































## 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	-30.00	-0.015957	Within authorized band for Band 2	Pass
	-20	-52.13	-0.027729		
	-10	-8.83	-0.004697		
	0	-21.60	-0.011489		
	10	-24.49	-0.013027		
	20	-31.50	-0.016755		
	30	-32.92	-0.017511		
	40	-34.90	-0.018564		
	50	-43.36	-0.023064		
16QAM					
3.85	-30	33.55	0.017846	Within authorized band for Band 2	Pass
	-20	49.50	0.026330		
	-10	54.19	0.028824		
	0	16.37	0.008707		
	10	20.89	0.011112		
	20	33.30	0.017713		
	30	28.90	0.015372		
	40	35.71	0.018995		
	50	37.98	0.020202		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.27	-5.01	-0.002665	Within authorized band for Band 2	Pass
	3.85	32.99	0.017548		
	4.43	-10.49	-0.005580		
16QAM					
25	3.27	-17.21	-0.009154	Within authorized band for Band 2	Pass
	3.85	-42.94	-0.022840		
	4.43	22.97	0.012218		

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					
3.85	-30	-48.55	-0.028023	Within authorized band for Band 4	Pass
	-20	-20.84	-0.012029		
	-10	-22.83	-0.013177		
	0	-31.76	-0.018332		
	10	-27.45	-0.015844		
	20	-37.92	-0.021887		
	30	-31.63	-0.018257		
	40	-39.12	-0.022580		
	50	-40.33	-0.023278		
16QAM					
3.85	-30	-24.50	-0.014141	Within authorized band for Band 4	Pass
	-20	-15.13	-0.008733		
	-10	-9.93	-0.005732		
	0	-6.24	-0.003602		
	10	-6.28	-0.003625		
	20	-5.81	-0.003354		
	30	-8.43	-0.004866		
	40	4.21	0.002430		
	50	-8.83	-0.005097		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.27	-10.81	-0.006240	Within authorized band for Band 4	Pass
	3.85	16.16	0.009328		
	4.43	-39.07	-0.022551		
16QAM					
25	3.27	31.76	0.018332	Within authorized band for Band 4	Pass
	3.85	13.43	0.007752		
	4.43	36.41	0.021016		

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	-40.24	-0.048105	±2.5	Pass
	-20	-52.37	-0.062606		
	-10	-9.08	-0.010855		
	0	-10.49	-0.012540		
	10	-15.12	-0.018075		
	20	-17.24	-0.020610		
	30	-20.79	-0.024854		
	40	-22.62	-0.027041		
	50	-24.91	-0.029779		
16QAM					
3.85	-30	2.57	0.003072	±2.5	Pass
	-20	12.50	0.014943		
	-10	11.26	0.013461		
	0	15.52	0.018553		
	10	13.43	0.016055		
	20	15.85	0.018948		
	30	14.53	0.017370		
	40	16.09	0.019235		
	50	12.85	0.015362		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.27	-8.85	-0.010580	±2.5	Pass
	3.85	24.20	0.028930		
	4.43	-26.16	-0.031273		
16QAM					
25	3.27	-13.50	-0.016139	±2.5	Pass
	3.85	-23.96	-0.028643		
	4.43	-2.20	-0.002630		

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	-37.71	-0.014876	Within authorized band for Band 7	Pass
	-20	-46.66	-0.018406		
	-10	-39.88	-0.015732		
	0	11.33	0.004469		
	10	13.62	0.005373		
	20	6.59	0.002600		
	30	12.76	0.005034		
	40	7.24	0.002856		
	50	-14.45	-0.005700		
16QAM					
3.85	-30	-4.55	-0.001795	Within authorized band for Band 7	Pass
	-20	7.47	0.002947		
	-10	10.27	0.004051		
	0	16.82	0.006635		
	10	27.35	0.010789		
	20	32.16	0.012686		
	30	27.01	0.010655		
	40	42.87	0.016911		
	50	33.96	0.013396		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.27	-29.55	-0.011657	Within authorized band for Band 7	Pass
	3.85	-8.30	-0.003274		
	4.43	-32.70	-0.012899		
16QAM					
25	3.27	28.01	0.011049	Within authorized band for Band 7	Pass
	3.85	-12.52	-0.004939		
	4.43	49.97	0.019712		

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

**LTE Band 38 part:**

Reference Frequency: LTE Band 38(10MHz) Middle channel=38000 Frequency=2595.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-45.60	-0.017572	Within authorized band for Band 38	Pass
	-20	-48.29	-0.018609		
	-10	-16.85	-0.006493		
	0	-58.44	-0.022520		
	10	-36.74	-0.014158		
	20	-63.67	-0.024536		
	30	-48.52	-0.018697		
	40	-12.36	-0.004763		
	50	-18.73	-0.007218		
16QAM					
3.85	-30	33.45	0.012890	Within authorized band for Band 38	Pass
	-20	-12.60	-0.004855		
	-10	-31.30	-0.012062		
	0	-55.96	-0.021565		
	10	-63.20	-0.024355		
	20	15.54	0.005988		
	30	-20.50	-0.007900		
	40	-34.93	-0.013461		
	50	-44.79	-0.017260		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.27	-65.27	-0.025152	Within authorized band for Band 38	Pass
	3.85	-23.59	-0.009091		
	4.43	-55.33	-0.021322		
16QAM					
25	3.27	13.20	0.005087	Within authorized band for Band 38	Pass
	3.85	-44.76	-0.017249		
	4.43	40.47	0.015595		

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		
<b>QPSK</b>					
3.85	-30	-24.28	-0.009356	Within authorized band for Band 41	Pass
	-20	-49.60	-0.019114		
	-10	-33.06	-0.012740		
	0	-29.68	-0.011437		
	10	-43.97	-0.016944		
	20	-31.84	-0.012270		
	30	-51.86	-0.019985		
	40	-33.03	-0.012728		
	50	-51.43	-0.019819		
<b>16QAM</b>					
3.85	-30	-37.54	-0.014466	Within authorized band for Band 41	Pass
	-20	24.75	0.009538		
	-10	43.33	0.016697		
	0	-26.46	-0.010197		
	10	-13.02	-0.005017		
	20	28.51	0.010987		
	30	-17.78	-0.006852		
	40	23.15	0.008921		
	50	-12.40	-0.004778		
<b>Voltage</b>					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
<b>QPSK</b>					
25	3.27	31.64	0.012193	Within authorized band for Band 41	Pass
	3.85	23.88	0.009202		
	4.43	-21.70	-0.008362		
<b>16QAM</b>					
25	3.27	38.27	0.014748	Within authorized band for Band41	Pass
	3.85	-28.65	-0.011040		
	4.43	-23.80	-0.009171		

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
Band38	20MHz	QPSK	38000	100RB#0	PASS	PASS
Band38	20MHz	16QAM	38000	100RB#0	PASS	PASS
Band41	20MHz	QPSK	40640	100RB#0	PASS	PASS
Band41	20MHz	16QAM	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





