



Appendix A

RF Test Data for 2.4G WIFI (Conducted Measurement)

Product Name: 4-gang Wi-Fi Smart Switch with RF Control

Trade Mark: SONOFF

Test Model: 4CHPROR3

Environmental Conditions

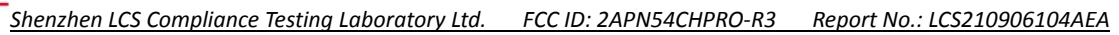
Temperature:	21.1 ° C
Relative Humidity:	52.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Bill Zhu
Supervised by:	Li Huan



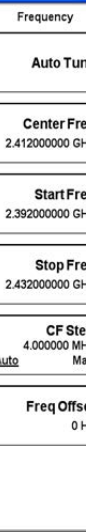
A.1 DTS Bandwidth

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	9.680	2432.400	2442.080	0.5	PASS
		2462	9.680	2456.920	2466.600	0.5	PASS
11G	Ant1	2412	16.640	2403.680	2420.320	0.5	PASS
		2437	16.640	2428.680	2445.320	0.5	PASS
		2462	16.600	2453.640	2470.240	0.5	PASS
11N20SISO	Ant1	2412	17.880	2403.080	2420.960	0.5	PASS
		2437	17.840	2428.120	2445.960	0.5	PASS
		2462	17.800	2453.040	2470.840	0.5	PASS



11B_Ant1_2412



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC [] SENSE INT ALIGN AUTO 09:32:10 AM Sep 13, 2021

Center Freq 2.437000000 GHz Trg: Free Run #Avg Type: RMS PNO: Fast → IF Gain: Low #Atten: 40 dB AvgHold: 100/100 TRACE [1] 2 3 4 5 6 TYPE [NANANAN] DET [PPPPPP]

Ref Offset 7.84 dB ΔMkr3 9.68 MHz Ref 30.00 dBm -0.013 dB

10 dBdiv Log

Ref Offset 7.84 dB Ref 30.00 dBm

ΔMkr3 9.68 MHz -0.013 dB

1 2 3Δ1

-5.05 dBm

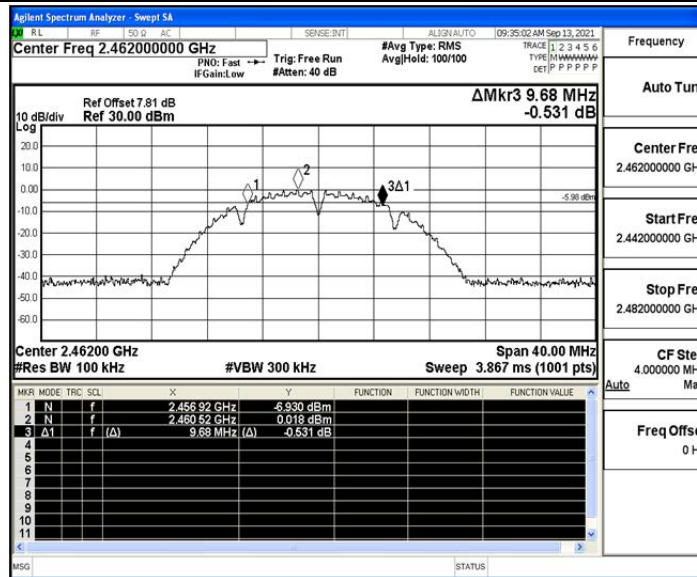
Center 2.43700 GHz Span 40.00 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 3.867 ms (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	f		2.432 40 GHz	-5.530 dBm			
2	N	f		2.438 52 GHz	0.951 dBm			
3	Δ1	f	(Δ)	9.68 MHz (Δ)	-0.013 dB			
4								
5								
6								
7								
8								
9								
10								
11								

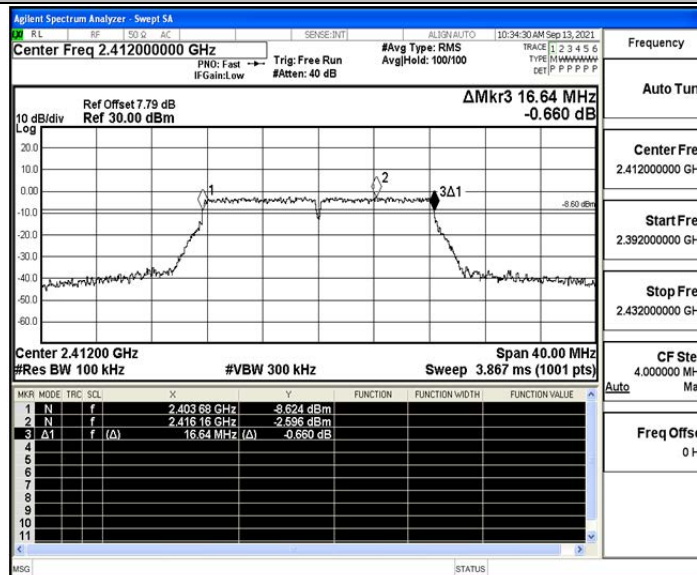
MSC STATUS

Frequency Auto Turn Center Freq 2.437000000 GHz Start Freq 2.417000000 GHz Stop Freq 2.457000000 GHz CF Ste 4.000000 MHz Auto Me Freq Offs 0 Hz

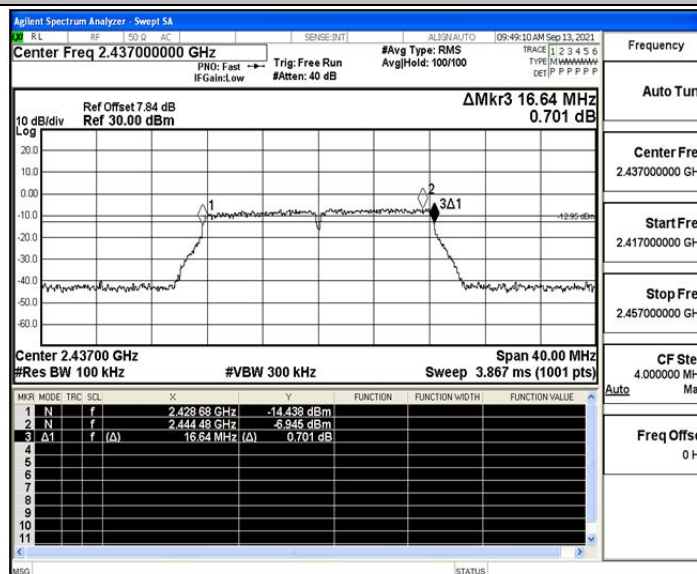
3 / 40



11G_Ant1_2412

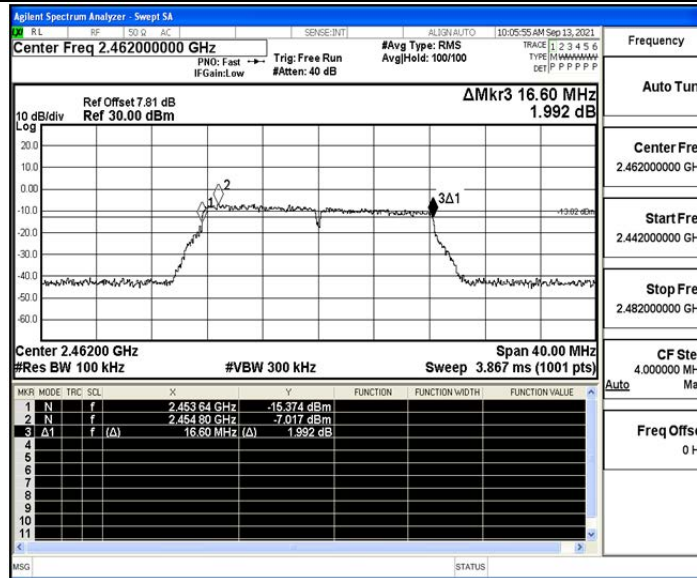


11G_Ant1_2437

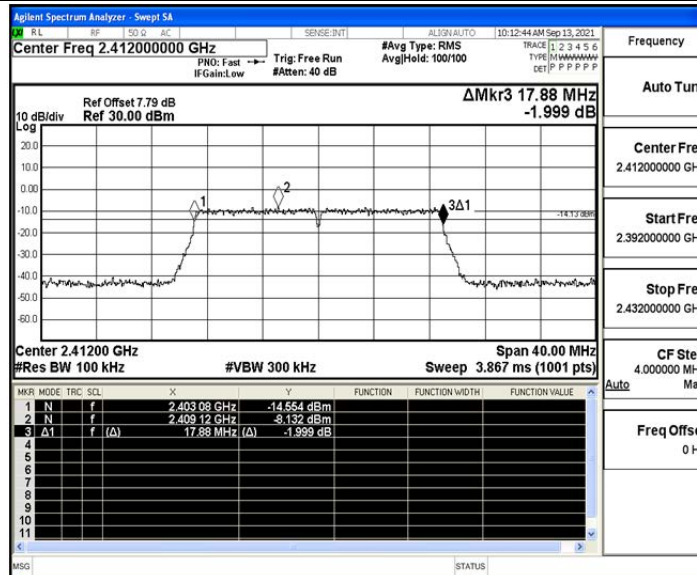




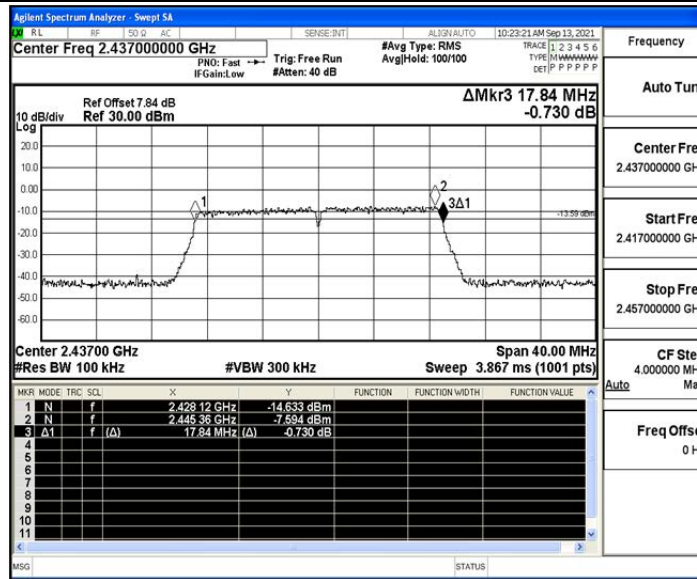
11G_Ant1_2462



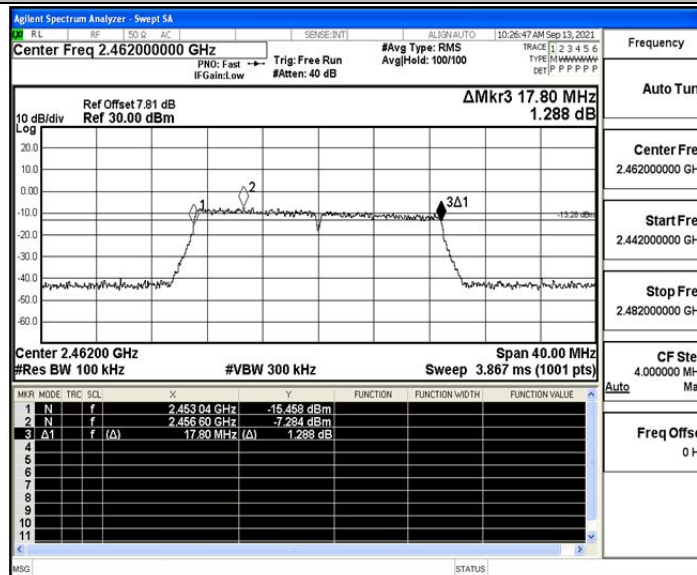
11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462





A.2 Maximum peak conducted output power

Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	2412	14.22	≤ 30	PASS
		2437	14.24	≤ 30	PASS
		2462	13.21	≤ 30	PASS
11G	Ant1	2412	14.16	≤ 30	PASS
		2437	14.49	≤ 30	PASS
		2462	13.65	≤ 30	PASS
11N20SISO	Ant1	2412	13.55	≤ 30	PASS
		2437	14.14	≤ 30	PASS
		2462	13.43	≤ 30	PASS



A.3 Maximum power spectral density

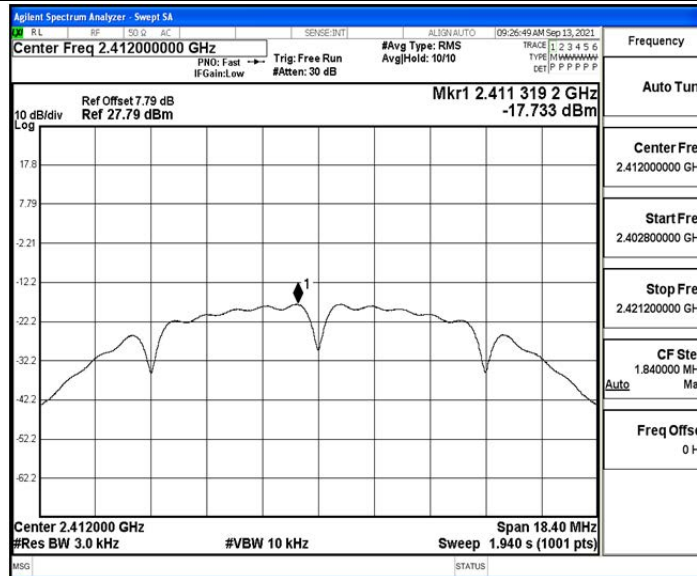
Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-17.73	≤8	PASS
		2437	-17.66	≤8	PASS
		2462	-18.61	≤8	PASS
11G	Ant1	2412	-21.12	≤8	PASS
		2437	-20.64	≤8	PASS
		2462	-21.28	≤8	PASS
11N20SISO	Ant1	2412	-21.61	≤8	PASS
		2437	-20.24	≤8	PASS
		2462	-20.73	≤8	PASS

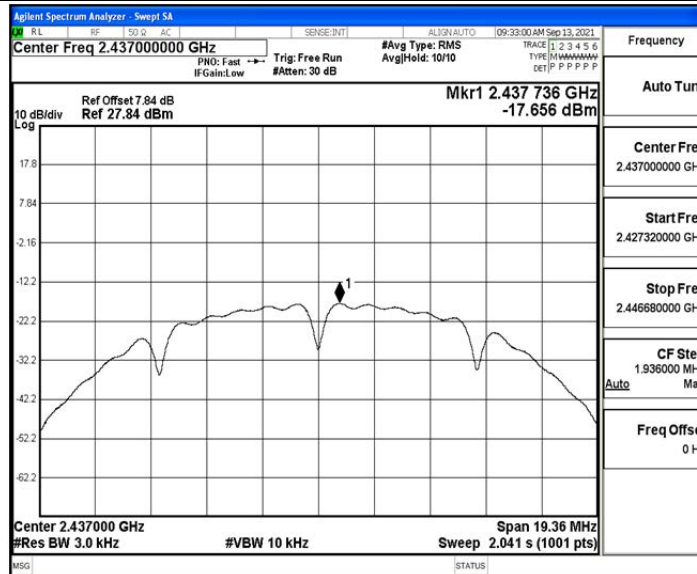


Test Graphs

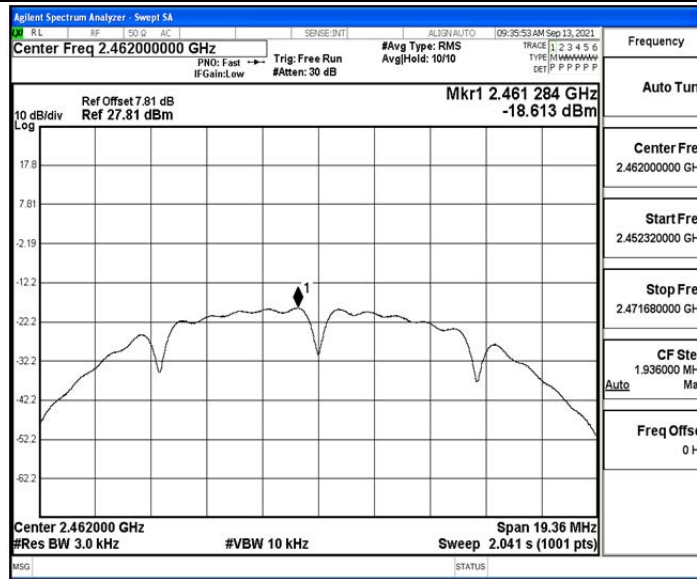
11B_Ant1_2412



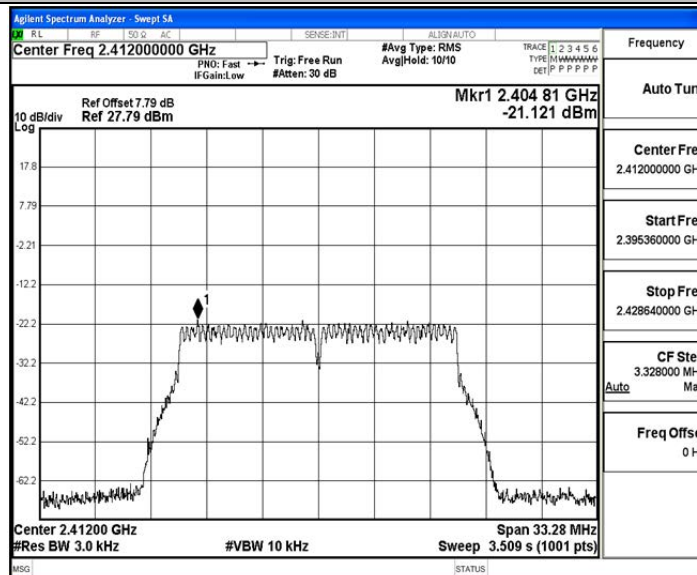
11B_Ant1_2437



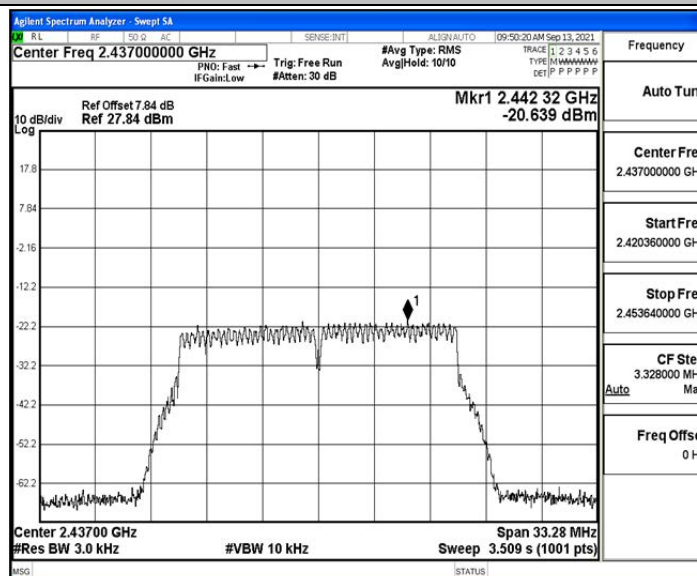
11B_Ant1_2462



11G_Ant1_2412

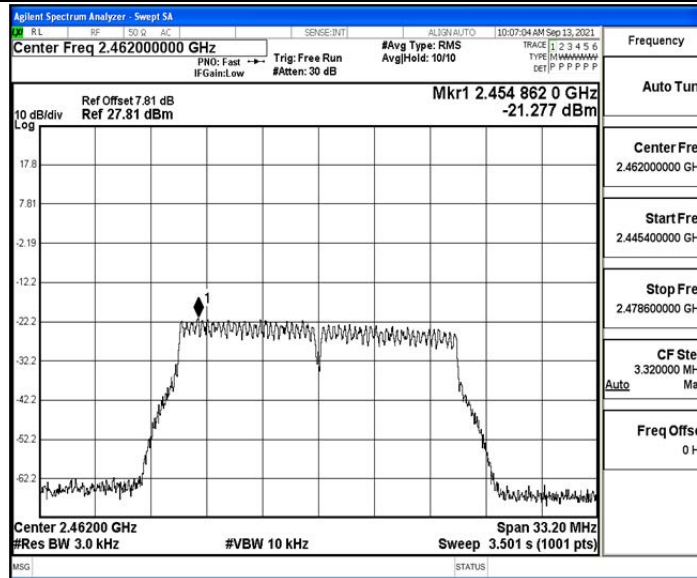


11G_Ant1_2437

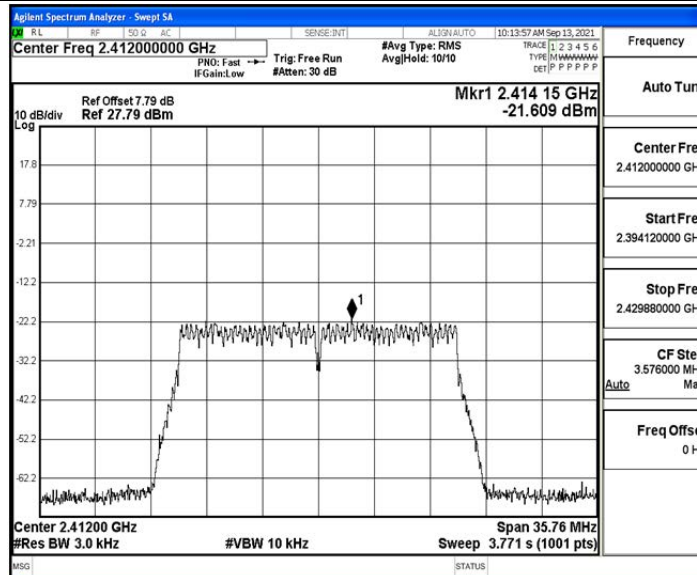




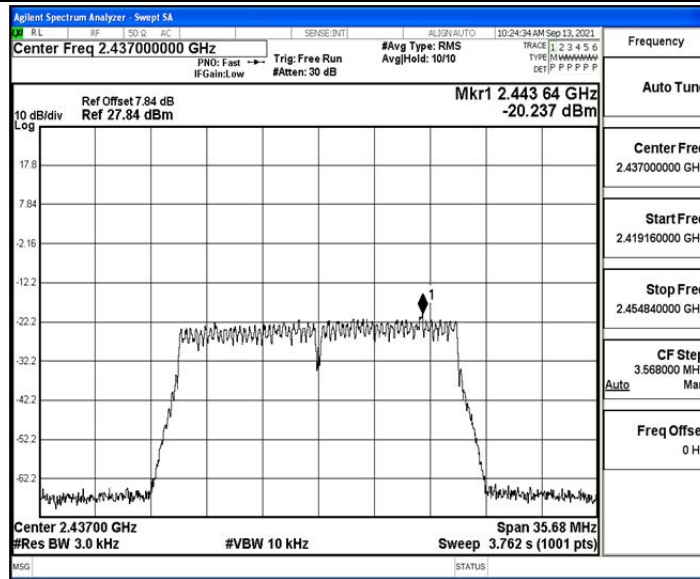
11G_Ant1_2462



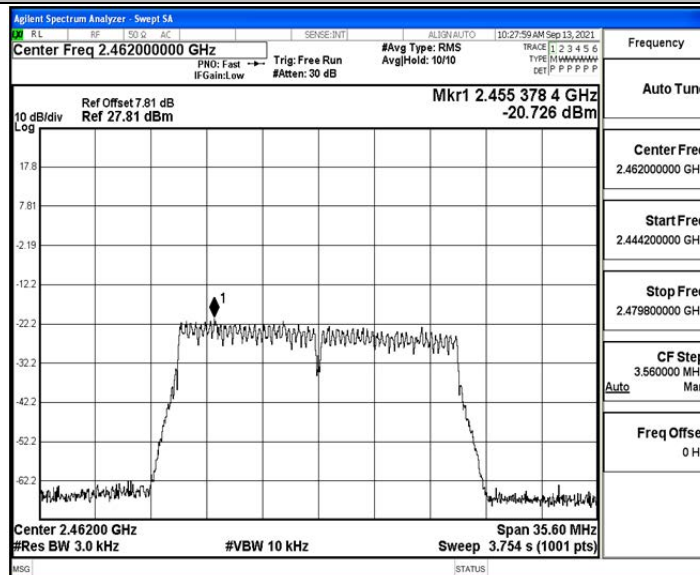
11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462





A.4 Band edge measurements

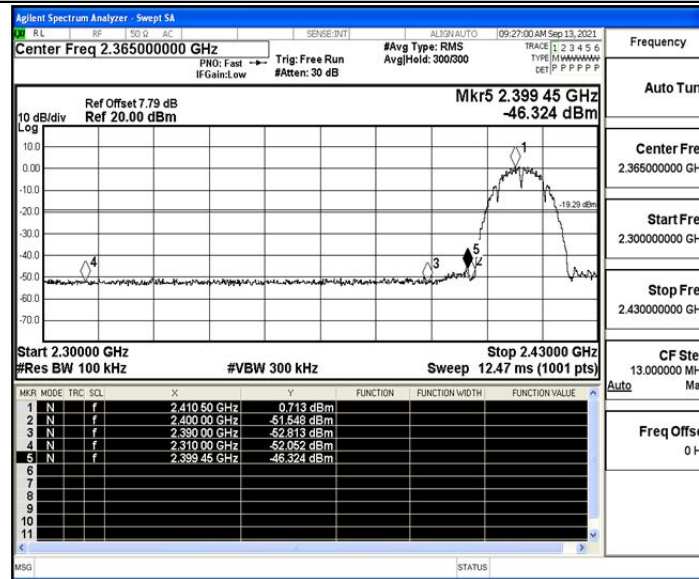
Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	0.71	-46.32	≤ -19.29	PASS
		High	2462	0.03	-49.12	≤ -19.97	PASS
11G	Ant1	Low	2412	-2.52	-36.01	≤ -22.52	PASS
		High	2462	-7.02	-46.76	≤ -27.02	PASS
11N20SISO	Ant1	Low	2412	-7.80	-49.69	≤ -27.8	PASS
		High	2462	-7.29	-47.15	≤ -27.29	PASS

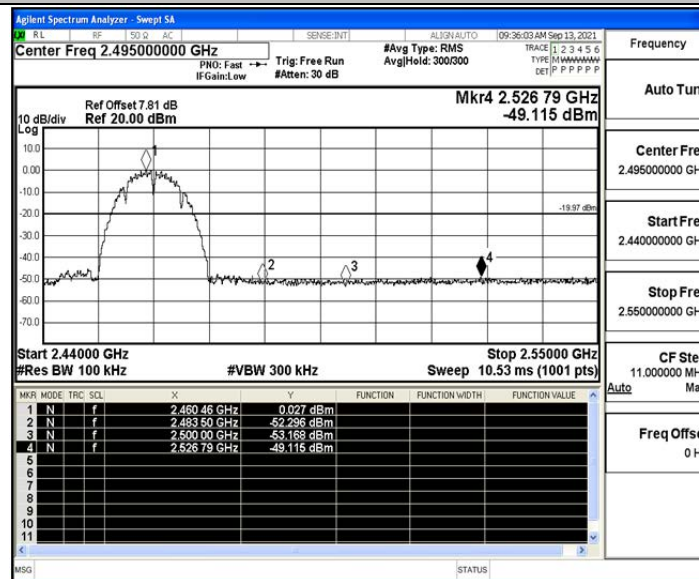


Test Graphs

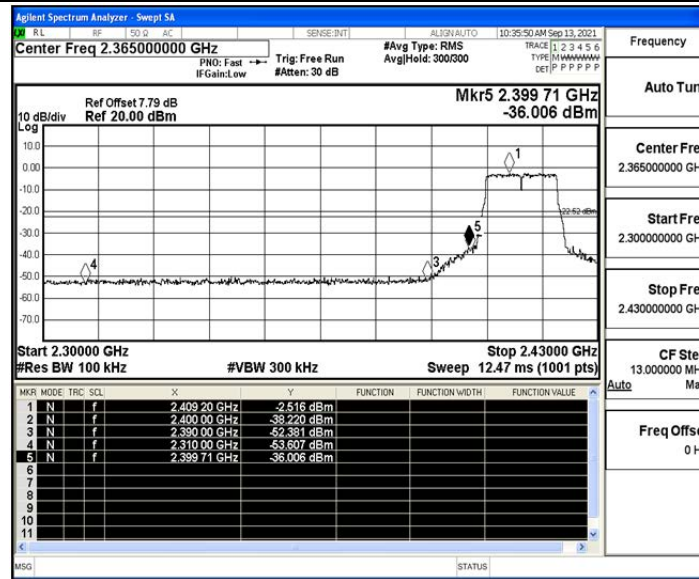
11B_Ant1_Low_2412



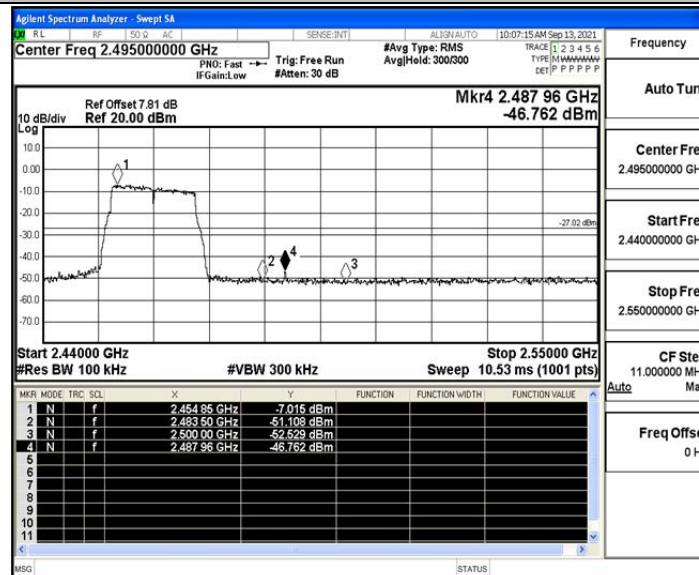
11B_Ant1_High_2462



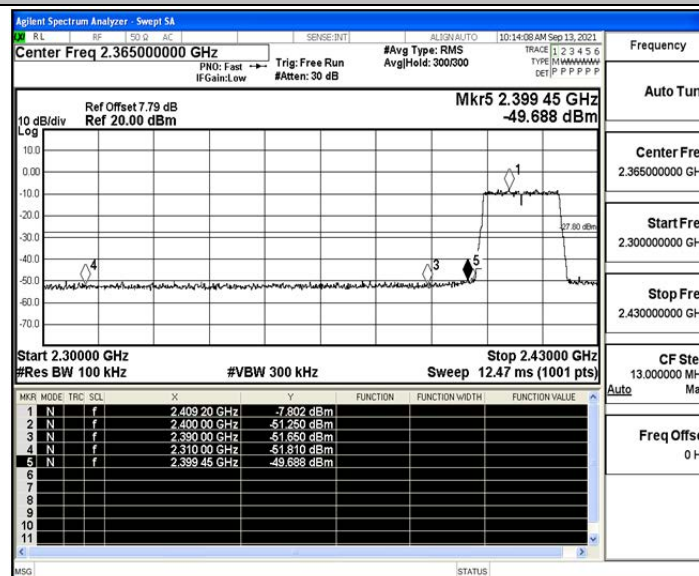
11G_Ant1_Low_2412



11G_Ant1_High_2462

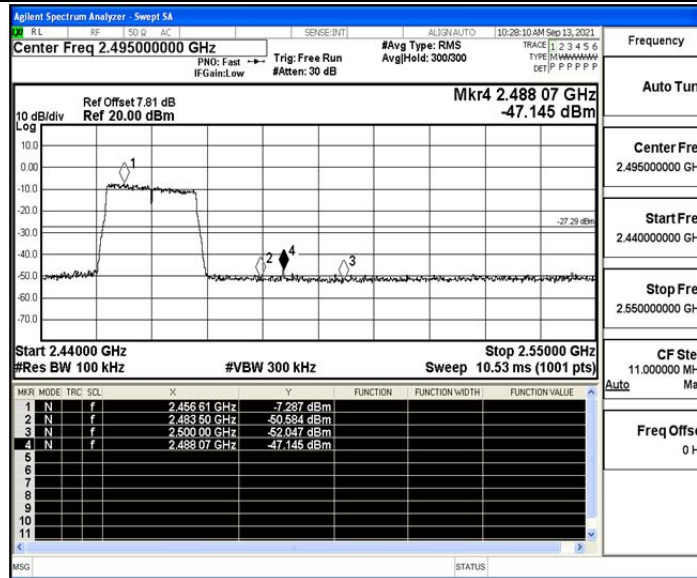


11N20SISO_Ant1_Low_2412





11N20SISO_Ant1_High_2462





A.5 Conducted Spurious Emission

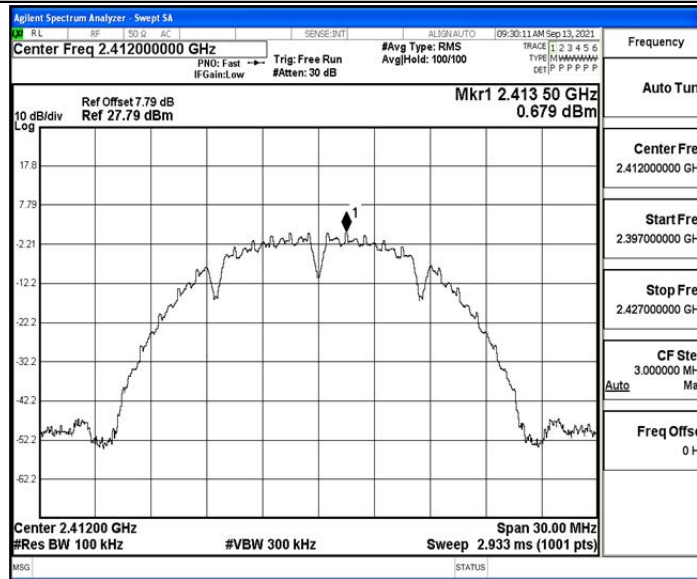
Test Result

TestMode	Antenna	Channel	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	0.68	0.68	---	PASS
			30~1000	0.68	-61.72	≤ -19.32	PASS
			1000~26500	0.68	-47.85	≤ -19.32	PASS
		2437	Reference	0.87	0.87	---	PASS
			30~1000	0.87	-61.36	≤ -19.13	PASS
			1000~26500	0.87	-47.15	≤ -19.13	PASS
		2462	Reference	-0.09	-0.09	---	PASS
			30~1000	-0.09	-62.15	≤ -20.09	PASS
			1000~26500	-0.09	-47.68	≤ -20.09	PASS
11G	Ant1	2412	Reference	-2.62	-2.62	---	PASS
			30~1000	-2.62	-61.82	≤ -22.62	PASS
			1000~26500	-2.62	-47.64	≤ -22.62	PASS
		2437	Reference	-6.89	-6.89	---	PASS
			30~1000	-6.89	-60.81	≤ -26.89	PASS
			1000~26500	-6.89	-47.23	≤ -26.89	PASS
		2462	Reference	-7.35	-7.35	---	PASS
			30~1000	-7.35	-61.6	≤ -27.35	PASS
			1000~26500	-7.35	-46.52	≤ -27.35	PASS
11N20SISO	Ant1	2412	Reference	-7.95	-7.95	---	PASS
			30~1000	-7.95	-61.66	≤ -27.95	PASS
			1000~26500	-7.95	-47.64	≤ -27.95	PASS
		2437	Reference	-7.31	-7.31	---	PASS
			30~1000	-7.31	-62.06	≤ -27.31	PASS
			1000~26500	-7.31	-47.49	≤ -27.31	PASS
		2462	Reference	-7.22	-7.22	---	PASS
			30~1000	-7.22	-61.84	≤ -27.22	PASS
			1000~26500	-7.22	-47.77	≤ -27.22	PASS

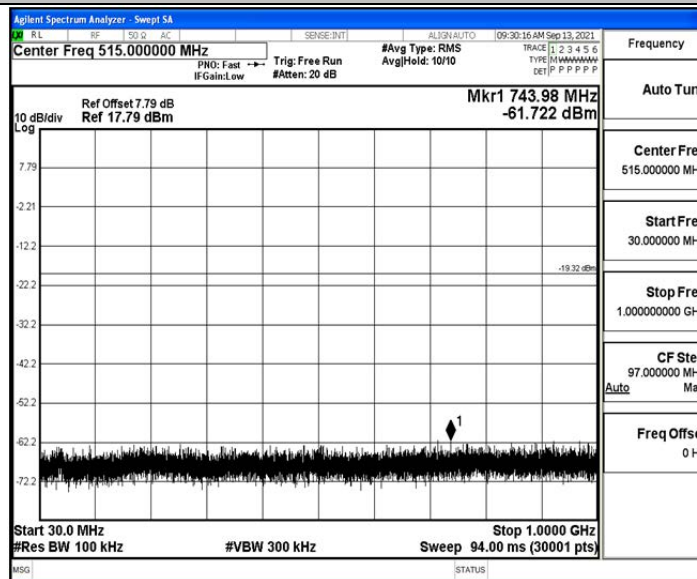


Test Graphs

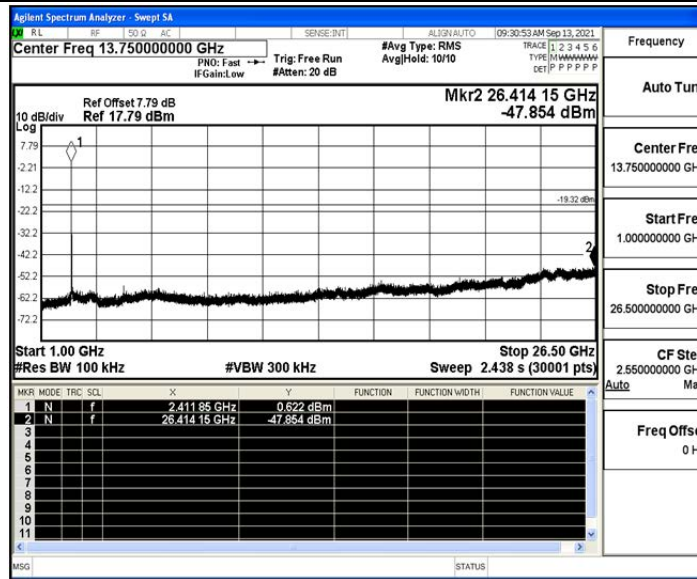
11B_Ant1_2412_0~Reference



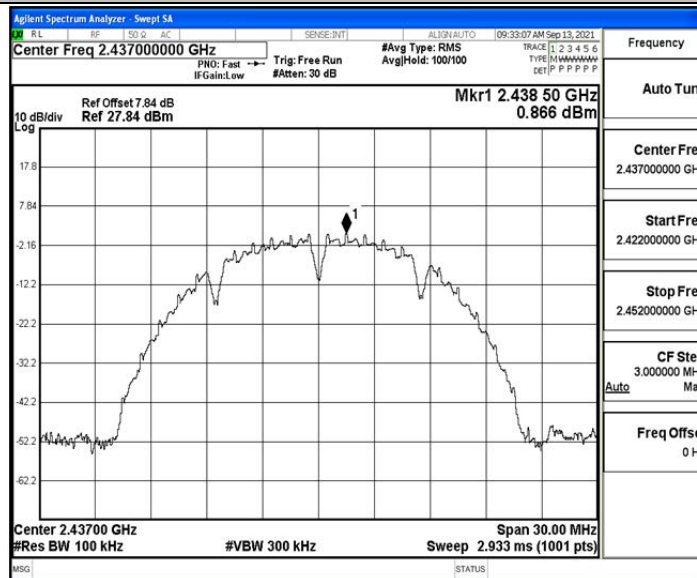
11B_Ant1_2412_30~1000



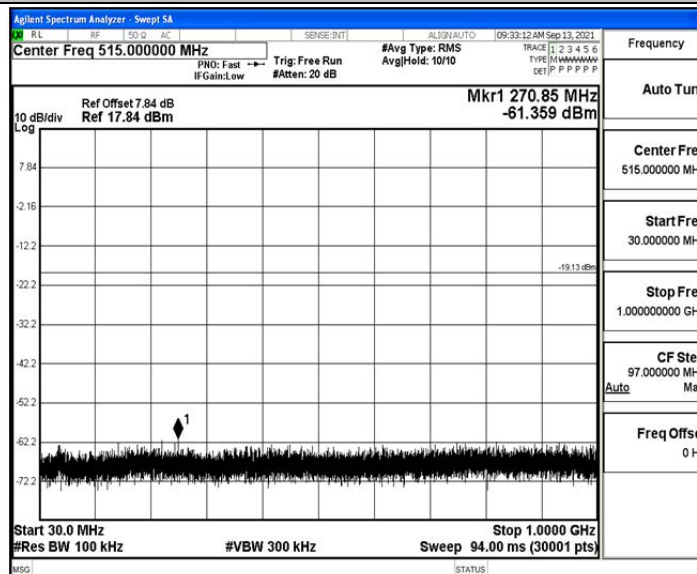
11B_Ant1_2412_1000~26500



11B_Ant1_2437_0~Reference

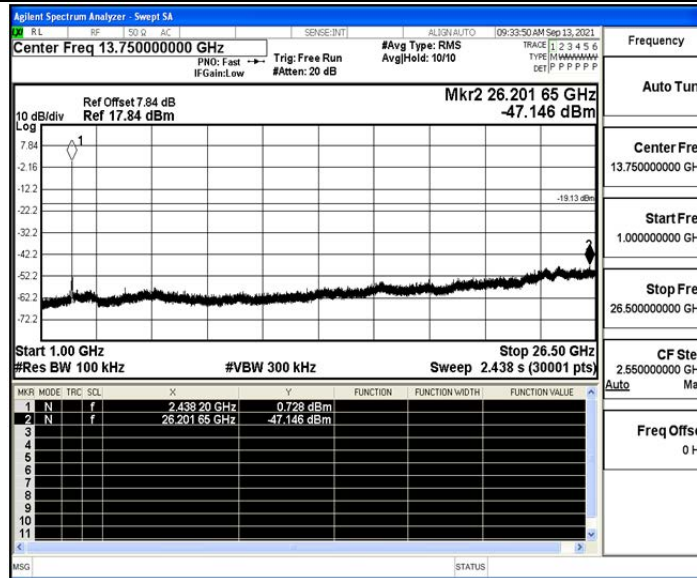


11B_Ant1_2437_30~1000

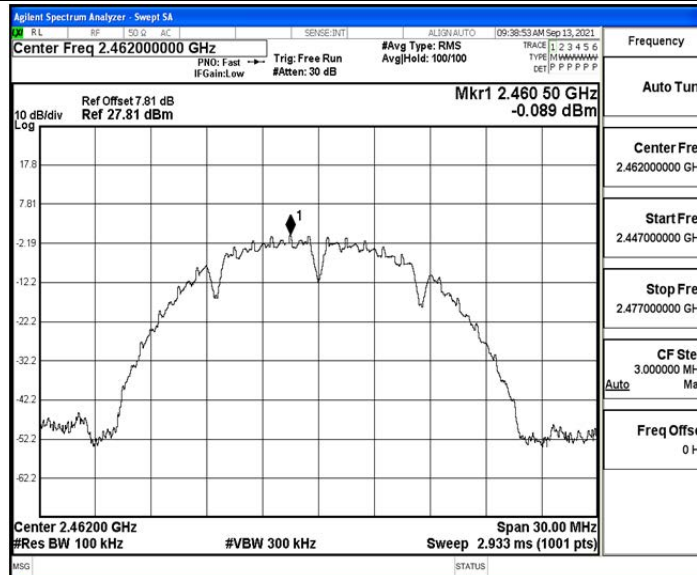




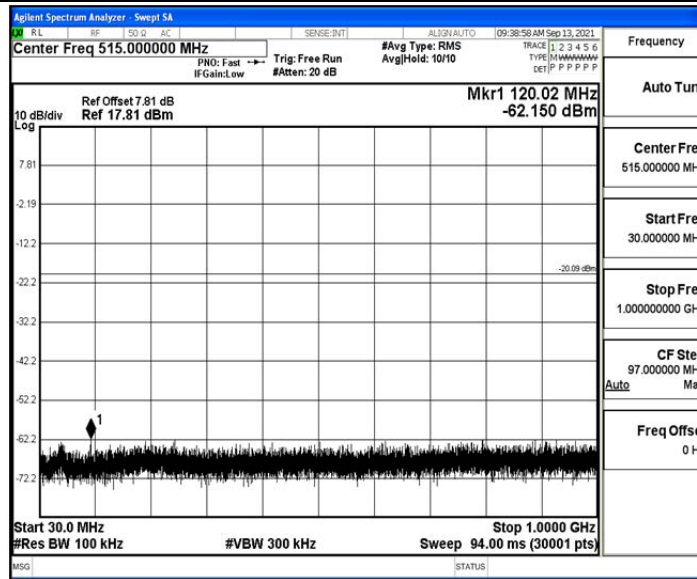
11B_Ant1_2437_1000~26500



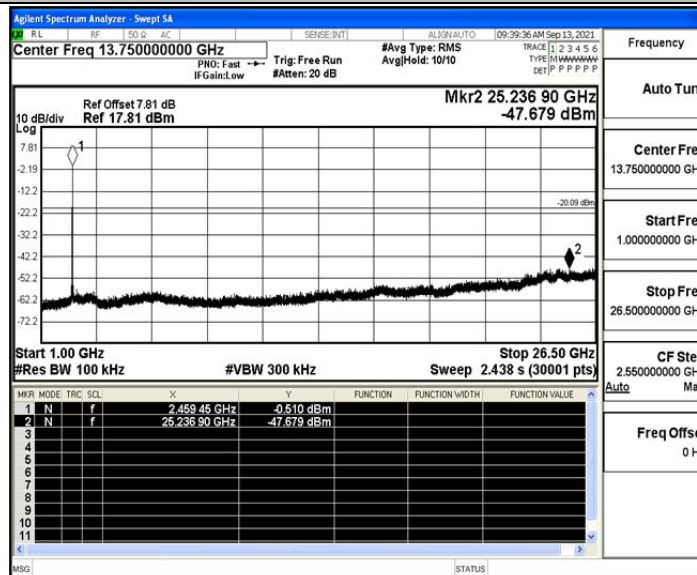
11B_Ant1_2462_0~Reference



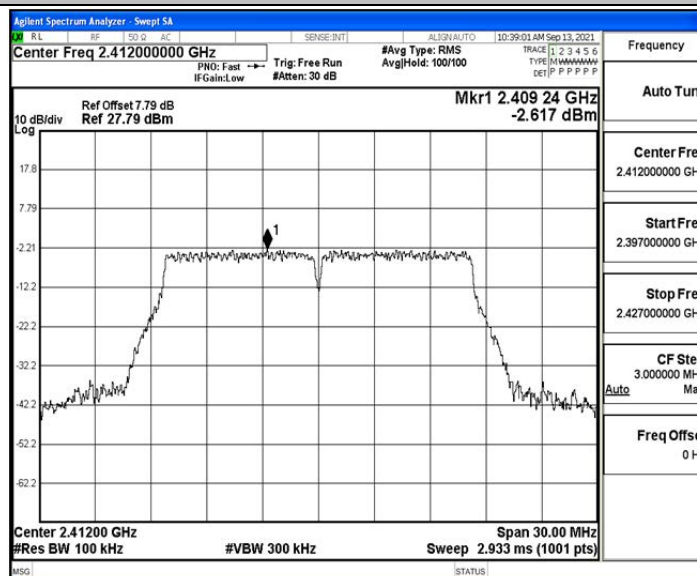
11B_Ant1_2462_30~1000



11B_Ant1_2462_1000~26500

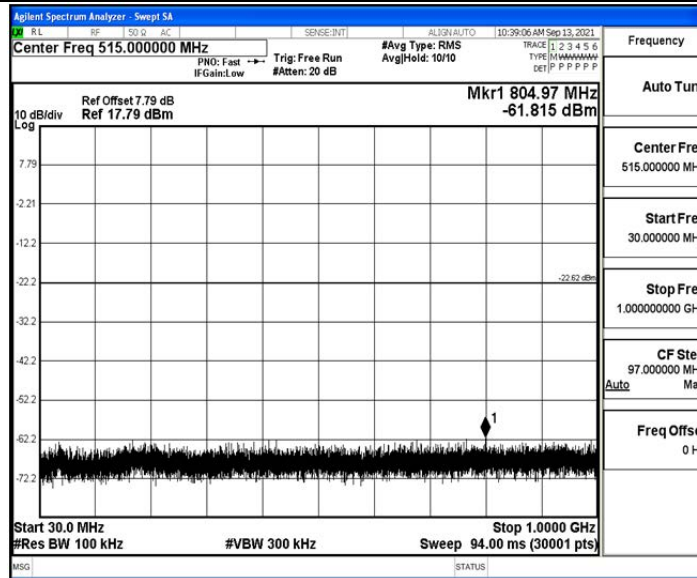


11G_Ant1_2412_0~Reference

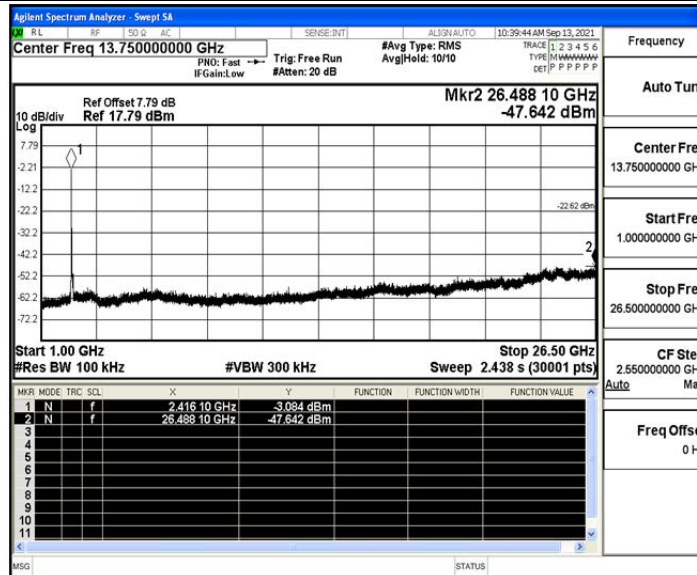




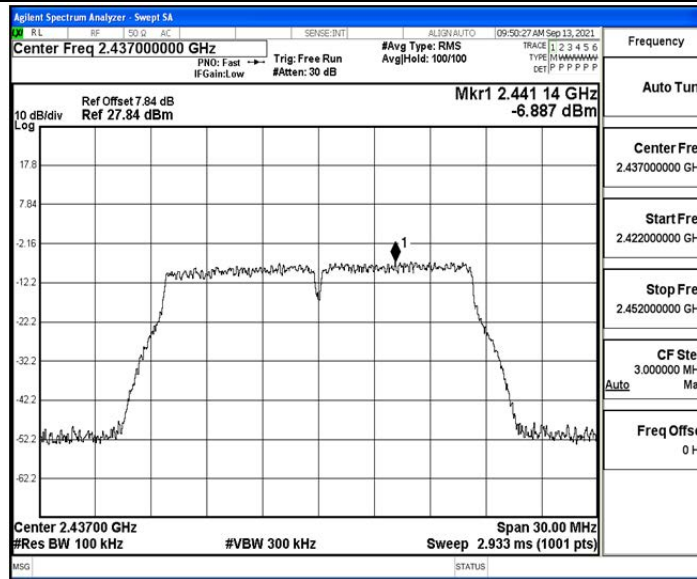
11G_Ant1_2412_30~1000



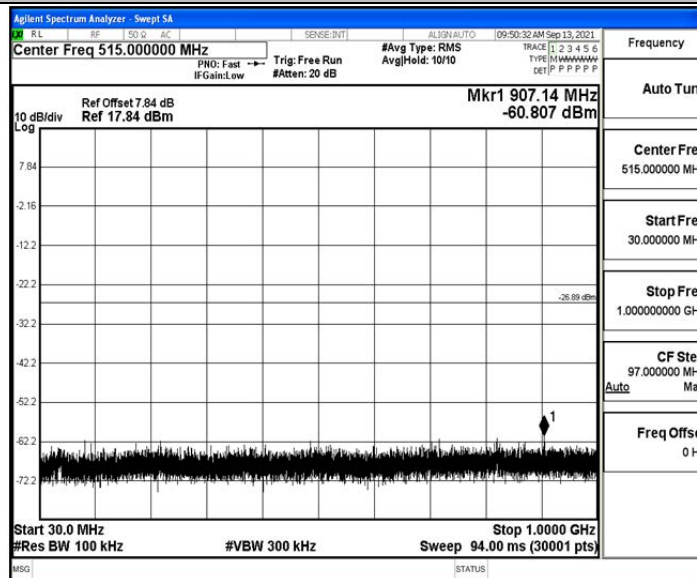
11G_Ant1_2412_1000~26500



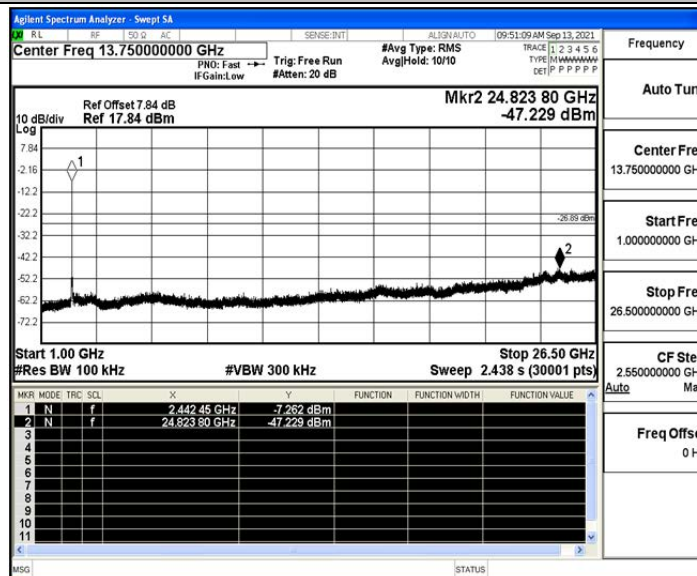
11G_Ant1_2437_0~Reference



11G_Ant1_2437_30~1000

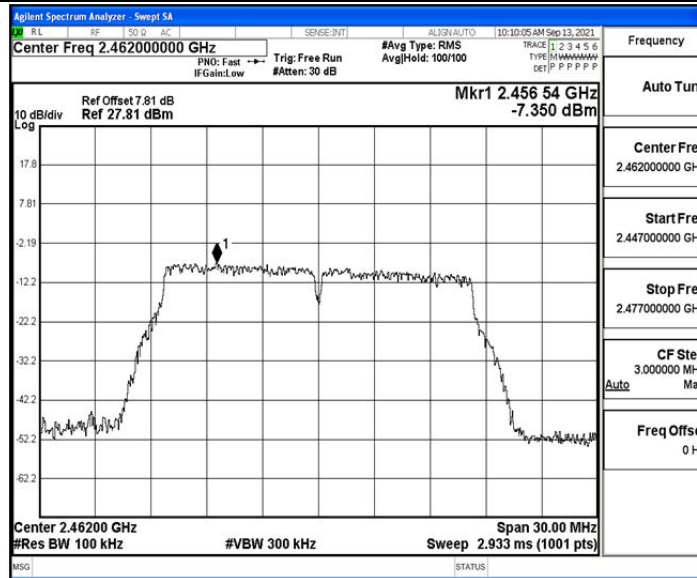


11G_Ant1_2437_1000~26500

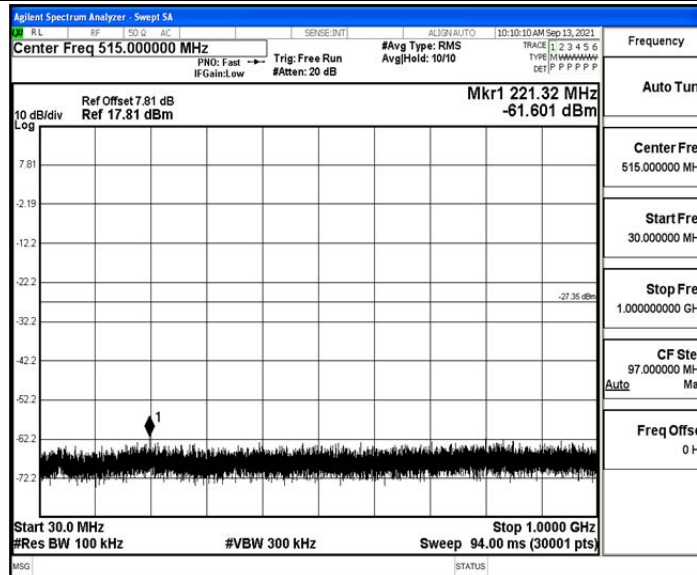




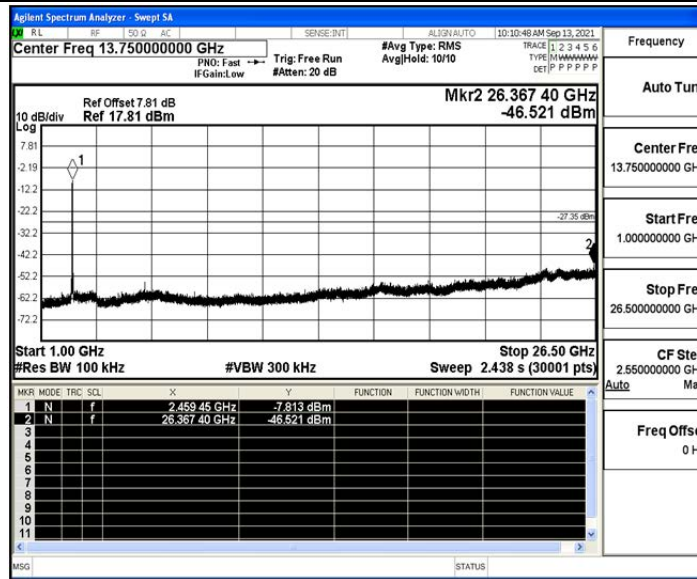
11G_Ant1_2462_0~Reference



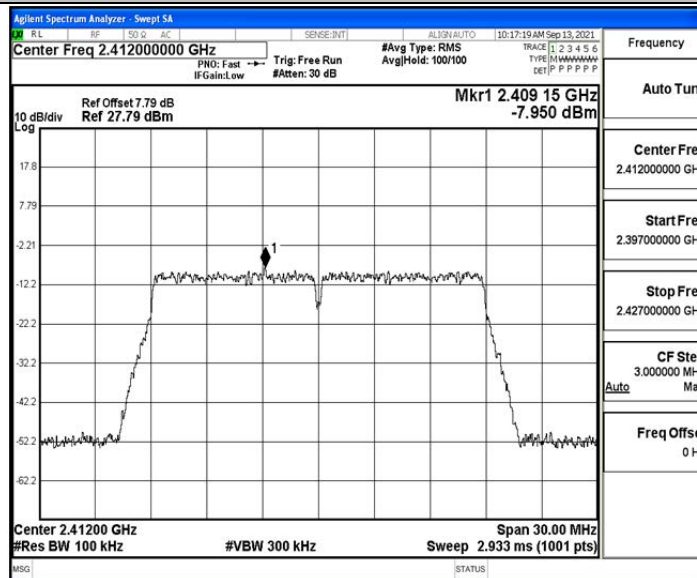
11G_Ant1_2462_30~1000



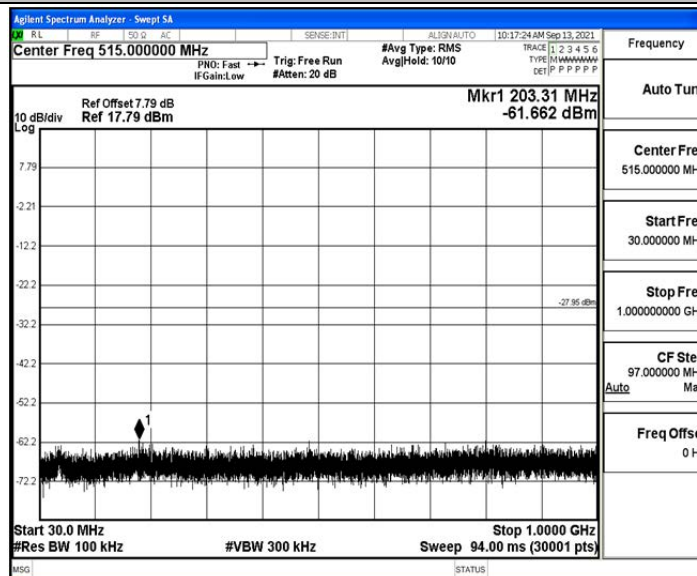
11G_Ant1_2462_1000~26500



11N20SISO_Ant1_2412_0~Reference

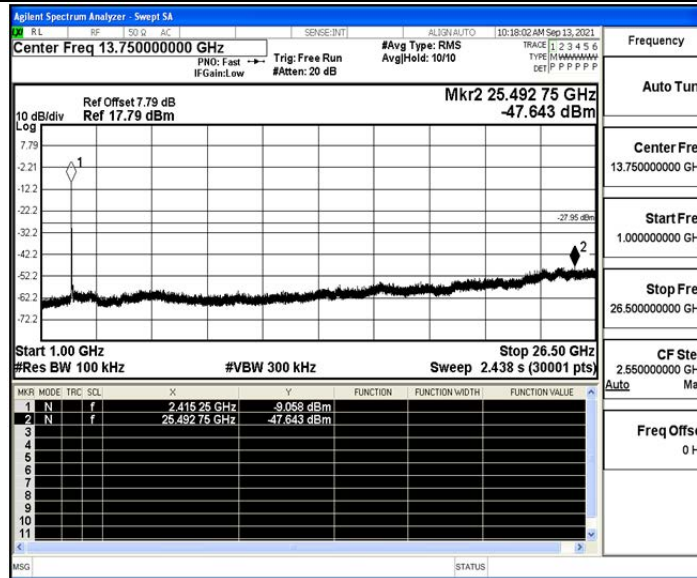


11N20SISO_Ant1_2412_30~1000

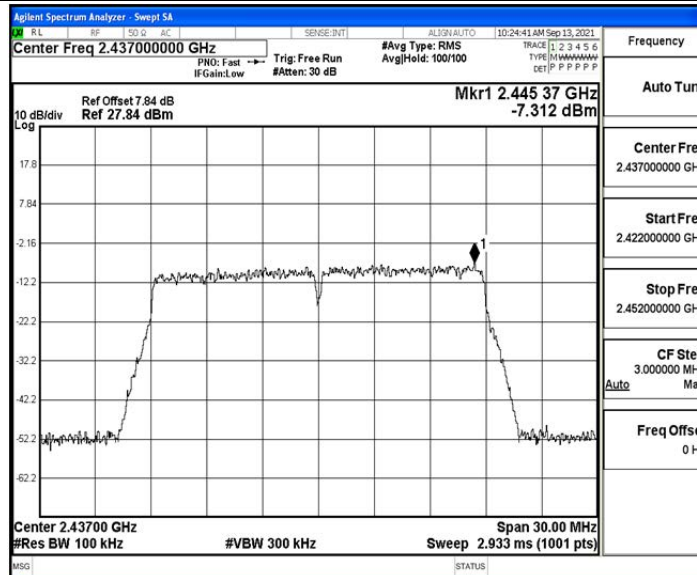




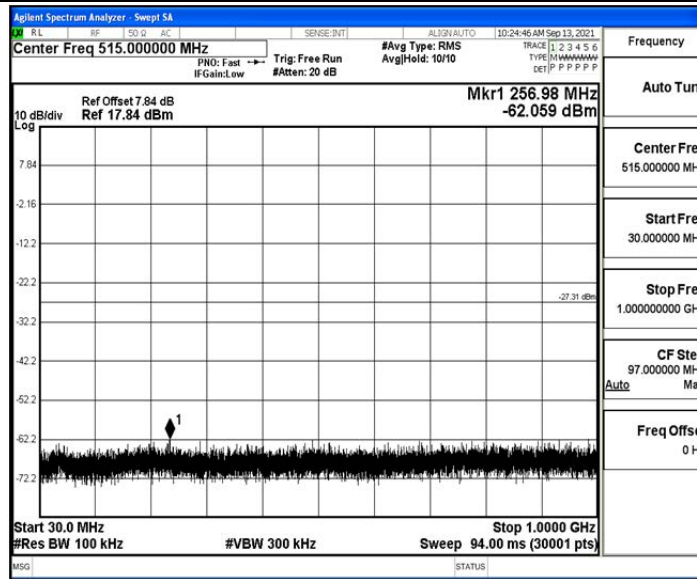
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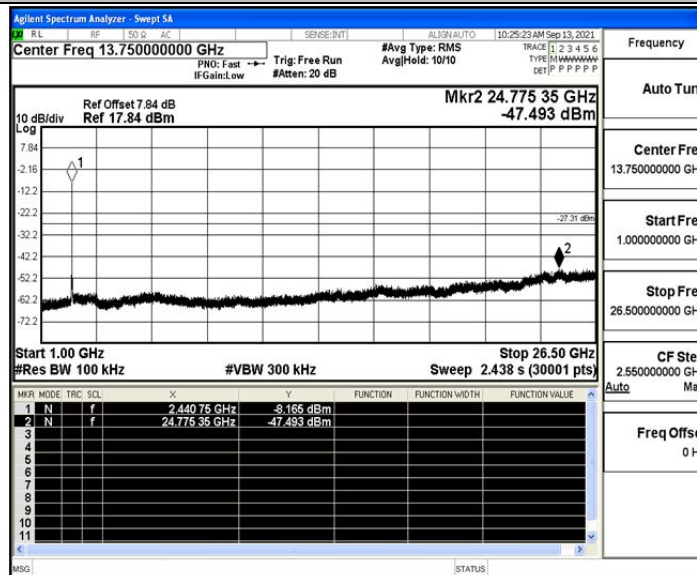
11N20SISO_Ant1_2437_0~Reference



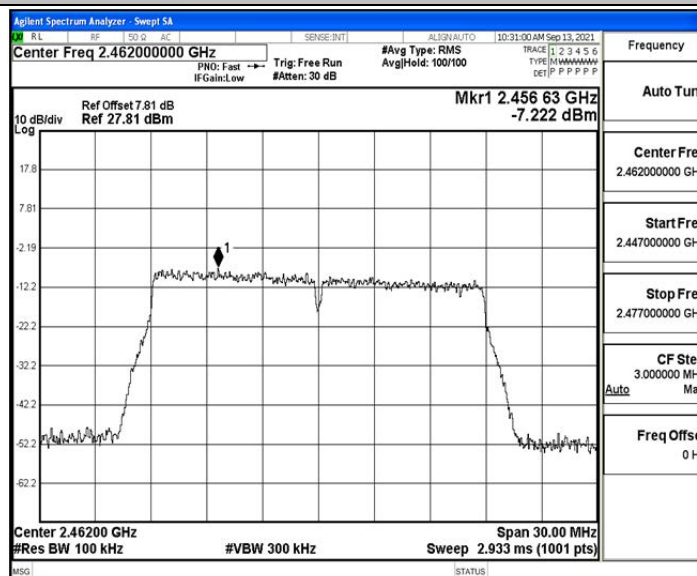
11N20SISO_Ant1_2437_30~1000



11N20SISO_Ant1_2437_1000~26500

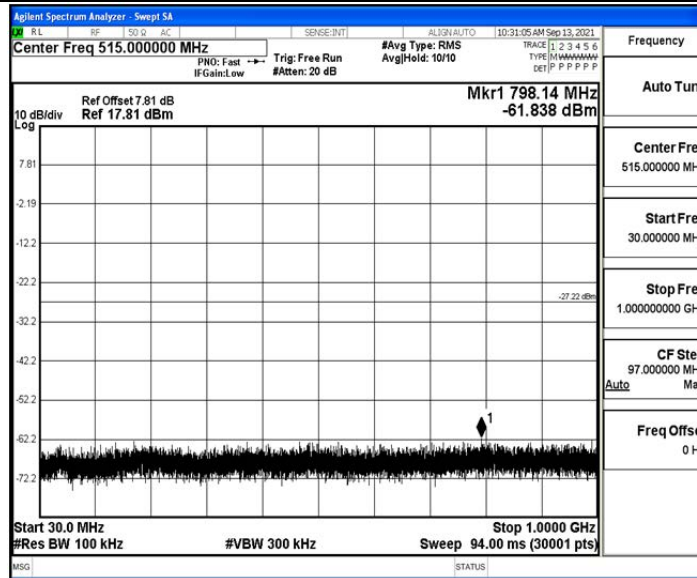


11N20SISO_Ant1_2462_0~Reference

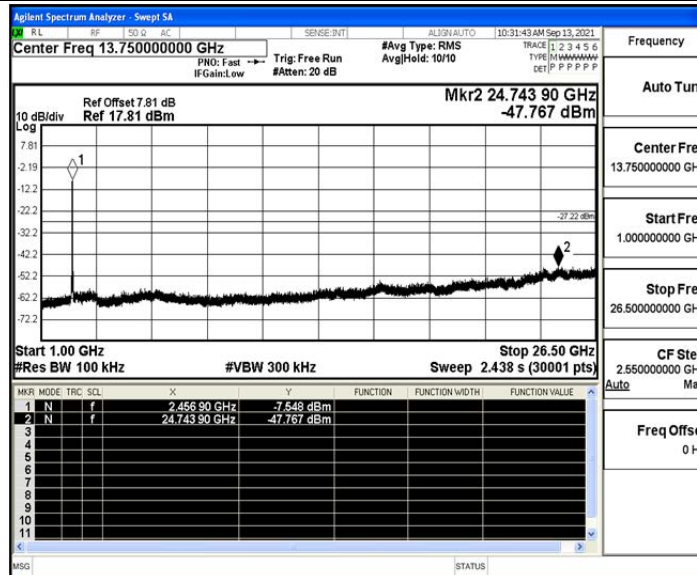




11N20SISO_Ant1_2462_30~1000



11N20SISO_Ant1_2462_1000~26500





A.6 Duty Cycle

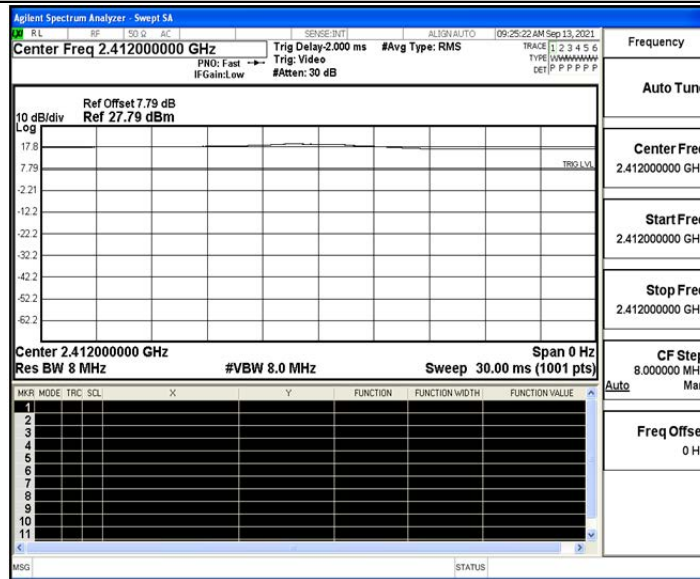
Test Result

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

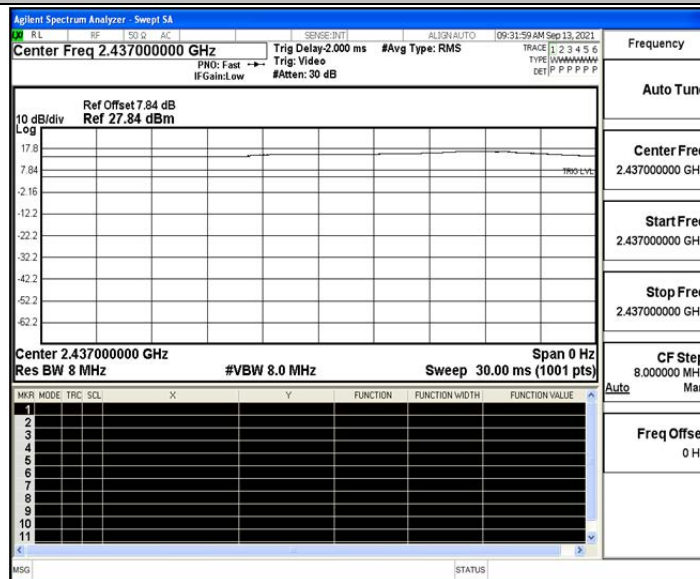


Test Graphs

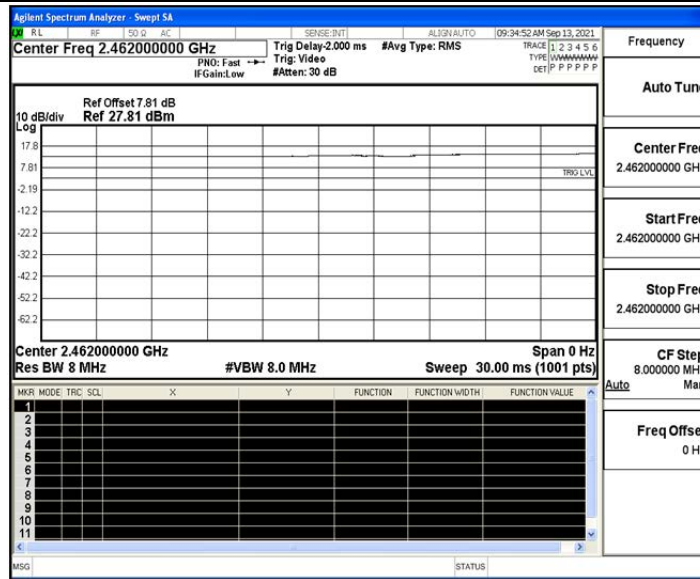
11B_Ant1_2412



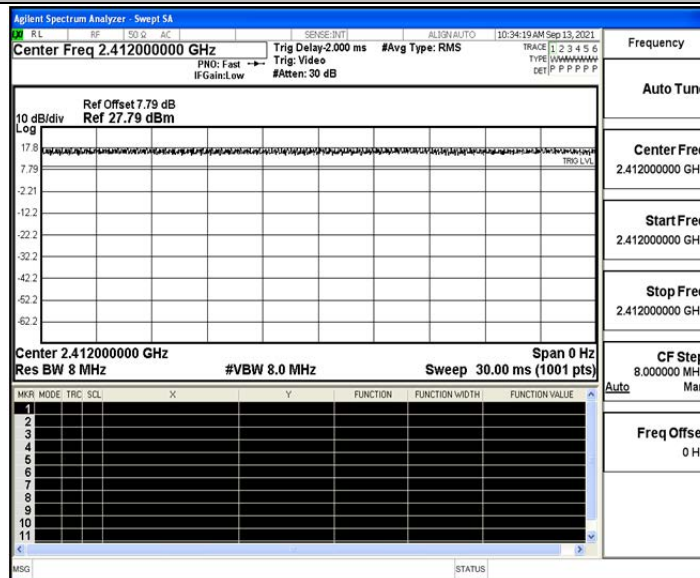
11B_Ant1_2437



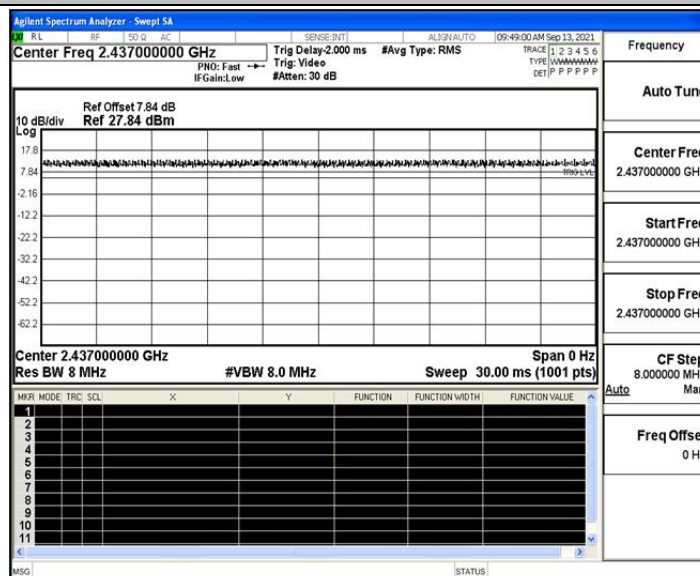
11B_Ant1_2462



11G_Ant1_2412

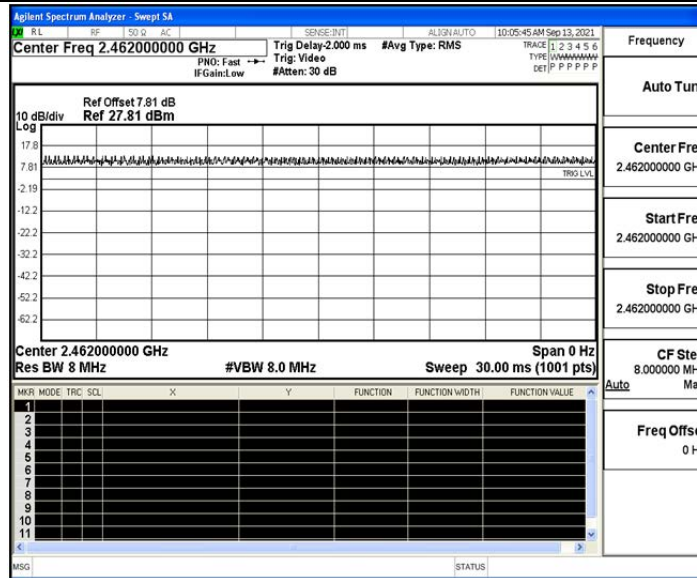


11G_Ant1_2437

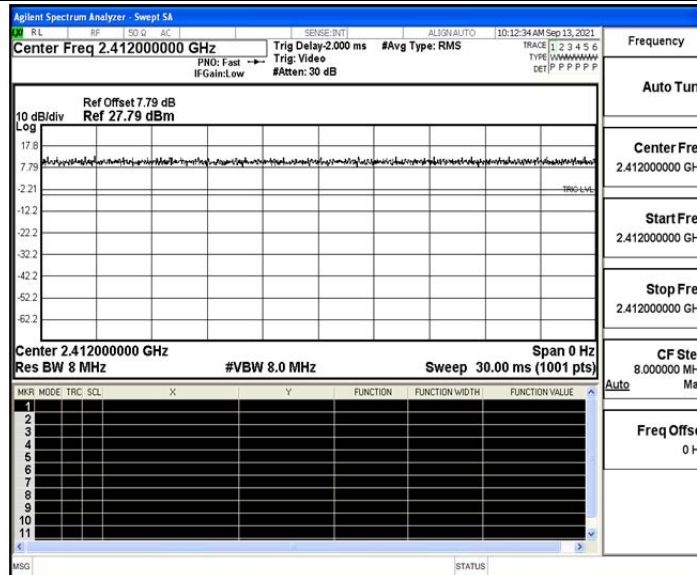




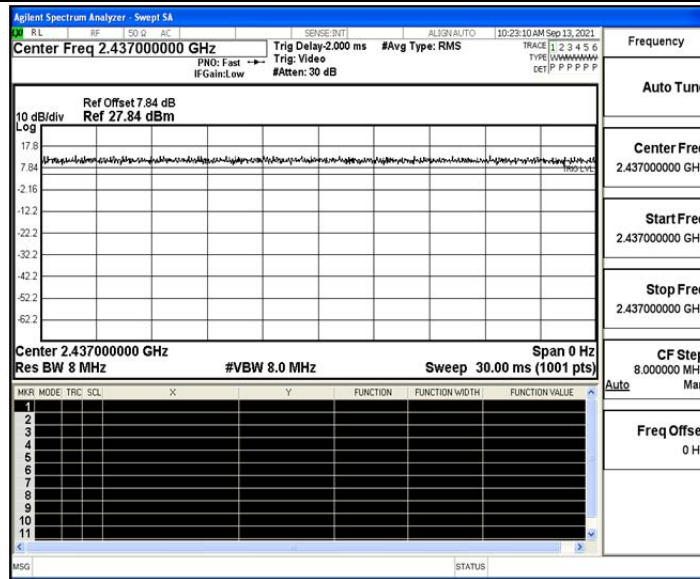
11G_Ant1_2462



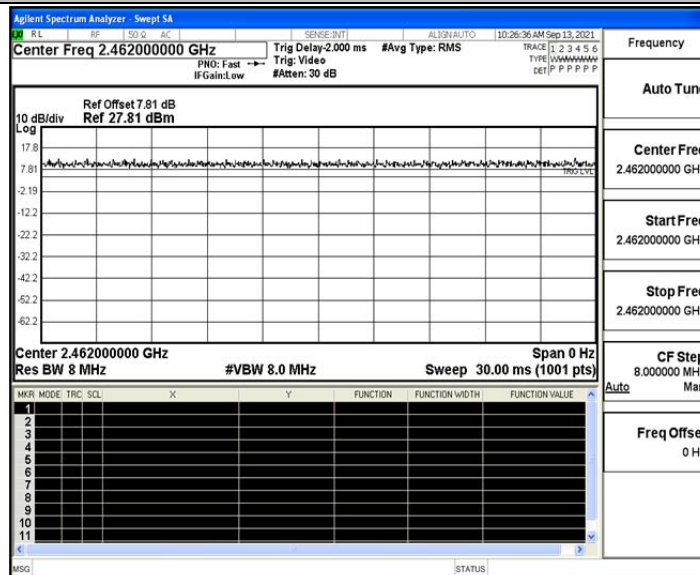
11N20SISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462





A.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	-49.29	≤-41.20	45.91	≤54	PASS
				AV	2389.180	-48.87	≤-41.20	46.33	≤54	PASS
				AV	2390.000	-48.89	≤-41.20	46.31	≤54	PASS
				Peak	2310.000	-46.49	≤-21.20	48.71	≤74	PASS
				Peak	2377.740	-39.19	≤-21.20	56.01	≤74	PASS
				Peak	2390.000	-43.51	≤-21.20	51.69	≤74	PASS
		High	2462	AV	2483.500	-48.29	≤-41.20	46.91	≤54	PASS
				AV	2487.960	-47.59	≤-41.20	47.61	≤54	PASS
				AV	2500.000	-48.3	≤-41.20	46.90	≤54	PASS
				Peak	2483.500	-43.81	≤-21.20	51.39	≤74	PASS
				Peak	2491.920	-38.83	≤-21.20	56.37	≤74	PASS
				Peak	2500.000	-42.37	≤-21.20	52.83	≤74	PASS
11G	Ant1	Low	2412	AV	2310.000	-49.45	≤-41.20	45.75	≤54	PASS
				AV	2389.960	-48.06	≤-41.20	47.14	≤54	PASS
				AV	2390.000	-48.06	≤-41.20	47.14	≤54	PASS
				Peak	2310.000	-44.69	≤-21.20	50.51	≤74	PASS
				Peak	2311.700	-39.42	≤-21.20	55.78	≤74	PASS
				Peak	2390.000	-45.25	≤-21.20	49.95	≤74	PASS
		High	2462	AV	2483.500	-47.91	≤-41.20	47.29	≤54	PASS
				AV	2487.960	-46.06	≤-41.20	49.14	≤54	PASS
				AV	2500.000	-48.44	≤-41.20	46.76	≤54	PASS
				Peak	2483.500	-41.14	≤-21.20	54.06	≤74	PASS
				Peak	2483.670	-39.83	≤-21.20	55.37	≤74	PASS
				Peak	2500.000	-43.62	≤-21.20	51.58	≤74	PASS
11N20SI SO	Ant1	Low	2412	AV	2310.000	-49.45	≤-41.20	45.75	≤54	PASS
				AV	2389.960	-48.98	≤-41.20	46.22	≤54	PASS
				AV	2390.000	-48.98	≤-41.20	46.22	≤54	PASS
				Peak	2310.000	-44.37	≤-21.20	50.83	≤74	PASS
				Peak	2324.700	-39.19	≤-21.20	56.01	≤74	PASS
				Peak	2390.000	-41.25	≤-21.20	53.95	≤74	PASS
		High	2462	AV	2483.500	-47.96	≤-41.20	47.24	≤54	PASS
				AV	2487.960	-46.23	≤-41.20	48.97	≤54	PASS
				AV	2500.000	-48.47	≤-41.20	46.73	≤54	PASS
				Peak	2483.500	-43.85	≤-21.20	51.35	≤74	PASS
				Peak	2492.250	-37.83	≤-21.20	57.37	≤74	PASS
				Peak	2500.000	-44.74	≤-21.20	50.46	≤74	PASS



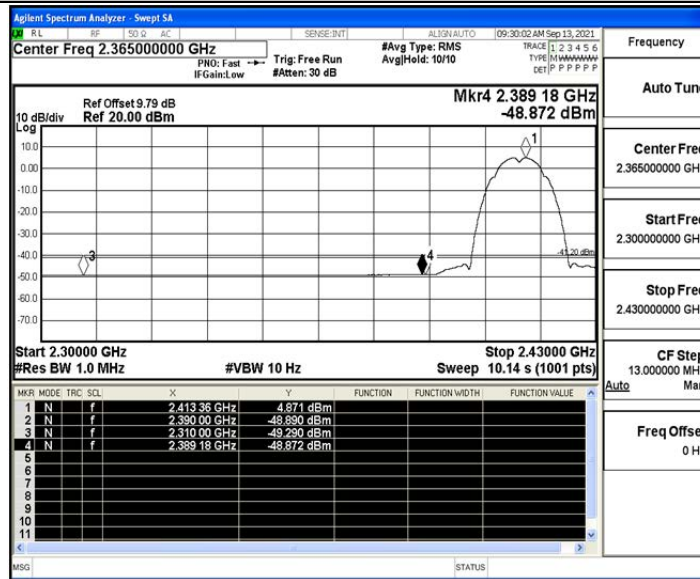
Note:

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.

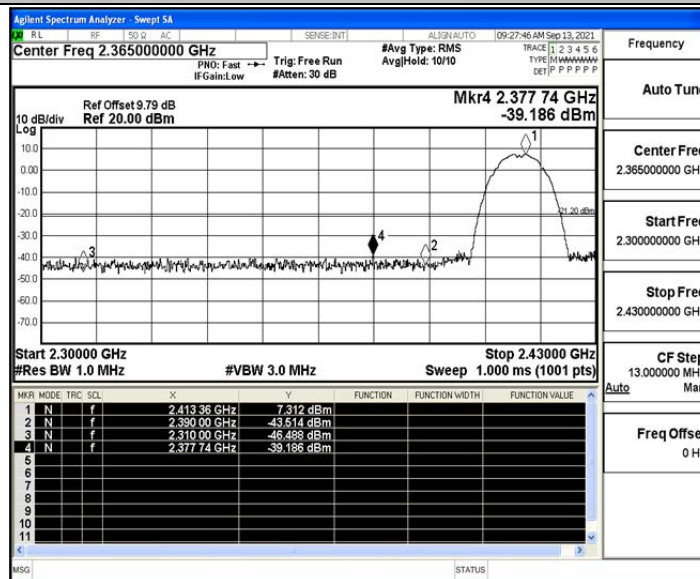


Test Graphs

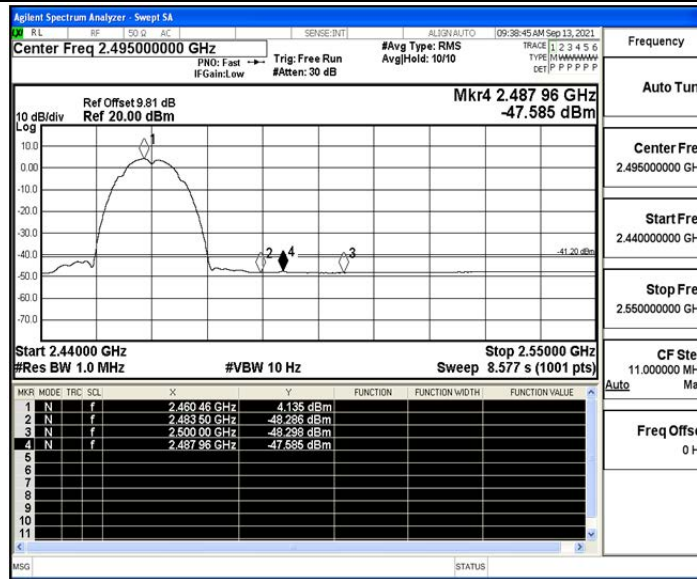
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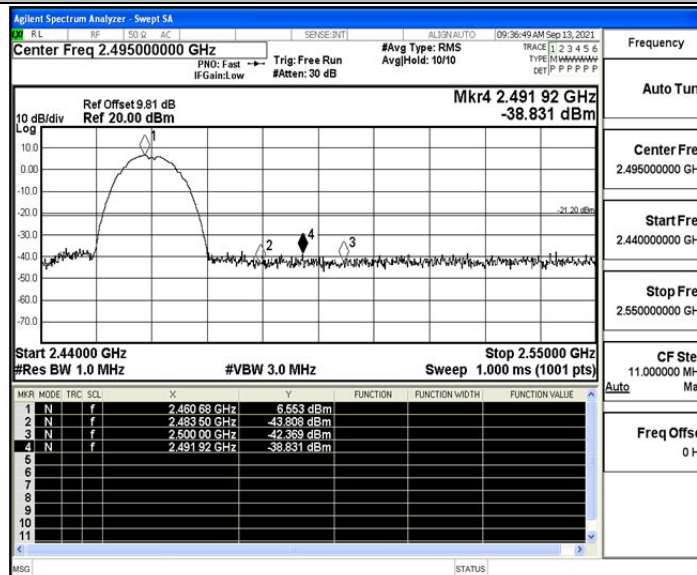
11B_Ant1_Low_2412_Peak



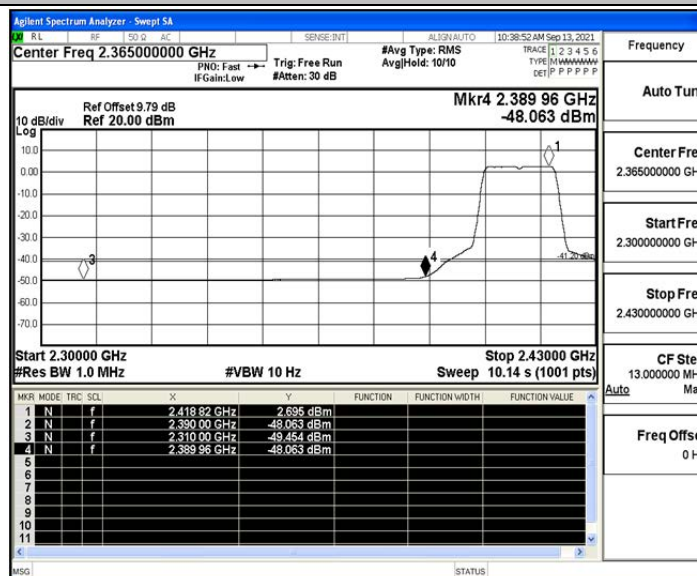
11B_Ant1_High_2462_AV



11B_Ant1_High_2462_Peak

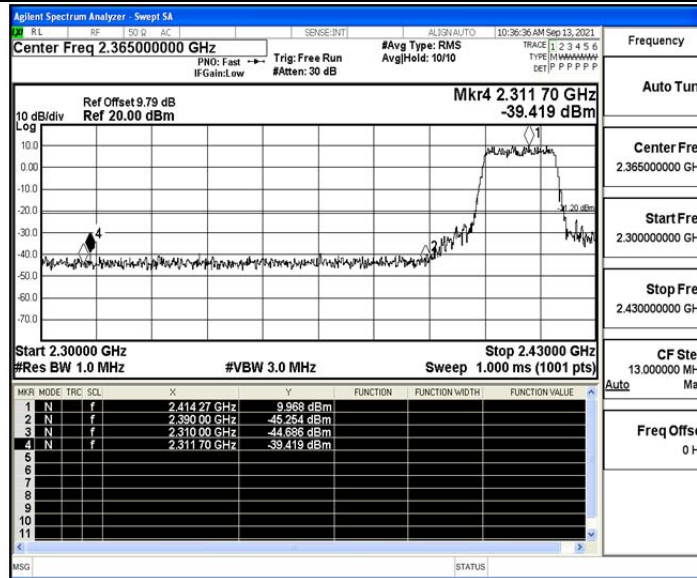


11G_Ant1_Low_2412_AV

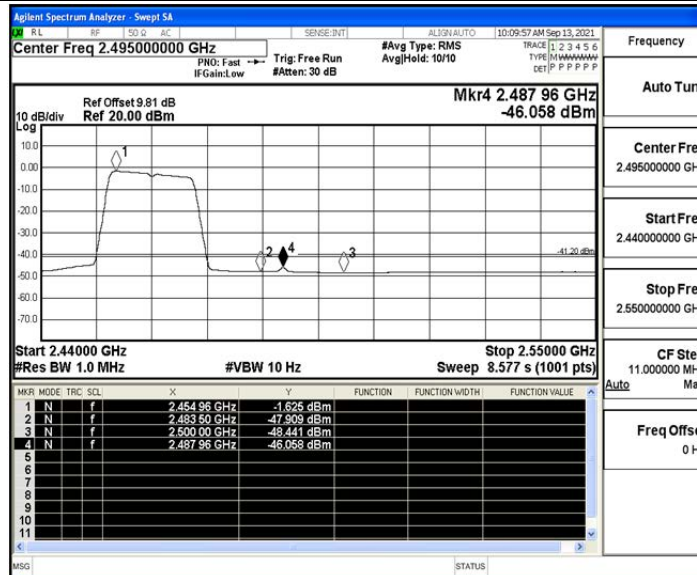




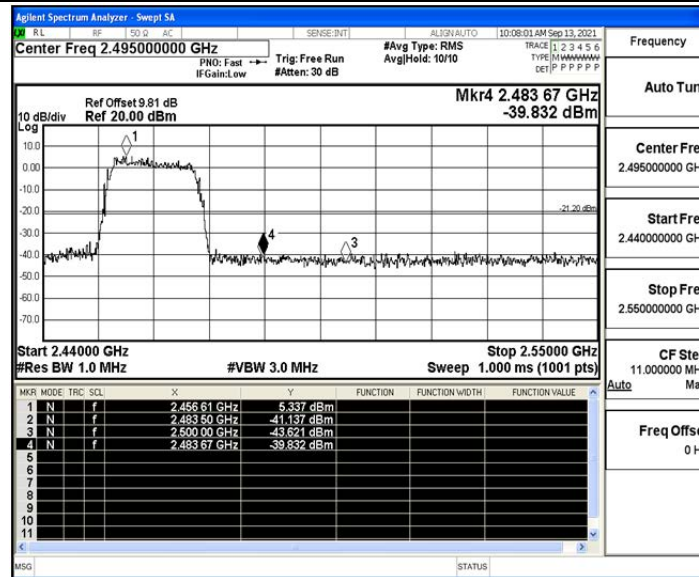
11G_Ant1_Low_2412_Peak



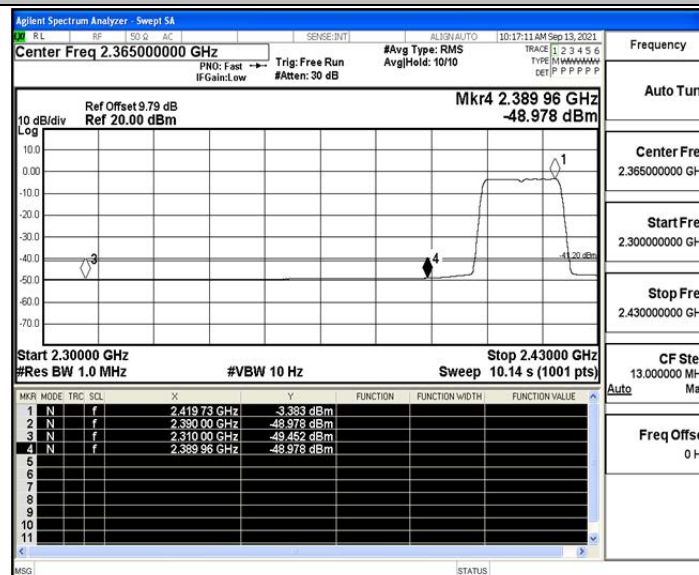
11G_Ant1_High_2462_AV



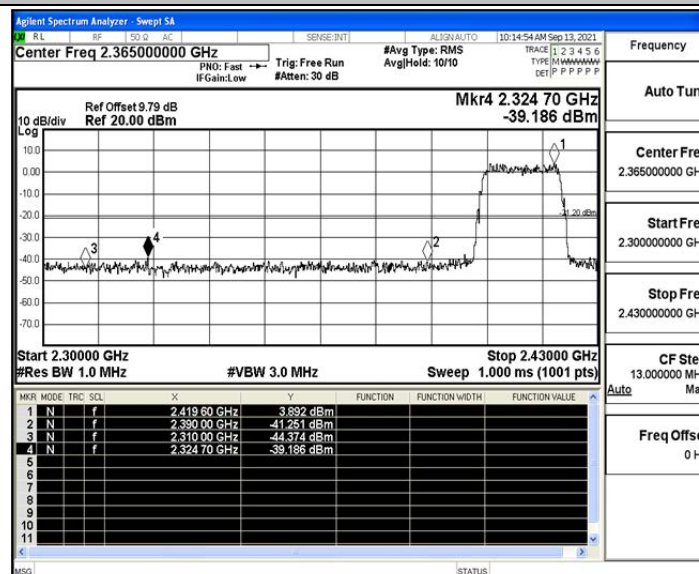
11G_Ant1_High_2462_Peak



11N20SISO_Ant1_Low_2412_AV

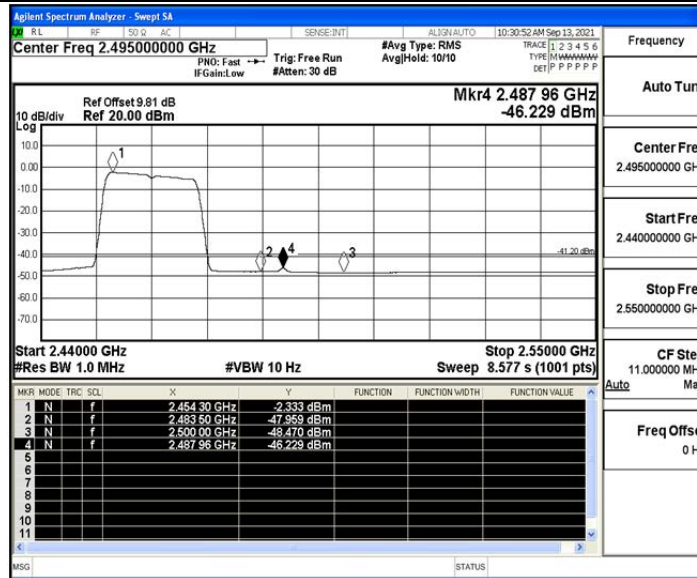


11N20SISO_Ant1_Low_2412_Peak





11N20SISO_Ant1_High_2462_AV



11N20SISO_Ant1_High_2462_Peak

