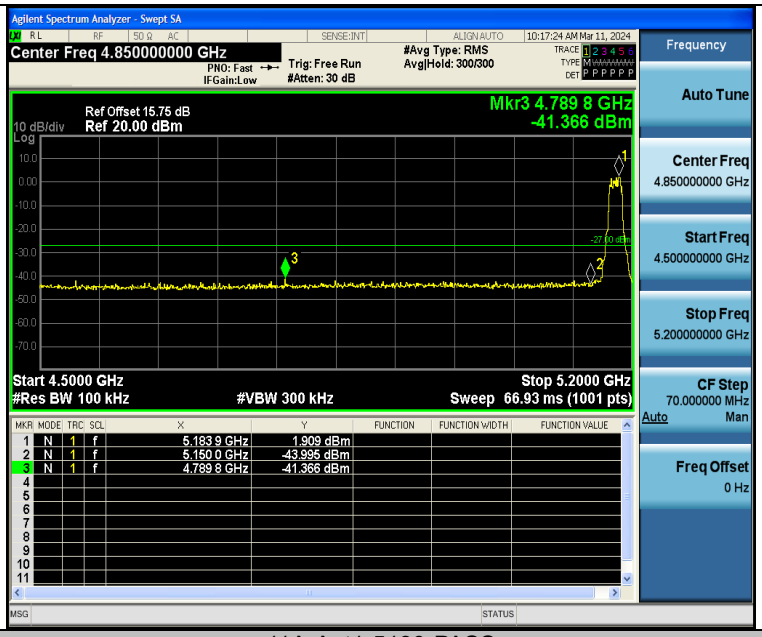
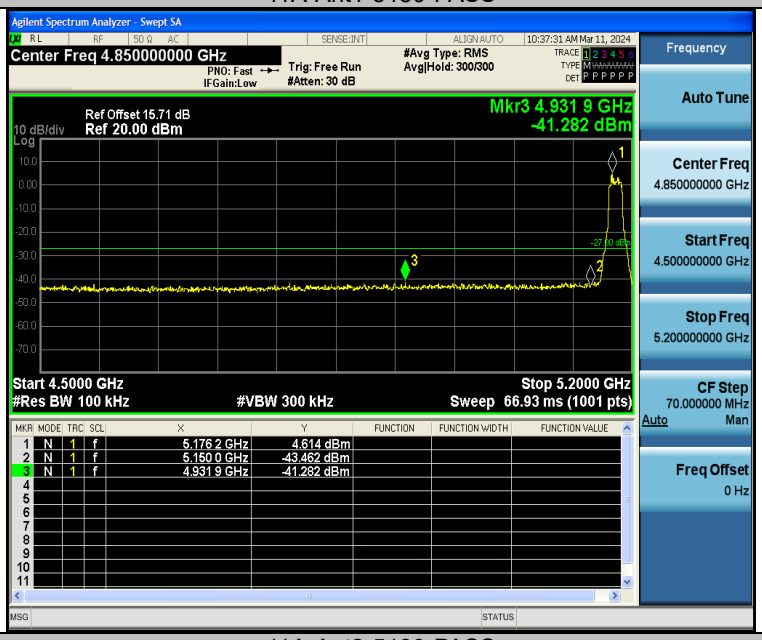
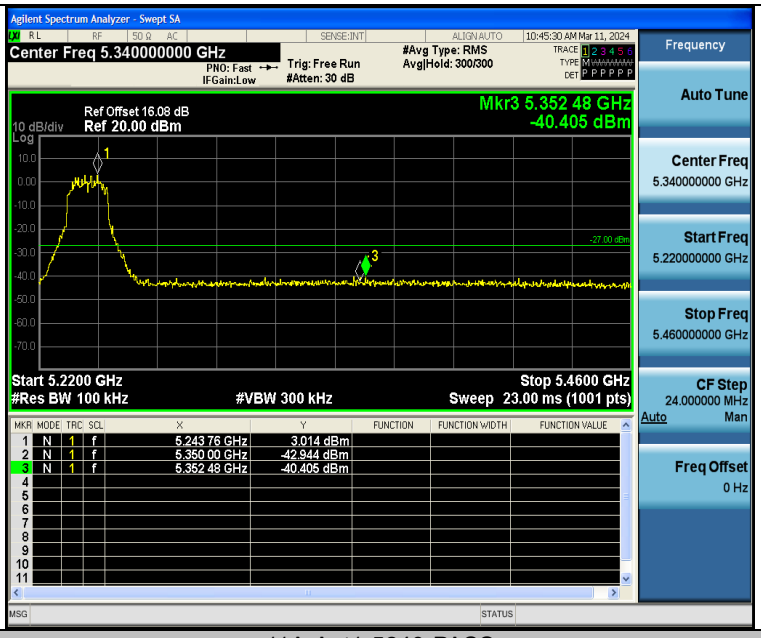
Test Graphs:



11A-Ant1-5180-PASS



11A-Ant2-5180-PASS



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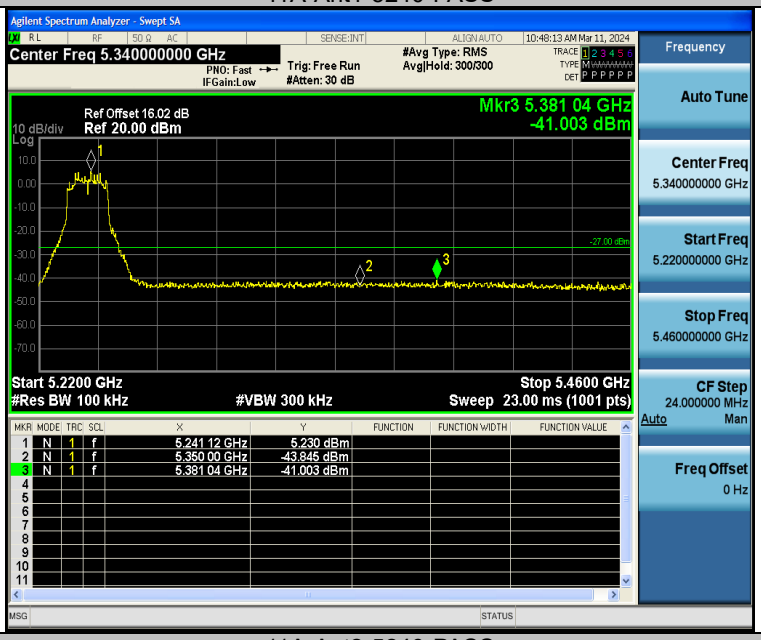

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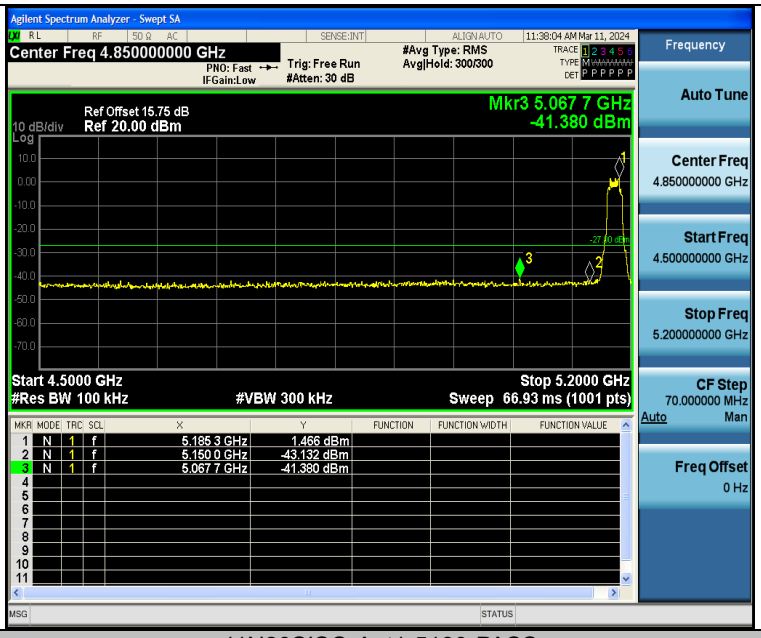
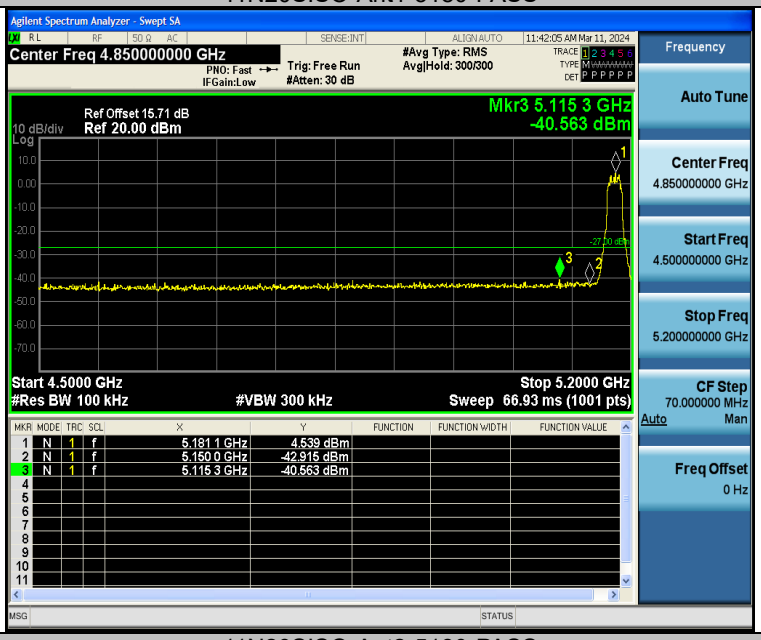


11N20SISO-Ant1-5180-PASS



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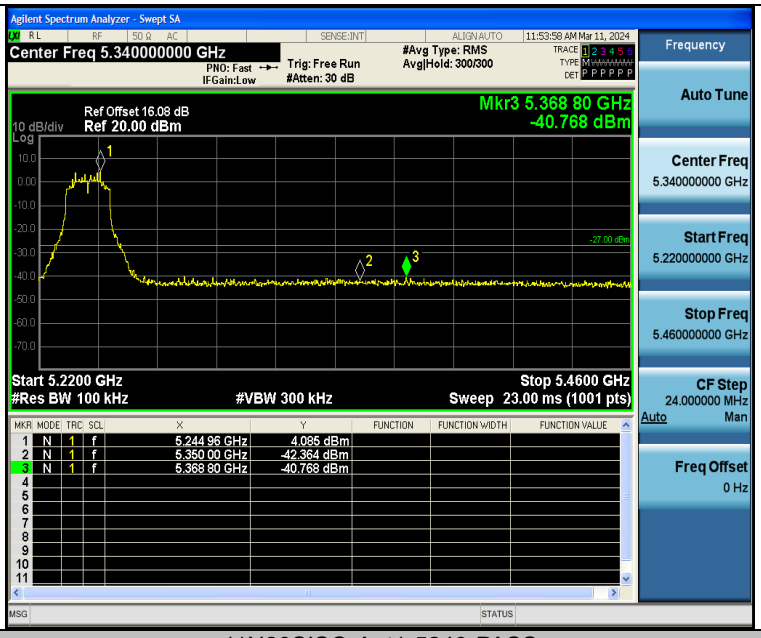

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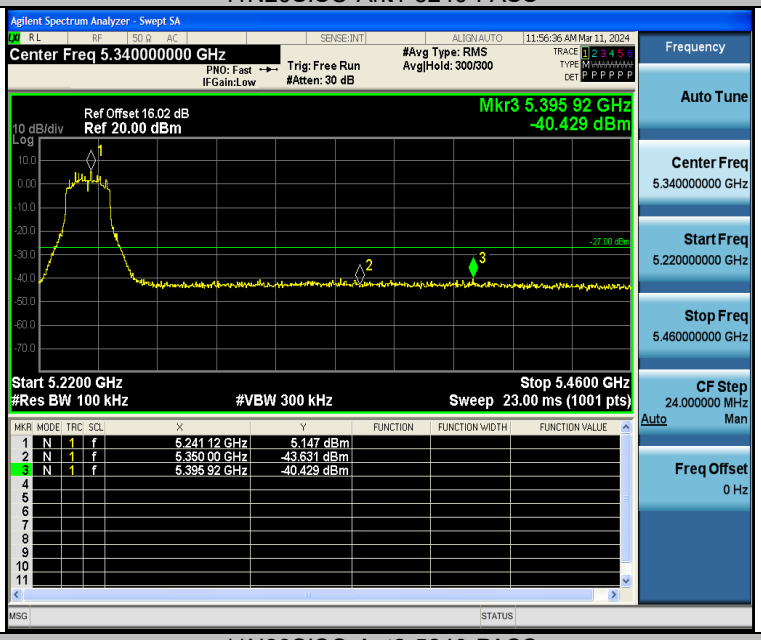

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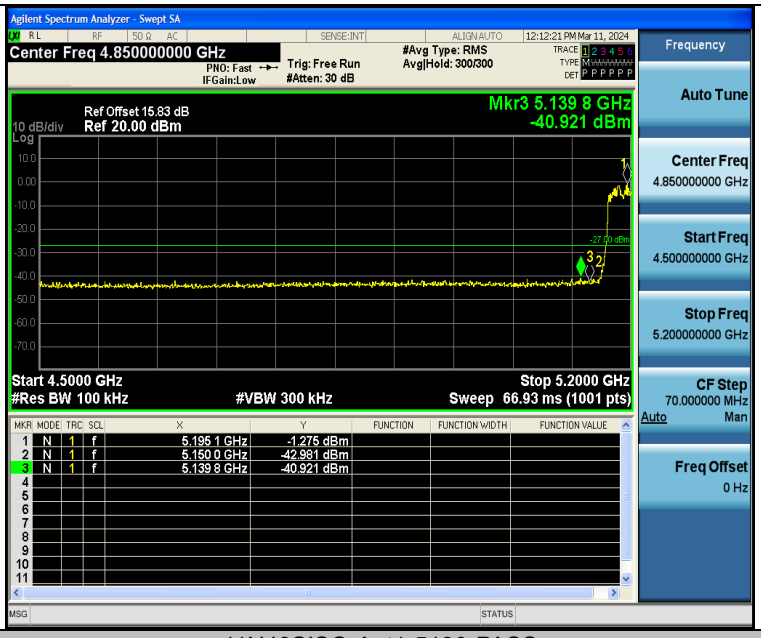

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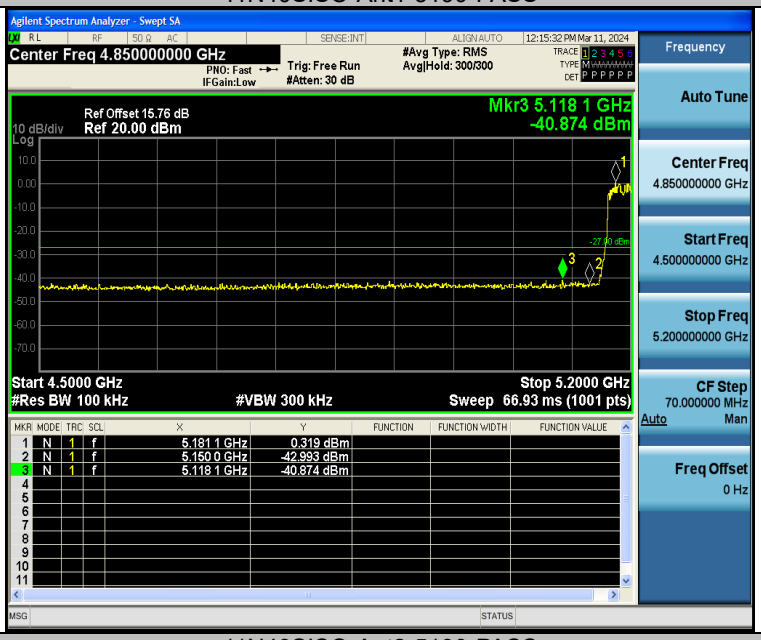

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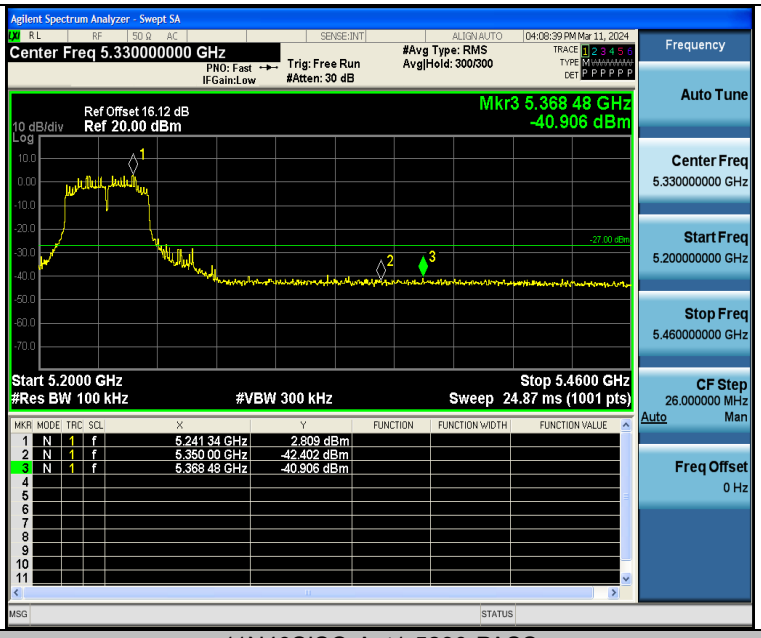

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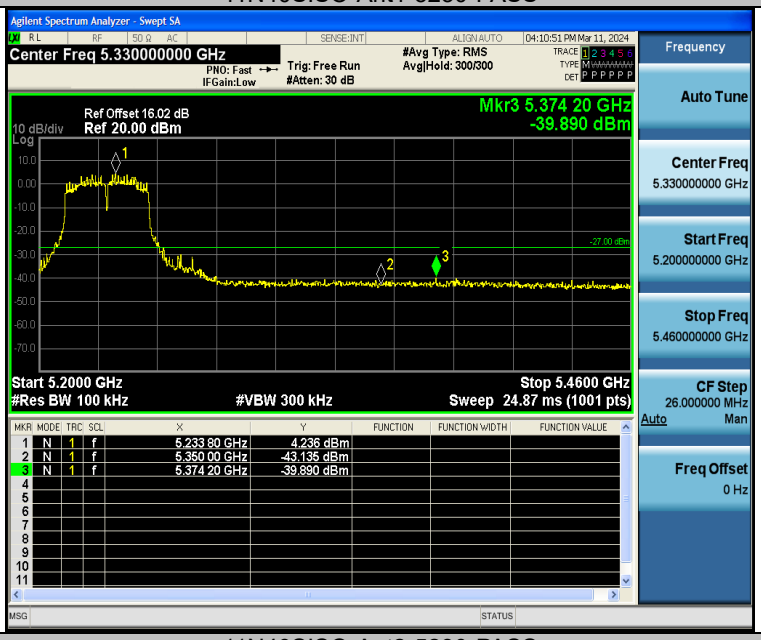

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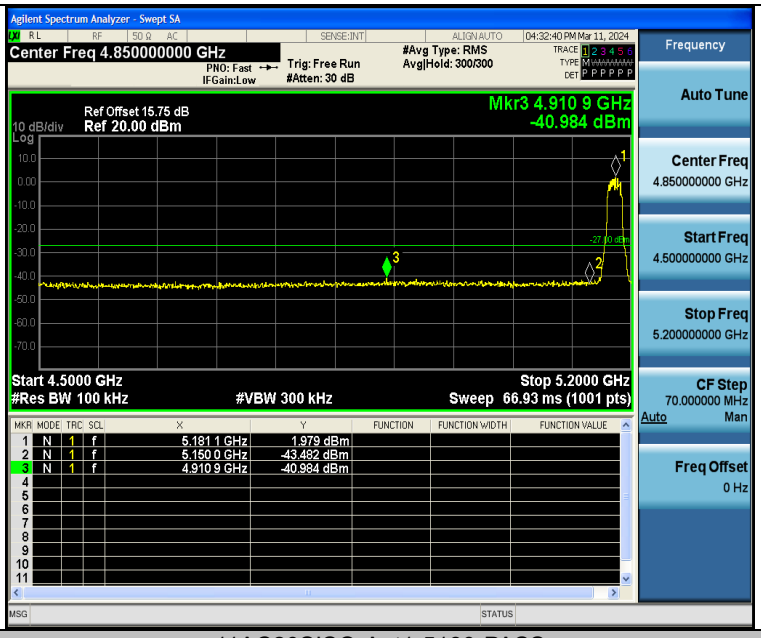

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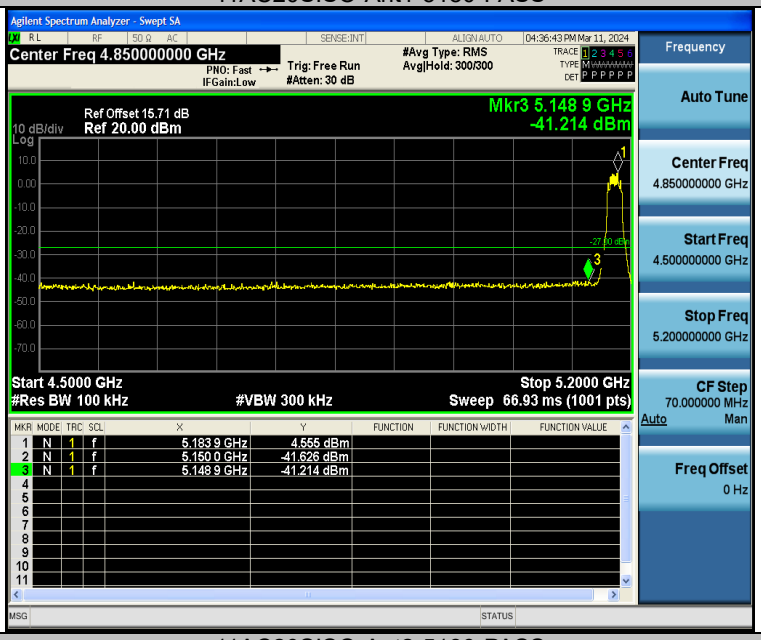

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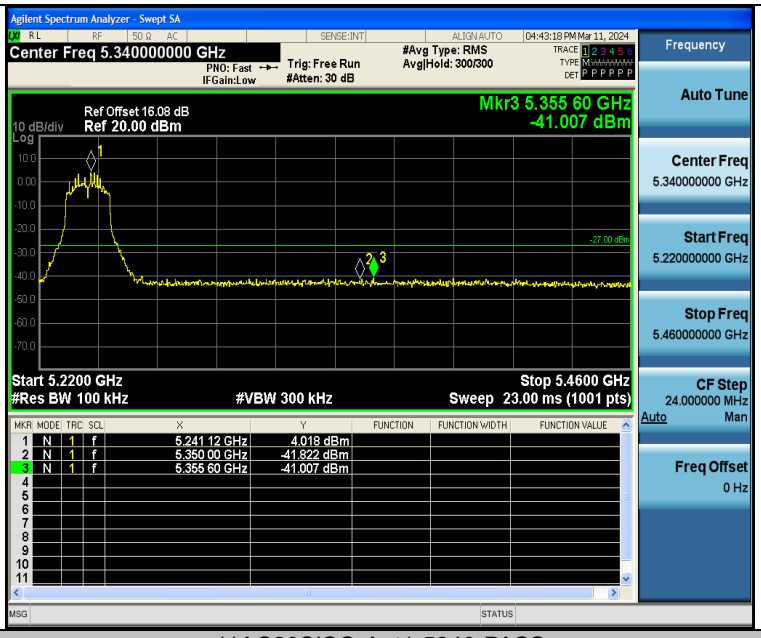

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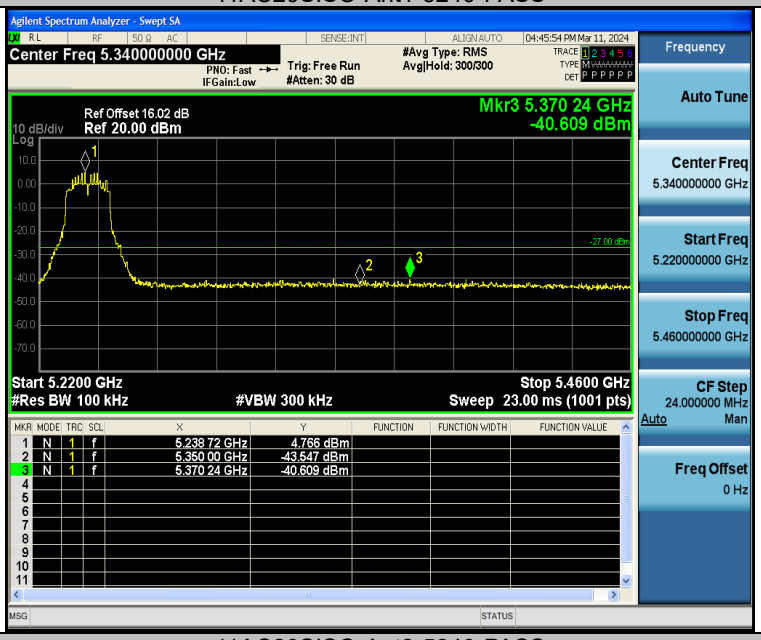

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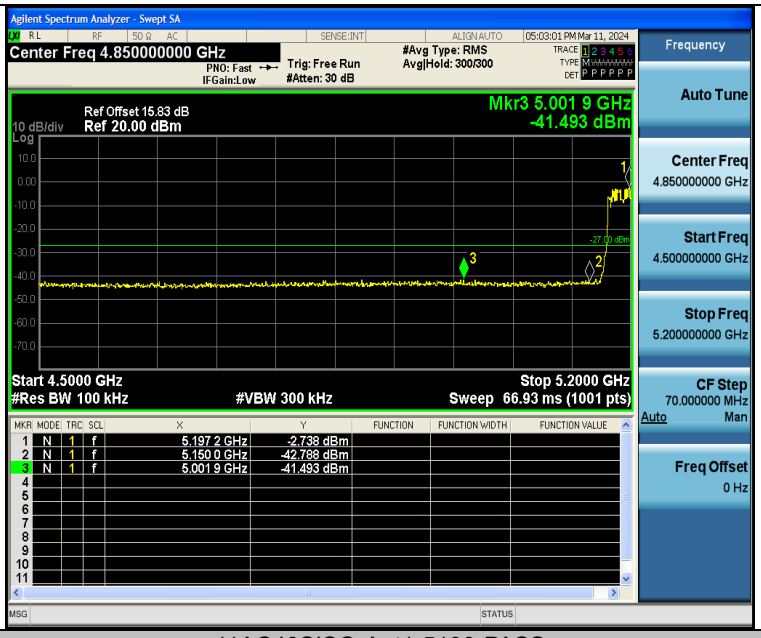

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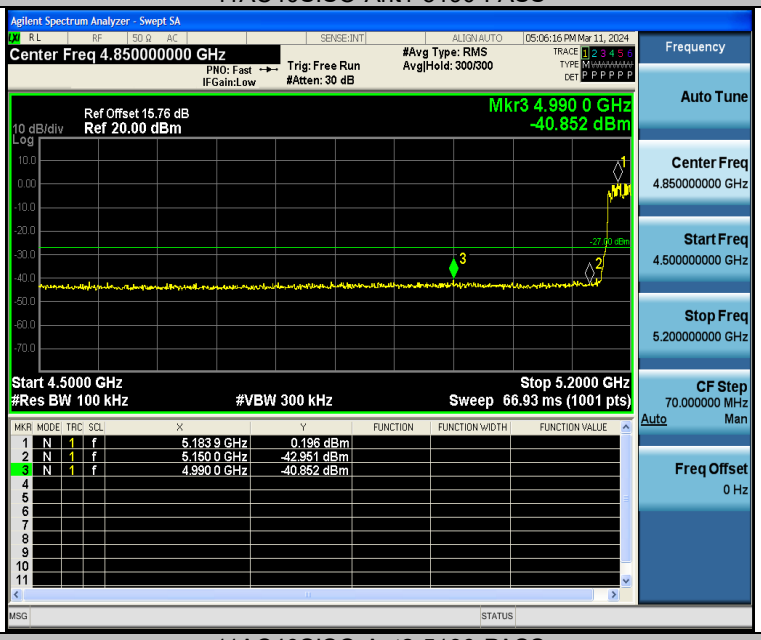

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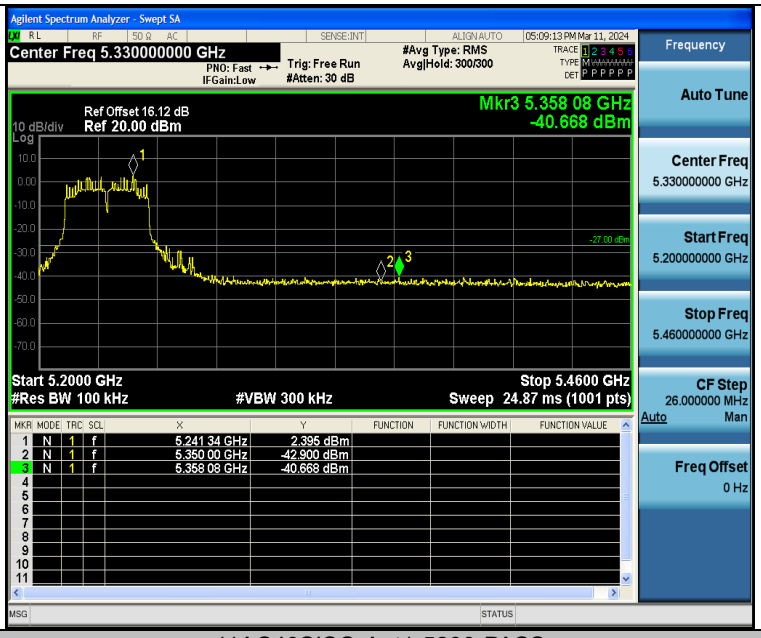

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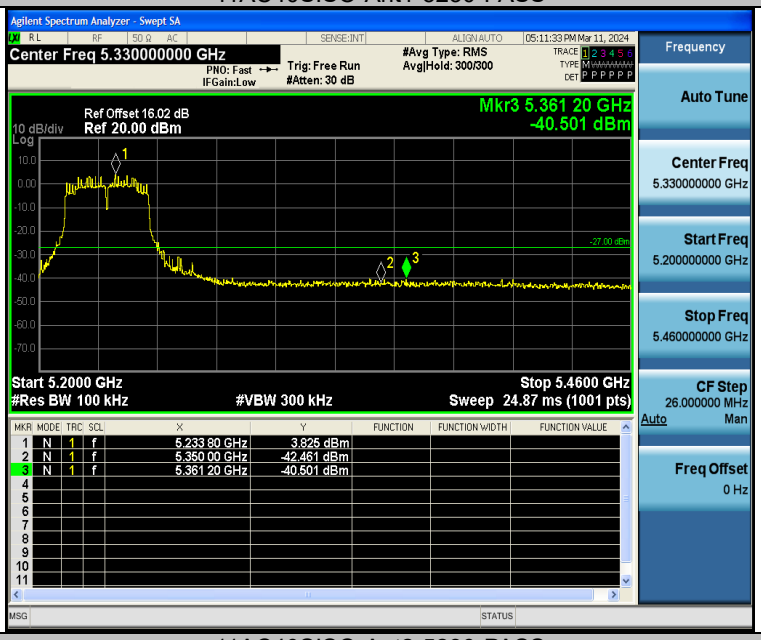

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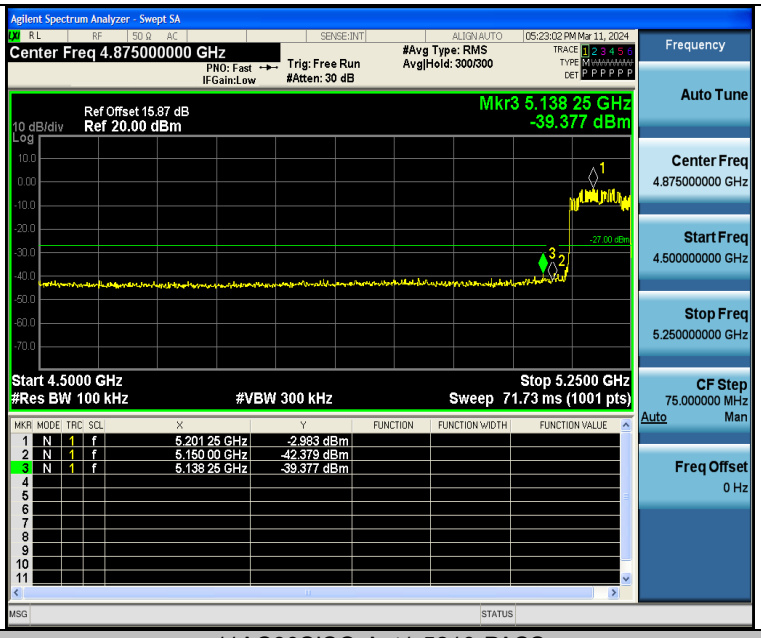
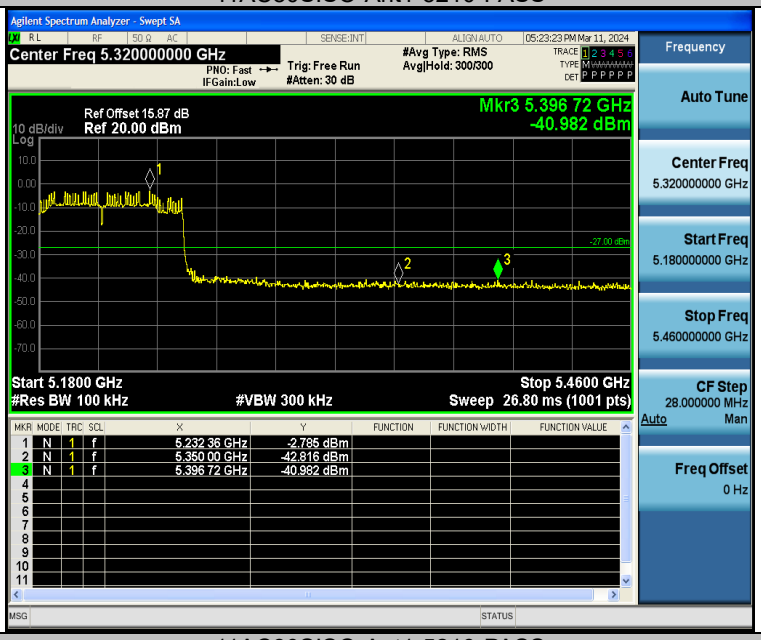


11AC80SISO-Ant1-5210-PASS



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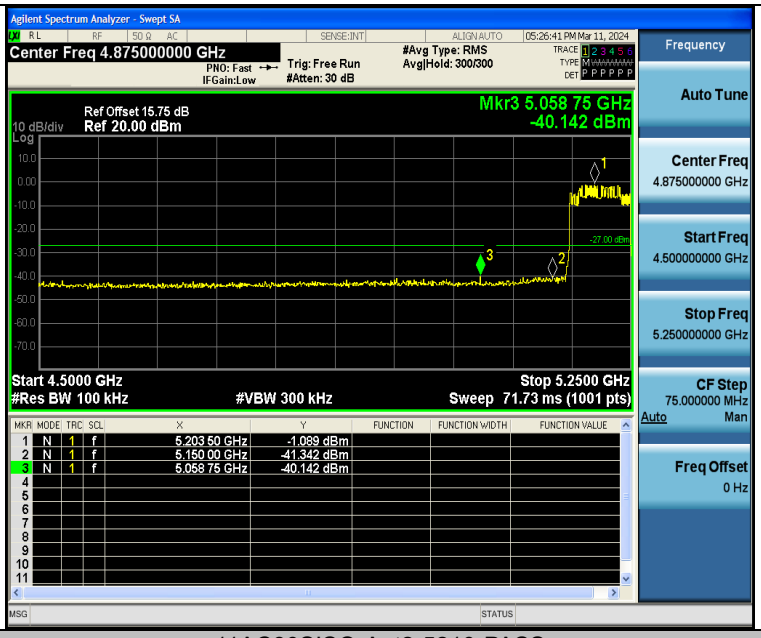

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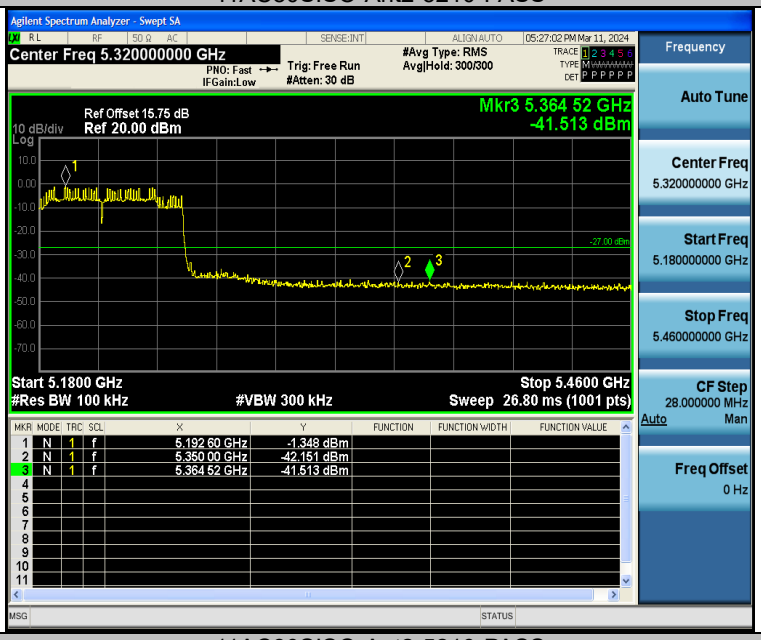
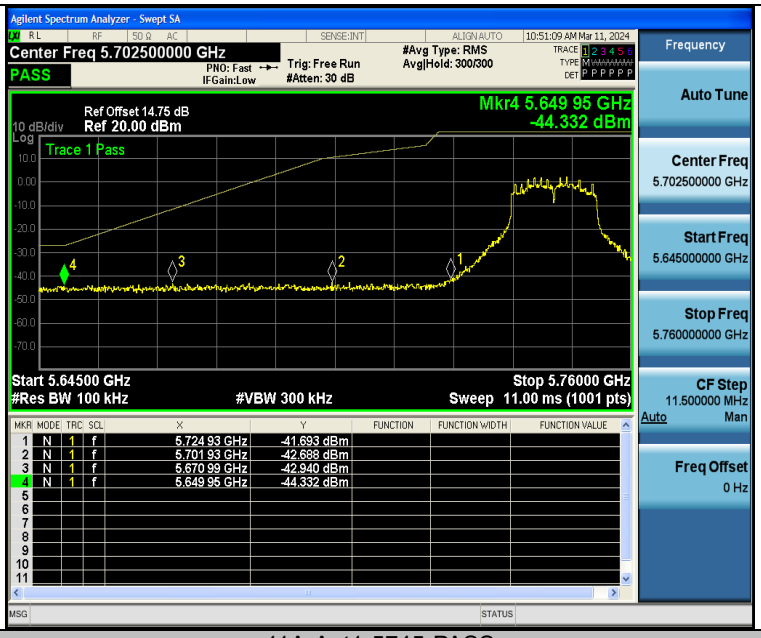
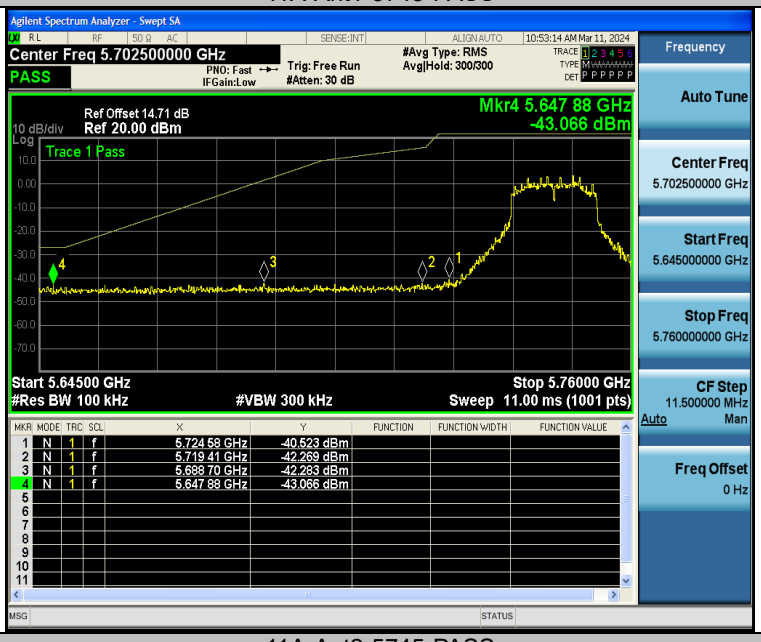


11AC80SISO-Ant2-5210-PASS

Test plots B4:



11A-Ant1-5745-PASS



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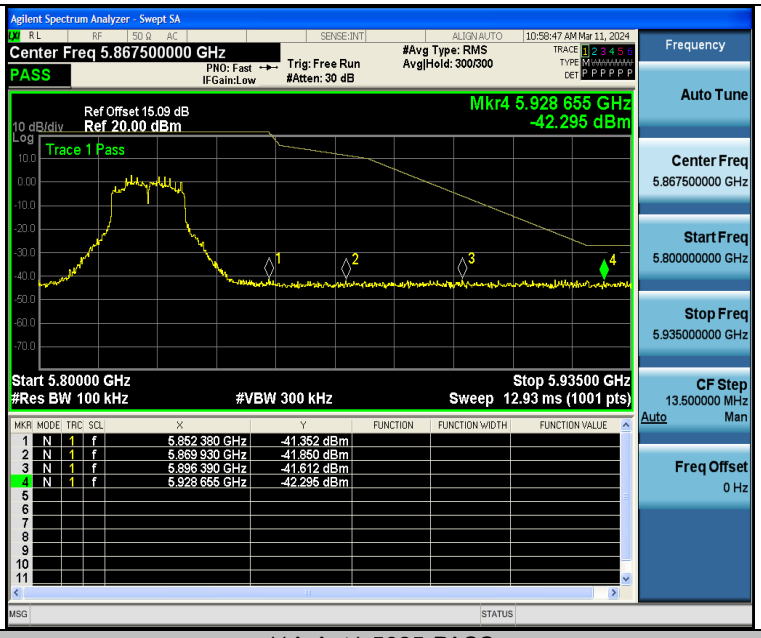
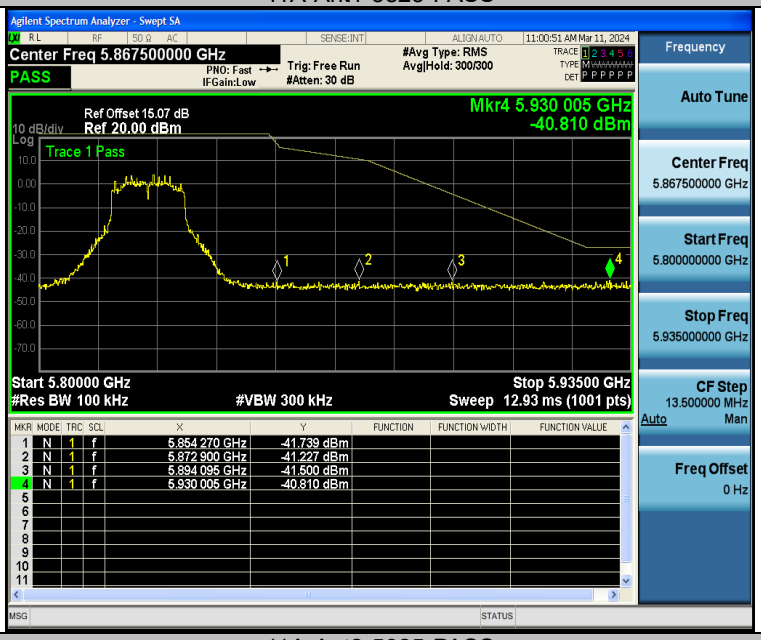


11A-Ant1-5825-PASS



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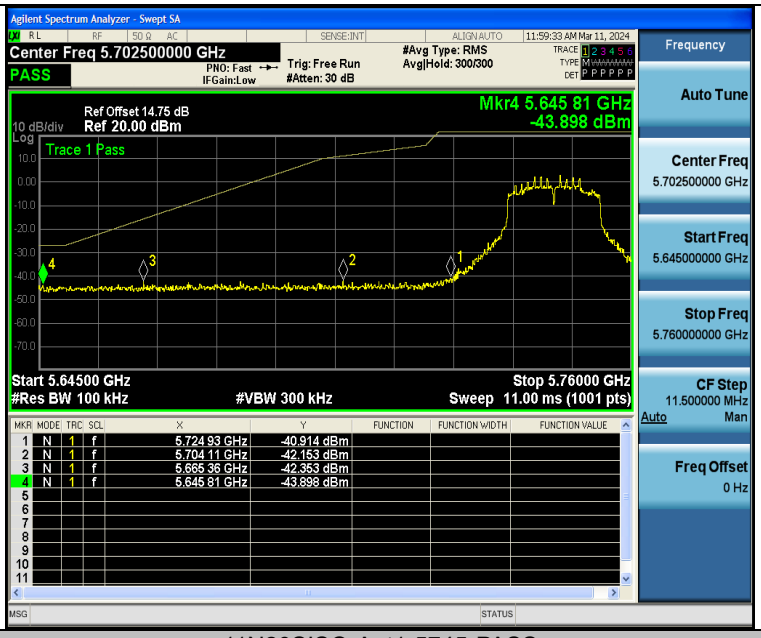

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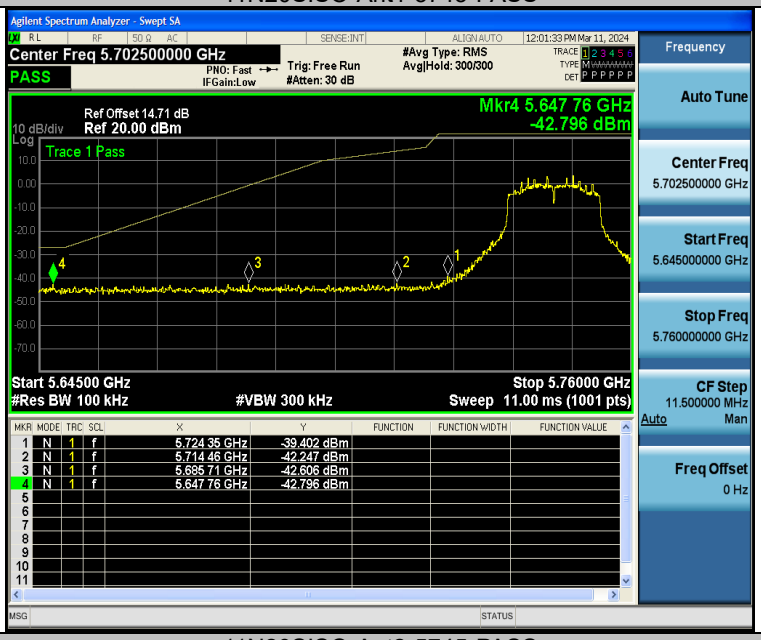

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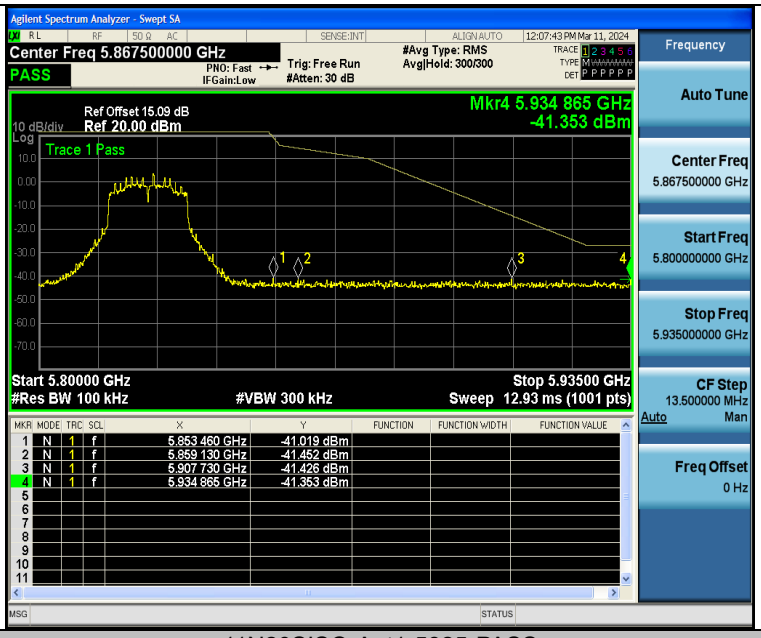

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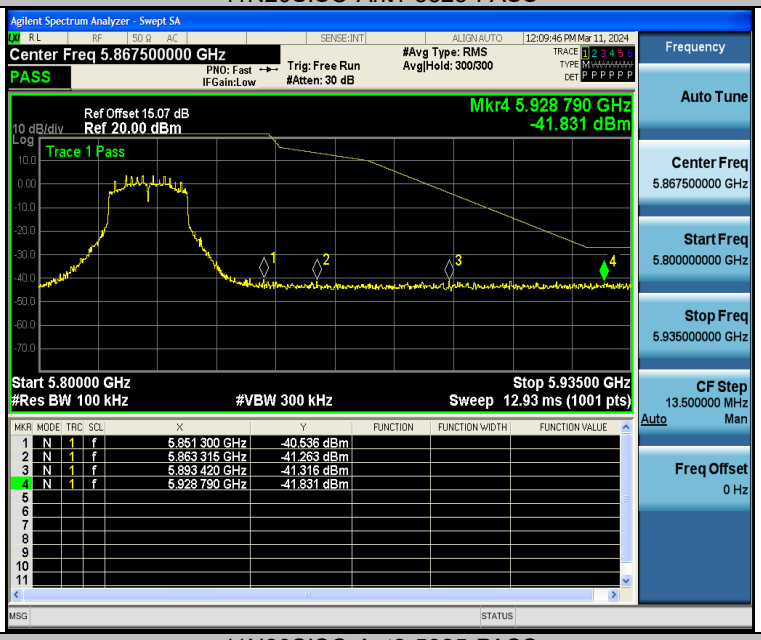

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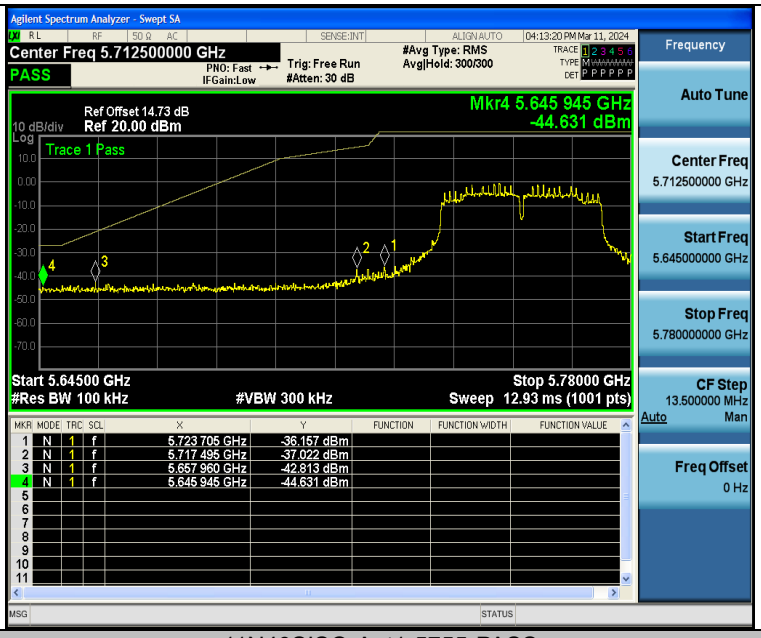
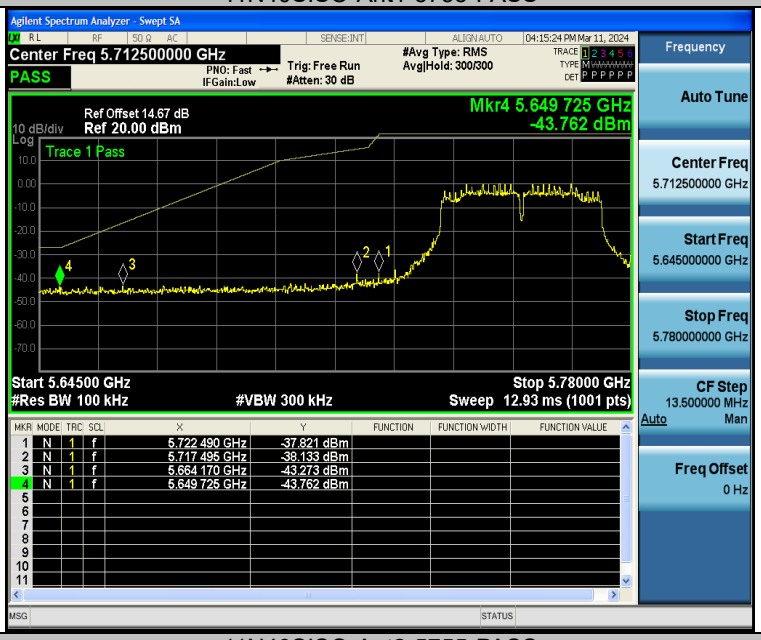


11N40SISO-Ant1-5755-PASS



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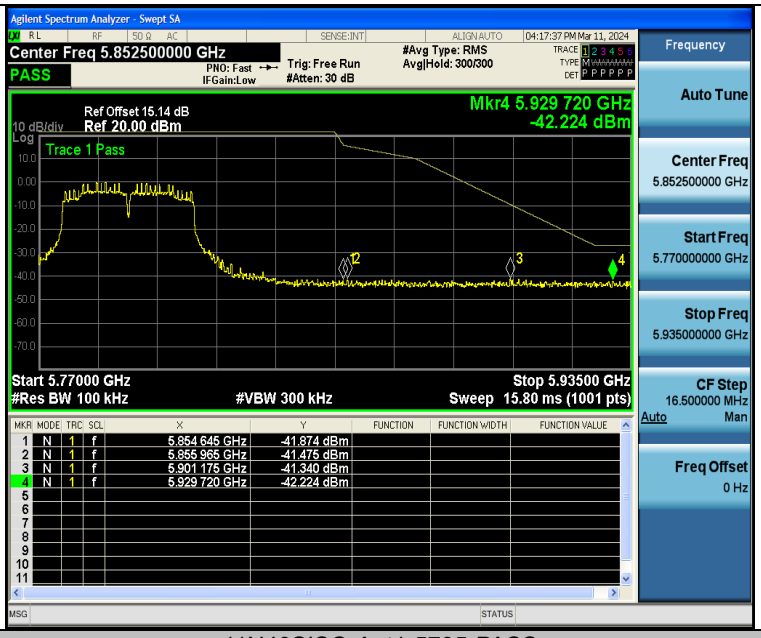

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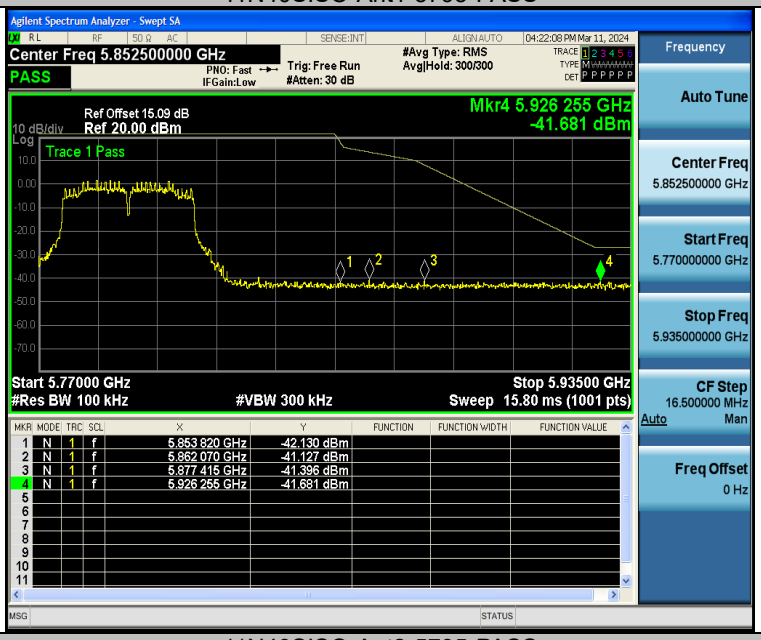

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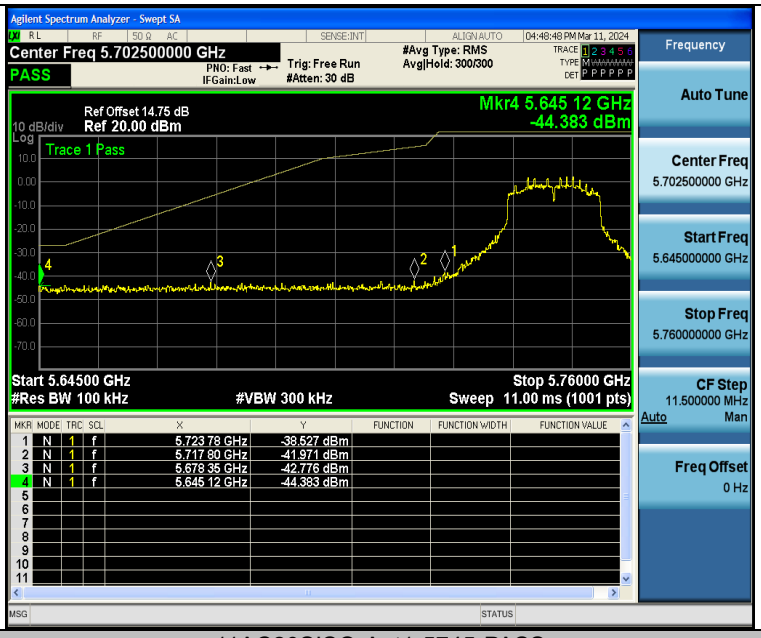

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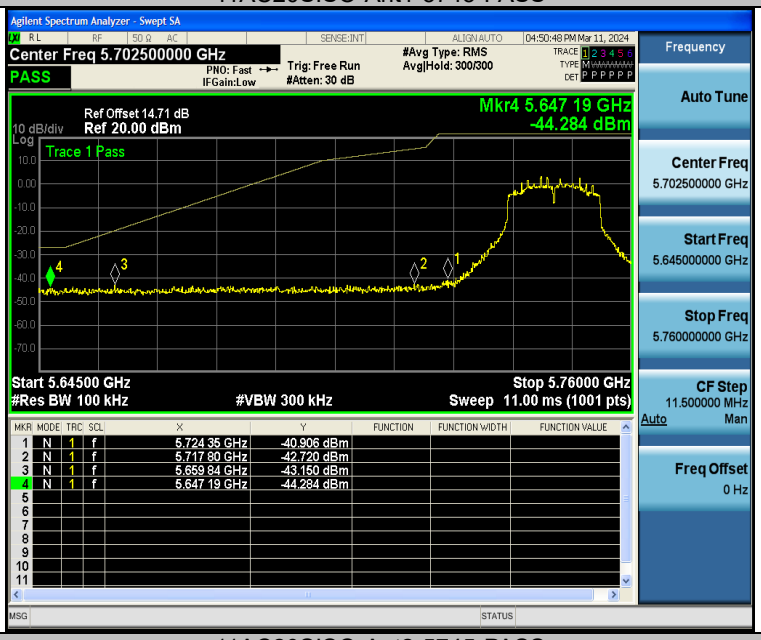

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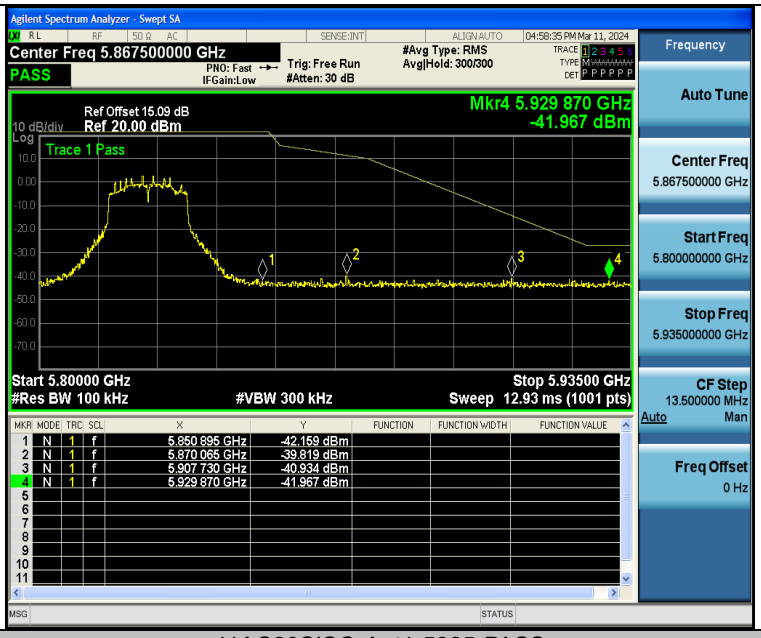

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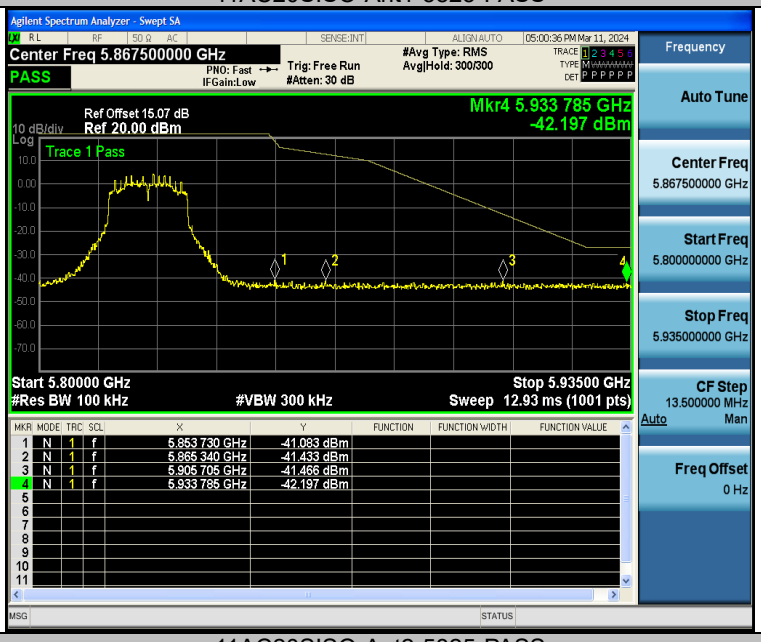

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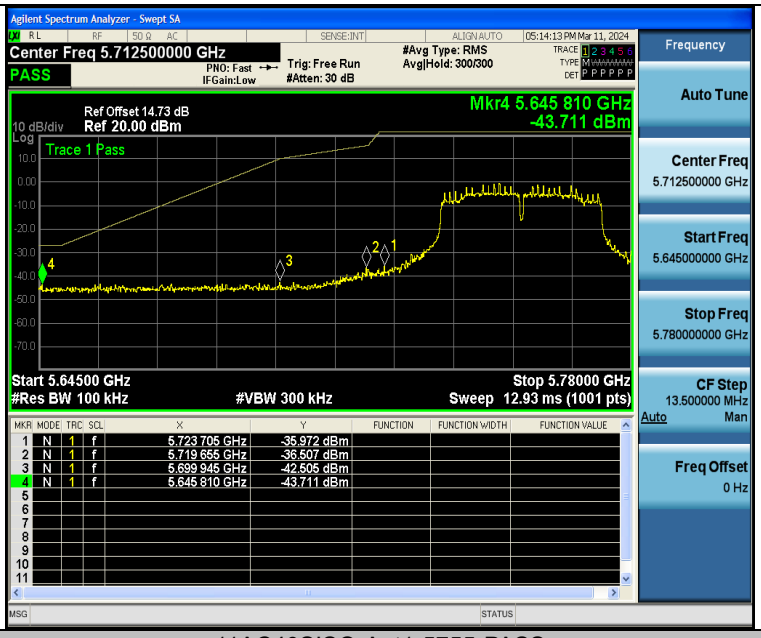

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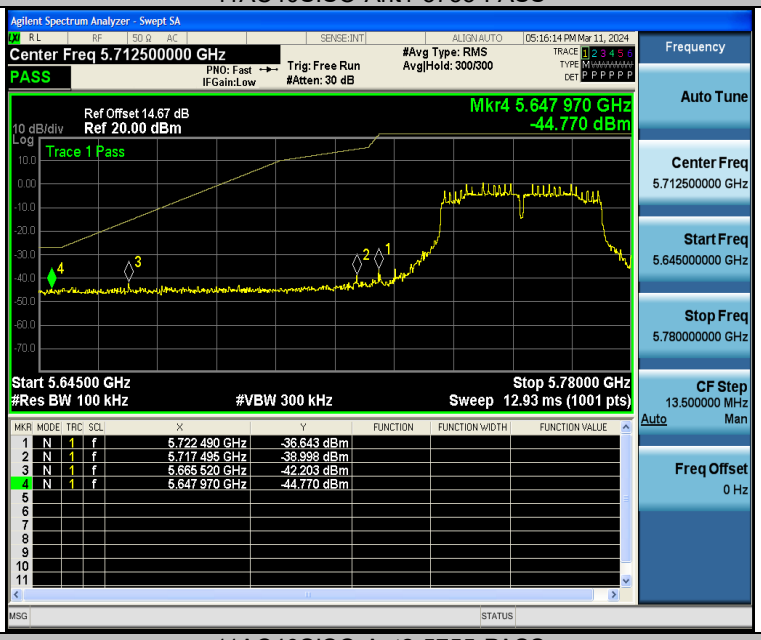
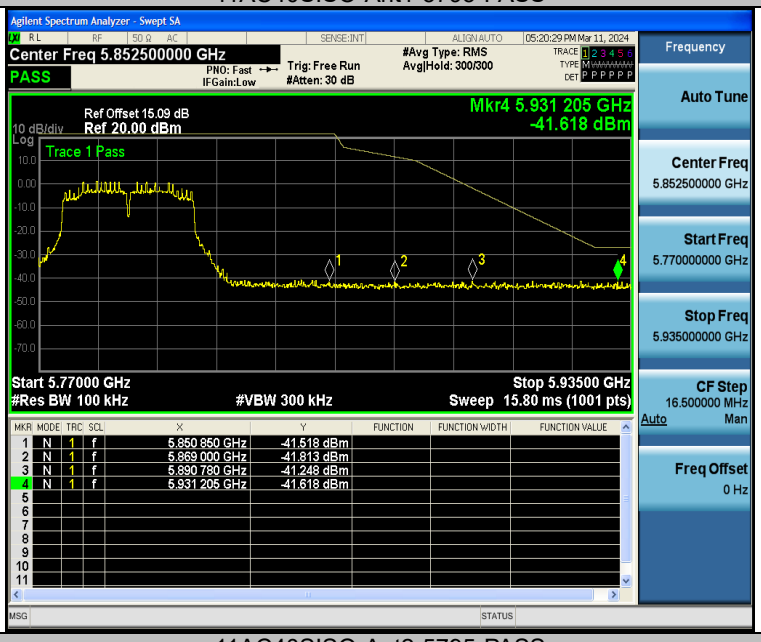


11AC40SISO-Ant2-5755-PASS

11AC40SISO-Ant1-5795-PASS



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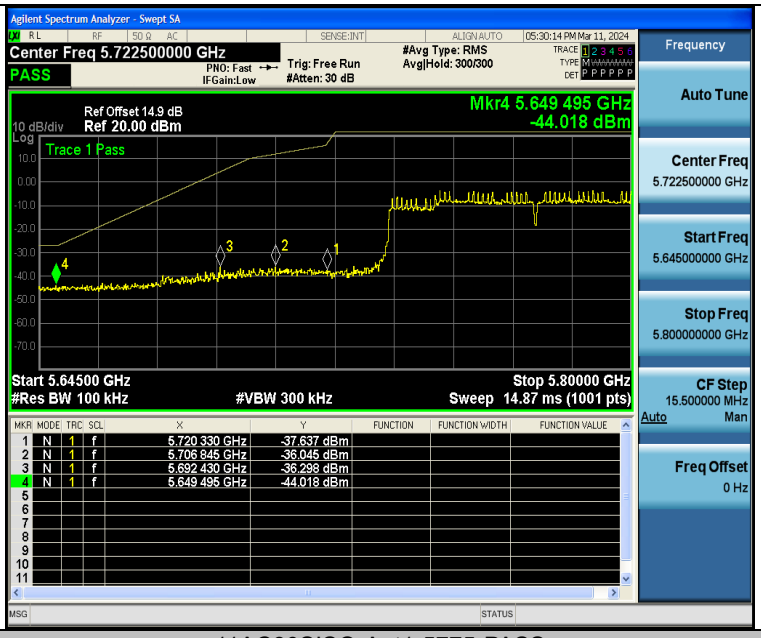

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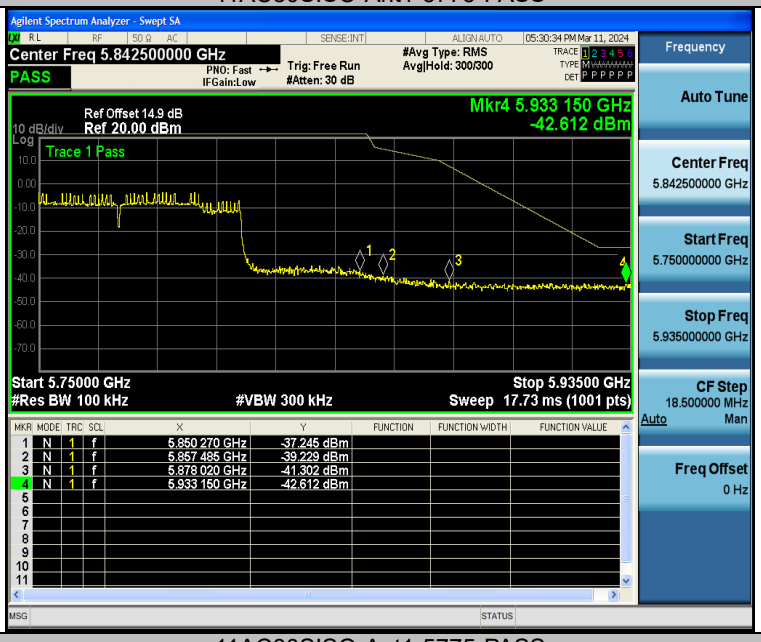

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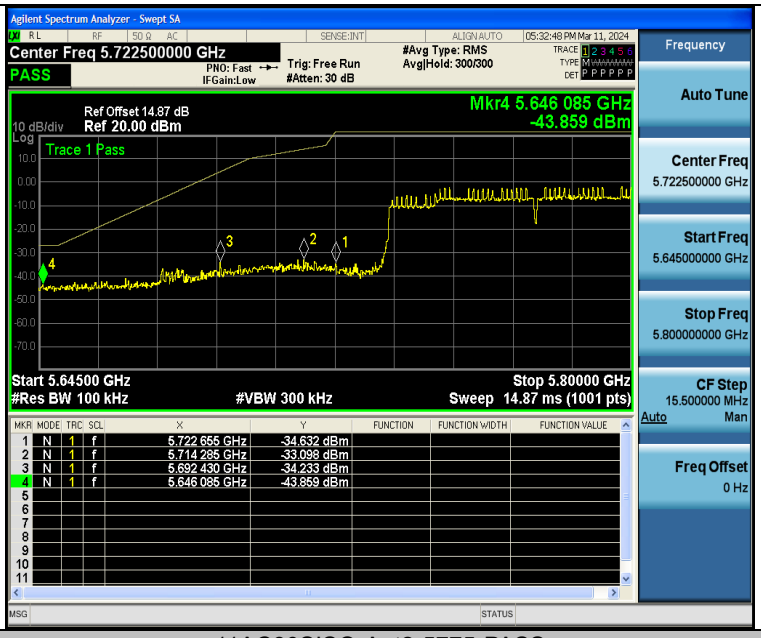


11AC80SISO-Ant2-5775-PASS

11AC80SISO-Ant2-5775-PASS

6.7 Restricted Band

Test Requirement : FCC Part15 E Section 15.407(b)

Test site : Measurement Distance: 3m

Test Limit :

Frequency	Limit (dBuV/m @3m)	Remark
Above 1GHz	74	Peak Value
	54	Average Value

Test Procedure:

1. The EUT was placed on a styrofoam table which is 1.5m above ground plane.

2. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

6. Repeat above procedures until the measurements for all frequencies are complete.

7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

8. The test above 1GHz must be use the fully anechoic room, and the test below 1GHz use the half anechoic room

Test Result:

Worst case mode:		802.11a(6Mbps)-ANT1		Test channel:		36		
NO.	Freq. [MHz]	level [dBμV/m]	Factor [dB]	Emission level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector Type
1	5150	50.25	6.53	56.78	74	17.22	H	Peak
2	5150	40.17	6.53	46.7	54	7.3	H	Average
3	5150	49.69	6.53	56.22	74	17.78	V	Peak
4	5150	38.45	6.53	44.98	54	9.02	V	Average

Worst case mode:		802.11a(6Mbps) - ANT1		Test channel:		48		
NO.	Freq. [MHz]	level [dBμV/m]	Factor [dB]	Emission level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector Type
1	5350	50.08	6.56	56.64	74	17.36	H	Peak
2	5350	40.19	6.56	46.75	54	7.25	H	Average
3	5350	49.97	6.56	56.53	74	17.47	V	Peak
4	5350	38.51	6.56	45.07	54	8.93	V	Average

Worst case mode:		802.11a(6Mbps) - ANT1		Test channel:		165		
NO.	Freq. [MHz]	level [dBμV/m]	Factor [dB]	Emission level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector Type
1	5850	49.99	6.64	56.63	74	17.37	H	Peak
2	5850	40.23	6.64	46.87	54	7.13	H	Average
3	5850	49.31	6.64	55.95	74	18.05	V	Peak
4	5850	37.71	6.64	44.35	54	9.65	V	Average

Worst case mode:		802.11a(6Mbps)-ANT2		Test channel:		36		
NO.	Freq. [MHz]	level [dBμV/m]	Factor [dB]	Emission level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector Type
1	5150	50.56	6.53	57.09	74	16.91	H	Peak
2	5150	40.01	6.53	46.54	54	7.46	H	Average
3	5150	49.62	6.53	56.15	74	17.85	V	Peak
4	5150	38.39	6.53	44.92	54	9.08	V	Average

Worst case mode:		802.11a(6Mbps) - ANT2		Test channel:		48		
NO.	Freq. [MHz]	level [dBμV/m]	Factor [dB]	Emission level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector Type
1	5350	50.11	6.56	56.67	74	17.33	H	Peak
2	5350	39.77	6.56	46.33	54	7.67	H	Average
3	5350	49.7	6.56	56.26	74	17.74	V	Peak
4	5350	38.3	6.56	44.86	54	9.14	V	Average

Worst case mode:		802.11a(6Mbps) - ANT2		Test channel:		165		
NO.	Freq. [MHz]	level [dBμV/m]	Factor [dB]	Emission level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector Type
1	5850	49.99	6.64	56.63	74	17.37	H	Peak
2	5850	40.23	6.64	46.87	54	7.13	H	Average
3	5850	49.31	6.64	55.95	74	18.05	V	Peak
4	5850	37.71	6.64	44.35	54	9.65	V	Average

Note: Only recorded the worst case in the report.

7 Emission Bandwidth and Occupied Bandwidth

Test Requirement	:	FCC CFR47 Part 15 Section 15.407(a)(e)
Test Method	:	ANSI C63.10:2013
Test Limit		According to FCC §15.407(a), 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. As per FCC §15.407(e): for equipment operating in the band 5725 – 5850 MHz, the minimum 6 dB bandwidth of U-NII devices shall be 500 kHz.

7.1 Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01,
Emission Bandwidth (EBW)
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%;99% Occupied Bandwidth
The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99% occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in II.G.3.d). Measurements of 99% occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

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.

7.2 Test Result

PASS

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations / data rates and antenna ports.
Following channel was selected for the final test as listed below.

26 dB emission bandwidth:

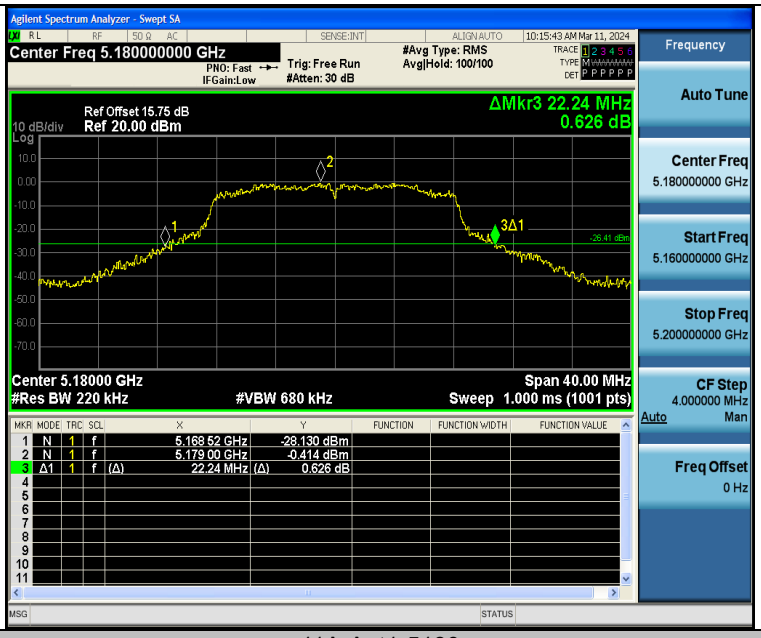
TestMode	Antenna	Frequency[MHz]	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	22.240	5168.520	5190.760	---	---
11A	Ant2	5180	22.680	5168.960	5191.640	---	---
11A	Ant1	5200	22.160	5188.880	5211.040	---	---
11A	Ant2	5200	21.280	5189.520	5210.800	---	---
11A	Ant1	5240	22.160	5228.440	5250.600	---	---
11A	Ant2	5240	22.640	5228.680	5251.320	---	---
11A	Ant1	5745	22.800	5733.680	5756.480	---	---
11A	Ant2	5745	23.080	5733.000	5756.080	---	---
11A	Ant1	5785	22.360	5773.920	5796.280	---	---
11A	Ant2	5785	22.760	5773.600	5796.360	---	---
11A	Ant1	5825	22.400	5813.960	5836.360	---	---
11A	Ant2	5825	22.960	5813.560	5836.520	---	---
11N20SISO	Ant1	5180	21.440	5169.160	5190.600	---	---
11N20SISO	Ant2	5180	23.280	5168.000	5191.280	---	---
11N20SISO	Ant1	5200	22.760	5188.520	5211.280	---	---
11N20SISO	Ant2	5200	23.320	5188.520	5211.840	---	---
11N20SISO	Ant1	5240	22.320	5228.760	5251.080	---	---
11N20SISO	Ant2	5240	23.880	5228.240	5252.120	---	---
11N20SISO	Ant1	5745	22.520	5733.920	5756.440	---	---
11N20SISO	Ant2	5745	23.760	5733.000	5756.760	---	---
11N20SISO	Ant1	5785	22.920	5773.360	5796.280	---	---
11N20SISO	Ant2	5785	22.360	5773.800	5796.160	---	---
11N20SISO	Ant1	5825	23.400	5812.800	5836.200	---	---
11N20SISO	Ant2	5825	23.520	5812.920	5836.440	---	---
11N40SISO	Ant1	5190	41.600	5169.280	5210.880	---	---
11N40SISO	Ant2	5190	42.000	5169.120	5211.120	---	---
11N40SISO	Ant1	5230	44.000	5208.640	5252.640	---	---
11N40SISO	Ant2	5230	40.960	5209.920	5250.880	---	---
11N40SISO	Ant1	5755	43.520	5733.320	5776.840	---	---
11N40SISO	Ant2	5755	40.960	5734.680	5775.640	---	---
11N40SISO	Ant1	5795	43.120	5772.920	5816.040	---	---
11N40SISO	Ant2	5795	40.880	5774.600	5815.480	---	---
11AC20SISO	Ant1	5180	21.200	5169.280	5190.480	---	---
11AC20SISO	Ant2	5180	22.520	5169.040	5191.560	---	---
11AC20SISO	Ant1	5200	20.880	5189.560	5210.440	---	---
11AC20SISO	Ant2	5200	22.160	5188.840	5211.000	---	---
11AC20SISO	Ant1	5240	21.320	5229.560	5250.880	---	---
11AC20SISO	Ant2	5240	21.640	5229.120	5250.760	---	---
11AC20SISO	Ant1	5745	23.720	5732.800	5756.520	---	---
11AC20SISO	Ant2	5745	22.200	5734.120	5756.320	---	---

11AC20SISO	Ant1	5785	22.200	5773.800	5796.000	---	---
11AC20SISO	Ant2	5785	22.080	5773.560	5795.640	---	---
11AC20SISO	Ant1	5825	22.240	5814.200	5836.440	---	---
11AC20SISO	Ant2	5825	23.600	5812.920	5836.520	---	---
11AC40SISO	Ant1	5190	42.000	5169.040	5211.040	---	---
11AC40SISO	Ant2	5190	41.920	5168.800	5210.720	---	---
11AC40SISO	Ant1	5230	44.400	5207.840	5252.240	---	---
11AC40SISO	Ant2	5230	43.520	5207.760	5251.280	---	---
11AC40SISO	Ant1	5755	43.440	5733.400	5776.840	---	---
11AC40SISO	Ant2	5755	42.240	5733.560	5775.800	---	---
11AC40SISO	Ant1	5795	42.960	5773.960	5816.920	---	---
11AC40SISO	Ant2	5795	42.960	5773.320	5816.280	---	---
11AC80SISO	Ant1	5210	80.960	5169.360	5250.320	---	---
11AC80SISO	Ant2	5210	81.120	5169.680	5250.800	---	---
11AC80SISO	Ant1	5775	81.600	5734.520	5816.120	---	---
11AC80SISO	Ant2	5775	81.280	5734.040	5815.320	---	---

minimum 6 dB bandwidth:

TestMode	Antenna	Frequency[MHz]	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	15.000	5737.440	5752.440	0.5	PASS
11A	Ant2	5745	14.680	5737.800	5752.480	0.5	PASS
11A	Ant1	5785	15.320	5777.200	5792.520	0.5	PASS
11A	Ant2	5785	15.040	5777.440	5792.480	0.5	PASS
11A	Ant1	5825	12.880	5819.600	5832.480	0.5	PASS
11A	Ant2	5825	13.800	5817.440	5831.240	0.5	PASS
11N20SISO	Ant1	5745	13.720	5738.720	5752.440	0.5	PASS
11N20SISO	Ant2	5745	12.560	5738.680	5751.240	0.5	PASS
11N20SISO	Ant1	5785	15.120	5777.400	5792.520	0.5	PASS
11N20SISO	Ant2	5785	15.080	5777.440	5792.520	0.5	PASS
11N20SISO	Ant1	5825	15.120	5817.400	5832.520	0.5	PASS
11N20SISO	Ant2	5825	15.120	5817.400	5832.520	0.5	PASS
11N40SISO	Ant1	5755	35.120	5737.400	5772.520	0.5	PASS
11N40SISO	Ant2	5755	35.040	5737.400	5772.440	0.5	PASS
11N40SISO	Ant1	5795	32.560	5778.680	5811.240	0.5	PASS
11N40SISO	Ant2	5795	35.040	5777.400	5812.440	0.5	PASS
11AC20SISO	Ant1	5745	13.360	5737.480	5750.840	0.5	PASS
11AC20SISO	Ant2	5745	10.120	5739.880	5750.000	0.5	PASS
11AC20SISO	Ant1	5785	15.120	5777.400	5792.520	0.5	PASS
11AC20SISO	Ant2	5785	12.600	5778.680	5791.280	0.5	PASS
11AC20SISO	Ant1	5825	15.160	5817.560	5832.720	0.5	PASS
11AC20SISO	Ant2	5825	15.040	5817.440	5832.480	0.5	PASS
11AC40SISO	Ant1	5755	33.760	5737.480	5771.240	0.5	PASS
11AC40SISO	Ant2	5755	35.040	5737.480	5772.520	0.5	PASS
11AC40SISO	Ant1	5795	32.560	5777.400	5809.960	0.5	PASS
11AC40SISO	Ant2	5795	35.040	5777.400	5812.440	0.5	PASS
11AC80SISO	Ant1	5775	75.040	5737.560	5812.600	0.5	PASS
11AC80SISO	Ant2	5775	75.040	5737.400	5812.440	0.5	PASS

Test Graphs：



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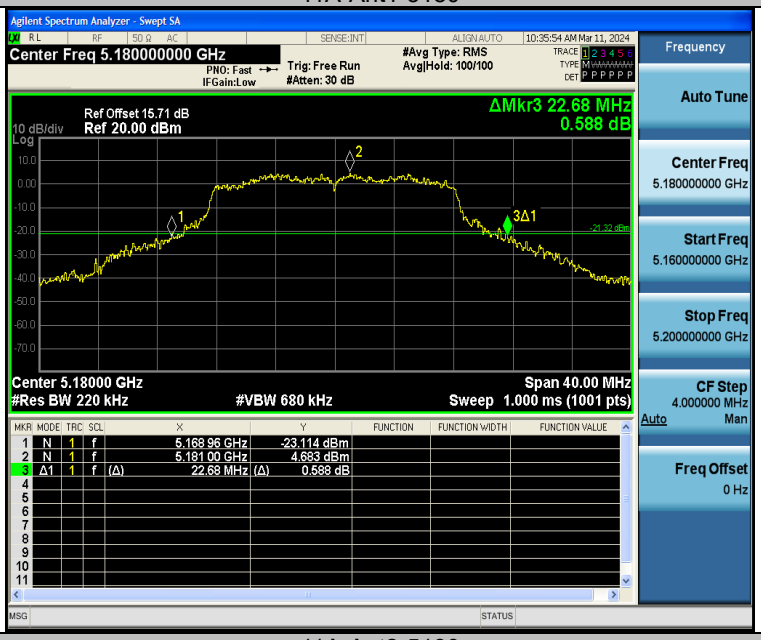

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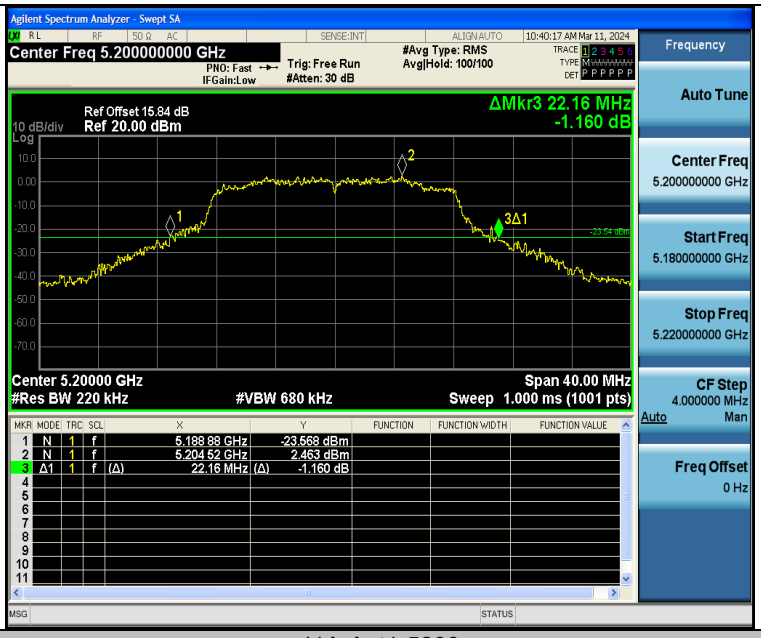

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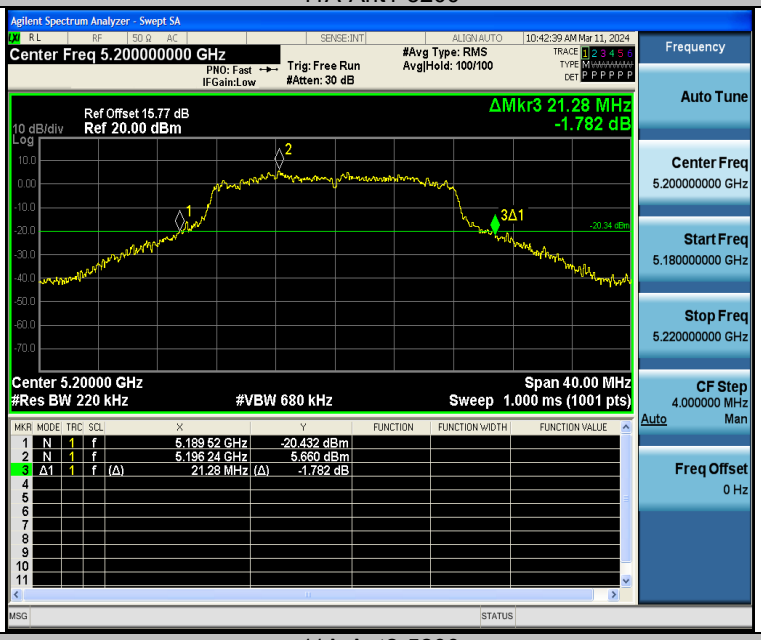

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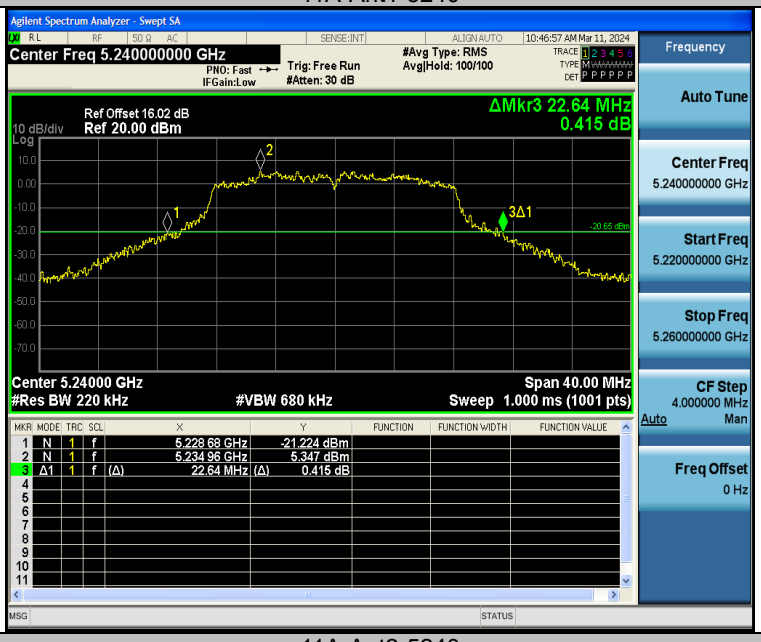

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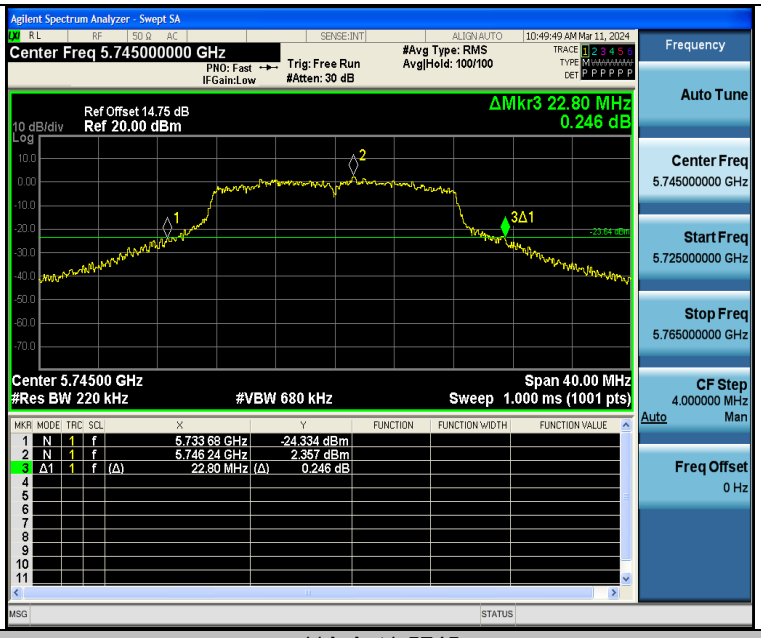

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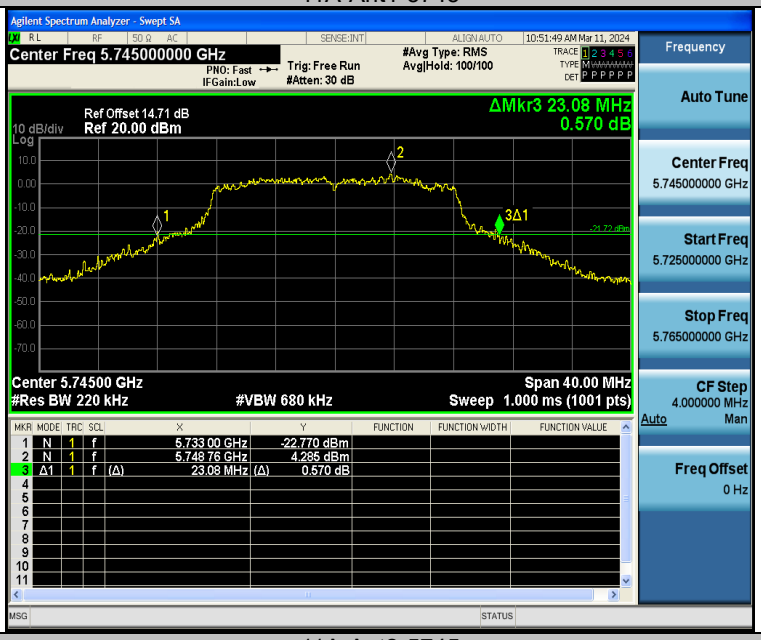

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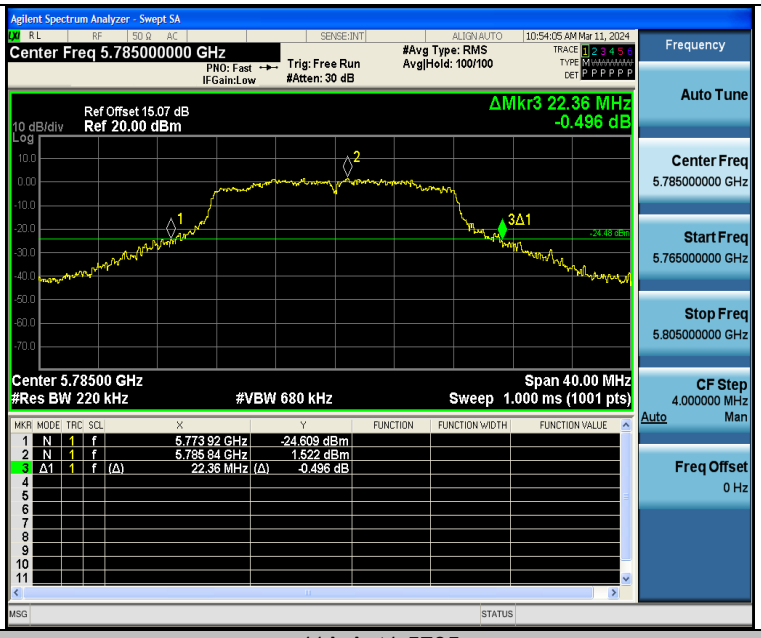

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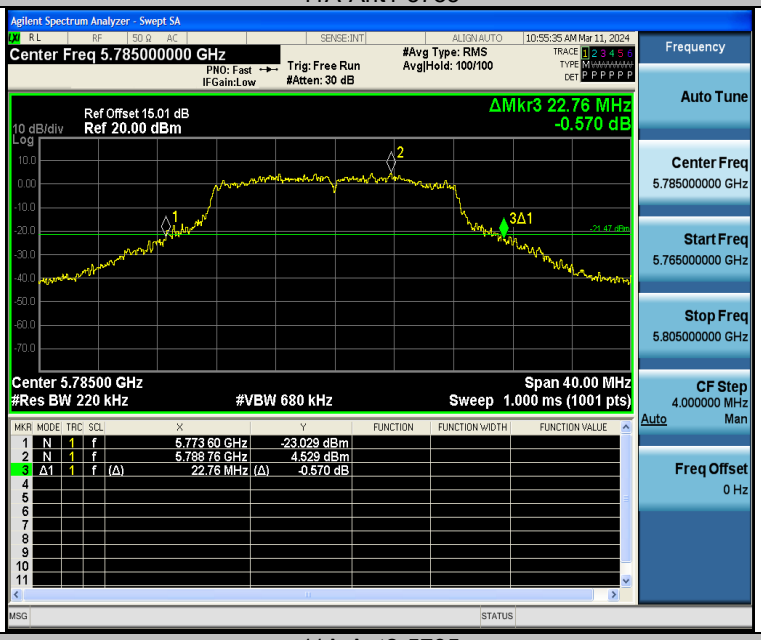

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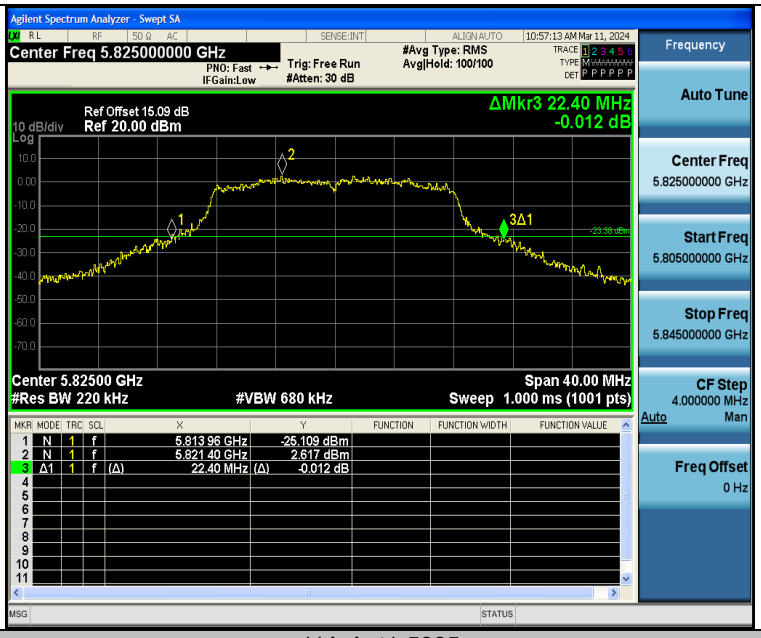

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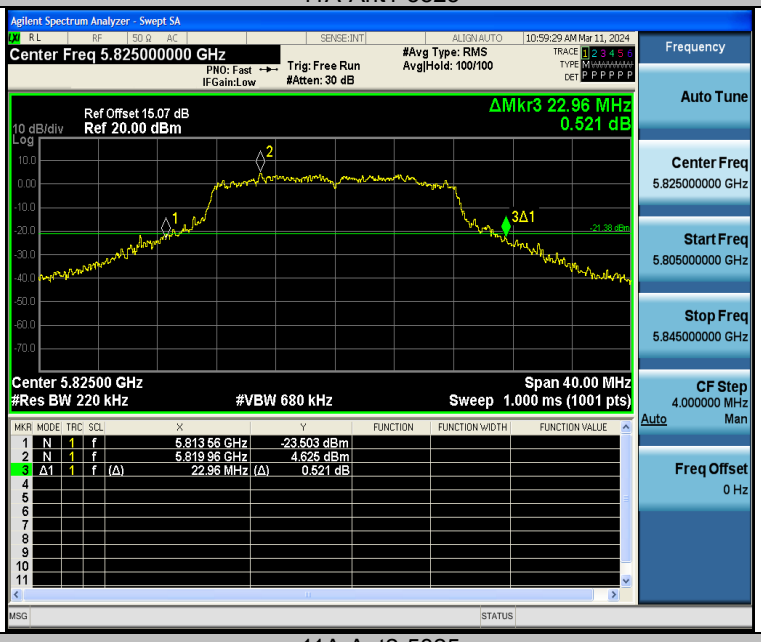

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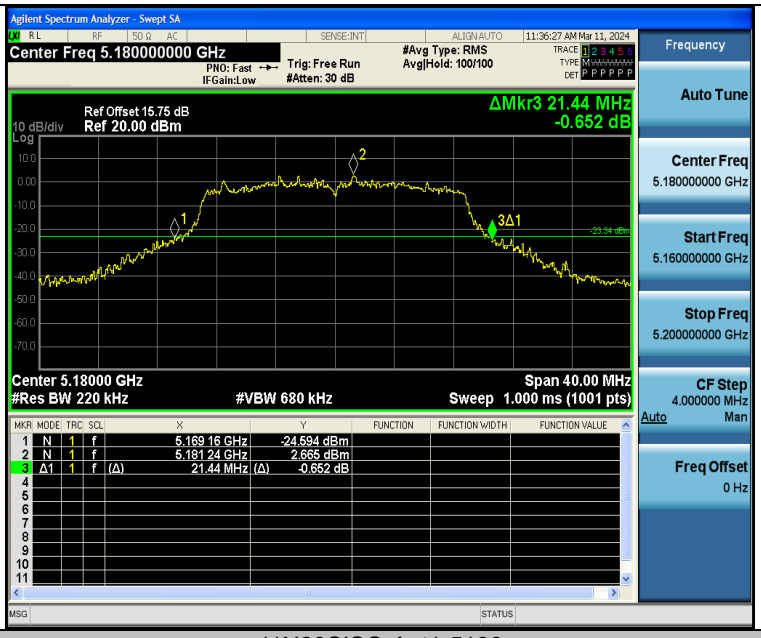

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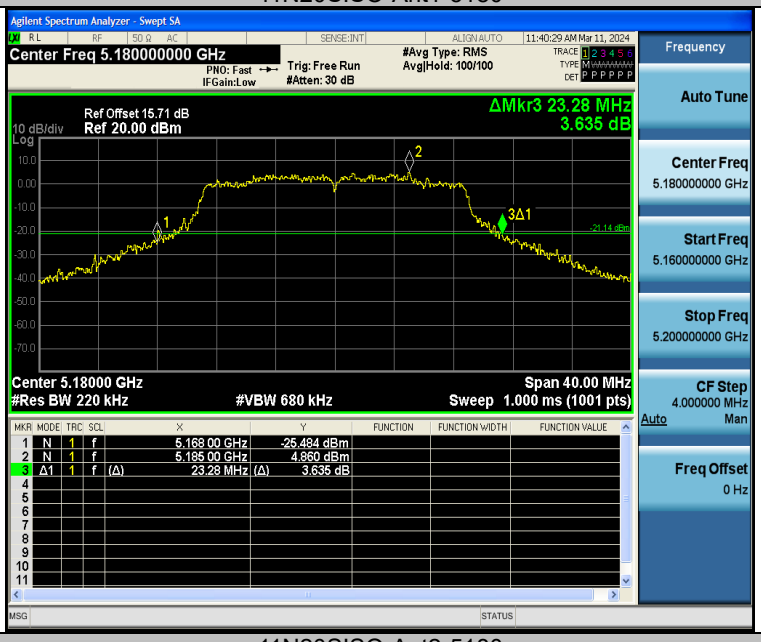

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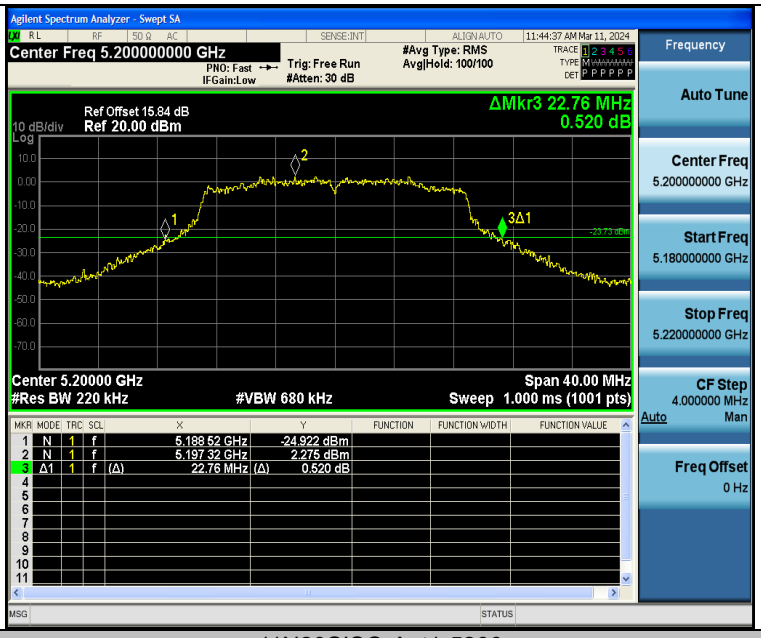

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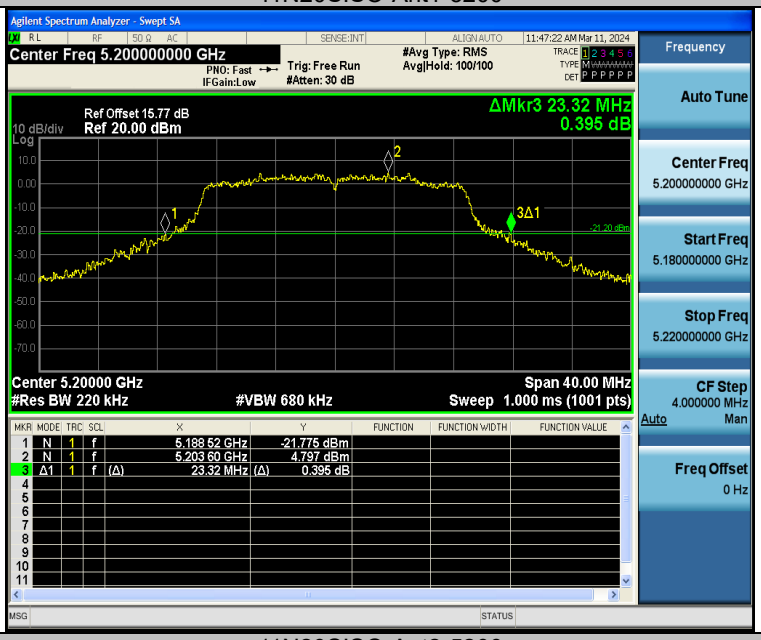

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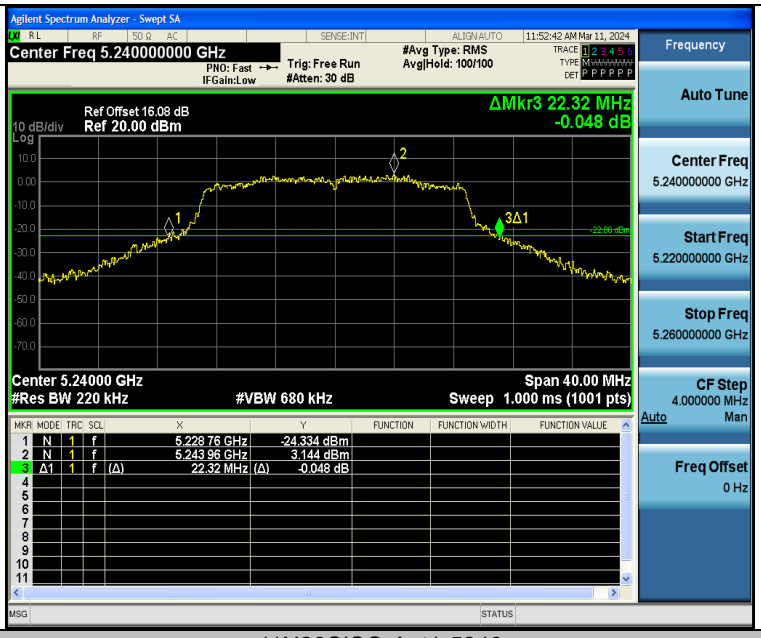

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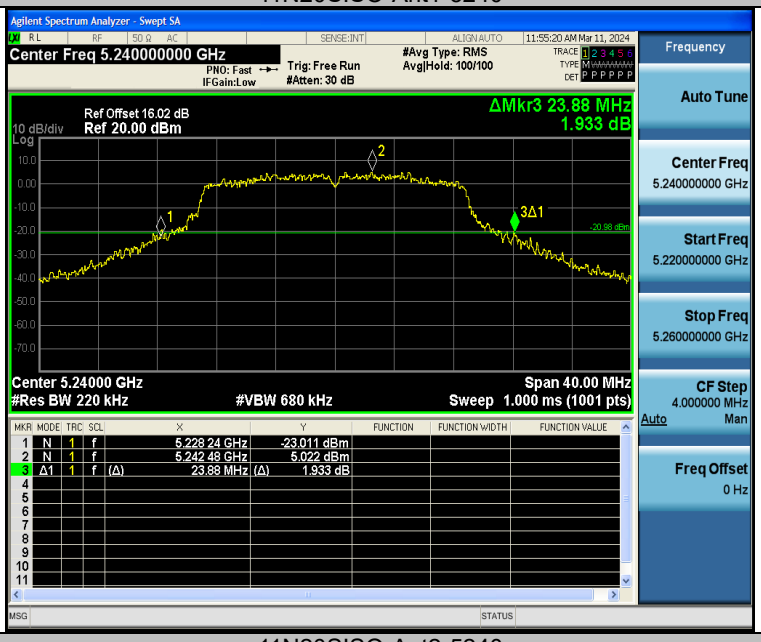

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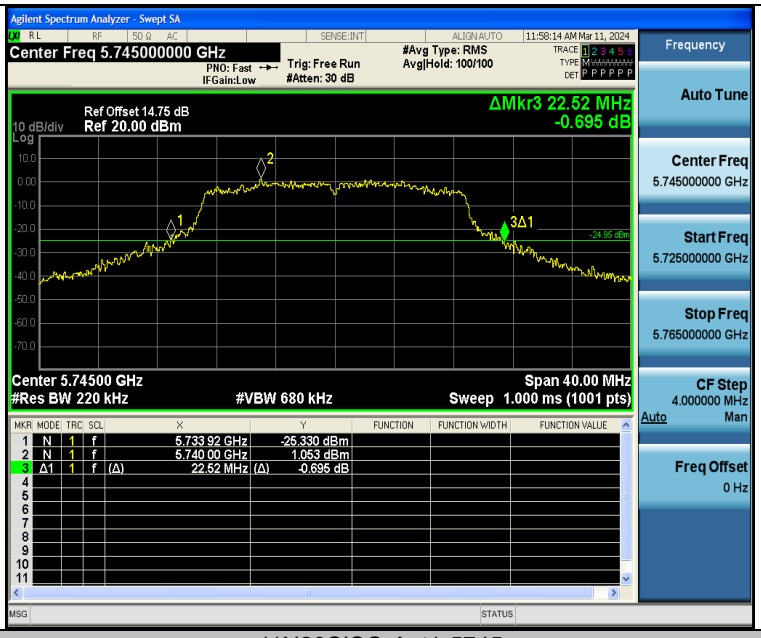

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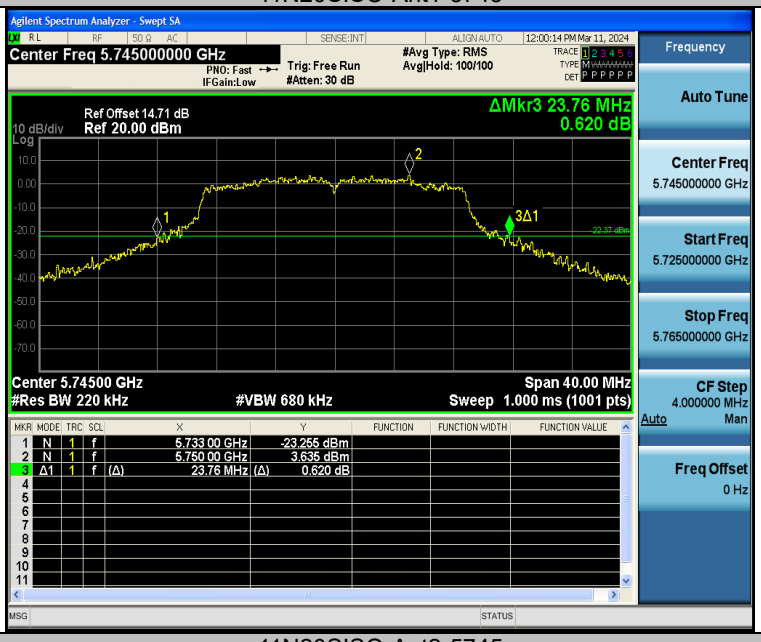

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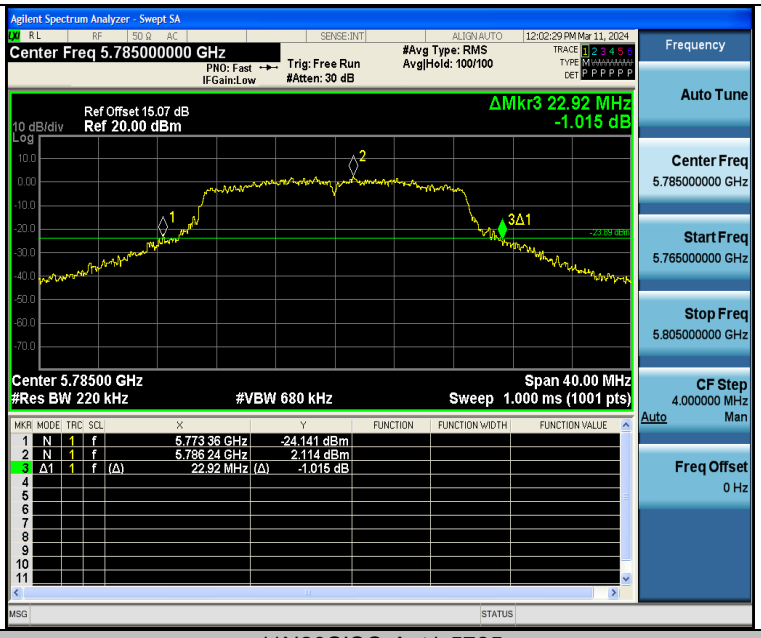

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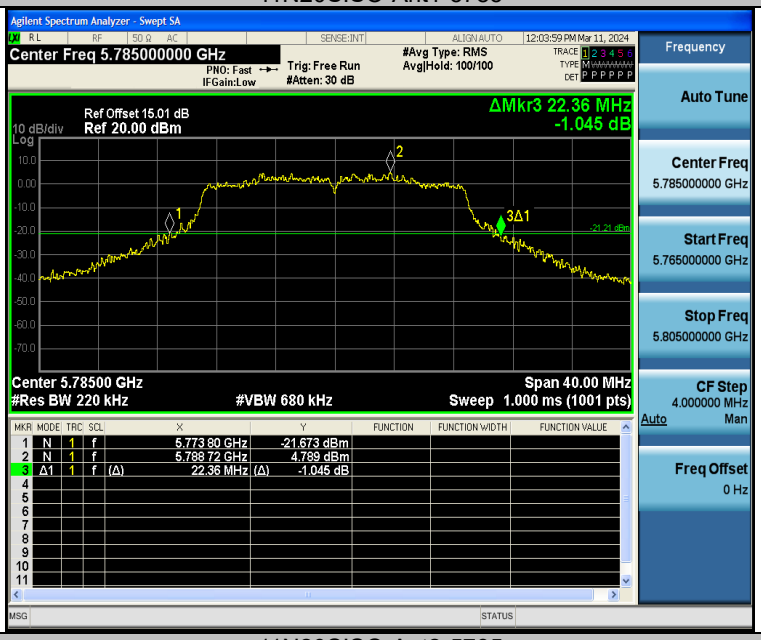

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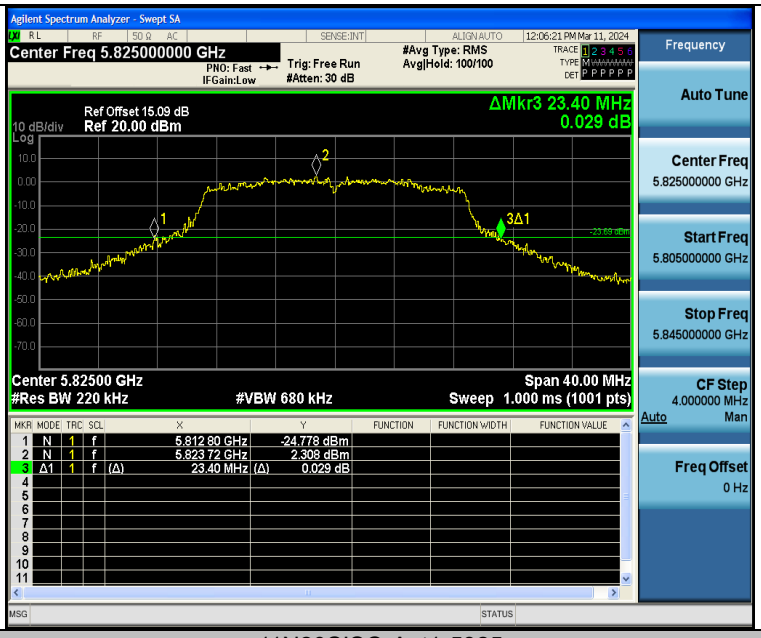

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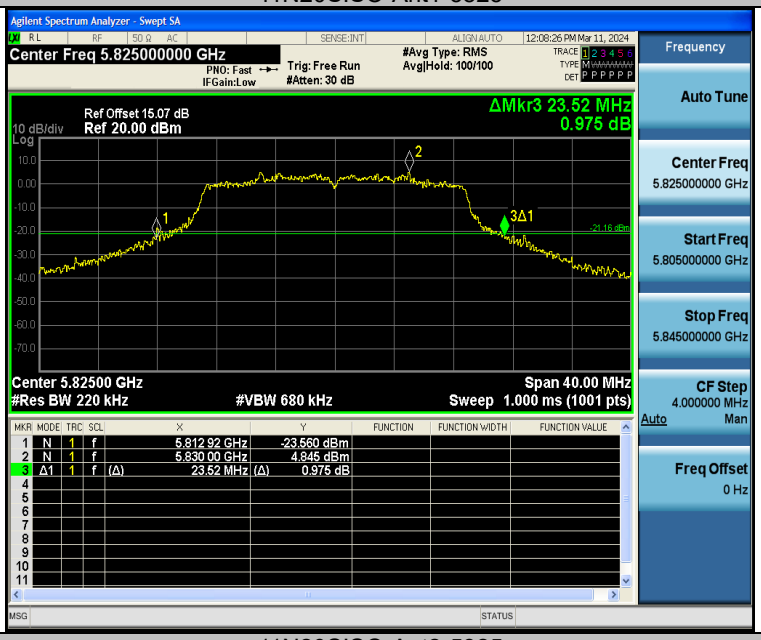

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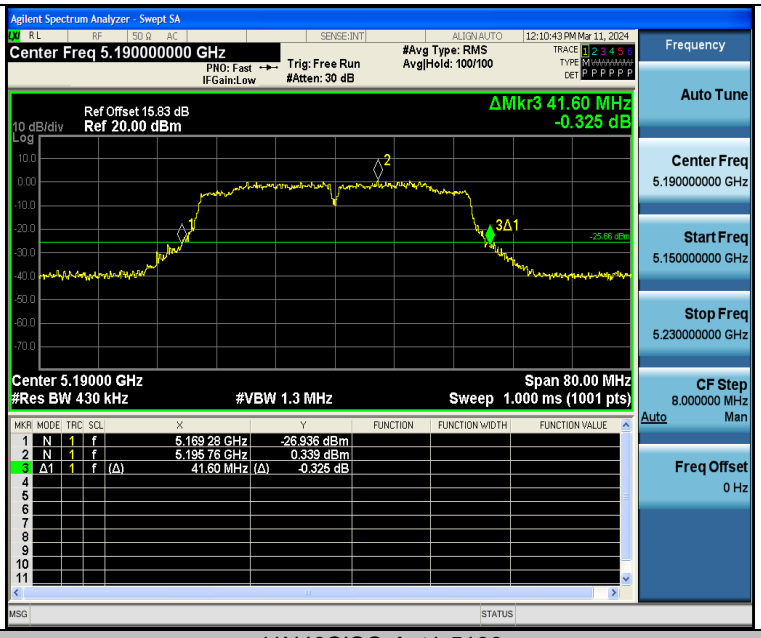

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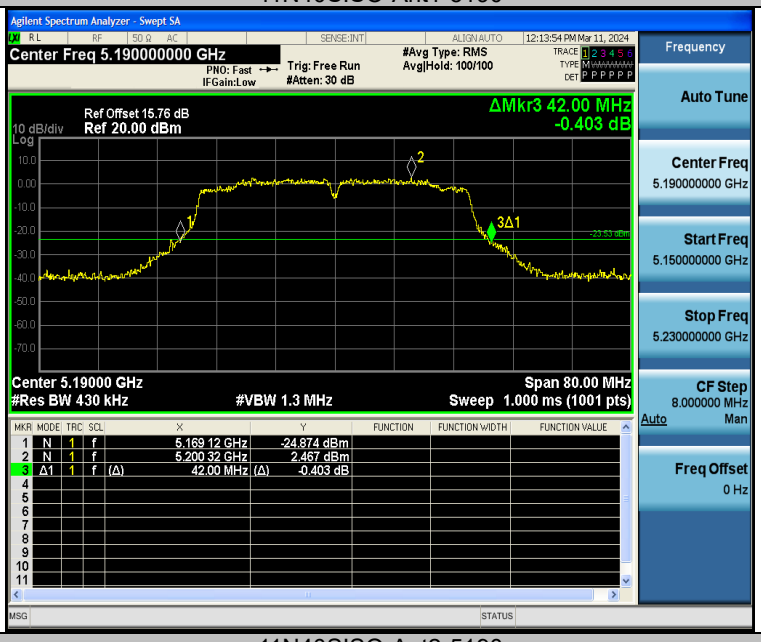

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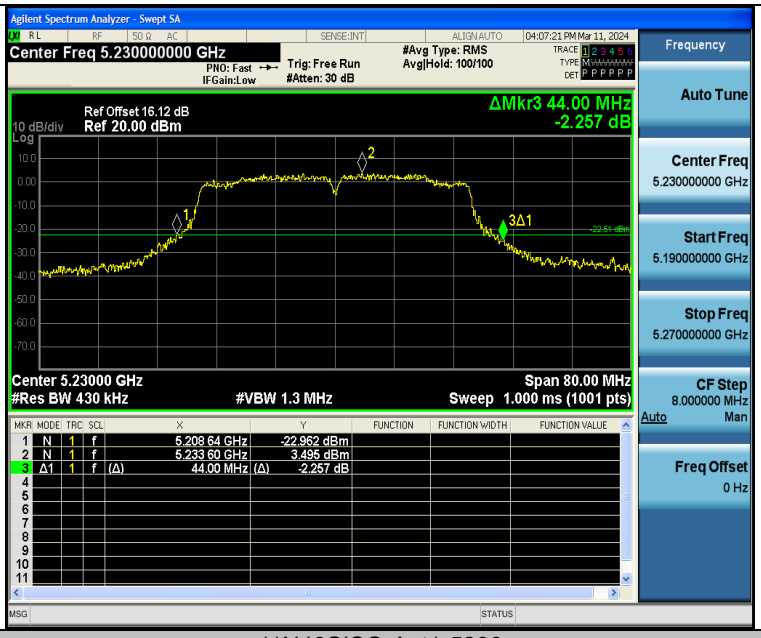
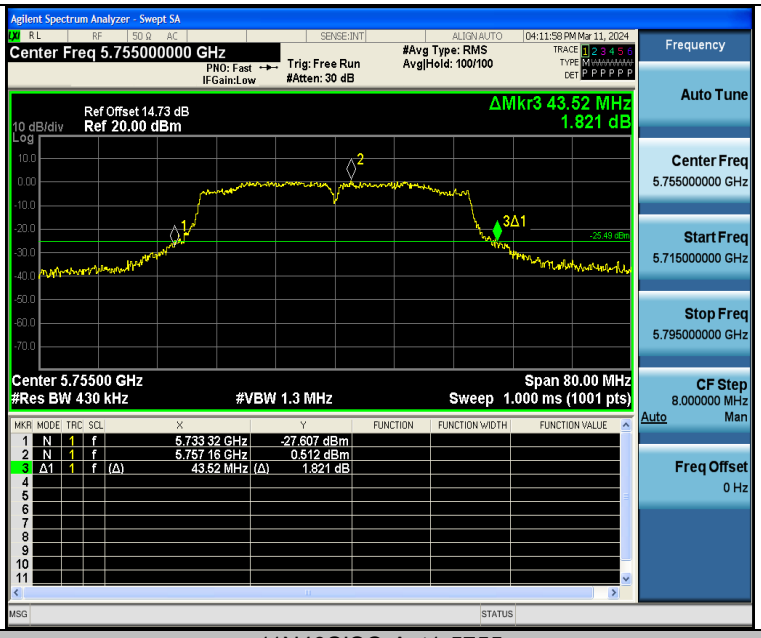
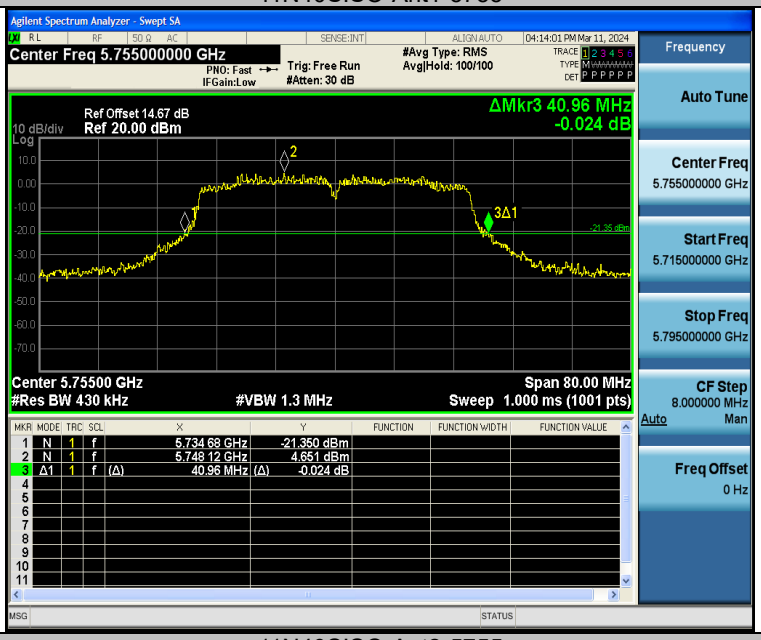


11N40SISO-Ant1-5230

11N40SISO-Ant2-5230



11N40SISO-Ant1-5755



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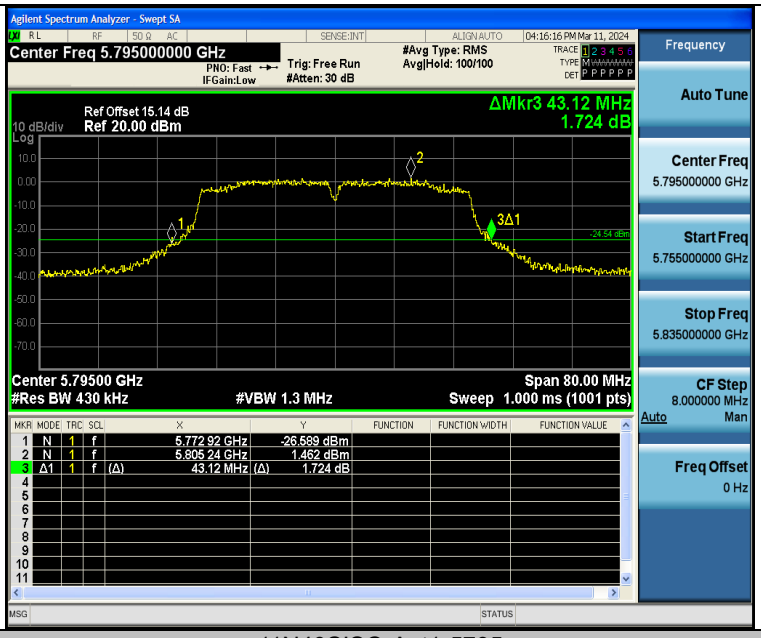
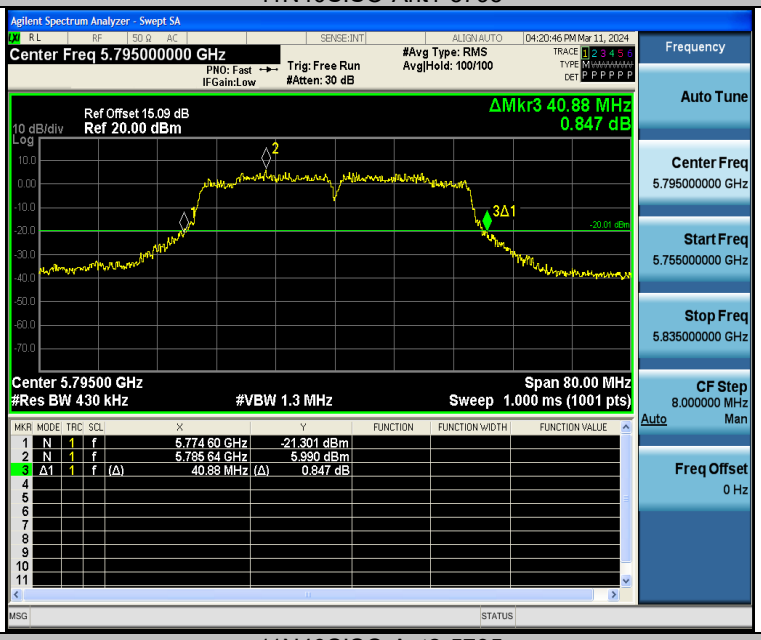


11N40SISO-Ant1-5795



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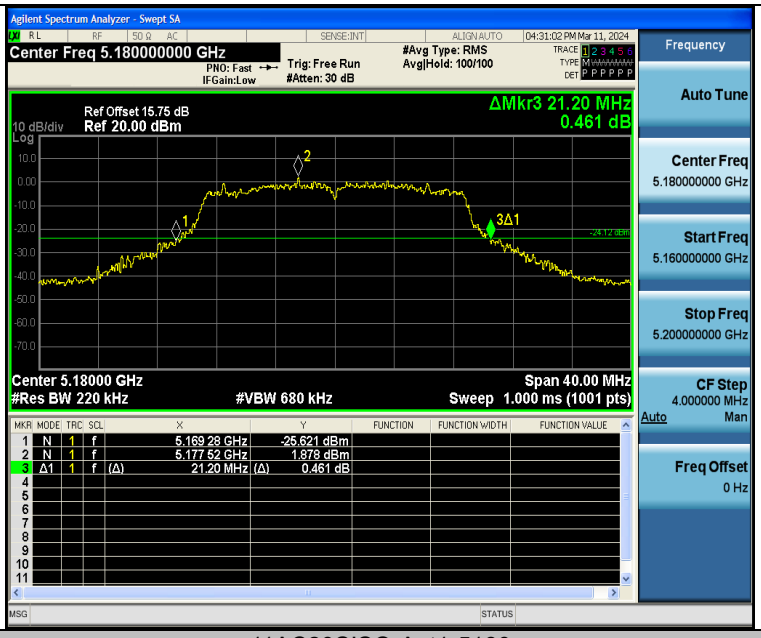

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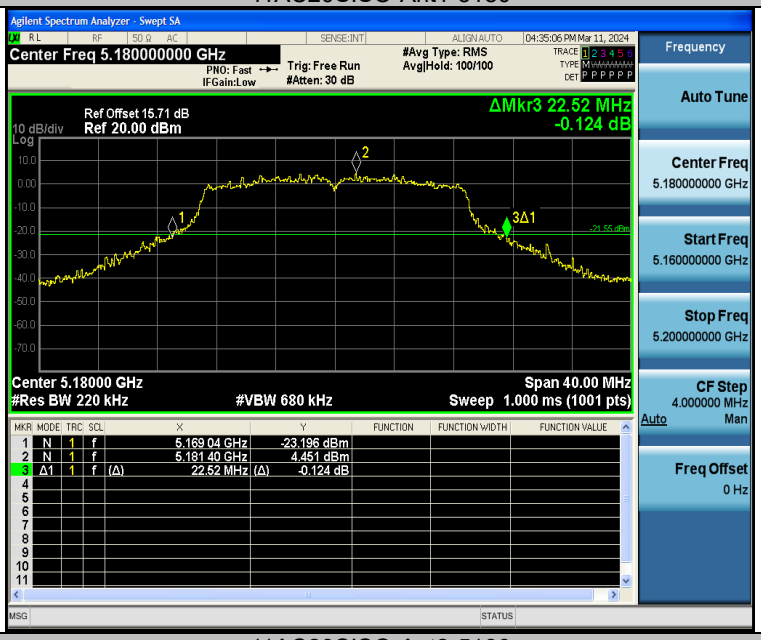
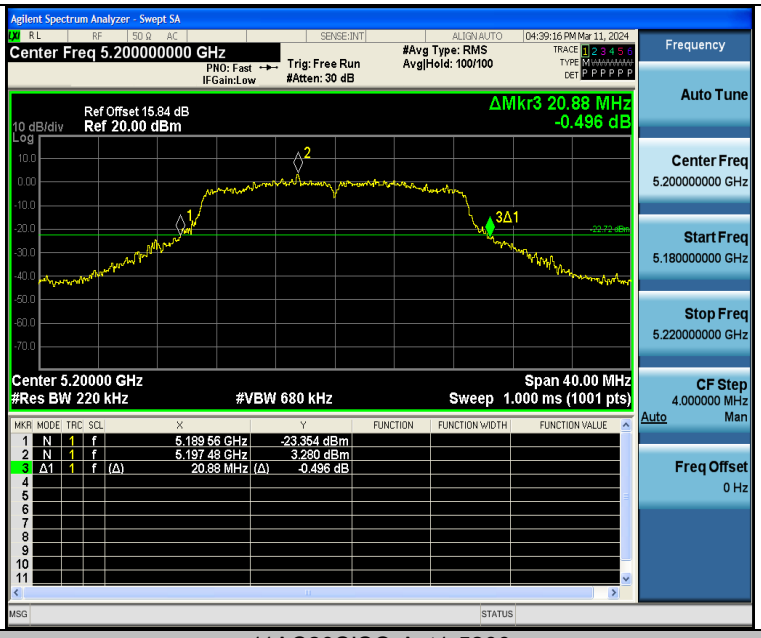


11AC20SISO-Ant2-5180



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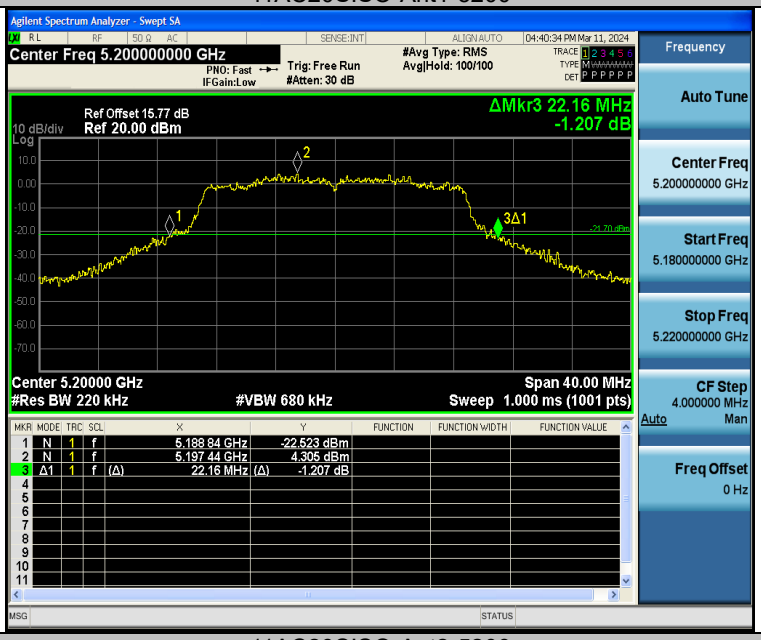

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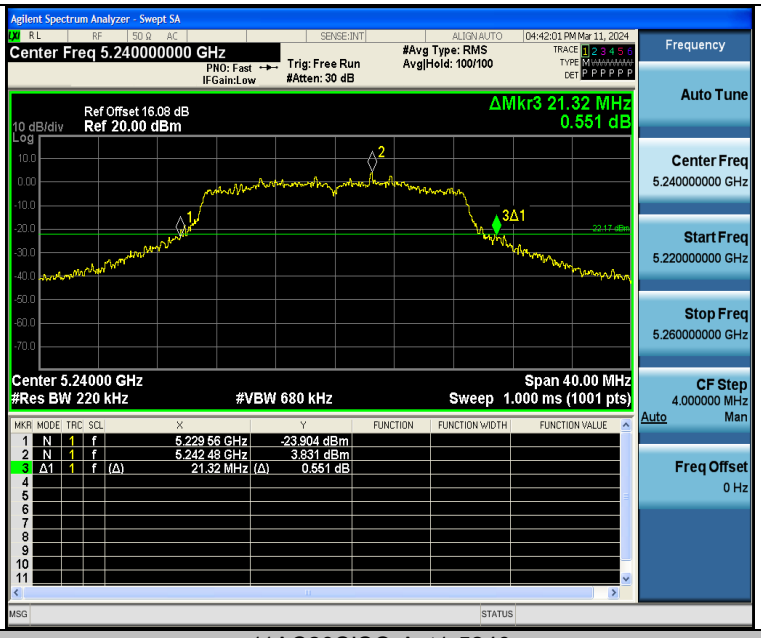
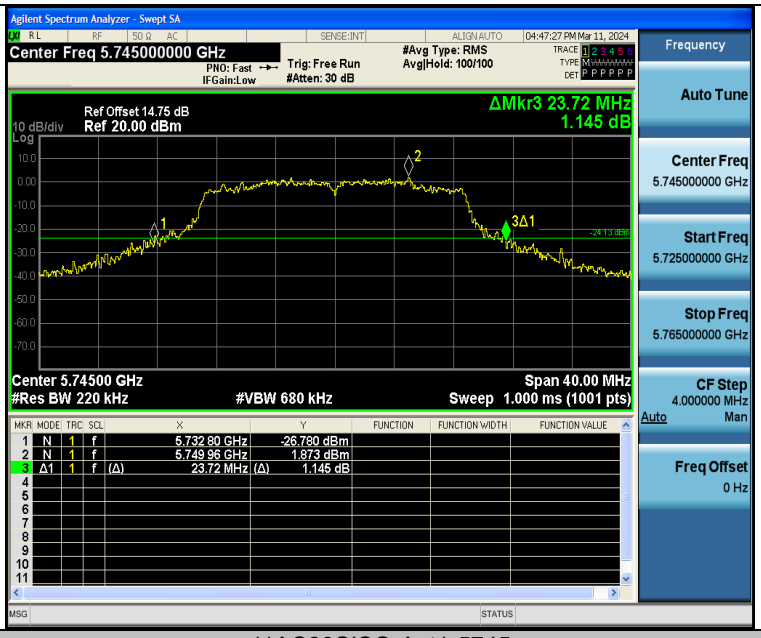
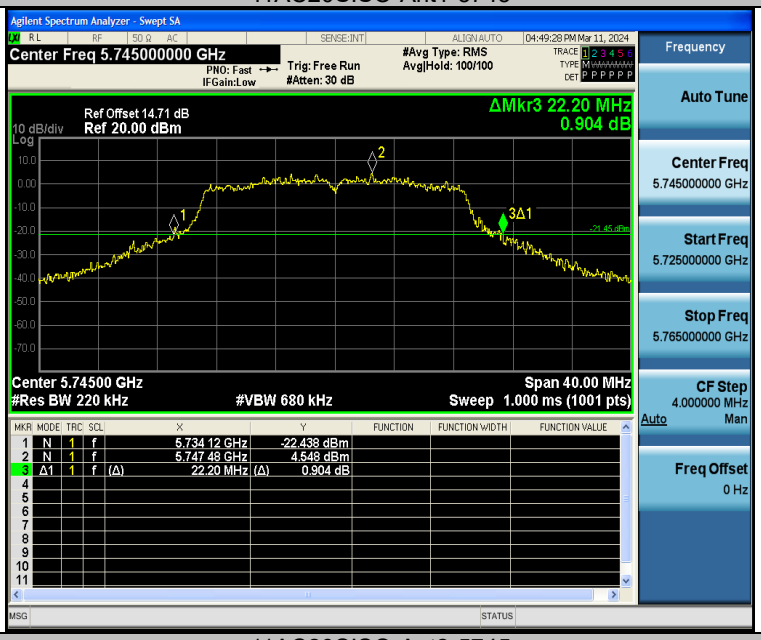


11AC20SISO-Ant1-5240

11AC20SISO-Ant2-5240



11AC20SISO-Ant1-5745



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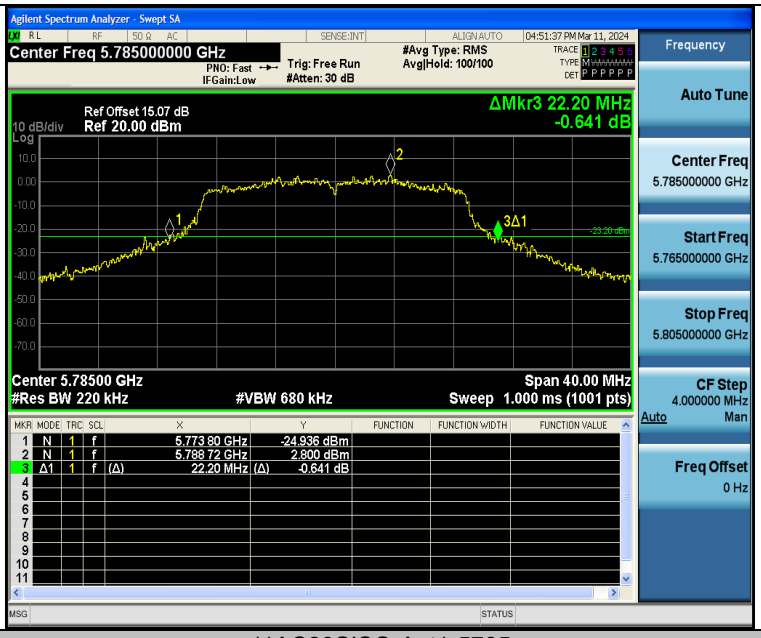
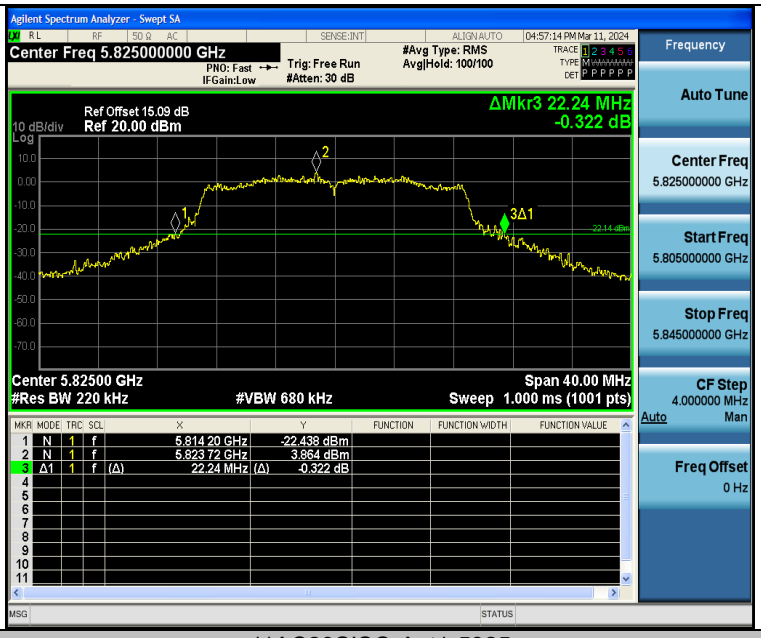
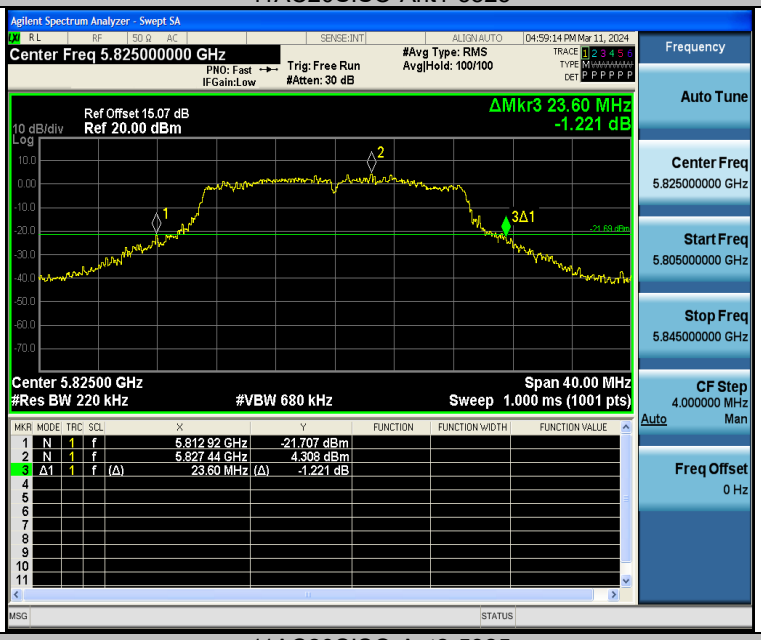


11AC20SISO-Ant1-5785

11AC20SISO-Ant2-5785



11AC20SISO-Ant1-5825



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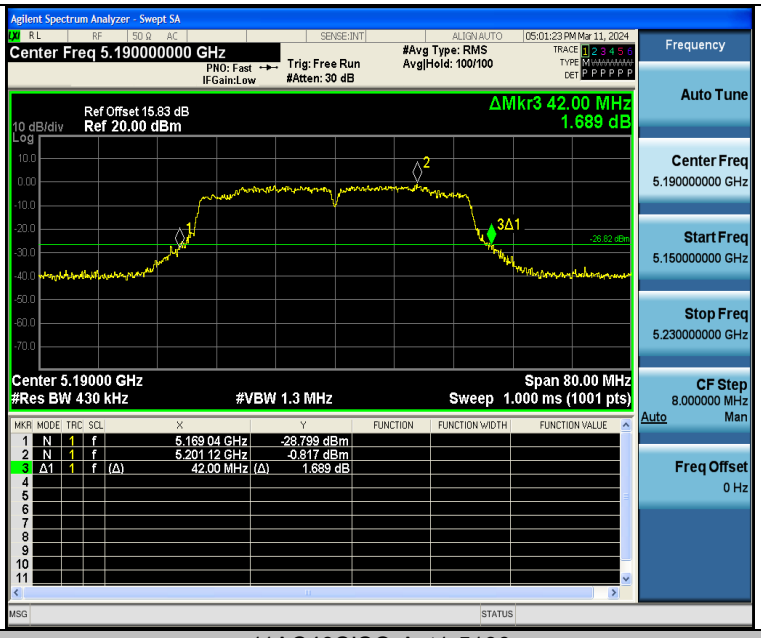

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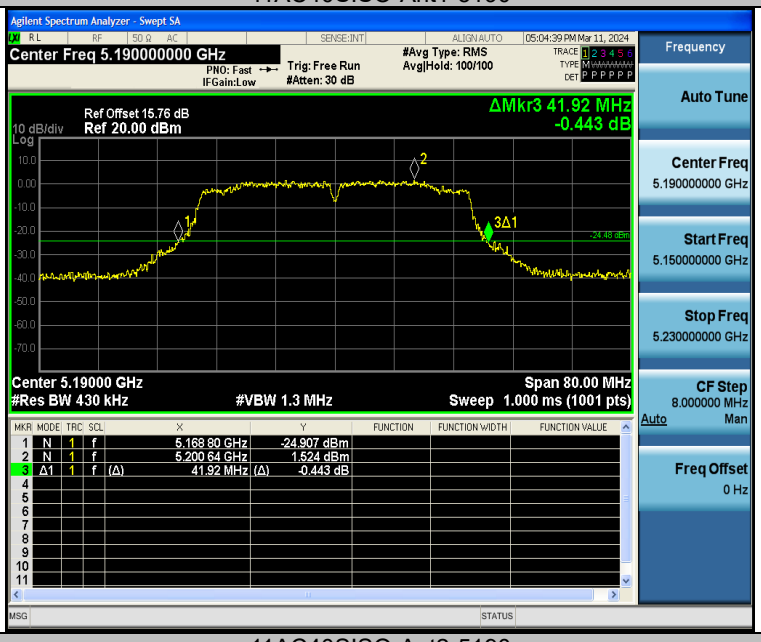

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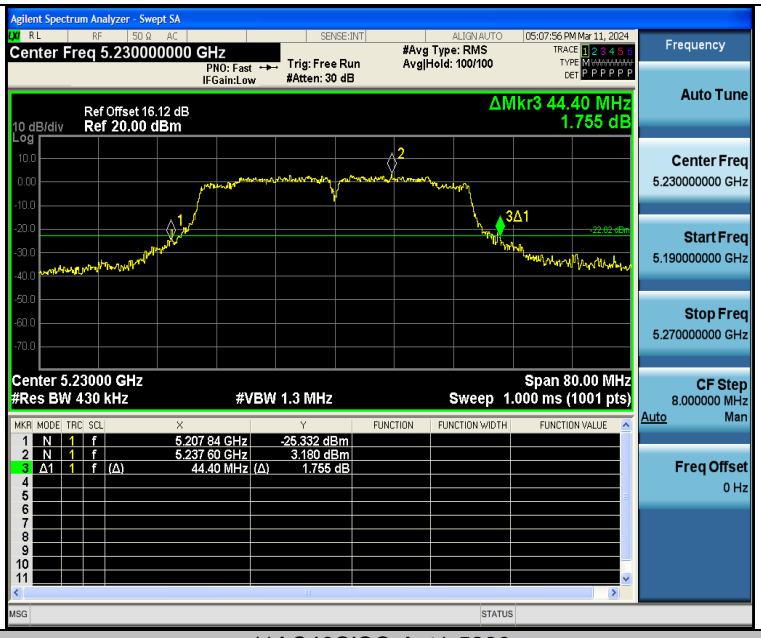
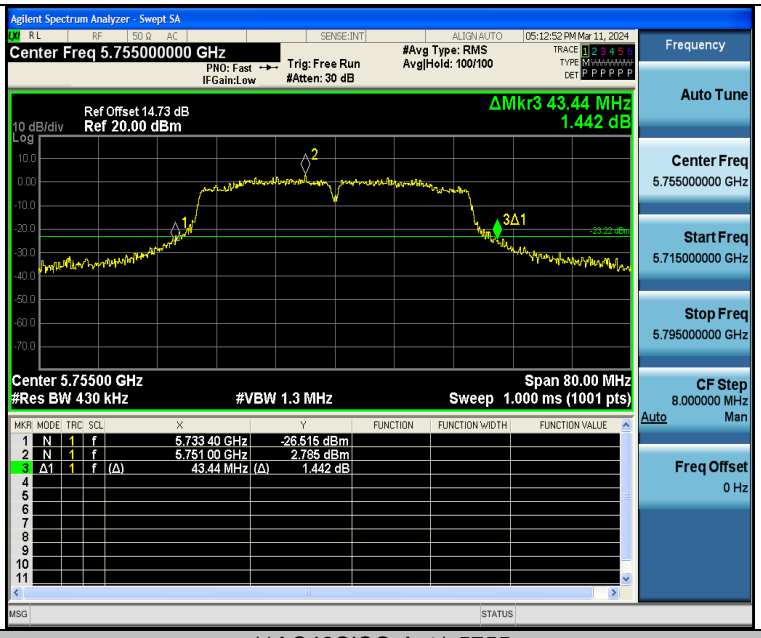


11AC40SISO-Ant1-5230

11AC40SISO-Ant2-5230



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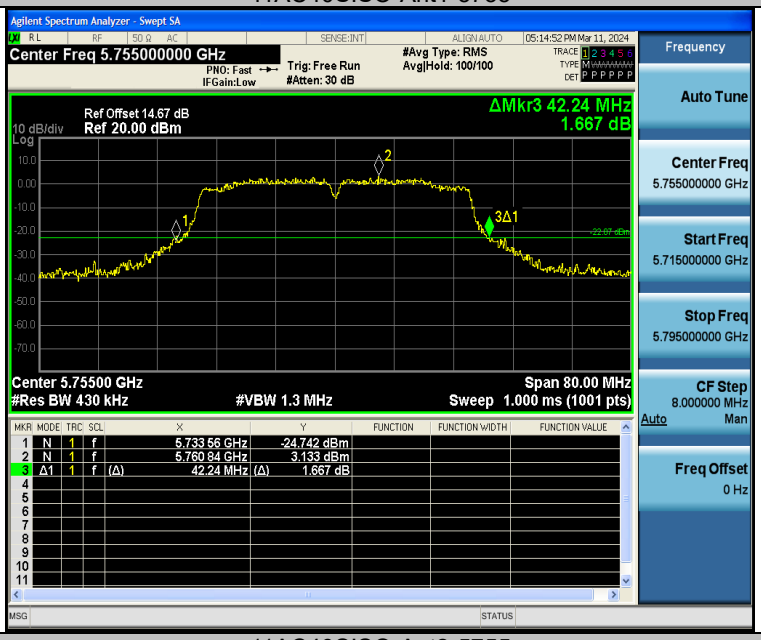

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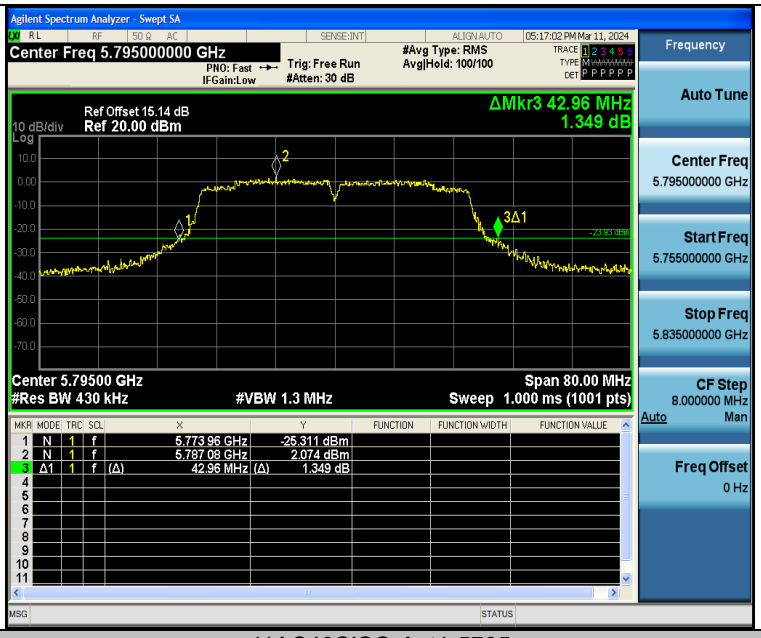

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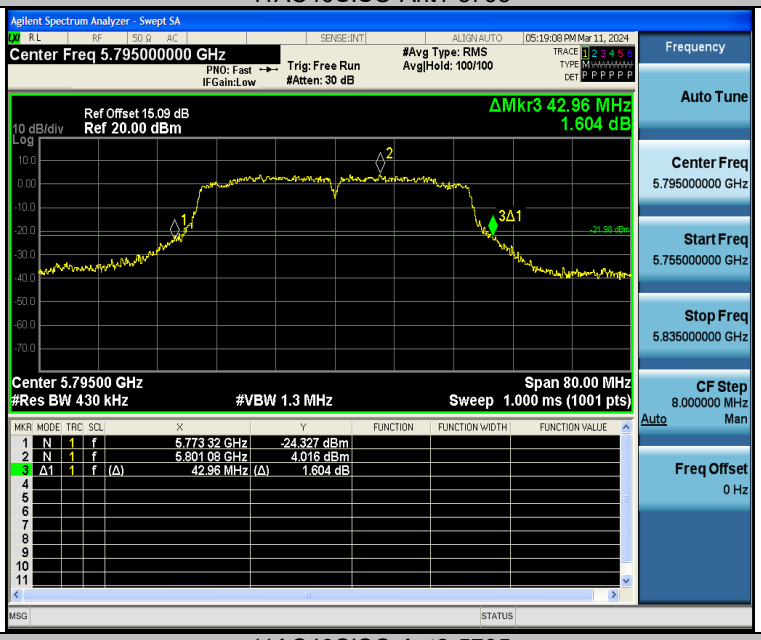

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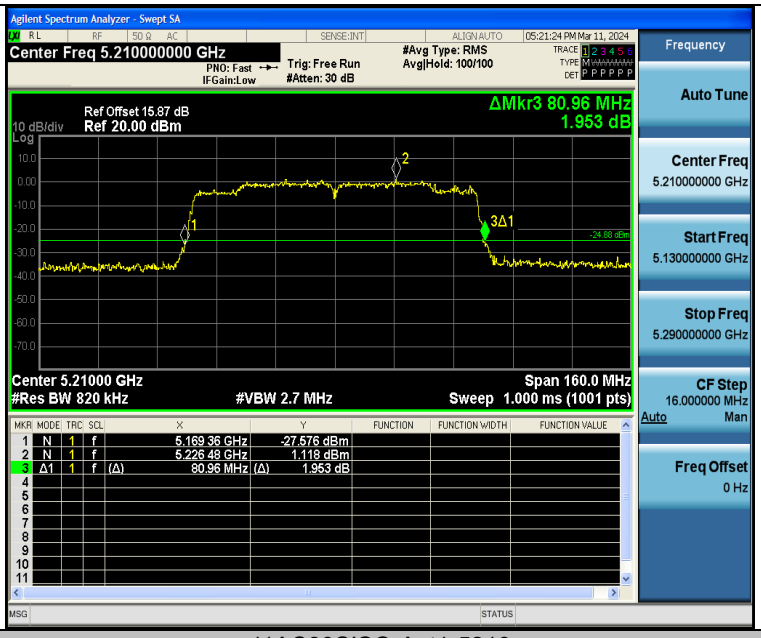

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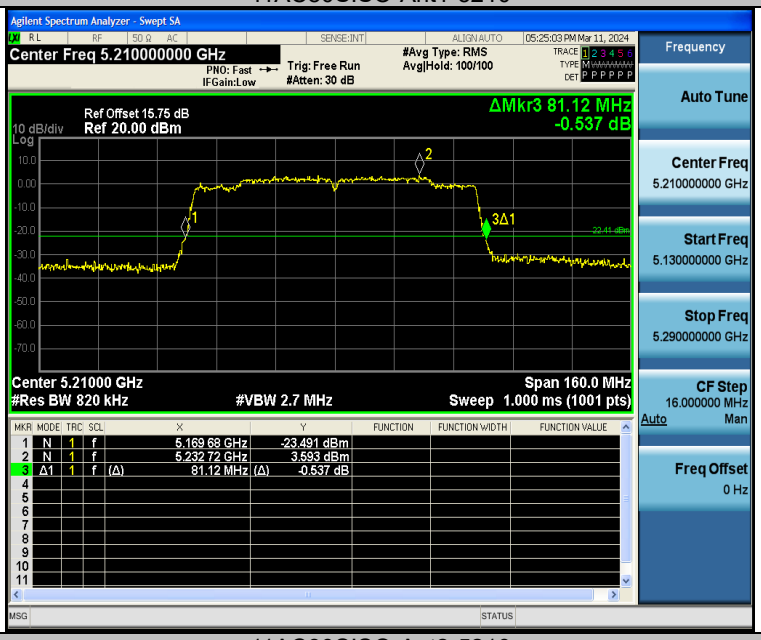

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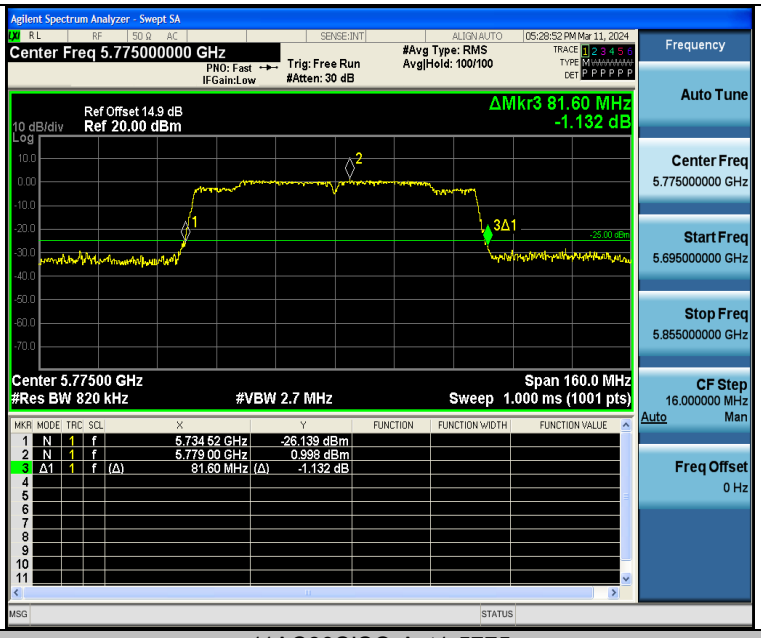

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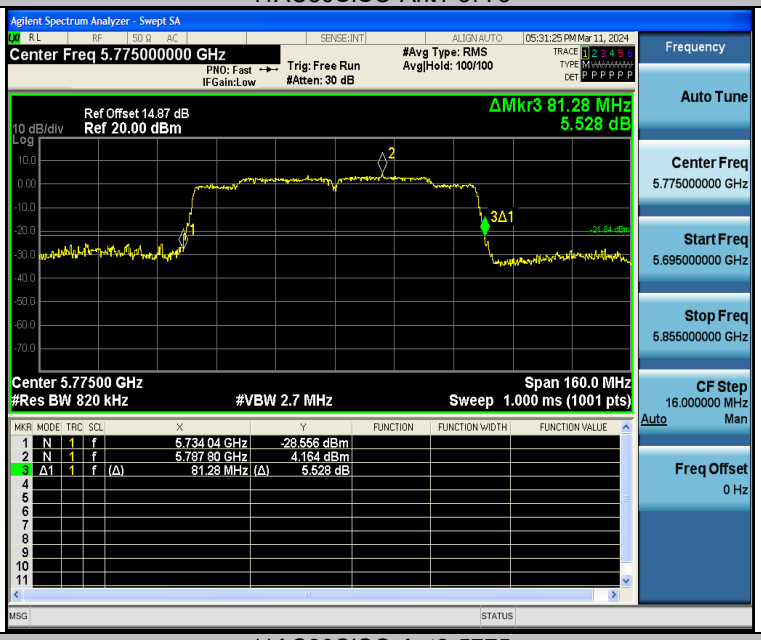
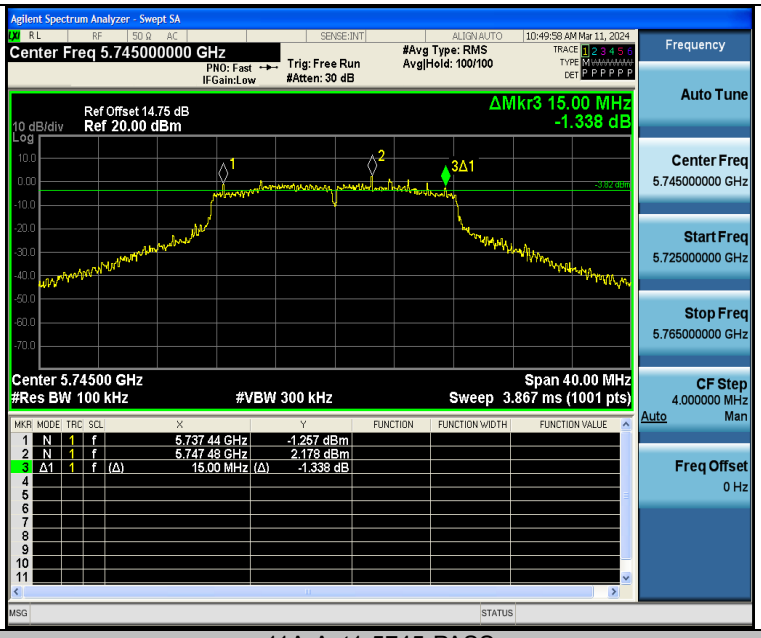
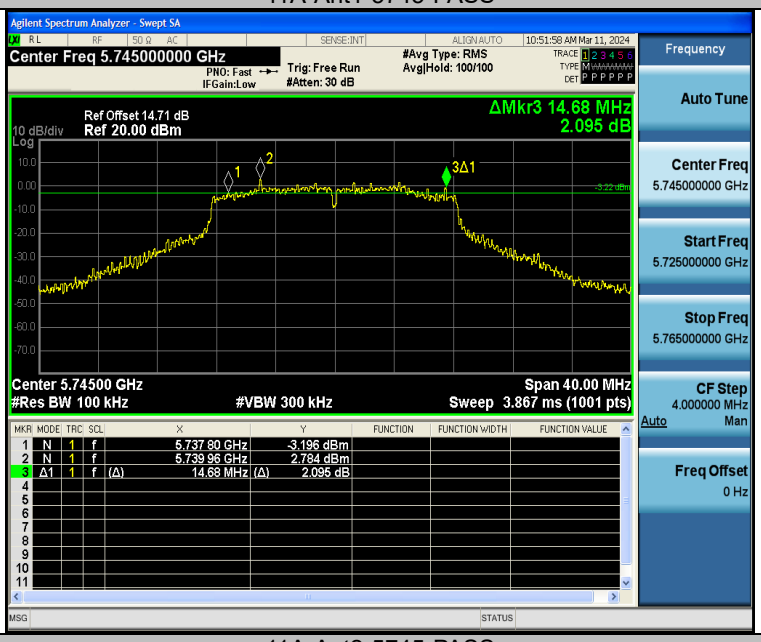


11AC80SISO-Ant2-5775

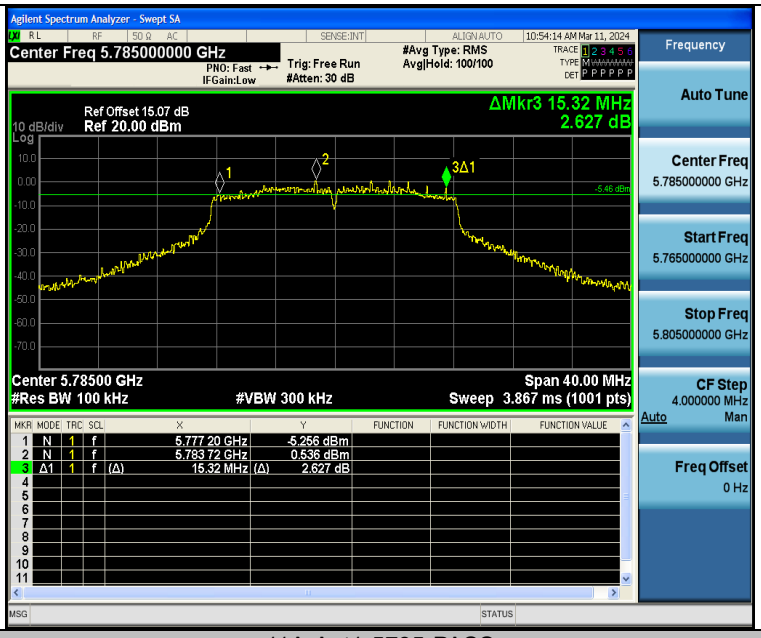
Min emission bandwidth Test Graphs:



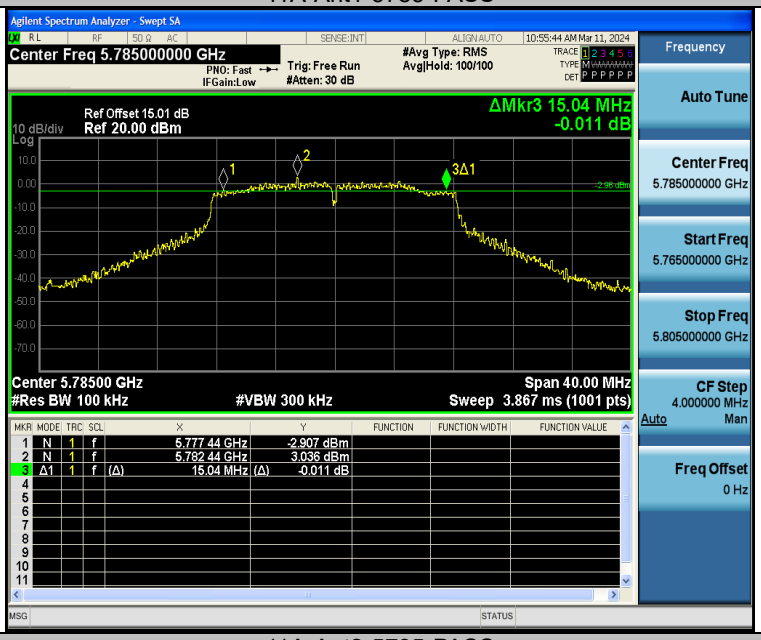
11A-Ant1-5745-PASS



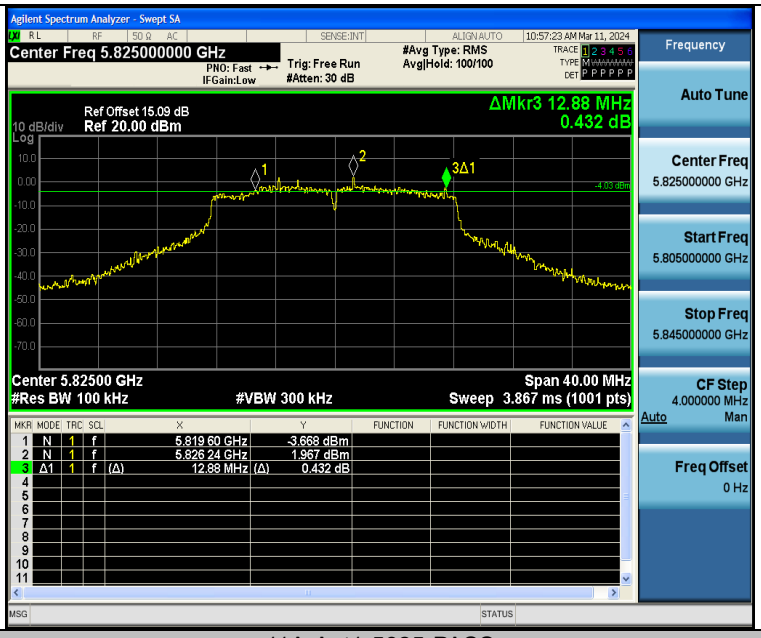
11A-Ant2-5745-PASS



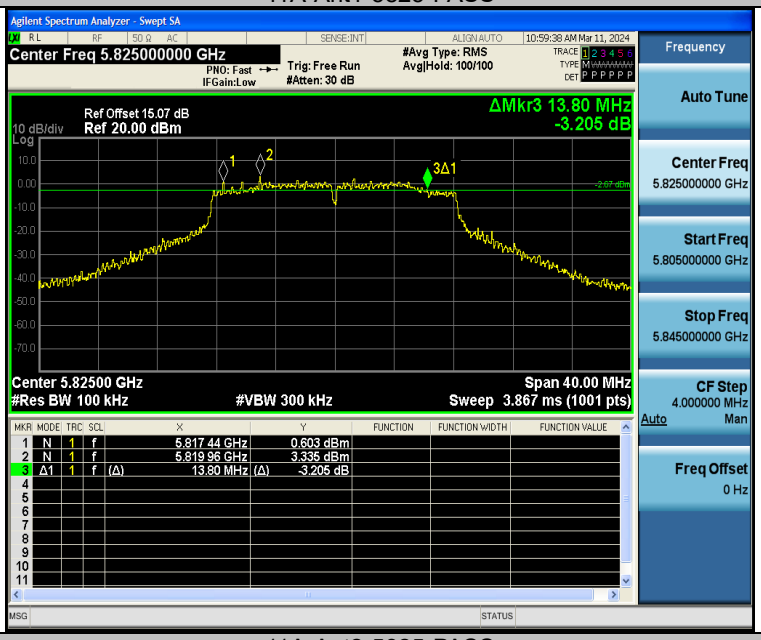
11A-Ant1-5785-PASS



11A-Ant2-5785-PASS



11A-Ant1-5825-PASS



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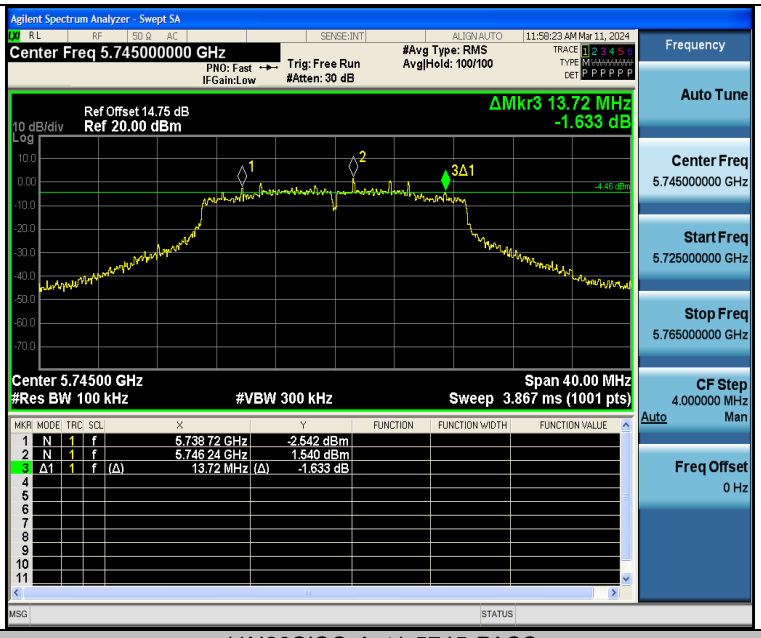
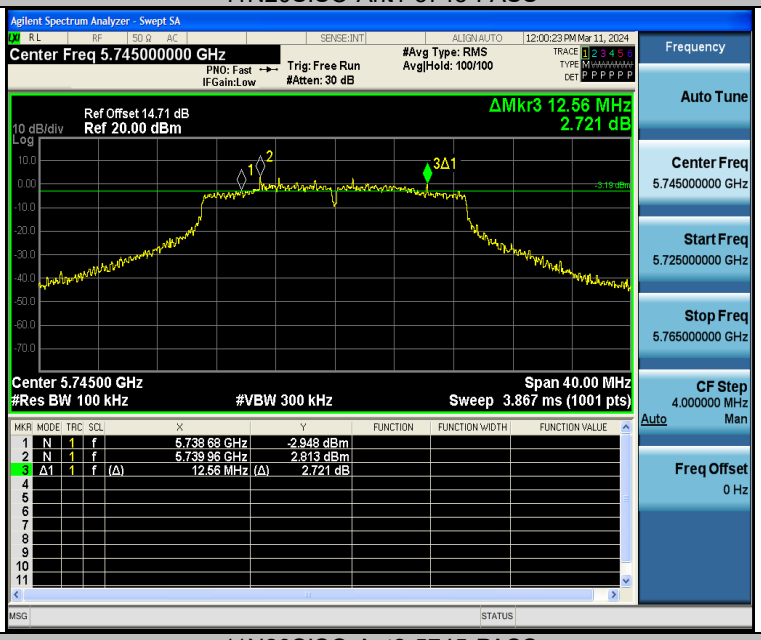


11N20SISO-Ant1-5745-PASS



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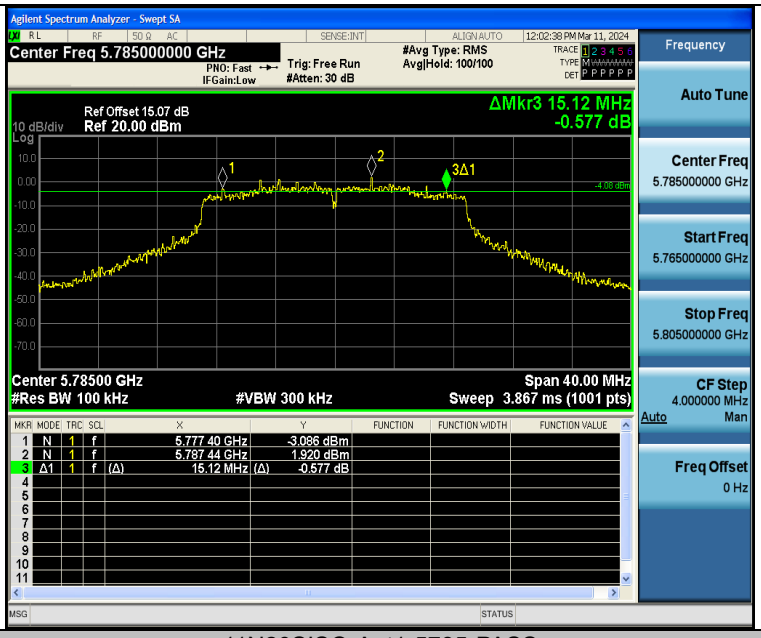

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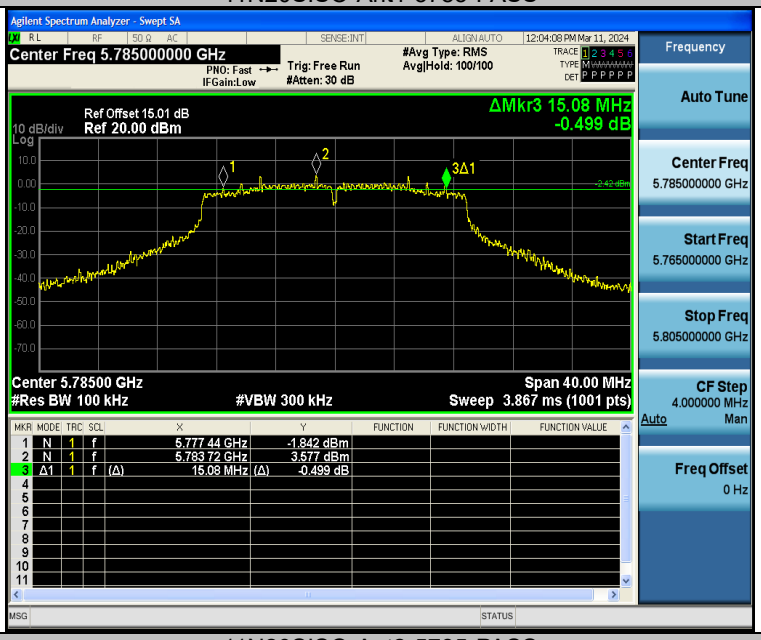

11N20SISO-Ant2-5785-PASS