



Appendix B

RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: SONOFF Smart Stackable Power Meter (Main Unit+4-Relays)

Test Model: SPM-Main

Environmental Conditions

Temperature:	24.6° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
Supervised by:	Li Huan

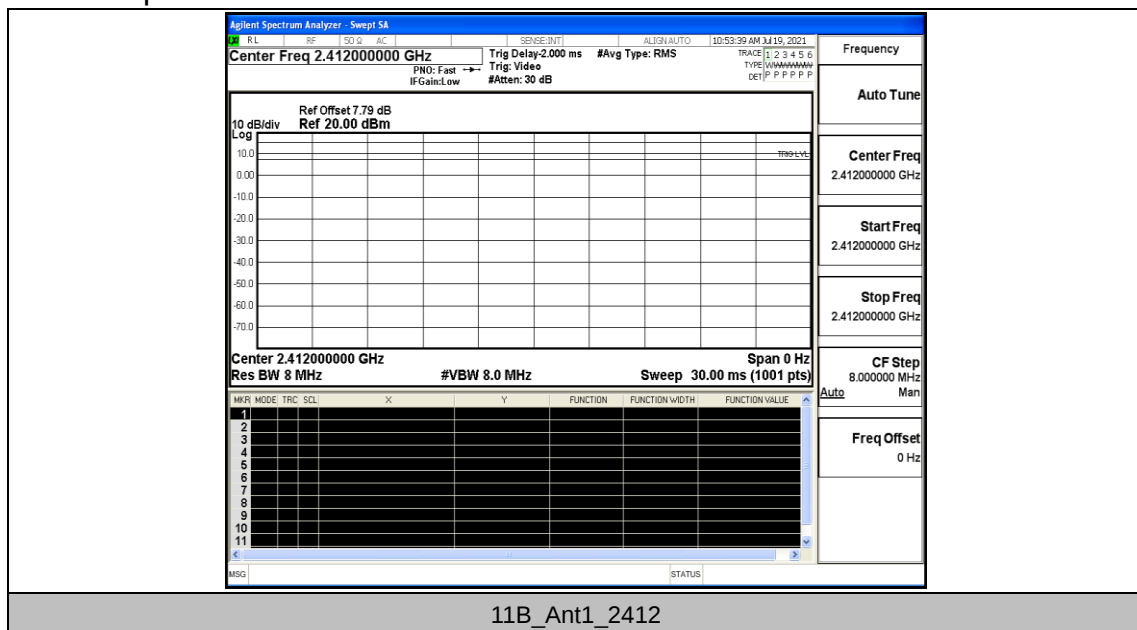


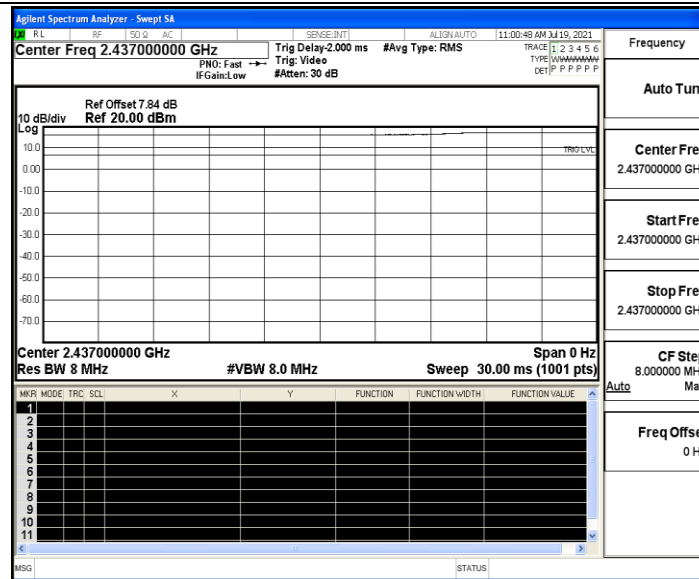
B.1 Duty Cycle

Test Result

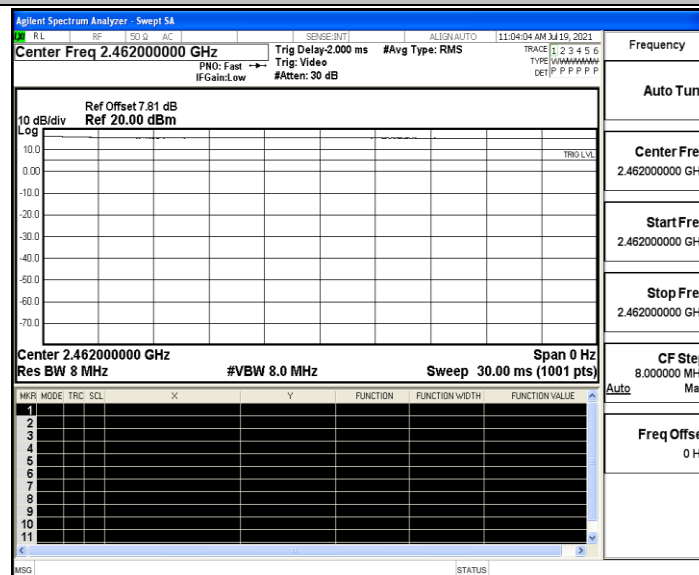
TestMode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
11B	Ant1	2412	30.00	30.00	100.00	---	PASS
		2437	30.00	30.00	100.00	---	PASS
		2462	30.00	30.00	100.00	---	PASS
11G	Ant1	2412	30.00	30.00	100.00	---	PASS
		2437	30.00	30.00	100.00	---	PASS
		2462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

Test Graphs

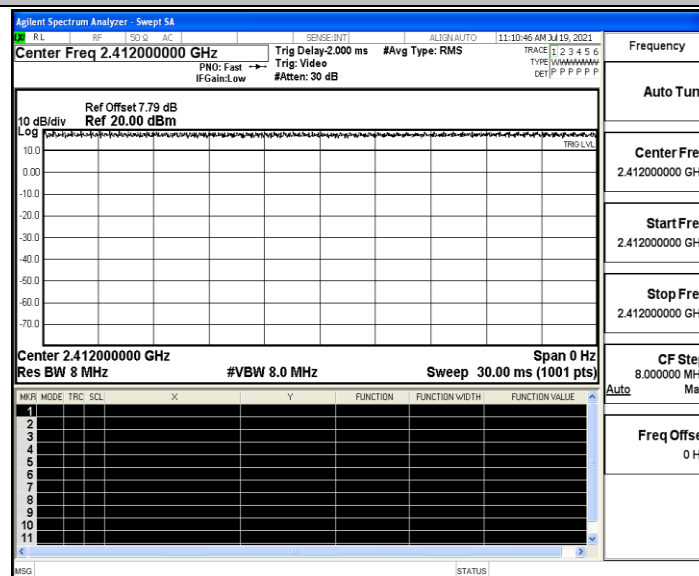




11B_Ant1_2437

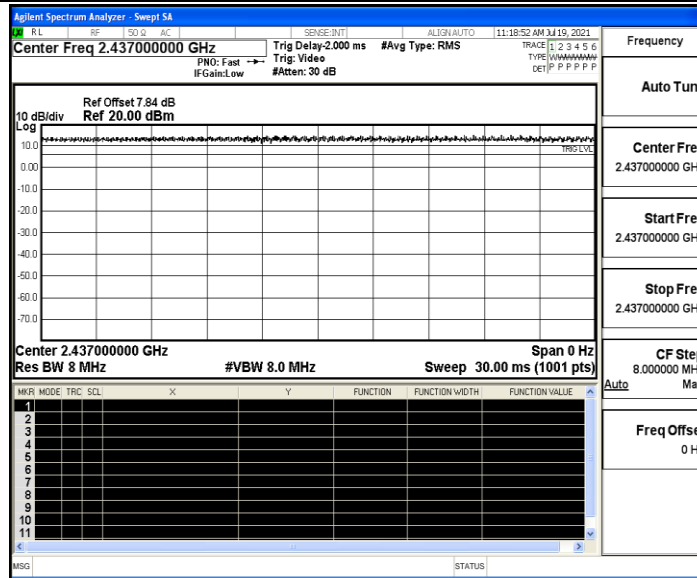


11B_Ant1_2462

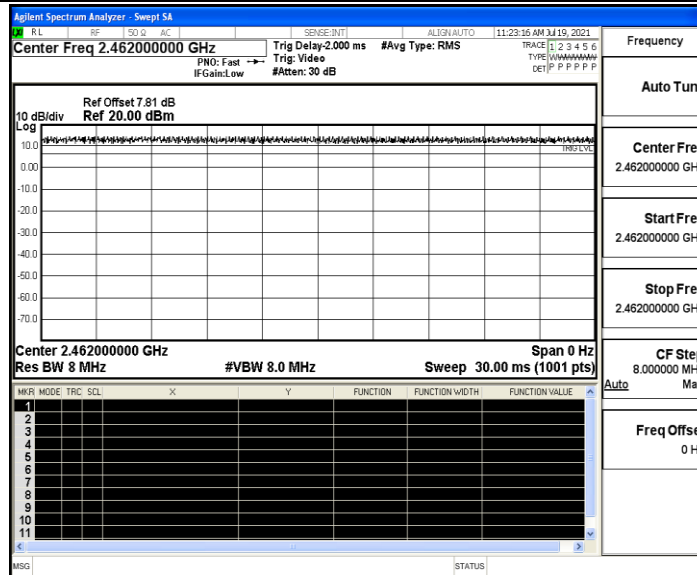




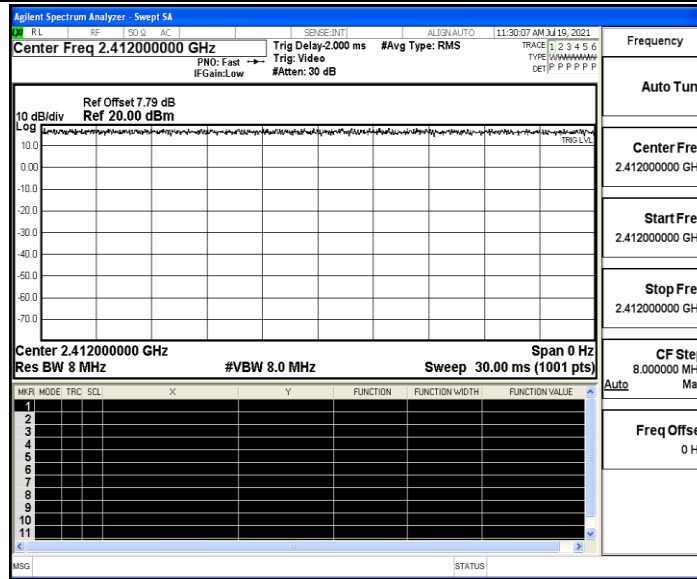
11G_Ant1_2412



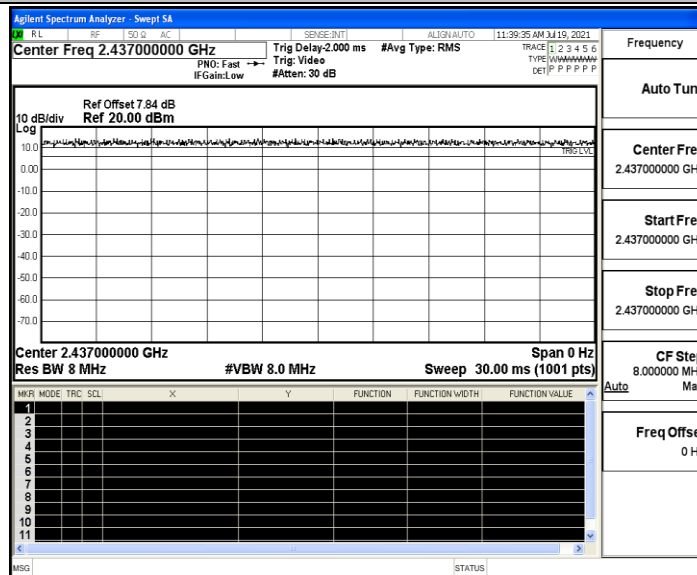
11G_Ant1_2437



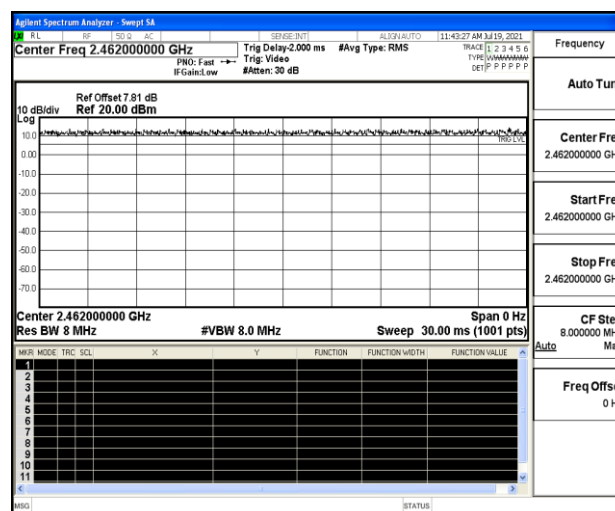
11G_Ant1_2462



11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



B.2 Maximum conducted output power

Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	2412	14.58	≤30	PASS
		2437	15.46	≤30	PASS
		2462	14.96	≤30	PASS
11G	Ant1	2412	14.79	≤30	PASS
		2437	15.79	≤30	PASS
		2462	15.49	≤30	PASS
11N20SISO	Ant1	2412	15.41	≤30	PASS
		2437	15.10	≤30	PASS
		2462	14.71	≤30	PASS



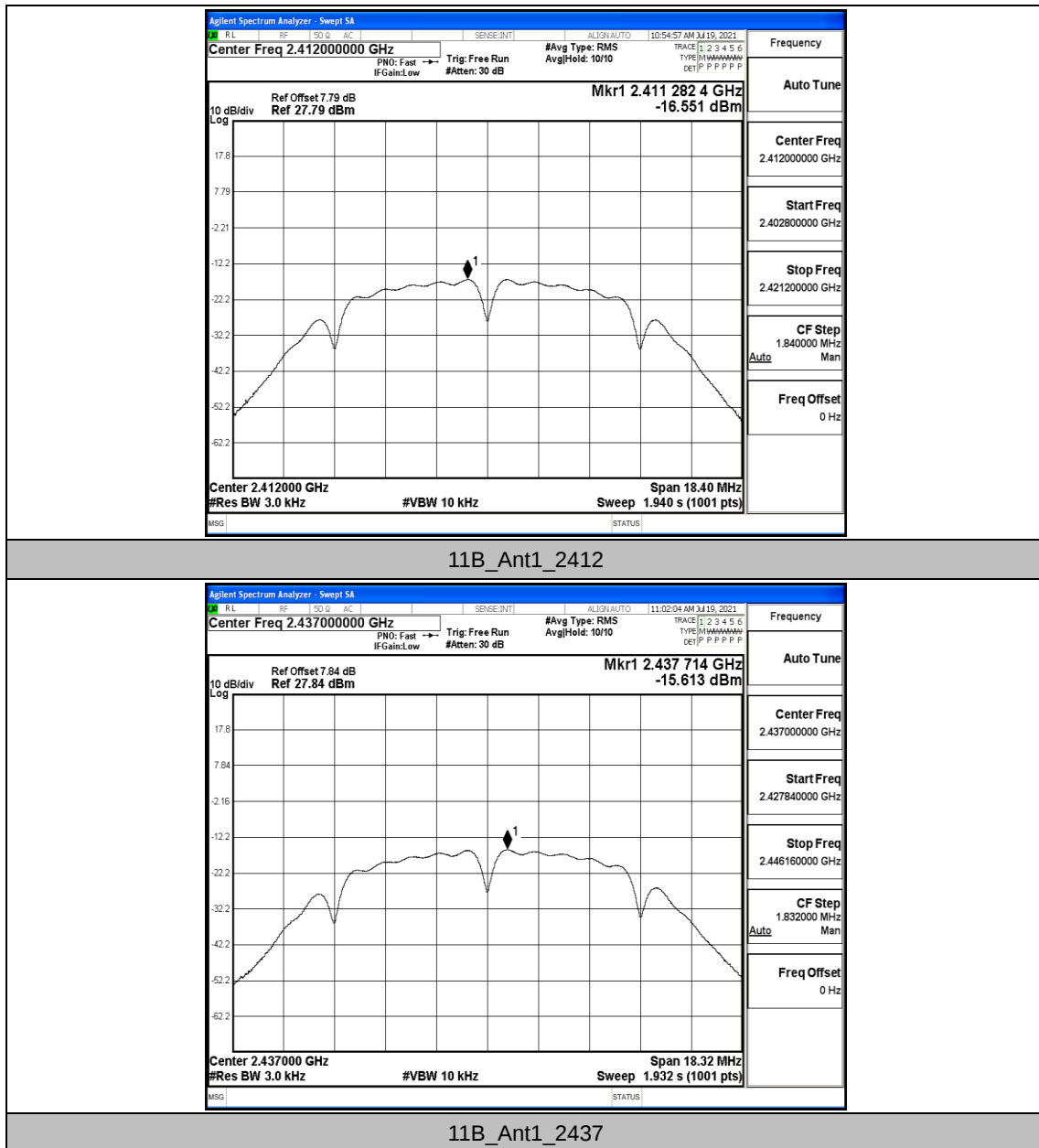
B.3 Maximum power spectral density

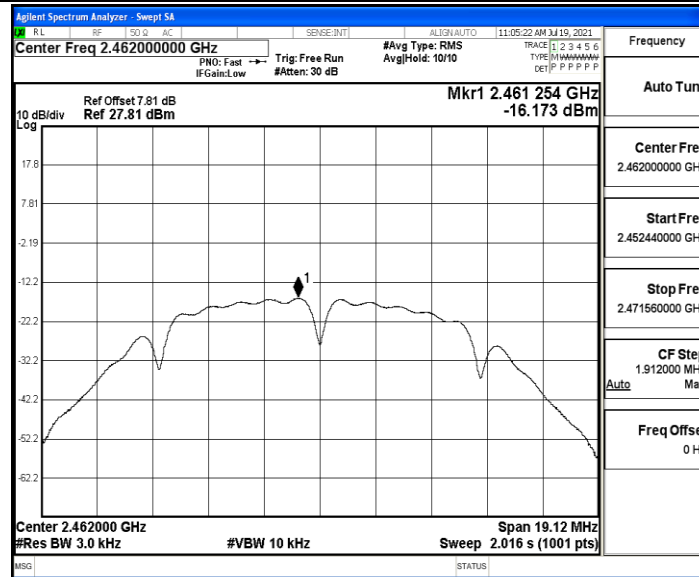
Test Result

TestMode	Antenna	Channel	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-16.55	≤8	PASS
		2437	-15.61	≤8	PASS
		2462	-16.17	≤8	PASS
11G	Ant1	2412	-20.5	≤8	PASS
		2437	-19.06	≤8	PASS
		2462	-19.04	≤8	PASS
11N20SISO	Ant1	2412	-19.85	≤8	PASS
		2437	-19.41	≤8	PASS
		2462	-19.52	≤8	PASS

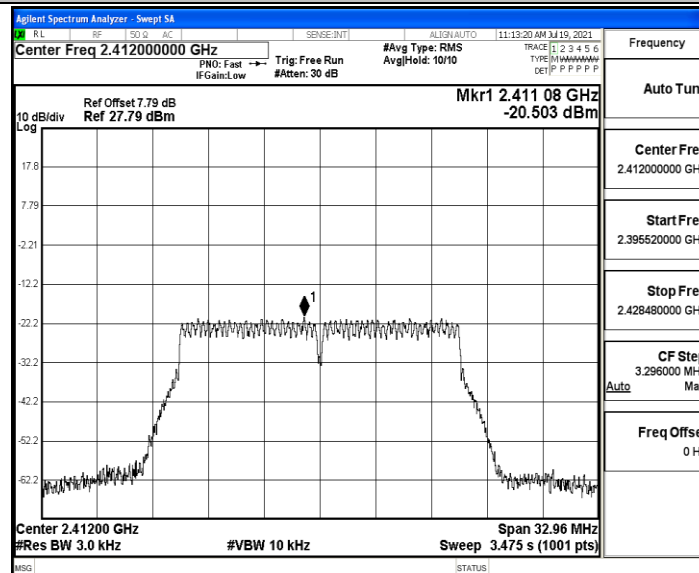


Test Graphs

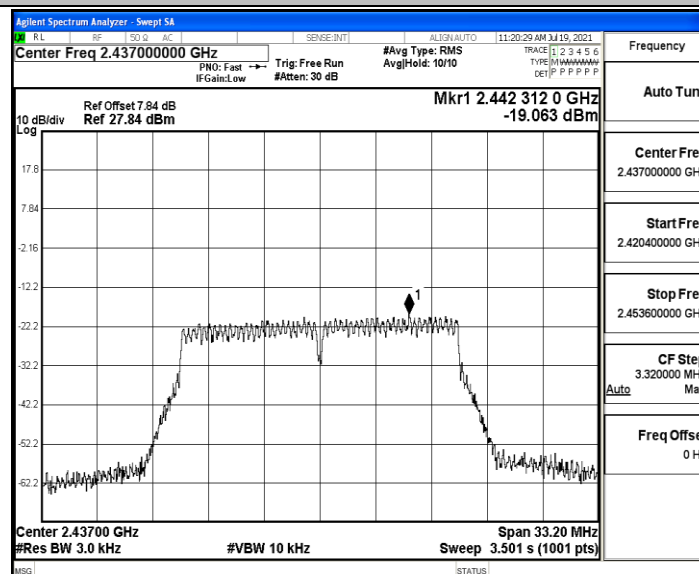




11B_Ant1_2462

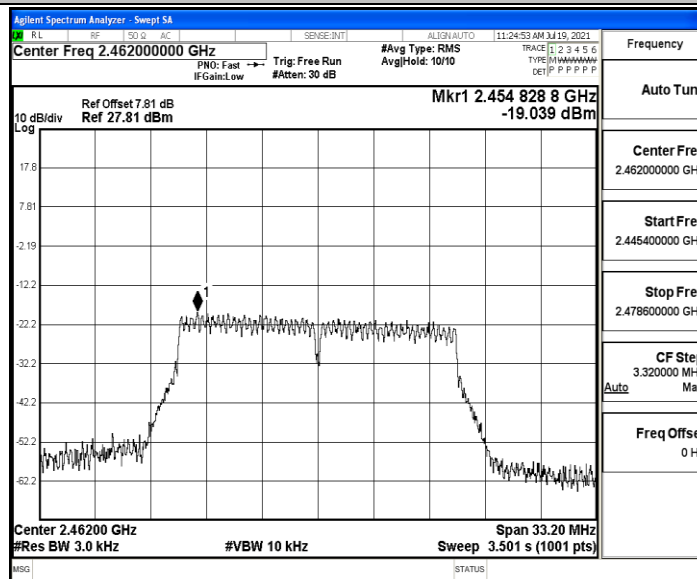


11G_Ant1_2412

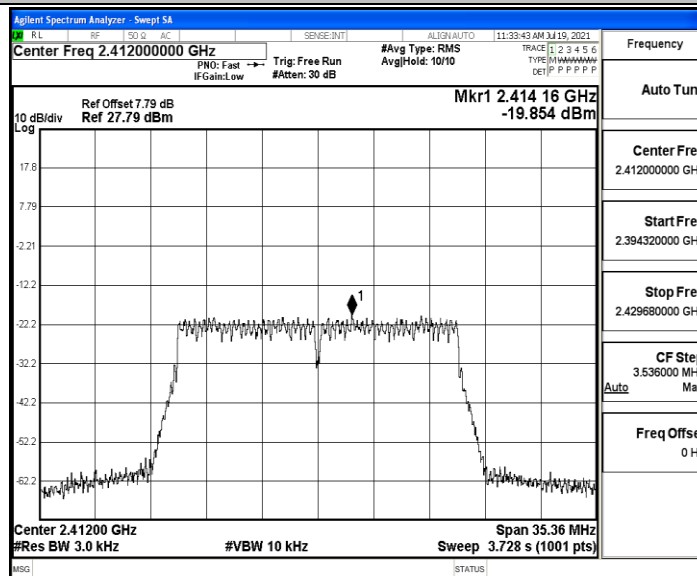




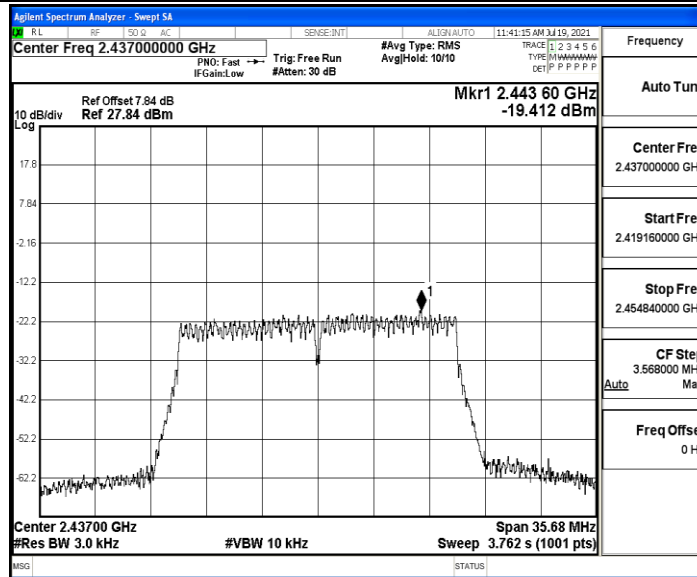
11G_Ant1_2437



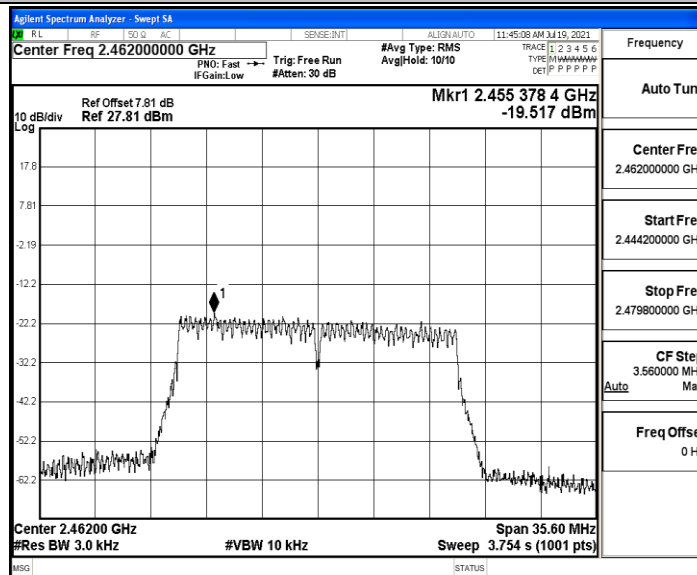
11G_Ant1_2462



11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



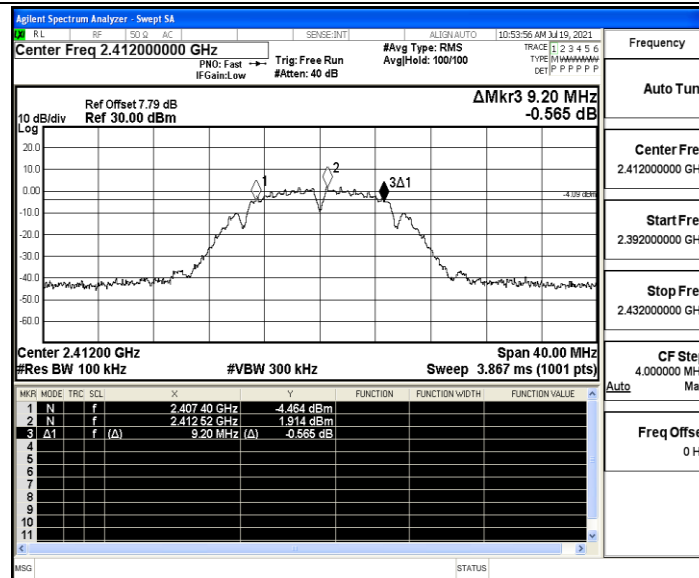
B.4 6dB Bandwidth

Test Result

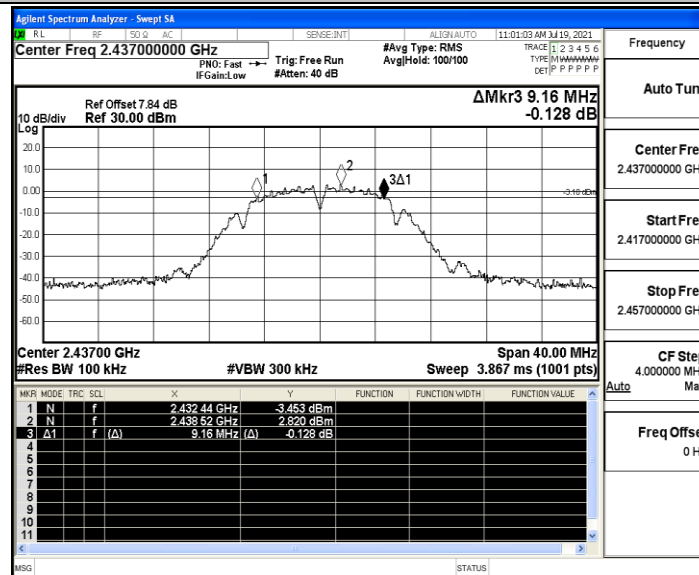
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.200	2407.400	2416.600	0.5	PASS
		2437	9.160	2432.440	2441.600	0.5	PASS
		2462	9.560	2457.000	2466.560	0.5	PASS
11G	Ant1	2412	16.480	2403.760	2420.240	0.5	PASS
		2437	16.600	2428.720	2445.320	0.5	PASS
		2462	16.600	2453.640	2470.240	0.5	PASS
11N20SISO	Ant1	2412	17.680	2403.160	2420.840	0.5	PASS
		2437	17.840	2428.120	2445.960	0.5	PASS
		2462	17.800	2453.040	2470.840	0.5	PASS



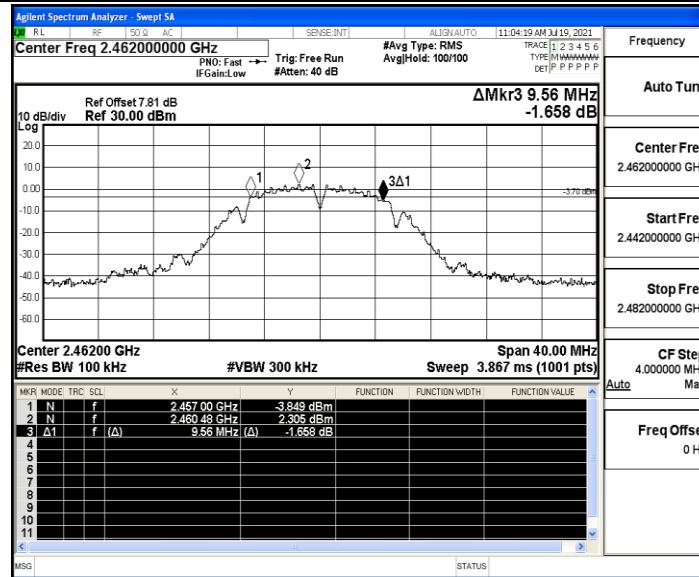
Test Graphs



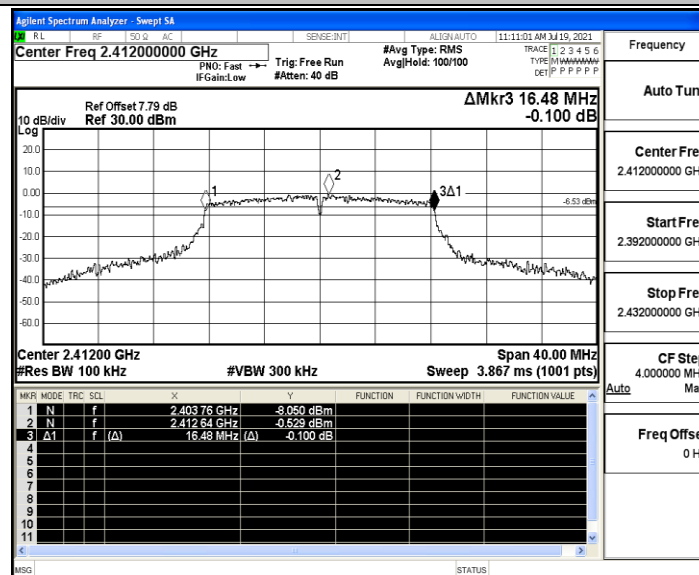
11B_Ant1_2412



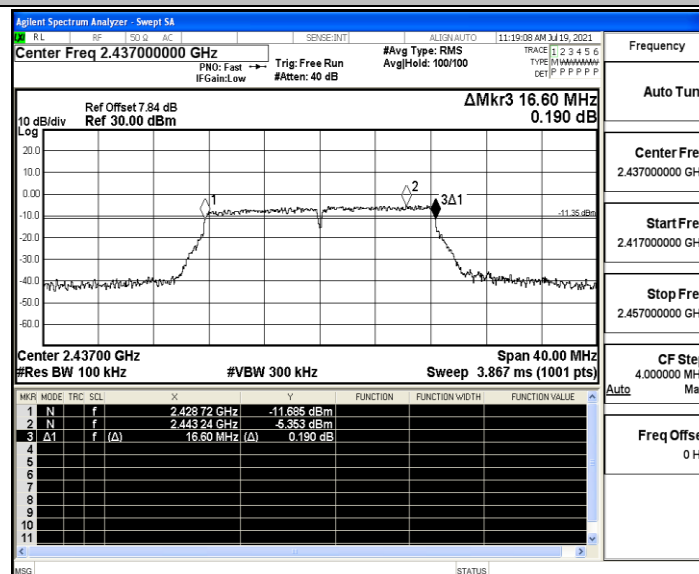
11B_Ant1_2437



11B_Ant1_2462

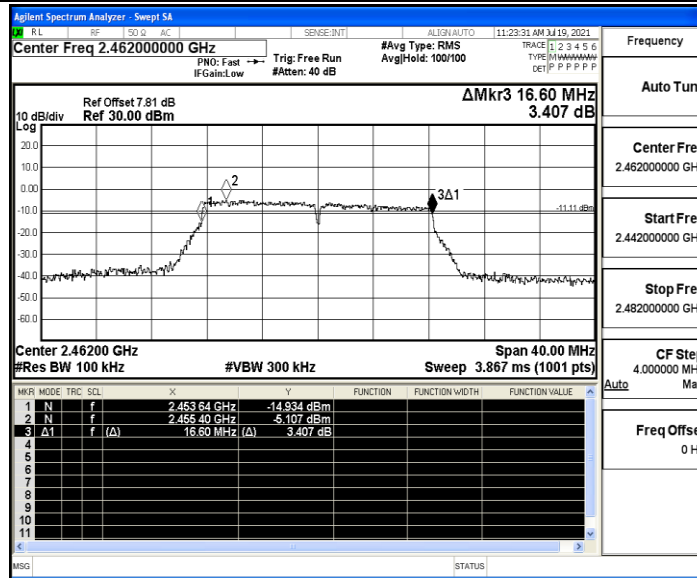


11G_Ant1_2412

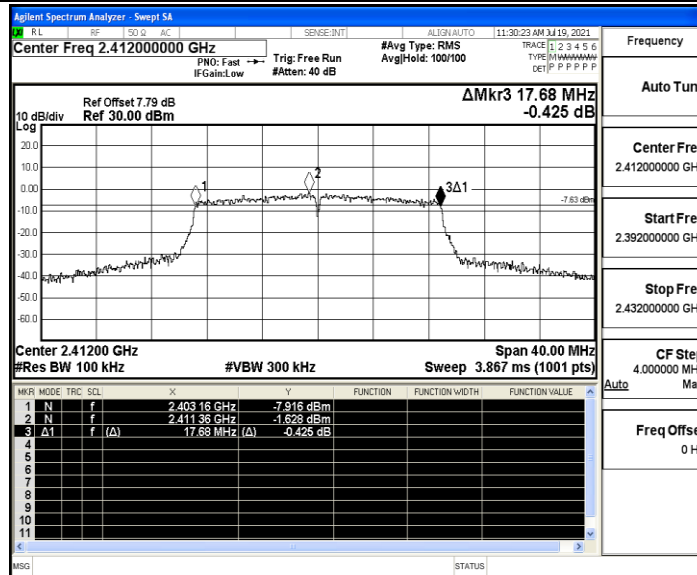




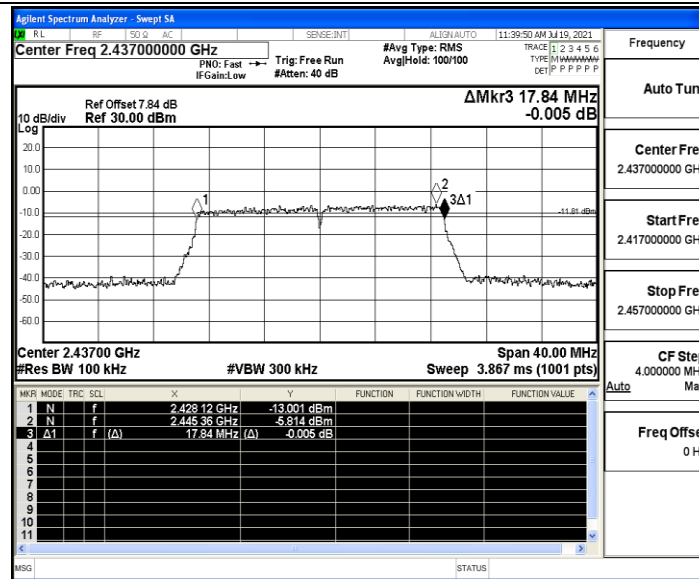
11G_Ant1_2437



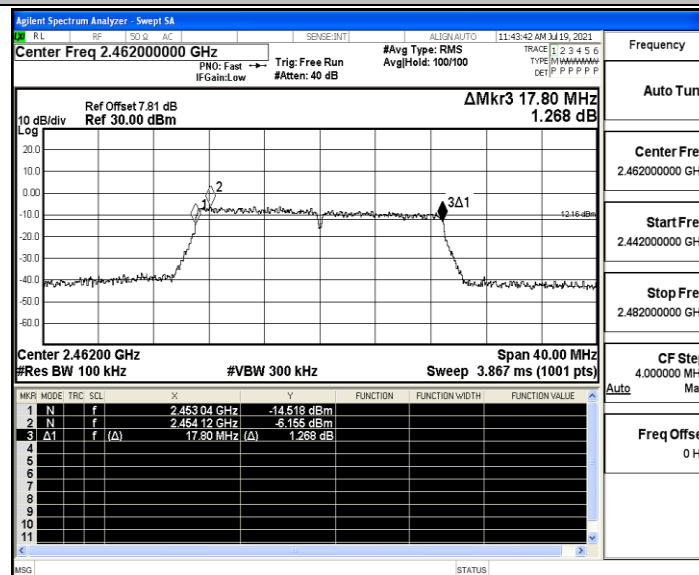
11G_Ant1_2462



11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



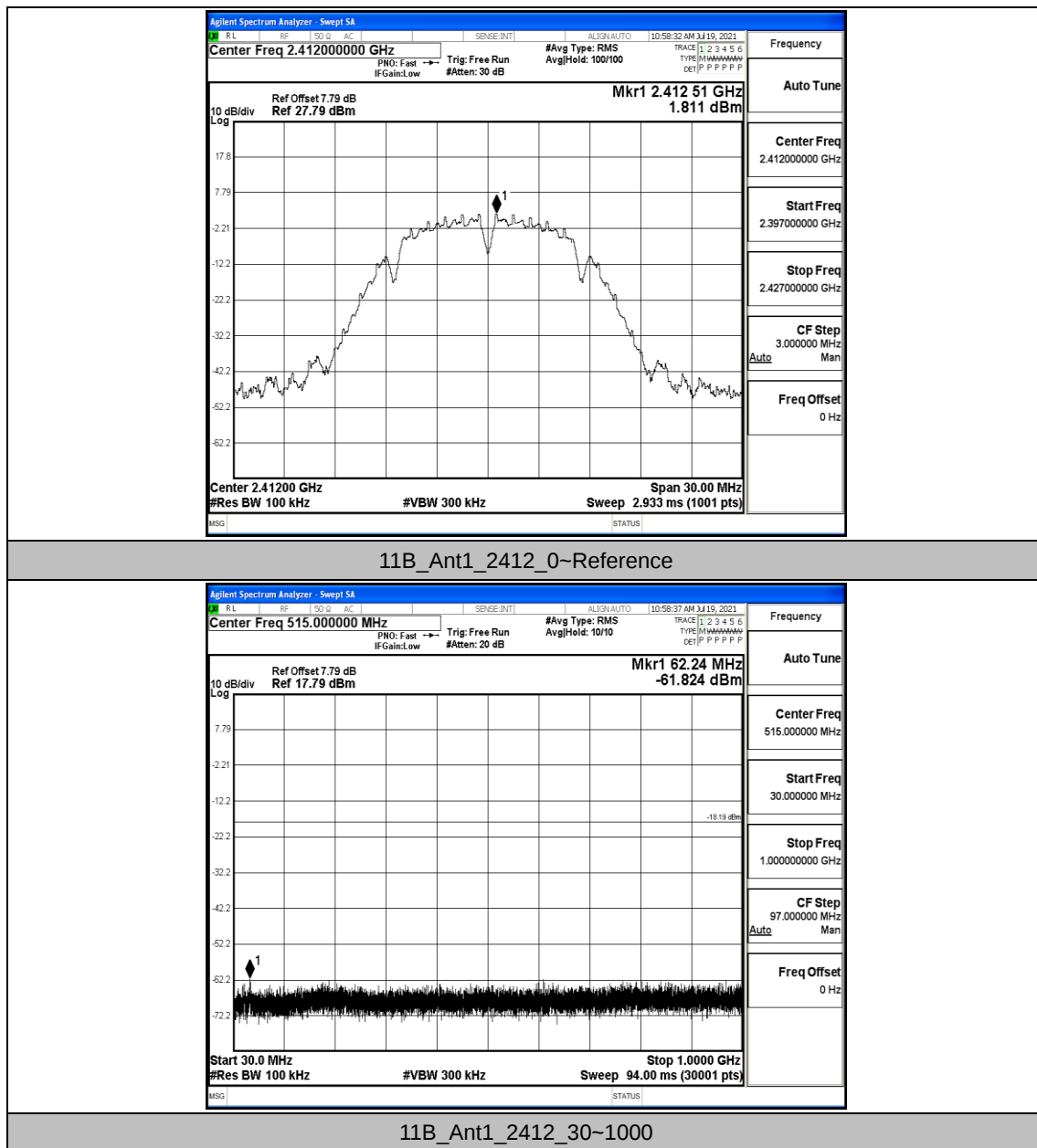
B.5 Conducted Spurious Emission

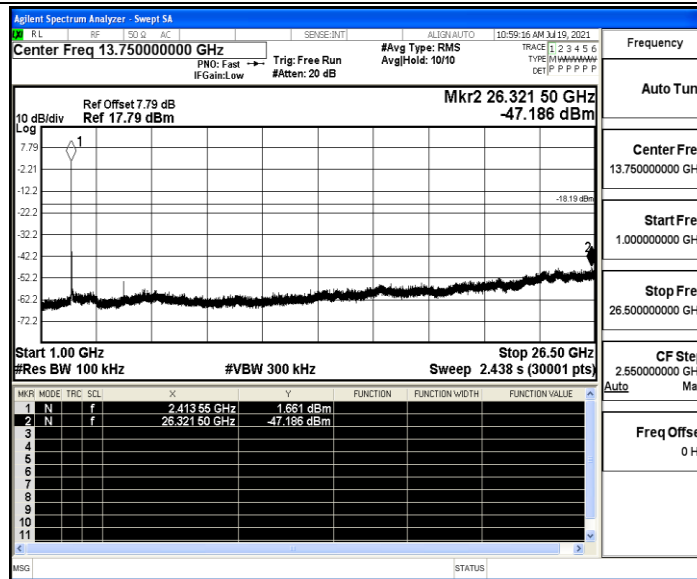
Test Result

TestMode	Antenna	Channel	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	1.81	1.81	---	PASS
			30~1000	1.81	-61.82	≤-18.19	PASS
			1000~26500	1.81	-47.19	≤-18.19	PASS
		2437	Reference	2.80	2.80	---	PASS
			30~1000	2.80	-59.6	≤-17.2	PASS
			1000~26500	2.80	-47.6	≤-17.2	PASS
		2462	Reference	2.33	2.33	---	PASS
			30~1000	2.33	-61.27	≤-17.67	PASS
			1000~26500	2.33	-47.62	≤-17.67	PASS
11G	Ant1	2412	Reference	-6.84	-6.84	---	PASS
			30~1000	-6.84	-60.11	≤-26.84	PASS
			1000~26500	-6.84	-47.25	≤-26.84	PASS
		2437	Reference	-5.01	-5.01	---	PASS
			30~1000	-5.01	-61.57	≤-25.01	PASS
			1000~26500	-5.01	-41.54	≤-25.01	PASS
		2462	Reference	-5.35	-5.35	---	PASS
			30~1000	-5.35	-60.8	≤-25.35	PASS
			1000~26500	-5.35	-46.94	≤-25.35	PASS
11N20SISO	Ant1	2412	Reference	-6.31	-6.31	---	PASS
			30~1000	-6.31	-61.7	≤-26.31	PASS
			1000~26500	-6.31	-47.79	≤-26.31	PASS
		2437	Reference	-6.19	-6.19	---	PASS
			30~1000	-6.19	-60.74	≤-26.19	PASS
			1000~26500	-6.19	-47.3	≤-26.19	PASS
		2462	Reference	-5.95	-5.95	---	PASS
			30~1000	-5.95	-60.68	≤-25.95	PASS
			1000~26500	-5.95	-47.47	≤-25.95	PASS

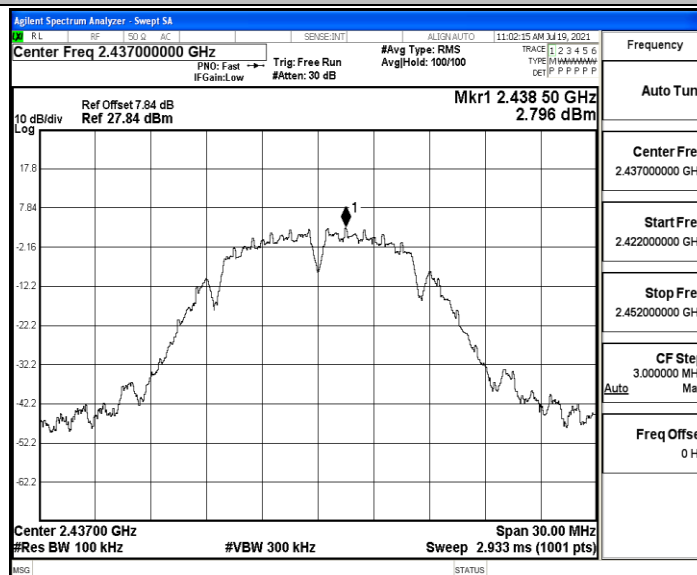


Test Graphs

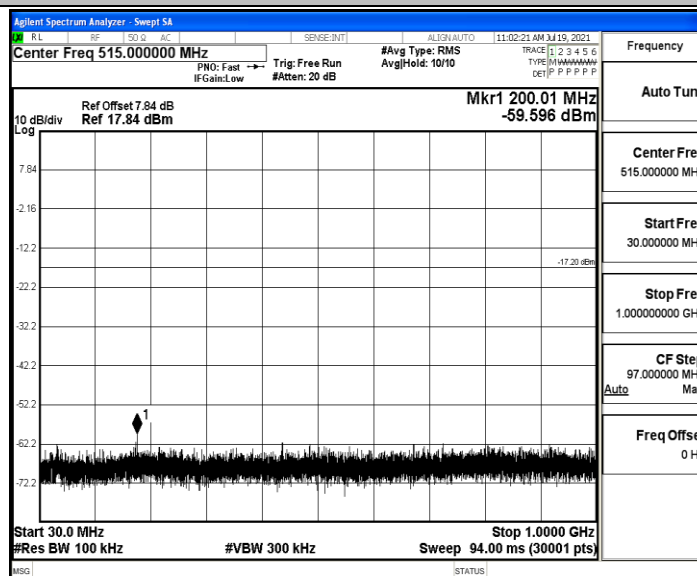




11B_Ant1_2412_1000~26500

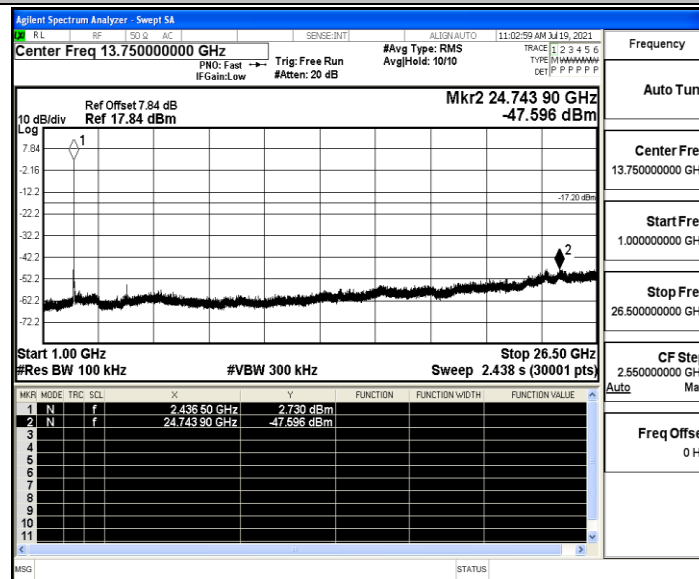


11B_Ant1_2437_0~Reference

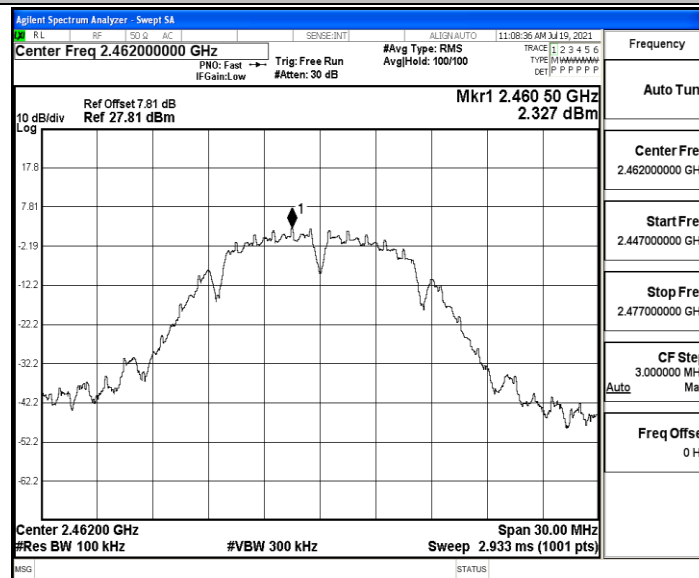




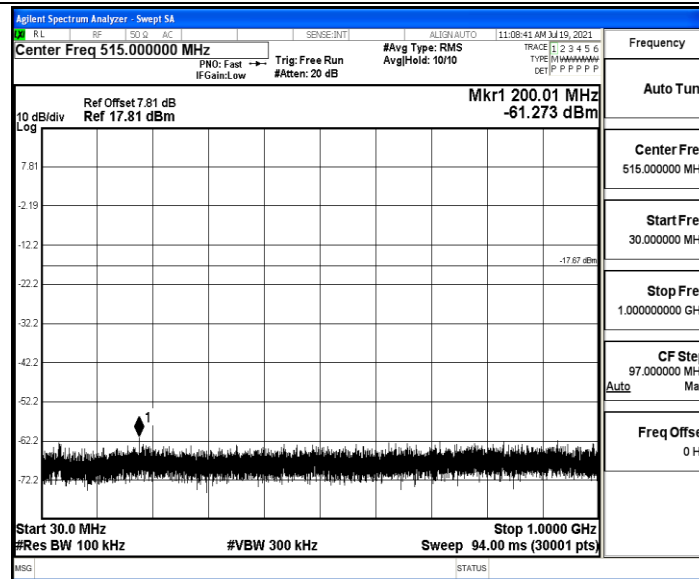
11B_Ant1_2437_30~1000



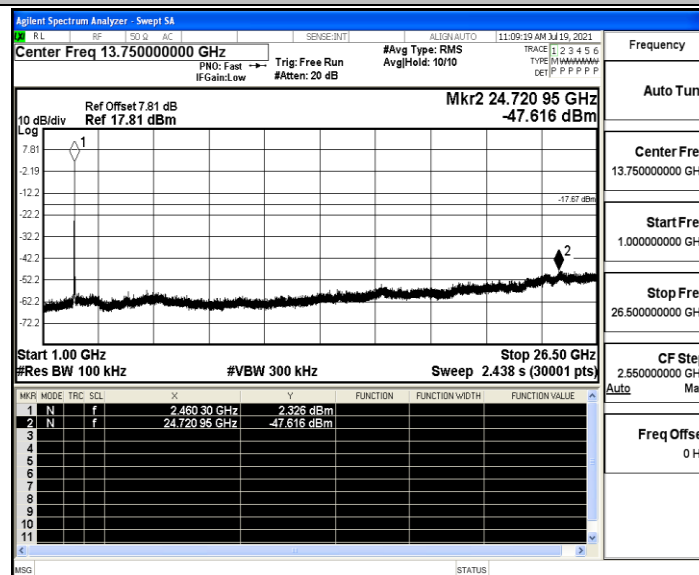
11B_Ant1_2437_1000~26500



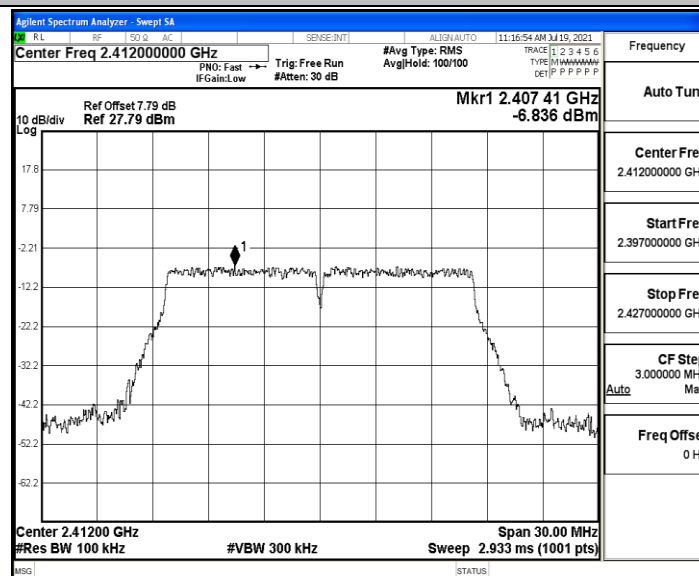
11B_Ant1_2462_0~Reference



11B_Ant1_2462_30~1000

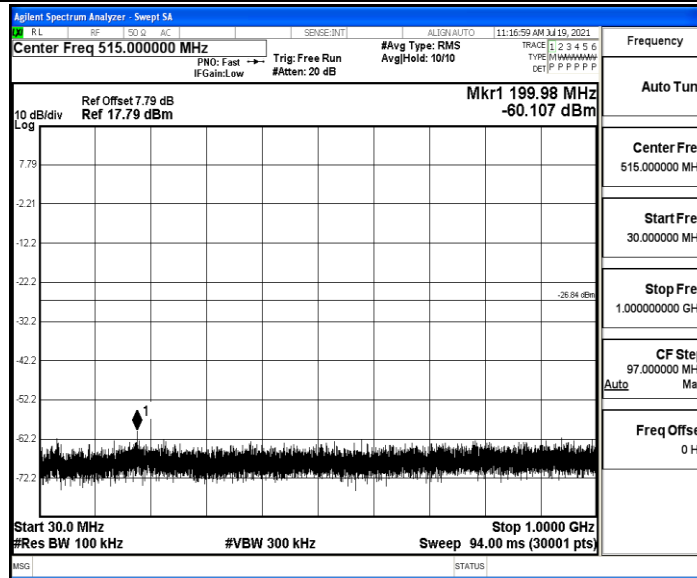


11B_Ant1_2462_1000~26500

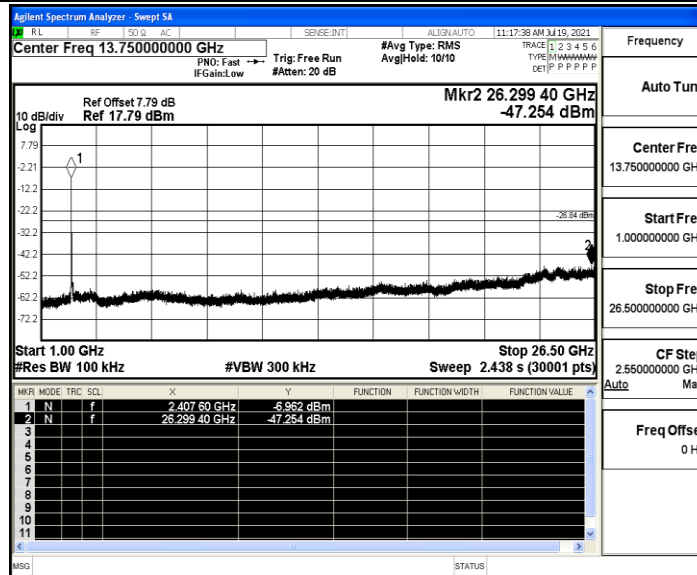




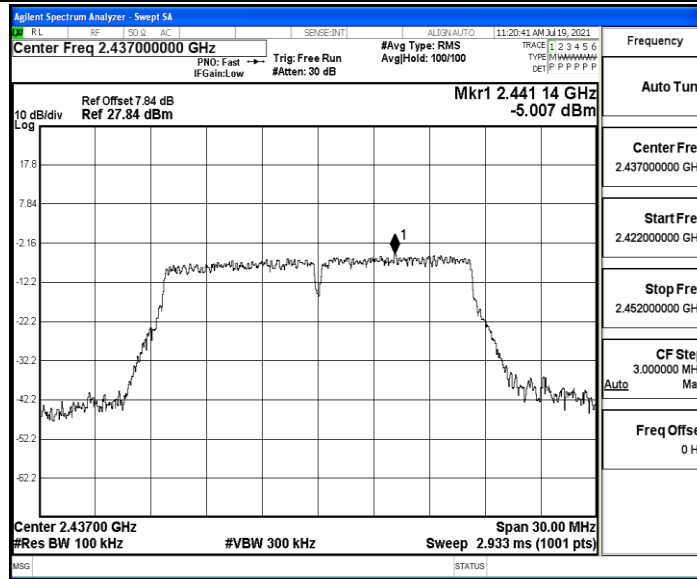
11G_Ant1_2412_0~Reference



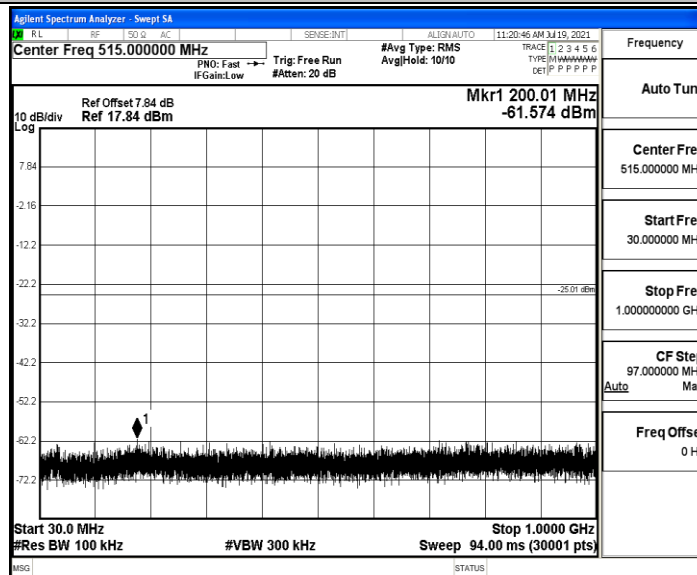
11G_Ant1_2412_30~1000



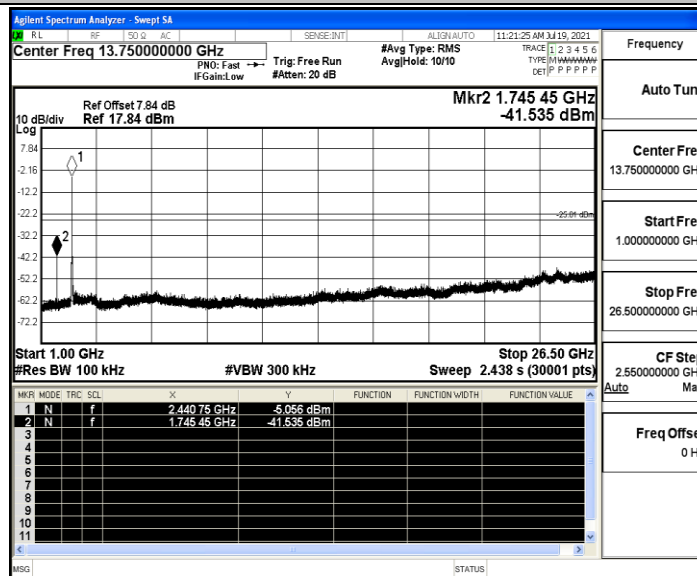
11G_Ant1_2412_1000~26500



11G_Ant1_2437_0~Reference

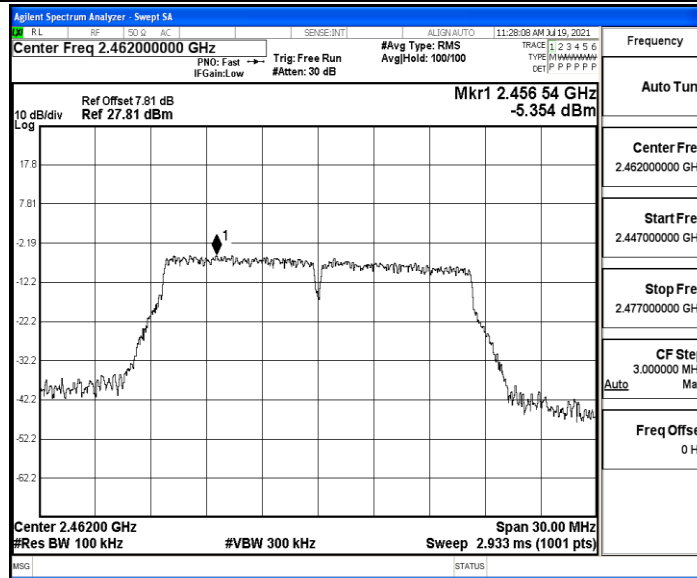


11G_Ant1_2437_30~1000

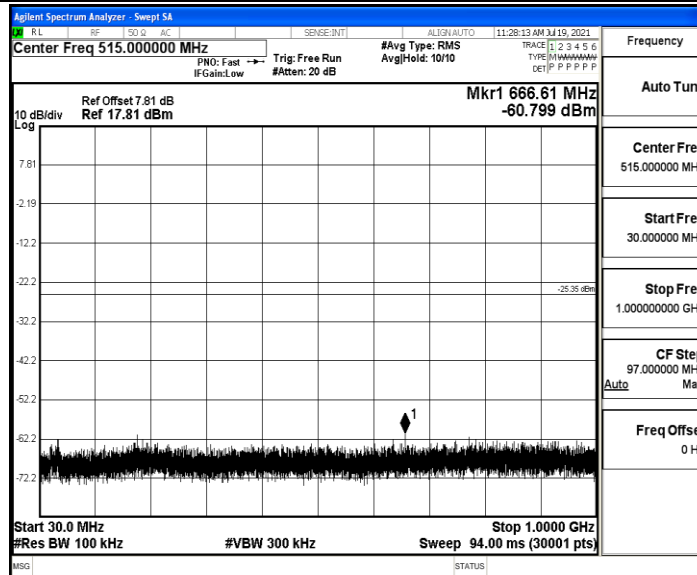




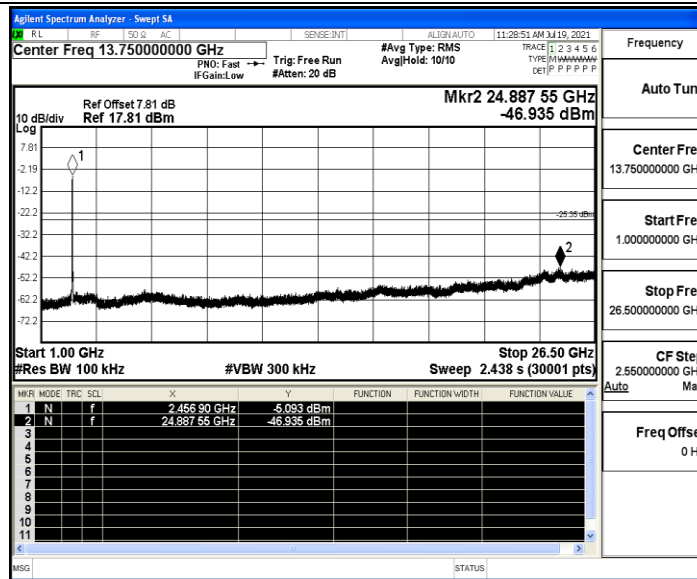
11G_Ant1_2437_1000~26500



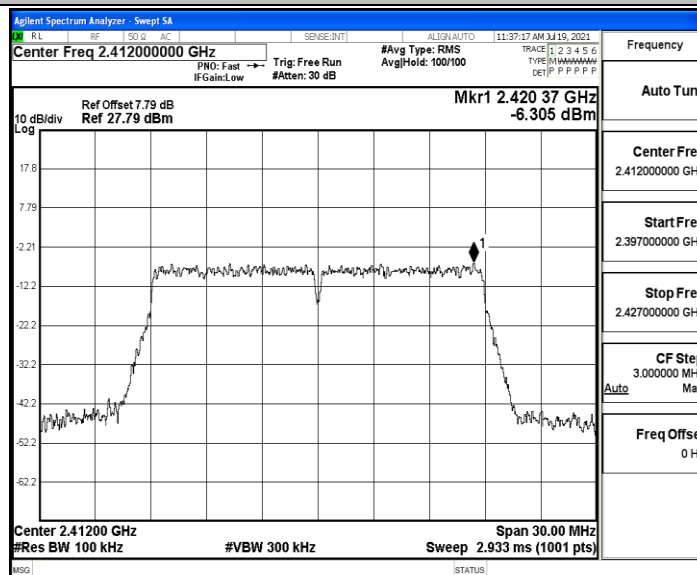
11G_Ant1_2462_0~Reference



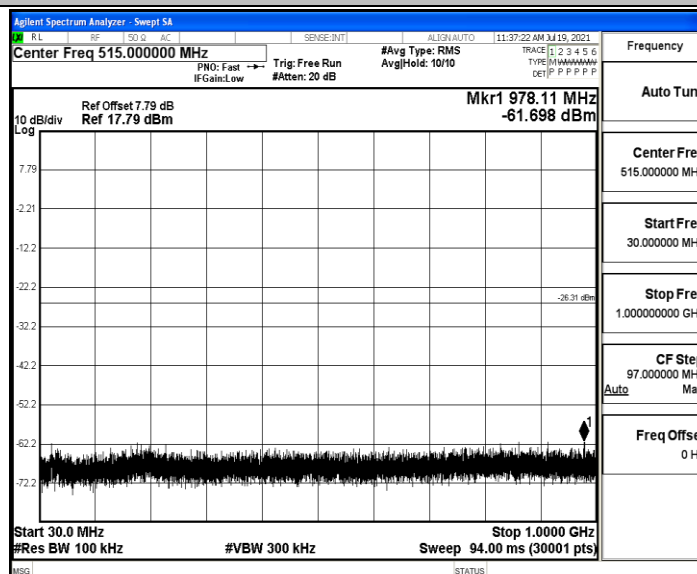
11G_Ant1_2462_30~1000



11G_Ant1_2462_1000~26500

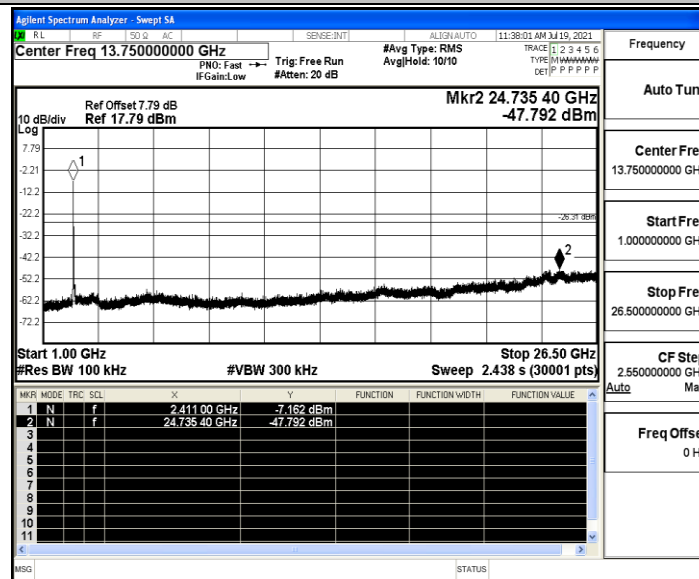


11N20SISO_Ant1_2412_0~Reference

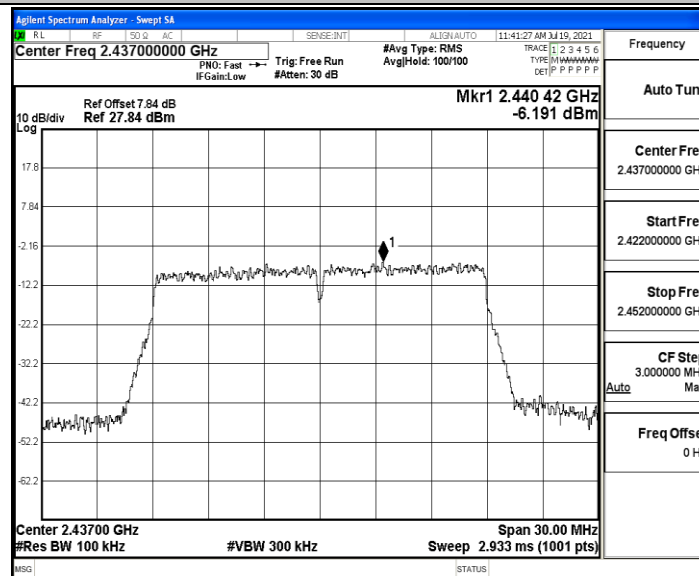




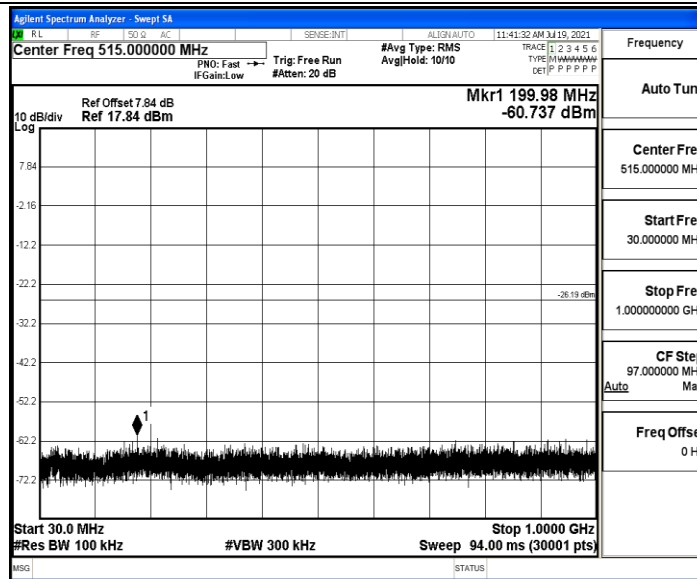
11N20SISO_Ant1_2412_30~1000



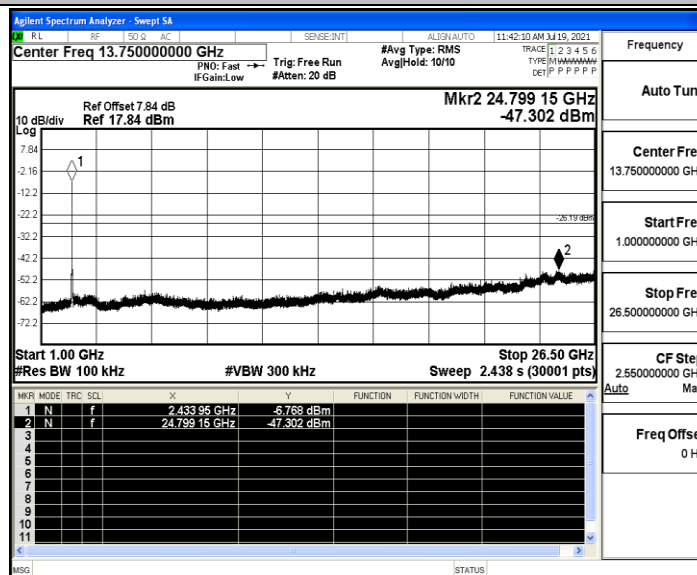
11N20SISO_Ant1_2412_1000~26500



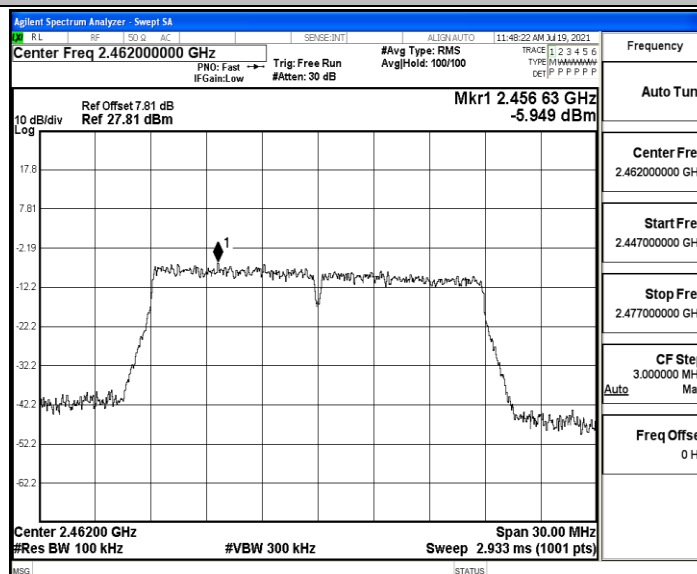
11N20SISO_Ant1_2437_0~Reference



11N20SISO_Ant1_2437_30~1000

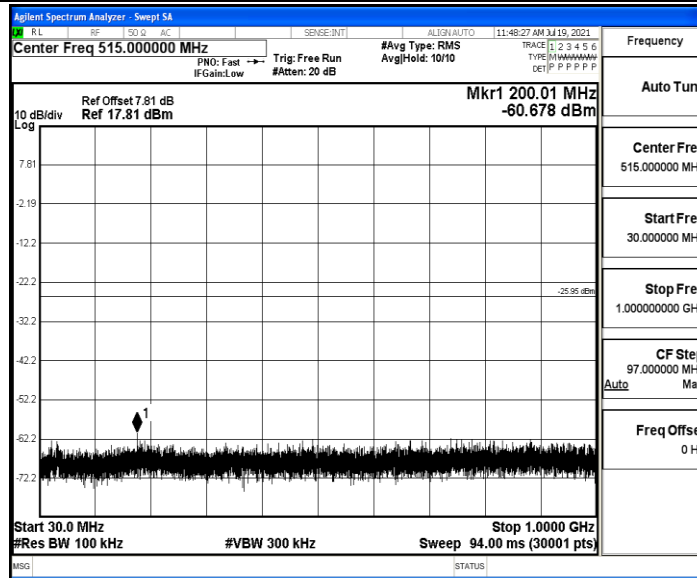


11N20SISO_Ant1_2437_1000~26500

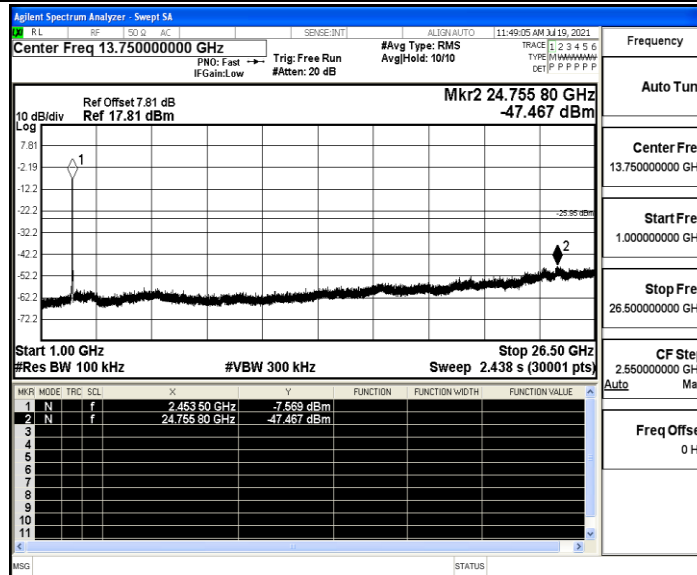




11N20SISO_Ant1_2462_0~Reference



11N20SISO_Ant1_2462_30~1000



11N20SISO_Ant1_2462_1000~26500

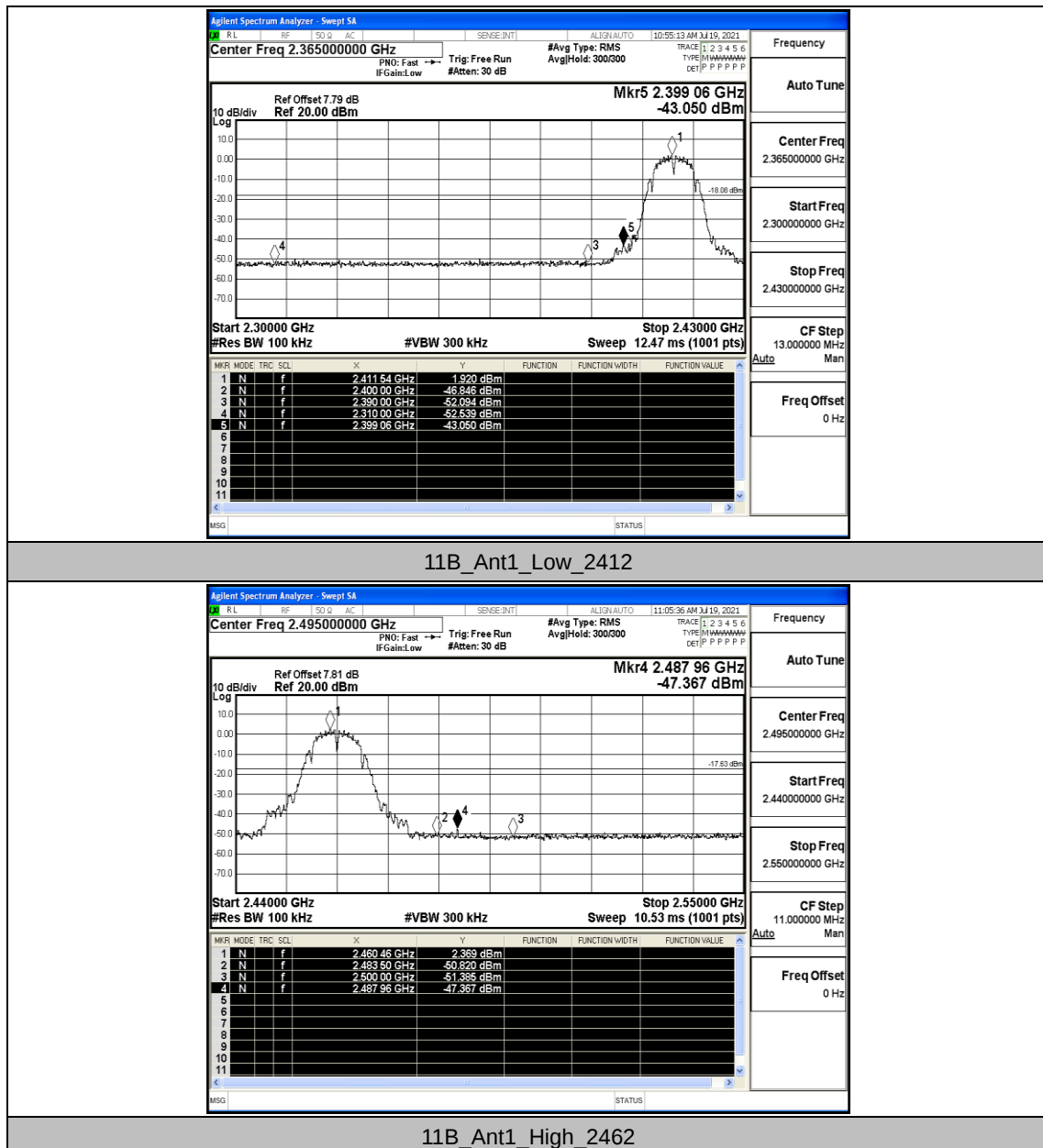


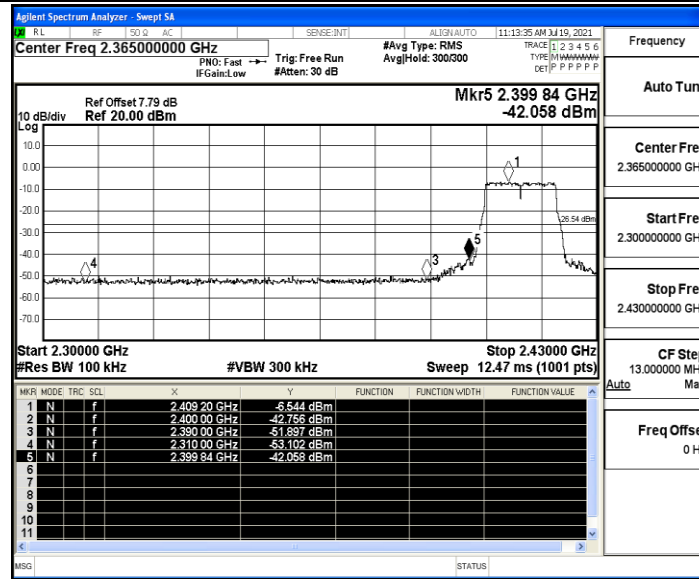
B.6 Band edge measurements

Test Result

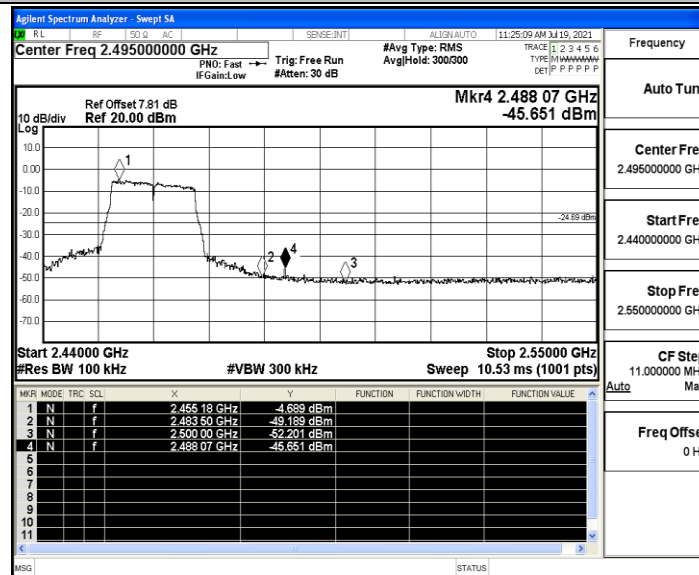
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	1.92	-43.05	≤-18.08	PASS
		High	2462	2.37	-47.37	≤-17.63	PASS
11G	Ant1	Low	2412	-6.54	-42.06	≤-26.54	PASS
		High	2462	-4.69	-45.65	≤-24.69	PASS
11N20SISO	Ant1	Low	2412	-6.13	-42.32	≤-26.13	PASS
		High	2462	-5.72	-46.16	≤-25.72	PASS

Test Graphs

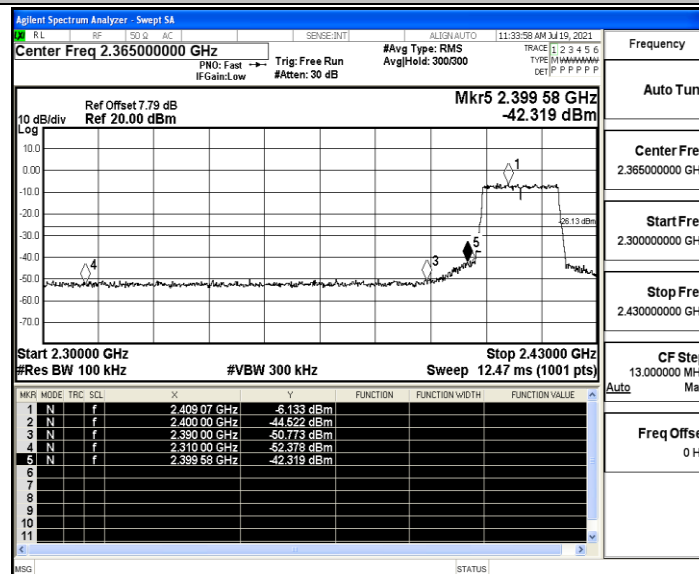




11G_Ant1_Low_2412

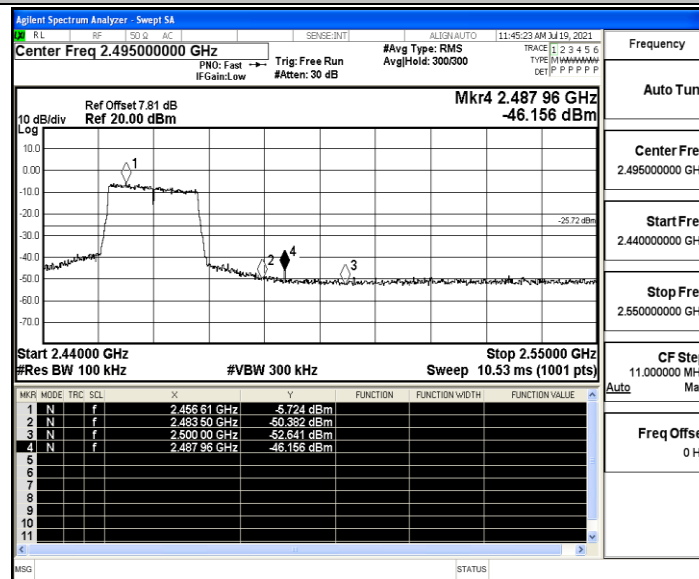


11G_Ant1_High_2462





11N20SISO_Ant1_Low_2412



11N20SISO_Ant1_High_2462



B.7 Emissions in Restricted Bands

Test Result

TestMode	Antenna	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
11B	Ant1	2412	AV	2310.000	-49.41	≤-41.20	45.79	≤54	PASS
			AV	2388.660	-49	≤-41.20	46.20	≤54	PASS
			AV	2390.000	-49.01	≤-41.20	46.19	≤54	PASS
			Peak	2310.000	-44.34	≤-21.20	50.86	≤74	PASS
			Peak	2340.300	-39.52	≤-21.20	55.68	≤74	PASS
			Peak	2390.000	-45.32	≤-21.20	49.88	≤74	PASS
		2462	AV	2483.500	-47.23	≤-41.20	47.97	≤54	PASS
			AV	2488.070	-46.49	≤-41.20	48.71	≤54	PASS
			AV	2500.000	-48.43	≤-41.20	46.77	≤54	PASS
			Peak	2483.500	-40.93	≤-21.20	54.27	≤74	PASS
			Peak	2483.780	-38.2	≤-21.20	57.00	≤74	PASS
			Peak	2500.000	-42.54	≤-21.20	52.66	≤74	PASS
11G	Ant1	2412	AV	2310.000	-49.43	≤-41.20	45.77	≤54	PASS
			AV	2389.960	-48.83	≤-41.20	46.37	≤54	PASS
			AV	2390.000	-48.83	≤-41.20	46.37	≤54	PASS
			Peak	2310.000	-45.47	≤-21.20	49.73	≤74	PASS
			Peak	2355.380	-39.59	≤-21.20	55.61	≤74	PASS
			Peak	2390.000	-45.4	≤-21.20	49.80	≤74	PASS
		2462	AV	2483.500	-45.87	≤-41.20	49.33	≤54	PASS
			AV	2487.960	-44.58	≤-41.20	50.62	≤54	PASS
			AV	2500.000	-48.42	≤-41.20	46.78	≤54	PASS
			Peak	2483.500	-41.33	≤-21.20	53.87	≤74	PASS
			Peak	2488.180	-37.19	≤-21.20	58.01	≤74	PASS
			Peak	2500.000	-41.27	≤-21.20	53.93	≤74	PASS
11N20SIS O	Ant1	2412	AV	2310.000	-49.44	≤-41.20	45.76	≤54	PASS
			AV	2389.960	-48.6	≤-41.20	46.60	≤54	PASS
			AV	2390.000	-48.6	≤-41.20	46.60	≤54	PASS
			Peak	2310.000	-45.31	≤-21.20	49.89	≤74	PASS
			Peak	2317.550	-40.54	≤-21.20	54.66	≤74	PASS
			Peak	2390.000	-42.82	≤-21.20	52.38	≤74	PASS
		2462	AV	2483.500	-46.33	≤-41.20	48.87	≤54	PASS
			AV	2487.960	-45.68	≤-41.20	49.52	≤54	PASS
			AV	2500.000	-48.43	≤-41.20	46.77	≤54	PASS
			Peak	2483.500	-39.9	≤-21.20	55.30	≤74	PASS
			Peak	2484.770	-37.83	≤-21.20	57.37	≤74	PASS
			Peak	2500.000	-43.01	≤-21.20	52.19	≤74	PASS

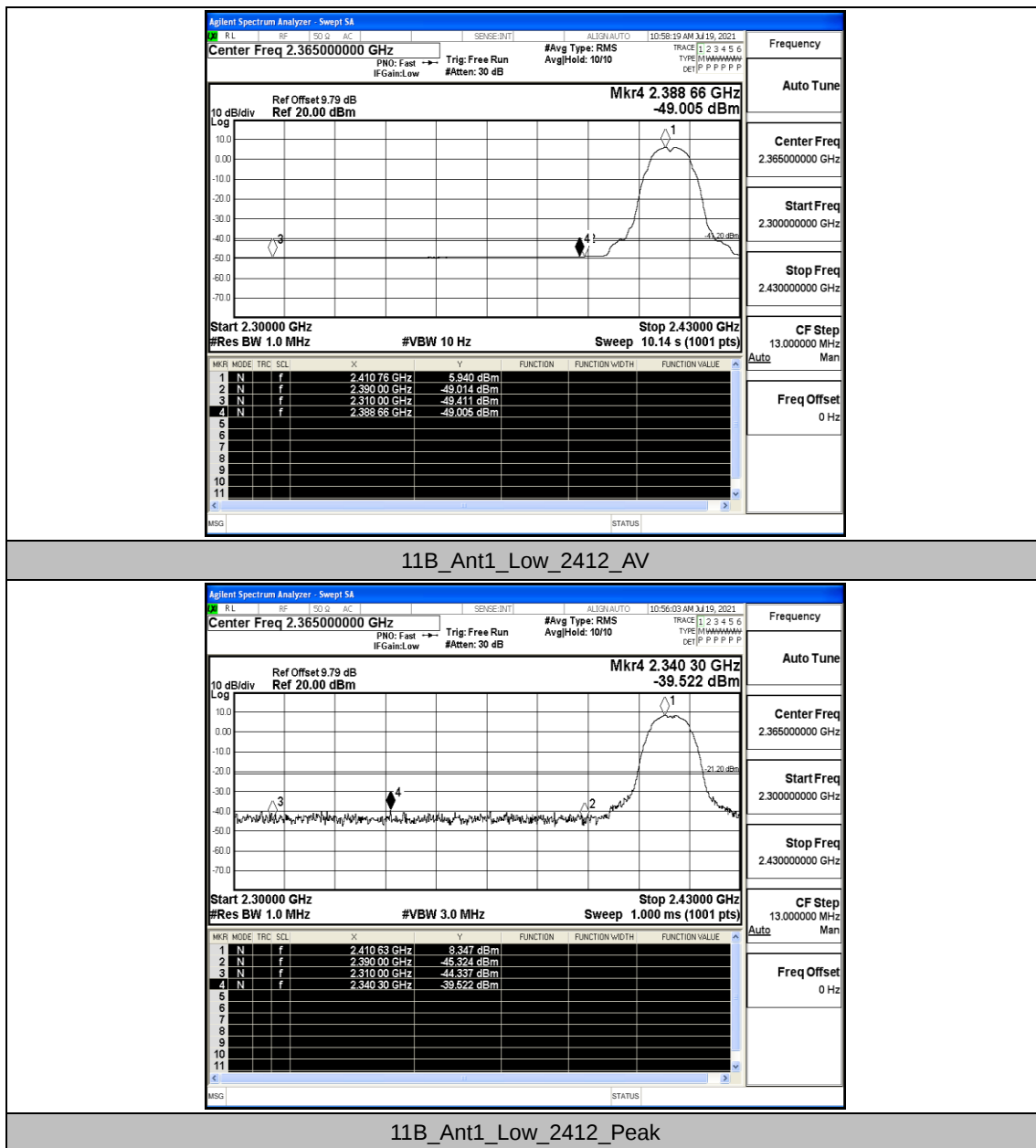


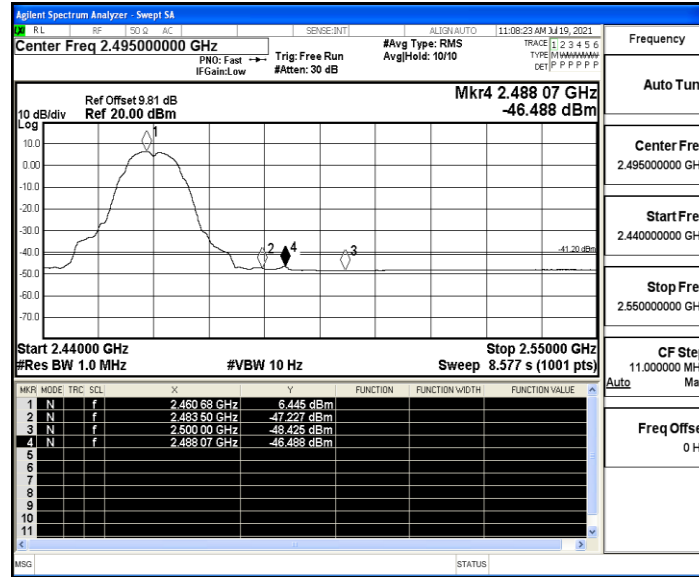
Note:

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.

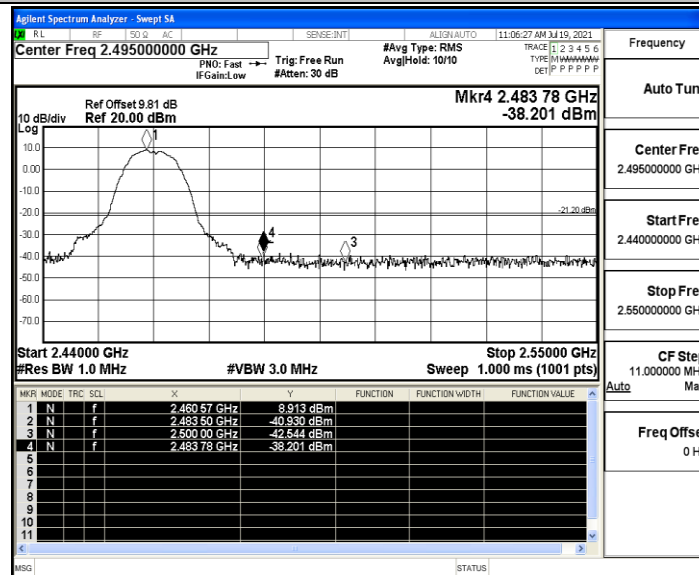


Test Graphs

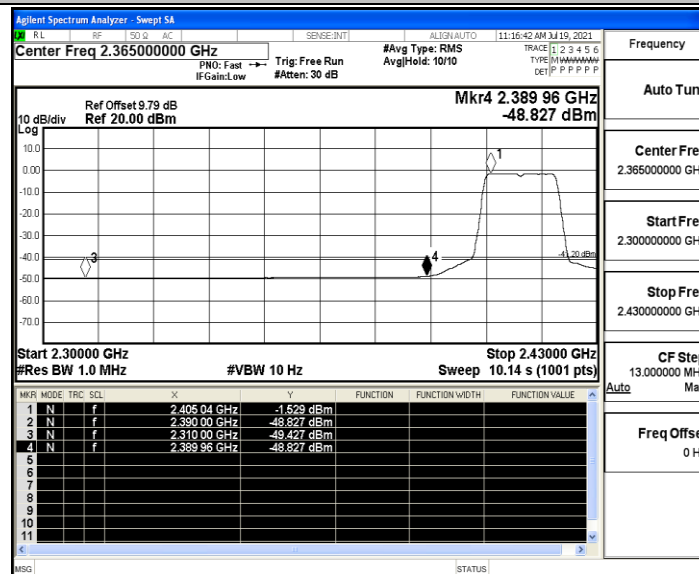




11B_Ant1_High_2462_AV

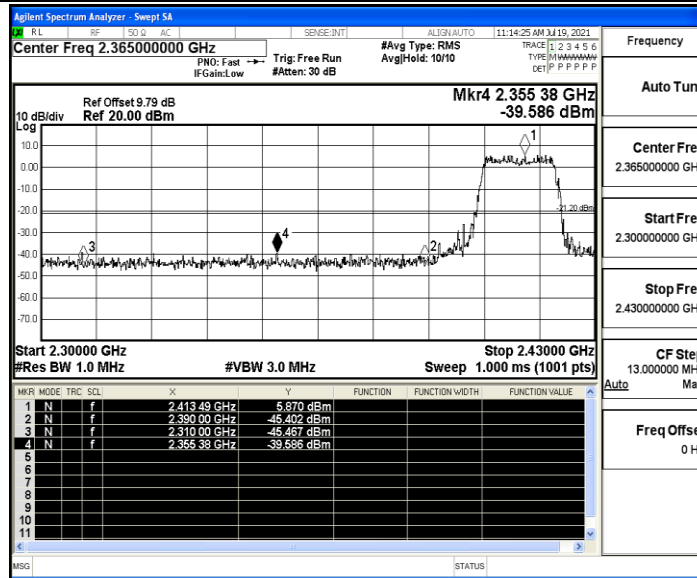


11B_Ant1_High_2462_Peak

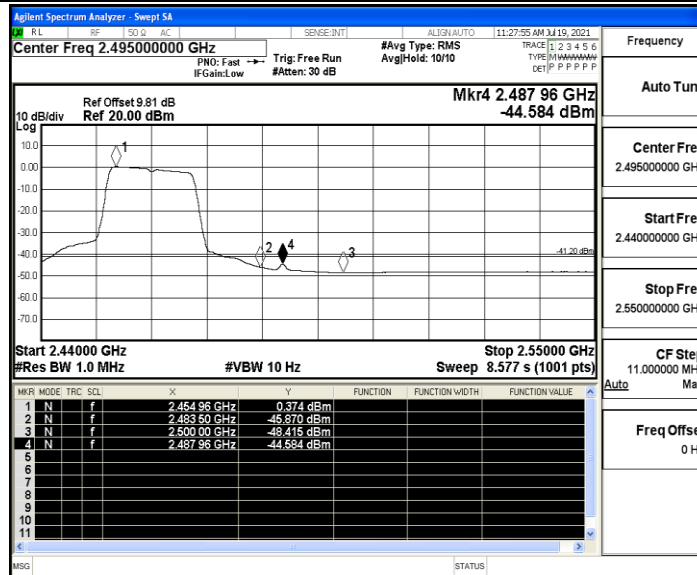




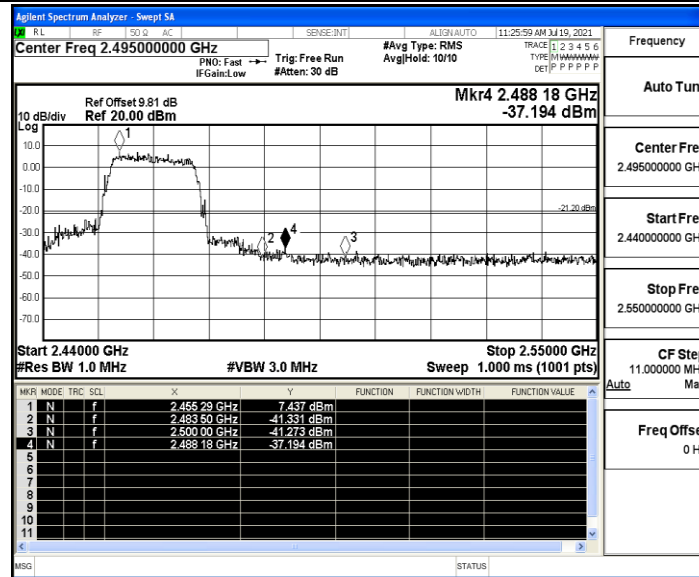
11G_Ant1_Low_2412_AV



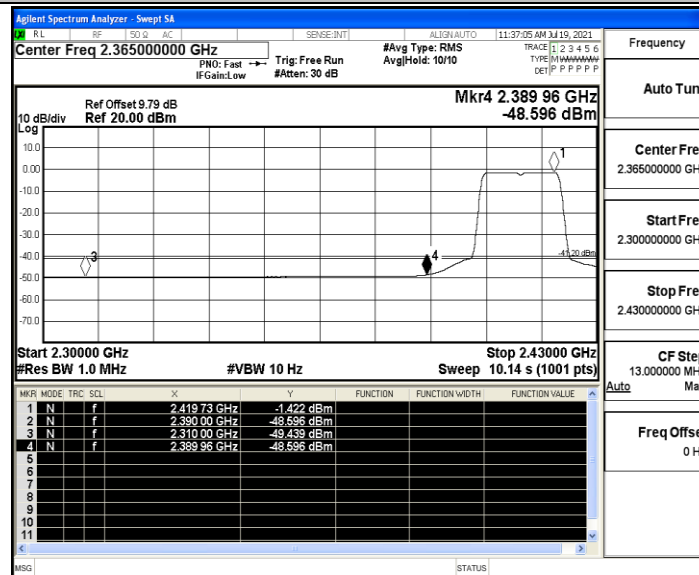
11G_Ant1_Low_2412_Peak



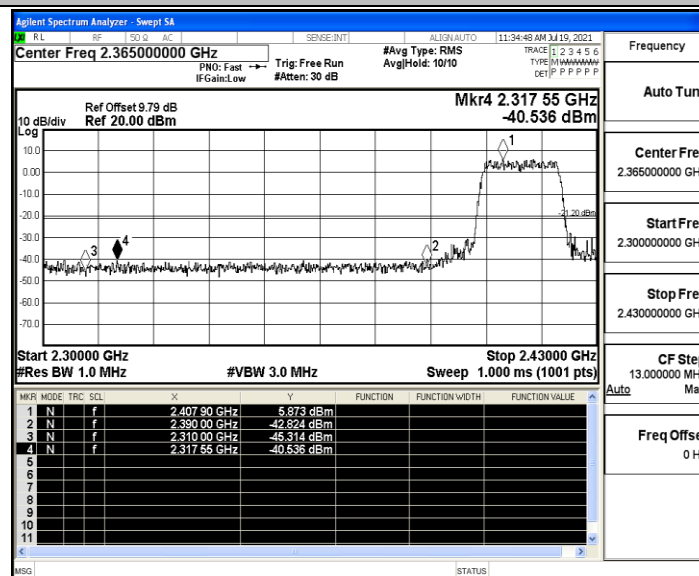
11G_Ant1_High_2462_AV



11G_Ant1_High_2462_Peak

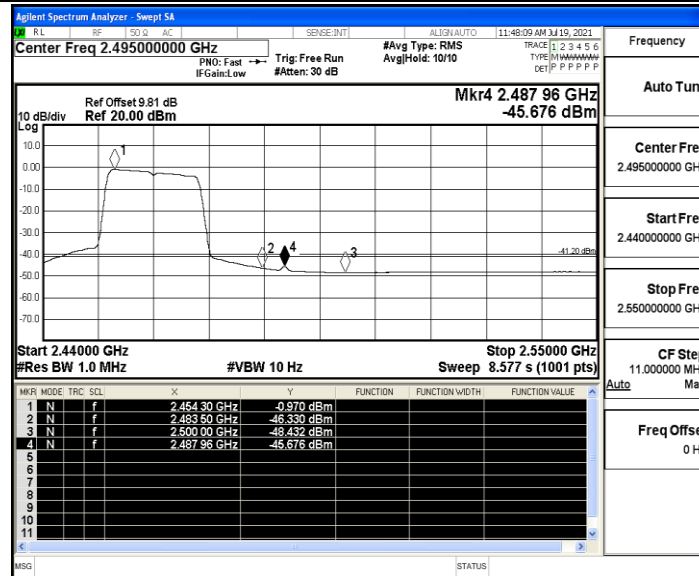


11N20SISO_Ant1_Low_2412_AV

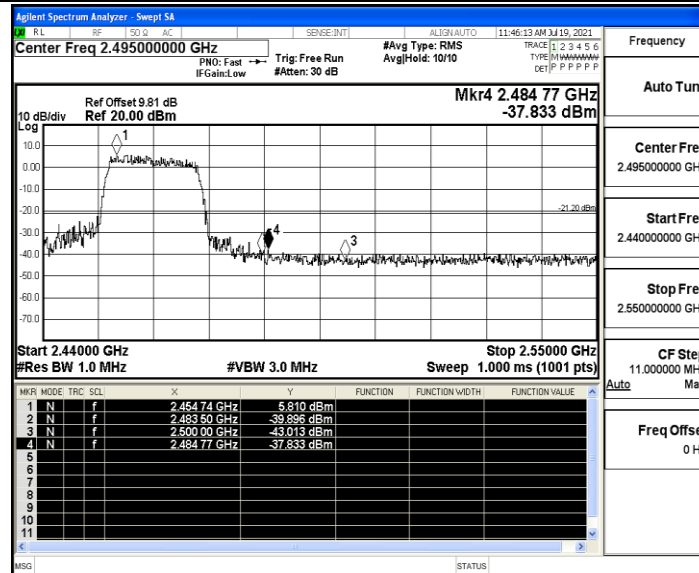




11N20SISO_Ant1_Low_2412_Peak



11N20SISO_Ant1_High_2462_AV



11N20SISO_Ant1_High_2462_Peak