

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					
3.91	-30	4.16	0.002213	Within authorized band for Band 2	Pass
	-20	5.87	0.003122		
	-10	-5.87	-0.003122		
	0	-6.12	-0.003255		
	10	-4.52	-0.002404		
	20	-6.58	-0.003500		
	30	15.36	0.008170		
	40	-9.37	-0.004984		
	50	-11.52	-0.006128		
16QAM					
3.91	-30	-5.82	-0.003096	Within authorized band for Band 2	Pass
	-20	-10.00	-0.005319		
	-10	7.17	0.003814		
	0	-9.10	-0.004840		
	10	8.77	0.004665		
	20	-8.04	-0.004277		
	30	-10.01	-0.005324		
	40	8.00	0.004255		
	50	-9.57	-0.005090		
64QAM					
3.91	-30	5.39	0.002867	Within authorized band for Band 2	Pass
	-20	9.66	0.005138		
	-10	11.26	0.005989		
	0	-10.01	-0.005324		
	10	-10.01	-0.005324		
	20	2.70	0.001436		
	30	-9.21	-0.004899		
	40	2.62	0.001394		
	50	-10.47	-0.005569		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-12.04	-0.006404	Within authorized band for Band 2	Pass
	3.91	9.37	0.004984		
	4.50	-7.50	-0.003989		
16QAM					
25	3.45	-3.86	-0.002053	Within authorized band for Band 2	Pass
	3.91	9.80	0.005213		
	4.50	-11.00	-0.005851		
64QAM					
25	3.45	-6.14	-0.003266	Within authorized band for Band 2	Pass
	3.91	-9.94	-0.005287		
	4.50	-10.69	-0.005686		
<i>Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.</i>					

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					
3.91	-30	7.61	0.004392	Within authorized band for Band 4	Pass
	-20	-8.97	-0.005177		
	-10	5.15	0.002973		
	0	9.74	0.005622		
	10	4.06	0.002343		
	20	8.64	0.004987		
	30	3.42	0.001974		
	40	-8.80	-0.005079		
	50	10.30	0.005945		
16QAM					
3.91	-30	7.80	0.004502	Within authorized band for Band 4	Pass
	-20	8.24	0.004756		
	-10	4.09	0.002361		
	0	3.83	0.002211		
	10	-14.53	-0.008387		
	20	-9.38	-0.005414		
	30	-12.87	-0.007429		
	40	-12.75	-0.007359		
	50	7.84	0.004525		
64QAM					
3.91	-30	-9.36	-0.005403	Within authorized band for Band 4	Pass
	-20	-5.22	-0.003013		
	-10	-14.69	-0.008479		
	0	-3.30	-0.001905		
	10	-9.17	-0.005293		
	20	-12.12	-0.006996		
	30	-9.63	-0.005558		
	40	6.02	0.003475		
	50	10.01	0.005778		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-7.44	-0.004294	Within authorized band for Band 4	Pass
	3.91	-14.38	-0.008300		
	4.50	8.68	0.005010		
16QAM					
25	3.45	-8.74	-0.005045	Within authorized band for Band 4	Pass
	3.91	-12.50	-0.007215		
	4.50	2.73	0.001576		
64QAM					
25	3.45	-4.99	-0.002880	Within authorized band for Band 4	Pass
	3.91	2.66	0.001535		
	4.50	-13.48	-0.007781		
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					
3.91	-30	-6.27	-0.007496	±2.5	Pass
	-20	-4.96	-0.005929		
	-10	-10.06	-0.012026		
	0	-5.01	-0.005989		
	10	-6.22	-0.007436		
	20	-5.52	-0.006599		
	30	-3.98	-0.004758		
	40	-6.45	-0.007711		
	50	-4.33	-0.005176		
16QAM					
3.91	-30	-3.28	-0.003921	±2.5	Pass
	-20	-5.81	-0.006946		
	-10	-8.43	-0.010078		
	0	-7.97	-0.009528		
	10	-8.20	-0.009803		
	20	-4.66	-0.005571		
	30	-6.09	-0.007280		
	40	-6.02	-0.007197		
	50	-2.17	-0.002594		
64QAM					
3.91	-30	-9.67	-0.011560	±2.5	Pass
	-20	-8.81	-0.010532		
	-10	-4.86	-0.005810		
	0	-9.68	-0.011572		
	10	-9.61	-0.011488		
	20	-5.61	-0.006707		
	30	-8.18	-0.009779		
	40	-2.93	-0.003503		
	50	-8.18	-0.009779		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-1.34	-0.001602	±2.5	Pass
	3.91	2.46	0.002941		
	4.50	-3.66	-0.004375		
16QAM					
25	3.45	-3.19	-0.003814	±2.5	Pass
	3.91	-6.24	-0.007460		
	4.50	-7.62	-0.009109		
64QAM					
25	3.45	4.08	0.004877	±2.5	Pass
	3.91	4.48	0.005356		
	4.50	-9.67	-0.011560		
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					
3.91	-30	-13.59	-0.005361	Within authorized band for Band 7	Pass
	-20	7.77	0.003065		
	-10	6.71	0.002647		
	0	-16.74	-0.006604		
	10	-17.07	-0.006734		
	20	-11.09	-0.004375		
	30	-16.32	-0.006438		
	40	-4.09	-0.001613		
	50	-12.26	-0.004836		
16QAM					
3.91	-30	3.25	0.001282	Within authorized band for Band 7	Pass
	-20	-2.22	-0.000876		
	-10	-7.44	-0.002935		
	0	-12.32	-0.004860		
	10	13.85	0.005464		
	20	6.78	0.002675		
	30	12.37	0.004880		
	40	-11.01	-0.004343		
	50	2.63	0.001037		
64QAM					
3.91	-30	-9.36	-0.003692	Within authorized band for Band 7	Pass
	-20	-3.56	-0.001404		
	-10	-15.61	-0.006158		
	0	11.13	0.004391		
	10	-9.50	-0.003748		
	20	6.49	0.002560		
	30	-14.05	-0.005542		
	40	-9.60	-0.003787		
	50	13.62	0.005373		

Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-13.33	-0.005258	Within authorized band for Band 7	Pass
	3.91	-15.05	-0.005937		
	4.50	-20.50	-0.008087		
16QAM					
25	3.45	18.44	0.007274	Within authorized band for Band 7	Pass
	3.91	-14.29	-0.005637		
	4.50	7.02	0.002769		
64QAM					
25	3.45	-11.76	-0.004639	Within authorized band for Band 7	Pass
	3.91	-5.59	-0.002205		
	4.50	11.70	0.004615		
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		
QPSK					
3.91	-30	6.22	0.002397	Within authorized band for Band 41	Pass
	-20	6.14	0.002366		
	-10	-5.99	-0.002308		
	0	-12.10	-0.004663		
	10	6.09	0.002347		
	20	4.33	0.001669		
	30	-14.31	-0.005514		
	40	-11.24	-0.004331		
	50	-8.84	-0.003407		
16QAM					
3.91	-30	4.86	0.001873	Within authorized band for Band 41	Pass
	-20	-8.45	-0.003256		
	-10	-13.92	-0.005364		
	0	-4.13	-0.001592		
	10	4.19	0.001615		
	20	-6.72	-0.002590		
	30	-5.14	-0.001981		
	40	-5.64	-0.002173		
	50	-10.76	-0.004146		
64QAM					
3.91	-30	-10.01	-0.003857	Within authorized band for Band 41	Pass
	-20	-3.50	-0.001349		
	-10	-8.87	-0.003418		
	0	-5.91	-0.002277		
	10	-5.34	-0.002058		
	20	-10.71	-0.004127		
	30	5.42	0.002089		
	40	6.04	0.002328		
	50	-5.35	-0.002062		

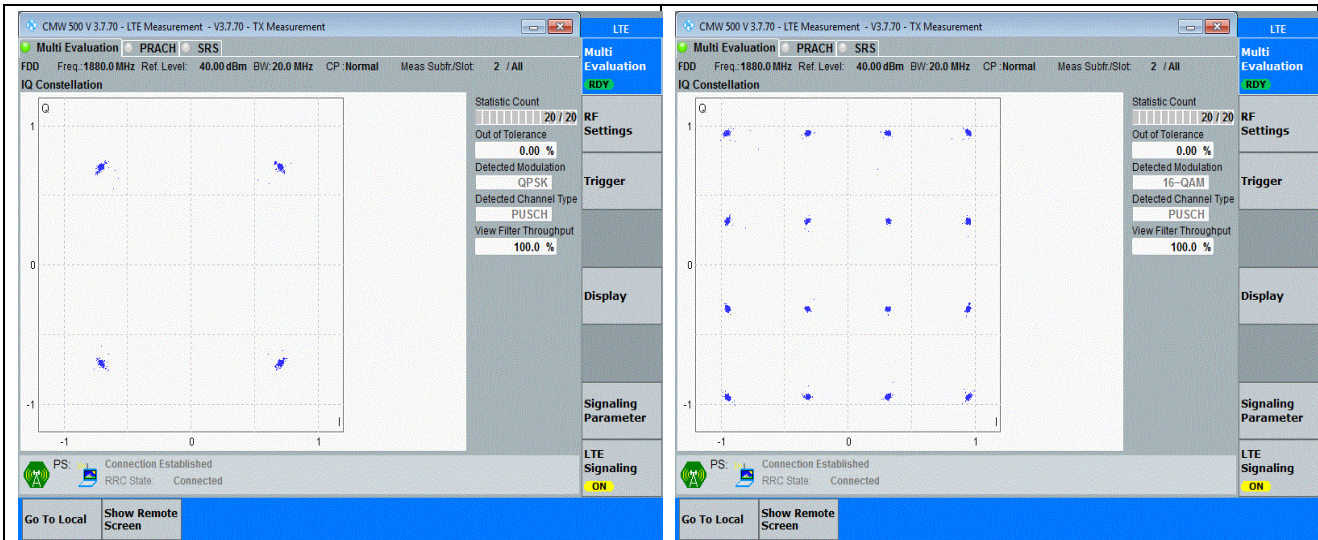
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.45	-9.81	-0.003780	Within authorized band for Band 41	Pass
	3.91	-17.34	-0.006682		
	4.50	-9.26	-0.003568		
16QAM					
25	3.45	-3.96	-0.001526	Within authorized band for Band41	Pass
	3.91	-4.61	-0.001776		
	4.50	-6.67	-0.002570		
64QAM					
25	3.45	-11.50	-0.004432	Within authorized band for Band41	Pass
	3.91	-6.21	-0.002393		
	4.50	-10.13	-0.003904		
<i>Remark: All bandwidth and all modulation had been tested, but only the worst case data displayed in this report.</i>					

Appendix G: Modulation Characteristics

Test Result

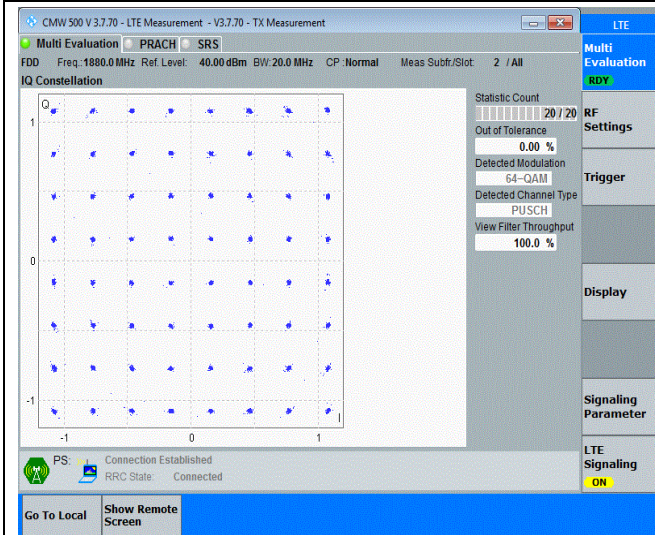
Band	Bandwidth	Modulation	Channel	RB Configuration	Verdict
Band2	20MHz	QPSK	18900	100RB#0	PASS
Band2	20MHz	16QAM	18900	100RB#0	PASS
Band2	20MHz	64QAM	18900	100RB#0	PASS
Band4	20MHz	QPSK	20175	100RB#0	PASS
Band4	20MHz	16QAM	20175	100RB#0	PASS
Band4	20MHz	64QAM	20175	100RB#0	PASS
Band5	10MHz	QPSK	20525	50RB#0	PASS
Band5	10MHz	16QAM	20525	50RB#0	PASS
Band5	10MHz	64QAM	20525	50RB#0	PASS
Band7	20MHz	QPSK	21100	100RB#0	PASS
Band7	20MHz	16QAM	21100	100RB#0	PASS
Band7	20MHz	64QAM	21100	100RB#0	PASS
41(2535-2655)	20MHz	QPSK	40640	100RB#0	PASS
41(2535-2655)	20MHz	16QAM	40640	100RB#0	PASS
41(2535-2655)	20MHz	64QAM	40640	100RB#0	PASS

Test Graphs

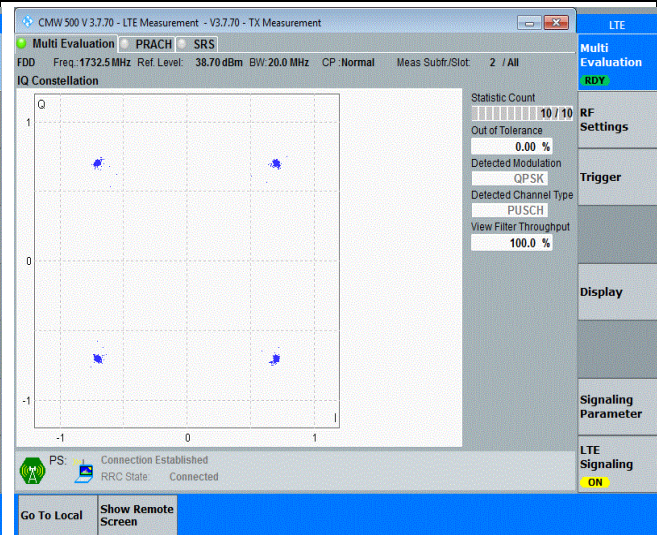


Band2-20MHz-QPSK-18900-100RB#0-PASS

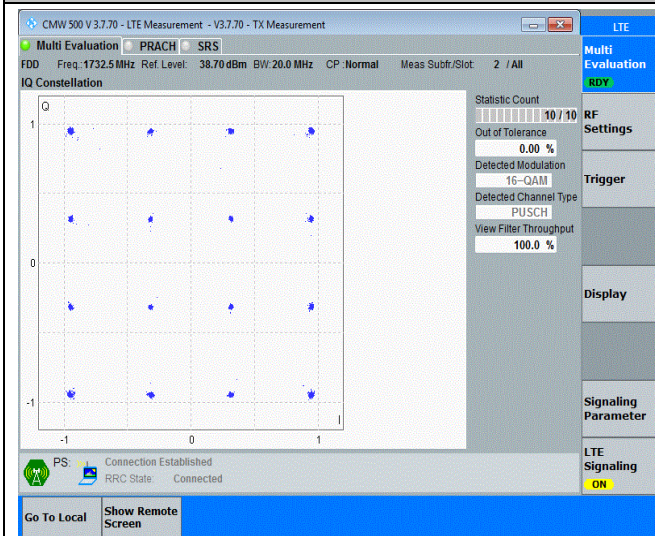
Band2-20MHz-16QAM-18900-100RB#0-PASS



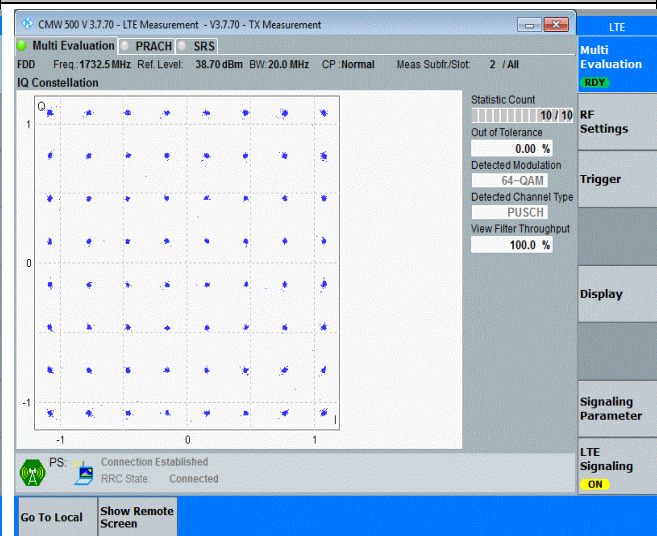
Band2-20MHz-64QAM-18900-100RB#0-PASS



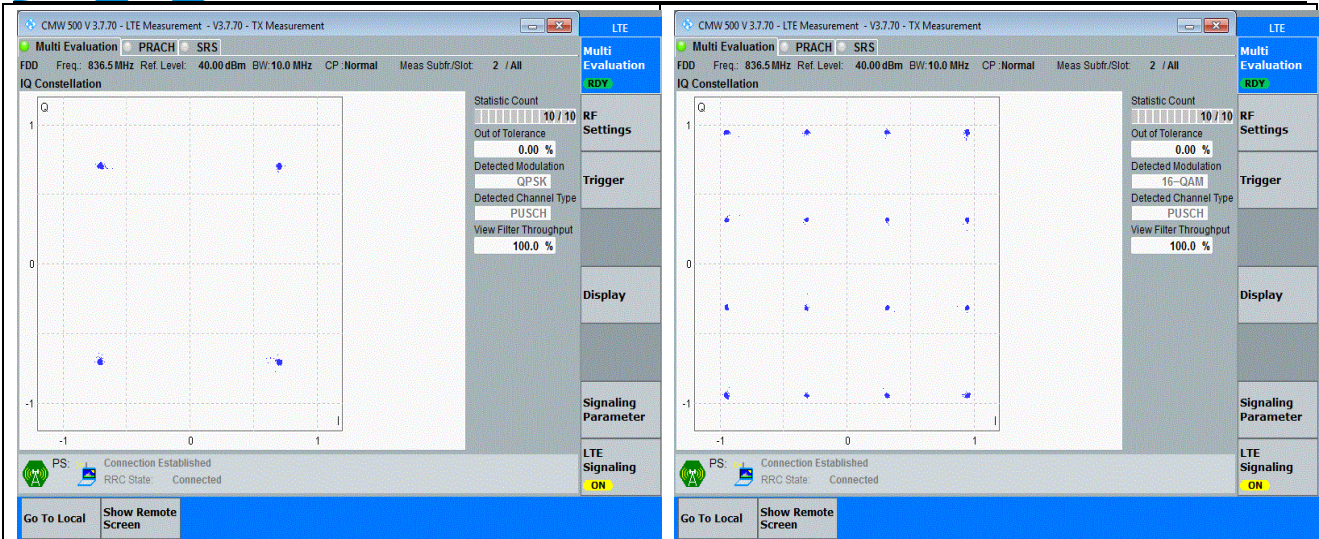
Band4-20MHz-QPSK-20175-100RB#0-PASS



Band4-20MHz-16QAM-20175-100RB#0-PASS

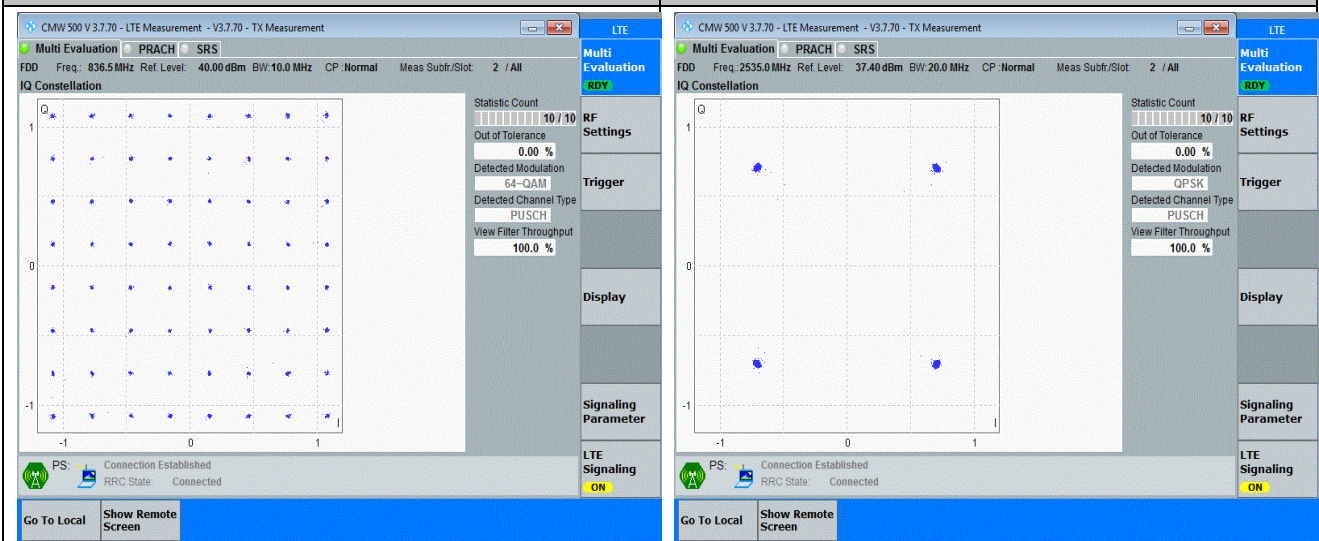


Band4-20MHz-64QAM-20175-100RB#0-PASS



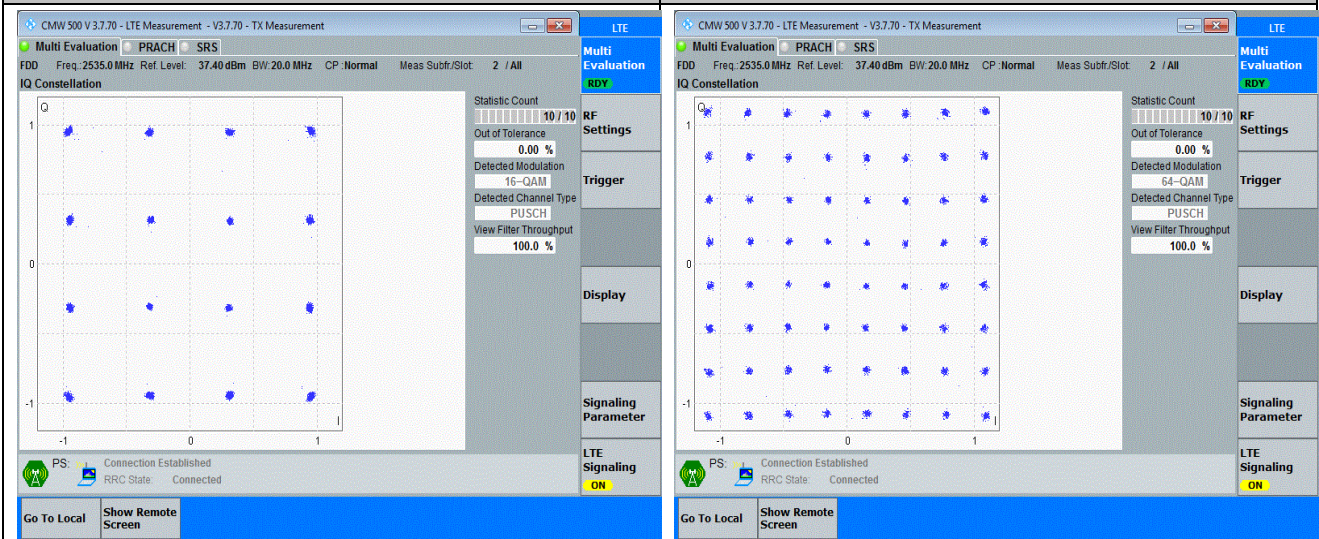
Band5-10MHz-QPSK-20525-50RB#0-PASS

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



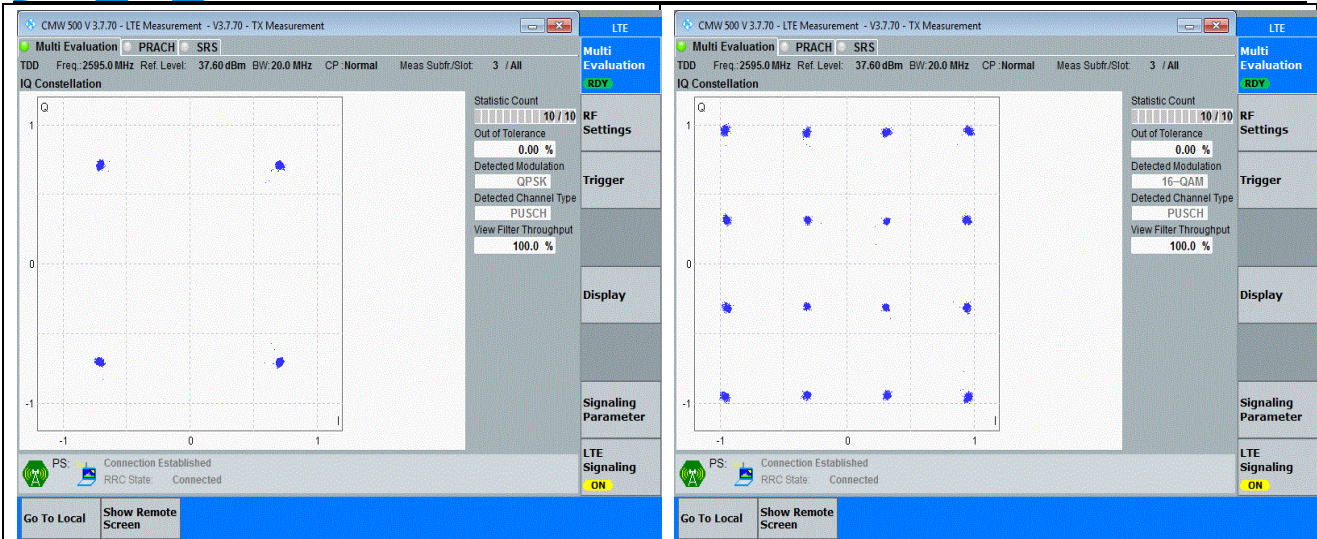
Band5-10MHz-64QAM-20525-50RB#0-PASS

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



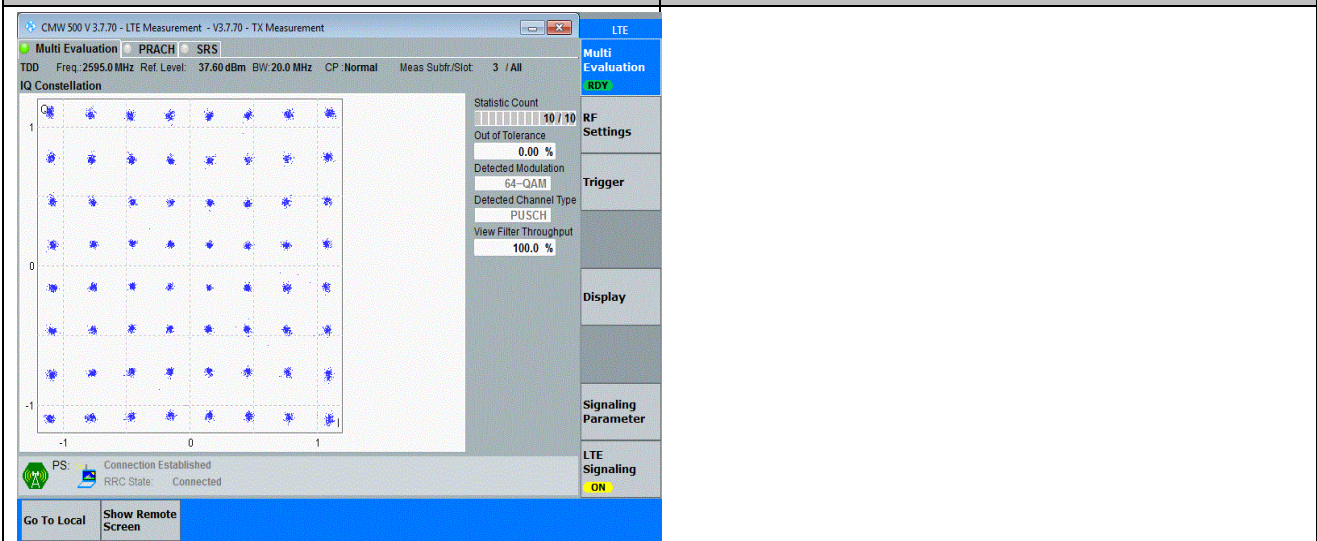
Band7-20MHz-16QAM-21100-100RB#0-PASS

Band7-20MHz-64QAM-21100-100RB#0-PASS



41(2535-2655)-20MHz-QPSK-40640-100RB#0-PASS

41(2535-2655)-20MHz-16QAM-40640-100RB#0-PASS



41(2535-2655)-20MHz-64QAM-40640-100RB#0-PASS