

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					
3.87	-30	9.27	0.004931	Within authorized band for Band 2	Pass
	-20	10.26	0.005457		
	-10	9.77	0.005197		
	0	9.56	0.005085		
	10	8.63	0.004590		
	20	9.47	0.005037		
	30	11.57	0.006154		
	40	15.26	0.008117		
	50	8.25	0.004388		
16QAM					
3.87	-30	14.35	0.007633	Within authorized band for Band 2	Pass
	-20	11.54	0.006138		
	-10	10.63	0.005654		
	0	12.33	0.006559		
	10	11.97	0.006367		
	20	10.37	0.005516		
	30	7.00	0.003723		
	40	7.60	0.004043		
	50	13.10	0.006968		
64QAM					
3.87	-30	11.09	0.005899	Within authorized band for Band 2	Pass
	-20	10.63	0.005654		
	-10	9.14	0.004862		
	0	10.71	0.005697		
	10	14.23	0.007569		
	20	8.54	0.004543		
	30	7.11	0.003782		
	40	10.21	0.005431		
	50	8.24	0.004383		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.00	9.04	0.004809	Within authorized band for Band 2	Pass
	3.87	9.34	0.004968		
	4.45	12.66	0.006734		
16QAM					
25	3.00	11.84	0.006298	Within authorized band for Band 2	Pass
	3.87	10.64	0.005660		
	4.45	11.93	0.006346		
64QAM					
25	3.00	8.90	0.004734	Within authorized band for Band 2	Pass
	3.87	11.77	0.006261		
	4.45	10.91	0.005803		
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					
3.87	-30	7.41	0.004277	Within authorized band for Band 4	Pass
	-20	-6.77	-0.003908		
	-10	11.89	0.006863		
	0	5.54	0.003198		
	10	-9.33	-0.005385		
	20	11.60	0.006696		
	30	7.14	0.004121		
	40	-8.15	-0.004704		
	50	8.50	0.004906		
16QAM					
3.87	-30	-7.55	-0.004358	Within authorized band for Band 4	Pass
	-20	17.25	0.009957		
	-10	-1.46	-0.000843		
	0	13.82	0.007977		
	10	9.63	0.005558		
	20	6.37	0.003677		
	30	6.45	0.003723		
	40	7.78	0.004491		
	50	8.98	0.005183		
64QAM					
3.87	-30	7.08	0.004087	Within authorized band for Band 4	Pass
	-20	10.56	0.006095		
	-10	9.98	0.005760		
	0	12.76	0.007365		
	10	11.14	0.006430		
	20	11.60	0.006696		
	30	13.12	0.007573		
	40	13.23	0.007636		
	50	12.95	0.007475		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.00	9.17	0.005293	Within authorized band for Band 4	Pass
	3.87	6.49	0.003746		
	4.45	9.78	0.005645		
16QAM					
25	3.00	-8.73	-0.005039	Within authorized band for Band 4	Pass
	3.87	7.15	0.004127		
	4.45	-7.55	-0.004358		
64QAM					
25	3.00	9.94	0.005737	Within authorized band for Band 4	Pass
	3.87	5.45	0.003146		
	4.45	13.09	0.007556		
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 (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.87	-30	-4.06	-0.004854	±2.5	Pass
	-20	-3.56	-0.004256		
	-10	-5.41	-0.006467		
	0	-3.93	-0.004698		
	10	-6.38	-0.007627		
	20	-4.51	-0.005392		
	30	-4.73	-0.005655		
	40	4.91	0.005870		
	50	-3.60	-0.004304		
16QAM					
3.87	-30	5.01	0.005989	±2.5	Pass
	-20	-3.43	-0.004100		
	-10	-8.33	-0.009958		
	0	-6.04	-0.007221		
	10	6.97	0.008332		
	20	-5.22	-0.006240		
	30	5.84	0.006981		
	40	-5.39	-0.006444		
	50	5.04	0.006025		
64QAM					
3.87	-30	-4.39	-0.005248	±2.5	Pass
	-20	4.18	0.004997		
	-10	-3.26	-0.003897		
	0	-4.84	-0.005786		
	10	2.73	0.003264		
	20	-3.50	-0.004184		
	30	-4.36	-0.005212		
	40	-3.08	-0.003682		
	50	3.98	0.004758		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.00	-6.25	-0.007472	±2.5	Pass
	3.87	5.75	0.006874		
	4.45	-4.38	-0.005236		
16QAM					
25	3.00	-4.99	-0.005965	±2.5	Pass
	3.87	3.12	0.003730		
	4.45	-3.30	-0.003945		
64QAM					
25	3.00	-5.68	-0.006790	±2.5	Pass
	3.87	-5.59	-0.006683		
	4.45	-2.63	-0.003144		
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					
3.87	-30	-3.02	-0.004269	Within authorized band for Band 12	Pass
	-20	-3.42	-0.004834		
	-10	-3.05	-0.004311		
	0	3.18	0.004495		
	10	3.82	0.005399		
	20	3.73	0.005272		
	30	-4.49	-0.006346		
	40	-5.74	-0.008113		
	50	3.58	0.005060		
16QAM					
3.87	-30	-2.49	-0.003519	Within authorized band for Band 12	Pass
	-20	-5.34	-0.007548		
	-10	3.69	0.005216		
	0	3.22	0.004551		
	10	-2.80	-0.003958		
	20	-6.55	-0.009258		
	30	-4.69	-0.006629		
	40	-4.42	-0.006247		
	50	-5.26	-0.007435		
64QAM					
3.87	-30	-3.16	-0.004466	Within authorized band for Band 12	Pass
	-20	-2.39	-0.003378		
	-10	-2.86	-0.004042		
	0	-3.66	-0.005173		
	10	-3.03	-0.004283		
	20	-2.39	-0.003378		
	30	-4.98	-0.007039		
	40	-5.78	-0.008170		
	50	2.86	0.004042		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.00	-5.91	-0.008353	Within authorized band for Band 12	Pass
	3.87	-3.48	-0.004919		
	4.45	2.68	0.003788		
16QAM					
25	3.00	-5.91	-0.008353	Within authorized band for Band 12	Pass
	3.87	-4.72	-0.006671		
	4.45	-4.96	-0.007011		
64QAM					
25	3.00	-5.01	-0.007081	Within authorized band for Band 12	Pass
	3.87	-4.21	-0.005951		
	4.45	-4.85	-0.006855		
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 (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.87	-30	5.18	0.007296	Within authorized band for Band 17	Pass
	-20	4.75	0.006690		
	-10	5.62	0.007915		
	0	-5.26	-0.007408		
	10	4.99	0.007028		
	20	-5.24	-0.007380		
	30	4.95	0.006972		
	40	-4.38	-0.006169		
	50	4.08	0.005746		
16QAM					
3.87	-30	-4.63	-0.006521	Within authorized band for Band 17	Pass
	-20	-4.49	-0.006324		
	-10	-5.24	-0.007380		
	0	-5.34	-0.007521		
	10	-4.18	-0.005887		
	20	-4.28	-0.006028		
	30	4.18	0.005887		
	40	4.69	0.006606		
	50	2.93	0.004127		
64QAM					
3.87	-30	5.84	0.008225	Within authorized band for Band 17	Pass
	-20	4.88	0.006873		
	-10	6.11	0.008606		
	0	5.49	0.007732		
	10	-3.45	-0.004859		
	20	-4.69	-0.006606		
	30	5.69	0.008014		
	40	-5.51	-0.007761		
	50	4.39	0.006183		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.00	-3.73	-0.005254	Within authorized band for Band 17	Pass
	3.87	-3.06	-0.004310		
	4.45	-3.83	-0.005394		
16QAM					
25	3.00	-6.22	-0.008761	Within authorized band for Band 17	Pass
	3.87	5.61	0.007901		
	4.45	-5.48	-0.007718		
64QAM					
25	3.00	-5.46	-0.007690	Within authorized band for Band 17	Pass
	3.87	4.39	0.006183		
	4.45	5.89	0.008296		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					

LTE Band 41 part: (注意测试频段)

Reference Frequency: LTE Band 41 (10MHz) Middle channel=40620 Frequency=2593.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.87	-30	6.54	0.002522	Within authorized band for Band 41	Pass
	-20	7.71	0.002973		
	-10	-8.47	-0.003266		
	0	7.08	0.002730		
	10	9.67	0.003729		
	20	6.21	0.002395		
	30	7.14	0.002754		
	40	8.13	0.003135		
	50	-6.54	-0.002522		
16QAM					
3.87	-30	7.22	0.002784	Within authorized band for Band 41	Pass
	-20	9.51	0.003668		
	-10	14.92	0.005754		
	0	8.54	0.003293		
	10	-6.05	-0.002333		
	20	12.57	0.004848		
	30	-6.34	-0.002445		
	40	7.25	0.002796		
	50	9.20	0.003548		
64QAM					
3.87	-30	7.94	0.003062	Within authorized band for Band 41	Pass
	-20	-11.14	-0.004296		
	-10	12.63	0.004871		
	0	-11.73	-0.004524		
	10	8.80	0.003394		
	20	8.05	0.003105		
	30	-7.51	-0.002896		
	40	6.94	0.002676		
	50	11.00	0.004242		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.00	-10.46	-0.004034	Within authorized band for Band 41	Pass
	3.87	7.45	0.002873		
	4.45	9.08	0.003502		
16QAM					
25	3.00	-7.98	-0.003078	Within authorized band for Band41	Pass
	3.87	-12.83	-0.004948		
	4.45	-4.91	-0.001894		
64QAM					
25	3.00	10.21	0.003938	Within authorized band for Band41	Pass
	3.87	-8.33	-0.003212		
	4.45	-7.95	-0.003066		
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					
3.87	-30	9.43	0.005404	Within authorized band for Band 66	Pass
	-20	8.80	0.005043		
	-10	7.67	0.004395		
	0	10.56	0.006052		
	10	7.93	0.004544		
	20	-7.01	-0.004017		
	30	11.76	0.006739		
	40	7.78	0.004458		
	50	9.80	0.005616		
16QAM					
3.87	-30	9.01	0.005163	Within authorized band for Band 66	Pass
	-20	7.07	0.004052		
	-10	8.87	0.005083		
	0	-8.28	-0.004745		
	10	-6.64	-0.003805		
	20	7.94	0.004550		
	30	8.98	0.005146		
	40	-9.56	-0.005479		
	50	10.97	0.006287		
64QAM					
3.87	-30	7.95	0.004556	Within authorized band for Band 66	Pass
	-20	11.34	0.006499		
	-10	-7.45	-0.004269		
	0	-9.54	-0.005467		
	10	-6.64	-0.003805		
	20	10.97	0.006287		
	30	11.93	0.006837		
	40	13.38	0.007668		
	50	12.29	0.007043		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.00	-6.62	-0.003794	Within authorized band for Band 66	Pass
	3.87	11.66	0.006682		
	4.45	-8.24	-0.004722		
16QAM					
25	3.00	7.67	0.004395	Within authorized band for Band 66	Pass
	3.87	-8.31	-0.004762		
	4.45	7.87	0.004510		
64QAM					
25	3.00	5.25	0.003009	Within authorized band for Band 66	Pass
	3.87	7.97	0.004567		
	4.45	10.54	0.006040		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					

LTE Band 71 part:

Reference Frequency: LTE Band 71 (10MHz) Middle channel=133297 Frequency=680.5MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.87	-30	-3.09	-0.004541	Within authorized band for Band 71	Pass
	-20	-2.90	-0.004262		
	-10	-2.26	-0.003321		
	0	-5.14	-0.007553		
	10	-6.55	-0.009625		
	20	-4.82	-0.007083		
	30	-5.95	-0.008744		
	40	3.52	0.005173		
	50	5.36	0.007877		
16QAM					
3.87	-30	3.85	0.005658	Within authorized band for Band 71	Pass
	-20	-3.98	-0.005849		
	-10	-3.22	-0.004732		
	0	4.18	0.006143		
	10	-3.06	-0.004497		
	20	-4.32	-0.006348		
	30	-5.18	-0.007612		
	40	-3.99	-0.005863		
	50	-7.65	-0.011242		
64QAM					
3.87	-30	-4.18	-0.006143	Within authorized band for Band 71	Pass
	-20	-5.32	-0.007818		
	-10	-4.68	-0.006877		
	0	-3.45	-0.005070		
	10	-4.41	-0.006481		
	20	-4.52	-0.006642		
	30	5.58	0.008200		
	40	-4.91	-0.007215		
	50	-4.59	-0.006745		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.00	-2.29	-0.003365	Within authorized band for Band 71	Pass
	3.87	2.89	0.004247		
	4.45	-6.57	-0.009655		
16QAM					
25	3.00	-4.48	-0.006583	Within authorized band for Band 71	Pass
	3.87	-4.56	-0.006701		
	4.45	-3.96	-0.005819		
64QAM					
25	3.00	-4.68	-0.006877	Within authorized band for Band 71	Pass
	3.87	-5.81	-0.008538		
	4.45	-4.29	-0.006304		
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
Band12	10MHz	QPSK	23095	50RB#0	PASS	PASS
Band12	10MHz	16QAM	23095	50RB#0	PASS	PASS
Band12	10MHz	64QAM	23095	50RB#0	PASS	PASS
Band17	10MHz	QPSK	23790	50RB#0	PASS	PASS
Band17	10MHz	16QAM	23790	50RB#0	PASS	PASS
Band17	10MHz	64QAM	23790	50RB#0	PASS	PASS
Band41	20MHz	QPSK	40620	100RB#0	PASS	PASS
Band41	20MHz	16QAM	40620	100RB#0	PASS	PASS
Band41	20MHz	64QAM	40620	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
Band71	20MHz	QPSK	133322	100RB#0	PASS	PASS
Band71	20MHz	16QAM	133322	100RB#0	PASS	PASS
Band71	20MHz	64QAM	133322	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









