

PCTEST ENGINEERING LABORATORY, INC.

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# MEASUREMENT REPORT

FCC Part 22, 24, & 27

#### Applicant Name:

LG Electronics MobileComm U.S.A 1000 Sylvan Avenue Englewood Cliffs, NJ 07632 United States Date of Testing: 10/24-10/31/2016 Test Site/Location: PCTEST Lab., Columbia, MD, USA Test Report Serial No.: 0Y1610241659.ZNF

# FCC ID:

## **ZNFM210**

**APPLICANT:** 

# LG ELECTRONICS MOBILECOMM U.S.A

Application Type:	Certification
Model(s):	LG-M210, LGM210, M210, LG-MS210, LGMS210, MS210
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§2 §22(H) §24(E) §27(L)
Test Procedure(s):	ANSI/TIA-603-D-2010, KDB 971168 D01 v02r02
Test Device Serial No.:	identical prototype [S/N: 69570, 69576, 69577]

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

Randy Ortanez President



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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) §27(L)				
BASE MODEL:	LG-M210				
FCC ID:	ZNFM210				
FCC CLASSIFICATION:	PCS Licensed Transmitter Held to Ear (PCE)				
MODE:	GSM / GPRS / EDGE / WCDMA				
FREQUENCY TOLERANCE:	±0.00025 % (2.5 ppm)				
Test Device Serial No.:	69570, 69576, 69577				
DATE(S) OF TEST:	10/24-10/31/2016				
TEST REPORT S/N:	0Y1610241659.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, GPRS, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

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			ERP/	EIRP		
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Emission Designator	
GPRS850	22H	824.2 - 848.8	0.676	28.30	243KGXW	
EDGE850	22H	824.2 - 848.8	0.181	22.58	239KG7W	
GPRS1900	24E	1850.2 - 1909.8	1.413	31.50	246KGXW	
EDGE1900	24E	1850.2 - 1909.8	0.290	24.62	245KG7W	
WCDMA850	22H	826.4 - 846.6	0.077	18.85	4M13F9W	
WCDMA1700	27	1712.4 - 1752.6	0.302	24.80	4M13F9W	
WCDMA1900	24E	1852.4 - 1907.6	0.350	25.44	4M12F9W	

**EUT Overview** 

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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 Internt'I (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.

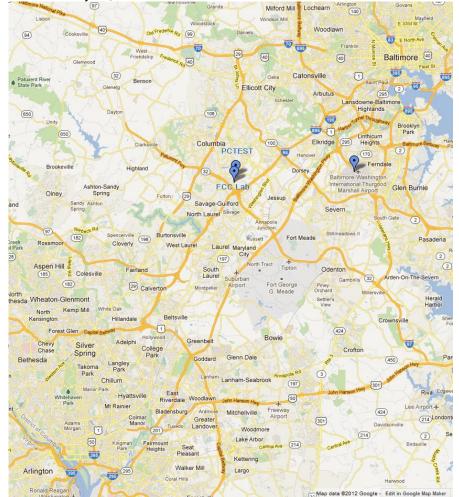


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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# 2.0 **PRODUCT INFORMATION**

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFM210**. 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, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 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 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.

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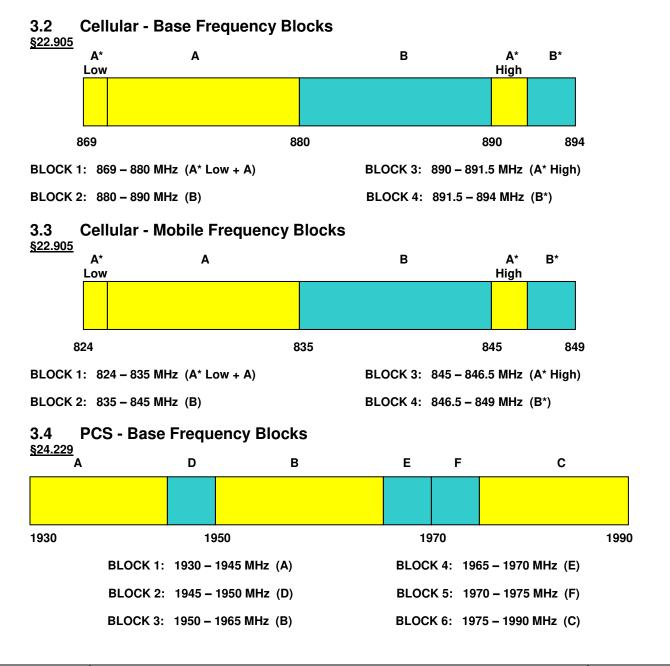


# 3.0 DESCRIPTION OF TESTS

# 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.





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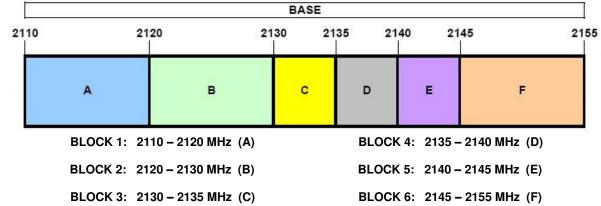


# 3.5 PCS - Mobile Frequency Blocks

<u>§24.229</u> A	D	В	E	F	С	
1850		1870	189	90		1910
	BLOCK 1: 1850	) – 1865 MHz (A)	BLOC	K4: 18	85 – 1890 MHz (E)	
	BLOCK 2: 1865	5 – 1870 MHz (D)	BLOC	K 5: 18	90 – 1895 MHz  (F)	
	BLOCK 3: 1870	– 1885 MHz (B)	BLOC	K6: 189	95 – 1910 MHz (C)	

# 3.6 AWS - Base Frequency Blocks

<u>§27.5(h)</u>



# 3.7 AWS - Mobile Frequency Blocks

<u>§27.5(h)</u>

MOBILE							
1710	17	20 1 <sup>:</sup>	1730 17 		40 17	45 17	
	A	в	с	D	E	F	
	BLOCK 1: 17	10 – 1720 MHz (A)		BLOCK	4: 1735 –	1740 MHz (D)	
	BLOCK 2: 172	20 – 1730 MHz (B)		BLOCK	5: 1740 –	1745 MHz (E)	
	BLOCK 3: 17	30 – 1735 MHz (C)		BLOCK	6: 1745 –	1755 MHz (F)	

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## 3.8 Radiated Measurements

#### §2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) §27.50(d)(10) §27.53(h)

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 72.4cm high PVC support structure is placed on top of the turntable. A 3" (~7.6cm) sheet of high density polystyrene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

Per the guidance of ANSI/TIA-603-D-2010, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

 $P_{d [dBm]} = P_{g [dBm]} - cable loss [dB] + antenna gain [dBd/dBi]$ 

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  $P_g$  [dBm] – 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 (±dB)
Conducted Bench Top Measurements	1.13
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
-	LTx3	Licensed Transmitter Cable Set	7/12/2016	Annual	7/12/2017	LTx3
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/11/2016	Annual	7/11/2017	RE1
Agilent	N9020A	MXA Signal Analyzer	11/5/2015	Annual	11/5/2016	US46470561
Agilent	N9038A	MXE EMI Receiver	4/21/2016	Annual	4/21/2017	MY51210133
Agilent	E5515C	Wireless Communications Test Set	3/4/2016	Biennial	3/4/2018	GB45360985
Espec	ESX-2CA	Environmental Chamber	3/4/2016	Annual	3/4/2017	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/26/2016	Biennial	4/26/2018	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	4/26/2016	Biennial	4/26/2018	128337
Mini Circuits	TVA-11-422	RF Power Amp	N/A		QA1317001	
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11403100002
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/4/2016	Annual	3/4/2017	11401010036
PCTEST	-	EMC Switch System	7/6/2016	Annual	7/6/2017	NM2
Rhode & Schwarz	CMU200	Base Station Simulator		N/A		107826
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/15/2016	Annual	7/15/2017	100348
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	7/11/2016	Annual	7/11/2017	100071
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	3/30/2016	Biennial	3/30/2018	9105-2404
Schwarzbeck	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A

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

## **GPRS Emission Designator**

#### Emission Designator = 250KGXW

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

## **EDGE Emission Designator**

#### Emission Designator = 250KG7W

EDGE BW = 250 kHz G = Phase Modulation 7 = Quantized/Digital Info 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)

## **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:	ZNFM210
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>GSM / GPRS / EDGE / WCDMA</u>

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER	MODE (TX)				-
2.1049	Occupied Bandwidth	Dccupied Bandwidth N/A			Section 7.2
2.1051 22.917(a) 24.238(a) 27.53(h)	Conducted Band Edge / Spurious Emissions	> 43 + log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Sections 7.3, 7.4
24.232(d)	Peak-Average Ratio	< 13 dB	CONDUCTED	PASS	Section 7.5
2.1046	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
2.1055 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24, 27)		PASS	Section 7.8
22.913(a.2)	Effective Radiated Power	< 7 Watts max. ERP		PASS	Section 7.6
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 7.6
27.50(d.4)	Equivalent Isotropic Radiated Power	< 1 Watts max. EIRP	RADIATED	PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(h)	Radiated Spurious     > 43 + log <sub>10</sub> (P[Watts]) for all out-of-band emissions		PASS	Section 7.7	

## Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "2G/3G Automation," Version 3.4.

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#### **Occupied Bandwidth** 7.2 §2.1049

## **Test Overview**

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

#### **Test Procedure Used**

KDB 971168 D01 v02r02 - Section 4.2

## **Test Settings**

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 1 5% of the expected OBW
- 3. VBW  $\geq$  3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple
- 7. The trace was allowed to stabilize
- 8. If necessary, steps 2 7 were repeated after changing the RBW such that it would be within

1 – 5% of the 99% occupied bandwidth observed in Step 7

#### Test Setup

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

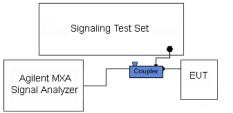


Figure 7-1. Test Instrument & Measurement Setup

## Test Notes

None.

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Keysight Spectrum Analyzer - Occupied B					
X RL RF 50Ω DC	T	SENSE:INT Senter Freq: 836.60000 rig: Free Run Atten: 34 dB	ALIGN AUTO 0 MHz Avg Hold: 100/100	06:07:48 PM Oct 20 Radio Std: None Radio Device: B	Trace/Detector
15 dB/div Ref 40.00 dBr Log 25.0 10.0	an ouncer		showing when		Clear Wr
-5.00 -20.0 -35.0 -50.0					Avera
.80.0					Max Ho
Center 836.6 MHz Res BW 4.7 kHz		#VBW 15 kHz		Span 500 Sweep 21.	6 ms Min Ho
	43.47 kHz			7 dBm	Detect
Transmit Freq Error x dB Bandwidth	-65 Hz 316.0 kHz			9.00 % .00 dB	Auto <u>M</u>
ISG			STATU	JS	

Plot 7-1. Occupied Bandwidth Plot (Cellular GPRS Mode - Ch. 190)



Plot 7-2. Occupied Bandwidth Plot (EDGE850 Mode - Ch. 190)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-3. Occupied Bandwidth Plot (PCS GPRS Mode – Ch. 661)



Plot 7-4. Occupied Bandwidth Plot (EDGE1900 Mode - Ch. 661)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Spectrum Analyzer - Occupied E	3W				
XX RL RF 50Ω DC	i Tr	SENSE:INT enter Freq: 836.600000 Mi ig: Free Run Avg utten: 26 dB	ALIGN AUTO Hz  Hold: 100/100	07:03:29 PM Oct 28, 2010 Radio Std: None Radio Device: BTS	Trace/Detector
10 dB/div Ref 40.00 dB	m				
20.0	and the second second	e-freese-age-yellerspectrationage	rome of the second s		Clear Write
-10.0 -20.0 -30.0 mm				how we have the second second	Average
-40.0					Max Hold
Center 836.6 MHz Res BW 91 kHz		#VBW 300 kHz Total Powe		Span 10 MH: Sweep 5 ms	
	.1253 MHz			abin	Detector Peak►
Transmit Freq Error x dB Bandwidth	899 Hz 4.698 MHz			.00 % 00 dB	Auto <u>Man</u>
MSG			STATUS		

Plot 7-5. Occupied Bandwidth Plot (Cellular WCDMA Mode - Ch. 4183)



Plot 7-6. Occupied Bandwidth Plot (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Plot 7-7. Occupied Bandwidth Plot (PCS WCDMA Mode - Ch. 9400)

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# **7.3** Spurious and Harmonic Emissions at Antenna Terminal §22.1051 §22.917(a) §24.238(a) §27.53(h)

#### **Test Overview**

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. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

# The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P_{[Watts]})$ , where P is the transmitter power in Watts.

#### Test Procedure Used

KDB 971168 D01 v02r02 - Section 6.0

#### Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to 10GHz for Cell, 20GHz for AWS, 20GHz for PCS (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

## Test Setup

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

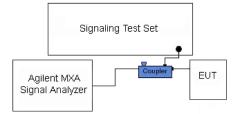


Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

Compliance with the applicable limits 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, Part 27. 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.

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	ectrum Analyzer	- Swept SA									
L <mark>XI</mark> RL	RF	50 Ω DC	CORREC	SEI	NSE:INT		ALIGN AUTO		1 Oct 28, 2016	Fred	uency
		NFE	PNO: Fast G	Trig: Free Atten: 30		#Avg Typ	e: RMS	TYP	E 1 2 3 4 5 6 E M WWWW T A N N N N N		
10 dB/div Log	Ref 20.0	00 dBm					MI	kr1 822. -42.2	45 MHz 22 dBm	A	uto Tune
10.0											n <b>ter Freq</b> 00000 MHz
-10.0									DL1 -13.00 dBm		t <b>art Freq</b> 00000 MHz
-20.0											<b>top Freq</b> 00000 MHz
-40.0									1	79.30 <u>Auto</u>	<b>CF Step</b> 00000 MHz Man
	n layes a last yr Pirae Anna y gwlae ardan y	Hispachia Traval Angeneration (1991	a an	a yendi dylani andala a yeneg a menadari si	laand by Frank Kone Alaan Haadka Kone Kone Alaan Haadka Kone Kone	(p) (sy far flyreinig fan dy Ny estadoù cartinadach	l, suga (ng gal) (ng gal) (ng gal) ang diga kang pang natin	n pigana y Hilagopal manaza, kabahaanan	n parta a transferi Maria a transferi Maria a transferi	Fre	e <b>q Offset</b> 0 Hz
-70.0										So	ale Type
Start 30.0 #Res BW			#VBV	/ 300 kHz		s	weep 38	Stop 82 .06 ms (1	23.0 MHz 5861 pts)	Log	Lin
MSG							STATUS				

Plot 7-8. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 128)



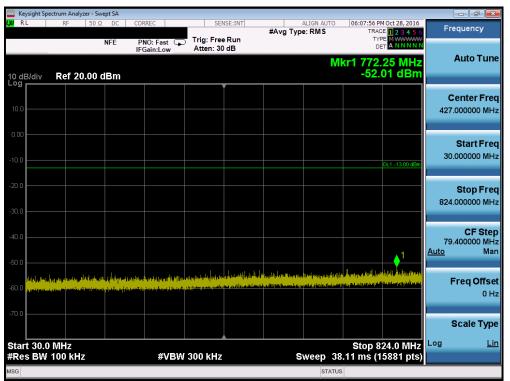
Plot 7-9. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 128)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	pectrum Analyzer - S	Swept SA									x
XI RL	RF 50	ΩDC	CORREC	SEI	NSE:INT	#Avg Typ	ALIGN AUTO		1 Oct 28, 2016	Frequency	
	_	NFE	PNO: Fast IFGain:Low	Trig: Free Atten: 20		"····ə · )P		TYP DE			
10 dB/div Log	Ref 10.00	dBm					Mł	(r1 2.473 -20.0	3 5 GHz 09 dBm	Auto Tu	ne
0.00										<b>Center Fr</b> 6.000000000 G	
-10.0	↓ 1								DL1 -13.00 dBm	<b>Start Fr</b> 2.000000000 G	
-30.0										<b>Stop Fr</b> 10.000000000 G	
-50.0	la materiale principalitation publication provide a planta any						ing the second secon	a a por la del logo d'Al de La porte numero de la como d'Al de La porte numero de la como d'Al de La porte		CF Sto 800.000000 M <u>Auto</u> M	
-70.0										Freq Offs 0	set Hz
-80.0										Scale Ty	pe
Start 2.0 #Res BW	00 GHz / 1.0 MHz		#VBW	/ 3.0 MHz		s	weep 13	Stop 10. .87 ms (1	JUD GHZ	Log <u>l</u>	Lin
MSG							STATUS	3			





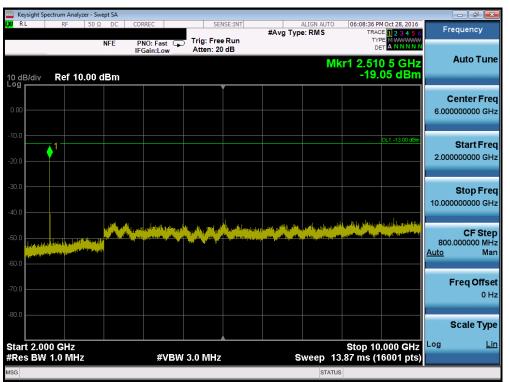
Plot 7-11. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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	ectrum Analyzer - S	wept SA								
X/RL	RF 50	Ω DC	CORREC			#Avg Type	RMS	TRACI	Oct 28, 2016	Frequency
0 dB/div	Ref 20.00	NFE dBm	PNO: Fast IFGain:Low	Atten: 30			Mkr	1 1.673	10 GHz 66 dBm	Auto Tu
10.0										<b>Center Fr</b> 1.424500000 G
10.0									DL1 -13.00 dBm	Start Fr 849.000000 M
20.0 30.0							<b>♦</b> <sup>1</sup>			<b>Stop Fr</b> 2.000000000 G
40.0										CF St 115.100000 M <u>Auto</u> M
50.0 <b>(44) ***</b> ***	llanes (p) en groeines (bagstere Techisti (en sindere en troines)	independent of Alternation	ana (j V (Pland Ng) (pp) (pp) (pp) ana na galaon (pp) (pp) (pp) (pp)	kada (telapone) yait (tel rengen gilet kana ana k	erdinin ing menangkan Alamat ang kanalang	l fersing and a first the	n da kang lang sa da di sa Kang sa kang sa kang Kang sa kang sa	n para da para da para da p	an an ann an ann an ann an ann an ann an a	Freq Offs 0
70.0										Scale Ty
	190 GHz 100 kHz		#VBW	300 kHz		s	weep 55	Stop 2.0 .25 ms (2	000 GHz 3021 pts)	Log <u>I</u>
SG							STATUS			



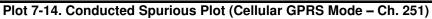


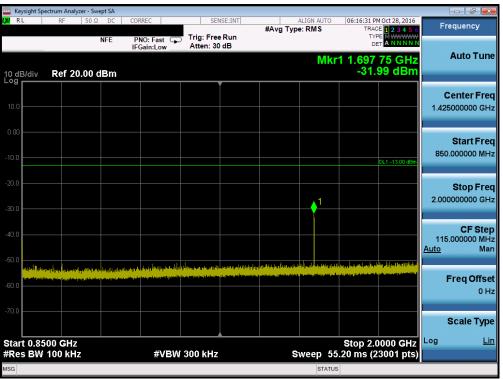
Plot 7-13. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	sight Spect	rum An	alyzer - Sw	ept SA										
l <mark>xi</mark> RL		RF	50 Ω		CORREC		SE	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	HOct 28, 2016	Fr	equency
				NFE	PNO: Fa IFGain:L		Atten: 30							Auto Tune
10 dB Log r	/div	Ref 2	20.00 (	dBm						M	kr1 739. -51.9	85 MHz 95 dBm		Autorune
								Ĭ						enter Freq
10.0													427	.000000 MHz
0.00														Start Freq
-10.0												DL1 -13.00 dBm	30	.000000 MHz
-20.0														Stop Freq
-30.0													824	.000000 MHz
-40.0													70	CF Step 400000 MHz
-50.0 -												1	Auto Auto	.400000 MH2 Man
	վեր <mark>Սերաստ</mark> ե	ne bite		a habboog	وبارم ألاليور أكري	annyalang	o na ang ang	when on the	u Uray of a spatian distributed a magnetic balance distributed at	looloolika ki		n an	F	req Offset
-60.0	una tanà man		ويناملن تلسلام	الرابح بظلقية	<u>مند حمل راز باغ زم</u> ر		<u>د. معارفة ومنا</u>							0 Hz
-70.0													;	Scale Type
	: 30.0 N										Stop 8	24.0 MHz	Log	<u>Lin</u>
	5 BW 1	00 kl	Hz		Ŧ	¢VBW ∶	300 kHz		s			5881 pts)		
MSG										STATUS				





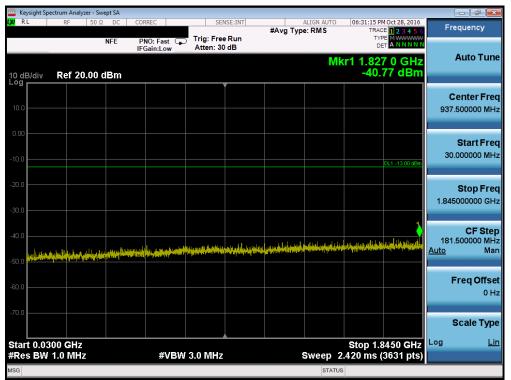


FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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		trum Ana	alyzer - Swe	pt SA										
LXI R	L	RF	50 Ω	DC	CORREC		SE	NSE:INT		ALIGN AUTO		M Oct 28, 2016	Fre	quency
				NFE	PNO: Fa IFGain:Lo		Trig: Fre Atten: 20		#Avg Typ		TYF DE	E 1 2 3 4 5 6 E M WWWW A N N N N N		
10 di Log	3/div	Ref '	10.00 d	Bm						M	(r1 2.54 -19.	7 0 GHz 33 dBm		Auto Tune
														e <b>nter Freq</b> 000000 GHz
		1										DL1 -13.00 dBm		<b>Start Freq</b> 000000 GHz
														Stop Freq 000000 GHz
	al de la companya	Program Collect Science and Law	ر د <sup>ی م</sup> ربع پر بر به با نظارت و را به با										800.0 <u>Auto</u>	CF Step 000000 MHz Man
													F	r <b>eq Offset</b> 0 Hz
														cale Type
	t 2.000 s BW 1				#	VBW	3.0 MHz		s	weep 13	Stop 10 3.87 ms (1	.000 GHz 6001 pts)	Log	<u>Lin</u>
MSG										STATU	5			





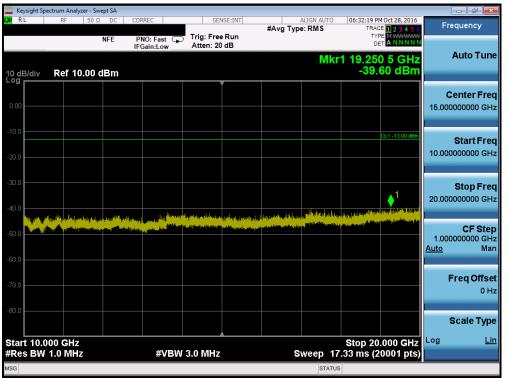
Plot 7-17. Conducted Spurious Plot (PCS GPRS Mode – Ch. 512)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ysight Spec	trum An	alyzer - Swe	ept SA										- 6 ×
l <b>,XI</b> R	L	RF	50 Ω	DC	CORREC		SE	NSE:INT	#Avg Typ	ALIGN AUTO		M Oct 28, 2016	Fre	equency
				NFE	PNO: Fa IFGain:Lo		Trig: Fre Atten: 3		#7181JP		TY D			
10 di Log	B/div	Ref	20.00 d	IBm						M	kr1 9.65 -32.	5 0 GHz 39 dBm		Auto Tune
								• 						enter Freq 6000000 GHz
												DL1 -13.00 dBm	1.910	Start Freq 0000000 GHz
												<b>1</b>	10.000	Stop Freq 0000000 GHz
		aliter state	andra and an and an					a Marya Marya Sarya Marya Marya Sara		ing partney partneys	ه را اطلع دیداند. مریکه کنی تختمی و بن		809. <u>Auto</u>	CF Step 000000 MHz Man
													F	F <b>req Offset</b> 0 Hz
														Scale Type
	t 1.910 s BW 1				#	VBW	3.0 MHz		s	weep 14	Stop 10 4.02 ms (1	.000 GHz  6181 pts)	Log	<u>Lin</u>
MSG										STATU	s			





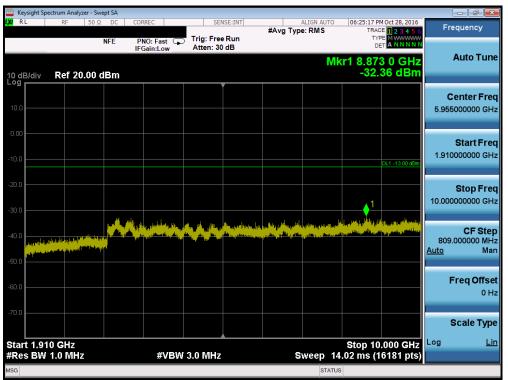
Plot 7-19. Conducted Spurious Plot (PCS GPRS Mode – Ch. 512)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analyzer - S	wept SA							- 6
XI RL	RF 50	ΩDC	CORREC	SENSE:I		ALIGN AUTO	06:24:57 PM OC TRACE	23456	Frequency
		NFE	PNO: Fast IFGain:Low	Trig: Free Ru Atten: 30 dB			TYPE DET		A
10 dB/div	Ref 20.00	dBm				Mł	40.82 cr1	5 GHz 2 dBm	Auto Tun
10.0									Center Fre 940.000000 M⊦
10.0							DL1	-13.00 dBm	Start Fre 30.000000 M⊦
20.0 30.0									<b>Stop Fre</b> 1.850000000 G⊦
40.0 50.0	An	in the state of the	international states of second second	an the state of the	raddalaithig ryyddod	i ji postali teki di shegara kili ya	a an	1 Innstantationale	<b>CF Ste</b> 182.000000 MH <u>Auto</u> Ma
60.0									Freq Offso 0 ⊦
70.0									Scale Typ
	300 GHz 1.0 MHz		#VBW	3.0 MHz		Sweep 2	Stop 1.850 .427 ms (36	00 0112	Log <u>Li</u>
SG						STATUS	;		





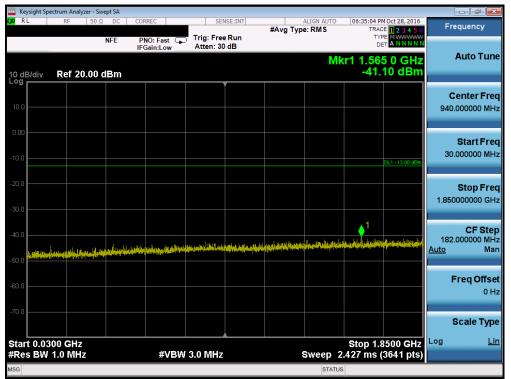
Plot 7-21. Conducted Spurious Plot (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analy	zer - Swept SA									- 6
L <mark>XI</mark> RL	RF	50 Ω DC	CORREC	SE	NSE:INT	#Avg Type	LIGN AUTO		M Oct 28, 2016	Fred	uency
		NFE	PNO: Fas IFGain:Lo	t Trig: Fre		#Avg Type		TYF De	E 1 2 3 4 5 6 E M WWWW A N N N N N		
10 dB/div Log	Ref 10	.00 dBm					Mki	1 19.57: -38.	2 5 GHz 68 dBm	A	uto Tune
0.00											n <b>ter Freq</b> 00000 GHz
-10.0									DL1 -13.00 dBm		<b>tart Freq</b> 00000 GHz
-30.0	ult, ada atal	اللغ فرو أو المعنون باو	k Jacob I ka	g blev berei (syntiker) fiekspert	a dala a sector a la compa	والمتعاقب والكرفيس وم		a han bar ta ta ta			<b>top Freq</b> 00000 GHz
-50.0	a 🔺 🖬 👘		in the second	and the second	f selfes a soft as track of		per Tradition and ge			1.00000 <u>Auto</u>	<b>CF Step</b> 00000 GHz Man
-70.0										Fr	e <b>q Offset</b> 0 Hz
-80.0											ale Type
Start 10. #Res BW		2	#	VBW 3.0 MHz	2	Sv	veep 17	Stop 20 7.33 ms (2	.000 GHz 0001 pts)	Log	Lin
MSG							STATU	S			





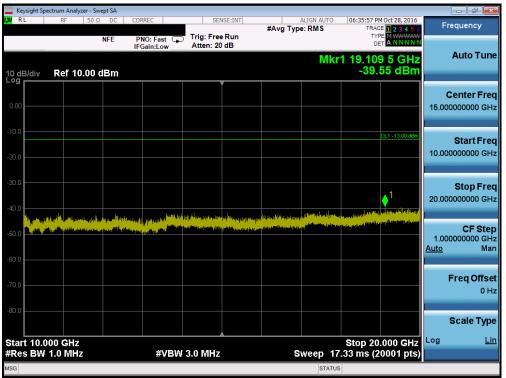
Plot 7-23. Conducted Spurious Plot (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analyzer - S	wept SA									
X/RL	RF 50 !		CORREC		NSE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	4 Oct 28, 2016 E 1 2 3 4 5 6	Frequ	iency
		NFE	PNO: Fast C IFGain:Low	Trig: Fre Atten: 3			M	(r1 4.05		Au	ito Tune
10 dB/div Log	Ref 20.00	dBm						-32.	59 dBm		
10.0											<b>iter Freq</b> 0000 GHz
-10.0									DL1 -13.00 dBm		t <b>art Freq</b> 0000 GHz
-20.0			1								t <b>op Freq</b> 0000 GHz
-40.0						alla Like de	a and an grant day of the second s	al <mark>a sporte la spitel populación de la spitel de la spitel La seguencia de la spitel de la sp La seguencia de la spitel de la s</mark>	d para da Unitaria da Salaka d Salaka da Salaka da S		CF Step 0000 MHz Man
-60.0										Fre	e <b>q Offsel</b> 0 Hz
-70.0										Sc	ale Type
Start 1.91 #Res BW			#VB	W 3.0 MHz		s	weep 14	Stop 10 .01 ms (1	.000 0112	Log	<u>Lin</u>
//SG							STATUS	5			





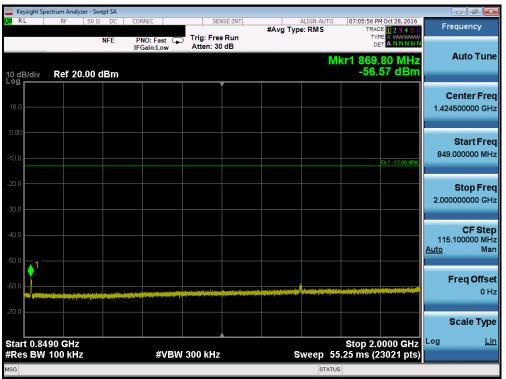
Plot 7-25. Conducted Spurious Plot (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analyzer -										- @ <mark>-</mark> ×
KI RL	RF 50	DΩ DC	CORREC PNO: Fast		NSE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Oct 28, 2016 E 1 2 3 4 5 6 E A WWWW A N N N N N	Freq	uency
		NFE	IFGain:Low	Atten: 30							uto Tune
10 dB/div	Ref 20.0	0 dBm					M	kr1 823. -31.	00 MHz 57 dBm	A	
					Ĭ					Ce	nter Fred
10.0										426.5	00000 MH:
0.00										s	Start Free
-10.0									DL1 -13.00 dBm		00000 MH:
20.0											
									1		Stop Free
30.0											
40.0											CF Step 00000 MH
50.0										<u>Auto</u>	Ma
60.0										Fr	eq Offse
											0 H
70.0										Se	ale Type
tart 30.0								Stop 8	23.0 MHz	Log	Li
Res BW	100 kHz		#VB	W 300 kHz		s	weep 38	.06 ms (1	5861 pts)		
Start 30.0 #Res BW			#VB	W 300 kHz		S	weep 38	.06 ms (1	23.0 MHz 5861 pts)	Log	

Plot 7-26. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)



Plot 7-27. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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Keysight Spectrum A										
RL RF	50 Ω	DC	CORREC		SENSE:INT	#Avg Typ	ALIGN AUTO	07:06:17 PM ( TRACE	123456	Frequency
		NFE	PNO: Fas IFGain:Lo		ig: Free Run tten: 20 dB			TYPE DET	A www. A N N N N N	
0 dB/div Ref	<sup>-</sup> 10.00 (	dBm					M	(r1 9.806 -51.0	0 GHz 2 dBm	Auto Tun
.00										Center Fre 6.000000000 G⊦
0.0								D	L1 -13.00 dBm	Start Fre 2.000000000 GH
0.0										Stop Fre 10.000000000 G⊦
0.0		$\sim$	<u> </u>	~~~	~~~	~~~	~~~~~	~~~	1	CF Ste 800.000000 MH <u>Auto</u> Ma
0.0										Freq Offs 0 H
0.0										Scale Typ
tart 2.000 GH Res BW 1.0 M			#	VBW 3.0	MHz	s	Sweep 13	Stop 10.0 8.87 ms (16	00 0112	Log <u>L</u>
G							STATU	3		

Plot 7-28. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)



Plot 7-29. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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		ctrum Ana	alyzer - Swe	pt SA									[	- • •
L <mark>XI</mark> RL		RF	50 Ω		CORREC		SI	ENSE:INT	#Avg Ty	ALIGN AUTO	TRA	M Oct 28, 2016	Fre	quency
				NFE	PNO: F IFGain:I	ast 🖵 .ow	Atten: 3							Auto Tune
10 dB Log r	/div	Ref 2	20.00 d	Bm						M	kr1 880 -56.	.20 MHz 05 dBm		Auto Tune
								Ĭ						enter Freq
10.0													1.424	500000 GHz
0.00														Start Freq
-10.0												DL1 -13.00 dBm	849.	000000 MHz
-20.0														Stop Freq
-30.0														000000 GHz
10.0														CF Step
-40.0													115. <u>Auto</u>	100000 MHz Man
-50.0	↑ <sup>1</sup>													
-60.0							میں اور						F	req Offset 0 Hz
-70.0														
														Scale Type
	: 0.849 5 BW 1				;	¢VB₩	300 kH:	z		Sweep 55	Stop 2. .25 ms (2	0000 0112	Log	Lin
MSG										STATUS				

Plot 7-30. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)



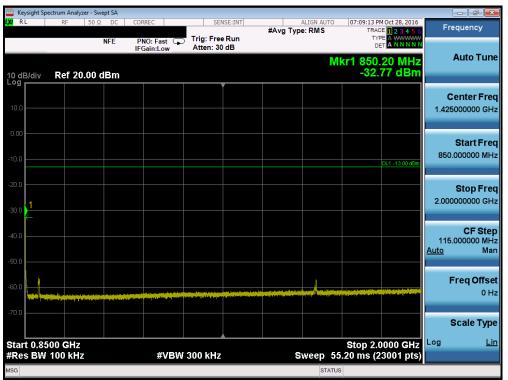
Plot 7-31. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ght Spectru			A										
X/RL		RF	50Ω D		ORREC		SI		#Avg Typ	ALIGN AUTO	TRAC	HOct 28, 2016	Fre	equency
			NFE		PNO: Fa FGain:L	st 🖵 ow	Atten: 3							Auto Tune
10 dB/	div R	ef 20.0	0 dBi	m						M	kr1 823. -61.3	55 MHz 82 dBm		
								Ĭ						enter Freq
10.0													427.	.000000 MHz
0.00														Start Freq
-10.0												DL1 -13.00 dBm	30.	.000000 MHz
-20.0														Stop Freq
-30.0													824	.000000 MHz
														CF Step
-40.0													79. <u>Auto</u>	400000 MHz Man
-50.0														
-60.0								and the part of the second	والمراجع والمقارب يتحد ومعرو	and the state of the state of the state			F	F <b>req Offset</b> 0 Hz
-70.0							and the second sec	an anti-tatatata tata	and a summarial data data data berri					
														Scale Type
	30.0 MI BW 10				#	VBW	300 kH:	z	s	Sweep 38	8 Stop 11 ms (1	24.0 MHz 5881 pts)	Log	Lin
MSG										STATUS				

Plot 7-32. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)



Plot 7-33. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	trum Analyzer	- Swept SA									×
X/RL	RF	50 Ω DC	CORREC		ENSE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	4 Oct 28, 2016 E 1 2 3 4 5 6	Frequency	y
		NFE	PNO: Fast IFGain:Low	Trig: Fro Atten: 2							
10 dB/div	Ref 10.0	00 dBm					Mk	r1 8.90 -50.	7 5 GHz 85 dBm	Auto T	une
0.00										Center F 6.000000000	
20.0									DL1 -13.00 dBm	Start F 2.000000000	
-30.0										<b>Stop F</b> 10.000000000	
50.0		_~~	~~~~	~~~	~~~~					CF \$ 800.000000 <u>Auto</u>	
70.0										Freq Of	ffse 0 H
-80.0										Scale T	Гуре
Start 2.000 Res BW 1			#VE	SW 3.0 MH	z	s	weep 13	Stop 10 .87 ms (1	.000 GHz 6001 pts)	Log	Lir
//SG							STATUS	;			

Plot 7-34. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4233)



Plot 7-35. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analyzer -	Swept SA									
XI RL	RF 5	Ω DC	CORREC	SEI	ISE:INT	#Avg Typ	ALIGN AUTO	06:58:31 PM	10ct 28, 2016 E 1 2 3 4 5 6	Frequ	Jency
		NFE	PNO: Fast G	Trig: Free Atten: 30		#/18/JP		TYP DE			
10 dB/div Log	Ref 20.0	0 dBm					M	(r1 9.788 -40.8	3 0 GHz 88 dBm	A	uto Tune
10.0											n <b>ter Freq</b> 10000 GHz
-10.0									DL1 -13.00 dBm		<b>tart Freq</b> 10000 GHz
-20.0											<b>top Freq</b> 10000 GHz
-40.0		^	~~~	~~~	~~~		~~~		1		<b>CF Step</b> 0000 MHz Man
-60.0										Fre	e <b>q Offset</b> 0 Hz
-70.0											ale Type
Start 1.75 #Res BW			#VB\	W 3.0 MHz		s	weep 14	Stop 10. .29 ms (1		Log	<u>Lin</u>
MSG							STATUS	3			





Plot 7-37. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analyzer -	- Swept SA									
X/RL	RF 5	OΩ DC	CORREC		ISE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	Oct 28, 2016	Fred	quency
10 dB/div	Ref 20.0	NFE 0 dBm	PNO: Fast G	Atten: 30			M	(r1 1.690	5 GHz 2 dBm	A	uto Tune
10.0											e <b>nter Freq</b> 00000 MHz
-10.0									DL1 -13,00 dBm		Start Freq 00000 MHz
-20.0											Stop Fred 00000 GHz
-40.0										168.0 <u>Auto</u>	CF Step 00000 MH: Mar
60.0	Yanga ayaliy yanga yanga saber abirra	Magnan and an	geninderlag italien meheneret fan de i							Fr	r <b>eq Offse</b> l 0 Hz
											cale Type
Start 0.03 #Res BW			#VBV	V 3.0 MHz			Sweep 2	Stop 1.7 2.240 ms (3	100 GHz 3361 pts)	Log	Lin
ISG							STATUS	5			





Plot 7-39. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	trum Analyzer -										
X/RL	RF 50	Ω DC	CORREC		NSE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	1 Oct 28, 2016	Freq	uency
		NFE	PNO: Fast IFGain:Low	Trig: Free Atten: 20				TYP DE			
10 dB/div Log	Ref 10.0	) dBm					Mkr	1 19.540 -47.3	) 5 GHz 87 dBm	A	uto Tune
0.00											<b>nter Freq</b> 00000 GHz
10.0									DL1 -13.00 dBm	5	Start Fred
-20.0										10.0000	00000 GH2
40.0											Stop Fred 00000 GH:
50.0	^					in an a the state of the second	-		1	1.0000 <u>Auto</u>	CF Step 00000 GH: Mar
70.0										Fr	e <b>q Offse</b> 0 H
80.0										So	cale Type
Start 10.00 ≇Res BW 1			#VE	W 3.0 MHz		s	weep 17	Stop 20. .33 ms (2	.000 GHz 0001 pts)	Log	<u>Lir</u>
SG							STATUS	;			





Plot 7-41. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1513)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ctrum Analyzer -	- Swept SA								_	
XI RL	RF 5	0Ω DC	CORREC	SEN	SE:INT	#Avg Typ	ALIGN AUTO	07:00:09 PM	4 Oct 28, 2016 E <b>1 2 3 4 5 6</b>	Fred	uency
		NFE	PNO: Fast G	Trig: Free Atten: 30		#/18/17P		TYP DE		_	
10 dB/div Log	Ref 20.0	0 dBm					Mk	(r1 1.76) -32.0	0 0 GHz 63 dBm	A	uto Tune
10.0											nter Freq 00000 GHz
-10.0									DL1 -13.00 dBm		Start Freq 00000 GHz
-20.0											<b>Stop Freq</b> 00000 GHz
-40.0		$\rightarrow$	~~~~	~~~	<u>^</u>		-	~		824.0 <u>Auto</u>	<b>CF Step</b> 00000 MHz Man
-60.0										Fr	e <b>q Offset</b> 0 Hz
-70.0											cale Type
Start 1.76 #Res BW			#VBV	V 3.0 MHz		S	weep 14	Stop 10. .28 ms (1	.000 GHz 6481 pts)	Log	Lin
MSG							STATUS	5			





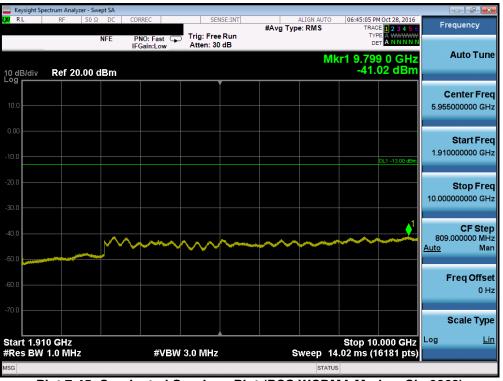
Plot 7-43. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1513)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Keysight Spec	trum Analyzer	- Swept SA									d X
LXI RL	RF 5	50Ω DC	CORREC		SENSE:INT		ALIGN AUTO	06:44:06 PM		Freque	nev
		NFE	PNO: Fa IFGain:L		j: Free Run en: 30 dB	#Avg Ty		TYPE DET	123456 A WWWWW A N N N N N		
10 dB/div Log	Ref 20.0	0 dBn	1				MI	(r1 1.845 -38.1	0 GHz 5 dBm	Auto	o Tune
10.0										Cente 937.5000	e <b>r Freq</b> 000 MHz
-10.0								C	11 -13.00 dBm		<b>rt Freq</b> 000 MHz
-20.0										<b>Sto</b> 1.8450000	<b>p Freq</b> 000 GHz
-40.0										C 181.5000 <u>Auto</u>	<b>F Step</b> 100 MHz Man
-60.0	1	an a	<u></u>					alation in a second		Freq	Offset 0 Hz
-70.0										Scal	е Туре
Start 0.030 #Res BW 1			ŧ	¢VBW 3.0 I	MHz		Sweep 2	Stop 1.84 2.420 ms (3	100 0112	Log	Lin
MSG							STATU	3			

Plot 7-44. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)



Plot 7-45. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9262)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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	ctrum Analyzer	- Swept SA								-	- • •
LX/RL	RF	50 Ω DC	CORREC PNO: Fast		SE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	Oct 28, 2016	Free	quency
10 dB/div	Ref 10.0		IFGain:Low	Atten: 20			Mkr	1 19.523		ļ	Auto Tune
0.00											e <b>nter Freq</b> 000000 GHz
-10.0									DL1 -13.00 dBm		<b>Start Freq</b> 000000 GHz
-30.0									. 1		<b>Stop Freq</b> 000000 GHz
-50.0		~~~								1.0000 <u>Auto</u>	CF Step 000000 GHz Man
-70.0										Fi	r <b>eq Offsel</b> 0 Hz
-80.0	00 GHz							Stop 20.	000 0112	S Log	cale Type <u>Lin</u>
#Res BW "	1.0 MHz		#VB	N 3.0 MHz		S	weep 17 STATUS	.33 ms (2	0001 pts)		





Plot 7-47. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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🔤 Keysight Spe	ctrum Analyzer - S	Swept SA								_	
LXI RL	RF 50	ΩDC	CORREC	SE	NSE:INT	#Avg Typ	ALIGN AUTO	TRAC	HOct 28, 2016	Fred	uency
		NFE	PNO: Fast C IFGain:Low	Trig: Fre Atten: 3				TYP DE			
10 dB/div Log	Ref 20.00	dBm					Mł	(r1 9.78 -40.8	1 5 GHz 80 dBm	<u>д</u>	uto Tune
10.0											<b>nter Freq</b> 00000 GHz
-10.0									DL1 -13.00 dBm		Start Freq 00000 GHz
-20.0											<b>Stop Freq</b> 00000 GHz
-40.0		$\sim$	~~~	$\sim$	~~~				1	809.0 <u>Auto</u>	CF Step 00000 MHz Man
-60.0										Fr	r <b>eq Offset</b> 0 Hz
-70.0										S	cale Type
Start 1.91 #Res BW			#VB	W 3.0 MHz		s	weep 14	Stop 10. .02 ms (1	.000 GHz 6181 pts)	Log	Lin
MSG							STATUS	5			



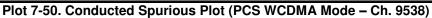


Plot 7-49. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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	ectrum Analyzer - S	Swept SA									
L <mark>XI</mark> RL	RF 50	Ω DC	CORREC	SENS		#Avg Type	ALIGN AUTO E: RMS	TRACE	Oct 28, 2016	Frequ	ency
		NFE	PNO: Fast 🖵 IFGain:Low	Trig: Free F Atten: 30 d					AWWWWW		
10 dB/div Log	Ref 20.00	dBm					Mł	(r1 1.844 -50.2	0 GHz 27 dBm	Au	to Tune
10.0											<b>ter Freq</b> 0000 MHz
0.00											<b>art Freq</b> 0000 MHz
-10.0									DL1 -13.00 dBm	St	op Freq
-30.0											0000 GHz CF Step
-40.0				ور بر والمراجع المراجع	مىرىمەر مەربىي	and a picture of the state of the	an internet	مىيىتىنى مەركەر مەر مەركەر مەركەر	1 		0000 MHz Man
-60.0	artificanganga pangangang katikagi katikan									Fre	<b>q Offset</b> 0 Hz
-70.0											ale Type
Start 0.03 #Res BW			#VBW	3.0 MHz			Sweep 2	Stop 1.8 427 ms (3	500 GHz 3641 pts)	Log	<u>Lin</u>
MSG							STATUS	3			





Plot 7-51. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analyz												
XI RL	RF	50 Ω	DC	CORREC		SE	NSE:INT		ALIGN AUTO		PM Oct 28, 2016	Er	equency
		N	FE	PNO: Fa IFGain:L	ist 😱 ow	Trig: Fre Atten: 20		#Avg Typ	be:RMS	т	ACE 1 2 3 4 5 6 YPE A WWWWW DET A NNNNN		
10 dB/div Log	Ref 10	.00 de	3m						Mł	(r1 19.99 -48	00 0 GHz .06 dBm		Auto Tune
0.00													enter Fred
-10.0											DL1 -13.00 dBm	10.000	Start Fred
40.0											1	20.000	<b>Stop Fre</b> 0000000 GH
50.0	~~~	~		-								1.000 <u>Auto</u>	<b>CF Stej</b> 0000000 GH Mar
70.0												<b>'</b>	F <b>req Offse</b> 0 H
-80.0													Scale Type
Start 10.0 #Res BW				#	VBW :	3.0 MHz		s	Sweep '	Stop 2 17.33 ms (	0.000 GHz 20001 pts)	Log	<u>Lir</u>
ISG									STAT	rus			

Plot 7-52. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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#### 7.4 Band Edge Emissions at Antenna Terminal §2.1051 §22.917(a) §24.238(a) §27.53(h)

#### Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

### The minimum permissible attenuation level of any spurious emission is $43 + \log_{10}(P_{[Watts]})$ , where P is the transmitter power in Watts.

#### Test Procedure Used

KDB 971168 D01 v02r02 - Section 6.0

#### Test Settings

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW  $\geq$  1% of the emission bandwidth
- 4. VBW <u>></u> 3 x RBW
- 5. Detector = RMS
- 6. Number of sweep points  $\geq 2 \times \text{Span/RBW}$
- 7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
- 8. Sweep time = auto couple
- 9. The trace was allowed to stabilize

#### Test Setup

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

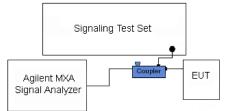


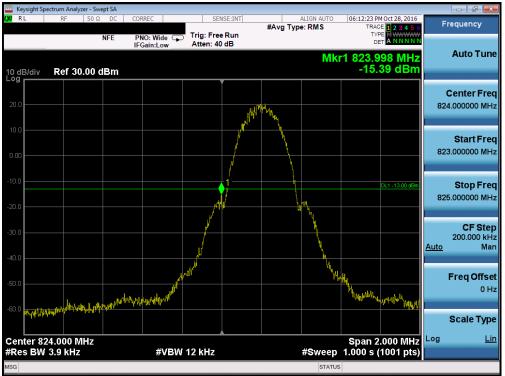
Figure 7-3. Test Instrument & Measurement Setup

#### Test Notes

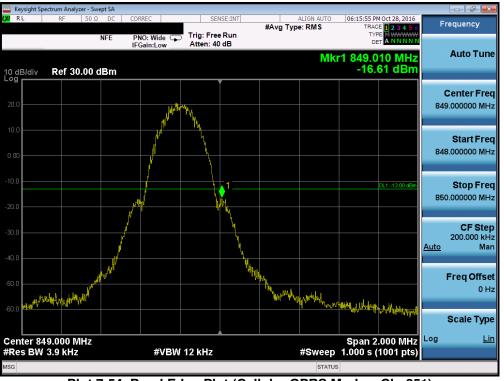
Per 22.917(b), 24.238(b), 27.53(h)(3), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. 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.

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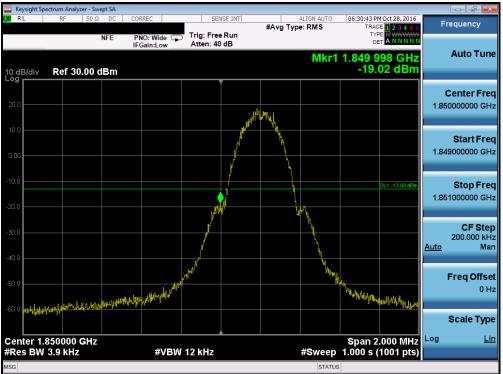
Plot 7-53. Band Edge Plot (Cellular GPRS Mode – Ch. 128)



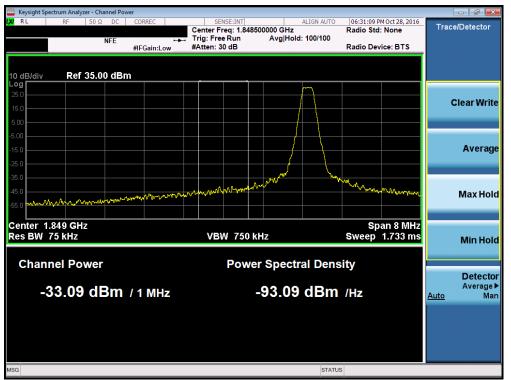
Plot 7-54. Band Edge Plot (Cellular GPRS Mode - Ch. 251)

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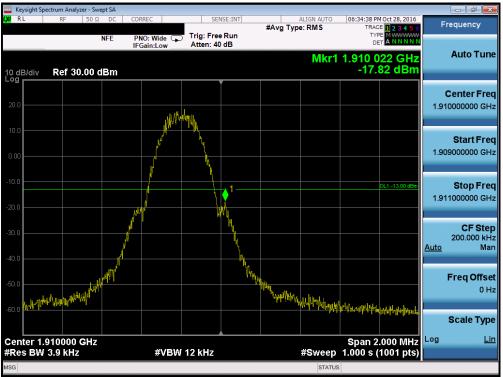
Plot 7-55. Band Edge Plot (PCS GPRS Mode - Ch. 512)

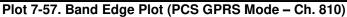


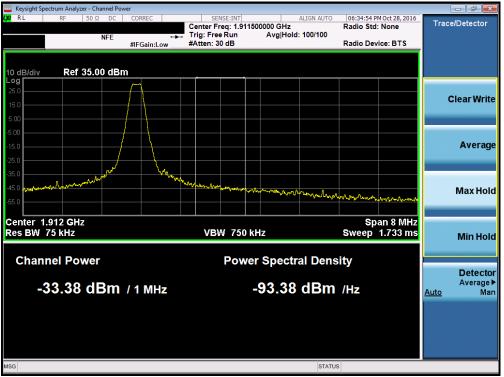
Plot 7-56. 4MHz Span Plot (PCS GPRS Mode - Ch. 512)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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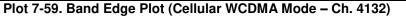


Plot 7-58. 4MHz Span Plot (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager		
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	rum Analyzer - S	wept SA									
LXU RL	RF 50		CORREC		SE:INT	#Avg Typ	ALIGN AUTO De: RMS	TRAC	M Oct 28, 2016 DE 1 2 3 4 5 6	Fr	requency
10 dB/div	Ref 30.00	NFE	PNO: Wide IFGain:Low	Trig: Free Atten: 40			Mki	1 824.0	40 dBm		Auto Tune
20.0											Center Freq 4.000000 MHz
0.00						~~~~~				816	Start Freq 5.500000 MHz
-10.0					1				DL1 -13.00 dBm	831	Stop Freq 1.500000 MHz
-30.0			Jan	$\sim$					man by	Auto <sup>1</sup>	CF Step I.500000 MHz Man
-50.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~										Freq Offset 0 Hz
-60.0											Scale Type
Center 824 #Res BW 1			#VBW	300 kHz			Sweep 1	Span 1 .000 ms (	5.00 MHz (1001 pts)	Log	Lin
MSG							STATUS				





Plot 7-60. Band Edge Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analyzer	- Swept SA									
XI RL	RF	50Ω DC	CORREC	SEI	NSE:INT	#A T	ALIGN AUTO		M Oct 28, 2016	F	requency
		NFE	PNO: Wide ( IFGain:Low _	Trig: Free Atten: 40		#Avg Ty	pe: RIVIS	TYP	E 1 2 3 4 5 6 E A WWWW A N N N N N		
10 dB/div Log	Ref 30.0	00 dBm					Mkr1	1.710 0 -20.	00 GHz 83 dBm		Auto Tune
20.0											Center Freq 0000000 GHz
0.00					$\bigwedge$	man	mmy			1.70	Start Freq 2500000 GHz
-10.0					1				DL1 -13.00 dBm	1.71	Stop Freq 7500000 GHz
30.0			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~				M	many	Auto	<b>CF Step</b> 1.500000 MH: Mar
50.0	www.										Freq Offse 0 H:
60.0											Scale Type
Center 1. Res BW	710000 G 100 kHz	Hz	#VB	W 300 kHz			Sweep	Span 1 1.000 ms (	5.00 MHz 1001 pts)	Log	Lir
ISG							STATU	s			

Plot 7-61. Band Edge Plot (AWS WCDMA Mode – Ch. 1312)

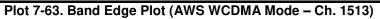


Plot 7-62. 4MHz Span Plot (AWS WCDMA Mode - Ch. 1312)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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All The second s	🔤 Keysight Sp	ectrum Analyzer - Sv	vept SA									- • •
Mkr1 1.755 000 GHz Center Fre 1.755000 GHz Ref 30.00 dBm Mkr1 1.755 000 GHz Center Fre 1.755000 GHz Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (1001 pts) Mkr1 1.755 000 GHz Start Fre 1.755000 GHz Span 15.00 MHz Sweep 1.000 ms (1001 pts) Mkr1 1.755 000 GHz Center Fre 1.755000 GHz Span 15.00 MHz Sweep 1.000 ms (1001 pts)	XU RL	RF 50 S			Trig: Free I	Run			TRAC	CE 123456	Fr	equency
Center Free 1.7550000 GH Center Free 1.7550000 GH Center Free 1.7550000 GH Center Free 1.7550000 GH Center Free 1.7550000 GH Center Free 1.7550000 GH Center Free 1.7550000 GH CF Stee 1.500000 MH Auto Ma Free Offse 0 H Scale Typ Log Li Syseep 1.000 ms (1001 pts)	10 dB/div Log	Ref 30.00		IFGain:Low	Atten: 40 o	β		Mkr1		,		Auto Tune
Start Fre 1.74750000 GH CF Ste 1.500000 GH CF Ste 1.500000 GH CF Ste 1.500000 GH CF Ste 1.50000 GH Scale Typ Log Log Log Log Log Log Log Log	20.0											
Stop Fre 1.76250000 GH CF Ste 1.500000 MH Auto Ma Freq Offse 0 H Scale Typ Log Log Log Log Log Log Log Log	0.00			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~						1.74	Start Freq 7500000 GHz
Auto 1.500000 MH Auto Ma Freq Offse 0 H Scale Typ Log Li Streep 1.000 KHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)	-10.0					1				DL1 -13.00 dBm	1.763	Stop Freq 2500000 GHz
enter 1.755000 GHz Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)	30.0 				h	~~~~	- Marine					<b>CF Step</b> .500000 MH: Mar
enter 1.755000 GHz Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (1001 pts)	50.0									Mr		F <b>req Offse</b> 0 H:
									Span 1	5.00 MHz		Scale Type <u>Lir</u>
	#Res BW	100 kHz		#VBW	300 kHz			Sweep Statu		(1001 pts)		





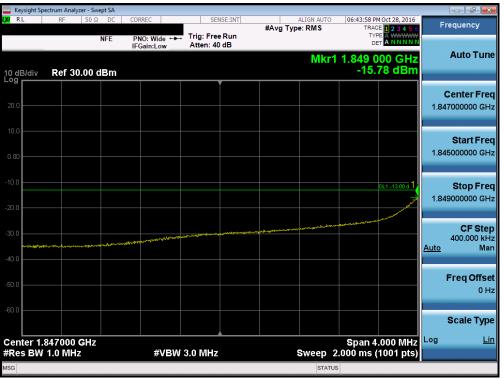
Plot 7-64. 4MHz Span Plot (AWS WCDMA Mode - Ch. 1513)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analy	zer - Swept S	SA										
U RL	RF	50 Ω [	DC CC	RREC		SE	NSE:INT		ALIGN AUTO		4 Oct 28, 2016	E.	requency
		NF	E P IF	NO: Wie Gain:Lo	de 🖵	Trig: Fre Atten: 40		#Avg Ty	ype: RMS	TYP	E 1 2 3 4 5 6 E A WWWW T A N N N N N		
0 dB/div	Ref 30	.00 dB	m						Mkr1	1.850 0 -23.	00 GHz 82 dBm		Auto Tun
20.0													Center Fre 0000000 GH
10.0 D.00							~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				1.84	<b>Start Fre</b> 2500000 GH
20.0							1				DL1 -13.00 dBm	1.85	<b>Stop Fre</b> 7500000 GH
10.0				~~~~	$\overline{\ }$	$\sim$				h		Auto <sup>1</sup>	CF Ste I.500000 MH Ma
50.0 🛹	~~~~	~~~~~	www.										Freq Offse 0 H
60.0													Scale Typ
enter 1. Res BW				#	VBW	300 kHz			Sweep 1	Span 1 .000 ms (	5.00 MHz 1001 pts)	Log	Li
SG									STATUS	3			

Plot 7-65. Band Edge Plot (PCS WCDMA Mode - Ch. 9262)



Plot 7-66. 4MHz Span Plot (PCS WCDMA Mode – Ch. 9262)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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	ectrum Analyzer - S										
X/RL	RF 50	Ω DC	CORREC		ISE:INT	#Avg Typ	ALIGN AUTO	TRA	PM Oct 28, 2016	F	requency
		NFE	PNO: Wide IFGain:Low	Trig: Free Atten: 40				T) [			
10 dB/div Log	Ref 30.00	dBm					Mkr1	1.910 -16	000 GHz .76 dBm		Auto Tune
20.0											Center Fred 0000000 GH
0.00		<u></u>	~^^^	unny l						1.90	Start Free 2500000 GH
20.0					1				DL1 -13.00 dBm	1.91	<b>Stop Fre</b> 7500000 GH
30.0 40.0	~~~~^					·~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				<u>Auto</u>	CF Ste 1.500000 MH Ma
50.0								~~~~	umung an		Freq Offse 0 H
60.0											Scale Typ
	910000 GHz 100 kHz	2	#VE	W 300 kHz			Sweep 1	Span .000 ms	15.00 MHz (1001 pts)	Log	Li
ISG							STATUS				





Plot 7-68. 4MHz Span Plot (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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#### **Peak-Average Ratio** 7.5 §24.232(d)

#### **Test Overview**

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

#### Test Procedure Used

KDB 971168 D01 v02r02 - Section 5.7.1

#### Test Settings

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW > Emission bandwidth of signal
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power

#### Test Setup

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

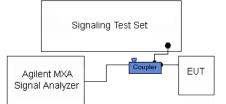


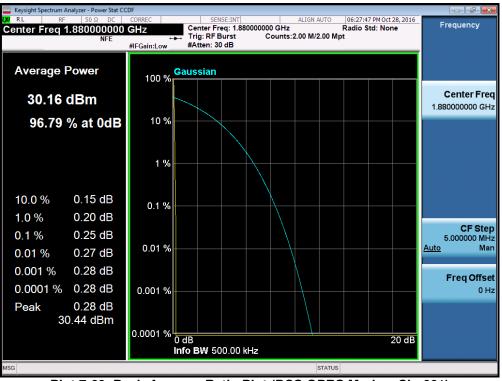
Figure 7-4. Test Instrument & Measurement Setup

#### Test Notes

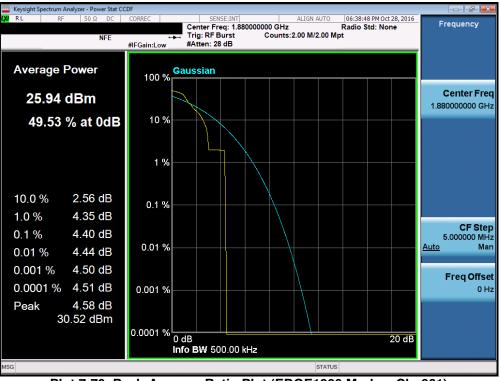
None

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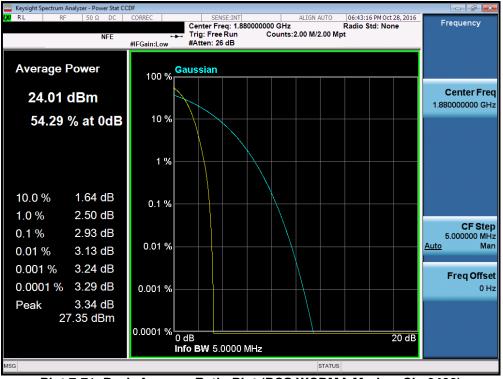




Plot 7-70. Peak-Average Ratio Plot (EDGE1900 Mode - Ch. 661)

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Plot 7-71. Peak-Average Ratio Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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#### 7.6 Radiated Power (ERP/EIRP) §22.913(a)(2) 24.232(c) 27.50(d.4)

#### Test Overview

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

#### Test Procedures Used

KDB 971168 D01 v02r02 - Section 5.2.1

ANSI/TIA-603-D-2010 - Section 2.2.17

#### Test Settings

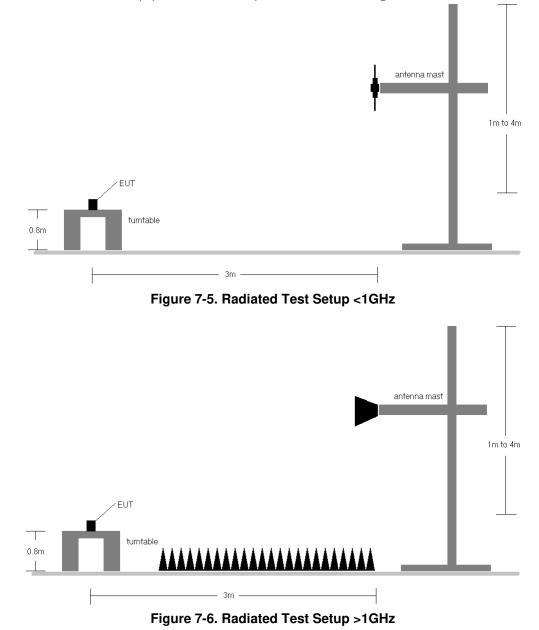
- Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
- 2. RBW = 1 5% of the expected OBW, not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

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#### Test Setup

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



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- 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 unit was tested with its standard battery.
- 4) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

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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	V	117	81	21.89	4.94	26.83	0.482	38.45	-11.62
836.60	GPRS850	V	101	268	23.30	5.00	28.30	0.676	38.45	-10.15
848.80	GPRS850	V	148	178	21.08	5.05	26.13	0.410	38.45	-12.32
836.60	GPRS850	Н	203	186	21.55	5.16	26.71	0.469	38.45	-11.74
836.60	EDGE850	V	101	268	17.58	5.00	22.58	0.181	38.45	-15.87

Table 7-2. ERP (Cellular GPRS)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBd]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	Н	358	280	13.33	5.03	18.36	0.069	38.45	-20.09
836.60	WCDMA850	Н	371	273	13.69	5.16	18.85	0.077	38.45	-19.60
846.60	WCDMA850	н	383	278	12.44	5.28	17.72	0.059	38.45	-20.73
836.60	WCDMA850	V	100	0	13.03	5.00	18.03	0.064	38.45	-20.42

Table 7-3. ERP (Cellular WCDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1712.40	WCDMA1700	Н	112	121	14.27	9.65	23.92	0.247	30.00	-6.08
1732.60	WCDMA1700	н	112	113	15.19	9.61	24.80	0.302	30.00	-5.20
1752.60	WCDMA1700	н	110	115	15.10	9.57	24.67	0.293	30.00	-5.33
1732.60	WCDMA1700	V	105	274	13.15	9.53	22.68	0.185	30.00	-7.32

Table 7-4. EIRP (AWS WCDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GPRS1900	Н	272	302	22.04	9.35	31.39	1.377	33.01	-1.62
1880.00	GPRS1900	н	106	287	22.23	9.27	31.50	1.413	33.01	-1.51
1909.80	GPRS1900	н	335	287	22.23	9.25	31.48	1.406	33.01	-1.53
1880.00	GPRS1900	V	112	271	20.83	9.27	30.10	1.023	33.01	-2.91
1880.00	EDGE1900	н	251	126	15.35	9.27	24.62	0.290	33.01	-8.39

#### Table 7-5. EIRP (PCS GPRS)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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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]
1852.40	WCDMA1900	Н	262	298	16.10	9.34	25.44	0.350	33.01	-7.57
1880.00	WCDMA1900	Н	101	291	15.13	9.27	24.40	0.276	33.01	-8.61
1907.60	WCDMA1900	н	100	286	13.47	9.24	22.71	0.187	33.01	-10.30
1852.40	WCDMA1900	V	179	95	12.75	9.22	21.97	0.157	33.01	-11.04

Table 7-6. EIRP (PCS WCDMA)

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#### **Radiated Spurious Emissions Measurements** 7.7 §2.1053 §22.917(a) 24.238(a) 27.53(h)

#### **Test Overview**

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

#### **Test Procedures Used**

KDB 971168 D01 v02r02 - Section 5.8

ANSI/TIA-603-D-2010 - Section 2.2.12

#### Test Settings

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW  $\geq$  3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points > 2 x 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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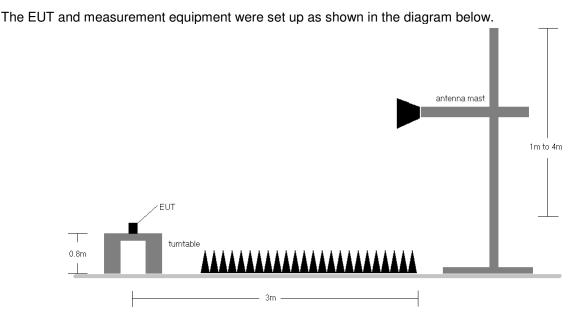


Figure 7-7. Test Instrument & Measurement Setup

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

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OPERATING FREQUENCY:	824.20	MHz
CHANNEL:	128	
MEASURED OUTPUT POWER:	dBm =	0.482 W
MODULATION SIGNAL:	GPRS (GMSK)	
DISTANCE:	3meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) = 39.83	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	Н	112	281	-57.81	3.65	-54.16	81.0
2472.60	Н	105	321	-46.40	3.57	-42.84	69.7
3296.80	Н	-	-	-59.96	5.79	-54.18	81.0
4121.00	Н	183	9	-64.11	6.96	-57.15	84.0
4945.20	Н	-	-	-63.53	7.96	-55.57	82.4

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

OPERATING FREQUENCY:	836	6.60	MHz	
CHANNEL:	19			
MEASURED OUTPUT POWER:	28.30	dBm =	0.676 W	
MODULATION SIGNAL:	GPRS (GMSK)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	41.30	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	Н	120	189	-56.17	3.52	-52.65	80.9
2509.80	Н	257	319	-44.73	3.59	-41.14	69.4
3346.40	Н	-	-	-59.23	5.87	-53.36	81.7
4183.00	Н	338	327	-62.45	7.16	-55.28	83.6
5019.60	Н	-	-	-63.56	8.03	-55.54	83.8

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

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OPERATING FREQUENCY:	848	MHz	
CHANNEL:	2		
MEASURED OUTPUT POWER:	26.13	dBm =	0.410 W
MODULATION SIGNAL:	GPRS (GMSK)	-	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W)	39.13	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	Н	223	319	-58.24	3.39	-54.85	81.0
2546.40	Н	331	57	-49.23	3.75	-45.48	71.6
3395.20	Н	-	-	-60.67	5.92	-54.74	80.9
4244.00	Н	-	-	-64.79	7.30	-57.49	83.6
5092.80	Н	_	-	-63.46	8.17	-55.29	81.4

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

OPERATING FREQUENCY:	826	MHz		
CHANNEL:	41	_		
MEASURED OUTPUT POWER:	18.36	dBm =	0.069 W	
MODULATION SIGNAL:	WCDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	31.36	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	Н	127	148	-64.04	3.62	-60.41	78.8
2479.20	Н	247	128	-63.66	3.56	-60.09	78.5
3305.60	Н	-	-	-66.15	5.83	-60.32	78.7

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

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	836	.60	MHz
CHANNEL:	41	-	
MEASURED OUTPUT POWER:	18.85	dBm =	0.077 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	31.85	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	Н	308	320	-65.70	3.52	-62.18	81.0
2509.80	Н	247	114	-62.99	3.59	-59.40	78.2
3346.40	Н	-	-	-65.87	5.87	-60.00	78.8

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

OPERATING FREQUENCY:	846	6.60	MHz
CHANNEL:	42		
MEASURED OUTPUT POWER:	17.72	dBm =	0.059 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	30.72	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	Н	242	129	-67.94	3.42	-64.53	82.2
2539.80	Н	242	141	-62.88	3.72	-59.16	76.9
3386.40	Н	-	-	-66.13	5.91	-60.21	77.9

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

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	1712.40	MHz
CHANNEL:	1312	
MEASURED OUTPUT POWER:	dBm =	0.247 W
MODULATION SIGNAL:	WCDMA	
DISTANCE:	3meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) = 36.92	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3424.80	Н	100	89	-65.69	8.15	-57.54	81.5
5137.20	Н	-	-	-65.93	10.37	-55.56	79.5
6849.60	Н	-	-	-64.65	11.48	-53.17	77.1

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

OPERATING FREQUENCY:	173	2.60	MHz
CHANNEL:	14		
MEASURED OUTPUT POWER:	24.80	dBm =	0.302 W
MODULATION SIGNAL:	WCDMA	_	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	37.80	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3465.20	Н	-	-	-66.15	8.26	-57.89	82.7
5197.80	Н	-	-	-66.59	10.41	-56.18	81.0
6930.40	Н	-	-	-64.28	11.53	-52.75	77.6

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

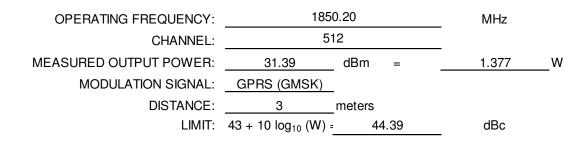
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OPERATING FREQUENCY:	175	1752.60		
CHANNEL:	15			
MEASURED OUTPUT POWER:	24.67	dBm =	0.293	W
MODULATION SIGNAL:	WCDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	37.67	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3505.20	Н	208	132	-65.82	8.36	-57.46	82.1
5257.80	Н	-	-	-65.76	10.35	-55.40	80.1
7010.40	Н	-	-	-64.56	11.59	-52.97	77.6

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



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	Н	132	350	-57.56	8.40	-49.16	80.5
5550.60	Н	154	270	-50.71	10.51	-40.20	71.6
7400.80	Н	-	-	-61.17	12.01	-49.16	80.6

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

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OPERATING FREQUENCY:	188	0.00	MHz	
CHANNEL:	6	61	-	
MEASURED OUTPUT POWER:	31.50	dBm =	1.413	W
MODULATION SIGNAL:	GPRS (GMSK)	-		
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W)	44.50	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	Н	233	38	-57.61	8.64	-48.97	80.5
5640.00	Н	238	174	-54.61	10.62	-44.00	75.5
7520.00	Н	-	-	-62.10	12.04	-50.06	81.6

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

OPERATING FREQUENCY:	190	9.80	MHz
CHANNEL:	8		
MEASURED OUTPUT POWER:	31.48	dBm =	1.406 W
MODULATION SIGNAL:	GPRS (GMSK)		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (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	Н	142	298	-55.42	8.77	-46.65	78.1
5729.40	Н	142	241	-49.29	10.71	-38.58	70.1
7639.20	Н	-	-	-61.58	12.17	-49.41	80.9

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

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	185	MHz		
CHANNEL:	92	62	_	
MEASURED OUTPUT POWER:	25.44	dBm =	0.350	W
MODULATION SIGNAL:	WCDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	38.44	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	Н	169	154	-66.27	8.42	-57.85	83.3
5557.20	Н	139	15	-65.56	10.52	-55.04	80.5
7409.60	Н	-	-	-64.37	12.01	-52.36	77.8

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

OPERATING FREQUENCY:	188	0.00	MHz
CHANNEL:	94	00	
MEASURED OUTPUT POWER:	24.40	dBm =	0.276 W
MODULATION SIGNAL:	WCDMA	_	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	37.40	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	Н	186	82	-65.55	8.64	-56.91	81.3
5640.00	Н	179	336	-65.08	10.62	-54.47	78.9
7520.00	Н	-	-	-64.48	12.04	-52.44	76.8

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

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	190	7.60	MHz
CHANNEL:	95	38	
MEASURED OUTPUT POWER:	22.71	dBm =	0.187 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	35.71	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3815.20	Н	154	198	-66.42	8.77	-57.65	80.4
5722.80	Н	103	184	-64.53	10.71	-53.82	76.5
7630.40	Н	-	-	-64.73	12.17	-52.56	75.3

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

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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#### 7.8 Frequency Stability / Temperature Variation §2.1055 §22.355 §24.235 §27.54

#### Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-D-2010. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

#### Test Procedure Used

ANSI/TIA-603-D-2010

#### **Test Settings**

- 1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

#### Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

#### Test Notes

None

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OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	190	
REFERENCE VOLTAGE:	3.85	VDC

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,599,969	-31	-0.0000037
100 %		- 30	836,600,010	10	0.0000012
100 %		- 20	836,600,280	280	0.0000335
100 %		- 10	836,600,007	7	0.0000008
100 %		0	836,599,965	-35	-0.0000042
100 %		+ 10	836,599,882	-118	-0.0000141
100 %		+ 20	836,599,735	-265	-0.0000317
100 %		+ 30	836,599,798	-202	-0.0000241
100 %		+ 40	836,600,359	359	0.0000429
100 %		+ 50	836,600,114	114	0.0000136
BATT. ENDPOINT	3.45	+ 20	836,599,973	-27	-0.0000032

Table 7-22. Frequency Stability Data (Cellular GPRS Mode – Ch. 190)

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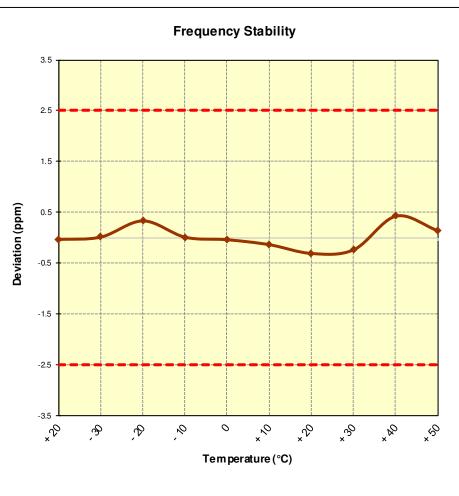


Figure 7-8. Frequency Stability Graph (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	4183	
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,599,871	-129	-0.0000154
100 %		- 30	836,600,034	34	0.0000041
100 %		- 20	836,600,094	94	0.0000112
100 %		- 10	836,599,722	-278	-0.0000332
100 %		0	836,599,953	-47	-0.0000056
100 %		+ 10	836,599,888	-112	-0.0000134
100 %		+ 20	836,599,654	-346	-0.0000414
100 %		+ 30	836,600,018	18	0.0000022
100 %		+ 40	836,600,218	218	0.0000261
100 %		+ 50	836,599,664	-336	-0.0000402
BATT. ENDPOINT	3.45	+ 20	836,600,214	214	0.0000256

 Table 7-23. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4183)

F	CC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
Te	est Report S/N:	Test Dates:	EUT Type:		Page 73 of 81
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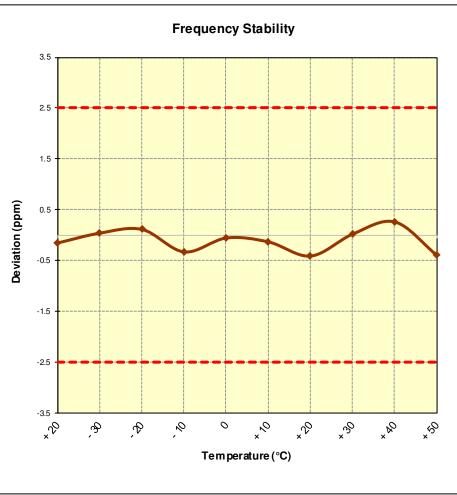


Figure 7-9. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	1,732,600,000	Hz
CHANNEL:	1413	
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,732,600,245	245	0.0000141
100 %		- 30	1,732,599,934	-66	-0.000038
100 %		- 20	1,732,600,166	166	0.0000096
100 %		- 10	1,732,599,801	-199	-0.0000115
100 %		0	1,732,599,747	-253	-0.0000146
100 %		+ 10	1,732,599,908	-92	-0.0000053
100 %		+ 20	1,732,600,220	220	0.0000127
100 %		+ 30	1,732,599,571	-429	-0.0000248
100 %		+ 40	1,732,600,088	88	0.0000051
100 %		+ 50	1,732,599,942	-58	-0.0000033
BATT. ENDPOINT	3.45	+ 20	1,732,600,215	215	0.0000124

Table 7-24. Frequency Stability Data (AWS WCDMA Mode – Ch. 1413)

#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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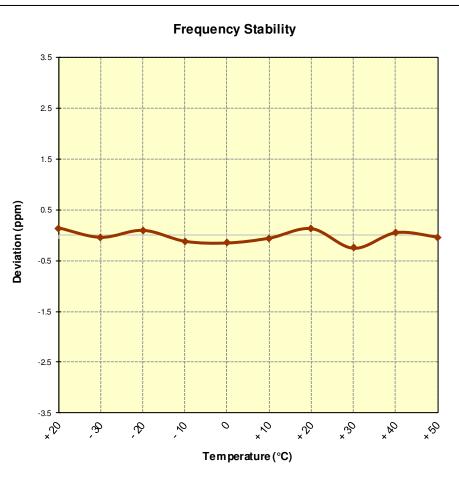


Figure 7-10. Frequency Stability Graph (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	661	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,880,000,138	138	0.0000073
100 %		- 30	1,879,999,728	-272	-0.0000145
100 %		- 20	1,880,000,297	297	0.0000158
100 %		- 10	1,879,999,969	-31	-0.0000016
100 %		0	1,880,000,255	255	0.0000136
100 %		+ 10	1,879,999,998	-2	-0.0000001
100 %		+ 20	1,879,999,974	-26	-0.0000014
100 %		+ 30	1,879,999,706	-294	-0.0000156
100 %		+ 40	1,879,999,820	-180	-0.0000096
100 %		+ 50	1,879,999,994	-6	-0.000003
BATT. ENDPOINT	3.45	+ 20	1,879,999,875	-125	-0.0000066

Table 7-25. Frequency Stability Data (PCS GPRS Mode – Ch. 661)

#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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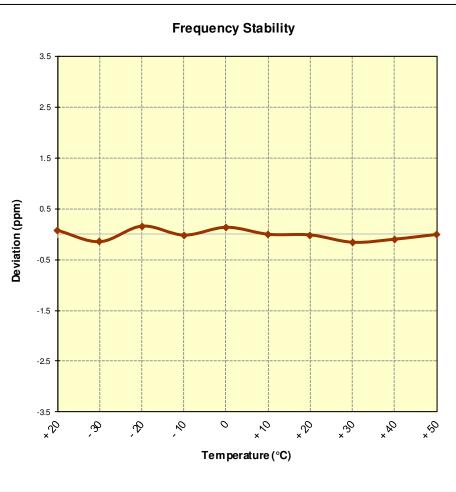


Figure 7-11. Frequency Stability Graph (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager
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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	9400	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	1,879,999,764	-236	-0.0000126
100 %		- 30	1,879,999,765	-235	-0.0000125
100 %		- 20	1,879,999,958	-42	-0.0000022
100 %		- 10	1,880,000,212	212	0.0000113
100 %		0	1,880,000,007	7	0.0000004
100 %		+ 10	1,879,999,598	-402	-0.0000214
100 %		+ 20	1,879,999,826	-174	-0.0000093
100 %		+ 30	1,880,000,315	315	0.0000168
100 %		+ 40	1,879,999,873	-127	-0.000068
100 %		+ 50	1,879,999,800	-200	-0.0000106
BATT. ENDPOINT	3.45	+ 20	1,879,999,842	-158	-0.000084

Table 7-26. Frequency Stability Data (PCS WCDMA Mode – Ch. 9400)

#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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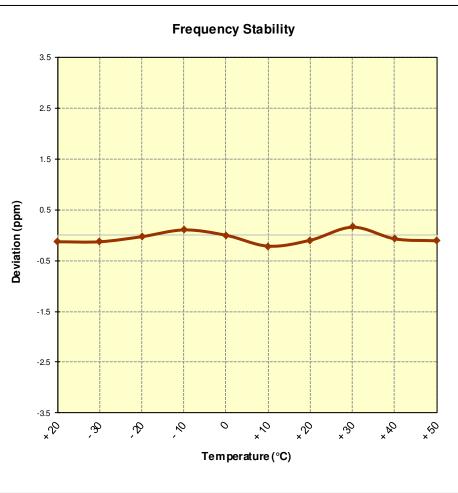


Figure 7-12. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFM210		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Reviewed by: Quality Manager	
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### 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the LG Portable Handset FCC ID: ZNFM210 complies with all the requirements of Parts 22, 24, & 27 of the FCC rules.

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