

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	-47.94	-0.025500	Within authorized band for Band 2	Pass
	-20	-53.16	-0.028277		
	-10	13.66	0.007266		
	0	22.07	0.011739		
	10	14.85	0.007899		
	20	7.48	0.003979		
	30	-9.90	-0.005266		
	40	-15.29	-0.008133		
	50	6.79	0.003612		
16QAM					
3.85	-30	41.58	0.022117	Within authorized band for Band 2	Pass
	-20	41.04	0.021830		
	-10	50.98	0.027117		
	0	-12.12	-0.006447		
	10	-10.13	-0.005388		
	20	18.02	0.009585		
	30	15.74	0.008372		
	40	23.96	0.012745		
	50	28.14	0.014968		
64QAM					
3.85	-30	42.77	0.022750	Within authorized band for Band 2	Pass
	-20	52.64	0.028000		
	-10	13.53	0.007197		
	0	24.25	0.012899		
	10	38.02	0.020223		
	20	-20.01	-0.010644		
	30	12.43	0.006612		
	40	16.32	0.008681		
	50	31.56	0.016787		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-24.42	-0.012989	Within authorized band for Band 2	Pass
	3.85	-15.36	-0.008170		
	4.40	-41.33	-0.021984		
16QAM					
25	3.45	13.06	0.006947	Within authorized band for Band 2	Pass
	3.85	-7.21	-0.003835		
	4.40	19.45	0.010346		
64QAM					
25	3.45	32.97	0.017537	Within authorized band for Band 2	Pass
	3.85	41.71	0.022186		
	4.40	26.29	0.013984		
<i>Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.</i>					

LTE Band 4 part:

Reference Frequency: LTE Band 4(10MHz) Middle channel=20175 Frequency=1732.5MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	16.41	0.009472	Within authorized band for Band 4	Pass
	-20	15.79	0.009114		
	-10	-9.81	-0.005662		
	0	-11.20	-0.006465		
	10	-12.35	-0.007128		
	20	-22.39	-0.012924		
	30	-19.35	-0.011169		
	40	-21.82	-0.012595		
	50	-21.43	-0.012369		
16QAM					
3.85	-30	9.33	0.005385	Within authorized band for Band 4	Pass
	-20	10.11	0.005835		
	-10	15.71	0.009068		
	0	18.20	0.010505		
	10	21.64	0.012491		
	20	23.95	0.013824		
	30	23.45	0.013535		
	40	29.05	0.016768		
	50	36.46	0.021045		
64QAM					
3.85	-30	-24.72	-0.014268	Within authorized band for Band 4	Pass
	-20	-15.02	-0.008670		
	-10	-15.44	-0.008912		
	0	-18.28	-0.010551		
	10	-18.58	-0.010724		
	20	-19.25	-0.011111		
	30	-12.69	-0.007325		
	40	-18.78	-0.010840		
	50	-15.91	-0.009183		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-29.87	-0.017241	Within authorized band for Band 4	Pass
	3.85	4.89	0.002823		
	4.40	-38.18	-0.022038		
16QAM					
25	3.45	-16.26	-0.009385	Within authorized band for Band 4	Pass
	3.85	-26.22	-0.015134		
	4.40	7.15	0.004127		
64QAM					
25	3.45	35.19	0.020312	Within authorized band for Band 4	Pass
	3.85	33.87	0.019550		
	4.40	39.60	0.022857		
<i>Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.</i>					

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	-7.30	-0.008727	±2.5	Pass
	-20	-12.63	-0.015099		
	-10	-15.08	-0.018027		
	0	-20.53	-0.024543		
	10	-26.16	-0.031273		
	20	-24.58	-0.029384		
	30	-24.35	-0.029109		
	40	-26.12	-0.031225		
	50	-28.48	-0.034047		
16QAM					
3.85	-30	-9.91	-0.011847	±2.5	Pass
	-20	-5.98	-0.007149		
	-10	-5.16	-0.006169		
	0	10.10	0.012074		
	10	14.33	0.017131		
	20	17.87	0.021363		
	30	24.06	0.028763		
	40	28.51	0.034082		
	50	33.72	0.040311		
64QAM					
3.85	-30	23.26	0.027806	±2.5	Pass
	-20	33.92	0.040550		
	-10	45.23	0.054071		
	0	48.69	0.058207		
	10	9.84	0.011763		
	20	14.78	0.017669		
	30	22.47	0.026862		
	40	28.30	0.033831		
	50	34.48	0.041219		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	13.43	0.016055	±2.5	Pass
	3.85	17.47	0.020885		
	4.40	7.14	0.008536		
16QAM					
25	3.45	-23.10	-0.027615	±2.5	Pass
	3.85	-30.68	-0.036677		
	4.40	-17.57	-0.021004		
64QAM					
25	3.45	48.29	0.057729	±2.5	Pass
	3.85	37.84	0.045236		
	4.40	12.70	0.015182		
<i>Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.</i>					

LTE Band 7 part:

Reference Frequency: LTE Band 7(10MHz) Middle channel=21100 Frequency=2535.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-27.32	-0.010777	Within authorized band for Band 7	Pass
	-20	-45.06	-0.017775		
	-10	14.92	0.005886		
	0	-47.68	-0.018809		
	10	-46.28	-0.018256		
	20	-38.72	-0.015274		
	30	-48.34	-0.019069		
	40	-9.78	-0.003858		
	50	-37.94	-0.014966		
16QAM					
3.85	-30	23.35	0.009211	Within authorized band for Band 7	Pass
	-20	30.67	0.012099		
	-10	31.89	0.012580		
	0	42.39	0.016722		
	10	38.85	0.015325		
	20	40.17	0.015846		
	30	45.38	0.017901		
	40	35.16	0.013870		
	50	47.29	0.018655		
64QAM					
3.85	-30	46.35	0.018284	Within authorized band for Band 7	Pass
	-20	-19.84	-0.007826		
	-10	17.61	0.006947		
	0	39.60	0.015621		
	10	14.02	0.005531		
	20	23.82	0.009396		
	30	36.52	0.014406		
	40	42.92	0.016931		
	50	-18.37	-0.007247		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-55.73	-0.021984	Within authorized band for Band 7	Pass
	3.85	14.62	0.005767		
	4.40	16.72	0.006596		
16QAM					
25	3.45	-12.50	-0.004931	Within authorized band for Band 7	Pass
	3.85	14.63	0.005771		
	4.40	-14.20	-0.005602		
64QAM					
25	3.45	62.43	0.024627	Within authorized band for Band 7	Pass
	3.85	33.66	0.013278		
	4.40	18.68	0.007369		
<i>Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.</i>					

LTE Band 41 part:

Reference Frequency: LTE Band 41 (10MHz) Middle channel=40640 Frequency=2595.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-49.31	-0.019002	Within authorized band for Band 41	Pass
	-20	-55.20	-0.021272		
	-10	-23.76	-0.009156		
	0	-29.91	-0.011526		
	10	-36.51	-0.014069		
	20	-59.07	-0.022763		
	30	-8.48	-0.003268		
	40	-20.60	-0.007938		
	50	-35.71	-0.013761		
16QAM					
3.85	-30	-9.23	-0.003557	Within authorized band for Band 41	Pass
	-20	21.47	0.008274		
	-10	33.76	0.013010		
	0	45.79	0.017645		
	10	47.61	0.018347		
	20	-19.07	-0.007349		
	30	-7.24	-0.002790		
	40	17.45	0.006724		
	50	14.12	0.005441		
64QAM					
3.85	-30	47.32	0.018235	Within authorized band for Band 41	Pass
	-20	46.39	0.017877		
	-10	22.04	0.008493		
	0	36.56	0.014089		
	10	45.63	0.017584		
	20	32.57	0.012551		
	30	48.27	0.018601		
	40	9.16	0.003530		
	50	26.92	0.010374		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-5.15	-0.001985	Within authorized band for Band 41	Pass
	3.85	19.05	0.007341		
	4.40	-29.30	-0.011291		
16QAM					
25	3.45	-28.15	-0.010848	Within authorized band for Band41	Pass
	3.85	-42.34	-0.016316		
	4.40	-15.54	-0.005988		
64QAM					
25	3.45	-18.44	-0.007106	Within authorized band for Band41	Pass
	3.85	27.61	0.010640		
	4.40	25.51	0.009830		
<i>Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.</i>					

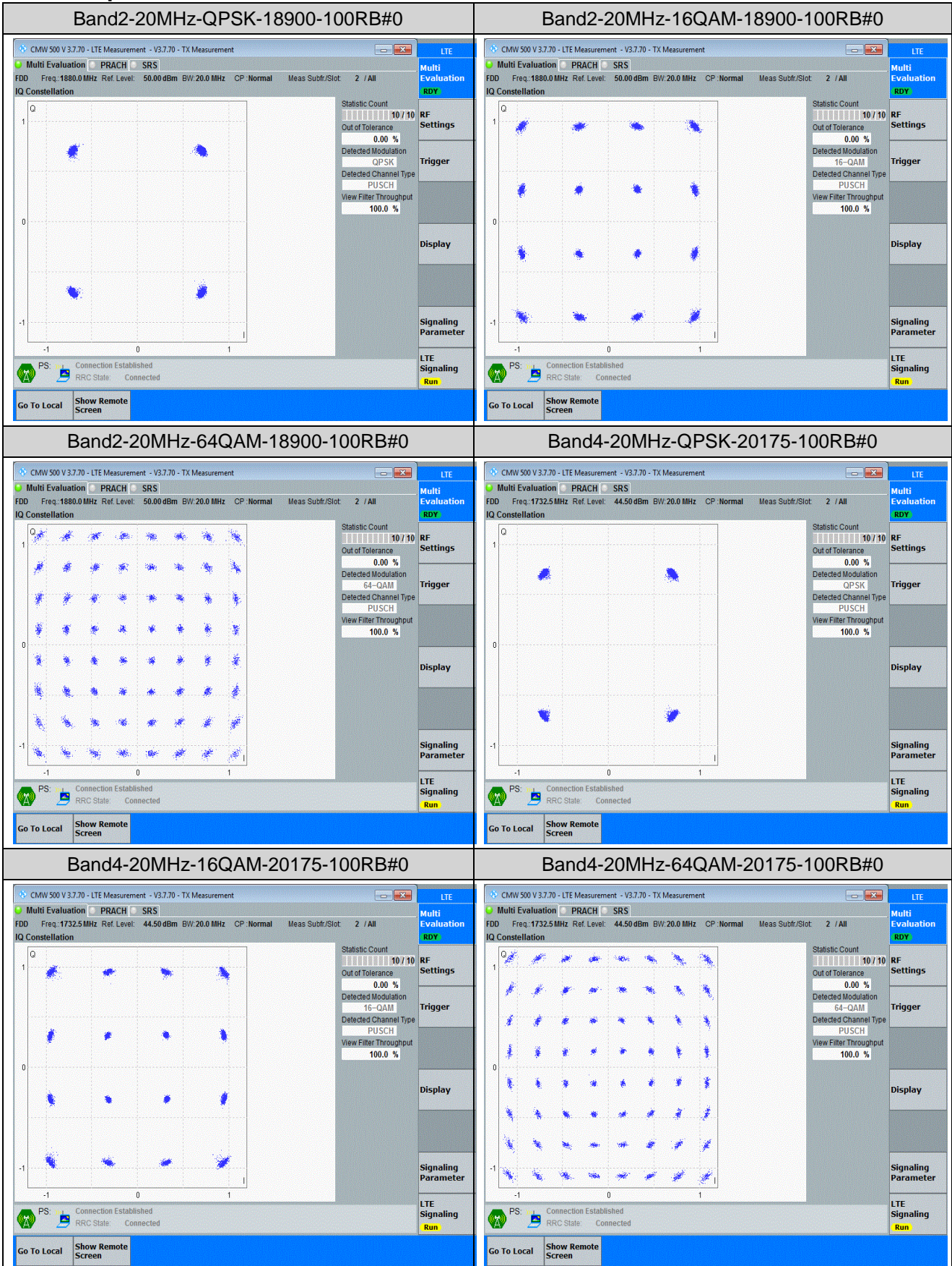
Appendix G: Modulation Characteristics

Test Result

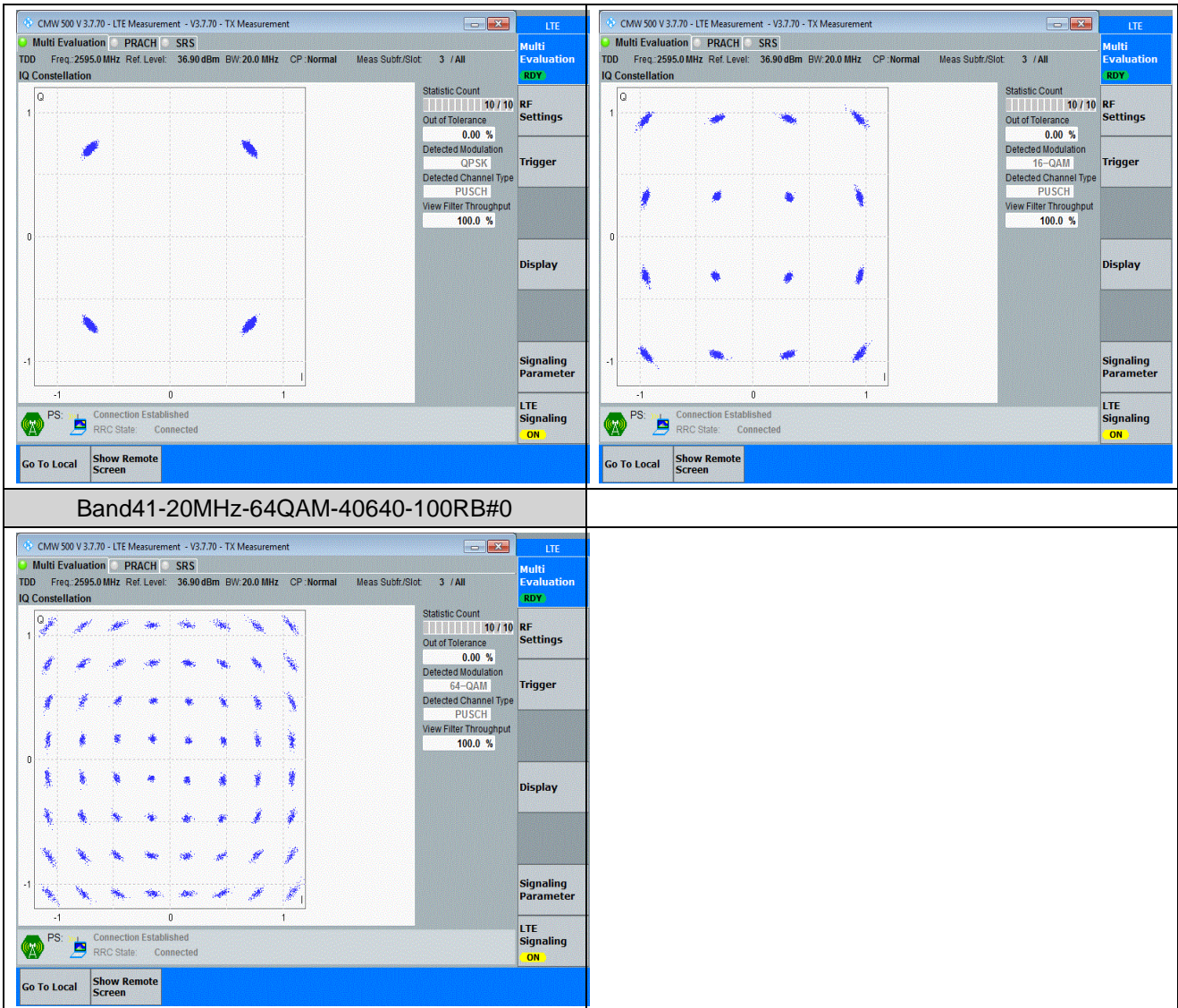
Band	Bandwidth	Modulation	Channel	RB Configuration	Result	Verdict
Band2	20MHz	QPSK	18900	100RB#0	PASS	PASS
Band2	20MHz	16QAM	18900	100RB#0	PASS	PASS
Band2	20MHz	64QAM	18900	100RB#0	PASS	PASS
Band4	20MHz	QPSK	20175	100RB#0	PASS	PASS
Band4	20MHz	16QAM	20175	100RB#0	PASS	PASS
Band4	20MHz	64QAM	20175	100RB#0	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
Band41	20MHz	QPSK	40640	100RB#0	PASS	PASS
Band41	20MHz	16QAM	40640	100RB#0	PASS	PASS
Band41	20MHz	64QAM	40640	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



<p align="center">Band5-10MHz-QPSK-20525-50RB#0</p>	<p align="center">Band5-10MHz-16QAM-20525-50RB#0</p>
<p align="center">Band5-10MHz-64QAM-20525-50RB#0</p>	<p align="center">Band7-20MHz-QPSK-21100-100RB#0</p>
<p align="center">Band7-20MHz-16QAM-21100-100RB#0</p>	<p align="center">Band7-20MHz-64QAM-21100-100RB#0</p>
<p align="center">Band41-20MHz-QPSK-40640-100RB#0</p>	<p align="center">Band41-20MHz-16QAM-40640-100RB#0</p>



Band41-20MHz-64QAM-40640-100RB#0