

## 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	-46.59	-0.026892	Within authorized band for Band 4	Pass
	-20	-29.17	-0.016837		
	-10	-39.28	-0.022672		
	0	-14.51	-0.008375		
	10	-19.96	-0.011521		
	20	-31.81	-0.018361		
	30	-5.61	-0.003238		
	40	-13.22	-0.007631		
	50	-18.54	-0.010701		
16QAM					
3.85	-30	15.19	0.008768	Within authorized band for Band 4	Pass
	-20	17.19	0.009922		
	-10	26.19	0.015117		
	0	27.74	0.016012		
	10	21.97	0.012681		
	20	18.78	0.010840		
	30	15.64	0.009027		
	40	23.67	0.013662		
	50	24.72	0.014268		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	12.66	0.007307	Within authorized band for Band 4	Pass
	3.85	21.03	0.012139		
	4.40	-17.92	-0.010343		
16QAM					
25	3.50	-12.33	-0.007117	Within authorized band for Band 4	Pass
	3.85	-25.73	-0.014851		
	4.40	6.90	0.003983		

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	26.35	0.031500	±2.5	Pass
	-20	19.64	0.023479		
	-10	18.42	0.022020		
	0	17.14	0.020490		
	10	15.72	0.018793		
	20	14.36	0.017167		
	30	14.96	0.017884		
	40	13.35	0.015959		
	50	12.25	0.014644		
16QAM					
3.85	-30	36.42	0.043539	±2.5	Pass
	-20	36.94	0.044160		
	-10	43.23	0.051680		
	0	44.90	0.053676		
	10	43.97	0.052564		
	20	3.58	0.004280		
	30	-2.89	-0.003455		
	40	3.49	0.004172		
	50	3.62	0.004328		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	29.84	0.035672	±2.5	Pass
	3.85	29.44	0.035194		
	4.40	22.90	0.027376		
16QAM					
25	3.50	20.83	0.024901	±2.5	Pass
	3.85	14.98	0.017908		
	4.40	31.64	0.037824		

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	-14.72	-0.005807	Within authorized band for Band 7	Pass
	-20	-22.32	-0.008805		
	-10	-19.74	-0.007787		
	0	-22.70	-0.008955		
	10	-20.87	-0.008233		
	20	-22.54	-0.008892		
	30	-25.78	-0.010170		
	40	-30.93	-0.012201		
	50	-25.26	-0.009964		
16QAM					
3.85	-30	25.89	0.010213	Within authorized band for Band 7	Pass
	-20	33.73	0.013306		
	-10	14.05	0.005542		
	0	32.74	0.012915		
	10	39.78	0.015692		
	20	40.68	0.016047		
	30	45.09	0.017787		
	40	-5.78	-0.002280		
	50	10.49	0.004138		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	47.34	0.018675	Within authorized band for Band 7	Pass
	3.85	29.51	0.011641		
	4.40	49.91	0.019688		
16QAM					
25	3.50	-21.86	-0.008623	Within authorized band for Band 7	Pass
	3.85	-26.79	-0.010568		
	4.40	9.91	0.003909		

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					
3.85	-30	7.02	0.009922	Within authorized band for Band 12	Pass
	-20	6.08	0.008594		
	-10	1.52	0.002148		
	0	1.30	0.001837		
	10	-1.24	-0.001753		
	20	-3.48	-0.004919		
	30	-5.58	-0.007887		
	40	-7.84	-0.011081		
	50	-9.11	-0.012876		
16QAM					
3.85	-30	8.97	0.012678	Within authorized band for Band 12	Pass
	-20	14.62	0.020664		
	-10	21.66	0.030615		
	0	31.04	0.043873		
	10	37.38	0.052834		
	20	38.98	0.055095		
	30	45.36	0.064113		
	40	42.96	0.060721		
	50	41.61	0.058813		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	20.83	0.029442	Within authorized band for Band 12	Pass
	3.85	28.02	0.039604		
	4.40	13.15	0.018587		
16QAM					
25	3.50	-4.86	-0.006869	Within authorized band for Band 12	Pass
	3.85	-8.38	-0.011845		
	4.40	6.17	0.008721		

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

LTE Band 13 part:

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					
3.85	-30	-47.97	-0.061343	Within authorized band for Band 13	Pass
	-20	1.46	0.001867		
	-10	-8.47	-0.010831		
	0	-7.31	-0.009348		
	10	-9.10	-0.011637		
	20	-15.34	-0.019616		
	30	-19.61	-0.025077		
	40	-19.25	-0.024616		
	50	-21.51	-0.027506		
16QAM					
3.85	-30	-9.90	-0.012660	Within authorized band for Band 13	Pass
	-20	-5.25	-0.006714		
	-10	2.05	0.002621		
	0	1.32	0.001688		
	10	-3.00	-0.003836		
	20	-2.92	-0.003734		
	30	2.85	0.003645		
	40	-3.95	-0.005051		
	50	-3.79	-0.004847		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-25.23	-0.032263	Within authorized band for Band 13	Pass
	3.85	-22.82	-0.029182		
	4.40	-39.04	-0.049923		
16QAM					
25	3.50	-20.61	-0.026355	Within authorized band for Band 13	Pass
	3.85	-21.72	-0.027775		
	4.40	-12.87	-0.016458		

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					
3.85	-30	5.68	0.008000	Within authorized band for Band 17	Pass
	-20	4.88	0.006873		
	-10	4.26	0.006000		
	0	-9.08	-0.012789		
	10	-15.38	-0.021662		
	20	-7.81	-0.011000		
	30	-13.35	-0.018803		
	40	-10.31	-0.014521		
	50	-10.49	-0.014775		
16QAM					
3.85	-30	8.97	0.012634	Within authorized band for Band 17	Pass
	-20	10.70	0.015070		
	-10	11.10	0.015634		
	0	17.95	0.025282		
	10	21.97	0.030944		
	20	25.33	0.035676		
	30	27.45	0.038662		
	40	32.16	0.045296		
	50	39.05	0.055000		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	15.88	0.022366	Within authorized band for Band 17	Pass
	3.85	15.86	0.022338		
	4.40	11.90	0.016761		
16QAM					
25	3.50	-4.52	-0.006366	Within authorized band for Band 17	Pass
	3.85	-10.81	-0.015225		
	4.40	3.16	0.004451		

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	-19.15	-0.007380	Within authorized band for Band 38	Pass
	-20	-14.42	-0.005557		
	-10	-49.24	-0.018975		
	0	-34.16	-0.013164		
	10	-40.84	-0.015738		
	20	-41.71	-0.016073		
	30	-44.37	-0.017098		
	40	13.95	0.005376		
	50	24.03	0.009260		
16QAM					
3.85	-30	-13.39	-0.005160	Within authorized band for Band 38	Pass
	-20	15.12	0.005827		
	-10	27.04	0.010420		
	0	42.49	0.016374		
	10	36.54	0.014081		
	20	49.92	0.019237		
	30	-7.28	-0.002805		
	40	18.64	0.007183		
	50	23.09	0.008898		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	-16.95	-0.006532	Within authorized band for Band 38	Pass
	3.85	-7.34	-0.002829		
	4.40	-42.96	-0.016555		
16QAM					
25	3.50	24.19	0.009322	Within authorized band for Band 38	Pass
	3.85	16.75	0.006455		
	4.40	38.48	0.014829		

*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 (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.85	-30	-9.66	-0.005536	Within authorized band for Band 66	Pass
	-20	-7.07	-0.004052		
	-10	-9.91	-0.005679		
	0	6.57	0.003765		
	10	-5.74	-0.003289		
	20	-13.18	-0.007553		
	30	-12.10	-0.006934		
	40	14.48	0.008298		
	50	7.84	0.004493		
16QAM					
3.85	-30	40.51	0.023215	Within authorized band for Band 66	Pass
	-20	43.73	0.025060		
	-10	-9.57	-0.005484		
	0	7.88	0.004516		
	10	11.67	0.006688		
	20	16.19	0.009278		
	30	7.10	0.004069		
	40	33.95	0.019456		
	50	27.44	0.015725		
Voltage					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	3.50	19.98	0.011450	Within authorized band for Band 66	Pass
	3.85	44.35	0.025415		
	4.40	15.82	0.009066		
16QAM					
25	3.50	7.40	0.004241	Within authorized band for Band 66	Pass
	3.85	-6.71	-0.003845		
	4.40	27.62	0.015828		

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



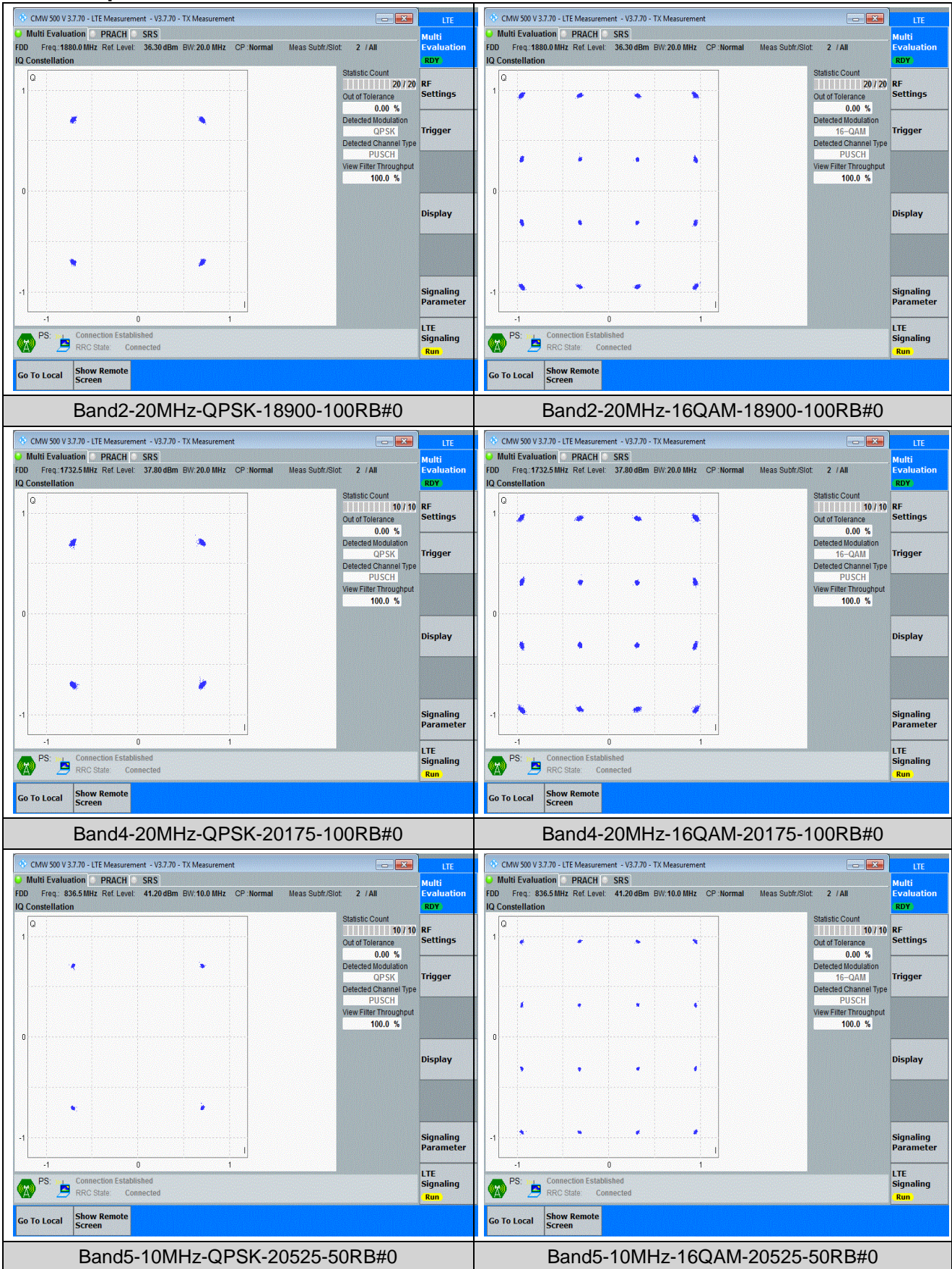
## Appendix G: Modulation Characteristics

### Test Result

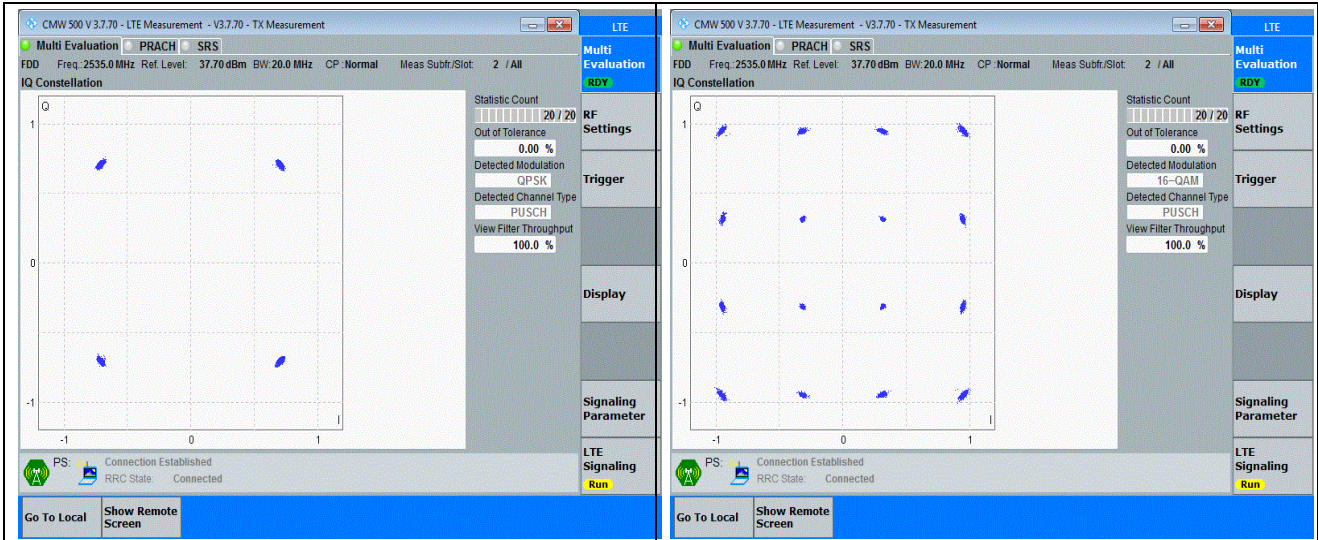
Band	Bandwidth	Modulation	Channel	RB Configuration	Result	Verdict
Band2	20MHz	QPSK	18900	100RB#0	PASS	PASS
Band2	20MHz	16QAM	18900	100RB#0	PASS	PASS
Band4	20MHz	QPSK	20175	100RB#0	PASS	PASS
Band4	20MHz	16QAM	20175	100RB#0	PASS	PASS
Band5	10MHz	QPSK	20525	50RB#0	PASS	PASS
Band5	10MHz	16QAM	20525	50RB#0	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
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
Band38	20MHz	QPSK	38000	100RB#0	PASS	PASS
Band38	20MHz	16QAM	38000	100RB#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

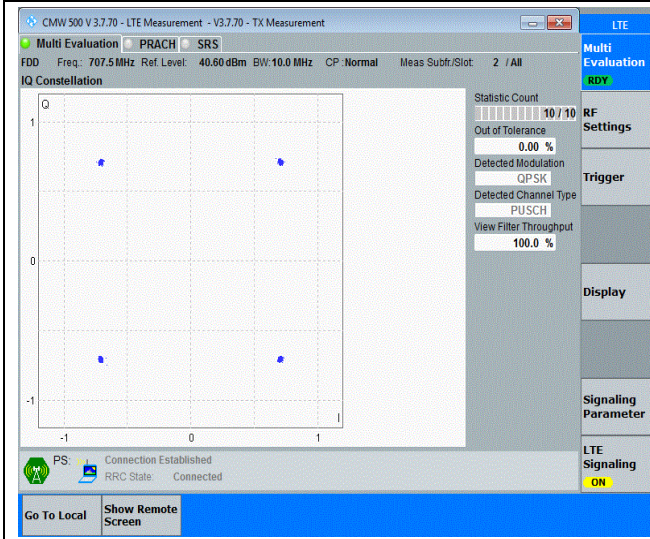




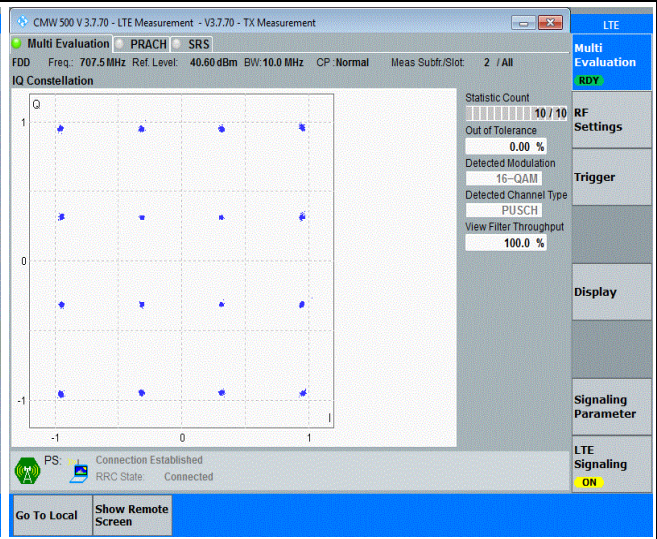


Band7-20MHz-QPSK-21100-100RB#0

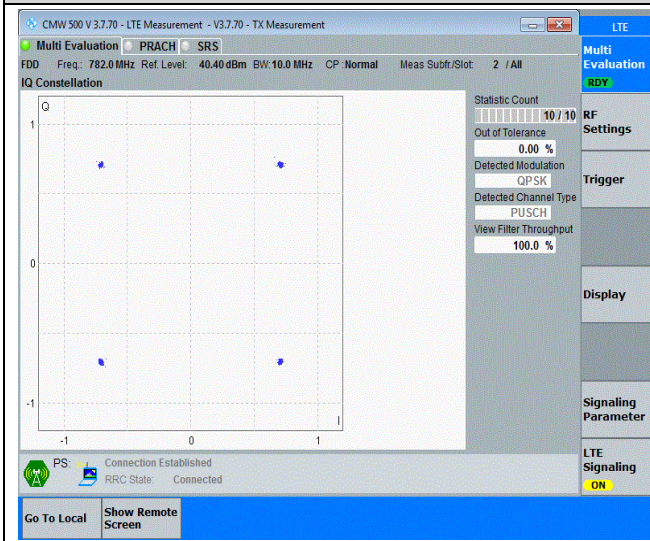
Band7-20MHz-16QAM-21100-100RB#0



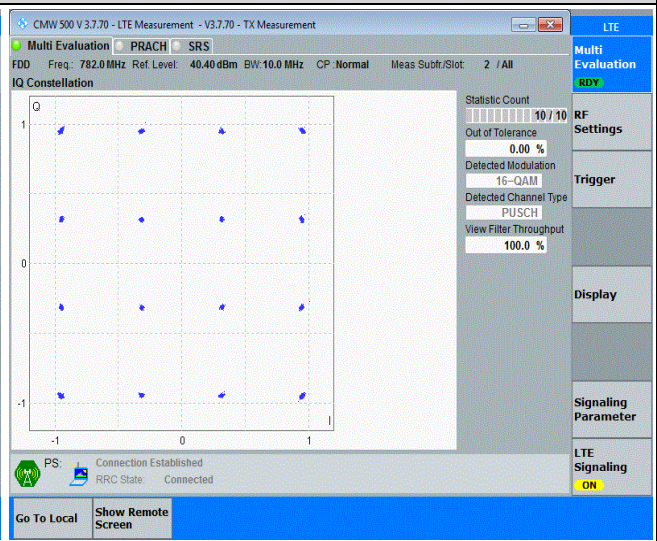
Band12-10MHz-QPSK-23095-50RB#0



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

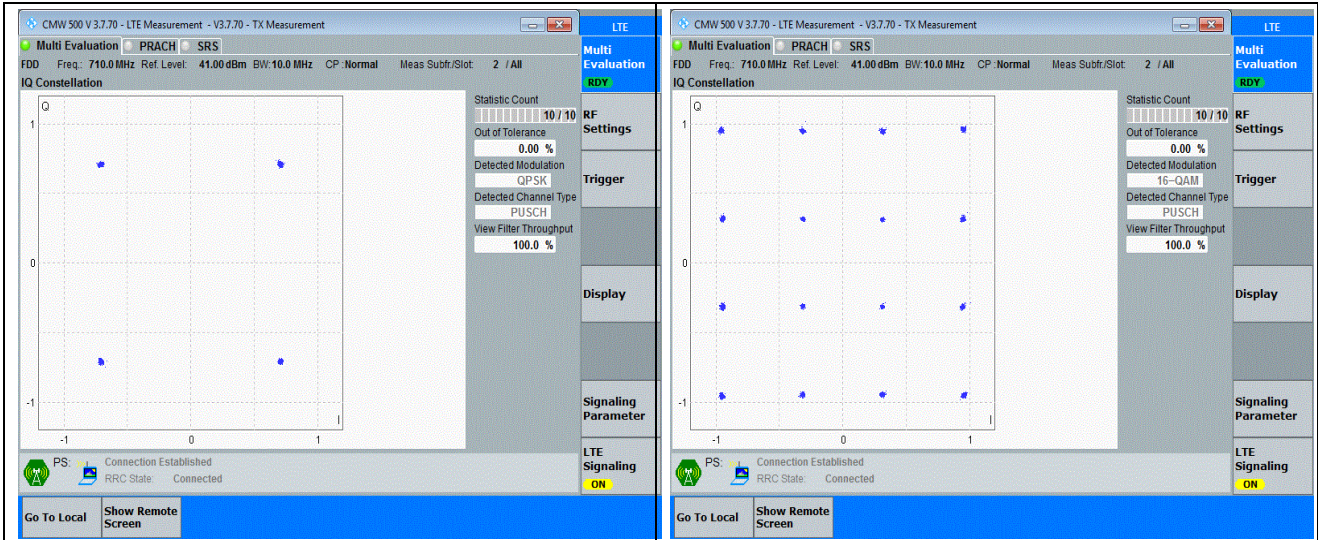


Band13-10MHz-QPSK-23230-50RB#0



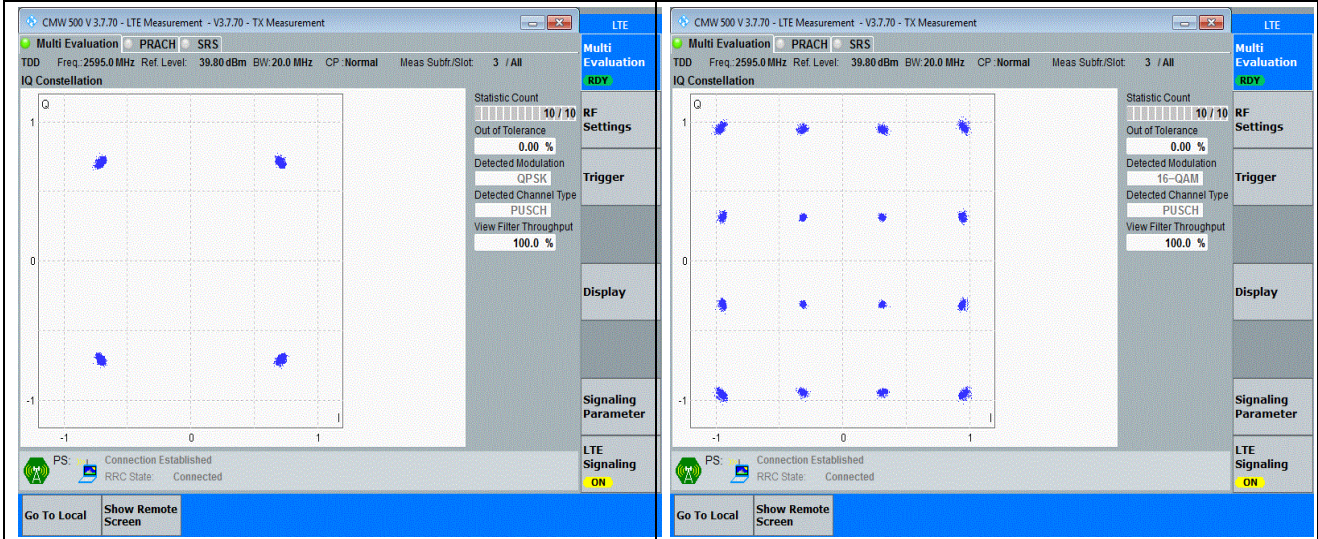
Band13-10MHz-16QAM-23230-50RB#0





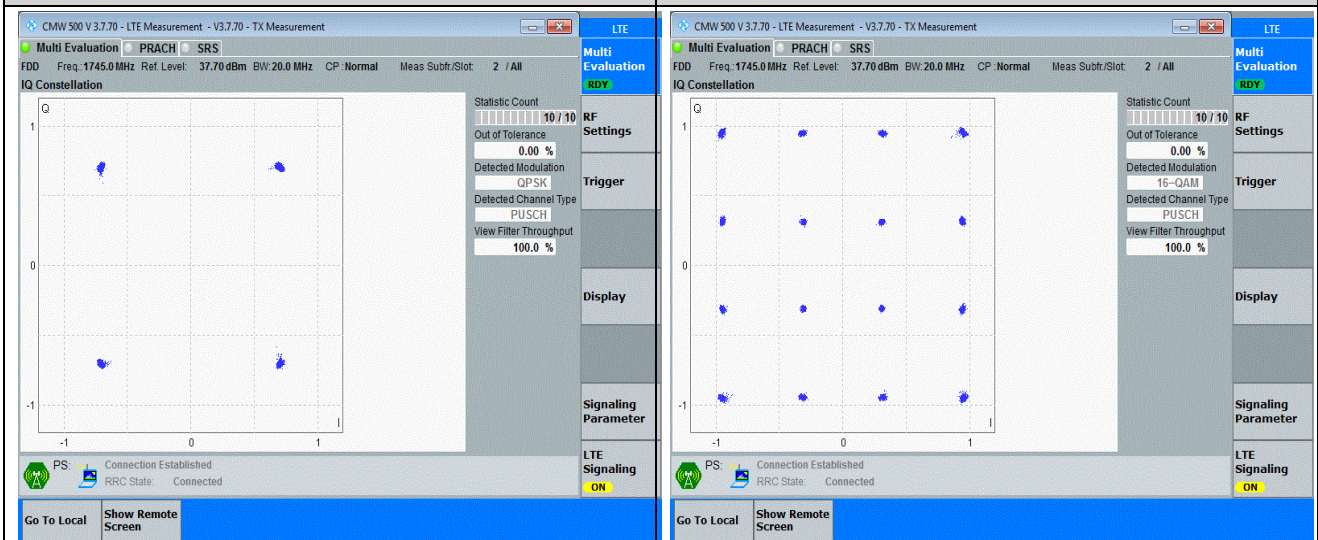
Band17-10MHz-QPSK-23790-50RB#0

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



Band38-20MHz-QPSK-38000-100RB#0

Band38-20MHz-16QAM-38000-100RB#0



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

Band66-20MHz-16QAM-132322-100RB#0