



Appendix C

RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: Rugged Handheld Computer

Test Model: EA520

Environmental Conditions

Temperature:	21.2° C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
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	8.160	2407.920	2416.080	0.5	PASS
		2437	7.160	2433.880	2441.040	0.5	PASS
		2462	7.680	2458.400	2466.080	0.5	PASS
11G	Ant1	2412	16.160	2404.040	2420.200	0.5	PASS
		2437	16.440	2428.800	2445.240	0.5	PASS
		2462	16.400	2453.800	2470.200	0.5	PASS
11N20SISO	Ant1	2412	17.640	2403.200	2420.840	0.5	PASS
		2437	17.680	2428.160	2445.840	0.5	PASS
		2462	17.600	2453.240	2470.840	0.5	PASS
11N40SISO	Ant1	2422	36.240	2404.000	2440.240	0.5	PASS
		2437	36.320	2419.000	2455.320	0.5	PASS
		2452	36.240	2434.000	2470.240	0.5	PASS



11B_Ant1_2412



Agilent Spectrum Analyzer - Sweep 54

RL RF TSD G ALC SENSE INT ALZLN AUTO 11:30:26 AM Sep 05, 2001

Center Freq 2.437000000 GHz Trig: Free Run #Avg Type: RMS Trace [2 3 4 5 6]
 PWR: Fast IF Gain: Low #Att: 40 dB Avg Hold: 100/100 Type [Manual] Det [P P P P P]

Ref Offset 7.84 dB Δ Mkr3 7.16 MHz
 Ref 30.00 dBm 0.356 dB

10 dB/div
 Log

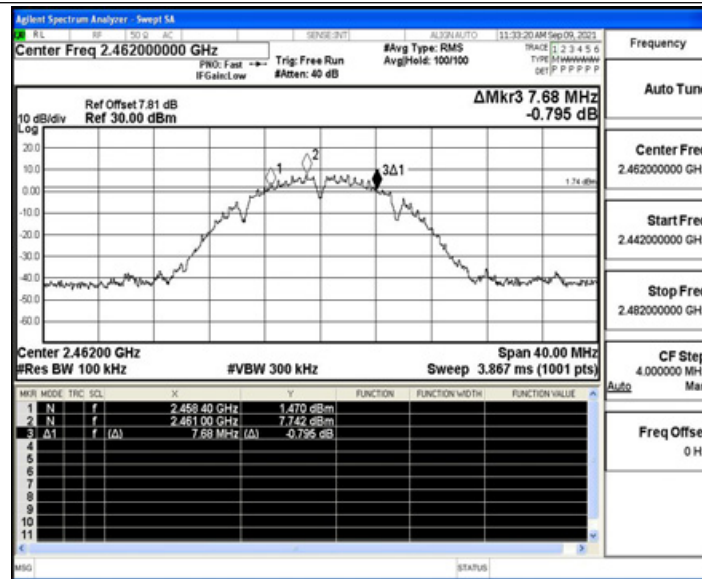
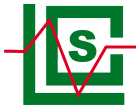
Center 2.43700 GHz Span 40.00 MHz
 #Res BW 100 kHz #VBW 300 kHz Sweep 3.867 ms (1001 pts)

MNR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f		2.433 89 GHz	-2.690 dBm			
2	N	f		2.436 00 GHz	3.876 dBm			
3	Δ 1	f	(Δ)	7.16 MHz (Δ)	0.356 dB			
4								
5								
6								
7								
8								
9								
10								
11								

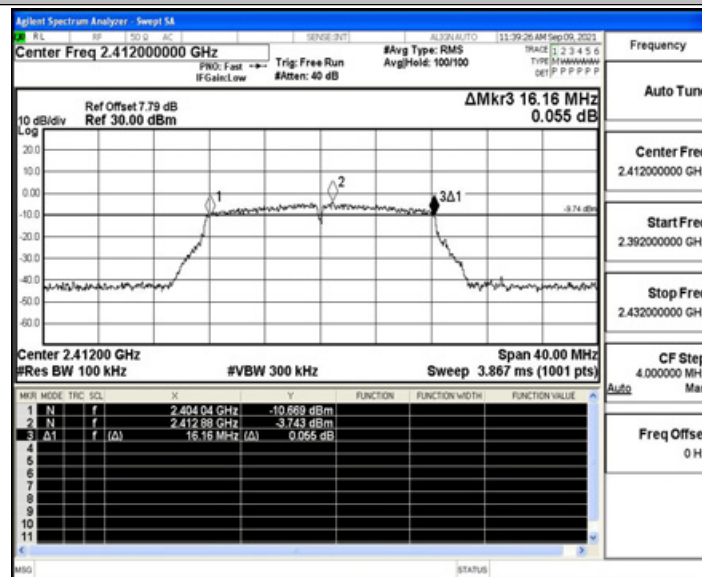
MNO STATUS

Frequency Auto Tun Center Freq 2.437000000 GHz Start Freq 2.417000000 GHz Stop Freq 2.457000000 GHz CF Step 4.000000 MHz Marker 3 Freq Offset 0 Hz

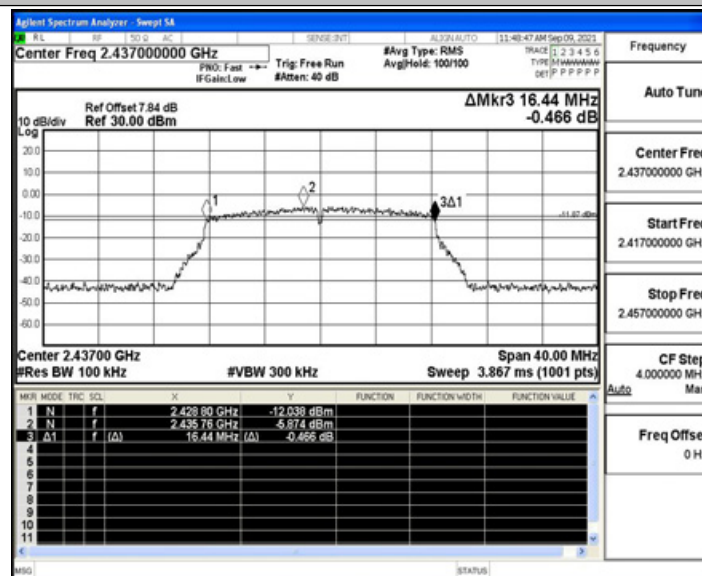
3



11G_Ant1_2412

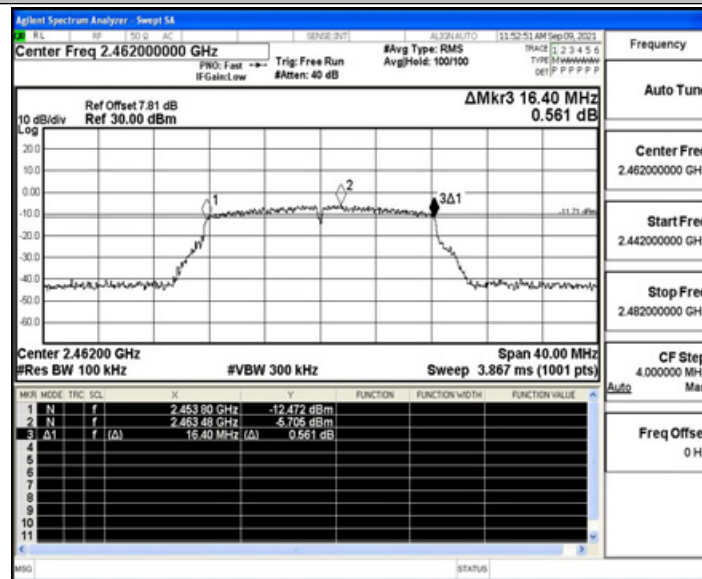


11G_Ant1_2437

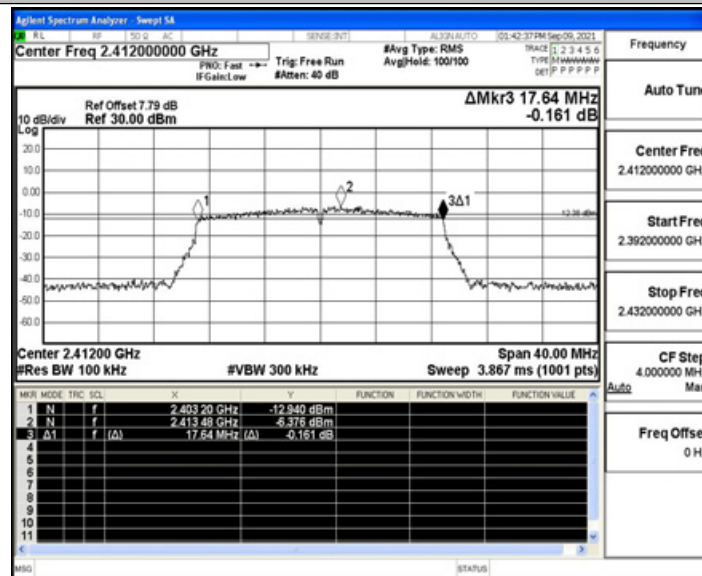




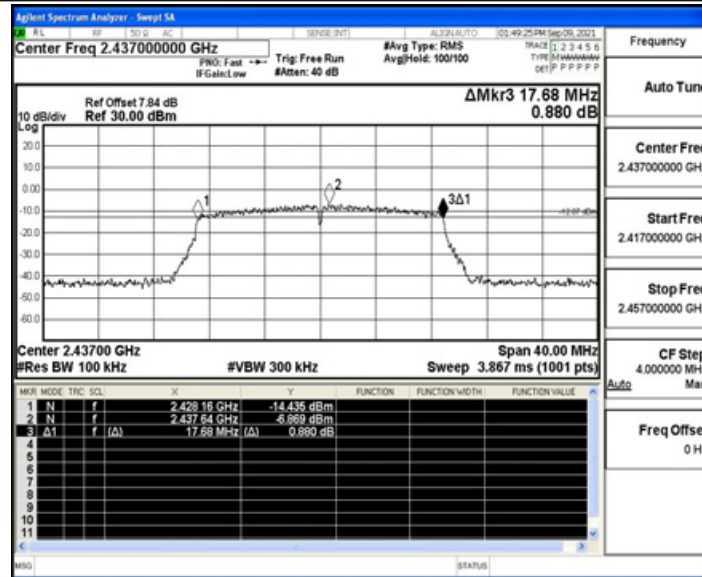
11G_Ant1_2462



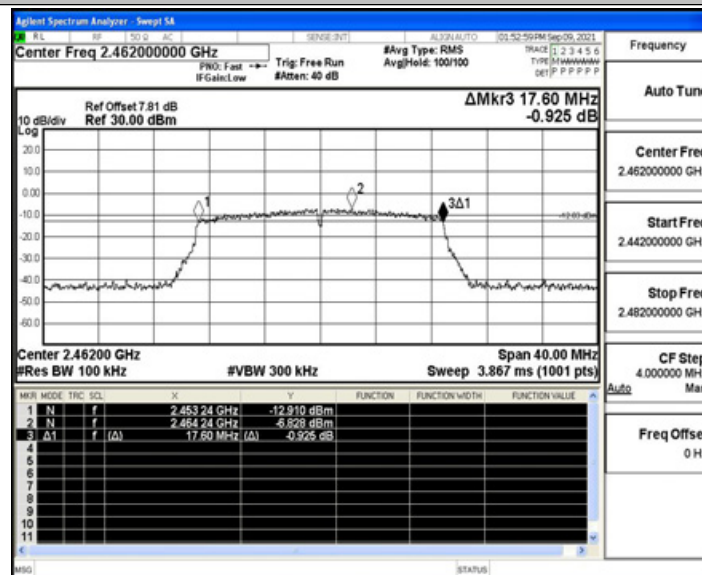
11N20SISO_Ant1_2412



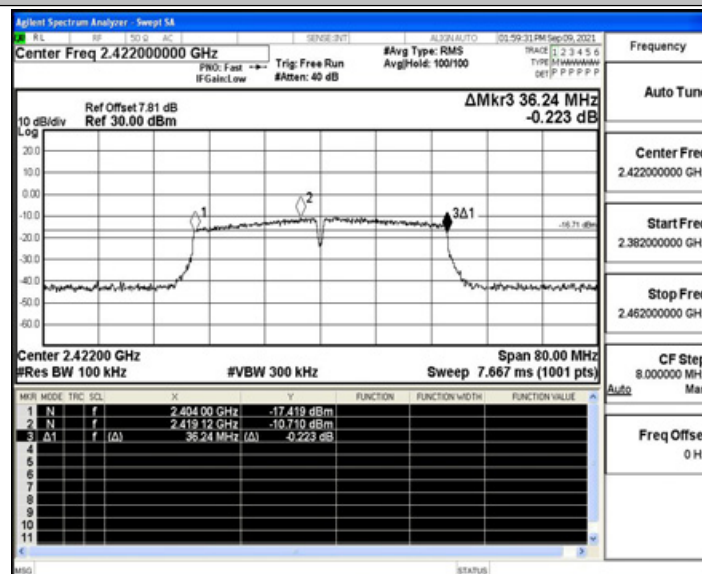
11N20SISO_Ant1_2437



11N20SISO_Ant1_2462

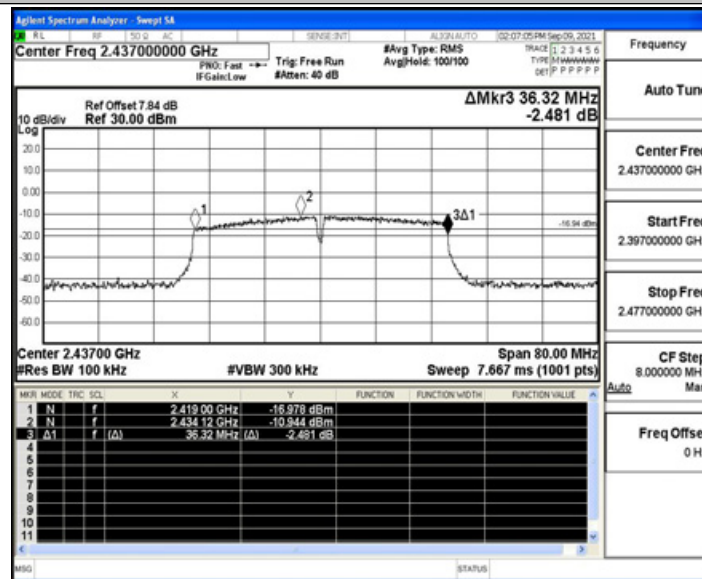


11N40SISO_Ant1_2422

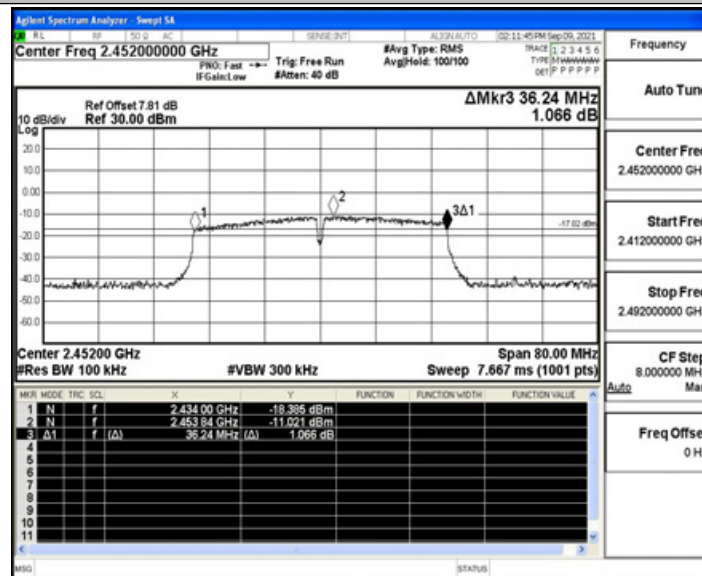




11N40SISO_Ant1_2437



11N40SISO_Ant1_2452





C.2 Maximum conducted output power

Test Result

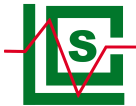
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	2412	15.25	≤30	PASS
		2437	14.87	≤30	PASS
		2462	14.66	≤30	PASS
11G	Ant1	2412	15.10	≤30	PASS
		2437	14.81	≤30	PASS
		2462	14.65	≤30	PASS
11N20SISO	Ant1	2412	14.01	≤30	PASS
		2437	13.71	≤30	PASS
		2462	13.69	≤30	PASS
11N40SISO	Ant1	2422	12.97	≤30	PASS
		2437	12.95	≤30	PASS
		2452	12.87	≤30	PASS



C.3 Maximum power spectral density

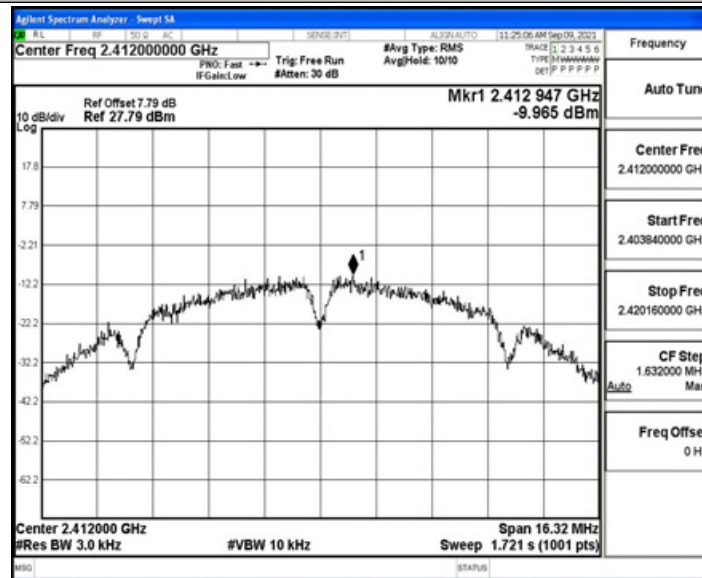
Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-9.97	≤8	PASS
		2437	-9.38	≤8	PASS
		2462	-10.37	≤8	PASS
11G	Ant1	2412	-15.85	≤8	PASS
		2437	-16.89	≤8	PASS
		2462	-17.21	≤8	PASS
11N20SISO	Ant1	2412	-18.12	≤8	PASS
		2437	-18.43	≤8	PASS
		2462	-17.32	≤8	PASS
11N40SISO	Ant1	2422	-21.17	≤8	PASS
		2437	-21.37	≤8	PASS
		2452	-21.05	≤8	PASS

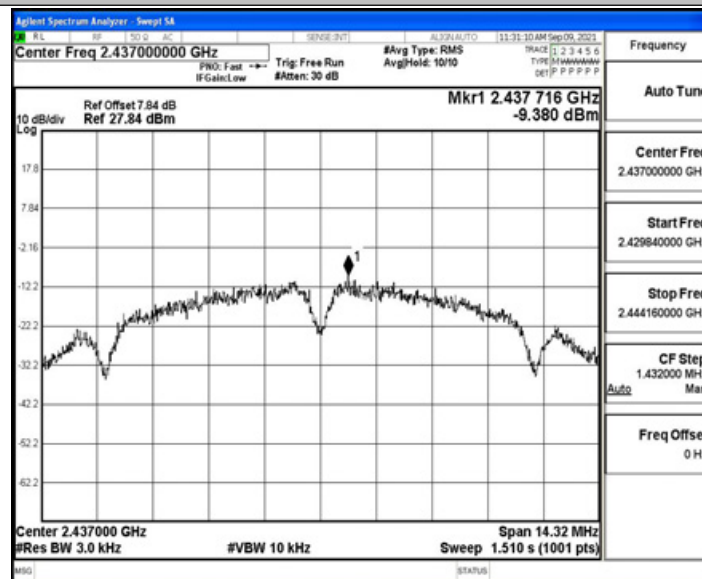


Test Graphs

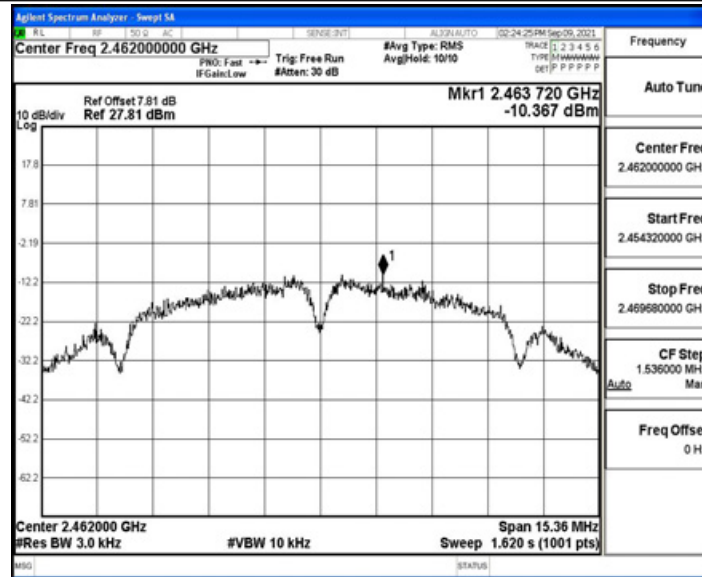
11B_Ant1_2412



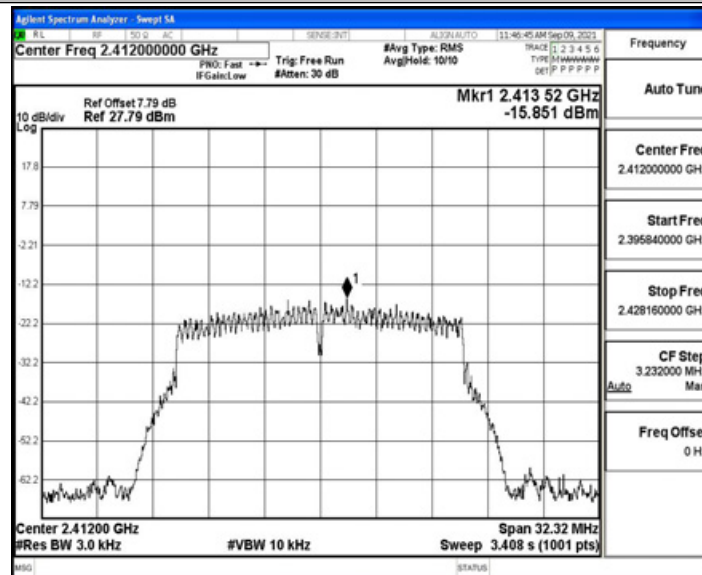
11B_Ant1_2437



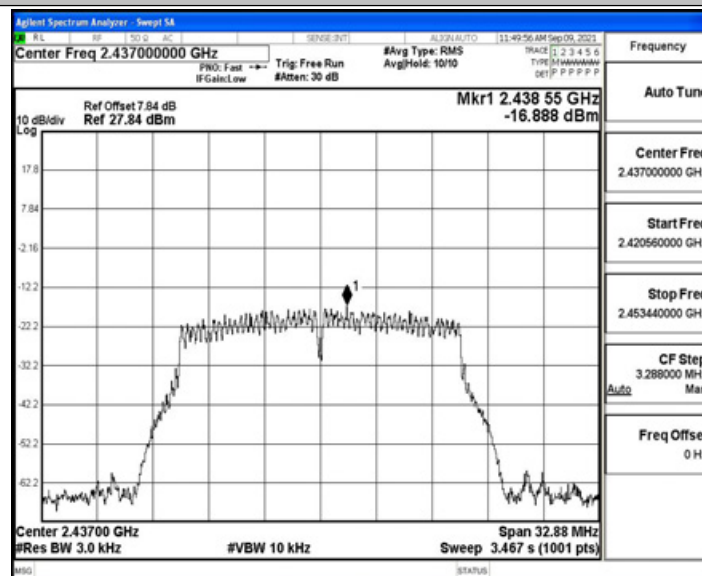
11B_Ant1_2462

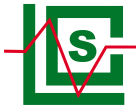


11G_Ant1_2412

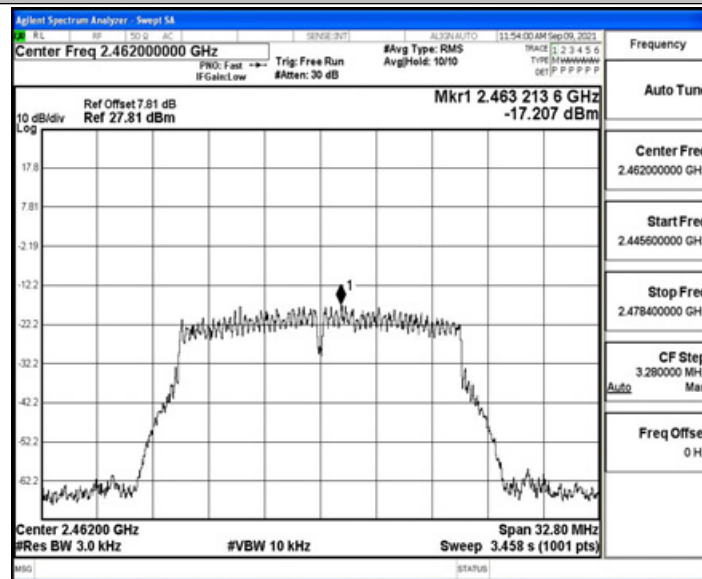


11G_Ant1_2437

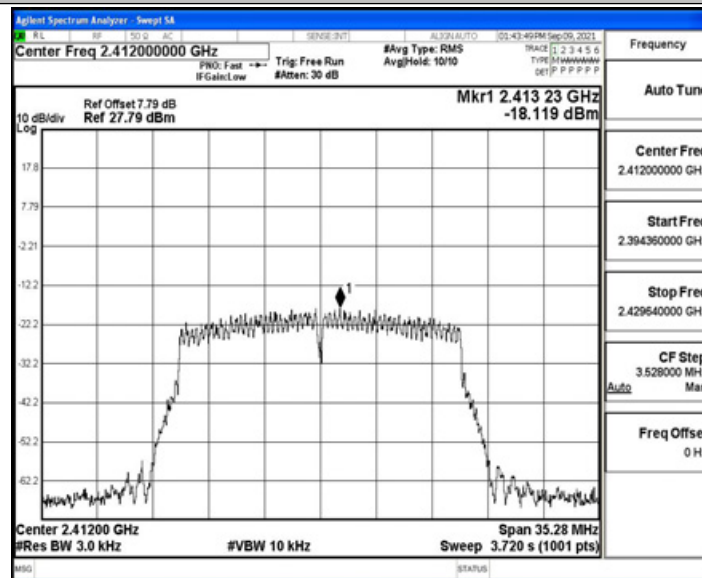




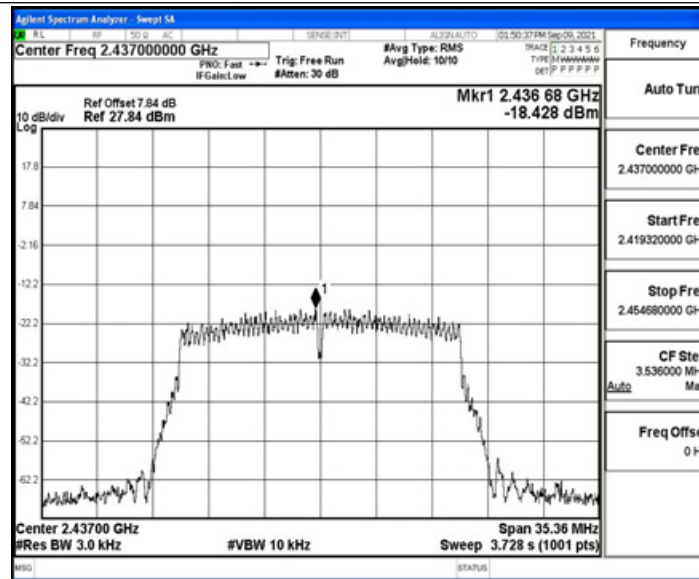
11G_Ant1_2462



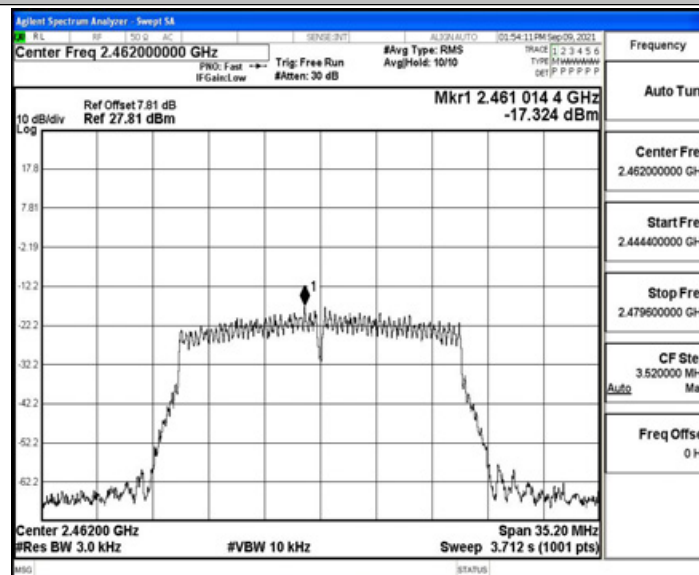
11N20SISO_Ant1_2412



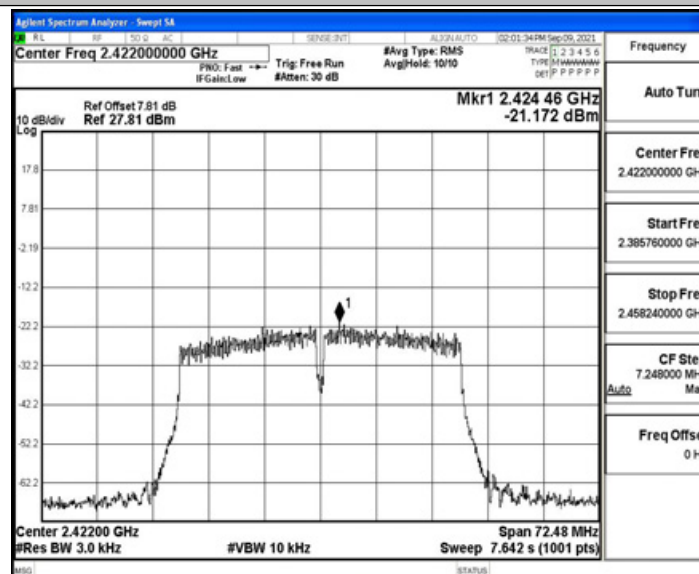
11N20SISO_Ant1_2437



11N20SISO_Ant1_2462

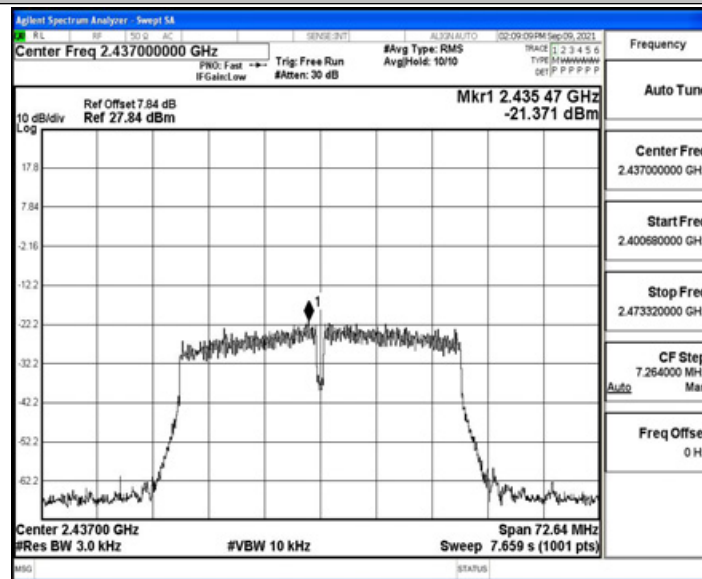


11N40SISO_Ant1_2422

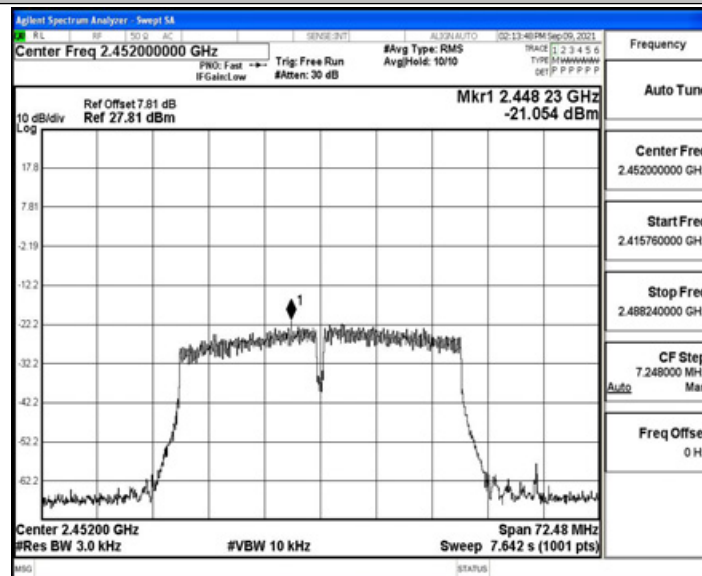




11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



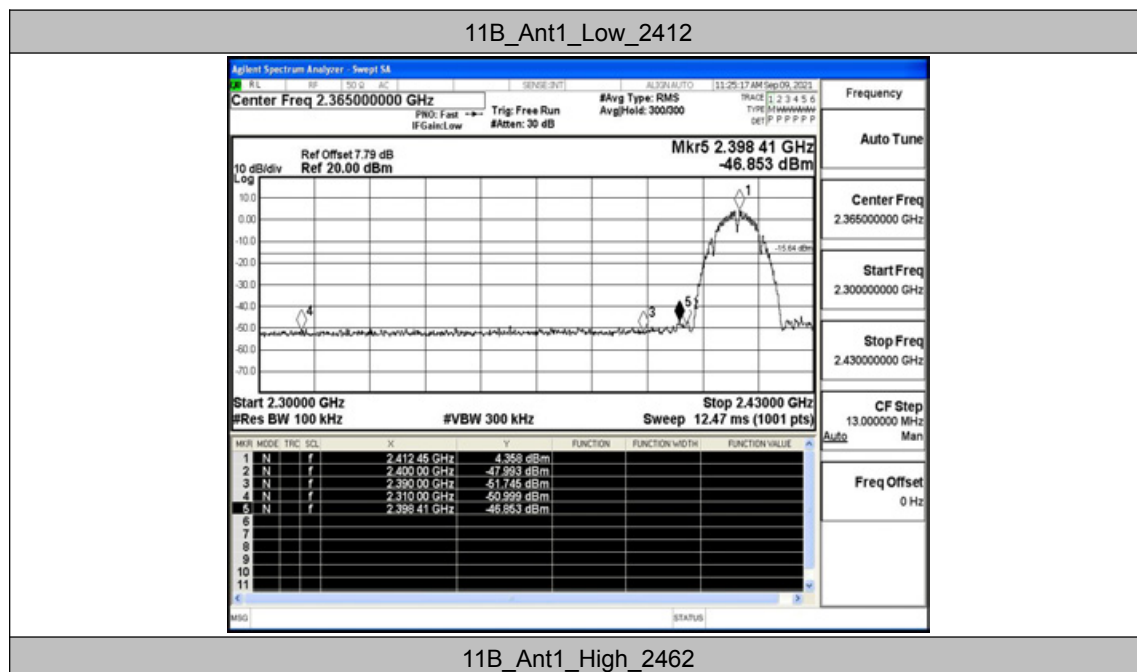


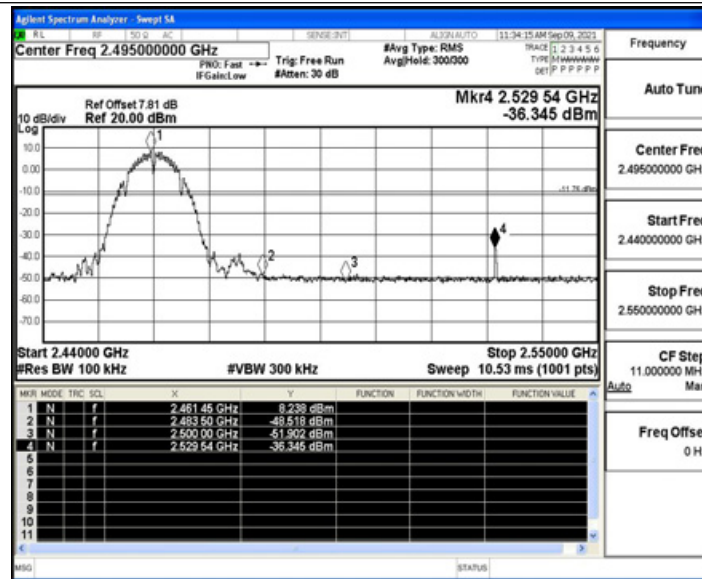
C.4 Band edge measurements

Test Result

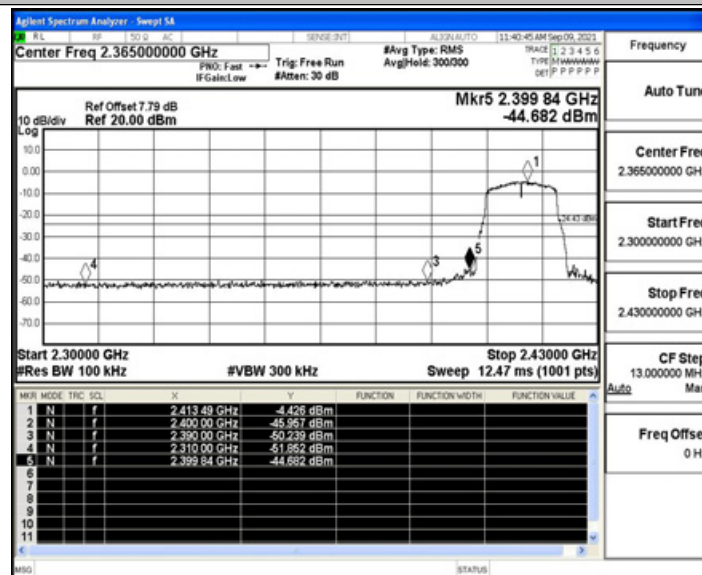
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	4.36	-46.85	≤-15.64	PASS
		High	2462	8.24	-36.35	≤-11.76	PASS
11G	Ant1	Low	2412	-4.43	-44.68	≤-24.43	PASS
		High	2462	-5.69	-48.62	≤-25.69	PASS
11N20SISO	Ant1	Low	2412	-7.02	-47.04	≤-27.02	PASS
		High	2462	-6.95	-48.96	≤-26.95	PASS
11N40SISO	Ant1	Low	2422	-10.27	-47.59	≤-30.27	PASS
		High	2452	-10.32	-42.75	≤-30.32	PASS

Test Graphs

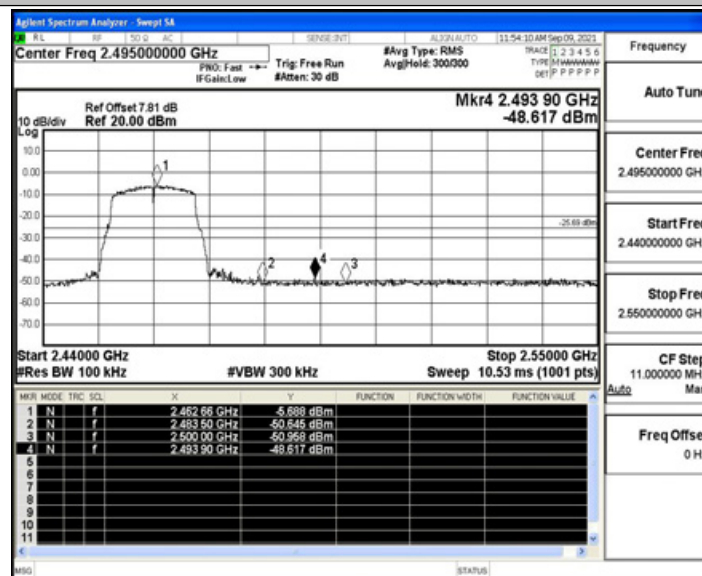


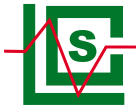


11G_Ant1_Low_2412

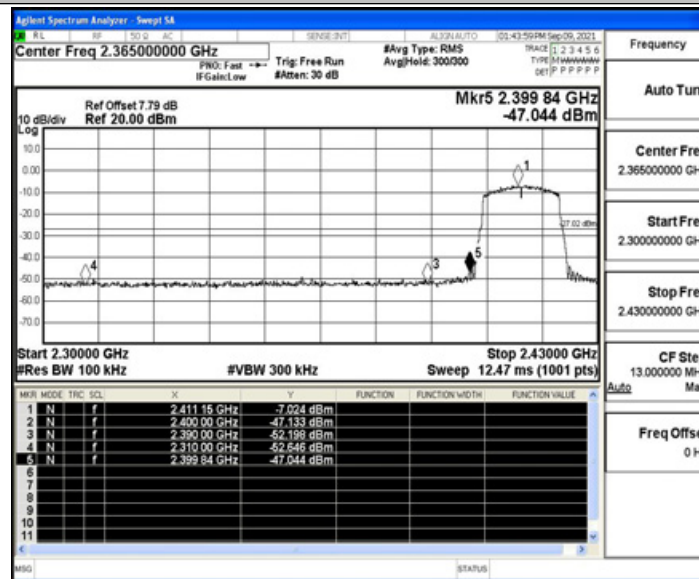


11G_Ant1_High_2462

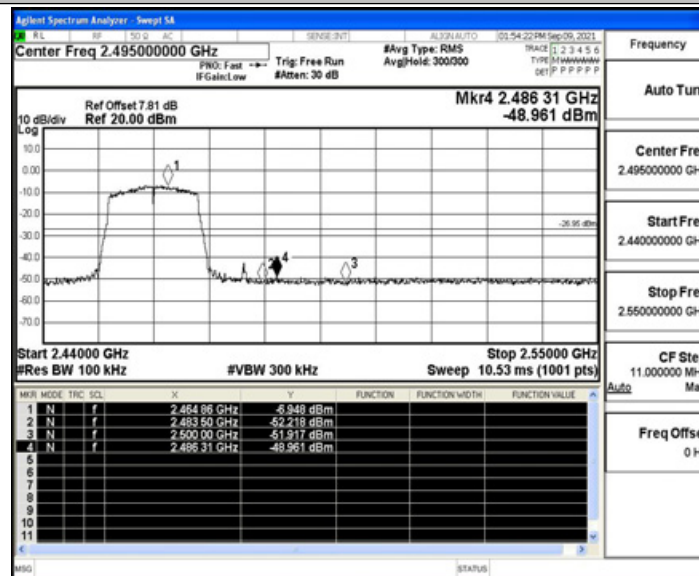




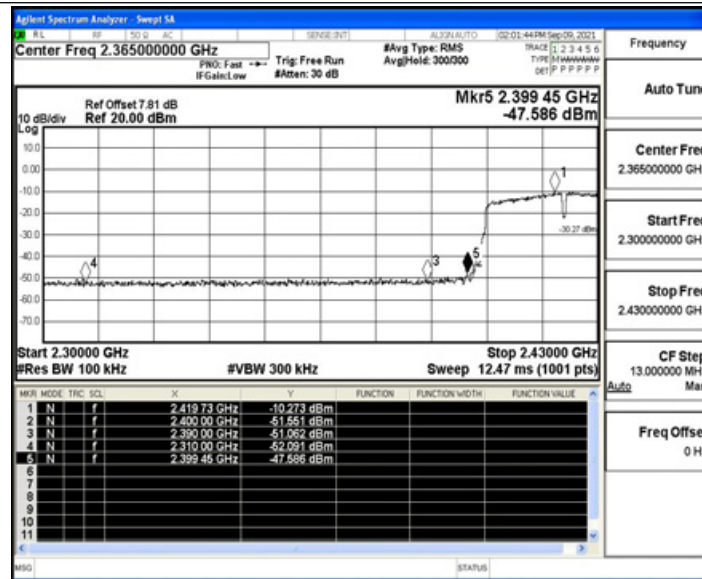
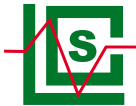
11N20SISO_Ant1_Low_2412



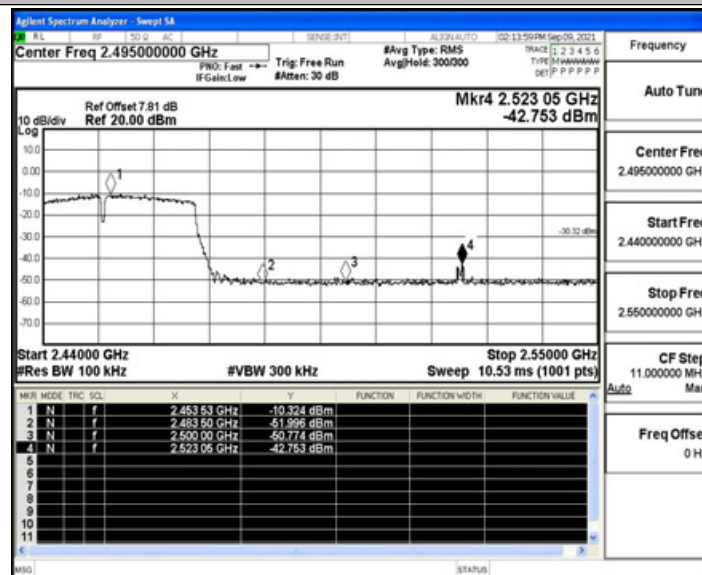
11N20SISO_Ant1_High_2462



11N40SISO_Ant1_Low_2422



11N40SISO_Ant1_High_2452





C.5 Conducted Spurious Emission

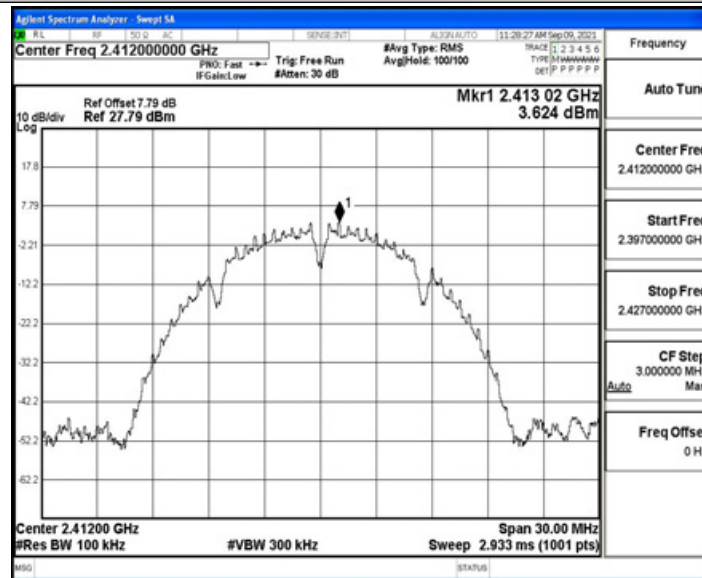
Test Result

TestMode	Antenna	Channel	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	3.62	3.62	---	PASS
			30~1000	3.62	-61.71	≤-16.38	PASS
			1000~26500	3.62	-47.52	≤-16.38	PASS
		2437	Reference	3.63	3.63	---	PASS
			30~1000	3.63	-62.09	≤-16.37	PASS
			1000~26500	3.63	-47.05	≤-16.37	PASS
		2462	Reference	7.83	7.83	---	PASS
			30~1000	7.83	-62.18	≤-12.17	PASS
			1000~26500	7.83	-47.78	≤-12.17	PASS
11G	Ant1	2412	Reference	-4.83	-4.83	---	PASS
			30~1000	-4.83	-61.82	≤-24.83	PASS
			1000~26500	-4.83	-38	≤-24.83	PASS
		2437	Reference	-6.12	-6.12	---	PASS
			30~1000	-6.12	-61.74	≤-26.12	PASS
			1000~26500	-6.12	-47.26	≤-26.12	PASS
		2462	Reference	-5.83	-5.83	---	PASS
			30~1000	-5.83	-61.65	≤-25.83	PASS
			1000~26500	-5.83	-47.46	≤-25.83	PASS
11N20SISO	Ant1	2412	Reference	-6.72	-6.72	---	PASS
			30~1000	-6.72	-62.14	≤-26.72	PASS
			1000~26500	-6.72	-47.4	≤-26.72	PASS
		2437	Reference	-7.41	-7.41	---	PASS
			30~1000	-7.41	-61.87	≤-27.41	PASS
			1000~26500	-7.41	-47.3	≤-27.41	PASS
		2462	Reference	-7.40	-7.40	---	PASS
			30~1000	-7.40	-62.28	≤-27.4	PASS
			1000~26500	-7.40	-48.19	≤-27.4	PASS
11N40SISO	Ant1	2422	Reference	-10.44	-10.44	---	PASS
			30~1000	-10.44	-61.83	≤-30.44	PASS
			1000~26500	-10.44	-47.75	≤-30.44	PASS
		2437	Reference	-10.75	-10.75	---	PASS
			30~1000	-10.75	-61.14	≤-30.75	PASS
			1000~26500	-10.75	-47.43	≤-30.75	PASS
		2452	Reference	-10.72	-10.72	---	PASS
			30~1000	-10.72	-61.76	≤-30.72	PASS
			1000~26500	-10.72	-47.86	≤-30.72	PASS

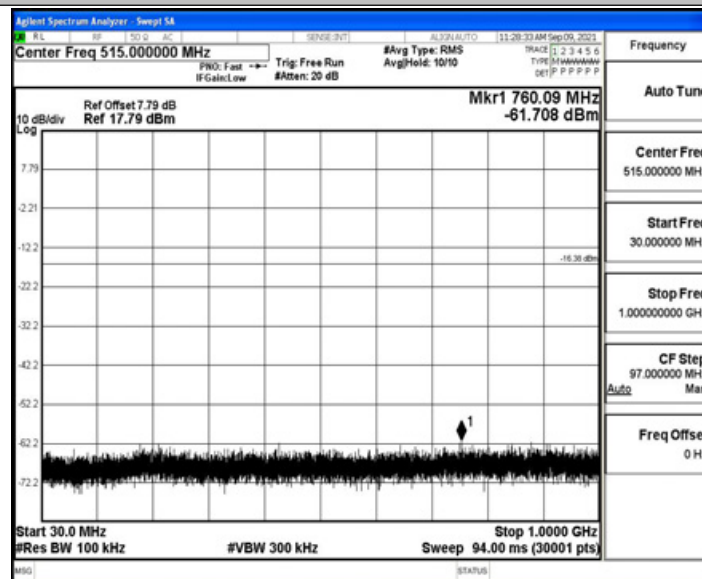


Test Graphs

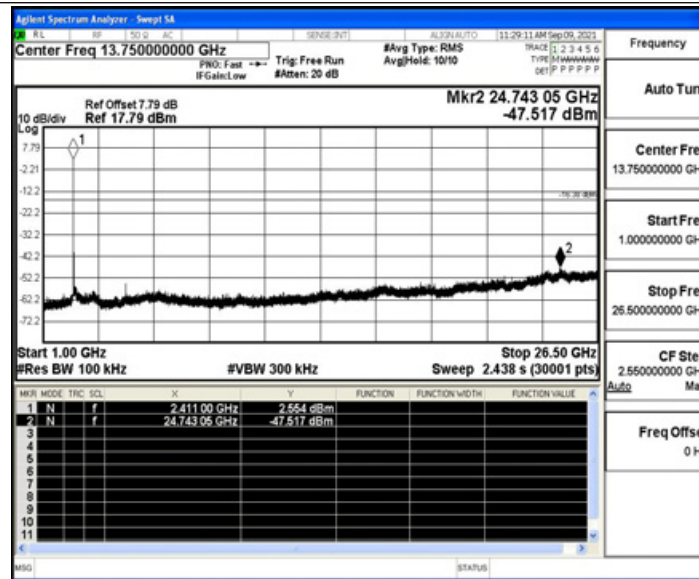
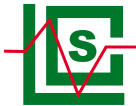
11B_Ant1_2412_0~Reference



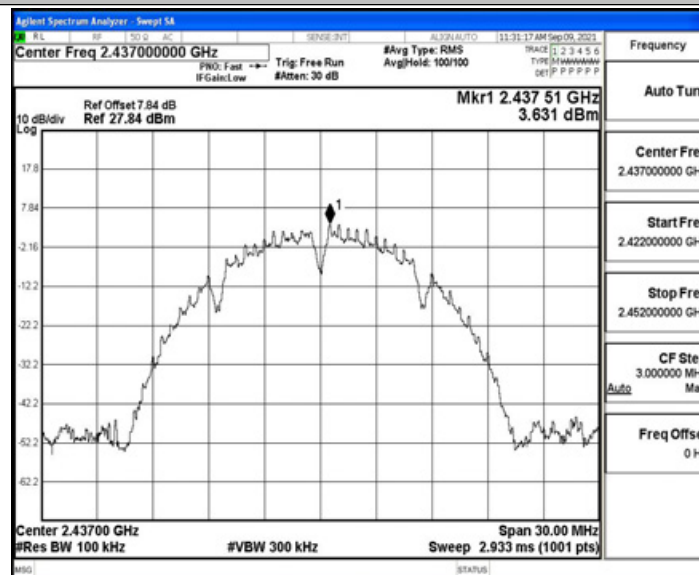
11B_Ant1_2412_30~1000



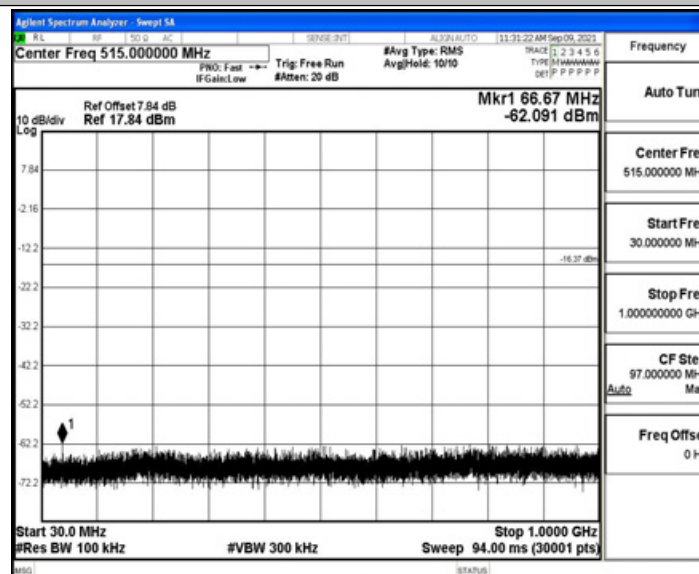
11B_Ant1_2412_1000~26500

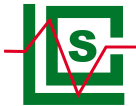


11B_Ant1_2437_0~Reference

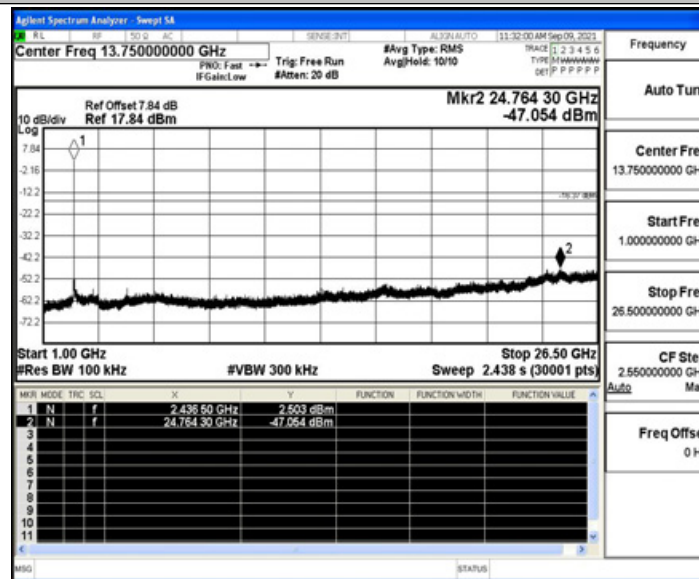


11B_Ant1_2437_30~1000

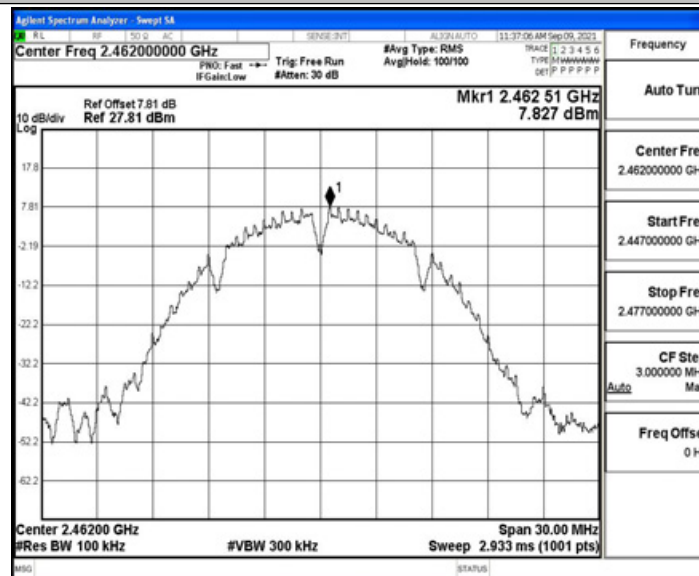




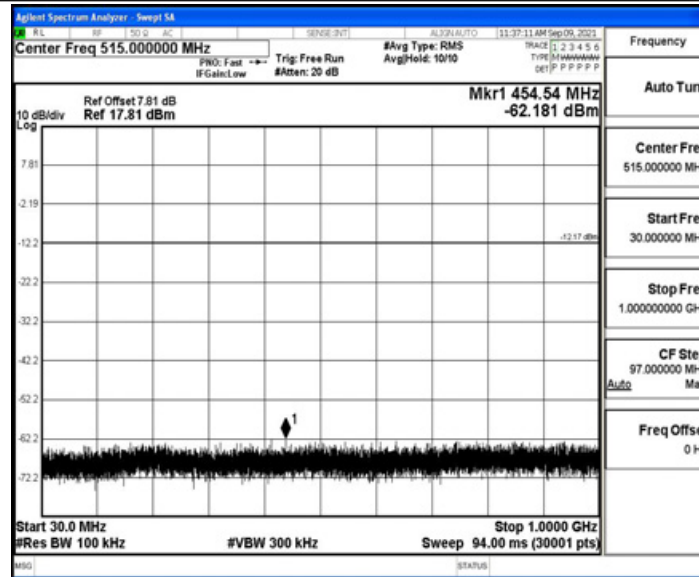
11B_Ant1_2437_1000~26500



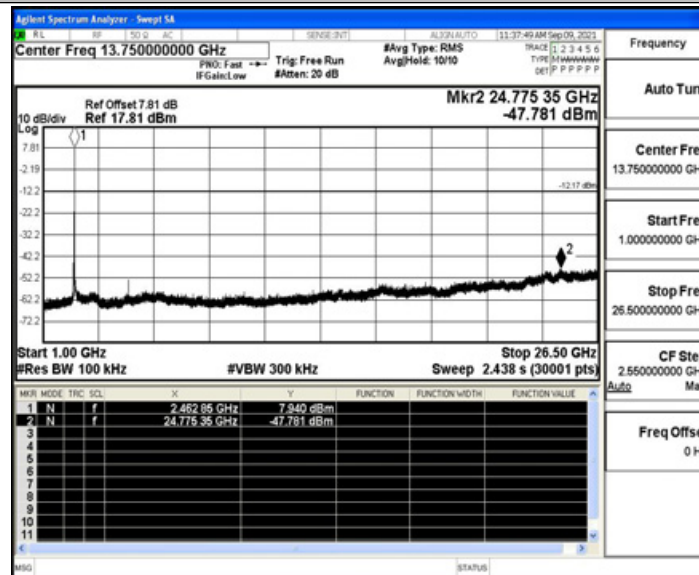
11B_Ant1_2462_0~Reference



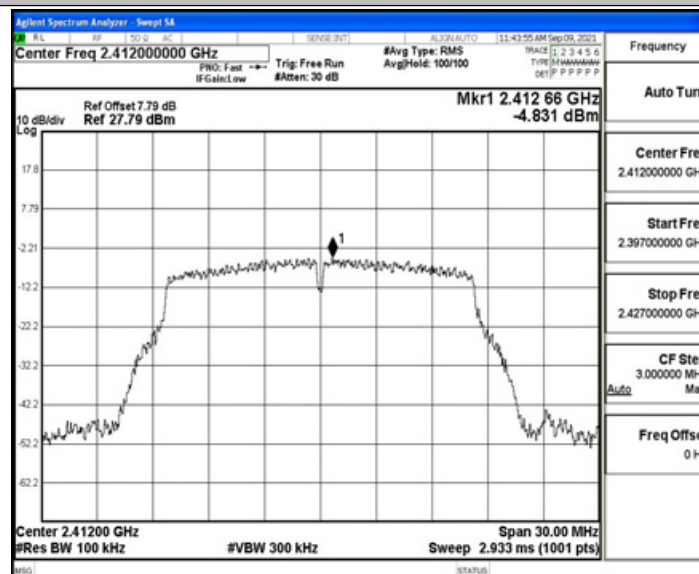
11B_Ant1_2462_30~1000

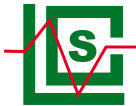


11B_Ant1_2462_1000~26500

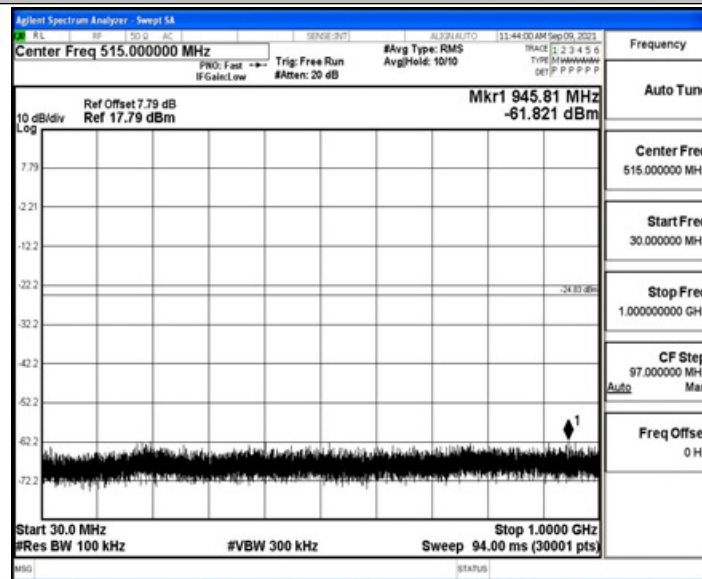


11G_Ant1_2412_0~Reference

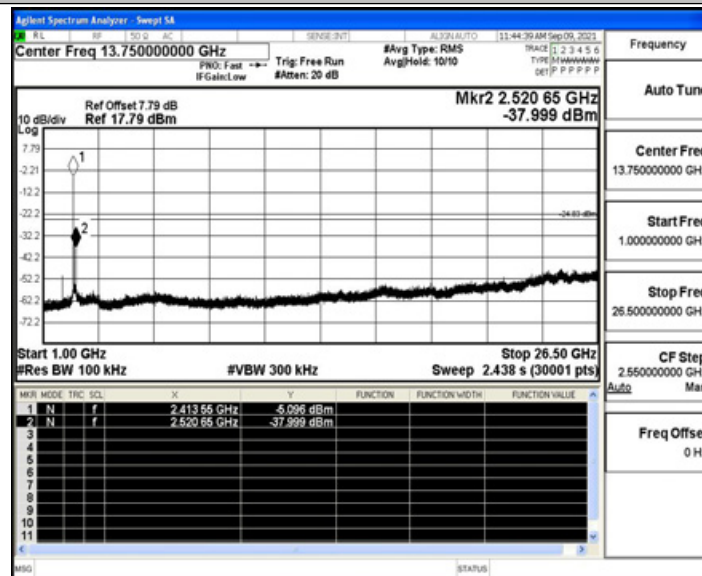




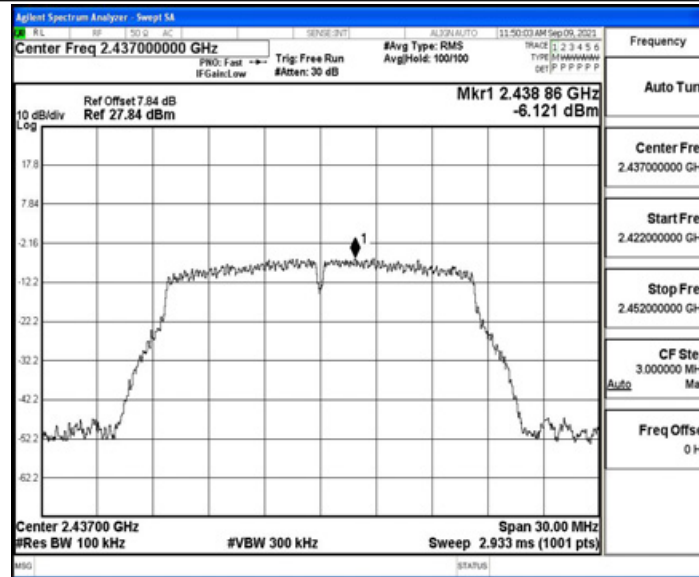
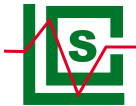
11G_Ant1_2412_30~1000



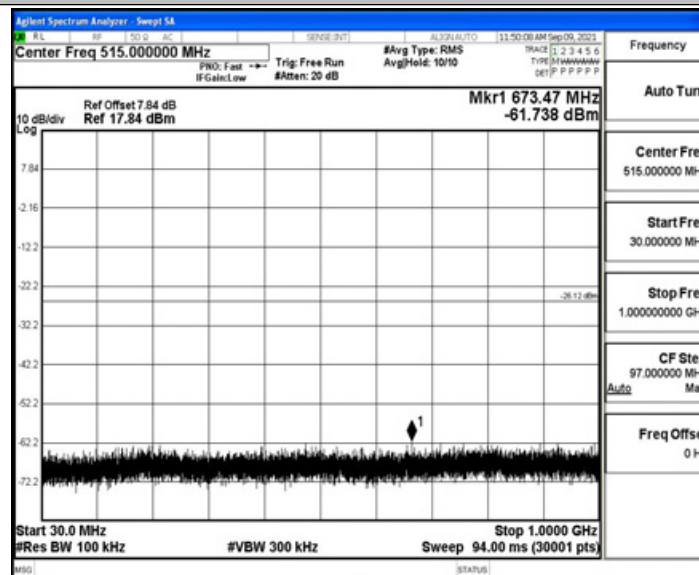
11G_Ant1_2412_1000~26500



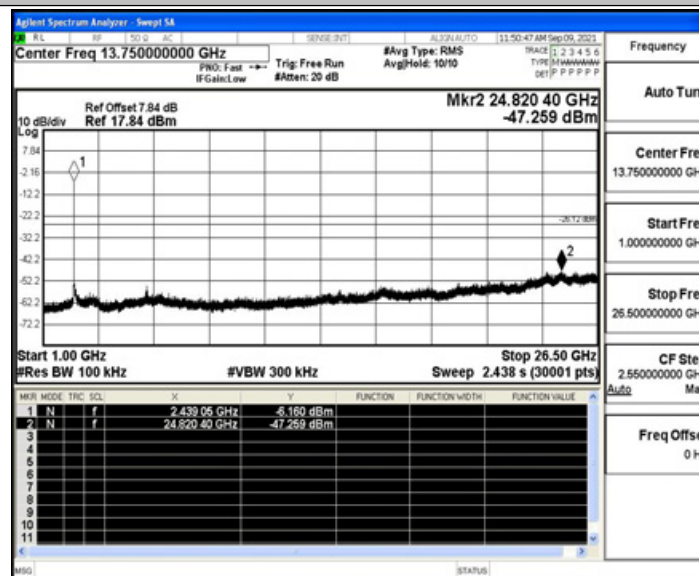
11G_Ant1_2437_0~Reference

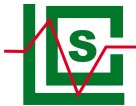


11G_Ant1_2437_30~1000

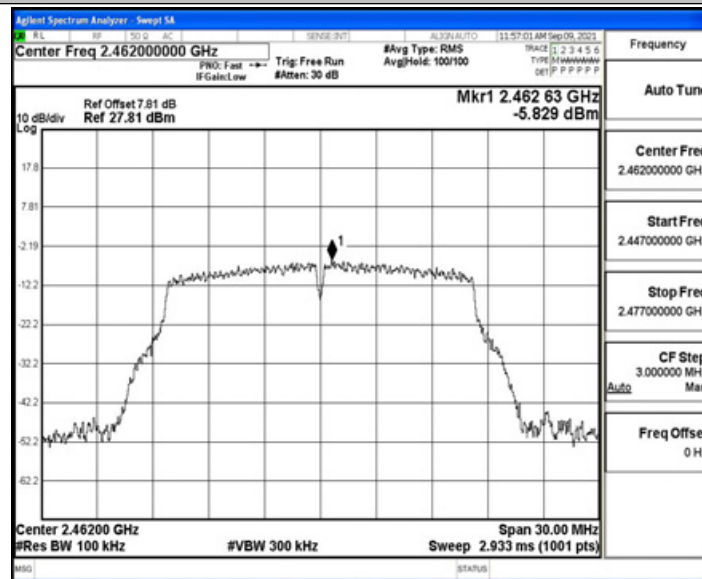


11G_Ant1_2437_1000~26500

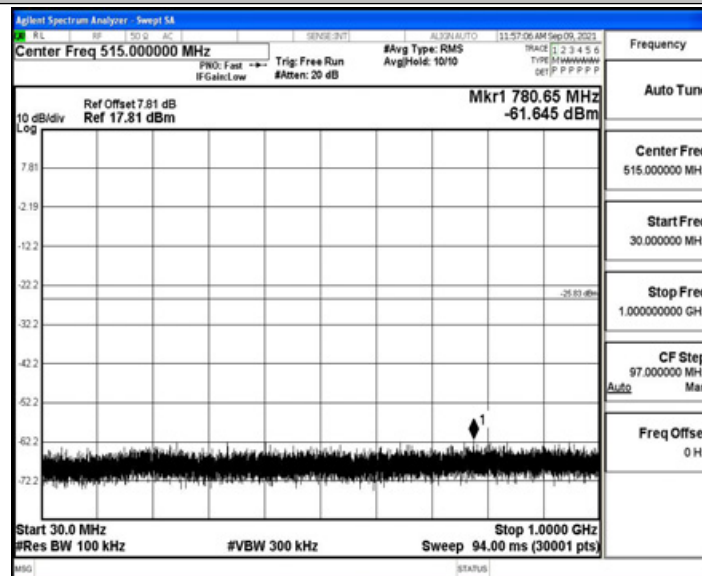




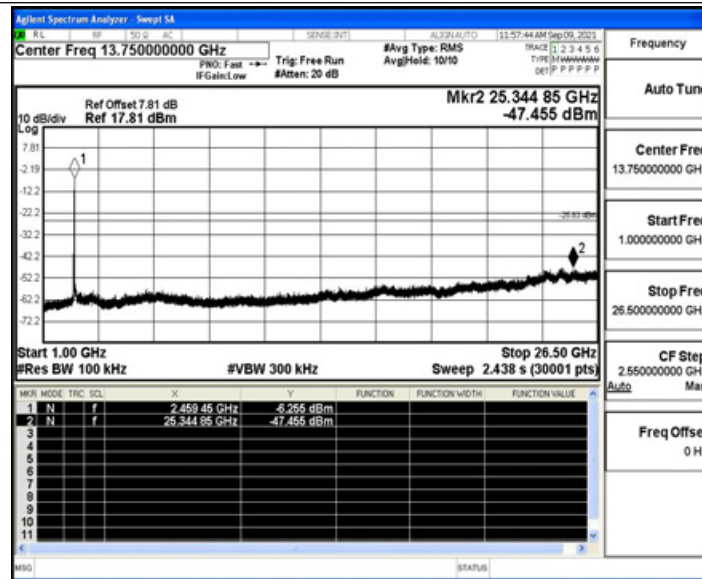
11G_Ant1_2462_0~Reference



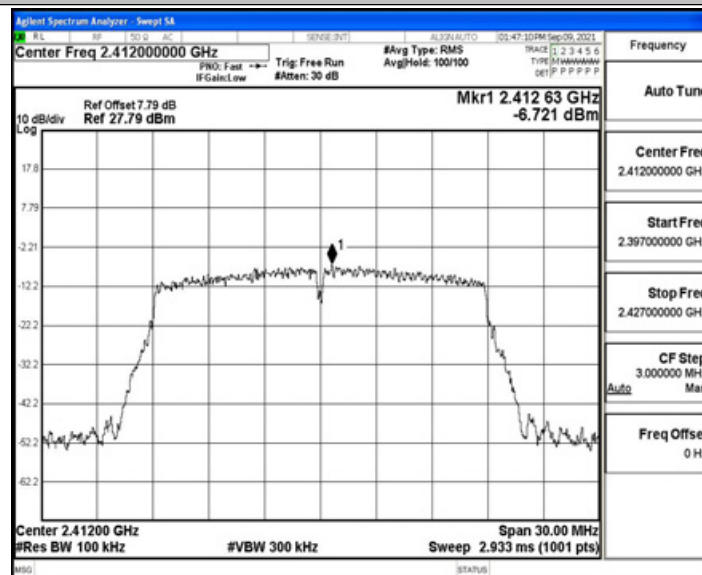
11G_Ant1_2462_30~1000



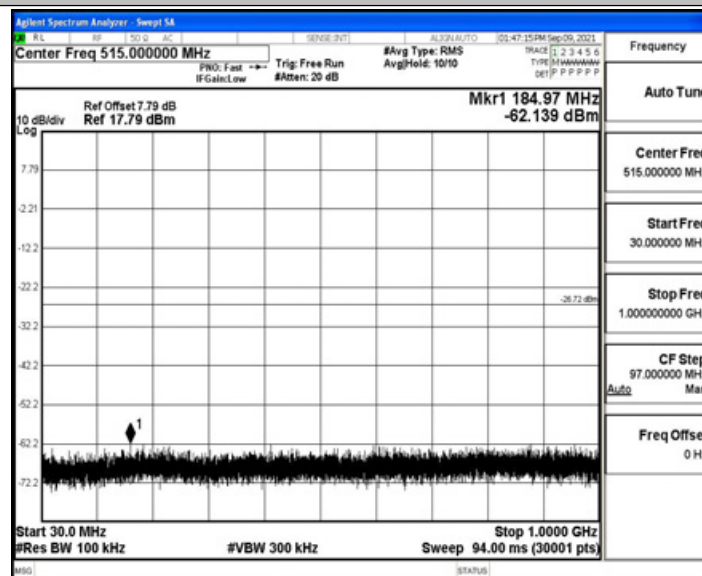
11G_Ant1_2462_1000~26500

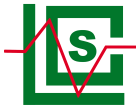


11N20SISO_Ant1_2412_0~Reference

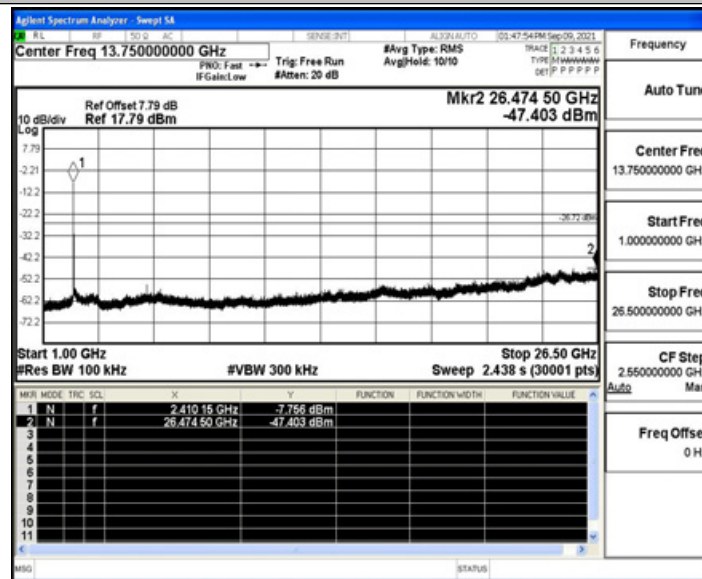


11N20SISO_Ant1_2412_30~1000

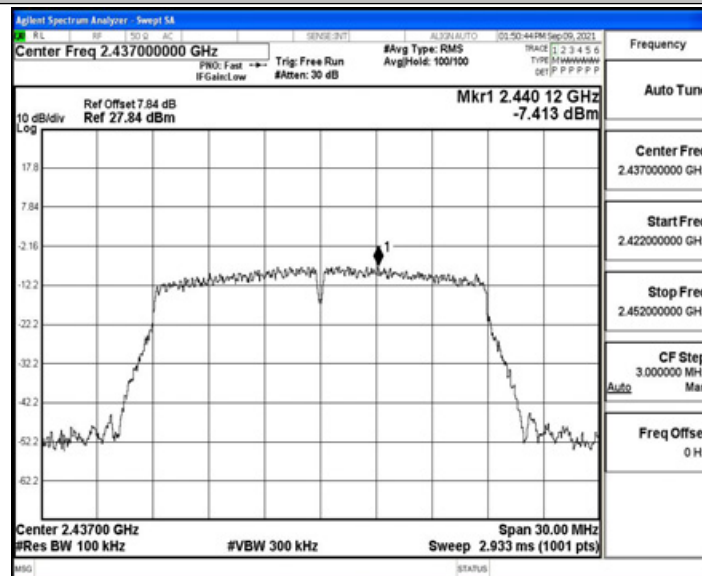




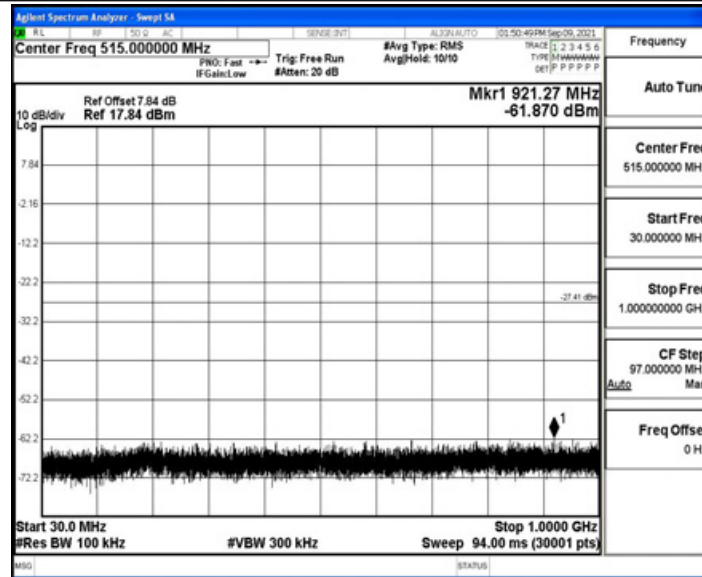
11N20SISO_Ant1_2412_1000~26500



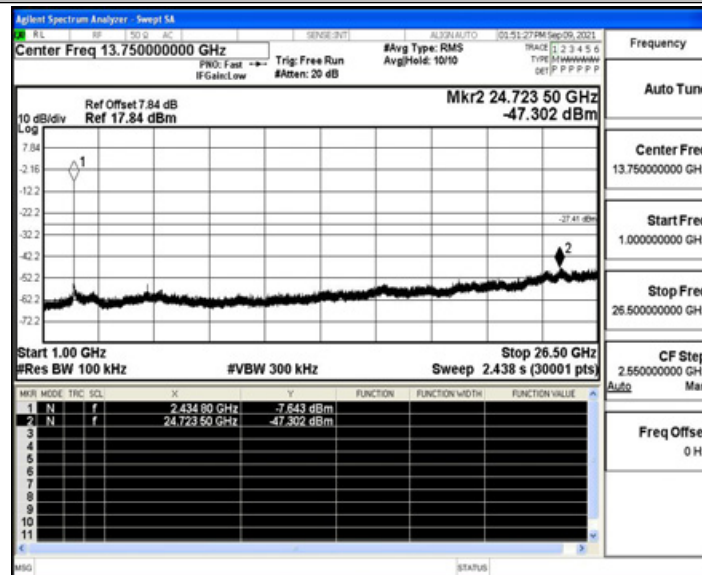
11N20SISO_Ant1_2437_0~Reference



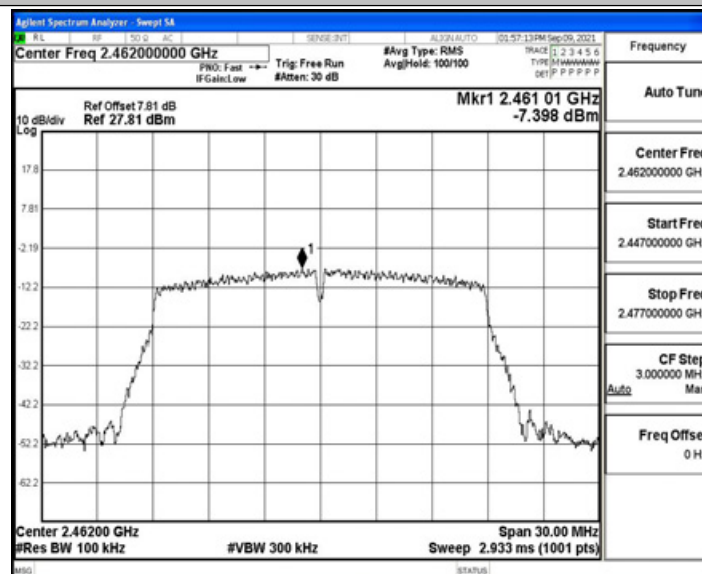
11N20SISO_Ant1_2437_30~1000

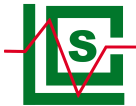


11N20SISO_Ant1_2437_1000~26500

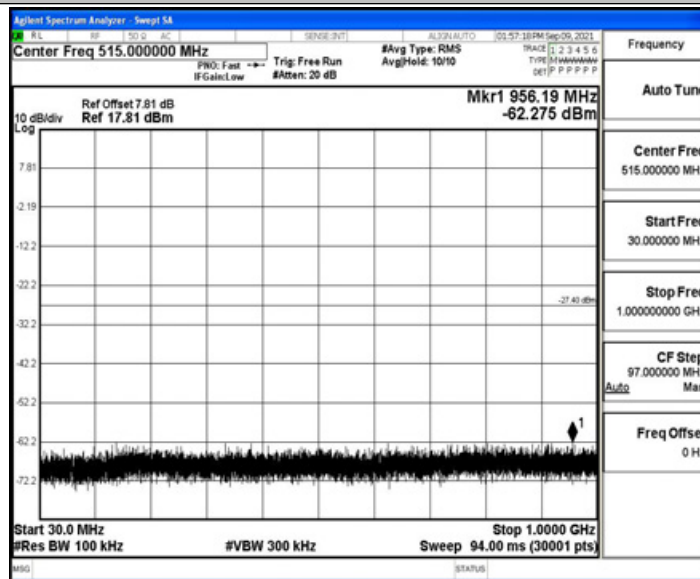


11N20SISO_Ant1_2462_0~Reference

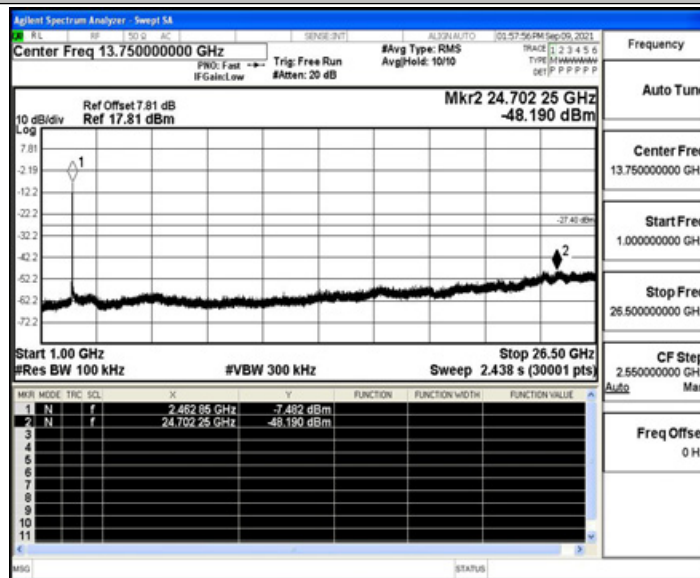




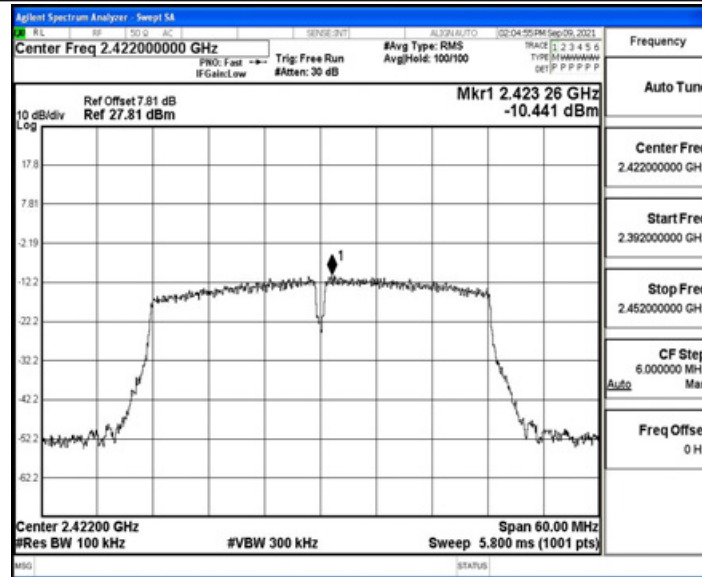
11N20SISO_Ant1_2462_30~1000



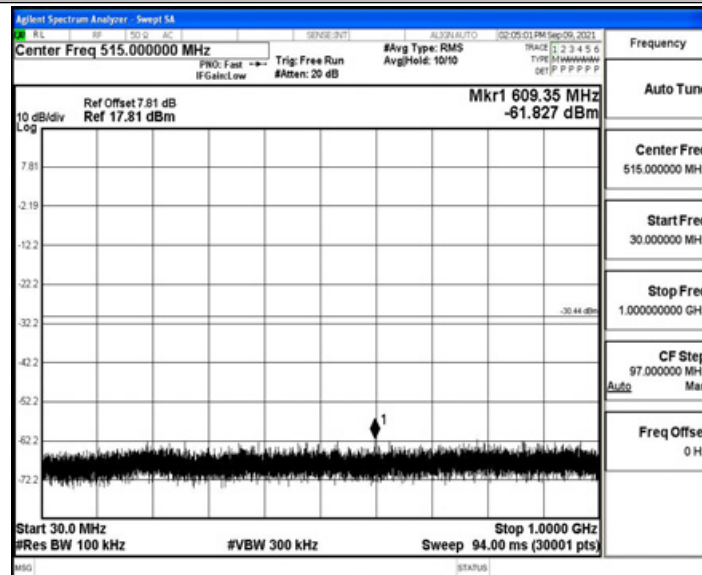
11N20SISO_Ant1_2462_1000~26500



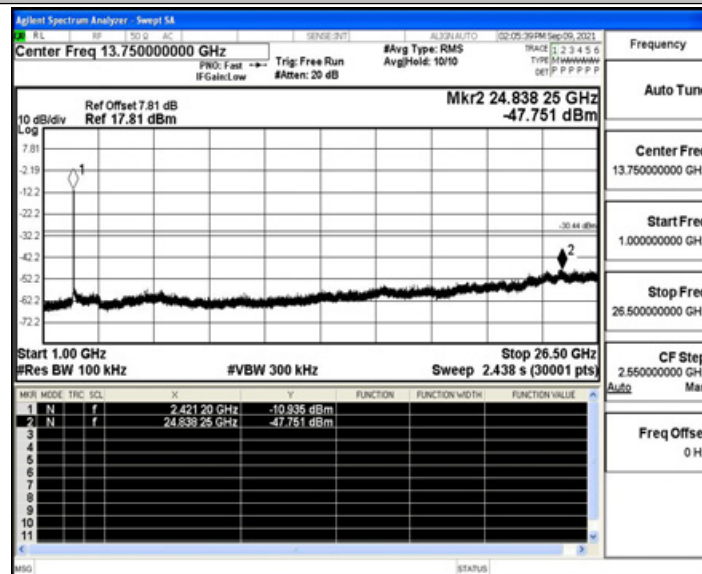
11N40SISO_Ant1_2422_0~Reference

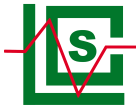


11N40SISO_Ant1_2422_30~1000

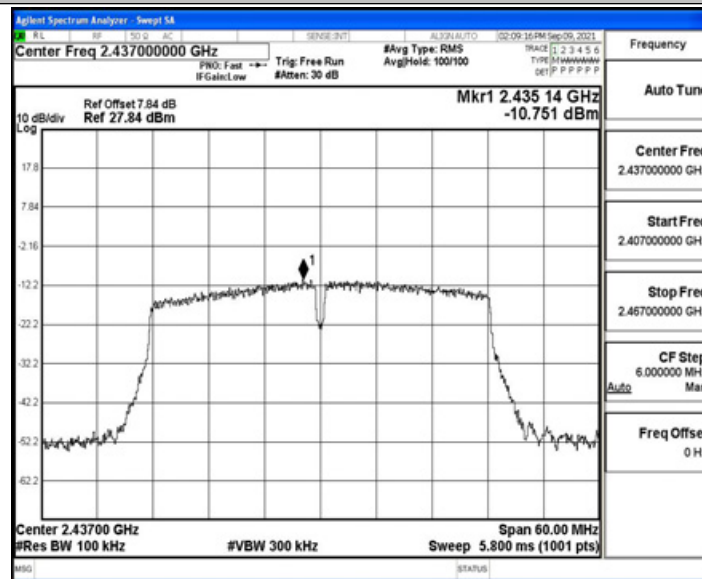


11N40SISO_Ant1_2422_1000~26500

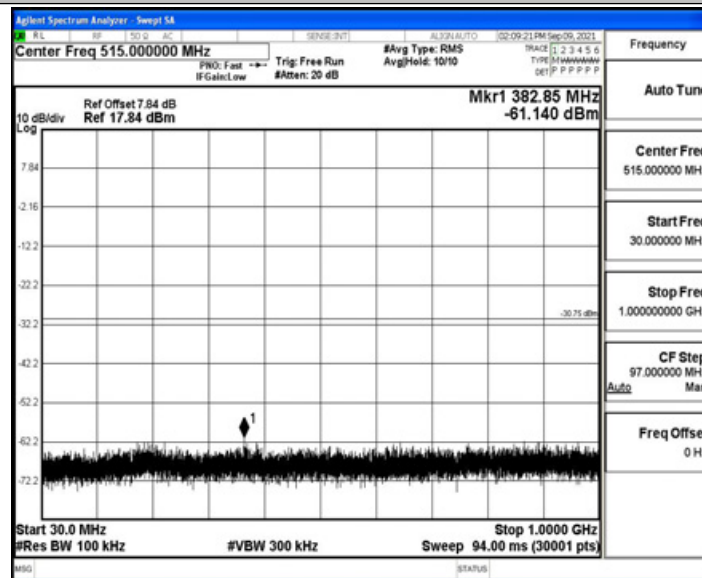




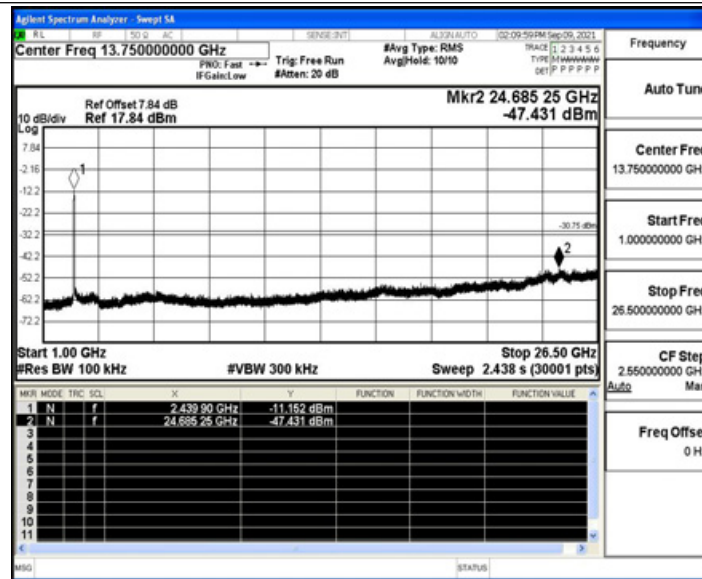
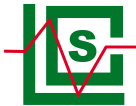
11N40SISO_Ant1_2437_0~Reference



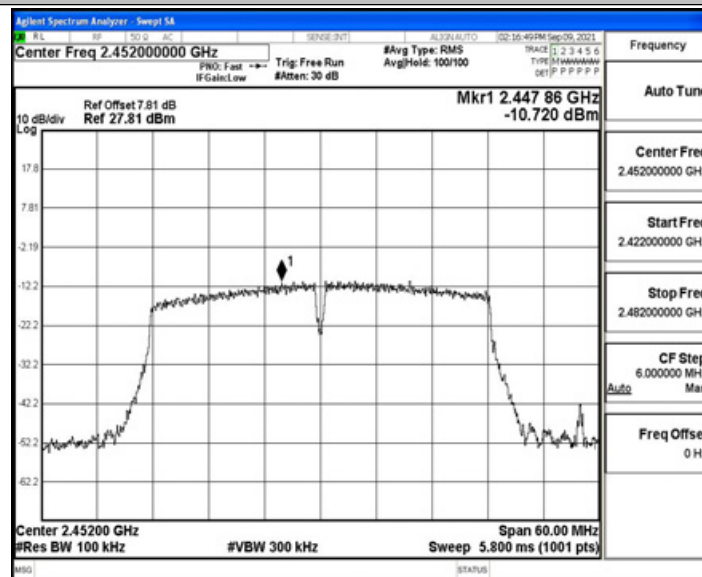
11N40SISO_Ant1_2437_30~1000



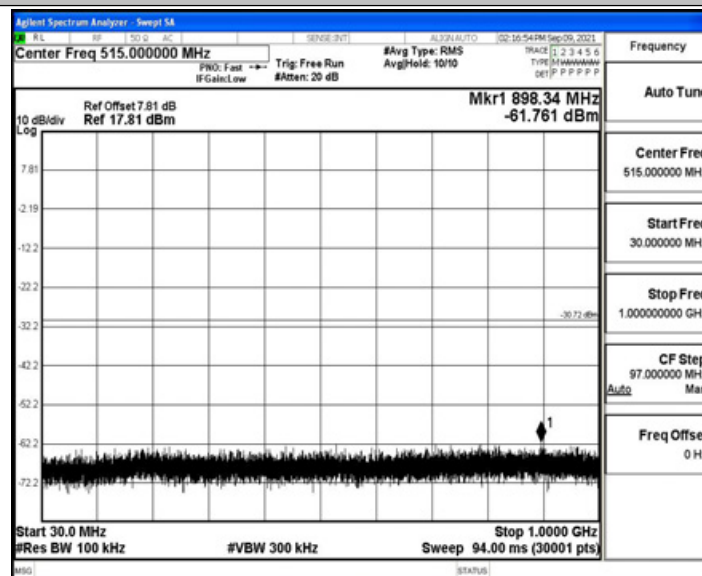
11N40SISO_Ant1_2437_1000~26500

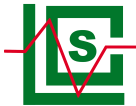


11N40SISO_Ant1_2452_0~Reference

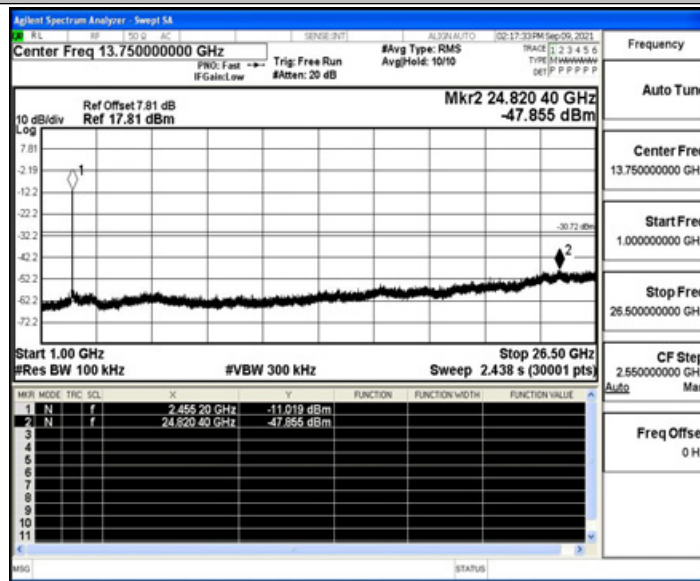


11N40SISO_Ant1_2452_30~1000





11N40SISO_Ant1_2452_1000~26500

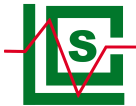




C.6 Duty Cycle

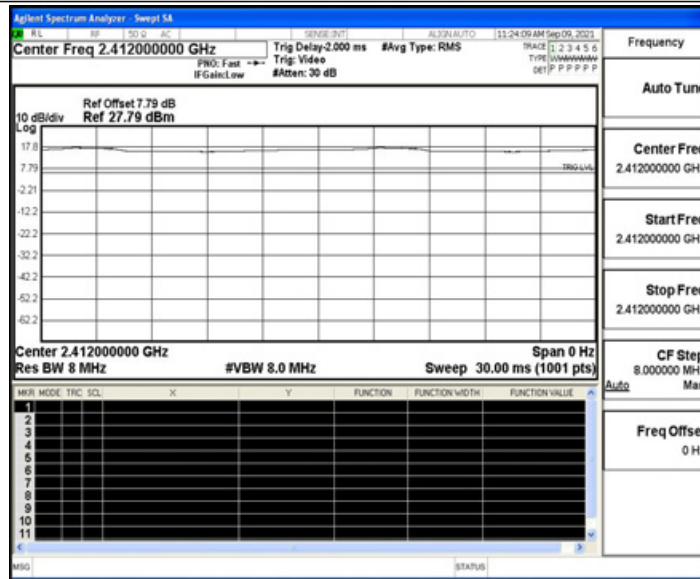
Test Result

TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
11B	Ant1	2412	30.00	30.00	100.00	---	PASS
		2437	30.00	30.00	100.00	---	PASS
		2462	30.00	30.00	100.00	---	PASS
11G	Ant1	2412	30.00	30.00	100.00	---	PASS
		2437	30.00	30.00	100.00	---	PASS
		2462	30.00	30.00	100.00	---	PASS
11N20SISO	Ant1	2412	30.00	30.00	100.00	---	PASS
		2437	30.00	30.00	100.00	---	PASS
		2462	30.00	30.00	100.00	---	PASS
11N40SISO	Ant1	2422	30.00	30.00	100.00	---	PASS
		2437	30.00	30.00	100.00	---	PASS
		2452	30.00	30.00	100.00	---	PASS

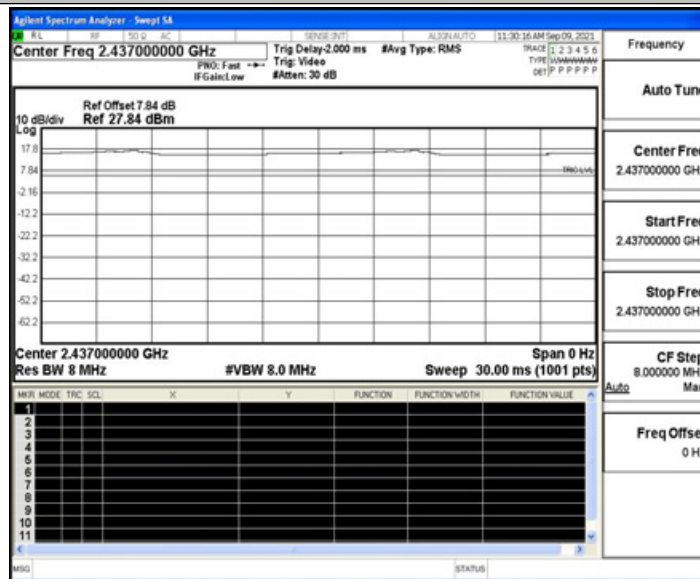


Test Graphs

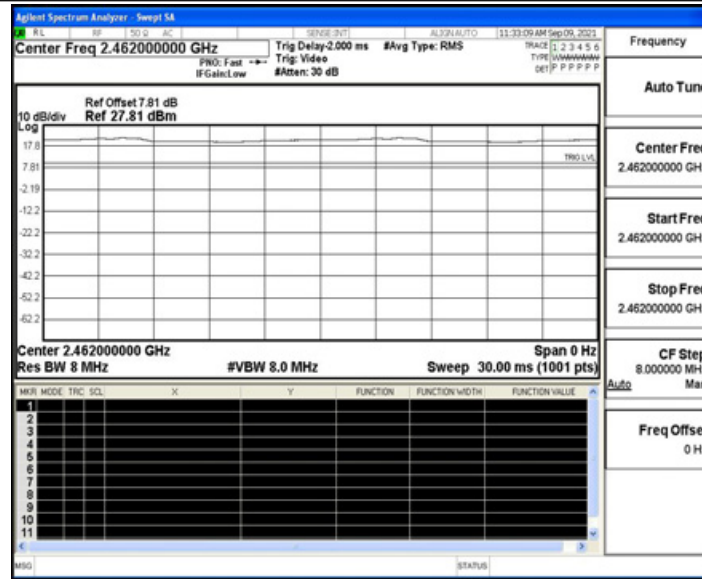
11B_Ant1_2412



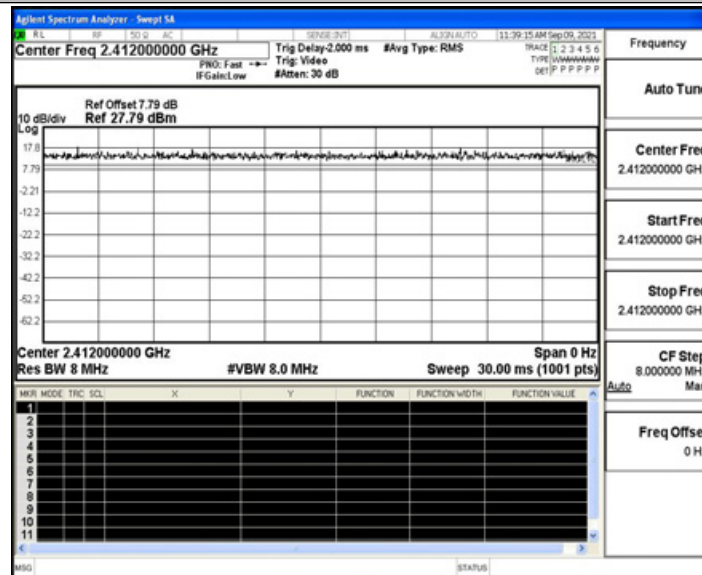
11B_Ant1_2437



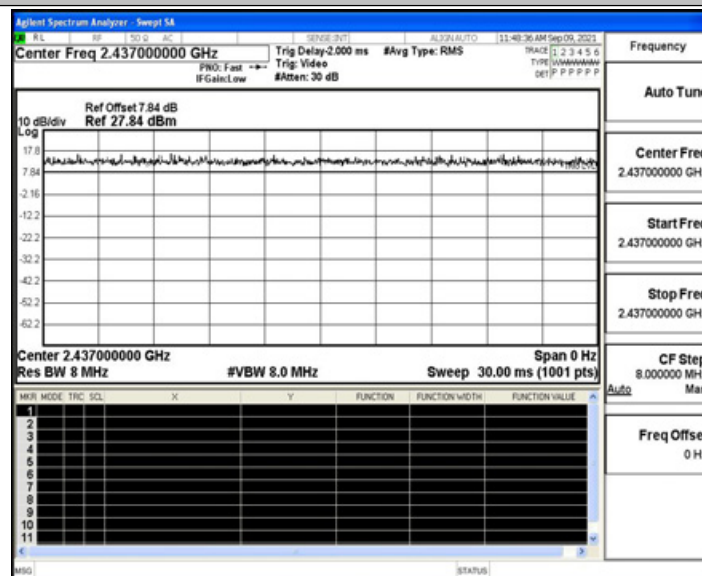
11B_Ant1_2462

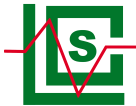


11G_Ant1_2412

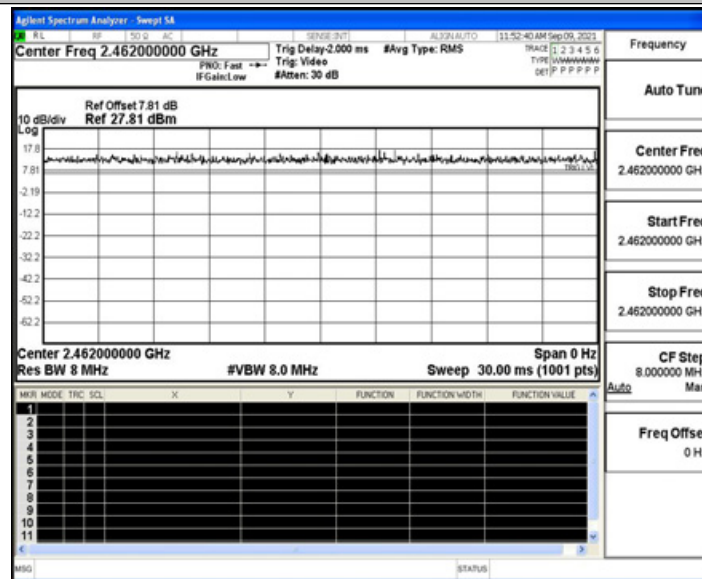


11G_Ant1_2437

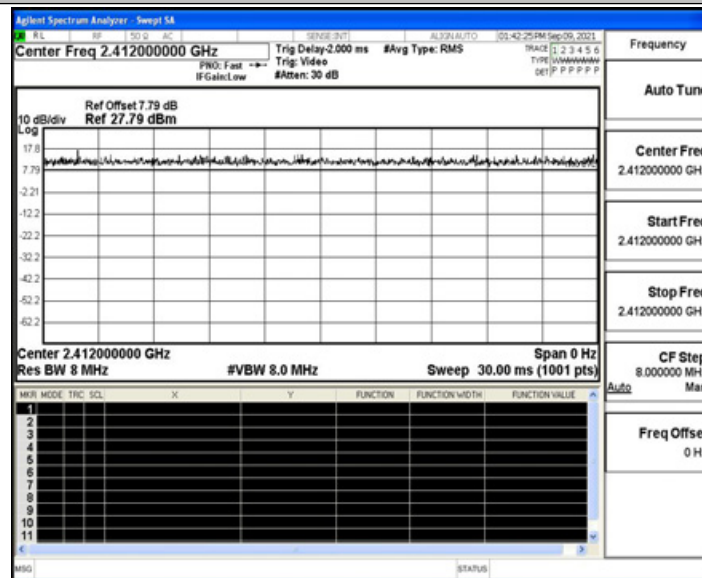




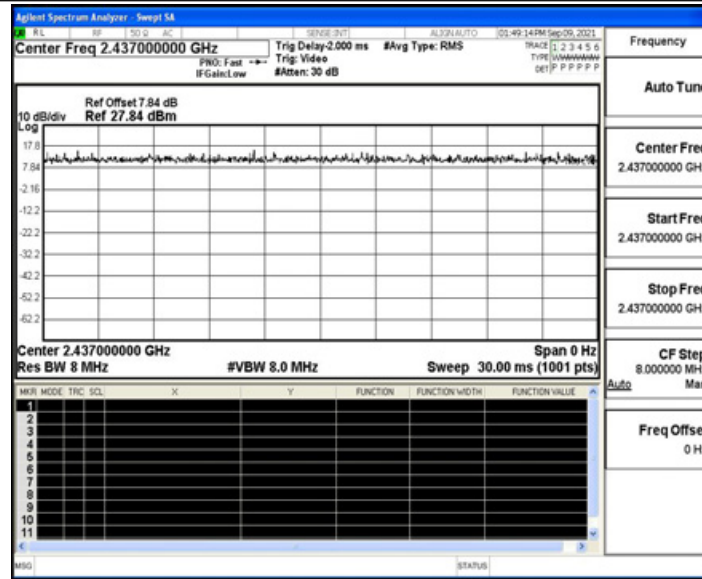
11G_Ant1_2462



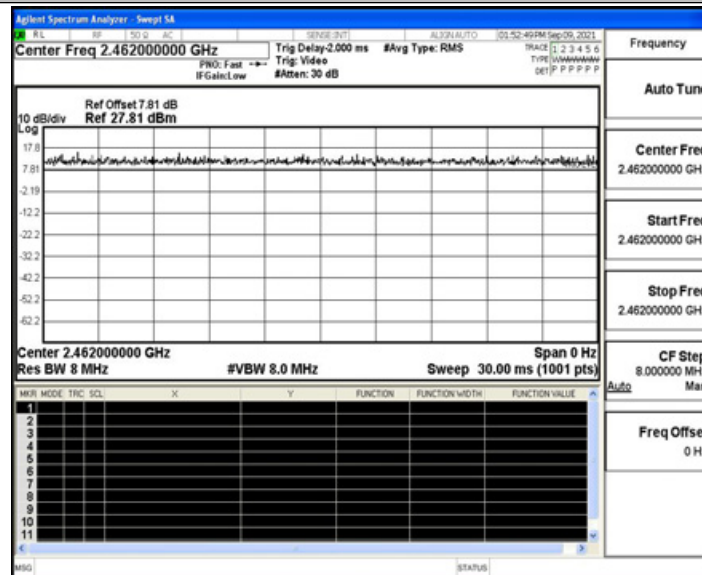
11N20SISO_Ant1_2412



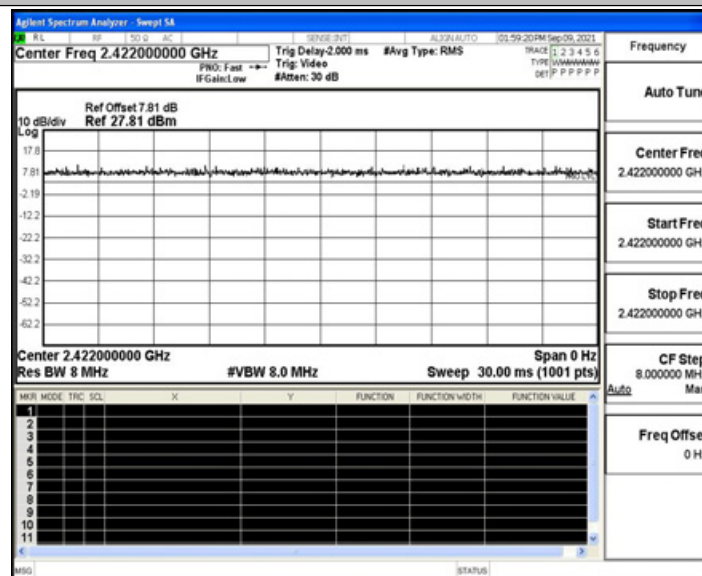
11N20SISO_Ant1_2437

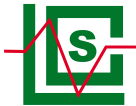


11N20SISO_Ant1_2462

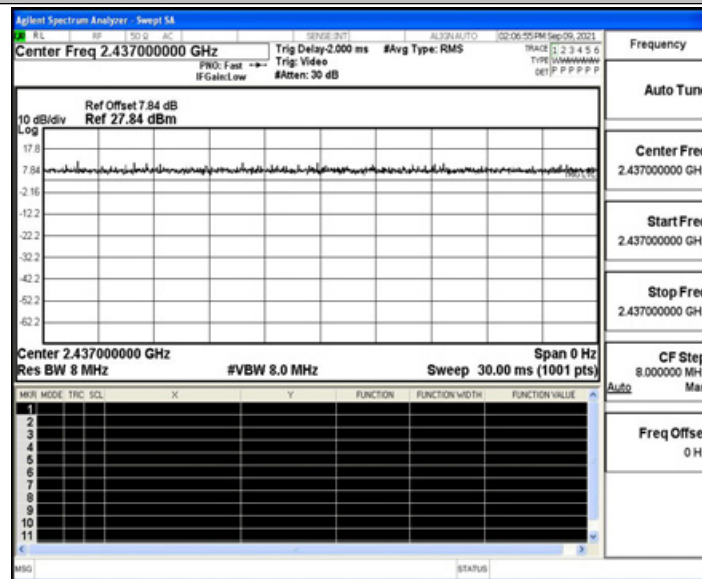


11N40SISO_Ant1_2422

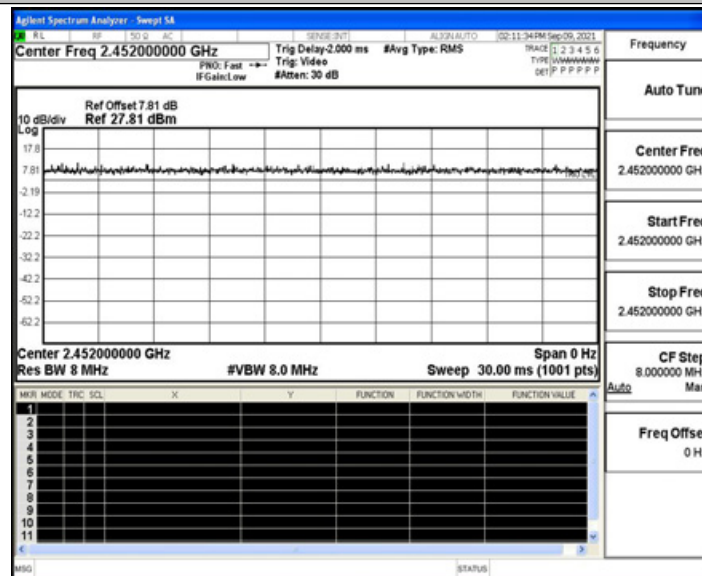




11N40SISO_Ant1_2437



11N40SISO_Ant1_2452





C.7 Emissions in Restricted Bands

Test Result

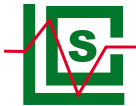
TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
11B	Ant1	Low	2412	AV	2310.000	-49.38	≤-41.20	45.82	≤54	PASS
				AV	2389.830	-48.67	≤-41.20	46.53	≤54	PASS
				AV	2390.000	-48.68	≤-41.20	46.52	≤54	PASS
				Peak	2310.000	-43.48	≤-21.20	51.72	≤74	PASS
				Peak	2324.830	-39.95	≤-21.20	55.25	≤74	PASS
				Peak	2390.000	-45.01	≤-21.20	50.19	≤74	PASS
		High	2462	AV	2483.500	-45.36	≤-41.20	49.84	≤54	PASS
				AV	2483.560	-45.47	≤-41.20	49.73	≤54	PASS
				AV	2500.000	-47.29	≤-41.20	47.91	≤54	PASS
				Peak	2483.500	-38.73	≤-21.20	56.47	≤74	PASS
				Peak	2487.520	-37.76	≤-21.20	57.44	≤74	PASS
				Peak	2500.000	-41.99	≤-21.20	53.21	≤74	PASS
11G	Ant1	Low	2412	AV	2310.000	-49.38	≤-41.20	45.82	≤54	PASS
				AV	2389.830	-48.38	≤-41.20	46.82	≤54	PASS
				AV	2390.000	-48.38	≤-41.20	46.82	≤54	PASS
				Peak	2310.000	-43.54	≤-21.20	51.66	≤74	PASS
				Peak	2372.280	-40.2	≤-21.20	55.00	≤74	PASS
				Peak	2390.000	-45.61	≤-21.20	49.59	≤74	PASS
		High	2462	AV	2483.500	-47.78	≤-41.20	47.42	≤54	PASS
				AV	2499.510	-47.74	≤-41.20	47.46	≤54	PASS
				AV	2500.000	-47.77	≤-41.20	47.43	≤54	PASS
				Peak	2483.500	-43.35	≤-21.20	51.85	≤74	PASS
				Peak	2484.220	-38.83	≤-21.20	56.37	≤74	PASS
				Peak	2500.000	-41.19	≤-21.20	54.01	≤74	PASS
11N20SIS O	Ant1	Low	2412	AV	2310.000	-49.41	≤-41.20	45.79	≤54	PASS
				AV	2389.960	-48.66	≤-41.20	46.54	≤54	PASS
				AV	2390.000	-48.66	≤-41.20	46.54	≤54	PASS
				Peak	2310.000	-43.86	≤-21.20	51.34	≤74	PASS
				Peak	2364.870	-39.35	≤-21.20	55.85	≤74	PASS
				Peak	2390.000	-42.62	≤-21.20	52.58	≤74	PASS
		High	2462	AV	2483.500	-48.02	≤-41.20	47.18	≤54	PASS
				AV	2499.400	-47.94	≤-41.20	47.26	≤54	PASS
				AV	2500.000	-47.97	≤-41.20	47.23	≤54	PASS
				Peak	2483.500	-41.66	≤-21.20	53.54	≤74	PASS
				Peak	2488.510	-39.57	≤-21.20	55.63	≤74	PASS
				Peak	2500.000	-43.94	≤-21.20	51.26	≤74	PASS
11N40SIS	Ant1	Low	2422	AV	2310.000	-49.42	≤-41.20	45.78	≤54	PASS



O				AV	2389.700	-48.61	≤-41.20	46.59	≤54	PASS
				AV	2390.000	-48.63	≤-41.20	46.57	≤54	PASS
				Peak	2310.000	-44.2	≤-21.20	51.00	≤74	PASS
				Peak	2366.690	-39.33	≤-21.20	55.87	≤74	PASS
				Peak	2390.000	-43.84	≤-21.20	51.36	≤74	PASS
		High	2452	AV	2483.500	-47.9	≤-41.20	47.30	≤54	PASS
				AV	2484.220	-47.78	≤-41.20	47.42	≤54	PASS
				AV	2500.000	-47.99	≤-41.20	47.21	≤54	PASS
				Peak	2483.500	-40.73	≤-21.20	54.47	≤74	PASS
				Peak	2497.750	-39.76	≤-21.20	55.44	≤74	PASS
				Peak	2500.000	-41.64	≤-21.20	53.56	≤74	PASS

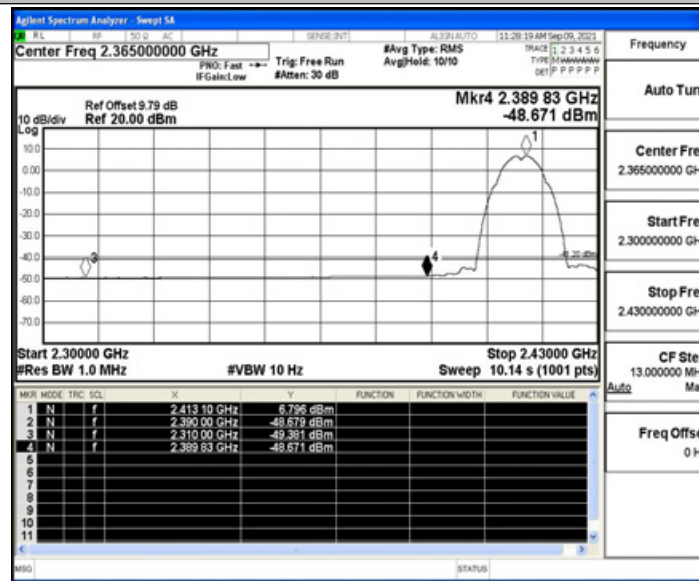
Note:

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.

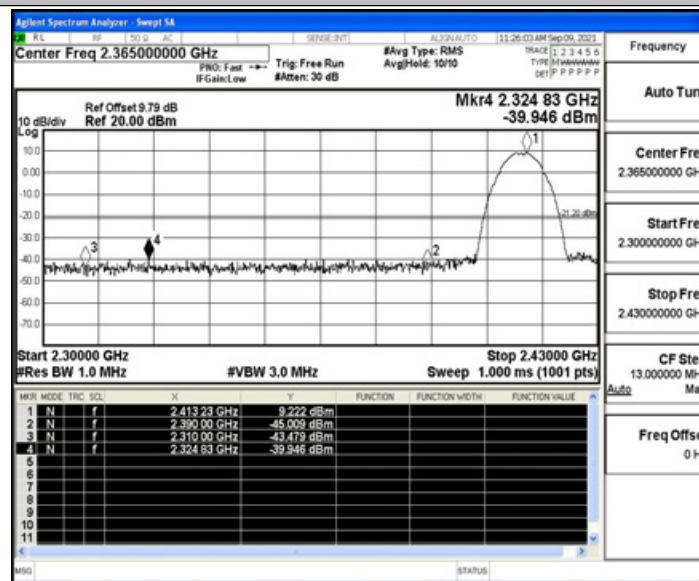


Test Graphs

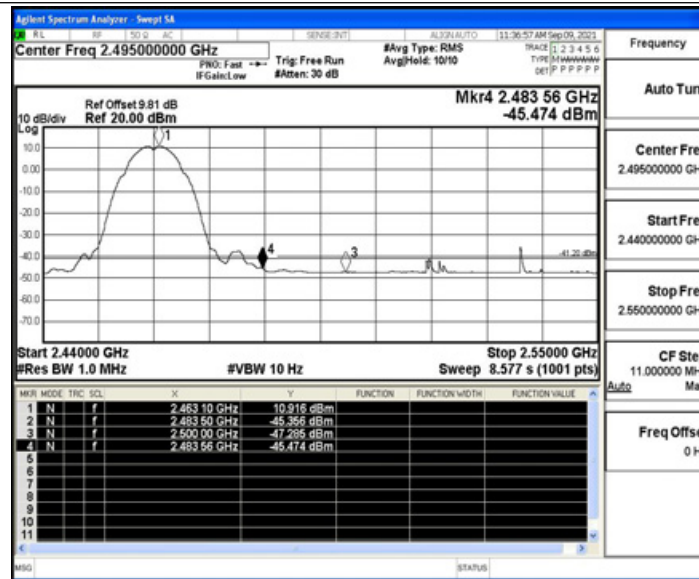
11B_Ant1_Low_2412_AV



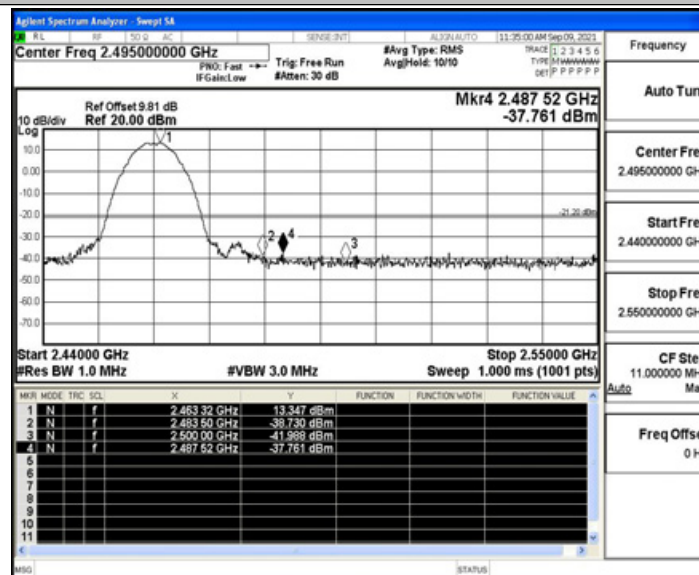
11B_Ant1_Low_2412_Peak



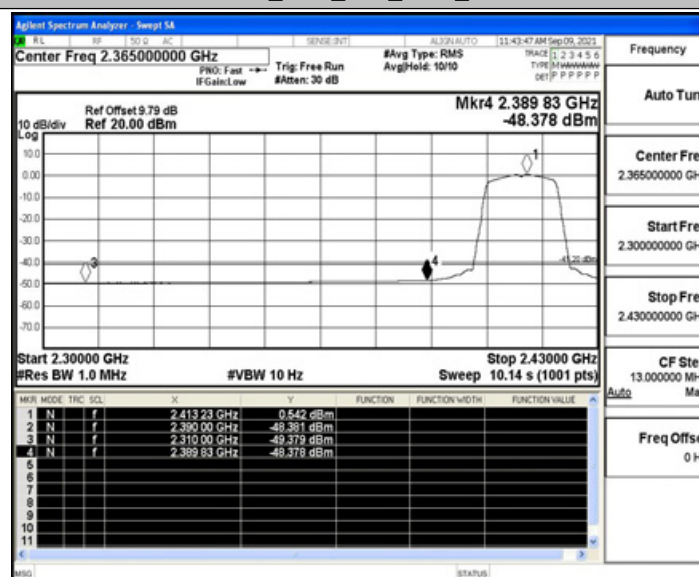
11B_Ant1_High_2462_AV



11B_Ant1_High_2462_Peak

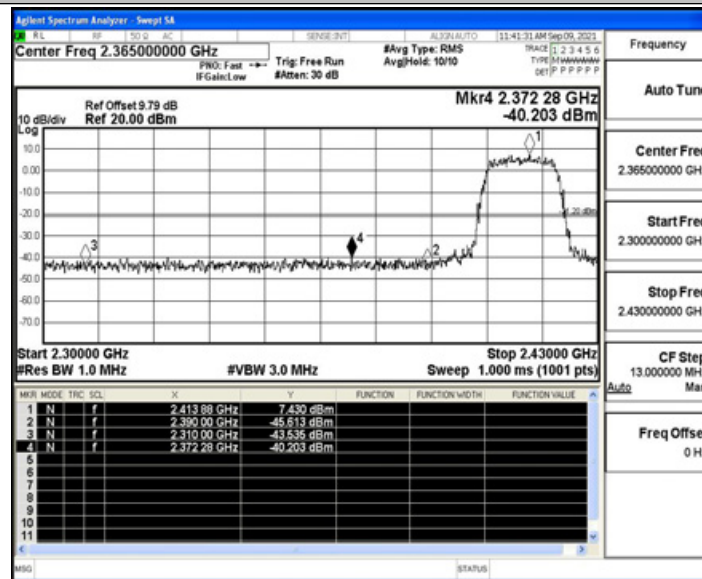


11G_Ant1_Low_2412_AV

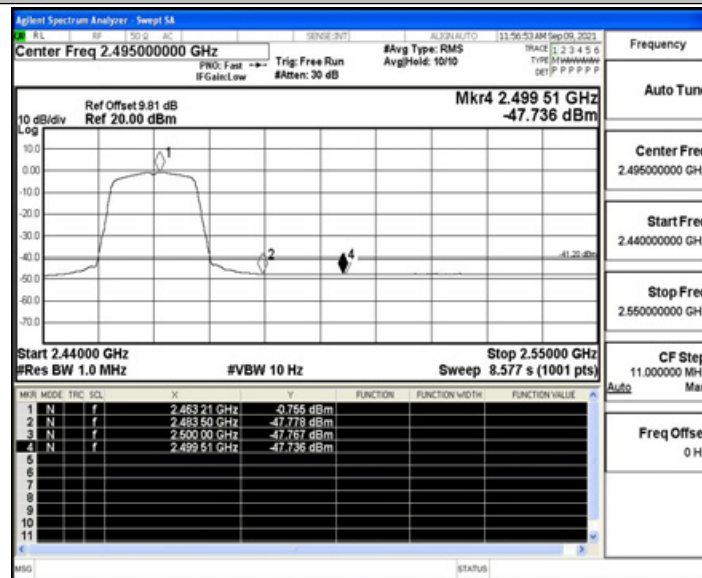




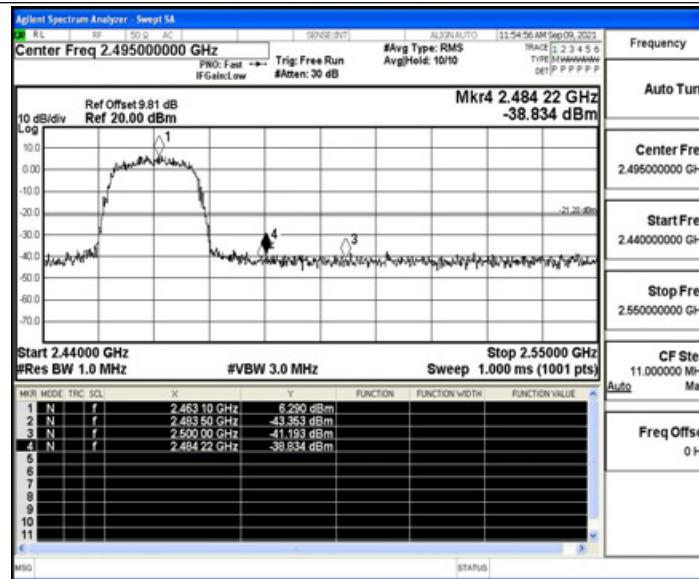
11G_Ant1_Low_2412_Peak



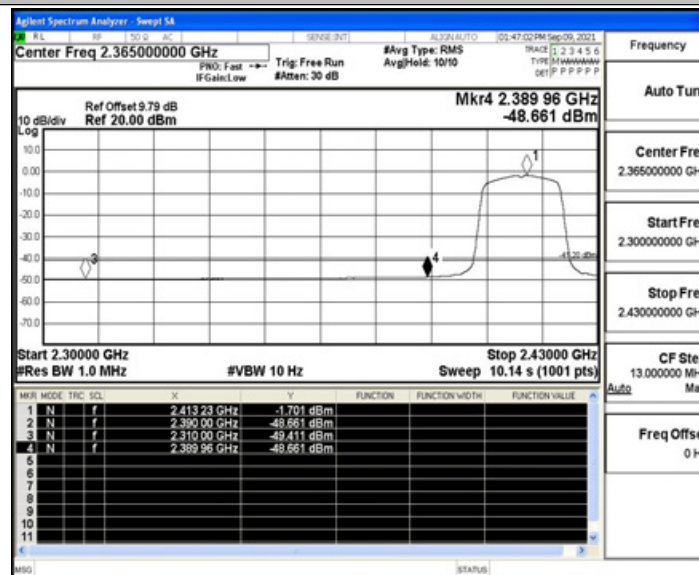
11G_Ant1_High_2462_AV



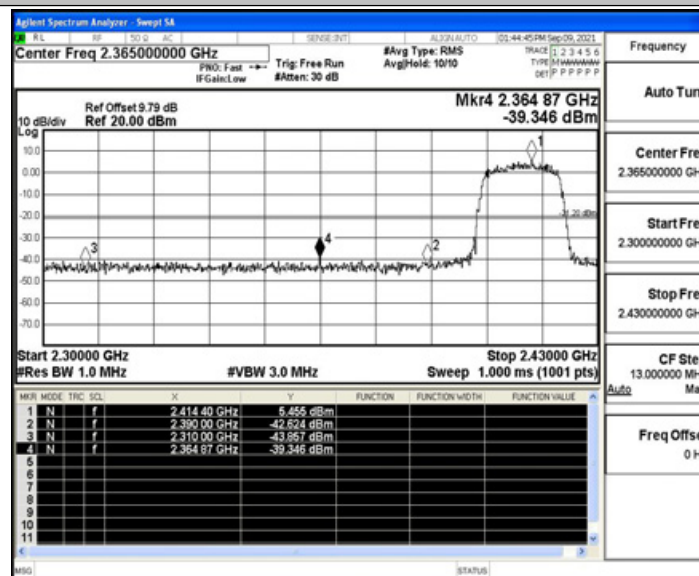
11G_Ant1_High_2462_Peak



11N20SISO_Ant1_Low_2412_AV

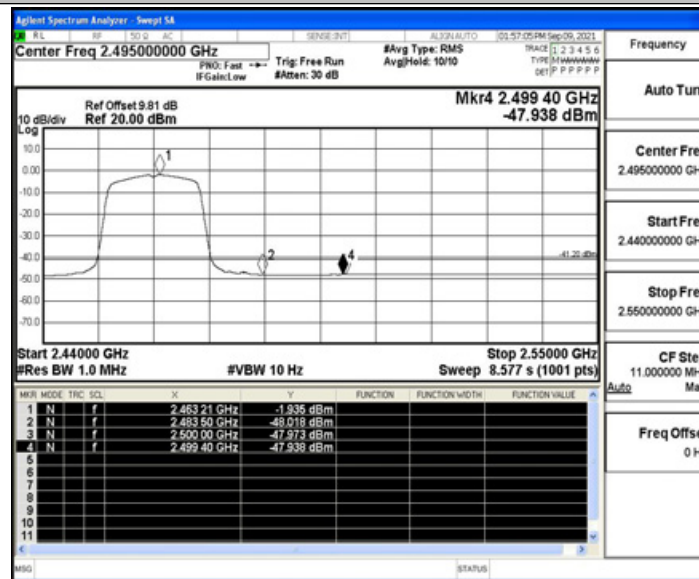


11N20SISO_Ant1_Low_2412_Peak

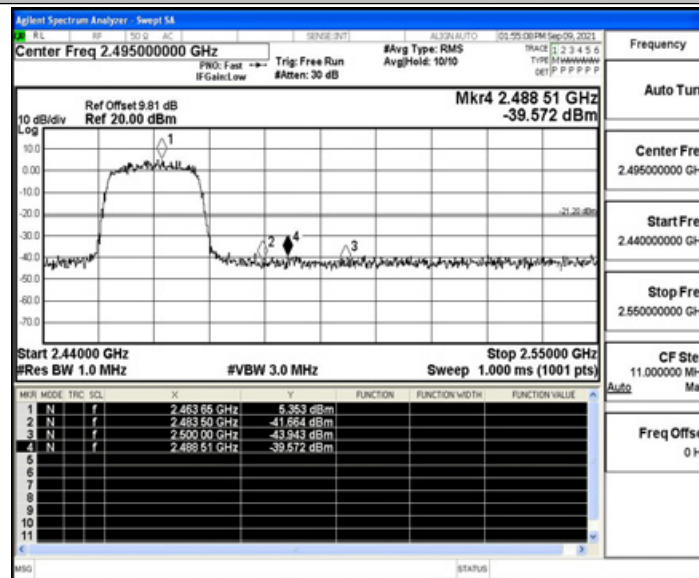




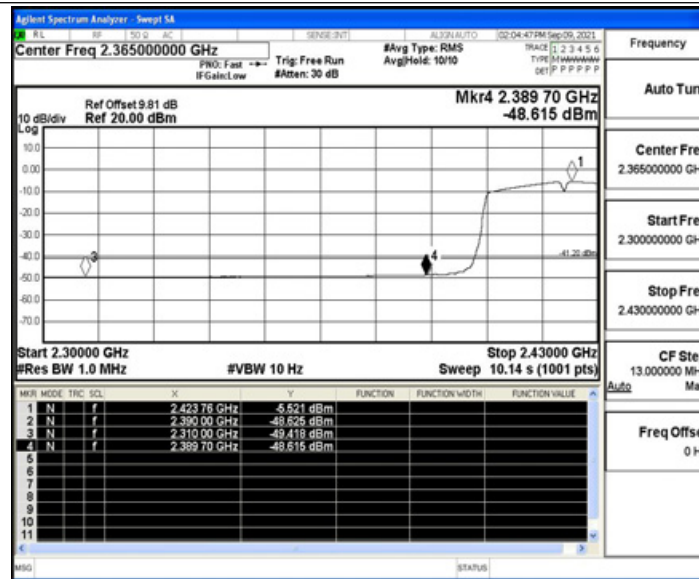
11N20SISO_Ant1_High_2462_AV



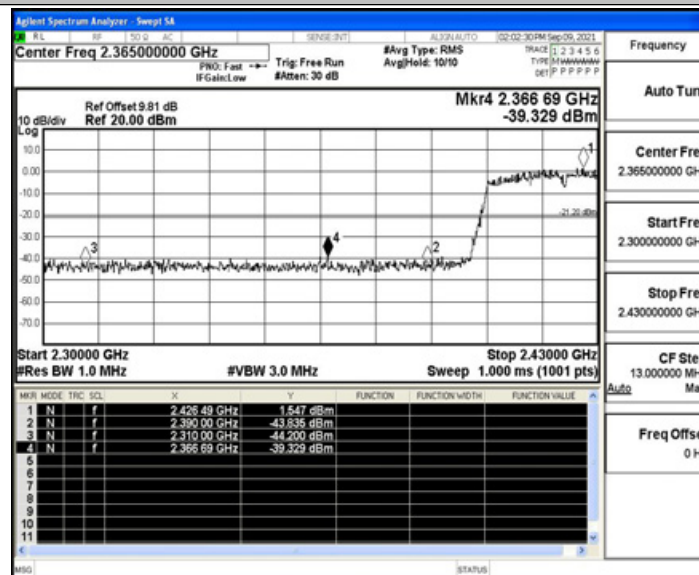
11N20SISO_Ant1_High_2462_Peak



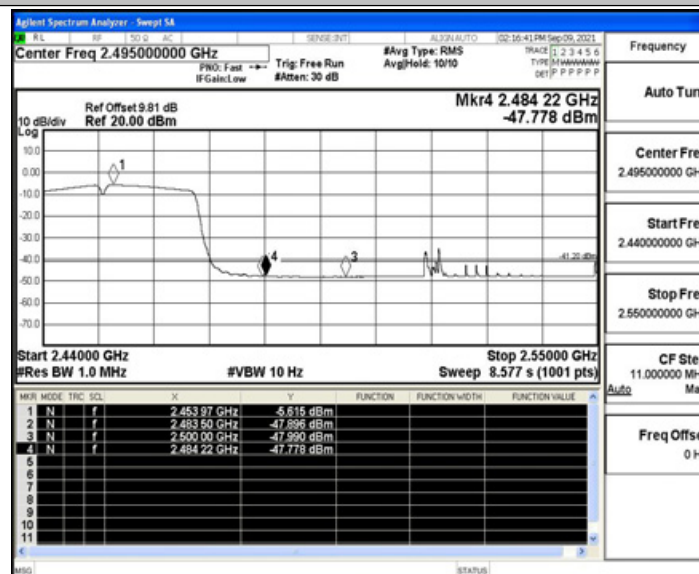
11N40SISO_Ant1_Low_2422_AV

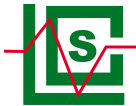


11N40SISO_Ant1_Low_2422_Peak



11N40SISO_Ant1_High_2452_AV





11N40SISO_Ant1_High_2452_Peak

