

Appendix A

RF Test Data for 2.4GWIFI (Conducted Measurement)

Product Name: SkyPortal WiFi Module

Test Model: 93973

Environmental Conditions

Temperature:	23.4°C
Relative Humidity:	54.6%
ATM Pressure:	100.0 kPa
Test Engineer:	Suichao Lai
Supervised by:	Yan Chen

A.1 DTS Bandwidth

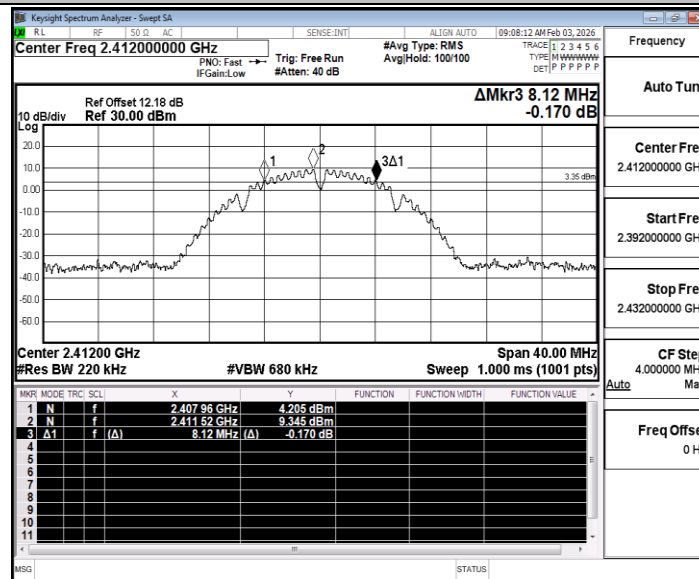
Test Result

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	8.120	2407.960	2416.080	0.5	PASS
		2437	8.120	2432.960	2441.080	0.5	PASS
		2462	8.120	2457.960	2466.080	0.5	PASS
11G	Ant1	2412	16.240	2403.880	2420.120	0.5	PASS
		2437	15.800	2429.120	2444.920	0.5	PASS
		2462	16.040	2453.920	2469.960	0.5	PASS
11N20SISO	Ant1	2412	17.240	2403.400	2420.640	0.5	PASS
		2437	16.720	2428.880	2445.600	0.5	PASS
		2462	17.000	2453.480	2470.480	0.5	PASS
11N40SISO	Ant1	2422	35.760	2404.400	2440.160	0.5	PASS
		2437	33.360	2421.480	2454.840	0.5	PASS
		2452	35.760	2434.320	2470.080	0.5	PASS

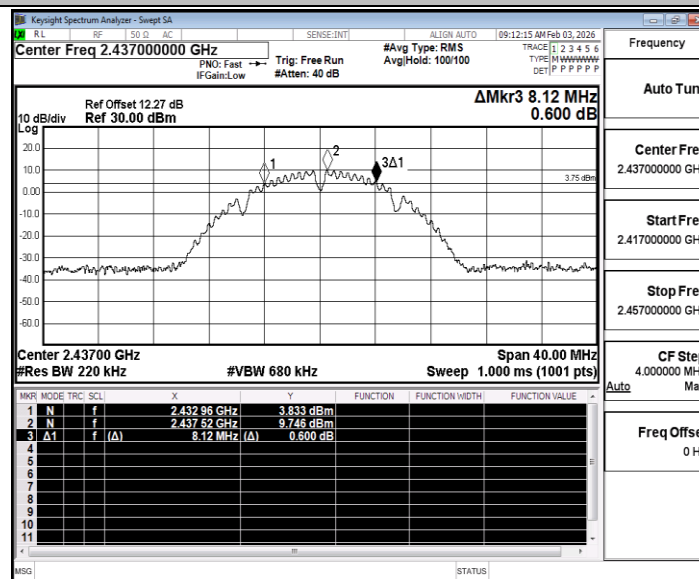
Note :offset=System attenuation +caba loss

Test Graphs

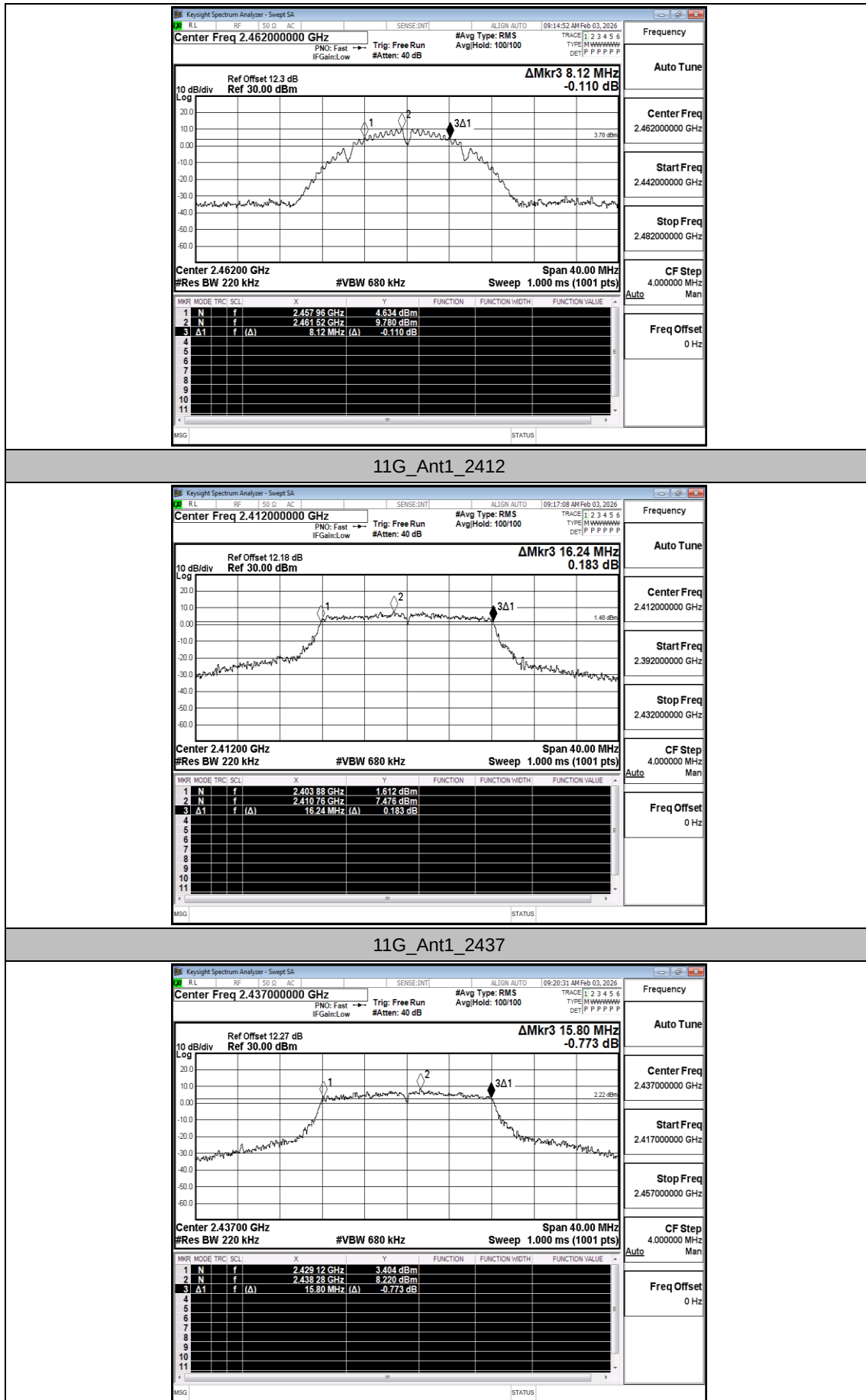
11B_Ant1_2412



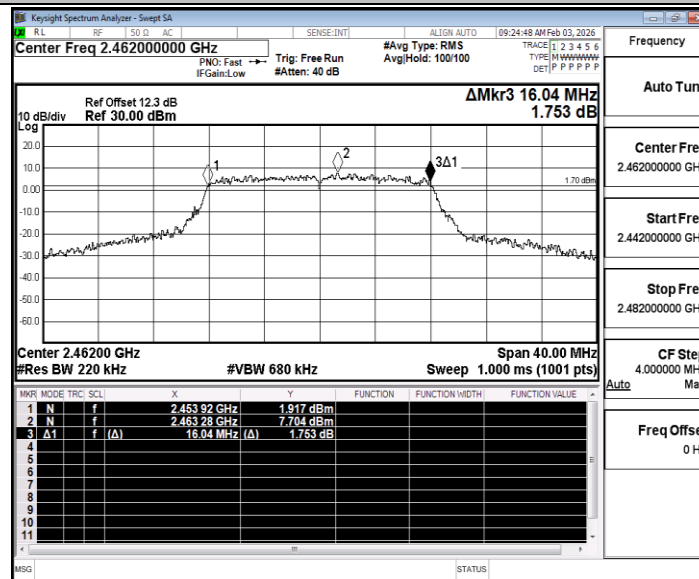
11B_Ant1_2437



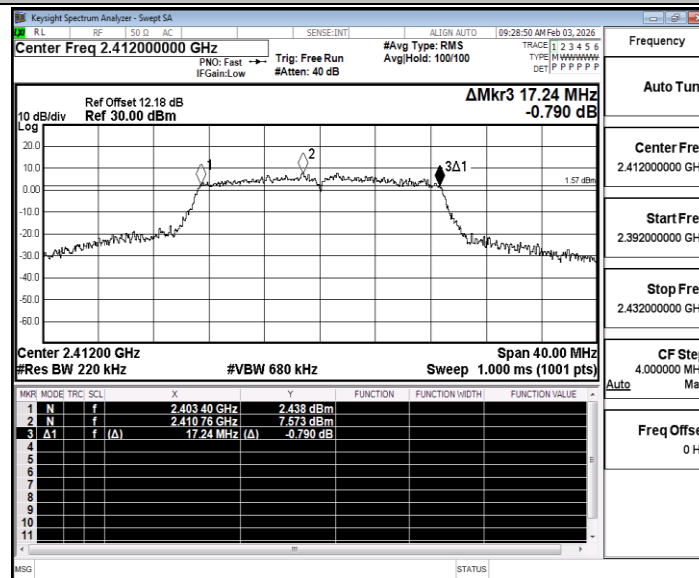
11B_Ant1_2462



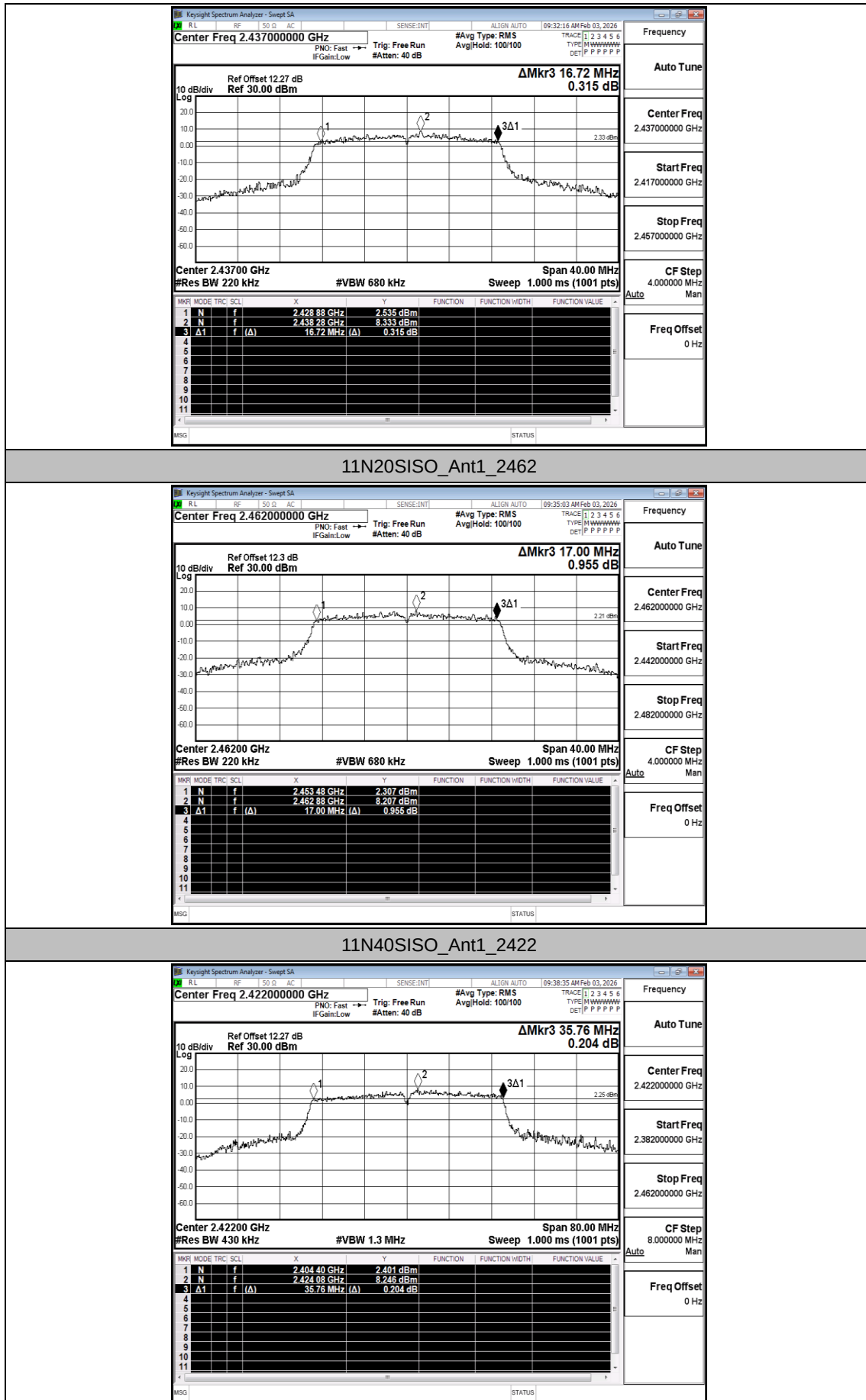
11G_Ant1_2462



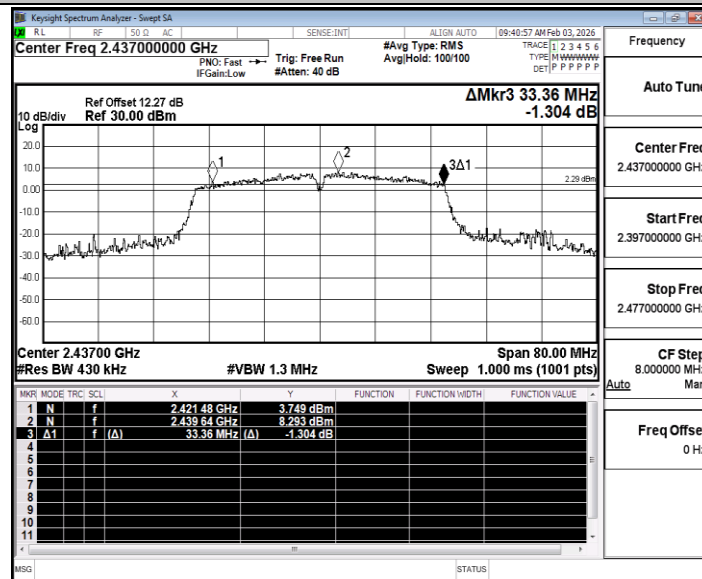
11N20SISO_Ant1_2412



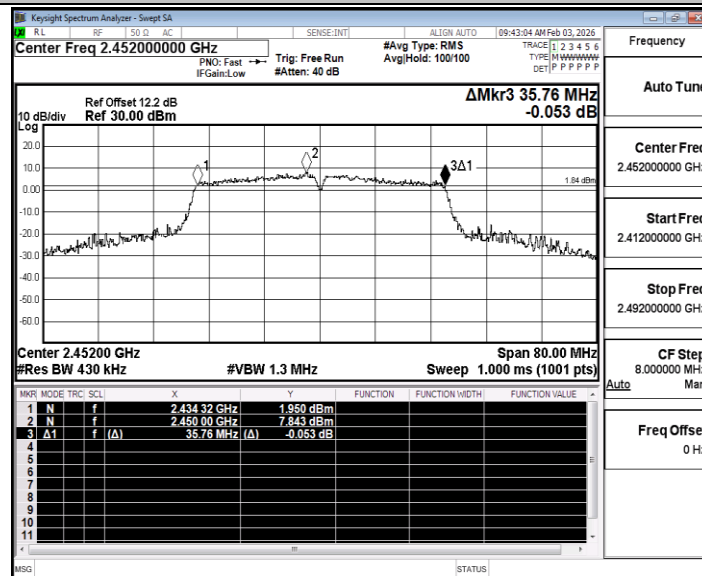
11N20SISO_Ant1_2437



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



A.2 Maximum Average conducted output power

Test Result Average

TestMode	Antenna	Frequency [MHz]	Measured Power	DC Factor [dB]	AV Power [dBm]	Gain [dBi]	Verdict
11B	Ant1	2412	18.95	0.02	18.97	≤30.00	PASS
		2437	19.23	0.02	19.25	≤30.00	PASS
		2462	19.14	0.02	19.16	≤30.00	PASS
11G	Ant1	2412	18.73	0.12	18.85	≤30.00	PASS
		2437	18.72	0.15	18.87	≤30.00	PASS
		2462	18.7	0.15	18.85	≤30.00	PASS
11N20SISO	Ant1	2412	18.99	0.16	19.15	≤30.00	PASS
		2437	19.04	0.13	19.17	≤30.00	PASS
		2462	18.81	0.13	18.94	≤30.00	PASS
11N40SISO	Ant1	2422	18.81	0.26	19.07	≤30.00	PASS
		2437	18.85	0.33	19.18	≤30.00	PASS
		2452	18.74	0.32	19.06	≤30.00	PASS

Note :offset=System attenuation +cabal loss

A.3 Maximum power spectral density

Test Result

TestMode	Antenna	Frequency[MHz]	Measured PSD [dBm/30kHz]	DC Factor [dB]	Result[dBm/30kHz]	Limit[dBm/30kHz]	Verdict
11B	Ant1	2412	-4.54	0.02	-4.52	≤8.00	PASS
		2437	-4.08	0.02	-4.06	≤8.00	PASS
		2462	-3.63	0.02	-3.61	≤8.00	PASS
11G	Ant1	2412	-7.08	0.12	-6.96	≤8.00	PASS
		2437	-6.42	0.15	-6.27	≤8.00	PASS
		2462	-6.88	0.15	-6.73	≤8.00	PASS
11N20SISO	Ant1	2412	-7.33	0.16	-7.17	≤8.00	PASS
		2437	-6.19	0.13	-6.06	≤8.00	PASS
		2462	-6.74	0.13	-6.61	≤8.00	PASS
11N40SISO	Ant1	2422	-9.8	0.26	-9.54	≤8.00	PASS
		2437	-9.23	0.33	-8.9	≤8.00	PASS
		2452	-9.14	0.32	-8.82	≤8.00	PASS

Note :offset=System attenuation +cable loss

11B_Ant1_2412

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.412000000 GHz

Ref Offset 12.18 dB
Ref 20.00 dBm

Mkr1 2.412 818 GHz
-4.537 dBm

Span 26.25 MHz

Center 2.41200 GHz
#Res BW 30 kHz
#VBW 100 kHz*
Sweep 35.79 ms (3000 pts)

11B_Ant1_2437

Keysight Spectrum Analyzer - Swept SA

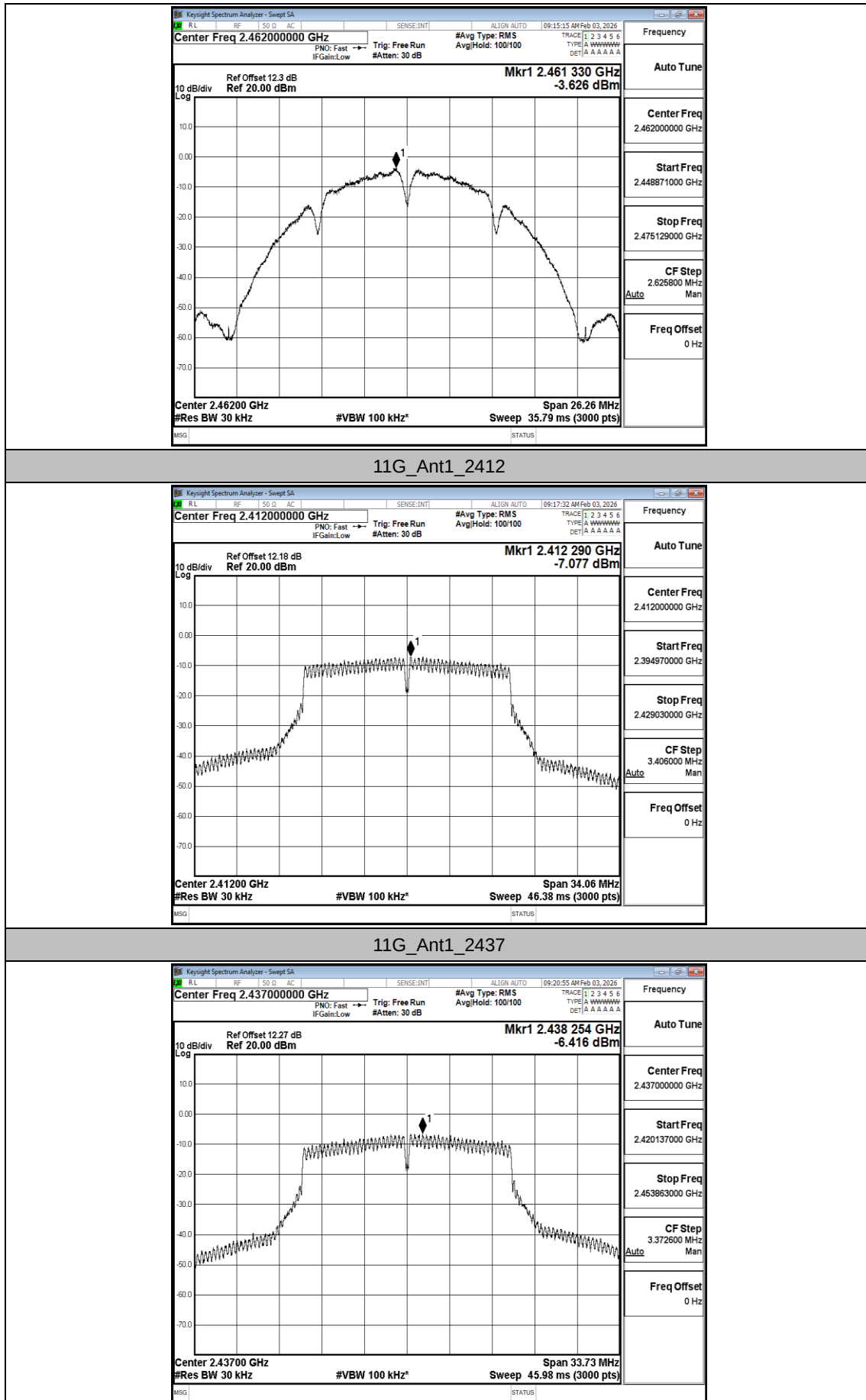
Center Freq 2.437000000 GHz

Ref Offset 12.27 dB
Ref 20.00 dBm

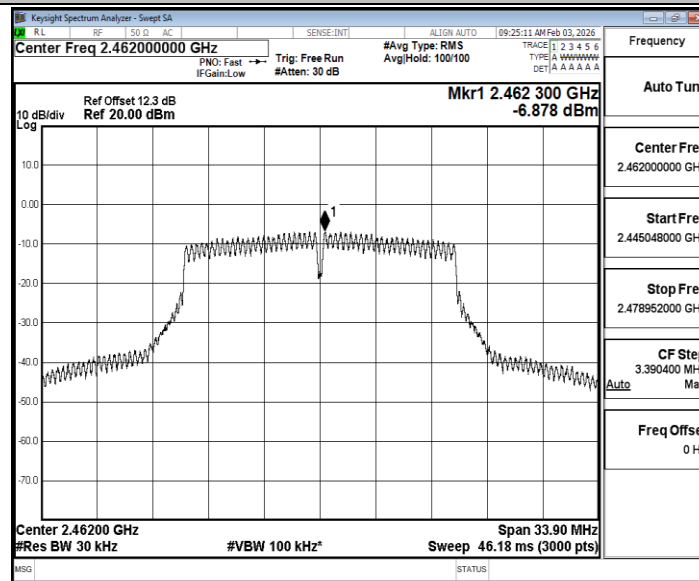
Mkr1 2.437 706 GHz
-4.075 dBm

Span 25.68 MHz

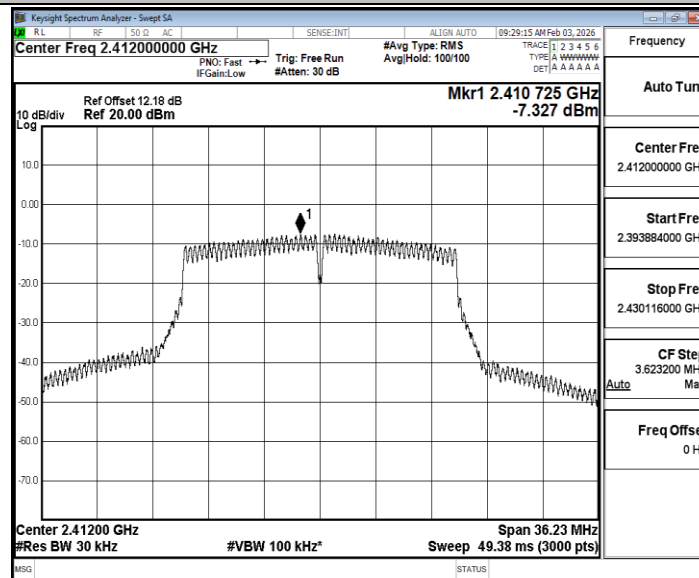
Center 2.43700 GHz
#Res BW 30 kHz
#VBW 100 kHz*
Sweep 34.99 ms (3000 pts)



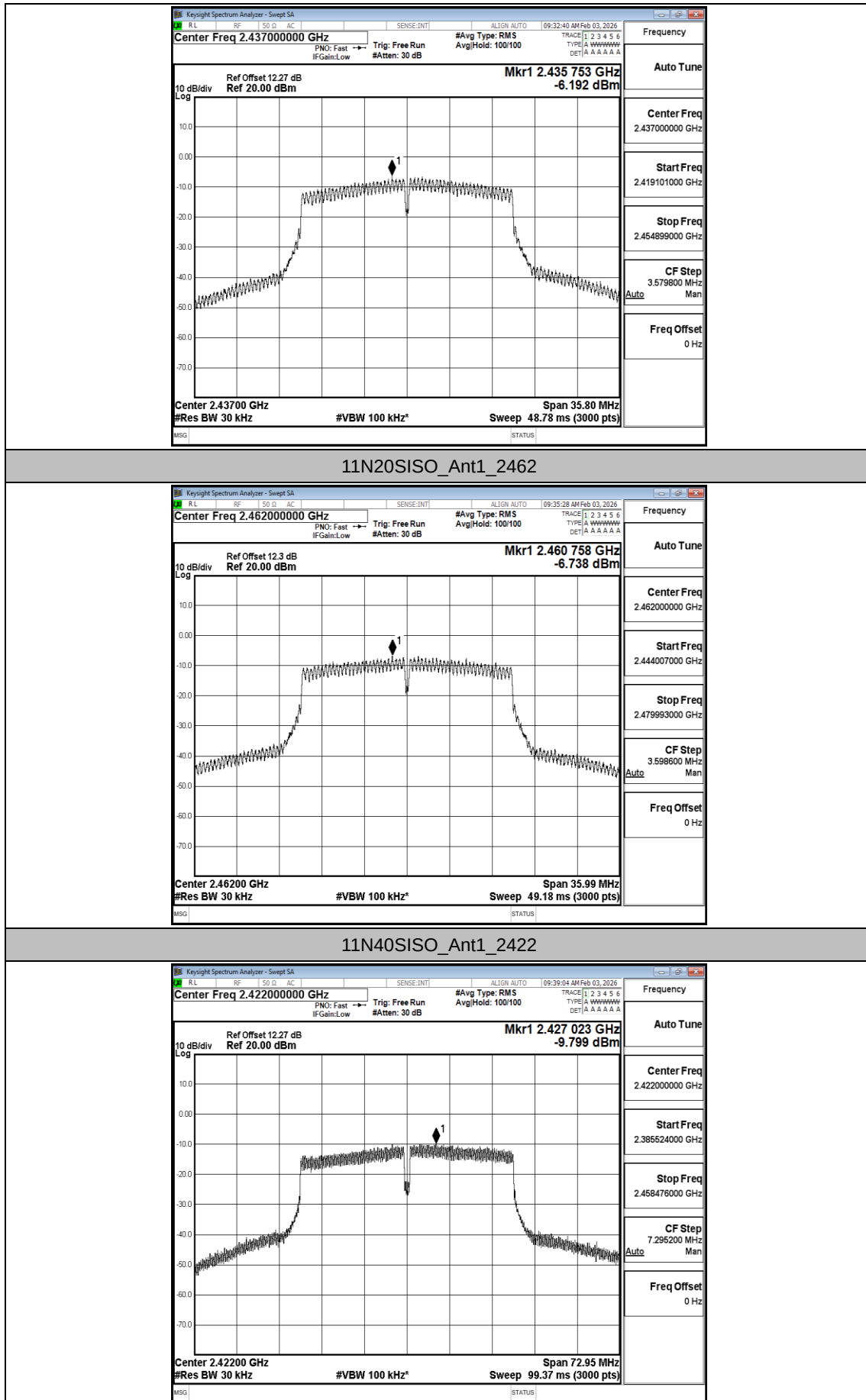
11G_Ant1_2462



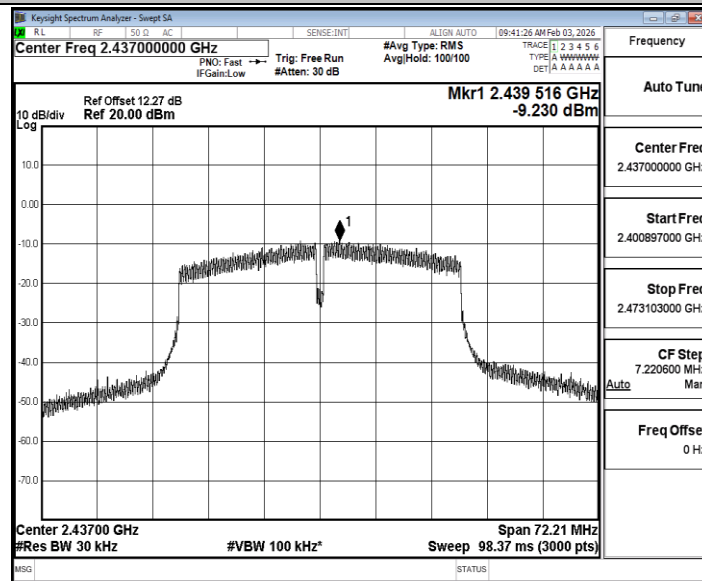
11N20SISO_Ant1_2412



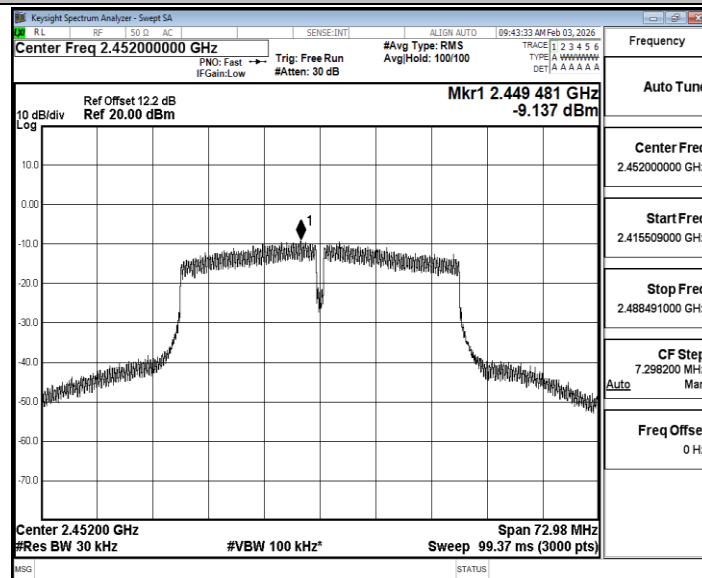
11N20SISO_Ant1_2437



11N40SISO_Ant1_2437



11N40SISO_Ant1_2452



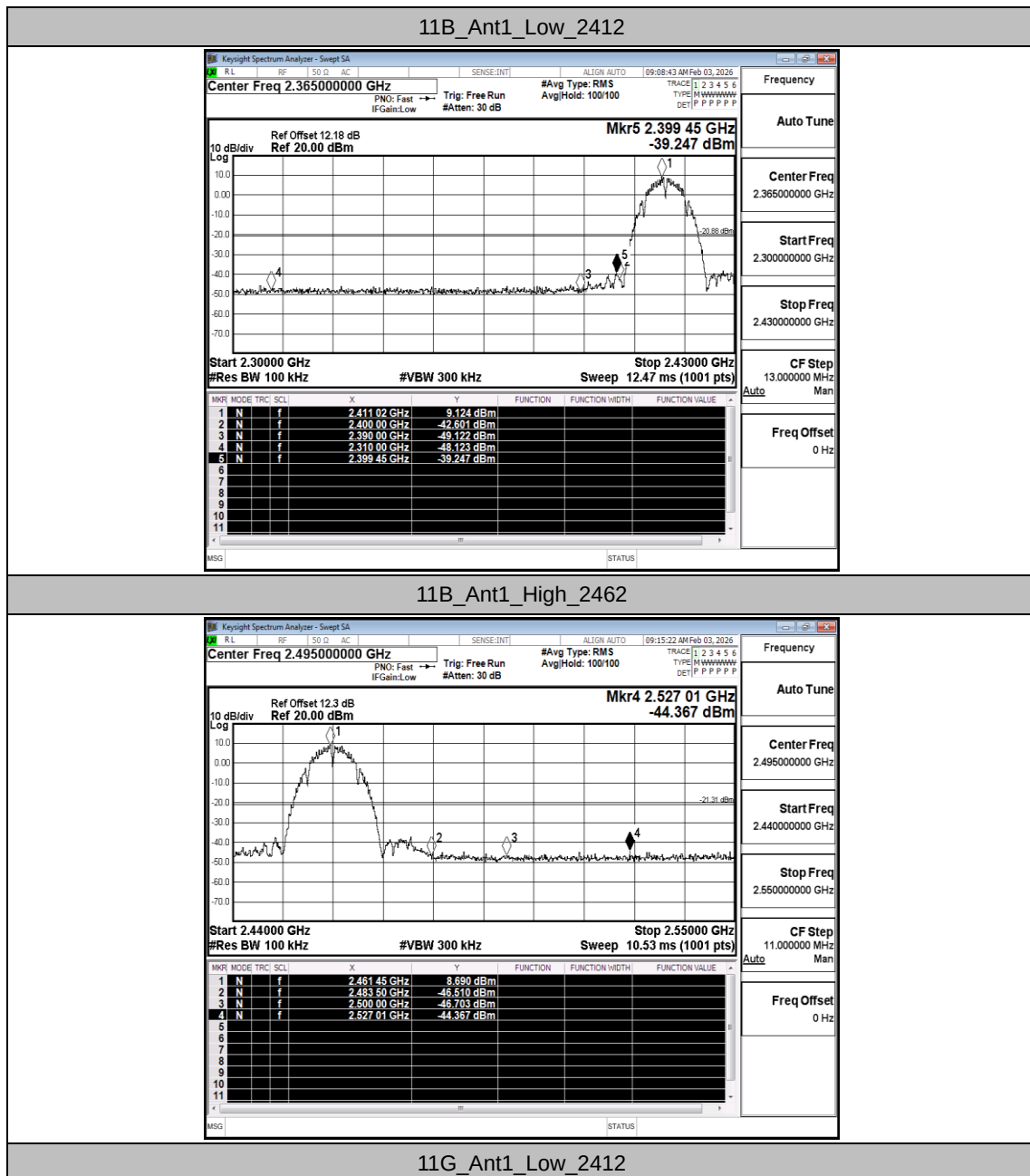
A.4 Band edge measurements

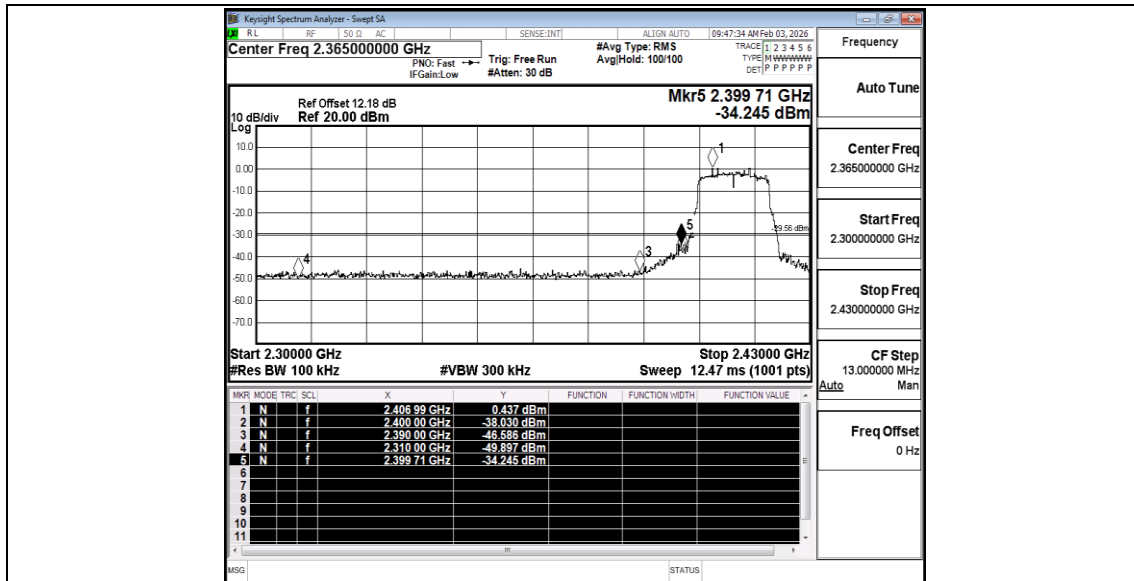
Test Result

TestMode	Antenna	Channel Name	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	9.12	-39.25	≤-20.88	PASS
		High	2462	8.69	-44.37	≤-21.31	PASS
11G	Ant1	Low	2412	0.44	-34.25	≤-29.56	PASS
		High	2462	7.06	-39.25	≤-22.94	PASS
11N20SISO	Ant1	Low	2412	1.45	-35.05	≤-28.55	PASS
		High	2462	6.54	-36.37	≤-23.46	PASS
11N40SISO	Ant1	Low	2422	0.67	-35.04	≤-29.33	PASS
		High	2452	4.31	-27.83	≤-25.69	PASS

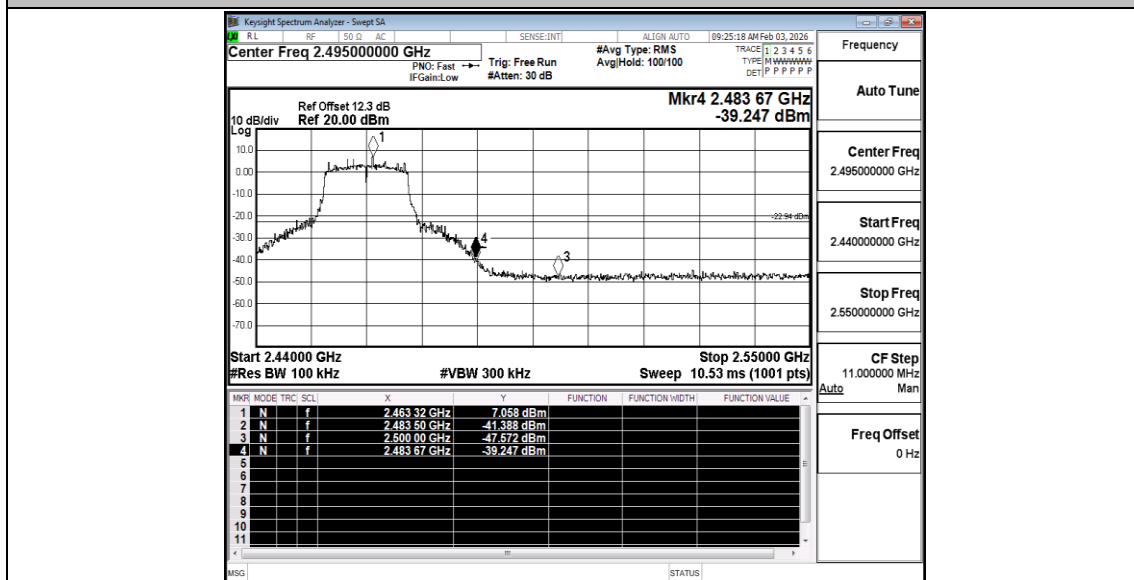
Note :offset=System attenuation +cable loss

Test Graphs

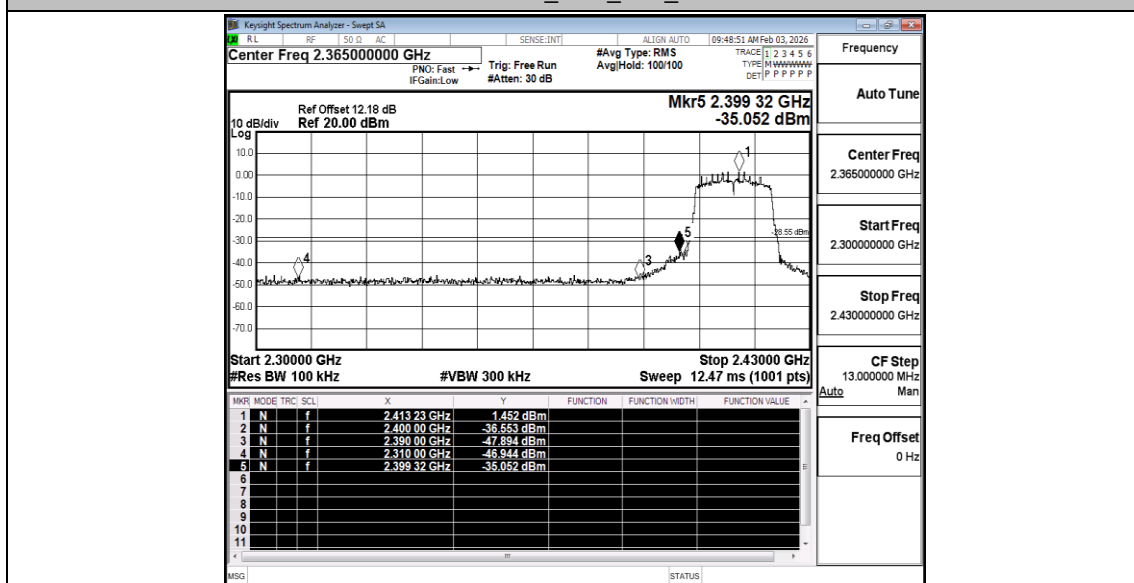




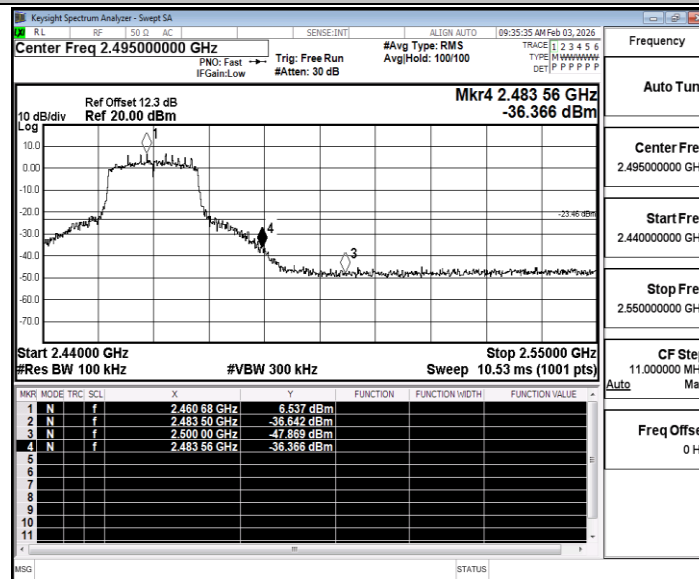
11G_Ant1_High_2462



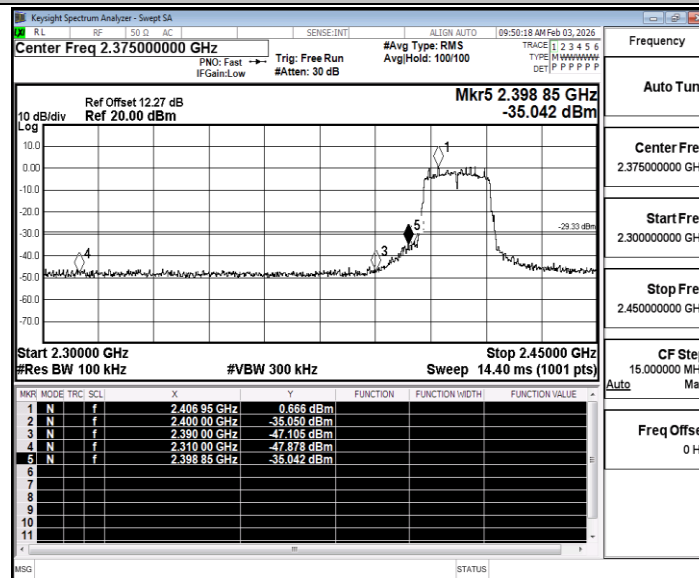
11N20SISO_Ant1_Low_2412



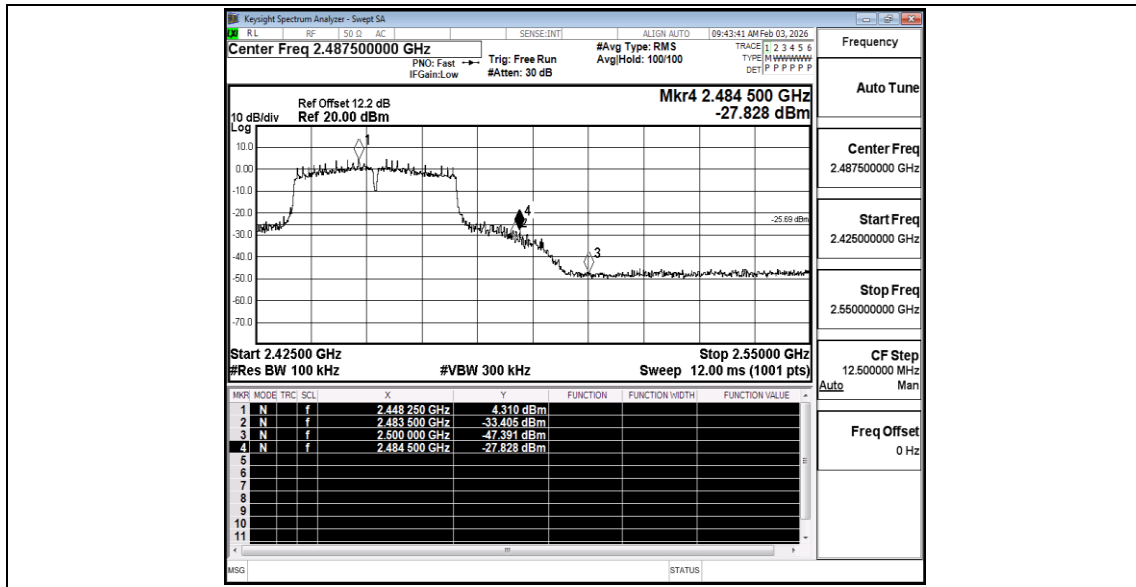
11N20SISO_Ant1_High_2462



11N40SISO_Ant1_Low_2422



11N40SISO_Ant1_High_2452



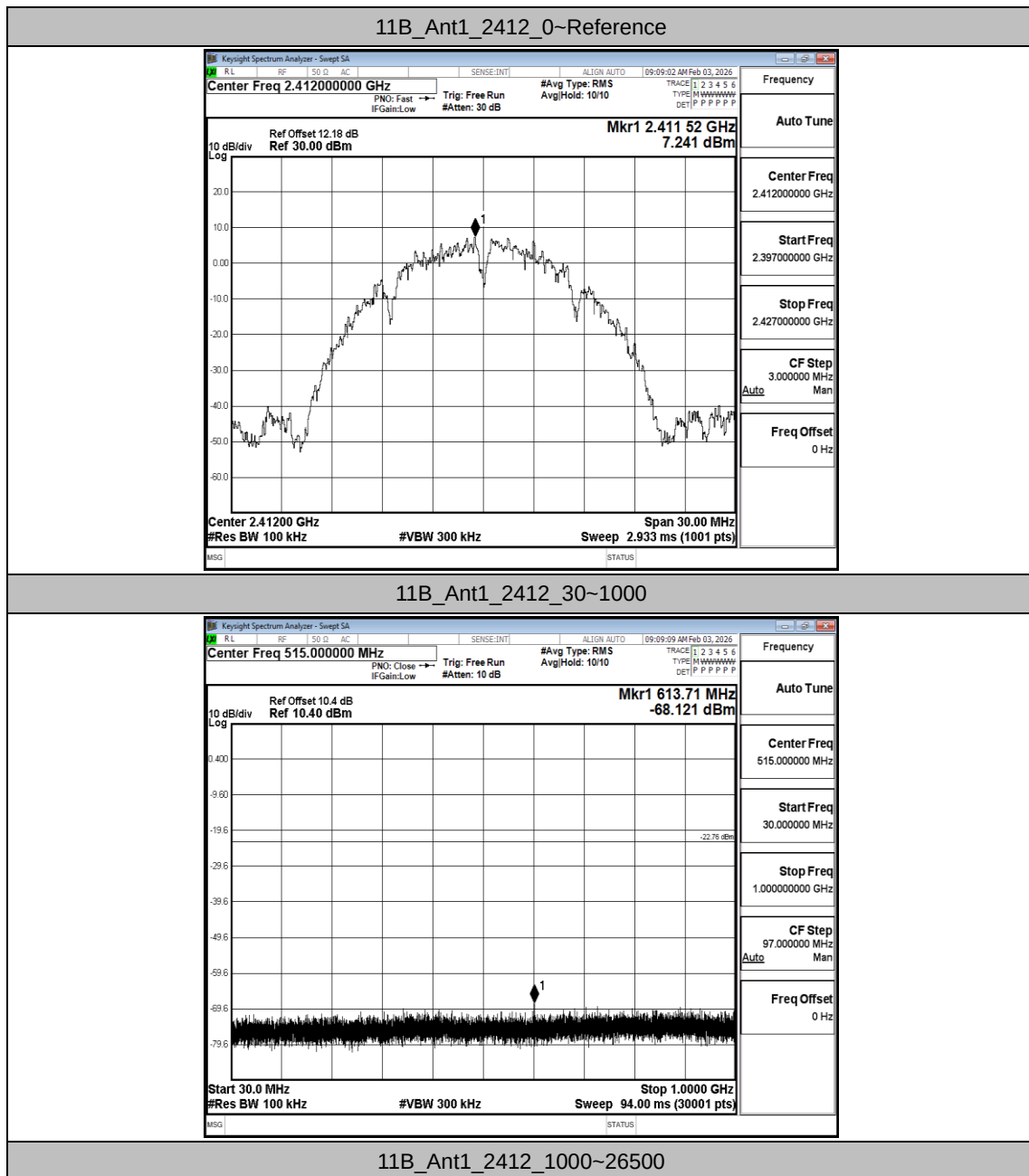
A.5 Conducted Spurious Emission

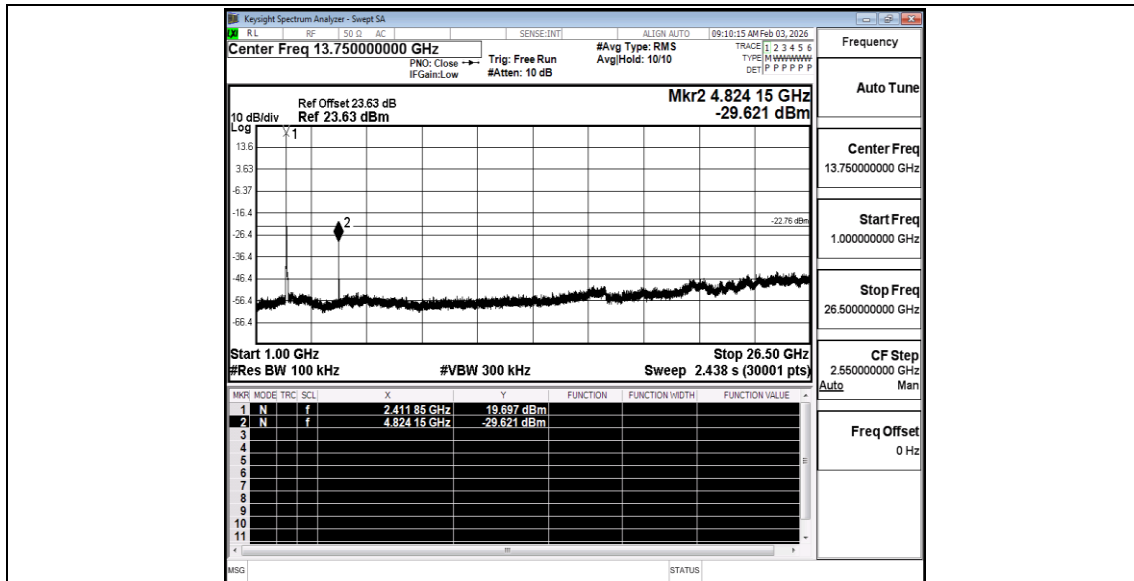
Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	7.24	7.24	---	PASS
			30~1000	7.24	-68.12	≤-22.76	PASS
			1000~26500	7.24	-29.62	≤-22.76	PASS
		2437	Reference	8.62	8.62	---	PASS
			30~1000	8.62	-68.07	≤-21.38	PASS
			1000~26500	8.62	-32.92	≤-21.38	PASS
		2462	Reference	7.05	7.05	---	PASS
			30~1000	7.05	-68.87	≤-22.95	PASS
			1000~26500	7.05	-30.19	≤-22.95	PASS
11G	Ant1	2412	Reference	5.15	5.15	---	PASS
			30~1000	5.15	-69.35	≤-24.85	PASS
			1000~26500	5.15	-43.37	≤-24.85	PASS
		2437	Reference	3.43	3.43	---	PASS
			30~1000	3.43	-68.1	≤-26.57	PASS
			1000~26500	3.43	-43.86	≤-26.57	PASS
		2462	Reference	5.49	5.49	---	PASS
			30~1000	5.49	-68.11	≤-24.51	PASS
			1000~26500	5.49	-43.28	≤-24.51	PASS
11N20SISO	Ant1	2412	Reference	4.34	4.34	---	PASS
			30~1000	4.34	-68.9	≤-25.66	PASS
			1000~26500	4.34	-42.8	≤-25.66	PASS
		2437	Reference	6.31	6.31	---	PASS
			30~1000	6.31	-68.8	≤-23.69	PASS
			1000~26500	6.31	-43.45	≤-23.69	PASS
		2462	Reference	4.41	4.41	---	PASS
			30~1000	4.41	-69	≤-25.59	PASS
			1000~26500	4.41	-42.13	≤-25.59	PASS
11N40SISO	Ant1	2422	Reference	3.55	3.55	---	PASS
			30~1000	3.55	-68.62	≤-26.45	PASS
			1000~26500	3.55	-43.03	≤-26.45	PASS
		2437	Reference	2.24	2.24	---	PASS
			30~1000	2.24	-68.64	≤-27.76	PASS
			1000~26500	2.24	-43.02	≤-27.76	PASS
		2452	Reference	2.73	2.73	---	PASS
			30~1000	2.73	-68.46	≤-27.27	PASS
			1000~26500	2.73	-43.14	≤-27.27	PASS

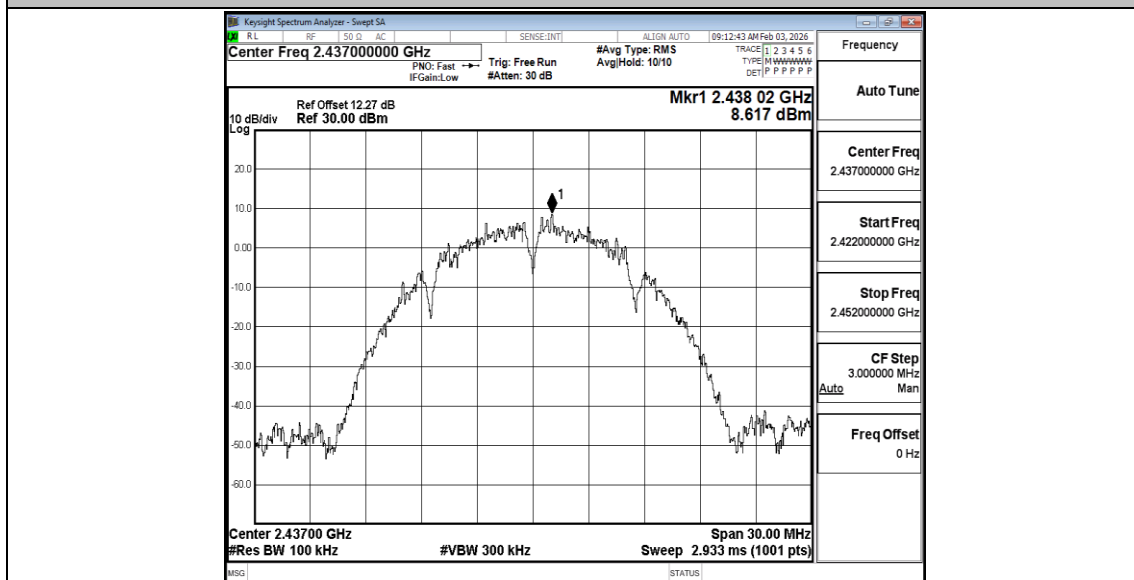
Note :Regarding the spurious emissions from 30MHz to 26.5GHz, the cable lose have been set in the CORREC' of the Spectrum Analyzer during the test.

Test Graphs

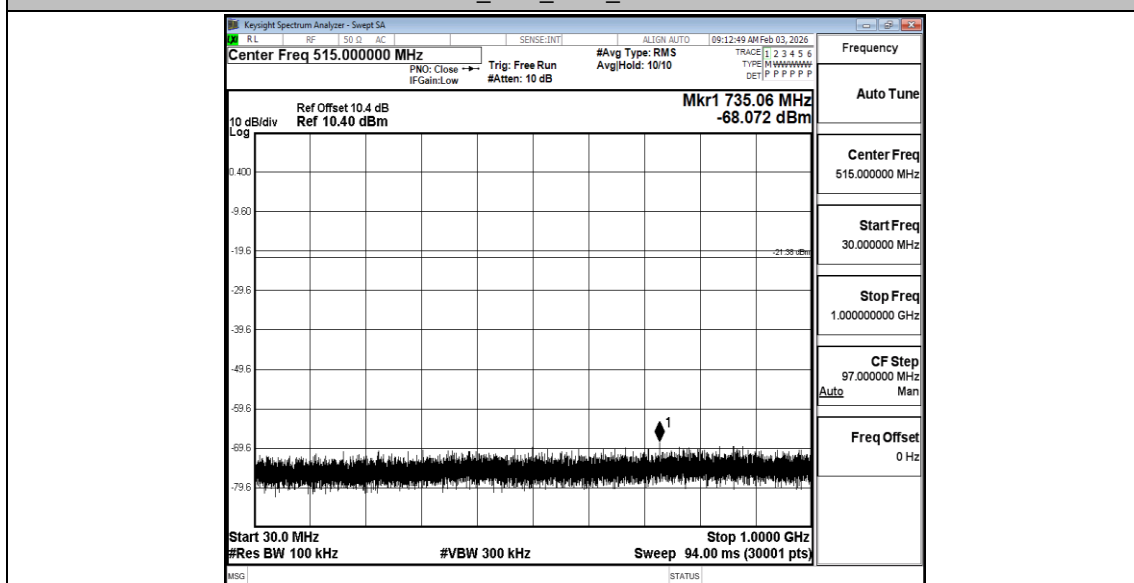




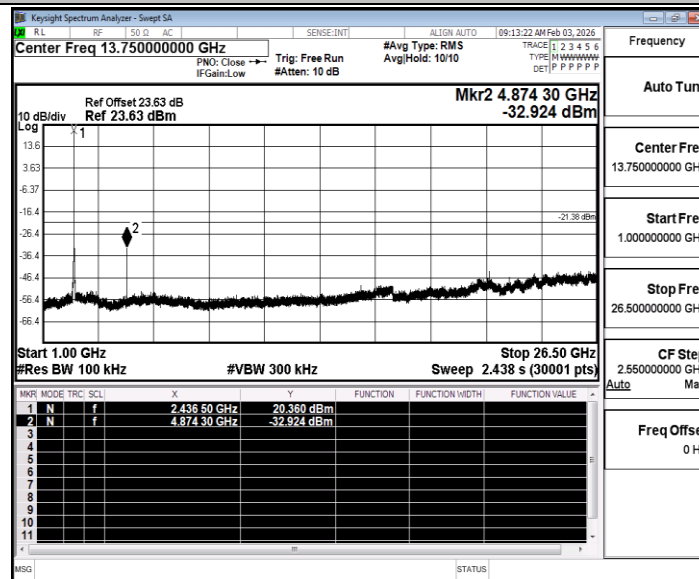
11B_Ant1_2437_0~Reference



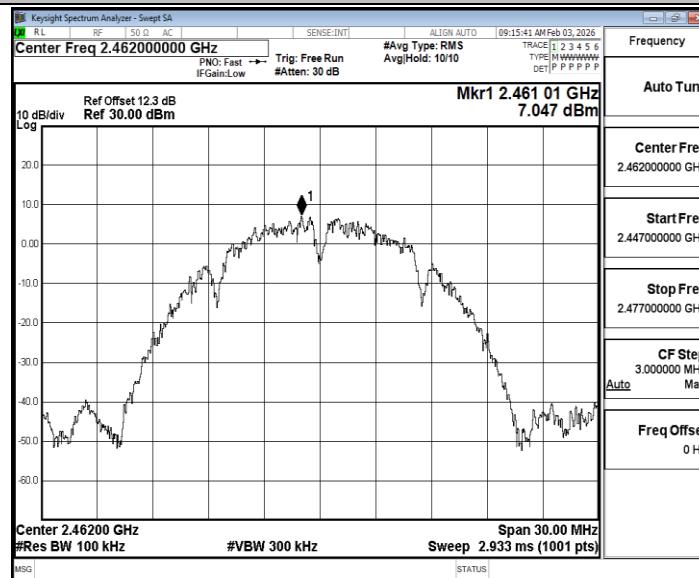
11B_Ant1_2437_30~1000



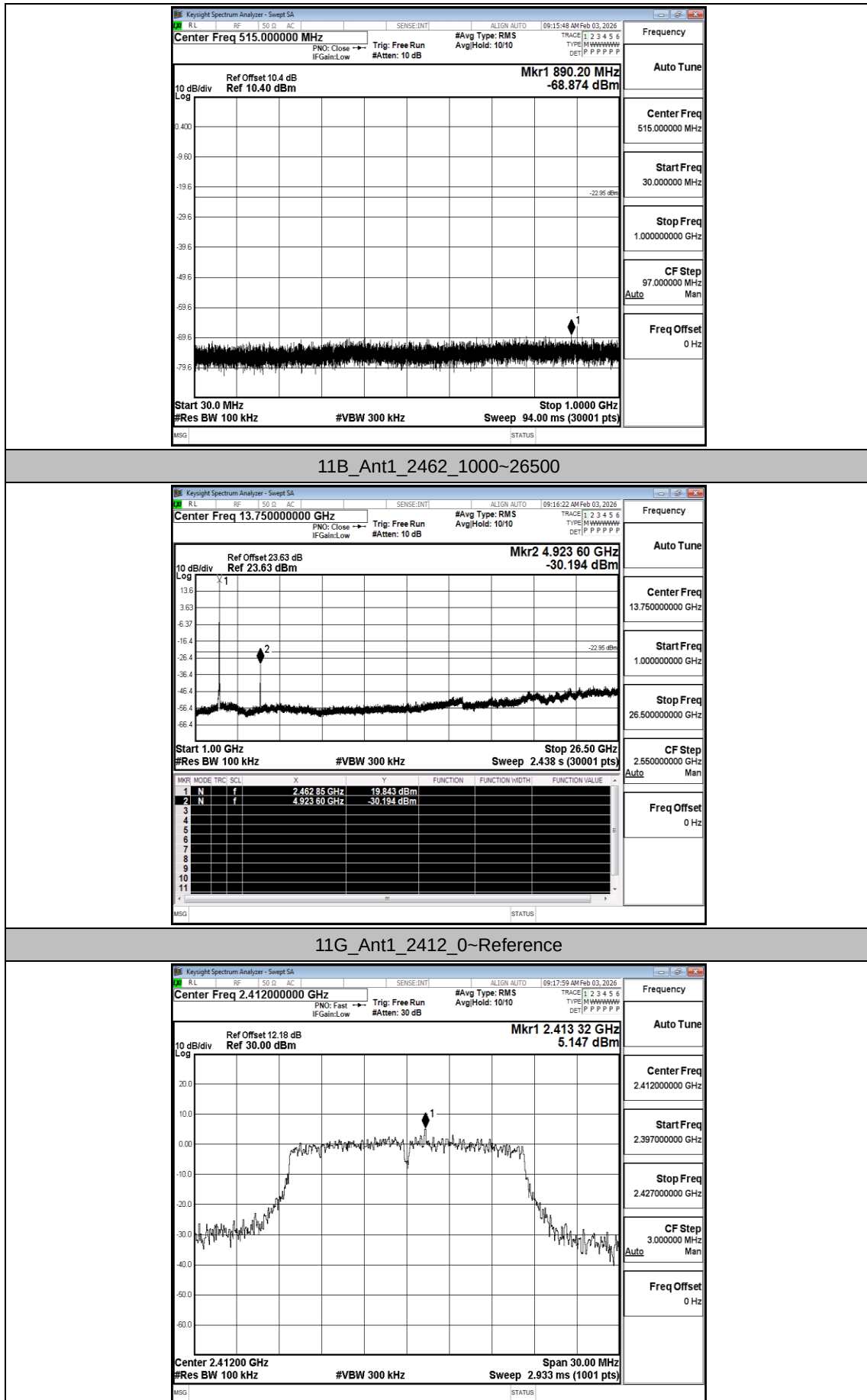
11B_Ant1_2437_1000~26500



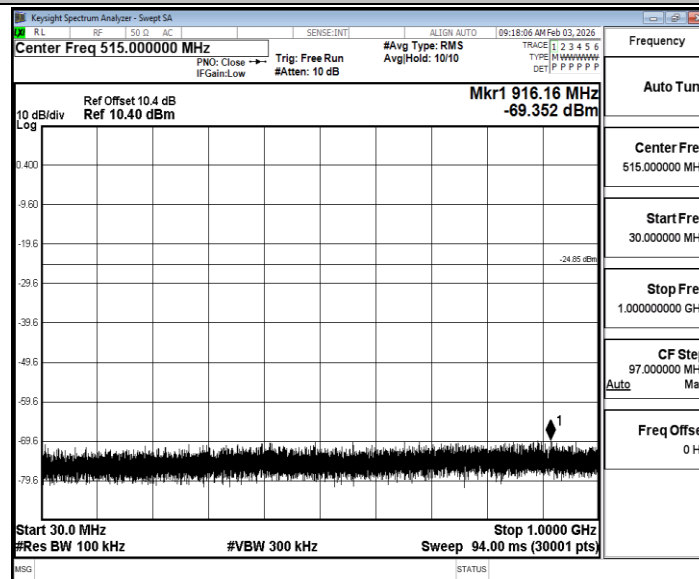
11B_Ant1_2462_0~Reference



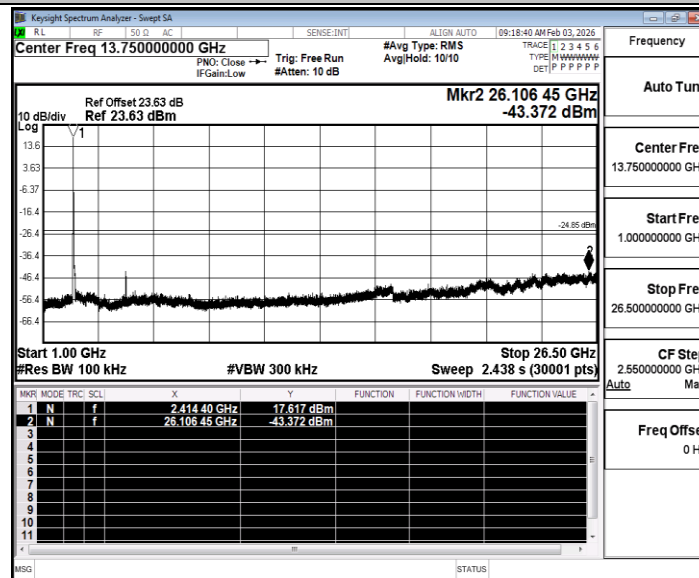
11B_Ant1_2462_30~1000



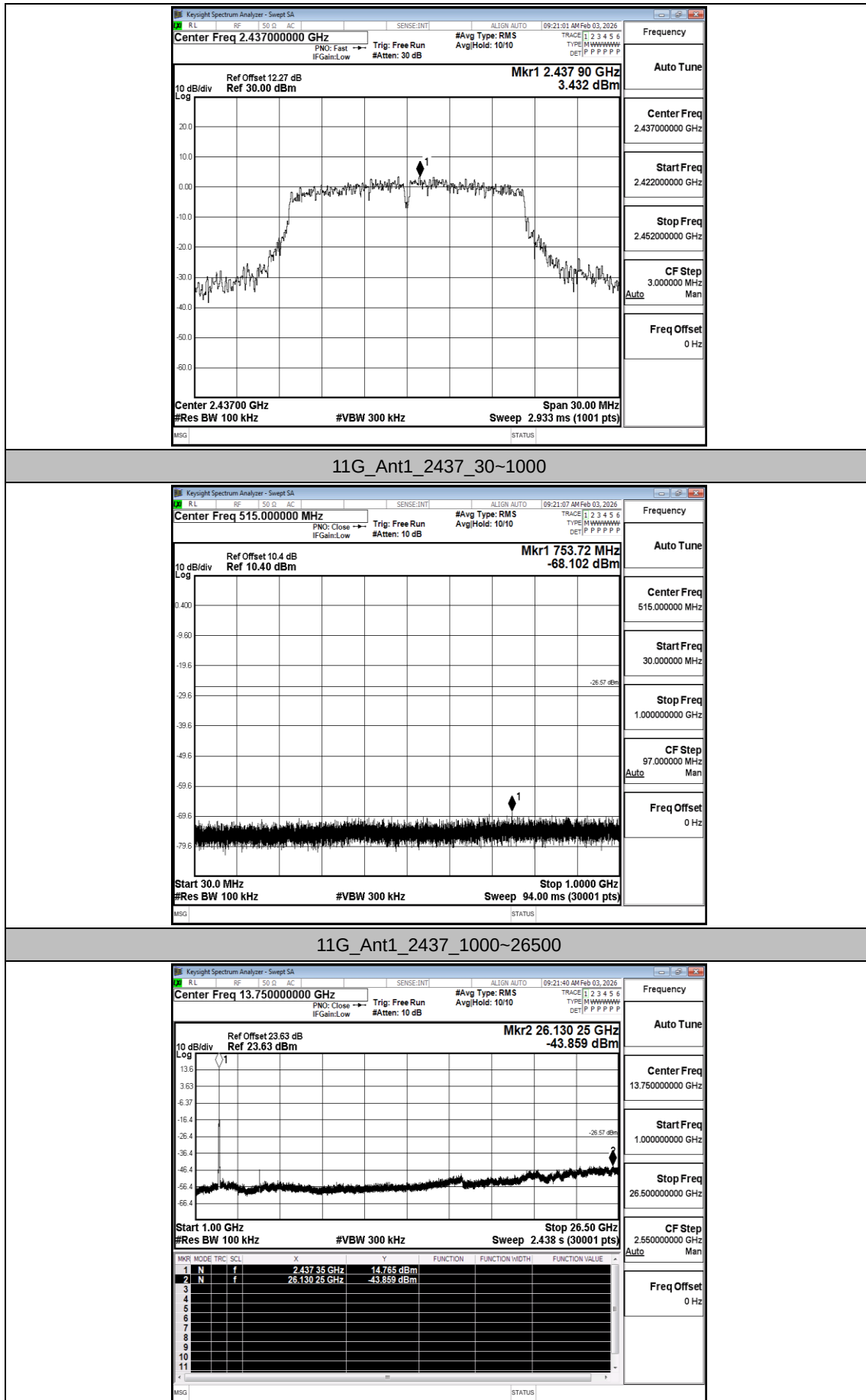
11G_Ant1_2412_30~1000



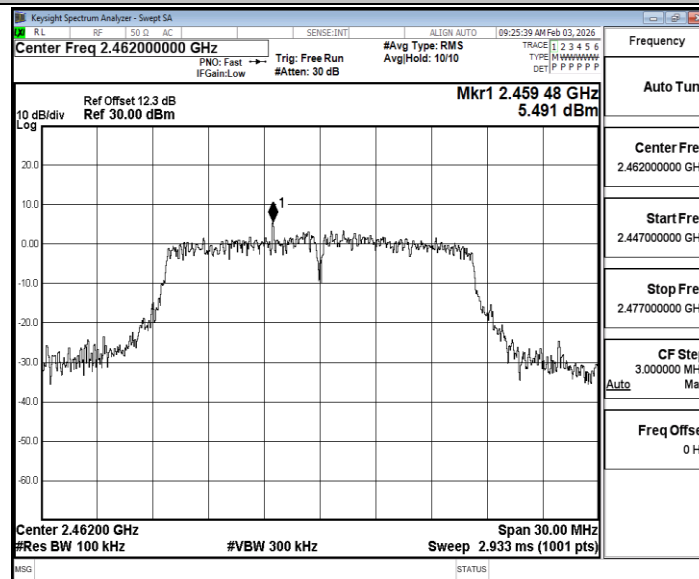
11G_Ant1_2412_1000~26500



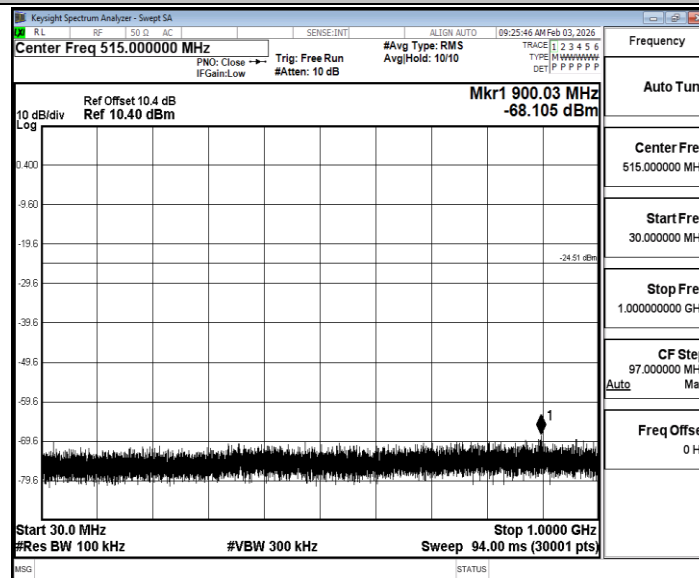
11G_Ant1_2437_0~Reference



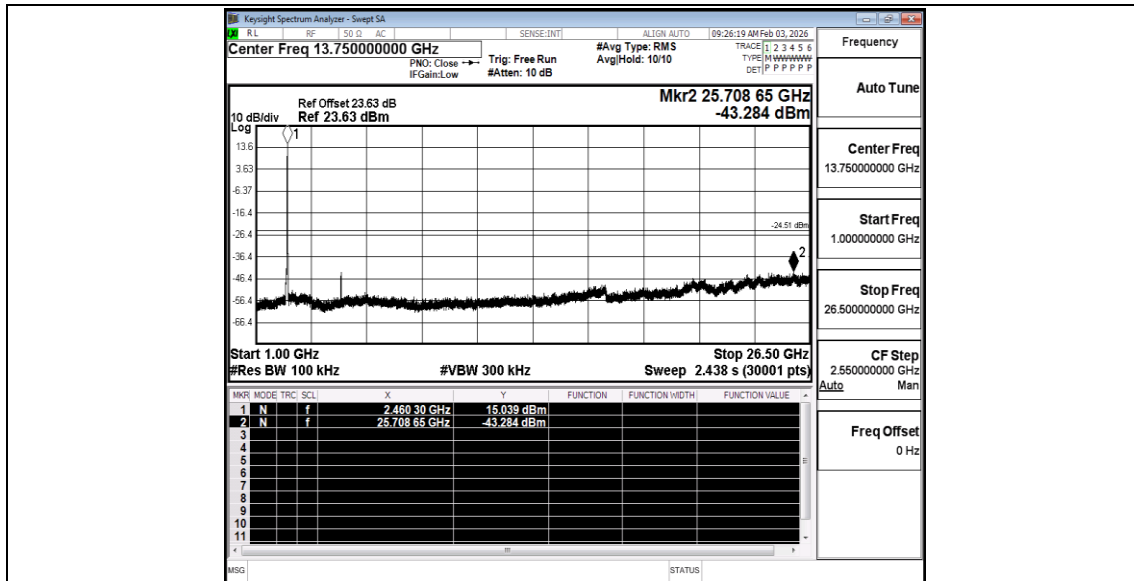
11G_Ant1_2462_0~Reference



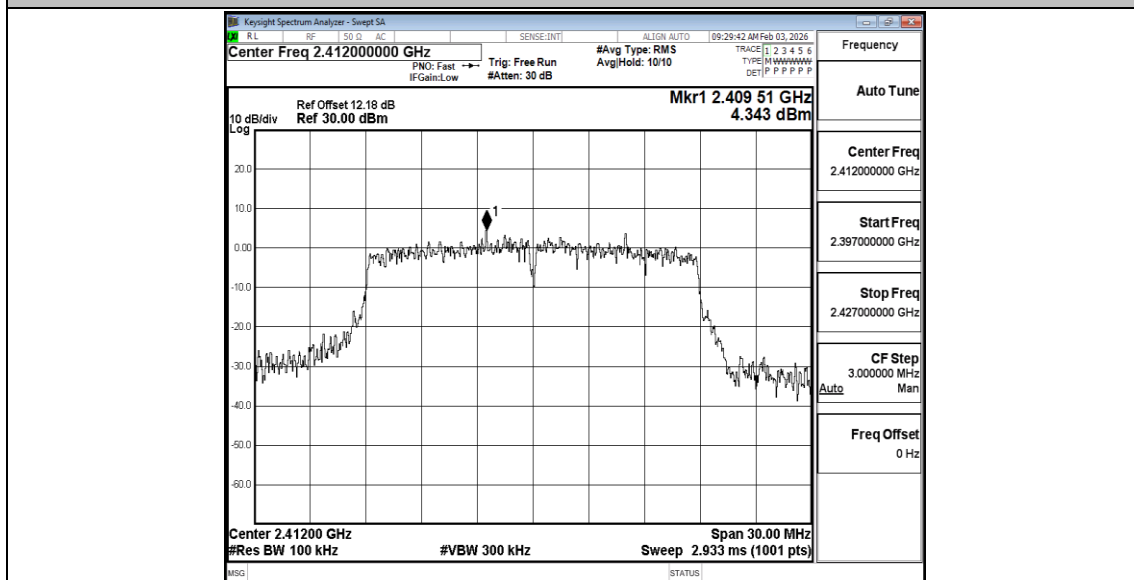
11G_Ant1_2462_30~1000



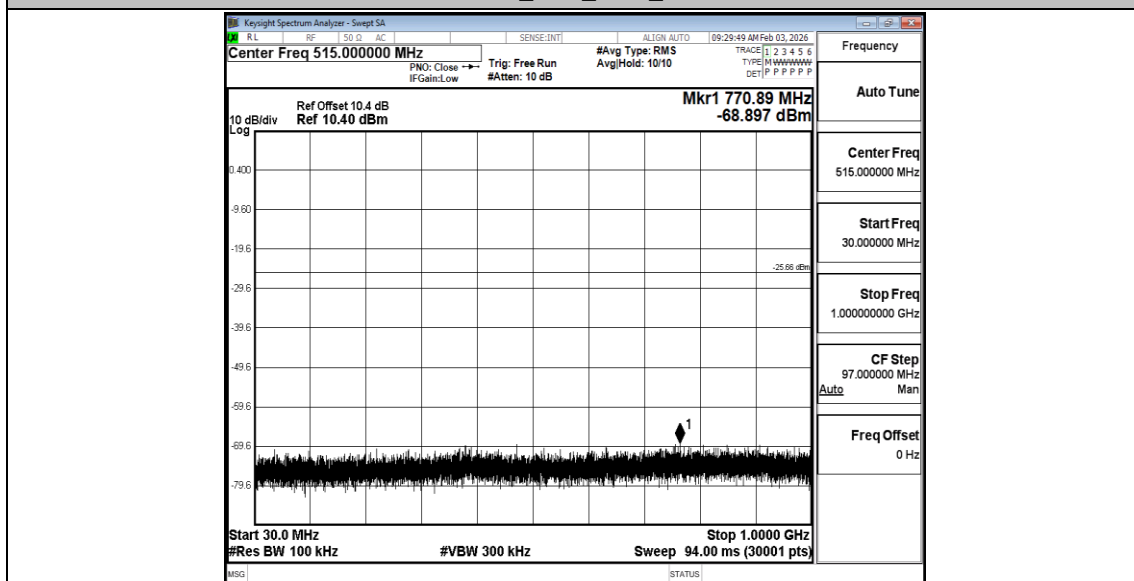
11G_Ant1_2462_1000~26500



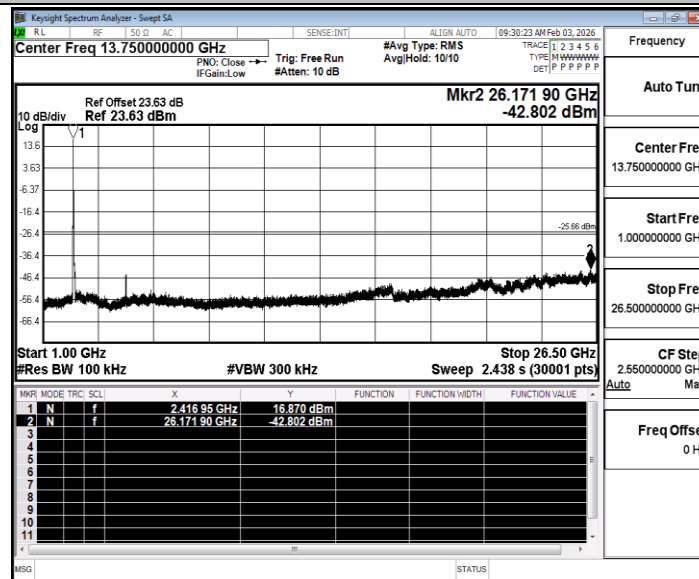
11N20SISO_Ant1_2412_0-Reference



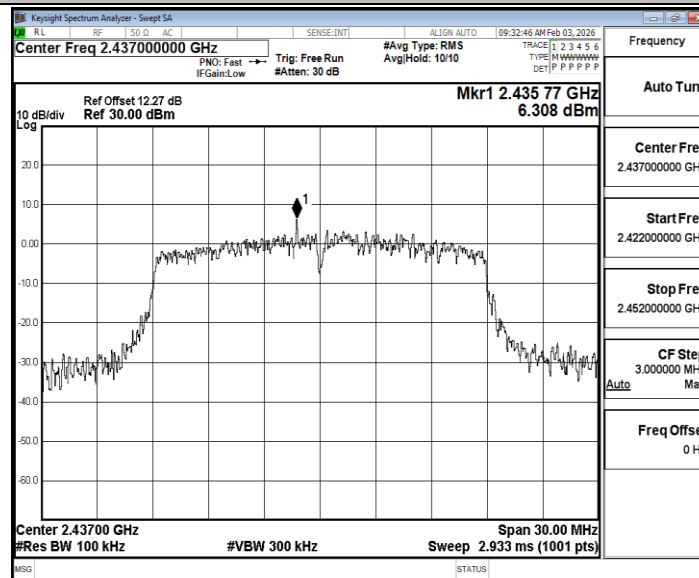
11N20SISO_Ant1_2412_30~1000



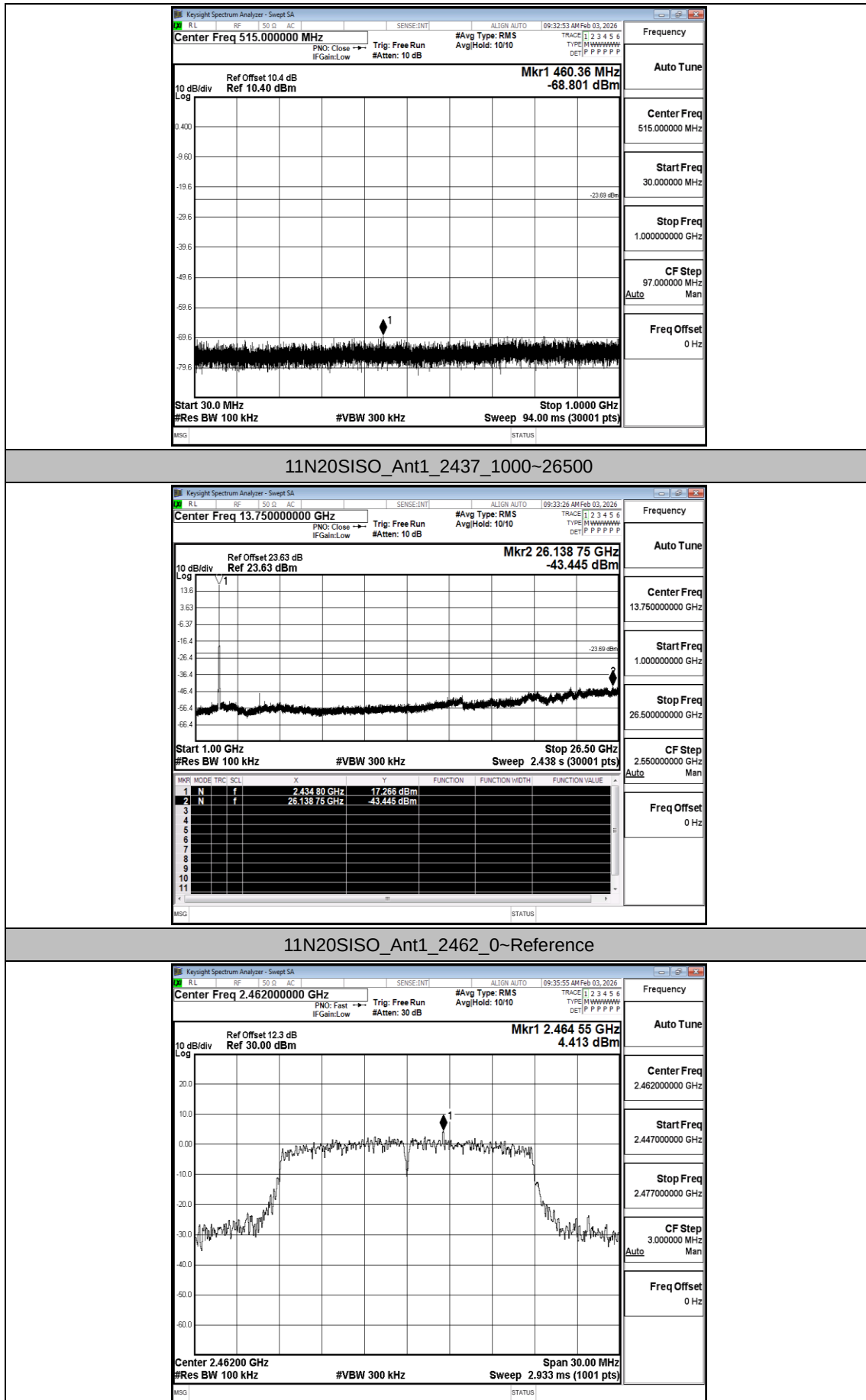
11N20SISO_Ant1_2412_1000~26500



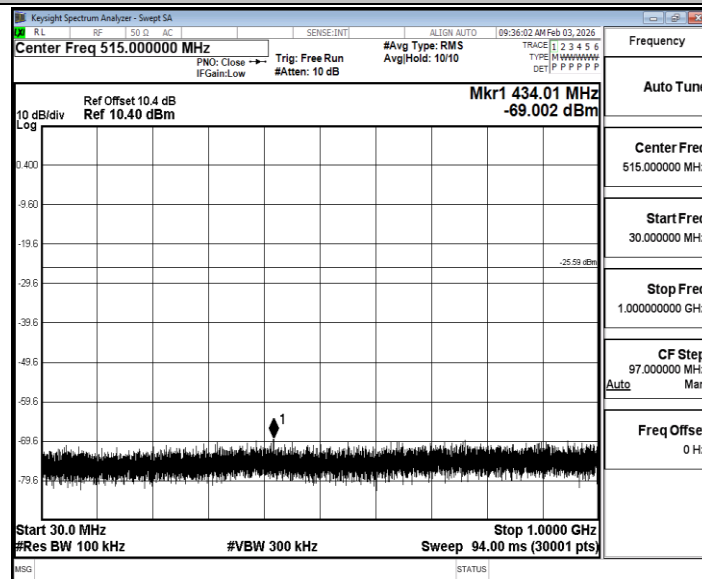
11N20SISO_Ant1_2437_0~Reference



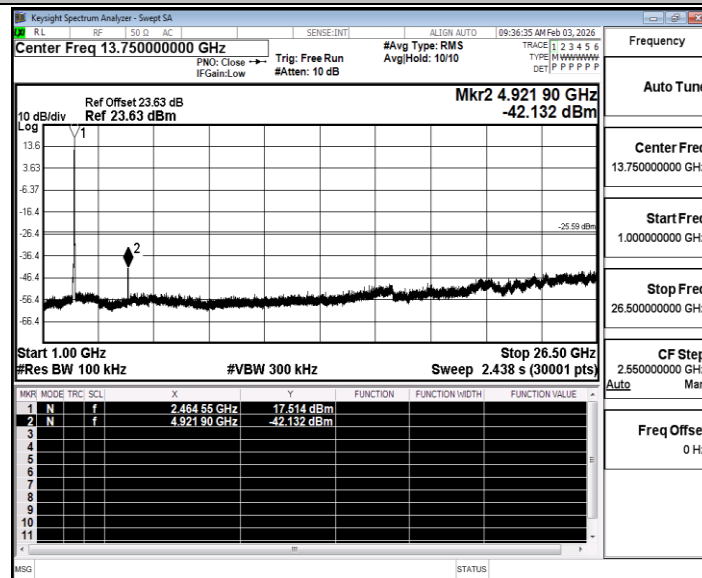
11N20SISO_Ant1_2437_30~1000



11N20SISO_Ant1_2462_30~1000



11N20SISO_Ant1_2462_1000~26500



11N40SISO_Ant1_2422_0~Reference

