

PCTEST ENGINEERING LABORATORY, INC.

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## 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: 10/13 - 10/21/2015, 11/17 - 11/30/2015 Test Site/Location: PCTEST Lab., Columbia, MD, USA Test Report Serial No.: 0Y1511161959.ZNF

#### FCC ID:

#### ZNFK330

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 LG-K330, LGK330, K330, LG-MS330, LGMS330, MS330, LGL51AL Portable Handset PCS Licensed Transmitter Held to Ear (PCE) §2 §22(H) §24(E) §27(L) ANSI/TIA-603-C-2004, KDB 971168 D01 v02r02 *identical prototype* [S/N: 511CYXM970218]

			ERP/	EIRP
Mode	Tx Frequency (MHz)	Emission Designator	Max. Power (W)	Max. Power (dBm)
GPRS850	824.2 - 848.8	246KGXW	0.537	27.30
EDGE850	824.2 - 848.8	242KG7W	0.086	19.32
GPRS1900	1850.2 - 1909.8	241KGXW	0.624	27.95
EDGE1900	1850.2 - 1909.8	246KG7W	0.202	23.06
WCDMA850	826.4 - 846.6	4M14F9W	0.053	17.23
WCDMA1700	1712.4 - 1752.5	4M17F9W	0.164	22.14
WCDMA1900	1852.4 - 1907.6	4M15F9W	0.169	22.28

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: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		
Test Report S/N:	Test Dates:	EUT Type:		Dage 1 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 1 of 81
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## TABLE OF CONTENTS

ART 2	22, 24, & 27 MEASUREMENT REPORT	3
INTF	RODUCTION	4
1.1	Scope	4
1.2	Testing Facility	4
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
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
MEA	SUREMENT UNCERTAINTY	9
TES	T EQUIPMENT CALIBRATION DATA	10
SAM	IPLE CALCULATIONS	12
TES	T RESULTS	13
7.1	Summary	13
7.2	Occupied Bandwidth	14
7.3	Spurious and Harmonic Emissions at Antenna Terminal	19
7.4	Band Edge Emissions at Antenna Terminal	43
7.5	Peak-Average Ratio	52
7.6	Radiated Power (ERP/EIRP)	55
7.7	Radiated Spurious Emissions Measurements	60
7.8	Frequency Stability / Temperature Variation	70
CON	ICLUSION	81
	INTF 1.1 1.2 PRC 2.1 2.2 2.3 2.4 DES 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 MEA TES SAM TES SAM TES 7.1 7.2 7.3 7.4 7.5 7.6 7.7 7.8	1.2       Testing Facility.         PRODUCT INFORMATION.         2.1       Equipment Description         2.2       Device Capabilities         2.3       Test Configuration         2.4       EMI Suppression Device(s)/Modifications.         DESCRIPTION OF TESTS

FCC ID: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 2 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 2 01 0 1
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2 10/30/2015





## 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:	LG-K330
FCC ID:	ZNFK330
FCC CLASSIFICATION:	PCS Licensed Transmitter Held to Ear (PCE)
MODE:	GSM / GPRS / EDGE / WCDMA
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm)
Test Device Serial No.:	511CYXM970218
DATE(S) OF TEST:	10/13 - 10/21/2015, 11/17 - 11/30/2015
TEST REPORT S/N:	0Y1511161959.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: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 2 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 3 of 81
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#### INTRODUCTION 1.0

#### 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.

#### **Testing Facility** 1.2

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

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

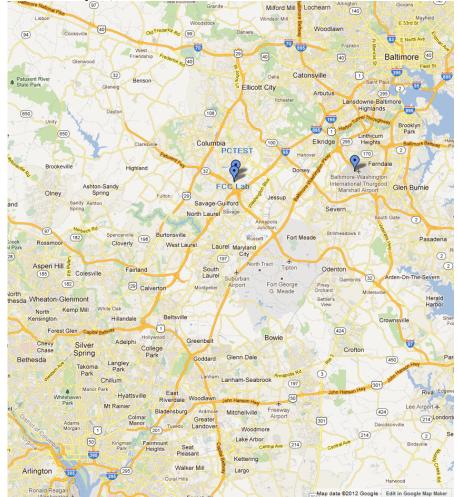


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 4 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 4 of 81
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## 2.0 PRODUCT INFORMATION

#### 2.1 Equipment Description

The Equipment Under Test (EUT) is the LG Electronics MobileComm U.S.A Portable Handset FCC ID: ZNFK330. 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 Electronics MobileComm U.S.A Portable Handset FCC ID: ZNFK330 was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168 D01 v02r02. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

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

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

	FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
	Test Report S/N:	Test Dates:	EUT Type:		Page 5 of 81
	0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 5 01 6 1
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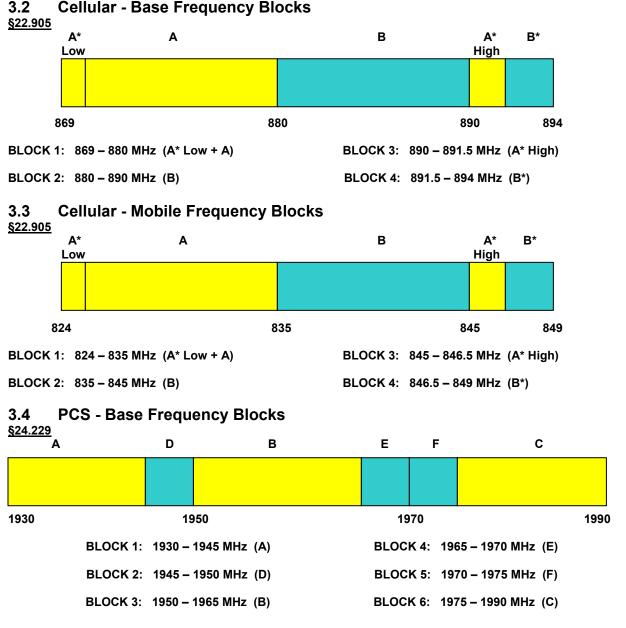


#### DESCRIPTION OF TESTS 3.0

#### 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 D01 v02r02) were used in the measurement of the LG Electronics MobileComm U.S.A Portable Handset FCC ID: ZNFK330.



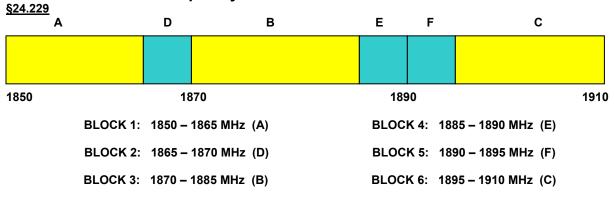


3.2	Cellular - Base Frequency Blocks	

FCC ID: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 6 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 6 of 81
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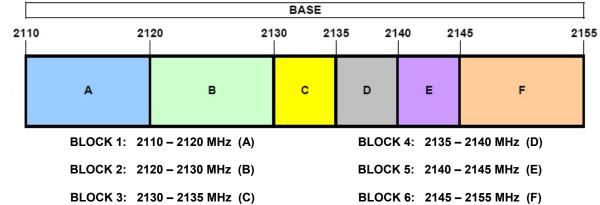


#### 3.5 PCS - Mobile Frequency Blocks



#### 3.6 AWS - Base Frequency Blocks

<u>§27.5(h)</u>



## 3.7 AWS - Mobile Frequency Blocks

<u>§27.5(h)</u>

	MOBILE							
17	10	17	720 1	730 1	735 17	' <b>40</b> 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: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 7 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage / 0101
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#### 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 turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

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:

Pd [dBm] = Pg [dBm] – cable loss [dB] + antenna gain [dBd/dBi]

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

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: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 8 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage o Ul o I
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2 10/30/2015



## 4.0 MEASUREMENT UNCERTAINTY

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

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

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 0 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 9 of 81
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## 5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx1	Licensed Transmitter Cable Set	4/16/2015	Annual	4/16/2016	N/A
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	4/28/2015	Annual	4/28/2016	N/A
Agilent	8447D	Broadband Amplifier	6/12/2015	Annual	6/12/2016	2443A01900
Agilent	N9020A	MXA Signal Analyzer	10/27/2014	Annual	10/27/2015	US46470561
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	7/30/2015	Biennial	7/30/2017	121034
Emco	3115	Horn Antenna (1-18GHz)	1/30/2014	Biennial	1/30/2016	9704-5182
Espec	ESX-2CA	Environmental Chamber	3/17/2015	Annual	3/17/2016	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	10/22/2014	Biennial	10/22/2016	128338
K & L	11SH10-3075/U18000	High Pass Filter	12/1/2014	Annual	12/1/2015	2
K & L	11SH10-3075/U18000	High Pass Filter	12/1/2014	Annual	12/1/2015	1
K & L	13SH10-1000/U1000	N Type High Pass Filter	12/1/2014	Annual	12/1/2015	1
K & L	13SH10-1000/U1000	N Type High Pass Filter	12/1/2014	Annual	12/1/2015	2
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	3/11/2015	Annual	3/11/2016	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	3/5/2015	Annual	3/5/2016	101622
Rohde & Schwarz	CMU200	Base Station Simulator		N/A		107826
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	3/12/2015	Annual	3/12/2016	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/17/2015	Annual	7/17/2016	100348
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	3/5/2015	Annual	3/5/2016	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/3/2015	Annual	3/3/2016	100040
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
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/28/2014	Biennial	1/28/2016	A051107
VWR	62344-734	Thermometer with Clock	2/20/2014	Biennial	2/20/2016	140140336

Table 5-1. Test Equipment for 10/13 – 10/21/2015

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 10 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 10 01 01
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Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx3	Licensed Transmitter Cable Set	6/12/2015	Annual	6/12/2016	LTx3
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	4/28/2015	Annual	4/28/2016	RE1
Agilent	8447D	Broadband Amplifier	6/12/2015	Annual	6/12/2016	2443A01900
Agilent	E5515C	Wireless Communications Test Set		N/A		GB46110872
Agilent	N9020A	MXA Signal Analyzer	11/5/2015	Annual	11/5/2016	US46470561
Emco	3115	Horn Antenna (1-18GHz)	1/30/2014	Biennial	1/30/2016	9704-5182
Emco	6502	Active Loop Antenna (10k - 30 MHz)	6/24/2014	Biennial	6/24/2016	267
Espec	ESX-2CA	Environmental Chamber	3/17/2015	Annual	3/17/2016	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
K & L	11SH10-3075/U18000	High Pass Filter	12/1/2014	Annual	12/1/2015	11SH10-3075/U18000-2
K & L	11SH10-3075/U18000	High Pass Filter	12/1/2014	Annual	12/1/2015	11SH10-3075/U18000-4
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/11/2015	Annual	3/11/2016	11401010036
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	3/11/2015	Annual	3/11/2016	11210140001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Mini-Circuits	TVA-11-422	RF Power Amp		N/A		QA1303002
Rhode & Schwarz	TS-PR18	Pre-Amplifier	3/5/2015	Annual	3/5/2016	101622
Rohde & Schwarz	CMU200	Base Station Simulator		N/A		107826
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	3/12/2015	Annual	3/12/2016	100342
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	3/5/2015	Annual	3/5/2016	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/3/2015	Annual	3/3/2016	100040
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
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/28/2014	Biennial	1/28/2016	A051107
VWR	62344-734	Thermometer with Clock	2/20/2014	Biennial	2/20/2016	140140336

Table 5-2. Test Equipment for 11/17 – 11/30/2015

#### Notes:

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

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 11 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 110101
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#### 6.0 SAMPLE CALCULATIONS

#### **GPRS Emission Designator**

#### Emission Designator = 250KGXW

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

#### **EDGE Emission Designator**

#### Emission Designator = 250KG7W

EDGE BW = 250 kHz G = 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)

#### 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: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 12 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 12 01 01
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### 7.0 TEST RESULTS

#### 7.1 Summary

Company Name:	LG Electronics MobileComm U.S.A
FCC ID:	ZNFK330
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>GSM / GPRS / 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 7.2
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 7.3, 7.4
24.232(d)	Peak-Average Ratio	< 13 dB	CONDUCTED	PASS	Section 7.5
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 7.8
22.913(a.2)	Effective Radiated Power	< 7 Watts max. ERP		PASS	Section 7.6
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 7.6
27.50(d.4)	Equivalent Isotropic Radiated Power	< 1 Watts max. EIRP	RADIATED	PASS	Section 7.6
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 7.7

Table 7-1	. Summary of	Test Results
-----------	--------------	--------------

#### Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots 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 3.2.

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 12 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 13 of 81
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# 7.2 Occupied Bandwidth §2.1049

#### Test Overview

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

#### Test Procedure Used

KDB 971168 D01 v02r02 - Section 4.2

#### **Test Settings**

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

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

#### Test Setup

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

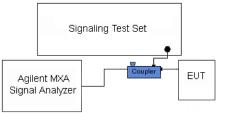


Figure 7-1. Test Instrument & Measurement Setup

#### Test Notes

None.

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 14 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 14 of 81
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Plot 7-1. Occupied Bandwidth Plot (Cellular GPRS Mode – Ch. 190)



Plot 7-2. Occupied Bandwidth Plot (EDGE850 Mode - Ch. 190)

FCC ID: ZNFK330	FCC Pt. 22, 24	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 15 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 15 of 81
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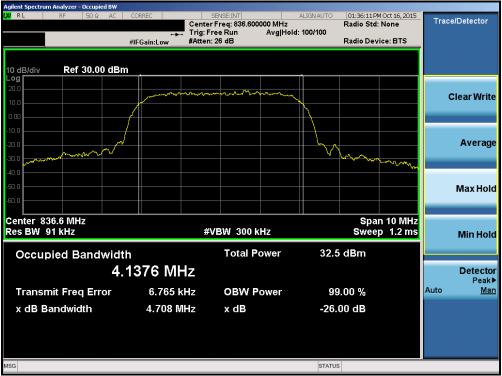


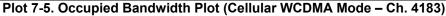


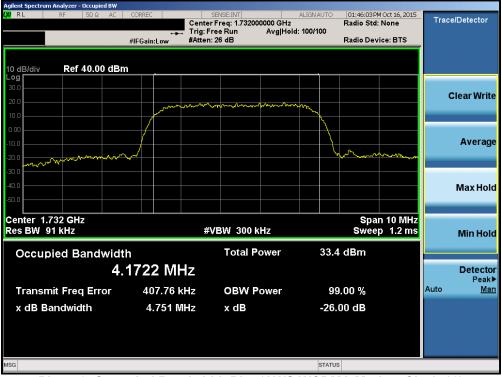
Plot 7-4. Occupied Bandwidth Plot (EDGE1900 Mode - Ch. 661)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 16 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 16 of 81
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Plot 7-6. Occupied Bandwidth Plot (AWS WCDMA Mode - Ch. 1412)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 17 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 17 of 81
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Plot 7-7. Occupied Bandwidth Plot (PCS WCDMA Mode - Ch. 9400)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Page 18 of 81		
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 10 01 01		
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#### 7.3 Spurious and Harmonic Emissions at Antenna Terminal §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 $43 + \log_{10}(P_{[Watts]})$ , where P is the transmitter power in Watts.

#### Test Procedure Used

KDB 971168 D01 v02r02 - Section 6.0

#### Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 10GHz for Cell, 20GHz for AWS, 20GHz for PCS (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

#### Test Setup

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

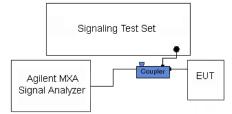


Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

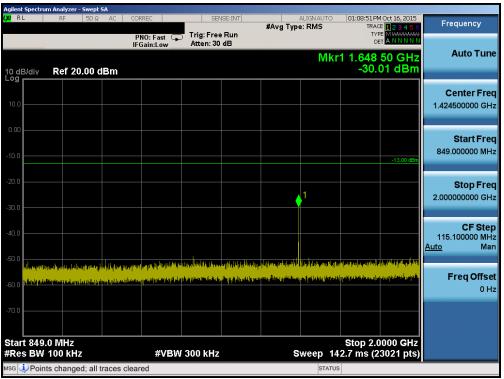
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22 and 1 MHz or greater for Part 24, Part 27. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth 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: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 10 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 19 of 81
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2 10/30/2015



		n Analyzer - Swe									
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0.00 -10.0										-13.00 dBm	Start Freq 30.000000 MHz
-20.0 -30.0											Stop Freq 823.000000 MHz
-40.0 -50.0										1	<b>CF Step</b> 79.300000 MHz <u>Auto</u> Man
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-70.0											
	t 30.0 s BW	MHz 100 kHz		#VBW	/ 300 kHz		ę	Sweep 98	Stop 8 .33 ms (1	23.0 MHz 5861 pts)	
MSG				ustad C				STATUS			h 400)

Plot 7-8. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 128)



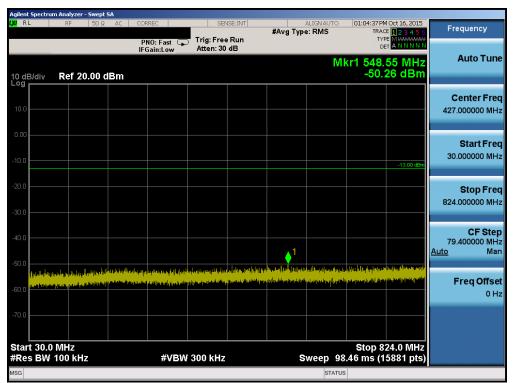
Plot 7-9. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 128)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 20 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 20 of 81
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2 10/30/2015



	n Analyzer - Swept									_
LXI RL	RF 50 Ω	AC CC	ORREC	SEN	VSE:INT	#Avg Typ	ALIGN AUTO		4 Oct 16, 2015	Frequency
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-70.0										<b>Freq Offset</b> 0 Hz
-80.0										
Start 2.00 #Res BW			#VBW	3.0 MHz		s	weep 13	Stop 10 .87 ms (1	.000 GHz 6001 pts)	
мsg 🧼 Point	s changed; all	traces clea	red				STATUS			

Plot 7-10. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 128)



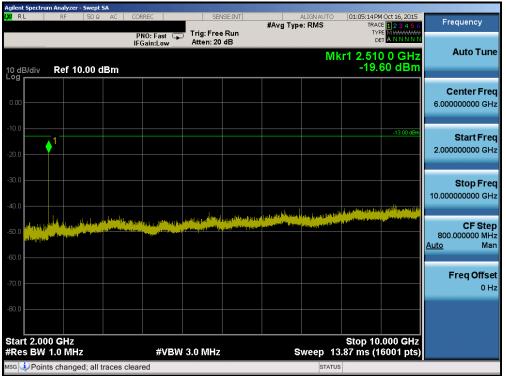
Plot 7-11. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFK330	FCC Pt. 22, 24	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dege 21 of 21
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 21 of 81
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2 10/30/2015



	m Analyzer - Swept Si									
LXI RL	RF 50 Ω	AC CORREC		SEN:	SE:INT	"	ALIGN AUTO		1 Oct 16, 2015	Frequency
		PNO: IFGair	Fast 🖵 n:Low	Trig: Free Atten: 30		#47	д туре: Кіміз	TYP	E M MANAMAN TANNNNN	
10 dB/div Log	Ref 20.00 dl	Зm					Mkr	1 1.673 -30.	05 GHz 56 dBm	Auto Tune
10.0										Center Freq 1.424500000 GHz
-10.0									-13.00 dBm	Start Freq 849.000000 MHz
-20.0							1			<b>Stop Freq</b> 2.000000000 GHz
-40.0										<b>CF Step</b> 115.100000 MHz <u>Auto</u> Man
-60.0	s United Transport Products of the F	al () and ()	anaryny ddaddyddy Gwladay (fysdarwydd	and Annal Annia (1934) and a Annad Magalana da a fan g	e filoso (spilis) piero montraleiro	ardin karya Anglan	ni kata ni da ing na ni nakanan di na kata na di na kata na di na kata na	linen anversielen Au Das Alberter	an mangang ng pangang p	Freq Offset 0 Hz
-70.0										
Start 849. #Res BW	100 kHz		#VBW	300 kHz			Sweep 14		000 GHz 3021 pts)	
MSG 횢 Point	ts changed; all tra	aces cleared					STATUS			





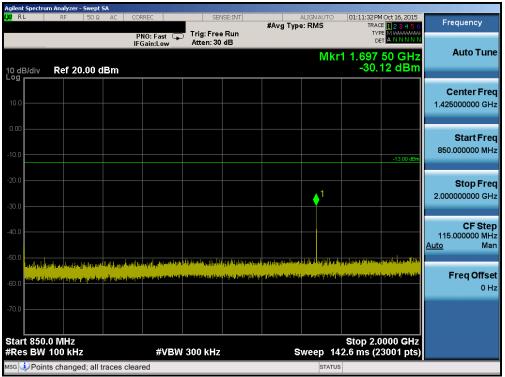
Plot 7-13. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 190)

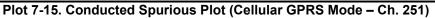
FCC ID: ZNFK330	FCC Pt. 22, 24	LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 22 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 22 01 61
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2 10/30/2015



	pectrum	n Analyzer - :											
l <mark>xi</mark> RL		RF	50 Ω	AC O	ORREC	SEI	NSE:INT	#Au	ALIGN AUTO		M Oct 16, 2015	Frequency	,
					PNO: Fast 🔾	Trig: Fre			, type. tune	TY			
	_			1	FGain:Low	Atten: 30	dB					Auto T	una
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10 dB/c	div	Ref 20.	.00 dl	Зm						-49.	95 dBm		
												Center F	rea
10.0												427.000000	
												427.000000	1411 12
0.00													
												Start F	req
-10.0												30.000000	MHz
											-13.00 dBm		
-20.0													
20.0												Stop F	
-30.0												824.000000	MHZ
-30.0													
-40.0												CF S	
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-50.0												Auto	Man
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-60.0	والا والأورال	أقدى فقدرته بسمرقا	us ka taile k	مقدرانا إمتنائكا	and the base of the second	an a distance de las	and and and a	lal tests it it it	and the second secon	a definition de matéria de	(مراميح) (الماميح)	Freq Of	fset
-60.0													0 Hz
-70.0													
-70.0													
Start :										Stop 8	24.0 MHz		
#Res	BW 1	100 kHz			#VBN	/ 300 kHz			Sweep 98	8.46 ms (1	5881 pts)		
MSG									STATU	s			
	_		_					_					





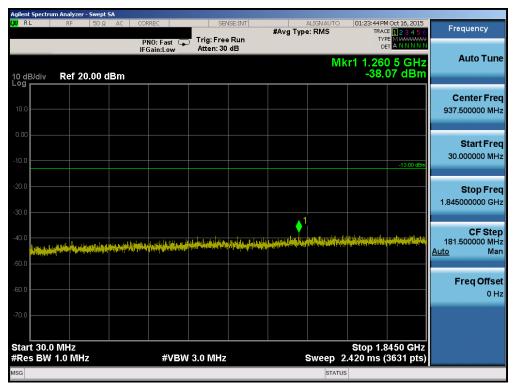


FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dega 22 of 91			
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 23 of 81			
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	m Analyzer - Swepi									
L <mark>XI</mark> RL	RF 50 S	AC CO	RREC	SEN	VSE:INT	#A T.	ALIGN AUTO		1 Oct 16, 2015	Frequency
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10 dB/div Log	Ref 10.00	dBm					Mk	r1 2.540 -18.0	6 5 GHz 88 dBm	Auto Tune
0.00										Center Freq 6.000000000 GHz
-10.0	1								-13.00 dBm	<b>Start Freq</b> 2.000000000 GHz
-30.0	othild and see the desired						بسيد المراداد	and <sup>th</sup> irman M <sup>1</sup> te	and the state of the	<b>Stop Freq</b> 10.000000000 GHz
-50.0 <sup>(1)</sup>	andan dan selam kanang selam kan Selam kanang selam ka	a an	hiji ng sang pangana p Pangana pangana pangana Pangana pangana	, to block of a finite second s	an a	in a state of the second s	den en e	رمريد، اعماد الأمريري المريد اعماد الأمريري	a shirin an	CF Step 800.000000 MHz <u>Auto</u> Man
-70.0										<b>Freq Offset</b> 0 Hz
-80.0 Start 2.00	0 GHz							Stop 10	.000 GHz	
#Res BW	1.0 MHz		#VBW	/ 3.0 MHz			Sweep 13	.87 ms (1	6001 pts)	
мsg 횢 Point	ts changed; all	traces clea	red				STATUS			

Plot 7-16. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 251)



Plot 7-17. Conducted Spurious Plot (PCS GPRS Mode – Ch. 512)

FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)					
Test Report S/N:	Test Dates:	EUT Type:		Dage 24 of 91			
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 24 of 81			
2015 PCTEST Engineering Laboratory, Inc.							



	um Analyzer - Swept									
L <mark>XI</mark> RL	RF 50 Ω	AC COI	RREC	SEN	JSE:INT		ALIGN AUTO		Oct 16, 2015	Frequency
			NO: Fast 📮 Gain:Low	Trig: Free Atten: 30		#Avg I	/pe: RMS	TYP	E 1 2 3 4 5 6 E M WWWWW T A N N N N N	
10 dB/div Log	Ref 20.00 c	IBm					Mł	(r1 9.962 -30.5	2 0 GHz 57 dBm	Auto Tune
10.0										Center Freq 5.955000000 GHz
-10.0									-13.00 dBm	<b>Start Freq</b> 1.910000000 GHz
-20.0									1	<b>Stop Freq</b> 10.000000000 GHz
-40.0	and particular production of the base of the second s	in an	l de tripique de la francésia Incorre de la francésia de la composition Incorre de la francésia de la francésia de la francésia de la francésia	an di Barang di Kalandi baha Malang da Kalandari Malang da Kalandari	a na serie di anna a Na serie di anna a	an gegelen genoemde sternen. Genoemde sterne stern	in the property of the propert	para para para para para para para para	n An an	CF Step 809.000000 MHz <u>Auto</u> Man
-60.0										Freq Offset 0 Hz
-70.0								Stop 10	.000 GHz	
	1.0 MHz			3.0 MHz			Sweep 14		6181 pts)	
мsg 칮 Poir	nts changed; all t	traces clear	red				STATUS	5		





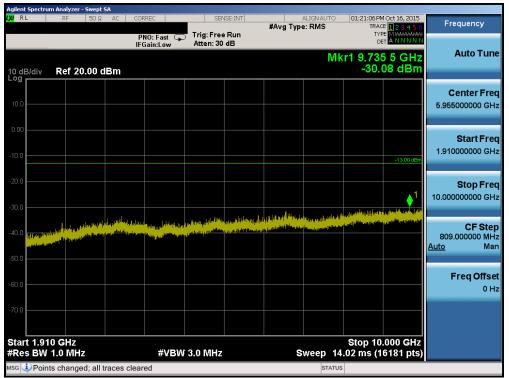
Plot 7-19. Conducted Spurious Plot (PCS GPRS Mode - Ch. 512)

FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)						
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 91				
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 25 of 81				
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V RL RF 50 Ω AC CORREC PNO: Fast C IFGain:Low 10 dB/div Ref 20.00 dBm	SENSE:INT Trig: Free Run Atten: 30 dB	ALIGNAUTO #Avg Type: RMS	01:20:50 PM Oct 16, 2015 TRACE 12:34 5 6 TYPE MUMANY DET ANNININ r1 1.494 0 GHz -37.26 dBm	Frequency Auto Tune
10 dB/div Ref 20.00 dBm		•	DET A N N N N N	Auto Tune
10 dB/div Ref 20.00 dBm		Mk	r1 1.494 0 GHz -37.26 dBm	Auto Tune
10.0				Center Freq 940.000000 MHz
-10.0			-13.00 dBm	Start Freq 30.000000 MHz
-20 0			.1	<b>Stop Freq</b> 1.85000000 GHz
	pages that stall leave in a surpressibility	a national nation and the distance of the second states	gy de synthese bie viere ligden pertegeneralet	CF Step 182.000000 MHz <u>Auto</u> Man
-60.0				<b>Freq Offset</b> 0 Hz
-70.0 Start 30.0 MHz			Stop 1 9500 CH-	
	W 3.0 MHz	Sweep 2	Stop 1.8500 GHz 427 ms (3641 pts)	
MSG		STATUS		





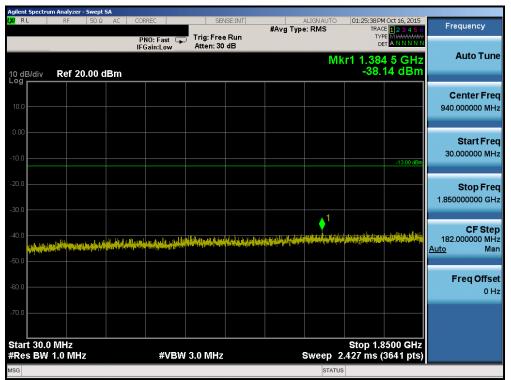
Plot 7-21. Conducted Spurious Plot (PCS GPRS Mode - Ch. 661)

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 91				
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 26 of 81				
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PNO: Fast       Trig: Free Run       #Avg Type: RMS       Trace II 2.3.4 store       Frequency         0 dB/div       Ref 10.00 dBm       Atten: 20 dB       Mkr1 16.893 0 GHz       Auto Tur         0 dB/div       Ref 10.00 dBm       -23.58 dBm       15.00000000 GH         0.00       -30.0 dBm       -30.0 dBm       -30.0 dBm       Start Fre         0.00       -30.0 dBm       -30.0 dBm       -30.0 dBm       Start Fre         0.00       -30.0 dBm       -30.0 dBm       -30.0 dBm       Start Fre         0.00       -30.0 dBm       -30.0 dBm       -30.0 dBm       Start Fre         0.00       -30.0 dBm       -30.0 dBm       -30.0 dBm       Start Fre         0.00       -30.0 dBm       -30.0 dBm       -30.0 dBm       Start Fre         0.00       -30.0 dBm       -30.0 dBm       -30.0 dBm       Start Fre         0.00       -30.0 dBm       -30.0 dBm       -30.0 dBm       Start Fre         0.00       -30.0 dBm       -30.0 dBm       -30.0 dBm       Start Fre         0.00       -30.0 dBm       -30.0 dBm       -30.0 dBm       Start Fre         0.00       -30.0 dBm       -30.0 dBm       -30.0 dBm       -30.0 dBm         0.00       -30.0 dBm		n Analyzer - Swept SA					
PN0: Fast IFGain: Low         Trig: Free Run Atten: 20 dB         Mkr1 16.893 0 GHz -23.58 dBm         Auto Tur           0 dB/div         Ref 10.00 dBm         -23.58 dBm         -23.55 dBm         -23.55 dBm <td< td=""><td>XVIRL</td><td>RF 50Ω.</td><td>AC CORREC</td><td>SENSE:INT</td><td>#Avg Type: RMS</td><td>01:21:12 PM Oct 16, 2015</td><td>Frequency</td></td<>	XVIRL	RF 50Ω.	AC CORREC	SENSE:INT	#Avg Type: RMS	01:21:12 PM Oct 16, 2015	Frequency
Nikr Tro.833 0 GH2         Center Fre           0.00         -23.58 dBm           0.00         -23.58 dBm           0.00         -1300 dBm           0.000 dBm         -1300 dBm					ang type. tuno	TYPE M WWWWWW	
Cog       Center Fre         0.00       .1300 dEm         10.0       .1300 dEm         20.0       .1300 dEm         30.0       .1300 dEm         40.0       .1300 dEm         11.0       .1300 dEm         20.0       .1300 dEm         30.0       .1300 dEm         11.0       .1300 dEm         20.0       .1300 dEm         20.0       .1300 dEm         20.0       .1300 dEm         30.0       .1300 dEm         11.0       .1300 dEm         20.0       .1300 dEm         20.0       .1300 dEm         30.0       .1300 dEm         11.0       .1300 dEm         20.00000000 GEm       .1300 dEm         20.000000000 GEm       .1300 dEm         20.00000000 GEm       .1300 dEm         20.00000000 GEm       .1300 dEm         20.00000000 GEm       .100000000					Mkr	1 16.893 0 GHz	Auto Tune
0.000	10 dB/div Log	Ref 10.00 dB	m			-23.58 GBM	
10.0							Center Freq
20.0 20.0	0.00						15.00000000 GHz
20.0 20.0	-10.0						
2000 300 400 400 400 400 400 400						-13.00 dBm	Start Freq
40.0         Image: Construction of the second	-20.0						10.00000000 GHz
40.0         Image: Construction of the second							
40.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			water we down a block of the state of the st				Stop Freq
50.0       CF Step         60.0       CF Step         70.0       CF Step         60.1       CF Step         70.0       CF Step         60.0       CF Step         70.0       CF Step         70.0       CF Step         60.0       CF Step <td>-40.0</td> <td>A CONTRACTOR OF A</td> <td>ىلىر مىكى خىرى كەركىتى مىرىغىيا دارا بارىرى. ئار مىكى خىرى كەركىتى مىرىغىيا دارا بارىرىلىرى</td> <td>Link field and a state of the state</td> <td></td> <td>ter and the same list beat the same</td> <td>20.00000000 GH2</td>	-40.0	A CONTRACTOR OF A	ىلىر مىكى خىرى كەركىتى مىرىغىيا دارا بارىرى. ئار مىكى خىرى كەركىتى مىرىغىيا دارا بارىرىلىرى	Link field and a state of the state		ter and the same list beat the same	20.00000000 GH2
2000       2000       1.00000000 GH         2000       2000       2000         2000       2000       2000         2000       2000       2000         2000       2000       2000         2000       2000       2000         2000       2000       2000         2000       20000       2000         2000       20000       20000         2000       20000       20000         2000       20000       20000         2000       20000       20000         2000       20000       20000         2000       20000       20000         2000       20000       20000         2000       20000       20000         2000       20000       20000         2000       20000       20000         2000       20000       20000         2000       20000       20000         20000       20000       20000         20000       20000       20000         20000       20000       20000         20000       20000       20000         20000       20000       20000	with the state	and the second state of th					CF Step
60.0 70.0 80.0	-50.0						1.000000000 GHz
70.0 80.0 Start 10.000 GHz Stop 20.000 GHz	-60.0						Auto Man
70.0 80.0 Start 10.000 GHz Stop 20.000 GHz							Freg Offset
Start 10.000 GHz Stop 20.000 GHz	-70.0						0 Hz
Start 10.000 GHz Stop 20.000 GHz	-80.0						
Start 10.000 GHz         Stop 20.000 GHz           #Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 25.33 ms (20001 pts)							
Res BW 1.0 MHz #VBW 3.0 MHz Sweep 25.33 ms (20001 pts)	Start 10-0	00 GHz				Stop 20 000 GHz	
			#VBW	3.0 MHz	Sweep 25	.33 ms (20001 pts)	
sa 😺 Points changed; all traces cleared status	мsg 🤳 Point	s changed; all tra	ces cleared		STATUS	6	





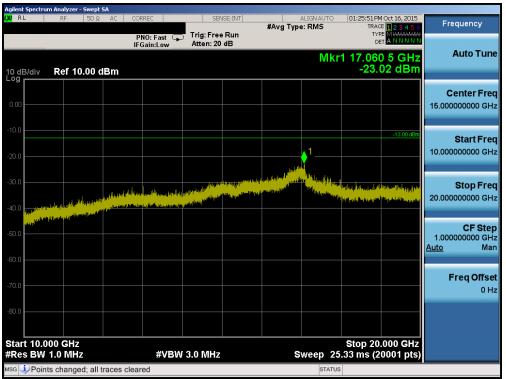
Plot 7-23. Conducted Spurious Plot (PCS GPRS Mode - Ch. 810)

FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)					
Test Report S/N:	Test Dates:	EUT Type:		Dage 27 of 91			
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 27 of 81			
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	m Analyzer - Swepi									
L <mark>XI</mark> RL	RF 50 S	AC C	ORREC	SEN	VSE:INT	#Avg Typ	ALIGN AUTO		Oct 16, 2015	Frequency
			PNO: Fast 🕞 FGain:Low	Trig: Free Atten: 30		HULS IN	e. Rino	TYP		
10 dB/div Log	Ref 20.00	dBm					MI	(r1 9.971 -31.0	l 0 GHz 08 dBm	Auto Tune
10.0										Center Freq 5.957500000 GHz
-10.0									-13.00 dBm	<b>Start Freq</b> 1.915000000 GHz
-20.0									1. The calification trad	<b>Stop Freq</b> 10.000000000 GHz
-40.0 (1910)))))) -50.0	<mark>nin dia kanalarahanakanakanakanakanakanakanakanakanakan</mark>	n <mark>a kanader da kundan</mark> Aya manikari ang ka	ninaa <sub>kaa</sub> du kaalayy Manggamati kalan	udalah puahah paharpan alah	l population de la constance Provision de la constance de la Provision de la constance de la	n a José Internétikan A managerénétikan A managerénétikan	al balan ya kasa da basa Kata wa kasa da basa	n Angela Diblog a Yangabila 29 awang dibila Jawawa A	مندون المعدالين مر <sub>يد</sub>	CF Step 808.500000 MHz <u>Auto</u> Man
-60.0										Freq Offset 0 Hz
-70.0 Start 1.91	5 GHz							Stop 10	.000 GHz	
#Res BW	1.0 MHz		#VBW	/ 3.0 MHz		Ś	weep 14	l.01 ms (1	6171 pts)	
мsg 🔱 Point	ts changed; all	traces clea	ared				STATU	s		





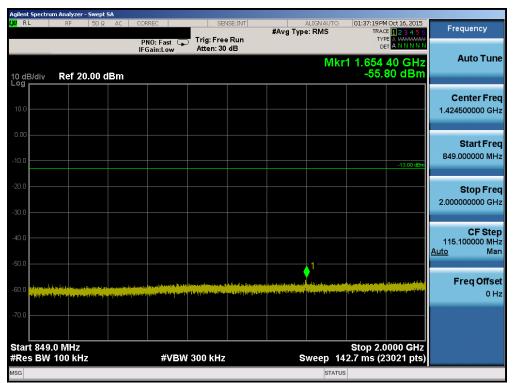
Plot 7-25. Conducted Spurious Plot (PCS GPRS Mode - Ch. 810)

FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)						
Test Report S/N:	Test Dates:	EUT Type:		Dage 29 of 91				
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 28 of 81				
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Agilent Spect	trum Analyzer - Sv									
	Freg 426.5	0Ω AC		SE	NSE:INT	#Avg Typ	ALIGNAUTO		4 Oct 16, 2015 E 1 2 3 4 5 6	Frequency
Contor			PNO: Fast G	Trig: Free Atten: 30			MI	TYI Di		Auto Tune
10 dB/div Log	Ref 20.0	0 dBm							54 dBm	
10.0										Center Freq 426.500000 MHz
-10.0									-13.00 dBm	Start Freq 30.000000 MHz
-20.0									1,	Stop Freq 823.000000 MHz
-40.0										CF Step 79.300000 MHz <u>Auto</u> Man
-60.0		ana	his theorem to a strategy of the left of a fulfiller process of a distribution of a full	a and position of the sector	del Telentry y Institution e Refer Del protocom grady	la fi fan de finantina f	the and the supervision of the Basel And Design Basel Anton Theorem Basel	an na shina a shina a shina An na shina a shina	ana na fan de	Freq Offset 0 Hz
-70.0 Start 30	0 MHz							Stop 8	23.0 MHz	
	W 100 kHz		#VBV	/ 300 kHz		ę	Sweep 98			
мsg 횢 Ро	ints changed;	all traces c	leared				STATUS			

Plot 7-26. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)



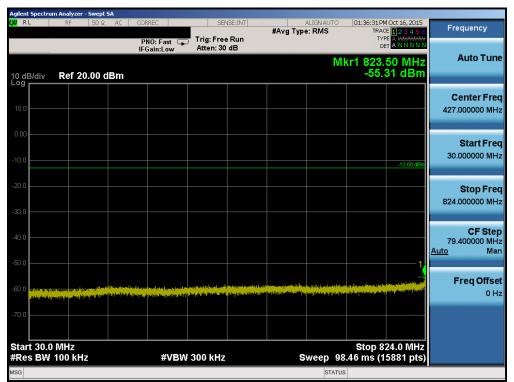
Plot 7-27. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 20 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 29 of 81
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	n Analyzer - Swept !									
LXI RL	RF 50 Ω	AC CC	DRREC	SEN	ISE:INT		ALIGN AUTO Type: RMS		4 Oct 16, 2015	Frequency
			PNO: Fast 🕞 Gain:Low	Trig: Free Atten: 20		#AVş	j Type: Rivis	TY	CE 1 2 3 4 5 6 PE A WWWWW T A NNNNN	
10 dB/div Log	Ref 10.00 d	IBm					Mk	r1 9.66 -47.	9 5 GHz 15 dBm	Auto Tune
0.00										Center Freq 6.000000000 GHz
-10.0									-13.00 dBm	<b>Start Freq</b> 2.000000000 GHz
-30.0									1	<b>Stop Freq</b> 10.000000000 GHz
-50.0					aller fort gegelende for			an a		CF Step 800.000000 MHz <u>Auto</u> Man
-70.0										<b>Freq Offset</b> 0 Hz
-80.0 Start 2.00 #Res BW			#\/R\A	3.0 MHz			Sweep 13	Stop 10	.000 GHz	
	s changed; all t	races clea		0.0 10112			STATUS	· · ·	000 F pts)	
				•		<u> </u>				1400

Plot 7-28. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)



Plot 7-29. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 20 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 30 of 81
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	m Analyzer - Swe									
L <mark>XI</mark> RL	RF 50	Ω AC	CORREC	SEN	ISE:INT	40	ALIGN AUTO		Oct 16, 2015	Frequency
			PNO: Fast 🖵 IFGain:Low	Trig: Free Atten: 30		#47	j Type: Kivis	TYP	E A WWWWW E A WWWWW T A N N N N N	
10 dB/div Log	Ref 20.00	dBm					Mkr	1 1.674 -56.3	80 GHz 32 dBm	Auto Tune
10.0										Center Fred 1.424500000 GH;
-10.0									-13.00 dBm	Start Fred 849.000000 MH;
-20.0										<b>Stop Fred</b> 2.000000000 GH;
-40.0										CF Step 115.100000 MHz <u>Auto</u> Mar
-60.0 He-10/1001	unan kalendar kalendar. Marina kalendar kalen	de la constante de la constant La génera de la constante de la	a del gana por por por porte de la composita de sera com Ny Escala y mandra da contrata a porte da contra	an fan straft with generated	s Destant ( ferstjoor Atens districter dat	l e fa berrade. Het prysersynte	andro, Pilanderetereter	langs <sup>a</sup> Pepert Konganatanan Keptan Kong Magnalina atak	i taga pangané ng ang ing ang ang ang ang ang ang ang ang ang a	Freq Offse 0 Ha
-70.0										
Start 849. #Res BW			#VBW	300 kHz			Sweep 14:	Stop 2.0 2.7 ms (2	000 GHz 3021 pts)	
мsg 🌙 Point	ts changed; a	II traces o	leared				STATUS			

Plot 7-30. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)



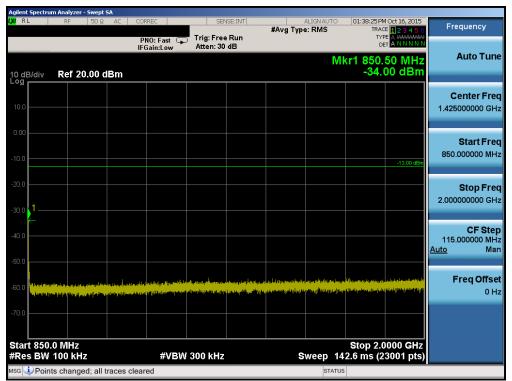
Plot 7-31. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 21 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 31 of 81
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2



	ım Analyzer - Swer								
X/RL	RF 50	ΩAC	CORREC	SENSE:INT	#Ava Tv	ALIGN AUTO pe: RMS	01:38:19 PM C	oct 16, 2015	Frequency
			PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 30 dB	wing iy	pe. runo	TYPE		
10 dB/div Log	Ref 20.00	dBm				MI	kr1 822.4 -56.9	5 MHz 1 dBm	Auto Tune
10.0									Center Freq 427.000000 MHz
									427.000000 MHz
0.00									Start Freq 30.000000 MHz
-10.0								-13.00 dBm	30.000000 MHz
-20.0									Stop Freq
-30.0									824.000000 MHz
-40.0									CF Step 79.400000 MHz
-50.0								1	<u>Auto</u> Man
-60.0	a sanisana ing maning ing ing ing		والمتعارفة والمراجع والمتعارف	Expany Sileson and File Distance Internation	الإحدار فلتفع الالعاري	- Lang Lagrad (Sales on party	alas da al da parte da terret		Freq Offset
-70.0	a han sa ka sa sa ka	ing seam interactions.	da hila di wakaza ya na kata Matili y	(Cardina (Company) and the foregram of the second the	and and the bound	The second second second second	alway how his book		0 Hz
Start 30.0 #Res BW			#VBW	300 kHz		Sweep 98	Stop 824 .46 ms (15	4.0 MHz 881 pts)	
//SG						STATUS			
						0.1100			

Plot 7-32. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)



Plot 7-33. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 22 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 32 of 81
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2



	n Analyzer - Swept									
LXI RL	RF 50 Ω	AC O	ORREC	SEN	ISE:INT	#Au	ALIGN AUTO Type: RMS		4 Oct 16, 2015 E 1 2 3 4 5 6	Frequency
			PNO: Fast 📮 FGain:Low	Trig: Free Atten: 20			Type. RMS	TYI	PE A WWWWWW T A N N N N N	
10 dB/div Log	Ref 10.00 c	IBm					Mk	r1 9.98 -47.	4 0 GHz 11 dBm	Auto Tune
0.00										Center Freq 6.000000000 GHz
-10.0									-13.00 dBm	<b>Start Freq</b> 2.000000000 GHz
-30.0									1	<b>Stop Freq</b> 10.000000000 GHz
-50.0				A SADA	inne a de las cidades de las seras Presentados de las las seras					CF Step 800.000000 MHz <u>Auto</u> Man
-70.0										<b>Freq Offset</b> 0 Hz
-80.0 Start 2.00 #Res BW			#\/B}A	3.0 MHz			Sweep 13	Stop 10	.000 GHz	
	s changed; all t	races clea		5.0 WHZ			SWEEP TJ		ooon pisj	
						<u> </u>				

Plot 7-34. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

			PNO: Fast C IFGain:Low	Trig: Free Atten: 30		#Avg Typ	e: RMS	TRACE TYPE DE	123456 A WWWWWW A N N N N N	Frequency
dB/div	Ref 20.00	0 dBm					Mk	r1 1.705 -29.7	0 GHz 2 dBm	Auto Tur
										Center Fre 867.500000 M⊦
									-13.00 dBm	Start Fre 30.000000 Mi
).0 ).0									1	<b>Stop Fre</b> 1.705000000 GH
).0				م المرابع والله جارا م	and a strange to the survey of	and the state of the	مەرمىيەر مەرمەر مەرم		nation of the state of the state	<b>CF Ste</b> 167.500000 MI <u>Auto</u> M
).0										Freq Offs 0
art 30.0 Res BW 1				W 3.0 MHz				Stop 1.7 .233 ms (3	050 GHz	

Plot 7-35. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 22 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 33 of 81
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	m Analyzer - Swepl									
(XI RL	RF 50 G	AC	CORREC	SEN	JSE:INT	#Avg Typ	ALIGN AUTO		4 Oct 16, 2015 E <mark>1 2 3 4 5 6</mark>	Frequency
			PNO: Fast 📮 IFGain:Low	Trig: Free Atten: 30		wayg iyi	Je. KINIS	TYI		
10 dB/div Log	Ref 20.00	dBm					Mł	(r1 3.42) -37.	6 5 GHz 16 dBm	Auto Tune
10.0										Center Freq 5.877500000 GHz
-10.0									-13.00 dBm	<b>Start Freq</b> 1.755000000 GHz
-20.0		<u> </u>								<b>Stop Freq</b> 10.000000000 GHz
-40.0										CF Step 824.500000 MHz <u>Auto</u> Man
-60.0										<b>Freq Offset</b> 0 Hz
-70.0 Start 1.75	5 GHz							Stop <u>10</u>	.000 GHz	
#Res BW	1.0 MHz			/ 3.0 MHz		ę	Sweep 14	.29 ms (1	6491 pts)	
мsg 🧼 Point	ts changed; all	traces cl	leared				STATUS	6		

Plot 7-36. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)



Plot 7-37. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)

FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 24 of 91	
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 34 of 81	
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	n Analyzer - Swept SA			-		
XI RL	RF 50Ω A	C CORREC	SENSE:INT	ALIGNAUTO #Avg Type: RMS	01:46:11 PM Oct 16, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 30 dB	arring type. tuno	TYPE A WAMAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	
	B-6-00-00-1B-		Atten: ov ub	Mk	r1 1.695 0 GHz -47.08 dBm	Auto Tune
10 dB/div Log <b>r</b>	Ref 20.00 dBr	n			-47.00 0.011	
						Center Freq
10.0						870.000000 MHz
0.00						
0.00						Start Freq
-10.0					-13.00 dBm	30.000000 MHz
-20.0						Stop Freq
-30.0						1.710000000 GHz
-30.0						
-40.0					1	CF Step 168.000000 MHz
						<u>Auto</u> Man
-50.0		and a set of the set of	a particular de la construction de		and the second design of the s	
-60.0						Freq Offset
00.0						0 Hz
-70.0						
Start 30.0					Stop 1.7100 GHz	
#Res BW	1.0 MHz	#VBW	3.0 MHz	Sweep 2	.240 ms (3361 pts)	
ISG				STATUS		





Plot 7-39. Conducted Spurious Plot (AWS WCDMA Mode - Ch. 1412)

FCC ID: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 91	
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 35 of 81	
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Plot 7-41. Conducted Spurious Plot (AWS WCDMA Mode - Ch. 1862)

FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 26 of 91	
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 36 of 81	
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Agilent Spectrur										
XV RL	RF 5	50Ω AC	CORREC	SEN	ISE:INT	#Ava Tv	ALIGNAUTO		4 Oct 16, 2015 E 1 2 3 4 5 6	Frequency
			PNO: Fast 🕞 IFGain:Low	Trig: Free Atten: 30				TYI		
			II OGINILON				M	(r1 1.76	0 0 GHz	Auto Tune
10 dB/div Log	Ref 20.0	0 dBm						-33.	0 0 GHz 45 dBm	
										Center Freq
10.0										5.880000000 GHz
0.00										Start Freq
-10.0									-13.00 dBm	1.760000000 GHz
									-13.00 0.011	
-20.0										Stop Freq
-30.0 1										10.00000000 GHz
-40.0		يەر يا ي	alah m	a large state	in the state	The latest states	a a surprise of the second		a a destructura de la contra de Contra de la contra d	CF Step 824.000000 MHz
Constant of the		and the selection of the	n de la competencia d Competencia de la competencia de la comp		in a product of the second	and the second secon	hit filmly come bill and			<u>Auto</u> Man
-50.0	a ha dili									
-60.0										Freq Offset
										0 Hz
-70.0										
Start 1.76								Stop 10	.000 GHz	
#Res BW				/ 3.0 MHz			Sweep 14		0481 pts)	
usg 🍑 Point		all traces of	leared				STATUS	3		





Plot 7-43. Conducted Spurious Plot (AWS WCDMA Mode - Ch. 1862)

FCC ID: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 27 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 37 of 81
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XX RL RF 50Ω AC CORREC	SENSE:IM	ALIGNAUTO	01:43:18 PM Oct 16, 2015	
	Talas Fast a Day		TRACE 1 2 3 4 5 6	Frequency
PNO: Fa IFGain:L	ow Trig: Free Ru Atten: 30 dB		11.845 0 GHz -35.46 dBm	Auto Tune
10 dB/div Ref 20.00 dBm			-35.46 dBm	
10.0				Center Freq 937.500000 MHz
-10.0			-13.00 dBm	Start Freq 30.000000 MHz
-20.0			1	Stop Freq 1.845000000 GHz
-40.0		مىلىدىنىيە بىرىكى بىرىكى ئىرىپىدىدىنىيە تىرىپىدىدىنى بىرىكى بىرىپىدىدىنىيە بىرىپىرىدىن بىرىپىدىن بىرىپىدىنىيە ب		<b>CF Step</b> 181.500000 MHz <u>Auto</u> Man
-60.0				<b>Freq Offset</b> 0 Hz
-70.0				
Start 30.0 MHz #Res BW 1.0 MHz #	VBW 3.0 MHz	Sweep 2.	Stop 1.8450 GHz 420 ms (3631 pts)	
MSG		STATUS		

Plot 7-44. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)



Plot 7-45. Conducted Spurious Plot (PCS WCDMA Mode - Ch. 9262)

FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 29 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 38 of 81
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10/30/2015









Plot 7-47. Conducted Spurious Plot (PCS WCDMA Mode - Ch. 9400)

FCC ID: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 39 of 81
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2 10/30/2015



	m Analyzer - Swept									
LXI RL	RF 50 Ω	AC CO	DRREC	SEI	VSE:INT	#Ava 1	ALIGN AUTO		4 Oct 16, 2015 E 1 2 3 4 5 6	Frequency
			PNO: Fast 🕞	Trig: Fre		ming i	ype. rano	TYI		
		I	Gain:Low	Atten: 30	dB					Auto Tune
							M	(r1 9.48	8 0 GHz	Autorune
10 dB/div Log	Ref 20.00	dBm						-37.	23 dBm	
										Center Freq
10.0										5.955000000 GHz
										5.95500000 GH2
0.00										
										Start Freq
-10.0										1.91000000 GHz
10.0									-13.00 dBm	
-20.0										
-20.0										Stop Freq
-30.0										10.00000000 GHz
-30.0									<u> </u>	
-40.0								المانية وقريب فلحمر يبين	and the state of the	CF Step
	مطعيدين الم	a selection to a select		and the state of the state	A DESCRIPTION OF	and the state of t	in the state of the second	and a static set with his	and the second s	809.000000 MHz
-50.0		C AND DEPOSIT	Constant States	a a state a state of the state		FIG. 1.				<u>Auto</u> Man
-50.0										
										Freq Offset
-60.0										0 Hz
70.0										
-70.0										
Start 1.91	0 GHz							Stop 10	.000 GHz	
#Res BW			#VBW	/ 3.0 MHz			Sweep 14	.02 ms (1	6181 pts)	
мsg 連 Poin	ts changed; all	traces clea	red				STATUS	6		
					_					

Plot 7-48. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)



Plot 7-49. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 40 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 40 of 81
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	ım Analyzer - Swept SA					
L <mark>XI</mark> RL	RF 50Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	01:44:12 PM Oct 16, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 30 dB	•		A
10 dB/div Log	Ref 20.00 dBm			MI	(r1 1.813 5 GHz -47.17 dBm	Auto Tune
						Center Freq
10.0						940.000000 MHz
0.00						Start Freq
-10.0					-13.00 dBm	30.000000 MHz
-20.0						Oton From
						<b>Stop Freq</b> 1.85000000 GHz
-30.0						
-40.0						CF Step 182.000000 MHz Auto Man
-50.0	And the second	المعالية الإيرانية المعاملين عن الإراكية الإراكية الإراكية الإراكية الإراكية الإراكية الإراكية الإراكية الإراكي		***		Auto Man
-60.0						Freq Offset 0 Hz
-70.0						0 H2
-70.0						
Start 30.0 #Res BW		#\/B\M	3.0 MHz	Swoon	Stop 1.8500 GHz 2.427 ms (3641 pts)	
		#VBW	3.0 WHZ			
100				STATU	3	





Plot 7-51. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 41 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 41 of 81
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Plot 7-52. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFK330	FCC Pt. 22, 24	🕒 LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 42 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 42 of 81
2015 PCTEST Engineering Laboratory, Inc.				V 3.2



#### 7.4 Band Edge Emissions at Antenna Terminal §2.1051 §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 D01 v02r02 - 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 > 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 = trace average for continuous emissions, max hold for pulse emissions
- 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.

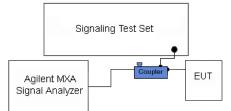


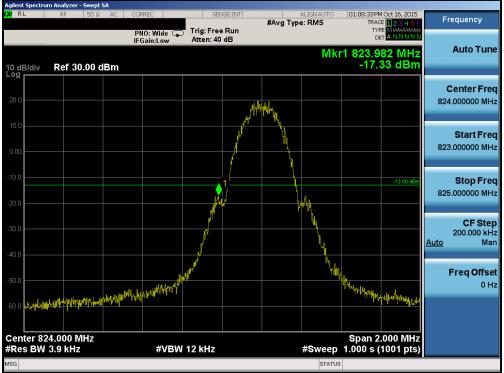
Figure 7-3. Test Instrument & Measurement Setup

#### Test Notes

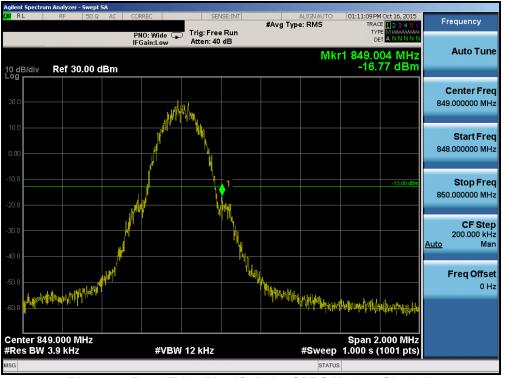
Per 22.917(b), 24.238(b), 27.53(h)(3), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions 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: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Deg. 42 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 43 of 81
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2 10/30/2015





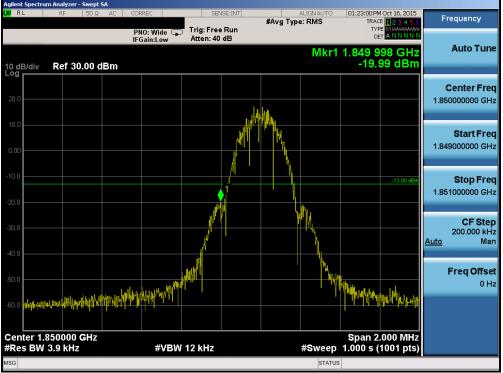
Plot 7-53. Band Edge Plot (Cellular GPRS Mode – Ch. 128)



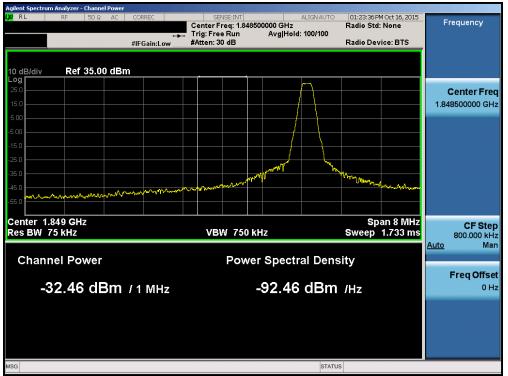
Plot 7-54. Band Edge Plot (Cellular GPRS Mode - Ch. 251)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 44 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 44 of 81
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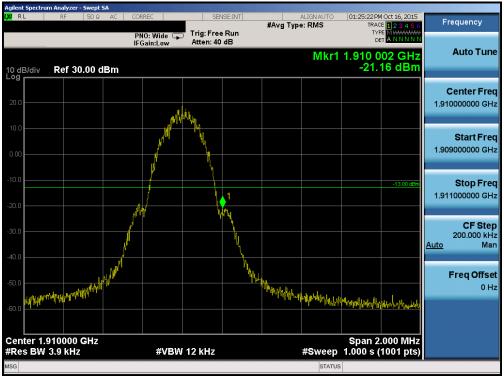
Plot 7-55. Band Edge Plot (PCS GPRS Mode - Ch. 512)

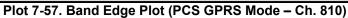


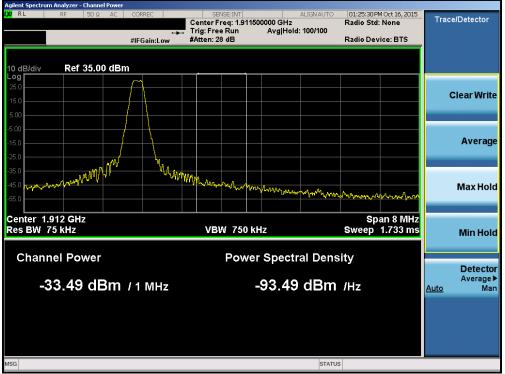
Plot 7-56. 4MHz Span Plot (PCS GPRS Mode – Ch. 512)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 45 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 45 of 81
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Plot 7-58. 4MHz Span Plot (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 46 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 46 of 81
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2 10/30/2015



Agilent Spectrur	n Analyzer - Swept S RF 50 Ω	AC CORF	REC	SEN	SE:INT		ALIGN AUTO	01:37:43 PM	4 Oct 16, 2015	
	10 30 32	PN	0: Fast 🕞 ain:Low		Run	#Avg Ty	pe: RMS	TRAC		Frequency
10 dB/div	Ref 30.00 d		ain:Low	Atten: 40			Mk	1 824.0 -19.	00 MHz 64 dBm	Auto Tune
20.0										Center Free 824.000000 MH:
0.00						n her share				Start Free 816.500000 MH:
-10.0					1				-13.00 dBm	<b>Stop Fred</b> 831.500000 MH:
-30.0				~~~~				h	man	CF Step 1.500000 MH: <u>Auto</u> Mar
50.0 <del></del>	an a		~~~ 							Freq Offse 0 H:
	4.000 MHz		20 (PAA					Span 1	5.00 MHz	
#Res BW	TUU KHZ		#VBW	/ 300 kHz			Sweep 1		TOUT pts)	





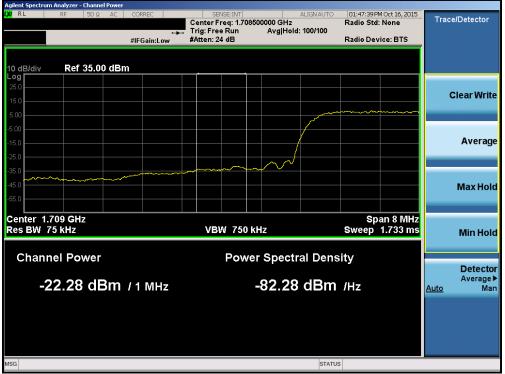
Plot 7-60. Band Edge Plot (Cellular WCDMA Mode - Ch. 4233)

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 47 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 47 of 81
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2



Agilent Spectrun											
LXI RL	RF 5	ΟΩ AC	CORREC	SEN	ISE:INT	#Avg Typ	ALIGNAUTO		1 Oct 16, 2015	Fr	equency
			PNO: Fast 🖵 IFGain:Low	Trig: Free Atten: 40		#Avg i yi	e. Kins	TYP	E A WWWWWW T A N N N N N		
10 dB/div	Ref 30.0	0 dBm	II Guilleow				Mkr1	1.710 0	00 GHz 46 dBm		Auto Tune
20.0											<b>enter Freq</b> 0000000 GHz
0.00						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	······			1.702	Start Freq 2500000 GHz
-10.0					1				-13.00 dBm	1.71	<b>Stop Freq</b> 7500000 GHz
-30.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	and the second sec	$\sim$				Vw	man	1 <u>Auto</u>	<b>CF Step</b> .500000 MHz Man
-40.0	and harments										F <b>req Offset</b> 0 Hz
-60.0 Center 1.7	10000 CH	47						Snan 1	5.00 MHz		
#Res BW		12	#VBW	300 kHz			Sweep 1	.867 ms (	1001 pts)		
MSG							STATUS				





Plot 7-62. 4MHz Span Plot (AWS WCDMA Mode – Ch. 1312)

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Deg. 49 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 48 of 81
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Plot 7-64. 4MHz Span Plot (AWS WCDMA Mode - Ch. 1862)

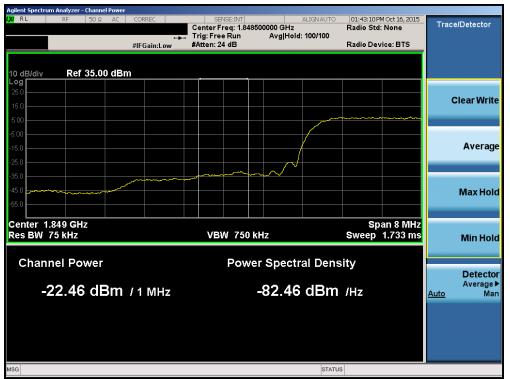
FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 40 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 49 of 81
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2

10/30/2015



	n Analyzer - Swept SA					
LXI RL	RF 50 Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	01:43:03 PM Oct 16, 2015 TRACE 1 2 3 4 5 6	Frequency
		PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 40 dB		TYPE A WARMAN DET A N N N N N	Auto Turo
10 dB/div Log	Ref 30.00 dBm	1		Mkr1	1.850 000 GHz -20.500 dBm	Auto Tune
20.0						Center Freq 1.85000000 GHz
0.00				manny		Start Freq 1.842500000 GHz
-10.0			1		-13.00 dBm	<b>Stop Freq</b> 1.857500000 GHz
-30.0			~~~		h	<b>CF Step</b> 1.500000 MHz <u>Auto</u> Man
-50.0						<b>Freq Offset</b> 0 Hz
-60.0	350000 GHz				Span 15.00 MHz	
#Res BW		#VBW	300 kHz	Sweep 1	Span 15.00 MHz .867 ms (1001 pts)	
MSG				STATUS	\$	

Plot 7-65. Band Edge Plot (PCS WCDMA Mode – Ch. 9262)



Plot 7-66. 4MHz Span Plot (PCS WCDMA Mode – Ch. 9262)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 50 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 50 of 81
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Plot 7-68. 4MHz Span Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 51 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 51 01 61
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### 7.5 Peak-Average Ratio

#### 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 D01 v02r02 - 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.

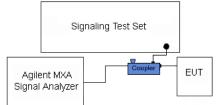


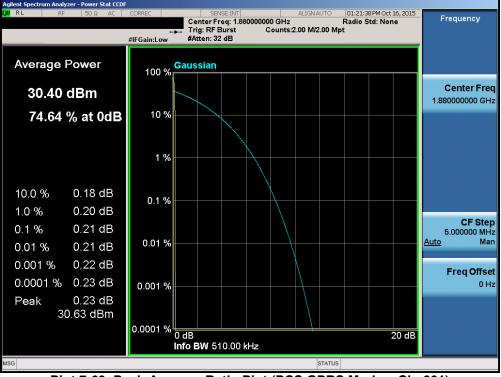
Figure 7-4. Test Instrument & Measurement Setup

#### Test Notes

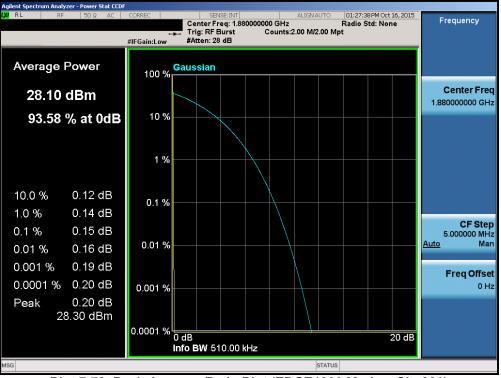
None

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 52 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 52 of 81
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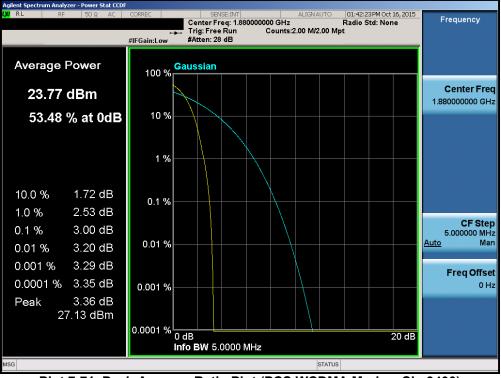




Plot 7-70. Peak-Average Ratio Plot (EDGE1900 Mode - Ch. 661)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 52 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 53 of 81
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Plot 7-71. Peak-Average Ratio Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dogo E4 of 91			
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 54 of 81			
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#### 7.6 Radiated Power (ERP/EIRP) §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 D01 v02r02 - Section 5.2.1

ANSI/TIA-603-C-2004 - Section 2.2.17

#### Test Settings

- 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
- 5. No. of sweep points  $\geq$  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". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
- 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: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga EE of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 55 of 81
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#### Test Setup

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

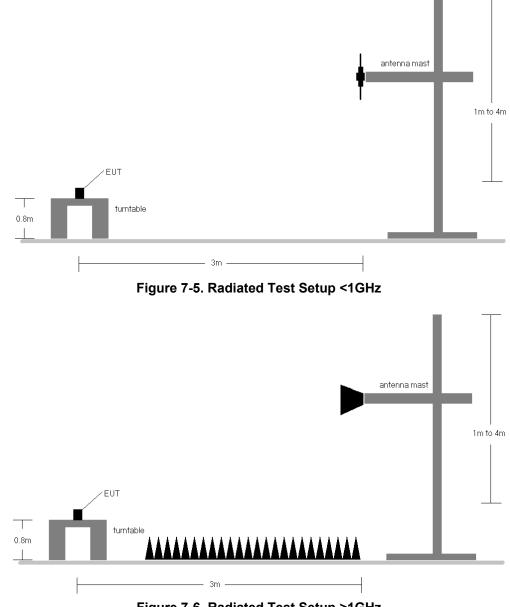


Figure 7-6.	Radiated Tes	t Setup >1GHz
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FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)				
Test Report S/N:	Test Dates:	EUT Type:		Page 56 of 81		
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 50 01 01		
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- 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 worst case setup is reported in the tables below.

FCC ID: ZNFK330	FCC Pt. 22, 24	LG	Reviewed by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 57 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 57 01 61
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Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GPRS850	V	1.39	345	24.05	2.98	27.03	0.504	38.45	-11.43
836.60	GPRS850	V	1.29	323	24.16	3.04	27.20	0.525	38.45	-11.25
848.80	GPRS850	V	1.39	295	24.19	3.11	27.30	0.537	38.45	-11.15
848.80	EDGE850	V	1.39	295	16.21	3.11	19.32	0.086	38.45	-19.13

Table 7-2. ERP (Cellular GPRS)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	V	1.32	95	12.60	2.99	15.59	0.036	38.45	-22.86
836.60	WCDMA850	V	1.32	195	14.16	3.04	17.20	0.053	38.45	-21.25
846.60	WCDMA850	V	1.32	195	14.13	3.10	17.23	0.053	38.45	-21.23

Table 7-3. ERP (Cellular WCDMA)

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dege 59 of 91				
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 58 of 81				
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Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1712.40	WCDMA1700	V	1.28	147	12.88	9.26	22.14	0.164	30.00	-7.86
1732.50	WCDMA1700	V	1.20	100	11.70	9.00	20.70	0.117	30.00	-9.30
1752.50	WCDMA1700	V	1.06	92	11.51	8.74	20.25	0.106	30.00	-9.75

Table 7-4. EIRP (AWS WCDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GPRS1900	V	1.10	21.00	19.61	8.34	27.95	0.624	33.01	-5.06
1880.00	GPRS1900	V	1.60	360	19.39	8.46	27.85	0.609	33.01	-5.16
1909.80	GPRS1900	V	1.54	358	17.49	8.65	26.14	0.411	33.01	-6.87
1850.20	EDGE1900	V	1.10	21	14.72	8.34	23.06	0.202	33.01	-9.95

Table 7-5. EIRP (PCS GPRS)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	V	1.58	320	11.76	8.35	20.11	0.103	33.01	-12.90
1880.00	WCDMA1900	V	1.00	22	13.82	8.46	22.28	0.169	33.01	-10.73
1907.60	WCDMA1900	V	1.01	29	13.43	8.62	22.05	0.160	33.01	-10.96

Table 7-6. EIRP (PCS WCDMA)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Page 59 of 81				
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 59 01 61				
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### 7.7 Radiated Spurious Emissions Measurements §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 horizontally 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 D01 v02r02 - 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  $\geq$  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.

FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)				
Test Report S/N:	Test Dates:	EUT Type:		Page 60 of 81		
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 60 01 61		
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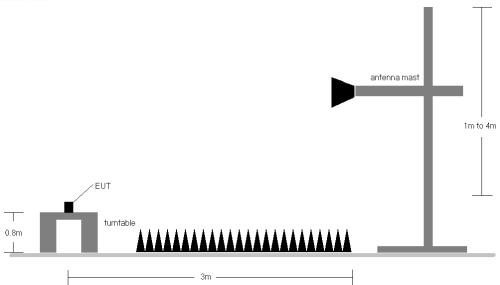


Figure 7-7. Test Instrument & Measurement Setup

#### 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 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.

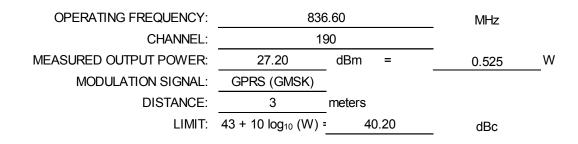
FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 61 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 01 01 01
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OPERATING FREQUENCY:	824.20	MHz
CHANNEL:	128	
MEASURED OUTPUT POWER:	dBm =	0.504 W
MODULATION SIGNAL:	GPRS (GMSK)	
DISTANCE:	<u> </u>	
LIMIT:	43 + 10 log <sub>10</sub> (W) = 40.03	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1648.40	Н	2.44	296	-49.63	6.56	-43.08	70.1
2472.60	Н	2.44	326	-43.09	7.29	-35.80	62.8
3296.80	Н	2.44	360	-58.14	7.37	-50.77	77.8

Table 7-7. Radiated Spurious Data (Cellular GPRS Mode – Ch. 128)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.20	Н	2.94	48	-47.60	6.55	-41.05	68.2
2509.80	Н	2.94	0	-41.09	7.34	-33.75	61.0
3346.40	Н	2.94	359	-58.85	7.44	-51.41	78.6

Table 7-8. Radiated Spurious Data (Cellular GPRS Mode – Ch. 190)

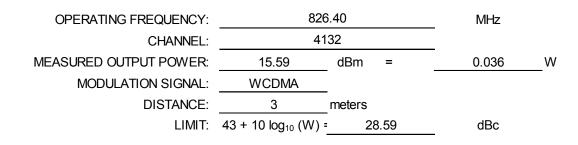
FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 62 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 62 of 81
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OPERATING FREQUENCY:	848	MHz	
CHANNEL:	2		
MEASURED OUTPUT POWER:	27.30	dBm =	0.537 W
MODULATION SIGNAL:	GPRS (GMSK)		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	40.30	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1697.60	Н	3.11	266	-47.63	6.55	-41.08	68.4
2546.40	Н	3.11	314	-43.82	7.36	-36.45	63.8
3395.20	Н	3.11	84	-59.21	7.51	-51.70	79.0

Table 7-9. Radiated Spurious Data (Cellular GPRS Mode – Ch. 251)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1652.80	Н	1.00	138	-65.02	6.56	-58.47	74.1
2479.20	Н	1.00	2	-64.12	7.30	-56.82	72.4
3305.60	Н	1.00	120	-60.85	7.38	-53.48	69.1

Table 7-10. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

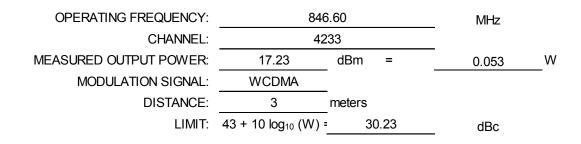
FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)			
Test Report S/N:	Test Dates:	EUT Type:		Page 63 of 81	
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 65 01 61	
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OPERATING FREQUENCY:	836	MHz	
CHANNEL:	41		
MEASURED OUTPUT POWER:	17.20	dBm =	0.053 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	30.20	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.20	Н	1.00	286	-63.86	6.55	-57.31	74.5
2509.80	Н	1.00	190	-63.86	7.34	-56.52	73.7
3346.40	Н	1.00	227	-60.32	7.44	-52.88	70.1

Table 7-11. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.20	Н	1.00	256	-61.05	6.55	-54.50	71.7
2539.80	Н	1.00	235	-63.18	7.36	-55.83	73.1
3386.40	Н	1.00	13	-60.39	7.50	-52.89	70.1

Table 7-12. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)

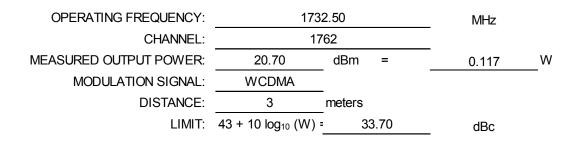
FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 64 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 64 01 61
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OPERATING FREQUENCY:	171	2.40	MHz
CHANNEL:	13		
MEASURED OUTPUT POWER:	22.14	dBm =	0.164 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	35.14	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3424.80	Н	1.20	0	-40.23	9.68	-30.55	52.7
5137.20	Н	1.20	120	-56.85	10.68	-46.17	68.3
6849.60	Н	1.20	5	-57.00	11.74	-45.26	67.4

Table 7-13. Radiated Spurious Data (AWS WCDMA Mode – Ch. 9262)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	Н	1.15	356	-39.25	9.71	-29.55	51.7
5197.50	Н	1.15	197	-56.97	10.59	-46.39	68.5
6930.00	Н	1.15	166	-56.56	11.75	-44.81	66.9

Table 7-14. Radiated Spurious Data (AWS WCDMA Mode – Ch. 9400)

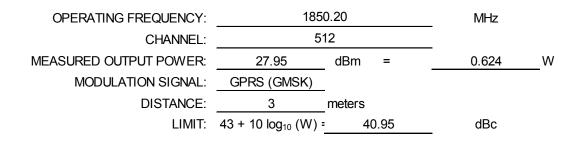
FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)				
Test Report S/N:	Test Dates:	EUT Type:		Page 65 of 81		
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 05 01 61		
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OPERATING FREQUENCY:	175	2.50	MHz
CHANNEL:	18	62	
MEASURED OUTPUT POWER:	20.25	dBm =	0.106 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	33.25	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3505.00	Н	1.17	350	-41.42	9.73	-31.69	53.8
5257.50	Н	1.17	340	-56.11	10.64	-45.47	67.6
7010.00	Н	1.17	186	-57.15	11.75	-45.40	67.5

Table 7-15. Radiated Spurious Data (AWS WCDMA Mode – Ch. 9538)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3700.40	Н	3.53	196	-49.67	9.44	-40.23	68.2
5550.60	Н	3.53	360	-37.57	10.78	-26.78	54.7
7400.80	Н	3.53	186	-52.86	10.69	-42.17	70.1

Table 7-16. Radiated Spurious Data (PCS GPRS Mode – Ch. 512)

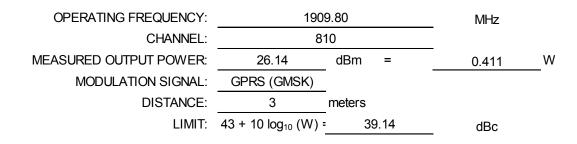
FCC ID: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)				
Test Report S/N:	Test Dates:	EUT Type:		Daga 66 of 91		
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 66 of 81		
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OPERATING FREQUENCY:	188	0.00	MHz
CHANNEL:	66	61	
MEASURED OUTPUT POWER:	27.85	dBm =	0.609 W
MODULATION SIGNAL:	GPRS (GMSK)		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	40.85	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	Н	1.10	130	-46.11	9.28	-36.83	64.8
5640.00	Н	1.10	0	-35.28	11.03	-24.24	52.2
7520.00	Н	1.10	259	-52.37	10.97	-41.40	69.3

 Table 7-17. Radiated Spurious Data (PCS GPRS Mode – Ch. 661)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3819.60	Н	2.99	195	-46.19	9.19	-37.00	65.0
5729.40	Н	2.99	187	-35.85	11.28	-24.57	52.5
7639.20	Н	2.99	208	-51.72	11.17	-40.54	68.5

Table 7-18. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

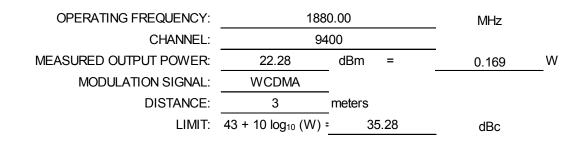
FCC ID: ZNFK330	FCC Pt. 22, 24	LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Page 67 of 81	
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 67 01 61	
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OPERATING FREQUENCY:	1852	MHz	
CHANNEL:	92	62	
MEASURED OUTPUT POWER:	20.11	dBm =	0.103 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	33.11	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3704.80	Н	2.06	120	-53.76	9.43	-44.33	64.4
5557.20	Н	2.06	345	-55.28	10.80	-44.49	64.6
7409.60	Н	2.06	312	-53.22	10.71	-42.51	62.6

Table 7-19. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9262)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	Н	2.38	126	-56.67	9.28	-47.39	67.5
5640.00	Н	2.38	100	-56.72	11.03	-45.68	65.8
7520.00	Н	2.38	65	-54.07	10.97	-43.10	63.2

Table 7-20. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFK330	FCC Pt. 22, 24	🕒 LG	Reviewed by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 69 of 91	
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 68 of 81	
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OPERATING FREQUENCY:	190	7.60	MHz
CHANNEL:	9538		
MEASURED OUTPUT POWER:	22.05	dBm =	0.160 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	35.05	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3815.20	Н	2.52	62	-56.93	9.19	-47.74	67.9
5722.80	Н	2.52	127	-56.79	11.27	-45.51	65.6
7630.40	Н	2.52	196	-53.55	11.17	-42.38	62.5

 Table 7-21. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 69 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 09 01 01
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#### 7.8 Frequency Stability / Temperature Variation §2.1055 §22.355 §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: ZNFK330	FCC Pt. 22, 24	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)				
Test Report S/N:	Test Dates:	EUT Type:		Page 70 of 81		
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 70 01 01		
© 2015 PCTEST Engineering Laboratory, Inc. V 3.2						

# Frequency Stability / Temperature Variation

OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	190	
REFERENCE VOLTAGE:	3.80	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,600,032	32	0.0000038
100 %		- 30	836,600,434	434	0.0000519
100 %		- 20	836,599,848	-152	-0.0000182
100 %		- 10	836,600,010	10	0.0000012
100 %		0	836,600,399	399	0.0000477
100 %		+ 10	836,599,681	-319	-0.0000381
100 %		+ 20	836,600,002	2	0.0000002
100 %		+ 30	836,600,296	296	0.0000354
100 %		+ 40	836,599,884	-116	-0.0000139
100 %		+ 50	836,599,884	-116	-0.0000139
BATT. ENDPOINT	3.40	+ 20	836,600,093	93	0.0000111

Table 7-22. Frequency Stability Data (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 71 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage / 10101
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### Frequency Stability / Temperature Variation §2.1055 §22.355

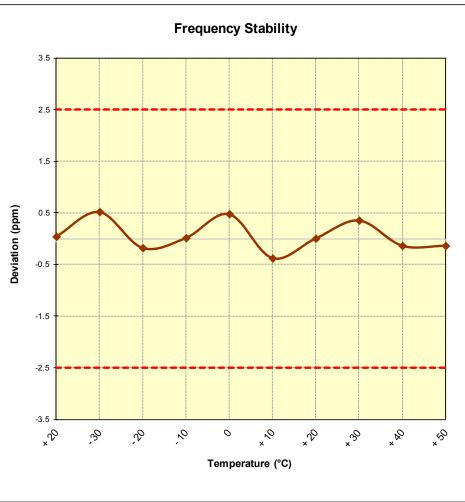


Figure 7-8. Frequency Stability Graph (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 72 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 72 01 01
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# Frequency Stability / Temperature Variation §2.1055 §22.355

OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	4183	
REFERENCE VOLTAGE:	3.80	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,600,120	120	0.0000143
100 %		- 30	836,600,150	150	0.0000179
100 %		- 20	836,599,922	-78	-0.0000093
100 %		- 10	836,600,041	41	0.0000049
100 %		0	836,600,004	4	0.0000005
100 %		+ 10	836,599,879	-121	-0.0000145
100 %		+ 20	836,600,270	270	0.0000323
100 %		+ 30	836,599,859	-141	-0.0000169
100 %		+ 40	836,600,075	75	0.0000090
100 %		+ 50	836,600,031	31	0.0000037
BATT. ENDPOINT	3.40	+ 20	836,599,800	-200	-0.0000239

 Table 7-23. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFK330	FCC Pt. 22, 24	I, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 73 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 75 01 61
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### Frequency Stability / Temperature Variation §2.1055 §22.355

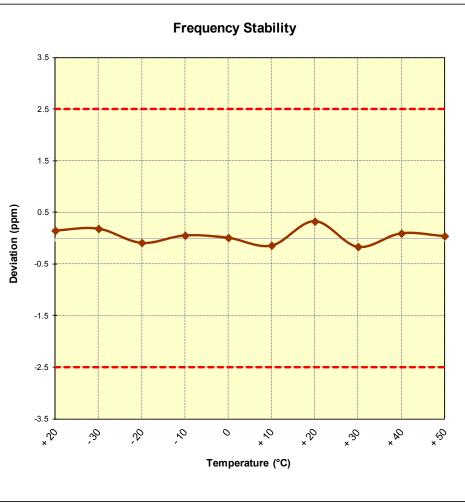


Figure 7-9. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 74 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 74 01 01
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# Frequency Stability / Temperature Variation

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	1762	_
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,500,059	59	0.0000034
100 %		- 30	1,732,499,997	-3	-0.0000002
100 %		- 20	1,732,499,765	-235	-0.0000136
100 %		- 10	1,732,499,996	-4	-0.0000002
100 %		0	1,732,500,030	30	0.0000017
100 %		+ 10	1,732,500,043	43	0.0000025
100 %		+ 20	1,732,499,835	-165	-0.0000095
100 %		+ 30	1,732,499,987	-13	-0.000008
100 %		+ 40	1,732,500,097	97	0.0000056
100 %		+ 50	1,732,500,080	80	0.0000046
BATT. ENDPOINT	3.40	+ 20	1,732,500,409	409	0.0000236

 Table 7-24. 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: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 75 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 75 01 61
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2



### Frequency Stability / Temperature Variation §2.1055 §27.54

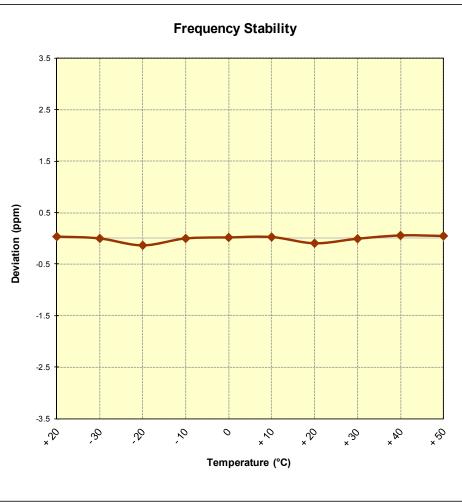


Figure 7-10. Frequency Stability Graph (AWS WCDMA Mode – Ch. 1412)

FCC ID: ZNFK330	FCC Pt. 22, 24	, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 76 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 70 01 01
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2 10/30/2015



## 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)	1,880,000,210	210	0.0000112
100 %		- 30	1,880,000,114	114	0.0000061
100 %		- 20	1,879,999,809	-191	-0.0000102
100 %		- 10	1,880,000,066	66	0.0000035
100 %		0	1,880,000,184	184	0.0000098
100 %		+ 10	1,879,999,659	-341	-0.0000181
100 %		+ 20	1,880,000,032	32	0.0000017
100 %		+ 30	1,879,999,919	-81	-0.0000043
100 %		+ 40	1,880,000,047	47	0.0000025
100 %		+ 50	1,879,999,808	-192	-0.0000102
BATT. ENDPOINT	3.40	+ 20	1,880,000,121	121	0.0000064

 Table 7-25. Frequency Stability Data (PCS GPRS 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: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 77 of 91
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Page 77 of 81
© 2015 PCTEST Enginee	ring Laboratory, Inc.			V 3.2 10/30/2015



## Frequency Stability / Temperature Variation §2.1055 §24.235

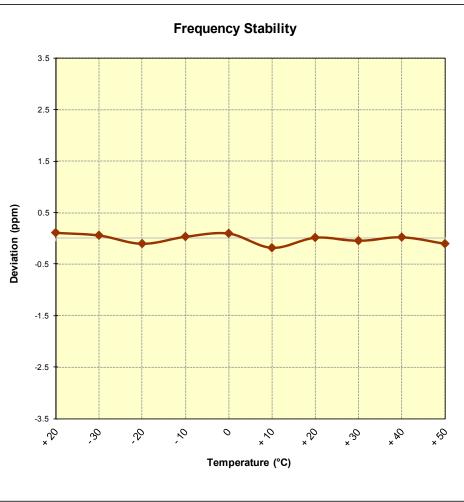


Figure 7-11. Frequency Stability Graph (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 78 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 10 01 01
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# Frequency Stability / Temperature Variation

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)	1,880,000,026	26	0.0000014
100 %		- 30	1,880,000,128	128	0.0000068
100 %		- 20	1,879,999,878	-122	-0.0000065
100 %		- 10	1,879,999,992	-8	-0.0000004
100 %		0	1,879,999,905	-95	-0.0000051
100 %		+ 10	1,880,000,026	26	0.0000014
100 %		+ 20	1,879,999,735	-265	-0.0000141
100 %		+ 30	1,879,999,673	-327	-0.0000174
100 %		+ 40	1,879,999,968	-32	-0.0000017
100 %		+ 50	1,880,000,141	141	0.0000075
BATT. ENDPOINT	3.40	+ 20	1,879,999,659	-341	-0.0000181

 Table 7-26. 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: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 79 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage 19 01 01
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## Frequency Stability / Temperature Variation §2.1055 §24.235

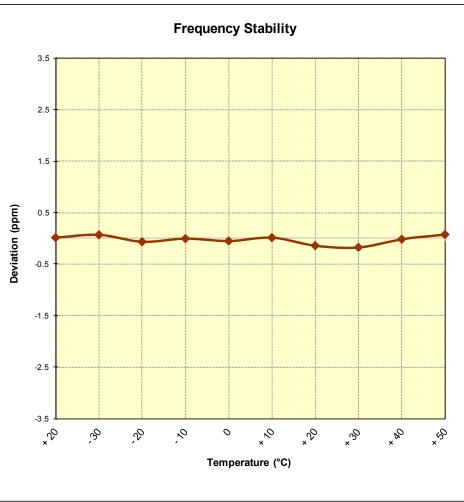


Figure 7-12. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 80 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage of 01 of
© 2015 PCTEST Engineering Laboratory, Inc. V 3 10/30/20				



#### 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Electronics MobileComm U.S.A Portable Handset FCC ID: ZNFK330** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules.

FCC ID: ZNFK330	FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		🕒 LG	Reviewed by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 81 of 81
0Y1511161959.ZNF	10/13 - 10/21/2015, 11/17 - 11/30/2015	Portable Handset		Fage of 01 of
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