



# PCTEST ENGINEERING LABORATORY, INC.

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## 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:**  
06/10 - 06/13/2013  
**Test Site/Location:**  
PCTEST Lab., Columbia, MD, USA  
**Test Report Serial No.:**  
0Y1306100966.ZNF


<b>FCC ID:</b>	<b>ZNFVS890</b>
<b>APPLICANT:</b>	<b>LG ELECTRONICS MOBILECOMM U.S.A</b>

**Application Type:** Class II Permissive Change  
**Model(s):** VS890, LG-VS890, LGVS890  
**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-C-2004, KDB 971168  
**Test Device Serial No.:** *identical prototype* [S/N: EMI #2]  
**Class II Permissive Change:** Please see FCC change documents.  
**Original Grant Date:** June 14, 2013



Mode	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
CDMA850	824.70 - 848.31	1M28F9W	0.189	22.76
CDMA1900	1851.25 - 1908.75	1M28F9W	0.279	24.46

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

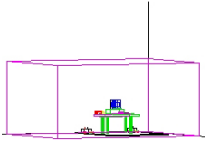


<b>FCC ID:</b> ZNFVS890		<b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1306100966.ZNF	<b>Test Dates:</b> 06/10 - 06/13/2013	<b>EUT Type:</b> Portable Handset	Page 1 of 24	

# T A B L E O F C O N T E N T S

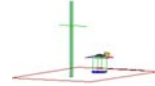
FCC PART 22 & 24 MEASUREMENT REPORT .....		3
1.0 INTRODUCTION .....		4
1.1 SCOPE .....		4
1.2 TESTING FACILITY .....		4
2.0 PRODUCT INFORMATION .....		5
2.1 EQUIPMENT DESCRIPTION .....		5
2.2 DEVICE CAPABILITIES .....		5
2.3 TEST CONFIGURATION .....		5
2.4 EMI SUPPRESSION DEVICE(S)/MODIFICATIONS .....		5
3.0 DESCRIPTION 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 RADIATED POWER AND RADIATED SPURIOUS EMISSIONS .....		7
3.7 PEAK-AVERAGE RATIO .....		8
3.8 FREQUENCY STABILITY / TEMPERATURE VARIATION .....		8
4.0 TEST EQUIPMENT CALIBRATION DATA .....		9
5.0 SAMPLE CALCULATIONS .....		10
6.0 TEST RESULTS .....		11
6.1 SUMMARY .....		11
6.2 CELLULAR EFFECTIVE RADIATED POWER (ERP) .....		12
6.3 PCS EFFECTIVE RADIATED POWER (EIRP) .....		13
6.4 CELLULAR CDMA RADIATED MEASUREMENTS .....		14
6.5 PCS CDMA RADIATED MEASUREMENTS .....		17
6.6 CELLULAR CDMA FREQUENCY STABILITY MEASUREMENTS .....		20
6.7 PCS CDMA FREQUENCY STABILITY MEASUREMENTS .....		22
7.0 CONCLUSION .....		24

<b>FCC ID:</b> ZNFVS890	 <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1306100966.ZNF	<b>Test Dates:</b> 06/10 - 06/13/2013	<b>EUT Type:</b> Portable Handset	
			Page 2 of 24



# MEASUREMENT REPORT

## FCC Part 22 & 24



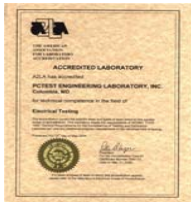
### §2.1033 General Information



**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:** VS890  
**FCC ID:** ZNFVS890  
**FCC CLASSIFICATION:** PCS Licensed Transmitter Held to Ear (PCE)  
**MODE:** CDMA  
**FREQUENCY TOLERANCE:** ±0.00025 % (2.5 ppm)  
**Test Device Serial No.:** EMI #2       Production     Pre-Production     Engineering  
**DATE(S) OF TEST:** 06/10 - 06/13/2013  
**TEST REPORT S/N:** 0Y1306100966.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.



<b>FCC ID:</b> ZNFVS890	 <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1306100966.ZNF	<b>Test Dates:</b> 06/10 - 06/13/2013	<b>EUT Type:</b> Portable Handset	Page 3 of 24

# 1.0 INTRODUCTION

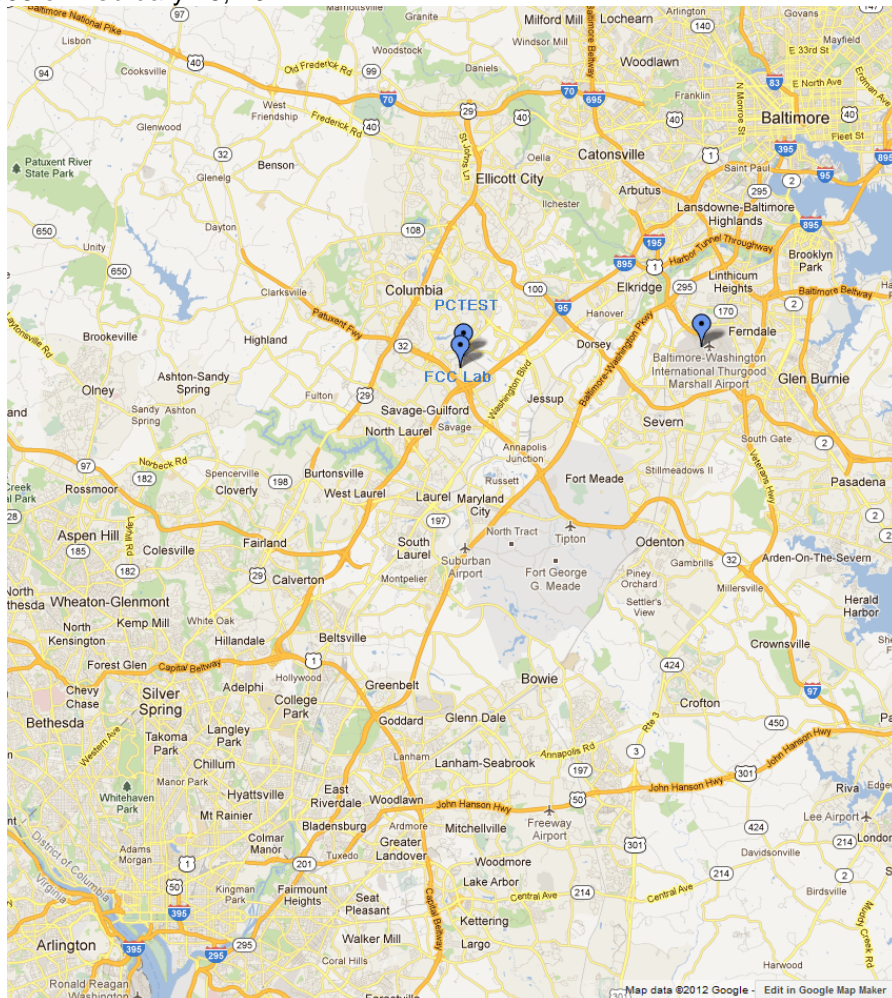
## 1.1 Scope

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 Intern't'l (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on February 15, 2012.



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

FCC ID: ZNFVS890		<b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset	Page 4 of 24	

## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFVS890**. 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 (BC0, BC1), Band 13 (10MHz BW) LTE, 802.11b/g/n WLAN, Bluetooth (1x,EDR, LE)

### 2.3 Test Configuration

The LG Portable Handset FCC ID: ZNFVS890 was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168. See Section 3.0 of this test report for a description of the radiated 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: ZNFVS890	 <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>			<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1306100966.ZNF	<b>Test Dates:</b> 06/10 - 06/13/2013	<b>EUT Type:</b> Portable Handset	Page 5 of 24	

### 3.0 DESCRIPTION OF TESTS

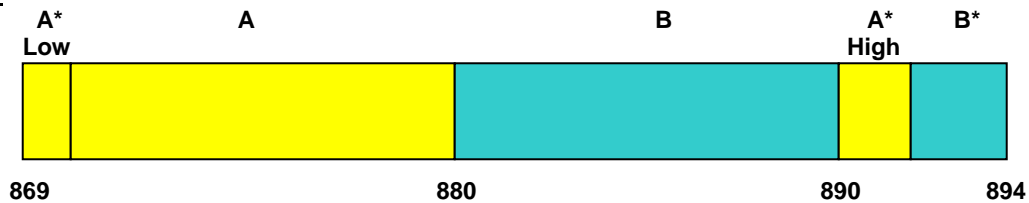
#### 3.1 Evaluation Procedure

The measurement procedures described in the “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-C-2004) and “Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems” (KDB 971168) were used in the measurement of the **LG Portable Handset FCC ID: ZNFVS890**.

Deviation from Measurement Procedure.....None

#### 3.2 Cellular - Base Frequency Blocks

§22.905



BLOCK 1: 869 – 880 MHz (A\* Low + A)

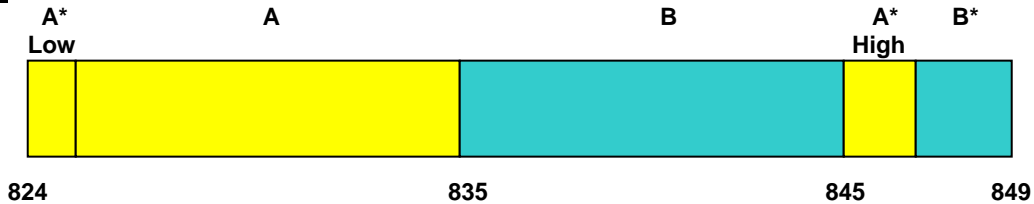
BLOCK 3: 890 – 891.5 MHz (A\* High)

BLOCK 2: 880 – 890 MHz (B)

BLOCK 4: 891.5 – 894 MHz (B\*)

#### 3.3 Cellular - Mobile Frequency Blocks

§22.905



BLOCK 1: 824 – 835 MHz (A\* Low + A)

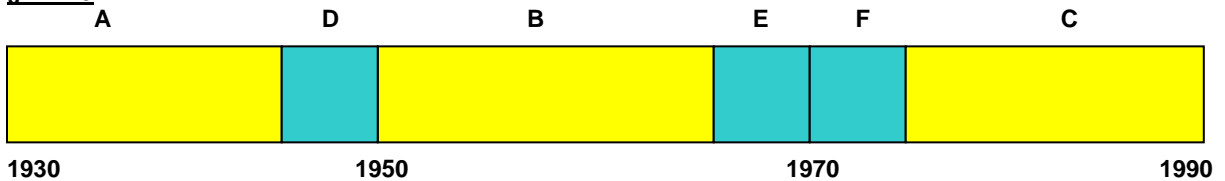
BLOCK 3: 845 – 846.5 MHz (A\* High)

BLOCK 2: 835 – 845 MHz (B)

BLOCK 4: 846.5 – 849 MHz (B\*)

#### 3.4 PCS - Base Frequency Blocks

§24.229



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 4: 1965 – 1970 MHz (E)

BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 5: 1970 – 1975 MHz (F)

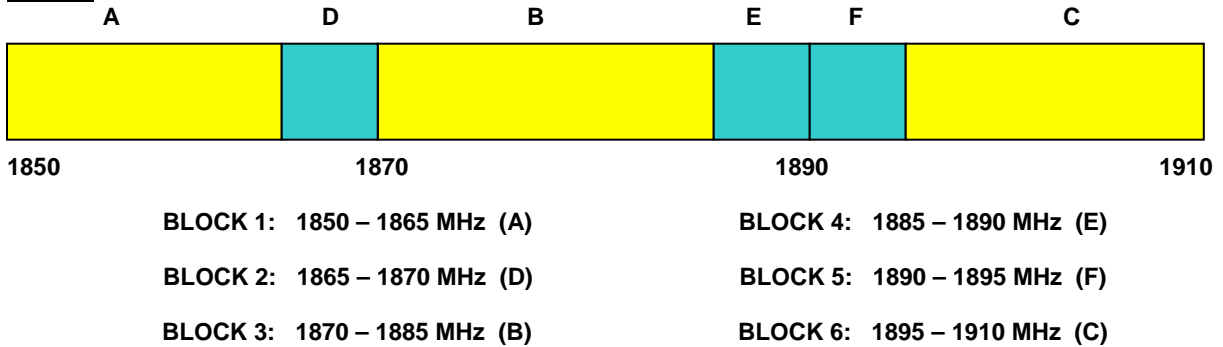
BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

FCC ID: ZNFVS890			FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset	Page 6 of 24		

### 3.5 PCS - Mobile Frequency Blocks

§24.229



### 3.6 Radiated Power and Radiated Spurious Emissions

§2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) RSS-132(4.4) RSS-132(4.5.1) RSS-133(6.4) RSS-133(6.5.1)



The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 78cm high PVC support structure is placed on top of the turntable. A 3/4" (~1.9cm) sheet of high density polyethylene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168.

Per the guidance of ANSI/TIA-603-C-2004, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_d \text{ [dBm]} = P_g \text{ [dBm]} - \text{cable loss} \text{ [dB]} + \text{antenna gain} \text{ [dBd/dBi]}$$

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

FCC ID: ZNFVS890		<b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset	Page 7 of 24	

The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of  $43 + 10\log_{10}(\text{Power}_{[\text{Watts}]})$  specified in 22.917(a) and 24.238(a).

### 3.7 Peak-Average Ratio

**§24.232(d) RSS-132(5.4) RSS-133(6.4)**

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.

For pulsed signals, 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. For continuous signals, the trigger is set to “free run” in the CCDF measurement mode.

### 3.8 Frequency Stability / Temperature Variation

**§2.1055 §22.355 §22.863 §22.905 §24.229 §24.235 RSS-132(4.3) RSS-133(6.3)**



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.

*Specification – 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, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.*

#### Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for 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.

FCC ID: ZNFVS890	 <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>			Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset	Page 8 of 24	



## 4.0 TEST EQUIPMENT CALIBRATION DATA



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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
Agilent	8447D	Broadband Amplifier	5/31/2013	Annual	5/31/2014	2443A01900
Espec	ESX-2CA	Environmental Chamber	4/16/2013	Annual	4/16/2014	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/22/2011	Biennial	7/22/2013	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	5/30/2012	Biennial	5/30/2014	135427
Mini-Circuits	VHF-3100+	High Pass Filter	1/17/2013	Annual	1/17/2014	30841
Rohde & Schwarz	CMU200	Base Station Simulator	N/A			836636/0005
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100040
Rohde & Schwarz	ESU26	EMI Test Receiver	2/25/2013	Annual	2/25/2014	100342
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/26/2012	Biennial	1/26/2014	A051107

**Table 4-1. Test Equipment**

**Notes:**

1. Equipment used for signaling with a calibration date of "N/A" shown in this list was only used for maintaining a link between the piece of equipment and the EUT. This equipment was not used to make direct calibrated measurements.

<b>FCC ID:</b> ZNFVS890		<b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1306100966.ZNF	<b>Test Dates:</b> 06/10 - 06/13/2013	<b>EUT Type:</b> Portable Handset	Page 9 of 24	

## 5.0 SAMPLE CALCULATIONS

### CDMA Emission Designator



**Emission Designator = 1M25F9W**

CDMA BW = 1.25 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data) (Measured at the 99.75% power bandwidth)

FCC ID: ZNFVS890	 <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>			Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset		Page 10 of 24

## 6.0 TEST RESULTS

### 6.1 Summary



Company Name: LG Electronics MobileComm U.S.A  
 FCC ID: ZNFVS890  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): CDMA

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
<b><u>TRANSMITTER MODE (TX)</u></b>					
22.913(a.2)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS	Section 6.2
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 6.3
2.1053 22.917(a) 24.238(a)	Undesirable Emissions	> 43 + log <sub>10</sub> (P[Watts]) for all out-of-band emissions		PASS	Sections, 6.4, 6.5
2.1055 22.355 24.235	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24)		PASS	Sections, 6.6, 6.7

**Table 6-1. Summary of Test Results**

**Notes:**

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

FCC ID: ZNFVS890		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset	Page 11 of 24	

## 6.2 Cellular Effective Radiated Power (ERP)



§22.913(a)(2) RSS-132(4.4) [SRSP-503(5.1.3)]

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	CDMA850	Standard	16.83	4.60	V	21.43	0.139	38.45	-17.02
836.52	CDMA850	Standard	17.03	4.82	V	21.85	0.153	38.45	-16.60
848.31	CDMA850	Standard	17.72	5.04	V	22.76	0.189	38.45	-15.69

**Table 6-2. ERP (Cellular CDMA)**

### NOTES:

- 1) This device was tested under all R.C.s and S.O.s 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

FCC ID: ZNFVS890			FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset		Page 12 of 24	

### 6.3 PCS Effective Radiated Power (EIRP)



§22.913(a)(2) RSS-132(4.4) [SRSP-503(5.1.3)]

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1851.25	CDMA1900	Standard	14.86	9.60	H	24.46	0.279	33.01	-8.55
1880.00	CDMA1900	Standard	13.59	9.53	H	23.12	0.205	33.01	-9.89
1908.75	CDMA1900	Standard	13.38	9.47	H	22.85	0.193	33.01	-10.16

**Table 6-3. EIRP (PCS CDMA)**

**NOTES:**

- 1) This device was tested under all R.C.s and S.O.s 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

FCC ID: ZNFVS890			FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset		Page 13 of 24	

## 6.4 Cellular CDMA Radiated Measurements

§2.1053 §22.917(a) RSS-132(4.5.1)

### Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 824.70 MHz  
 CHANNEL: 1013  
 MEASURED OUTPUT POWER: 21.43 dBm = 0.139 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  34.43 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1649.40	-55.35	2.59	-52.77	V	74.2
2474.10	-54.18	2.89	-51.29	V	72.7
3298.80	-56.71	5.45	-51.26	V	72.7
4123.50	-81.51	7.05	-74.46	V	95.9
4948.20	-80.98	7.87	-73.12	V	94.5

Table 6-4. Radiated Spurious Data (Cellular CDMA Mode – Ch. 1013)

#### NOTES:

- 1) This device was tested under all R.C.s and S.O.s 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

FCC ID: ZNFVS890			FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset	Page 14 of 24		

**Cellular CDMA Radiated Measurements (Cont'd)**  
**§2.1053 §22.917(a) RSS-132(4.5.1)**

**Field Strength of SPURIOUS Radiation**



OPERATING FREQUENCY: 836.52 MHz  
 CHANNEL: 384  
 MEASURED OUTPUT POWER: 21.85 dBm = 0.153 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  34.85 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1673.04	-54.58	2.34	-52.24	V	74.1
2509.56	-53.64	2.84	-50.81	V	72.7
3346.08	-57.01	5.64	-51.37	V	73.2
4182.60	-81.65	7.14	-74.51	V	96.4
5019.12	-81.01	7.97	-73.04	V	94.9

**Table 6-5. Radiated Spurious Data (Cellular CDMA Mode – Ch. 384)**

**NOTES:**

- 1) This device was tested under all R.C.s and S.O.s 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

FCC ID: ZNFVS890	 <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>			Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset	Page 15 of 24	

**Cellular CDMA Radiated Measurements (Cont'd)**  
**§2.1053 §22.917(a) RSS-132(4.5.1)**

**Field Strength of SPURIOUS Radiation**



OPERATING FREQUENCY: 848.31 MHz  
 CHANNEL: 777  
 MEASURED OUTPUT POWER: 22.76 dBm = 0.189 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.76 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1696.62	-54.47	2.09	-52.38	V	75.1
2544.93	-54.04	3.16	-50.88	V	73.6
3393.24	-57.71	5.83	-51.88	V	74.6
4241.55	-81.79	7.24	-74.56	V	97.3
5089.86	-80.79	8.02	-72.77	V	95.5

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

**NOTES:**

- 1) This device was tested under all R.C.s and S.O.s 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

FCC ID: ZNFVS890	 FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset	Page 16 of 24	



## 6.5 PCS CDMA Radiated Measurements

### §2.1053 §24.238(a) RSS-133(6.5.2)

#### Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 1851.25 MHz  
 CHANNEL: 25  
 MEASURED OUTPUT POWER: 24.46 dBm = 0.279 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  37.46 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3702.50	-49.85	8.40	-41.45	H	65.9
5553.75	-52.07	10.62	-41.45	H	65.9
7405.00	-51.87	11.82	-40.05	H	64.5
9256.25	-45.72	13.30	-32.43	H	56.9
11107.50	-49.58	13.50	-36.08	H	60.5

**Table 6-7. Radiated Spurious Data (PCS CDMA Mode – Ch. 25)**

#### **NOTES:**

- 1) This device was tested under all R.C.s and S.O.s 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

FCC ID: ZNFVS890			FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset		Page 17 of 24	

**PCS CDMA Radiated Measurements (Cont'd)**  
§2.1053 §24.238(a) RSS-133(6.5.2)

**Field Strength of SPURIOUS Radiation**



OPERATING FREQUENCY: 1880.00 MHz  
 CHANNEL: 661  
 MEASURED OUTPUT POWER: 23.12 dBm = 0.205 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  36.12 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-44.04	8.42	-35.61	H	58.7
5640.00	-51.83	10.66	-41.18	H	64.3
7520.00	-51.84	11.92	-39.92	H	63.0
9400.00	-50.84	13.24	-37.60	H	60.7
11280.00	-76.02	13.49	-62.53	H	85.7

**Table 6-8. Radiated Spurious Data (PCS CDMA Mode – Ch. 600)**

**NOTES:**

- 1) This device was tested under all R.C.s and S.O.s 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

FCC ID: ZNFVS890	 <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>			Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset	Page 18 of 24	

**PCS CDMA Radiated Measurements (Cont'd)**  
§2.1053 §24.238(a) RSS-133(6.5.2)

**Field Strength of SPURIOUS Radiation**



OPERATING FREQUENCY: 1908.75 MHz  
 CHANNEL: 1175  
 MEASURED OUTPUT POWER: 22.85 dBm = 0.193 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.85 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3817.50	-47.95	8.57	-39.38	H	62.2
5726.25	-50.86	10.69	-40.17	H	63.0
7635.00	-48.08	12.06	-36.02	H	58.9
9543.75	-46.59	13.20	-33.39	H	56.2
11452.50	-75.95	13.42	-62.53	H	85.4

**Table 6-9. Radiated Spurious Data (PCS CDMA Mode – Ch. 1175)**

**NOTES:**

- 1) This device was tested under all R.C.s and S.O.s 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The data reported in the table above was measured in this test setup.

FCC ID: ZNFVS890	 <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>			Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset	Page 19 of 24	



## 6.6 Cellular CDMA Frequency Stability Measurements

§2.1055 §22.355 RSS-132(4.3)

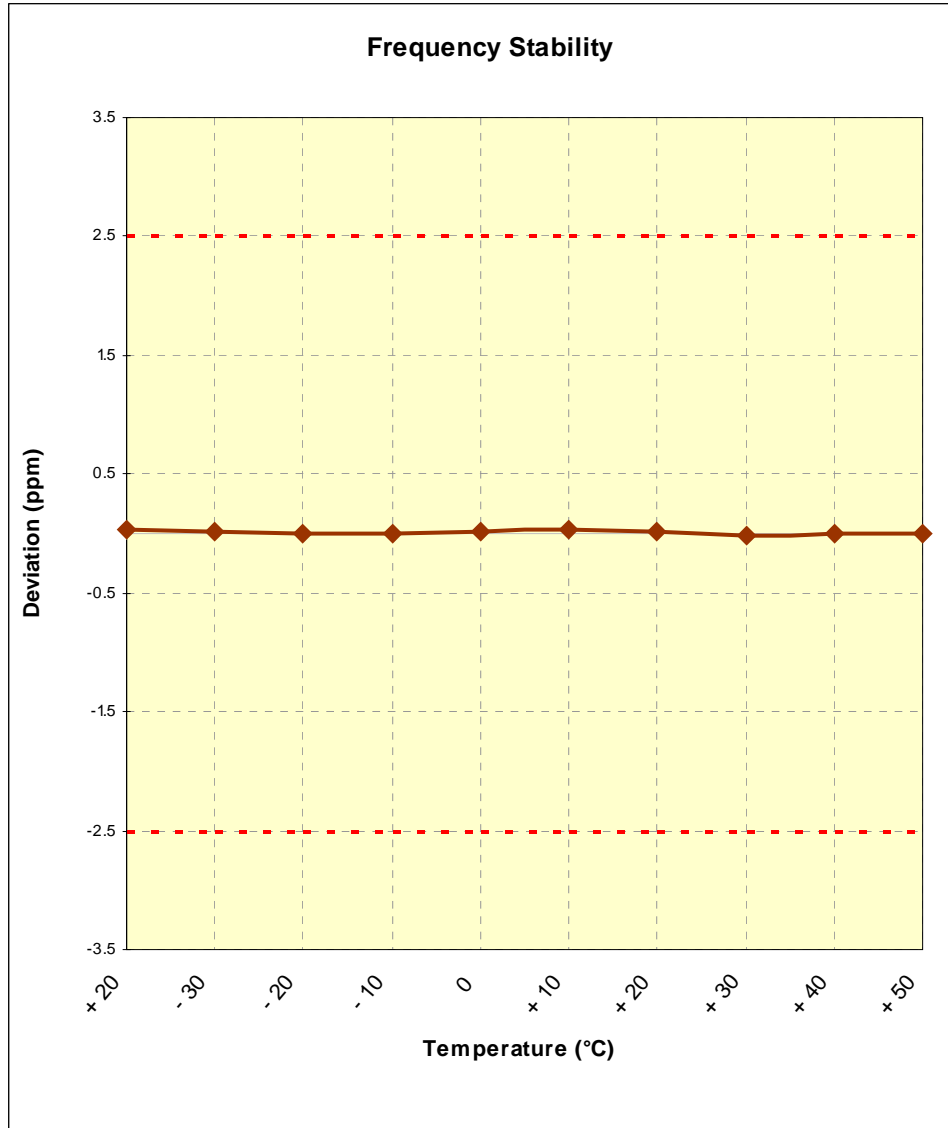
OPERATING FREQUENCY: 836,520,000 Hz  
 CHANNEL: 384  
 REFERENCE VOLTAGE: 3.8 VDC  
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,520,022	22	0.0000026
100 %		- 30	836,520,020	20	0.0000024
100 %		- 20	836,519,998	-2	-0.0000002
100 %		- 10	836,520,000	0	0.0000000
100 %		0	836,520,010	10	0.0000012
100 %		+ 10	836,520,026	26	0.0000031
100 %		+ 20	836,520,016	16	0.0000019
100 %		+ 30	836,519,987	-13	-0.0000016
100 %		+ 40	836,519,995	-5	-0.0000006
100 %		+ 50	836,520,006	6	0.0000007
115 %	4.37	+ 20	836,519,971	-29	-0.0000035
BATT. ENDPOINT	3.25	+ 20	836,519,983	-17	-0.0000020



Table 6-10. Frequency Stability Data (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFVS890	 <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>			Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset		Page 20 of 24

**Cellular CDMA Frequency Stability Measurements (Cont'd)**  
**§2.1055 §22.355 RSS-132(4.3)**



**Figure 6-1. Frequency Stability Graph (Cellular CDMA Mode – Ch. 384)**

<b>FCC ID:</b> ZNFVS890		<b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1306100966.ZNF	<b>Test Dates:</b> 06/10 - 06/13/2013	<b>EUT Type:</b> Portable Handset		Page 21 of 24

## 6.7 PCS CDMA Frequency Stability Measurements

§2.1055 §24.235 RSS-139(6.3)

OPERATING FREQUENCY: 1,880,000,000 Hz

CHANNEL: 661



REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,973	-27	-0.0000014
100 %		- 30	1,879,999,990	-10	-0.0000005
100 %		- 20	1,880,000,021	21	0.0000011
100 %		- 10	1,879,999,982	-18	-0.0000010
100 %		0	1,880,000,024	24	0.0000013
100 %		+ 10	1,880,000,011	11	0.0000006
100 %		+ 20	1,880,000,009	9	0.0000005
100 %		+ 30	1,880,000,029	29	0.0000015
100 %		+ 40	1,880,000,020	20	0.0000011
100 %		+ 50	1,880,000,007	7	0.0000004
115 %		4.37	+ 20	1,879,999,988	-12
BATT. ENDPOINT	3.25	+ 20	1,880,000,015	15	0.0000008

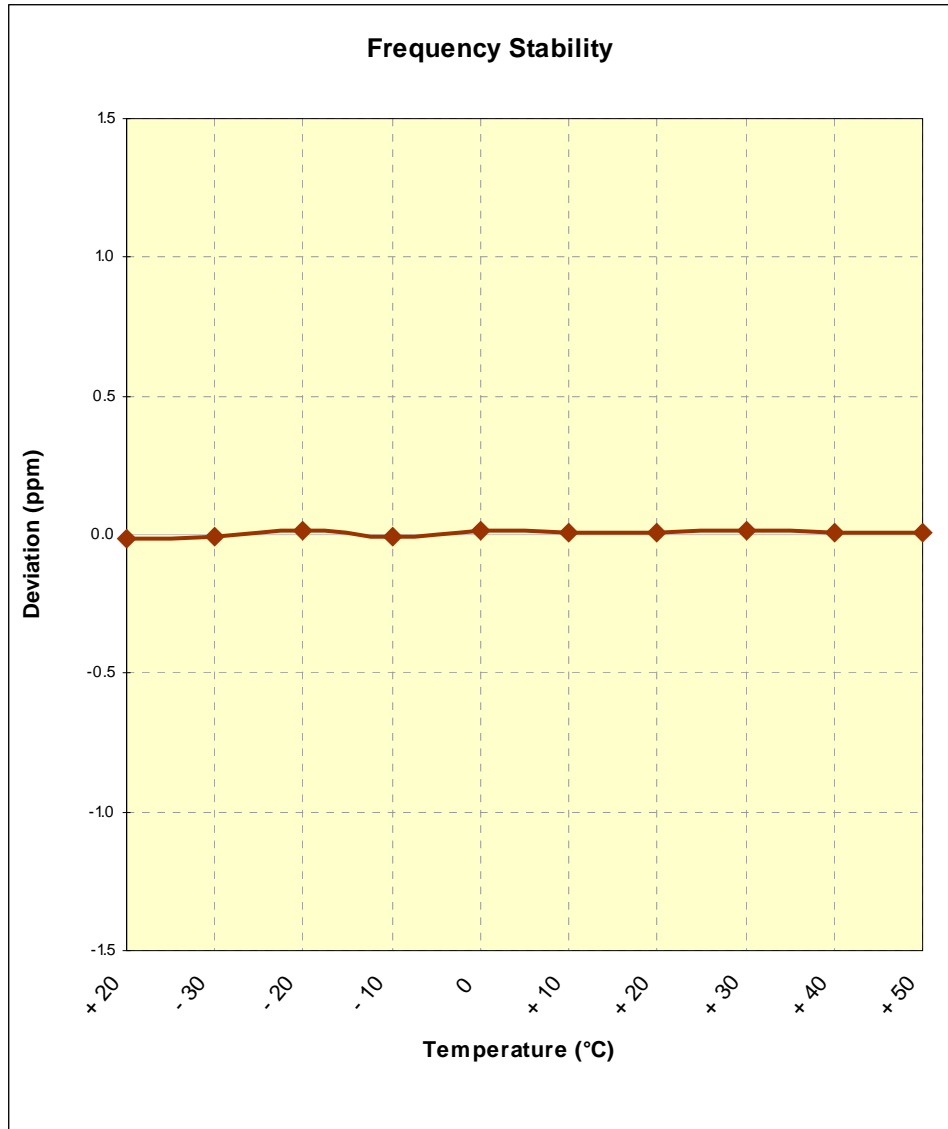
Table 6-11. Frequency Stability Data (PCS CDMA Mode – Ch. 600)

**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 in-band 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: ZNFVS890			FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306100966.ZNF	Test Dates: 06/10 - 06/13/2013	EUT Type: Portable Handset	Page 22 of 24		

**PCS CDMA Frequency Stability Measurements (Cont'd)**  
§2.1055 §24.235 RSS-139(6.3)





**Figure 6-2. Frequency Stability Graph (PCS CDMA Mode – Ch. 600)**

<b>FCC ID:</b> ZNFVS890		<b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1306100966.ZNF	<b>Test Dates:</b> 06/10 - 06/13/2013	<b>EUT Type:</b> Portable Handset	Page 23 of 24	

## 7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFVS890** complies with all the requirements of Parts 2, 22, 24 of the FCC rules.

FCC ID: ZNFVS890		<b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1306100966.ZNF	<b>Test Dates:</b> 06/10 - 06/13/2013	<b>EUT Type:</b> Portable Handset	Page 24 of 24	