FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E
FCC CFR47 PART 27 SUBPART L

CERTIFICATION TEST REPORT
FOR
GSM/WCDMA/LTE PHONE + BLUETOOTH, DTS/UNII a/b/g/n & NFC

MODEL NUMBER: LG-H443, H443, LGH443

FCC ID: ZNFH443

REPORT NUMBER: 14I19589-E1 REVISION A

ISSUE DATE: FEBRUARY 10, 2015

Prepared for
LG ELECTRONICS MOBILECOMM U.S.A., INC
1000 SYLVAN AVENUE
ENGLEWOOD CLIFFS,
NEW JERSEY, 07632, U.S.A

Prepared by
UL VERIFICATION SERVICES
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
----	1/12/15	Initial Issue	D. Coronia
A	2/10/15	Update standard	D. Coronia

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS 5
2. TEST METHODOLOGY 6
3. FACILITIES AND ACCREDITATION 6
4. CALIBRATION AND UNCERTAINTY 6
4.1. MEASURING INSTRUMENT CALIBRATION 6
4.2. SAMPLE CALCULATION 6
4.3. MEASUREMENT UNCERTAINTY 7
5. EQUIPMENT UNDER TEST 8
5.1. DESCRIPTION OF EUT 8
5.2. MAXIMUM OUTPUT POWER 9
5.3. MAXIMUM OUTPUT POWER (LTE) 10
5.4. DESCRIPTION OF AVAILABLE ANTENNAS 12
5.5. DESCRIPTION OF TEST SETUP 13
6. TEST AND MEASUREMENT EQUIPMENT 16
7. Summary Table 17
8. RF POWER OUTPUT VERIFICATION 18
8.1. GSM/GPRS/EDGE 18
8.1.1. GSM OUTPUT POWER RESULT 19
8.2. UMTS REL 99 20
8.2.1. UMTS REL 99 OUTPUT POWER RESULT 20
8.3. UMTS HSDPA 21
8.3.1. UMTS HSDPA OUTPUT POWER RESULT 22
8.4. UMTS HSUPA 23
8.4.1. UMTS HSUPA OUTPUT POWER RESULT 24
8.5. DC-HSDPA 25
8.5.1. UMTS DC-HSDPA OUTPUT POWER RESULT 27
8.7. LTE OUTPUT VERIFICATION 28
8.7.1. LTE OUTPUT RESULT 28
9. PEAK TO AVERAGE RATIO 32
9.1. CONDUCTED PEAK TO AVERAGE RESULT 33
10. LIMITS AND CONDUCTED RESULTS 38
10.1. OCCUPIED BANDWIDTH 38

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

10.1.1. OCCUPIED BANDWIDTH RESULTS 39
10.1.2. LTE OCCUPIED BANDWIDTH RESULTS 41
10.1.3. OCCUPIED BANDWIDTH PLOTS 43
10.2. BAND EDGE EMISSIONS 55
10.2.1. BAND EDGE PLOTS 56
10.3. OUT OF BAND EMISSIONS 76
10.3.1. OUT OF BAND EMISSIONS RESULT 77
10.3.2. OUT OF BAND EMISSIONS PLOTS 81
10.4. FREQUENCY STABILITY 87
10.4.1. FREQUENCY STABILITY RESULTS 88
11. RADIATED TEST RESULTS 91
11.1. RADIATED POWER (ERP & EIRP) 91
11.1.1. ERP/EIRP Results 92
11.1.2. LTE ERP/EIRP Results 94
11.1.3. ERP/EIRP PLOTS 97
11.2. FIELD STRENGTH OF SPURIOUS RADIATION 121
11.2.1. SPURIOUS RADIATION PLOTS 122
12. SETUP PHOTOS 146

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	LG ELECTRONICS MOBILECOMM U.S.A., INC
EUT DESCRIPTION:	GSM/WCDMA/LTE PHONE + BLUETOOTH, DTS/UNII a/b/g/n & NFC
MODEL:	LG-H443, H443, LGH443
SERIAL NUMBER:	43-03557
DATE TESTED:	DECEMBER 9 2014 - JANUARY 9 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 22H, 24E and 27L	PASS

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Verification Services Inc. By:

DAN CORONIA
CONSUMER TECHNOLOGY DIVISION
PROJECT LEAD
UL Verification Services Inc.

Tested By:

STEVEN TRAN
CONSUMER TECHNOLOGY DIVISION
LAB ENGINEER
UL Verification Services Inc.

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

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 22, FCC CFR Part 24, and FCC CFR 47 Part 27.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☒ Chamber A(IC: 2324B-1)	☐ Chamber D(IC: 2324B-4)
☒ Chamber B(IC: 2324B-2)	☐ Chamber E(IC: 2324B-5)
☒ Chamber C(IC: 2324B-3)	☐ Chamber F(IC: 2324B-6)
	☐ Chamber G(IC: 2324B-7)
	☐ Chamber H(IC: 2324B-8)

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

EIRP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna) + Substitution Antenna Factor (dBi)

ERP = PSA reading with EUT worst orientation (dBm) + Path loss (dB) – cable loss(between the SG and substitution antenna)

(Path loss = Signal generator output – PSA reading with substitution antenna)

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

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 40000 MHz	4.94 Db

Uncertainty figures are valid to a confidence level of 95%.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE PHONE + BLUETOOTH, DTS/UNII a/b/g/n & NFC

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

5.2. MAXIMUM OUTPUT POWER

FCC Part 22/24/27						
Band	Frequency Range(MHz)	Modulation Mw	Conducted		Radiated	
			AVG(dBm)	AVG(Mw)	AVG(dBm)	AVG(Mw)
GSM850	824~849	GMSK	32.7	1862.09		
	824~849	GPRS	32.7	1862.09	27.66	583.45
	824~849	EGPRS	27.7	588.84	23.49	223.36
GSM1900	1850~1910	GMSK	30.1	1023.29		
	1850~1910	GPRS	30.1	1023.29	29.98	995.41
	1850~1910	EGPRS	26.5	446.68	26.46	442.59
Band 5	824~849	REL99	23.1	204.17	18.561	71.8
	824~849	HSDPA	23.1	204.17	17.581	57.29
	824~849	HSUPA	23.1	204.17		
Band 2	1850~1910	REL99	23.2	208.93	24.33	271.02
	1850~1910	HSDPA	23.1	204.17	23.06	202.30
	1850~1910	HSUPA	23.2	208.93		

The transmitter has a maximum peak conducted and radiated ERP / EIRP output powers as follows:

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

5.3. MAXIMUM OUTPUT POWER (LTE)

The transmitter has a maximum peak conducted and radiated ERP/EIRP output powers as follows:

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Mw	Conducted		Radiated	
				AVG(dBm)	AVG(Mw)	AVG(dBm)	AVG(Mw)
LTE17	704~716	10MHz	QPSK	23.4	218.78	19.171	82.62
	704~716	10MHz	16QAM	22.6	181.97	18.141	65.18

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Mw	Conducted		Radiated	
				AVG(dBm)	AVG(Mw)	AVG(dBm)	AVG(Mw)
LTE17	704~716	5MHz	QPSK	23.3	213.80	18.701	74.15
	704~716	5MHz	16QAM	22.2	165.96	17.431	55.35

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Mw	Conducted		Radiated	
				AVG(dBm)	AVG(Mw)	AVG(dBm)	AVG(Mw)
LTE5	824~849	10MHz	QPSK	23.6	229.09	19.481	88.74
	824~849	10MHz	16QAM	22.7	186.21	18.521	71.14

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Mw	Conducted		Radiated	
				AVG(dBm)	AVG(Mw)	AVG(dBm)	AVG(Mw)
LTE5	824~849	5MHz	QPSK	23.5	223.87	19.421	87.52
	824~849	5MHz	16QAM	22.6	181.97	18.531	71.3

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation Mw	Conducted		Radiated	
				AVG(dBm)	AVG(Mw)	AVG(dBm)	AVG(Mw)
LTE4	1710~1755	10MHz	QPSK	23.5	223.87	18.61	72.61
	1710~1755	10MHz	16QAM	22.7	186.21	17.94	62.23

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

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			Mw	AVG(dBm)	AVG(Mw)	AVG(dBm)	AVG(Mw)
LTE4	1710~1755	5MHz	QPSK	23.3	213.80	19.37	86.5
	1710~1755	5MHz	16QAM	22.7	186.21	18.31	67.76

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			Mw	AVG(dBm)	AVG(Mw)	AVG(dBm)	AVG(Mw)
LTE2	1850~1910	10MHz	QPSK	23.7	234.42	23.36	216.77
	1850~1910	10MHz	16QAM	22.7	186.21	22.47	176.6

FCC Part 22/2 4/27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation	Conducted		Radiated	
			Mw	AVG(dBm)	AVG(Mw)	AVG(dBm)	AVG(Mw)
LTE2	1850~1910	5MHz	QPSK	23.6	229.09	23.48	222.84
	1850~1910	5MHz	16QAM	22.6	181.97	22.47	176.6

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

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna for the [List the bands supported] with a maximum peak gain as follow:

Frequency (MHz)	Peak Gain (dBi)
BAND 2, 1850~1910MHz	-0.42
BAND 4, 1710~1755MHz	-5.19
BAND 5, 824~849MHz	-5.25
BAND 17, 704~716MHz	-4.69

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	MCS-01WR	RD4X0891946	N/A
Earphone	LG	LG-L33L	N/A	N/A

I/O CABLES (CONDUCTED SETUP)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA
3	RF In/Out	1	Communication Test Set	Shielded	1m	NA

I/O CABLES (RADIATED SETUP)

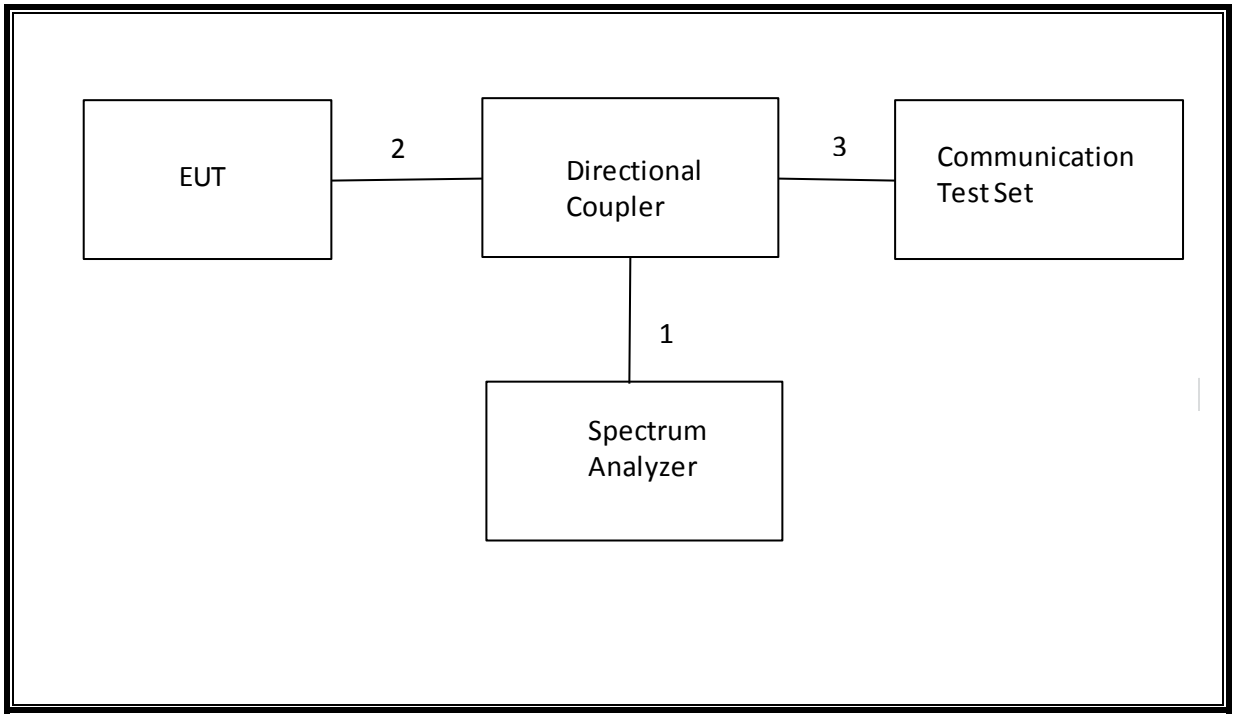
I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	USB	1	AC Adapter	Un-shielded	1.2m	NA
2	Jack	1	Headset	Shielded	1m	NA
3	RF In/out	1	Communication Test Set	Un-shielded	2m	NA

TEST SETUP

The EUT is continuously communicated to the call box during the tests.

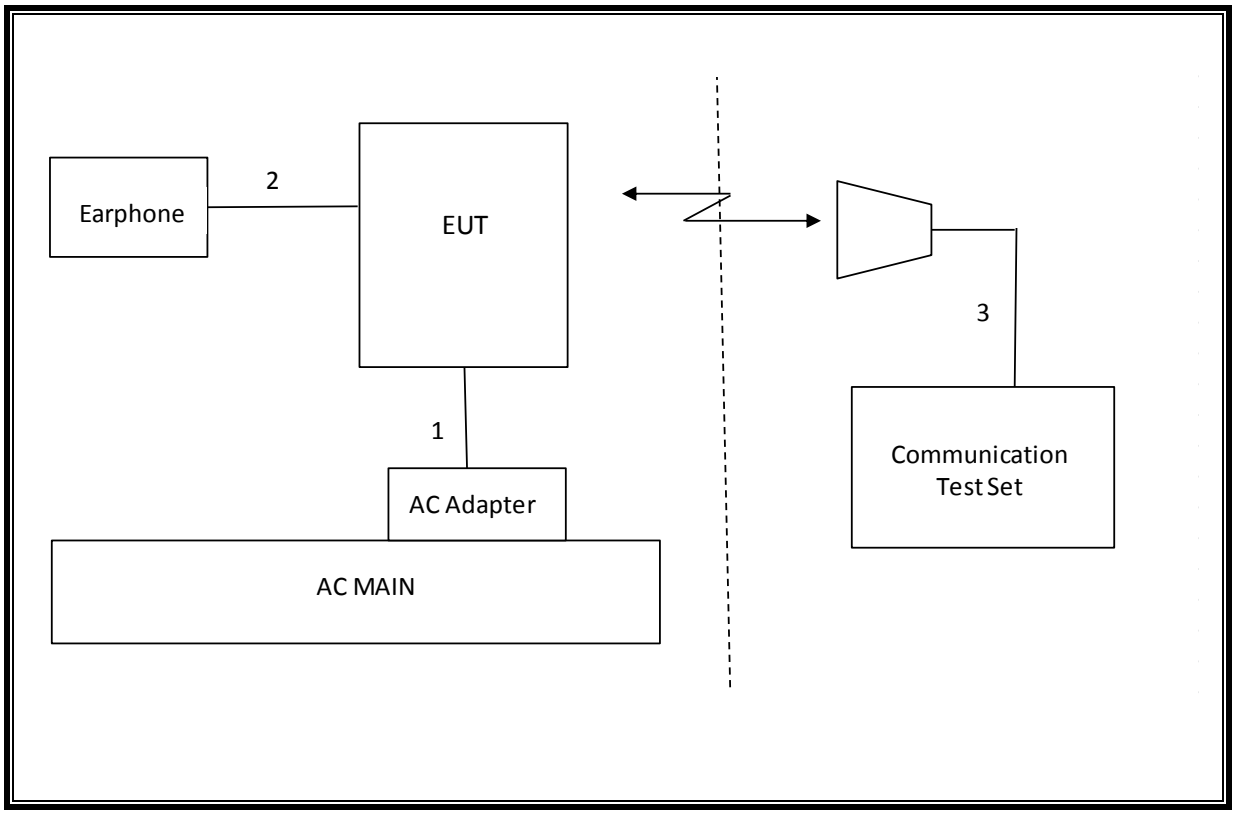
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



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

SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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

6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01179	02/26/15
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	04/22/15
Antenna, Horn, 18 GHz	EMCO	3115	C00783	10/25/15
Antenna, Horn, 18 GHz	EMCO	3115	C00784	10/25/15
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02688	CNR
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	05/11/15
Communications Test Set	R&S	CMW500	T159	07/02/15
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	06/18/15
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	C00993	02/14/15
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/15

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

7. Summary Table

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Note
2.1049	N/A	Occupied Band width (99%)	N/A	Conducted	Pass	9.0 MHz
22.917(a) 24.238(a) 27.53(g) 90.691	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-17.8 dBm
2.1046	N/A	Conducted output power	N/A		Pass	32.7 dBm
22.355 24.235 27.54 90.213	RSS-132(4.3) RSS-133(6.3) RSS-139(6.3) RSS-199(4.3)	Frequency Stability	2.5PPM		Pass	.011 PPM
22.913(a)(2)	RSS-132(4.4)	Effective Radiated Power	38 dBm	Radiated	Pass	27.7 dBm
27.50(b)(10)	N/A		34.77 dBm		Pass	19.2 dBm
24.232(c) 27.50(h)(2)	RSS-133(6.4) RSS-199(4.4)	Equivalent Isotropic Radiated Power	33dBm		Pass	30 dBm
27.50(d)(4)	RSS-139(6.4)		30dBm		Pass	19.4 dBm
22.917(a) 24.238(a) 27.53(g)	RSS-132(4.5.1) RSS-133(6.5.1) RSS-139(6.5.1)	Radiated Spurious Emission	-13dBm		Pass	-32.1 dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

8. RF POWER OUTPUT VERIFICATION

8.1. GSM/GPRS/EDGE

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900
Press Connection control to choose the different menus
Press RESET > choose all to reset all settings
Connection Press Signal Off to turn off the signal and change settings
Network Support > GSM+GPRS or GSM+EGPRS
Main Service > Packet Data
Service selection > Test Mode A – Auto Slot Config. off
MS Signal Press Slot Config bottom on the right twice to select and change the number of time slots and power setting
> Slot configuration > Uplink/Gamma
> 33 dBm for GPRS 850/900
> 30 dBm for GPRS1800/1900
BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel
Frequency Offset > + 0 Hz
Mode > BCCH and TCH
BCCH Level > -85 dBm (May need to adjust if link is not stable)
BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]
Channel Type > Off
P0> 4 dB
Slot Config > Unchanged (if already set under MS Signal)
TCH > choose desired test channel
Hopping > Off
Main Timeslot > 3 (Default)
Network Coding Scheme > CS4 (GPRS) and MCS5 ~ MCS9 (EGPRS)
Bit Stream > 2E9-1PSR Bit Pattern
AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Connection Press Signal On to turn on the signal and change settings

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

8.1.1. GSM OUTPUT POWER RESULT

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)
GSM (Voice)	CS1	1	128	824.2	32.6
			190	836.6	32.7
			251	848.8	32.4
GPRS (GMSK)	CS1	1	128	824.2	32.6
			190	836.6	32.7
			251	848.8	32.4
		2	128	824.2	31.3
			190	836.6	31.4
			251	848.8	31.4
EGPRS (8PSK)	MCS5	1	128	824.2	27.7
			190	836.6	27.7
			251	848.8	27.6
		2	128	824.2	27.7
			190	836.6	27.7
			251	848.8	27.5

Mode	Coding Scheme	Time Slots	Ch No.	Freq. (MHz)	Burst Pwr (dBm)
GSM (Voice)	CS1	1	512	1850.2	30.1
			661	1880.0	30.0
			810	1909.8	29.9
GPRS (GMSK)	CS1	1	512	1850.2	30.1
			661	1880.0	30.0
			810	1909.8	29.9
		2	512	1850.2	29.2
			661	1880.0	29.1
			810	1909.8	29.0
EGPRS (8PSK)	MCS5	1	512	1850.2	26.5
			661	1880.0	26.3
			810	1909.8	26.5
		2	512	1850.2	26.4
			661	1880.0	26.5
			810	1909.8	26.5

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

8.2. UMTS REL 99

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	βc	Not Applicable
	βd	Not Applicable
	βec	Not Applicable
	βc/βd	8/15
	βhs	Not Applicable
	βed	Not Applicable

8.2.1. UMTS REL 99 OUTPUT POWER RESULT

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Rel 99 (RMC, 12.2 kbps)	4132	826.4	0	23.1
		4183	836.6	0	23.1
		4233	846.6	0	23.1

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Rel 99 (RMC, 12.2 kbps)	9262	1852.4	0	23.2
		9400	1880.0	0	23.2
		9538	1907.6	0	23.2

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

8.3. UMTS HSDPA

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel5 HSDPA			
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs =βhs/βc	30/15			

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

8.3.1. UMTS HSDPA OUTPUT POWER RESULT

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	23.1
		4183	836.6	0	23.1
		4233	846.6	0	23.1
	Subtest 2	4132	826.4	0	23.1
		4183	836.6	0	23.1
		4233	846.6	0	23.1
	Subtest 3	4132	826.4	0.5	22.7
		4183	836.6	0.5	22.6
		4233	846.6	0.5	22.6
	Subtest 4	4132	826.4	0.5	22.7
		4183	836.6	0.5	22.6
		4233	846.6	0.5	22.6

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	23.1
		9400	1880.0	0	23.1
		9538	1907.6	0	23.1
	Subtest 2	9262	1852.4	0	23.1
		9400	1880.0	0	23.1
		9538	1907.6	0	23.1
	Subtest 3	9262	1852.4	0.5	22.6
		9400	1880.0	0.5	22.8
		9538	1907.6	0.5	22.7
	Subtest 4	9262	1852.4	0.5	22.6
		9400	1880.0	0.5	22.8
		9538	1907.6	0.5	22.7

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

8.4. UMTS HSUPA

TEST PROCEDURE

The following summary of these settings are illustrated below: (ETSI TS 134.121-1 Table C.11.1)

	Mode	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	P-CPICH (dB)	-10				
	P-CCPCH (dB)	-12				
	SCH (dB)	-12				
	PICH(dB)	-15				
	DPCH (dB)	-9				
	HS-SCCH_1 (dB)	-8				
	HS-PDSCH (dB)	-3				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	Bc	11/15	6/15	15/15	2/15	15/15
	Bd	15/15	15/15	9/15	15/15	15/15
	Bec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	Bhs	22/15	12/15	30/15	4/15	30/15
	βed (note1)	1309/225	94/75	47/15 47/15	56/75	134/15
	MPR	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	Reference E-TFCIs	5	5	2	5	5
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

Note1: βed cannot be set directly, it is set by Absolute Grant Value.

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

8.4.1. UMTS HSUPA OUTPUT POWER RESULT

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	23.1
		4183	836.6	0	23.0
		4233	846.6	0	23.0
	Subtest 2	4132	826.4	2	21.7
		4183	836.6	2	21.4
		4233	846.6	2	21.5
	Subtest 3	4132	826.4	1	21.6
		4183	836.6	1	21.5
		4233	846.6	1	21.9
	Subtest 4	4132	826.4	2	21.7
		4183	836.6	2	21.4
		4233	846.6	2	21.5
	Subtest 5	4132	826.4	0	23.1
		4183	836.6	0	23.0
		4233	846.6	0	23.0

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	23.2
		9400	1880.0	0	23.2
		9538	1907.6	0	23.2
	Subtest 2	9262	1852.4	2	21.3
		9400	1880.0	2	21.6
		9538	1907.6	2	21.0
	Subtest 3	9262	1852.4	1	21.8
		9400	1880.0	1	21.7
		9538	1907.6	1	22.1
	Subtest 4	9262	1852.4	2	21.3
		9400	1880.0	2	21.6
		9538	1907.6	2	21.0
	Subtest 5	9262	1852.4	0	23.2
		9400	1880.0	0	23.2
		9538	1907.6	0	23.2

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

8.5. DC-HSDPA

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13

The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

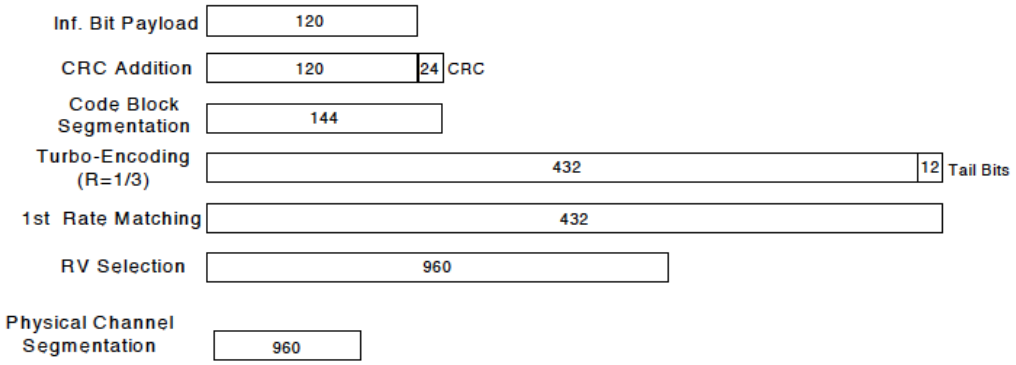


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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

The following 4 Sub-tests for HSDPA were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

	Mode	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack Repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs = βhs/ βc	30/15			

Up commands are set continuously to set the UE to Max power.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

8.5.1. UMTS DC-HSDPA OUTPUT POWER RESULT

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band V	Subtest 1	4132	826.4	0	23.1
		4183	836.6	0	23.1
		4233	846.6	0	23.1
	Subtest 2	4132	826.4	0	23.1
		4183	836.6	0	23.1
		4233	846.6	0	23.1
	Subtest 3	4132	826.4	0.5	22.7
		4183	836.6	0.5	22.6
		4233	846.6	0.5	22.6
	Subtest 4	4132	826.4	0.5	22.7
		4183	836.6	0.5	22.6
		4233	846.6	0.5	22.6

Band	Mode	UL Ch No.	Freq. (MHz)	MPR	Avg Pwr (dBm)
W-CDMA Band II	Subtest 1	9262	1852.4	0	23.1
		9400	1880.0	0	23.1
		9538	1907.6	0	23.1
	Subtest 2	9262	1852.4	0	23.1
		9400	1880.0	0	23.1
		9538	1907.6	0	23.1
	Subtest 3	9262	1852.4	0.5	22.6
		9400	1880.0	0.5	22.8
		9538	1907.6	0.5	22.7
	Subtest 4	9262	1852.4	0.5	22.6
		9400	1880.0	0.5	22.8
		9538	1907.6	0.5	22.7

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

8.7. LTE OUTPUT VERIFICATION

8.7.1. LTE OUTPUT RESULT

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
						23790
						710 MHz
LTE Band 17	10	QPSK	1	0	0	23.4
			1	25	0	23.2
			1	49	0	23.3
			25	0	1	22.2
			25	12	1	22.1
			25	25	1	22.0
			50	0	1	22.1
		16QAM	1	0	1	22.5
			1	25	1	22.6
			1	49	1	22.7
			25	0	2	21.2
			25	12	2	21.1
			25	25	2	21.1
			50	0	2	21.1

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
						23790
						710 MHz
LTE Band 17	5	QPSK	1	0	0	23.3
			1	12	0	23.1
			1	24	0	23.0
			12	0	1	22.1
			12	7	1	22.1
			12	13	1	22.0
			25	0	1	22.1
		16QAM	1	0	1	22.2
			1	12	1	22.1
			1	24	1	22.1
			12	0	2	21.3
			12	7	2	21.2
			12	13	2	21.2
			25	0	2	21.1

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

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20450	20525	20600
						829 MHz	836.5 MHz	844 MHz
LTE Band 5	10	QPSK	1	0	0	23.3	23.5	23.4
			1	25	0	23.4	23.6	23.3
			1	49	0	23.2	23.4	23.2
			25	0	1	22.4	22.4	22.3
			25	12	1	22.3	22.3	22.3
			25	25	1	22.2	22.3	22.3
			50	0	1	22.3	22.3	22.3
		16QAM	1	0	1	22.7	22.7	22.4
			1	25	1	22.1	22.7	22.2
			1	49	1	22.1	22.7	22.2
			25	0	2	21.3	21.2	21.2
			25	12	2	21.2	21.2	21.3
			25	25	2	21.2	21.2	21.3
			50	0	2	21.2	21.2	21.3

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20425	20525	20625
						826.5 MHz	836.5 MHz	846.5 MHz
LTE Band 5	5	QPSK	1	0	0	23.3	23.3	23.3
			1	12	0	23.3	23.5	23.3
			1	24	0	23.2	23.5	23.3
			12	0	1	22.3	22.3	22.2
			12	7	1	22.3	22.3	22.2
			12	13	1	22.3	22.2	22.2
			25	0	1	22.2	22.3	22.2
		16QAM	1	0	1	22.6	22.2	22.5
			1	12	1	22.2	22.3	22.6
			1	24	1	21.8	22.3	22.5
			12	0	2	21.1	21.4	21.4
			12	7	2	21.0	21.3	21.4
			12	13	2	21.2	21.3	21.4
			25	0	2	21.2	21.3	21.2

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

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						20000	20175	20350
						1715 MHz	1732.5 MHz	1750 MHz
LTE Band 4	10	QPSK	1	0	0	23.4	23.4	23.3
			1	25	0	23.5	23.5	23.1
			1	49	0	23.4	23.4	23.1
			25	0	1	22.3	22.3	22.1
			25	12	1	22.1	22.1	22.1
			25	25	1	22.2	22.2	22.2
			50	0	1	22.2	22.2	22.1
		16QAM	1	0	1	22.5	22.7	22.6
			1	25	1	22.6	22.7	22.2
			1	49	1	22.6	22.3	22.2
			25	0	2	21.3	21.2	21.3
			25	12	2	21.3	21.1	21.2
			25	25	2	21.3	21.1	21.2
			50	0	2	21.1	21.1	21.0

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						19975	20175	20375
						1712.5 MHz	1732.5 MHz	1752.5 MHz
LTE Band 4	5	QPSK	1	0	0	23.2	23.1	23.3
			1	12	0	23.3	23.3	23.2
			1	24	0	23.1	23.4	23.1
			12	0	1	22.3	22.3	22.2
			12	7	1	22.1	22.2	22.1
			12	13	1	22.1	22.2	22.1
			25	0	1	22.2	22.2	22.2
		16QAM	1	0	1	22.7	22.2	22.5
			1	12	1	22.2	22.2	22.3
			1	24	1	22.2	21.8	22.2
			12	0	2	21.5	21.3	21.2
			12	7	2	21.3	21.1	21.2
			12	13	2	21.3	21.2	21.3
			25	0	2	21.3	21.5	21.1

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

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18650	18900	19150
						1855 MHz	1880 MHz	1905 MHz
LTE Band 2	10	QPSK	1	0	0	23.4	23.7	23.4
			1	25	0	23.3	23.5	23.3
			1	49	0	23.3	23.4	23.3
			25	0	1	22.2	22.4	22.3
			25	12	1	22.2	22.3	22.2
			25	25	1	22.2	22.3	22.2
			50	0	1	22.2	22.4	22.2
		16QAM	1	0	1	22.7	22.6	22.3
			1	25	1	22.4	22.7	22.2
			1	49	1	22.7	22.7	22.3
			25	0	2	21.2	21.3	21.2
			25	12	2	21.2	21.3	21.3
			25	25	2	21.4	21.3	21.3
			50	0	2	21.3	21.3	21.2

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)		
						18625	18900	19175
						1852.5 MHz	1880 MHz	1907.5 MHz
LTE Band 2	5	QPSK	1	0	0	23.1	23.3	23.2
			1	12	0	23.2	23.6	23.3
			1	24	0	23.2	23.3	23.3
			12	0	1	22.1	22.2	22.2
			12	7	1	22.2	22.3	22.2
			12	13	1	22.2	22.3	22.2
			25	0	1	22.2	22.3	22.2
		16QAM	1	0	1	22.2	22.3	22.6
			1	12	1	22.2	22.3	22.2
			1	24	1	22.1	22.2	22.1
			12	0	2	21.1	21.1	21.2
			12	7	2	21.0	21.1	21.4
			12	13	2	21.2	21.2	21.3
			25	0	2	21.3	21.5	21.2

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

9. PEAK TO AVERAGE RATIO

Test Procedure

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

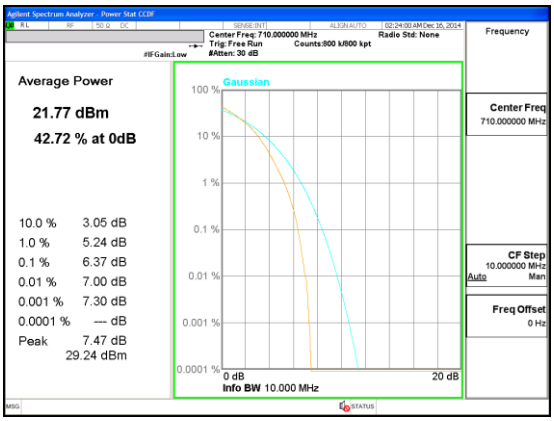
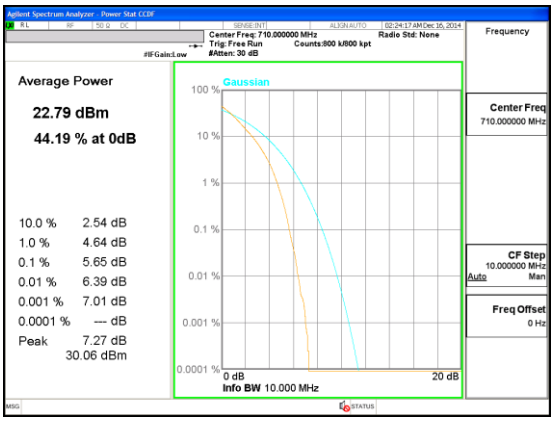
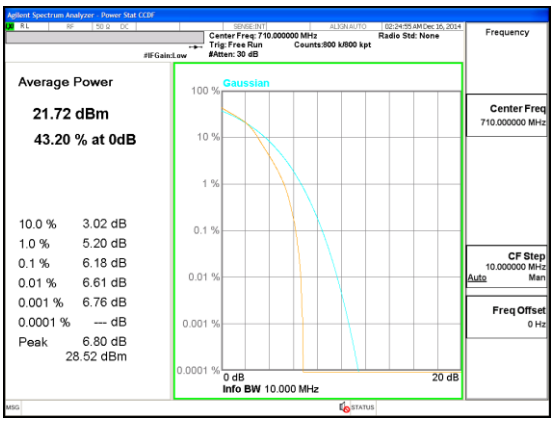
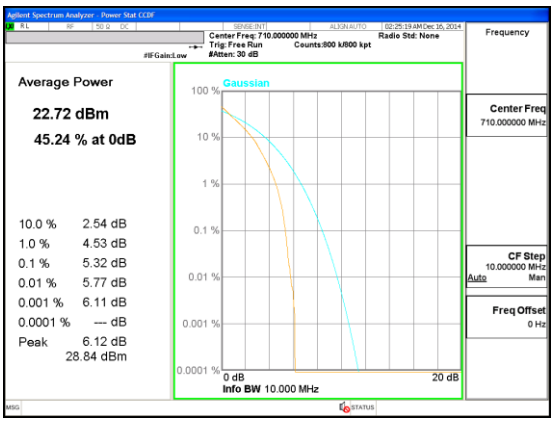
Test Spec

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.

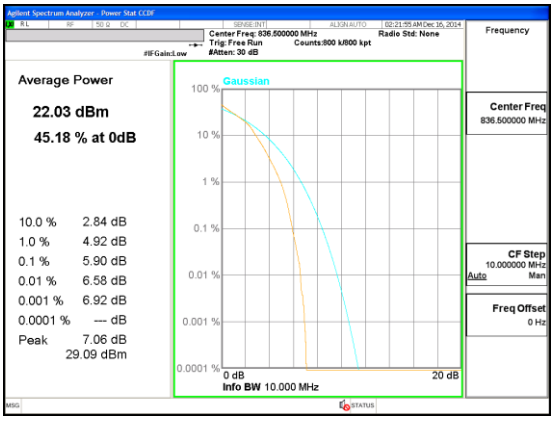
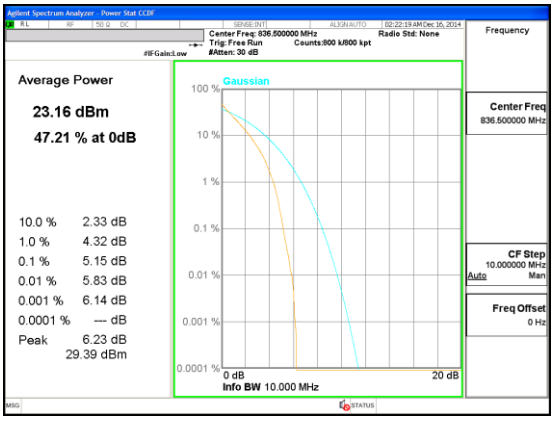
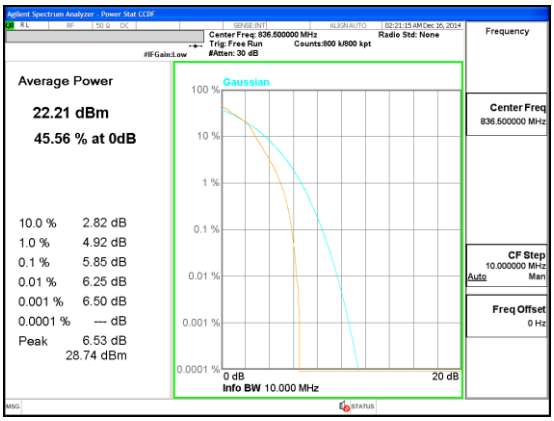
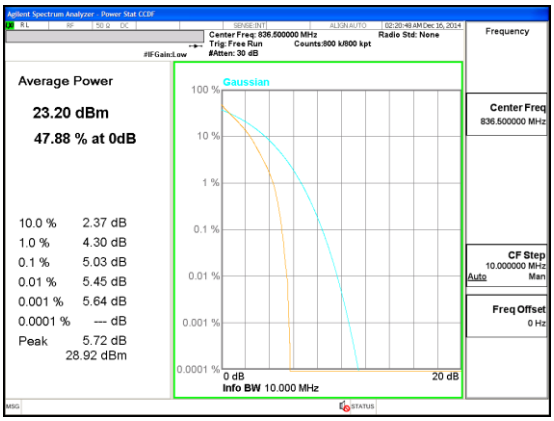
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

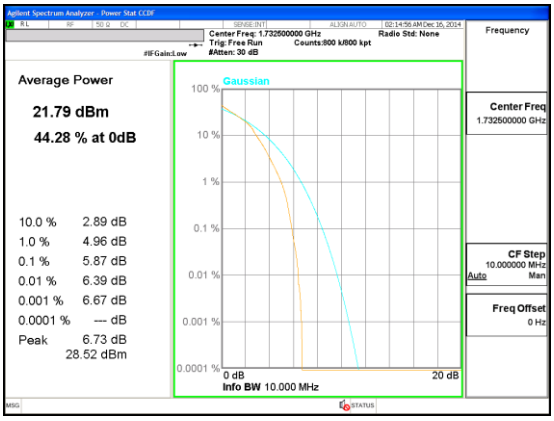
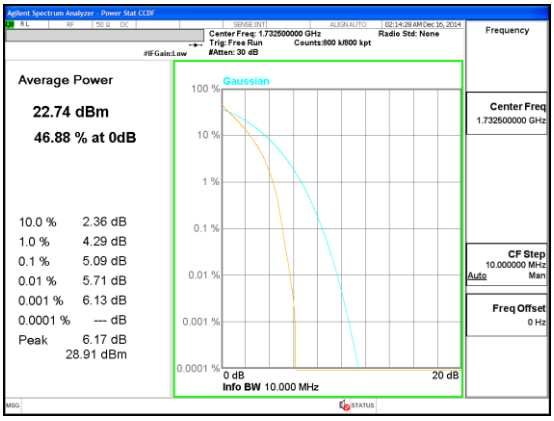
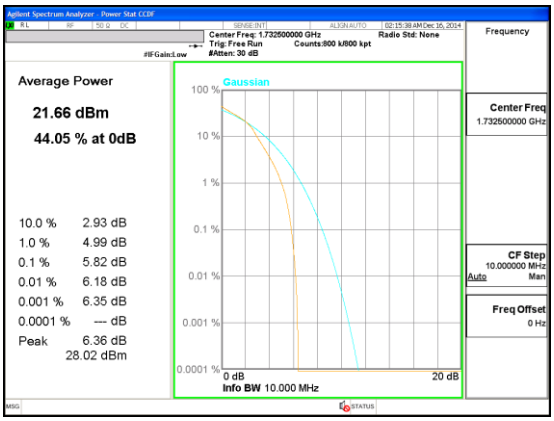
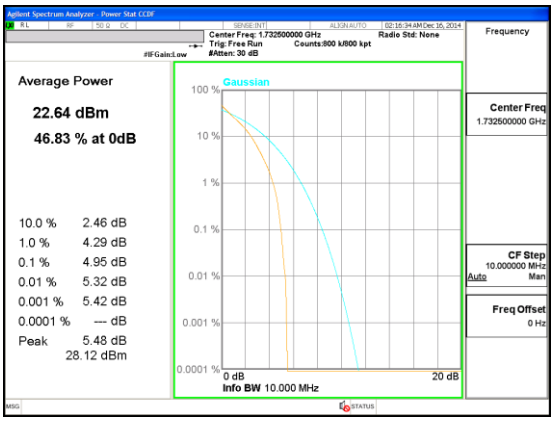
9.1. CONDUCTED PEAK TO AVERAGE RESULT

Band LTE17 10MHz 16QAM	 Band LTE17 10MHz 16QAM Mid channel	 Band LTE17 10MHz QPSK Mid channel
Band LTE17 5MHz 16QAM	 Band LTE17 5MHz 16QAM Mid channel	 Band LTE17 5MHz QPSK Mid channel

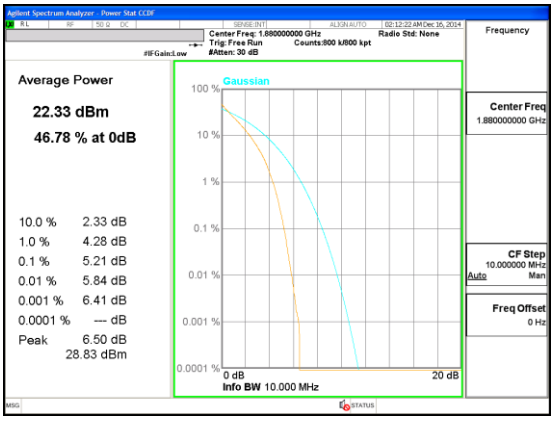
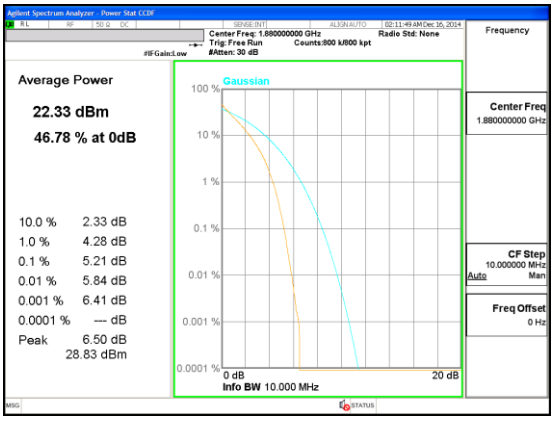
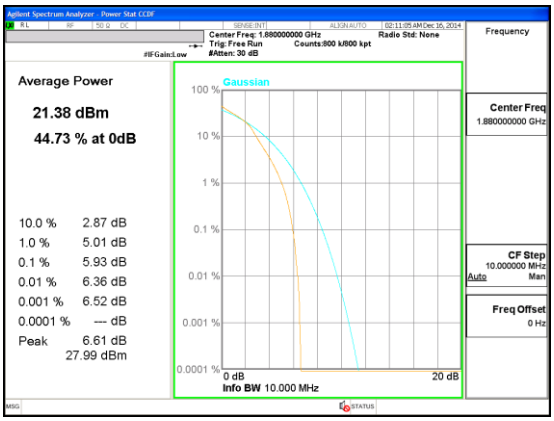
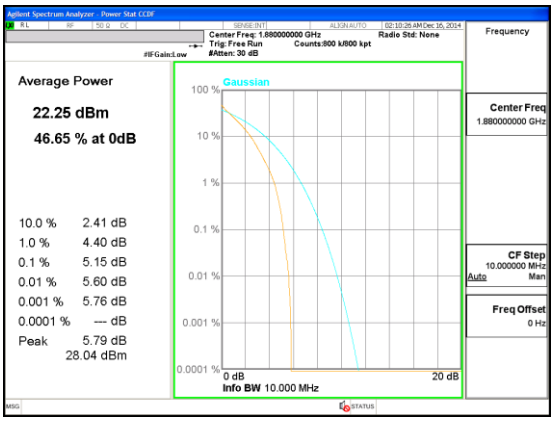
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE5 10MHz 16QAM	 Band LTE5 10MHz 16QAM Mid channel	 Band LTE5 10MHz QPSK Mid channel
Band LTE5 5MHz 16QAM	 Band LTE5 5MHz 16QAM Mid channel	 Band LTE5 5MHz QPSK Mid channel

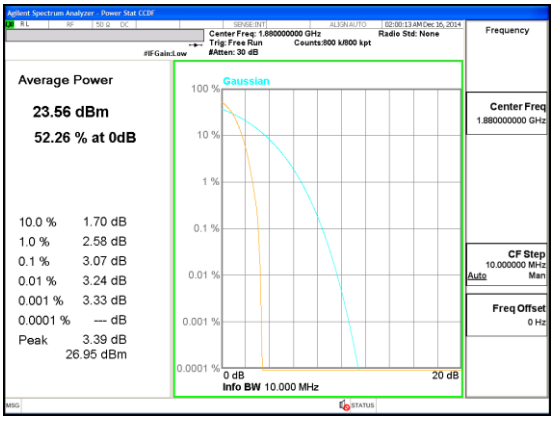
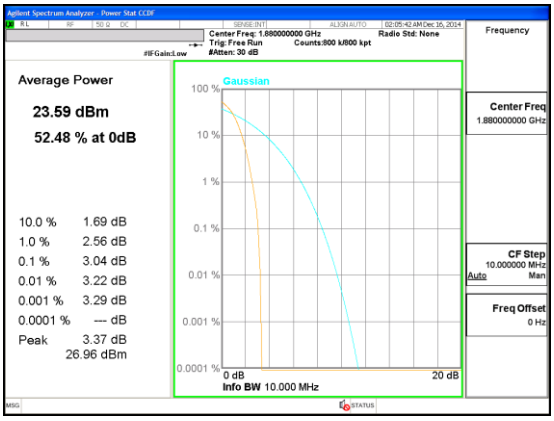
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

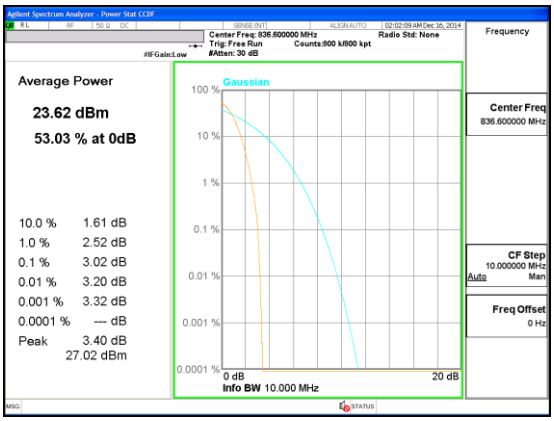
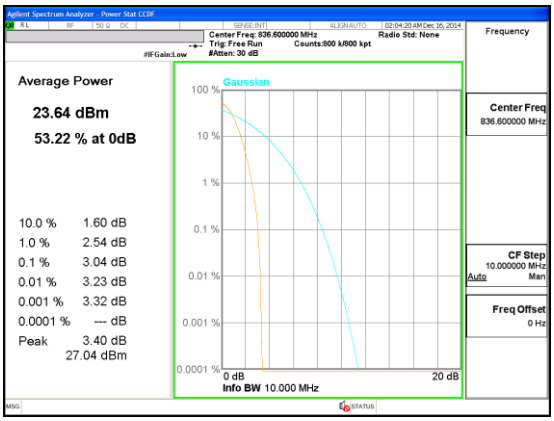
Band LTE4 10MHz 16QAM	 Band LTE4 10MHz 16QAM Mid channel	 Band LTE4 10MHz QPSK Mid channel
Band LTE4 5MHz 16QAM	 Band LTE4 5MHz 16QAM Mid channel	 Band LTE4 5MHz QPSK Mid channel

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

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

Band Band 2 HSDPA	 Band WCDMA B2 HSDPA	 Band WCDMA B2 REL99

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

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

10. LIMITS AND CONDUCTED RESULTS

10.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v02r01 - 06/07/2013)

MODES TESTED

GSM, WCDMA, and LTE

RESULTS

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

10.1.1. OCCUPIED BANDWIDTH RESULTS

Band	Mode	Channel	f (MHz)	99% BW (kHz))	-26dB BW (kHz)
GSM850	GMSK	128	824.2		
		190	836.6		
		251	848.8		
	GPRS	128	824.2	244	309.3
		190	836.6	243.6	325.8
		251	848.8	238.4	311.2
	EGPRS	128	824.2	240.3	292.6
		190	836.6	241	307.2
		251	848.8	243.9	304.7
GSM1900	GMSK	512	1850.2		
		661	1880		
		810	1909.8		
	GPRS	512	1850.2	248.6	312.1
		661	1880	239.4	322.7
		810	1909.8	241.6	320.5
	EGPRS	512	1850.2	246.2	316.3
		661	1880	245.7	310.7
		810	1909.8	247	315.7

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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	Mode	Channel	f (MHz)	99% BW (MHz))	-26dB BW (MHz)
Band 5	REL99	4132	826.4	4.148	4.644
		4183	836.6	4.149	4.639
		4233	846.6	4.166	4.657
	HSDPA	4132	826.4	4.164	4.658
		4183	836.6	4.157	4.646
		4233	846.6	4.16	4.643
	HSUPA	4132	826.4		
		4183	836.6		
		4233	846.6		
Band 2	REL99	9262	1852.4	4.161	4.637
		9400	1880	4.162	4.634
		9538	1907.6	4.164	4.641
	HSDPA	9262	1852.4	4.179	4.627
		9400	1880	4.18	4.653
		9538	1907.6	4.162	4.632
	HSUPA	9262	1852.4		
		9400	1880		
		9538	1907.6		

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

10.1.2. LTE OCCUPIED BANDWIDTH RESULTS

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE17	10	QPSK	50/0	709	8.983	9.783
			50/0	710	9.014	9.787
			50/0	711	9.027	9.869
		16QAM	50/0	709	9.006	9.773
			50/0	710	9.019	9.867
			50/0	711	9.036	9.892
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE17	5	QPSK	25/0	706.5	4.502	4.937
			25/0	710	4.529	5.016
			25/0	713.5	4.5	4.936
		16QAM	25/0	706.5	4.505	4.959
			25/0	710	4.516	4.999
			25/0	713.5	4.513	4.924

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE5	10	QPSK	50/0	829	8.97	9.826
			50/0	836.5	8.982	9.722
			50/0	844	8.964	9.778
		16QAM	50/0	829	8.973	9.738
			50/0	836.5	8.965	9.717
			50/0	844	8.97	9.71
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE5	5	QPSK	25/0	826.5	4.506	4.937
			25/0	836.5	4.503	4.973
			25/0	846.5	4.511	4.973
		16QAM	25/0	826.5	4.505	4.982
			25/0	836.5	4.505	4.966
			25/0	846.5	4.52	4.98

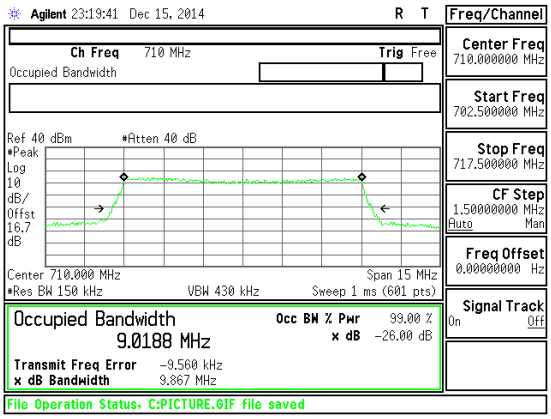
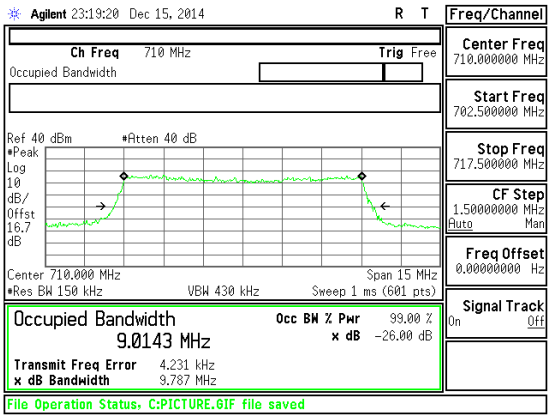
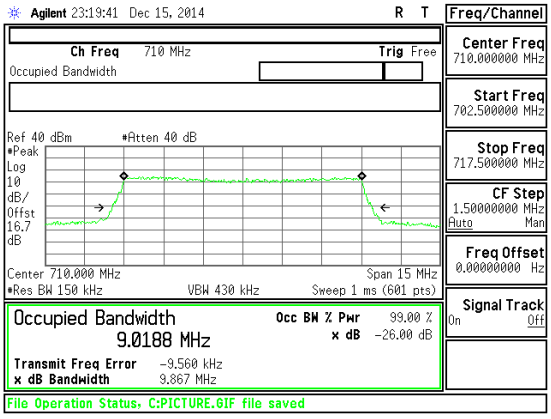
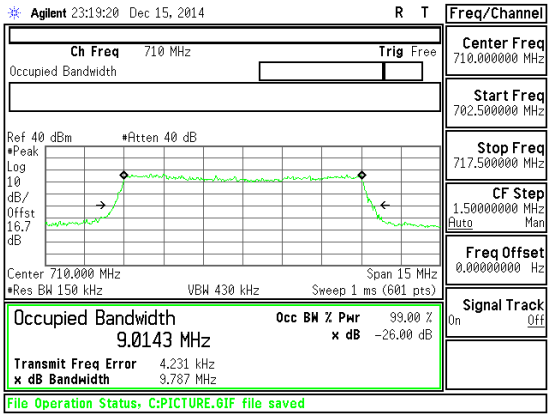
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE4	10	QPSK	50/0	1715	8.964	9.788
			50/0	1732.5	8.967	9.828
			50/0	1750	8.961	9.78
		16QAM	50/0	1715	8.957	9.776
			50/0	1732.5	8.961	9.883
			50/0	1750	8.98	9.903
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE4	5	QPSK	25/0	1712.5	4.509	4.878
			25/0	1732.5	4.509	4.994
			25/0	1752.5	4.508	4.951
		16QAM	25/0	1712.5	4.508	4.986
			25/0	1732.5	4.497	4.968
			25/0	1752.5	4.525	4.975

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE2	10	QPSK	50/0	1855	8.953	9.846
			50/0	1880	8.965	9.841
			50/0	1905	8.955	9.837
		16QAM	50/0	1855	8.975	9.847
			50/0	1880	8.956	9.687
			50/0	1905	8.939	9.728
Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE2	5	QPSK	25/0	1852.5	4.508	4.978
			25/0	1880	4.518	4.924
			25/0	1907.5	4.51	4.928
		16QAM	25/0	1852.5	4.505	5.011
			25/0	1880	4.514	4.95
			25/0	1907.5	4.504	5.01

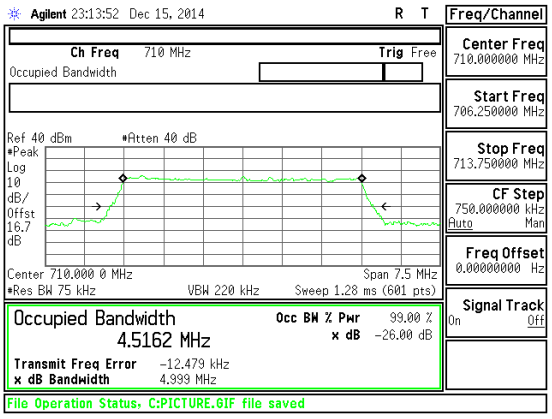
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.1.3. OCCUPIED BANDWIDTH PLOTS

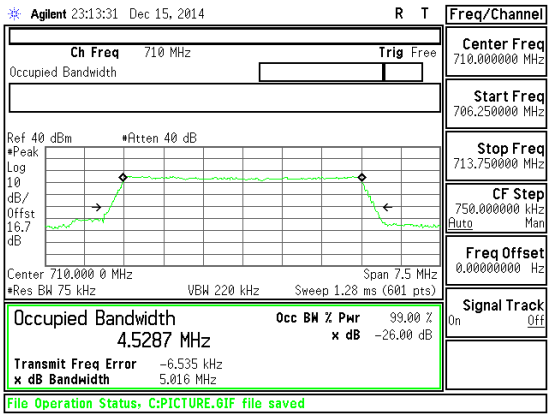
Band LTE17 10MHz 16QAM	 Band LTE17 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE17 10MHz OBW QPSK Mid Channel FRB.gif
Band LTE17 10MHz 16QAM	 Band LTE17 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE17 10MHz OBW QPSK Mid Channel FRB.gif

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

Band LTE17 5MHz 16QAM

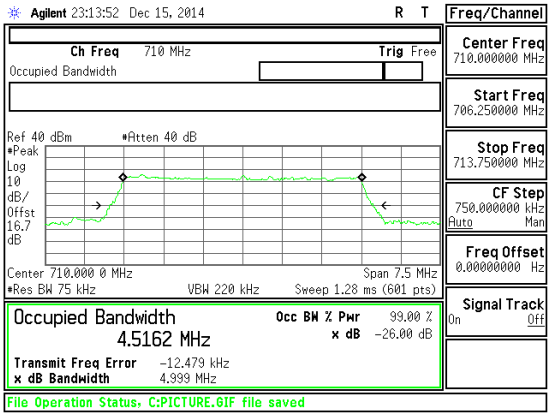


Band LTE17 5MHz OBW 16QAM Mid Channel FRB.gif

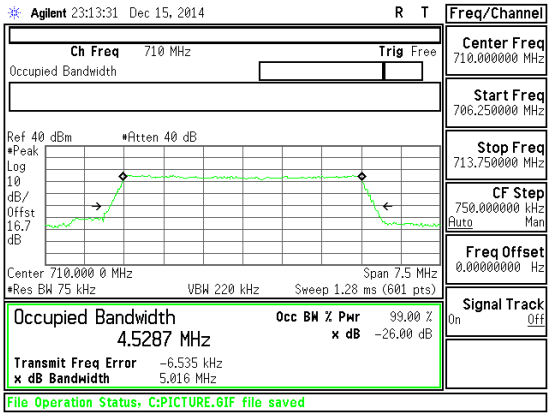


Band LTE17 5MHz OBW QPSK Mid Channel FRB.gif

Band LTE17 5MHz 16QAM

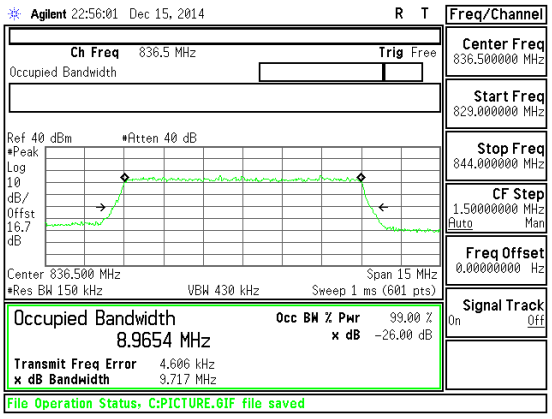
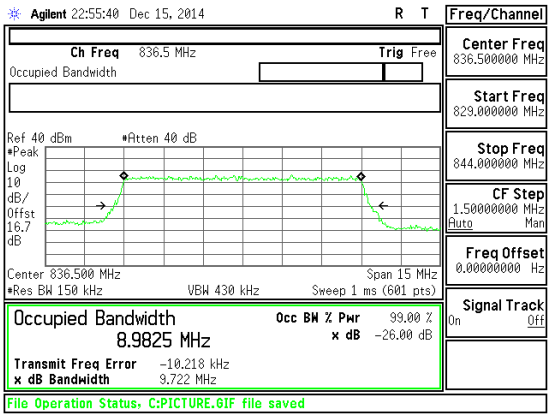
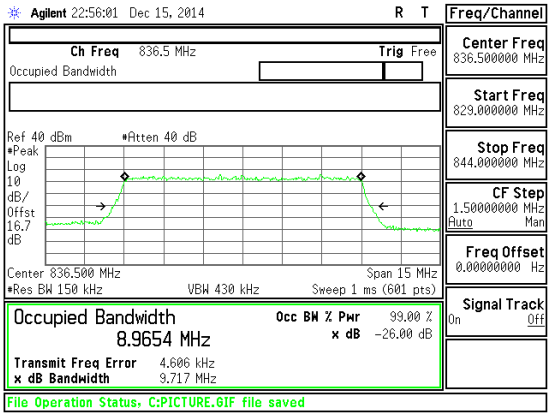
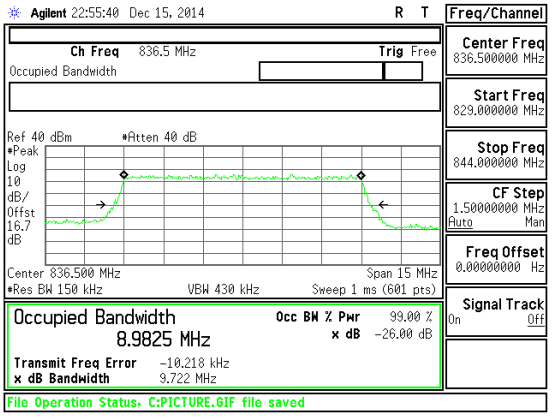


Band LTE17 5MHz OBW 16QAM Mid Channel FRB.gif

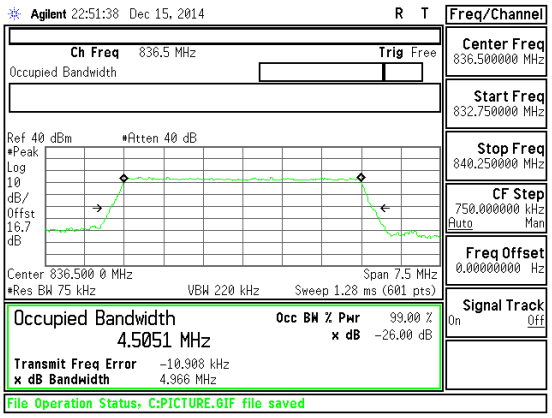
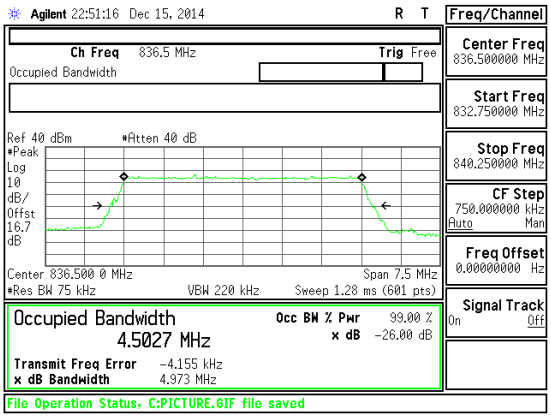
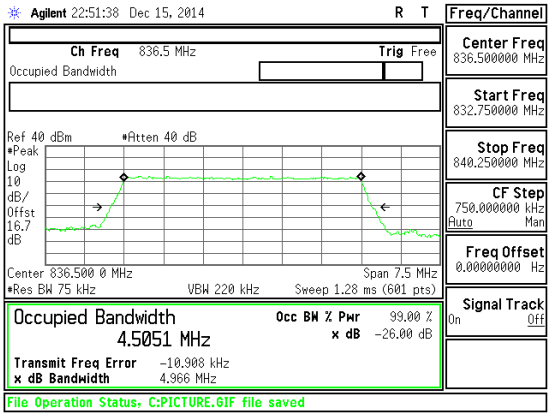
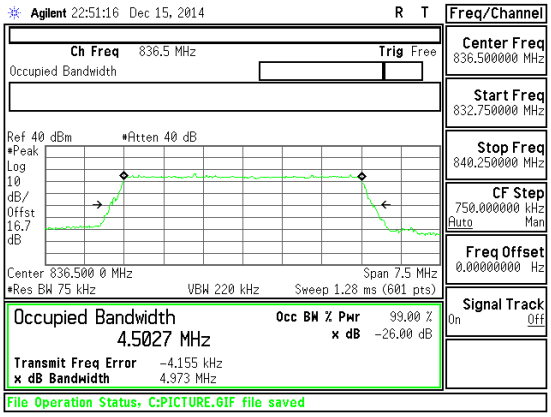


Band LTE17 5MHz OBW QPSK Mid Channel FRB.gif

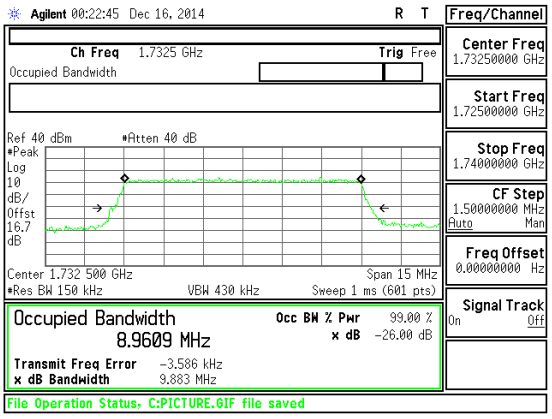
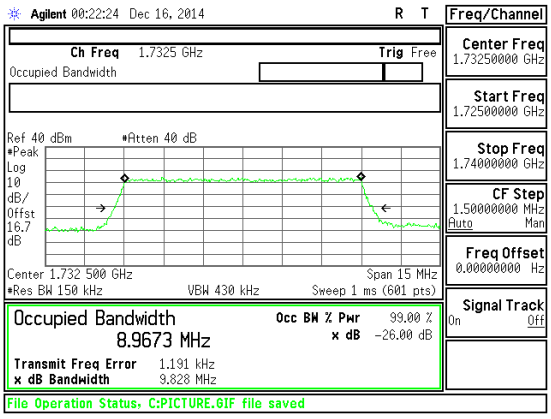
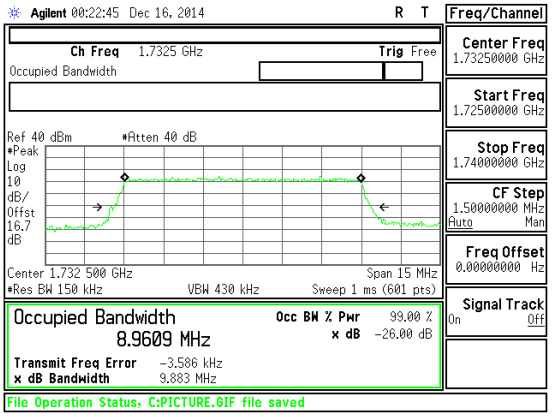
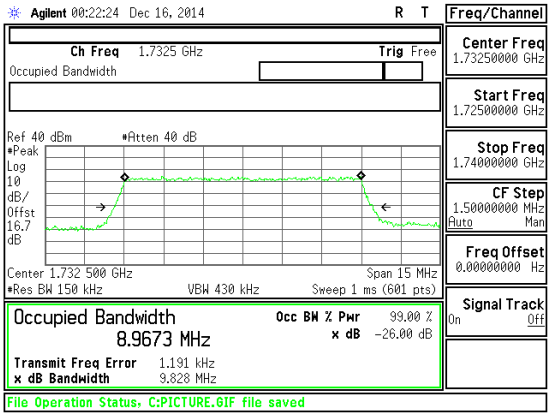
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE5 10MHz 16QAM	 Band LTE5 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE5 10MHz OBW QPSK Mid Channel FRB.gif
Band LTE5 10MHz 16QAM	 Band LTE5 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE5 10MHz OBW QPSK Mid Channel FRB.gif

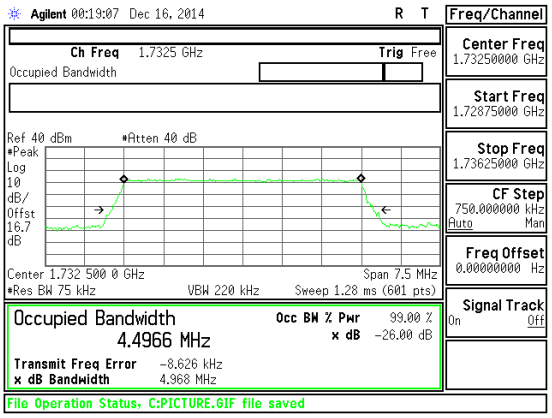
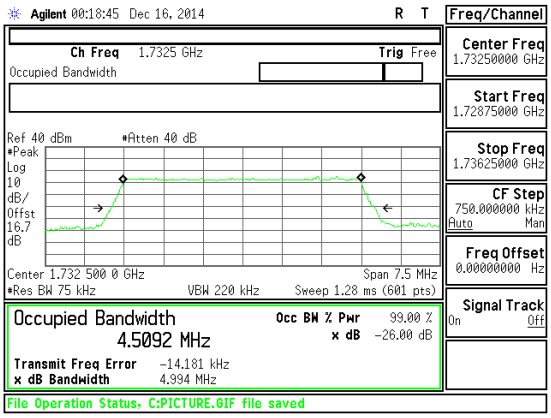
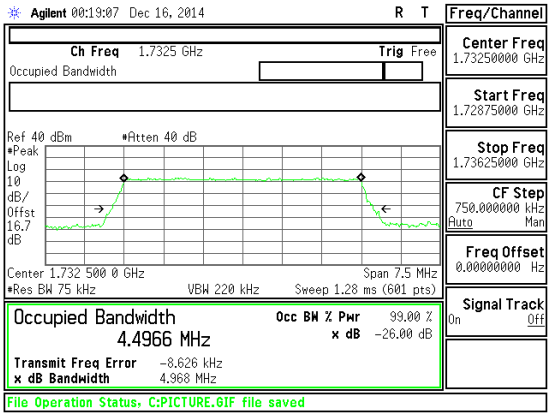
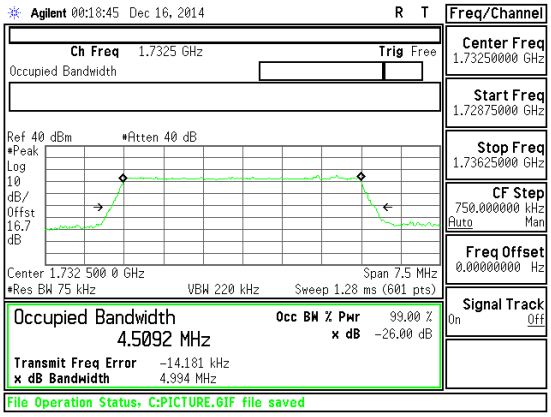
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE5 5MHz 16QAM	 Band LTE5 5MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE5 5MHz OBW QPSK Mid Channel FRB.gif
Band LTE5 5MHz 16QAM	 Band LTE5 5MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE5 5MHz OBW QPSK Mid Channel FRB.gif

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 OBW 16QAM Mid Channel FRB.gif	 Band LTE4 10MHz OBW QPSK Mid Channel FRB.gif
Band LTE4 10MHz 16QAM	 Band LTE4 10MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE4 10MHz OBW QPSK Mid Channel FRB.gif

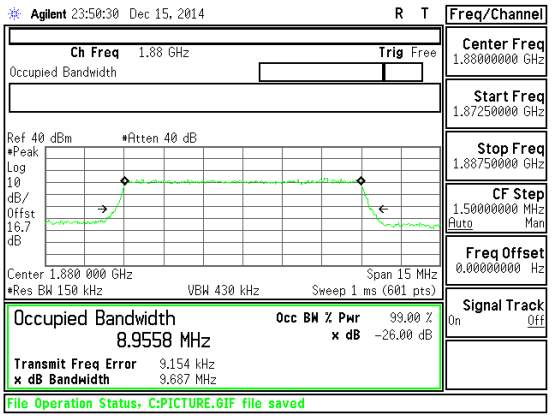
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE4 5MHz 16QAM	 Band LTE4 5MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE4 5MHz OBW QPSK Mid Channel FRB.gif
Band LTE4 5MHz 16QAM	 Band LTE4 5MHz OBW 16QAM Mid Channel FRB.gif	 Band LTE4 5MHz OBW QPSK Mid Channel FRB.gif

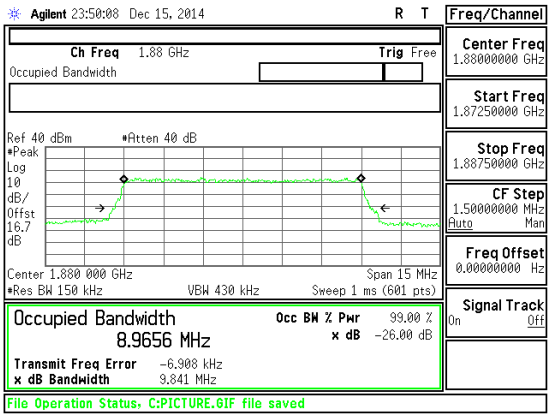
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

Band LTE2 10MHz 16QAM

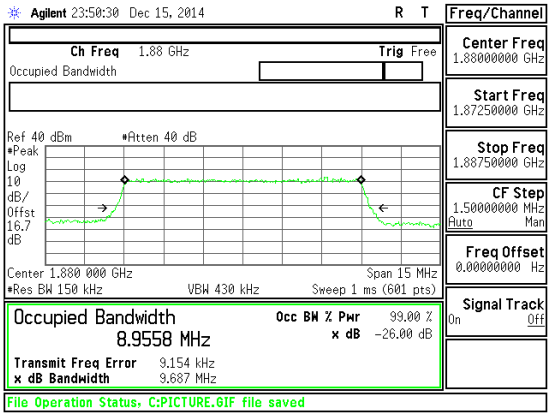


Band LTE2 10MHz OBW 16QAM Mid Channel FRB.gif

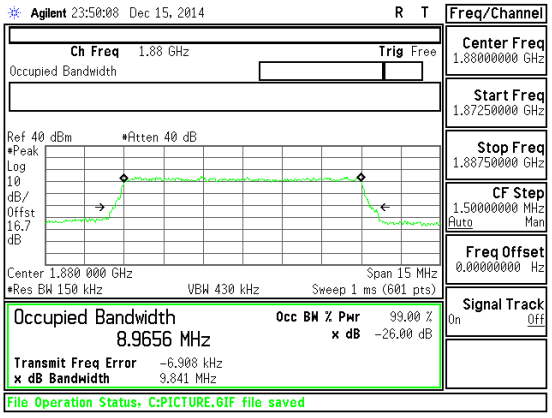


Band LTE2 10MHz OBW QPSK Mid Channel FRB.gif

Band LTE2 10MHz 16QAM



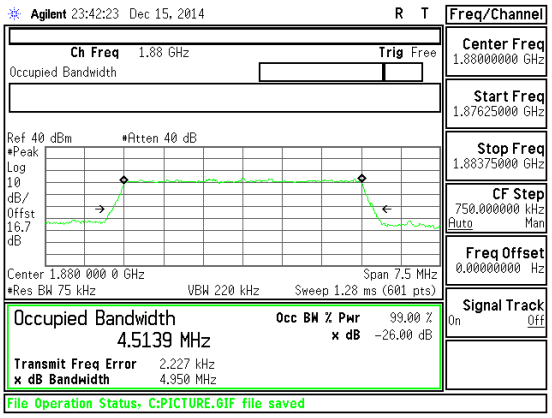
Band LTE2 10MHz OBW 16QAM Mid Channel FRB.gif



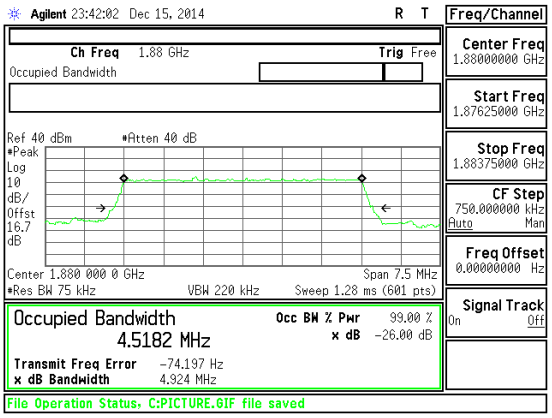
Band LTE2 10MHz OBW QPSK Mid Channel FRB.gif

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

Band LTE2 5MHz 16QAM

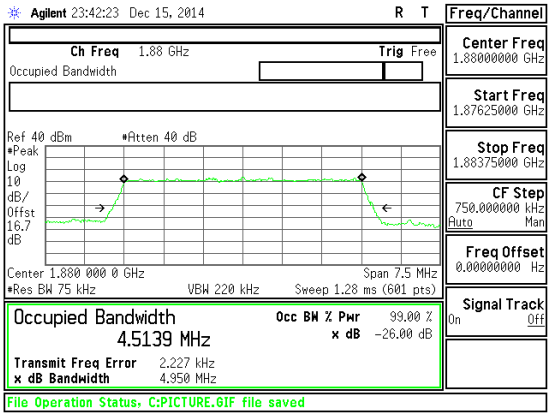


Band LTE2 5MHz OBW 16QAM Mid Channel FRB.gif

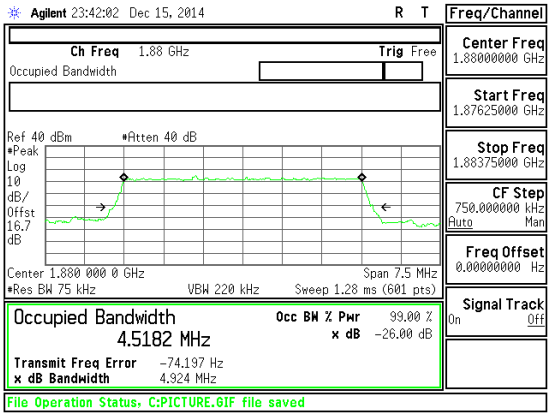


Band LTE2 5MHz OBW QPSK Mid Channel FRB.gif

Band LTE2 5MHz 16QAM

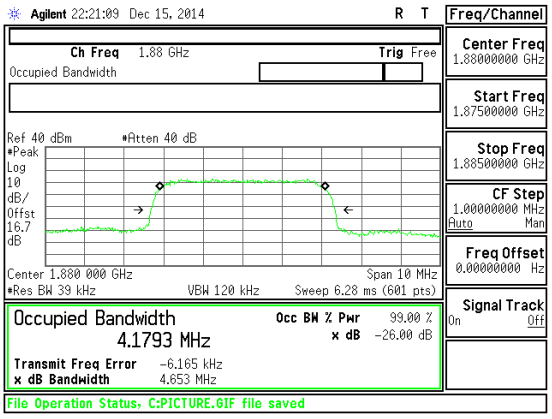
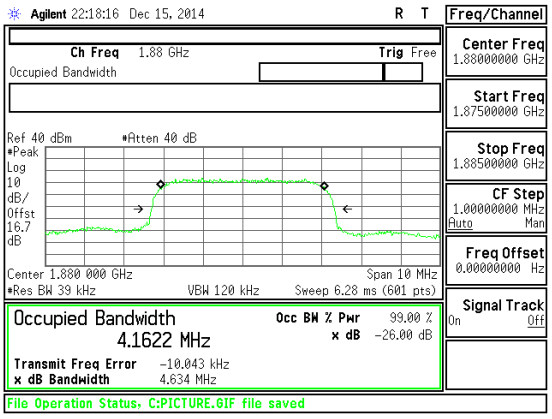
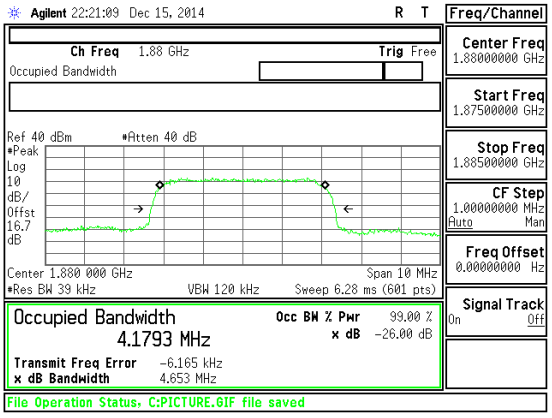
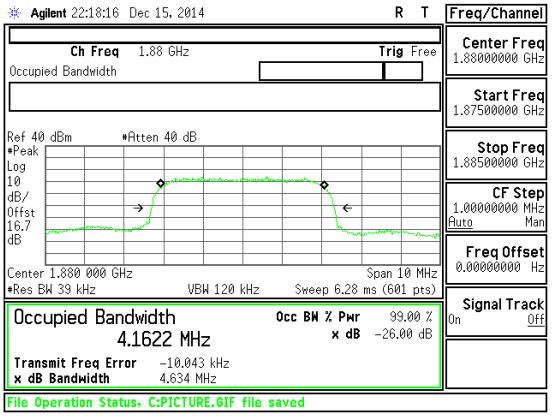


Band LTE2 5MHz OBW 16QAM Mid Channel FRB.gif

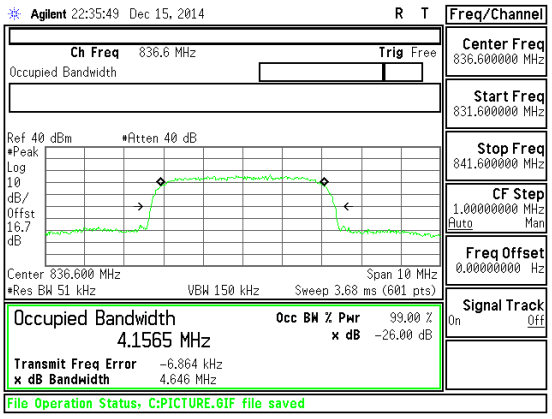
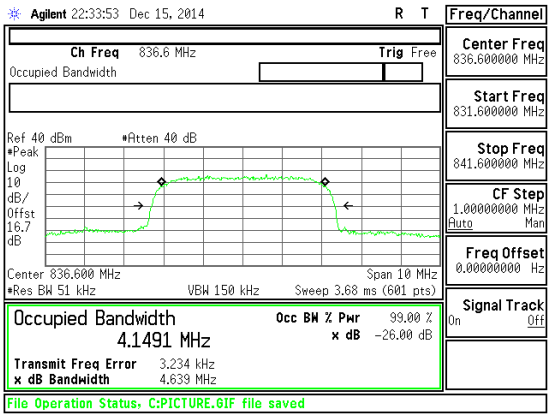
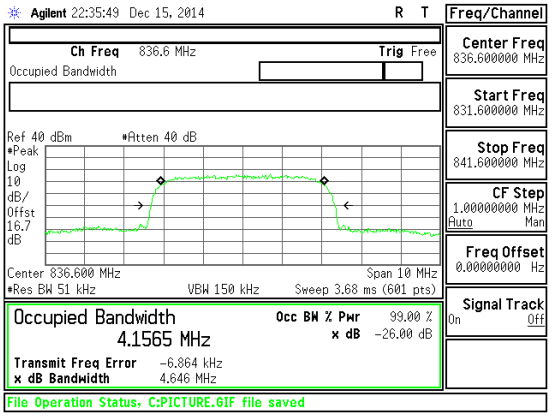
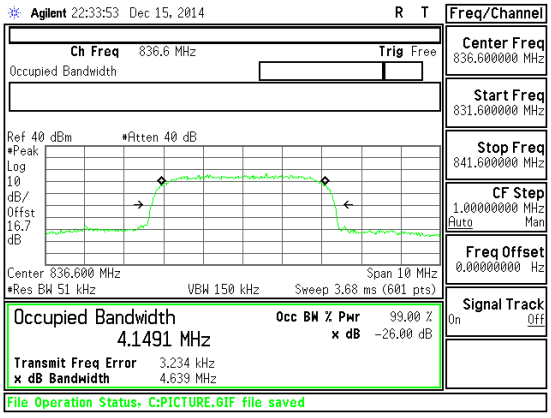


Band LTE2 5MHz OBW QPSK Mid Channel FRB.gif

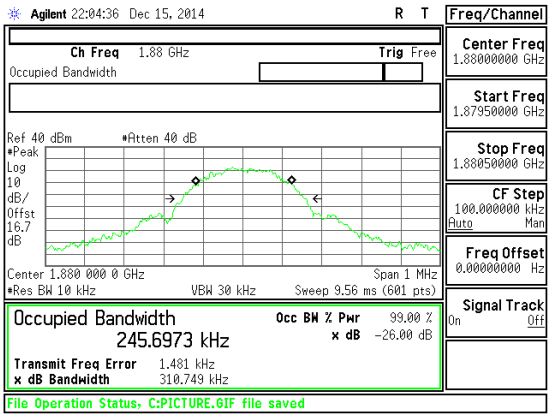
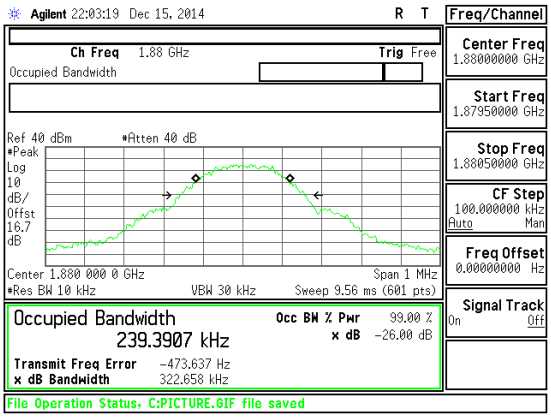
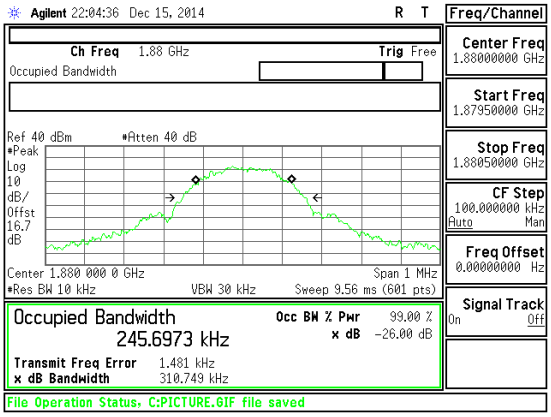
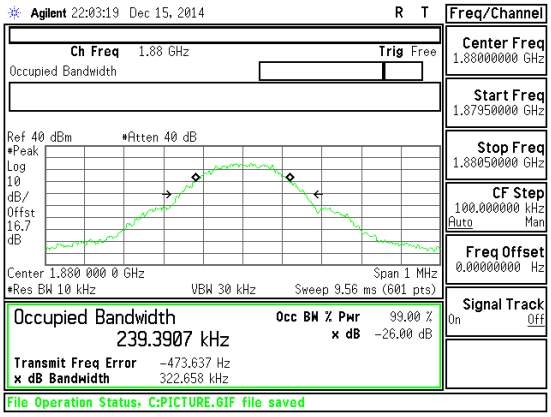
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band Band 2 HSDPA	 Band WCDMA B2 HSDPA OBW	 Band WCDMA B2 REL99 OBW
Band Band 2 HSDPA	 Band WCDMA B2 HSDPA OBW	 Band WCDMA B2 REL99 OBW

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 OBW	 Band WCDMA B5 REL99 OBW
Band Band 5 HSDPA	 Band WCDMA B5 HSDPA OBW	 Band WCDMA B5 REL99 OBW

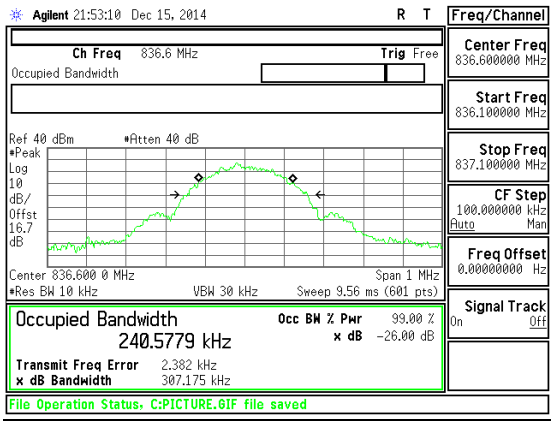
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band GSM1900 EGPRS	 Band GSM1900 EGPRS OBW Mid channel	 Band GSM1900 GPRS OBW Mid channel
Band GSM1900 EGPRS	 Band GSM1900 EGPRS OBW Mid channel	 Band GSM1900 GPRS OBW Mid channel

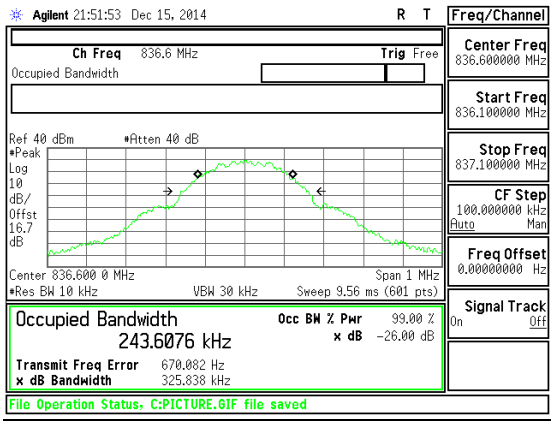
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

Band GSM850 EGPRS

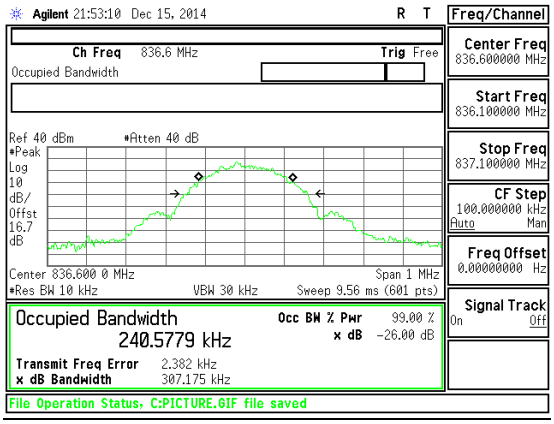


Band GSM850 EGPRS OBW Mid channel

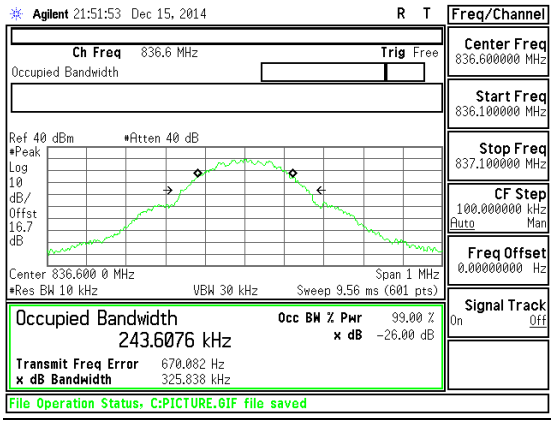


Band GSM850 GPRS OBW Mid channel

Band GSM850 EGPRS



Band GSM850 EGPRS OBW Mid channel



Band GSM850 GPRS OBW Mid channel

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

10.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §22.359, §24.238, and §27. 53

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) For mobile station, the attenuation factor shall be not less than 43+10Log(P)dB at the channel edge and (55+10Log(P)dB) at 5.5MHz from the channel edges.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01
The transmitter output was connected to an Agilent 8960 or a CMW500 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

MODES TESTED

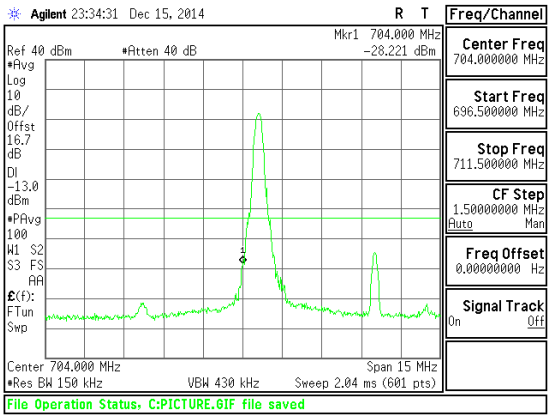
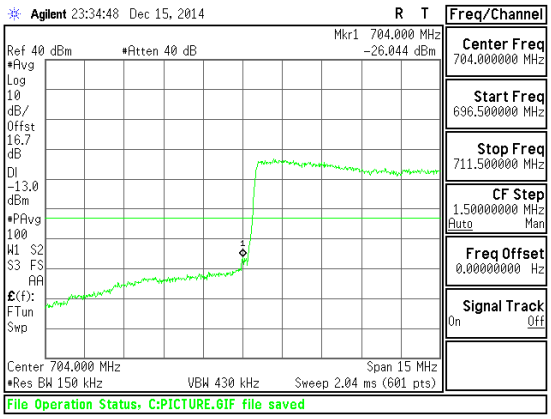
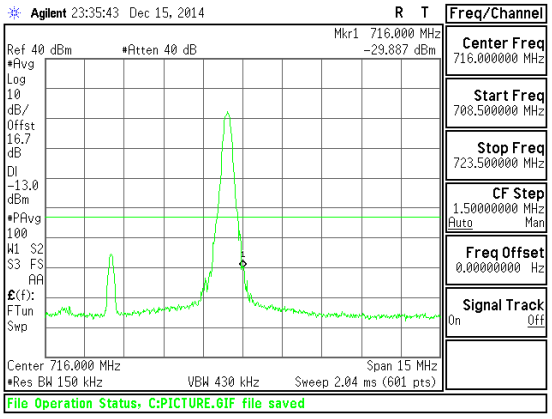
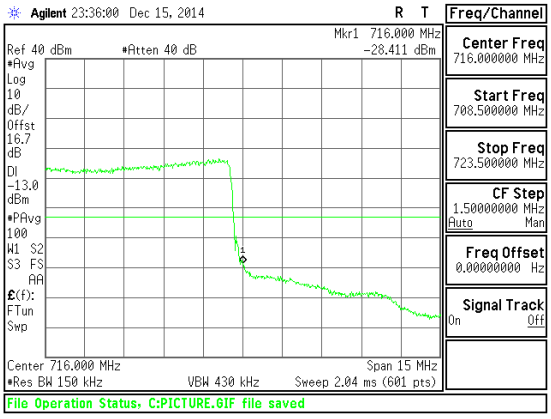
GSM, WCDMA, and LTE

RESULTS

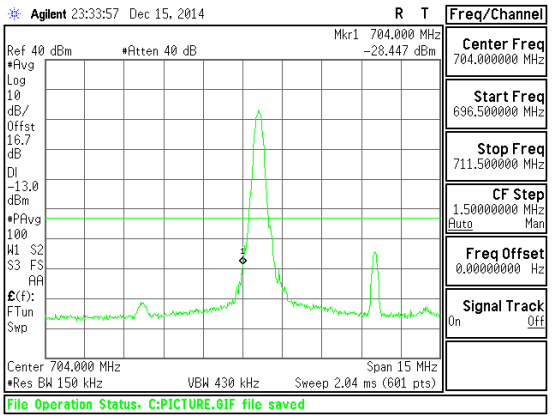
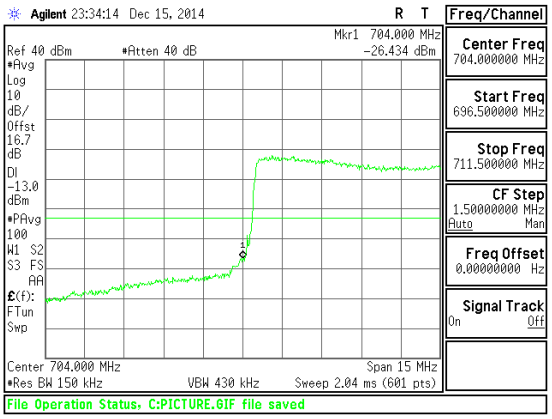
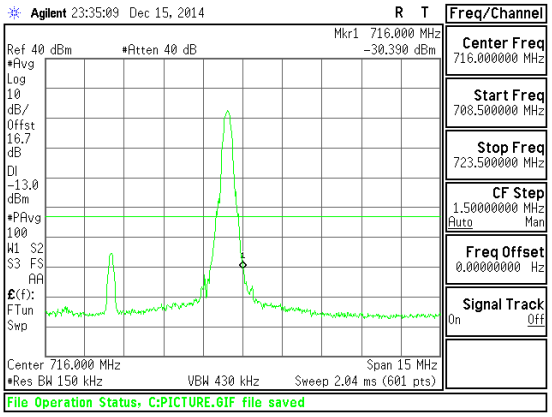
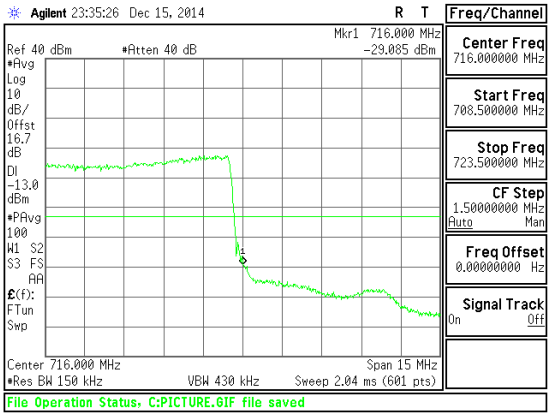
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

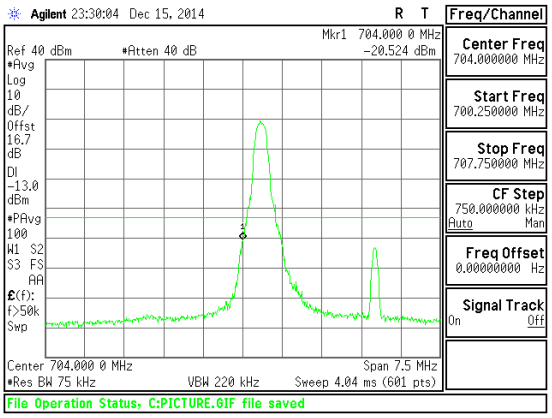
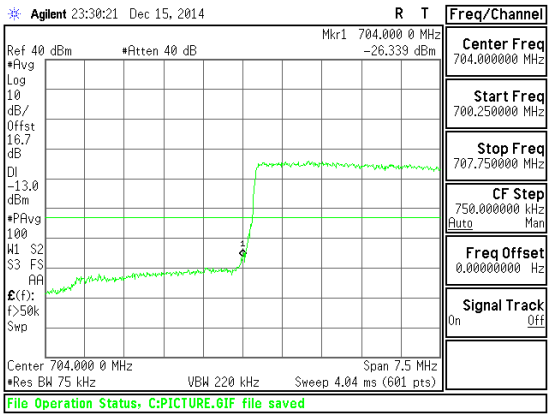
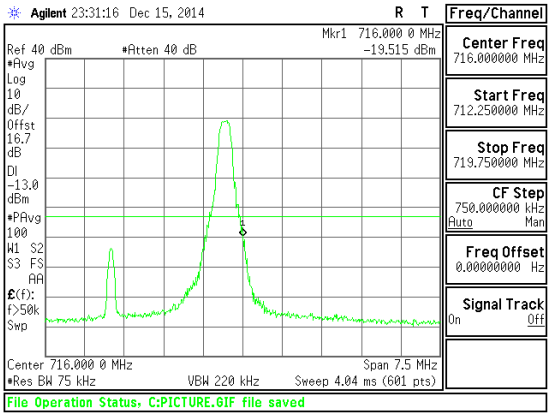
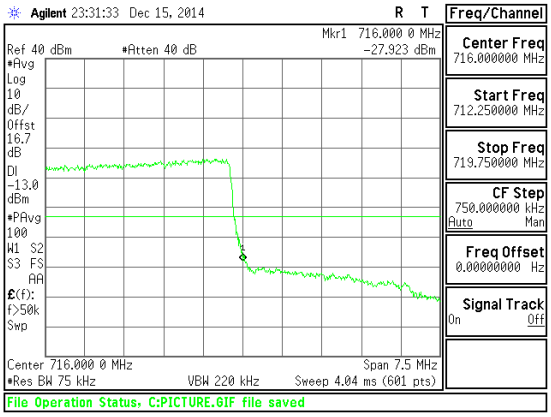
10.2.1. BAND EDGE PLOTS

Band LTE17 10MHz 16QAM	 Band LTE17 10MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE17 10MHz CBE 16QAM Low Channel FRB.gif
Band LTE17 10MHz 16QAM	 Band LTE17 10MHz CBE 16QAM High Channel 1RB.gif	 Band LTE17 10MHz CBE 16QAM High Channel FRB.gif

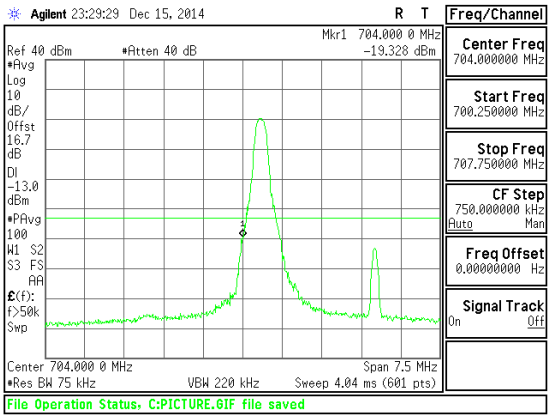
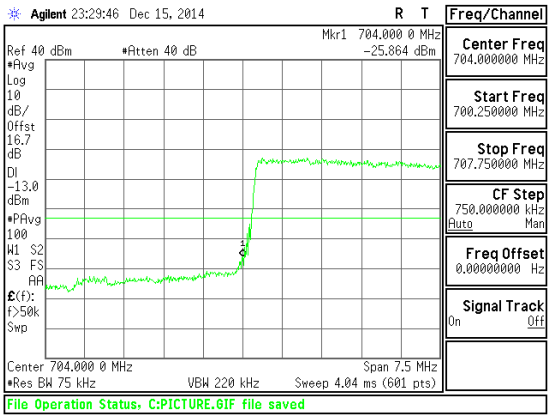
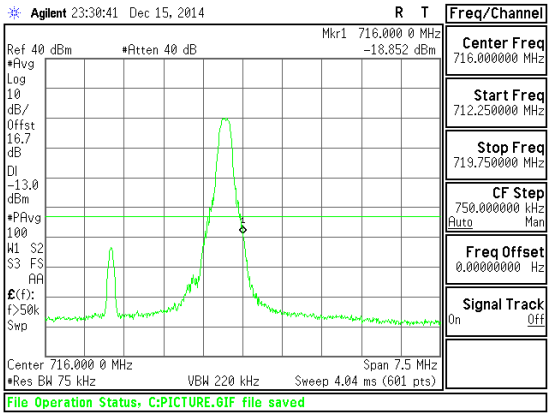
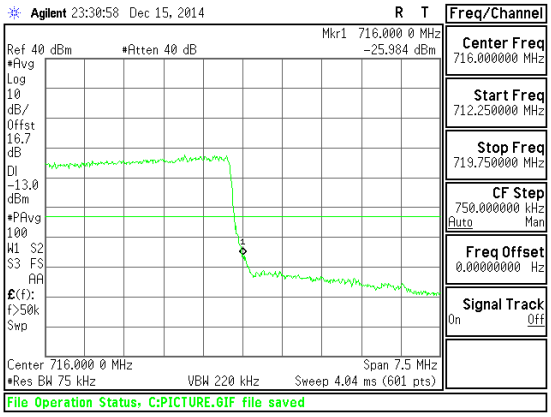
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE17 10MHz QPSK	 Band LTE17 10MHz CBE QPSK Low Channel 1RB.gif	 Band LTE17 10MHz CBE QPSK Low Channel FRB.gif
Band LTE17 10MHz QPSK	 Band LTE17 10MHz CBE QPSK High Channel 1RB.gif	 Band LTE17 10MHz CBE QPSK High Channel FRB.gif

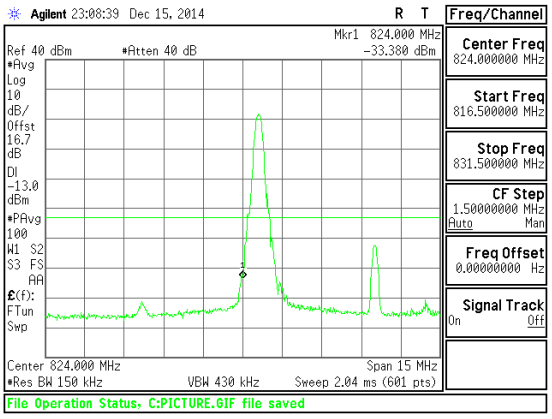
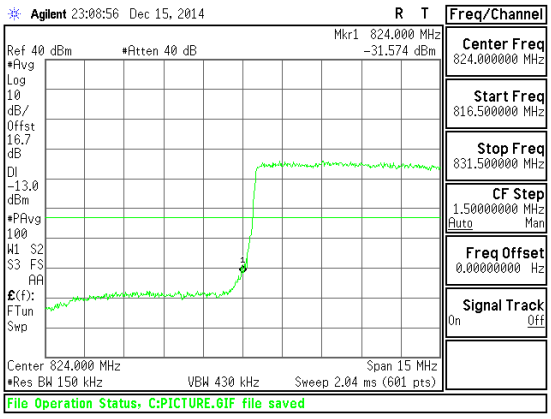
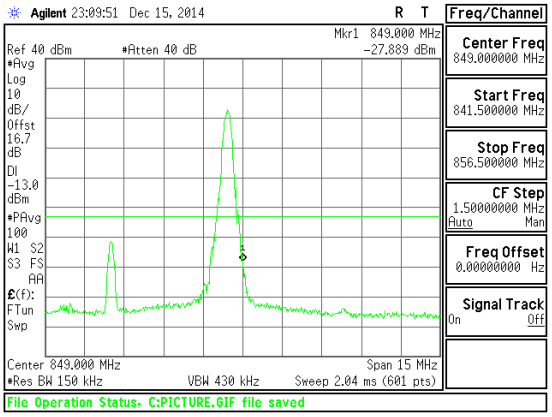
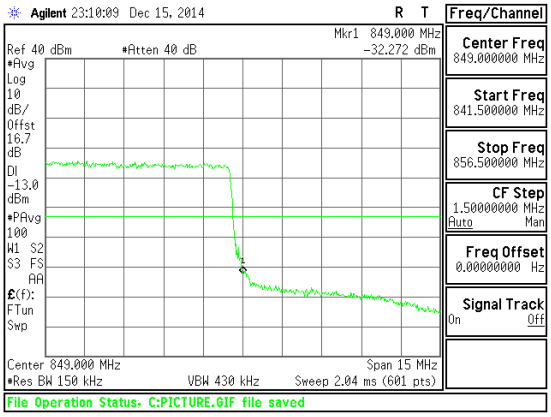
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE17 5MHz 16QAM	 Band LTE17 5MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE17 5MHz CBE 16QAM Low Channel FRB.gif
Band LTE17 5MHz 16QAM	 Band LTE17 5MHz CBE 16QAM High Channel 1RB.gif	 Band LTE17 5MHz CBE 16QAM High Channel FRB.gif

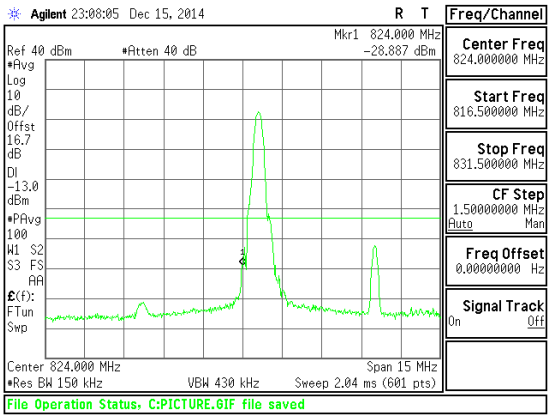
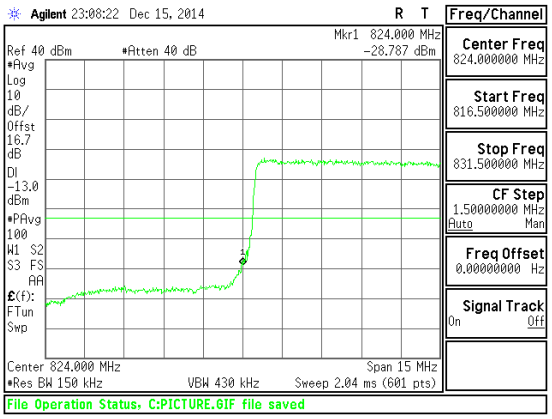
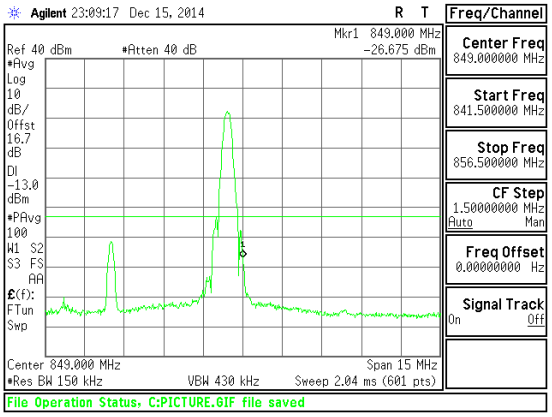
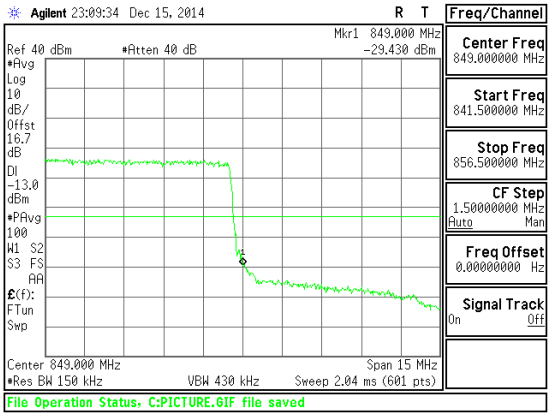
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE17 5MHz QPSK	 Band LTE17 5MHz CBE QPSK Low Channel 1RB.gif	 Band LTE17 5MHz CBE QPSK Low Channel FRB.gif
Band LTE17 5MHz QPSK	 Band LTE17 5MHz CBE QPSK High Channel 1RB.gif	 Band LTE17 5MHz CBE QPSK High Channel FRB.gif

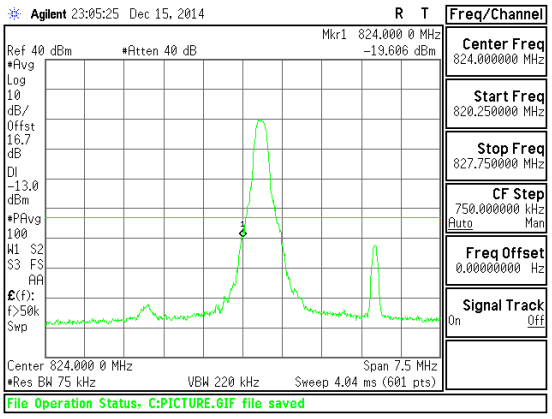
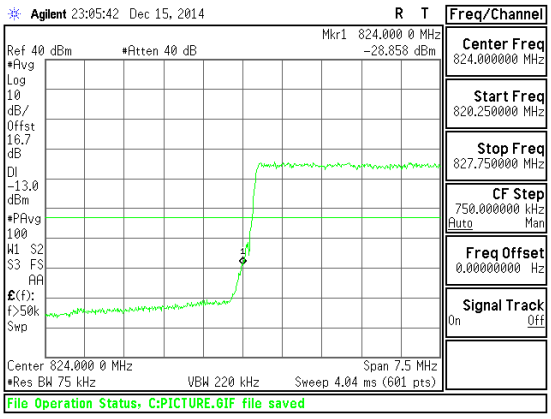
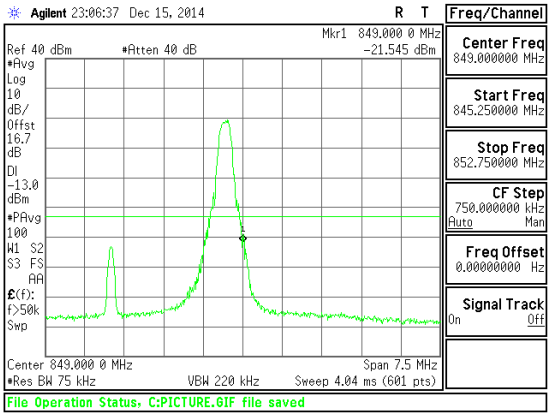
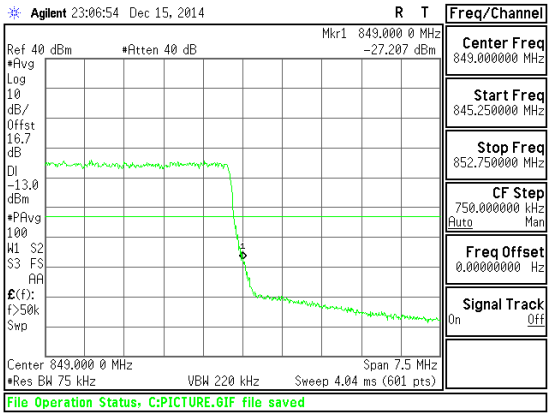
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE5 10MHz 16QAM	 Band LTE5 10MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE5 10MHz CBE 16QAM Low Channel FRB.gif
Band LTE5 10MHz 16QAM	 Band LTE5 10MHz CBE 16QAM High Channel 1RB.gif	 Band LTE5 10MHz CBE 16QAM High Channel FRB.gif

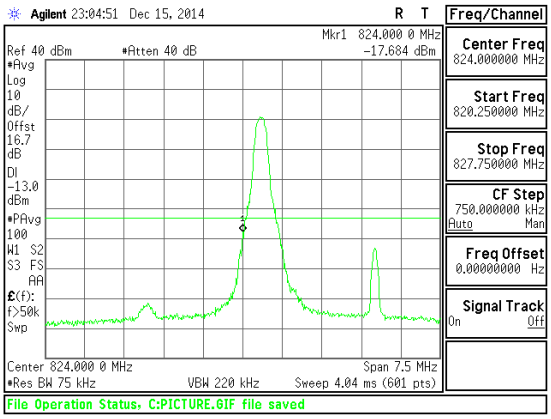
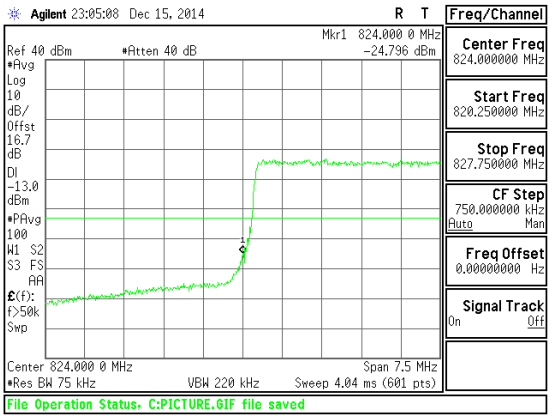
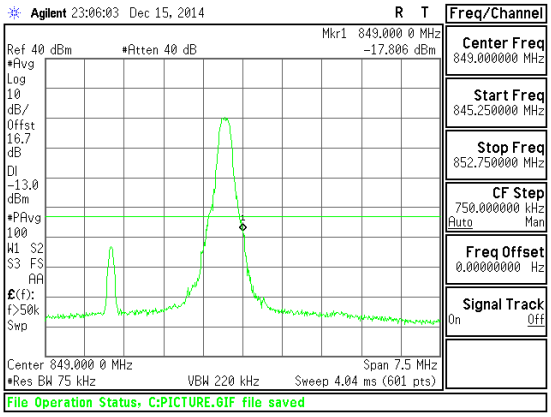
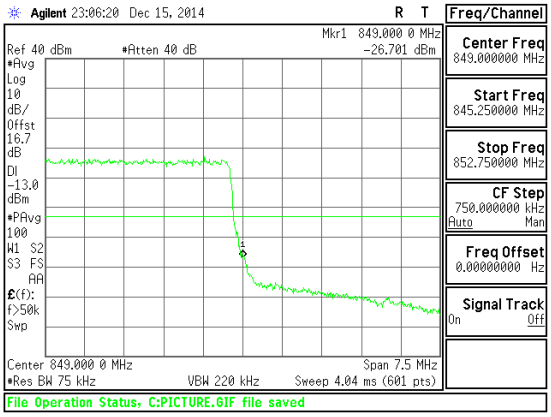
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE5 10MHz QPSK	 Band LTE5 10MHz CBE QPSK Low Channel 1RB.gif	 Band LTE5 10MHz CBE QPSK Low Channel FRB.gif
Band LTE5 10MHz QPSK	 Band LTE5 10MHz CBE QPSK High Channel 1RB.gif	 Band LTE5 10MHz CBE QPSK High Channel FRB.gif

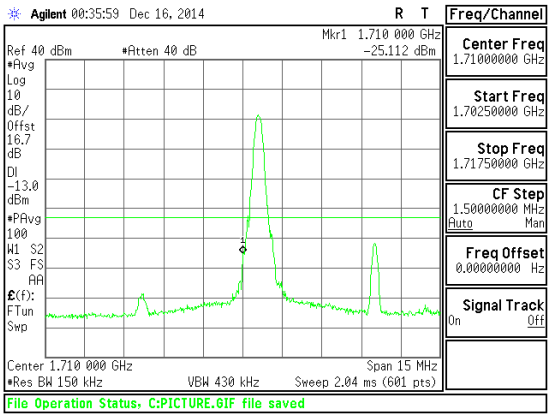
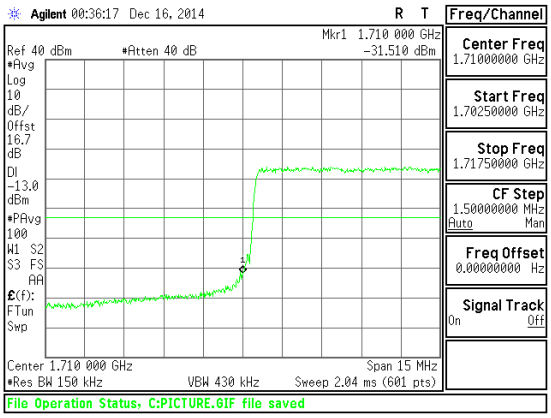
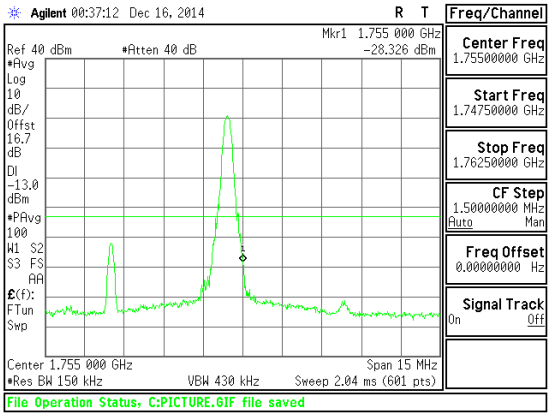
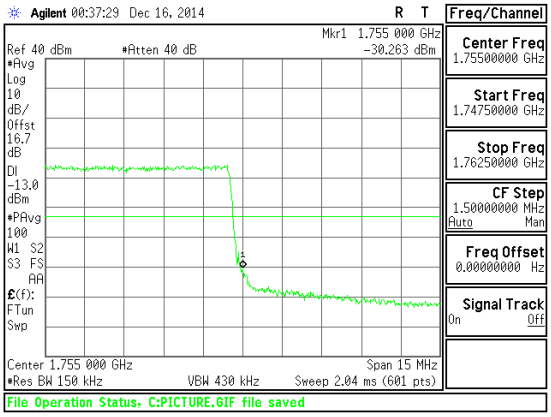
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE5 5MHz 16QAM	 Band LTE5 5MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE5 5MHz CBE 16QAM Low Channel FRB.gif
Band LTE5 5MHz 16QAM	 Band LTE5 5MHz CBE 16QAM High Channel 1RB.gif	 Band LTE5 5MHz CBE 16QAM High Channel FRB.gif

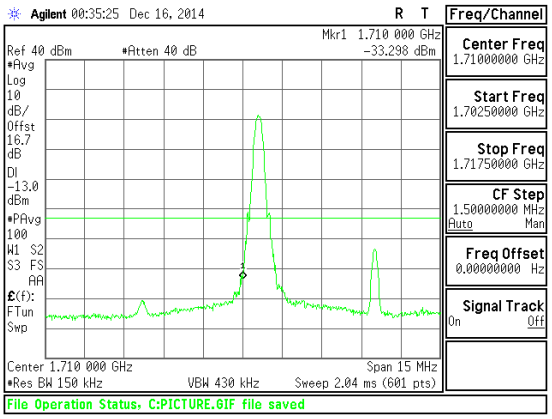
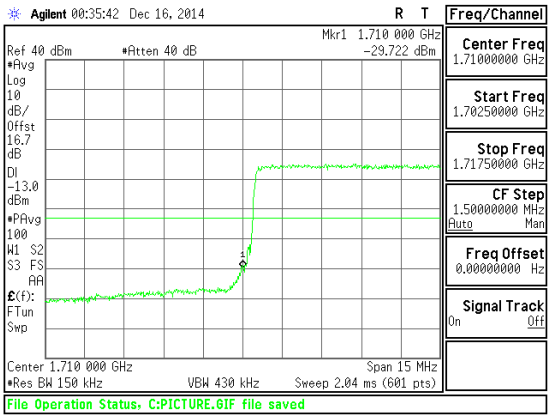
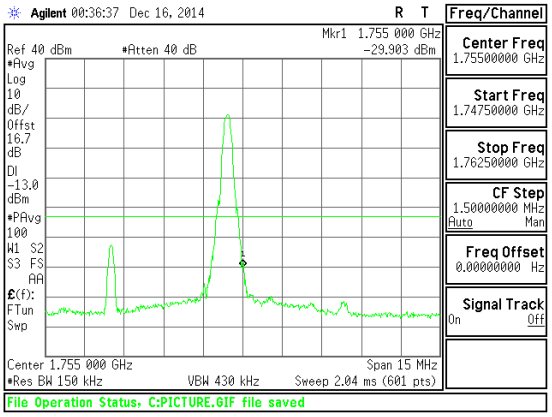
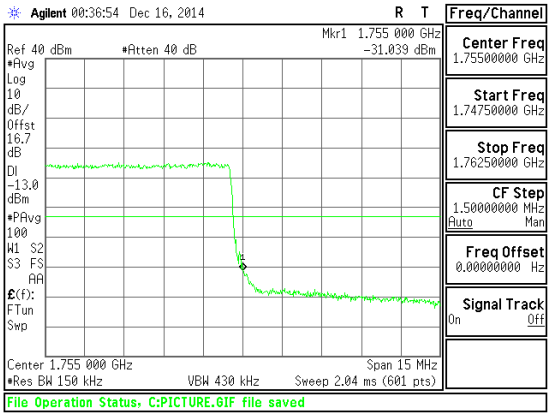
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE5 5MHz QPSK	 Band LTE5 5MHz CBE QPSK Low Channel 1RB.gif	 Band LTE5 5MHz CBE QPSK Low Channel FRB.gif
Band LTE5 5MHz QPSK	 Band LTE5 5MHz CBE QPSK High Channel 1RB.gif	 Band LTE5 5MHz CBE QPSK High Channel FRB.gif

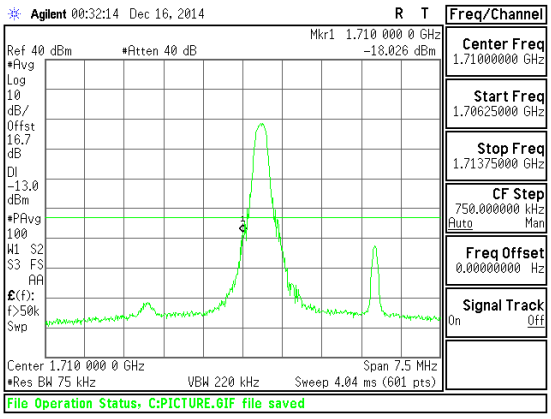
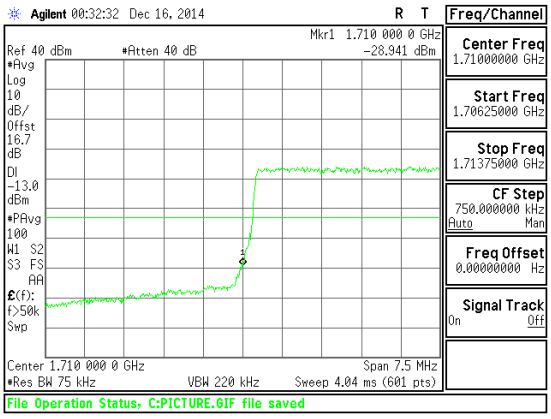
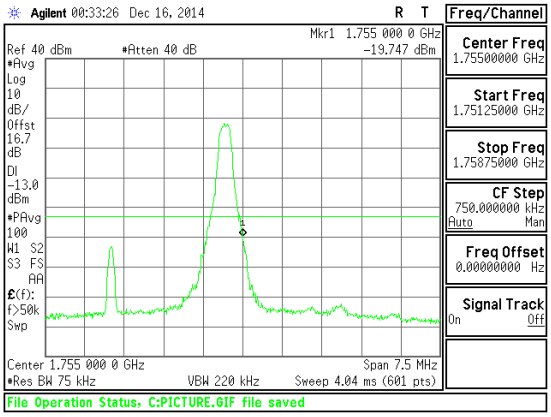
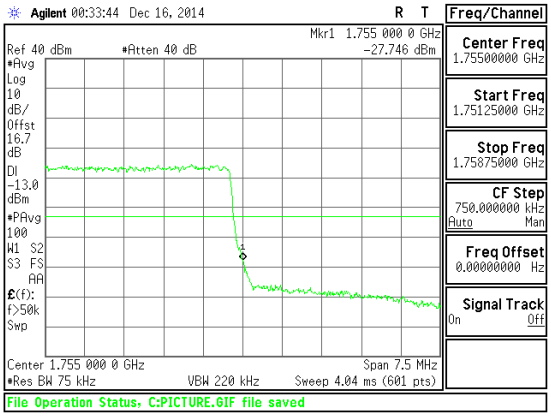
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE4 10MHz 16QAM	 Band LTE4 10MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE4 10MHz CBE 16QAM Low Channel FRB.gif
Band LTE4 10MHz 16QAM	 Band LTE4 10MHz CBE 16QAM High Channel 1RB.gif	 Band LTE4 10MHz CBE 16QAM High Channel FRB.gif

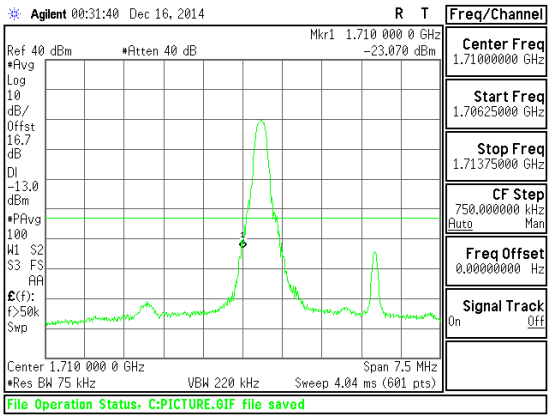
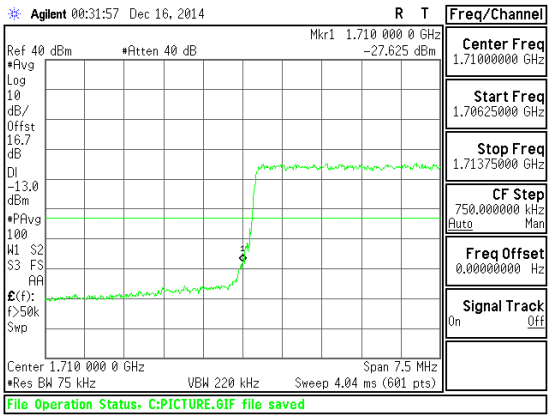
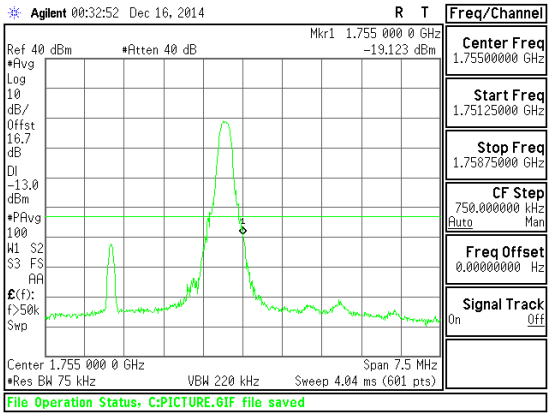
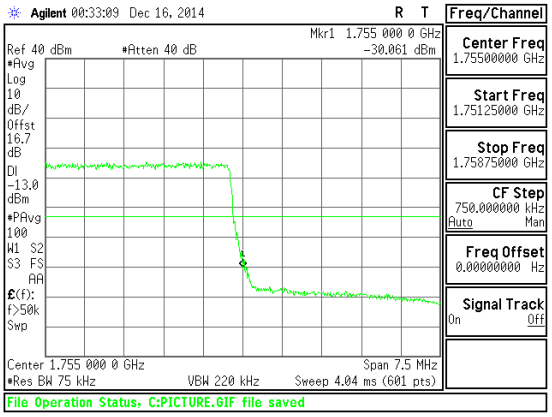
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE4 10MHz QPSK	 Band LTE4 10MHz CBE QPSK Low Channel 1RB.gif	 Band LTE4 10MHz CBE QPSK Low Channel FRB.gif
Band LTE4 10MHz QPSK	 Band LTE4 10MHz CBE QPSK High Channel 1RB.gif	 Band LTE4 10MHz CBE QPSK High Channel FRB.gif

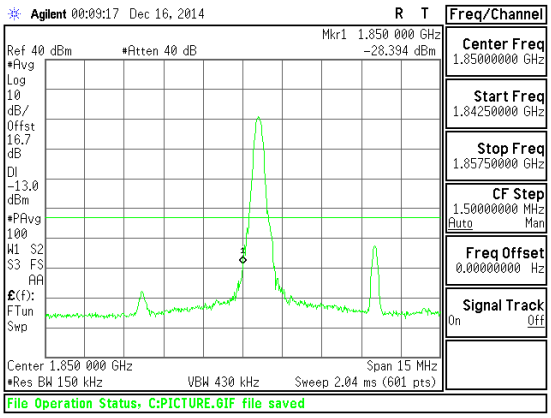
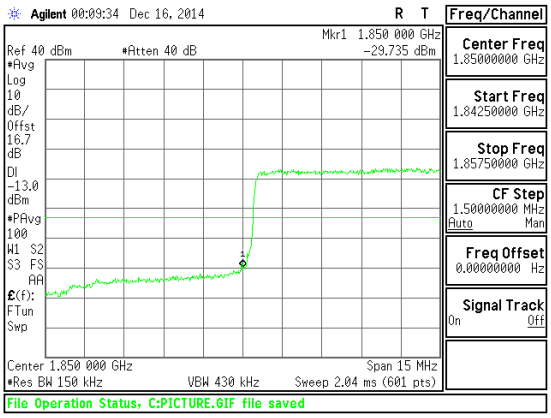
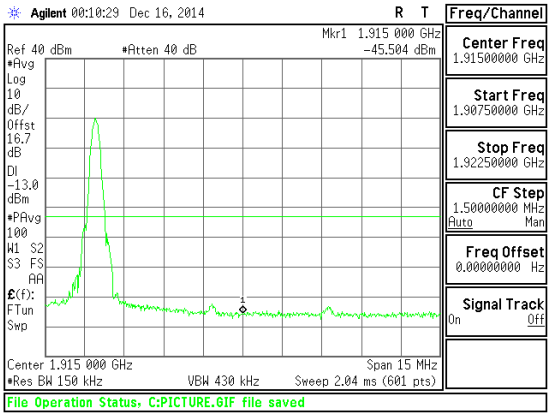
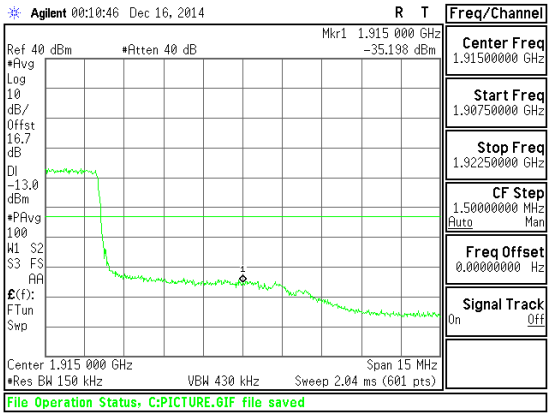
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE4 5MHz 16QAM	 Band LTE4 5MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE4 5MHz CBE 16QAM Low Channel FRB.gif
Band LTE4 5MHz 16QAM	 Band LTE4 5MHz CBE 16QAM High Channel 1RB.gif	 Band LTE4 5MHz CBE 16QAM High Channel FRB.gif

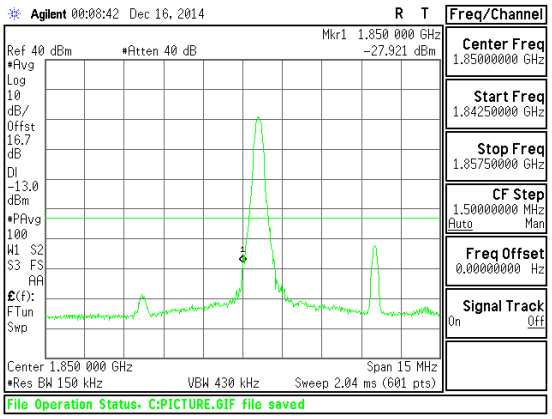
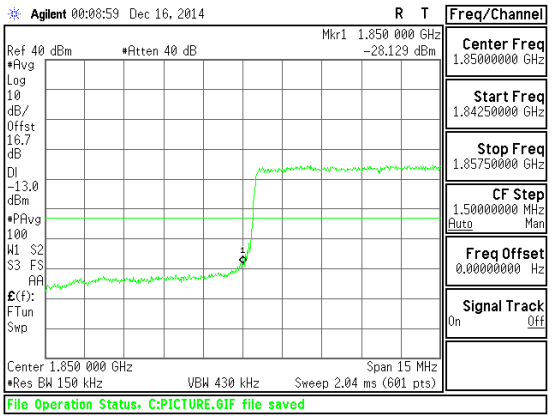
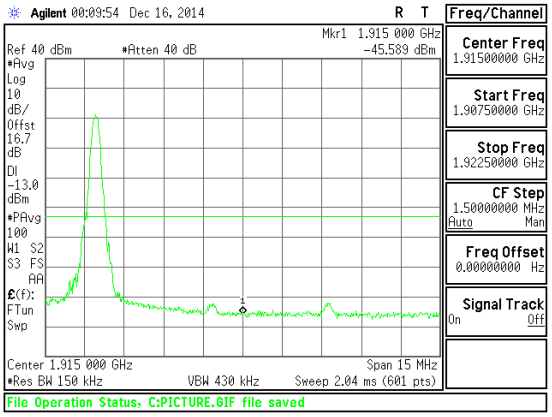
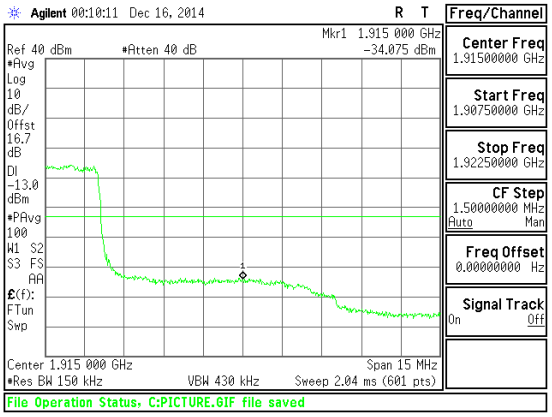
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE4 5MHz QPSK	 Band LTE4 5MHz CBE QPSK Low Channel 1RB.gif	 Band LTE4 5MHz CBE QPSK Low Channel FRB.gif
Band LTE4 5MHz QPSK	 Band LTE4 5MHz CBE QPSK High Channel 1RB.gif	 Band LTE4 5MHz CBE QPSK High Channel FRB.gif

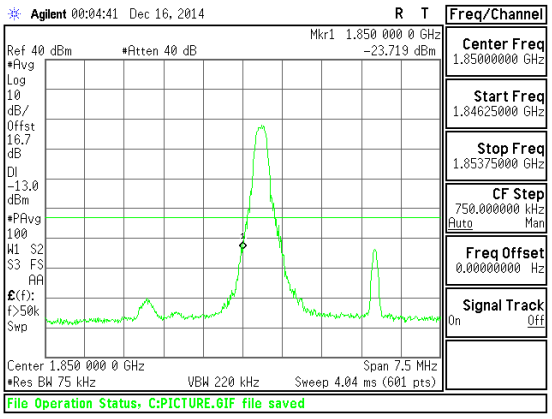
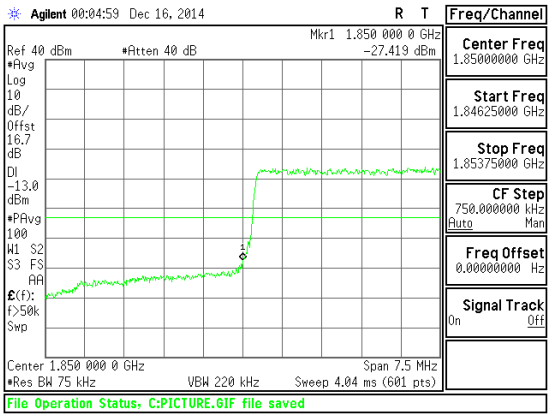
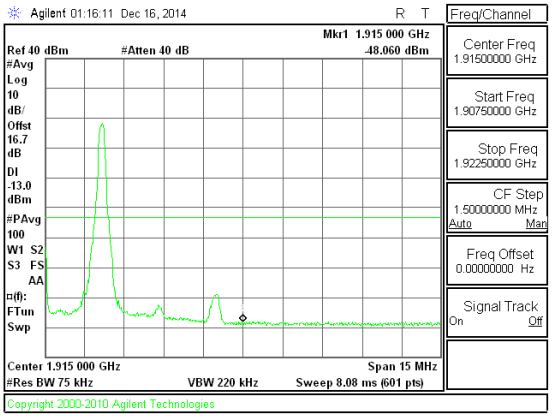
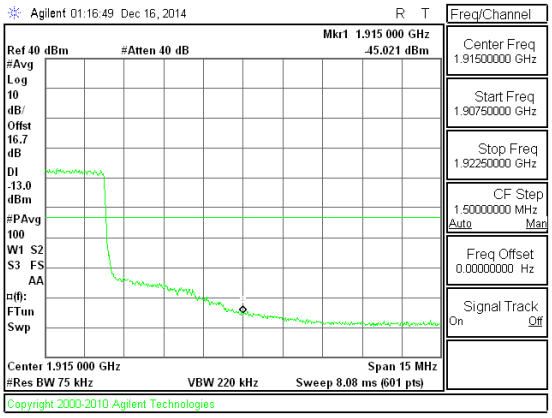
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE2 10MHz 16QAM	 Band LTE2 10MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 10MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 10MHz 16QAM	 Band LTE2 10MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 10MHz CBE 16QAM High Channel FRB.gif

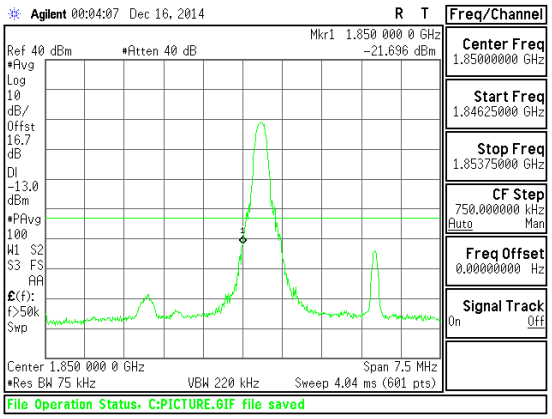
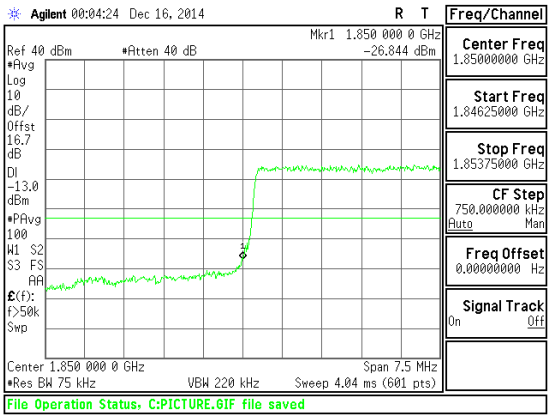
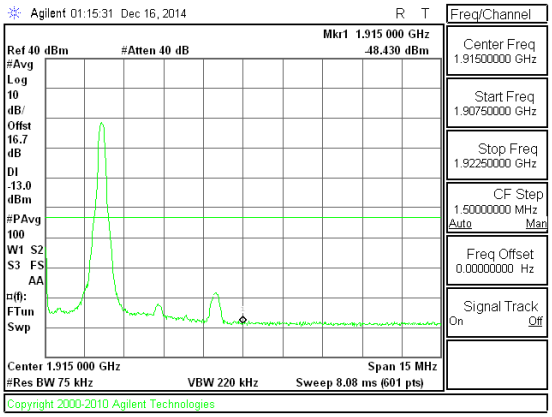
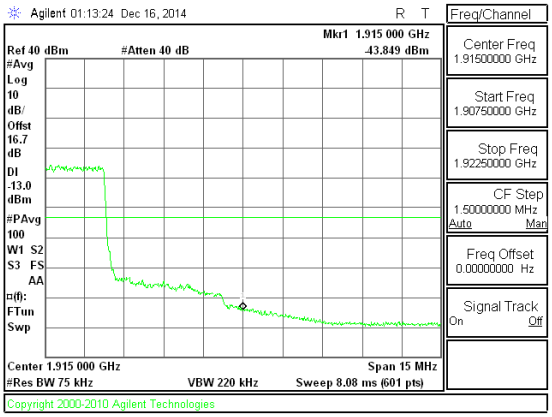
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE2 10MHz QPSK	 Band LTE2 10MHz CBE QPSK Low Channel 1RB.gif	 Band LTE2 10MHz CBE QPSK Low Channel FRB.gif
Band LTE2 10MHz QPSK	 Band LTE2 10MHz CBE QPSK High Channel 1RB.gif	 Band LTE2 10MHz CBE QPSK High Channel FRB.gif

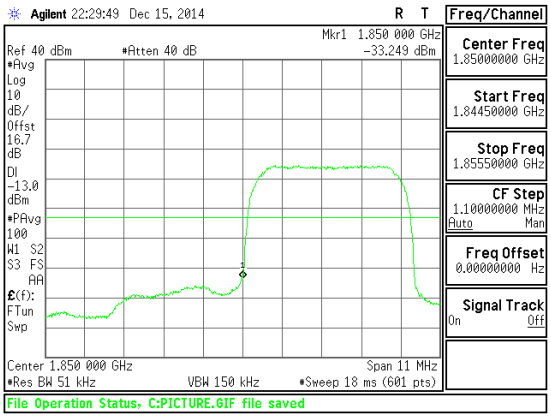
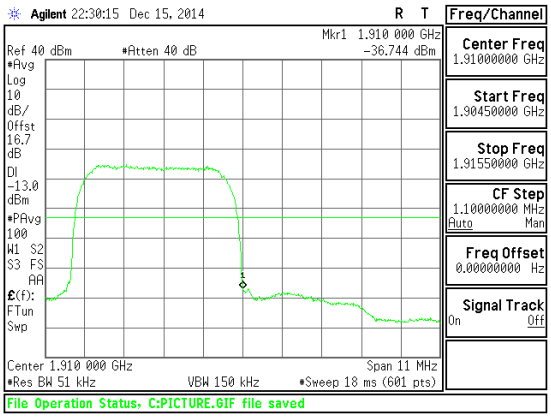
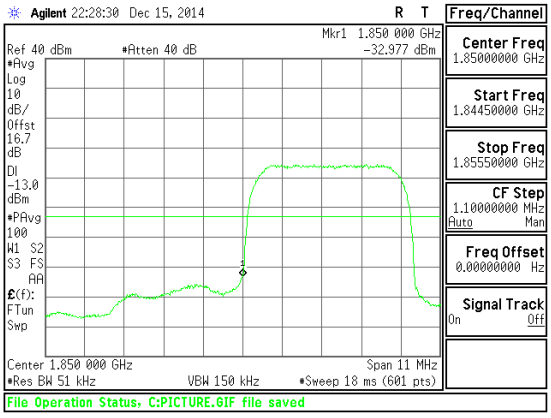
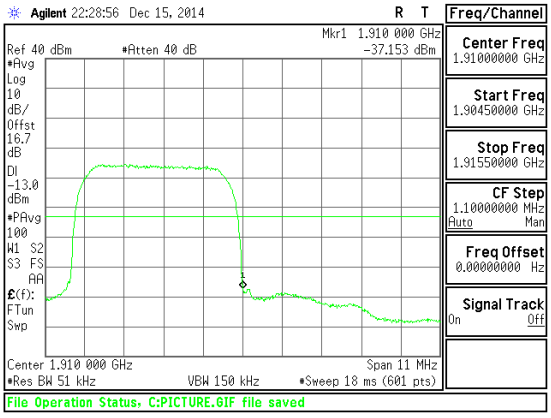
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE2 5MHz 16QAM	 Band LTE2 5MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE2 5MHz CBE 16QAM Low Channel FRB.gif
Band LTE2 5MHz 16QAM	 Band LTE2 5MHz CBE 16QAM High Channel 1RB.gif	 Band LTE2 5MHz CBE 16QAM High Channel FRB.gif

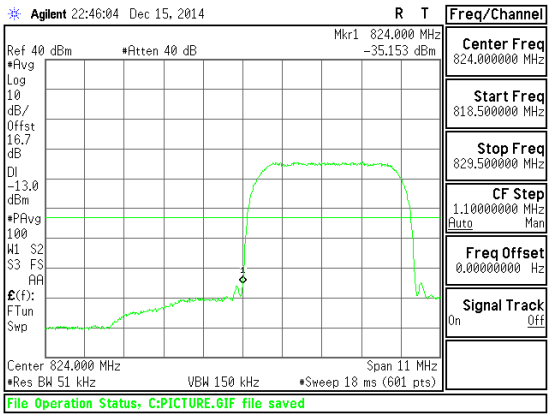
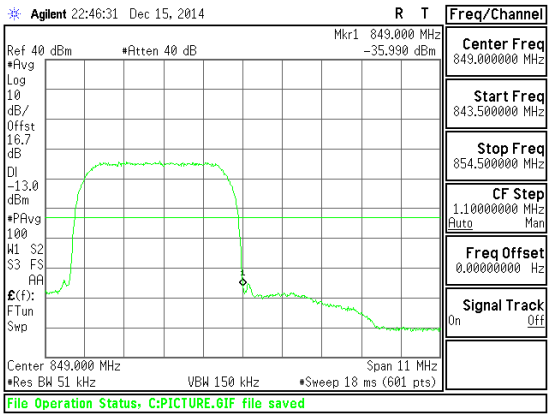
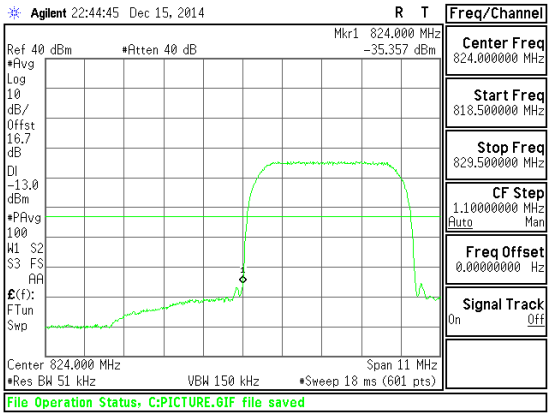
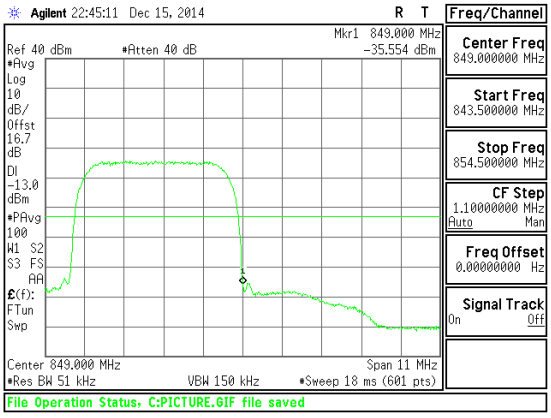
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band LTE2 5MHz QPSK	 Band LTE2 5MHz CBE QPSK Low Channel 1RB.gif	 Band LTE2 5MHz CBE QPSK Low Channel FRB.gif
Band LTE2 5MHz QPSK	 Band LTE2 5MHz CBE QPSK High Channel 1RB.gif	 Band LTE2 5MHz CBE QPSK High Channel FRB.gif

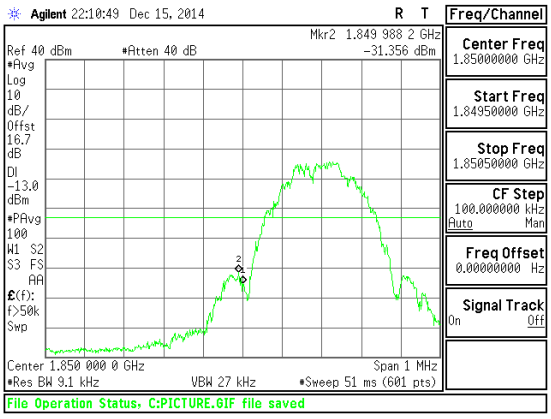
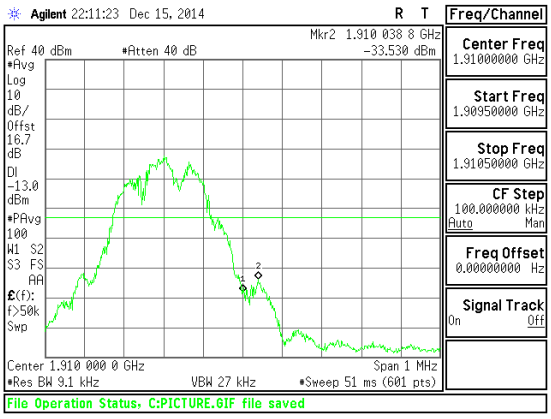
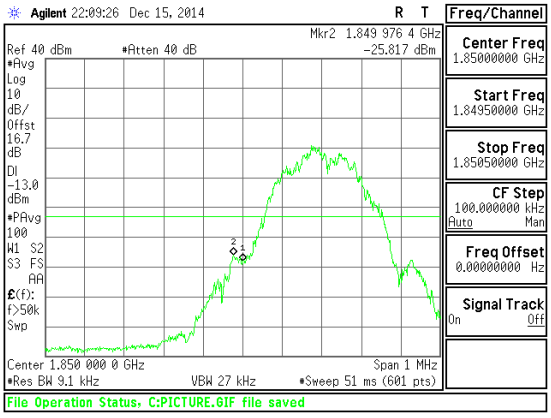
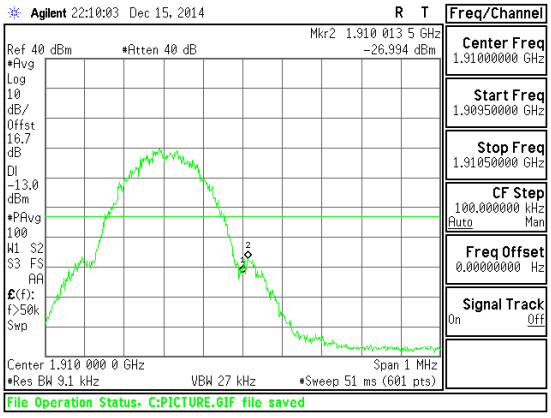
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band Band 2 HSDPA	 Band WCDMA B2 HSDPA CBE	 Band WCDMA B2 HSDPA CBE
Band Band 2 REL99	 Band WCDMA B2 REL99 CBE	 Band WCDMA B2 REL99 CBE

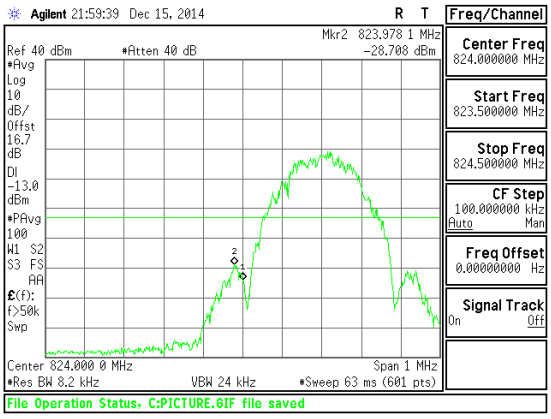
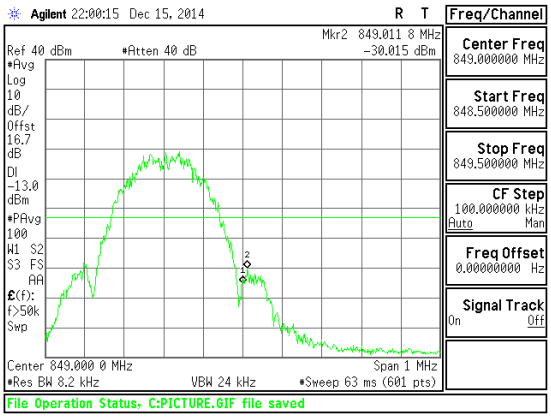
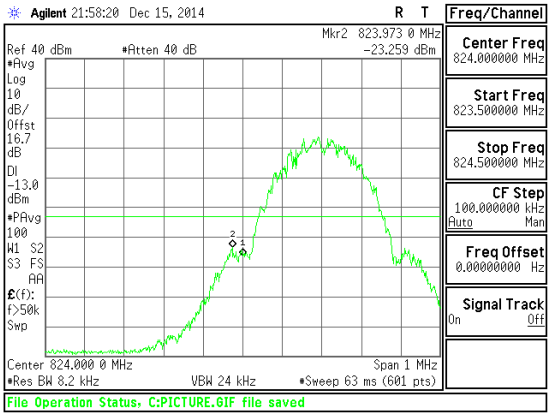
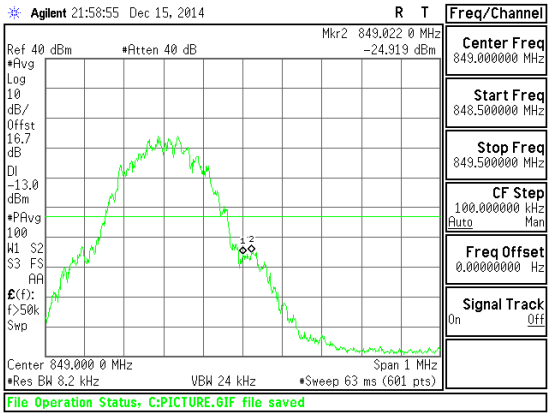
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band Band 5 HSDPA	 Band WCDMA B5 HSDPA CBE	 Band WCDMA B5 HSDPA CBE
Band Band 5 REL99	 Band WCDMA B5 REL99 CBE	 Band WCDMA B5 REL99 CBE

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

Band GSM 1900 EGPRS	 Band GSM1900 EGPRS CBE Low channel	 Band GSM1900 EGPRS CBE High channel
Band GSM1900 GPRS	 Band GSM1900 GPRS CBE Low channel	 Band GSM1900 GPRS CBE High channel

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

Band GSM 850 EGPRS	 Band GSM850 EGPRS CBE Low channel	 Band GSM850 EGPRS CBE High channel
Band GSM 850 GPRS	 Band GSM850 GPRS CBE Low channel	 Band GSM850 GPRS CBE High channel

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, and §27.53

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) For mobile station, the attenuation factor shall be not less than 43+10Log(P)dB at the channel edge and (55+10Log(P)dB) at 5.5MHz from the channel edges.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

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, and LTE

RESULTS

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE17	10	QPSK	709	-27.289	-13	-14.289
			710	-26.347	-13	-13.347
			711	-27.02	-13	-14.02
		16QAM	709	-26.769	-13	-13.769
			710	-26.992	-13	-13.992
			711	-27.271	-13	-14.271
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE17	5	QPSK	706.5	-27.078	-13	-14.078
			710	-26.909	-13	-13.909
			713.5	-26.971	-13	-13.971
		16QAM	706.5	-26.803	-13	-13.803
			710	-26.461	-13	-13.461
			713.5	-26.662	-13	-13.662

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE5	10	QPSK	829	-26.233	-13	-13.233
			836.5	-26.437	-13	-13.437
			844	-22.714	-13	-9.714
		16QAM	829	-27.054	-13	-14.054
			836.5	-25.406	-13	-12.406
			844	-27.687	-13	-14.687
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE5	5	QPSK	826.5	-26.213	-13	-13.213
			836.5	-27.162	-13	-14.162
			846.5	-26.888	-13	-13.888
		16QAM	826.5	-27.079	-13	-14.079
			836.5	-26.467	-13	-13.467
			846.5	-27.258	-13	-14.258

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	10	QPSK	1715	-30.167	-13	-17.167
			1732.5	-30.1	-13	-17.1
			1750	-30.554	-13	-17.554
		16QAM	1715	-30.943	-13	-17.943
			1732.5	-30.22	-13	-17.22
			1750	-30.229	-13	-17.229
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE4	5	QPSK	1712.5	-30.128	-13	-17.128
			1732.5	-30.082	-13	-17.082
			1752.5	-30.006	-13	-17.006
		16QAM	1712.5	-30.299	-13	-17.299
			1732.5	-30.639	-13	-17.639
			1752.5	-29.909	-13	-16.909

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	10	QPSK	1855	-30.725	-13	-17.725
			1880	-27.58	-13	-14.58
			1905	-22.778	-13	-9.778
		16QAM	1855	-30.284	-13	-17.284
			1880	-25.997	-13	-12.997
			1905	-27.456	-13	-14.456
Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE2	5	QPSK	1852.5	-30.169	-13	-17.169
			1880	-30.191	-13	-17.191
			1907.5	-30.613	-13	-17.613
		16QAM	1852.5	-30.234	-13	-17.234
			1880	-29.976	-13	-16.976
			1907.5	-30.407	-13	-17.407

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

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
GSM850	GMSK	824.2			
		836.6			
		848.8			
	GPRS	824.2	-19.338	-13	-6.338
		836.6	-19.955	-13	-6.955
		848.8	-19.304	-13	-6.304
	EGPRS	824.2	-18.944	-13	-5.944
		836.6	-19.339	-13	-6.339
		848.8	-19.456	-13	-6.456
GSM1900	GMSK	1850.2			
		1880			
		1909.8			
	GPRS	1850.2	-19.936	-13	-6.936
		1880	-19.878	-13	-6.878
		1909.8	-19.789	-13	-6.789
	EGPRS	1850.2	-19.63	-13	-6.63
		1880	-19.651	-13	-6.651
		1909.8	-18.921	-13	-5.921

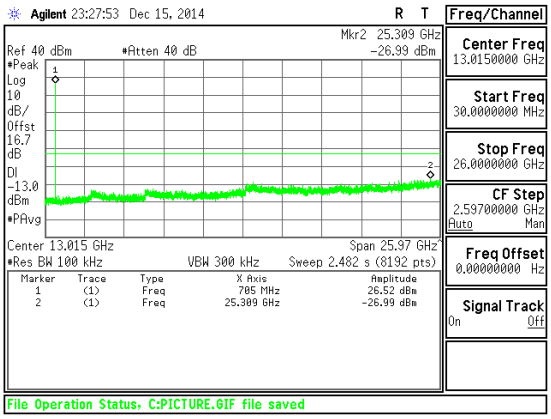
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Band	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
WCDMA Band 5	REL99	824.2	-18.67	-13	-5.67
		836.6	-19.958	-13	-6.958
		848.8	-19.664	-13	-6.664
	HSDPA	824.2	-19.573	-13	-6.573
		836.6	-19.63	-13	-6.63
		848.8	-19.285	-13	-6.285
	HSUPA	824.2			
		836.6			
		848.8			
WCDMA Band 2	REL99	1850.2	-19.18	-13	-6.18
		1880	-19.652	-13	-6.652
		1909.8	-19.427	-13	-6.427
	HSDPA	1850.2	-18.749	-13	-5.749
		1880	-18.637	-13	-5.637
		1909.8	-19.664	-13	-6.664
	HSUPA	1850.2			
		1880			
		1909.8			

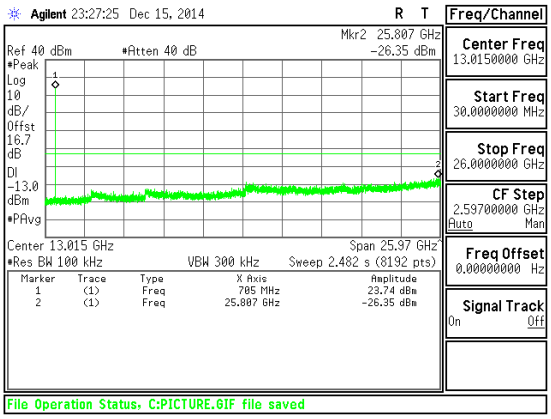
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

10.3.2. OUT OF BAND EMISSIONS PLOTS

Band LTE17 10MHz 16QAM

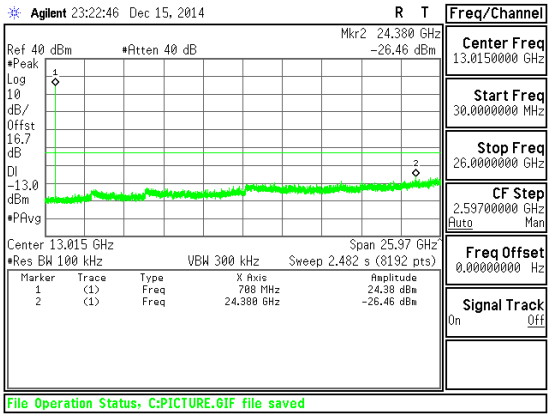


Band LTE17 10MHz CSE 16QAM Mid channel

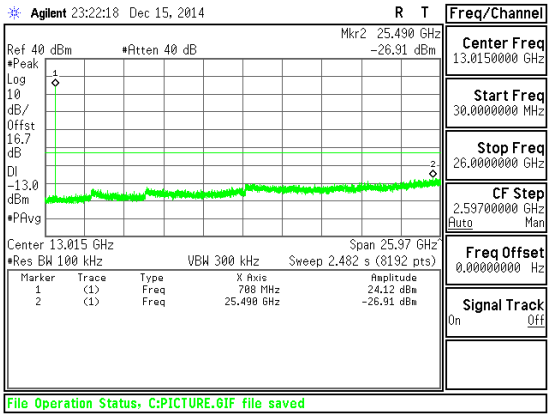


Band LTE17 10MHz CSE QPSK Mid channel

Band LTE17 5MHz 16QAM



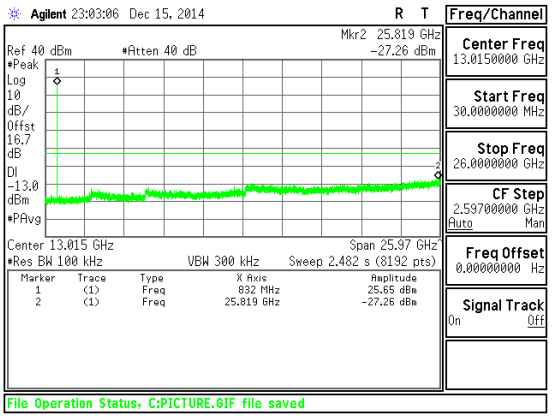
Band LTE17 5MHz CSE 16QAM Mid channel



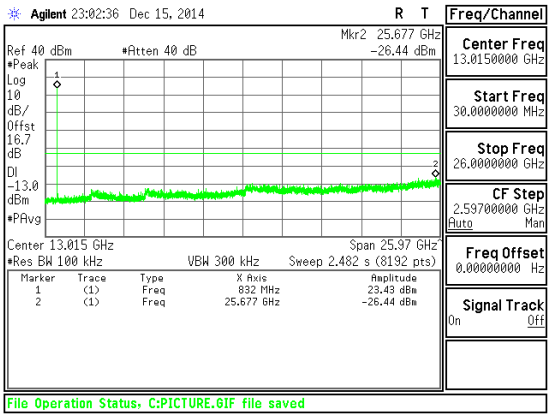
Band LTE17 5MHz CSE QPSK Mid channel

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

Band LTE5 10MHz 16QAM

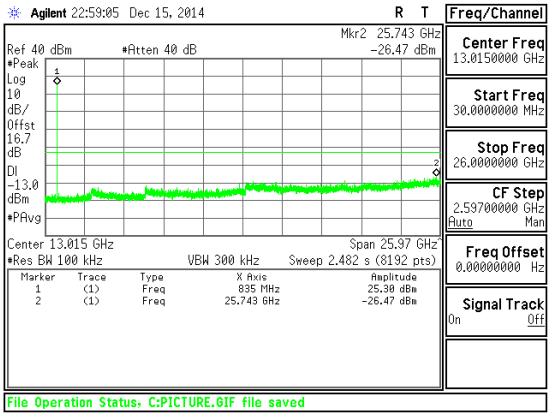


Band LTE5 10MHz CSE 16QAM Mid channel

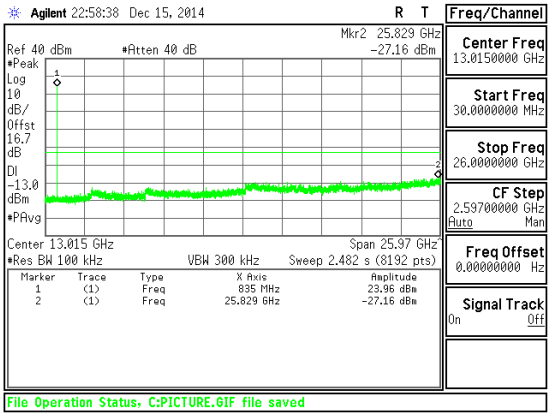


Band LTE5 10MHz CSE QPSK Mid channel

Band LTE5 5MHz 16QAM



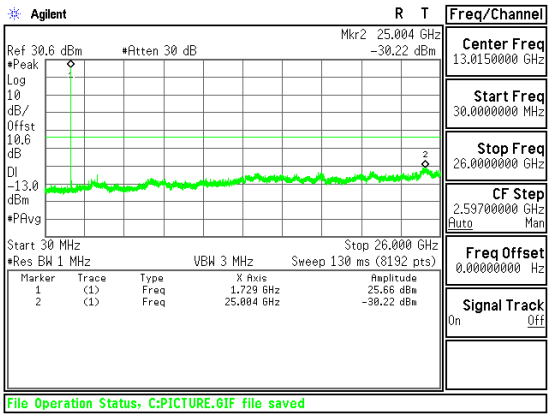
Band LTE5 5MHz CSE 16QAM Mid channel



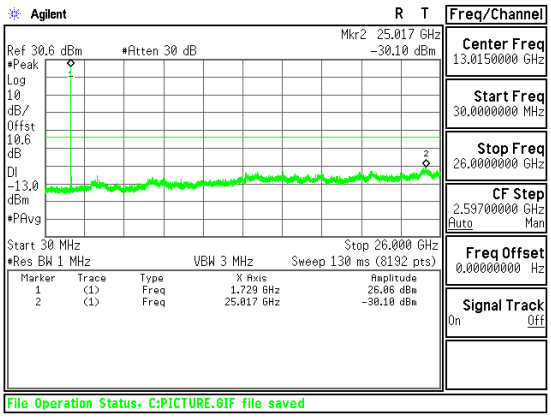
Band LTE5 5MHz CSE QPSK Mid channel

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

Band LTE4 10MHz 16QAM

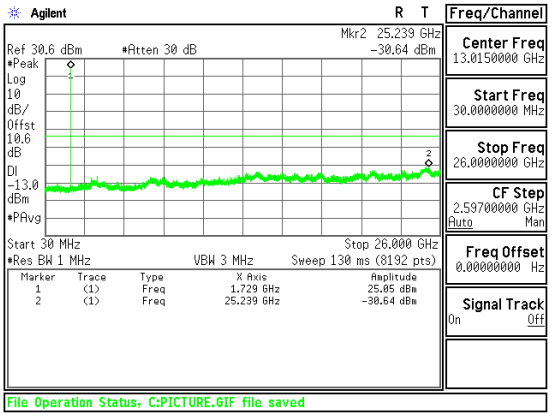


Band LTE4 10MHz CSE 16QAM Mid channel

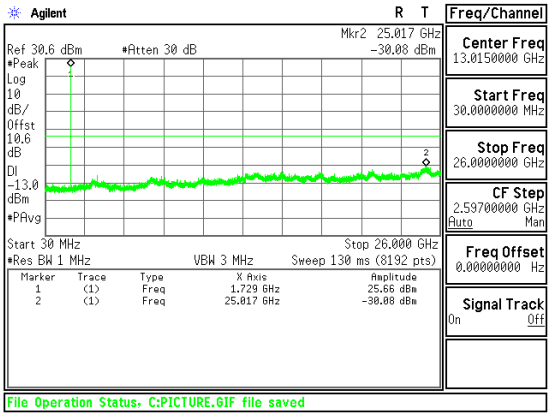


Band LTE4 10MHz CSE QPSK Mid channel

Band LTE4 5MHz 16QAM



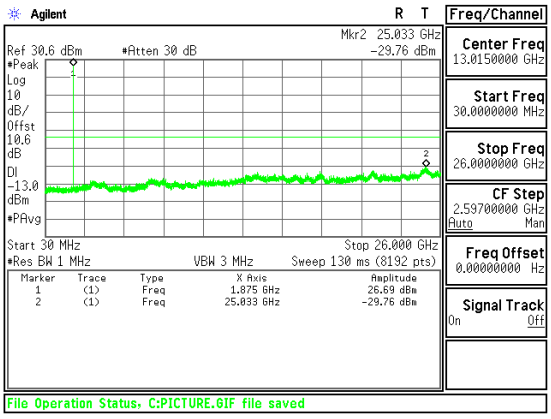
Band LTE4 5MHz CSE 16QAM Mid channel



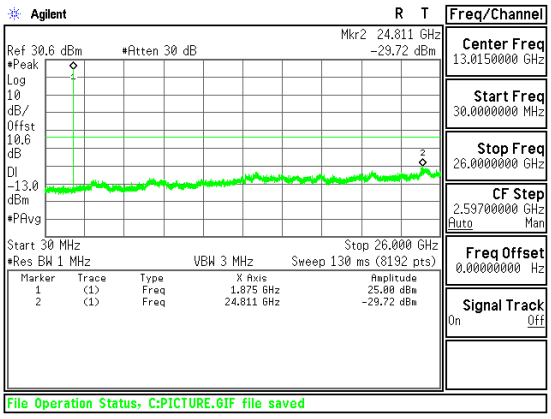
Band LTE4 5MHz CSE QPSK Mid channel

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

Band LTE2 10MHz 16QAM

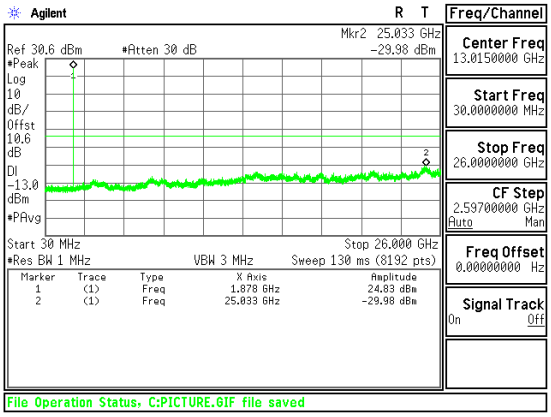


Band LTE2 10MHz CSE 16QAM Mid channel

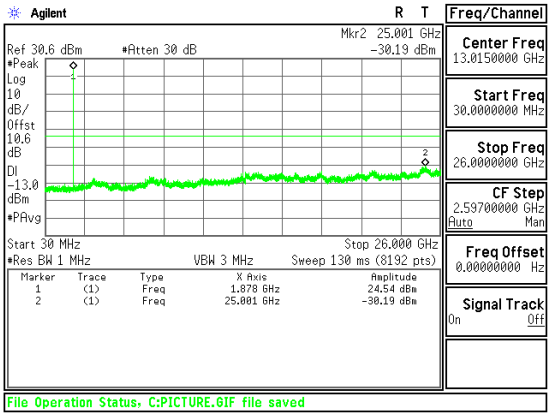


Band LTE2 10MHz CSE QPSK Mid channel

Band LTE2 5MHz 16QAM



Band LTE2 5MHz CSE 16QAM Mid channel



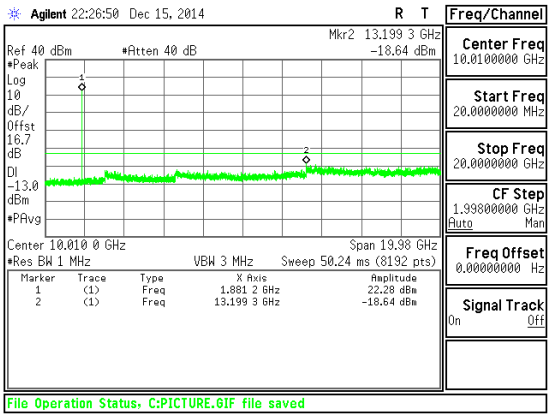
Band LTE2 5MHz CSE QPSK Mid channel

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

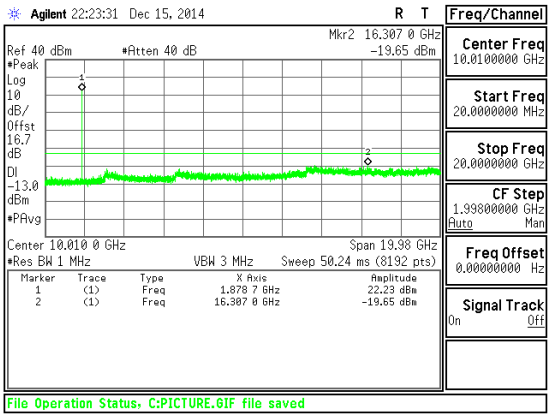
Band

Band 2

HSDPA



Band WCDMA B2 HSDPA CSE

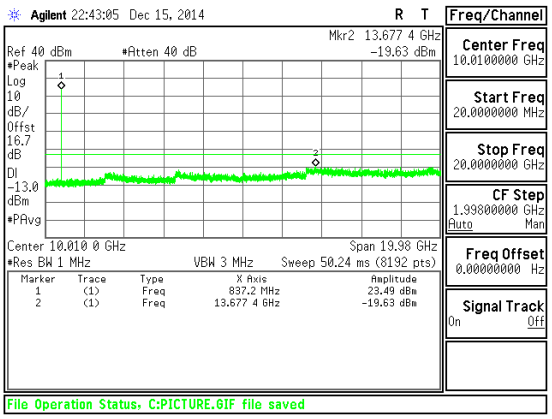


Band WCDMA B2 REL99 CSE

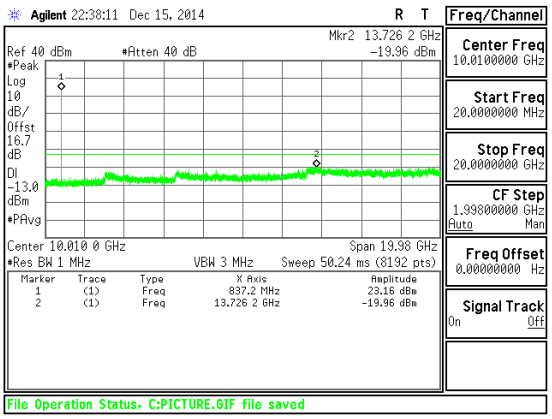
Band

Band 5

HSDPA



Band WCDMA B5 HSDPA CSE



Band WCDMA B5 REL99 CSE

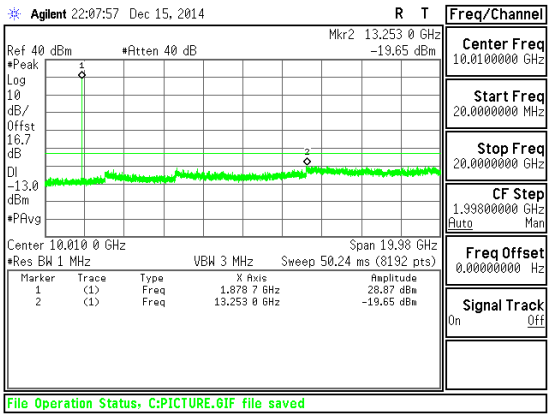
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

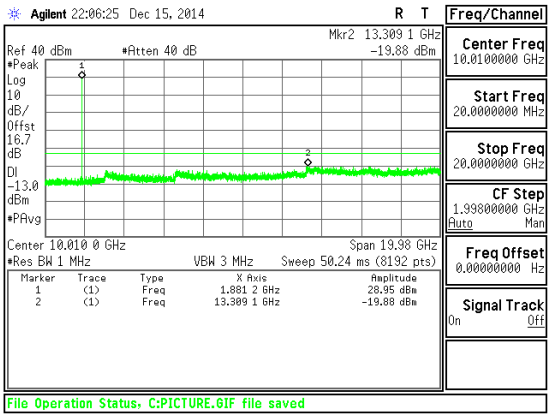
Band

GSM 1900

EGPRS



Band GSM1900 EGPRS CSE Mid channel

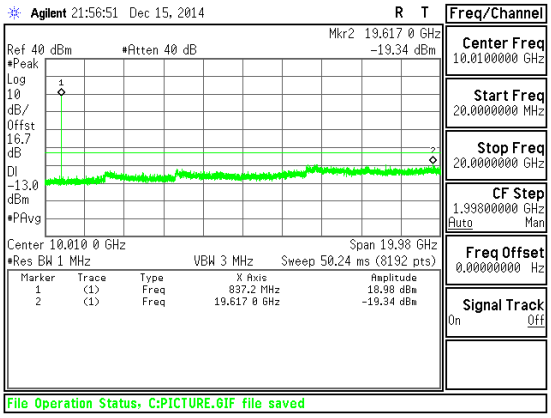


Band GSM1900 GPRS CSE Mid channel

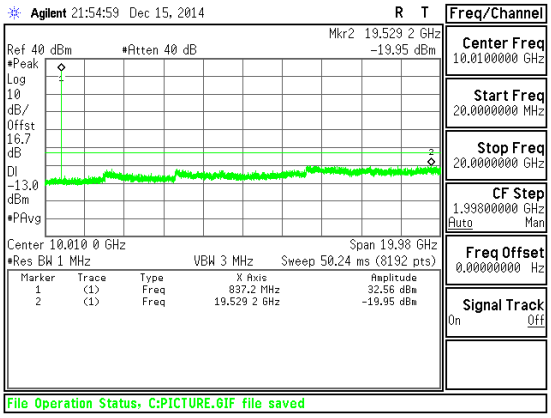
Band

GSM 850

EGPRS



Band GSM850 EGPRS CSE Mid channel



Band GSM850 GPRS CSE Mid channel

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

10.4. FREQUENCY STABILITY

RULE PART(S)

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

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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r01

MODES TESTED

GSM, WCDMA, and LTE

RESULTS

See the following pages.

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

10.4.1. FREQUENCY STABILITY RESULTS

GPRS 850 -Freq: 836.6MHz– MID CHANNEL

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	836.600015	0.006	2.5
3.80	40	836.600021	-0.001	2.5
3.80	30	836.600019	0.002	2.5
3.80	***20***	**836.600020**	**0**	***2.5***
3.80	10	836.600021	-0.001	2.5
3.80	0	836.600025	-0.006	2.5
3.80	-10	836.600016	0.006	2.5
3.80	-20	836.600021	-0.001	2.5
3.80	-30	836.600024	-0.004	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**	**836.600020**	**0**	**2.5**
4.37	20	836.6000212	*-0.001*	2.5
3.23(End of volt)	20	836.6000224	*-0.003*	2.5

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

GPRS 1900 -Freq: 1880MHz– MID CHANNEL

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	1880.000028	-0.006	2.5
3.80	40	1880.000018	0.000	2.5
3.80	30	1880.000033	-0.008	2.5
3.80	***20***	**1880.000017**	**0**	***2.5***
3.80	10	1880.000034	-0.009	2.5
3.80	0	1880.000035	-0.010	2.5
3.80	-10	1880.000023	-0.003	2.5
3.80	-20	1880.000024	-0.004	2.5
3.80	-30	1880.000017	0.000	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**	**1880.000017**	**0**	**2.5**
4.37	20	1880.000023	*-0.004*	2.5
3.23(End of volt)	20	1880.00002	*-0.002*	2.5

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

LTE BAND 4 – MID CHANNEL

Reference Frequency: PCS Mid Channel 1732.500004MHz @ 20ºC Limit: within the authorized block or +- 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	1732.500003	0.001	2.5
3.80	40	1732.500005	-0.001	2.5
3.80	30	1732.500003	0.001	2.5
3.80	***20***	***1732.500004***	***0***	***2.5***
3.80	10	1732.500004	0.000	2.5
3.80	0	1732.500005	-0.001	2.5
3.80	-10	1732.500003	0.001	2.5
3.80	-20	1732.500006	-0.001	2.5
3.80	-30	1732.500002	0.001	2.5

Reference Frequency: PCS Mid Channel 1732.500004 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4331.250 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse	Delta (ppm)	Limit (ppm)
3.80	***20***	***1732.500004***	***0.00000***	***2.5***
4.37	20	1732.500002	*0.00115*	2.5
3.23	20	1732.500005	*-0.00058*	2.5

LTE Band 17 MID CHANNEL

Reference Frequency: PCS Mid Channel 709.999995 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 1775.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse (MHz)	Delta (ppm)	Limit (ppm)
3.80	50	709.999994	0.001	2.5
3.80	40	709.999997	-0.003	2.5
3.80	30	709.999996	-0.001	2.5
3.80	***20***	***709.999995***	***0***	***2.5***
3.80	10	709.999994	0.001	2.5
3.80	0	709.999996	-0.001	2.5
3.80	-10	709.999994	0.001	2.5
3.80	-20	710.000002	-0.010	2.5
3.80	-30	710.000003	-0.011	2.5

Reference Frequency: PCS Mid Channel 709.999995 MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 1775.000 Hz				
Power Supply (Vdc)	Environment Temperature (*C)	Frequency Deviation Measureed with Time Elapse	Delta (ppm)	Limit (ppm)
3.80	***20***	***709.999995***	***0.00000***	***2.5***
4.37	20	709.999994	*0.00141*	2.5
3.23	20	709.999993	*0.00282*	2.5

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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. RADIATED TEST RESULTS

11.1. 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 v02r01
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, and LTE

TEST RESULTS

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

11.1.1. ERP/EIRP Results

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 2	REL99	9262	1852.4	23.3	213.80
		9400	1880	24.33	271.02
		9538	1907.6	23.5	223.87
	HSDPA	9262	1852.4	22.82	191.43
		9400	1880	23.06	202.30
		9538	1907.6	22.8	190.55
	HSUPA	9262	1852.4		
		9400	1880		
		9538	1907.6		

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
Band 5	REL99	4132	826.4	18.561	71.8
		4183	836.6	18.311	67.78
		4233	846.6	17.961	62.53
	HSDPA	4132	826.4	17.581	57.29
		4183	836.6	17.431	55.35
		4233	846.6	17.121	51.53
	HSUPA	4132	826.4		
		4183	836.6		
		4233	846.6		

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

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM1900	GMSK	512	1850.2		
		661	1880		
		810	1909.8		
	GPRS	512	1850.2	29.89	974.99
		661	1880	29.98	995.41
		810	1909.8	29.3	851.14
	EGPRS	512	1850.2	26.46	442.59
		661	1880	25.46	351.56
		810	1909.8	26.24	420.73

Band	Mode	Channel	f(MHz)	ERP / EIRP	
				dBm	mW
GSM850	GMSK	128	824.2		
		190	836.6		
		251	848.8		
	GPRS	128	824.2	27.27	533.33
		190	836.6	27.431	553.48
		251	848.8	27.66	583.45
	EGPRS	128	824.2	23.36	216.77
		190	836.6	22.491	177.46
		251	848.8	23.49	223.36

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

11.1.2. LTE ERP/EIRP Results

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE17	10	QPSK	1/0	709	18.271	67.16
			1/0	710	18.531	71.3
			1/0	711	19.171	82.62
		16QAM	1/0	709	17.051	50.71
			1/0	710	17.321	53.96
			1/0	711	18.141	65.18

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE17	5	QPSK	1/0	706.5	18.061	63.99
			1/0	710	18.281	67.31
			1/0	713.5	18.701	74.15
		16QAM	1/0	706.5	16.891	48.88
			1/0	710	17.331	54.09
			1/0	713.5	17.431	55.35

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE5	10	QPSK	1/0	829	18.851	76.75
			1/0	836.5	19.481	88.74
			1/0	844	19.161	82.43
		16QAM	1/0	829	18.231	66.54
			1/0	836.5	18.521	71.14
			1/0	844	18.291	67.47

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)	ERP / EIRP	
					dBm	mW
LTE5	5	QPSK	1/0	826.5	18.091	64.43
			1/0	836.5	19.421	87.52
			1/0	846.5	19.141	82.05
		16QAM	1/0	826.5	17.351	54.34
			1/0	836.5	18.531	71.3
			1/0	846.5	18.151	65.33

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	10	QPSK	1/0	1715	18.16	65.46
			1/0	1732.5	18.61	72.61
			1/0	1750	18.56	71.78
		16QAM	1/0	1715	17.09	51.17
			1/0	1732.5	17.76	59.7
			1/0	1750	17.94	62.23

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE4	5	QPSK	1/0	1712.5	18.87	77.09
			1/0	1732.5	19.37	86.5
			1/0	1752.5	19.17	82.6
		16QAM	1/0	1712.5	17.98	62.81
			1/0	1732.5	18.31	67.76
			1/0	1752.5	18.01	63.24

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)	ERP / EIRP	
					dBm	mW
LTE2	10	QPSK	1/0	1855	23.36	216.77
			1/0	1880	23.1	204.17
			1/0	1905	23.27	212.32
		16QAM	1/0	1855	22.47	176.6
			1/0	1880	22.04	159.96
			1/0	1905	22.14	163.68

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP / EIRP	
					dBm	mW
LTE2	5	QPSK	1/0	1852.5	22.98	198.61
			1/0	1880	23.48	222.84
			1/0	1907.5	23.3	213.8
		16QAM	1/0	1852.5	22.25	167.88
			1/0	1880	22.47	176.6
			1/0	1907.5	22.33	171

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

11.1.3. ERP/EIRP PLOTS

Band

LTE17

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B17 10MHz 16QAM

Test Equipment:
Receiving: Sunol T185, and 3m Chamber N-type Cable (Setup this one for testing EUT)
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)	Margin (dB)	Notes
Low Ch								
709.00	7.78	V	0.6	0.0	7.18	34.8	-27.6	
709.00	17.65	H	0.6	0.0	17.05	34.8	-17.7	
Mid Ch								
710.00	7.95	V	0.6	0.0	7.35	34.8	-27.4	
710.00	17.92	H	0.6	0.0	17.32	34.8	-17.4	
High Ch								
711.00	8.10	V	0.6	0.0	7.50	34.8	-27.3	
711.00	18.74	H	0.6	0.0	18.14	34.8	-16.6	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B17 10MHz QPSK

Test Equipment:
Receiving: Sunol T185, and 3m Chamber N-type Cable (Setup this one for testing EUT)
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)	Margin (dB)	Notes
Low Ch								
709.00	9.82	V	0.6	0.0	9.22	34.8	-25.5	
709.00	18.87	H	0.6	0.0	18.27	34.8	-16.5	
Mid Ch								
710.00	9.87	V	0.6	0.0	9.27	34.8	-25.5	
710.00	19.13	H	0.6	0.0	18.53	34.8	-16.2	
High Ch								
711.00	9.95	V	0.6	0.0	9.35	34.8	-25.4	
711.00	19.77	H	0.6	0.0	19.17	34.8	-15.6	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B17 5MHz 16QAM

Test Equipment:
Receiving: Sunol T185, and 3m Chamber N-type Cable (Setup this one for testing EUT)
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)	Margin (dB)	Notes
Low Ch								
706.50	11.08	V	0.6	0.0	10.48	34.8	-24.3	
706.50	17.49	H	0.6	0.0	16.89	34.8	-17.9	
Mid Ch								
710.00	10.64	V	0.6	0.0	10.04	34.8	-24.7	
710.00	17.93	H	0.6	0.0	17.33	34.8	-17.4	
High Ch								
713.50	10.83	V	0.6	0.0	10.23	34.8	-24.5	
713.50	18.03	H	0.6	0.0	17.43	34.8	-17.3	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B17 5MHz 16QAM

Test Equipment:
Receiving: Sunol T185, and 3m Chamber N-type Cable (Setup this one for testing EUT)
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)	Margin (dB)	Notes
Low Ch								
706.50	12.03	V	0.6	0.0	11.43	34.8	-23.3	
706.50	18.66	H	0.6	0.0	18.06	34.8	-16.7	
Mid Ch								
710.00	11.61	V	0.6	0.0	11.01	34.8	-23.8	
710.00	18.88	H	0.6	0.0	18.28	34.8	-16.5	
High Ch								
713.50	11.83	V	0.6	0.0	11.23	34.8	-23.5	
713.50	19.30	H	0.6	0.0	18.70	34.8	-16.1	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: LG Electronics
Project #: 14I19589
Date: 12/12/14
Test Engineer: L. Lara
Configuration: EUT only Y-pos
Mode: LTE5 10MHz 16QAM

Test Equipment:
Receiving: Sunol T243, and 5m Chamber B N-type 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								
829.00	14.13	V	0.9	0.0	13.23	38.5	-25.2	
829.00	19.13	H	0.9	0.0	18.23	38.5	-20.2	
Mid Ch								
836.50	14.12	V	0.9	0.0	13.22	38.5	-25.2	
836.50	19.42	H	0.9	0.0	18.52	38.5	-19.9	
High Ch								
844.00	13.59	V	0.9	0.0	12.69	38.5	-25.8	
844.00	19.19	H	0.9	0.0	18.29	38.5	-20.2	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: LG Electronics
Project #: 14I19589
Date: 12/12/14
Test Engineer: L. Lara
Configuration: EUT only Y-pos
Mode: LTE5 10MHz QPSK

Test Equipment:
Receiving: Sunol T243, and 5m Chamber B N-type 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								
829.00	14.67	V	0.9	0.0	13.77	38.5	-24.7	
829.00	19.75	H	0.9	0.0	18.85	38.5	-19.6	
Mid Ch								
836.50	15.00	V	0.9	0.0	14.10	38.5	-24.3	
836.50	20.38	H	0.9	0.0	19.48	38.5	-19.0	
High Ch								
844.00	14.38	V	0.9	0.0	13.48	38.5	-25.0	
844.00	20.06	H	0.9	0.0	19.16	38.5	-19.3	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: LG Electronics
Project #: 14I19589
Date: 12/12/14
Test Engineer: L. Lara
Configuration: EUT only Y-pos
Mode: LTE5 5MHz 16QAM

Test Equipment:
Receiving: Sunol T243, and 5m Chamber B N-type 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								
826.50	12.83	V	0.9	0.0	11.93	38.5	-26.5	
826.50	18.25	H	0.9	0.0	17.35	38.5	-21.1	
Mid Ch								
836.50	13.71	V	0.9	0.0	12.81	38.5	-25.6	
836.50	19.43	H	0.9	0.0	18.53	38.5	-19.9	
High Ch								
846.50	13.03	V	0.9	0.0	12.13	38.5	-26.3	
846.50	19.05	H	0.9	0.0	18.15	38.5	-20.3	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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. Chamber B

Company: LG Electronics
Project #: 14I19589
Date: 12/12/14
Test Engineer: L. Lara
Configuration: EUT only Y-pos
Mode: LTE5 5MHz QPSK

Test Equipment:
Receiving: Sunol T243, and 5m Chamber B N-type 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								
826.50	13.56	V	0.9	0.0	12.66	38.5	-25.8	
826.50	18.99	H	0.9	0.0	18.09	38.5	-20.4	
Mid Ch								
836.50	14.59	V	0.9	0.0	13.69	38.5	-24.8	
836.50	20.32	H	0.9	0.0	19.42	38.5	-19.0	
High Ch								
846.50	14.01	V	0.9	0.0	13.11	38.5	-25.3	
846.50	20.04	H	0.9	0.0	19.14	38.5	-19.3	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\23\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B4 5MHz 16QAM

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T962 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1715.00	8.22	V	0.8	8.6	16.02	33.0	-17.0	
1715.00	9.29	H	0.8	8.6	17.09	33.0	-15.9	
Mid Ch								
1732.50	7.97	V	0.9	8.7	15.82	33.0	-17.2	
1732.50	9.91	H	0.9	8.7	17.76	33.0	-15.2	
High Ch								
1750.00	9.00	V	0.9	8.8	16.90	33.0	-16.1	
1750.00	10.04	H	0.9	8.8	17.94	33.0	-15.1	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\23\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B4 5MHz QPSK

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T962 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1715.00	9.52	V	0.8	8.6	17.32	33.0	-15.7	
1715.00	10.36	H	0.8	8.6	18.16	33.0	-14.8	
Mid Ch								
1732.50	8.81	V	0.9	8.7	16.66	33.0	-16.3	
1732.50	10.76	H	0.9	8.7	18.61	33.0	-14.4	
High Ch								
1750.00	10.02	V	0.9	8.8	17.92	33.0	-15.1	
1750.00	10.66	H	0.9	8.8	18.56	33.0	-14.4	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B4 5MHz 16QAM

Band

LTE4

5MHz

16QAM

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T962 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.50	9.05	V	0.8	8.6	16.85	33.0	-16.2	
1712.50	10.18	H	0.8	8.6	17.98	33.0	-15.0	
Mid Ch								
1732.50	9.40	V	0.9	8.7	17.25	33.0	-15.8	
1732.50	10.46	H	0.9	8.7	18.31	33.0	-14.7	
High Ch								
1752.50	9.21	V	0.9	8.8	17.11	33.0	-15.9	
1752.50	10.11	H	0.9	8.8	18.01	33.0	-15.0	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

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. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B4 5MHz QPSK

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T962 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1712.50	9.97	V	0.8	8.6	17.77	30.0	-12.2	
1712.50	11.07	H	0.8	8.6	18.87	30.0	-11.1	
Mid Ch								
1732.50	10.80	V	0.9	8.7	18.65	30.0	-11.4	
1732.50	11.52	H	0.9	8.7	19.37	30.0	-10.6	
High Ch								
1752.50	10.07	V	0.9	8.8	17.97	30.0	-12.0	
1752.50	11.27	H	0.9	8.8	19.17	30.0	-10.8	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B2 10MHz 16QAM

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1855.00	13.72	V	0.8	7.9	20.82	33.0	-12.2	
1855.00	15.37	H	0.8	7.9	22.47	33.0	-10.5	
Mid Ch								
1880.00	14.22	V	0.9	7.9	21.27	33.0	-11.7	
1880.00	14.99	H	0.9	7.9	22.04	33.0	-11.0	
High Ch								
1905.00	13.38	V	0.9	7.9	20.38	33.0	-12.6	
1905.00	15.14	H	0.9	7.9	22.14	33.0	-10.9	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B2 10MHz QPSK

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1855.00	14.69	V	0.8	7.9	21.79	33.0	-11.2	
1855.00	16.26	H	0.8	7.9	23.36	33.0	-9.6	
Mid Ch								
1880.00	15.26	V	0.9	7.9	22.31	33.0	-10.7	
1880.00	16.05	H	0.9	7.9	23.10	33.0	-9.9	
High Ch								
1905.00	14.42	V	0.9	7.9	21.42	33.0	-11.6	
1905.00	16.27	H	0.9	7.9	23.27	33.0	-9.7	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B2 5MHz QPSK

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.50	13.75	V	0.8	7.9	20.85	33.0	-12.2	
1852.50	15.15	H	0.8	7.9	22.25	33.0	-10.8	
Mid Ch								
1880.00	14.56	V	0.9	7.9	21.61	33.0	-11.4	
1880.00	15.42	H	0.9	7.9	22.47	33.0	-10.5	
High Ch								
1907.50	13.86	V	0.9	7.9	20.86	33.0	-12.1	
1907.50	15.33	H	0.9	7.9	22.33	33.0	-10.7	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: LTE B2 5MHz QPSK

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.50	14.99	V	0.8	7.9	22.09	33.0	-10.9	
1852.50	15.88	H	0.8	7.9	22.98	33.0	-10.0	
Mid Ch								
1880.00	15.56	V	0.9	7.9	22.61	33.0	-10.4	
1880.00	16.43	H	0.9	7.9	23.48	33.0	-9.5	
High Ch								
1907.50	14.92	V	0.9	7.9	21.92	33.0	-11.1	
1907.50	16.30	H	0.9	7.9	23.30	33.0	-9.7	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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 2

HSDPA

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: WCDMA B2 HSDPA

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.50	14.53	V	0.8	7.9	21.63	33.0	-11.4	
1852.50	15.72	H	0.8	7.9	22.82	33.0	-10.2	
Mid Ch								
1880.00	14.95	V	0.9	7.9	22.00	33.0	-11.0	
1880.00	16.01	H	0.9	7.9	23.06	33.0	-9.9	
High Ch								
1907.50	13.73	V	0.9	7.9	20.73	33.0	-12.3	
1907.50	15.80	H	0.9	7.9	22.80	33.0	-10.2	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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 2

REL99

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: Lions
Project #: 14I19589
Date: 12\22\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: WCDMA REL99 B2

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T217 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1852.50	15.31	V	0.8	7.9	22.41	33.0	-10.6	
1852.50	16.20	H	0.8	7.9	23.30	33.0	-9.7	
Mid Ch								
1880.00	15.51	V	0.9	7.9	22.56	33.0	-10.4	
1880.00	17.28	H	0.9	7.9	24.33	33.0	-8.7	
High Ch								
1907.50	13.65	V	0.9	7.9	20.65	33.0	-12.4	
1907.50	16.50	H	0.9	7.9	23.50	33.0	-9.5	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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. Chamber B

Company: Lions
Project #: 14I19589
Date: 12\23\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: WCDMA B5 HSDPA

Test Equipment:
Receiving: Sunol T243, and 5m Chamber B N-type 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								
826.40	11.13	V	0.9	0.0	10.23	38.5	-28.2	
826.40	18.48	H	0.9	0.0	17.58	38.5	-20.9	
Mid Ch								
836.60	12.73	V	0.9	0.0	11.83	38.5	-26.6	
836.60	18.33	H	0.9	0.0	17.43	38.5	-21.0	
High Ch								
846.60	12.97	V	0.9	0.0	12.07	38.5	-26.4	
846.60	18.02	H	0.9	0.0	17.12	38.5	-21.3	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

REL99

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Lions
Project #: 14I19589
Date: 12\23\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: REL99 B5 HSDPA

Test Equipment:
Receiving: Sunol T243, and 5m Chamber B N-type 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								
826.40	12.30	V	0.9	0.0	11.40	38.5	-27.0	
826.40	19.46	H	0.9	0.0	18.56	38.5	-19.9	
Mid Ch								
836.60	13.40	V	0.9	0.0	12.50	38.5	-25.9	
836.60	19.21	H	0.9	0.0	18.31	38.5	-20.1	
High Ch								
846.60	13.42	V	0.9	0.0	12.52	38.5	-25.9	
846.60	18.86	H	0.9	0.0	17.96	38.5	-20.5	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

GSM 1900

EGPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: LG
Project #: 14I19589
Date: 12/15/14
Test Engineer: J. Hsu
Configuration: EUT X-position
Mode: EGPRS1900

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T961 Substitution, 8ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.20	11.27	V	0.9	10.7	21.07	33.0	-11.9	
1850.20	16.66	H	0.9	10.7	26.46	33.0	-6.5	
Mid Ch								
1880.00	10.97	V	0.9	10.7	20.77	33.0	-12.2	
1880.00	15.66	H	0.9	10.7	25.46	33.0	-7.5	
High Ch								
1909.80	6.11	V	0.9	10.7	15.91	33.0	-17.1	
1909.80	16.44	H	0.9	10.7	26.24	33.0	-6.8	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber C

Company: LG
Project #: 14I19589
Date: 12/15/14
Test Engineer: J. Hsu
Configuration: EUT X-position
Mode: GPRS1900

Test Equipment:
Receiving: Horn T119, and Chamber C SMA Cables
Substitution: Horn T961 Substitution, 8ft SMA Cable Warehouse

Band

GSM 1900

GPRS

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Notes
Low Ch								
1850.20	6.58	V	0.9	10.7	16.38	33.0	-16.6	
1850.20	20.09	H	0.9	10.7	29.89	33.0	-3.1	
Mid Ch								
1880.00	6.95	V	0.9	10.7	16.75	33.0	-16.3	
1880.00	20.18	H	0.9	10.7	29.98	33.0	-3.0	
High Ch								
1909.80	7.55	V	0.9	10.7	17.35	33.0	-15.7	
1909.80	19.50	H	0.9	10.7	29.30	33.0	-3.7	

Rev. 3.17.11
Note: For Band 4 EIRP limit is 30dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

GSM 850

EGPRS

High Frequency Substitution Measurement
UL Verification Services, Inc. Chamber B

Company: Lions
Project #: 14I19589
Date: 12\23\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: EGPRS850

Test Equipment:
Receiving: Sunol T243, and 5m Chamber B N-type 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								
826.40	15.23	V	0.9	0.0	14.33	38.5	-24.1	
826.40	24.26	H	0.9	0.0	23.36	38.5	-15.1	
Mid Ch								
836.60	15.20	V	0.9	0.0	14.30	38.5	-24.1	
836.60	23.39	H	0.9	0.0	22.49	38.5	-16.0	
High Ch								
846.60	16.42	V	0.9	0.0	15.52	38.5	-22.9	
846.60	24.39	H	0.9	0.0	23.49	38.5	-15.0	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

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. Chamber B

Company: Lions
Project #: 14I19589
Date: 12\23\14
Test Engineer: D. Soper
Configuration: EUT x-position
Mode: GPRS850

Test Equipment:
Receiving: Sunol T243, and 5m Chamber B N-type 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								
826.40	19.68	V	0.9	0.0	18.78	38.5	-19.7	
826.40	28.17	H	0.9	0.0	27.27	38.5	-11.2	
Mid Ch								
836.60	22.35	V	0.9	0.0	21.45	38.5	-17.0	
836.60	28.33	H	0.9	0.0	27.43	38.5	-11.0	
High Ch								
846.60	21.06	V	0.9	0.0	20.16	38.5	-18.3	
846.60	28.56	H	0.9	0.0	27.66	38.5	-10.8	

Rev. 3.17.11
Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

11.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238, and §27.53

LIMIT

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) For mobile station, the attenuation factor shall be not less than 43+10Log(P)dB at the channel edge and (55+10Log(P)dB) at 5.5MHz from the channel edges.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

MODES TESTED

GSM, WCDMA, and LTE

RESULTS

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

11.2.1. SPURIOUS RADIATION PLOTS

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/2014
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Location: Chamber C
Mode: LTE_16QAM Band 17 Harmonics, 10MHz Bandwidth

Band LTE17 10MHz 16QAM

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 709									
1418.00	-31.4	V	3.0	37.4	1.0	-67.8	-13.0	-54.8	
2127.00	-26.1	V	3.0	36.6	1.0	-61.7	-13.0	-48.7	
2836.00	-22.6	V	3.0	36.4	1.0	-58.0	-13.0	-45.0	
1418.00	-31.9	H	3.0	37.4	1.0	-68.2	-13.0	-55.2	
2127.00	-26.8	H	3.0	36.6	1.0	-62.4	-13.0	-49.4	
2836.00	-23.0	H	3.0	36.4	1.0	-58.4	-13.0	-45.4	
Mid Ch, 710									
1420.00	-31.7	V	3.0	37.3	1.0	-68.1	-13.0	-55.1	
2130.00	-25.7	V	3.0	36.6	1.0	-61.2	-13.0	-48.2	
2840.00	-22.2	V	3.0	36.4	1.0	-57.6	-13.0	-44.6	
1420.00	-31.7	H	3.0	37.3	1.0	-68.1	-13.0	-55.1	
2130.00	-26.4	H	3.0	36.6	1.0	-62.0	-13.0	-49.0	
2840.00	-23.3	H	3.0	36.4	1.0	-58.7	-13.0	-45.7	
High Ch, 711									
1422.00	-31.9	V	3.0	37.3	1.0	-68.3	-13.0	-55.3	
2133.00	-25.4	V	3.0	36.6	1.0	-60.9	-13.0	-47.9	
2844.00	-22.1	V	3.0	36.4	1.0	-57.5	-13.0	-44.5	
1422.00	-31.5	H	3.0	37.3	1.0	-67.9	-13.0	-54.9	
2133.00	-26.8	H	3.0	36.6	1.0	-62.4	-13.0	-49.4	
2844.00	-23.3	H	3.0	36.4	1.0	-58.7	-13.0	-45.7	

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

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/2014
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Location: Chamber C
Mode: LTE_QPSK Band 17 Harmonics, 10MHz Bandwidth

Band LTE17 10MHz QPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 709									
1418.00	-31.5	V	3.0	37.4	1.0	-67.9	-13.0	-54.9	
2127.00	-25.7	V	3.0	36.6	1.0	-61.3	-13.0	-48.3	
2836.00	-22.7	V	3.0	36.4	1.0	-58.1	-13.0	-45.1	
1418.00	-30.9	H	3.0	37.4	1.0	-67.2	-13.0	-54.2	
2127.00	-26.8	H	3.0	36.6	1.0	-62.3	-13.0	-49.3	
2836.00	-23.3	H	3.0	36.4	1.0	-58.7	-13.0	-45.7	
Mid Ch, 710									
1420.00	-31.7	V	3.0	37.3	1.0	-68.1	-13.0	-55.1	
2130.00	-25.7	V	3.0	36.6	1.0	-61.3	-13.0	-48.3	
2840.00	-22.3	V	3.0	36.4	1.0	-57.6	-13.0	-44.6	
1420.00	-31.5	H	3.0	37.3	1.0	-67.9	-13.0	-54.9	
2130.00	-26.0	H	3.0	36.6	1.0	-61.5	-13.0	-48.5	
2840.00	-22.9	H	3.0	36.4	1.0	-58.3	-13.0	-45.3	
High Ch, 711									
1422.00	-32.1	V	3.0	37.3	1.0	-68.4	-13.0	-55.4	
2133.00	-25.4	V	3.0	36.6	1.0	-61.0	-13.0	-48.0	
2844.00	-22.7	V	3.0	36.4	1.0	-58.0	-13.0	-45.0	
1422.00	-30.4	H	3.0	37.3	1.0	-66.8	-13.0	-53.8	
2133.00	-26.5	H	3.0	36.6	1.0	-62.1	-13.0	-49.1	
2844.00	-22.9	H	3.0	36.4	1.0	-58.3	-13.0	-45.3	

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

UL Verification Services, Inc
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/2014
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Location: Chamber C
Mode: LTE_16QAM Band 17 Harmonics, 5MHz Bandwidth

Band
LTE17
5MHz
16QAM

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 706.5									
1413.00	-31.8	V	3.0	37.4	1.0	-68.1	-13.0	-55.1	
2119.50	-25.7	V	3.0	36.6	1.0	-61.3	-13.0	-48.3	
2826.00	-22.6	V	3.0	36.4	1.0	-58.0	-13.0	-45.0	
1413.00	-31.8	H	3.0	37.4	1.0	-68.1	-13.0	-55.1	
2119.50	-26.5	H	3.0	36.6	1.0	-62.0	-13.0	-49.0	
2826.00	-23.6	H	3.0	36.4	1.0	-59.0	-13.0	-46.0	
Mid Ch, 710									
1420.00	-31.6	V	3.0	37.3	1.0	-68.0	-13.0	-55.0	
2130.00	-25.9	V	3.0	36.6	1.0	-61.5	-13.0	-48.5	
2840.00	-22.7	V	3.0	36.4	1.0	-58.1	-13.0	-45.1	
1420.00	-31.4	H	3.0	37.3	1.0	-67.8	-13.0	-54.8	
2130.00	-26.8	H	3.0	36.6	1.0	-62.4	-13.0	-49.4	
2840.00	-23.0	H	3.0	36.4	1.0	-58.4	-13.0	-45.4	
High Ch, 713.5									
1427.00	-32.0	V	3.0	37.3	1.0	-68.3	-13.0	-55.3	
2140.50	-25.1	V	3.0	36.6	1.0	-60.6	-13.0	-47.6	
2854.00	-22.5	V	3.0	36.4	1.0	-57.8	-13.0	-44.8	
1427.00	-32.0	H	3.0	37.3	1.0	-68.3	-13.0	-55.3	
2140.50	-26.0	H	3.0	36.6	1.0	-61.6	-13.0	-48.6	
2854.00	-22.6	H	3.0	36.4	1.0	-58.0	-13.0	-45.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

QPSK

UL Verification Services, Inc
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/2014
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Location: Chamber C
Mode: LTE_QPSK Band 17 Harmonics, 5MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 706.5									
1413.00	-31.8	V	3.0	37.4	1.0	-68.1	-13.0	-55.1	
2119.50	-25.5	V	3.0	36.6	1.0	-61.1	-13.0	-48.1	
2826.00	-22.1	V	3.0	36.4	1.0	-57.5	-13.0	-44.5	
1413.00	-31.7	H	3.0	37.4	1.0	-68.0	-13.0	-55.0	
2119.50	-26.5	H	3.0	36.6	1.0	-62.1	-13.0	-49.1	
2826.00	-23.3	H	3.0	36.4	1.0	-58.7	-13.0	-45.7	
Mid Ch, 710									
1420.00	-31.7	V	3.0	37.3	1.0	-68.1	-13.0	-55.1	
2130.00	-25.4	V	3.0	36.6	1.0	-60.9	-13.0	-47.9	
2840.00	-22.3	V	3.0	36.4	1.0	-57.7	-13.0	-44.7	
1420.00	-31.6	H	3.0	37.3	1.0	-68.0	-13.0	-55.0	
2130.00	-26.1	H	3.0	36.6	1.0	-61.7	-13.0	-48.7	
2840.00	-23.3	H	3.0	36.4	1.0	-58.7	-13.0	-45.7	
High Ch, 713.5									
1427.00	-31.6	V	3.0	37.3	1.0	-67.9	-13.0	-54.9	
2140.50	-25.5	V	3.0	36.6	1.0	-61.0	-13.0	-48.0	
2854.00	-21.6	V	3.0	36.4	1.0	-57.0	-13.0	-44.0	
1427.00	-31.0	H	3.0	37.3	1.0	-67.4	-13.0	-54.4	
2140.50	-26.2	H	3.0	36.6	1.0	-61.8	-13.0	-48.8	
2854.00	-22.7	H	3.0	36.4	1.0	-58.1	-13.0	-45.1	

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

UL Verification Services, Inc
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/2014
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Location: Chamber C
Mode: LTE_16QAM Band 5 Harmonics, 10MHz Bandwidth

Band
LTE5
10MHz
16QAM

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 829									
1658.00	-28.0	V	3.0	37.0	1.0	-64.1	-13.0	-51.1	
2487.00	-24.0	V	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3316.00	-20.9	V	3.0	36.1	1.0	-56.1	-13.0	-43.1	
1658.00	-28.4	H	3.0	37.0	1.0	-64.4	-13.0	-51.4	
2487.00	-25.2	H	3.0	36.4	1.0	-60.7	-13.0	-47.7	
3316.00	-20.9	H	3.0	36.1	1.0	-56.0	-13.0	-43.0	
Mid Ch, 836.5									
1673.00	-28.0	V	3.0	37.0	1.0	-64.0	-13.0	-51.0	
2509.50	-23.0	V	3.0	36.4	1.0	-58.4	-13.0	-45.4	
3346.00	-20.4	V	3.0	36.1	1.0	-55.5	-13.0	-42.5	
1673.00	-27.8	H	3.0	37.0	1.0	-63.8	-13.0	-50.8	
2509.50	-24.5	H	3.0	36.4	1.0	-59.9	-13.0	-46.9	
3346.00	-20.8	H	3.0	36.1	1.0	-56.0	-13.0	-43.0	
High Ch, 844									
1688.00	-27.8	V	3.0	37.0	1.0	-63.8	-13.0	-50.8	
2532.00	-22.9	V	3.0	36.4	1.0	-58.3	-13.0	-45.3	
3376.00	-22.0	V	3.0	36.1	1.0	-57.1	-13.0	-44.1	
1688.00	-27.8	H	3.0	37.0	1.0	-63.8	-13.0	-50.8	
2532.00	-24.6	H	3.0	36.4	1.0	-60.0	-13.0	-47.0	
3376.00	-21.9	H	3.0	36.1	1.0	-57.0	-13.0	-44.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

10MHz

QPSK

UL Verification Services, Inc
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/2014
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Location: Chamber C
Mode: LTE_QPSK Band 5 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 829									
1658.00	-28.1	V	3.0	37.0	1.0	-64.1	-13.0	-51.1	
2487.00	-23.5	V	3.0	36.4	1.0	-58.9	-13.0	-45.9	
3316.00	-20.3	V	3.0	36.1	1.0	-55.4	-13.0	-42.4	
1658.00	-28.2	H	3.0	37.0	1.0	-64.2	-13.0	-51.2	
2487.00	-25.4	H	3.0	36.4	1.0	-60.8	-13.0	-47.8	
3316.00	-20.7	H	3.0	36.1	1.0	-55.8	-13.0	-42.8	
Mid Ch, 836.5									
1673.00	-28.1	V	3.0	37.0	1.0	-64.1	-13.0	-51.1	
2509.50	-22.9	V	3.0	36.4	1.0	-58.3	-13.0	-45.3	
3346.00	-21.2	V	3.0	36.1	1.0	-56.3	-13.0	-43.3	
1673.00	-28.3	H	3.0	37.0	1.0	-64.3	-13.0	-51.3	
2509.50	-24.3	H	3.0	36.4	1.0	-59.7	-13.0	-46.7	
3346.00	-21.2	H	3.0	36.1	1.0	-56.4	-13.0	-43.4	
High Ch, 844									
1688.00	-27.4	V	3.0	37.0	1.0	-63.4	-13.0	-50.4	
2532.00	-22.9	V	3.0	36.4	1.0	-58.3	-13.0	-45.3	
3376.00	-22.4	V	3.0	36.1	1.0	-57.5	-13.0	-44.5	
1688.00	-27.3	H	3.0	37.0	1.0	-63.3	-13.0	-50.3	
2532.00	-24.1	H	3.0	36.4	1.0	-59.5	-13.0	-46.5	
3376.00	-22.2	H	3.0	36.1	1.0	-57.3	-13.0	-44.3	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

16QAM

UL Verification Services, Inc
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/2014
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Location: Chamber C
Mode: LTE_16QAM Band 5 Harmonics, 5MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.5									
1653.00	-28.8	V	3.0	37.0	1.0	-64.8	-13.0	-51.8	
2479.50	-23.7	V	3.0	36.4	1.0	-59.2	-13.0	-46.2	
3306.00	-21.7	V	3.0	36.1	1.0	-56.8	-13.0	-43.8	
1653.00	-28.8	H	3.0	37.0	1.0	-64.8	-13.0	-51.8	
2479.50	-25.6	H	3.0	36.4	1.0	-61.0	-13.0	-48.0	
3306.00	-21.5	H	3.0	36.1	1.0	-56.6	-13.0	-43.6	
Mid Ch, 836.5									
1673.00	-27.6	V	3.0	37.0	1.0	-63.6	-13.0	-50.6	
2509.50	-22.1	V	3.0	36.4	1.0	-57.5	-13.0	-44.5	
3346.00	-21.1	V	3.0	36.1	1.0	-56.2	-13.0	-43.2	
1673.00	-27.5	H	3.0	37.0	1.0	-63.5	-13.0	-50.5	
2509.50	-24.0	H	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3346.00	-21.4	H	3.0	36.1	1.0	-56.5	-13.0	-43.5	
High Ch, 846.5									
1693.00	-28.0	V	3.0	37.0	1.0	-64.0	-13.0	-51.0	
2539.50	-23.2	V	3.0	36.4	1.0	-58.6	-13.0	-45.6	
3386.00	-21.7	V	3.0	36.1	1.0	-56.8	-13.0	-43.8	
1693.00	-27.6	H	3.0	37.0	1.0	-63.6	-13.0	-50.6	
2539.50	-24.8	H	3.0	36.4	1.0	-60.2	-13.0	-47.2	
3386.00	-21.9	H	3.0	36.1	1.0	-57.0	-13.0	-44.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

UL Verification Services, Inc
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/2014
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Location: Chamber C
Mode: LTE_QPSK Band 5 Harmonics, 5MHz Bandwidth

Band LTE5 5MHz QPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.5									
1653.00	-28.0	V	3.0	37.0	1.0	-64.0	-13.0	-51.0	
2479.50	-24.0	V	3.0	36.4	1.0	-59.4	-13.0	-46.4	
3306.00	-21.5	V	3.0	36.1	1.0	-56.7	-13.0	-43.7	
1653.00	-28.6	H	3.0	37.0	1.0	-64.6	-13.0	-51.6	
2479.50	-25.4	H	3.0	36.4	1.0	-60.9	-13.0	-47.9	
3306.00	-21.4	H	3.0	36.1	1.0	-56.6	-13.0	-43.6	
Mid Ch, 836.5									
1673.00	-27.2	V	3.0	37.0	1.0	-63.2	-13.0	-50.2	
2509.50	-23.7	V	3.0	36.4	1.0	-59.1	-13.0	-46.1	
3346.00	-20.6	V	3.0	36.1	1.0	-55.7	-13.0	-42.7	
1673.00	-27.4	H	3.0	37.0	1.0	-63.4	-13.0	-50.4	
2509.50	-25.1	H	3.0	36.4	1.0	-60.5	-13.0	-47.5	
3346.00	-21.0	H	3.0	36.1	1.0	-56.1	-13.0	-43.1	
High Ch, 846.5									
1693.00	-27.4	V	3.0	37.0	1.0	-63.3	-13.0	-50.3	
2539.50	-23.1	V	3.0	36.4	1.0	-58.5	-13.0	-45.5	
3386.00	-21.4	V	3.0	36.1	1.0	-56.5	-13.0	-43.5	
1693.00	-28.1	H	3.0	37.0	1.0	-64.1	-13.0	-51.1	
2539.50	-24.9	H	3.0	36.4	1.0	-60.3	-13.0	-47.3	
3386.00	-22.5	H	3.0	36.1	1.0	-57.6	-13.0	-44.6	

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

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/30/2014
Test Engineer: L. Lara
Configuration: EUT X-position with AC charger and HS
Location: Chamber C
Mode: LTE_16QAM Band 4 Harmonics, 10MHz Bandwidth

Band
LTE4
10MHz
16QAM

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1715									
3430.00	-8.0	V	3.0	36.1	1.0	-43.0	-13.0	-30.0	
5145.00	-15.1	V	3.0	35.4	1.0	-49.6	-13.0	-36.6	
6860.00	-12.7	V	3.0	35.7	1.0	-47.3	-13.0	-34.3	
3430.00	-8.5	H	3.0	36.1	1.0	-43.6	-13.0	-30.6	
5145.00	-16.4	H	3.0	35.4	1.0	-50.8	-13.0	-37.8	
6860.00	-11.8	H	3.0	35.7	1.0	-46.5	-13.0	-33.5	
Mid Ch, 1732.5									
3465.00	-3.7	V	3.0	36.0	1.0	-38.7	-13.0	-25.7	
5197.50	-15.7	V	3.0	35.4	1.0	-50.1	-13.0	-37.1	
6930.00	-12.5	V	3.0	35.7	1.0	-47.2	-13.0	-34.2	
3465.00	-1.4	H	3.0	36.0	1.0	-36.4	-13.0	-23.4	
5197.50	-16.4	H	3.0	35.4	1.0	-50.8	-13.0	-37.8	
6930.00	-10.9	H	3.0	35.7	1.0	-45.6	-13.0	-32.6	
High Ch, 1750									
3500.00	-6.6	V	3.0	36.0	1.0	-41.6	-13.0	-28.6	
5250.00	-16.5	V	3.0	35.4	1.0	-51.0	-13.0	-38.0	
7000.00	-12.2	V	3.0	35.7	1.0	-46.9	-13.0	-33.9	
3500.00	-1.8	H	3.0	36.0	1.0	-36.8	-13.0	-23.8	
5250.00	-16.1	H	3.0	35.4	1.0	-50.5	-13.0	-37.5	
7000.00	-10.8	H	3.0	35.7	1.0	-45.5	-13.0	-32.5	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/30/2014
Test Engineer: L. Lara
Configuration: EUT X-position with AC charger and HS
Location: Chamber C
Mode: LTE_QPSK Band 4 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1715									
3430.00	-6.1	V	3.0	36.1	1.0	-41.1	-13.0	-28.1	
5145.00	-16.5	V	3.0	35.4	1.0	-50.9	-13.0	-37.9	
6860.00	-13.3	V	3.0	35.7	1.0	-47.9	-13.0	-34.9	
3430.00	-8.0	H	3.0	36.1	1.0	-43.1	-13.0	-30.1	
5145.00	-16.7	H	3.0	35.4	1.0	-51.1	-13.0	-38.1	
6860.00	-12.2	H	3.0	35.7	1.0	-46.9	-13.0	-33.9	
Mid Ch, 1732.5									
3465.00	-4.8	V	3.0	36.0	1.0	-39.8	-13.0	-26.8	
5197.50	-15.6	V	3.0	35.4	1.0	-50.0	-13.0	-37.0	
6930.00	-12.0	V	3.0	35.7	1.0	-46.7	-13.0	-33.7	
3465.00	-1.5	H	3.0	36.0	1.0	-36.5	-13.0	-23.5	
5197.50	-16.2	H	3.0	35.4	1.0	-50.6	-13.0	-37.6	
6930.00	-11.4	H	3.0	35.7	1.0	-46.1	-13.0	-33.1	
High Ch, 1750									
3500.00	-3.6	V	3.0	36.0	1.0	-38.6	-13.0	-25.6	
5250.00	-15.0	V	3.0	35.4	1.0	-49.4	-13.0	-36.4	
7000.00	-11.4	V	3.0	35.7	1.0	-46.1	-13.0	-33.1	
3500.00	-1.1	H	3.0	36.0	1.0	-36.1	-13.0	-23.1	
5250.00	-15.9	H	3.0	35.4	1.0	-50.4	-13.0	-37.4	
7000.00	-11.2	H	3.0	35.7	1.0	-45.8	-13.0	-32.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/30/2014
Test Engineer: L. Lara
Configuration: EUT X-position with AC charger and HS
Location: Chamber C
Mode: LTE_16QAM Band 4 Harmonics, 5MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.5									
3425.00	-6.5	V	3.0	36.1	1.0	-41.6	-13.0	-28.6	
5137.50	-15.2	V	3.0	35.4	1.0	-49.6	-13.0	-36.6	
6850.00	-12.9	V	3.0	35.7	1.0	-47.5	-13.0	-34.5	
3425.00	-4.1	H	3.0	36.1	1.0	-39.2	-13.0	-26.2	
5137.50	-15.8	H	3.0	35.4	1.0	-50.3	-13.0	-37.3	
6850.00	-11.5	H	3.0	35.7	1.0	-46.2	-13.0	-33.2	
Mid Ch, 1732.5									
3465.00	-4.2	V	3.0	36.0	1.0	-39.3	-13.0	-26.3	
5197.50	-15.2	V	3.0	35.4	1.0	-49.7	-13.0	-36.7	
6930.00	-12.9	V	3.0	35.7	1.0	-47.6	-13.0	-34.6	
3465.00	-1.2	H	3.0	36.0	1.0	-36.3	-13.0	-23.3	
5197.50	-16.0	H	3.0	35.4	1.0	-50.5	-13.0	-37.5	
6930.00	-11.0	H	3.0	35.7	1.0	-45.7	-13.0	-32.7	
High Ch, 1752.5									
3505.00	-2.1	V	3.0	36.0	1.0	-37.1	-13.0	-24.1	
5257.50	-16.4	V	3.0	35.4	1.0	-50.8	-13.0	-37.8	
7010.00	-11.3	V	3.0	35.7	1.0	-45.9	-13.0	-32.9	
3505.00	0.9	H	3.0	36.0	1.0	-34.1	-13.0	-21.1	
5257.50	-15.6	H	3.0	35.4	1.0	-50.1	-13.0	-37.1	
7010.00	-10.9	H	3.0	35.7	1.0	-45.6	-13.0	-32.6	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/30/2014
Test Engineer: L. Lara
Configuration: EUT X-position with AC charger and HS
Location: Chamber C
Mode: LTE_QPSK Band 4 Harmonics, 5MHz Bandwidth

Band LTE4 5MHz QPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1712.5									
3425.00	-6.5	V	3.0	36.1	1.0	-41.6	-13.0	-28.6	
5137.50	-16.3	V	3.0	35.4	1.0	-50.8	-13.0	-37.8	
6850.00	-13.5	V	3.0	35.7	1.0	-48.1	-13.0	-35.1	
3425.00	-3.9	H	3.0	36.1	1.0	-39.0	-13.0	-26.0	
5137.50	-16.0	H	3.0	35.4	1.0	-50.4	-13.0	-37.4	
6850.00	-11.5	H	3.0	35.7	1.0	-46.2	-13.0	-33.2	
Mid Ch, 1732.5									
3465.00	-5.5	V	3.0	36.0	1.0	-40.5	-13.0	-27.5	
5197.50	-14.9	V	3.0	35.4	1.0	-49.4	-13.0	-36.4	
6930.00	-12.4	V	3.0	35.7	1.0	-47.1	-13.0	-34.1	
3465.00	-1.1	H	3.0	36.0	1.0	-36.1	-13.0	-23.1	
5197.50	-16.2	H	3.0	35.4	1.0	-50.6	-13.0	-37.6	
6930.00	-11.9	H	3.0	35.7	1.0	-46.6	-13.0	-33.6	
High Ch, 1752.5									
3505.00	-1.3	V	3.0	36.0	1.0	-36.3	-13.0	-23.3	
5257.50	-16.0	V	3.0	35.4	1.0	-50.4	-13.0	-37.4	
7010.00	-11.4	V	3.0	35.7	1.0	-46.1	-13.0	-33.1	
3505.00	2.6	H	3.0	36.0	1.0	-32.4	-13.0	-19.4	
5257.50	-16.0	H	3.0	35.4	1.0	-50.5	-13.0	-37.5	
7010.00	-10.4	H	3.0	35.7	1.0	-45.1	-13.0	-32.1	

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

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/30/2014
Test Engineer: L. Lara
Configuration: EUT X-position with AC charger and HS
Location: Chamber C
Mode: LTE_16QAM Band 2 Harmonics, 10MHz Bandwidth

Band
LTE2
10MHz
16QAM

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1855									
3710.00	-11.6	V	3.0	35.9	1.0	-46.5	-13.0	-33.5	
5565.00	-16.5	V	3.0	35.5	1.0	-50.9	-13.0	-37.9	
7420.00	-11.9	V	3.0	35.7	1.0	-46.7	-13.0	-33.7	
3710.00	-6.2	H	3.0	35.9	1.0	-41.1	-13.0	-28.1	
5565.00	-16.0	H	3.0	35.5	1.0	-50.4	-13.0	-37.4	
7420.00	-11.5	H	3.0	35.7	1.0	-46.2	-13.0	-33.2	
Mid Ch, 1880									
3760.00	-17.0	V	3.0	35.8	1.0	-51.8	-13.0	-38.8	
5640.00	-12.1	V	3.0	35.5	1.0	-46.6	-13.0	-33.6	
7520.00	-11.2	V	3.0	35.7	1.0	-46.0	-13.0	-33.0	
3760.00	-13.1	H	3.0	35.8	1.0	-47.9	-13.0	-34.9	
5640.00	-14.6	H	3.0	35.5	1.0	-49.1	-13.0	-36.1	
7520.00	-11.6	H	3.0	35.7	1.0	-46.3	-13.0	-33.3	
High Ch, 1905									
3810.00	-13.9	V	3.0	35.8	1.0	-48.7	-13.0	-35.7	
5715.00	-12.8	V	3.0	35.5	1.0	-47.3	-13.0	-34.3	
7620.00	-12.7	V	3.0	35.8	1.0	-47.4	-13.0	-34.4	
3810.00	-12.2	H	3.0	35.8	1.0	-47.0	-13.0	-34.0	
5715.00	-14.8	H	3.0	35.5	1.0	-49.3	-13.0	-36.3	
7620.00	-10.8	H	3.0	35.8	1.0	-45.6	-13.0	-32.6	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

QPSK

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/30/2014
Test Engineer: L. Lara
Configuration: EUT X-position with AC charger and HS
Location: Chamber C
Mode: LTE_QPSK Band 2 Harmonics, 10MHz Bandwidth

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1855									
3710.00	-12.4	V	3.0	35.9	1.0	-47.2	-13.0	-34.2	
5565.00	-13.1	V	3.0	35.5	1.0	-47.5	-13.0	-34.5	
7420.00	-12.4	V	3.0	35.7	1.0	-47.1	-13.0	-34.1	
3710.00	-7.1	H	3.0	35.9	1.0	-41.9	-13.0	-28.9	
5565.00	-15.3	H	3.0	35.5	1.0	-49.7	-13.0	-36.7	
7420.00	-11.5	H	3.0	35.7	1.0	-46.3	-13.0	-33.3	
Mid Ch, 1880									
3760.00	-17.8	V	3.0	35.8	1.0	-52.6	-13.0	-39.6	
5640.00	-15.1	V	3.0	35.5	1.0	-49.6	-13.0	-36.6	
7520.00	-12.4	V	3.0	35.7	1.0	-47.1	-13.0	-34.1	
3760.00	-13.4	H	3.0	35.8	1.0	-48.2	-13.0	-35.2	
5640.00	-14.1	H	3.0	35.5	1.0	-48.6	-13.0	-35.6	
7520.00	-11.8	H	3.0	35.7	1.0	-46.6	-13.0	-33.6	
High Ch, 1905									
3810.00	-16.9	V	3.0	35.8	1.0	-51.7	-13.0	-38.7	
5715.00	-15.9	V	3.0	35.5	1.0	-50.4	-13.0	-37.4	
7620.00	-11.0	V	3.0	35.8	1.0	-45.8	-13.0	-32.8	
3810.00	-12.4	H	3.0	35.8	1.0	-47.2	-13.0	-34.2	
5715.00	-14.9	H	3.0	35.5	1.0	-49.4	-13.0	-36.4	
7620.00	-11.4	H	3.0	35.8	1.0	-46.2	-13.0	-33.2	

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

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/30/2014
Test Engineer: L. Lara
Configuration: EUT X-position with AC charger and HS
Location: Chamber C
Mode: LTE_16QAM Band 2 Harmonics, 5MHz Bandwidth

Band

LTE2

5MHz

16QAM

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.5									
3705.00	-11.5	V	3.0	35.9	1.0	-46.3	-13.0	-33.3	
5557.50	-15.4	V	3.0	35.5	1.0	-49.9	-13.0	-36.9	
7410.00	-12.2	V	3.0	35.7	1.0	-46.9	-13.0	-33.9	
3705.00	-8.3	H	3.0	35.9	1.0	-43.2	-13.0	-30.2	
5557.50	-16.3	H	3.0	35.5	1.0	-50.8	-13.0	-37.8	
7410.00	-12.1	H	3.0	35.7	1.0	-46.8	-13.0	-33.8	
Mid Ch, 1880									
3760.00	-11.2	V	3.0	35.8	1.0	-46.0	-13.0	-33.0	
5640.00	-14.4	V	3.0	35.5	1.0	-48.9	-13.0	-35.9	
7520.00	-11.6	V	3.0	35.7	1.0	-46.3	-13.0	-33.3	
3760.00	-9.6	H	3.0	35.8	1.0	-44.4	-13.0	-31.4	
5640.00	-14.9	H	3.0	35.5	1.0	-49.4	-13.0	-36.4	
7520.00	-11.5	H	3.0	35.7	1.0	-46.3	-13.0	-33.3	
High Ch, 1907.5									
3815.00	-17.7	V	3.0	35.8	1.0	-52.4	-13.0	-39.4	
5722.50	-14.4	V	3.0	35.5	1.0	-48.9	-13.0	-35.9	
7630.00	-11.7	V	3.0	35.8	1.0	-46.4	-13.0	-33.4	
3815.00	-14.5	H	3.0	35.8	1.0	-49.3	-13.0	-36.3	
5722.50	-12.8	H	3.0	35.5	1.0	-47.3	-13.0	-34.3	
7630.00	-10.0	H	3.0	35.8	1.0	-44.8	-13.0	-31.8	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/30/2014
Test Engineer: L. Lara
Configuration: EUT X-position with AC charger and HS
Location: Chamber C
Mode: LTE_QPSK Band 2 Harmonics, 5MHz Bandwidth

Band LTE2 5MHz QPSK

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.5									
3705.00	-12.1	V	3.0	35.9	1.0	-47.0	-13.0	-34.0	
5557.50	-15.3	V	3.0	35.5	1.0	-49.8	-13.0	-36.8	
7410.00	-12.0	V	3.0	35.7	1.0	-46.7	-13.0	-33.7	
3705.00	-7.9	H	3.0	35.9	1.0	-42.8	-13.0	-29.8	
5557.50	-14.7	H	3.0	35.5	1.0	-49.1	-13.0	-36.1	
7410.00	-11.3	H	3.0	35.7	1.0	-46.0	-13.0	-33.0	
Mid Ch, 1880									
3760.00	-13.6	V	3.0	35.8	1.0	-48.4	-13.0	-35.4	
5640.00	-15.6	V	3.0	35.5	1.0	-50.1	-13.0	-37.1	
7520.00	-11.4	V	3.0	35.7	1.0	-46.1	-13.0	-33.1	
3760.00	-9.9	H	3.0	35.8	1.0	-44.7	-13.0	-31.7	
5640.00	-15.3	H	3.0	35.5	1.0	-49.7	-13.0	-36.7	
7520.00	-11.1	H	3.0	35.7	1.0	-45.8	-13.0	-32.8	
High Ch, 1907.5									
3815.00	-15.7	V	3.0	35.8	1.0	-50.5	-13.0	-37.5	
5722.50	-12.3	V	3.0	35.5	1.0	-46.8	-13.0	-33.8	
7630.00	-11.9	V	3.0	35.8	1.0	-46.7	-13.0	-33.7	
3815.00	-14.3	H	3.0	35.8	1.0	-49.0	-13.0	-36.0	
5722.50	-12.5	H	3.0	35.5	1.0	-47.0	-13.0	-34.0	
7630.00	-11.2	H	3.0	35.8	1.0	-46.0	-13.0	-33.0	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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 2

HSDPA

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/30/2014
Test Engineer: L. Lara
Configuration: EUT X-position with AC charger and HS
Location: Chamber C
Mode: HSDPA Band 2 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4									
3704.80	-16.6	V	3.0	35.9	1.0	-51.4	-13.0	-38.4	
5557.20	-16.4	V	3.0	35.5	1.0	-50.9	-13.0	-37.9	
7409.60	-11.8	V	3.0	35.7	1.0	-46.5	-13.0	-33.5	
3704.80	-16.8	H	3.0	35.9	1.0	-51.6	-13.0	-38.6	
5557.20	-15.3	H	3.0	35.5	1.0	-49.7	-13.0	-36.7	
7409.60	-11.4	H	3.0	35.7	1.0	-46.1	-13.0	-33.1	
Mid Ch, 1880									
3760.00	-18.2	V	3.0	35.8	1.0	-53.0	-13.0	-40.0	
5640.00	-15.1	V	3.0	35.5	1.0	-49.6	-13.0	-36.6	
7520.00	-11.7	V	3.0	35.7	1.0	-46.4	-13.0	-33.4	
3760.00	-17.2	H	3.0	35.8	1.0	-52.1	-13.0	-39.1	
5640.00	-15.6	H	3.0	35.5	1.0	-50.1	-13.0	-37.1	
7520.00	-11.4	H	3.0	35.7	1.0	-46.1	-13.0	-33.1	
High Ch, 1907.6									
3815.20	-17.5	V	3.0	35.8	1.0	-52.3	-13.0	-39.3	
5722.80	-15.2	V	3.0	35.5	1.0	-49.7	-13.0	-36.7	
7630.40	-12.6	V	3.0	35.8	1.0	-47.4	-13.0	-34.4	
3815.20	-14.5	H	3.0	35.8	1.0	-49.2	-13.0	-36.2	
5722.80	-14.2	H	3.0	35.5	1.0	-48.7	-13.0	-35.7	
7630.40	-11.7	H	3.0	35.8	1.0	-46.4	-13.0	-33.4	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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 2

REL99

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/30/2014
Test Engineer: L. Lara
Configuration: EUT X-position with AC charger and HS
Location: Chamber C
Mode: Rel99 Band 2 Harmonics

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 1852.4									
3704.80	-17.2	V	3.0	35.9	1.0	-52.1	-13.0	-39.1	
5557.20	-15.8	V	3.0	35.5	1.0	-50.3	-13.0	-37.3	
7409.60	-10.8	V	3.0	35.7	1.0	-45.5	-13.0	-32.5	
3704.80	-15.8	H	3.0	35.9	1.0	-50.7	-13.0	-37.7	
5557.20	-15.2	H	3.0	35.5	1.0	-49.7	-13.0	-36.7	
7409.60	-11.3	H	3.0	35.7	1.0	-46.1	-13.0	-33.1	
Mid Ch, 1880									
3760.00	-19.5	V	3.0	35.8	1.0	-54.3	-13.0	-41.3	
5640.00	-15.9	V	3.0	35.5	1.0	-50.4	-13.0	-37.4	
7520.00	-12.6	V	3.0	35.7	1.0	-47.4	-13.0	-34.4	
3760.00	-16.8	H	3.0	35.8	1.0	-51.6	-13.0	-38.6	
5640.00	-14.9	H	3.0	35.5	1.0	-49.3	-13.0	-36.3	
7520.00	-11.7	H	3.0	35.7	1.0	-46.4	-13.0	-33.4	
High Ch, 1907.6									
3815.20	-16.6	V	3.0	35.8	1.0	-51.4	-13.0	-38.4	
5722.80	-13.4	V	3.0	35.5	1.0	-47.9	-13.0	-34.9	
7630.40	-12.5	V	3.0	35.8	1.0	-47.3	-13.0	-34.3	
3815.20	-14.3	H	3.0	35.8	1.0	-49.1	-13.0	-36.1	
5722.80	-13.6	H	3.0	35.5	1.0	-48.1	-13.0	-35.1	
7630.40	-11.5	H	3.0	35.8	1.0	-46.2	-13.0	-33.2	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/14
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Mode: WCDMA_HSDPA_ 850

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.652	-28.8	V	3.0	37.4	1.0	-65.2	-13.0	-52.2	
2.479	-23.8	V	3.0	36.4	1.0	-59.1	-13.0	-46.1	
3.306	-20.7	V	3.0	35.8	1.0	-55.5	-13.0	-42.5	
1.652	-29.1	H	3.0	37.4	1.0	-65.5	-13.0	-52.5	
2.479	-25.5	H	3.0	36.4	1.0	-60.9	-13.0	-47.9	
3.306	-21.0	H	3.0	35.8	1.0	-55.8	-13.0	-42.8	
Mid Ch, 836.6MHz									
1.673	-28.1	V	3.0	37.3	1.0	-64.4	-13.0	-51.4	
2.510	-23.0	V	3.0	36.4	1.0	-58.4	-13.0	-45.4	
3.346	-20.5	V	3.0	35.8	1.0	-55.2	-13.0	-42.2	
1.673	-27.8	H	3.0	37.3	1.0	-64.2	-13.0	-51.2	
2.510	-24.3	H	3.0	36.4	1.0	-59.7	-13.0	-46.7	
3.346	-20.9	H	3.0	35.8	1.0	-55.7	-13.0	-42.7	
High Ch, 846.6MHz									
1.693	-27.5	V	3.0	37.3	1.0	-63.8	-13.0	-50.8	
2.539	-23.3	V	3.0	36.3	1.0	-58.6	-13.0	-45.6	
3.386	-22.0	V	3.0	35.7	1.0	-56.7	-13.0	-43.7	
1.693	-27.6	H	3.0	37.3	1.0	-63.9	-13.0	-50.9	
2.539	-24.6	H	3.0	36.3	1.0	-59.9	-13.0	-46.9	
3.386	-21.8	H	3.0	35.7	1.0	-56.5	-13.0	-43.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/14
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Mode: WCDMA_Rel 99_ 850

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band

Band 5

REL99

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 826.40MHz									
1.652	-28.9	V	3.0	37.4	1.0	-65.3	-13.0	-52.3	
2.479	-23.5	V	3.0	36.4	1.0	-58.9	-13.0	-45.9	
3.306	-21.4	V	3.0	35.8	1.0	-56.2	-13.0	-43.2	
1.652	-28.9	H	3.0	37.4	1.0	-65.2	-13.0	-52.2	
2.479	-25.5	H	3.0	36.4	1.0	-60.8	-13.0	-47.8	
3.306	-21.4	H	3.0	35.8	1.0	-56.2	-13.0	-43.2	
Mid Ch, 836.6MHz									
1.673	-27.8	V	3.0	37.3	1.0	-64.2	-13.0	-51.2	
2.510	-23.1	V	3.0	36.4	1.0	-58.5	-13.0	-45.5	
3.346	-20.6	V	3.0	35.8	1.0	-55.4	-13.0	-42.4	
1.673	-28.0	H	3.0	37.3	1.0	-64.3	-13.0	-51.3	
2.510	-24.4	H	3.0	36.4	1.0	-59.7	-13.0	-46.7	
3.346	-20.8	H	3.0	35.8	1.0	-55.6	-13.0	-42.6	
High Ch, 846.6MHz									
1.693	-27.4	V	3.0	37.3	1.0	-63.7	-13.0	-50.7	
2.539	-23.4	V	3.0	36.3	1.0	-58.8	-13.0	-45.8	
3.386	-22.4	V	3.0	35.7	1.0	-57.1	-13.0	-44.1	
1.693	-27.8	H	3.0	37.3	1.0	-64.1	-13.0	-51.1	
2.539	-24.9	H	3.0	36.3	1.0	-60.2	-13.0	-47.2	
3.386	-21.9	H	3.0	35.7	1.0	-56.6	-13.0	-43.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 14I19589
Date: 12/29/14
Test Engineer: Jude Semana
Configuration: X-pos EUT w/ AC Adaptor and HS
Mode: EGPRS1900 Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1850.2MHz									
GSM 1900 EGPRS	3.700	-11.0	V	3.0	35.4	1.0	-45.4	-13.0	-32.4	
	5.551	-8.0	V	3.0	34.7	1.0	-41.7	-13.0	-28.7	
	7.401	-5.3	V	3.0	34.9	1.0	-39.2	-13.0	-26.2	
	3.700	-7.3	H	3.0	35.4	1.0	-41.7	-13.0	-28.7	
	5.551	-5.4	H	3.0	34.7	1.0	-39.1	-13.0	-26.1	
	7.401	-3.0	H	3.0	34.9	1.0	-36.9	-13.0	-23.9	
	Mid Ch, 1880.0MHz									
	3.760	-12.7	V	3.0	35.3	1.0	-47.0	-13.0	-34.0	
	5.640	-10.3	V	3.0	34.7	1.0	-44.0	-13.0	-31.0	
	7.520	-10.5	V	3.0	34.9	1.0	-44.4	-13.0	-31.4	
	3.760	-15.3	H	3.0	35.3	1.0	-49.6	-13.0	-36.6	
	5.640	-9.0	H	3.0	34.7	1.0	-42.8	-13.0	-29.8	
	7.520	-5.2	H	3.0	34.9	1.0	-39.2	-13.0	-26.2	
	High Ch, 1909.8MHz									
	3.820	-8.0	V	3.0	35.3	1.0	-42.3	-13.0	-29.3	
	5.729	-6.0	V	3.0	34.7	1.0	-39.7	-13.0	-26.7	
	7.639	-4.6	V	3.0	35.0	1.0	-38.5	-13.0	-25.5	
	3.820	-8.8	H	3.0	35.3	1.0	-43.1	-13.0	-30.1	
	5.729	-5.3	H	3.0	34.7	1.0	-39.0	-13.0	-26.0	
	7.639	-3.6	H	3.0	35.0	1.0	-37.5	-13.0	-24.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

UL Verification Services, Inc.
Above 1GHz High Frequency Substitution Measurement

Company: LG
Project #: 14I19589
Date: 12/29/14
Test Engineer: Jude Semana
Configuration: X-pos EUT w/ AC Adaptor and HS
Mode: GPRS1900 Harm

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 24

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 1850.2MHz									
GSM 1900 GPRS	3.700	-13.6	V	3.0	35.4	1.0	-48.0	-13.0	-35.0	
	5.551	-8.1	V	3.0	34.7	1.0	-41.9	-13.0	-28.9	
	7.401	-5.5	V	3.0	34.9	1.0	-39.4	-13.0	-26.4	
	3.700	-8.7	H	3.0	35.4	1.0	-43.1	-13.0	-30.1	
	5.551	-5.8	H	3.0	34.7	1.0	-39.6	-13.0	-26.6	
	7.401	-3.1	H	3.0	34.9	1.0	-37.0	-13.0	-24.0	
	Mid Ch, 1880.0MHz									
	3.760	-12.7	V	3.0	35.3	1.0	-47.1	-13.0	-34.1	
	5.640	-11.5	V	3.0	34.7	1.0	-45.2	-13.0	-32.2	
	7.520	-9.7	V	3.0	34.9	1.0	-43.6	-13.0	-30.6	
	3.760	-9.9	H	3.0	35.3	1.0	-44.2	-13.0	-31.2	
	5.640	-6.8	H	3.0	34.7	1.0	-40.5	-13.0	-27.5	
	7.520	-3.2	H	3.0	34.9	1.0	-37.2	-13.0	-24.2	
	High Ch, 1909.8MHz									
	3.820	-8.7	V	3.0	35.3	1.0	-43.0	-13.0	-30.0	
	5.729	-6.4	V	3.0	34.7	1.0	-40.1	-13.0	-27.1	
	7.639	-6.0	V	3.0	35.0	1.0	-39.9	-13.0	-26.9	
	3.820	-10.9	H	3.0	35.3	1.0	-45.2	-13.0	-32.2	
	5.729	-5.4	H	3.0	34.7	1.0	-39.1	-13.0	-26.1	
	7.639	-5.1	H	3.0	35.0	1.0	-39.1	-13.0	-26.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
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.

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/14
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Mode: EGPRS 850

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band

GSM 850

EGPRS

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1.648	-28.3	V	3.0	37.4	1.0	-64.7	-13.0	-51.7	
2.473	-23.9	V	3.0	36.4	1.0	-59.3	-13.0	-46.3	
3.297	-21.5	V	3.0	35.8	1.0	-56.3	-13.0	-43.3	
1.648	-29.2	H	3.0	37.4	1.0	-65.5	-13.0	-52.5	
2.473	-25.9	H	3.0	36.4	1.0	-61.3	-13.0	-48.3	
3.297	-21.6	H	3.0	35.8	1.0	-56.4	-13.0	-43.4	
Mid Ch, 836.6MHz									
1.673	-27.7	V	3.0	37.3	1.0	-64.0	-13.0	-51.0	
2.510	-22.6	V	3.0	36.4	1.0	-57.9	-13.0	-44.9	
3.346	-21.1	V	3.0	35.8	1.0	-55.9	-13.0	-42.9	
1.673	-28.3	H	3.0	37.3	1.0	-64.6	-13.0	-51.6	
2.510	-24.6	H	3.0	36.4	1.0	-59.9	-13.0	-46.9	
3.346	-20.7	H	3.0	35.8	1.0	-55.4	-13.0	-42.4	
High Ch, 848.8MHz									
1.698	-27.3	V	3.0	37.3	1.0	-63.6	-13.0	-50.6	
2.547	-24.0	V	3.0	36.3	1.0	-59.3	-13.0	-46.3	
3.395	-22.2	V	3.0	35.7	1.0	-56.9	-13.0	-43.9	
1.698	-28.0	H	3.0	37.3	1.0	-64.3	-13.0	-51.3	
2.547	-25.4	H	3.0	36.3	1.0	-60.7	-13.0	-47.7	
3.395	-22.3	H	3.0	35.7	1.0	-57.0	-13.0	-44.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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

UL Verification Services
Above 1GHz High Frequency Substitution Measurement

Company: LG Electronics
Project #: 14I19589
Date: 12/29/14
Test Engineer: L. Lara
Configuration: EUT Y-position with AC charger and HS
Mode: GPRS 850

Chamber	Pre-amplifer	Filter	Limit
3m Chamber	T34 8449B	Filter 1	Part 22

Band	f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
	Low Ch, 824.2MHz									
GSM 850	1.648	-28.6	V	3.0	37.4	1.0	-65.0	-13.0	-52.0	
	2.473	-23.6	V	3.0	36.4	1.0	-59.0	-13.0	-46.0	
	3.297	-21.0	V	3.0	35.8	1.0	-55.8	-13.0	-42.8	
	1.648	-28.0	H	3.0	37.4	1.0	-64.4	-13.0	-51.4	
	2.473	-24.3	H	3.0	36.4	1.0	-59.7	-13.0	-46.7	
	3.297	-21.6	H	3.0	35.8	1.0	-56.4	-13.0	-43.4	
	Mid Ch, 836.6MHz									
GPRS	1.673	-28.1	V	3.0	37.3	1.0	-64.4	-13.0	-51.4	
	2.510	-22.9	V	3.0	36.4	1.0	-58.3	-13.0	-45.3	
	3.346	-20.9	V	3.0	35.8	1.0	-55.6	-13.0	-42.6	
	1.673	-28.2	H	3.0	37.3	1.0	-64.5	-13.0	-51.5	
	2.510	-24.6	H	3.0	36.4	1.0	-60.0	-13.0	-47.0	
	3.346	-21.0	H	3.0	35.8	1.0	-55.7	-13.0	-42.7	
	High Ch, 848.8MHz									
	1.698	-27.9	V	3.0	37.3	1.0	-64.2	-13.0	-51.2	
	2.547	-22.7	V	3.0	36.3	1.0	-58.1	-13.0	-45.1	
	3.395	-21.5	V	3.0	35.7	1.0	-56.2	-13.0	-43.2	
	1.698	-27.8	H	3.0	37.3	1.0	-64.1	-13.0	-51.1	
	2.547	-25.3	H	3.0	36.3	1.0	-60.7	-13.0	-47.7	
	3.395	-22.3	H	3.0	35.7	1.0	-57.0	-13.0	-44.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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