

PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. 410.290.6652 / Fax 410.290.6654 http://www.pctestlab.com



## 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: 5/23 - 7/02/13, 7/15/13 Test Site/Location: PCTEST Lab., Columbia, MD, USA Test Report Serial No.: 0Y1305140843.ZNF

#### ZNFLS980

# APPLICANT:

FCC ID :

### LG ELECTRONICS MOBILECOMM U.S.A

FCC Classification: FCC Rule Part(s): EUT Type: Model(s): Test Device Serial No.: PCS Licensed Transmitter Held to Ear (PCE) §2; §22; §24; §27 Portable Handset LS980, LGLS980 *identical prototype* [S/N: RF1]

				ERP/EIRP		
Mode	Tx Frequency	Emission	Modulation	Max.	Max.	
	(MHz)	Designator	Woddiation	Power	Power	
				(W)	(dBm)	
LTE Band 26	824.7 - 848.3	1M10G7D	QPSK	0.057	17.56	
LTE Band 26	824.7 - 848.3	1M09W7D	16QAM	0.044	16.45	
LTE Band 26	825.5 - 847.5	2M70G7D	QPSK	0.065	18.15	
LTE Band 26	825.5 - 847.5	2M69W7D	16QAM	0.050	16.95	
LTE Band 26	826.5 - 846.5	4M51G7D	QPSK	0.069	18.39	
LTE Band 26	826.5 - 846.5	4M52W7D	16QAM	0.055	17.40	
LTE Band 26	829 - 844	8M99G7D	QPSK	0.067	18.28	
LTE Band 26	829 - 844	9M01W7D	16QAM	0.054	17.29	
LTE Band 25	1851.5 - 1913.5	2M68G7D	QPSK	0.356	25.51	
LTE Band 25	1851.5 - 1913.5	2M69W7D	16QAM	0.299	24.75	
LTE Band 25	1852.5 - 1912.5	4M48G7D	QPSK	0.510	27.08	
LTE Band 25	1852.5 - 1912.5	4M47W7D	16QAM	0.463	26.66	
LTE Band 25	1855 - 1910	8M94G7D	QPSK	0.375	25.74	
LTE Band 25	1855 - 1910	8M94W7D	16QAM	0.294	24.68	
LTE Band 41	2501 - 2685	8M95G7D	QPSK	0.135	21.29	
LTE Band 41	2501 - 2685	8M90W7D	16QAM	0.104	20.19	
LTE Band 41	2503.5 - 2682.5	13M4G7D	QPSK	0.101	20.03	
LTE Band 41	2503.5 - 2682.5	13M4W7D	16QAM	0.076	18.83	
LTE Band 41	2506 - 2680	17M8G7D	QPSK	0.100	20.02	
LTE Band 41	2506 - 2680	17M9W7D	16QAM	0.078	18.90	

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.

ndy Ortanez President



FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 1 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 1 of 78
© 2013 PCTEST Engineering Laboratory, Inc.				V4.5

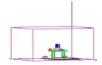


# TABLE OF CONTENTS

FCC P/	ART 22	2, 24 & 27 MEASUREMENT REPORT	3				
1.0	INTR	DDUCTION	4				
	1.1	SCOPE	4				
	1.2	TESTING FACILITY	4				
2.0	PRO	DUCT INFORMATION	5				
	2.1	EQUIPMENT DESCRIPTION	5				
	2.2	DEVICE CAPABILITIES	5				
	2.3	EMI SUPPRESSION DEVICE(S)/MODIFICATIONS	5				
	2.4	LABELING REQUIREMENTS	5				
3.0	DESC	RIPTION OF TESTS	6				
	3.1	MEASUREMENT PROCEDURE	6				
	3.2	CELLULAR - BASE FREQUENCY BLOCKS	6				
	3.3	CELLULAR - MOBILE FREQUENCY BLOCKS	6				
	3.4	PCS - BASE FREQUENCY BLOCKS	6				
	3.5	PCS - MOBILE FREQUENCY BLOCKS	7				
	3.6	OCCUPIED BANDWIDTH	7				
	3.7	SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL	7				
	3.8	PEAK-AVERAGE RATIO	7				
	3.9	RADIATED POWER AND RADIATED SPURIOUS EMISSIONS	8				
	3.10	FREQUENCY STABILITY / TEMPERATURE VARIATION	9				
4.0	TEST	EQUIPMENT CALIBRATION DATA	10				
5.0	SAMF	PLE CALCULATIONS	11				
6.0	TEST	TEST RESULTS					
	6.1	SUMMARY	12				
	6.2	EFFECTIVE RADIATED POWER (ERP)	13				
	6.3	EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)	14				
	6.4	BAND 26 RADIATED SPURIOUS EMISSIONS	16				
	6.5	BAND 25 RADIATED SPURIOUS EMISSIONS	19				
	6.6	BAND 41 RADIATED SPURIOUS EMISSIONS	22				
	6.7	BAND 26 FREQUENCY STABILITY MEASUREMENTS	25				
	6.8	BAND 25 FREQUENCY STABILITY MEASUREMENTS	27				
	6.9	BAND 41 FREQUENCY STABILITY MEASUREMENTS	29				
7.0	BAND 26 PLOTS OF EMISSIONS						
8.0	BAND	25 PLOTS OF EMISSIONS	46				
9.0	BAND	0 41 PLOTS OF EMISSIONS	61				
10.0	CON	CLUSION	78				

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 2 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 2 of 78	
© 2013 PCTEST Engineering Laboratory, Inc.					





# MEASUREMENT REPORT FCC Part 22, 24 & 27



### §2.1033 General Information

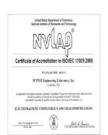
APPLICANT: APPLICANT ADDRESS:	LG Electronics Mobile 1000 Sylvan Avenue	Comm U.S.A		
	Englewood Cliffs, NJ	07632, United St	ates	
TEST SITE:	PCTEST ENGINEER	NG LABORATO	RY, INC.	
TEST SITE ADDRESS:	7185 Oakland Mills R	oad, Columbia, M	1D 21045 USA	
FCC RULE PART(S):	§2; §22; §24; §27			
BASE MODEL:	LS980			
FCC ID:	ZNFLS980			
FCC CLASSIFICATION:	PCS Licensed Transm	nitter Held to Ear	(PCE)	
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm	)		
Test Device Serial No.:	RF1	Production	Pre-Production	Engineering
DATE(S) OF TEST:	5/23 - 7/02/13, 7/15/1	3		
TEST REPORT S/N:	0Y1305140843.ZNF			

#### **Test Facility / Accreditations**

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

- <image><section-header>
- 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 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.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 0 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 3 of 78
© 2013 PCTEST Engineering Laboratory, Inc.				





#### 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 C63.4-2003 on February 15, 2012.

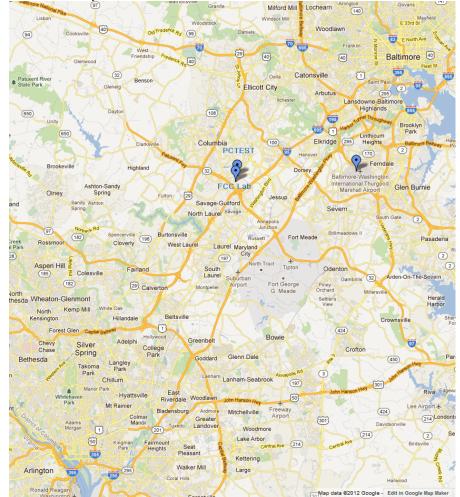


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 4 af 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 4 of 78	
© 2013 PCTEST Engineering Laboratory Inc.					

013 PCTEST Engineering



# 2.0 PRODUCT INFORMATION

#### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFLS980**. 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), 850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Band 25 (3,5,10MHz), 26 (1.4,3,5,10 MHz), 41 (10,15,20 MHz) LTE, 802.11a/b/g/n/ac WLAN (DTS/NII), Bluetooth (1x,EDR, LE), NFC

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

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

#### 2.4 Labeling Requirements

#### Per 2.925

The FCC identifier shall be permanently affixed to the equipment and shall be readily visible to the purchaser at the time of purchase.

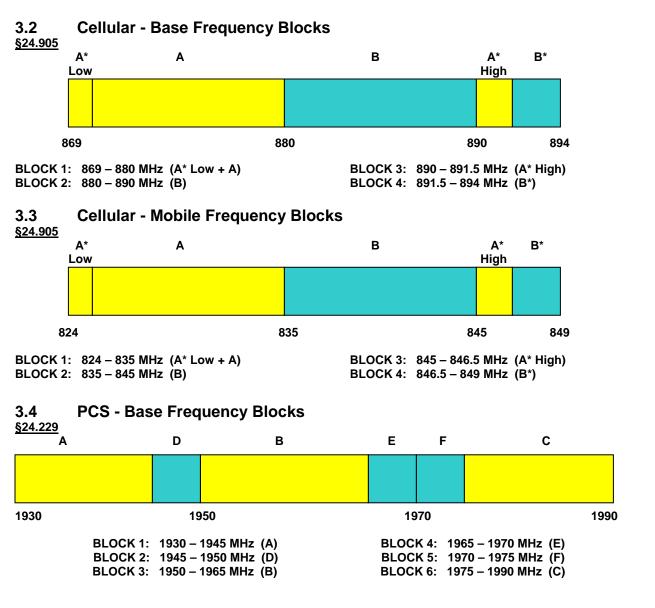
FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 5 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 5 of 78
© 2013 PCTEST Engineering Laboratory, Inc.				



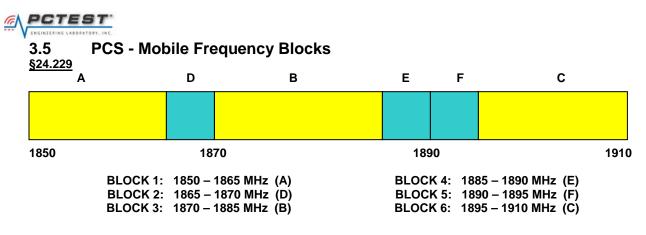
# 3.0 DESCRIPTION OF TESTS

#### 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-C-2004) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168) were used in the measurement of the **LG Portable Handset FCC ID: ZNFLS980.** 



FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege C of 79
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 6 of 78
© 2013 PCTEST Engineering Laboratory, Inc.				



#### 3.6 Occupied Bandwidth §2.1049 RSS-Gen(4.6.1)

The implementation of this test is performed by the spectrum analyzer's occupied bandwidth function. 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.

#### **3.7** Spurious and Harmonic Emissions at Antenna Terminal §2.1051 §22.917(a)(b) §24.238(a)(b) §27.53(m) RSS-132(4.5.1)

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. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Cell band, or 1 MHz or greater for PCS band, BRS and EBS stations. 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 for PCS band, BRS and EBS stations. 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.

# 3.8 Peak-Average Ratio

#### <u>§24.232(d) RSS-132(5.4)</u>

A peak to average ratio measurement is performed at the conducted port of the EUT. For LTE signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 7 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 7 of 78	
© 2013 PCTEST Engineering Laboratory, Inc.				



#### **3.9** Radiated Power and Radiated Spurious Emissions §2.1053 §22.913(a.2) §22.917(a) §27.53(h) RSS-132(4.4) RSS-132(4.5.1)

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. For measurements above 1GHz 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 below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It 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 78cm high PVC support structure is placed on top of the turntable. A 3/4" (~1.9cm) sheet of high density polyethylene 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 wooden turntable 80cm above the ground plane and 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.

Per the guidance of ANSI/TIA-603-C-2004, 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 [Watts]) specified in 22.917(a) and 24.238(a).

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 0 at 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 8 of 78
© 2013 PCTEST Engineering Laboratory, Inc.				



#### 3.10 Frequency Stability / Temperature Variation

§2.1055 §22.863 §22.905 §27.5(i) §27.54 RSS-132(4.3)

The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block for Part 24 and 27. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency for Part 22.

#### **Time Period and Procedure:**

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).

2. The equipment is turned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A sufficient stabilization period at each temperature shall be used prior to each frequency requirement.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 0 of 79
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 9 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.	·		V4.5



# 4.0 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		Cal Due	Serial Number
-	LTx1	Licensed Transmitter Cable Set 1/17/2013 Annual 1/17/2014		1/17/2014	N/A	
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
Agilent	N9020A	MXA Signal Analyzer	10/9/2012	Annual	10/9/2013	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	1/11/2013	Annual	1/11/2014	MY52350166
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/22/2011	Biennial	7/22/2013	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	5/30/2012	Biennial	5/30/2014	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	11/7/2012	Biennial	11/7/2014	128338
Mini-Circuits	VHF-1200+	High Pass Filter	1/17/2013	Annual	1/17/2014	30923
Mini-Circuits	VHF-3100+	High Pass Filter	1/17/2013	Annual	1/17/2014	30841
Mini-Circuits	SSG-4000HP	USB Synthesized Signal Generator		N/A		11208010032
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	4/17/2013	Annual	4/17/2014	11210140001
Mini-Circuits	TVA-11-422	RF Power Amp		N/A		QA1303002
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Biennial	10/7/2013	103962
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100040
Rohde & Schwarz	ESU26	EMI Test Receiver	2/25/2013	Annual	2/25/2014	100342
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	10/3/2011	Biennial	10/3/2013	91052522TX
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	10/3/2011	Biennial	10/3/2013	91052523RX
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A

Table 4-1. Test Equipment

#### Notes:

- 1. For equipment listed above that has a calibration due date that falls within the test date range, care was taken to ensure that this equipment was utilized after returning from calibration.
- 2. Equipment used for signaling with a calibration date of "N/A" shown in this list was only used for maintaining a link between the piece of equipment and the EUT. This equipment was not used to make direct calibrated measurements.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 10 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 10 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5



# 5.0 SAMPLE CALCULATIONS

#### **Emission Designator**

#### **QPSK Modulation**

#### Emission Designator = 8M62G7D

LTE BW = 8.62 MHz G = Phase Modulation 7 = Quantized/Digital Info D = Amplitude/Angle Modulated

#### 16QAM Modulation

#### Emission Designator = 8M45W7D

LTE BW = 8.45 MHz W = Amplitude/Angle Modulated 7 = Quantized/Digital Info D = Combination (Audio/Data)

#### 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).

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 11 of 79
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 11 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5



# 6.0 TEST RESULTS

### 6.1 Summary

Company Name:	LG Electronics MobileComm U.S.A
FCC ID:	ZNFLS980
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 MO	DE (TX)				
2.1049	Occupied Bandwidth	N/A		PASS	Section, 7.0, 8.0, 9.0
2.1051 22.917(a) 24.238(a) 27.53(m)	Band Edge / Conducted Spurious Emissions	> 43 + 10log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions	CONDUCTED	PASS	Section, 7.0, 8.0, 9.0
24.232(d)	Peak-Average Ratio	< 13 dB		PASS	Section, 8.0
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
22.913(a.2)	Effective Radiated Power (Band 26)	< 7 Watts max. ERP		PASS	Section 6.2
24.232(c) 27.50(h.2)	Equivalent Isotropic Radiated Power (Band 25 EBS)	< 2 Watts max. EIRP		PASS	Section 6.3
2.1053 22.917(a) 24.238(a) 27.53(m)	Undesirable Emissions	> 43 + 10log <sub>10</sub> (P[Watts]) for all out-of-band emissions	RADIATED	PASS	Section, 6.4, 6.5, 6.6
2.1055. 22.35527.5(i) 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)		PASS	Section, 6.7, 6.8, 6.9

Table 6-1. 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 shown in Section 7.0 8.0 9.0 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.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 10 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 12 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.		V4.5



#### 6.2 Effective Radiated Power (ERP) §22.913(a.2) RSS-132(4.4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	Margin [dB]
824.70	1.4	QPSK	Standard	1/0	12.49	4.68	V	17.17	0.052	-21.28
836.50	1.4	QPSK	Standard	1/0	12.74	4.82	V	17.56	0.057	-20.89
848.30	1.4	QPSK	Standard	1/0	12.03	4.96	V	16.99	0.050	-21.46
824.70	1.4	16-QAM	Standard	1/0	11.16	4.68	V	15.84	0.038	-22.61
836.50	1.4	16-QAM	Standard	1/0	11.63	4.82	V	16.45	0.044	-22.00
848.30	1.4	16-QAM	Standard	1/0	10.68	4.96	V	15.64	0.037	-22.81
825.50	3	QPSK	Standard	1/14	13.14	4.68	V	17.82	0.061	-20.63
836.50	3	QPSK	Standard	1/0	13.33	4.82	V	18.15	0.065	-20.30
847.50	3	QPSK	Standard	1/0	11.66	4.96	V	16.62	0.046	-21.83
825.50	3	16-QAM	Standard	1/14	12.02	4.68	V	16.70	0.047	-21.75
836.50	3	16-QAM	Standard	1/0	12.13	4.82	V	16.95	0.050	-21.50
847.50	3	16-QAM	Standard	1/0	10.56	4.96	V	15.52	0.036	-22.93
826.50	5	QPSK	Standard	1/24	13.71	4.68	V	18.39	0.069	-20.06
836.50	5	QPSK	Standard	1/0	13.49	4.82	V	18.31	0.068	-20.14
846.50	5	QPSK	Standard	1/0	13.33	4.96	V	18.29	0.067	-20.16
826.50	5	16-QAM	Standard	1/24	12.61	4.68	V	17.29	0.054	-21.16
836.50	5	16-QAM	Standard	1/0	12.16	4.82	V	16.98	0.050	-21.47
846.50	5	16-QAM	Standard	1/0	12.44	4.96	V	17.40	0.055	-21.05
829.00	10	QPSK	Standard	1/49	13.26	4.68	V	17.94	0.062	-20.51
836.50	10	QPSK	Standard	1/0	13.46	4.82	V	18.28	0.067	-20.17
844.00	10	QPSK	Standard	1/0	12.50	4.96	V	17.46	0.056	-20.99
829.00	10	16-QAM	Standard	1/49	11.88	4.68	V	16.56	0.045	-21.89
836.50	10	16-QAM	Standard	1/0	12.47	4.82	V	17.29	0.054	-21.16
844.00	10	16-QAM	Standard	1/0	10.41	4.96	V	15.37	0.034	-23.08

Table 6-2. ERP Data (Band 26)

- 1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 2. This unit was tested with its standard battery.
- 3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 12 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 13 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5



#### 6.3 Equivalent Isotropic Radiated Power (EIRP) §24.232(c) §27.50(h.2) RSS-133(6.4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1851.50	3	QPSK	Standard	15/0	14.42	9.59	Н	24.01	0.252	-9.00
1882.50	3	QPSK	Standard	15/0	14.90	9.53	Н	24.43	0.277	-8.58
1913.50	3	QPSK	Standard	15/0	16.04	9.47	Н	25.51	0.356	-7.50
1851.50	3	16-QAM	Standard	15/0	14.00	9.59	Н	23.59	0.228	-9.42
1882.50	3	16-QAM	Standard	15/0	14.35	9.53	Н	23.88	0.244	-9.13
1913.50	3	16-QAM	Standard	15/0	15.28	9.47	Н	24.75	0.299	-8.26
1852.50	5	QPSK	Standard	25/0	16.95	9.59	Н	26.54	0.451	-6.47
1882.50	5	QPSK	Standard	25/0	17.55	9.53	Н	27.08	0.510	-5.93
1912.50	5	QPSK	Standard	25/0	17.48	9.47	Н	26.95	0.496	-6.06
1852.50	5	16-QAM	Standard	25/0	16.40	9.59	Н	25.99	0.397	-7.02
1882.50	5	16-QAM	Standard	25/0	17.13	9.53	Н	26.66	0.463	-6.35
1912.50	5	16-QAM	Standard	25/0	16.45	9.47	Н	25.92	0.391	-7.09
1855.00	10	QPSK	Standard	50/0	16.15	9.59	Н	25.74	0.375	-7.27
1882.50	10	QPSK	Standard	50/0	14.63	9.53	Н	24.16	0.260	-8.85
1910.00	10	QPSK	Standard	50/0	15.00	9.47	Н	24.47	0.280	-8.54
1855.00	10	16-QAM	Standard	50/0	15.09	9.59	Н	24.68	0.294	-8.33
1882.50	10	16-QAM	Standard	50/0	13.56	9.53	Н	23.09	0.203	-9.92
1910.00	10	16-QAM	Standard	50/0	14.01	9.47	Н	23.48	0.223	-9.53

Table 6-3. EIRP Data (Band 25)

- 1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 1. This unit was tested with its standard battery.
- 2. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:	Dogo 14 of 70			
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 14 of 78			
© 2013 PCTEST Engineering	© 2013 PCTEST Engineering Laboratory, Inc.					



Equivalent Isotrop	bic Radiated Power	(EIRP) (Cont	t.)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
2501.00	10	QPSK	Standard	1/0	10.31	8.66	V	18.97	0.079	-14.04
2593.00	10	QPSK	Standard	1/0	11.37	8.72	V	20.09	0.102	-12.92
2685.00	10	QPSK	Standard	1/0	12.47	8.82	V	21.29	0.135	-11.72
2501.00	10	16-QAM	Standard	1/0	9.11	8.66	V	17.77	0.060	-15.24
2593.00	10	16-QAM	Standard	1/0	10.61	8.72	V	19.33	0.086	-13.68
2685.00	10	16-QAM	Standard	1/0	11.37	8.82	V	20.19	0.104	-12.82
2503.50	15	QPSK	Standard	1/0	11.20	8.66	V	19.86	0.097	-13.15
2593.00	15	QPSK	Standard	1/0	10.35	8.72	V	19.07	0.081	-13.94
2682.50	15	QPSK	Standard	1/0	11.21	8.82	V	20.03	0.101	-12.98
2503.50	15	16-QAM	Standard	1/0	10.17	8.66	V	18.83	0.076	-14.18
2593.00	15	16-QAM	Standard	1/0	9.63	8.72	V	18.35	0.068	-14.66
2682.50	15	16-QAM	Standard	1/0	9.98	8.82	V	18.80	0.076	-14.21
2506.00	20	QPSK	Standard	1/0	10.87	8.66	V	19.53	0.090	-13.48
2593.00	20	QPSK	Standard	1/0	10.57	8.72	V	19.29	0.085	-13.72
2680.00	20	QPSK	Standard	1/0	11.20	8.82	V	20.02	0.100	-12.99
2506.00	20	16-QAM	Standard	1/0	9.52	8.66	V	18.18	0.066	-14.83
2593.00	20	16-QAM	Standard	1/0	9.42	8.72	V	18.14	0.065	-14.87
2680.00	20	16-QAM	Standard	1/0	10.08	8.82	V	18.90	0.078	-14.11

Table 6-4. EIRP Data (Band 41)

- 3. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 2. This unit was tested with its standard battery.
- 4. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 15 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 15 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5



6.4 Band 26 Radiated Spurious Emissions §2.1053 §22.917(a) RSS-132(4.5.1)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	826.	50	MHz
MEASURED OUTPUT POWER:	18.39	dBm =	<u>0.069</u> W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5 MHz		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	31.39	dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
	37.44	2.50	34.95	V	53.34
2479.50	50.45	2.82	-47.64	V	66.03
3306.00		5.52	74.19	V	92.59
4132.50		7. <u>0</u> 8	-72.33	V	90.72
4959.00	-78.88	7.91	-70.97	V	89.36
5785.50	-76.96	8.51	-68.45	V	86.85

Table 6-5. Radiated Spurious Data

- 1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 2. This unit was tested with its standard battery.
- 3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 10 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 16 of 78	
© 2013 PCTEST Engineering Laboratory, Inc.				



Band 26 Radiated Spurious Measurements (continued) §2.1053 §22.917(a) RSS-132(4.5.1)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	836.50		MHz
MEASURED OUTPUT POWER:	18.31	dBm	= <u>0.068</u> W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5 MHz		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	31.31	dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1673.00	-38.52	2.34	-36.19	V	54.50
2509.50	-52.14	2.84	-49.30	<u> </u>	67.61
3346.00	-79.83	5.64	-74.18	V	92.50
4182.50		7. <u>1</u> 4	72.36	V	_ 90.67 _
5019.00	78.86	7.97	70.89 _		89.21
5855.50	-76.66	8.46	-68.20	V	86.51

Table 6-6. Radiated Spurious Data

#### NOTES:

- 1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 2. This unit was tested with its standard battery.
- 3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dega 17 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 17 of 78	
© 2013 PCTEST Engineering Laboratory, Inc.				

ig i



Band 26 Radiated Spurious Measurements (continued) §2.1053 §22.917(a) RSS-132(4.5.1)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	846.	50	MHz
MEASURED OUTPUT POWER:	18.29	dBm =	0.067 W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5 MHz		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	31.29	dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1693.00	-36.37	2.18	-34.19	V	52.48
2539.50	-51.20	3.04	-48.16	V	66.45
3386.00	-79.94	5.76	-74.17	V	92.46
4232.50	-79.59	7. <u>2</u> 0	-72.39		90.68
5079.00	78.72	8.00		V	_ 89.01 _
5925.50	-76.37	8.42	-67.95	V	86.24

Table 6-7. Radiated Spurious Data

- 1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 2. This unit was tested with its standard battery.
- 3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dege 10 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 18 of 78	
© 2013 PCTEST Engineering Laboratory, Inc.				



6.5 Band 25 Radiated Spurious Emissions §2.1053 §24.238(a) RSS-133(6.5.1)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1852.	.50	MHz
MEASURED OUTPUT POWER:	26.54	dBm =	<u>0.451</u> W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5 MHz		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	39.54	dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3705.00		<u> </u>	40.83	<u>H</u> _	<u>67.37</u>
5557.50	56.57	10.63		<u> </u>	72.48
7410.00		11.84	- <u>6</u> 8.16	Н	94.70
9262.50	-79.36	13.29	<u>6</u> 6.07	Н	92.61
11115.00	-75.99	13.50	-62.49	<u> </u>	89.03
12967.50	-72.44	13.68	-58.76	Н	85.30

Table 6-8. Radiated Spurious Data

- 1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 2. This unit was tested with its standard battery.
- 3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 10 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 19 of 78
© 2013 PCTEST Engineering Laboratory, Inc.				



Band 25 Radiated Spurious Measurements (continued) §2.1053 §24.238(a) RSS-133(6.5.1)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1882.50	)	MHz
MEASURED OUTPUT POWER:	27.08	dBm =	<u>0.510</u> W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5 MHz		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	40.08	dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3765.00	-48.95	8.44	-40.51	<u>    H     </u>	67.59
5647.50	-56.87	10.66	-46.21	<u> </u>	73.29
7530.00	-79.89	11.94	-67.95	<u> </u>	95.03
9412.50		13.23	65.74	<u> </u>	_ 92.81 _
11295.00	75.76	1 <u>3</u> .48	62.28 _	Н	89.35
13177.50	-72.05	13.84	-58.21	Н	85.28

Table 6-9. Radiated Spurious Data

#### NOTES:

- 1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 2. This unit was tested with its standard battery.
- 3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dega 20 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 20 of 78	
© 2013 PCTEST Engineering Laboratory, Inc.				

ig i



Band 25 Radiated Spurious Measurements (continued) §2.1053 §24.238(a) RSS-133(6.5.1)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	1912	.50	MHz
MEASURED OUTPUT POWER:	26.95	dBm =	0.496W
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	5 MHz		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	39.95	dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3825.00	-45.01	8.57	-36.44	<u>    H     </u>	63.39
5737.50	-53.80	10.69	-43.11	<u> </u>	70.06
7650.00	-52.71	12.07	-40.64	н	67.59
9562.50	-52.20	<u>13.2</u> 0	- <u>3</u> 9.00	<u>н</u>	65.95
11475.00	-75.69	1 <u>3</u> .42	-62.28	н	89.23
13387.50	-72.55	14.04	-58.51	Н	85.46

Table 6-10. Radiated Spurious Data

- 1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 2. This unit was tested with its standard battery.
- 3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dago 21 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 21 of 78	
© 2013 PCTEST Engineering Laboratory, Inc.				



## 6.6 Band 41 Radiated Spurious Emissions §2.1053 §27.53(m)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	2501.	.00	MHz
MEASURED OUTPUT POWER:	18.97	dBm =	0.079 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	5 MHz	_	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	31.97	dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
5002.00	-51.39	10.10	-41.28	V	67.82
	54.76	11.91	42.85	<u>_</u>	_ 69.39 _
1 <u>000</u> 4.00	77.23	1 <u>3.19</u>	-64.03		90.57
12505.00		13.40	<u>-6</u> 0.27		86.81
15006.00	-70.44	14.09	-56.35	V	82.89
17507.00	-66.36	13.99	-52.37	V	78.91

Table 6-11. Radiated Spurious Data

- 1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 2. This unit was tested with its standard battery.
- 3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 22 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 22 of 78	
© 2013 PCTEST Engineering Laboratory, Inc.				



Band 41 Radiated Spurious Measurements (continued) §2.1053 §27.53(m)

#### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	2593.00	C	MHz
MEASURED OUTPUT POWER:	20.09	dBm =	0.102 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	5 MHz	_	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	33.09	dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
5186.00	-55.12	10.24	-44.88	V	71.95
7779.00	-54.06	12.22	-41.85	V	68.92
1 <u>0372.0</u> 0	77.02	1 <u>3.09</u>	63.93 _	V	91.00
12965.00	-72.58	<u>13.62</u> _	-58.96	V	86.04
1 <u>555</u> 8. <u>0</u> 0	66.94	1 <u>3.88</u>	53.06 _		80.13
18151.00	-66.36	14.51	-51.86	V	78.93

Table 6-12. Radiated Spurious Data

#### NOTES:

- 1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 2. This unit was tested with its standard battery.
- 3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 22 of 79
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 23 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5

04/15/2013



Band 41 Radiated Spurious Measurements (continued) §2.1053 §27.53(m)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	2506	.00	MHz
MEASURED OUTPUT POWER:	21.29	dBm =	0.135 W
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	5 MHz	_	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	34.29	dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
5012.00	-51.14	10.44	-40.70	V	61.99
7518.00	-53.97	12.49	-41.48	V	62.77
1_0024.00	75.68	13.20	62.48	V	83.77
12530.00	-72.82	<u> </u>	- <u>5</u> 8.72		80.01
1 <u>5036.00</u>	63.89	1 <u>3.63</u>	50.26	V	71. <u>55</u>
17542.00	-67.08	15.53	-51.55	V	72.84

Table 6-13. Radiated Spurious Data

#### NOTES:

- 1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- 2. This unit was tested with its standard battery.
- 3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 24 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 24 of 78	
© 2013 PCTEST Engineering Laboratory, Inc.				

ng i



# 6.7 Band 26 Frequency Stability Measurements §2.1055 §22.355 RSS-132(4.3)

OPERATING FREQUENCY: 836,500,000 Hz

CHANNEL: \_\_\_\_\_\_20525

REFERENCE VOLTAGE: <u>3.8</u> VDC

DEVIATION LIMIT:	± 0.00025	% or 2.5 ppm
------------------	-----------	--------------

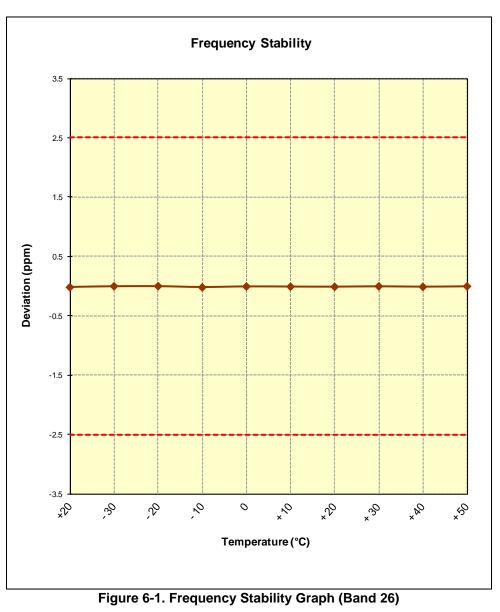
VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,499,982	-18	-0.0000021
<u>100 %</u>		<u>3</u> 0	836,499,997	3	-0 <u>.0000004</u>
1 <u>00 %</u>		- 20	836,499,998	2	-0.0000002
100 %		- 10	836,499,981	-19	-0.0000022
100 %		0	836,499,993	7	-0.0000008
100 %		+ 10	836,499,990	-10	-0.0000011
100 %		+ 20	836,499,988	-12	-0.0000014
1 <u>00 %</u>		<u>+ 30</u>	836,499,995	<u> </u>	- <u>0</u> .0 <u>0</u> 0006
<u>100 %</u>		<u>+ 4</u> 0	_ 8 <u>36,</u> 499, <u>9</u> 88_	-12	-0 <u>.000</u> 001 <u>4</u>
<u>100 %</u>		<u>+ 5</u> 0	_ 8 <u>36,</u> 499, <u>9</u> 96	4	-0 <u>.00000</u> 05
<u>_115 %</u>	4.37	<u>+ 20</u>	836,499,992	<u>-8</u>	-0.0000010
BATT. ENDPOINT	3.40	+ 20	836,499,981 Stability Data (Ba	-19	-0.0000023

Table 6-14. Frequency Stability Data (Band 26)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 25 of 79
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 25 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.		V4.5



# Band 26 Frequency Stability Measurements (Cont'd) §2.1055 §22.355 RSS-132(4.3)



FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 79
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 26 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5



# 6.8 Band 25 Frequency Stability Measurements §2.1055 §24.235 RSS-133(6.3)

OPERATING FREQUENCY: 1,882,500,000 Hz

CHANNEL: 26365

REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
1 <u>00 %</u>	3.80	<u>+ 20 (Ref</u> )	<u>1,882,499,997</u>	<u> </u>	
<u>100 %</u>		<u>3</u> 0	_1, <u>882</u> ,4 <u>99,988</u>	-12	-0.0000006
<u> </u>		- 20	1,882,499,997	-3	-0.0000002
100 %		- 10	1,882,499,989	-11	-0.0000006
100 %		0	1,882,499,983	-17	-0.0000009
100 %		+ 10	1,882,499,990	-10	-0.0000005
100 %		+ 20	1,882,499,983	-17	-0.0000009
_ <u>100 %</u>		+ <u>30</u>	_1, <u>882,499,985</u>	15	_0 <u>.0000008</u>
1 <u>00 %</u>		<u>+40</u>	<u>1,882,499,996</u>	<u>-4</u>	- <u>0</u> .0 <u>00</u> 002
<u>100 %</u>		<u>+ 5</u> 0	_1, <u>882,499,988</u>	12	_0 <u>.00000</u> 06
<u>115 %</u>	4.37	<u>+ 2</u> 0	_1, <u>882,499,995</u>	-5	_0 <u>.0000003</u>
BATT. ENDPOINT	3.40	+ 20	1,882,499,996 bility Data (Band )	-4	-0.0000002

Table 6-15. Frequency Stability Data (Band 25)

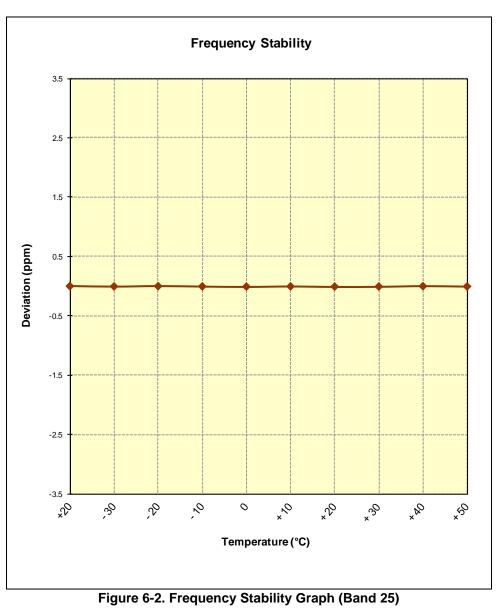
#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	G Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dego 07 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 27 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.		V4.5



# Band 25 Frequency Stability Measurements (Cont'd) §2.1055 §24.235 RSS-133(6.3)



FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 28 of 78	
© 2013 PCTEST Engineering	2013 PCTEST Engineering Laboratory, Inc.				



## 6.9 Band 41 Frequency Stability Measurements §2.1055 §27.5(i) §27.54

OPERATING FREQUENCY: 2,590,000,000 Hz

CHANNEL: 40590

REFERENCE VOLTAGE: <u>3.8</u> VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 <u>%</u>	3.80	<u>+ 20 (Ref)</u>	2,589,999,993		- <u>0.00000</u> 3
<u> </u>		<u>3</u> 0	2,589,999,987	1 <u>3</u>	-0.0000005
100 %		<u>2</u> 0	2,589,999,996	4	-0.0000002
100 %		- 10	2,589,999,982	-18	-0.0000007
100 %		0	2,589,999,994	-6	-0.0000002
100 %		+ 10	2,589,999,981	-19	-0.0000007
100 %		+ 20	2,589,999,995	-5	-0.0000002
<u>100 %</u>		+ <u>30</u>	2,589,999,990	10	_0 <u>.0000004</u>
1 <u>00 %</u>		+ 40	2,5 <u>8</u> 9,999,981	19	- <u>0.0000</u> 007
<u>100 %</u>		<u>+ 5</u> 0	_2, <u>589,999,983</u>	17	-0 <u>.000</u> 0006
<u>115 %</u>	4.37	<u>+ 2</u> 0	_2, <u>589,999,994</u>	6	-0.0000002
BATT. ENDPOINT	3.40	+ 20	2,589,999,995 x Stability Data (	-5	-0.0000002

Table 6-16. Frequency Stability Data (Band 41)

#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 20 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 29 of 78
© 2013 PCTEST Engineering Laboratory, Inc.				



# Band 41 Frequency Stability Measurements (Cont'd) §2.1055 §27.5(i) §27.54

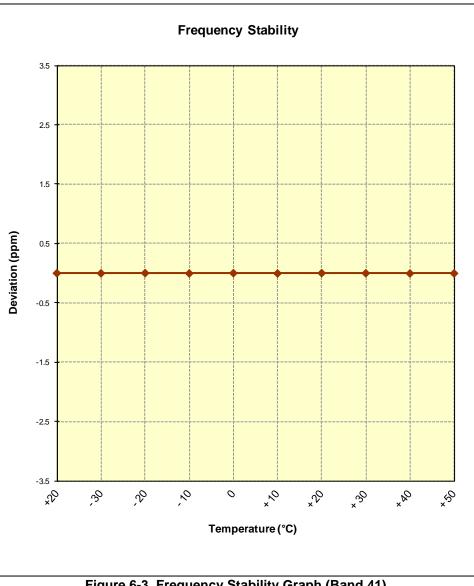


Figure 6-3. Frequency Stability Graph (Band 41)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 79
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 30 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5



#### 7.0 **BAND 26 PLOTS OF EMISSIONS**

Note: All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.



Plot 7-1. Lower Band Edge Plot (1.4MHz QPSK – RB Size 6)

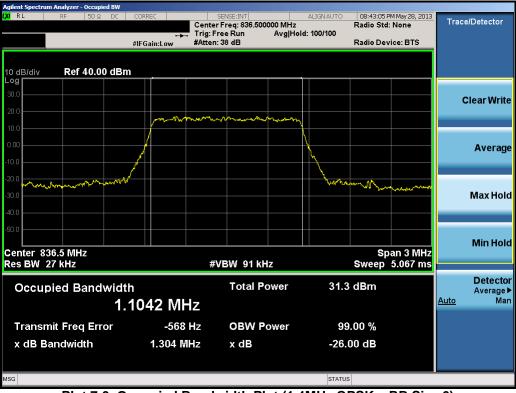


Plot 7-2. Lower Extended Band Edge Plot (1.4MHz QPSK – RB Size 6)

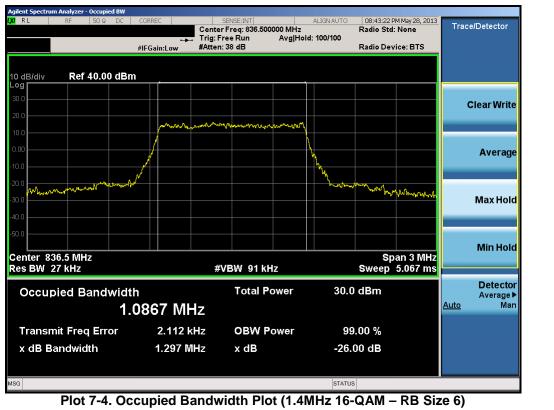
FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 04 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 31 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5

2013 PC ngineering Laboratory,





Plot 7-3. Occupied Bandwidth Plot (1.4MHz QPSK - RB Size 6)



FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 22 of 79
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 32 of 78

© 2013 PCTEST Engineering Laboratory, Inc.



Agilent Spectrum Analyzer - Swept SA	CORREC SE	NSE:INT	ALIGNAUTO	08:46:15 PM May 28, 2013	
Center Freq 849.00000	MHz	#:	Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
10 dB/div Ref 28.00 dBm	IFGain:Low Atten: 38		Mkr	DET A NNNNN 1 849.000 MHz -17.780 dBm	Auto Tune
18.0					Center Freq 849.000000 MHz
-2.00					Start Freq 848.000000 MHz
-12.0		1		-13.00 dBm	<b>Stop Freq</b> 850.000000 MHz
-32.0					<b>CF Step</b> 200.000 kHz <u>Auto</u> Mar
-52.0					Freq Offse 0 Ha
-62.0					
Center 849.000 MHz #Res BW 100 kHz	#VBW 300 kHz		#Sweep	Span 2.000 MHz 1.00 s (1001 pts)	
MSG			STATUS		

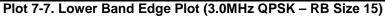


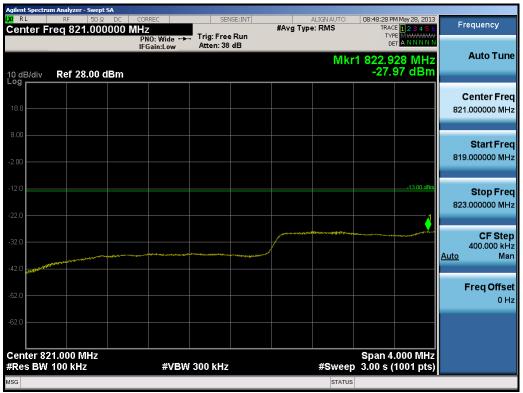


© 2013 PCTEST Engineering Laboratory, Inc.



Agilent Spectrum Analyzer - Swept SA	CORREC	SENSE:INT	ALI	GNAUTO	08:48:17 PM May 28, 2013	
Center Freq 824.000000	MHz	Trig: Free Run	#Avg Type: I		TRACE 1 2 3 4 5 6 TYPE MWWWWA	Frequency
	PNO: Wide 😱 IFGain:Low	Atten: 38 dB			DETANNNN	
10 dB/div Ref 28.00 dBm				Mkr1	823.998 MHz -18.26 dBm	Auto Tune
						Center Freq
18.0						824.000000 MHz
8.00			and the second secon	an da siya da s		Start Freq
-2.00						823.000000 MHz
-12.0		1			-13.00 dBm	Stop Fred
-22.0						825.000000 MHz
-32.0						CF Step
						200.000 kHz <u>Auto</u> Mar
-42.0						Freq Offse
-52.0						0 Hz
-62.0						
Center 824.000 MHz #Res BW 100 kHz	#VBW 3	300 kHz		#Sweep	Span 2.000 MHz 1.00 s (1001 pts)	
MSG				STATUS		





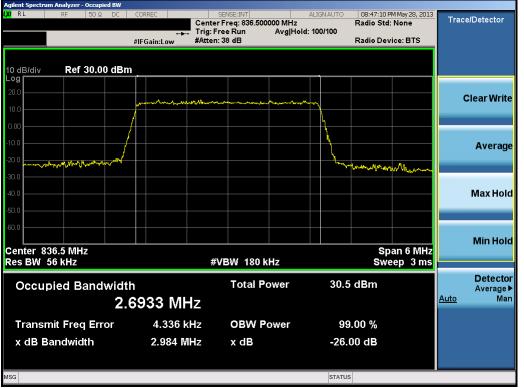
Plot 7-8. Lower Extended Band Edge Plot (3.0MHz QPSK – RB Size 15)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 24 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 34 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.		V4.5









Plot 7-10. Occupied Bandwidth Plot (3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 25 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 35 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.		V4.5



Agilent Spectrum Analyzer - Swept SA K RF 50 Ω Center Freq 849.0000		SENSE:INT	A #Avg Type:		08:49:07 PM May 28, 2013 TRACE 1 2 3 4 5 6	Frequency
	PNO: Wide 😱 IFGain:Low	Trig: Free Run Atten: 38 dB	ming type.		TYPE ANNNN Det ANNNNN 1 849.000 MHz -18.242 dBm	Auto Tune
10 dB/div Ref 28.00 dB	m				-18.242 dBm	Center Fred
8.00						849.000000 MH:
-2.00						Start Free 848.000000 MH:
-12.0					- <u>13.00 dBm</u>	Stop Free 850.000000 MH
32.0		A the marter	Management		and a new of a statement of the statemen	CF Stej 200.000 kH
42.0						<u>Auto</u> Ma
52.0						Freq Offse 0 H
-62.0						
Center 849.000 MHz #Res BW 100 kHz	#VBW	300 kHz			Span 2.000 MHz 1.00 s (1001 pts)	
MSG				STATUS		

Plot 7-11. Upper Band Edge Plot (3.0MHz QPSK – RB Size 15)



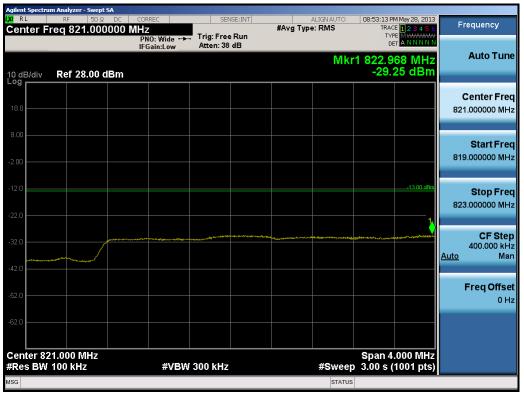
Plot 7-12. Upper Extended Band Edge Plot (3.0MHz QPSK – RB Size 15)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 79
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 36 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5



Agilent Spectrum	Analyzer - Swept SA RF 50 Ω DC	CORREC	SENSE:INT		ALIGNAUTO	08:53:02 PM May 28, 2013	
	aq 824.000000	MHz		#Avg Typ		TRACE 123456 TYPE MWWWWW	Frequency
		PNO: Wide 🗣 IFGain:Low	Atten: 38 dB			DET A N N N N N	Auto Tuno
10 dB/div Log	Ref 28.00 dBm				Mkr	1 824.000 MHz -22.278 dBm	Auto Tune
209							Center Freq
18.0							824.000000 MHz
8.00						mitemateries to the product of the second	
							Start Freq 823.000000 MHz
-2.00			/				
-12.0						-13.00.dBm	Stop Freq
-22.0			1 Andrewski				825.000000 MHz
ىلىرىلىدە يەرىمىيەر.	41491 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Wheese community and the second se	and a start and a start and a start a st				CF Step
-32.0							200.000 kHz Auto Man
-42.0							
-52.0							Freq Offset
							0 Hz
-62.0							
Center 824	.000 MHz					Span 2.000 MHz	
#Res BW 1		#VBW	300 kHz		#Sweep	1.00 s (1001 pts)	
MSG					STATUS		

Plot 7-13. Lower Band Edge Plot (5.0MHz QPSK – RB Size 25)



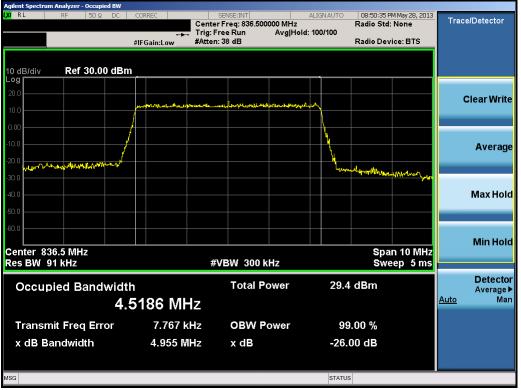
Plot 7-14. Lower Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 27 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 37 of 78	
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5	









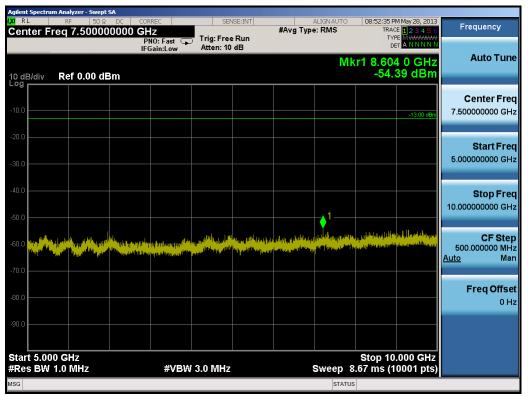
Plot 7-16. Occupied Bandwidth Plot (5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 38 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.		V4.5



XI RL Center Fr	RF 50 Ω eq 2.51500	0000 GH	REC Z NO: Fast G Gain:Low			#Avg Type	ALIGN AUTO e: RMS	TRAC	M May 28, 2013 DE <b>1 2 3 4 5 6</b> DE M WWWWWW ET A N N N N N	Frequency
10 dB/div	Ref 28.00 d		Jain:Low_	Auen. oo			Mkr1	3.819 6 -24.	25 GHz 81 dBm	Auto Tune
18.0										<b>Center Free</b> 2.515000000 GH
-2.00										Start Free 30.000000 MH
-12.0							<u>1</u>		-13.00.dBm	<b>Stop Fre</b> 5.000000000 GH
-32.0		a ta ba da da da ta da	leigi ya kali jama shi ku ku	e <mark>ga na balang sa Dapat sa Ba</mark>	ور مرد مرد وروی رو در از در ا	a ta ang sa		litele (, , , , , ), et al. () The second se	and day <mark>b</mark> ird to grant the second	<b>CF Ste</b> 497.000000 MH <u>Auto</u> Ma
-42.0 <mark>, 18 m - 19 m - </mark>										<b>Freq Offse</b> 0 H
-62.0 Start 30 M								Stop 5	.000 GHz	
#Res BW	1.0 MHz s changed; all t	races clear		/ 3.0 MHz			Sweep 8	-	0001 pts)	

Plot 7-17. Conducted Spurious Plot (5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



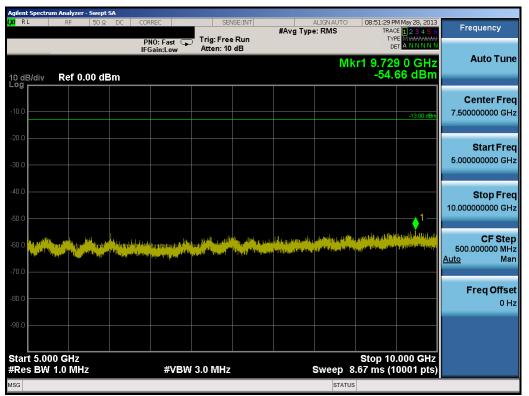
Plot 7-18. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 39 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5



( <mark>1</mark> RL		RF	50 Ω		ORREC PNO: Fast FGain:Low			#Avg Typ	ALIGNAUTO e: RMS	TRAC	M May 28, 2013 2E <b>1 2 3 4 5 6</b> 2E M <del>M M M M M</del> ET A N N N N N	Frequency
0 dB/c	div R	lef 28.	00 d		Guilleow				Mkr1	3.777 3 -26.	80 GHz 30 dBm	Auto Tun
18.0 -												Center Fre 2.515000000 G⊦
8.00												Start Fre 30.000000 MH
-12.0									1_		-13.00.dBm	<b>Stop Fre</b> 5.000000000 GH
32.0 —	العارير العر	An and the second		al pages till på	and a state of the	l y sa a si la da la si a	a alface <mark>di Ala a</mark> lfacte Alface <mark>di Ala a</mark> lfacte Alface di Ala alfacte	nya (jila kiya yang)			dia kandi di di di angan di Pangan na kang di pang panal	CF Ste 497.000000 MH <u>Auto</u> Ma
42.0 <b></b> 52.0	des de la séle	u <u>i i i i i i i i i i i i i i i i i i i</u>										Freq Offs 0 I
62.0	30 MH:	Z								Stop 5	.000 GHz	
	BW 1.0				#VB	W 3.0 MHz			Sweep 8	3.67 ms (1	0001 pts)	

Plot 7-19. Conducted Spurious Plot (5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



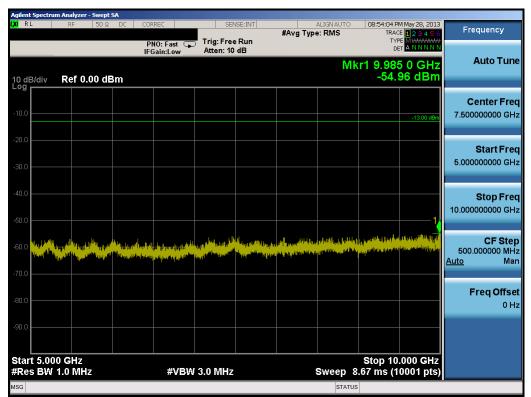
Plot 7-20. Conducted Spurious Plot (5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 40 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 40 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5



URL RF 5		ORREC	Trig: Free		#Avg Typ	ALIGN AUTO e: RMS	TRAC	M May 28, 2013 26 <b>1 2 3 4 5 6</b> 26 M <del>WWWWW</del> 57 A N N N N N	Frequency
0 dB/div Ref 28.0		FGain:Low	Atten: 38	dB		Mkr1	3.807 2	00 GHz 78 dBm	Auto Tun
18.0									<b>Center Fre</b> 2.515000000 GH
2.00									<b>Start Fre</b> 30.000000 Mi
22.0						1_		-13.00.dBm	<b>Stop Fre</b> 5.000000000 GF
	ndayina Jangu ang Pada ang Pad Pada ang Pada	nsk men kelen der Marstel Generalischer Antonis		n a an	Martin Carlotta (Santa)			aldraf Marshy and Statestation, shift	<b>CF St</b> e 497.000000 MI <u>Auto</u> Mi
42.0 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)									Freq Offs 0 I
62.0							Stop 5	.000 GHz	
Res BW 1.0 MHz		#VBW	/ 3.0 MHz			Sweep 8	.67 ms (1	0000 GH2 0001 pts)	

Plot 7-21. Conducted Spurious Plot (5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-22. Conducted Spurious Plot (5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dago 41 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 41 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5



ide Trig:Free Run Atten: 38 dB		1kr1 849.000 MHz -23.887 dBm	Auto Tune Center Frec 849.00000 MHz Start Frec 848.000000 MHz Stop Frec 850.00000 MHz
		-13.00 dBm	849.000000 MH; Start Frec 848.000000 MH; Stop Frec
		-13.00 dBm	848.000000 MH Stop Free
The way was a second at the			
			<b>CF Ste</b> 200.000 kF <u>Auto</u> Ma
			Freq Offs 0 H
	#\$\\\	Span 2.000 MHz eep 1.00 s (1001 pts)	
	#VBM 300 kHz	#VBW 300 kHz #Sw	Span 2.000 MHz #VRW 300 kHz #Sween 1.00 s (1001 nts)

Plot 7-23. Upper Band Edge Plot (5.0MHz QPSK – RB Size 25)

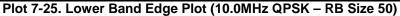


Plot 7-24. Upper Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 42 of 70	
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 42 of 78	
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5	



Agilent Spectrum Analyzer - Swept SA	CORREC	SENSE:INT		ALIGNAUTO	08:56:29 PM May 28, 2013	
			#Avg Typ		TRACE 123456 TYPE MWWWW	Frequency
	PNO: Wide 🏳 IFGain:Low	Trig: Free Run Atten: 38 dB			DET ANNNN	
10 dB/div Ref 28.00 dBm				Mkr	824.000 MHz -26.007 dBm	Auto Tune
18.0						Center Fred 824.000000 MHz
-2.00			$\square$		50 - 2 - 200	Start Fred 822.000000 MH:
-12.0		1			-13.00.dBm	Stop Free 826.000000 MH:
-32.0		and the second se				CF Stej 400.000 kH <u>Auto</u> Ma
-52.0						Freq Offse 0 H
-62.0						
Center 824.000 MHz #Res BW 100 kHz	#VBW	300 kHz		#Sweep	Span 4.000 MHz 1.00 s (1001 pts)	
MSG				STATUS		

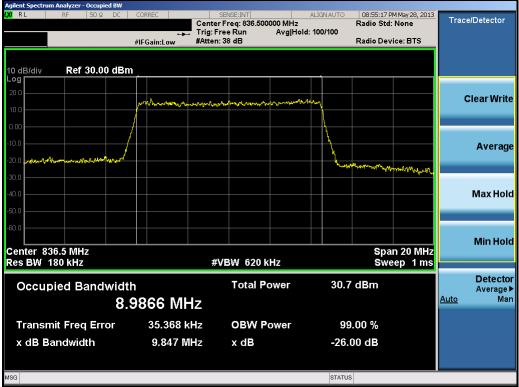




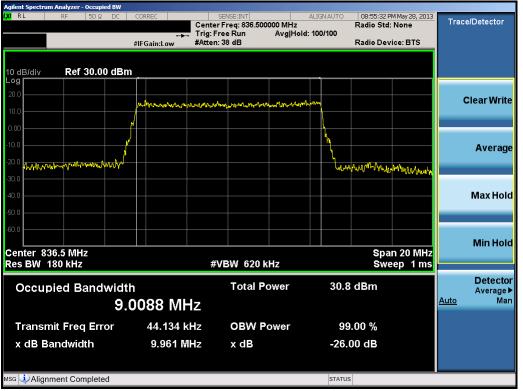
Plot 7-26. Lower Extended Band Edge Plot (10.0MHz QPSK - RB Size 50)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 42 of 70		
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 43 of 78		
© 2013 PCTEST Engineering	2013 PCTEST Engineering Laboratory, Inc.					









## Plot 7-28. Occupied Bandwidth Plot (10.0MHz 16-QAM – RB Size 50)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dama 44 af 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Page 44 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.		V4.5



Agilent Spectru	m Analyzer - Swept SA RF 50 Ω DC	CORREC	SENSE:INT	ALIGNAUTO	08:57:26 PM May 28, 2013	
	req 849.00000			#Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A N N N N	Frequency
10 dB/div Log	Ref 28.00 dBm			М	kr1 849.008 MHz -27.82 dBm	Auto Tune
18.0						Center Fred 849.000000 MH;
-2.00						Start Free 847.000000 MH
-12.0			Mar. 1			<b>Stop Fre</b> 851.000000 MH
-32.0			In the first of the sector of	a	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<b>CF Ste</b> 400.000 kH <u>Auto</u> Ma
42.0 52.0						Freq Offse 0 H
-62.0						
Center 84 #Res BW	9.000 MHz 100 kHz	#VBW	300 kHz	#Swe	Span 4.000 MHz ep 1.00 s (1001 pts)	
MSG				STAT	US	

Plot 7-29. Upper Band Edge Plot (10.0MHz QPSK – RB Size 50)



Plot 7-30. Upper Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 45 of 70		
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 45 of 78		
© 2013 PCTEST Engineering	2013 PCTEST Engineering Laboratory, Inc.					

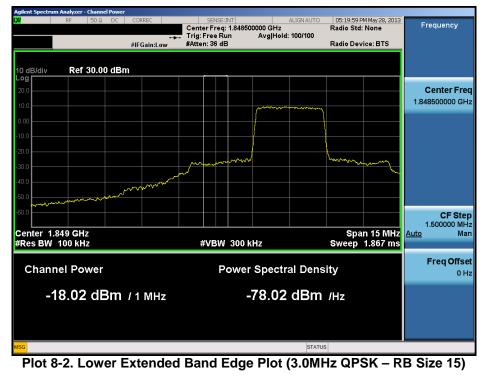


# 8.0 BAND 25 PLOTS OF EMISSIONS

**Note:** All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.

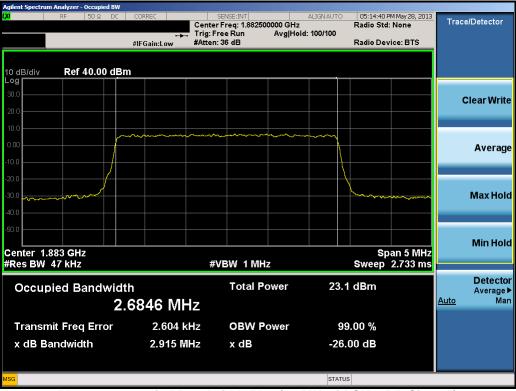


Plot 8-1. Lower Band Edge Plot (3.0MHz QPSK – RB Size 15)

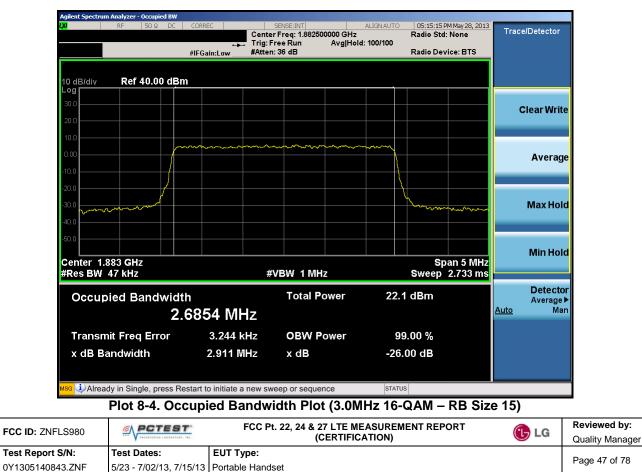


FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 46 of 79
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 46 of 78
O 0040 DOTEOT Estimation	I ale anatami. In a			14.5





Plot 8-3. Occupied Bandwidth Plot (3.0MHz QPSK – RB Size 15)





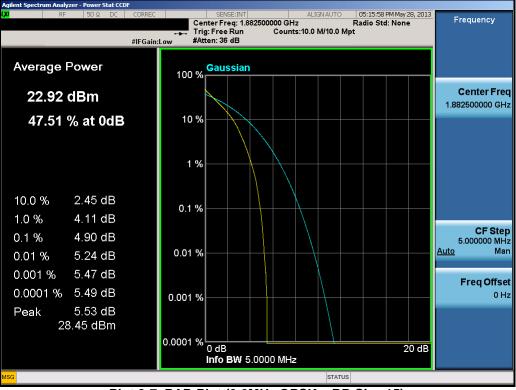
Agilent Spectrum Analyzer - Swept					
L <b>XI</b> RF 50 Ω		SENSE:INT	ALIGNAUTO #Avg Type: RMS	05:16:49 PM May 28, 2013 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 25.00 d	PNO: Wide ↔ IFGain:Low	Trig: Free Run #Atten: 36 dB	Mk	r1 1.915 00 GHz -14.07 dBm	Auto Tune
15.0	proventing and a second				Center Free 1.915000000 GH:
-5.00		1			Start Fred 1.910000000 GH
-15.0					<b>Stop Fre</b> 1.920000000 GH
.35.0				and a star and a star and a star and a star a st	<b>CF Ste</b> 1.000000 MH <u>Auto</u> Ma
.45.0					Freq Offse 0 H
-65.0					
Center 1.915000 GHz #Res BW 100 kHz	#VBW	300 kHz	#Swee	Span 10.00 MHz p 3.00 s (1001 pts)	
MSG			STAT		

Plot 8-5. Upper Band Edge Plot (3.0MHz QPSK – RB Size 15)

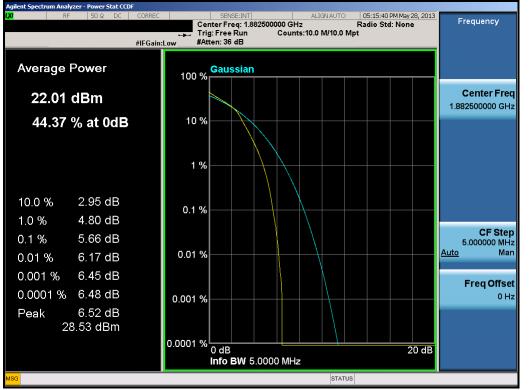


FCC ID: ZNFLS980	THOISTCHINE LABORATORY, INC.	(CERTIFICATION)	C LG	Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 48 of 78
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Faye 40 01 70
© 2013 PCTEST Engineering	Laboratory Inc			V/4 5









### Plot 8-8. PAR Plot (3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 40 at 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 49 of 78
© 2013 PCTEST Engineering	Laboratory Inc.			V4 5



gilent Spectru	m Analyzer - Swept RF 50 Ω		ORREC	054	SE:INT		ALIGNAUTO	05-10-22.0	M May 28, 2013	
<b>4</b>	KF   DU Se	F	PNO: Wide ↔ Gain:Low		e Run	#Avg Typ		TRAC TYP	E 1 2 3 4 5 6 E WWWWWW T A N N N N N	Frequency
0 dB/div	Ref 25.00		Gam.Eow				Mkr1	1.850 -22.	00 GHz 38 dBm	Auto Tun
15.0										<b>Center Fre</b> 1.85000000 GF
5.00										<b>Start Fre</b> 1.840000000 GF
25.0					1			-A	-13.00 dBm	<b>Stop Fr</b> 1.860000000 G
5.0		American	production and a second s	and the state of t				ni <sup>to</sup> netton (noteronol)	and real real real real real real real real	CF Ste 2.000000 MI <u>Auto</u> M
5.0	Analisman and an and a second and a second									Freq Offs
enter 1.8	85000 GHz							Span 2	0.00 MHz	
	100 kHz		#VBW	/ 300 kHz			#Sweep	3.00 s (	1001 pts)	
G							STATUS			

Plot 8-9. Lower Band Edge Plot (5.0MHz QPSK – RB Size 25)

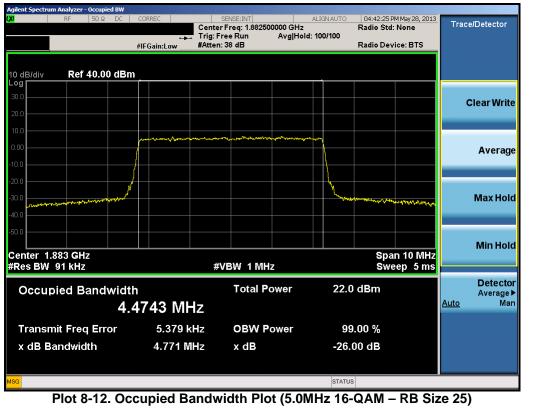


	**** Y ENGINEERINE LARONATORS, INC.	(CERTIFICATION)	Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Page 50 of 78		
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Fage 50 01 76		
© 2013 PCTEST Engineering	2013 PCTEST Engineering Laboratory. Inc.				



Agilent Spectrum Analyzer - Occupied BW	CORREC	SENSE:INT	ALIGNA		M May 28, 2013	
	#IFGain:Low	Center Freq: 1.8825		Radio Std:	None	Trace/Detector
10 dB/div Ref 40.00 dBm	• • • •					
20.0						Clear Write
10.0 0.00 						Average
-20.0				harmon	alas an	Max Hold
-60.0 Center 1.883 GHz #Res BW 91 kHz		#VBW 1 MI	tz	Spa	n 10 MHz ep: 5 ms	Min Hold
	Occupied Bandwidth 4.4828 MHz			Total Power 22.9 dBm		Detector Average ► <u>Auto</u> Man
Transmit Freq Error x dB Bandwidth	3.899   4.795 N			99.00 % -26.00 dB		
<mark>MSG</mark>				STATUS		

Plot 8-11. Occupied Bandwidth Plot (5.0MHz QPSK - RB Size 25)

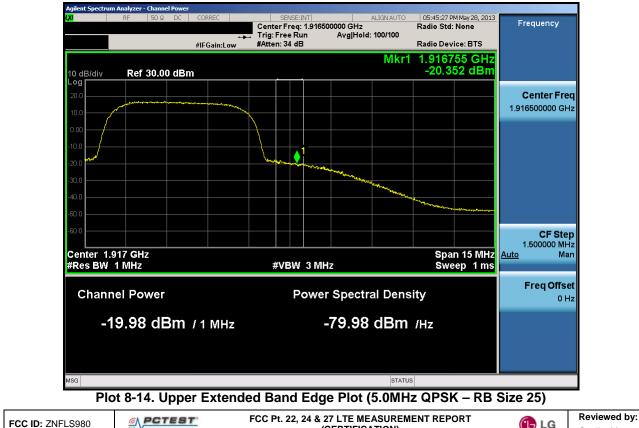


FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 51 of 79
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 51 of 78
© 2013 PCTEST Engineering	Laboratory, Inc.			V4.5



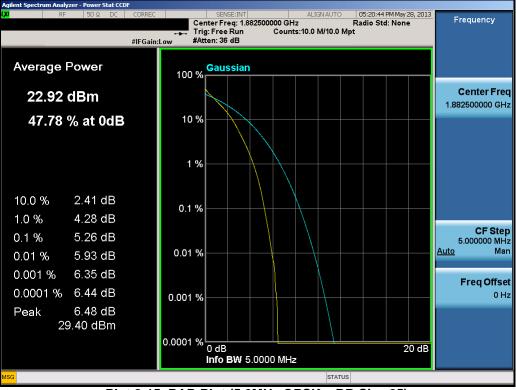
gilent Spectrum Analyzer - S 0 RF	50 Ω DC	CORREC	SENSE:INT		ALIGNAUTO	04:48:55 PM	May 28, 2013	-
		PNO: Wide ↔ IFGain:Low	. Trig: Free Run Atten: 36 dB	#Avg Type	e: RMS	TYPE	123456 Mwwww ANNNNN	Frequency
0 dB/div Ref 25.	00 dBm				Mkr	1 1.915 ( -17.24	00 GHz 8 dBm	Auto Tun
15.0								Center Fre 1.915000000 G⊢
5.00								<b>Start Fre</b> 1.905000000 GF
25.0			1	harrow and			-13.00 dBm	Stop Fre 1.925000000 G⊦
45.0					Land and the second sec	<b>6</b>		CF Ste 2.000000 MH <u>Auto</u> Ma
55.0						And a share a s	<sup>in and</sup> ar and a start of the	Freq Offs 0 F
65.0 Center 1.91500 GH	Iz					Span 20	.00 MHz	
Res BW 100 kHz		#VBW	300 kHz		#Sweep	3.00 s (1	001 pts)	

Plot 8-13. Upper Band Edge Plot (5.0MHz QPSK – RB Size 25)

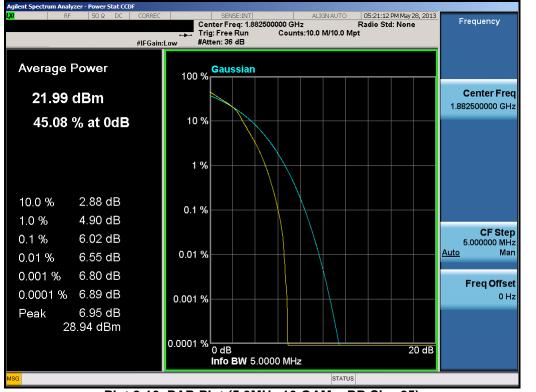


FCC ID: ZNFLS980	ENGINECOTHE LABORATORS, INC.	(CERTIFICATION)	Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 52 of 78
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Fage 52 01 76
© 2013 PCTEST Engineering	Laboratory Inc	·	V/4 5





Plot 8-15. PAR Plot (5.0MHz QPSK – RB Size 25)



## Plot 8-16. PAR Plot (5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Daga 52 of 70		
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 53 of 78		
© 2013 PCTEST Engineering Laboratory, Inc.						



	ım Analyzer - Swept SA	600056				
<mark>XI</mark>	RF 50Ω DC	CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	03:49:58 PM May 28, 2013 TRACE 1 2 3 4 5 6	Frequency
		PNO: Wide 🥌 IFGain:Low	Trig: Free Run Atten: 36 dB	Mkr	түре Милинин Det ANNNNN 1 1.850 00 GHz -27.41 dBm	Auto Tune
10 dB/div Log	Ref 25.00 dBm				-27.41 dBm	
15.0						Center Fre 1.850000000 GH
5.00				and a second		<b>Start Fre</b> 1.835000000 GH
-15.0			1		-13.00 dBm	<b>Stop Fre</b> 1.865000000 GH
35.0		and a second at the second	www.			CF Ste 3.000000 M⊢ <u>Auto</u> Ma
55.0						Freq Offso 0 ⊦
-65.0	85000 GHz				Span 30.00 MHz	
	100 kHz	#VBW	300 kHz	#Sweep	3.00 s (1001 pts)	
ISG				STATUS		

Plot 8-17. Lower Band Edge Plot (10.0MHz QPSK – RB Size 50)

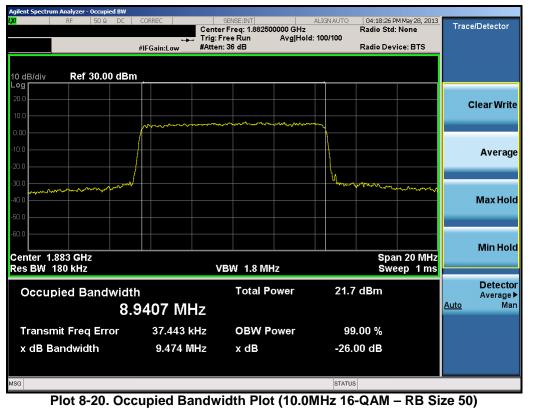


FCC ID: ZNFL5980	TO ENGINEERINE LANDRATORY, INC.	(CERTIFICATION)	Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 54 of 78
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Fage 54 01 76
© 2013 DCTEST Engineering	Laboratory Inc		



Agilent Spectrum Analyzer - Occupied BW IXI RF 50 Ω DC	CORREC	SENSE:INT Center Freg: 1.8825	ALIGN AU	TO 04:17:58 P Radio Std:	M May 28, 2013	Trace/Detect	tor
	↔ #IFGain:Low		Avg Hold: 100/100				
10 dB/div Ref 30.00 dBr	n						
20.0						Clear W	Vrite
0.00	m		umum m				
-10.0						Avei	rage
-20.0	/		<u> </u>	Wayson and the second			
-40.0						MaxH	Hold
-60.0							
Center 1.883 GHz				Spa	n 20 MHz	Min H	Hold
Res BW 180 kHz		VBW 1.8 M	HZ	Swe	ep 1 ms		
Occupied Bandwidt		Total P	ower 2	2.5 dBm		Dete Avera	age►
8.9392 MHz						<u>Auto</u>	Man
Transmit Freq Error	38.562 I	KHZ OBW P	ower	99.00 %			
x dB Bandwidth	9.451 N	/Hz xdB	-2	26.00 dB			
MSG		Pandwidth DI		ATUS			

Plot 8-19. Occupied Bandwidth Plot (10.0MHz QPSK - RB Size 50)



FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage EE of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 55 of 78





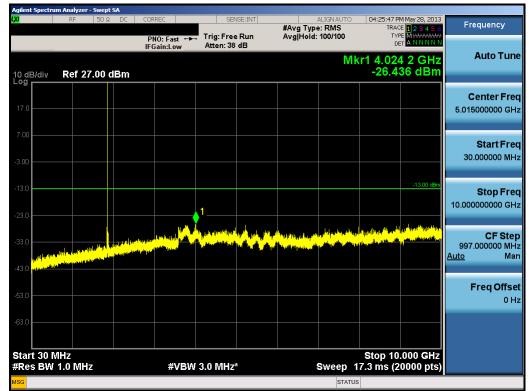
Plot 8-21. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)



Plot 8-22. Conducted Spurious Plot (10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga EC of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 56 of 78
© 2013 PCTEST Engineering	Laboratory Inc	·		V4 5



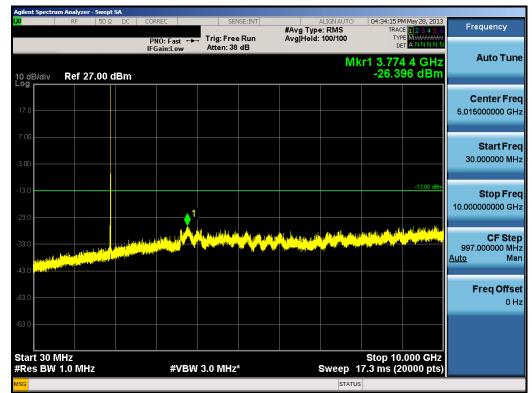


Plot 8-23. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

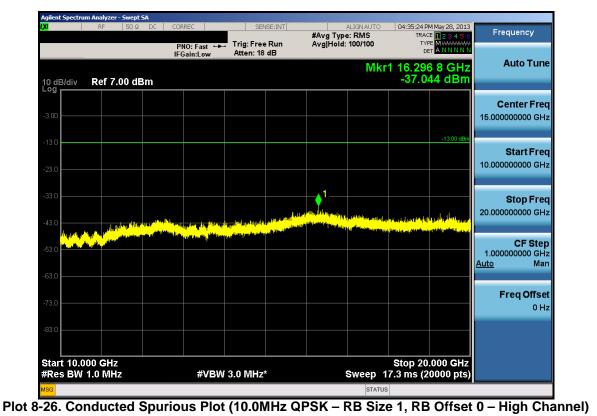


FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dege 57 of 70		
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 57 of 78		





Plot 8-25. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

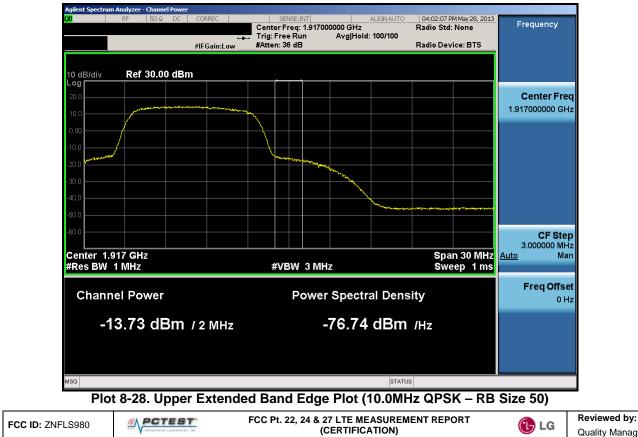


FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 50 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 58 of 78
Q 0040 DOTEOT Fasting	Laborates: bas			



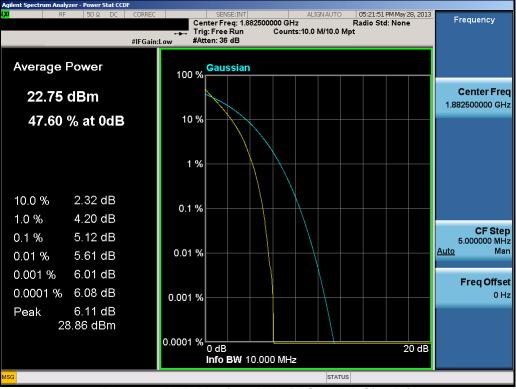
Agilent Spectrum Analyzer - Swept SA					
XI RF 50Ω DC			ALIGNAUTO	04:02:54 PM May 28, 2013 TRACE 123456	Frequency
	PNO: Wide +++ Trig: Free IFGain:Low Atten: 36			TYPE MWWWWW DET ANNNNN	
10 dB/div Ref 25.00 dBm			Mkr1	1.915 00 GHz -23.36 dBm	Auto Tune
15.0					Center Freq
					1.915000000 GHz
5.00					Start Freq
-5.00				-13.00 dBm	1.900000000 GHz
-15.0		1		-13.00 08m	Stop Fred
-25.0		and a second and a second			1.930000000 GHz
-35.0					CF Step 3.000000 MH
-45.0					<u>Auto</u> Mar
					Freq Offse
-55.0			<u> </u>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	0 Hz
-65.0					
Center 1.91500 GHz				Span 30.00 MHz	
#Res BW 100 kHz	#VBW 300 kHz		#Sweep	3.00 s (1001 pts)	
			0.4100		

Plot 8-27. Upper Band Edge Plot (10.0MHz QPSK - RB Size 50)

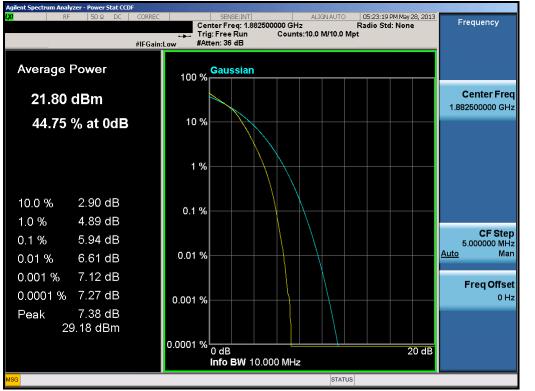


FCC ID. ZINFLO900		(CERTIFICATION)	Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:	Page 59 of 78			
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset	Fage 59 01 76			
© 2013 PCTEST Engineering Laboratory. Inc.						









### Plot 8-30. PAR Plot (10.0MHz 16-QAM – RB Size 50)

FCC ID: ZNFLS980		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage C0 of 70
0Y1305140843.ZNF	5/23 - 7/02/13, 7/15/13	Portable Handset		Page 60 of 78
© 2013 PCTEST Engineering Laboratory, Inc.				