



# PCTEST ENGINEERING LABORATORY, INC.

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<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:**

12/29/2014 - 1/9/2015

**Test Site/Location:**

PCTEST Lab., Columbia, MD, USA

**Test Report Serial No.:**

0Y1412312353.ZNF

**FCC ID:**

**ZNFL16C**

**APPLICANT:**

**LG ELECTRONICS MOBILECOMM U.S.A**

**Application Type:**

Class II Permissive Change

**Model(s):**

LGL16C, L16C, LG-L16C

**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 v02r02

**Test Device Serial No.:**

*identical prototype* [S/N: 29DEC-8]

**Class II Permissive Change:**

Please see FCC change document

**Original Grant Date:**

1/7/2015

| Mode     | Tx Frequency (MHz) | ERP/EIRP       |                  |
|----------|--------------------|----------------|------------------|
|          |                    | Max. Power (W) | Max. Power (dBm) |
| CDMA850  | 824.70 - 848.31    | 0.093          | 19.68            |
| CDMA1900 | 1851.25 - 1908.75  | 0.201          | 23.03            |

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

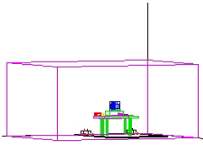


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|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| FCC ID: ZNFL16C                             |  <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT<br/>(CLASS II PERMISSIVE CHANGE)</b> |                                      |  <b>Reviewed by:</b><br>Quality Manager |
| <b>Test Report S/N:</b><br>0Y1412312353.ZNF | <b>Test Dates:</b><br>12/29/2014 - 1/9/2015                                                                                                                             | <b>EUT Type:</b><br>Portable Handset | Page 1 of 19                                                                                                                 |

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

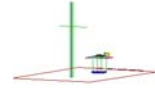
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## MEASUREMENT REPORT

### FCC Part 22 & 24

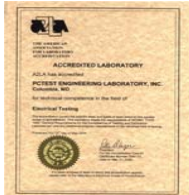


#### §2.1033 General Information

**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:** LGL16C, L16C, LG-L16C  
**FCC ID:** ZNFL16C  
**FCC CLASSIFICATION:** PCS Licensed Transmitter Held to Ear (PCE)  
**MODE:** CDMA  
**FREQUENCY TOLERANCE:**  $\pm 0.00025\%$  (2.5 ppm)  
**Test Device Serial No.:** 29DEC-8 ☐ Production ☒ Pre-Production ☐ Engineering  
**DATE(S) OF TEST:** 12/29/2014 - 1/9/2015  
**TEST REPORT S/N:** 0Y1412312353.ZNF

#### Test Facility / Accreditations

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



- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

|                                             |                                                                                                                                                                                                                                                                     |                                       |                                        |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------|
| FCC ID: ZNFL16C                             |  <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT</b><br><b>(CLASS II PERMISSIVE CHANGE)</b>  |                                       | <b>Reviewed by:</b><br>Quality Manager |
| <b>Test Report S/N:</b><br>0Y1412312353.ZNF | <b>Test Dates:</b><br>12/29/2014 - 1/9/2015                                                                                                                                                                                                                         | <b>EUT Type:</b><br>Portatble Handset | Page 3 of 19                           |

## 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.

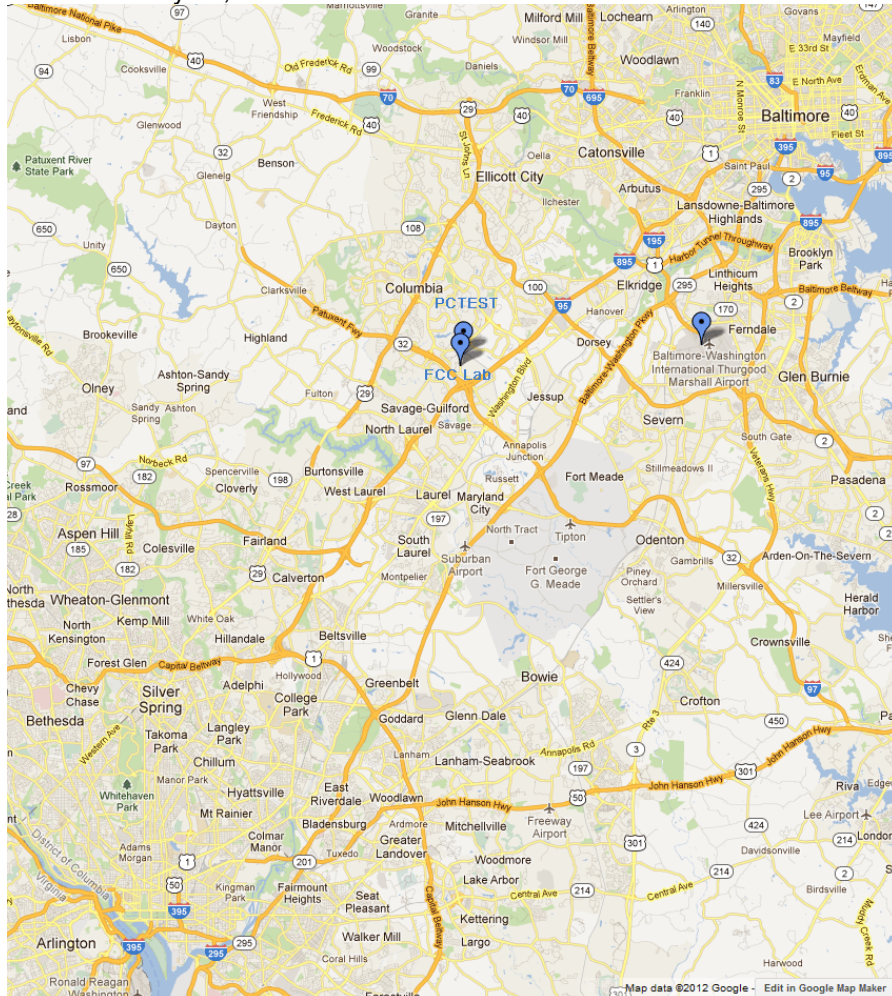


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

|                                      |                                                                                                                                                                                                                                                               |                               |                                 |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------|
| FCC ID: ZNFL16C                      |  <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT<br/>(CLASS II PERMISSIVE CHANGE)</b>  |                               | Reviewed by:<br>Quality Manager |
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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LGE Poratble Handset FCC ID: ZNFL16C**. 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, 802.11b/g/n WLAN, Bluetooth (1x, EDR, LE)

### 2.3 Test Configuration

The LGE Poratble Handset FCC ID: ZNFL16C was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168 v02r02. See Section 6.0 of this test report for a description of the radiated tests.

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

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

|                                      |                                                                                     |                                                                         |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
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### 3.0 DESCRIPTION OF TESTS

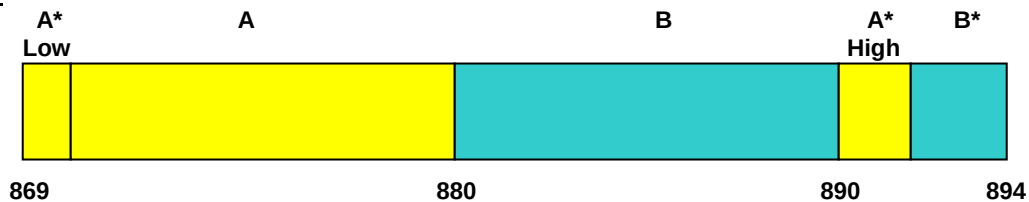
#### 3.1 Evaluation Procedure

The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-C-2004) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 v02r02) were used in the measurement of the **LGE Poratble Handset FCC ID: ZNFL16C**.

Deviation from Measurement Procedure.....None

#### 3.2 Cellular - Base Frequency Blocks

§22.905



BLOCK 1: 869 – 880 MHz (A\* Low + A)

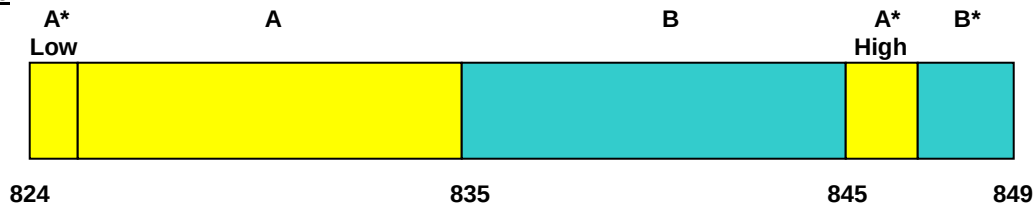
BLOCK 3: 890 – 891.5 MHz (A\* High)

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)

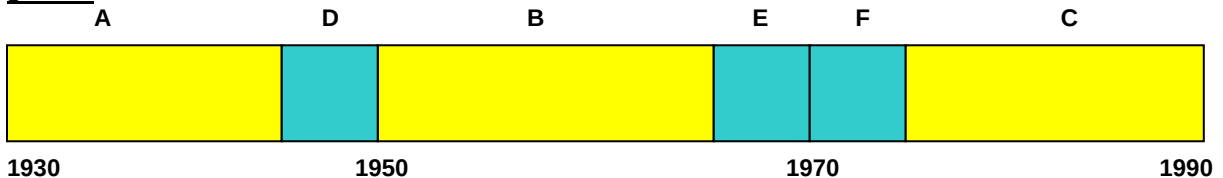
BLOCK 3: 845 – 846.5 MHz (A\* High)

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)

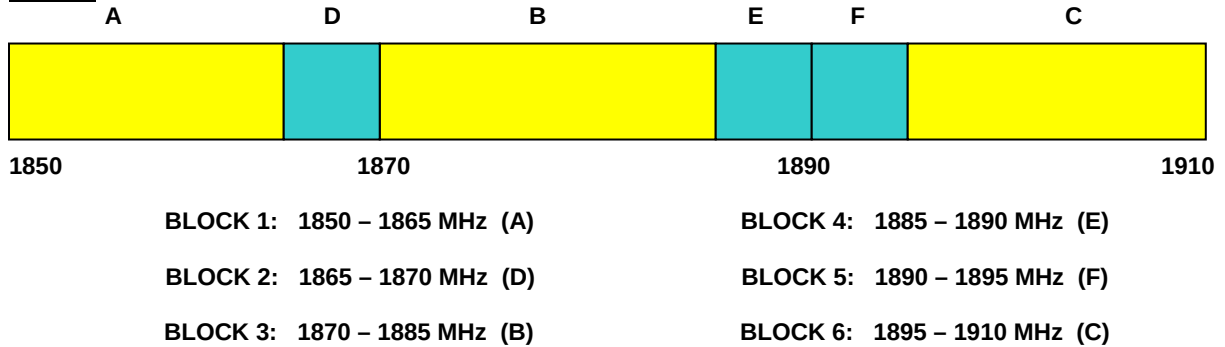
BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

|                                      |                                        |                                                                         |    |                                 |
|--------------------------------------|----------------------------------------|-------------------------------------------------------------------------|----|---------------------------------|
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### 3.5 PCS - Mobile Frequency Blocks

§24.229



### 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 Clause 5, Figure 5.7 of ANSI C63.4-2009. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 78cm high PVC support structure is placed on top of the turntable. A ¾" (~1.9cm) sheet of high density polyethylene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. For the EUT positioning, "H" is defined with the EUT lying flat on the test surface, "H2" is defined with the EUT standing up on its side, and "V" is defined with the EUT standing upright.

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

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

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

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

|                                      |                                                                                                                                                                               |                                |                                                                                                                              |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------|
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| Test Report S/N:<br>0Y1412312353.ZNF | Test Dates:<br>12/29/2014 - 1/9/2015                                                                                                                                          | EUT Type:<br>Portatble Handset | Page 7 of 19                                                                                                                 |

## 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) | 3/25/2014  | Annual       | 3/25/2015  | N/A           |
| Agilent         | 8447D              | Broadband Amplifier                    | 5/30/2014  | Annual       | 5/30/2015  | 2443A01900    |
| Agilent         | E4448A             | PSA (3Hz-50GHz) Spectrum Analyzer      | 4/16/2014  | Annual       | 4/16/2015  | US42510244    |
| Agilent         | N9020A             | MXA Signal Analyzer                    | 10/27/2014 | Annual       | 10/27/2015 | US46470561    |
| Emco            | 6502               | Active Loop Antenna (10k - 30 MHz)     | 6/24/2014  | Biennial     | 6/24/2016  | 267           |
| Espec           | ESX-2CA            | Environmental Chamber                  | 4/16/2014  | Annual       | 4/16/2015  | 17620         |
| ETS Lindgren    | 3117               | 1-18 GHz DRG Horn (Medium)             | 4/8/2014   | Biennial     | 4/8/2016   | 125518        |
| ETS Lindgren    | 3160-09            | 18-26.5 GHz Standard Gain Horn         | 6/17/2014  | Biennial     | 6/17/2016  | 135427        |
| ETS Lindgren    | 3164-08            | Quad Ridge Horn Antenna                | 3/12/2014  | Biennial     | 3/12/2016  | 128337        |
| K & L           | 13SH10-1000/U1000  | N Type High Pass Filter                | 5/22/2014  | Annual       | 5/22/2015  | 1             |
| K & L           | 11SH10-3075/U18000 | High Pass Filter                       | 5/2/2014   | Annual       | 5/2/2015   | 4             |
| Mini-Circuits   | SSG-4000HP         | USB Synthesized Signal Generator       | N/A        |              |            | 11208010032   |
| Mini-Circuits   | PWR-SENS-4RMS      | USB Power Sensor                       | 4/9/2014   | Annual       | 4/9/2015   | 11401010036   |
| Mini-Circuits   | TVA-11-422         | RF Power Amp                           | N/A        |              |            | QA1303002     |
| Rohde & Schwarz | CMU200             | Base Station Simulator                 | N/A        |              |            | 836536/0005   |
| Rohde & Schwarz | TS-PR18            | 1-18 GHz Pre-Amplifier                 | 3/5/2014   | Annual       | 3/5/2015   | 100071        |
| Rohde & Schwarz | TS-PR26            | 18-26.5 GHz Pre-Amplifier              | 3/12/2014  | Annual       | 3/12/2015  | 100040        |
| Rohde & Schwarz | ESU26              | EMI Test Receiver (26.5GHz)            | 1/27/2014  | Annual       | 1/27/2015  | 100342        |
| Schwarzbeck     | UHA 9105           | Dipole Antenna (400 - 1GHz) Rx         | 11/21/2013 | Biennial     | 11/21/2015 | 9105-2404     |
| Seekonk         | NC-100             | Torque Wrench (8" lb)                  | 4/16/2014  | Annual       | 4/16/2015  | N/A           |
| Sunol           | JB5                | Bi-Log Antenna (30M - 5GHz)            | 1/28/2014  | Biennial     | 1/28/2016  | A051107       |

**Table 4-1. Test Equipment**

### Notes:

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

|                                      |                                                                                     |                               |                                                                         |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFL16C                      |  |                               | FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT<br>(CLASS II PERMISSIVE CHANGE) |  | Reviewed by:<br>Quality Manager |
| Test Report S/N:<br>0Y1412312353.ZNF | Test Dates:<br>12/29/2014 - 1/9/2015                                                | EUT Type:<br>Portable Handset | Page 8 of 19                                                            |                                                                                       |                                 |

## 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)

### 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: ZNFL16C                      |  <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT<br/>(CLASS II PERMISSIVE CHANGE)</b> |                               |  <b>Reviewed by:</b><br>Quality Manager |
| Test Report S/N:<br>0Y1412312353.ZNF | Test Dates:<br>12/29/2014 - 1/9/2015                                                                                                                                    | EUT Type:<br>Poratble Handset | Page 9 of 19                                                                                                                 |

## 6.0 TEST RESULTS

### 6.1 Summary

Company Name: LG Electronics MobileComm U.S.A  
 FCC ID: ZNFL16C  
 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>TRANSMITTER MODE (TX)</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 6.2 |
| 2.1053<br>22.917(a)<br>24.238(a) | Radiated Spurious Emissions         | > 43 + log <sub>10</sub> (P[Watts]) for all out-of-band emissions |                | PASS        | Section 6.3 |

**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.

|                                      |                                                                                                                                                                                                                                                               |                               |                                 |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------|
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| Test Report S/N:<br>0Y1412312353.ZNF | Test Dates:<br>12/29/2014 - 1/9/2015                                                                                                                                                                                                                          | EUT Type:<br>Portable Handset | Page 10 of 19                   |

## 6.2 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-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

### Test Procedures Used

KDB 971168 v02r02 – Section 5.2.1

ANSI/TIA-603-C-2004 – Section 2.2.17

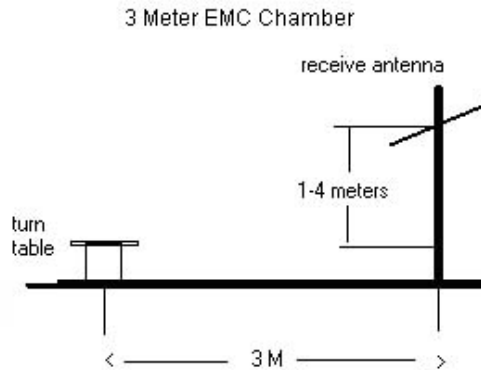
### Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW  $\geq 3 \times$  RBW
4. Span = 1.5 times the OBW
5. No. of sweep points  $\geq 2 \times$  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: ZNFL16C                      |  <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT<br/>(CLASS II PERMISSIVE CHANGE)</b> |                               |  <b>Reviewed by:</b><br>Quality Manager |
| Test Report S/N:<br>0Y1412312353.ZNF | Test Dates:<br>12/29/2014 - 1/9/2015                                                                                                                                    | EUT Type:<br>Portable Handset | Page 11 of 19                                                                                                                |

## Test Setup

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



**Figure 6-1. Test Instrument & Measurement Setup**

## Test Notes

- 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case setup is reported in the tables below.

|                                      |                                                                                     |                                                                         |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFL16C                      |  | FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT<br>(CLASS II PERMISSIVE CHANGE) |  | Reviewed by:<br>Quality Manager |
| Test Report S/N:<br>0Y1412312353.ZNF | Test Dates:<br>12/29/2014 - 1/9/2015                                                | EUT Type:<br>Poratble Handset                                           |                                                                                       | Page 12 of 19                   |

| Frequency [MHz] | Mode    | Battery Type | Substitute Level [dBm] | Ant. Gain [dBd] | Ant. Pol. [H/V] | ERP [dBm] | ERP [Watts] | ERP Limit [dBm] | Margin [dB] |
|-----------------|---------|--------------|------------------------|-----------------|-----------------|-----------|-------------|-----------------|-------------|
| 824.70          | CDMA850 | Standard     | 16.70                  | 2.98            | V               | 19.68     | 0.093       | 38.45           | -18.77      |
| 836.52          | CDMA850 | Standard     | 16.30                  | 3.04            | V               | 19.34     | 0.086       | 38.45           | -19.11      |
| 848.31          | CDMA850 | Standard     | 15.14                  | 3.10            | V               | 18.24     | 0.067       | 38.45           | -20.21      |

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

| Frequency [MHz] | Mode     | Battery Type | Substitute Level [dBm] | Ant. Gain [dBi] | Ant. Pol. [H/V] | EIRP [dBm] | EIRP [Watts] | EIRP Limit [dBm] | Margin [dB] |
|-----------------|----------|--------------|------------------------|-----------------|-----------------|------------|--------------|------------------|-------------|
| 1851.25         | CDMA1900 | Standard     | 14.69                  | 8.34            | V               | 23.03      | 0.201        | 33.01            | -9.98       |
| 1880.00         | CDMA1900 | Standard     | 14.45                  | 8.46            | V               | 22.90      | 0.195        | 33.01            | -10.11      |
| 1908.75         | CDMA1900 | Standard     | 13.85                  | 8.64            | V               | 22.49      | 0.177        | 33.01            | -10.52      |

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

|                                             |                                                                                                                                                                                                                                                               |                                      |  |                                        |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--|----------------------------------------|
| FCC ID: ZNFL16C                             |  <b>FCC Pt. 22 &amp; 24 CDMA MEASUREMENT REPORT<br/>(CLASS II PERMISSIVE CHANGE)</b>  |                                      |  | <b>Reviewed by:</b><br>Quality Manager |
| <b>Test Report S/N:</b><br>0Y1412312353.ZNF | <b>Test Dates:</b><br>12/29/2014 - 1/9/2015                                                                                                                                                                                                                   | <b>EUT Type:</b><br>Portable Handset |  | Page 13 of 19                          |

## 6.3 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-C-2004 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

### Test Procedures Used

KDB 971168 v02r02 – Section 5.8

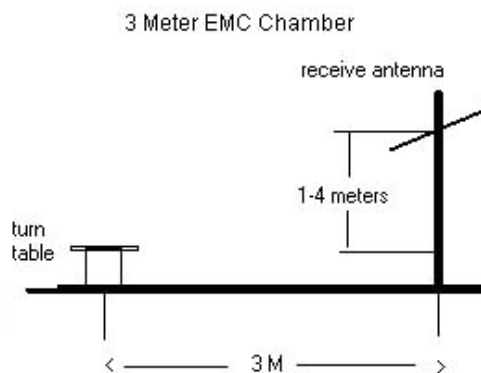
ANSI/TIA-603-C-2004 – Section 2.2.12

### Test Settings

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

### Test Setup

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



**Figure 6-2. Test Instrument & Measurement Setup**

|                                      |                                               |                                                                         |    |                                 |
|--------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------|----|---------------------------------|
| FCC ID: ZNFL16C                      | <b>PCTEST</b><br>ENGINEERING LABORATORY, INC. | FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT<br>(CLASS II PERMISSIVE CHANGE) | LG | Reviewed by:<br>Quality Manager |
| Test Report S/N:<br>0Y1412312353.ZNF | Test Dates:<br>12/29/2014 - 1/9/2015          | EUT Type:<br>Portatble Handset                                          |    | Page 14 of 19                   |

## 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 "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case setup is reported in the tables below.
- 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.

OPERATING FREQUENCY: 824.70 MHz  
 CHANNEL: 1013  
 MEASURED OUTPUT POWER: 19.68 dBm = 0.093 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  32.68

| Frequency [MHz] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBd] | Spurious Emission Level [dBm] | Ant. Pol. [H/V] | [dBc] |
|-----------------|----------------------------------|-------------------------------|-------------------------------|-----------------|-------|
| 1649.40         | -62.76                           | 3.61                          | -59.14                        | H               | 78.8  |
| 2474.10         | -60.46                           | 3.57                          | -56.89                        | H               | 76.6  |
| 3298.80         | -61.92                           | 5.66                          | -56.26                        | H               | 75.9  |

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

OPERATING FREQUENCY: 836.52 MHz  
 CHANNEL: 384  
 MEASURED OUTPUT POWER: 19.34 dBm = 0.086 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  32.34

| Frequency [MHz] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBd] | Spurious Emission Level [dBm] | Ant. Pol. [H/V] | [dBc] |
|-----------------|----------------------------------|-------------------------------|-------------------------------|-----------------|-------|
| 1673.04         | -63.47                           | 3.53                          | -59.95                        | H               | 79.3  |
| 2509.56         | -59.42                           | 3.57                          | -55.85                        | H               | 75.2  |
| 3346.08         | -62.05                           | 5.78                          | -56.26                        | H               | 75.6  |

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

OPERATING FREQUENCY: 848.31 MHz  
 CHANNEL: 777  
 MEASURED OUTPUT POWER: 18.24 dBm = 0.067 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  31.24

| Frequency [MHz] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBd] | Spurious Emission Level [dBm] | Ant. Pol. [H/V] | [dBc] |
|-----------------|----------------------------------|-------------------------------|-------------------------------|-----------------|-------|
| 1696.62         | -61.65                           | 3.44                          | -58.21                        | H               | 76.5  |
| 2544.93         | -60.57                           | 3.64                          | -56.93                        | H               | 75.2  |
| 3393.24         | -62.47                           | 5.90                          | -56.57                        | H               | 74.8  |

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

OPERATING FREQUENCY: 1851.25 MHz  
 CHANNEL: 25  
 MEASURED OUTPUT POWER: 23.03 dBm = 0.201 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  36.03

| Frequency [MHz] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Ant. Pol. [H/V] | [dBc] |
|-----------------|----------------------------------|-------------------------------|-------------------------------|-----------------|-------|
| 3702.50         | -53.29                           | 9.43                          | -43.86                        | H               | 66.9  |
| 5553.75         | -52.41                           | 10.79                         | -41.62                        | H               | 64.7  |
| 7405.00         | -57.78                           | 10.70                         | -47.08                        | H               | 70.1  |
| 9256.25         | -57.12                           | 11.58                         | -45.54                        | H               | 68.6  |

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

OPERATING FREQUENCY: 1880.00 MHz  
 CHANNEL: 600  
 MEASURED OUTPUT POWER: 22.90 dBm = 0.195 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  35.90

| Frequency [MHz] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Ant. Pol. [H/V] | [dBc] |
|-----------------|----------------------------------|-------------------------------|-------------------------------|-----------------|-------|
| 3760.00         | -54.69                           | 9.28                          | -45.40                        | H               | 68.4  |
| 5640.00         | -55.12                           | 11.03                         | -44.08                        | H               | 67.1  |
| 7520.00         | -59.12                           | 10.97                         | -48.15                        | H               | 71.2  |
| 9400.00         | -57.45                           | 11.53                         | -45.91                        | H               | 68.9  |
| 11280.00        | -57.93                           | 12.71                         | -45.22                        | H               | 68.3  |

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

OPERATING FREQUENCY: 1908.75 MHz  
 CHANNEL: 1175  
 MEASURED OUTPUT POWER: 22.49 dBm = 0.177 W  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  35.49

| Frequency [MHz] | Level at Antenna Terminals [dBm] | Substitute Antenna Gain [dBi] | Spurious Emission Level [dBm] | Ant. Pol. [H/V] | [dBc] |
|-----------------|----------------------------------|-------------------------------|-------------------------------|-----------------|-------|
| 3817.50         | -53.13                           | 9.19                          | -43.93                        | H               | 67.0  |
| 5726.25         | -55.15                           | 11.28                         | -43.87                        | H               | 66.9  |
| 7635.00         | -59.42                           | 11.17                         | -48.25                        | H               | 71.3  |
| 9543.75         | -58.41                           | 11.82                         | -46.59                        | H               | 69.6  |
| 11452.50        | -57.67                           | 12.71                         | -44.95                        | H               | 68.0  |

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

|                                      |                                                                                     |                                                                         |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFL16C                      |  | FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT<br>(CLASS II PERMISSIVE CHANGE) |  | Reviewed by:<br>Quality Manager |
| Test Report S/N:<br>0Y1412312353.ZNF | Test Dates:<br>12/29/2014 - 1/9/2015                                                | EUT Type:<br>Portable Handset                                           |                                                                                       | Page 18 of 19                   |

## 7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LGE Poratble Handset** **FCC ID: ZNFL16C** complies with all the requirements of Parts 22 & 24 of the FCC rules.

|                                      |                                                                                     |                                                                         |                                                                                       |                                 |
|--------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------|
| FCC ID: ZNFL16C                      |  | FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT<br>(CLASS II PERMISSIVE CHANGE) |  | Reviewed by:<br>Quality Manager |
| Test Report S/N:<br>0Y1412312353.ZNF | Test Dates:<br>12/29/2014 - 1/9/2015                                                | EUT Type:<br>Poratble Handset                                           |                                                                                       | Page 19 of 19                   |