**MEASUREMENT REPORT**
FCC Part 22 & 90**Applicant Name:**LG Electronics USA, Inc.
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States**Date of Testing:**

7/25/2018 - 8/8/2018

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M1808070153-04-R2.ZNF

FCC ID:**ZNFV405UA****APPLICANT:****LG Electronics USA, Inc.****Application Type:**

Class II Permissive Change

Model:

LM-V405UA

Additional Model(s):

LMV405UA, LM-V405TA, LMV405TA, LM-V405MA, LMV405MA, LM-V405QA, LMV405QA, LM-V405QA5, LMV405QA5, LM-V405QA6, LMV405QA6, LM-V405UAB, LMV405UAB, LM-V405UAL, LMV405UAL

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part:

§2.1049, §22(H), §90.691, §90.543

Test Procedure(s):

ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01, KDB 648474 D03 v01r04


Class II Permissive Change:

Please see FCC change document

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.

This revised Test Report (S/N: 1M1808070153-04-R2.ZNF) supersedes and replaces the previously issued test report (S/N: 1M1808070153-04-R1.ZNF) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly."

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.

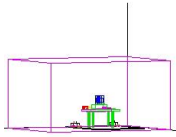

Randy Ortanez
President

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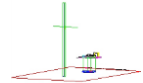
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FCC Part 22(H) & 90



Mode	Tx Frequency (MHz)	Measurement	Max. Power (W)	Max. Power (dBm)	Emission Designator	Modulation
LTE Band 14	790.5 - 795.5	ERP	0.065	18.12	4M54G7D	QPSK
LTE Band 14	790.5 - 795.5	ERP	0.042	16.28	4M54W7D	16-QAM
LTE Band 14	790.5 - 795.5	ERP	0.036	15.59	4M53W7D	64-QAM
LTE Band 14	793	ERP	0.062	17.89	9M01G7D	QPSK
LTE Band 14	793	ERP	0.046	16.67	9M02W7D	16-QAM
LTE Band 14	793	ERP	0.035	15.38	9M01W7D	64-QAM
CDMA800 (BC10)	817.9 - 823.1	Conducted	0.337	25.28	1M28F9W	CDMA
LTE Band 26	814.7 - 823.3	Conducted	0.349	25.43	1M10G7D	QPSK
LTE Band 26	814.7 - 823.3	Conducted	0.276	24.41	1M08W7D	16-QAM
LTE Band 26	814.7 - 823.3	Conducted	0.223	23.49	1M09W7D	64-QAM
LTE Band 26	815.5 - 822.5	Conducted	0.348	25.42	2M69G7D	QPSK
LTE Band 26	815.5 - 822.5	Conducted	0.278	24.44	2M69W7D	16-QAM
LTE Band 26	815.5 - 822.5	Conducted	0.218	23.39	2M69W7D	64-QAM
LTE Band 26	816.5 - 821.5	Conducted	0.351	25.45	4M50G7D	QPSK
LTE Band 26	816.5 - 821.5	Conducted	0.280	24.47	4M50G7D	16-QAM
LTE Band 26	816.5 - 821.5	Conducted	0.220	23.42	4M51W7D	64-QAM
LTE Band 26	819	Conducted	0.342	25.34	8M97G7D	QPSK
LTE Band 26	819	Conducted	0.276	24.41	8M96W7D	16-QAM
LTE Band 26	819	Conducted	0.219	23.40	8M96W7D	64-QAM
LTE Band 26	821.5	Conducted	0.337	25.28	13M4G7D	QPSK
LTE Band 26	821.5	Conducted	0.274	24.38	13M4W7D	16-QAM
LTE Band 26	821.5	Conducted	0.219	23.40	13M4W7D	64-QAM
LTE Band 26	821.5	ERP	0.068	18.30	13M4G7D	QPSK
LTE Band 26	821.5	ERP	0.046	16.65	13M4W7D	16-QAM
LTE Band 26	821.5	ERP	0.039	15.92	13M4W7D	64-QAM

EUT Overview

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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) 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 Innovation, Science and Economic Development Canada.

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

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

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFV405UA**. 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 90.543, 22(H) and 90.691.

Test Device Serial No.: 06549, 06556, 06507, 06523

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



2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 7.0 of this test report for a description of the radiated tests.

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

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 document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

3.2 Radiated Power and Radiated Spurious Emissions

\$2.1053, \$90.635, \$90.691, \$90.543

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. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

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 v03r01.



Per the guidance of ANSI/TIA-603-E-2016, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

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

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 v03r01 is used to record the EUT power level that is subsequently matched via the aforementioned substitution method given in ANSI/TIA-603-E-2016.

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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 uncertainty shown below 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)
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 C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Anritsu	MT8820C	Radio Communication Analyzer	1/30/2018	Annual	1/30/2019	6201300731
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	12/1/2016	Biennial	12/1/2018	125518
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/30/2018	Annual	3/30/2019	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	1/24/2018	Annual	1/24/2019	100040
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	8/9/2018	Annual	8/9/2019	100348
Rohde & Schwarz	CMW500	Radio Communication Tester	11/3/2017	Annual	11/3/2018	100976
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/18/2018	Annual	6/18/2019	102134
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB6	Bi-Log Antenna (30M - 6GHz)	9/27/2016	Biennial	9/27/2018	A082816

Table 5-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
2. 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 – BC10



Example: Channel 476 CDMA BC10 Mode 3rd 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 2nd 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 USA, Inc.
 FCC ID: ZNFV405UA
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): CDMA / EvDO / LTE
 Band: Band Class 10 / Band 26 / Band 14

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1046 90.635	Conducted Power	< 100 Watts	CONDUCTED	PASS	Section 7.2
22.913(a.2)	Effective Radiated Power (Band 26)	< 7 Watts max. ERP	RADIATED	PASS	Section 7.3
90.542	Effective Radiated Power (Band 14)	< 3 Watts max. ERP		PASS	Section 7.3
2.1053 90.691 90.543	Radiated Spurious Emissions	> 43 + log ₁₀ (P[Watts]) for all out-of-band emissions except > 50 + 10log ₁₀ (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:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The Class II Permissive Change test results reported herein are within the expected measurement tolerances of the original certification test results. It has been determined that the radiated powers did not change.

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7.2 Conducted Power Output Data



§2.1046 §90.635

Frequency [MHz]	BC10 [Channel]	Battery Type	Cond. PWR [dBm]	Cond. PWR [Watts]	Cond. PWR Limit [dBm]	Margin [dB]
817.90	476	Standard	25.28	0.337	50.00	-24.72
823.10	684	Standard	25.22	0.333	50.00	-24.78

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	25.43	0.349	50.00	-24.57
823.30	1.4	QPSK	25.29	0.338	50.00	-24.71
814.70	1.4	16-QAM	24.41	0.276	50.00	-25.59
823.30	1.4	16-QAM	24.35	0.272	50.00	-25.65
814.70	1.4	64-QAM	23.49	0.223	50.00	-26.51
823.30	1.4	64-QAM	23.24	0.211	50.00	-26.76
815.50	3	QPSK	25.42	0.348	50.00	-24.58
822.50	3	QPSK	25.37	0.344	50.00	-24.63
815.50	3	16-QAM	24.37	0.274	50.00	-25.63
822.50	3	16-QAM	24.44	0.278	50.00	-25.56
815.50	3	64-QAM	23.39	0.218	50.00	-26.61
822.50	3	64-QAM	23.30	0.214	50.00	-26.70
816.50	5	QPSK	25.45	0.351	50.00	-24.55
821.50	5	QPSK	25.27	0.337	50.00	-24.73
816.50	5	16-QAM	24.47	0.280	50.00	-25.53
821.50	5	16-QAM	24.40	0.275	50.00	-25.60
816.50	5	64-QAM	23.42	0.220	50.00	-26.58
821.50	5	64-QAM	23.15	0.207	50.00	-26.85
819.00	10	QPSK	25.34	0.342	50.00	-24.66
819.00	10	16-QAM	24.41	0.276	50.00	-25.59
819.00	10	64-QAM	23.4	0.219	50.00	-26.60
821.50	15	QPSK	25.28	0.337	50.00	-24.72
821.50	15	16-QAM	24.38	0.274	50.00	-25.62
821.50	15	64-QAM	23.4	0.219	50.00	-26.60

Table 7-3. LTE Band 26 Conducted Power Output Data

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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Cond. PWR [dBm]	Cond. PWR [Watts]
793.00	5	QPSK	25.45	0.351
793.00	5	16-QAM	24.11	0.258
793.00	5	64-QAM	23.28	0.213
793.00	10	QPSK	25.4	0.347
793.00	10	16-QAM	24.31	0.270
793.00	10	64-QAM	23.3	0.214

Table 7-4. LTE Band 14 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.

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7.3 Radiated Power (ERP)

§22.913(a.2) §90.542

Test Overview

Effective Radiated Power (ERP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 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 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – 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

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Test Setup

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

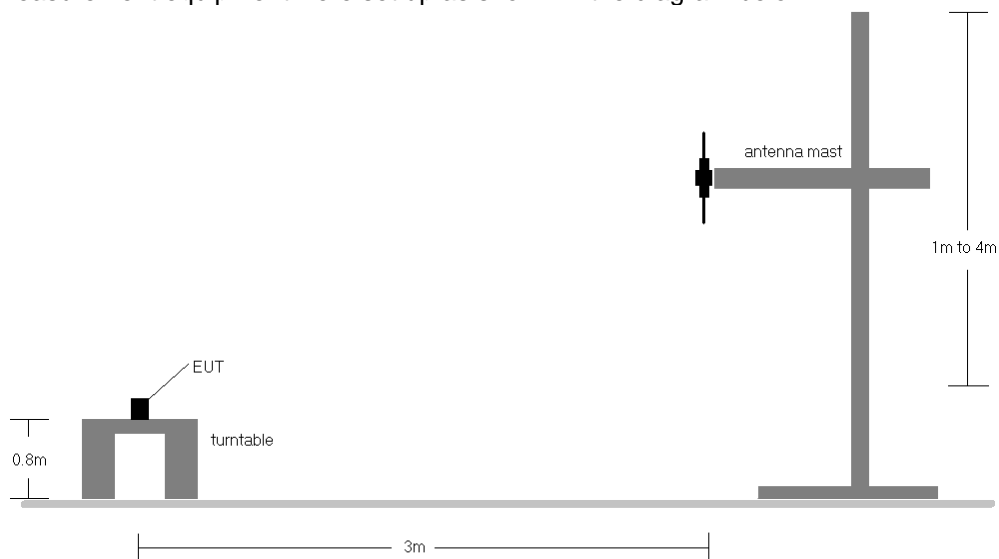


Figure 7-1. Radiated Test Setup <1GHz

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.

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]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
821.50	15	QPSK	H	150	91	1 / 0	18.96	1.49	18.30	0.068	38.45	-20.15
821.50	15	16-QAM	H	150	91	1 / 0	17.31	1.49	16.65	0.046	38.45	-21.80
821.50	15	64-QAM	H	150	91	1 / 0	16.58	1.49	15.92	0.039	38.45	-22.53
821.50	15 (WCP)	QPSK	H	150	321	1 / 36	17.39	1.49	16.73	0.047	38.45	-21.72

Table 7-5. ERP Data (Band 26)

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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]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
790.50	5	QPSK	H	150	106	1 / 24	18.91	1.36	18.12	0.065	34.77	-16.65	20.27	0.106	36.99	-16.72
793.00	5	QPSK	H	150	110	1 / 0	18.63	1.37	17.85	0.061	34.77	-16.92	20.00	0.100	36.99	-16.99
795.50	5	QPSK	H	150	99	1 / 0	18.64	1.38	17.87	0.061	34.77	-16.90	20.02	0.101	36.99	-16.97
790.50	5	16-QAM	H	150	106	1 / 24	17.07	1.36	16.28	0.042	34.77	-18.49	18.43	0.070	36.99	-18.56
790.50	5	64-QAM	H	150	106	1 / 24	16.38	1.36	15.59	0.036	34.77	-19.18	17.74	0.059	36.99	-19.25
793.00	10	QPSK	H	150	103	1 / 25	18.67	1.37	17.89	0.062	34.77	-16.88	20.04	0.101	36.99	-16.95
793.00	10	16-QAM	H	150	103	1 / 25	17.45	1.37	16.67	0.046	34.77	-18.10	18.82	0.076	36.99	-18.17
793.00	10	64-QAM	H	150	103	1 / 25	16.16	1.37	15.38	0.035	34.77	-19.39	17.53	0.057	36.99	-19.46
790.50	5	QPSK	V	150	124	1 / 12	15.48	1.36	14.69	0.029	34.77	-20.08	16.84	0.048	36.99	-20.15
790.50	5 (WCP)	QPSK	H	150	99	1 / 24	18.78	1.36	17.99	0.063	34.77	-16.78	20.14	0.103	36.99	-16.85

Table 7-6. ERP Data (Band 14)

FCC ID: ZNFV405UA	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
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7.4 Radiated Spurious Emissions Measurements

§2.1053 §90.691 §90.543

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 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 v03r01 – Section 5.8

ANSI/TIA-603-E-2016 – 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 = RMS
6. Trace mode = Average (Max Hold for pulsed emissions)
7. 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.

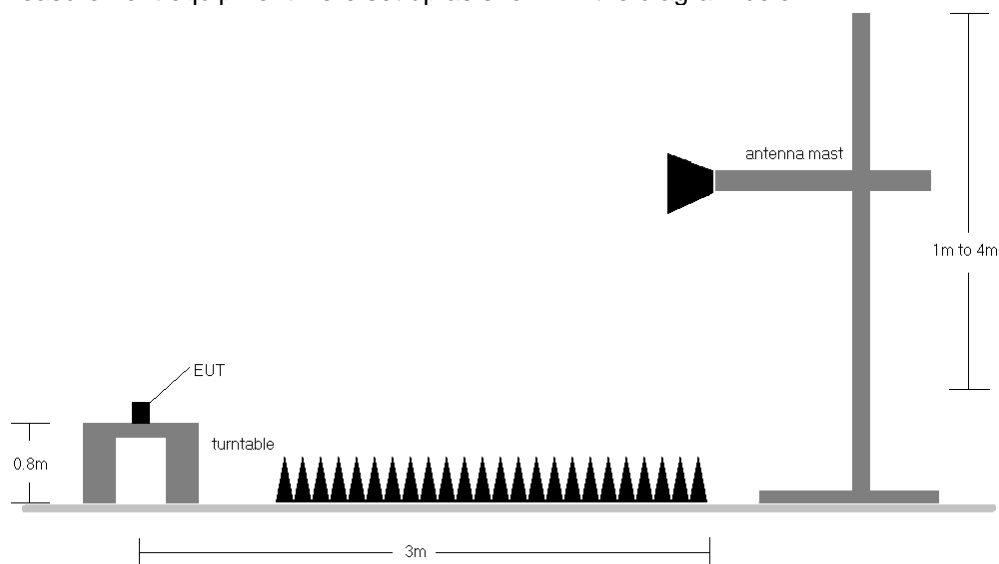


Figure 7-2. Test Instrument & Measurement Setup

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.
6. Per 90.543(f), emissions in the 1559 – 1610MHz band are subject to a limit of -40dBm/MHz for wideband signals. These emission measurements are shown in this section below.

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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 [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1635.80	H	150	315	-71.64	4.78	-66.86	-53.9
2453.70	H	150	329	-64.10	4.95	-59.15	-46.2
3271.60	H	-	-	-67.28	6.19	-61.09	-48.1

Table 7-7. 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 [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1646.20	H	150	325	-68.94	4.80	-64.13	-51.1
2469.30	H	150	329	-64.40	4.98	-59.42	-46.4
3292.40	H	-	-	-67.61	6.23	-61.38	-48.4

Table 7-8. CDMA BC10 Radiated Spurious Data (Ch. 684)

FCC ID: ZNFV405UA		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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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 [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1646.20	H	150	325	-64.92	4.80	-60.11	-47.1
2469.30	H	-	-	-68.30	4.98	-63.32	-50.3
3292.40	H	-	-	-67.64	6.23	-61.41	-48.4

Table 7-9. CDMA BC10 Radiated Spurious Data with WCP (Ch. 684)

OPERATING FREQUENCY: 816.50 MHz
 CHANNEL: 26715
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 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 [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1633.00	V	-	-	-72.08	4.78	-67.30	-54.3
2449.50	V	150	290	-66.23	4.94	-61.29	-48.3
3266.00	V	-	-	-67.74	6.17	-61.57	-48.6

Table 7-10. Radiated Spurious Data (LTE Band 26 – Low Channel)

FCC ID: ZNFV405UA	 MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
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OPERATING FREQUENCY: 821.50 MHz
 CHANNEL: 26765
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 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 [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1643.00	V	150	274	-68.35	4.80	-63.56	-50.6
2464.50	V	150	299	-57.14	4.97	-52.17	-39.2
3286.00	V	-	-	-67.58	6.22	-61.36	-48.4

Table 7-11. Radiated Spurious Data (LTE Band 26 – High Channel)

OPERATING FREQUENCY: 821.50 MHz
 CHANNEL: 26765
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 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 [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1643.00	V	150	270	-70.21	4.80	-65.42	-52.4
2464.50	V	150	294	-61.92	4.97	-56.95	-43.9
3286.00	V	-	-	-67.65	6.22	-61.43	-48.4

Table 7-12. Radiated Spurious Data with WCP (LTE Band 26 - Low Channel)

FCC ID: ZNFV405UA		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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OPERATING FREQUENCY: 779.50 MHz
 CHANNEL: 23205
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]	Margin [dB]
2338.50	V	150	8	-61.11	4.86	-56.25	-43.3
3118.00	V	-	-	-64.97	5.99	-58.98	-46.0
3897.50	V	-	-	-65.13	7.26	-57.87	-44.9

Table 7-13. Radiated Spurious Data (LTE Band 14 – Low Channel)

OPERATING FREQUENCY: 782.00 MHz
 CHANNEL: 23230
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]	Margin [dB]
2346.00	V	150	8	-59.64	4.88	-54.76	-41.8
3128.00	V	-	-	-67.72	6.02	-61.71	-48.7
3910.00	V	-	-	-67.78	7.25	-60.53	-47.5

Table 7-14. Radiated Spurious Data (LTE Band 14 – Mid Channel)

FCC ID: ZNFV405UA		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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OPERATING FREQUENCY: 784.50 MHz
 CHANNEL: 23255
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm

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]	Margin [dB]
2353.50	V	150	359	-61.19	4.90	-56.29	-43.3
3138.00	V	-	-	-67.92	6.05	-61.87	-48.9
3922.50	V	-	-	-68.53	7.22	-61.31	-48.3

Table 7-15. Radiated Spurious Data (LTE Band 14 – High Channel)

MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.00 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 [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1559.00	V	150	8	-68.33	4.47	-63.87	-23.9
1564.00	V	150	358	-70.55	4.50	-66.06	-26.1
1569.00	V	-	-	-72.60	4.53	-68.08	-28.1

Table 7-16. Radiated Spurious Data (LTE Band 14 – Wide Band)

FCC ID: ZNFV405UA		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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OPERATING FREQUENCY: 779.50 MHz
 CHANNEL: 23205
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: -13 dBm



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]	Margin [dB]
1559.00	V	-	-	-71.71	4.47	-67.24	-54.2
2338.50	V	150	265	-67.15	4.86	-62.29	-49.3
3118.00	V	-	-	-67.92	5.99	-61.93	-48.9

Table 7-17. Radiated Spurious Data with WCP (LTE Band 14 - Ch. 23355)

MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.00 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 [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1586.00	V	137	12	-70.08	4.62	-65.46	-25.5

Table 7-18. Radiated Spurious Data with WCP (LTE Band 14 – Wide Band)

FCC ID: ZNFV405UA		MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFV405UA** complies with all the requirements of Parts 22(H) and 90 of the FCC rules.

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Test Report S/N: 1M1808070153-04-R2.ZNF	Test Dates: 7/25/2018 - 8/8/2018	EUT Type: Portable Handset	Page 24 of 24	