

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					
3.70	-30	-17.02	-0.009053	Within authorized band for Band 2	Pass
	-20	-15.29	-0.008133		
	-10	-9.37	-0.004984		
	0	-18.51	-0.009846		
	10	-23.07	-0.012271		
	20	-16.52	-0.008787		
	30	-14.00	-0.007447		
	40	-12.85	-0.006835		
	50	-17.94	-0.009543		
16QAM					
3.70	-30	-8.45	-0.004495	Within authorized band for Band 2	Pass
	-20	-14.79	-0.007867		
	-10	-4.62	-0.002457		
	0	-18.10	-0.009628		
	10	-11.47	-0.006101		
	20	-18.93	-0.010069		
	30	-16.81	-0.008941		
	40	-17.72	-0.009426		
	50	-19.87	-0.010569		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-11.72	-0.006234	Within authorized band for Band 2	Pass
	3.70	-22.80	-0.012128		
	4.20	-10.80	-0.005745		
16QAM					
25	3.50	-17.57	-0.009346	Within authorized band for Band 2	Pass
	3.70	-7.00	-0.003723		
	4.20	-19.27	-0.010250		
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					
3.70	-30	-8.28	-0.009898	±2.5	Pass
	-20	-9.37	-0.011201		
	-10	-9.46	-0.011309		
	0	-9.51	-0.011369		
	10	-8.28	-0.009898		
	20	-9.97	-0.011919		
	30	-7.72	-0.009229		
	40	-8.78	-0.010496		
	50	-8.27	-0.009886		
16QAM					
3.70	-30	-9.16	-0.010950	±2.5	Pass
	-20	-11.22	-0.013413		
	-10	-11.84	-0.014154		
	0	-10.46	-0.012504		
	10	-13.66	-0.016330		
	20	-6.19	-0.007400		
	30	-8.61	-0.010293		
	40	-10.44	-0.012481		
	50	-9.78	-0.011692		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-8.71	-0.010412	±2.5	Pass
	3.70	-13.00	-0.015541		
	4.20	-9.13	-0.010915		
16QAM					
25	3.50	-9.08	-0.010855	±2.5	Pass
	3.70	-4.12	-0.004925		
	4.20	-6.38	-0.007627		
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					
3.70	-30	-16.69	-0.006584	Within authorized band for Band 7	Pass
	-20	-12.46	-0.004915		
	-10	-13.65	-0.005385		
	0	-10.17	-0.004012		
	10	-11.04	-0.004355		
	20	-16.68	-0.006580		
	30	-6.94	-0.002738		
	40	-10.43	-0.004114		
	50	-8.87	-0.003499		
16QAM					
3.70	-30	-17.22	-0.006793	Within authorized band for Band 7	Pass
	-20	-15.21	-0.006000		
	-10	-14.93	-0.005890		
	0	-13.48	-0.005318		
	10	-18.27	-0.007207		
	20	-12.55	-0.004951		
	30	-16.25	-0.006410		
	40	-12.75	-0.005030		
	50	-12.43	-0.004903		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-14.43	-0.005692	Within authorized band for Band 7	Pass
	3.70	-16.47	-0.006497		
	4.20	-14.53	-0.005732		
16QAM					
25	3.50	-4.16	-0.001641	Within authorized band for Band 7	Pass
	3.70	7.50	0.002959		
	4.20	-12.15	-0.004793		
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					
3.70	-30	-9.36	-0.013230	Within authorized band for Band 12	Pass
	-20	-6.48	-0.009159		
	-10	4.26	0.006021		
	0	-14.28	-0.020184		
	10	-5.55	-0.007845		
	20	-8.44	-0.011929		
	30	-9.50	-0.013428		
	40	-7.60	-0.010742		
	50	-6.87	-0.009710		
16QAM					
3.70	-30	-9.28	-0.013117	Within authorized band for Band 12	Pass
	-20	-8.18	-0.011562		
	-10	-10.47	-0.014799		
	0	-7.00	-0.009894		
	10	-6.87	-0.009710		
	20	-7.94	-0.011223		
	30	-13.26	-0.018742		
	40	-9.63	-0.013611		
	50	-7.57	-0.010700		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-8.93	-0.012622	Within authorized band for Band 12	Pass
	3.70	-5.18	-0.007322		
	4.20	-10.50	-0.014841		
16QAM					
25	3.50	-7.84	-0.011081	Within authorized band for Band 12	Pass
	3.70	-8.88	-0.012551		
	4.20	-5.95	-0.008410		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					

LTE Band 13 part:

Reference Frequency: LTE Band 13(10MHz) Middle channel=23230 Frequency=782.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.70	-30	-9.98	-0.012762	Within authorized band for Band 13	Pass
	-20	-8.64	-0.011049		
	-10	-6.84	-0.008747		
	0	-6.79	-0.008683		
	10	-9.01	-0.011522		
	20	-7.65	-0.009783		
	30	-1.76	-0.002251		
	40	-5.92	-0.007570		
	50	-6.92	-0.008849		
16QAM					
3.70	-30	-7.31	-0.009348	Within authorized band for Band 13	Pass
	-20	-12.06	-0.015422		
	-10	-6.55	-0.008376		
	0	-12.46	-0.015934		
	10	-10.94	-0.013990		
	20	-13.56	-0.017340		
	30	-11.44	-0.014629		
	40	-9.18	-0.011739		
	50	-8.41	-0.010754		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-11.32	-0.014476	Within authorized band for Band 13	Pass
	3.70	-6.75	-0.008632		
	4.20	-7.91	-0.010115		
16QAM					
25	3.50	-9.03	-0.011547	Within authorized band for Band 13	Pass
	3.70	-7.93	-0.010141		
	4.20	-10.49	-0.013414		
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					
3.70	-30	-3.72	-0.005239	Within authorized band for Band 17	Pass
	-20	-8.25	-0.011620		
	-10	-8.71	-0.012268		
	0	-9.77	-0.013761		
	10	-6.01	-0.008465		
	20	-9.10	-0.012817		
	30	-9.48	-0.013352		
	40	-5.76	-0.008113		
	50	-7.70	-0.010845		
16QAM					
3.70	-30	-10.93	-0.015394	Within authorized band for Band 17	Pass
	-20	-9.81	-0.013817		
	-10	-11.30	-0.015915		
	0	-3.60	-0.005070		
	10	-7.50	-0.010563		
	20	-5.22	-0.007352		
	30	-9.80	-0.013803		
	40	-8.43	-0.011873		
	50	-3.40	-0.004789		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-5.42	-0.007634	Within authorized band for Band 17	Pass
	3.70	-9.77	-0.013761		
	4.20	-10.96	-0.015437		
16QAM					
25	3.50	-8.77	-0.012352	Within authorized band for Band 17	Pass
	3.70	-7.80	-0.010986		
	4.20	-9.14	-0.012873		
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					
3.7	-30	-9.57	-0.005484	Within authorized band for Band 66	Pass
	-20	-11.07	-0.006344		
	-10	-11.99	-0.006871		
	0	-13.73	-0.007868		
	10	-9.47	-0.005427		
	20	-10.99	-0.006298		
	30	-11.26	-0.006453		
	40	4.15	0.002378		
	50	-9.40	-0.005387		
16QAM					
3.7	-30	-13.86	-0.007943	Within authorized band for Band 66	Pass
	-20	-8.74	-0.005009		
	-10	-8.91	-0.005106		
	0	-4.98	-0.002854		
	10	-13.39	-0.007673		
	20	-10.33	-0.005920		
	30	-10.77	-0.006172		
	40	-15.78	-0.009043		
	50	-6.14	-0.003519		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-9.28	-0.005318	Within authorized band for Band 66	Pass
	3.70	-18.64	-0.010682		
	4.20	-9.36	-0.005364		
16QAM					
25	3.50	-7.10	-0.004069	Within authorized band for Band 66	Pass
	3.70	-12.46	-0.007140		
	4.20	-15.55	-0.008911		
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
Band13	10MHz	QPSK	23230	50RB#0	PASS	PASS
Band13	10MHz	16QAM	23230	50RB#0	PASS	PASS
Band17	10MHz	QPSK	23790	50RB#0	PASS	PASS
Band17	10MHz	16QAM	23790	50RB#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





