



# PCTEST ENGINEERING LABORATORY, INC.

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## MEASUREMENT REPORT FCC Part 24 & 27 LTE

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


**Date of Testing:**  
12/28/2016 - 1/16/2017  
**Test Site/Location:**  
PCTEST Lab., Columbia, MD, USA  
**Test Report Serial No.:**  
1M1701030002-03.ZNF

<b>FCC ID :</b>	<b>ZNFL64VL</b>
<b>APPLICANT:</b>	<b>LG ELECTRONICS MOBILECOMM U.S.A</b>



**Application Type:** Class II Permissive Change  
**FCC Classification:** PCS Licensed Transmitter Held to Ear (PCE)  
**FCC Rule Part(s):** §2; §24; §27  
**Test Procedure(s):** ANSI/TIA-603-D-2010, KDB 971168 D01 v02r02  
**EUT Type:** Portable Handset  
**Model:** LGL64VL  
**Additional Model(s):** L64VL, LG-L64VL  
**Test Device Serial No.:** *production model* [S/N: 90005]  
**Class II Permissive Change:** Please see FCC change document  
**Original Grant Date:** 1/6/2017

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

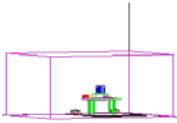


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# T A B L E O F C O N T E N T S

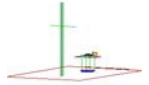
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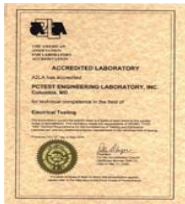


### §2.1033 General Information



**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  
**FCC RULE PART(S):** §2; §24; §27  
**BASE MODEL:** LGL64VL  
**FCC ID:** ZNFL64VL  
**FCC CLASSIFICATION:** PCS Licensed Transmitter Held to Ear (PCE)  
**FREQUENCY TOLERANCE:** ±0.00025 % (2.5 ppm)  
**Test Device Serial No.:** 90005       Production     Pre-Production     Engineering  
**DATE(S) OF TEST:** 12/28/2016 - 1/16/2017  
**TEST REPORT S/N:** 1M1701030002-03.ZNF

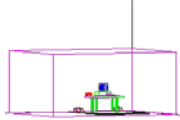
### Test Facility / Accreditations

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



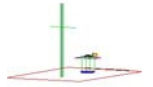
- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards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

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## MEASUREMENT REPORT

### FCC Part 24 & 27



Mode	FCC Rule Part	Tx Frequency (MHz)	ERP/EIRP		Modulation
			Max. Power (W)	Max. Power (dBm)	
LTE Band 13	27	779.5 - 784.5	0.075	18.74	QPSK
LTE Band 13	27	779.5 - 784.5	0.053	17.21	16QAM
LTE Band 13	27	782	0.076	18.81	QPSK
LTE Band 13	27	782	0.061	17.86	16QAM
LTE Band 4	27	1710.7 - 1754.3	0.315	24.99	QPSK
LTE Band 4	27	1710.7 - 1754.3	0.218	23.39	16QAM
LTE Band 4	27	1711.5 - 1753.5	0.318	25.02	QPSK
LTE Band 4	27	1711.5 - 1753.5	0.213	23.29	16QAM
LTE Band 4	27	1712.5 - 1752.5	0.325	25.12	QPSK
LTE Band 4	27	1712.5 - 1752.5	0.231	23.64	16QAM
LTE Band 4	27	1715 - 1750	0.294	24.69	QPSK
LTE Band 4	27	1715 - 1750	0.227	23.57	16QAM
LTE Band 4	27	1717.5 - 1747.5	0.280	24.47	QPSK
LTE Band 4	27	1717.5 - 1747.5	0.227	23.57	16QAM
LTE Band 4	27	1720 - 1745	0.287	24.57	QPSK
LTE Band 4	27	1720 - 1745	0.219	23.40	16QAM
LTE Band 2	24E	1850.7 - 1909.3	0.202	23.05	QPSK
LTE Band 2	24E	1850.7 - 1909.3	0.130	21.15	16QAM
LTE Band 2	24E	1851.5 - 1908.5	0.200	23.02	QPSK
LTE Band 2	24E	1851.5 - 1908.5	0.132	21.22	16QAM
LTE Band 2	24E	1852.5 - 1907.5	0.183	22.62	QPSK
LTE Band 2	24E	1852.5 - 1907.5	0.120	20.79	16QAM
LTE Band 2	24E	1855 - 1905	0.202	23.05	QPSK
LTE Band 2	24E	1855 - 1905	0.137	21.37	16QAM
LTE Band 2	24E	1857.5 - 1902.5	0.212	23.27	QPSK
LTE Band 2	24E	1857.5 - 1902.5	0.137	21.37	16QAM
LTE Band 2	24E	1860 - 1900	0.244	23.88	QPSK
LTE Band 2	24E	1860 - 1900	0.184	22.65	16QAM

### EUT Overview

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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'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.

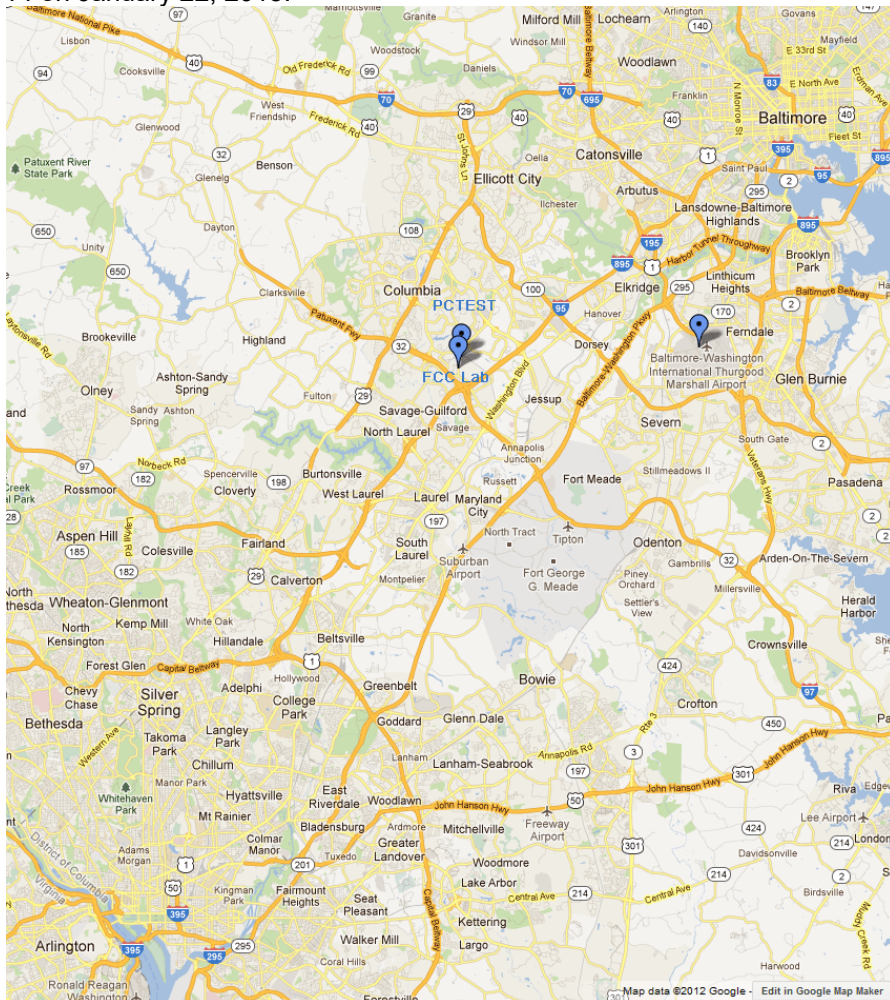


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFL64VL**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

### 2.2 Device Capabilities

This device contains the following capabilities:



850/1900 CDMA (BC0, BC1), Multi-band LTE, 802.11b/g/n WLAN, Bluetooth (1x, EDR, LE)

### 2.3 Test Configuration

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

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

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

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## 3.0 DESCRIPTION OF TESTS

### 3.1 Measurement 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 EUT.

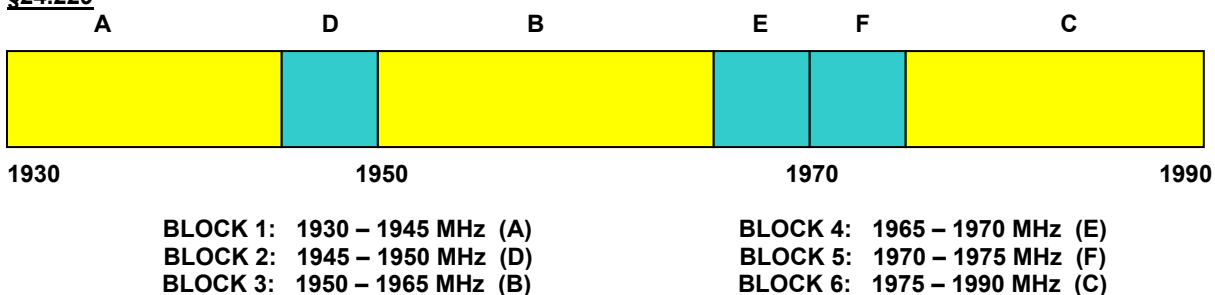
### 3.1 Block C Frequency Range

#### §27.5(b)(3)

Two paired channels of 11 megahertz each are available for assignment in Block C in the 746-757 MHz and 776-787 MHz bands. In the event that no licenses for two channels in this Block C are assigned based on the results of the first auction in which such licenses were offered because the auction results do not satisfy the applicable reserve price, the spectrum in the 746-757 MHz and 776-787 MHz bands will instead be made available for assignment at a subsequent auction as follows: (i) Two paired channels of 6 megahertz each available for assignment in Block C1 in the 746-752 MHz and 776-782 MHz bands. (ii) Two paired channels of 5 megahertz each available for assignment in Block C2 in the 752-757 MHz and 782-787 MHz bands.

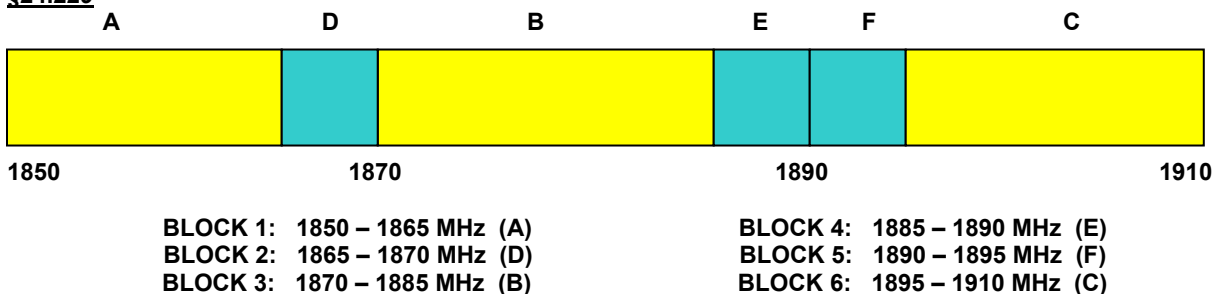
### 3.2 PCS - Base Frequency Blocks

#### §24.229





### 3.3 PCS - Mobile Frequency Blocks

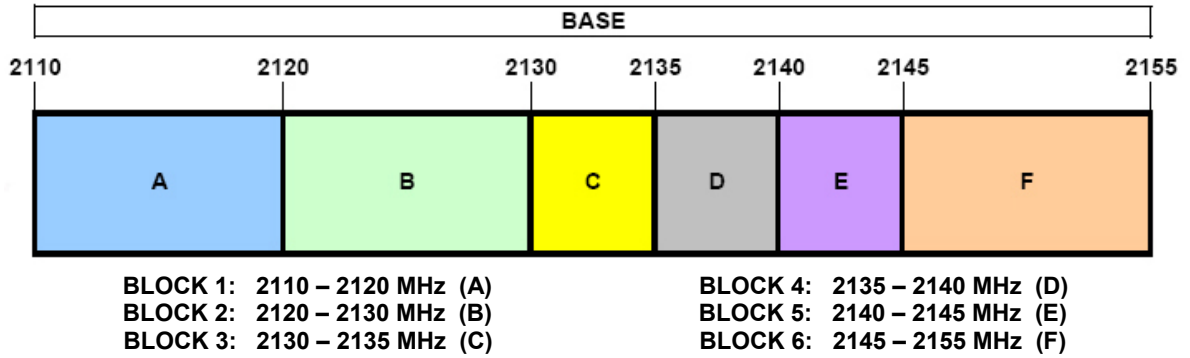
#### §24.229



### 3.4 AWS - Base Frequency Blocks

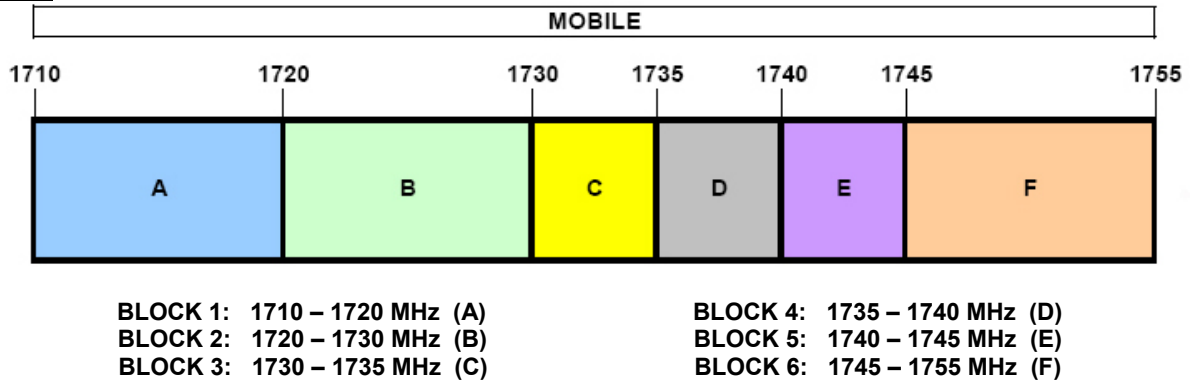
#### §27.5(h)

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### 3.5 AWS - Mobile Frequency Blocks

§27.5(h)





### 3.6 Radiated Power and Radiated Spurious Emissions

§2.1053 §24.232(c) §24.238(a) §27.50(b.10) §27.50(d.4) §27.53(f) §27.53(h)

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

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

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

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## 4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of  $k = 2$  to indicate a 95% level of confidence. The measurement data shown herein meets or exceeds the  $U_{\text{CISPR}}$  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

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## 5.0 TEST EQUIPMENT CALIBRATION DATA



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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTX3	Licensed Transmitter Cable Set	7/12/2016	Annual	7/12/2017	LTX3
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/11/2016	Annual	7/11/2017	RE1
Agilent	N9030A	PXA Signal Analyzer (44GHz)	3/1/2016	Annual	3/1/2017	MY52350166
Agilent	N9020A	MXA Signal Analyzer	10/28/2016	Annual	10/28/2017	US46470561
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	7/11/2016	Annual	7/11/2017	441128
Emco	6502	Active Loop Antenna (10k - 30 MHz)	8/9/2016	Biennial	8/9/2018	2936
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
Espec	ESX-2CA	Environmental Chamber	3/4/2016	Annual	3/4/2017	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/26/2016	Biennial	4/26/2018	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	4/26/2016	Biennial	4/26/2018	128337
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	8/23/2016	Biennial	8/23/2018	135427
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/4/2016	Annual	3/4/2017	11401010036
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
PCTEST	-	EMC Switch System	7/11/2016	Annual	7/11/2017	NM1
PCTEST	-	EMC Switch System	7/6/2016	Annual	7/6/2017	NM2
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	7/27/2016	Annual	7/27/2017	103200
Rohde & Schwarz	CMW500	Radio Communication Tester	10/20/2016	Annual	10/20/2017	100976
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/15/2016	Annual	7/15/2017	100348
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/7/2016	Annual	3/7/2017	100040
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	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
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

**Table 5-1. Test Equipment**

**Notes:**

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



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## 6.0 SAMPLE CALCULATIONS

### 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  $- (-24.80)$ .

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## 7.0 TEST RESULTS

### 7.1 Summary



Company Name: LG Electronics MobileComm U.S.A  
 FCC ID: ZNFL64VL  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
27.50(b.10)	Effective Radiated Power (Band 13)	< 3 Watts max. ERP	RADIATED	PASS	Section 7.2
24.232(c)	Equivalent Isotropic Radiated Power (Band 2)	< 2 Watts max. EIRP		PASS	Section 7.2
27.50(d.4)	Equivalent Isotropic Radiated Power (Band 4 66)	< 1 Watts max. EIRP		PASS	Section 7.2
2.1053 24.238(a) 27.53(c) 27.53(h)	Undesirable Emissions	> 43 + 10log <sub>10</sub> (P[Watts]) for all out-of-band emissions		PASS	Section 7.3
27.53(f)	Undesirable Emissions (Band 13)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 – 1610 MHz		PASS	Section 7.3

**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.

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## 7.2 Radiated Power (ERP/EIRP)

§24.232(c.2) §27.50(b.10) §27.50(d.4)

### Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at 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

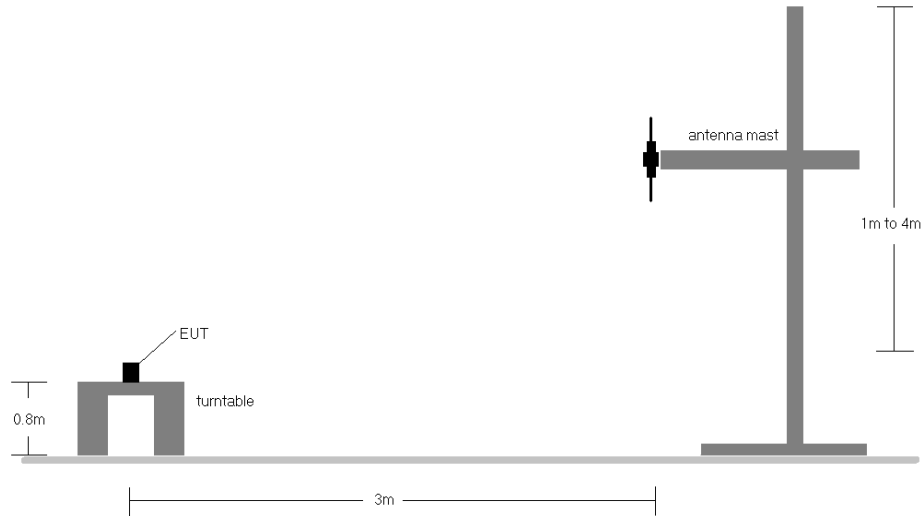
1. Radiated power measurements are performed using the signal analyzer’s “channel power” measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW  $\geq$  3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points  $\geq$  2 x span / 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

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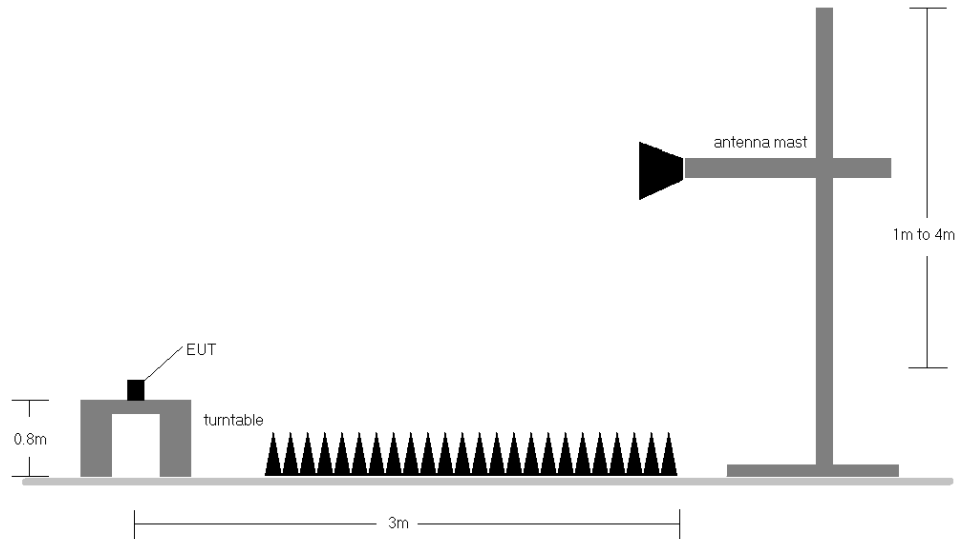


## Test Setup

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





**Figure 7-1. Radiated Test Setup <1GHz**



**Figure 7-2. 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.
- 3) Class 2 Permissive Change samples were used for testing. It has been determined that powers did not change between Original Certification samples and Class 2 Permissive Change samples. Test results fall within expected measurement tolerances.

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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]
779.50	5	QPSK	H	150	40	1 / 0	19.40	-0.83	18.57	34.77	-16.20
782.00	5	QPSK	H	150	310	1 / 0	19.56	-0.82	18.74	34.77	-16.03
784.50	5	QPSK	H	150	290	1 / 0	19.28	-0.81	18.47	34.77	-16.30
779.50	5	16-QAM	H	150	40	1 / 0	17.59	-0.83	16.76	34.77	-18.01
782.00	5	16-QAM	H	150	310	1 / 0	18.03	-0.82	17.21	34.77	-17.56
784.50	5	16-QAM	H	150	290	1 / 0	17.38	-0.81	16.57	34.77	-18.20
782.00	10	QPSK	H	150	85	1 / 0	19.63	-0.82	18.81	34.77	-15.96
782.00	10	16-QAM	H	150	85	1 / 0	18.68	-0.82	17.86	34.77	-16.91
782.00	10	QPSK	V	150	70	1 / 0	19.62	-0.82	18.80	34.77	-15.97

**Table 7-2. ERP Data (Band 13)**

FCC ID: ZNFL64VL		FCC Pt. 24 & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	V	150	105	1 / 5	19.43	5.56	24.99	30.00	-5.01
1732.50	1.4	QPSK	V	150	90	1 / 5	19.14	5.41	24.55	30.00	-5.45
1754.30	1.4	QPSK	V	150	97	1 / 5	18.77	5.26	24.03	30.00	-5.97
1710.70	1.4	16-QAM	V	150	105	1 / 5	17.83	5.56	23.39	30.00	-6.61
1732.50	1.4	16-QAM	V	150	90	1 / 5	17.27	5.41	22.68	30.00	-7.32
1754.30	1.4	16-QAM	V	150	97	1 / 5	16.76	5.26	22.02	30.00	-7.98
1711.50	3	QPSK	V	150	105	1 / 14	19.47	5.55	25.02	30.00	-4.98
1732.50	3	QPSK	V	150	95	1 / 14	19.19	5.41	24.60	30.00	-5.40
1753.50	3	QPSK	V	150	92	1 / 14	18.85	5.26	24.11	30.00	-5.89
1711.50	3	16-QAM	V	150	105	1 / 14	17.74	5.55	23.29	30.00	-6.71
1732.50	3	16-QAM	V	150	95	1 / 14	17.47	5.41	22.88	30.00	-7.12
1753.50	3	16-QAM	V	150	92	1 / 14	16.72	5.26	21.98	30.00	-8.02
1712.50	5	QPSK	V	150	101	1 / 24	19.57	5.55	25.12	30.00	-4.88
1732.50	5	QPSK	V	150	95	1 / 24	18.87	5.41	24.28	30.00	-5.72
1752.50	5	QPSK	V	150	100	1 / 24	18.76	5.27	24.03	30.00	-5.97
1712.50	5	16-QAM	V	150	101	1 / 24	18.09	5.55	23.64	30.00	-6.36
1732.50	5	16-QAM	V	150	95	1 / 24	17.46	5.41	22.87	30.00	-7.13
1752.50	5	16-QAM	V	150	100	1 / 24	17.53	5.27	22.80	30.00	-7.20
1715.00	10	QPSK	V	150	95	1 / 49	19.15	5.53	24.68	30.00	-5.32
1732.50	10	QPSK	V	150	90	1 / 49	19.28	5.41	24.69	30.00	-5.31
1750.00	10	QPSK	V	150	85	1 / 49	17.66	5.29	22.95	30.00	-7.05
1715.00	10	16-QAM	V	150	95	1 / 49	17.69	5.53	23.22	30.00	-6.78
1732.50	10	16-QAM	V	150	90	1 / 49	18.16	5.41	23.57	30.00	-6.43
1750.00	10	16-QAM	V	150	85	1 / 49	16.57	5.29	21.86	30.00	-8.14
1717.50	15	QPSK	V	150	90	1 / 74	18.67	5.51	24.18	30.00	-5.82
1732.50	15	QPSK	V	150	92	1 / 74	19.06	5.41	24.47	30.00	-5.53
1747.50	15	QPSK	V	150	101	1 / 74	17.65	5.31	22.96	30.00	-7.04
1717.50	15	16-QAM	V	150	90	1 / 74	17.41	5.51	22.92	30.00	-7.08
1732.50	15	16-QAM	V	150	92	1 / 74	18.16	5.41	23.57	30.00	-6.43
1747.50	15	16-QAM	V	150	101	1 / 74	16.39	5.31	21.70	30.00	-8.30
1720.00	20	QPSK	V	150	95	1 / 99	19.08	5.49	24.57	30.00	-5.43
1732.50	20	QPSK	V	150	90	1 / 99	18.10	5.41	23.51	30.00	-6.49
1745.00	20	QPSK	V	150	102	1 / 99	17.65	5.32	22.97	30.00	-7.03
1720.00	20	16-QAM	V	150	95	1 / 99	17.91	5.49	23.40	30.00	-6.60
1732.50	20	16-QAM	V	150	90	1 / 99	17.19	5.41	22.60	30.00	-7.40
1745.00	20	16-QAM	V	150	102	1 / 99	16.56	5.32	21.88	30.00	-8.12
1712.50	5	QPSK	H	150	260	1 / 99	17.31	5.55	22.86	30.00	-7.14

**Table 7-3. EIRP Data (Band 4)**

FCC ID: ZNFL64VL		FCC Pt. 24 & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1701030002-03.ZNF	Test Dates: 12/28/2016 - 1/16/2017	EUT Type: Portable Handset		Page 17 of 25	

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	150	300	1 / 0	18.23	4.82	23.05	33.01	-9.96
1880.00	1.4	QPSK	V	150	305	1 / 0	17.40	4.74	22.14	33.01	-10.87
1909.30	1.4	QPSK	V	150	295	1 / 0	16.81	4.68	21.49	33.01	-11.52
1850.70	1.4	16-QAM	V	150	300	1 / 0	16.33	4.82	21.15	33.01	-11.86
1880.00	1.4	16-QAM	V	150	305	1 / 0	15.48	4.74	20.22	33.01	-12.79
1909.30	1.4	16-QAM	V	150	295	1 / 0	14.81	4.68	19.49	33.01	-13.52
1851.50	3	QPSK	V	150	297	1 / 0	18.20	4.82	23.02	33.01	-9.99
1880.00	3	QPSK	V	150	330	1 / 0	17.49	4.74	22.23	33.01	-10.78
1908.50	3	QPSK	V	150	300	1 / 0	17.21	4.68	21.89	33.01	-11.12
1851.50	3	16-QAM	V	150	297	1 / 0	16.40	4.82	21.22	33.01	-11.79
1880.00	3	16-QAM	V	150	330	1 / 0	15.45	4.74	20.19	33.01	-12.82
1908.50	3	16-QAM	V	150	300	1 / 0	14.98	4.68	19.66	33.01	-13.35
1852.50	5	QPSK	V	150	310	1 / 0	17.81	4.81	22.62	33.01	-10.39
1880.00	5	QPSK	V	150	295	1 / 0	17.39	4.74	22.13	33.01	-10.88
1907.50	5	QPSK	V	150	297	1 / 0	16.79	4.68	21.47	33.01	-11.54
1852.50	5	16-QAM	V	150	310	1 / 0	15.98	4.81	20.79	33.01	-12.22
1880.00	5	16-QAM	V	150	295	1 / 0	15.99	4.74	20.73	33.01	-12.28
1907.50	5	16-QAM	V	150	297	1 / 0	15.44	4.68	20.12	33.01	-12.89
1855.00	10	QPSK	V	150	295	1 / 0	17.58	4.81	22.39	33.01	-10.62
1880.00	10	QPSK	V	150	305	1 / 0	18.31	4.74	23.05	33.01	-9.96
1905.00	10	QPSK	V	150	325	1 / 0	16.30	4.68	20.98	33.01	-12.03
1855.00	10	16-QAM	V	150	295	1 / 0	16.36	4.81	21.17	33.01	-11.84
1880.00	10	16-QAM	V	150	305	1 / 0	16.63	4.74	21.37	33.01	-11.64
1905.00	10	16-QAM	V	150	325	1 / 0	15.05	4.68	19.73	33.01	-13.28
1857.50	15	QPSK	V	150	335	1 / 0	17.51	4.80	22.31	33.01	-10.70
1880.00	15	QPSK	V	150	330	1 / 0	18.53	4.74	23.27	33.01	-9.74
1902.50	15	QPSK	V	150	55	1 / 0	17.94	4.69	22.63	33.01	-10.38
1857.50	15	16-QAM	V	150	335	1 / 0	16.56	4.80	21.36	33.01	-11.65
1880.00	15	16-QAM	V	150	330	1 / 0	16.63	4.74	21.37	33.01	-11.64
1902.50	15	16-QAM	V	150	55	1 / 0	16.64	4.69	21.33	33.01	-11.68
1860.00	20	QPSK	V	150	335	1 / 0	18.55	4.79	23.34	33.01	-9.67
1880.00	20	QPSK	V	150	300	1 / 0	19.14	4.74	23.88	33.01	-9.13
1900.00	20	QPSK	V	150	310	1 / 0	18.00	4.69	22.69	33.01	-10.32
1860.00	20	16-QAM	V	150	335	1 / 0	16.60	4.79	21.39	33.01	-11.62
1880.00	20	16-QAM	V	150	300	1 / 0	17.91	4.74	22.65	33.01	-10.36
1900.00	20	16-QAM	V	150	310	1 / 0	16.84	4.69	21.53	33.01	-11.48
1880.00	20	QPSK	H	150	85	1 / 0	16.89	4.74	21.63	33.01	-11.38

**Table 7-4. EIRP Data (Band 2)**

FCC ID: ZNFL64VL		FCC Pt. 24 & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1701030002-03.ZNF	Test Dates: 12/28/2016 - 1/16/2017	EUT Type: Portable Handset		Page 18 of 25	

## 7.3 Radiated Spurious Emissions Measurements

§2.1053 §24.238(a) §27.53(c) §27.53(f) §27.53(h)

### 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 vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak 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 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

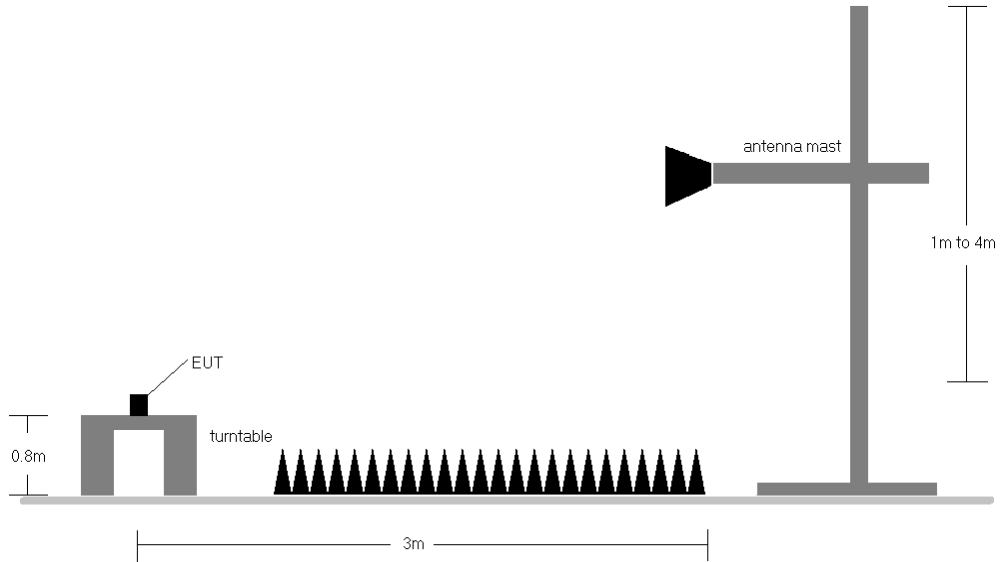
### Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
2. VBW  $\geq$  3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points  $\geq$  2 x span / RBW
5. Detector = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. The trace was allowed to stabilize

FCC ID: ZNFL64VL		FCC Pt. 24 & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1701030002-03.ZNF	Test Dates: 12/28/2016 - 1/16/2017	EUT Type: Portable Handset	Page 19 of 25	

**Test Setup**



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



**Figure 7-3. Test Instrument & Measurement Setup**

**Test Notes**

- 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.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) 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.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

FCC ID: ZNFL64VL		FCC Pt. 24 & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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OPERATING FREQUENCY: 782.00 MHz  
 CHANNEL: 23230  
 MEASURED OUTPUT POWER: 18.81 dBm = 0.076 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  31.81 dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
2346.00	H	-	-	-71.57	6.80	-64.78	83.6
3128.00	H	-	-	-68.41	6.88	-61.53	80.3

Table 7-5. Radiated Spurious Data (Band 13 – Mid Channel)

MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.00 MHz  
 DISTANCE: 3 meters  
 NARROWBAND EMISSION LIMIT: -50 dBm  
 WIDEBAND EMISSION LIMIT: -40 dBm/MHz

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]
1564.00	H	-	-	-75.16	6.50	-68.66	-28.7

Table 7-6. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)

FCC ID: ZNFL64VL		FCC Pt. 24 & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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OPERATING FREQUENCY: 1712.50 MHz  
 CHANNEL: 19975  
 MEASURED OUTPUT POWER: 25.12 dBm = 0.325 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  38.12 dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3425.00	H	100	338	-66.36	9.55	-56.82	81.9
5137.50	H	100	172	-60.95	11.02	-49.92	75.0
6850.00	H	-	-	-62.80	10.76	-52.05	77.2
8562.50	H	-	-	-60.82	11.31	-49.51	74.6

**Table 7-7. Radiated Spurious Data (Band 4 – Low Channel)**

OPERATING FREQUENCY: 1732.50 MHz  
 CHANNEL: 20175  
 MEASURED OUTPUT POWER: 24.28 dBm = 0.268 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  37.28 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	H	100	340	-67.24	9.64	-57.60	81.9
5197.50	H	100	154	-62.58	10.98	-51.61	75.9
6930.00	H	-	-	-62.66	10.85	-51.81	76.1
8662.50	H	-	-	-60.85	11.53	-49.32	73.6

**Table 7-8. Radiated Spurious Data (Band 4 – Mid Channel)**

FCC ID: ZNFL64VL		FCC Pt. 24 & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1701030002-03.ZNF	Test Dates: 12/28/2016 - 1/16/2017	EUT Type: Portable Handset	Page 22 of 25	

OPERATING FREQUENCY: 1752.50 MHz  
 CHANNEL: 20375  
 MEASURED OUTPUT POWER: 24.03 dBm = 0.253 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  37.03 dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3505.00	H	100	293	-66.73	9.74	-57.00	81.0
5257.50	H	100	155	-63.43	11.05	-52.38	76.4
7010.00	H	-	-	-63.24	11.00	-52.24	76.3
8762.50	H	-	-	-61.31	11.71	-49.60	73.6

**Table 7-9. Radiated Spurious Data (Band 4 – High Channel)**

OPERATING FREQUENCY: 1860.00 MHz  
 CHANNEL: 18700  
 MEASURED OUTPUT POWER: 23.34 dBm = 0.216 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.34 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3720.00	H	100	283	-67.13	9.82	-57.31	80.7
5580.00	H	126	187	-63.95	11.20	-52.74	76.1
7440.00	H	-	-	-61.90	10.90	-50.99	74.3
9300.00	H	-	-	-61.28	12.27	-49.01	72.3

**Table 7-10. Radiated Spurious Data (Band 2 – Low Channel)**

FCC ID: ZNFL64VL		FCC Pt. 24 & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1701030002-03.ZNF	Test Dates: 12/28/2016 - 1/16/2017	EUT Type: Portable Handset	Page 23 of 25	

OPERATING FREQUENCY: 1880.00 MHz  
 CHANNEL: 18900  
 MEASURED OUTPUT POWER: 23.88 dBm = 0.244 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.88 dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	H	100	92	-58.80	9.63	-49.17	73.1
5640.00	H	100	76	-65.02	11.29	-53.73	77.6
7520.00	H	-	-	-61.96	11.12	-50.83	74.7
9400.00	H	-	-	-61.22	12.28	-48.94	72.8

Table 7-11. Radiated Spurious Data (Band 2 – Mid Channel)

OPERATING FREQUENCY: 1900.00 MHz  
 CHANNEL: 19100  
 MEASURED OUTPUT POWER: 22.69 dBm = 0.186 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 20.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.69 dBc



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3800.00	H	120	90	-63.74	9.44	-54.30	77.0
5700.00	H	110	185	-64.65	11.37	-53.28	76.0
7600.00	H	-	-	-62.29	11.32	-50.98	73.7
9500.00	H	-	-	-61.52	12.39	-49.13	71.8

Table 7-12. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: ZNFL64VL		FCC Pt. 24 & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1701030002-03.ZNF	Test Dates: 12/28/2016 - 1/16/2017	EUT Type: Portable Handset	Page 24 of 25	

## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFL64VL** complies with all the requirements of Parts 24 & 27 of the FCC rules for LTE operation only.

<b>FCC ID:</b> ZNFL64VL		<b>FCC Pt. 24 &amp; 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M1701030002-03.ZNF	<b>Test Dates:</b> 12/28/2016 - 1/16/2017	<b>EUT Type:</b> Portable Handset	Page 25 of 25	