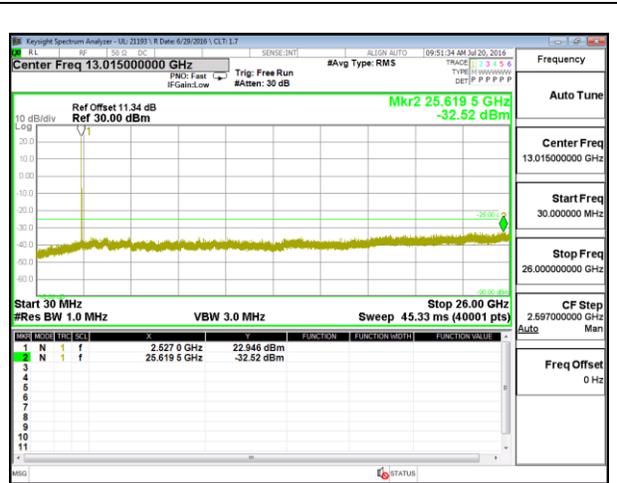


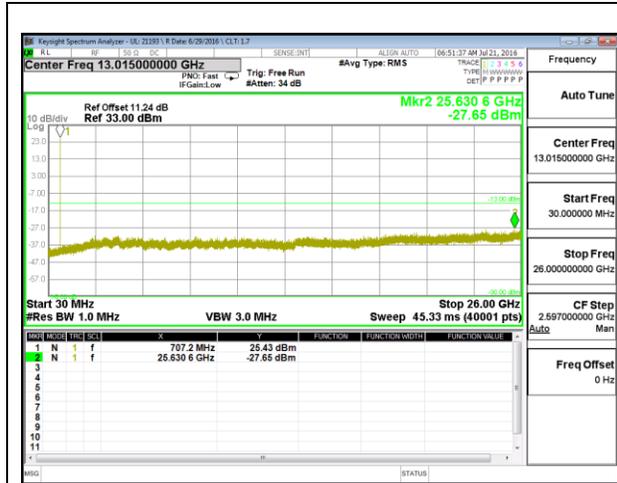
LTE B7 20MHz QPSK Middle Channel



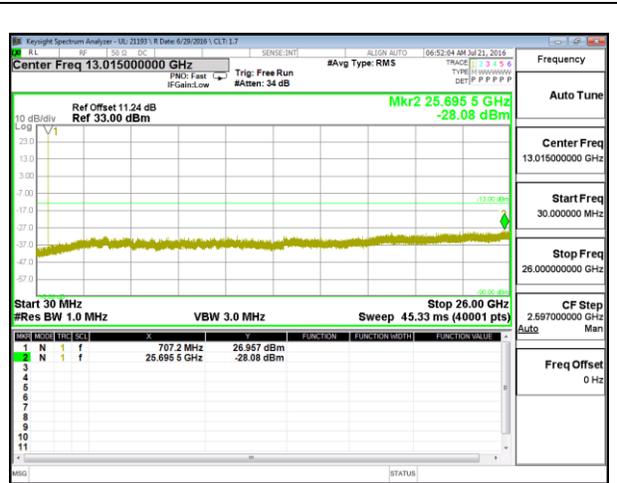
LTE B7 20MHz 16QAM Middle Channel

**LTE Band 12**

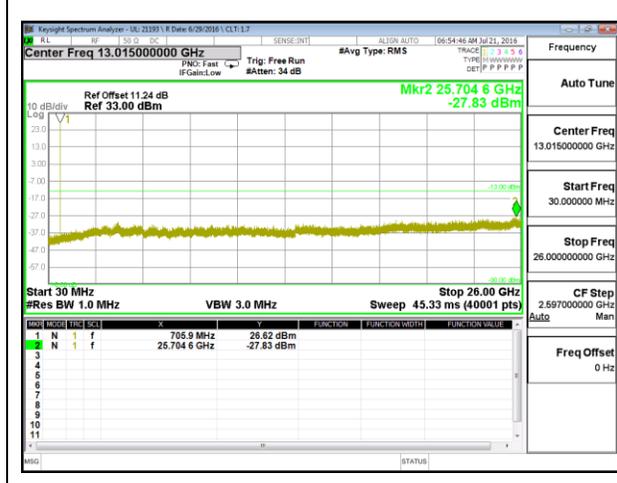
BW(MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
1.4	QPSK	699.7	-28.37	-13	-15.37
		707.5	-27.65	-13	-14.65
		715.3	-28.71	-13	-15.71
	16QAM	699.7	-27.68	-13	-14.68
		707.5	-28.08	-13	-15.08
		715.3	-28.01	-13	-15.01
3	QPSK	700.5	-27.72	-13	-14.72
		707.5	-27.83	-13	-14.83
		714.5	-28.27	-13	-15.27
	16QAM	700.5	-28.36	-13	-15.36
		707.5	-28.2	-13	-15.2
		714.5	-28.82	-13	-15.82
5	QPSK	701.5	-27.09	-13	-14.09
		707.5	-28.13	-13	-15.13
		713.5	-28.38	-13	-15.38
	16QAM	701.5	-27.51	-13	-14.51
		707.5	-28.53	-13	-15.53
		713.5	-27.35	-13	-14.35
10	QPSK	704	-28.24	-13	-15.24
		707.5	-27.93	-13	-14.93
		711	-27.42	-13	-14.42
	16QAM	704	-27.87	-13	-14.87
		707.5	-27.78	-13	-14.78
		711	-28.13	-13	-15.13



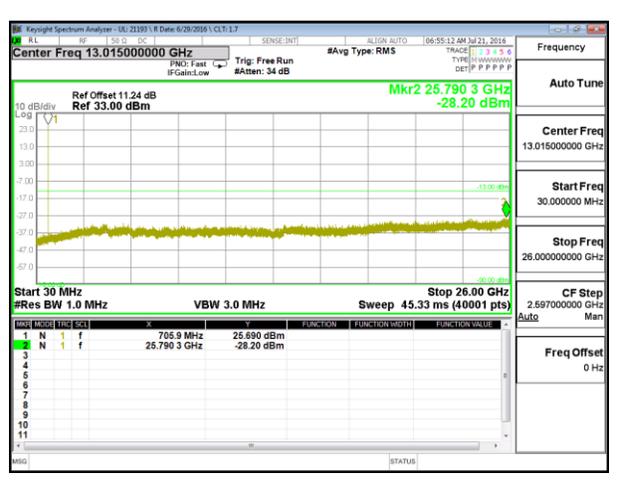
LTE B12 1.4MHz QPSK Middle Channel



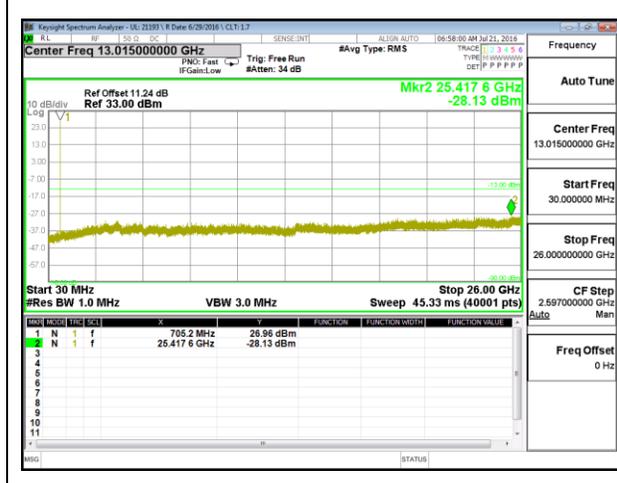
LTE B12 1.4MHz 16QAM Middle Channel



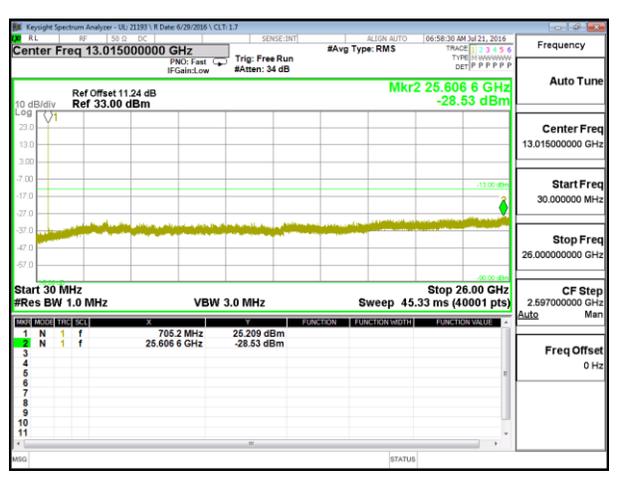
LTE B12 3MHz QPSK Middle Channel



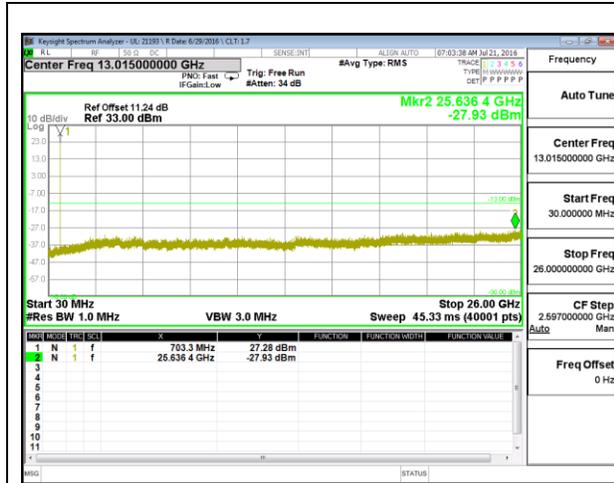
LTE B12 3MHz 16QAM Middle Channel



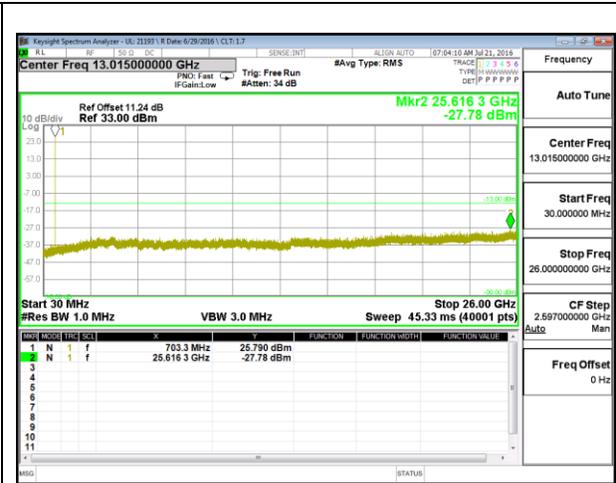
LTE B12 5MHz QPSK Middle Channel



LTE B12 5MHz 16QAM Middle Channel



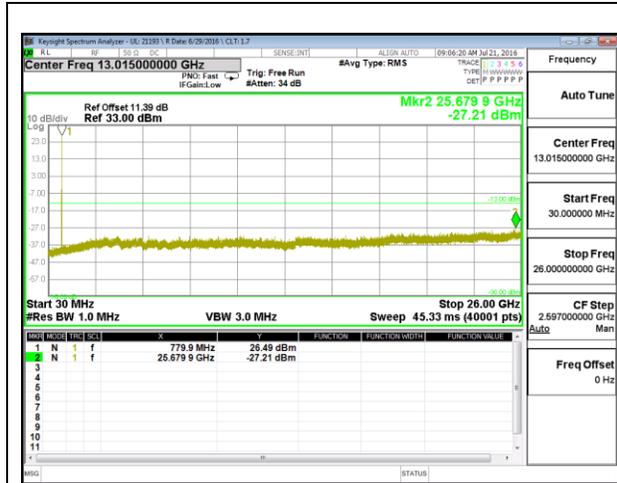
LTE B12 10MHz QPSK Middle Channel



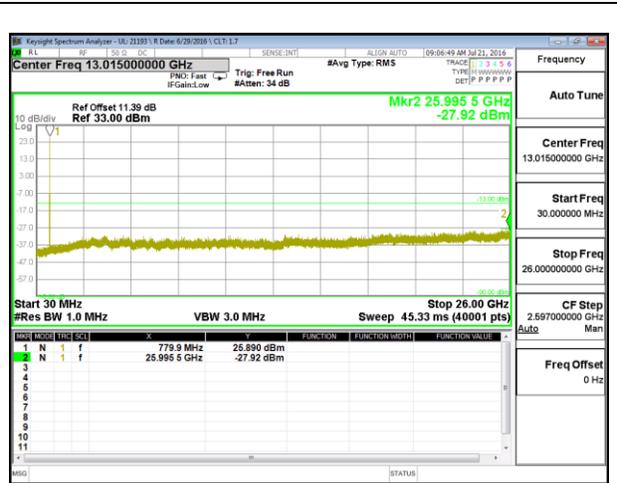
LTE B12 10MHz 16QAM Middle Channel

**LTE Band 13**

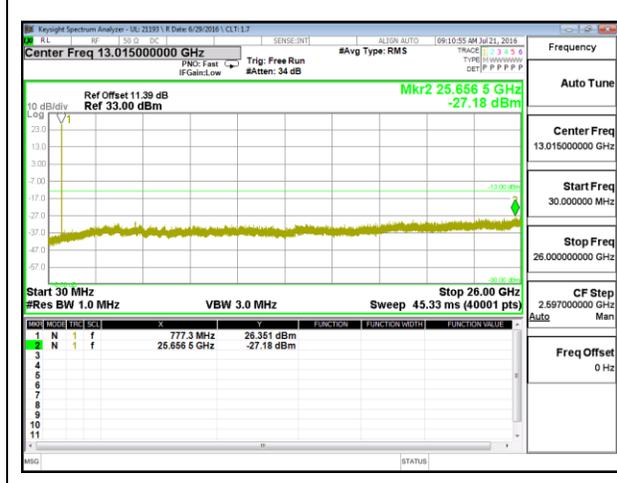
BW(MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
5	QPSK	779.5	-27.45	-13	-14.45
		782	-27.21	-13	-14.21
		784.5	-27.45	-13	-14.45
	16QAM	779.5	-27.57	-13	-14.57
		782	-27.92	-13	-14.92
		784.5	-28.31	-13	-15.31
10	QPSK	782	-27.92	-13	-14.92
		782	-27.97	-13	-14.97
		782	-27.18	-13	-14.18
	16QAM	782	-28.18	-13	-15.18
		782	-28.37	-13	-15.37
		782	-28.11	-13	-15.11



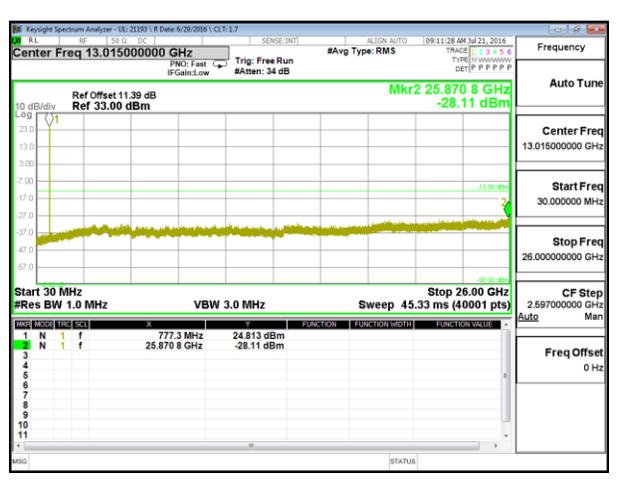
LTE B13 5MHz QPSK Middle Channel



LTE B13 5MHz 16QAM Middle Channel



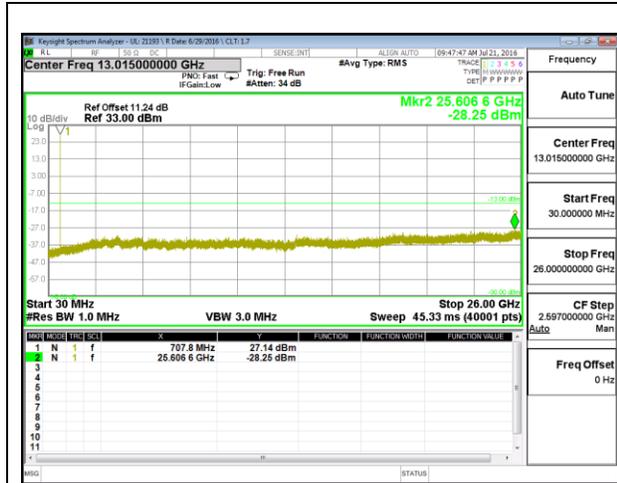
LTE B13 10MHz QPSK Middle Channel



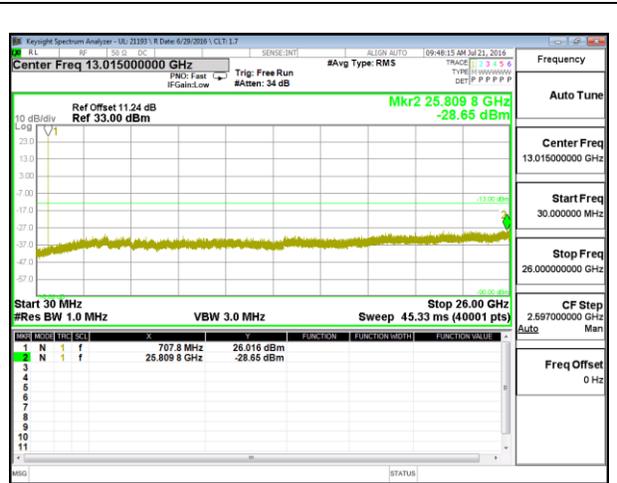
LTE B13 10MHz 16QAM Middle Channel

**LTE Band 17**

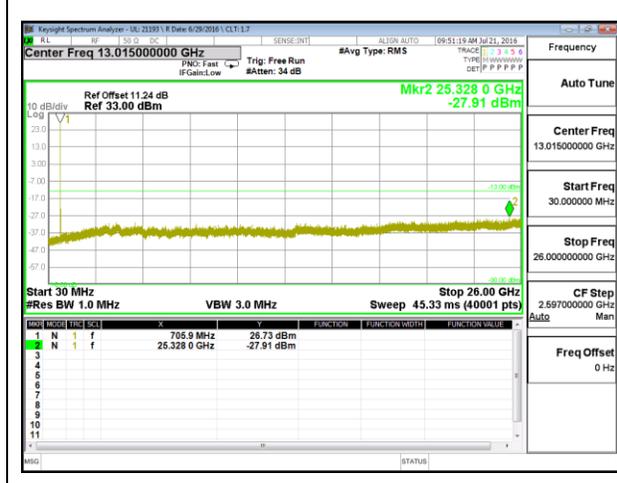
BW(MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
5	QPSK	706.5	-28.54	-13	-15.54
		710	-28.25	-13	-15.25
		713.5	-26.99	-13	-13.99
	16QAM	706.5	-28.18	-13	-15.18
		710	-28.65	-13	-15.65
		713.5	-28.33	-13	-15.33
10	QPSK	709	-27.76	-13	-14.76
		710	-27.91	-13	-14.91
		711	-27.54	-13	-14.54
	16QAM	709	-27.28	-13	-14.28
		710	-27.35	-13	-14.35
		711	-28.12	-13	-15.12



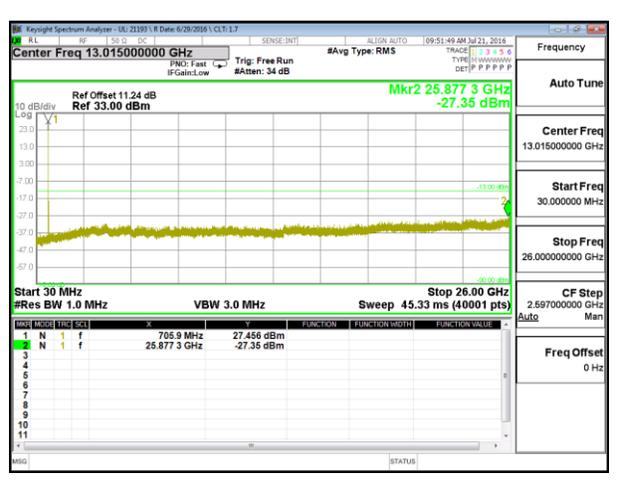
LTE B17 5MHz QPSK Middle Channel



LTE B17 5MHz 16QAM Middle Channel



LTE B17 10MHz QPSK Middle Channel



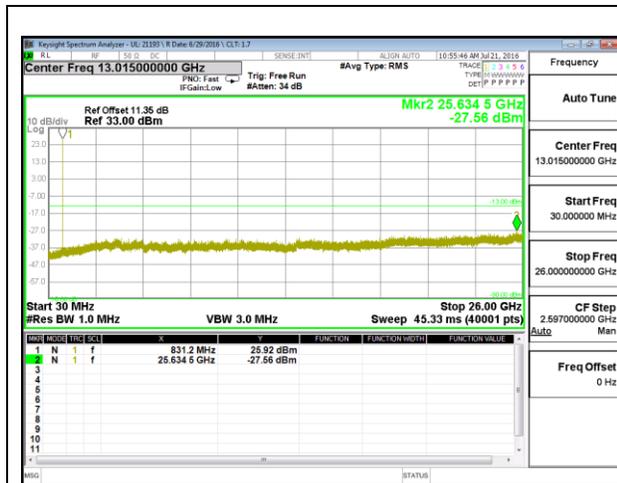
LTE B17 10MHz 16QAM Middle Channel

**LTE Band 26-Part 90**

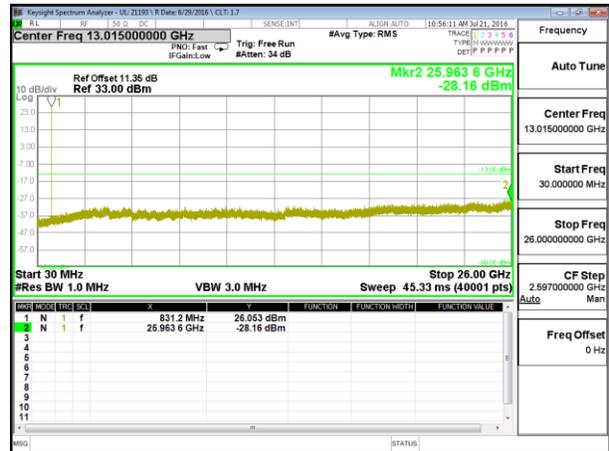
BW(MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
1.4	QPSK	814.7	-28.21	-13	-15.21
	16QAM	814.7	-27.92	-13	-14.92
3	QPSK	815.5	-28.2	-13	-15.2
	16QAM	815.5	-27.2	-13	-14.2
5	QPSK	816.5	-28.04	-13	-15.04
	16QAM	816.5	-27.52	-13	-14.52
10	QPSK	819	-27.55	-13	-14.55
	16QAM	819	-27.47	-13	-14.47

**LTE Band 26-Part 22**

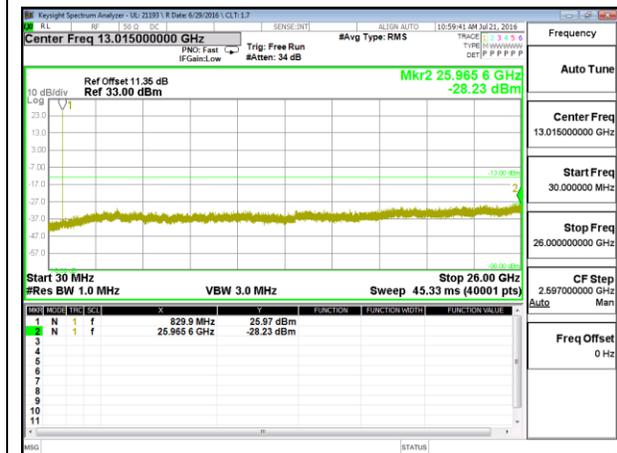
BW(MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
1.4	QPSK	831.5	-27.56	-13	-14.56
		848.3	-27.87	-13	-14.87
	16QAM	831.5	-28.16	-13	-15.16
		848.3	-27.17	-13	-14.17
3	QPSK	831.5	-28.23	-13	-15.23
		847.5	-28	-13	-15
	16QAM	831.5	-26.97	-13	-13.97
		847.5	-27.82	-13	-14.82
5	QPSK	831.5	-27.42	-13	-14.42
		846.5	-28.34	-13	-15.34
	16QAM	831.5	-28.11	-13	-15.11
		846.5	-27.82	-13	-14.82
10	QPSK	831.5	-27.75	-13	-14.75
		844	-27.4	-13	-14.4
	16QAM	831.5	-27.83	-13	-14.83
		844	-28.54	-13	-15.54
15	QPSK	836.5	-28.09	-13	-15.09
		841.5	-28.25	-13	-15.25
	16QAM	836.5	-28.07	-13	-15.07
		841.5	-27.9	-13	-14.9



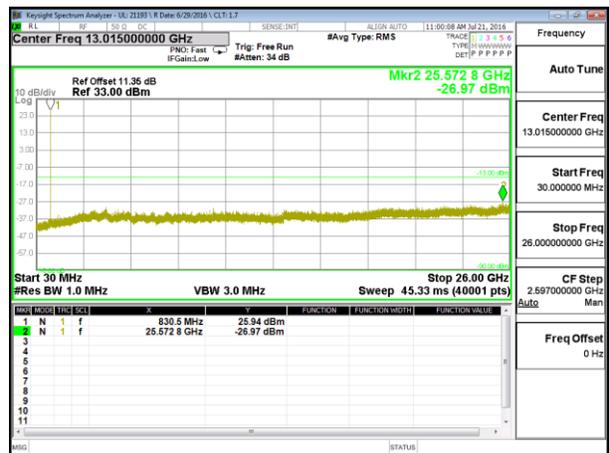
LTE B26 1.4MHz QPSK Middle Channel



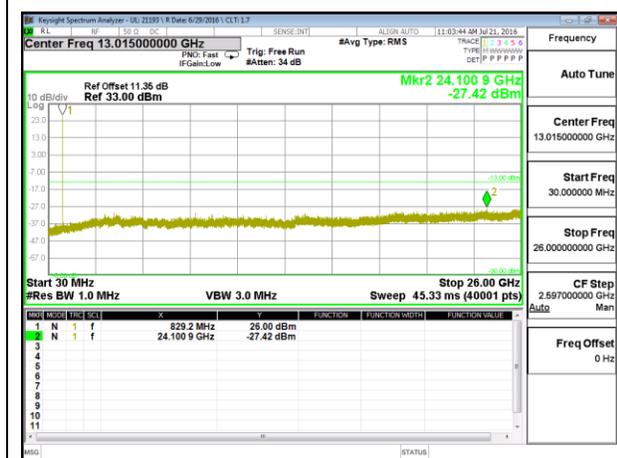
LTE B26 1.4MHz 16QAM Middle Channel



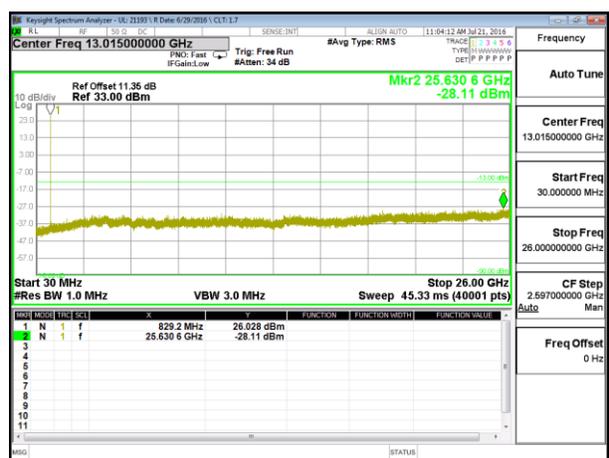
LTE B26 3MHz QPSK Middle Channel



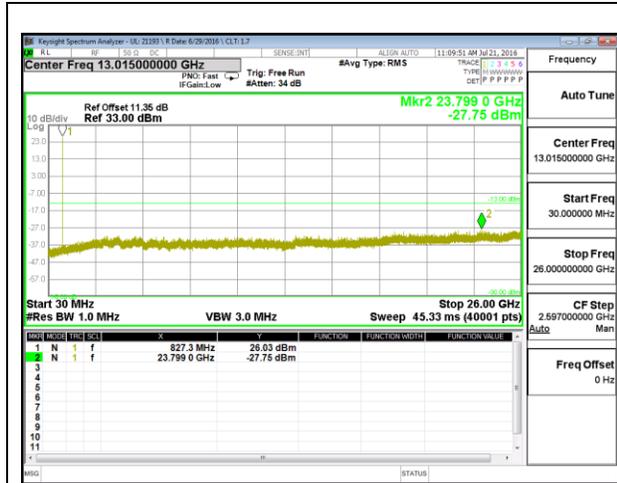
LTE B26 3MHz 16QAM Middle Channel



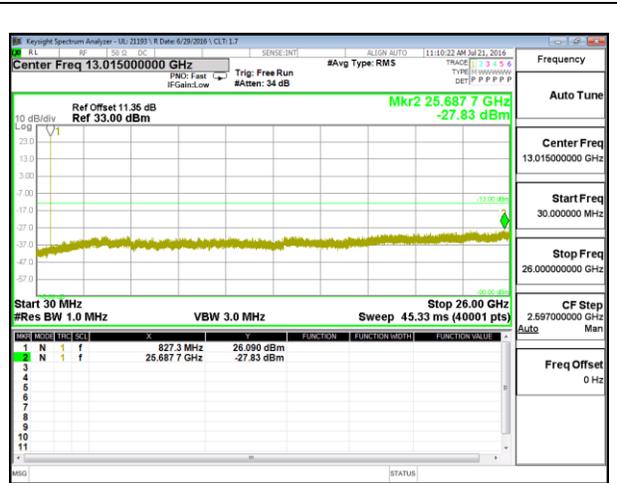
LTE B26 5MHz QPSK Middle Channel



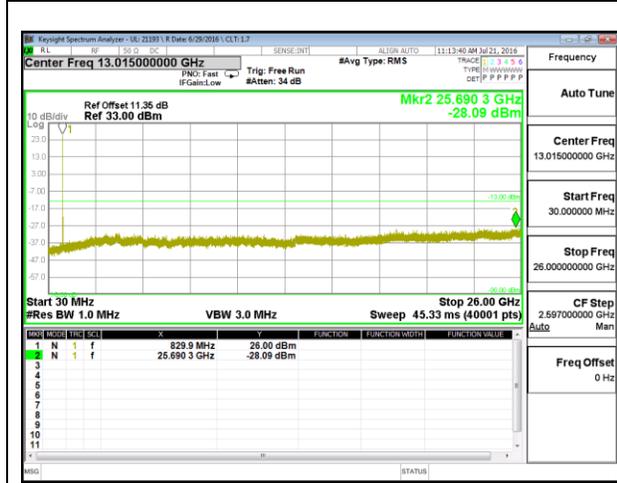
LTE B26 5MHz 16QAM Middle Channel



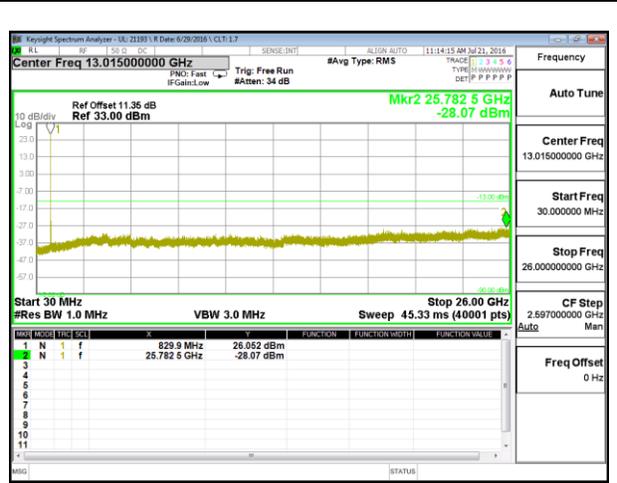
LTE B26 10MHz QPSK Middle Channel



LTE B26 10MHz 16QAM Middle Channel



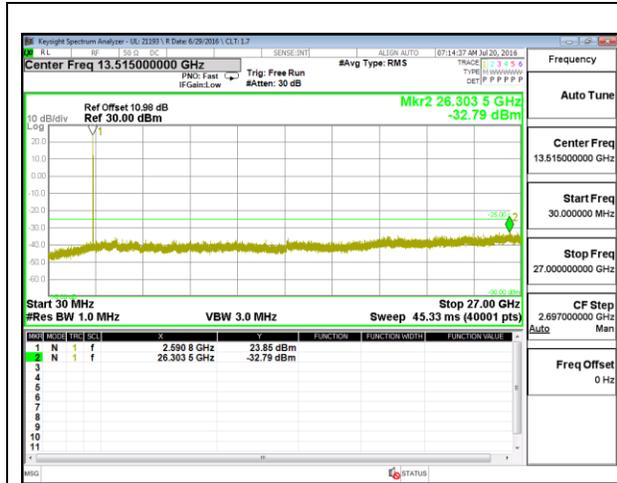
LTE B26 15MHz QPSK Middle Channel



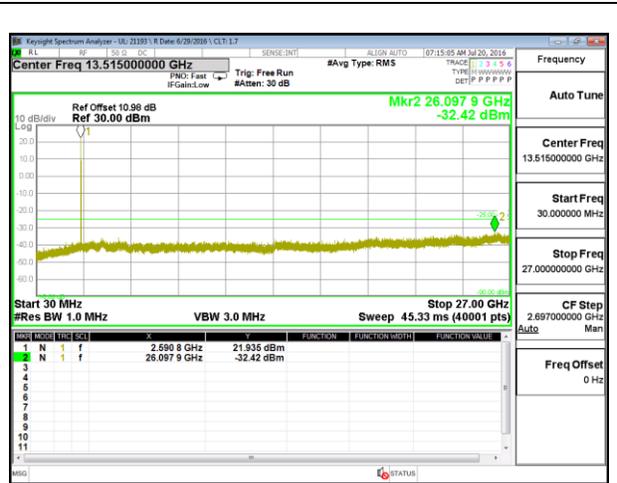
LTE B26 15MHz 16QAM Middle Channel

**LTE Band 41**

BW(MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
5	QPSK	2498.5	-32.73	-25	-7.73
		2593	-32.79	-25	-7.79
		2687.5	-31.4	-25	-6.4
	16QAM	2498.5	-32.91	-25	-7.91
		2593	-32.42	-25	-7.42
		2687.5	-32.93	-25	-7.93
10	QPSK	2501	-32.38	-25	-7.38
		2593	-32.74	-25	-7.74
		2685	-32.79	-25	-7.79
	16QAM	2501	-31.8	-25	-6.8
		2593	-31.47	-25	-6.47
		2685	-32.79	-25	-7.79
15	QPSK	2503.5	-33.12	-25	-8.12
		2593	-32.59	-25	-7.59
		2682.5	-32.56	-25	-7.56
	16QAM	2503.5	-32.33	-25	-7.33
		2593	-32.46	-25	-7.46
		2682.5	-32.83	-25	-7.83
20	QPSK	2506	-32.63	-25	-7.63
		2593	-32.35	-25	-7.35
		2680	-32.37	-25	-7.37
	16QAM	2506	-32.38	-25	-7.38
		2593	-31.2	-25	-6.2
		2680	-32.24	-25	-7.24



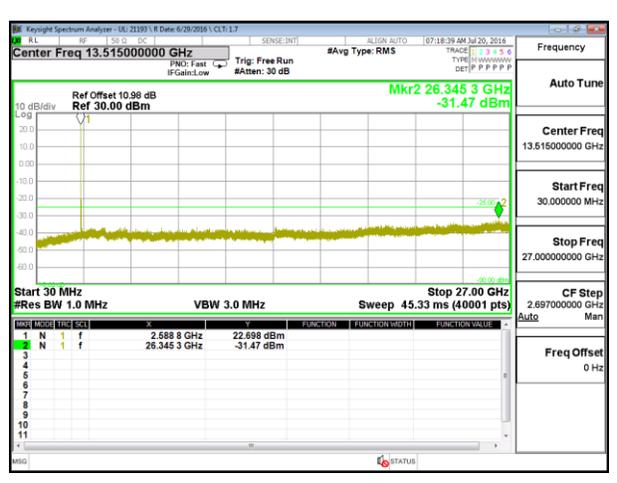
LTE B41 5MHz QPSK Middle Channel



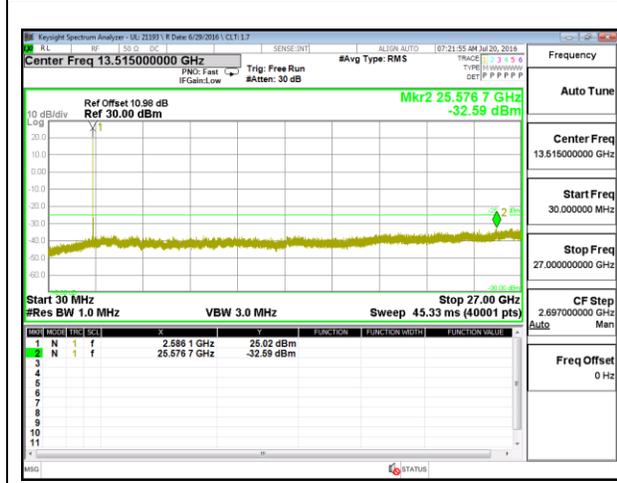
LTE B41 5MHz 16QAM Middle Channel



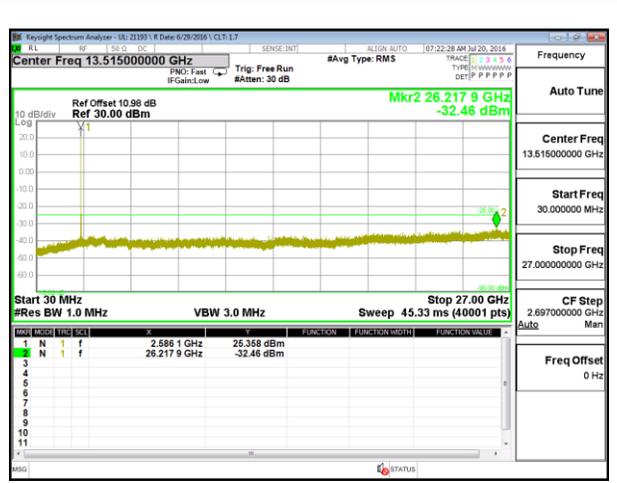
LTE B41 10MHz QPSK Middle Channel



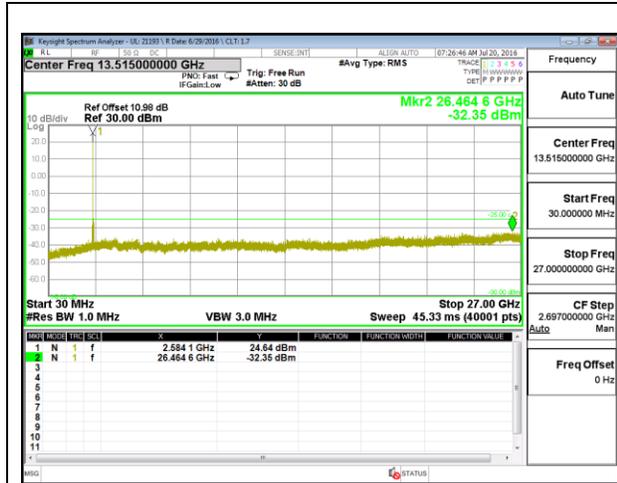
LTE B41 10MHz 16QAM Middle Channel



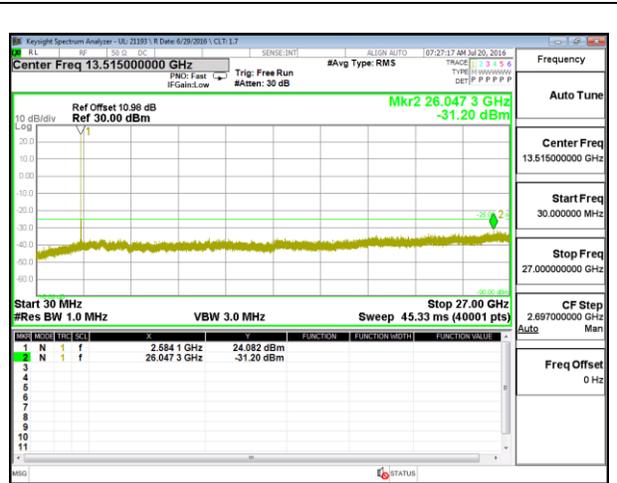
LTE B41 15MHz QPSK Middle Channel



LTE B41 15MHz 16QAM Middle Channel



LTE B41 20MHz QPSK Middle Channel



LTE B41 20MHz 16QAM Middle Channel

## **13. FREQUENCY STABILITY**

### **RULE PART(S)**

FCC: §2.1055, §22.355, §24.235, §27.54 and §90.213

### **LIMITS**

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations.

§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

§27.54 - The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

§90.213 - The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations.

### **TEST PROCEDURE**

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

### 13.1. FREQUENCY STABILITY RESULTS

**GSM 1900**

GPRS

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	1850.0530	1909.9470		
Extreme (50C)		1850.0530	1909.9470	-5.4	-0.003
Extreme (40C)		1850.0530	1909.9470	6.5	0.003
Extreme (30C)		1850.0530	1909.9470	-5.0	-0.003
Extreme (10C)		1850.0530	1909.9470	7.1	0.004
Extreme (0C)		1850.0530	1909.9470	7.3	0.004
Extreme (-10C)		1850.0530	1909.9470	6.6	0.004
Extreme (-20C)		1850.0530	1909.9470	7.0	0.004
Extreme (-30C)		1850.0530	1909.9470	7.8	0.004
25C	3.8 Vdc	1850.0530	1909.9470	5.3	0.003
	4.2 Vdc	1850.0530	1909.9470	-4.6	-0.002
	3.6 Vdc	1850.0530	1909.9470	5.3	0.003

EGPRS

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8Vdc	1850.0630	1909.9420		
Extreme (50C)		1850.0630	1909.9420	-5.4	-0.003
Extreme (40C)		1850.0630	1909.9420	6.5	0.003
Extreme (30C)		1850.0630	1909.9420	-5.0	-0.003
Extreme (10C)		1850.0630	1909.9420	7.1	0.004
Extreme (0C)		1850.0630	1909.9420	7.3	0.004
Extreme (-10C)		1850.0630	1909.9420	6.6	0.004
Extreme (-20C)		1850.0630	1909.9420	7.0	0.004
Extreme (-30C)		1850.0630	1909.9420	7.8	0.004
25C	3.8 Vdc	1850.0630	1909.9420	5.3	0.003
	4.2 Vdc	1850.0630	1909.9420	-4.6	-0.002
	3.6 Vdc	1850.0630	1909.9420	5.3	0.003

**WCDMA Band 2**

REL99

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	1850.1280	1909.8530		
Extreme (50C)		1850.1280	1909.8530	-5.4	-0.003
Extreme (40C)		1850.1280	1909.8530	6.5	0.003
Extreme (30C)		1850.1280	1909.8530	-5.0	-0.003
Extreme (10C)		1850.1280	1909.8530	7.1	0.004
Extreme (0C)		1850.1280	1909.8530	7.3	0.004
Extreme (-10C)		1850.1280	1909.8530	6.6	0.004
Extreme (-20C)		1850.1280	1909.8530	7.0	0.004
Extreme (-30C)		1850.1280	1909.8530	7.8	0.004
25C	3.8 Vdc	1850.1280	1909.8530	5.3	0.003
	4.2 Vdc	1850.1280	1909.8530	-4.6	-0.002
	3.6 Vdc	1850.1280	1909.8530	5.3	0.003

HSDPA

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8Vdc	1850.1850	1909.8350		
Extreme (50C)		1850.1850	1909.8350	-5.4	-0.003
Extreme (40C)		1850.1850	1909.8350	6.5	0.003
Extreme (30C)		1850.1850	1909.8350	-5.0	-0.003
Extreme (10C)		1850.1850	1909.8350	7.1	0.004
Extreme (0C)		1850.1850	1909.8350	7.3	0.004
Extreme (-10C)		1850.1850	1909.8350	6.6	0.004
Extreme (-20C)		1850.1850	1909.8350	7.0	0.004
Extreme (-30C)		1850.1850	1909.8350	7.8	0.004
25C	3.8 Vdc	1850.1850	1909.8350	5.3	0.003
	4.2 Vdc	1850.1850	1909.8350	-4.6	-0.002
	3.6 Vdc	1850.1850	1909.8350	5.3	0.003

**LTE Band 2**

QPSK

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	1850.7300	1909.2700		
Extreme (50C)		1850.7300	1909.2700	-5.4	-0.003
Extreme (40C)		1850.7300	1909.2700	6.5	0.003
Extreme (30C)		1850.7300	1909.2700	-5.0	-0.003
Extreme (10C)		1850.7300	1909.2700	7.1	0.004
Extreme (0C)		1850.7300	1909.2700	7.3	0.004
Extreme (-10C)		1850.7300	1909.2700	6.6	0.004
Extreme (-20C)		1850.7300	1909.2700	7.0	0.004
Extreme (-30C)		1850.7300	1909.2700	7.8	0.004
25C	3.8 Vdc	1850.7300	1909.2700	5.3	0.003
	4.2 Vdc	1850.7300	1909.2700	-4.6	-0.002
	3.6 Vdc	1850.7300	1909.2700	5.3	0.003

16QAM

Limit		1850	1910	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8Vdc	1850.7300	1909.2700		
Extreme (50C)		1850.7300	1909.2700	-5.4	-0.003
Extreme (40C)		1850.7300	1909.2700	6.5	0.003
Extreme (30C)		1850.7300	1909.2700	-5.0	-0.003
Extreme (10C)		1850.7300	1909.2700	7.1	0.004
Extreme (0C)		1850.7300	1909.2700	7.3	0.004
Extreme (-10C)		1850.7300	1909.2700	6.6	0.004
Extreme (-20C)		1850.7300	1909.2700	7.0	0.004
Extreme (-30C)		1850.7300	1909.2700	7.8	0.004
25C	3.8 Vdc	1850.7300	1909.2700	5.3	0.003
	4.2 Vdc	1850.7300	1909.2700	-4.6	-0.002
	3.6 Vdc	1850.7300	1909.2700	5.3	0.003

**WCDMA Band 4**

REL99

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	1710.1470	1754.8350		
Extreme (50C)		1710.1470	1754.8350	5.0	0.003
Extreme (40C)		1710.1470	1754.8350	6.5	0.004
Extreme (30C)		1710.1470	1754.8350	-5.0	-0.003
Extreme (10C)		1710.1470	1754.8350	7.1	0.004
Extreme (0C)		1710.1470	1754.8350	7.3	0.004
Extreme (-10C)		1710.1470	1754.8350	6.6	0.004
Extreme (-20C)		1710.1470	1754.8350	7.0	0.004
Extreme (-30C)		1710.1470	1754.8350	7.8	0.004
25C		3.8 Vdc	1710.1470	1754.8350	5.3
	4.2 Vdc	1710.1470	1754.8350	-4.6	-0.003
	3.6 Vdc	1710.1470	1754.8350	5.3	0.003

HSDPA

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8Vdc	1710.1650	1754.7980		
Extreme (50C)		1710.1650	1754.7980	5.0	0.003
Extreme (40C)		1710.1650	1754.7980	6.5	0.004
Extreme (30C)		1710.1650	1754.7980	-5.0	-0.003
Extreme (10C)		1710.1650	1754.7980	7.1	0.004
Extreme (0C)		1710.1650	1754.7980	7.3	0.004
Extreme (-10C)		1710.1650	1754.7980	6.6	0.004
Extreme (-20C)		1710.1650	1754.7980	7.0	0.004
Extreme (-30C)		1710.1650	1754.7980	7.8	0.004
25C		3.8 Vdc	1710.1650	1754.7980	5.3
	4.2 Vdc	1710.1650	1754.7980	-4.6	-0.003
	3.6 Vdc	1710.1650	1754.7980	5.3	0.003

**LTE Band 4**

QPSK, (20MHz BANDWIDTH)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	1710.7300	1754.2700		
Extreme (50C)		1710.7300	1754.2700	5.0	0.003
Extreme (40C)		1710.7300	1754.2700	6.5	0.004
Extreme (30C)		1710.7300	1754.2700	-5.0	-0.003
Extreme (10C)		1710.7300	1754.2700	7.1	0.004
Extreme (0C)		1710.7300	1754.2700	7.3	0.004
Extreme (-10C)		1710.7300	1754.2700	6.6	0.004
Extreme (-20C)		1710.7300	1754.2700	7.0	0.004
Extreme (-30C)		1710.7300	1754.2700	7.8	0.004
25C	3.8 Vdc	1710.7300	1754.2700	5.3	0.003
	4.2 Vdc	1710.7300	1754.2700	-4.6	-0.003
	3.6 Vdc	1710.7300	1754.2700	5.3	0.003

16QAM, (20MHz BANDWIDTH)

Limit		1710	1755	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8Vdc	1710.7300	1754.2700		
Extreme (50C)		1710.7300	1754.2700	5.0	0.003
Extreme (40C)		1710.7300	1754.2700	6.5	0.004
Extreme (30C)		1710.7300	1754.2700	-5.0	-0.003
Extreme (10C)		1710.7300	1754.2700	7.1	0.004
Extreme (0C)		1710.7300	1754.2700	7.3	0.004
Extreme (-10C)		1710.7300	1754.2700	6.6	0.004
Extreme (-20C)		1710.7300	1754.2700	7.0	0.004
Extreme (-30C)		1710.7300	1754.2700	7.8	0.004
25C	3.8 Vdc	1710.7300	1754.2700	5.3	0.003
	4.2 Vdc	1710.7300	1754.2700	-4.6	-0.003
	3.6 Vdc	1710.7300	1754.2700	5.3	0.003

**LTE Band 5**

Reference Frequency: PCS Mid Channel		836.5	MHz @ 20°C	
Limit: to stay +/- 2.5 ppm =		2091.250	Hz	
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.499997	0.010	2.5
3.80	40	836.499997	0.009	2.5
3.80	30	836.499996	0.010	2.5
<b>3.80</b>	<b>20</b>	<b>836.500005</b>	<b>0</b>	<b>2.5</b>
3.80	10	836.500003	0.002	2.5
3.80	0	836.500004	0.000	2.5
3.80	-10	836.500003	0.001	2.5
3.80	-20	836.500003	0.002	2.5
3.80	-30	836.499997	0.009	2.5

Reference Frequency: PCS Mid Channel		836.5	MHz @ 20°C	
Limit: to stay +/- 2.5 ppm =		2091.250	Hz	
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
<b>3.80</b>	<b>20</b>	<b>836.500005</b>	<b>0</b>	<b>2.5</b>
4.20	20	836.5000032	0.002	2.5
3.60	20	836.5000055	-0.001	2.5

Note: LTE B5 test data cover LTE B26 and WCDMA B5

**LTE Band 7**

QPSK, (20MHz BANDWIDTH)

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	2500.7300	2569.3300		
Extreme (50C)		2500.7300	2569.3300	-5.8	-0.002
Extreme (40C)		2500.7300	2569.3300	-9.9	-0.004
Extreme (30C)		2500.7300	2569.3300	-8.9	-0.004
Extreme (10C)		2500.7300	2569.3300	-8.2	-0.003
Extreme (0C)		2500.7300	2569.3300	-8.8	-0.003
Extreme (-10C)		2500.7300	2569.3300	-8.0	-0.003
Extreme (-20C)		2500.7300	2569.3300	-7.9	-0.003
Extreme (-30C)		2500.7300	2569.3300	-10.7	-0.004
25C	3.8 Vdc	2500.7300	2569.3300	-8.7	-0.003
	4.2 Vdc	2500.7300	2569.3300	-9.6	-0.004
	3.6 Vdc	2500.7300	2569.3300	-7.8	-0.003

16QAM, (20MHz BANDWIDTH)

Limit		2500	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8Vdc	2500.7300	2569.3300		
Extreme (50C)		2500.7300	2569.3300	-5.8	-0.002
Extreme (40C)		2500.7300	2569.3300	-9.9	-0.004
Extreme (30C)		2500.7300	2569.3300	-8.9	-0.004
Extreme (10C)		2500.7300	2569.3300	-8.2	-0.003
Extreme (0C)		2500.7300	2569.3300	-8.8	-0.003
Extreme (-10C)		2500.7300	2569.3300	-8.0	-0.003
Extreme (-20C)		2500.7300	2569.3300	-7.9	-0.003
Extreme (-30C)		2500.7300	2569.3300	-10.7	-0.004
25C	3.8 Vdc	2500.7300	2569.3300	-8.7	-0.003
	4.2 Vdc	2500.7300	2569.3300	-9.6	-0.004
	3.6 Vdc	2500.7300	2569.3300	-7.8	-0.003

**LTE Band 12**

QPSK, (10MHz BANDWIDTH)

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	699.4000	715.6700		
Extreme (50C)		699.4000	715.6700	-2.5	-0.004
Extreme (40C)		699.4000	715.6700	-3.2	-0.005
Extreme (30C)		699.4000	715.6700	-4.3	-0.006
Extreme (10C)		699.4000	715.6700	3.2	0.005
Extreme (0C)		699.4000	715.6700	-2.9	-0.004
Extreme (-10C)		699.4000	715.6700	2.6	0.004
Extreme (-20C)		699.4000	715.6700	-2.9	-0.004
Extreme (-30C)		699.4000	715.6700	-3.2	-0.004
25C	3.8 Vdc	699.4000	715.6700	3.5	0.005
	4.2 Vdc	699.4000	715.6700	3.5	0.005
	3.6 Vdc	699.4000	715.6700	3.1	0.004

16QAM, (10MHz BANDWIDTH)

Limit		699	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8Vdc	699.3700	715.6700		
Extreme (50C)		699.3700	715.6700	5.0	0.007
Extreme (40C)		699.3700	715.6700	6.5	0.009
Extreme (30C)		699.3700	715.6700	-5.0	-0.007
Extreme (10C)		699.3700	715.6700	7.1	0.010
Extreme (0C)		699.3700	715.6700	7.3	0.010
Extreme (-10C)		699.3700	715.6700	6.6	0.009
Extreme (-20C)		699.3700	715.6700	7.0	0.010
Extreme (-30C)		699.3700	715.6700	7.8	0.011
25C	3.8 Vdc	699.3700	715.6700	5.3	0.007
	4.2 Vdc	699.3700	715.6700	-4.6	-0.006
	3.6 Vdc	699.3700	715.6700	5.3	0.007

**LTE Band 13**

QPSK, (10MHz BANDWIDTH)

Limit		777	787	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	777.4000	786.6700		
Extreme (50C)		777.4000	786.6700	-3.4	-0.004
Extreme (40C)		777.4000	786.6700	-4.4	-0.006
Extreme (30C)		777.4000	786.6700	-4.0	-0.005
Extreme (10C)		777.4000	786.6700	3.7	0.005
Extreme (0C)		777.4000	786.6700	4.5	0.006
Extreme (-10C)		777.4000	786.6700	3.0	0.004
Extreme (-20C)		777.4000	786.6700	3.4	0.004
Extreme (-30C)		777.4000	786.6700	-3.6	-0.005
25C	3.8 Vdc	777.4000	786.6700	-3.2	-0.004
	4.2 Vdc	777.4000	786.6700	-3.4	-0.004
	3.6 Vdc	777.4000	786.6700	3.0	0.004

16QAM, (10MHz BANDWIDTH)

Limit		777	2570	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8Vdc	777.3700	786.6300		
Extreme (50C)		777.3700	786.6300	-5.8	-0.003
Extreme (40C)		777.3700	786.6300	-9.9	-0.006
Extreme (30C)		777.3700	786.6300	-8.9	-0.005
Extreme (10C)		777.3700	786.6300	-8.2	-0.005
Extreme (0C)		777.3700	786.6300	-8.8	-0.005
Extreme (-10C)		777.3700	786.6300	-8.0	-0.005
Extreme (-20C)		777.3700	786.6300	-7.9	-0.005
Extreme (-30C)		777.3700	786.6300	-10.7	-0.006
25C	3.8 Vdc	777.3700	786.6300	-8.7	-0.005
	4.2 Vdc	777.3700	786.6300	-9.6	-0.006
	3.6 Vdc	777.3700	786.6300	-7.8	-0.005

**LTE Band 17**

QPSK, (10MHz BANDWIDTH)

Limit		704	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	704.4000	715.6700		
Extreme (50C)		704.4000	715.6700	-2.3	-0.003
Extreme (40C)		704.4000	715.6700	-2.2	-0.003
Extreme (30C)		704.4000	715.6700	-3.1	-0.004
Extreme (10C)		704.4000	715.6700	3.8	0.005
Extreme (0C)		704.4000	715.6700	3.7	0.005
Extreme (-10C)		704.4000	715.6700	3.4	0.005
Extreme (-20C)		704.4000	715.6700	3.2	0.004
Extreme (-30C)		704.4000	715.6700	-3.1	-0.004
25C	3.8 Vdc	704.4000	715.6700	3.7	0.005
	4.2 Vdc	704.4000	715.6700	3.4	0.005
	3.6 Vdc	704.4000	715.6700	3.9	0.006

16QAM, (10MHz BANDWIDTH)

Limit		704	716	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8Vdc	704.3700	715.6300		
Extreme (50C)		704.3700	715.6300	-2.3	-0.003
Extreme (40C)		704.3700	715.6300	-2.2	-0.003
Extreme (30C)		704.3700	715.6300	-3.1	-0.004
Extreme (10C)		704.3700	715.6300	3.8	0.005
Extreme (0C)		704.3700	715.6300	3.7	0.005
Extreme (-10C)		704.3700	715.6300	3.4	0.005
Extreme (-20C)		704.3700	715.6300	3.2	0.004
Extreme (-30C)		704.3700	715.6300	-3.1	-0.004
25C	3.8 Vdc	704.3700	715.6300	3.7	0.005
	4.2 Vdc	704.3700	715.6300	3.4	0.005
	3.6 Vdc	704.3700	715.6300	3.9	0.006

**LTE Band 41**

QPSK, (20MHz BANDWIDTH)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8 Vdc	2496.6700	2689.2700		
Extreme (50C)		2496.6700	2689.2700	-5.8	-0.002
Extreme (40C)		2496.6700	2689.2700	-9.9	-0.004
Extreme (30C)		2496.6700	2689.2700	-8.9	-0.003
Extreme (10C)		2496.6700	2689.2700	-8.2	-0.003
Extreme (0C)		2496.6700	2689.2700	-8.8	-0.003
Extreme (-10C)		2496.6700	2689.2700	-8.0	-0.003
Extreme (-20C)		2496.6700	2689.2700	-7.9	-0.003
Extreme (-30C)		2496.6700	2689.2700	-10.7	-0.004
25C	3.8 Vdc	2496.6700	2689.2700	-8.7	-0.003
	4.2 Vdc	2496.6700	2689.2700	-9.6	-0.004
	3.6 Vdc	2496.6700	2689.2700	-7.8	-0.003

16QAM, (20MHz BANDWIDTH)

Limit		2496	2690	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm (MHz)	F high @ -13dBm (MHz)		
Temperature	Voltage				
Normal (25C)	3.8Vdc	2496.7300	2689.2000		
Extreme (50C)		2496.7300	2689.2000	-5.8	-0.002
Extreme (40C)		2496.7300	2689.2000	-9.9	-0.004
Extreme (30C)		2496.7300	2689.2000	-8.9	-0.003
Extreme (10C)		2496.7300	2689.2000	-8.2	-0.003
Extreme (0C)		2496.7300	2689.2000	-8.8	-0.003
Extreme (-10C)		2496.7300	2689.2000	-8.0	-0.003
Extreme (-20C)		2496.7300	2689.2000	-7.9	-0.003
Extreme (-30C)		2496.7300	2689.2000	-10.7	-0.004
25C	3.8 Vdc	2496.7300	2689.2000	-8.7	-0.003
	4.2 Vdc	2496.7300	2689.2000	-9.6	-0.004
	3.6 Vdc	2496.7300	2689.2000	-7.8	-0.003

## 14. RADIATED TEST RESULTS

### 14.1. RADIATED POWER (ERP & EIRP)

#### RULE PART(S)

FCC: §2. 1046, §22. 913, §24. 232, §27 and § 90.635.

#### LIMITS

22.913 (a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232 (c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

27.50 (b) - (10) Portable stations (handheld devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP. (LTE B13)

27.50 (c) - (10) Portable stations (handheld devices) are limited to 3 watts ERP; (LTE B17)

27.50 (d) - (4) Fixed, mobile, and portable (handheld) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.(Band 4)

27.50 (h) - (2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power. (LTE B41 & 7)

90.635 (b) - The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw). (LTE B26)

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

#### TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17; PSA setting reference to 971168 D01 v02r02

For peak power measurement with a PSA:

a) Set the RBW  $\geq$  OBW; b) Set VBW  $\geq 3 \times$  RBW; c) Set span  $\geq 2 \times$  RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points  $\geq$  span/RBW; g) Trace mode = max hold;

For average power measurement with a PSA:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW  $\geq 3 \times$  RBW; d) Set number of points in sweep  $\geq 2 \times$  span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle  $\geq 98$ ; h) Use trigger to capture bursts If burst duty cycle  $< 98$ ; i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function.

**14.1.1. ERP/EIRP RESULTS AND TABLE**

**GSM**

Band	Mode	Channel	f(MHz)	ERP/EIRP	
				dBm	mW
GSM850	GPRS	128	824.2	23.52	224.91
		190	836.6	24.59	287.74
		251	848.8	24.89	308.32
	EGPRS	128	824.2	18.11	64.71
		190	836.6	19.21	83.37
		251	848.8	19.70	93.33
GSM1900	GPRS	512	1850.2	27.69	587.49
		661	1880	27.21	526.02
		810	1909.8	26.70	467.74
	EGPRS	512	1850.2	24.62	289.73
		661	1880	23.98	250.03
		810	1909.8	23.28	212.81

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/18/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (GSM/UMTS sample #3)  
 Mode: GPRS850

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch									
824.20	30.08	V	5.1	0.7	-1.45	23.52	38.5	-14.9	
824.20	21.71	H	5.1	0.7	-1.45	15.15	38.5	-23.3	
Mid Ch									
836.60	31.21	V	5.2	0.7	-1.45	24.59	38.5	-13.9	
836.60	22.66	H	5.2	0.7	-1.45	16.04	38.5	-22.4	
High Ch									
848.80	31.53	V	5.2	0.7	-1.45	24.89	38.5	-13.6	
848.80	23.83	H	5.2	0.7	-1.45	17.19	38.5	-21.3	

Rev. 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm. For Band 26 limit is 50dBm

GSM850 GPRS

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/18/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (GSM/UMTS sample #3)  
 Mode: EGPRS850

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch									
824.20	24.67	V	5.1	0.7	-1.45	18.11	38.5	-20.3	
824.20	16.31	H	5.1	0.7	-1.45	9.76	38.5	-28.7	
Mid Ch									
836.60	25.83	V	5.2	0.7	-1.45	19.21	38.5	-19.2	
836.60	17.24	H	5.2	0.7	-1.45	10.62	38.5	-27.8	
High Ch									
848.80	26.34	V	5.2	0.7	-1.45	19.70	38.5	-18.7	
848.80	18.49	H	5.2	0.7	-1.45	11.85	38.5	-26.6	

Rev. 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm. For Band 26 limit is 50dBm

GSM850 EGPRS

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/15/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (GSM/UMTS sample #3)  
 Mode: GPRS1900

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.20	31.42	V	8.1	4.4	27.69	33.0	-5.3	
1850.20	26.23	H	8.1	4.4	22.49	33.0	-10.5	
Mid Ch								
1880.00	31.07	V	8.2	4.3	27.21	33.0	-5.8	
1880.00	26.74	H	8.2	4.3	22.87	33.0	-10.1	
High Ch								
1909.80	30.72	V	8.2	4.2	26.70	33.0	-6.3	
1909.80	25.45	H	8.2	4.2	21.42	33.0	-11.6	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

GSM1900 GPRS

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/15/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (GSM/UMTS sample #3)  
 Mode: EGPRS1900

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.20	28.36	V	8.1	4.4	24.62	33.0	-8.4	
1850.20	23.09	H	8.1	4.4	19.35	33.0	-13.7	
Mid Ch								
1880.00	27.85	V	8.2	4.3	23.98	33.0	-9.0	
1880.00	23.63	H	8.2	4.3	19.77	33.0	-13.2	
High Ch								
1909.80	27.31	V	8.2	4.2	23.28	33.0	-9.7	
1909.80	22.06	H	8.2	4.2	18.04	33.0	-15.0	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

GSM1900 EGPRS

**WCDMA**

Band	Mode	Channel	f(MHz)	ERP/EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	19.48	88.72
		9400	1880	19.10	81.28
		9538	1907.6	19.17	82.60
	HSDPA	9262	1852.4	18.04	63.68
		9400	1880	17.65	58.21
		9538	1907.6	17.65	58.21
Band 4	REL99	1312	1712.4	19.68	92.90
		1413	1732.6	19.34	85.90
		1513	1752.6	19.43	87.70
	HSDPA	1312	1712.4	18.06	63.97
		1413	1732.6	17.88	61.38
		1513	1752.6	17.89	61.52
Band 5	REL99	4132	826.4	17.03	50.47
		4183	836.6	17.72	59.16
		4233	846.6	17.60	57.54
	HSDPA	4132	826.4	15.74	37.50
		4183	836.6	16.38	43.45
		4233	846.6	16.49	44.57

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/15/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (GSM/UMTS sample #3)  
 Mode: WCDMA2, REL99

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	23.23	V	8.1	4.4	19.48	33.0	-13.5	
1852.40	18.00	H	8.1	4.4	14.25	33.0	-18.7	
Mid Ch								
1880.00	22.97	V	8.2	4.3	19.10	33.0	-13.9	
1880.00	18.70	H	8.2	4.3	14.83	33.0	-18.2	
High Ch								
1907.60	23.18	V	8.2	4.2	19.17	33.0	-13.8	
1907.60	18.08	H	8.2	4.2	14.07	33.0	-18.9	

Rev: 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

B2 REL99

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/15/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (GSM/UMTS sample #3)  
 Mode: WCDMA2, HSDPA

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.40	21.79	V	8.1	4.4	18.04	33.0	-15.0	
1852.40	16.65	H	8.1	4.4	12.90	33.0	-20.1	
Mid Ch								
1880.00	21.52	V	8.2	4.3	17.65	33.0	-15.3	
1880.00	17.19	H	8.2	4.3	13.32	33.0	-19.7	
High Ch								
1907.60	21.66	V	8.2	4.2	17.65	33.0	-15.3	
1907.60	16.50	H	8.2	4.2	12.49	33.0	-20.5	

Rev: 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

B2 REL99

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/15/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (GSM/UMTS sample #3)  
 Mode: WCDMA4, REL99

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.40	22.70	V	7.7	4.7	19.68	33.0	-13.3	
1712.40	17.53	H	7.7	4.7	14.91	33.0	-18.1	
Mid Ch								
1732.60	22.46	V	7.8	4.6	19.34	33.0	-13.7	
1732.60	18.22	H	7.8	4.6	15.10	33.0	-17.9	
High Ch								
1752.60	22.66	V	7.8	4.6	19.43	33.0	-13.6	
1752.60	17.63	H	7.8	4.6	14.40	33.0	-18.6	

Rev: 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

B4 REL99

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/15/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (GSM/UMTS sample #3)  
 Mode: WCDMA4, HSDPA

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.40	21.08	V	7.7	4.7	18.06	33.0	-14.9	
1712.40	16.28	H	7.7	4.7	13.26	33.0	-19.7	
Mid Ch								
1732.60	21.00	V	7.8	4.6	17.88	33.0	-15.1	
1732.60	16.71	H	7.8	4.6	13.59	33.0	-19.4	
High Ch								
1752.60	21.12	V	7.8	4.6	17.89	33.0	-15.1	
1752.60	15.98	H	7.8	4.6	12.75	33.0	-20.2	

Rev: 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

B4 REL99

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/18/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (GSM/UMTS sample #3)  
 Mode: WCDMA5, REL99

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch									
826.40	23.60	V	5.1	0.7	-1.45	17.03	38.5	-21.4	
826.40	14.96	H	5.1	0.7	-1.45	8.39	38.5	-30.1	
Mid Ch									
836.60	24.34	V	5.2	0.7	-1.45	17.72	38.5	-20.7	
836.60	15.52	H	5.2	0.7	-1.45	8.90	38.5	-29.5	
High Ch									
846.60	24.23	V	5.2	0.7	-1.45	17.60	38.5	-20.9	
846.60	16.65	H	5.2	0.7	-1.45	10.02	38.5	-28.4	

Rev: 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

B5 REL99

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/18/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (GSM/UMTS sample #3)  
 Mode: WCDMA5, HSDPA

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch									
826.40	22.31	V	5.1	0.7	-1.45	15.74	38.5	-22.7	
826.40	13.97	H	5.1	0.7	-1.45	7.40	38.5	-31.0	
Mid Ch									
836.60	23.00	V	5.2	0.7	-1.45	16.38	38.5	-22.1	
836.60	14.40	H	5.2	0.7	-1.45	7.78	38.5	-30.7	
High Ch									
846.60	23.12	V	5.2	0.7	-1.45	16.49	38.5	-22.0	
846.60	15.54	H	5.2	0.7	-1.45	8.91	38.5	-29.5	

Rev: 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

B5 REL99

**LTE Band 2**

BW (MHz)	Mode	RB/RB Size	f(MHz)	EIRP	
				dBm	mW
1.4	QPSK	1/0	1850.7	16.12	40.93
		1/0	1880	16.27	42.36
		1/0	1909.3	17.17	52.12
	16QAM	1/0	1850.7	15.17	32.89
		1/0	1880	15.35	34.28
		1/0	1909.3	16.36	43.25
3	QPSK	1/0	1851.5	16.35	43.15
		1/0	1880	16.50	44.67
		1/0	1908.5	17.17	52.12
	16QAM	1/0	1851.5	15.52	35.65
		1/0	1880	15.50	35.48
		1/0	1908.5	16.41	43.75
5	QPSK	1/0	1852.5	16.22	41.88
		1/0	1880	16.82	48.08
		1/0	1907.5	17.52	56.49
	16QAM	1/0	1852.5	15.40	34.67
		1/0	1880	15.91	38.99
		1/0	1907.5	16.70	46.77
10	QPSK	1/0	1855	16.65	46.24
		1/0	1880	16.67	46.45
		1/0	1905	16.71	46.88
	16QAM	1/0	1855	15.82	38.19
		1/0	1880	15.95	39.36
		1/0	1905	16.02	39.99
15	QPSK	1/0	1857.5	16.38	43.45
		1/0	1880	16.58	45.50
		1/0	1902.5	17.18	52.24
	16QAM	1/0	1857.5	15.69	37.07
		1/0	1880	15.72	37.33
		1/0	1902.5	16.37	43.35
20	QPSK	1/0	1860	16.55	45.19
		1/0	1880	17.25	53.09
		1/0	1900	17.47	55.85
	16QAM	1/0	1860	15.83	38.28
		1/0	1880	16.54	45.08
		1/0	1900	16.46	44.26

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/21/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE sample #1) Mode: LTE 2, 1.4M, QPSK <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.70	19.86	V	8.1	4.4	16.12	33.0	-16.9	Avg
1850.70	18.99	H	8.1	4.4	15.25	33.0	-17.7	
Mid Ch								
1880.00	19.85	V	8.2	4.3	15.98	33.0	-17.0	
1880.00	20.14	H	8.2	4.3	16.27	33.0	-16.7	
High Ch								
1909.30	20.10	V	8.2	4.2	16.08	33.0	-16.9	
1909.30	21.19	H	8.2	4.2	17.17	33.0	-15.8	
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B2 1.4MHz QPSK

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/21/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE sample #1) Mode: LTE 2, 1.4M, 16QAM <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.70	18.91	V	8.1	4.4	15.17	33.0	-17.8	Avg
1850.70	18.11	H	8.1	4.4	14.37	33.0	-18.6	
Mid Ch								
1880.00	18.92	V	8.2	4.3	15.05	33.0	-17.9	
1880.00	19.22	H	8.2	4.3	15.35	33.0	-17.6	
High Ch								
1909.30	19.32	V	8.2	4.2	15.30	33.0	-17.7	
1909.30	20.38	H	8.2	4.2	16.36	33.0	-16.6	
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B2 1.4MHz 16QAM

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/21/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE sample #1) Mode: LTE 2, 3M, QPSK <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1851.50	20.09	V	8.1	4.4	16.35	33.0	-16.7	Avg
1851.50	19.57	H	8.1	4.4	15.83	33.0	-17.2	
Mid Ch								
1880.00	19.88	V	8.2	4.3	16.01	33.0	-17.0	
1880.00	20.37	H	8.2	4.3	16.50	33.0	-16.5	
High Ch								
1908.50	20.00	V	8.2	4.2	15.99	33.0	-17.0	
1908.50	21.18	H	8.2	4.2	17.17	33.0	-15.8	
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B2 3MHz QPSK

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/21/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE sample #1) Mode: LTE 2, 3M, 16QAM <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1851.50	19.22	V	8.1	4.4	15.52	33.0	-17.5	Avg
1851.50	18.93	H	8.1	4.4	15.23	33.0	-17.8	
Mid Ch								
1880.00	19.03	V	8.2	4.3	15.13	33.0	-17.9	
1880.00	19.40	H	8.2	4.3	15.50	33.0	-17.5	
High Ch								
1908.50	19.34	V	8.2	4.2	15.34	33.0	-17.7	
1908.50	20.41	H	8.2	4.2	16.41	33.0	-16.6	
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B2 3MHz 16QAM

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/21/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE sample #1) Mode: LTE 2, 5M, QPSK <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.50	19.97	V	8.1	4.4	16.22	33.0	-16.8	Avg
1852.50	19.23	H	8.1	4.4	15.48	33.0	-17.5	
Mid Ch								
1880.00	20.15	V	8.2	4.3	16.28	33.0	-16.7	
1880.00	20.69	H	8.2	4.3	16.82	33.0	-16.2	
High Ch								
1907.50	20.20	V	8.2	4.2	16.19	33.0	-16.8	
1907.50	21.53	H	8.2	4.2	17.52	33.0	-15.5	
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B2 5MHz QPSK

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/21/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE sample #1) Mode: LTE 2, 5M, 16QAM <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.50	19.10	V	8.1	4.4	15.40	33.0	-17.6	Avg
1852.50	18.27	H	8.1	4.4	14.57	33.0	-18.4	
Mid Ch								
1880.00	19.51	V	8.2	4.3	15.61	33.0	-17.4	
1880.00	19.81	H	8.2	4.3	15.91	33.0	-17.1	
High Ch								
1907.50	19.49	V	8.2	4.2	15.49	33.0	-17.5	
1907.50	20.70	H	8.2	4.2	16.70	33.0	-16.3	
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B2 5MHz 16QAM

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/21/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 2, 10M, QPSK

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1855.00	20.41	V	8.1	4.3	16.65	33.0	-16.4	Avg
1855.00	20.15	H	8.1	4.3	16.39	33.0	-16.6	
Mid Ch								
1880.00	20.33	V	8.2	4.3	16.43	33.0	-16.6	
1880.00	20.57	H	8.2	4.3	16.67	33.0	-16.3	
High Ch								
1905.00	20.70	V	8.2	4.2	16.71	33.0	-16.3	
1905.00	20.56	H	8.2	4.2	16.57	33.0	-16.4	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B2 10MHz QPSK

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/21/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 2, 10M, 16QAM

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1855.00	19.62	V	8.1	4.3	15.82	33.0	-17.2	Avg
1855.00	19.41	H	8.1	4.3	15.61	33.0	-17.4	
Mid Ch								
1880.00	19.45	V	8.2	4.3	15.55	33.0	-17.5	
1880.00	19.86	H	8.2	4.3	15.96	33.0	-17.0	
High Ch								
1905.00	20.02	V	8.2	4.2	16.02	33.0	-17.0	
1905.00	19.73	H	8.2	4.2	15.73	33.0	-17.3	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B2 10MHz 16QAM

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/21/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 2, 15M, QPSK

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1897.50	20.15	V	8.1	4.3	16.38	33.0	-16.6	Avg
1897.50	19.92	H	8.1	4.3	16.15	33.0	-16.9	
Mid Ch								
1880.00	20.48	V	8.2	4.3	16.58	33.0	-16.4	
1880.00	20.23	H	8.2	4.3	16.33	33.0	-16.7	
High Ch								
1902.50	20.86	V	8.2	4.2	16.88	33.0	-16.1	
1902.50	21.16	H	8.2	4.2	17.18	33.0	-15.8	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B2 15MHz QPSK

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/21/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 2, 15M, 16QAM

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1897.50	19.49	V	8.1	4.3	15.69	33.0	-17.3	Avg
1897.50	19.31	H	8.1	4.3	15.51	33.0	-17.5	
Mid Ch								
1880.00	19.62	V	8.2	4.3	15.72	33.0	-17.3	
1880.00	19.41	H	8.2	4.3	15.51	33.0	-17.5	
High Ch								
1902.50	20.20	V	8.2	4.2	16.20	33.0	-16.8	
1902.50	20.37	H	8.2	4.2	16.37	33.0	-16.6	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B2 15MHz 16QAM

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/21/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 2, 20M, QPSK

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1860.00	20.34	V	8.1	4.3	16.55	33.0	-16.4	Avg
1860.00	19.86	H	8.1	4.3	16.07	33.0	-16.9	
Mid Ch								
1880.00	21.15	V	8.2	4.3	17.25	33.0	-15.8	
1880.00	20.73	H	8.2	4.3	16.83	33.0	-16.2	
High Ch								
1900.00	21.43	V	8.2	4.2	17.47	33.0	-15.5	
1900.00	21.40	H	8.2	4.2	17.44	33.0	-15.6	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B2 20MHz QPSK

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/21/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 2, 20M, 16QAM

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1860.00	19.63	V	8.1	4.3	15.83	33.0	-17.2	Avg
1860.00	19.01	H	8.1	4.3	15.21	33.0	-17.8	
Mid Ch								
1880.00	20.44	V	8.2	4.3	16.54	33.0	-16.5	
1880.00	20.04	H	8.2	4.3	16.14	33.0	-16.9	
High Ch								
1900.00	20.45	V	8.2	4.2	16.45	33.0	-16.6	
1900.00	20.46	H	8.2	4.2	16.46	33.0	-16.5	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B2 20MHz 16QAM

**LTE Band 4**

BW (MHz)	Mode	RB/RB Size	f(MHz)	EIRP	
				dBm	mW
1.4	QPSK	1/0	1710.7	18.84	76.56
		1/0	1732.5	18.40	69.18
		1/0	1754.3	18.48	70.47
	16QAM	1/0	1710.7	18.19	65.92
		1/0	1732.5	17.68	58.61
		1/0	1754.3	17.71	59.02
3	QPSK	1/0	1711.5	19.08	80.91
		1/0	1732.5	19.22	83.56
		1/0	1753.5	18.61	72.61
	16QAM	1/0	1711.5	18.26	66.99
		1/0	1732.5	18.52	71.12
		1/0	1753.5	17.85	60.95
5	QPSK	1/0	1712.5	19.01	79.62
		1/0	1732.5	19.13	81.85
		1/0	1752.5	18.69	73.96
	16QAM	1/0	1712.5	18.40	69.18
		1/0	1732.5	18.48	70.47
		1/0	1752.5	18.12	64.86
10	QPSK	1/0	1715	19.75	94.41
		1/0	1732.5	19.54	89.95
		1/0	1750	19.05	80.35
	16QAM	1/0	1715	18.87	77.09
		1/0	1732.5	18.93	78.16
		1/0	1750	18.26	66.99
15	QPSK	1/0	1717.5	19.37	86.50
		1/0	1732.5	19.27	84.53
		1/0	1747.5	19.20	83.18
	16QAM	1/0	1717.5	18.50	70.79
		1/0	1732.5	18.50	70.79
		1/0	1747.5	18.43	69.66
20	QPSK	1/0	1720	19.41	87.30
		1/0	1732.5	19.42	87.50
		1/0	1745	19.52	89.54
	16QAM	1/0	1720	18.71	74.30
		1/0	1732.5	18.64	73.11
		1/0	1745	18.77	75.34

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/14/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 4, 1.4M, QPSK								
<b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1710.70	21.86	V	7.7	4.7	18.84	30.0	-11.2	
1710.70	17.37	H	7.7	4.7	14.35	30.0	-15.6	
Mid Ch								
1732.50	21.52	V	7.8	4.6	18.40	30.0	-11.6	
1732.50	18.01	H	7.8	4.6	14.89	30.0	-15.1	
High Ch								
1754.30	21.72	V	7.8	4.6	18.48	30.0	-11.5	
1754.30	17.26	H	7.8	4.6	14.02	30.0	-16.0	
Rev: 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B4 1.4MHz QPSK

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/14/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 4, 1.4M, 16QAM								
<b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1710.70	21.21	V	7.7	4.7	18.19	30.0	-11.8	
1710.70	16.47	H	7.7	4.7	13.45	30.0	-16.5	
Mid Ch								
1732.50	20.80	V	7.8	4.6	17.68	30.0	-12.3	
1732.50	17.22	H	7.8	4.6	14.10	30.0	-15.9	
High Ch								
1754.30	20.95	V	7.8	4.6	17.71	30.0	-12.3	
1754.30	16.66	H	7.8	4.6	13.42	30.0	-16.6	
Rev: 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B4 1.4MHz 16QAM

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/14/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 4, 3M, QPSK								
<b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1711.50	22.10	V	7.7	4.7	19.08	30.0	-10.9	
1711.50	17.51	H	7.7	4.7	14.49	30.0	-15.5	
Mid Ch								
1732.50	22.34	V	7.8	4.6	19.22	30.0	-10.8	
1732.50	17.98	H	7.8	4.6	14.86	30.0	-15.1	
High Ch								
1753.50	21.84	V	7.8	4.6	18.61	30.0	-11.4	
1753.50	17.41	H	7.8	4.6	14.18	30.0	-15.8	
Rev: 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B4 3MHz QPSK

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/14/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 4, 3M, 16QAM								
<b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1711.50	21.28	V	7.7	4.7	18.26	30.0	-11.7	
1711.50	17.04	H	7.7	4.7	14.02	30.0	-16.0	
Mid Ch								
1732.50	21.64	V	7.8	4.6	18.52	30.0	-11.5	
1732.50	17.30	H	7.8	4.6	14.18	30.0	-15.8	
High Ch								
1753.50	21.08	V	7.8	4.6	17.85	30.0	-12.2	
1753.50	16.45	H	7.8	4.6	13.22	30.0	-16.8	
Rev: 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B4 3MHz 16QAM

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/14/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 4, 5M, QPSK								
<b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.50	22.84	V	7.7	4.7	19.01	30.0	-11.0	
1712.50	18.37	H	7.7	4.7	15.34	30.0	-14.7	
Mid Ch								
1732.50	22.25	V	7.8	4.6	19.13	30.0	-10.9	
1732.50	18.32	H	7.8	4.6	15.20	30.0	-14.8	
High Ch								
1752.50	21.92	V	7.8	4.6	18.69	30.0	-11.3	
1752.50	17.49	H	7.8	4.6	14.26	30.0	-15.7	
Rev: 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B4 5MHz QPSK

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/14/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 4, 5M, 16QAM								
<b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.50	21.43	V	7.7	4.7	18.40	30.0	-11.6	
1712.50	17.55	H	7.7	4.7	14.52	30.0	-15.5	
Mid Ch								
1732.50	21.60	V	7.8	4.6	18.48	30.0	-11.5	
1732.50	17.39	H	7.8	4.6	14.27	30.0	-15.7	
High Ch								
1752.50	21.35	V	7.8	4.6	18.12	30.0	-11.9	
1752.50	16.72	H	7.8	4.6	13.49	30.0	-16.5	
Rev: 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B4 5MHz 16QAM

**Fundamental Substitution Measurement (Fc > 1GHz)**  
UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/14/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 4, 10M, QPSK

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1715.00	22.79	V	7.7	4.7	19.75	30.0	-10.2	
1715.00	17.08	H	7.7	4.7	14.04	30.0	-16.0	
Mid Ch								
1732.50	22.66	V	7.8	4.6	19.54	30.0	-10.5	
1732.50	18.52	H	7.8	4.6	15.40	30.0	-14.6	
High Ch								
1750.00	22.26	V	7.8	4.6	19.05	30.0	-11.0	
1750.00	17.51	H	7.8	4.6	14.30	30.0	-15.7	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B4 10MHz QPSK

**Fundamental Substitution Measurement (Fc > 1GHz)**  
UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/14/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 4, 10M, 16QAM

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1715.00	21.91	V	7.7	4.7	18.87	30.0	-11.1	
1715.00	16.25	H	7.7	4.7	13.21	30.0	-16.8	
Mid Ch								
1732.50	22.05	V	7.8	4.6	18.93	30.0	-11.1	
1732.50	17.89	H	7.8	4.6	14.77	30.0	-15.2	
High Ch								
1750.00	21.47	V	7.8	4.6	18.26	30.0	-11.7	
1750.00	16.65	H	7.8	4.6	13.44	30.0	-16.6	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B4 10MHz 16QAM

**Fundamental Substitution Measurement (Fc > 1GHz)**  
UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/14/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 4, 15M, QPSK

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1717.50	22.42	V	7.7	4.7	19.37	30.0	-10.6	
1717.50	17.09	H	7.7	4.7	14.04	30.0	-16.0	
Mid Ch								
1732.50	22.39	V	7.8	4.6	19.27	30.0	-10.7	
1732.50	18.16	H	7.8	4.6	15.04	30.0	-15.0	
High Ch								
1747.50	22.40	V	7.8	4.6	19.20	30.0	-10.8	
1747.50	17.82	H	7.8	4.6	14.62	30.0	-15.4	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B4 15MHz QPSK

**Fundamental Substitution Measurement (Fc > 1GHz)**  
UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/14/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 4, 15M, 16QAM

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1717.50	21.55	V	7.7	4.7	18.50	30.0	-11.5	
1717.50	16.32	H	7.7	4.7	13.27	30.0	-16.7	
Mid Ch								
1732.50	21.62	V	7.8	4.6	18.50	30.0	-11.5	
1732.50	17.44	H	7.8	4.6	14.32	30.0	-15.7	
High Ch								
1747.50	21.63	V	7.8	4.6	18.43	30.0	-11.6	
1747.50	17.03	H	7.8	4.6	13.83	30.0	-16.2	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B4 15MHz 16QAM

**Fundamental Substitution Measurement (Fc > 1GHz)**  
UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/14/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 4, 20M, QPSK

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1720.00	22.47	V	7.7	4.7	19.41	30.0	-10.6	
1720.00	17.77	H	7.7	4.7	14.71	30.0	-15.3	
Mid Ch								
1732.50	22.54	V	7.8	4.6	19.42	30.0	-10.6	
1732.50	17.96	H	7.8	4.6	14.84	30.0	-15.2	
High Ch								
1745.00	22.70	V	7.8	4.6	19.52	30.0	-10.5	
1745.00	17.98	H	7.8	4.6	14.80	30.0	-15.2	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B4 20MHz QPSK

**Fundamental Substitution Measurement (Fc > 1GHz)**  
UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/14/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 4, 20M, 16QAM

**Test Equipment:**  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1720.00	21.77	V	7.7	4.7	18.71	30.0	-11.3	
1720.00	17.11	H	7.7	4.7	14.05	30.0	-15.9	
Mid Ch								
1732.50	21.76	V	7.8	4.6	18.64	30.0	-11.4	
1732.50	17.17	H	7.8	4.6	14.05	30.0	-15.9	
High Ch								
1745.00	21.95	V	7.8	4.6	18.77	30.0	-11.2	
1745.00	17.32	H	7.8	4.6	14.14	30.0	-15.9	

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

LTE B4 20MHz 16QAM

**LTE Band 5**

BW (MHz)	Mode	RB/RB Size	f(MHz)	ERP	
				dBm	mW
1.4	QPSK	1/0	824.7	16.86	48.53
		1/0	836.5	17.08	51.05
		1/0	848.3	16.33	42.95
	16QAM	1/0	824.7	15.84	38.37
		1/0	836.5	16.28	42.46
		1/0	848.3	15.32	34.04
3	QPSK	1/0	825.5	16.79	47.75
		1/0	836.5	17.01	50.23
		1/0	847.5	16.58	45.50
	16QAM	1/0	825.5	15.83	38.28
		1/0	836.5	16.17	41.40
		1/0	847.5	15.83	38.28
5	QPSK	1/0	826.5	16.84	48.31
		1/0	836.5	17.23	52.84
		1/0	846.5	16.61	45.81
	16QAM	1/0	826.5	15.98	39.63
		1/0	836.5	16.39	43.55
		1/0	846.5	15.86	38.55
10	QPSK	1/0	829	16.82	48.08
		1/0	836.5	17.11	51.40
		1/0	844	16.59	45.60
	16QAM	1/0	829	16.10	40.74
		1/0	836.5	16.30	42.66
		1/0	844	15.77	37.76

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/18/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE Sample #1) Mode: LTE 5, 1.4MHz, QPSK									
<b>Test Equipment:</b> Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
824.70	23.42	V	5.1	0.7	-1.45	16.86	38.5	-21.6	
824.70	14.10	H	5.1	0.7	-1.45	7.54	38.5	-30.9	
Mid Ch									
836.50	23.70	V	5.2	0.7	-1.45	17.00	38.5	-21.4	
836.50	14.33	H	5.2	0.7	-1.45	7.71	38.5	-30.7	
High Ch									
848.30	22.97	V	5.2	0.7	-1.45	16.33	38.5	-22.1	
848.30	15.10	H	5.2	0.7	-1.45	8.46	38.5	-30.0	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B5 1.4MHz QPSK

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/18/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE Sample #1) Mode: LTE 5, 1.4MHz, 16QAM									
<b>Test Equipment:</b> Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
824.70	22.40	V	5.1	0.7	-1.45	15.84	38.5	-22.6	
824.70	13.23	H	5.1	0.7	-1.45	6.67	38.5	-31.8	
Mid Ch									
836.50	22.90	V	5.2	0.7	-1.45	16.28	38.5	-22.2	
836.50	13.37	H	5.2	0.7	-1.45	6.75	38.5	-31.7	
High Ch									
848.30	21.96	V	5.2	0.7	-1.45	15.32	38.5	-23.1	
848.30	14.19	H	5.2	0.7	-1.45	7.55	38.5	-30.9	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B5 1.4MHz 16QAM

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/18/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE Sample #1) Mode: LTE 5, 3MHz, QPSK									
<b>Test Equipment:</b> Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
825.50	23.36	V	5.1	0.7	-1.45	16.79	38.5	-21.7	
825.50	14.22	H	5.1	0.7	-1.45	7.65	38.5	-30.8	
Mid Ch									
836.50	23.63	V	5.2	0.7	-1.45	17.01	38.5	-21.4	
836.50	14.44	H	5.2	0.7	-1.45	7.82	38.5	-30.6	
High Ch									
847.50	23.22	V	5.2	0.7	-1.45	16.58	38.5	-21.9	
847.50	15.15	H	5.2	0.7	-1.45	8.51	38.5	-29.9	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B5 3MHz QPSK

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/18/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE Sample #1) Mode: LTE 5, 3MHz, 16QAM									
<b>Test Equipment:</b> Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
825.50	22.40	V	5.1	0.7	-1.45	15.83	38.5	-22.6	
825.50	13.56	H	5.1	0.7	-1.45	6.99	38.5	-31.5	
Mid Ch									
836.50	22.79	V	5.2	0.7	-1.45	16.17	38.5	-22.3	
836.50	13.37	H	5.2	0.7	-1.45	6.75	38.5	-31.7	
High Ch									
847.50	22.47	V	5.2	0.7	-1.45	15.83	38.5	-22.6	
847.50	14.07	H	5.2	0.7	-1.45	7.43	38.5	-31.9	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B5 3MHz 16QAM

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/18/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE Sample #1) Mode: LTE 5, 5MHz, QPSK									
<b>Test Equipment:</b> Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
826.50	23.41	V	5.1	0.7	-1.45	16.84	38.5	-21.6	
826.50	14.41	H	5.1	0.7	-1.45	7.84	38.5	-30.6	
Mid Ch									
836.50	23.85	V	5.2	0.7	-1.45	17.23	38.5	-21.2	
836.50	14.54	H	5.2	0.7	-1.45	7.92	38.5	-30.5	
High Ch									
846.50	23.24	V	5.2	0.7	-1.45	16.61	38.5	-21.8	
846.50	15.11	H	5.2	0.7	-1.45	8.48	38.5	-30.0	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B5 5MHz QPSK

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/18/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE Sample #1) Mode: LTE 5, 5MHz, 16QAM									
<b>Test Equipment:</b> Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
826.50	22.55	V	5.1	0.7	-1.45	15.98	38.5	-22.5	
826.50	13.56	H	5.1	0.7	-1.45	6.99	38.5	-31.5	
Mid Ch									
836.50	23.01	V	5.2	0.7	-1.45	16.39	38.5	-22.1	
836.50	13.56	H	5.2	0.7	-1.45	6.94	38.5	-31.5	
High Ch									
846.50	22.49	V	5.2	0.7	-1.45	15.86	38.5	-22.6	
846.50	14.26	H	5.2	0.7	-1.45	7.63	38.5	-30.8	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B5 5MHz 16QAM

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/16/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (LTE Sample #1)  
 Mode: LTE 5, 10MHz, QPSK

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
829.00	23.40	V	5.1	0.7	-1.45	16.82	38.5	-21.6	
829.00	14.20	H	5.1	0.7	-1.45	7.62	38.5	-30.8	
Mid Ch									
836.50	23.73	V	5.2	0.7	-1.45	17.11	38.5	-21.3	
836.50	14.33	H	5.2	0.7	-1.45	7.71	38.5	-30.7	
High Ch									
844.00	23.22	V	5.2	0.7	-1.45	16.59	38.5	-21.9	
844.00	14.72	H	5.2	0.7	-1.45	8.09	38.5	-30.4	

Rev: 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

**LTE B5 10MHz QPSK**

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/16/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (LTE Sample #1)  
 Mode: LTE 5, 10MHz, 16QAM

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
829.00	22.68	V	5.1	0.7	-1.45	16.10	38.5	-22.4	
829.00	13.43	H	5.1	0.7	-1.45	6.85	38.5	-31.6	
Mid Ch									
836.50	22.92	V	5.2	0.7	-1.45	16.30	38.5	-22.1	
836.50	13.42	H	5.2	0.7	-1.45	6.80	38.5	-31.6	
High Ch									
844.00	22.40	V	5.2	0.7	-1.45	15.77	38.5	-22.7	
844.00	13.75	H	5.2	0.7	-1.45	7.12	38.5	-31.3	

Rev: 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

**LTE B5 10MHz 16QAM**

**LTE Band 7**

BW (MHz)	Mode	RB/RB Size	f(MHz)	EIRP (PEAK)	
				dBm	mW
5	QPSK	1/0	2502.5	23.36	216.77
		1/0	2535	25.63	365.59
		1/0	2567.5	26.30	426.58
	16QAM	1/0	2502.5	23.35	216.27
		1/0	2535	25.68	369.83
		1/0	2567.5	26.22	418.79
10	QPSK	1/0	2505	23.17	207.49
		1/0	2535	25.02	317.69
		1/0	2565	25.54	358.10
	16QAM	1/0	2505	23.21	209.41
		1/0	2535	25.11	324.34
		1/0	2565	25.58	361.41
15	QPSK	1/0	2507.5	23.35	216.27
		1/0	2535	24.94	311.89
		1/0	2562.5	25.18	329.61
	16QAM	1/0	2507.5	23.49	223.36
		1/0	2535	24.93	311.17
		1/0	2562.5	25.21	331.89
20	QPSK	1/0	2510	23.63	230.67
		1/0	2535	24.82	303.39
		1/0	2560	25.91	389.94
	16QAM	1/0	2510	23.70	234.42
		1/0	2535	24.80	302.00
		1/0	2560	25.98	396.28

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/20/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 7, 5M, QPSK <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2502.50	27.42	V	9.6	5.5	23.36	33.0	-9.6	Pk
2502.50	24.91	H	9.6	5.5	20.85	33.0	-12.1	Pk
Mid Ch								
2535.00	29.68	V	9.6	5.6	25.63	33.0	-7.4	Pk
2535.00	27.41	H	9.6	5.6	23.36	33.0	-9.6	Pk
High Ch								
2567.50	30.34	V	9.7	5.7	26.30	33.0	-6.7	Pk
2567.50	27.53	H	9.7	5.7	23.49	33.0	-9.5	Pk
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B7 5MHz QPSK

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/20/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 7, 5M, 16QAM <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2502.50	27.41	V	9.6	5.5	23.35	33.0	-9.7	Pk
2502.50	24.97	H	9.6	5.5	20.91	33.0	-12.1	Pk
Mid Ch								
2535.00	29.72	V	9.6	5.6	25.68	33.0	-7.3	Pk
2535.00	27.46	H	9.6	5.6	23.41	33.0	-9.6	Pk
High Ch								
2567.50	30.25	V	9.7	5.7	26.22	33.0	-6.8	Pk
2567.50	27.53	H	9.7	5.7	23.50	33.0	-9.5	Pk
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B7 5MHz 16QAM

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/20/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 7, 10M, QPSK <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2505.00	27.23	V	9.6	5.5	23.17	33.0	-9.8	Pk
2505.00	24.59	H	9.6	5.5	20.93	33.0	-12.1	Pk
Mid Ch								
2535.00	29.07	V	9.6	5.6	25.02	33.0	-8.0	Pk
2535.00	26.90	H	9.6	5.6	22.85	33.0	-10.2	Pk
High Ch								
2565.00	29.57	V	9.7	5.7	25.54	33.0	-7.5	Pk
2565.00	27.11	H	9.7	5.7	23.07	33.0	-9.9	Pk
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B7 10MHz QPSK

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/20/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 7, 10M, 16QAM <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2505.00	27.27	V	9.6	5.5	23.21	33.0	-9.8	Pk
2505.00	25.04	H	9.6	5.5	20.99	33.0	-12.0	Pk
Mid Ch								
2535.00	29.16	V	9.6	5.6	25.11	33.0	-7.9	Pk
2535.00	26.96	H	9.6	5.6	22.91	33.0	-10.1	Pk
High Ch								
2565.00	29.61	V	9.7	5.7	25.58	33.0	-7.4	Pk
2565.00	27.17	H	9.7	5.7	23.13	33.0	-9.9	Pk
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B7 10MHz 16QAM

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/20/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 7, 15M, QPSK <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2507.50	27.41	V	9.6	5.5	23.35	33.0	-9.6	Pk
2507.50	25.16	H	9.6	5.5	21.10	33.0	-11.9	Pk
Mid Ch								
2535.00	28.99	V	9.6	5.6	24.94	33.0	-8.1	Pk
2535.00	26.64	H	9.6	5.6	22.60	33.0	-10.4	Pk
High Ch								
2562.50	29.22	V	9.7	5.7	25.18	33.0	-7.8	Pk
2562.50	27.36	H	9.7	5.7	23.32	33.0	-9.7	Pk
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B7 15MHz QPSK

Fundamental Substitution Measurement (Fc > 1GHz) UL LLC, Chamber N								
Company: SOMC Project #: 16J23633 Date: 07/20/2016 Test Engineer: Mark Nolting Configuration: Standalone (LTE sample #1) Mode: LTE 7, 15M, 16QAM <b>Test Equipment:</b> Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2507.50	27.55	V	9.6	5.5	23.49	33.0	-9.5	Pk
2507.50	25.33	H	9.6	5.5	21.28	33.0	-11.7	Pk
Mid Ch								
2535.00	28.98	V	9.6	5.6	24.93	33.0	-8.1	Pk
2535.00	26.61	H	9.6	5.6	22.56	33.0	-10.4	Pk
High Ch								
2562.50	29.25	V	9.7	5.7	25.21	33.0	-7.8	Pk
2562.50	27.37	H	9.7	5.7	23.33	33.0	-9.7	Pk
Rev. 11.02.2015 Note: For Band 4 EIRP limit is 30dBm								

LTE B7 15MHz 16QAM

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/20/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 7, 20M, QPSK

Test Equipment:  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2510.00	27.69	V	9.6	5.5	23.63	33.0	-9.4	Pk
2510.00	25.72	H	9.6	5.5	21.66	33.0	-11.3	Pk
Mid Ch								
2535.00	28.87	V	9.6	5.6	24.82	33.0	-8.2	Pk
2535.00	26.69	H	9.6	5.6	22.64	33.0	-10.4	Pk
High Ch								
2560.00	29.94	V	9.7	5.7	25.91	33.0	-7.1	Pk
2560.00	28.19	H	9.7	5.7	24.15	33.0	-8.8	Pk

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

**LTE B7 20MHz QPSK**

**Fundamental Substitution Measurement (Fc > 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/20/2016  
 Test Engineer: Mark Nolting  
 Configuration: Standalone (LTE sample #1)  
 Mode: LTE 7, 20M, 16QAM

Test Equipment:  
 Substitution: Horn antenna AT0078, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
2510.00	27.76	V	9.6	5.5	23.70	33.0	-9.3	Pk
2510.00	25.81	H	9.6	5.5	21.75	33.0	-11.2	Pk
Mid Ch								
2535.00	28.85	V	9.6	5.6	24.80	33.0	-8.2	Pk
2535.00	26.64	H	9.6	5.6	22.59	33.0	-10.4	Pk
High Ch								
2560.00	30.02	V	9.7	5.7	25.98	33.0	-7.0	Pk
2560.00	28.18	H	9.7	5.7	24.15	33.0	-8.9	Pk

Rev. 11.02.2015  
 Note: For Band 4 EIRP limit is 30dBm

**LTE B7 20MHz 16QAM**

**LTE Band 12**

BW (MHz)	Mode	RB/RB Size	f(MHz)	ERP	
				dBm	mW
1.4	QPSK	1/0	699.7	13.38	21.78
		1/0	707.5	13.89	24.49
		1/0	715.3	14.01	25.18
	16QAM	1/0	699.7	12.40	17.38
		1/0	707.5	12.90	19.50
		1/0	715.3	13.06	20.23
3	QPSK	1/0	700.5	13.53	22.54
		1/0	707.5	13.87	24.38
		1/0	714.5	13.89	24.49
	16QAM	1/0	700.5	12.67	18.49
		1/0	707.5	13.06	20.23
		1/0	714.5	13.04	20.14
5	QPSK	1/0	701.5	14.16	26.06
		1/0	707.5	13.51	22.44
		1/0	713.5	13.69	23.39
	16QAM	1/0	701.5	13.27	21.23
		1/0	707.5	12.44	17.54
		1/0	713.5	12.74	18.79
10	QPSK	1/0	704	14.14	25.94
		1/0	707.5	13.47	22.23
		1/0	711	14.28	26.79
	16QAM	1/0	704	13.12	20.51
		1/0	707.5	12.59	18.16
		1/0	711	13.35	21.63

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/20/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE Sample #1) Mode: LTE 12, 1.4MHz, QPSK									
Test Equipment: Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
699.70	18.19	V	4.7	2.0	-0.15	13.38	38.5	-25.1	Avg.
699.70	6.93	H	4.7	2.0	-0.15	2.12	38.5	-36.3	
Mid Ch									
707.50	18.82	V	4.7	1.9	-0.24	13.89	38.5	-24.6	Avg.
707.50	7.04	H	4.7	1.9	-0.24	2.11	38.5	-36.3	
High Ch									
715.30	19.07	V	4.7	1.8	-0.33	14.01	38.5	-24.4	Avg.
715.30	8.88	H	4.7	1.8	-0.33	3.02	38.5	-35.4	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B12 1.4MHz QPSK

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/20/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE Sample #1) Mode: LTE 12, 1.4MHz, 16QAM									
Test Equipment: Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
699.70	17.21	V	4.7	2.0	-0.15	12.40	38.5	-26.0	Avg.
699.70	5.83	H	4.7	2.0	-0.15	1.02	38.5	-37.4	
Mid Ch									
707.50	17.83	V	4.7	1.9	-0.24	12.90	38.5	-25.5	Avg.
707.50	6.09	H	4.7	1.9	-0.24	1.16	38.5	-37.3	
High Ch									
715.30	18.12	V	4.7	1.8	-0.33	13.06	38.5	-25.4	Avg.
715.30	7.04	H	4.7	1.8	-0.33	1.98	38.5	-36.5	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B12 1.4MHz 16QAM

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/19/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE Sample #1) Mode: LTE 12, 3MHz, QPSK									
Test Equipment: Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
700.50	18.35	V	4.7	2.0	-0.16	13.53	38.5	-24.9	Avg.
700.50	5.88	H	4.7	2.0	-0.16	1.06	38.5	-37.4	
Mid Ch									
707.50	18.80	V	4.7	1.9	-0.24	13.87	38.5	-24.6	Avg.
707.50	7.33	H	4.7	1.9	-0.24	2.40	38.5	-36.0	
High Ch									
714.50	19.03	V	4.7	1.8	-0.32	13.80	38.5	-24.5	Avg.
714.50	7.79	H	4.7	1.8	-0.32	2.74	38.5	-35.7	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B12 3MHz QPSK

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/19/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE Sample #1) Mode: LTE 12, 3MHz, 16QAM									
Test Equipment: Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
700.50	17.49	V	4.7	2.0	-0.16	12.67	38.5	-25.8	Avg.
700.50	4.98	H	4.7	2.0	-0.16	0.16	38.5	-38.3	
Mid Ch									
707.50	17.99	V	4.7	1.9	-0.24	13.06	38.5	-25.4	Avg.
707.50	6.39	H	4.7	1.9	-0.24	1.46	38.5	-37.0	
High Ch									
714.50	18.09	V	4.7	1.8	-0.32	13.04	38.5	-25.4	Avg.
714.50	6.75	H	4.7	1.8	-0.32	1.70	38.5	-36.7	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B12 3MHz 16QAM

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/19/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE Sample #1) Mode: LTE 12, 5MHz, QPSK									
Test Equipment: Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
701.50	18.99	V	4.7	2.0	-0.17	14.16	38.5	-24.3	Avg.
701.50	7.10	H	4.7	2.0	-0.17	2.27	38.5	-36.2	
Mid Ch									
707.50	18.44	V	4.7	1.9	-0.24	13.51	38.5	-24.9	Avg.
707.50	7.42	H	4.7	1.9	-0.24	2.49	38.5	-36.0	
High Ch									
713.50	18.72	V	4.7	1.8	-0.31	13.69	38.5	-24.8	Avg.
713.50	7.69	H	4.7	1.8	-0.31	2.66	38.5	-35.8	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B12 5MHz QPSK

Fundamental Substitution Measurement (Fc < 1GHz)									
UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/19/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE Sample #1) Mode: LTE 12, 5MHz, 16QAM									
Test Equipment: Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
701.50	18.10	V	4.7	2.0	-0.17	13.27	38.5	-25.2	Avg.
701.50	6.28	H	4.7	2.0	-0.17	1.45	38.5	-37.0	
Mid Ch									
707.50	17.37	V	4.7	1.9	-0.24	12.44	38.5	-26.0	Avg.
707.50	6.38	H	4.7	1.9	-0.24	1.45	38.5	-37.0	
High Ch									
713.50	17.77	V	4.7	1.8	-0.31	12.74	38.5	-25.7	Avg.
713.50	6.80	H	4.7	1.8	-0.31	1.77	38.5	-36.7	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B12 5MHz 16QAM

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/19/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE Sample #1)  
 Mode: LTE 12, 10MHz, QPSK

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
704.00	19.01	V	4.7	2.0	-0.20	14.14	38.5	-24.3	
704.00	7.17	H	4.7	2.0	-0.20	2.30	38.5	-36.2	Avg
Mid Ch									
707.50	18.40	V	4.7	1.9	-0.24	13.47	38.5	-25.0	
707.50	7.17	H	4.7	1.9	-0.24	2.24	38.5	-36.2	
High Ch									
711.00	19.27	V	4.7	1.9	-0.28	14.28	38.5	-24.2	
711.00	7.40	H	4.7	1.9	-0.28	2.41	38.5	-36.0	

Rev: 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

**LTE B12 10MHz QPSK**

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/19/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE Sample #1)  
 Mode: LTE 12, 10MHz, 16QAM

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
704.00	17.99	V	4.7	2.0	-0.20	13.12	38.5	-25.3	
704.00	6.25	H	4.7	2.0	-0.20	1.38	38.5	-37.1	Avg
Mid Ch									
707.50	17.52	V	4.7	1.9	-0.24	12.59	38.5	-25.9	
707.50	6.25	H	4.7	1.9	-0.24	1.32	38.5	-37.1	
High Ch									
711.00	18.34	V	4.7	1.9	-0.28	13.35	38.5	-25.1	
711.00	6.41	H	4.7	1.9	-0.28	1.42	38.5	-37.0	

Rev: 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

**LTE B12 10MHz 16QAM**

**LTE Band 13**

BW (MHz)	Mode	RB/RB Size	f(MHz)	ERP	
				dBm	mW
5	QPSK	1/0	779.5	16.06	40.36
		1/0	782	15.89	38.82
		1/0	784.5	15.82	38.19
	16QAM	1/0	779.5	15.10	32.36
		1/0	782	15.02	31.77
		1/0	784.5	14.98	31.48
10	QPSK	1/0	782	15.35	34.28
	16QAM	1/0	782	14.50	28.18

Fundamental Substitution Measurement (Fc < 1GHz) UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/21/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE Sample #1) Mode: LTE 13, 5MHz, QPSK									
Test Equipment: Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
779.50	22.21	V	4.9	0.9	-1.20	16.06	38.5	-22.4	
779.50	11.43	H	4.9	0.9	-1.20	5.28	38.5	-33.2	Avg
Mid Ch									
782.00	22.88	V	5.0	0.9	-1.23	15.89	38.5	-22.6	
782.00	11.87	H	5.0	0.9	-1.23	5.68	38.5	-32.8	
High Ch									
784.50	22.06	V	5.0	0.9	-1.26	15.82	38.5	-22.6	
784.50	12.88	H	5.0	0.9	-1.26	5.84	38.5	-32.6	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B13 5MHz QPSK

Fundamental Substitution Measurement (Fc < 1GHz) UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/21/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE Sample #1) Mode: LTE 13, 5MHz, 16QAM									
Test Equipment: Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
779.50	21.25	V	4.9	0.9	-1.20	15.10	38.5	-23.4	
779.50	10.52	H	4.9	0.9	-1.20	4.37	38.5	-34.1	Avg
Mid Ch									
782.00	21.21	V	5.0	0.9	-1.23	15.02	38.5	-23.4	
782.00	10.53	H	5.0	0.9	-1.23	4.74	38.5	-33.7	
High Ch									
784.50	21.22	V	5.0	0.9	-1.26	14.98	38.5	-23.5	
784.50	11.39	H	5.0	0.9	-1.26	5.15	38.5	-33.3	
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B13 5MHz 16QAM

Fundamental Substitution Measurement (Fc < 1GHz) UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/21/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE Sample #1) Mode: LTE 13, 10MHz, QPSK									
Test Equipment: Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
N/A	0.00	V				-2.15	38.5		
N/A	0.00	H				-2.15	38.5		
Mid Ch									
782.00	21.54	V	5.0	0.9	-1.23	15.35	38.5	-23.1	Avg
782.00	11.78	H	5.0	0.9	-1.23	5.59	38.5	-32.9	
High Ch									
N/A	0.00	V				-2.15	38.5		
N/A	0.00	H				-2.15	38.5		
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B13 10MHz QPSK

Fundamental Substitution Measurement (Fc < 1GHz) UL LLC, Chamber N									
Company: SOMC Project #: 16J23633 Date: 07/21/2016 Test Engineer: Brian Kiewra / John Manser Configuration: Standalone (LTE Sample #1) Mode: LTE 13, 10MHz, 16QAM									
Test Equipment: Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374									
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
N/A	0.00	V				-2.15	38.5		
N/A	0.00	H				-2.15	38.5		
Mid Ch									
782.00	20.69	V	5.0	0.9	-1.23	14.50	38.5	-24.0	Avg
782.00	10.84	H	5.0	0.9	-1.23	4.65	38.5	-33.8	
High Ch									
N/A	0.00	V				-2.15	38.5		
N/A	0.00	H				-2.15	38.5		
Rev: 11.02.2015 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm									

LTE B13 10MHz 16QAM

**LTE Band 17**

BW (MHz)	Mode	RB/RB Size	f(MHz)	ERP	
				dBm	mW
5	QPSK	1/0	706.5	13.55	22.65
		1/0	710	13.68	23.33
		1/0	713.5	14.33	27.10
	16QAM	1/0	706.5	12.76	18.88
		1/0	710	12.74	18.79
		1/0	713.5	13.39	21.83
10	QPSK	1/0	709	14.04	25.35
		1/0	710	13.92	24.66
		1/0	711	14.35	27.23
	16QAM	1/0	709	13.07	20.28
		1/0	710	13.09	20.37
		1/0	711	13.42	21.98

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/21/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE Sample #1)  
 Mode: LTE 17, 5MHz, QPSK

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
706.50	18.46	V	4.7	1.9	-0.23	13.55	38.5	-24.9	Avg
706.50	6.71	H	4.7	1.9	-0.23	1.80	38.5	-36.7	
Mid Ch									
710.00	18.65	V	4.7	1.9	-0.27	13.68	38.5	-24.8	Avg
710.00	6.81	H	4.7	1.9	-0.27	1.84	38.5	-36.6	
High Ch									
713.50	19.36	V	4.7	1.8	-0.31	14.33	38.5	-24.1	Avg
713.50	7.44	H	4.7	1.8	-0.31	2.41	38.5	-36.0	

Rev: 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE B17 5MHz QPSK

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/21/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE Sample #1)  
 Mode: LTE 17, 5MHz, 16QAM

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
706.50	17.67	V	4.7	1.9	-0.23	12.76	38.5	-25.7	Avg
706.50	5.88	H	4.7	1.9	-0.23	0.97	38.5	-37.5	
Mid Ch									
710.00	17.71	V	4.7	1.9	-0.27	12.74	38.5	-25.7	Avg
710.00	5.74	H	4.7	1.9	-0.27	0.77	38.5	-37.7	
High Ch									
713.50	18.42	V	4.7	1.8	-0.31	13.39	38.5	-25.1	Avg
713.50	6.55	H	4.7	1.8	-0.31	1.52	38.5	-36.9	

Rev: 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE B17 5MHz 16QAM

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/21/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE Sample #1)  
 Mode: LTE 17, 10MHz, QPSK

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
709.00	19.00	V	4.7	1.9	-0.26	14.04	38.5	-24.4	Avg
709.00	6.65	H	4.7	1.9	-0.26	1.69	38.5	-36.8	
Mid Ch									
710.00	18.89	V	4.7	1.9	-0.27	13.92	38.5	-24.5	Avg
710.00	7.11	H	4.7	1.9	-0.27	2.14	38.5	-36.3	
High Ch									
711.00	19.34	V	4.7	1.9	-0.28	14.35	38.5	-24.1	Avg
711.00	6.26	H	4.7	1.9	-0.28	1.27	38.5	-37.2	

Rev: 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE B17 10MHz QPSK

**Fundamental Substitution Measurement (Fc < 1GHz)**  
 UL LLC, Chamber N

Company: SOMC  
 Project #: 16J23633  
 Date: 07/21/2016  
 Test Engineer: Brian Kiewra / John Manser  
 Configuration: Standalone (LTE Sample #1)  
 Mode: LTE 17, 10MHz, 16QAM

**Test Equipment:**  
 Substitution: Dipole antenna AT0016, cable CBL055, and signal-source T374

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low									
709.00	18.03	V	4.7	1.9	-0.26	13.07	38.5	-25.4	Avg
709.00	5.88	H	4.7	1.9	-0.26	0.92	38.5	-37.5	
Mid Ch									
710.00	18.06	V	4.7	1.9	-0.27	13.09	38.5	-25.4	Avg
710.00	6.39	H	4.7	1.9	-0.27	1.42	38.5	-37.0	
High Ch									
711.00	18.41	V	4.7	1.9	-0.28	13.42	38.5	-25.0	Avg
711.00	5.38	H	4.7	1.9	-0.28	0.39	38.5	-38.1	

Rev: 11.02.2015  
 Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

LTE B17 10MHz 16QAM