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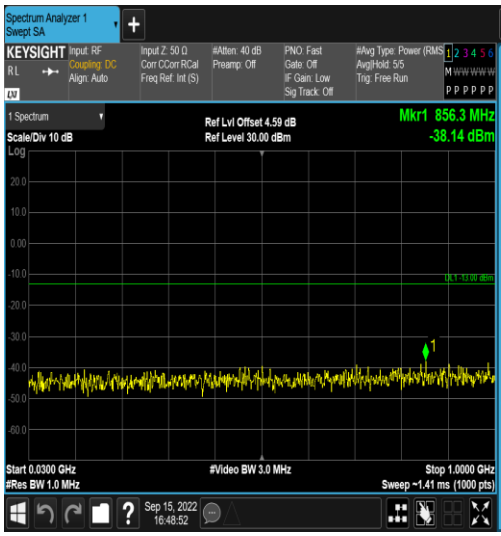	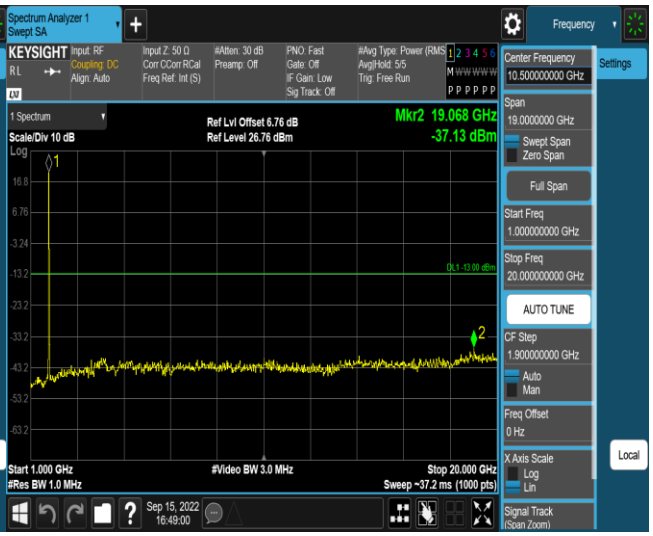
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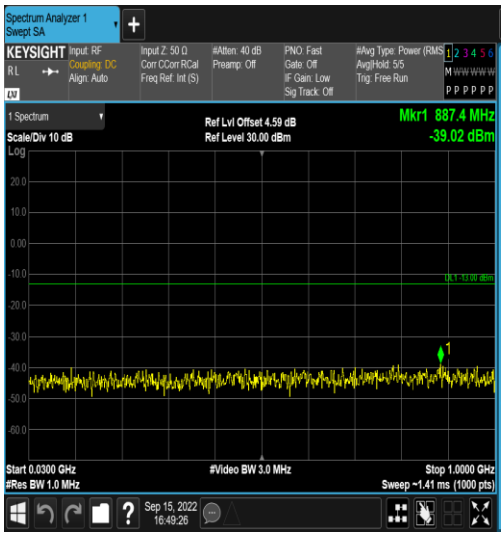
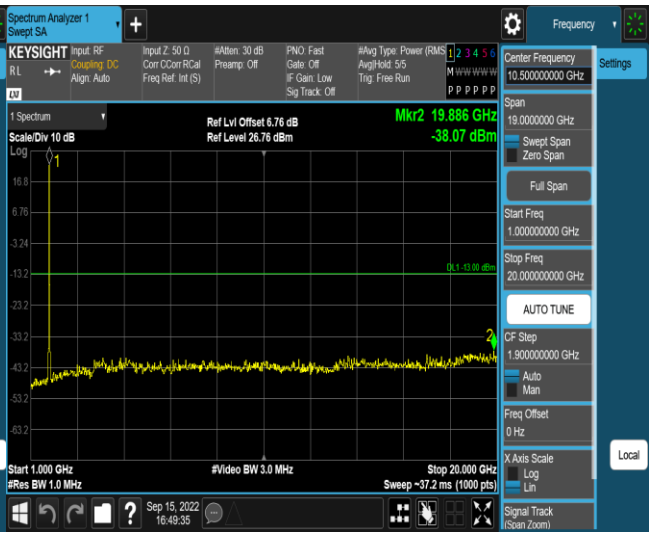
	

Appendix F: Frequency Stability

Test Result

LTE Band 2 part:

Reference Frequency: LTE Band 2 (10MHz) Middle channel=18900 Frequency=1880.0MHz					
Temperature					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-19.21	-0.010218	Within authorized band for Band 2	Pass
	-20	-7.08	-0.003766		
	-10	9.10	0.004840		
	0	34.56	0.018383		
	10	41.76	0.022213		
	20	19.00	0.010106		
	30	27.28	0.014511		
	40	41.27	0.021952		
	50	42.66	0.022691		
16QAM					
3.85	-30	-17.61	-0.016805	Within authorized band for Band 2	Pass
	-20	-6.41	-0.010546		
	-10	11.15	0.001939		
	0	35.03	0.016774		
	10	37.77	0.021729		
	20	18.88	0.006823		
	30	24.58	0.014405		
	40	37.29	0.014923		
	50	40.69	0.015276		
Voltage					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	51.64	0.027468	Within authorized band for Band 2	Pass
	3.85	48.32	0.025702		
	4.24	33.29	0.017707		
16QAM					
25	3.50	47.22	0.020768	Within authorized band for Band 2	Pass
	3.85	44.16	0.018100		
	4.24	35.08	0.012679		
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					
3.85	-30	21.37	0.025547	±2.5	Pass
	-20	19.91	0.023802		
	-10	17.42	0.020825		
	0	13.40	0.016019		
	10	10.89	0.013019		
	20	8.87	0.010604		
	30	8.10	0.009683		
	40	12.06	0.014417		
	50	7.27	0.008691		
16QAM					
3.85	-30	24.49	0.023205	±2.5	Pass
	-20	15.42	0.015919		
	-10	16.38	0.019321		
	0	14.33	0.009053		
	10	13.15	0.011300		
	20	12.71	0.010379		
	30	3.39	0.004140		
	40	15.04	0.008620		
	50	3.73	0.006124		
Voltage					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	30.88	0.036916	±2.5	Pass
	3.85	34.82	0.041626		
	4.24	27.98	0.033449		
16QAM					
25	3.50	27.72	0.035715	±2.5	Pass
	3.85	38.45	0.036110		
	4.24	23.43	0.030470		
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 (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-22.24	-0.008773	Within authorized band for Band 7	Pass
	-20	-36.74	-0.014493		
	-10	-50.88	-0.020071		
	0	-58.57	-0.023105		
	10	-14.41	-0.005684		
	20	-38.05	-0.015010		
	30	-46.58	-0.018375		
	40	-7.85	-0.003097		
	50	-29.47	-0.011625		
16QAM					
3.85	-30	-19.18	-0.016661	Within authorized band for Band 7	Pass
	-20	-38.03	-0.019367		
	-10	-49.42	-0.026358		
	0	-55.82	-0.031084		
	10	-10.51	-0.006830		
	20	-33.55	-0.021736		
	30	-41.87	-0.022776		
	40	-8.29	-0.003218		
	50	-25.28	-0.018784		
Voltage					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	24.35	0.009606	Within authorized band for Band 7	Pass
	3.85	18.81	0.007420		
	4.24	13.35	0.005266		
16QAM					
25	3.50	22.39	0.006458	Within authorized band for Band 7	Pass
	3.85	17.55	0.001867		
	4.24	15.06	-0.000890		
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 (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	30.91	0.043689	Within authorized band for Band 12	Pass
	-20	25.92	0.036636		
	-10	29.64	0.041894		
	0	29.91	0.042276		
	10	27.27	0.038544		
	20	24.29	0.034332		
	30	25.39	0.035887		
	40	23.06	0.032594		
	50	24.65	0.034841		
16QAM					
3.85	-30	34.60	0.041432	Within authorized band for Band 12	Pass
	-20	23.71	0.030930		
	-10	30.92	0.038519		
	0	30.58	0.041952		
	10	30.77	0.037410		
	20	20.14	0.030080		
	30	23.54	0.029963		
	40	22.09	0.025701		
	50	26.17	0.027397		
Voltage					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	31.87	0.045046	Within authorized band for Band 12	Pass
	3.85	27.78	0.039265		
	4.24	30.48	0.043081		
16QAM					
25	3.50	32.21	0.043578	Within authorized band for Band 12	Pass
	3.85	25.62	0.037474		
	4.24	32.68	0.037571		
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					
3.85	-30	16.21	0.022831	Within authorized band for Band 17	Pass
	-20	13.58	0.019127		
	-10	11.53	0.016239		
	0	5.08	0.007155		
	10	5.34	0.007521		
	20	7.90	0.011127		
	30	4.66	0.006563		
	40	-4.95	-0.006972		
	50	-7.01	-0.009873		
16QAM					
3.85	-30	13.60	0.022404	Within authorized band for Band 17	Pass
	-20	17.50	0.012885		
	-10	10.31	0.008991		
	0	6.89	0.003345		
	10	6.74	0.003476		
	20	5.99	0.010068		
	30	1.68	0.003046		
	40	-5.42	-0.012646		
	50	-8.08	-0.016165		
Voltage					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	26.99	0.038014	Within authorized band for Band 17	Pass
	3.85	27.79	0.039141		
	4.24	21.76	0.030648		
16QAM					
25	3.50	28.10	0.036360	Within authorized band for Band 17	Pass
	3.85	25.14	0.032912		
	4.24	26.71	0.023528		
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 (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-34.19	-0.019593	Within authorized band for Band 66	Pass
	-20	-12.83	-0.007352		
	-10	-25.43	-0.014573		
	0	-43.80	-0.025100		
	10	-45.59	-0.026126		
	20	-23.17	-0.013278		
	30	-39.41	-0.022585		
	40	-31.57	-0.018092		
	50	-4.42	-0.002533		
16QAM					
3.85	-30	-36.70	-0.027417	Within authorized band for Band 66	Pass
	-20	-17.51	-0.013208		
	-10	-22.09	-0.019094		
	0	-43.18	-0.027431		
	10	-48.14	-0.031867		
	20	-21.56	-0.015300		
	30	-40.91	-0.026429		
	40	-29.31	-0.019025		
	50	-8.40	-0.004586		
Voltage					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	21.47	0.012304	Within authorized band for Band 66	Pass
	3.85	25.42	0.014567		
	4.24	-13.92	-0.007977		
16QAM					
25	3.50	17.06	0.009165	Within authorized band for Band 66	Pass
	3.85	27.72	0.014216		
	4.24	-13.39	-0.011749		
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.					

Appendix G: Modulation Characteristics

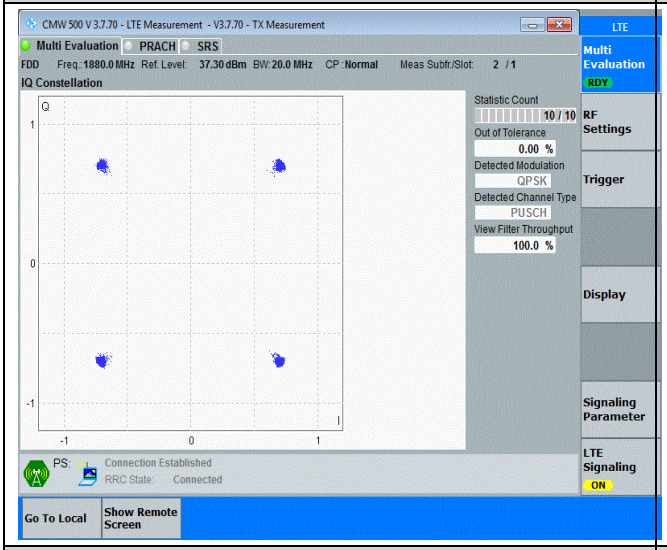
Test Result

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
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

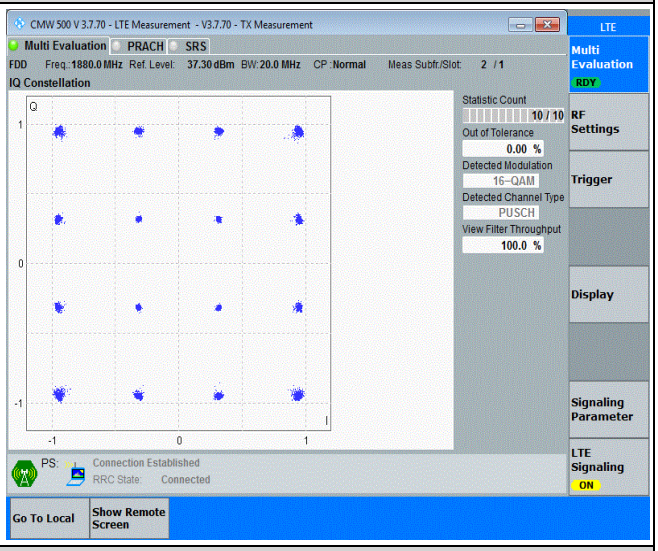
Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.

Test Graphs

Band2-20MHz-QPSK-18900-100RB#0



Band2-20MHz-16QAM-18900-100RB#0



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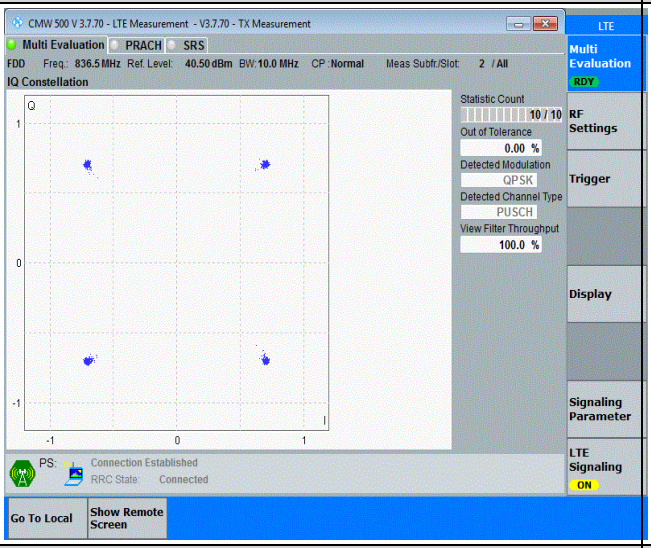
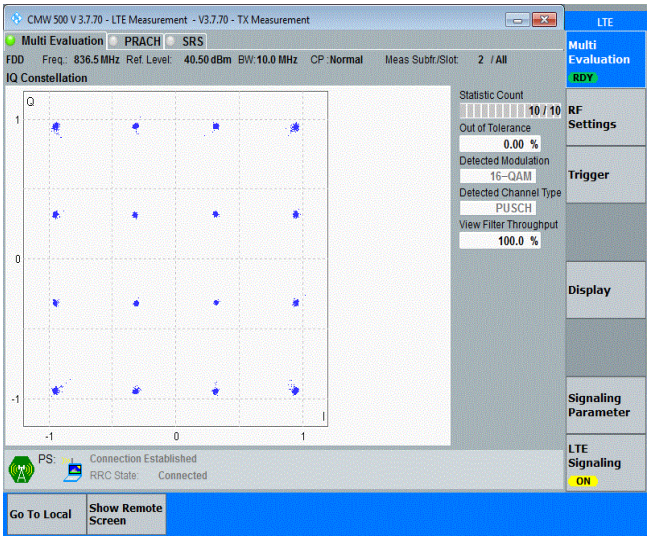
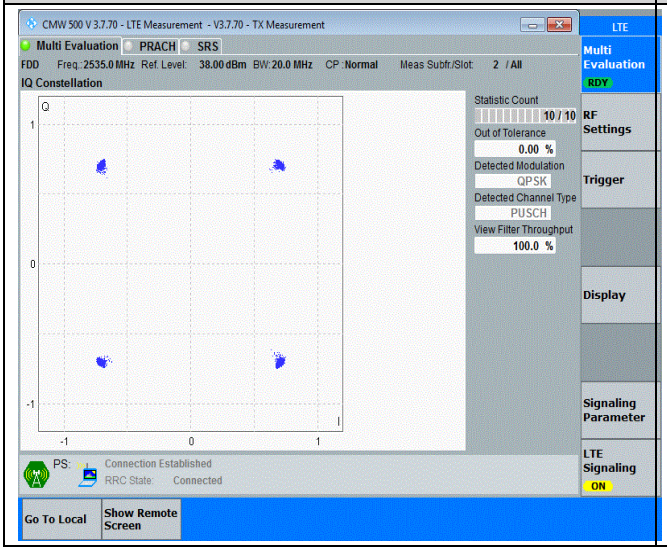


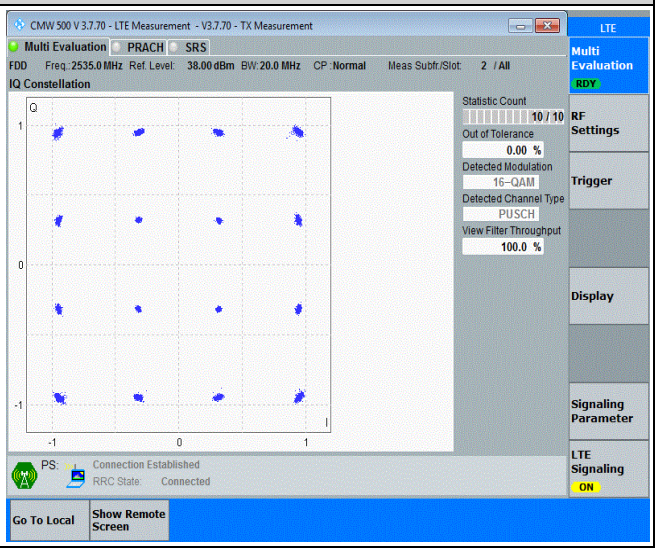
Band5-10MHz-16QAM-20525-50RB#0



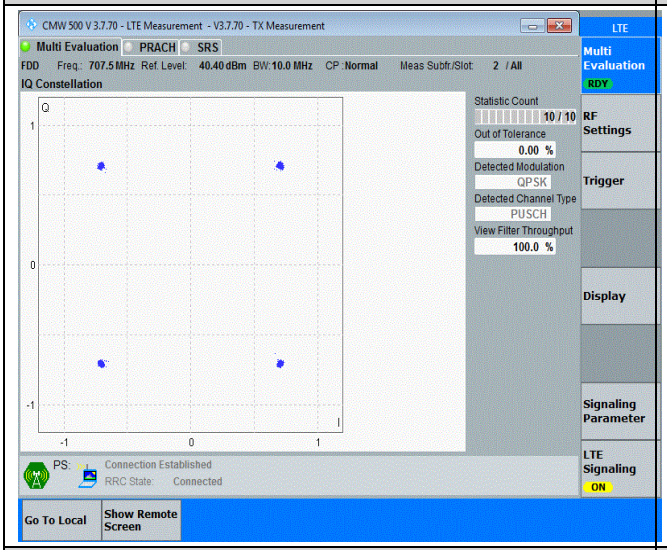
Band7-20MHz-QPSK-21100-100RB#0



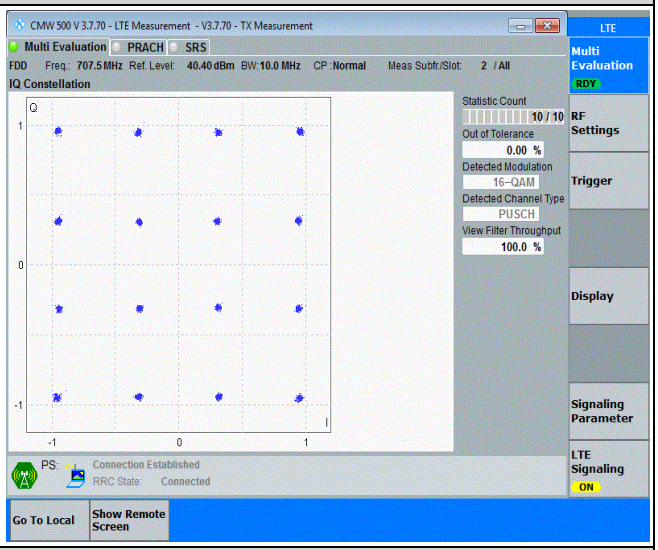
Band7-20MHz-16QAM-21100-100RB#0



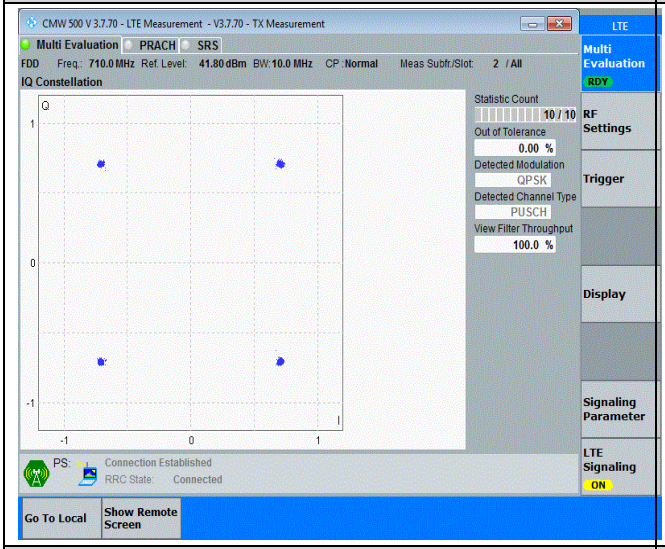
Band12-10MHz-QPSK-23095-50RB#0



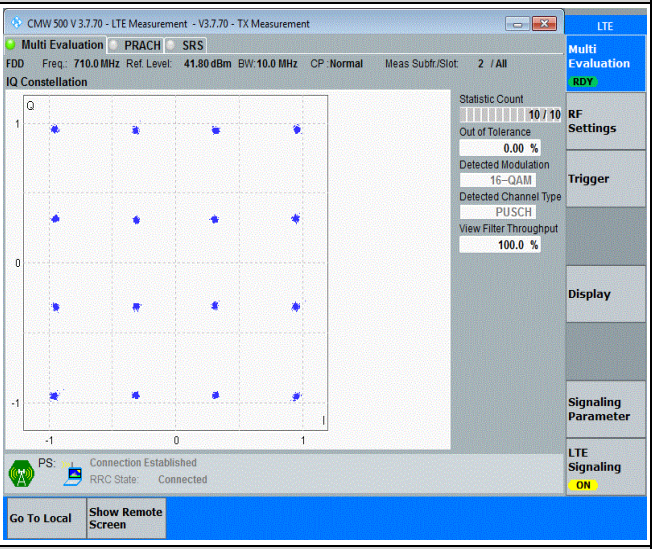
Band12-10MHz-16QAM-23095-50RB#0



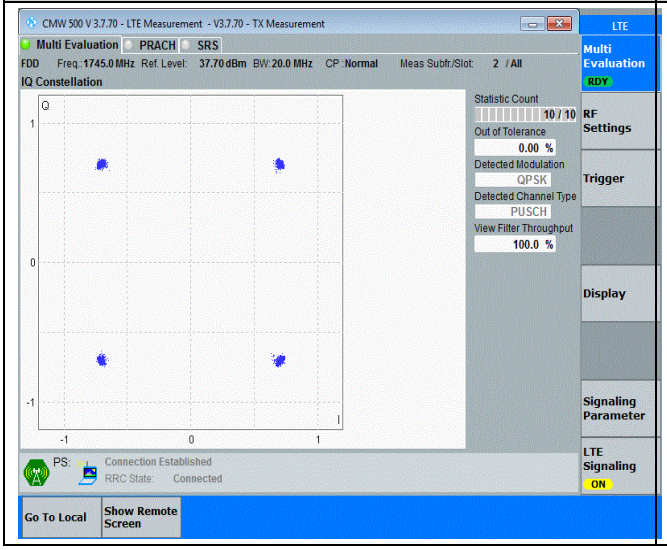
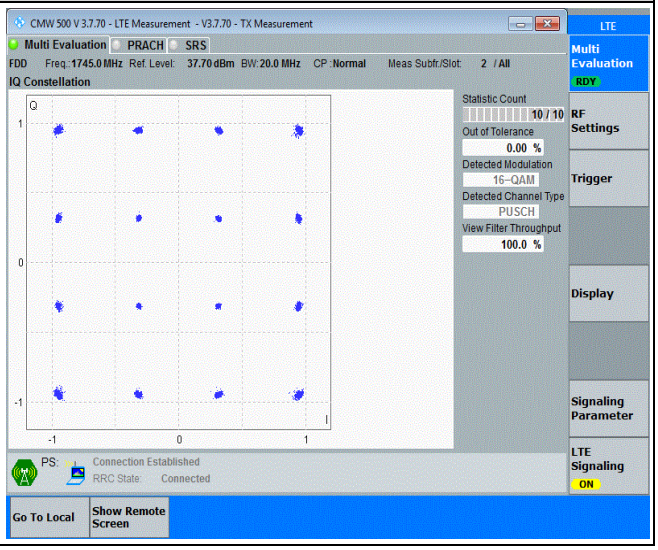
Band17-10MHz-QPSK-23790-50RB#0



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



Band66-20MHz-QPSK-132322-100RB#0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