

Appendix for LTE Band 13

Product Name: Smart Phone

Model No: Black G4

Appendix A: Average Power Output Data

Test Result

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	23205	779.5	QPSK	1	0	23.64	23.0±1	/
				1	49	23.93	23.0±1	/
				1	99	23.65	23.0±1	/
				12	0	22.62	23.0±1	1.0
				12	24	22.81	23.0±1	1.0
				12	49	22.85	23.0±1	1.0
				25	0	22.75	23.0±1	1.0
			16QAM	1	0	22.77	22.5±1	1.0
				1	49	23.09	22.5±1	1.0
				1	99	22.79	22.5±1	1.0
				12	0	21.71	22.5±1	1.0
				12	24	21.89	22.5±1	1.0
				12	49	21.91	22.5±1	1.0
				25	0	21.8	22.5±1	1.0
	23230	782.0	QPSK	1	0	23.65	23.0±1	/
				1	49	23.81	23.0±1	/
				1	99	23.6	23.0±1	/
				12	0	22.57	23.0±1	1.0
				12	24	22.79	23.0±1	1.0
				12	49	22.76	23.0±1	1.0
				25	0	22.7	23.0±1	1.0
			16QAM	1	0	23.17	22.5±1	1.0
				1	49	23.33	22.5±1	1.0
				1	99	23.13	22.5±1	1.0
				12	0	21.73	22.5±1	1.0
				12	24	21.93	22.5±1	1.0
				12	49	21.84	22.5±1	1.0
				25	0	21.77	22.5±1	1.0
	23255	784.5	QPSK	1	0	23.66	23.0±1	/
				1	49	23.91	23.0±1	/
				1	99	23.61	23.0±1	/
				12	0	22.64	23.0±1	1.0
				12	24	22.71	23.0±1	1.0
				12	49	22.66	23.0±1	1.0
				25	0	22.64	23.0±1	1.0

			16QAM	1	0	22.81	22.0±1	1.0
				1	49	22.89	22.0±1	1.0
				1	99	22.65	22.0±1	1.0
				12	0	21.67	22.0±1	1.0
				12	24	21.75	22.0±1	1.0
				12	49	21.69	22.0±1	1.0
				25	0	21.65	22.0±1	1.0

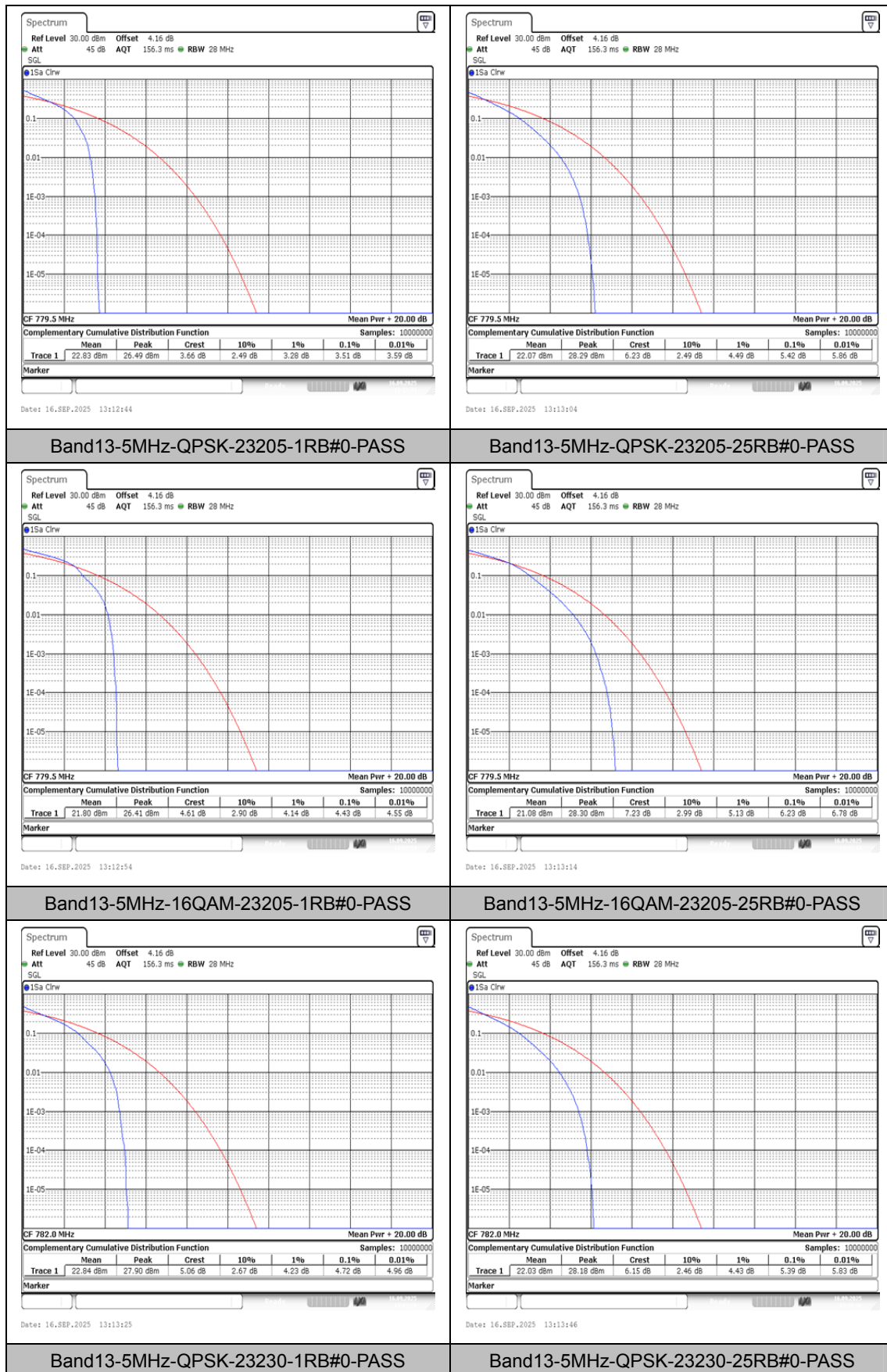
BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	23230	782.0	QPSK	1	0	23.78	23.0±1	/
				1	49	23.82	23.0±1	/
				1	99	23.71	23.0±1	/
				25	0	22.61	23.0±1	1.0
				25	24	22.74	23.0±1	1.0
				25	49	22.82	23.0±1	1.0
				50	0	22.74	23.0±1	1.0
			16QAM	1	0	22.66	22.0±1	1.0
				1	49	22.7	22.0±1	1.0
				1	99	22.56	22.0±1	1.0
				25	0	21.64	22.0±1	1.0
				25	24	21.79	22.0±1	1.0
				25	49	21.86	22.0±1	1.0
				50	0	21.71	22.0±1	1.0

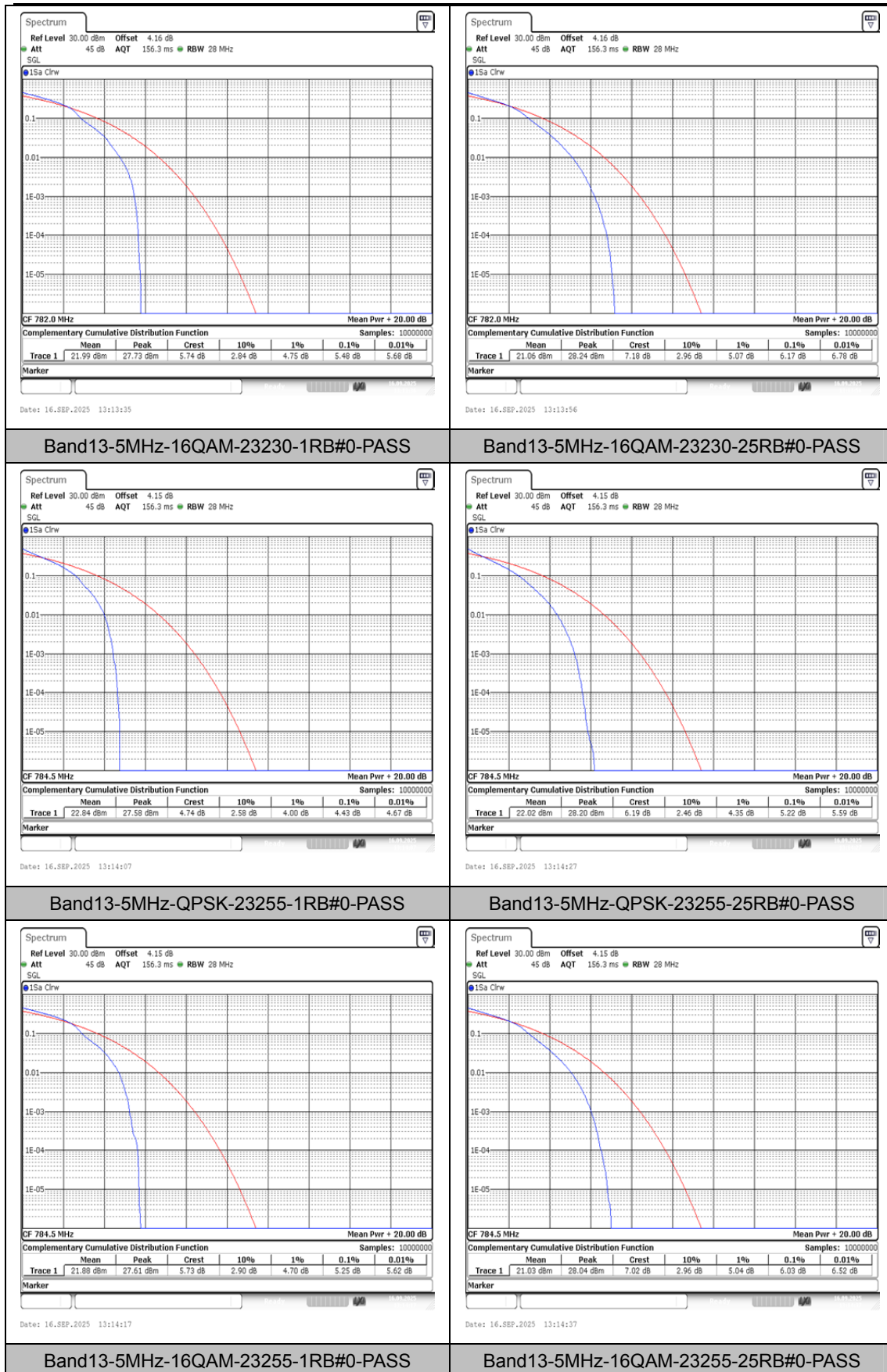
Appendix B: Peak-to-Average Ratio(CCDF)

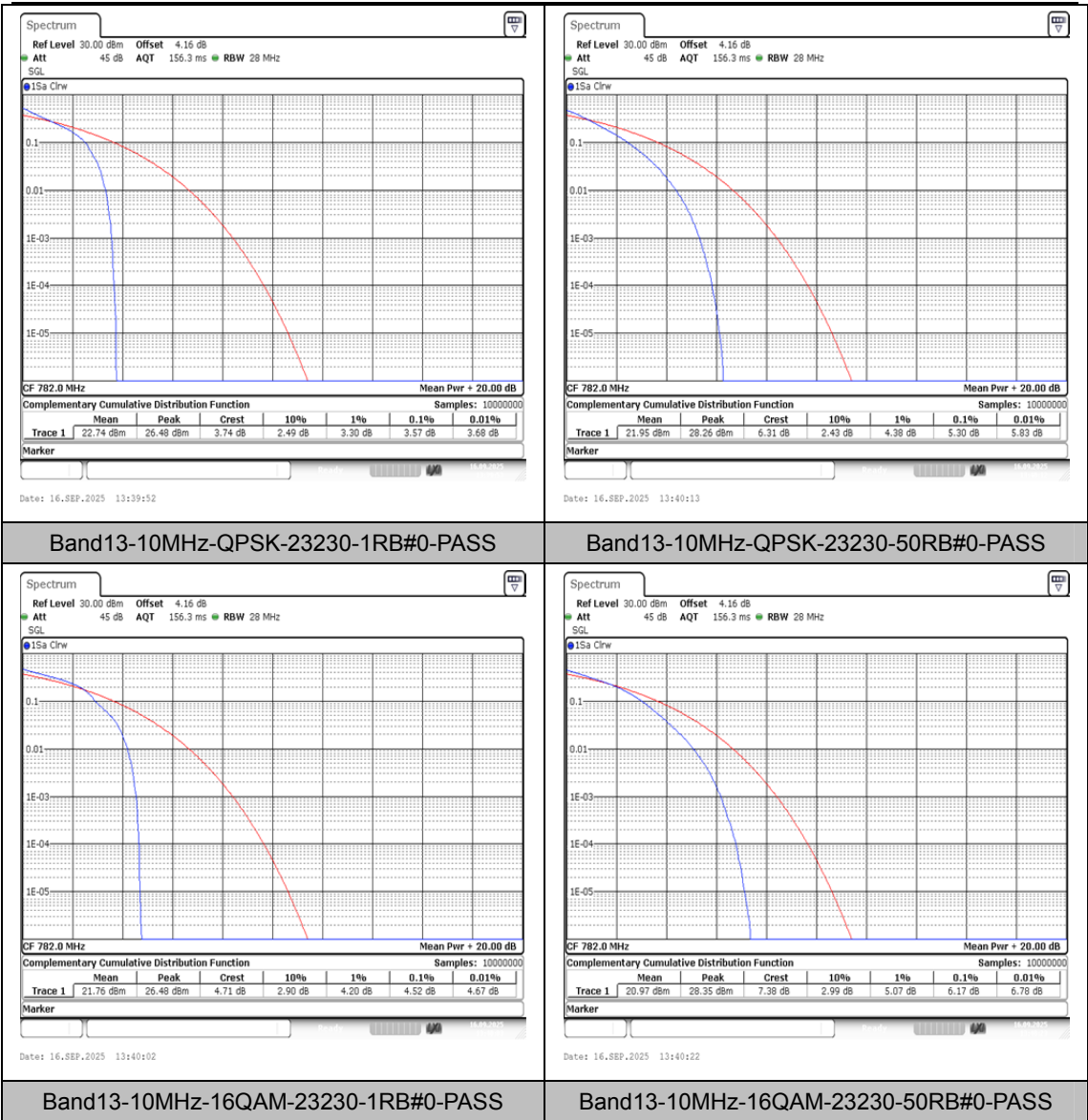
Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dB)	Limit(dB)	Verdict
Band13	5MHz	QPSK	23205	1RB#0	3.51	13	PASS
Band13	5MHz	QPSK	23205	25RB#0	5.42	13	PASS
Band13	5MHz	16QAM	23205	1RB#0	4.43	13	PASS
Band13	5MHz	16QAM	23205	25RB#0	6.23	13	PASS
Band13	5MHz	QPSK	23230	1RB#0	4.72	13	PASS
Band13	5MHz	QPSK	23230	25RB#0	5.39	13	PASS
Band13	5MHz	16QAM	23230	1RB#0	5.48	13	PASS
Band13	5MHz	16QAM	23230	25RB#0	6.17	13	PASS
Band13	5MHz	QPSK	23255	1RB#0	4.43	13	PASS
Band13	5MHz	QPSK	23255	25RB#0	5.22	13	PASS
Band13	5MHz	16QAM	23255	1RB#0	5.25	13	PASS
Band13	5MHz	16QAM	23255	25RB#0	6.03	13	PASS
Band13	10MHz	QPSK	23230	1RB#0	3.57	13	PASS
Band13	10MHz	QPSK	23230	50RB#0	5.30	13	PASS
Band13	10MHz	16QAM	23230	1RB#0	4.52	13	PASS
Band13	10MHz	16QAM	23230	50RB#0	6.17	13	PASS

Test Graphs





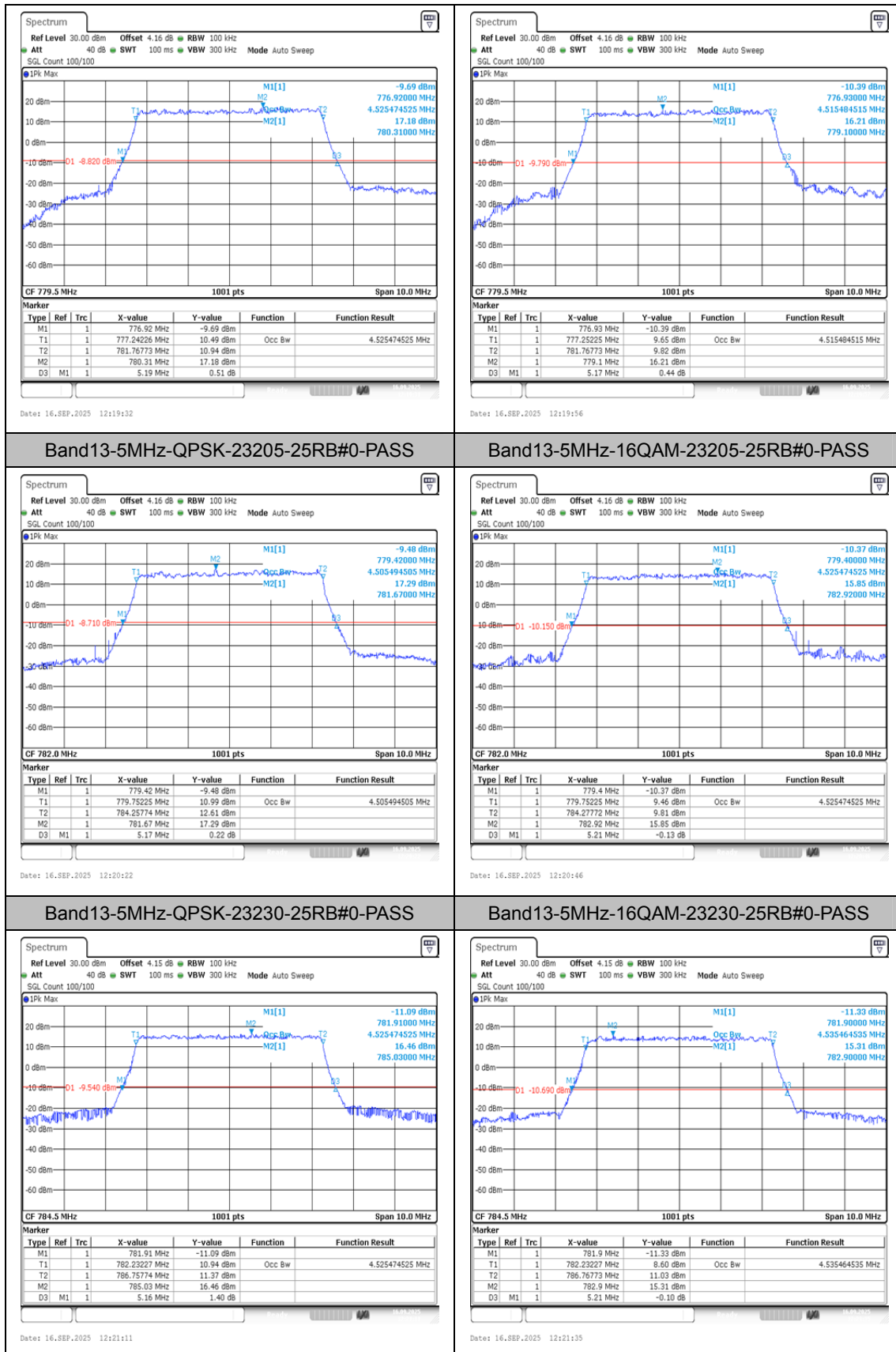


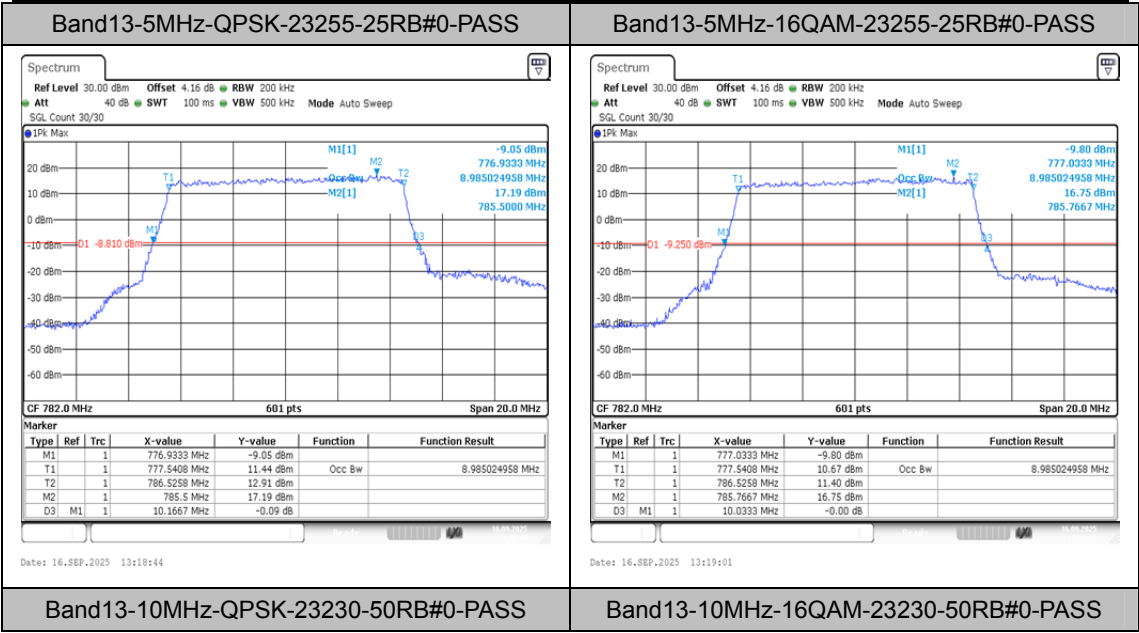
Appendix C: 26dB Bandwidth and Occupied Bandwidth

Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
Band13	5MHz	QPSK	23205	25RB#0	4.525	5.19	PASS
Band13	5MHz	16QAM	23205	25RB#0	4.515	5.17	PASS
Band13	5MHz	QPSK	23230	25RB#0	4.505	5.17	PASS
Band13	5MHz	16QAM	23230	25RB#0	4.525	5.21	PASS
Band13	5MHz	QPSK	23255	25RB#0	4.525	5.16	PASS
Band13	5MHz	16QAM	23255	25RB#0	4.535	5.21	PASS
Band13	10MHz	QPSK	23230	50RB#0	8.985	10.17	PASS
Band13	10MHz	16QAM	23230	50RB#0	8.985	10.03	PASS

Test Graphs



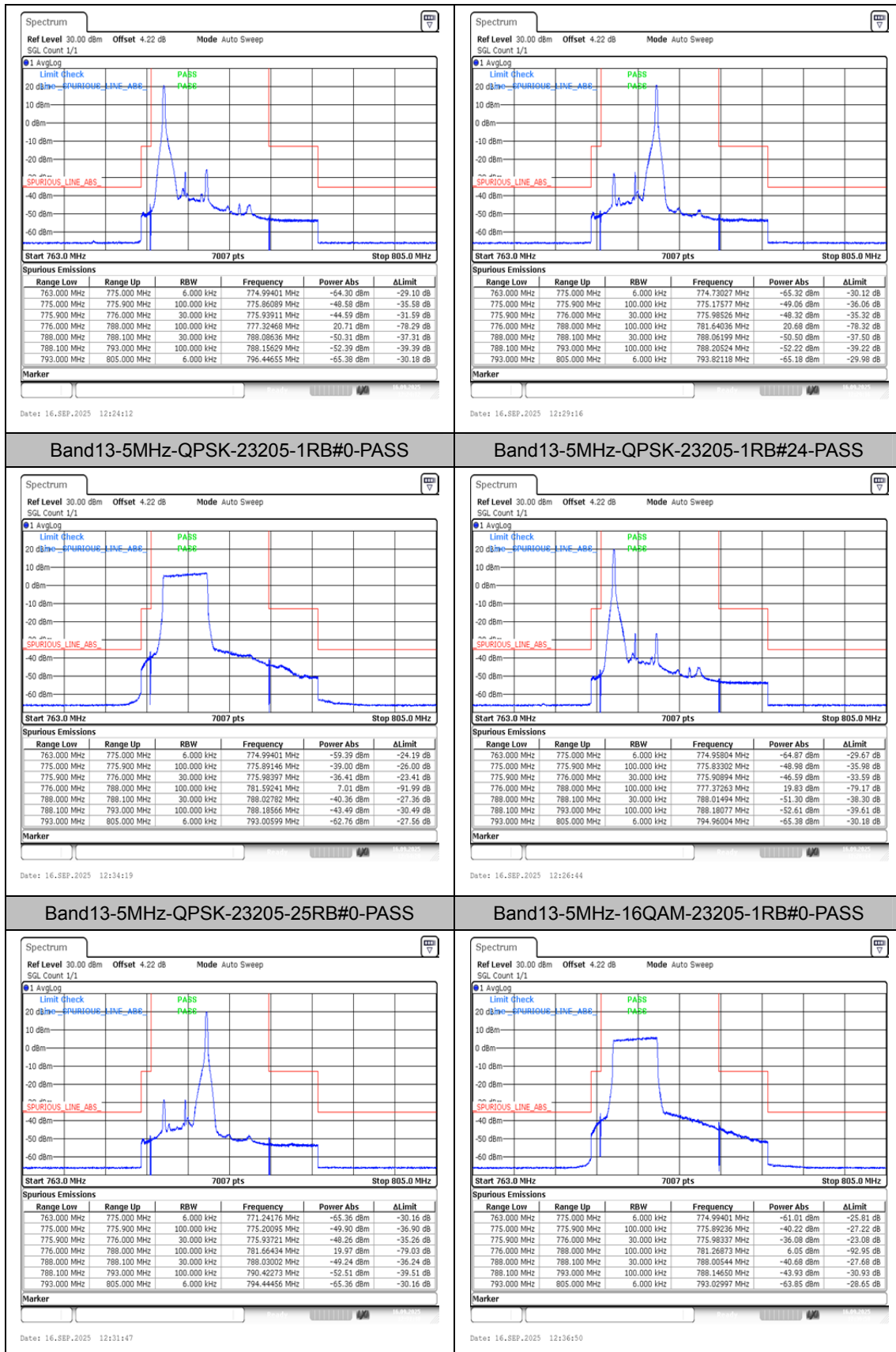


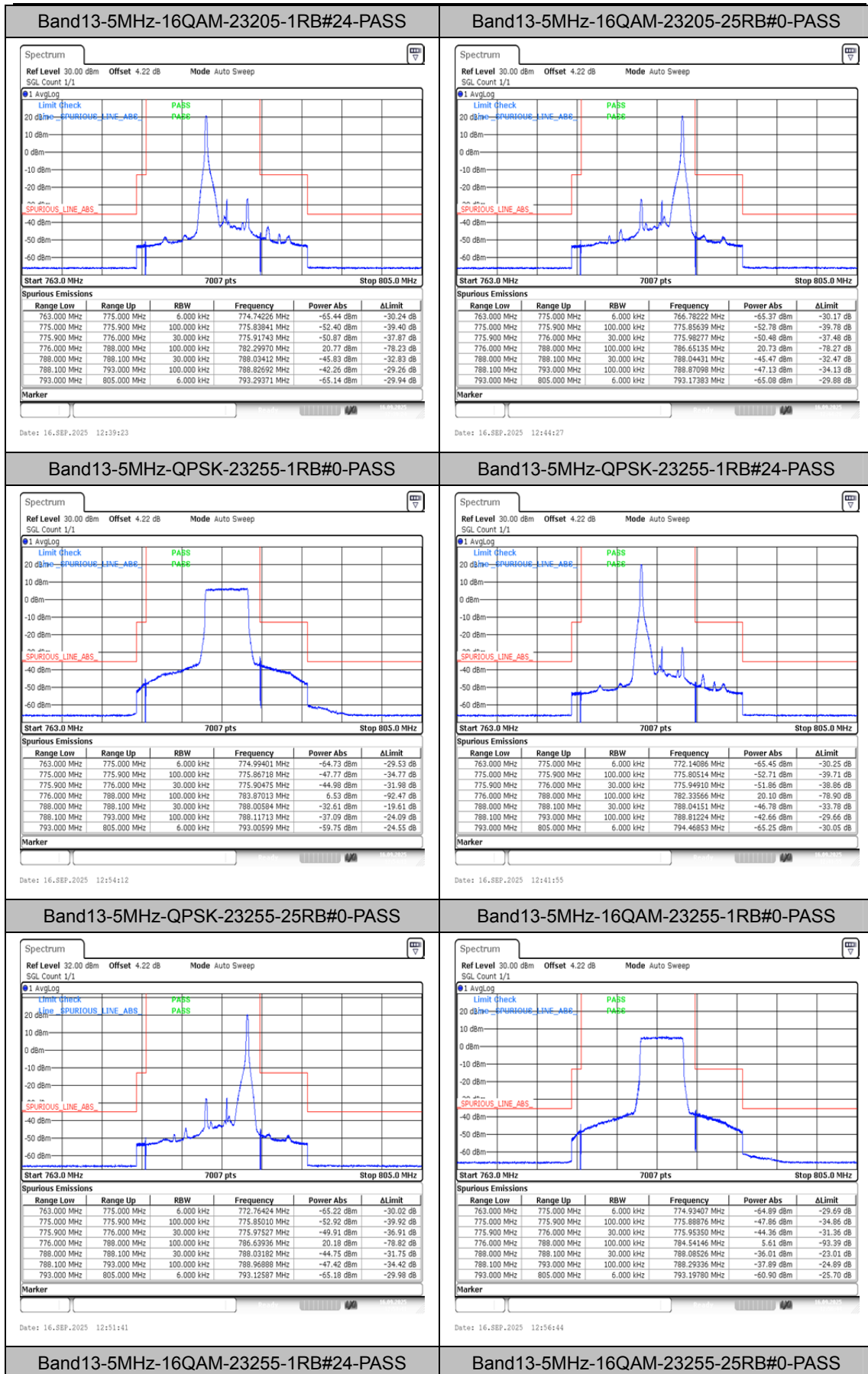
Appendix D: Band Edge

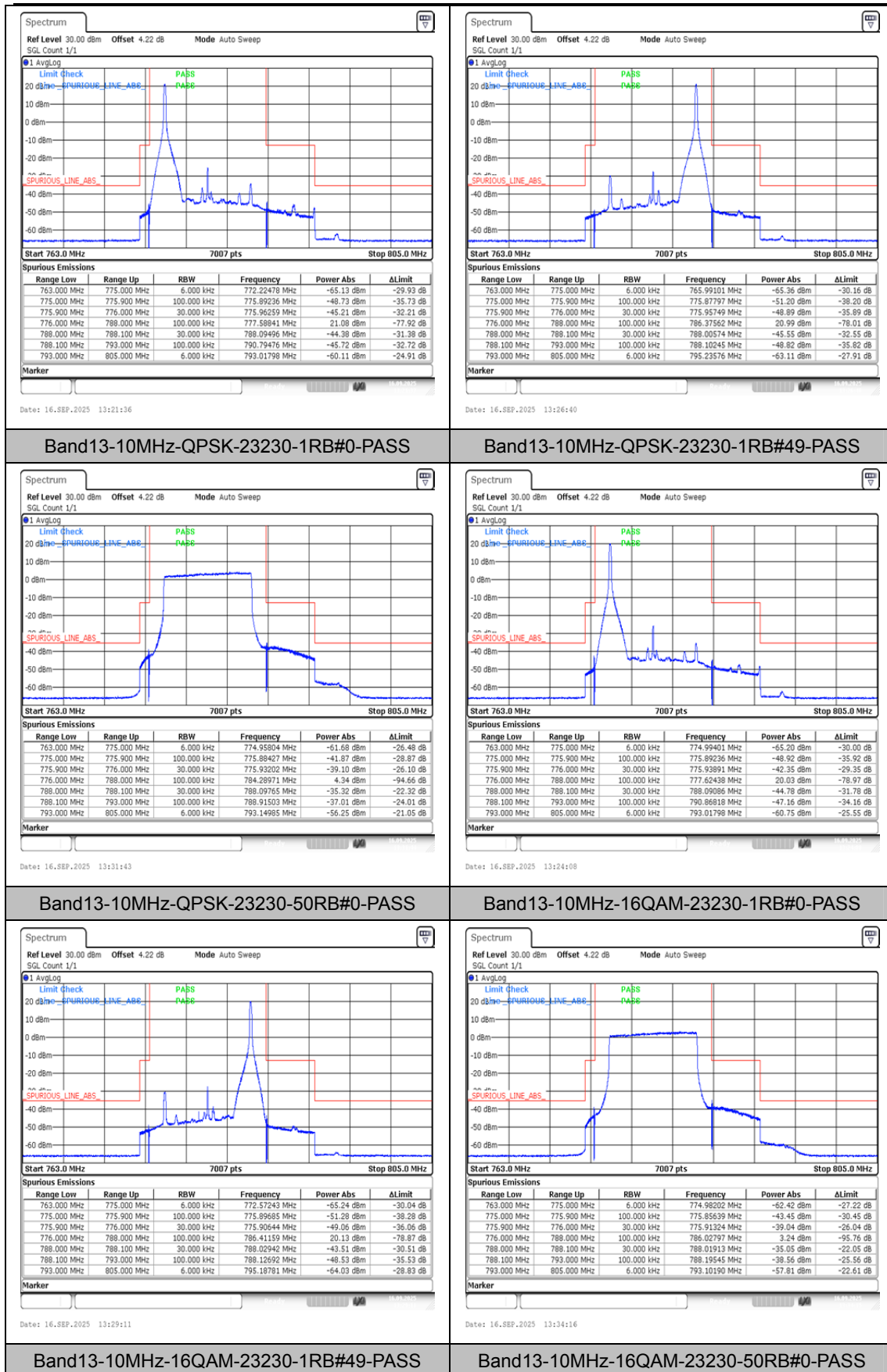
Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dBm)	Verdict
Band13	5MHz	QPSK	23205	1RB#0	-64.30	PASS
Band13	5MHz	QPSK	23205	1RB#24	-65.18	PASS
Band13	5MHz	QPSK	23205	25RB#0	-36.41	PASS
Band13	5MHz	16QAM	23205	1RB#0	-64.87	PASS
Band13	5MHz	16QAM	23205	1RB#24	-65.36	PASS
Band13	5MHz	16QAM	23205	25RB#0	-36.08	PASS
Band13	5MHz	QPSK	23255	1RB#0	-42.26	PASS
Band13	5MHz	QPSK	23255	1RB#24	-65.08	PASS
Band13	5MHz	QPSK	23255	25RB#0	-32.61	PASS
Band13	5MHz	16QAM	23255	1RB#0	-42.66	PASS
Band13	5MHz	16QAM	23255	1RB#24	-65.18	PASS
Band13	5MHz	16QAM	23255	25RB#0	-36.01	PASS
Band13	10MHz	QPSK	23230	1RB#0	-60.11	PASS
Band13	10MHz	QPSK	23230	1RB#49	-63.11	PASS
Band13	10MHz	QPSK	23230	50RB#0	-56.25	PASS
Band13	10MHz	16QAM	23230	1RB#0	-60.75	PASS
Band13	10MHz	16QAM	23230	1RB#49	-64.03	PASS
Band13	10MHz	16QAM	23230	50RB#0	-35.05	PASS

Test Graphs







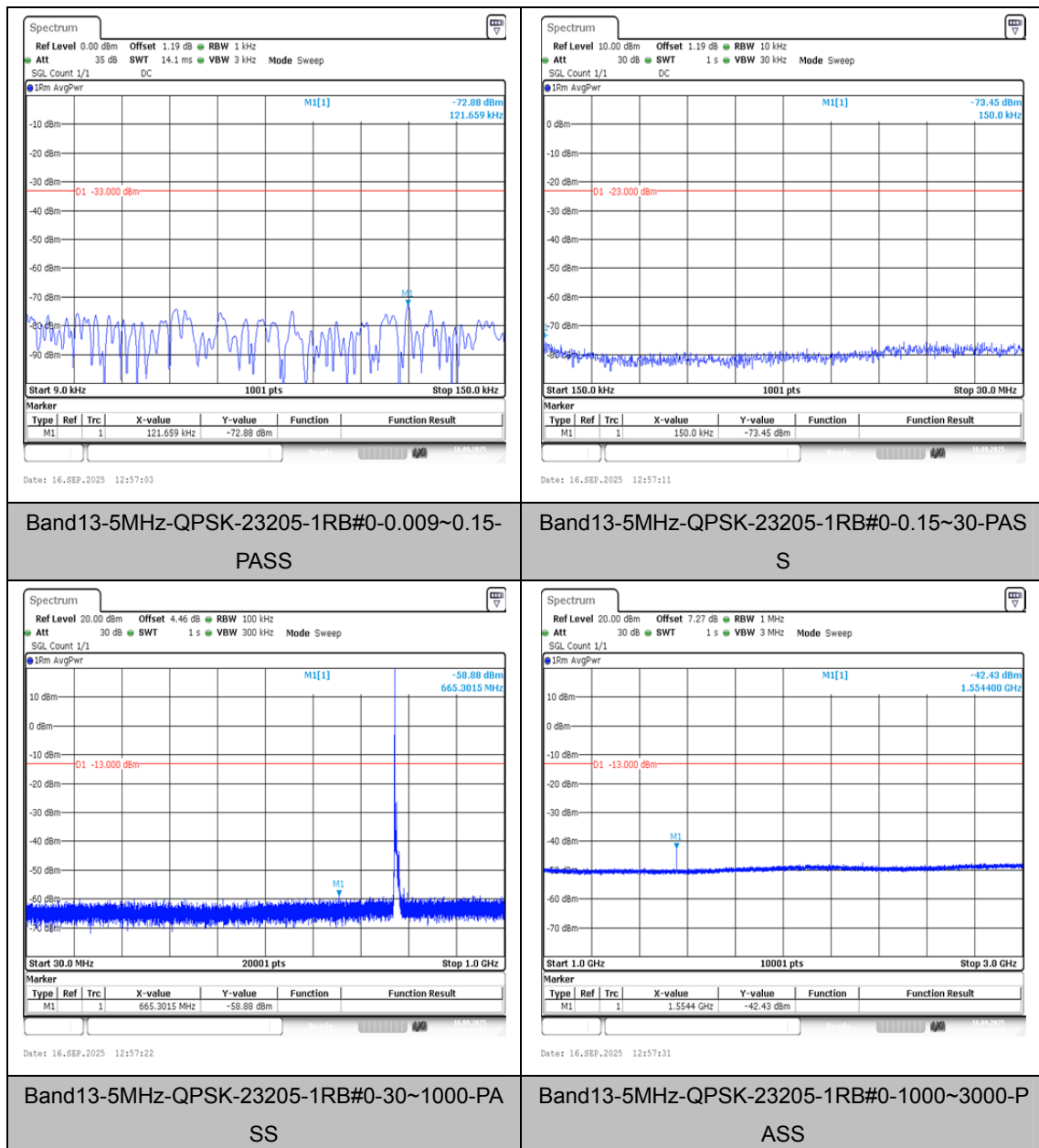
Appendix E: Conducted Spurious Emission

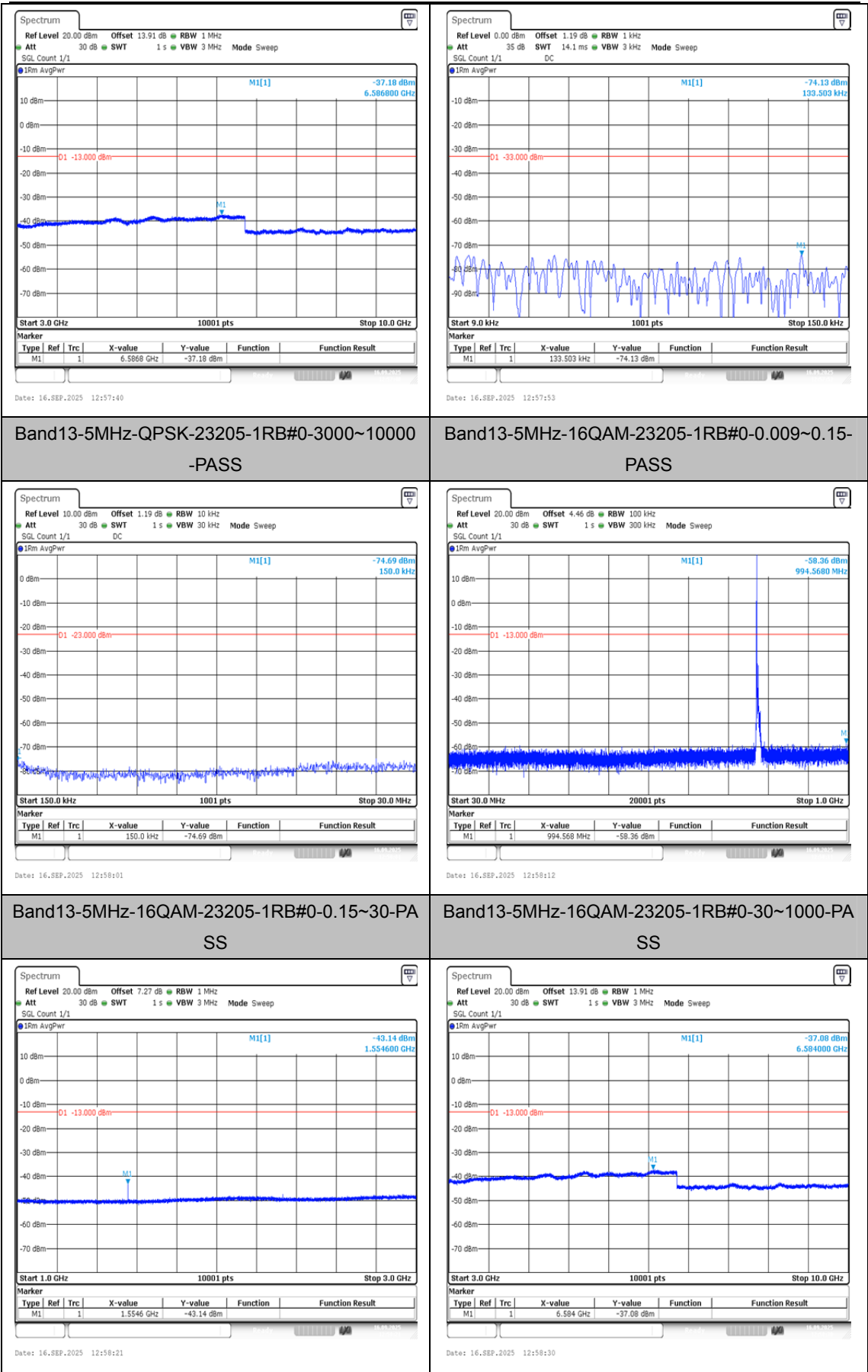
Test Result

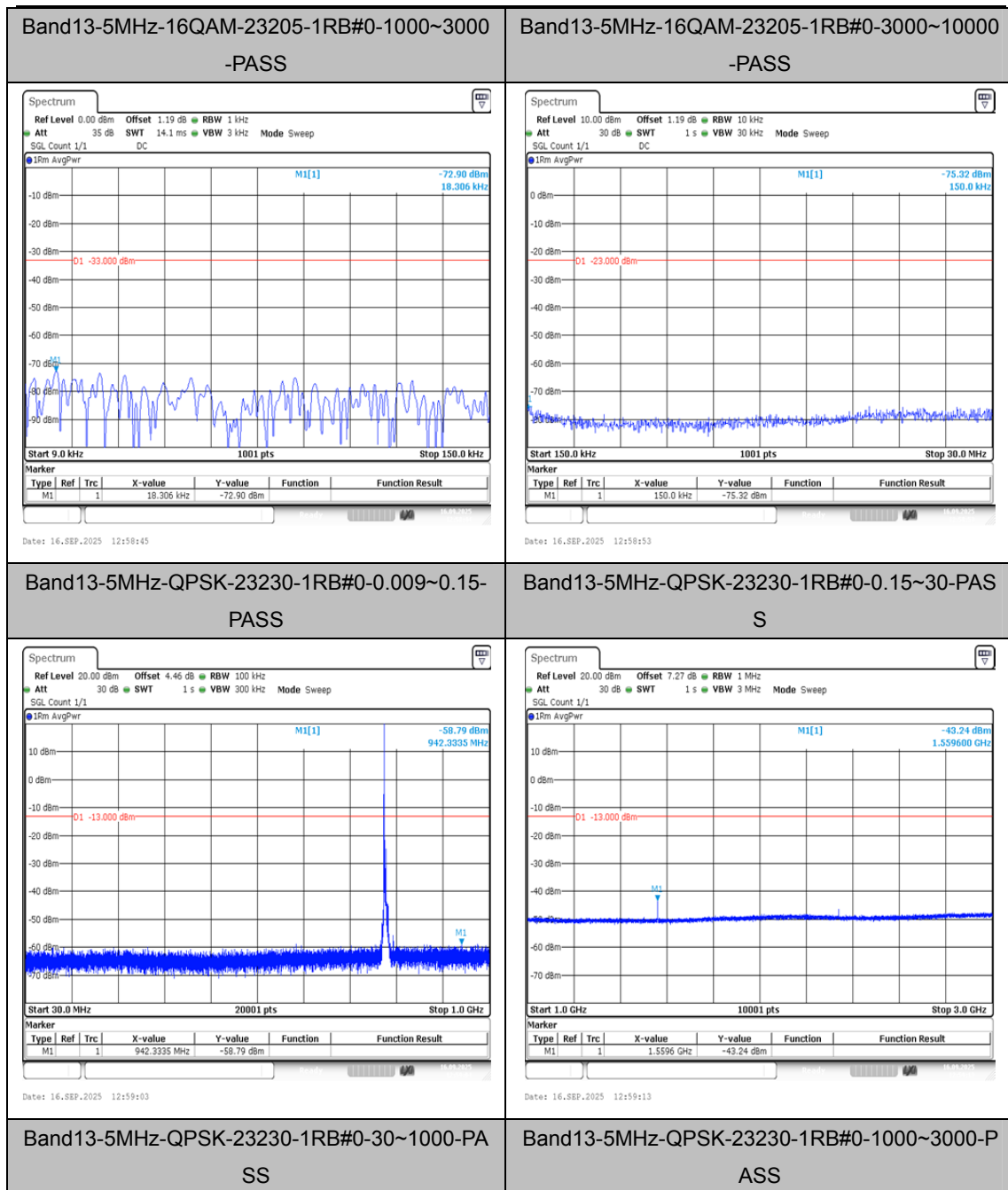
Band	Bandwidth	Modulation	Channel	RB Configuration	Frequency Range	Result (dBm)	Verdict
Band13	5MHz	QPSK	23205	1RB#0	0.009~0.15	-72.88	PASS
Band13	5MHz	QPSK	23205	1RB#0	0.15~30	-73.45	PASS
Band13	5MHz	QPSK	23205	1RB#0	30~1000	-58.88	PASS
Band13	5MHz	QPSK	23205	1RB#0	1000~3000	-42.43	PASS
Band13	5MHz	QPSK	23205	1RB#0	3000~10000	-37.18	PASS
Band13	5MHz	16QAM	23205	1RB#0	0.009~0.15	-74.13	PASS
Band13	5MHz	16QAM	23205	1RB#0	0.15~30	-74.69	PASS
Band13	5MHz	16QAM	23205	1RB#0	30~1000	-58.36	PASS
Band13	5MHz	16QAM	23205	1RB#0	1000~3000	-43.14	PASS
Band13	5MHz	16QAM	23205	1RB#0	3000~10000	-37.08	PASS
Band13	5MHz	QPSK	23230	1RB#0	0.009~0.15	-72.90	PASS
Band13	5MHz	QPSK	23230	1RB#0	0.15~30	-75.32	PASS
Band13	5MHz	QPSK	23230	1RB#0	30~1000	-58.79	PASS
Band13	5MHz	QPSK	23230	1RB#0	1000~3000	-43.24	PASS
Band13	5MHz	QPSK	23230	1RB#0	3000~10000	-37.17	PASS
Band13	5MHz	16QAM	23230	1RB#0	0.009~0.15	-71.32	PASS
Band13	5MHz	16QAM	23230	1RB#0	0.15~30	-74.84	PASS
Band13	5MHz	16QAM	23230	1RB#0	30~1000	-58.55	PASS
Band13	5MHz	16QAM	23230	1RB#0	1000~3000	-43.96	PASS
Band13	5MHz	16QAM	23230	1RB#0	3000~10000	-37.10	PASS
Band13	5MHz	QPSK	23255	1RB#0	0.009~0.15	-72.04	PASS
Band13	5MHz	QPSK	23255	1RB#0	0.15~30	-73.46	PASS
Band13	5MHz	QPSK	23255	1RB#0	30~1000	-58.25	PASS
Band13	5MHz	QPSK	23255	1RB#0	1000~3000	-44.13	PASS
Band13	5MHz	QPSK	23255	1RB#0	3000~10000	-36.93	PASS
Band13	5MHz	16QAM	23255	1RB#0	0.009~0.15	-71.66	PASS
Band13	5MHz	16QAM	23255	1RB#0	0.15~30	-74.56	PASS
Band13	5MHz	16QAM	23255	1RB#0	30~1000	-58.15	PASS
Band13	5MHz	16QAM	23255	1RB#0	1000~3000	-44.17	PASS
Band13	5MHz	16QAM	23255	1RB#0	3000~10000	-37.16	PASS
Band13	10MHz	QPSK	23230	1RB#0	0.009~0.15	-72.96	PASS
Band13	10MHz	QPSK	23230	1RB#0	0.15~30	-73.82	PASS
Band13	10MHz	QPSK	23230	1RB#0	30~1000	-58.73	PASS
Band13	10MHz	QPSK	23230	1RB#0	1000~3000	-42.76	PASS
Band13	10MHz	QPSK	23230	1RB#0	3000~10000	-36.80	PASS

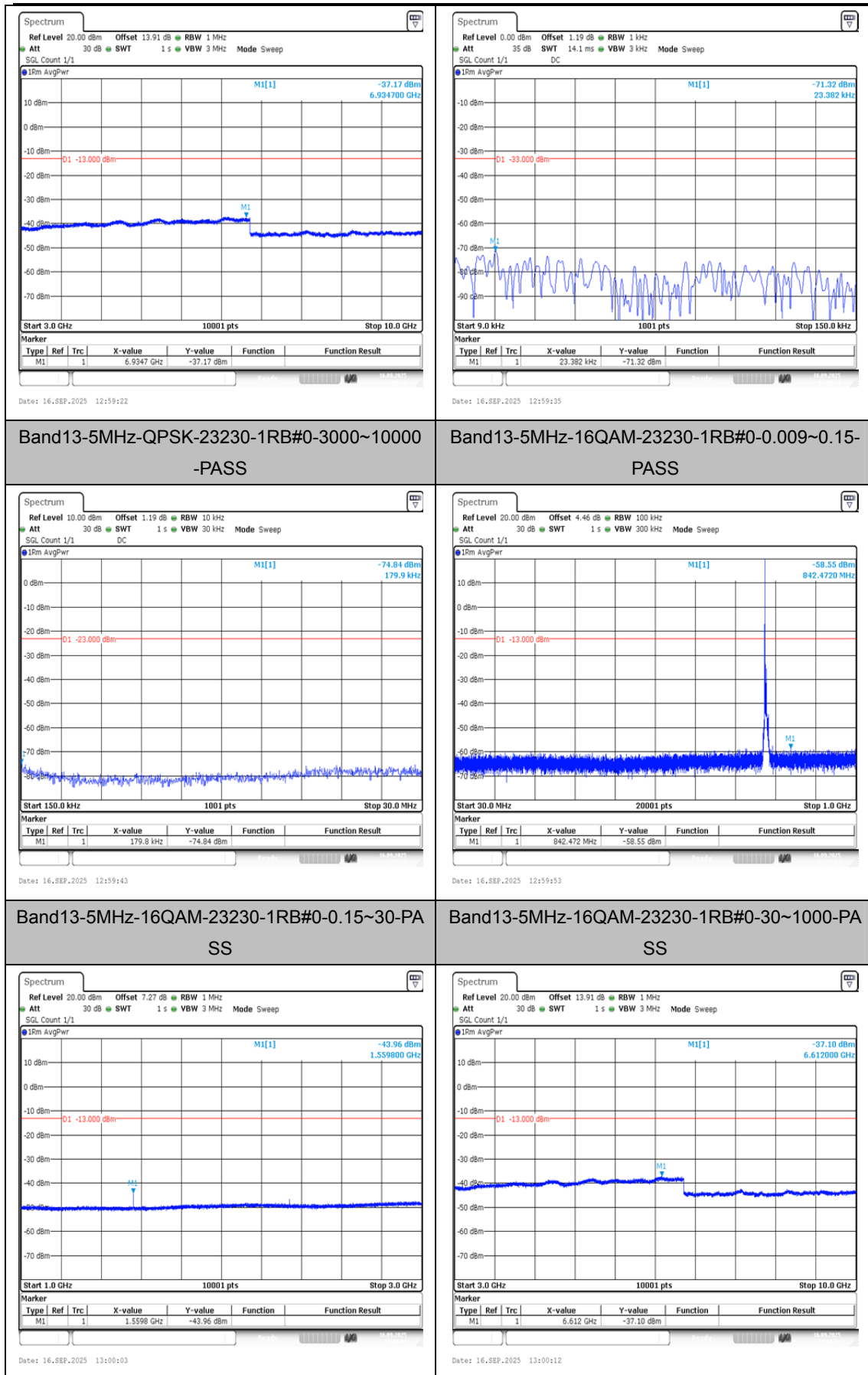
Band13	10MHz	16QAM	23230	1RB#0	0.009~0.15	-70.85	PASS
Band13	10MHz	16QAM	23230	1RB#0	0.15~30	-73.38	PASS
Band13	10MHz	16QAM	23230	1RB#0	30~1000	-58.77	PASS
Band13	10MHz	16QAM	23230	1RB#0	1000~3000	-43.40	PASS
Band13	10MHz	16QAM	23230	1RB#0	3000~10000	-37.33	PASS

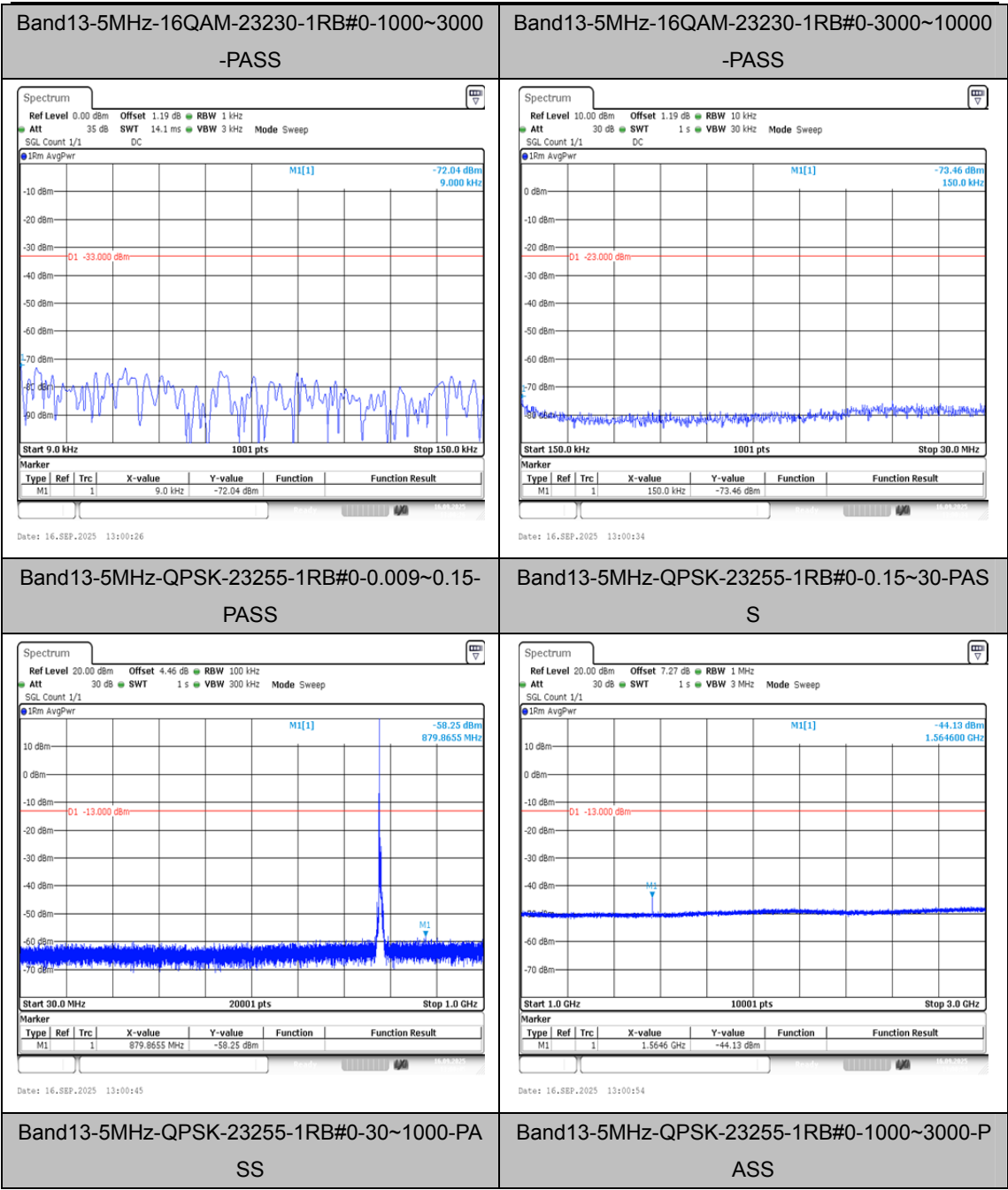
Test Graphs

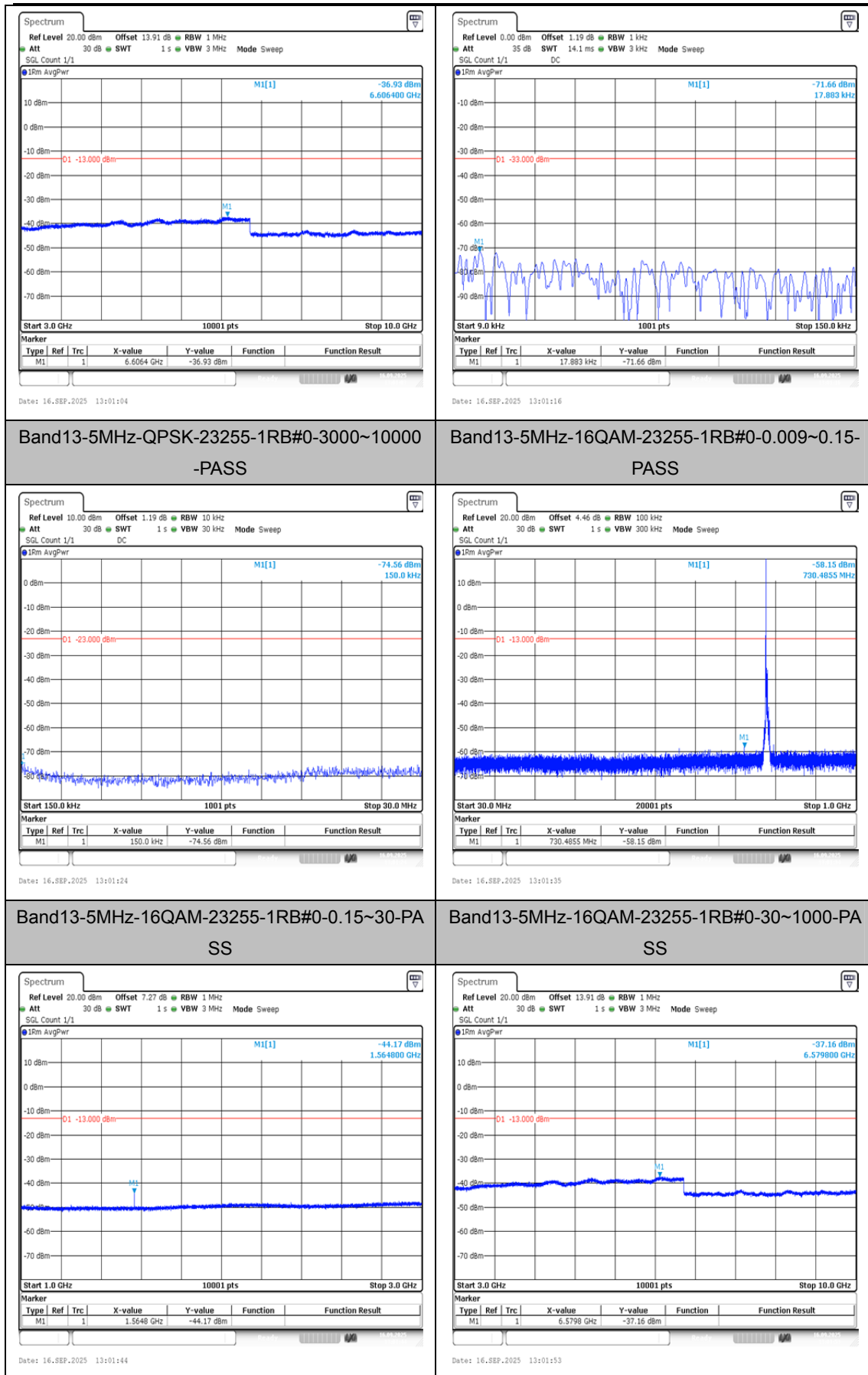


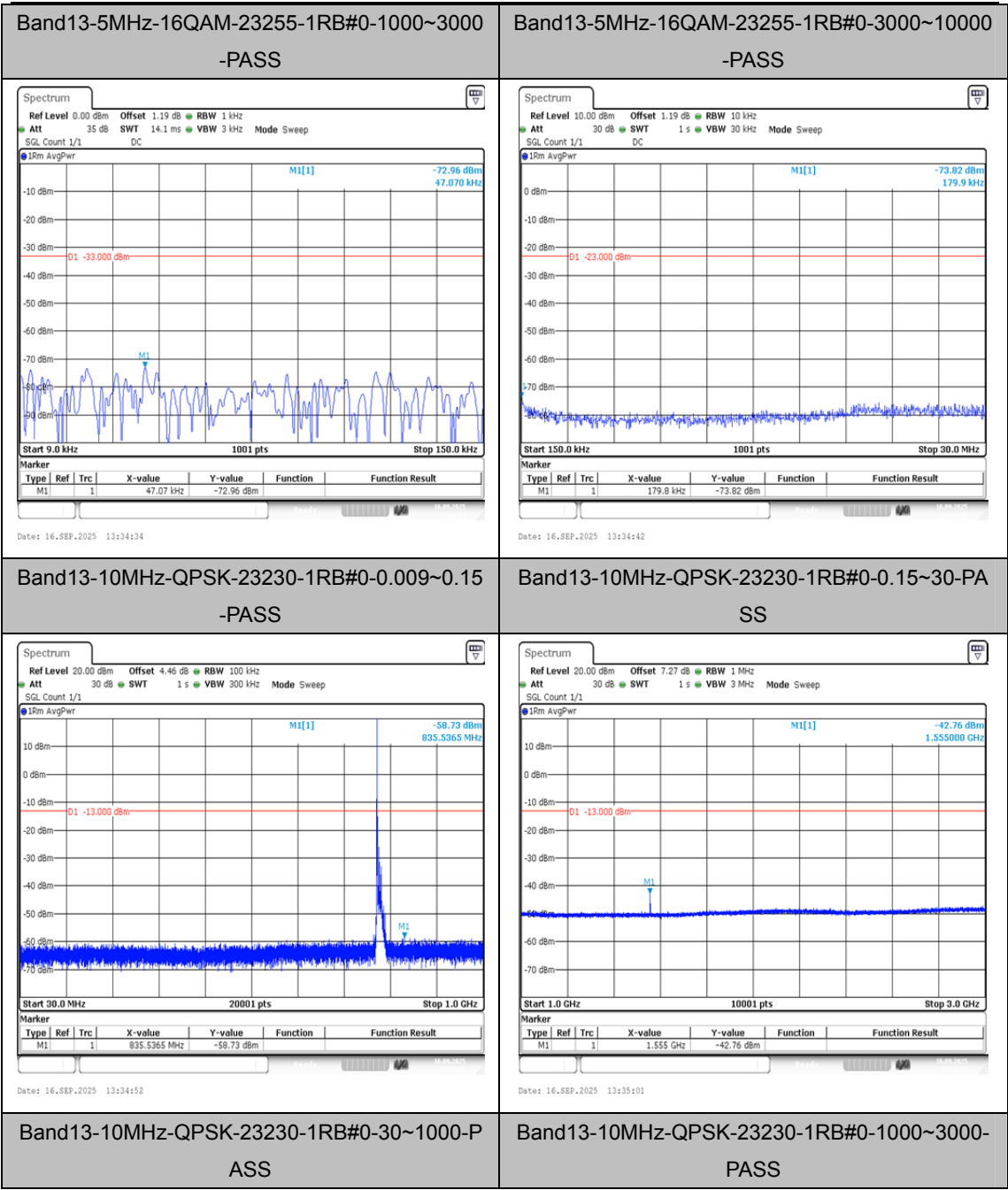


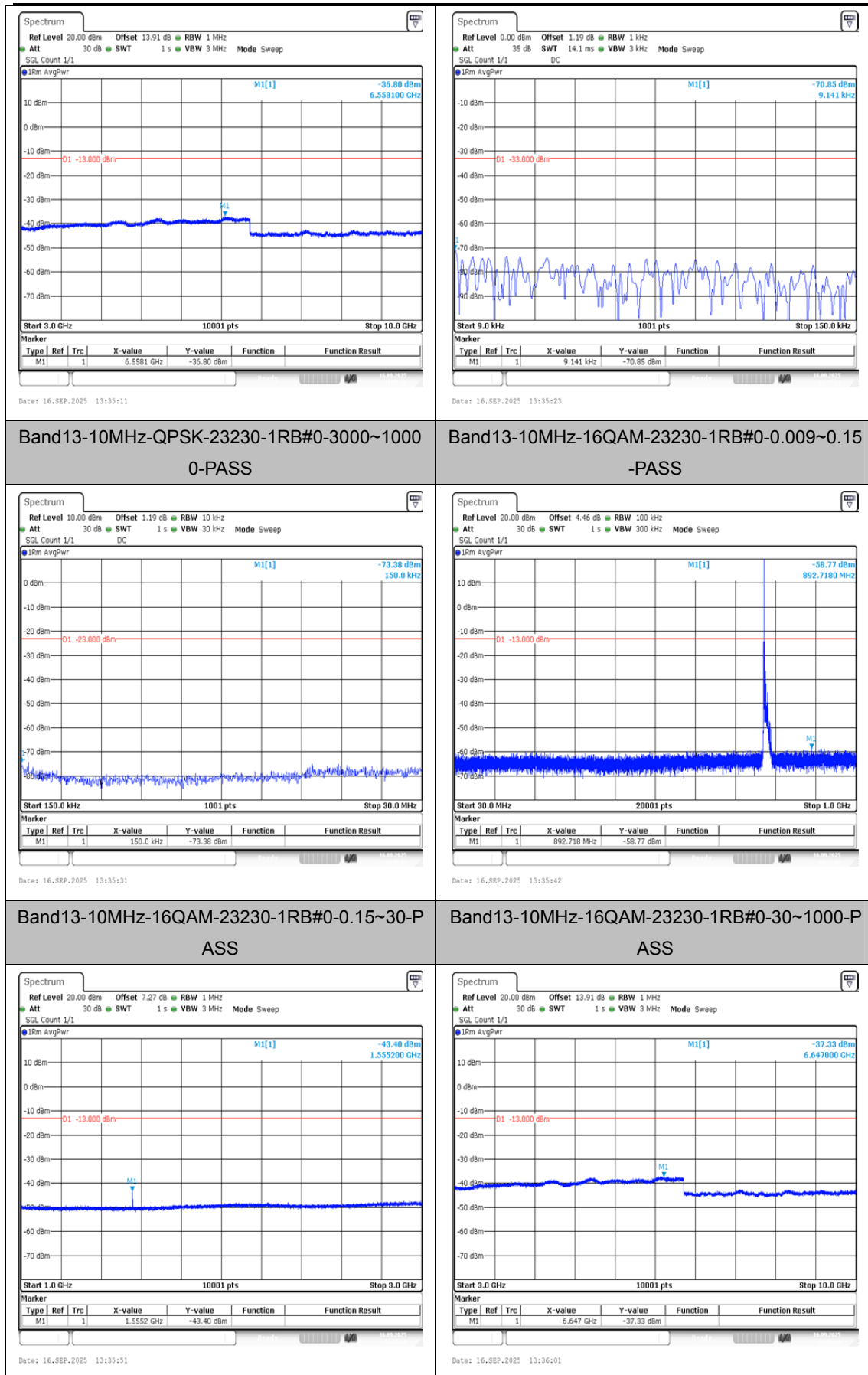












Band13-10MHz-16QAM-23230-1RB#0-1000~300 0-PASS	Band13-10MHz-16QAM-23230-1RB#0-3000~1000 0-PASS
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Appendix F: Frequency Stability

Test Result

Voltage										
Band	Bandwidth h	Modulation	Channel	RB Configure	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band13	5MHz	QPSK	23205	25RB#0	VN	NT	-3.83	-0.004913	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	VL	NT	-4.59	-0.005888	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	VH	NT	-4.39	-0.005632	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	VN	NT	-7.37	-0.009455	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	VL	NT	-3.43	-0.004400	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	VH	NT	-7.78	-0.009981	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	VN	NT	-3.13	-0.004003	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	VL	NT	-4.66	-0.005959	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	VH	NT	-4.58	-0.005857	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	VN	NT	-1.40	-0.001790	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	VL	NT	3.98	0.005090	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	VH	NT	-3.83	-0.004898	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	VN	NT	3.20	0.004079	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	VL	NT	-3.76	-0.004793	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	VH	NT	-2.45	-0.003123	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	VN	NT	-2.70	-0.003442	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	VL	NT	-4.63	-0.005902	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	VH	NT	-6.81	-0.008681	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	VN	NT	-2.73	-0.003491	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	VL	NT	4.45	0.005691	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	VH	NT	-5.11	-0.006535	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VN	NT	-1.19	-0.001522	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VL	NT	-3.96	-0.005064	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VH	NT	1.86	0.002379	±2.5	PASS

Temperature										
Band	Bandwidth h	Modulation	Channel	RB Configure	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band13	5MHz	QPSK	23205	25RB#0	NV	-30	-6.68	-0.008570	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	-20	-9.73	-0.012482	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	-10	-11.10	-0.014240	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	0	-12.04	-0.015446	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	10	-10.10	-0.012957	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	20	-7.28	-0.009339	±2.5	PASS

Band13	5MHz	QPSK	23205	25RB#0	NV	30	-4.92	-0.006312	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	40	-6.08	-0.007800	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	50	-7.52	-0.009647	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	-30	-7.07	-0.009070	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	-20	-5.08	-0.006517	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	-10	-3.88	-0.004978	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	0	-6.52	-0.008364	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	10	-6.59	-0.008454	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	20	-6.64	-0.008518	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	30	-8.01	-0.010276	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	40	-6.44	-0.008262	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	50	-6.61	-0.008480	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	-30	-11.97	-0.015307	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	-20	-8.90	-0.011381	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	-10	-8.70	-0.011125	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	0	-9.63	-0.012315	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	10	-12.82	-0.016394	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	20	-13.13	-0.016790	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	30	-8.68	-0.011100	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	40	-10.03	-0.012826	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	50	-5.85	-0.007481	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	-30	-10.40	-0.013299	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	-20	-9.58	-0.012251	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	-10	-10.59	-0.013542	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	0	-14.82	-0.018951	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	10	-9.37	-0.011982	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	20	-6.77	-0.008657	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	30	-8.15	-0.010422	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	40	-3.89	-0.004974	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	50	-9.20	-0.011765	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	-30	-5.51	-0.007024	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	-20	-5.39	-0.006871	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	-10	-6.61	-0.008426	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	0	-10.96	-0.013971	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	10	-8.91	-0.011358	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	20	-8.73	-0.011128	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	30	-13.23	-0.016864	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	40	-8.47	-0.010797	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	50	-7.91	-0.010083	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	-30	-10.76	-0.013716	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	-20	-14.53	-0.018521	±2.5	PASS

Band13	5MHz	16QAM	23255	25RB#0	NV	-10	-10.24	-0.013053	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	0	-9.88	-0.012594	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	10	-9.40	-0.011982	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	20	-11.03	-0.014060	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	30	-14.99	-0.019108	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	40	-8.90	-0.011345	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	50	-4.49	-0.005723	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	-30	-13.35	-0.017072	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	-20	-3.98	-0.005090	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	-10	-3.30	-0.004220	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	0	-5.15	-0.006586	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	10	-8.58	-0.010972	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	20	-10.67	-0.013645	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	30	-6.52	-0.008338	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	40	-6.02	-0.007698	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	50	-4.75	-0.006074	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	-30	-8.11	-0.010371	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	-20	-6.87	-0.008785	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	-10	-14.29	-0.018274	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	0	-5.62	-0.007187	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	10	-7.50	-0.009591	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	20	-12.33	-0.015767	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	30	-12.23	-0.015639	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	40	-8.75	-0.011189	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	50	-6.77	-0.008657	±2.5	PASS