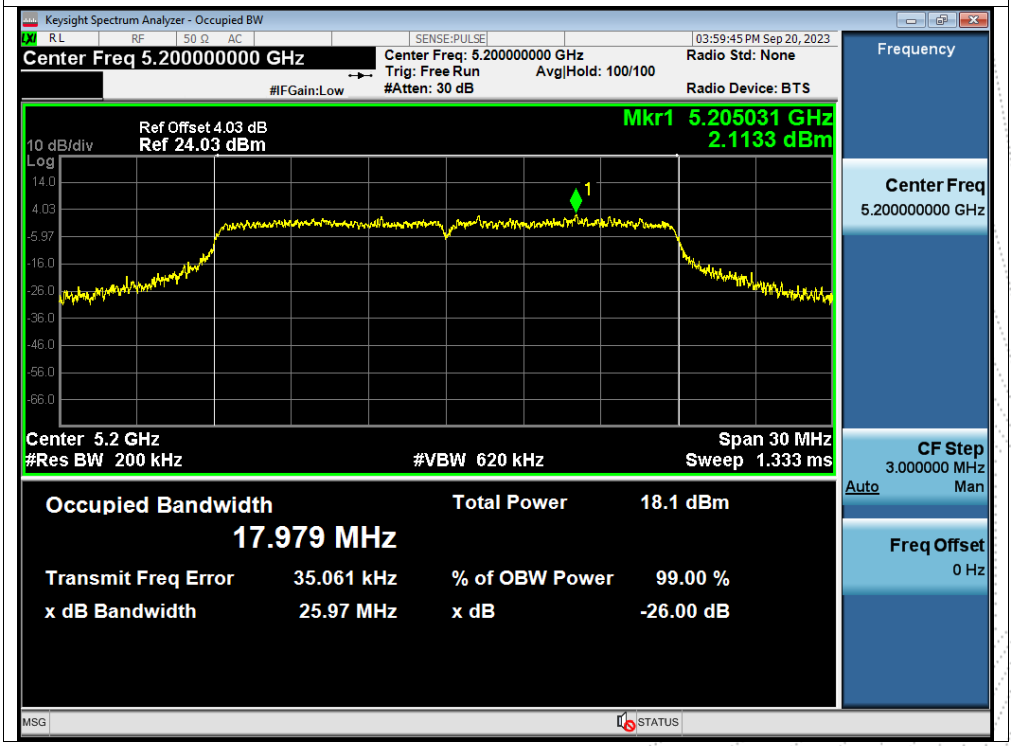
OBW NVNT n40 5230MHz Ant1



OBW NVNT ac20 5180MHz Ant1



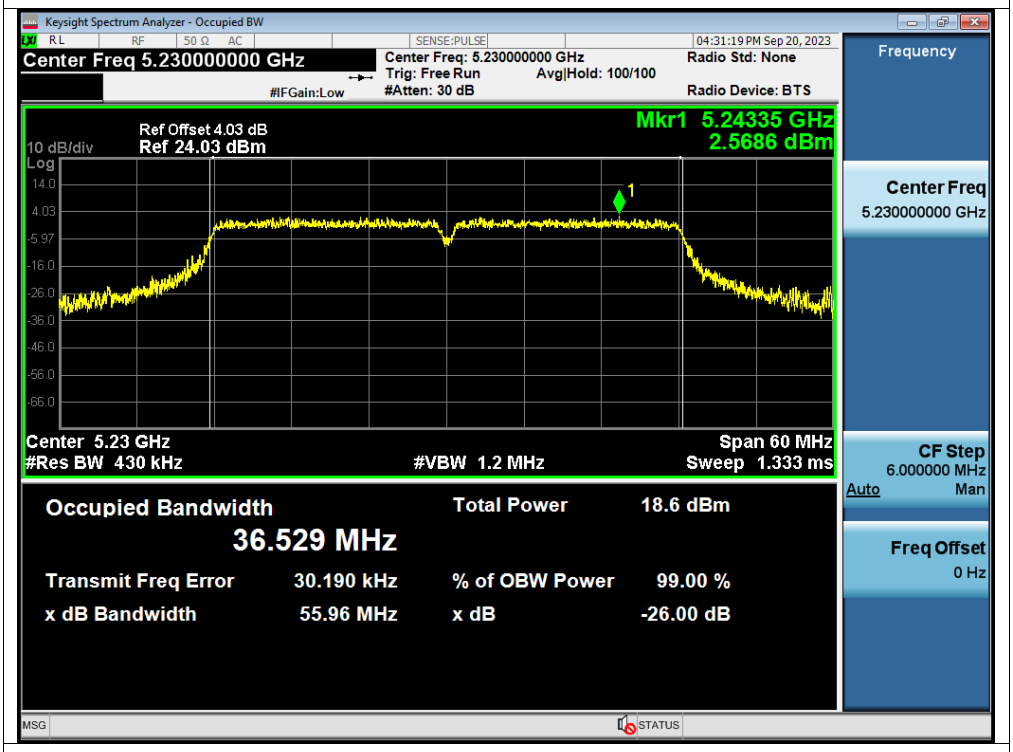
OBW NVNT ac20 5200MHz Ant1



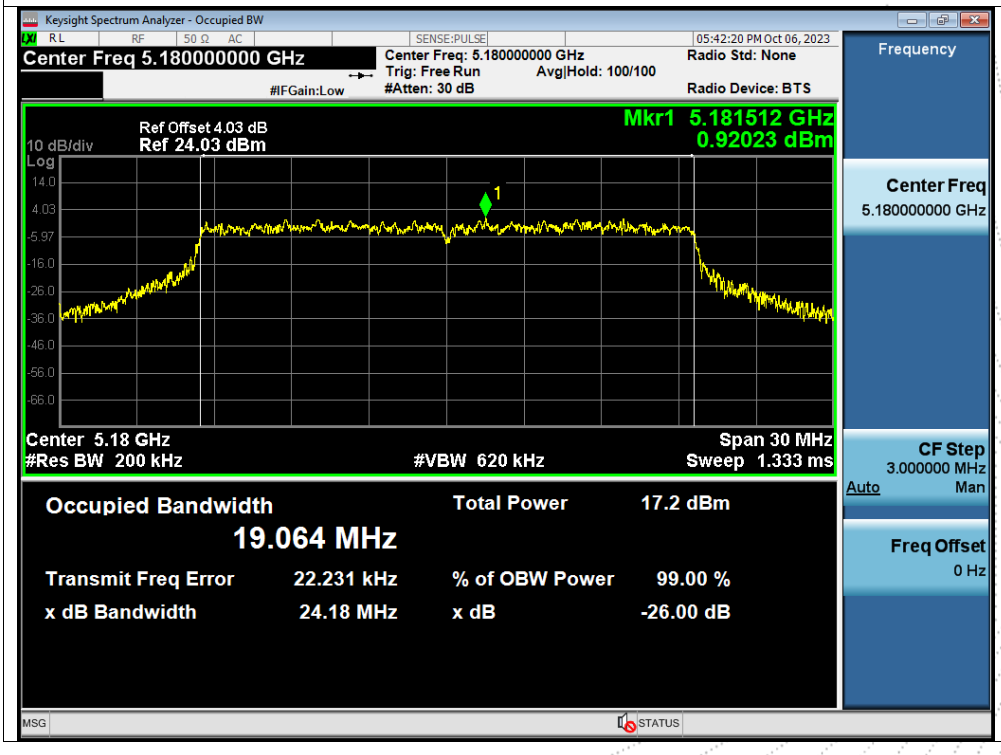
OBW NVNT ac20 5240MHz Ant1

OBW NVNT ac40 5190MHz Ant1

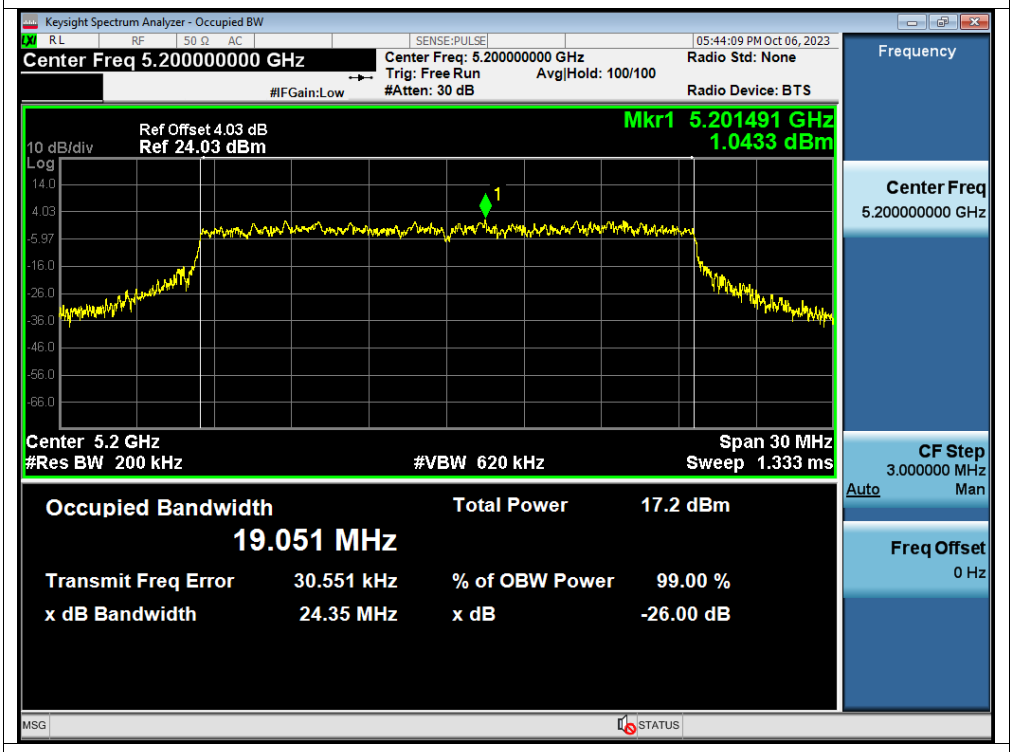
OBW NVNT ac40 5230MHz Ant1



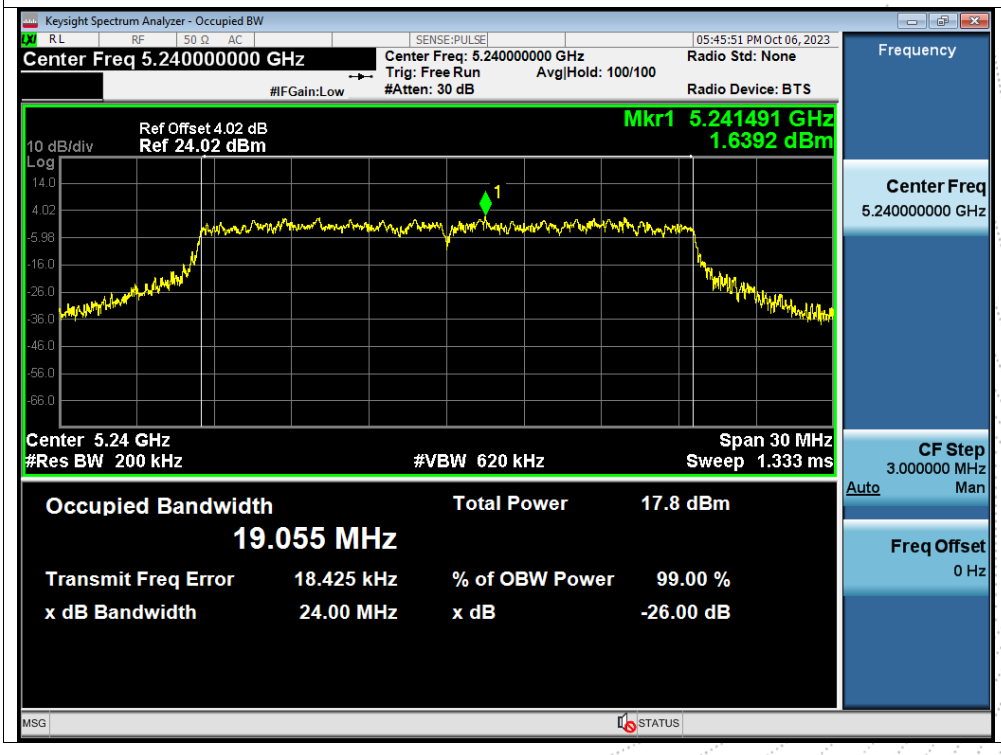
OBW NVNT ax20 5180MHz Ant1



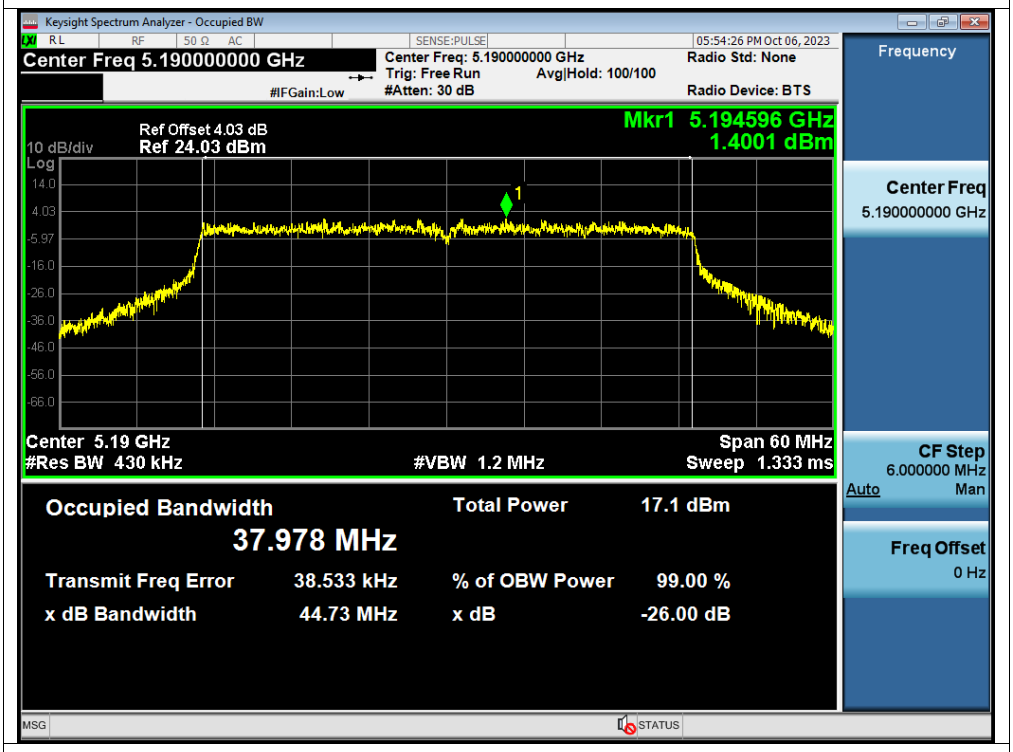
OBW NVNT ax20 5200MHz Ant1



OBW NVNT ax20 5240MHz Ant1



OBW NVNT ax40 5190MHz Ant1



OBW NVNT ax40 5230MHz Ant1

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 3.8V
Test Mode:	(5745-5825MHz)		

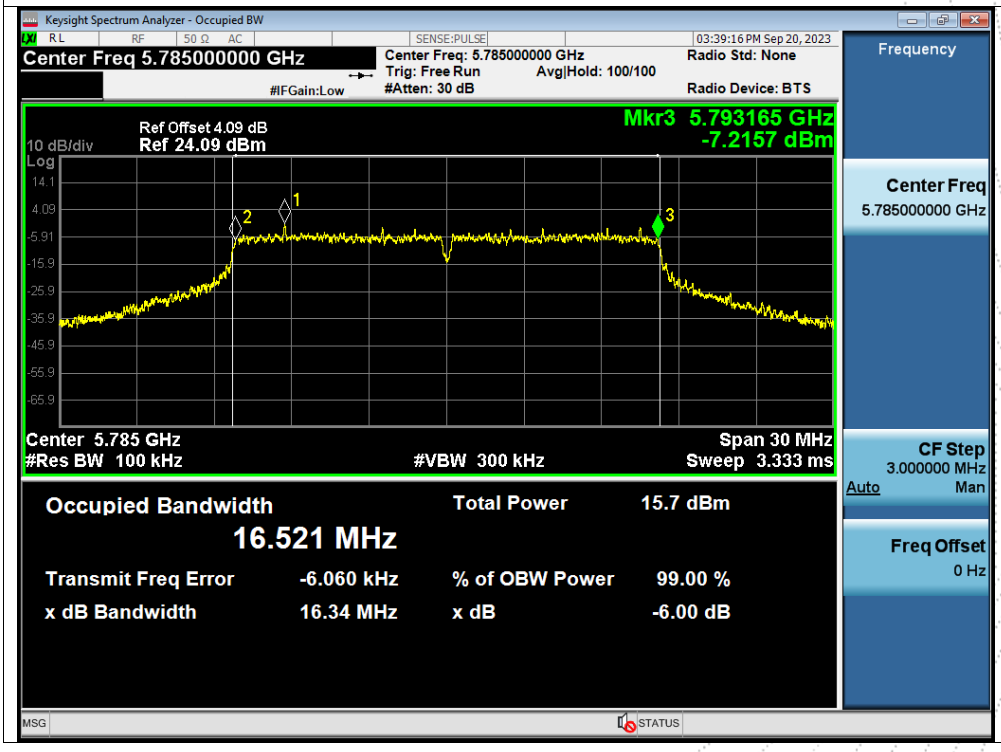
Condition	Mode	Frequency (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	a	5745	16.34	0.5	Pass
NVNT	a	5785	16.343	0.5	Pass
NVNT	a	5825	16.323	0.5	Pass
NVNT	n20	5745	17.595	0.5	Pass
NVNT	n20	5785	17.553	0.5	Pass
NVNT	n20	5825	17.623	0.5	Pass
NVNT	n40	5755	36.312	0.5	Pass
NVNT	n40	5795	36.338	0.5	Pass
NVNT	ac20	5745	17.587	0.5	Pass
NVNT	ac20	5785	17.575	0.5	Pass
NVNT	ac20	5825	17.574	0.5	Pass
NVNT	ac40	5755	36.304	0.5	Pass
NVNT	ac40	5795	36.318	0.5	Pass
NVNT	ax20	5745	18.988	0.5	Pass
NVNT	ax20	5785	19.045	0.5	Pass
NVNT	ax20	5825	19.014	0.5	Pass
NVNT	ax40	5755	37.947	0.5	Pass
NVNT	ax40	5795	38.066	0.5	Pass

Condition	Mode	Frequency (MHz)	99% OBW (MHz)
NVNT	a	5745	16.757
NVNT	a	5785	16.681
NVNT	a	5825	16.732
NVNT	n20	5745	17.956
NVNT	n20	5785	17.932
NVNT	n20	5825	17.929
NVNT	n40	5755	36.566
NVNT	n40	5795	36.581
NVNT	ac20	5745	17.972
NVNT	ac20	5785	17.919
NVNT	ac20	5825	17.932
NVNT	ac40	5755	36.619
NVNT	ac40	5795	36.557
NVNT	ax20	5745	19.049
NVNT	ax20	5785	19.073
NVNT	ax20	5825	19.045
NVNT	ax40	5755	37.995
NVNT	ax40	5795	37.996

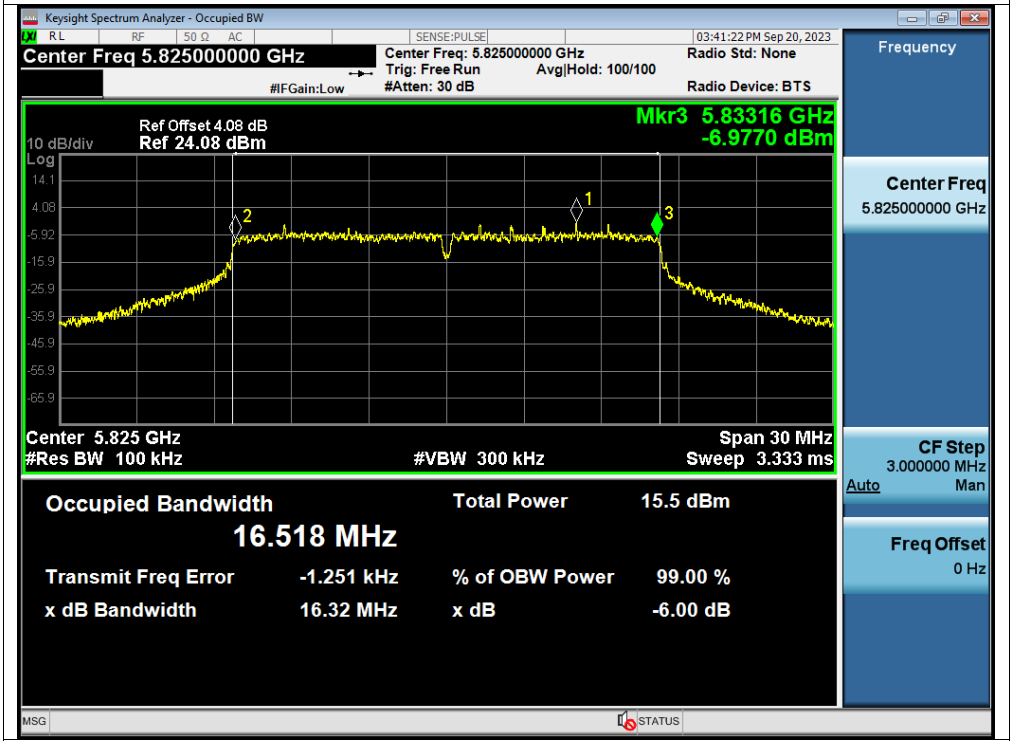
Test Graphs

-6dB Bandwidth NVNT a 5745MHz Ant1

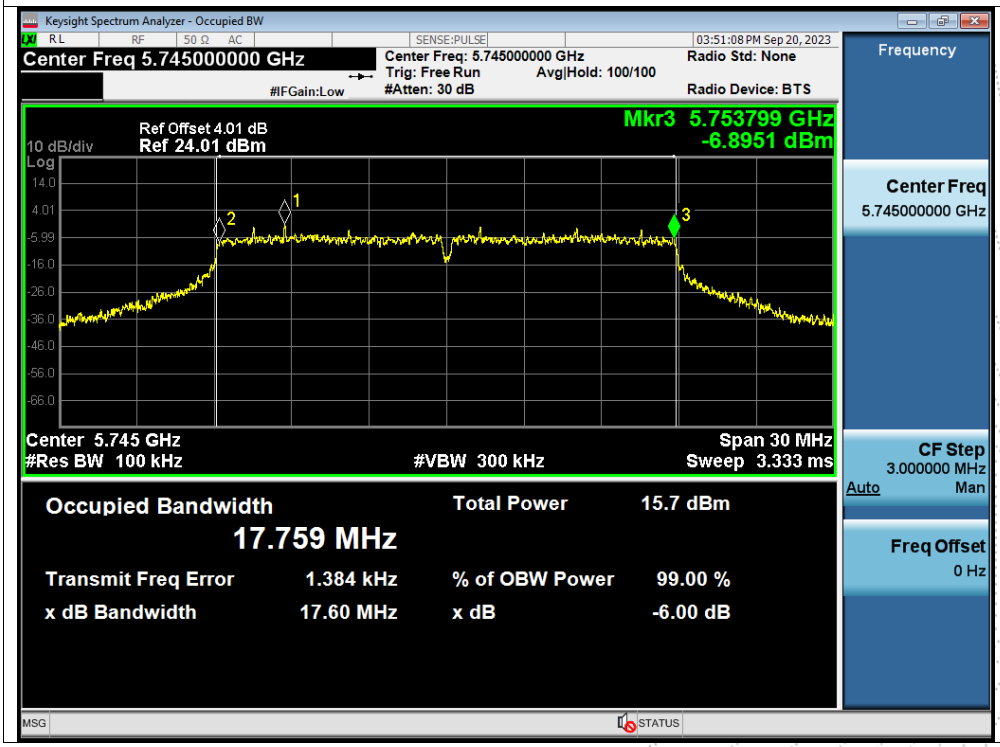
-6dB Bandwidth NVNT a 5785MHz Ant1



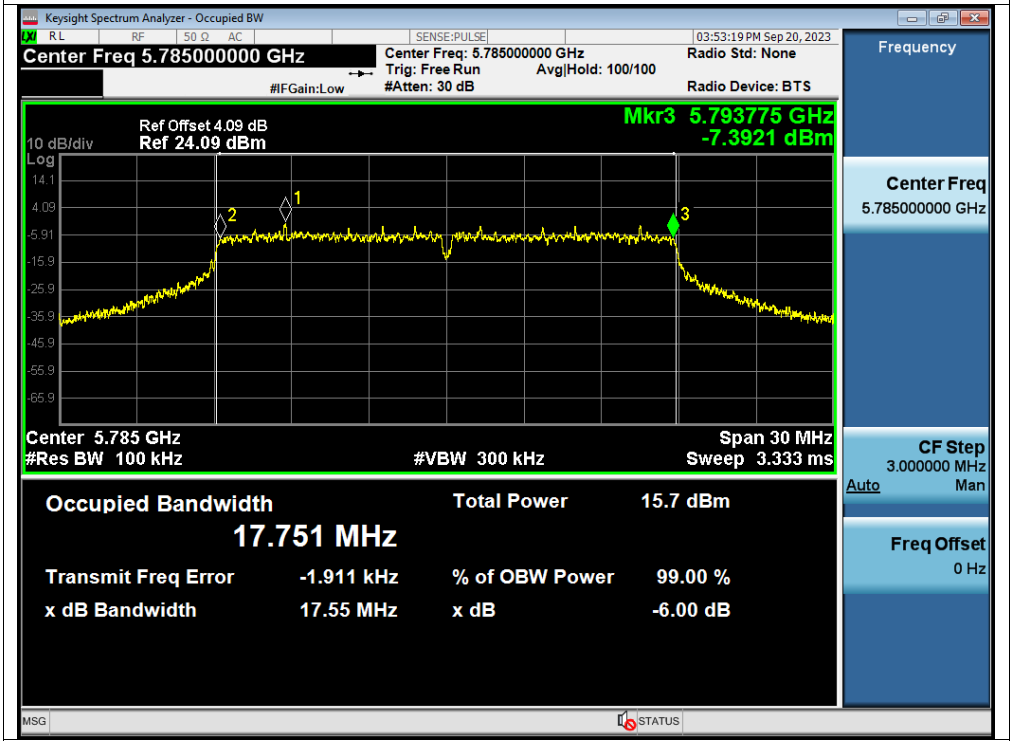
-6dB Bandwidth NVNT a 5825MHz Ant1



-6dB Bandwidth NVNT n20 5745MHz Ant1



-6dB Bandwidth NVNT n20 5785MHz Ant1



-6dB Bandwidth NVNT n20 5825MHz Ant1

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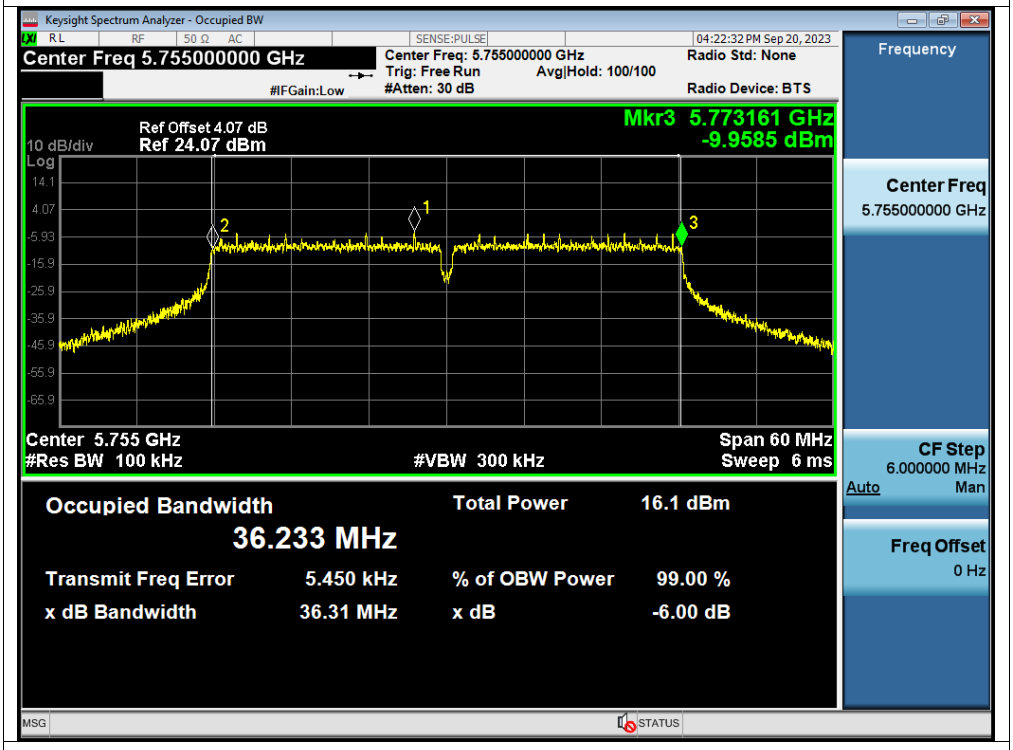

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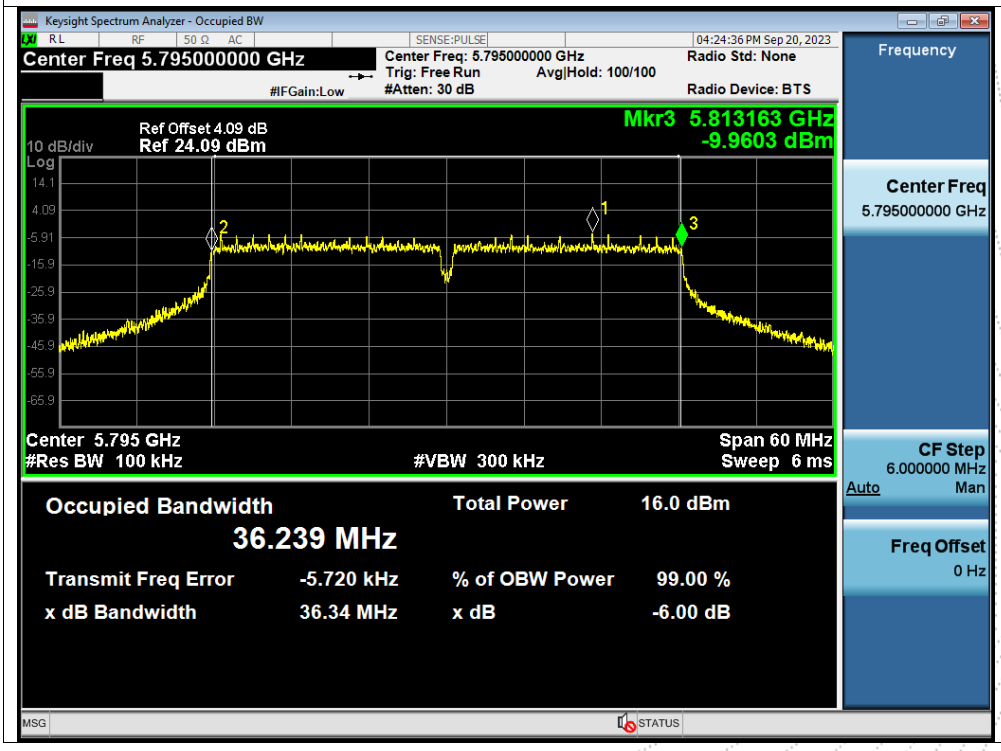

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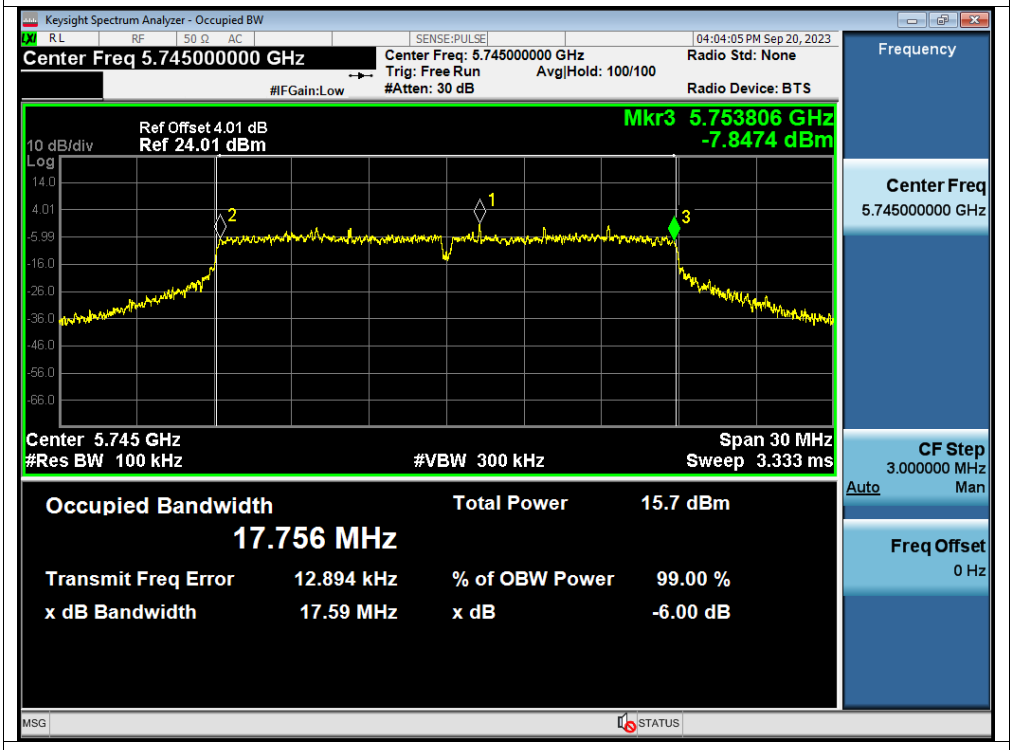

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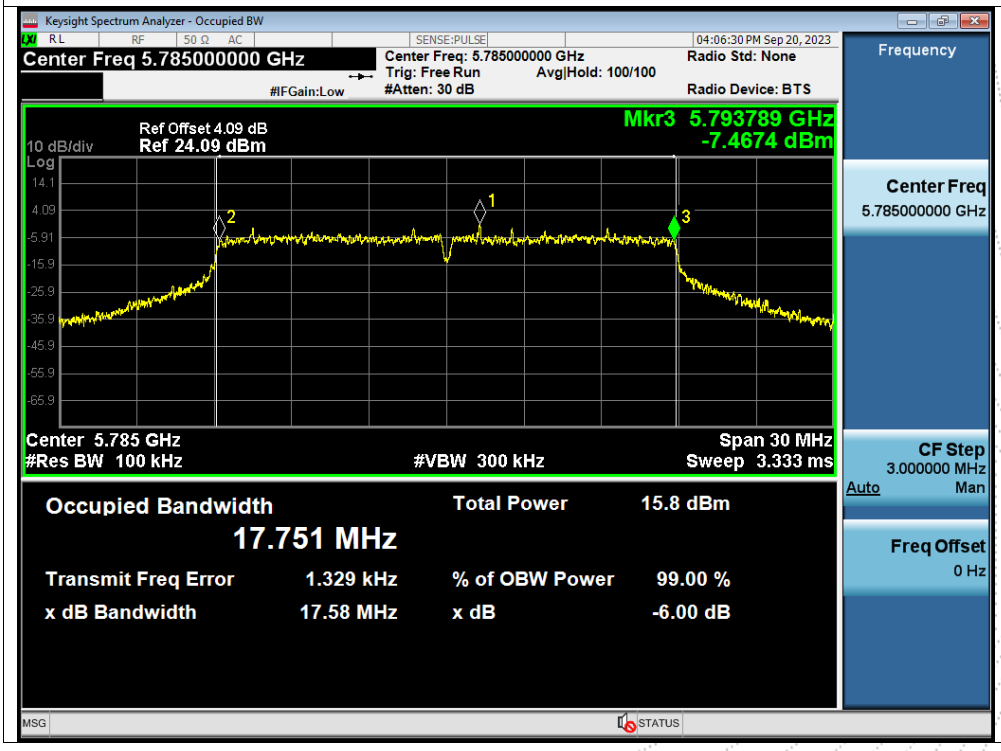

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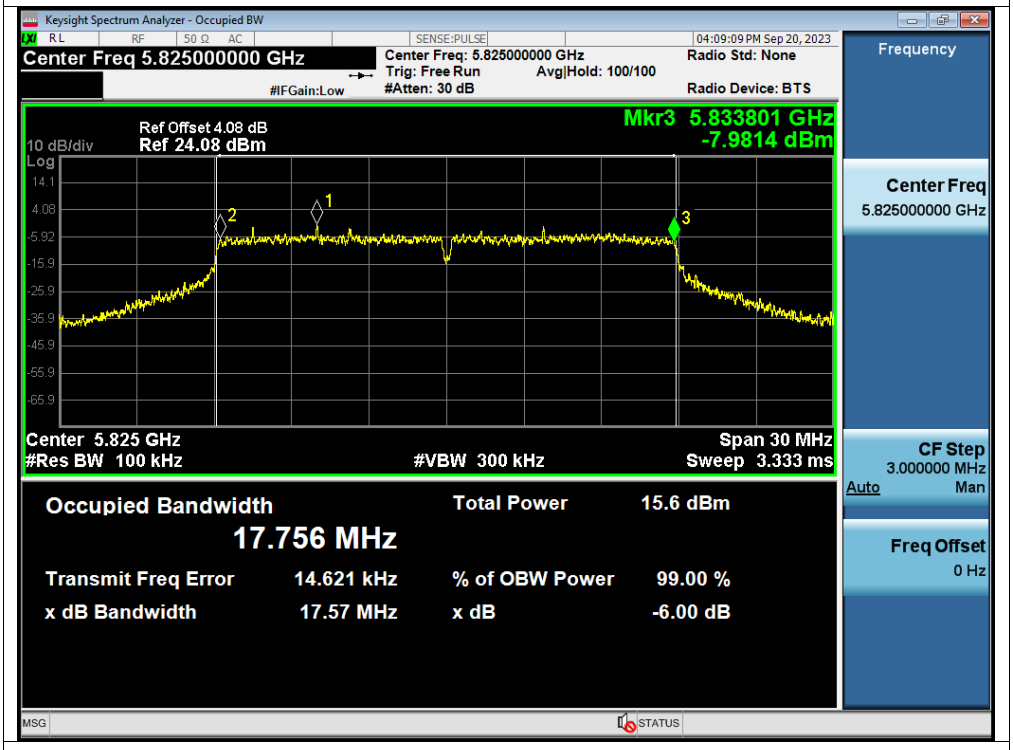

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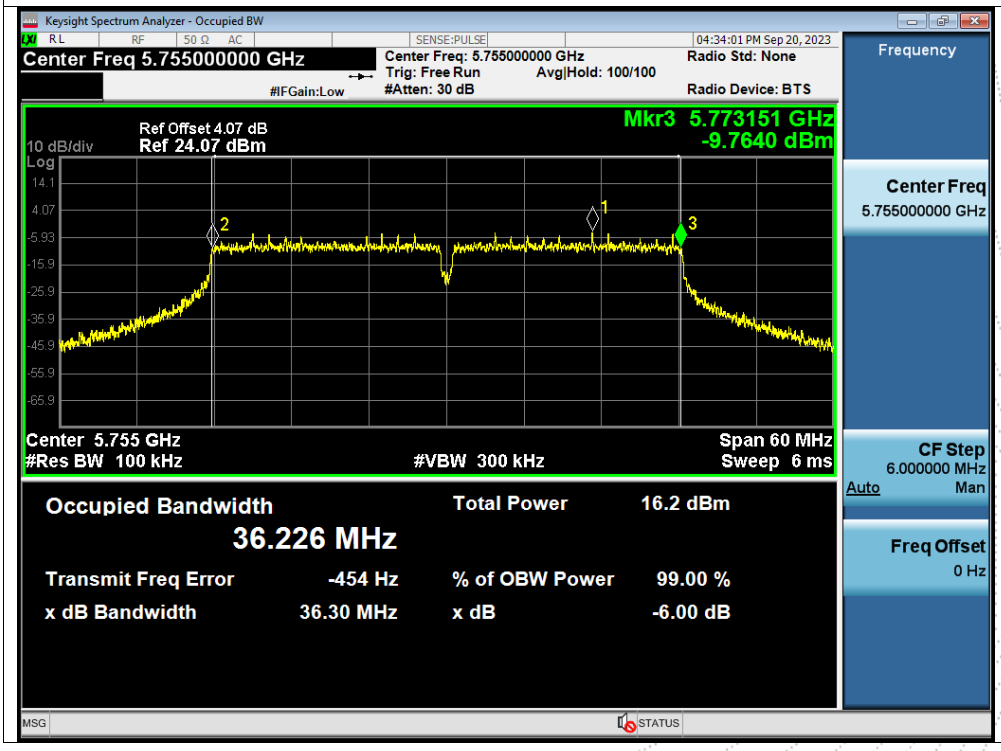

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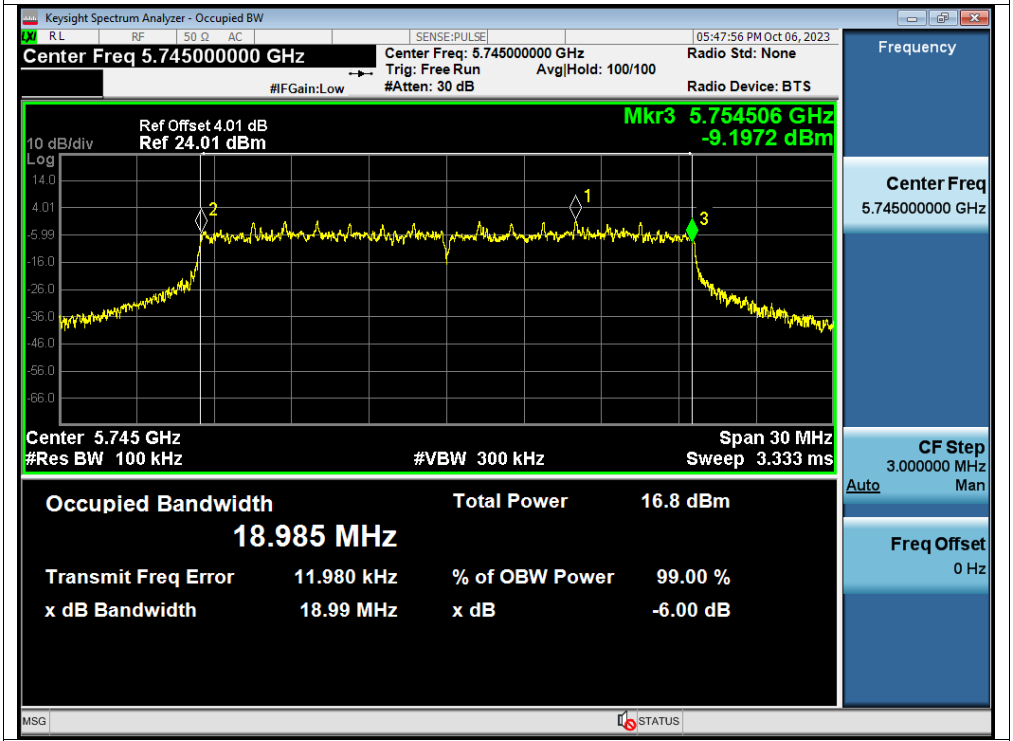

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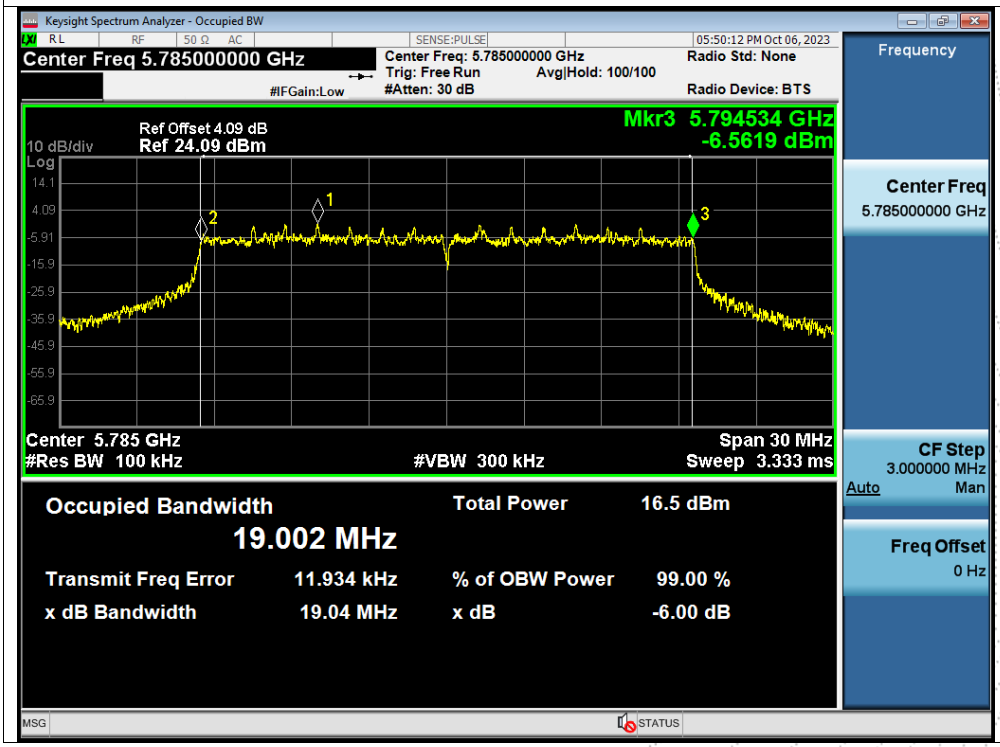

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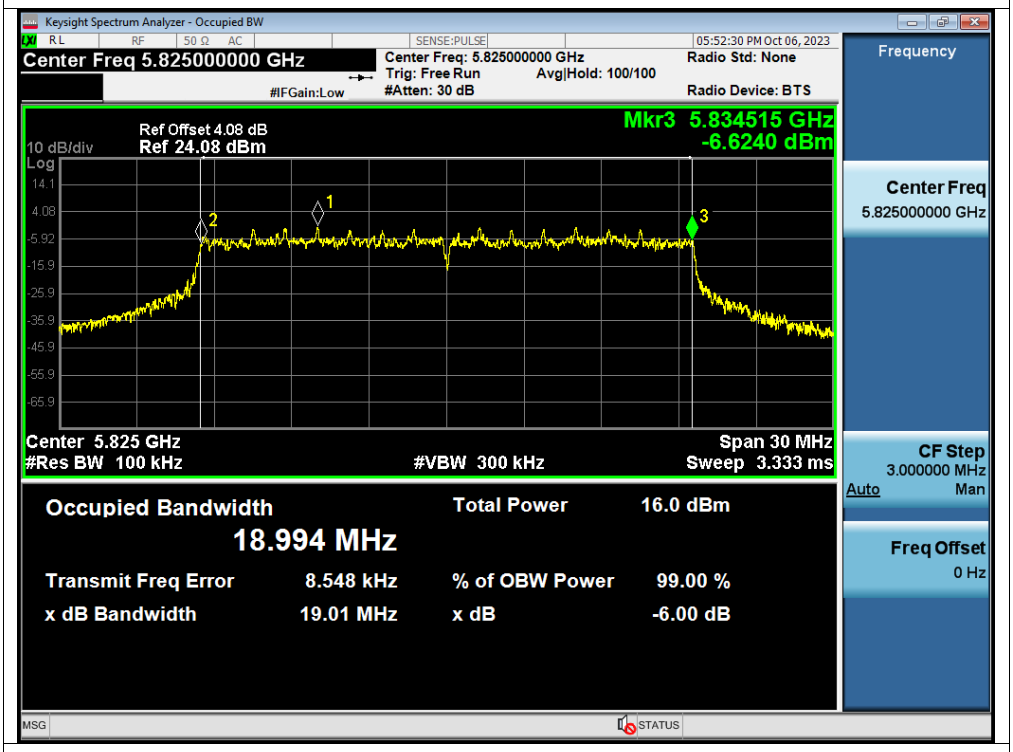

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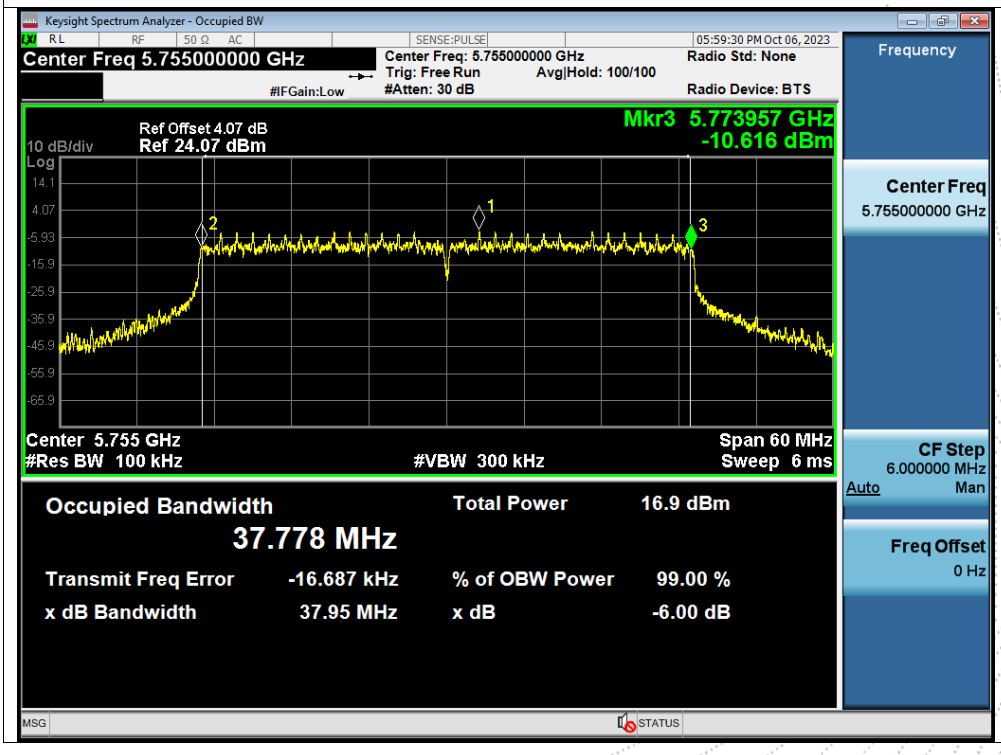

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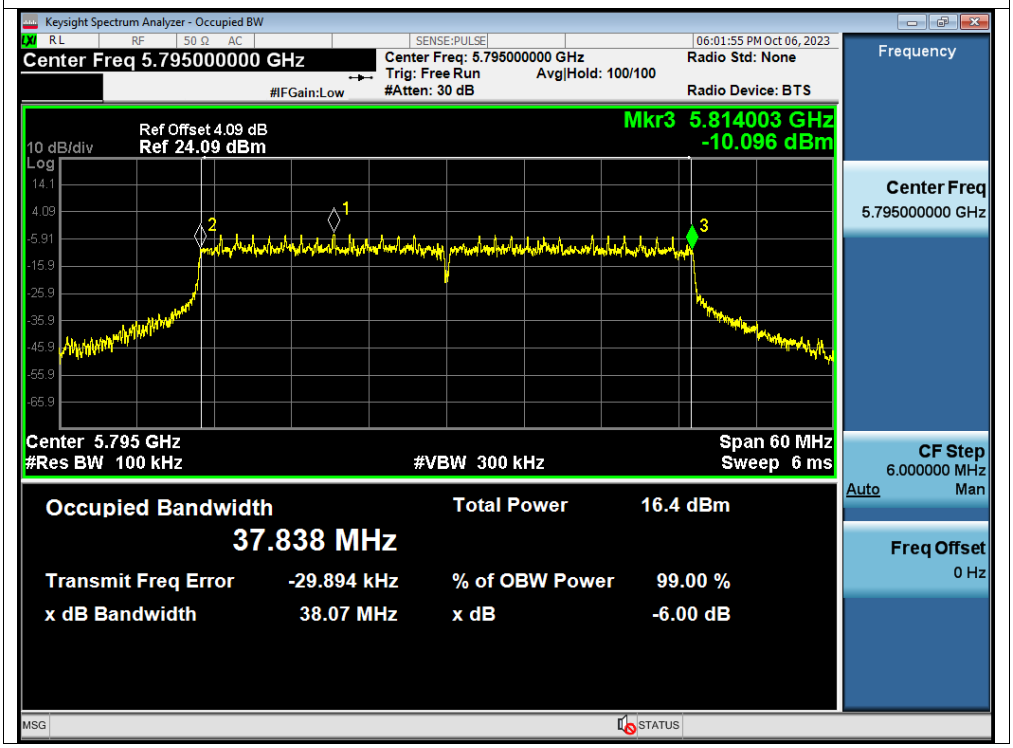
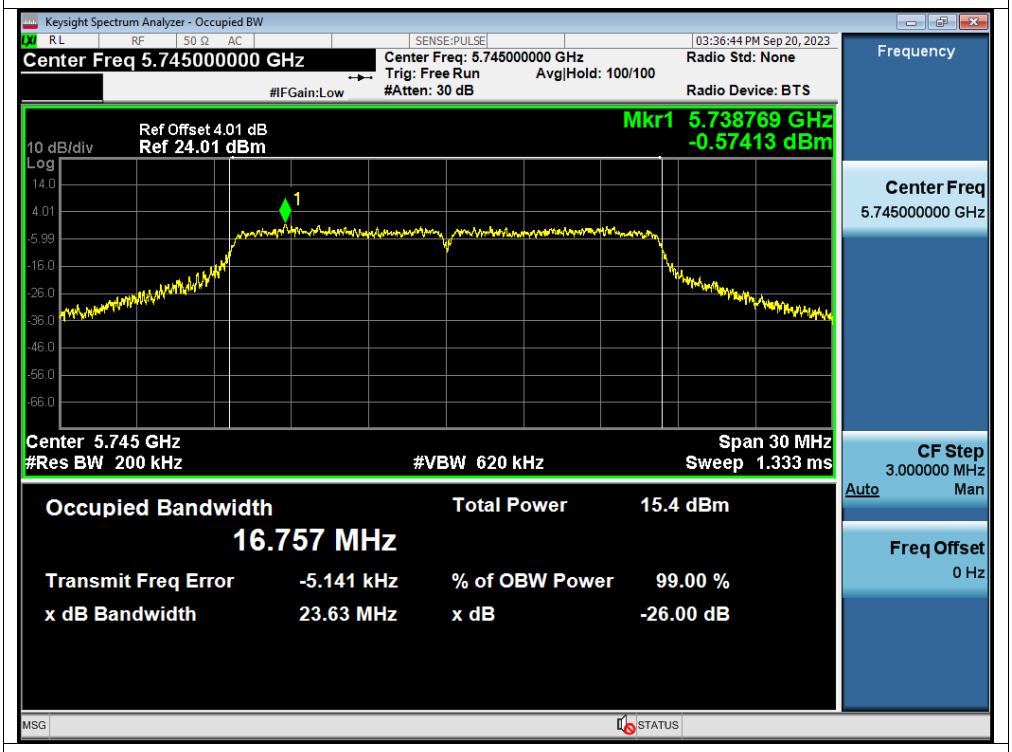


OBW NVNT a 5745MHz Ant1



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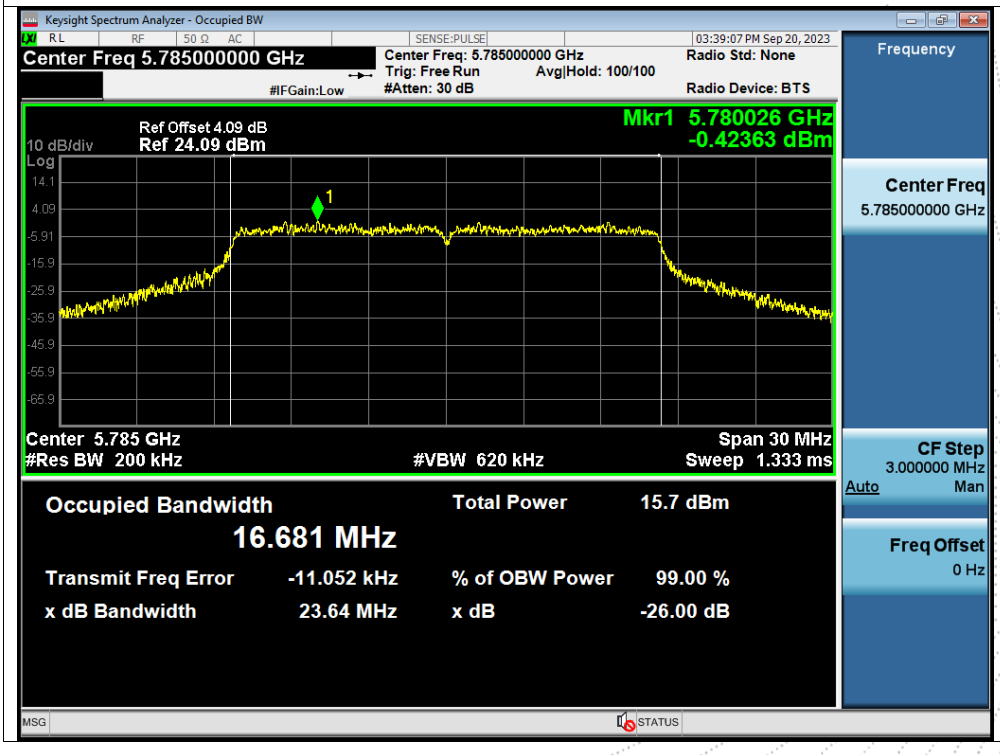

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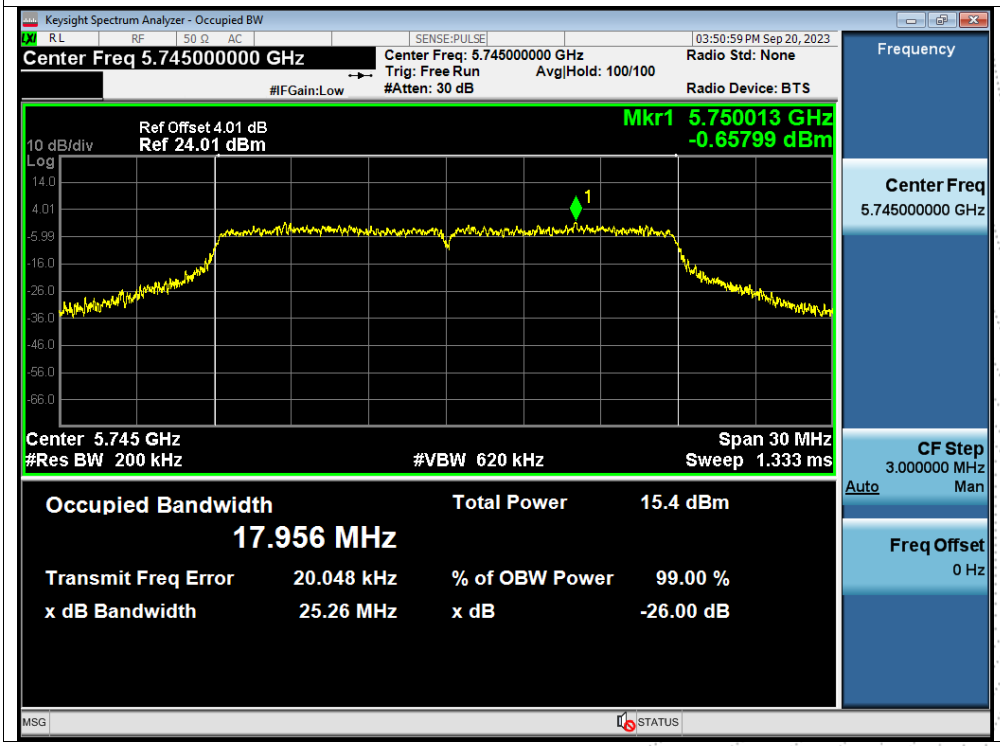

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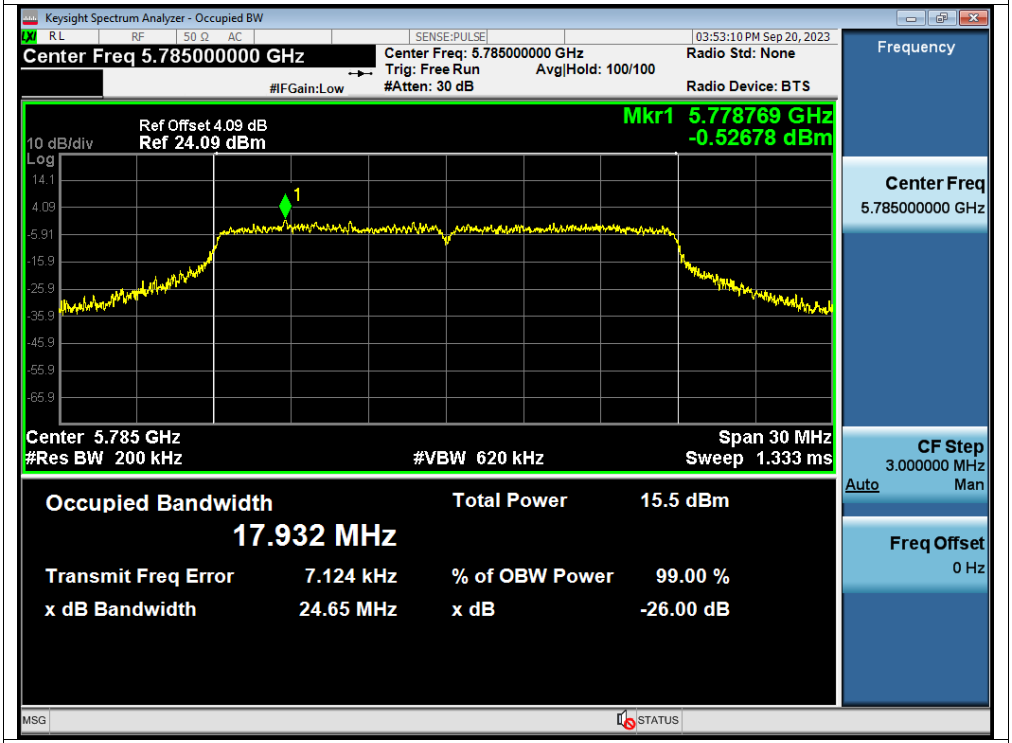

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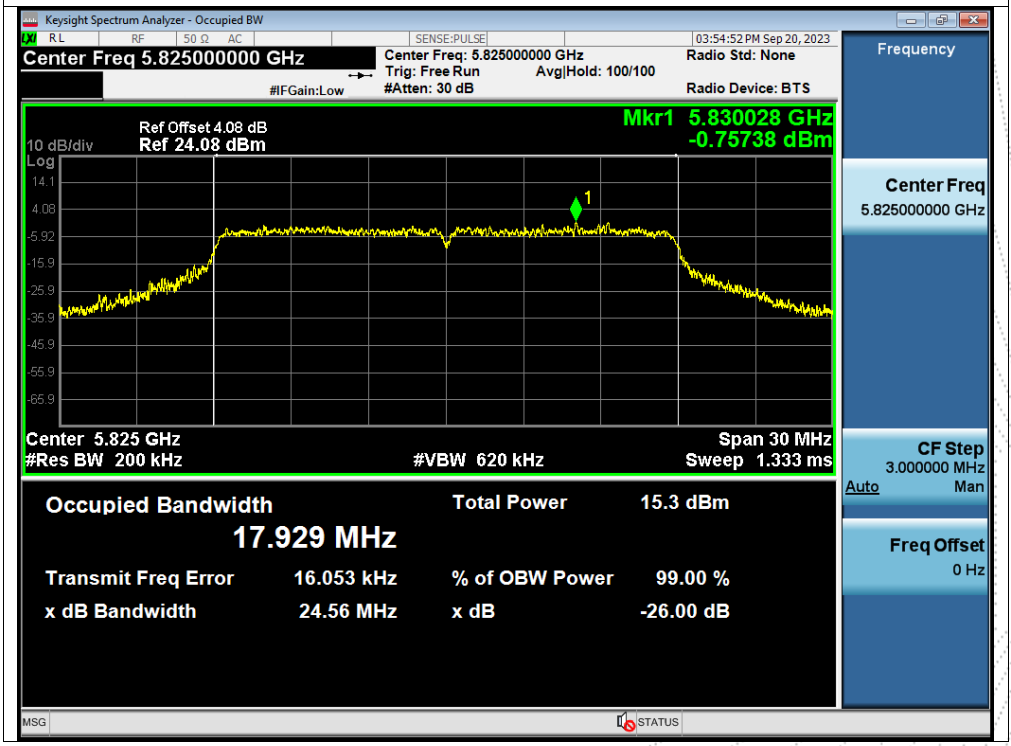

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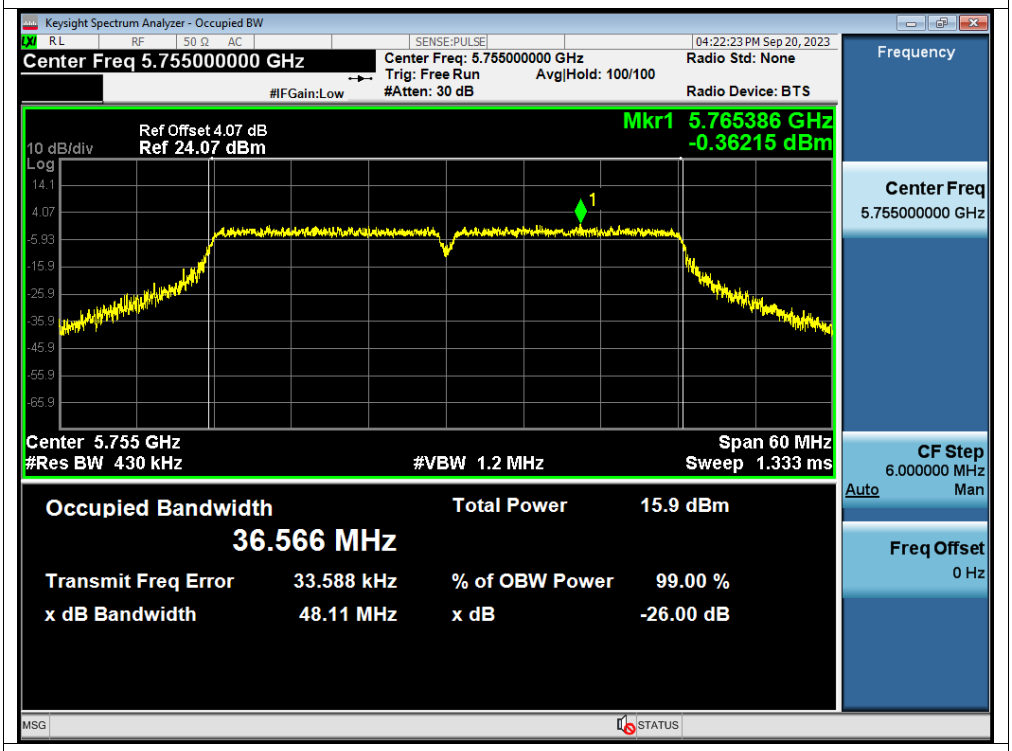

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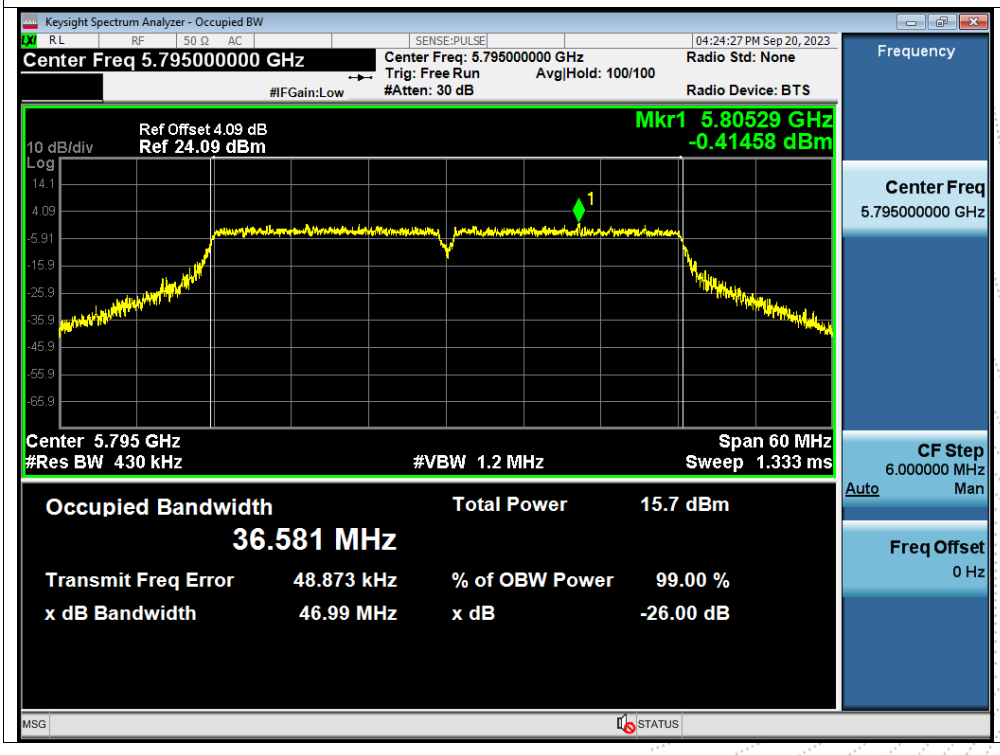

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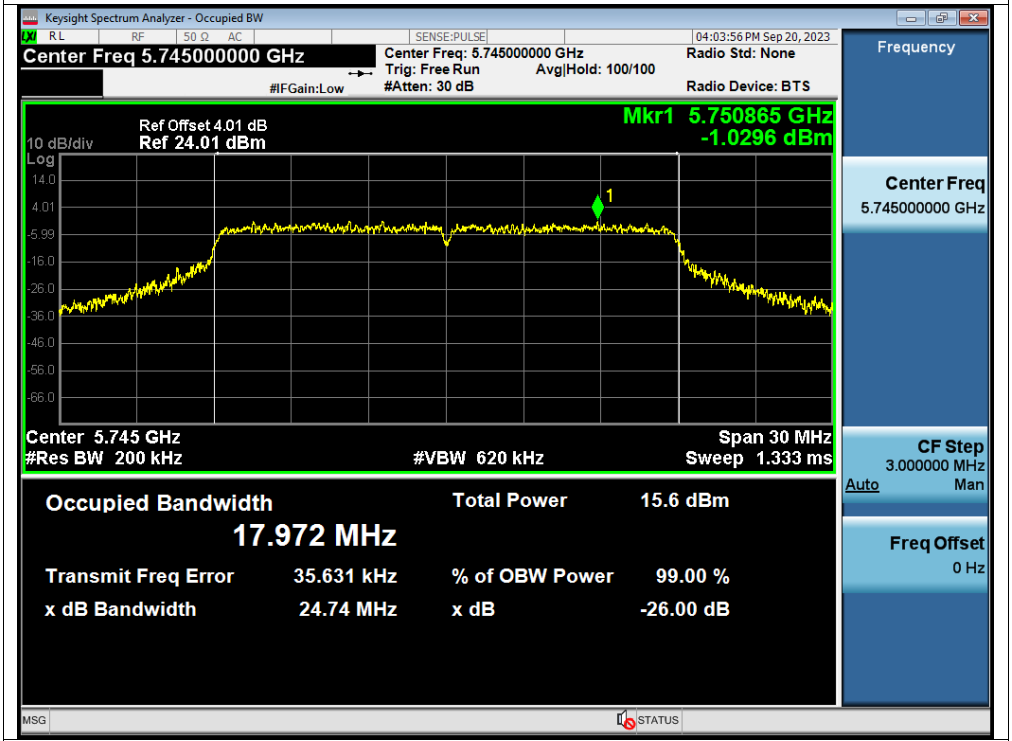

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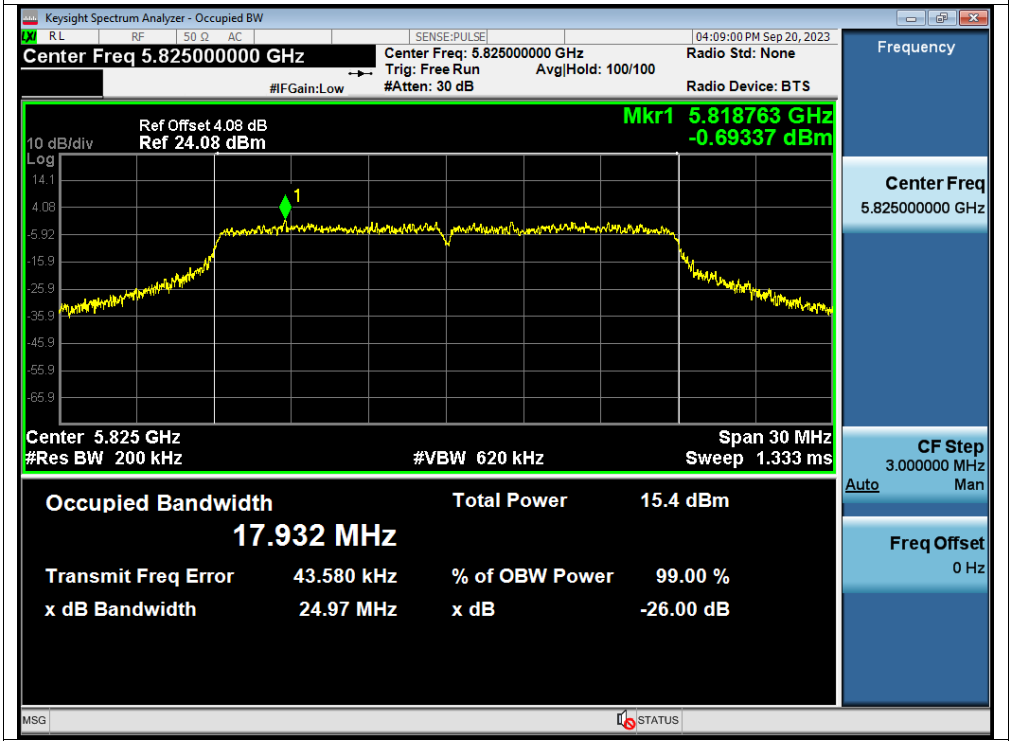

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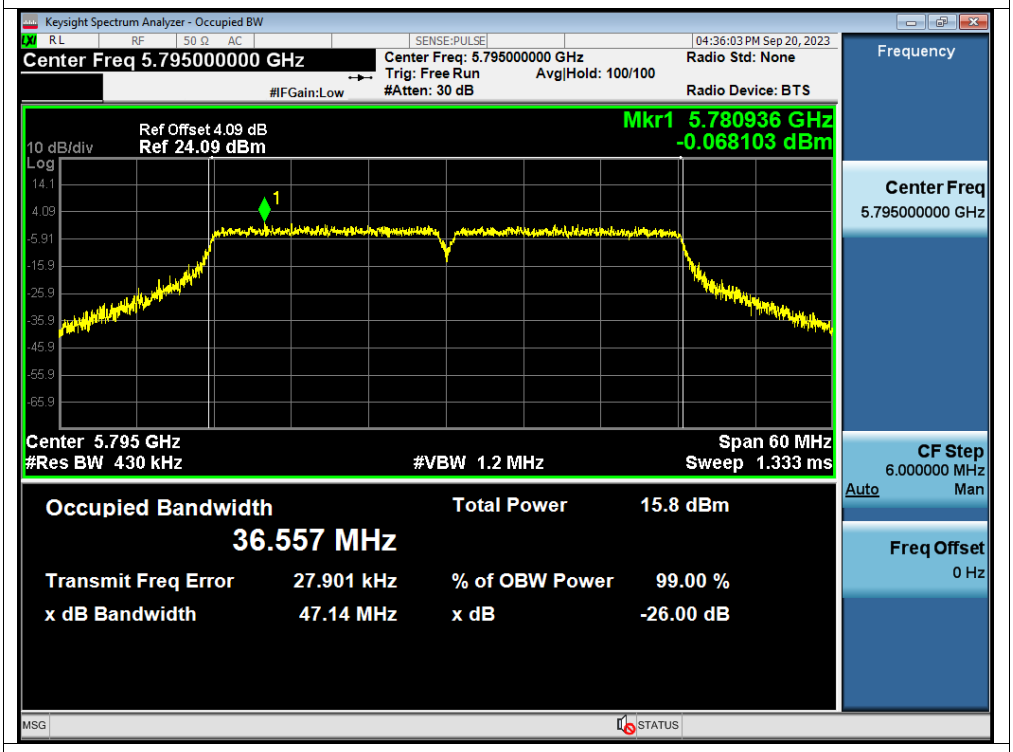

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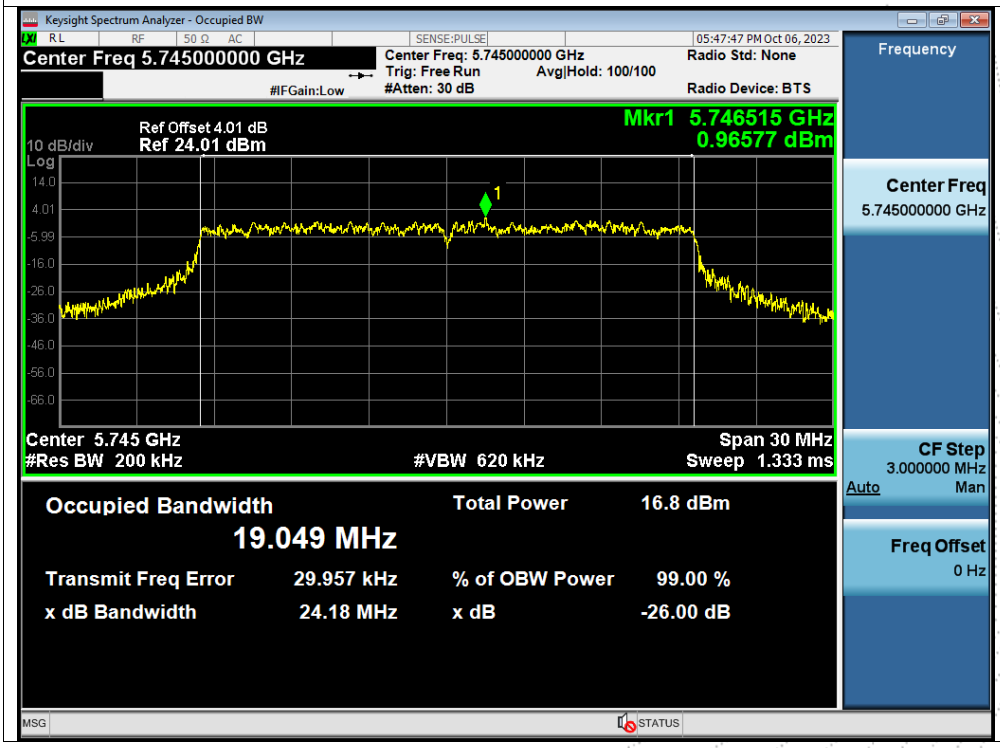

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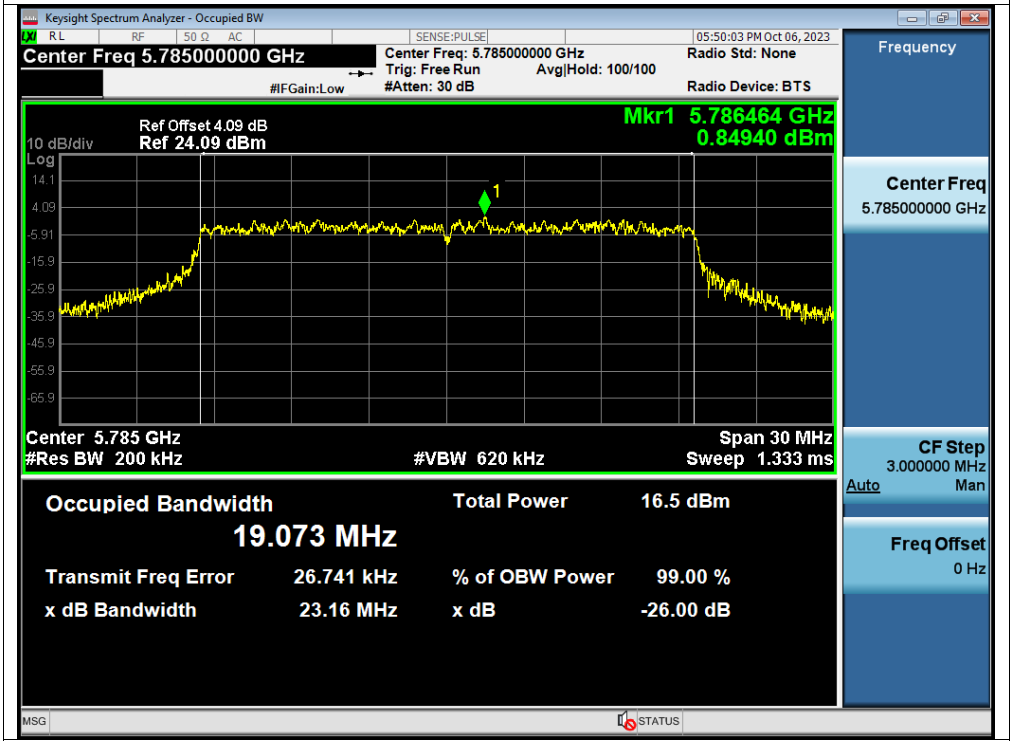

OBW NVNT ax20 5825MHz Ant1

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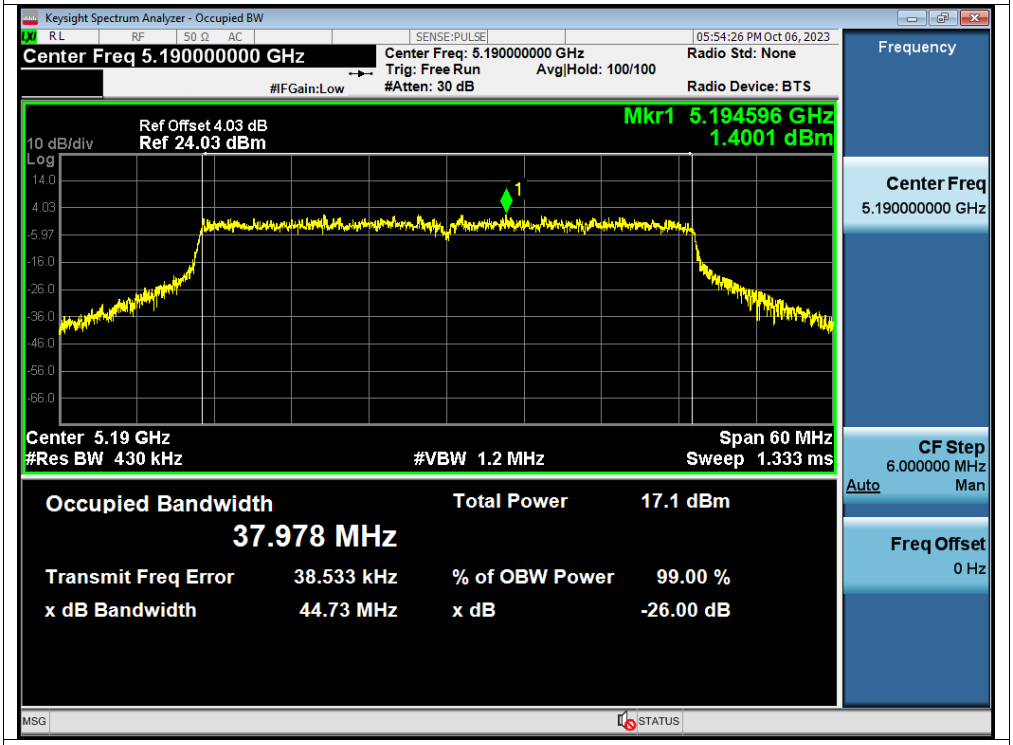

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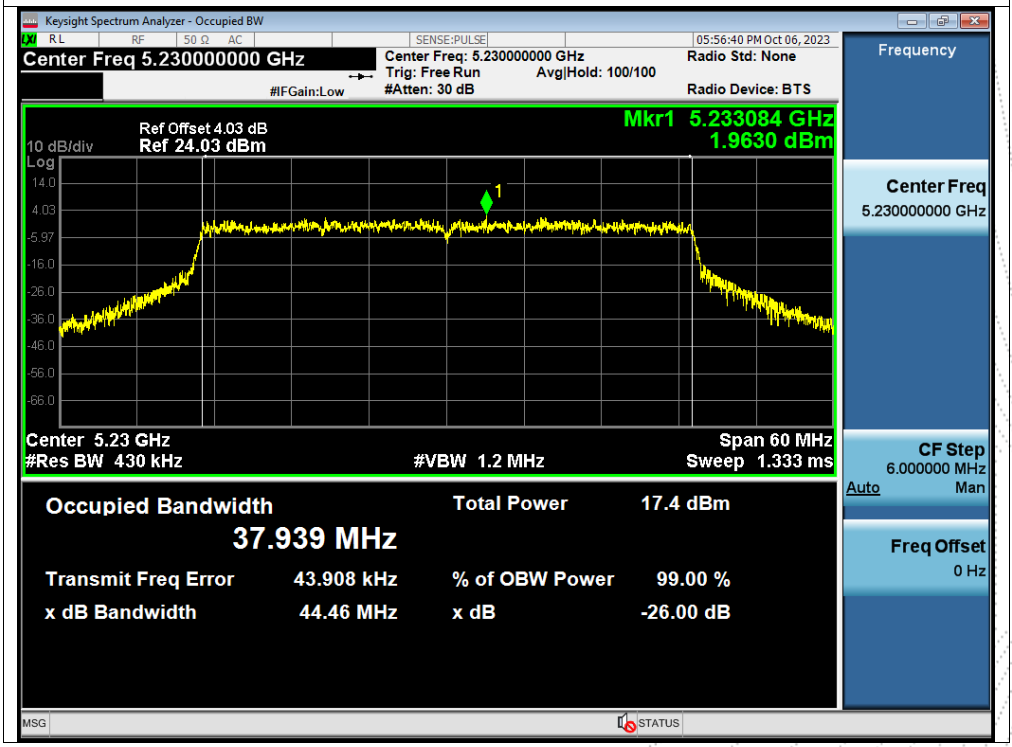

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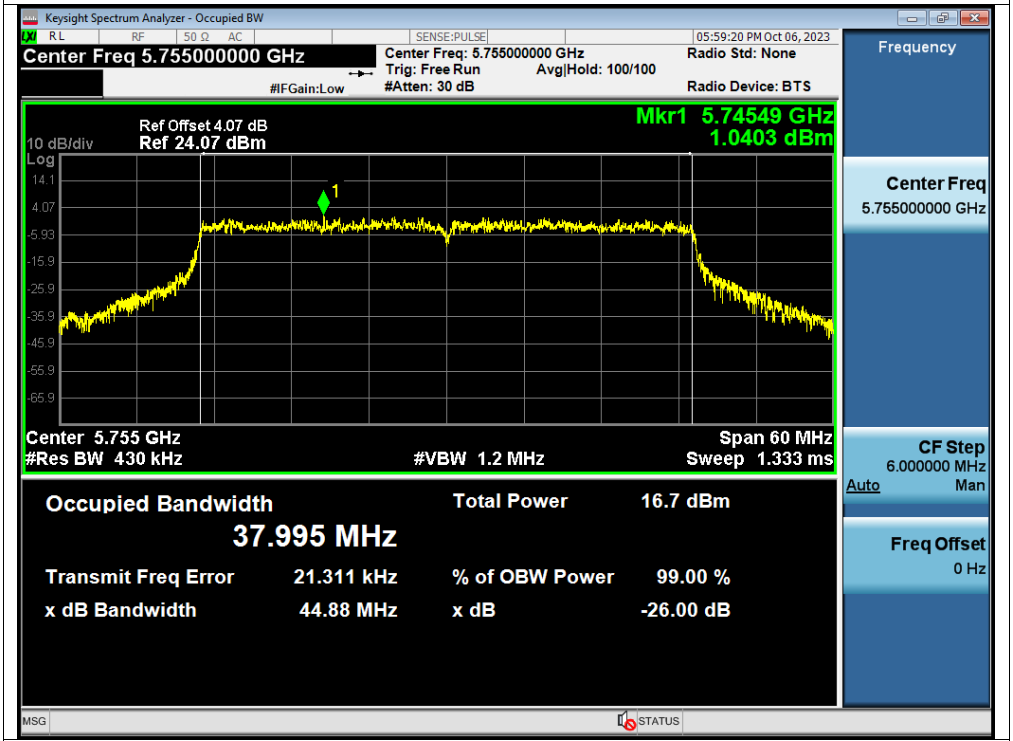
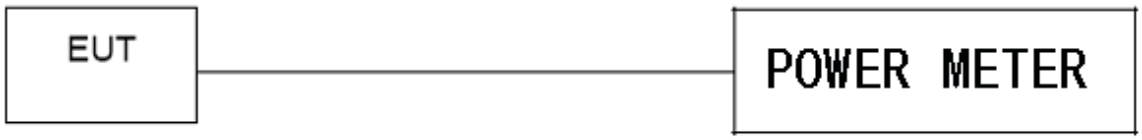


OBW NVNT ax40 5795MHz Ant1

10. Maximum Conducted Output Power

10.1 Block Diagram Of Test Setup



10.2 Limit

According to FCC §15.407

The maximum conduced output power should not exceed**:**

Frequency Band(MHz)	Limit
5150~5250	0.25W
5250~5350	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 ≤ 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.