

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

#### Applicant Name:

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

#### Date of Testing: 7/14-7/22/2014 Test Site/Location: PCTEST Lab., Columbia, MD, USA Test Report Serial No.: 0Y1407141386.ZNF

# FCC ID:

# ZNFMS395

APPLICANT:

# LG ELECTRONICS MOBILECOMM U.S.A

Application Type: Model(s): EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Test Device Serial No.: Certification MS395, LGMS395, LG-MS395 Portable Handset PCS Licensed Transmitter Held to Ear (PCE) §2 §22(H) §24(E) §27(L) ANSI/TIA-603-C-2004, KDB 971168 v02r01 *identical prototype* [S/N: 14JULY-26, 14JULY-25]

			ERP/	EIRP
Mode	Tx Frequency (MHz)	Emission Designator	Max. Power (W)	Max. Power (dBm)
GSM850	824.2 - 848.8	245KGXW	0.787	28.96
EDGE850	824.2 - 848.8	242KG7W	0.220	23.43
GSM1900	1850.2 - 1909.8	242KGXW	0.989	29.95
EDGE1900	1850.2 - 1909.8	245KG7W	0.390	25.91
WCDMA850	826.4 - 846.6	4M16F9W	0.075	18.73
WCDMA1700	1712.4 - 1752.5	4M15F9W	0.155	21.92
WCDMA1900	1852.4 - 1907.6	4M15F9W	0.179	22.52

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.

Randy Ortanez President



FCC ID: ZNFMS395	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 1 of 70		
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 1 of 70		
© 2014 PCTEST Engineering Laboratory, Inc.						

V 1.10 07/10/2014



# TABLE OF CONTENTS

FCC F	PART 2	2, 24, & 27 MEASUREMENT REPORT	3
1.0	INTR	ODUCTION	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	TEST CONFIGURATION	5
	2.4	EMI SUPPRESSION DEVICE(S)/MODIFICATIONS	5
3.0	DES	CRIPTION OF TESTS	6
	3.1	EVALUATION 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	AWS - BASE FREQUENCY BLOCKS	7
	3.7	AWS - MOBILE FREQUENCY BLOCKS	7
	3.8	RADIATED MEASUREMENTS	8
4.0	TEST	FEQUIPMENT CALIBRATION DATA	9
5.0	SAM	PLE CALCULATIONS	10
6.0	TEST	r Results	11
	6.1	SUMMARY	11
	6.2	OCCUPIED BANDWIDTH	12
	6.3	SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL	17
	6.4	BAND EDGE EMISSIONS AT ANTENNA TERMINAL	35
	6.5	PEAK-AVERAGE RATIO	43
	6.6	RADIATED POWER (ERP/EIRP)	46
	6.7	RADIATED SPURIOUS EMISSIONS MEASUREMENTS	50
	6.8	FREQUENCY STABILITY / TEMPERATURE VARIATION	59
7.0	CON	CLUSION	70

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 2 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 2 01 70	
2014 PCTEST Engineering Laboratory, Inc.					

07/10/2014





# MEASUREMENT REPORT FCC Part 22, 24, & 27



# §2.1033 General Information

APPLICANT:	LG Electronics MobileComm U.S.A			
APPLICANT ADDRESS:	1000 Sylvan Avenue			
	Englewood Cliffs, NJ 07632, United States			
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.			
TEST SITE ADDRESS:	7185 Oakland Mills Road, Columbia, MD 21046 USA			
FCC RULE PART(S):	§2 §22(H) §24(E) §27(L)			
BASE MODEL:	MS395			
FCC ID:	ZNFMS395			
FCC CLASSIFICATION:	PCS Licensed Transmitter Held to Ear (PCE)			
MODE:	GSM / EDGE / WCDMA			
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm)			
<b>Test Device Serial No.:</b>	14JULY-26, 14JULY-25 Production Pre-Production Engineering			
DATE(S) OF TEST:	7/14-7/22/2014			
TEST REPORT S/N:	0Y1407141386.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 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: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 2 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 3 of 70	
© 2014 PCTEST Engineering Laboratory, Inc.					



07/10/2014



# **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 C63.4-2009 on February 15, 2012.

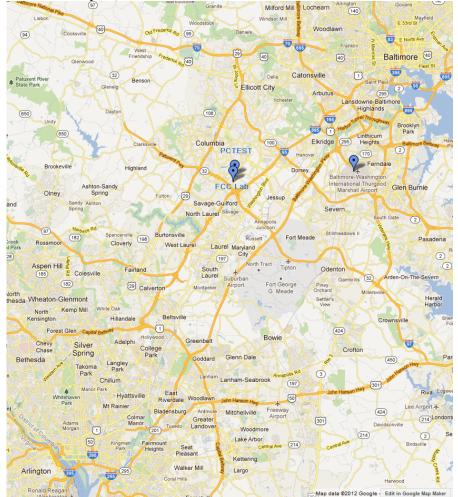


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: ZNFMS395	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 4 of 70		
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 4 of 70		
© 2014 DCTEST Engineering Laboratory Inc.						



# 2.0 PRODUCT INFORMATION

# 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFMS395**. The test data contained in this report pertains only to the emissions due to the EUT's 2G/3G licensed transmitters.

# 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, Bluetooth (1x, EDR, LE)

# 2.3 Test Configuration

The LG Portable Handset FCC ID: ZNFMS395 was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168 v02r01. See Section 6.0 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.

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Page 5 of 70		
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 5 01 70		
© 2014 PCTEST Engineering Laboratory Inc						

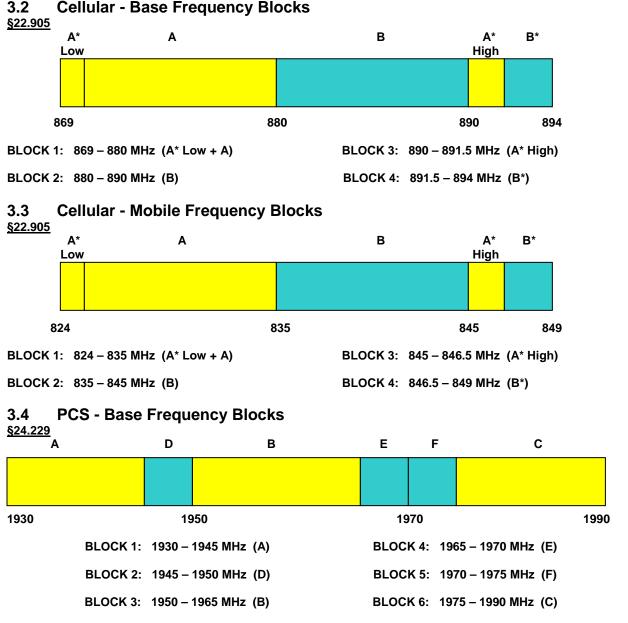


#### **DESCRIPTION OF TESTS** 3.0

#### 3.1 **Evaluation Procedure**

The measurement procedures described in the "Land Mobile FM or PM - Communications Equipment -Measurements and Performance Standards" (ANSI/TIA-603-C-2004) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 v02r01) were used in the measurement of the LG Portable Handset FCC ID: ZNFMS395.





FCC ID: ZNFMS395	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dego 6 of 70		
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 6 of 70		
© 2014 PCTEST Engineering Laboratory, Inc.						

#### 3.2 **Cellular - Base Frequency Blocks**

<sup>07/10/2014</sup> 

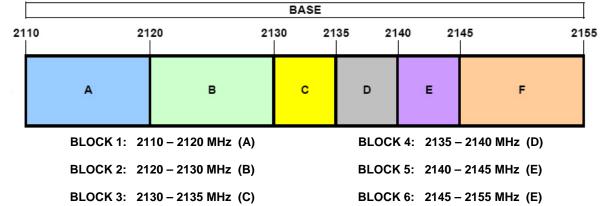


#### **PCS - Mobile Frequency Blocks** 3.5

<u>§24.229</u> A		D	В	E	F	С	
1850		18	370	189	) 90		1910
	BLOCK 1:	1850 –	1865 MHz (A)	BLOC	K 4: 18	85 – 1890 MHz (E)	
	BLOCK 2:	1865 –	1870 MHz (D)	BLOC	K 5: 18	90 – 1895 MHz (F)	
	BLOCK 3:	1870 –	1885 MHz (B)	BLOC	K6: 189	95 – 1910 MHz (C)	

#### **AWS - Base Frequency Blocks** 3.6

<u>§27.5(h)</u>



#### 3.7 **AWS - Mobile Frequency Blocks**

<u>§27.5(h)</u>

	MOBILE							
17	10	1	720 17 	7 <b>30</b> 17	35 17	40 17	45	1755
		A	в	с	D	E	F	
		BLOCK 1: 17	′10 – 1720 MHz  (A)		BLOCK	4: 1735 –	1740 MHz (D)	
		BLOCK 2: 17	′20 – 1730 MHz (B)		BLOCK	5: 1740 –	1745 MHz (E)	
		BLOCK 3: 17	/30 – 1735 MHz (C)		BLOCK	6: 1745 –	1755 MHz (F)	

FCC ID: ZNFMS395	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dege 7 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 7 of 70	
© 2014 PCTEST Engineering Laboratory, Inc.					

PCTEST

# 3.8 Radiated Measurements

## §2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) §27.50(d)(10) §27.53(h

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 Clause 5, Figure 5.7 of ANSI C63.4-2009. 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  $\frac{3}{4}$ " (~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. For the EUT positioning, "H" is defined with the EUT lying flat on the test surface, "H2" is defined with the EUT standing up on its side, and "V" is defined with the EUT standing upright.

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  $P_{g \text{ [dBm]}}$  – cable loss  $_{\text{[dB]}}$ .

Radiated power levels are investigated with the receive antenna vertically polarized while radiated spurious emissions levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/TIA-603-C-2004.

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dego 9 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 8 of 70	
© 2014 PCTEST Engineering Laboratory. Inc.					



#### TEST EQUIPMENT CALIBRATION DATA 4.0

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	1/29/2014	Annual	1/29/2015	N/A
-	LTx3	Licensed Transmitter Cable Set	1/30/2014	Annual 1/30/2015		N/A
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	5/29/2014	Annual	5/29/2015	N/A
-	RE3	Radiated Emissions Cable Set	7/7/2014	Annual	7/7/2015	N/A
Agilent	N9020A	MXA Signal Analyzer	10/29/2013	Annual	10/29/2014	US46470561
Emco	3115	Horn Antenna (1-18GHz)	1/30/2014	Biennial	1/30/2016	9704-5182
Espec	ESX-2CA	Environmental Chamber	4/16/2014	Annual	4/16/2015	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/8/2014	Biennial	4/8/2016	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	6/17/2014	Biennial	6/17/2016	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	11/7/2012	Biennial	11/7/2014	128338
K & L	11SH10-3075/U18000	High Pass Filter	5/2/2014	Annual	5/2/2015	2
K & L	11SH10-3075/U18000	High Pass Filter	5/2/2014	Annual	5/2/2015	4
K & L	13SH10-1000/U1000	N Type High Pass Filter	5/22/2014	Annual	5/22/2015	1
K & L	13SH10-1000/U1000	N Type High Pass Filter	5/22/2014	Annual	5/22/2015	2
K & L	13SH10-1000/U1000	N Type High Pass Filter	5/22/2014	Annual	5/22/2015	4
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/9/2014	Annual	4/9/2015	11401010036
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	4/17/2014	Annual	4/17/2015	11210140001
Mini-Circuits	SSG-4000HP	USB Synthesized Signal Generator		N/A		11208010032
Mini-Circuits	TVA-11-422	RF Power Amp		N/A		QA1303002
Rhode & Schwarz	TS-PR18	Pre-Amplifier	6/12/2014	Annual	6/12/2015	101622
Rohde & Schwarz	CMU200	Base Station Simulator	N/A		836536/0005	
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	1/27/2014 Annual 1/27/2015		100342	
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/21/2014	Annual	5/21/2015	100348
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	3/5/2014	Annual	3/5/2015	100071
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/21/2013	Biennial	11/21/2015	9105-2404
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/18/2014	Biennial	3/18/2016	N/A
VWR	62344-734	Thermometer with Clock	2/20/2014	Biennial	2/20/2016	140140336

Table 4-1. Test Equipment

Note: Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 0 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 9 of 70	
© 2014 PCTEST Engineering Laboratory, Inc.					

Engineering Laboratory, I



#### SAMPLE CALCULATIONS 5.0

# GSM Emission Designator

## Emission Designator = 250KGXW

GSM BW = 250 kHz G = Phase Modulation X = Cases not otherwise covered W = Combination (Audio/Data)

# **EDGE Emission Designator**

## Emission Designator = 250KG7W

EDGE BW = 250 kHzG = Phase Modulation 7 = Quantized/Digital Info W = Combination (Audio/Data)

# WCDMA Emission Designator

## Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz F = Frequency Modulation 9 = Composite Digital Info W = Combination (Audio/Data) (Measured at the 99.75% power bandwidth)

# Spurious Radiated Emission

#### Example: Spurious emission at 3700.40 MHz

The receive 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 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm - (-24.80) = 50.3 dBc.

FCC ID: ZNFMS395				Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 10 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 10 of 70	
© 2014 PCTEST Engineering Laboratory. Inc.					

ngineering Laboratory,



# 6.0 TEST RESULTS

# 6.1 Summary

Company Name:	LG Electronics MobileComm U.S.A
FCC ID:	ZNFMS395
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>GSM / EDGE / WCDMA</u>

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER	MODE (TX)				
2.1049	Occupied Bandwidth	N/A		PASS	Section 6.2
2.1051 22.917(a) 24.238(a) 27.53(h)	Conducted Band Edge / Spurious Emissions	> 43 + log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Sections 6.3, 6.4
24.232(d) 27.50(d.5)	Peak-Average Ratio	< 13 dB	CONDUCTED	PASS	Section 6.5
2.1046	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
2.1055 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24, 27)		PASS	Section 6.8
22.913(a.2)	Effective Radiated Power	< 7 Watts max. ERP		PASS	Section 6.6
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 6.6
27.50(d.4)	Equivalent Isotropic Radiated Power	< 1 Watts max. EIRP	RADIATED	PASS	Section 6.6
2.1053 22.917(a) 24.238(a) 27.53(h)	Radiated Spurious Emissions	> 43 + log <sub>10</sub> (P[Watts]) for all out-of-band emissions		PASS	Section 6.7

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 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 "2G/3G Automation", Version 2.5.

FCC ID: ZNFMS395	PCTEST	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 11 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 11 of 70	
© 2014 PCTEST Engineering Laboratory, Inc.					



# 6.2 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 v02r01 - Section 4.2

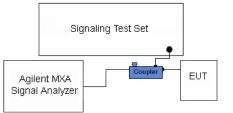
## Test Settings

- 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 6-1. Test Instrument & Measurement Setup

# Test Notes

None.

FCC ID: ZNFMS395	CALEST	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 12 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 12 01 70	
© 2014 PCTEST Engineering La	014 PCTEST Engineering Laboratory, Inc.				





Plot 6-1. Occupied Bandwidth Plot (Cellular GSM Mode - Ch. 190)



Plot 6-2. Occupied Bandwidth Plot (EDGE850 Mode - Ch. 190)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 12 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 13 of 70	
© 2014 PCTEST Engineering	2014 PCTEST Engineering Laboratory, Inc.				

leening Laboratory, inc.





Plot 6-3. Occupied Bandwidth Plot (PCS GSM Mode - Ch. 661)



Plot 6-4. Occupied Bandwidth Plot (EDGE1900 Mode - Ch. 661)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 14 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 14 of 70	
© 2014 PCTEST Engineering Laboratory Inc					

2014 PCTEST Engineering Laboratory, Inc



Agilent Spectrum Analyzer - Occupied BW					
()20 RL   RF   50 Ω AC	Center		ALIGN AUTO	02:58:44 PM Jul 21, 2014 Radio Std: None Radio Device: BTS	Trace/Detector
10 dB/div Ref 10.00 dBm					
-10.0	/ Marin	r water all the second of the second s			Clear Write
-20.0 -30.0 -40.0				and the second sec	Average
-50 0 -60 0 -70 0					Max Hold
-80.0 Center 836.6 MHz Res BW 91 kHz	#\	/BW 300 kHz		Span 10 MHz Sweep 1.2 ms	Min Hold
Occupied Bandwidth 4.1	557 MHz	Total Power	21.0	dBm	Detector Peak▶ Auto <u>Man</u>
Transmit Freq Error x dB Bandwidth	2.094 kHz 4.665 MHz	OBW Power x dB	99. -26.0	00 % 0 dB	
MSG			STATUS		





Plot 6-6. Occupied Bandwidth Plot (AWS WCDMA Mode - Ch. 1412)

FCC ID: ZNFMS395	PCTEST	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 15 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 15 of 70
© 2014 PCTEST Engineering L	aboratory Inc.	•		V 1 10





Plot 6-7. Occupied Bandwidth Plot (PCS WCDMA Mode - Ch. 9400)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 16 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 16 01 70
© 2014 PCTEST Engineering	Laboratory, Inc.			V 1.10

ngineering Laboratory, I

#### Spurious and Harmonic Emissions at Antenna Terminal 6.3 §2.1051 §22.917(a) §24.238(a) §27.53(h)

## **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 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.

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

## **Test Procedure Used**

KDB 971168 v02r01 - Section 6.0

## Test Settings

- Start frequency was set to 30MHz and stop frequency was set to 10GHz for Cell, 20GHz for AWS. 20GHz for PCS (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = max hold
- 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.

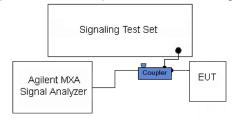


Figure 6-2. Test Instrument & Measurement Setup

#### Test Notes

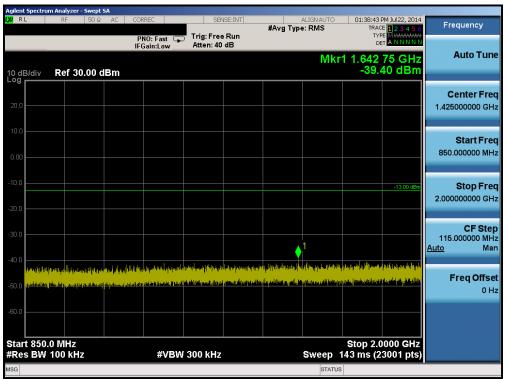
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22 and 1 MHz or greater for Part 24, Part 27. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth 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.

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 17 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 17 of 70
© 2014 PCTEST Engineering	Laboratory, Inc.			V 1.10



	pectrum	Analyzer - Swep							_	_	
LXI RL		RF 50 9	Ω AC O	ORREC	SEN	JSE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	PM Jul 22, 2014	Frequency
			1	PNO: Fast 🕞 FGain:Low	Trig: Free Atten: 40				TYF		
				Com.cow				M	(r1 822	48 MHz	Auto Tune
10 dB/	/div	Ref 30.00	dBm						-39.	11 dBm	
Log											O antas Erra
20.0											Center Freq 426.500000 MHz
											420.300000 WH2
10.0											
											Start Freq
0.00											30.000000 MHz
-10.0										-13.00 dBm	Stop Freq
											823.000000 MHz
-20.0 —											
-30.0											CF Step
										1	79.300000 MHz <u>Auto</u> Man
-40.0				and the second section of the	to tab		. R. con list the	In the second	o a duanda da arra	an instalate	
		alahiyan alahiyan a	ang ang tang tang tang tang tang tang ta	endedering (date) and a	a para sa	ana ang ang atalap Pangang ang ang ang ang ang ang ang ang a	na segre a se parte paga la ancie Nan ana kanda dalama mankad	e mersye sigerer respective Generalis Astronomerski se detalog	n waa na sana sa mara sa	a de la calenda da Cale	Freq Offset
-50.0	ا فاد خاله رمان ا	him., jatāti aldītistu	and a failer of the second	d in heavy of the instants	ower strongs	to the second	n navnin alti.	an alar I is i a ri	a set di se a		0 Hz
-60.0											
	30.0									23.0 MHz	
	BW 1	00 kHz		#VBN	/ 300 kHz			Sweep 9	8.7 ms (2	0001 pts)	
MSG								STATUS			





Plot 6-9. Conducted Spurious Plot (Cellular GSM Mode - Ch. 128)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 19 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 18 of 70
© 2014 PCTEST Engineering L	aboratory. Inc.			V 1.10

Engineering Laboratory, I



			er - Swept S										
l <mark>XI</mark> RL	-	RF	50 Ω	AC	CORREC		SEI	NSE:INT	#Avg Typ	ALIGNAUTO		PM Jul 22, 2014	Frequency
					PNO: Fa IFGain:L		Trig: Free #Atten: 2		wing typ		TY D		Auto Turo
10 dE Log r	3/div	Ref	5.00 dE	m						MI	(r1 2.47 -24.	2 5 GHz 31 dBm	Auto Tune
-5.00													Center Freq 6.00000000 GHz
-15.0												-13.00 dBm	
-15.0		1											<b>Start Freq</b> 2.000000000 GHz
-35.0								NUMBER OF STREET,	lli ji qarqa ki ki gʻara i muqatiri.	uliki jarence ili osiat	The state of the s	inter an in the second s	<b>Stop Freq</b> 10.000000000 GHz
	a dag kayang s	an in Ang	and the second secon	an a bhanna	n fan sen ferstaan fe Gestaan ferstaan ferst	and a state	A STREET, STATES	and the line of	nar-tura İslandi dağırışı	a sa ang sa	an an an an an Anna Anna Anna Anna Anna Anna A Anna Anna	and the state of the state	CF Step
-55.0	I los terrores												800.000000 MHz
-65.0													<u>Auto</u> Man
-75.0													<b>Freq Offset</b> 0 Hz
-85.0													
	t 2.00 s BW					žVRM	3.0 MHz			Sween 1	Stop 10	.000 GHz 6001 pts)	
MSG		NO WI			"		0.0 10112			STATUS		oot proj	
						_				0.110			

Plot 6-10. Conducted Spurious Plot (Cellular GSM Mode – Ch. 128)



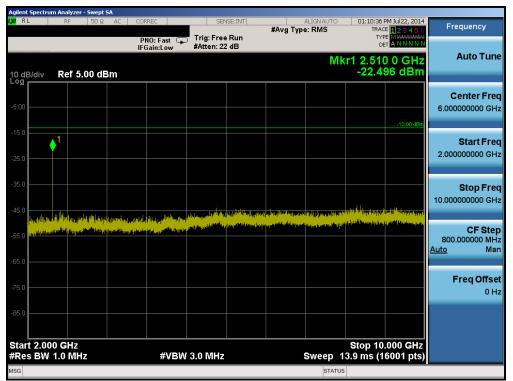
Plot 6-11. Conducted Spurious Plot (Cellular GSM Mode – Ch. 190)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 10 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 19 of 70
© 2014 PCTEST Engineering La	aboratory Inc.	•		V 1 10



	ım Analyzer - Swep									
L <mark>XI</mark> RL	RF 50 9	AC C	ORREC	SEN	SE:INT	#Avg Typ	ALIGN AUTO		CE 123456	Frequency
			PNO: Fast 🖵	Trig: Free Atten: 40				TY	PE MWWWWWW	
			IFGain:Low	Atten: 40	dB		DAL.			Auto Tune
	-						IVIK	r1 1.953 _40	30 GHz 49 dBm	riato rano
10 dB/div	Ref 30.00	авт					1		45 0.0111	
										Center Freq
20.0										1.425000000 GHz
10.0										Start Freq
										Start Freq 850.000000 MHz
0.00										850.000000 MIPIZ
-10.0									-13.00 dBm	Stop Freq
-20.0										2.000000000 GHz
-20.0										
-30.0										CF Step
-30.0									. 1	115.000000 MHz <u>Auto</u> Man
-40.0									<b>♦'</b>	<u>Auto</u> man
100 the pilles	and the designed of the	hy post of the first sector	ومشواه والمراولة المراجع أأحد	and here the last	հեկկորություն	nd din poster da	s etter fühligten f	n lifeteriden in den som	and the second states of the second	
-50.0 <mark>4100.41</mark>	ويدأدون فالمحمد لللم فستشاهروا	and the office of the second	أمامل الانتخاب ويرأن يتلي	النائلان إداء كالمعلى فز	وأفاره الفحاط والا	e hoorpeling of helioph	والمترابل والمتروية المترارات	Charles and a strength of the	ille fan de serve	Freq Offset 0 Hz
										0 H2
-60.0										
Start 850	0 MHz							Stop 2	0000 GHz	
#Res BW			#VBW	300 kHz			Sweep		23001 pts)	
MSG							STATU			





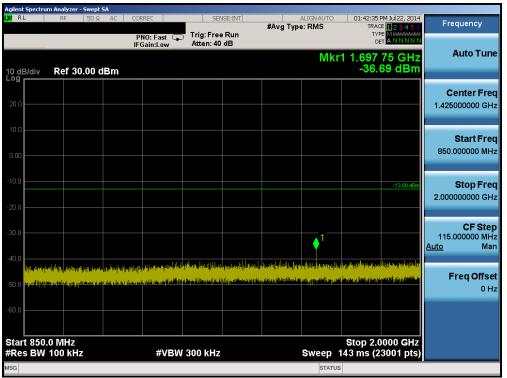
Plot 6-13. Conducted Spurious Plot (Cellular GSM Mode - Ch. 190)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 20 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 20 of 70
© 2014 PCTEST Engineering	aboratory Inc	·		V 1 10



	ım Analyzer - Sı							
X/RL	RF	50Ω AC	CORREC	SENSE:IN		ALIGN AUTO Type: RMS	01:42:29 PM Jul 22, 2014 TRACE 1 2 3 4 5 6	
			PNO: Fast 🖵	Trig: Free Run		rype. rano		
			IFGain:Low	Atten: 40 dB				Auto Tune
						MI	kr1 791.44 MHz	
10 dB/div	Ref 30.0	00 dBm					-40.03 dBm	
								Center Freq
20.0								426.500000 MHz
10.0								Start Freq
								30.000000 MHz
0.00								30.00000 WHZ
-10.0							-13.00 dBm	Stop Freq
								823.000000 MHz
-20.0								
-30.0								CF Step 79.300000 MHz
							<b>▲</b> 1	Auto Man
-40.0							<b>•</b>	
							and process and an appropriate present	
-50.0 14.14.000	لرغف غضعما وأرستك	المقدار الألا الأعروان	ny palamaké ké kener ké ké ner rakadhar	als althoused during	u pancer providenti	initia dal partico di	hah disama ang sang panina hang sang bang sang sang sang sang sang sang sang s	Freq Offset
								0 Hz
-60.0								
Start 30.0							Stop 823.0 MHz	
#Res BW	100 kHz		#VBW	300 kHz		Sweep 9	8.7 ms (20001 pts)	
ISG						STATUS		





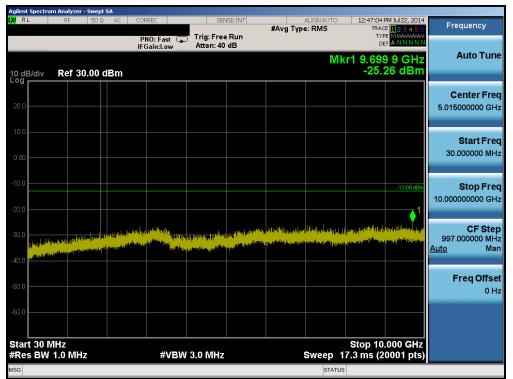
Plot 6-15. Conducted Spurious Plot (Cellular GSM Mode – Ch. 251)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 21 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 21 of 70
© 2014 PCTEST Engineering I	aboratory Inc	•		V 1 10



			zer - Swept 9										
LXI RL		RF	50 Ω	AC	CORREC		SEI	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS		PM Jul 22, 2014	Frequency
					PNO: IFGair	Fast 🖵 n:Low	Trig: Fre #Atten: 2				TY D		
10 dE Log r	3/div	Ref	5.00 dE	3m						MI	kr1 2.54 -21.	6 5 GHz 67 dBm	Auto Tune
-5.00												-13.00 dBm	Center Freq 6.000000000 GHz
-15.0 -25.0		1											<b>Start Freq</b> 2.000000000 GHz
-35.0 ·									ul ja ja ja 1973. (1975) 1974 – Jacob Martin alas atalah	العيمان والع	seed and the second second	a statistica a succession de la constitución de la constitución de la constitución de la constitución de la con	<b>Stop Freq</b> 10.000000000 GHz
-55.0	aranji (projov prioriterni i	y kryv (pr) 11 de herer	i turi i la diga ji	an a	r program sensit Alahan senat	yan di tamilaya <sub>Nan</sub> asi tamina Nana	andra a carana andra a carana			an for the first of the second	ad post of a <sup>th</sup> the part of the	, den Haldellin an , den se de	CF Step 800.000000 MHz <u>Auto</u> Man
-75.0 :													Freq Offset 0 Hz
	t 2.000										Stop 10	.000 GHz	
	s BW 1	1.0 IV	IHz			#VBW	3.0 MHz					6001 pts)	
MSG										STATU	5		





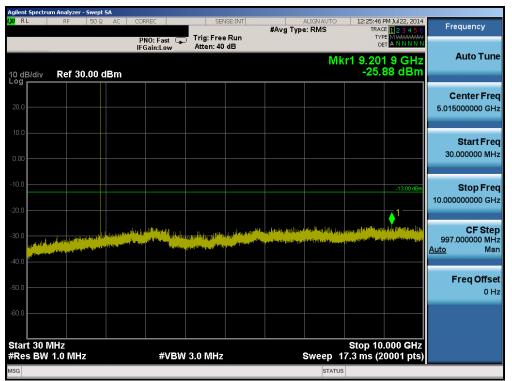
Plot 6-17. Conducted Spurious Plot (PCS GSM Mode - Ch. 512)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 22 of 70
© 2014 PCTEST Engineering L	aboratory Inc	•		V 1 10



	m Analyzer - Swep									
X/RL	RF 50 Ω	2 AC	CORREC	SEN	VSE:INT	#Ava Ti	ALIGN AUTO	12:47:10 P TRACE	M Jul 22, 2014	Frequency
			PNO: Fast G	Trig: Free Atten: 10			, p =	TYP	ANNNN	
I0 dB/div	Ref 0.00 d	Bm					Mkr	1 17.033 -50.6	0 GHz 0 dBm	Auto Tune
10.0									-13.00 dBm	Center Free 15.000000000 GH
30.0										Start Free 10.000000000 GH
40.0							1			<b>Stop Fre</b> 20.000000000 GH
60.0 <mark>анында</mark> <mark>даржаа</mark> л 70.0	n a legen av fraga klassika konstanti A Deli Sector Algan av Sector Alganisma A Deli Sector Algan av Sector Alganisma	Ystepellest "Gree Marine (Marine)	t in holy possible de la faite	a partenitas kap <sup>la</sup> ntas de 	an a	() at the second s		ter p <sub>ere</sub> lister p <sub>ere</sub> gy bet b <u>ter e<sub>re</sub> eres de per</u> petitelle	E (AM (AN ARABANA)). A ant part of the dama of	<b>CF Stej</b> 1.000000000 GH <u>Auto</u> Ma
80.0										Freq Offse 0 H
90.0								Stop 20		
fart 10.0 Res BW			#VBW	/ 3.0 MHz			Sweep 2	Stop 20. 5.3 ms (20	000 GHZ 0001 pts)	
SG							STATUS			





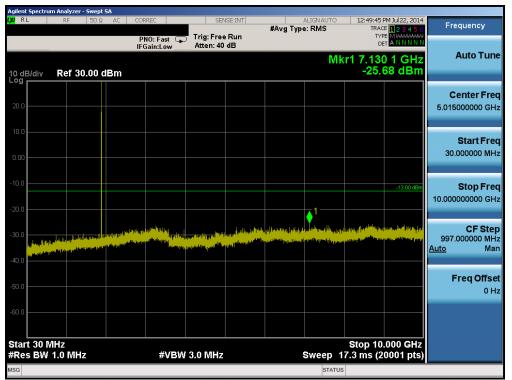
Plot 6-19. Conducted Spurious Plot (PCS GSM Mode - Ch. 661)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 22 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 23 of 70
© 2014 PCTEST Engineering	Laboratory, Inc.	·		V 1.10



	n Analyzer - Swept								-	
(IRL	RF 50 Ω	AC C	ORREC		ISE:INT	#Avg Ty	ALIGNAUTO	TRACE	4 Jul 22, 2014	Frequency
			PNO: Fast 🖵 IFGain:Low	Trig: Free Atten: 10				TYPE	ANNNN	
0 dB/div	Ref 0.00 dl	Bm					Mkr	1 17.013 -50.2	5 GHz 3 dBm	Auto Tun
10.0									-13.00 dBm	Center Fre 15.000000000 GH
80.0										Start Fre 10.000000000 G⊦
40.0 50.0							<b>1</b>			Stop Fre 20.000000000 GH
	da yaliphayaa <mark>dayaa ahaaliinti iyoona ahadana Naharinadii</mark>	a taya Alexandra Ale Yaraa Kasana ka	ng na gina ka	a yan da galaya saya saya saya saya saya saya saya	alina da para para para para para para para	len dag kanada selar Ang dag kanada selar selar		l fi Lipper ( 1944 gi y plander Maren - Gebeu Geren Arbit ()		CF Ste 1.000000000 GH <u>Auto</u> Ma
80.0										Freq Offs 0 F
90.0	00 GHz							Stop 20.0	000 GHz	
Res BW	1.0 MHz		#VBW	3.0 MHz			Sweep 2	5.3 ms (20	001 pts)	
SG							STATUS			





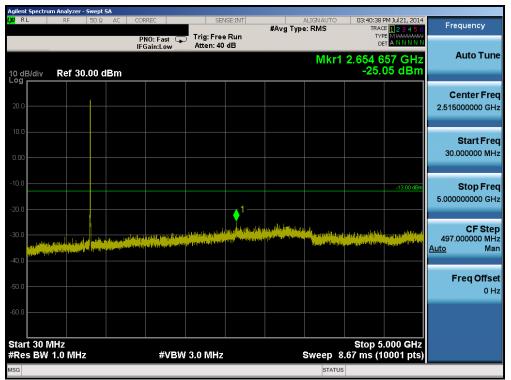
Plot 6-21. Conducted Spurious Plot (PCS GSM Mode - Ch. 810)

FCC ID: ZNFMS395	<u>«NPCTEST</u>	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 24 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 24 of 70
© 2014 PCTEST Engineering L	aboratory Inc.	•		V 1 10



	n Analyzer - Swept									
L <mark>XI</mark> RL	RF 50 Ω	AC C	ORREC	SEN	JSE:INT	#Avg Typ	ALIGN AUTO		M Jul 22, 2014	Frequency
			PNO: Fast 🖵 FGain:Low	Trig: Free Atten: 10		#AVg Typ	e: RMS	TYP	123456 Mwwww ANNNNN	
10 dB/div Log	Ref 0.00 dl	Bm					Mkr	1 17.092 -49.8	0 GHz 39 dBm	Auto Tune
-10.0									-13.00 dBm	Center Freq 15.000000000 GHz
-20.0										<b>Start Freq</b> 10.000000000 GHz
-40.0					1		1			<b>Stop Freq</b> 20.000000000 GHz
-60.0		n gilden die stationen die s	let <sub>myn</sub> t dans fryntifi	gan di naga sa ki ka				n kang planta panan di Tahu panéhinta panéhi	ىقتارىيدۇقاللىيىغ <sup>ى</sup>	<b>CF Step</b> 1.00000000 GHz <u>Auto</u> Man
-80.0										<b>Freq Offset</b> 0 Hz
-90.0	00 GHz							Stop 20.	000 GHz	
#Res BW			#VBW	3.0 MHz			Sweep 2	5.3 ms (20	0001 pts)	
MSG							STATUS			





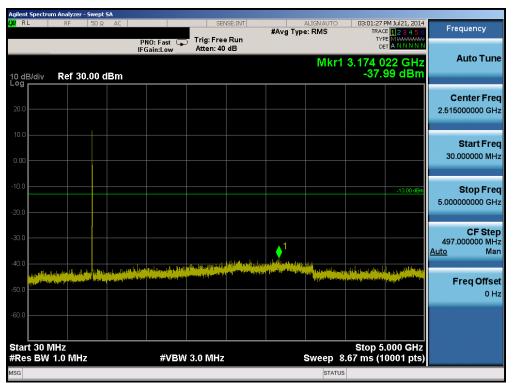
Plot 6-23. Conducted Spurious Plot (Cellular WCDMA Mode - Ch. 4132)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 25 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 25 of 70
© 2014 PCTEST Engineering L	aboratory Inc	·		V 1 10



	m Analyzer - Swept !									
X/RL	RF 50 Ω	AC CORR	EC	SEN	ISE:INT	#Avg Typ	ALIGNAUTO		M Jul 21, 2014	Frequency
			): Fast 🖵 iin:Low	Trig: Free Atten: 10				TYP		
10 dB/div Log	Ref 0.00 dE	۶m					Mk	r1 8.715 -50.0	5 GHz 59 dBm	Auto Tune
-10.0									-13.00 dBm	Center Freq 7.500000000 GHz
-20.0										<b>Start Freq</b> 5.000000000 GHz
-40.0							1	n mata di sala single dela	W., Corpetity, <mark>da distri</mark>	<b>Stop Freq</b> 10.000000000 GHz
-60.0 77 (100)		n general services and the service of the service o		nen period al fait (period) aparten period		All a subsection of the	en est belitiken, bien	a ethos an da faoin a da bar		CF Step 500.000000 MHz <u>Auto</u> Man
-80.0										<b>Freq Offset</b> 0 Hz
-90.0										
Start 5.00 #Res BW			#VBW	3.0 MHz			Sweep 8	Stop 10. 67 ms (1)	000 GHz 0001 pts)	
ASG							STATUS			

Plot 6-24. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)



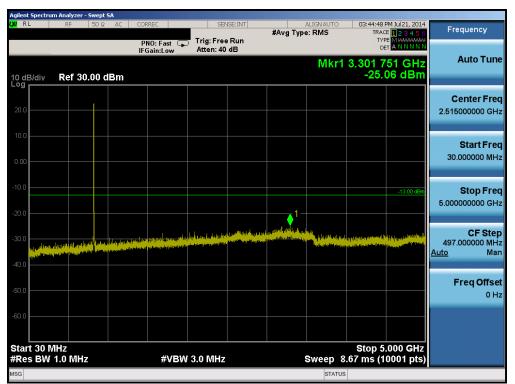
Plot 6-25. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFMS395	PCTEST	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 26 of 70
© 2014 PCTEST Engineering L	aboratory Inc	•		V 1 10



Agilent Spectru										
LXI RL	RF	50Ω AC		SEN	ISE:INT	#Avg Typ	ALIGNAUTO	03:02:03 PM Ju TRACE		Frequency
			PNO: Fast 🖵 IFGain:Low	Trig: Free Atten: 10		HULA IA	e. RMS	TYPE M		
10 dB/div Log	Ref 0.00	) dBm					Mk	r1 5.834 5 -69.42	GHz dBm	Auto Tune
-10.0									13.00 dBm	Center Freq 7.50000000 GHz
-20.0										Start Freq 5.000000000 GHz
-40.0										<b>Stop Freq</b> 10.00000000 GHz
-60.0		1								CF Step 500.000000 MHz Auto Man
-70.0 -80.0			ferðin á fra seginenn heigi fylft Aleiti Félfrengu, ísar földa er pilf	a politika (kata je o je				an integration of the standard statements of the statements of t	n dia mandi kani Na sa yang pangin	<b>Freq Offset</b> 0 Hz
-90.0										
Start 5.00 #Res BW			#VBW	3.0 MHz			-	Stop 10.00 .67 ms (1000	0 GHz 01 pts)	
MSG							STATUS			

Plot 6-26. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)



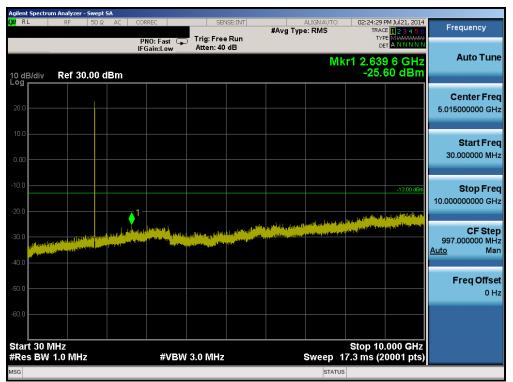
Plot 6-27. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 27 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 27 of 70
© 2014 PCTEST Engineering L	aboratory Inc	•		V 1 10



	m Analyzer - Swept									
X/RL	RF 50 Ω	AC COI	RREC	SEN	NSE:INT	#Aua	ALIGN AUTO Type: RMS		M Jul 21, 2014	Frequency
			NO: Fast 😱 Gain:Low	Trig: Free Atten: 10		- Arg	Type: NW5	TYPE	ANNNN	
10 dB/div Log	Ref 0.00 dE	3m					MI	kr1 9.443 -49.8	0 GHz 9 dBm	Auto Tune
-10.0									-13.00 dBm	Center Freq 7.50000000 GHz
-20.0										Start Freq 5.000000000 GHz
-40.0							. ب. بر بر بران الشرق بر . بر	fu die Afreiliaanskaarten 171	و العندية المنظمة المنظمة الم	<b>Stop Freq</b> 10.000000000 GHz
-60.0 2019 10 101			n de principa (nº faith de principa n disco per principa de principa	y bala, barah bara jarjar gang menantist bara atap	ang	pro denti (metti teoreti anti denti	ing		han Xindi da Guna sent	<b>CF Step</b> 500.000000 MHz <u>Auto</u> Man
-80.0										<b>Freq Offset</b> 0 Hz
-90.0										
Start 5.00 #Res BW			#VBW	3.0 MHz			Sweep 8	Stop 10. 8.67 ms (10	000 GHz 0001 pts)	
MSG							STATU	s		

Plot 6-28. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)



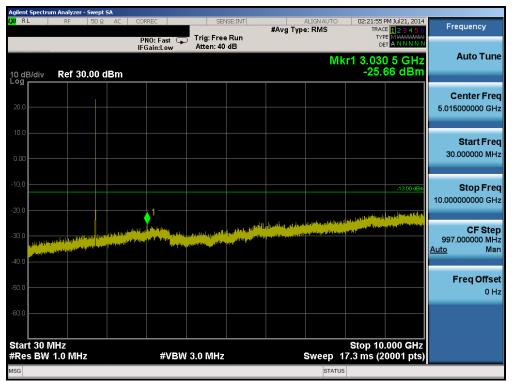
Plot 6-29. Conducted Spurious Plot (AWS WCDMA Mode - Ch. 1312)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 29 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset	Page 28 of 70	
© 2014 PCTEST Engineering La	aboratory Inc.	•		V 1 10



RF 50 9	2 AC	CORREC	SEI	NSE:INT		ALIGN AUTO			E
		PNO: Fast IFGain:Low			#Avg Typ	e: RMS	TYPE	MANNAN	Frequency
Ref 0.00 d	Bm					Mkr	15.069 -40.9	5 GHz 7 dBm	Auto Tun
								-13.00 dBm	Center Fre 15.000000000 GH
									<b>Start Fre</b> 10.000000000 GH
اللانيان ورود والمتقم	(discut discussion	Ministration and the second state						Hereiter V Produce Anne	Stop Fre 20.000000000 GH
									CF Ste 1.000000000 GH <u>Auto</u> Ma
									Freq Offso 0 ⊦
00 GHz							Stop 20.0	000 GHz	
.0 MHz		#VE	3W 3.0 MHz			Sweep 2	5.3 ms (20	0001 pts)	
	Ref 0.00 d	Ref 0.00 dBm	Ref 0.00 dBm	PNO: Fast IFGain:Low       Trig: Fre Atten: 10         Ref 0.00 dBm	PN0: Fast IFGain:Low       Trig: Free Run Atten: 10 dB         Ref 0.00 dBm       1         1       1 <t< td=""><td>PNO: Fast IFGain:Low         Trig: Free Run Atten: 10 dB           Ref 0.00 dBm         1           1         1</td><td>PNO: Fast IFGain:Low         Trig: Free Run Atten: 10 dB         #Avg Type: RMS           Ref 0.00 dBm         1         1         1           1         1         1         1         1           1         1         1         1         1         1           1         &lt;</td><td>PNO: Fast IFGain:Low         Trig: Free Run Atten: 10 dB         #Avg Type: RMS         TRACE TYPE           Ref 0.00 dBm        </td><td>PNO: Fast IFGain:Low         Trig: Free Run Atten: 10 dB         #Avg Type: RMS         TRACE         23 4 5 6 Tree           Ref 0.00 dBm         Image: State Stat</td></t<>	PNO: Fast IFGain:Low         Trig: Free Run Atten: 10 dB           Ref 0.00 dBm         1           1         1	PNO: Fast IFGain:Low         Trig: Free Run Atten: 10 dB         #Avg Type: RMS           Ref 0.00 dBm         1         1         1           1         1         1         1         1           1         1         1         1         1         1           1         <	PNO: Fast IFGain:Low         Trig: Free Run Atten: 10 dB         #Avg Type: RMS         TRACE TYPE           Ref 0.00 dBm	PNO: Fast IFGain:Low         Trig: Free Run Atten: 10 dB         #Avg Type: RMS         TRACE         23 4 5 6 Tree           Ref 0.00 dBm         Image: State Stat





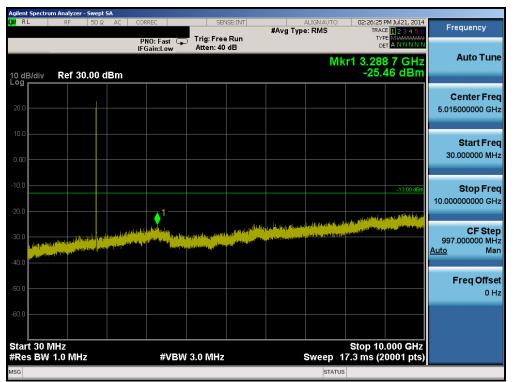
Plot 6-31. Conducted Spurious Plot (AWS WCDMA Mode - Ch. 1412)

FCC ID: ZNFMS395	PCTEST	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 20 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 29 of 70
© 2014 PCTEST Engineering L	aboratory Inc.	•		V 1 10



R L	n Analyzer - Swept RF 50 Ω		CORREC	SEN	JSE:INT		ALIGN AUTO	02:22:25	PM Jul 21, 2014	
			PNO: Fast 😱	Trig: Free	Run	#Avg 1	Type: RMS	TRA TY	CE 123456 PE MWWWWWW ET ANNNNN	Frequency
0 dB/div	Ref 0.00 di	Зm	IFGain:Low	Atten: 10	dB		Mk	r1 15.07	9 0 GHz 55 dBm	Auto Tun
10.0									-13.00 dBm	Center Free 15.000000000 GH
30.0					. 1					Start Fre 10.000000000 GH
40.0		Constitution and the	and a particulation of the					(University) Internet of the second		Stop Fre 20.000000000 GH
60.0 <b></b>										<b>CF Ste</b> 1.00000000 GH <u>Auto</u> Ma
80.0										Freq Offse 0 ⊦
30.0	00 GHz							Stop 20	0.000 GHz	
Res BW			#VBW	3.0 MHz			Sweep	25.3 ms (2	20001 pts)	
G							STATU	JS		





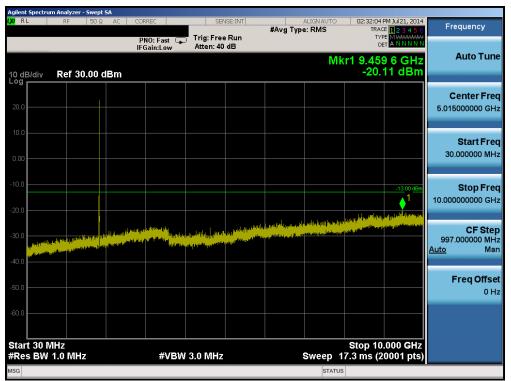
Plot 6-33. Conducted Spurious Plot (AWS WCDMA Mode - Ch. 1862)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 30 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 50 01 70
© 2014 PCTEST Engineering La	boratory Inc	•		V 1 10



RL	m Analyzer - Swe RF 50		CORREC	SENSE:INT		GNAUTO		M Jul 21, 2014	Frequency
			PNO: Fast 📮 IFGain:Low	Trig: Free Run Atten: 10 dB	#Avg Type: F	RMS	TYPE	123456 Mwwww ANNNNN	
0 dB/div	Ref 0.00	dBm				Mkr1	15.185 -39.9	0 GHz 2 dBm	Auto Tun
10.0								-13.00 dBm	Center Fre 15.000000000 GH
80.0									<b>Start Fre</b> 10.000000000 GH
40.0	Internet internet	Manufactures, property	to to be, or freehalo at the land			Program in the second second	de la sub anda da la la la la sub	in de fan in de skelige mente New yn de fan de skelige mente	<b>Stop Fre</b> 20.000000000 GH
60.0	s & a balance of a super-standard		alle i ree pe je drak indaki						<b>CF Ste</b> 1.000000000 GH <u>Auto</u> Ma
30.0									Freq Offso 0 ⊦
30.0	00 GHz						Stop 20.	000 GHz	
Res BW	1.0 MHz		#VBW	3.0 MHz	Sv	veep 2	5.3 ms (20	0001 pts)	
G						STATUS			





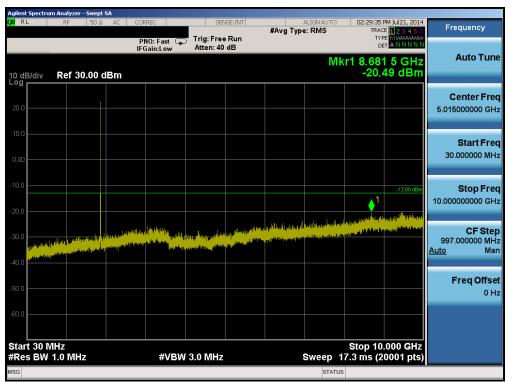
Plot 6-35. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 21 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset	Page 31 of 70	
© 2014 PCTEST Engineering La	aboratory Inc.	•		V 1 10



	m Analyzer - Swept S			-				-1		
LXU RL	RF 50 Ω	AC CORI	REC	SEN	ISE:INT	#Avg Typ	ALIGNAUTO e: RMS		PM Jul 21, 2014	Frequency
		PN IFG	IO: Fast 📮 ain:Low	Trig: Free Atten: 10				T YF De		Auto Tune
10 dB/div Log	Ref 0.00 dB	m					Mkr	1 15.260	0 0 GHz 18 dBm	Auto Tune
-10.0										Center Freq 15.00000000 GHz
-20.0									-13.00 dBm	15.00000000 GH2
										Start Freq 10.000000000 GHz
-30.0					▲1					
-40.0					areal analyses in a fig	a lave a specific difference			an an India an And	<b>Stop Freq</b> 20.00000000 GHz
	and Color United States of Local States	an till in styl gange	and the state	and the second second	and the state of the	illenka pasinti sua atam	laalijan ardineesi	an a	a a substantia da substantia. A substantia da substantia d	
-60.0	nasahi tengan basalan terdak terd									CF Step 1.00000000 GHz
-70.0										<u>Auto</u> Man
-80.0										Freq Offset 0 Hz
-90.0										
								<b>0</b> 4 <b>6</b>		
Start 10.0 #Res BW			#VBW	3.0 MHz			Sweep 2	stop 20 5.3 ms (2	.000 GHz 0001 pts)	
MSG							STATUS			

Plot 6-36. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)



Plot 6-37. Conducted Spurious Plot (PCS WCDMA Mode - Ch. 9400)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 22 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 32 of 70
© 2014 PCTEST Engineering I	aboratory Inc	·		V 1 10



RL	m Analyzer - Swo RF 50	Ω AC	CORREC	SENSE:INT		ALIGNAUTO	02:29:49 PM Jul 21, 2014	
			PNO: Fast 📮 IFGain:Low	Trig: Free Run Atten: 10 dB	#Avç	Type: RMS	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A N N N N N	
0 dB/div	Ref 0.00	dBm				Mkr	15.006 5 GHz -41.03 dBm	Auto Tun
10.0							-13.00 dBm	Center Fre 15.000000000 GH
80.0								<b>Start Fre</b> 10.000000000 GH
40.0	a langtan dal mandali dal provinsi dal	g)lostfileer	n fan het sen ster ster ster ster ster ster ster ster		a haadhay ya haada ahaa haada ahaa haada ahaa haada ahaa		er h <sub>ann</sub> n (Marchael) Transachtae ann Mithean an Anna an Anna	<b>Stop Fre</b> 20.000000000 GH
			had any d <sub>y a s</sub> ystem (100 Main M <sup>164</sup>					<b>CF Ste</b> 1.000000000 GH <u>Auto</u> Ma
80.0								Freq Offse 0 H
90.0	00 687						Stop 20.000 GHz	
Res BW	1.0 MHz		#VBW	3.0 MHz		Sweep 2	5.3 ms (20001 pts)	
SG						STATUS		





Plot 6-39. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 22 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 33 of 70
© 2014 PCTEST Engineering L	aboratory Inc	•		V 1 10



					#A T	ALIGN AUTO		M Jul 21, 2014	Frequency
		PNO: Fast 🕞 Gain:Low	Trig: Free Atten: 10	e Run dB	#Avg Typ	e: RMS	TYP	E 1 2 3 4 5 6 E M <del>WWWWW</del> T A N N N N N	
Ref 0.00 dE	Зm					Mkr	1 15.067 -41.7	7 0 GHz 79 dBm	Auto Tun
								-13.00 dBm	Center Fre 15.000000000 GH
									<b>Start Fre</b> 10.000000000 GH
La tratte than the state	teen titeer keykt (j		Hand Device (14)	1 Inducidadaria andariana periora	Const Jacobi (1943) (19 Talina da da kana da k	hi Palana <sup>b</sup> ahara	Tel <u>akona</u> layar	un fennen an	Stop Fre 20.000000000 GH
n an Aostain							interio de la constanti de la c	Azərlar dil Navazəri	<b>CF Ste</b> 1.000000000 GH <u>Auto</u> Ma
									FreqOffse 0 ⊦
0.687							Stop 20	000 CH2	
.0 MHz		#VBW	3.0 MHz			Sweep 2	5.3 ms (2)	0001 pts)	
		0 GHz					Ref 0.00 dBm         Image: I	Ref 0.00 dBm         -41.1           Image: Constraint of the state of the st	Image: Stop 20.000 GHz 0.00 MHz       Image: Stop 20.000 GHz Stop 20.0

Plot 6-40. Conducted Spurious Plot (PCS WCDMA Mode - Ch. 9538)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 34 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset			
© 2014 PCTEST Engineering Laboratory. Inc.					

EST Engineering Laboratory, Ir CI



# 6.4 Band Edge Emissions at Antenna Terminal §22.1051 §22.917(a) §24.238(a) §27.53(h)

## Test Overview

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 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.

# The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P_{[Watts]})$ , where P is the transmitter power in Watts.

## Test Procedure Used

KDB 971168 v02r01 – Section 6.0

## **Test Settings**

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW  $\geq$  1% of the emission bandwidth
- 4. VBW <u>></u> 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = max hold
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

#### Test Setup

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

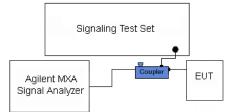


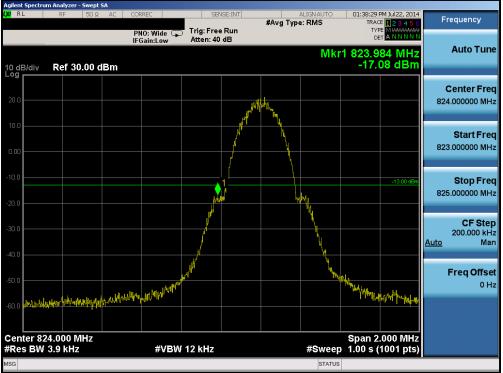
Figure 6-3. Test Instrument & Measurement Setup

#### Test Notes

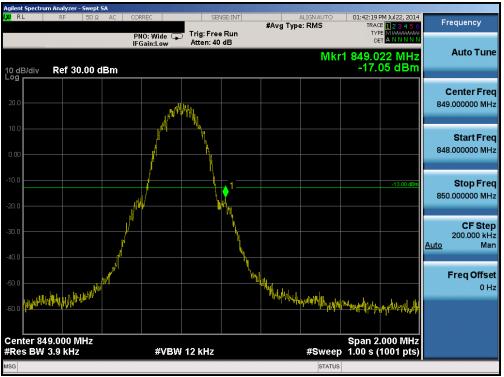
Per 22.917(b), 24.238(b), 27.53(h)(3), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. 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.

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 35 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 35 01 70
© 2014 PCTEST Engineering Laboratory, Inc.				





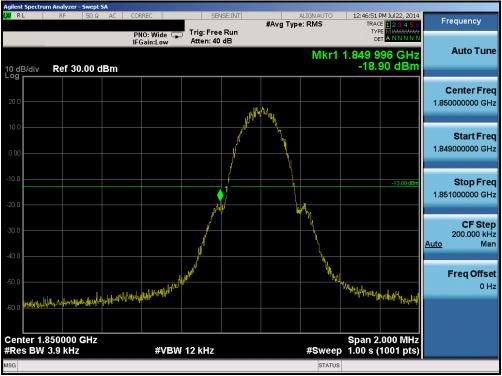
Plot 6-41. Band Edge Plot (Cellular GSM Mode - Ch. 128)

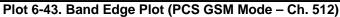


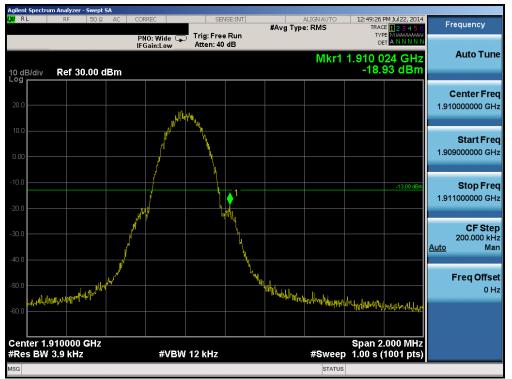
Plot 6-42. Band Edge Plot (Cellular GSM Mode - Ch. 251)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 20 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 36 of 70	
© 2014 PCTEST Engineering Laboratory, Inc.					









Plot 6-44. Band Edge Plot (PCS GSM Mode - Ch. 810)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 27 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 37 of 70	
2014 PCTEST Engineering Laboratory, Inc.					



Agilent Spectru	m Analyzer - Swept S/ RF 50 Ω			NSE:INT			00.07.07		
LA RL	RF   50 Ω	AC CORREC			#Avg Ty	ALIGN AUTO pe: RMS	TRAC	PM Jul 21, 2014 E <b>1 2 3 4 5 6</b>	Frequency
		PNO: Fast IFGain:Low	Trig: Free Atten: 40				TYI DI		
		n ounicou				Mkr	1 824.0	00 MHz	Auto Tune
10 dB/div	Ref 30.00 dE	Зm					-26.8	00 MHz 54 dBm	
20.0									Center Freq 824.000000 MHz
20.0									824.000000 WH2
10.0					and all the staff of the star				
				1					Start Freq
0.00									816.500000 MHz
							ļ		
-10.0				1				-13.00 dBm	Stop Freq
									831.500000 MHz
-20.0				1			1		
-30.0				Y					CF Step
-30.0			~ 1	)			ha st	and the second	1.500000 MHz Auto Man
-40.0			~~~~				- Barter		<u>Auto</u> mun
	James	Jun Margaret							Freq Offset
-50.0	and the second								0 Hz
									0112
-60.0									
	4.000 MHz						Span 1	5.00 MHz 1001 pts)	
#Res BW	100 kHz	#V	BW 300 kHz			#Sweep	1.00 s (	1001 pts)	
MSG						STATUS			





Plot 6-46. Band Edge Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dega 29 of 70		
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 38 of 70		
© 2014 PCTEST Engineering Laboratory, Inc.						

© 2014 PCTEST Engineering Laboratory, Inc.



	n Analyzer - Swept SA					
L <mark>XI</mark> RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS		Frequency
		PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 40 dB	•		
10 dB/div Log	Ref 30.00 dBm				1 1.710 000 GHz -26.640 dBm	
20.0						Center Freq 1.710000000 GHz
0.00						<b>Start Freq</b> 1.702500000 GHz
-10.0					-13.00 dBm	<b>Stop Freq</b> 1.717500000 GHz
-30.0			~~~^ <sup>1</sup>			<b>CF Step</b> 1.500000 MHz <u>Auto</u> Man
-40.0						<b>Freq Offset</b> 0 Hz
-60.0 Center 1.7	710000 GHz				Span 15.00 MHz	
#Res BW	100 kHz	#VBW	300 kHz		ep 1.00 s (1001 pts)	
MSG				STAT	US	

Plot 6-47. Band Edge Plot (AWS WCDMA Mode - Ch. 1312)



Plot 6-48. 4MHz Span Plot (AWS WCDMA Mode - Ch. 1312)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 70		
0Y1407141386.ZNF 7/14-7/22/2014		Portable Handset	Page 39 of 70			
© 2014 PCTEST Engineering Laboratory. Inc.						

Engineering Laboratory, I



	m Analyzer - Swej									
LXI RL	RF 50	Ω AC	CORREC	SEN	ISE:INT	#Avg Ty	ALIGN AUTO		PM Jul 21, 2014	Frequency
			PNO: Fast 😱 IFGain:Low	Trig: Free Atten: 40				TY		
10 dB/div Log	Ref 30.00	dBm					Mkr1	1.756 3 -28.	865 GHz 07 dBm	Auto Tune
20.0										Center Freq 1.755000000 GHz
0.00			mggauthh-yunthhathaauthathuy							<b>Start Freq</b> 1.747500000 GHz
-10.0						.1			-13.00 dBm	<b>Stop Freq</b> 1.762500000 GHz
-30.0								~		CF Step 1.500000 MHz <u>Auto</u> Man
-50.0								المعيد	the second second	Freq Offset 0 Hz
	755000 GH2	2	#\/DW	200 1/11-			#0	Span 1	5.00 MHz	
#Res BW	TOU KHZ		#VBW	300 kHz			#Sweep	1.00 S (	(1001 pts)	
150							STATUS			



Agilent Spectru <b>LXI</b> RL	m Analyzer - Swept SA	000050	051105	78.175			00.00.465		
L <b>AU</b> RL	RF 50 Ω AC	CORREC	SENSE:	##	Avg Type:	.IGN AUTO RMS	TRAC	M Jul 21, 2014	Frequency
		PNO: Fast 🔸 IFGain:Low	. Trig: Free Ru Atten: 40 dB				DE		Auto Tu
10 dB/div Log	Ref 30.00 dBm					Mkr1	1.756 0 -17.′	00 GHz I8 dBm	
20.0									<b>Center Fr</b> 1.758000000 G
10.0 0.00									<b>Start Fr</b> 1.756000000 G
-10.0								-13.00 dBm	<b>Stop Fr</b> 1.760000000 G
-30.0								<u></u>	CF Ste 400.000 ki <u>Auto</u> M
-50.0									Freq Offs 01
-60.0									
Center 1.7 #Res BW	758000 GHz 1.0 MHz	#VBW	3.0 MHz			#Sweep	Span 4. 3.00 s ('	000 MHz 1001 pts)	
MSG						STATUS			

Plot 6-50. 4MHz Span Plot (AWS WCDMA Mode – Ch. 1862)

FCC ID: ZNFMS395		(OFRIFICATION)		Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 70		
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 40 of 70		
© 2014 PCTEST Engineering Laboratory Inc						

© 2014 PCTEST Engineering Laboratory, Inc.



	Analyzer - Swept SA			1		
L <mark>XI</mark> RL	RF 50 Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	02:31:45 PM Jul 21, 2014 TRACE 1 2 3 4 5 6	Frequency
10 dB/div	Ref 30.00 dBn	PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 40 dB	Mkr1	TRACE 1 2 3 4 5 6 TYPE MWWWW DET A NNNNN 1.849 985 GHz -23.91 dBm	Auto Tune
						Center Freq 1.85000000 GHz
0.00						<b>Start Freq</b> 1.842500000 GHz
-10.0			1		-13.00 dBm	<b>Stop Freq</b> 1.857500000 GHz
-30.0			~		hurman	CF Step 1.500000 MHz <u>Auto</u> Man
-50.0						<b>Freq Offset</b> 0 Hz
	50000 GHz	#\BW	200 kU-	#0	Span 15.00 MHz 9 1.00 s (1001 pts)	
#Res BW 1		#VBW	300 kHz	#Sweep	- 1.00 s (1001 pts)	

Plot 6-51. Band Edge Plot (PCS WCDMA Mode - Ch. 9262)



Plot 6-52. 4MHz Span Plot (PCS WCDMA Mode - Ch. 9262)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dega 41 of 70		
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset	Page 41 of 70			
© 2014 PCTEST Engineering Laboratory. Inc.						



	n Analyzer - Swept SA					
LXXI RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	02:36:01 PM Jul 21, 2014 TRACE 1 2 3 4 5 6	Frequency
		PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 40 dB		DET A N N N N	
				Mkr1	1.910 000 GHz -25.500 dBm	Auto Tune
10 dB/div Log	Ref 30.00 dBm				-25.500 dBm	
						Center Freq
20.0						1.910000000 GHz
10.0		······				Start Freq
						1.902500000 GHz
0.00						
-10.0						Oton From
					-13.00 dBm	Stop Freq 1.917500000 GHz
-20.0			1			1.011000000 0112
			X .			CF Step
-30.0			hund			1.500000 MHz
-40.0						<u>Auto</u> Man
-40.0				haven		
-50.0						Freq Offset
						0 Hz
-60.0						
	010000 GHz				Span 15.00 MHz	
#Res BW	100 kHz	#VBW	300 kHz	#Sweep	1.00 s (1001 pts)	
MSG				STATUS		





Plot 6-54. 4MHz Span Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 42 of 70		
0Y1407141386.ZNF 7/14-7/22/2014		Portable Handset	Page 42 of 70			
© 2014 PCTEST Engineering Laboratory Inc.						

© 2014 PCTEST Engineering Laboratory, Inc.



# 6.5 Peak-Average Ratio §24.232(d) §27.50(d.5)

# Test Overview

A peak to average ratio measurement is performed at the conducted port of the EUT. 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.

# Test Procedure Used

KDB 971168 v02r01 - Section 5.7.1

# Test Settings

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW > Emission bandwidth of signal
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power.

# Test Setup

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

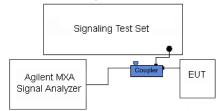


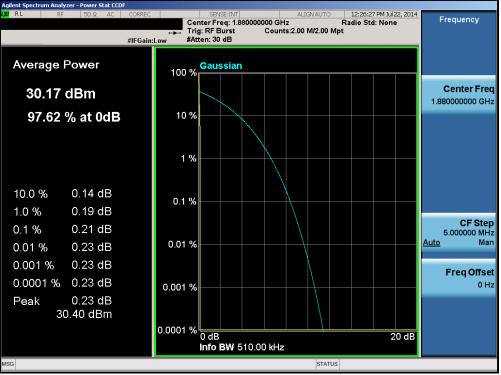
Figure 6-4. Test Instrument & Measurement Setup

# Test Notes

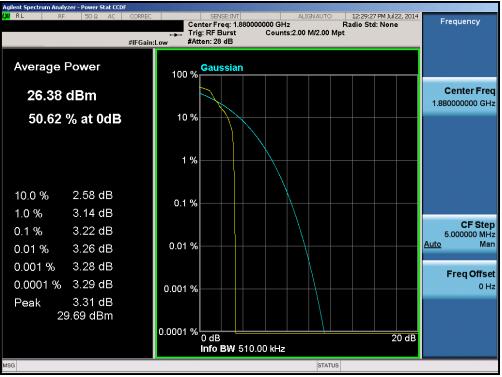
None

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:		Dage 42 of 70					
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset	Page 43 of 70						
© 2014 PCTEST Engineering Laboratory, Inc.									







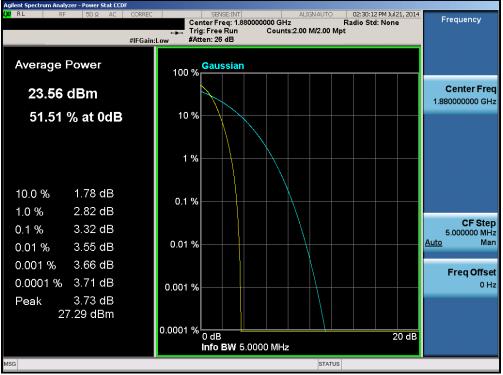


Plot 6-56. Peak-Average Ratio Plot (EDGE1900 Mode - Ch. 661)

FCC ID: ZNFMS395	PCTEST	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:		Dega 44 of 70					
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset	Page 44 of 70						
© 2014 PCTEST Engineering Laboratory, Inc.									

07/10/2014





Plot 6-57. Peak-Average Ratio Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 45 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 45 01 70
© 2014 PCTEST Engineering L	aboratory, Inc.	·		V 1.10



#### **Radiated Power (ERP/EIRP)** 6.6 §22.913(a)(2) 24.232(c) 27.50(d.4)

# **Test Overview**

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

## **Test Procedures Used**

KDB 971168 v02r01 - Section 5.2.1

ANSI/TIA-603-C-2004 – Section 2.2.17

## Test Settings

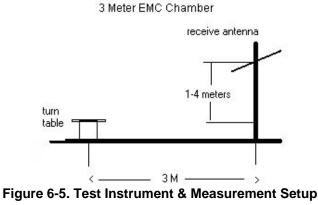
- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used.
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW  $\geq$  3 x RBW
- 4. Span = 1.5 times the OBW
- No. of sweep points > 2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize.

FCC ID: ZNFMS395	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 46 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 46 of 70	
© 2014 PCTEST Engineering	Laboratory, Inc.			V 1.10	



# Test Setup

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



### Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) 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 upright. The worst case setup is reported in the tables below.

FCC ID: ZNFMS395	PCTEST	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 17 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 47 of 70
© 2014 PCTEST Engineering I	aboratory, Inc.	•		V 1.10



Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Ant. Gain [dBd]	-	EUT Pol.	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GSM850	Standard	22.13	4.41	V	V	26.54	0.451	38.45	-11.91
836.60	GSM850	Standard	24.31	4.50	V	V	28.81	0.761	38.45	-9.64
848.80	GSM850	Standard	24.37	4.59	V	V	28.96	0.787	38.45	-9.49
848.80	EDGE850	Standard	18.84	4.59	V	V	23.43	0.220	38.45	-15.02

Table 6-2. ERP (Cellular GSM)

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Ant. Gain [dBd]	-	EUT Pol.	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	Standard	12.59	4.43	V	V	17.02	0.050	38.45	-21.43
836.60	WCDMA850	Standard	13.87	4.49	V	V	18.36	0.069	38.45	-20.09
846.60	WCDMA850	Standard	14.15	4.58	V	V	18.73	0.075	38.45	-19.73

Table 6-4. ERP (Cellular WCDMA)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 49 of 70
0Y1407141386.ZNF 7/14-7/22/2014		Portable Handset	Page 48 of 70	
© 2014 PCTEST Engineering L	aboratory. Inc.	·		V 1.10

PCTEST Engineering Laboratory, Inc.



Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Ant. Gain [dBi]	-	EUT Pol.	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1712.40	WCDMA1700	Standard	11.47	9.66	V	H2	21.13	0.130	30.00	-8.87
1732.50	WCDMA1700	Standard	11.33	9.65	V	H2	20.98	0.125	30.00	-9.02
1752.50	WCDMA1700	Standard	12.29	9.63	V	H2	21.92	0.155	30.00	-8.08

Table 6-3. EIRP (AWS WCDMA)

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Ant. Gain [dBi]	Ant. Pol. [H/V]	EUT Pol.	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GSM1900	Standard	20.46	9.49	V	H2	29.95	0.989	33.01	-3.06
1880.00	GSM1900	Standard	20.48	9.44	V	H2	29.92	0.982	33.01	-3.09
1909.80	GSM1900	Standard	20.36	9.41	V	H2	29.77	0.948	33.01	-3.24
1850.20	EDGE1900	Standard	16.42	9.49	V	H2	25.91	0.390	33.01	-7.10

# Table 6-4. EIRP (PCS GSM)

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Ant. Gain [dBi]	-	EUT Pol.	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	Standard	13.03	9.49	V	H2	22.52	0.179	33.01	-10.49
1880.00	WCDMA1900	Standard	12.67	9.44	V	H2	22.11	0.163	33.01	-10.90
1907.60	WCDMA1900	Standard	12.14	9.41	V	H2	21.55	0.143	33.01	-11.46

Table 6-4. EIRP (PCS WCDMA)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dago 40 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 49 of 70	
© 2014 PCTEST Engineering L	aboratory, Inc.	•		V 1.10	



#### **Radiated Spurious Emissions Measurements** 6.7 §2.1053 §22.917(a) 24.238(a) 27.53(h)

# **Test Overview**

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

# **Test Procedures Used**

KDB 971168 v02r01 - Section 5.8

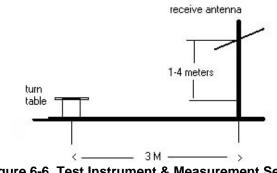
ANSI/TIA-603-C-2004 - Section 2.2.12

## **Test Settings**

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW  $\geq$  3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points > 2 x span / RBW
- 5. Detector = Peak
- 6. Trace mode = max hold
- 7. The trace was allowed to stabilize

# Test Setup

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



3 Meter EMC Chamber

Figure 6-6. Test Instrument & Measurement Setup

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 50 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 50 of 70	
© 2014 PCTEST Engineering Laboratory, Inc.					



### Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) 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 upright. The worst case setup is reported in the tables below.
- 5) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 6) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.

OPERATING FREQUENCY:	824.20		MHz
CHANNEL:	128	128	
MEASURED OUTPUT POWER:	26.54	dBm =	0.451 W
MODULATION SIGNAL:	GSM (GMSK)		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	39.54	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
1648.40	-57.88	6.56	-51.32	Η	Н	77.9
2472.60	-64.41	7.29	-57.12	Н	Н	83.7
3296.80	-59.32	7.37	-51.95	Н	Н	78.5

Table 6-5. Radiated Spurious Data (Cellular GSM Mode – Ch. 128)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 51 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 51 of 70
2014 PCTEST Engineering Laboratory, Inc.				

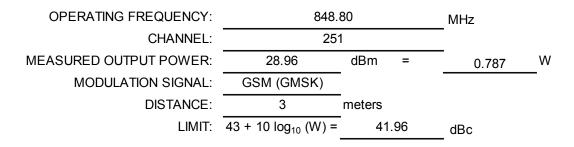
07/10/2014



OPERATING FREQUENCY:	836.60		MHz
CHANNEL:	190	190	
MEASURED OUTPUT POWER:	28.81	dBm =	0.761 W
MODULATION SIGNAL:	GSM (GMSK)		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	41.81	dBc

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
1673.20	-59.79	6.55	-53.23	Н	Н	82.0
2509.80	-60.44	7.34	-53.09	Н	Н	81.9
3346.40	-58.45	7.44	-51.01	Н	Н	79.8

Table 6-6. Radiated Spurious Data (Cellular GSM Mode – Ch. 190)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]		EUT Pol. [H/H2/V]	[dBc]
1697.60	-59.35	6.55	-52.80	Н	Н	81.8
2546.40	-61.84	7.36	-54.48	Н	Н	83.4
3395.20	-58.40	7.51	-50.89	Н	Н	79.9

Table 6-7. Radiated Spurious Data (Cellular GSM Mode – Ch. 251)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 52 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 52 01 70	
2014 PCTEST Engineering Laboratory, Inc.					

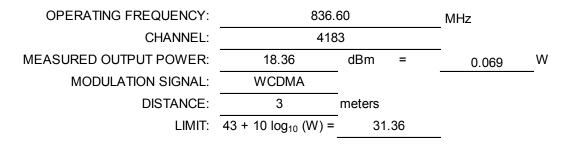
07/10/2014



OPERATING FREQUENCY:	826.40		MHz
CHANNEL:	4132		_
MEASURED OUTPUT POWER:	17.02	dBm =	0.050 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	30.02	_

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]		EUT Pol. [H/H2/V]	[dBc]
1652.80	-58.62	3.60	-55.02	Н	Н	72.0
2479.20	-57.02	3.57	-53.45	Н	Н	70.5

Table 6-8. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]			EUT Pol. [H/H2/V]	[dBc]
1673.20	-60.74	3.53	-57.22	Н	Н	75.6

Table 6-9. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 52 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 53 of 70	
© 2014 PCTEST Engineering Laboratory. Inc.					

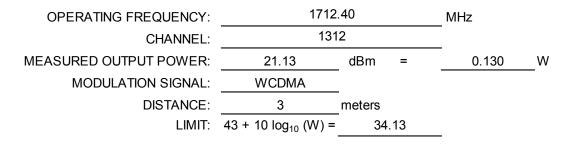
Engineering Laboratory, I



OPERATING FREQUENCY:	846.	60	MHz
CHANNEL:	423	3	_
MEASURED OUTPUT POWER:	18.73	dBm =	- 0.075 W
MODULATION SIGNAL:	WCDMA	-	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	31.73	_

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]		EUT Pol. [H/H2/V]	[dBc]
1693.20	-51.76	3.46	-48.31	Н	Н	67.0
2539.80	-56.80	3.63	-53.16	Н	Н	71.9

Table 6-10. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]		EUT Pol. [H/H2/V]	[dBc]
3424.80	-51.15	8.15	-43.00	Η	H2	64.1
5137.20	-54.85	10.26	-44.59	Н	H2	65.7
6849.60	-59.90	11.39	-48.52	Н	H2	69.6

Table 6-11. Radiated Spurious Data (AWS WCDMA Mode - Ch. 9262)

FCC ID: ZNFMS395	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	N: Test Dates: EUT Type:				
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 54 of 70	
© 2014 PCTEST Engineering Laboratory Inc					

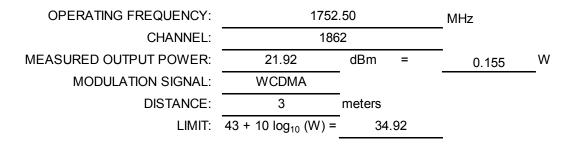
© 2014 PCTEST Engineering Laboratory, Inc.



OPERATING FREQUENCY:	1732	.50	MHz
CHANNEL:	141	2	-
MEASURED OUTPUT POWER:	20.98	dBm =	0.125 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	33.98	_

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]		EUT Pol. [H/H2/V]	[dBc]
3465.00	-51.17	8.29	-42.88	Н	H2	64.0
5197.50	-57.84	10.35	-47.50	Н	H2	68.6

Table 6-12. Radiated Spurious Data (AWS WCDMA Mode – Ch. 9400)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]		Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
3505.00	-49.27	8.40	-40.87	Н	H2	62.0
5257.50	-57.55	10.36	-47.19	Н	H2	68.3

Table 6-13. Radiated Spurious Data (AWS WCDMA Mode - Ch. 9538)

FCC ID: ZNFMS395	<u>«NPCTEST</u>	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:				
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 55 of 70		
© 2014 PCTEST Engineering Laboratory. Inc.						

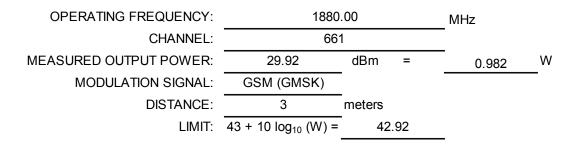
Engineering Laboratory, I



OPERATING FREQUENCY:	1850.20		MHz
CHANNEL:	512		_
MEASURED OUTPUT POWER:	29.95	dBm =	0.989 W
MODULATION SIGNAL:	GSM (GMSK)		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	42.95	_

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
3700.40	-55.14	9.44	-45.70	Н	Н	75.7
5550.60	-53.43	10.78	-42.64	Н	Н	72.6
7400.80	-54.34	10.69	-43.65	Н	Н	73.6

Table 6-14. Radiated Spurious Data (PCS GSM Mode - Ch. 512)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]		Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
3760.00	-58.23	9.28	-48.95	Н	Н	78.9
5640.00	-58.87	11.03	-47.84	Н	Н	77.8

Table 6-15. Radiated Spurious Data (PCS GSM Mode - Ch. 661)

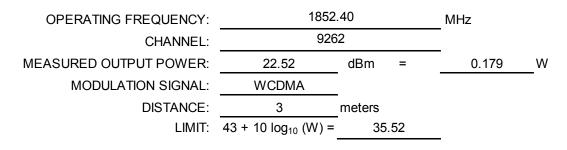
FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage E6 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 56 of 70
© 2014 PCTEST Engineering	Laboratory, Inc.	·		V 1.10



OPERATING FREQUENCY:	1909.80		MHz
CHANNEL:	810		-
MEASURED OUTPUT POWER:	29.77	dBm =	0.948 W
MODULATION SIGNAL:	GSM (GMSK)	-	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	42.77	

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]		EUT Pol. [H/H2/V]	[dBc]
3819.60	-59.49	9.19	-50.30	Н	Н	80.3
5729.40	-60.19	11.28	-48.91	Н	Н	78.9
7639.20	-55.87	11.17	-44.70	Н	Н	74.7

Table 6-16. Radiated Spurious Data (PCS GSM Mode – Ch. 810)



Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]		Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
3704.80	-51.19	8.40	-42.79	Н	Н	65.3
5557.20	-59.77	10.57	-49.20	Н	Н	71.7

Table 6-17. Radiated Spurious Data (PCS WCDMA Mode - Ch. 9262)

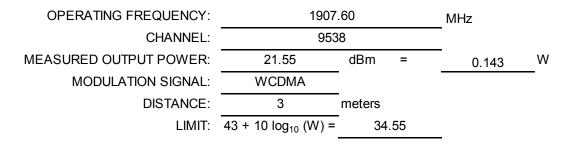
FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 57 of 70		
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 57 of 70		
© 2014 PCTEST Engineering L	2014 PCTEST Engineering Laboratory, Inc.					



OPERATING FREQUENCY:	1880.00		MHz
CHANNEL:	9400		-
MEASURED OUTPUT POWER:	22.11	dBm =	0.163 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	35.11	_

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]		EUT Pol. [H/H2/V]	[dBc]
3760.00	-52.47	8.38	-44.08	Τ	Н	66.6
5640.00	-60.20	10.70	-49.50	Н	Н	72.0

Table 6-18. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)



	equency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]		EUT Pol. [H/H2/V]	[dBc]
	3815.20	-53.57	8.40	-45.18	H	Н	67.7
į	5722.80	-60.25	10.76	-49.49	Н	Н	72.0

Table 6-19. Radiated Spurious Data (PCS WCDMA Mode - Ch. 9538)

FCC ID: ZNFMS395	PCTEST	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 58 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 56 01 70
© 2014 PCTEST Engineering	Laboratory Inc.	-		V 1 10

© 2014 PCTEST Engineering Laboratory, Inc.



# 6.8 Frequency Stability / Temperature Variation §2.1055 §22.355 §24.229 §24.235 §27.54

### Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. 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.

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

### Test Procedure Used

ANSI/TIA-603-C-2004

### Test Settings

- 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 fifteen minutes 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 period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

### Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

### Test Notes

None

FCC ID: ZNFMS395	<u>PCTEST</u>	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 50 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 59 of 70	
2014 PCTEST Engineering Laboratory, Inc.					



# Frequency Stability / Temperature Variation §22.1055 §22.355

OPERATING FREQUENCY: 836,600,000 Ηz

CHANNEL:

190

VDC 3.80

REFERENCE VOLTAGE:

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,599,992	-8	-0.0000010
100 %		- 30	836,599,999	-1	-0.0000001
100 %		- 20	836,599,998	-2	-0.0000003
100 %		- 10	836,599,999	-1	-0.0000001
100 %		0	836,599,982	-18	-0.0000021
100 %		+ 10	836,599,996	-4	-0.0000004
100 %		+ 20	836,599,984	-16	-0.0000019
100 %		+ 30	836,599,995	-5	-0.0000005
100 %		+ 40	836,599,983	-17	-0.0000021
100 %		+ 50	836,599,992	-8	-0.0000010
115 %	4.37	+ 20	836,599,987	-13	-0.0000016
BATT. ENDPOINT	3.45	+ 20	836,599,986	-14	-0.0000016

 Table 6-20. Frequency Stability Data (Cellular GSM Mode – Ch. 190)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 60 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Fage 00 01 70	
2014 PCTEST Engineering Laboratory, Inc.					



# Frequency Stability / Temperature Variation §2.1055 §22.355

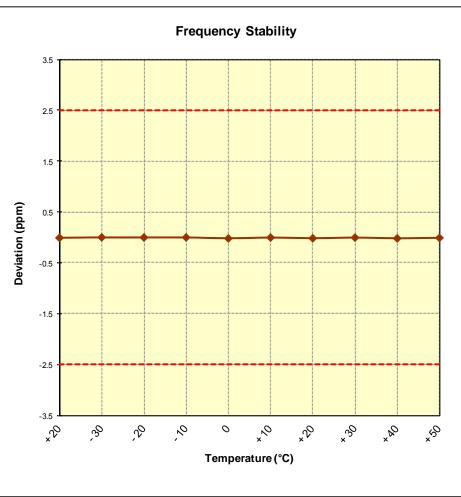


Figure 6-7. Frequency Stability Graph (Cellular GSM Mode – Ch. 190)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 61 of 70		
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 61 of 70		
© 2014 PCTEST Engineering L	2014 PCTEST Engineering Laboratory, Inc.					



# Frequency Stability / Temperature Variation §2.1055 §22.355

OPERATING FREQUENCY: 836,600,000 Ηz CHANNEL: 4183 REFERENCE VOLTAGE: VDC 3.80

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,599,981	-19	-0.0000023
100 %		- 30	836,599,997	-3	-0.000003
100 %		- 20	836,599,988	-12	-0.0000015
100 %		- 10	836,599,996	-4	-0.0000005
100 %		0	836,599,999	-1	-0.0000001
100 %		+ 10	836,599,983	-17	-0.0000021
100 %		+ 20	836,599,995	-5	-0.0000007
100 %		+ 30	836,599,981	-19	-0.0000023
100 %		+ 40	836,599,990	-10	-0.0000012
100 %		+ 50	836,599,995	-5	-0.0000005
115 %	4.37	+ 20	836,599,999	-1	-0.0000001
BATT. ENDPOINT	3.45	+ 20	836,599,988	-12	-0.0000014

Table 6-21. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFMS395	CALEST	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 62 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 62 01 70
© 2014 PCTEST Engineering La	boratory, Inc.	•		V 1.10



# Frequency Stability / Temperature Variation §2.1055 §22.355

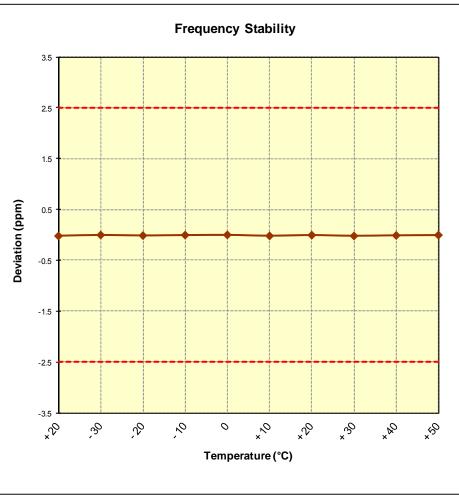


Figure 6-8. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 62 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 63 of 70
© 2014 PCTEST Engineering	Laboratory, Inc.	•		V 1.10



# Frequency Stability / Temperature Variation

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	1412	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,499,984	-16	-0.0000009
100 %		- 30	1,732,499,990	-10	-0.000006
100 %		- 20	1,732,499,987	-13	-0.0000007
100 %		- 10	1,732,499,988	-12	-0.0000007
100 %		0	1,732,499,990	-10	-0.0000006
100 %		+ 10	1,732,499,983	-17	-0.0000010
100 %		+ 20	1,732,499,985	-15	-0.0000009
100 %		+ 30	1,732,499,990	-10	-0.0000006
100 %		+ 40	1,732,499,996	-4	-0.0000002
100 %		+ 50	1,732,499,983	-17	-0.0000010
115 %	4.37	+ 20	1,732,499,998	-2	-0.0000001
BATT. ENDPOINT	3.45	+ 20	1,732,499,986	-14	-0.000008

Table 6-22. Frequency Stability Data (AWS WCDMA Mode – Ch. 1412)

# 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: ZNFMS395	PCTEST	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 64 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 64 01 70
© 2014 PCTEST Engineering	Laboratory, Inc.	•		V 1.10

07/10/2014



# Frequency Stability / Temperature Variation §2.1055 §27.54

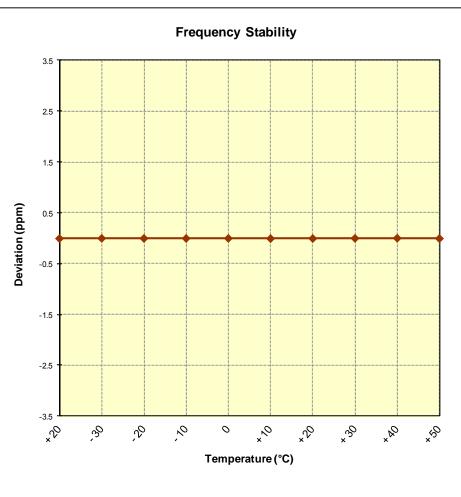


Figure 6-9. Frequency Stability Graph (AWS WCDMA Mode – Ch. 1412)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 65 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 65 of 70
© 2014 PCTEST Engineering	Laboratory, Inc.	·		V 1.10

07/10/2014



# Frequency Stability / Temperature Variation §2.1055 §24.235

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	661	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,991	-9	-0.0000005
100 %		- 30	1,879,999,999	-1	0.0000000
100 %		- 20	1,879,999,980	-20	-0.0000010
100 %		- 10	1,879,999,992	-8	-0.0000004
100 %		0	1,879,999,998	-2	-0.0000001
100 %		+ 10	1,879,999,990	-10	-0.0000006
100 %		+ 20	1,879,999,986	-14	-0.000007
100 %		+ 30	1,879,999,988	-12	-0.0000006
100 %		+ 40	1,879,999,985	-15	-0.000008
100 %		+ 50	1,879,999,993	-7	-0.0000004
115 %	4.37	+ 20	1,879,999,995	-5	-0.000003
BATT. ENDPOINT	3.45	+ 20	1,879,999,984	-16	-0.0000009

Table 6-23. Frequency Stability Data (PCS GSM Mode – Ch. 661)

# 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: ZNFMS395	<u> PCTEST</u>	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 66 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 66 of 70
© 2014 PCTEST Engineering	Laboratory, Inc.			V 1.10 07/10/2014



# Frequency Stability / Temperature Variation §2.1055 §24.235

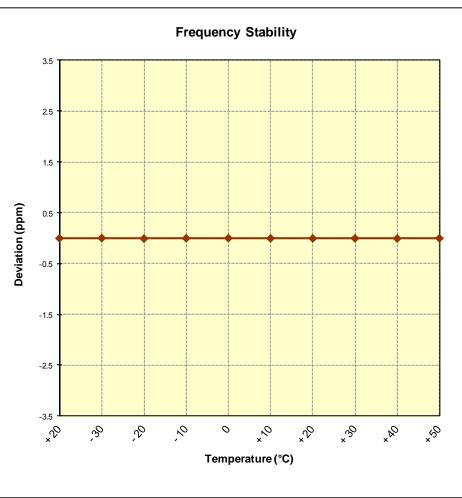


Figure 6-10. Frequency Stability Graph (PCS GSM Mode – Ch. 661)

FCC ID: ZNFMS395	<u>PCTEST</u>	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 67 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 67 01 70
© 2014 PCTEST Engineering	Laboratory, Inc.	·		V 1.10

07/10/2014



# Frequency Stability / Temperature Variation §2.1055 §24.235

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	9400	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,994	-6	-0.000003
100 %		- 30	1,879,999,984	-16	-0.000008
100 %		- 20	1,879,999,989	-11	-0.0000006
100 %		- 10	1,879,999,985	-15	-0.000008
100 %		0	1,879,999,998	-2	-0.0000001
100 %		+ 10	1,879,999,980	-20	-0.0000010
100 %		+ 20	1,879,999,989	-11	-0.0000006
100 %		+ 30	1,879,999,984	-16	-0.000008
100 %		+ 40	1,879,999,989	-11	-0.0000006
100 %		+ 50	1,879,999,990	-10	-0.0000005
115 %	4.37	+ 20	1,879,999,986	-14	-0.000008
BATT. ENDPOINT	3.45	+ 20	1,879,999,999	-1	-0.0000001

Table 6-24. Frequency Stability Data (PCS WCDMA Mode – Ch. 9400)

# 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: ZNFMS395	PCTEST	FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dege 69 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 68 of 70	
© 2014 PCTEST Engineering Laboratory, Inc.			V 1.10		

V 1.10 07/10/2014



# Frequency Stability / Temperature Variation §2.1055 §24.235

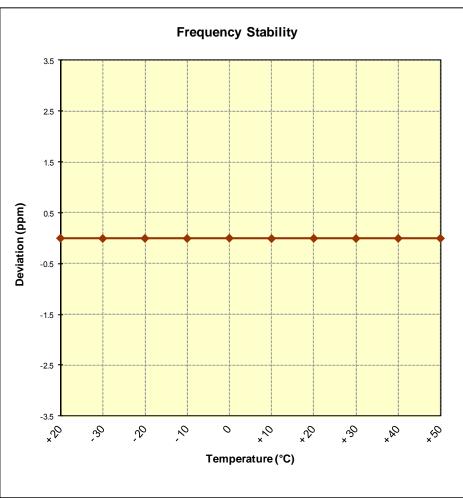


Figure 6-11. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 60 of 70	
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 69 of 70	
© 2014 PCTEST Engineering Laboratory, Inc.			V 1.10		

rıng эгу



#### CONCLUSION 7.0

The data collected relate only to the item(s) tested and show that the LG Portable Handset FCC ID: ZNFMS395 complies with all the requirements of Parts 2, 22, 24, 27 of the FCC rules.

FCC ID: ZNFMS395		FCC Pt. 22, 24, & 27 GSM / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 70 of 70
0Y1407141386.ZNF	7/14-7/22/2014	Portable Handset		Page 70 of 70
© 2014 PCTEST Engineering La	boratory, Inc.			V 1.10

ngineering Lab atory,

<sup>07/10/2014</sup>