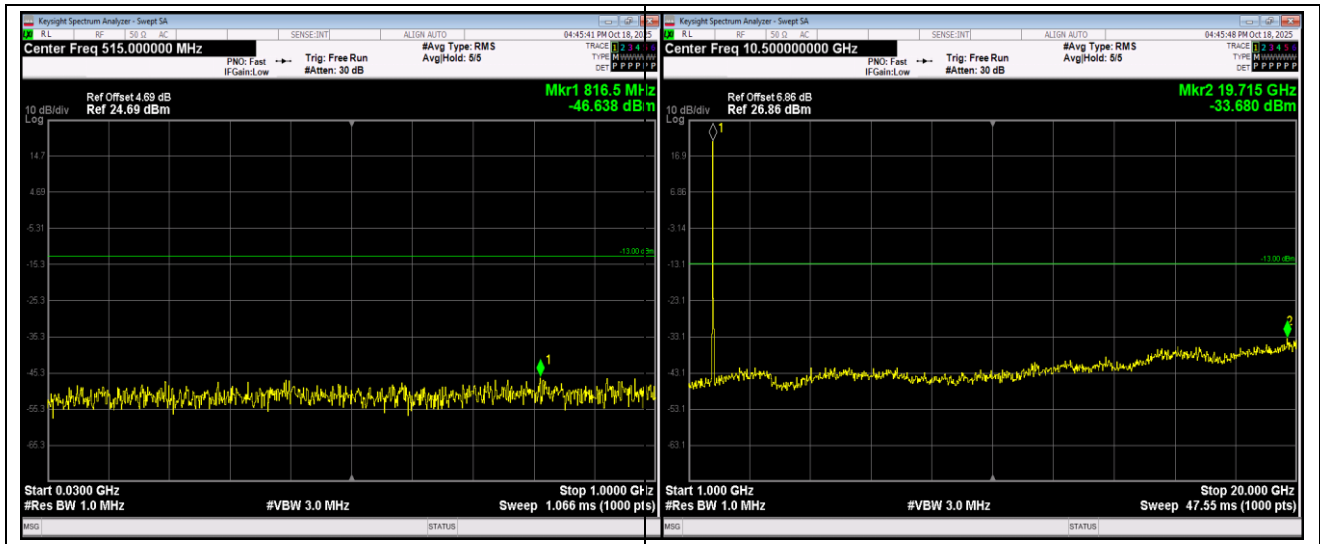






Appendix F: Frequency Stability

Test Result

LTE Band 2 part:

Reference Frequency: LTE Band 2 (10MHz) Middle channel=18900 Frequency=1880.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-13.88	-0.007383	Within authorized band for Band 2	Pass
	-20	-14.88	-0.007915		
	-10	-14.39	-0.007654		
	0	-16.47	-0.008761		
	10	-16.09	-0.008559		
	20	-13.40	-0.007128		
	30	-9.88	-0.005255		
	40	-22.09	-0.011750		
	50	-15.68	-0.008340		
16QAM					
3.85	-30	-15.13	-0.008048	Within authorized band for Band 2	Pass
	-20	-18.74	-0.009968		
	-10	-9.91	-0.005271		
	0	-16.68	-0.008872		
	10	-8.33	-0.004431		
	20	-13.68	-0.007277		
	30	-13.05	-0.006941		
	40	-7.95	-0.004229		
	50	-14.48	-0.007702		
64QAM					
3.85	-30	-12.09	-0.006431	Within authorized band for Band 2	Pass
	-20	-22.54	-0.011989		
	-10	-13.22	-0.007032		
	0	-15.11	-0.008037		
	10	-16.38	-0.008713		
	20	-18.31	-0.009739		
	30	-4.22	-0.002245		
	40	-17.12	-0.009106		
	50	-18.68	-0.009936		



Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	2.98	-14.73	-0.007835	Within authorized band for Band 2	Pass
	3.85	-12.69	-0.006750		
	4.40	-20.30	-0.010798		
16QAM					
25	2.98	-10.73	-0.005707	Within authorized band for Band 2	Pass
	3.85	-15.95	-0.008484		
	4.40	-8.33	-0.004431		
64QAM					
25	2.98	-10.97	-0.005835	Within authorized band for Band 2	Pass
	3.85	-11.42	-0.006074		
	4.40	-11.34	-0.006032		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					



LTE Band 4 part:

Reference Frequency: LTE Band 4(10MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-17.82	-0.010286	Within authorized band for Band 4	Pass
	-20	-12.67	-0.007313		
	-10	-9.90	-0.005714		
	0	-7.81	-0.004508		
	10	-10.13	-0.005847		
	20	-15.28	-0.008820		
	30	-14.23	-0.008214		
	40	-5.91	-0.003411		
	50	-13.12	-0.007573		
16QAM					
3.85	-30	-10.66	-0.006153	Within authorized band for Band 4	Pass
	-20	-12.20	-0.007042		
	-10	-15.26	-0.008808		
	0	-10.97	-0.006332		
	10	-12.97	-0.007486		
	20	-9.86	-0.005691		
	30	-9.64	-0.005564		
	40	-2.72	-0.001570		
	50	-9.93	-0.005732		
64QAM					
3.85	-30	-10.87	-0.006274	Within authorized band for Band 4	Pass
	-20	6.84	0.003948		
	-10	10.19	0.005882		
	0	-2.86	-0.001651		
	10	-12.69	-0.007325		
	20	-11.20	-0.006465		
	30	-5.31	-0.003065		
	40	-4.12	-0.002378		
	50	3.58	0.002066		



Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	2.98	-14.08	-0.008127	Within authorized band for Band 4	Pass
	3.85	-17.24	-0.009951		
	4.40	5.46	0.003152		
16QAM					
25	2.98	-16.31	-0.009414	Within authorized band for Band 4	Pass
	3.85	-5.42	-0.003128		
	4.40	-9.10	-0.005253		
64QAM					
25	2.98	7.93	0.004577	Within authorized band for Band 4	Pass
	3.85	-14.09	-0.008133		
	4.40	-1.93	-0.001114		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					



LTE Band 5 part:

Reference Frequency: LTE Band 5(10MHz) Middle channel=20525 Frequency=836.5MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-5.59	-0.006683	±2.5	Pass
	-20	-10.99	-0.013138		
	-10	-7.42	-0.008870		
	0	-8.64	-0.010329		
	10	-10.44	-0.012481		
	20	-8.57	-0.010245		
	30	-6.12	-0.007316		
	40	-11.36	-0.013580		
	50	-6.19	-0.007400		
16QAM					
3.85	-30	-4.65	-0.005559	±2.5	Pass
	-20	-7.97	-0.009528		
	-10	-13.66	-0.016330		
	0	-9.64	-0.011524		
	10	-9.80	-0.011715		
	20	-5.95	-0.007113		
	30	-7.30	-0.008727		
	40	-8.43	-0.010078		
	50	-11.84	-0.014154		
64QAM					
3.85	-30	-6.24	-0.007460	±2.5	Pass
	-20	-12.86	-0.015374		
	-10	-10.79	-0.012899		
	0	-8.13	-0.009719		
	10	-4.61	-0.005511		
	20	-7.18	-0.008583		
	30	-5.59	-0.006683		
	40	-8.20	-0.009803		
	50	-11.57	-0.013831		



Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	2.98	-5.69	-0.006802	±2.5	Pass
	3.85	-7.14	-0.008536		
	4.40	-7.04	-0.008416		
16QAM					
25	2.98	-9.04	-0.010807	±2.5	Pass
	3.85	-6.12	-0.007316		
	4.40	-9.27	-0.011082		
64QAM					
25	2.98	-11.09	-0.013258	±2.5	Pass
	3.85	-8.00	-0.009564		
	4.40	-4.95	-0.005918		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					



LTE Band 7 part:

Reference Frequency: LTE Band 7(10MHz) Middle channel=21100 Frequency=2535.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-7.27	-0.002868	Within authorized band for Band 7	Pass
	-20	-9.17	-0.003617		
	-10	-15.48	-0.006107		
	0	11.57	0.004564		
	10	13.76	0.005428		
	20	16.19	0.006387		
	30	-10.80	-0.004260		
	40	13.38	0.005278		
	50	14.09	0.005558		
16QAM					
3.85	-30	-18.32	-0.007227	Within authorized band for Band 7	Pass
	-20	-9.07	-0.003578		
	-10	-13.02	-0.005136		
	0	15.61	0.006158		
	10	-14.93	-0.005890		
	20	18.37	0.007247		
	30	-16.84	-0.006643		
	40	-13.35	-0.005266		
	50	5.84	0.002304		
64QAM					
3.85	-30	-19.74	-0.007787	Within authorized band for Band 7	Pass
	-20	-17.48	-0.006895		
	-10	9.20	0.003629		
	0	-9.91	-0.003909		
	10	-10.83	-0.004272		
	20	-13.32	-0.005254		
	30	-6.48	-0.002556		
	40	12.76	0.005034		
	50	-12.39	-0.004888		



Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	2.98	-12.42	-0.004899	Within authorized band for Band 7	Pass
	3.85	-17.14	-0.006761		
	4.40	-16.49	-0.006505		
16QAM					
25	2.98	-15.02	-0.005925	Within authorized band for Band 7	Pass
	3.85	-13.38	-0.005278		
	4.40	-7.40	-0.002919		
64QAM					
25	2.98	-14.38	-0.005673	Within authorized band for Band 7	Pass
	3.85	-16.09	-0.006347		
	4.40	-14.06	-0.005546		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					



LTE Band 38 part:

Reference Frequency: LTE Band 38(10MHz) Middle channel=38000 Frequency=2595.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-16.32	-0.006289	Within authorized band for Band 38	Pass
	-20	-8.44	-0.003252		
	-10	-8.20	-0.003160		
	0	-15.11	-0.005823		
	10	-12.80	-0.004933		
	20	-7.27	-0.002802		
	30	-9.13	-0.003518		
	40	-4.21	-0.001622		
	50	-10.21	-0.003934		
16QAM					
3.85	-30	-13.29	-0.005121	Within authorized band for Band 38	Pass
	-20	-9.01	-0.003472		
	-10	-7.77	-0.002994		
	0	-9.24	-0.003561		
	10	-20.57	-0.007927		
	20	-18.60	-0.007168		
	30	-11.84	-0.004563		
	40	-15.49	-0.005969		
	50	-12.65	-0.004875		
64QAM					
3.85	-30	-8.78	-0.003383	Within authorized band for Band 38	Pass
	-20	-6.12	-0.002358		
	-10	-10.81	-0.004166		
	0	-16.38	-0.006312		
	10	-13.12	-0.005056		
	20	-8.23	-0.003171		
	30	-12.09	-0.004659		
	40	-12.59	-0.004852		
	50	-15.13	-0.005830		



Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	2.98	-10.26	-0.003954	Within authorized band for Band 38	Pass
	3.85	-13.56	-0.005225		
	4.40	-14.35	-0.005530		
16QAM					
25	2.98	-12.07	-0.004651	Within authorized band for Band 38	Pass
	3.85	-7.40	-0.002852		
	4.40	-11.34	-0.004370		
64QAM					
25	2.98	-9.51	-0.003665	Within authorized band for Band 38	Pass
	3.85	-8.38	-0.003229		
	4.40	-10.11	-0.003896		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					



LTE Band 66 part:

Reference Frequency: LTE Band 66 (10MHz) Middle channel=132322 Frequency=1745.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-4.79	-0.002745	Within authorized band for Band 66	Pass
	-20	-8.80	-0.005043		
	-10	-4.89	-0.002802		
	0	-12.79	-0.007330		
	10	-5.06	-0.002900		
	20	-9.73	-0.005576		
	30	-4.82	-0.002762		
	40	-4.94	-0.002831		
	50	-7.82	-0.004481		
16QAM					
3.85	-30	-7.75	-0.004441	Within authorized band for Band 66	Pass
	-20	-12.26	-0.007026		
	-10	-9.94	-0.005696		
	0	-13.32	-0.007633		
	10	-6.58	-0.003771		
	20	-8.80	-0.005043		
	30	-8.63	-0.004946		
	40	-7.32	-0.004195		
	50	-12.72	-0.007289		
64QAM					
3.85	-30	-6.32	-0.003622	Within authorized band for Band 66	Pass
	-20	-13.29	-0.007616		
	-10	-10.54	-0.006040		
	0	-4.95	-0.002837		
	10	-10.81	-0.006195		
	20	-9.21	-0.005278		
	30	-9.21	-0.005278		
	40	-8.15	-0.004670		
	50	-10.79	-0.006183		



Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	2.98	-13.95	-0.007994	Within authorized band for Band 66	Pass
	3.85	-9.93	-0.005691		
	4.40	-6.12	-0.003507		
16QAM					
25	2.98	-8.14	-0.004665	Within authorized band for Band 66	Pass
	3.85	-9.64	-0.005524		
	4.40	-7.95	-0.004556		
64QAM					
25	2.98	-8.53	-0.004888	Within authorized band for Band 66	Pass
	3.85	-9.47	-0.005427		
	4.40	-10.57	-0.006057		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					

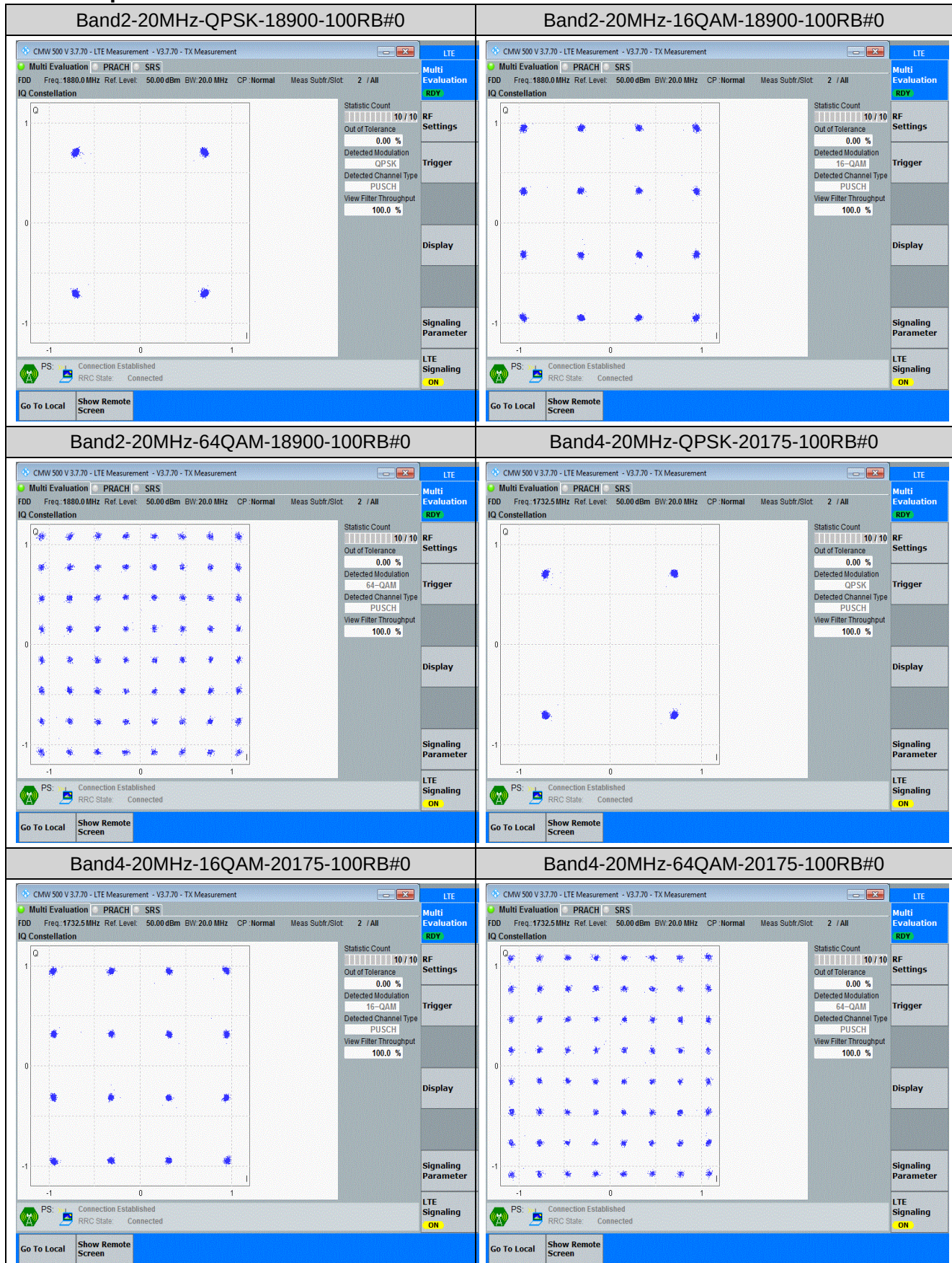
Appendix G: Modulation Characteristics

Test Result

Band	Bandwidth	Modulation	Channel	RB Configuration	Result	Verdict
Band2	20MHz	QPSK	18900	100RB#0	PASS	PASS
Band2	20MHz	16QAM	18900	100RB#0	PASS	PASS
Band2	20MHz	64QAM	18900	100RB#0	PASS	PASS
Band4	20MHz	QPSK	20175	100RB#0	PASS	PASS
Band4	20MHz	16QAM	20175	100RB#0	PASS	PASS
Band4	20MHz	64QAM	20175	100RB#0	PASS	PASS
Band5	10MHz	QPSK	20525	50RB#0	PASS	PASS
Band5	10MHz	16QAM	20525	50RB#0	PASS	PASS
Band5	10MHz	64QAM	20525	50RB#0	PASS	PASS
Band7	20MHz	QPSK	21100	100RB#0	PASS	PASS
Band7	20MHz	16QAM	21100	100RB#0	PASS	PASS
Band7	20MHz	64QAM	21100	100RB#0	PASS	PASS
Band38	20MHz	QPSK	38000	100RB#0	PASS	PASS
Band38	20MHz	16QAM	38000	100RB#0	PASS	PASS
Band38	20MHz	64QAM	38000	100RB#0	PASS	PASS
Band66	20MHz	QPSK	132322	100RB#0	PASS	PASS
Band66	20MHz	16QAM	132322	100RB#0	PASS	PASS
Band66	20MHz	64QAM	132322	100RB#0	PASS	PASS

Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.

Test Graphs



Band5-10MHz-QPSK-20525-50RB#0	Band5-10MHz-16QAM-20525-50RB#0
Band5-10MHz-64QAM-20525-50RB#0	Band7-20MHz-QPSK-21100-100RB#0
Band7-20MHz-16QAM-21100-100RB#0	Band7-20MHz-64QAM-21100-100RB#0
Band38-20MHz-QPSK-38000-100RB#0	Band38-20MHz-16QAM-38000-100RB#0

