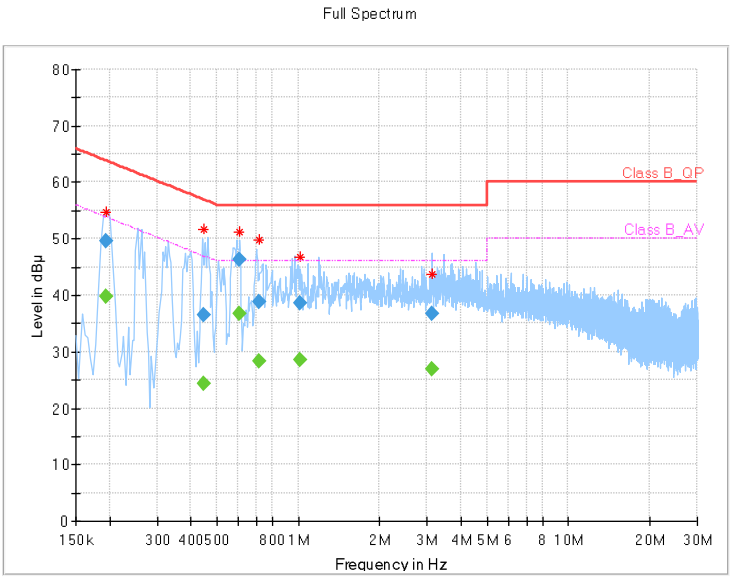
Frequency Range	150KHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	Environmental Conditions	26deg. C, 51%RH
Tested By	Carl Xie		

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.194000	---	39.78	53.86	14.08	N	ON	9.7
0.194000	49.52	---	63.86	14.34	N	ON	9.7
0.448000	---	24.25	46.91	22.66	N	ON	9.7
0.448000	36.43	---	56.91	20.48	N	ON	9.7
0.604000	---	36.81	46.00	9.19	N	ON	9.7
0.604000	46.37	---	56.00	9.63	N	ON	9.7
0.720000	---	28.36	46.00	17.64	N	ON	9.7
0.720000	38.94	---	56.00	17.06	N	ON	9.7
1.014000	---	28.50	46.00	17.50	N	ON	9.8
1.014000	38.58	---	56.00	17.42	N	ON	9.8
3.140000	---	26.92	46.00	19.08	N	ON	9.8
3.140000	36.77	---	56.00	19.23	N	ON	9.8

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value - Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



3.3 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

3.3.1 LIMITS OF MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

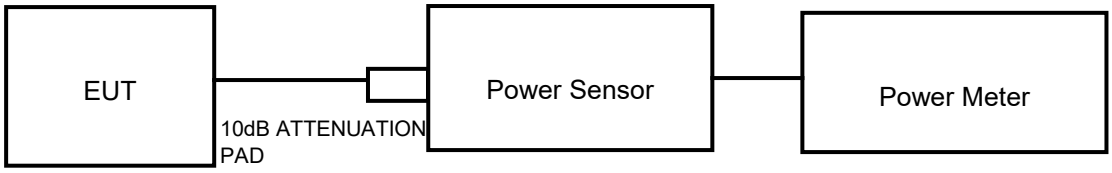
Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
	B	Indoor Access Point	1 Watt (30 dBm)
	√	Client devices	250mW (24 dBm)
U-NII-2A	√		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	√		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

NOTE: Where B is the 26dB emission bandwidth in MHz.

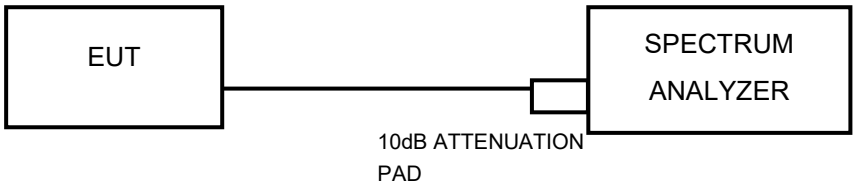
3.3.2 TEST SETUP

FOR POWER OUTPUT MEASUREMENT

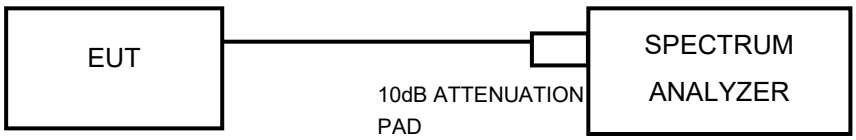
802.11a, 802.11n/ac (20MHz), 802.11 n/ac (40MHz) TEST CONFIGURATION



11ac TEST CONFIGURATION



FOR 26dB BANDWIDTH



3.3.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Meter	ANRITSU	ML2495A	1506002	Feb. 22,22	Feb. 21,23
EXA Signal Analyzer	KEYSIGHT	N9010A-526	MY54510322	Feb. 18,22	Feb. 17,23
EXA Signal Analyzer	KEYSIGHT	N9010A-544	MY54510355	May.15,22	May.14,23
Power Sensor	ANRITSU	MA2411B	1339352	May. 06,22	May. 05,23

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.

3.3.4 TEST PROCEDURE

FOR POWER MEASUREMENT

For 802.11a, 802.11 n/ac (20MHz), 802.11 n/ac (40MHz)

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

For 802.11ac (80MHz)

1. Measure the duty cycle, x, of the transmitter output signal as described in II.B.
2. Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
3. Set RBW = 1 MHz.
4. Set VBW ≥ 3 MHz.
5. 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.)
6. Sweep time = auto.
7. Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
8. Do not use sweep triggering. Allow the sweep to “free run.”
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
10. Add 10 log (1/x), where x is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10 log (1/0.25) = 6 dB if the duty cycle is 25%.

FOR 99 PERCENT OCCUPIED BANDWIDTH

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.

FOR 26dB BANDWIDTH

1) Set RBW = approximately 1% of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Measure the maximum width of the emission that is 26 dB down from the peak 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%.

FOR 6dB BANDWIDTH

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 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.

3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

3.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

3.3.7 TEST RESULTS

Please Refer to Appendix A/B Of this test report.

3.4 MAXIMUM POWER SPECTRAL DENSITY MEASUREMENT

3.4.1 LIMITS OF MAXIMUM POWER SPECTRAL DENSITY MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Client devices	11dBm/ MHz
U-NII-2A	√		11dBm/ MHz
U-NII-2C	√		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

3.4.2 TEST SETUP

3.4.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.4.4 TEST PROCEDURES

Using method SA-2

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
3) Set Channel power measure = 1MHz
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission).
7) Record the max value

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

3.4.6 EUT OPERATING CONDITIONS

Same as 3.1.7.

3.4.7 TEST RESULTS

Please Refer to Appendix A/B Of this test report.

3.5 AUTOMATICALLY DISCONTINUE TRANSMISSION

3.5.1 LIMIT OF AUTOMATICALLY DISCONTINUE TRANSMISSION

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

3.5.2 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.5.3 TEST RESULT

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving。 The EUT can detect the controlling of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

6 APPENDIX A

RLAN

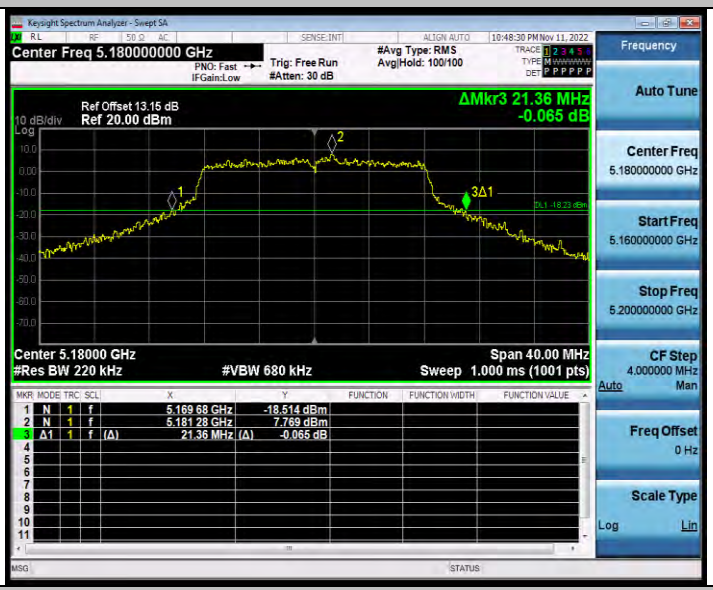
EMISSION BANDWIDTH

TEST RESULT

TestMode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	21.360	5169.680	5191.040	---	---
		5200	22.000	5188.960	5210.960	---	---
		5240	21.200	5229.520	5250.720	---	---
		5260	20.960	5249.520	5270.480	---	---
		5300	21.600	5289.520	5311.120	---	---
		5320	22.200	5308.600	5330.800	---	---
		5500	21.960	5488.840	5510.800	---	---
		5580	21.760	5569.360	5591.120	---	---
		5700	21.400	5689.760	5711.160	---	---
		5745	21.600	5733.880	5755.480	---	---
		5785	21.880	5774.160	5796.040	---	---
		5825	20.920	5814.800	5835.720	---	---
11N20SISO	Ant1	5180	21.960	5168.800	5190.760	---	---
		5200	23.120	5188.640	5211.760	---	---
		5240	22.800	5228.440	5251.240	---	---
		5260	21.760	5249.160	5270.920	---	---
		5300	21.840	5289.000	5310.840	---	---
		5320	22.440	5308.680	5331.120	---	---
		5500	21.760	5489.000	5510.760	---	---
		5580	21.720	5569.120	5590.840	---	---
		5700	21.840	5688.920	5710.760	---	---
		5745	21.200	5734.360	5755.560	---	---
		5785	21.760	5773.960	5795.720	---	---
		5825	21.880	5813.840	5835.720	---	---
11N40SISO	Ant1	5190	40.400	5169.840	5210.240	---	---
		5230	40.800	5209.760	5250.560	---	---
		5270	40.560	5249.680	5290.240	---	---
		5310	40.400	5289.920	5330.320	---	---

		5510	40.560	5490.080	5530.640	---	---
		5550	40.400	5530.080	5570.480	---	---
		5670	40.480	5649.920	5690.400	---	---
		5755	40.320	5734.840	5775.160	---	---
		5795	40.560	5774.920	5815.480	---	---
11AC20SISO	Ant1	5180	21.320	5169.200	5190.520	---	---
		5200	22.720	5188.520	5211.240	---	---
		5240	22.320	5228.920	5251.240	---	---
		5260	21.520	5249.320	5270.840	---	---
		5300	22.960	5288.840	5311.800	---	---
		5320	22.320	5308.760	5331.080	---	---
		5500	22.160	5488.880	5511.040	---	---
		5580	21.880	5569.000	5590.880	---	---
		5700	22.000	5688.920	5710.920	---	---
		5745	22.720	5733.640	5756.360	---	---
		5785	21.960	5773.840	5795.800	---	---
		5825	21.600	5814.520	5836.120	---	---
11AC40SISO	Ant1	5190	40.800	5169.520	5210.320	---	---
		5230	40.480	5210.000	5250.480	---	---
		5270	40.480	5250.000	5290.480	---	---
		5310	40.800	5289.600	5330.400	---	---
		5510	40.480	5490.080	5530.560	---	---
		5550	40.160	5530.080	5570.240	---	---
		5670	40.400	5649.920	5690.320	---	---
		5755	40.640	5734.920	5775.560	---	---
		5795	40.960	5774.600	5815.560	---	---
11AC80SISO	Ant1	5210	80.320	5170.000	5250.320	---	---
		5290	80.800	5249.680	5330.480	---	---
		5530	80.960	5489.520	5570.480	---	---
		5610	80.000	5570.000	5650.000	---	---
		5775	80.480	5734.840	5815.320	---	---

TEST GRAPHS

11A_Ant1_5180

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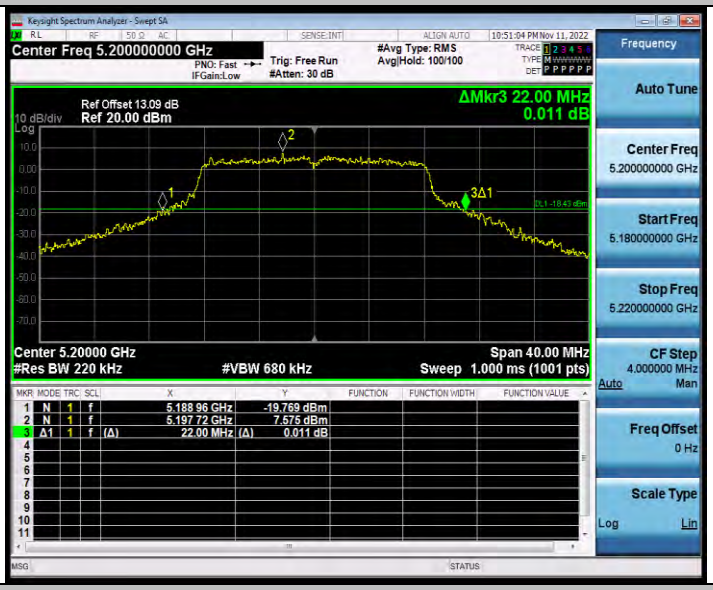
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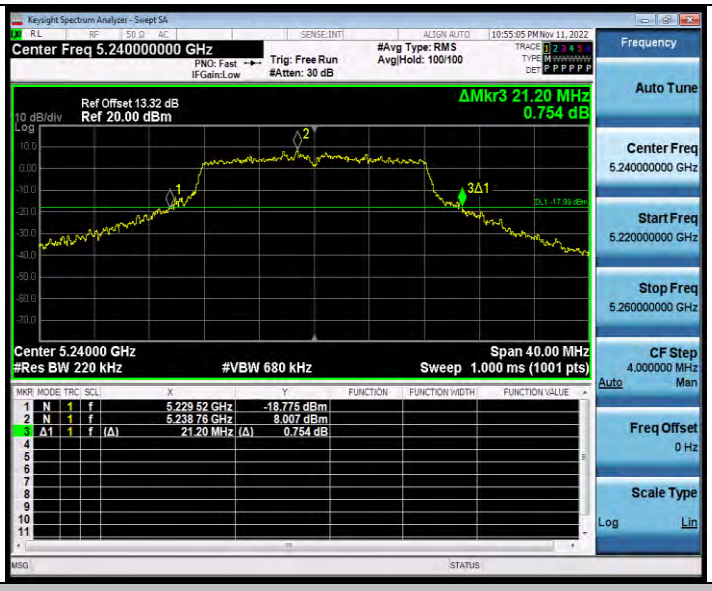

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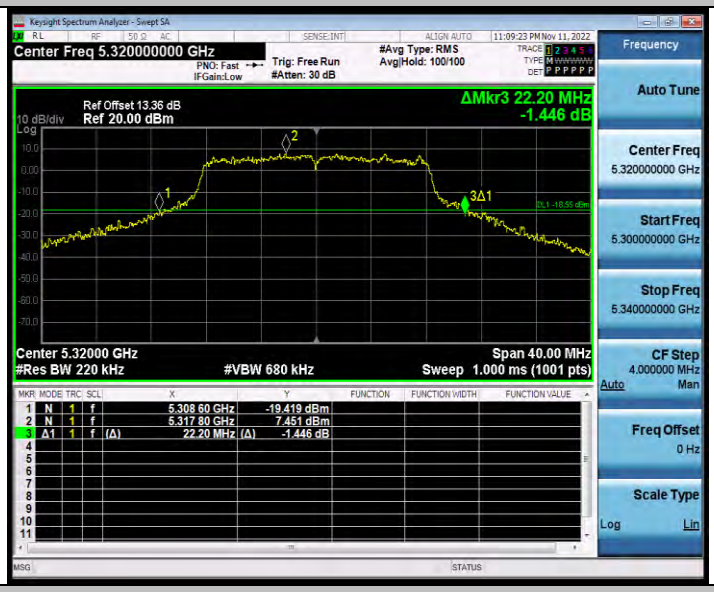
11A_Ant1_5300

11A_Ant1_5320



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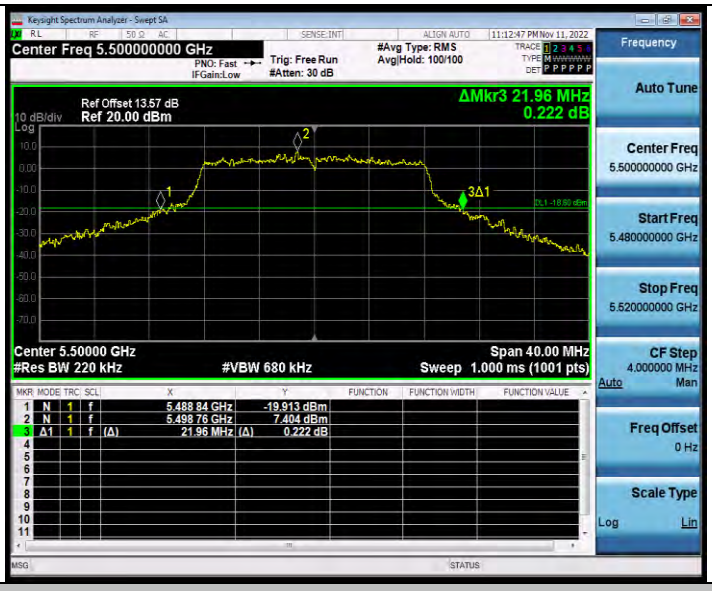

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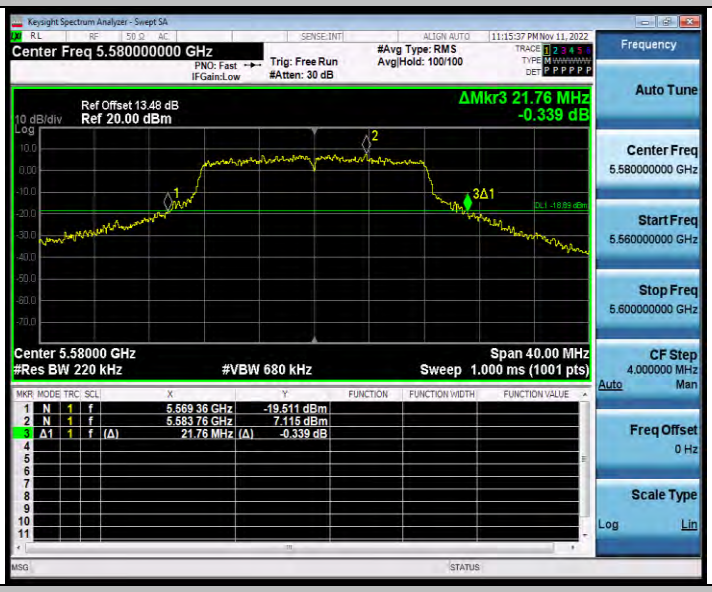

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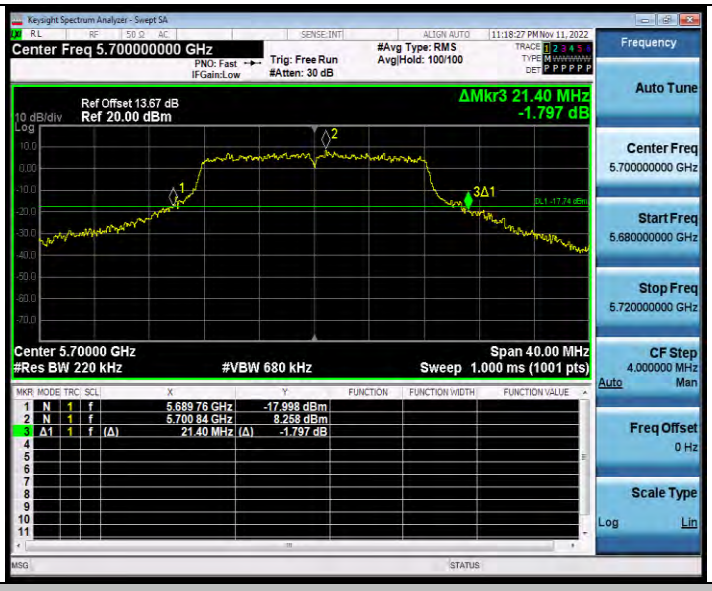

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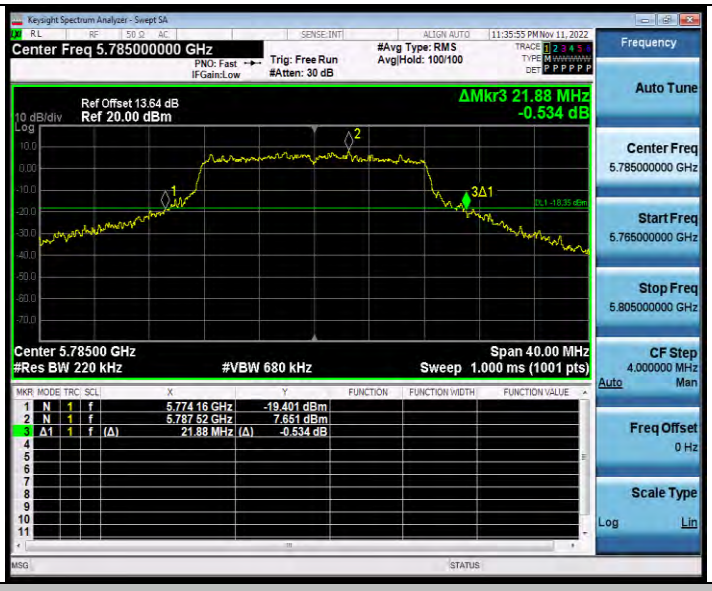

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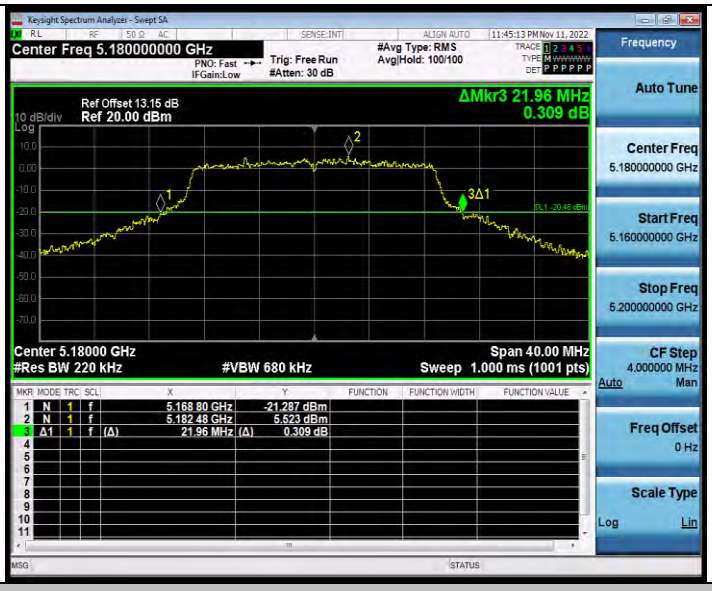

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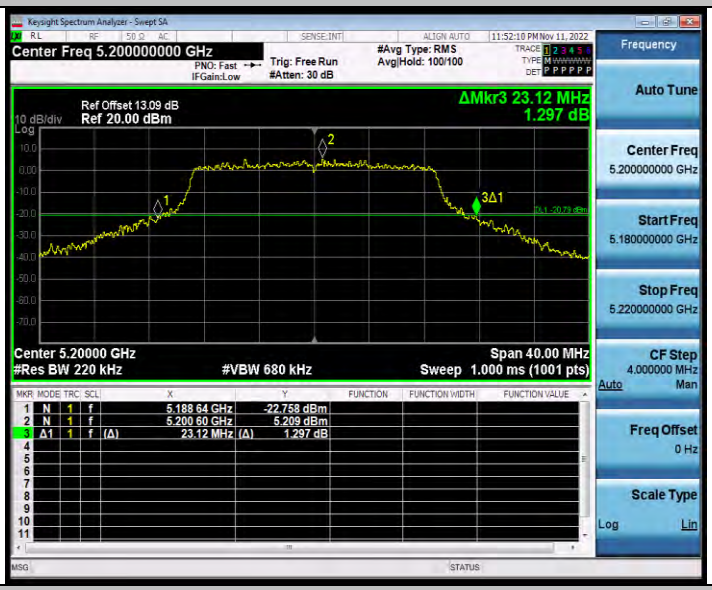

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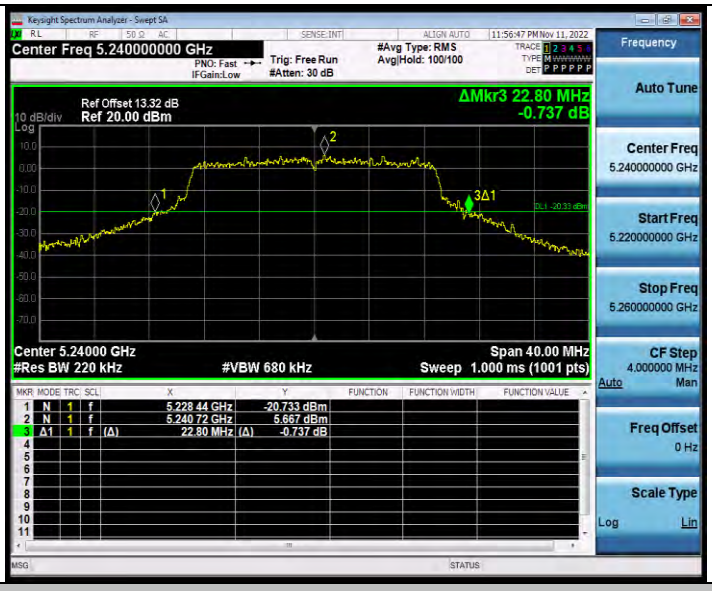

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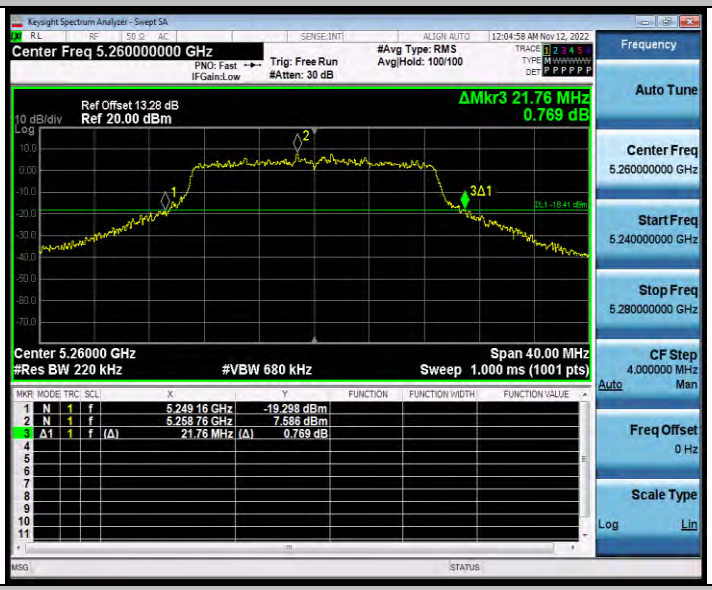

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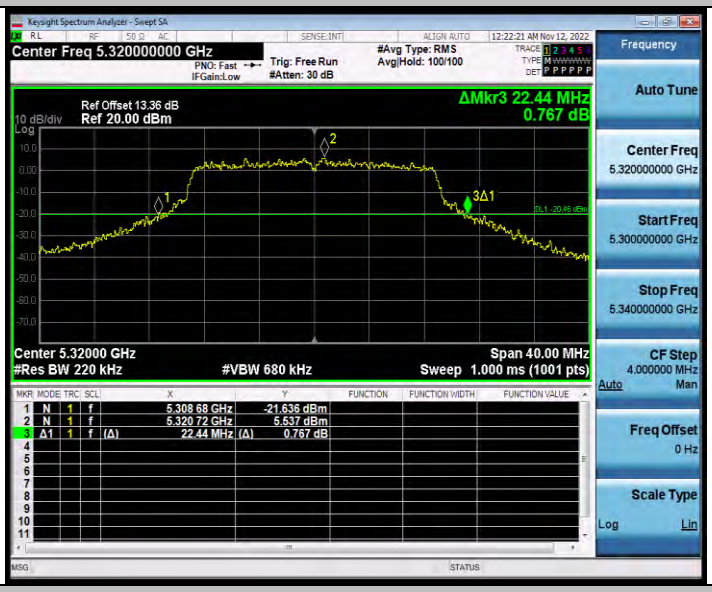
11N20SISO_Ant1_5320



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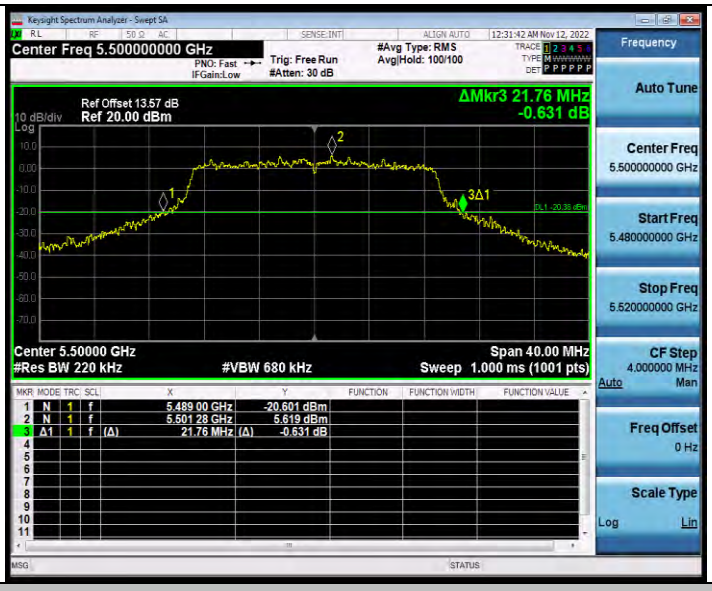

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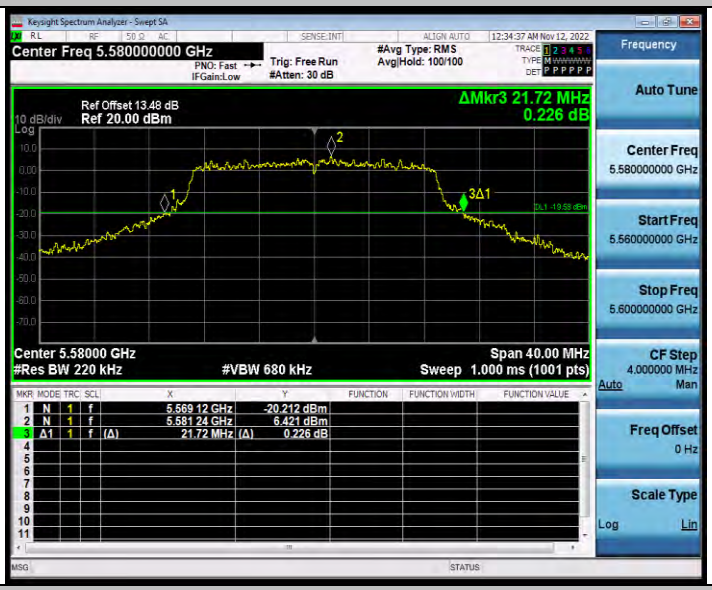

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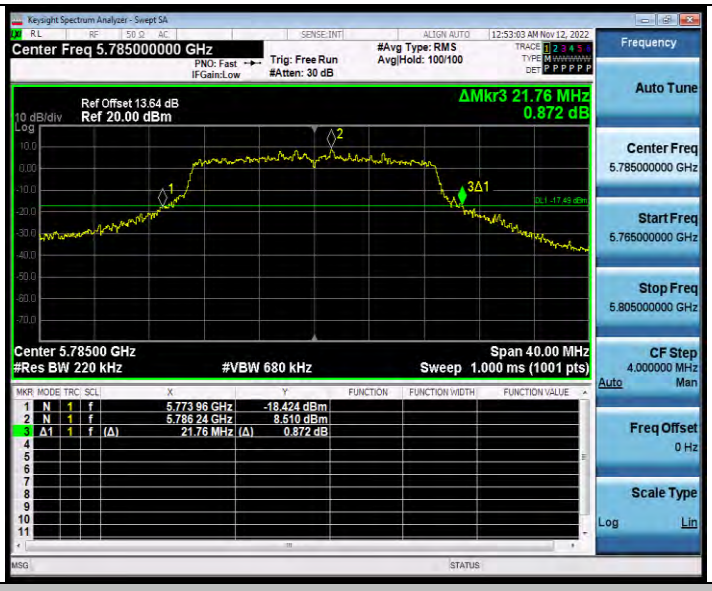

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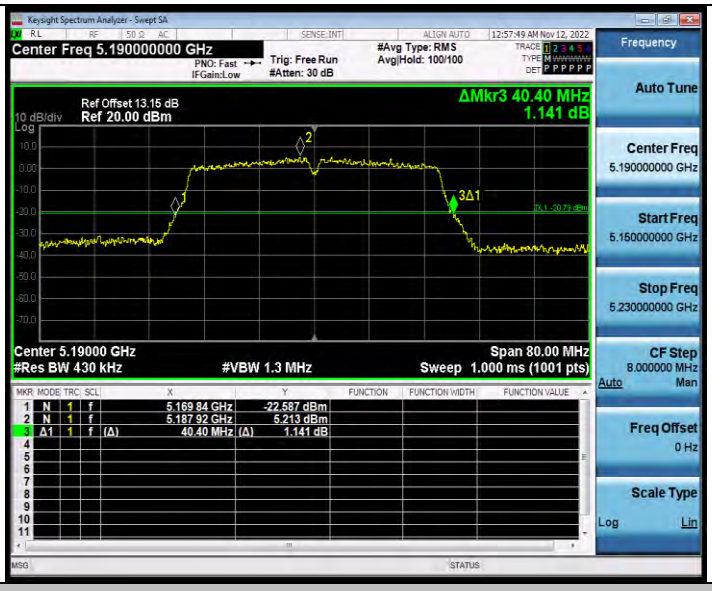

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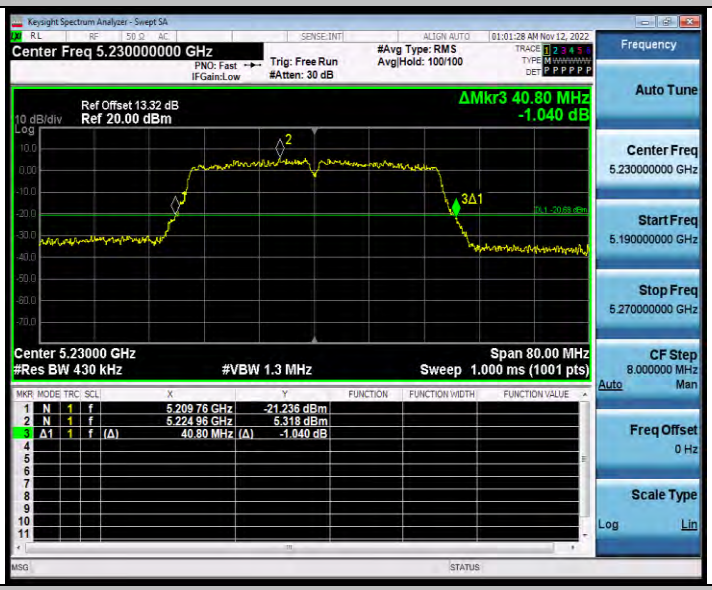

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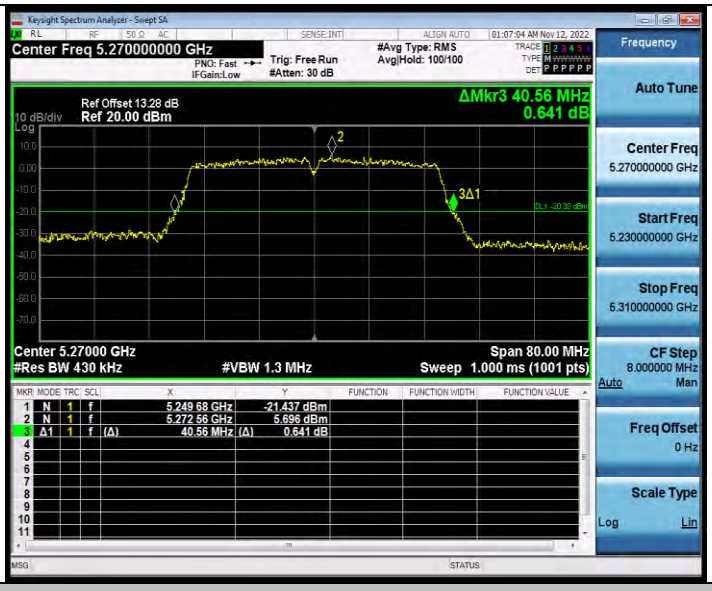

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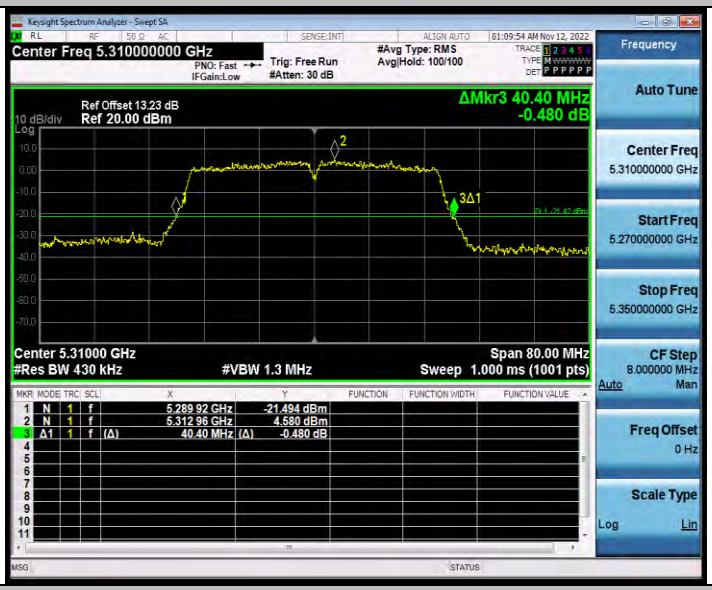

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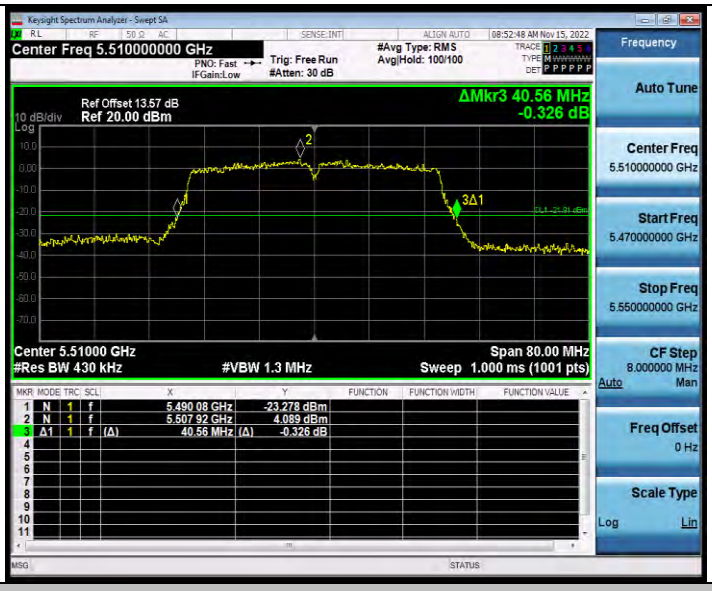

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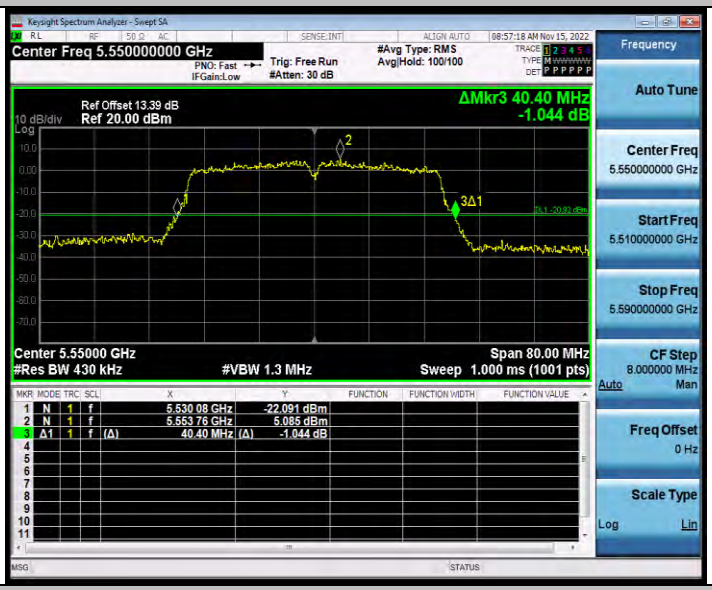
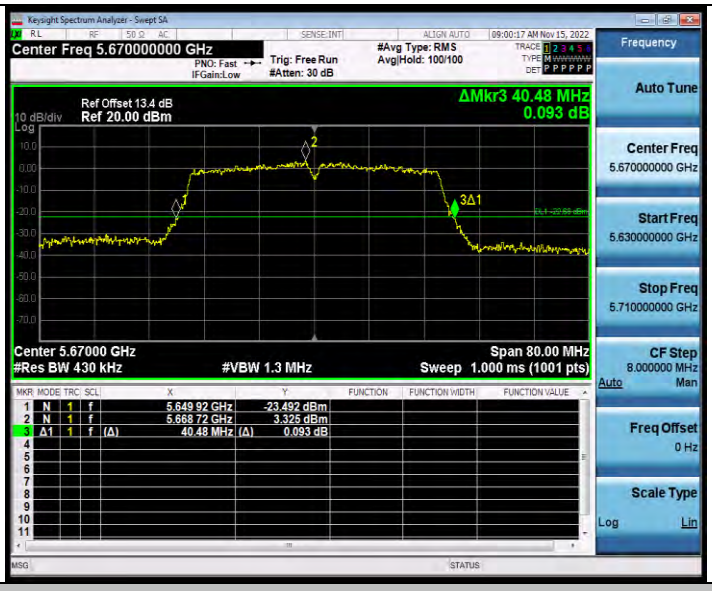
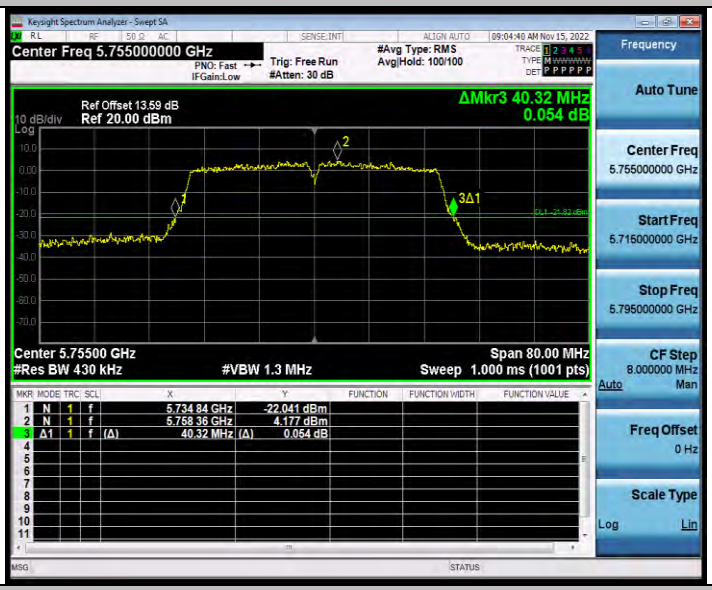


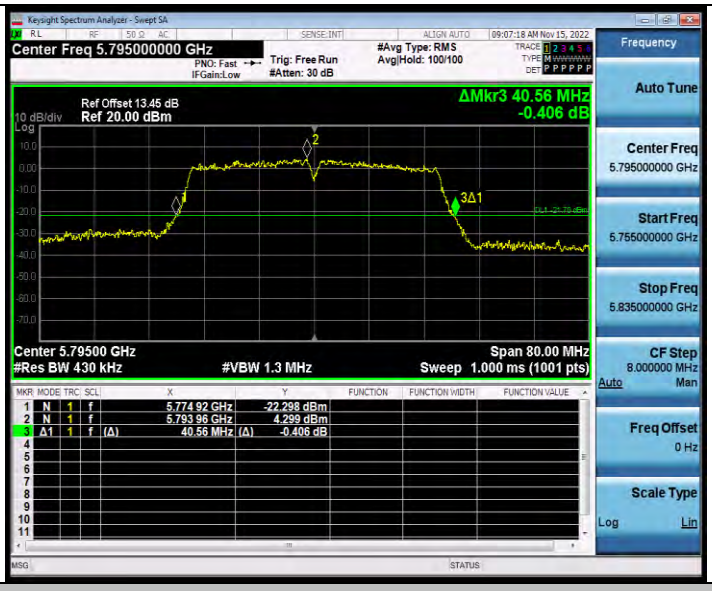
11N40SISO_Ant1_5670



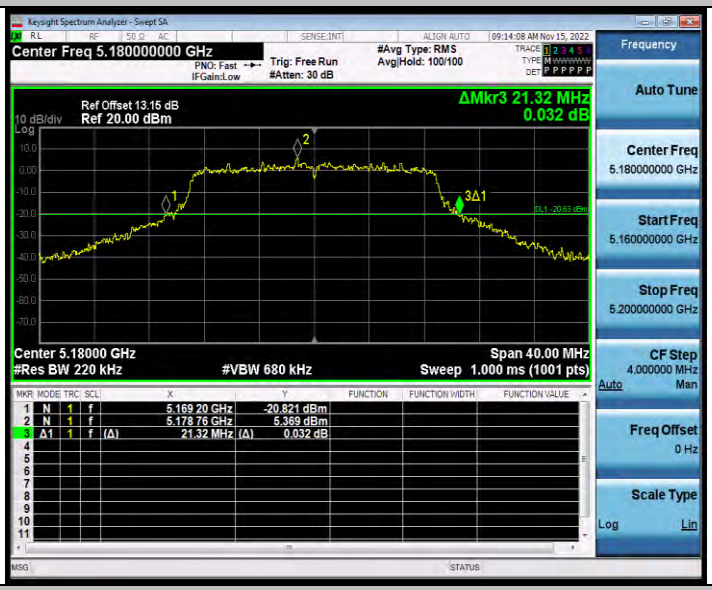
11N40SISO_Ant1_5755



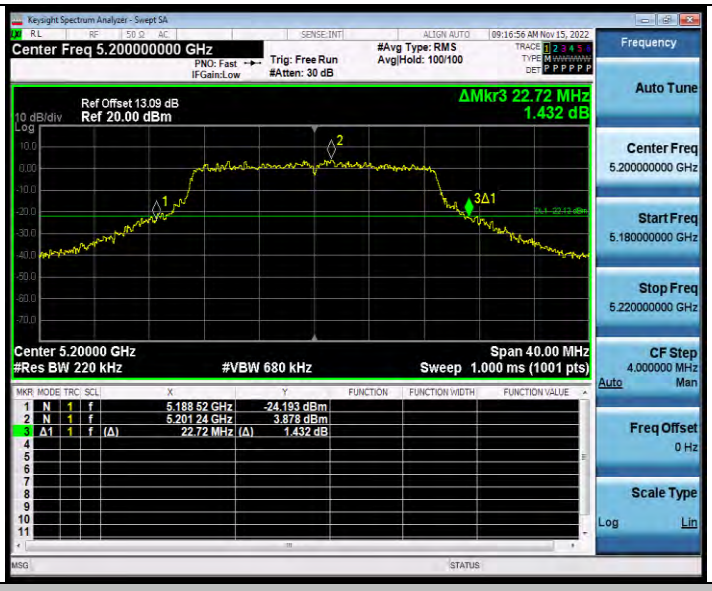
11N40SISO_Ant1_5795



11AC20SISO_Ant1_5180

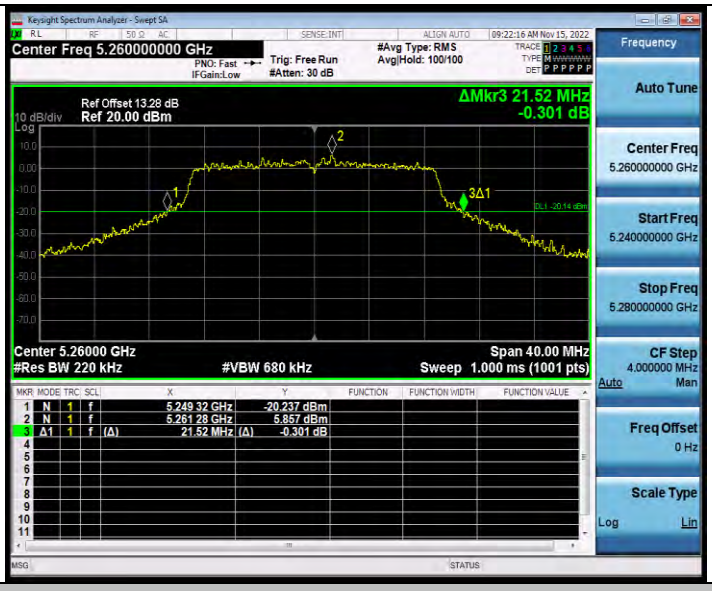


11AC20SISO_Ant1_5200

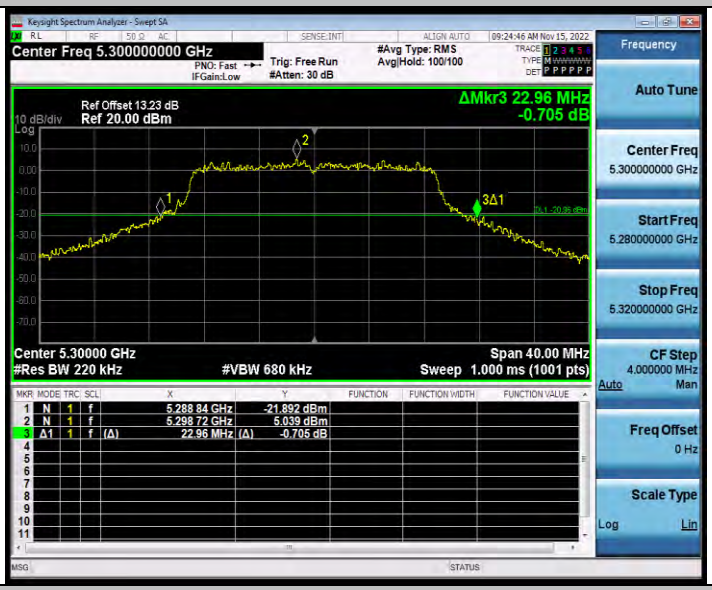


11AC20SISO_Ant1_5240

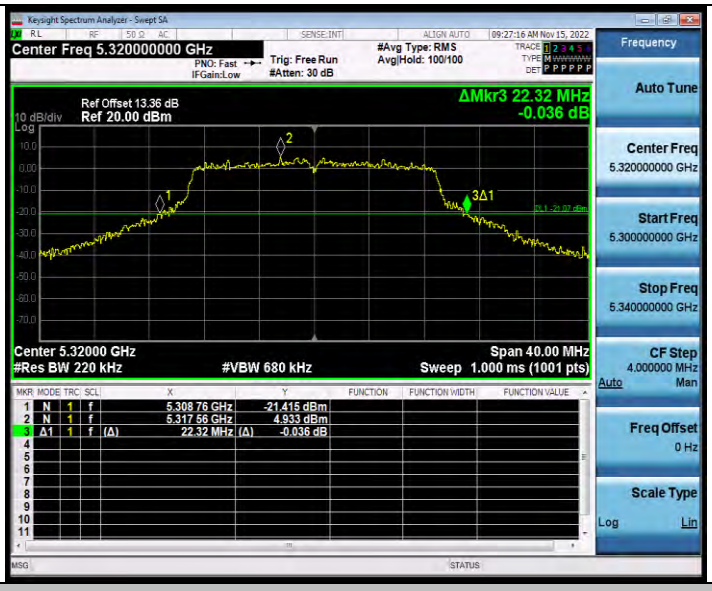
11AC20SISO_Ant1_5260



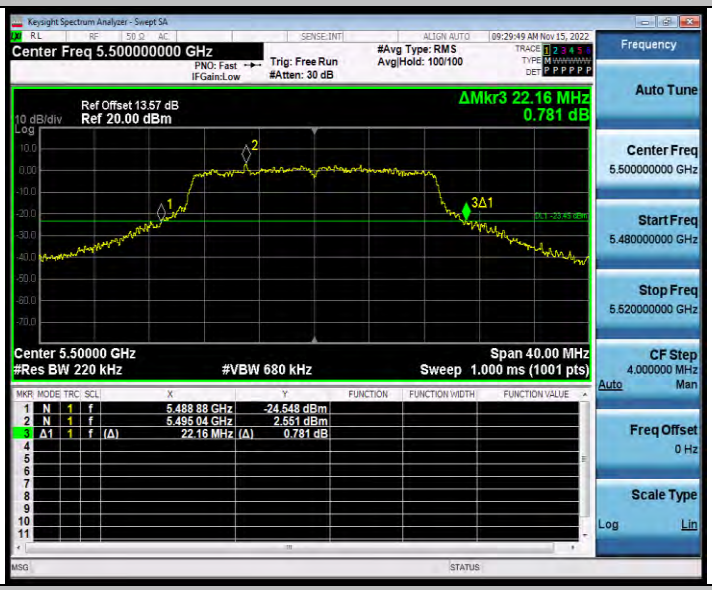
11AC20SISO_Ant1_5300



11AC20SISO_Ant1_5320

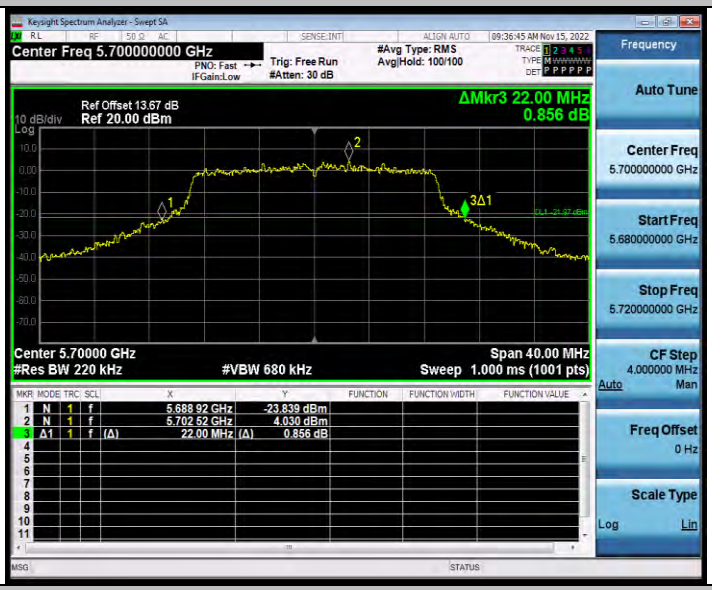


11AC20SISO_Ant1_5500



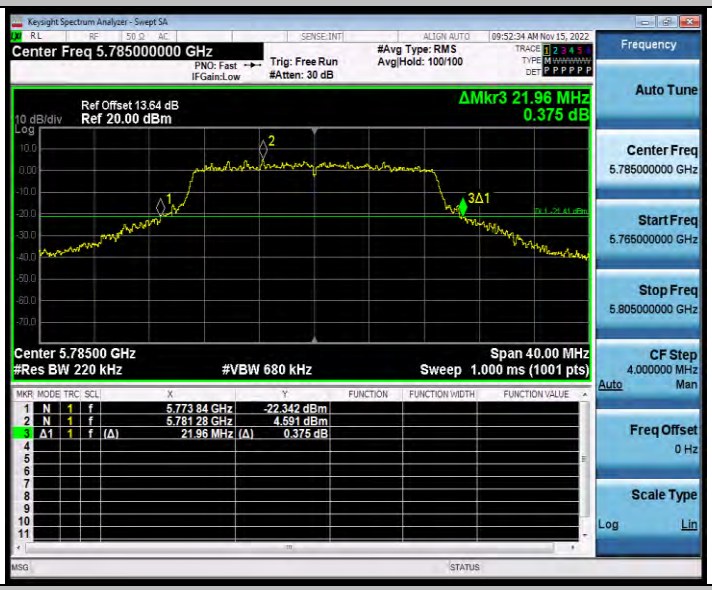
11AC20SISO_Ant1_5580

11AC20SISO_Ant1_5700

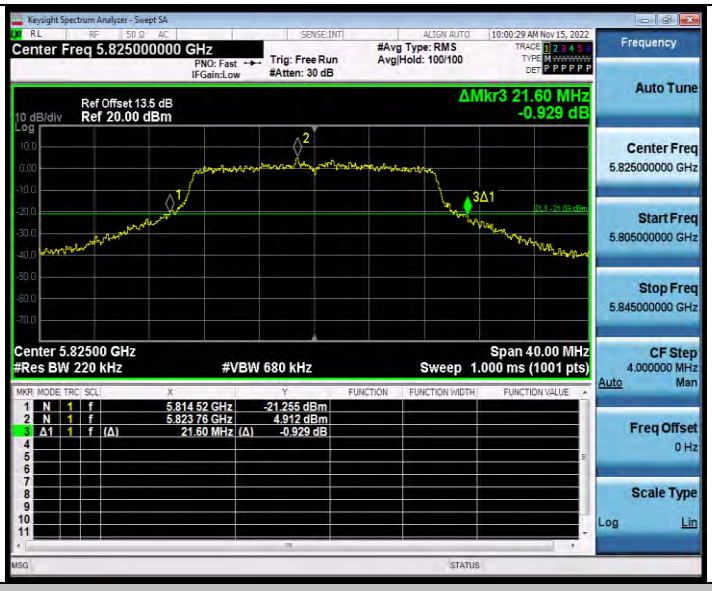


11AC20SISO_Ant1_5745

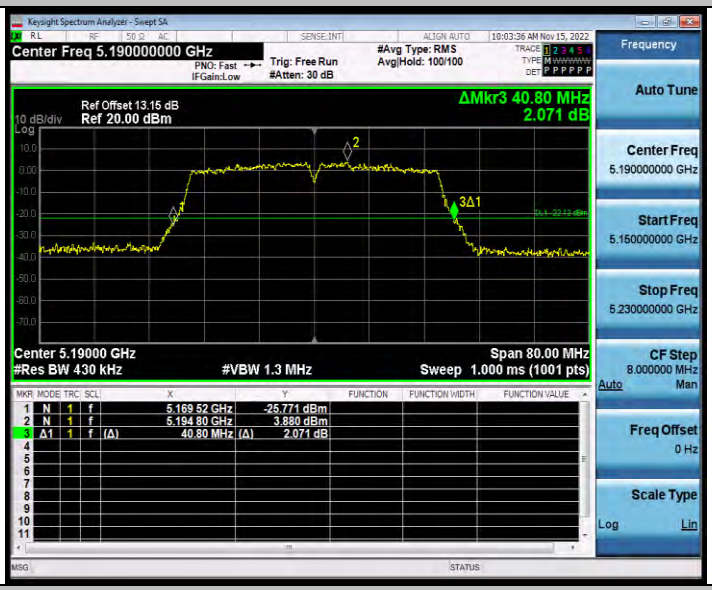
11AC20SISO_Ant1_5785



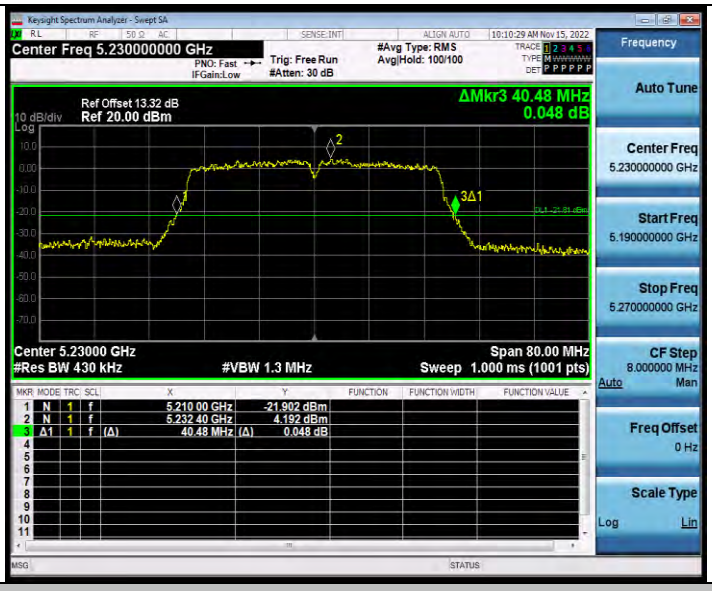
11AC20SISO_Ant1_5825



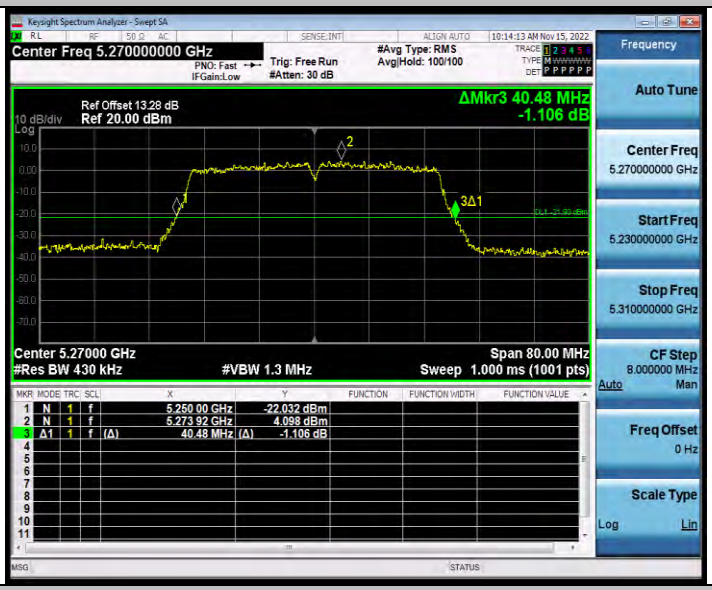
11AC40SISO_Ant1_5190



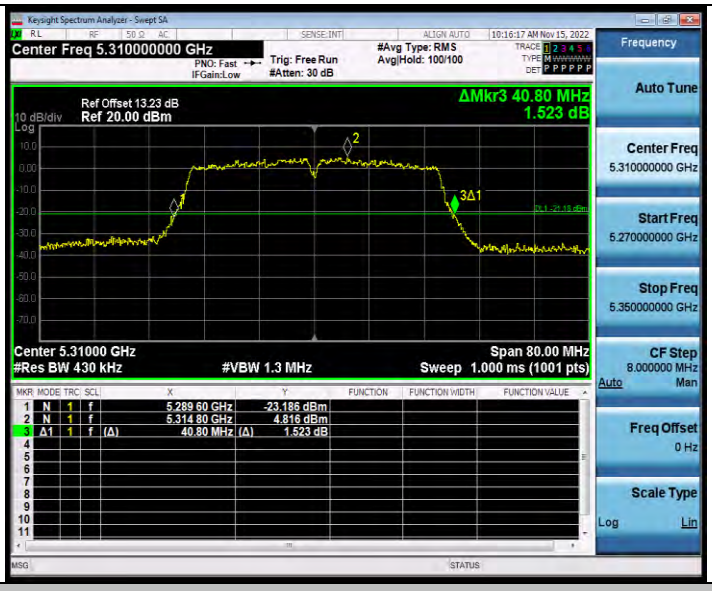
11AC40SISO_Ant1_5230



11AC40SISO_Ant1_5270

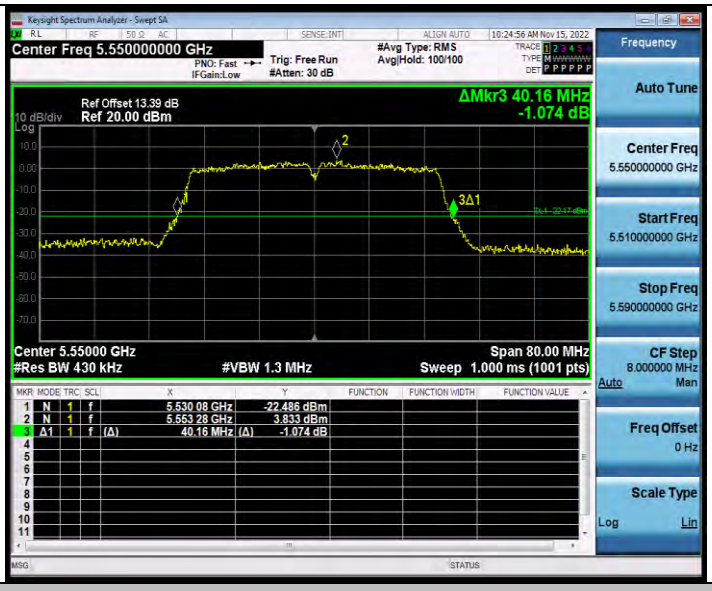


11AC40SISO_Ant1_5310

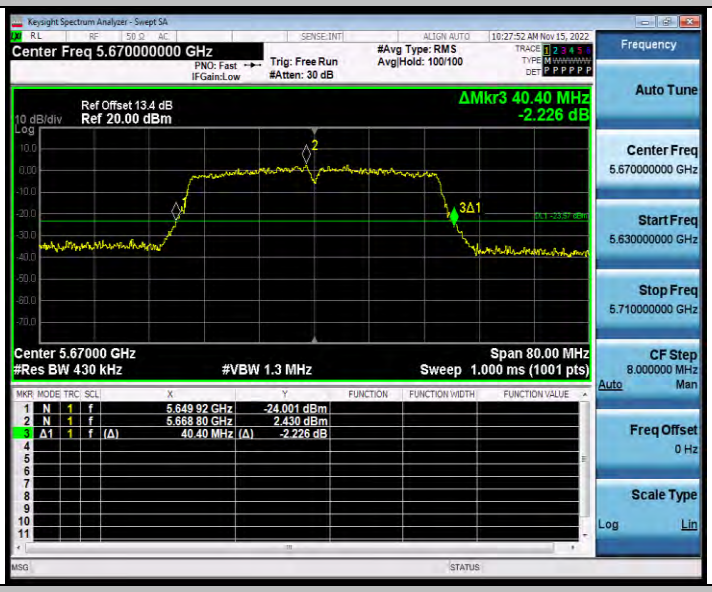


11AC40SISO_Ant1_5510

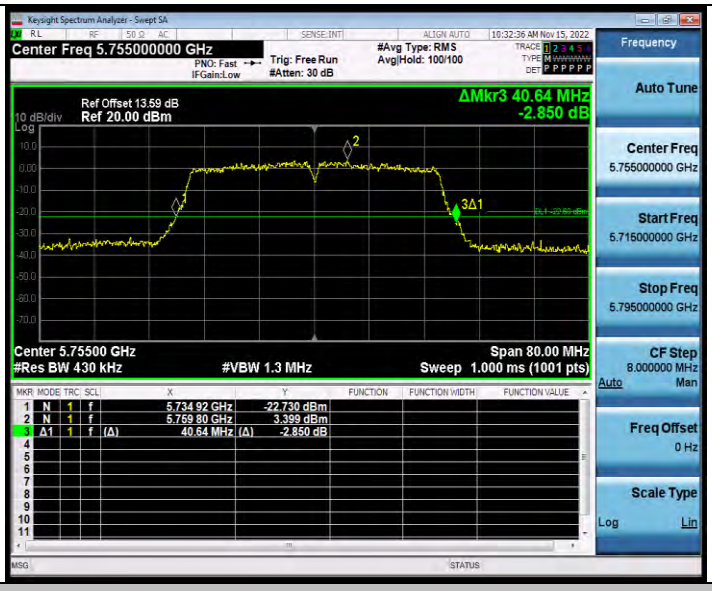
11AC40SISO_Ant1_5550



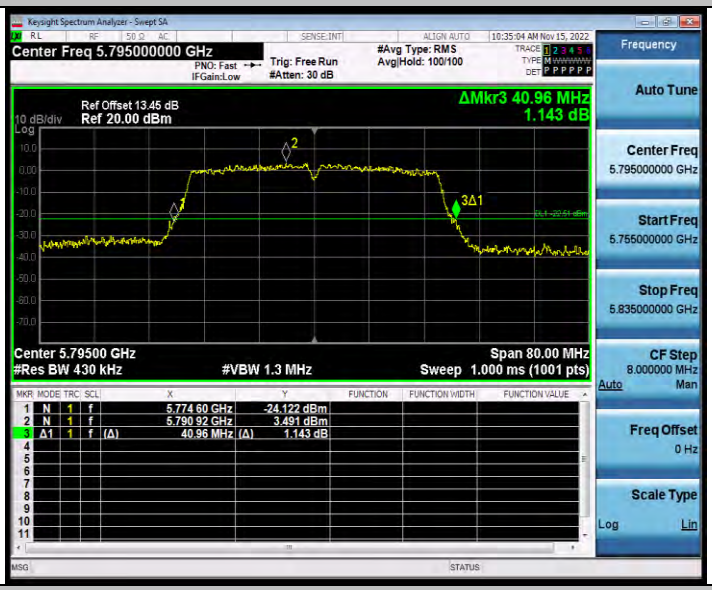
11AC40SISO_Ant1_5670



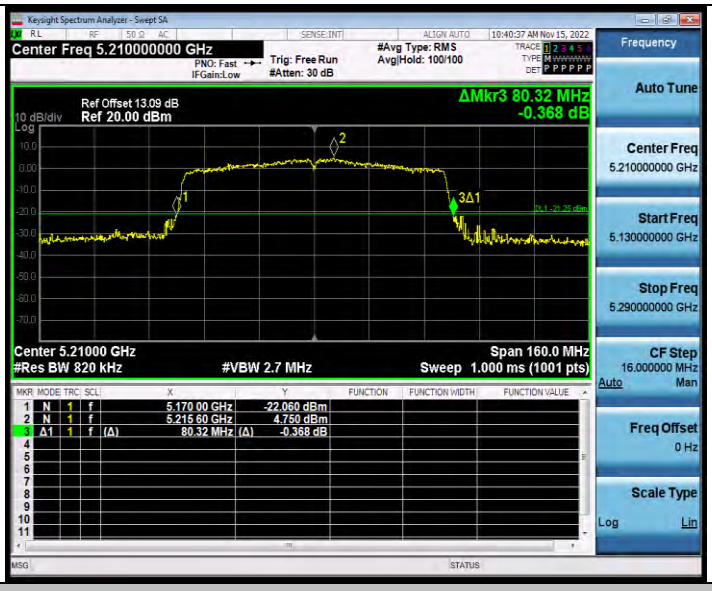
11AC40SISO_Ant1_5755



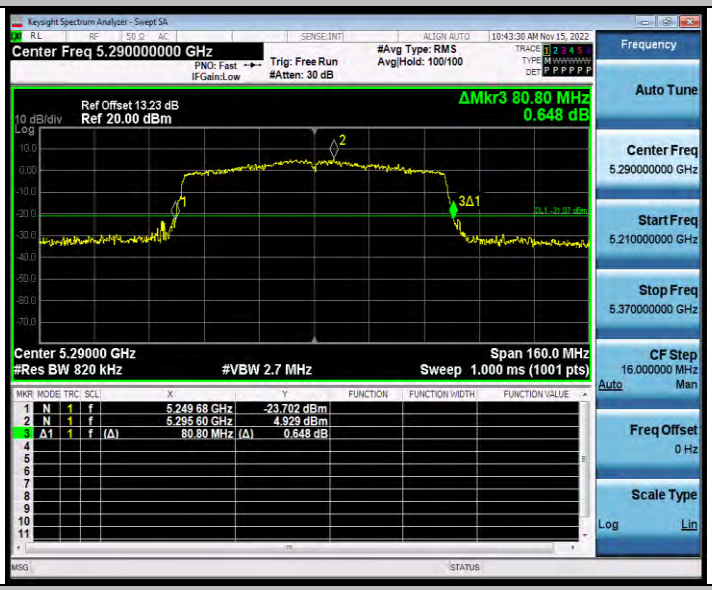
11AC40SISO_Ant1_5795



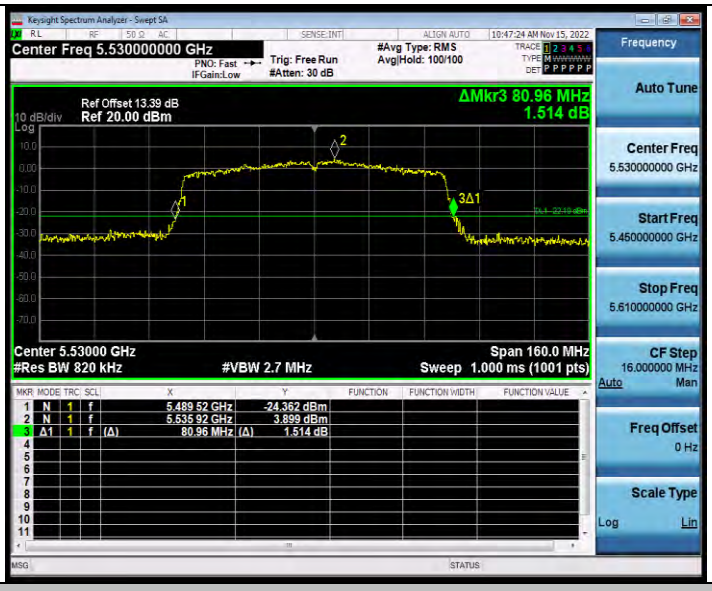
11AC80SISO_Ant1_5210



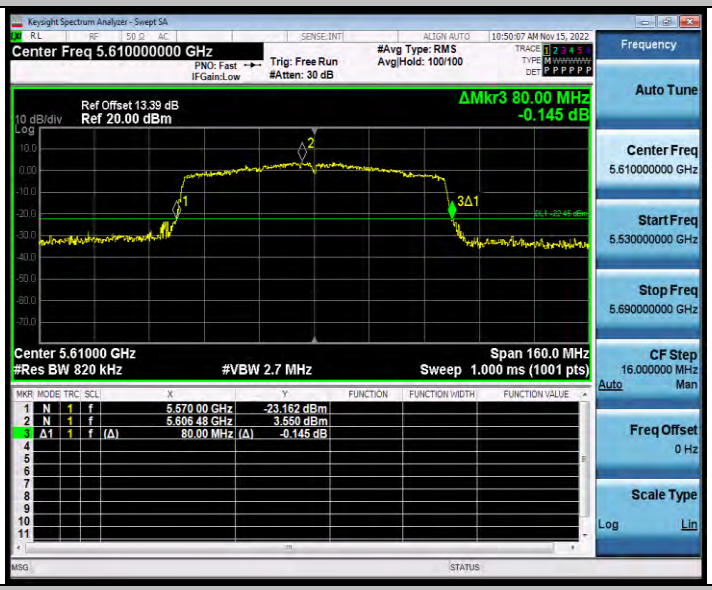
11AC80SISO_Ant1_5290



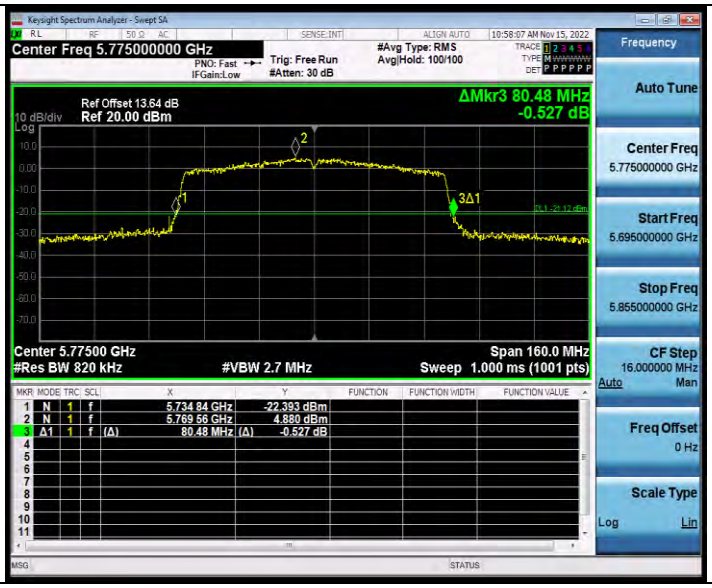
11AC80SISO_Ant1_5530



11AC80SISO_Ant1_5610



11AC80SISO_Ant1_5775


Keysight Spectrum Analyzer - Swept SA
Center Freq 5.775000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
10:58:07 AM Nov 15, 2022
Ref Offset 13.64 dB
10 dB/div
Ref 20.00 dBm
ΔMkr3 80.48 MHz
-0.527 dB
Center 5.77500 GHz
#Res BW 820 kHz
#VBW 2.7 MHz
Span 160.0 MHz
Sweep 1.000 ms (1001 pts)
1 N 1 f 5.734 84 GHz -22.393 dBm
2 N 1 f 5.769 56 GHz 4.880 dBm
3 Δ1 1 f (Δ) 80.48 MHz (Δ) -0.527 dB
Frequency
Auto Tune
Center Freq
5.775000000 GHz
Start Freq
5.695000000 GHz
Stop Freq
5.855000000 GHz
CF Step
16.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

OCCUPIED CHANNEL BANDWIDTH

TEST RESULT

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	16.794	5171.6332	5188.4272	---	---
		5200	16.823	5191.5944	5208.4174	---	---
		5240	16.818	5231.5936	5248.4116	---	---
		5260	16.845	5251.5505	5268.3955	---	---
		5300	16.845	5291.5660	5308.4110	---	---
		5320	16.768	5311.5937	5328.3617	---	---
		5500	16.845	5491.5525	5508.3975	---	---
		5580	16.799	5571.6091	5588.4081	---	---
		5700	16.809	5691.5874	5708.3964	---	---
		5745	16.802	5736.6108	5753.4128	---	---
		5785	16.791	5776.5739	5793.3649	---	---
		5825	16.804	5816.5732	5833.3772	---	---
11N20SISO	Ant1	5180	17.937	5171.0784	5189.0154	---	---
		5200	18.012	5191.0335	5209.0455	---	---
		5240	18.013	5231.0349	5249.0479	---	---
		5260	17.976	5251.0211	5268.9971	---	---
		5300	18.009	5291.0103	5309.0193	---	---
		5320	17.903	5311.0471	5328.9501	---	---
		5500	17.983	5491.0037	5508.9867	---	---
		5580	17.923	5571.0679	5588.9909	---	---
		5700	17.970	5691.0375	5709.0075	---	---
		5745	17.946	5736.0437	5753.9897	---	---
		5785	17.934	5776.0256	5793.9596	---	---
		5825	17.961	5816.0061	5833.9671	---	---
11N40SISO	Ant1	5190	36.192	5171.9925	5208.1845	---	---
		5230	36.201	5211.9938	5248.1948	---	---
		5270	36.306	5251.9096	5288.2156	---	---
		5310	36.225	5291.9304	5328.1554	---	---
		5510	36.253	5491.9811	5528.2341	---	---
		5550	36.224	5531.9661	5568.1901	---	---
		5670	36.156	5652.0122	5688.1682	---	---

		5755	36.272	5736.9082	5773.1802	---	---
		5795	36.226	5776.8933	5813.1193	---	---
11AC20SISO	Ant1	5180	17.932	5171.0706	5189.0026	---	---
		5200	17.983	5191.0350	5209.0180	---	---
		5240	18.020	5231.0524	5249.0724	---	---
		5260	18.005	5251.0419	5269.0469	---	---
		5300	17.972	5291.0490	5309.0210	---	---
		5320	17.988	5311.0375	5329.0255	---	---
		5500	17.977	5491.0721	5509.0491	---	---
		5580	17.981	5571.0434	5589.0244	---	---
		5700	17.964	5691.0812	5709.0452	---	---
		5745	17.979	5736.0279	5754.0069	---	---
		5785	17.961	5776.0238	5793.9848	---	---
		5825	17.969	5816.0479	5834.0169	---	---
11AC40SISO	Ant1	5190	36.168	5171.9806	5208.1486	---	---
		5230	36.228	5211.9571	5248.1851	---	---
		5270	36.231	5251.9533	5288.1843	---	---
		5310	36.171	5291.9707	5328.1417	---	---
		5510	36.187	5491.9940	5528.1810	---	---
		5550	36.189	5531.9516	5568.1406	---	---
		5670	36.198	5651.9847	5688.1827	---	---
		5755	36.181	5736.9481	5773.1291	---	---
		5795	36.166	5776.9171	5813.0831	---	---
11AC80SISO	Ant1	5210	74.855	5172.7355	5247.5905	---	---
		5290	74.799	5252.6803	5327.4793	---	---
		5530	74.748	5492.7479	5567.4959	---	---
		5610	74.526	5572.6688	5647.1948	---	---
		5775	74.702	5737.6043	5812.3063	---	---

TEST GRAPHS

11A_Ant1_5180

11A_Ant1_5200

11A_Ant1_5240

11A_Ant1_5260

11A_Ant1_5300

11A_Ant1_5320

11A_Ant1_5500

11A_Ant1_5580

11A_Ant1_5700

11A_Ant1_5745

11A_Ant1_5785

11A_Ant1_5825

11N20SISO_Ant1_5180

11N20SISO_Ant1_5200

11N20SISO_Ant1_5240

11N20SISO_Ant1_5260

11N20SISO_Ant1_5300

11N20SISO_Ant1_5320

11N20SISO_Ant1_5500

11N20SISO_Ant1_5580

11N20SISO_Ant1_5700

11N20SISO_Ant1_5745

11N20SISO_Ant1_5785