Appendix P: Test Data for NB1 Band 12

Product Name: IoTgo Track-Solar iot

Test Model: iot

Environmental Conditions

Temperature:	23.8°C
Relative Humidity:	52.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Can Kun
Supervised by:	Nick Peng

P.1 Conducted Output Power Data for NB1

Test Result

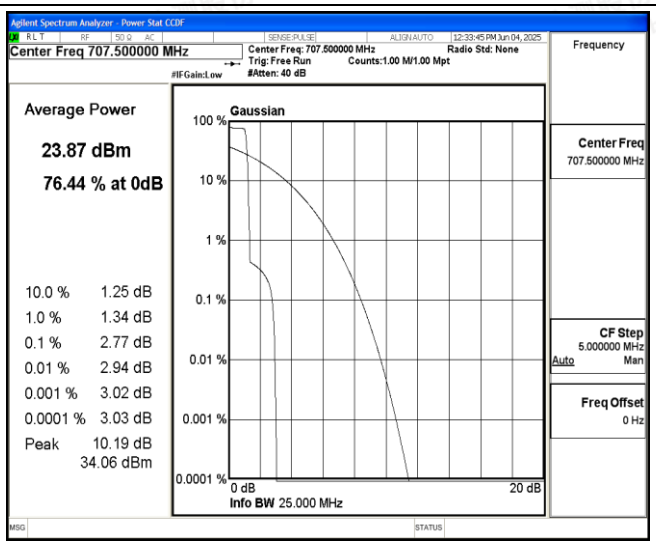
Band	OpMode	SCS	BW	Modu	Channel	Tones	Result (dBm)	Limit (dBm)	Verdict
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23011	1@0	22.84	-999 To 34.8	PASS
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23011	1@47	22.77	-999 To 34.8	PASS
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23095	1@0	22.85	-999 To 34.8	PASS
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23095	1@47	22.83	-999 To 34.8	PASS
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23179	1@0	22.77	-999 To 34.8	PASS
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23179	1@47	22.72	-999 To 34.8	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@0	22.83	-999 To 34.8	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@47	22.76	-999 To 34.8	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@0	22.85	-999 To 34.8	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@47	22.83	-999 To 34.8	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@0	22.81	-999 To 34.8	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@47	22.75	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@0	21.65	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@11	21.61	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	3@3	22.96	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@0	21.78	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@11	22.76	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	3@3	23.04	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@0	22.74	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@11	21.70	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	3@3	23.05	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	1@0	21.74	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	1@11	21.69	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	3@3	22.88	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	1@0	21.84	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	1@11	21.76	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	3@3	23.04	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	1@0	21.76	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	1@11	21.66	-999 To 34.8	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	3@3	22.93	-999 To 34.8	PASS

P.2 Peak-to-Average Ratio(CCDF) for NB1

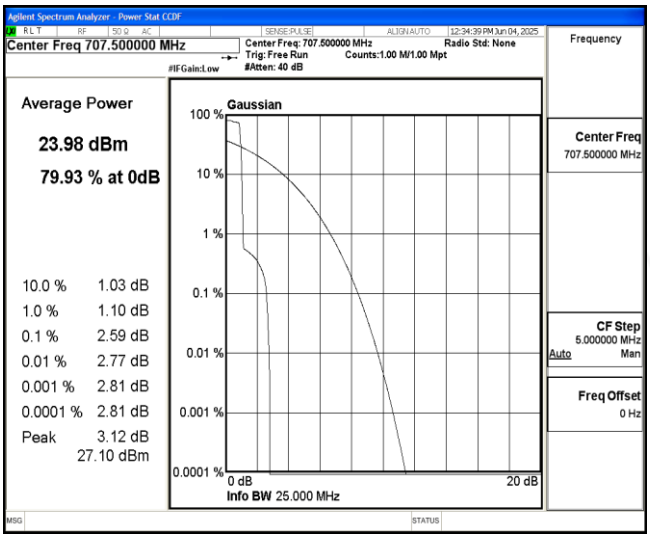
Test Result

Band	OpMode	SCS	BW	Modu	Channel	Tones	Result (dBm)	Limit (dBm)	Verdict
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23095	1@0	2.77	<=13	PASS
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23095	1@47	2.59	<=13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@0	3.75	<=13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@47	3.47	<=13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@0	8.64	<=13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@11	5.89	<=13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	3@3	10.97	<=13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	1@0	7.35	<=13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	1@11	5.88	<=13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	3@3	10.52	<=13	PASS

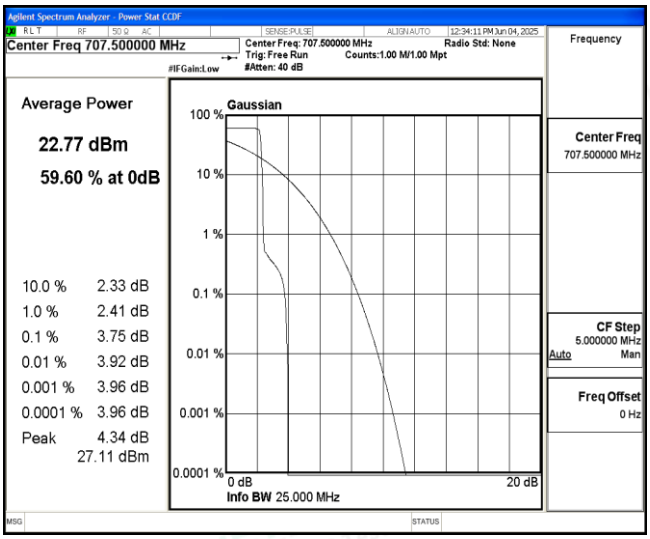
Test Graphs



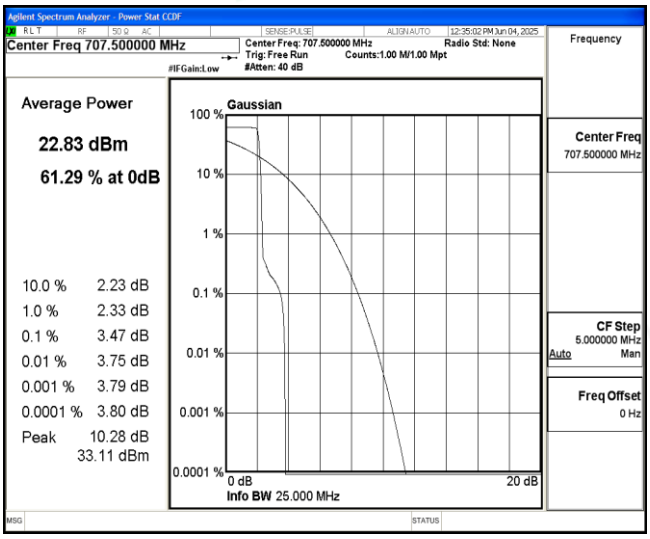
Band12-Stand-Alone-NaN-BPSK-23095-1@0-3.75kHz-2.77-<=13-PASS



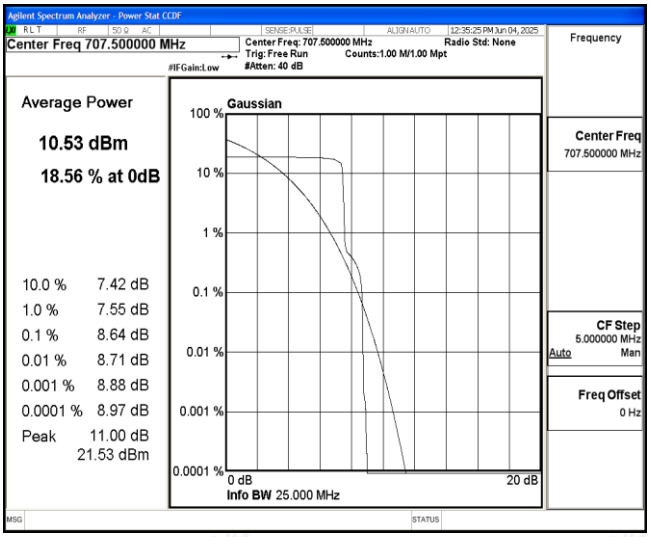
Band12-Stand-Alone-NaN-BPSK-23095-1@47-3.75kHz-2.59-<=13-PASS



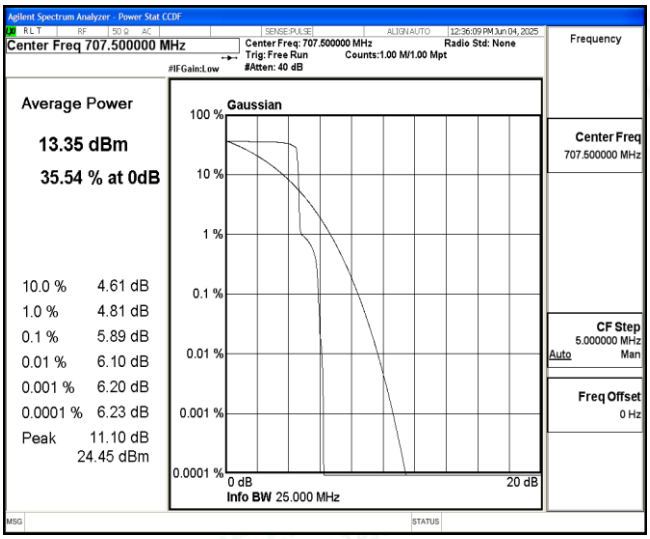
Band12-Stand-Alone-NaN-QPSK-23095-1@0-3.75kHz-3.75-<=13-PASS



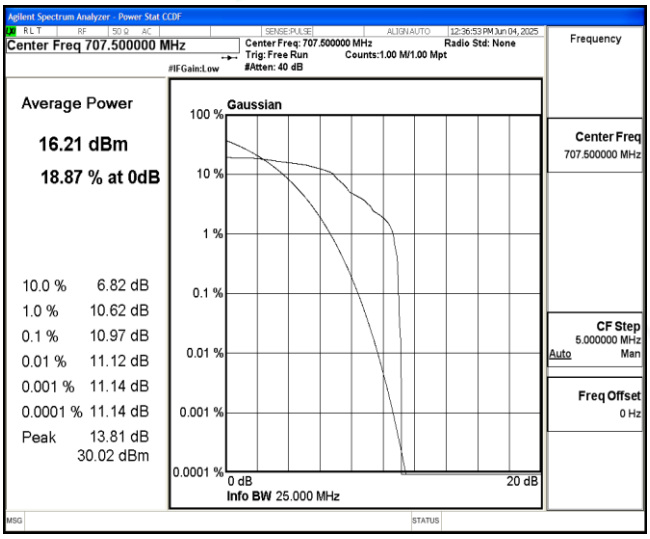
Band12-Stand-Alone-NaN-QPSK-23095-1@47-3.75kHz-3.47-<=13-PASS



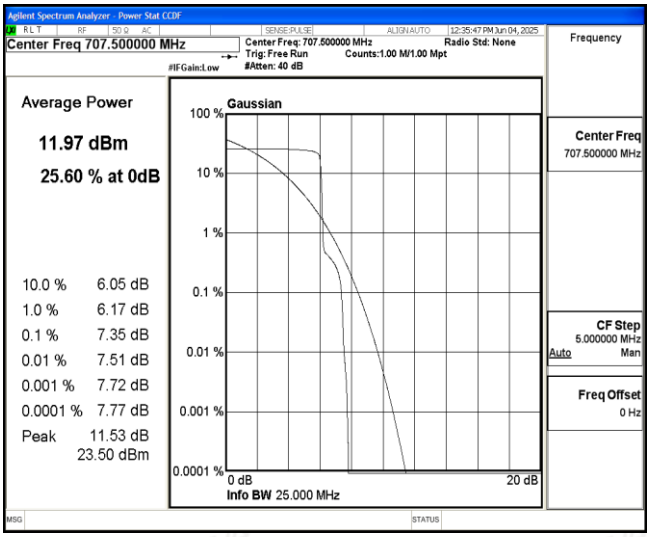
Band12-Stand-Alone-NaN-BPSK-23095-1@0-15kHz-8.64-<=13-PASS



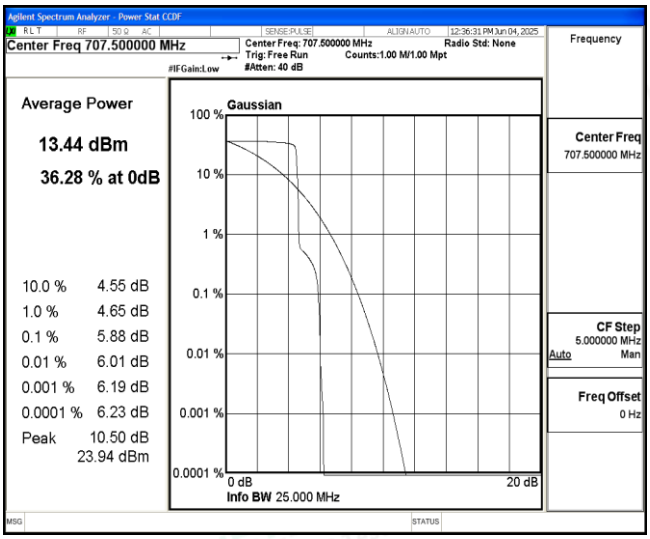
Band12-Stand-Alone-NaN-BPSK-23095-1@11-15kHz-5.89-<=13-PASS



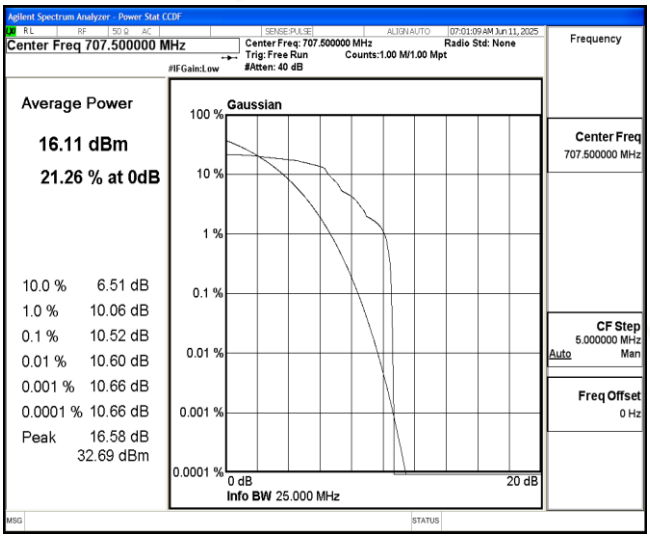
Band12-Stand-Alone-NaN-BPSK-23095-3@3-15kHz-10.97-<=13-PASS



Band12-Stand-Alone-NaN-QPSK-23095-1@0-15kHz-7.35-<=13-PASS



Band12-Stand-Alone-NaN-QPSK-23095-1@11-15kHz-5.88-<=13-PASS



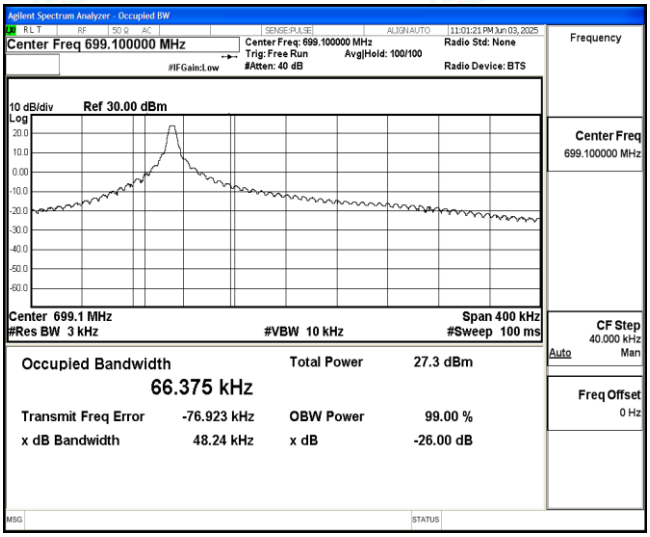
Band12-Stand-Alone-NaN-QPSK-23095-3@3-15kHz-10.52-<=13-PASS

P.3 Emission Bandwidth for NB1

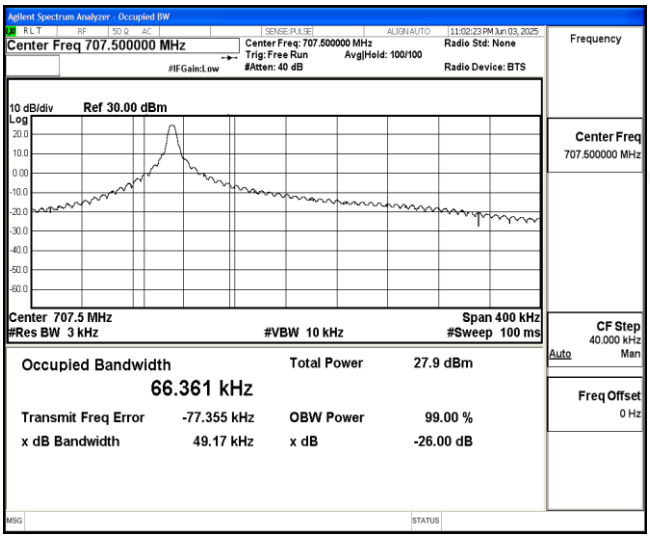
Test Result

Band	OpMode	SCS	BW	Modu	Channel	Tones	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23011	1@0	0.0664	0.0482	PASS
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23095	1@0	0.0664	0.0492	PASS
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23179	1@0	0.0668	0.0491	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@0	0.1713	0.1888	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@0	0.0739	0.0502	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@0	0.0729	0.0509	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@0	0.1240	0.1062	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	12@0	0.1903	0.2372	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@0	0.1274	0.1066	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	12@0	0.1887	0.2426	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@0	0.1206	0.1160	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	12@0	0.1866	0.2384	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	1@0	0.1263	0.1153	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	12@0	0.1849	0.2514	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	1@0	0.1202	0.1172	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	12@0	0.1851	0.2382	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	1@0	0.1163	0.1280	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	12@0	0.1852	0.2486	PASS

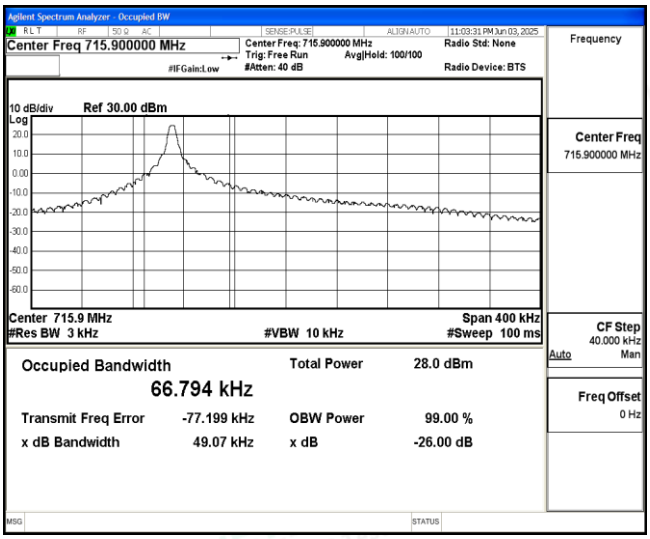
Test Graphs



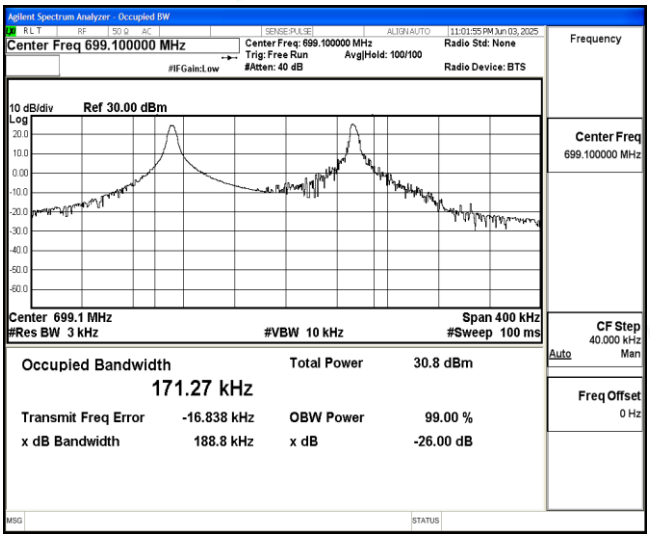
Band12-Stand-Alone-NaN-BPSK-23011-1@0-3.75kHz-0.0482-PASS



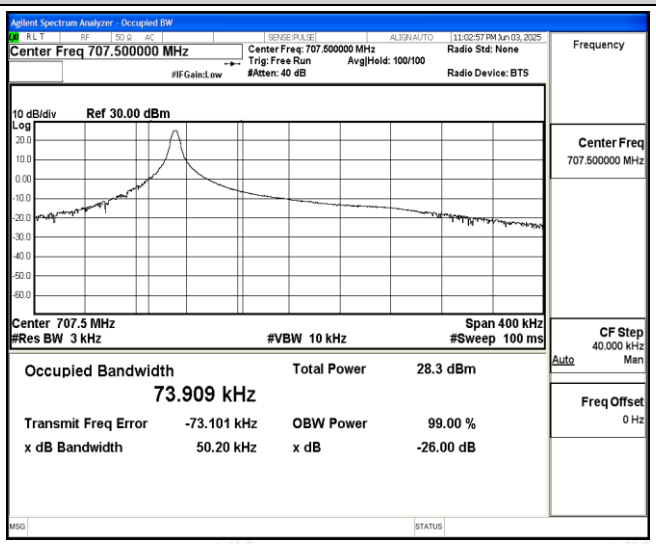
Band12-Stand-Alone-NaN-BPSK-23095-1@0-3.75kHz-0.0492-PASS



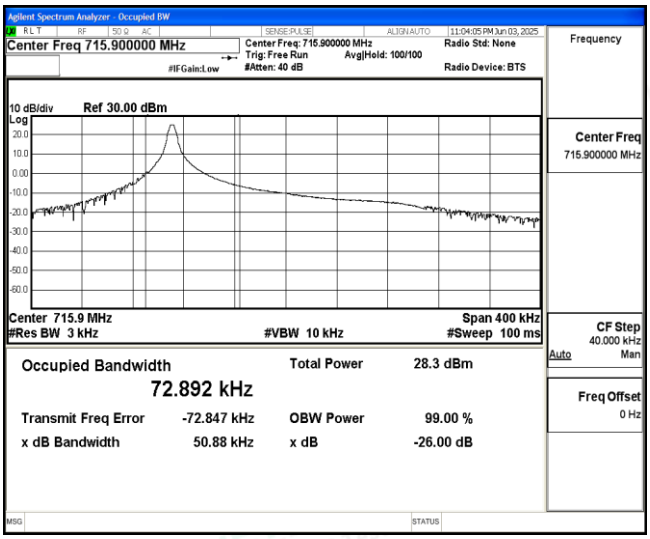
Band12-Stand-Alone-NaN-BPSK-23179-1@0-3.75kHz-0.0491-PASS



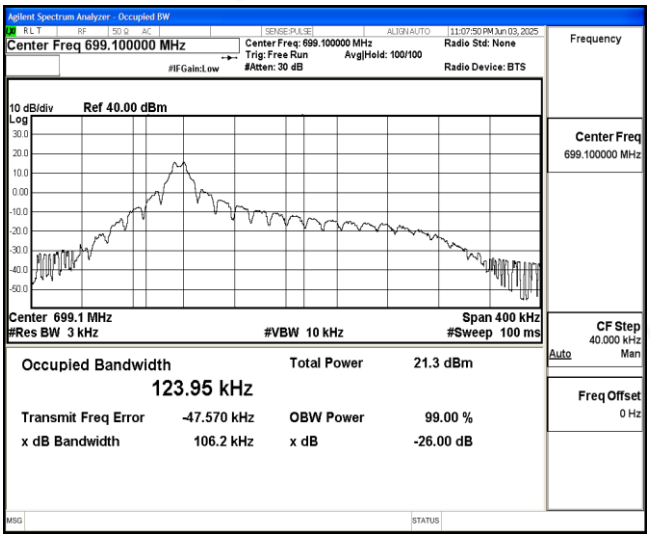
Band12-Stand-Alone-NaN-QPSK-23011-1@0-3.75kHz-0.1888-PASS



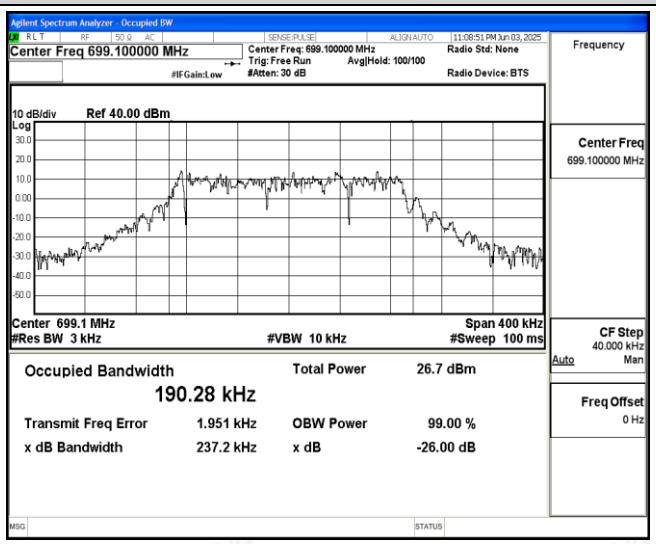
Band12-Stand-Alone-NaN-QPSK-23095-1@0-3.75kHz-0.0502-PASS



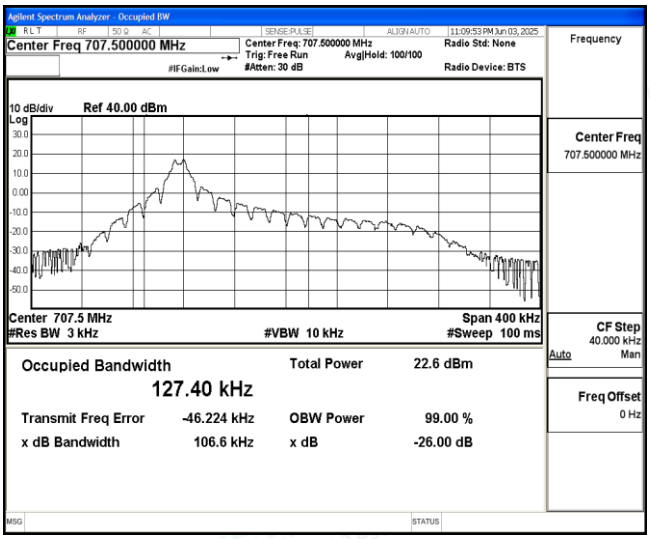
Band12-Stand-Alone-NaN-QPSK-23179-1@0-3.75kHz-0.0509-PASS



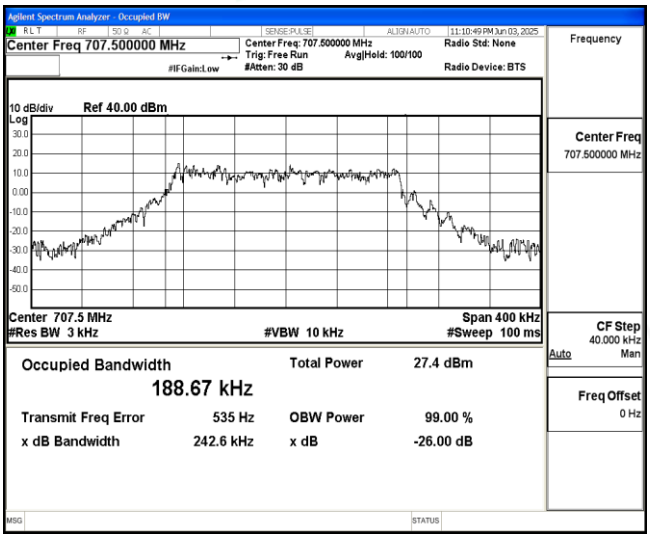
Band12-Stand-Alone-NaN-BPSK-23011-1@0-15kHz-0.1062-PASS



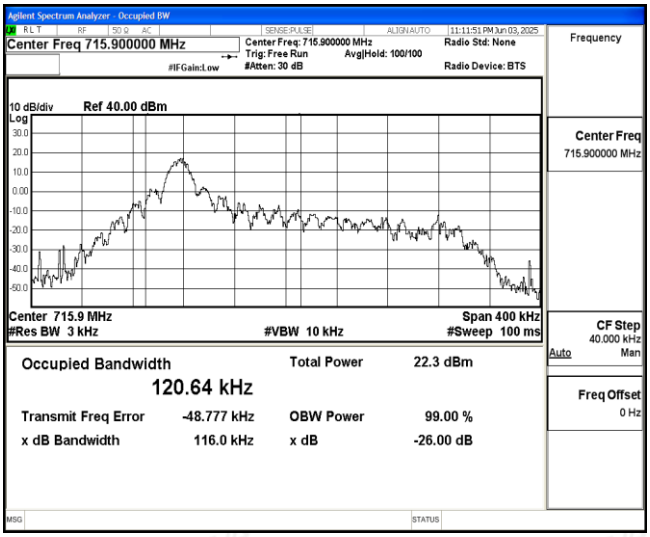
Band12-Stand-Alone-NaN-BPSK-23011-12@0-15kHz-0.2372-PASS



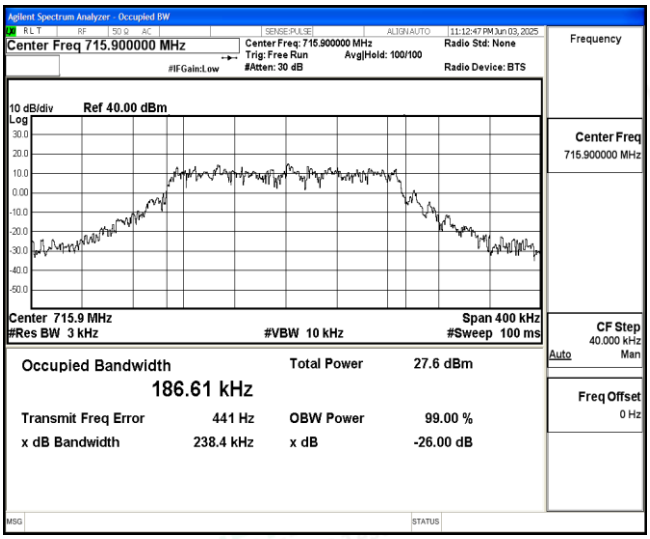
Band12-Stand-Alone-NaN-BPSK-23095-1@0-15kHz-0.1066-PASS



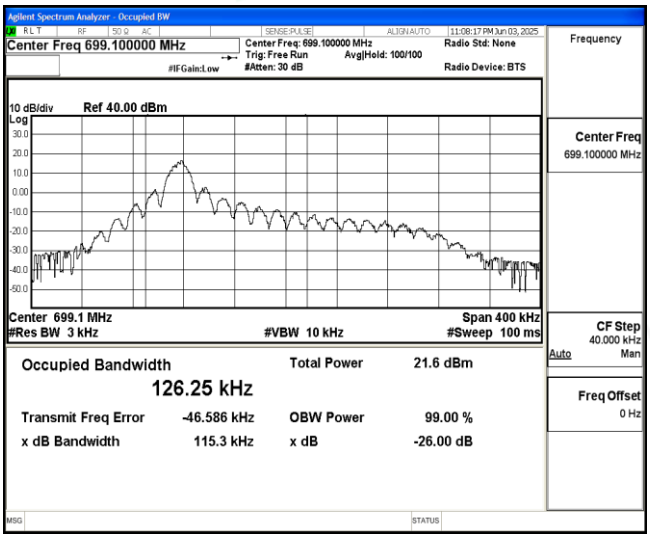
Band12-Stand-Alone-NaN-BPSK-23095-12@0-15kHz-0.2426-PASS



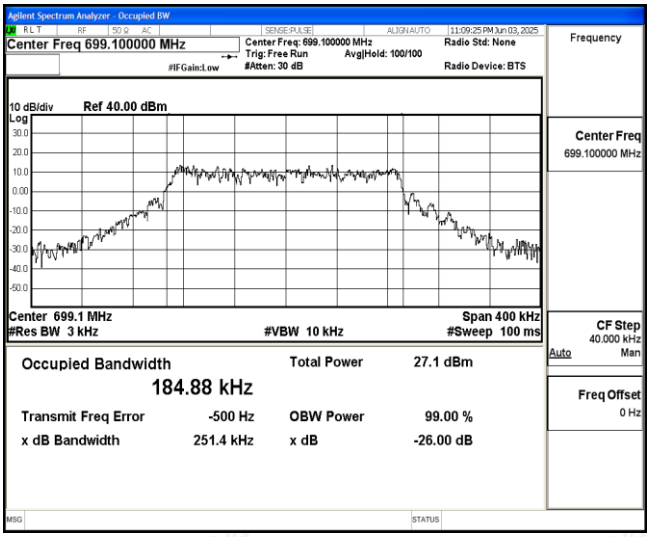
Band12-Stand-Alone-NaN-BPSK-23179-1@0-15kHz-0.1160-PASS



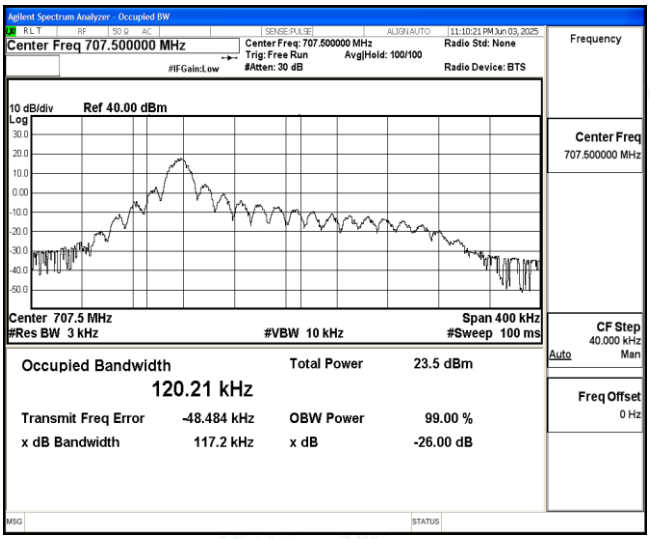
Band12-Stand-Alone-NaN-BPSK-23179-12@0-15kHz-0.2384-PASS



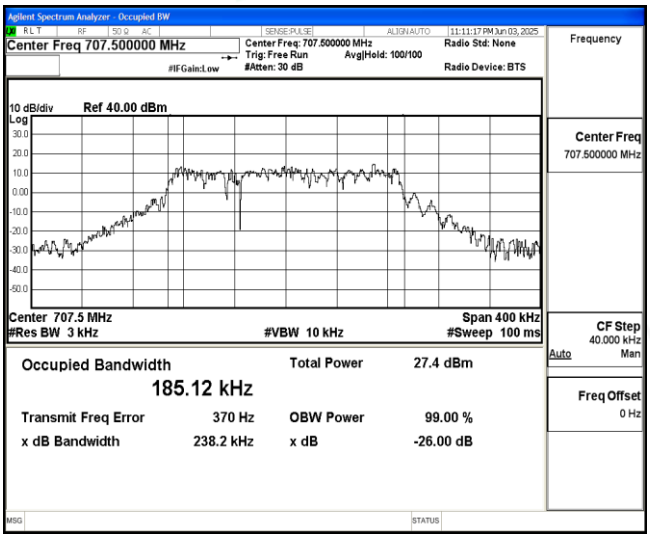
Band12-Stand-Alone-NaN-QPSK-23011-1@0-15kHz-0.1153-PASS



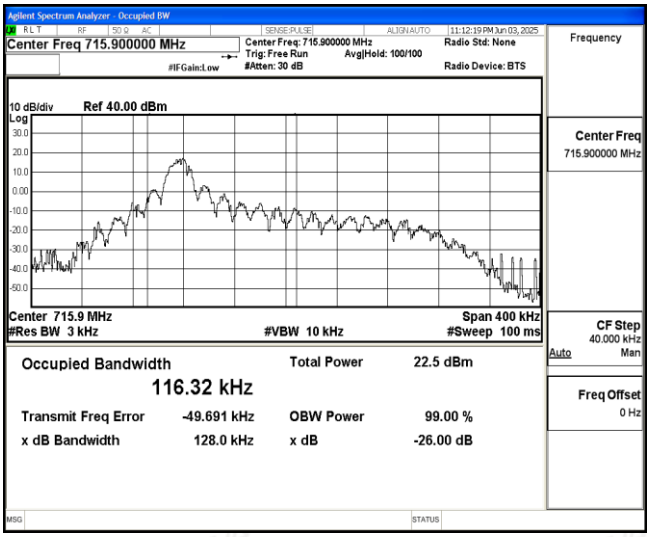
Band12-Stand-Alone-NaN-QPSK-23011-12@0-15kHz-0.2514-PASS



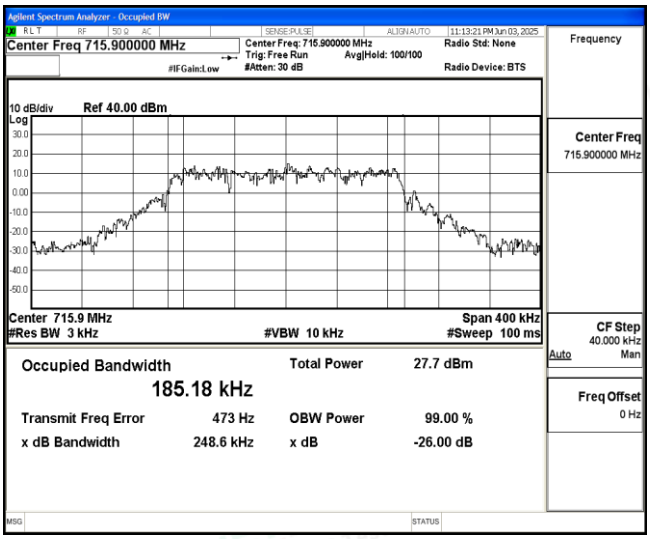
Band12-Stand-Alone-NaN-QPSK-23095-1@0-15kHz-0.1172-PASS



Band12-Stand-Alone-NaN-QPSK-23095-12@0-15kHz-0.2382-PASS



Band12-Stand-Alone-NaN-QPSK-23179-1@0-15kHz-0.1280-PASS



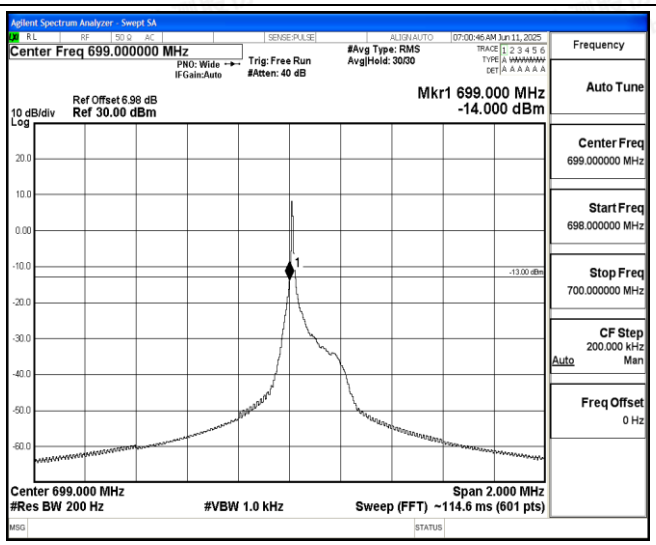
Band12-Stand-Alone-NaN-QPSK-23179-12@0-15kHz-0.2486-PASS

P.4 Band Edge for NB1

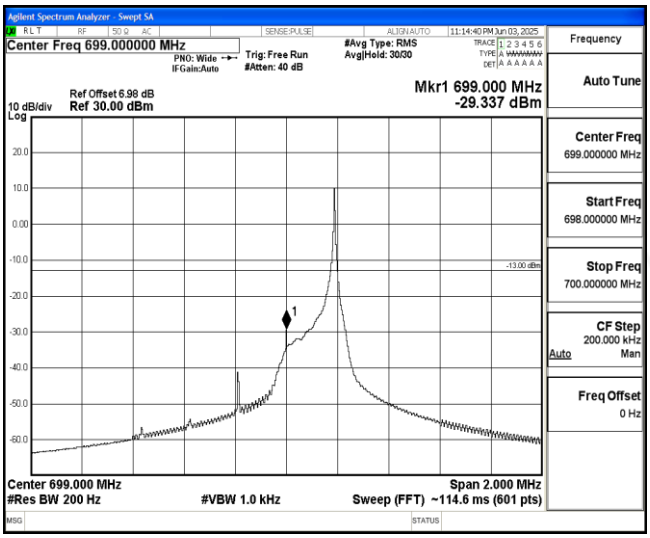
Test Result

Band	OpMode	SCS	BW	Modu	Channel	Tones	Result (dBm)	Verdict
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23011	1@0	-14.00	PASS
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23011	1@47	-29.24	PASS
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23179	1@0	-34.72	PASS
Band12	Stand-Alone	3.75kHz	NaN	BPSK	23179	1@47	-13.06	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@0	-13.48	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@47	-30.75	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@0	-35.44	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@47	-14.03	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@0	-18.98	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@11	-38.46	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	12@0	-30.81	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@0	-37.33	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@11	-19.15	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	12@0	-30.84	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	1@0	-21.60	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	1@11	-41.21	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	12@0	-32.65	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	1@0	-38.37	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	1@11	-20.34	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	12@0	-36.06	PASS

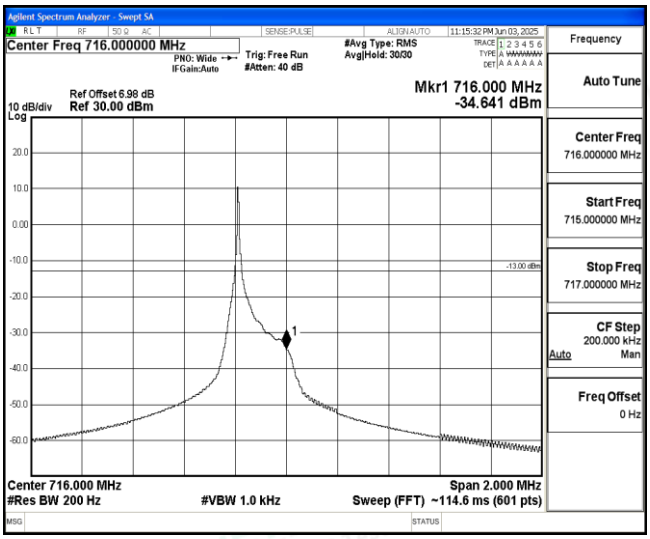
Test Graphs



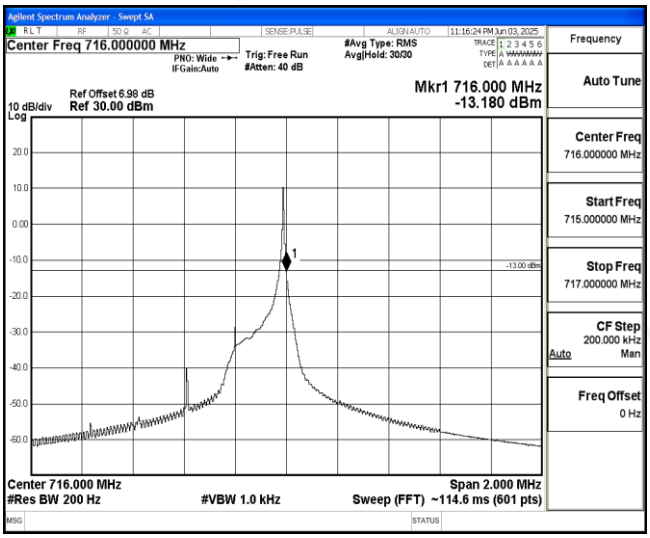
Band12-Stand-Alone-NaN-BPSK-23011-1@0-3.75kHz--14.00-PASS



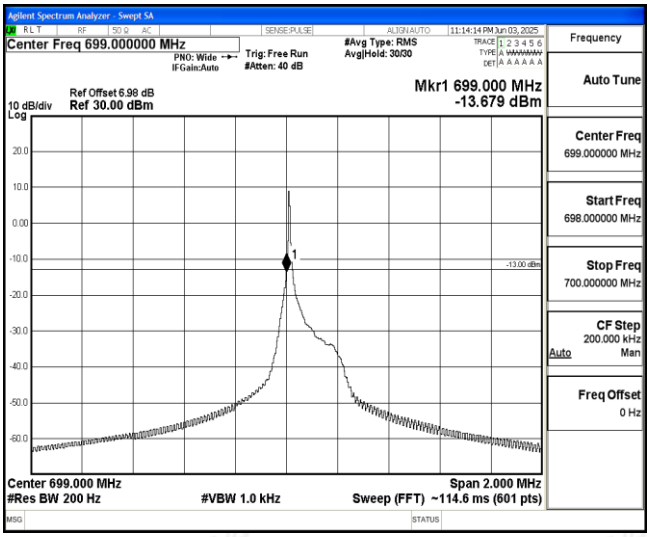
Band12-Stand-Alone-NaN-BPSK-23011-1@47-3.75kHz--29.24-PASS



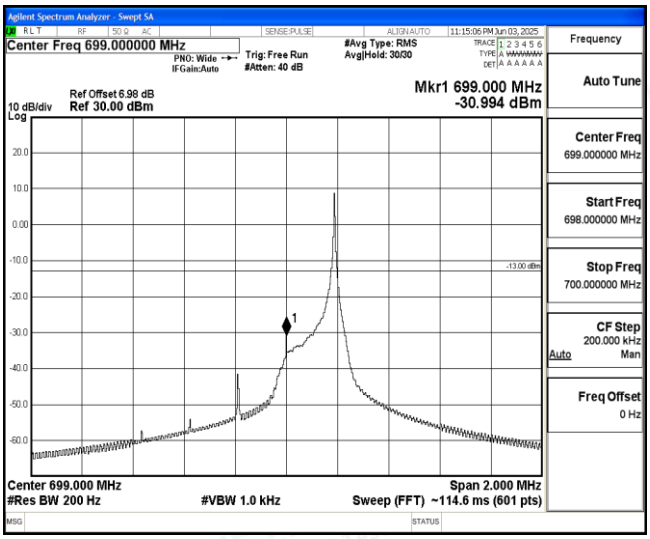
Band12-Stand-Alone-NaN-BPSK-23179-1@0-3.75kHz--34.72-PASS



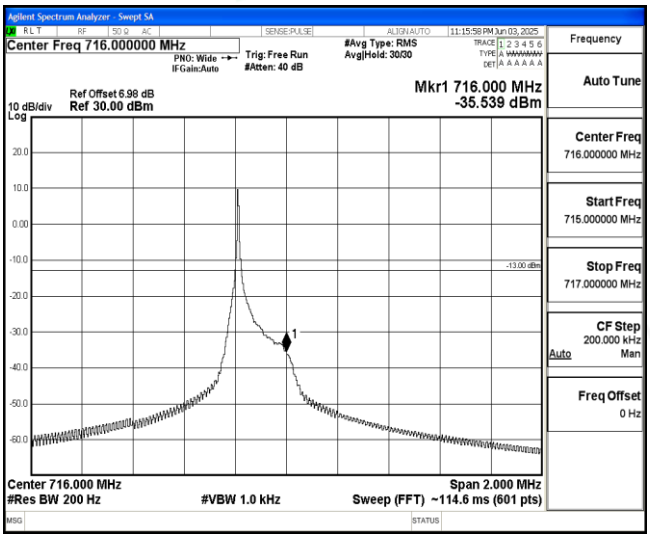
Band12-Stand-Alone-NaN-BPSK-23179-1@47-3.75kHz--13.06-PASS



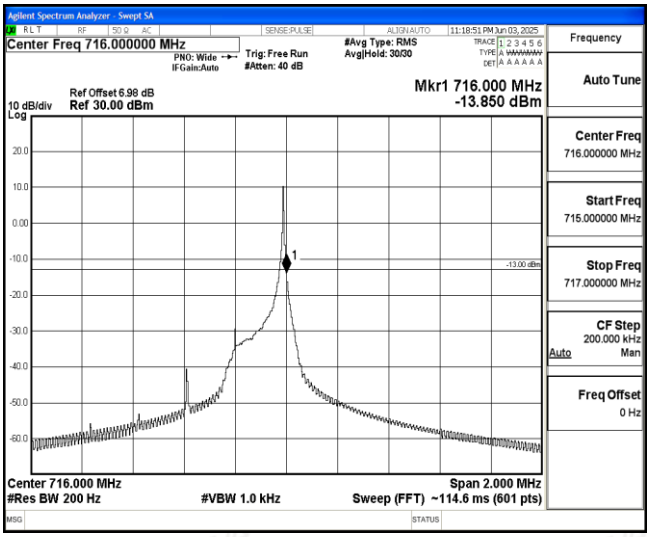
Band12-Stand-Alone-NaN-QPSK-23011-1@0-3.75kHz--13.48-PASS



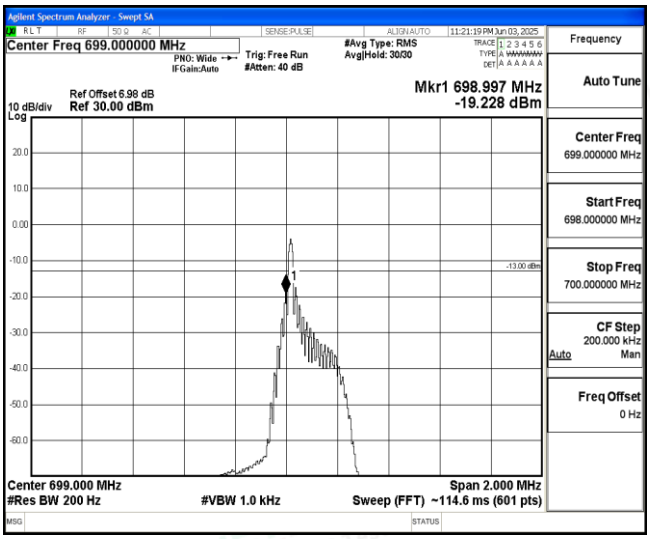
Band12-Stand-Alone-NaN-QPSK-23011-1@47-3.75kHz--30.75-PASS



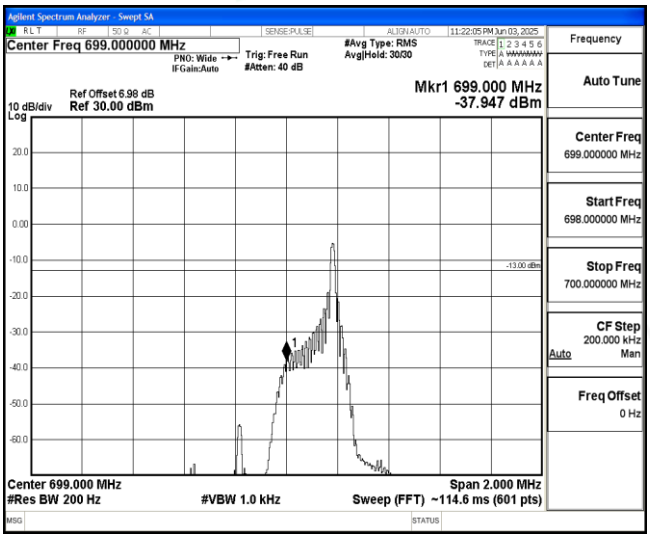
Band12-Stand-Alone-NaN-QPSK-23179-1@0-3.75kHz--35.44-PASS



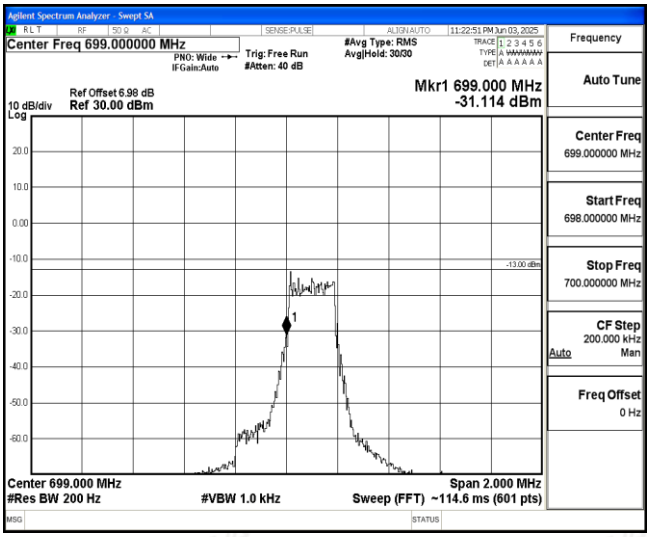
Band12-Stand-Alone-NaN-QPSK-23179-1@47-3.75kHz--14.03-PASS



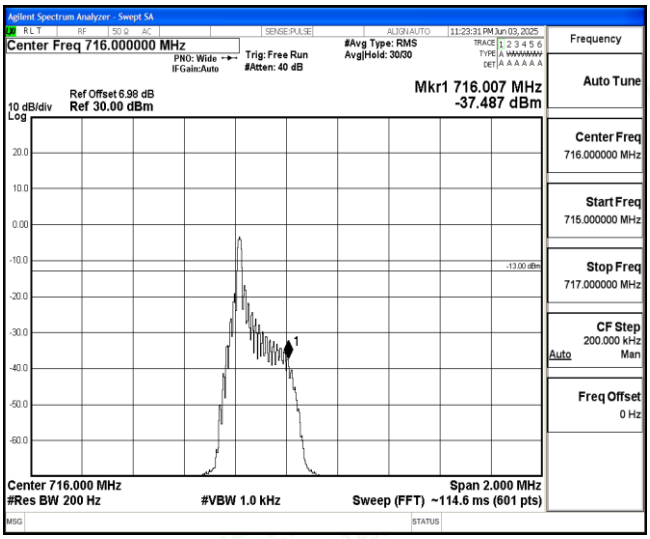
Band12-Stand-Alone-NaN-BPSK-23011-1@0-15kHz--18.98-PASS



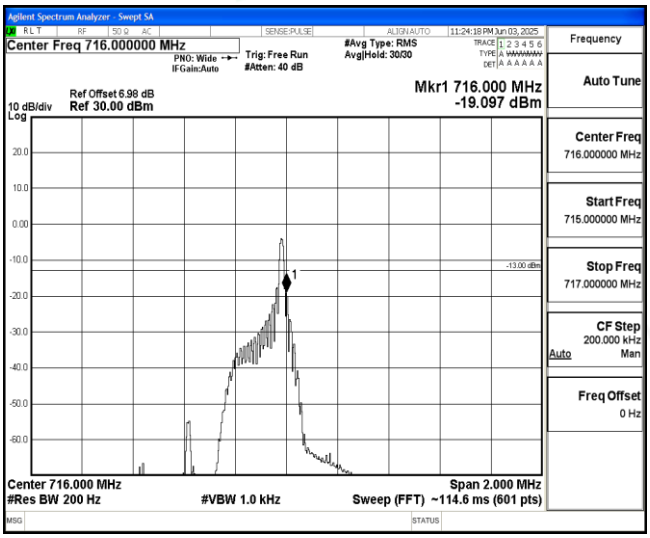
Band12-Stand-Alone-NaN-BPSK-23011-1@11-15kHz--38.46-PASS



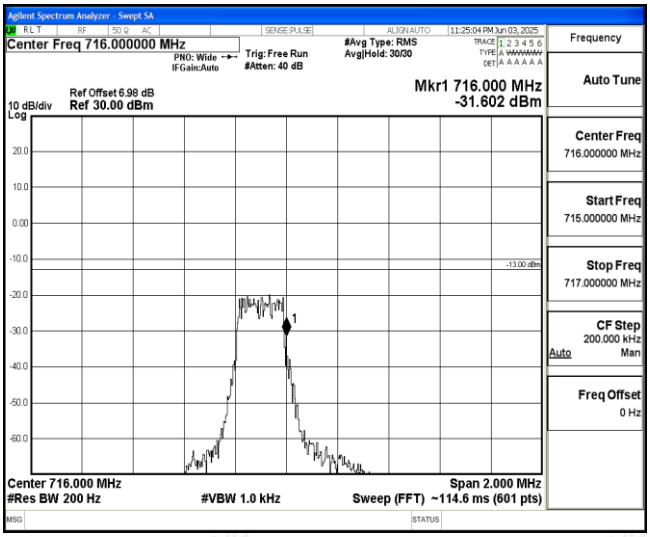
Band12-Stand-Alone-NaN-BPSK-23011-12@0-15kHz--30.81-PASS



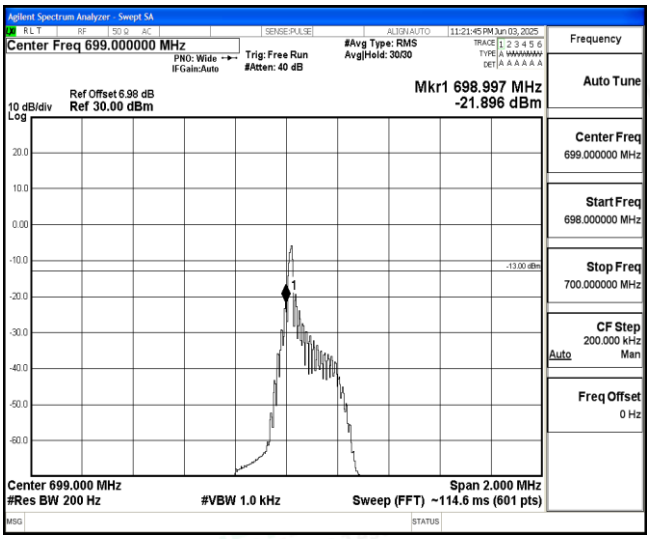
Band12-Stand-Alone-NaN-BPSK-23179-1@0-15kHz--37.33-PASS



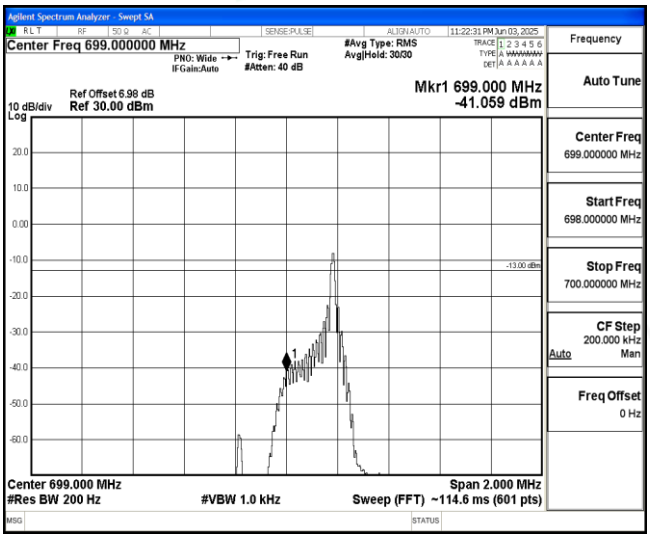
Band12-Stand-Alone-NaN-BPSK-23179-1@11-15kHz--19.15-PASS



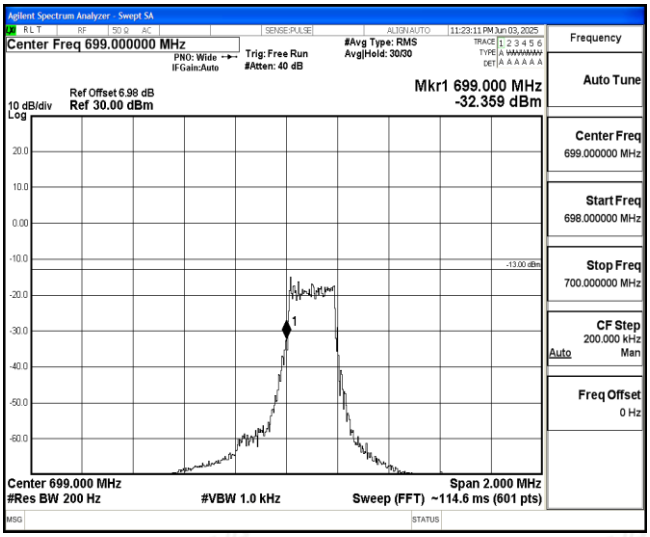
Band12-Stand-Alone-NaN-BPSK-23179-12@0-15kHz--30.84-PASS



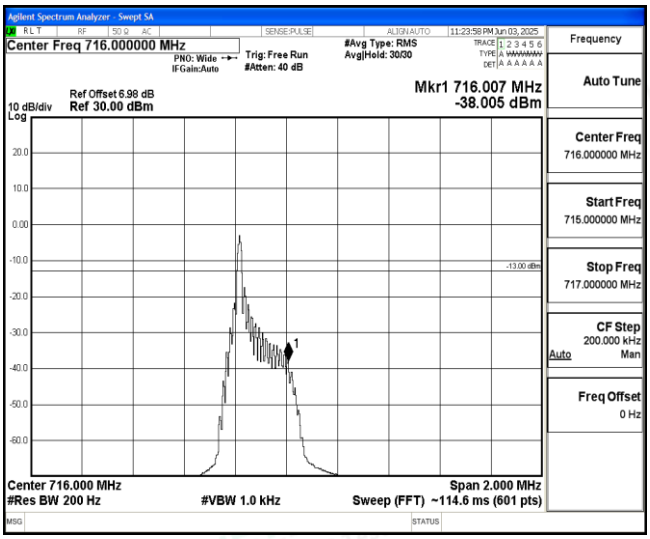
Band12-Stand-Alone-NaN-QPSK-23011-1@0-15kHz--21.60-PASS



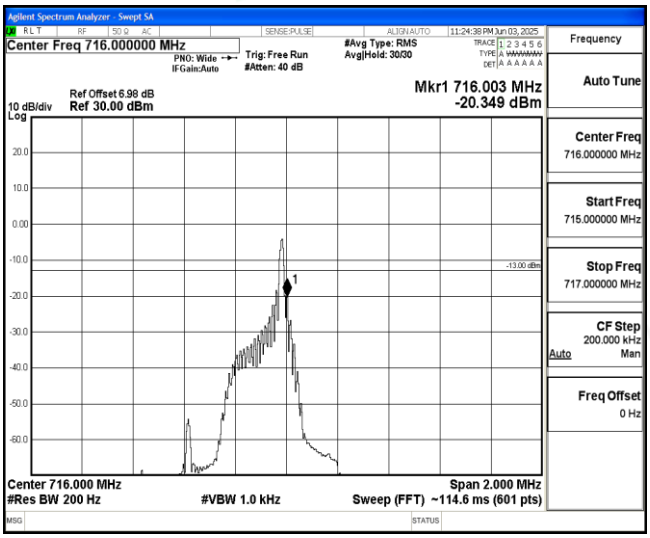
Band12-Stand-Alone-NaN-QPSK-23011-1@11-15kHz--41.21-PASS



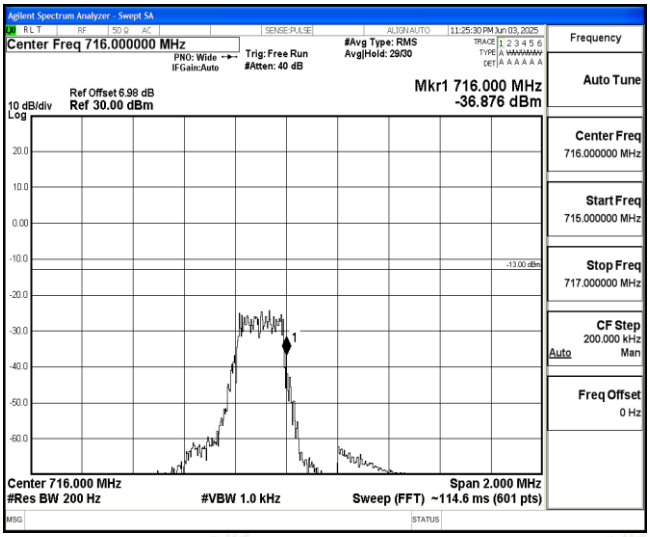
Band12-Stand-Alone-NaN-QPSK-23011-12@0-15kHz--32.65-PASS



Band12-Stand-Alone-NaN-QPSK-23179-1@0-15kHz--38.37-PASS



Band12-Stand-Alone-NaN-QPSK-23179-1@11-15kHz--20.34-PASS



Band12-Stand-Alone-NaN-QPSK-23179-12@0-15kHz--36.06-PASS

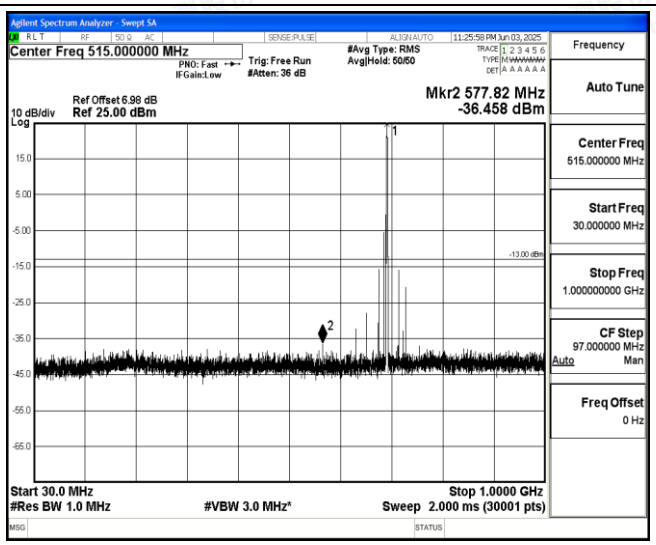
P.5 Conducted Spurious Emission for NB1

Test Result

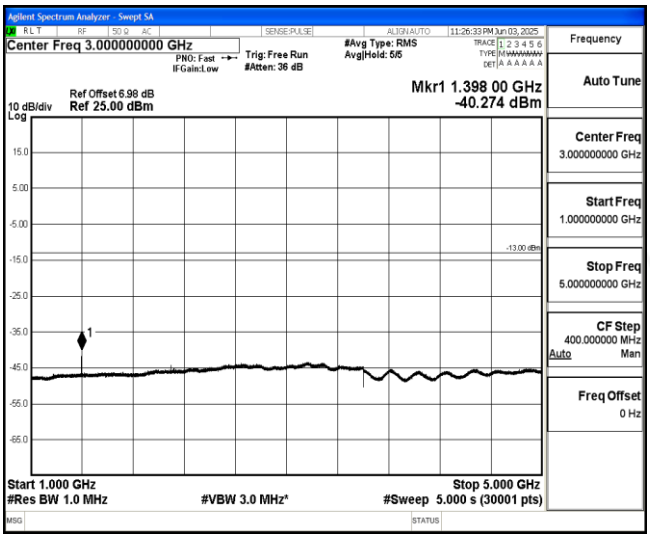
Band	OpMode	SCS	BW	Modu	Channel	Tones	Freq Start [MHz]	Freq Stop [MHz]	Result (dBm)	Limit (dBm)	Verdict
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@0	30	1000	-36.46	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@0	1000	5000	-40.27	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@0	5000	12000	-59.18	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@0	12000	26500	-44.08	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@47	30	1000	-36.69	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@47	1000	5000	-40.35	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@47	5000	12000	-59.24	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23011	1@47	12000	26500	-44.18	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@0	30	1000	-37.4	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@0	1000	5000	-40.04	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@0	5000	12000	-59.38	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@0	12000	26500	-44.23	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@47	30	1000	-37.12	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@47	1000	5000	-39.88	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@47	5000	12000	-59.06	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23095	1@47	12000	26500	-44.16	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@0	30	1000	-36.38	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@0	1000	5000	-40.05	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@0	5000	12000	-58.94	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@0	12000	26500	-44.28	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@47	30	1000	-36.68	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@47	1000	5000	-40.19	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@47	5000	12000	-59.12	-13	PASS
Band12	Stand-Alone	3.75kHz	NaN	QPSK	23179	1@47	12000	26500	-44.23	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@0	30	1000	-37.73	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@0	1000	5000	-43.46	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@0	5000	12000	-59.22	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@0	12000	26500	1-44.24	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@11	30	1000	-37.92	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@11	1000	5000	-43.57	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@11	5000	12000	-59.2	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23011	1@11	12000	26500	-44.11	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@0	30	1000	-36.8	-13	PASS

Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@0	1000	5000	-43.42	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@0	5000	12000	-59.19	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@0	12000	26500	-44.24	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@11	30	1000	-36.66	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@11	1000	5000	-43.5	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@11	5000	12000	-59.05	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23095	1@11	12000	26500	-44.32	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@0	30	1000	-37.81	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@0	1000	5000	-43.23	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@0	5000	12000	-59.22	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@0	12000	26500	-44.37	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@11	30	1000	-36.48	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@11	1000	5000	-43.51	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@11	5000	12000	-59.19	-13	PASS
Band12	Stand-Alone	15kHz	NaN	BPSK	23179	1@11	12000	26500	-44.21	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	12@0	30	1000	-37.32	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	12@0	1000	5000	-43.18	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	12@0	5000	12000	-59.2	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23011	12@0	12000	26500	-44.1	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	12@0	30	1000	-37.69	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	12@0	1000	5000	-41.1	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	12@0	5000	12000	-59.16	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23095	12@0	12000	26500	-44.14	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	12@0	30	1000	-37.26	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	12@0	1000	5000	-43.52	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	12@0	5000	12000	-59.26	-13	PASS
Band12	Stand-Alone	15kHz	NaN	QPSK	23179	12@0	12000	26500	-44.14	-13	PASS

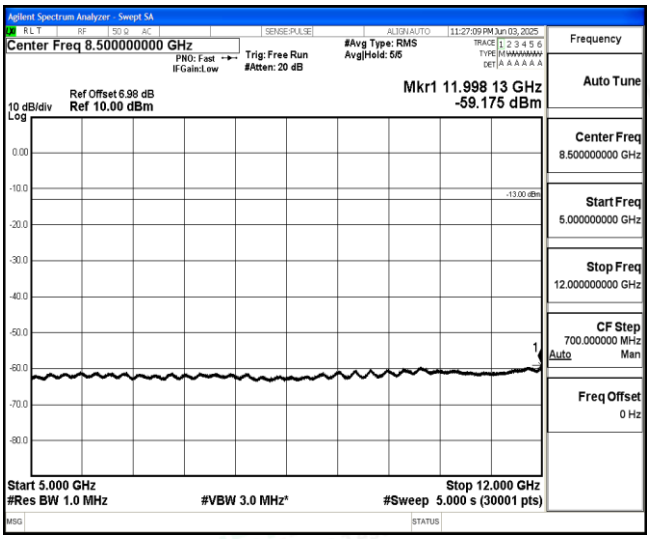
Test Graphs



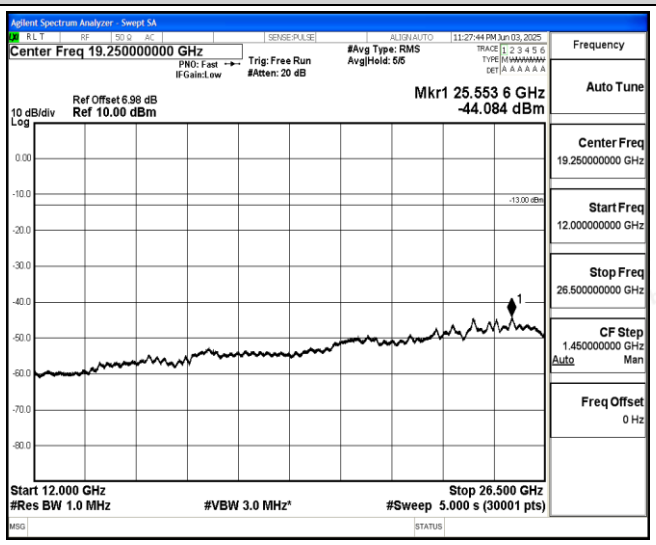
Band12-Stand-Alone-NaN-QPSK-23011-1@0-3.75kHz-30-1000-30~1000MHz@-36.46dBm--13-PASS



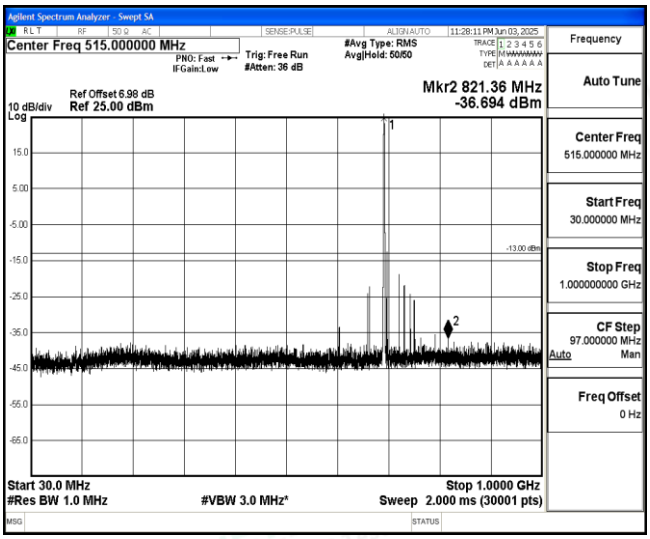
Band12-Stand-Alone-NaN-QPSK-23011-1@0-3.75kHz-1000-5000-1000~5000MHz@-40.27dBm--13-PASS



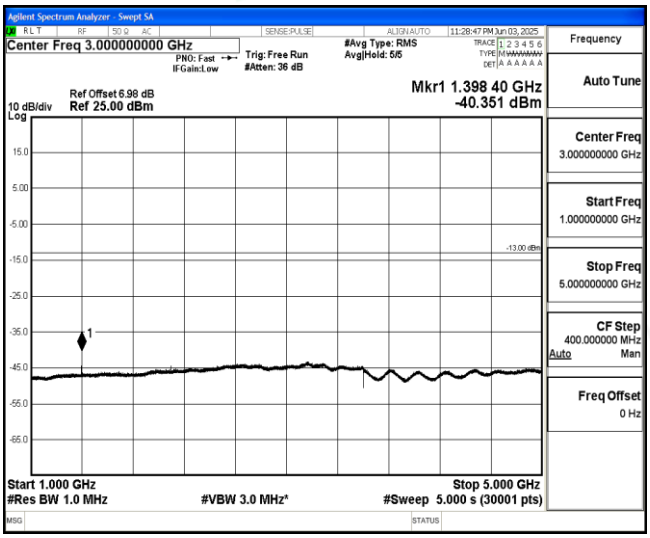
Band12-Stand-Alone-NaN-QPSK-23011-1@0-3.75kHz-5000-12000-5000~12000MHz@-59.18dBm--13-PASS



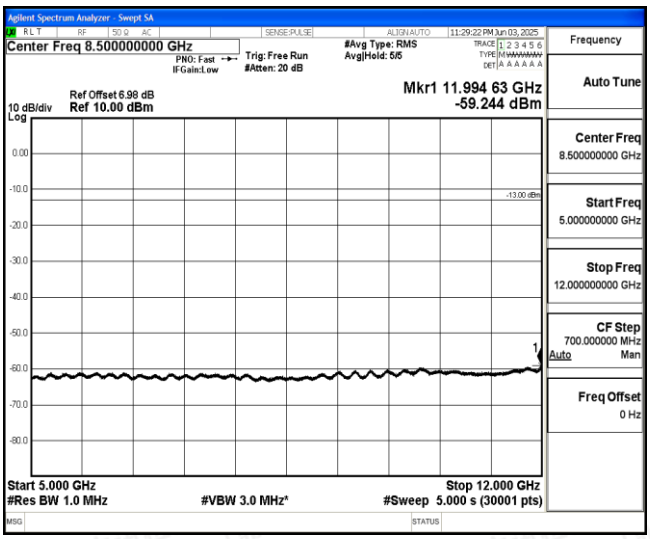
Band12-Stand-Alone-NaN-QPSK-23011-1@0-3.75kHz-12000-26500-12000~26500MHz@-44.08dBm--13-PASS



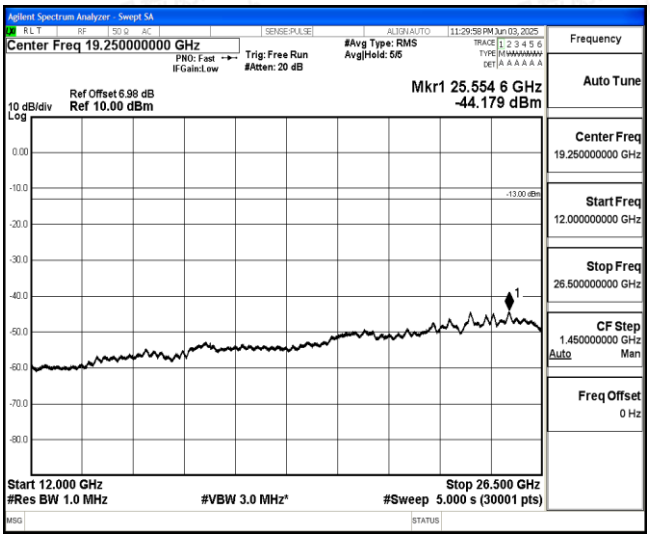
Band12-Stand-Alone-NaN-QPSK-23011-1@47-3.75kHz-30-1000-30~1000MHz@-36.69dBm--13-PASS



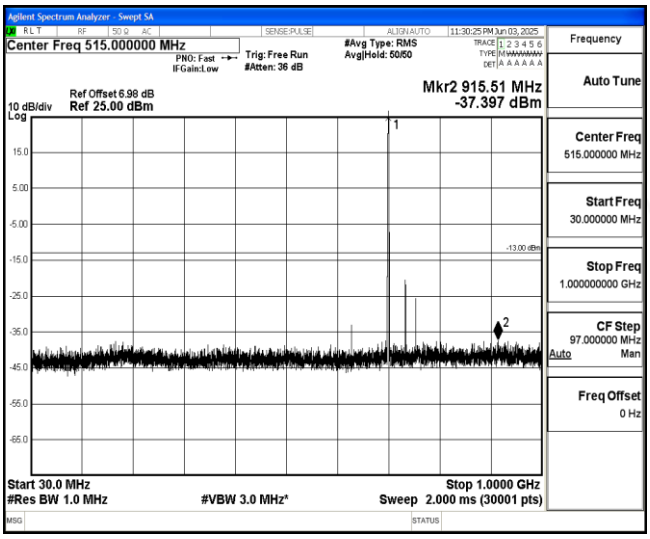
Band12-Stand-Alone-NaN-QPSK-23011-1@47-3.75kHz-1000-5000-1000~5000MHz@-40.35dBm--13-PASS



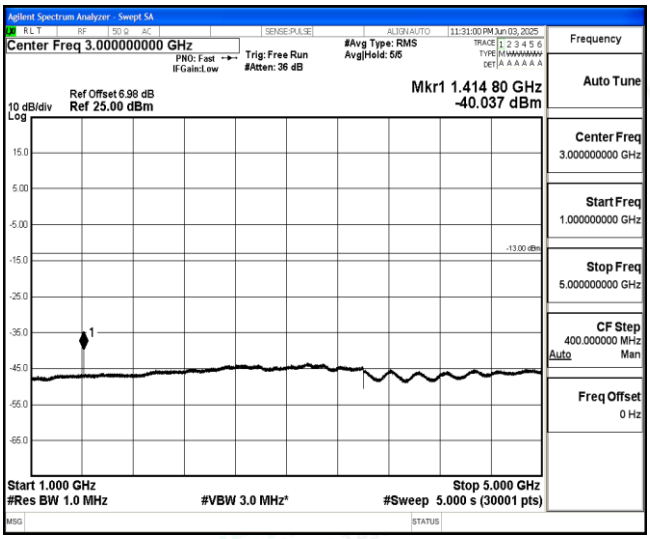
Band12-Stand-Alone-NaN-QPSK-23011-1@47-3.75kHz-5000-12000-5000~12000MHz@-59.24dBm--13-PASS



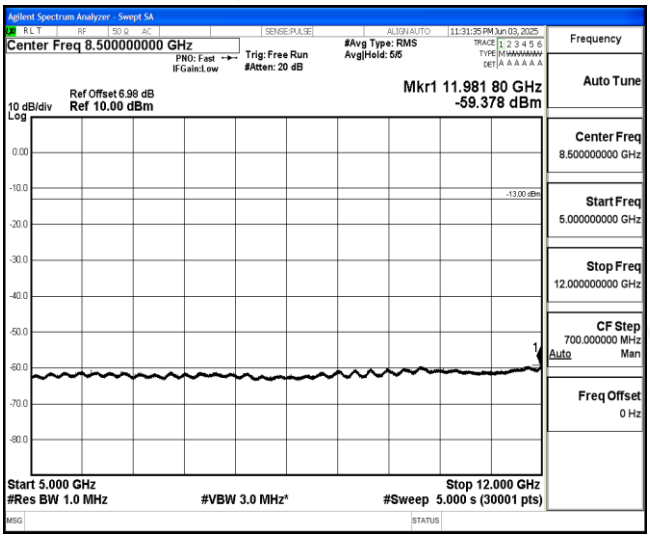
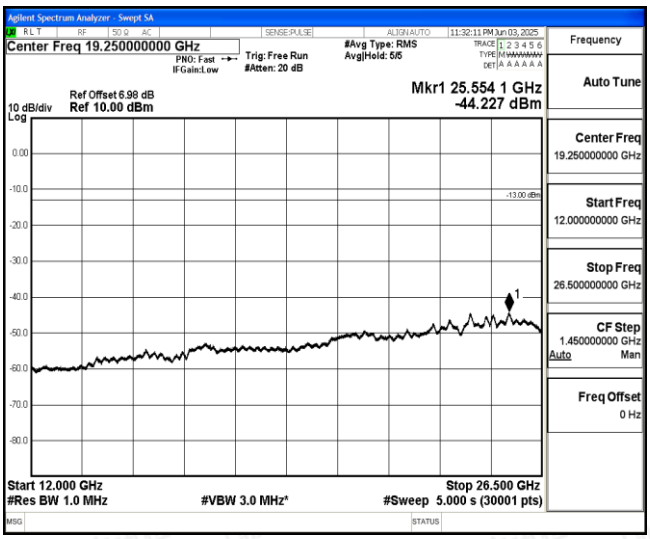
Band12-Stand-Alone-NaN-QPSK-23011-1@47-3.75kHz-12000-26500-12000~26500MHz@-44.18dBm--13-PASS



Band12-Stand-Alone-NaN-QPSK-23095-1@0-3.75kHz-30-1000-30~1000MHz@-37.4dBm--13-PASS



Band12-Stand-Alone-NaN-QPSK-23095-1@0-3.75kHz-1000-5000-1000~5000MHz@-40.04dBm--13-PASS



Band12-Stand-Alone-NaN-QPSK-23095-1@0-3.75kHz-5000-12000-5000~12000MHz@-59.38dBm--13-PASS