



# PCTEST ENGINEERING LABORATORY, INC.

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## MEASUREMENT REPORT FCC Part 90

**Applicant:**

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

**Date of Testing:**

1/15 - 1/23/2015

**Test Site/Location:**

PCTEST Lab., Columbia, MD, USA

**Test Report Serial No.:**

OY1501300325.ZNF

**FCC ID:****ZNFLK430****APPLICANT:****LG ELECTRONICS MOBILECOMM U.S.A****Applicant Type:**

Class II Permissive Change

**FCC Classification:**

PCS Licensed Transmitter (PCB)

**FCC Rule Part:**

§90.691

**EUT Type:**

Portable Tablet

**Model(s):**

LG-LK430, LGLK430, LK430, LK-430

**Test Device Serial No.:***identical prototype* [S/N: Radiated #1]**Class II Permissive Change:**

See FCC change document

**Original Grant Date:**

1/14/2015



Mode	Tx Frequency (MHz)	Cond. PWR	
		Max. Power (W)	Max. Power (dBm)
LTE Band 26	814.7 - 823	0.263	24.20
LTE Band 26	814.7 - 823	0.208	23.20
LTE Band 26	815.5 - 822.5	0.263	24.20
LTE Band 26	815.5 - 822.5	0.209	23.20
LTE Band 26	816.5 - 821.5	0.261	24.20
LTE Band 26	816.5 - 821.5	0.208	23.14
LTE Band 26	819	0.261	24.18
LTE Band 26	819	0.207	23.16

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





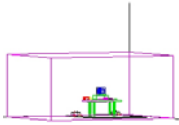
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# MEASUREMENT REPORT

## LTE



### §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-LK430, LGLK430, LK430, LK-430  
**FCC CLASSIFICATION:** PCS Licensed Transmitter (PCB)  
**MODE:** LTE  
**FREQUENCY TOLERANCE:** ±0.00025 % (2.5 ppm)  
**Test Device Serial No.:** Radiated #1  Production  Pre-Production  Engineering  
**DATE(S) OF TEST:** 1/15 - 1/23/2015  
**TEST REPORT S/N:** 0Y1501300325.ZNF

### Test Facility / Accreditations

Measurements were performed at **PCTEST Engineering Lab. located in Columbia, MD 21045, 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.



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## 1.0 INTRODUCTION

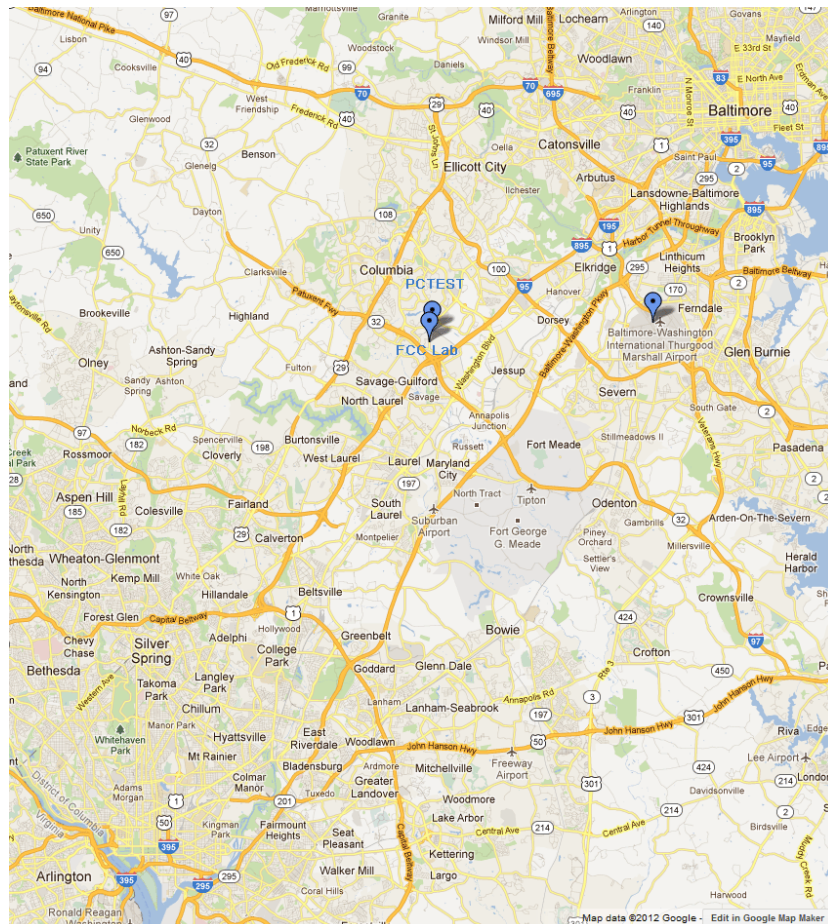
### 1.1 Scope

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'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 C63.4-2003 on February 15, 2012.



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

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Tablet FCC ID: ZNFLK430**. The EUT consisted of the following component(s):

Trade Name / Base Model	FCC ID	Description
LG / Model: LG-LK430, LGLK430, LK430, LK-430	ZNFLK430	Portable Tablet

**Table 2-1. EUT Equipment Description**

**Note:** All data contained in this report is applicable for the device operation in the lower spectrum of B26 LTE (814 – 824 MHz). Test data shown supports the devices compliance with §90.691 of the FCC Rules and Regulation.



### 2.2 Device Capabilities

This device contains the following capabilities:

Multi-band LTE, 802.11b/g/n WLAN, Bluetooth (1x, EDR, LE)

### 2.3 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) was used in the measurement of the measurement of the **LG Portable Tablet FCC ID: ZNFLK430**.

### 3.2 Occupied Bandwidth

#### §2.1049

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The spectrum analyzers’ “occupied bandwidth” measurement function was used to record the occupied bandwidth in accordance with KDB 971168.

### 3.3 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.

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### 3.4 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 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 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:

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

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  $43 + 10\log_{10}(\text{Power [Watts]})$  specified in 90.691.



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## 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
-	RE3	Radiated Emissions Cable Set	10/17/2014	Annual	10/17/2015	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
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	6/26/2013	Biennial	6/26/2015	121034
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	12/1/2014	Annual	12/1/2015	1
Rhode & Schwarz	TS-PR18	Pre-Amplifier	6/12/2014	Annual	6/12/2015	101622
Rohde & Schwarz	CMW500	Radio Communication Tester	10/4/2013	Biennial	10/4/2015	103962
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/21/2014	Annual	5/21/2015	100348
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/18/2014	Biennial	3/18/2016	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/28/2014	Biennial	1/28/2016	A051107

**Table 4-1. Test Equipment**

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## 5.0 SAMPLE CALCULATIONS

### Emission Designator

#### QPSK Modulation

**Emission Designator = 9M00G7D**

LTE BW = 9.00 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

#### 16QAM Modulation



**Emission Designator = 9M01W7D**

LTE BW = 9.01 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

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## 6.0 TEST RESULTS

### 6.1 Summary



Company Name: LG Electronics MobileComm U.S.A  
 FCC ID: ZNFLK430  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): LTE  
 Band: Band 26

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
§2.1053, §90.691	Undesirable Emissions	$> 43 + 10\log_{10}(P[\text{Watts}])$ for all out-of-band emissions	RADIATED	PASS	Sections 6.2

**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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## 6.2 Radiated Spurious Emissions Measurements

§2.1053, §90.691

### Field Strength of SPURIOUS Radiation for LTE Band 26

OPERATING FREQUENCY: 814.70 MHz

CHANNEL: 26697

MEASURED OUTPUT POWER: 24.20 dBm = 0.263 W

MODULATION SIGNAL: QPSK

BANDWIDTH: 1.4 MHz

DISTANCE: 3 meters



LIMIT:  $43 + 10 \log_{10}(W)$  -13.00 dBm

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
1629.40	-54.75	3.69	-51.06	H	H	-38.1
2444.10	-53.81	3.60	-50.21	H	H	-37.2
3258.80	-59.79	5.58	-54.21	H	H	-41.2

**Table 6-2. Radiated Spurious Data (Ch. 26697)**

#### NOTES:

1. 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.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

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**Radiated Spurious Emissions Measurements**  
**§2.1053, §90.691**

**Field Strength of SPURIOUS Radiation for LTE Band 26**



OPERATING FREQUENCY: 823.30 MHz  
 CHANNEL: 26783  
 MEASURED OUTPUT POWER: 24.18 dBm = 0.262 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 1.4 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W)$  -13.00 dBm

Frequency [MHz]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	[dBc]
1646.60	-58.63	3.62	-55.00	H	H	-42.0
2469.90	-57.06	3.58	-53.48	H	H	-40.5

**Table 6-3. Radiated Spurious Data (Ch. 26783)**



**NOTES:**

1. 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.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

FCC ID: ZNFLK430		Part 90 LTE MEASUREMENT REPORT CLASS II PERMISSIVE Change		Reviewed by: Quality Manager
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## 7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Tablet FCC ID: ZNFLK430** complies with all the requirements of Parts 90 of the FCC rules.

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