

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					
3.80	-30	29.40	0.015638	Within authorized band for Band 2	Pass
	-20	30.17	0.016048		
	-10	28.91	0.015378		
	0	28.21	0.015005		
	10	26.19	0.013931		
	20	24.81	0.013197		
	30	23.86	0.012691		
	40	23.12	0.012298		
	50	23.25	0.012367		
16QAM					
3.80	-30	22.06	0.011734	Within authorized band for Band 2	Pass
	-20	21.41	0.011388		
	-10	26.44	0.014064		
	0	25.31	0.013463		
	10	24.49	0.013027		
	20	28.35	0.015080		
	30	23.60	0.012553		
	40	27.61	0.014686		
	50	28.42	0.015117		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	35.98	0.019138	Within authorized band for Band 2	Pass
	3.80	-46.01	-0.024473		
	4.20	32.59	0.017335		
16QAM					
25	3.50	21.44	0.011404	Within authorized band for Band 2	Pass
	3.80	22.16	0.011787		
	4.20	23.12	0.012298		
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 (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.80	-30	-5.87	-0.003388	Within authorized band for Band 4	Pass
	-20	-5.55	-0.003203		
	-10	3.49	0.002014		
	0	5.59	0.003227		
	10	12.35	0.007128		
	20	12.97	0.007486		
	30	11.23	0.006482		
	40	-7.02	-0.004052		
	50	-14.48	-0.008358		
16QAM					
3.80	-30	-24.15	-0.013939	Within authorized band for Band 4	Pass
	-20	-16.67	-0.009622		
	-10	-11.00	-0.006349		
	0	-2.47	-0.001426		
	10	9.66	0.005576		
	20	17.94	0.010355		
	30	21.24	0.012260		
	40	34.65	0.020000		
	50	10.06	0.005807		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-9.70	-0.005599	Within authorized band for Band 4	Pass
	3.80	-19.64	-0.011336		
	4.20	-18.02	-0.010401		
16QAM					
25	3.50	-20.66	-0.011925	Within authorized band for Band 4	Pass
	3.80	-17.44	-0.010066		
	4.20	-24.29	-0.014020		
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					
3.80	-30	3.93	0.004698	±2.5	Pass
	-20	3.63	0.004340		
	-10	2.00	0.002391		
	0	-3.35	-0.004005		
	10	-4.32	-0.005164		
	20	-5.45	-0.006515		
	30	-7.65	-0.009145		
	40	-10.60	-0.012672		
	50	-10.44	-0.012481		
16QAM					
3.80	-30	-10.59	-0.012660	±2.5	Pass
	-20	-11.20	-0.013389		
	-10	-7.07	-0.008452		
	0	-5.97	-0.007137		
	10	-43.64	-0.052170		
	20	-19.81	-0.023682		
	30	-4.28	-0.005117		
	40	-2.36	-0.002821		
	50	-1.72	-0.002056		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-2.62	-0.003132	±2.5	Pass
	3.80	-6.87	-0.008213		
	4.20	3.55	0.004244		
16QAM					
25	3.50	-13.12	-0.015684	±2.5	Pass
	3.80	-11.13	-0.013305		
	4.20	-12.89	-0.015409		
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					
3.80	-30	23.85	0.009408	Within authorized band for Band 7	Pass
	-20	-4.25	-0.001677		
	-10	-23.59	-0.009306		
	0	-44.57	-0.017582		
	10	-62.46	-0.024639		
	20	-41.69	-0.016446		
	30	-55.39	-0.021850		
	40	9.98	0.003937		
	50	5.38	0.002122		
16QAM					
3.80	-30	-30.07	-0.011862	Within authorized band for Band 7	Pass
	-20	-9.08	-0.003582		
	-10	-5.36	-0.002114		
	0	13.98	0.005515		
	10	29.95	0.011815		
	20	41.99	0.016564		
	30	-14.93	-0.005890		
	40	3.36	0.001325		
	50	18.48	0.007290		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	38.48	0.015179	Within authorized band for Band 7	Pass
	3.80	21.44	0.008458		
	4.20	30.20	0.011913		
16QAM					
25	3.50	-33.56	-0.013239	Within authorized band for Band 7	Pass
	3.80	-11.93	-0.004706		
	4.20	-35.69	-0.014079		
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					
3.80	-30	16.45	0.023251	Within authorized band for Band 12	Pass
	-20	18.34	0.025922		
	-10	17.01	0.024042		
	0	15.45	0.021837		
	10	12.47	0.017625		
	20	8.81	0.012452		
	30	6.07	0.008580		
	40	3.95	0.005583		
	50	-2.03	-0.002869		
16QAM					
3.80	-30	-11.94	-0.016876	Within authorized band for Band 12	Pass
	-20	-8.05	-0.011378		
	-10	-2.45	-0.003463		
	0	34.12	0.048226		
	10	13.28	0.018770		
	20	19.28	0.027251		
	30	27.88	0.039406		
	40	37.38	0.052834		
	50	41.63	0.058841		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	6.24	0.008820	Within authorized band for Band 12	Pass
	3.80	-3.83	-0.005413		
	4.20	14.29	0.020198		
16QAM					
25	3.50	-4.59	-0.006488	Within authorized band for Band 12	Pass
	3.80	-5.25	-0.007420		
	4.20	-11.40	-0.016113		
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					
3.80	-30	16.91	0.023817	Within authorized band for Band 17	Pass
	-20	17.62	0.024817		
	-10	17.72	0.024958		
	0	17.54	0.024704		
	10	18.91	0.026634		
	20	18.40	0.025915		
	30	20.14	0.028366		
	40	19.63	0.027648		
	50	18.51	0.026070		
16QAM					
3.80	-30	-36.32	-0.051155	Within authorized band for Band 17	Pass
	-20	-48.12	-0.067775		
	-10	-50.11	-0.070577		
	0	-10.64	-0.014986		
	10	-17.80	-0.025070		
	20	-17.97	-0.025310		
	30	-15.86	-0.022338		
	40	-45.32	-0.063831		
	50	-25.51	-0.035930		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	10.39	0.014634	Within authorized band for Band 17	Pass
	3.80	2.89	0.004070		
	4.20	14.85	0.020915		
16QAM					
25	3.50	20.27	0.028549	Within authorized band for Band 17	Pass
	3.80	20.16	0.028394		
	4.20	22.67	0.031930		
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
Band4	20MHz	QPSK	20175	100RB#0	PASS	PASS
Band4	20MHz	16QAM	20175	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

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

Test Graphs



