

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: 11/8 - 11/14/2016 Test Site/Location: PCTEST Lab., Columbia, MD, USA Test Report Serial No.: 0Y1611071713.ZNF

## FCC ID:

## **ZNFM150**

**APPLICANT:** 

## LG ELECTRONICS MOBILECOMM U.S.A

Application Type: Model(s): EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Test Device Serial No.:

Certification

LG-M150, LGM150, M150, LG-M151, LGM151, M151, LG-M153, LGM153, M153, LG-M154, LGM154, M154 Portable Handset

PCS Licensed Transmitter Held to Ear (PCE)

§2 §22(H) §24(E) §27(L)

ANSI/TIA-603-D-2010, KDB 971168 D01 v02r02

identical prototype [S/N: 00871, 00905]

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

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

Randy Ortanez President



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## §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-M150
FCC ID:	ZNFM150
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.:	00871, 00905
DATE(S) OF TEST:	11/8 - 11/14/2016
TEST REPORT S/N:	0Y1611071713.ZNF

## **Test Facility / Accreditations**

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

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

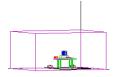
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## MEASUREMENT REPORT FCC Part 22, 24, & 27



		EIRP		
Mode	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Emission Designator
GPRS850	824.2 - 848.8	1.230	30.90	241KGXW
EDGE850	824.2 - 848.8	0.317	25.01	239KG7W
WCDMA850	826.4 - 846.6	0.062	17.92	4M13F9W
WCDMA1700	1712.4 - 1752.6	0.373	25.71	4M15F9W
GPRS1900	1850.2 - 1909.8	0.942	29.74	244KGXW
EDGE1900	1850.2 - 1909.8	0.360	25.56	243KG7W
WCDMA1900	1852.4 - 1907.6	0.326	25.13	4M17F9W

**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.

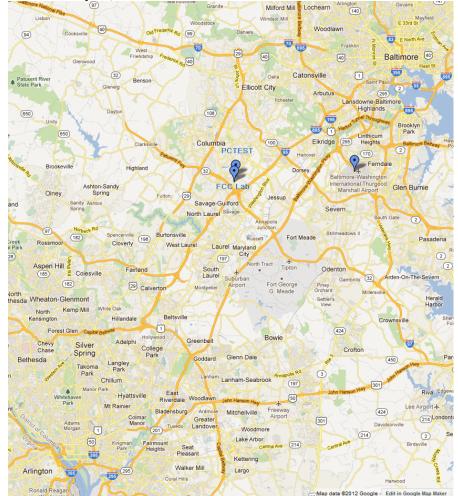


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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## 2.0 PRODUCT INFORMATION

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFM150**. 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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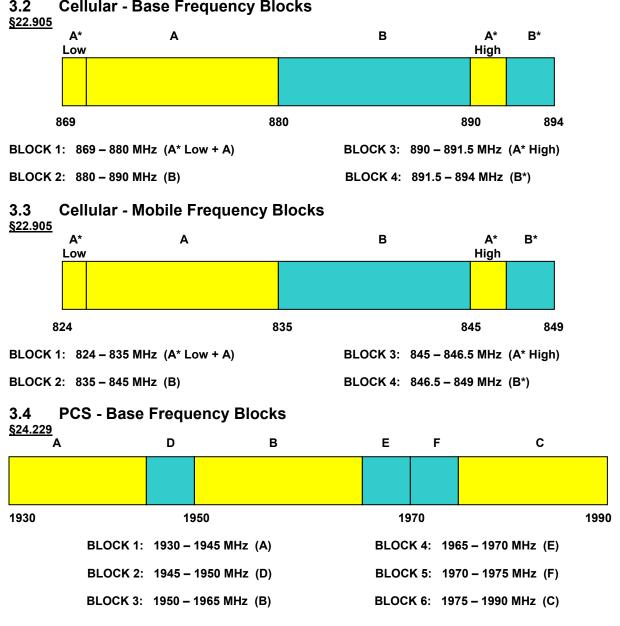


#### DESCRIPTION OF TESTS 3.0

#### 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.



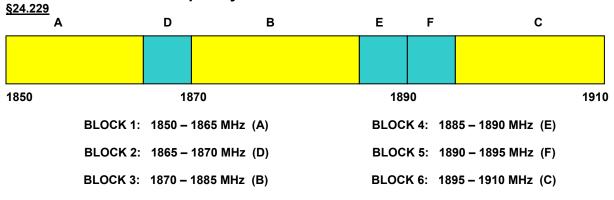


#### 3.2 **Cellular - Base Frequency Blocks**

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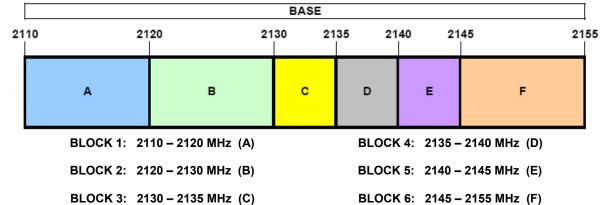


## 3.5 PCS - Mobile Frequency Blocks



## 3.6 AWS - Base Frequency Blocks

<u>§27.5(h)</u>



## 3.7 AWS - Mobile Frequency Blocks

<u>§27.5(h)</u>

	MOBILE							
17	10	17	/20 17	730 17 	35 17	40 17	45	1755
		A	В	с	D	E	F	
		BLOCK 1: 17	10 – 1720 MHz (A)		BLOCK	4: 1735 –	1740 MHz (D)	
		BLOCK 2: 17	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  $U_{\text{CISPR}}$  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		N/A		
Agilent	N9030A	PXA Signal Analyzer (44GHz)	3/1/2016	Annual	3/1/2017	MY52350166
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	2/26/2016	Biennial	2/26/2018	441128
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
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	3160-09	18-26.5 GHz Standard Gain Horn	8/28/2016	Biennial	8/28/2018	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	4/26/2016	Biennial	4/26/2018	128338
K & L	11SH10-3075/U18000	High Pass Filter	7/11/2016	Annual	7/11/2017	11SH10-3075/U18000-2
K & L	13SH10-1000/U1000	N Type High Pass Filter	N Type High Pass Filter 7/6/2016 Annual 7/6/2017		13SH10-1000/U1000-1	
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	3/4/2016	Annual	3/7/2017	11210140001
Mini-Circuits	SSG-4000HP	USB Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	TVA-11-422	RF Power Amp		N/A		QA1303002
PCTEST	-	EMC Switch System	7/11/2016	Annual	7/11/2017	NM1
PCTEST	-	EMC Switch System	7/6/2016	Annual	7/6/2017	NM2
Rohde & Schwarz	CMU200	Base Station Simulator	6/2/2016	Annual	6/2/2017	109892
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/15/2016	Annual	7/15/2017	100348
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	3/7/2016	Annual	3/7/2017	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/7/2016	Annual	3/7/2017	100040
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	3/30/2016	Biennial	3/30/2018	9105-2404
Schwarzbeck	VULB-9161SE	Trilog Super Broadband Test Antenna	11/13/2015	Biennial	11/13/2017	9161-4075
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

Table 5-1. Test Equipment

## Notes:

1. 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:	ZNFM150		
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
2.1049	Occupied Bandwidth	N/A		PASS	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 Emissions	> 43 + log <sub>10</sub> (P[Watts]) for all out-of-band emissions		PASS	Section 7.7

Table 7-1.	Summary	of Test	Results
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## 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 3.5.

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# 7.2 Occupied Bandwidth §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

- 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.

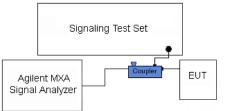


Figure 7-1. Test Instrument & Measurement Setup

## Test Notes

None.

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Keysight Spectrum Analyzer - Occupied B	N				
RL   RF   50 Ω AC	Trig: I	SENSE:INT A r Freq: 836.600000 MHz Free Run Avg Hold: n: 34 dB	R 100/100	03:03:56 PM Nov 08, 2016 adio Std: None adio Device: BTS	Trace/Detector
5 dB/div Ref 30.00 dBr 09 150 0.00					Clear Write
15 0					Average
75.0 100.0 105					Max Hole
enter 836.6 MHz es BW 4.7 kHz		VBW 15 kHz Total Power	39.4 d	Span 500 kHz Sweep 21.6 ms	Min Hol
Occupied Bandwid 2 Transmit Freq Error	41.45 kHz -232 Hz	% of OBW Powe			Detecto Peaki Auto Mai
x dB Bandwidth	313.6 kHz	x dB	-26.00		
SG			STATUS		

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



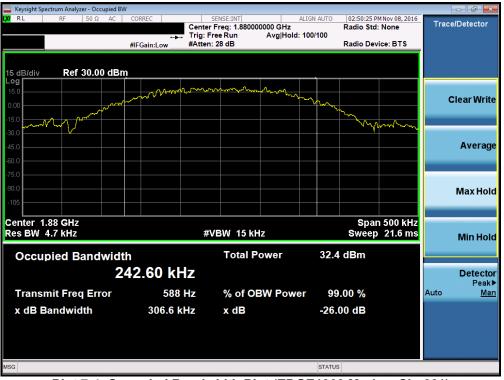
Plot 7-2. Occupied Bandwidth Plot (EDGE850 Mode - Ch. 190)

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Plot 7-3. Occupied Bandwidth Plot (PCS GPRS Mode – Ch. 661)



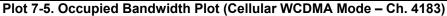
Plot 7-4. Occupied Bandwidth Plot (EDGE1900 Mode - Ch. 661)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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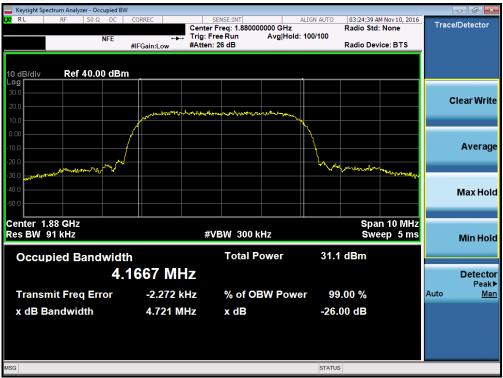




Plot 7-6. Occupied Bandwidth Plot (AWS WCDMA Mode – Ch. 1412)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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Plot 7-7. Occupied Bandwidth Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	Reviewed by: Quality Manager
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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.

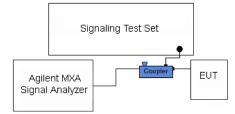


Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

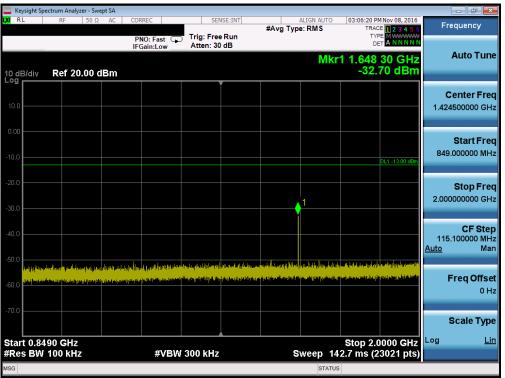
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22 and 1 MHz or greater for Part 24, Part 27. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth 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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	trum Analyzer -									
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			PNO: Fast IFGain:Lov	Trig: Fr Atten:		#Avg Ty	pe: RMS	TRACE 1 2 3 TYPE MWM DET A NN	www	
0 dB/div	Ref 20.00	) dBm					M	kr1 822.50 M -45.34 d	IHz Bm	Auto Tun
10.0										Center Fre 5.500000 MH
10.0								DL1 -13.0		Start Fre 0.000000 MH
30.0									823	Stop Fre 3.000000 MH
ŧ0.0									Auto	<b>CF Ste</b> 9.300000 MH Ma
(1991)*(1991) 50.0 <mark>- Alfabertian</mark>	ntysenethoptoetee desta entre albeid	anta kata bang anta kata pala	a da filo d <mark>a policipa da filo da secono de secono Esta de secono de sec</mark>	n an	ite (the part of the loss of the second s	p k ing Panjatan ing ang panjang pang pang pang pang pang pang pang p	Harri Internety a Ar a bit my tanal sta	n - feisfeis feisfeis feisfeisfeisfeisfeisfeisfeisfeisfeisfeis		Freq Offse 0 H
70.0										Scale Typ
tart 30.0 l Res BW 1			#\	'BW 300 kH	z	ę	Sweep 98	Stop 823.0 F .33 ms (15861	/IHz <sup>Log</sup> pts)	L
G							STATUS			

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

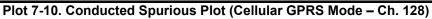


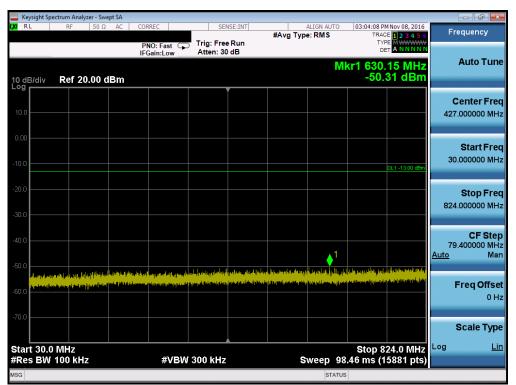
Plot 7-9. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 128)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	pectrum Ai	nalyzer - Swe	pt SA										- • ×
L <mark>XI</mark> RL	RF	50 Ω	AC	CORREC		SEI	ISE:INT		ALIGN AUTO		M Nov 08, 2016	Fre	quency
	_			PNO: Fa		Trig: Free #Atten: 2		#Avg Typ	e:RMS	TY	CE 123456 PE MWWWW ET ANNNNN		
10 dB/div Log	Ref	10.00 d	Bm						Mł	(r1 2.47 -27.	2 5 GHz 25 dBm		Auto Tune
0.00													e <b>nter Freq</b> 000000 GHz
-10.0	↓1										DL1 -13.00 dBm		<b>Start Freq</b> 000000 GHz
-30.0										a ant shutter and see	as differentiation		<b>Stop Freq</b> 000000 GHz
-50.0			ay Malayan Wata Bayan	a a sharar a Sharar a sharar a sha		( kelanda gala kalenda) Antina yang kelanda	and Added States and Added States	n <mark>de serven ander server de la presentación de La presentación de la presentación de</mark>	n fi fingen an en den sen Tringen an den sen den sen		n a porta de la completa de la comp	800.0 <u>Auto</u>	CF Step 000000 MHz Man
-70.0												F	req Offset 0 Hz
-80.0													cale Type
Start 2.0 #Res BW				#	¢VBW	3.0 MHz		s	weep 13	Stop 10 .87 ms (1	).000 GHz 16001 pts)	Log	Lin
MSG									STATUS	3			





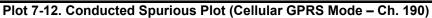
Plot 7-11. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 190)

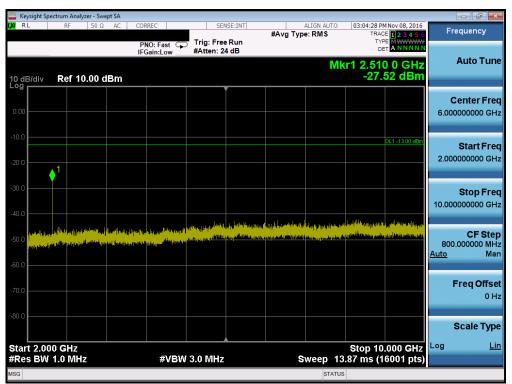
FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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Keysight Spectrum Analyzer - S	wept SA				- ē 💌
X RL RF 50	Ω AC CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	03:04:16 PM Nov 08, 2016 TRACE 1 2 3 4 5 6 TYPE M WWWWW	Frequency
	IFGain:Low	Atten: 30 dB		DET A NNNN	Auto Tune
10 dB/div Ref 20.00	dBm		Mkr <sup>*</sup>	1.673 35 GHz -31.39 dBm	Autorune
					Center Free
10.0					1.424500000 GH:
0.00					Start Fred
-10.0				DL1 -13.00 dBm	849.000000 MH:
20.0					
			▲1		Stop Fred 2.000000000 GH:
30.0					
40.0					CF Stej 115.100000 MH Auto Mai
-50.0		, na patricia da cara d	ومعقوات والمتعاولة أطوا أوريعها وورونا الرقائي		<u>Auto</u> Mar
-60.0 Indiational instance and indi	and a second district of the local second	le paradomonia a predsta policija na balka i koncentra policija p	alahan bahan pangan di salah sala	en, pulitiking och dappelisterikovik	Freq Offse
					0 H:
-70.0					Scale Type
Start 0.8490 GHz			0	3top 2.0000 GHZ	Log <u>Li</u>
Res BW 100 kHz	#VBI	V 300 kHz	Sweep 14.	2.7 ms (23021 pts)	





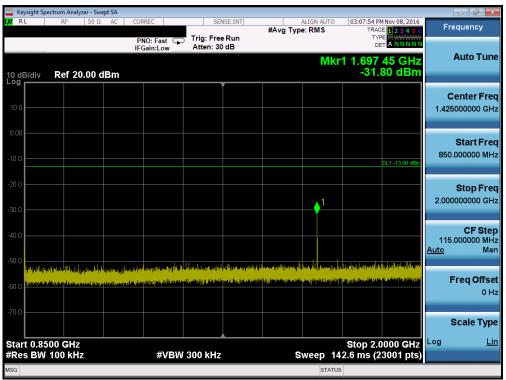
Plot 7-13. Conducted Spurious Plot (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ectrum Analyz	er - Swep	it SA								- 6	x
X/RL	RF	50 Ω	AC CO	ORREC		SENSE:INT	#Aug Tu	ALIGN AUTO		Nov 08, 2016	Frequency	,
				PNO: Fast FGain:Lov	, up	g: Free Run ten: 30 dB	#Avg ty	pe: RWS	TYPE	1 2 3 4 5 6 MWWWWW A NNNNN		
10 dB/div Log	Ref 20	.00 di	Зm					Μ	kr1 786.0 -49.8	05 MHz 19 dBm	Auto T	une
10.0											Center F 427.000000	
-10.0										)L1 -13.00 dBm	Start F 30.000000	
-20.0											<b>Stop F</b> 824.000000	
-40.0											CF S 79.400000 <u>Auto</u>	
-60.0 <b>-60.0</b>	erney felmere festi olevent Agenetel	an the first of the second	handen besternen open ekonomischen Andrea	n hughrani pri Réferencia ta	ngayaya (philopa) agaman Singaah	nd fud ble geregaleden Frendsportsellen	align of a last of the south of a	Alle (Madeuslandigati Arga Mine musisi na algani pari pani	n folgen for fan ferskilder Freedore fer ferskilder fer	eraljetajetaji pogranat Indrikterijateti jednika	Freq Of	<b>fset</b> 0 Hz
-70.0											Scale T	
Start 30.0 #Res BW				#\	/BW 300	kHz		Sweep 98	Stop 82	4.0 10112	Log	Lin
MSG								STATUS				-
								0.1100				





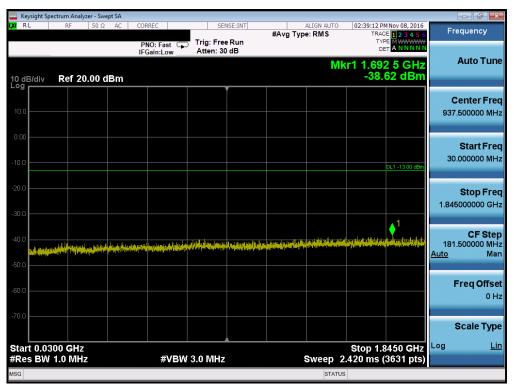


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🔤 Keysight Sp	ectrum Ana	ilyzer - Swe	pt SA										- 6 .
L <mark>XI</mark> RL	RF	50 Ω	AC	CORREC		SEI	ISE:INT		ALIGN AUTO		M Nov 08, 2016	Ero	quency
				PNO: Fas IFGain:Lo		Trig: Free #Atten: 2		#Avg Typ	e:RMS	TY	CE 1 2 3 4 5 6 PE M WWWW ET A N N N N N		
10 dB/div Log	Ref 1	0.00 d	Bm						Mł	(r1 2.54 -26.	6 5 GHz 52 dBm		Auto Tune
0.00													<b>enter Freq</b> 000000 GHz
-10.0	↓1										DL1 -13.00 dBm		<b>Start Freq</b> 000000 GHz
-30.0							natala 1	at a color and at case as		. entir men de la colora			<b>Stop Freq</b> 000000 GHz
-50.0	an a	ad a telada A finis and	alanda (j. j. j. j. j. Resta (j. s. j.	thirdney of marking of	a ti fa a gladi Drivenska p <sup>ak</sup>	an din (nationalise	a a b desti de bine y	, <mark>(M. Syn) be p<sup>rin</sup>teratory</mark> 	n na mangaga (pi ya gini gini d	a párti terménék nev a sta	en an an air air an an an air an	800.0 <u>Auto</u>	<b>CF Step</b> 000000 MHz Man
-70.0												F	<b>req Offset</b> 0 Hz
-80.0													cale Type
Start 2.00 #Res BW				#	VBW :	3.0 MHz		s	weep 13	Stop 10 8.87 ms (1	.000 GHz 6001 pts)	Log	Lin
MSG									STATUS	5			





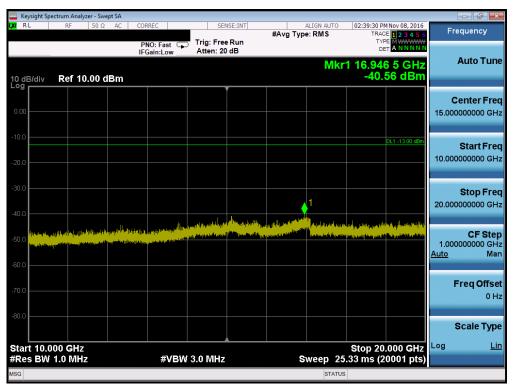
Plot 7-17. Conducted Spurious Plot (PCS GPRS Mode – Ch. 512)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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🚾 Keysight Sp	ectrum Analyze	er - Swept S	А									
XI RL	RF	50 Ω A	C COR	REC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO		MNov 08, 2016	Free	quency
				IO: Fast 🕞 Sain:Low	Trig: Free Atten: 30		#Avg typ	e. KWS	TYP			
10 dB/div Log	Ref 20.	00 dBr	n					Mk	r1 8.75 -35.	6 0 GHz 81 dBm		luto Tune
10.0												enter Fred
10.00										DL1 -13.00 dBm		Start Free
-20.0									1_			Stop Free
ada da anti-	ang panan da papangan Manana da pangangan	llen genilt sin <sub>före</sub> Verhaltigen	ri mang dipinan Madapatén Mala	et append to apple	enerallistes (altra na attaca an attación	alla ficklas (spiso original <sup>ser</sup> teriopie	hand y gan dig di Stati ya Na ng da di sang bilana y	nananalahan Inggahanan	ander Antonia and Antonia assessed	antay <sup>la</sup> n hann start.	809.0 <u>Auto</u>	CF Stej 00000 MH Ma
-50.0											FI	r <b>eq Offse</b> 0 H
-70.0												cale Typ
Start 1.91 ≇Res BW	10 GHz 1.0 MHz			#VBW	3.0 MHz		s	weep 14	Stop 10 .02 ms (1	.000 GHz 6181 pts)	Log	Lii
ISG								STATUS				





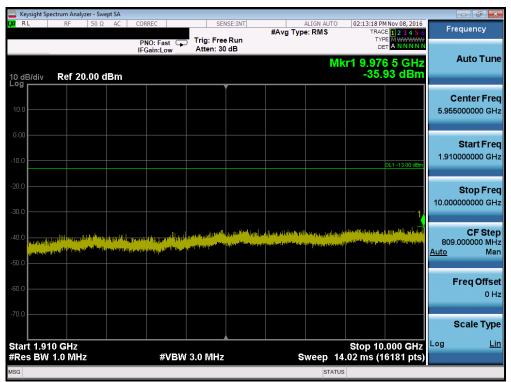
Plot 7-19. Conducted Spurious Plot (PCS GPRS Mode – Ch. 512)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ctrum Analyzer	- Swept SA										
RL	RF 5	50Ω AC	CORRE	C	SE	NSE:INT	#Avg Typ	ALIGN AUTO		MNov 08, 2016	Frequ	encv
			PNC IFGa	:Fast 🖵 in:Low	Trig: Fre Atten: 30		#Avg iyp	e. RWS	TY	E MWWWW A NNNN		
0 dB/div	Ref 20.0	0 dBm						M	kr1 1.48 -38.	3 0 GHz 60 dBm	Au	to Tun
10.0											Cen 940.000	ter Fre 0000 M⊦
10.0										DL1 -13.00 dBm		art Fre 1000 M⊦
20.0											<b>St</b> 1.850000	<b>op Fre</b> 0000 G⊦
10.0 •••••••••••••••••••••••••••••••••••	u pini i kuli da gajai	je pristo de speciel		harigi aya ahi a ba		h la ha a sa ta			1 A desire desired and the second se	ha human ingi dali. Patri kangari ya kang	182.000 <u>Auto</u>	CF Ste 1000 M⊦ Ma
0.0											Fre	<b>q Offs</b> 0 H
70.0											Sca	ale Typ
tart 0.03 Res BW				#VBW	3.0 MHz			Sweep 2	Stop 1.8 2.427 ms (	0000	Log	L
SG								STATU	IS			





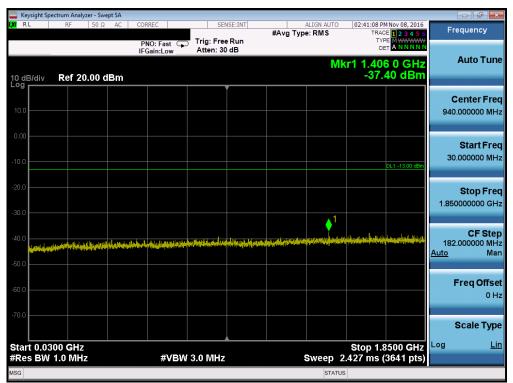
Plot 7-21. Conducted Spurious Plot (PCS GPRS Mode - Ch. 661)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ectrum Analyzer - S	Swept SA									
XV RL	RF 50	Ω AC	CORREC	SEN	SE:INT	#Avg Typ	ALIGN AUTO		Nov 08, 2016	Frequ	iency
			PNO: Fast G	Trig: Free Atten: 20				TYP DE			
10 dB/div	Ref 10.00	dBm					Mkr	1 17.022 -40.2	2 5 GHz 25 dBm	AL	ito Tune
0.00										Cen 15.00000	ter Fre
10.0									DL1 -13.00 dBm		
20.0										S1 10.00000	art Fre 0000 GH
30.0							. 1				top Fre
0.0			in the second	<mark>(1., h], have the s<sup>11</sup> frage</mark>	hinggegender,	Contraction for the st	<b>e '</b> G <mark>an wan Klaislen</mark>	Milliogenthalisteenstyle	Արդերնեսպեստ	20.00000	
50.0 <b>10000000000000000000000000000000000</b>	(hayan balan bi ya jaran balan bartan Yayan balan bi ya ya she ya she	ang na		, and a set of the second se	iddines, so allow the s	a para di kata di kata Na sangan kata di kata d	lander and the second bill and a second	hâne, Ardistina de anti-	finan denta da conta d		CF Stej 0000 GH Ma
70.0										Fre	e <b>q Offse</b> 0 H
30.0										Sci	ale Typ
	000 GHz 1.0 MHz		#VB\	V 3.0 MHz			weep 25	Stop 20	.000 GHz 0001 pts)	Log	<u>Li</u>
SG							STATUS				





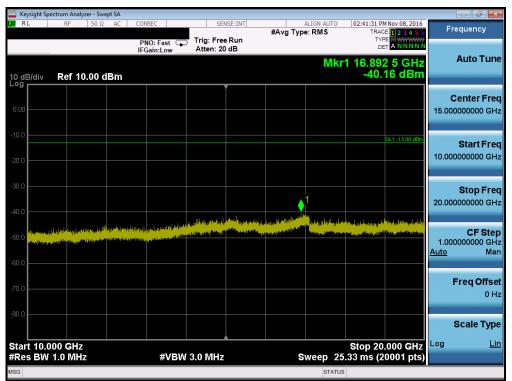
Plot 7-23. Conducted Spurious Plot (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ectrum Analyzer	- Swept SA									- 6 <b>-</b> X
XI RL	RF	50Ω AC	CORREC	SENS		#Avg Typ	ALIGN AUTO e: RMS	TRAC	1Nov 08, 2016 E 1 2 3 4 5 6	Freq	uency
			PNO: Fast IFGain:Low	Atten: 30 c							
10 dB/div Log	Ref 20.0	0 dBm					Mk	r1 6.394 -35.1	4 0 GHz 15 dBm	A	uto Tune
10.0											nter Fred 00000 GH:
10.00									DL1 -13.00 dBm		Start Free
-20.0					1-						Stop Free
40.0	ng gang sa kanang sa sa sa kanang sa Kanang sa kanang sa	a la la companya di sa la companya di s Na sa la companya di s	मा । अस्र भ्या <mark>स्व अन्त्र प्रमुख्याण्य अन्त्र विद्याप्र</mark> मा । अस्र भ्या स्व प्रमुख्याण्य अन्त्र विद्याप्र	n parti l'Angona (Planta) Angona (Planta) Angona (Planta)	aptilla tapas	Alassa A	n an thi firm an the second		a da a da da da a da a gama Na da	808.50 <u>Auto</u>	CF Stej 00000 MH Ma
60.0										Fr	e <b>q Offse</b> 0 H
-70.0											ale Type
Start 1.91 Res BW	15 GHz 1.0 MHz		#VBW	3.0 MHz		s	weep 14	Stop 10 .01 ms (1	.000 GHz 6171 pts)	Log	Li
SG							STATUS				





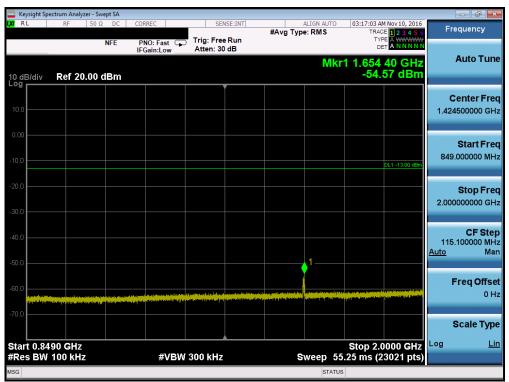
Plot 7-25. Conducted Spurious Plot (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ectrum Analyzer									7 ×
X/RL	RF 5	50 Ω DC	CORREC PNO: Fa		SENSE:IN	ALIGN AUTO	TRAC	M Nov 10, 2016 E 1 2 3 4 5 6 E A WWWW A N N N N N	Frequenc	cy
I0 dB/div	Ref 20.0	0 dBm	IFGain:L	.ow	Atten: 30 dB	М	kr1 822.		Auto	Tune
10.0									Center 426.50000	
10.0								DL1 -13.00 dBm	Start 30.00000	
20.0 30.0								1	<b>Stop</b> 823.00000	
\$0.0 50.0								Ť	CF 79.30000 <u>Auto</u>	<sup>0</sup> Ste 0 MH Ma
60.0 <b></b>	1. es 111.5 \$ \$1. es 2 \$1. es 2 \$1. es 2 1111-125 \$ \$2. es 2 \$1. e					A THE REPORT OF THE REPORT		and have by the Stationard Biology All Stationard Stationard Biology All Stationard Stationard Biology (Stationard Biology (Stationard Stationard Biology (Stationard	Freq C	Offse 0 H
70.0									Scale	
itart 30.0 Res BW	MHz 100 kHz		#	<b>≠VBW</b> 30	00 kHz	Sweep 38	Stop 8 3.06 ms (1	20.0 10112	Log	Li

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

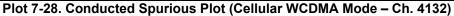


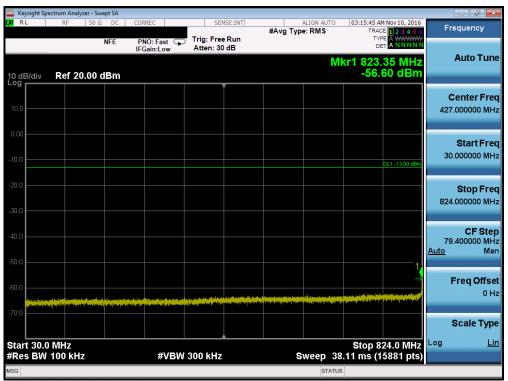
Plot 7-27. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4132)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ectrum Analyzer -							
X/RL	RF 5	0Ω DC	CORREC	SENSE:IN	T #Avg Ty	ALIGN AUTO	03:17:12 AM Nov10, 2016 TRACE 1 2 3 4 5 6	Frequency
		NFE	PNO: Fast 🕞 IFGain:Low	Trig: Free Run Atten: 20 dB				
10 dB/div	Ref 10.0	0 dBm				M	(r1 9.718 0 GHz -48.96 dBm	Auto Tune
0.00								Center Freq 6.000000000 GHz
-10.0							DL1 -13.00 dBm	Start Freq 2.000000000 GHz
-30.0								<b>Stop Freq</b> 10.000000000 GHz
-50.0		_~	<b>~~</b> ~~	~~~~				CF Step 800.000000 MHz <u>Auto</u> Man
-70.0								Freq Offset 0 Hz
-80.0								Scale Type
Start 2.00 #Res BW			#VBV	/ 3.0 MHz		Sweep 13	Stop 10.000 GHz 3.87 ms (16001 pts)	Log <u>Lin</u>
MSG						STATUS	3	



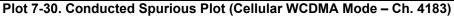


Plot 7-29. Conducted Spurious Plot (Cellular WCDMA Mode – Ch. 4183)

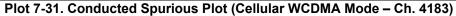
FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ectrum Analyze									
(IRL	RF	50 Ω DC	CORREC	Tria	SENSE:INT	#Avg Type	ALIGN AUTO e: RMS	TRACE	Nov 10, 2016	Frequency
		NFE	PNO: Fas IFGain:Lo		n: 30 dB				A WWWWW A NNNNN	
I0 dB/div	Ref 20.	00 dBm					Mkr	1 1.671 -58.5	65 GHz 61 dBm	Auto Tun
10.0										Center Free 1.424500000 GH
0.00									DL1 -13.00 dBm	Start Free 849.000000 MH
20.0										<b>Stop Fre</b> 2.000000000 GH
40.0										<b>CF Ste</b> 115.100000 MH <u>Auto</u> Ma
50.0 60.0	han a bhann a b	on - Nai yanan Bilangka			ang ng tao ing taong tao ang tao ang	la cu la faga parti para tanàna dia mat		a de la competencia d A competencia de la com	n a serie de la company de La company de la company de	Freq Offse 0 H
70.0	lind contraction in the	the contract of a s								Scale Type
tart 0.84 Res BW			#	VBW 300 I	kHz	S	weep 55	Stop 2.0 .25 ms (2:		Log <u>Li</u>
SG							STATUS	;		



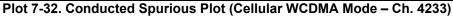


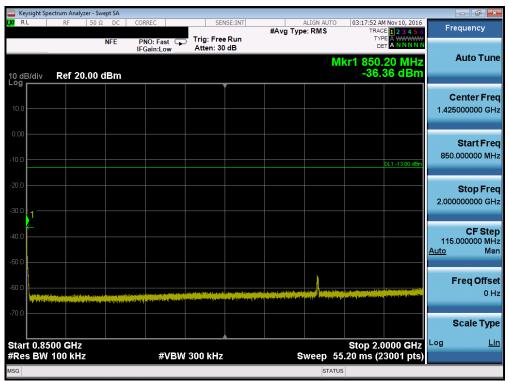


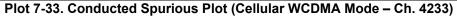
FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dago 21 of 91
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	ectrum Analyze						
C RL	RF	50 Ω DC	PNO: Fast	SENSE:INT	#Avg Type: RMS	03:17:46 AM Nov 10, 2016 TRACE 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
			IFGain:Low	Atten: 30 dB		Mkr1 799.45 MHz	
0 dB/div	Ref 20.	00 dBm				-62.16 dBm	
				Ĭ			Center Free
10.0							427.000000 MH
0.00							Start Free
10.0						DL1 -13.00 dBm	30.000000 MH
20.0							
							Stop Fre 824.000000 MH
30.0							
40.0							CF Ste 79.400000 MH
50.0							<u>Auto</u> Ma
60.0						1	Freq Offse
							0 H
70.0							Scale Type
tart 30.0	) MHz					Stop 824.0 MHz	Log <u>Li</u>
	100 kHz		#VB	N 300 kHz	Sweep 3	38.11 ms (15881 pts)	
SG					STAT	TUS	



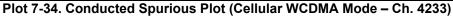




FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager	
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	ectrum Analyz									
XIRL	RF	50 Ω DC	CORREC		SENSE:INT	#Avg T	ALIGN AUTO ype: RMS	TRACE	Nov 10, 2016	Frequency
		NFE	PNO: Fa IFGain:L		rig: Free Run Atten: 20 dB			TYPE DET	A WWWWW A NNNNN	
10 dB/div	Ref 10	.00 dBm					MI	(r1 9.976 -48.4	5 GHz 7 dBm	Auto Tune
.00										Center Fred 6.000000000 GHz
-10.0									DL1 -13.00 dBm	Start Freq 2.000000000 GHz
-30.0										Stop Freq 10.000000000 GHz
-50.0	الغامين المتغان		A.		<b>~~</b> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					CF Step 800.000000 MHz <u>Auto</u> Man
70.0										Freq Offse 0 H;
-80.0										Scale Type
Start 2.00 #Res BW			#	VBW 3.	0 MHz		Sweep 13	Stop 10. 3.87 ms (16		Log <u>Lin</u>
ISG							STATUS	5		





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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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Keysight Spectr											
X/RL	RF 50	NFE	CORREC		SE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	Nov 10, 2016 E 1 2 3 4 5 6 E A WWWW T A N N N N N	Frequ	ency
		NFE	IFGain:Low	Atten: 30			M			Au	to Tune
10 dB/div Log	Ref 20.00	) dBm						(r1 9.85) -38.9	96 dBm		
10.0											ter Freq
										5.877500	000 GHz
0.00											art Freq
-10.0									DL1 -13.00 dBm	1.755000	000 GHz
-20.0										St	op Freq
-30.0										10.00000	000 GHz
-40.0											CF Step
-50.0	and the second			~~~						824.500 <u>Auto</u>	000 MHz Man
A STATE OF STATE										Fre	q Offset
-60.0											0 Hz
-70.0										Sca	le Type
Start 1.755								Stop 10	.000 0112	Log	<u>Lin</u>
#Res BW 1.	0 MHz		#VBV	V 3.0 MHz		S		.29 ms (1	6491 pts)		
SG							STATUS	5			





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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ctrum Analyzer - Sv								- 6 <b>-</b>
XI RL	RF 50 S		CORREC	Tria	SENSE:INT	ALIGN #Avg Type: RM		1:53 AM Nov 10, 2016	Frequency
		NFE	PNO: Fas IFGain:Lo		en: 30 dB				Auto Tune
10 dB/div	Ref 20.00	dBm					Mkr1 1.	607 5 GHz 51.04 dBm	Auto Tune
					ľ				Center Free
10.0									870.000000 MH:
0.00									Start Fred
-10.0								DL1 -13.00 dBm	30.000000 MH
								DET -13.00 dBm	
20.0									Stop Free 1.710000000 GH
30.0									1.7 1000000 GH
40.0									CF Ste
								▲1	168.000000 MH <u>Auto</u> Ma
50.0	*****				من المراجع والمراجع والمراجع والمراجع والم				
60.0									Freq Offse
70.0									
									Scale Type
Start 0.030				VBW 3.0 M	A	Cura	Stop	o 1.7100 GHz ns (3361 pts)	Log <u>Lir</u>
			#	7BW 3.01	MIN2		status	n <del>s (</del> 550 r pts)	





Plot 7-39. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1412)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ectrum Analyzer	- Swept SA					
X/RL	RF	50 Ω DC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	03:21:13 AM Nov 10, 2016 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
10 dB/div	Ref 10.0	10 dBm	IFGain:Low	Atten: 20 dB	Mk	1 19.430 5 GHz -44.41 dBm	Auto Tune
0.00							Center Fred 15.000000000 GH;
20.0						DL1 -13.00 dBm	Start Free 10.000000000 GH
40.0						1	Stop Free 20.000000000 GH
50.0 <b>****</b>						(1) Second property and the former of the first distance of the	CF Step 1.000000000 GH <u>Auto</u> Ma
70.0							Freq Offse 0 H
80.0							Scale Type
	000 GHz 1.0 MHz		#VB\	V 3.0 MHz		Stop 20.000 GHz 7.33 ms (20001 pts)	Log <u>Lir</u>
SG					STATU	S	



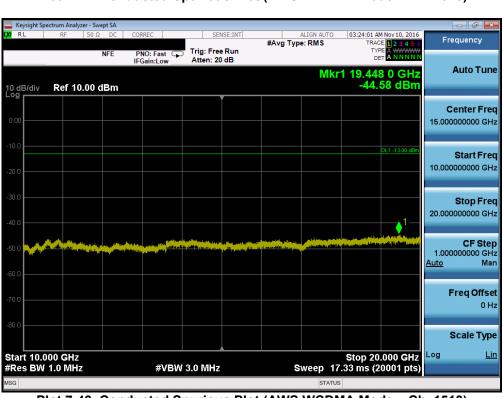


Plot 7-41. Conducted Spurious Plot (AWS WCDMA Mode - Ch. 1513)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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Keysight Spectrun										
K <mark>I</mark> RL F	RF 50	ΩDC	CORREC	SE	NSE:INT	#Avg Tv	ALIGN AUTO	03:23:49 AM No TRACE	2 3 4 5 6	Frequency
		NFE	PNO: Fast IFGain:Low	Trig: Fre				TYPE DET	NNNNN	
			IFGall.LOw	Atten: 0	o ub		M	kr1 1.760 (	) GHz	Auto Tun
10 dB/div Re	ef 20.00	dBm						-36.60	dBm	
.09										Center Free
10.0										5.880000000 GH
0.00										Start Free
10.0										1.760000000 GH
								DL1	-13.00 dBm	
20.0										Stop Free
										10.000000000 GH
30.0 1										
40.0										CF Ster
			(Approximate)			and the state	No. House		تظنف ستريد	824.000000 MH <u>Auto</u> Ma
50.0										
										Freq Offse
60.0										он
70.0										
										Scale Type
L Start 1.760 G	Hz							Stop 10.00	00 GHz	Log <u>Li</u> i
Res BW 1.0			#V	BW 3.0 MHz	2		Sweep 14	.28 ms (164	81 pts)	
SG							STATU	5		



Plot 7-42. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1513)

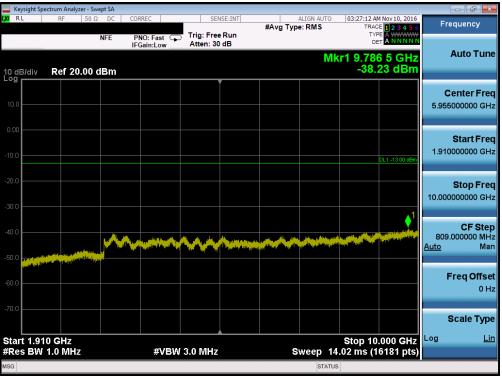


FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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Keysight Spectru									- 6 -
RL	RF 50		CORREC		SENSE:INT	#Avg Typ	ALIGN AUTO	03:27:05 AM Nov 10, 2 TRACE 2 3 4	5.6 Frequency
		NFE	PNO: Fas IFGain:Lo		): Free Run en: 30 dB				
) dB/div R	ef 20.00	dBm					Mł	r1 1.845 0 G -37.23 dE	Hz Auto Tur Sm
									Center Fre
0.0									937.500000 MH
.00									Start Fre
D.O									30.000000 MH
								DL1 -13.00	
D.O									Stop Fre
D.O									1,
									CF Ste
									Auto M
		mitineteniero	nderifine etter frimer		and the second	feren dir y standar y Berlina Hon		ىلىدۇلىرىدىكە ئەتھەيلەرلىردانيە تەركەن يەركەر تەكە ئالىرىكە ئەتلەرلىرىدىكە ئەتھەرلىرىدىكە ئەتلەر تەكەر ئەكەر ئەكە	
D.O									Freq Offs
D.O									
									Scale Typ
tart 0.0300 Res BW 1.0			#	VBW 3.0 I	MHz		Sweep 2	Stop 1.8450 G 420 ms (3631 p	Hz L <sup>og</sup> L
G							STATUS		

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

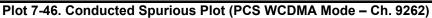


Plot 7-45. Conducted Spurious Plot (PCS WCDMA Mode - Ch. 9262)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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(RL	RF 50	Ω DC									P X
		NFE	CORREC	Trig: Free		#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Nov 10, 2016 DE <b>1 2 3 4 5</b> 6 PE A WWWWW ET A N N N N N	Frequenc	y
0 dB/div	Ref 10.00	dBm	IFGain:Low	Atten: 20	) dB		Mkr	1 19.56	3 5 GHz 97 dBm	Auto <sup>-</sup>	Tune
0.00										Center 15.00000000	
20.0									DL1 -13.00 dBm	Start 10.00000000	
40.0									1	Stop 20.00000000	
50.0 <b>****</b>						W nego dobile de la d Na de la de la debite		the start and start		CF 1.000000000 <u>Auto</u>	Ste 0 GH Ma
70.0										Freq C	Offse 0 H
80.0										Scale	
tart 10.00 Res BW			#VBV	V 3.0 MHz		s	weep 17	Stop 20 .33 ms (2	.000 GHz 20001 pts)	Log	Lii





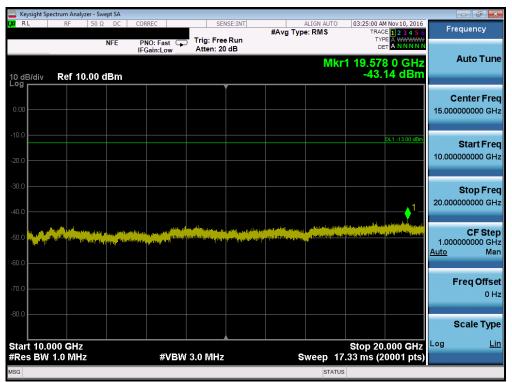
Plot 7-47. Conducted Spurious Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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Keysight Spec										- đ	×
X/RL	RF 5	50 Ω DC	CORREC		NSE:INT	#Avg Typ	ALIGN AUTO	TRAC	M Nov 10, 2016 E 1 2 3 4 5 6 E A WWWWW A N N N N N	Frequency	У
			IFGain:Low	Atten: 3			M	(r1 9.97	,	Auto T	Гune
10 dB/div -og 10.0	Ref 20.0	IO dBm						-36.		Center	
0.00									DL1 -13.00 dBm	Start I 1.910000000	
-20.0										<b>Stop I</b> 10.000000000	
-40.0		~	<b>Western</b>	~~~			er og senten som för af det som bled som som som som som som som som som som			CF \$ 809.000000 <u>Auto</u>	
60.0										Freq O	ffse 0 H
-70.0										Scale 1	Туре
Start 1.910 #Res BW 1			#VB\	N 3.0 MHz		s	weep 14	Stop 10 1.02 ms (1	.000 0112	Log	Lin
ISG							STATUS	S			





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

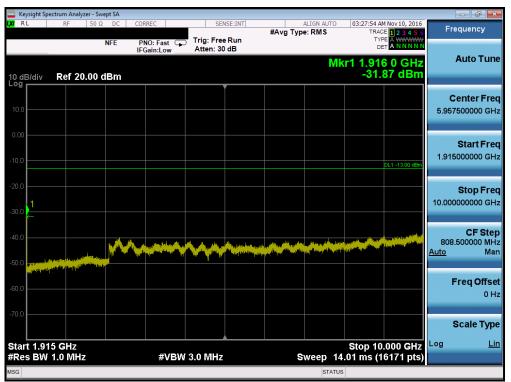
FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ctrum Analyzer - Swe									
KI RL	RF 50 Ω		CORREC		ENSE:INT	#Avg Typ	ALIGN AUTO	03:27:48 AM N TRACE	1 2 3 4 5 6	Frequency
		NFE	PNO: Fast IFGain:Low					DET		
I0 dB/div	Ref 20.00 d	IBm					Mł	r1 1.829 -50.66	5 GHz 6 dBm	Auto Tur
.09					Ĭ					Center Fre
10.0										940.000000 MH
0.00										Otort Fra
10.0										Start Fre 30.000000 MH
10.0								DL	1 -13.00 dBm	
20.0										Stop Fre
30.0										1.850000000 GH
40.0										CF Ste
+0.0									1	182.000000 MH Auto Ma
50.0				مىلىدىرى بىرى بىرى بىرى بىرى بىرى بىرى بىرى	-		م بحدثية بسيد نومهم د يوم		an a	
60.0	preserve and the state of the second state of the second state of the second state of the second state of the s									Freq Offs
										0 H
70.0										Scale Typ
tart 0.03								Stop 1.85	00 0112	Log <u>L</u>
Res BW	1.0 WHz		#V	BW 3.0 MH	Z		Sweep 2	.427 ms (36	641 pts)	





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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ectrum Analyzer						
RL	RF 5	0Ω DC	CORREC	SENSE:INT	#Avg Type: RMS	03:28:05 AM Nov 10, 2016 TRACE 1 2 3 4 5 6 TYPE A MANANANA	Frequency
0 dB/div	Ref 10.0	NFE 0 dBm	PNO: Fast C IFGain:Low	Atten: 20 dB	Mk	TYPE A WWWWW DET A NNNNN r1 19.186 0 GHz -44.19 dBm	Auto Tun
°g							Center Fre 15.000000000 GH
20.0						DL1 -13.00 dBm	Start Fre 10.000000000 GH
10.0 10.0						1	<b>Stop Fre</b> 20.000000000 GH
io.o <b>*****</b>				a Poline, and Charles Child Charles in Poline your Chi Mine Specific Annual you to Specific Annual You (Specific Annual You (Specific Annual You (Specific A	and <sub>the second s</sub>	na di na dia pangka na na katala na dina katala na katala na katala na katala na katala na katala na katala na Na na di pangka na na ng na katala na kat Na na	CF Ste 1.00000000 G⊦ <u>Auto</u> Ma
0.0							Freq Offs 0 F
30.0							Scale Typ
	000 GHz 1.0 MHz		#VB	W 3.0 MHz	Sweep 1	Stop 20.000 GHz 7.33 ms (20001 pts)	Log <u>Li</u>
G					STATU	IS	

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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> 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 > 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.

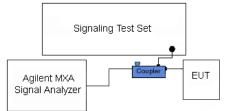


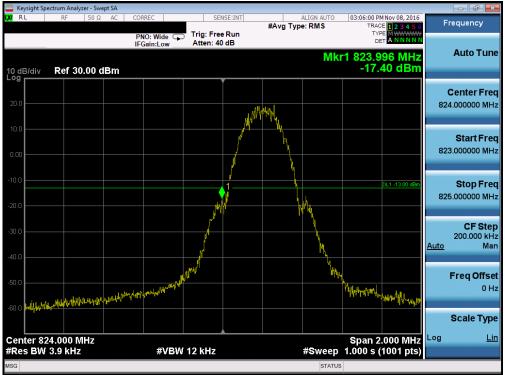
Figure 7-3. Test Instrument & Measurement Setup

#### Test Notes

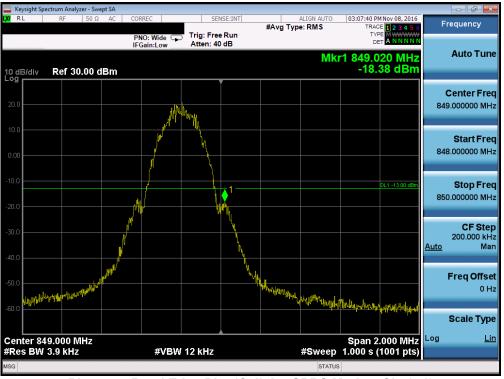
Per 22.917(b), 24.238(b), 27.53(h)(3), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions 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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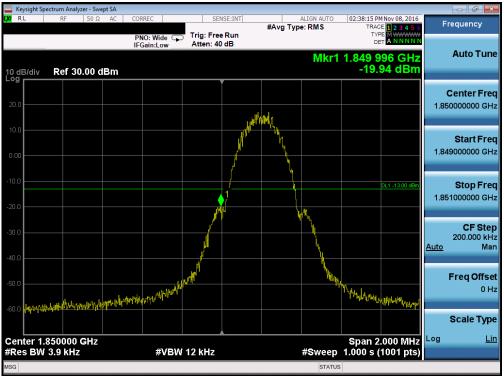
Plot 7-53. Band Edge Plot (Cellular GPRS Mode – Ch. 128)



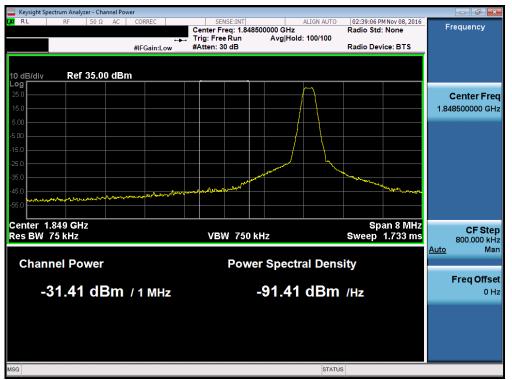
Plot 7-54. Band Edge Plot (Cellular GPRS Mode - Ch. 251)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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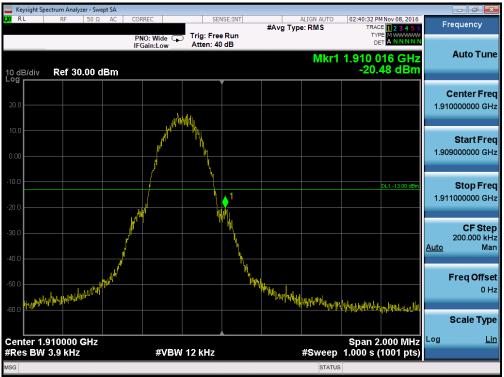
Plot 7-55. Band Edge Plot (PCS GPRS Mode - Ch. 512)

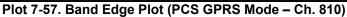


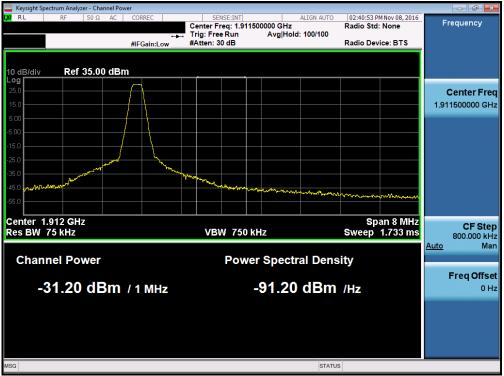
Plot 7-56. 4MHz Span Plot (PCS GPRS Mode – Ch. 512)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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Plot 7-58. 4MHz Span Plot (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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Keysight Spectro											- # ×
KI RL	RF 50	Ω DC	CORREC PNO: Wide		NSE:INT	#Avg Typ	ALIGN AUTO e: RMS	TRAC	M Nov 10, 2016 DE <b>1 2 3 4 5 6</b> PE A WWWWW ET A N N N N N	Fr	equency
0 dB/div	Ref 30.00		IFGain:Low	Atten: 40			Mk	1 823.8	880 MHz 41 dBm		Auto Tune
20.0											enter Fre .000000 МН
0.00					$\int$	, mar	m			816	Start Fre 500000 MH
20.0					1				DL1 -13.00 dBm	831	<b>Stop Fre</b> 500000 MH
10.0								5	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1 <u>Auto</u>	<b>CF Ste</b> j 500000 MH Ma
0.0	and the second s	~~~~								F	F <b>req Offse</b> 0 H
.0.0											Scale Typ
enter 824. Res BW 10			#VB	W 300 kHz			Sweep 1	Span 1 .000 ms (	5.00 MHz (1001 pts)	Log	Li
SG							STATUS				



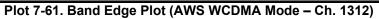


Plot 7-60. Band Edge Plot (Cellular WCDMA Mode – Ch. 4233)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ectrum Analyzer -	Swept SA										- • ×
X/RL	RF 50	ΩDC	CORREC		SEN	SE:INT	#Avg Ty	ALIGN AUTO		M Nov 10, 2016	F	requency
		NFE	PNO: Wid IFGain:Lo		rig: Free Atten: 40		#/\Vg iy		TY D			
10 dB/div Log	Ref 30.00	) dBm						Mkr	1 1.710 -20.	000 GHz 53 dBm		Auto Tune
20.0												Center Freq 0000000 GHz
0.00						(	~~~~~	m			1.70	Start Fred 2500000 GHz
-10.0						1				DL1 -13.00 dBm	1.71	Stop Freq 7500000 GHz
-30.0			John March	مسمر	~~~					m	<u>Auto</u>	<b>CF Step</b> 1.500000 MH Mar
50.0												Freq Offse 0 Hi
-60.0												Scale Type
Center 1. #Res BW	710000 GH 100 kHz	Z	#\	/BW 30	10 kHz			Sweep	Span 1 1.000 ms	5.00 MHz (1001 pts)	Log	Lir
ISG								STATU	JS			



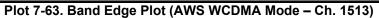


Plot 7-62. 4MHz Span Plot (AWS WCDMA Mode - Ch. 1312)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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🔤 Keysight Sp	pectrum Analyzer	- Swept SA									×
X/RL	RF 5	50 Ω DC	CORREC	Vide 🕞 TI	SENSE:INT	#Avg Ty	ALIGN AUTO pe: RMS	TRA	AM Nov 10, 2016 CE 1 2 3 4 5 6 (PE A WWWWW ET A NNNNN	Frequency	1
10 dB/div Log	Ref 30.0		IFGain:		tten: 40 dB		Mkr	1 1.755	000 GHz .26 dBm	Auto T	une
20.0										Center F 1.755000000	
0.00				^	~					Start F 1.747500000	
-10.0									DL1 -13.00 dBm	Stop F 1.762500000	
30.0 40.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					han han	~~~			CF S 1.500000 <u>Auto</u>	
50.0								m		Freq Of	f <b>fse</b> 0 H
	.755000 GI	Hz						Span '		Scale T	ſype Lir
Res BW	100 kHz			#VBW 30	U KHZ		Sweep		(1001 pts)		





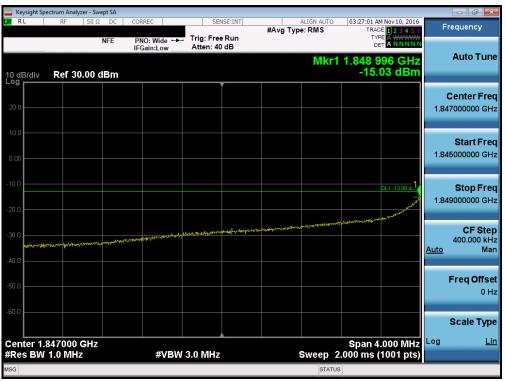
Plot 7-64. 4MHz Span Plot (AWS WCDMA Mode - Ch. 1513)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ectrum Analyzer -	Swept SA									di X
XI RL	RF 50	DΩ DC	CORREC		SENSE:INT	ALI #Avg Type: F		TRACI	Nov 10, 2016 <b>1 2 3 4 5 6</b> A WWWW A NNNNN	Freque	ncy
10 dB/div Log	Ref 30.00	) dBm	IFGain:Lo	ow Atte	n: 40 dB		Mkr1 1	.850 0	00 GHz 58 dBm	Aut	o Tune
20.0										Cento 1.8500000	e <b>r Fre</b> d 000 GH:
0.00						·····	~~~			Sta 1.8425000	rt Fre 000 GH
20.0					1				DL1 -13.00 dBm	<b>Sto</b> 1.8575000	<b>p Fre</b> 000 GH
40.0								h	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2 1.5000 <u>Auto</u>	F Ste 000 MH Ma
i0.0	· · · · · · · · · · · · · · · · · · ·	~~~~~								Freq	Offs 0 ⊦
60.0	850000 GH							Snan 1	5 00 MHz		e Typ Li
	100 kHz	14	#	VBW 300 H	Hz	Sv	veep 1.0	00 ms (	5.00 MHz 1001 pts)		

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



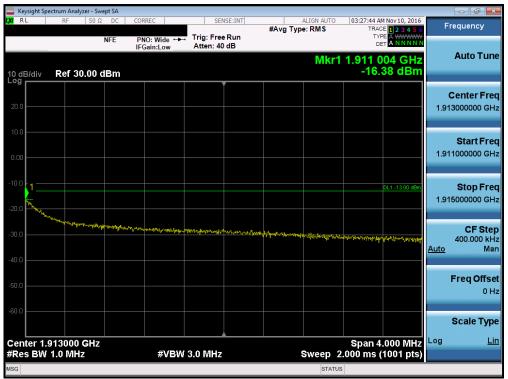
Plot 7-66. 4MHz Span Plot (PCS WCDMA Mode - Ch. 9262)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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	ectrum Analyzer										
X/RL	RF 5	0Ω DC	CORREC		SENSE:INT	#Avg Ty	ALIGN AUTO		M Nov 10, 2016	Fr	equency
		NFE	PNO: Wi IFGain:L		j: Free Run en: 40 dB			TY D	PE A WWWWW		
10 dB/div	Ref 30.0	0 dBm					Mkr	1 1.910 ( -18.	000 GHz 58 dBm		Auto Tune
20.0											<b>Center Freq</b> 0000000 GHz
0.00			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~						1.902	Start Freq 2500000 GHz
-10.0					1				DL1 -13.00 dBm	1.917	Stop Freq 7500000 GHz
-30.0	~~~~~	~			5	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~			1 <u>Auto</u>	<b>CF Step</b> .500000 MHz Man
-50.0									m n	ľ	Freq Offset 0 Hz
-60.0											Scale Type
Center 1. #Res BW	910000 GI 100 kHz	lz	#	VBW 300	kHz		Sweep	Span 1 1.000 ms	5.00 MHz (1001 pts)	Log	Lin
MSG							STATU	IS			





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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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### 7.5 Peak-Average Ratio

#### 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

#### <u>Test Setup</u>

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

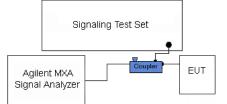


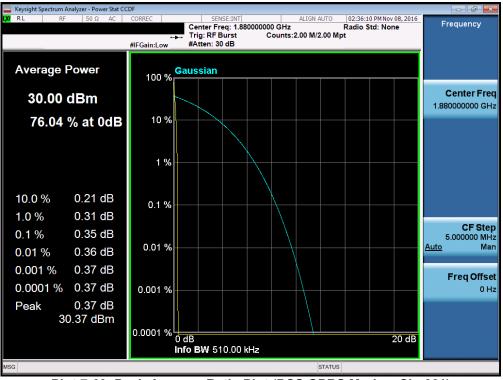
Figure 7-4. Test Instrument & Measurement Setup

#### Test Notes

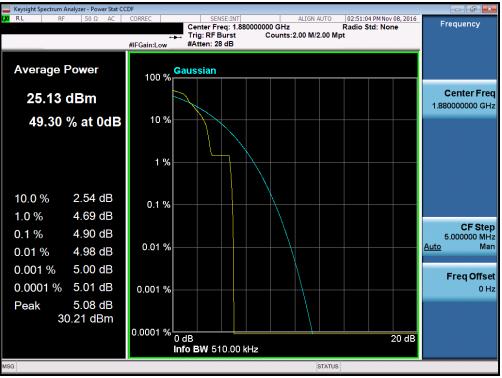
None

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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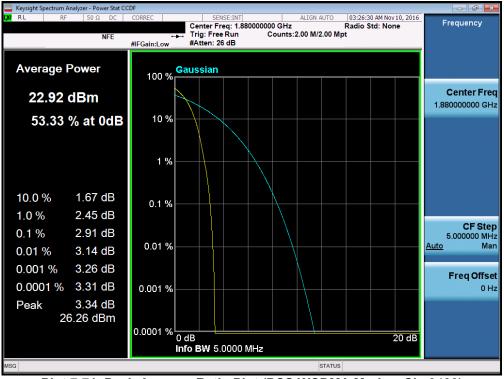




Plot 7-70. Peak-Average Ratio Plot (EDGE1900 Mode - Ch. 661)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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Plot 7-71. Peak-Average Ratio Plot (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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#### Test Setup

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

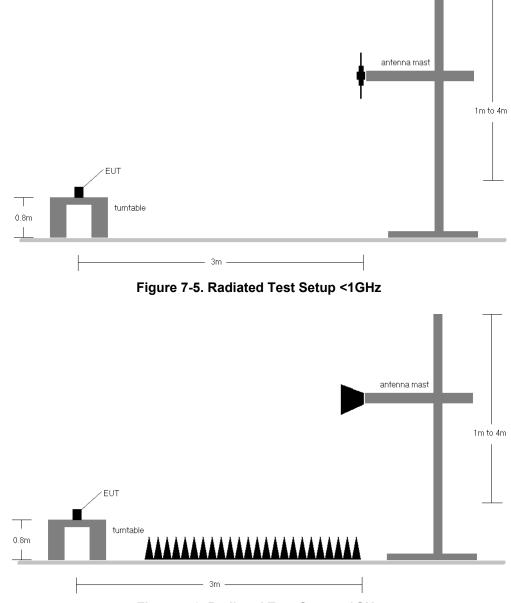


Figure 7-6. Radiated Test Setup >1GHz

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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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.

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT OB LG (CERTIFICATION)	<b>Reviewed by:</b> Quality Manager
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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	н	353	292	24.63	5.00	29.63	0.919	38.45	-8.82
836.60	GPRS850	н	100	290	24.80	5.16	29.96	0.991	38.45	-8.49
848.80	GPRS850	н	378	292	25.59	5.31	30.90	1.230	38.45	-7.55
848.80	GPRS850	V	341	246	24.11	5.05	29.16	0.824	38.45	-9.29
848.80	EDGE850	н	378	292	19.70	5.31	25.01	0.317	38.45	-13.44

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	V	100	186	11.71	4.95	16.66	0.046	38.45	-21.79
836.60	WCDMA850	V	342	188	12.32	5.00	17.32	0.054	38.45	-21.13
846.60	WCDMA850	V	199	170	12.88	5.04	17.92	0.062	38.45	-20.53
846.60	WCDMA850	н	134	304	11.66	5.28	16.94	0.049	38.45	-21.51

Table 7-3. ERP (Cellular WCDMA)

[MHz]	Mode	Pol. [H/V]	Antenna Height [cm]	Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1712.40	WCDMA1700	н	138	82	15.07	9.65	24.72	0.297	30.00	-5.28
1732.60	WCDMA1700	н	120	76	16.10	9.61	25.71	0.373	30.00	-4.29
1752.60	WCDMA1700	н	116	70	14.87	9.57	24.44	0.278	30.00	-5.56
1732.60	WCDMA1700	V	149	164	15.34	9.53	24.87	0.307	30.00	-5.13

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	110	356	20.39	9.35	29.74	0.942	33.01	-3.27
1880.00	GPRS1900	н	149	349	19.74	9.27	29.01	0.797	33.01	-4.00
1909.80	GPRS1900	н	110	12	18.46	9.25	27.71	0.590	33.01	-5.30
1850.20	GPRS1900	V	183	192	14.18	9.21	23.39	0.218	33.01	-9.62
1850.20	EDGE1900	н	110	356	16.21	9.35	25.56	0.360	33.01	-7.45

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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> 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	121	93	15.79	9.34	25.13	0.326	33.01	-7.88
1880.00	WCDMA1900	н	115	78	15.55	9.27	24.82	0.304	33.01	-8.19
1907.60	WCDMA1900	н	109	76	14.00	9.24	23.24	0.211	33.01	-9.77
1852.40	WCDMA1900	V	222	167	14.28	9.22	23.50	0.224	33.01	-9.51

Table 7-6. EIRP (PCS WCDMA)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager		
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### 7.7 Radiated Spurious Emissions Measurements §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  $\geq$  2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

	FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	Reviewed by: Quality Manager
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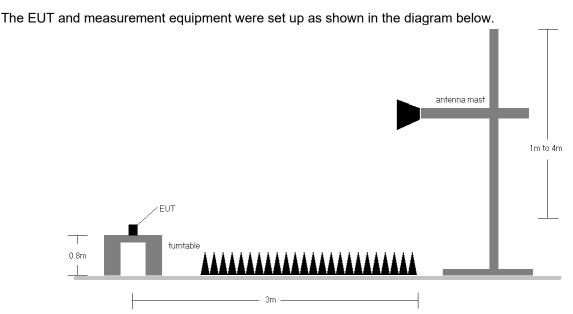


Figure 7-7. Test Instrument & Measurement Setup

#### 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	MHz		
CHANNEL:	12	28		
MEASURED OUTPUT POWER:	29.63	dBm =	0.919	W
MODULATION SIGNAL:	GPRS (GMSK)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	42.63	dBc	

Level [dBc] i]
4 88.9
9 59.5
3 86.5
0 68.7
9 85.6
9 81.0
3 0 9

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

OPERATING FREQUENCY:	836	6.60	MHz	
CHANNEL:	19			
MEASURED OUTPUT POWER:	29.96	dBm =	0.991	W
MODULATION SIGNAL:	GPRS (GMSK)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	42.96	dBc	

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673.20	Н	100	285	-70.69	6.70	-64.00	94.0
2509.80	Н	100	338	-57.22	7.63	-49.59	79.6

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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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OPERATING FREQUENCY:	848	3.80	MHz
CHANNEL:	25	51	-
MEASURED OUTPUT POWER:	30.90	dBm =	- 1.230 W
MODULATION SIGNAL:	GPRS (GMSK)	•	
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	43.90	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1697.60	Н	296	0	-68.65	6.70	-61.96	92.9
2546.40	Н	100	214	-64.18	7.60	-56.59	87.5

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

OPERATING FREQUENCY:	826	MHz	
CHANNEL:	41	_	
MEASURED OUTPUT POWER:	16.66	dBm =	0.046 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	29.66	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1652.80	Н	128	71	-68.43	6.70	-61.74	78.4
2479.20	Н	-	-	-72.13	7.54	-64.60	81.3
3305.60	Н	-	-	-69.52	7.38	-62.14	78.8

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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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OPERATING FREQUENCY:	836	6.60	MHz	
CHANNEL:	41			
MEASURED OUTPUT POWER:	17.32	dBm =	0.054	W
MODULATION SIGNAL:	WCDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	30.32	dBc	

Frequ [MH	-	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBd]	Spurious Emission Level [dBm]	[dBc]
1673	3.20	Н	122	74	-63.14	6.70	-56.45	73.8
2509	9.80	Н	-	-	-72.65	7.63	-65.02	82.3
3346	5.40	Н	-	-	-69.52	7.52	-62.00	79.3

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

OPERATING FREQUENCY:	846	5.60	MHz	
CHANNEL:	42			
MEASURED OUTPUT POWER:	17.92	dBm =	0.062	W
MODULATION SIGNAL:	WCDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	30.92	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	119	77	-64.28	6.70	-57.58	75.5
2539.80	Н	-	-	-72.51	7.60	-64.91	82.8
3386.40	Н	-	-	-69.39	7.65	-61.75	79.7

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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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OPERATING FREQUENCY:	171	1712.40		
CHANNEL:	13			
MEASURED OUTPUT POWER:	24.72	dBm =	0.297 W	
MODULATION SIGNAL:	WCDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	37.72	dBc	

Frequenc [MHz]	y Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3424.80	Н	-	-	-68.37	9.87	-58.50	83.2
5137.20	н	-	-	-65.78	10.76	-55.02	79.7
6849.60	Н	-	-	-60.98	11.67	-49.31	74.0

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

OPERATING FREQUENCY:	173	MHz	
CHANNEL:	14		
MEASURED OUTPUT POWER:	25.71	dBm =	0.373 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	38.71	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]
3465.20	Н	-	-	-67.94	9.91	-58.02	83.7
5197.80	Н	-	-	-66.22	10.75	-55.47	81.2
6930.40	Н	-	-	-60.77	11.76	-49.01	74.7

Table 7-14. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1412)

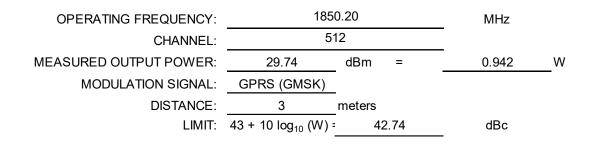
FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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OPERATING FREQUENCY:	175	MHz		
CHANNEL:	15	13		
MEASURED OUTPUT POWER:	24.44	dBm =	0.278 W	
MODULATION SIGNAL:	WCDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	37.44	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]
3505.20	Н	-	-	-68.98	9.95	-59.03	83.5
5257.80	Н	-	-	-66.42	10.71	-55.71	80.2
7010.40	Н	-	-	-60.78	11.83	-48.95	73.4

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	110	183	-55.97	9.53	-46.44	76.2
5550.60	Н	154	146	-47.31	11.01	-36.31	66.0
7400.80	Н	-	-	-47.74	10.94	-36.80	66.5
9251.00	Н	116	251	-46.66	11.52	-35.14	64.9
11101.20	Н	-	-	-47.01	12.81	-34.20	63.9
12951.40	Н	-	-	-45.74	13.37	-32.37	62.1

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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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OPERATING FREQUENCY:	1880.00		MHz	
CHANNEL:	661	-		
MEASURED OUTPUT POWER:	29.01 dB	m =	0.797	W
MODULATION SIGNAL:	GPRS (GMSK)			-
DISTANCE:	3 mete	ers		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	42.01	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	110	171	-55.66	9.39	-46.28	75.3
5640.00	Н	159	256	-49.38	11.22	-38.16	67.2
7520.00	Н	-	-	-48.11	11.10	-37.01	66.0
9400.00	Н	110	270	-45.27	11.54	-33.73	62.7
11280.00	Н	-	-	-46.57	12.76	-33.80	62.8
13160.00	Н	-	-	-45.10	13.05	-32.05	61.1
		Table 7 17	Dadiated	Sourious Data (P	CS CDPS Mode	Ch 661)	

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

OPERATING FREQUENCY:	190	9.80	MHz	
CHANNEL:	8	10		
MEASURED OUTPUT POWER:	27.71	dBm =	0.590	N
MODULATION SIGNAL:	GPRS (GMSK)			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	40.71	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]
3819.60	Н	180	195	-55.87	9.32	-46.55	74.3
5729.40	Н	161	278	-50.00	11.37	-38.63	66.3
7639.20	Н	-	-	-48.72	11.33	-37.38	65.1
9549.00	Н	116	65	-44.03	11.78	-32.26	60.0
11458.80	Н	-	-	-46.38	12.69	-33.69	61.4
13368.60	Н	-	-	-43.62	12.64	-30.98	58.7

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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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OPERATING FREQUENCY:	185	2.40	MHz
CHANNEL:	92		
MEASURED OUTPUT POWER:	25.13	dBm =	0.326 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	38.13	dBc

Frequency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
3704.80	Н	115	295	-55.95	8.42	-47.53	72.7
5557.20	Н	-	-	-65.20	10.52	-54.68	79.8
7409.60	Н	-	-	-60.32	12.01	-48.31	73.4

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

OPERATING FREQUENCY:	188	MHz	
CHANNEL:	94		
MEASURED OUTPUT POWER:	24.82	dBm =	0.304 W
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	43 + 10 log <sub>10</sub> (W) =	37.82	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	124	293	-56.68	8.64	-48.04	72.9
5640.00	Н	-	-	-64.94	10.62	-54.32	79.1
7520.00	Н	-	-	-60.65	12.04	-48.60	73.4

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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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OPERATING FREQUENCY:	190	MHz		
CHANNEL:	95	•		
MEASURED OUTPUT POWER:	23.24	dBm =	0.211	W
MODULATION SIGNAL:	WCDMA			
DISTANCE:	3	meters		
LIMIT:	43 + 10 log <sub>10</sub> (W) =	36.24	dBc	

F	requency [MHz]	Ant. Pol. [H/V]	Height	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	[dBc]
	3815.20	Н	109	308	-57.17	8.77	-48.39	71.6
	5722.80	Н	-	-	-64.44	10.71	-53.73	77.0
	7630.40	Н	-	-	-60.34	12.17	-48.17	71.4

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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT OB LG (CERTIFICATION)	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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## Frequency Stability / Temperature Variation §2.1055 §22.355

OPERATING FREQUENCY: 836,600,000 Hz

CHANNEL:

190

VDC

3.85 REFERENCE VOLTAGE:

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,600,212	212	0.0000253
100 %		- 30	836,599,956	-44	-0.0000053
100 %		- 20	836,599,622	-378	-0.0000452
100 %		- 10	836,599,935	-65	-0.0000078
100 %		0	836,599,662	-338	-0.0000404
100 %		+ 10	836,600,008	8	0.0000010
100 %		+ 20	836,600,254	254	0.0000304
100 %		+ 30	836,599,734	-266	-0.0000318
100 %		+ 40	836,599,711	-289	-0.0000345
100 %		+ 50	836,600,005	5	0.0000006
BATT. ENDPOINT	3.45	+ 20	836,599,842	-158	-0.0000189

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

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### Frequency Stability / Temperature Variation §2.1055 §22.355

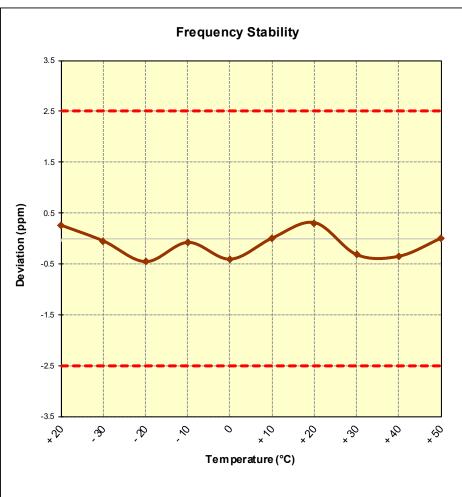


Figure 7-8. Frequency Stability Graph (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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#### Frequency Stability / Temperature Variation §2.1055 §22.355

OPERATING FREQUENCY: 836,600,000 Hz CHANNEL: 4183 REFERENCE VOLTAGE: VDC 3.85

DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	836,599,552	-448	-0.0000536
100 %		- 30	836,599,963	-37	-0.0000044
100 %		- 20	836,600,051	51	0.0000061
100 %		- 10	836,599,954	-46	-0.0000055
100 %		0	836,600,117	117	0.0000140
100 %		+ 10	836,600,108	108	0.0000129
100 %		+ 20	836,600,131	131	0.0000157
100 %		+ 30	836,599,743	-257	-0.0000307
100 %		+ 40	836,600,296	296	0.0000354
100 %		+ 50	836,599,842	-158	-0.0000189
BATT. ENDPOINT	3.45	+ 20	836,600,018	18	0.0000022

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

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT 🚯 LG (CERTIFICATION)	<b>Reviewed by:</b> Quality Manager
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# Frequency Stability / Temperature Variation

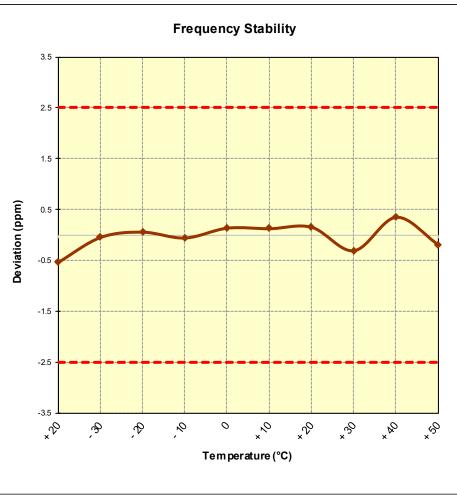


Figure 7-9. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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# Frequency Stability / Temperature Variation

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)	1,732,599,799	-201	-0.0000116
100 %		- 30	1,732,600,034	34	0.0000020
100 %		- 20	1,732,600,208	208	0.0000120
100 %		- 10	1,732,599,928	-72	-0.0000042
100 %		0	1,732,599,958	-42	-0.0000024
100 %		+ 10	1,732,600,055	55	0.0000032
100 %		+ 20	1,732,600,279	279	0.0000161
100 %		+ 30	1,732,599,801	-199	-0.0000115
100 %		+ 40	1,732,599,864	-136	-0.0000078
100 %		+ 50	1,732,599,768	-232	-0.0000134
BATT. ENDPOINT	3.45	+ 20	1,732,599,985	-15	-0.000009

 Table 7-24. Frequency Stability Data (AWS WCDMA Mode – Ch. 1412)

#### 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: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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## Frequency Stability / Temperature Variation §2.1055 §27.54

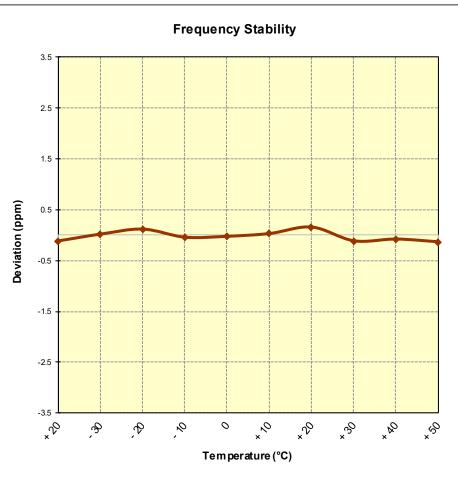


Figure 7-10. Frequency Stability Graph (AWS WCDMA Mode – Ch. 1412)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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### Frequency Stability / Temperature Variation §2.1055 §24.235

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)	1,879,999,962	-38	-0.0000020
100 %		- 30	1,880,000,219	219	0.0000116
100 %		- 20	1,880,000,058	58	0.0000031
100 %		- 10	1,880,000,144	144	0.0000077
100 %		0	1,880,000,146	146	0.0000078
100 %		+ 10	1,880,000,256	256	0.0000136
100 %		+ 20	1,880,000,121	121	0.0000064
100 %		+ 30	1,879,999,796	-204	-0.0000109
100 %		+ 40	1,879,999,974	-26	-0.0000014
100 %		+ 50	1,880,000,095	95	0.0000051
BATT. ENDPOINT	3.45	+ 20	1,879,999,959	-41	-0.0000022

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: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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#### Frequency Stability / Temperature Variation §2.1055 §24.235

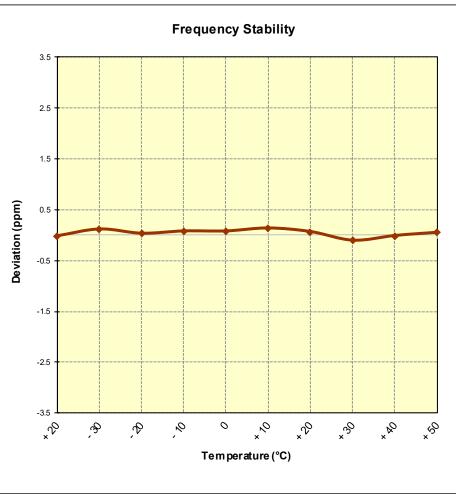


Figure 7-11. Frequency Stability Graph (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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# Frequency Stability / Temperature Variation

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)	1,879,999,783	-217	-0.0000115
100 %		- 30	1,879,999,717	-283	-0.0000151
100 %		- 20	1,880,000,072	72	0.0000038
100 %		- 10	1,879,999,862	-138	-0.0000073
100 %		0	1,879,999,709	-291	-0.0000155
100 %		+ 10	1,880,000,087	87	0.0000046
100 %		+ 20	1,879,999,887	-113	-0.0000060
100 %		+ 30	1,880,000,455	455	0.0000242
100 %		+ 40	1,879,999,934	-66	-0.0000035
100 %		+ 50	1,879,999,879	-121	-0.0000064
BATT. ENDPOINT	3.45	+ 20	1,880,000,210	210	0.0000112

 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: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> Quality Manager
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## Frequency Stability / Temperature Variation §2.1055 §24.235

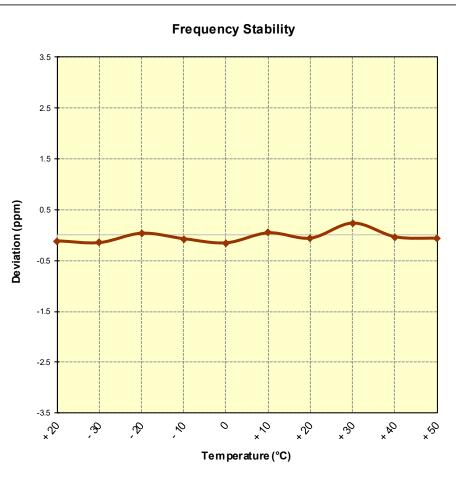


Figure 7-12. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT	<b>Reviewed by:</b> 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: ZNFM150 complies with all the requirements of Parts 22, 24, & 27 of the FCC rules.

FCC ID: ZNFM150		FCC Pt. 22, 24, & 27 GSM / GPRS / EDGE / WCDMA MEASUREMENT REPORT 🚯 LG (CERTIFICATION)	<b>Reviewed by:</b> Quality Manager	
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