

Appendix for LTE Band 13

Product Name: Smart Phone

Model No: Black S

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	23.61	23.5±1	/
				1	49	23.58	23.5±1	/
				1	99	23.57	23.5±1	/
				12	0	22.69	23.0±1	1.0
				12	24	22.69	23.0±1	1.0
				12	49	22.67	23.0±1	1.0
				25	0	22.77	23.0±1	1.0
			16QAM	1	0	23.01	23.0±1	1.0
				1	49	23.13	23.0±1	1.0
				1	99	22.99	23.0±1	1.0
				12	0	21.56	21.5±1	1.0
				12	24	21.57	21.5±1	1.0
				12	49	21.53	21.5±1	1.0
				25	0	21.73	21.5±1	1.0
	23230	782.0	QPSK	1	0	23.71	23.5±1	/
				1	49	23.69	23.5±1	/
				1	99	23.7	23.5±1	/
				12	0	22.66	23.0±1	1.0
				12	24	22.62	23.0±1	1.0
				12	49	22.72	23.0±1	1.0
				25	0	22.6	23.0±1	1.0
			16QAM	1	0	22.42	22.0±1	1.0
				1	49	22.24	22.0±1	1.0
				1	99	22.3	22.0±1	1.0
				12	0	21.58	22.0±1	1.0
				12	24	21.67	22.0±1	1.0
				12	49	21.55	22.0±1	1.0
				25	0	21.68	22.0±1	1.0
	23255	784.5	QPSK	1	0	23.74	24.0±1	/
				1	49	23.65	24.0±1	/
				1	99	23.65	24.0±1	/
				12	0	22.65	22.5±1	1.0
				12	24	22.63	22.5±1	1.0
				12	49	22.47	22.5±1	1.0
				25	0	22.51	22.5±1	1.0

			16QAM	1	0	22.35	22.5±1	1.0
				1	49	22.35	22.5±1	1.0
				1	99	22.68	22.5±1	1.0
				12	0	21.41	21.5±1	1.0
				12	24	21.51	21.5±1	1.0
				12	49	21.61	21.5±1	1.0
				25	0	21.53	21.5±1	1.0

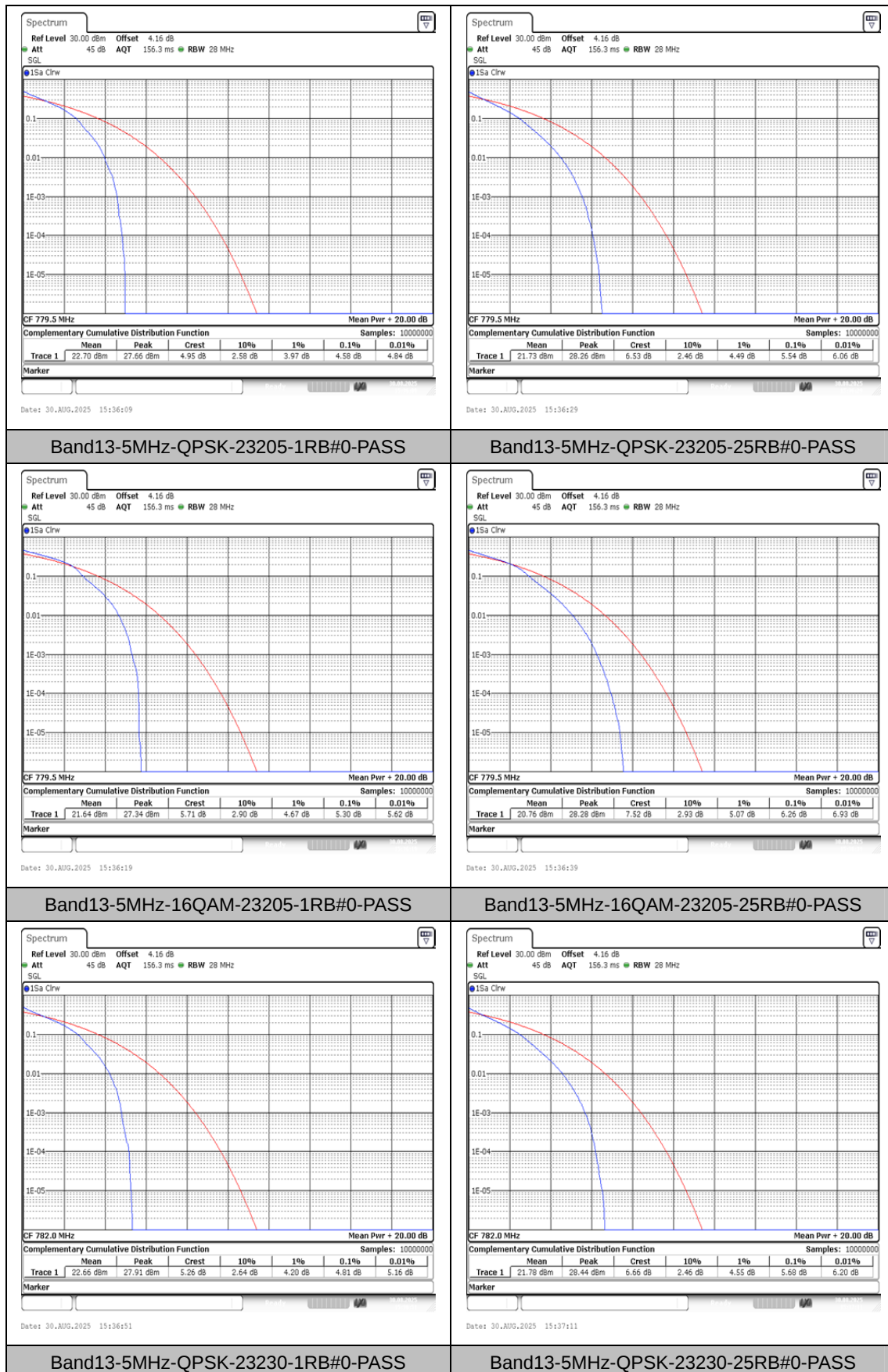
BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	23230	782.0	QPSK	1	0	23.64	23.5±1	/
				1	49	23.41	23.5±1	/
				1	99	23.6	23.5±1	/
				25	0	22.62	22.5±1	1.0
				25	24	22.47	22.5±1	1.0
				25	49	22.59	22.5±1	1.0
				50	0	22.38	22.5±1	1.0
			16QAM	1	0	23.06	23.0±1	1.0
				1	49	23.17	23.0±1	1.0
				1	99	23.04	23.0±1	1.0
				25	0	21.4	21.5±1	1.0
				25	24	21.28	21.5±1	1.0
				25	49	21.42	21.5±1	1.0
				50	0	21.52	21.5±1	1.0

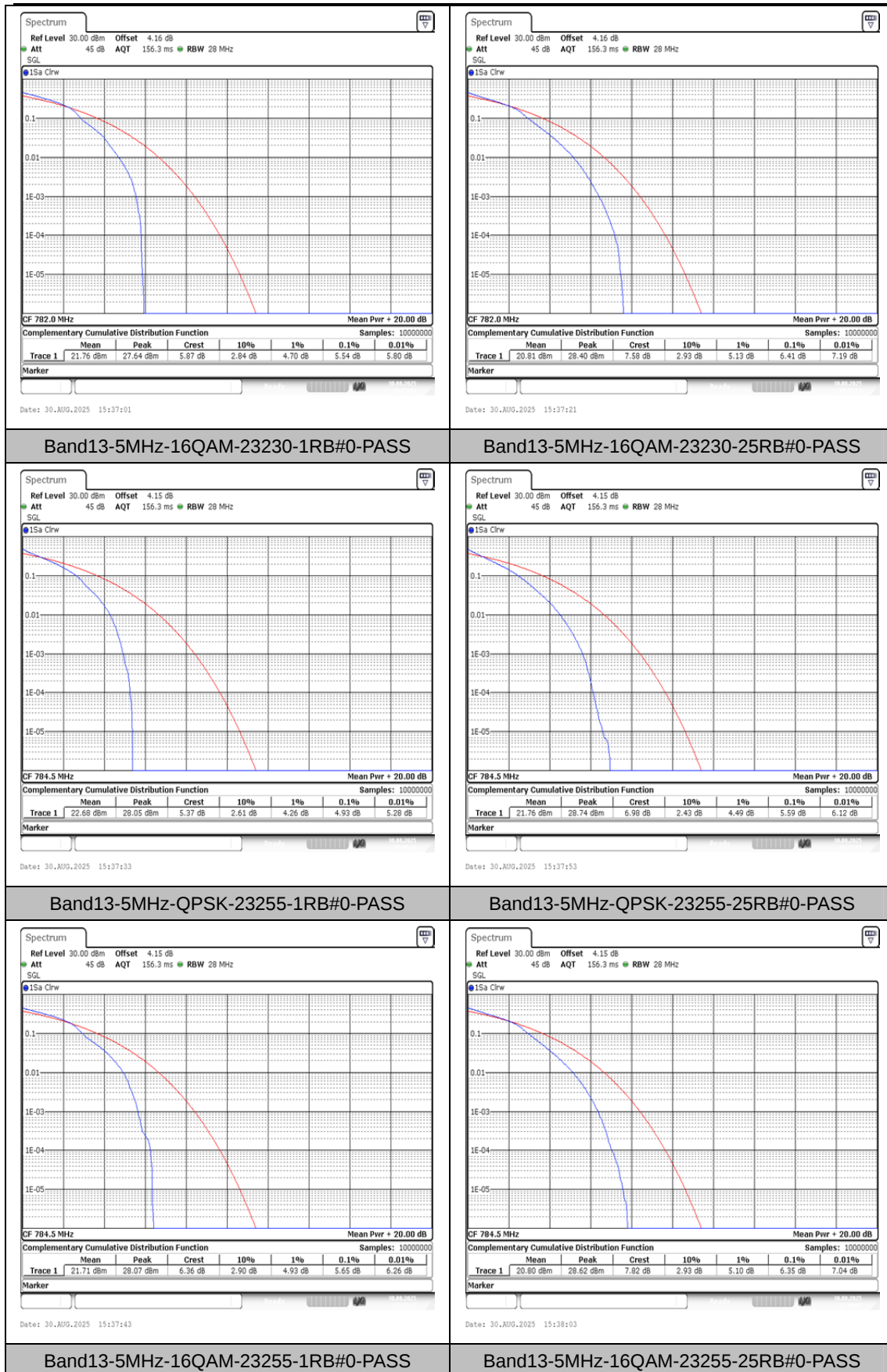
Appendix B: Peak-to-Average Ratio(CCDF)

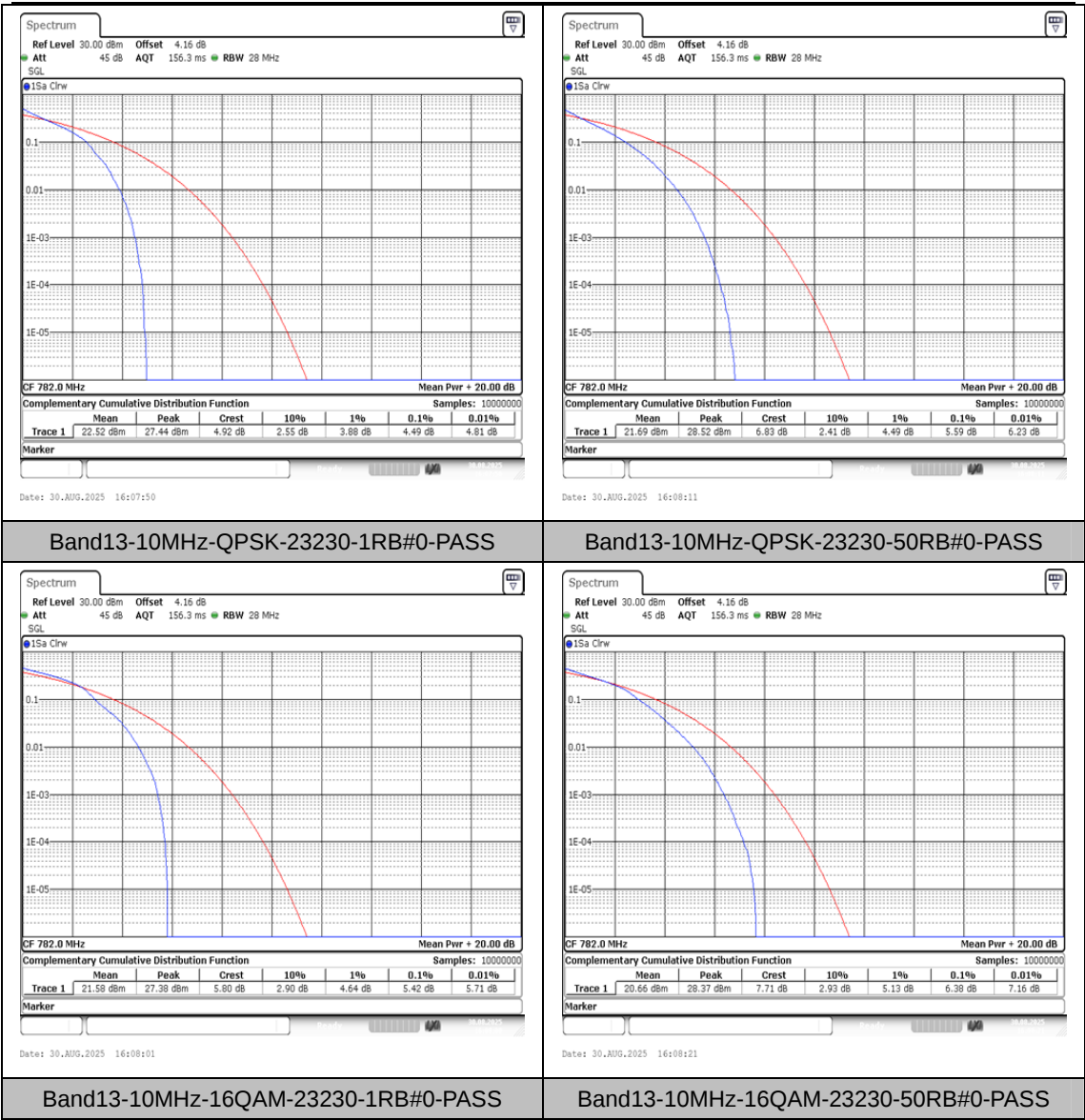
Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dB)	Limit(dB)	Verdict
Band13	5MHz	QPSK	23205	1RB#0	4.58	13	PASS
Band13	5MHz	QPSK	23205	25RB#0	5.54	13	PASS
Band13	5MHz	16QAM	23205	1RB#0	5.30	13	PASS
Band13	5MHz	16QAM	23205	25RB#0	6.26	13	PASS
Band13	5MHz	QPSK	23230	1RB#0	4.81	13	PASS
Band13	5MHz	QPSK	23230	25RB#0	5.68	13	PASS
Band13	5MHz	16QAM	23230	1RB#0	5.54	13	PASS
Band13	5MHz	16QAM	23230	25RB#0	6.41	13	PASS
Band13	5MHz	QPSK	23255	1RB#0	4.93	13	PASS
Band13	5MHz	QPSK	23255	25RB#0	5.59	13	PASS
Band13	5MHz	16QAM	23255	1RB#0	5.65	13	PASS
Band13	5MHz	16QAM	23255	25RB#0	6.35	13	PASS
Band13	10MHz	QPSK	23230	1RB#0	4.49	13	PASS
Band13	10MHz	QPSK	23230	50RB#0	5.59	13	PASS
Band13	10MHz	16QAM	23230	1RB#0	5.42	13	PASS
Band13	10MHz	16QAM	23230	50RB#0	6.38	13	PASS

Test Graphs





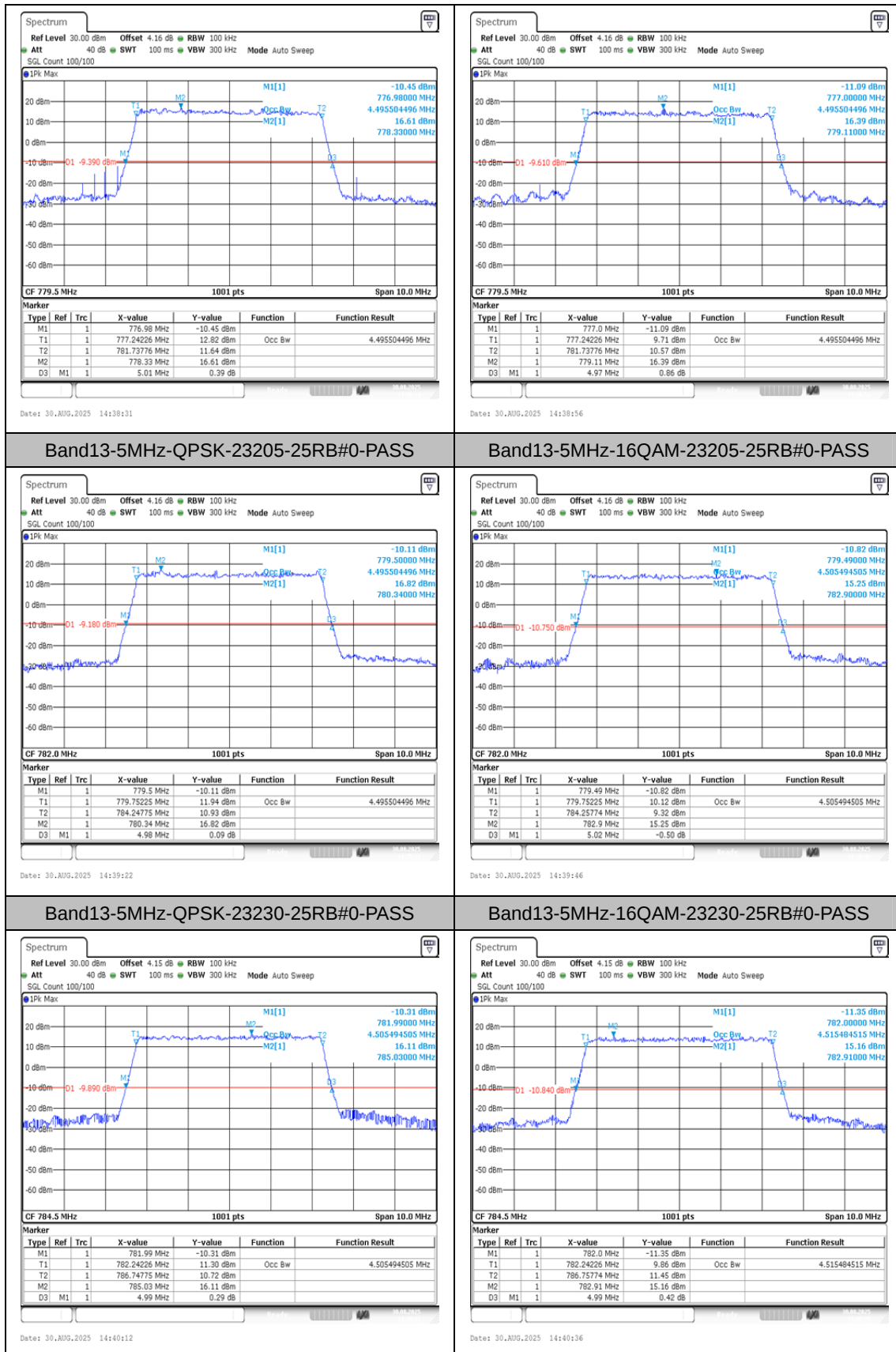


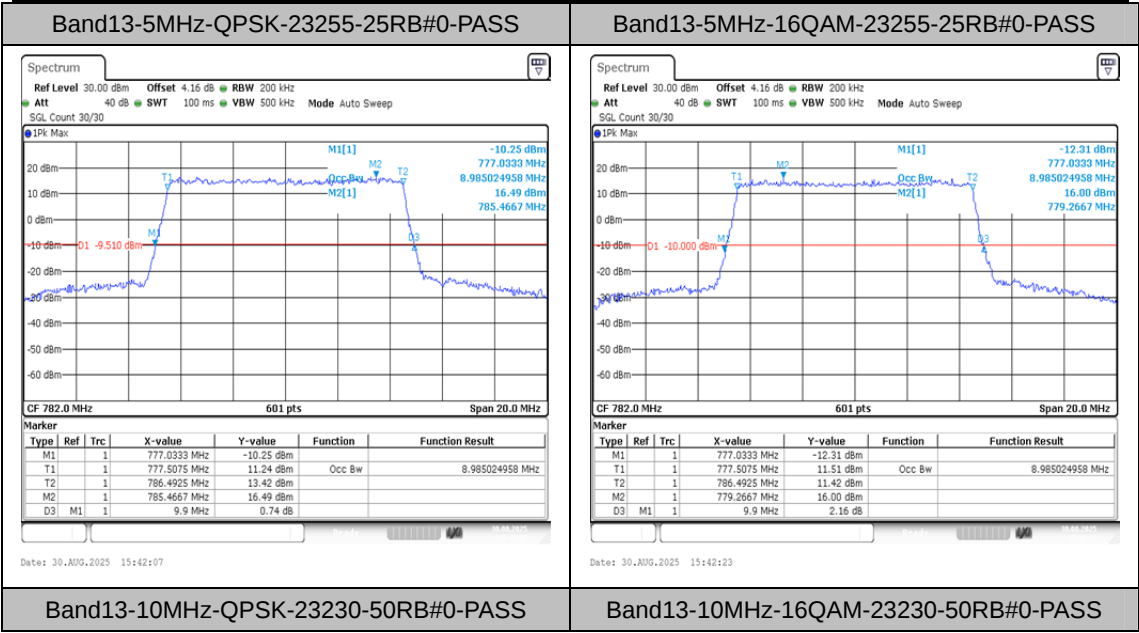
Appendix C: 26dB Bandwidth and Occupied Bandwidth

Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
Band13	5MHz	QPSK	23205	25RB#0	4.496	5.01	PASS
Band13	5MHz	16QAM	23205	25RB#0	4.496	4.97	PASS
Band13	5MHz	QPSK	23230	25RB#0	4.496	4.98	PASS
Band13	5MHz	16QAM	23230	25RB#0	4.505	5.02	PASS
Band13	5MHz	QPSK	23255	25RB#0	4.505	4.99	PASS
Band13	5MHz	16QAM	23255	25RB#0	4.515	4.99	PASS
Band13	10MHz	QPSK	23230	50RB#0	8.985	9.90	PASS
Band13	10MHz	16QAM	23230	50RB#0	8.985	9.90	PASS

Test Graphs



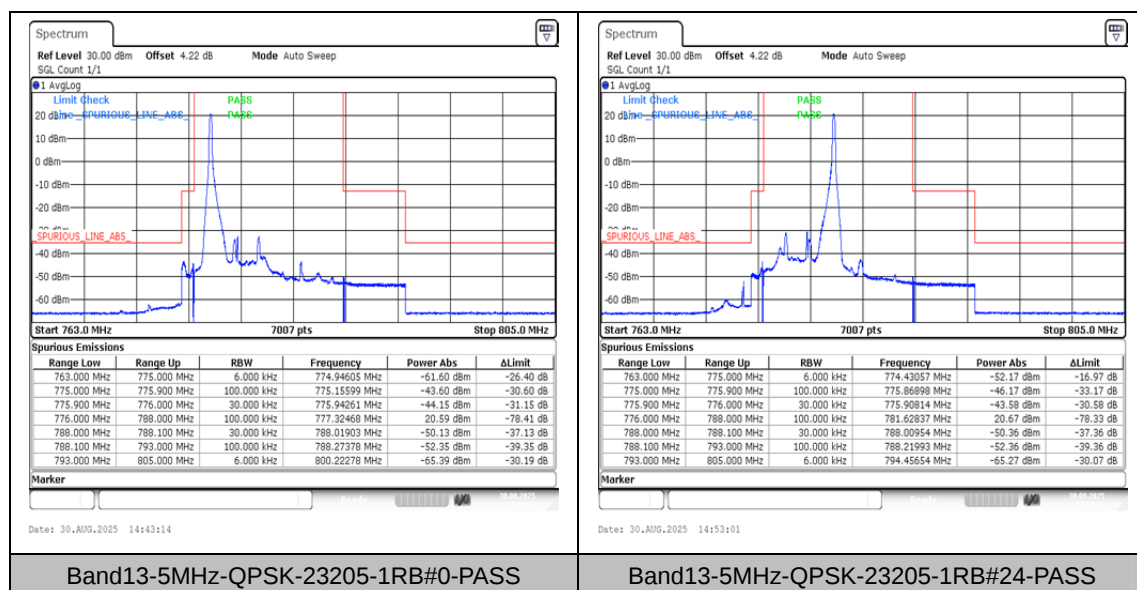


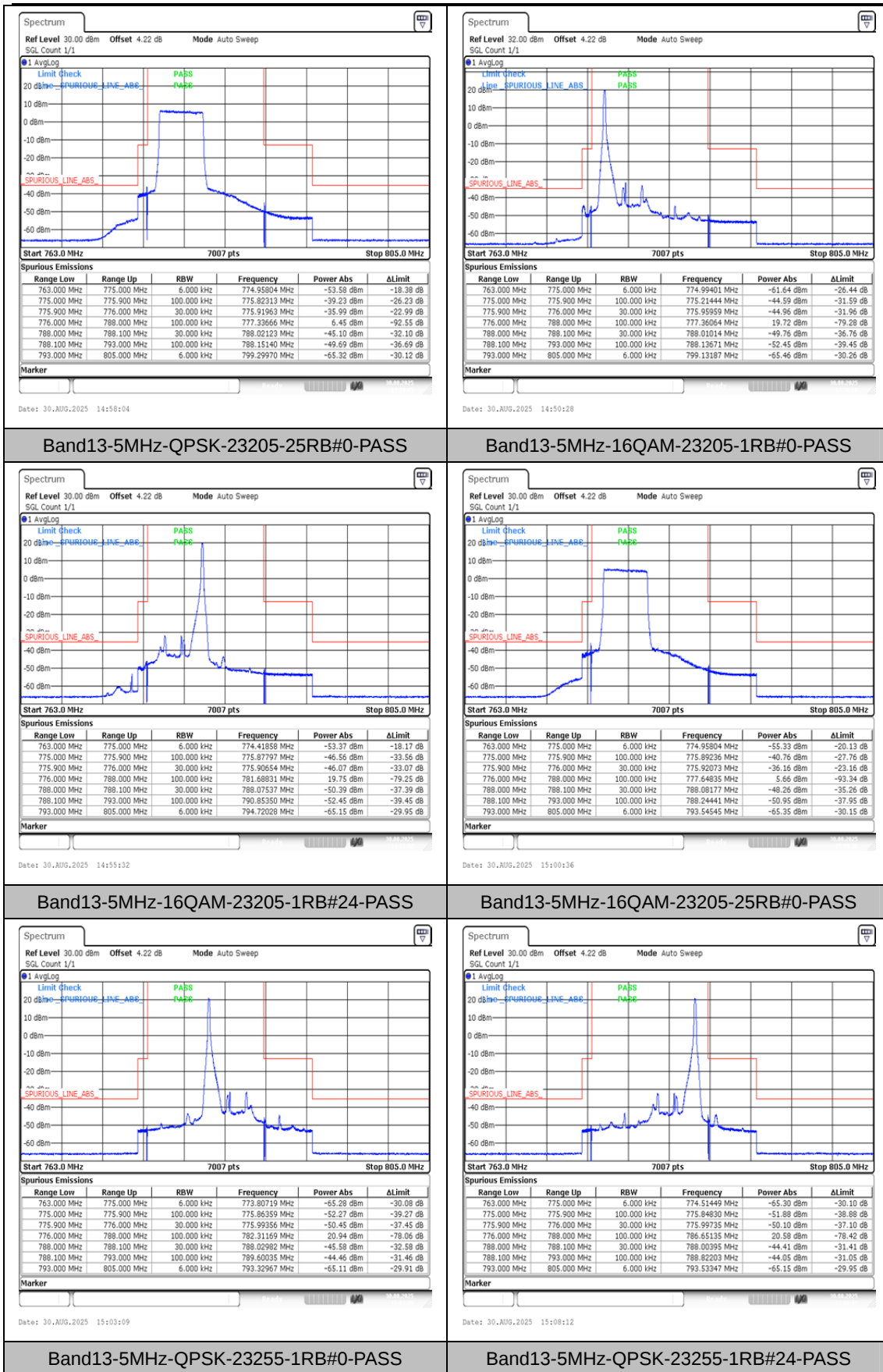
Appendix D: Band Edge

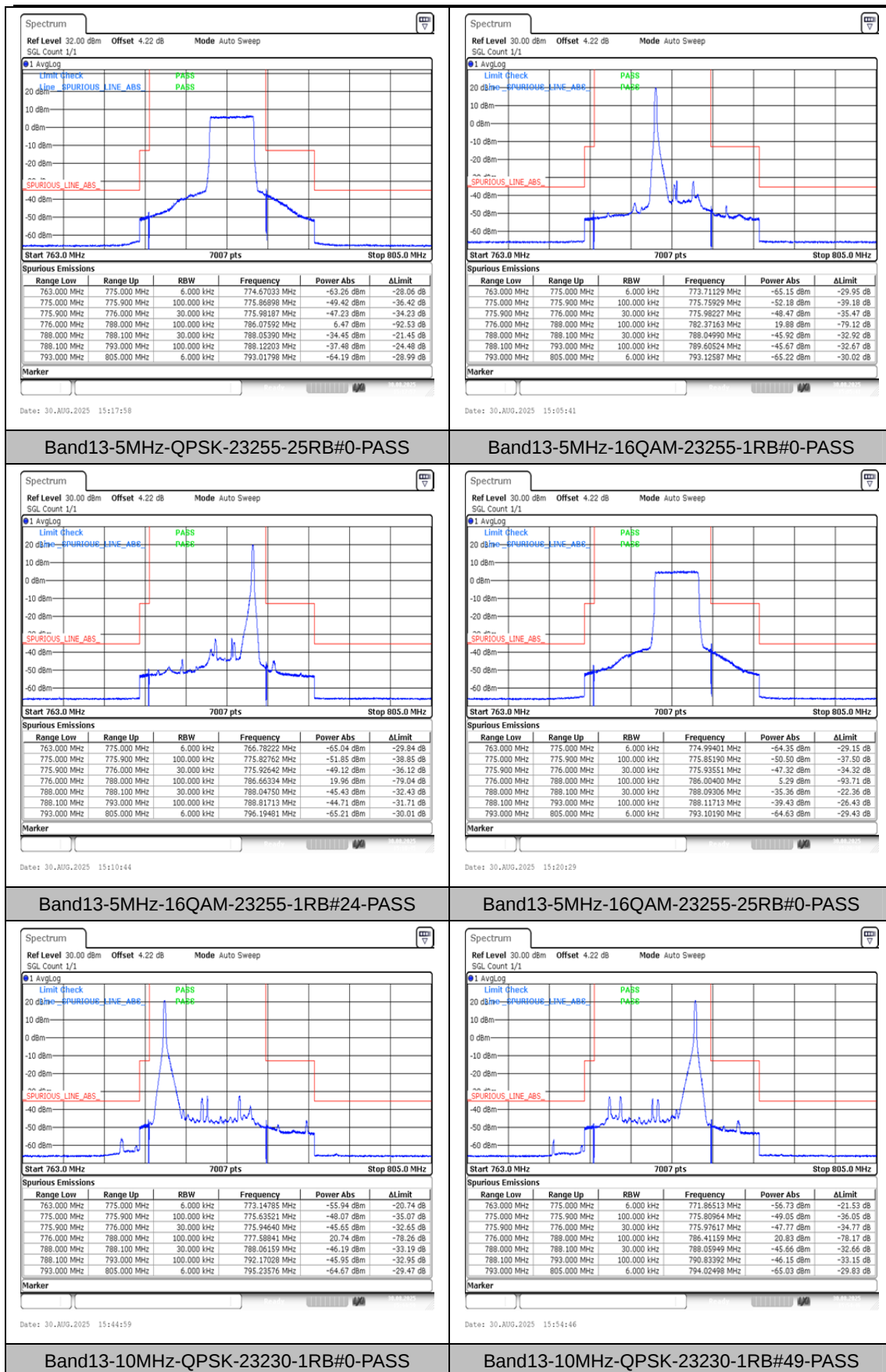
Test Result

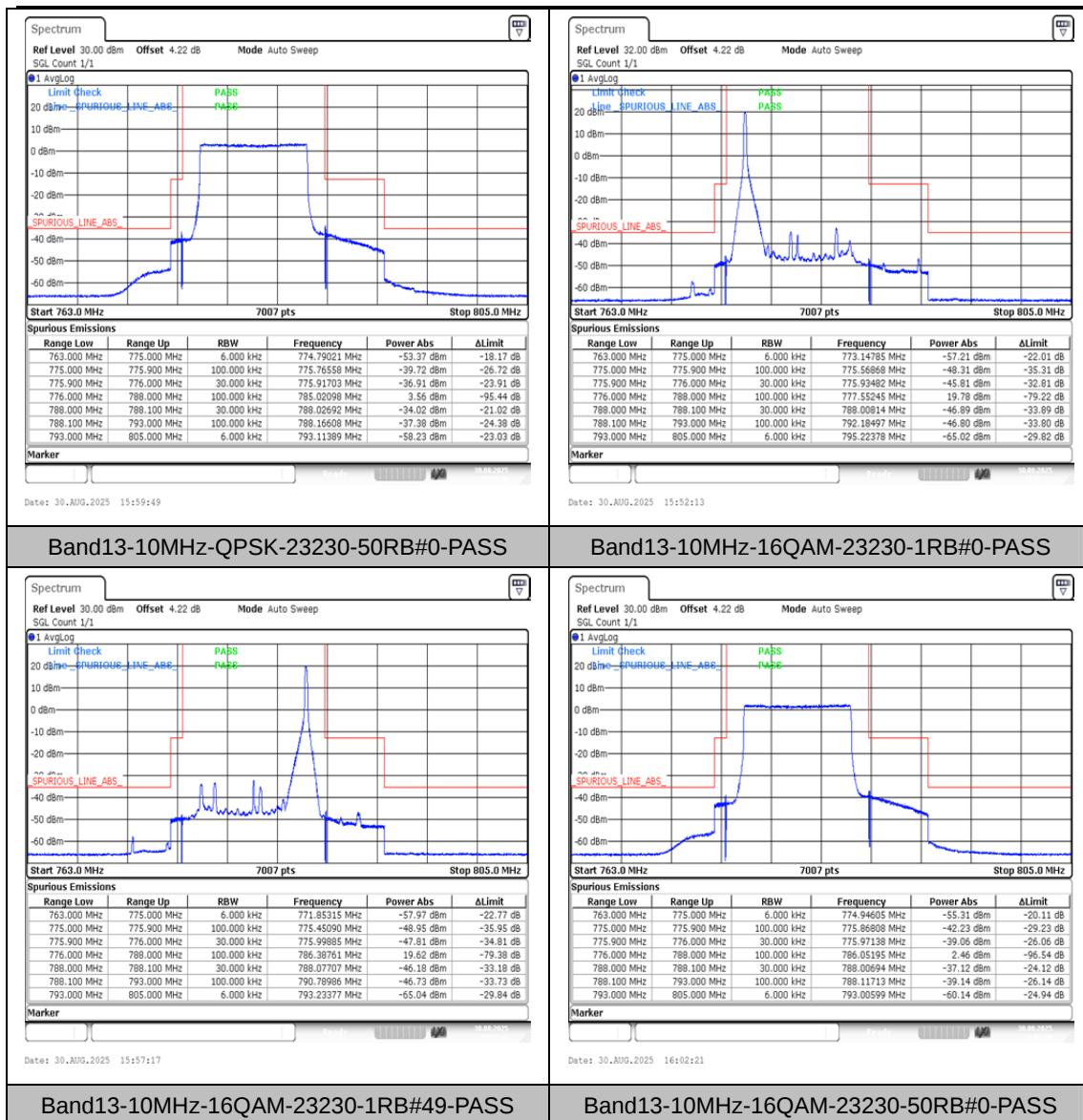
Band	Bandwidth	Modulation	Channel	RB Configuration	Result(dBm)	Verdict
Band13	5MHz	QPSK	23205	1RB#0	-61.60	PASS
Band13	5MHz	QPSK	23205	1RB#24	-52.17	PASS
Band13	5MHz	QPSK	23205	25RB#0	-53.58	PASS
Band13	5MHz	16QAM	23205	1RB#0	-61.64	PASS
Band13	5MHz	16QAM	23205	1RB#24	-53.37	PASS
Band13	5MHz	16QAM	23205	25RB#0	-55.33	PASS
Band13	5MHz	QPSK	23255	1RB#0	-65.11	PASS
Band13	5MHz	QPSK	23255	1RB#24	-65.15	PASS
Band13	5MHz	QPSK	23255	25RB#0	-34.45	PASS
Band13	5MHz	16QAM	23255	1RB#0	-65.15	PASS
Band13	5MHz	16QAM	23255	1RB#24	-65.04	PASS
Band13	5MHz	16QAM	23255	25RB#0	-35.36	PASS
Band13	10MHz	QPSK	23230	1RB#0	-55.94	PASS
Band13	10MHz	QPSK	23230	1RB#49	-56.73	PASS
Band13	10MHz	QPSK	23230	50RB#0	-53.37	PASS
Band13	10MHz	16QAM	23230	1RB#0	-57.21	PASS
Band13	10MHz	16QAM	23230	1RB#49	-57.97	PASS
Band13	10MHz	16QAM	23230	50RB#0	-55.31	PASS

Test Graphs









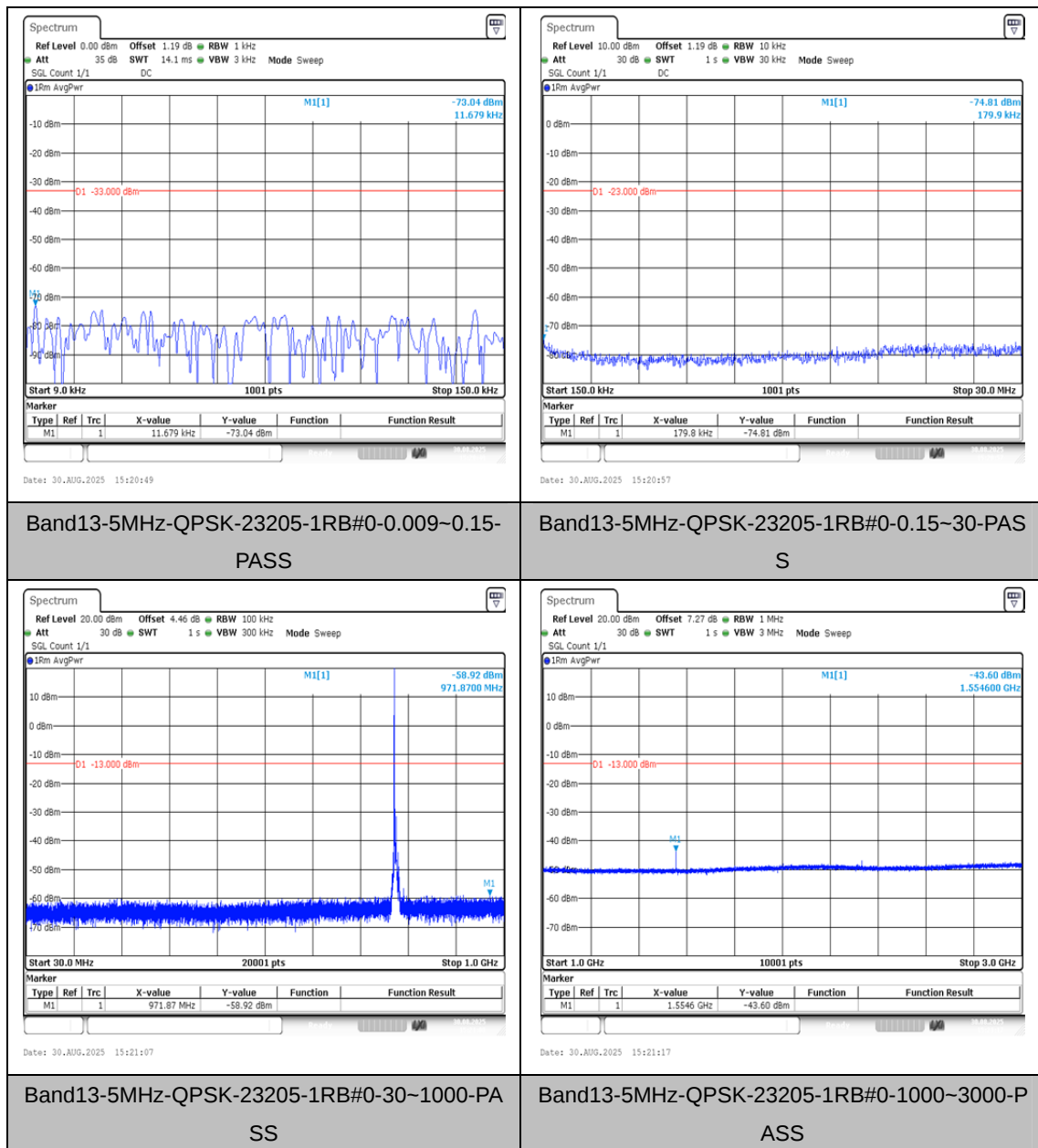
Appendix E: Conducted Spurious Emission

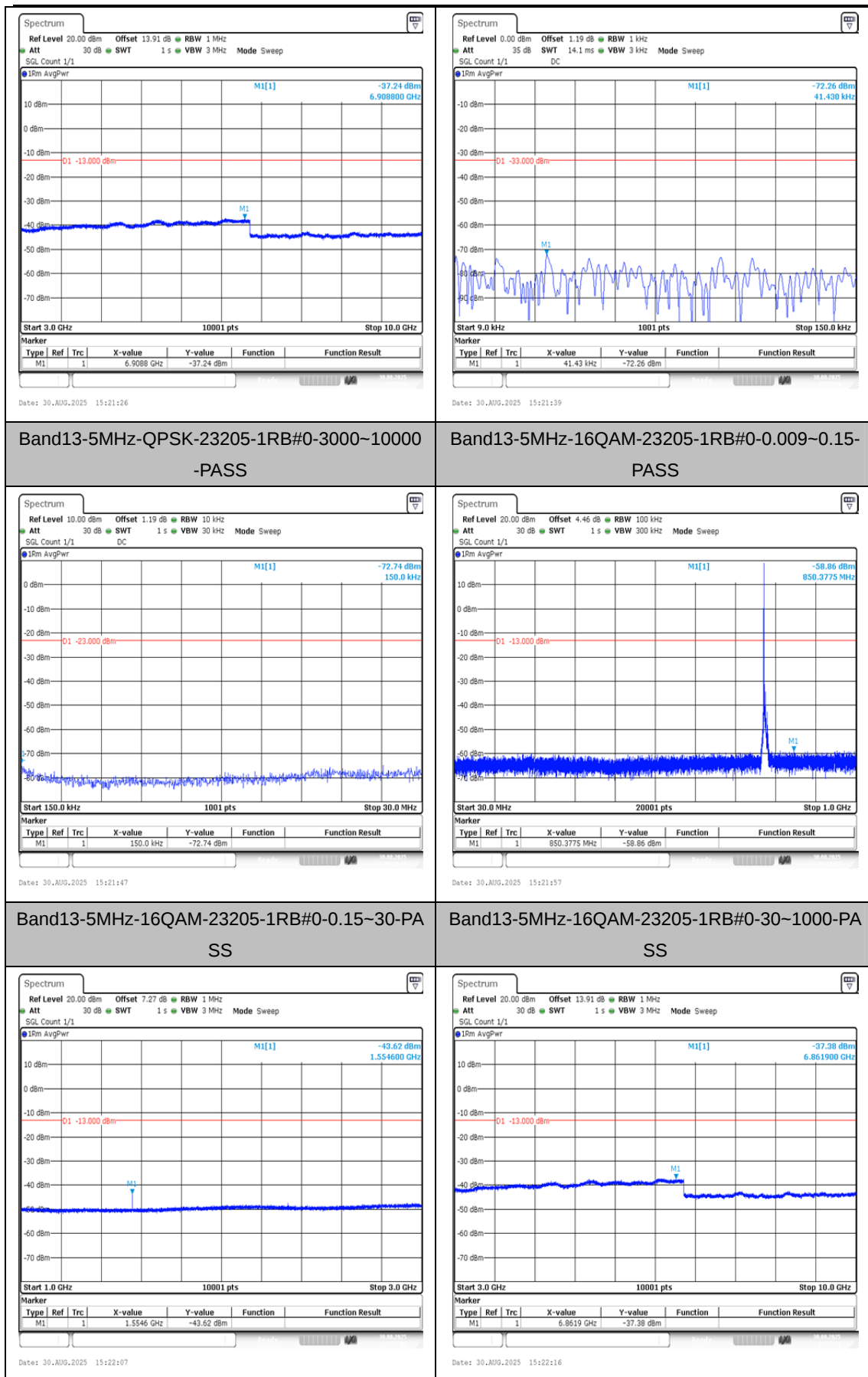
Test Result

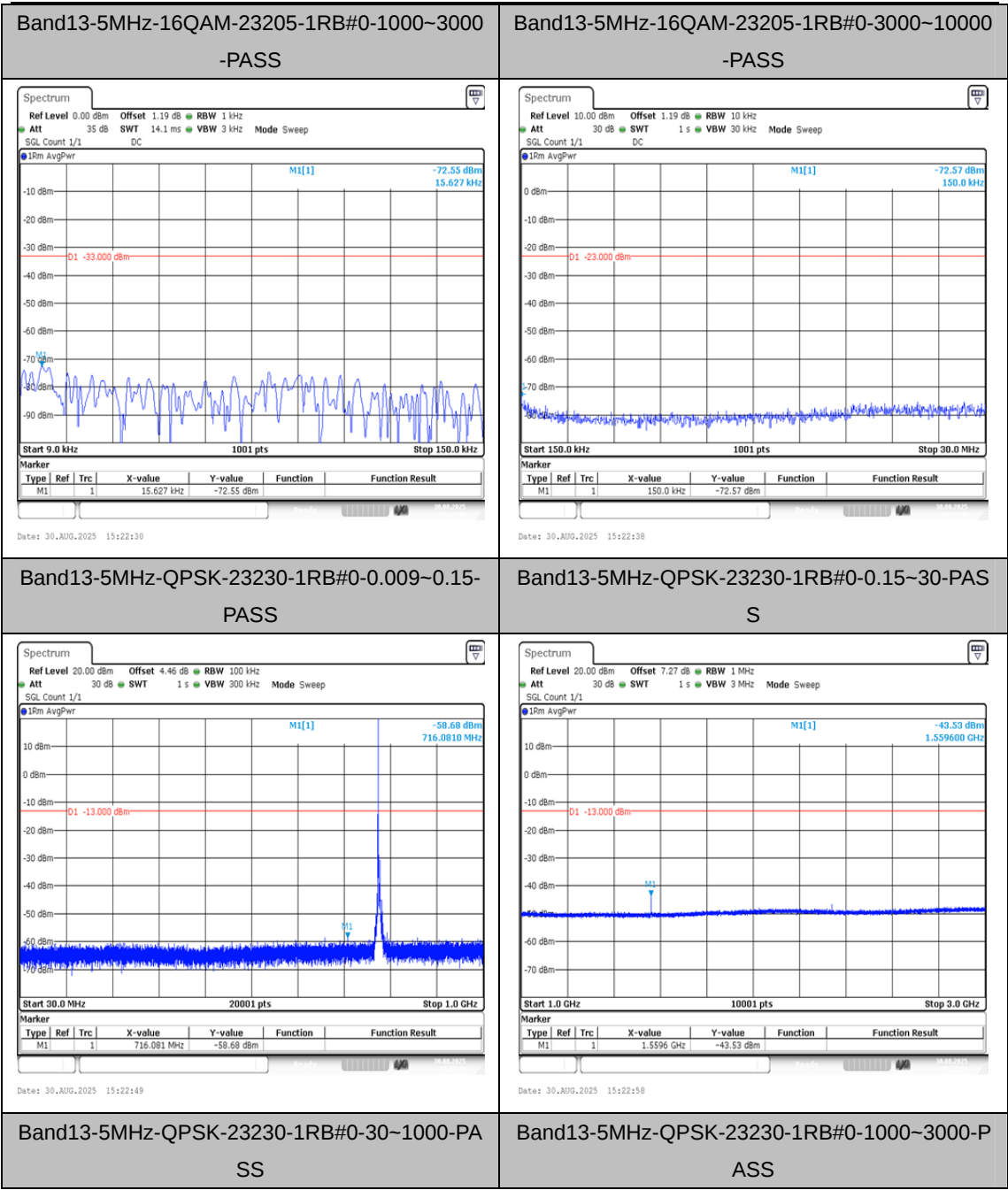
Band	Bandwidth	Modulation	Channel	RB Configuration	Frequency Range	Result (dBm)	Verdict
Band13	5MHz	QPSK	23205	1RB#0	0.009~0.15	-73.04	PASS
Band13	5MHz	QPSK	23205	1RB#0	0.15~30	-74.81	PASS
Band13	5MHz	QPSK	23205	1RB#0	30~1000	-58.92	PASS
Band13	5MHz	QPSK	23205	1RB#0	1000~3000	-43.60	PASS
Band13	5MHz	QPSK	23205	1RB#0	3000~10000	-37.24	PASS
Band13	5MHz	16QAM	23205	1RB#0	0.009~0.15	-72.26	PASS
Band13	5MHz	16QAM	23205	1RB#0	0.15~30	-72.74	PASS
Band13	5MHz	16QAM	23205	1RB#0	30~1000	-58.86	PASS
Band13	5MHz	16QAM	23205	1RB#0	1000~3000	-43.62	PASS
Band13	5MHz	16QAM	23205	1RB#0	3000~10000	-37.38	PASS
Band13	5MHz	QPSK	23230	1RB#0	0.009~0.15	-72.55	PASS
Band13	5MHz	QPSK	23230	1RB#0	0.15~30	-72.57	PASS
Band13	5MHz	QPSK	23230	1RB#0	30~1000	-58.68	PASS
Band13	5MHz	QPSK	23230	1RB#0	1000~3000	-43.53	PASS
Band13	5MHz	QPSK	23230	1RB#0	3000~10000	-37.22	PASS
Band13	5MHz	16QAM	23230	1RB#0	0.009~0.15	-72.26	PASS
Band13	5MHz	16QAM	23230	1RB#0	0.15~30	-74.09	PASS
Band13	5MHz	16QAM	23230	1RB#0	30~1000	-57.57	PASS
Band13	5MHz	16QAM	23230	1RB#0	1000~3000	-45.27	PASS
Band13	5MHz	16QAM	23230	1RB#0	3000~10000	-36.97	PASS
Band13	5MHz	QPSK	23255	1RB#0	0.009~0.15	-73.18	PASS
Band13	5MHz	QPSK	23255	1RB#0	0.15~30	-74.48	PASS
Band13	5MHz	QPSK	23255	1RB#0	30~1000	-57.90	PASS
Band13	5MHz	QPSK	23255	1RB#0	1000~3000	-42.97	PASS
Band13	5MHz	QPSK	23255	1RB#0	3000~10000	-37.12	PASS
Band13	5MHz	16QAM	23255	1RB#0	0.009~0.15	-71.92	PASS
Band13	5MHz	16QAM	23255	1RB#0	0.15~30	-74.29	PASS
Band13	5MHz	16QAM	23255	1RB#0	30~1000	-58.60	PASS
Band13	5MHz	16QAM	23255	1RB#0	1000~3000	-45.11	PASS
Band13	5MHz	16QAM	23255	1RB#0	3000~10000	-37.23	PASS
Band13	10MHz	QPSK	23230	1RB#0	0.009~0.15	-71.81	PASS
Band13	10MHz	QPSK	23230	1RB#0	0.15~30	-72.93	PASS
Band13	10MHz	QPSK	23230	1RB#0	30~1000	-58.38	PASS
Band13	10MHz	QPSK	23230	1RB#0	1000~3000	-43.71	PASS
Band13	10MHz	QPSK	23230	1RB#0	3000~10000	-37.24	PASS
Band13	10MHz	16QAM	23230	1RB#0	0.009~0.15	-71.27	PASS

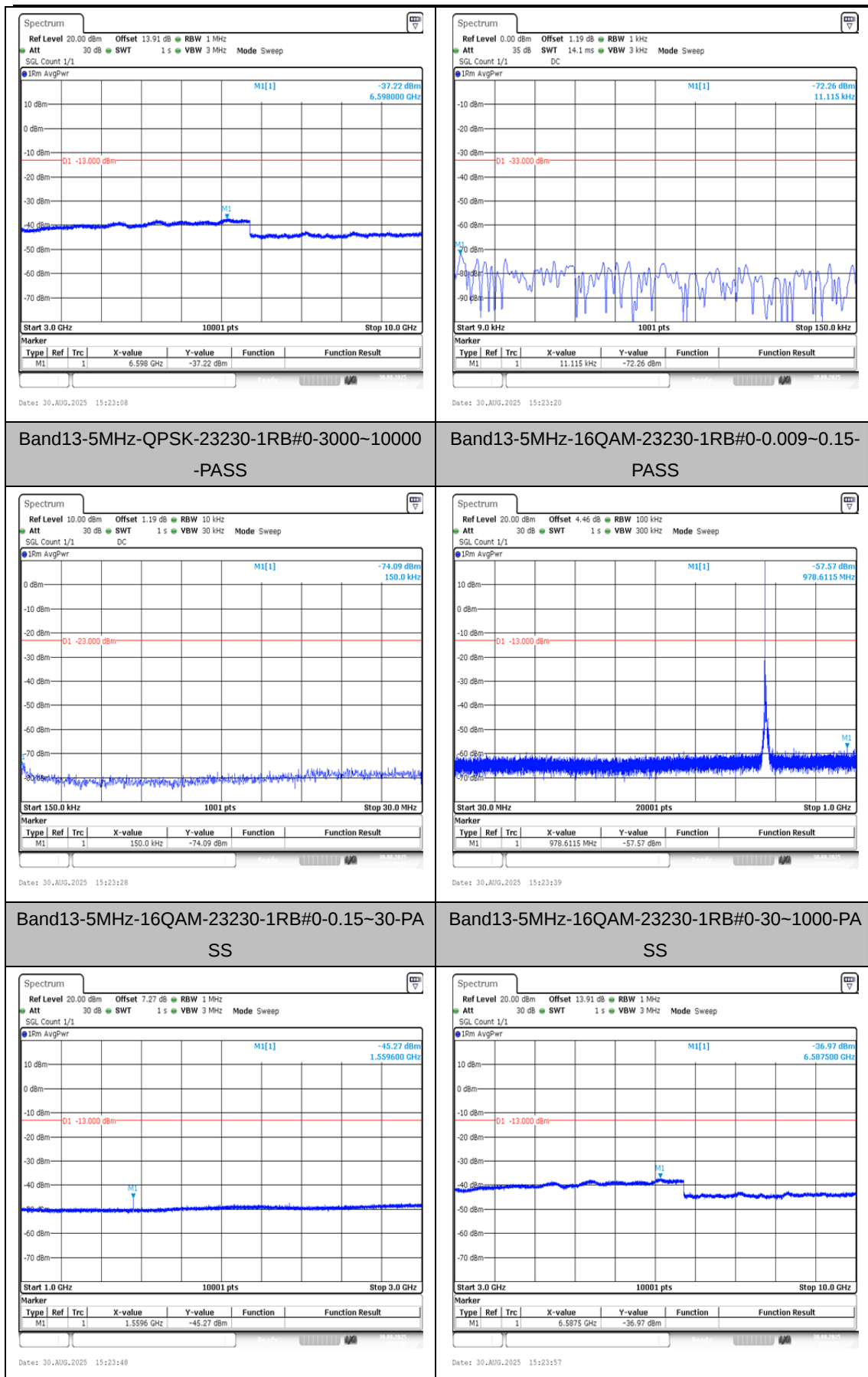
Band13	10MHz	16QAM	23230	1RB#0	0.15~30	-75.13	PASS
Band13	10MHz	16QAM	23230	1RB#0	30~1000	-58.42	PASS
Band13	10MHz	16QAM	23230	1RB#0	1000~3000	-43.84	PASS
Band13	10MHz	16QAM	23230	1RB#0	3000~10000	-36.99	PASS

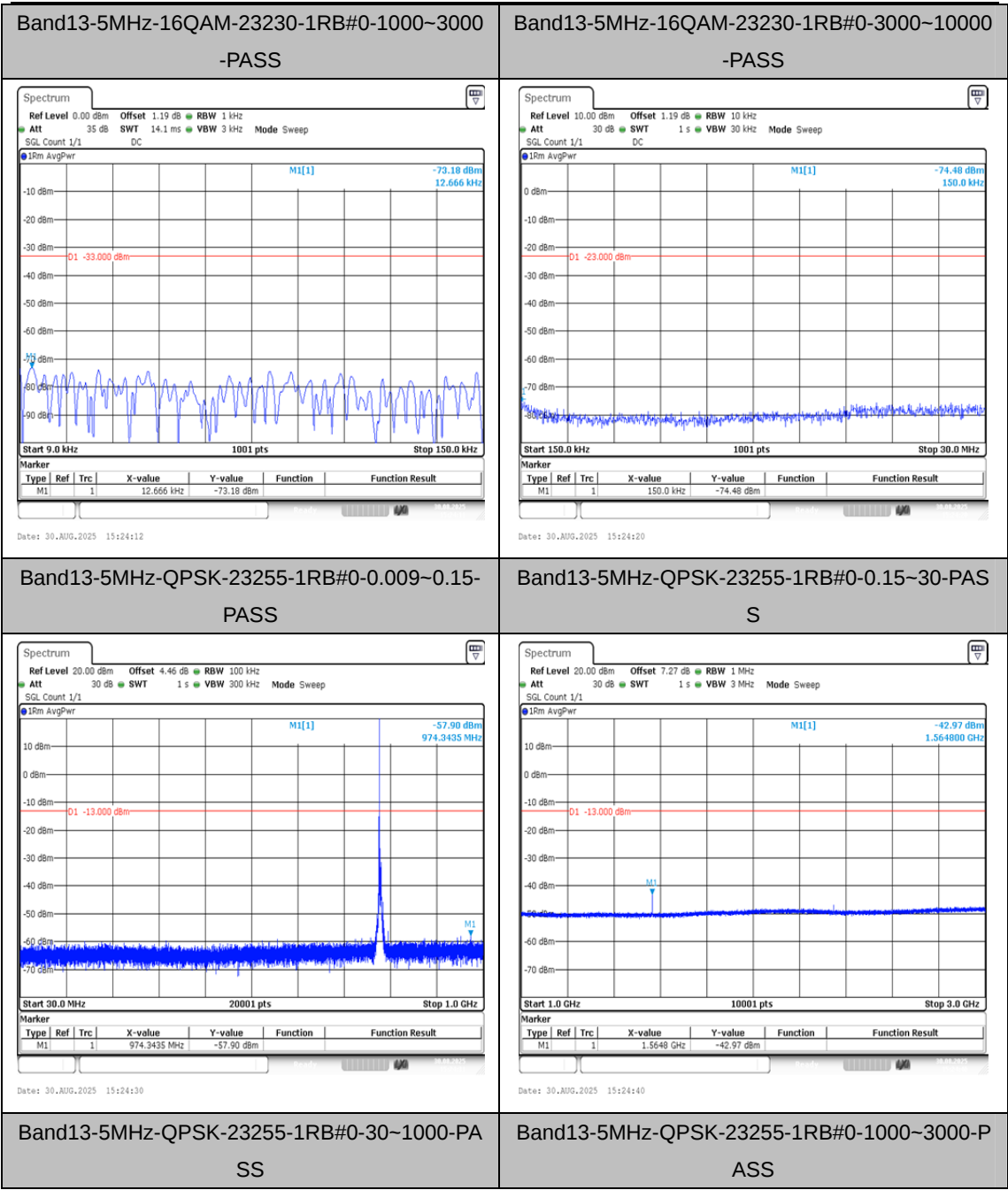
Test Graphs

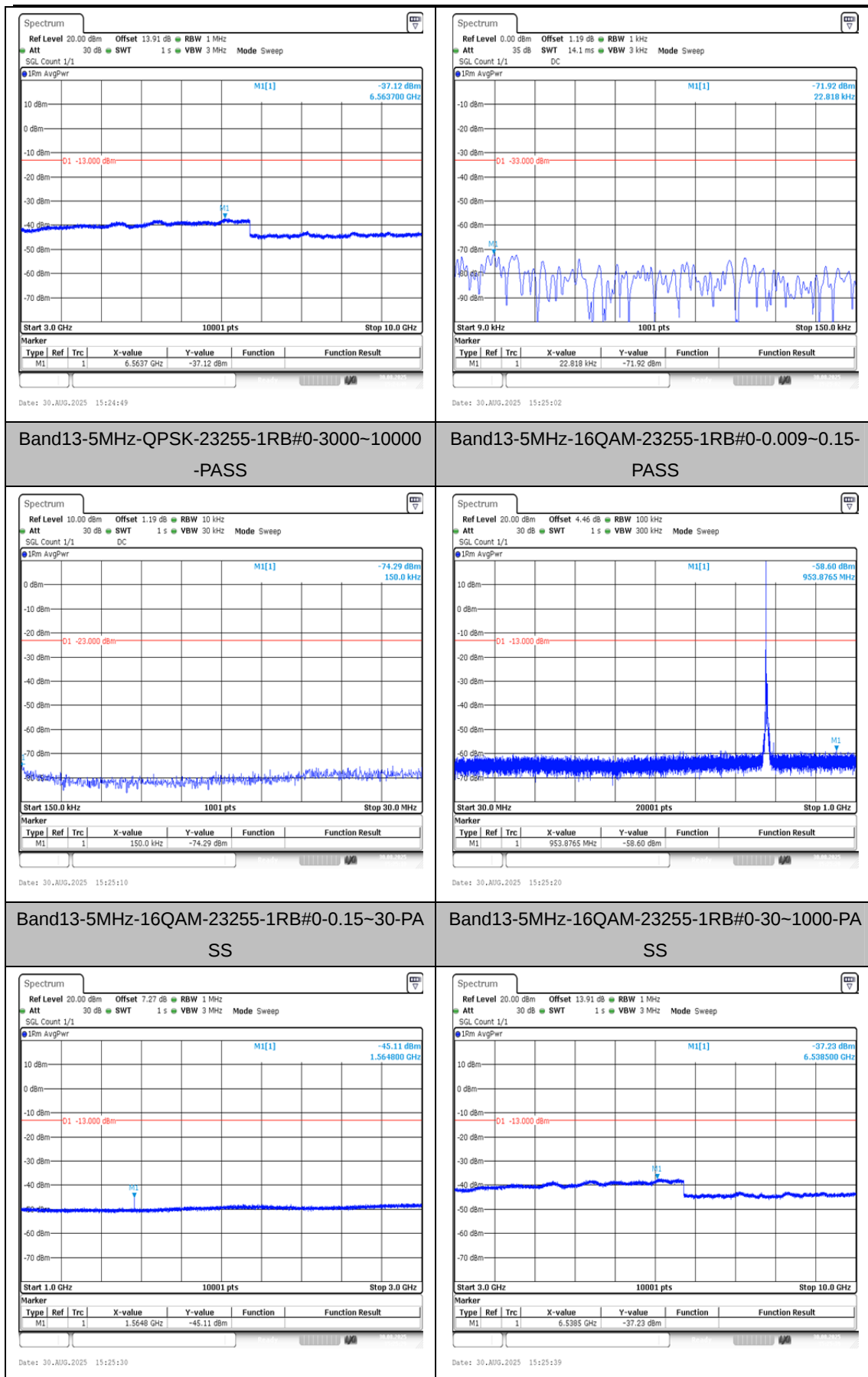


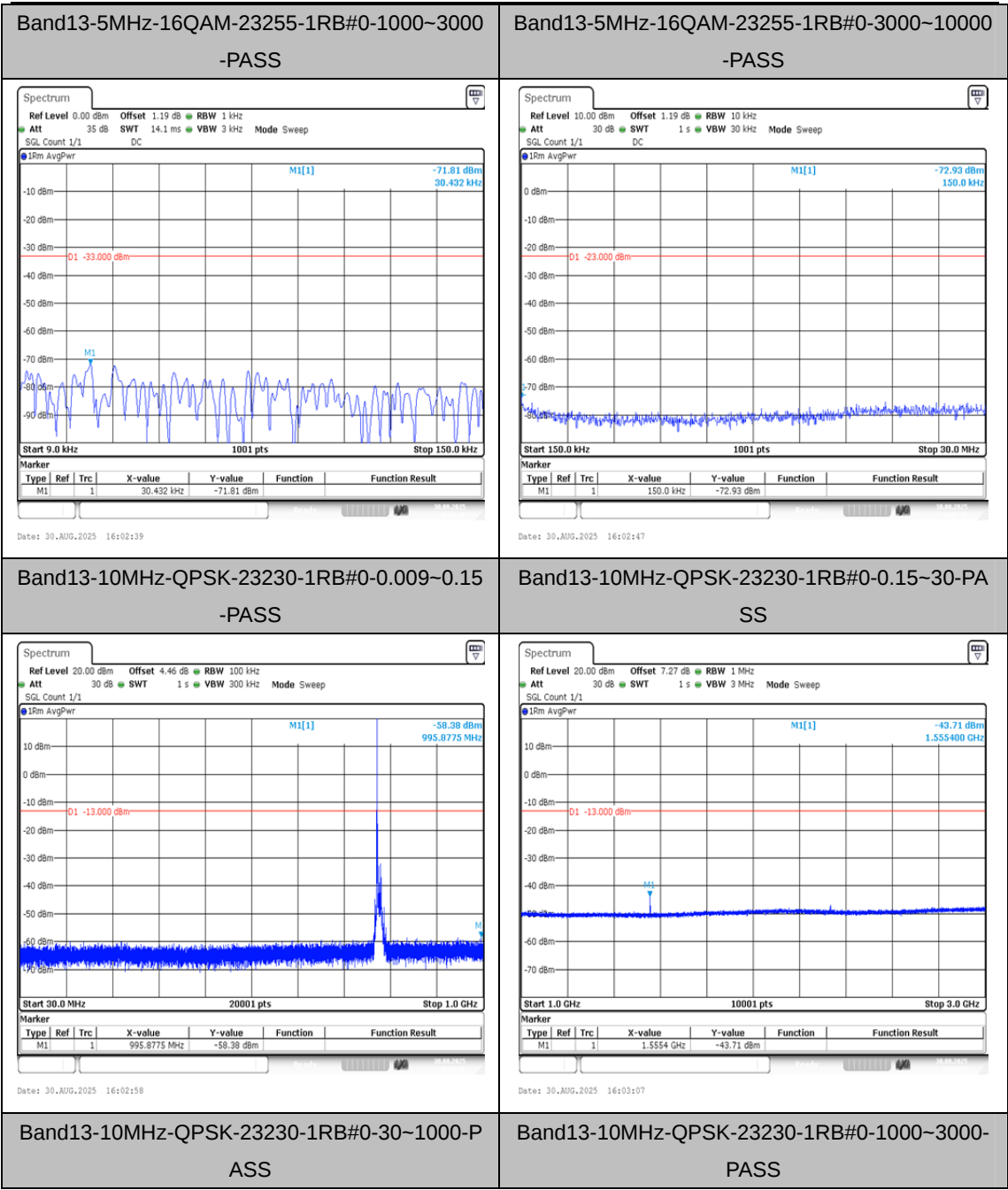


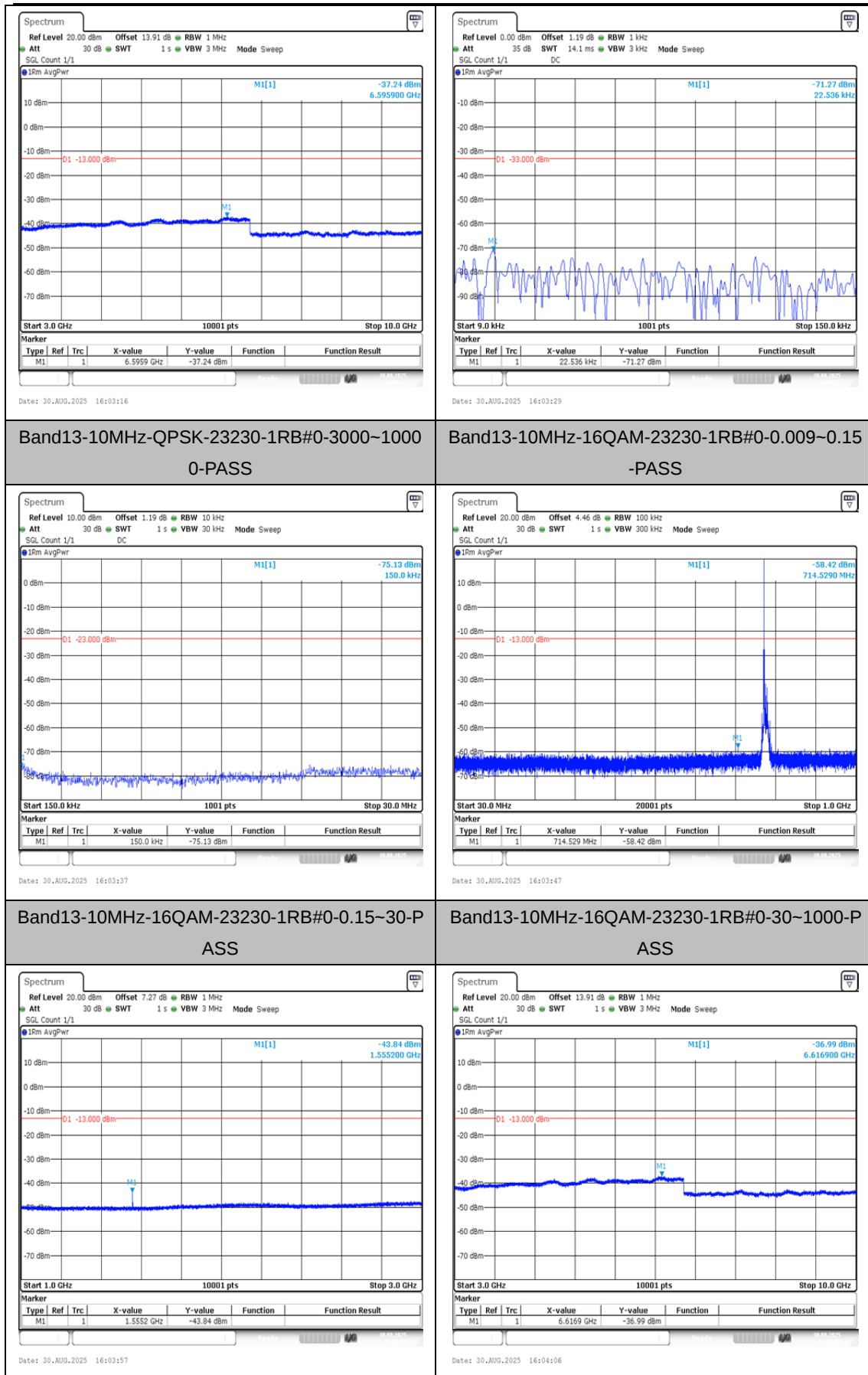












Band13-10MHz-16QAM-23230-1RB#0-1000~300 0-PASS	Band13-10MHz-16QAM-23230-1RB#0-3000~1000 0-PASS
---	--

Appendix F: Frequency Stability

Test Result

Band	Bandwidth	Modulation	Channel	RB Configure	Voltage		Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
					Voltage [Vdc]	Temperature (°C)				
Band13	5MHz	QPSK	23205	25RB#0	VN	NT	25.61	0.032854	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	VL	NT	29.13	0.037370	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	VH	NT	31.57	0.040500	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	VN	NT	-12.80	-0.016421	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	VL	NT	25.89	0.033214	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	VH	NT	29.45	0.037781	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	VN	NT	-6.65	-0.008504	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	VL	NT	-30.36	-0.038824	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	VH	NT	-49.00	-0.062660	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	VN	NT	-39.58	-0.050614	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	VL	NT	-42.40	-0.054220	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	VH	NT	23.16	0.029616	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	VN	NT	-5.42	-0.006909	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	VL	NT	-7.93	-0.010108	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	VH	NT	-15.31	-0.019516	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	VN	NT	29.23	0.037259	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	VL	NT	35.48	0.045226	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	VH	NT	40.48	0.051600	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	VN	NT	-29.35	-0.037532	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	VL	NT	-10.69	-0.013670	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	VH	NT	-9.50	-0.012148	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VN	NT	-14.92	-0.019079	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VL	NT	-31.46	-0.040230	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	VH	NT	-43.57	-0.055716	±2.5	PASS

Temperature										
Band	Bandwidth	Modulation	Channel	RB Configuration	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
Band13	5MHz	QPSK	23205	25RB#0	NV	-30	-7.25	-0.009301	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	-20	-2.57	-0.003297	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	-10	-8.97	-0.011507	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	0	-6.79	-0.008711	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	10	-11.34	-0.014548	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	20	5.18	0.006645	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	30	-2.62	-0.003361	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	40	5.38	0.006902	±2.5	PASS
Band13	5MHz	QPSK	23205	25RB#0	NV	50	-5.51	-0.007069	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	-30	-5.88	-0.007543	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	-20	-7.34	-0.009416	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	-10	-5.79	-0.007428	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	0	1.56	0.002001	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	10	-4.68	-0.006004	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	20	-11.47	-0.014715	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	30	-6.87	-0.008813	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	40	-5.35	-0.006863	±2.5	PASS
Band13	5MHz	16QAM	23205	25RB#0	NV	50	-5.82	-0.007466	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	-30	8.64	0.011049	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	-20	-4.03	-0.005153	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	-10	-5.89	-0.007532	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	0	3.43	0.004386	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	10	5.04	0.006445	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	20	7.62	0.009744	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	30	-5.62	-0.007187	±2.5	PASS
Band13	5MHz	QPSK	23230	25RB#0	NV	40	-5.94	-0.007596	±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	-5.95	-0.007609	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	-20	-5.78	-0.007391	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	-10	-4.58	-0.005857	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	0	-5.21	-0.006662	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	10	-5.58	-0.007136	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	20	-4.99	-0.006381	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	30	9.23	0.011803	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	40	2.39	0.003056	±2.5	PASS
Band13	5MHz	16QAM	23230	25RB#0	NV	50	-4.86	-0.006215	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	-30	5.44	0.006934	±2.5	PASS

Band13	5MHz	QPSK	23255	25RB#0	NV	-20	-3.28	-0.004181	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	-10	4.48	0.005711	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	0	-4.31	-0.005494	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	10	-10.09	-0.012862	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	20	-6.69	-0.008528	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	30	-4.52	-0.005762	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	40	-7.37	-0.009395	±2.5	PASS
Band13	5MHz	QPSK	23255	25RB#0	NV	50	6.65	0.008477	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	-30	-6.68	-0.008515	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	-20	-8.05	-0.010261	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	-10	-10.14	-0.012925	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	0	-7.31	-0.009318	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	10	-5.94	-0.007572	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	20	-7.95	-0.010134	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	30	-8.35	-0.010644	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	40	-2.13	-0.002715	±2.5	PASS
Band13	5MHz	16QAM	23255	25RB#0	NV	50	3.05	0.003888	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	-30	4.43	0.005665	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	-20	-5.04	-0.006445	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	-10	2.30	0.002941	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	0	5.49	0.007020	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	10	9.57	0.012238	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	20	8.83	0.011292	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	30	6.39	0.008171	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	40	-7.37	-0.009425	±2.5	PASS
Band13	10MHz	QPSK	23230	50RB#0	NV	50	7.15	0.009143	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	-30	-4.23	-0.005409	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	-20	1.10	0.001407	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	-10	-4.78	-0.006113	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	0	-4.92	-0.006292	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	10	5.81	0.007430	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	20	-3.56	-0.004552	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	30	5.36	0.006854	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	40	-4.92	-0.006292	±2.5	PASS
Band13	10MHz	16QAM	23230	50RB#0	NV	50	5.81	0.007430	±2.5	PASS