Appendix C

RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: carplay box

Test Model: RK0232

Environmental Conditions

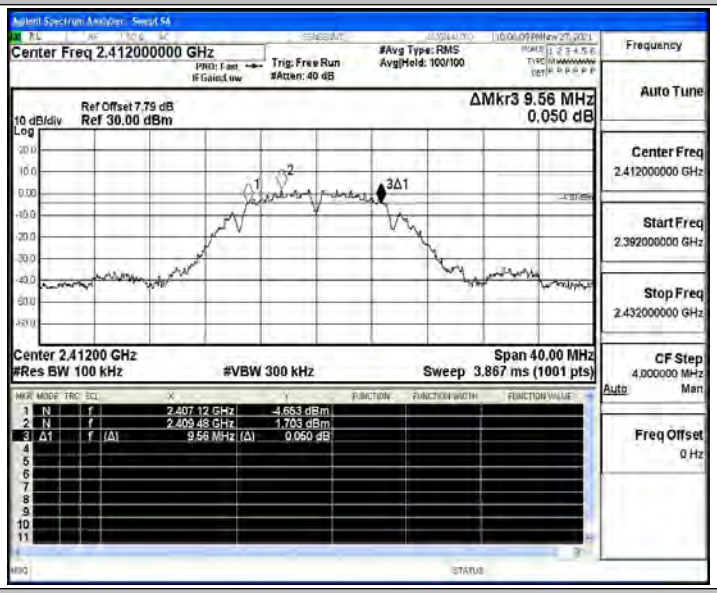
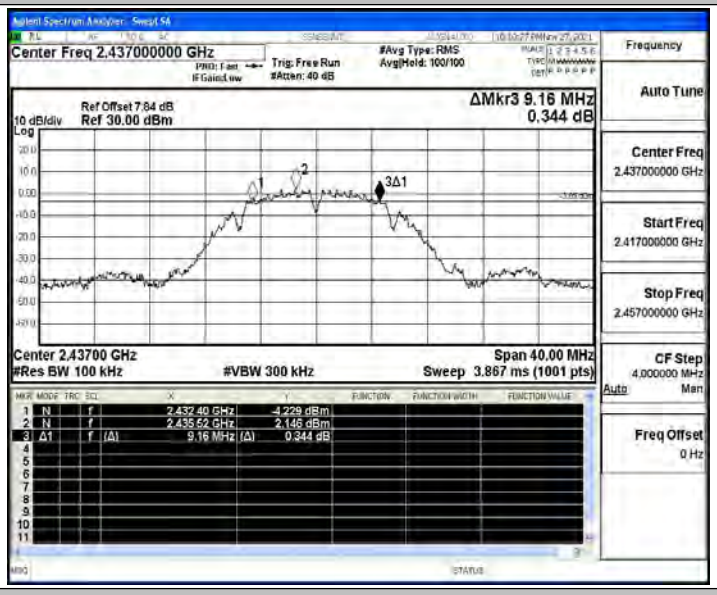
Temperature:	23.7° C
Relative Humidity:	52.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Monkey Li
Supervised by:	Li Huan

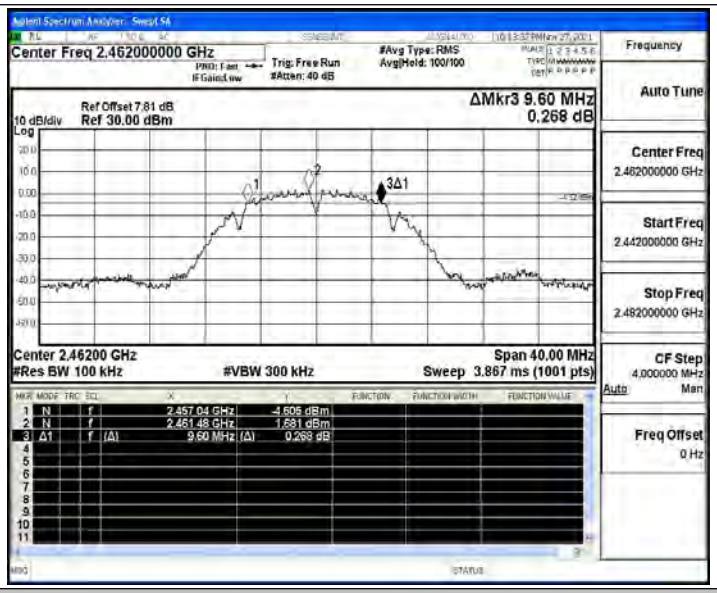
C.1 6dB Bandwidth

Test Result

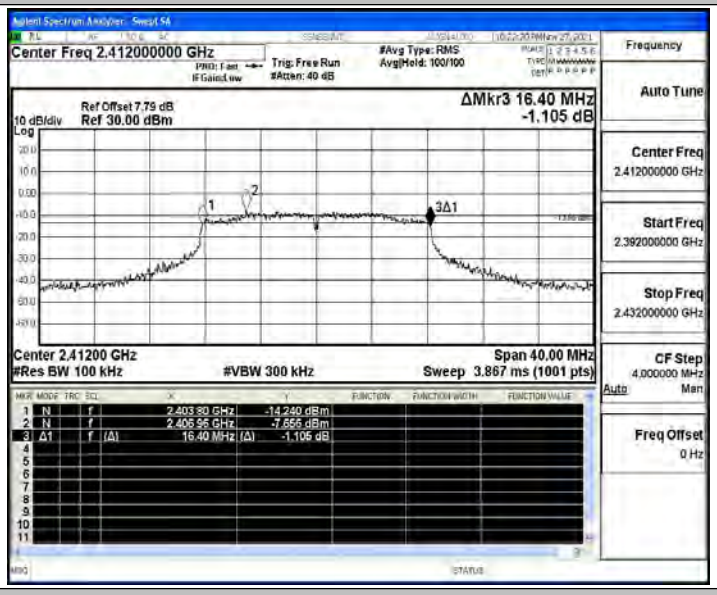
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.560	2407.120	2416.680	0.5	PASS
		2437	9.160	2432.400	2441.560	0.5	PASS
		2462	9.600	2457.040	2466.640	0.5	PASS
11G	Ant1	2412	16.400	2403.800	2420.200	0.5	PASS
		2437	15.880	2429.080	2444.960	0.5	PASS
		2462	13.880	2455.680	2469.560	0.5	PASS
11N20SISO	Ant1	2412	12.480	2405.440	2417.920	0.5	PASS
		2437	13.880	2430.640	2444.520	0.5	PASS
		2462	13.920	2454.440	2468.360	0.5	PASS
11N40SISO	Ant1	2422	32.720	2406.880	2439.600	0.5	PASS
		2437	33.840	2419.480	2453.320	0.5	PASS
		2452	35.280	2434.320	2469.600	0.5	PASS

Test Graphs

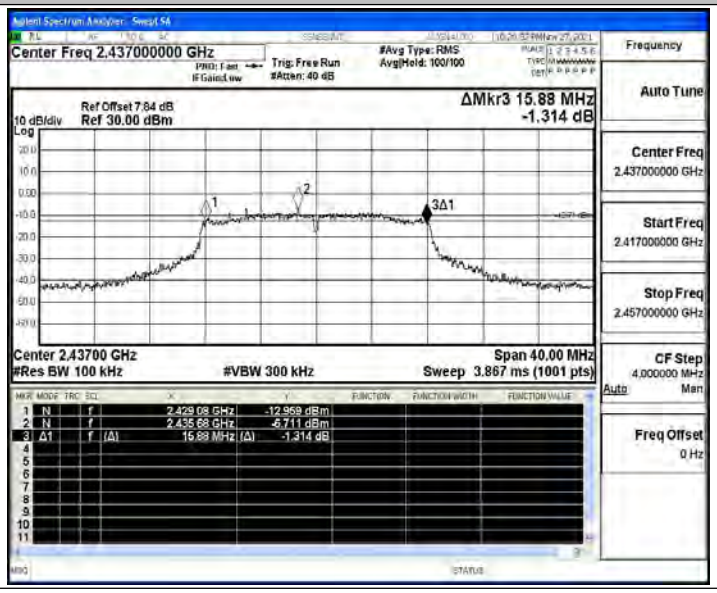
11B_Ant1_2412

11B_Ant1_2437

11B_Ant1_2462

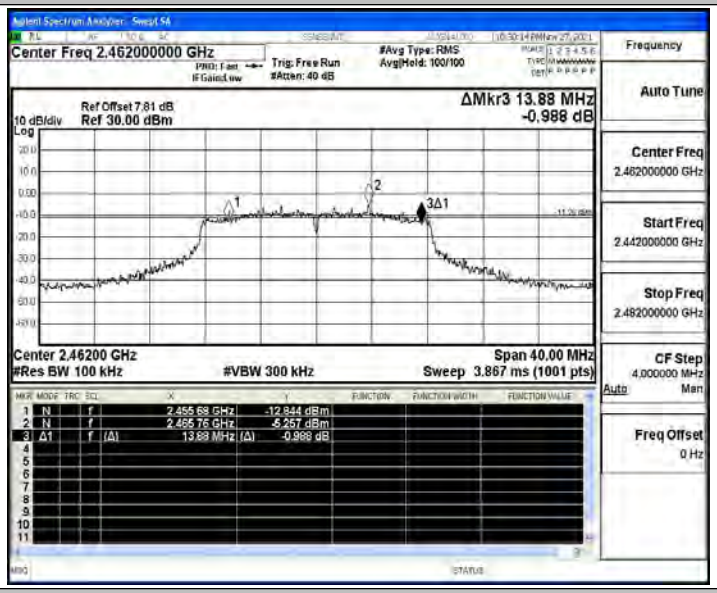
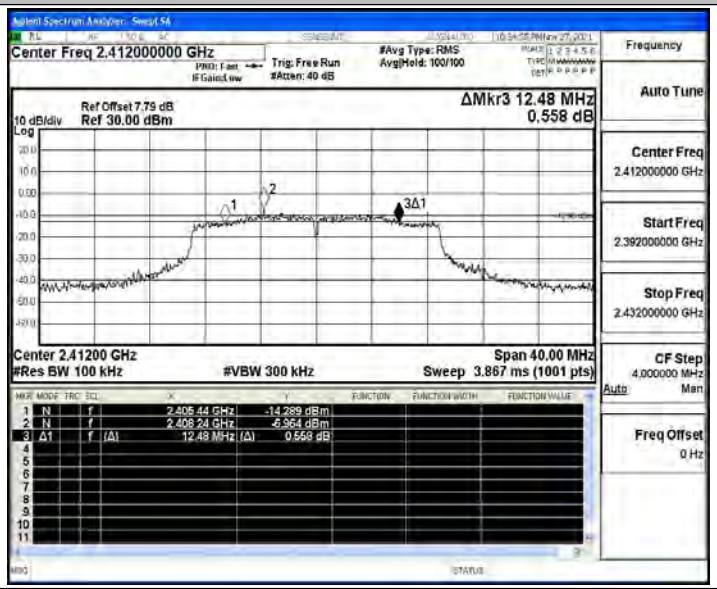


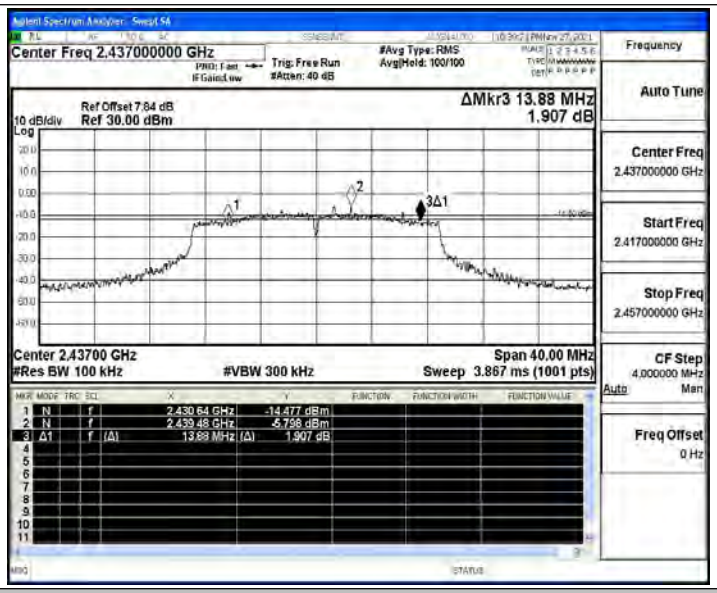
11G_Ant1_2412



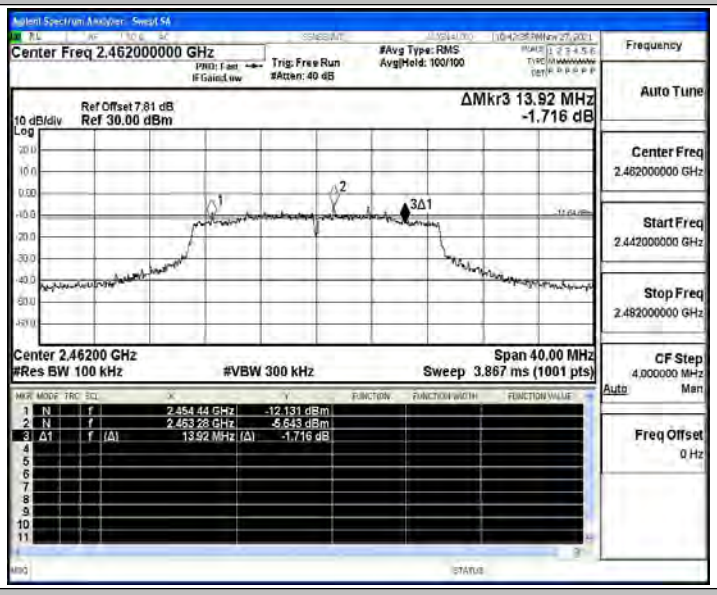
11G_Ant1_2437



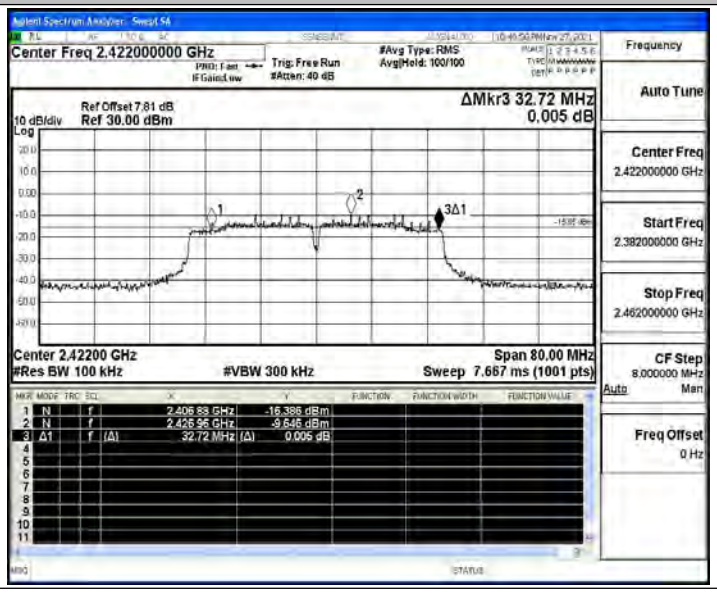
11G_Ant1_2462

11N20SISO_Ant1_2412

11N20SISO_Ant1_2437

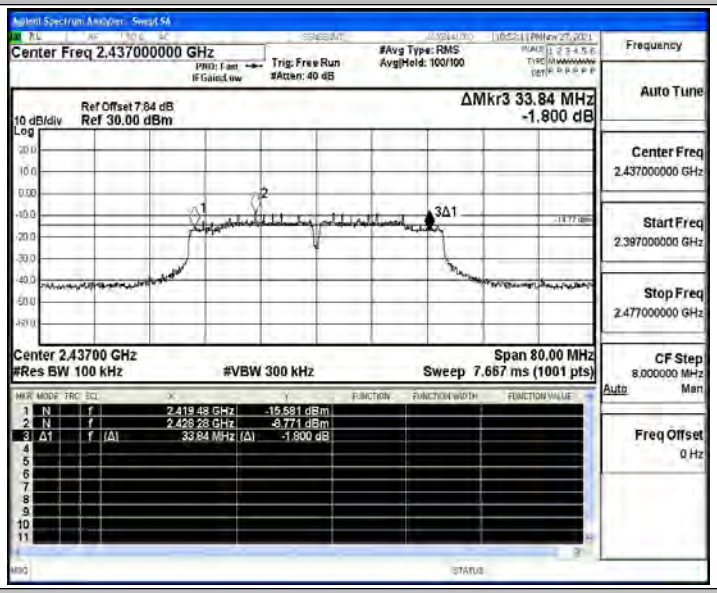
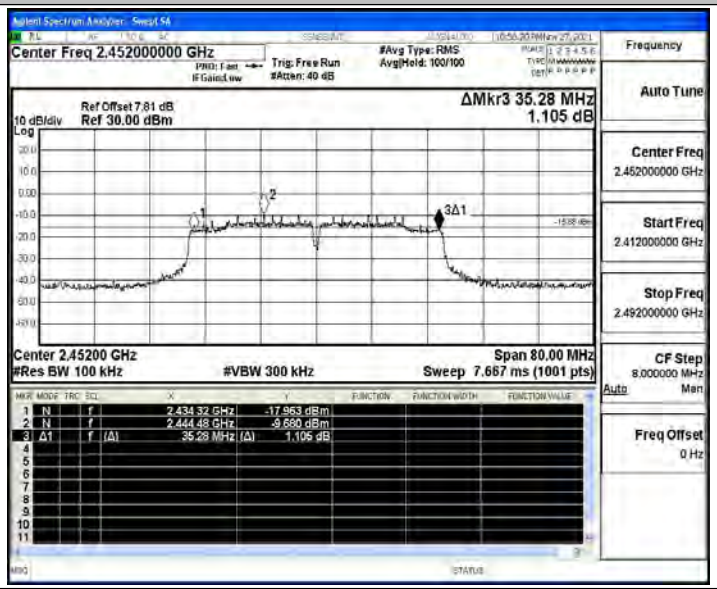


11N20SISO_Ant1_2462



11N40SISO_Ant1_2422



11N40SISO_Ant1_2437

11N40SISO_Ant1_2452


C.2 Maximum conducted output power

Test Result

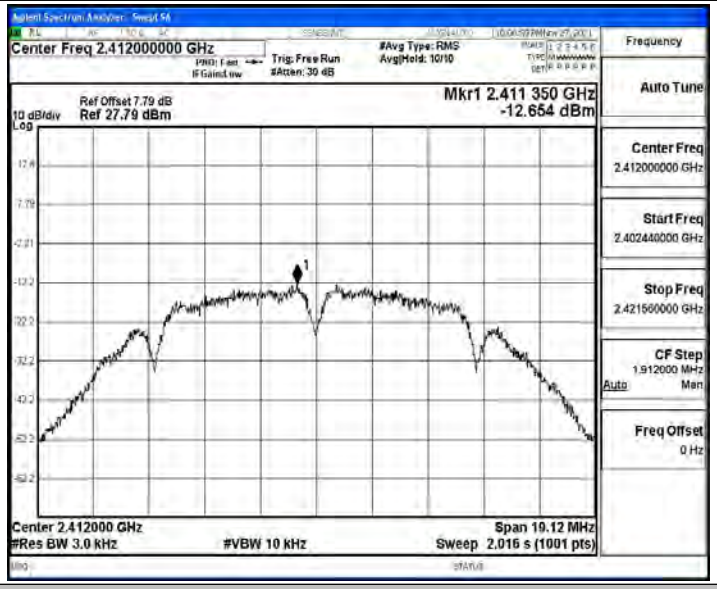
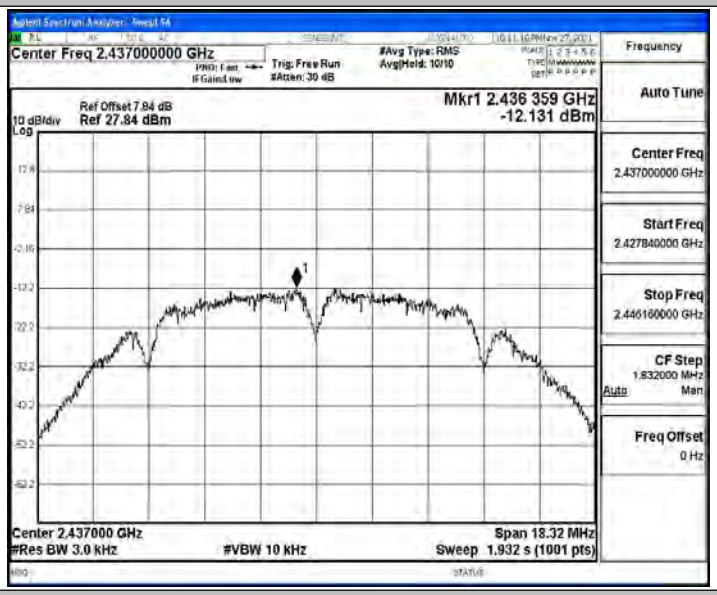
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	2412	14.65	≤30	PASS
		2437	15.37	≤30	PASS
		2462	15.72	≤30	PASS
11G	Ant1	2412	12.17	≤30	PASS
		2437	12.61	≤30	PASS
		2462	12.94	≤30	PASS
11N20SISO	Ant1	2412	11.48	≤30	PASS
		2437	11.72	≤30	PASS
		2462	12.39	≤30	PASS
11N40SISO	Ant1	2422	11.03	≤30	PASS
		2437	11.74	≤30	PASS
		2452	12.58	≤30	PASS

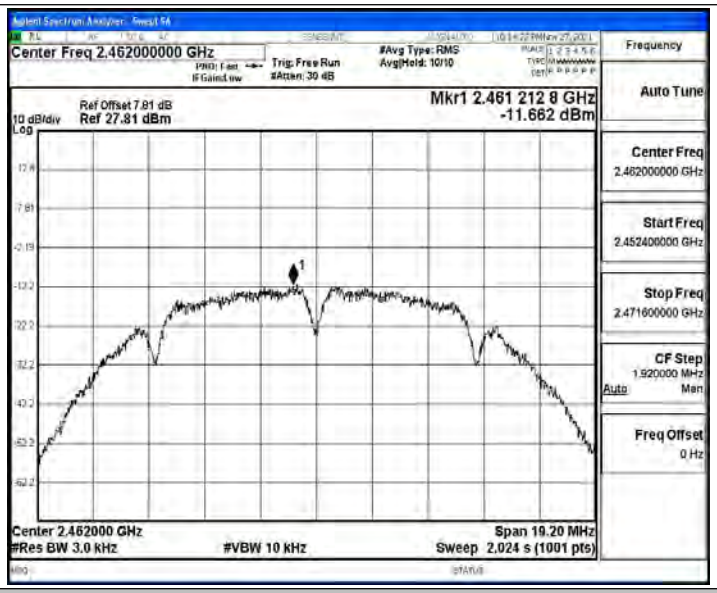
C.3 Maximum power spectral density

Test Result

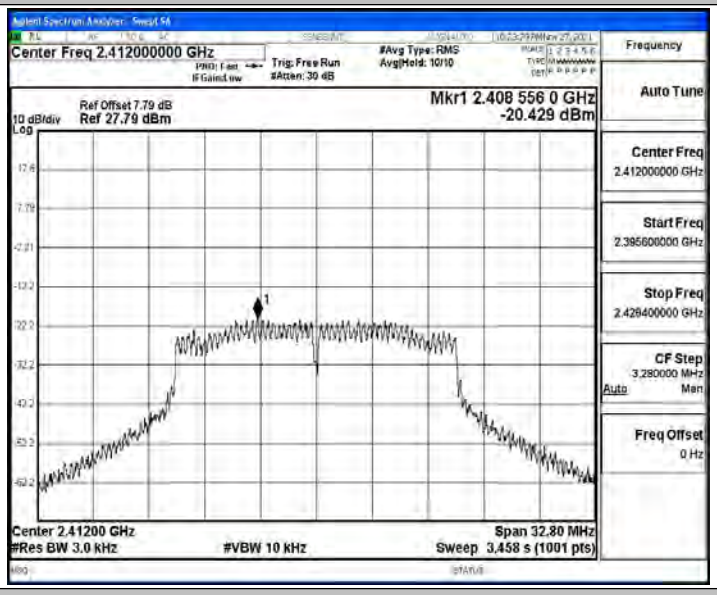
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-12.65	≤8	PASS
		2437	-12.13	≤8	PASS
		2462	-11.66	≤8	PASS
11G	Ant1	2412	-20.43	≤8	PASS
		2437	-19.77	≤8	PASS
		2462	-18.91	≤8	PASS
11N20SISO	Ant1	2412	-20.47	≤8	PASS
		2437	-20.58	≤8	PASS
		2462	-19.2	≤8	PASS
11N40SISO	Ant1	2422	-22.59	≤8	PASS
		2437	-22.33	≤8	PASS
		2452	-21.34	≤8	PASS

Test Graphs

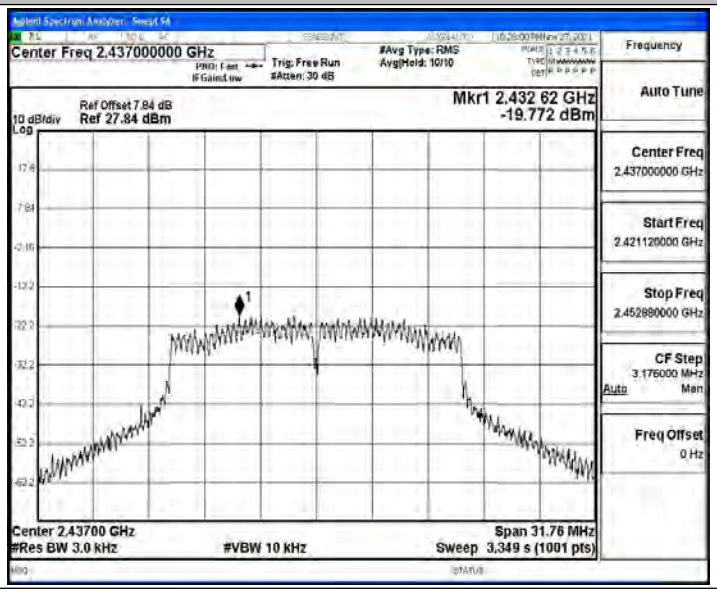
11B_Ant1_2412

11B_Ant1_2437

11B_Ant1_2462



11G_Ant1_2412



11G_Ant1_2437



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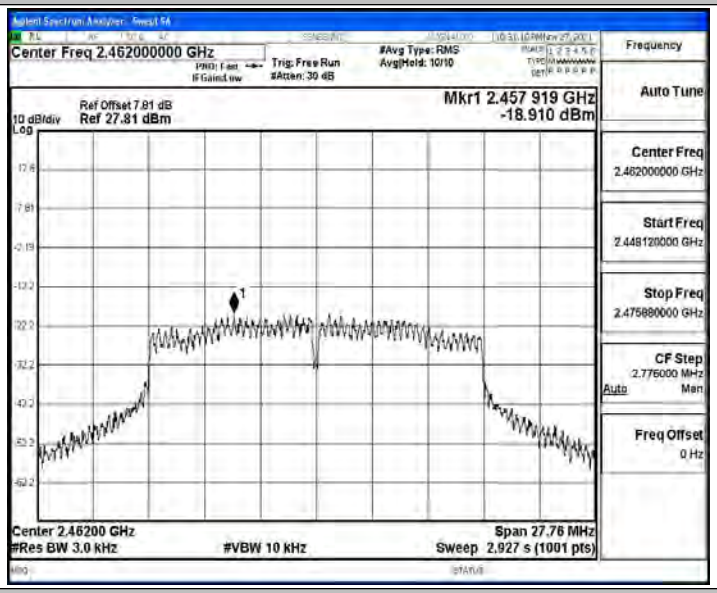
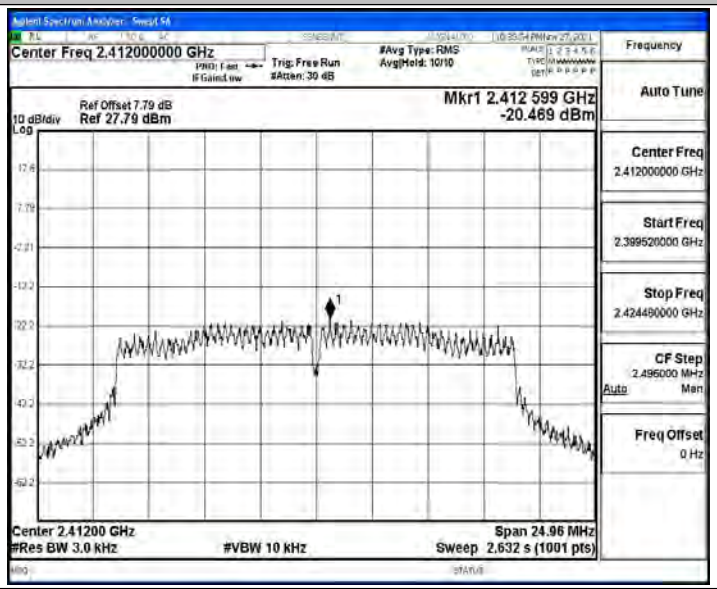
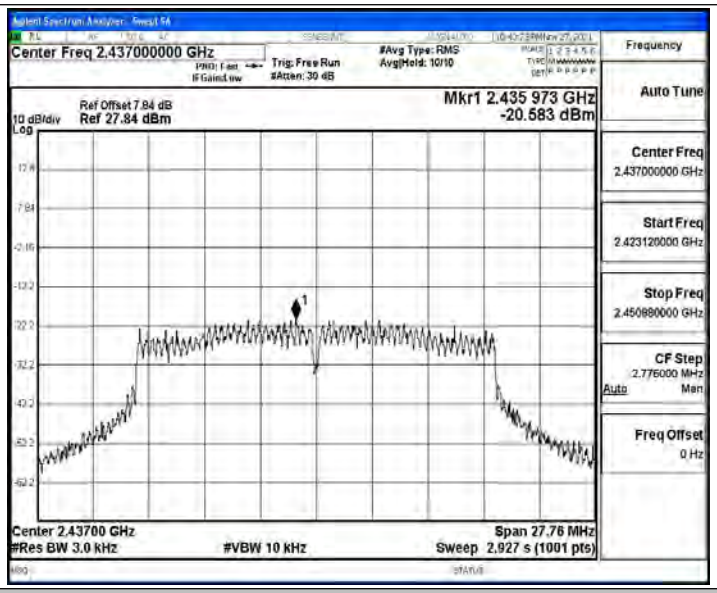

11N20SISO_Ant1_2412

11N20SISO_Ant1_2437



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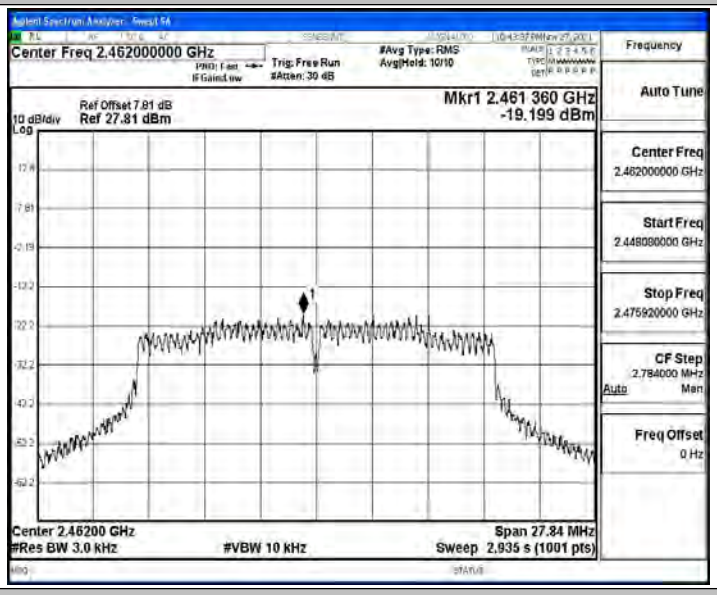
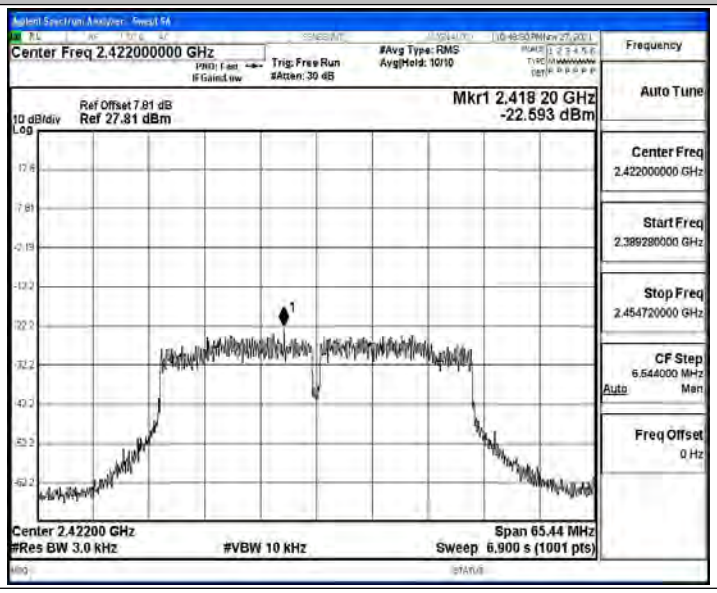


11N40SISO_Ant1_2422



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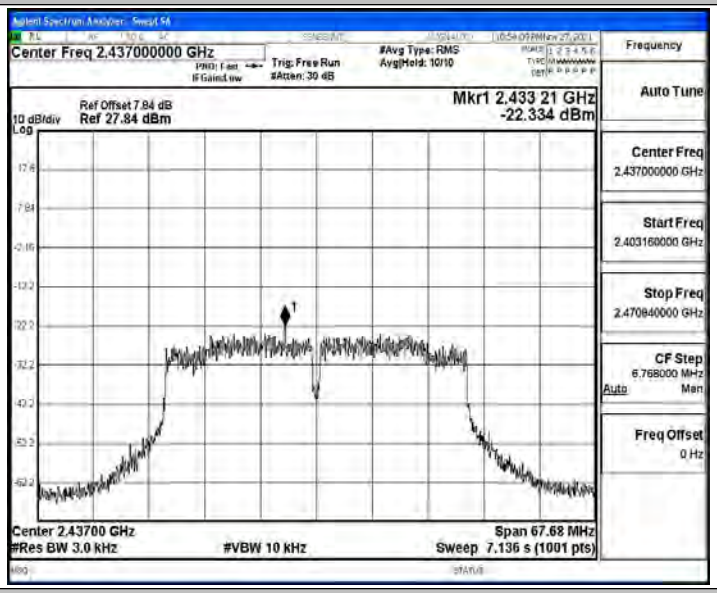
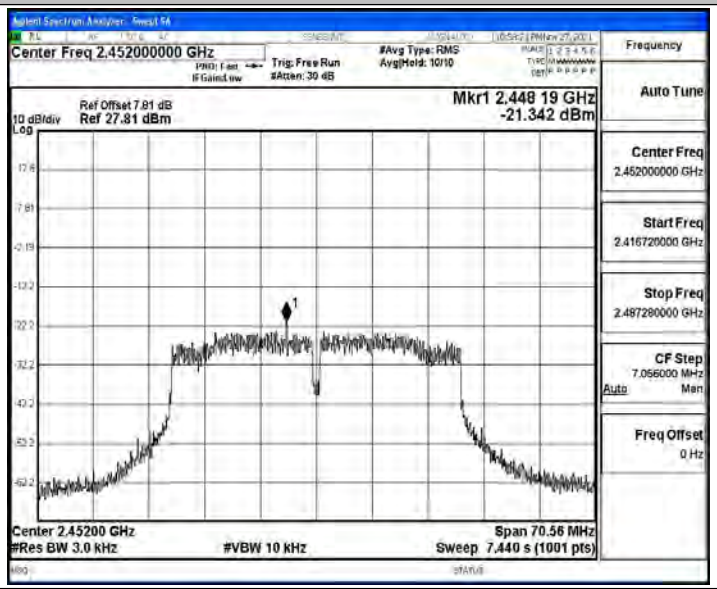

11N40SISO_Ant1_2452


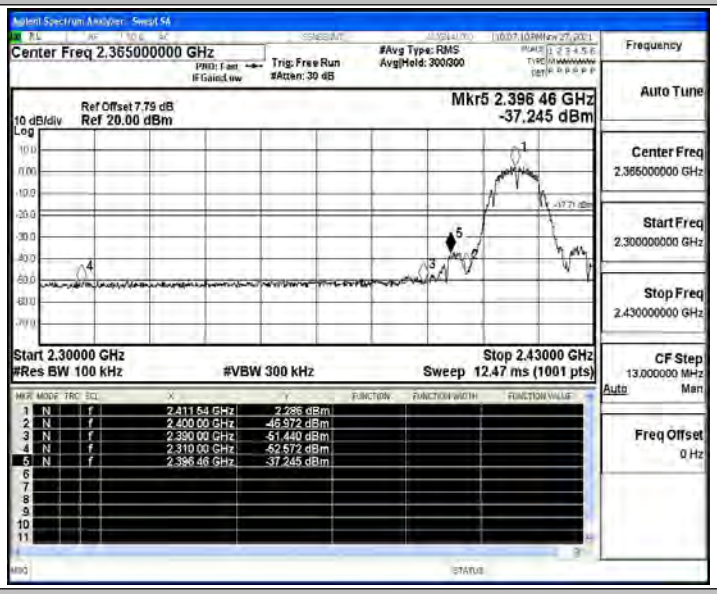
C.4 Band edge measurements

Test Result

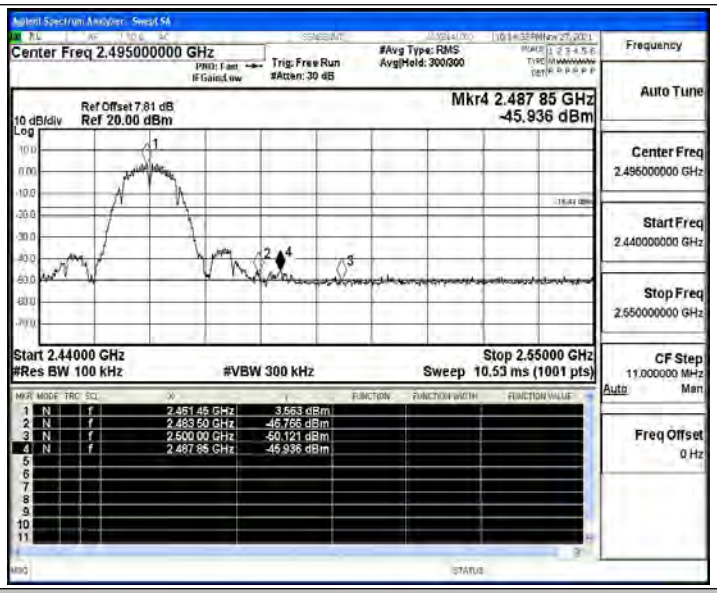
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	2.29	-37.25	≤-17.71	PASS
		High	2462	3.56	-45.94	≤-16.44	PASS
11G	Ant1	Low	2412	-5.42	-34.6	≤-25.42	PASS
		High	2462	-4.31	-48.22	≤-24.31	PASS
11N20SISO	Ant1	Low	2412	-6.13	-35.39	≤-26.13	PASS
		High	2462	-4.87	-47.39	≤-24.87	PASS
11N40SISO	Ant1	Low	2422	-9.21	-39.61	≤-29.21	PASS
		High	2452	-8.08	-43.36	≤-28.08	PASS

Test Graphs

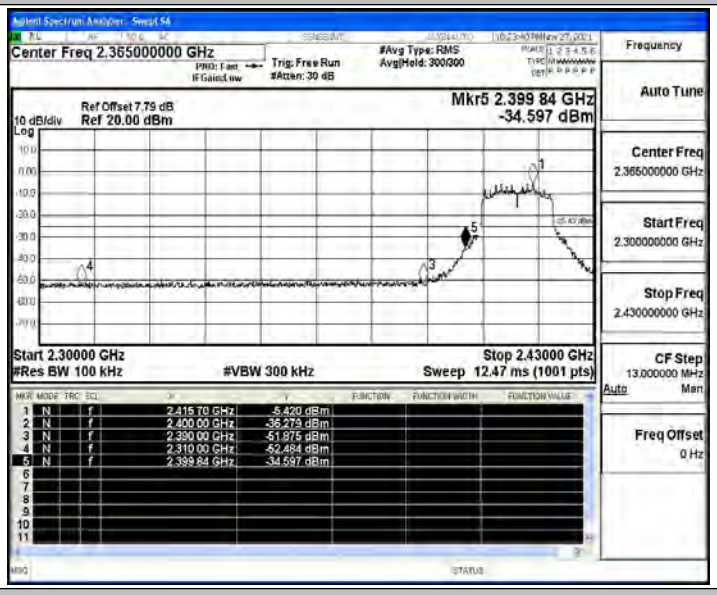
11B_Ant1_Low_2412



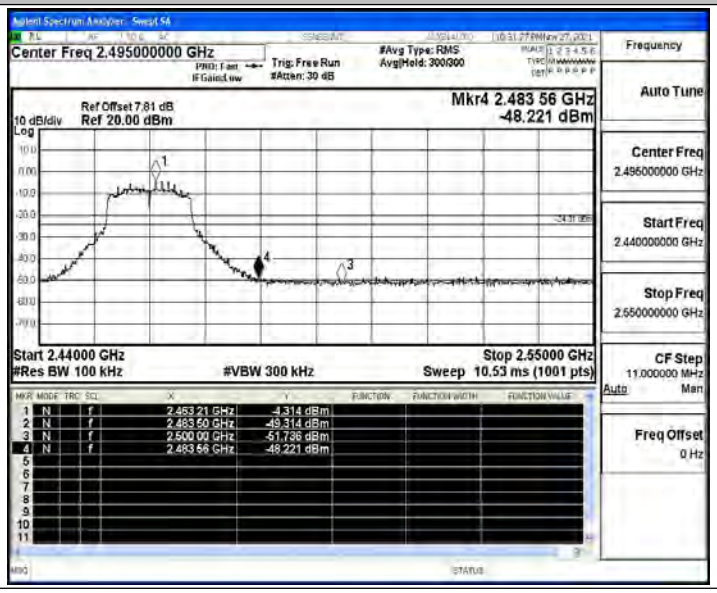
11B_Ant1_High_2462

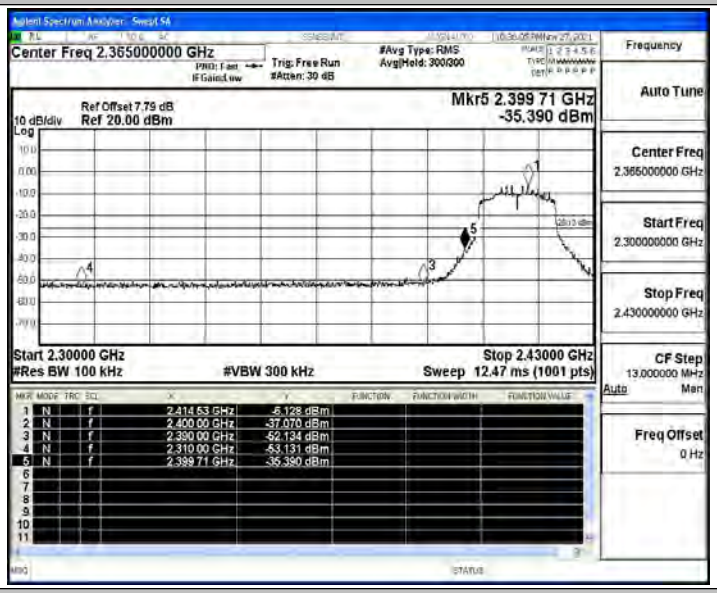
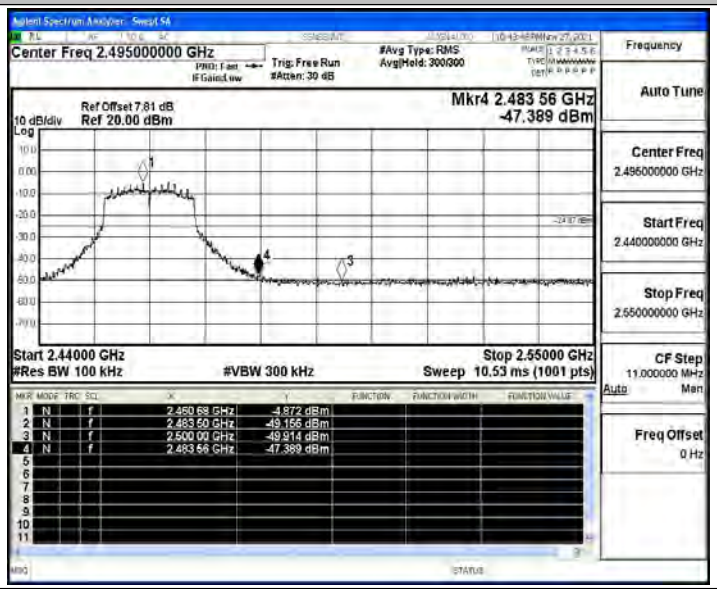


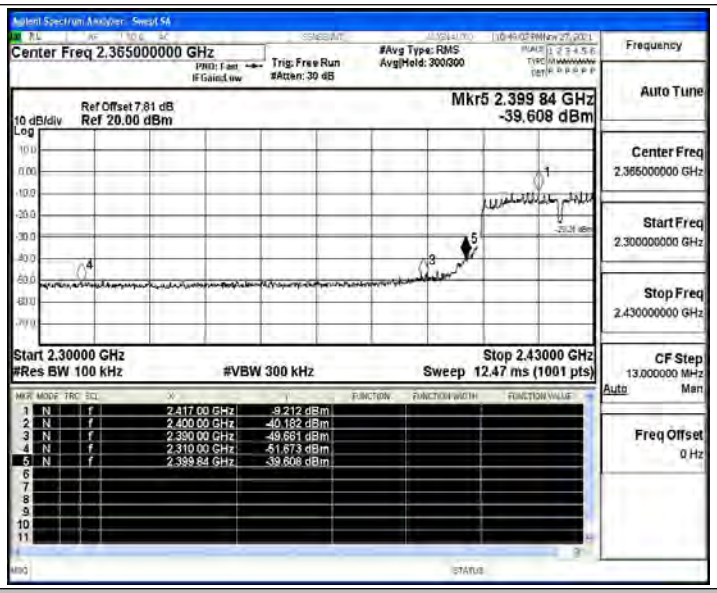
11G_Ant1_Low_2412



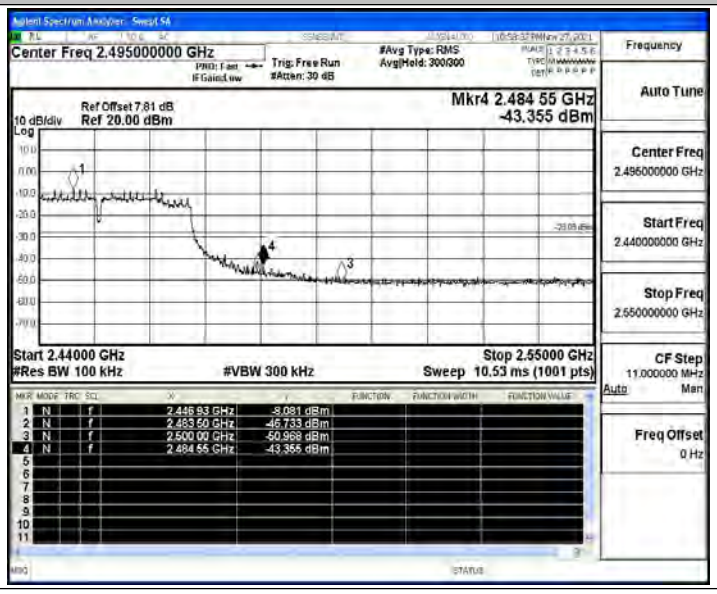
11G_Ant1_High_2462



11N20SISO_Ant1_Low_2412

11N20SISO_Ant1_High_2462

11N40SISO_Ant1_Low_2422



11N40SISO_Ant1_High_2452

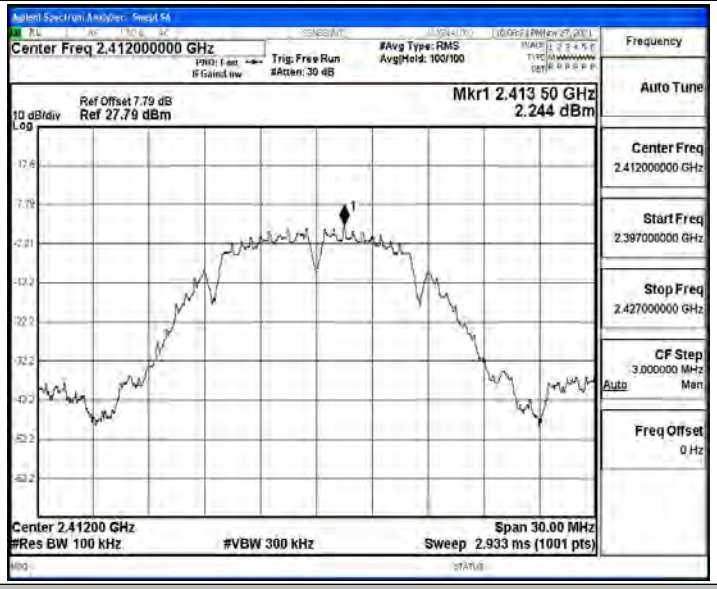
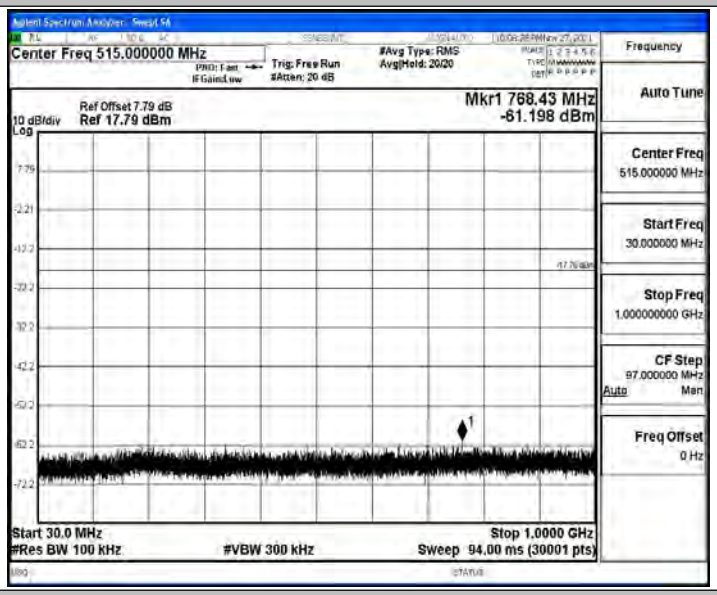


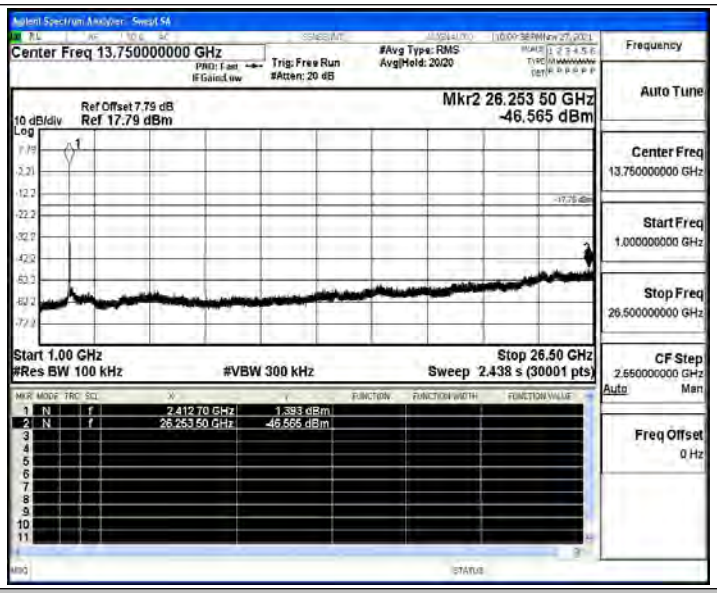
C.5 Conducted Spurious Emission

Test Result

TestMode	Antenna	Channel	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	2.24	2.24	---	PASS
			30~1000	2.24	-61.2	≤-17.76	PASS
			1000~26500	2.24	-46.57	≤-17.76	PASS
		2437	Reference	2.85	2.85	---	PASS
			30~1000	2.85	-61.62	≤-17.15	PASS
			1000~26500	2.85	-46.64	≤-17.15	PASS
		2462	Reference	3.32	3.32	---	PASS
			30~1000	3.32	-61.76	≤-16.68	PASS
			1000~26500	3.32	-46.79	≤-16.68	PASS
11G	Ant1	2412	Reference	-5.95	-5.95	---	PASS
			30~1000	-5.95	-61.51	≤-25.95	PASS
			1000~26500	-5.95	-46.32	≤-25.95	PASS
		2437	Reference	-5.59	-5.59	---	PASS
			30~1000	-5.59	-61.6	≤-25.59	PASS
			1000~26500	-5.59	-46.21	≤-25.59	PASS
		2462	Reference	-4.27	-4.27	---	PASS
			30~1000	-4.27	-61.06	≤-24.27	PASS
			1000~26500	-4.27	-46.81	≤-24.27	PASS
11N20SISO	Ant1	2412	Reference	-5.80	-5.80	---	PASS
			30~1000	-5.80	-61.31	≤-25.8	PASS
			1000~26500	-5.80	-46.97	≤-25.8	PASS
		2437	Reference	-5.83	-5.83	---	PASS
			30~1000	-5.83	-61.33	≤-25.83	PASS
			1000~26500	-5.83	-46.65	≤-25.83	PASS
		2462	Reference	-4.40	-4.40	---	PASS
			30~1000	-4.40	-61.77	≤-24.4	PASS
			1000~26500	-4.40	-47.31	≤-24.4	PASS
11N40SISO	Ant1	2422	Reference	-9.66	-9.66	---	PASS
			30~1000	-9.66	-61.39	≤-29.66	PASS
			1000~26500	-9.66	-47.15	≤-29.66	PASS
		2437	Reference	-8.84	-8.84	---	PASS
			30~1000	-8.84	-61.81	≤-28.84	PASS
			1000~26500	-8.84	-46.45	≤-28.84	PASS
		2452	Reference	-8.11	-8.11	---	PASS
			30~1000	-8.11	-60.82	≤-28.11	PASS
			1000~26500	-8.11	-46.49	≤-28.11	PASS

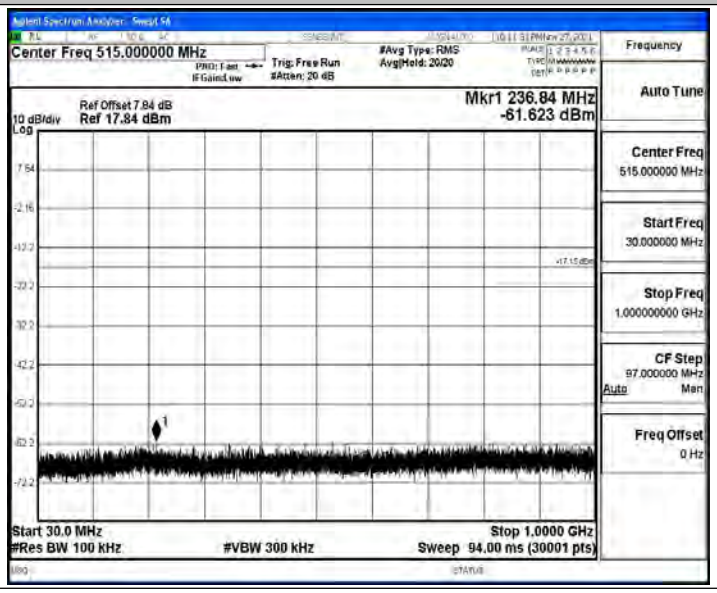
Test Graphs

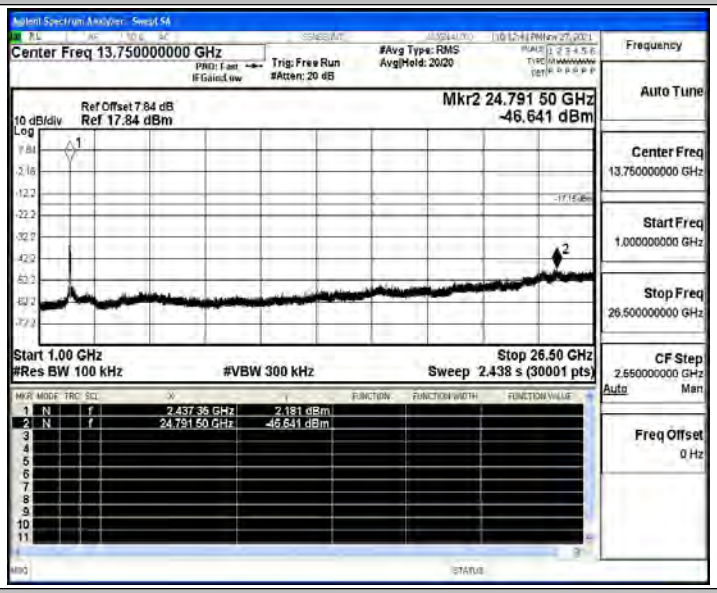
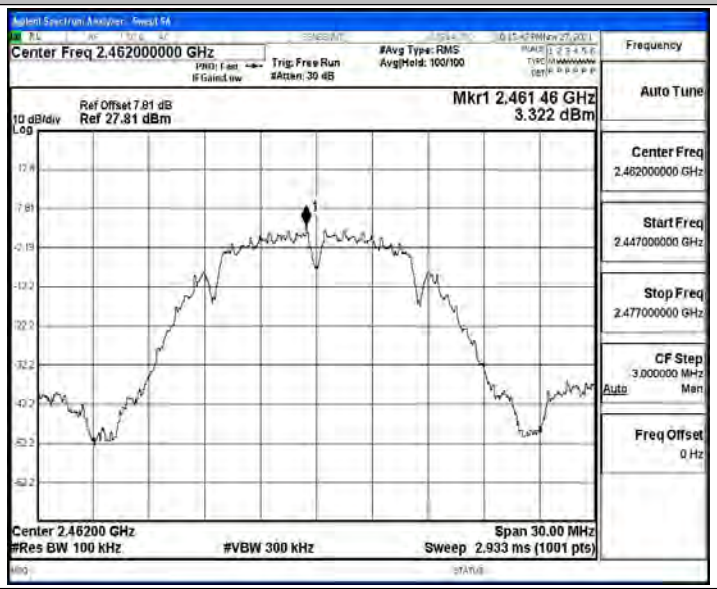
11B_Ant1_2412_0~Reference

11B_Ant1_2412_30~1000

11B_Ant1_2412_1000~26500

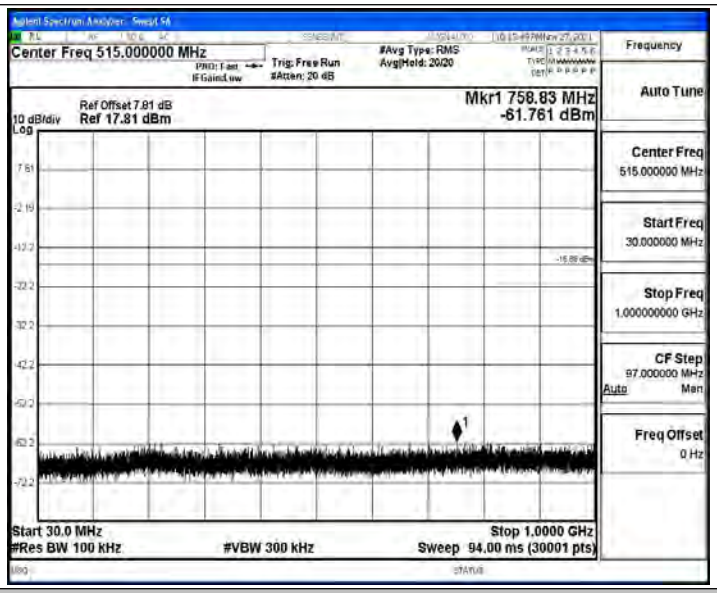


11B_Ant1_2437_0~Reference

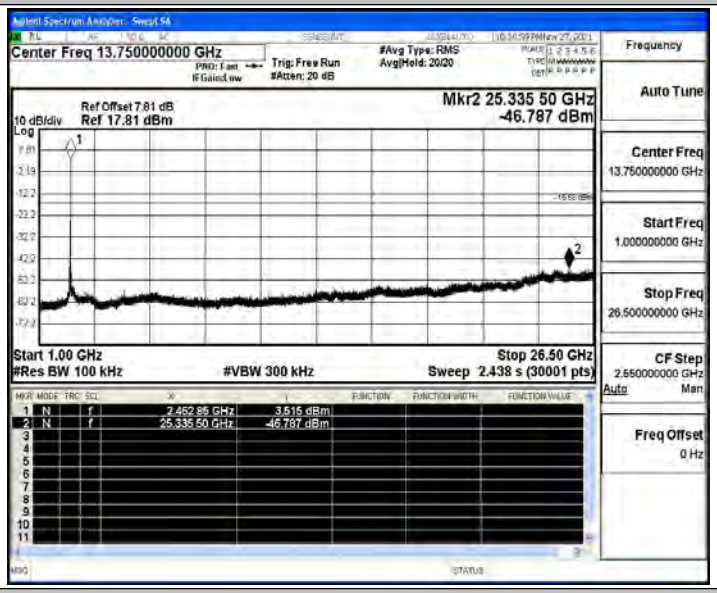
11B_Ant1_2437_30~1000



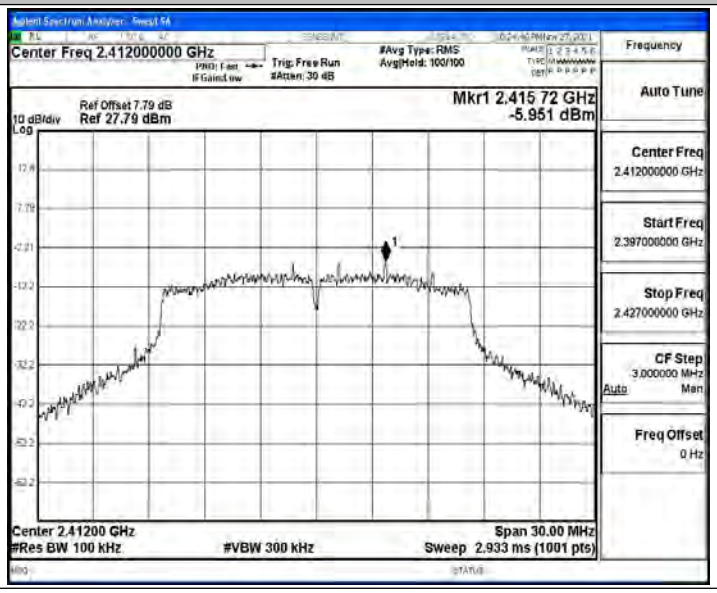
11B_Ant1_2437_1000~26500

11B_Ant1_2462_0~Reference

11B_Ant1_2462_30~1000

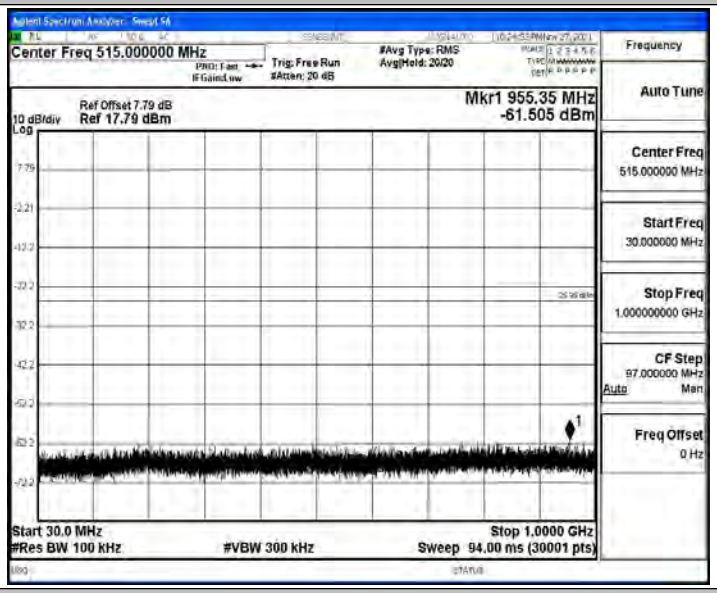
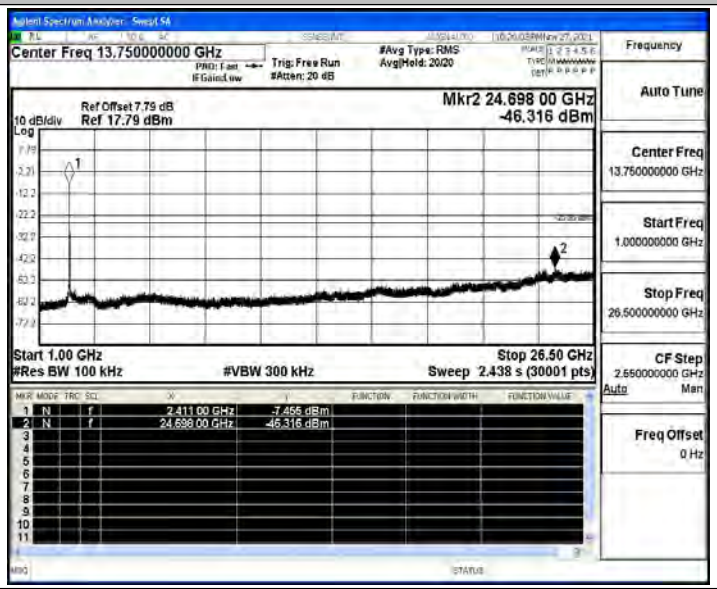


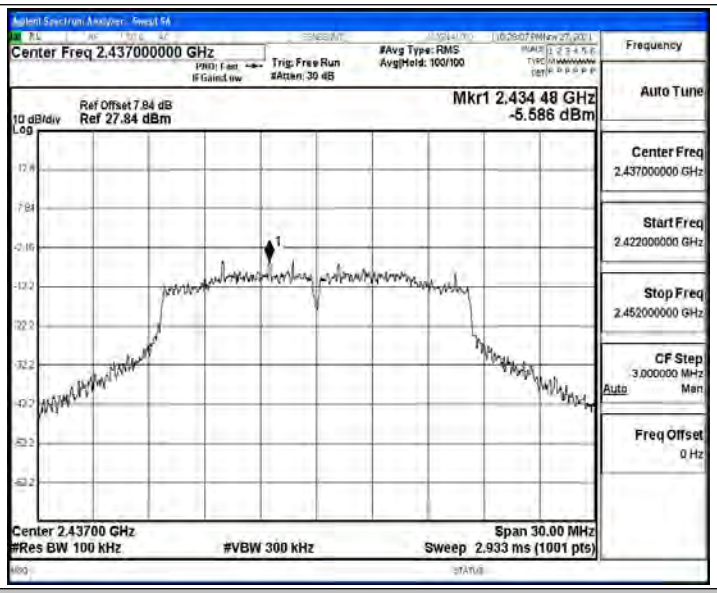
11B_Ant1_2462_1000~26500



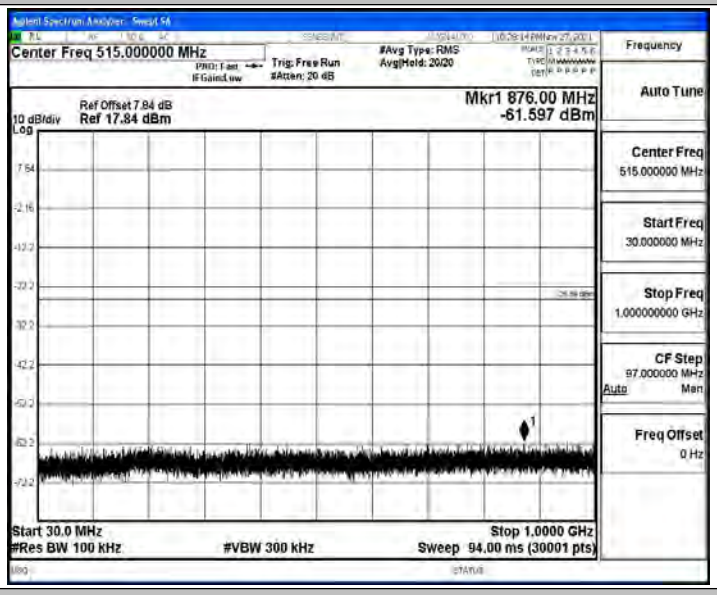
11G_Ant1_2412_0~Reference



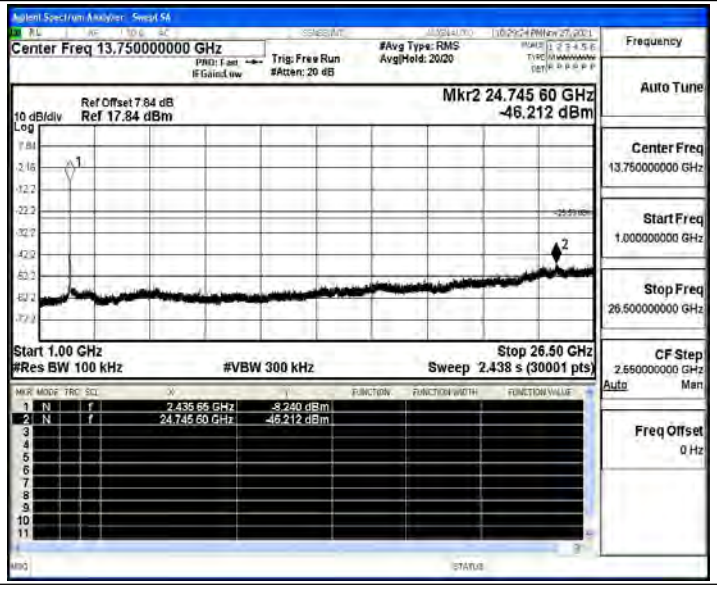
11G_Ant1_2412_30~1000

11G_Ant1_2412_1000~26500

11G_Ant1_2437_0~Reference

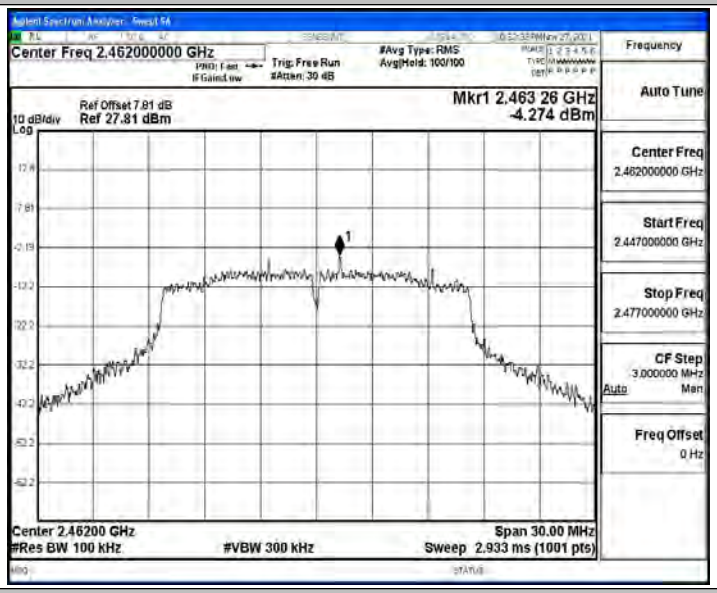
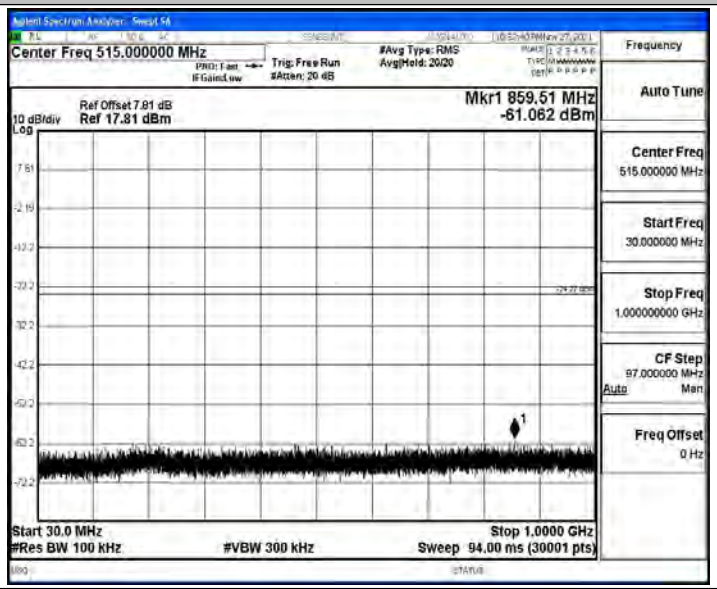


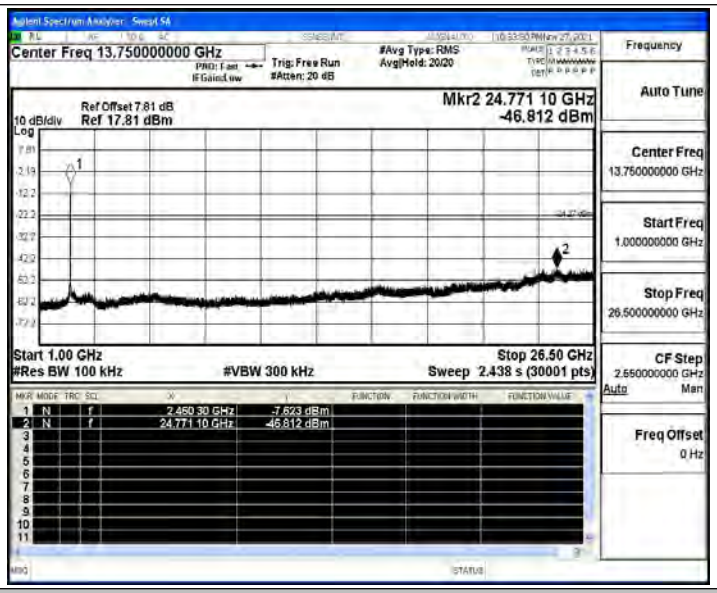
11G_Ant1_2437_30~1000



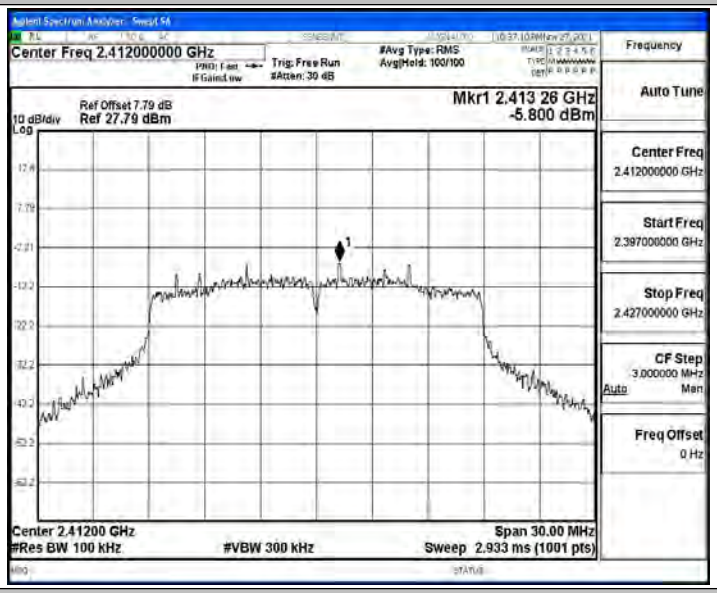
11G_Ant1_2437_1000~26500



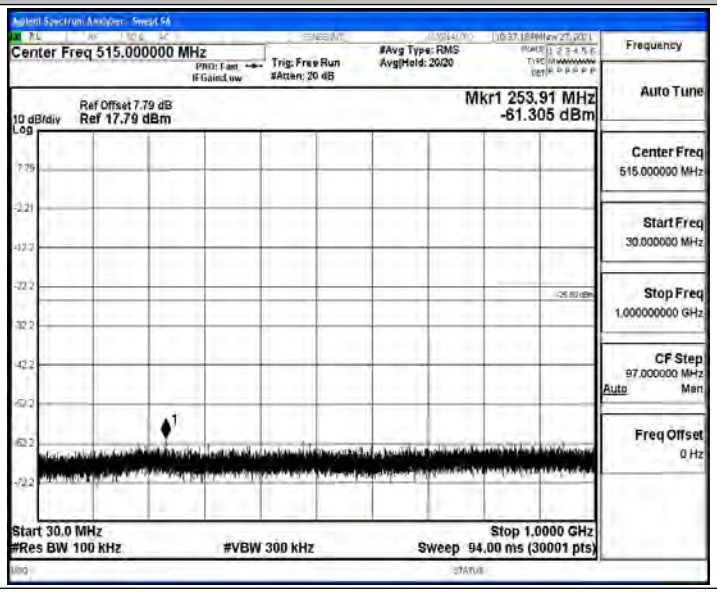
11G_Ant1_2462_0~Reference

11G_Ant1_2462_30~1000

11G_Ant1_2462_1000~26500

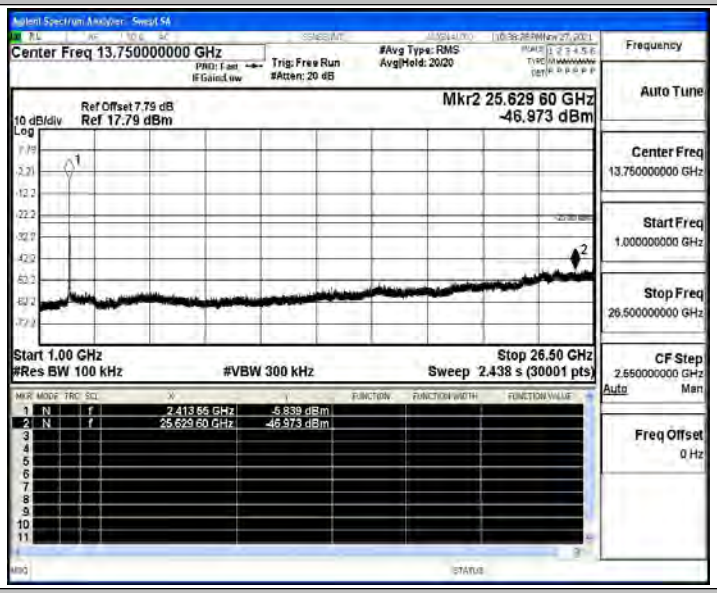
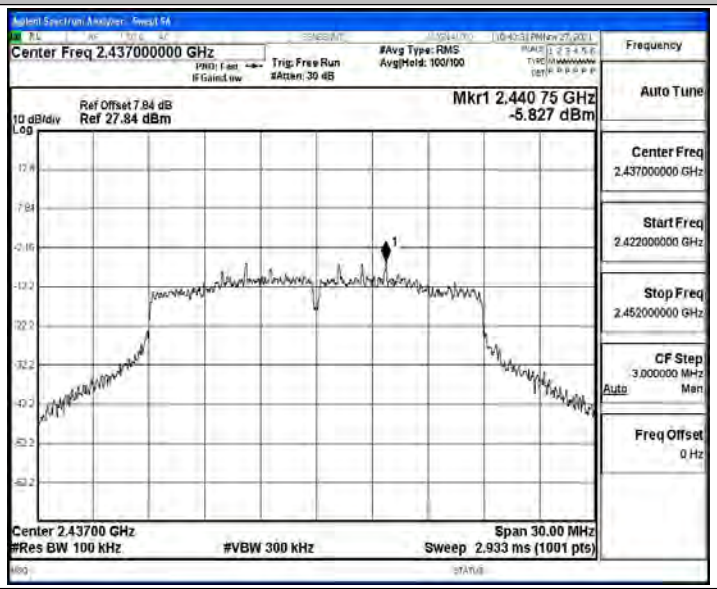


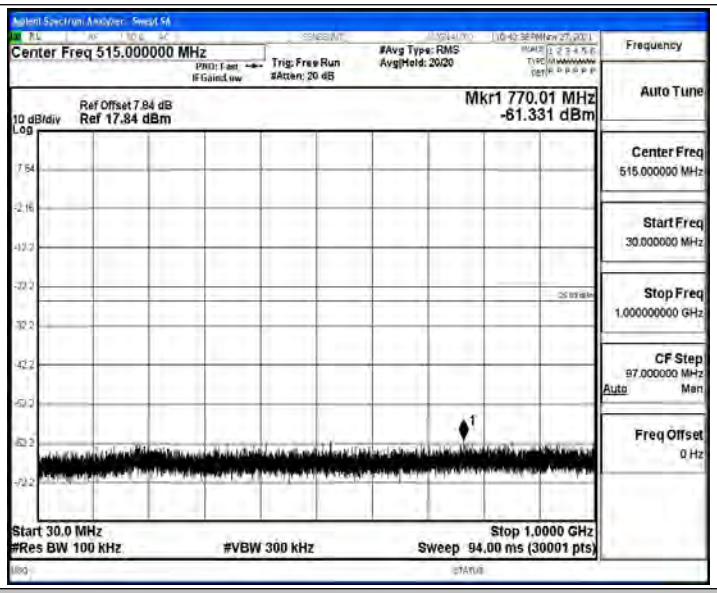
11N20SISO_Ant1_2412_0~Reference



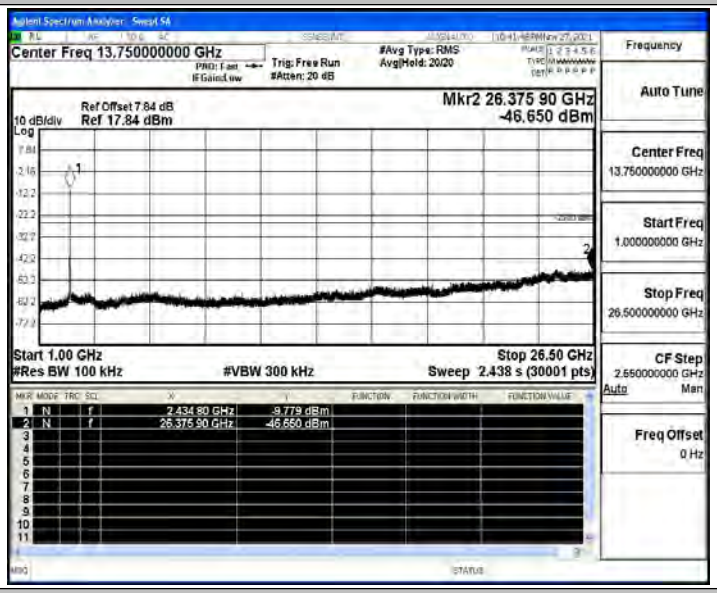
11N20SISO_Ant1_2412_30~1000



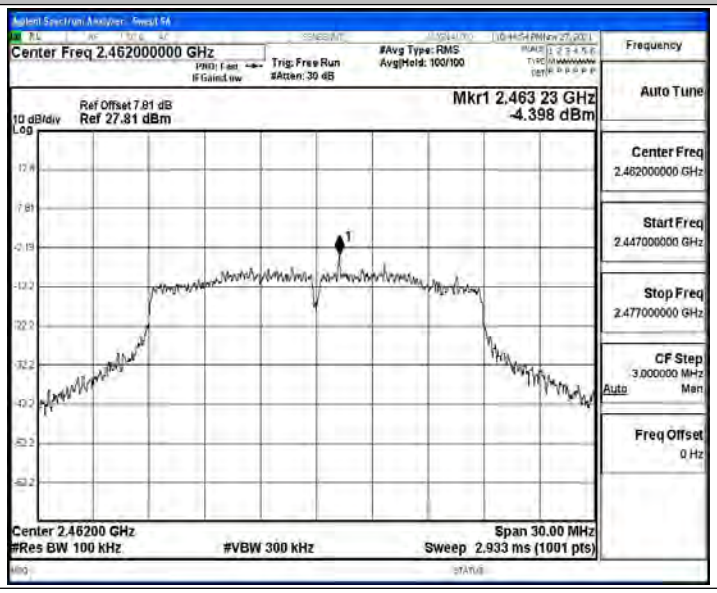
11N20SISO_Ant1_2412_1000~26500

11N20SISO_Ant1_2437_0~Reference

11N20SISO_Ant1_2437_30~1000

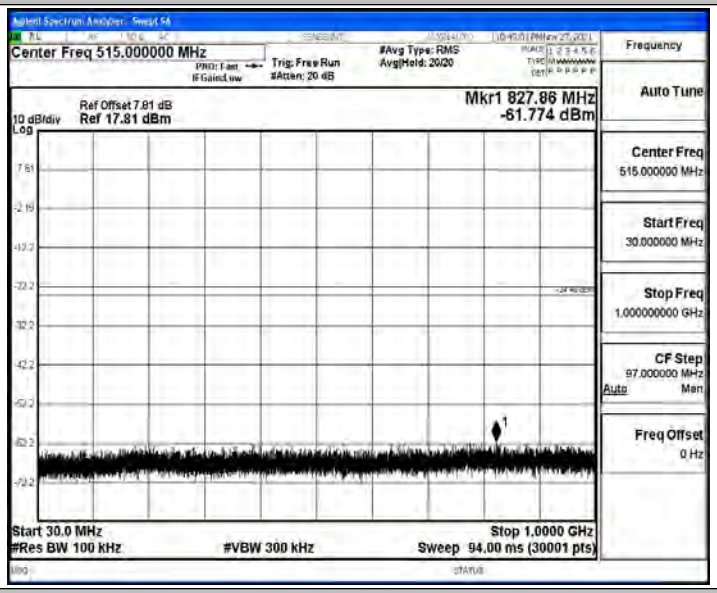
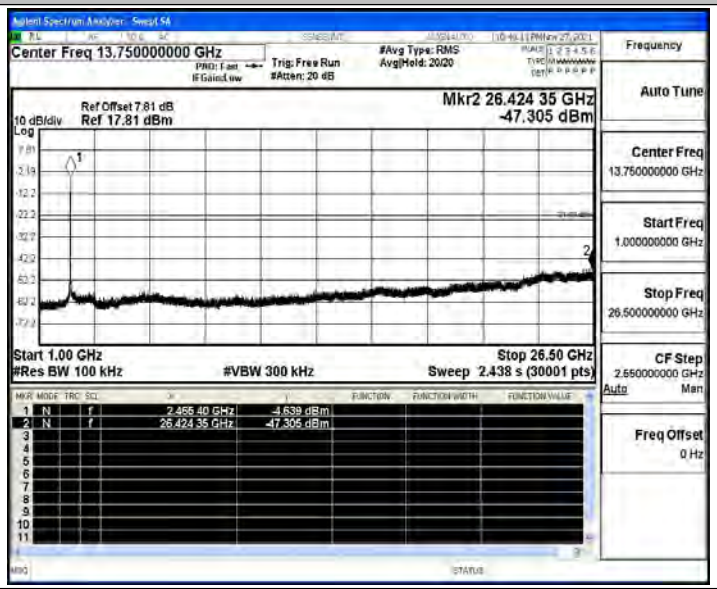


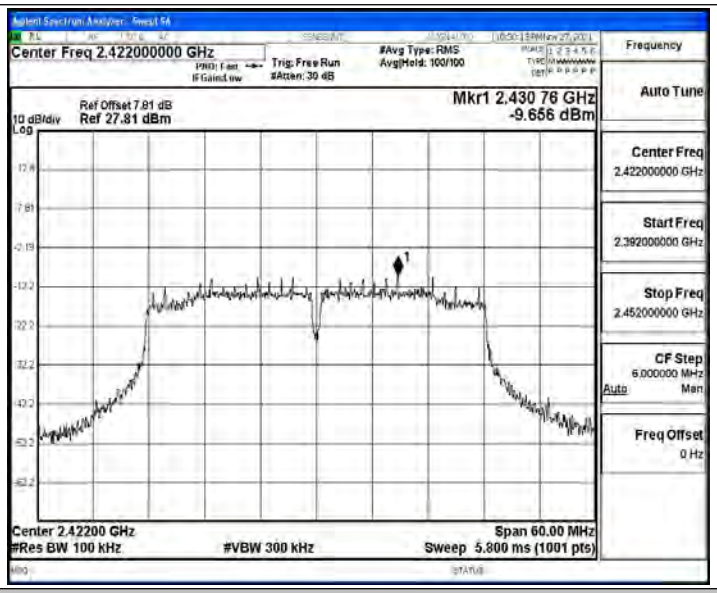
11N20SISO_Ant1_2437_1000~26500



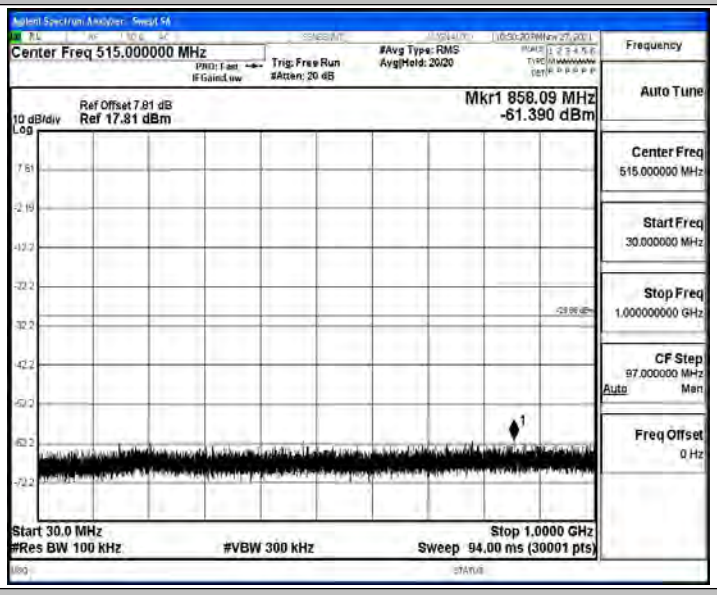
11N20SISO_Ant1_2462_0~Reference



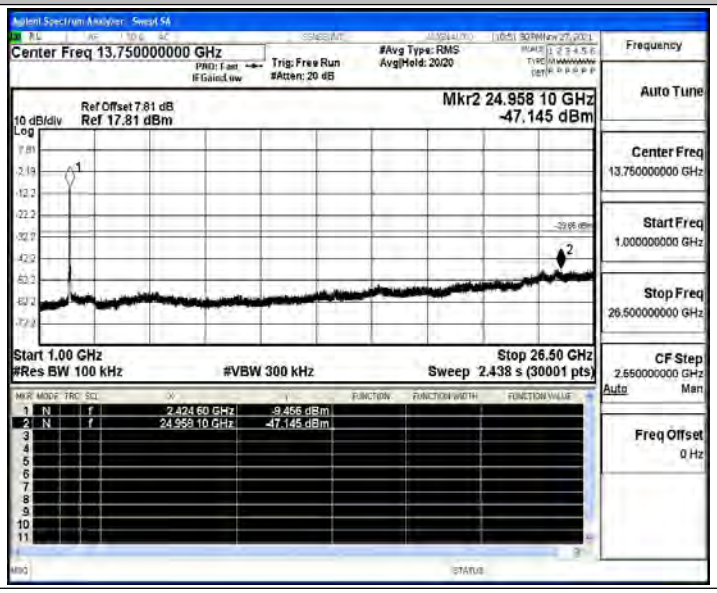
11N20SISO_Ant1_2462_30~1000

11N20SISO_Ant1_2462_1000~26500

11N40SISO_Ant1_2422_0~Reference



11N40SISO_Ant1_2422_30~1000



11N40SISO_Ant1_2422_1000~26500



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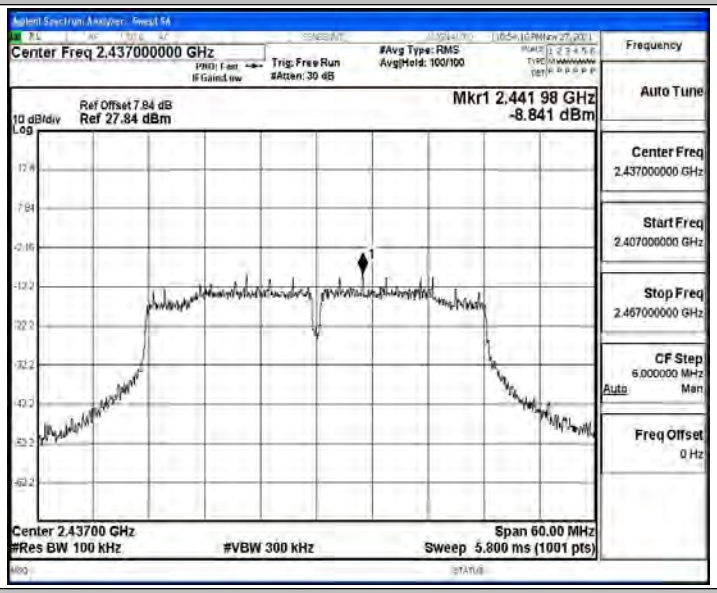
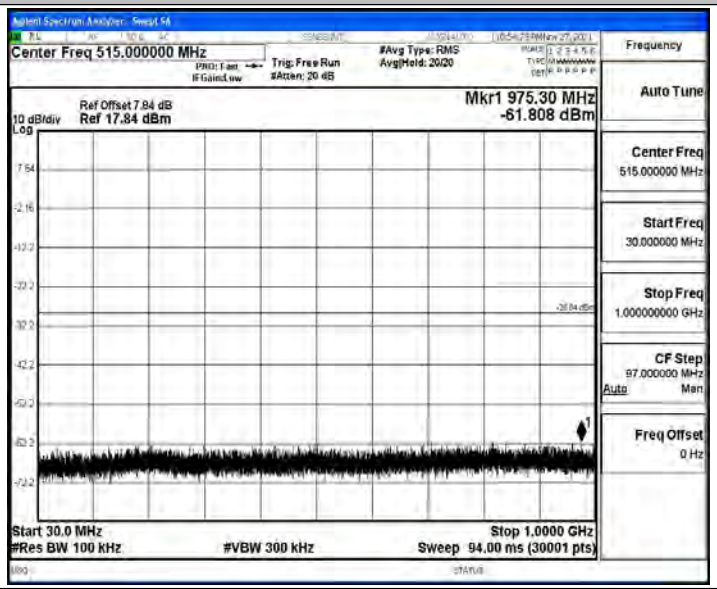
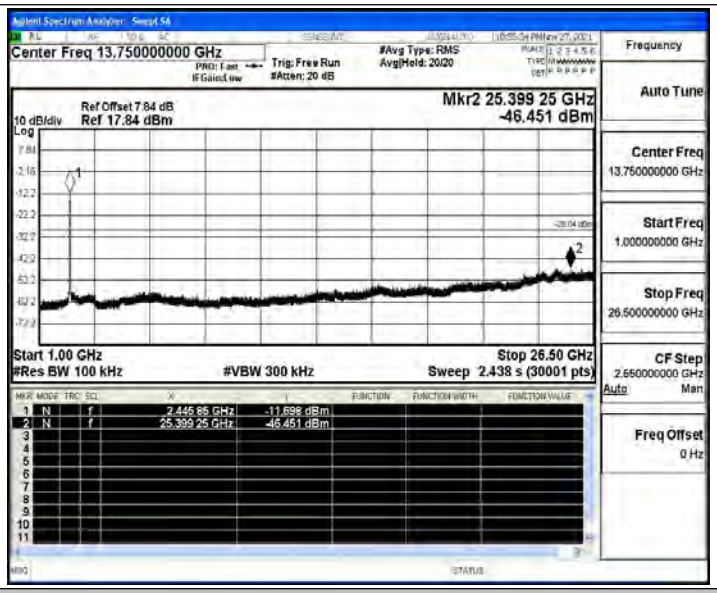
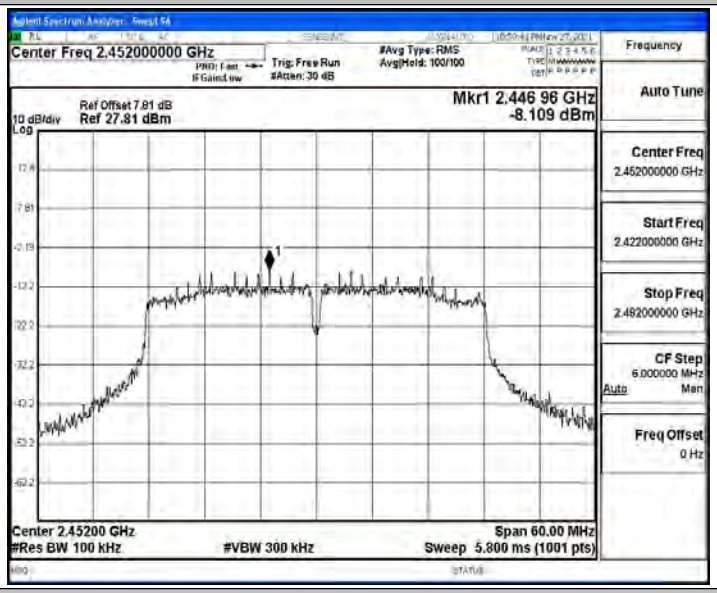
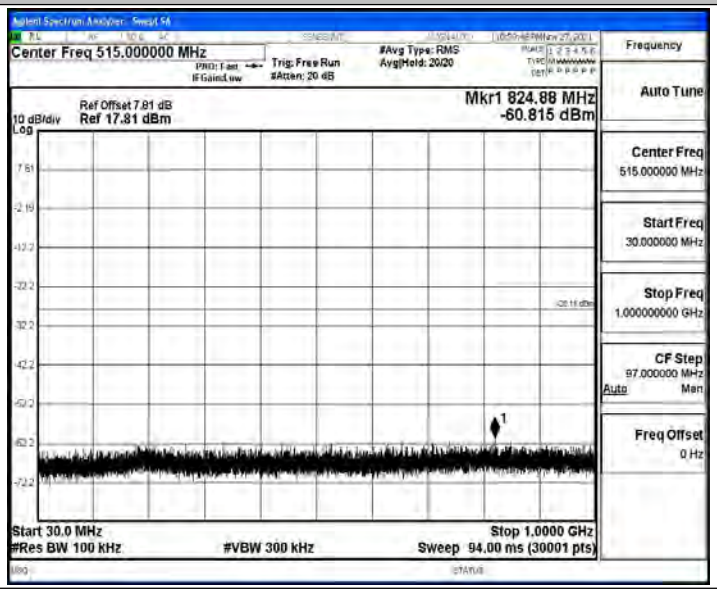

11N40SISO_Ant1_2437_30~1000

11N40SISO_Ant1_2437_1000~26500

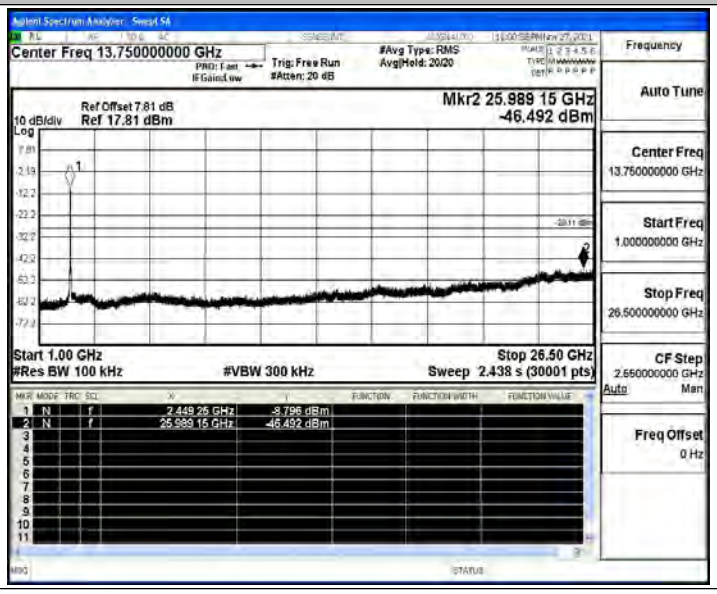


11N40SISO_Ant1_2452_0~Reference



11N40SISO_Ant1_2452_30~1000



11N40SISO_Ant1_2452_1000~26500


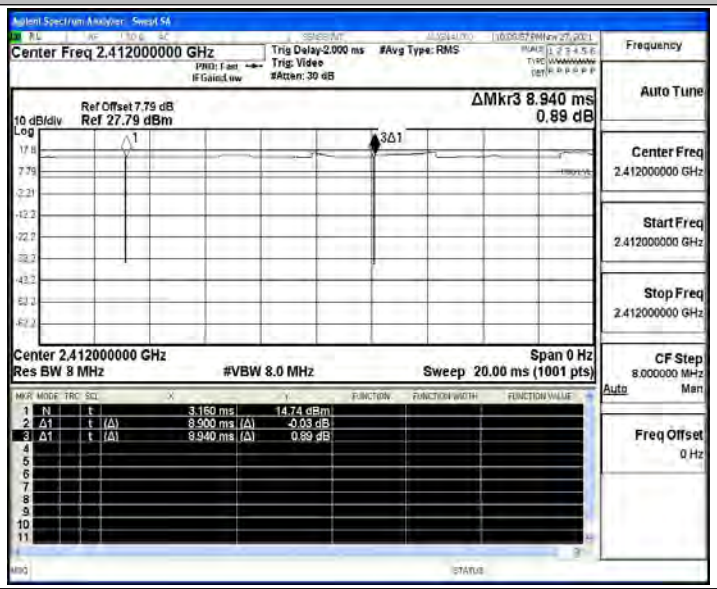
C.6 Duty Cycle

Test Result

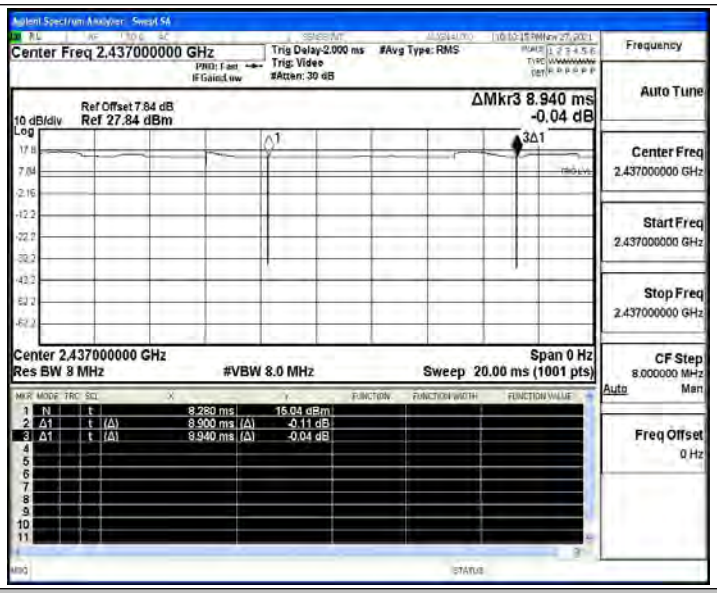
TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
11B	Ant1	2412	8.90	8.94	99.55	---	PASS
		2437	8.90	8.94	99.55	---	PASS
		2462	8.90	8.94	99.55	---	PASS
11G	Ant1	2412	2.05	2.08	98.56	---	PASS
		2437	2.05	2.08	98.56	---	PASS
		2462	2.05	2.08	98.56	---	PASS
11N20SISO	Ant1	2412	1.90	1.93	98.45	---	PASS
		2437	1.91	1.94	98.45	---	PASS
		2462	1.91	1.94	98.45	---	PASS
11N40SISO	Ant1	2422	0.93	0.96	96.88	---	PASS
		2437	0.93	0.96	96.88	---	PASS
		2452	0.93	0.96	96.88	---	PASS

Test Graphs

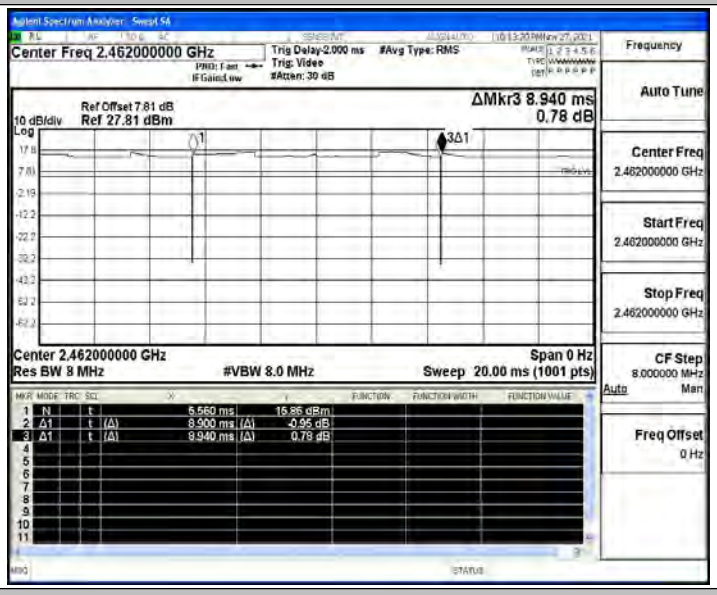
11B_Ant1_2412



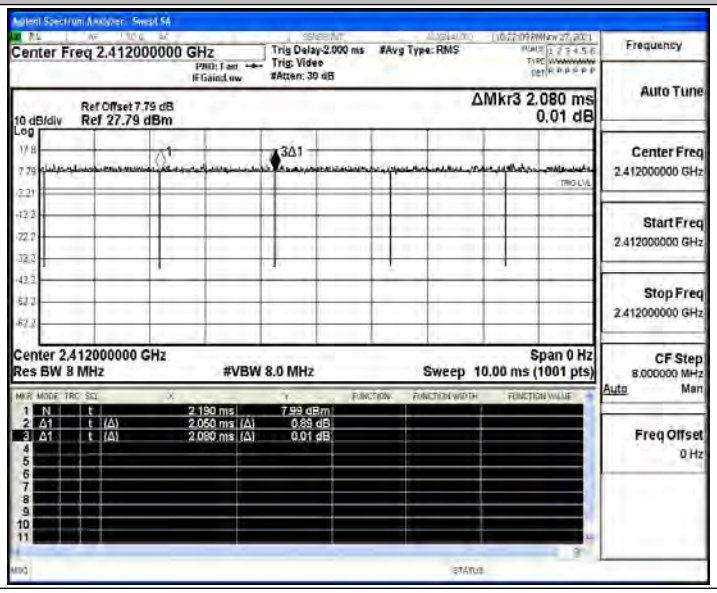
11B_Ant1_2437

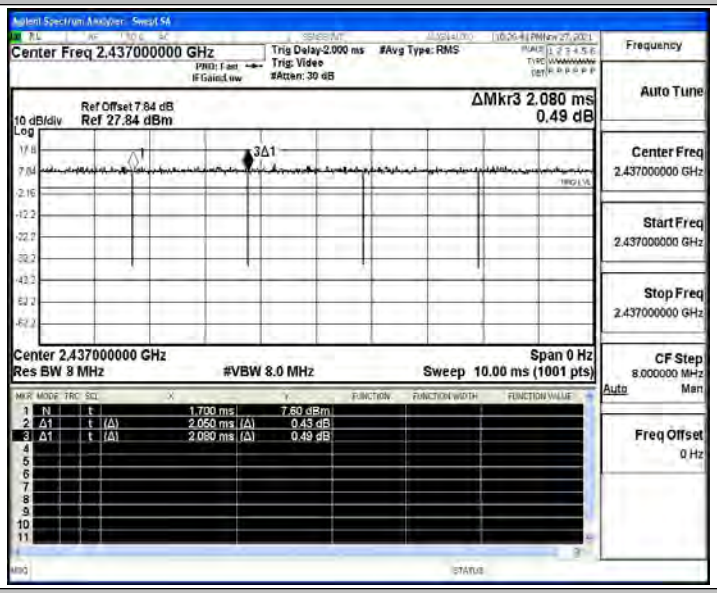
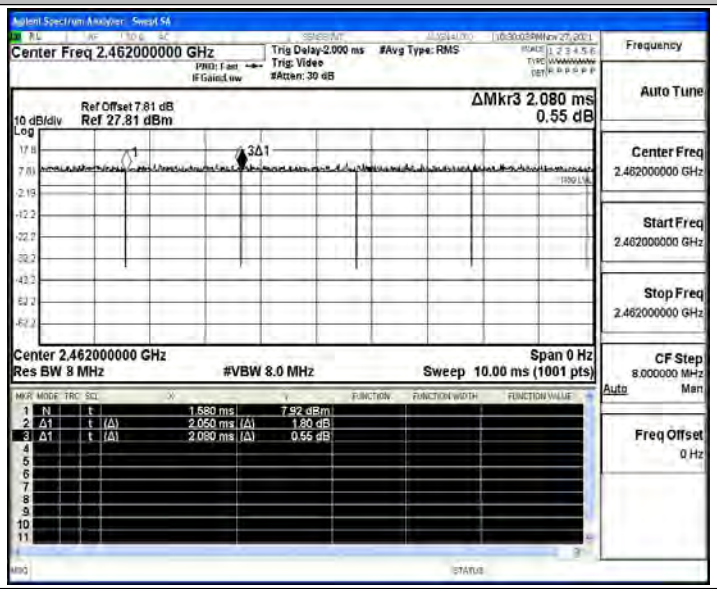


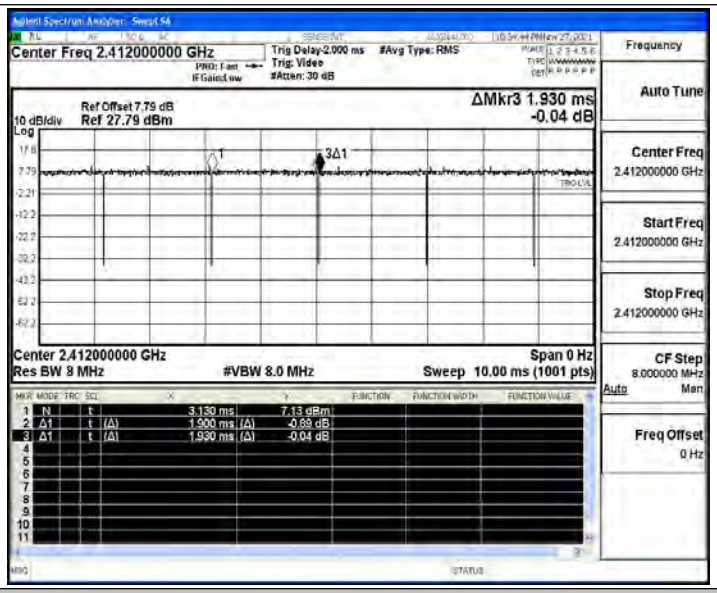
11B_Ant1_2462



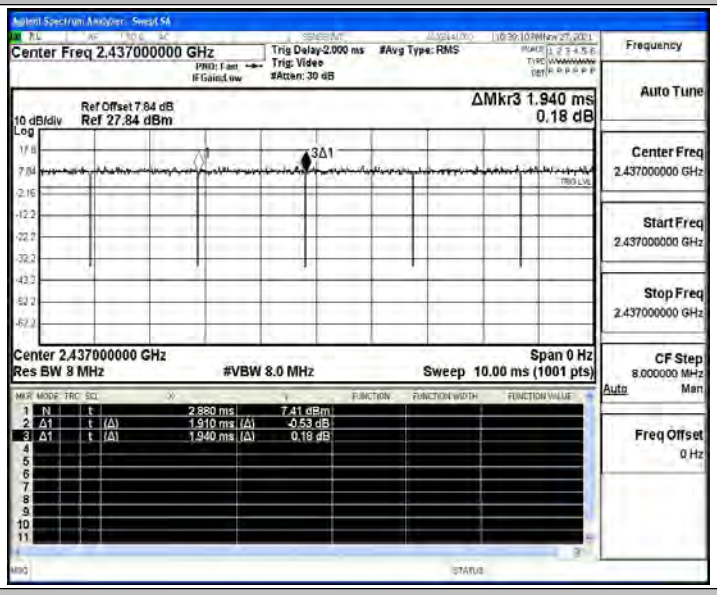
11G_Ant1_2412



11G_Ant1_2437

11G_Ant1_2462

11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



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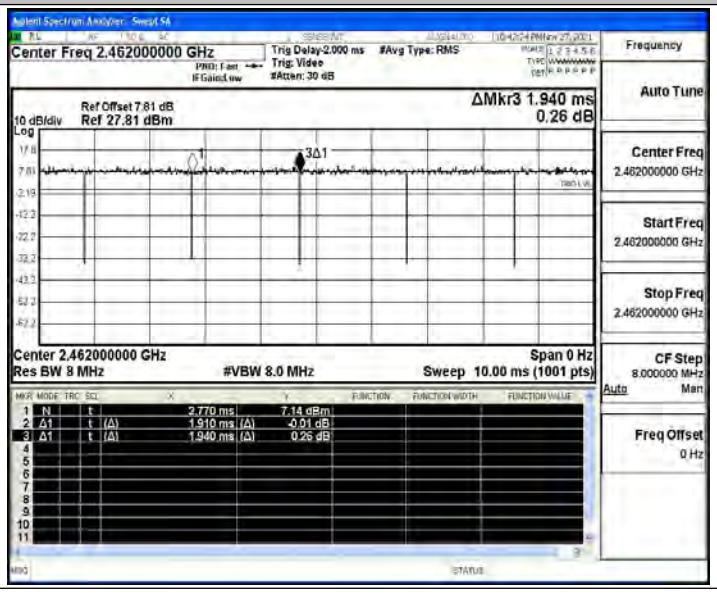
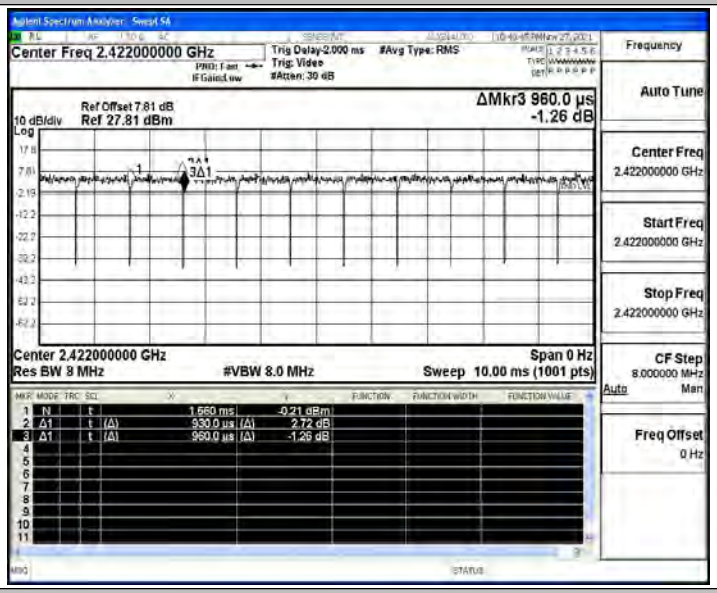


11N40SISO_Ant1_2422

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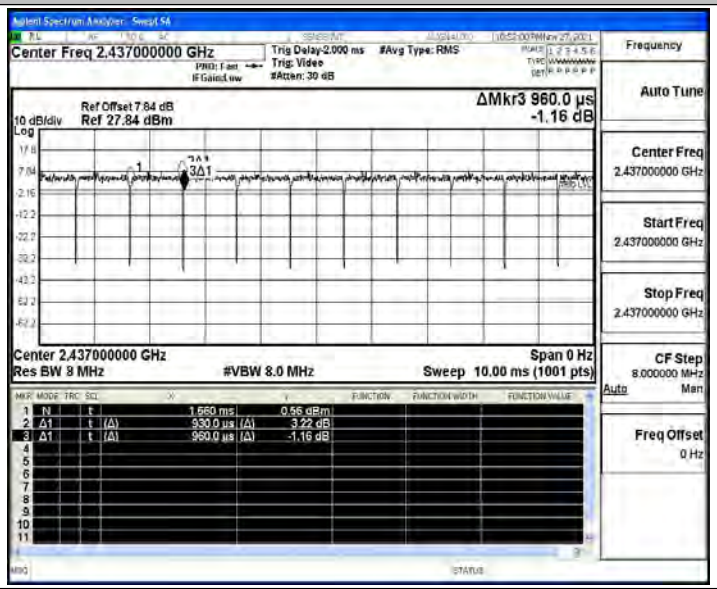
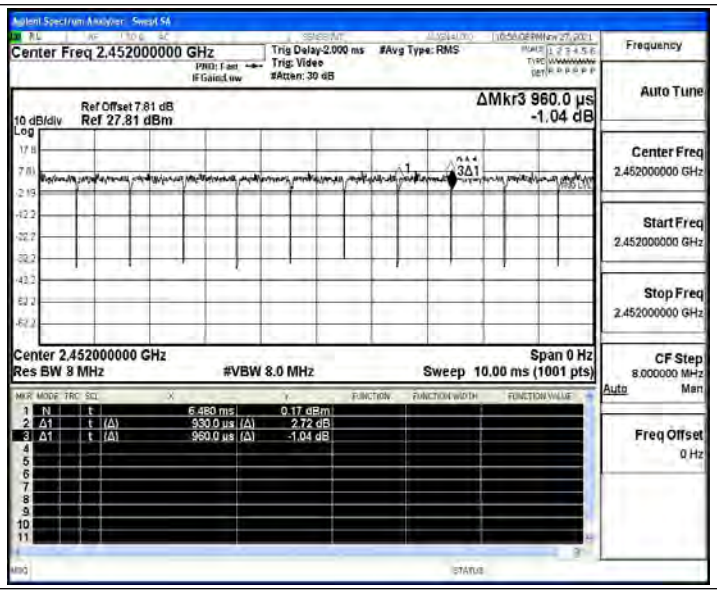

11N40SISO_Ant1_2452


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.452000000 GHz
Trig Delay 2.000 ms
Trig: Video
#Avg Type: RMS
#Atten: 30 dB
Ref Offset 7.81 dB
10 dB/div
Ref 27.81 dBm
ΔMkr3 960.0 µs
-1.04 dB
Center 2.452000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 10.00 ms (1001 pts)
1 N 1 t 6.480 ms 0.17 dBm
2 Δ1 t (Δ) 930.0 µs (Δ) 2.72 dB
3 Δ1 t (Δ) 960.0 µs (Δ) -1.04 dB
Frequency
Auto Tune
Center Freq
2.452000000 GHz
Start Freq
2.452000000 GHz
Stop Freq
2.452000000 GHz
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz

C.7 Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
11B	Ant1	Low	2412	AV	2310.000	-49.04	≤-41.20	46.16	≤54	PASS
				AV	2386.710	-45.35	≤-41.20	49.85	≤54	PASS
				AV	2390.000	-47.42	≤-41.20	47.78	≤54	PASS
				Peak	2310.000	-44.43	≤-21.20	50.77	≤74	PASS
				Peak	2385.670	-38.28	≤-21.20	56.92	≤74	PASS
				Peak	2390.000	-40.86	≤-21.20	54.34	≤74	PASS
		High	2462	AV	2483.500	-44.59	≤-41.20	50.61	≤54	PASS
				AV	2487.630	-43.11	≤-41.20	52.09	≤54	PASS
				AV	2500.000	-47.49	≤-41.20	47.71	≤54	PASS
				Peak	2483.500	-37.19	≤-21.20	58.01	≤74	PASS
				Peak	2489.610	-36.19	≤-21.20	59.01	≤74	PASS
				Peak	2500.000	-45.39	≤-21.20	49.81	≤74	PASS
11G	Ant1	Low	2412	AV	2310.000	-48.86	≤-41.20	46.34	≤54	PASS
				AV	2389.700	-47.64	≤-41.20	47.56	≤54	PASS
				AV	2390.000	-47.68	≤-41.20	47.52	≤54	PASS
				Peak	2310.000	-43.95	≤-21.20	51.25	≤74	PASS
				Peak	2389.570	-39.44	≤-21.20	55.76	≤74	PASS
				Peak	2390.000	-43.08	≤-21.20	52.12	≤74	PASS
		High	2462	AV	2483.500	-46.39	≤-41.20	48.81	≤54	PASS
				AV	2483.670	-46.29	≤-41.20	48.91	≤54	PASS
				AV	2500.000	-47.55	≤-41.20	47.65	≤54	PASS
				Peak	2483.500	-38.63	≤-21.20	56.57	≤74	PASS
				Peak	2483.560	-37.36	≤-21.20	57.84	≤74	PASS
				Peak	2500.000	-42.27	≤-21.20	52.93	≤74	PASS
11N20SISO	Ant1	Low	2412	AV	2310.000	-48.93	≤-41.20	46.27	≤54	PASS
				AV	2389.310	-47.66	≤-41.20	47.54	≤54	PASS
				AV	2390.000	-47.67	≤-41.20	47.53	≤54	PASS
				Peak	2310.000	-43.72	≤-21.20	51.48	≤74	PASS
				Peak	2380.730	-39.88	≤-21.20	55.32	≤74	PASS
				Peak	2390.000	-43.46	≤-21.20	51.74	≤74	PASS
		High	2462	AV	2483.500	-45.2	≤-41.20	50.00	≤54	PASS
				AV	2483.560	-45.26	≤-41.20	49.94	≤54	PASS
				AV	2500.000	-47.65	≤-41.20	47.55	≤54	PASS
				Peak	2483.500	-39.3	≤-21.20	55.90	≤74	PASS
				Peak	2487.520	-38.16	≤-21.20	57.04	≤74	PASS
				Peak	2500.000	-43.89	≤-21.20	51.31	≤74	PASS
11N40SIS	Ant1	Low	2422	AV	2310.000	-48.69	≤-41.20	46.51	≤54	PASS

O				AV	2389.570	-45.68	≤-41.20	49.52	≤54	PASS
				AV	2390.000	-46	≤-41.20	49.20	≤54	PASS
				Peak	2310.000	-42.39	≤-21.20	52.81	≤74	PASS
				Peak	2389.960	-36.54	≤-21.20	58.66	≤74	PASS
				Peak	2390.000	-36.54	≤-21.20	58.66	≤74	PASS
		High	2452	AV	2483.500	-42.76	≤-41.20	52.44	≤54	PASS
				AV	2484.330	-42.63	≤-41.20	52.57	≤54	PASS
				AV	2500.000	-46.83	≤-41.20	48.37	≤54	PASS
				Peak	2483.500	-34.95	≤-21.20	60.25	≤74	PASS
				Peak	2484.660	-33.23	≤-21.20	61.97	≤74	PASS
				Peak	2500.000	-40.56	≤-21.20	54.64	≤74	PASS

Note：

1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

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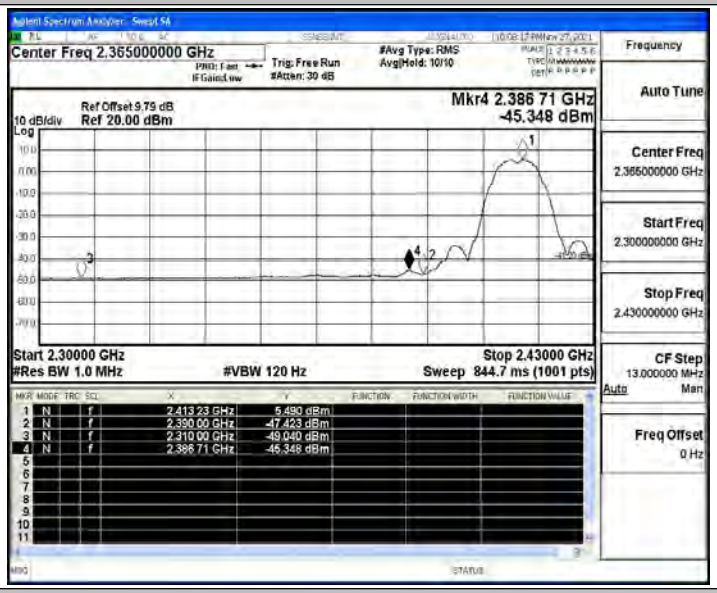
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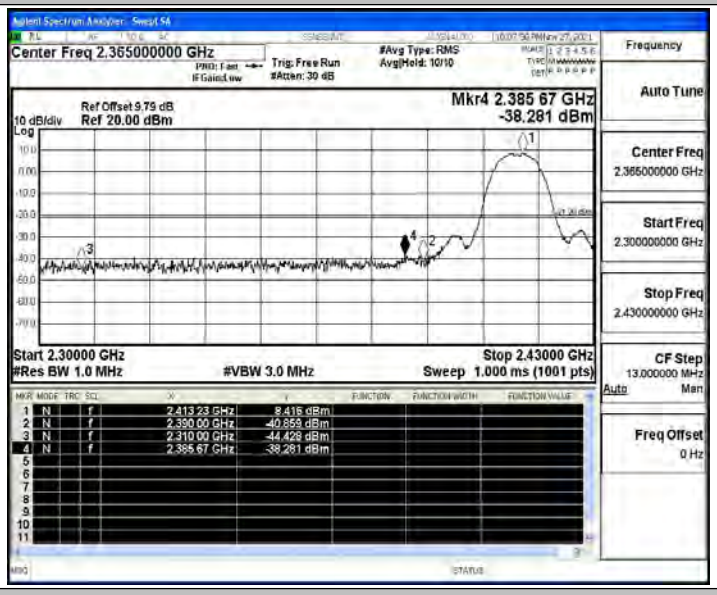
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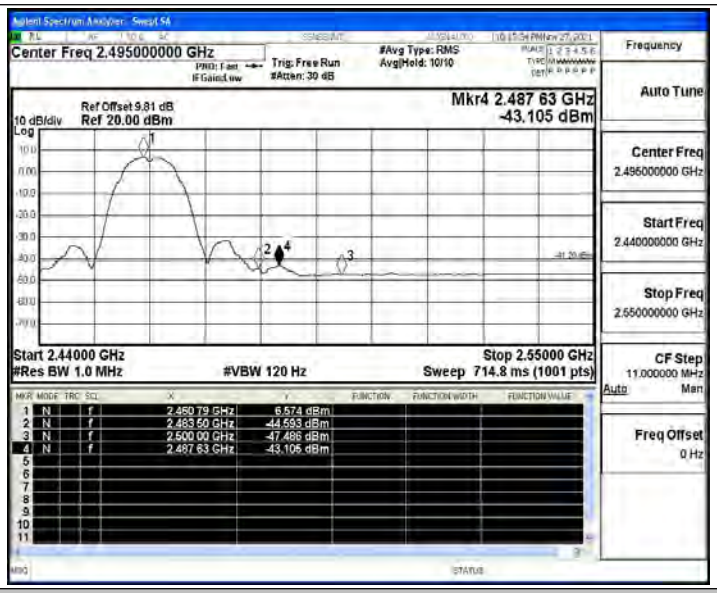

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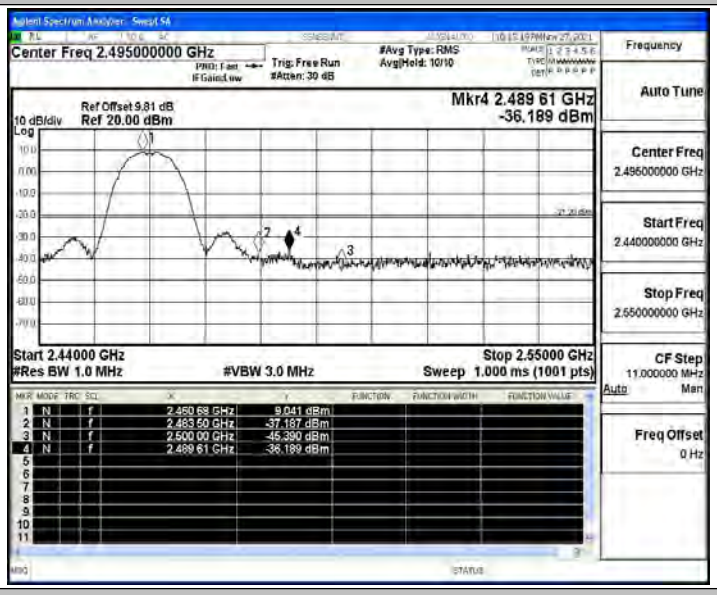

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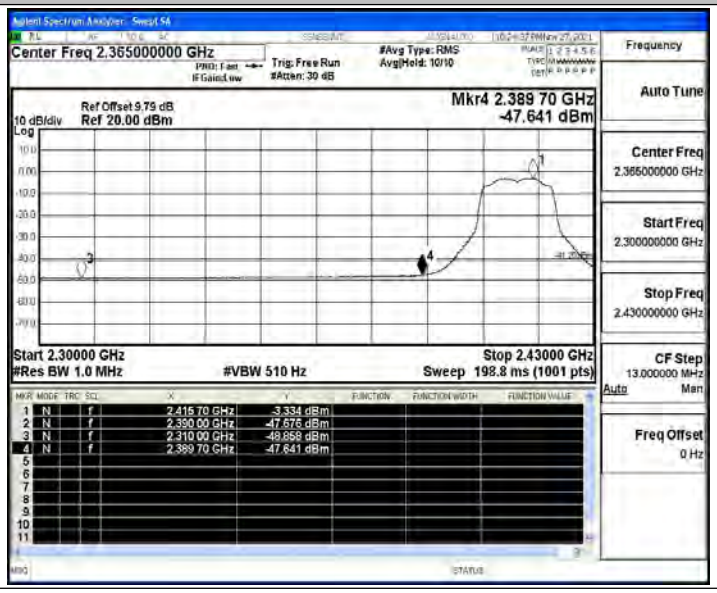

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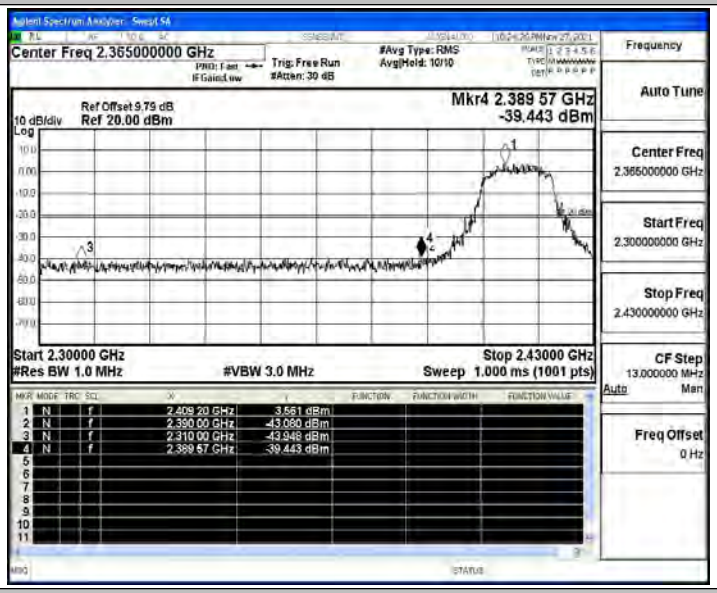
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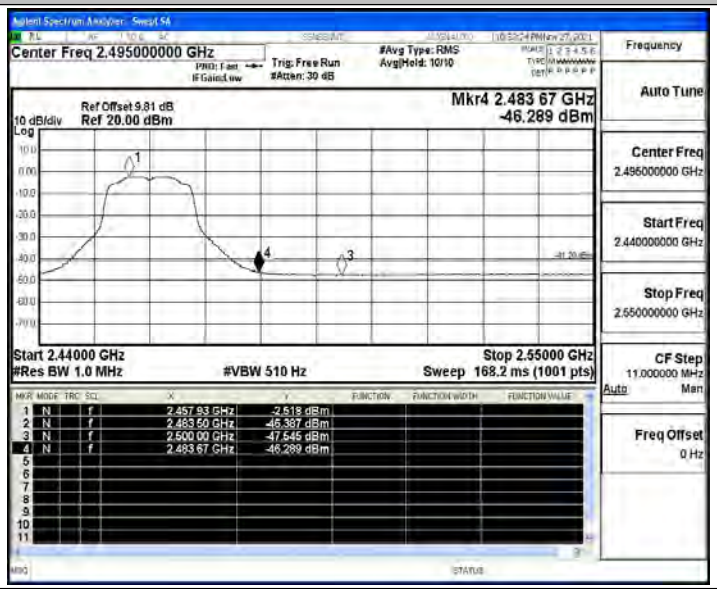
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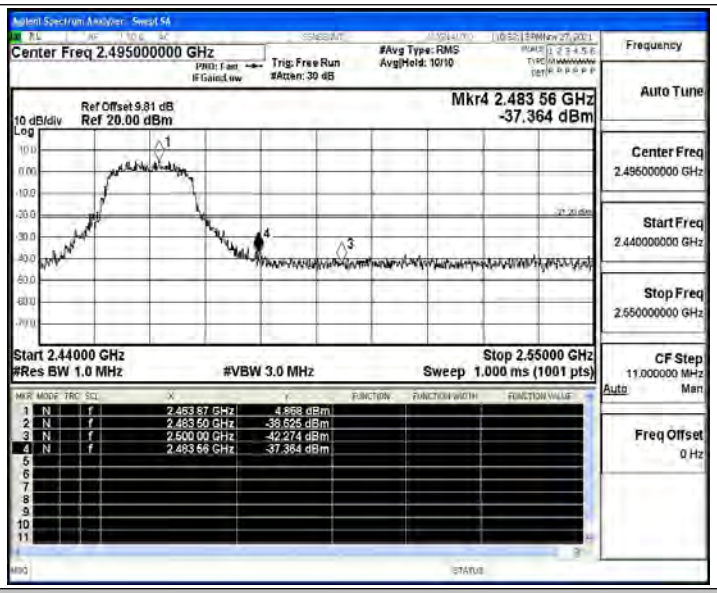

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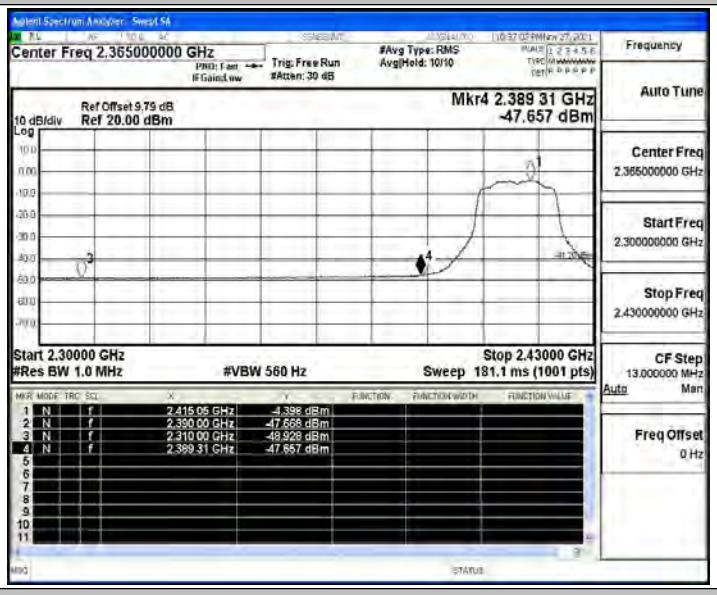

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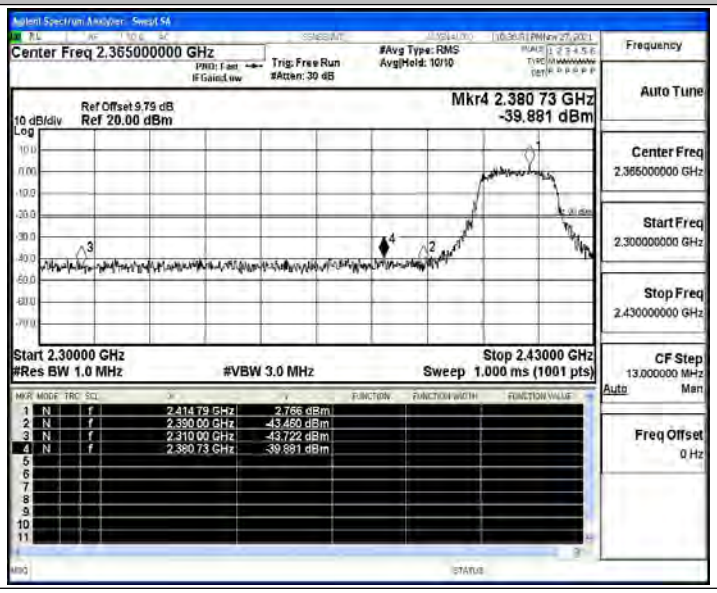

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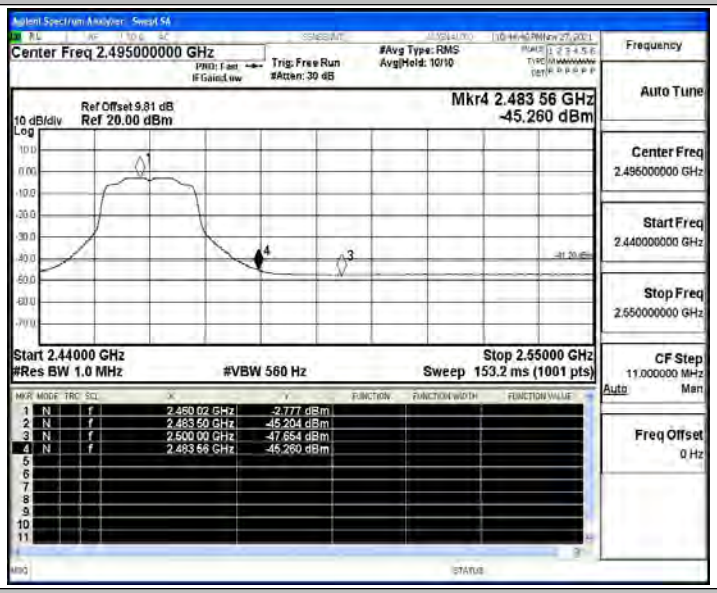
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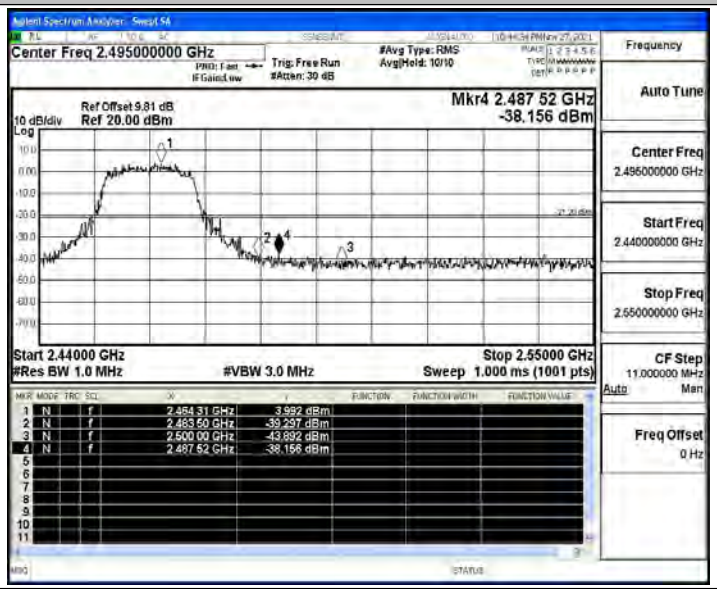
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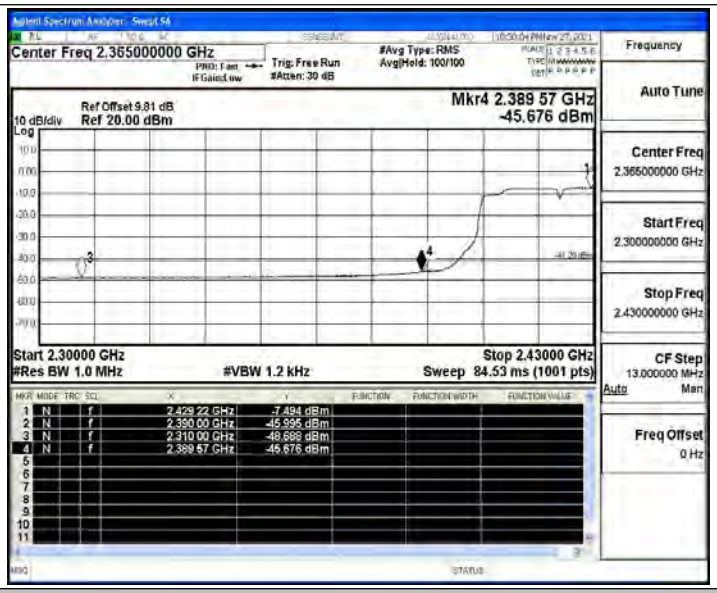

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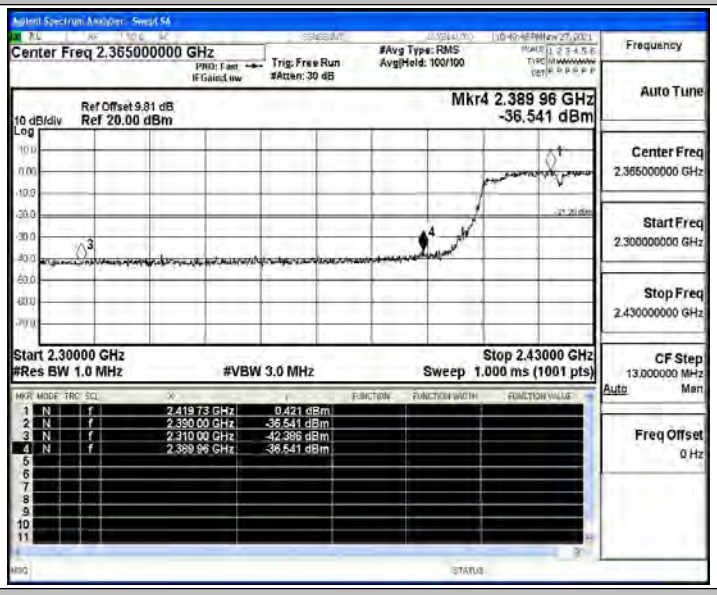

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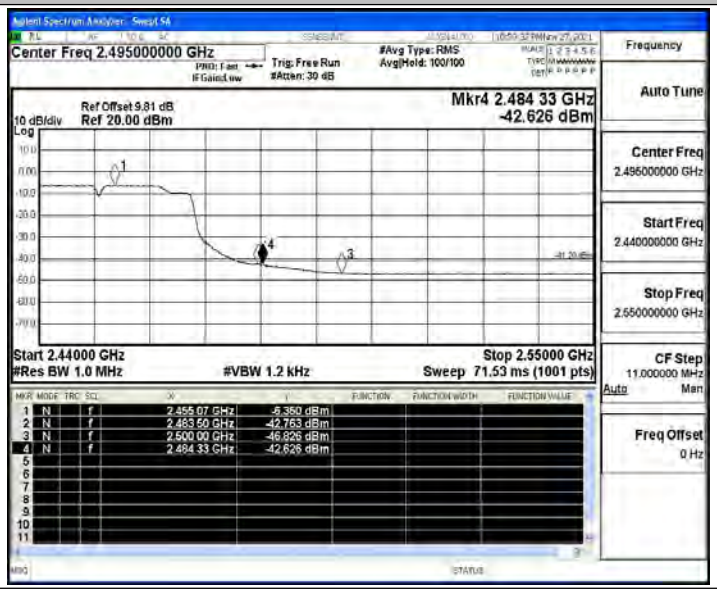
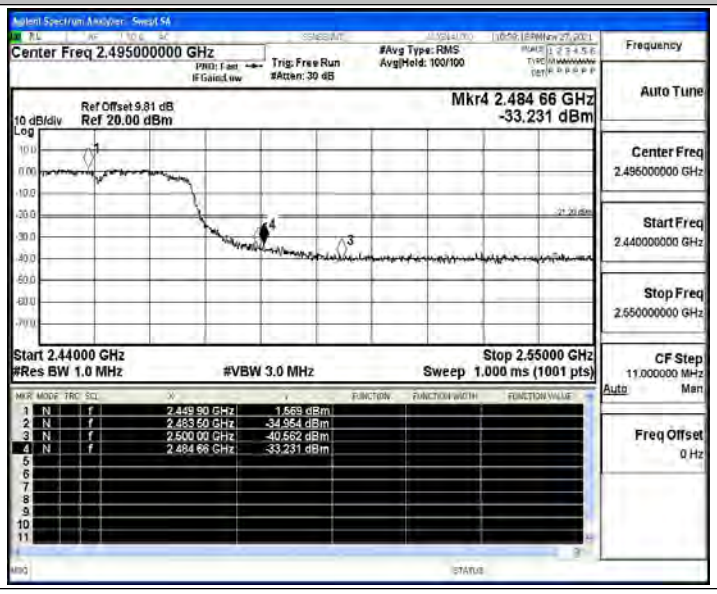
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