FCC CFR47 PART 27 SUBPART F

CERTIFICATION TEST REPORT

FOR

LTE Watch + BLUETOOTH and WLAN 2.4GHz b/g/n & NFC

MODEL NUMBER: LG-W200V, LGW200V, W200V, LG-W200VW, LGW200VW, W200VW

FCC ID: ZNFW200V

REPORT NUMBER: 15I21799-E1V1

ISSUE DATE: SEPTEMBER 28, 2015

Prepared for

LG ELECTRONICS MOBILECOMM U.S.A., INC
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Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	09/28/15	Initial Issue	

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

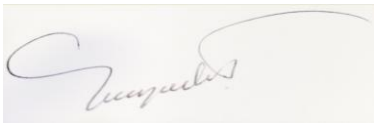
COMPANY NAME:	LG ELECTRONICS MOBILECOMM U.S.A., INC.
EUT DESCRIPTION:	LTE Watch + Bluetooth and WLAN 2.4GHz b/g/n & NFC
MODEL:	LG-W200V, LGW200V, W200V, LG-W200VW, LGW200VW, W200VW
SERIAL NUMBER:	0a930e7384e9da39 (Conducted); 0a930d208484da47 (Radiated)
DATE TESTED:	SEPTEMBER 17 – 21, 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 27F	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.

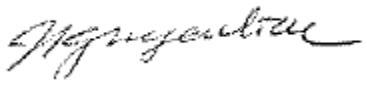
Approved & Released
For UL Verification Services Inc. By:



VIEN TRAN
CONSUMER TECHNOLOGY DIVISION
WiSE SENIOR ENGINEER
UL VERIFICATION SERVICES INC

DAN CORONIA
CONSUMER TECHNOLOGY DIVISION
WiSE PROJECT LEAD
UL VERIFICATION SERVICES INC

Tested By:



LIEU NGUYEN
CONSUMER TECHNOLOGY DIVISION
WiSE LAB ENGINEER
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 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)

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 1000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a LTE Watch with Bluetooth and WLAN 2.4GHz b/g/n & NFC.

5.2. MAXIMUM OUTPUT POWER (LTE)

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

LTE Band 13

FCC Part 27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation mW	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE13	777~787	10MHz	QPSK	23.4	218.78	22.75	188.36
	777~787	10MHz	16QAM	22.4	173.78	22.24	167.49

FCC Part 27							
Band	Frequency Range(MHz)	BandWidth (MHz)	Modulation mW	Conducted		Radiated	
				AVG(dBm)	AVG(mW)	AVG(dBm)	AVG(mW)
LTE13	777~787	5MHz	QPSK	23.5	223.87	22.95	197.24
	777~787	5MHz	16QAM	22.3	169.82	21.65	146.22

5.3. 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)
LTE 13, 777~787	-0.1

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	MCS-02WR	RA71011271	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

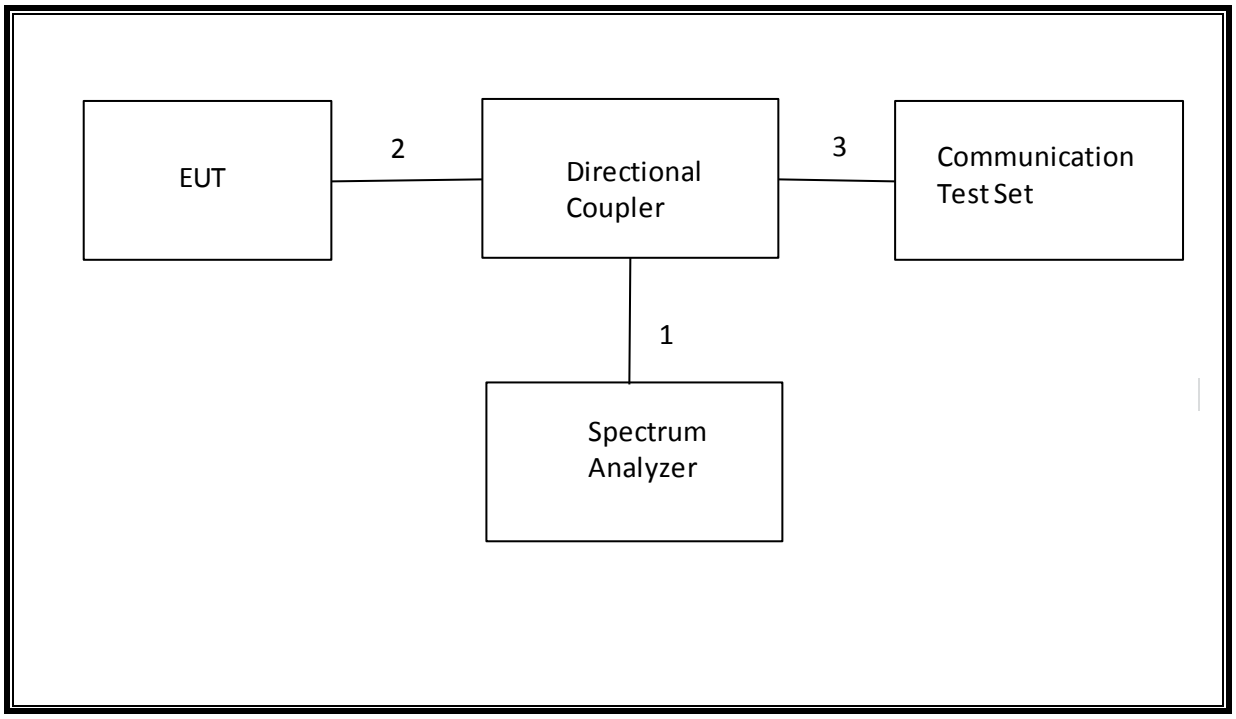
I/O CABLES (RADIATED SETUP)

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

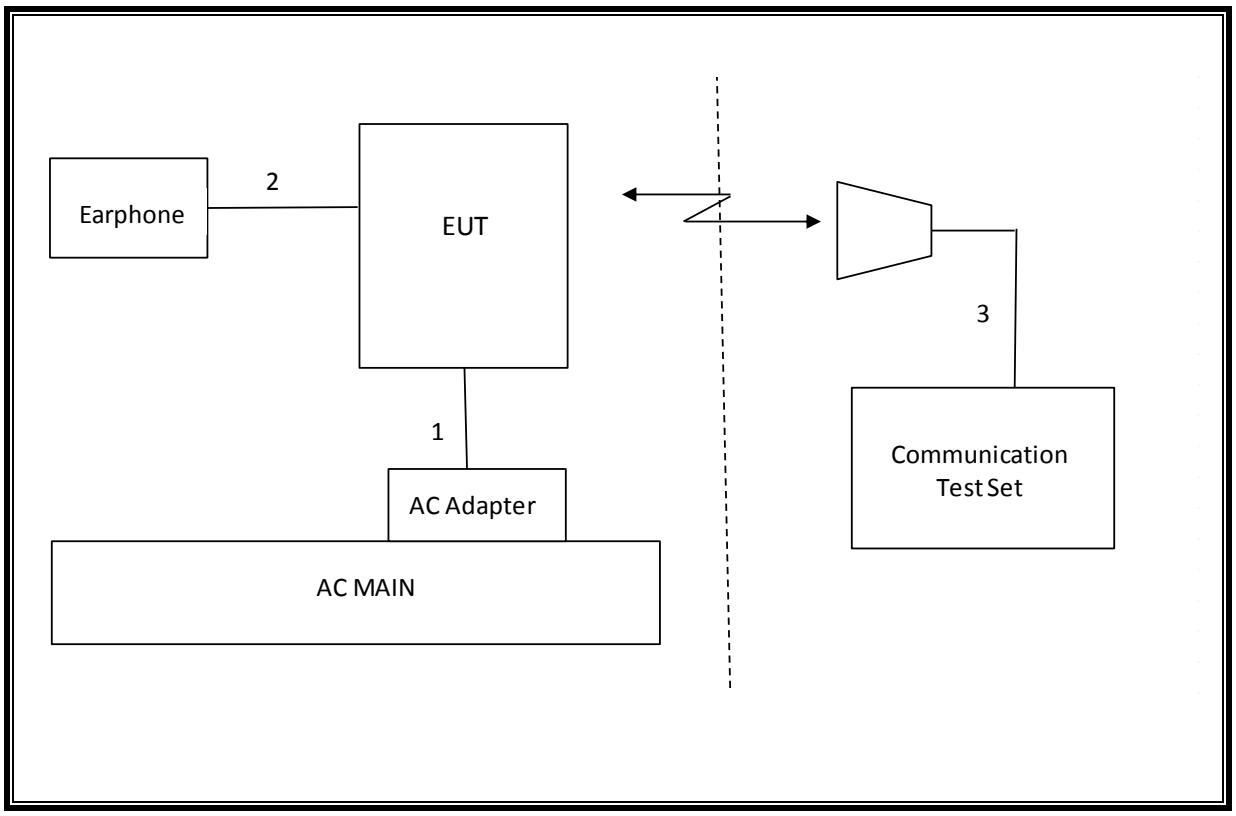
TEST SETUP

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

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



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	02/26/16
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	04/22/16
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	01/09/16
Communications Test Set	R&S	CMW500	T159	07/02/16
DC power supply, 8 V @ 3 A or 15 V	Agilent / HP	E3610A	None	CNR
Vector signal generator, 6 GHz	Agilent / HP	E4438C	None	06/18/16
Antenna, Tuned Dipole 400~1000	ETS	3121C DB4	C00993	02/14/16
Directional Coupler	RF-Lambda	RFDC5M06G15	None	CNR
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/15

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Version 9.5, 07/22/14
Conducted Software	UL	UL EMC	Version 9.5, 05/17/14
CLT Software	UL	UL RF	Version 1.0, 02/02/15
Antenna Port Software	UL	UL RF	Version 2.1.1.1, 1/20/15

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	8.94 MHz
27.53(g)	N/A	Band Edge / Conducted Spurious Emission	-13dBm		Pass	-29.15 dBm
2.1046	N/A	Conducted output power	N/A		Pass	23.5 dBm
27.54	N/A	Frequency Stability	2.5PPM		Pass	0.002 PPM
27.50(c)(10)	N/A	Effective Radiated Power	34.77 dBm	Radiated	Pass	22.95 dBm
27.53(g)	N/A	Radiated Spurious Emission	-13dBm		Pass	-56.5 dBm

9. LTE OUTPUT VERIFICATION

9.1.1. LTE OUTPUT RESULT

LTE Band 13

Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
						23230
						782 MHz
LTE Band 13	10	QPSK	1	0	0	23.30
			1	25	0	23.40
			1	49	0	23.40
			25	0	1	22.50
			25	12	1	22.60
			25	25	1	22.60
			50	0	1	22.60
		16QAM	1	0	1	22.30
			1	25	1	22.30
			1	49	1	22.40
			25	0	2	21.50
			25	12	2	21.60
			25	25	2	21.60
			50	0	2	21.60
Band	BW (MHz)	Mode	RB Allocation	RB offset	Target MPR	Avg Pwr (dBm)
						23230
						782 MHz
LTE Band 13	5	QPSK	1	0	0	23.40
			1	12	0	23.40
			1	24	0	23.50
			12	0	1	22.50
			12	7	1	22.60
			12	13	1	22.60
			25	0	1	22.60
		16QAM	1	0	1	22.20
			1	12	1	22.20
			1	24	1	22.30
			12	0	2	21.50
			12	7	2	21.60
			12	13	2	21.60
			25	0	2	21.70

10. PEAK TO AVERAGE RATIO

Test Procedure

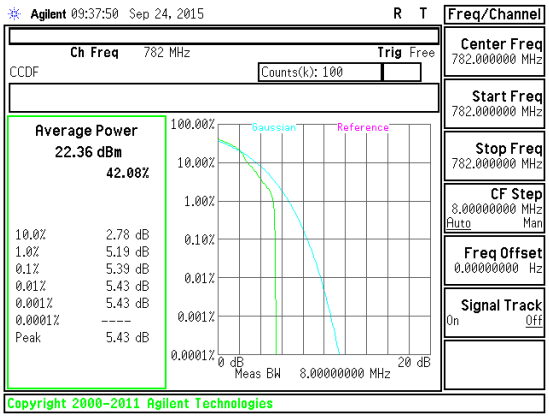
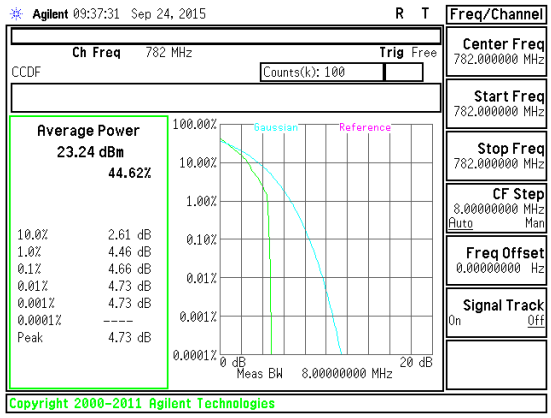
Per KDB 971168 D01 Power Meas License Digital Systems v02r02

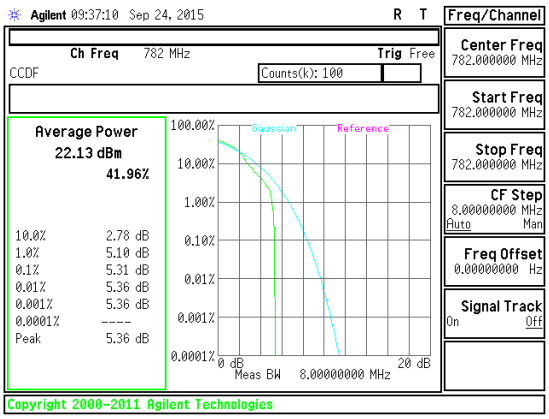
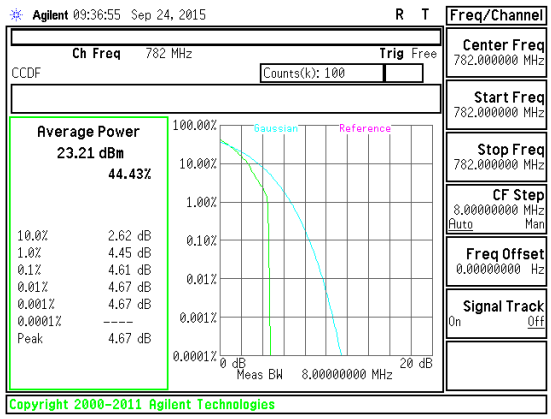
Test Spec

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

10.1. CONDUCTED PEAK TO AVERAGE RESULT

LTE Band 13

Band LTE13 10MHz	 Band LTE13 10MHz 16QAM Mid channel	 Band LTE13 10MHz QPSK Mid channel

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

11. LIMITS AND CONDUCTED RESULTS

11.1. 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 v02r02)

MODES TESTED

LTE

RESULTS

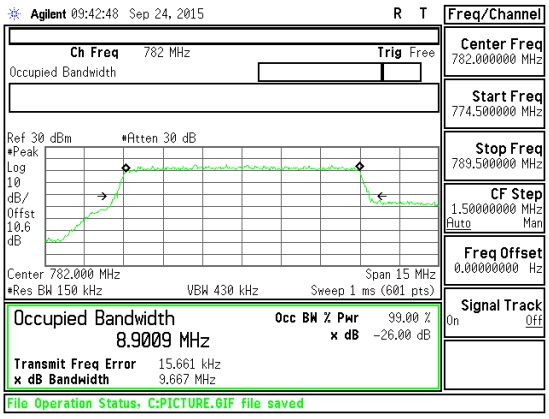
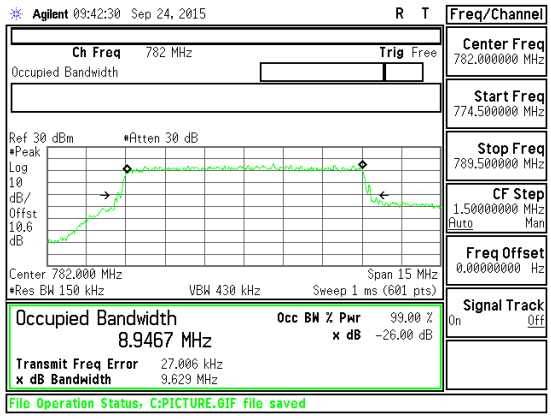
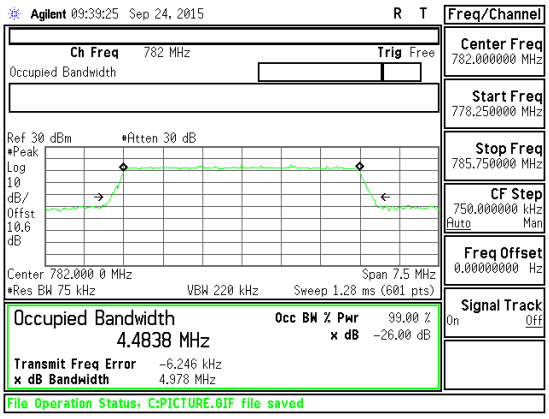
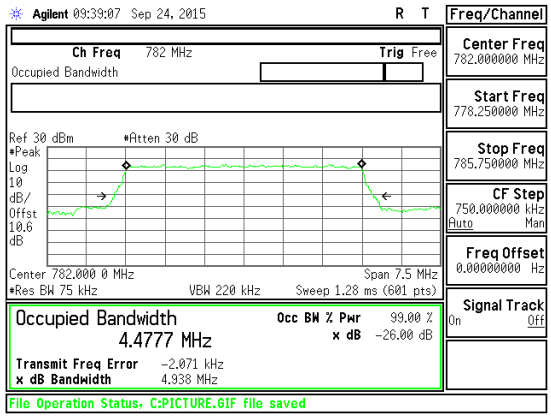
11.1.1. OCCUPIED BANDWIDTH RESULTS

LTE Band 13

Band	BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
LTE13	10	QPSK	50/0	782	8.949	9.749
		16QAM	50/0	782	8.927	9.693
LTE13	5	QPSK	25/0	779.5	4.509	5.69
			25/0	782	4.478	4.938
			25/0	784.5	4.504	4.99
		16QAM	25/0	779.5	4.503	5.732
			25/0	782	4.484	4.978
			25/0	784.5	4.5	4.945

11.1.1. OCCUPIED BANDWIDTH PLOTS

LTE Band 13

Band LTE13 10MHz	 Band LTE13 10MHz 16QAM Mid channel	 Band LTE13 10MHz QPSK Mid channel
Band LTE13 5MHz 16QAM	 Band LTE13 5MHz CSE 16QAM Mid channel	 Band LTE13 5MHz CSE QPSK Mid channel

11.2. BAND EDGE EMISSIONS

RULE PART(S)

FCC: §27.53(g)

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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02
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.

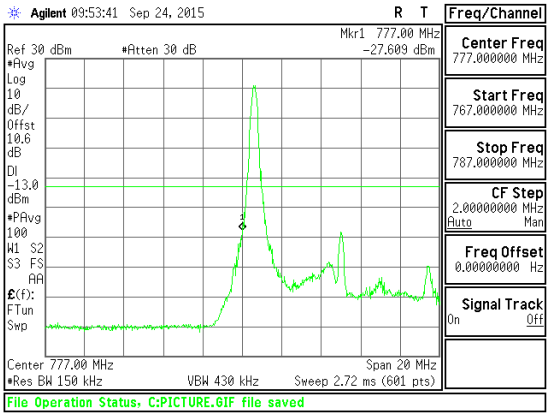
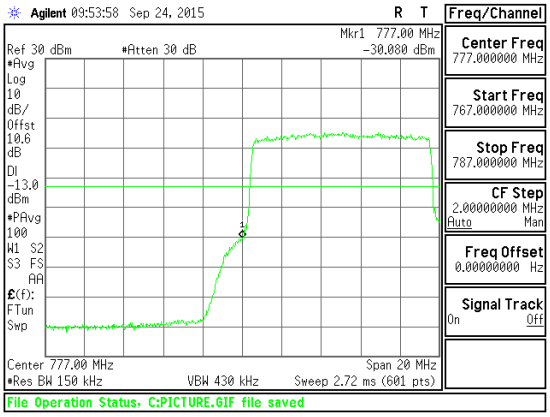
MODES TESTED

LTE

RESULTS

11.2.1. BAND EDGE PLOTS

LTE Band 13

Band LTE13 10MHz 16QAM		
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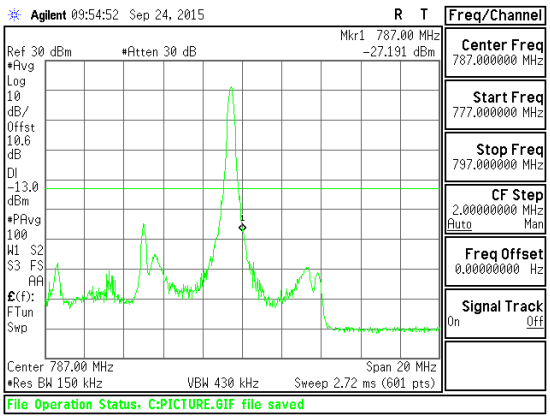
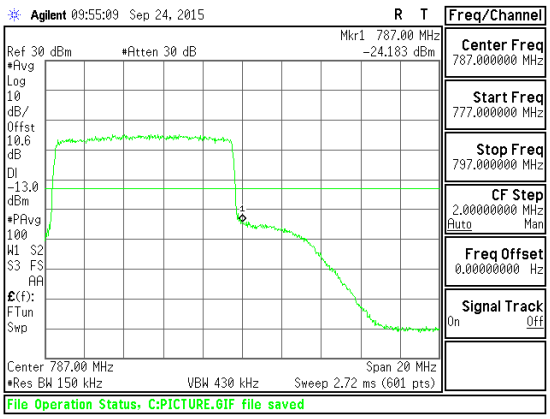
Band LTE13 10MHz QPSK		
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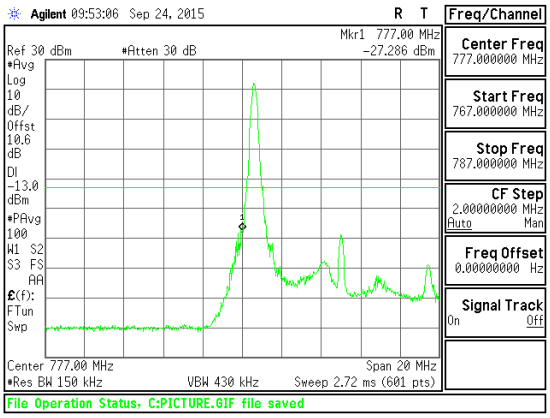
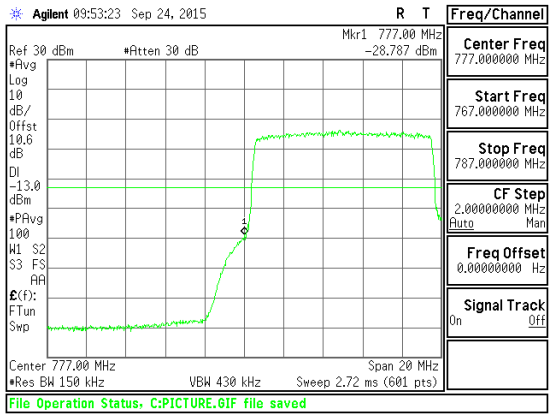
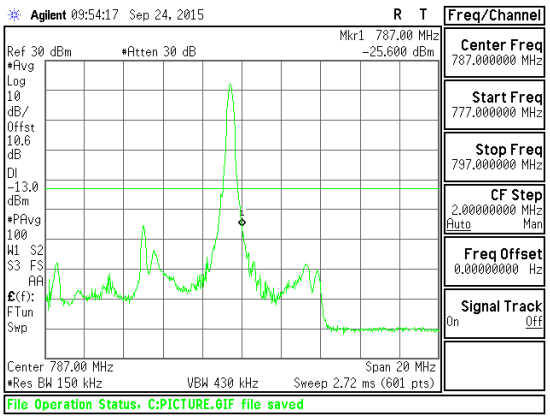
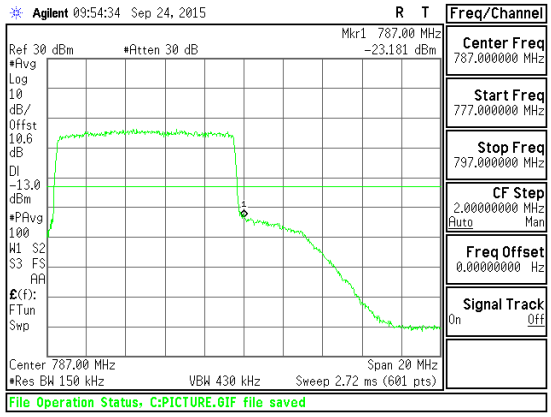
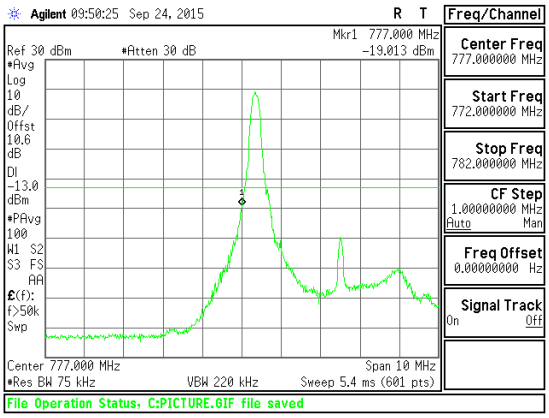
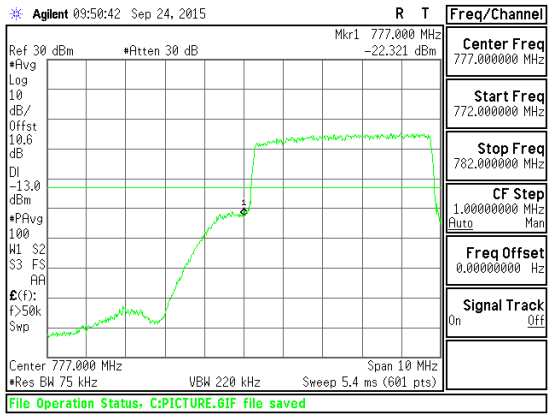
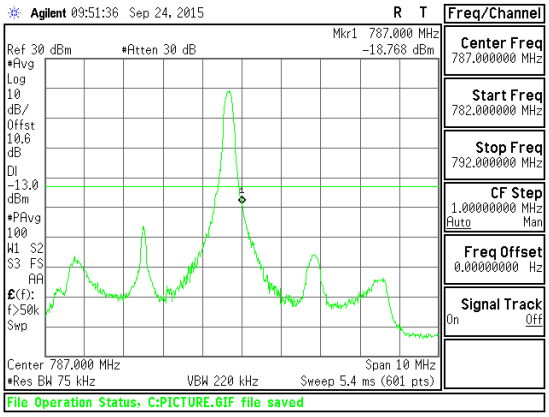
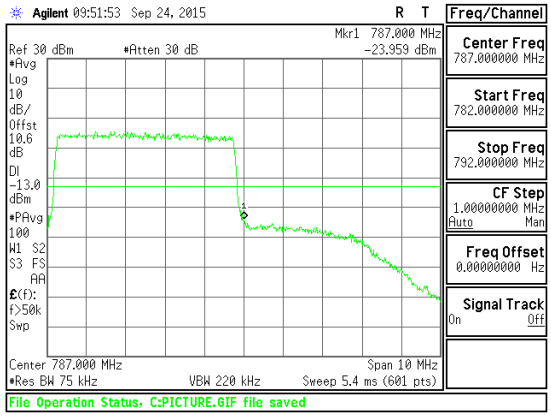
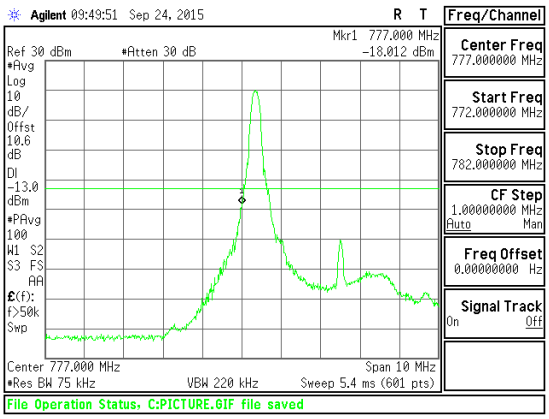
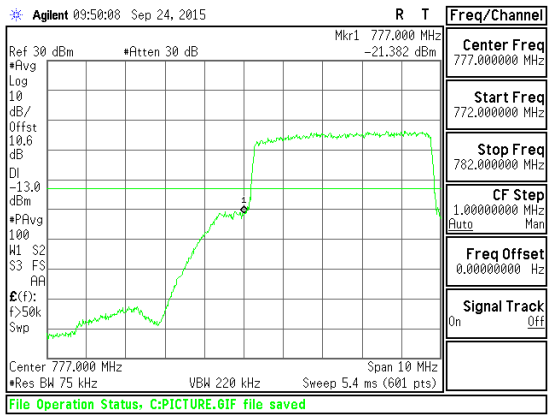
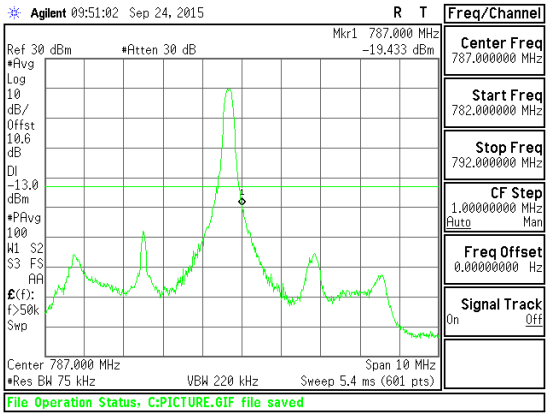
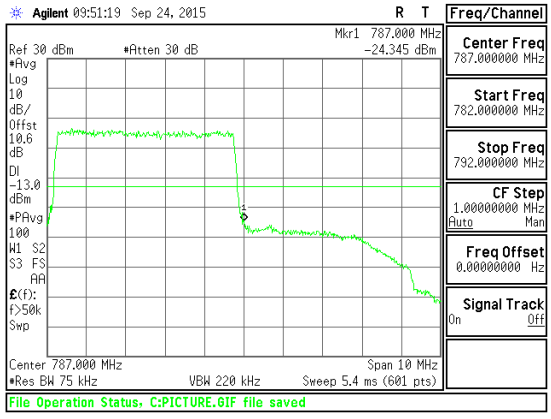
Band LTE13 10MHz 16QAM	 Band LTE13 10MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE13 10MHz CBE 16QAM Low Channel FRB.gif
Band LTE13 10MHz QPSK	 Band LTE13 10MHz CBE QPSK High Channel 1RB.gif	 Band LTE13 10MHz CBE QPSK High Channel FRB.gif

Band LTE13 5MHz 16QAM	 Band LTE13 5MHz CBE 16QAM Low Channel 1RB.gif	 Band LTE13 5MHz CBE 16QAM Low Channel FRB.gif
Band LTE13 5MHz 16QAM	 Band LTE13 5MHz CBE 16QAM High Channel 1RB.gif	 Band LTE13 5MHz CBE 16QAM High Channel FRB.gif

Band LTE13 5MHz QPSK	 Band LTE13 5MHz CBE QPSK Low Channel 1RB.gif	 Band LTE13 5MHz CBE QPSK Low Channel FRB.gif
Band LTE13 5MHz QPSK	 Band LTE13 5MHz CBE QPSK High Channel 1RB.gif	 Band LTE13 5MHz CBE QPSK High Channel FRB.gif

11.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §27.53(g)

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.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

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

MODES TESTED

LTE

RESULTS

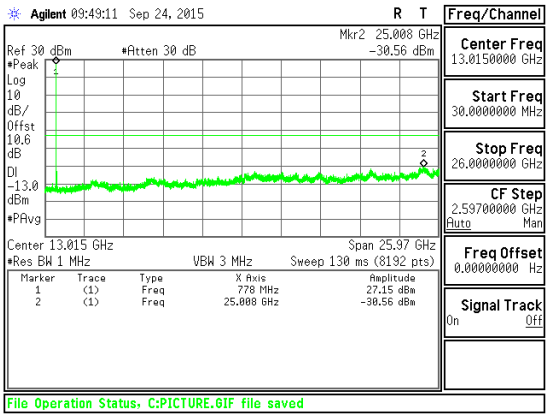
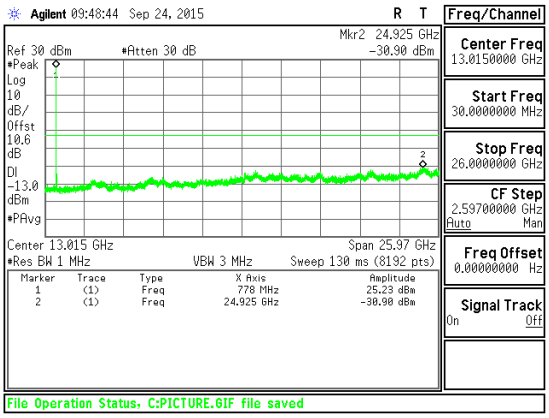
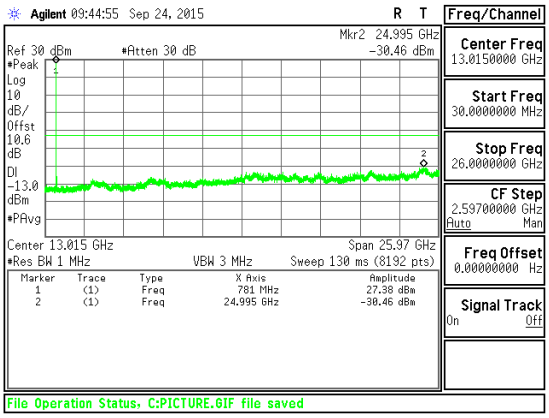
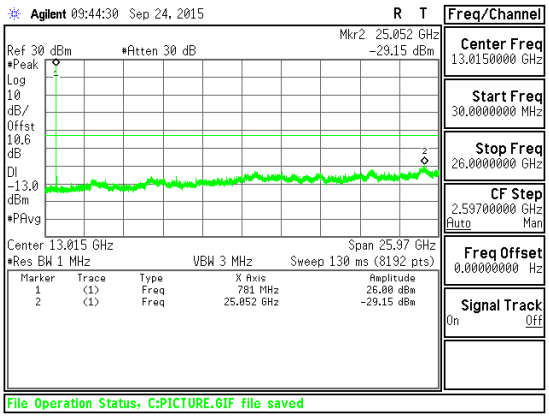
11.3.1. OUT OF BAND EMISSIONS RESULT

LTE Band 13

Band	BW (MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
LTE13	10	QPSK	782	-29.725	-13	-16.725
		16QAM	782	-30.274	-13	-17.274
	5	QPSK	779.5	-30.042	-13	-17.042
			782	-29.152	-13	-16.152
			784.5	-30.523	-13	-17.523
		16QAM	779.5	-30.394	-13	-17.394
			782	-30.462	-13	-17.462
			784.5	-29.876	-13	-16.876

11.3.2. OUT OF BAND EMISSIONS PLOTS

LTE Band 13

Band LTE13 10MHz 16QAM		
	Band LTE13 10MHz CSE 16QAM Mid channel	Band LTE13 10MHz CSE QPSK Mid channel
Band LTE13 5MHz 16QAM		
	Band LTE13 5MHz CSE 16QAM Mid channel	Band LTE13 5MHz CSE QPSK Mid channel

12. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §27.54

LIMITS

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

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

MODES TESTED

LTE

RESULTS

See the following pages.

12.1.1. FREQUENCY STABILITY RESULTS

LTE Band 13, Frequency: 782 MHz – MID CHANNEL

Reference Frequency: Mid Channel		782	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		1955.000	Hz	
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	781.999996	0.002	2.5
3.80	40	781.999996	0.001	2.5
3.80	30	781.999997	0.000	2.5
3.80	***20***	**781.999997**	**0**	***2.5***
3.80	10	781.999998	-0.001	2.5
3.80	0	781.999998	-0.002	2.5
3.80	-10	782.000001	-0.005	2.5
3.80	-20	782.000002	-0.006	2.5
3.80	-30	782.000002	-0.006	2.5

Reference Frequency: PCS Mid Channel		782	MHz @ 20°C	
Limit: to stay +- 2.5 ppm =		1955.000	Hz	
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***781.999997***	***0***	***2.5***
4.37	20	781.999997	*0.000*	2.5
3.23(End of volt)	20	781.999997	*0.001*	2.5

13. RADIATED TEST RESULTS

13.1. RADIATED POWER (ERP)

RULE PART(S)

FCC: §2.1046, §27.50(c) (10)

LIMITS

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)

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

TEST PROCEDURE

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

For peak power measurement with a PSA:

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

For average power measurement with a PSA:

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

MODES TESTED

LTE

TEST RESULTS

13.1.1. LTE ERP/EIRP Results

LTE Band 13

Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP	
					dBm	mW
LTE13	10	QPSK	1/0	782.00	22.75	188.36
		16QAM	1/0	782.00	22.24	167.49
Band	BW (MHz)	Mode	RB/RB Size	f (MHz)	ERP	
					dBm	mW
LTE13	5	QPSK	1/0	779.5	22.95	197.24
			1/0	782	22.48	177.01
			1/0	784.5	21.57	143.55
		16QAM	1/0	779.5	21.65	146.22
			1/0	782	21.13	129.72
			1/0	784.5	20.57	114.02

13.1.2. ERP/EIRP PLOTS

LTE Band 13

Band
LTE13
10MHz
16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	LG Electronics
Project #:	15I21799
Date:	9/22/2015
Test Engineer:	Lieu Nguyen
Configuration:	EUT only
Location:	Chamber C
Mode:	LTE_16QAM Band 13 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Dipole T185, and Chamber C SMA Cables
Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
782.00	15.90	V	0.9	0.0	15.00	34.8	-19.8	
782.00	23.14	H	0.9	0.0	22.24	34.8	-12.5	

Band

LTE13

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company:	LG Electronics
Project #:	15I21799
Date:	9/22/2015
Test Engineer:	Lieu Nguyen
Configuration:	EUT only
Location:	Chamber C
Mode:	LTE_QPSK Band 13 Fundamentals, 10MHz Bandwidth

Test Equipment:
Receiving: Dipole T185, and Chamber C SMA Cables
Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch								
782.00	16.32	V	0.9	0.0	15.42	34.8	-19.4	
782.00	23.65	H	0.9	0.0	22.75	34.8	-12.0	

Band

LTE13

5MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21799
Date: 9/18/2015
Test Engineer: Lieu Nguyen
Configuration: EUT only
Location: Chamber C
Mode: LTE_16QAM Band 13 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Dipole T185, and Chamber C SMA Cables
Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	13.50	V	0.9	0.0	12.60	34.8	-22.2	
779.50	22.55	H	0.9	0.0	21.65	34.8	-13.1	
Mid Ch								
782.00	15.05	V	0.9	0.0	14.15	34.8	-20.6	
782.00	22.03	H	0.9	0.0	21.13	34.8	-13.6	
High Ch								
784.50	17.11	V	0.9	0.0	16.21	34.8	-18.6	
784.50	21.47	H	0.9	0.0	20.57	34.8	-14.2	

Band

LTE13

5MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: LG
Project #: 15I21799
Date: 9/18/2015
Test Engineer: Lieu Nguyen
Configuration: EUT only
Location: Chamber C
Mode: LTE_QPSK Band 13 Fundamentals, 5MHz Bandwidth

Test Equipment:
Receiving: Dipole T185, and Chamber C SMA Cables
Substitution: Horn T60 Substitution, 4ft SMA Cable Warehouse

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
779.50	14.85	V	0.9	0.0	13.95	34.8	-20.8	
779.50	23.85	H	0.9	0.0	22.95	34.8	-11.8	
Mid Ch								
782.00	15.14	V	0.9	0.0	14.24	34.8	-20.5	
782.00	23.38	H	0.9	0.0	22.48	34.8	-12.3	
High Ch								
784.50	18.26	V	0.9	0.0	17.36	34.8	-17.4	
784.50	22.47	H	0.9	0.0	21.57	34.8	-13.2	

13.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §27.53(g)

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

LTE

RESULTS

13.2.1. SPURIOUS RADIATION PLOTS

LTE Band 13

Band

LTE13

10MHz

16QAM

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

Company:	LG Electronics
Project #:	15I21799
Date:	9/23/2015
Test Engineer:	Lieu Nguyen
Configuration:	EUT with AC Adapter
Location:	Chamber C
Mode:	LTE_16QAM Band 13 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
Mid Ch, 782									
1564.00	-20.8	V	3.0	37.1	1.0	-56.9	-13.0	-43.9	
2346.00	-24.5	V	3.0	36.5	1.0	-60.0	-13.0	-47.0	
3128.00	-22.1	V	3.0	36.3	1.0	-57.4	-13.0	-44.4	
1564.00	-21.2	H	3.0	37.1	1.0	-57.4	-13.0	-44.4	
2346.00	-25.4	H	3.0	36.5	1.0	-60.9	-13.0	-47.9	
3128.00	-23.4	H	3.0	36.3	1.0	-58.7	-13.0	-45.7	

Band

LTE13

10MHz

QPSK

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

Company: LG Electronics
Project #: 15I21799
Date: 9/23/2015
Test Engineer: Lieu Nguyen
Configuration: EUT with AC Adapter
Location: Chamber C
Mode: LTE_QPSK Band 13 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
Mid Ch, 782									
1564.00	-22.2	V	3.0	37.1	1.0	-58.4	-13.0	-45.4	
2346.00	-24.7	V	3.0	36.5	1.0	-60.2	-13.0	-47.2	
3128.00	-22.5	V	3.0	36.3	1.0	-57.7	-13.0	-44.7	
1564.00	-22.1	H	3.0	37.1	1.0	-58.3	-13.0	-45.3	
2346.00	-26.2	H	3.0	36.5	1.0	-61.7	-13.0	-48.7	
3128.00	-23.8	H	3.0	36.3	1.0	-59.1	-13.0	-46.1	

Band

LTE13

5MHz

16QAM

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

Company: LG Electronics
Project #: 15I21799
Date: 9/23/2015
Test Engineer: Lieu Nguyen
Configuration: EUT , AC Adapter
Location: Chamber C
Mode: LTE_16QAM Band 13 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, 779.5									
1559.00	-22.0	V	3.0	37.1	1.0	-58.1	-13.0	-45.1	
2338.50	-23.9	V	3.0	36.5	1.0	-59.4	-13.0	-46.4	
3118.00	-23.8	V	3.0	36.3	1.0	-59.1	-13.0	-46.1	
1559.00	-22.3	H	3.0	37.1	1.0	-58.5	-13.0	-45.5	
2338.50	-25.8	H	3.0	36.5	1.0	-61.3	-13.0	-48.3	
3118.00	-23.5	H	3.0	36.3	1.0	-58.7	-13.0	-45.7	
Mid Ch, 782									
1564.00	-20.6	V	3.0	37.1	1.0	-56.8	-13.0	-43.8	
2346.00	-24.9	V	3.0	36.5	1.0	-60.4	-13.0	-47.4	
3128.00	-23.0	V	3.0	36.3	1.0	-58.2	-13.0	-45.2	
1564.00	-20.3	H	3.0	37.1	1.0	-56.5	-13.0	-43.5	
2346.00	-25.8	H	3.0	36.5	1.0	-61.3	-13.0	-48.3	
3128.00	-22.4	H	3.0	36.3	1.0	-57.7	-13.0	-44.7	
High Ch, 784.5									
1569.00	-21.4	V	3.0	37.1	1.0	-57.5	-13.0	-44.5	
2353.50	-24.1	V	3.0	36.5	1.0	-59.6	-13.0	-46.6	
3138.00	-23.4	V	3.0	36.3	1.0	-58.6	-13.0	-45.6	
1569.00	-21.0	H	3.0	37.1	1.0	-57.2	-13.0	-44.2	
2353.50	-25.2	H	3.0	36.5	1.0	-60.7	-13.0	-47.7	
3138.00	-22.3	H	3.0	36.3	1.0	-57.6	-13.0	-44.6	

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

Company: LG Electronics
Project #: 15I21799
Date: 9/23/2015
Test Engineer: Lieu Nguyen
Configuration: EUT , AC Adapter
Location: Chamber C
Mode: LTE_QPSK Band 13 Harmonics, 5MHz Bandwidth

Band
LTE13
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, 779.5									
1559.00	-22.4	V	3.0	37.1	1.0	-58.6	-13.0	-45.6	
2338.50	-23.5	V	3.0	36.5	1.0	-59.0	-13.0	-46.0	
3118.00	-23.7	V	3.0	36.3	1.0	-59.0	-13.0	-46.0	
1559.00	-21.6	H	3.0	37.1	1.0	-57.7	-13.0	-44.7	
2338.50	-25.8	H	3.0	36.5	1.0	-61.3	-13.0	-48.3	
3118.00	-23.2	H	3.0	36.3	1.0	-58.4	-13.0	-45.4	
Mid Ch, 782									
1564.00	-20.4	V	3.0	37.1	1.0	-56.5	-13.0	-43.5	
2346.00	-24.3	V	3.0	36.5	1.0	-59.8	-13.0	-46.8	
3128.00	-23.3	V	3.0	36.3	1.0	-58.6	-13.0	-45.6	
1564.00	-19.6	H	3.0	37.1	1.0	-55.7	-13.0	-42.7	
2346.00	-24.6	H	3.0	36.5	1.0	-60.1	-13.0	-47.1	
3128.00	-23.0	H	3.0	36.3	1.0	-58.2	-13.0	-45.2	
High Ch, 784.5									
1569.00	-21.3	V	3.0	37.1	1.0	-57.4	-13.0	-44.4	
2353.50	-24.1	V	3.0	36.5	1.0	-59.6	-13.0	-46.6	
3138.00	-23.1	V	3.0	36.3	1.0	-58.4	-13.0	-45.4	
1569.00	-21.0	H	3.0	37.1	1.0	-57.1	-13.0	-44.1	
2353.50	-25.0	H	3.0	36.5	1.0	-60.5	-13.0	-47.5	
3138.00	-22.5	H	3.0	36.3	1.0	-57.8	-13.0	-44.8	