

9.3. 9 MHz MODE IN THE 2.4 GHz AUTHORIZED BAND

9.3.1. 6 dB BANDWIDTH

LIMITS

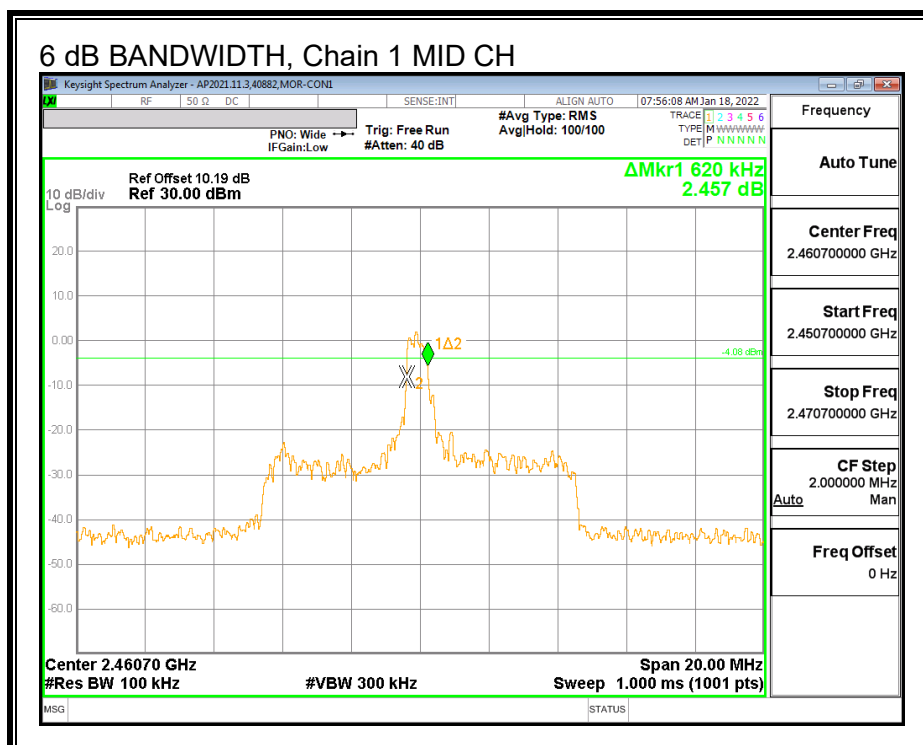
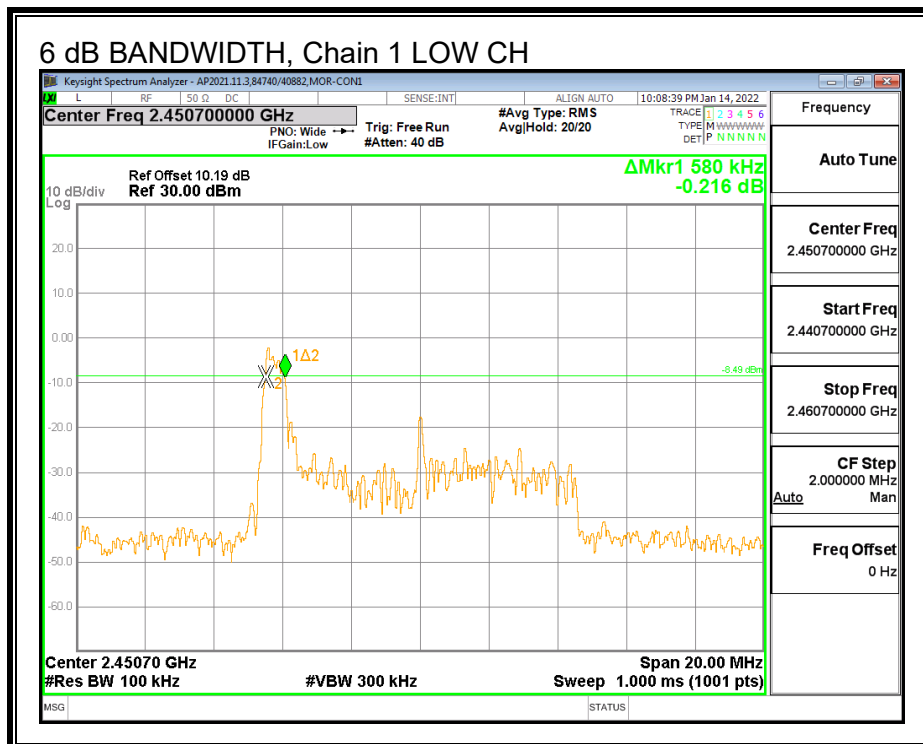
FCC §15.247 (a) (2)

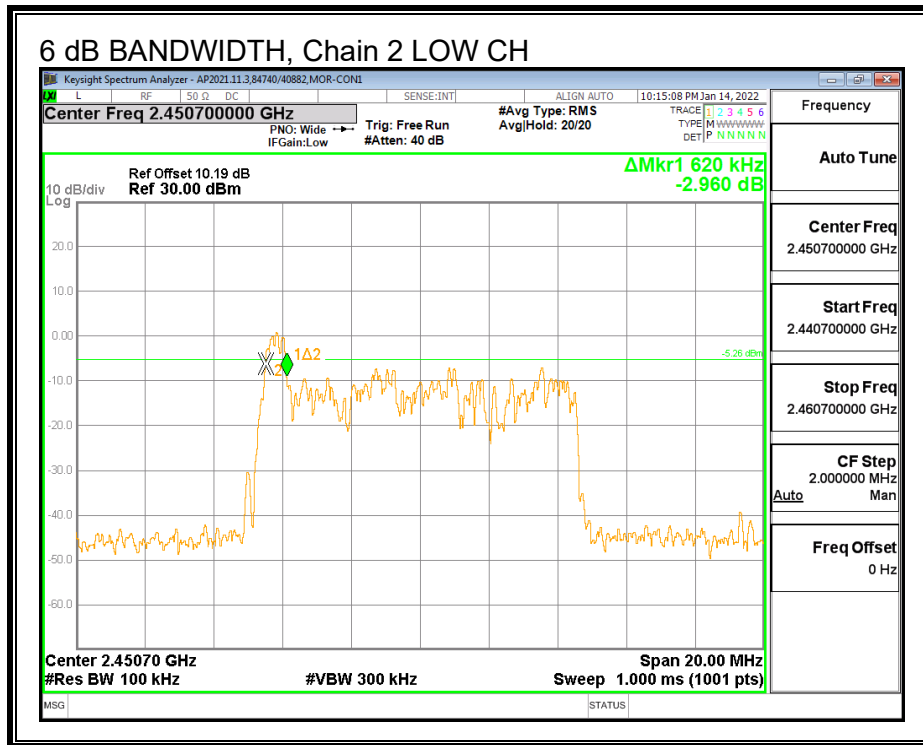
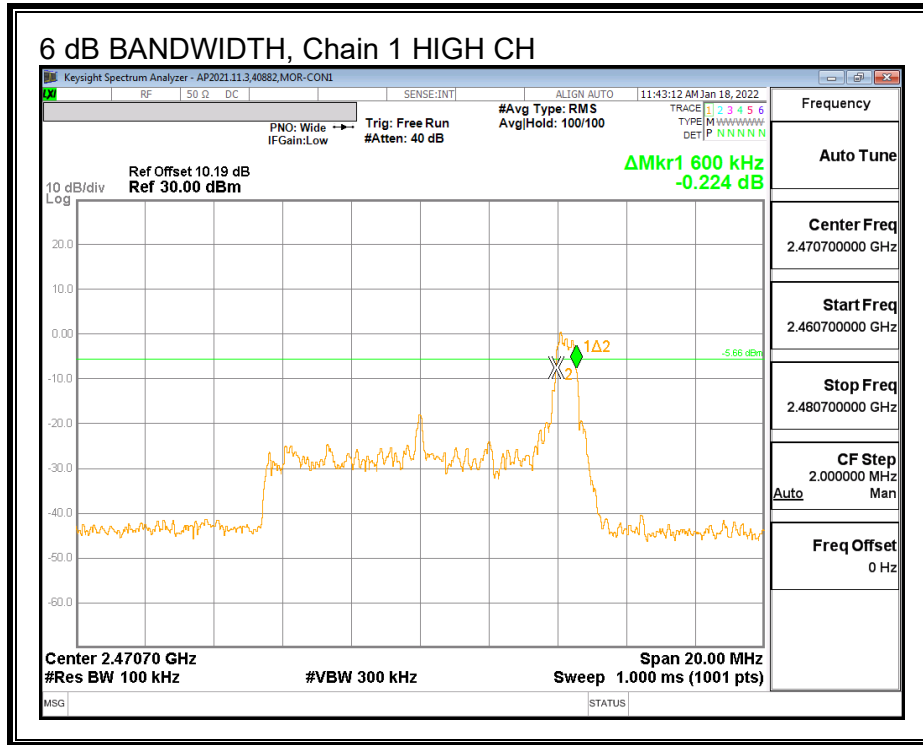
The minimum 6 dB bandwidth shall be at least 500 kHz.

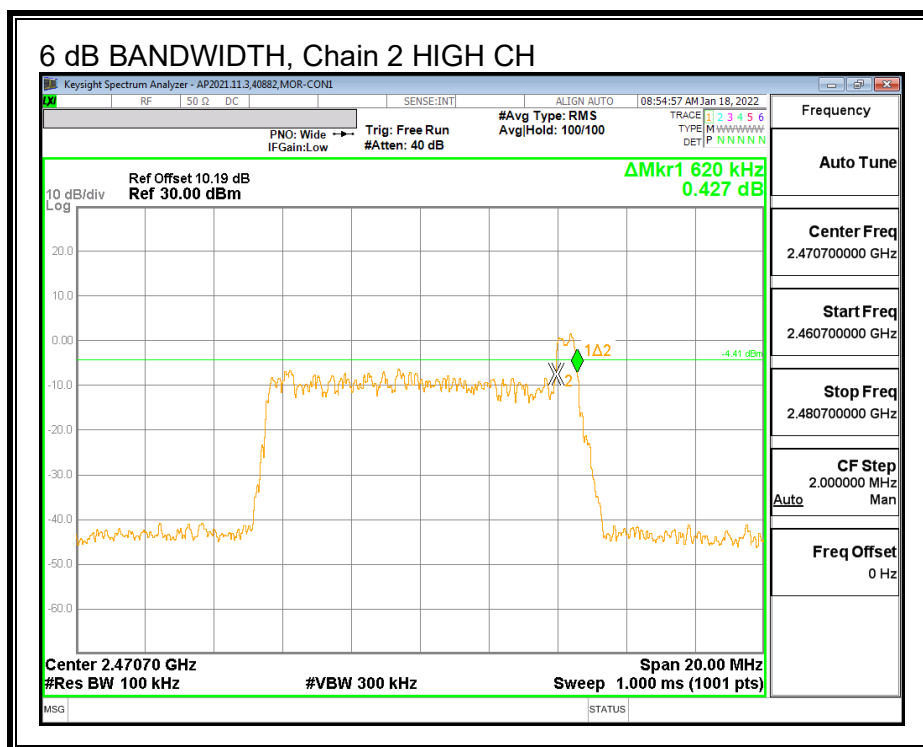
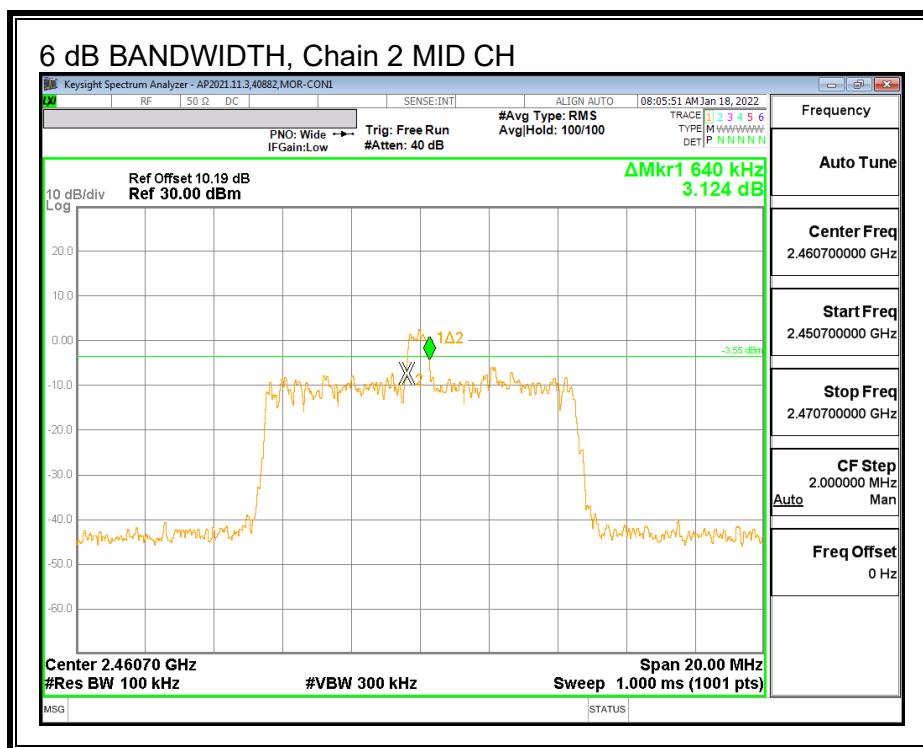
RESULTS - QPSK

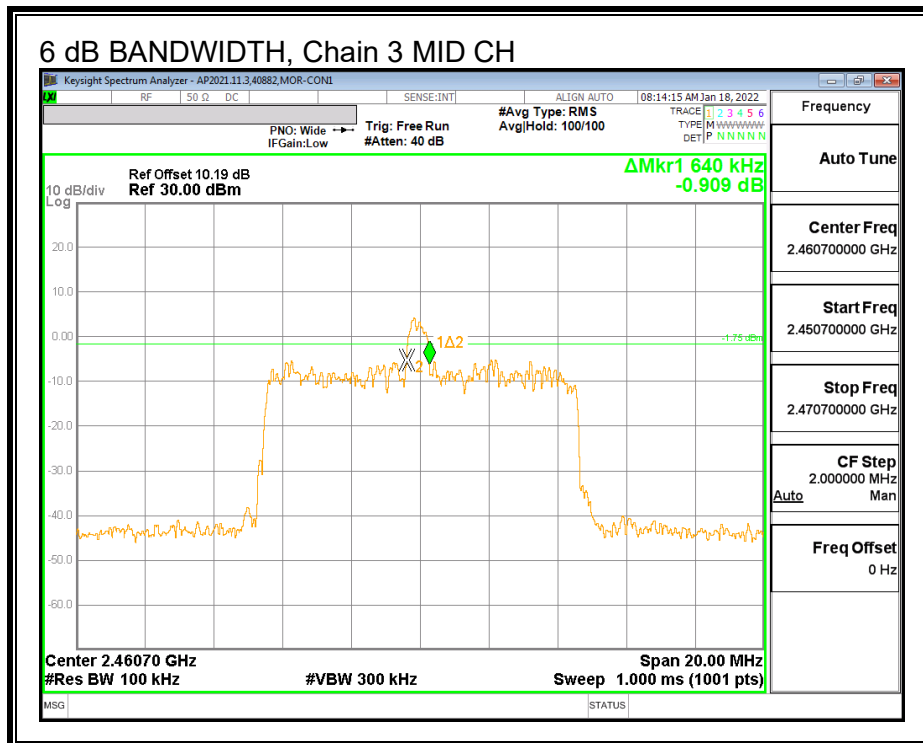
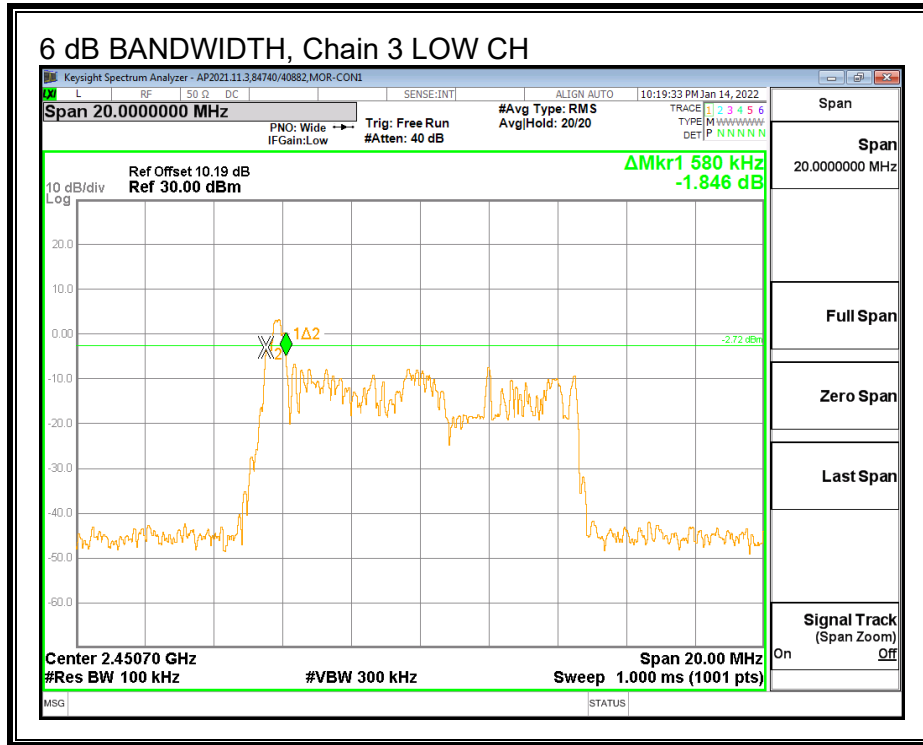
Channel	Frequency (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	6 dB BW Chain 3 (MHz)	6 dB BW Chain 4 (MHz)	Minimum Limit (MHz)
Low	2450.7	0.580	0.620	0.580	8.920	0.5
Mid	2460.7	0.620	0.640	0.640	8.720	0.5
High	2470.7	0.600	0.620	0.620	8.920	0.5

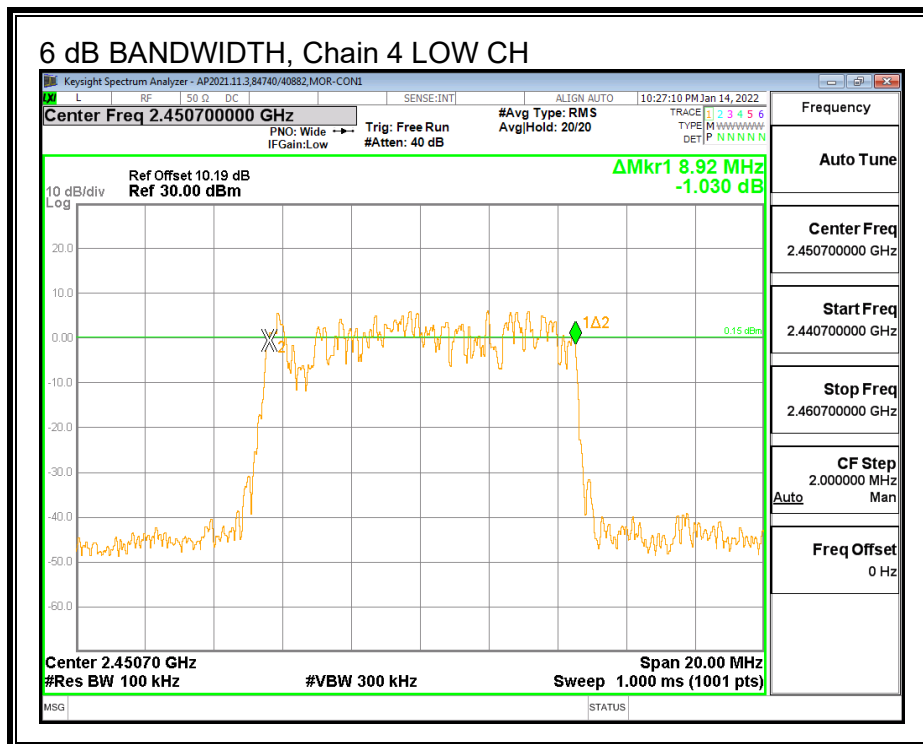
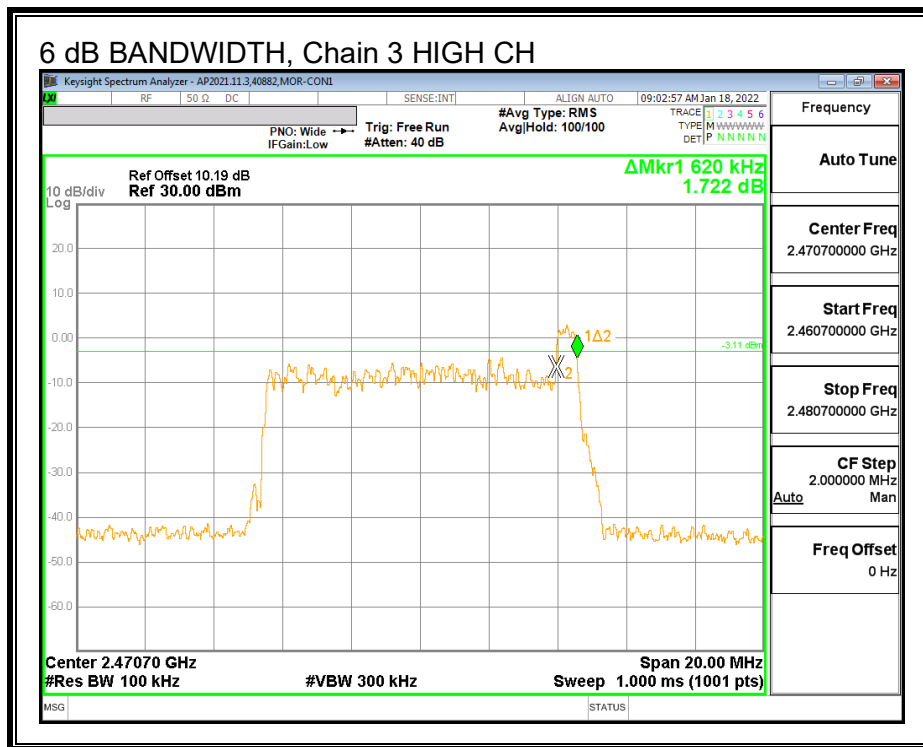
Channel	Frequency (MHz)	6 dB BW Chain 5 (MHz)	6 dB BW Chain 6 (MHz)	6 dB BW Chain 7 (MHz)	6 dB BW Chain 8 (MHz)	Minimum Limit (MHz)
Low	2450.7	8.980	8.920	0.560	9.000	0.5
Mid	2460.7	8.900	8.760	0.600	8.800	0.5
High	2470.7	8.280	8.940	0.620	8.780	0.5

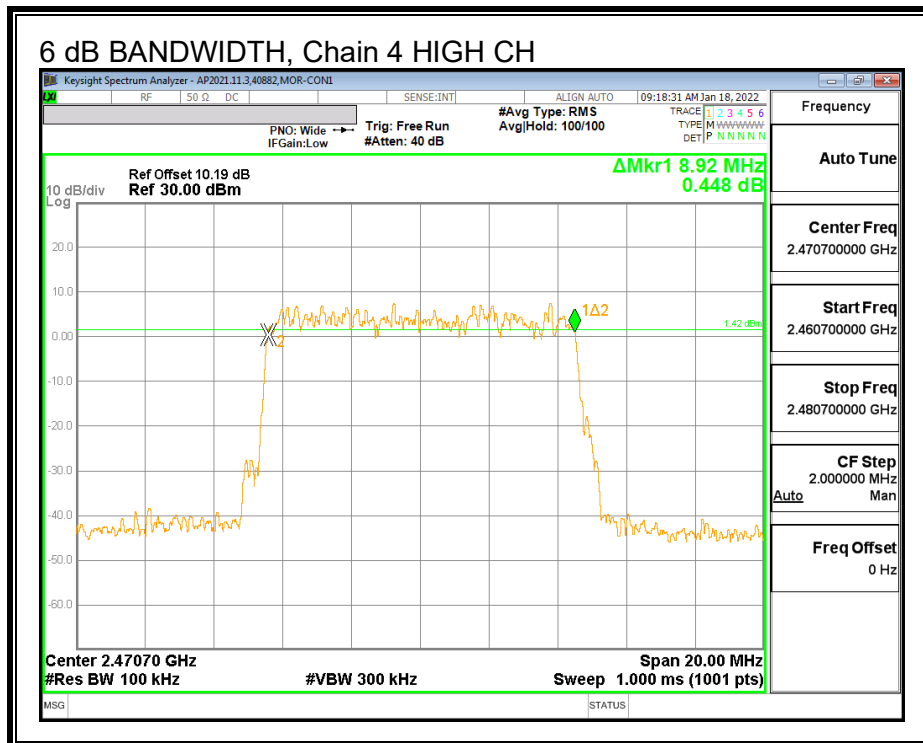
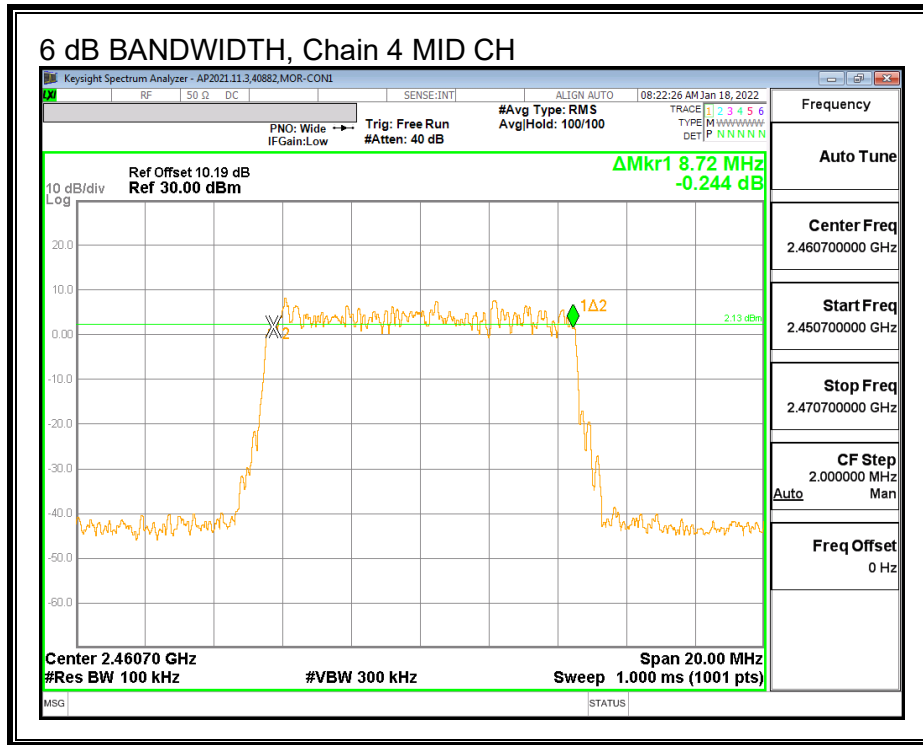


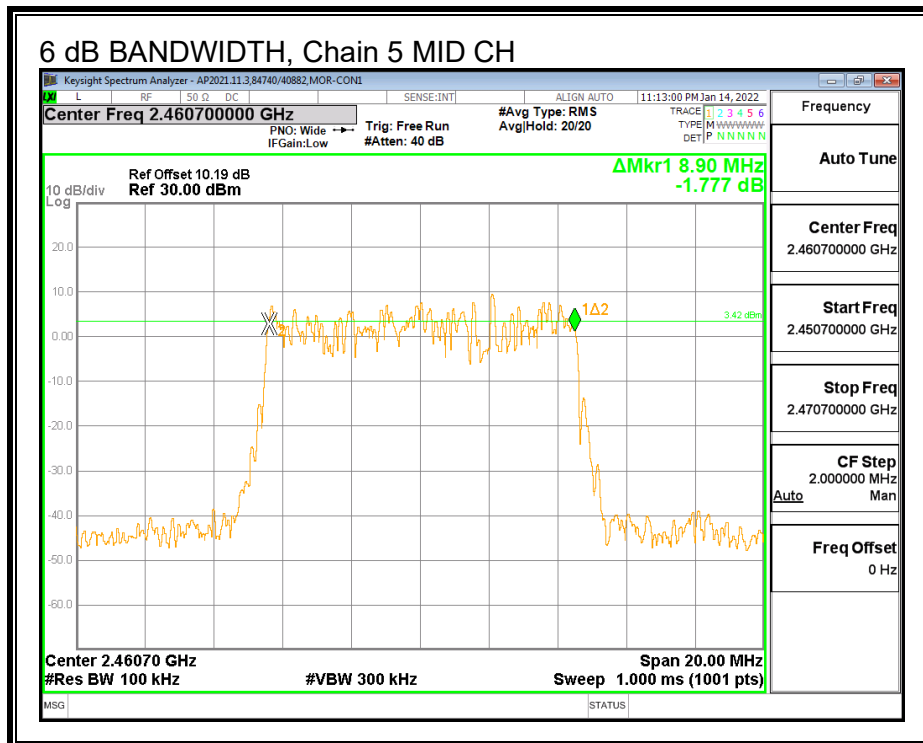
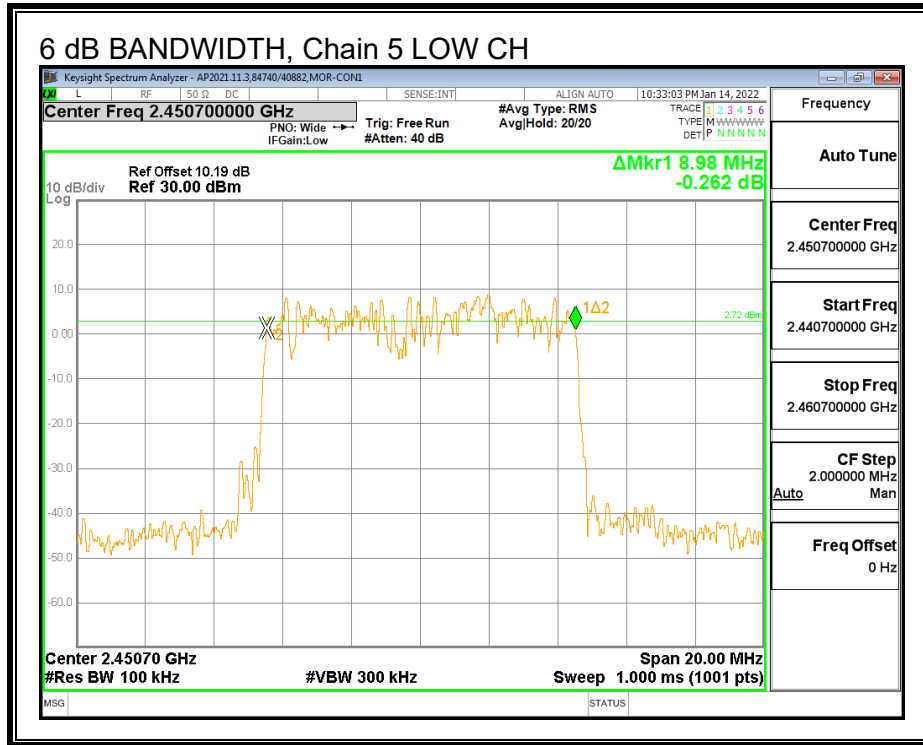


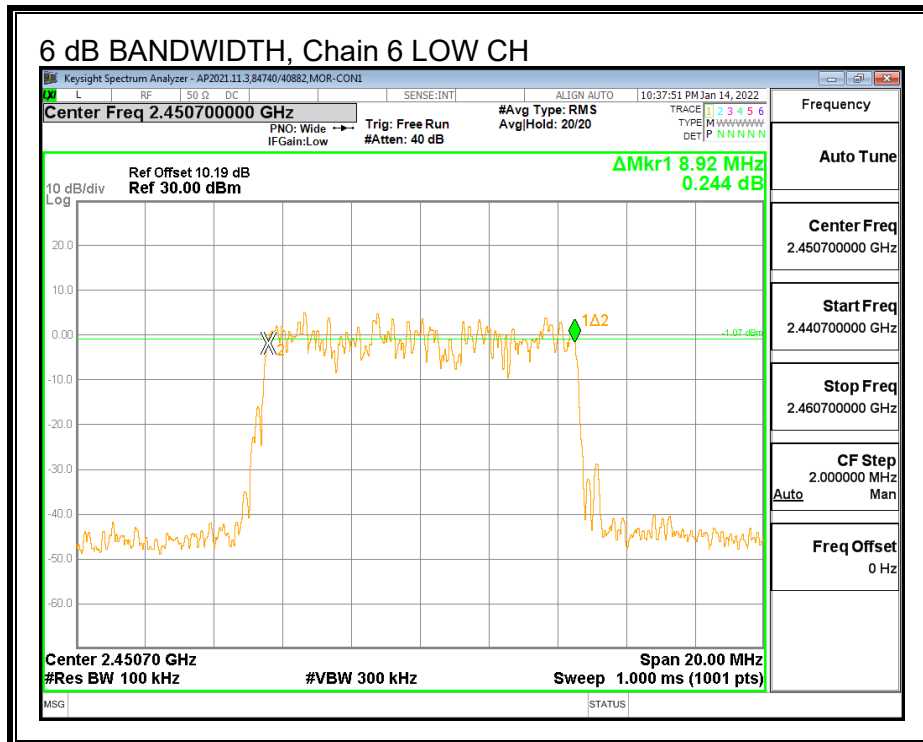
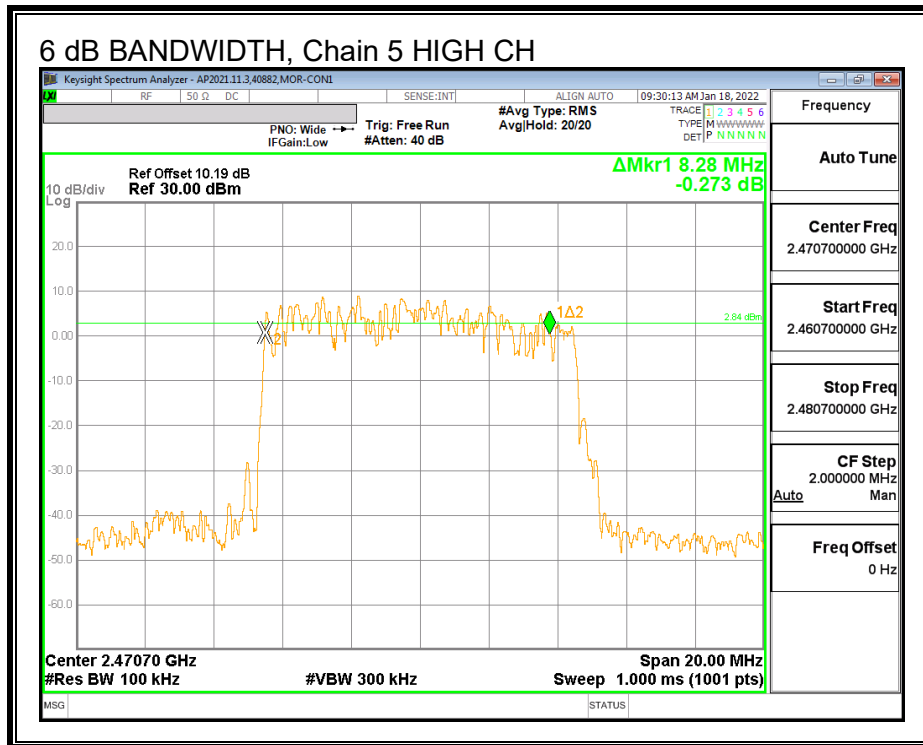


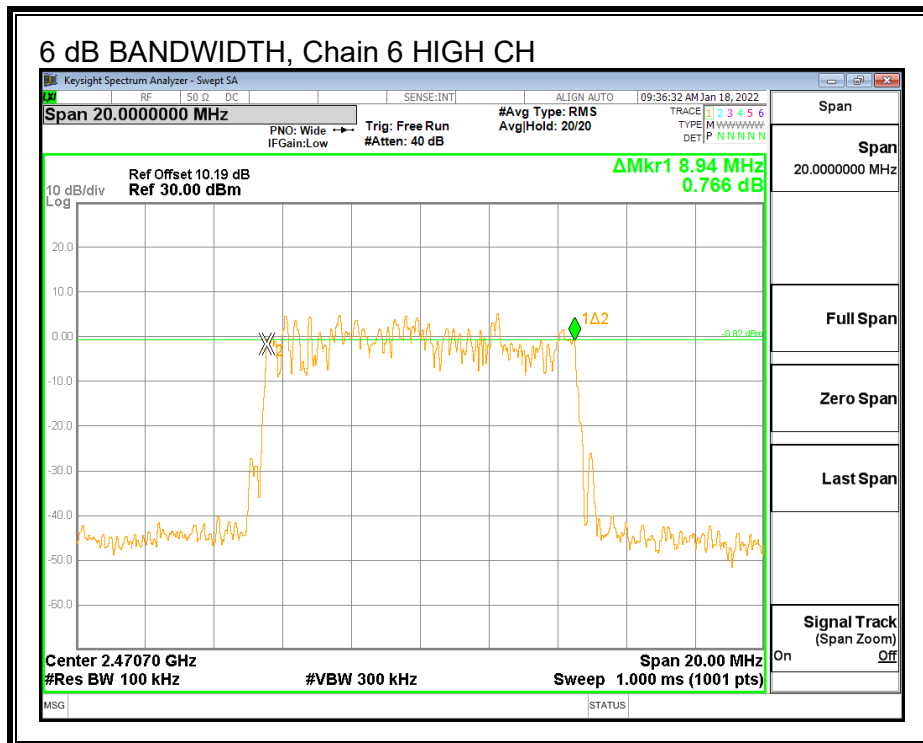
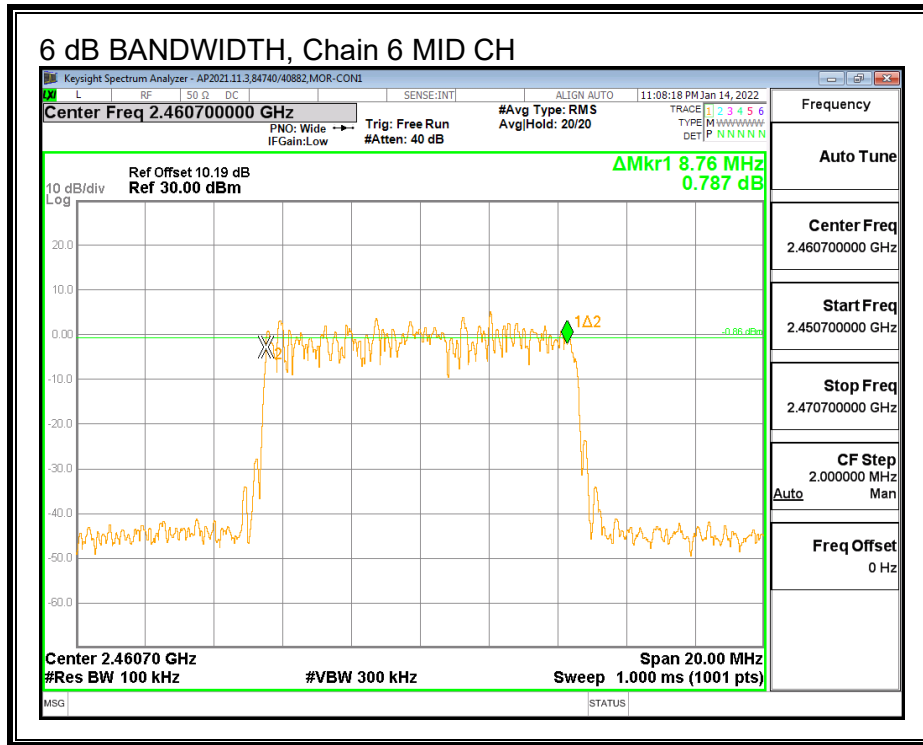


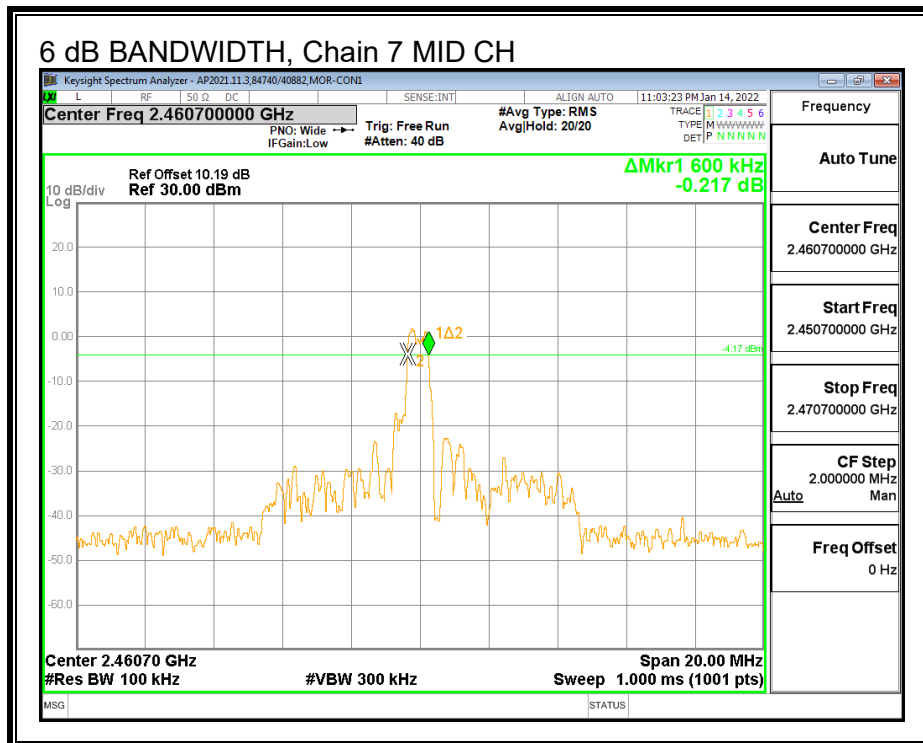
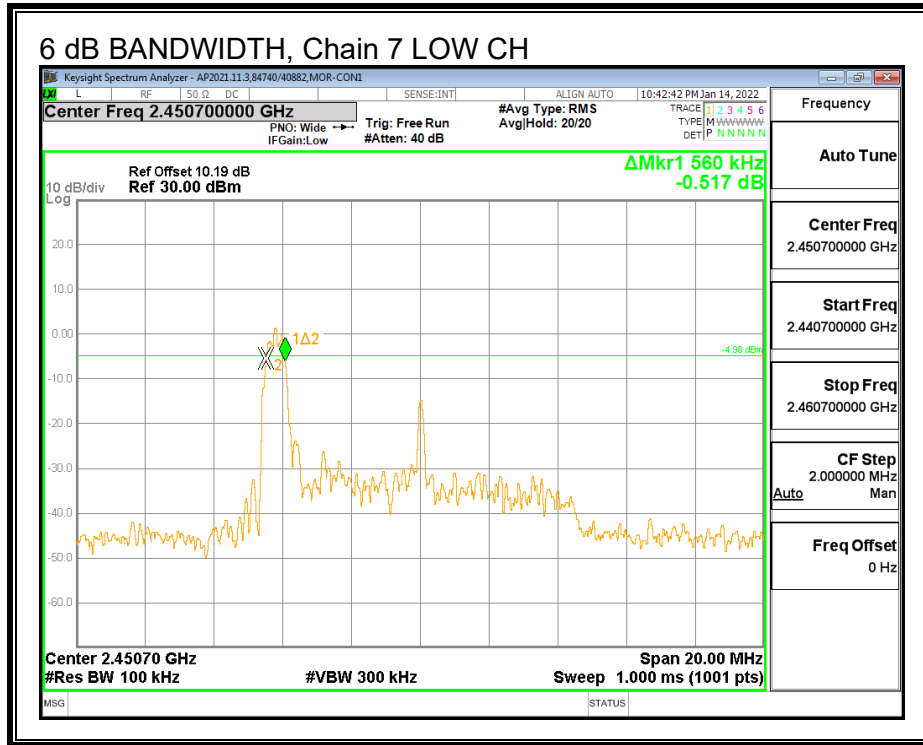


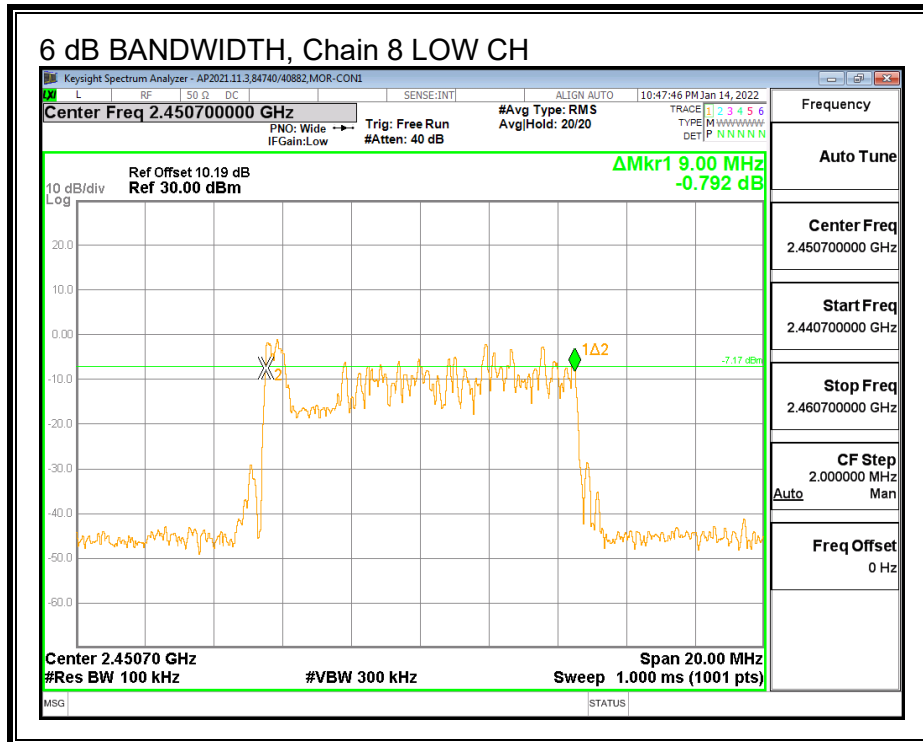
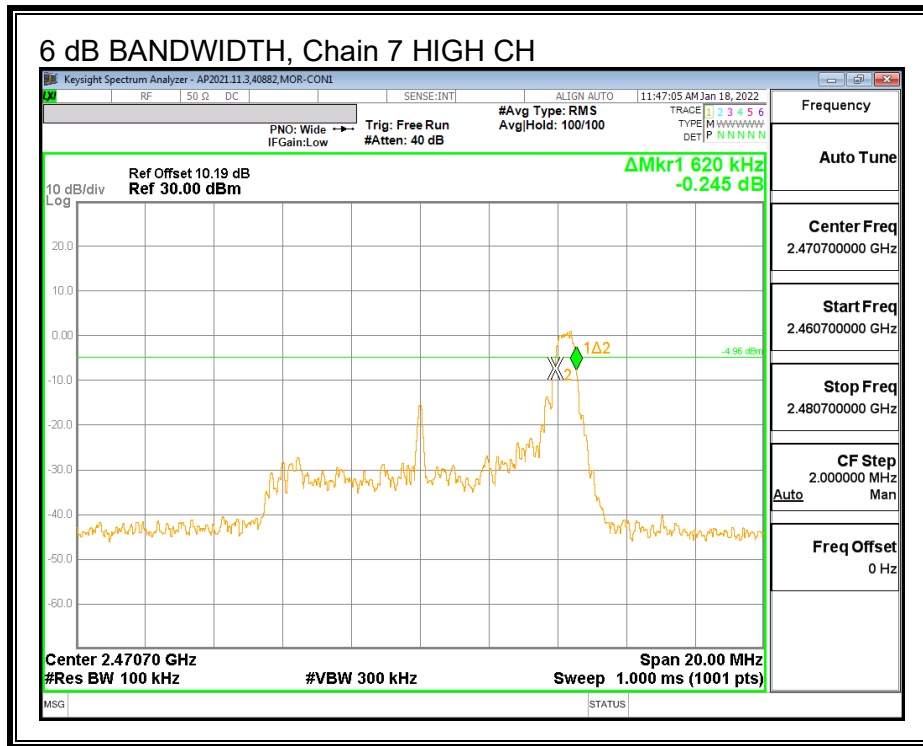


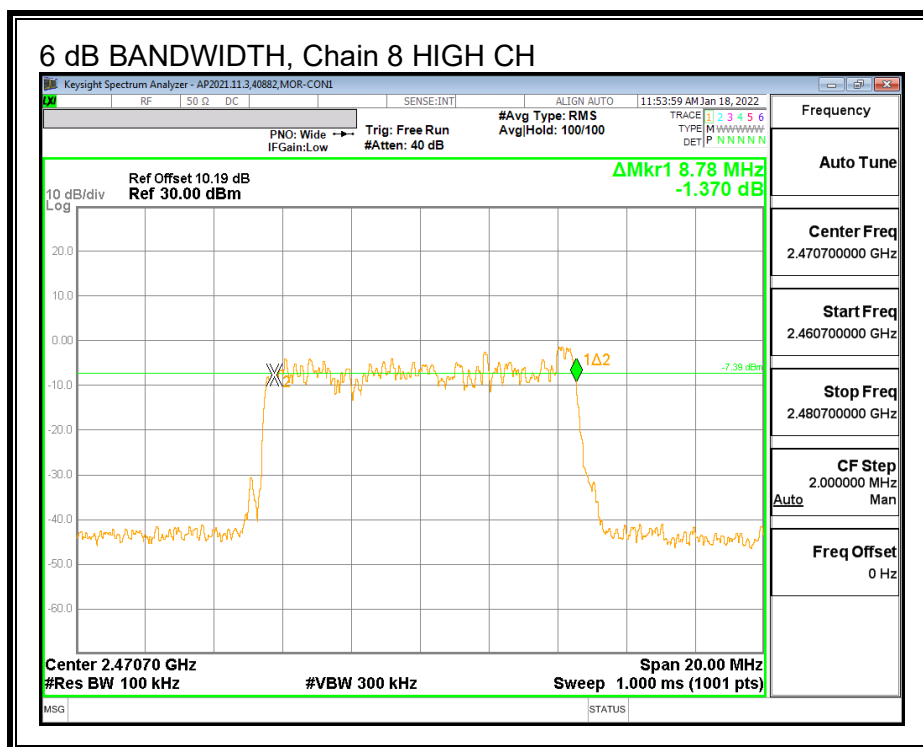
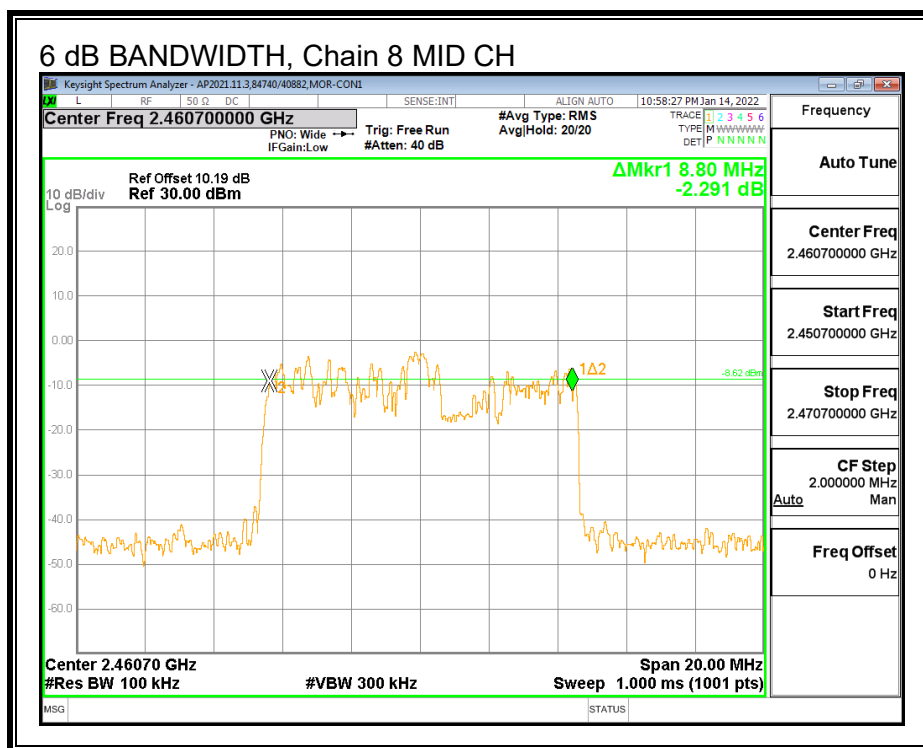








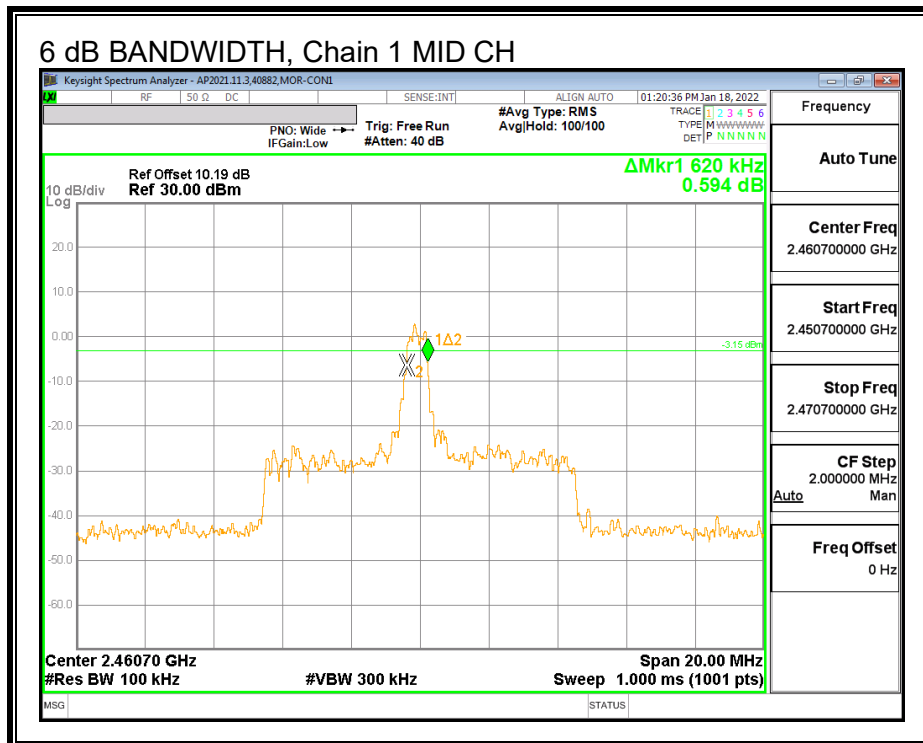
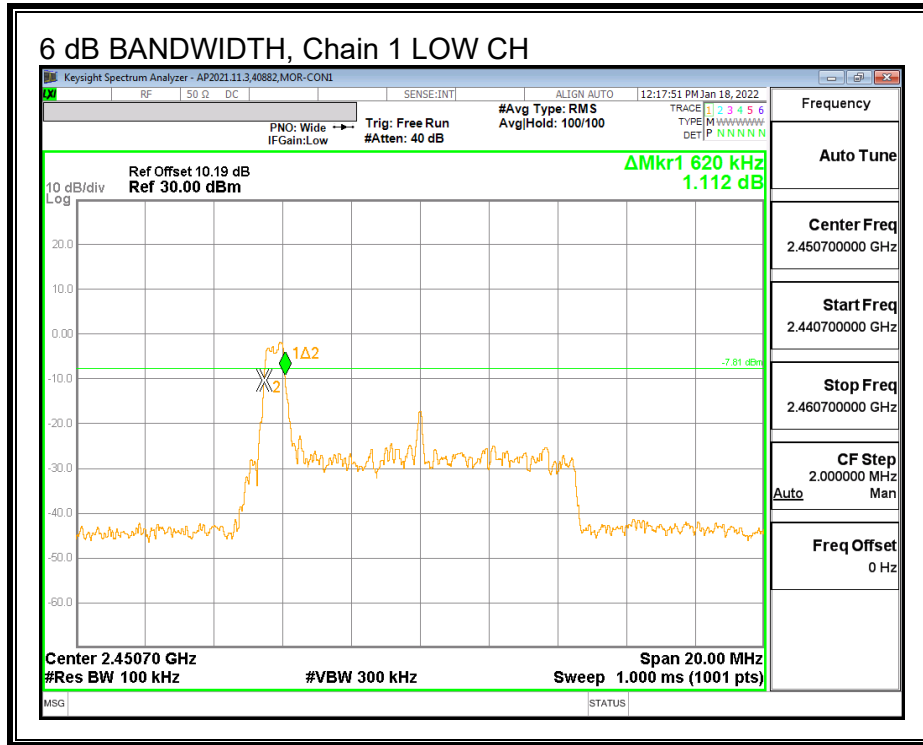


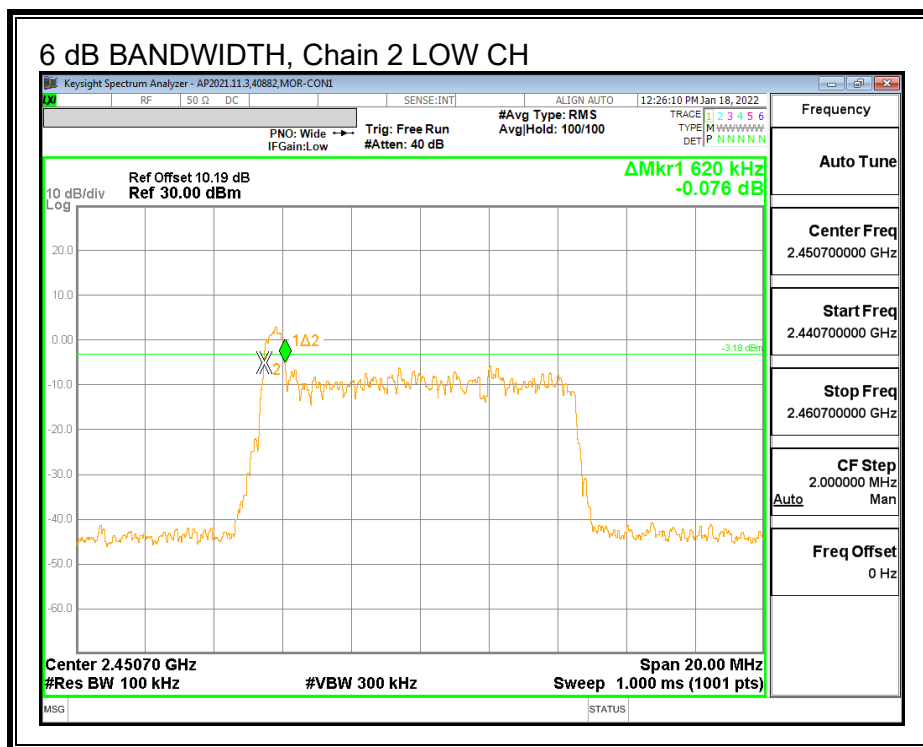
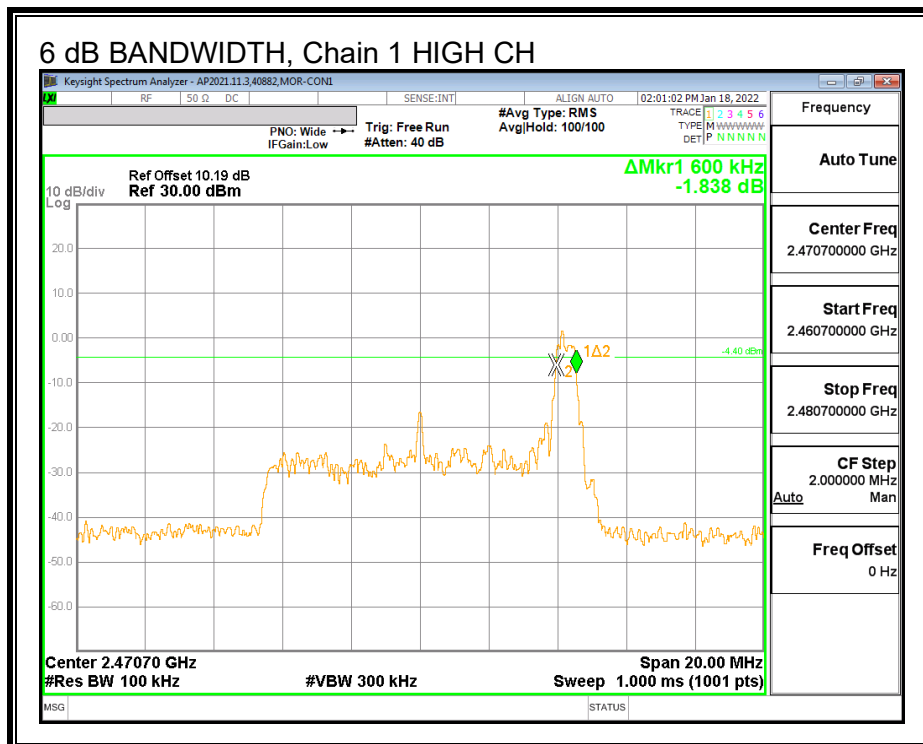


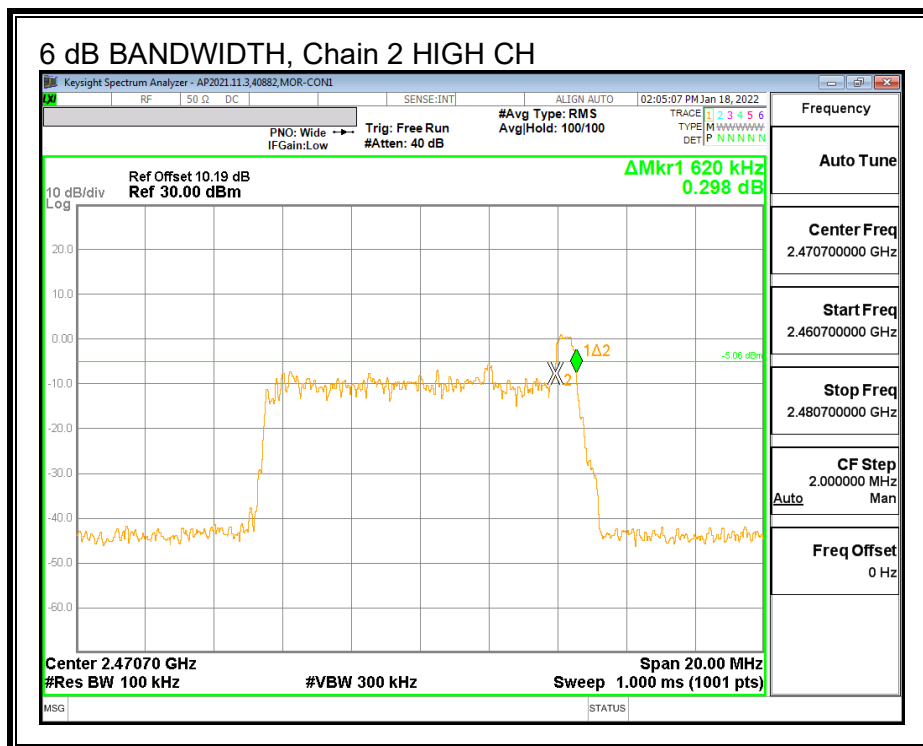
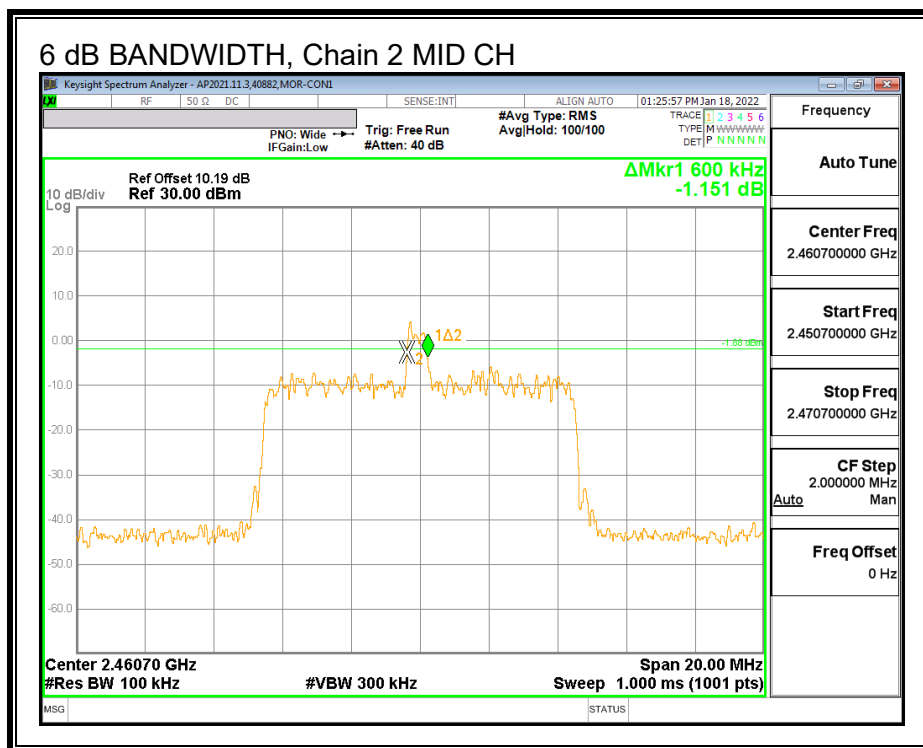
RESULTS – 16-QAM

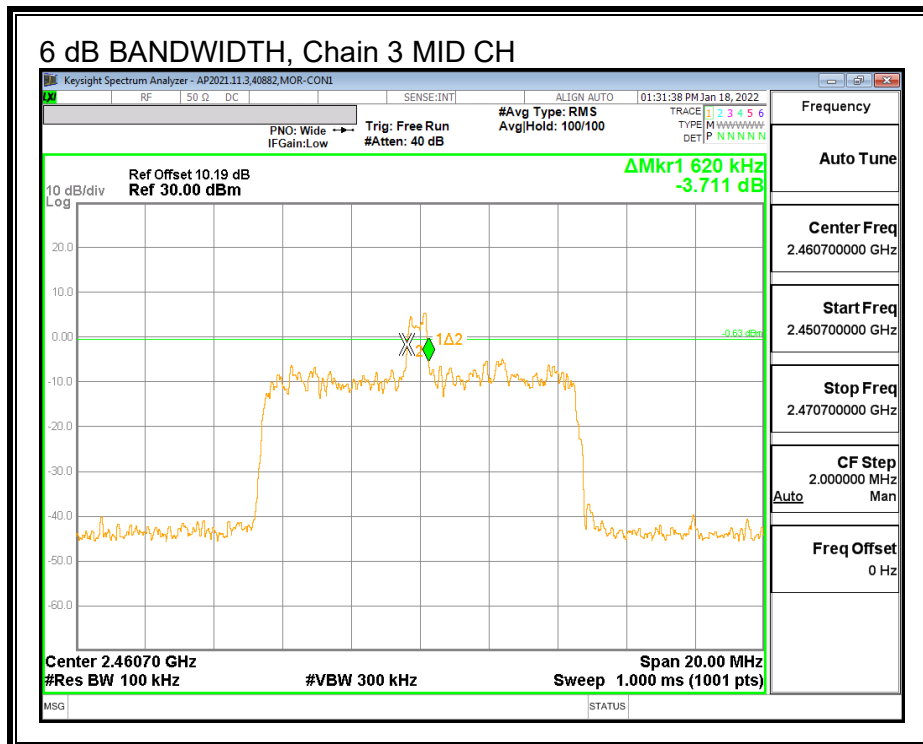
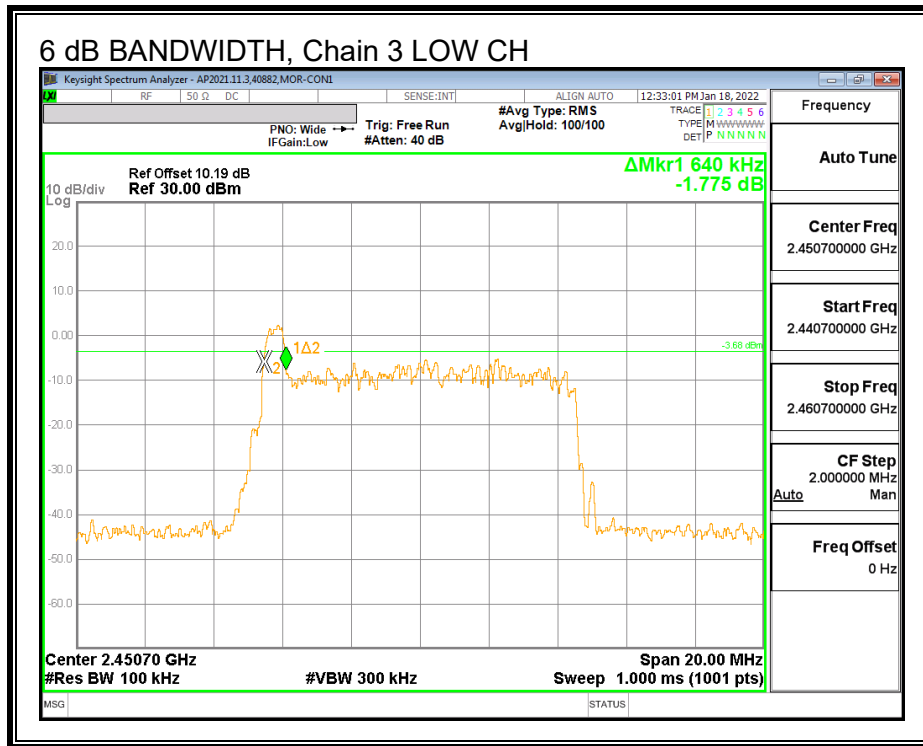
Channel	Frequency (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	6 dB BW Chain 3 (MHz)	6 dB BW Chain 4 (MHz)	Minimum Limit (MHz)
Low	2450.7	0.620	0.620	0.640	9.000	0.5
Mid	2460.7	0.620	0.600	0.620	8.920	0.5
High	2470.7	0.600	0.620	0.620	8.900	0.5

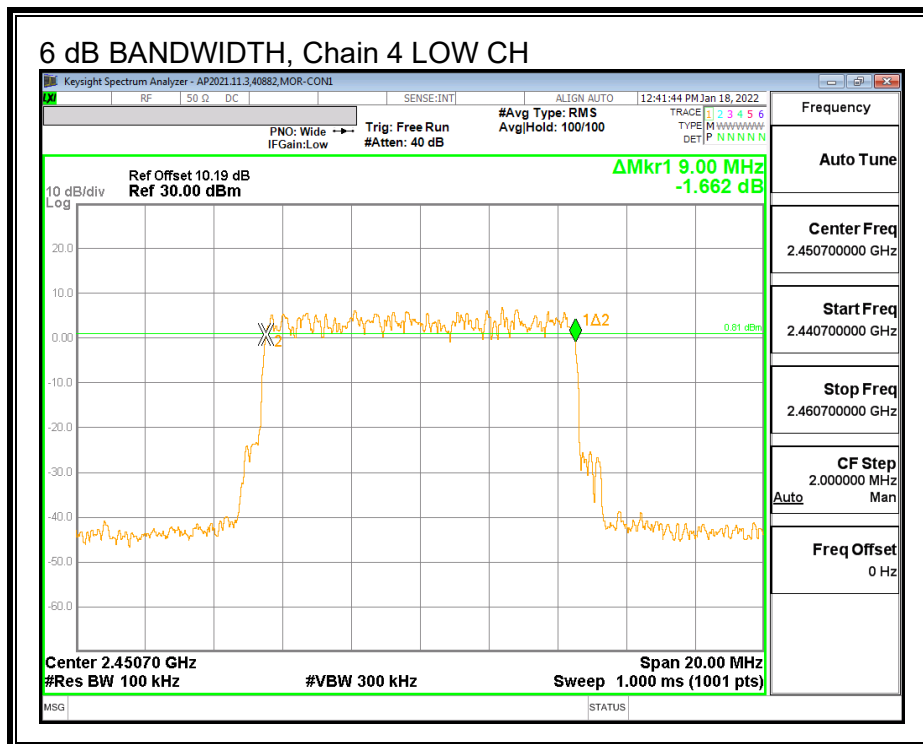
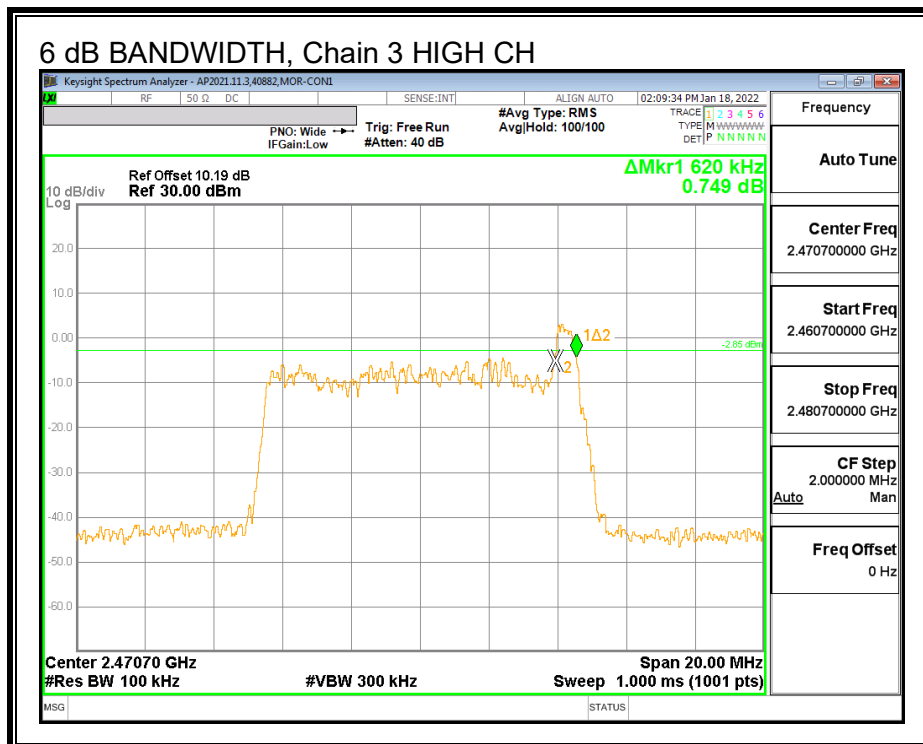
Channel	Frequency (MHz)	6 dB BW Chain 5 (MHz)	6 dB BW Chain 6 (MHz)	6 dB BW Chain 7 (MHz)	6 dB BW Chain 8 (MHz)	Minimum Limit (MHz)
Low	2450.7	8.920	8.900	0.620	8.800	0.5
Mid	2460.7	8.600	8.960	0.680	7.880	0.5
High	2470.7	8.880	9.020	0.620	8.780	0.5

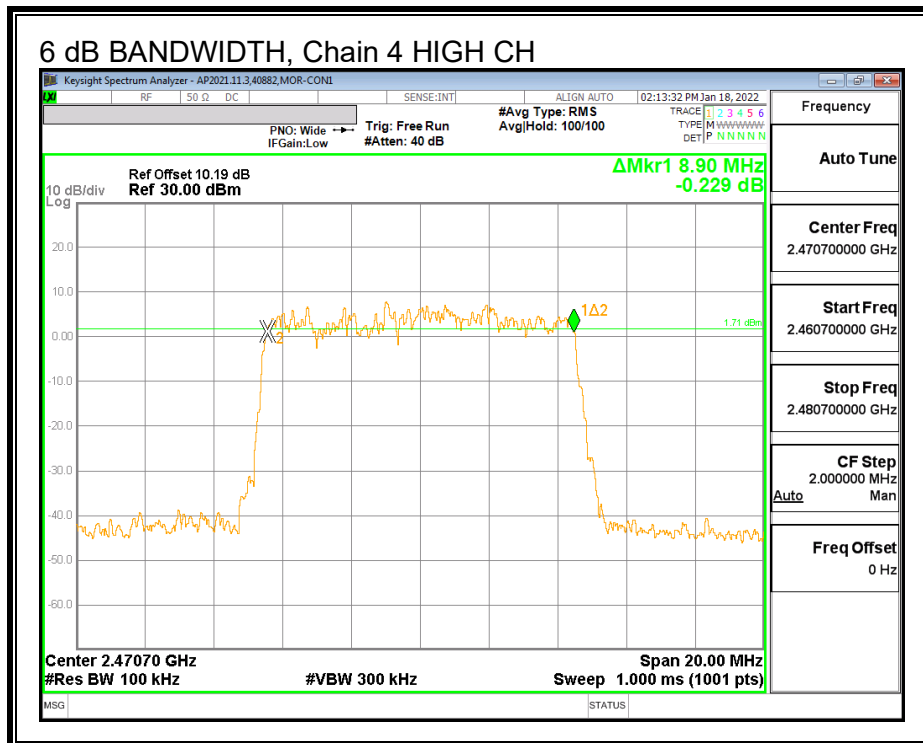
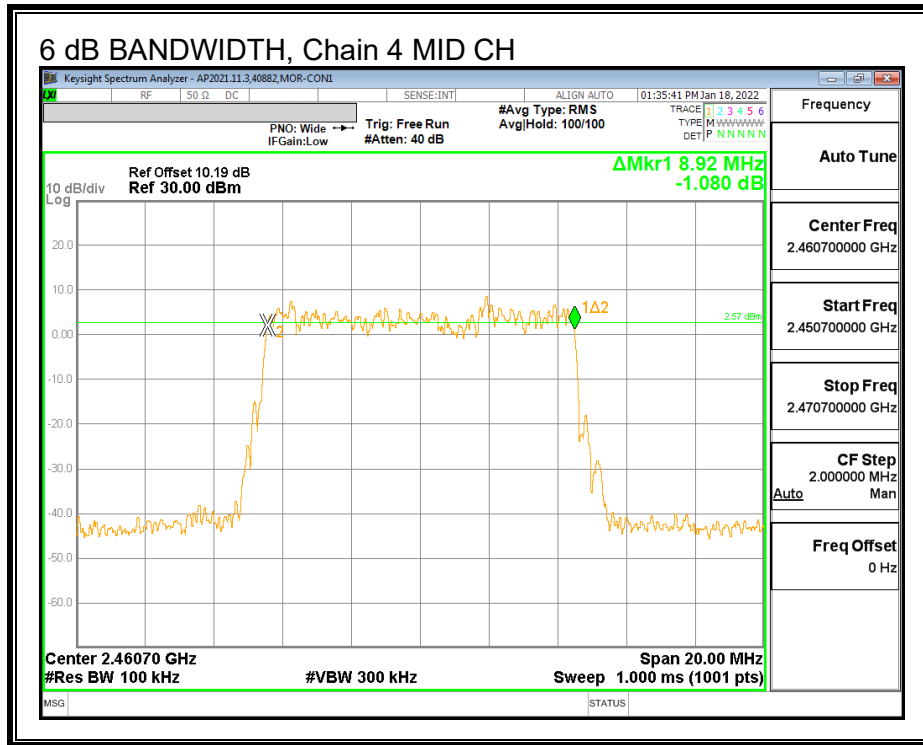


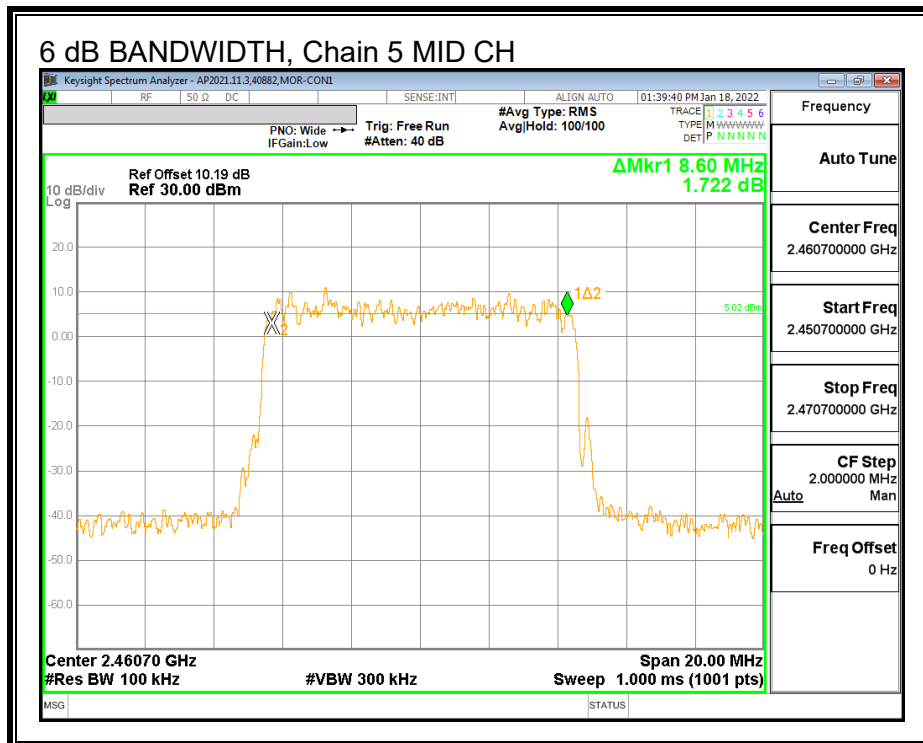
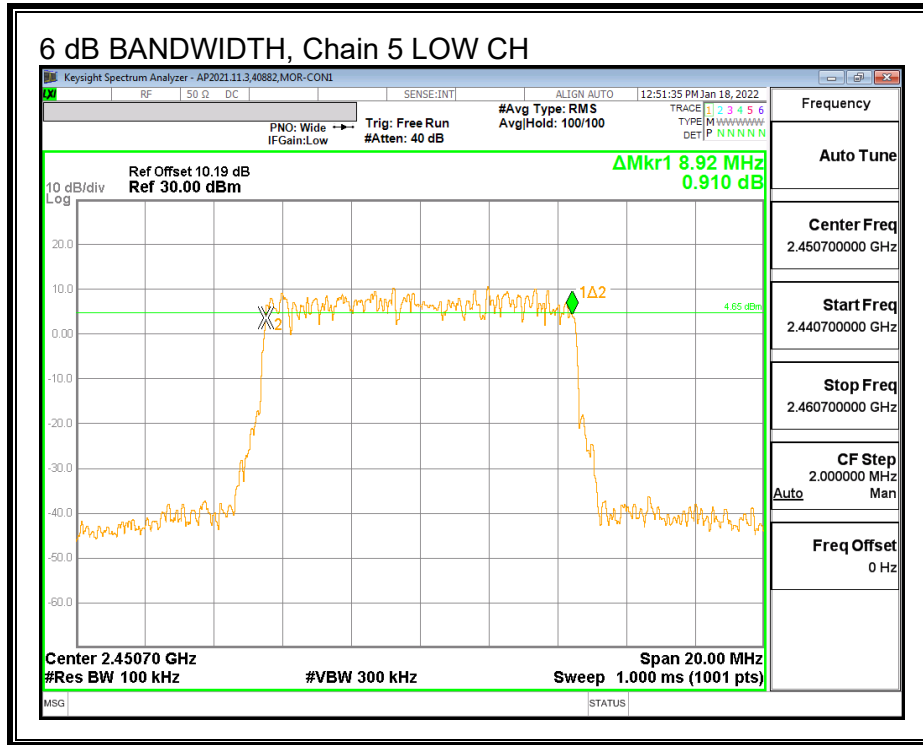


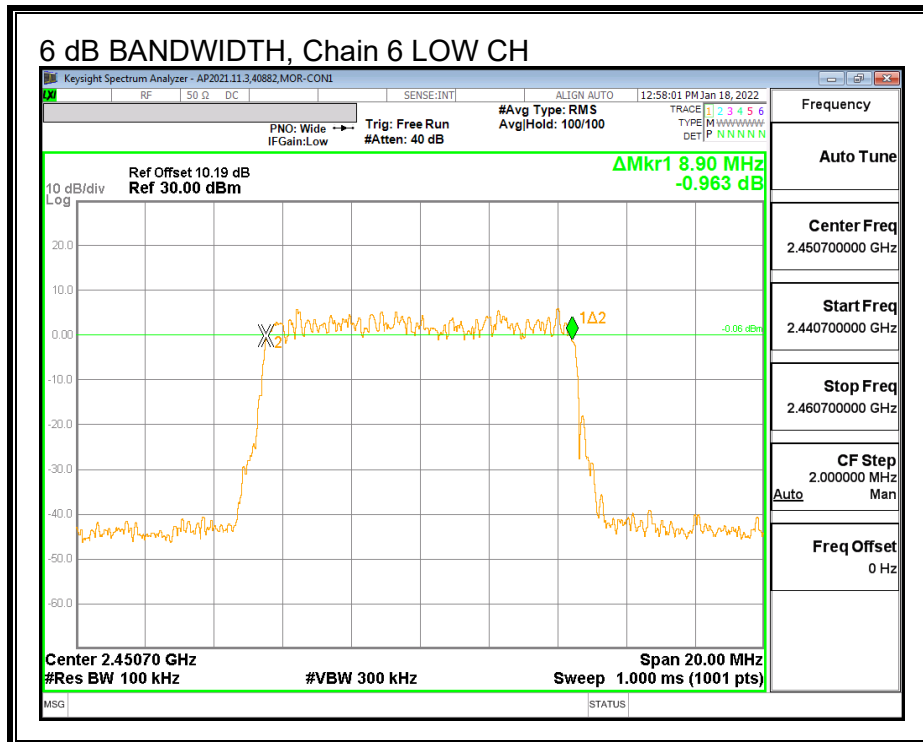
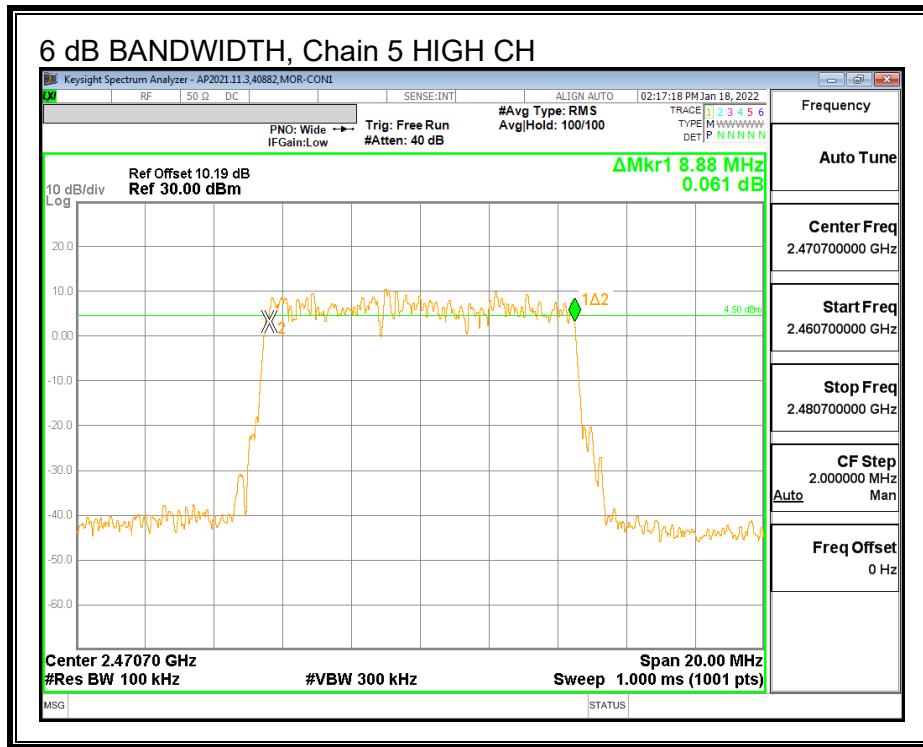


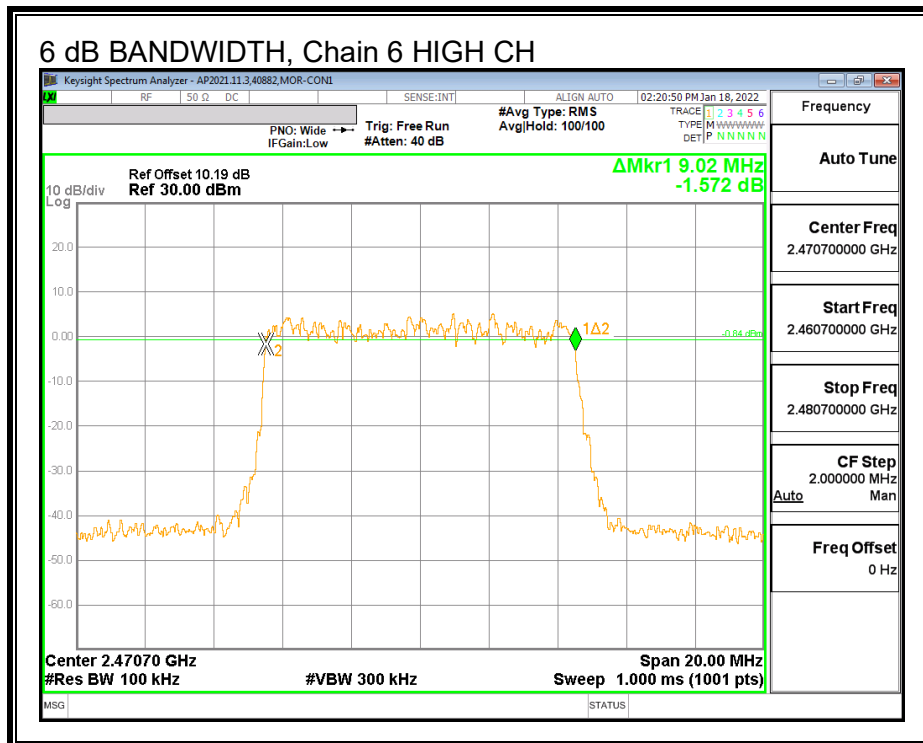
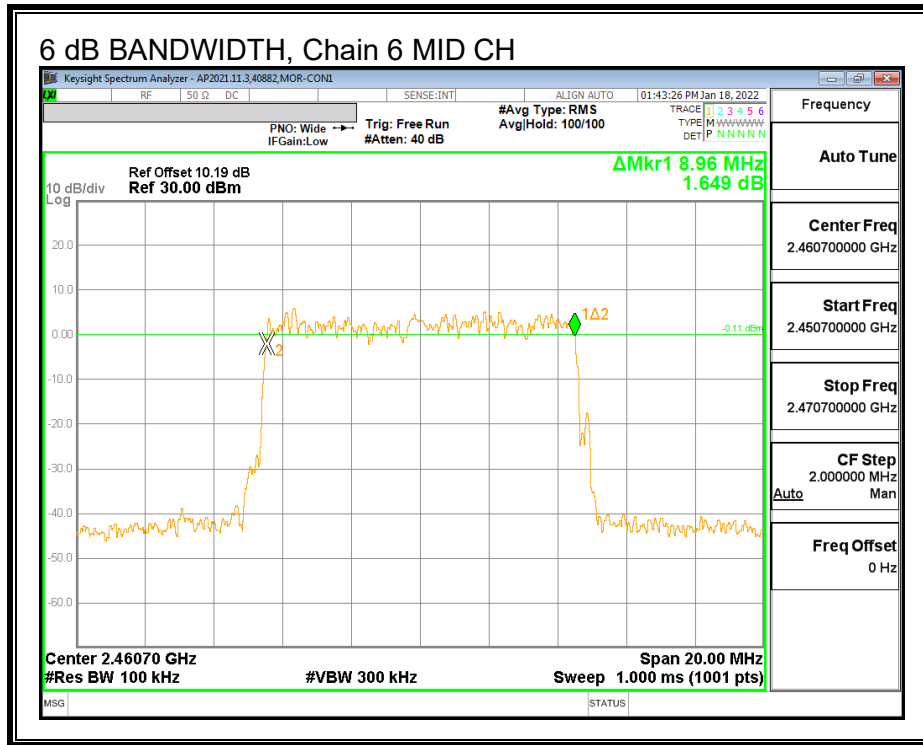


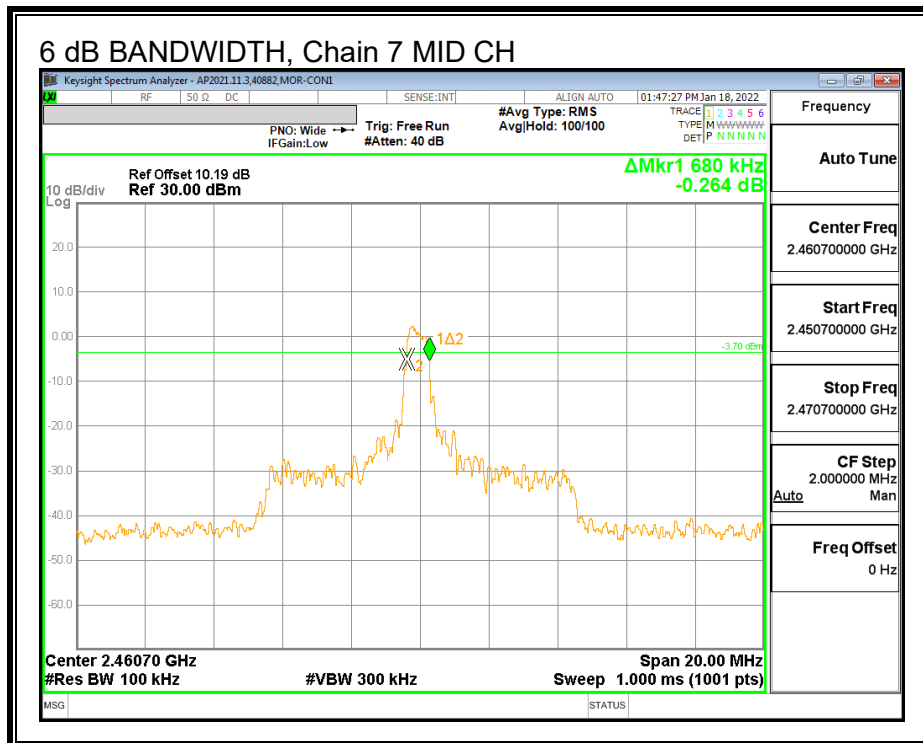
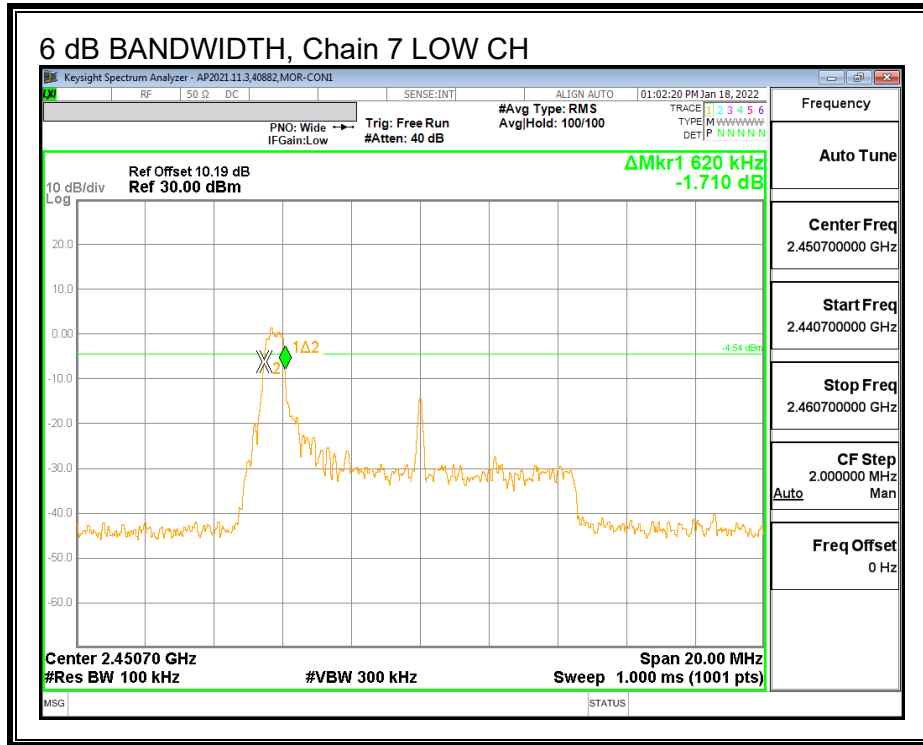


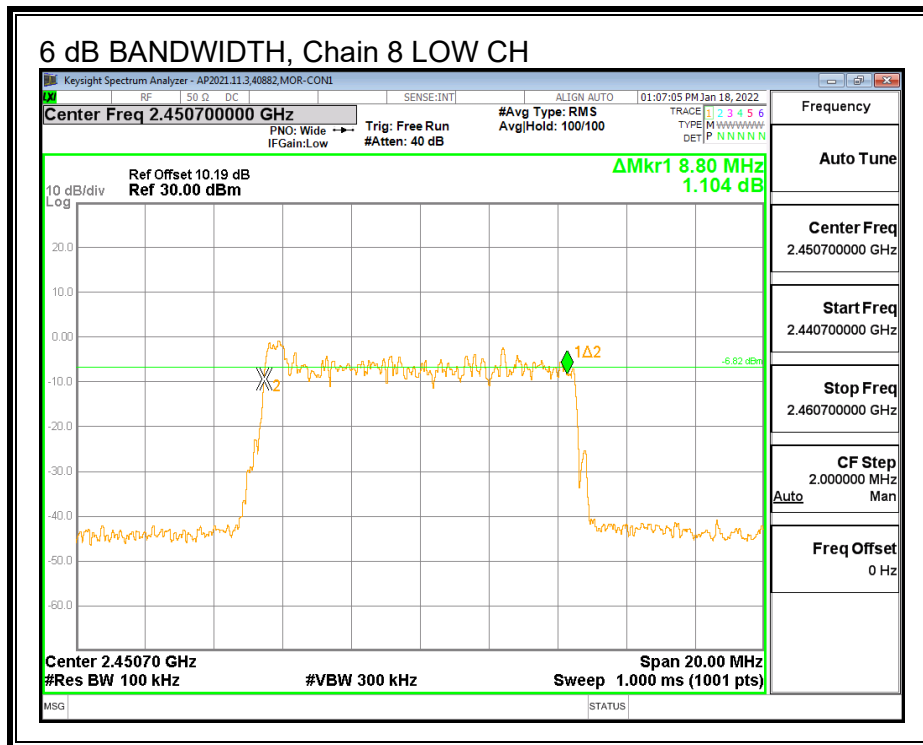
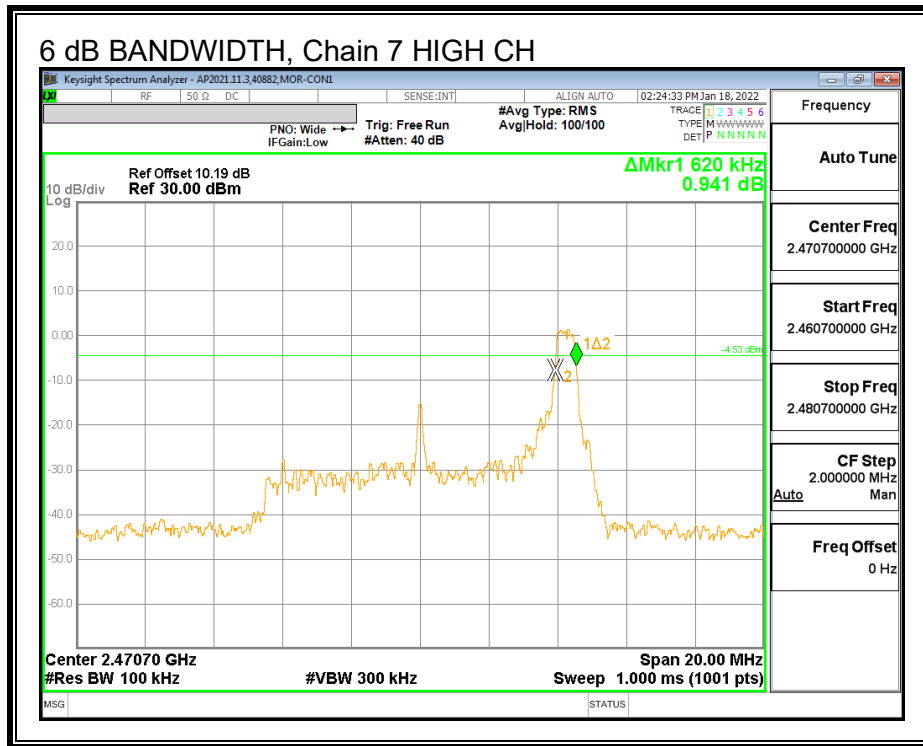


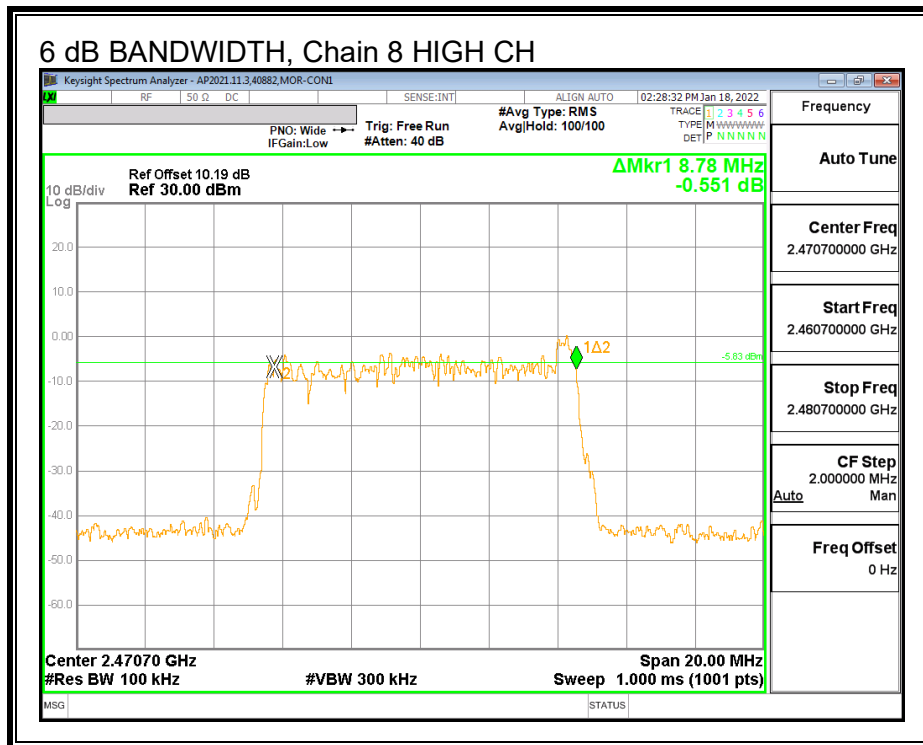
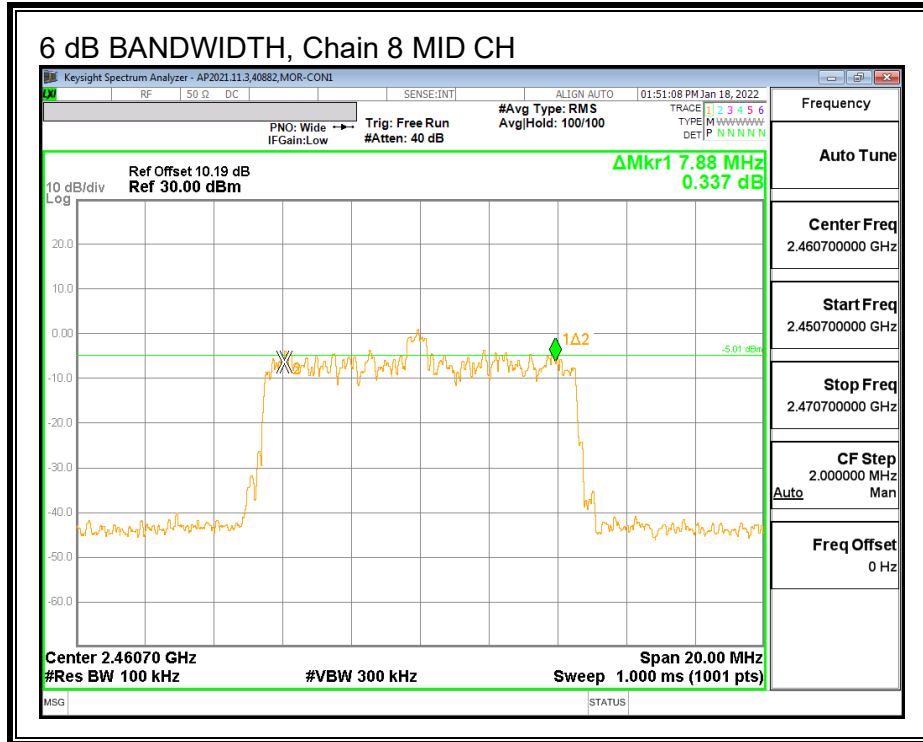












9.3.2. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

§15.247 (c) (2) In addition to the provisions in paragraphs (b)(1), (b)(3), (b)(4) and (c)(1)(i) of this section, transmitters operating in the 2400-2483.5 MHz band that emit multiple directional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided the emissions comply with the following:

(i) Different information must be transmitted to each receiver.

(ii) If the transmitter employs an antenna system that emits multiple directional beams but does not do emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device, i.e., the sum of the power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph (b)(1) or (b)(3) of this section, as applicable. However, the total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as follows:

(A) The directional gain shall be calculated as the sum of $10 \log$ (number of array elements or staves) plus the directional gain of the element or stave having the highest gain.

(B) A lower value for the directional gain than that calculated in paragraph (c)(2)(ii)(A) of this section will be accepted if sufficient evidence is presented, e.g., due to shading of the array or coherence loss in the beamforming.

(iii) If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequency channels, the power supplied to each emission beam is subject to the power limit specified in paragraph (c)(2)(ii) of this section. If transmitted beams overlap, the power shall be reduced to ensure that their aggregate power does not exceed the limit specified in paragraph (c)(2)(ii) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall not exceed the limit specified in paragraph (c)(2)(ii) of this section by more than 8 dB.

RESULTS - QPSK

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)
Low	2448.2	26.8	24.00
Mid	2460.7	26.8	24.00
High	2473.2	26.8	24.00

Results

Channel	Frequency (MHz)	Chain 1 Power (dB)	Chain 2 Power (dB)	Chain 3 Power (dB)	Chain 4 Power (dB)
Low	2448.2	-0.35	2.51	3.64	17.64
Mid	2460.7	-0.48	2.77	3.58	17.41
High	2473.2	-0.3	3.35	4.81	17.63

Channel	Frequency (MHz)	Chain 5 Power (dB)	Chain 6 Power (dB)	Chain 7 Power (dB)	Chain 8 Power (dB)	Total Corrected Power (dBm)	Limit	Margin
Low	2448.2	19.86	15.96	0.88	7.13	23.13	24.00	-0.87
Mid	2460.7	20.05	15.71	1.59	6.26	23.10	24.00	-0.90
High	2473.2	19.72	15.21	0.56	5.86	22.92	24.00	-1.08

RESULTS – 16-QAM

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)
Low	2448.2	26.8	24.00
Mid	2460.7	26.8	24.00
High	2473.2	26.8	24.00

Results

Channel	Frequency (MHz)	Chain 1 Power (dB)	Chain 2 Power (dB)	Chain 3 Power (dB)	Chain 4 Power (dB)
Low	2448.2	-0.48	2.98	3.74	17.45
Mid	2460.7	-0.34	3.1	4.24	16.98
High	2473.2	-0.54	2.85	4.05	16.88

Channel	Frequency (MHz)	Chain 5 Power (dB)	Chain 6 Power (dB)	Chain 7 Power (dB)	Chain 8 Power (dB)	Total Corrected Power (dBm)	Limit	Margin
Low	2448.2	18.99	15.58	0.92	6.53	22.60	24.00	-1.40
Mid	2460.7	20.14	15.84	1.2	5.89	23.06	24.00	-0.94
High	2473.2	19.57	15.78	0.88	5.86	22.73	24.00	-1.27

RESULTS – 64-QAM

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)
Low	2448.2	26.8	24.00
Mid	2460.7	26.8	24.00
High	2473.2	26.8	24.00

Results

Channel	Frequency (MHz)	Chain 1 Power (dB)	Chain 2 Power (dB)	Chain 3 Power (dB)	Chain 4 Power (dB)
Low	2448.2	-0.46	3.12	3.84	17.27
Mid	2460.7	-0.34	2.89	4.02	17.31
High	2473.2	-0.29	3.1	4.1	17.36

Channel	Frequency (MHz)	Chain 5 Power (dB)	Chain 6 Power (dB)	Chain 7 Power (dB)	Chain 8 Power (dB)	Total Corrected Power (dBm)	Limit	Margin
Low	2448.2	20.22	15.55	0.96	6.46	23.13	24.00	-0.87
Mid	2460.7	19.34	15.37	1.33	5.94	22.67	24.00	-1.33
High	2473.2	20.11	15.45	1.21	5.99	23.07	24.00	-0.93

9.3.3. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

RESULTS - QPSK

Duty Cycle CF (dB)	Included in Calculations of Corr'd PSD							
	Chain 1	Chain 2	Chain 3	Chain 4	Chain 5	Chain 6	Chain 7	Chain 8
	4.48	17	14.41	9.58	9.64	12.1	4.52	9.3

PSD Results

Channel	Frequency (MHz)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Chain 3 Meas (dBm)	Chain 4 Meas (dBm)
Low	2450.700	-21.54	-20.53	-19.56	-18.03
Mid	2460.700	-19.36	-19.96	-18.77	-16.89
High	2470.700	-20.36	-20.77	-18.98	-17.85

Channel	Frequency (MHz)	Chain 5 Meas (dBm)	Chain 6 Meas (dBm)	Chain 7 Meas (dBm)	Chain 8 Meas (dBm)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2450.700	-16.88	-18.37	-15.98	-18.53	1.84	8.0	-6.2
Mid	2460.700	-15.90	-17.51	-16.50	-19.00	2.52	8.0	-5.5
High	2470.700	-17.28	-19.04	-16.71	-18.89	1.73	8.0	-6.3

