

Appendix B

RF Test Data for 2.4GWIFI (Conducted Measurement)

Product Name: Smart deadbolt

Test Model: DDL241X-1HW

Environmental Conditions

Temperature:	23.5°C
Relative Humidity:	54.3%
ATM Pressure:	100.0 kPa
Test Engineer:	Zhang hai
Supervised by:	Fengliu Tang

B.1 DTS Bandwidth

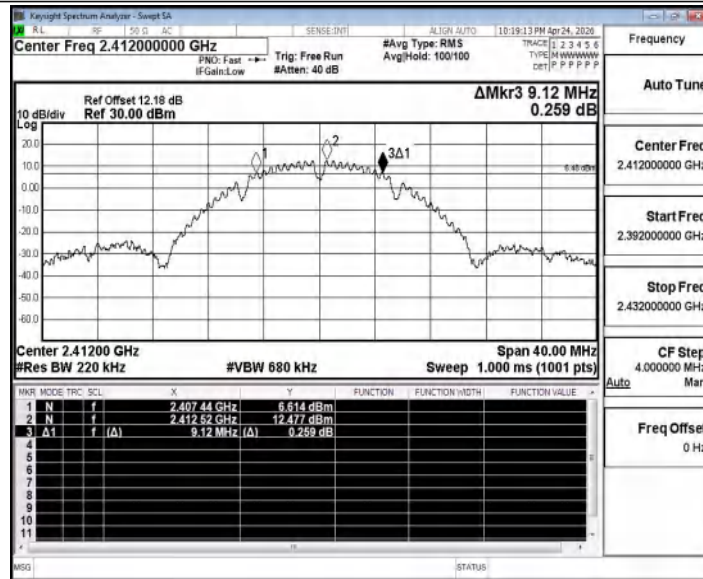
Test Result

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.120	2407.440	2416.560	0.5	PASS
		2437	9.120	2432.440	2441.560	0.5	PASS
		2462	9.120	2457.440	2466.560	0.5	PASS
11G	Ant1	2412	16.320	2403.840	2420.160	0.5	PASS
		2437	16.240	2428.880	2445.120	0.5	PASS
		2462	16.040	2454.040	2470.080	0.5	PASS
11N20SISO	Ant1	2412	16.640	2403.880	2420.520	0.5	PASS
		2437	17.440	2428.400	2445.840	0.5	PASS
		2462	17.720	2453.240	2470.960	0.5	PASS
11N40SISO	Ant1	2422	35.360	2404.240	2439.600	0.5	PASS
		2437	34.240	2420.120	2454.360	0.5	PASS
		2452	34.720	2434.000	2468.720	0.5	PASS

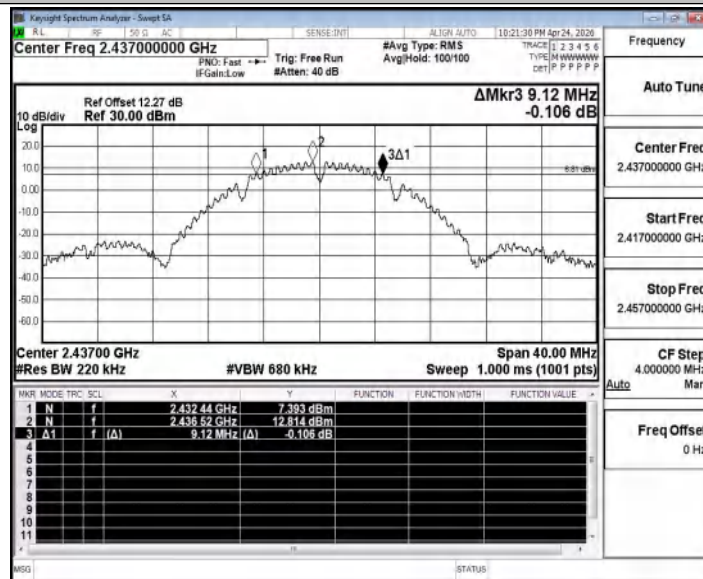
Note :offset=System attenuation +cabal loss

Test Graphs

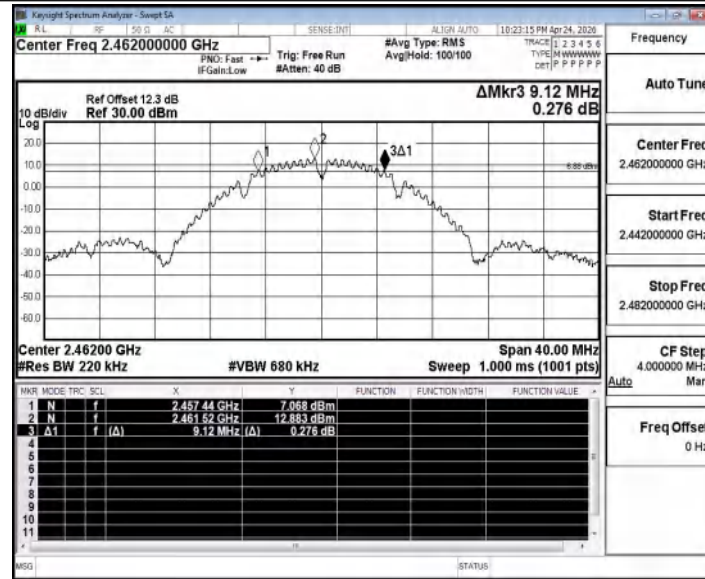
11B_Ant1_2412



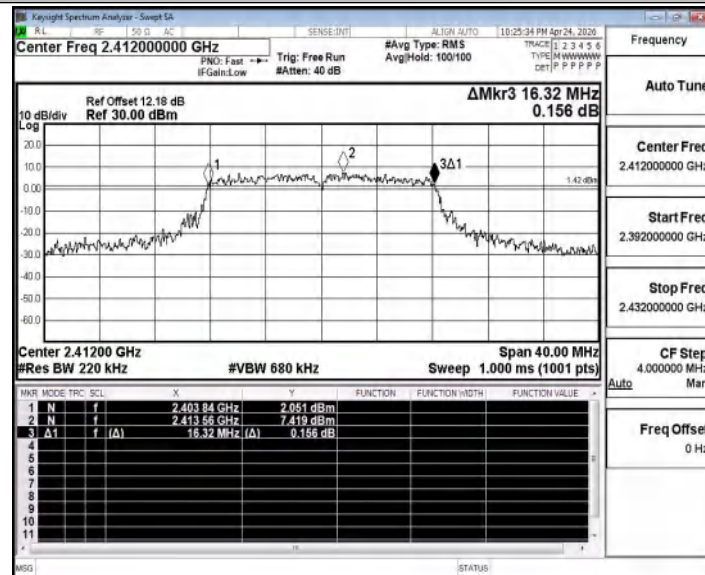
11B_Ant1_2437



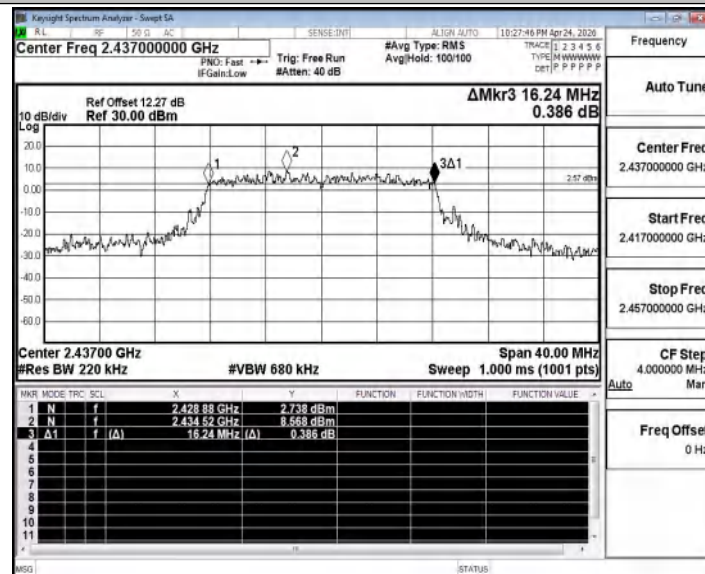
11B_Ant1_2462



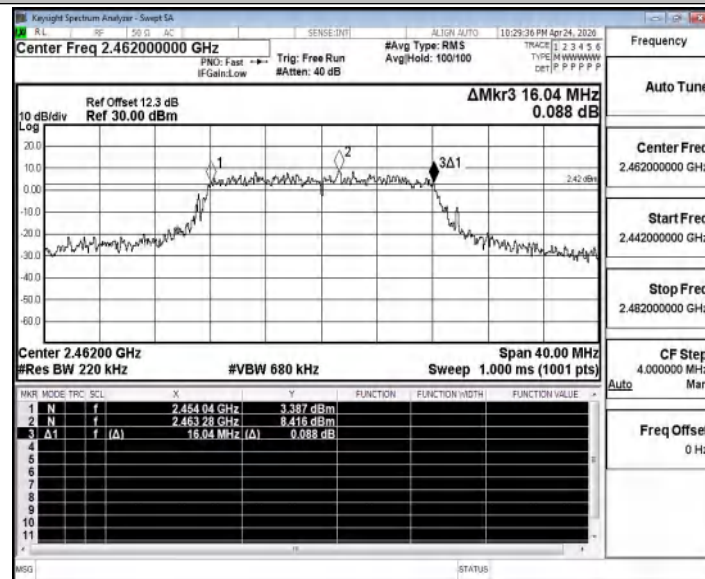
11G_Ant1_2412



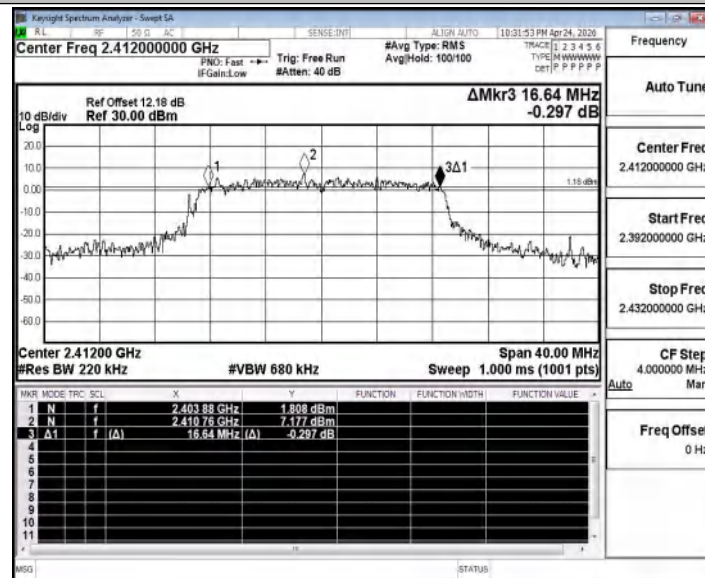
11G_Ant1_2437



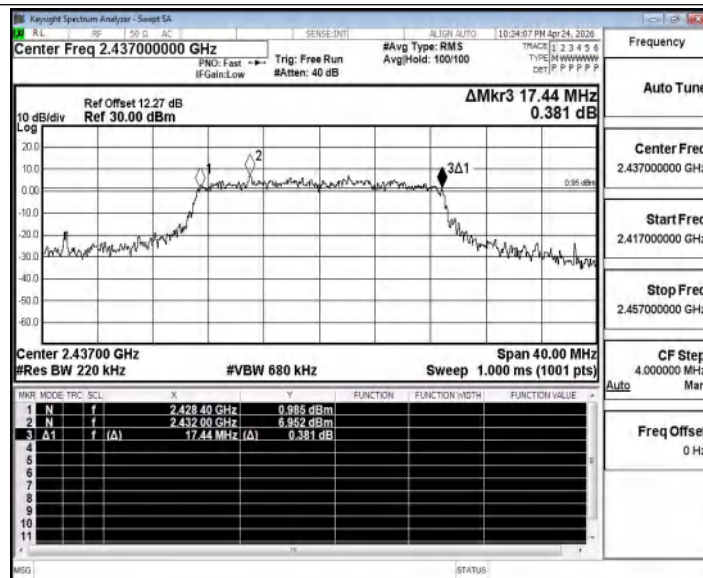
11G_Ant1_2462



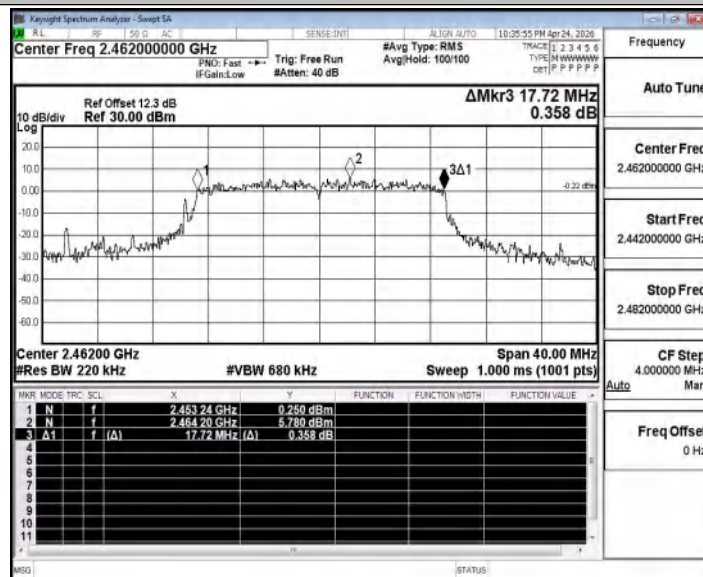
11N20SISO_Ant1_2412



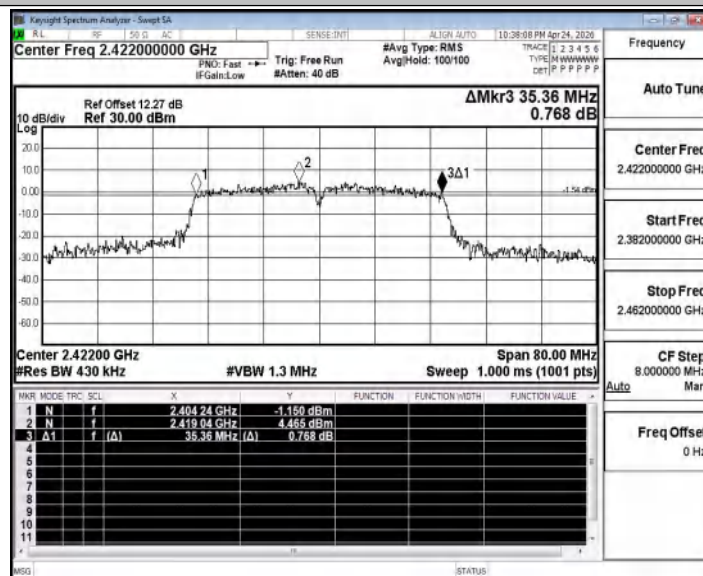
11N20SISO_Ant1_2437



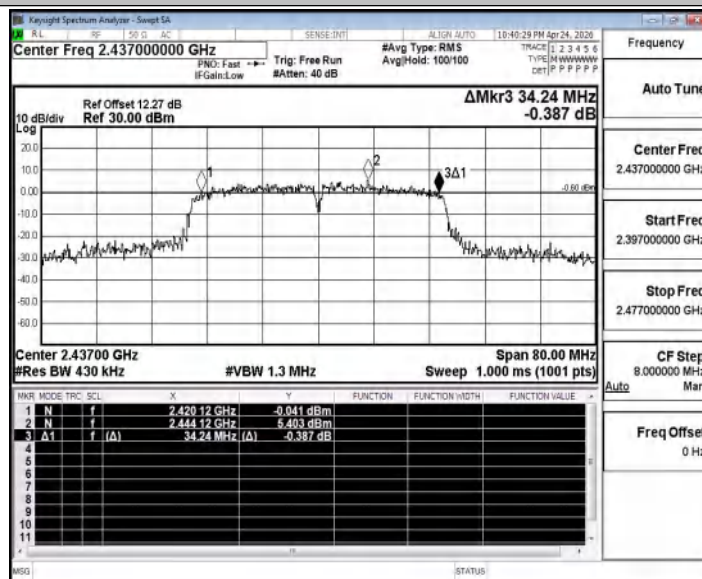
11N20SISO_Ant1_2462



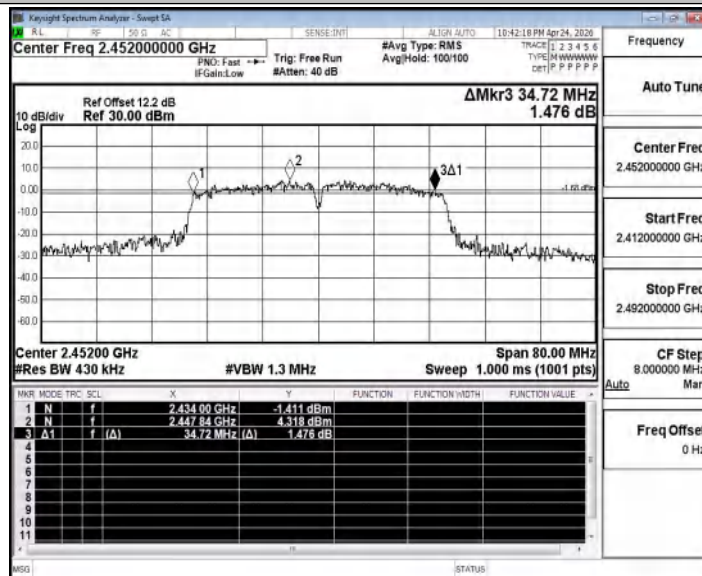
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



B.2 Maximum Average conducted output power

Test Result Average

TestMode	Antenna	Frequency [MHz]	Measured Power	DC Factor [dB]	AV Power [dBm]	Conducted Limit[dBm]	Verdict
11B	Ant1	2412	15.30	0.00	15.30	≤30.00	PASS
		2437	15.32	0.00	15.32	≤30.00	PASS
		2462	15.32	3.10	18.42	≤30.00	PASS
11G	Ant1	2412	9.01	8.63	17.64	≤30.00	PASS
		2437	9.24	8.60	17.84	≤30.00	PASS
		2462	8.82	8.63	17.45	≤30.00	PASS
11N20SISO	Ant1	2412	7.37	8.84	16.21	≤30.00	PASS
		2437	7.51	8.91	16.42	≤30.00	PASS
		2462	7.05	8.85	15.90	≤30.00	PASS
11N40SISO	Ant1	2422	4.39	10.02	14.41	≤30.00	PASS
		2437	5.17	10.02	15.19	≤30.00	PASS
		2452	5.14	10.03	15.17	≤30.00	PASS

Note :offset=System attenuation +cabal loss

B.3 Maximum power spectral density

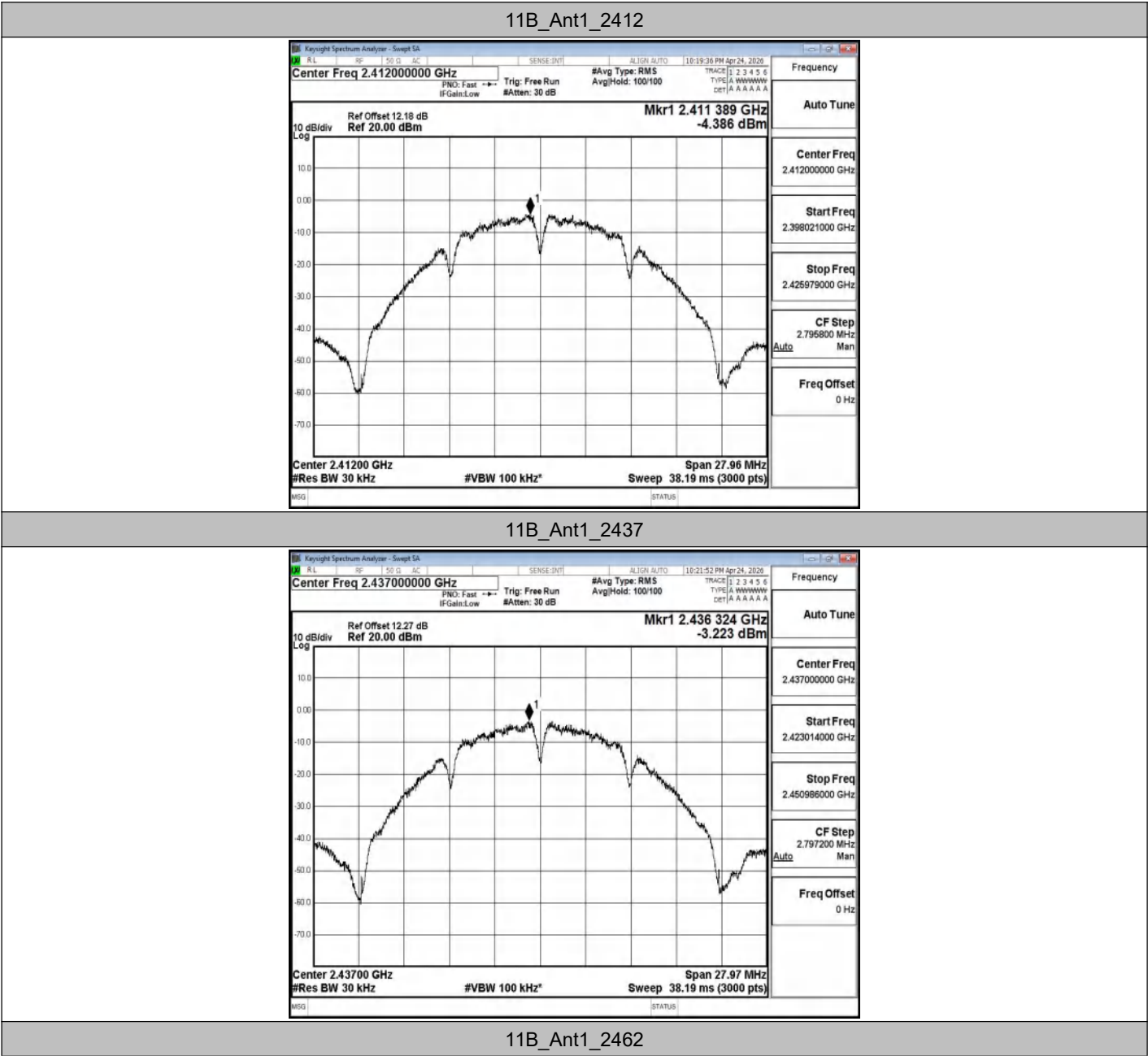
Test Result

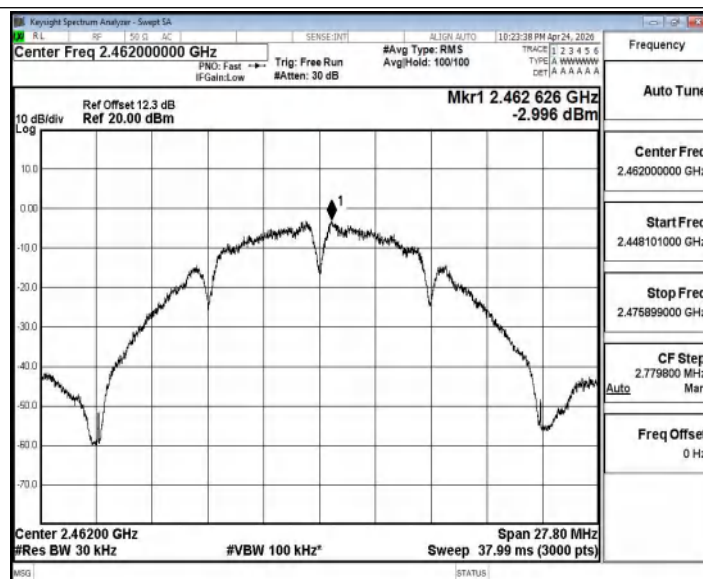
TestMode	Antenna	Frequency [MHz]	Measured PSD [dBm/30kHz]	DC Factor [dB]	Result[dBm/30kHz]	Result [dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-4.39	3.10	-1.29	-11.29	≤8.00	PASS
		2437	-3.22	0.00	-3.22	-13.22	≤8.00	PASS
		2462	-3	0.00	-3.00	-13.00	≤8.00	PASS
11G	Ant1	2412	-12.25	8.63	-3.62	-13.62	≤8.00	PASS
		2437	-2.74	8.60	5.86	-4.14	≤8.00	PASS
		2462	-12.73	8.63	-4.10	-14.10	≤8.00	PASS
11N20SISO	Ant1	2412	-14.19	8.84	-5.35	-15.35	≤8.00	PASS
		2437	-14.37	8.91	-5.46	-15.46	≤8.00	PASS
		2462	-14.92	8.85	-6.07	-16.07	≤8.00	PASS
11N40SISO	Ant1	2422	-18.92	10.02	-8.90	-18.90	≤8.00	PASS
		2437	-19.96	10.02	-9.94	-19.94	≤8.00	PASS
		2452	-19.97	10.03	-9.94	-19.94	≤8.00	PASS

Note :offset=System attenuation +cable loss

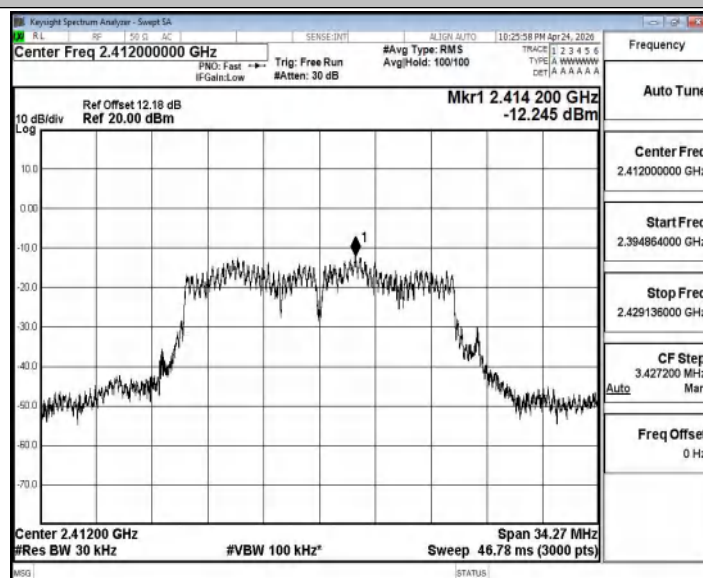
Result[dBm/3kHz]=Result[dBm/30kHz]+10*Log(3/30)

Test Graphs

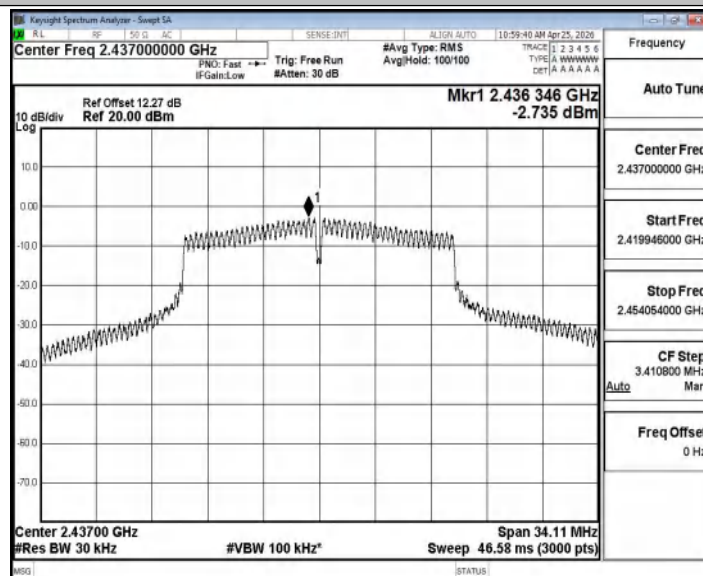




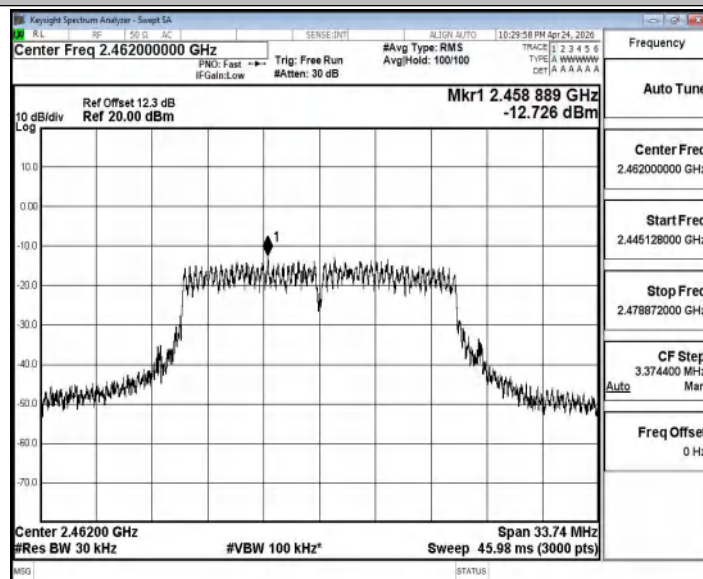
11G_Ant1_2412



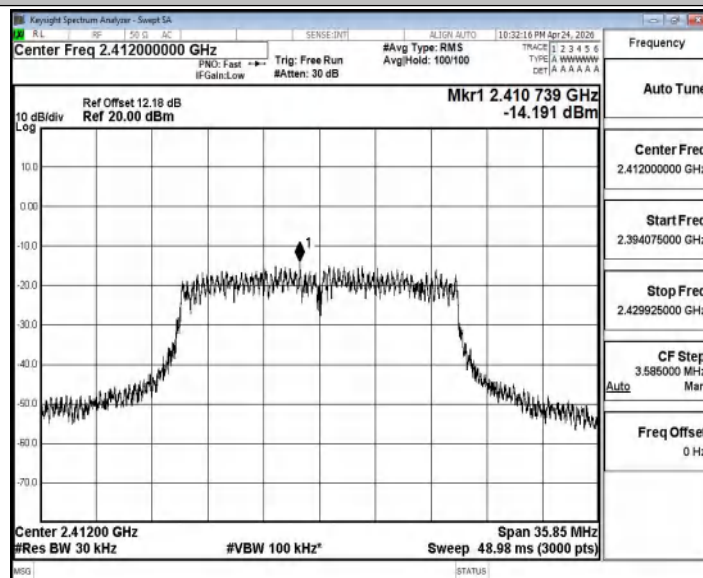
11G_Ant1_2437



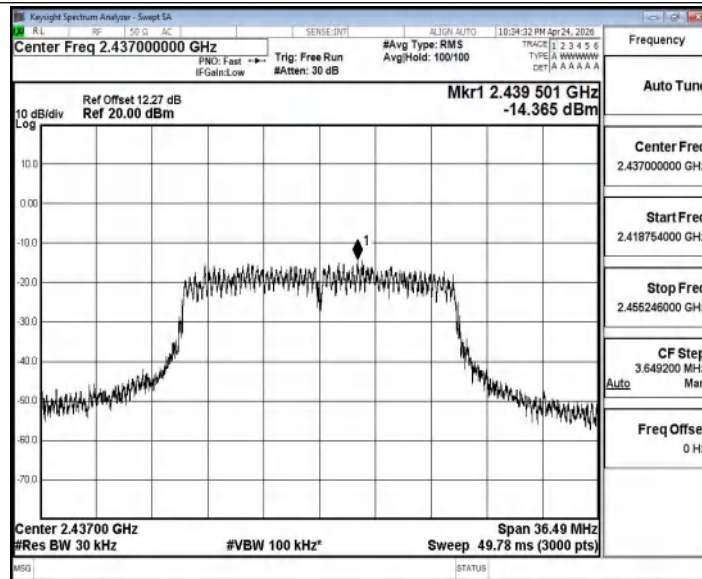
11G_Ant1_2462



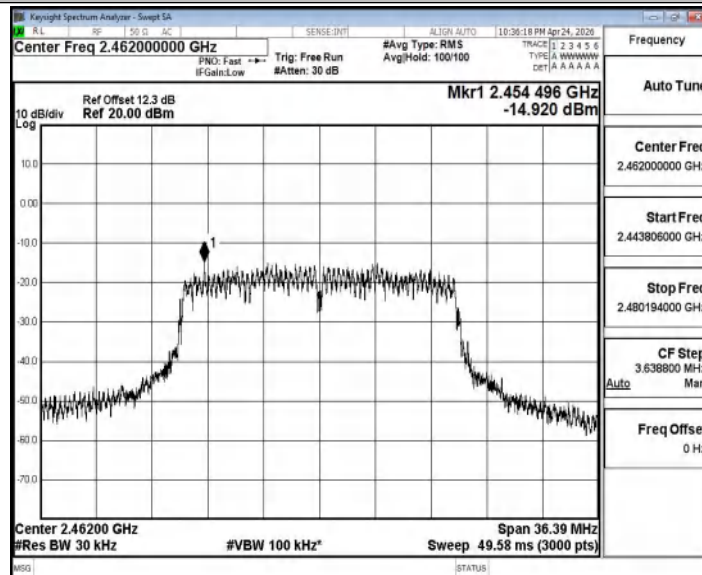
11N20SISO_Ant1_2412



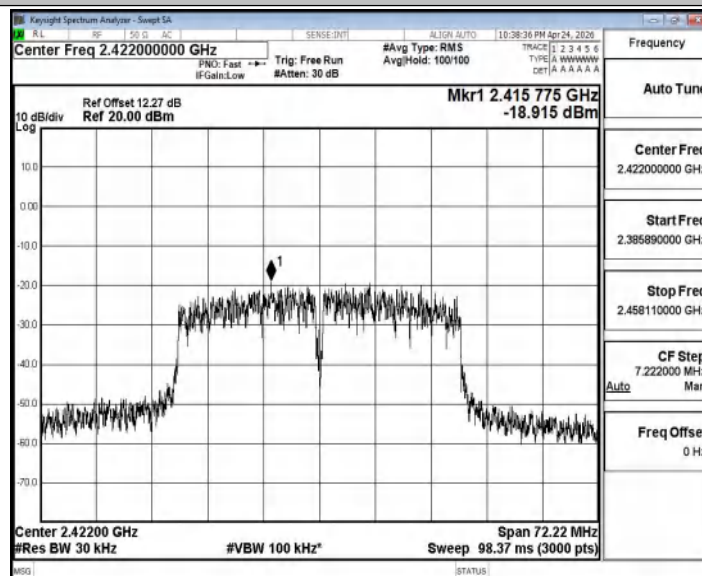
11N20SISO_Ant1_2437



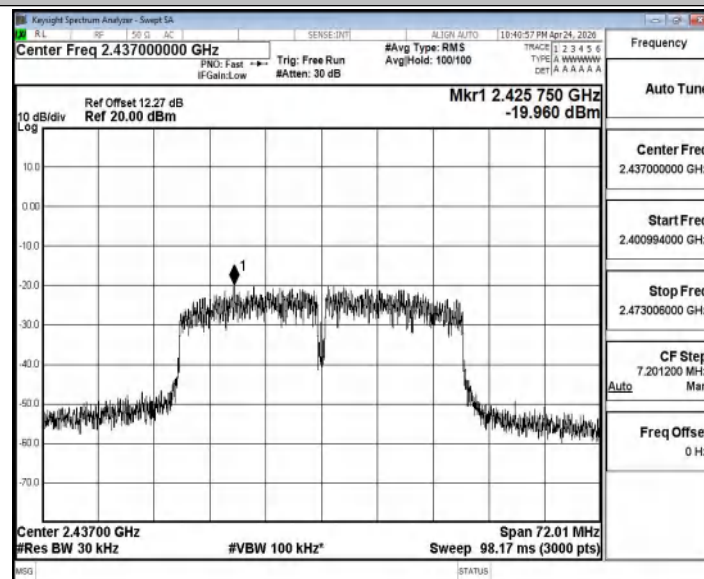
11N20SISO_Ant1_2462



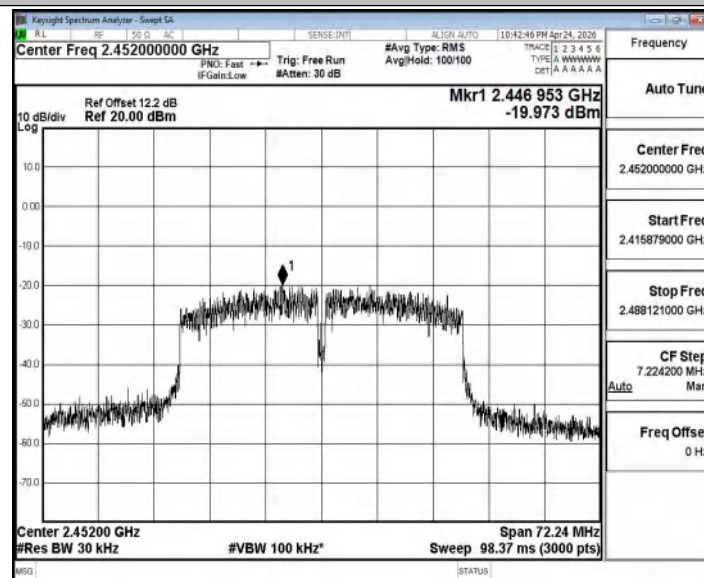
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



B.4 Band edge measurements

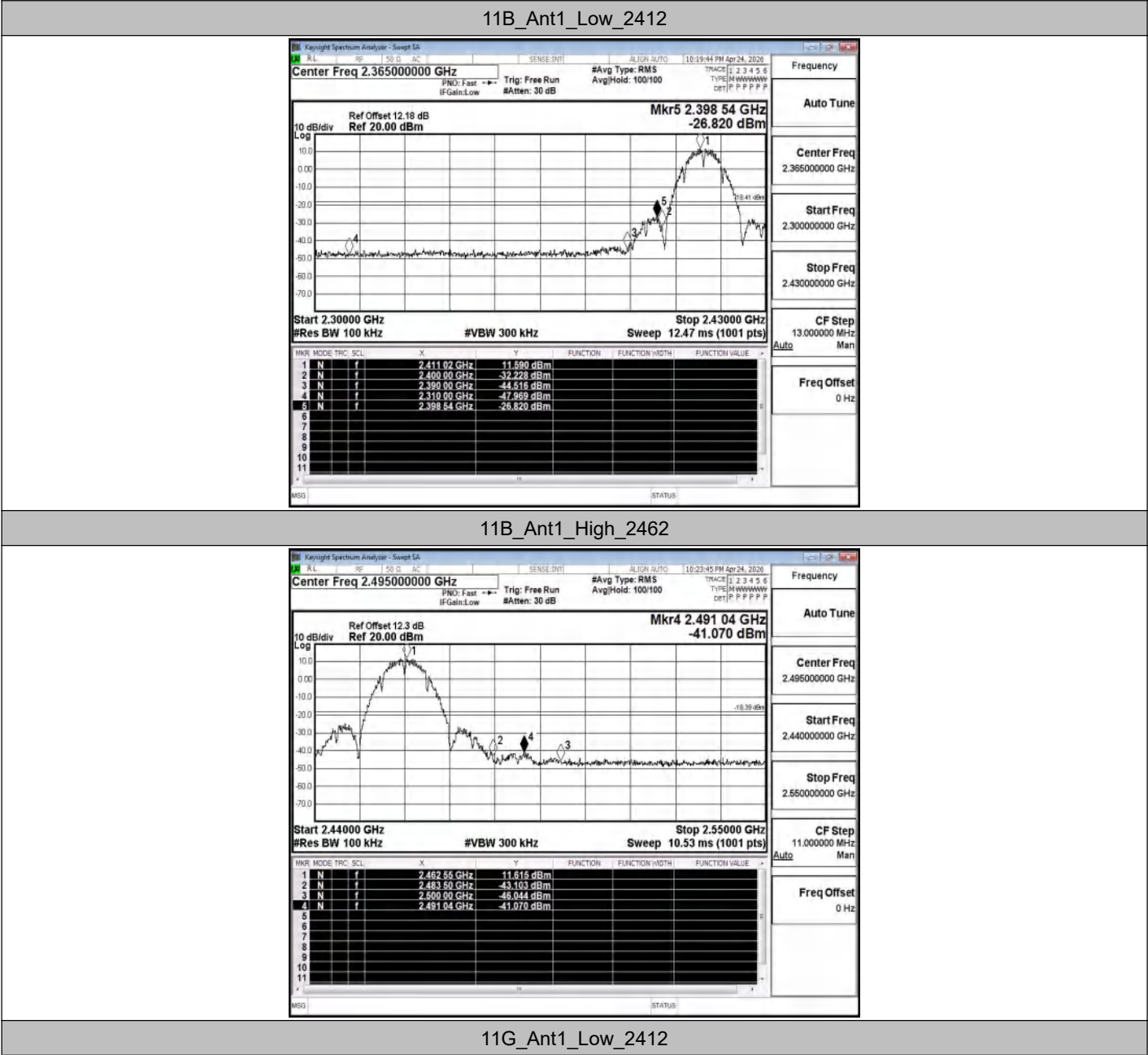
Test Result

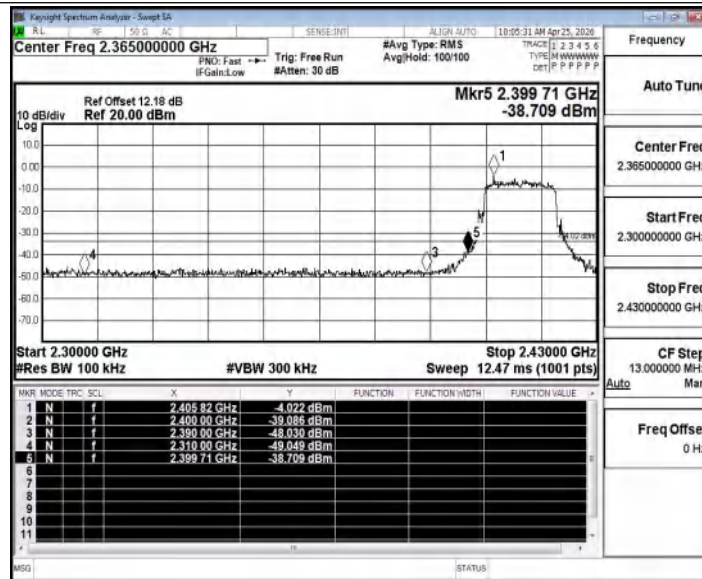
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	11.59	-26.82	≤-18.41	PASS
		High	2462	11.62	-41.07	≤-18.39	PASS
11G	Ant1	Low	2412	-4.02	-38.71	≤-34.02	PASS
		High	2462	7.27	-33.71	≤-22.73	PASS
11N20SISO	Ant1	Low	2412	2.59	-35.7	≤-27.41	PASS
		High	2462	3.91	-37.17	≤-26.09	PASS
11N40SISO	Ant1	Low	2422	-3.58	-38.91	≤-33.58	PASS
		High	2452	1.75	-31.65	≤-28.25	PASS

Note :offset=System attenuation +cabal loss

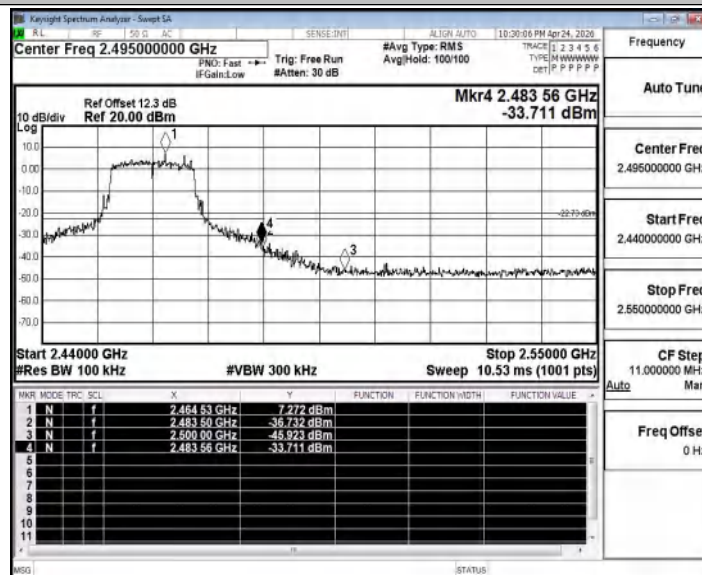
Ref Level -30db=Limit

Test Graphs

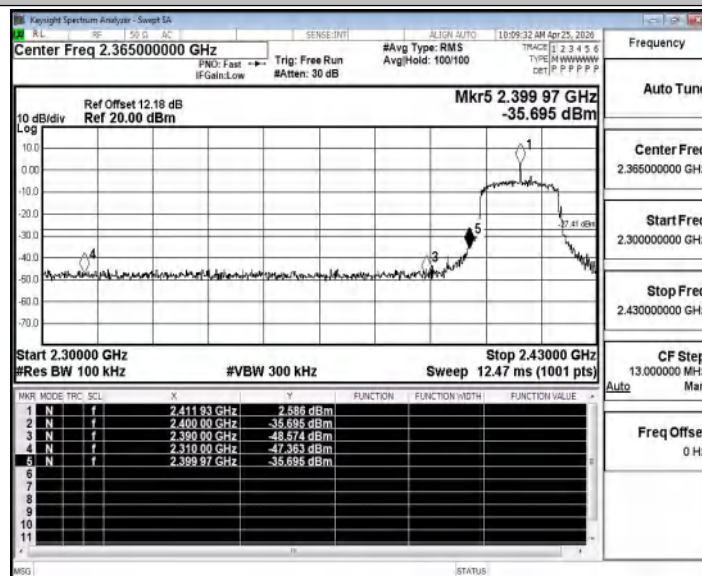




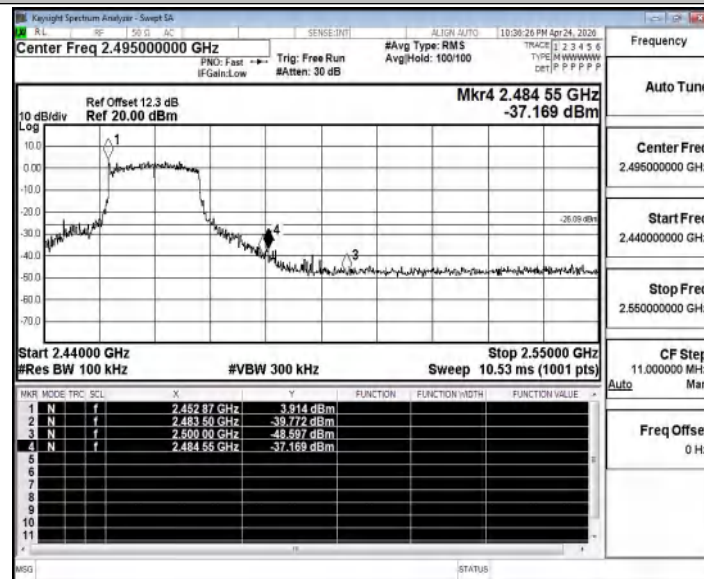
11G_Ant1_High_2462



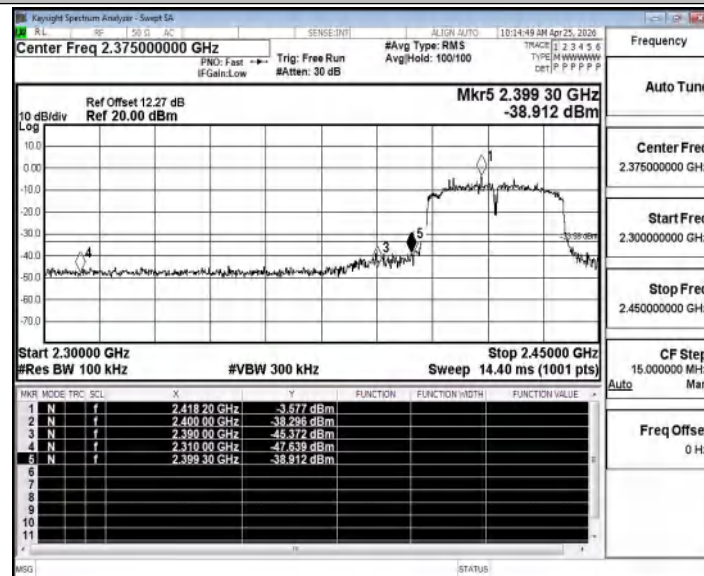
11N20SISO_Ant1_Low_2412



11N20SISO_Ant1_High_2462



11N40SISO_Ant1_Low_2422



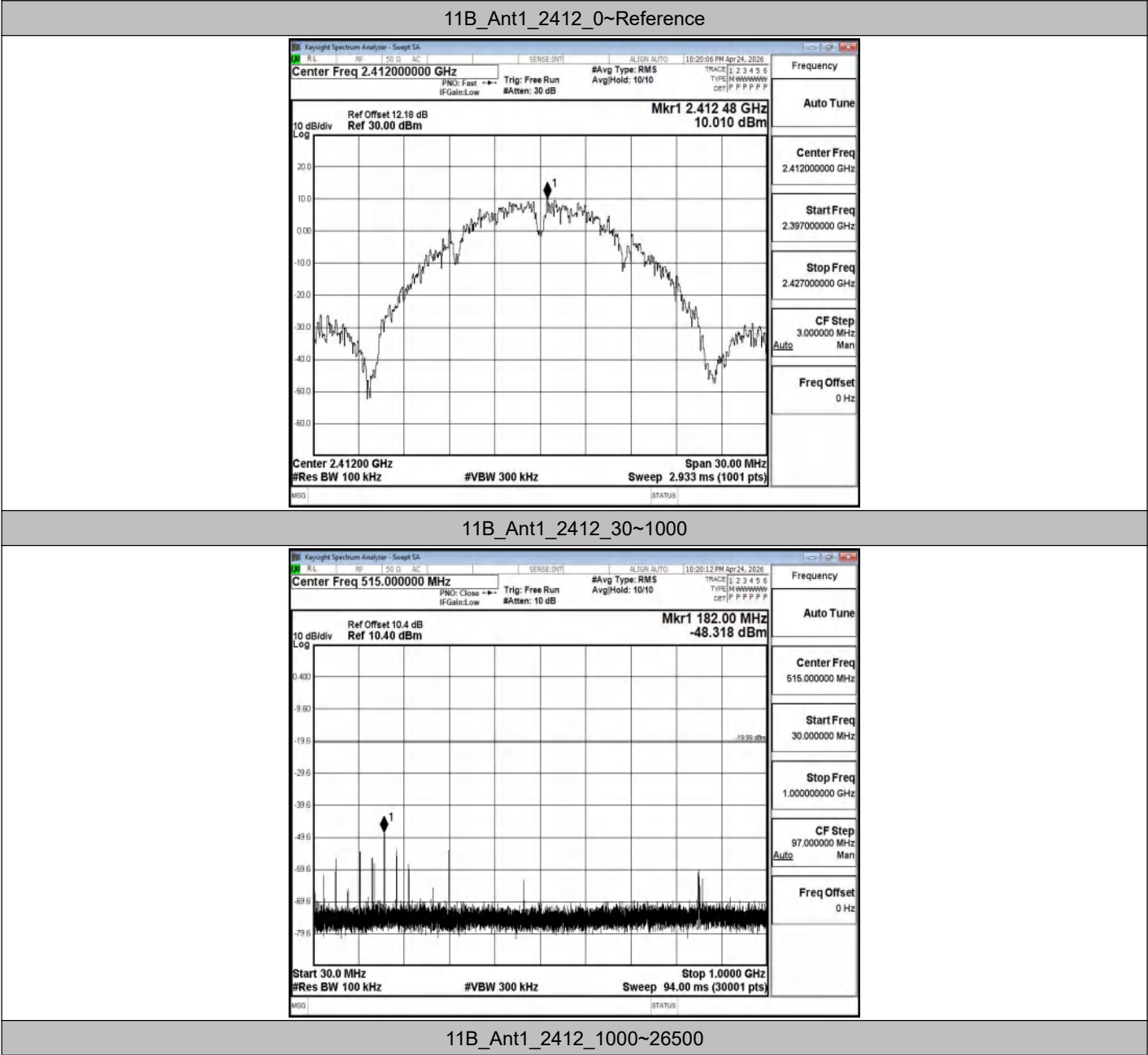
11N40SISO_Ant1_High_2452

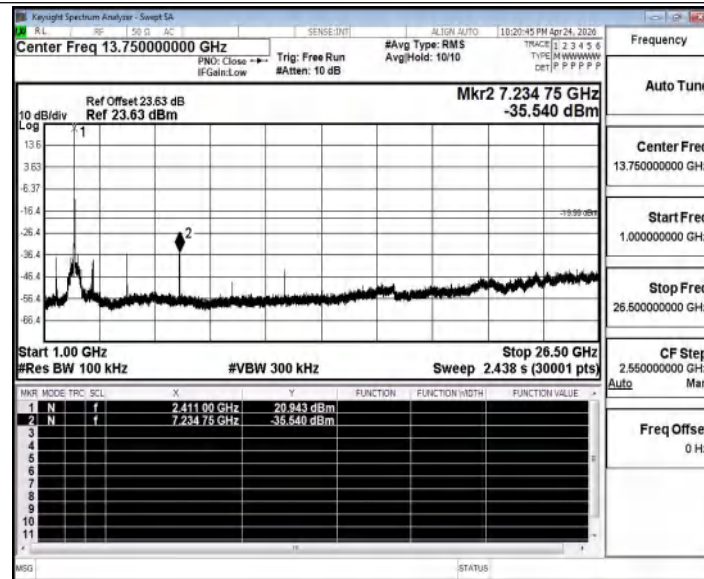
B.5 Conducted Spurious Emission Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	10.01	10.01	---	PASS
			30~1000	10.01	-48.32	≤-19.99	PASS
			1000~26500	10.01	-35.54	≤-19.99	PASS
		2437	Reference	10.47	10.47	---	PASS
			30~1000	10.47	-48.47	≤-19.53	PASS
			1000~26500	10.47	-35.63	≤-19.53	PASS
		2462	Reference	10.16	10.16	---	PASS
			30~1000	10.16	-48.73	≤-19.84	PASS
			1000~26500	10.16	-35.51	≤-19.84	PASS
11G	Ant1	2412	Reference	2.67	2.67	---	PASS
			30~1000	2.67	-67.54	≤-27.33	PASS
			1000~26500	2.67	-38.13	≤-27.33	PASS
		2437	Reference	2.14	2.14	---	PASS
			30~1000	2.14	-68.73	≤-27.86	PASS
			1000~26500	2.14	-37.83	≤-27.86	PASS
		2462	Reference	3.13	3.13	---	PASS
			30~1000	3.13	-47.94	≤-26.87	PASS
			1000~26500	3.13	-31.44	≤-26.87	PASS
11N20SISO	Ant1	2412	Reference	2.01	2.01	---	PASS
			30~1000	2.01	-68.47	≤-27.99	PASS
			1000~26500	2.01	-38.74	≤-27.99	PASS
		2437	Reference	4.63	4.63	---	PASS
			30~1000	4.63	-68.48	≤-25.37	PASS
			1000~26500	4.63	-38.11	≤-25.37	PASS
		2462	Reference	2.97	2.97	---	PASS
			30~1000	2.97	-68.51	≤-27.03	PASS
			1000~26500	2.97	-38.49	≤-27.03	PASS
11N40SISO	Ant1	2422	Reference	0.29	0.29	---	PASS
			30~1000	0.29	-54.35	≤-29.71	PASS
			1000~26500	0.29	-40.62	≤-29.71	PASS
		2437	Reference	0.27	0.27	---	PASS
			30~1000	0.27	-54.24	≤-29.73	PASS
			1000~26500	0.27	-40.76	≤-29.73	PASS
		2452	Reference	1.53	1.53	---	PASS
			30~1000	1.53	-54.81	≤-28.47	PASS
			1000~26500	1.53	-40.49	≤-28.47	PASS

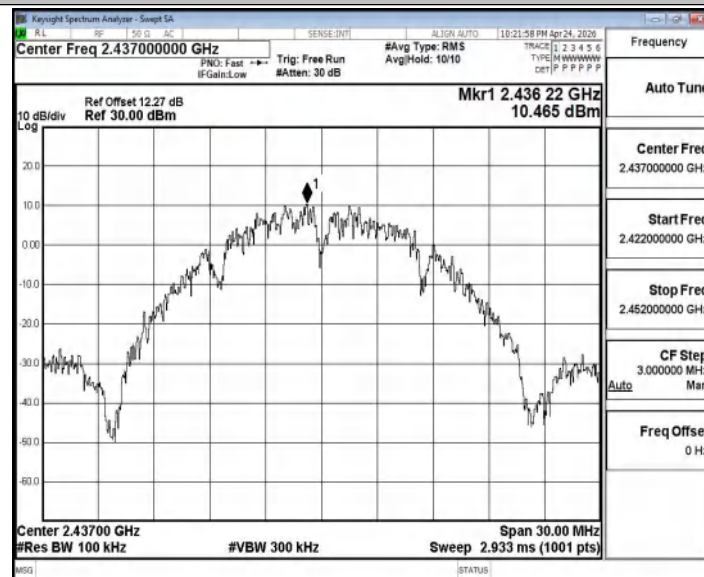
Note :Regarding the spurious emissions from 30MHz to 26.5GHz, the cable lose have been set in the CORREC' of the Spectrum Analyzer during the test.

Test Graphs

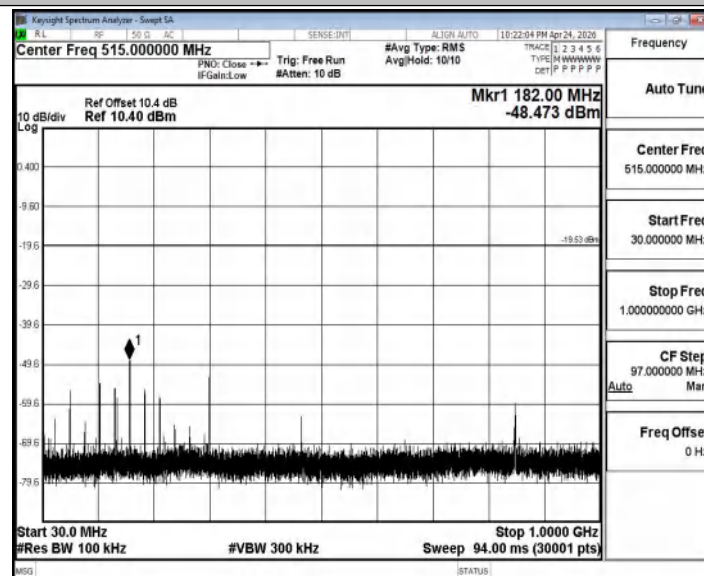




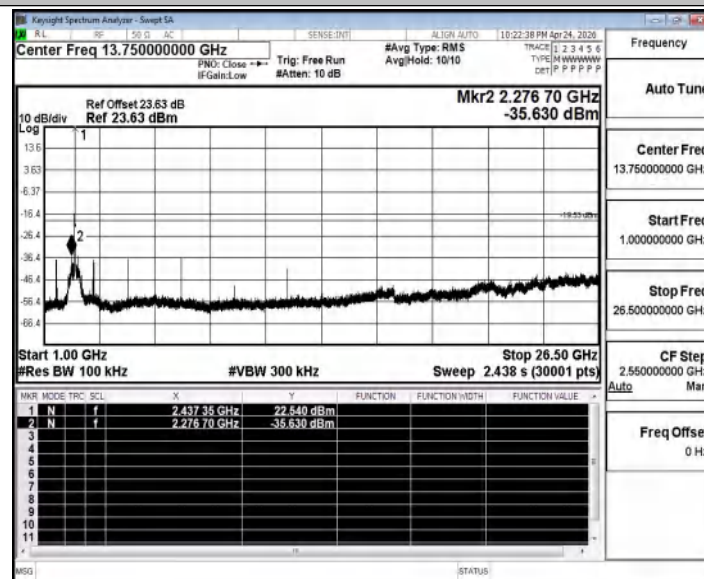
11B_Ant1_2437_0~Reference



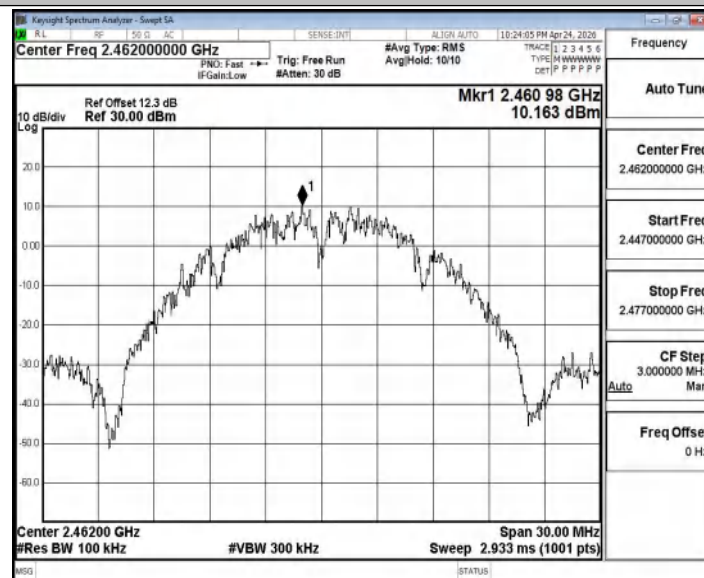
11B_Ant1_2437_30~1000



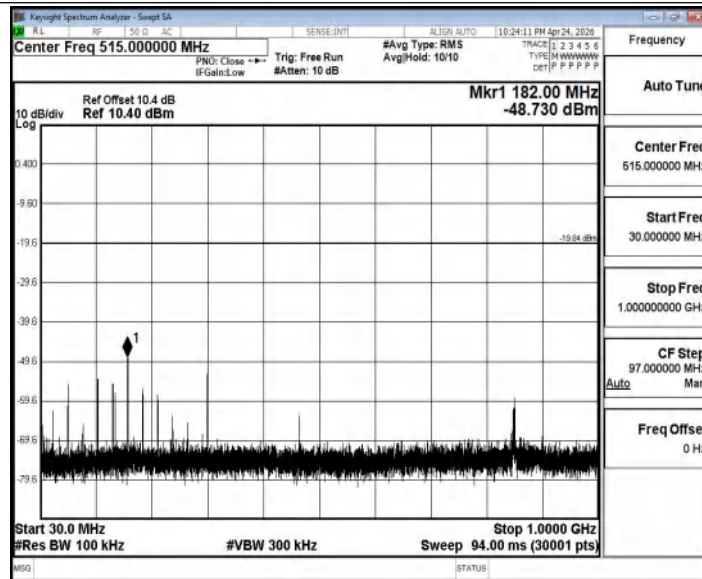
11B_Ant1_2437_1000~26500



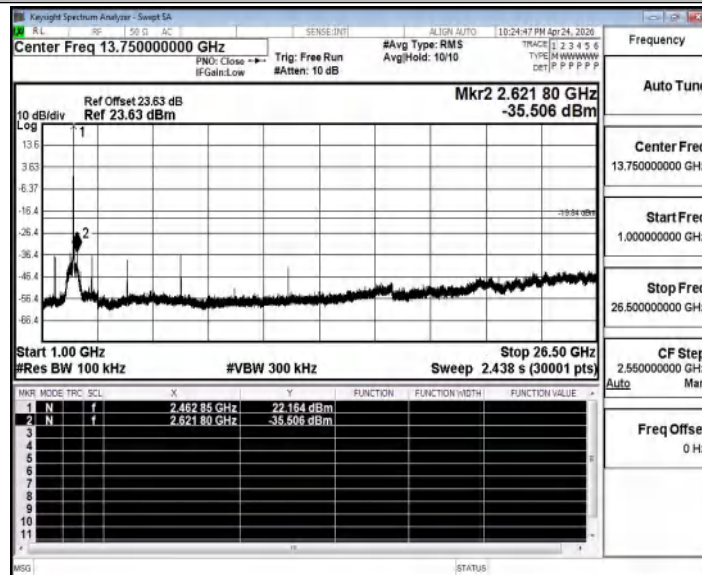
11B_Ant1_2462_0~Reference



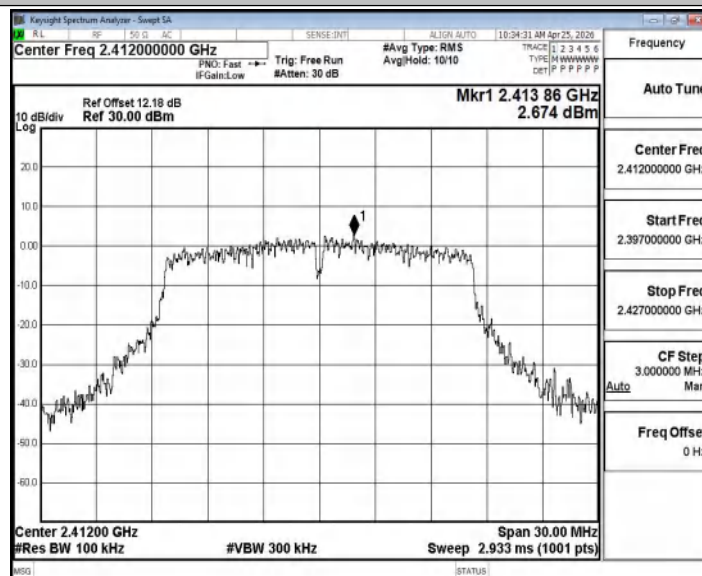
11B_Ant1_2462_30~1000



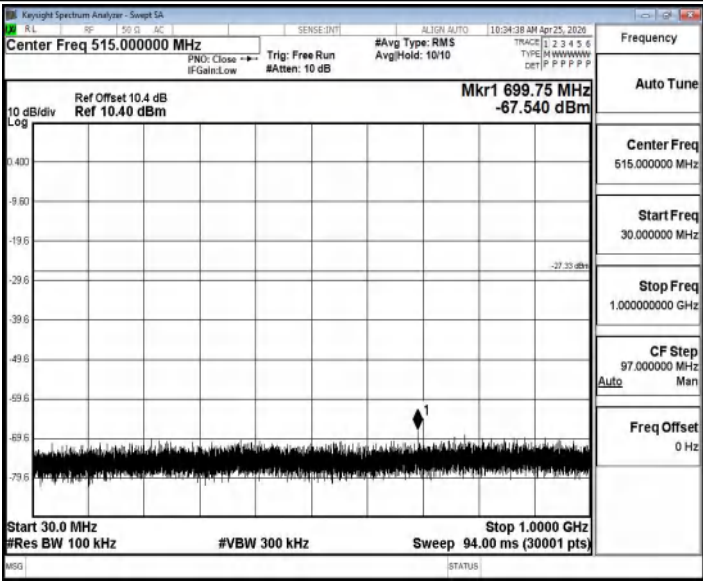
11B_Ant1_2462_1000~26500



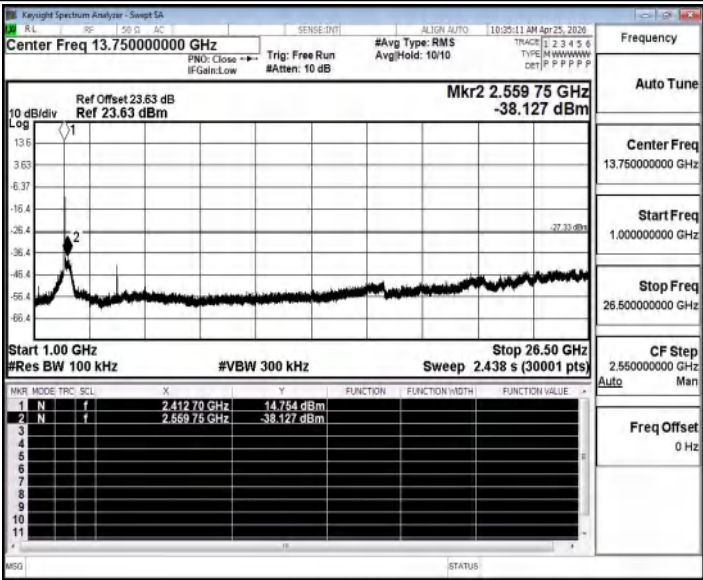
11G_Ant1_2412_0~Reference



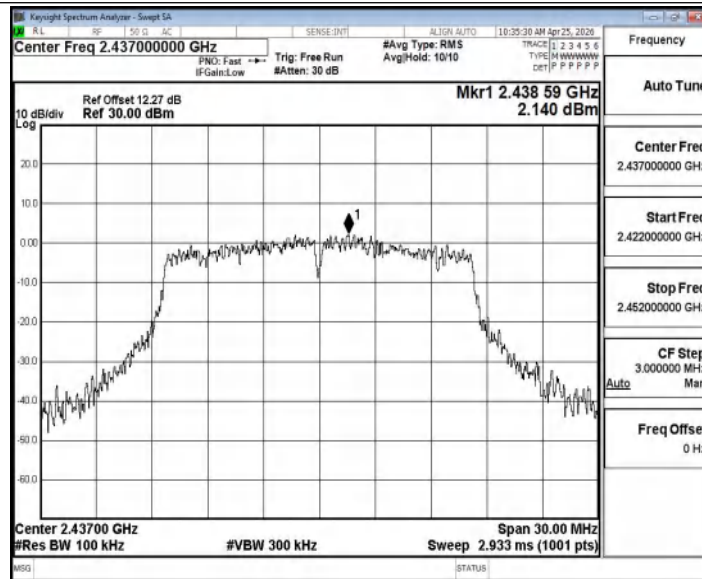
11G_Ant1_2412_30~1000



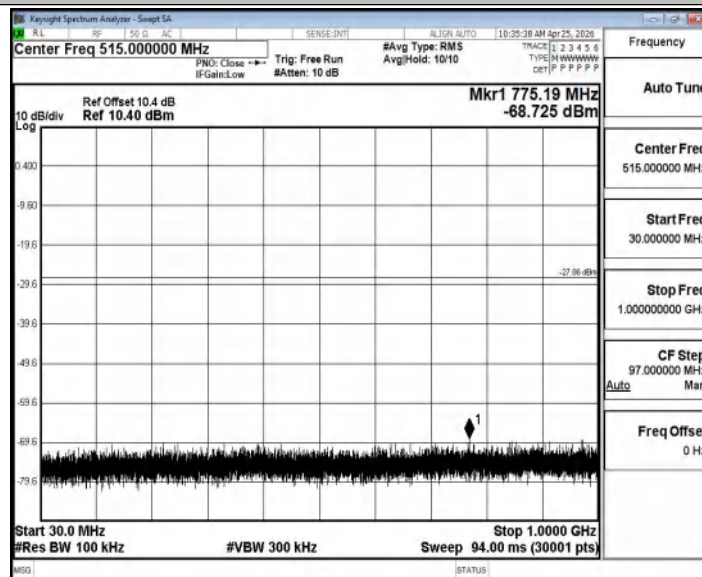
11G_Ant1_2412_1000~26500



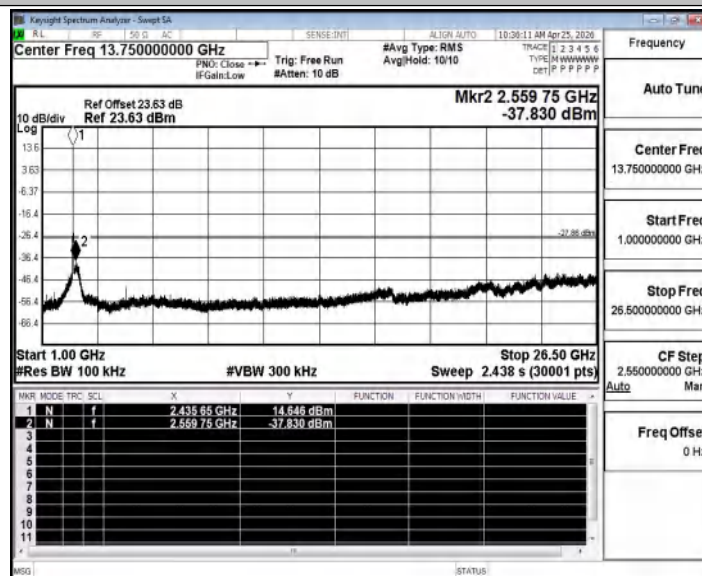
11G_Ant1_2437_0~Reference



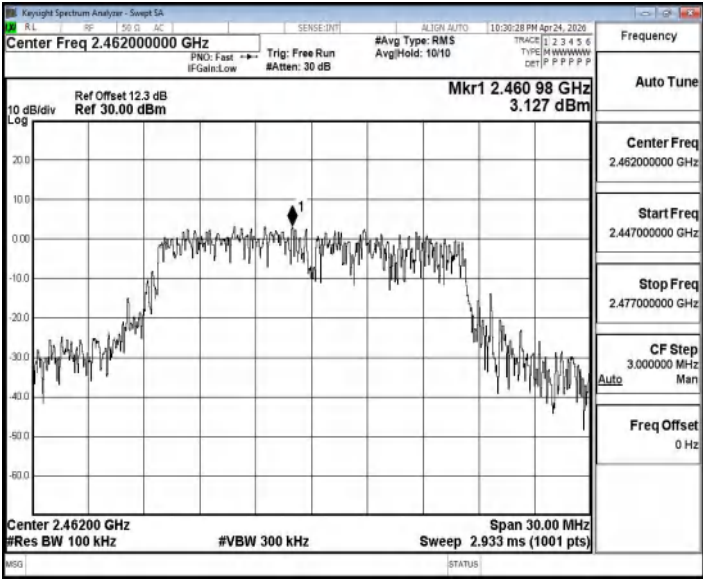
11G_Ant1_2437_30~1000



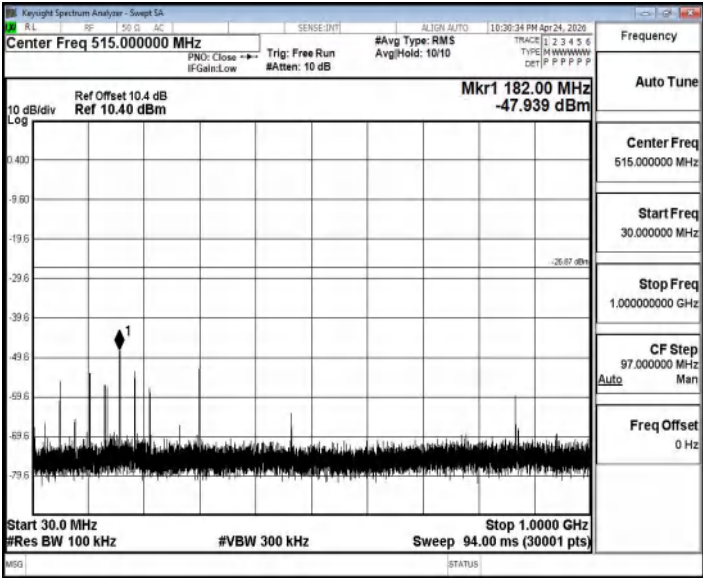
11G_Ant1_2437_1000~26500



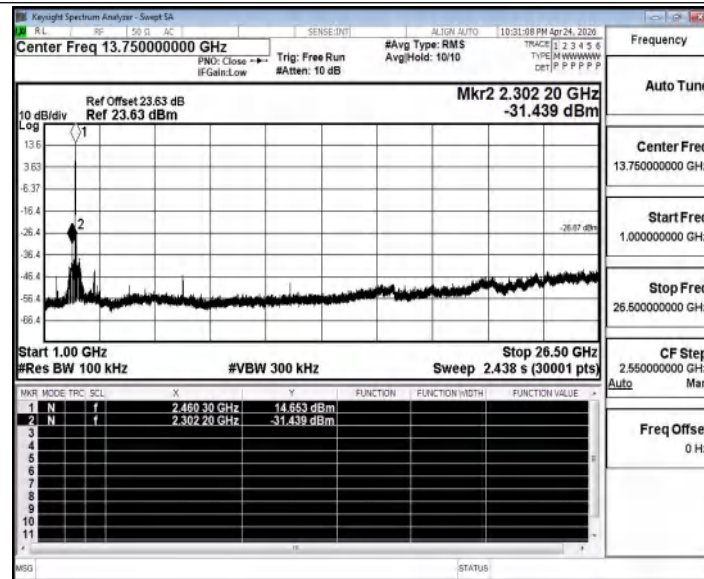
11G_Ant1_2462_0~Reference



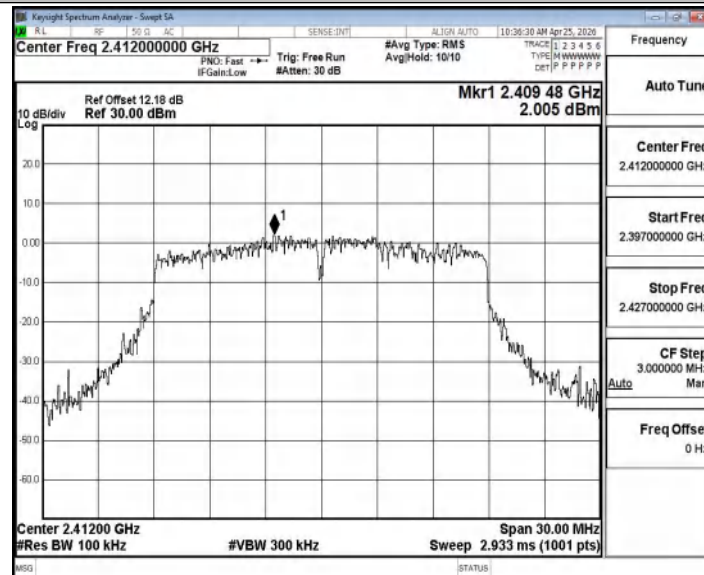
11G_Ant1_2462_30~1000



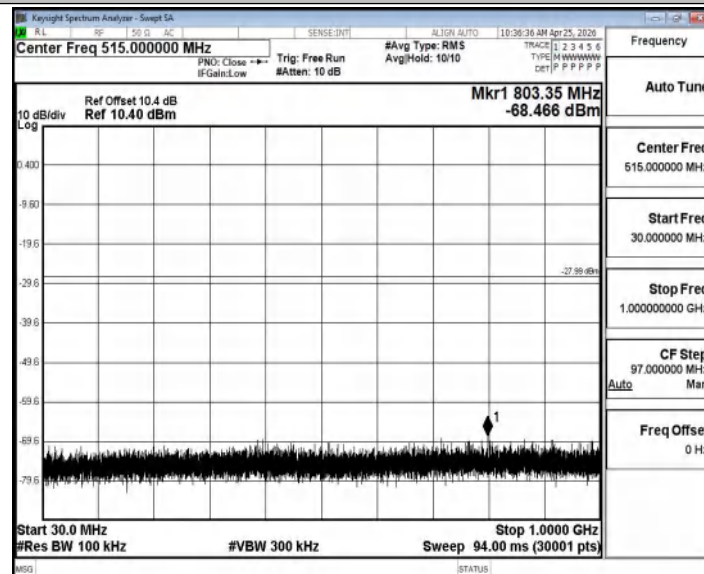
11G_Ant1_2462_1000~26500



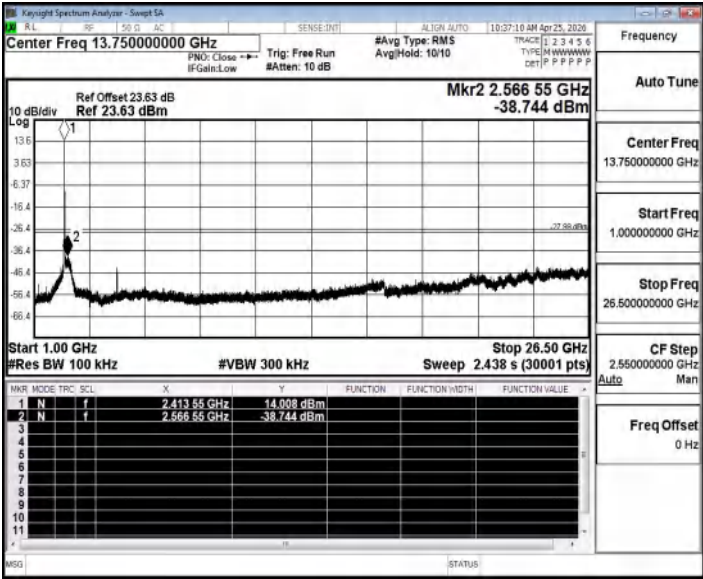
11N20SISO_Ant1_2412_0~Reference



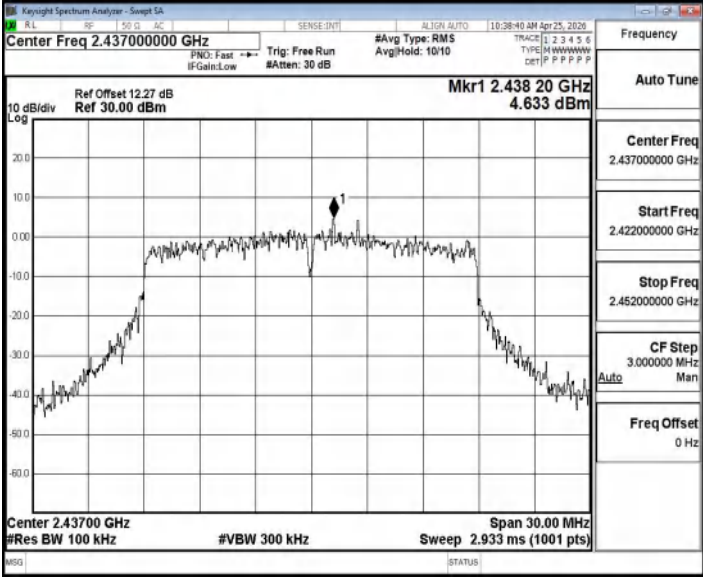
11N20SISO_Ant1_2412_30~1000



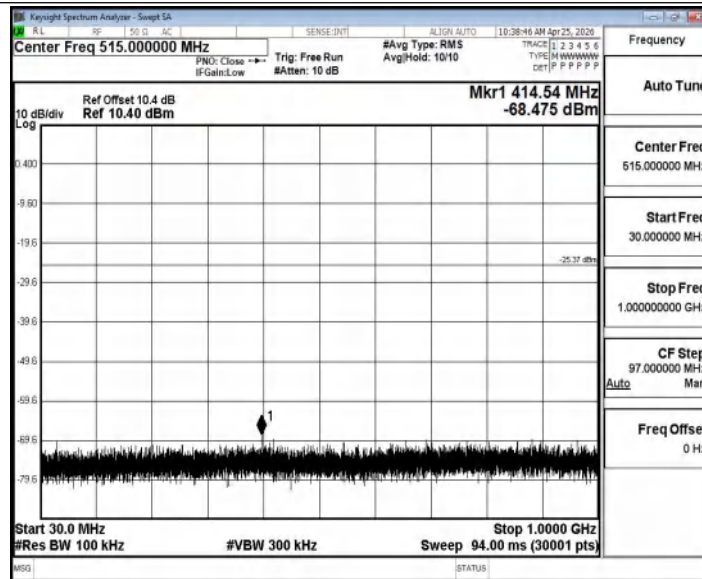
11N20SISO_Ant1_2412_1000~26500



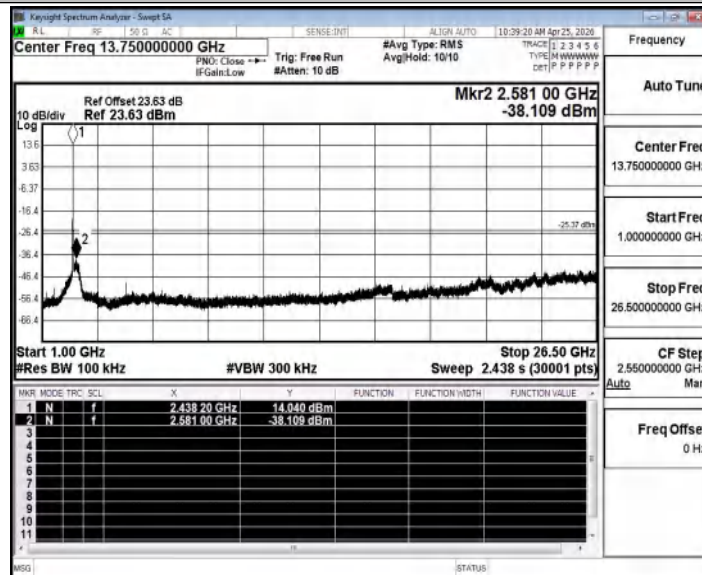
11N20SISO_Ant1_2437_0~Reference



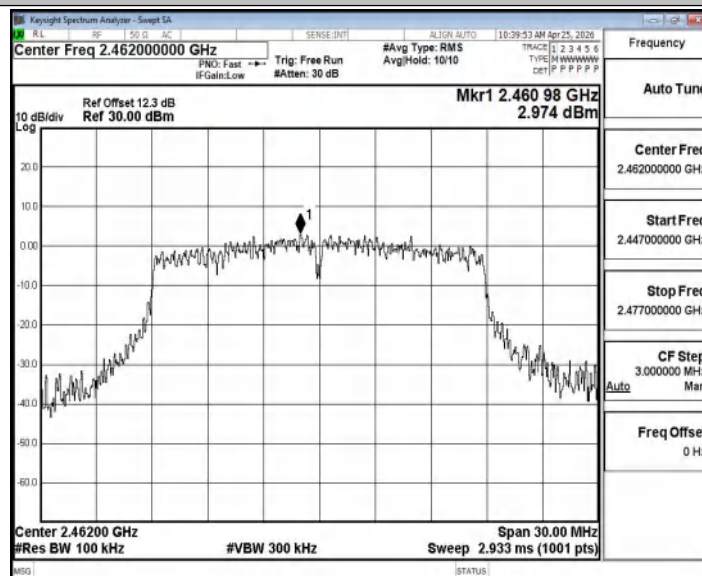
11N20SISO_Ant1_2437_30~1000

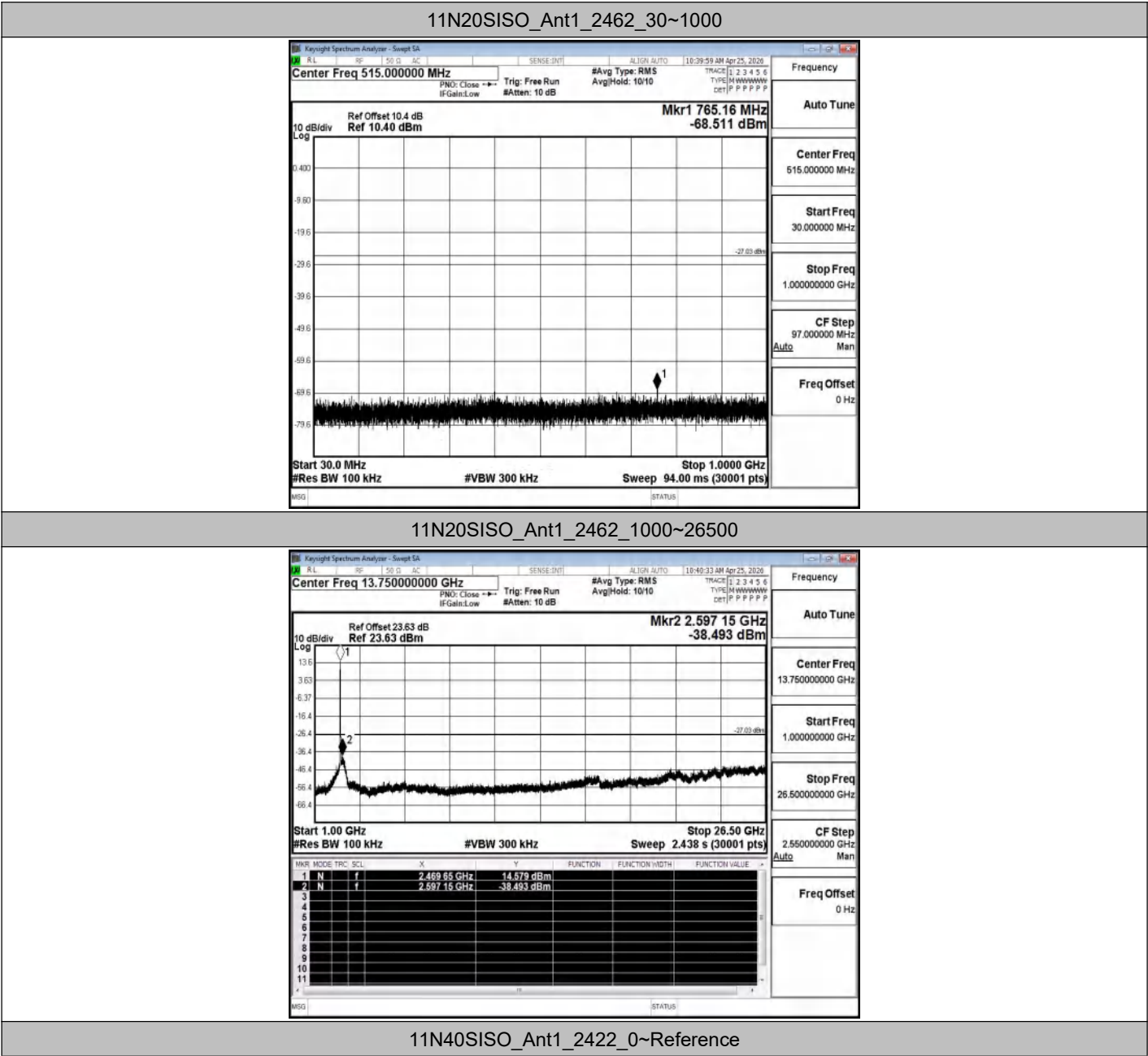


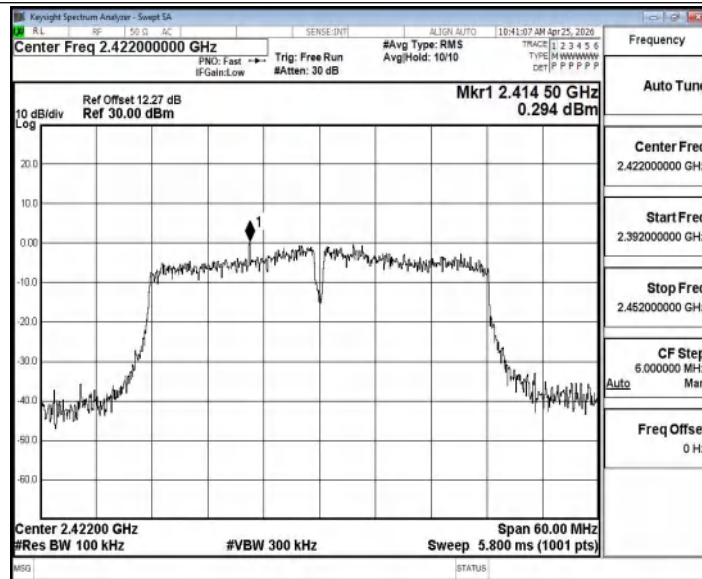
11N20SISO_Ant1_2437_1000~26500



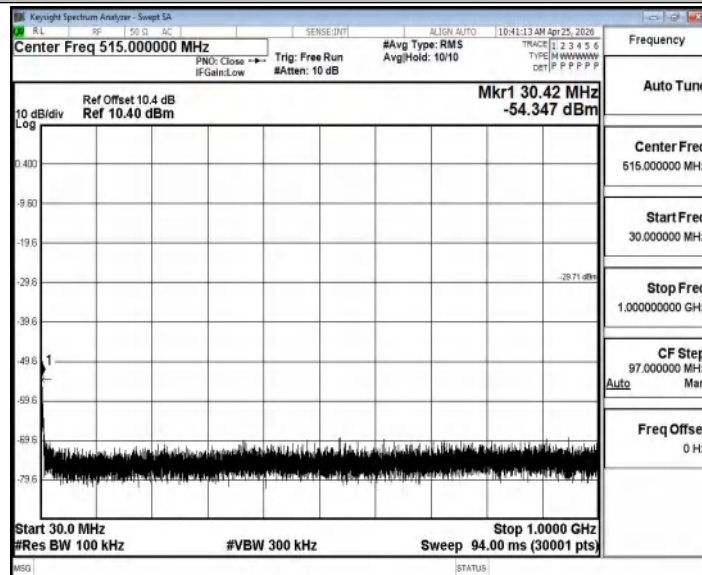
11N20SISO_Ant1_2462_0~Reference



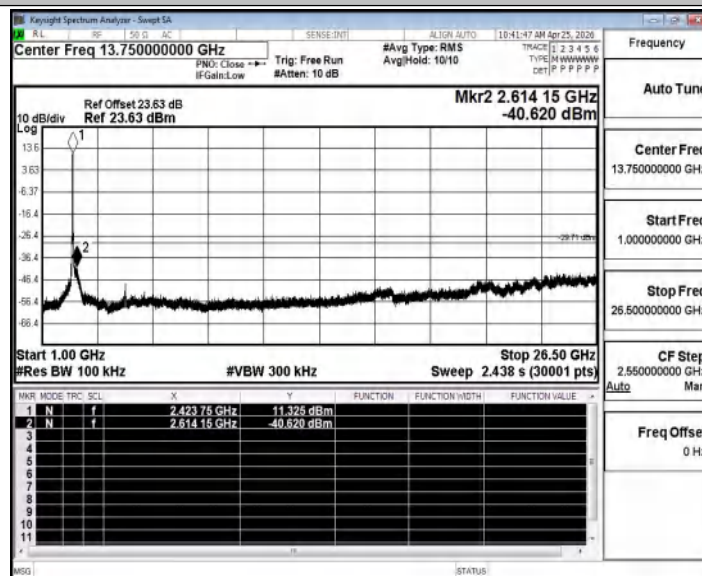


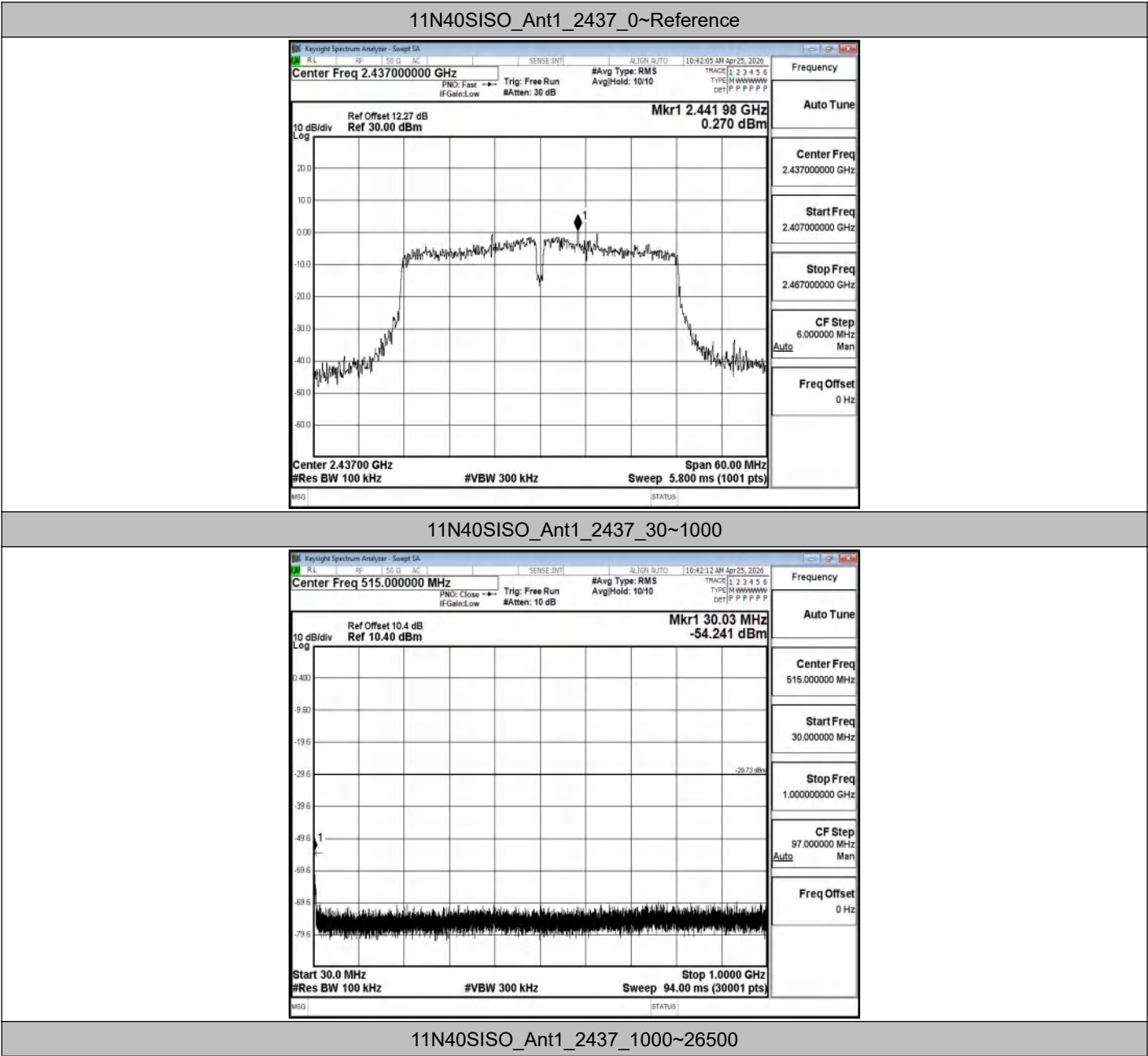


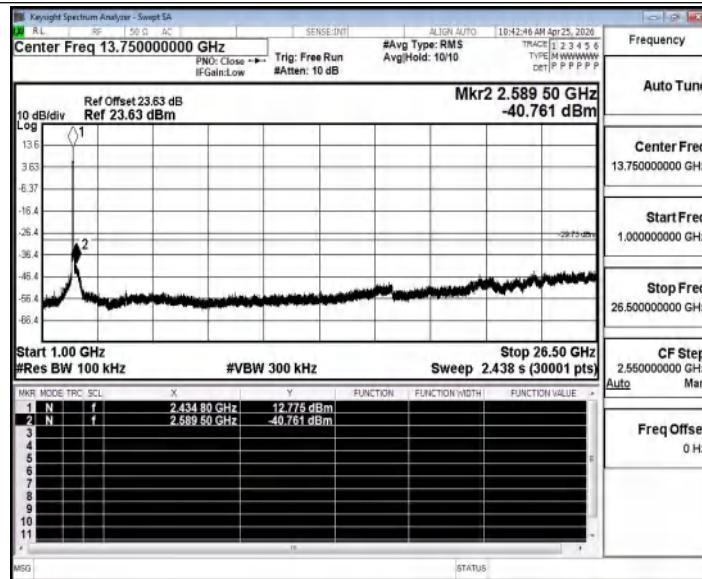
11N40SISO_Ant1_2422_30~1000



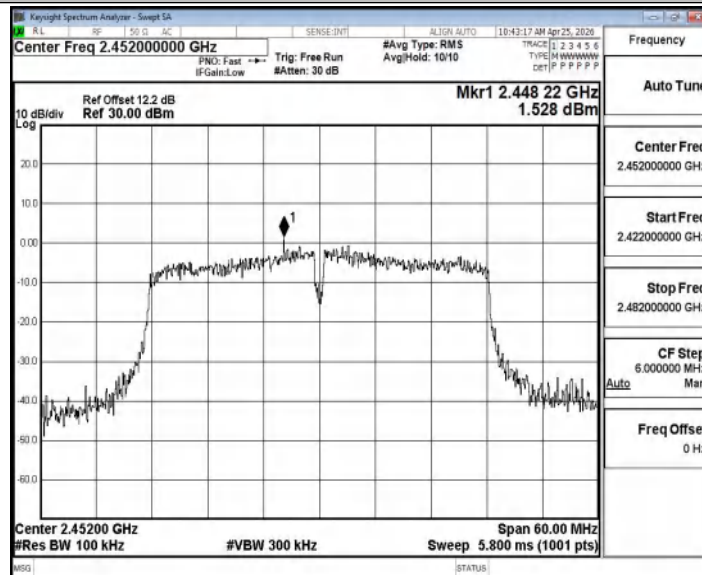
11N40SISO_Ant1_2422_1000~26500



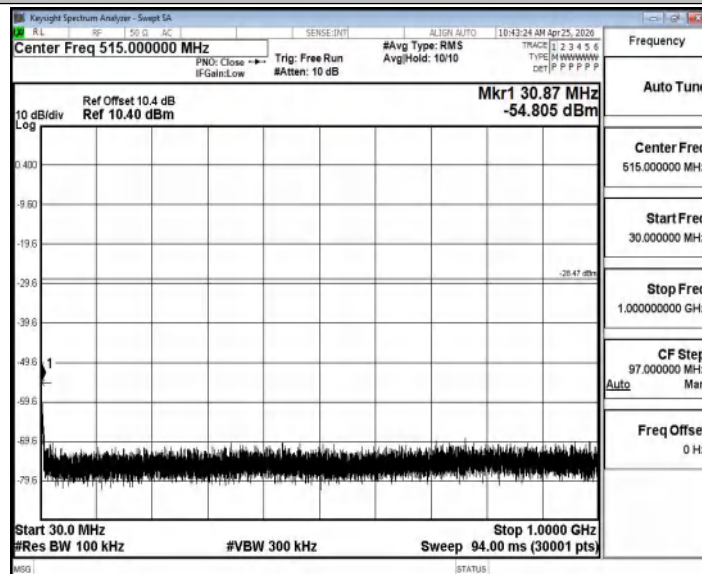


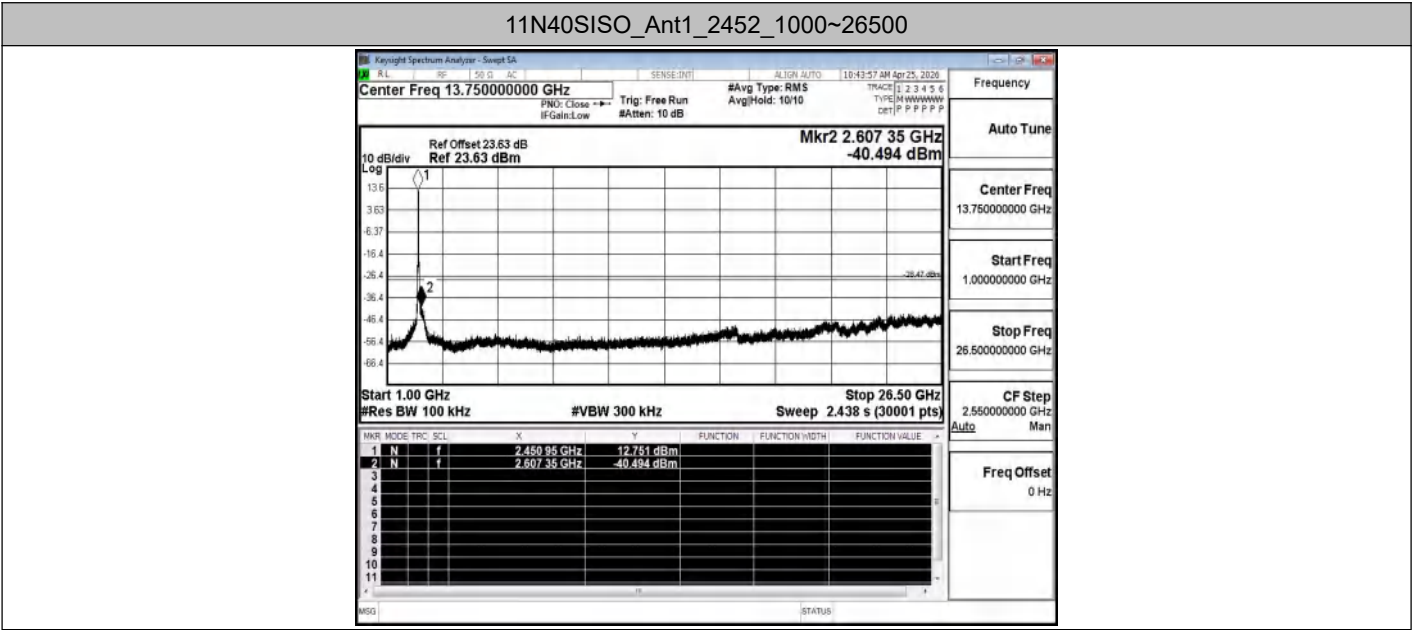


11N40SISO_Ant1_2452_0~Reference



11N40SISO_Ant1_2452_30~1000





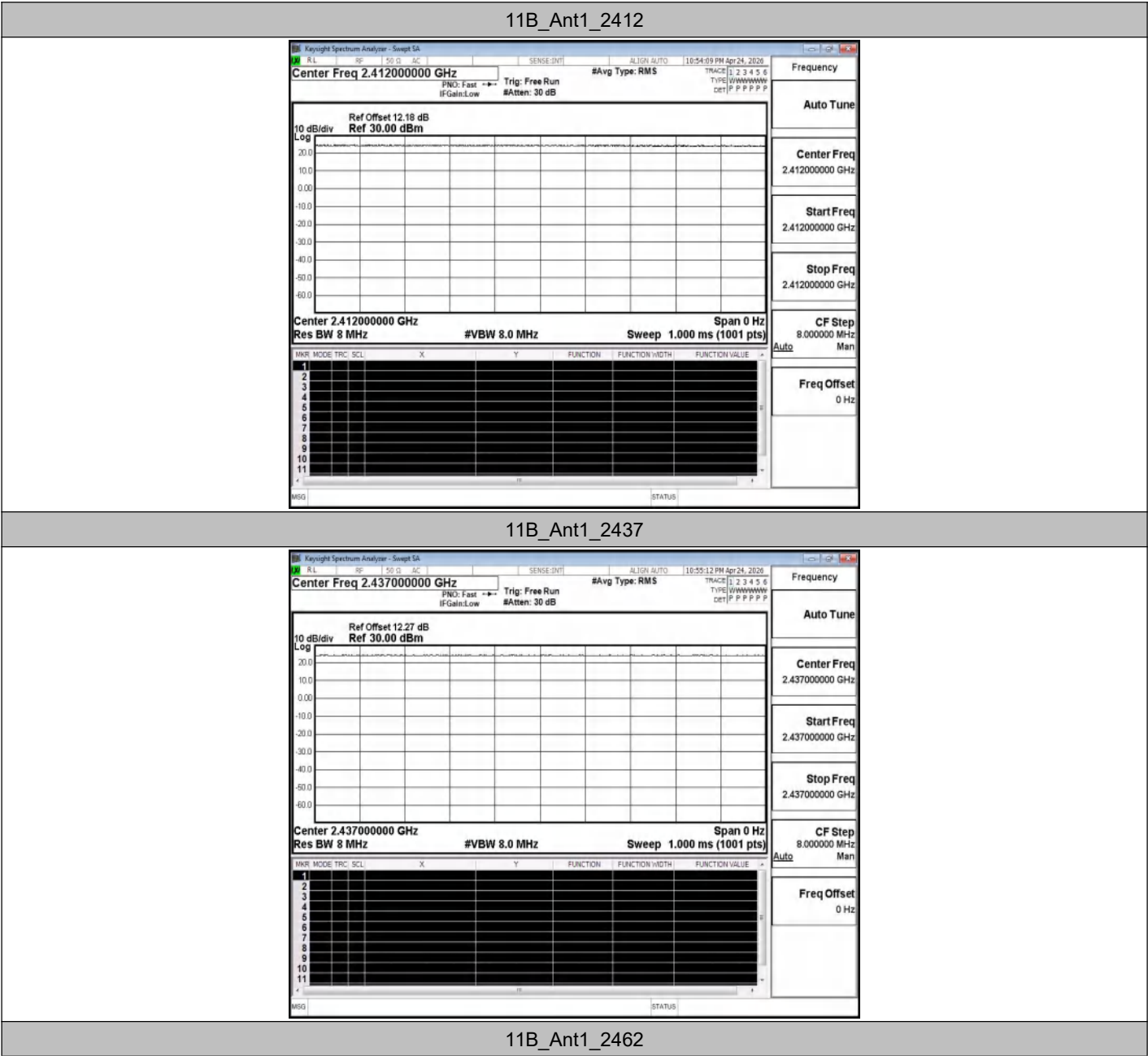
B.6 Duty Cycle

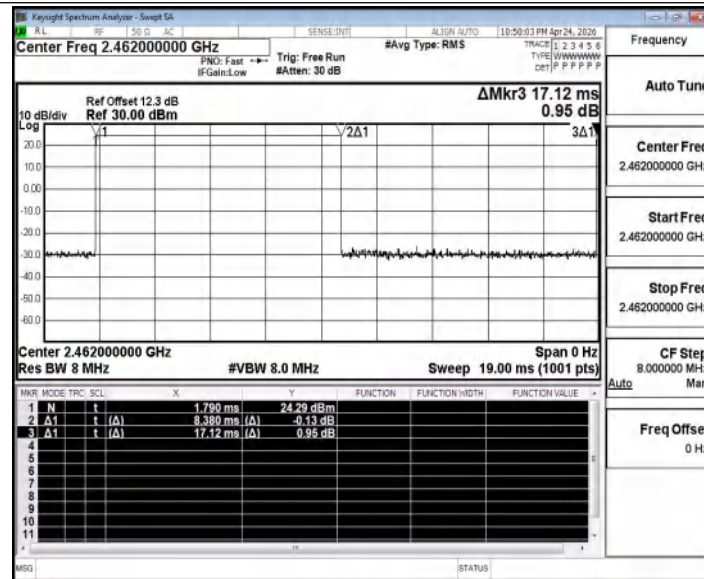
Test Result

TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	xFactor
11B	Ant1	2412	1.00	1.00	100.00	0.00
		2437	1.00	1.00	100.00	0.00
		2462	8.38	17.12	48.95	3.10
11G	Ant1	2412	1.39	10.13	13.72	8.63
		2437	1.40	10.14	13.81	8.60
		2462	1.39	10.13	13.72	8.63
11N20SISO	Ant1	2412	1.31	10.04	13.05	8.84
		2437	1.29	10.04	12.85	8.91
		2462	1.31	10.05	13.03	8.85
11N40SISO	Ant1	2422	0.65	6.53	9.95	10.02
		2437	0.65	6.53	9.95	10.02
		2452	0.65	6.54	9.94	10.03

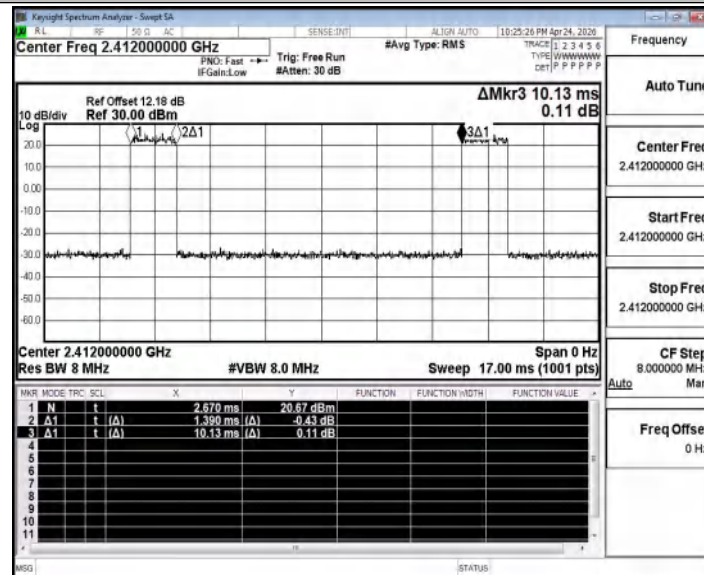
Note :offset=System attenuation +cabal loss

Test Graphs

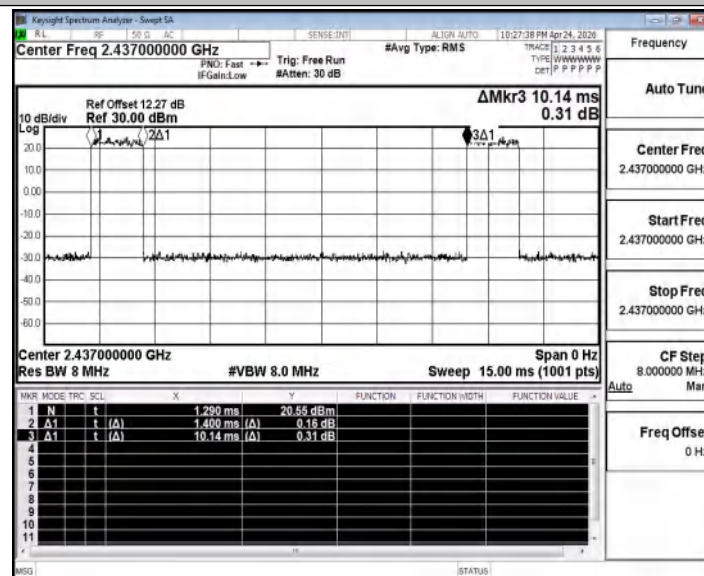




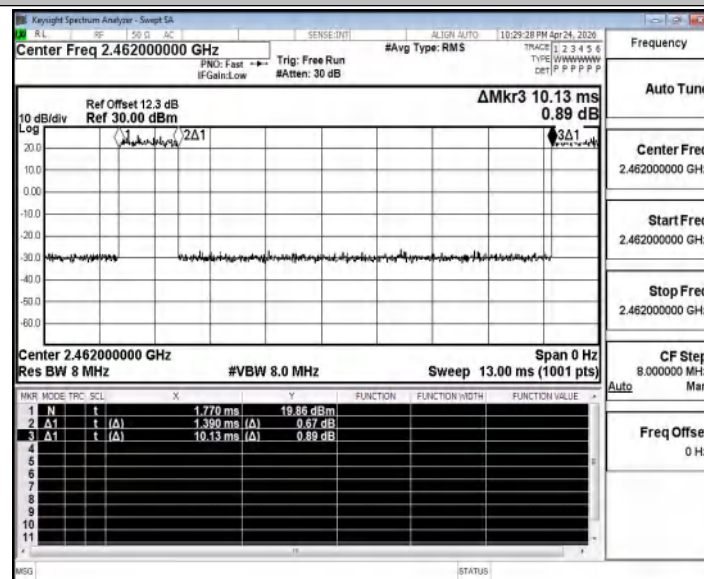
11G_Ant1_2412



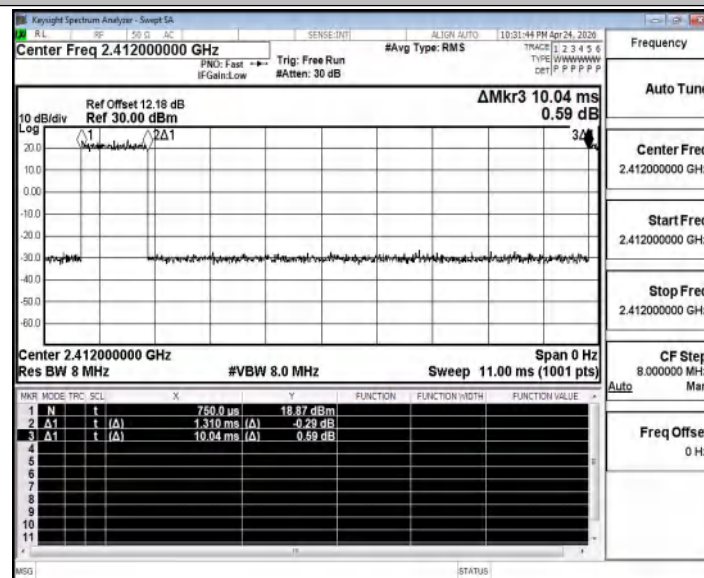
11G_Ant1_2437



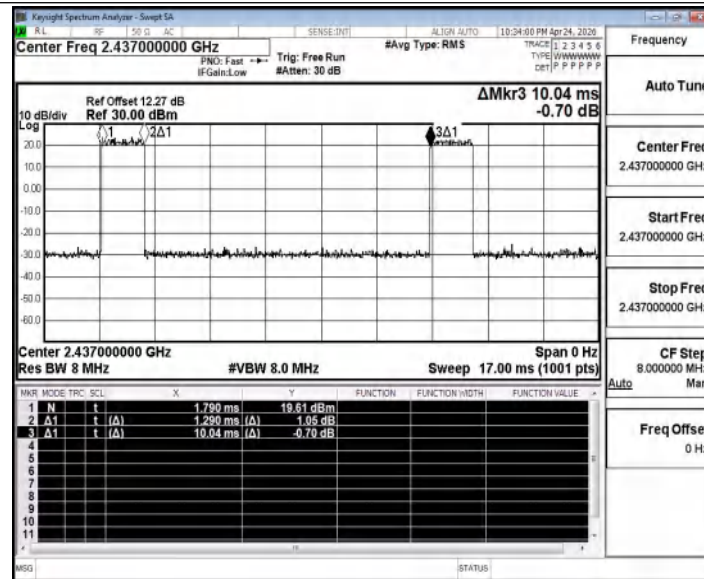
11G_Ant1_2462



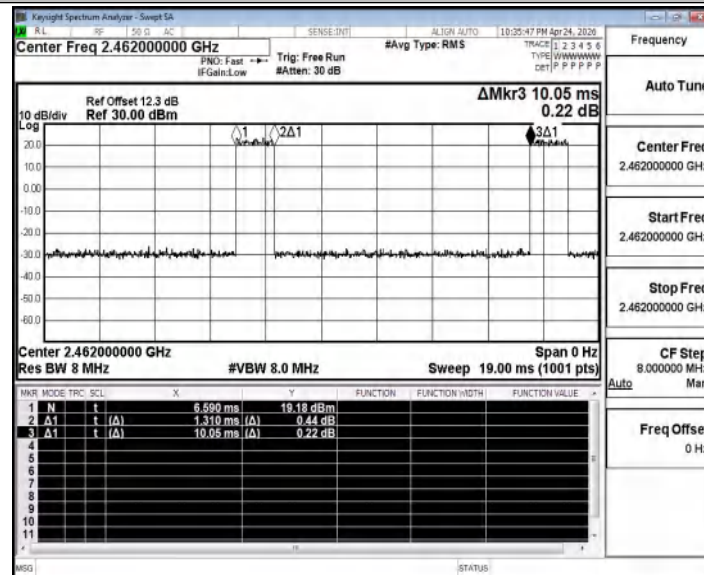
11N20SISO_Ant1_2412



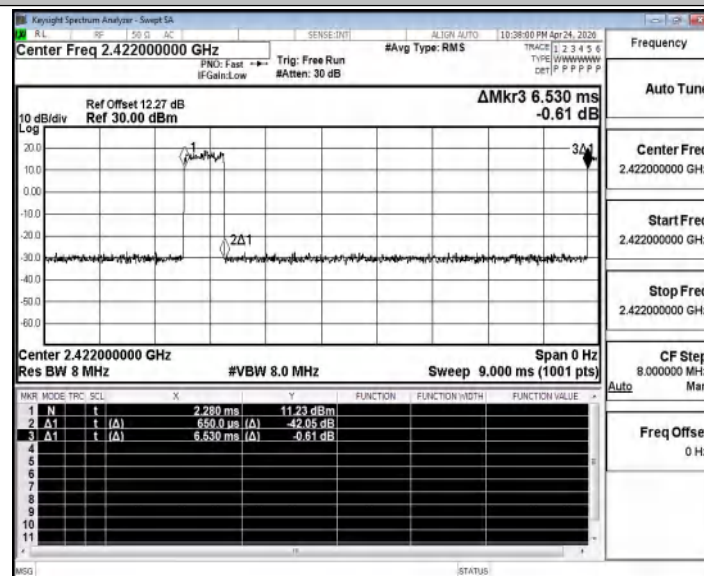
11N20SISO_Ant1_2437



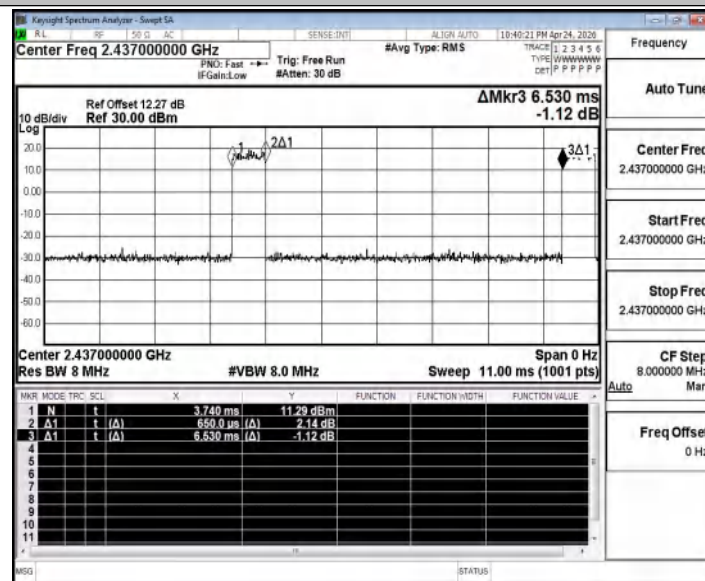
11N20SISO_Ant1_2462



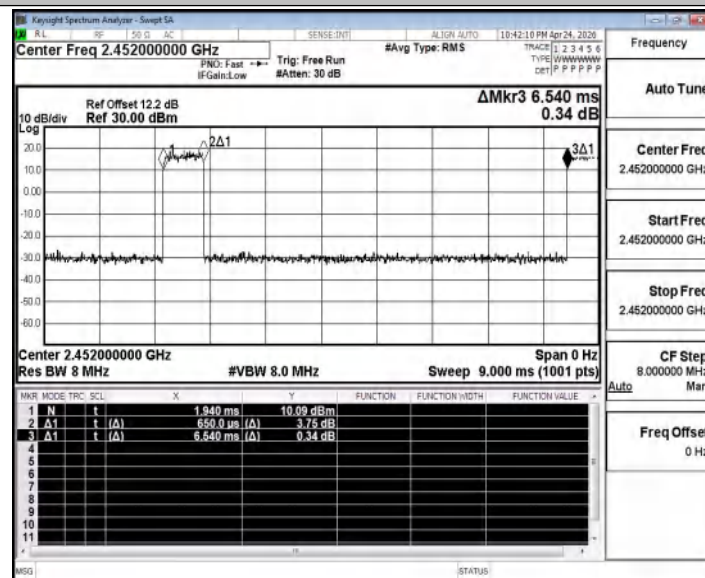
11N40SISO_Ant1_2422



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



B.7 Emissions in Restricted Bands

Test Result

TestMode	Antenna	ChName	Frequency[MHz]	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Gain [dBi]	DC Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
11B	Ant1	Low	2412	AV	2310.000	-53.37	≤-44.28	4.23	0.00	46.06	≤54	PASS
				AV	2334.840	-48.27	≤-44.28	4.23	0.00	51.16	≤54	PASS
				AV	2390.000	-52.65	≤-44.28	4.23	0.00	46.78	≤54	PASS
				Peak	2310.000	-49.72	≤-24.28	4.23	0.00	49.71	≤74	PASS
				Peak	2334.710	-39.7	≤-24.28	4.23	0.00	59.73	≤74	PASS
				Peak	2390.000	-46.62	≤-24.28	4.23	0.00	52.81	≤74	PASS
		High	2462	AV	2483.500	-51.34	≤-47.38	4.23	3.10	51.19	≤54	PASS
				AV	2483.560	-51.08	≤-47.38	4.23	3.10	51.45	≤54	PASS
				AV	2500.000	-53.55	≤-47.38	4.23	3.10	48.98	≤54	PASS
				Peak	2483.500	-40.91	≤-24.28	4.23	0.00	58.52	≤74	PASS
				Peak	2484.660	-39.8	≤-24.28	4.23	0.00	59.63	≤74	PASS
				Peak	2500.000	-43.1	≤-24.28	4.23	0.00	56.33	≤74	PASS
11G	Ant1	Low	2412	AV	2310.000	-56.29	≤-52.91	4.23	8.63	51.77	≤54	PASS
				AV	2337.830	-54.87	≤-52.91	4.23	8.63	53.19	≤54	PASS
				AV	2390.000	-55.65	≤-52.91	4.23	8.63	52.41	≤54	PASS
				Peak	2310.000	-42.78	≤-24.28	4.23	0.00	56.65	≤74	PASS
				Peak	2337.830	-39.95	≤-24.28	4.23	0.00	59.48	≤74	PASS
				Peak	2390.000	-42.17	≤-24.28	4.23	0.00	57.26	≤74	PASS
		High	2462	AV	2483.500	-54.92	≤-52.91	4.23	8.63	53.14	≤54	PASS
				AV	2484.000	-54.64	≤-52.91	4.23	8.63	53.42	≤54	PASS
				AV	2500.000	-55.29	≤-52.91	4.23	8.63	52.77	≤54	PASS
				Peak	2483.500	-41.16	≤-24.28	4.23	0.00	58.27	≤74	PASS

11N20SISO	Ant1	Low	2412	Peak	2484.330	-39.71	≤-24.28	4.23	0.00	59.72	≤74	PASS
				Peak	2500.000	-43.36	≤-24.28	4.23	0.00	56.07	≤74	PASS
				AV	2310.000	-55.32	≤-53.12	4.23	8.84	52.95	≤54	PASS
				AV	2389.830	-53.71	≤-53.12	4.23	8.84	53.56	≤54	PASS
				AV	2390.000	-54.35	≤-53.12	4.23	8.84	53.92	≤54	PASS
				Peak	2310.000	-41.92	≤-24.28	4.23	0.00	57.51	≤74	PASS
		High	2462	Peak	2386.190	-35.8	≤-24.28	4.23	0.00	63.63	≤74	PASS
				Peak	2390.000	-39.05	≤-24.28	4.23	0.00	60.38	≤74	PASS
				AV	2483.500	-53.51	≤-53.13	4.23	8.85	53.77	≤54	PASS
				AV	2484.330	-53.4	≤-53.13	4.23	8.85	53.88	≤54	PASS
				AV	2500.000	-54.82	≤-53.13	4.23	8.85	53.46	≤54	PASS
				Peak	2483.500	-38.53	≤-24.28	4.23	0.00	60.90	≤74	PASS
11N40SISO	Ant1	Low	2422	Peak	2485.430	-35.91	≤-24.28	4.23	0.00	63.52	≤74	PASS
				Peak	2500.000	-41.98	≤-24.28	4.23	0.00	57.45	≤74	PASS
				AV	2310.000	-59.81	≤-54.30	4.23	10.02	49.64	≤54	PASS
				AV	2389.400	-55.83	≤-54.30	4.23	10.02	53.62	≤54	PASS
				AV	2390.000	-55.7	≤-54.30	4.23	10.02	53.75	≤54	PASS
				Peak	2310.000	-51.04	≤-24.28	4.23	0.00	48.39	≤74	PASS
		High	2452	Peak	2385.050	-40.06	≤-24.28	4.23	0.00	59.37	≤74	PASS
				Peak	2390.000	-45.4	≤-24.28	4.23	0.00	54.03	≤74	PASS
				AV	2483.500	-55	≤-54.31	4.23	10.03	53.46	≤54	PASS
				AV	2483.625	-55.28	≤-54.31	4.23	10.03	53.18	≤54	PASS
				AV	2500.000	-58.55	≤-54.31	4.23	10.03	50.91	≤54	PASS
				Peak	2483.500	-44	≤-24.28	4.23	0.00	55.43	≤74	PASS
				Peak	2485.750	-42.17	≤-24.28	4.23	0.00	57.61	≤74	PASS
				Peak	2500.000	-49.16	≤-24.28	4.23	0.00	50.62	≤74	PASS

Note :offset=System attenuation +cabal loss

Guangzhou LCS Compliance Testing Laboratory Ltd.

Add: No.44-1, Qianfeng North Road, Shiqi, Panyu District, Guangzhou, Guangdong, China

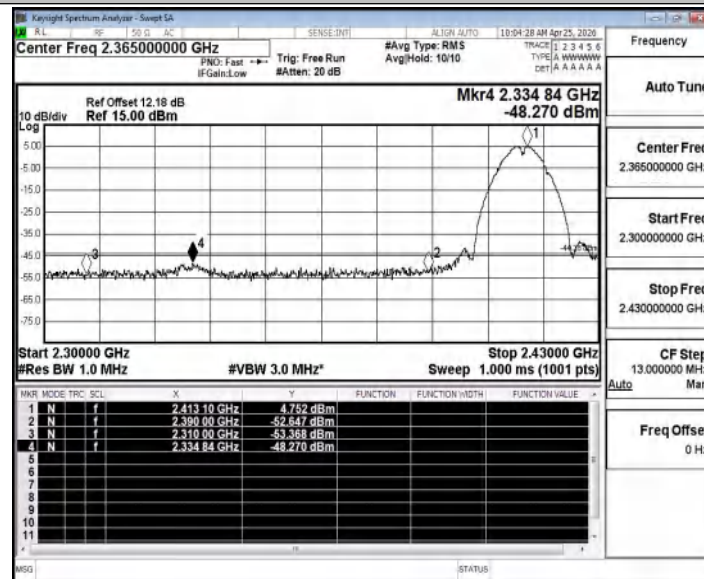
Tel: +(86) 020-39166689 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Note:

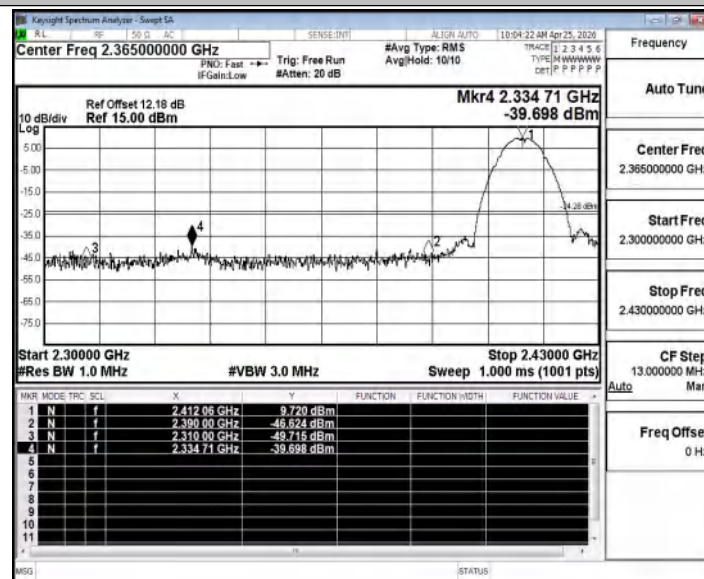
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

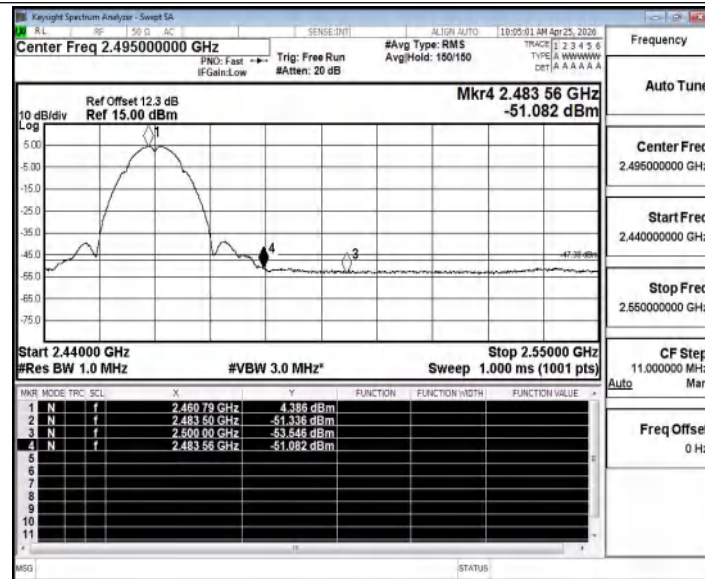
11B_Ant1_Low_2412_AV



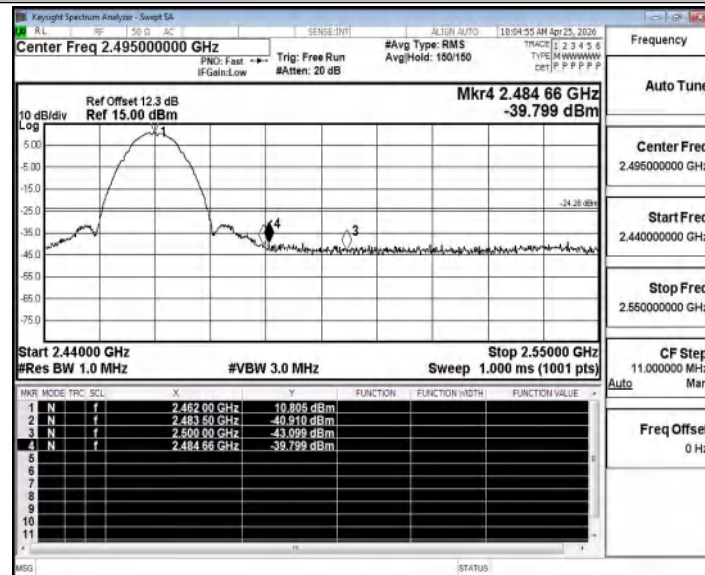
11B_Ant1_Low_2412_Peak



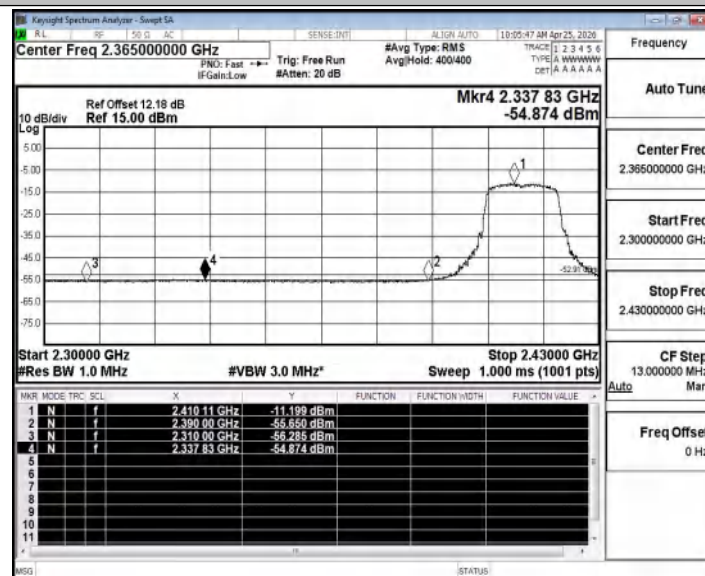
11B_Ant1_High_2462_AV



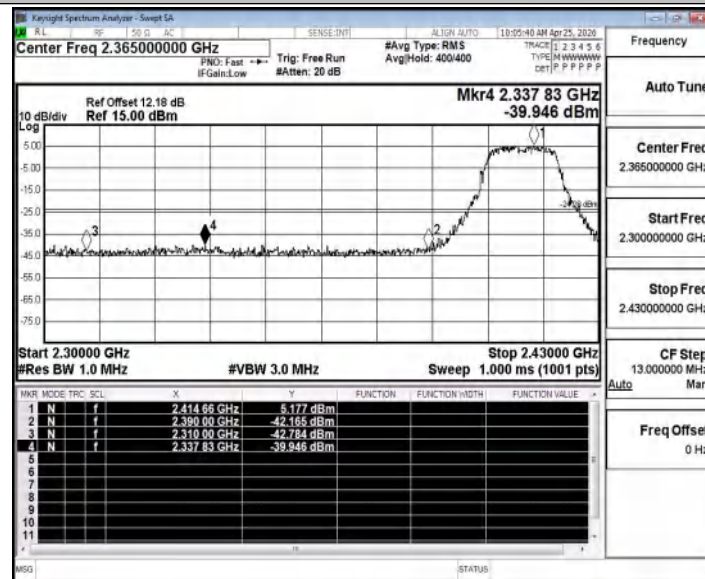
11B_Ant1_High_2462_Peak



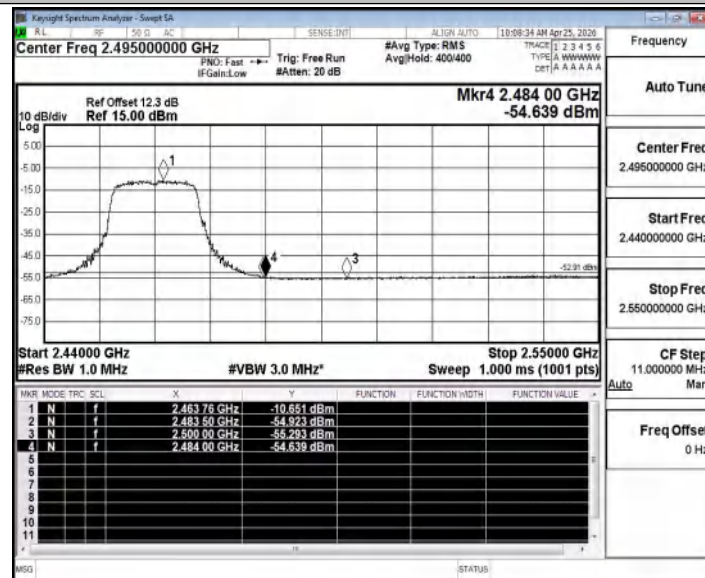
11G_Ant1_Low_2412_AV



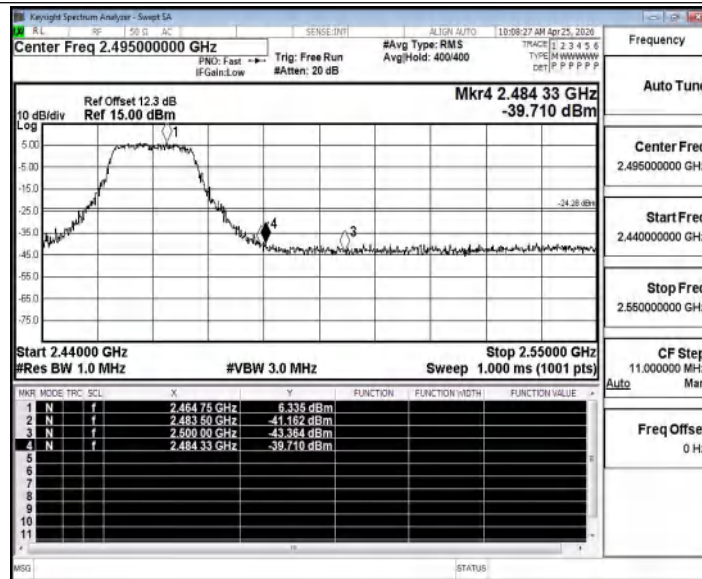
11G_Ant1_Low_2412_Peak



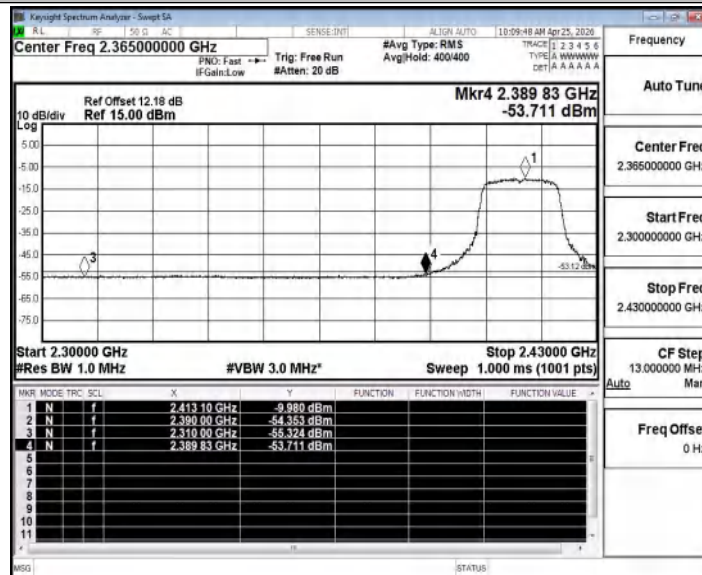
11G_Ant1_High_2462_AV



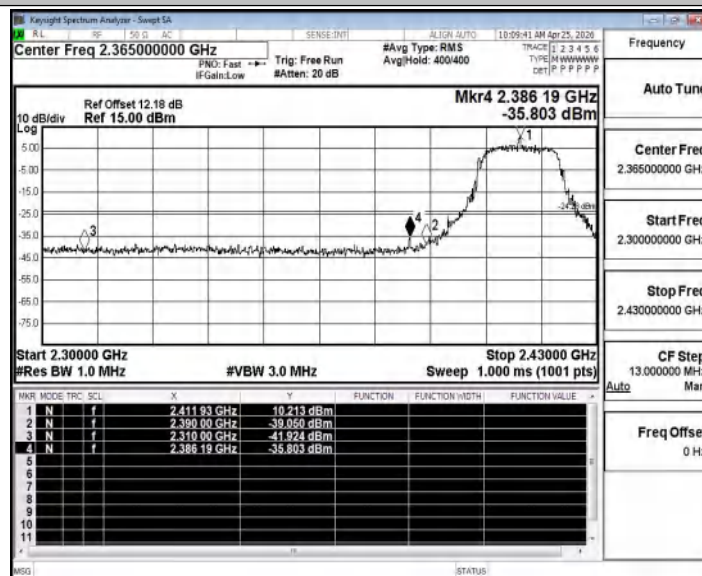
11G_Ant1_High_2462_Peak



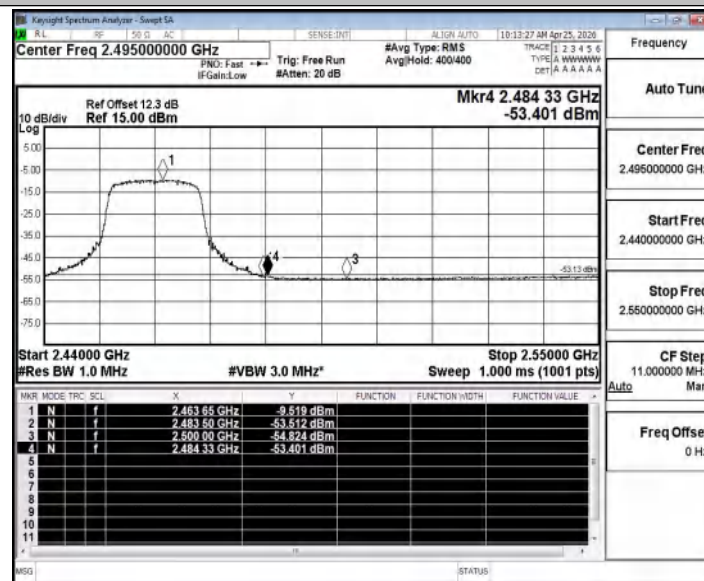
11N20SISO_Ant1_Low_2412_AV



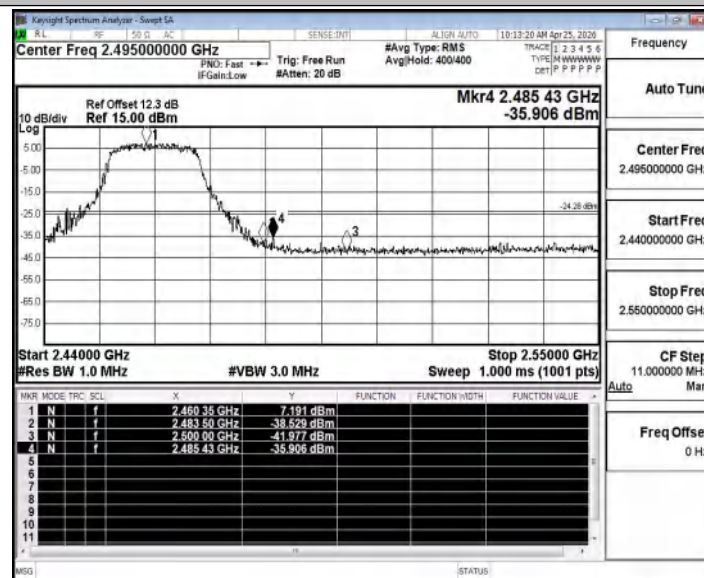
11N20SISO_Ant1_Low_2412_Peak



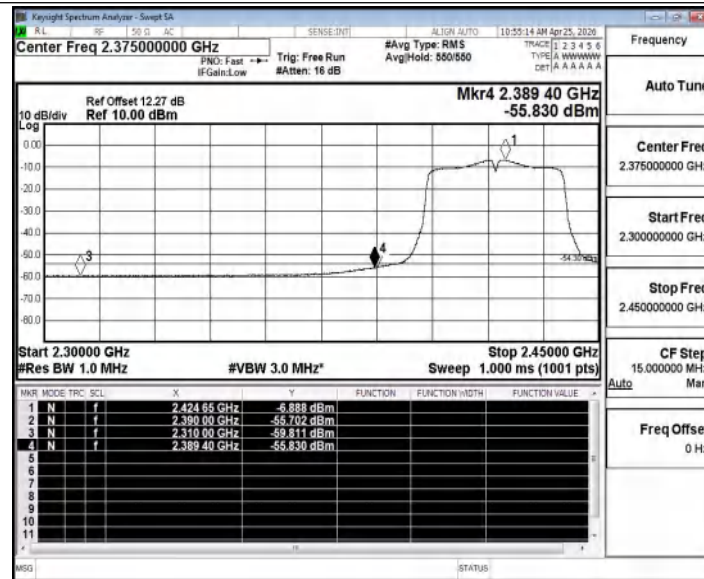
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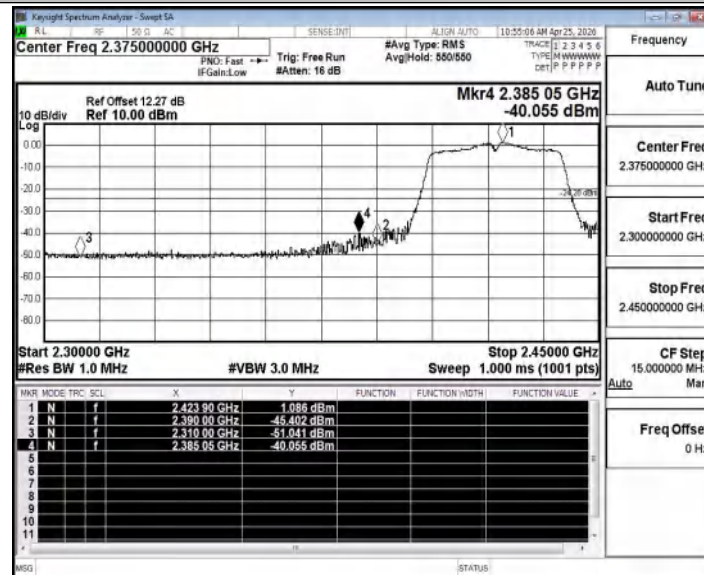
11N20SISO_Ant1_High_2462_Peak



11N40SISO_Ant1_Low_2422_AV



11N40SISO_Ant1_Low_2422_Peak



11N40SISO_Ant1_High_2452_AV

