

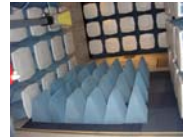


PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA

Tel. 410.290.6652 / Fax 410.290.6654

<http://www.pctestlab.com>



MEASUREMENT REPORT

FCC Part 22, 24, & 27

Applicant Name:

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

Date of Testing:

7/24-8/15/2017

Test Site/Location:

PCTEST Lab., Columbia, MD, USA

Test Report Serial No.:

1M1707180223-02-R2.ZNF

FCC ID:

ZNFLS998

APPLICANT:

LG ELECTRONICS MOBILECOMM U.S.A

Application Type:

Class II Permissive Change

Model:

LGLS998

Additional Model(s):

LG-LS998, LS998, LG-AS998, LGA998, AS998

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part(s):

§2 §22(H) §24(E) §27(L)

Test Procedure(s):

ANSI/TIA-603-D-2010, KDB 971168 D01 v02r02, KDB 648474 D03 v01r04

Test Device Serial No.:

identical prototype [S/N: 01570, 01569, 01572, 01569]

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: 1M1707180223-02-R2.ZNF) supersedes and replaces the previously issued test report (S/N: 1M1707180223-02-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



FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset	Page 1 of 35	

© 2017 PCTEST Engineering Laboratory, Inc.

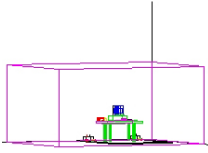
V 6.8
07/14/2017

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.

TABLE OF CONTENTS

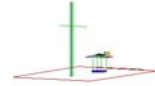
FCC PART 22, 24, & 27 MEASUREMENT REPORT	3
1.0 INTRODUCTION	5
1.1 Scope	5
1.2 Testing Facility	5
2.0 PRODUCT INFORMATION	6
2.1 Equipment Description	6
2.2 Device Capabilities	6
2.3 Test Configuration	6
2.4 EMI Suppression Device(s)/Modifications	6
3.0 DESCRIPTION OF TESTS	7
3.1 Evaluation Procedure	7
3.2 Cellular - Base Frequency Blocks	7
3.3 Cellular - Mobile Frequency Blocks	7
3.4 PCS - Base Frequency Blocks	7
3.5 PCS - Mobile Frequency Blocks	8
3.6 AWS - Base Frequency Blocks	8
3.7 AWS - Mobile Frequency Blocks	8
3.8 Radiated Measurements	9
4.0 MEASUREMENT UNCERTAINTY	10
5.0 TEST EQUIPMENT CALIBRATION DATA	11
6.0 SAMPLE CALCULATIONS	12
7.0 TEST RESULTS	13
7.1 Summary	13
7.2 Radiated Power (ERP/EIRP)	14
7.3 Radiated Spurious Emissions Measurements	19
8.0 CONCLUSION	35

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 2 of 35



MEASUREMENT REPORT

FCC Part 22, 24, & 27

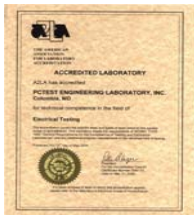


§2.1033 General Information

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 21046 USA
FCC RULE PART(S): §2 §22(H) §24(E) §27(L)
BASE MODEL: LGLS998
FCC ID: ZNFLS998
FCC CLASSIFICATION: PCS Licensed Transmitter Held to Ear (PCE)
MODE: CDMA / GSM / WCDMA
FREQUENCY TOLERANCE: $\pm 0.00025\%$ (2.5 ppm)
Test Device Serial No.: 01570, 01569, 01572, 01569 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST: 7/24-8/15/2017
TEST REPORT S/N: 1M1707180223-02-R2.ZNF

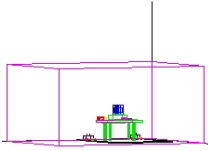
Test Facility / Accreditations

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.

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 3 of 35



MEASUREMENT REPORT

FCC Part 22, 24, & 27



Mode	FCC Rule Part	Tx Frequency (MHz)	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
GPRS850	22H	824.2 - 848.8	0.422	26.25
EDGE850	22H	824.2 - 848.8	0.090	19.55
WCDMA850	22H	826.4 - 846.6	0.093	19.69
CDMA850	22H	824.70 - 848.31	0.111	20.47
WCDMA1700	27	1712.4 - 1752.6	0.297	24.73
GPRS1900	24E	1850.2 - 1909.8	0.969	29.86
EDGE1900	24E	1850.2 - 1909.8	0.307	24.86
WCDMA1900	24E	1852.4 - 1907.6	0.348	25.41
CDMA1900	24E	1851.25 - 1908.75	0.329	25.17

EUT Overview

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset	Page 4 of 35	

1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Intern't'l (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2014 on January 22, 2015.

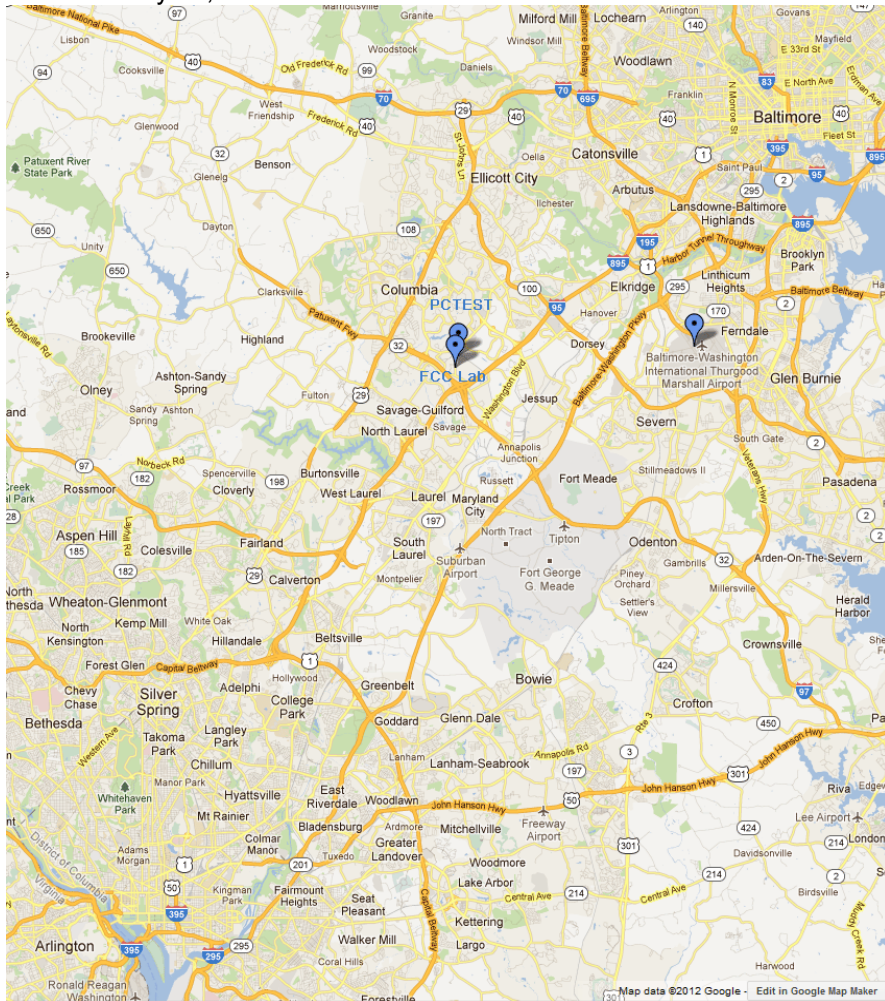


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: ZNFLS998	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 5 of 35

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFLS998**. The test data contained in this report pertains only to the emissions due to the EUT's 2G/3G licensed transmitters.

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n 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-D-2010 and KDB 971168 D01 v02r02. 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 a certified 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.

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset	Page 6 of 35	

3.0 DESCRIPTION OF TESTS

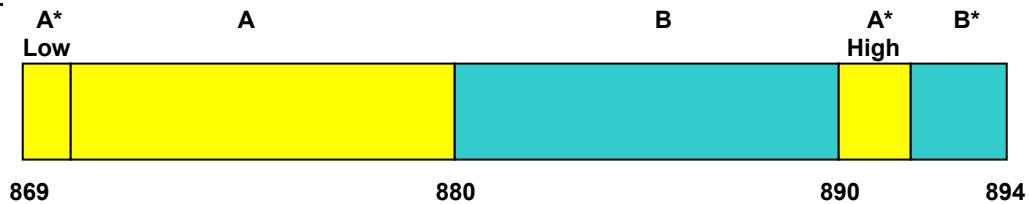
3.1 Evaluation Procedure

The measurement procedures described in the “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-D-2010) and “Measurement Guidance for Certification of Licensed Digital Transmitters” (KDB 971168 D01 v02r02) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

3.2 Cellular - Base Frequency Blocks

\$22.905



BLOCK 1: 869 – 880 MHz (A* Low + A)

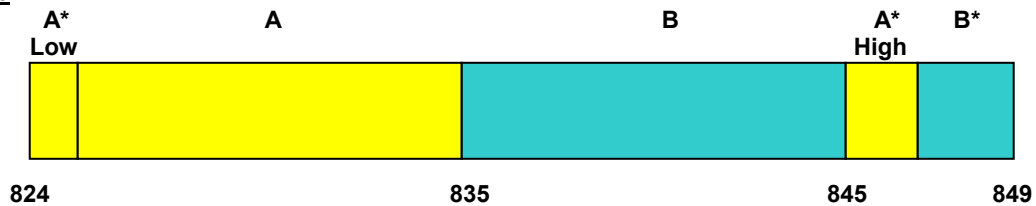
BLOCK 3: 890 – 891.5 MHz (A* High)

BLOCK 2: 880 – 890 MHz (B)

BLOCK 4: 891.5 – 894 MHz (B*)

3.3 Cellular - Mobile Frequency Blocks

\$22.905



BLOCK 1: 824 – 835 MHz (A* Low + A)

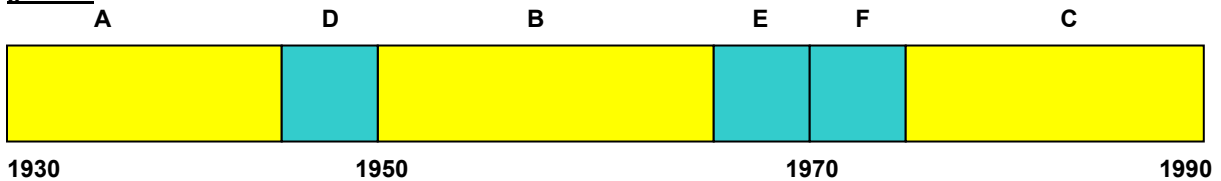
BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 2: 835 – 845 MHz (B)

BLOCK 4: 846.5 – 849 MHz (B*)

3.4 PCS - Base Frequency Blocks

\$24.229



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 4: 1965 – 1970 MHz (E)

BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 5: 1970 – 1975 MHz (F)

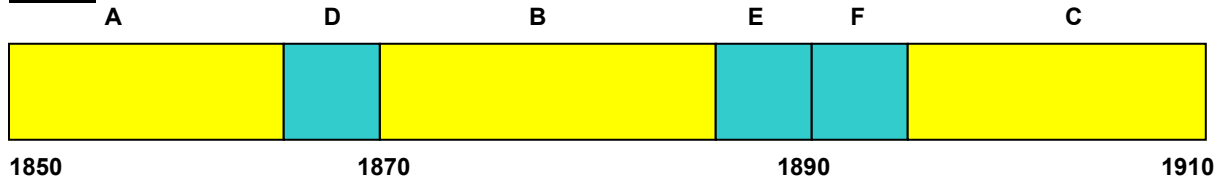
BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 7 of 35

3.5 PCS - Mobile Frequency Blocks

§24.229



BLOCK 1: 1850 – 1865 MHz (A)

BLOCK 4: 1885 – 1890 MHz (E)

BLOCK 2: 1865 – 1870 MHz (D)

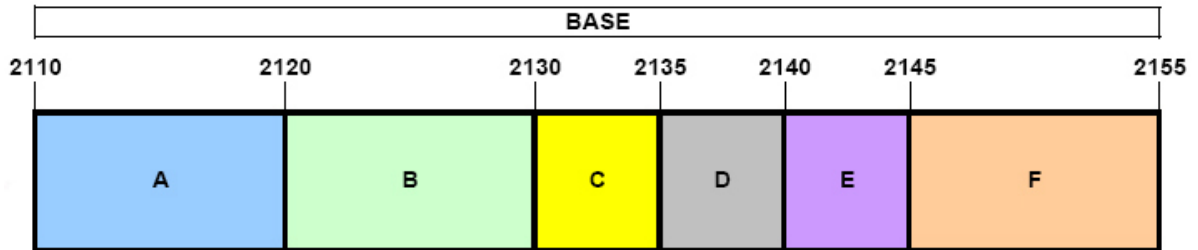
BLOCK 5: 1890 – 1895 MHz (F)

BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 6: 1895 – 1910 MHz (C)

3.6 AWS - Base Frequency Blocks

§27.5(h)



BLOCK 1: 2110 – 2120 MHz (A)

BLOCK 4: 2135 – 2140 MHz (D)

BLOCK 2: 2120 – 2130 MHz (B)

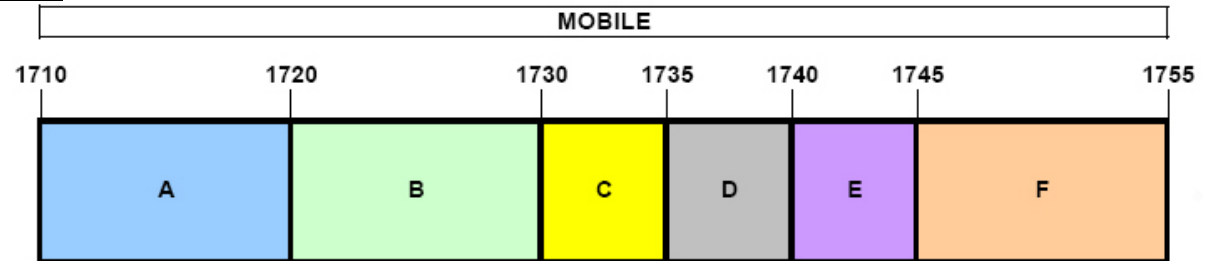
BLOCK 5: 2140 – 2145 MHz (E)

BLOCK 3: 2130 – 2135 MHz (C)

BLOCK 6: 2145 – 2155 MHz (F)

3.7 AWS - Mobile Frequency Blocks

§27.5(h)



BLOCK 1: 1710 – 1720 MHz (A)

BLOCK 4: 1735 – 1740 MHz (D)

BLOCK 2: 1720 – 1730 MHz (B)

BLOCK 5: 1740 – 1745 MHz (E)

BLOCK 3: 1730 – 1735 MHz (C)

BLOCK 6: 1745 – 1755 MHz (F)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 8 of 35

3.8 Radiated Measurements

\$2.1053 \$22.913(a.2) \$22.917(a) \$24.232(c) \$24.238(a) \$27.50(d)(10) \$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.

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

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/ITA-603-D-2010.

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset	Page 9 of 35	

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

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 10 of 35

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
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	6/21/2017	Annual	6/21/2018	RE1
COM-Power	AL-130R	Active Loop Antenna	6/5/2017	Annual	6/5/2018	121085
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	12/1/2016	Biennial	12/1/2018	125518
PCTEST	-	EMC Switch System	6/21/2017	Annual	6/21/2018	NM1
PCTEST	-	EMC Switch System	6/21/2017	Annual	6/21/2018	NM2
Rohde & Schwarz	CMU200	Base Station Simulator	4/11/2017	Annual	4/11/2018	836371/0079
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	4/19/2017	Annual	4/19/2018	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/31/2017	Annual	7/31/2018	100348
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/11/2017	Annual	5/11/2018	100040
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	3/30/2016	Biennial	3/30/2018	9105-2404
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

Table 5-1. Test Equipment

Notes:

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.

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset	Page 11 of 35	

6.0 SAMPLE CALCULATIONS

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

The receive 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 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm $- (-24.80) = 50.3$ dBc.

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 12 of 35

7.0 TEST RESULTS

7.1 Summary

Company Name: LG Electronics MobileComm U.S.A
 FCC ID: ZNFLS998
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): CDMA / GSM / WCDMA

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a.2)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS	Section 7.2
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 7.2
27.50(d.4)	Equivalent Isotropic Radiated Power	< 1 Watts max. EIRP		PASS	Section 7.2
2.1053 22.917(a) 24.238(a) 27.53(h)	Radiated Spurious Emissions	> 43 + log ₁₀ (P[Watts]) for all out-of-band emissions		PASS	Section 7.3

Table 7-1. Summary of Test Results

Note:

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

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset	Page 13 of 35	

7.2 Radiated Power (ERP/EIRP)

§22.913(a)(2) 24.232(c) 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 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. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
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".
Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 14 of 35

Test Setup

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

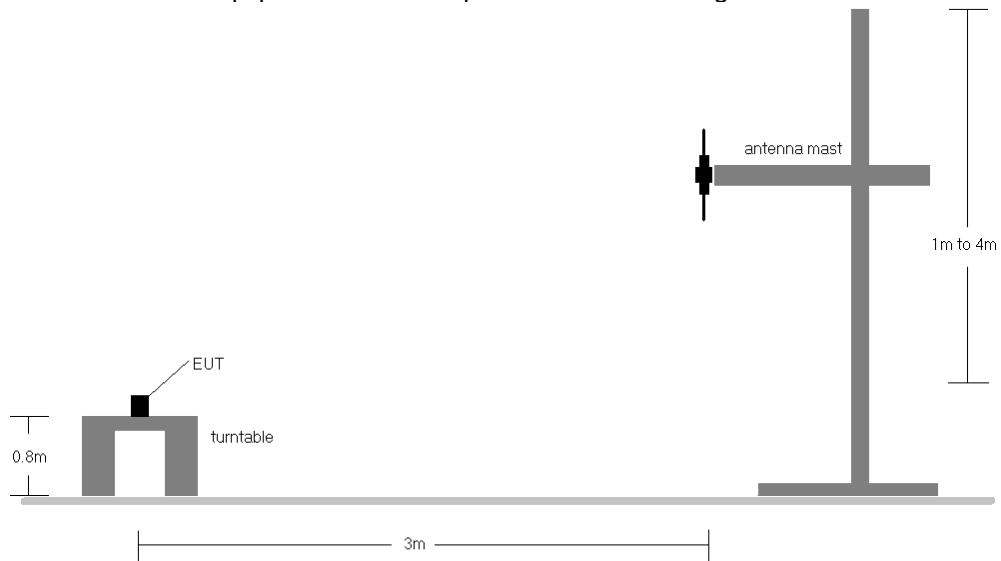


Figure 7-1. Radiated Test Setup <1GHz

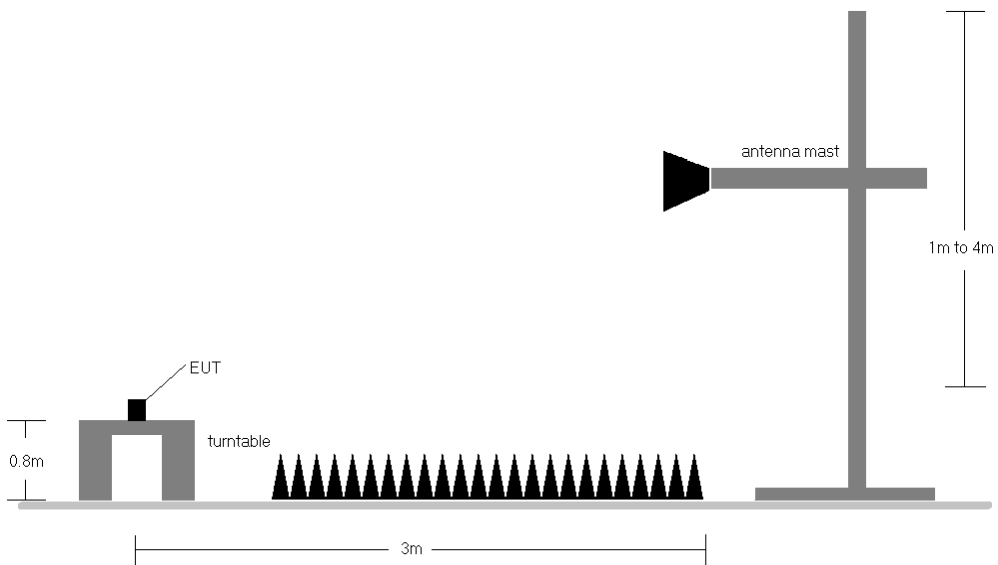


Figure 7-2. Radiated Test Setup >1GHz

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 15 of 35

Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) This device employs CDMA/EvDO capabilities. This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 4) This unit was tested with its standard battery.
- 5) 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.

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GPRS850	V	356	188	26.91	-0.65	26.25	0.422	38.45	-12.20
836.60	GPRS850	V	356	188	26.31	-0.65	25.66	0.368	38.45	-12.79
848.80	GPRS850	V	356	188	25.79	-0.65	25.14	0.327	38.45	-13.31
824.20	GPRS850	H	271	198	26.83	-0.65	26.18	0.415	38.45	-12.27
824.20	EDGE850	V	356	188	20.20	-0.65	19.55	0.090	38.45	-18.90
824.20	GPRS850 (WCP)	V	337	64	26.73	-0.65	26.08	0.405	38.45	-12.37

Table 7-2. ERP (Cellular GPRS)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	CDMA850	H	150	335	21.12	-0.65	20.47	0.111	38.45	-17.98
836.52	CDMA850	H	150	337	21.07	-0.65	20.42	0.110	38.45	-18.03
848.31	CDMA850	H	150	343	21.02	-0.65	20.37	0.109	38.45	-18.08
824.70	CDMA850	V	150	98	18.54	-0.65	17.89	0.062	38.45	-20.56
824.70	CDMA850 (WCP)	H	150	355	21.00	-0.65	20.35	0.108	38.45	-18.10

Table 7-3. ERP (Cellular CDMA)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 16 of 35

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	H	150	183	20.34	-0.65	19.69	0.093	38.45	-18.76
836.60	WCDMA850	H	150	178	20.26	-0.65	19.61	0.091	38.45	-18.84
846.60	WCDMA850	H	150	171	19.76	-0.65	19.11	0.081	38.45	-19.34
826.40	WCDMA850	V	150	101	19.49	-0.65	18.84	0.077	38.45	-19.61
826.40	WCDMA850 (WCP)	H	150	184	20.05	-0.65	19.40	0.087	38.45	-19.05

Table 7-4. ERP (Cellular WCDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1712.40	WCDMA1700	H	31	330	19.18	5.55	24.73	0.297	30.00	-5.27
1732.60	WCDMA1700	H	12	350	17.44	5.41	22.85	0.193	30.00	-7.15
1752.60	WCDMA1700	H	44	331	19.00	5.27	24.27	0.267	30.00	-5.73
1712.40	WCDMA1700	V	40	3	19.06	5.63	24.69	0.294	30.00	-5.31
1712.40	WCDMA1700 (WCP)	H	2	352	12.41	5.55	17.96	0.062	30.00	-12.04

Table 7-5. EIRP (AWS WCDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GPRS1900	V	190	253	24.15	4.79	28.94	0.783	33.01	-4.07
1880.00	GPRS1900	V	190	253	25.02	4.84	29.86	0.969	33.01	-3.15
1909.80	GPRS1900	V	190	251	23.76	4.86	28.62	0.728	33.01	-4.39
1880.00	GPRS1900	H	190	251	25.09	4.74	29.83	0.962	33.01	-3.18
1880.00	EDGE1900	V	190	253	20.02	4.84	24.86	0.307	33.01	-8.15
1880.00	GPRS1900 (WCP)	V	180	153	24.48	4.84	29.32	0.856	33.01	-3.69

Table 7-6. EIRP (PCS GPRS)

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset	Page 17 of 35	

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1851.25	CDMA1900	H	150	346	20.35	4.82	25.17	0.329	33.01	-7.84
1880.00	CDMA1900	H	150	13	19.65	4.74	24.39	0.275	33.01	-8.62
1908.75	CDMA1900	H	150	340	19.98	4.68	24.66	0.293	33.01	-8.35
1851.25	CDMA1900	V	150	49	15.91	4.86	20.77	0.119	33.01	-12.24
1851.25	CDMA1900 (WCP)	H	150	8	18.85	4.86	23.71	0.235	33.01	-9.30

Table 7-7. EIRP (PCS CDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	H	47	336	20.13	4.81	24.94	0.312	33.01	-8.07
1880.00	WCDMA1900	H	44	330	20.67	4.74	25.41	0.348	33.01	-7.60
1907.60	WCDMA1900	H	39	339	19.92	4.68	24.60	0.289	33.01	-8.41
1880.00	WCDMA1900	V	25	6	17.77	4.84	22.61	0.183	33.01	-10.40
1880.00	WCDMA1900 (WCP)	H	345	356	15.92	4.74	20.66	0.116	33.01	-12.35

Table 7-8. EIRP (PCS WCDMA)

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset	Page 18 of 35	

7.3 Radiated Spurious Emissions Measurements

\$2.1053 \$22.917(a) 24.238(a) 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 horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.8

ANSI/TIA-603-D-2010 – Section 2.2.12

Test Settings

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

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 19 of 35

Test Setup

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

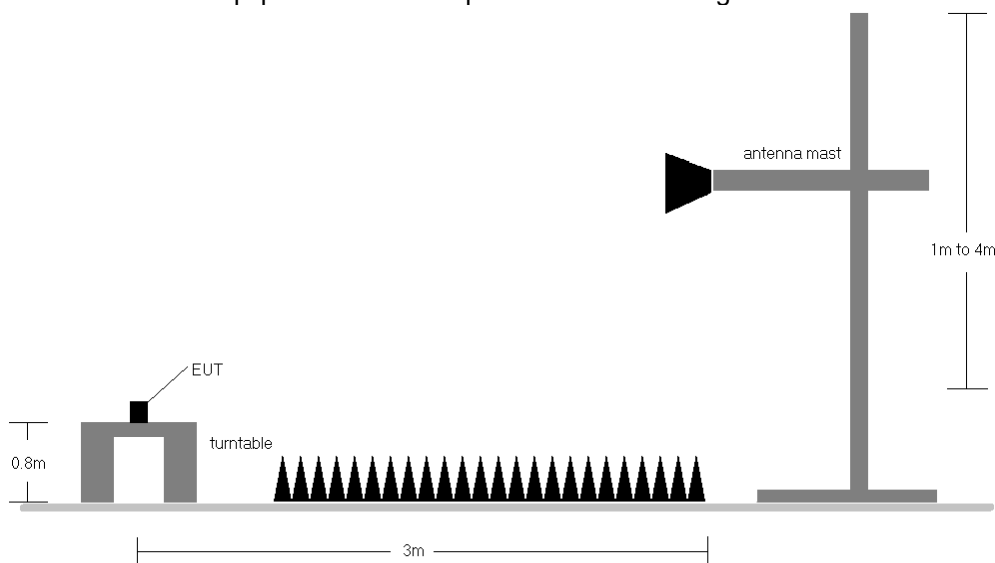


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) This device employs CDMA/EvDO capabilities. This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 4) This unit was tested with its standard battery.
- 5) 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.
- 6) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 7) 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.
- 8) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

FCC ID: ZNFS998	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 20 of 35

OPERATING FREQUENCY: 824.20 MHz
 CHANNEL: 128
 MEASURED OUTPUT POWER: 26.25 dBm = 0.422 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 39.25 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]
1648.40	H	201	141	-60.08	6.69	-53.39	79.6
2472.60	H	271	136	-57.85	7.51	-50.34	76.6
3296.80	H	-	-	-59.63	7.36	-52.27	78.5

Table 7-9. Radiated Spurious Data (Cellular GPRS Mode – Ch. 128)

OPERATING FREQUENCY: 836.60 MHz
 CHANNEL: 190
 MEASURED OUTPUT POWER: 25.66 dBm = 0.368 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 38.66 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]
1673.20	H	138	163	-63.64	6.70	-56.94	82.6
2509.80	H	121	220	-46.14	7.63	-38.51	64.2
3346.40	H	-	-	-59.79	7.52	-52.27	77.9

Table 7-10. Radiated Spurious Data (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 21 of 35

OPERATING FREQUENCY: 848.80 MHz
 CHANNEL: 251
 MEASURED OUTPUT POWER: 25.14 dBm = 0.327 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 38.14 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]
1697.60	H	118	154	-60.95	6.70	-54.25	79.4
2546.40	H	169	222	-42.75	7.60	-35.15	60.3
3395.20	H	-	-	-59.52	7.68	-51.84	77.0
4244.00	H	136	220	-56.22	8.41	-47.81	72.9
5092.80	H	-	-	-56.70	8.62	-48.08	73.2

Table 7-11. Radiated Spurious Data (Cellular GPRS Mode – Ch. 251)

OPERATING FREQUENCY: 824.20 MHz
 CHANNEL: 128
 MEASURED OUTPUT POWER: 26.08 dBm = 0.405 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 39.08 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]
1648.40	H	176	23	-68.38	6.69	-61.68	87.8
2472.60	H	113	302	-55.32	7.51	-47.81	73.9
3296.80	H	-	-	-63.61	7.36	-56.25	82.3

Table 7-12. Radiated Spurious Data with WCP (Cellular GPRS Mode – Ch. 128)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 22 of 35

OPERATING FREQUENCY: 824.70 MHz
 CHANNEL: 1013
 MEASURED OUTPUT POWER: 20.47 dBm = 0.111 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.47 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]
1649.40	H	117	140	-74.00	6.70	-67.30	87.8
2474.10	H	119	202	-70.88	7.52	-63.36	83.8
3298.80	H	-	-	-68.80	7.36	-61.44	81.9

Table 7-13. Radiated Spurious Data (Cellular CDMA Mode – Ch. 1013)

OPERATING FREQUENCY: 836.52 MHz
 CHANNEL: 384
 MEASURED OUTPUT POWER: 20.42 dBm = 0.110 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.42 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]
1673.04	H	121	216	-73.83	6.70	-67.13	87.6
2509.56	H	118	200	-60.54	7.63	-52.91	73.3
3346.08	H	-	-	-69.32	7.51	-61.81	82.2

Table 7-14. Radiated Spurious Data (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 23 of 35

OPERATING FREQUENCY: 848.31 MHz
 CHANNEL: 777
 MEASURED OUTPUT POWER: 20.37 dBm = 0.109 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.37 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]
1696.62	H	167	141	-70.66	6.70	-63.96	84.3
2544.93	H	110	200	-54.79	7.60	-47.19	67.6
3393.24	H	-	-	-68.99	7.67	-61.32	81.7

Table 7-15. Radiated Spurious Data (Cellular CDMA Mode – Ch. 777)

OPERATING FREQUENCY: 848.31 MHz
 CHANNEL: 777
 MEASURED OUTPUT POWER: 20.35 dBm = 0.108 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.35 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]
1696.62	H	209	357	-75.09	8.40	-66.69	87.0
2544.93	H	112	193	-55.43	8.63	-46.80	67.1
3393.24	H	-	-	-70.68	9.33	-61.35	81.7

Table 7-16. Radiated Spurious Data with WCP (Cellular CDMA Mode – Ch. 777)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 24 of 35

OPERATING FREQUENCY: 826.40 MHz
 CHANNEL: 4132
 MEASURED OUTPUT POWER: 19.69 dBm = 0.093 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.69 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]
1652.80	H	-	-	-68.76	3.65	-65.12	84.8
2479.20	H	-	-	-64.09	3.58	-60.52	80.2

Table 7-17. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

OPERATING FREQUENCY: 836.60 MHz
 CHANNEL: 4183
 MEASURED OUTPUT POWER: 19.61 dBm = 0.091 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.61 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]
1673.20	H	-	-	-68.49	3.58	-64.91	84.5
2509.80	H	288	250	-60.88	3.62	-57.26	76.9
3346.40	H	-	-	-65.40	5.76	-59.64	79.3

Table 7-18. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)					Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset				Page 25 of 35	

OPERATING FREQUENCY: 846.60 MHz
 CHANNEL: 4233
 MEASURED OUTPUT POWER: 19.11 dBm = 0.081 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.11 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]
1693.20	H	-	-	-67.87	3.51	-64.37	83.5
2539.80	H	-	-	-64.07	3.73	-60.34	79.5

Table 7-19. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)

OPERATING FREQUENCY: 826.40 MHz
 CHANNEL: 4132
 MEASURED OUTPUT POWER: 19.40 dBm = 0.087 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.40 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]
1652.80	H	170	11	-64.96	3.65	-61.32	80.7
2479.20	H	-	-	-65.69	3.58	-62.12	81.5

Table 7-20. Radiated Spurious Data with WCP (Cellular WCDMA Mode – Ch. 4132)

OPERATING FREQUENCY: 1712.40 MHz
 CHANNEL: 1312
 MEASURED OUTPUT POWER: 24.73 dBm = 0.297 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 37.73 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]
3424.80	H	-	-	-66.68	8.11	-58.57	83.3
5137.20	H	-	-	-66.85	10.24	-56.61	81.3

Table 7-21. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1312)

OPERATING FREQUENCY: 1732.60 MHz
 CHANNEL: 1413
 MEASURED OUTPUT POWER: 22.85 dBm = 0.193 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.85 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]
3465.20	H	-	-	-67.70	8.33	-59.37	82.2
5197.80	H	-	-	-66.82	10.27	-56.54	79.4

Table 7-22. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 27 of 35

OPERATING FREQUENCY: 1752.60 MHz
 CHANNEL: 1513
 MEASURED OUTPUT POWER: 24.27 dBm = 0.267 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 37.27 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]
3505.20	H	-	-	-67.52	8.52	-59.00	83.3
5257.80	H	-	-	-66.88	10.29	-56.59	80.9

Table 7-23. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1513)

OPERATING FREQUENCY: 1712.40 MHz
 CHANNEL: 1312
 MEASURED OUTPUT POWER: 17.96 dBm = 0.062 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.96 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]
3424.80	H	-	-	-70.54	9.87	-60.67	78.6
5137.20	H	-	-	-68.16	10.76	-57.41	75.4

Table 7-24. Radiated Spurious Data with WCP (AWS WCDMA Mode – Ch. 1312)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 28 of 35

OPERATING FREQUENCY: 1850.20 MHz
 CHANNEL: 512
 MEASURED OUTPUT POWER: 28.94 dBm = 0.783 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 41.94 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]
3700.40	V	348	351	-63.96	9.53	-54.43	83.4
5550.60	V	214	330	-63.25	10.94	-52.32	81.3
7400.80	V	-	-	-57.35	10.92	-46.43	75.4
9251.00	V	155	40	-55.72	11.49	-44.22	73.2
11101.20	V	142	31	-56.41	12.67	-43.74	72.7
12951.40	V	-	-	-56.28	13.35	-42.93	71.9

Table 7-25. Radiated Spurious Data (PCS GPRS Mode – Ch. 512)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 661
 MEASURED OUTPUT POWER: 29.86 dBm = 0.969 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 42.86 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	V	239	22	-64.24	9.38	-54.86	84.7
5640.00	V	153	320	-63.62	11.15	-52.47	82.3
7520.00	V	-	-	-56.95	11.11	-45.83	75.7
9400.00	V	127	9	-54.16	11.53	-42.63	72.5
11280.00	V	-	-	-56.76	12.70	-44.06	73.9

Table 7-26. Radiated Spurious Data (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 29 of 35

OPERATING FREQUENCY: 1909.80 MHz
 CHANNEL: 810
 MEASURED OUTPUT POWER: 28.62 dBm = 0.728 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 41.62 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]
3819.60	V	152	343	-60.33	9.29	-51.03	79.7
5729.40	V	137	306	-64.07	11.37	-52.70	81.3
7639.20	V	-	-	-57.34	11.32	-46.02	74.6
9549.00	V	125	2	-55.17	11.73	-43.44	72.1
11458.80	V	-	-	-56.83	12.69	-44.14	72.8

Table 7-27. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 661
 MEASURED OUTPUT POWER: 29.32 dBm = 0.856 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 42.32 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	125	20	-64.77	11.73	-53.04	82.4
5640.00	H	159	188	-65.97	12.69	-53.27	82.6
7520.00	H	-	-	-58.71	12.62	-46.08	75.4

Table 7-28. Radiated Spurious Data with WCP (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 30 of 35

OPERATING FREQUENCY: 1851.25 MHz
 CHANNEL: 25
 MEASURED OUTPUT POWER: 25.17 dBm = 0.329 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 38.17 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]
3702.50	H	189	14	-67.67	9.52	-58.15	83.3
5553.75	H	-	-	-66.79	11.02	-55.77	80.9

Table 7-29. Radiated Spurious Data (PCS CDMA Mode – Ch. 25)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 600
 MEASURED OUTPUT POWER: 24.39 dBm = 0.275 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 37.39 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	157	320	-67.17	9.39	-57.79	82.2
5640.00	H	-	-	-67.08	11.22	-55.86	80.2

Table 7-30. Radiated Spurious Data (PCS CDMA Mode – Ch. 600)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 31 of 35

OPERATING FREQUENCY: 1908.75 MHz
 CHANNEL: 1175
 MEASURED OUTPUT POWER: 24.66 dBm = 0.293 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) = 37.66$ 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]
3817.50	H	159	52	-66.50	9.32	-57.18	81.8
5726.25	H	-	-	-65.28	11.36	-53.92	78.6
7635.00	H	146	321	-57.39	11.33	-46.06	70.7
9543.75	H	-	-	-57.24	11.76	-45.47	70.1

Table 7-31. Radiated Spurious Data (PCS CDMA Mode – Ch. 1175)

OPERATING FREQUENCY: 1908.75 MHz
 CHANNEL: 1175
 MEASURED OUTPUT POWER: 23.71 dBm = 0.235 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) = 36.71$ 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]
3817.50	H	141	110	-68.25	9.32	-58.93	82.6
5726.25	H	-	-	-67.62	11.36	-56.26	80.0

Table 7-32. Radiated Spurious Data with WCP (PCS CDMA Mode – Ch. 1175)

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 32 of 35

OPERATING FREQUENCY: 1852.40 MHz
 CHANNEL: 9262
 MEASURED OUTPUT POWER: 24.94 dBm = 0.312 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 37.94 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]
3704.80	H	-	-	-65.05	8.31	-56.74	81.7
5557.20	H	-	-	-67.10	10.54	-56.57	81.5

Table 7-33. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9262)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 9400
 MEASURED OUTPUT POWER: 25.41 dBm = 0.348 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 38.41 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	-	-	-65.65	8.46	-57.19	82.1
5640.00	H	-	-	-65.56	10.60	-54.96	79.9

Table 7-34. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 33 of 35

OPERATING FREQUENCY: 1907.60 MHz
 CHANNEL: 9538
 MEASURED OUTPUT POWER: 24.60 dBm = 0.289 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) = 37.60$ 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]
3815.20	H	-	-	-65.42	8.56	-56.86	81.5
5722.80	H	-	-	-65.45	10.63	-54.82	79.4

Table 7-35. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9538)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 9400
 MEASURED OUTPUT POWER: 20.66 dBm = 0.116 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) = 33.66$ 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	-	-	-65.89	8.46	-57.43	78.1
5640.00	H	-	-	-65.81	10.60	-55.21	75.9

Table 7-36. Radiated Spurious Data with WCP (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset		Page 34 of 35

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFLS998** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules.

FCC ID: ZNFLS998		FCC Pt. 22, 24, & 27 CDMA / GSM / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1707180223-02-R2.ZNF	Test Dates: 7/24-8/15/2017	EUT Type: Portable Handset	Page 35 of 35	