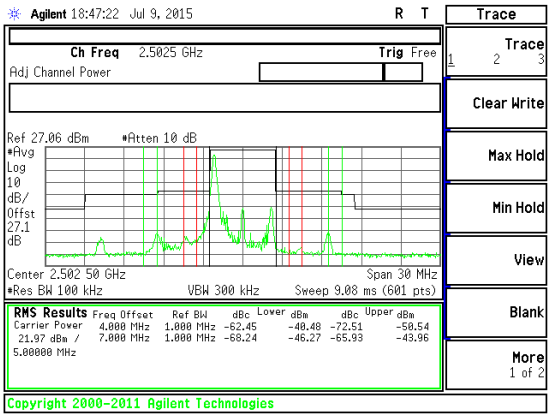
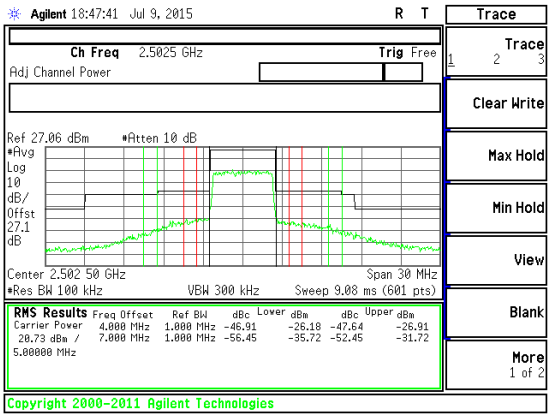
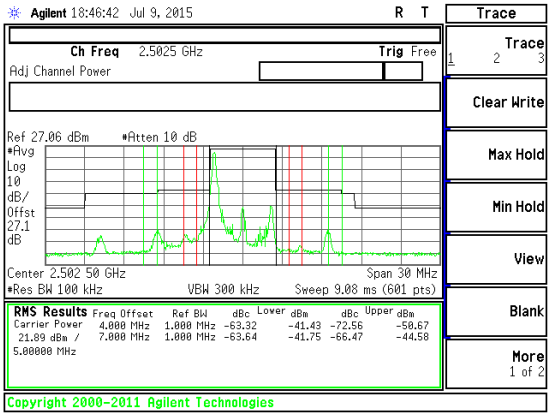
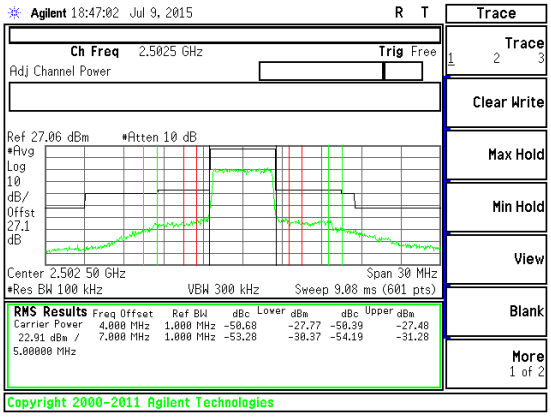
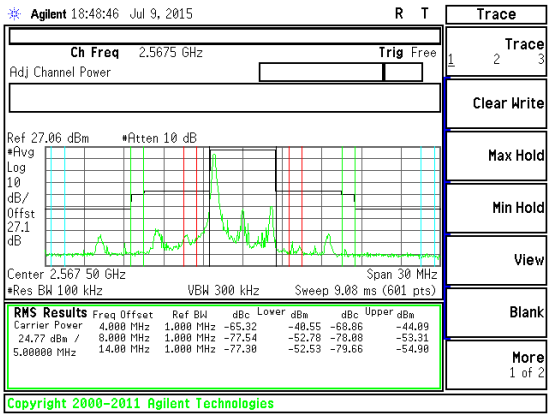
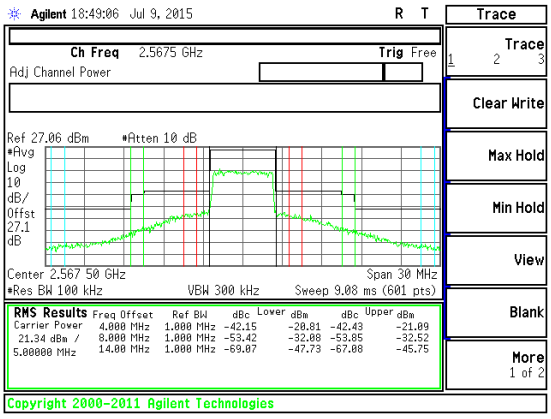
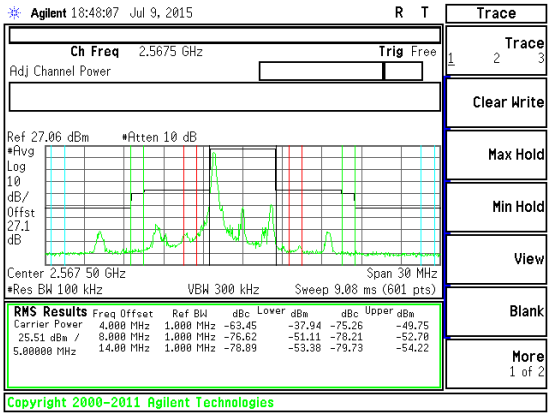
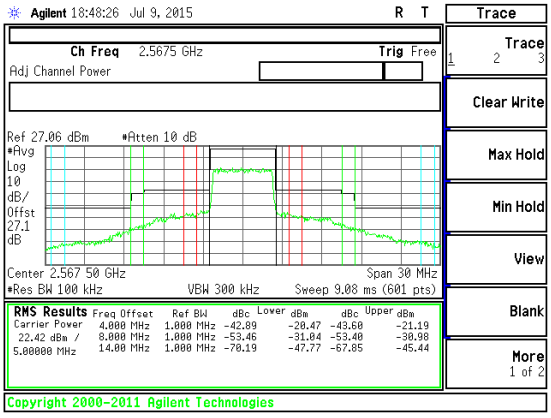
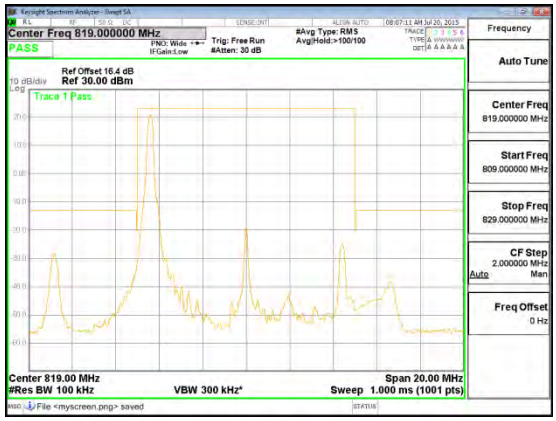
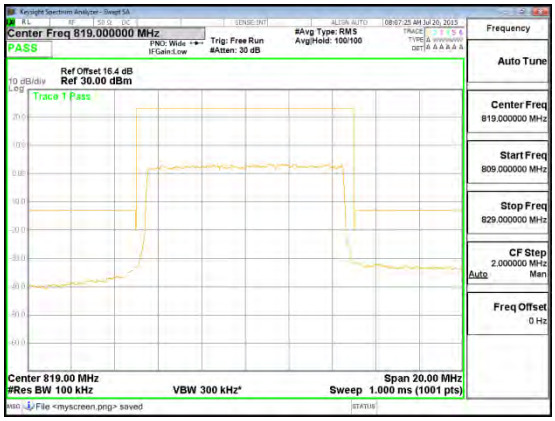
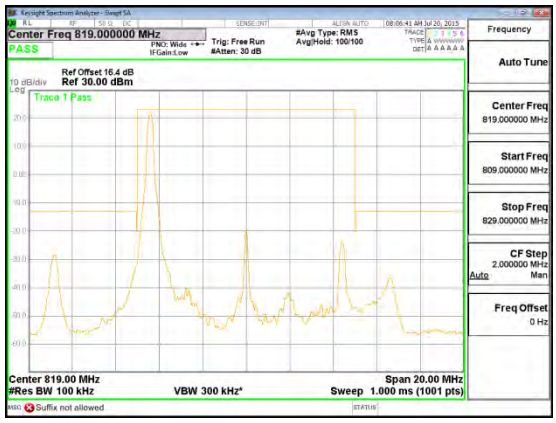
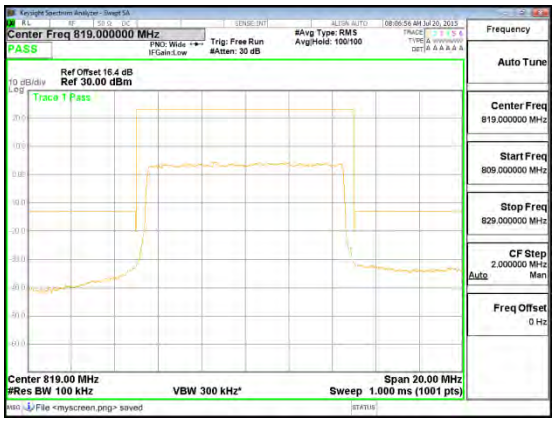
Band LTE7 5MHz 16QAM	 Band LTE7 5MHz EM 16QAM Low Channel 1RB.gif	 Band LTE7 5MHz EM 16QAM Low Channel FRB.gif
Band LTE7 5MHz QPSK	 Band LTE7 5MHz EM QPSK Low Channel 1RB.gif	 Band LTE7 5MHz EM QPSK Low Channel FRB.gif

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

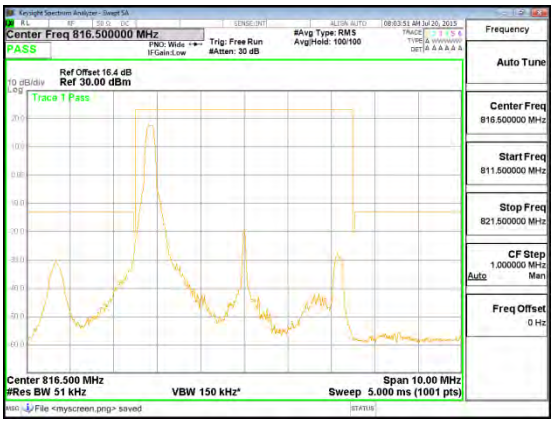
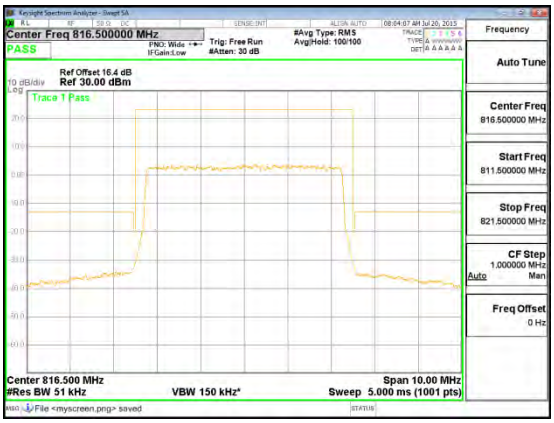
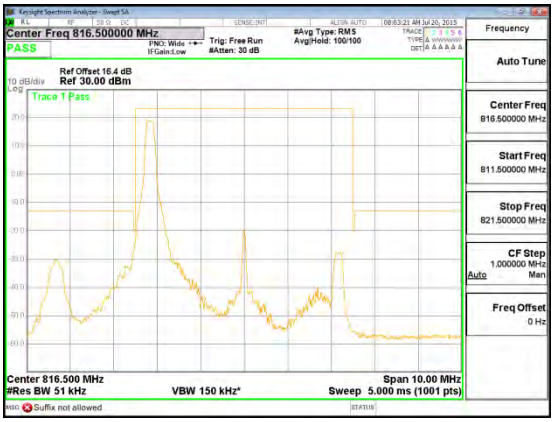
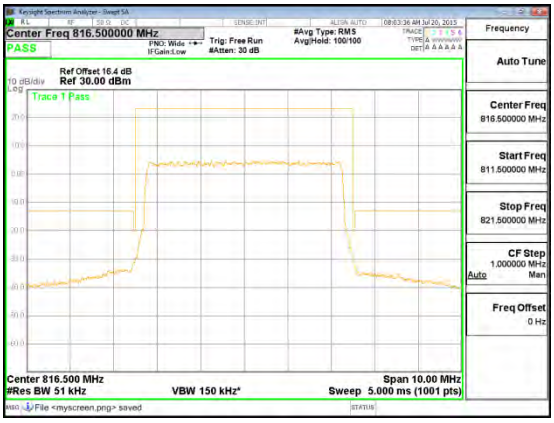
Band LTE7 5MHz 16QAM	 Band LTE7 5MHz EM 16QAM High Channel 1RB.gif	 Band LTE7 5MHz EM 16QAM High Channel FRB.gif
Band LTE7 5MHz QPSK	 Band LTE7 5MHz EM QPSK High Channel 1RB.gif	 Band LTE7 5MHz EM QPSK High Channel FRB.gif

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

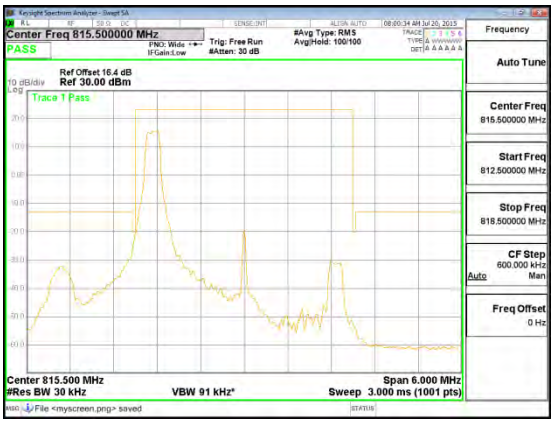
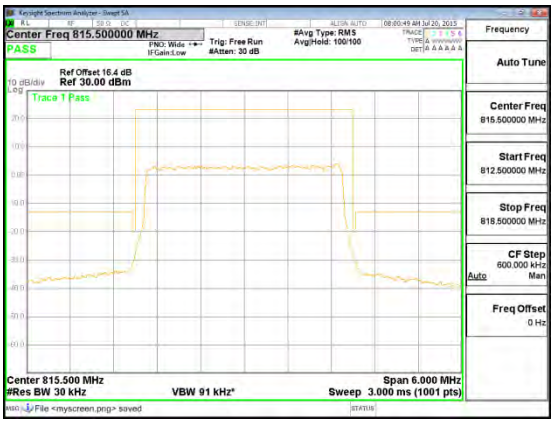
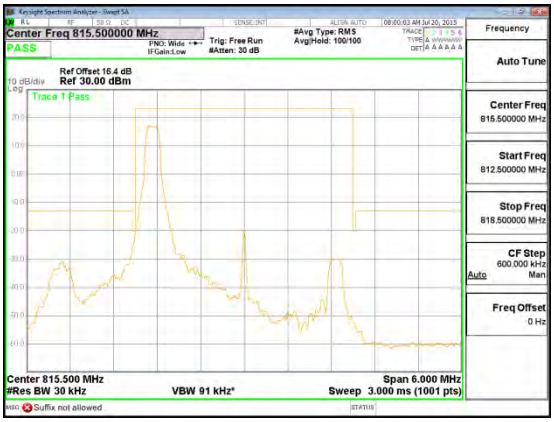
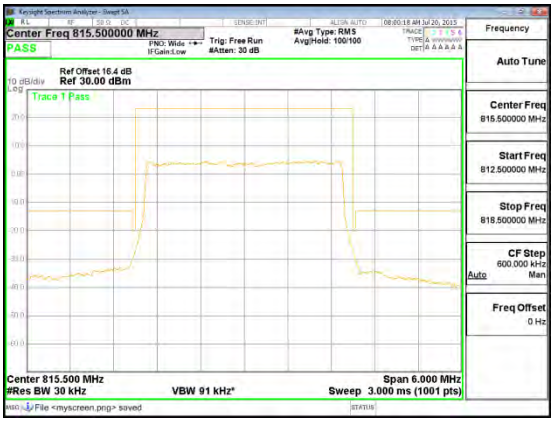
LTE Band 26

Band LTE26 10MHz 16QAM	 Band LTE26 10MHz EM 16QAM Low Channel 1RB.gif	 Band LTE26 10MHz EM 16QAM Low Channel FRB.gif
Band LTE26 10MHz QPSK	 Band LTE26 10MHz EM QPSK Low Channel 1RB.gif	 Band LTE26 10MHz EM QPSK Low Channel FRB.gif

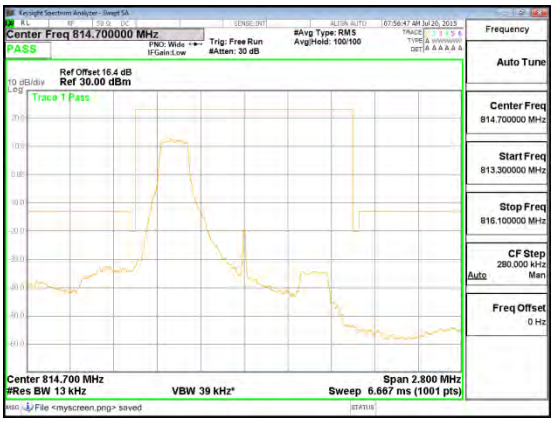
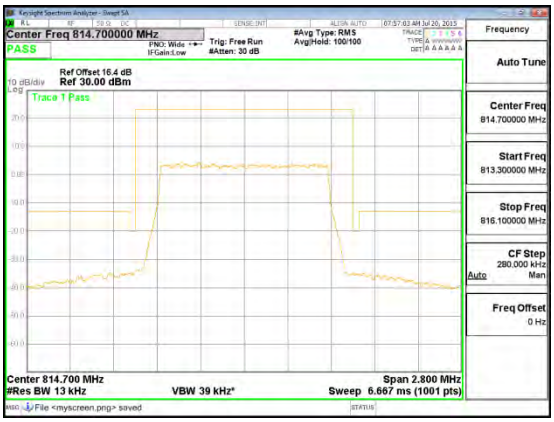
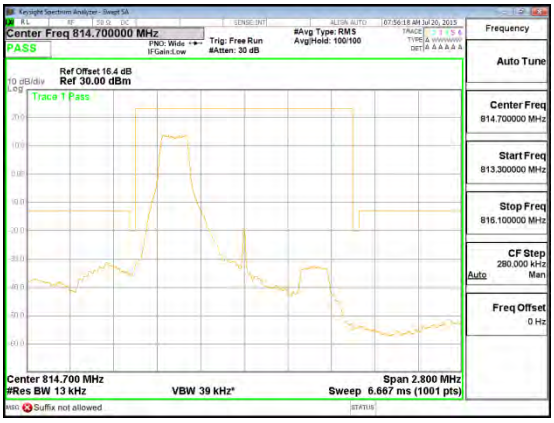
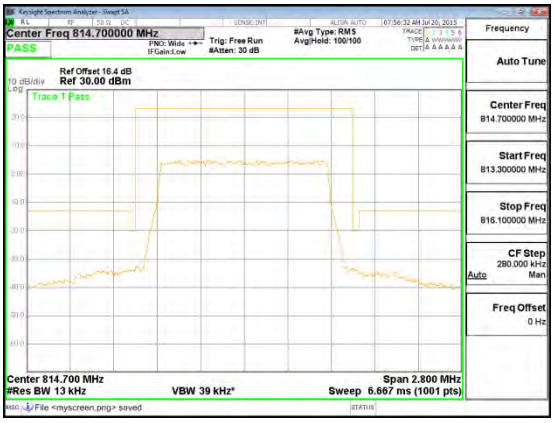
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE26 5MHz 16QAM	 Band LTE26 5MHz EM 16QAM Low Channel 1RB.gif	 Band LTE26 5MHz EM 16QAM Low Channel FRB.gif
Band LTE26 5MHz QPSK	 Band LTE26 5MHz EM QPSK Low Channel 1RB.gif	 Band LTE26 5MHz EM QPSK Low Channel FRB.gif

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

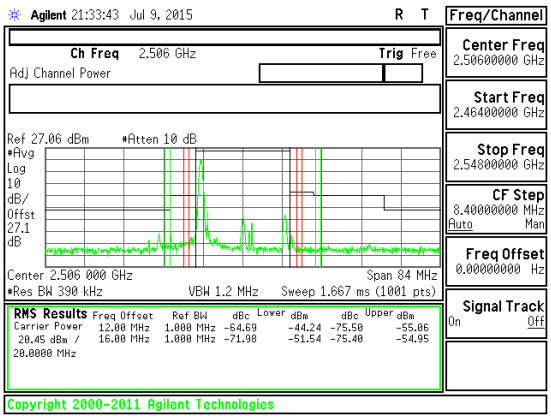
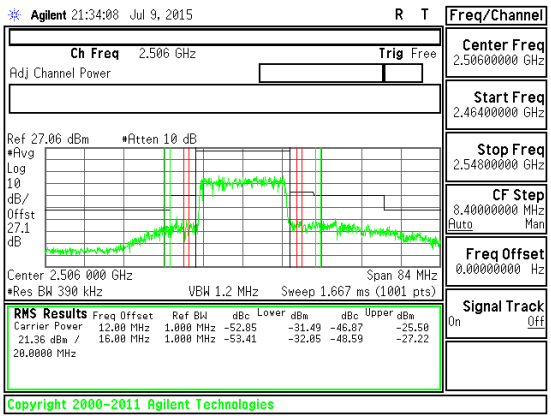
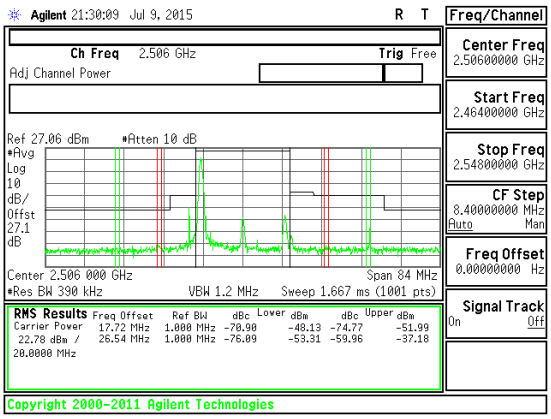
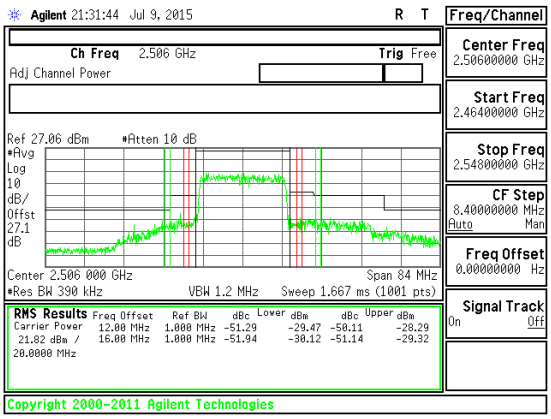
Band LTE26 3MHz 16QAM	 Band LTE26 3MHz EM 16QAM Low Channel 1RB.gif	 Band LTE26 3MHz EM 16QAM Low Channel FRB.gif
Band LTE26 3MHz QPSK	 Band LTE26 5MHz EM QPSK Low Channel 1RB.gif	 Band LTE26 3MHz EM QPSK Low Channel FRB.gif

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

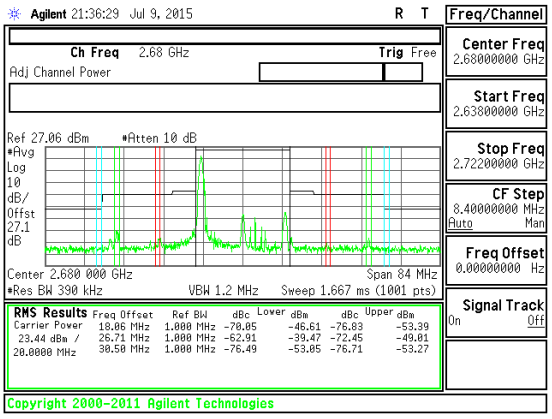
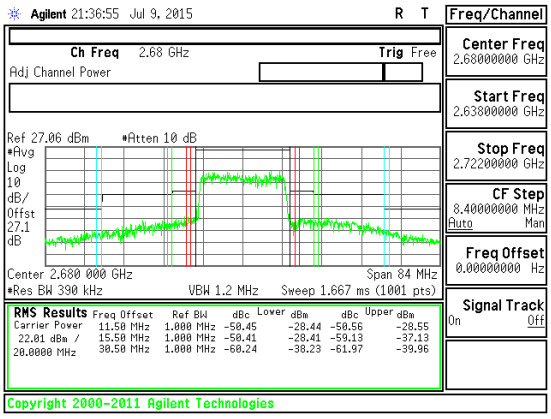
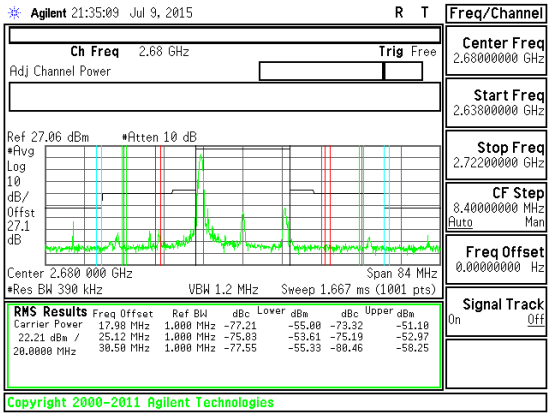
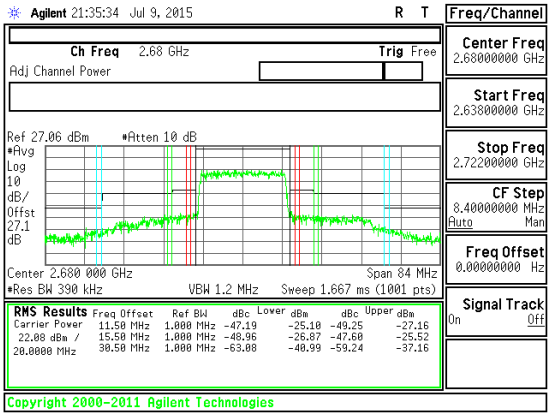
Band LTE26 1.4MHz 16QAM	 Band LTE26 1.4MHz EM 16QAM Low Channel 1RB.gif	 Band LTE26 1.4MHz EM 16QAM Low Channel FRB.gif
Band LTE26 1.4MHz QPSK	 Band LTE26 1.4MHz EM QPSK Low Channel 1RB.gif	 Band LTE26 1.4MHz EM QPSK Low Channel FRB.gif

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 41

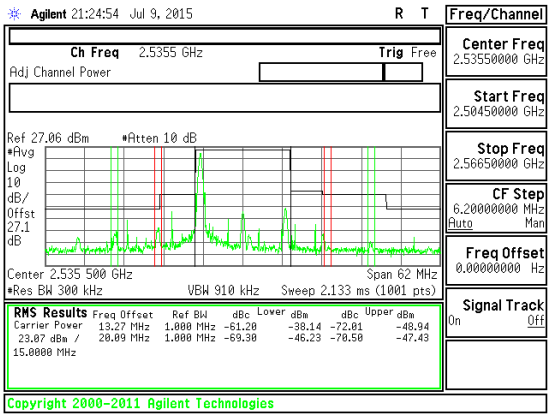
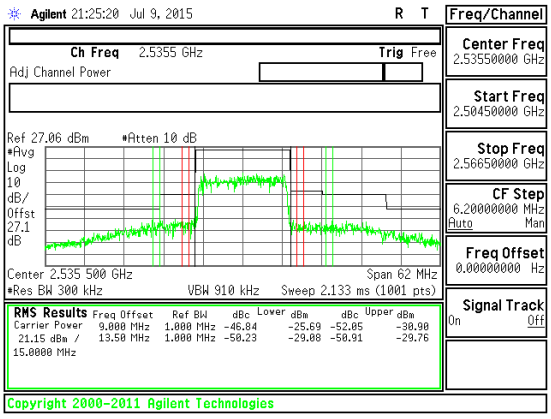
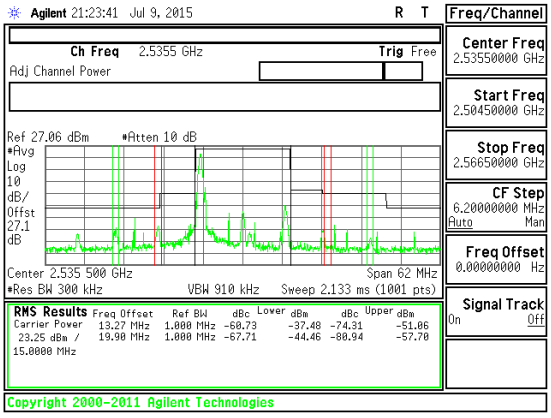
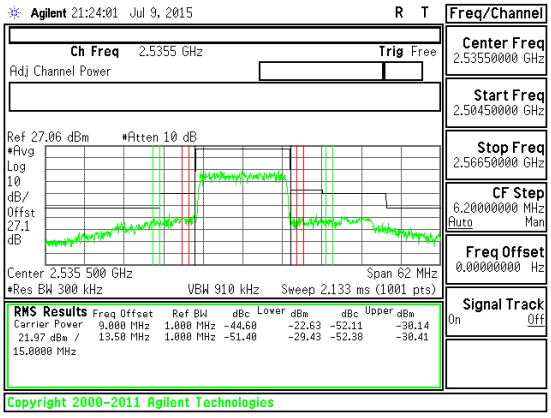
Band LTE41 20MHz 16QAM	 Band LTE41 20MHz EM 16QAM Low Channel 1RB.gif	 Band LTE41 20MHz EM 16QAM Low Channel FRB.gif
Band LTE41 20MHz QPSK	 Band LTE41 20MHz EM QPSK Low Channel 1RB.gif	 Band LTE41 20MHz EM QPSK Low Channel FRB.gif

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE41 20MHz 16QAM	 Band LTE41 20MHz EM 16QAM High Channel 1RB.gif	 Band LTE41 20MHz EM 16QAM High Channel FRB.gif
Band LTE41 20MHz QPSK	 Band LTE41 20MHz EM QPSK High Channel 1RB.gif	 Band LTE41 20MHz EM QPSK High Channel FRB.gif

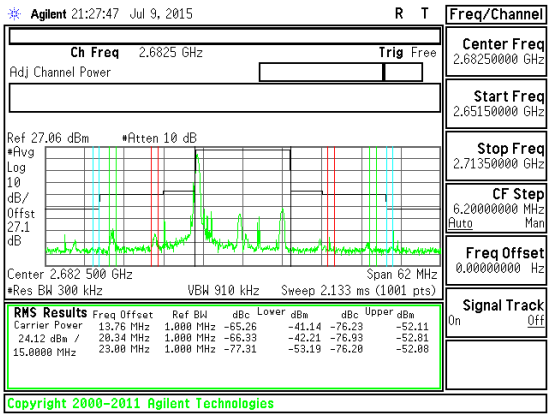
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

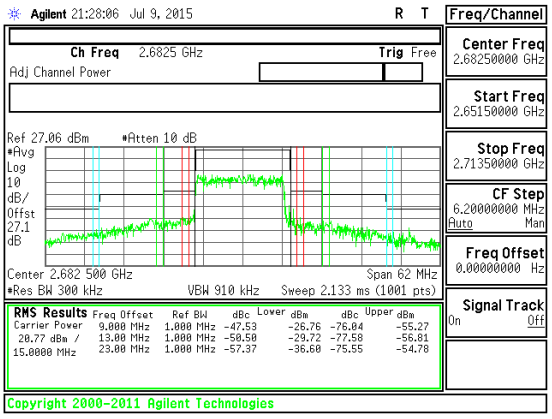
Band LTE41 15MHz 16QAM	 Band LTE41 15MHz EM 16QAM Low Channel 1RB.gif	 Band LTE41 15MHz EM 16QAM Low Channel FRB.gif
Band LTE41 15MHz QPSK	 Band LTE41 15MHz EM QPSK Low Channel 1RB.gif	 Band LTE41 15MHz EM QPSK Low Channel FRB.gif

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE41 15MHz 16QAM

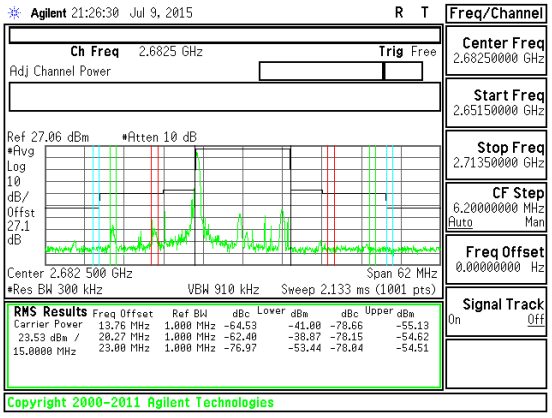


Band LTE41 15MHz EM 16QAM High Channel 1RB.gif

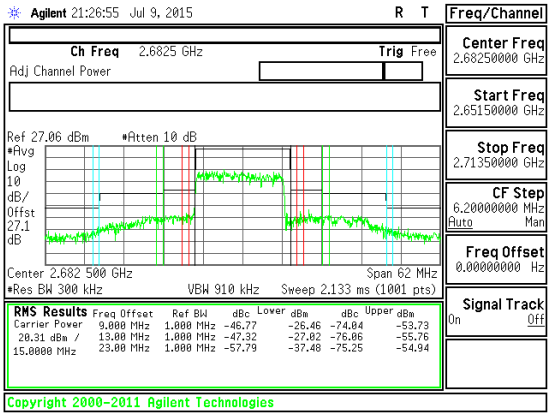


Band LTE41 15MHz EM 16QAM High Channel FRB.gif

Band LTE41 15MHz QPSK

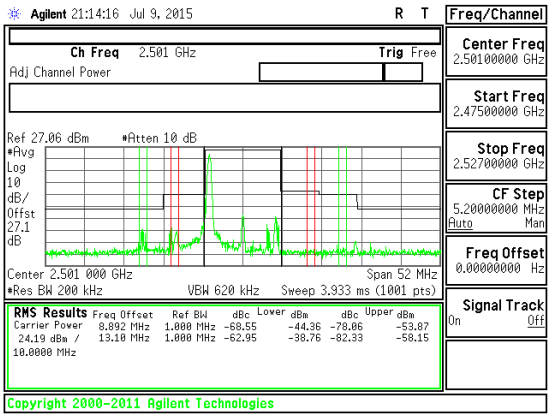
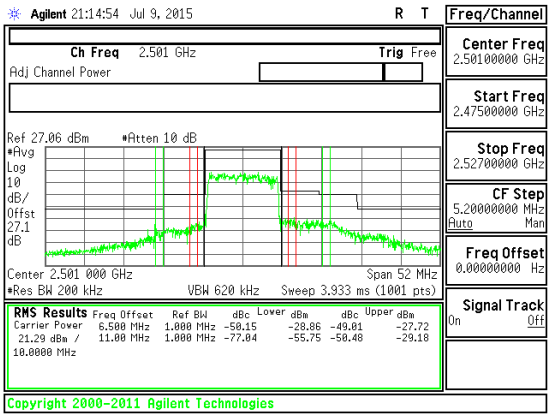
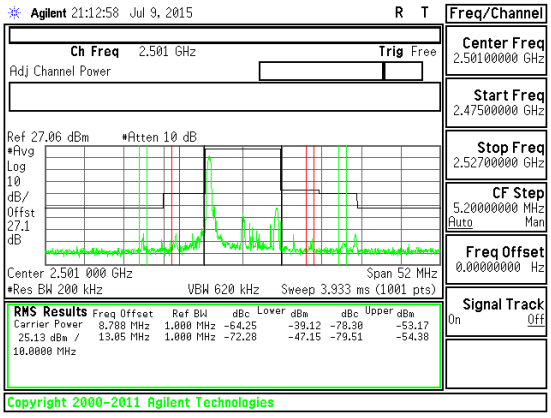
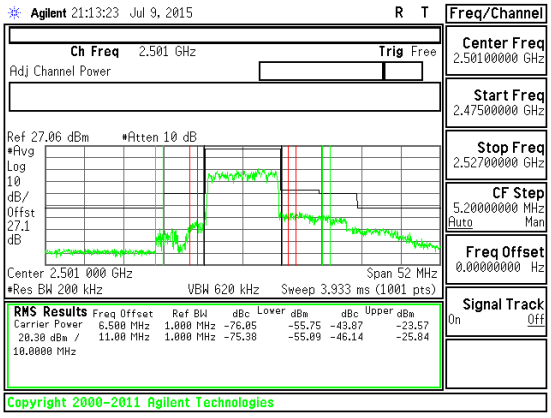


Band LTE41 15MHz EM QPSK High Channel 1RB.gif



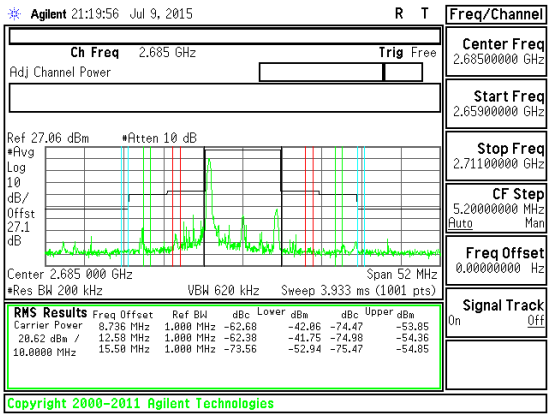
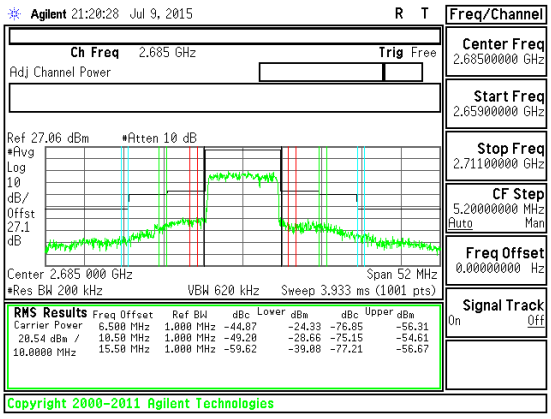
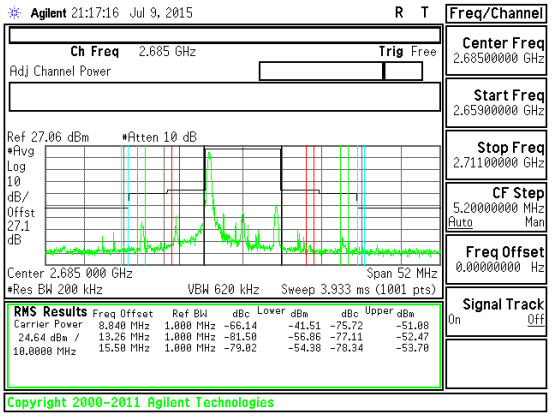
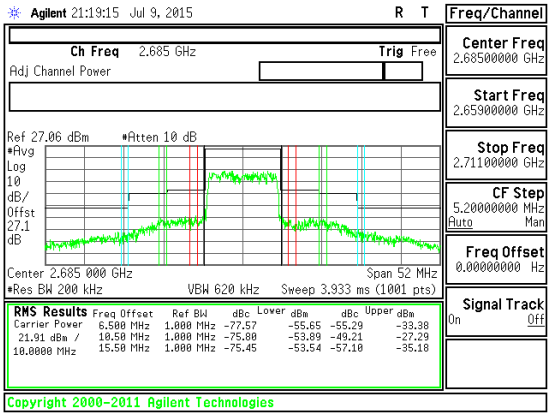
Band LTE41 15MHz EM QPSK High Channel FRB.gif

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

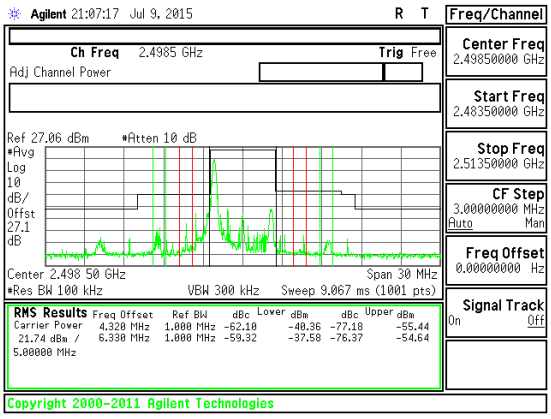
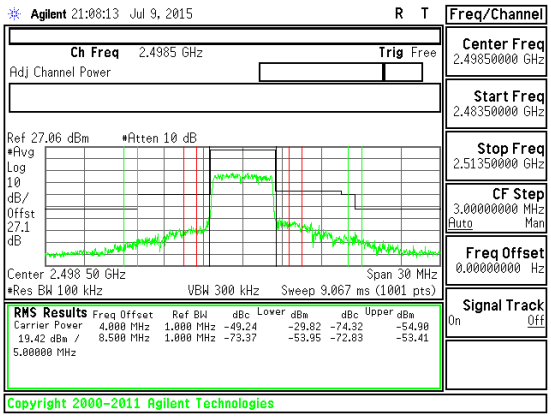
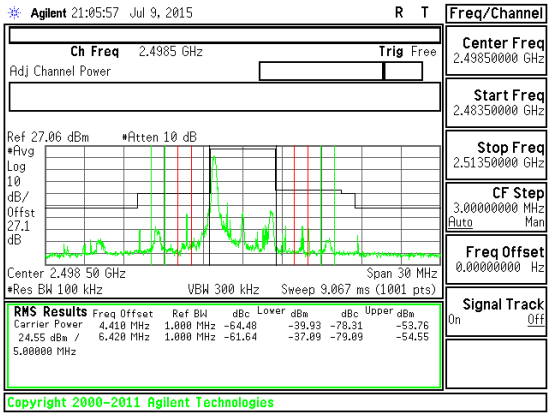
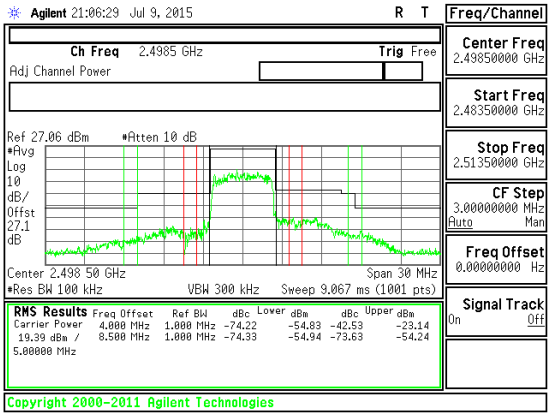
Band LTE41 10MHz 16QAM	 Band LTE41 10MHz EM 16QAM Low Channel 1RB.gif	 Band LTE41 10MHz EM 16QAM Low Channel FRB.gif
Band LTE41 10MHz QPSK	 Band LTE41 10MHz EM QPSK Low Channel 1RB.gif	 Band LTE41 10MHz EM QPSK Low Channel FRB.gif

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

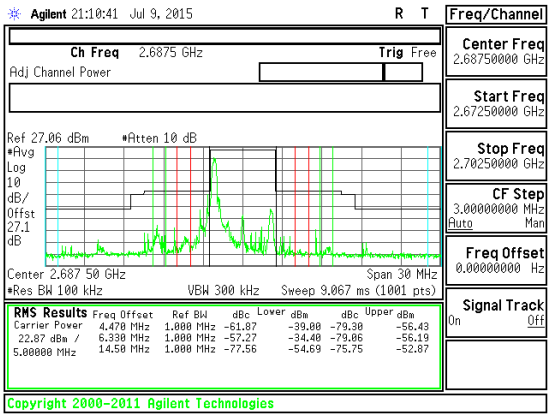
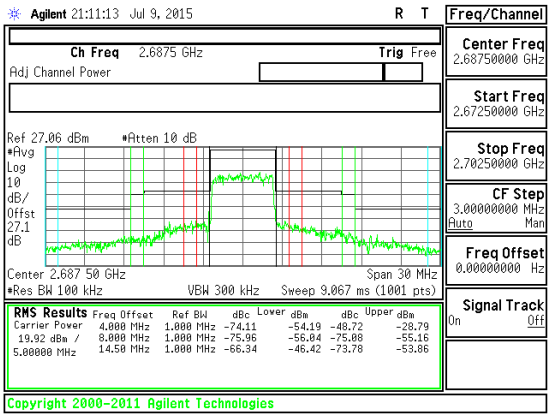
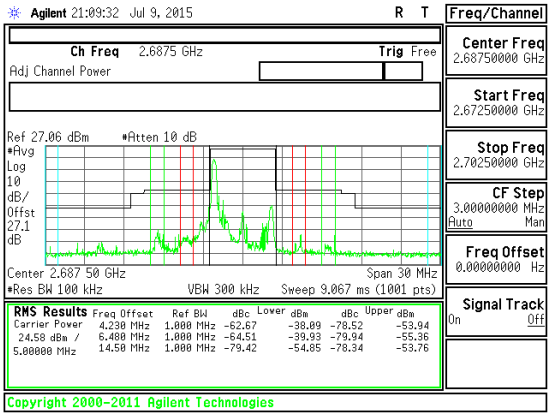
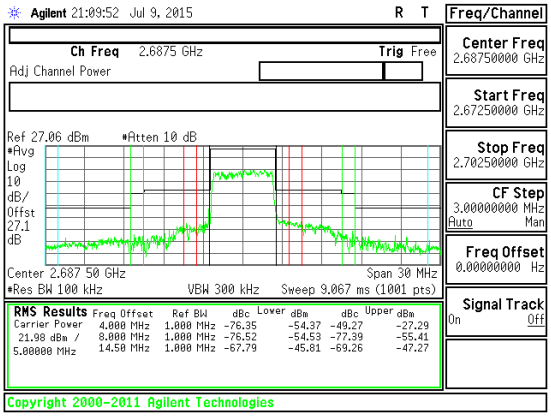
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE41 10MHz 16QAM	 Band LTE41 10MHz EM 16QAM High Channel 1RB.gif	 Band LTE41 10MHz EM 16QAM High Channel FRB.gif
Band LTE41 10MHz QPSK	 Band LTE41 10MHz EM QPSK High Channel 1RB.gif	 Band LTE41 10MHz EM QPSK High Channel FRB.gif

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE41 5MHz 16QAM	 Band LTE41 5MHz EM 16QAM Low Channel 1RB.gif	 Band LTE41 5MHz EM 16QAM Low Channel FRB.gif
Band LTE41 5MHz QPSK	 Band LTE41 5MHz EM QPSK Low Channel 1RB.gif	 Band LTE41 5MHz EM QPSK Low Channel FRB.gif

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE41 5MHz 16QAM	 Band LTE41 5MHz EM 16QAM High Channel 1RB.gif	 Band LTE41 5MHz EM 16QAM High Channel FRB.gif
Band LTE41 5MHz QPSK	 Band LTE41 5MHz EM QPSK High Channel 1RB.gif	 Band LTE41 5MHz EM QPSK High Channel FRB.gif

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238, §27.53 and §90.691

LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

Part 27: (m)(4) (4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

MODES TESTED

GSM, WCDMA, CDMA, and LTE

RESULTS

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.3.1. OUT OF BAND EMISSIONS RESULT

GSM

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM 850	GPRS	824.2	-19.168	-13	-6.168
		836.6	-19.14	-13	-6.14
		848.8	-19.017	-13	-6.017
	EGPRS	824.2	-18.52	-13	-5.52
		836.6	-19.664	-13	-6.664
		848.8	-18.725	-13	-5.725
GSM 1900	GPRS	1850.2	-18.348	-13	-5.348
		1880	-18.723	-13	-5.723
		1909.8	-18.18	-13	-5.18
	EGPRS	1850.2	-19.172	-13	-6.172
		1880	-18.88	-13	-5.88
		1909.8	-18.869	-13	-5.869

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

WCDMA

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
Band 5	REL99	826.4	-28.175	-13	-15.175
		836.6	-28.345	-13	-15.345
		846.6	-28.462	-13	-15.462
	HSDPA	826.4	-28.563	-13	-15.563
		836.6	-28.933	-13	-15.933
		846.6	-28.668	-13	-15.668
Band 4	REL99	1712.4	-28.504	-13	-15.504
		1732.6	-28.072	-13	-15.072
		1752.6	-28.796	-13	-15.796
	HSDPA	1712.4	-28.361	-13	-15.361
		1732.6	-27.497	-13	-14.497
		1752.6	-28.181	-13	-15.181
Band 2	REL99	1852.4	-25.755	-13	-12.755
		1880	-27.201	-13	-14.201
		1907.6	-28.432	-13	-15.432
	HSDPA	1852.4	-26.551	-13	-13.551
		1880	-26.751	-13	-13.751
		1907.6	-27.646	-13	-14.646

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

CDMA

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
BC10	1xRTT	817.9	-27.6	-13	-14.6
		820.5	-27.18	-13	-14.18
		823.1	-26.85	-13	-13.85
	EVDO	817.9	-26.51	-13	-13.51
		820.5	-27.22	-13	-14.22
		823.1	-27.22	-13	-14.22
BC0	1xRTT	824.7	-27.932	-13	-14.932
		836.52	-27.012	-13	-14.012
		848.31	-27.64	-13	-14.64
	EVDO	824.7	-24.04	-13	-11.04
		836.52	-23.77	-13	-10.77
		848.31	-23.34	-13	-10.34
BC1	1xRTT	1851.25	-24.451	-13	-11.451
		1880	-25.625	-13	-12.625
		1908.75	-27.716	-13	-14.716
	EVDO	1851.25	-23.13	-13	-10.13
		1880	-23.701	-13	-10.701
		1908.75	-27.15	-13	-14.15

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 2

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	20	16QAM	1860	-21.73	-13	-8.73
			1880	-22.69	-13	-9.69
			1900	-21.91	-13	-8.91
		QPSK	1860	-20.906	-13	-7.906
			1880	-21.56	-13	-8.56
			1900	-21.98	-13	-8.98
	15	16QAM	1857.5	-22.632	-13	-9.632
			1880	-22.09	-13	-9.09
			1902.5	-21.062	-13	-8.062
		QPSK	1857.5	-21.924	-13	-8.924
			1880	-21.62	-13	-8.62
			1902.5	-20.857	-13	-7.857
	10	16QAM	1855	-22.434	-13	-9.434
			1880	-22.77	-13	-9.77
			1905	-22.05	-13	-9.05
		QPSK	1855	-22.687	-13	-9.687
			1880	-22.522	-13	-9.522
			1905	-22.57	-13	-9.57
	5	16QAM	1852.5	-22.072	-13	-9.072
			1880	-21.929	-13	-8.929
			1907.5	-22.384	-13	-9.384
		QPSK	1852.5	-22.466	-13	-9.466
			1880	-21.807	-13	-8.807
			1907.5	-22.433	-13	-9.433

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	3	16QAM	1851.5	-22.253	-13	-9.253
			1880	-21.848	-13	-8.848
			1908.5	-21.525	-13	-8.525
		QPSK	1851.5	-22.322	-13	-9.322
			1880	-22.007	-13	-9.007
			1908.5	-22.132	-13	-9.132
	1.4	16QAM	1850.7	-21.576	-13	-8.576
			1880	-22.362	-13	-9.362
			1909.3	-21.612	-13	-8.612
		QPSK	1850.7	-20.726	-13	-7.726
			1880	-21.735	-13	-8.735
			1909.3	-21.977	-13	-8.977

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 4

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	20	16QAM	1720	-21.79	-13	-8.79
			1732.5	-22.29	-13	-9.29
			1745	-22.36	-13	-9.36
		QPSK	1720	-22.01	-13	-9.01
			1732.5	-20.9	-13	-7.9
			1745	-21.84	-13	-8.84
	15	16QAM	1717.5	-22.32	-13	-9.32
			1732.5	-21.27	-13	-8.27
			1747.5	-21.55	-13	-8.55
		QPSK	1717.5	-22.49	-13	-9.49
			1732.5	-21.43	-13	-8.43
			1747.5	-21.83	-13	-8.83
	10	16QAM	1715	-21.994	-13	-8.994
			1732.5	-21.459	-13	-8.459
			1750	-21.722	-13	-8.722
		QPSK	1715	-22.74	-13	-9.74
			1732.5	-22.61	-13	-9.61
			1750	-22.15	-13	-9.15
	5	16QAM	1712.5	-22.021	-13	-9.021
			1732.5	-21.933	-13	-8.933
			1752.5	-22.472	-13	-9.472
		QPSK	1712.5	-22.091	-13	-9.091
			1732.5	-22.322	-13	-9.322
			1752.5	-22.17	-13	-9.17

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	3	16QAM	1711.5	-20.827	-13	-7.827
			1732.5	-21.126	-13	-8.126
			1753.5	-22.244	-13	-9.244
		QPSK	1711.5	-21.762	-13	-8.762
			1732.5	-22.039	-13	-9.039
			1753.5	-22.586	-13	-9.586
	1.4	16QAM	1710.7	-22.079	-13	-9.079
			1732.5	-22.371	-13	-9.371
			1754.3	-22.631	-13	-9.631
		QPSK	1710.7	-22.446	-13	-9.446
			1732.5	-22.211	-13	-9.211
			1754.3	-22.321	-13	-9.321

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 5

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE5	10	16QAM	829	-23.13	-13	-10.13
			836.5	-23.08	-13	-10.08
			844	-22.29	-13	-9.29
		QPSK	829	-22.21	-13	-9.21
			836.5	-22.58	-13	-9.58
			844	-21.95	-13	-8.95
	5	16QAM	826.5	-21.859	-13	-8.859
			836.5	-22.71	-13	-9.71
			846.5	-22.25	-13	-9.25
		QPSK	826.5	-22.38	-13	-9.38
			836.5	-21.746	-13	-8.746
			846.5	-22.93	-13	-9.93
	3	16QAM	825.5	-22.598	-13	-9.598
			836.5	-22.802	-13	-9.802
			847.5	-21.415	-13	-8.415
		QPSK	825.5	-22.283	-13	-9.283
			836.5	-22.482	-13	-9.482
			847.5	-22.404	-13	-9.404
	1.4	16QAM	824.7	-22.234	-13	-9.234
			836.5	-23.233	-13	-10.233
			848.3	-21.02	-13	-8.02
		QPSK	824.7	-22.02	-13	-9.02
			836.5	-22.352	-13	-9.352
			848.3	-22.509	-13	-9.509

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 7

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE7	20	16QAM	2510	-34.124	-25	-9.124
			2535	-34.101	-25	-9.101
			2560	-33.514	-25	-8.514
		QPSK	2510	-34.032	-25	-9.032
			2535	-34.464	-25	-9.464
			2560	-33.712	-25	-8.712
	15	16QAM	2507.5	-33.915	-25	-8.915
			2535	-34.184	-25	-9.184
			2562.5	-34.065	-25	-9.065
		QPSK	2507.5	-33.308	-25	-8.308
			2535	-33.219	-25	-8.219
			2562.5	-33.272	-25	-8.272
	10	16QAM	2505	-33.778	-25	-8.778
			2535	-34.121	-25	-9.121
			2565	-32.837	-25	-7.837
		QPSK	2505	-34.251	-25	-9.251
			2535	-33.876	-25	-8.876
			2565	-34.246	-25	-9.246
	5	16QAM	2502.5	-33.847	-25	-8.847
			2535	-34.392	-25	-9.392
			2567.5	-33.863	-25	-8.863
		QPSK	2502.5	-33.735	-25	-8.735
			2535	-33.86	-25	-8.86
			2567.5	-34.046	-25	-9.046

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 12

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE12	10	16QAM	704	-22.67	-13	-9.67
			707.5	-22.71	-13	-9.71
			711	-22.957	-13	-9.957
		QPSK	704	-22.667	-13	-9.667
			707.5	-22.262	-13	-9.262
			711	-22.159	-13	-9.159
	5	16QAM	701.5	-22.875	-13	-9.875
			707.5	-23.216	-13	-10.216
			713.5	-22.718	-13	-9.718
		QPSK	701.5	-22.274	-13	-9.274
			707.5	-21.895	-13	-8.895
			713.5	-22.54	-13	-9.54
	3	16QAM	700.5	-22.972	-13	-9.972
			707.5	-22.077	-13	-9.077
			714.5	-23.162	-13	-10.162
		QPSK	700.5	-23.213	-13	-10.213
			707.5	-22.403	-13	-9.403
			714.5	-22.559	-13	-9.559
	1.4	16QAM	699.7	-22.67	-13	-9.67
			707.5	-23.161	-13	-10.161
			715.3	-22.303	-13	-9.303
		QPSK	699.7	-21.676	-13	-8.676
			707.5	-22.971	-13	-9.971
			715.3	-22.544	-13	-9.544

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 13

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE13	10	16QAM	782	-22.73	-13	-9.73
			782	-22.73	-13	-9.73
			782	-22.73	-13	-9.73
		QPSK	782	-22.08	-13	-9.08
			782	-22.08	-13	-9.08
			782	-22.08	-13	-9.08
	5	16QAM	779.5	-23.172	-13	-10.172
			785	-22.274	-13	-9.274
			784.5	-22.721	-13	-9.721
		QPSK	779.5	-21.612	-13	-8.612
			785	-22.443	-13	-9.443
			784.5	-22.314	-13	-9.314

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 17

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE17	10	16QAM	709	-28.63	-13	-15.63
			710	-28.45	-13	-15.45
			711	-28.84	-13	-15.84
		QPSK	709	-27.91	-13	-14.91
			710	-28.35	-13	-15.35
			711	-28.63	-13	-15.63
	5	16QAM	706.5	-27.89	-13	-14.89
			710	-28.24	-13	-15.24
			713.5	-28.10	-13	-15.10
		QPSK	706.5	-29.00	-13	-16.00
			710	-28.49	-13	-15.49
			713.5	-27.96	-13	-14.96

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 25

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE25	20	16QAM	1860	-28.5	-13	-15.5
			1882.5	-28.32	-13	-15.32
			1905	-28.45	-13	-15.45
		QPSK	1860	-27.73	-13	-14.73
			1882.5	-27.74	-13	-14.74
			1905	-28.4	-13	-15.4
	15	16QAM	1857.5	-28.05	-13	-15.05
			1882.5	-27.41	-13	-14.41
			1907.5	-27.96	-13	-14.96
		QPSK	1857.5	-28.3	-13	-15.3
			1882.5	-27.03	-13	-14.03
			1907.5	-28.03	-13	-15.03
	10	16QAM	1855	-27.36	-13	-14.36
			1882.5	-28.57	-13	-15.57
			1910	-27.65	-13	-14.65
		QPSK	1855	-28.39	-13	-15.39
			1882.5	-28.26	-13	-15.26
			1910	-27.74	-13	-14.74
	5	16QAM	1852.5	-27.06	-13	-14.06
			1882.5	-28.13	-13	-15.13
			1912.5	-28.39	-13	-15.39
		QPSK	1852.5	-28.27	-13	-15.27
			1882.5	-27.53	-13	-14.53
			1912.5	-27.66	-13	-14.66

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE25	3	16QAM	1851.5	-27.93	-13	-14.93
			1882.5	-28.44	-13	-15.44
			1913.5	-27.90	-13	-14.90
		QPSK	1851.5	-27.85	-13	-14.85
			1882.5	-27.89	-13	-14.89
			1913.5	-27.22	-13	-14.22
	1.4	16QAM	1850.7	-27.42	-13	-14.42
			1882.5	-27.65	-13	-14.65
			1914.3	-28.05	-13	-15.05
		QPSK	1850.7	-24.44	-13	-11.44
			1882.5	-28.23	-13	-15.23
			1914.3	-27.56	-13	-14.56

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 26

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE26	15	16QAM	831.5	-21.60	-13	-8.60
			836.5	-23.96	-13	-10.96
			841.5	-22.53	-13	-9.53
		QPSK	831.5	-22.18	-13	-9.18
			836.5	-24.75	-13	-11.75
			841.5	-22.37	-13	-9.37
	10	16QAM	819	-22.72	-13	-9.72
			831.5	-22.29	-13	-9.29
			844	-22.03	-13	-9.03
		QPSK	819	-22.55	-13	-9.55
			831.5	-22.90	-13	-9.90
			844	-22.17	-13	-9.17
	5	16QAM	816.5	-21.72	-13	-8.72
			831.5	-22.30	-13	-9.30
			846.5	-22.95	-13	-9.95
		QPSK	816.5	-22.48	-13	-9.48
			831.5	-23.30	-13	-10.30
			846.5	-22.74	-13	-9.74
	3	16QAM	815.5	-22.24	-13	-9.24
			831.5	-22.15	-13	-9.15
			847.5	-21.74	-13	-8.74
		QPSK	815.5	-21.85	-13	-8.85
			831.5	-22.57	-13	-9.57
			847.5	-22.65	-13	-9.65
	1.4	16QAM	814.7	-22.04	-13	-9.04
			831.5	-22.57	-13	-9.57
			848.3	-22.40	-13	-9.40
		QPSK	814.7	-22.51	-13	-9.51
			831.5	-22.60	-13	-9.60
			848.3	-23.15	-13	-10.15

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

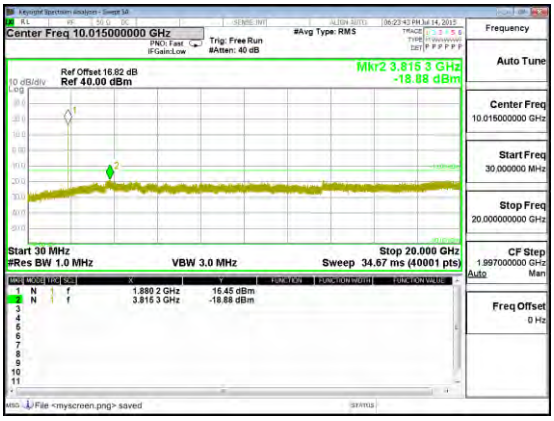
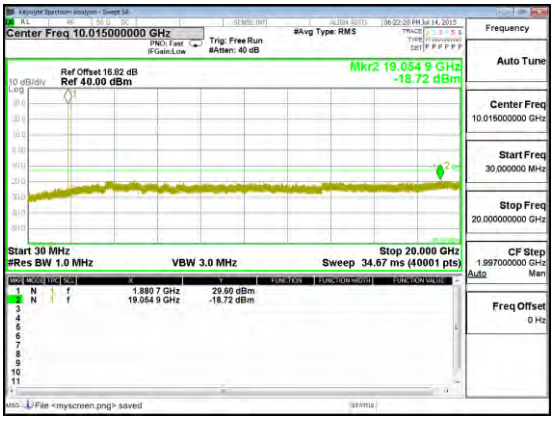
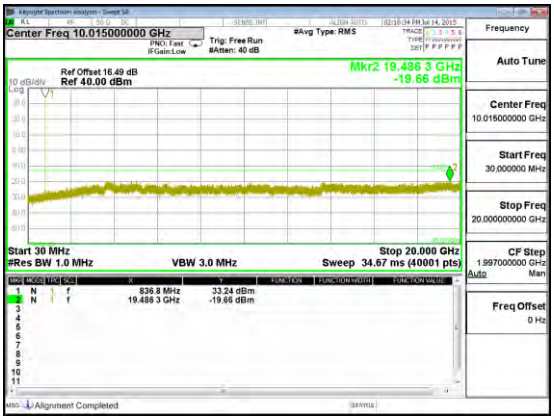
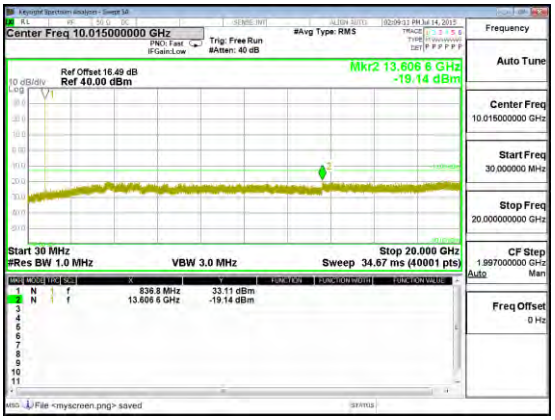
LTE Band 41

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE41	20	16QAM	2506	-33.49	-25	-8.49
			2593	-34.31	-25	-9.31
			2680	-34.01	-25	-9.01
		QPSK	2506	-34.38	-25	-9.38
			2593	-33.85	-25	-8.85
			2680	-33.90	-25	-8.90
	15	16QAM	2503.5	-33.07	-25	-8.07
			2593	-34.10	-25	-9.10
			2682.5	-33.95	-25	-8.95
		QPSK	2503.5	-34.38	-25	-9.38
			2593	-33.74	-25	-8.74
			2682.5	-33.64	-25	-8.64
	10	16QAM	2501	-32.55	-25	-7.55
			2593	-34.57	-25	-9.57
			2685	-33.68	-25	-8.68
		QPSK	2501	-33.54	-25	-8.54
			2593	-33.30	-25	-8.30
			2685	-34.09	-25	-9.09
	5	16QAM	2498.5	-33.94	-25	-8.94
			2593	-33.75	-25	-8.75
			2687.5	-33.67	-25	-8.67
		QPSK	2498.5	-33.32	-25	-8.32
			2593	-33.78	-25	-8.78
			2687.5	-33.18	-25	-8.18

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

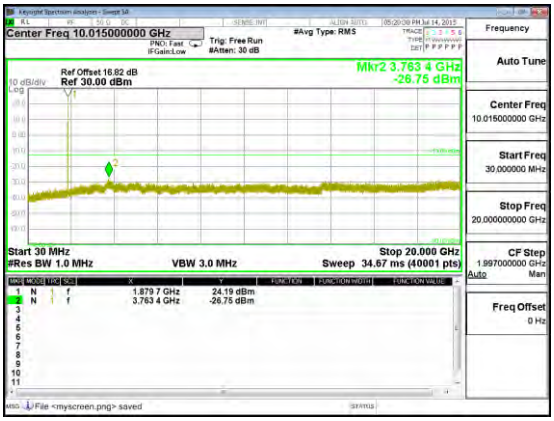
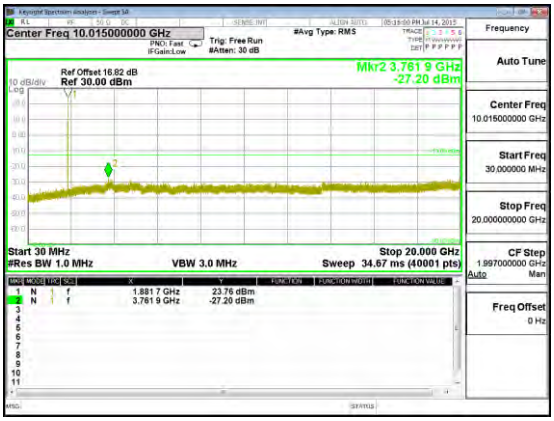
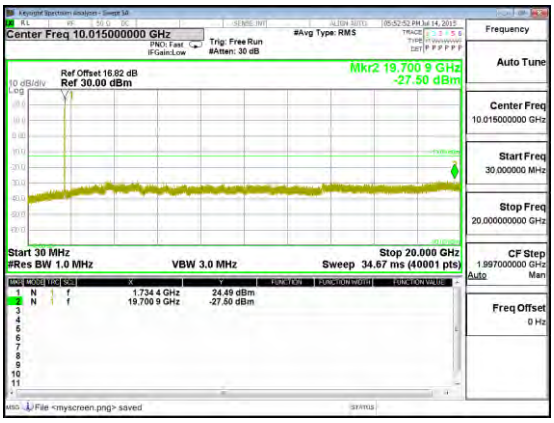
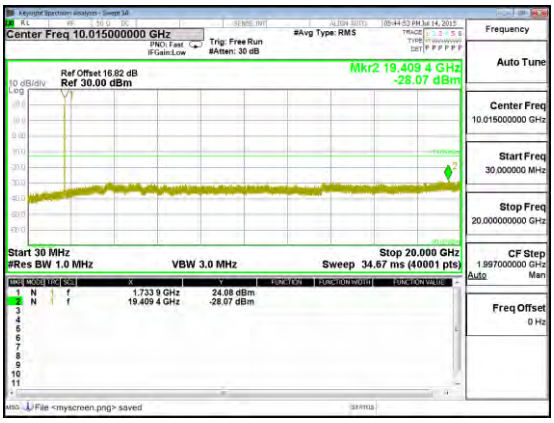
10.3.2. OUT OF BAND EMISSIONS PLOTS

GSM

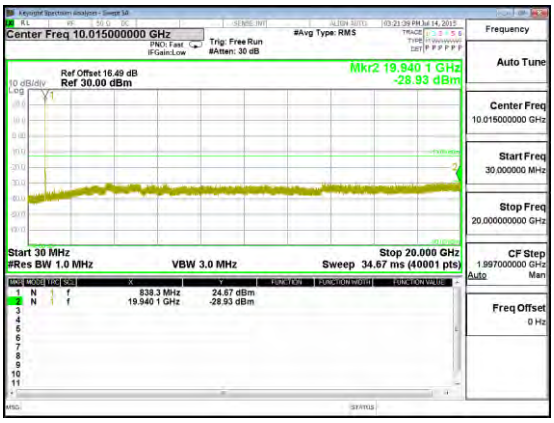
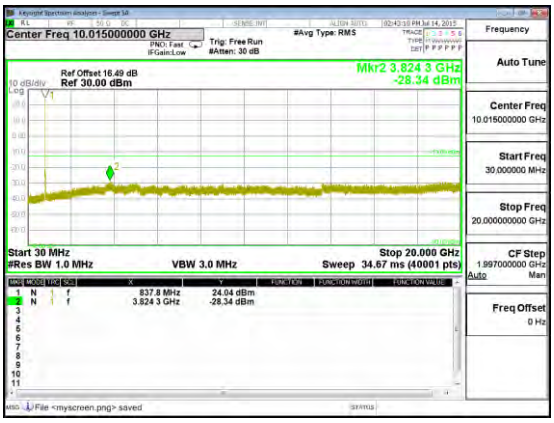
Band GSM1900 EGPRS	 Band GSM1900 EGPRS CSE Mid channel	 Band GSM1900 GPRS CSE Mid channel
Band GSM850 EGPRS	 Band GSM850 EGPRS CSE Mid channel	 Band GSM850 GPRS CSE Mid channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

WCDMA

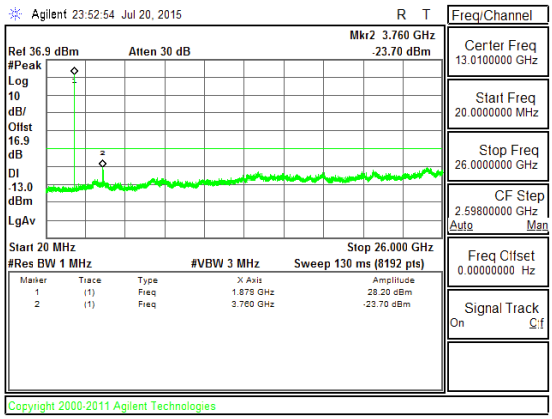
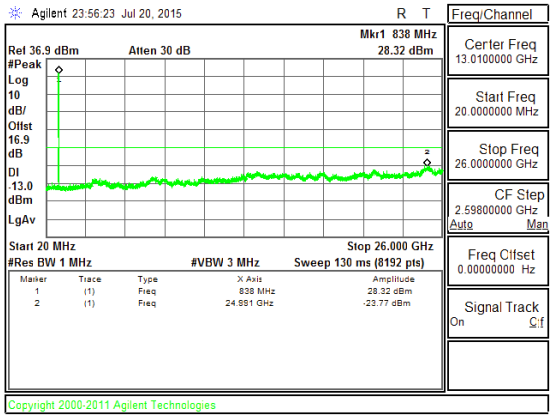
Band Band 2 HSDPA	 Band WCDMA B2 HSDPA CSE	 Band WCDMA B2 REL99 CSE
Band Band 4 HSDPA	 Band WCDMA B4 HSDPA CSE	 Band WCDMA B4 REL99 CSE

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

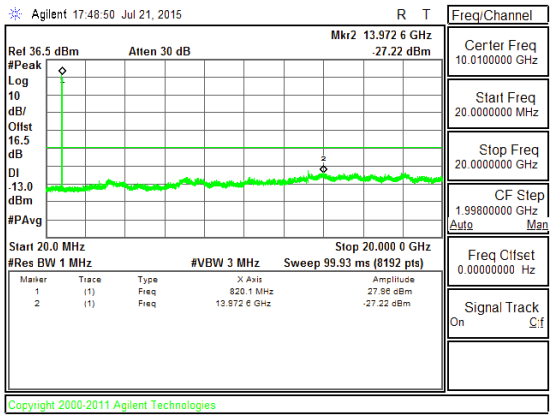
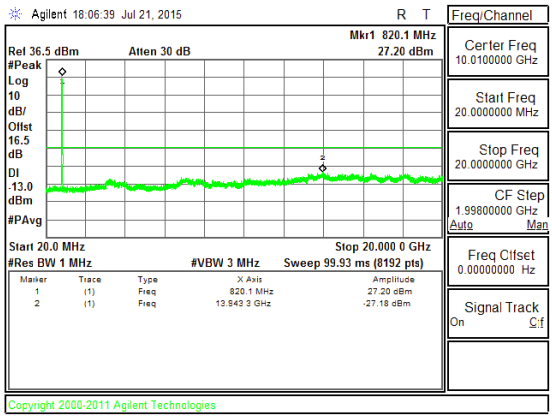
Band Band 5 HSDPA	 Band WCDMA B5 HSDPA CSE	 Band WCDMA B5 REL99 CSE

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

CDMA

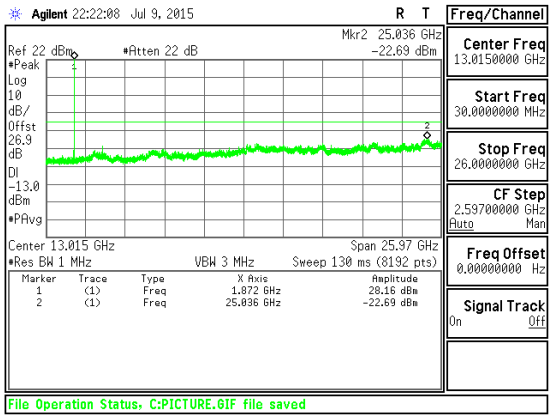
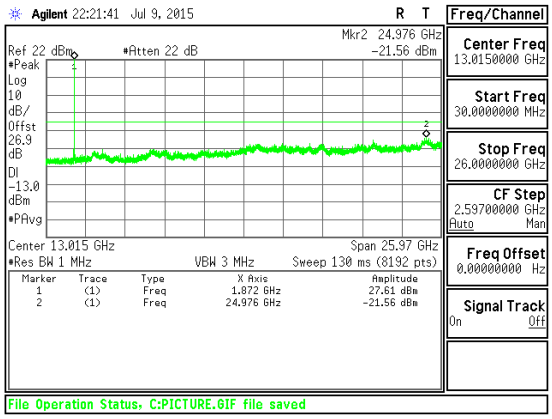
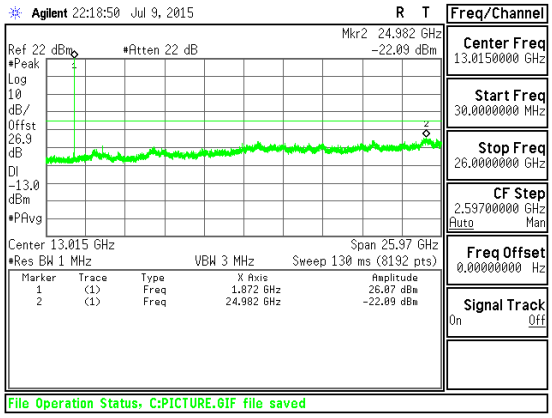
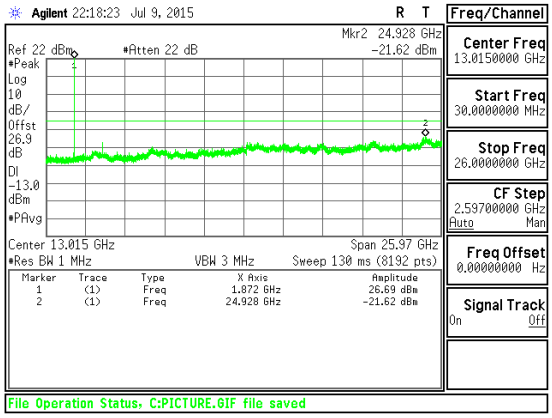
Band BC1 EVDO REL. 0	 Band BC1 EVDO Rel. 0 CSE Mid channel	 Band BC1 1xRTT CSE Mid channel
Band BC0 EVDO REL. 0	 Band BC0 EVDO Rel. 0 CSE Mid channel	 Band BC0 1xRTT CSE Mid channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band BC10 EVDO REL. 0	 Band BC10 EVDO Rel. 0 CSE Mid channel	 Band BC10 1xRTT CSE Mid channel

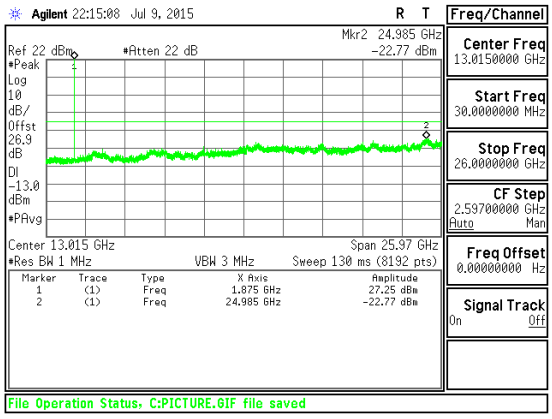
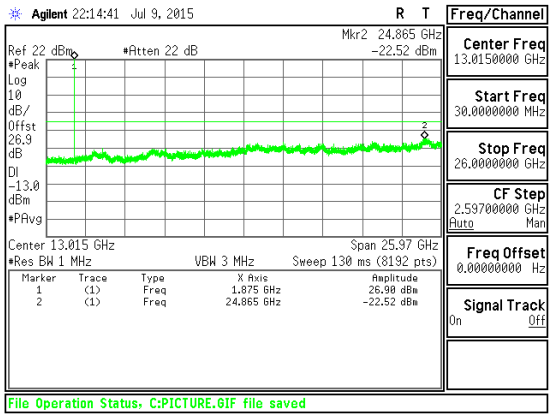
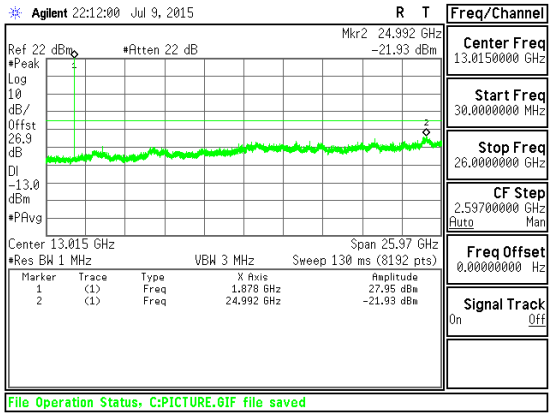
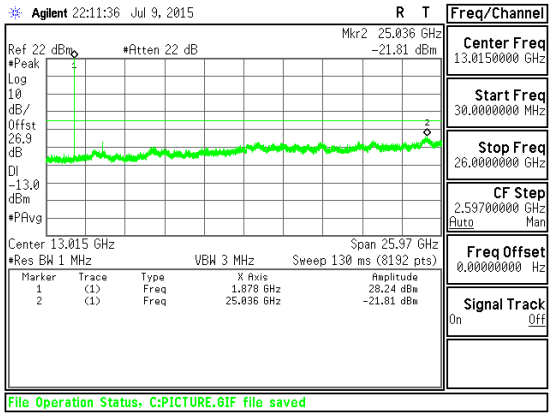
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 2

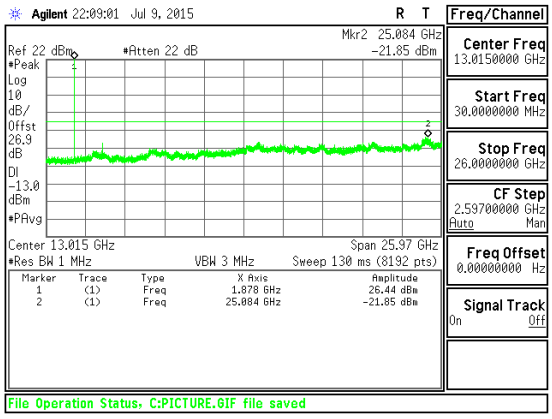
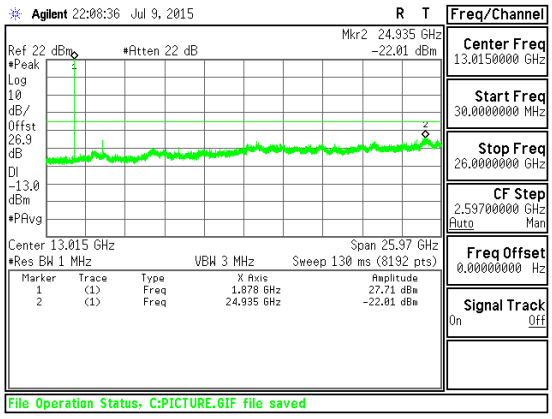
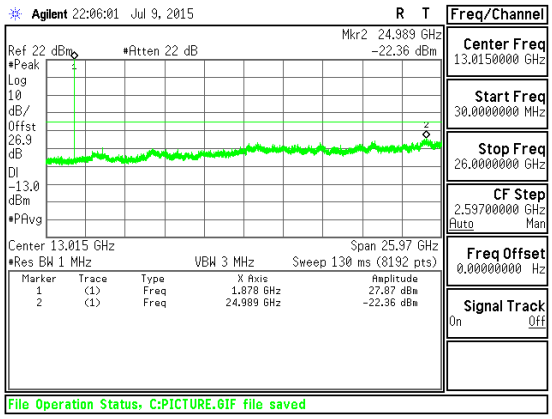
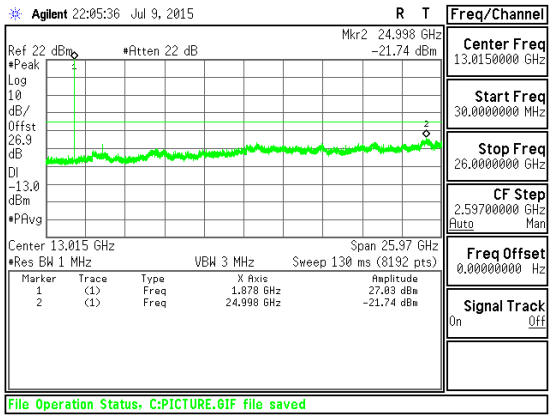
Band LTE2 20MHz 16QAM	 Band LTE2 20MHz CSE 16QAM Mid channel	 Band LTE2 20MHz CSE QPSK Mid channel
Band LTE2 15MHz 16QAM	 Band LTE2 15MHz CSE 16QAM Mid channel	 Band LTE2 15MHz CSE QPSK Mid channel

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

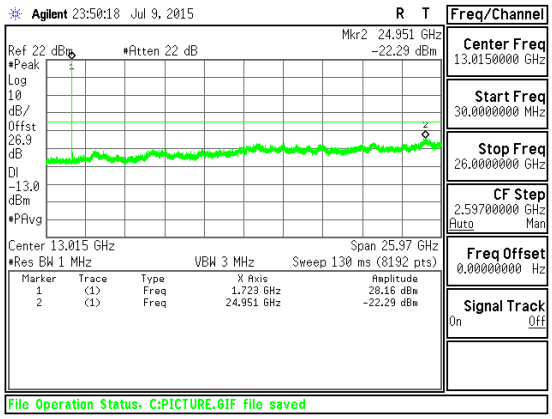
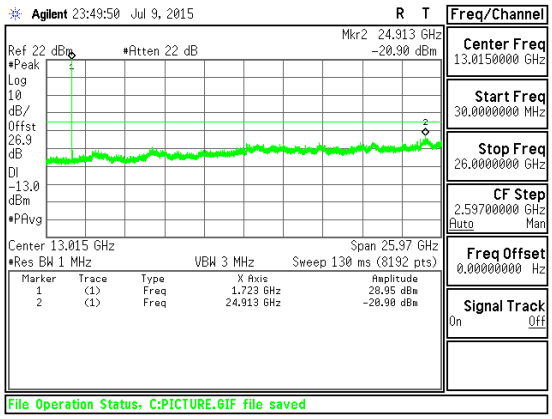
Band LTE2 10MHz 16QAM	 Band LTE2 10MHz CSE 16QAM Mid channel	 Band LTE2 10MHz CSE QPSK Mid channel
Band LTE2 5MHz 16QAM	 Band LTE2 5MHz CSE 16QAM Mid channel	 Band LTE2 5MHz CSE QPSK Mid channel

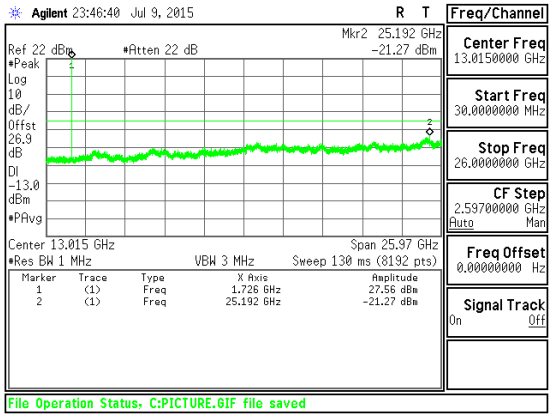
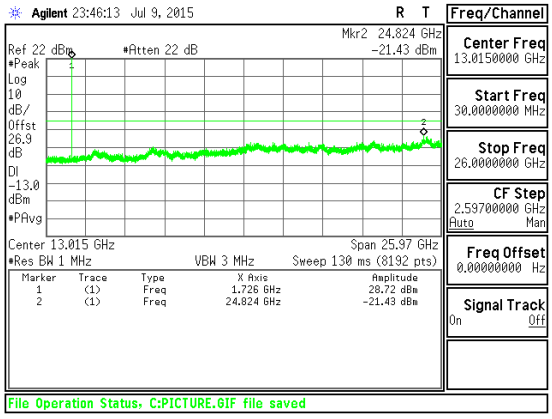
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE2 3MHz 16QAM	 Band LTE2 3MHz CSE 16QAM Mid channel	 Band LTE2 3MHz CSE QPSK Mid channel
Band LTE2 1.4MHz 16QAM	 Band LTE2 1.4MHz CSE 16QAM Mid channel	 Band LTE2 1.4MHz CSE QPSK Mid channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 4

Band LTE4 20MHz 16QAM	 Band LTE4 20MHz CSE 16QAM Mid channel	 Band LTE4 20MHz CSE QPSK Mid channel

Band LTE4 15MHz 16QAM	 Band LTE4 15MHz CSE 16QAM Mid channel	 Band LTE4 15MHz CSE QPSK Mid channel

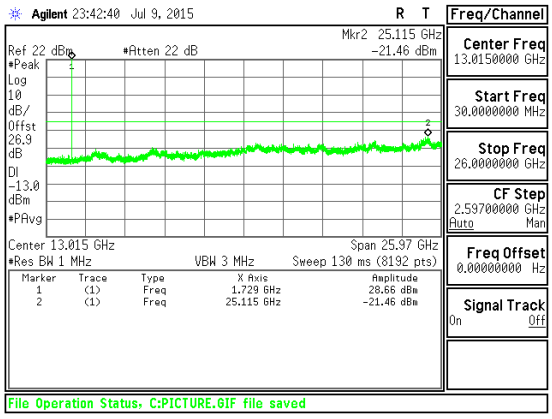
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

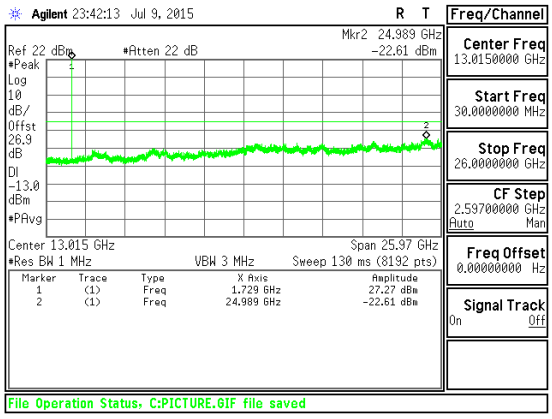
LTE4

10MHz

16QAM



Band LTE4 10MHz CSE 16QAM Mid channel



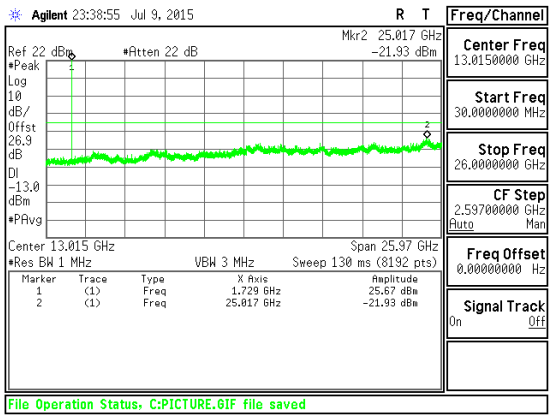
Band LTE4 10MHz CSE QPSK Mid channel

Band

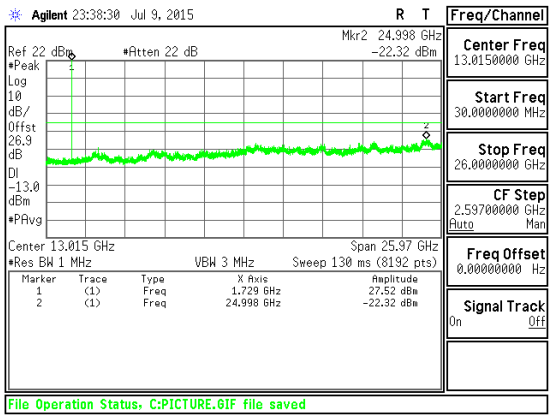
LTE4

5MHz

16QAM

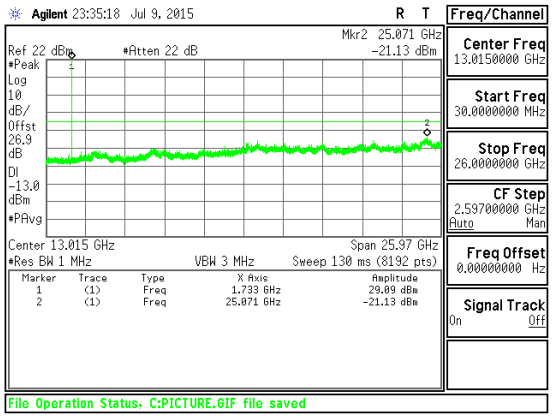
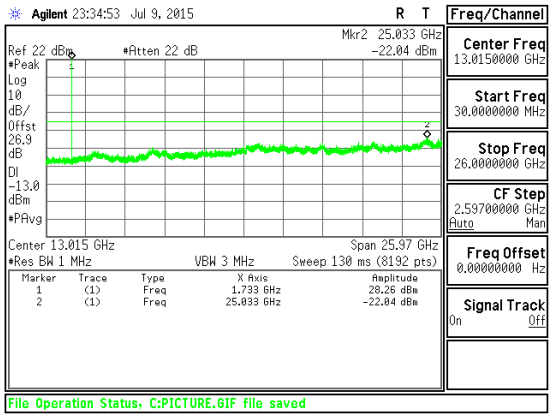


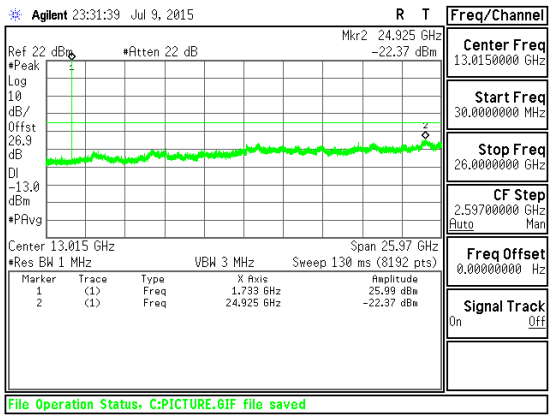
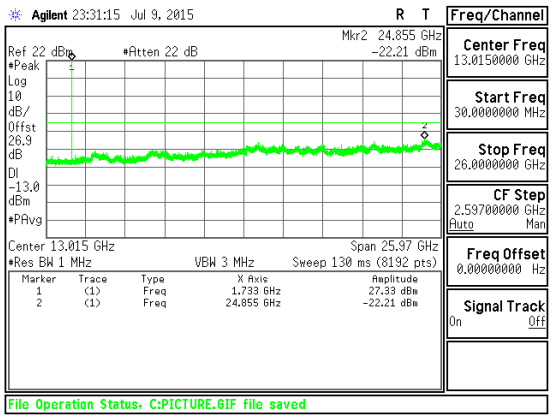
Band LTE4 5MHz CSE 16QAM Mid channel



Band LTE4 5MHz CSE QPSK Mid channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

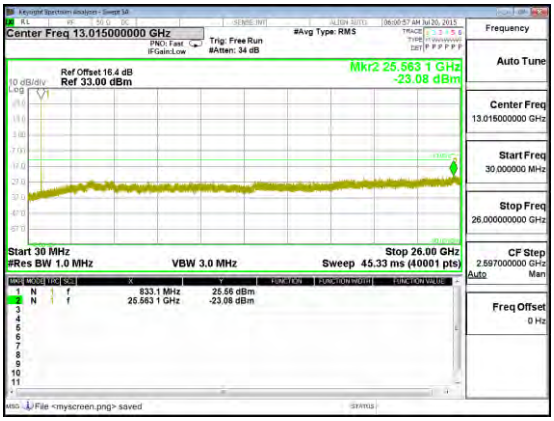
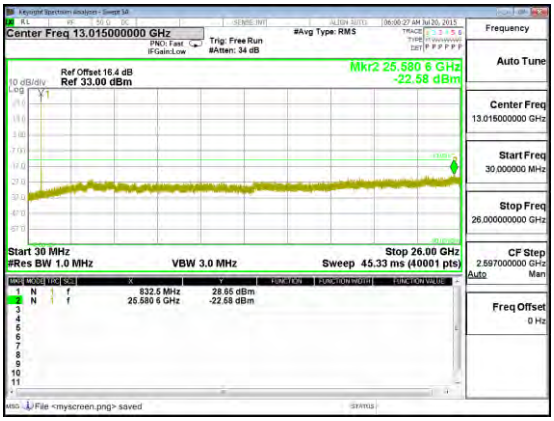
Band LTE4 3MHz 16QAM	 Band LTE4 3MHz CSE 16QAM Mid channel	 Band LTE4 3MHz CSE QPSK Mid channel

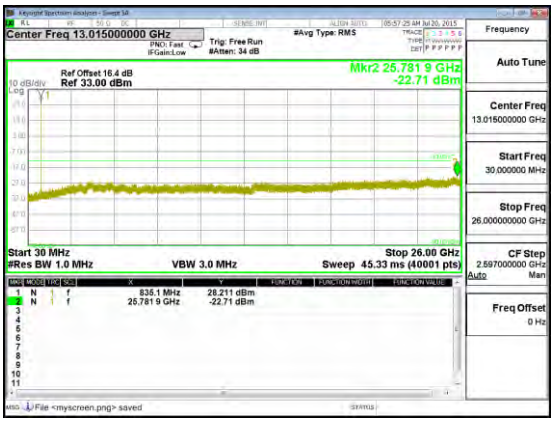
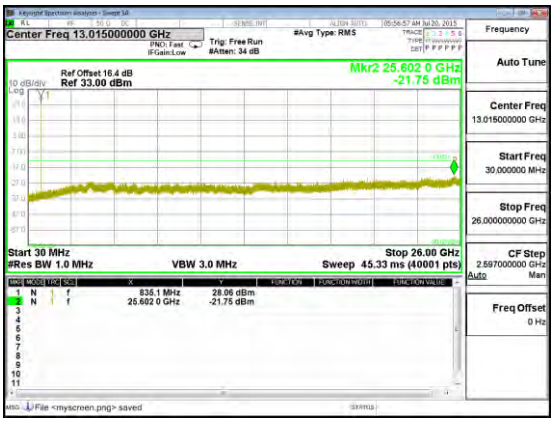
Band LTE4 1.4MHz 16QAM	 Band LTE4 1.4MHz CSE 16QAM Mid channel	 Band LTE4 1.4MHz CSE QPSK Mid channel

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

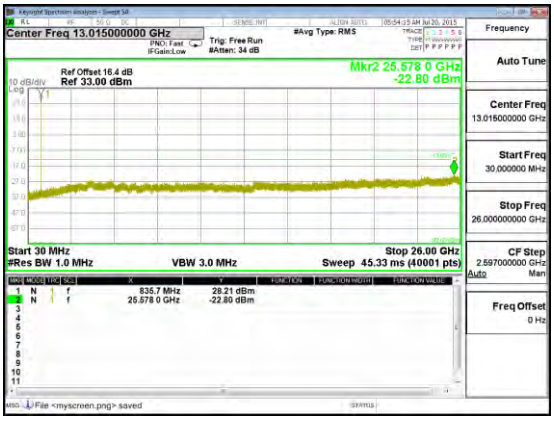
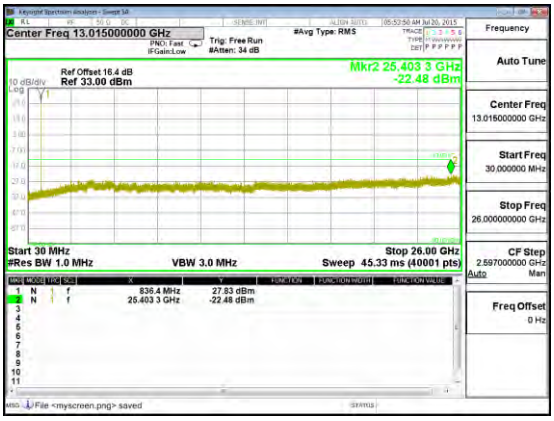
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

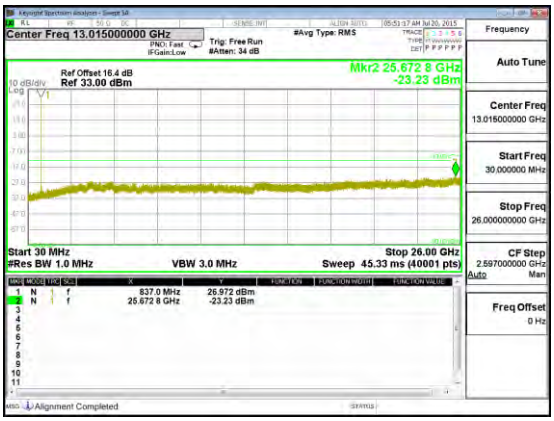
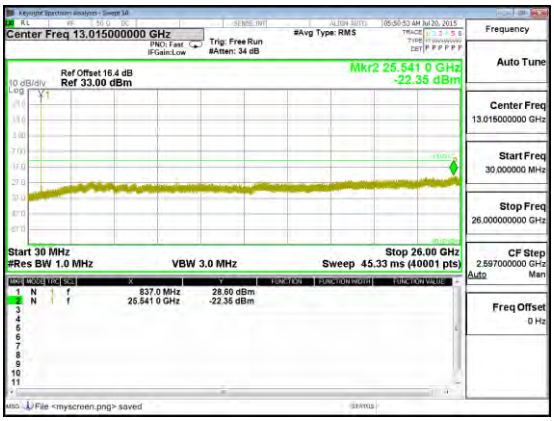
LTE Band 5

Band LTE5 10MHz 16QAM	 Band LTE5 10MHz CSE 16QAM Mid channel	 Band LTE5 10MHz CSE QPSK Mid channel

Band LTE5 5MHz 16QAM	 Band LTE5 5MHz CSE 16QAM Mid channel	 Band LTE5 5MHz CSE QPSK Mid channel

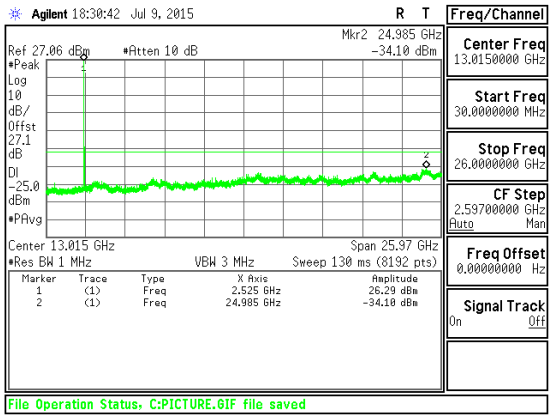
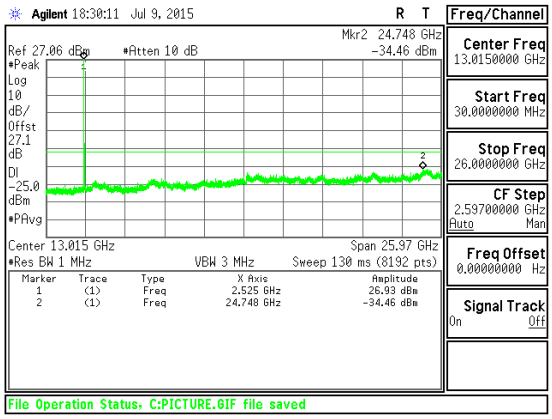
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

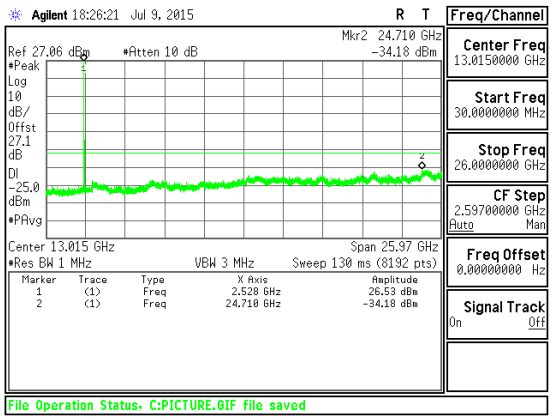
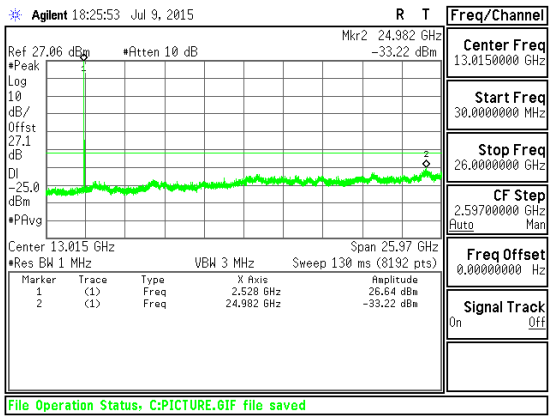
Band LTE5 3MHz 16QAM	 Band LTE5 3MHz CSE 16QAM Mid channel	 Band LTE5 3MHz CSE QPSK Mid channel

Band LTE5 1.4MHz 16QAM	 Band LTE5 1.4MHz CSE 16QAM Mid channel	 Band LTE5 1.4MHz CSE QPSK Mid channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 7

Band LTE7 20MHz 16QAM	 Band LTE7 20MHz CSE 16QAM Mid channel	 Band LTE7 20MHz CSE QPSK Mid channel

Band LTE7 15MHz 16QAM	 Band LTE7 15MHz CSE 16QAM Mid channel	 Band LTE7 15MHz CSE QPSK Mid channel

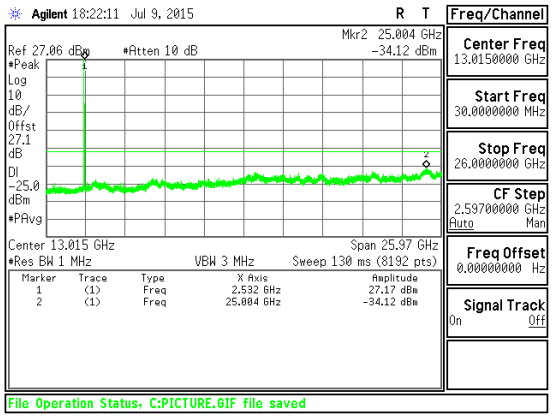
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

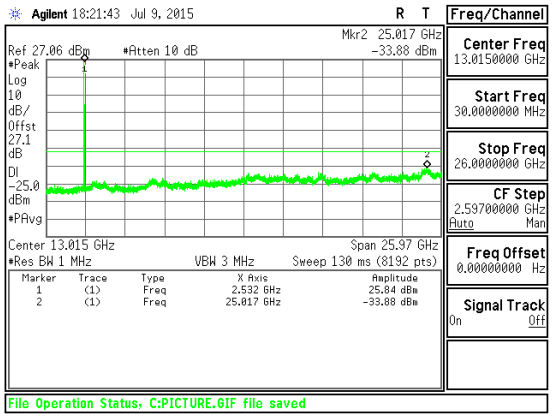
LTE7

10MHz

16QAM



Band LTE7 10MHz CSE 16QAM Mid channel



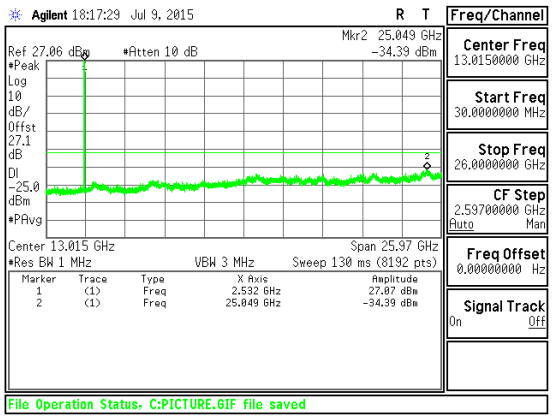
Band LTE7 10MHz CSE QPSK Mid channel

Band

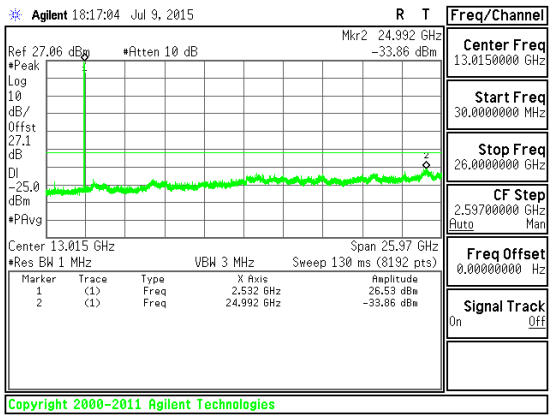
LTE7

5MHz

16QAM



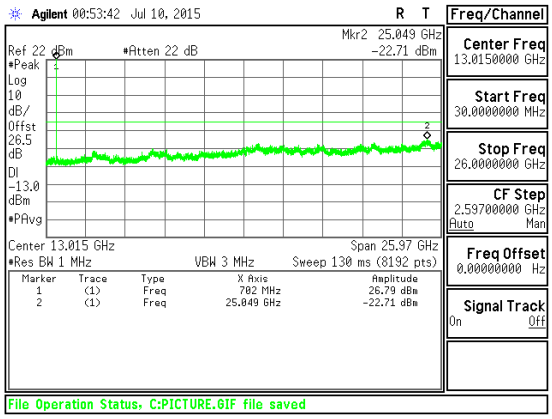
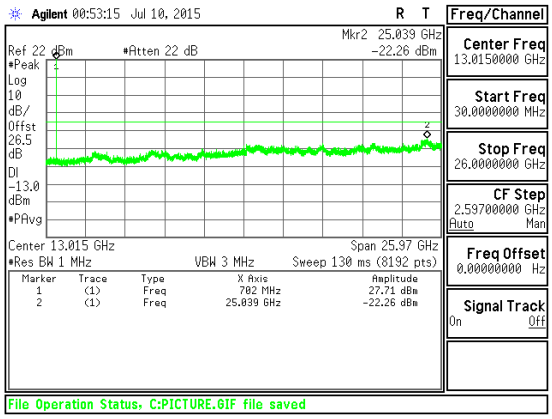
Band LTE7 5MHz CSE 16QAM Mid channel

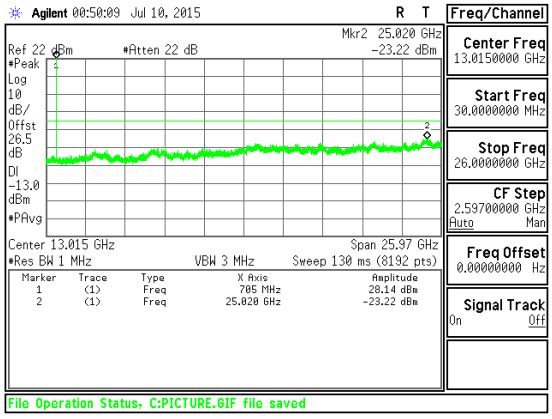
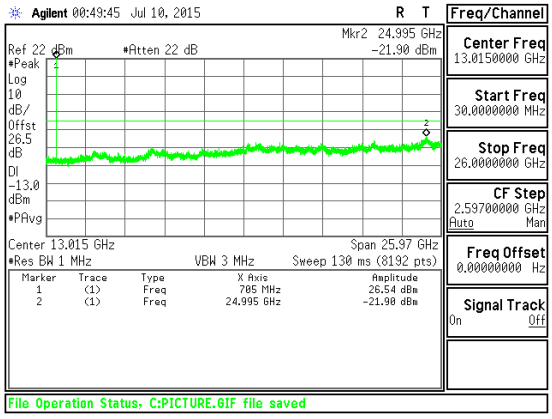


Band LTE7 5MHz CSE QPSK Mid channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 12

Band LTE12 10MHz 16QAM	 Band LTE12 10MHz CSE 16QAM Mid channel	 Band LTE12 10MHz CSE QPSK Mid channel

Band LTE12 5MHz 16QAM	 Band LTE12 5MHz CSE 16QAM Mid channel	 Band LTE12 5MHz CSE QPSK Mid channel

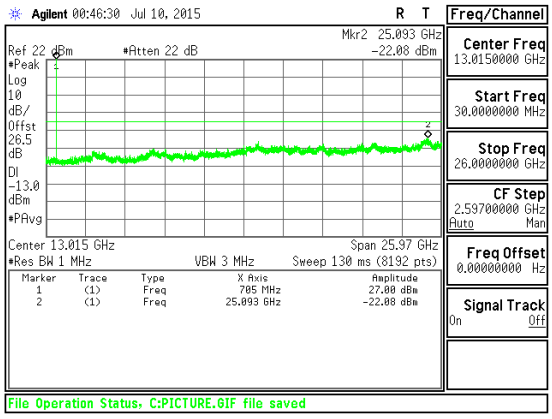
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

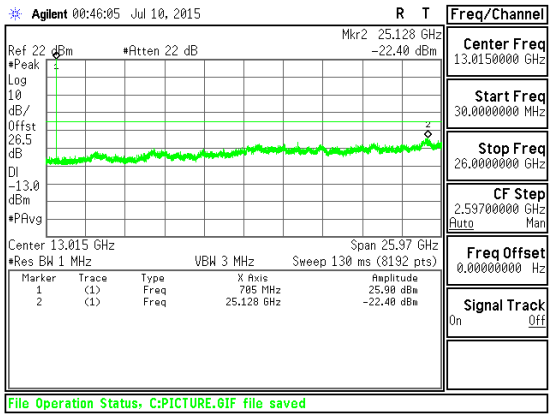
LTE12

3MHz

16QAM



Band LTE12 3MHz CSE 16QAM Mid channel



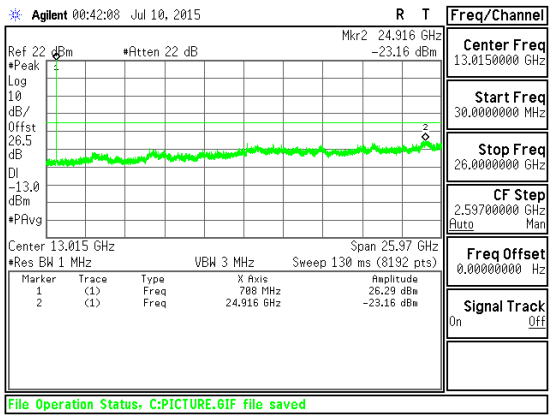
Band LTE12 3MHz CSE QPSK Mid channel

Band

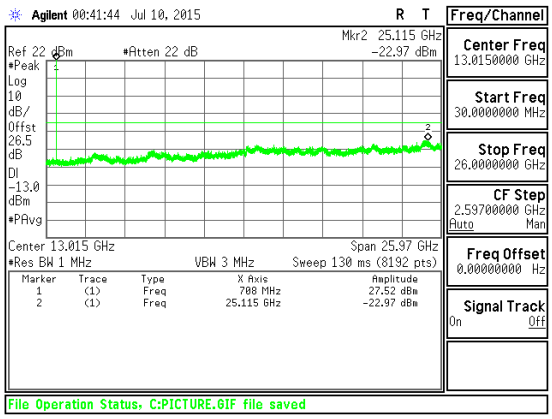
LTE12

1.4MHz

16QAM



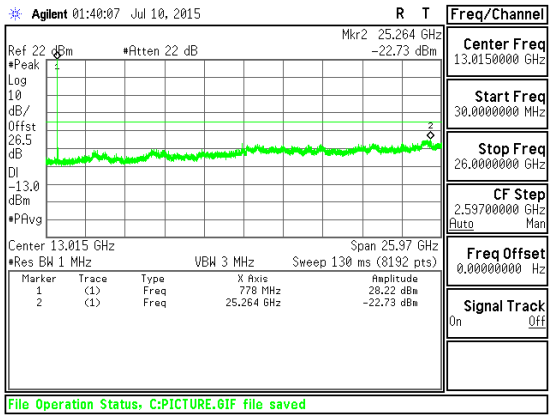
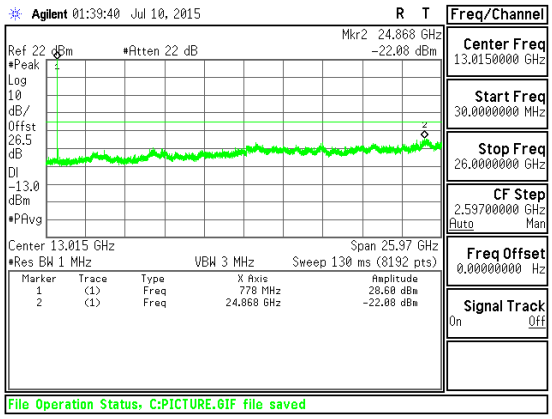
Band LTE12 1.4MHz CSE 16QAM Mid channel

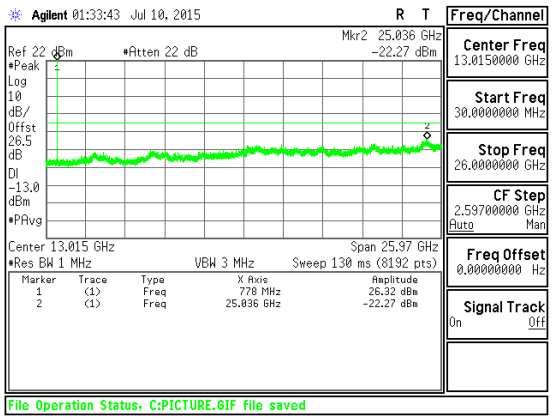
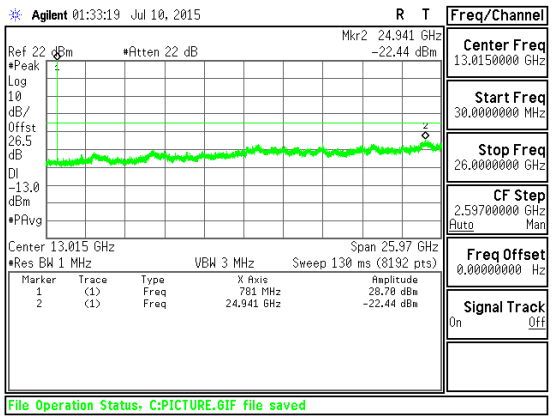


Band LTE12 1.4MHz CSE QPSK Mid channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 13

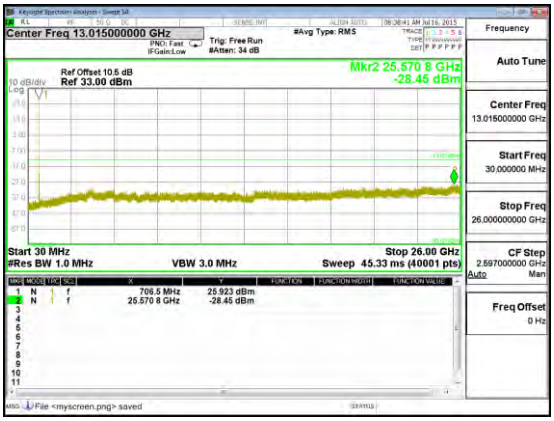
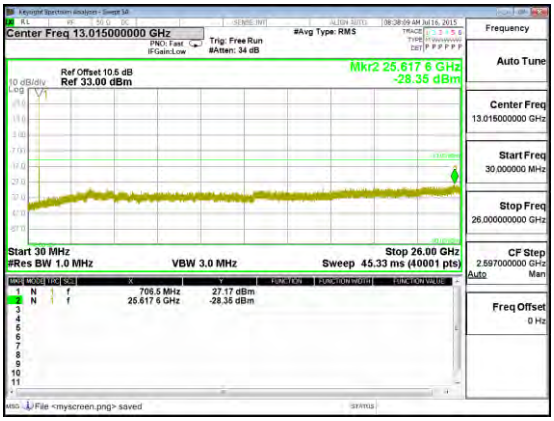
Band LTE13 10MHz 16QAM	 Band LTE13 10MHz CSE 16QAM High channel	 Band LTE13 10MHz CSE QPSK High channel

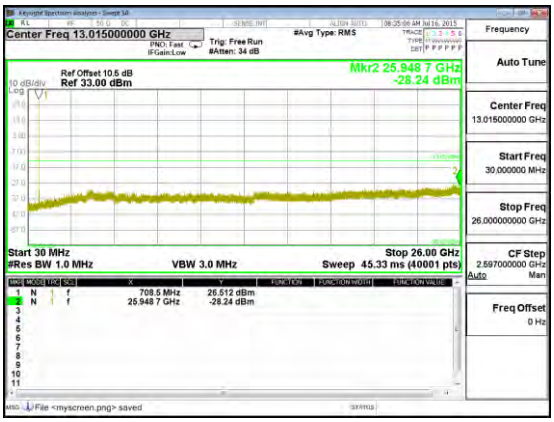
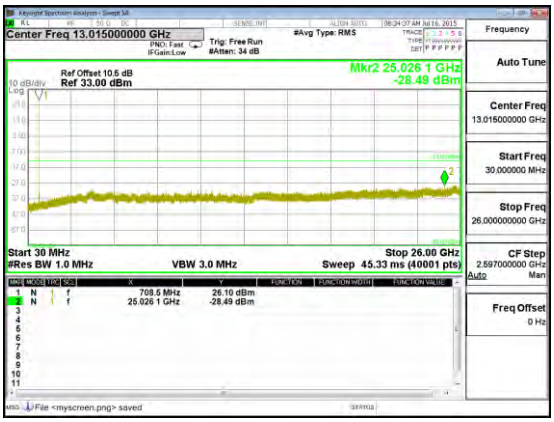
Band LTE13 5MHz 16QAM	 Band LTE13 5MHz CSE 16QAM Mid channel	 Band LTE13 5MHz CSE QPSK Mid channel

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 17

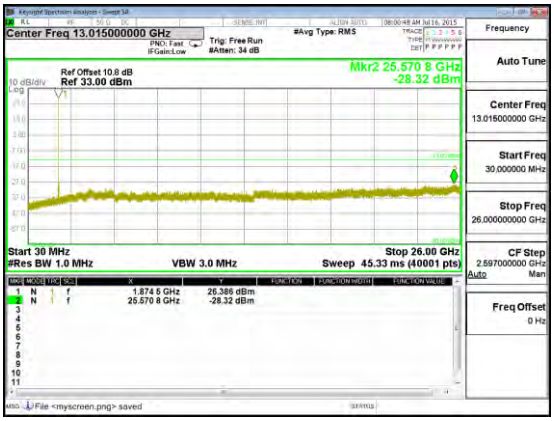
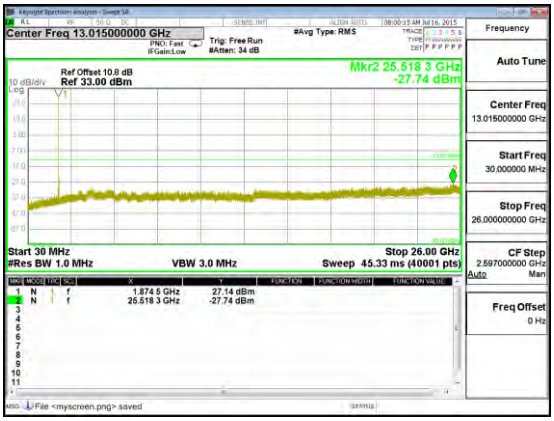
Band LTE17 10MHz 16QAM	 Band LTE17 10MHz CSE 16QAM Mid channel	 Band LTE17 10MHz CSE QPSK Mid channel

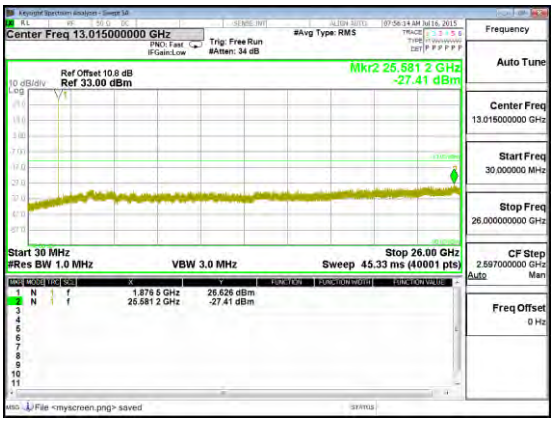
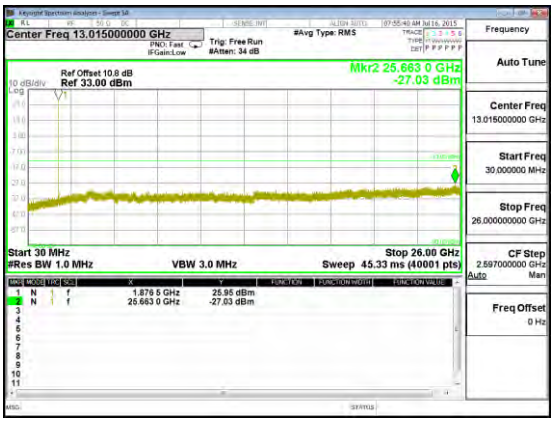
Band LTE17 5MHz 16QAM	 Band LTE17 5MHz CSE 16QAM Mid channel	 Band LTE17 5MHz CSE QPSK Mid channel

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

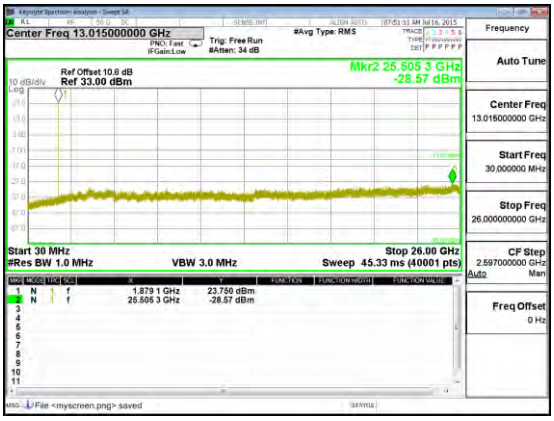
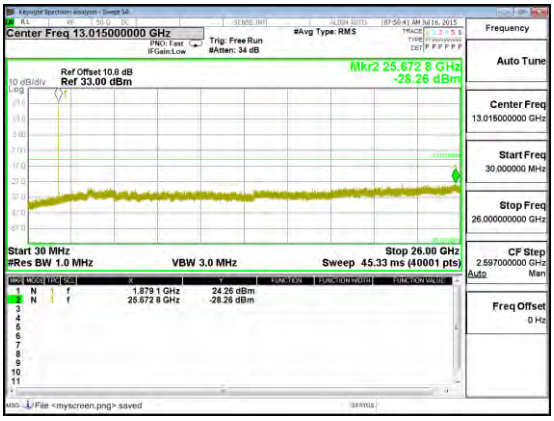
LTE Band 25

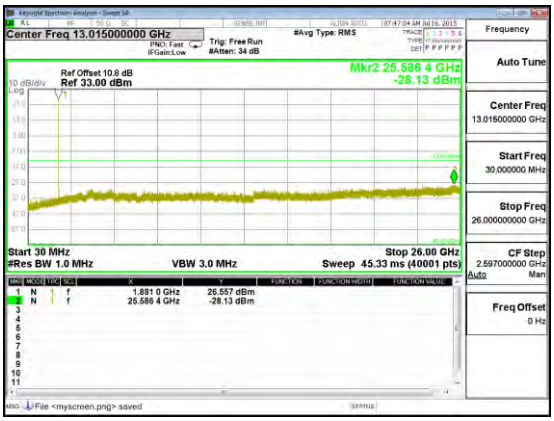
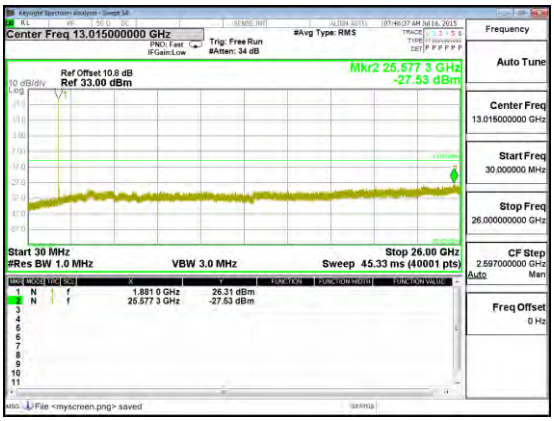
Band LTE25 20MHz 16QAM	 Band LTE25 20MHz CSE 16QAM Mid channel	 Band LTE25 20MHz CSE QPSK Mid channel

Band LTE25 15MHz 16QAM	 Band LTE25 15MHz CSE 16QAM Mid channel	 Band LTE25 15MHz CSE QPSK Mid channel

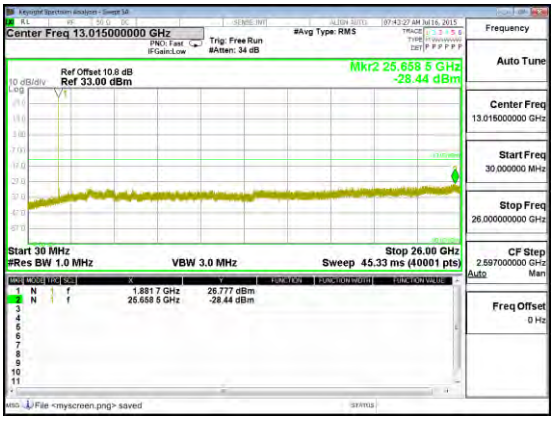
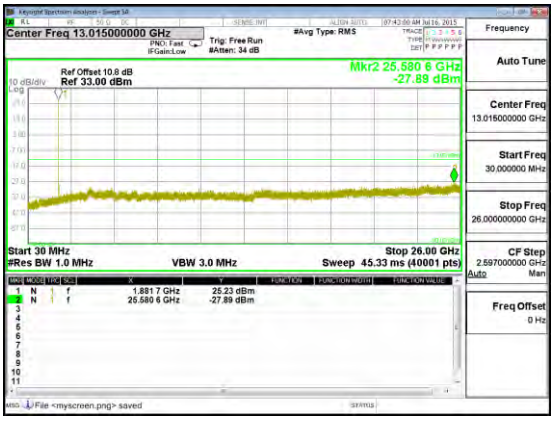
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

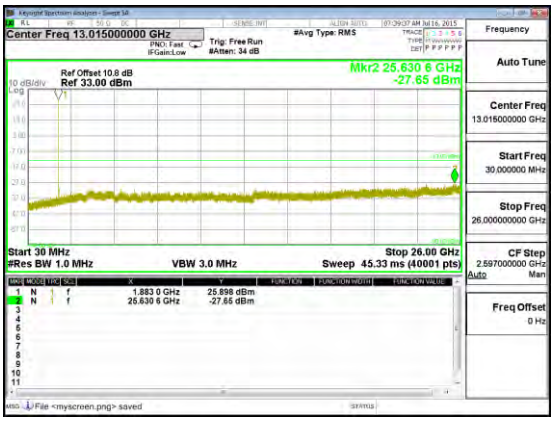
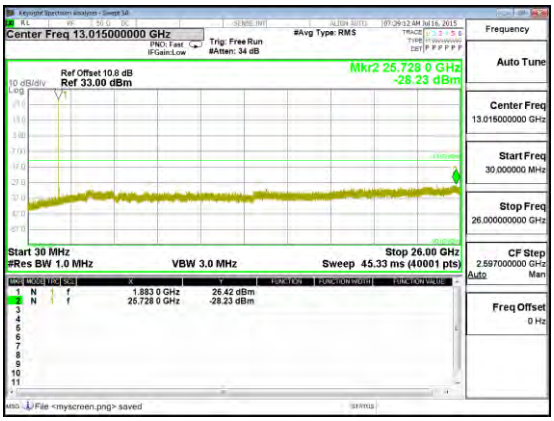
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE25 10MHz 16QAM	 Band LTE25 10MHz CSE 16QAM Mid channel	 Band LTE25 10MHz CSE QPSK Mid channel

Band LTE25 5MHz 16QAM	 Band LTE25 5MHz CSE 16QAM Mid channel	 Band LTE25 5MHz CSE QPSK Mid channel

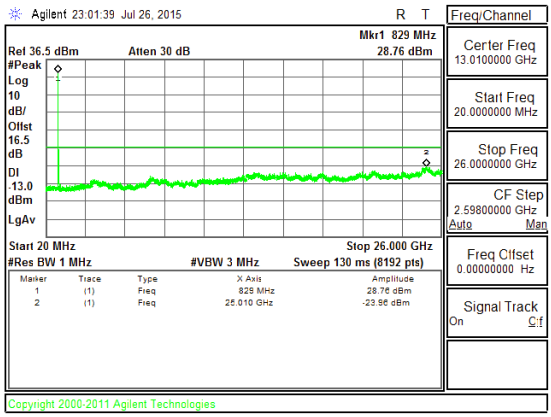
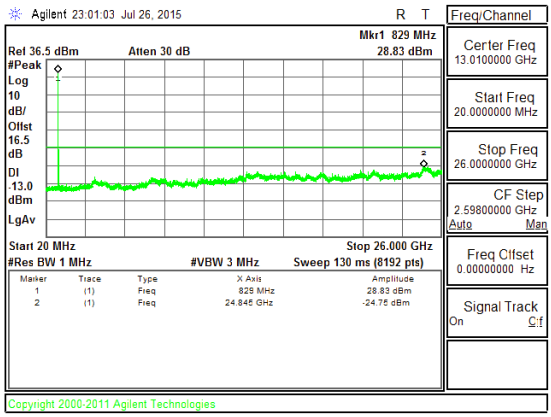
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

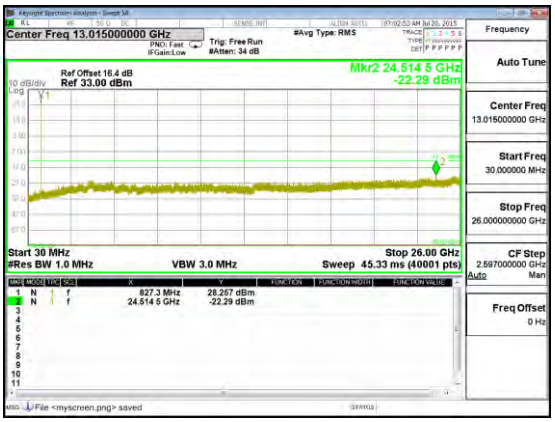
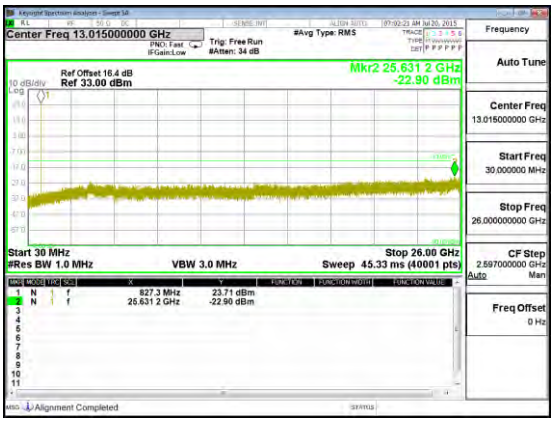
Band LTE25 3MHz 16QAM	 Band LTE25 3MHz CSE 16QAM Mid channel	 Band LTE25 3MHz CSE QPSK Mid channel

Band LTE25 1.4MHz 16QAM	 Band LTE25 1.4MHz CSE 16QAM Mid channel	 Band LTE25 1.4MHz CSE QPSK Mid channel

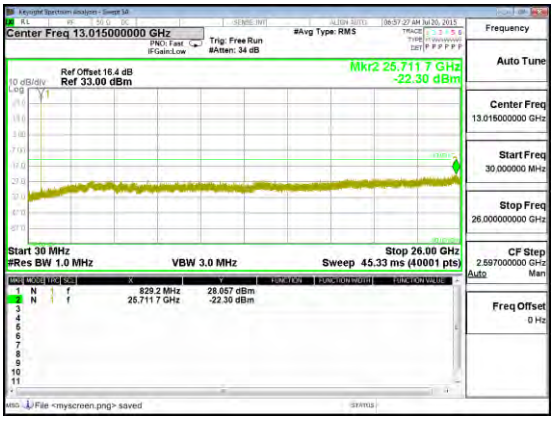
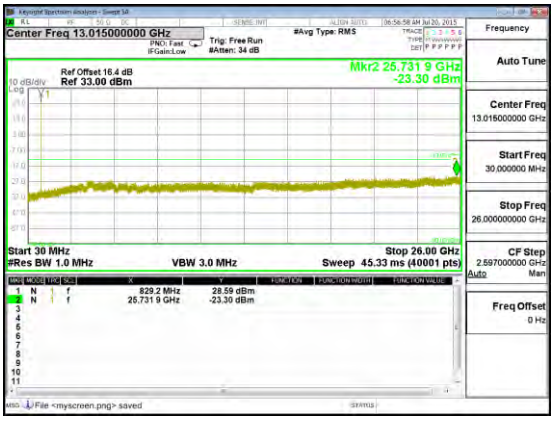
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

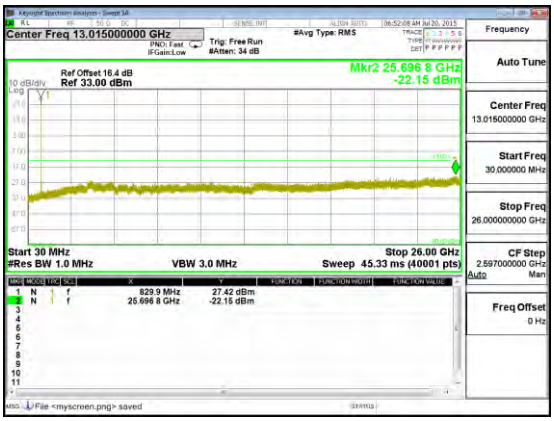
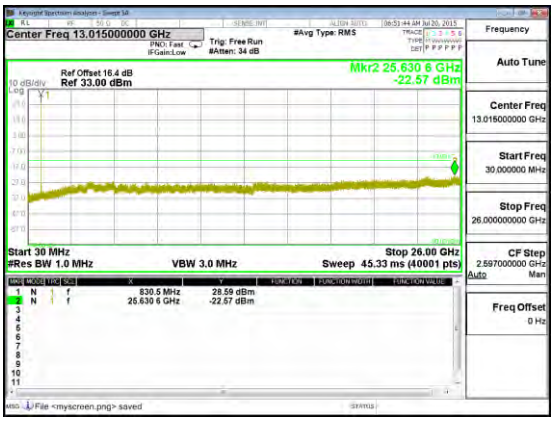
LTE Band 26

Band LTE26 15MHz 16QAM	 Band LTE26 15MHz CSE 16QAM Mid channel	 Band LTE26 15MHz CSE QPSK Mid channel

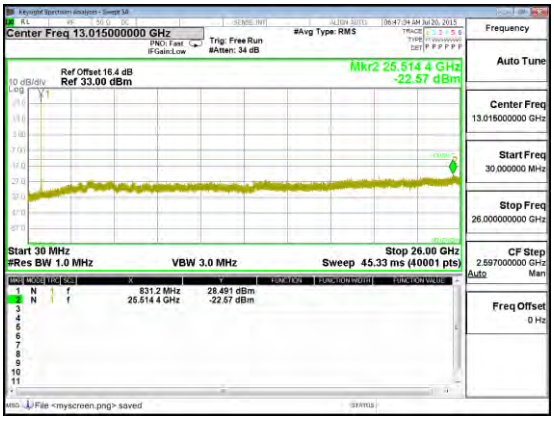
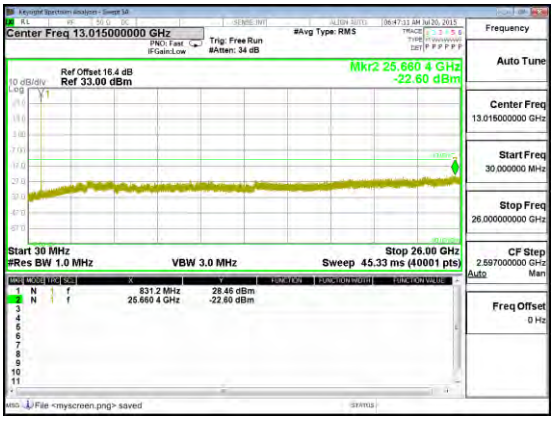
Band LTE26 10MHz 16QAM	 Band LTE26 10MHz CSE 16QAM Mid channel	 Band LTE26 10MHz CSE QPSK Mid channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE26 5MHz 16QAM	 Band LTE26 5MHz CSE 16QAM Mid channel	 Band LTE26 5MHz CSE QPSK Mid channel

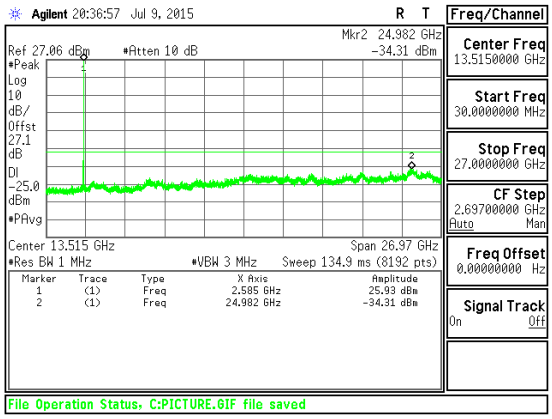
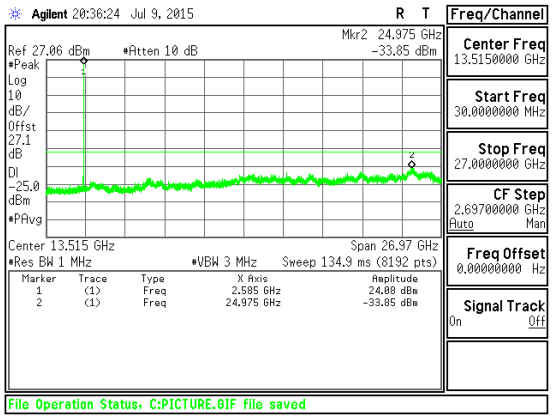
Band LTE26 3MHz 16QAM	 Band LTE26 3MHz CSE 16QAM Mid channel	 Band LTE26 3MHz CSE QPSK Mid channel

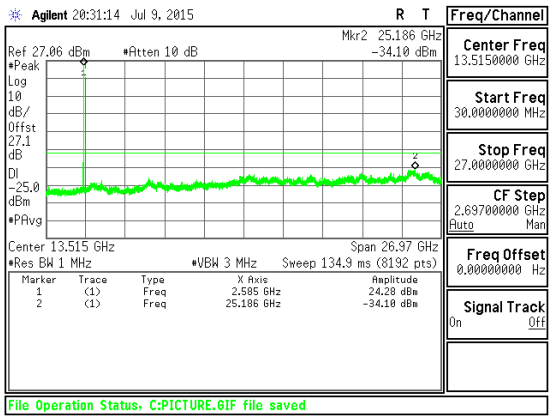
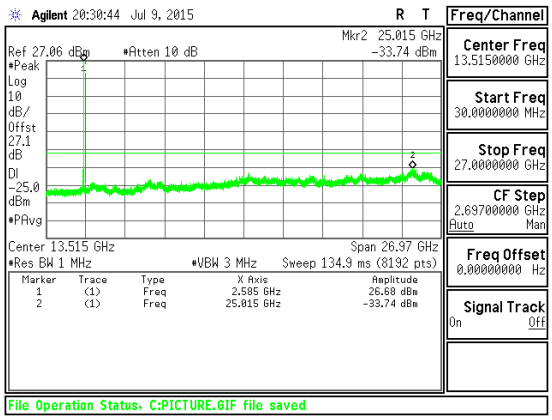
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE26 1.4MHz 16QAM	 Band LTE26 1.4MHz CSE 16QAM Mid channel	 Band LTE26 1.4MHz CSE QPSK Mid channel

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 41

Band LTE41 20MHz 16QAM	 Band LTE41 20MHz CSE 16QAM Mid channel	 Band LTE41 20MHz CSE QPSK Mid channel

Band LTE41 15MHz 16QAM	 Band LTE41 15MHz CSE 16QAM Mid channel	 Band LTE41 15MHz CSE QPSK Mid channel

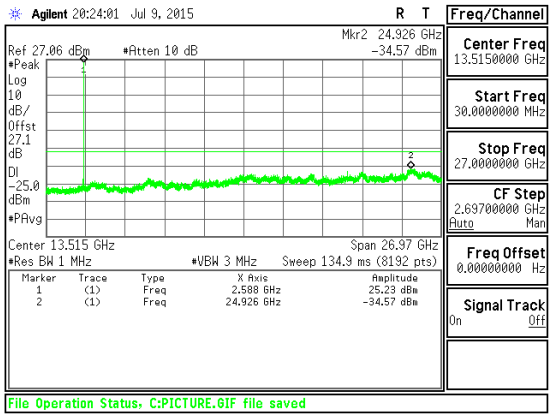
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

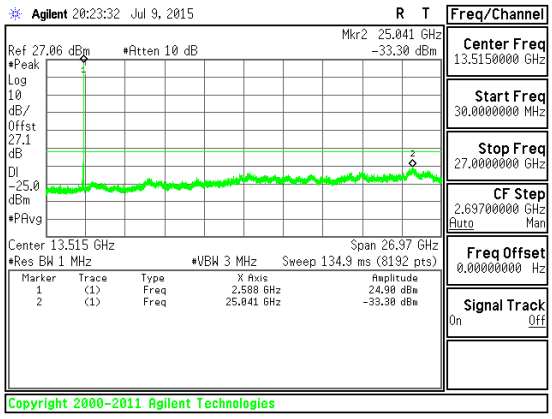
LTE41

10MHz

16QAM



Band LTE41 10MHz CSE 16QAM Mid channel



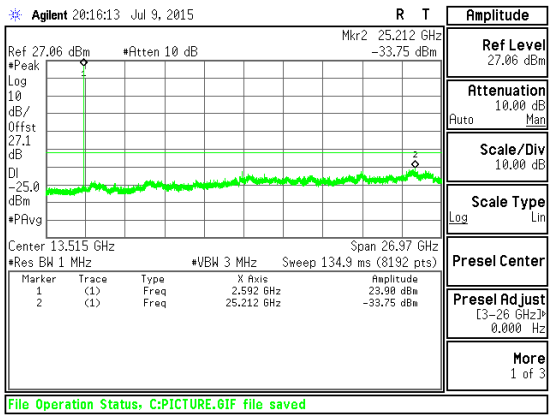
Band LTE41 10MHz CSE QPSK Mid channel

Band

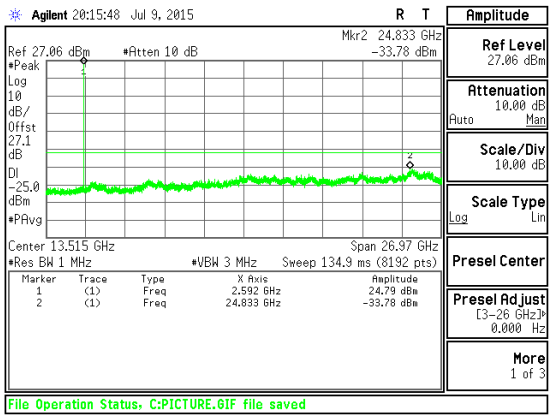
LTE41

5MHz

16QAM



Band LTE41 5MHz CSE 16QAM Mid channel



Band LTE41 5MHz CSE QPSK Mid channel

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

11. 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 ±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 ±2.5 ppm for mobile stations.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

MODES TESTED

GSM, WCDMA, CDMA, and LTE

RESULTS

See the following pages.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

11.1.1. FREQUENCY STABILITY RESULTS

GSM 850

Reference Frequency: PCS Mid Channel		836.6	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		2091.500	Hz	
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
3.80	50	836.600023	0.001	2.5
3.80	40	836.600025	-0.001	2.5
3.80	30	836.600025	-0.001	2.5
3.80	***20***	**836.600024**	**0**	***2.5***
3.80	10	836.600022	0.002	2.5
3.80	0	836.600021	0.004	2.5
3.80	-10	836.600022	0.003	2.5
3.80	-20	836.600021	0.004	2.5
3.80	-30	836.600020	0.005	2.5

Reference Frequency: PCS Mid Channel		836.6	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		2091.500	Hz	
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
3.80	***20***	***836.600024***	***0***	***2.5***
4.37	20	836.6000219	*0.003*	2.5
3.23(End of Volt)	20	836.6000236	*0.001*	2.5

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

GSM 1900

Reference Frequency: PCS Mid Channel 1880 MHz @ 20°C Limit: to stay +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000039	0.000	2.5
3.80	40	1880.000038	0.000	2.5
3.80	30	1880.000036	0.001	2.5
3.80	***20***	**1880.000038**	**0**	***2.5***
3.80	10	1880.000035	0.002	2.5
3.80	0	1880.000024	0.007	2.5
3.80	-10	1880.000023	0.008	2.5
3.80	-20	1880.000021	0.009	2.5
3.80	-30	1880.000022	0.008	2.5

Reference Frequency: PCS Mid Channel 1880 MHz @ 20°C Limit: to stay +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1880.000038***	***0***	***2.5***
4.37	20	1880.000041	*-0.002*	2.5
3.23(End of Volt)	20	1880.000032	*0.003*	2.5

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 4

Reference Frequency: PCS Mid Channel 1732.5 MHz @ 20°C Limit: to stay +- 2.5 ppm = 4331.250 Hz				
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
3.80	50	1732.499993	0.001	2.5
3.80	40	1732.499994	0.000	2.5
3.80	30	1732.499994	0.000	2.5
3.80	***20***	**1732.499994**	**0**	***2.5***
3.80	10	1732.499995	0.000	2.5
3.80	0	1732.499996	-0.001	2.5
3.80	-10	1732.500007	-0.007	2.5
3.80	-20	1732.500005	-0.006	2.5
3.80	-30	1732.500005	-0.006	2.5

Reference Frequency: PCS Mid Channel 1732.5 MHz @ 20°C Limit: to stay +- 2.5 ppm = 4331.250 Hz				
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
3.80	***20***	***1732.499994***	***0***	***2.5***
4.37	20	1732.499993	*0.000*	2.5
3.23(End of volt)	20	1732.499995	*-0.001*	2.5

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 7

Reference Frequency: Cellular Mid Channel 2535.000019 MHz @ 20°C Limit: to stay +- 2.5 ppm = 6337.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	2534.999993	0.000	2.5
3.80	40	2534.999992	0.000	2.5
3.80	30	2534.999994	-0.001	2.5
3.80	***20***	2534.999992	***0***	***2.5***
3.80	10	2534.999993	0.000	2.5
3.80	0	2534.999994	-0.001	2.5
3.80	-10	2534.999994	0.000	2.5
3.80	-20	2534.999993	0.000	2.5
3.80	-30	2534.999993	0.000	2.5

Reference Frequency: Cellular Mid Channel 2535.000019 MHz @ 20°C Limit: to stay +- 2.5 ppm = 6337.500 Hz				
Power Supply (Vdc)	Environment Temperature (°C)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***2534.999992***	***0***	***2.5***
4.37	20	2534.999992	*0.000*	2.5
3.23(End of Volt)	20	2534.999993	*0.000*	2.5

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 12

Reference Frequency: Cellular Mid Channel 707.5 MHz @ 20°C Limit: to stay +- 2.5 ppm = 1768.750 Hz				
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
3.80	50	707.500004	0.000	2.5
3.80	40	707.500005	-0.001	2.5
3.80	30	707.500003	0.001	2.5
3.80	***20***	***707.500004***	***0***	2.5
3.80	10	707.500003	0.001	2.5
3.80	0	707.500005	-0.001	2.5
3.80	-10	707.499997	0.010	2.5
3.80	-20	707.499997	0.010	2.5
3.80	-30	707.500004	0.000	2.5

Reference Frequency: Cellular Mid Channel 707.5 MHz @ 20°C Limit: to stay +- 2.5 ppm = 1768.750 Hz				
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse**		
		(MHz)	**Delta (ppm)**	**Limit (ppm)**
3.80	***20***	***707.500004***	***0***	***2.5***
4.37	20	707.500004	*0.000*	2.5
3.23(End of Volt)	20	707.500005	*-0.001*	2.5

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 13

Reference Frequency: PCS Mid Channel		782	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		1955.000	Hz	
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse (MHz)**	**Delta (ppm)**	**Limit (ppm)**
3.80	50	782.000003	0.002	2.5
3.80	40	782.000004	0.001	2.5
3.80	30	782.000003	0.001	2.5
3.80	***20***	**782.000004**	**0**	***2.5***
3.80	10	781.999998	0.009	2.5
3.80	0	781.999998	0.009	2.5
3.80	-10	782.000003	0.002	2.5
3.80	-20	781.999997	0.009	2.5
3.80	-30	782.000003	0.001	2.5
		782.0000000	0.006	

Reference Frequency: PCS Mid Channel		782	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		1955.000	Hz	
Power Supply (Vdc)	**Environment Temperature (°C)**	**Frequency Deviation Measureed with Time Elapse (MHz)**	**Delta (ppm)**	**Limit (ppm)**
3.80	***20***	***782.000004***	***0***	***2.5***
4.37	20	782.0000032	*0.002*	2.5
3.23(End of volt)	20	782.0000027	*0.002*	2.5

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

12. RADIATED TEST RESULTS

12.1. 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 (hand-held 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 (hand-held devices) are limited to 3 watts ERP; (LTE B17)

27.50(d) - (4) Fixed, mobile, and portable (hand-held) 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 ≥ OBW; b) Set VBW ≥ 3 × RBW; c) Set span ≥ 2 x RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points ≥ 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 ≥ 3 x RBW; d) Set number of points in sweep ≥ 2 × span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle ≥ 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.

MODES TESTED

GSM, WCDMA, CDMA, and LTE

TEST RESULTS

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

12.1.1. ERP/EIRP RESULTS

GSM

Band	Mode	Channel	f(MHz)	ERP	
				dBm	mW
GSM850	GPRS	128	824.2	30.43	1103.82
		190	836.6	31.01	1261.83
		251	848.8	30.32	1077.46
	EGPRS	128	824.2	25.38	345.14
		190	836.6	26.80	479.07
		251	848.8	25.69	370.68
GSM1900	GPRS	512	1850.2	29.68	928.83
		661	1880	29.55	901.32
		810	1909.8	29.56	904.34
	EGPRS	512	1850.2	25.04	319.11
		661	1880	25.12	325
		810	1909.8	24.76	299.46

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

WCDMA

Band	Mode	Channel	f(MHz)	EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	24.08	255.73
		9400	1880	24.24	265.39
		9538	1907.6	22.71	186.51
	HSDPA	9262	1852.4	22.78	189.58
		9400	1880	21.66	146.51
		9538	1907.6	22.09	161.69
Band 4	REL99	1312	1712.4	25.22	332.66
		1413	1732.6	24.54	284.45
		1513	1752.6	26.11	408.32
	HSDPA	1312	1712.4	23.87	243.78
		1413	1732.6	23.00	199.53
		1513	1752.6	24.32	270.4
Band 5	REL99	4132	826.4	23.61	229.61
		4183	836.6	23.18	207.97
		4233	846.6	22.66	184.5
	HSDPA	4132	826.4	22.57	180.72
		4183	836.6	22.17	164.82
		4233	846.6	21.64	145.88

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

CDMA

Band	Mode	Channel	f(MHz)	ERP	
				dBm	mW
BC10	1xRTT	476	817.9	21.84	152.79
		580	820.5	21.99	158.16
		684	823.1	22.14	163.72
	EVDO REL. 0	476	817.9	21.50	141.25
		580	820.5	21.50	141.25
		684	823.1	21.51	141.58
BC0	1xRTT	1013	824.7	21.57	143.58
		384	836.52	21.51	141.61
		777	848.31	20.79	119.98
	EVDO REL. 0	1013	824.7	21.38	137.40
		384	836.52	21.32	135.52
		777	848.31	20.66	116.41
BC1	1xRTT	25	1851.25	27.62	578.1
		600	1880	27.69	587.49
		1175	1908.75	27.61	576.77
	EVDO REL. 0	25	1851.25	27.50	562.34
		600	1880	27.57	571.48
		1175	1908.75	27.45	555.90

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 2

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	EIRP	
					dBm	mW
LTE2	20	QPSK	1/0	1860	25.92	390.84
			1/0	1880	26.12	409.26
			1/0	1900	25.95	393.55
		16QAM	1/0	1860	24.94	311.89
			1/0	1880	25.37	344.35
			1/0	1900	25.02	317.69
LTE2	15	QPSK	1/0	1857.5	25.92	390.84
			1/0	1880	26.1	407.38
			1/0	1902.5	25.96	394.46
		16QAM	1/0	1857.5	24.92	310.46
			1/0	1880	25.3	338.84
			1/0	1902.5	24.94	311.89
LTE2	10	QPSK	1/0	1855	25.83	382.82
			1/0	1880	26.14	411.15
			1/0	1905	25.95	393.55
		16QAM	1/0	1855	24.91	309.74
			1/0	1880	25.38	345.14
			1/0	1905	24.94	311.89

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	EIRP	
					dBm	mW
LTE2	5	QPSK	1/0	1852.5	25.84	383.71
			1/0	1880	26.13	410.2
			1/0	1907.5	25.98	396.28
		16QAM	1/0	1852.5	24.89	308.32
			1/0	1880	25.18	329.61
			1/0	1907.5	25	316.23
LTE2	3	QPSK	1/0	1851.5	25.81	381.07
			1/0	1880	26.11	408.32
			1/0	1908.5	25.97	395.37
		16QAM	1/0	1851.5	24.9	309.03
			1/0	1880	25.3	338.84
			1/0	1908.5	24.96	313.33
LTE2	1.4	QPSK	1/0	1850.7	25.81	381.07
			1/0	1880	26.16	413.05
			1/0	1909.3	25.98	396.28
		16QAM	1/0	1850.7	24.99	315.5
			1/0	1880	25.12	325.09
			1/0	1909.3	24.99	315.5

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 4

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	EIRP	
					dBm	mW
LTE4	20	QPSK	1/0	1720	24.41	276.07
			1/0	1732.5	25.55	358.68
			1/0	1745	26.03	400.76
		16QAM	1/0	1720	23.45	221.32
			1/0	1732.5	24.72	296.28
			1/0	1745	25.02	317.6
LTE4	15	QPSK	1/0	1717.5	24.34	271.89
			1/0	1732.5	25.53	357.03
			1/0	1747.5	26.13	409.75
		16QAM	1/0	1717.5	23.37	217.47
			1/0	1732.5	24.71	295.6
			1/0	1747.5	25.16	327.73
LTE4	10	QPSK	1/0	1715	24.29	268.35
			1/0	1732.5	25.62	364.51
			1/0	1750	26.23	419.98
		16QAM	1/0	1715	23.27	212.18
			1/0	1732.5	24.74	297.65
			1/0	1750	25.25	335.14

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	EIRP	
					dBm	mW
LTE4	5	QPSK	1/0	1712.5	24.38	274.17
			1/0	1732.5	25.56	359.51
			1/0	1752.5	26.19	415.8
		16QAM	1/0	1712.5	23.39	218.29
			1/0	1732.5	24.67	292.89
			1/0	1752.5	25.21	331.81
LTE4	3	QPSK	1/0	1711.5	24.36	273.14
			1/0	1732.5	25.59	362
			1/0	1753.5	26.18	414.49
		16QAM	1/0	1711.5	23.35	216.47
			1/0	1732.5	24.70	294.92
			1/0	1753.5	25.19	330
LTE4	1.4	QPSK	1/0	1710.7	24.30	268.97
			1/0	1732.5	25.60	362.83
			1/0	1754.3	26.20	417.09
		16QAM	1/0	1710.7	23.32	214.64
			1/0	1732.5	24.68	293.57
			1/0	1754.3	25.21	332.07

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 5

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP	
					dBm	mW
LTE5	10	QPSK	1/0	829	21.01	126.18
			1/0	836.5	22.25	167.88
			1/0	844	21.74	149.28
		16QAM	1/0	829	20.91	123.31
			1/0	836.5	22.13	163.31
			1/0	844	21.59	144.21
LTE5	5	QPSK	1/0	826.5	21.11	129.12
			1/0	836.5	22.47	176.60
			1/0	846.5	21.68	147.23
		16QAM	1/0	826.5	20.91	123.31
			1/0	836.5	22.23	167.11
			1/0	846.5	21.40	138.04
LTE5	3	QPSK	1/0	825.5	21.31	135.21
			1/0	836.5	22.44	175.39
			1/0	847.5	21.53	142.23
		16QAM	1/0	825.5	21.01	126.18
			1/0	836.5	22.20	165.96
			1/0	847.5	21.10	128.82
LTE5	1.4	QPSK	1/0	824.7	21.51	141.58
			1/0	836.5	22.52	178.65
			1/0	848.3	21.45	139.64
		16QAM	1/0	824.7	20.86	121.90
			1/0	836.5	21.69	147.57
			1/0	848.3	21.00	125.89

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 7

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	EIRP	
					dBm	mW
LTE7	20	QPSK	1/0	2510	20.75	118.74
			1/0	2535	21.00	125.78
			1/0	2560	22.07	160.88
		16QAM	1/0	2510	19.89	97.41
			1/0	2535	20.04	100.83
			1/0	2560	21.23	132.59
LTE7	15	QPSK	1/0	2507.5	20.81	120.39
			1/0	2535	21.45	139.51
			1/0	2562.5	21.73	149
		16QAM	1/0	2507.5	20.10	102.24
			1/0	2535	20.28	106.56
			1/0	2562.5	20.87	122.24
LTE7	10	QPSK	1/0	2505	19.90	97.71
			1/0	2535	20.29	106.87
			1/0	2565	22.19	165.48
		16QAM	1/0	2505	18.91	77.79
			1/0	2535	19.73	93.94
			1/0	2565	21.73	148.85
LTE7	5	QPSK	1/0	2502.5	21.57	143.51
			1/0	2535	21.18	131.17
			1/0	2567.5	22.03	159.52
		16QAM	1/0	2502.5	21.67	146.85
			1/0	2535	20.47	111.39
			1/0	2567.5	21.05	127.3

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 12

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP	
					dBm	mW
LTE12	10	QPSK	1/0	704	19.44	87.9
			1/0	707.5	19.96	99.08
			1/0	711	19.33	85.7
		16QAM	1/0	704	18.20	66.07
			1/0	707.5	19.00	79.43
			1/0	711	18.26	66.99
LTE12	5	QPSK	1/0	701.5	18.80	75.86
			1/0	707.5	19.46	88.31
			1/0	713.5	18.80	75.86
		16QAM	1/0	701.5	18.60	72.44
			1/0	707.5	18.39	69.02
			1/0	713.5	17.80	60.26
LTE12	3	QPSK	1/0	700.5	18.85	76.74
			1/0	707.5	19.30	85.11
			1/0	714.5	18.84	76.56
		16QAM	1/0	700.5	18.50	70.79
			1/0	707.5	19.70	93.33
			1/0	714.5	19.60	91.2
LTE12	1.4	QPSK	1/0	699.7	19.09	81.1
			1/0	707.5	19.10	81.28
			1/0	715.3	18.78	75.51
		16QAM	1/0	699.7	18.20	66.07
			1/0	707.5	17.90	61.66
			1/0	715.3	17.80	60.26

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 13

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP	
					dBm	mW
LTE13	10	QPSK	1/0	782	20	100
			1/0	782	20	100
			1/0	782	20	100
		16QAM	1/0	782	18.9	77.62
			1/0	782	18.9	77.62
			1/0	782	18.9	77.62
LTE13	5	QPSK	1/0	779.5	19.55	90.16
			1/0	782	19.5	89.13
			1/0	784.5	19.3	85.11
		16QAM	1/0	779.5	18.2	66.07
			1/0	782	18.4	69.18
			1/0	784.5	18.5	70.79

LTE Band 17

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP	
					dBm	mW
LTE17	10	QPSK	1/0	709	19.44	87.9
			1/0	710	19.96	99.08
			1/0	711	19.33	85.7
		16QAM	1/0	709	18.20	66.07
			1/0	710	19.00	79.43
			1/0	711	18.26	66.99
LTE17	5	QPSK	1/0	706.5	18.80	75.86
			1/0	710	19.46	88.31
			1/0	713.5	18.80	75.86
		16QAM	1/0	706.5	18.60	72.44
			1/0	710	18.39	69.02
			1/0	713.5	17.80	60.26

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 25

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	EIRP	
					dBm	mW
LTE25	20	QPSK	1/0	1860	25.92	390.84
			1/0	1882.5	26.12	409.26
			1/0	1905	25.95	393.55
		16QAM	1/0	1860	24.94	311.89
			1/0	1882.5	25.37	344.35
			1/0	1905	25.02	317.69
LTE25	15	QPSK	1/0	1857.5	25.92	390.84
			1/0	1882.5	26.1	407.38
			1/0	1907.5	25.96	394.46
		16QAM	1/0	1857.5	24.92	310.46
			1/0	1882.5	25.3	338.84
			1/0	1907.5	24.94	311.89
LTE25	10	QPSK	1/0	1855	25.83	382.82
			1/0	1882.5	26.14	411.15
			1/0	1910	25.95	393.55
		16QAM	1/0	1855	24.91	309.74
			1/0	1882.5	25.38	345.14
			1/0	1910	24.94	311.89

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	EIRP	
					dBm	mW
LTE25	5	QPSK	1/0	1852.5	25.84	383.71
			1/0	1882.5	26.13	410.2
			1/0	1912.5	25.98	396.28
		16QAM	1/0	1852.5	24.89	308.32
			1/0	1882.5	25.18	329.61
			1/0	1912.5	25	316.23
LTE25	3	QPSK	1/0	1851.5	25.81	381.07
			1/0	1882.5	26.11	408.32
			1/0	1913.5	25.97	395.37
		16QAM	1/0	1851.5	24.9	309.03
			1/0	1882.5	25.3	338.84
			1/0	1913.5	24.96	313.33
LTE25	1.4	QPSK	1/0	1850.7	25.81	381.07
			1/0	1882.5	26.16	413.05
			1/0	1914.3	25.98	396.28
		16QAM	1/0	1850.7	24.99	315.5
			1/0	1882.5	25.12	325.09
			1/0	1914.3	24.99	315.5

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 26

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP	
					dBm	mW
LTE26	15	QPSK	1/0	831.5	23.07	202.77
			1/0	836.5	22.35	171.79
			1/0	841.5	22.01	158.85
		16QAM	1/0	831.5	22.65	184.08
			1/0	836.5	21.84	152.76
			1/0	841.5	21.72	148.59
LTE26	10	QPSK	1/0	819	23.30	213.80
			1/0	829	21.01	126.18
			1/0	831.5	22.25	167.88
			1/0	844	21.74	149.28
		16QAM	1/0	819	22.95	197.24
			1/0	829	20.91	123.31
			1/0	831.5	22.13	163.31
			1/0	844	21.59	144.21
LTE26	5	QPSK	1/0	816.5	23.66	232.27
			1/0	826.5	21.11	129.12
			1/0	831.5	22.47	176.60
			1/0	846.5	21.68	147.23
		16QAM	1/0	816.5	23.57	227.51
			1/0	826.5	20.91	123.31
			1/0	831.5	22.23	167.11
			1/0	846.5	21.40	138.04
LTE26	3	QPSK	1/0	815.5	23.47	222.33
			1/0	825.5	21.31	135.21
			1/0	831.5	22.44	175.39
			1/0	847.5	21.53	142.23
		16QAM	1/0	815.5	23.34	215.77
			1/0	825.5	21.01	126.18
			1/0	831.5	22.20	165.96
			1/0	847.5	21.10	128.82

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE26	1.4	QPSK	1/0	814.7	23.71	234.96
			1/0	824.7	21.51	141.58
			1/0	831.5	22.52	178.65
			1/0	848.3	21.45	139.64
		16QAM	1/0	814.7	23.38	217.77
			1/0	824.7	20.86	121.90
			1/0	831.5	21.69	147.57
			1/0	848.3	21.00	125.89

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 41

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	EIRP	
					dBm	mW
LTE41	20	QPSK	1/0	2506	17.34	54.2
			1/0	2593	19.70	93.24
			1/0	2680	19.28	84.64
		16QAM	1/0	2506	16.27	42.36
			1/0	2593	18.84	76.49
			1/0	2680	18.80	75.78
	15	QPSK	1/0	2503.5	16.82	48.07
			1/0	2593	18.13	64.95
			1/0	2682.5	18.23	66.56
		16QAM	1/0	2503.5	16.37	43.34
			1/0	2593	17.59	57.36
			1/0	2682.5	17.73	59.33
	10	QPSK	1/0	2501	16.03	40.07
			1/0	2593	18.87	77.02
			1/0	2685	16.71	46.87
		16QAM	1/0	2501	15.38	34.5
			1/0	2593	18.77	75.26
			1/0	2685	16.30	42.65
	5	QPSK	1/0	2498.5	16.54	45.12
			1/0	2593	19.25	84.06
			1/0	2687.5	18.37	68.64
		16QAM	1/0	2498.5	16.29	42.6
			1/0	2593	18.53	71.22
			1/0	2687.5	17.54	56.7

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

GSM

Band

GSM 1900

EGPRS

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/15/2015
Test Engineer: A. Escamilla
Configuration: X-pos , EUT only
Location: Chamber A
Mode: EGPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	18.05	V	0.9	7.9	25.04	33.0	-8.0	
1850.20	17.54	H	0.9	7.9	24.53	33.0	-8.5	
Mid Ch								
1880.00	17.27	V	0.9	7.9	24.24	33.0	-8.8	
1880.00	18.15	H	0.9	7.9	25.12	33.0	-7.9	
High Ch								
1909.80	17.14	V	0.9	7.9	24.12	33.0	-8.9	
1909.80	17.78	H	0.9	7.9	24.76	33.0	-8.2	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

GSM1900

GPRS

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/15/2015
Test Engineer: A. Escamilla
Configuration: X-pos EUT w/ AC Adapter + Headset
Location: Chamber A
Mode: GPRS 1900 MHz Fundamentals

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	22.48	V	0.9	7.9	29.47	33.0	-3.5	
1850.20	22.69	H	0.9	7.9	29.68	33.0	-3.3	
Mid Ch								
1880.00	22.58	V	0.9	7.9	29.55	33.0	-3.5	
1880.00	22.55	H	0.9	7.9	29.52	33.0	-3.5	
High Ch								
1909.80	21.60	V	0.9	7.9	28.58	33.0	-4.4	
1909.80	22.58	H	0.9	7.9	29.56	33.0	-3.4	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

GSM 850

EGPRS

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: EGPRS 850 MHz Fundamentals

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	18.93	V	0.9	0.0	18.03	38.5	-20.5	
824.20	26.28	H	0.9	0.0	25.38	38.5	-13.1	
Mid Ch								
836.60	17.29	V	0.9	0.0	16.39	38.5	-22.1	
836.60	27.70	H	0.9	0.0	26.80	38.5	-11.7	
High Ch								
848.80	16.89	V	0.9	0.0	15.99	38.5	-22.5	
848.80	26.59	H	0.9	0.0	25.69	38.5	-12.8	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

GSM 850

GPRS

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: GPRS 850 MHz Fundamentals

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.20	25.10	V	0.9	0.0	24.20	38.5	-14.3	
824.20	31.33	H	0.9	0.0	30.43	38.5	-8.1	
Mid Ch								
836.60	23.12	V	0.9	0.0	22.22	38.5	-16.3	
836.60	31.91	H	0.9	0.0	31.01	38.5	-7.5	
High Ch								
848.80	22.79	V	0.9	0.0	21.89	38.5	-16.6	
848.80	31.22	H	0.9	0.0	30.32	38.5	-8.2	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

WCDMA

Band

Band 2

HSDPA

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235 -
Date: 7/15/2015
Test Engineer: A. Escamilla
Configuration: X-pos EUT Only
Location: Chamber A
Mode: HSDPA Band 2 Fundamentals

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	15.29	V	0.9	7.9	22.28	33.0	-10.7	
1852.40	15.79	H	0.9	7.9	22.78	33.0	-10.2	
Mid Ch								
1880.00	14.69	V	0.9	7.9	21.66	33.0	-11.3	
1880.00	14.20	H	0.9	7.9	21.17	33.0	-11.8	
High Ch								
1907.60	14.95	V	0.9	7.9	21.93	33.0	-11.1	
1907.60	15.11	H	0.9	7.9	22.09	33.0	-10.9	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

Band 2

REL99

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/15/2015
Test Engineer: A. Escamilla
Configuration: X-pos EUT only
Location: Chamber A
Mode: Rel99 Band 2 Fundamentals

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.40	16.39	V	0.9	7.9	23.38	33.0	-9.6	
1852.40	17.09	H	0.9	7.9	24.08	33.0	-8.9	
Mid Ch								
1880.00	16.12	V	0.9	7.9	23.09	33.0	-9.9	
1880.00	17.27	H	0.9	7.9	24.24	33.0	-8.8	
High Ch								
1907.60	15.72	V	0.9	7.9	22.70	33.0	-10.3	
1907.60	15.73	H	0.9	7.9	22.71	33.0	-10.3	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

Band 4

HSDPA

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/15/2015
Test Engineer: A. Escamilla
Configuration: X-pos, EUT only
Location: Chamber A
Mode: HSDPA Band 4 Fundamentals

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	14.67	V	0.9	8.2	21.97	33.0	-11.0	
1712.40	16.57	H	0.9	8.2	23.87	33.0	-9.1	
Mid Ch								
1732.60	14.41	V	0.9	8.2	21.71	33.0	-11.3	
1732.60	15.70	H	0.9	8.2	23.00	33.0	-10.0	
High Ch								
1752.60	15.75	V	0.9	8.1	22.95	33.0	-10.1	
1752.60	17.12	H	0.9	8.1	24.32	33.0	-8.7	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

Band 4

REL99

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/15/2015
Test Engineer: A. Escamilla
Configuration: X-pos, EUT only
Location: Chamber A
Mode: REL99 Band 4 Fundamentals

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.40	17.00	V	0.9	8.2	24.30	33.0	-8.7	
1712.40	17.92	H	0.9	8.2	25.22	33.0	-7.8	
Mid Ch								
1732.60	16.51	V	0.9	8.2	23.81	33.0	-9.2	
1732.60	17.24	H	0.9	8.2	24.54	33.0	-8.5	
High Ch								
1752.60	17.26	V	0.9	8.1	24.46	33.0	-8.5	
1752.60	18.91	H	0.9	8.1	26.11	33.0	-6.9	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

Band 5

HSDPA

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: HSDPA Band 5 Fundamentals

Test Equipment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	14.47	V	0.9	0.0	13.57	38.5	-24.9	
826.40	23.47	H	0.9	0.0	22.57	38.5	-15.9	
Mid Ch								
836.60	13.17	V	0.9	0.0	12.27	38.5	-26.2	
836.60	23.07	H	0.9	0.0	22.17	38.5	-16.3	
High Ch								
846.60	13.66	V	0.9	0.0	12.76	38.5	-25.7	
846.60	22.54	H	0.9	0.0	21.64	38.5	-16.9	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

Band 5

REL99

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: Rel99 Band 5 Fundamentals

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.40	15.47	V	0.9	0.0	14.57	38.5	-23.9	
826.40	24.51	H	0.9	0.0	23.61	38.5	-14.9	
Mid Ch								
836.60	14.20	V	0.9	0.0	13.30	38.5	-25.2	
836.60	24.08	H	0.9	0.0	23.18	38.5	-15.3	
High Ch								
846.60	14.69	V	0.9	0.0	13.79	38.5	-24.7	
846.60	23.56	H	0.9	0.0	22.66	38.5	-15.8	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

CDMA

Band

BC1

High Frequency Fundamental Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/21/2015
Test Engineer: R.Alegre
Configuration: EUT Only
Mode: CDMA EVDO BC1

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.8513	16.7	V	0.90	8.01	23.81	33.0	-9.2	
1.8513	20.4	H	0.90	8.01	27.50	33.0	-5.5	
Mid Ch								
1.8800	16.3	V	0.90	8.01	23.43	33.0	-9.6	
1.8800	20.5	H	0.90	8.01	27.57	33.0	-5.4	
High Ch								
1.9088	17.7	V	0.90	8.01	24.84	33.0	-8.2	
1.9088	20.3	H	0.90	8.01	27.45	33.0	-5.6	

Rev. 3.17.11

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

BC1

1xRTT

High Frequency Fundamental Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/21/2015
Test Engineer: R.Alegre
Configuration: EUT Only
Mode: CDMA RTT BC1

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59 Substitution, 4ft SMA Cable Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1.8513	16.8	V	0.90	8.01	23.91	33.0	-9.1	
1.8513	20.5	H	0.90	8.01	27.62	33.0	-5.4	
Mid Ch								
1.8800	16.5	V	0.90	8.01	23.56	33.0	-9.4	
1.8800	20.6	H	0.90	8.01	27.69	33.0	-5.3	
High Ch								
1.9088	17.9	V	0.90	8.01	24.97	33.0	-8.0	
1.9088	20.5	H	0.90	8.01	27.61	33.0	-5.4	

Rev. 3.17.11

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

BC0

High Frequency Substitution Measurement
UL Verification Services Chamber C

Company: LG Electronics
Project #: 15I21235
Date: 7/21/2015
Test Engineer: R.Alegre
Configuration: EUT Only
Mode: CDMA EVDO BC0

Test Equipment:
Receiving: T185, and Chamber C Cable
Substitution: Dipole T273, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	14.61	V	0.9	0.0	13.71	38.5	-24.7	
824.70	22.28	H	0.9	0.0	21.38	38.5	-17.1	
Mid Ch								
836.52	13.82	V	0.9	0.0	12.92	38.5	-25.5	
836.52	22.22	H	0.9	0.0	21.32	38.5	-17.1	
High Ch								
848.31	14.06	V	0.9	0.0	13.16	38.5	-25.3	
848.31	21.56	H	0.9	0.0	20.66	38.5	-17.8	

Rev. 3.17.11

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

BC0

1xRTT

High Frequency Substitution Measurement
UL Verification Services Chamber C

Company: LG Electronics
Project #: 15I21235
Date: 7/21/2015
Test Engineer: R.Alegre
Configuration: EUT Only
Mode: CDMA RTT BC0

Test Equipment:
Receiving: T185, and Chamber C Cable
Substitution: Dipole T273, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
824.70	14.68	V	0.9	0.0	13.78	38.5	-24.7	
824.70	22.47	H	0.9	0.0	21.57	38.5	-16.9	
Mid Ch								
836.52	13.90	V	0.9	0.0	13.00	38.5	-25.4	
836.52	22.41	H	0.9	0.0	21.51	38.5	-16.9	
High Ch								
848.31	14.17	V	0.9	0.0	13.27	38.5	-25.2	
848.31	21.69	H	0.9	0.0	20.79	38.5	-17.7	

Rev. 3.17.11

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

BC10

High Frequency Substitution Measurement
UL Verification Services Chamber C

Company: LG Electronics
Project #: 15I21235
Date: 7/21/2015
Test Engineer: R.Alegre
Configuration: EUT Only
Mode: CDMA EVDO BC10

Test Equipment:
Receiving: T185, and Chamber C Cable
Substitution: Dipole T273, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
817.90	14.36	V	0.9	0.0	13.46	38.5	-25.0	
817.90	22.40	H	0.9	0.0	21.50	38.5	-16.9	
Mid Ch								
820.50	13.69	V	0.9	0.0	12.79	38.5	-25.7	
820.50	22.40	H	0.9	0.0	21.50	38.5	-16.9	
High Ch								
823.10	13.88	V	0.9	0.0	12.98	38.5	-25.5	
823.10	22.41	H	0.9	0.0	21.51	38.5	-16.9	

Rev. 3.17.11

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

BC10

1xRTT

High Frequency Substitution Measurement
UL Verification Services Chamber C

Company: LG Electronics
Project #: 15I21235
Date: 7/21/2015
Test Engineer: R.Alegre
Configuration: EUT Only
Mode: CDMA RTT BC10

Test Equipment:
Receiving: T185, and Chamber C Cable
Substitution: Dipole T273, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
817.90	14.70	V	0.9	0.0	13.80	38.5	-24.6	
817.90	22.74	H	0.9	0.0	21.84	38.5	-16.6	
Mid Ch								
820.50	13.91	V	0.9	0.0	13.01	38.5	-25.4	
820.50	22.89	H	0.9	0.0	21.99	38.5	-16.5	
High Ch								
823.10	14.12	V	0.9	0.0	13.22	38.5	-25.2	
823.10	23.04	H	0.9	0.0	22.14	38.5	-16.3	

Rev. 3.17.11

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 2

Band

LTE2

20MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	13.49	V	0.9	8.0	20.60	33.0	-12.4	
1860.00	17.83	H	0.9	8.0	24.94	33.0	-8.1	
Mid Ch								
1880.00	13.56	V	0.9	8.0	20.67	33.0	-12.3	
1880.00	18.26	H	0.9	8.0	25.37	33.0	-7.6	
High Ch								
1900.00	13.81	V	0.9	8.0	20.92	33.0	-12.1	
1900.00	17.91	H	0.9	8.0	25.02	33.0	-8.0	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE2

20MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 2 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	14.50	V	0.9	8.0	21.61	33.0	-11.4	
1860.00	18.81	H	0.9	8.0	25.92	33.0	-7.1	
Mid Ch								
1880.00	14.72	V	0.9	8.0	21.83	33.0	-11.2	
1880.00	19.01	H	0.9	8.0	26.12	33.0	-6.9	
High Ch								
1900.00	13.68	V	0.9	8.0	20.79	33.0	-12.2	
1900.00	18.84	H	0.9	8.0	25.95	33.0	-7.1	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE2

15MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	13.46	V	0.9	8.0	20.57	33.0	-12.4	
1857.50	17.81	H	0.9	8.0	24.92	33.0	-8.1	
Mid Ch								
1880.00	13.61	V	0.9	8.0	20.72	33.0	-12.3	
1880.00	18.19	H	0.9	8.0	25.30	33.0	-7.7	
High Ch								
1902.50	13.60	V	0.9	8.0	20.71	33.0	-12.3	
1902.50	17.83	H	0.9	8.0	24.94	33.0	-8.1	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE2

15MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 2 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	14.41	V	0.9	8.0	21.52	33.0	-11.5	
1857.50	18.81	H	0.9	8.0	25.92	33.0	-7.1	
Mid Ch								
1880.00	14.46	V	0.9	8.0	21.57	33.0	-11.4	
1880.00	18.99	H	0.9	8.0	26.10	33.0	-6.9	
High Ch								
1902.50	14.55	V	0.9	8.0	21.66	33.0	-11.3	
1902.50	18.85	H	0.9	8.0	25.96	33.0	-7.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE2

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	13.48	V	0.9	8.0	20.59	33.0	-12.4	
1855.00	17.80	H	0.9	8.0	24.91	33.0	-8.1	
Mid Ch								
1880.00	13.48	V	0.9	8.0	20.59	33.0	-12.4	
1880.00	18.27	H	0.9	8.0	25.38	33.0	-7.6	
High Ch								
1905.00	13.76	V	0.9	8.0	20.87	33.0	-12.1	
1905.00	17.83	H	0.9	8.0	24.94	33.0	-8.1	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE2

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 2 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	14.53	V	0.9	8.0	21.64	33.0	-11.4	
1855.00	18.72	H	0.9	8.0	25.83	33.0	-7.2	
Mid Ch								
1880.00	14.56	V	0.9	8.0	21.67	33.0	-11.3	
1880.00	19.03	H	0.9	8.0	26.14	33.0	-6.9	
High Ch								
1905.00	14.59	V	0.9	8.0	21.70	33.0	-11.3	
1905.00	18.84	H	0.9	8.0	25.95	33.0	-7.1	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE2

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	13.48	V	0.9	8.0	20.59	33.0	-12.4	
1852.50	17.78	H	0.9	8.0	24.89	33.0	-8.1	
Mid Ch								
1880.00	13.59	V	0.9	8.0	20.70	33.0	-12.3	
1880.00	18.07	H	0.9	8.0	25.18	33.0	-7.8	
High Ch								
1907.50	13.61	V	0.9	8.0	20.72	33.0	-12.3	
1907.50	17.89	H	0.9	8.0	25.00	33.0	-8.0	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE2

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 2 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	14.50	V	0.9	8.0	21.61	33.0	-11.4	
1852.50	18.73	H	0.9	8.0	25.84	33.0	-7.2	
Mid Ch								
1880.00	14.70	V	0.9	8.0	21.81	33.0	-11.2	
1880.00	19.02	H	0.9	8.0	26.13	33.0	-6.9	
High Ch								
1907.50	14.69	V	0.9	8.0	21.80	33.0	-11.2	
1907.50	18.87	H	0.9	8.0	25.98	33.0	-7.0	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE2

3MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	13.50	V	0.9	8.0	20.61	33.0	-12.4	
1851.50	17.79	H	0.9	8.0	24.90	33.0	-8.1	
Mid Ch								
1880.00	13.64	V	0.9	8.0	20.75	33.0	-12.3	
1880.00	18.19	H	0.9	8.0	25.30	33.0	-7.7	
High Ch								
1908.50	13.70	V	0.9	8.0	20.81	33.0	-12.2	
1908.50	17.85	H	0.9	8.0	24.96	33.0	-8.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE2

3MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 2 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	14.49	V	0.9	8.0	21.60	33.0	-11.4	
1851.50	18.70	H	0.9	8.0	25.81	33.0	-7.2	
Mid Ch								
1880.00	14.69	V	0.9	8.0	21.80	33.0	-11.2	
1880.00	19.00	H	0.9	8.0	26.11	33.0	-6.9	
High Ch								
1908.50	14.67	V	0.9	8.0	21.78	33.0	-11.2	
1908.50	18.86	H	0.9	8.0	25.97	33.0	-7.0	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE2

1.4MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	13.52	V	0.9	8.0	20.63	33.0	-12.4	
1850.70	17.88	H	0.9	8.0	24.99	33.0	-8.0	
Mid Ch								
1880.00	13.67	V	0.9	8.0	20.78	33.0	-12.2	
1880.00	18.01	H	0.9	8.0	25.12	33.0	-7.9	
High Ch								
1909.30	13.72	V	0.9	8.0	20.83	33.0	-12.2	
1909.30	17.88	H	0.9	8.0	24.99	33.0	-8.0	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE2

1.4MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 2 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	14.51	V	0.9	8.0	21.62	33.0	-11.4	
1850.70	18.70	H	0.9	8.0	25.81	33.0	-7.2	
Mid Ch								
1880.00	14.77	V	0.9	8.0	21.88	33.0	-11.1	
1880.00	19.05	H	0.9	8.0	26.16	33.0	-6.8	
High Ch								
1909.30	14.70	V	0.9	8.0	21.81	33.0	-11.2	
1909.30	18.87	H	0.9	8.0	25.98	33.0	-7.0	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 4

Band

LTE4

20MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 4 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	14.20	V	0.9	8.2	21.55	30.0	-8.5	
1720.00	16.11	H	0.9	8.2	23.45	30.0	-6.5	
Mid Ch								
1732.50	14.58	V	0.9	8.2	21.85	30.0	-8.2	
1732.50	17.45	H	0.9	8.2	24.72	30.0	-5.3	
High Ch								
1745.00	14.42	V	0.9	8.1	21.62	30.0	-8.4	
1745.00	17.82	H	0.9	8.1	25.02	30.0	-5.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE4

20MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 4 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1720.00	15.18	V	0.9	8.2	22.53	30.0	-7.5	
1720.00	17.07	H	0.9	8.2	24.41	30.0	-5.6	
Mid Ch								
1732.50	15.71	V	0.9	8.2	22.98	30.0	-7.0	
1732.50	18.28	H	0.9	8.2	25.55	30.0	-4.5	
High Ch								
1745.00	15.49	V	0.9	8.1	22.69	30.0	-7.3	
1745.00	18.83	H	0.9	8.1	26.03	30.0	-4.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE4

15MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 4 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	14.07	V	0.9	8.2	21.42	30.0	-8.6	
1717.50	16.03	H	0.9	8.2	23.37	30.0	-6.6	
Mid Ch								
1732.50	14.56	V	0.9	8.2	21.83	30.0	-8.2	
1732.50	17.44	H	0.9	8.2	24.71	30.0	-5.3	
High Ch								
1747.50	14.65	V	0.9	8.1	21.84	30.0	-8.2	
1747.50	17.96	H	0.9	8.1	25.16	30.0	-4.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE4

15MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 4 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1717.50	14.90	V	0.9	8.2	22.25	30.0	-7.7	
1717.50	17.00	H	0.9	8.2	24.34	30.0	-5.7	
Mid Ch								
1732.50	15.57	V	0.9	8.2	22.84	30.0	-7.2	
1732.50	18.26	H	0.9	8.2	25.53	30.0	-4.5	
High Ch								
1747.50	15.48	V	0.9	8.1	22.67	30.0	-7.3	
1747.50	18.93	H	0.9	8.1	26.13	30.0	-3.9	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE4

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 4 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	14.26	V	0.9	8.2	21.53	30.0	-8.5	
1715.00	16.00	H	0.9	8.2	23.27	30.0	-6.7	
Mid Ch								
1732.50	14.46	V	0.9	8.2	21.73	30.0	-8.3	
1732.50	17.47	H	0.9	8.2	24.74	30.0	-5.3	
High Ch								
1750.00	14.51	V	0.9	8.1	21.70	30.0	-8.3	
1750.00	18.06	H	0.9	8.1	25.25	30.0	-4.7	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE4

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 4 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1715.00	15.15	V	0.9	8.2	22.42	30.0	-7.6	
1715.00	17.02	H	0.9	8.2	24.29	30.0	-5.7	
Mid Ch								
1732.50	15.62	V	0.9	8.2	22.89	30.0	-7.1	
1732.50	18.35	H	0.9	8.2	25.62	30.0	-4.4	
High Ch								
1750.00	15.38	V	0.9	8.1	22.57	30.0	-7.4	
1750.00	19.04	H	0.9	8.1	26.23	30.0	-3.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE4

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 4 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	14.20	V	0.9	8.2	21.55	30.0	-8.5	
1712.50	16.05	H	0.9	8.2	23.39	30.0	-6.6	
Mid Ch								
1732.50	14.68	V	0.9	8.2	21.95	30.0	-8.1	
1732.50	17.40	H	0.9	8.2	24.67	30.0	-5.3	
High Ch								
1752.50	14.36	V	0.9	8.1	21.56	30.0	-8.4	
1752.50	18.01	H	0.9	8.1	25.21	30.0	-4.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE4

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 4 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1712.50	15.13	V	0.9	8.2	22.48	30.0	-7.5	
1712.50	17.04	H	0.9	8.2	24.38	30.0	-5.6	
Mid Ch								
1732.50	15.60	V	0.9	8.2	22.87	30.0	-7.1	
1732.50	18.29	H	0.9	8.2	25.56	30.0	-4.4	
High Ch								
1752.50	15.35	V	0.9	8.1	22.55	30.0	-7.5	
1752.50	18.99	H	0.9	8.1	26.19	30.0	-3.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE4

3MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 4 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	14.14	V	0.9	8.2	21.49	30.0	-8.5	
1711.50	16.01	H	0.9	8.2	23.35	30.0	-6.6	
Mid Ch								
1732.50	14.67	V	0.9	8.2	21.94	30.0	-8.1	
1732.50	17.43	H	0.9	8.2	24.70	30.0	-5.3	
High Ch								
1753.50	14.35	V	0.9	8.1	21.54	30.0	-8.5	
1753.50	17.99	H	0.9	8.1	25.19	30.0	-4.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE4

3MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 4 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1711.50	15.15	V	0.9	8.2	22.50	30.0	-7.5	
1711.50	17.02	H	0.9	8.2	24.36	30.0	-5.6	
Mid Ch								
1732.50	15.70	V	0.9	8.2	22.97	30.0	-7.0	
1732.50	18.32	H	0.9	8.2	25.59	30.0	-4.4	
High Ch								
1753.50	15.42	V	0.9	8.1	22.61	30.0	-7.4	
1753.50	18.98	H	0.9	8.1	26.18	30.0	-3.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE4

1.4MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 4 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	14.16	V	0.9	8.2	21.43	30.0	-8.6	
1710.70	16.05	H	0.9	8.2	23.32	30.0	-6.7	
Mid Ch								
1732.50	14.70	V	0.9	8.2	21.97	30.0	-8.0	
1732.50	17.41	H	0.9	8.2	24.68	30.0	-5.3	
High Ch								
1754.30	14.42	V	0.9	8.1	21.61	30.0	-8.4	
1754.30	18.02	H	0.9	8.1	25.21	30.0	-4.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE4

1.4MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 4 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1710.70	15.17	V	0.9	8.2	22.44	30.0	-7.6	
1710.70	17.03	H	0.9	8.2	24.30	30.0	-5.7	
Mid Ch								
1732.50	15.68	V	0.9	8.2	22.95	30.0	-7.1	
1732.50	18.33	H	0.9	8.2	25.60	30.0	-4.4	
High Ch								
1754.30	15.40	V	0.9	8.1	22.59	30.0	-7.4	
1754.30	19.01	H	0.9	8.1	26.20	30.0	-3.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 5

Band

LTE5

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_16QAM Band 5 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	13.74	V	0.9	0.0	12.84	38.5	-25.7	
829.00	21.81	H	0.9	0.0	20.91	38.5	-17.6	
Mid Ch								
836.50	13.34	V	0.9	0.0	12.44	38.5	-26.1	
836.50	23.03	H	0.9	0.0	22.13	38.5	-16.4	
High Ch								
844.00	13.42	V	0.9	0.0	12.52	38.5	-26.0	
844.00	22.49	H	0.9	0.0	21.59	38.5	-16.9	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE5

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_QPSK Band 5 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
829.00	14.04	V	0.9	0.0	13.14	38.5	-25.4	
829.00	21.91	H	0.9	0.0	21.01	38.5	-17.5	
Mid Ch								
836.50	13.39	V	0.9	0.0	12.49	38.5	-26.0	
836.50	23.15	H	0.9	0.0	22.25	38.5	-16.3	
High Ch								
844.00	13.55	V	0.9	0.0	12.65	38.5	-25.9	
844.00	22.64	H	0.9	0.0	21.74	38.5	-16.8	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE5

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_16QAM Band 5 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	12.24	V	0.9	0.0	11.34	38.5	-27.2	
826.50	21.81	H	0.9	0.0	20.91	38.5	-17.6	
Mid Ch								
836.50	12.64	V	0.9	0.0	11.74	38.5	-26.8	
836.50	23.13	H	0.9	0.0	22.23	38.5	-16.3	
High Ch								
846.50	13.21	V	0.9	0.0	12.31	38.5	-26.2	
846.50	22.30	H	0.9	0.0	21.40	38.5	-17.1	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE5

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_QPSK Band 5 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
826.50	12.44	V	0.9	0.0	11.54	38.5	-27.0	
826.50	22.01	H	0.9	0.0	21.11	38.5	-17.4	
Mid Ch								
836.50	12.83	V	0.9	0.0	11.93	38.5	-26.6	
836.50	23.37	H	0.9	0.0	22.47	38.5	-16.0	
High Ch								
846.50	13.41	V	0.9	0.0	12.51	38.5	-26.0	
846.50	22.58	H	0.9	0.0	21.68	38.5	-16.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE5

3MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_16QAM Band 5 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
825.50	13.04	V	0.9	0.0	12.14	38.5	-26.4	
825.50	21.91	H	0.9	0.0	21.01	38.5	-17.5	
Mid Ch								
836.50	13.03	V	0.9	0.0	12.13	38.5	-26.4	
836.50	23.10	H	0.9	0.0	22.20	38.5	-16.3	
High Ch								
847.50	12.61	V	0.9	0.0	11.71	38.5	-26.8	
847.50	22.00	H	0.9	0.0	21.10	38.5	-17.4	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE5

3MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_QPSK Band 5 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
825.50	13.24	V	0.9	0.0	12.34	38.5	-26.2	
825.50	22.21	H	0.9	0.0	21.31	38.5	-17.2	
Mid Ch								
836.50	13.30	V	0.9	0.0	12.40	38.5	-26.1	
836.50	23.34	H	0.9	0.0	22.44	38.5	-16.1	
High Ch								
847.50	12.91	V	0.9	0.0	12.01	38.5	-26.5	
847.50	22.43	H	0.9	0.0	21.53	38.5	-17.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE5

1.4MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_16QAM Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	13.19	V	0.9	0.0	12.29	38.5	-26.2	
824.70	21.76	H	0.9	0.0	20.86	38.5	-17.6	
Mid Ch								
836.50	12.70	V	0.9	0.0	11.80	38.5	-26.7	
836.50	22.59	H	0.9	0.0	21.69	38.5	-16.8	
High Ch								
848.30	12.66	V	0.9	0.0	11.76	38.5	-26.7	
848.30	21.90	H	0.9	0.0	21.00	38.5	-17.5	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE5

1.4MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_QPSK Band 5 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
824.70	13.44	V	0.9	0.0	12.54	38.5	-26.0	
824.70	22.41	H	0.9	0.0	21.51	38.5	-17.0	
Mid Ch								
836.50	13.12	V	0.9	0.0	12.22	38.5	-26.3	
836.50	23.42	H	0.9	0.0	22.52	38.5	-16.0	
High Ch								
848.30	13.13	V	0.9	0.0	12.23	38.5	-26.3	
848.30	22.35	H	0.9	0.0	21.45	38.5	-17.1	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 7

Band

LTE7

20MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/24/2015
Test Engineer: G. Escano
Configuration: EUT Only
Location: Chamber B
Mode: LTE_16QAM Band 7 Fundamentals, 20MHz Bandwidth

Test Equipment:
Receiving: Horn T1345, and Chamber B SMA Cables
Substitution: Horn T60, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2510.00	6.08	V	0.9	9.3	14.48	33.0	-18.5	
2510.00	11.48	H	0.9	9.3	19.89	33.0	-13.1	
Mid Ch								
2535.00	4.66	V	0.9	9.3	13.07	33.0	-19.9	
2535.00	11.63	H	0.9	9.3	20.04	33.0	-13.0	
High Ch								
2560.00	4.71	V	0.9	9.3	13.11	33.0	-19.9	
2560.00	12.82	H	0.9	9.3	21.23	33.0	-11.8	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE7

20MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/24/2015
Test Engineer: G. Escano
Configuration: EUT Only
Location: Chamber B
Mode: LTE_QPSK Band 7 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T1345, and Chamber B SMA Cables
Substitution: Horn T60, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2510.00	6.72	V	0.9	9.3	15.12	33.0	-17.9	
2510.00	12.34	H	0.9	9.3	20.75	33.0	-12.3	
Mid Ch								
2535.00	5.48	V	0.9	9.3	13.89	33.0	-19.1	
2535.00	12.59	H	0.9	9.3	21.00	33.0	-12.0	
High Ch								
2560.00	5.71	V	0.9	9.3	14.11	33.0	-18.9	
2560.00	13.66	H	0.9	9.3	22.07	33.0	-10.9	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE7

15MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/24/2015
Test Engineer: G. Escano
Configuration: EUT Only
Location: Chamber B
Mode: LTE_16QAM Band 7 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T1345, and Chamber B SMA Cables
Substitution: Horn T60, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2507.50	3.29	V	0.9	9.3	11.69	33.0	-21.3	
2507.50	11.69	H	0.9	9.3	20.10	33.0	-12.9	
Mid Ch								
2535.00	3.35	V	0.9	9.3	11.76	33.0	-21.2	
2535.00	11.87	H	0.9	9.3	20.28	33.0	-12.7	
High Ch								
2562.50	4.89	V	0.9	9.3	13.29	33.0	-19.7	
2562.50	12.47	H	0.9	9.3	20.87	33.0	-12.1	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE7

15MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/24/2015
Test Engineer: G. Escano
Configuration: EUT Only
Location: Chamber B
Mode: LTE_QPSK Band 7 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T1345, and Chamber B SMA Cables
Substitution: Horn T60, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2507.50	4.11	V	0.9	9.3	12.51	33.0	-20.5	
2507.50	12.40	H	0.9	9.3	20.81	33.0	-12.2	
Mid Ch								
2535.00	4.30	V	0.9	9.3	12.71	33.0	-20.3	
2535.00	13.04	H	0.9	9.3	21.45	33.0	-11.6	
High Ch								
2562.50	5.66	V	0.9	9.3	14.06	33.0	-18.9	
2562.50	13.33	H	0.9	9.3	21.73	33.0	-11.3	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE7

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/13/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber B
Mode: LTE_16QAM Band 7 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T1345, and Chamber B SMA Cables
Substitution: Horn T59,SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2505.00	9.55	V	0.9	9.5	18.13	33.0	-14.9	
2505.00	10.33	H	0.9	9.5	18.91	33.0	-14.1	
Mid Ch								
2535.00	10.74	V	0.9	9.5	19.33	33.0	-13.7	
2535.00	11.14	H	0.9	9.5	19.73	33.0	-13.3	
High Ch								
2565.00	13.13	V	0.9	9.5	21.73	33.0	-11.3	
2565.00	12.97	H	0.9	9.5	21.57	33.0	-11.4	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE7

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/13/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber B
Mode: LTE_QPSK Band 7 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T1345, and Chamber B SMA Cables
Substitution: Horn T59,SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2505.00	10.66	V	0.9	9.5	19.24	33.0	-13.8	
2505.00	11.32	H	0.9	9.5	19.90	33.0	-13.1	
Mid Ch								
2535.00	11.24	V	0.9	9.5	19.83	33.0	-13.2	
2535.00	11.70	H	0.9	9.5	20.29	33.0	-12.7	
High Ch								
2565.00	13.59	V	0.9	9.5	22.19	33.0	-10.8	
2565.00	13.36	H	0.9	9.5	21.96	33.0	-11.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE7

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/13/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber B
Mode: LTE_16QAM Band 7 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T1345, and Chamber B SMA Cables
Substitution: Horn T59,SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2502.50	13.09	V	0.9	9.5	21.67	33.0	-11.3	
2502.50	7.65	H	0.9	9.5	16.23	33.0	-16.8	
Mid Ch								
2535.00	11.88	V	0.9	9.5	20.47	33.0	-12.5	
2535.00	8.59	H	0.9	9.5	17.18	33.0	-15.8	
High Ch								
2567.50	12.45	V	0.9	9.5	21.05	33.0	-12.0	
2567.50	7.47	H	0.9	9.5	16.07	33.0	-16.9	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE7

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 07/13/15
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber B
Mode: LTE_QPSK Band 7 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T1345, and Chamber B SMA Cables
Substitution: Horn T59,SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2502.50	12.99	V	0.9	9.5	21.57	33.0	-11.4	
2502.50	7.46	H	0.9	9.5	16.04	33.0	-17.0	
Mid Ch								
2535.00	12.59	V	0.9	9.5	21.18	33.0	-11.8	
2535.00	9.47	H	0.9	9.5	18.06	33.0	-14.9	
High Ch								
2567.50	13.43	V	0.9	9.5	22.03	33.0	-11.0	
2567.50	8.64	H	0.9	9.5	17.24	33.0	-15.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 12

Band

LTE12

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_16QAM Band 12 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
704.00	9.60	V	0.9	0.0	8.70	38.5	-29.8	
704.00	19.10	H	0.9	0.0	18.20	38.5	-20.3	
Mid Ch								
707.50	9.42	V	0.9	0.0	8.52	38.5	-30.0	
707.50	19.90	H	0.9	0.0	19.00	38.5	-19.5	
High Ch								
711.00	9.50	V	0.9	0.0	8.60	38.5	-29.9	
711.00	19.16	H	0.9	0.0	18.26	38.5	-20.2	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE12

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_QPSK Band 12 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
704.00	10.50	V	0.9	0.0	9.60	38.5	-28.9	
704.00	20.34	H	0.9	0.0	19.44	38.5	-19.1	
Mid Ch								
707.50	10.23	V	0.9	0.0	9.33	38.5	-29.2	
707.50	20.86	H	0.9	0.0	19.96	38.5	-18.5	
High Ch								
711.00	10.44	V	0.9	0.0	9.54	38.5	-29.0	
711.00	20.23	H	0.9	0.0	19.33	38.5	-19.2	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE12

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_16QAM Band 12 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
701.50	9.40	V	0.9	0.0	8.50	38.5	-30.0	
701.50	19.50	H	0.9	0.0	18.60	38.5	-19.9	
Mid Ch								
707.50	9.30	V	0.9	0.0	8.40	38.5	-30.1	
707.50	19.29	H	0.9	0.0	18.39	38.5	-20.1	
High Ch								
713.50	9.20	V	0.9	0.0	8.30	38.5	-30.2	
713.50	18.70	H	0.9	0.0	17.80	38.5	-20.7	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE12

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_QPSK Band 12 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
701.50	10.50	V	0.9	0.0	9.60	38.5	-28.9	
701.50	19.70	H	0.9	0.0	18.80	38.5	-19.7	
Mid Ch								
707.50	10.45	V	0.9	0.0	9.55	38.5	-29.0	
707.50	20.36	H	0.9	0.0	19.46	38.5	-19.0	
High Ch								
713.50	10.12	V	0.9	0.0	9.22	38.5	-29.3	
713.50	19.70	H	0.9	0.0	18.80	38.5	-19.7	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE12

3MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_16QAM Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
700.50	9.60	V	0.9	0.0	8.70	38.5	-29.8	
700.50	19.40	H	0.9	0.0	18.50	38.5	-20.0	
Mid Ch								
707.50	10.15	V	0.9	0.0	9.25	38.5	-29.3	
707.50	20.60	H	0.9	0.0	19.70	38.5	-18.8	
High Ch								
714.50	10.30	V	0.9	0.0	9.40	38.5	-29.1	
714.50	20.50	H	0.9	0.0	19.60	38.5	-18.9	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE12

3MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_QPSK Band 12 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
700.50	10.79	V	0.9	0.0	9.89	38.5	-28.6	
700.50	19.75	H	0.9	0.0	18.85	38.5	-19.7	
Mid Ch								
707.50	10.40	V	0.9	0.0	9.50	38.5	-29.0	
707.50	20.20	H	0.9	0.0	19.30	38.5	-19.2	
High Ch								
714.50	10.46	V	0.9	0.0	9.56	38.5	-28.9	
714.50	19.74	H	0.9	0.0	18.84	38.5	-19.7	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE12

1.4MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_16QAM Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	9.20	V	0.9	0.0	8.30	38.5	-30.2	
699.70	19.10	H	0.9	0.0	18.20	38.5	-20.3	
Mid Ch								
707.50	9.00	V	0.9	0.0	8.10	38.5	-30.4	
707.50	18.80	H	0.9	0.0	17.90	38.5	-20.6	
High Ch								
715.30	9.20	V	0.9	0.0	8.30	38.5	-30.2	
715.30	18.70	H	0.9	0.0	17.80	38.5	-20.7	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE12

1.4MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_QPSK Band 12 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
699.70	10.30	V	0.9	0.0	9.40	38.5	-29.1	
699.70	19.99	H	0.9	0.0	19.09	38.5	-19.4	
Mid Ch								
707.50	9.71	V	0.9	0.0	8.81	38.5	-29.7	
707.50	20.00	H	0.9	0.0	19.10	38.5	-19.4	
High Ch								
715.30	10.10	V	0.9	0.0	9.20	38.5	-29.3	
715.30	19.68	H	0.9	0.0	18.78	38.5	-19.7	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 13

Band

LTE13

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT only
Location: Chamber A
Mode: LTE_16QAM Band 13 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T416, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
Mid Ch								
782.00	9.90	V	0.9	0.0	9.00	34.8	-25.8	
782.00	19.80	H	0.9	0.0	18.90	34.8	-15.9	
High Ch								

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE13

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT only
Location: Chamber A
Mode: LTE_QPSK Band 13 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T416, Xft SMA Cable (SN # SERIALNUMBER) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
Mid Ch								
782.00	11.15	V	0.9	0.0	10.25	34.8	-24.5	
782.00	20.90	H	0.9	0.0	20.00	34.8	-14.8	
High Ch								

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE13

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT only
Location: Chamber B
Mode: LTE_16QAM Band 13 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	11.20	V	0.9	0.0	10.30	34.8	-24.5	
779.50	19.10	H	0.9	0.0	18.20	34.8	-16.6	
Mid Ch								
782.00	10.50	V	0.9	0.0	9.60	34.8	-25.2	
782.00	19.30	H	0.9	0.0	18.40	34.8	-16.4	
High Ch								
784.50	10.80	V	0.9	0.0	9.90	34.8	-24.9	
784.50	19.40	H	0.9	0.0	18.50	34.8	-16.3	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE13

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT only
Location: Chamber B
Mode: LTE_QPSK Band 13 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Dipole S/N: 00022117, 4ft SMA Cable (SN # 245200 001) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	11.96	V	0.9	0.0	11.06	34.8	-23.7	
779.50	20.45	H	0.9	0.0	19.55	34.8	-15.2	
Mid Ch								
782.00	11.78	V	0.9	0.0	10.88	34.8	-23.9	
782.00	20.40	H	0.9	0.0	19.50	34.8	-15.3	
High Ch								
784.50	11.79	V	0.9	0.0	10.89	34.8	-23.9	
784.50	20.20	H	0.9	0.0	19.30	34.8	-15.5	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 17

Band

LTE17

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_16QAM Band 17 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
709.00	9.60	V	0.9	0.0	8.70	38.5	-29.8	
709.00	19.10	H	0.9	0.0	18.20	38.5	-20.3	
Mid Ch								
710.00	9.42	V	0.9	0.0	8.52	38.5	-30.0	
710.00	19.90	H	0.9	0.0	19.00	38.5	-19.5	
High Ch								
711.00	9.50	V	0.9	0.0	8.60	38.5	-29.9	
711.00	19.16	H	0.9	0.0	18.26	38.5	-20.2	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE17

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_QPSK Band 17 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
709.00	10.50	V	0.9	0.0	9.60	38.5	-28.9	
709.00	20.34	H	0.9	0.0	19.44	38.5	-19.1	
Mid Ch								
710.00	10.23	V	0.9	0.0	9.33	38.5	-29.2	
710.00	20.86	H	0.9	0.0	19.96	38.5	-18.5	
High Ch								
711.00	10.44	V	0.9	0.0	9.54	38.5	-29.0	
711.00	20.23	H	0.9	0.0	19.33	38.5	-19.2	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE17

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_16QAM Band 17 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
706.50	9.40	V	0.9	0.0	8.50	38.5	-30.0	
706.50	19.50	H	0.9	0.0	18.60	38.5	-19.9	
Mid Ch								
710.00	9.30	V	0.9	0.0	8.40	38.5	-30.1	
710.00	19.29	H	0.9	0.0	18.39	38.5	-20.1	
High Ch								
713.50	9.20	V	0.9	0.0	8.30	38.5	-30.2	
713.50	18.70	H	0.9	0.0	17.80	38.5	-20.7	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE17

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/23/2015
Test Engineer: K.Kedida
Configuration: EUT Only
Location: Chamber A
Mode: LTE_QPSK Band 17 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, 6ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
706.50	10.50	V	0.9	0.0	9.60	38.5	-28.9	
706.50	19.70	H	0.9	0.0	18.80	38.5	-19.7	
Mid Ch								
710.00	10.45	V	0.9	0.0	9.55	38.5	-29.0	
710.00	20.36	H	0.9	0.0	19.46	38.5	-19.0	
High Ch								
713.50	10.12	V	0.9	0.0	9.22	38.5	-29.3	
713.50	19.70	H	0.9	0.0	18.80	38.5	-19.7	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 25

Band

LTE25

20MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 25 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	13.49	V	0.9	8.0	20.60	33.0	-12.4	
1860.00	17.83	H	0.9	8.0	24.94	33.0	-8.1	
Mid Ch								
1882.50	13.56	V	0.9	8.0	20.67	33.0	-12.3	
1882.50	18.26	H	0.9	8.0	25.37	33.0	-7.6	
High Ch								
1905.00	13.81	V	0.9	8.0	20.92	33.0	-12.1	
1905.00	17.91	H	0.9	8.0	25.02	33.0	-8.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE25

20MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 25 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1860.00	14.50	V	0.9	8.0	21.61	33.0	-11.4	
1860.00	18.81	H	0.9	8.0	25.92	33.0	-7.1	
Mid Ch								
1882.50	14.72	V	0.9	8.0	21.83	33.0	-11.2	
1882.50	19.01	H	0.9	8.0	26.12	33.0	-6.9	
High Ch								
1905.00	13.68	V	0.9	8.0	20.79	33.0	-12.2	
1905.00	18.84	H	0.9	8.0	25.95	33.0	-7.1	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE25

15MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 25 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	13.46	V	0.9	8.0	20.57	33.0	-12.4	
1857.50	17.81	H	0.9	8.0	24.92	33.0	-8.1	
Mid Ch								
1882.50	13.61	V	0.9	8.0	20.72	33.0	-12.3	
1882.50	18.19	H	0.9	8.0	25.30	33.0	-7.7	
High Ch								
1907.50	13.60	V	0.9	8.0	20.71	33.0	-12.3	
1907.50	17.83	H	0.9	8.0	24.94	33.0	-8.1	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE25

15MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 25 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1857.50	14.41	V	0.9	8.0	21.52	33.0	-11.5	
1857.50	18.81	H	0.9	8.0	25.92	33.0	-7.1	
Mid Ch								
1882.50	14.46	V	0.9	8.0	21.57	33.0	-11.4	
1882.50	18.99	H	0.9	8.0	26.10	33.0	-6.9	
High Ch								
1907.50	14.55	V	0.9	8.0	21.66	33.0	-11.3	
1907.50	18.85	H	0.9	8.0	25.96	33.0	-7.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE25

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 25 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	13.48	V	0.9	8.0	20.59	33.0	-12.4	
1855.00	17.80	H	0.9	8.0	24.91	33.0	-8.1	
Mid Ch								
1882.50	13.48	V	0.9	8.0	20.59	33.0	-12.4	
1882.50	18.27	H	0.9	8.0	25.38	33.0	-7.6	
High Ch								
1910.00	13.76	V	0.9	8.0	20.87	33.0	-12.1	
1910.00	17.83	H	0.9	8.0	24.94	33.0	-8.1	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE25

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 25 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1855.00	14.53	V	0.9	8.0	21.64	33.0	-11.4	
1855.00	18.72	H	0.9	8.0	25.83	33.0	-7.2	
Mid Ch								
1882.50	14.56	V	0.9	8.0	21.67	33.0	-11.3	
1882.50	19.03	H	0.9	8.0	26.14	33.0	-6.9	
High Ch								
1910.00	14.59	V	0.9	8.0	21.70	33.0	-11.3	
1910.00	18.84	H	0.9	8.0	25.95	33.0	-7.1	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE25

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 25 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	13.48	V	0.9	8.0	20.59	33.0	-12.4	
1852.50	17.78	H	0.9	8.0	24.89	33.0	-8.1	
Mid Ch								
1882.50	13.59	V	0.9	8.0	20.70	33.0	-12.3	
1882.50	18.07	H	0.9	8.0	25.18	33.0	-7.8	
High Ch								
1912.50	13.61	V	0.9	8.0	20.72	33.0	-12.3	
1912.50	17.89	H	0.9	8.0	25.00	33.0	-8.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE25

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 25 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1852.50	14.50	V	0.9	8.0	21.61	33.0	-11.4	
1852.50	18.73	H	0.9	8.0	25.84	33.0	-7.2	
Mid Ch								
1882.50	14.70	V	0.9	8.0	21.81	33.0	-11.2	
1882.50	19.02	H	0.9	8.0	26.13	33.0	-6.9	
High Ch								
1912.50	14.69	V	0.9	8.0	21.80	33.0	-11.2	
1912.50	18.87	H	0.9	8.0	25.98	33.0	-7.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE25

3MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 25 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	13.50	V	0.9	8.0	20.61	33.0	-12.4	
1851.50	17.79	H	0.9	8.0	24.90	33.0	-8.1	
Mid Ch								
1882.50	13.64	V	0.9	8.0	20.75	33.0	-12.3	
1882.50	18.19	H	0.9	8.0	25.30	33.0	-7.7	
High Ch								
1913.50	13.70	V	0.9	8.0	20.81	33.0	-12.2	
1913.50	17.85	H	0.9	8.0	24.96	33.0	-8.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE25

3MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 25 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1851.50	14.49	V	0.9	8.0	21.60	33.0	-11.4	
1851.50	18.70	H	0.9	8.0	25.81	33.0	-7.2	
Mid Ch								
1882.50	14.69	V	0.9	8.0	21.80	33.0	-11.2	
1882.50	19.00	H	0.9	8.0	26.11	33.0	-6.9	
High Ch								
1913.50	14.67	V	0.9	8.0	21.78	33.0	-11.2	
1913.50	18.86	H	0.9	8.0	25.97	33.0	-7.0	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE25

1.4MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_16QAM Band 25 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	13.52	V	0.9	8.0	20.63	33.0	-12.4	
1850.70	17.88	H	0.9	8.0	24.99	33.0	-8.0	
Mid Ch								
1882.50	13.67	V	0.9	8.0	20.78	33.0	-12.2	
1882.50	18.01	H	0.9	8.0	25.12	33.0	-7.9	
High Ch								
1914.30	13.72	V	0.9	8.0	20.83	33.0	-12.2	
1914.30	17.88	H	0.9	8.0	24.99	33.0	-8.0	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE25

1.4MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG Electronics
Project #: 15I21235
Date: 7/16/2015
Test Engineer: R.Alegre
Configuration: EUT Only(2160195)
Location: Chamber A
Mode: LTE_QPSK Band 25 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Horn T136, and Chamber A SMA Cables
Substitution: Horn T59, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.70	14.51	V	0.9	8.0	21.62	33.0	-11.4	
1850.70	18.70	H	0.9	8.0	25.81	33.0	-7.2	
Mid Ch								
1882.50	14.77	V	0.9	8.0	21.88	33.0	-11.1	
1882.50	19.05	H	0.9	8.0	26.16	33.0	-6.8	
High Ch								
1914.30	14.70	V	0.9	8.0	21.81	33.0	-11.2	
1914.30	18.87	H	0.9	8.0	25.98	33.0	-7.0	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 26

Band

LTE26

15MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_16QAM Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
831.50	13.81	V	0.9	0.0	12.91	38.5	-25.6	
831.50	23.55	H	0.9	0.0	22.65	38.5	-15.9	
Mid Ch								
836.50	13.41	V	0.9	0.0	12.51	38.5	-26.0	
836.50	22.74	H	0.9	0.0	21.84	38.5	-16.7	
High Ch								
841.50	13.29	V	0.9	0.0	12.39	38.5	-26.1	
841.50	22.62	H	0.9	0.0	21.72	38.5	-16.8	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE26

15MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_QPSK Band 26 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
831.50	14.17	V	0.9	0.0	13.27	38.5	-25.2	
831.50	23.97	H	0.9	0.0	23.07	38.5	-15.4	
Mid Ch								
836.50	13.81	V	0.9	0.0	12.91	38.5	-25.6	
836.50	23.25	H	0.9	0.0	22.35	38.5	-16.2	
High Ch								
841.50	13.68	V	0.9	0.0	12.78	38.5	-25.7	
841.50	22.91	H	0.9	0.0	22.01	38.5	-16.5	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE26

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_16QAM Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Part 90								
819.00	13.91	V	0.9	0.0	13.01	50.0	-37.0	
819.00	23.85	H	0.9	0.0	22.95	50.0	-27.1	
Part 22								
829.00	13.74	H	0.9	0.0	12.84	38.5	-25.7	
829.00	21.81	H	0.9	0.0	20.91	38.5	-17.6	
Mid Ch								
831.50	13.34	V	0.9	0.0	12.44	38.5	-26.1	
831.50	23.03	H	0.9	0.0	22.13	38.5	-16.4	
High Ch								
844.00	13.42	V	0.9	0.0	12.52	38.5	-26.0	
844.00	22.49	H	0.9	0.0	21.59	38.5	-16.9	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE26

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_QPSK Band 26 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Part 90								
819.00	14.25	V	0.9	0.0	13.35	50.0	-36.7	
819.00	24.20	H	0.9	0.0	23.30	50.0	-26.7	
Part 22								
829.00	14.04	H	0.9	0.0	13.14	38.5	-25.4	
829.00	21.91	H	0.9	0.0	21.01	38.5	-17.5	
Mid Ch								
831.50	13.39	V	0.9	0.0	12.49	38.5	-26.0	
831.50	23.15	H	0.9	0.0	22.25	38.5	-16.3	
High Ch								
844.00	13.55	V	0.9	0.0	12.65	38.5	-25.9	
844.00	22.64	H	0.9	0.0	21.74	38.5	-16.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE26

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_16QAM Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Part 90								
816.50	13.02	V	0.9	0.0	12.12	50.0	-37.9	
816.50	24.47	H	0.9	0.0	23.57	50.0	-26.4	
Part 22								
826.50	12.24	H	0.9	0.0	11.34	38.5	-27.2	
826.50	21.81	H	0.9	0.0	20.91	38.5	-17.6	
Mid Ch								
831.50	12.64	V	0.9	0.0	11.74	38.5	-26.8	
831.50	23.13	H	0.9	0.0	22.23	38.5	-16.3	
High Ch								
846.50	13.21	V	0.9	0.0	12.31	38.5	-26.2	
846.50	22.30	H	0.9	0.0	21.40	38.5	-17.1	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE26

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_QPSK Band 26 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Part 90								
816.50	13.15	V	0.9	0.0	12.25	50.0	-37.8	
816.50	24.56	H	0.9	0.0	23.66	50.0	-26.3	
Part 22								
826.50	12.44	H	0.9	0.0	11.54	38.5	-27.0	
826.50	22.01	H	0.9	0.0	21.11	38.5	-17.4	
Mid Ch								
831.50	12.83	V	0.9	0.0	11.93	38.5	-26.6	
831.50	23.37	H	0.9	0.0	22.47	38.5	-16.0	
High Ch								
846.50	13.41	V	0.9	0.0	12.51	38.5	-26.0	
846.50	22.58	H	0.9	0.0	21.68	38.5	-16.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE26

3MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_16QAM Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
815.50	13.76	V	0.9	0.0	12.86	50.0	-37.1	
815.50	24.24	H	0.9	0.0	23.34	50.0	-26.7	
Part 22								
825.50	13.04	V	0.9	0.0	12.14	38.5	-26.4	
825.50	21.91	H	0.9	0.0	21.01	38.5	-17.5	
Mid Ch								
831.50	13.03	V	0.9	0.0	12.13	38.5	-26.4	
831.50	23.10	H	0.9	0.0	22.20	38.5	-16.3	
High Ch								
847.50	12.61	V	0.9	0.0	11.71	38.5	-26.8	
847.50	22.00	H	0.9	0.0	21.10	38.5	-17.4	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE26

3MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_QPSK Band 26 Fundamentals, 3MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Part 90								
815.50	13.85	V	0.9	0.0	12.95	50.0	-37.1	
815.50	24.37	H	0.9	0.0	23.47	50.0	-26.5	
Part 22								
825.50	13.24	V	0.9	0.0	12.34	38.5	-26.2	
825.50	22.21	H	0.9	0.0	21.31	38.5	-17.2	
Mid Ch								
831.50	13.30	V	0.9	0.0	12.40	38.5	-26.1	
831.50	23.34	H	0.9	0.0	22.44	38.5	-16.1	
High Ch								
847.50	12.91	V	0.9	0.0	12.01	38.5	-26.5	
847.50	22.43	H	0.9	0.0	21.53	38.5	-17.0	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE26

1.4MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_16QAM Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Part 90								
814.70	13.72	V	0.9	0.0	12.82	50.0	-37.2	
814.70	24.28	H	0.9	0.0	23.38	50.0	-26.6	
Part 22								
824.70	13.19	V	0.9	0.0	12.29	38.5	-26.2	
824.70	21.76	H	0.9	0.0	20.86	38.5	-17.6	
Mid Ch								
831.50	12.70	V	0.9	0.0	11.80	38.5	-26.7	
831.50	22.59	H	0.9	0.0	21.69	38.5	-16.8	
High Ch								
848.30	12.66	V	0.9	0.0	11.76	38.5	-26.7	
848.30	21.90	H	0.9	0.0	21.00	38.5	-17.5	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE26

1.4MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/16/2015
Test Engineer: A. Escamilla
Configuration: EUT Only (X position)
Location: Chamber A
Mode: LTE_QPSK Band 26 Fundamentals, 1.4MHz Bandwidth

Test Equpment:
Receiving: Hybrid T130, and Chamber A SMA Cables
Substitution: Dipole T273, SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Part 90								
814.70	14.09	V	0.9	0.0	13.19	50.0	-36.8	
814.70	24.61	H	0.9	0.0	23.71	50.0	-26.3	
Part 22								
824.70	13.44	V	0.9	0.0	12.54	38.5	-26.0	
824.70	22.41	H	0.9	0.0	21.51	38.5	-17.0	
Mid Ch								
831.50	13.12	V	0.9	0.0	12.22	38.5	-26.3	
831.50	23.42	H	0.9	0.0	22.52	38.5	-16.0	
High Ch								
848.30	13.13	V	0.9	0.0	12.23	38.5	-26.3	
848.30	22.35	H	0.9	0.0	21.45	38.5	-17.1	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LTE Band 41

Band

LTE41

20MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/22/2015
Test Engineer: A. Escamilla
Configuration: X-Pos, EUT Only
Location: Chamber C
Mode: LTE_16QAM Band 41 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2506.00	6.67	V	0.9	9.5	15.25	33.0	-17.8	
2506.00	7.69	H	0.9	9.5	16.27	33.0	-16.7	
Mid Ch								
2593.00	7.61	V	0.9	9.5	16.22	33.0	-16.8	
2593.00	10.23	H	0.9	9.5	18.84	33.0	-14.2	
High Ch								
2680.00	4.86	V	0.9	9.7	13.69	33.0	-19.3	
2680.00	9.97	H	0.9	9.7	18.80	33.0	-14.2	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE41

20MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/22/2015
Test Engineer: A. Escamilla
Configuration: X-Pos, EUT Only
Location: Chamber C
Mode: LTE_QPSK Band 41 Fundamentals, 20MHz Bandwidth

Test Equpment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2506.00	7.17	V	0.9	9.5	15.75	33.0	-17.3	
2506.00	8.76	H	0.9	9.5	17.34	33.0	-15.7	
Mid Ch								
2593.00	8.54	V	0.9	9.5	17.15	33.0	-15.9	
2593.00	11.09	H	0.9	9.5	19.70	33.0	-13.3	
High Ch								
2680.00	5.75	V	0.9	9.7	14.58	33.0	-18.4	
2680.00	10.45	H	0.9	9.7	19.28	33.0	-13.7	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE41

15MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/22/2015
Test Engineer: A. Escamilla
Configuration: X-Pos, EUT Only
Location: Chamber C
Mode: LTE_16QAM Band 41 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2503.50	4.90	V	0.9	9.5	13.48	33.0	-19.5	
2503.50	7.79	H	0.9	9.5	16.37	33.0	-16.6	
Mid Ch								
2593.00	6.51	V	0.9	9.5	15.12	33.0	-17.9	
2593.00	8.98	H	0.9	9.5	17.59	33.0	-15.4	
High Ch								
2682.50	4.23	V	0.9	9.7	13.06	33.0	-19.9	
2682.50	8.90	H	0.9	9.7	17.73	33.0	-15.3	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE41

15MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/22/2015
Test Engineer: A. Escamilla
Configuration: X-Pos, EUT Only
Location: Chamber C
Mode: LTE_QPSK Band 41 Fundamentals, 15MHz Bandwidth

Test Equpment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2503.50	5.67	V	0.9	9.5	14.25	33.0	-18.8	
2503.50	8.24	H	0.9	9.5	16.82	33.0	-16.2	
Mid Ch								
2593.00	7.15	V	0.9	9.5	15.76	33.0	-17.2	
2593.00	9.52	H	0.9	9.5	18.13	33.0	-14.9	
High Ch								
2682.50	4.83	V	0.9	9.7	13.66	33.0	-19.3	
2682.50	9.40	H	0.9	9.7	18.23	33.0	-14.8	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE41

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/22/2015
Test Engineer: A. Escamilla
Configuration: X-Pos, EUT Only
Location: Chamber C
Mode: LTE_16QAM Band 41 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	5.89	V	0.9	9.5	14.47	33.0	-18.5	
2501.00	6.80	H	0.9	9.5	15.38	33.0	-17.6	
Mid Ch								
2593.00	5.84	V	0.9	9.5	14.45	33.0	-18.6	
2593.00	10.16	H	0.9	9.5	18.77	33.0	-14.2	
High Ch								
2685.00	5.45	V	0.9	9.7	14.29	33.0	-18.7	
2685.00	7.46	H	0.9	9.7	16.30	33.0	-16.7	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE41

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/22/2015
Test Engineer: A. Escamilla
Configuration: X-Pos, EUT Only
Location: Chamber C
Mode: LTE_QPSK Band 41 Fundamentals, 10MHz Bandwidth

Test Equpment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2501.00	5.99	V	0.9	9.5	14.57	33.0	-18.4	
2501.00	7.45	H	0.9	9.5	16.03	33.0	-17.0	
Mid Ch								
2593.00	6.52	V	0.9	9.5	15.13	33.0	-17.9	
2593.00	10.26	H	0.9	9.5	18.87	33.0	-14.1	
High Ch								
2685.00	5.91	V	0.9	9.7	14.75	33.0	-18.3	
2685.00	7.87	H	0.9	9.7	16.71	33.0	-16.3	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701H
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE41

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/22/2015
Test Engineer: A. Escamilla
Configuration: X-Pos, EUT Only
Location: Chamber C
Mode: LTE_16QAM Band 41 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	5.88	V	0.9	9.5	14.45	33.0	-18.5	
2498.50	7.72	H	0.9	9.5	16.29	33.0	-16.7	
Mid Ch								
2593.00	6.04	V	0.9	9.5	14.65	33.0	-18.4	
2593.00	9.92	H	0.9	9.5	18.53	33.0	-14.5	
High Ch								
2687.50	5.39	V	0.9	9.7	14.24	33.0	-18.8	
2687.50	8.69	H	0.9	9.7	17.54	33.0	-15.5	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band

LTE41

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21235
Date: 7/22/2015
Test Engineer: A. Escamilla
Configuration: X-Pos, EUT Only
Location: Chamber C
Mode: LTE_QPSK Band 41 Fundamentals, 5MHz Bandwidth

Test Equpment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T59, Xft SMA Cable (SN # 506392) Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
2498.50	5.61	V	0.9	9.5	14.18	33.0	-18.8	
2498.50	7.97	H	0.9	9.5	16.54	33.0	-16.5	
Mid Ch								
2593.00	6.14	V	0.9	9.5	14.75	33.0	-18.3	
2593.00	10.64	H	0.9	9.5	19.25	33.0	-13.8	
High Ch								
2687.50	5.71	V	0.9	9.7	14.56	33.0	-18.4	
2687.50	9.52	H	0.9	9.7	18.37	33.0	-14.6	

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.