

PCTEST ENGINEERING LABORATORY, INC.

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



MEASUREMENT REPORT FCC Part 22 & 24

Applicant Name:

LG Electronics MobileComm U.S.A 1000 Sylvan Avenue Englewood Cliffs, NJ 07632 United States Date of Testing: 12/27/2016 - 1/4/2017 Test Site/Location: PCTEST Lab., Columbia, MD, USA Test Report Serial No.: 0Y1612232003.ZNF

FCC ID:

ZNFUS110

APPLICANT:

LG ELECTRONICS MOBILECOMM U.S.A

Application Type:	Certification
Model:	LG-US110
Additional Model(s):	LGUS110, US110
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§2 §22(H) §24(E)
Test Procedure(s):	ANSI/TIA-603-D-2010, KDB 971168 D01 v02r02
Test Device Serial No.:	identical prototype [S/N: 00130, 00131]

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: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 1 of 16
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 1 of 46
© 2017 PCTEST Engineering Laboratory, Inc.				

V 5.1 11/28/2016

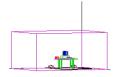


TABLE OF CONTENTS

FCC	PART 2	22 & 24 MEASUREMENT REPORT	3
1.0	INTF	RODUCTION	5
	1.1	Scope	5
	1.2	Testing Facility	5
2.0	PRO	DUCT INFORMATION	6
	2.1	Equipment Description	6
	2.2	Device Capabilities	6
	2.3	Test Configuration	6
	2.4	EMI Suppression Device(s)/Modifications	6
3.0	DES	CRIPTION OF TESTS	7
	3.1	Evaluation Procedure	7
	3.2	Cellular - Base Frequency Blocks	7
	3.3	Cellular - Mobile Frequency Blocks	7
	3.4	PCS - Base Frequency Blocks	7
	3.5	PCS - Mobile Frequency Blocks	8
	3.6	Radiated Measurements	9
4.0	MEA	ASUREMENT UNCERTAINTY	10
5.0	TES	T EQUIPMENT CALIBRATION DATA	11
6.0	SAM	IPLE CALCULATIONS	12
7.0	TES	T RESULTS	13
	7.1	Summary	
	7.2	Occupied Bandwidth	14
	7.3	Spurious and Harmonic Emissions at Antenna Terminal	16
	7.4	Band Edge Emissions at Antenna Terminal	26
	7.5	Peak-Average Ratio	31
	7.6	Radiated Power (ERP/EIRP)	
	7.7	Radiated Spurious Emissions Measurements	
	7.8	Frequency Stability / Temperature Variation	41
8.0	CON	NCLUSION	46

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	G Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 2 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 2 of 46
© 2017 PCTEST Engineering L			V 5.1 11/28/2016





MEASUREMENT REPORT FCC Part 22 & 24

§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)				
BASE MODEL:	LG-US110				
FCC ID:	ZNFUS110				
FCC CLASSIFICATION:	PCS Licensed Transmitter Held to Ear (PCE)				
MODE:	CDMA				
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm)				
Test Device Serial No.:	00130, 00131				
DATE(S) OF TEST:	12/27/2016 - 1/4/2017				
TEST REPORT S/N:	0Y1612232003.ZNF				

Test Facility / Accreditations

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

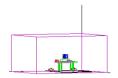
- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards 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, , GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 3 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 5 01 46
© 2017 PCTEST Engineering Laboratory, Inc.				



11/28/2016





MEASUREMENT REPORT FCC Part 22 & 24



			ERP/	'EIRP		
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Emission Designator	
CDMA850	22H	824.70 - 848.31	0.133	21.25	1M27F9W	
CDMA1900	24E	1851.25 - 1908.75	0.300	24.77	1M28F9W	
EUT Overview						

EUT Overview

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 4 of 46	
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 4 01 40	
2017 PCTEST Engineering Laboratory, Inc.				



1.0 INTRODUCTION

1.1 Scope

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

1.2 Testing Facility

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

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

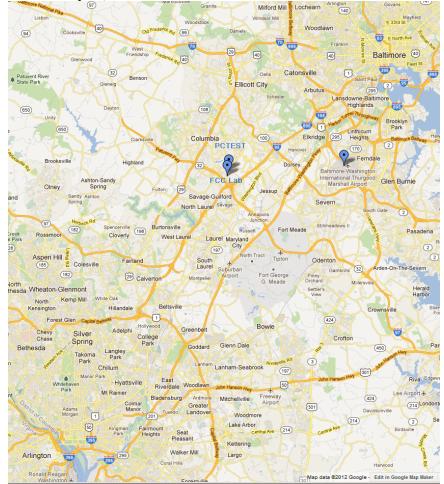


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga E of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 5 of 46
© 2017 PCTEST Engineering Laboratory, Inc.				



2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFUS110**. 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 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1), Multi-band LTE, 802.11b/g/n WLAN, Bluetooth (1x, EDR, LE)

2.3 Test Configuration

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

2.4 EMI Suppression Device(s)/Modifications

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

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 6 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 6 01 46
© 2017 PCTEST Engineering La	boratory, Inc.		V 5.1 11/28/2016

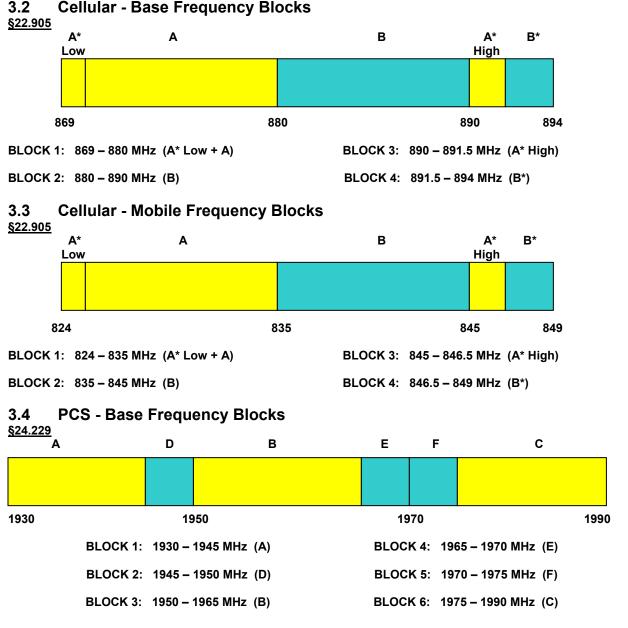


DESCRIPTION OF TESTS 3.0

3.1 **Evaluation Procedure**

The measurement procedures described in the "Land Mobile FM or PM - Communications Equipment -Measurements and Performance Standards" (ANSI/TIA-603-D-2010) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 D01 v02r02) were used in the measurement of the EUT.





^{3.2} **Cellular - Base Frequency Blocks**

Approved by: FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT PCTEST FCC ID: ZNFUS110 (B) LG (CERTIFICATION) **Quality Manager** Test Report S/N: EUT Type: Test Dates: Page 7 of 46 0Y1612232003.ZNF 12/27/2016 - 1/4/2017 Portable Handset © 2017 PCTEST Engineering Laboratory, Inc. V 5 1 11/28/2016



3.5 PCS - Mobile Frequency Blocks §24.229

<u>924.229</u> A	D	В	E	F	С	
1850	187	70	189	0		1910
BLOC	CK 1: 1850 – 1	865 MHz (A)	BLOCI	K 4: 188	35 – 1890 MHz (E)	
BLOC	CK 2: 1865 – 1	870 MHz (D)	BLOC	K 5: 189	90 – 1895 MHz (F)	
BLOC	:K 3: 1870 – 1	885 MHz (B)	BLOCI	K 6: 189	95 – 1910 MHz (C)	

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 9 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 8 of 46
2017 PCTEST Engineering Laboratory, Inc.			

PCTEST

3.6 Radiated Measurements §2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a)

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

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

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

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

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

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/ITA-603-D-2010.

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 0 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 9 of 46
© 2017 PCTEST Engineering L	aboratory, Inc.	·		V 5.1 11/28/2016

^{© 2015} PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



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: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 10 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 10 01 46
© 2017 PCTEST Engineering Lal	2017 PCTEST Engineering Laboratory, Inc.		



5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2006.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx3	Licensed Transmitter Cable Set	7/12/2016	Annual	7/12/2017	N/A
Agilent	N9030A	PXA Signal Analyzer (44GHz)	3/1/2016	Annual	3/1/2017	MY52350166
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	2/26/2016	Biennial	2/26/2018	441128
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
Espec	ESX-2CA	Environmental Chamber	3/4/2016	Annual	3/4/2017	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/26/2016	Biennial	4/26/2018	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	8/28/2016	Biennial	8/28/2018	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	4/26/2016	Biennial	4/26/2018	128338
K & L	11SH10-3075/U18000	High Pass Filter	7/11/2016	Annual	7/11/2017	11SH10-3075/U18000-2
K & L	13SH10-1000/U1000	N Type High Pass Filter	7/6/2016	Annual	7/6/2017	13SH10-1000/U1000-1
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	3/4/2016	Annual	3/7/2017	11210140001
Mini-Circuits	SSG-4000HP	USB Synthesized Signal Generator		N/A		11208010032
Mini-Circuits	TVA-11-422	RF Power Amp		N/A		QA1303002
PCTEST	-	EMC Switch System	7/11/2016	Annual	7/11/2017	NM1
PCTEST	-	EMC Switch System	7/6/2016	Annual	7/6/2017	NM2
Rohde & Schwarz	CMU200	Base Station Simulator	6/2/2016	Annual	6/2/2017	109892
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/15/2016	Annual	7/15/2017	100348
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	3/7/2016	Annual	3/7/2017	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/7/2016	Annual	3/7/2017	100040
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	3/30/2016	Biennial	3/30/2018	9105-2404
Schwarzbeck	VULB-9161SE	Trilog Super Broadband Test Antenna	11/13/2015	Biennial	11/13/2017	9161-4075
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

Table 5-1. Test Equipment

Notes:

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

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 11 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 11 of 46
© 2017 PCTEST Engineering	Laboratory, Inc.			V 5.1 11/28/2016

^{© 2015} PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



6.0 SAMPLE CALCULATIONS

CDMA Emission Designator

Emission Designator = 1M25F9W

CDMA BW = 1.25 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: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 12 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 12 01 40
© 2017 PCTEST Engineering La	2017 PCTEST Engineering Laboratory, Inc.			



7.0 TEST RESULTS

7.1 Summary

Company Name:	LG Electronics MobileComm U.S.A
FCC ID:	ZNFUS110
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>CDMA</u>

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1051 22.917(a) 24.238(a)	Conducted Band Edge / Spurious Emissions	> 43 + log ₁₀ (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	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24)		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	RADIATED	PASS	Section 7.6
2.1053 22.917(a) 24.238(a)	Radiated Spurious Emissions	> 43 + log ₁₀ (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.
- 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 3.5.

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 12 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 13 of 46
© 2017 PCTEST Engineering	Laboratory, Inc.			V 5.1 11/28/2016



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.

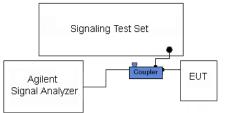


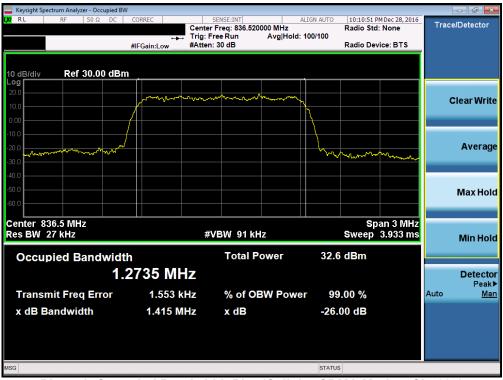
Figure 7-1. Test Instrument & Measurement Setup

Test Notes

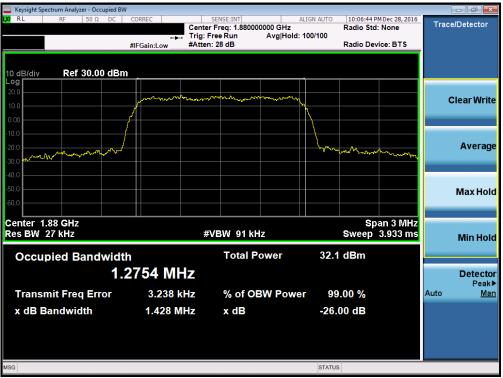
None.

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 14 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 14 of 46
© 2017 PCTEST Engineering L	aboratory, Inc.			V 5.1 11/28/2016





Plot 7-1. Occupied Bandwidth Plot (Cellular CDMA Mode - Ch. 384)



Plot 7-2. Occupied Bandwidth Plot (PCS CDMA Mode – Ch. 600)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 15 of 16
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 15 of 46
© 2017 PCTEST Engineering Lat	ooratory, Inc.		V 5.1 11/28/2016

7.3 Spurious and Harmonic Emissions at Antenna Terminal §22.1051 §22.917(a) §24.238(a)

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 10th 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 PCS (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = trace average
- 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.

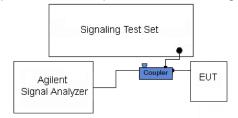


Figure 7-2. Test Instrument & Measurement Setup

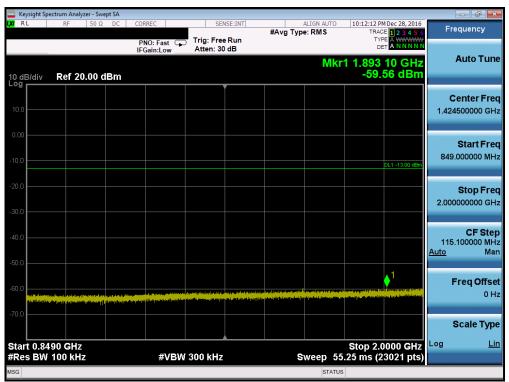
Test Notes

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. 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: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 16 of 16
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 16 of 46
© 2017 PCTEST Engineering La	boratory, Inc.	·		V 5.1 11/28/2016



	ectrum Analy	zer - Swep	ot SA										
XIRL	RF	<u>50</u> Ω	DC	CORREC		SE	NSE:INT	#Avg Typ	ALIGN AUTO		4 Dec 28, 2016	F	requency
				PNO: Fa IFGain:L	ist 🖵 ow	Trig: Fre Atten: 3		#Avg Typ	e: RIVIS	TYF	E 1 2 3 4 5 6 E A WWWW A N N N N N		
10 dB/div Log	Ref 20	.00 dl	Bm						M	kr1 823. -29.	00 MHz 86 dBm		Auto Tune
10.0													Center Freq 6.500000 MHz
-10.0											DL1 -13.00 dBm	31	Start Freq 0.000000 MHz
-20.0											1	82	Stop Freq 3.000000 MHz
-40.0												79 <u>Auto</u>	CF Step 9.300000 MHz Man
-60.0	an a		en an feile gestaar Liiste ja kuu	dank paring for the specific Strike specific differences in	the force of the legislation of the second		n an line an	en and a statistic enterestic profile the sec The second se	i gala ng sa kang kang kang kang kang kang kang kan	a na sa	a da da ser dina ta la ja Majari a sugar da pasa		Freq Offset 0 Hz
-70.0													Scale Type
Start 30.0 #Res BW		2		#	VBW	300 kHz		s	weep 38	Stop 8 .06 ms (1	23.0 MHz 5861 pts)	Log	Lin
MSG									STATUS	3			



Plot 7-3. Conducted Spurious Plot (Cellular CDMA Mode - Ch. 1013)

Plot 7-4. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 1013)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:	Dage 17 of 46					
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 17 of 46					
© 2017 PCTEST Engineering Laboratory, Inc.								



	ectrum Analyz		t SA									
X/RL	RF	50 Ω	DC C	ORREC			INSE:INT	#Avg Typ	ALIGN AUTO	TRAC	MDec 28, 2016	Frequency
				PNO: Fa FGain:L		Trig: Fre Atten: 2				TYI Di		
10 dB/div Log	Ref 10.	.00 dE	3m						M	(r1 2.47 -45.	4 5 GHz 65 dBm	Auto Tune
0.00												Center Fred 6.000000000 GH
-10.0											DL1 -13.00 dBm	Start Fred 2.000000000 GH
-30.0	1											Stop Fred 10.000000000 GH
-50.0			Ŵ		~~	***						CF Step 800.000000 MH <u>Auto</u> Mar
70.0												Freq Offse 이 H:
-80.0												Scale Type
Start 2.00 Res BW	00 GHz 1.0 MHz			#	VBW	3.0 MH;	2	\$	Sweep 13	Stop 10 3.87 ms (1	.000 GHz 6001 pts)	Log <u>Lir</u>
ISG									STATUS	3		



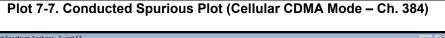
Plot 7-5. Conducted Spurious Plot (Cellular CDMA Mode - Ch. 1013)

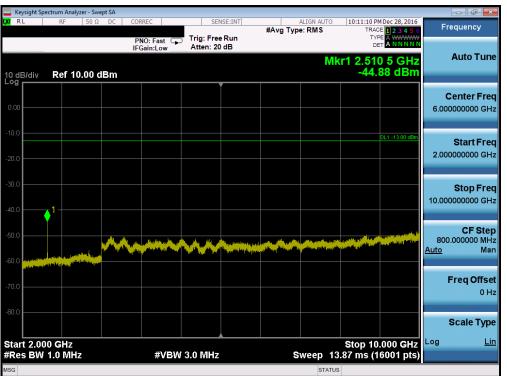
Plot 7-6. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:	Page 18 of 46				
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 16 01 46				
© 2017 PCTEST Engineering Laboratory, Inc.							



	ectrum Analyzer											
XI RL	RF	50 Ω DC	PNO: F	ast 🖵	Trig: Free Atten: 30		#Avg Typ	ALIGN AUTO	TRAC	1 Dec 28, 2016 E 1 2 3 4 5 6 E A WWWWWW T A N N N N N	Free	quency
10 dB/div	Ref 20.0	00 dBm	ii Gain.	LOW				Mkr	1 1.672 -55.	60 GHz 48 dBm	4	uto Tune
10.0												e nter Freq 00000 GHz
10.00										DL1 -13.00 dBm		Start Freq 00000 MHz
-20.0												Stop Fred 00000 GHz
40.0								1			115.1 <u>Auto</u>	CF Step 00000 MH Mar
60.0	المراجع المراجع والمراجع المراجع المراجع المراجع المراجع المراجع المراجع والمراجع والمراجع المراجع المراجع الم المراجع المراجع والمراجع والمر	a na data ya sha sha ku shi sa Mari ku jaya ta ya ku sha shi ta		a ta a lista ani ing kila a a a a a a a a a a a a	da bada bila yika yakin Dala Artypinan yyy	landa production Maria	ol never particular films and figged and a particular films		a deserva e secondario da se a persona e secondario da secondario a persona e secondario da secondario da secondario da secondario da second	ang kang sang sa kalang sa kang sa kan Kang dan sa kang	Fi	r eq Offse l 0 Hz
-70.0											S	cale Type
Start 0.84 #Res BW	90 GHz 100 kHz			#VBW :	300 kHz		s	weep 55	Stop 2.0 .25 ms (2	0000 GHz 3021 pts)	Log	Lin
ISG								STATUS	;			



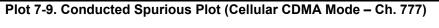


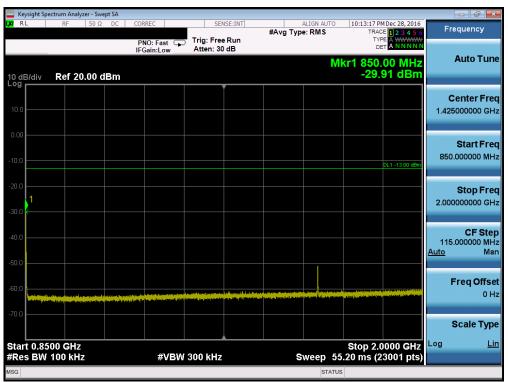
Plot 7-8. Conducted Spurious Plot (Cellular CDMA Mode - Ch. 384)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	G Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:	Dega 10 of 46				
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 19 of 46				
© 2017 PCTEST Engineering Laboratory, Inc.							



	ectrum Analyze	r - Swept S	5A										
LXI RL	RF	50Ω [ORREC	et (SI	ENSE:INT	#Avg Typ	ALIGN AUTO De: RMS	TRAC	MDec 28, 2016 E 1 2 3 4 5 6 E A WWWW A N N N N N	F	requency
10 dB/div Log	Ref 20.0	00 dBi		IFGain:L	ow	Atten: 3	0 dB		M	kr1 823.	95 MHz 35 dBm		Auto Tune
10.0													Center Freq 7.000000 MHz
-10.0											DL1 -13.00 dBm	30	Start Freq 0.000000 MHz
-20.0												824	Stop Freq 1.000000 MHz
-40.0												79 <u>Auto</u>	CF Step 9.400000 MHz Man
-60.0			and the state of	sali antoning data panganal t				ha te a the second state to the first of the second state of the second state of the second state of the second	e konnen dige fil kannen konnen er Innen dige kilk bis under detteration		1		Freq Offset 0 Hz
Start 30.0	MHz									Stop 8	24.0 MHz	Log	Scale Type Lin
#Res BW				#	VBW	300 kH:	z	S	Sweep 38	.11 ms (1	5881 pts)		



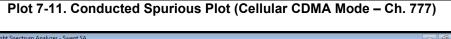


Plot 7-10. Conducted Spurious Plot (Cellular CDMA Mode - Ch. 777)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 46				
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 20 of 46				
© 2017 PCTEST Engineering Laboratory, Inc.								



	ctrum Analyz	er - Swej	pt SA									
XI RL	RF	50 Ω	DC	CORREC		S	ENSE:INT		ALIGN AUTO		Dec 28, 2016	Frequency
				PNO: Fa IFGain:L		Trig: Fr Atten: :		#Avg Ty	/pe: RMS	TYP DE	E 1 2 3 4 5 6 E A WWWWW T A N N N N N	
10 dB/div Log	Ref 10	.00 d	Bm						M	(r1 2.545 -44.5	50 GHz 59 dBm	Auto Tune
0.00												Center Free 6.000000000 GH
-10.0											DL1 -13.00 dBm	Start Free 2.000000000 GH
40.0												Stop Free 10.000000000 GH
50.0			<u> </u>	un 199		~~~	<u></u>					CF Step 800.000000 MH <u>Auto</u> Mar
70.0												Freq Offse 0 H
80.0												Scale Type
Start 2.00 #Res BW				#	VBW	3.0 MH	z		Sweep 13	Stop 10. 3.87 ms (1	000 0112	Log <u>Lir</u>
ISG									STATU	5		





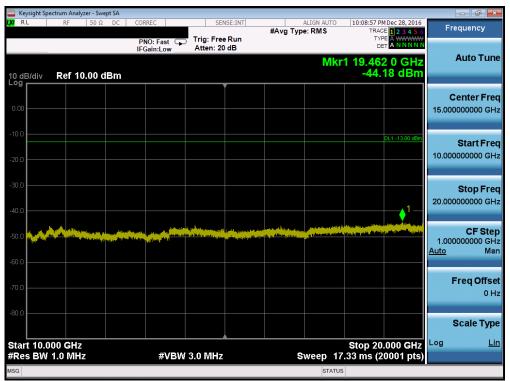
Plot 7-12. Conducted Spurious Plot (PCS CDMA Mode - Ch. 25)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:	Dage 21 of 46				
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 21 of 46				
© 2017 PCTEST Engineering Laboratory, Inc.							



	ectrum Analyzer - S	vept SA									d X
X/RL	RF 50 9	DC DC	PNO: Fast		NSE:INT	#Avg Typ	ALIGN AUTO	TRAC	Dec 28, 2016 E 1 2 3 4 5 6 E A M N N N N	Freque	ency
10 dB/div Log	Ref 20.00	dBm	IFGain:Low	Atten: 3) dB		Mk	r1 3.70	3 5 GHz 11 dBm	Aut	o Tune
10.0										Cent 5.955000	e r Freq 000 GHz
-10.0									DL1 -13.00 dBm	Sta 1.910000	a rt Freq 000 GHz
-20.0		. 1								St e 10.000000	o p Freq 000 GHz
-40.0				~~~						(809.000 <u>Auto</u>	CF Step 000 MHz Man
-60.0										Free	Offse 0 Hz
											le Type
Start 1.91 #Res BW			#VB	V 3.0 MHz		s	weep 14	Stop 10 .02 ms (1	.000 GHz 6181 pts)	Log	Lin
MSG							STATUS				





Plot 7-14. Conducted Spurious Plot (PCS CDMA Mode - Ch. 25)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 46				
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 22 of 46				
© 2017 PCTEST Engineering Laboratory, Inc.								



	ctrum Analyz	er - Swep	t SA										- • •
L <mark>XI</mark> RL	RF	50 Ω	DC	CORREC		SEI	NSE:INT		ALIGN AUTO		M Dec 28, 2016	Fre	quency
				PNO: Fa IFGain:L	ist 😱 ow	Trig: Free Atten: 30		#Avg	Type: RMS	TY D	CE 1 2 3 4 5 6 PE A WWWW ET A NNNNN		
10 dB/div Log	Ref 20.	00 dE	3m						M	kr1 1.83 -50	3 0 GHz 42 dBm		Auto Tune
10.0													enter Freq 000000 MHz
-10.0											DL1 -13.00 dBm		Start Freq 000000 MHz
-20.0												1.850	Stop Freq 000000 GHz
-40.0											1	182. <u>Auto</u>	CF Step 000000 MHz Man
-60.0	*****	New York				an an Anna an Anna Anna Anna Anna Anna	alalan ay talayi she ya a	<u> </u>	94-1-99-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9-9-			F	r eq Offset 0 Hz
-70.0													Scale Type
Start 0.03 #Res BW				#	VBW :	3.0 MHz			Sweep	Stop 1. 2.427 ms	8500 GHz (3641 pts)	Log	Lin
MSG									STATU	JS			





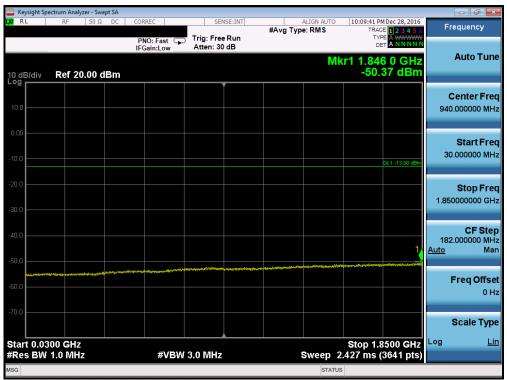
Plot 7-16. Conducted Spurious Plot (PCS CDMA Mode - Ch. 600)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Page 23 of 46				
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 2					
© 2017 PCTEST Engineering Lal	2017 PCTEST Engineering Laboratory, Inc.							



Log	50 Ω DC	PNO: Fast G	Trig: Free Run Atten: 20 dB	ALIGN AUT #Avg Type: RMS	0 10:07:16 PM Dec 28, 201 TRACE 1 23 4 5 TYPE A WWWW DET A NNNN kr1 19.617 5 GH: -44.43 dBn	Auto Tune
-og 0.00 10.0 20.0 30.0 40.0	10.00 dBm	IFGain:Low	Atten: 20 dB	M	kr1 19.617 5 GH -44.43 dBn	Center Free 15.0000000 GH
					DL1 -13.00 dB	15.00000000 GH:
40.0					DL1 -13.00 dB	Start Free
40.0						
and the second second						Stop Fre 20.000000000 GH
						CF Ste 1.000000000 GH <u>Auto</u> Ma
70.0						Freq Offse 0 H
80.0						Scale Type
tart 10.000 GH Res BW 1.0 M		#VB\	N 3.0 MHz	Sweep	Stop 20.000 GH 17.33 ms (20001 pts	z Log <u>Li</u> s)





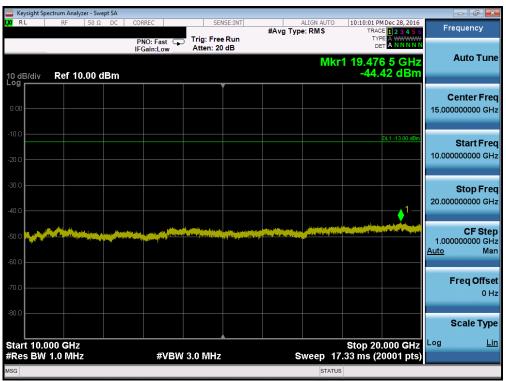
Plot 7-18. Conducted Spurious Plot (PCS CDMA Mode – Ch. 1175)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:	Dage 24 of 46					
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 24 of 46					
© 2017 PCTEST Engineering La	2017 PCTEST Engineering Laboratory, Inc.							



Keysight Spectrum Analyzer - Swept SA					
<mark>α RL RF 50 Ω DC</mark>	PNO: Fast 🕞 Trig: I	Free Run	vg Type: RMS	10:09:50 PM Dec 28, 2016 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNNN	Frequency
0 dB/div Ref 20.00 dBn		: 30 dB	Mk	r1 9.825 5 GHz -38.36 dBm	Auto Tune
10.0					Center Free 5.957500000 GH
10.0				DL1 -13.00 dBm	Start Free 1.915000000 GH
30.0					Stop Fre 10.000000000 GH
40.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				CF Step 808.50000 MH <u>Auto</u> Mar
					Freq Offse 0 H
70.0					Scale Type
tart 1.915 GHz Res BW 1.0 MHz	#VBW 3.0 M	Hz	Sweep 14	Stop 10.000 GHz .01 ms (16171 pts)	Log <u>Li</u> i





Plot 7-20. Conducted Spurious Plot (PCS CDMA Mode – Ch. 1175)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 46				
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 25 of 46				
© 2017 PCTEST Engineering La	2017 PCTEST Engineering Laboratory, Inc.							

7.4 Band Edge Emissions at Antenna Terminal §2.1051 §22.917(a) §24.238(a)

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 \geq 1% of the emission bandwidth
- 4. VBW <u>></u> 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average
- 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.

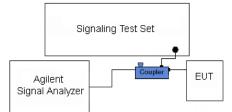


Figure 7-3. Test Instrument & Measurement Setup

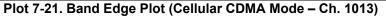
Test Notes

Per 22.917(b), 24.238(b), 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: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 46				
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 26 of 46				
© 2017 PCTEST Engineering L	2017 PCTEST Engineering Laboratory, Inc.							



	ctrum Analyzer -										
U RL	RF 50	Ω DC	CORREC	Trig: Fre		#Avg Ty	ALIGN AUTO pe: RMS	TRAC	E 1 2 3 4 5 6 A MMMM A NNNN	Fr	equency
0 dB/div	Ref 30.00) dBm	IFGain:Low	Atten: 4	0 dB		Mk	r1 824.0			Auto Tune
20.0											Center Free
0.00					form	man	m			821	Start Free .500000 MH
20.0					1				DL1 -13.00 dBm	826	Stop Fre 500000 MH
10.0			m	mun				Www	M.	<u>Auto</u>	CF Ste 500.000 kH Ma
i0.0	ywwww	m	ſ 								Freq Offse 0 H
											Scale Typ
enter 82 Res BW	4.000 MHz 15 kHz		#VB	W 47 kHz			Sweep 8	5 Span 8.800 ms (0000 101112	Log	Li
SG							STATUS	3			

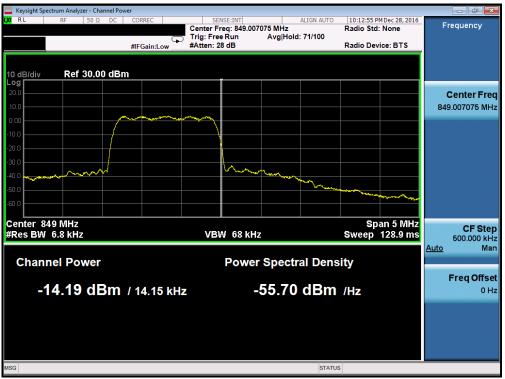




Plot 7-22. 4MHz Span Plot (Cellular CDMA Mode – Ch. 1013)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dage 07 of 46				
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 27 of 46					
© 2017 PCTEST Engineering La	2017 PCTEST Engineering Laboratory, Inc.							









Plot 7-24. 4MHz Span Plot (Cellular CDMA Mode – Ch. 777)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dage 29 of 46				
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 28 of 46					
© 2017 PCTEST Engineering La	2017 PCTEST Engineering Laboratory, Inc.							



	ctrum Analyzer												
RL	RF	50ΩD	C COF	RREC		SI	INSE:INT	#Avg Ty	ALIGN AUTO		2 PM Dec 28, 2016 RACE 1 2 3 4 5 6	F	requency
			PN IF(NO: Wid Gain:Lo	le 🖵 w	Trig: Fre Atten: 4		#/\vg iy	pe. Kino				
0 dB/div	Ref 30.0)0 dBr	n						Mkı	1 1.849 -3	645 GHz 7.86 dBm		Auto Tun
													Center Fre 50000000 GH
.00									~~~~			1.84	Start Fre 17500000 GH
D.O											DL1 -13.00 dBm	1.8	Stop Fre 52500000 GF
0.0							<u>n</u> w	v				<u>Auto</u>	CF Ste 500.000 kH Ma
	mm	m	w	~~~~		سا میہا <u>(</u>							Freq Offs 0 F
0.0													Scale Typ
enter 1.8 Res BW	350000 G 15 kHz	Hz		#	VBW -	47 kHz			Sweep	Span 8.800 <u>m</u>	5.000 MHz s (1001 pts)	Log	L
G									STAT				

Plot 7-25. Band Edge Plot (PCS CDMA Mode - Ch. 25)

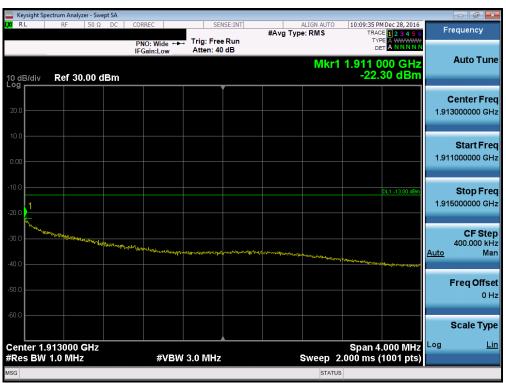


Plot 7-26. 4MHz Span Plot (PCS CDMA Mode - Ch. 25)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 46					
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 29 of 46					
© 2017 PCTEST Engineering Lab	2017 PCTEST Engineering Laboratory, Inc.							



	ectrum Analyzer - Sw	ept SA									
XU RL	RF 50 Ω	DC	CORREC		NSE:INT	#Avg Typ	ALIGN AUTO	TRAC	Dec 28, 2016	Frequ	ency
			PNO: Wide IFGain:Low	Trig: Fre Atten: 4				DE			
10 dB/div Log	Ref 30.00 (dBm					Mkr1	1.910 0 -37.6	00 GHz 04 dBm	Au	to Tune
					Ĭ					Cen	ter Fred
20.0										1.910000	000 GH
10.0	. Maynana	hm	man m							St	artFree
0.00			an na (1.907500	000 GH:
10.0									DL1 -13.00 dBm	St	op Fred
-20.0										1.912500	000 GH
30.0											CF Step
40.0	M			Mar	1			A. Jussid		500 <u>Auto</u>	.000 kH Ma
50.0					- W Y	Mwww.	www.	A. A.		Fre	q Offse
								Marrie Marriel	Mr. W.		0 H
60.0										Sca	le Typ
Center 1.9 Res BW	910000 GHz		#\/E	SW 47 kHz	A		Swoon 9	Span 5. .800 ms (0000 101112	Log	Lir
	13 KHZ		#VE	5WV 47 KHZ			Sweep a		roor pis)		



Plot 7-27. Band Edge Plot (PCS CDMA Mode - Ch. 1175)

Plot 7-28. 4MHz Span Plot (PCS CDMA Mode - Ch. 1175)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 30 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 30 01 46
© 2017 PCTEST Engineering Lab	boratory, Inc.		V 5.1



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.

Test Setup

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

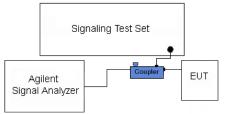


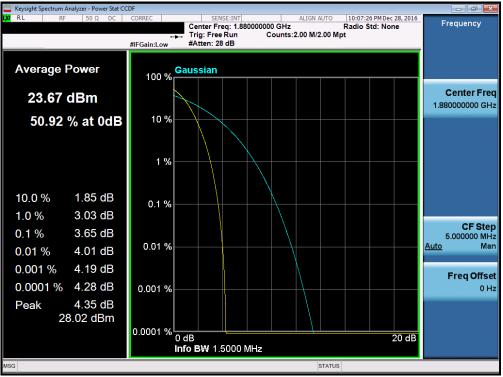
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

None

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dere 21 of 16
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 31 of 46
© 2017 PCTEST Engineering L	aboratory, Inc.			V 5.1 11/28/2016





Plot 7-29. Peak-Average Ratio Plot (PCS CDMA Mode - Ch. 600)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 32 of 46
© 2017 PCTEST Engineering La	boratory, Inc.			V 5.1



7.6 Radiated Power (ERP/EIRP) §22.913(a)(2) 24.232(c)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally 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 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-D-2010 - Section 2.2.17

Test Settings

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 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".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 33 of 46
© 2017 PCTEST Engineering I	aboratory, Inc.	•		V 5.1 11/28/2016

^{© 2015} PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTEST LAB.COM.



Test Setup

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

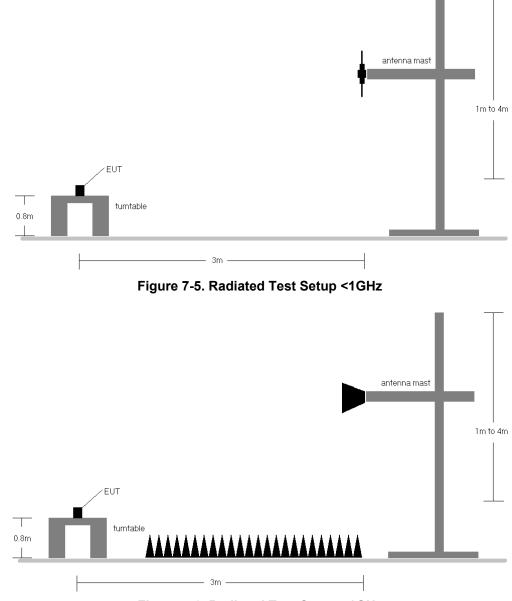


Figure 7-6. Radiated Test Setup >1GHz

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 24 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 34 of 46
© 2017 PCTEST Engineering Lal	boratory, Inc.	·	V 5.1



- 1) This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

Frequency [MHz]	Mode	-	r Azimuth		Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	CDMA850	н	0	86	20.78	-0.65	20.13	0.103	38.45	-18.32
836.52	CDMA850	н	170	80	21.41	-0.65	20.76	0.119	38.45	-17.69
848.31	CDMA850	н	10	86	21.90	-0.65	21.25	0.133	38.45	-17.20
848.31	CDMA850	V	37	122	21.17	-0.65	20.52	0.113	38.45	-17.93

Table 7-2. ERP (Cellular CDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Positione r Azimuth [degree]		Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1851.25	CDMA1900	н	5	351	19.95	4.82	24.77	0.300	33.01	-8.24
1880.00	CDMA1900	н	0	355	19.22	4.74	23.96	0.249	33.01	-9.05
1908.75	CDMA1900	н	0	64	19.61	4.68	24.29	0.269	33.01	-8.72
1851.25	CDMA1900	V	100	0	19.09	4.79	23.88	0.244	33.01	-9.13

Table 7-3. EIRP (PCS CDMA)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 25 of 46		
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 35 of 46		
© 2017 PCTEST Engineering Laboratory, Inc.					



7.7 Radiated Spurious Emissions Measurements §2.1053 §22.917(a) 24.238(a)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 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-D-2010 - 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 = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 26 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 36 of 46
© 2017 PCTEST Engineering La	boratory, Inc.			V 5.1 11/28/2016



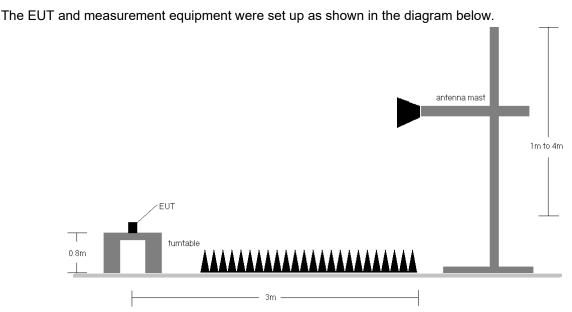


Figure 7-7. Test Instrument & Measurement Setup

Test Notes

- 1) This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 4) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 5) 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.
- 6) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 27 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 37 of 46
© 2017 PCTEST Engineering I	aboratory, Inc.			V 5.1 11/28/2016



OPERATING FREQUENCY:	824	.70	MHz
CHANNEL:	10	13	
MEASURED OUTPUT POWER:	20.13	dBm =	0.103 W
MODULATION SIGNAL:	CDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	33.13	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1649.40	Н	339	100	-60.16	6.25	-53.91	74.0
2474.10	Н	-	-	-61.71	6.61	-55.10	75.2
3298.80	Н	-	-	-60.28	6.99	-53.30	73.4
4123.50	Н	-	-	-57.56	7.70	-49.85	70.0

Table 7-4. Radiated Spurious Data (Cellular CDMA Mode – Ch. 1013)

OPERATING FREQUENCY:	836	5.52	MHz
CHANNEL:	38	34	-
MEASURED OUTPUT POWER:	20.76	dBm =	0.119 W
MODULATION SIGNAL:	CDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	33.76	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.04	Н	341	100	-60.43	6.13	-54.31	75.1
2509.56	Н	-	-	-61.96	6.64	-55.32	76.1
3346.08	Н	-	-	-59.65	7.14	-52.51	73.3
4182.60	Н	-	-	-57.95	8.06	-49.89	70.7

Table 7-5. Radiated Spurious Data (Cellular CDMA Mode – Ch. 384)

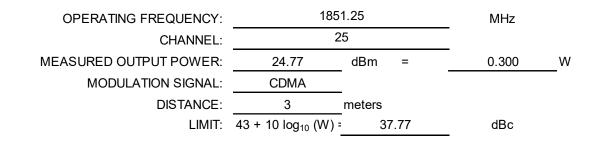
FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 29 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 38 of 46
© 2017 PCTEST Engineering La			V 5.1 11/28/2016



OPERATING FREQUENCY:	848	9.31	MHz	
CHANNEL:	77	77	-	
MEASURED OUTPUT POWER:	21.25	dBm =	0.133 W	/
MODULATION SIGNAL:	CDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log ₁₀ (W) =	34.25	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1696.62	Н	336	100	-59.18	6.01	-53.17	74.4
2544.93	Н	-	-	-60.54	6.74	-53.80	75.1
3393.24	Н	-	-	-59.40	7.29	-52.11	73.4
4241.55	Н	-	-	-58.82	8.34	-50.47	71.7

Table 7-6. Radiated Spurious Data (Cellular CDMA Mode – Ch. 777)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3702.50	Н	161	100	-50.04	9.91	-40.13	64.9
5553.75	Н	-	-	-56.10	11.16	-44.94	69.7
7405.00	Н	-	-	-50.46	10.80	-39.65	64.4
9256.25	Н	-	-	-51.76	12.30	-39.46	64.2

Table 7-7. Radiated Spurious Data (PCS CDMA Mode - Ch. 25)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 39 of 46
© 2017 PCTEST Engineering	_aboratory, Inc.		V 5.1 11/28/2016



OPERATING FREQUENCY:	188	0.00	MHz
CHANNEL:	60	-	
MEASURED OUTPUT POWER:	23.96	dBm =	0.249 W
MODULATION SIGNAL:	CDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	36.96	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	Н	158	137	-50.29	9.63	-40.66	64.6
5640.00	Н	-	-	-55.30	11.29	-44.01	68.0
7520.00	Н	-	-	-51.09	11.12	-39.97	63.9
9400.00	Н	-	-	-51.90	12.28	-39.62	63.6

Table 7-8. Radiated Spurious Data (PCS CDMA Mode – Ch. 600)

OPERATING FREQUENCY:	190	8.75	MHz
CHANNEL:	11	75	_
MEASURED OUTPUT POWER:	24.29	dBm =	0.269 W
MODULATION SIGNAL:	CDMA	•	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log ₁₀ (W) =	37.29	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3817.50	Н	167	125	-48.91	9.40	-39.51	63.8
5726.25	Н	-	-	-55.82	11.37	-44.45	68.7
7635.00	Н	-	-	-50.59	11.34	-39.25	63.5
9543.75	Н	-	-	-51.39	12.47	-38.92	63.2

Table 7-9. Radiated Spurious Data (PCS CDMA Mode – Ch. 1175)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dama 40 of 40
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 40 of 46
© 2017 PCTEST Engineering Lal			V 5.1 11/28/2016



7.8 Frequency Stability / Temperature Variation §2.1055 §22.355 §24.235

Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-D-2010. 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 $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Procedure Used

ANSI/TIA-603-D-2010

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: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 41 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 41 of 46
2017 PCTEST Engineering Laboratory, Inc.				



Frequency Stability / Temperature Variation §2.1055 §22.355

OPERATING FREQUENCY: 836,520,000 Hz

CHANNEL:

384

VDC

REFERENCE VOLTAGE: 3.80

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,519,864	-136	-0.0000163
100 %		- 30	836,520,034	34	0.0000041
100 %		- 20	836,519,804	-196	-0.0000234
100 %		- 10	836,520,020	20	0.0000024
100 %		0	836,520,067	67	0.0000080
100 %		+ 10	836,519,908	-92	-0.0000110
100 %		+ 20	836,520,074	74	0.000088
100 %		+ 30	836,520,105	105	0.0000126
100 %		+ 40	836,520,423	423	0.0000506
100 %		+ 50	836,519,662	-338	-0.0000404
BATT. ENDPOINT	3.40	+ 20	836,519,656	-344	-0.0000411

Table 7-10. Frequency Stability Data (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	.G Approved by: Quality Manage	
Test Report S/N:	Test Dates:	EUT Type:	Page 42 of 46	
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Fage 42 01 40	
© 2017 PCTEST Engineering Laboratory, Inc.				
			11/28/20	



Frequency Stability / Temperature Variation §2.1055 §22.355

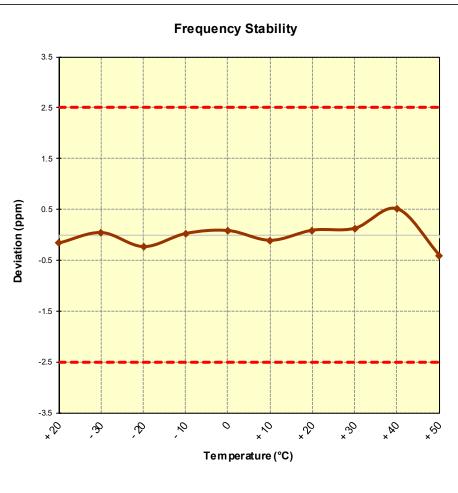


Figure 7-8. Frequency Stability Graph (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 42 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 43 of 46
© 2017 PCTEST Engineering La	boratory, Inc.			V 5.1 11/28/2016



Frequency Stability / Temperature Variation §2.1055 §24.235

OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	600	
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,885	-115	-0.0000061
100 %		- 30	1,880,000,231	231	0.0000123
100 %		- 20	1,880,000,029	29	0.0000015
100 %		- 10	1,879,999,887	-113	-0.0000060
100 %		0	1,880,000,231	231	0.0000123
100 %		+ 10	1,880,000,025	25	0.0000013
100 %		+ 20	1,880,000,350	350	0.0000186
100 %		+ 30	1,880,000,055	55	0.0000029
100 %		+ 40	1,880,000,047	47	0.0000025
100 %		+ 50	1,880,000,240	240	0.0000128
BATT. ENDPOINT	3.40	+ 20	1,880,000,346	346	0.0000184

 Table 7-11. Frequency Stability Data (PCS CDMA Mode – Ch. 600)

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: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 44 of 40
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 44 of 46
2017 PCTEST Engineering Laboratory, Inc.				V 5.1 11/28/2016



Frequency Stability / Temperature Variation §2.1055 §24.235

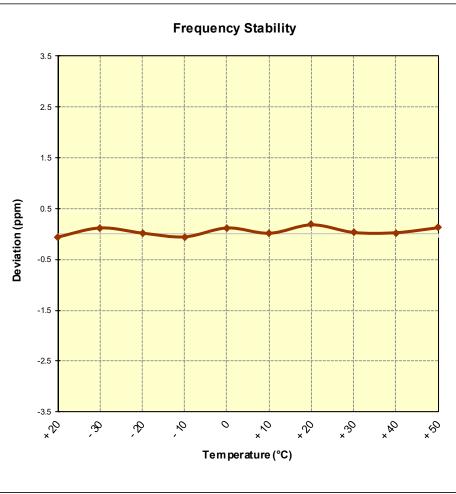


Figure 7-9. Frequency Stability Graph (PCS CDMA Mode – Ch. 600)

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 45 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset		Page 45 of 46
© 2017 PCTEST Engineering L	aboratory, Inc.			V 5.1 11/28/2016



8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFUS110** complies with all the requirements of Parts 22 & 24 of the FCC rules.

FCC ID: ZNFUS110		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 46 of 46
0Y1612232003.ZNF	12/27/2016 - 1/4/2017	Portable Handset	Page 46 of 46
© 2017 PCTEST Engineering La	boratory, Inc.		V 5.1 11/28/2016