



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	-17.80	-0.009468	Within authorized band for Band 2	Pass
	-20	-7.35	-0.003910		
	-10	-16.84	-0.008957		
	0	-7.32	-0.003894		
	10	-14.33	-0.007622		
	20	-6.92	-0.003681		
	30	11.57	0.006154		
	40	-20.18	-0.010734		
	50	-12.86	-0.006840		
16QAM					
3.85	-30	-13.92	-0.007404	Within authorized band for Band 2	Pass
	-20	-10.19	-0.005420		
	-10	-15.85	-0.008431		
	0	1.72	0.000915		
	10	-12.85	-0.006835		
	20	-10.76	-0.005723		
	30	7.04	0.003745		
	40	-16.09	-0.008559		
	50	-11.67	-0.006207		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-12.12	-0.006447	Within authorized band for Band 2	Pass
	3.85	-12.09	-0.006431		
	4.35	-13.39	-0.007122		
16QAM					
25	3.45	-14.96	-0.007957	Within authorized band for Band 2	Pass
	3.85	-15.06	-0.008011		
	4.35	-14.92	-0.007936		

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	-9.14	-0.010926	±2.5	Pass
	-20	-9.47	-0.011321		
	-10	-8.47	-0.010126		
	0	-12.49	-0.014931		
	10	-8.30	-0.009922		
	20	-10.76	-0.012863		
	30	-7.82	-0.009348		
	40	-7.22	-0.008631		
	50	-6.67	-0.007974		
16QAM					
3.85	-30	-10.00	-0.011955	±2.5	Pass
	-20	-7.90	-0.009444		
	-10	-8.75	-0.010460		
	0	-8.10	-0.009683		
	10	-6.74	-0.008057		
	20	-7.00	-0.008368		
	30	-7.94	-0.009492		
	40	-7.40	-0.008846		
	50	-9.54	-0.011405		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-8.58	-0.010257	±2.5	Pass
	3.85	-9.73	-0.011632		
	4.35	-10.37	-0.012397		
16QAM					
25	3.45	-10.00	-0.011955	±2.5	Pass
	3.85	-9.04	-0.010807		
	4.35	-4.61	-0.005511		

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 (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-13.12	-0.005176	Within authorized band for Band 7	Pass
	-20	-7.58	-0.002990		
	-10	10.87	0.004288		
	0	11.26	0.004442		
	10	-19.80	-0.007811		
	20	-20.17	-0.007957		
	30	-19.21	-0.007578		
	40	-14.25	-0.005621		
	50	6.90	0.002722		
16QAM					
3.85	-30	12.65	0.004990	Within authorized band for Band 7	Pass
	-20	-21.56	-0.008505		
	-10	-8.81	-0.003475		
	0	-14.92	-0.005886		
	10	-10.14	-0.004000		
	20	-16.06	-0.006335		
	30	-13.88	-0.005475		
	40	10.47	0.004130		
	50	-12.45	-0.004911		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	4.56	0.001799	Within authorized band for Band 7	Pass
	3.85	-14.12	-0.005570		
	4.35	-7.08	-0.002793		
16QAM					
25	3.45	-11.23	-0.004430	Within authorized band for Band 7	Pass
	3.85	-20.08	-0.007921		
	4.35	-11.27	-0.004446		

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

LTE Band 12 part:

Reference Frequency: LTE Band 12(10MHz) Middle channel=23095 Frequency=707.5MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-10.26	-0.014502	Within authorized band for Band 12	Pass
	-20	-13.10	-0.018516		
	-10	-11.12	-0.015717		
	0	-14.02	-0.019816		
	10	-10.03	-0.014177		
	20	-4.19	-0.005922		
	30	-8.18	-0.011562		
	40	-11.33	-0.016014		
	50	-10.26	-0.014502		
16QAM					
3.85	-30	-11.54	-0.016311	Within authorized band for Band 12	Pass
	-20	-8.24	-0.011647		
	-10	-6.05	-0.008551		
	0	-14.33	-0.020254		
	10	-9.61	-0.013583		
	20	-8.33	-0.011774		
	30	-7.20	-0.010177		
	40	-9.17	-0.012961		
	50	-5.42	-0.007661		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-9.13	-0.012905	Within authorized band for Band 12	Pass
	3.85	-9.74	-0.013767		
	4.35	-5.49	-0.007760		
16QAM					
25	3.45	-10.83	-0.015307	Within authorized band for Band 12	Pass
	3.85	-12.25	-0.017314		
	4.35	-9.06	-0.012806		

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

LTE Band 17 part:

Reference Frequency: LTE Band 17(10MHz) Middle channel=23790 Frequency=710.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-3.48	-0.004901	Within authorized band for Band 17	Pass
	-20	-11.96	-0.016845		
	-10	-7.30	-0.010282		
	0	-7.60	-0.010704		
	10	-7.91	-0.011141		
	20	-6.18	-0.008704		
	30	-10.64	-0.014986		
	40	-10.89	-0.015338		
	50	-6.59	-0.009282		
16QAM					
3.85	-30	-9.17	-0.012915	Within authorized band for Band 17	Pass
	-20	-11.20	-0.015775		
	-10	-12.76	-0.017972		
	0	-8.90	-0.012535		
	10	-11.23	-0.015817		
	20	-12.47	-0.017563		
	30	-11.34	-0.015972		
	40	-10.47	-0.014746		
	50	-8.01	-0.011282		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-10.54	-0.014845	Within authorized band for Band 17	Pass
	3.85	-10.69	-0.015056		
	4.35	-4.81	-0.006775		
16QAM					
25	3.45	-8.10	-0.011408	Within authorized band for Band 17	Pass
	3.85	-11.12	-0.015662		
	4.35	-8.38	-0.011803		

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

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	-4.16	-0.001603	Within authorized band for Band 41	Pass
	-20	3.39	0.001306		
	-10	4.59	0.001769		
	0	-14.89	-0.005738		
	10	2.89	0.001114		
	20	-15.41	-0.005938		
	30	-13.60	-0.005241		
	40	-13.32	-0.005133		
	50	-14.53	-0.005599		
16QAM					
3.85	-30	3.65	0.001407	Within authorized band for Band 41	Pass
	-20	-11.59	-0.004466		
	-10	-9.36	-0.003607		
	0	3.69	0.001422		
	10	-11.52	-0.004439		
	20	-10.79	-0.004158		
	30	-13.98	-0.005387		
	40	-11.32	-0.004362		
	50	-12.90	-0.004971		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-10.27	-0.003958	Within authorized band for Band 41	Pass
	3.85	-15.02	-0.005788		
	4.35	-13.38	-0.005156		
16QAM					
25	3.45	-13.15	-0.005067	Within authorized band for Band41	Pass
	3.85	-11.00	-0.004239		
	4.35	-11.67	-0.004497		

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	-9.70	-0.005559	Within authorized band for Band 66	Pass
	-20	-8.81	-0.005049		
	-10	-10.99	-0.006298		
	0	-8.00	-0.004585		
	10	3.18	0.001822		
	20	-13.07	-0.007490		
	30	-9.30	-0.005330		
	40	-8.21	-0.004705		
	50	-9.57	-0.005484		
16QAM					
3.85	-30	4.05	0.002321	Within authorized band for Band 66	Pass
	-20	-11.40	-0.006533		
	-10	-10.17	-0.005828		
	0	-9.51	-0.005450		
	10	-8.34	-0.004779		
	20	-11.52	-0.006602		
	30	-11.49	-0.006585		
	40	6.85	0.003926		
	50	6.51	0.003731		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	6.54	0.003748	Within authorized band for Band 66	Pass
	3.85	-8.10	-0.004642		
	4.35	-12.13	-0.006951		
16QAM					
25	3.45	-2.57	-0.001473	Within authorized band for Band 66	Pass
	3.85	-10.11	-0.005794		
	4.35	-11.69	-0.006699		

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

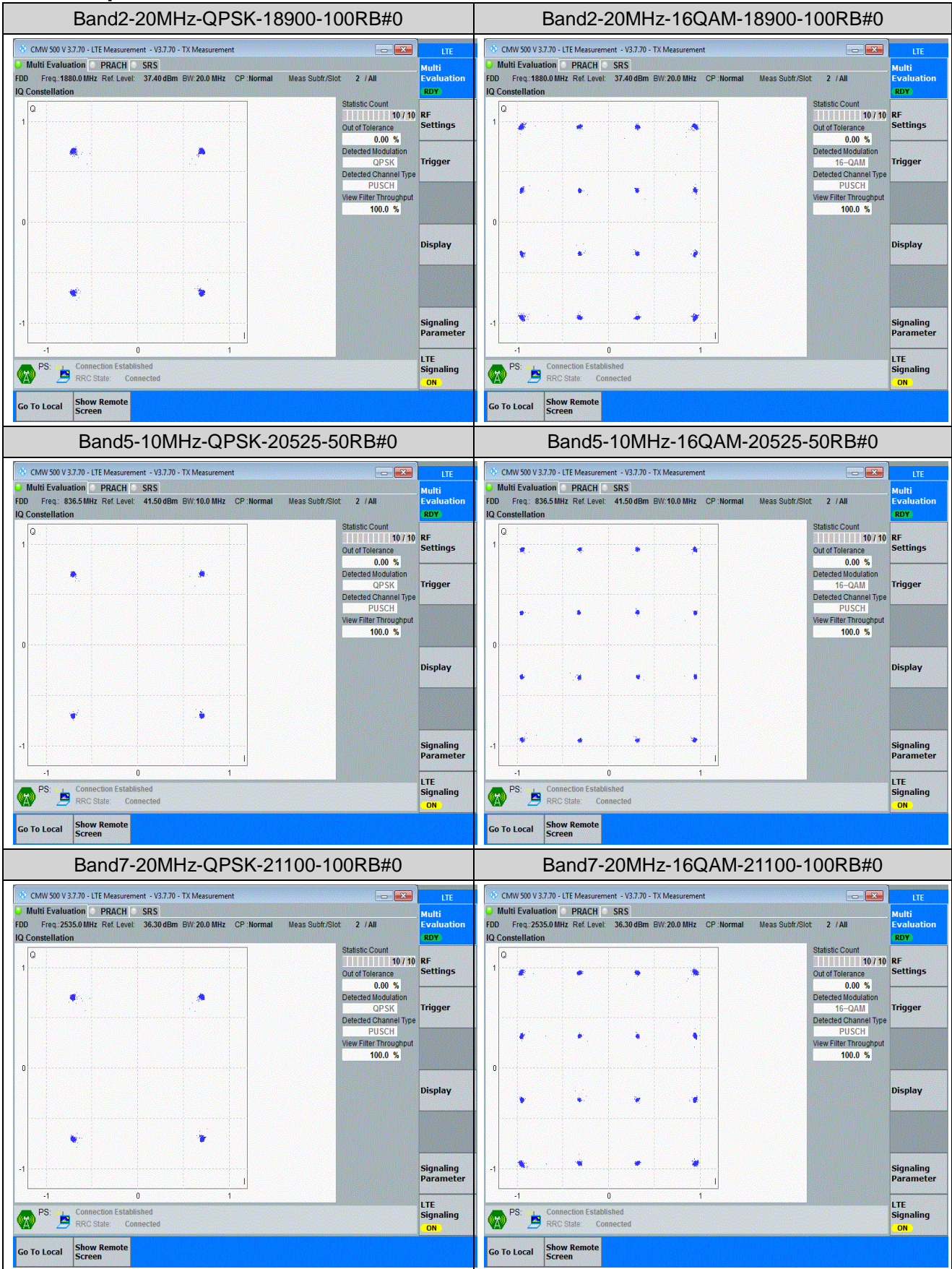
Appendix G: Modulation Characteristics

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
Band5	10MHz	QPSK	20525	50RB#0	PASS	PASS
Band5	10MHz	16QAM	20525	50RB#0	PASS	PASS
Band7	20MHz	QPSK	21100	100RB#0	PASS	PASS
Band7	20MHz	16QAM	21100	100RB#0	PASS	PASS
Band12	10MHz	QPSK	23095	50RB#0	PASS	PASS
Band12	10MHz	16QAM	23095	50RB#0	PASS	PASS
Band17	10MHz	QPSK	23790	50RB#0	PASS	PASS
Band17	10MHz	16QAM	23790	50RB#0	PASS	PASS
Band41	20MHz	QPSK	40640	100RB#0	PASS	PASS
Band41	20MHz	16QAM	40640	100RB#0	PASS	PASS
Band66	20MHz	QPSK	132322	100RB#0	PASS	PASS
Band66	20MHz	16QAM	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



<p align="center">Band12-10MHz-QPSK-23095-50RB#0</p>	<p align="center">Band12-10MHz-16QAM-23095-50RB#0</p>
<p align="center">Band17-10MHz-QPSK-23790-50RB#0</p>	<p align="center">Band17-10MHz-16QAM-23790-50RB#0</p>
<p align="center">Band41-20MHz-QPSK-40640-100RB#0</p>	<p align="center">Band41-20MHz-16QAM-40640-100RB#0</p>
<p align="center">Band66-20MHz-QPSK-132322-100RB#0</p>	<p align="center">Band66-20MHz-16QAM-132322-100RB#0</p>

