



# PCTEST ENGINEERING LABORATORY, INC.

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## MEASUREMENT REPORT FCC Part 22 & 24

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

**Date of Testing:**  
Feb 15-20, 2013  
**Test Site/Location:**  
PCTEST Lab., Columbia, MD, USA  
**Test Report Serial No.:**  
0Y1302130271.ZNF

<b>FCC ID:</b>	<b>ZNFE980</b>
<b>APPLICANT:</b>	<b>LG ELECTRONICS MOBILECOMM U.S.A</b>

**Application Type:** Class II Permissive Change  
**Model(s):** E980, LGE980, LG-E980  
**EUT Type:** Portable Handset  
**FCC Classification:** PCS Licensed Transmitter Held to Ear (PCE)  
**FCC Rule Part(s):** §2 §22(H) §24(E)  
**Test Procedure(s):** ANSI/TIA-603-C-2004, KDB 971168  
**Test Device Serial No.:** *identical prototype* [S/N: 301KPDT230098]  
**Class II Permissive Change:** Please see FCC change documents.  
**Original Grant Date:** 3/21/2013

Mode	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
GSM850	824.2 - 848.8	244KGXW	0.789	28.97
EDGE850	824.2 - 848.8	247KG7W	0.230	23.62
GSM1900	1850.2 - 1909.8	245KGXW	1.270	31.04
EDGE1900	1850.2 - 1909.8	246KG7W	0.289	24.61
WCDMA850	826.4 - 846.6	4M15F9W	0.093	19.69
WCDMA1900	1852.4 - 1907.6	4M18F9W	0.184	22.66

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

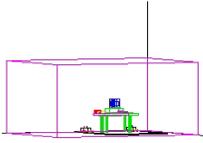


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<b>Test Report S/N:</b> 0Y1302130271.ZNF	<b>Test Dates:</b> Feb 15-20, 2013	<b>EUT Type:</b> Portable Handset	Page 1 of 26

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

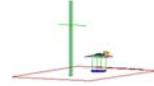
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# MEASUREMENT REPORT

## FCC Part 22 & 24

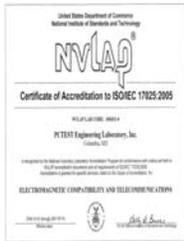
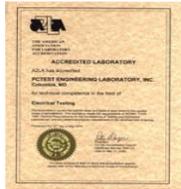


### §2.1033 General Information

**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:** 6660-B Dobbin Road, Columbia, MD 21045 USA  
**FCC RULE PART(S):** §2 §22(H) §24(E)  
**BASE MODEL:** E980  
**FCC ID:** ZNFE980  
**FCC CLASSIFICATION:** PCS Licensed Transmitter Held to Ear (PCE)  
**MODE:** GSM / EDGE / WCDMA  
**FREQUENCY TOLERANCE:** ±0.00025 % (2.5 ppm)  
**Test Device Serial No.:** 301KPDT230098     Production     Pre-Production     Engineering  
**DATE(S) OF TEST:** Feb 15-20, 2013  
**TEST REPORT S/N:** 0Y1302130271.ZNF

### Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21045, U.S.A.



- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) 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 (2451A-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 (2451A-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

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# 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 in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on January 10, 2012.

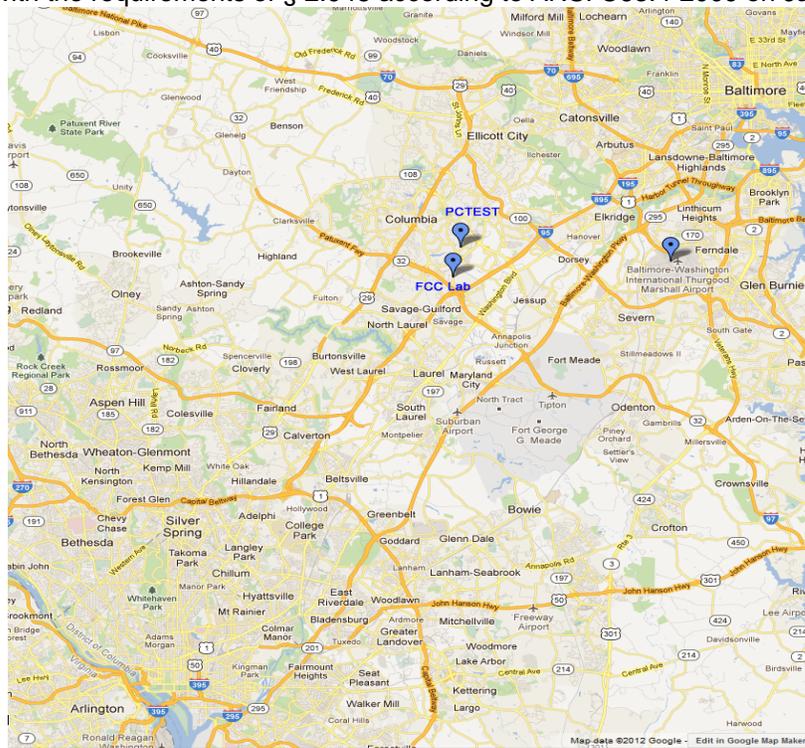


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFE980**. 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 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Band 2, 4, 5, 17 LTE with 5 and 10MHz Bandwidth, 802.11a/b/g/n WLAN (DTS/NII), Bluetooth (1x,EDR, LE), NFC

### 2.3 Test Configuration

The LG Portable Handset FCC ID: ZNFE980 was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168. See Section 3.0 of this test report for a description of the radiated emissions tests.

**Note:** The EUT's GSM/EDGE/WCDMA transmitter was tested while wirelessly charging via a representative charging pad (the LG Nexus 4 Wireless Charger Model: WCP-300). Worst case emissions from the EUT's GSM/EDGE/WCDMA transmitter did not occur during wireless charging.

In addition, the EUT was also tested with a Folio Cover (LG-F240). Worst case emissions from the EUT's GSM/EDGE/WCDMA transmitter did not occur this time either.

The data contained in this report represent worst case emissions.

### 2.4 EMI Suppression Device(s)/Modifications

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

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### 3.0 DESCRIPTION OF TESTS

#### 3.1 Evaluation Procedure

The measurement procedures described in the “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” were used in the measurement of the measurement of the **LG Portable Handset FCC ID: ZNFE980**.

Deviation from Measurement Procedure.....None

#### 3.2 Cellular - Base Frequency Blocks

§22.905



BLOCK 1: 869 – 880 MHz (A\* Low + A)

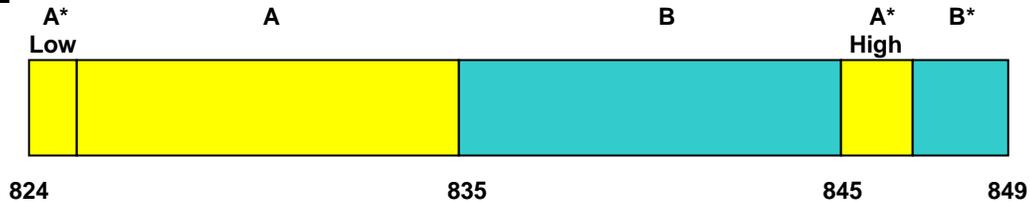
BLOCK 3: 890 – 891.5 MHz (A\* High)

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)

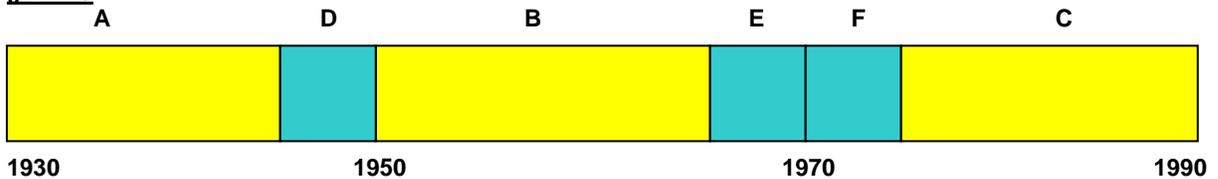
BLOCK 3: 845 – 846.5 MHz (A\* High)

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)

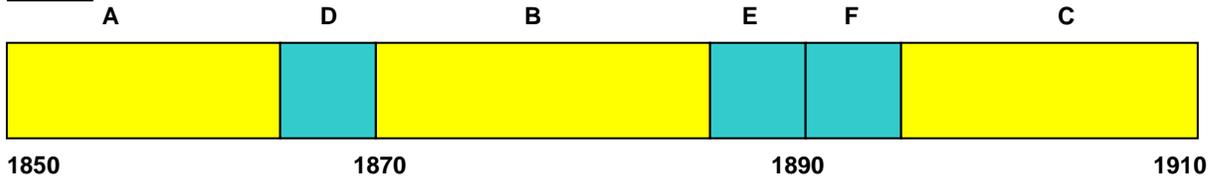
BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

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### 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 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051 §22.917(a) §24.238(a) RSS-132(4.5.1) RSS-133(6.5.1)

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22 and 1 MHz or greater for Part 24. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

### 3.7 Radiated Power and Radiated Spurious Emissions

§2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) RSS-132(4.4) RSS-132(4.5.1) RSS-133(6.4) RSS-133(6.5.1)

Radiated power measurements are performed on the 3 meter OATS per the guidelines of ANSI/TIA-603-C-2004. The measurement area is situated on an 18 meter x 20 meter galvanized 1/2" hardware cloth as the conducting ground plane. This material is sewn together in sections 4 feet wide and 60 feet long. A total of eighteen sections are required to cover the entire measurement area. Sections are laid across the width of the pad, overlapped 1" and sewn and soldered together at intervals of 3" (7.6 cm.) The terrain of the test site is reasonably flat and level. Power and cable to the test site are buried 18" deep into the ground outside the perimeter of the site. An all-weather non-metallic housing is situated on a 2 x 3 meter area adjacent to the measurement area to house the test equipment. The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168.

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

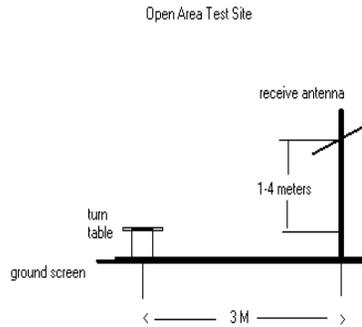
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receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

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

The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of  $43 + 10\log_{10}(\text{Power [Watts]})$  specified in 22.917(a) and 24.238(a).



**Figure 3-1. Diagram of 3-meter outdoor test range**

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## 4.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/10/2012	Annual	7/10/2013	N/A
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	3/13/2012	Annual	3/13/2013	N/A
-	LTx2	Licensed Transmitter Cable Set	1/17/2013	Annual	1/17/2014	N/A
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	2/15/2013	Annual	2/15/2014	3008A00985
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2012	Annual	10/10/2013	3613A00315
Agilent	N9020A	MXA Signal Analyzer	10/9/2012	Annual	10/9/2013	US46470561
Agilent	N9038A	MXE EMI Receiver	12/8/2012	Annual	12/8/2013	MY51210133
Agilent	N9030A	PXA Signal Analyzer (26.5GHz)	2/23/2012	Annual	2/23/2013	MY49432391
Agilent	N9030A	PXA Signal Analyzer (44GHz)	1/11/2013	Annual	1/11/2014	MY52350166
Anritsu	MA2411B	Pulse Sensor	9/19/2012	Annual	9/19/2013	1027293
Anritsu	ML2495A	Power Meter	10/11/2012	Annual	10/11/2013	1039008
Mini-Circuits	VHF-1300+	High Pass Filter	1/21/2013	Annual	1/21/2014	30716
Mini-Circuits	VHF-3100+	High Pass Filter	1/21/2013	Annual	1/21/2014	31144
Rohde & Schwarz	CMU200	Base Station Simulator	5/22/2012	Annual	5/22/2013	109892
Rohde & Schwarz	CMU200	Base Station Simulator	N/A			836536/0005
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Biennial	10/7/2013	103962
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	10/3/2011	Biennial	10/3/2013	91052522TX
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	10/3/2011	Biennial	10/3/2013	91052523RX
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
Sunol	DRH-118	Horn Antenna (1 - 18GHz)	7/5/2011	Biennial	7/5/2013	A050307
Sunol	DRH-118	Horn Antenna (1-18 GHz)	6/17/2011	Biennial	6/17/2013	A042511

**Table 4-1. Test Equipment**

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## 5.0 SAMPLE CALCULATIONS

### GSM Emission Designator

**Emission Designator = 250KGXW**

GSM BW = 250 kHz  
 G = Phase Modulation  
 X = Cases not otherwise covered  
 W = Combination (Audio/Data)

### WCDMA Emission Designator

**Emission Designator = 4M16F9W**

WCDMA BW = 4.16 MHz  
 F = Frequency Modulation  
 9 = Composite Digital Info  
 W = Combination (Audio/Data) (Measured at the 99.75% power bandwidth)

### 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.

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## 6.0 TEST RESULTS

### 6.1 Summary

Company Name: LG Electronics MobileComm U.S.A  
 FCC ID: ZNFE980  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): GSM / EDGE / WCDMA

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
<b>TRANSMITTER MODE (TX)</b>					
22.913(a.2)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS	Section 6.2
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 6.3
2.1053 22.917(a) 24.238(a)	Undesirable Emissions	< 43 + log <sub>10</sub> (P[Watts]) for all out-of-band emissions		PASS	Sections 6.4, 6.5, 6.6, 6.7

**Table 6-1. Summary of Test Results**

**Notes:**

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

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## 6.2 Cellular Effective Radiated Power (ERP)

§22.913(a)(2) RSS-132(4.4) [SRSP-503(5.1.3)]

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBd]	PoI [H/V]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GSM850	Standard	28.97	0.00	V	28.97	0.789	38.45	-9.48
836.60	GSM850	Standard	28.50	0.00	V	28.50	0.708	38.45	-9.95
848.80	GSM850	Standard	27.14	0.00	V	27.14	0.518	38.45	-11.31
824.20	EDGE850	Standard	23.62	0.00	V	23.62	0.230	38.45	-14.83

**Table 6-2. ERP (Cellular GSM)**

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBd]	PoI [H/V]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	Standard	19.69	0.00	V	19.69	0.093	38.45	-18.76
836.60	WCDMA850	Standard	19.44	0.00	V	19.44	0.088	38.45	-19.01
846.60	WCDMA850	Standard	18.81	0.00	V	18.81	0.076	38.45	-19.64

**Table 6-4. ERP (Cellular WCDMA)**

### NOTES:

- 1) This device was tested under all configurations and the highest power is reported in GSM mode using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This device 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."
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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### 6.3 PCS Effective Radiated Power (EIRP)

§22.913(a)(2) RSS-132(4.4) [SRSP-503(5.1.3)]

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GSM1900	Standard	23.29	7.75	H	31.04	1.270	33.01	-1.97
1880.00	GSM1900	Standard	21.11	7.83	H	28.94	0.783	33.01	-4.07
1909.80	GSM1900	Standard	21.31	7.93	H	29.24	0.839	33.01	-3.77
1850.20	EDGE1900	Standard	16.86	7.75	H	24.61	0.289	33.01	-8.40

Table 6-3. EIRP (PCS GSM)

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	Standard	13.12	7.75	H	20.87	0.122	33.01	-12.14
1880.00	WCDMA1900	Standard	14.39	7.83	H	22.22	0.167	33.01	-10.79
1907.60	WCDMA1900	Standard	14.74	7.92	H	22.66	0.184	33.01	-10.35

Table 6-4. EIRP (PCS WCDMA)

**NOTES:**

- 1) This device was tested under all configurations and the highest power is reported in GSM mode using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band. This device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits. This device 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."
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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## 6.4 Cellular GSM Radiated Measurements

§2.1053 §22.917(a) RSS-132(4.5.1)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 824.20 MHz  
 CHANNEL: 128  
 MEASURED OUTPUT POWER: 28.97 dBm = 0.789 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  41.97 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1648.40	-54.20	6.16	-48.03	V	77.0
2472.60	-51.31	6.34	-44.97	V	73.9
3296.80	-50.54	6.70	-43.84	V	72.8
4121.00	-52.08	7.38	-44.71	V	73.7
4945.20	-80.89	8.91	-71.98	V	100.9

Table 6-4. Radiated Spurious Data (Cellular GSM Mode – Ch. 128)

#### NOTES:

- 1) This device was tested under all configurations and the highest power is reported in GSM mode using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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**Cellular GSM Radiated Measurements (Cont'd)**  
**§2.1053 §22.917(a) RSS-132(4.5.1)**

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 836.60 MHz  
 CHANNEL: 190  
 MEASURED OUTPUT POWER: 28.50 dBm = 0.708 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  41.50 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1673.20	-50.22	6.16	-44.06	V	72.6
2509.80	-51.32	6.34	-44.98	V	73.5
3346.40	-51.21	6.70	-44.51	V	73.0
4183.00	-52.83	7.38	-45.45	V	74.0
5019.60	-115.35	8.91	-106.44	V	134.9

**Table 6-5. Radiated Spurious Data (Cellular GSM Mode – Ch. 190)**

**NOTES:**

- 1) This device was tested under all configurations and the highest power is reported in GSM mode using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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**Cellular GSM Radiated Measurements (Cont'd)**  
§2.1053 §22.917(a) RSS-132(4.5.1)

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 848.80 MHz  
 CHANNEL: 251  
 MEASURED OUTPUT POWER: 27.14 dBm = 0.518 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  40.14 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1697.60	-50.89	6.16	-44.73	V	71.9
2546.40	-50.33	6.34	-43.99	V	71.1
3395.20	-50.35	6.70	-43.64	V	70.8
4244.00	-53.04	7.38	-45.66	V	72.8
5092.80	-80.24	8.91	-71.33	V	98.5

**Table 6-6. Radiated Spurious Data (Cellular GSM Mode – Ch. 251)**

**NOTES:**

- 1) This device was tested under all configurations and the highest power is reported in GSM mode using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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## 6.5 Cellular WCDMA Radiated Measurements

§2.1053 §22.917(a) RSS-132(4.5.1)

### Field Strength of SPURIOUS Radiation

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)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1652.80	-58.07	6.15	-51.91	V	71.6
2479.20	-56.50	6.34	-50.15	V	69.8
3305.60	-51.55	6.73	-44.81	V	64.5
4132.00	-80.88	7.45	-73.43	V	93.1
4958.40	-80.81	8.89	-71.92	V	91.6

Table 6-7. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

#### NOTES:

- 1) This device 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."
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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**Cellular WCDMA Radiated Measurements (Cont'd)**  
**§2.1053 §22.917(a) RSS-132(4.5.1)**

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 836.60 MHz  
 CHANNEL: 4183  
 MEASURED OUTPUT POWER: 19.44 dBm = 0.088 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.44 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1673.20	-57.83	6.15	-51.68	V	71.1
2509.80	-55.93	6.34	-49.58	V	69.0
3346.40	-51.94	6.73	-45.20	V	64.6
4183.00	-80.88	7.45	-73.43	V	92.9
5019.60	-80.81	8.89	-71.92	V	91.4

**Table 6-8. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)**

**NOTES:**

- 1) This device 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."
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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**Cellular WCDMA Radiated Measurements (Cont'd)**  
**§2.1053 §22.917(a) RSS-132(4.5.1)**

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 846.60 MHz  
 CHANNEL: 4233  
 MEASURED OUTPUT POWER: 18.81 dBm = 0.076 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  31.81 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1693.20	-51.07	6.15	-44.92	V	63.7
2539.80	-55.72	6.34	-49.38	V	68.2
3386.40	-52.75	6.73	-46.01	V	64.8
4233.00	-80.88	7.45	-73.43	V	92.2
5079.60	-80.81	8.89	-71.92	V	90.7

**Table 6-9. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)**

**NOTES:**

- 1) This device 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."
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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## 6.6 PCS GSM Radiated Measurements

§2.1053 §24.238(a) RSS-133(6.5.2)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1850.20 MHz  
 CHANNEL: 512  
 MEASURED OUTPUT POWER: 31.04 dBm = 1.270 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  44.04 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3700.40	-40.57	9.63	-30.94	H	62.0
5550.60	-52.91	10.60	-42.31	H	73.3
7400.80	-49.37	10.85	-38.52	H	69.6
9251.00	-45.82	12.20	-33.62	H	64.7
11101.20	-73.16	12.85	-60.31	H	91.3

**Table 6-10. Radiated Spurious Data (PCS GSM Mode – Ch. 512)**

#### **NOTES:**

- 1) This device was tested under all configurations and the highest power is reported in GSM mode using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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**PCS GSM Radiated Measurements (Cont'd)**  
§2.1053 §24.238(a) RSS-133(6.5.2)

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 1880.00 MHz  
 CHANNEL: 661  
 MEASURED OUTPUT POWER: 28.94 dBm = 0.783 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  41.94 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-40.72	9.63	-31.09	H	60.0
5640.00	-52.74	10.60	-42.14	H	71.1
7520.00	-48.01	10.85	-37.16	H	66.1
9400.00	-46.98	12.20	-34.78	H	63.7
11280.00	-72.85	12.85	-60.00	H	88.9

**Table 6-11. Radiated Spurious Data (PCS GSM Mode – Ch. 661)**

**NOTES:**

- 1) This device was tested under all configurations and the highest power is reported in GSM mode using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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**PCS GSM Radiated Measurements (Cont'd)**  
§2.1053 §24.238(a) RSS-133(6.5.2)

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 1909.80 MHz  
 CHANNEL: 810  
 MEASURED OUTPUT POWER: 29.24 dBm = 0.839 W  
 MODULATION SIGNAL: GSM (GMSK)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  42.24 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3819.60	-34.30	9.63	-24.67	H	53.9
5729.40	-50.66	10.60	-40.06	H	69.3
7639.20	-48.45	10.85	-37.60	H	66.8
9549.00	-47.18	12.20	-34.99	H	64.2
11458.80	-71.89	12.85	-59.04	H	88.3

**Table 6-12. Radiated Spurious Data (PCS GSM Mode – Ch. 810)**

**NOTES:**

- 1) This device was tested under all configurations and the highest power is reported in GSM mode using a Power Control Level of "0" in the PCS Band and "5" in the Cellular Band.
- 1) This unit was tested with its standard battery.
- 2) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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## 6.7 PCS WCDMA Radiated Measurements

§2.1053 §24.238(a) RSS-133(6.5.2)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1852.40 MHz  
 CHANNEL: 9262  
 MEASURED OUTPUT POWER: 20.87 dBm = 0.122 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  33.87 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3704.80	-49.85	9.61	-40.24	H	61.1
5557.20	-53.02	10.62	-42.39	H	63.3
7409.60	-75.12	10.84	-64.28	H	85.1
9262.00	-73.85	12.20	-61.65	H	82.5
11114.40	-71.01	12.86	-58.15	H	79.0

**Table 6-13. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9262)**

#### **NOTES:**

- 1) This device 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."
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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**PCS WCDMA Radiated Measurements (Cont'd)**  
§2.1053 §24.238(a) RSS-133(6.5.2)

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 1880.00 MHz  
 CHANNEL: 9400  
 MEASURED OUTPUT POWER: 22.22 dBm = 0.167 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.22 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-50.02	9.61	-40.41	H	62.6
5640.00	-52.70	10.62	-42.08	H	64.3
7520.00	-75.12	10.84	-64.28	H	86.5
9400.00	-73.85	12.20	-61.65	H	83.9
11280.00	-71.01	12.86	-58.15	H	80.4

**Table 6-14. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)**

**NOTES:**

- 1) This device 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."
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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**PCS WCDMA Radiated Measurements (Cont'd)**  
§2.1053 §24.238(a) RSS-133(6.5.2)

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 1907.60 MHz  
 CHANNEL: 9538  
 MEASURED OUTPUT POWER: 22.66 dBm = 0.184 W  
 MODULATION SIGNAL: WCDMA  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.66 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3815.20	-49.57	9.61	-39.96	H	62.6
5722.80	-52.57	10.62	-41.95	H	64.6
7630.40	-75.12	10.84	-64.28	H	86.9
9538.00	-73.85	12.20	-61.65	H	84.3
11445.60	-71.01	12.86	-58.15	H	80.8

**Table 6-15. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9538)**

**NOTES:**

- 1) This device 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."
- 2) This unit was tested with its standard battery.
- 3) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup for the Cell Band and Horizontal setup for the PCS Band. The data reported in the table above was measured in this test setup.

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## 7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFE980** complies with all the requirements of Parts 2, 22, 24 of the FCC rules.

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