



# PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21045 USA  
Tel. 410.290.6652 / Fax 410.290.6654  
http://www.pctestlab.com



## MEASUREMENT REPORT FCC Part 22 & 90

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

**Date of Testing:**  
8/8-8/19/2016  
**Test Site/Location:**  
PCTEST Lab., Columbia, MD, USA  
**Test Report Serial No.:**  
0Y1608121343.ZNF

<b>FCC ID:</b>	<b>ZNFLS997</b>
<b>APPLICANT:</b>	<b>LG ELECTRONICS MOBILECOMM U.S.A</b>

**Applicant Type:** Class II Permissive Change  
**FCC Classification:** PCS Licensed Transmitter Held to Ear (PCE)  
**FCC Rule Part:** §2.1049 §22(H) §90.691  
**Test Procedure(s):** KDB 971168 D01 v02r02  
**EUT Type:** Portable Handset  
**Model(s):** LG-LS997, LGLS997, LS997  
**Test Device Serial No.:** *identical prototype* [S/N: 07797, 07789, 07771]  
**Class II Permissive Change:** See FCC change document

Mode	Tx Frequency (MHz)	Measurement	Max. Power (W)	Max. Power (dBm)
CDMA800 (BC10)	817.9 - 823.1	Conducted	0.326	25.13
LTE Band 26	814.7 - 823.3	Conducted	0.286	24.56
LTE Band 26	814.7 - 823.3	Conducted	0.234	23.70
LTE Band 26	815.5 - 822.5	Conducted	0.282	24.50
LTE Band 26	815.5 - 822.5	Conducted	0.234	23.70
LTE Band 26	816.5 - 821.5	Conducted	0.282	24.50
LTE Band 26	816.5 - 821.5	Conducted	0.234	23.70
LTE Band 26	819	Conducted	0.283	24.52
LTE Band 26	819	Conducted	0.233	23.68
LTE Band 26	821.5	ERP	0.093	19.68
LTE Band 26	821.5	ERP	0.074	18.71

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

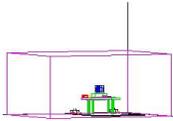


<b>FCC ID:</b> ZNFLS997		<b>Part 22(H) &amp; 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1608121343.ZNF	<b>Test Dates:</b> 8/8-8/19/2016	<b>EUT Type:</b> Portable Handset	Page 1 of 21	

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

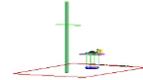
FCC PART 22(H) & 90 MEASUREMENT REPORT .....	3
1.0 INTRODUCTION .....	4
1.1 Scope .....	4
1.2 Testing Facility .....	4
2.0 PRODUCT INFORMATION .....	5
2.1 Equipment Description .....	5
2.2 Device Capabilities .....	5
2.3 Test Configuration .....	5
2.4 EMI Suppression Device(s)/Modifications .....	5
3.0 DESCRIPTION OF TESTS .....	6
3.1 Evaluation Procedure .....	6
3.2 Spurious and Harmonic Emissions at Antenna Terminal .....	6
3.3 Radiated Power and Radiated Spurious Emissions .....	7
4.0 MEASUREMENT UNCERTAINTY .....	8
5.0 TEST EQUIPMENT CALIBRATION DATA .....	9
6.0 SAMPLE CALCULATIONS .....	10
7.0 TEST RESULTS .....	11
7.1 Summary .....	11
7.2 Conducted Power Output Data .....	12
7.3 Radiated Power (ERP) .....	13
7.4 Radiated Spurious Emissions Measurements .....	15
8.0 CONCLUSION .....	21

<b>FCC ID:</b> ZNFLS997		<b>Part 22(H) &amp; 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1608121343.ZNF	<b>Test Dates:</b> 8/8-8/19/2016	<b>EUT Type:</b> Portable Handset	Page 2 of 21	



# MEASUREMENT REPORT

## FCC Part 22(H) & 90

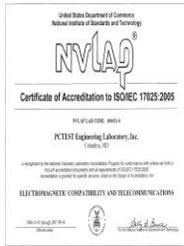
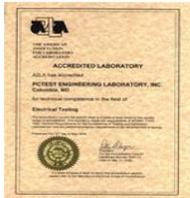


### §2.1033 General Information

**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 21045 USA  
**BASE MODEL:** LG-LS997  
**FCC CLASSIFICATION:** PCS Licensed Transmitter Held to Ear (PCE)  
**MODE:** CDMA / LTE  
**FREQUENCY TOLERANCE:** ±0.00025 % (2.5 ppm)  
**Test Device Serial No.:** 07797, 07789, 07771       Production     Pre-Production     Engineering  
**DATE(S) OF TEST:** 8/8-8/19/2016  
**TEST REPORT S/N:** 0Y1608121343.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.
- 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.
- 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.
- 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> ZNFLS997		<b>Part 22(H) &amp; 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1608121343.ZNF	<b>Test Dates:</b> 8/8-8/19/2016	<b>EUT Type:</b> Portable Handset	Page 3 of 21	

# 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 C63.4-2014 on January 22, 2015.

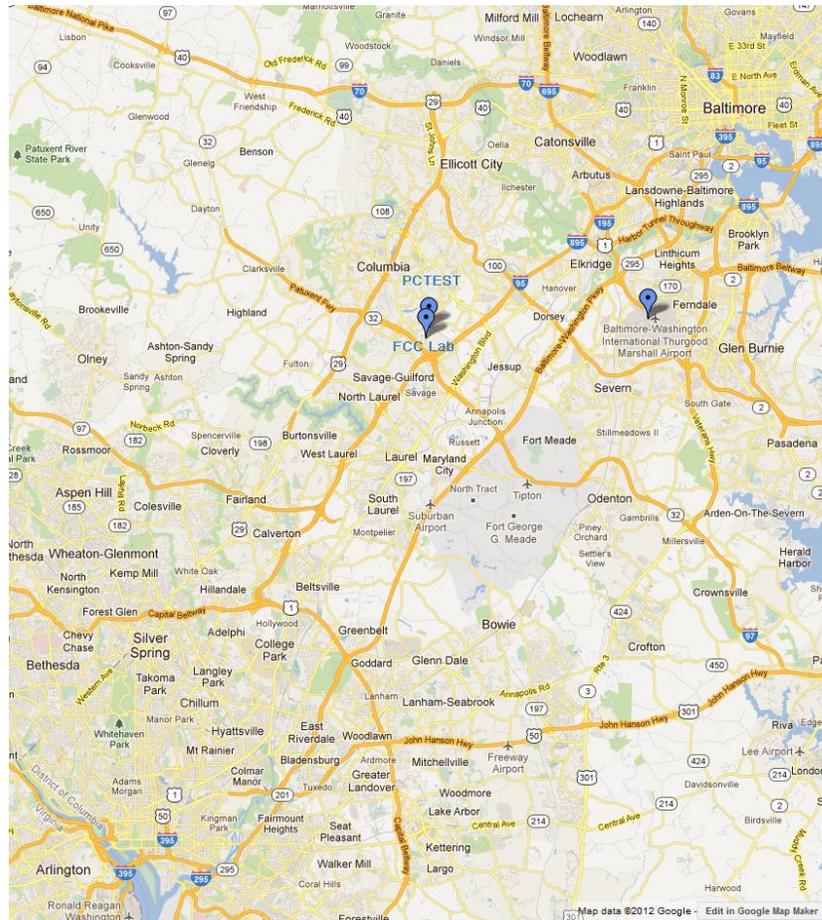


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset		Page 4 of 21

## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFLS997**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 22(H) and 90.691.

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n/ac WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), NFC

This device uses a closed-loop tuner circuit that dynamically updates the antenna impedance parameters to optimize antenna performance. The tuner for this device was set to simulate a "free space" condition in which the transmit antenna is matched to the medium into which it is transmitting and, thus, all power is at its maximum level.

This device also employs an antenna switching diversity (ASD<sub>iv</sub>) mechanism that allows for radiated transmission from one of two antennas at a time for BC10 CDMA/ EVDO and LTE Band 26. Both antennas cannot transmit simultaneously so dual transmission conditions were not investigated. The two antennas share the same conducted circuitry so only one set of conducted measurements is included. The main transmit antenna data is labeled as "Antenna 1" and the secondary transmit antenna data is labeled as "Antenna 2" in the radiated section of this report.

### 2.3 Test Configuration

The LG Portable Handset FCC ID: ZNFLS997 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 tests.

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

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

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset	Page 5 of 21	

## 3.0 DESCRIPTION OF TESTS

### 3.1 Evaluation Procedure

The measurement procedures described in the document titled “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-D-2010) and “Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems” (KDB 971168 D01 v02r02) were used in the measurement of the **LG Portable Handset FCC ID: ZNFLS997**.

### 3.2 Spurious and Harmonic Emissions at Antenna Terminal §2.1051, §90.691

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic.

Out-of-band emission requirement shall apply only to the “outer” channels included in an EA license and to spectrum adjacent to interior channels used by incumbent licensees. The emission limits are as follows:

For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $116 \text{ Log}_{10}(f/6.1)$  decibels or  $50 + 10 \text{ Log}_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \text{ Log}_{10}(P)$  decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset	Page 6 of 21	

### 3.3 Radiated Power and Radiated Spurious Emissions

§2.1053, §90.635, §90.691

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 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 D01 v02r02.

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:

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

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  $P_g \text{ [dBm]} - \text{cable loss [dB]}$ .

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 90.691.

For fundamental radiated power measurements, the guidance of KDB 971168 D01 v02r02 is used to record the EUT power level that is subsequently matched via the aforementioned substitution method given in ANSI/TIA-603-D-2010.

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset	Page 7 of 21	

## 4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. 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 ( $\pm$ dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset	Page 8 of 21	

## 5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/11/2016	Annual	7/11/2017	RE1
Agilent	E5515C	Wireless Communications Test Set	3/4/2016	Biennial	3/4/2018	GB45360985
Anritsu	MT8820C	Radio Communication Analyzer	4/14/2016	Annual	4/14/2017	6201240328
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/26/2016	Biennial	4/26/2018	125518
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/4/2016	Annual	3/4/2017	11401010036
PCTEST	-	EMC Switch System	7/6/2016	Annual	7/6/2017	NM2
Rohde & Schwarz	CMW500	Radio Communication Tester	10/21/2015	Annual	10/21/2016	102060
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/15/2016	Annual	7/15/2017	100348
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/18/2015	Biennial	11/18/2017	91052523RX
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A

**Table 5-1. Test Equipment**

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset	Page 9 of 21	

## 6.0 SAMPLE CALCULATIONS

### Spurious Radiated Emission – BC10

#### **Example: Channel 476 CDMA BC10 Mode 3<sup>rd</sup> Harmonic (2453.70MHz)**

The average 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  $2453.70$  MHz. So  $6.1$  dB is added to the signal generator reading of  $-30.9$  dBm yielding  $-24.80$  dBm. The fundamental EIRP was  $25.501$  dBm so this harmonic was  $25.501$  dBm  $- (-24.80) = 50.3$  dBc.

### Spurious Radiated Emission – LTE Band

#### **Example: Middle Channel LTE Mode 2<sup>nd</sup> Harmonic (1564 MHz)**

The average 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  $1564$  MHz. So  $6.1$  dB is added to the signal generator reading of  $-30.9$  dBm yielding  $-24.80$  dBm. The fundamental EIRP was  $25.501$  dBm so this harmonic was  $25.501$  dBm  $- (-24.80)$ .

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset		Page 10 of 21

## 7.0 TEST RESULTS

### 7.1 Summary

Company Name: LG Electronics MobileComm U.S.A  
 FCC ID: ZNFLS997  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): CDMA / LTE  
 Band: Band Class 10 / Band 26

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
<b>TRANSMITTER MODE (TX)</b>					
2.1046 90.635	Conducted Power	< 100 Watts	RADIATED	PASS	Section 7.2
22.913(a.2)	Effective Radiated Power (Band 26)	< 7 Watts max. ERP		PASS	Section 7.3
2.1053 90.691	Radiated Spurious Emissions	> 43 + log <sub>10</sub> (P[Watts]) for all out-of-band emissions except > 50 + 10log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions within 37.5kHz of Block Edge		PASS	Section 7.4

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

**Notes:**

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

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset	Page 11 of 21	

## 7.2 Conducted Power Output Data

§90.635

Frequency [MHz]	BC10 [Channel]	Battery Type	Cond. PWR [dBm]	Cond. PWR [Watts]	Cond. PWR Limit [dBm]	Margin [dB]
817.90	476	Standard	25.13	0.326	50.00	-24.87
823.10	684	Standard	25.06	0.321	50.00	-24.94

Table 7-2. CDMA BC10 Conducted Power Output Data

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Cond. PWR [dBm]	Cond. PWR [Watts]	Cond. PWR Limit [dBm]	Margin [dB]
814.70	1.4	QPSK	24.55	0.285	50.00	-25.45
823.30	1.4	QPSK	24.56	0.286	50.00	-25.44
814.70	1.4	16-QAM	23.7	0.234	50.00	-26.30
823.30	1.4	16-QAM	23.68	0.233	50.00	-26.32
815.50	3	QPSK	24.47	0.280	50.00	-25.53
822.50	3	QPSK	24.50	0.282	50.00	-25.50
815.50	3	16-QAM	23.7	0.234	50.00	-26.30
822.50	3	16-QAM	23.60	0.229	50.00	-26.40
816.50	5	QPSK	24.5	0.282	50.00	-25.50
821.50	5	QPSK	24.50	0.282	50.00	-25.50
816.50	5	16-QAM	23.7	0.234	50.00	-26.30
821.50	5	16-QAM	23.61	0.230	50.00	-26.39
819.00	10	QPSK	24.52	0.283	50.00	-25.48
819.00	10	16-QAM	23.68	0.233	50.00	-26.32

Table 7-2. LTE Band 26 Conducted Power Output Data

### NOTES:

1. For CDMA mode, 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. For LTE mode, the device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with 1 RB.
2. This unit was tested with its standard battery.

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset	Page 12 of 21	

## 7.3 Radiated Power (ERP)

### §22.913(a.2)

#### Test Overview

Effective Radiated Power (ERP) 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. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, 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: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset	Page 13 of 21	

## Test Setup

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

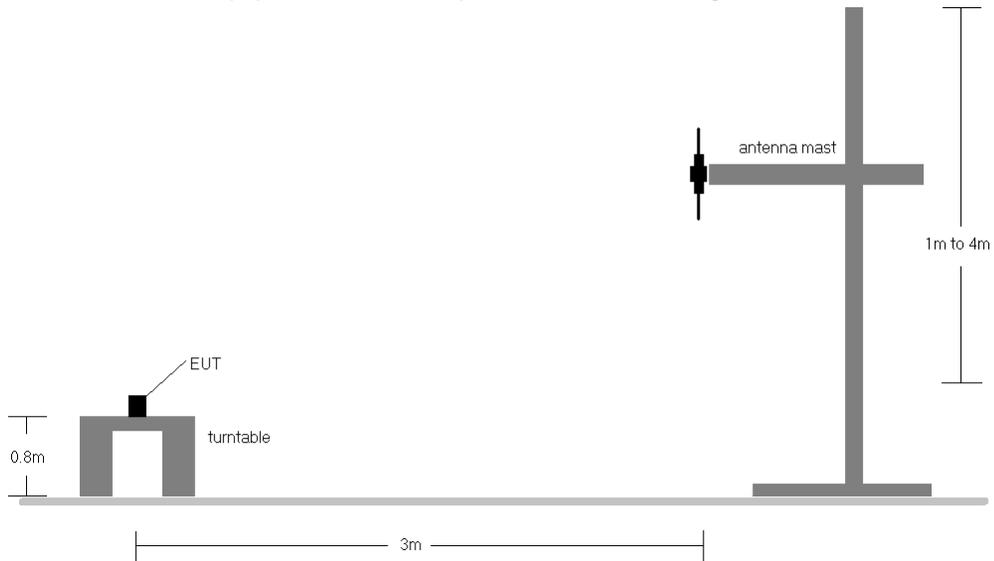


Figure 7-1. Radiated Test Setup <1GHz

## Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.

## Antenna-1 Radiated Power (ERP)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
821.50	15	QPSK	H	223	25	1 / 0	14.71	4.97	19.68	38.45	-18.77
821.50	15	16-QAM	H	223	25	1 / 0	13.74	4.97	18.71	38.45	-19.74

Table 7-1. ERP Data (Band 26)

## Antenna-2 Radiated Power (ERP)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
821.50	15	QPSK	H	110	337	1 / 0	7.12	4.97	12.09	38.45	-26.36
821.50	15	16-QAM	H	110	337	1 / 0	6.16	4.97	11.13	38.45	-27.32

Table 7-2. ERP Data (Band 26)

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset		Page 14 of 21

## 7.4 Radiated Spurious Emissions Measurements

**§2.1053 §90.691**

### 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

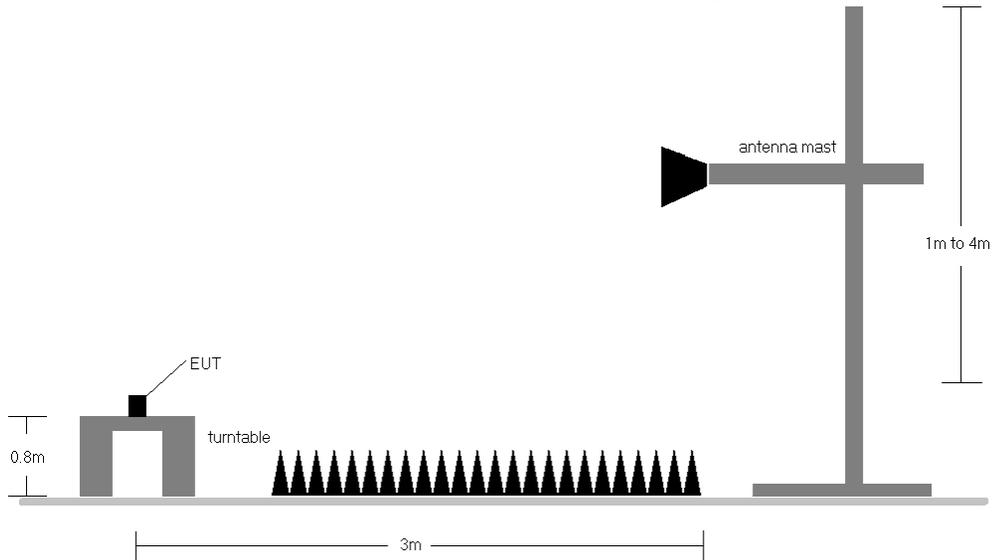
### Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW  $\geq 3 \times$  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

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset		Page 15 of 21

**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**

1. For CDMA mode, 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. For LTE mode, the device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with 1 RB.
3. This unit was tested with its standard battery.
4. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
5. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

FCC ID: ZNFLS997	PCTEST ENGINEERING LABORATORY, INC.	Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset	Page 16 of 21	

## Antenna-1 Radiated Spurious Emissions Measurements

OPERATING FREQUENCY: 817.90 MHz  
 CHANNEL: 476  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT: -13.00 dBm

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]	Margin [dB]
1635.80	H	100	204	-58.49	3.71	-54.77	-41.8
2453.70	H	100	305	-54.02	3.58	-50.44	-37.4
3271.60	H	-	-	-55.59	5.52	-50.07	-37.1

**Table 7-3. CDMA BC10 Radiated Spurious Data (Ch. 476)**

OPERATING FREQUENCY: 823.10 MHz  
 CHANNEL: 684  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT: -13.00 dBm

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]	Margin [dB]
1646.20	H	-	-	-58.73	3.66	-55.07	-42.1
2469.30	H	-	-	-53.93	3.57	-50.36	-37.4

**Table 7-4. CDMA BC10 Radiated Spurious Data (Ch. 684)**

OPERATING FREQUENCY: 814.70 MHz  
 CHANNEL: 26697  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 1.4 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13.00 dBm

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]	Margin [dB]
1629.40	H	-	-	-58.44	3.75	-54.70	-41.7
2444.10	H	149	0	-54.60	3.58	-51.02	-38.0
3258.80	H	-	-	-54.07	5.38	-48.69	-35.7

Table 7-5. LTE Band 26 Radiated Spurious Data (Ch. 26697)

OPERATING FREQUENCY: 823.30 MHz  
 CHANNEL: 26783  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 1.4 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13.00 dBm

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]	Margin [dB]
1646.60	H	-	-	-58.29	3.66	-54.63	-41.6
2469.90	H	-	-	-53.85	3.57	-50.28	-50.3

Table 7-6. LTE Band 26 Radiated Spurious Data (Ch. 26783)

## Antenna-2 Radiated Spurious Emissions Measurements

OPERATING FREQUENCY: 817.90 MHz  
 CHANNEL: 476  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT: -13.00 dBm

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]	Margin [dB]
1635.80	H	-	-	-59.00	3.71	-55.28	-42.3

Table 7-5. CDMA BC10 Radiated Spurious Data (Ch. 476)

OPERATING FREQUENCY: 823.10 MHz  
 CHANNEL: 684  
 MODULATION SIGNAL: CDMA  
 DISTANCE: 3 meters  
 LIMIT: -13.00 dBm

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]	Margin [dB]
1646.20	H	-	-	-58.40	3.66	-54.74	-41.7

Table 7-6. CDMA BC10 Radiated Spurious Data (Ch. 684)

OPERATING FREQUENCY: 814.70 MHz  
 CHANNEL: 26697  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 1.4 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13.00 dBm

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]	Margin [dB]
1629.40	H	-	-	-58.77	3.75	-55.03	-42.0

Table 7-8. LTE Band 26 Radiated Spurious Data (Ch. 26697)

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset	Page 19 of 21	

OPERATING FREQUENCY: 823.30 MHz  
 CHANNEL: 26783  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 1.4 MHz  
 DISTANCE: 3 meters  
 LIMIT: -13.00 dBm

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]	Margin [dB]
1646.60	H	-	-	-57.92	3.66	-54.26	-41.3
2469.90	H	-	-	-53.69	3.57	-50.12	-50.1

Table 7-9. LTE Band 26 Radiated Spurious Data (Ch. 26783)

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset	Page 20 of 21	

## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFLS997** complies with all the requirements of Parts 22(H) and 90 of the FCC rules.

FCC ID: ZNFLS997		Part 22(H) & 90 CDMA / LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121343.ZNF	Test Dates: 8/8-8/19/2016	EUT Type: Portable Handset		Page 21 of 21