



# PCTEST ENGINEERING LABORATORY, INC.

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<http://www.pctestlab.com>



## MEASUREMENT REPORT FCC Part 22, 24, & 27 LTE

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

**Date of Testing:**  
8/8 - 8/25/2016  
**Test Site/Location:**  
PCTEST Lab., Columbia, MD, USA  
**Test Report Serial No.:**  
0Y1608121374-R1.ZNF

<b>FCC ID :</b>	<b>ZNFVS995</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; §22; §24; §27  
**Test Procedure(s):** ANSI/TIA-603-D-2010, KDB 971168 D01 v02r02  
**EUT Type:** Portable Handset  
**Model(s):** LG-VS995, LGVS995, VS995, LG-US996, LGUS996, US996, LG-H990T, LGH990T, H990T, LG-VS995S, LGVS995S, VS995S  
**Test Device Serial No.:** *production model* [S/N: 11353]  
**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: 0Y1608121374-R1.ZNF) supersedes and replaces the previously issued test report (S/N: 0Y1608121374.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

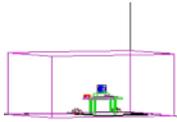


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# T A B L E O F C O N T E N T S

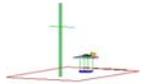
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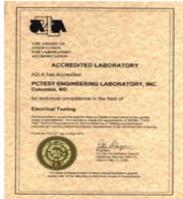


### §2.1033 General Information

**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; §22; §24; §27  
**BASE MODEL:** LG-VS995, LGVS995, VS995, LG-US996, LGUS996, US996, LG-H990T, LGH990T, H990T, LG-VS995S, LGVS995S, VS995S  
**FCC ID:** ZNFVVS995  
**FCC CLASSIFICATION:** PCS Licensed Transmitter Held to Ear (PCE)  
**FREQUENCY TOLERANCE:** ±0.00025 % (2.5 ppm)  
**Test Device Serial No.:** 11353  Production  Pre-Production  Engineering  
**DATE(S) OF TEST:** 8/8 - 8/25/2016  
**TEST REPORT S/N:** 0Y1608121374-R1.ZNF

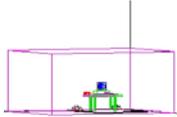
### Test Facility / Accreditations

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



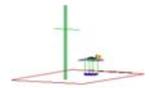
- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards 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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Mode	Tx Frequency (MHz)	Modulation	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
LTE Band 12	699.7 - 715.3	QPSK	0.085	19.28
LTE Band 12	699.7 - 715.3	16QAM	0.066	18.19
LTE Band 12	700.5 - 714.5	QPSK	0.094	19.73
LTE Band 12	700.5 - 714.5	16QAM	0.077	18.87
LTE Band 12/17	701.5 - 713.5	QPSK	0.099	19.96
LTE Band 12/17	701.5 - 713.5	16QAM	0.080	19.04
LTE Band 12/17	704 - 711	QPSK	0.086	19.32
LTE Band 12/17	704 - 711	16QAM	0.069	18.40
LTE Band 13	779.5 - 784.5	QPSK	0.097	19.85
LTE Band 13	779.5 - 784.5	16QAM	0.079	18.99
LTE Band 13	782	QPSK	0.087	19.41
LTE Band 13	782	16QAM	0.074	18.68
LTE Band 5	824.7 - 848.3	QPSK	0.093	19.70
LTE Band 5	824.7 - 848.3	16QAM	0.074	18.69
LTE Band 5	825.5 - 847.5	QPSK	0.099	19.94
LTE Band 5	825.5 - 847.5	16QAM	0.079	18.98
LTE Band 5	826.5 - 846.5	QPSK	0.088	19.44
LTE Band 5	826.5 - 846.5	16QAM	0.071	18.52
LTE Band 5	829 - 844	QPSK	0.093	19.70
LTE Band 5	829 - 844	16QAM	0.076	18.82
LTE Band 4	1710.7 - 1754.3	QPSK	0.219	23.41
LTE Band 4	1710.7 - 1754.3	16QAM	0.166	22.21
LTE Band 4	1711.5 - 1753.5	QPSK	0.217	23.36
LTE Band 4	1711.5 - 1753.5	16QAM	0.157	21.95
LTE Band 4/66	1712.5 - 1777.5	QPSK	0.180	22.55
LTE Band 4/66	1712.5 - 1777.5	16QAM	0.134	21.28
LTE Band 4/66	1715 - 1775	QPSK	0.209	23.21
LTE Band 4/66	1715 - 1775	16QAM	0.164	22.16
LTE Band 4/66	1717.5 - 1772.5	QPSK	0.198	22.97
LTE Band 4/66	1717.5 - 1772.5	16QAM	0.145	21.61
LTE Band 4/66	1720 - 1770	QPSK	0.240	23.80
LTE Band 4/66	1720 - 1770	16QAM	0.203	23.08
LTE Band 25/2	1850.7 - 1914.3	QPSK	0.195	22.91
LTE Band 25/2	1850.7 - 1914.3	16QAM	0.151	21.78
LTE Band 25/2	1851.5 - 1913.5	QPSK	0.238	23.76
LTE Band 25/2	1851.5 - 1913.5	16QAM	0.157	21.96
LTE Band 25/2	1852.5 - 1912.5	QPSK	0.233	23.67
LTE Band 25/2	1852.5 - 1912.5	16QAM	0.167	22.22
LTE Band 25/2	1855 - 1910	QPSK	0.167	22.23
LTE Band 25/2	1855 - 1910	16QAM	0.123	20.90
LTE Band 25/2	1857.5 - 1907.5	QPSK	0.200	23.02
LTE Band 25/2	1857.5 - 1907.5	16QAM	0.130	21.14
LTE Band 25/2	1860 - 1905	QPSK	0.155	21.91
LTE Band 25/2	1860 - 1905	16QAM	0.116	20.66

### EUT Overview

**Note:**

Class 2 Permissive Change test samples were used for ERP/EIRP measurements. It has been determined that radiated powers were not changed for the ZNFVS995. Differences in radiated powers from the original certification ERP/EIRP that are reported herein are within expected measurement tolerances.

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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.

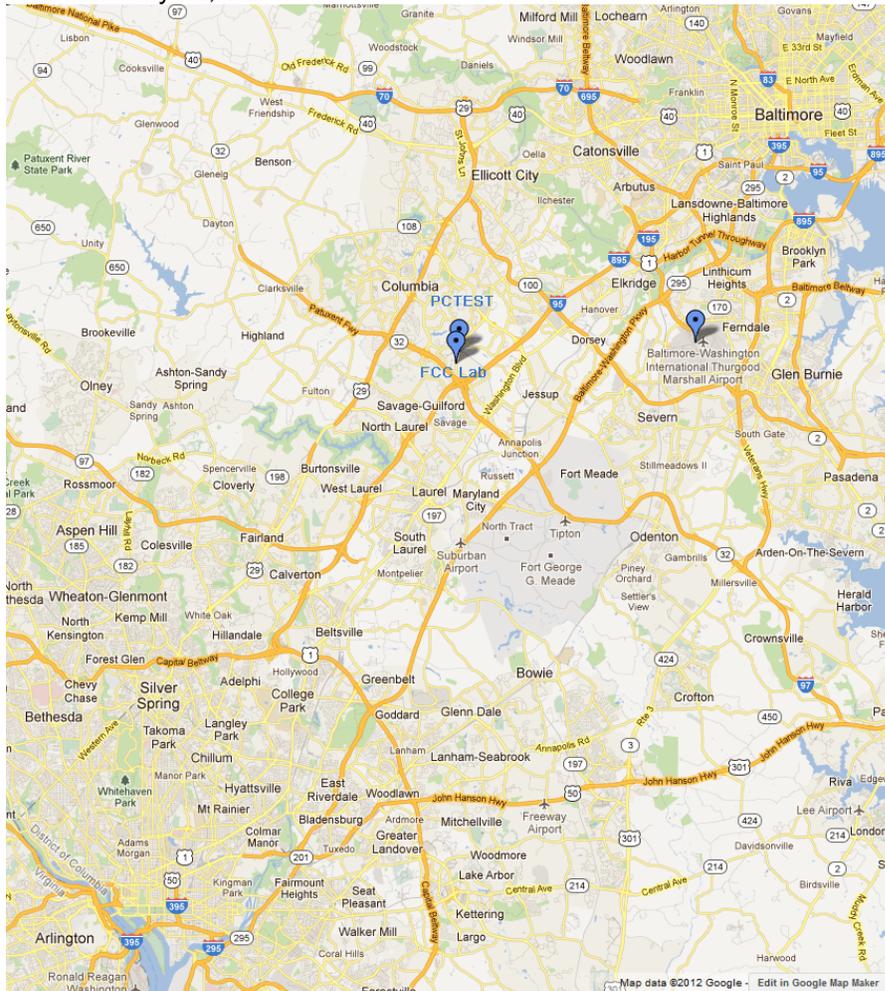


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LGE Portable Handset FCC ID: ZNFVS995**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

This device also employs an antenna switching diversity (ASDiv) mechanism that allows for radiated transmission from one of two antennas at a time for Bands 5, 12/17, and 13. 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.

In addition, in order 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.

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA (BC0, BC1), 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 LGE Portable Handset FCC ID: ZNFVS995 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 **LGE Portable Handset FCC ID: ZNFVS995**.

### 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 Block A Frequency Range

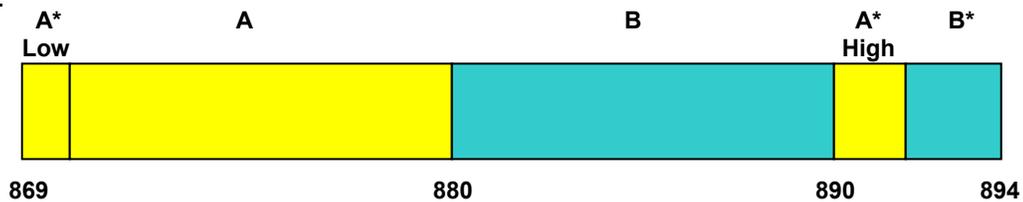
#### §27.5(c)

698-746 MHz band. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

Block A: 698-704 MHz and 728-734 MHz;  
 Block B: 704-710 MHz and 734-740 MHz; and  
 Block C: 710-716 MHz and 740-746 MHz.

### 3.3 Cellular - Base Frequency Blocks

#### §22.905



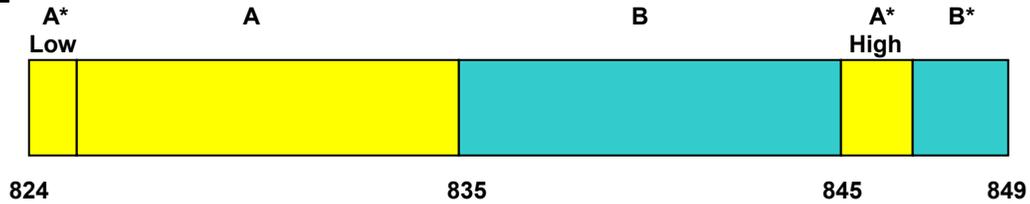
**BLOCK 1:** 869 – 880 MHz (A\* Low + A)  
**BLOCK 2:** 880 – 890 MHz (B)

**BLOCK 3:** 890 – 891.5 MHz (A\* High)  
**BLOCK 4:** 891.5 – 894 MHz (B\*)

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### 3.4 Cellular - Mobile Frequency Blocks

§22.905

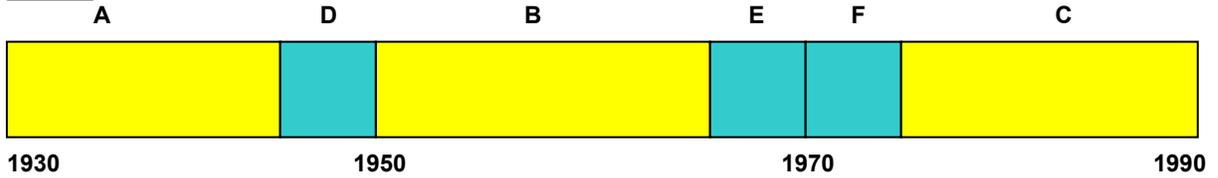


BLOCK 1: 824 – 835 MHz (A\* Low + A)  
 BLOCK 2: 835 – 845 MHz (B)

BLOCK 3: 845 – 846.5 MHz (A\* High)  
 BLOCK 4: 846.5 – 849 MHz (B\*)

### 3.5 PCS - Base Frequency Blocks

§24.229

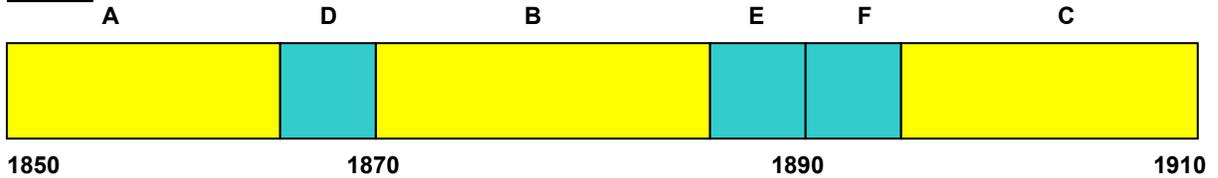


BLOCK 1: 1930 – 1945 MHz (A)  
 BLOCK 2: 1945 – 1950 MHz (D)  
 BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 4: 1965 – 1970 MHz (E)  
 BLOCK 5: 1970 – 1975 MHz (F)  
 BLOCK 6: 1975 – 1990 MHz (C)

### 3.6 PCS - Mobile Frequency Blocks

§24.229

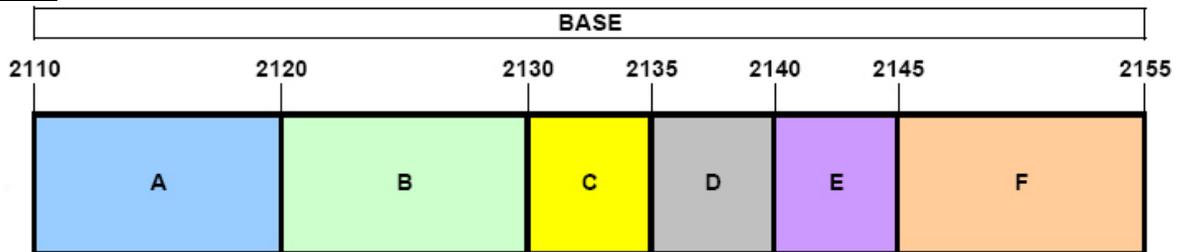


BLOCK 1: 1850 – 1865 MHz (A)  
 BLOCK 2: 1865 – 1870 MHz (D)  
 BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 4: 1885 – 1890 MHz (E)  
 BLOCK 5: 1890 – 1895 MHz (F)  
 BLOCK 6: 1895 – 1910 MHz (C)

### 3.7 AWS - Base Frequency Blocks

§27.5(h)



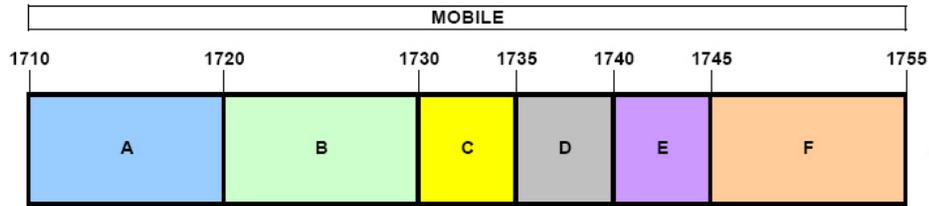
BLOCK 1: 2110 – 2120 MHz (A)  
 BLOCK 2: 2120 – 2130 MHz (B)  
 BLOCK 3: 2130 – 2135 MHz (C)

BLOCK 4: 2135 – 2140 MHz (D)  
 BLOCK 5: 2140 – 2145 MHz (E)  
 BLOCK 6: 2145 – 2155 MHz (F)

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### 3.8 AWS - Mobile Frequency Blocks

§27.5(h)



BLOCK 1: 1710 – 1720 MHz (A)

BLOCK 2: 1720 – 1730 MHz (B)

BLOCK 3: 1730 – 1735 MHz (C)

BLOCK 4: 1735 – 1740 MHz (D)

BLOCK 5: 1740 – 1745 MHz (E)

BLOCK 6: 1745 – 1755 MHz (F)

### 3.9 Radiated Power and Radiated Spurious Emissions

§2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) §27.50(b.10) §27.50(c.10) §27.50(d.4) §27.53(f) §27.53(g) §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.

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 C63.10-2013. 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  $U_{\text{CISPR}}$  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).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/4/2016	Annual	9/4/2016	RE1
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	7/30/2015	Biennial	7/30/2017	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	2/26/2016	Annual	2/26/2017	441119
Emco	3116	Horn Antenna (18 - 40GHz)	3/27/2015	Triennial	3/27/2018	9203-2178
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	10/22/2014	Biennial	10/22/2016	128338
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	3/4/2016	Annual	3/4/2017	11210140001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
PCTEST	-	EMC Switch System	7/11/2016	Annual	7/11/2017	NM1
Rhode & Schwarz	TS-PR18	Pre-Amplifier	3/7/2016	Annual	3/7/2017	101622
Rohde & Schwarz	CMW500	Radio Communication Tester	10/13/2015	Annual	10/13/2016	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) Tx	11/18/2015	Biennial	11/18/2017	91052522TX
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: ZNFVS995  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
<b>TRANSMITTER MODE (TX)</b>					
22.913(a.2)	Effective Radiated Power (Band 5)	< 7 Watts max. ERP	RADIATED	PASS	Section 7.2
27.50(b.10) 27.50(c.10)	Effective Radiated Power (Band 12 13)	< 3 Watts max. ERP		PASS	Section 7.2
24.232(c)	Equivalent Isotropic Radiated Power (Band 25)	< 2 Watts max. EIRP		PASS	Section 7.2
27.50(d.4)	Equivalent Isotropic Radiated Power (Band 4)	< 1 Watts max. EIRP		PASS	Section 7.2
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 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:**

- 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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## 7.2 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.2) §27.50(b.10) §27.50(c.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

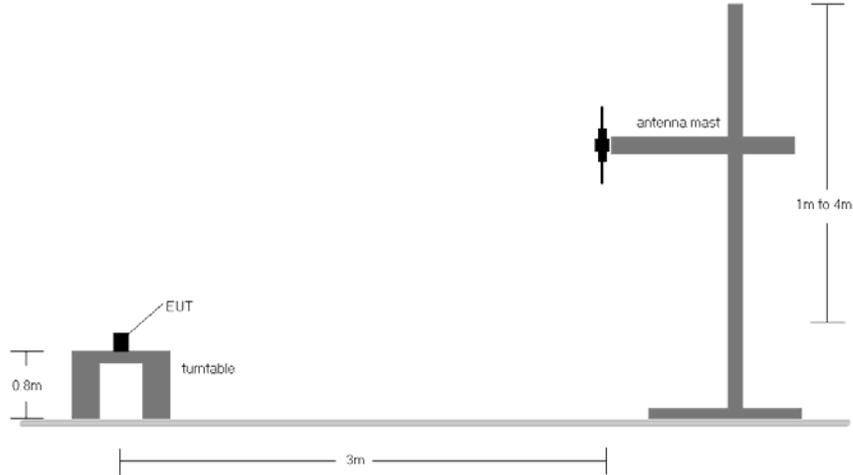
### Test Settings

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

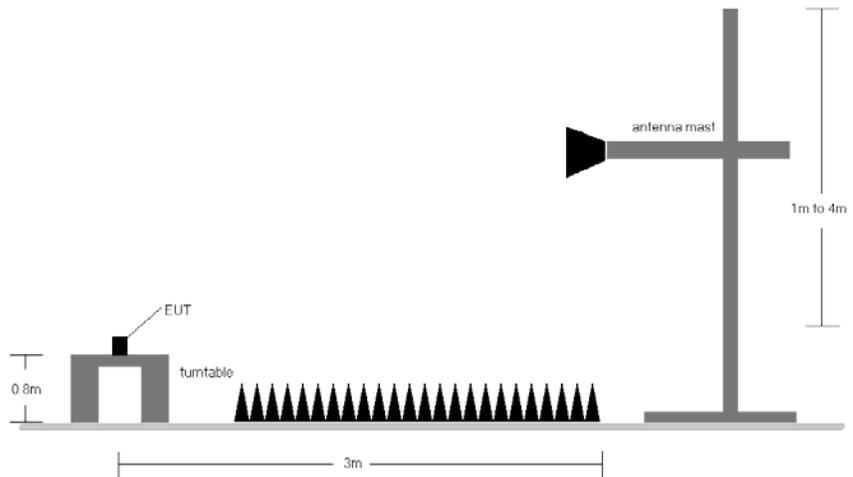
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**Test Setup**

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) The ERP's and EIRP's listed were measured using the Class II Permissive change sample, and were found to be within the measurement tolerances of the original certification samples for radiated power. Side by side comparisons have determined that the output power was not changed for these Class II Permissive Change samples.

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## 7.2.1 Antenna-1 Radiated Power (ERP/EIRP)

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	213	174	1 / 24	15.70	4.19	19.89	34.77	-14.88
782.00	5	QPSK	H	187	218	1 / 24	15.65	4.25	19.90	34.77	-14.87
784.50	5	QPSK	H	180	223	1 / 24	15.60	4.32	19.92	34.77	-14.85
779.50	5	16QAM	H	213	174	1 / 24	14.30	4.19	18.49	34.77	-16.28
782.00	5	16QAM	H	187	218	1 / 24	14.40	4.25	18.65	34.77	-16.12
784.50	5	16QAM	H	180	223	1 / 24	14.60	4.32	18.92	34.77	-15.85
782.00	10	QPSK	H	183	218	1 / 49	16.28	4.25	20.53	34.77	-14.24
782.00	10	16QAM	H	183	218	1 / 49	14.65	4.25	18.90	34.77	-15.87
782.00	10	QPSK	V	130	130	1 / 0	13.44	4.25	17.69	34.77	-17.08

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

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed 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 [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	H	267	0	1 / 5	16.29	2.12	18.41	34.77	-16.36
707.50	1.4	QPSK	H	265	2	1 / 5	17.89	2.31	20.20	34.77	-14.57
715.30	1.4	QPSK	H	270	3	1 / 0	16.99	2.52	19.51	34.77	-15.26
699.70	1.4	16-QAM	H	267	0	1 / 5	15.29	2.12	17.41	34.77	-17.36
707.50	1.4	16-QAM	H	265	2	1 / 5	16.59	2.31	18.90	34.77	-15.87
715.30	1.4	16-QAM	H	270	3	1 / 0	16.09	2.52	18.61	34.77	-16.16
700.50	3	QPSK	H	270	10	1 / 14	17.12	2.12	19.24	34.77	-15.53
707.50	3	QPSK	H	275	6	1 / 0	17.71	2.31	20.02	34.77	-14.75
714.50	3	QPSK	H	266	2	1 / 0	17.89	2.50	20.39	34.77	-14.38
700.50	3	16-QAM	H	270	10	1 / 14	15.93	2.12	18.05	34.77	-16.72
707.50	3	16-QAM	H	275	6	1 / 0	16.55	2.31	18.86	34.77	-15.91
714.50	3	16-QAM	H	266	2	1 / 0	16.79	2.50	19.29	34.77	-15.48
701.50	5	QPSK	H	287	2	1 / 24	17.44	2.15	19.59	34.77	-15.18
707.50	5	QPSK	H	265	2	1 / 0	17.81	2.31	20.12	34.77	-14.65
713.50	5	QPSK	H	267	7	1 / 0	17.79	2.48	20.27	34.77	-14.51
701.50	5	16-QAM	H	287	2	1 / 24	16.32	2.15	18.47	34.77	-16.30
707.50	5	16-QAM	H	265	2	1 / 0	16.67	2.31	18.98	34.77	-15.79
713.50	5	16-QAM	H	267	7	1 / 0	16.77	2.48	19.25	34.77	-15.53
704.00	10	QPSK	H	262	9	1 / 49	17.80	2.22	20.02	34.77	-14.76
707.50	10	QPSK	H	262	4	1 / 0	17.99	2.31	20.30	34.77	-14.47
711.00	10	QPSK	H	267	1	1 / 49	17.99	2.41	20.40	34.77	-14.37
704.00	10	16-QAM	H	262	9	1 / 49	16.63	2.22	18.85	34.77	-15.93
707.50	10	16-QAM	H	262	4	1 / 0	16.74	2.31	19.05	34.77	-15.72
711.00	10	16-QAM	H	267	1	1 / 49	16.47	2.41	18.88	34.77	-15.89
711.00	10	QPSK	V	171	1	1 / 74	15.74	2.41	18.15	34.77	-16.62

**Table 7-3. ERP Data (Band 12/17)**

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed 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 [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	H	25	228	1 / 0	13.74	5.01	18.75	38.45	-19.70
836.50	1.4	QPSK	H	26	358	1 / 0	12.87	5.16	18.03	38.45	-20.42
848.30	1.4	QPSK	H	32	206	1 / 0	13.37	5.30	18.67	38.45	-19.78
824.70	1.4	16-QAM	H	25	228	1 / 0	12.60	5.01	17.61	38.45	-20.84
836.50	1.4	16-QAM	H	26	358	1 / 0	11.95	5.16	17.11	38.45	-21.34
848.30	1.4	16-QAM	H	32	206	1 / 0	12.01	5.30	17.31	38.45	-21.14
825.50	3	QPSK	H	230	28	1 / 0	14.37	5.02	19.39	38.45	-19.06
836.50	3	QPSK	H	357	30	1 / 0	13.77	5.16	18.93	38.45	-19.52
847.50	3	QPSK	H	208	36	1 / 14	13.97	5.29	19.26	38.45	-19.19
825.50	3	16-QAM	H	230	28	1 / 0	13.27	5.02	18.29	38.45	-20.16
836.50	3	16-QAM	H	357	30	1 / 0	12.82	5.16	17.98	38.45	-20.47
847.50	3	16-QAM	H	208	36	1 / 0	12.66	5.29	17.95	38.45	-20.50
826.50	5	QPSK	H	226	23	1 / 0	14.74	5.03	19.77	38.45	-18.68
836.50	5	QPSK	H	210	19	1 / 0	14.06	5.16	19.22	38.45	-19.23
846.50	5	QPSK	H	208	32	1 / 0	13.99	5.28	19.27	38.45	-19.18
826.50	5	16-QAM	H	226	23	1 / 0	13.79	5.03	18.82	38.45	-19.63
836.50	5	16-QAM	H	210	19	1 / 0	12.92	5.16	18.08	38.45	-20.37
846.50	5	16-QAM	H	208	32	1 / 0	13.03	5.28	18.31	38.45	-20.14
829.00	10	QPSK	H	230	26	1 / 0	14.77	5.06	19.83	38.45	-18.62
836.50	10	QPSK	H	204	29	1 / 0	14.67	5.16	19.83	38.45	-18.62
844.00	10	QPSK	H	210	26	1 / 0	14.59	5.25	19.84	38.45	-18.61
829.00	10	16-QAM	H	230	26	1 / 0	13.57	5.06	18.63	38.45	-19.82
836.50	10	16-QAM	H	204	29	1 / 0	13.41	5.16	18.57	38.45	-19.88
844.00	10	16-QAM	H	210	26	1 / 0	13.57	5.25	18.82	38.45	-19.63
844.00	10	QPSK	V	132	333	1 / 0	12.22	5.25	17.47	38.45	-20.98

**Table 7-4. ERP Data (Band 5)**

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed 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	H	103	228	1 / 0	13.23	9.66	22.89	30.00	-7.11
1732.50	1.4	QPSK	H	166	107	1 / 0	13.49	9.61	23.10	30.00	-6.90
1754.30	1.4	QPSK	H	122	210	1 / 0	12.32	9.57	21.89	30.00	-8.11
1710.70	1.4	16-QAM	H	103	228	1 / 0	12.22	9.66	21.88	30.00	-8.12
1732.50	1.4	16-QAM	H	166	107	1 / 0	12.49	9.61	22.10	30.00	-7.90
1754.30	1.4	16-QAM	H	122	210	1 / 0	11.49	9.57	21.06	30.00	-8.94
1711.50	3	QPSK	H	289	303	1 / 0	13.17	9.65	22.82	30.00	-7.18
1732.50	3	QPSK	H	299	101	1 / 0	13.44	9.61	23.05	30.00	-6.95
1753.50	3	QPSK	H	169	106	1 / 0	13.99	9.57	23.56	30.00	-6.44
1711.50	3	16-QAM	H	289	303	1 / 0	11.95	9.65	21.60	30.00	-8.40
1732.50	3	16-QAM	H	299	101	1 / 0	12.24	9.61	21.85	30.00	-8.15
1753.50	3	16-QAM	H	169	106	1 / 0	12.89	9.57	22.46	30.00	-7.54
1712.50	5	QPSK	H	228	286	1 / 0	14.68	9.65	24.33	30.00	-5.67
1745.00	5	QPSK	H	107	269	1 / 0	13.24	9.59	22.83	30.00	-7.17
1777.50	5	QPSK	H	279	282	1 / 0	14.14	9.53	23.67	30.00	-6.33
1712.50	5	16-QAM	H	228	286	1 / 0	13.29	9.65	22.94	30.00	-7.06
1745.00	5	16-QAM	H	107	269	1 / 0	12.02	9.59	21.61	30.00	-8.39
1777.50	5	16-QAM	H	279	282	1 / 0	13.09	9.53	22.62	30.00	-7.38
1715.00	10	QPSK	H	115	263	1 / 0	14.32	9.65	23.97	30.00	-6.03
1745.00	10	QPSK	H	110	276	1 / 0	14.49	9.59	24.08	30.00	-5.92
1775.00	10	QPSK	H	277	282	1 / 0	14.28	9.53	23.81	30.00	-6.19
1715.00	10	16-QAM	H	115	263	1 / 0	13.00	9.65	22.65	30.00	-7.35
1745.00	10	16-QAM	H	110	276	1 / 0	12.79	9.59	22.38	30.00	-7.62
1775.00	10	16-QAM	H	277	282	1 / 0	12.91	9.53	22.44	30.00	-7.56
1717.50	15	QPSK	H	230	274	1 / 0	14.49	9.64	24.13	30.00	-5.87
1745.00	15	QPSK	H	117	267	1 / 74	14.06	9.59	23.65	30.00	-6.35
1772.50	15	QPSK	H	277	280	1 / 0	13.89	9.54	23.43	30.00	-6.57
1717.50	15	16-QAM	H	230	274	1 / 0	12.72	9.64	22.36	30.00	-7.64
1745.00	15	16-QAM	H	117	267	1 / 74	11.79	9.59	21.38	30.00	-8.62
1772.50	15	16-QAM	H	277	280	1 / 0	12.13	9.54	21.67	30.00	-8.33
1720.00	20	QPSK	H	299	284	1 / 0	14.16	9.64	23.80	30.00	-6.20
1745.00	20	QPSK	H	113	266	1 / 99	13.89	9.59	23.48	30.00	-6.52
1770.00	20	QPSK	H	115	136	1 / 0	13.79	9.54	23.33	30.00	-6.67
1720.00	20	16-QAM	H	299	284	1 / 0	13.29	9.64	22.93	30.00	-7.07
1745.00	20	16-QAM	H	113	266	1 / 99	12.69	9.59	22.28	30.00	-7.72
1770.00	20	16-QAM	H	115	136	1 / 0	12.49	9.54	22.03	30.00	-7.97
1712.50	5	QPSK	V	100	31	1 / 0	13.97	9.65	23.62	30.00	-6.38

**Table 7-5. EIRP Data (Band 66/4)**

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed 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]
1850.70	1.4	QPSK	H	265	307	1 / 0	13.17	9.35	22.52	33.01	-10.49
1882.50	1.4	QPSK	H	255	98	1 / 5	13.13	9.27	22.40	33.01	-10.61
1914.30	1.4	QPSK	H	198	99	1 / 0	12.87	9.26	22.13	33.01	-10.88
1850.70	1.4	16-QAM	H	265	307	1 / 0	12.17	9.35	21.52	33.01	-11.49
1882.50	1.4	16-QAM	H	255	98	1 / 5	12.17	9.27	21.44	33.01	-11.57
1914.30	1.4	16-QAM	H	198	99	1 / 0	11.87	9.26	21.13	33.01	-11.88
1851.50	3	QPSK	H	203	97	1 / 0	14.17	9.35	23.52	33.01	-9.49
1882.50	3	QPSK	H	100	12	1 / 0	12.29	9.27	21.56	33.01	-11.45
1913.50	3	QPSK	H	196	95	1 / 0	14.03	9.26	23.29	33.01	-9.72
1851.50	3	16-QAM	H	203	97	1 / 0	12.47	9.35	21.82	33.01	-11.19
1882.50	3	16-QAM	H	100	12	1 / 0	11.07	9.27	20.34	33.01	-12.67
1913.50	3	16-QAM	H	196	95	1 / 0	12.58	9.26	21.84	33.01	-11.17
1852.50	5	QPSK	H	267	108	1 / 0	13.45	9.34	22.79	33.01	-10.22
1882.50	5	QPSK	H	252	111	1 / 0	12.41	9.27	21.68	33.01	-11.33
1912.50	5	QPSK	H	196	95	12 / 6	12.97	9.26	22.23	33.01	-10.78
1852.50	5	16-QAM	H	267	108	1 / 0	12.77	9.34	22.11	33.01	-10.90
1882.50	5	16-QAM	H	252	111	1 / 0	11.12	9.27	20.39	33.01	-12.62
1912.50	5	16-QAM	H	196	95	1 / 0	11.87	9.26	21.13	33.01	-11.88
1855.00	10	QPSK	H	103	150	1 / 0	12.67	9.34	22.01	33.01	-11.00
1882.50	10	QPSK	H	265	104	1 / 0	12.51	9.27	21.78	33.01	-11.23
1910.00	10	QPSK	H	148	101	1 / 0	12.67	9.25	21.92	33.01	-11.09
1855.00	10	16-QAM	H	103	150	1 / 0	11.17	9.34	20.51	33.01	-12.50
1882.50	10	16-QAM	H	265	104	1 / 0	11.32	9.27	20.59	33.01	-12.42
1910.00	10	16-QAM	H	148	101	1 / 0	11.23	9.25	20.48	33.01	-12.53
1857.50	15	QPSK	H	101	272	1 / 0	13.67	9.33	23.00	33.01	-10.01
1882.50	15	QPSK	H	101	156	1 / 0	13.15	9.27	22.42	33.01	-10.59
1907.50	15	QPSK	H	100	156	1 / 74	13.46	9.24	22.70	33.01	-10.31
1857.50	15	16-QAM	H	101	272	1 / 0	11.77	9.33	21.10	33.01	-11.91
1882.50	15	16-QAM	H	101	156	1 / 0	11.67	9.27	20.94	33.01	-12.07
1907.50	15	16-QAM	H	100	156	1 / 74	11.53	9.24	20.77	33.01	-12.24
1860.00	20	QPSK	H	110	83	1 / 0	12.47	9.32	21.79	33.01	-11.22
1882.50	20	QPSK	H	105	333	1 / 0	12.44	9.27	21.71	33.01	-11.30
1905.00	20	QPSK	H	203	89	1 / 0	12.55	9.24	21.79	33.01	-11.22
1860.00	20	16-QAM	H	110	83	1 / 0	10.92	9.32	20.24	33.01	-12.77
1882.50	20	16-QAM	H	105	333	1 / 0	11.07	9.27	20.34	33.01	-12.67
1905.00	20	16-QAM	H	203	89	1 / 0	11.01	9.24	20.25	33.01	-12.76
1851.50	3	QPSK	V	242	25	1 / 0	10.62	9.35	19.97	33.01	-13.04

**Table 7-6. EIRP Data (Band 25/2)**

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## 7.2.2 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]
707.50	1.4	QPSK	H	122	350	1 / 0	11.81	2.31	14.12	34.77	-20.65
707.50	1.4	16-QAM	H	122	350	1 / 0	10.88	2.31	13.19	34.77	-21.58
707.50	3	QPSK	H	100	322	1 / 0	11.78	2.31	14.09	34.77	-20.68
707.50	3	16-QAM	H	100	322	1 / 0	10.71	2.31	13.02	34.77	-21.75
707.50	5	QPSK	H	134	254	1 / 0	11.82	2.31	14.13	34.77	-20.64
707.50	5	16-QAM	H	134	254	1 / 0	10.86	2.31	13.17	34.77	-21.60
707.50	10	QPSK	H	150	225	1 / 0	11.93	2.31	14.24	34.77	-20.53
707.50	10	16-QAM	H	150	225	1 / 0	10.82	2.31	13.13	34.77	-21.64
707.50	10	QPSK	V	100	222	1 / 0	10.87	2.31	13.18	34.77	-21.59

**Table 7-7. ERP Data (Band 12)**

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]
782.00	5	QPSK	H	122	355	1 / 0	10.43	4.25	14.68	34.77	-20.09
782.00	5	16QAM	H	122	355	1 / 0	9.30	4.25	13.55	34.77	-21.22
782.00	10	QPSK	H	111	230	1 / 0	10.30	4.25	14.55	34.77	-20.22
782.00	10	16QAM	H	111	230	1 / 0	9.25	4.25	13.50	34.77	-21.27
782.00	5	QPSK	V	115	200	1 / 0	7.37	4.25	11.62	34.77	-23.15

**Table 7-8. ERP Data (Band 13)**

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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]
836.50	1.4	QPSK	H	122	100	1 / 0	5.07	5.16	10.23	38.45	-28.22
836.50	1.4	16-QAM	H	122	100	1 / 0	4.23	5.16	9.39	38.45	-29.06
836.50	3	QPSK	H	151	223	1 / 0	5.27	5.16	10.43	38.45	-28.02
847.50	3	16-QAM	H	151	223	1 / 0	4.18	5.29	9.47	38.45	-28.98
836.50	5	QPSK	H	154	20	1 / 0	5.28	5.16	10.44	38.45	-28.01
836.50	5	16-QAM	H	154	20	1 / 0	4.27	5.16	9.43	38.45	-29.02
836.50	10	QPSK	H	100	341	1 / 0	5.28	5.16	10.44	38.45	-28.01
836.50	10	16-QAM	H	100	341	1 / 0	3.60	5.16	8.76	38.45	-29.69
836.50	5	QPSK	V	192	200	1 / 0	2.87	5.16	8.03	38.45	-30.42

**Table 7-9. ERP Data (Band 5)**

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## 7.3 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §27.53(c) §27.53(f) §27.53(g) §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

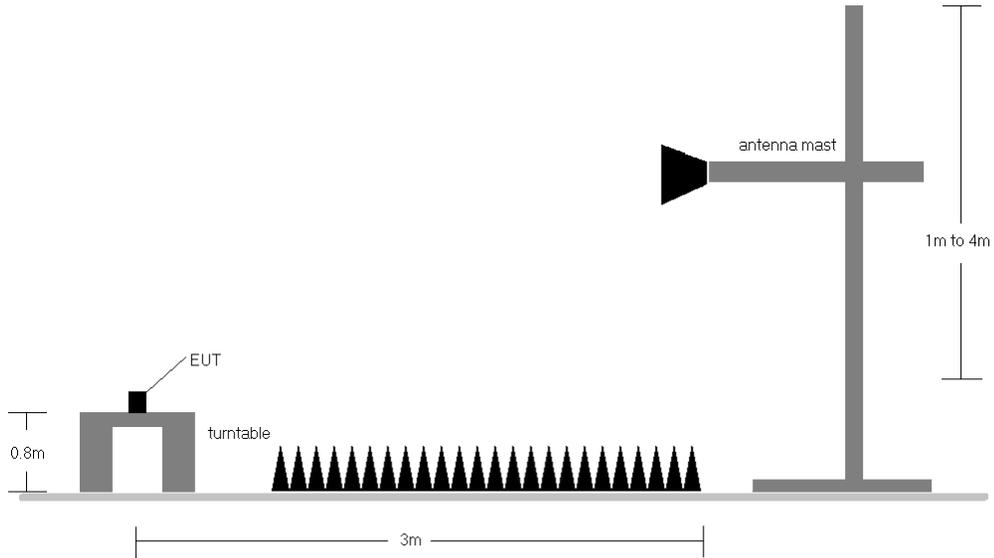
### Test Settings

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 = Peak
6. Trace mode = max hold
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 7-3. 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.

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### 7.3.1 Antenna-1 Radiated Spurious Emissions Measurements

OPERATING FREQUENCY: 704.00 MHz  
 CHANNEL: 23060  
 MEASURED OUTPUT POWER: 20.02 dBm = 0.100 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  33.02 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]
1408.00	H	222	245	-65.41	2.45	-62.96	83.0
2112.00	H	-	-	-66.37	3.44	-62.93	82.9

**Table 7-10. Radiated Spurious Data (Band 12 – Low Channel)**

OPERATING FREQUENCY: 707.50 MHz  
 CHANNEL: 23095  
 MEASURED OUTPUT POWER: 20.30 dBm = 0.107 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  33.30 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]
1415.00	H	225	282	-67.92	2.54	-65.37	85.7
2122.50	H	-	-	-69.84	3.42	-66.42	86.7

**Table 7-11. Radiated Spurious Data (Band 12 – Mid Channel)**

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 711.00 MHz  
 CHANNEL: 23130  
 MEASURED OUTPUT POWER: 20.40 dBm = 0.110 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  33.40 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]
1422.00	H	220	281	-65.54	2.63	-62.91	83.3
2133.00	H	-	-	-66.23	3.39	-62.83	83.2
2844.00	H	-	-	-66.95	4.91	-62.05	82.4

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

OPERATING FREQUENCY: 782.00 MHz  
 CHANNEL: 23230  
 MEASURED OUTPUT POWER: 20.53 dBm = 0.113 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  33.53 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	-	-	-69.62	3.63	-65.99	86.5
3128.00	H	-	-	-55.97	4.95	-51.02	71.6

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

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
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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	260	137	-70.92	3.80	-67.12	-27.1

**Table 7-14. Radiated Spurious Data (Band 13 – 1559-1610MHz Band)**

OPERATING FREQUENCY: 829.00 MHz  
 CHANNEL: 20450  
 MEASURED OUTPUT POWER: 19.83 dBm = 0.096 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.83 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]
1658.00	H	120	320	-56.94	3.60	-53.34	73.2
2487.00	H	-	-	-55.22	3.56	-51.66	71.5

**Table 7-15. Radiated Spurious Data (Band 5 – Low Channel)**

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 836.50 MHz  
 CHANNEL: 20525  
 MEASURED OUTPUT POWER: 19.83 dBm = 0.096 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.83 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]
1673.00	H	122	156	-56.82	3.52	-53.30	73.1
2509.50	H	-	-	-53.60	3.59	-50.01	69.8

Table 7-16. Radiated Spurious Data (Band 5 – Mid Channel)

OPERATING FREQUENCY: 844.00 MHz  
 CHANNEL: 20600  
 MEASURED OUTPUT POWER: 19.84 dBm = 0.096 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.84 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]
1688.00	H	130	215	-57.48	3.44	-54.04	73.9
2532.00	H	-	-	-53.73	3.69	-50.05	69.9

Table 7-17. Radiated Spurious Data (Band 5 – High Channel)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 1712.50 MHz  
 CHANNEL: 131997  
 MEASURED OUTPUT POWER: 24.33 dBm = 0.271 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  37.33 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	112	277	-74.45	8.15	-66.30	90.6
5137.50	H	-	-	-73.54	10.37	-63.17	87.5

Table 7-18. Radiated Spurious Data (Band 66 – Low Channel)

OPERATING FREQUENCY: 1745.00 MHz  
 CHANNEL: 132322  
 MEASURED OUTPUT POWER: 22.83 dBm = 0.192 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.83 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]
3490.00	H	-	-	-74.77	8.33	-66.45	89.3
5235.00	H	-	-	-74.13	10.38	-63.75	86.6

Table 7-19. Radiated Spurious Data (Band 66 – Mid Channel)

OPERATING FREQUENCY: 1777.50 MHz  
 CHANNEL: 132647  
 MEASURED OUTPUT POWER: 23.67 dBm = 0.233 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.67 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]
3555.00	H	-	-	-77.08	8.44	-68.65	92.3
5332.50	H	-	-	-74.51	10.34	-64.17	87.8

Table 7-20. Radiated Spurious Data (Band 66 – High Channel)

OPERATING FREQUENCY: 1851.50 MHz  
 CHANNEL: 26055  
 MEASURED OUTPUT POWER: 23.52 dBm = 0.225 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.52 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]
3703.00	H	-	-	-54.57	8.41	-46.16	69.7
5554.50	H	-	-	-54.08	10.52	-43.56	67.1

Table 7-21. Radiated Spurious Data (Band 25 – Low Channel)

OPERATING FREQUENCY: 1882.50 MHz  
 CHANNEL: 26365  
 MEASURED OUTPUT POWER: 21.56 dBm = 0.143 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  34.56 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]
3765.00	H	-	-	-54.93	8.66	-46.27	67.8
5647.50	H	-	-	-54.76	10.62	-44.14	65.7

Table 7-22. Radiated Spurious Data (Band 25 – Mid Channel)

OPERATING FREQUENCY: 1913.50 MHz  
 CHANNEL: 26675  
 MEASURED OUTPUT POWER: 23.29 dBm = 0.213 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 3.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.29 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]
3827.00	H	115	265	-53.94	8.76	-45.19	68.5
5740.50	H	-	-	-54.31	10.73	-43.58	66.9

Table 7-23. Radiated Spurious Data (Band 25 – High Channel)

### 7.3.2 Antenna-2 Radiated Spurious Emissions Measurements

OPERATING FREQUENCY: 707.50 MHz  
 CHANNEL: 20475  
 MEASURED OUTPUT POWER: 14.24 dBm = 0.027 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  27.24 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]
1415.00	H	-	-	-63.11	5.69	-57.42	71.7

Table 7-24. Radiated Spurious Data (Band 12 – Mid Channel)

OPERATING FREQUENCY: 782.00 MHz  
 CHANNEL: 23230  
 MEASURED OUTPUT POWER: 14.68 dBm = 0.029 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  27.68 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	-	-	-61.99	5.69	-56.30	71.0

Table 7-25. Radiated Spurious Data (Band 13 – Mid Channel)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
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OPERATING FREQUENCY: 836.50 MHz  
 CHANNEL: 20525  
 MEASURED OUTPUT POWER: 10.44 dBm = 0.011 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5.0 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  23.44 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]
1673.00	H	-	-	-57.62	3.52	-54.10	64.5

Table 7-26. Radiated Spurious Data (Band 5 – High Channel)

FCC ID: ZNFVS995		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1608121374-R1.ZNF	Test Dates: 8/8 - 8/25/2016	EUT Type: Portable Handset	Page 33 of 34	

## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LGE Portable Handset FCC ID: ZNFVS995** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: ZNFVS995		<b>FCC Pt. 22, 24, &amp; 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1608121374-R1.ZNF	<b>Test Dates:</b> 8/8 - 8/25/2016	<b>EUT Type:</b> Portable Handset	Page 34 of 34	