



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:

1/18 - 2/2/2016

Test Site/Location:

PCTEST Lab., Columbia, MD, USA

Test Report Serial No.:

OY1601180102.ZNF

FCC ID :

ZNFL81AL

APPLICANT:

LG ELECTRONICS MOBILECOMM U.S.A

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-C-2004, KDB 971168 v02r02

EUT Type:

Portable Handset

Model(s):

LGL81AL, LG-L81AL, L81AL, LG-K540, LGK540, K540

Test Device Serial No.:

identical prototype [S/N: 03561]

Class II Permissive Change:

Please see FCC change document

Original Grant Date:

1/21/2016

Mode	Tx Frequency (MHz)	Emission Designator	Modulation	ERP/EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE Band 12	699.7 - 715.3	1M10G7D	QPSK	0.079	18.97
LTE Band 12	699.7 - 715.3	1M10W7D	16QAM	0.069	18.39
LTE Band 12	700.5 - 714.5	2M71G7D	QPSK	0.086	19.32
LTE Band 12	700.5 - 714.5	2M71W7D	16QAM	0.071	18.54
LTE Band 12	701.5 - 713.5	4M51G7D	QPSK	0.069	18.37
LTE Band 12	701.5 - 713.5	4M51W7D	16QAM	0.058	17.67
LTE Band 12	704 - 711	9M03G7D	QPSK	0.074	18.72
LTE Band 12	704 - 711	9M03W7D	16QAM	0.063	18.02
LTE Band 5	824.7 - 848.3	1M12G7D	QPSK	0.093	19.70
LTE Band 5	824.7 - 848.3	1M12W7D	16QAM	0.078	18.90
LTE Band 5	825.5 - 847.5	2M71G7D	QPSK	0.093	19.68
LTE Band 5	825.5 - 847.5	2M71W7D	16QAM	0.087	19.41
LTE Band 5	826.5 - 846.5	4M51G7D	QPSK	0.086	19.33
LTE Band 5	826.5 - 846.5	4M51W7D	16QAM	0.069	18.38
LTE Band 5	829 - 844	9M01G7D	QPSK	0.092	19.63
LTE Band 5	829 - 844	9M02W7D	16QAM	0.070	18.43
LTE Band 4	1710.7 - 1754.3	1M13G7D	QPSK	0.226	23.54
LTE Band 4	1710.7 - 1754.3	1M13W7D	16QAM	0.182	22.60
LTE Band 4	1711.5 - 1753.5	2M71G7D	QPSK	0.165	22.17
LTE Band 4	1711.5 - 1753.5	2M71W7D	16QAM	0.140	21.45
LTE Band 4	1712.5 - 1752.5	4M53G7D	QPSK	0.170	22.31
LTE Band 4	1712.5 - 1752.5	4M51W7D	16QAM	0.149	21.74
LTE Band 4	1715 - 1750	9M00G7D	QPSK	0.188	22.73
LTE Band 4	1715 - 1750	8M98W7D	16QAM	0.137	21.36
LTE Band 4	1717.5 - 1747.5	13M5G7D	QPSK	0.180	22.55
LTE Band 4	1717.5 - 1747.5	13M5W7D	16QAM	0.148	21.72
LTE Band 4	1720 - 1745	18M0G7D	QPSK	0.176	22.46
LTE Band 4	1720 - 1745	18M0W7D	16QAM	0.147	21.68
LTE Band 2	1850.7 - 1909.3	1M12G7D	QPSK	0.087	19.39
LTE Band 2	1850.7 - 1909.3	1M13W7D	16QAM	0.075	18.74
LTE Band 2	1851.5 - 1908.5	2M70G7D	QPSK	0.076	18.81
LTE Band 2	1851.5 - 1908.5	2M71W7D	16QAM	0.062	17.92
LTE Band 2	1852.5 - 1907.5	4M51G7D	QPSK	0.063	18.01
LTE Band 2	1852.5 - 1907.5	4M50W7D	16QAM	0.049	16.92
LTE Band 2	1855 - 1905	8M99G7D	QPSK	0.069	18.37
LTE Band 2	1855 - 1905	8M98W7D	16QAM	0.060	17.77
LTE Band 2	1857.5 - 1902.5	13M5G7D	QPSK	0.067	18.28
LTE Band 2	1857.5 - 1902.5	13M5W7D	16QAM	0.064	18.09
LTE Band 2	1860 - 1900	17M6G7D	QPSK	0.096	19.84
LTE Band 2	1860 - 1900	18M0W7D	16QAM	0.082	19.12

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

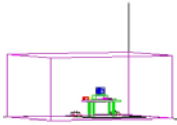


FCC ID: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Reviewed by: Quality Manager
Test Report S/N: OY1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset	Page 1 of 27	

TABLE OF CONTENTS

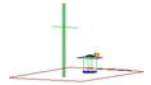
FCC PART 22, 24, & 27 MEASUREMENT REPORT	3
1.0 INTRODUCTION	4
1.1 Scope.....	4
1.2 Testing Facility	4
2.0 PRODUCT INFORMATION.....	5
2.1 Equipment Description	5
2.2 Device Capabilities	5
2.3 Test Configuration.....	5
2.4 EMI Suppression Device(s)/Modifications.....	5
3.0 DESCRIPTION OF TESTS	6
3.1 Measurement Procedure.....	6
3.2 Block A Frequency Range	6
3.3 Cellular - Base Frequency Blocks	6
3.4 Cellular - Mobile Frequency Blocks.....	6
3.5 PCS - Base Frequency Blocks	7
3.6 PCS - Mobile Frequency Blocks	7
3.7 AWS - Base Frequency Blocks	7
3.8 AWS - Mobile Frequency Blocks.....	7
3.9 Radiated Power and Radiated Spurious Emissions.....	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.....	19
8.0 CONCLUSION.....	27

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 2 of 27



MEASUREMENT REPORT

FCC Part 22, 24, & 27

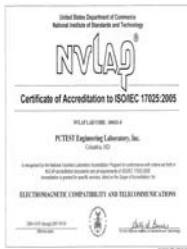
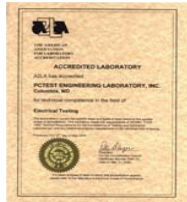


§2.1033 General Information

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 21045 USA
FCC RULE PART(S): §2; §22; §24; §27
BASE MODEL: LGL81AL
FCC ID: ZNFL81AL
FCC CLASSIFICATION: PCS Licensed Transmitter Held to Ear (PCE)
FREQUENCY TOLERANCE: $\pm 0.00025\%$ (2.5 ppm)
Test Device Serial No.: 03561 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST: 1/18 - 2/2/2016
TEST REPORT S/N: 0Y1601180102.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: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 3 of 27

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.

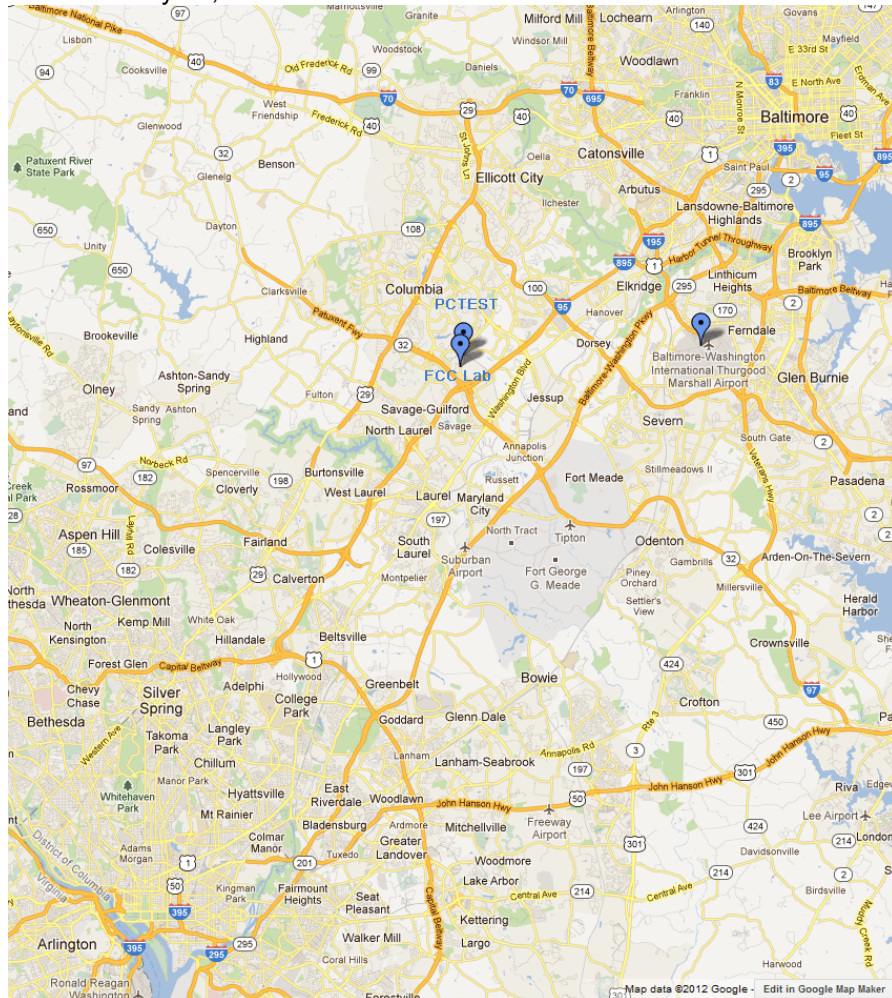


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 4 of 27

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFL81AL**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

2.2 Device Capabilities

This device contains the following capabilities:

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

LTE Band 12 (698 - 716 MHz) overlaps the entire frequency range of LTE Band 17 (704 - 716 MHz). Therefore, test data provided in this report covers Band 17 as well as Band 12.

2.3 Test Configuration

The LG Portable Handset FCC ID: ZNFL81AL was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168 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.

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 5 of 27

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-C-2004) and “Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems” (KDB 971168 v02r02) were used in the measurement of the **LG Portable Handset FCC ID: ZNFL81AL**.

3.2 Block A Frequency Range

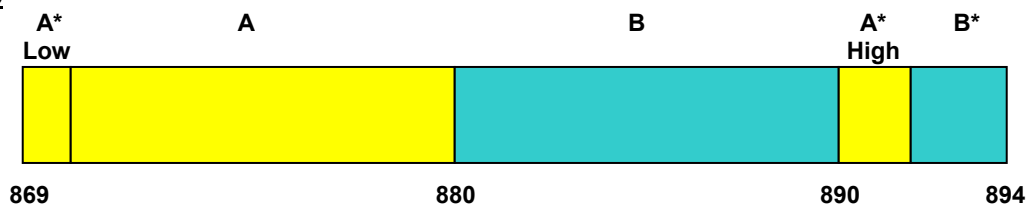
§27.5(c)

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

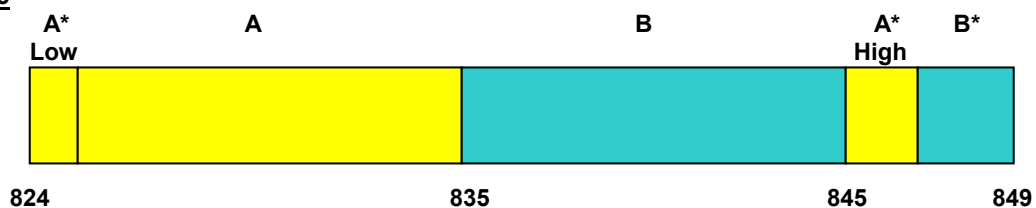


BLOCK 1: 869 – 880 MHz (A* Low + A)
BLOCK 2: 880 – 890 MHz (B)

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

3.4 Cellular - Mobile Frequency Blocks

§22.905



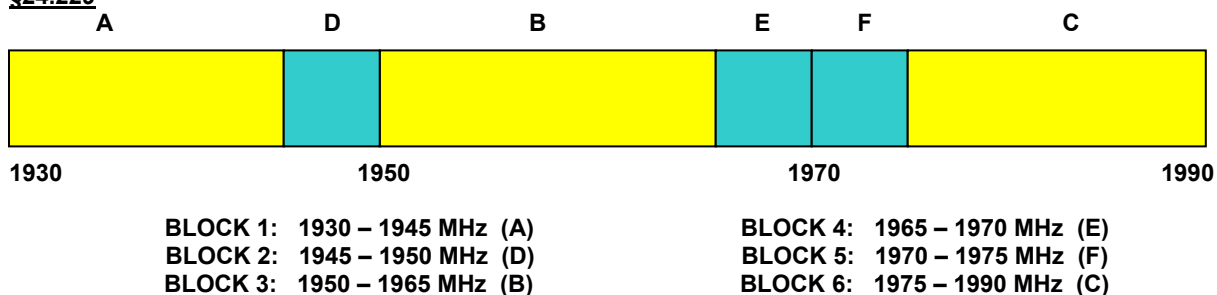
BLOCK 1: 824 – 835 MHz (A* Low + A)
BLOCK 2: 835 – 845 MHz (B)

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

FCC ID: ZNFL81AL	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 6 of 27

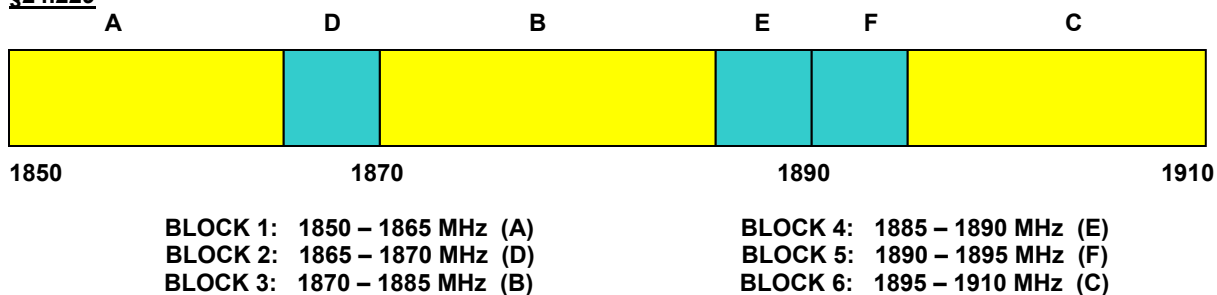
3.5 PCS - Base Frequency Blocks

§24.229



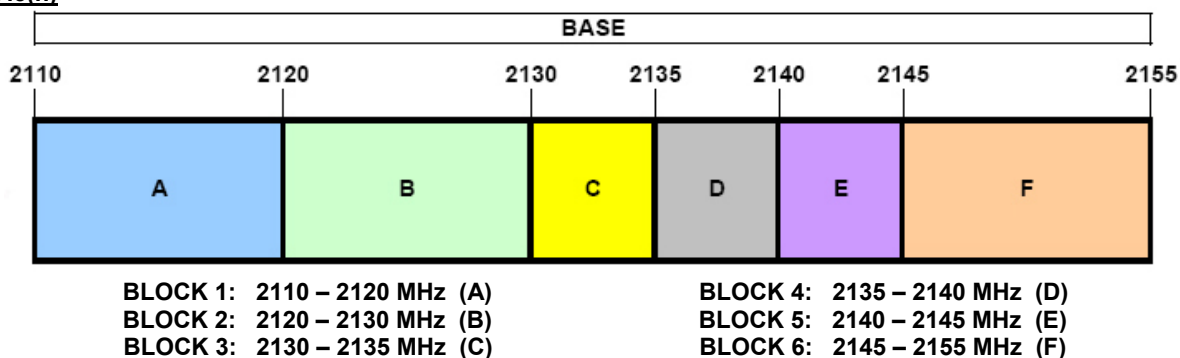
3.6 PCS - Mobile Frequency Blocks

§24.229



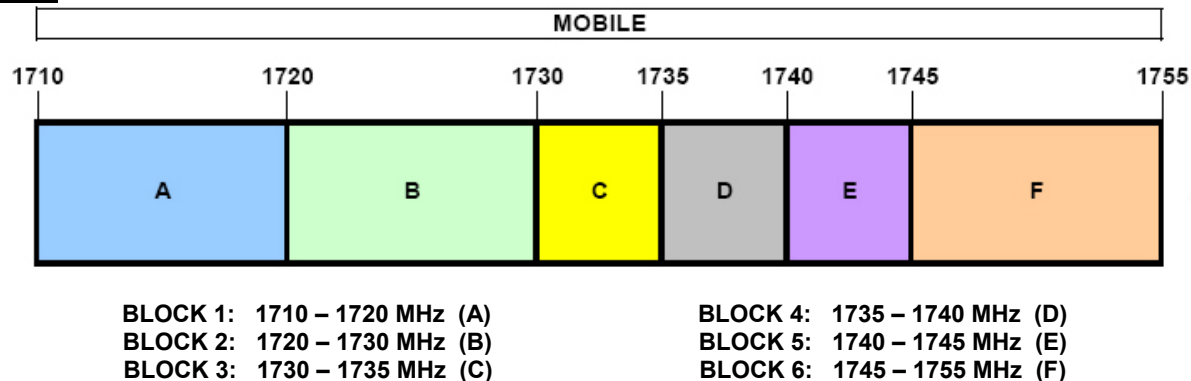
3.7 AWS - Base Frequency Blocks

§27.5(h)



3.8 AWS - Mobile Frequency Blocks

§27.5(h)



FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 7 of 27

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(c.10) §27.50(d.4) §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 Clause 5, Figure 5.7 of ANSI C63.4-2009. For measurements above 1GHz 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 below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It 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 78cm high PVC support structure is placed on top of the turntable. A ¾" (~1.9cm) sheet of high density polyethylene 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.

Per the guidance of ANSI/TIA-603-C-2004, 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 $43 + 10\log_{10}(\text{Power}_{\text{[Watts]}})$.

FCC ID: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset	Page 8 of 27

4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95% level of confidence. The measurement data shown herein meets or exceeds the U_{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: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 9 of 27

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
-	LTX1	Licensed Transmitter Cable Set	4/16/2015	Annual	4/16/2016	LTX1
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	4/28/2015	Annual	4/28/2016	RE1
Agilent	N9020A	MXA Signal Analyzer	11/5/2015	Annual	11/5/2016	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	3/17/2015	Annual	3/17/2016	MY52350166
Anritsu	MT8820C	Radio Communication Analyzer	7/24/2015	Annual	7/24/2016	6200901190
Emco	3115	Horn Antenna (1-18GHz)	1/30/2014	Biennial	3/30/2016	9704-5182
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	6/17/2014	Biennial	6/17/2016	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2014	Biennial	3/12/2016	128337
K & L	11SH10-3075/U18000	High Pass Filter	7/18/2015	Annual	7/18/2016	11SH10-3075/U18000-2
K & L	13SH10-1000/U1000	N Type High Pass Filter	7/18/2015	Annual	7/18/2016	13SH10-1000/U1000-1
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	3/11/2015	Annual	3/11/2016	11210140001
Mini-Circuits	SSG-4000HP	USB Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	TVA-11-422	RF Power Amp	N/A			QA1303002
Rohde & Schwarz	CMW500	Radio Communication Tester	10/13/2015	Annual	10/13/2016	100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	3/12/2015	Annual	3/12/2016	100342
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	3/5/2015	Annual	3/5/2016	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/3/2015	Annual	3/3/2016	100040
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	2/21/2014	Biennial	2/21/2016	9105-2404
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/18/2014	Biennial	3/18/2016	N/A
VWR	62344-734	Thermometer with Clock	2/20/2014	Biennial	2/20/2016	140140420

Table 5-1. Test Equipment

Note:

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

FCC ID: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset	Page 10 of 27

6.0 SAMPLE CALCULATIONS

Spurious Radiated Emission – LTE Band

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was –81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of –81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80).

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 11 of 27

7.0 TEST RESULTS

7.1 Summary

Company Name: LG Electronics MobileComm U.S.A
 FCC ID: ZNFL81AL
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
TRANSMITTER MODE (TX)					
22.913(a.2)	Effective Radiated Power (Band 5)	< 7 Watts max. ERP	RADIATED	PASS	Section 7.2
27.50(c.10)	Effective Radiated Power (Band 12)	< 3 Watts max. ERP		PASS	Section 7.2
24.232(c)	Equivalent Isotropic Radiated Power (Band 2)	< 2 Watts max. EIRP		PASS	Section 7.2
27.50(d.4)	Equivalent Isotropic Radiated Power (Band 4)	< 1 Watts max. EIRP		PASS	Section 7.2
2.1053 22.917(a) 24.238(a) 27.53(g) 27.53(h)	Undesirable Emissions	> 43 + 10log 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: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset	Page 12 of 27

7.2 Radiated Power (ERP/EIRP)

§22.913(a.2) §24.232(c.2) §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-C-2004 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 v02r02 – Section 5.2.1

ANSI/TIA-603-C-2004 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $\geq 2 \times$ span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 13 of 27

Test Setup

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

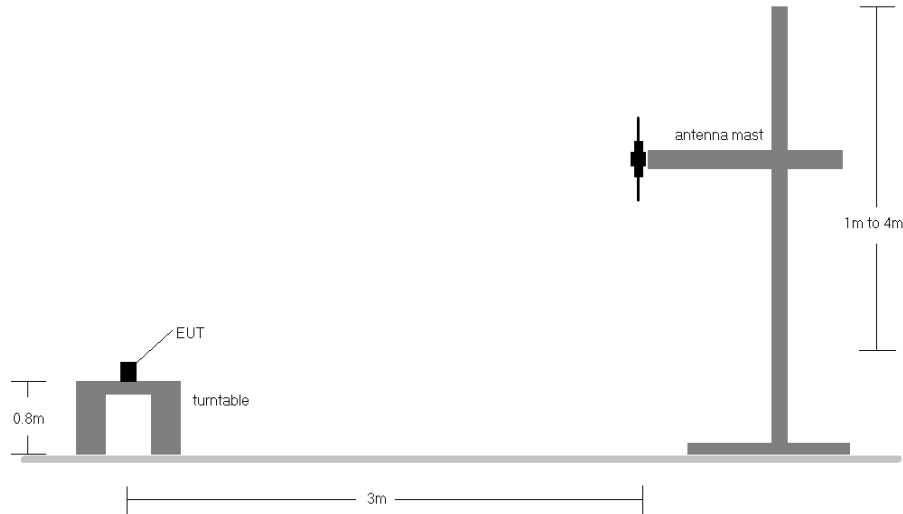


Figure 7-1. Radiated Test Setup <1GHz

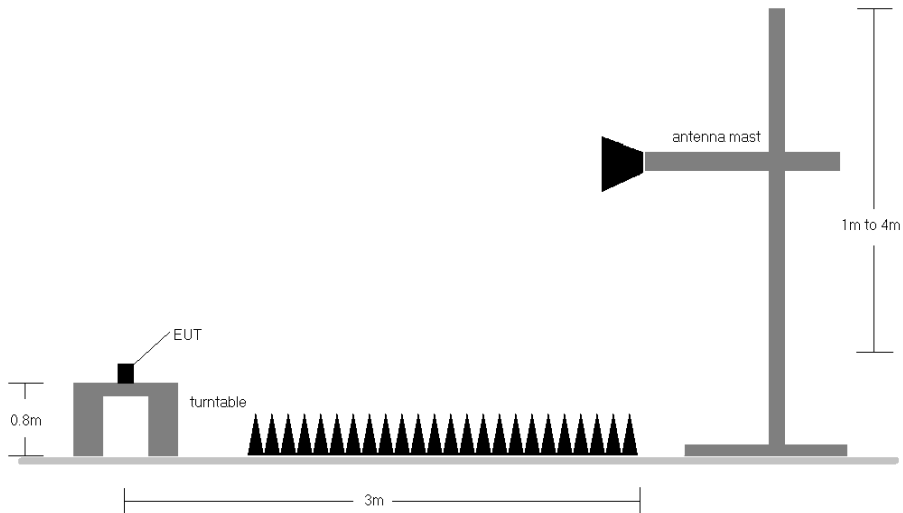


Figure 7-2. Radiated Test Setup >1GHz

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.

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 14 of 27

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	V	1.51	2	1 / 5	18.94	0.91	19.85	34.77	-14.92
707.50	1.4	QPSK	V	1.51	2	1 / 0	18.01	1.07	19.08	34.77	-15.69
715.30	1.4	QPSK	V	1.51	2	1 / 0	16.99	1.23	18.22	34.77	-16.56
699.70	1.4	16-QAM	V	1.51	2	1 / 0	17.89	0.91	18.80	34.77	-15.97
707.50	1.4	16-QAM	V	1.51	2	1 / 0	17.24	1.07	18.31	34.77	-16.46
715.30	1.4	16-QAM	V	1.51	2	1 / 0	16.24	1.23	17.47	34.77	-17.31
700.50	3	QPSK	V	1.61	359	1 / 14	19.00	0.92	19.92	34.77	-14.85
707.50	3	QPSK	V	1.61	359	1 / 0	18.45	1.07	19.52	34.77	-15.25
714.50	3	QPSK	V	1.61	359	1 / 0	17.67	1.21	18.88	34.77	-15.89
700.50	3	16-QAM	V	1.61	359	1 / 14	18.07	0.92	18.99	34.77	-15.78
707.50	3	16-QAM	V	1.61	359	1 / 0	17.45	1.07	18.52	34.77	-16.25
714.50	3	16-QAM	V	1.61	359	1 / 0	16.86	1.21	18.07	34.77	-16.70
701.50	5	QPSK	V	1.62	356	1 / 24	18.86	0.94	19.80	34.77	-14.97
707.50	5	QPSK	V	1.62	356	1 / 0	18.99	1.07	20.06	34.77	-14.71
713.50	5	QPSK	V	1.62	356	1 / 0	18.36	1.19	19.55	34.77	-15.22
701.50	5	16-QAM	V	1.62	356	1 / 24	18.12	0.94	19.06	34.77	-15.71
707.50	5	16-QAM	V	1.62	356	1 / 0	17.76	1.07	18.83	34.77	-15.94
713.50	5	16-QAM	V	1.62	356	1 / 0	17.30	1.19	18.49	34.77	-16.28
704.00	10	QPSK	V	1.62	5	1 / 0	18.82	1.00	19.82	34.77	-14.95
707.50	10	QPSK	V	1.62	5	1 / 0	18.75	1.07	19.82	34.77	-14.95
711.00	10	QPSK	V	1.62	5	1 / 0	18.17	1.14	19.31	34.77	-15.47
704.00	10	16-QAM	V	1.62	5	1 / 0	17.89	1.00	18.89	34.77	-15.88
707.50	10	16-QAM	V	1.62	5	1 / 0	17.95	1.07	19.02	34.77	-15.75
711.00	10	16-QAM	V	1.62	5	1 / 0	17.99	1.14	19.13	34.77	-15.64

Table 7-2. ERP Data (Band 12)

FCC ID: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset	Page 15 of 27	

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	V	1.25	352	1 / 5	16.15	2.98	19.13	38.45	-19.32
836.50	1.4	QPSK	V	1.25	352	1 / 0	15.78	3.04	18.82	38.45	-19.63
848.30	1.4	QPSK	V	1.25	352	1 / 0	14.73	3.10	17.83	38.45	-20.62
824.70	1.4	16-QAM	V	1.25	352	1 / 5	15.28	2.98	18.26	38.45	-20.19
836.50	1.4	16-QAM	V	1.25	352	1 / 0	14.96	3.04	18.00	38.45	-20.45
848.30	1.4	16-QAM	V	1.25	352	1 / 0	14.00	3.10	17.10	38.45	-21.35
825.50	3	QPSK	V	1.23	340	1 / 14	16.29	2.98	19.27	38.45	-19.18
836.50	3	QPSK	V	1.23	340	1 / 0	15.91	3.04	18.95	38.45	-19.50
847.50	3	QPSK	V	1.23	340	1 / 0	15.07	3.10	18.17	38.45	-20.28
825.50	3	16-QAM	V	1.23	340	1 / 14	15.45	2.98	18.43	38.45	-20.02
836.50	3	16-QAM	V	1.23	340	1 / 0	15.08	3.04	18.12	38.45	-20.33
847.50	3	16-QAM	V	1.23	340	1 / 0	14.34	3.10	17.44	38.45	-21.01
826.50	5	QPSK	V	1.31	209	1 / 24	16.07	2.99	19.06	38.45	-19.39
836.50	5	QPSK	V	1.31	209	1 / 0	15.77	3.04	18.81	38.45	-19.64
846.50	5	QPSK	V	1.31	209	1 / 0	14.06	3.09	17.15	38.45	-21.30
826.50	5	16-QAM	V	1.31	209	1 / 24	15.36	2.99	18.35	38.45	-20.10
836.50	5	16-QAM	V	1.31	209	1 / 0	15.04	3.04	18.08	38.45	-20.37
846.50	5	16-QAM	V	1.31	209	1 / 0	13.40	3.09	16.49	38.45	-21.96
829.00	10	QPSK	V	1.28	338	1 / 0	16.26	3.00	19.26	38.45	-19.19
836.50	10	QPSK	V	1.28	338	1 / 0	16.12	3.04	19.16	38.45	-19.29
844.00	10	QPSK	V	1.28	338	1 / 0	15.83	3.08	18.91	38.45	-19.54
829.00	10	16-QAM	V	1.28	338	1 / 0	15.69	3.00	18.69	38.45	-19.76
836.50	10	16-QAM	V	1.28	338	1 / 0	15.54	3.04	18.58	38.45	-19.87
844.00	10	16-QAM	V	1.28	338	1 / 0	15.12	3.08	18.20	38.45	-20.25

Table 7-3. ERP Data (Band 5)

FCC ID: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset	Page 16 of 27

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	V	1.38	255	1 / 5	12.26	9.28	21.54	30.00	-8.46
1732.50	1.4	QPSK	V	1.38	255	1 / 5	13.70	9.00	22.70	30.00	-7.30
1754.30	1.4	QPSK	V	1.38	255	1 / 0	12.90	8.72	21.62	30.00	-8.38
1710.70	1.4	16-QAM	V	1.38	255	1 / 5	11.28	9.28	20.56	30.00	-9.44
1732.50	1.4	16-QAM	V	1.38	255	1 / 5	13.15	9.00	22.15	30.00	-7.85
1754.30	1.4	16-QAM	V	1.38	255	1 / 0	11.93	8.72	20.65	30.00	-9.35
1711.50	3	QPSK	V	1.38	235	1 / 14	12.63	9.27	21.90	30.00	-8.10
1732.50	3	QPSK	V	1.38	235	1 / 0	14.23	9.00	23.23	30.00	-6.77
1753.50	3	QPSK	V	1.38	235	1 / 0	13.08	8.73	21.81	30.00	-8.19
1711.50	3	16-QAM	V	1.38	235	1 / 14	11.78	9.27	21.05	30.00	-8.95
1732.50	3	16-QAM	V	1.38	235	1 / 0	13.41	9.00	22.41	30.00	-7.59
1753.50	3	16-QAM	V	1.38	235	1 / 0	12.22	8.73	20.95	30.00	-9.05
1712.50	5	QPSK	V	1.38	241	1 / 0	12.44	9.26	21.70	30.00	-8.30
1732.50	5	QPSK	V	1.38	241	1 / 0	14.29	9.00	23.29	30.00	-6.71
1752.50	5	QPSK	V	1.38	241	1 / 0	13.25	8.74	21.99	30.00	-8.01
1712.50	5	16-QAM	V	1.38	241	1 / 0	11.42	9.26	20.68	30.00	-9.32
1732.50	5	16-QAM	V	1.38	241	1 / 0	13.35	9.00	22.35	30.00	-7.65
1752.50	5	16-QAM	V	1.38	241	1 / 0	12.28	8.74	21.02	30.00	-8.98
1715.00	10	QPSK	V	1.40	231	1 / 0	13.03	9.22	22.25	30.00	-7.75
1732.50	10	QPSK	V	1.40	231	1 / 0	13.94	9.00	22.94	30.00	-7.06
1750.00	10	QPSK	V	1.40	231	1 / 0	13.10	8.77	21.87	30.00	-8.13
1715.00	10	16-QAM	V	1.40	231	1 / 0	12.28	9.22	21.50	30.00	-8.50
1732.50	10	16-QAM	V	1.40	231	1 / 0	13.22	9.00	22.22	30.00	-7.78
1750.00	10	16-QAM	V	1.40	231	1 / 0	12.26	8.77	21.03	30.00	-8.97
1717.50	15	QPSK	V	1.39	235	1 / 74	13.35	9.19	22.54	30.00	-7.46
1732.50	15	QPSK	V	1.39	235	1 / 0	13.59	9.00	22.59	30.00	-7.41
1747.50	15	QPSK	V	1.39	235	1 / 0	13.27	8.80	22.07	30.00	-7.93
1717.50	15	16-QAM	V	1.39	235	1 / 74	12.71	9.19	21.90	30.00	-8.10
1732.50	15	16-QAM	V	1.39	235	1 / 0	13.01	9.00	22.01	30.00	-7.99
1747.50	15	16-QAM	V	1.39	235	1 / 0	12.57	8.80	21.37	30.00	-8.63
1720.00	20	QPSK	V	1.36	238	1 / 99	13.98	9.16	23.14	30.00	-6.86
1732.50	20	QPSK	V	1.36	238	1 / 0	13.38	9.00	22.38	30.00	-7.62
1745.00	20	QPSK	V	1.36	238	1 / 0	13.33	8.83	22.16	30.00	-7.84
1720.00	20	16-QAM	V	1.36	238	1 / 99	13.45	9.16	22.61	30.00	-7.39
1732.50	20	16-QAM	V	1.36	238	1 / 0	12.88	9.00	21.88	30.00	-8.12
1745.00	20	16-QAM	V	1.36	238	1 / 0	12.79	8.83	21.62	30.00	-8.38

Table 7-4. EIRP Data (Band 4)

FCC ID: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE) 			Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 17 of 27

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	1.65	296	1 / 5	10.71	8.34	19.05	33.01	-13.96
1880.00	1.4	QPSK	V	1.65	296	1 / 5	11.93	8.46	20.39	33.01	-12.62
1909.30	1.4	QPSK	V	1.65	296	1 / 5	11.44	8.64	20.08	33.01	-12.93
1850.70	1.4	16-QAM	V	1.65	296	1 / 5	10.05	8.34	18.39	33.01	-14.62
1880.00	1.4	16-QAM	V	1.65	296	1 / 5	10.92	8.46	19.38	33.01	-13.63
1909.30	1.4	16-QAM	V	1.65	296	1 / 5	10.78	8.64	19.42	33.01	-13.59
1851.50	3	QPSK	V	1.62	257	1 / 14	9.35	8.35	17.70	33.01	-15.31
1880.00	3	QPSK	V	1.62	257	1 / 14	5.96	8.46	14.42	33.01	-18.59
1908.50	3	QPSK	V	1.62	257	1 / 14	10.33	8.63	18.96	33.01	-14.05
1851.50	3	16-QAM	V	1.62	257	1 / 14	8.56	8.35	16.91	33.01	-16.10
1880.00	3	16-QAM	V	1.62	257	1 / 14	5.02	8.46	13.48	33.01	-19.53
1908.50	3	16-QAM	V	1.62	257	1 / 14	9.67	8.63	18.30	33.01	-14.71
1852.50	5	QPSK	V	1.62	260	1 / 24	9.35	8.35	17.70	33.01	-15.31
1880.00	5	QPSK	V	1.62	260	1 / 24	10.03	8.46	18.49	33.01	-14.52
1907.50	5	QPSK	V	1.62	260	1 / 24	7.88	8.62	16.50	33.01	-16.51
1852.50	5	16-QAM	V	1.62	260	1 / 24	8.28	8.35	16.63	33.01	-16.38
1880.00	5	16-QAM	V	1.62	260	1 / 24	8.92	8.46	17.38	33.01	-15.63
1907.50	5	16-QAM	V	1.62	260	1 / 24	7.19	8.62	15.81	33.01	-17.20
1855.00	10	QPSK	V	1.65	254	1 / 0	9.08	8.36	17.44	33.01	-15.57
1880.00	10	QPSK	V	1.65	254	1 / 49	9.35	8.46	17.81	33.01	-15.20
1905.00	10	QPSK	V	1.65	254	1 / 0	8.52	8.59	17.11	33.01	-15.90
1855.00	10	16-QAM	V	1.65	254	1 / 0	8.24	8.36	16.60	33.01	-16.41
1880.00	10	16-QAM	V	1.65	254	1 / 49	8.43	8.46	16.89	33.01	-16.12
1905.00	10	16-QAM	V	1.65	254	1 / 0	7.63	8.59	16.22	33.01	-16.79
1857.50	15	QPSK	V	1.60	255	1 / 74	10.76	8.37	19.13	33.01	-13.88
1880.00	15	QPSK	V	1.60	255	1 / 0	11.54	8.46	20.00	33.01	-13.01
1902.50	15	QPSK	V	1.60	255	1 / 74	10.81	8.56	19.37	33.01	-13.64
1857.50	15	16-QAM	V	1.60	255	1 / 74	9.96	8.37	18.33	33.01	-14.68
1880.00	15	16-QAM	V	1.60	255	1 / 0	10.91	8.46	19.37	33.01	-13.64
1902.50	15	16-QAM	V	1.60	255	1 / 74	10.11	8.56	18.67	33.01	-14.34
1860.00	20	QPSK	V	1.62	259	1 / 0	11.56	8.38	19.94	33.01	-13.07
1880.00	20	QPSK	V	1.62	259	1 / 0	11.93	8.46	20.39	33.01	-12.62
1900.00	20	QPSK	V	1.62	259	1 / 0	11.81	8.53	20.34	33.01	-12.67
1860.00	20	16-QAM	V	1.62	259	1 / 0	10.83	8.38	19.21	33.01	-13.80
1880.00	20	16-QAM	V	1.62	259	1 / 0	11.23	8.46	19.69	33.01	-13.32
1900.00	20	16-QAM	V	1.62	259	1 / 0	10.96	8.53	19.49	33.01	-13.52

Table 7-5. EIRP Data (Band 2)

FCC ID: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE) 			Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 18 of 27

7.3 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) §24.238(a) §27.53(g) §27.53(h)

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-C-2004 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 v02r02 – Section 5.8

ANSI/TIA-603-C-2004 – 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 = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 19 of 27

Test Setup

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

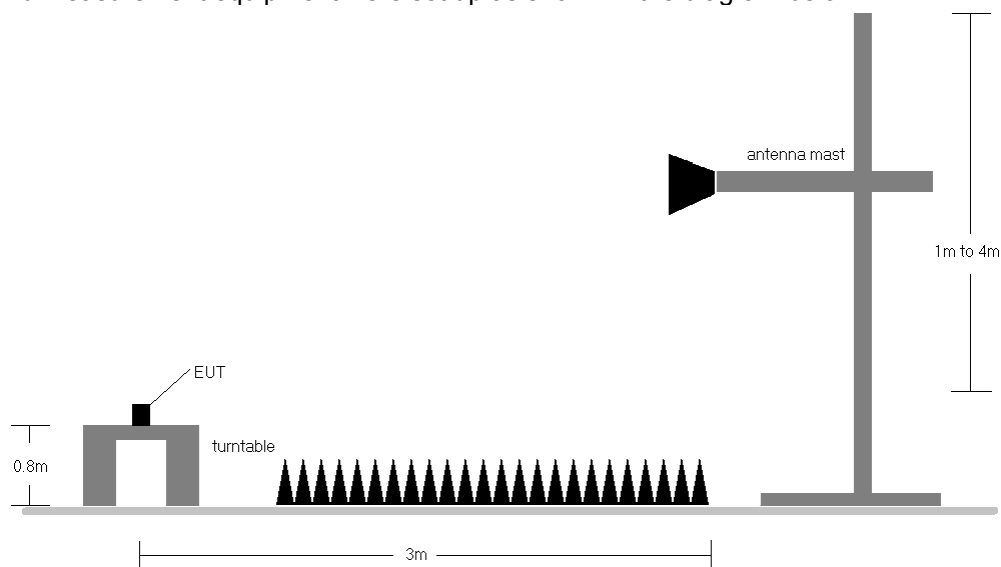


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 20 of 27

OPERATING FREQUENCY: 701.50 MHz
 CHANNEL: 23035
 MEASURED OUTPUT POWER: 19.80 dBm = 0.096 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.80 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1403.00	H	1.12	123	-62.23	5.66	-56.56	76.4
2104.50	H	-	-	-59.93	6.63	-53.30	73.1
2806.00	H	-	-	-62.88	7.84	-55.05	74.9
3507.50	H	-	-	-59.30	7.58	-51.72	71.5

Table 7-6. Radiated Spurious Data (Band 12 – Low Channel)

OPERATING FREQUENCY: 707.50 MHz
 CHANNEL: 23095
 MEASURED OUTPUT POWER: 20.06 dBm = 0.101 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.06 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1415.00	H	1.16	118	-62.40	5.73	-56.67	76.7
2122.50	H	-	-	-60.37	6.73	-53.64	73.7
2830.00	H	-	-	-62.21	7.80	-54.41	74.5
3537.50	H	-	-	-59.21	7.59	-51.62	71.7

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

OPERATING FREQUENCY: 713.50 MHz
 CHANNEL: 23155
 MEASURED OUTPUT POWER: 19.55 dBm = 0.090 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.55 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1427.00	H	1.11	109	-61.99	5.80	-56.19	75.7
2140.50	H	-	-	-59.62	6.83	-52.79	72.3
2854.00	H	-	-	-61.78	7.76	-54.02	73.6
3567.50	H	-	-	-58.76	7.60	-51.16	70.7

Table 7-8. Radiated Spurious Data (Band 12 – High Channel)

OPERATING FREQUENCY: 825.50 MHz
 CHANNEL: 20415
 MEASURED OUTPUT POWER: 19.27 dBm = 0.085 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.27 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1651.00	H	1.06	56	-56.48	6.56	-49.92	69.2
2476.50	H	1.11	285	-55.95	7.30	-48.65	67.9
3302.00	H	-	-	-60.02	7.37	-52.65	71.9
4127.50	H	-	-	-57.28	8.04	-49.24	68.5
4953.00	H	-	-	-56.66	8.74	-47.92	67.2

Table 7-9. Radiated Spurious Data (Band 5 – Low Channel)

FCC ID: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 22 of 27

OPERATING FREQUENCY: 836.50 MHz
 CHANNEL: 20525
 MEASURED OUTPUT POWER: 18.95 dBm = 0.079 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 31.95 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.00	H	1.10	74	-55.97	6.55	-49.42	68.4
2509.50	H	1.12	280	-56.02	7.34	-48.68	67.6
3346.00	H	-	-	-59.29	7.44	-51.86	70.8
4182.50	H	-	-	-57.31	8.20	-49.11	68.1
5019.00	H	-	-	-56.54	8.74	-47.79	66.7

Table 7-10. Radiated Spurious Data (Band 5 – Mid Channel)

OPERATING FREQUENCY: 847.50 MHz
 CHANNEL: 20635
 MEASURED OUTPUT POWER: 18.17 dBm = 0.066 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 3.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 31.17 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1695.00	H	1.12	62	-56.04	6.55	-49.49	67.7
2542.50	H	1.05	285	-56.28	7.36	-48.91	67.1
3390.00	H	-	-	-59.99	7.51	-52.48	70.7
4237.50	H	-	-	-57.68	8.38	-49.30	67.5
5085.00	H	-	-	-55.81	8.62	-47.20	65.4

Table 7-11. Radiated Spurious Data (Band 5 – High Channel)

OPERATING FREQUENCY: 1712.50 MHz
 CHANNEL: 19975
 MEASURED OUTPUT POWER: 21.70 dBm = 0.148 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.70 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3425.00	H	1.24	157	-45.97	9.68	-36.29	58.0
5137.50	H	1.00	102	-52.45	10.68	-41.78	63.5
6850.00	H	-	-	-46.09	11.74	-34.35	56.0
8562.50	H	1.00	183	-45.86	11.05	-34.81	56.5
10275.00	H	-	-	-51.43	12.27	-39.16	60.9
11987.50	H	-	-	-48.03	12.48	-35.55	57.2

Table 7-12. Radiated Spurious Data (Band 4 – Low Channel)

OPERATING FREQUENCY: 1732.50 MHz
 CHANNEL: 20175
 MEASURED OUTPUT POWER: 23.29 dBm = 0.213 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.29 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.00	H	1.31	152	-46.07	9.71	-36.36	59.6
5197.50	H	1.00	98	-51.63	10.59	-41.05	64.3
6930.00	H	-	-	-49.59	11.75	-37.84	61.1
8662.50	H	1.05	174	-45.80	11.06	-34.74	58.0
10395.00	H	-	-	-50.77	12.37	-38.40	61.7
12127.50	H	-	-	-49.28	12.83	-36.45	59.7

Table 7-13. Radiated Spurious Data (Band 4 – Mid Channel)

FCC ID: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			 Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 24 of 27

OPERATING FREQUENCY: 1752.50 MHz
 CHANNEL: 20375
 MEASURED OUTPUT POWER: 21.99 dBm = 0.158 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5.0 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.99 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3505.00	H	1.27	146	-45.75	9.73	-36.02	58.0
5257.50	H	1.08	106	-51.75	10.64	-41.11	63.1
7010.00	H	-	-	-52.29	11.75	-40.53	62.5
8762.50	H	1.00	168	-45.12	11.00	-34.12	56.1
10515.00	H	-	-	-50.79	12.48	-38.31	60.3
12267.50	H	-	-	-49.19	13.05	-36.14	58.1

Table 7-14. Radiated Spurious Data (Band 4 – High Channel)

OPERATING FREQUENCY: 1850.70 MHz
 CHANNEL: 18607
 MEASURED OUTPUT POWER: 19.05 dBm = 0.080 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.05 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3701.40	H	1.00	91	-54.18	9.44	-44.74	63.8
5552.10	H	1.00	141	-52.51	10.79	-41.72	60.8
7402.80	H	1.00	139	-49.66	10.69	-38.96	58.0
9253.50	H	-	-	-50.54	11.58	-38.96	58.0
11104.20	H	-	-	-51.82	12.79	-39.03	58.1
12954.90	H	-	-	-49.85	13.18	-36.67	55.7

Table 7-15. Radiated Spurious Data (Band 2 – Low Channel)

FCC ID: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)			 Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 25 of 27

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 18900
 MEASURED OUTPUT POWER: 20.39 dBm = 0.109 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 33.39 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	H	1.00	86	-54.11	9.28	-44.83	65.2
5640.00	H	1.00	137	-53.96	11.03	-42.93	63.3
7520.00	H	1.00	133	-51.20	10.97	-40.23	60.6
9400.00	H	-	-	-47.01	11.53	-35.47	55.9
11280.00	H	-	-	-50.34	12.71	-37.63	58.0
13160.00	H	-	-	-48.32	12.74	-35.58	56.0

Table 7-16. Radiated Spurious Data (Band 2 – Mid Channel)

OPERATING FREQUENCY: 1909.30 MHz
 CHANNEL: 19193
 MEASURED OUTPUT POWER: 20.08 dBm = 0.102 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 1.4 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 33.08 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [m]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3818.60	H	1.00	95	-53.11	9.19	-43.91	64.0
5727.90	H	1.00	142	-52.82	11.28	-41.54	61.6
7637.20	H	1.00	135	-50.57	11.17	-39.40	59.5
9546.50	H	-	-	-46.41	11.82	-34.59	54.7
11455.80	H	-	-	-51.86	12.71	-39.15	59.2
13365.10	H	-	-	-48.88	12.47	-36.42	56.5

Table 7-17. Radiated Spurious Data (Band 2 – High Channel)

FCC ID: ZNFL81AL	 FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		 Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	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: ZNFL81AL** complies with all the requirements of Parts 22, 24, & 27 of the FCC rules for LTE operation only.

FCC ID: ZNFL81AL		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1601180102.ZNF	Test Dates: 1/18 - 2/2/2016	EUT Type: Portable Handset		Page 27 of 27