



PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA

Tel. 410.290.6652 / Fax 410.290.6654

<http://www.pctestlab.com>



MEASUREMENT REPORT FCC Part 22 & 24

Applicant Name:

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

Date of Testing:

01/23 - 02/02/2017

Test Site/Location:

PCTEST Lab., Columbia, MD, USA

Test Report Serial No.:

1M1701170029-02.ZNF

FCC ID:

ZNFVS501

APPLICANT:

LG ELECTRONICS MOBILECOMM U.S.A

Application Type:

Class II Permissive Change

Model:

LG-VS501

Additional Model(s):

LGVS501, VS501

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-D-2010, KDB 971168 D01 v02r02

Test Device Serial No.:

identical prototype [S/N: 02008]

Class II Permissive Change:

Please see FCC change document

Original Grant Date:

01/20/2017

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



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V 6.2

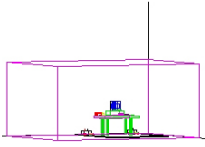
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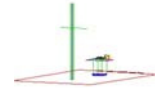
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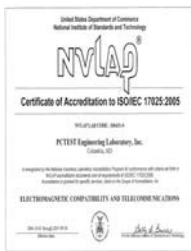
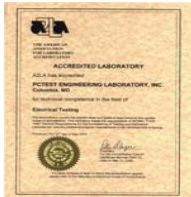


§2.1033 General Information

APPLICANT: LG Electronics MobileComm U.S.A
APPLICANT ADDRESS: 1000 Sylvan Avenue
 Englewood Cliffs, NJ 07632, United States
TEST SITE: PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS: 7185 Oakland Mills Road, Columbia, MD 21046 USA
FCC RULE PART(S): §2 §22(H) §24(E)
BASE MODEL: LG-VS501
FCC ID: ZNFVS501
FCC CLASSIFICATION: PCS Licensed Transmitter Held to Ear (PCE)
MODE: GSM / GPRS / EDGE / CDMA / WCDMA
FREQUENCY TOLERANCE: $\pm 0.00025\%$ (2.5 ppm)
Test Device Serial No.: 02008 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST: 01/23 - 02/02/2017
TEST REPORT S/N: 1M1701170029-02.ZNF

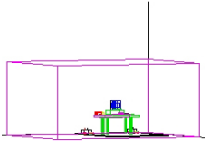
Test Facility / Accreditations

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



- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

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Mode	FCC Rule Part	Tx Frequency (MHz)	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
GPRS850	22H	824.2 - 848.8	0.942	29.74
EDGE850	22H	824.2 - 848.8	0.377	25.76
WCDMA850	22H	826.4 - 846.6	0.214	23.31
CDMA850	22H	824.70 - 848.31	0.197	22.94
GPRS1900	24E	1850.2 - 1909.8	1.406	31.48
EDGE1900	24E	1850.2 - 1909.8	0.450	26.53
WCDMA1900	24E	1852.4 - 1907.6	0.459	26.62
CDMA1900	24E	1851.25 - 1908.75	0.439	26.43

EUT Overview

Note:

Class II Permissive Change test samples were used for ERP/EIRP measurements. It has been determined that radiated powers were not changed for the ZNFVS501. Differences in radiated powers from the original certification ERP/EIRP that are reported herein are within expected measurement tolerances.

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1.0 INTRODUCTION

1.1 Scope

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

1.2 Testing Facility

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

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

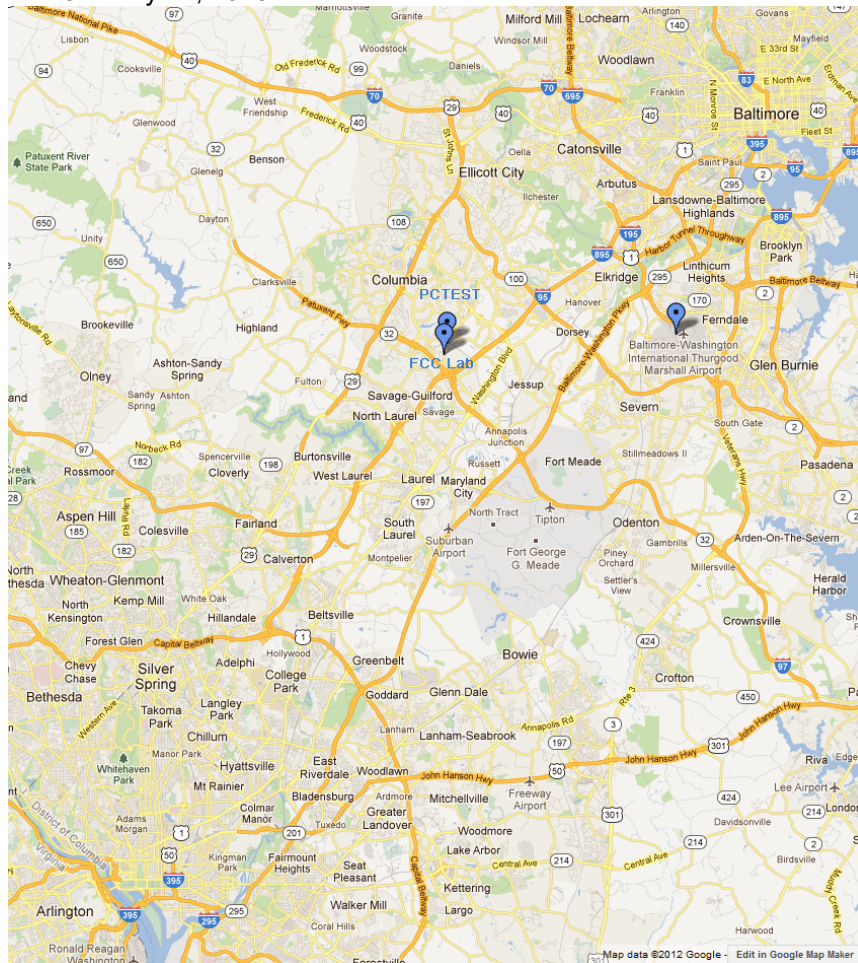


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFVS501**. The test data contained in this report pertains only to the emissions due to the EUT's 2G/3G licensed transmitters.

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A (BC0, BC1), 850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n 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.

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3.0 DESCRIPTION OF TESTS

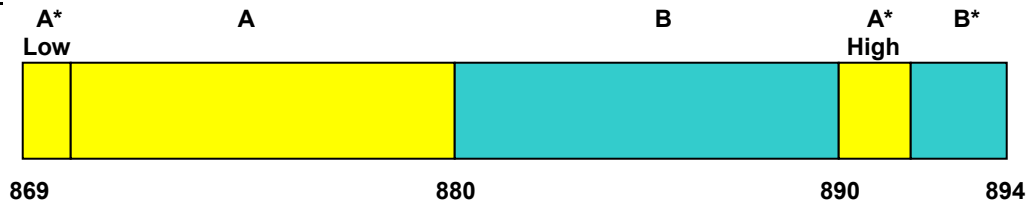
3.1 Evaluation Procedure

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

Deviation from Measurement Procedure.....None

3.2 Cellular - Base Frequency Blocks

§22.905



BLOCK 1: 869 – 880 MHz (A* Low + A)

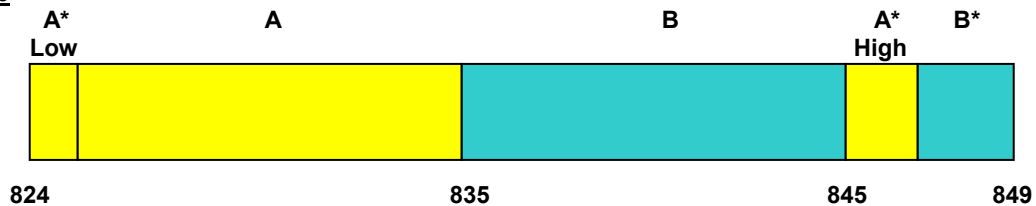
BLOCK 3: 890 – 891.5 MHz (A* High)

BLOCK 2: 880 – 890 MHz (B)

BLOCK 4: 891.5 – 894 MHz (B*)

3.3 Cellular - Mobile Frequency Blocks

§22.905



BLOCK 1: 824 – 835 MHz (A* Low + A)

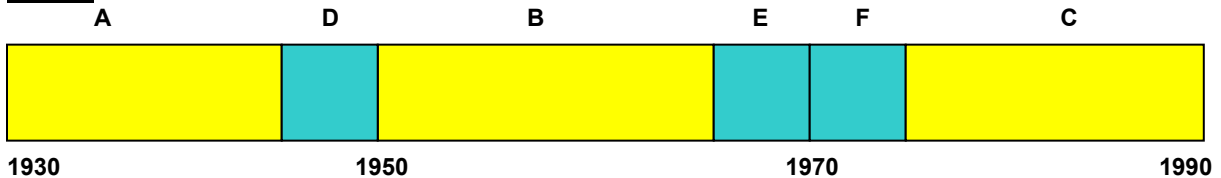
BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 2: 835 – 845 MHz (B)

BLOCK 4: 846.5 – 849 MHz (B*)

3.4 PCS - Base Frequency Blocks

§24.229



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 4: 1965 – 1970 MHz (E)

BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 5: 1970 – 1975 MHz (F)

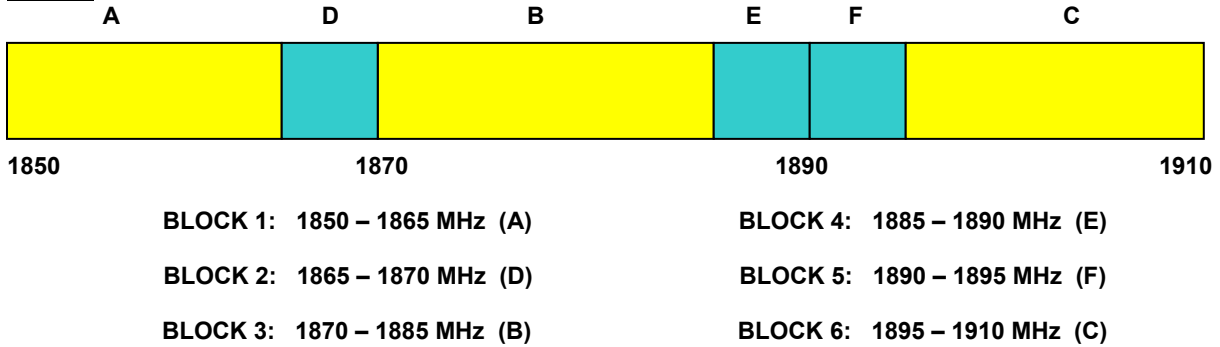
BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

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3.5 PCS - Mobile Frequency Blocks

§24.229



3.6 Radiated Measurements

§2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a)

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.

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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)
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2006.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/11/2016	Annual	7/11/2017	RE1
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	7/30/2015	Biennial	7/30/2017	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	7/6/2016	Annual	7/6/2017	441119
Com-Power	PAM-118A	Pre-Amplifier	7/26/2016	Annual	7/26/2017	551080
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	12/1/2016	Biennial	12/1/2018	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	4/26/2016	Biennial	4/26/2018	128337
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	12/5/2016	Biennial	12/5/2018	128338
K & L	11SH10-3075/U18000	High Pass Filter	7/11/2016	Annual	7/11/2017	11SH10-3075/U18000-2
K & L	13SH10-1000/U1000	N Type High Pass Filter	7/6/2016	Annual	7/6/2017	13SH10-1000/U1000-1
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/4/2016	Annual	3/4/2017	11401010036
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	3/4/2016	Annual	3/4/2017	11210140001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
PCTEST	-	EMC Switch System	7/11/2016	Annual	7/11/2017	NM1
PCTEST	-	EMC Switch System	7/6/2016	Annual	7/6/2017	NM2
Rohde & Schwarz	CMU200	Base Station Simulator	3/29/2016	Annual	3/29/2017	836371/0079
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	5/16/2016	Annual	5/16/2017	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/15/2016	Annual	7/15/2017	100348
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/7/2016	Annual	3/7/2017	100040
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	3/30/2016	Biennial	3/30/2018	9105-2404
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	3/30/2016	Biennial	3/30/2018	9105-2403
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A
Sunol	DRH-118	Horn Antenna (1-18GHz)	7/30/2015	Biennial	7/30/2017	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

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.

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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.

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7.0 TEST RESULTS

7.1 Summary

Company Name: LG Electronics MobileComm U.S.A
 FCC ID: ZNFVS501
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): GSM / GPRS / EDGE / CDMA / WCDMA

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

Table 7-1. Summary of Test Results

Note:

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

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7.2 Radiated Power (ERP/EIRP)

§22.913(a)(2) 24.232(c)

Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-D-2010 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v02r02 – Section 5.2.1

ANSI/TIA-603-D-2010 – Section 2.2.17

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
2. RBW = 1 – 5% of the expected OBW, not to exceed 1MHz
3. VBW $\geq 3 \times$ RBW
4. Span = 1.5 times the OBW
5. No. of sweep points $\geq 2 \times$ span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

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Test Setup

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

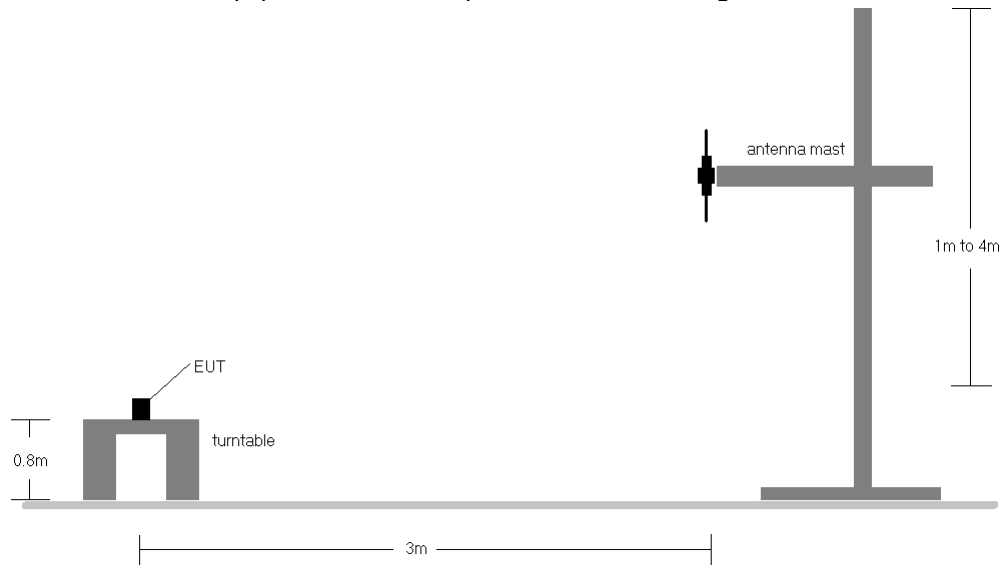


Figure 7-1. Radiated Test Setup <1GHz

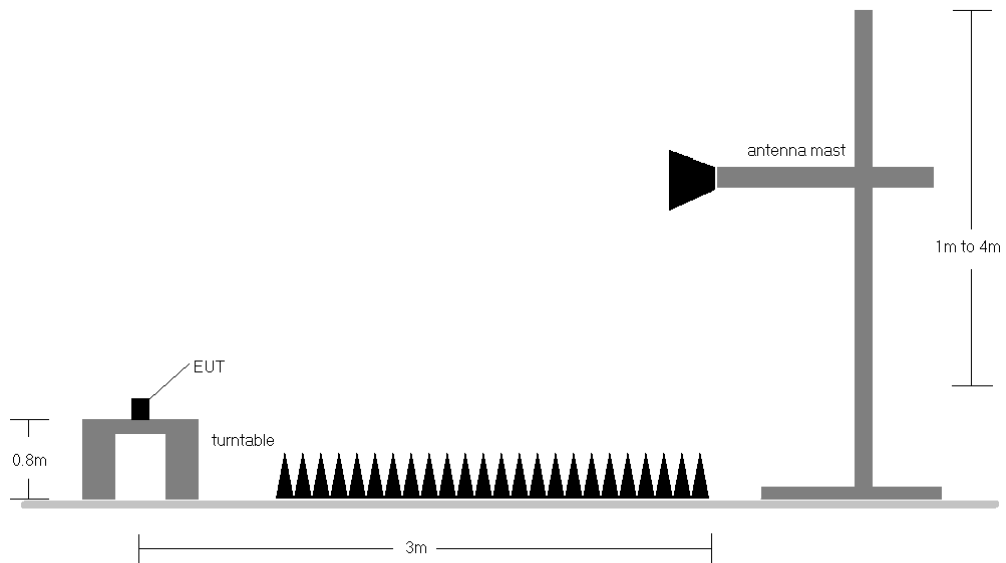


Figure 7-2. Radiated Test Setup >1GHz

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Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) This device employs CDMA/EvDO Rev0/A and 1x Advanced capabilities. This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 4) This unit was tested with its standard battery.
- 5) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 6) Class II Permissive Change test samples were used for ERP/EIRP measurements. It has been determined that radiated powers were not changed for the ZNFVS501. Differences in radiated powers from the original certification ERP/EIRP that are reported herein are within expected measurement tolerances.

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Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GPRS850	H	150	79	30.39	-0.65	29.74	0.942	38.45	-8.71
836.60	GPRS850	H	150	79	30.18	-0.65	29.53	0.897	38.45	-8.92
848.80	GPRS850	H	150	79	30.20	-0.65	29.55	0.902	38.45	-8.90
824.20	GPRS850	V	150	79	29.35	-0.65	28.70	0.741	38.45	-9.75
824.20	EDGE850	H	150	79	26.41	-0.65	25.76	0.377	38.45	-12.69

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

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	CDMA850	H	150	87	22.62	-0.65	21.97	0.157	38.45	-16.48
836.52	CDMA850	H	150	87	23.15	-0.65	22.50	0.178	38.45	-15.95
848.31	CDMA850	H	150	87	23.59	-0.65	22.94	0.197	38.45	-15.51
848.31	CDMA850	V	150	96	22.68	-0.65	22.03	0.160	38.45	-16.42

Table 7-3. ERP (Cellular CDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	H	150	349	23.63	-0.65	22.98	0.199	38.45	-15.47
836.60	WCDMA850	H	150	349	23.70	-0.65	23.05	0.202	38.45	-15.40
846.60	WCDMA850	H	150	349	23.96	-0.65	23.31	0.214	38.45	-15.14
846.60	WCDMA850	V	150	81	22.37	-0.65	21.72	0.149	38.45	-16.73

Table 7-4. ERP (Cellular WCDMA)

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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	H	150	97	25.95	4.82	30.77	1.194	33.01	-2.24
1880.00	GPRS1900	H	150	97	26.68	4.74	31.42	1.387	33.01	-1.59
1909.80	GPRS1900	H	150	97	26.80	4.68	31.48	1.406	33.01	-1.53
1909.80	GPRS1900	V	150	97	25.83	4.86	30.69	1.172	33.01	-2.32
1909.80	EDGE1900	H	150	97	21.85	4.68	26.53	0.450	33.01	-6.48

Table 7-5. EIRP (PCS GPRS/EDGE)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1851.25	CDMA1900	H	150	103	21.61	4.82	26.43	0.439	33.01	-6.58
1880.00	CDMA1900	H	150	103	21.48	4.74	26.22	0.419	33.01	-6.79
1908.75	CDMA1900	H	150	103	21.55	4.68	26.23	0.420	33.01	-6.78
1851.25	CDMA1900	V	150	155	19.33	4.82	24.15	0.260	33.01	-8.86

Table 7-6. EIRP (PCS CDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	H	150	96	21.37	4.81	26.18	0.415	33.01	-6.83
1880.00	WCDMA1900	H	150	96	21.88	4.74	26.62	0.459	33.01	-6.39
1907.60	WCDMA1900	H	150	96	21.71	4.68	26.39	0.436	33.01	-6.62
1880.00	WCDMA1900	V	150	99	20.20	4.84	25.04	0.320	33.01	-7.97

Table 7-7. EIRP (PCS WCDMA)

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7.3 Radiated Spurious Emissions Measurements

§2.1053 §22.917(a) 24.238(a)

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

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Test Setup

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

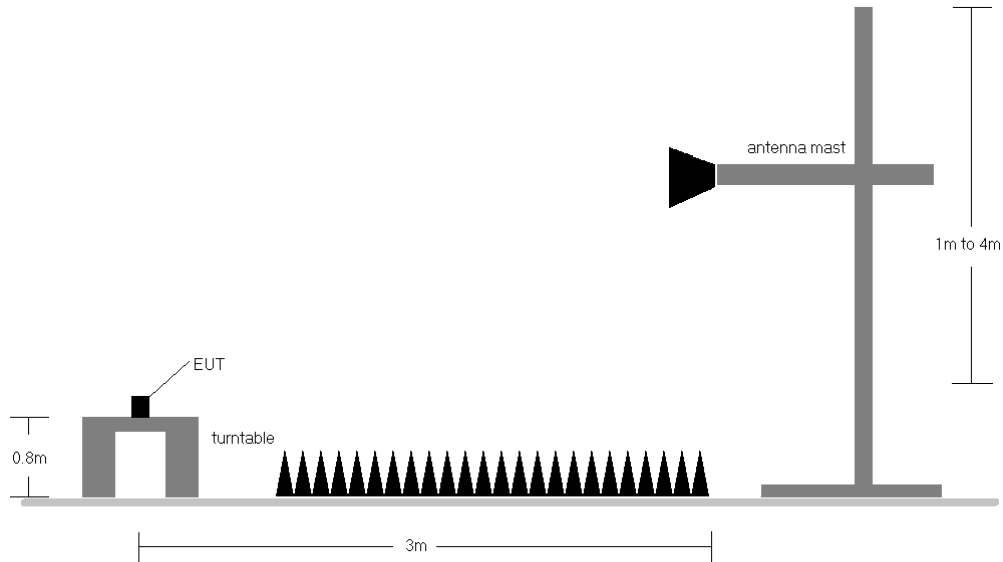


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) This device employs CDMA/EvDO Rev0/A and 1x Advanced capabilities. This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 4) This unit was tested with its standard battery.
- 5) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 6) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 7) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 8) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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OPERATING FREQUENCY: 824.20 MHz
 CHANNEL: 128
 MEASURED OUTPUT POWER: 29.74 dBm = 0.942 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 42.74 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1648.40	H	100	347	-62.82	6.30	-56.52	86.3
2472.60	H	100	146	-51.59	6.85	-44.74	74.5
3296.80	H	-	-	-62.60	7.12	-55.48	85.2

Table 7-8. Radiated Spurious Data (Cellular GPRS Mode – Ch. 128)

OPERATING FREQUENCY: 836.60 MHz
 CHANNEL: 190
 MEASURED OUTPUT POWER: 29.53 dBm = 0.897 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 42.53 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.20	H	100	342	-62.29	6.21	-56.08	85.6
2509.80	H	100	149	-47.24	6.86	-40.38	69.9
3346.40	H	-	-	-61.99	7.26	-54.73	84.3

Table 7-9. Radiated Spurious Data (Cellular GPRS Mode – Ch. 190)

OPERATING FREQUENCY: 848.80 MHz
 CHANNEL: 251
 MEASURED OUTPUT POWER: 29.55 dBm = 0.902 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 42.55 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1697.60	H	100	283	-49.39	6.12	-43.28	72.8
2546.40	H	100	79	-46.05	6.97	-39.08	68.6
3395.20	H	-	-	-61.96	7.41	-54.55	84.1

Table 7-10. Radiated Spurious Data (Cellular GPRS Mode – Ch. 251)

OPERATING FREQUENCY: 824.70 MHz
 CHANNEL: 1013
 MEASURED OUTPUT POWER: 21.97 dBm = 0.157 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.97 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1649.40	H	128	10	-61.37	6.70	-54.67	76.6
2474.10	H	-	-	-73.23	7.52	-65.71	87.7

Table 7-11. Radiated Spurious Data (Cellular CDMA Mode – Ch. 1013)

OPERATING FREQUENCY: 836.52 MHz
 CHANNEL: 384
 MEASURED OUTPUT POWER: 22.50 dBm = 0.178 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.50 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.04	H	187	18	-64.65	6.70	-57.95	80.5
2509.56	H	-	-	-72.99	7.63	-65.36	87.9

Table 7-12. Radiated Spurious Data (Cellular CDMA Mode – Ch. 384)

OPERATING FREQUENCY: 848.31 MHz
 CHANNEL: 777
 MEASURED OUTPUT POWER: 22.94 dBm = 0.197 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.94 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1696.62	H	124	10	-62.78	6.70	-56.08	79.0
2544.93	H	-	-	-72.89	7.60	-65.29	88.2

Table 7-13. Radiated Spurious Data (Cellular CDMA Mode – Ch. 777)

OPERATING FREQUENCY: 826.40 MHz
 CHANNEL: 4132
 MEASURED OUTPUT POWER: 22.98 dBm = 0.199 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.98 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1652.80	H	129	17	-60.58	6.70	-53.89	76.9
2479.20	H	-	-	-73.42	7.54	-65.88	88.9
3305.60	H	-	-	-69.86	7.38	-62.48	85.5

Table 7-14. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

OPERATING FREQUENCY: 836.60 MHz
 CHANNEL: 4183
 MEASURED OUTPUT POWER: 23.05 dBm = 0.202 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.05 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.20	H	115	221	-65.38	6.70	-58.69	81.7
2509.80	H	-	-	-73.34	7.63	-65.71	88.8
3346.40	H	-	-	-70.12	7.52	-62.61	85.7

Table 7-15. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

OPERATING FREQUENCY: 846.60 MHz
 CHANNEL: 4233
 MEASURED OUTPUT POWER: 23.31 dBm = 0.214 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.31 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1693.20	H	125	18	-62.38	6.70	-55.68	79.0
2539.80	H	-	-	-73.13	7.60	-65.53	88.8
3386.40	H	-	-	-70.01	7.65	-62.36	85.7

Table 7-16. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)

OPERATING FREQUENCY: 1850.20 MHz
 CHANNEL: 512
 MEASURED OUTPUT POWER: 30.77 dBm = 1.194 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 43.77 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3700.40	H	126	192	-64.87	9.53	-55.34	86.1
5550.60	H	128	143	-65.56	11.01	-54.56	85.3
7400.80	H	110	258	-57.11	10.94	-46.17	76.9
9251.00	H	132	258	-51.36	11.52	-39.84	70.6
11101.20	H	-	-	-56.74	12.81	-43.93	74.7
12951.40	H	-	-	-54.97	13.37	-41.59	72.4

Table 7-17. Radiated Spurious Data (PCS GPRS Mode – Ch. 512)

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OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 661
 MEASURED OUTPUT POWER: 31.42 dBm = 1.387 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 44.42 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	H	110	344	-61.73	9.39	-52.35	83.8
5640.00	H	110	300	-56.87	11.22	-45.65	77.1
7520.00	H	110	279	-56.15	11.10	-45.04	76.5
9400.00	H	110	82	-44.76	11.54	-33.22	64.6
11280.00	H	-	-	-55.84	12.76	-43.08	74.5
13160.00	H	-	-	-53.87	13.05	-40.82	72.2

Table 7-18. Radiated Spurious Data (PCS GPRS Mode – Ch. 661)

OPERATING FREQUENCY: 1909.80 MHz
 CHANNEL: 810
 MEASURED OUTPUT POWER: 31.48 dBm = 1.406 W
 MODULATION SIGNAL: GPRS (GMSK)
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 44.48 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3819.60	H	110	175	-57.83	9.32	-48.50	80.0
5729.40	H	111	53	-55.59	11.37	-44.22	75.7
7639.20	H	110	135	-55.08	11.33	-43.75	75.2
9549.00	H	110	21	-45.19	11.78	-33.41	64.9
11458.80	H	-	-	-55.80	12.69	-43.11	74.6
13368.60	H	-	-	-52.76	12.64	-40.12	71.6

Table 7-19. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFVS501		FCC Pt. 22 & 24 GSM / GPRS / EDGE / CDMA / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
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OPERATING FREQUENCY: 1851.25 MHz
 CHANNEL: 25
 MEASURED OUTPUT POWER: 26.43 dBm = 0.439 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 39.43 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3702.50	H	119	37	-58.74	9.52	-49.21	75.6
5553.75	H	-	-	-68.32	11.02	-57.30	83.7

Table 7-20. Radiated Spurious Data (PCS CDMA Mode – Ch. 25)

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 600
 MEASURED OUTPUT POWER: 26.22 dBm = 0.419 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 39.22 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	H	119	29	-58.03	9.39	-48.64	74.9
5640.00	H	-	-	-68.49	11.22	-57.27	83.5

Table 7-21. Radiated Spurious Data (PCS CDMA Mode – Ch. 600)

OPERATING FREQUENCY: 1908.75 MHz
 CHANNEL: 1175
 MEASURED OUTPUT POWER: 26.23 dBm = 0.420 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 39.23 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3817.50	H	110	19	-53.50	9.32	-44.18	70.4
5726.25	H	-	-	-68.34	11.36	-56.98	83.2

Table 7-22. Radiated Spurious Data (PCS CDMA Mode – Ch. 1175)

OPERATING FREQUENCY: 1852.40 MHz
 CHANNEL: 9262
 MEASURED OUTPUT POWER: 26.18 dBm = 0.415 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 39.18 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3704.80	H	121	31	-57.17	9.52	-47.65	73.8
5557.20	H	-	-	-67.66	11.03	-56.63	82.8
7409.60	H	-	-	-59.82	10.95	-48.87	75.1

Table 7-23. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9262)

FCC ID: ZNFVS501		FCC Pt. 22 & 24 GSM / GPRS / EDGE / CDMA / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1701170029-02.ZNF	Test Dates: 01/23 - 02/02/2017	EUT Type: Portable Handset		Page 27 of 29

OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 9400
 MEASURED OUTPUT POWER: 26.62 dBm = 0.459 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 39.62 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3760.00	H	145	49	-62.76	9.39	-53.38	80.0
5640.00	H	-	-	-67.88	11.22	-56.66	83.3
7520.00	H	-	-	-59.24	11.10	-48.13	74.8

Table 7-24. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)

OPERATING FREQUENCY: 1907.60 MHz
 CHANNEL: 9538
 MEASURED OUTPUT POWER: 26.39 dBm = 0.436 W
 MODULATION SIGNAL: WCDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 39.39 dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3815.20	H	117	35	-56.26	9.32	-46.94	73.3
5722.80	H	-	-	-67.51	11.35	-56.16	82.5
7630.40	H	-	-	-59.30	11.32	-47.98	74.4

Table 7-25. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9538)

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFVS501** complies with all the requirements of Parts 22 & 24 of the FCC rules.

FCC ID: ZNFVS501		FCC Pt. 22 & 24 GSM / GPRS / EDGE / CDMA / WCDMA MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Approved by: Quality Manager
Test Report S/N: 1M1701170029-02.ZNF	Test Dates: 01/23 - 02/02/2017	EUT Type: Portable Handset		Page 29 of 29