

PCTEST ENGINEERING LABORATORY, INC.

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# MEASUREMENT REPORT FCC Part 22, 24, & 27 LTE

#### Applicant Name:

LG Electronics MobileComm U.S.A 1000 Sylvan Avenue Englewood Cliffs, NJ 07632 United States

Date of Testing: July 06 - 22, 2016 **Test Site/Location:** PCTEST Lab., Columbia, MD, USA **Test Report Serial No.:** 0Y1607051164.ZNF

### ZNFLS676

# **APPLICANT:**

FCC ID :

## LG ELECTRONICS MOBILECOMM U.S.A

**Application Type: FCC Classification:** FCC Rule Part(s): Test Procedure(s): EUT Type: Model(s): **Test Device Serial No.:**  Certification PCS Licensed Transmitter Held to Ear (PCE) §2; §22; §24; §27 ANSI/TIA-603-D-2010, KDB 971168 D01 v02r02 Portable Handset LGLS676, LG-LS676, LS676 identical prototype [S/N: 2MQ64]

				ERP		
Mode	Tx Frequency (MHz)	Emission Designator	Modulation	Max. Power (W)	Max. Pow er (dBm)	
LTE Band 12	699.7 - 715.3	1M11G7D	QPSK	0.087	19.39	
LTE Band 12	699.7 - 715.3	1M13W7D	16QAM	0.072	18.56	
LTE Band 12	700.5 - 714.5	2M73G7D	QPSK	0.085	19.32	
LTE Band 12	700.5 - 714.5	2M73W7D	16QAM	0.071	18.50	
LTE Band 12	701.5 - 713.5	4M50G7D	QPSK	0.088	19.45	
LTE Band 12	701.5 - 713.5	4M51W7D	16QAM	0.076	18.79	
LTE Band 12	704 - 711	8M95G7D	QPSK	0.086	19.32	
LTE Band 12	704 - 711	8M97W7D	16QAM	0.072	18.60	
LTE Band 5/26	824.7 - 848.3	1M08G7D	QPSK	0.082	19.15	
LTE Band 5/26	824.7 - 848.3	1M09W7D	16QAM	0.069	18.40	
LTE Band 5/26	825.5 - 847.5	2M69G7D	QPSK	0.084	19.26	
LTE Band 5/26	825.5 - 847.5	2M69W7D	16QAM	0.067	18.29	
LTE Band 5/26	826.5 - 846.5	4M51G7D	QPSK	0.091	19.59	
LTE Band 5/26	826.5 - 846.5	4M52W7D	16QAM	0.076	18.82	
LTE Band 5/26	829 - 844	8M99G7D	QPSK	0.088	19.43	
LTE Band 5/26	829 - 844	8M92W7D	16QAM	0.078	18.94	
LTE Band 26	831.5 - 841.5	13M4G7D	QPSK	0.089	19.51	
LTE Band 26	831.5 - 841.5	13M4W7D	16QAM	0.074	18.71	

				EIRP		
Mode	Tx Frequency (MHz)	Emission Designator	Modulation			
	(			(W)	(dBm)	
LTE Band 4	1710.7 - 1754.3	1M11G7D	QPSK	0.278	24.44	
LTE Band 4	1710.7 - 1754.3	1M12W7D	16QAM	0.246	23.91	
LTE Band 4	1711.5 - 1753.5	2M71G7D	QPSK	0.271	24.32	
LTE Band 4	1711.5 - 1753.5	2M71W7D	16QAM	0.231	23.64	
LTE Band 4	1712.5 - 1752.5	4M50G7D	QPSK	0.305	24.84	
LTE Band 4	1712.5 - 1752.5	4M50W7D	16QAM	0.251	24.00	
LTE Band 4	1715 - 1750	8M97G7D	QPSK	0.300	24.77	
LTE Band 4	1715 - 1750	8M95W7D	16QAM	0.248	23.95	
LTE Band 4	1717.5 - 1747.5	13M5G7D	QPSK	0.283	24.52	
LTE Band 4	1717.5 - 1747.5	13M5W7D	16QAM	0.232	23.66	
LTE Band 4	1720 - 1745	17M9G7D	QPSK	0.271	24.33	
LTE Band 4	1720 - 1745	18M0W7D	16QAM	0.211	23.25	
LTE Band 2/25	1850.7 - 1914.3	1M12G7D	QPSK	0.331	25.20	
LTE Band 2/25	1850.7 - 1914.3	1M11W7D	16QAM	0.289	24.62	
LTE Band 2/25	1851.5 - 1913.5	2M71G7D	QPSK	0.336	25.27	
LTE Band 2/25	1851.5 - 1913.5	2M71W7D	16QAM	0.291	24.64	
LTE Band 2/25	1852.5 - 1912.5	4M50G7D	QPSK 0.331		25.20	
LTE Band 2/25	1852.5 - 1912.5	4M49W7D	16QAM 0.273		24.36	
LTE Band 2/25	1855 - 1910	8M99G7D	QPSK 0.345		25.38	
LTE Band 2/25	1855 - 1910	8M95W7D	16QAM 0.277		24.42	
LTE Band 2/25	1857.5 - 1907.5	13M5G7D	QPSK 0.265		24.23	
LTE Band 2/25	1857.5 - 1907.5	13M5W7D	16QAM	0.221	23.44	
LTE Band 2/25	1860 - 1905	18M0G7D	QPSK	0.268	24.27	
LTE Band 2/25	1860 - 1905	18M0W7D	16QAM	0.219	23.40	
LTE Band 41	2498.5 - 2687.5	4M51G7D	QPSK	0.289	24.61	
LTE Band 41	2498.5 - 2687.5	4M51W7D	16QAM	0.259	24.13	
LTE Band 41	2501 - 2685	8M99G7D	QPSK	0.278	24.44	
LTE Band 41	2501 - 2685	8M99W7D	16QAM	0.241	23.82	
LTE Band 41	2503.5 - 2682.5	13M5G7D	QPSK	0.270	24.31	
LTE Band 41	2503.5 - 2682.5	13M5W7D	16QAM	0.219	23.40	
LTE Band 41	2506 - 2680	18M0G7D	QPSK	0.261	24.17	
LTE Band 41	2506 - 2680	18M0W7D	16QAM	0.224	23.50	

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



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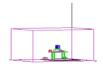


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# MEASUREMENT REPORT FCC Part 22, 24, & 27



## §2.1033 General Information

	-			
APPLICANT:	LG Electronics MobileComn	n U.S.A		
APPLICANT ADDRESS:	1000 Sylvan Avenue			
	Englewood Cliffs, NJ 07632	, United States		
TEST SITE:	PCTEST ENGINEERING LA	ABORATORY, INC.		
TEST SITE ADDRESS:	7185 Oakland Mills Road, Columbia, MD 21045 USA			
FCC RULE PART(S):	§2; §22; §24; §27			
BASE MODEL:	LGLS676			
FCC ID:	ZNFLS676			
FCC CLASSIFICATION:	PCS Licensed Transmitter H	Held to Ear (PCE)		
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm)			
Test Device Serial No.:	2MQ64	Production	Pre-Production	Engineering
DATE(S) OF TEST:	July 06 - 22, 2016			
TEST REPORT S/N:	0Y1607051164.ZNF			

### **Test Facility / Accreditations**

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
   PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and
  - PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
  - PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
  - PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
  - PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
  - PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
  - PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

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# 1.0 INTRODUCTION

### 1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

# 1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Internt'I (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2014 on January 22, 2015.

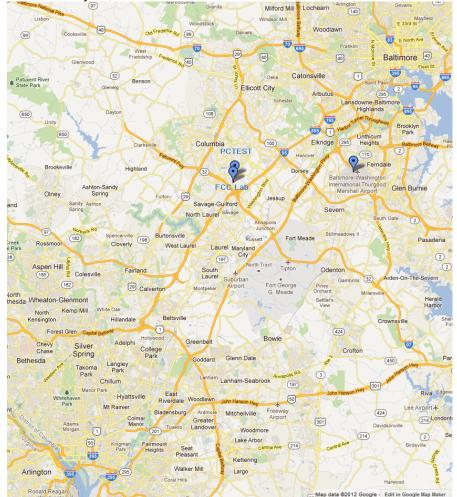


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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# 2.0 PRODUCT INFORMATION

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFLS676**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

## 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA, Multi-band LTE, 802.11b/g/n WLAN, Bluetooth (1x, EDR, LE)

LTE Band 26 (814.7 – 849 MHz) overlaps the entire frequency range of LTE Band 5 (824 – 849 MHz). Therefore, test data provided in this report covers Band 5 and the portion of Band 26 subject to Part 22.

LTE Band 25 (1850 - 1915 MHz) overlaps the entire frequency range of LTE Band 2 (1850 - 1910 MHz). Therefore, test data provided in this report covers Band 2 as well as Band 25.

## 2.3 Test Configuration

The LG Portable Handset FCC ID: ZNFLS676 was tested per the guidance of ANSI/TIA-603-D-2010 and KDB 971168 D01 v02r02. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

### 2.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

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# 3.0 DESCRIPTION OF TESTS

### 3.1 Measurement Procedure

The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-D-2010) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v02r02) were used in the measurement of the **LG Portable Handset FCC ID: ZNFLS676.** 

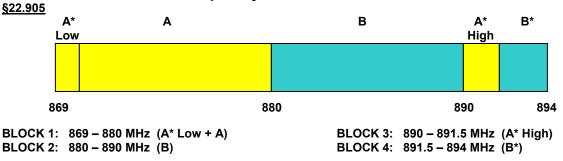
# 3.2 Block A Frequency Range

#### <u>§27.5(c)</u>

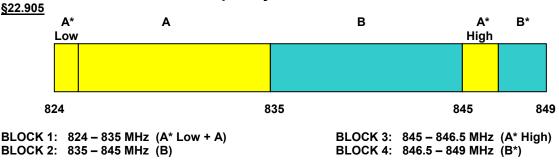
<u>698-746 MHz band</u>. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

Block A: 698-704 MHz and 728-734 MHz; Block B: 704-710 MHz and 734-740 MHz; and Block C: 710-716 MHz and 740-746 MHz.



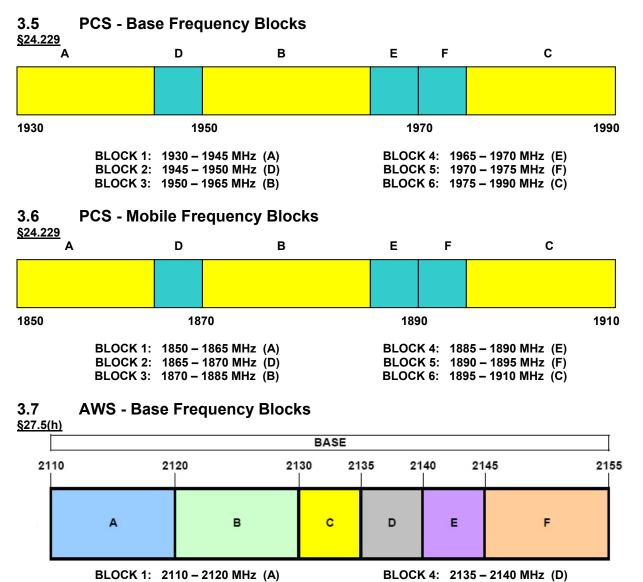


# 3.4 Cellular - Mobile Frequency Blocks



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BLOCK 2: 2120 - 2130 MHz (B)

BLOCK 3: 2130 - 2135 MHz (C)

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BLOCK 5: 2140 - 2145 MHz (E)

BLOCK 6: 2145 - 2155 MHz (F)



#### **AWS - Mobile Frequency Blocks** 3.8

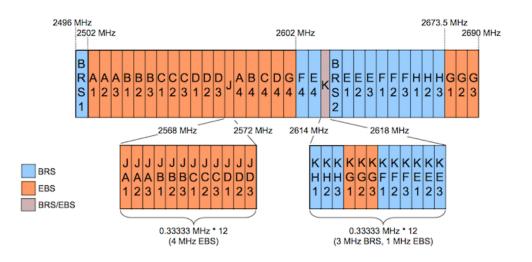
<u>§27.5(h)</u>



				MOBILE				4
17	10	17	20 17	30 17	35 17	<b>40</b> 17	45 1	755
	А		В	с	D	E	F	
	BLOC	K 2: 17	10 – 1720 MHz (A) 20 – 1730 MHz (B) 30 – 1735 MHz (C)		BLOCK	5: 1740 -	1740 MHz (D) 1745 MHz (E) 1755 MHz (F)	-

#### 3.9 **BRS/EBS Frequency Block**

<u>§27.5</u>



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#### **3.10** Radiated Power and Radiated Spurious Emissions §2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) §27.50(c.10) §27.50(d.4) §27.53(g) §27.53(h) §27.53(m)

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 72.4cm high PVC support structure is placed on top of the turntable. A 3" (~7.6cm) sheet of high density polystyrene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v02r02.

Per the guidance of ANSI/TIA-603-D-2010, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

 $P_{d [dBm]} = P_{g [dBm]} - cable loss_{[dB]} + antenna gain_{[dBd/dBi]}$ 

Where,  $P_d$  is the dipole equivalent power,  $P_g$  is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to  $P_{g \ [dBm]}$  – cable loss  $_{[dB]}$ .

The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10log<sub>10</sub>(Power <sub>[Watts]</sub>). For Band 41, the calculated  $P_d$  levels are compared to the absolute spurious emission limit of -25dBm which is equivalent to the required minimum attenuation of 55 + 10log<sub>10</sub>(Power <sub>[Watts]</sub>).

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# 4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement data shown herein meets or exceeds the  $U_{CISPR}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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# 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/11/2016	Annual	7/11/2017	RE1
-	LTx2	Licensed Transmitter Cable Set	5/12/2016	Annual	5/12/2017	LTx2
-	LTx3	Licensed Transmitter Cable Set	7/12/2016	Annual	7/12/2017	LTx3
Agilent	E5515C	Wireless Communications Test Set	1/29/2016	Biennial	1/29/2018	GB46310798
Agilent	N9020A	MXA Signal Analyzer	11/5/2015	Annual	11/5/2016	US46470561
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	7/30/2015	Biennial	7/30/2017	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	7/6/2016	Annual	7/6/2017	441119
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
Espec	ESX-2CA	Environmental Chamber	3/4/2016	Annual	3/4/2017	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/26/2016	Biennial	4/26/2018	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	10/22/2014	Biennial	10/22/2016	128338
K & L	13SH10-1000/U1000	N Type High Pass Filter	7/6/2016	Annual	7/6/2017	13SH10-1000/U1000-1
K & L	13SH10-1000/U1000	N Type High Pass Filter	7/11/2016	Annual	7/11/2017	13SH10-1000/U1000-2
K & L	11SH10-3075/U18000	High Pass Filter	7/11/2016	Annual	7/11/2017	11SH10-3075/U18000-2
K & L	11SH10-3075/U18000	High Pass Filter	7/18/2015	Annual	7/18/2016	11SH10-3075/U18000-4
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	3/4/2016	Annual	3/4/2017	11210140001
Mini-Circuits	TVA-11-422	RF Power Amp		N/A		QA1303002
PCTEST	-	EMC Switch System	7/11/2016	Annual	7/11/2017	NM1
PCTEST	-	EMC Switch System	7/6/2016	Annual	7/6/2017	NM2
Rhode & Schwarz	TS-PR18	Pre-Amplifier	7/6/2016	Annual	7/6/2017	101622
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		100976
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	7/11/2016	Annual	7/11/2017	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/7/2016	Annual	3/7/2017	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	5/16/2016	Annual	5/16/2017	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/15/2016	Annual	7/15/2017	100348
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	3/30/2016	Biennial	3/30/2018	9105-2404
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

Table 5-1. Test Equipment

#### Notes:

- 1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- 2. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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# 6.0 SAMPLE CALCULATIONS

### Emission Designator

#### **QPSK Modulation**

#### Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

#### 16QAM Modulation

#### Emission Designator = 8M45W7D

LTE BW = 8.45 MHz W = Amplitude/Angle Modulated 7 = Quantized/Digital Info D = Data transmission, telemetry, telecommand

## Spurious Radiated Emission – LTE Band

# Example: Middle Channel LTE Mode 2<sup>nd</sup> Harmonic (1564 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80).

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# 7.0 TEST RESULTS

## 7.1 Summary

Company Name:	LG Electronics MobileComm U.S.A
FCC ID:	ZNFLS676
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
TRANSMITTER M	ODE (TX)				
2.1049	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1051 22.917(a) 24.238(a) 27.53(g) 27.53(h)	Out of Band Emissions	> 43 + 10log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Section 7.3, 7.4
27.53(m)	Out of Band Emissions	<ul> <li>&gt; 43 + 10log<sub>10</sub> (P[Watts]) at channel edges and</li> <li>&gt; 55 + 10log<sub>10</sub> (P[Watts]) at 5.5MHz away and beyond channel edges</li> </ul>	CONDUCTED	PASS	Section 7.3, 7.4
24.232(d)	Peak-Average Ratio	< 13 dB		PASS	Section 7.5
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
2.1055. 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)		PASS	Section 7.8
22.913(a.2)	Effective Radiated Power (Band 5/26)	< 7 Watts max. ERP		PASS	Section 7.6
27.50(c.10)	Effective Radiated Power (Band 12)	< 3 Watts max. ERP		PASS	Section 7.6
24.232(c) 27.50(h.2)	Equivalent Isotropic Radiated Power (Band 2/25 41)	< 2 Watts max. EIRP		PASS	Section 7.6
27.50(d.4)	Equivalent Isotropic Radiated Power (Band 4)	< 1 Watts max. EIRP	RADIATED	PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(g) 27.53(h)	Undesirable Emissions	> 43 + 10log <sub>10</sub> (P[Watts]) for all out-of-band emissions		PASS	Section 7.7
27.53(m)	Undesirable Emissions	<ul> <li>&gt; 43 + 10log<sub>10</sub> (P[Watts]) at channel edges</li> <li>&gt; 55 + 10log<sub>10</sub> (P[Watts]) at 5.5MHz away and beyond channel edges</li> <li>Table 7.1. Summary of Toot Population</li> </ul>		PASS	Section 7.7

Table 7-1. Summary of Test Results

#### Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots (Sections 7.2, 7.3, 7.4, 7.5) were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 4.2.

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#### 7.2 **Occupied Bandwidth** §2.1049

### Test Overview

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

#### **Test Procedure Used**

KDB 971168 D01 v02r02 - Section 4.2

#### **Test Settings**

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 1 5% of the expected OBW
- 3. VBW  $\geq$  3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize
- 8. If necessary, steps 2 7 were repeated after changing the RBW such that it would be within

1 – 5% of the 99% occupied bandwidth observed in Step 7

#### Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

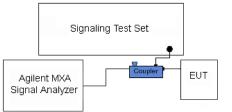


Figure 7-1. Test Instrument & Measurement Setup

#### Test Notes

None.

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Plot 7-1. Occupied Bandwidth Plot (Band 12 – 1.4MHz QPSK – RB Size 6)



Plot 7-2. Occupied Bandwidth Plot (Band 12 – 1.4MHz 16-QAM – RB Size 6)

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Keysight Spectrum Analyzer - Occupied BW							
X RF 50 Ω AC	CORREC #IFGain:Low	SENSE:INT Center Freq: 707.500000 MH Trig: Free Run Avg t #Atten: 36 dB	ALIGN AUTO z Hold: 100/100	04:22:01 PM Radio Std: I Radio Devic	None	Trace	Detector
10 dB/div Ref 30.00 dBm	•						
20.0	m	a.m.m.m.				с	lear Write
0 00 -10.0 -20.0 -30.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		h h	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ᢣᢧᡊᡙᡘᢑᠰᠩᢌ		Average
40.0							Max Hold
Center 707.5 MHz Res BW 75 kHz		#VBW 240 kHz			n 8 MHz 1.4 ms		Min Hol
	Occupied Bandwidth Total Power 29.3 dBm 2.7291 MHz						Detecto Peak
Transmit Freq Error	-1.118 kl	Hz % of OBW Po	ower 99	.00 %		Auto	Mai
x dB Bandwidth	2.988 MI	Hz x dB	-26.	00 dB			
SG			STATU	6			

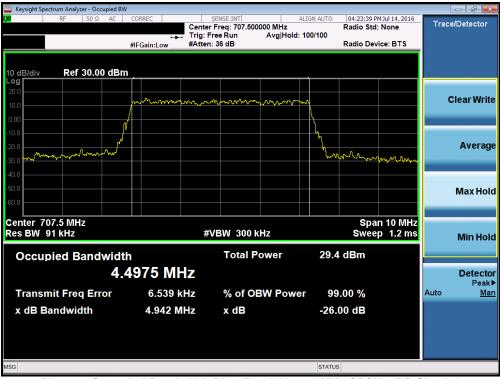
Plot 7-3. Occupied Bandwidth Plot (Band 12 – 3.0MHz QPSK – RB Size 15)



Plot 7-4. Occupied Bandwidth Plot (Band 12 – 3.0MHz 16-QAM – RB Size 15)

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Plot 7-5. Occupied Bandwidth Plot (Band 12 – 5.0MHz QPSK – RB Size 25)



Plot 7-6. Occupied Bandwidth Plot (Band 12 – 5.0MHz 16-QAM – RB Size 25)

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Plot 7-7. Occupied Bandwidth Plot (Band 12 – 10.0MHz QPSK – RB Size 50)



Plot 7-8. Occupied Bandwidth Plot (Band 12 – 10.0MHz 16-QAM – RB Size 50)

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Plot 7-9. Occupied Bandwidth Plot (Band 5/26 - 1.4MHz QPSK - RB Size 6)



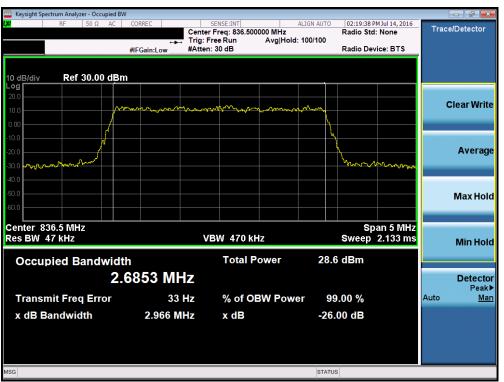
Plot 7-10. Occupied Bandwidth Plot (Band 5/26 - 1.4MHz 16-QAM - RB Size 6)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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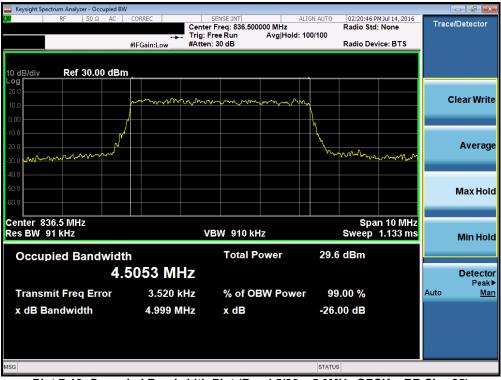
Plot 7-11. Occupied Bandwidth Plot (Band 5/26 - 3.0MHz QPSK - RB Size 15)



Plot 7-12. Occupied Bandwidth Plot (Band 5/26 – 3.0MHz 16-QAM – RB Size 15)

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Plot 7-13. Occupied Bandwidth Plot (Band 5/26 - 5.0MHz QPSK - RB Size 25)



Plot 7-14. Occupied Bandwidth Plot (Band 5/26 - 5.0MHz 16-QAM - RB Size 25)

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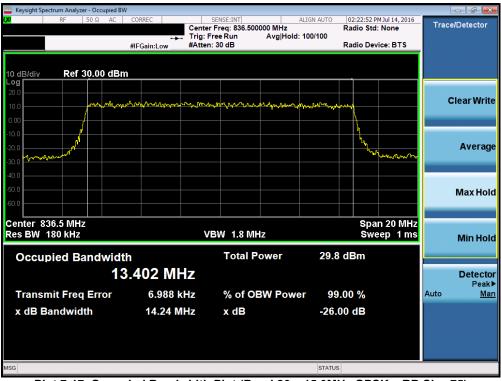
Plot 7-15. Occupied Bandwidth Plot (Band 5/26 - 10.0MHz QPSK - RB Size 50)



Plot 7-16. Occupied Bandwidth Plot (Band 5/26 - 10.0MHz 16-QAM - RB Size 50)

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Plot 7-17. Occupied Bandwidth Plot (Band 26 – 15.0MHz QPSK – RB Size 75)



Plot 7-18. Occupied Bandwidth Plot (Band 26 – 15.0MHz 16-QAM – RB Size 75)

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Plot 7-19. Occupied Bandwidth Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



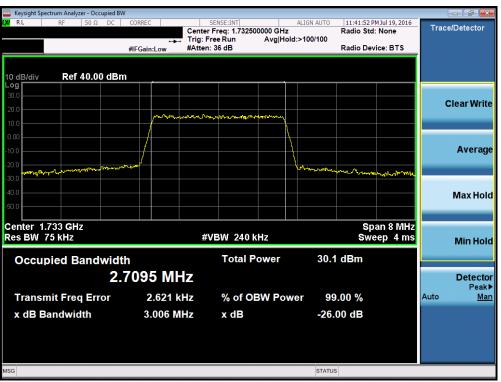
Plot 7-20. Occupied Bandwidth Plot (Band 4 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-21. Occupied Bandwidth Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Plot 7-22. Occupied Bandwidth Plot (Band 4 – 3.0MHz 16-QAM – RB Size 15)

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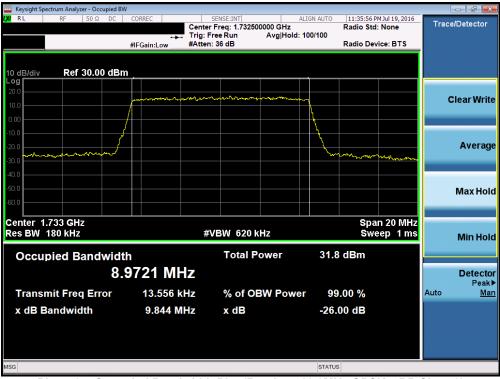
Plot 7-23. Occupied Bandwidth Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



Plot 7-24. Occupied Bandwidth Plot (Band 4 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: ZNFLS676	<u>PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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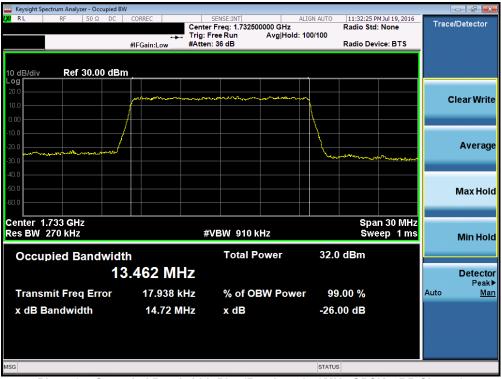
Plot 7-25. Occupied Bandwidth Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



Plot 7-26. Occupied Bandwidth Plot (Band 4 – 10.0MHz 16-QAM – RB Size 50)

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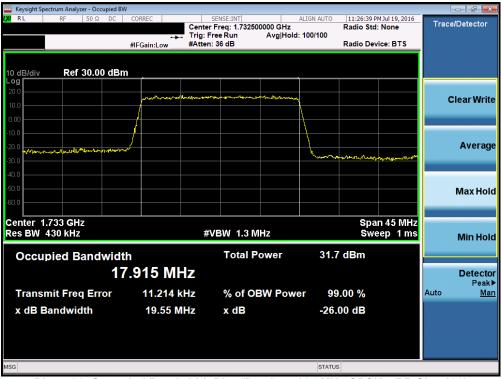
Plot 7-27. Occupied Bandwidth Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



Plot 7-28. Occupied Bandwidth Plot (Band 4 – 15.0MHz 16-QAM – RB Size 75)

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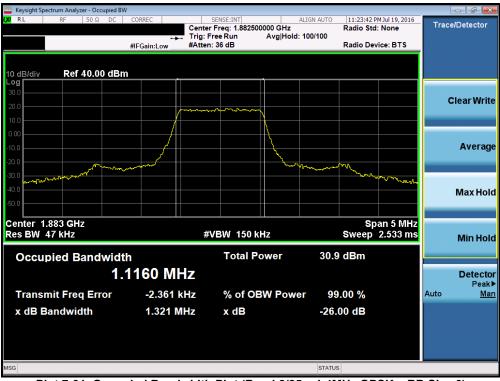
Plot 7-29. Occupied Bandwidth Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



Plot 7-30. Occupied Bandwidth Plot (Band 4 – 20.0MHz 16-QAM – RB Size 100)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-31. Occupied Bandwidth Plot (Band 2/25 - 1.4MHz QPSK - RB Size 6)



Plot 7-32. Occupied Bandwidth Plot (Band 2/25 - 1.4MHz 16-QAM - RB Size 6)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-33. Occupied Bandwidth Plot (Band 2/25 – 3.0MHz QPSK – RB Size 15)



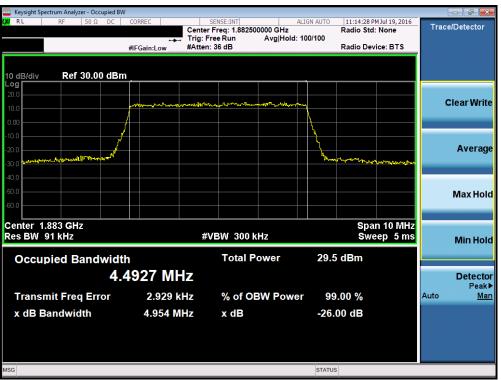
Plot 7-34. Occupied Bandwidth Plot (Band 2/25 – 3.0MHz 16-QAM – RB Size 15)

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Plot 7-35. Occupied Bandwidth Plot (Band 2/25 - 5.0MHz QPSK - RB Size 25)



Plot 7-36. Occupied Bandwidth Plot (Band 2/25 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-37. Occupied Bandwidth Plot (Band 2/25 – 10.0MHz QPSK – RB Size 50)



Plot 7-38. Occupied Bandwidth Plot (Band 2/25 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: ZNFLS676	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-39. Occupied Bandwidth Plot (Band 2/25 - 15.0MHz QPSK - RB Size 75)



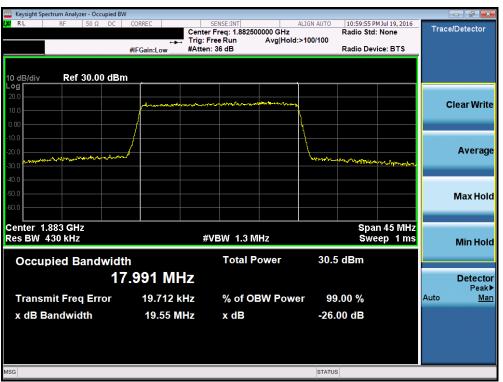
Plot 7-40. Occupied Bandwidth Plot (Band 2/25 – 15.0MHz 16-QAM – RB Size 75)

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Plot 7-41. Occupied Bandwidth Plot (Band 2/25 - 20.0MHz QPSK - RB Size 100)



Plot 7-42. Occupied Bandwidth Plot (Band 2/25 - 20.0MHz 16-QAM - RB Size 100)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-43. Occupied Bandwidth Plot (Band 41 – 5.0MHz QPSK – RB Size 25)



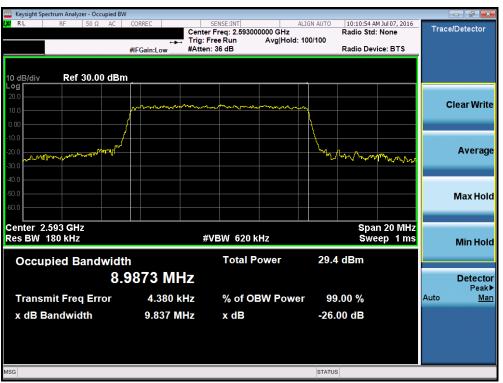
Plot 7-44. Occupied Bandwidth Plot (Band 41 - 5.0MHz 16-QAM - RB Size 25)

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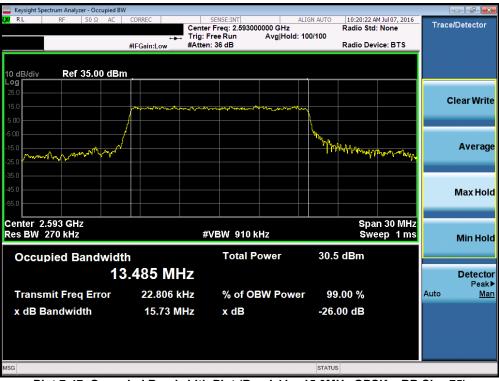
Plot 7-45. Occupied Bandwidth Plot (Band 41 – 10.0MHz QPSK – RB Size 50)



Plot 7-46. Occupied Bandwidth Plot (Band 41 – 10.0MHz 16-QAM – RB Size 50)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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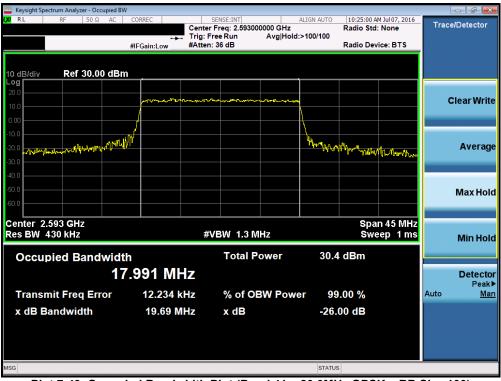
Plot 7-47. Occupied Bandwidth Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



Plot 7-48. Occupied Bandwidth Plot (Band 41 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-49. Occupied Bandwidth Plot (Band 41 – 20.0MHz QPSK – RB Size 100)



Plot 7-50. Occupied Bandwidth Plot (Band 41 - 20.0MHz 16-QAM - RB Size 100)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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#### 7.3 Spurious and Harmonic Emissions at Antenna Terminal §2.1051 §22.917(a) §24.238(a) §27.53(g) §27.53(h) §27.53(m)

# **Test Overview**

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

For Band 41, the minimum permissible attenuation level of any spurious emission is 55 +  $log_{10}(P_{IWatts1}).$ 

The minimum permissible attenuation level of any spurious emission is 43 + log<sub>10</sub>(P<sub>IWatts1</sub>), where P is the transmitter power in Watts.

## **Test Procedure Used**

KDB 971168 D01 v02r02 - Section 6.0

### Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to at least 10 \* the fundamental frequency (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

## Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

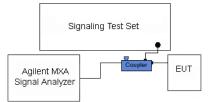


Figure 7-2. Test Instrument & Measurement Setup

## Test Notes

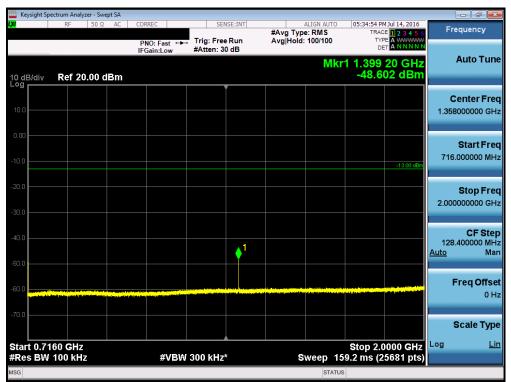
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. 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 emission are attenuated at least 26 dB below the transmitter power.

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🔤 Keysight Sp													
X	RF	50 Ω	AC	CORREC		SEI	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	MJul 14, 2016	Fr	equency
				PNO: Fa	ast ↔⊷ .ow	Trig: Free #Atten: 3		Avg Hold:		TYF			
10 dB/div Log	Ref 2	0.00 d	Bm						M	kr1 695. -45.2	20 MHz 53 dBm		Auto Tune
10.0													enter Freq .950000 MHz
-10.0											-13.00 dBm	30	Start Freq .000000 MHz
-20.0												697	<b>Stop Fred</b> .900000 MH;
-40.0											1	66 <u>Auto</u>	CF Step .790000 MH: Mar
-60.0											<mark>/</mark>		Freq Offse 0 Ha
-70.0													Scale Type
Start 30.0 #Res BW		z		;	¢VBW∶	300 kHz	*	s	weep <u>82</u>	Stop 6 .82 ms <u>(1</u>	97.9 MHz 3359 pts)	Log	<u>Lin</u>
MSG									STATUS				

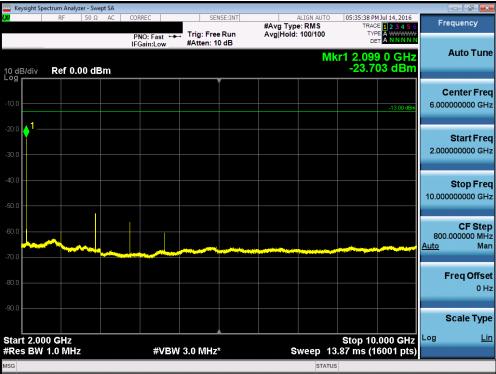
Plot 7-51. Conducted Spurious Plot (Band 12 – 10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)



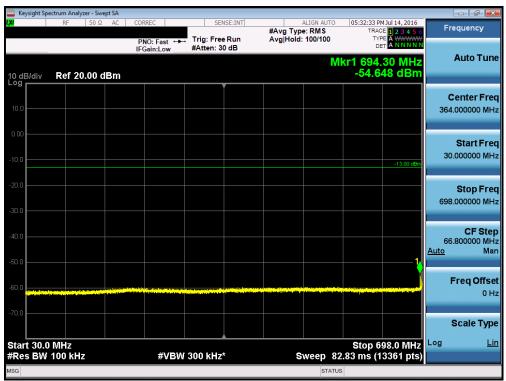
Plot 7-52. Conducted Spurious Plot (Band 12 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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Plot 7-53. Conducted Spurious Plot (Band 12 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 7-54. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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🔤 Keysight Spe	ectrum Analy	zer - Swep	t SA										
LXI	RF	50 Ω	AC	CORREC	ast 🛏		NSE:INT	#Avg Typ Avg Hold		TRAC	MJul 14, 2016 E 1 2 3 4 5 6 E A WWWW	Fr	equency
10 dB/div Log	Ref 20	).00 dE	3m	IFGain:L		#Atten: 3	0 dB	_	М	kr1 720.	70 MHz 35 dBm		Auto Tune
10.0													<b>Center Freq</b> 8000000 GHz
-10.0											-13.00 dBm	716	Start Freq 5.000000 MHz
-20.0												2.00	<b>Stop Freq</b> 0000000 GHz
-40.0												128 <u>Auto</u>	<b>CF Step</b> 8.400000 MHz Man
-60.0											De Lanselet (perfi		Freq Offsel 0 Hz
-70.0													Scale Type
Start 0.71 #Res BW	60 GHz 100 kHz	z		#	¢VBW	300 kHz	*	3	weep 15	Stop 2.0 9.2 ms (2	0000 GHz 5681 pts)	Log	Lin
MSG									STATUS	3			

Plot 7-55. Conducted Spurious Plot (Band 12 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



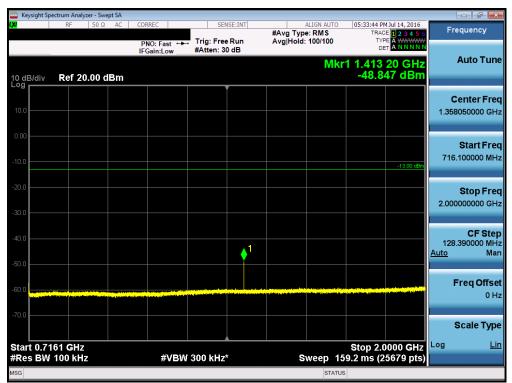
Plot 7-56. Conducted Spurious Plot (Band 12 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLS676	<u>PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Keysight Sp	oectrum Analyz	er - Swep	ot SA										
L <mark>XI</mark>	RF	50 Ω	AC	CORREC				#Avg Typ Avg Hold		TRAC	4Jul 14, 2016 E 1 2 3 4 5 6 E A WWWWW	Fr	equency
				PNO: Fa IFGain:L	ow	#Atten: 3		Avginoid		DE	ANNNN		A
10 dB/div Log	Ref 20	.00 dl	Зm						M	kr1 697. -48.8	80 MHz 47 dBm		Auto Tune
10.0													Center Freq
0.00													Start Freq
-10.0											-13.00 dBm	30	0.000000 MHz
-20.0												698	Stop Freq 3.000000 MHz
-30.0													CF Step
-50.0											1,	66 <u>Auto</u>	5.800000 MHz Man
-60.0													Freq Offset 0 Hz
-70.0													Scale Type
Start 30.0 #Res BW				#	(VBM	300 kHz	*		ween 82	Stop 6 2.83 ms (1	30.0 IVII 12	Log	<u>Lin</u>
MSG	NOT MIL			"		000 1112			STATU		ooon pro)		

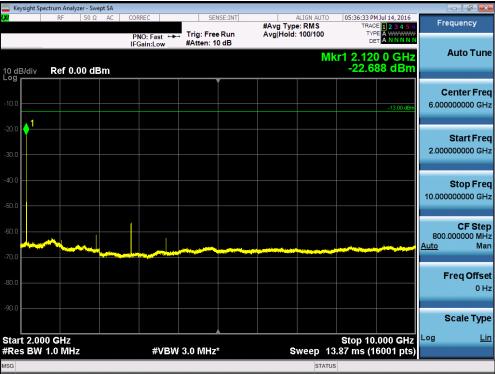
Plot 7-57. Conducted Spurious Plot (Band 12 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



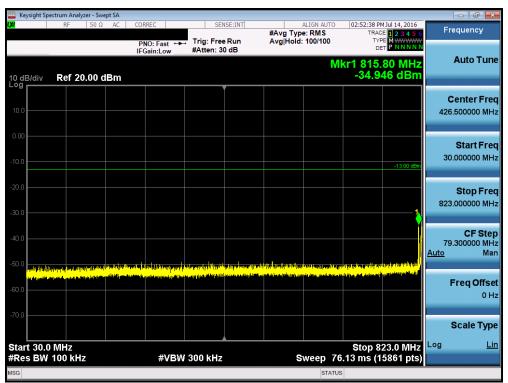
Plot 7-58. Conducted Spurious Plot (Band 12 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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Plot 7-59. Conducted Spurious Plot (Band 12 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



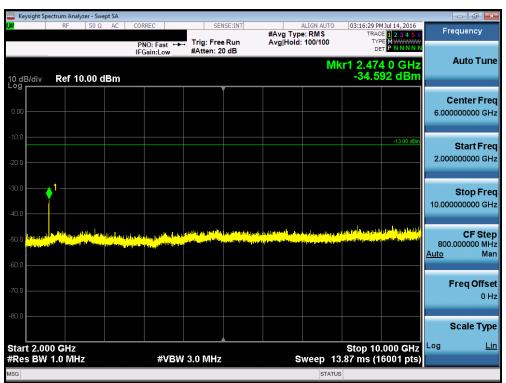
Plot 7-60. Conducted Spurious Plot (Band 5/26 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Keysight Sp	ectrum Analyz	er - Swep	ot SA										
L <mark>XI</mark>	RF	50 Ω	AC	CORREC			ISE:INT	#Avg Typ		TR4	PM Jul 14, 2016 CE 1 2 3 4 5 6 PE MWWWWW	F	requency
10 dB/div	Ref 20	00 dl	Bm	PNO: F IFGain:I	ast ↔ ₋ow	Trig: Free #Atten: 30		Avg Hold		ہ kr1 1.649	ET P NNNN		Auto Tune
10.0						,							<b>Center Freq</b> 4500000 GHz
-10.0											-13.00 dBm	84	Start Freq 9.000000 MHz
-20.0												2.00	Stop Freq 0000000 GHz
-40.0						twatting any	at to table double	- and the state state. Show	1	togilet state to produce the	and the second state the second	11! <u>Auto</u>	CF Step 5.100000 MHz Mar
-60.0	Landa Mayor (Marika Mayor) A firenana (Marika Marika) A firenana	in the second second			i na si si si si si si	apad bel a sign with the second	n ( ) an tha an an an an an an an an	an a	n a colorado de de	ي عاديدة عند المعربي المعطي التي عاديدة المعربي المعطي	n, frankræk i dje per mi mi krite		Freq Offse 0 Ha
-70.0										<u> </u>		Log	Scale Type
Start 0.84 #Res BW				ł	#VBW	300 kHz		s	weep	5.0p 2. 110.5 ms (	0000 GHz 23021 pts)	9	<u></u>
MSG									STAT	TUS			

Plot 7-61. Conducted Spurious Plot (Band 5/26 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



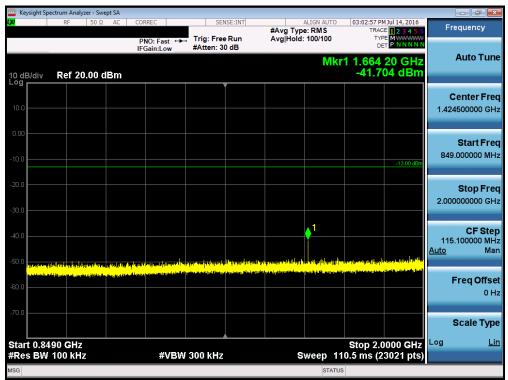
Plot 7-62. Conducted Spurious Plot (Band 5/26 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFLS676	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Spect	trum Analyzer - Swept SA					
<mark>x</mark> Marker 1 8	RF 50 Ω AC 323.350000000	CORREC MHZ PNO: Fast ↔→ IFGain:Low	SENSE:INT Trig: Free Run #Atten: 30 dB	ALIGN AUTO #Avg Type: RMS Avg Hold: 100/100	02:49:24 PM Jul 14, 2016 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N	Peak Search
10 dB/div	Ref 20.00 dBm			M	kr1 823.35 MHz -35.496 dBm	Next Peak
10.0						Next Pk Righ
10.00					-13.00 dBm	Next Pk Let
30.0					1	Marker Delt
40.0						Mkr→C
the second second	na na hEnna na hEnna Anna La Chuir an Anna Anna Anna Anna Anna Anna Anna	lanistiiliga) dagad dagal ja ja selyst Matao kan kiin pilaasi pisaa seta pisat	ng Sig aya Ayan ng Lawan di Kaya (Ang Calipa) Ng Katalay ng Kayan ng Kaya (Kang Calipa) (Kalipa) (Kalipa)	e gi den se processe de la construcción de la construcción de la construcción de la construcción de la constru La construcción de la construcción d	ng manana manana (ang ang sang sang sang sang sang sang sa	Mkr→RefL
70.0	MHz				Stop 824.0 MHz	Moi 1 of
Res BW 1	00 kHz	#VBW	300 kHz	Sweep 76	.22 ms (15881 pts)	

Plot 7-63. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



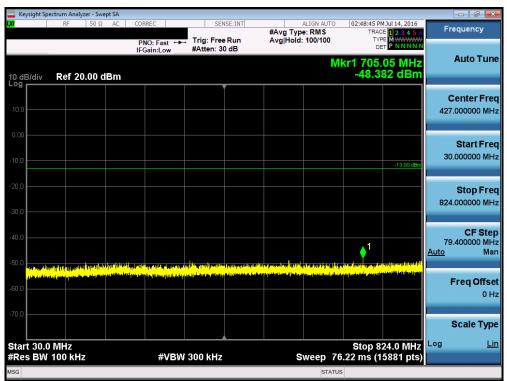
Plot 7-64. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLS676	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Key	sight Spectro													X
L <u>XI</u>		RF	50 Ω	AC		ast ⊶⊷	Trig: Free		#Avg Typ Avg Hold:		TRJ	PM Jul 14, 2016 ACE 1 2 3 4 5 6 YPE MWWWWW DET P N N N N N	Frequenc	У
10 dE Log	3/div	Ref 10	).00 d	Bm	IFGain:L	_OW	#Atten: 2	0 dB		N	/kr1 2.49	96 5 GHz 116 dBm	Auto 1	Tune
0.00													Center 6.000000000	
-10.0 -20.0												-13.00 dBm	Start 2.000000000	
-30.0 -40.0	1												Stop 10.000000000	
-50.0		ii an			alitica alla con					in dia manana dia mana Na sama dia manana dia m		ing ay an District Strange was a strange of the second strange of the second strange of the second strange of t	CF 800.000000 <u>Auto</u>	Step 0 MH Mar
-70.0													Freq O	Offse 0 H
-80.0													Scale	Type Lir
	t 2.000 s BW 1.		z		;	#VBW	3.0 MHz		s	weep	Stop 1 13.87 ms (	0.000 GHz 16001 pts)		
MSG										STA	TUS			

Plot 7-65. Conducted Spurious Plot (Band 5/26 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-66. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLS676	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Key	ysight Spec	trum Anal	yzer - Swe	pt SA										
L)XI		RF	50 Ω	AC		ast ↔	Trig: Free		#Avg Typ Avg Hold	ALIGN AUTO De: RMS I: 100/100	TRA	PM Jul 14, 2016 CE 1 2 3 4 5 6 PE M	Freq	uency
10 dE Log	B/div	Ref 2	0.00 d	Bm	IFGain:L	.ow	#Atten: 3	0 dB		M	(r1 1.679		A	uto Tune
10.0														<b>nter Freq</b> 00000 GHz
0.00 -10.0												-13.00 dBm		<b>Start Freq</b> 00000 MHz
-20.0 -30.0														<b>Stop Freq</b> 00000 GHz
-40.0						1.0 .			n. 1.1	<b>↓</b> 1		-ton to ask doublet	115.00 <u>Auto</u>	<b>CF Step</b> 00000 MHz Man
-50.0		and krasting at	1999 - C. 1999 -			a calleagair A calleagair		) if we print out (non-starting two-starting (non-starting		e ford te geologica de La ford de la ford de la ford	tin teneste in teneste finis	leken in der seinen der seinen seinen der seinen der seinen der seinen seinen seinen seinen seinen seinen seine	Fr	e <b>q Offset</b> 0 Hz
-70.0														ale Type
	t0.850 sBW 1				#	¢VBW	300 kHz		s	Sweep	Stop 2. 110.4 ms (	0000 GHz 23001 pts)	-	Lin
MSG										STAT	rus			

Plot 7-67. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-68. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLS676	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Keysight Spe	ctrum Analyze	er - Swept	t SA										
L <b>XI</b> RL	RF	50 Ω	DC	CORREC	ast 🖵	Trig: Fre		#Avg Typ	ALIGN AUTO e: RMS	TRA	M Jul 19, 2016 DE <mark>1 2 3 4 5</mark> 6 PE A WWWWW	F	requency
10 dB/div Log	Ref 20.	.00 dE	3m	IFGain:L	.ow	Atten: 30	) dB		Μ	kr1 1.70	9 0 GHz 87 dBm		Auto Tune
10.0													<b>Center Freq</b> 9.500000 MHz
-10.0											-13.00 dBm	3(	Start Freq 0.000000 MHz
-20.0											1	1.70	Stop Freq 9000000 GHz
-40.0												16 <sup>.</sup> <u>Auto</u>	<b>CF Step</b> 7.900000 MHz Man
-60.0	a da manangina ang kanangina ang kanangina ang kanangina ang kanangina ang kanangina ang kanangina ang kanangin Ing kanangina ang kanangina a	4-special rev 4**	1			****							Freq Offset 0 Hz
-70.0										<b>6</b> 4 4			Scale Type Lin
Start 0.03 #Res BW				#	¢VBW	3.0 MHz				2.239 ms	7090 GHz (3359 pts)	LUg	
MSG									STATU	JS			

Plot 7-69. Conducted Spurious Plot (Band 4 – 20.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)



Plot 7-70. Conducted Spurious Plot (Band 4 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Keysight Spe	ctrum Analy:	zer - Swept	t SA										
L <mark>XI</mark> RL	RF	50 Ω	DC	CORREC		SE	NSE:INT	#Avg Typ	ALIGN AUTO		M Jul 19, 2016 CE <b>1 2 3 4 5 6</b>	Fr	equency
				PNO: Fa IFGain:L		Trig: Fre Atten: 1		#AV9 19P		TYI Di			
10 dB/div Log	Ref 0.0	00 dBr	m						Mkı	1 19.59 -55.	0 5 GHz 98 dBm		Auto Tune
-10.0											-13.00 dBm		<b>Center Freq</b> 0000000 GHz
-20.0												10.000	Start Freq 0000000 GHz
-40.0											1	20.000	<b>Stop Freq</b> 0000000 GHz
-60.0			alar <sup>da</sup> na ara				d gester gynesister og	a na ana ang Din Kabura Ang Jang ang ang ang ang ang ang ang ang ang	and failed and a start of starting the year	u) fallen (önnfand Losffrag) Fra Start (önnfand Losffrag)		1.000 <u>Auto</u>	<b>CF Step</b> 0000000 GHz Man
-80.0												i	F <b>req Offset</b> 0 Hz
-90.0													Scale Type
Start 10.0 #Res BW				#	VBW	3.0 MHz		5	weep 17	Stop 20 .33 ms (2	.000 GHz 20001 pts)	Log	Lin
мsg 連 Point			aces cle						STATU	_		-	
	-												

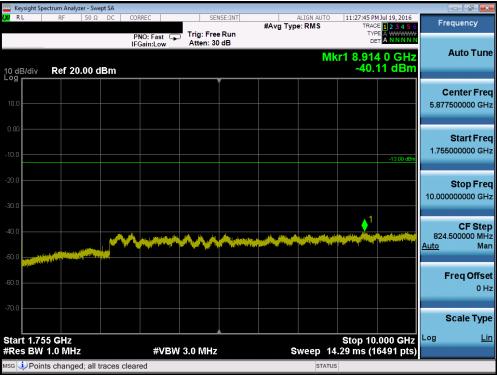
Plot 7-71. Conducted Spurious Plot (Band 4 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



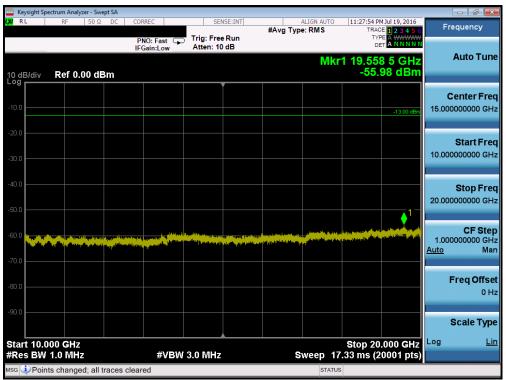
Plot 7-72. Conducted Spurious Plot (Band 4 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-73. Conducted Spurious Plot (Band 4 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-74. Conducted Spurious Plot (Band 4 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analyz	zer - Swept	t SA									- d <b>-</b>
LX/IRL	RF	50 Ω	DC	CORREC	ast 🖵	SEI	#Avg Typ	ALIGN AUTO	TRAC	MJul 19, 2016 E <b>1 2 3 4 5</b> 6 E A WWWWW	F	requency
10 dB/div	Ref 20	.00 dE	3m	IFGain:L	.ow	Atten: 30		М	kr1 1.70	9 5 GHz 55 dBm		Auto Tune
10.0												Center Freq 0.000000 MHz
-10.0										-13.00 dBm	3	Start Freq 0.000000 MHz
-20.0											1.71	Stop Freq 0000000 GHz
-40.0										1	16 <u>Auto</u>	<b>CF Step</b> 3.000000 MHz Man
-60.0		ar i pangan tangan P	an a	erende entrefere				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				Freq Offset 0 Hz
-70.0											1.00	Scale Type
Start 0.03 #Res BW		2		#	¢VBW	3.0 MHz			2.240 ms (	7100 GHz 3361 pts)	Log	Lin
MSG								STATU	JS			

Plot 7-75. Conducted Spurious Plot (Band 4 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-76. Conducted Spurious Plot (Band 4 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLS676	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Keysight Spe	ctrum Analyze	r - Swept SA										
L <mark>XI</mark> RL	RF	50 Ω DC	CORREC PNO: Fa		Trig: Free		#Avg Typ	ALIGN AUTO e: RMS	TRAC	MJul 19, 2016 E 1 2 3 4 5 6 E A WWWW	Fre	equency
10 dB/div Log	Ref 0.0	0 dBm	IFGain:L	ow	Atten: 10	dB		Mkr	1 19.56	8 0 GHz 07 dBm		Auto Tune
-10.0										-13.00 dBm		enter Freq 0000000 GHz
-20.0											10.000	Start Freq
-40.0										1	20.000	Stop Freq
			ariinning gannaa Ariintig ganaa		a di ta basa Mata da kata a kata	and the provident of the strength os strength of the strength os strengtho	an a				1.000 <u>Auto</u>	<b>CF Step</b> 0000000 GHz Man
-80.0											F	F <b>req Offset</b> 0 Hz
-90.0												Scale Type Lin
Start 10.0 #Res BW			#	VBW :	3.0 MHz		S	weep 17	Stop 20 .33 ms (2	.000 GHz 0001 pts)	Log	
мsg 🧼 Point	s changed	; all traces	cleared					STATUS				

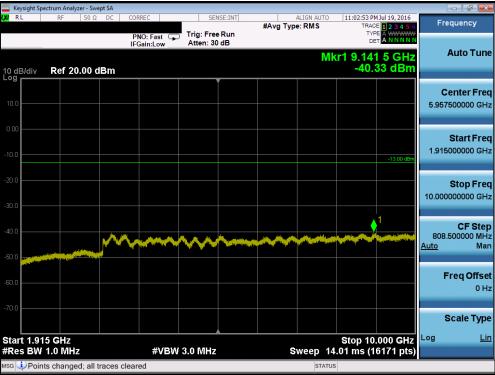
Plot 7-77. Conducted Spurious Plot (Band 4 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



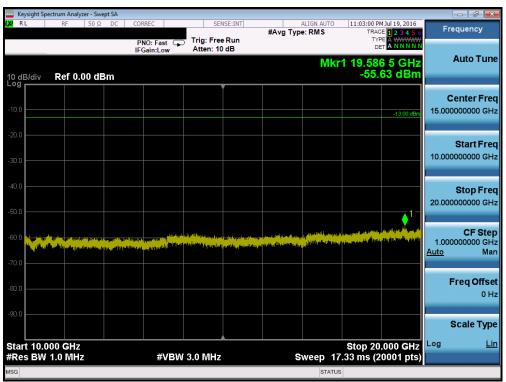
Plot 7-78. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-79. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



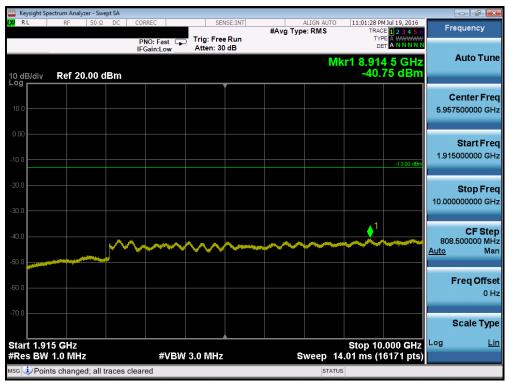
Plot 7-80. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ctrum Analyzer	- Swept SA	4									
LXI RL	RF 5	i0Ω D(				ISE:INT	#Avg Typ	ALIGN AUTO	TRAC	1 Jul 19, 2016 E 1 2 3 4 5 6 E A WWWW	Fi	equency
10 dB/div	Ref 20.0	0 dBn	IFGai	Fast 😱 n:Low	Trig: Free Atten: 30			M	DE (r1 1.848			Auto Tune
10.0												Center Freq 0.000000 MHz
-10.0										-13.00 dBm	30	Start Freq 0.000000 MHz
-20.0											1.85	Stop Freq 0000000 GHz
-40.0										1	182 <u>Auto</u>	CF Step 2.000000 MHz Man
-60.0	ietitteet settertennen der		9.07 <b>12 13 14 1</b> 5 14 15 14 14 17 14 14 17 14			n fi an		- <b>0</b> 0		1,44,45,47,47,47,47,47,47,47,47,47,47,47,47,47,		Freq Offset 0 Hz
-70.0												Scale Type
Start 0.030 #Res BW				#VBW	3.0 MHz			Sweep 2	Stop 1.8 .427 ms (	500 GHz 3641 pts)	Log	Lin
MSG								STATUS	3			

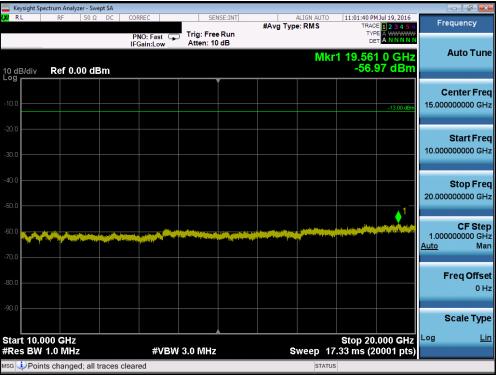
Plot 7-81. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-82. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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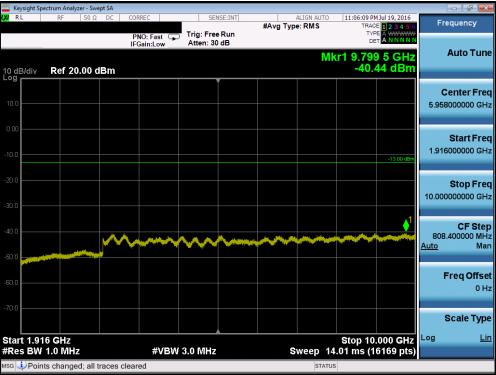
Plot 7-83. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-84. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLS676	<u>PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-85. Conducted Spurious Plot (Band 2/25 – 20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-86. Conducted Spurious Plot (Band 2/25 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFLS676	PCTEST	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Keysight Spe	ctrum Analyz	er - Swept	: SA										
LXI RL	RF	50 Ω	AC	CORREC			SE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Jul 07, 2016 E <b>1 2 3 4 5</b> 6	Fre	equency
	Gate: LO			PNO: Fa IFGain:L		Trig: Free Atten: 30			NAL	DI			Auto Tune
10 dB/div Log	Ref 20	.00 dE	3m							-44.	95 dBm		
10.0													enter Freq 500000 GHz
-10.0												30.	Start Freq 000000 MHz
-20.0											-25.00 dBm	2.475	<b>Stop Freq</b> 000000 GHz
-40.0	dia			. mbmar	مدينة بالبرية.			u. and a local data first firs	li Le Index Multi de la de	and a substant for the second		244. <u>Auto</u>	<b>CF Step</b> 500000 MHz Man
-50.0			an a		14 (n.) - 14 (n.) - 1							F	F <b>req Offset</b> 0 Hz
-70.0													Scale Type
Start 0.03 #Res BW				#	VBW	3.0 MHz			Sweep 2		.475 GHz (4891 pts)	Log	Lin
мsg 🧼 Point	s changed	d; all tra	ices cle	eared					STATUS				

Plot 7-87. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



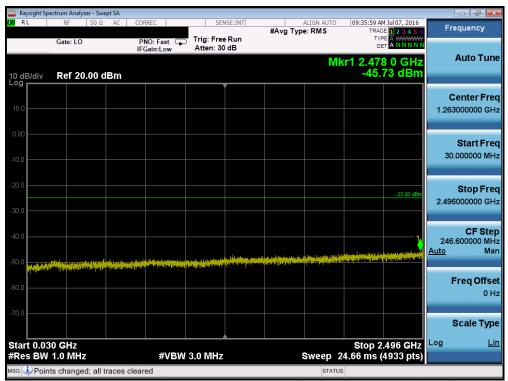
Plot 7-88. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-89. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



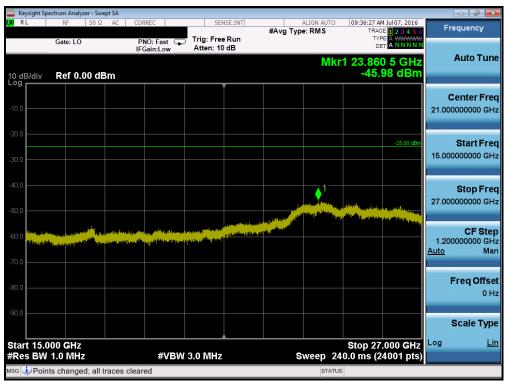
Plot 7-90. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLS676	<u>PCTEST</u>	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Spectru	um Analyzer - :	Swept SA									
(X) RL		Ω AC	CORREC			#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Jul 07, 2016 CE <b>1 2 3 4 5 6</b> DE A WWWW	Fre	equency
	ate: LO Ref 20.00	) dBm	PNO: Fast IFGain:Lov	÷			Mkr	DE 1 14.26	2 5 GHz 81 dBm		Auto Tune
10.0											<b>enter Freq</b> 000000 GHz
-10.0										2.690	Start Freq 000000 GHz
-20.0									-25.00 dBm	15.000	Stop Freq 000000 GHz
-40.0		ilijan potenija Balad La potenija Jakadi	langa balan na panang 200 Ingga balan ng panang bala	nina (1991) a secon financia da seconda da s Na Filipina da seconda d	ang daga sebagan pengangan Pengangan pengangan p	and all the second s	landa ya shi ya ka Guyala (Kuyata)	Parland and the first of the fi	a basa di katempi kanan Mana di katempi katempi katempi Mana di katempi katempi katempi katempi katempi katempi katempi katempi katempi	1.231 <u>Auto</u>	CF Step 000000 GHz Man
-60.0	Ч - 1									F	F <b>req Offset</b> 0 Hz
-70.0										5	Scale Type
Start 2.690 ( #Res BW 1.0			#V	BW 3.0 MHz		S	weep 12	Stop 15 3.1 ms (2	.000 GHz 4621 pts)	Log	Lin
MSG 🗼 Points o	changed; a	II traces of	leared				STATUS	5			

Plot 7-91. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-92. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Spectrum	Analyzer - Sw	ept SA									
LXVI RL R		AC	CORREC		SEN	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	4 Jul 07, 2016 E 1 2 3 4 5 6 E A WWWW	Frequency
	e: LO ef 20.00 c	iBm	PNO: Fas IFGain:Lo	st 😱 ow	Atten: 30			MI	or 1 2.47	ANNNN	Auto Tune
					`						Center Fred 1.263000000 GH:
-10.0											Start Free 30.000000 MH:
-20.0										-25.00 dBm	Stop Fred 2.496000000 GH
-40.0					and the second state of th		len i transvili goveral da			1	CF Step 246.600000 MH: <u>Auto</u> Mar
-60.0											Freq Offse 0 H:
-70.0 Start 0.030 G	H7								Stop 2	496 GHz	Scale Type
#Res BW 1.0			#	VBW :	3.0 MHz			Sweep 2	.4.66 ms (	4933 pts)	
30								STATU			

Plot 7-93. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-94. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-95. Conducted Spurious Plot (Band 41 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLS676		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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