

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	-8.85	-0.004707	Within authorized band for Band 2	Pass
	-20	8.65	0.004601		
	-10	17.67	0.009399		
	0	24.08	0.012809		
	10	35.28	0.018766		
	20	37.71	0.020059		
	30	-4.22	-0.002245		
	40	7.65	0.004069		
	50	9.86	0.005245		
16QAM					
3.70	-30	-37.72	-0.020064	Within authorized band for Band 2	Pass
	-20	-11.09	-0.005899		
	-10	-25.33	-0.013473		
	0	-29.94	-0.015926		
	10	-36.58	-0.019457		
	20	-38.65	-0.020559		
	30	-48.59	-0.025846		
	40	-47.74	-0.025394		
	50	-53.84	-0.028638		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-37.18	-0.019777	Within authorized band for Band 2	Pass
	3.70	-31.53	-0.016771		
	4.20	-24.12	-0.012830		
16QAM					
25	3.50	-3.66	-0.001947	Within authorized band for Band 2	Pass
	3.70	14.28	0.007596		
	4.20	-24.42	-0.012989		
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					
3.70	-30	-20.13	-0.011619	Within authorized band for Band 4	Pass
	-20	-27.42	-0.015827		
	-10	-40.10	-0.023146		
	0	6.74	0.003890		
	10	-7.81	-0.004508		
	20	-19.15	-0.011053		
	30	-37.29	-0.021524		
	40	-41.28	-0.023827		
	50	-8.28	-0.004779		
16QAM					
3.70	-30	5.25	0.003030	Within authorized band for Band 4	Pass
	-20	-16.79	-0.009691		
	-10	-38.01	-0.021939		
	0	-8.53	-0.004924		
	10	-24.62	-0.014211		
	20	-37.88	-0.021864		
	30	-8.70	-0.005022		
	40	-13.03	-0.007521		
	50	-23.29	-0.013443		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-32.43	-0.018719	Within authorized band for Band 4	Pass
	3.70	-17.80	-0.010274		
	4.20	-46.16	-0.026644		
16QAM					
25	3.50	-31.93	-0.018430	Within authorized band for Band 4	Pass
	3.70	-18.18	-0.010494		
	4.20	-26.56	-0.015330		
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	-10.13	-0.012110	±2.5	Pass
	-20	-5.39	-0.006444		
	-10	5.99	0.007161		
	0	6.08	0.007268		
	10	7.34	0.008775		
	20	9.61	0.011488		
	30	14.10	0.016856		
	40	15.39	0.018398		
	50	16.39	0.019594		
16QAM					
3.70	-30	-6.78	-0.008105	±2.5	Pass
	-20	-12.90	-0.015421		
	-10	-17.37	-0.020765		
	0	-20.87	-0.024949		
	10	-25.95	-0.031022		
	20	-26.98	-0.032253		
	30	-28.87	-0.034513		
	40	-31.76	-0.037968		
	50	-33.09	-0.039558		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-27.85	-0.033293	±2.5	Pass
	3.70	-5.14	-0.006145		
	4.20	-18.61	-0.022247		
16QAM					
25	3.50	12.50	0.014943	±2.5	Pass
	3.70	16.87	0.020167		
	4.20	4.76	0.005690		
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 13(10MHz) Middle channel=23095 Frequency=707.5MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.70	-30	3.46	0.004890	±2.5	Pass
	-20	5.02	0.007095		
	-10	7.04	0.009951		
	0	8.15	0.011519		
	10	9.16	0.012947		
	20	8.68	0.012269		
	30	10.84	0.015322		
	40	12.66	0.017894		
	50	10.46	0.014784		
16QAM					
3.70	-30	6.42	0.009074	±2.5	Pass
	-20	7.40	0.010459		
	-10	7.40	0.010459		
	0	4.98	0.007039		
	10	7.28	0.010290		
	20	5.28	0.007463		
	30	3.98	0.005625		
	40	3.35	0.004735		
	50	3.59	0.005074		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-3.89	-0.005498	±2.5	Pass
	3.70	8.64	0.012212		
	4.20	2.27	0.003208		
16QAM					
25	3.50	12.39	0.017512	±2.5	Pass
	3.70	12.75	0.018021		
	4.20	10.59	0.014968		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					

LTE Band 13part:

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	-2.49	-0.003184	±2.5	Pass
	-20	3.43	0.004386		
	-10	3.89	0.004974		
	0	7.10	0.009079		
	10	8.23	0.010524		
	20	7.82	0.010000		
	30	13.20	0.016880		
	40	14.26	0.018235		
	50	13.79	0.017634		
16QAM					
3.70	-30	7.72	0.009872	±2.5	Pass
	-20	6.59	0.008427		
	-10	2.86	0.003657		
	0	2.25	0.002877		
	10	-3.43	-0.004386		
	20	-4.88	-0.006240		
	30	-5.35	-0.006841		
	40	-8.13	-0.010396		
	50	-7.12	-0.009105		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-5.75	-0.007353	±2.5	Pass
	3.70	-7.00	-0.008951		
	4.20	-3.99	-0.005102		
16QAM					
25	3.50	16.62	0.021253	±2.5	Pass
	3.70	15.48	0.019795		
	4.20	12.16	0.015550		

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

LTE Band 17part:

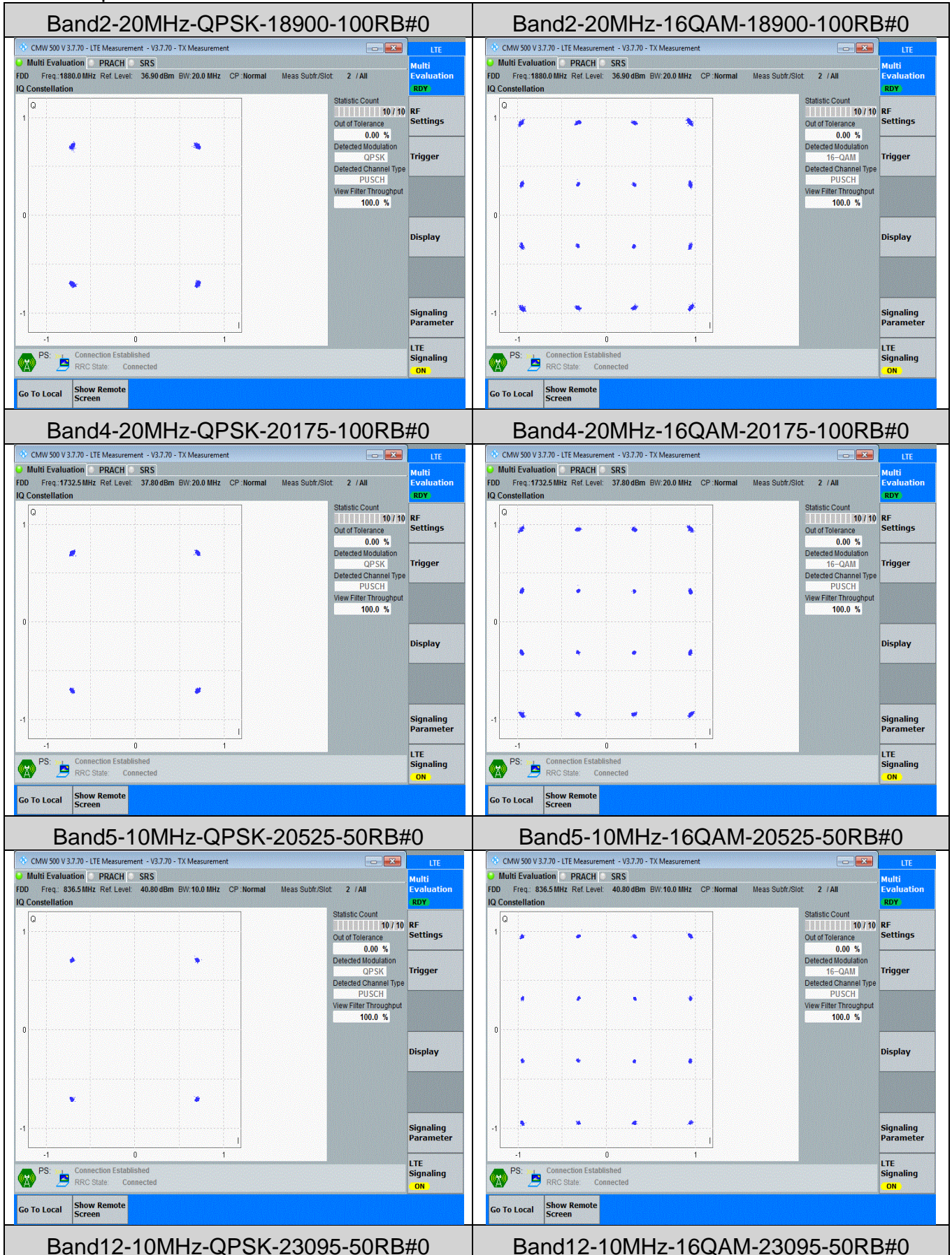
Reference Frequency: LTE Band 17(10MHz) Middle channel=23790 Frequency=710.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.70	-30	-4.95	-0.006972	±2.5	Pass
	-20	4.78	0.006732		
	-10	7.37	0.010380		
	0	11.92	0.016789		
	10	14.46	0.020366		
	20	14.52	0.020451		
	30	18.78	0.026451		
	40	21.21	0.029873		
	50	23.36	0.032901		
16QAM					
3.70	-30	12.86	0.018113	±2.5	Pass
	-20	10.69	0.015056		
	-10	7.64	0.010761		
	0	4.71	0.006634		
	10	3.36	0.004732		
	20	3.13	0.004408		
	30	-2.65	-0.003732		
	40	-3.65	-0.005141		
	50	-5.92	-0.008338		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-18.22	-0.025662	±2.5	Pass
	3.70	-3.72	-0.005239		
	4.20	-9.91	-0.013958		
16QAM					
25	3.50	23.23	0.032718	±2.5	Pass
	3.70	24.65	0.034718		
	4.20	17.35	0.024437		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					

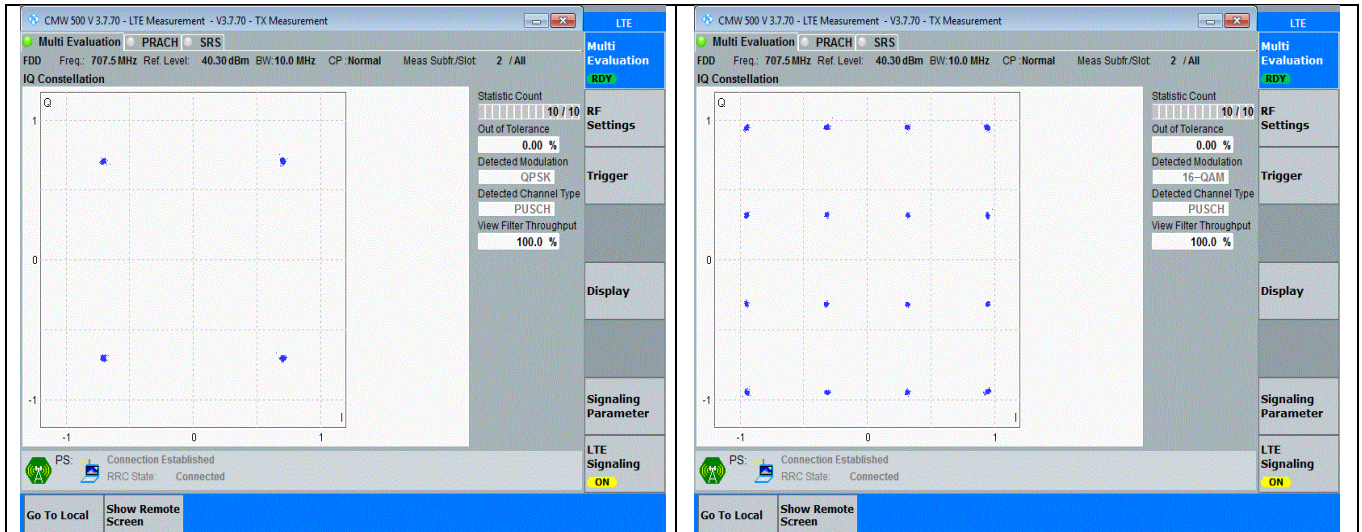
Appendix G: Modulation Characteristics
Test Result

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
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

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

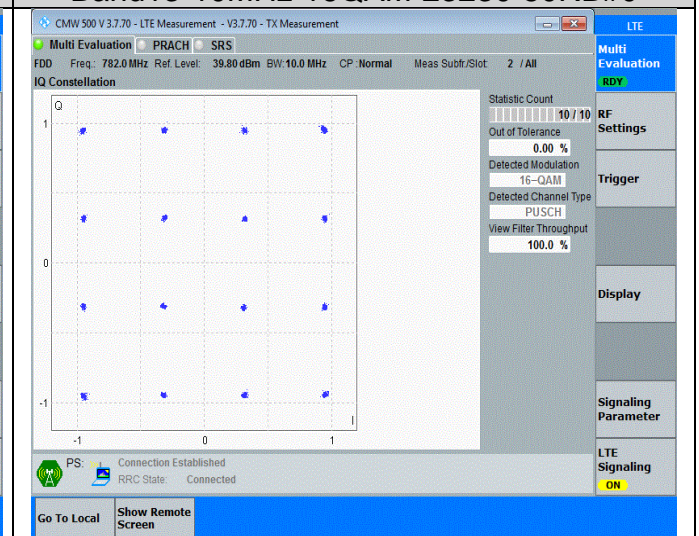
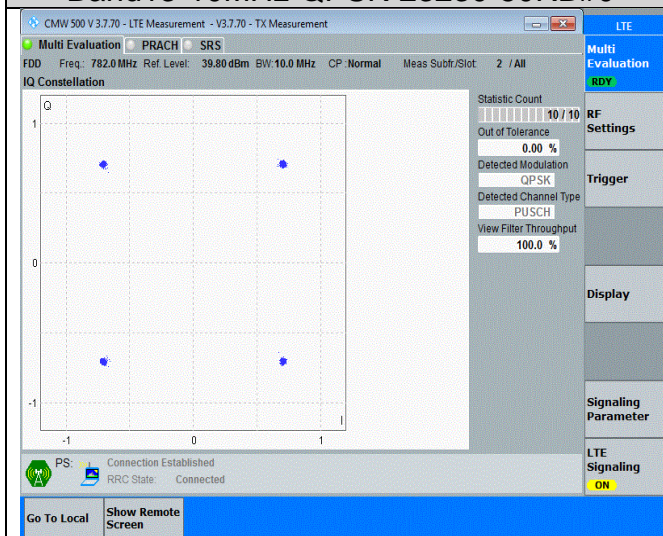
Test Graphs





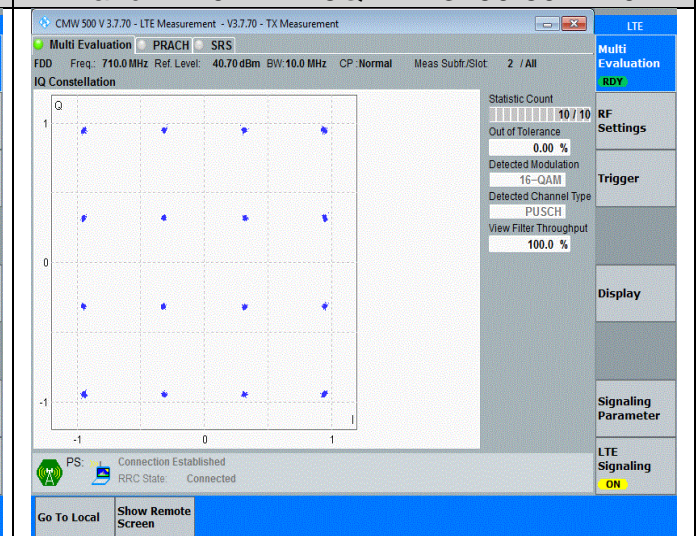
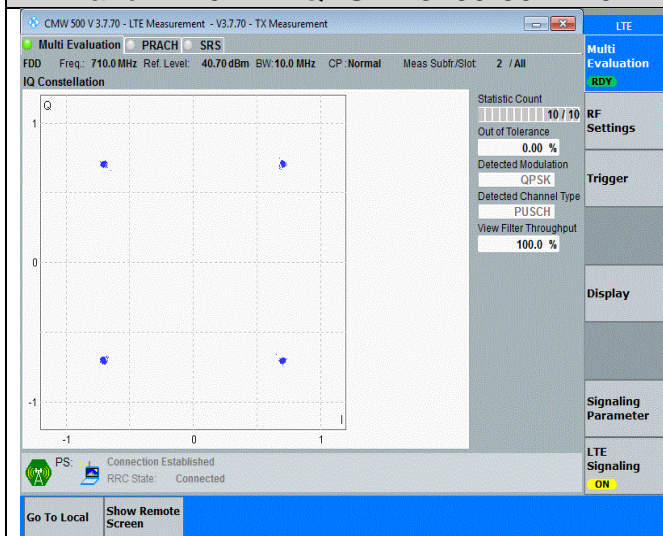
Band13-10MHz-QPSK-23230-50RB#0

Band13-10MHz-16QAM-23230-50RB#0



Band17-10MHz-QPSK-23790-50RB#0

Band17-10MHz-16QAM-23790-50RB#0



-----End of report-----