



PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA

Tel. 410.290.6652 / Fax 410.290.6654

http://www.pctest.com



MEASUREMENT REPORT GSM / GPRS / EDGE / WCDMA

Applicant Name:

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

Date of Testing:

10/02-10/16/2017

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M1710020259-02.ZNF

FCC ID:

ZNFX210MA

APPLICANT:

LG Electronics MobileComm U.S.A

Application Type:

Class II Permissive Change

Model:

LM-X210MA

Additional Model(s):

LMX210MA, X210MA, LM-X210TA, LMX210TA, X210TA, LM-X210TAT, LMX210TAT, X210TAT

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part(s):

22, 24, & 27

Test Procedure(s):

ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v02r02

Class II Permissive Change:

Please see FCC change document

Original Grant Date:

10/12/2017

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Randy Ortanez
President

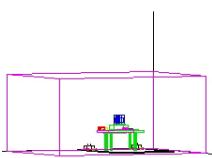
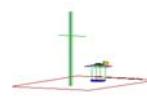


FCC ID: ZNFX210MA	PCTEST Engineering Laboratory, Inc.			GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset				Page 1 of 30

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

1.0	INTRODUCTION	4
1.1	Scope	4
1.2	PCTEST Test Location	4
1.3	Test Facility / Accreditations	4
2.0	PRODUCT INFORMATION	5
2.1	Equipment Description	5
2.2	Device Capabilities	5
2.3	Test Configuration	5
2.4	EMI Suppression Device(s)/Modifications	5
3.0	DESCRIPTION OF TESTS	6
3.1	Evaluation Procedure	6
3.2	Cellular - Base Frequency Blocks	6
3.3	Cellular - Mobile Frequency Blocks	6
3.4	PCS - Base Frequency Blocks	6
3.5	PCS - Mobile Frequency Blocks	7
3.6	AWS - Base Frequency Blocks	7
3.7	AWS - Mobile Frequency Blocks	7
3.8	Radiated Measurements	8
4.0	MEASUREMENT UNCERTAINTY	9
5.0	TEST EQUIPMENT CALIBRATION DATA	10
6.0	SAMPLE CALCULATIONS	11
7.0	TEST RESULTS	12
7.1	Summary	12
7.2	Radiated Power (ERP/EIRP)	13
7.3	Radiated Spurious Emissions Measurements	18
8.0	CONCLUSION	30

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 2 of 30

MEASUREMENT REPORT

GSM / GPRS / EDGE / WCDMA

Mode	FCC Rule Part	Tx Frequency (MHz)	ERP		EIRP	
			Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)
GPRS 850	22H	824.2 - 848.8	1.531	31.85	2.512	34.00
EDGE850	22H	824.2 - 848.8	1.294	31.12	2.123	33.27
WCDMA850	22H	826.4 - 846.6	0.139	21.42	0.228	23.57
WCDMA1700	27	1712.4 - 1752.6			0.303	24.81
GPRS 1900	24E	1850.2 - 1909.8			1.242	30.94
EDGE1900	24E	1850.2 - 1909.8			0.398	26.00
WCDMA1900	24E	1852.4 - 1907.6			0.288	24.59

EUT Overview

FCC ID: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT <small>(CLASS II PERMISSIVE CHANGE)</small>				Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset			Page 3 of 30

1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations

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

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (22831) test laboratory with the site description on file with ISED.

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.		GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset			Page 4 of 30

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFX210MA**. The test data contained in this report pertains only to the emissions due to the EUT's 2G/3G licensed transmitters.

Test Device Serial No.: 61979

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE)

2.3 Test Configuration

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

2.4 EMI Suppression Device(s)/Modifications

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

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.			GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset				Page 5 of 30

3.0 DESCRIPTION OF TESTS

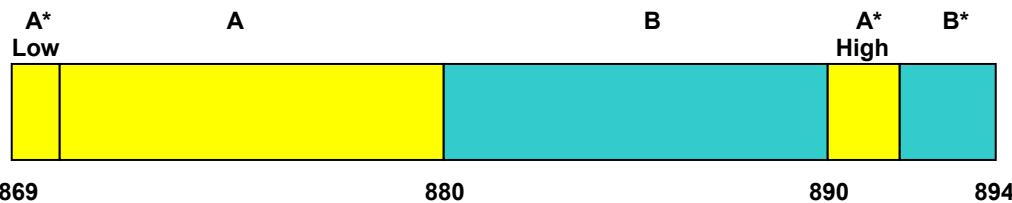
3.1 Evaluation Procedure

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)

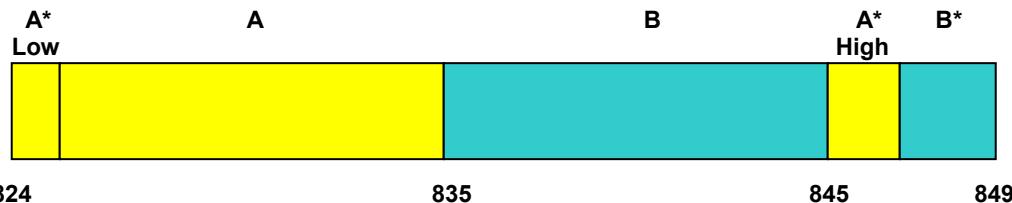
BLOCK 2: 880 – 890 MHz (B)

BLOCK 3: 890 – 891.5 MHz (A* High)

BLOCK 4: 891.5 – 894 MHz (B*)

3.3 Cellular - Mobile Frequency Blocks

§22.905



BLOCK 1: 824 – 835 MHz (A* Low + A)

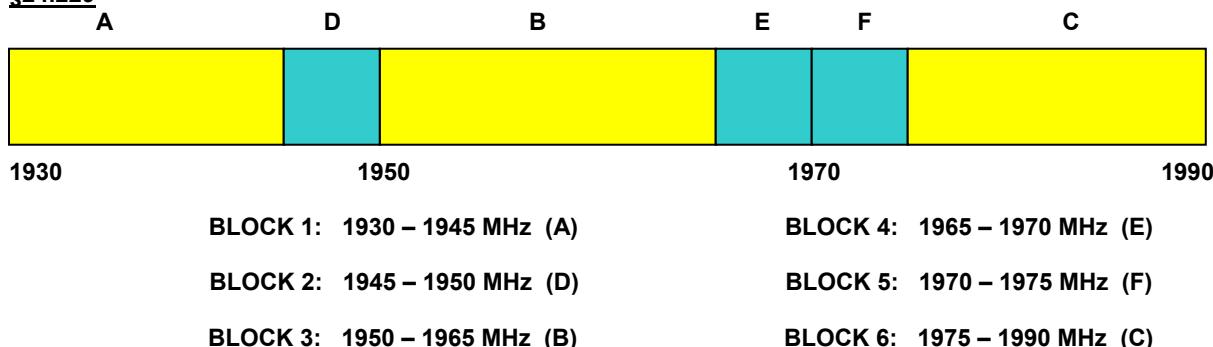
BLOCK 2: 835 – 845 MHz (B)

BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 4: 846.5 – 849 MHz (B*)

3.4 PCS - Base Frequency Blocks

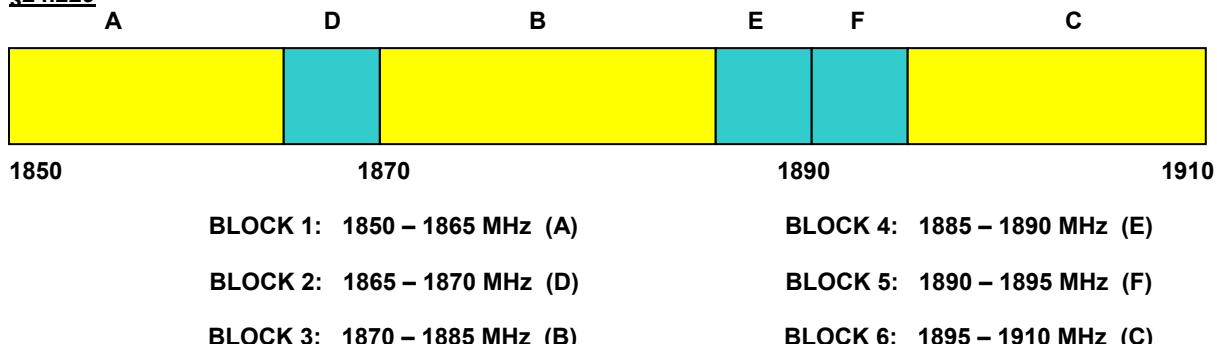
§24.229



FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 6 of 30

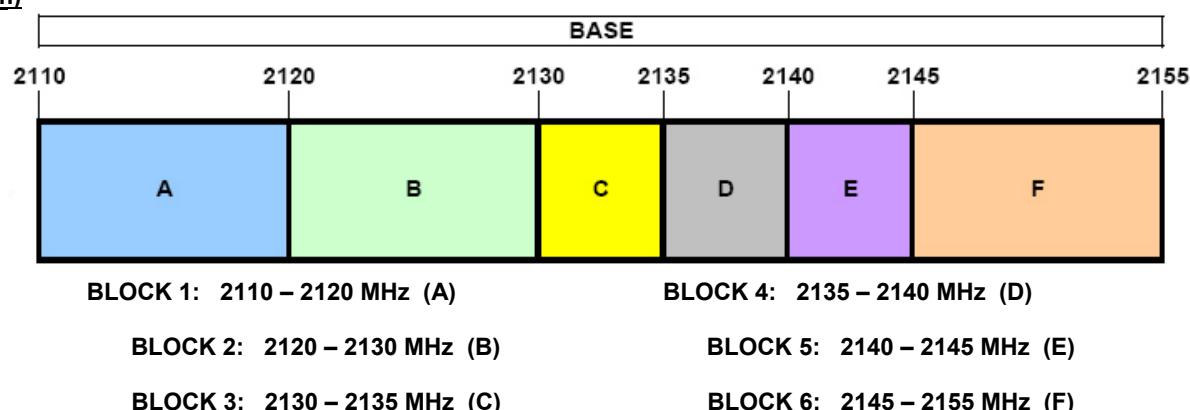
3.5 PCS - Mobile Frequency Blocks

§24.229



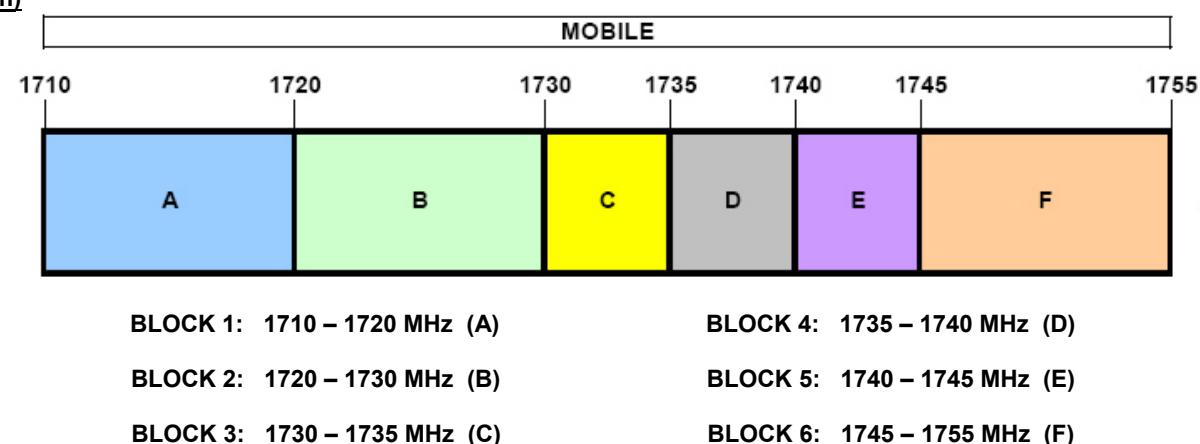
3.6 AWS - Base Frequency Blocks

§27.5(h)



3.7 AWS - Mobile Frequency Blocks

§27.5(h)



FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 7 of 30

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: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)				Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset			

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)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

FCC ID: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset	Page 9 of 30

5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	6/21/2017	Annual	6/21/2018	RE1
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	6/21/2017	Annual	6/21/2018	441119
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
Emco	6502	Active Loop Antenna (10k - 30 MHz)	8/9/2016	Biennial	8/9/2018	2936
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
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	TS-PR18	1-18 GHz Pre-Amplifier	3/7/2017	Annual	3/7/2018	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/11/2017	Annual	5/11/2018	100040
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	FSW67	Signal / Spectrum Analyzer	8/11/2017	Annual	8/11/2018	103200
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

Table 5-1. Test Equipment

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 10 of 30	

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: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)				Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset			

7.0 TEST RESULTS

7.1 Summary

Company Name: LG Electronics MobileComm U.S.A

FCC ID: ZNFX210MA

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)

Mode(s): GSM / GPRS / EDGE / WCDMA

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a.2)	RSS-132(5.4)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS	Section 7.2
24.232(c)	RSS-133(6.4)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 7.2
27.50(d.4)	RSS-139(6.5)	Equivalent Isotropic Radiated Power	< 1 Watts max. EIRP		PASS	Section 7.2
2.1053 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)	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

Notes:

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

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 12 of 30

7.2 Radiated Power (ERP/EIRP)

§22.913(a)(2) 24.232(c) 27.50(d.4) RSS-132(5.4) RSS-133(6.4) RSS-139(6.5)

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 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". 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: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02/10/16/2017	EUT Type: Portable Handset	Page 13 of 30	

Test Setup

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

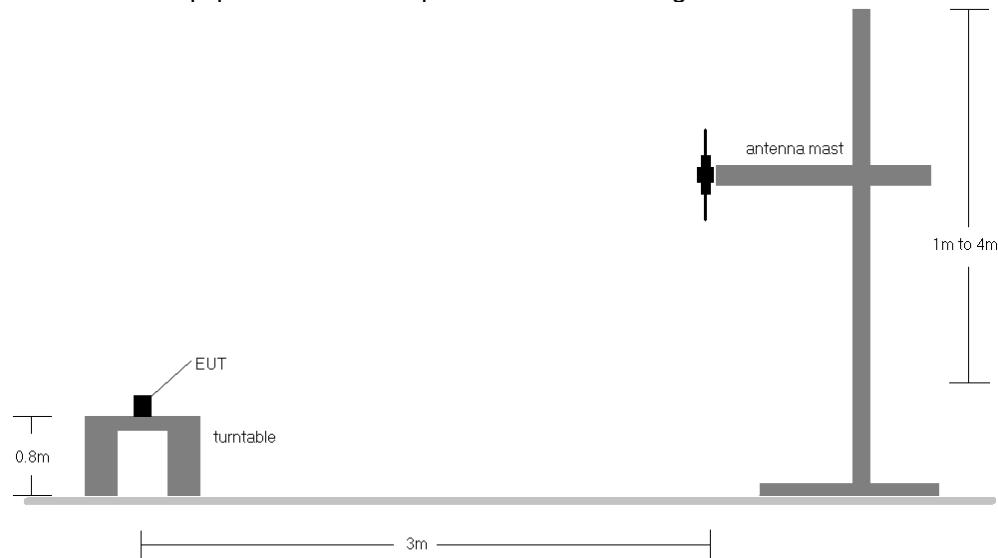


Figure 7-1. Radiated Test Setup <1GHz

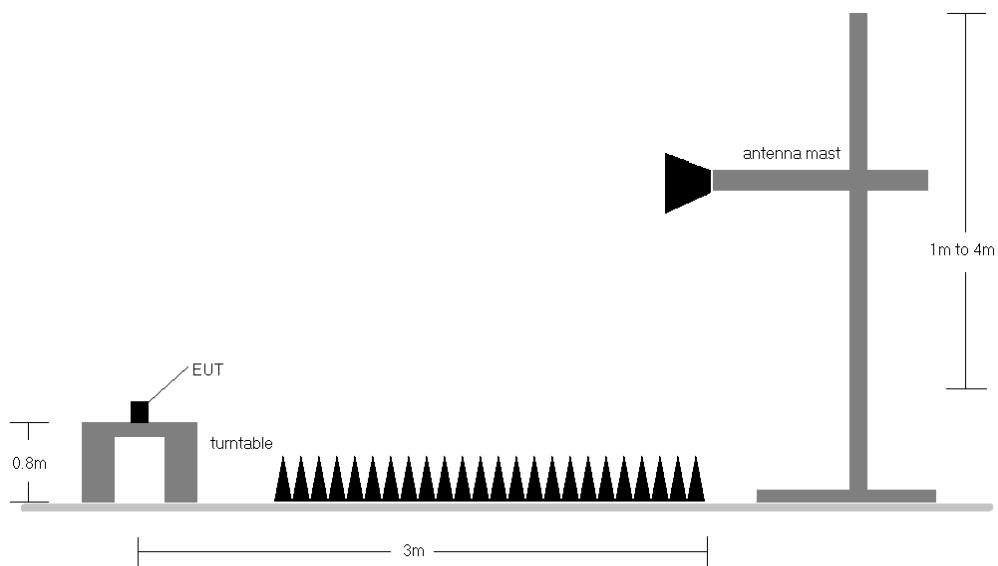


Figure 7-2. Radiated Test Setup >1GHz

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 14 of 30

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) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1."
- 3) This unit was tested with its standard battery.
- 4) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

FCC ID: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)				Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset			

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.20	GPRS850	H	150	87	32.30	1.50	31.65	1.461	38.45	-6.80	33.80	2.397	40.61	-6.81
836.60	GPRS850	H	150	340	32.50	1.50	31.85	1.531	38.45	-6.60	34.00	2.512	40.61	-6.61
848.80	GPRS850	H	150	343	32.21	1.50	31.56	1.432	38.45	-6.89	33.71	2.350	40.61	-6.90
836.60	GPRS850	V	150	339	24.75	1.50	24.10	0.257	38.45	-14.35	26.25	0.422	40.61	-14.36
836.60	EDGE850	H	150	340	31.77	1.50	31.12	1.294	38.45	-7.33	33.27	2.123	40.61	-7.34

Table 7-2. ERP/EIRP (Cellular GPRS)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	V	150	354	21.98	1.50	21.33	0.136	38.45	-17.12	23.48	0.223	40.61	-17.13
836.60	WCDMA850	V	150	0	22.07	1.50	21.42	0.139	38.45	-17.03	23.57	0.228	40.61	-17.04
846.60	WCDMA850	V	150	360	21.46	1.50	20.81	0.121	38.45	-17.64	22.96	0.198	40.61	-17.65
836.60	WCDMA850	H	150	224	20.77	1.50	20.12	0.103	38.45	-18.33	22.27	0.169	40.61	-18.34

Table 7-3. ERP/EIRP (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	150	328	15.58	9.23	24.81	0.303	30.00	-5.19
1732.60	WCDMA1700	H	150	353	14.96	9.32	24.28	0.268	30.00	-5.72
1752.60	WCDMA1700	H	150	347	12.77	9.38	22.15	0.164	30.00	-7.85
1712.40	WCDMA1700	V	150	272	12.80	9.23	22.03	0.160	30.00	-7.97

Table 7-4. 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	150	232	25.92	4.79	30.71	1.177	33.01	-2.30
1880.00	GPRS1900	V	150	251	25.88	4.84	30.73	1.182	33.01	-2.28
1909.80	GPRS1900	V	150	264	26.08	4.86	30.94	1.242	33.01	-2.07
1909.80	GPRS1900	H	150	38	23.91	4.86	28.77	0.753	33.01	-4.24
1909.80	EDGE1900	V	150	264	21.14	4.86	26.00	0.398	33.01	-7.01

Table 7-5. EIRP (PCS GPRS)

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)						Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02/10/16/2017	EUT Type: Portable Handset					Page 16 of 30	

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	V	150	231	15.46	8.59	24.05	0.254	33.01	-8.96
1880.00	WCDMA1900	V	150	269	15.53	8.38	23.91	0.246	33.01	-9.10
1907.60	WCDMA1900	V	150	265	16.42	8.17	24.59	0.288	33.01	-8.42
1907.60	WCDMA1900	H	150	344	16.15	8.17	24.32	0.271	33.01	-8.69

Table 7-6. EIRP (PCS WCDMA)

FCC ID: ZNFX210MA	 PCTEST® ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset			Page 17 of 30	

7.3 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) 24.238(a) 27.53(h) RSS-132(5.5) RSS-133(5.5) RSS-139(6.6)

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: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.			GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset				Page 18 of 30

Test Setup

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

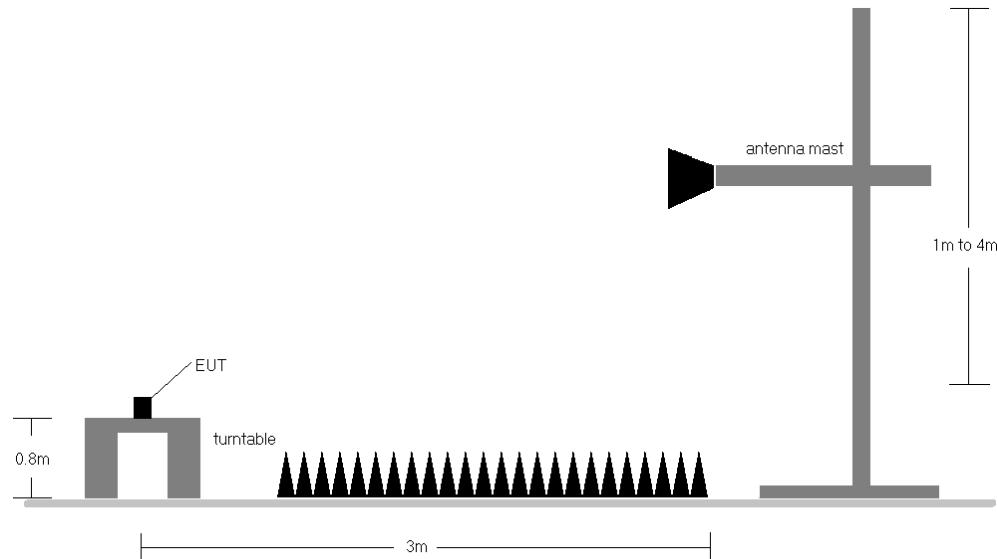


Figure 7-3. Test Instrument & Measurement Setup

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) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1."
- 3) This unit was tested with its standard battery.
- 4) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 5) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 6) 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.
- 7) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

FCC ID: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		 Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset	Page 19 of 30

Cellular GPRS Mode

OPERATING FREQUENCY: 824.20 MHz
 CHANNEL: 128
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1648.40	V	102	91	-59.91	8.86	-51.05	-38.1
2472.60	V	102	299	-61.50	9.17	-52.32	-39.3

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

OPERATING FREQUENCY: 836.60 MHz
 CHANNEL: 190
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.20	V	121	83	-58.61	8.70	-49.91	-36.9
2509.80	V	100	313	-62.12	9.24	-52.89	-39.9

Table 7-8. Radiated Spurious Data (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02/10/16/2017	EUT Type: Portable Handset		Page 20 of 30	

OPERATING FREQUENCY: 848.80 MHz
 CHANNEL: 251
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1697.60	V	100	97	-55.77	8.55	-47.22	-34.2
2546.40	V	102	298	-61.89	9.20	-52.69	-39.7
3395.20	V	-	-	-66.82	9.45	-57.37	-44.4

Table 7-9. Radiated Spurious Data (Cellular GPRS Mode – Ch. 251)

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset		Page 21 of 30	

Cellular WCDMA Mode

OPERATING FREQUENCY: 826.40 MHz
 CHANNEL: 4132
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1652.80	H	100	360	-66.24	8.85	-57.39	-44.4
2479.20	H	-	-	-68.18	9.69	-58.49	-45.5

Table 7-10. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

OPERATING FREQUENCY: 836.60 MHz
 CHANNEL: 4183
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.20	H	195	360	-63.70	8.85	-54.86	-41.9
2509.80	H	-	-	-65.18	9.78	-55.40	-42.4

Table 7-11. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02/10/16/2017	EUT Type: Portable Handset		Page 22 of 30

OPERATING FREQUENCY: 846.60 MHz
 CHANNEL: 4233
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1693.20	H	122	340	-62.76	8.85	-53.92	-40.9
2539.80	H	-	-	-64.46	9.75	-54.71	-41.7

Table 7-12. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)

FCC ID: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset

AWS WCDMA Mode

OPERATING FREQUENCY: 1712.40 MHz
 CHANNEL: 1312
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3424.80	H	104	5	-60.25	9.87	-50.38	-37.4
5137.20	H	-	-	-62.51	10.76	-51.75	-38.8

Table 7-13. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1312)

OPERATING FREQUENCY: 1732.60 MHz
 CHANNEL: 1413
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3465.20	H	100	350	-59.21	9.91	-49.30	-36.3
5197.80	H	-	-	-61.10	10.75	-50.36	-37.4

Table 7-14. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02/10/16/2017	EUT Type: Portable Handset		Page 24 of 30	

OPERATING FREQUENCY: 1752.60 MHz
 CHANNEL: 1513
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3505.20	H	-	-	-60.53	9.95	-50.58	-37.6
5257.80	H	-	-	-61.52	10.71	-50.81	-37.8

Table 7-15. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1513)

FCC ID: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset	Page 25 of 30

PCS GPRS Mode

OPERATING FREQUENCY: 1850.20 MHz
 CHANNEL: 512
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3700.40	H	-	-	-65.54	9.53	-56.01	-43.0
5550.60	H	-	-	-65.23	11.01	-54.23	-41.2

Table 7-16. Radiated Spurious Data (PCS GPRS Mode – Ch. 512)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 661
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	H	-	-	-64.88	9.39	-55.49	-42.5
5640.00	H	-	-	-66.56	11.22	-55.34	-42.3

Table 7-17. Radiated Spurious Data (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset			Page 26 of 30	

OPERATING FREQUENCY: 1909.80 MHz
 CHANNEL: 810
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3819.60	H	-	-	-65.00	9.32	-55.68	-42.7
5729.40	H	100	247	-61.42	11.37	-50.05	-37.1
7639.20	H	-	-	-60.63	11.33	-49.30	-36.3

Table 7-18. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset	Page 27 of 30

PCS WCDMA Mode

OPERATING FREQUENCY: 1852.40 MHz
 CHANNEL: 9262
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3704.80	H	-	-	-64.38	9.52	-54.86	-41.9
5557.20	H	-	-	-61.33	11.03	-50.30	-37.3

Table 7-19. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9262)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 9400
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	H	-	-	-62.79	9.39	-53.40	-40.4
5640.00	H	-	-	-63.63	11.22	-52.41	-39.4

Table 7-20. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFX210MA	 PCTEST ENGINEERING LABORATORY, INC.	GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		 LG	Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02/10/16/2017	EUT Type: Portable Handset		Page 28 of 30	

OPERATING FREQUENCY: 1907.60 MHz
 CHANNEL: 9538
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3815.20	H	-	-	-64.05	9.32	-54.73	-41.7
5722.80	H	-	-	-64.12	11.35	-52.77	-39.8

Table 7-21. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	 Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset** **FCC ID: ZNFX210MA** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules.

FCC ID: ZNFX210MA	 GSM/GPRS/EDGE/WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)				Approved by: Quality Manager
Test Report S/N: 1M1710020259-02.ZNF	Test Dates: 10/02-10/16/2017	EUT Type: Portable Handset			