

PCTEST ENGINEERING LABORATORY, INC.

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## MEASUREMENT REPORT GSM / GPRS / EDGE / CDMA / WCDMA

#### **Applicant Name:**

LG Electronics USA, Inc. 1000 Sylvan Avenue Englewood Cliffs, NJ 07632 United States

## Date of Testing: 6/11 – 7/9/2019 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1906100096-04-R1.ZNF

## FCC ID:

#### ZNFX320TA

**APPLICANT:** 

## LG Electronics USA, Inc.

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification LM-X320TA LMX320TA, X320TA, LM-X320MA, LMX320MA, X320MA Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 22, 24, & 27 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

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.

This revised Test Report (S/N: 1M1906100096-04-R1.ZNF) supersedes and replaces the previously issued test report (S/N: 1M1906100096-04.ZNF) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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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			Ef	RP	EI	RP	
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)	Emission Designator
GPRS850	22H	824.2 - 848.8	0.855	29.32	1.402	31.47	247KGXW
EDGE850	22H	824.2 - 848.8	0.181	22.58	0.297	24.73	245KG7W
CDMA850	22H	824.70 - 848.31	0.115	20.60	0.188	22.75	1M28F9W
WCDMA850	22H	826.4 - 846.6	0.121	20.81	0.198	22.96	4M16F9W
WCDMA1700	27	1712.4 - 1752.6			0.325	25.12	4M16F9W
GPRS1900	24E	1850.2 - 1909.8			1.168	30.67	249KGXW
EDGE1900	24E	1850.2 - 1909.8			0.309	24.89	246KG7W
CDMA1900	24E	1851.25 - 1908.75			0.305	24.84	1M27F9W
WCDMA1900	24E	1852.4 - 1907.6			0.282	24.50	4M15F9W

**EUT Overview** 

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## **1.0 INTRODUCTION**

## 1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) 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 Innovation, Science and Economic Development Canada.

## 1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

#### **1.3** Test Facility / Accreditations Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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# 2.0 PRODUCT INFORMATION

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFX320TA**. The test data contained in this report pertains only to the emissions due to the EUT's 2G/3G licensed transmitters.

Test Device Serial No.: 85162, 85519, 85212, 85162

## 2.2 Device Capabilities

This device contains the following capabilities:

800/850/1900 CDMA (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multiband LTE, 802.11b/g/n WLAN, 802.11a/n UNII, Bluetooth (1x, EDR, LE)

## 2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03r01. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

## 2.4 EMI Suppression Device(s)/Modifications

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

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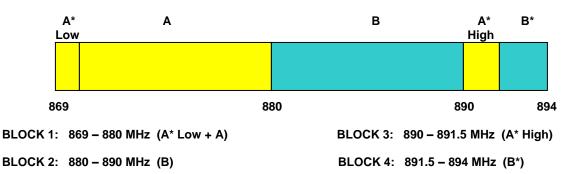
# 3.0 DESCRIPTION OF TESTS

## 3.1 Evaluation Procedure

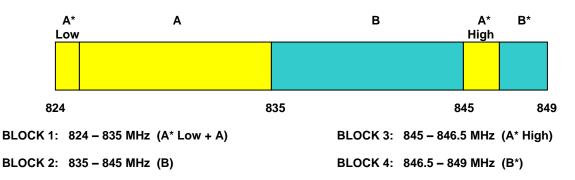
The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

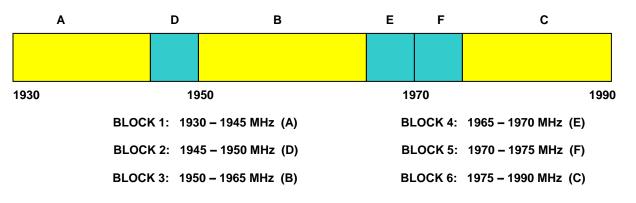
## 3.2 Cellular - Base Frequency Blocks



## 3.3 Cellular - Mobile Frequency Blocks



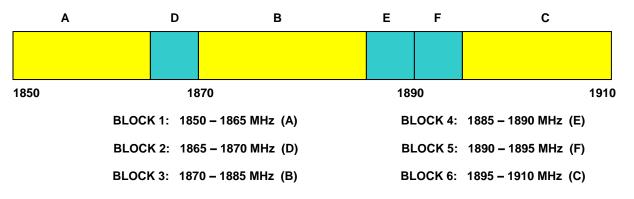
## 3.4 PCS - Base Frequency Blocks



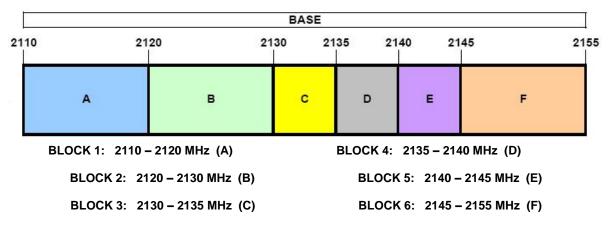
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## 3.5 PCS - Mobile Frequency Blocks



#### 3.6 AWS - Base Frequency Blocks



## 3.7 AWS - Mobile Frequency Blocks

			MOBILE				
710	17	20 1'	730 17 	735 17	40 17	745 	1755
	A	В	с	D	E	F	
	BLOCK 1: 17	10 – 1720 MHz (A)		BLOCK	4: 1735 –	1740 MHz (D)	
	BLOCK 2: 17	OCK 2: 1720 – 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

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. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

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-E-2016, 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].

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 474788 D01.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/TIA-603-E-2016.

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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 uncertainty shown below meets or exceeds the  $U_{CISPR}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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# 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx3	LIcensed Transmitter Cable Set	8/23/2018	Annual	8/23/2019	LTx3
Agilent	N9030A	PXA Signal Analyzer (44GHz)	6/12/2019	Annual	6/12/2020	MY52350166
Agilent	N9020A	MXA Signal Analyzer	4/20/2019	Annual	4/20/2020	US46470561
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/9/2018	Biennial	8/9/2020	135427
Espec	ESX-2CA	Environmental Chamber	6/13/2019	Annual	6/13/2020	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
Mini Circuits	TVA-11-422	RF Power Amp		N/A	QA1317001	
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/19/2019	4/19/2019 Annual 4/19/202		11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	TC-TA18	Vivaldi Antenna	8/17/2018	Biennial	8/17/2020	101072
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	9/19/2018	Annual	9/19/2019	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	6/5/2019	Annual	6/5/2020	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	8/9/2018	Annual	8/9/2019	100348
Rohde & Schwarz	CMW500	Radio Communication Tester	11/14/2018	Annual	11/14/2019	100976
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/18/2018	Annual	6/18/2019	102134
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107

Table 5-1. Test Equipment

#### Notes:

- 1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- 2. 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)

## **CDMA Emission Designator**

#### Emission Designator = 1M25F9W

CDMA BW = 1.25 MHz F = Frequency Modulation 9 = Composite 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 USA, Inc.
FCC ID:	ZNFX320TA
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>GSM / GPRS / EDGE / CDMA / WCDMA</u>

FCC Part Section(s)	RSS Section(s)	Test Description	cription Test Limit		Test Result	Reference
2.1049	RSS-Gen (4.6.1) RSS-133(2.3) RSS-139(2.3)	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1051 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)	Conducted Band Edge / Spurious Emissions	> 43 + 10 $\log_{10}$ (P[Watts]) at Band Edge and for all out-of- band emissions		PASS	Sections 7.3, 7.4
24.232(d) 27.50(d)(5)	RSS-132(5.4) RSS-133(6.4) RSS-139(6.5)	Peak-Average Ratio	Peak-Average Ratio < 13 dB		PASS	Section 7.5
2.1046	RSS-132(5.4) RSS-133(4.1) RSS-139(4.1)	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
2.1055 22.355 24.235 27.54	RSS-132(5.3) RSS-133(6.3) RSS-139(6.4)	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24, 27)		PASS	Section 7.8
22.913(a)(5)	RSS-132(5.4)	Effective Radiated Power	< 7 Watts max. ERP		PASS	Section 7.6
24.232(c)	RSS-133(6.4)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 7.6
27.50(d)(4)	RSS-139(6.5)	Equivalent Isotropic Radiated Power	< 1 Watts max. EIRP	RADIATED	PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)	Radiated Spurious Emissions	> 43 + 10 log <sub>10</sub> (P[Watts]) for all out-of-band emissions		PASS	Section 7.7

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

#### Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 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 3.9.

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## 7.2 Occupied Bandwidth

#### **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 v03r01 - Section 4.2

#### **Test Settings**

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

#### Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

#### Test Notes

None.

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Keysight Spectrum Analyzer - Occupied BW					- ē 💌
XIRL RF 50Ω AC	CORREC	SENSE:INT er Freg: 836.600000 MHz	02:38:33 P Radio Std	MJun 18, 2019 : None	Trace/Detector
	Trig:		d: 100/100 Radio Dev		
	#FGain:Low #Atte	n: 32 dB	Radio Dev	lice: BTS	
15 dB/div Ref 40.00 dBm			1		
25.0		mmmm			
10.0	~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	home		Clear Writ
5.00			- The second		
20.0			- min	m	
35.0				~~~	Averag
-50.0					
-65.0					
-80.0					Max Hol
-95.0					Wax noi
Center 836.6 MHz Res BW 6.2 kHz		#VBW 18 kHz		n 625 kHz ) 15.6 ms	
	*		Sweep	15.01115	Min Hol
Occupied Bandwidth		Total Power	39.9 dBm		
	7.03 kHz				Detecto
					Peak
Transmit Freq Error	75 Hz	% of OBW Pow	ver 99.00 %		Auto <u>Ma</u>
x dB Bandwidth	313.6 kHz	x dB	-26.00 dB		
ISG			STATUS		

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



Plot 7-2. Occupied Bandwidth Plot (EDGE850 GPRS Mode)

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



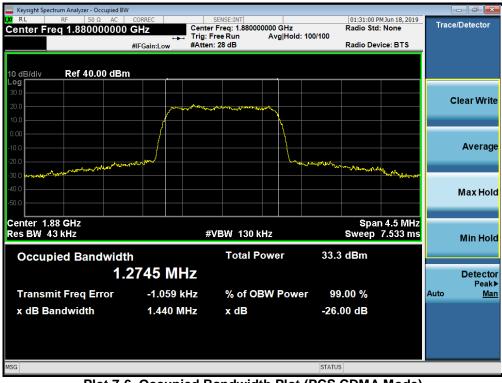
Plot 7-4. Occupied Bandwidth Plot (EDGE1900 Mode)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 15 of 100
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Plot 7-5. Occupied Bandwidth Plot (Cellular CDMA Mode)



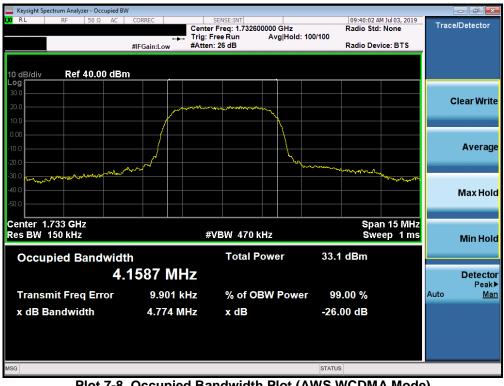
Plot 7-6. Occupied Bandwidth Plot (PCS CDMA Mode)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 16 of 100
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Plot 7-7. Occupied Bandwidth Plot (Cellular WCDMA Mode)



Plot 7-8. Occupied Bandwidth Plot (AWS WCDMA Mode)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 17 of 100	
1M1906100096-04-R1.ZNF	6/11 – 7/9/2019	Portable Handset		Page 17 of 109	
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🔤 Keysight Spectrum Analyze									-	
IXI RL RF	50 Ω AC	CORREC	С	SENSE:INT enter Freg: 1.8800	000000 GHz		02:10:41 PM Jun : adio Std: Nor		Trace/	Detector
			ter T	rig: Free Run Atten: 28 dB	Avg Hold:	100/100	adio Device: E			
		#IFGain:Lo	w #/	Riten. 20 dB		K	auto Device.	513		
a inti Difi										
10 dB/div Ref	40.00 dB	m								
30.0									~	ear Writ
20.0				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					CI	earwrite
10.0			$\leftarrow$							
0.00										
-10.0										Average
-20.0		man					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
-30.0							- Second	~~~~		
-40.0									I	Max Hole
-50.0										
Center 1.88 GHz							Span 15	5 MHz		
Res BW 150 kHz				#VBW 470	kHz		Sweep			Min Hol
		41-		Total	Power	33.9 d	Pm			
Occupied Ba					FOWEI	55.9 u	BIII			
	4	.1472	MHz							Detecto
Transmit Freq	Error	2.9	32 kHz	% of C	BW Powe	r 99.00	0 %		Auto	Ma
x dB Bandwid		17	56 MHz			-26.00	dB			
		4.7	- MII 12	X UD		-20.00				
ISG						STATUS			_	_

Plot 7-9. Occupied Bandwidth Plot (PCS WCDMA Mode)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 19 of 100	
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## 7.3 Spurious and Harmonic Emissions at Antenna Terminal

#### **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 $43 + 10\log_{10}(P_{[Watts]})$ , where P is the transmitter power in Watts.

#### **Test Procedure Used**

KDB 971168 D01 v03r01 - 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

Per 24.238(b), 27.53(h)(3), and RSS-133(6.5), RSS-139(6.5), compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1MHz, and 100 kHz or greater for Part 22 and RSS-132 measurements below 1GHz. 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.

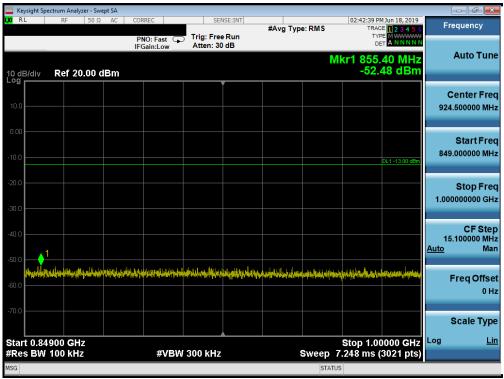
FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dege 10 of 100	
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## **Cellular GPRS Mode**

🔤 Keysight Sp	ectrum Analyzer	- Swept SA									d ×
L <mark>XI</mark> RL	RF 5	0Ω AC	CORREC	Tria	SENSE:INT	#Avg Typ	e: RMS	TRA	M Jun 18, 2019 CE 1 2 3 4 5 6 PE M WWWWW	Freque	ncy
10 dB/div	Ref 20.0	0 dBm	IFGain:Lo		n: 30 dB			Mkr1 822	.65 MHz 33 dBm	Auto	o Tune
10.0										Cente 426.5000	er Freq 00 MHz
-10.0									DL1 -13.00 dBm	Sta 30.0000	rt Freq 00 MHz
-20.0										Sto 823.0000	p Frec 00 MHz
-40.0									1,	C 79.3000 <u>Auto</u>	FStep 00 MHz Mar
a final distants	Mithersteinen (Mithersteinen) Herrege intellisierten er	landal bayan da ana ana ana ana ana ana ana ana an	linger gestreter ver bij biget p ondere af stie, die de weten die a	n (pangang keng bergan di berga) Keng adara keng parta antika keng	na produkti na Na produkti na p	na distance and the state of th	handar an teallact reachd an tha ar	i pan <mark>d</mark> Aliya (pering) dan sasa Manangkara (pering) dan sasa	antifeliatara di para 1 aliana di Patrimenta di A	Freq	Offset 0 Hz
-70.0								Stop	23.0 MHz		e Type Lir
#Res BW			#	VBW 300 I	kHz	s	weep	38.06 ms (1	20.0 10112		
MSG							STA	TUS			

Plot 7-10. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)

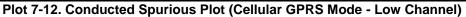


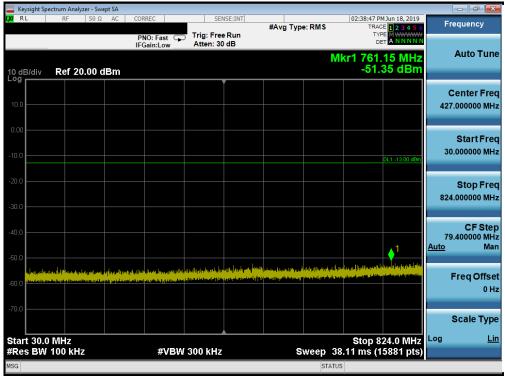
#### Plot 7-11. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 20 of 100	
1M1906100096-04-R1.ZNF	6/11 – 7/9/2019	Portable Handset		Page 20 of 109	
© 2010 DOTECT Engineering Labor	Hami laa			1/ 0 0 00/01/2010	



Keysight Spectrum Anal	yzer - Swept SA						
LXIRL RF		DRREC	SENSE:INT	#Avg Type: RM	02:43:02 PM Ju IS TRACE TYPE	IN 18, 2019 1 2 3 4 5 6 MWWWWW A N N N N N	Frequency
10 dB/div Ref 1	ا 0.00 dBm	FGain:Low	#Atten: 30 dB		Mkr1 1.648		Auto Tune
0.00						5.	Center Freq 500000000 GHz
-10.0					DL:	1 -13.00 dBm	Start Freq 000000000 GHz
-30.0	and the second			and a state of the	dal fallera y Alana, yara she ya ng Mayya ka kayan Ala fallara yara she yara she ya na kayana she ya ya ka ya sh	Internet Martinet	Stop Freq 000000000 GHz
-50.0						9 Auto	CF Step 00.000000 MHz 0 Man
-70.0							Freq Offset 0 Hz
Start 1.000 GHz #Res BW 1.0 MH	7	#VBW :	3.0 MHz	Swee	Stop 10.0 p 15.60 ms (180	00 GHz	Scale Type <u>Lin</u>
MSG	1 <b>2</b>	#VE9V \			STATUS	лот раз)	





Plot 7-13. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Dama 04 af 400	
1M1906100096-04-R1.ZNF	6/11 – 7/9/2019			Page 21 of 109	
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019				



	pectrum Ana	alyzer - Swe	ept SA									×
LXU RL	RF	50 Ω	AC	CORREC		NSE:INT	#Avg Typ	e: RMS	TRAC	M Jun 18, 2019 CE 1 2 3 4 5 6	Frequency	
10 dB/div	Ref 2	20.00 d		PNO: Fast G IFGain:Low	Atten: 30			М	kr1 861.	.35 MHz 47 dBm	Auto Tu	ine
10.0											Center Fr 924.500000 M	
-10.0										DL1 -13.00 dBm	Start Fr 849.000000 M	
-20.0											Stop Fr 1.000000000 G	
-40.0	1										CF St 15.100000 M <u>Auto</u> M	
-60.0	nin an the state of the state o	n an	ange fillige	nd a statistic statistic sparati	han an a	an Milalis Advest	nteri ala kantera kantalian Interi ala kantera kantalian	qebulitereted:	Windowski Williamski Williamski Williamski Williamski Williamski Williamski Williamski Williamski Williamski W National State St	adiyyadi salanda ya	Freq Offs 0	set Hz
Start 0.8	4900 G	47							Stop 1.0	0000 GHz	Scale Ty	/pe Lin
#Res BV				#VBV	V 300 kHz			Sweep 7	7.248 ms (	(3021 pts)		
MSG								STATU	s			

Plot 7-14. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)



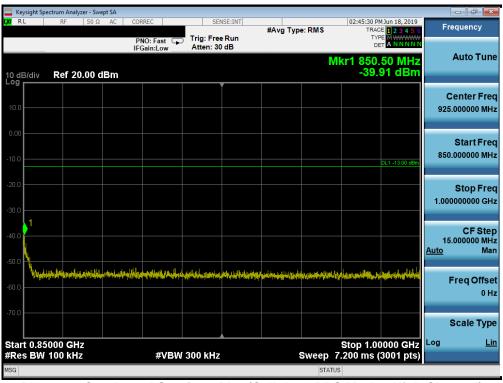
Plot 7-15. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Dama 00 af 400	
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	ectrum Analyzer -	Swept SA									
XI RL	RF 50	Ω AC	CORREC		Trig: Free		#Avg Typ	e:RMS	TRAC	MJun 18, 2019 DE <b>1 2 3 4 5</b> 6 PE MWWWWW ET A N N N N N	Frequency
10 dB/div Log	Ref 20.00	) dBm	IFGain:L	ow	Atten: 30	dB		N	lkr1 607.		Auto Tun
10.0											Center Free 427.000000 MH
-10.0										DL1 -13.00 dBm	Start Free 30.000000 MH
-20.0											Stop Free 824.000000 MH
40.0								<b>▲</b> 1			CF Stej 79.400000 MH <u>Auto</u> Ma
فالعوال بيروا	na sy fastan (generalisen Multiplice) generalise staar mili	appen a had specific loc, as he distanted	in <mark>Depart of the P</mark>	an an Antaria ( <mark>1</mark> 74) An Antaria (1744) An Antaria (1744)	n formalis Second States of the second s	uppelan basala	kirkeys <sup>a</sup> ng þögð þegð hegð he Treft sen skinner sen skinner s	, Topograf (Marian Marian) Topologic (Marian Marian) Topologic (Marian)	en Hadrige (Anna Hadrige) Weiter (Meriden Hadrige) Weiter (Meriden Hadrige)	lignand ang katika katika Alaman ng katika katika Alaman ng katika katika	Freq Offse 0 H
-70.0									Stop 8	24.0 MHz	Scale Type Log <u>Li</u> i
#Res BW	100 kHz		;	¢VBW 3	00 kHz		s	SWEED 3	8.11 ms (1	5881 pts)	

Plot 7-16. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)



Plot 7-17. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Dama 00 at 400	
1M1906100096-04-R1.ZNF	6/11 – 7/9/2019			Page 23 of 109	
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	ectrum Analyzer - S										
RL	RF 50	Ω AC CC	RREC		ISE:INT	#Avg Typ	e: RMS	TRAC	MJun 18, 2019 E 1 2 3 4 5 6	F	requency
		F	NO: Fast 🖵 Gain:Low	Trig: Free #Atten: 3							
0 dB/div	Ref 10.00	dBm					M	kr1 1.69 -32.	7 5 GHz 95 dBm		Auto Tune
											Center Free
).00											0000000 GH
0.0											
.0.0									DL1 -13.00 dBm		Start Free
20.0										1.00	0000000 GH
30.0	<u>1</u>										
	Ň.	alı ara, döldüktetası ile		مأتقادات وزقر وليراج		and you be a series			ostalla-pha-p	10.00	Stop Free
0.0 <mark>"(shotth</mark> e		أودراء والمالا أأعمر وردر	A CONTRACTOR	and the second	متدارك هاشر روز، اورز	<u>اللا يعام (المحمد (ال المحمد (المحمد (المحمد (المحمد (المحمد (المحمد (المحمد (المحمد (لمحمد (لمحمد (المحمد (المحمد (لمحمد (لمحمد (لمحم</u>	in, dii fiather, ja	دىرى يەرىكى قاتىر يې يە	and a star way that you different the start of the start		
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										Auto	Mai
0.0											
'0.0											Freq Offse
											UH
80.0											Scale Type
				,				Oton 40			<u>Li</u> ı
tart 1.00 Res BW	00 GHZ 1.0 MHZ		#VBW	3.0 MHz		s	weep 1	5.60 ms (1	.000 GHz 8001 pts)	-	
5G							STATU				

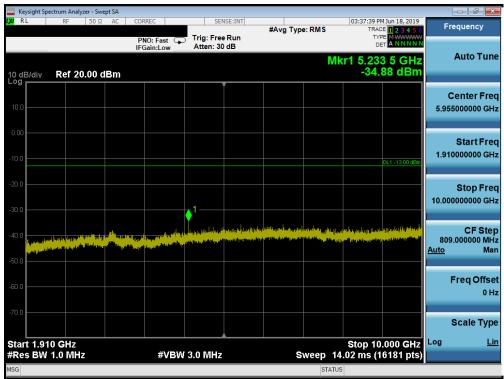
Plot 7-18. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 24 of 100	
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© 2010 DCTEST Engineering Labor	ton/ Inc			V 0 0 02/01/2010	



	ectrum Analyzer - S				 		1		
XI RL	RF 50	F	NO: Fast	<b>_</b>	#Avg Typ	be: RMS	TRACI	Jun 18, 2019 <b>1 2 3 4 5 6</b> MWWWWW A N N N N N	Frequency
0 dB/div	Ref 20.00		Gam.Low			Mk	r1 1.844 -40.1	0 GHz 13 dBm	Auto Tur
10.0									Center Fre 937.500000 Mi
0.00								DL1 -13.00 dBm	Start Fr 30.000000 M
20.0									Stop Fr 1.845000000 G
	Haipelister Billsin prosincels of the	<u>, an </u>	a line open in the		, idiona dela Mener	ullation and and a		1 Anthenin an Anthenia Anthenia an Anthenia	CF St 181.500000 M <u>Auto</u> M
0.0									Freq Offs 0
0.0									Scale Ty
			#VBW	3.0 MHz		Sweep 2.	Stop 1.8 420 ms (3	450 GHz 3631 pts)	Log <u>l</u>
70.0 Start 0.03 #Res BW			#VBW	3.0 MHz		Sweep 2.	Stop 1.8 420 ms (3	450 GHz 3631 pts)	

Plot 7-19. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)

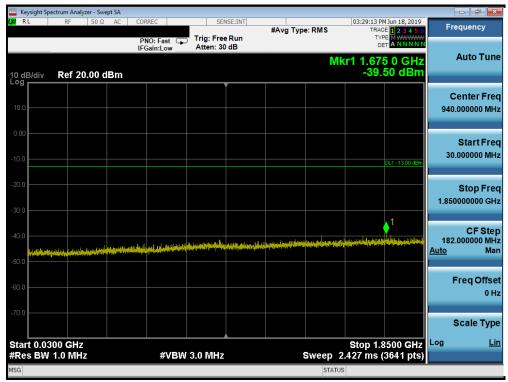


#### Plot 7-20. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 25 of 100
1M1906100096-04-R1.ZNF	6/11 – 7/9/2019	Portable Handset		Page 25 of 109
© 0040 DOTEOT Es sis series Labor	atawa ha a			1/000000000000



🔤 Keysight Spectrum Analyzer - Swept SA			- f -
<b>LXI RL</b> RF 50Ω AC	CORREC SENSE:INT PNO: Fast Trig: Free Run	#Avg Type: RMS	3:38:04 PM Jun 18, 2019 TRACE 1 2 3 4 5 6 TYPE M WWWWWW DET A NNNNN
10 dB/div Ref 10.00 dBm	IFGain:Low Atten: 20 dB	Mkr1 1	17.674 5 GHz -37.09 dBm
0.00			Center Fred 15.00000000 GH
-20.0			011-13.00 dBm Start Free 10.000000000 GH
-30.0	والمراجع المراجع		Stop Free 20.000000000 GH
-50.0			CF Step 1.00000000 GH <u>Auto</u> Mar
-70.0			Freq Offse 0 H
-80.0 Start 10.000 GHz			top 20.000 GHz
#Res BW 1.0 MHz	#VBW 3.0 MHz	Sweep 25.33	ms (20001 pts)



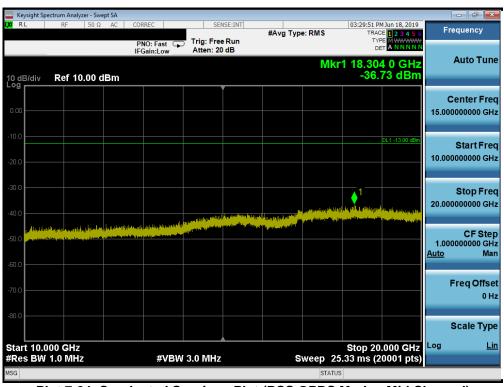
Plot 7-22. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 26 of 100	
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	Spectrum Ana	alyzer - Swe	pt SA									
X/RL	RF	50 Ω	AC	CORREC PNO: Fa	st 🖵	Trig: Free Atten: 30		#Avg Typ	e:RMS	TRA	PM Jun 18, 2019 ACE 1 2 3 4 5 6 YPE M WWWWW DET A N N N N N	Frequency
10 dB/div	Ref 2	20.00 d	Bm	IFGain:Lo	ow	Atten. 30	uв		N	/kr1 6.90	02 0 GHz .50 dBm	Auto Tun
10.0												Center Fre 5.955000000 GH
-10.0											DL1 -13.00 dBm	Start Free 1.910000000 GH
-20.0								1				Stop Free 10.000000000 GH
-40.0				albine on Line production			taga pada ng sila da jai kaong pinang sila si sa si		a siliki ya Juk	and to plant provide A standard for a standard	ala a selata da selat Non constante da selata da selat	CF Stej 809.000000 MH <u>Auto</u> Ma
-60.0												Freq Offse 0 H
-70.0										Oton 4	0.000 GHz	Scale Type
#Res BV				#	VBW	3.0 MHz		s	Sweep	14.02 ms (	0.000 GHz 16181 pts)	
ISG									STA	TUS		

Plot 7-23. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)



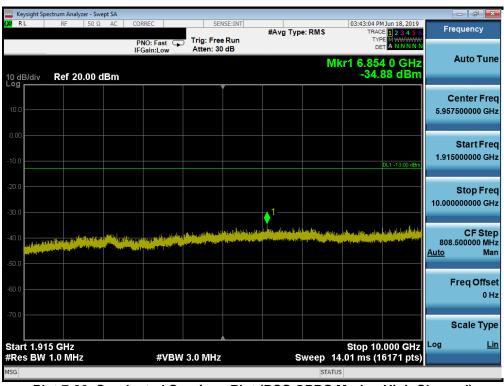
Plot 7-24. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 27 of 100
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	ectrum Analyzer - Swept SA					
K RL	RF 50 Ω AC	PNO: Fast 🗔	SENSE:INT Trig: Free Run Atten: 30 dB	#Avg Type: RMS	03:42:45 PM Jun 18, 2019 TRACE 1 2 3 4 5 6 TYPE M WWWW DET A N N N N N	Frequency
0 dB/div	Ref 20.00 dBm	IFGain:Low	Atten: 30 dB	M	kr1 1.811 5 GHz -40.12 dBm	Auto Tune
10.0						Center Fred 940.000000 MH
10.0					DL1 -13.00 dBm	Start Free 30.000000 MH
20.0						Stop Free 1.850000000 GH
40.0 برانانین	alarate part a throw to find a life of the		1711-1121-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	ada satu dalar Mundula ana kada	an plating and a second s	CF Ste 182.000000 MH <u>Auto</u> Ma
60.0						Freq Offse 0 H
70.0 Start 0.03					Stop 1.8500 GHz	Scale Type
	1.0 MHz	#VBW	3.0 MHz	Sweep 2	2.427 ms (3641 pts)	-
SG				STATU	S	

Plot 7-25. Conducted Spurious Plot (PCS GPRS Mode - High Channel)



Plot 7-26. Conducted Spurious Plot (PCS GPRS Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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	ectrum Analyzer - Sw	ept SA									
RL	RF 50 Ω		O: Fast	SEN		#Avg Typ	e: RMS	TRA	PM Jun 18, 2019 CE 1 2 3 4 5 6 PE M WWWWW	F	requency
0 dB/div	Ref 10.00 c	IFG	ain:Low	Atten: 20			Mk	r1 18.59	8 0 GHz 38 dBm		Auto Tune
.00											Center Free 0000000 GH
0.0									DL1 -13.00 dBm	10.00	Start Free 0000000 GH
0.0				a mada da	INT NOT THE OWNER	T ( a lega ege ( a		1 Artestitiener Dense	a shine ye a barret	20.00	Stop Fre 0000000 GH
	for the part of the second	k <mark>politika (</mark> konstantika) 19. juun – John Miller Million, sensis 19. juun – John Miller Million, sensis	The Freedoment of the state of the		ing te and in the line of a					1.00 <u>Auto</u>	CF Stej 0000000 GH Ma
J.O											Freq Offse 0 H
0.0											Scale Typ
tart 10.0	00 GHz 1.0 MHz		#\/B\/(	3.0 MHz			ween 2	Stop 20	0.000 GHz 20001 pts)	Log	Li

Plot 7-27. Conducted Spurious Plot (PCS GPRS Mode - High Channel)

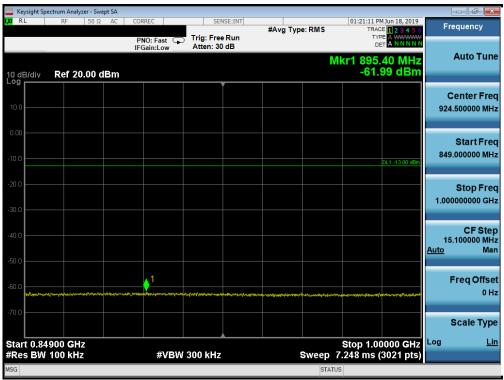
FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 100
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## Cellular CDMA Mode

Keysight Spectrum Analyzer - Swept SA				
RL RF 50 Ω AC	CORREC SENSE:INT PNO: Fast Trig: Free Run IFGain:Low Atten: 30 dB	#Avg Type: RMS	01:21:02 PM Jun 18, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
0 dB/div Ref 20.00 dBm	IPGaill.LOW Attent of up	N	lkr1 822.95 MHz -28.03 dBm	Auto Tun
og 10.0				Center Fre 426.500000 MH
0.00			DL1 -13.00 dBm	Start Fre 30.000000 MH
20.0			<b>1</b> ,	Stop Fre 823.000000 M⊦
10.0				CF Ste 79.300000 MH <u>Auto</u> Ma
	in the second	ng Ang San La Pangana Bara ng San Jang San Jang Pang San Ang San		Freq Offs 0 H
70.0				Scale Typ
tart 30.0 MHz Res BW 100 kHz	#VBW 300 kHz	Sweep 3	Stop 823.0 MHz 8.06 ms (15861 pts)	Log <u>L</u>

Plot 7-28. Conducted Spurious Plot (Cellular CDMA Mode - Low Channel)



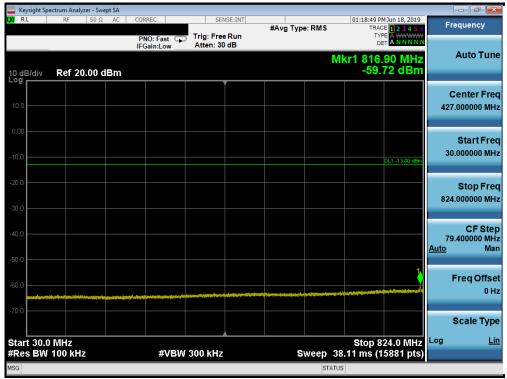
Plot 7-29. Conducted Spurious Plot (Cellular CDMA Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 20 of 100
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Keysight Spectrum Analyzer - Swept SA					
RL RF 50 Ω AC	PNO: Fast	SENSE:INT Trig: Free Run #Atten: 30 dB	#Avg Type: RMS	01:21:33 PM Jun 18, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNNN	Frequency
0 dB/div Ref 10.00 dBm			M	kr1 9.985 0 GHz -43.94 dBm	Auto Tun
0.00					Center Fre 5.500000000 GH
0.0				DL1 -13.00 dBm	Start Fre 1.000000000 GH
0.0				1	Stop Fre 10.000000000 GH
	~~~				CF Ste 900.000000 MH <u>Auto</u> Ma
70.0					Freq Offse 0 H
0.0					Scale Typ
tart 1.000 GHz Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 1	Stop 10.000 GHz 5.60 ms (18001 pts)	Log <u>Li</u>

Plot 7-30. Conducted Spurious Plot (Cellular CDMA Mode - Low Channel)
-----------------------------------------------------------------------



Plot 7-31. Conducted Spurious Plot (Cellular CDMA Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 21 of 100
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	ectrum Analyzer - S										×
XU RL	RF 50	Ω AC	CORREC PNO: Fast IFGain:Low			#Avg Type:	RMS	TRAC	I Jun 18, 2019 E 1 2 3 4 5 6 E A WWWWW T A N N N N N	Frequenc	эy
10 dB/div	Ref 20.00	dBm	IFGall:LOW	Atten. or			М	kr1 880.	80 MHz 14 dBm	Auto	Tune
10.0										Center 924.500000	
-10.00									DL1 -13.00 dBm	Start 849.000000	
30.0										Stop 1.000000000	
-40.0										CF 15.100000 <u>Auto</u>	Step MH: Mar
-60.0	1919-Ballin Jaffigune 11-1-10-1	1	،	Salari Managari ya Jiriyi yina dago (nada	******	story-Mc gyd acharasadau Maani, add	والمجددا الإوسام والمترادة والم	م	49/14-17000-14 <sup>4</sup> 91-144	Freq O	offse 0 Ha
-70.0										Scale '	
	1900 GHz 100 kHz		#VE	3W 300 kHz		St	weep 7	Stop 1.00 .248 ms (	0000 GHz 3021 pts)	Log	Lin
ISG							STATUS				

Plot 7-32. Conducted Spurious Plot (Cellular CDMA Mode - Mid Channel)



Plot 7-33. Conducted Spurious Plot (Cellular CDMA Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dara 20 of 400
1M1906100096-04-R1.ZNF	6/11 – 7/9/2019	6/11 – 7/9/2019 Portable Handset		Page 32 of 109
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	ght Spect	rum Anal	yzer - Swe	pt SA										
LXU RL		RF	50 Ω	AC	CORREC PNO: F IFGain:	ast 🖵	SE Trig: Fre Atten: 3		#Avg Type	e: RMS	TRA	M Jun 18, 2019 DE <b>1 2 3 4 5</b> 6 PE A WWWWW ET A N N N N N	Fre	quency
10 dB/c	div	Ref 2	0.00 d	IBm	IFGain:	LOW	Atten: 3			M	lkr1 814			Auto Tune
10.0														enter Freq 000000 MHz
-10.00												DL1 -13.00 dBm		Start Freq 000000 MHz
-20.0 -														Stop Freq 000000 MHz
-40.0													79.4 <u>Auto</u>	CF Step 400000 MHz Man
-60.0			et (stiphete				ulia en etimol y ta						F	req Offset 0 Hz
-70.0														cale Type
Start : #Res			z			#VBW	300 kHz	2	S	weep 3	8 Stop 8.11 ms (1	24.0 MHz 5881 pts)	Log	<u>Lin</u>
MSG										STATU	IS			

Plot 7-34. Conducted Spurious Plot (Cellular CDMA Mode - High Channel)



Plot 7-35. Conducted Spurious Plot (Cellular CDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 100	
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	ectrum Analy:	zer - Swep	ot SA										
LXU RL	RF	50 Ω	AC	CORREC	ast 🖵	Trig: Free		#Avg Typ	e:RMS	TRA	M Jun 18, 2019 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	Fi	requency
10 dB/div	Ref 10	).00 di	Bm	IFGain:L	ow	#Atten: 3	0 dB		N	/kr1 9.98			Auto Tune
0.00													Center Freq 0000000 GHz
-10.0											DL1 -13.00 dBm	1.00	Start Fred 0000000 GHz
-30.0											1	10.00	Stop Free
-50.0			****	~~	~							900 <u>Auto</u>	CFStep 0.000000 MH Mar
70.0													Freq Offse 0 H
-80.0	0 GHz									Stop 10	.000 GHz		Scale Type <u>Lir</u>
#Res BW	1.0 MHz	2		1	₽VBW	3.0 MHz		s	sta	15.60 ms (1 Tus	8001 pts)		

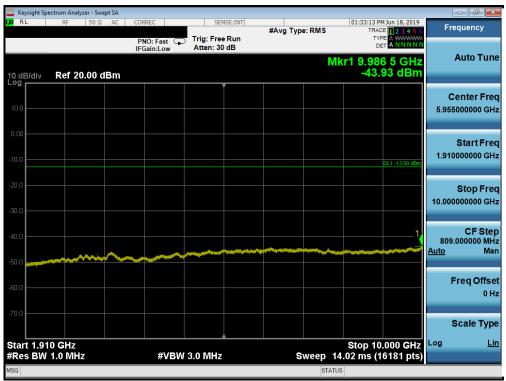
Plot 7-36. Conducted Spurious Plot (Cellular CDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 24 of 100
1M1906100096-04-R1.ZNF	6/11 – 7/9/2019		Page 34 of 109	
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Keysight Spectrum Analyzer - Swept SA				
RL RF 50 Ω AC	CORREC SENSE:INT PNO: Fast Trig: Free Run IEGain: I ow Atten: 30 dB	#Avg Type: RMS	01:32:59 PM Jun 18, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A NNNNN	Frequency
D dB/div Ref 20.00 dBm	IFGain:Low Atten: 30 dB	M	kr1 1.845 0 GHz -44.20 dBm	Auto Tun
10.0				Center Fre 937.500000 M⊦
0.00			DL1 -13.00 dBm	Start Fre 30.000000 MH
0.0				Stop Fre 1.845000000 GH
				CF Ste 181.500000 MI <u>Auto</u> Ma
50.0	n na			Freq Offs 0 I
tart 0.0300 GHz			900 P 110100 0112	Scale Typ Log <u>L</u>
Res BW 1.0 MHz	#VBW 3.0 MHz	Sweep 2	2.420 ms (3631 pts)	

Plot 7-37. Conducted Spurious Plot (PCS CDMA Mode - Low Channel)

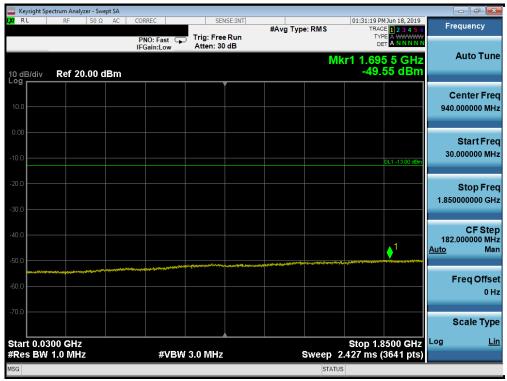


#### Plot 7-38. Conducted Spurious Plot (PCS CDMA Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 100	
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@ 2010 DOTECT Engineering Labore	1/ 0 0 00/01/0010				



Keysight Spectrum Analyzer - Swept SA					- <i>-</i>
RL RF 50 Ω AC	PNO: Fast	SENSE:INT Trig: Free Run Atten: 20 dB	#Avg Type: RMS	01:33:32 PM Jun 18, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWWY DET A N N N N N	Frequency
dB/div Ref 10.00 dBm			Mk	r1 18.307 5 GHz -44.93 dBm	Auto Tun
.00					Center Fre 15.000000000 GH
0.0				DL1 -13.00 dBm	Start Fre 10.000000000 GH
0.0				1	Stop Fre 20.000000000 GH
					CF Ste 1.00000000 GH <u>Auto</u> Ma
0.0					Freq Offse 0 H
0.0					Scale Typ
tart 10.000 GHz Res BW 1.0 MHz	#VBW :	3.0 MHz	Sweep 2	Stop 20.000 GHz 5.33 ms (20001 pts)	Log <u>Li</u>



Plot 7-40. Conducted Spurious Plot (PCS CDMA Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 100	
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🔤 Keysight Sp	ectrum Analyzer - :	Swept SA								x
LXI RL	RF 50	ΩAC	CORREC	<b>.</b>	Run	≇Avg Type: RMS	TRAC	M Jun 18, 2019 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	Frequency	
10 dB/div	Ref 20.00	) dBm	IFGain:Low _	Atten: 30	ab	Μ	kr1 10.00		Auto Tu	ıne
10.0									Center Fi 5.955000000 0	
-10.0								DL1 -13.00 dBm	Start Fi 1.91000000 0	
-20.0									Stop Fr 10.000000000 (	
-40.0								1	CF S1 809.000000 M <u>Auto</u> M	
-60.0									Freq Off 0	iset ) Hz
-70.0 Start 1.91	0 GHz						Stop 10	.000 GHz	Scale Ty Log	ype <u>Lin</u>
#Res BW	1.0 MHz		#VB	W 3.0 MHz			14.02 ms (1	6181 pts)		
MSG						SIA	ATUS			

Plot 7-41. Conducted Spurious Plot (PCS CDMA Mode - Mid Channel)





FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Page 37 of 109	
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	ectrum Analyzer - Swe								
LXU RL	RF 50 Ω	AC	CORREC PNO: Fas		SENSE:INT	#Avg Type: RMS	01:34:53 PM Jun TRACE	n 18, 2019 2 3 4 5 6 WWWWW	Frequency
10 dB/div	Ref 20.00 c	dBm	IFGain:Lo	w At	en: 30 dB		Mkr1 1.663 ( -49.51	5 GHz	Auto Tune
10.0									Center Freq 940.000000 MHz
-10.0							DL1	-13.00 dBm	Start Freq 30.000000 MHz
-20.0									Stop Freq 1.85000000 GHz
-40.0							<b>1</b>	<u> </u>	CFStep 182.000000 MHz Auto Man
-60.0	الان المراجع ا المراجع المراجع	a de grant op i alle Pipe		particular second s					Freq Offset 0 Hz
-70.0 Start 0.03	00 GHz						Stop 1.850	00 GHz	Scale Type .og <u>Lin</u>
#Res BW			#	VBW 3.0	MHz		p 2.427 ms (36	41 pts)	

Plot 7-43. Conducted Spurious Plot (PCS CDMA Mode - High Channel)



Plot 7-44. Conducted Spurious Plot (PCS CDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:			Page 38 of 109	
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PNO: Fast PNO: Fast Trig: Free Run Atten: 20 dB PNO: Fast Atten: 20 dB Mkr1 18.303 0 GHZ -44.89 dBm Center Free 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00		ectrum Analyz										-	
Inclusion       Mkr1 18.303 0 GHz -44.89 dBm       Auto Tune         0 dB/div       Ref 10.00 dBm       Center Free 15.00000000 GHz       Center Free 15.00000000 GHz         0 d       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz         0 d       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz         0 d       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz         0 d       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz         0 d       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz         0 d       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz         0 d       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz         0 d       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz       Image: Start Free 10.00000000 GHz         0 d       Image: Start Free 10.00000000 GHz       Image: Start Free 10.0000000 GHz       Image: Start Free 10.00000000 GHz         0 d       Image: Start Free 10.00000000 GHz       Image: Start	XI RL	RF	50 Ω	PNO: Fa	st 🖵	Trig: Fre	e Run	#Avg Typ	e:RMS	Т	RACE 1 2 3 4 5 6	Freq	luency
0.00       Image: Center Free         0.00       Image: Center Free         100       Image: Center Free         000       Image: Center Free         <	10 dB/div	Ref 10	.00 dB	IFGain:Lo	DW	Atten: 2	Jab		Μ	kr1 18.3	03 0 GHz	A	uto Tune
200       Image: Constraint of the second seco													
40 0 50 0 50 0 70 0 70 0 50 0 50 0 70 0 50 0 50 0 70 0 50 0 70 0 50 0 50 0 70 0 50 0	-10.0										DL1 -13.00 dBm		
2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       20000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000       2000	-30.0									1-			
70.0 80.0 Start 10.000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 25.33 ms (20001 pts)	-50.0					and the second se							00000 GH
Start 10.000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 25.33 ms (20001 pts)	70.0											Fr	
Res BW 1.0 MHz #VBW 3.0 MHz Sweep 25.33 ms (20001 pts)										Stop	20.000 GHz		
		1.0 MHz	4	#	VBW	3.0 MHz				25.33 ms	(20001 pts)		

Plot 7-45. Conducted Spurious Plot (PCS CDMA Mode - High Channel)

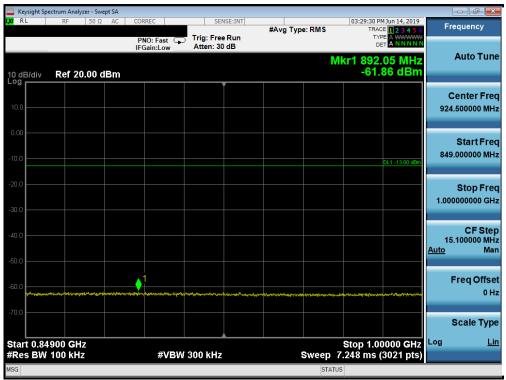
FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🚺 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 39 of 109	
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## Cellular WCDMA Mode

Keysight Spectrum Analyzer - Swept SA				• <b>•</b>
RL RF 50 Ω AC	CORREC SENSE:INT PNO: Fast Free Run IFGain:Low Atten: 30 dB	#Avg Type: RMS	03:29:05 PM Jun 14, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
0 dB/div Ref 20.00 dBm	In Guinteow	N	lkr1 822.50 MHz -27.10 dBm	Auto Tun
10.0				Center Free 426.500000 MH
10.0			DL1 -13.00 dBm	Start Fre 30.000000 MH
20.0			1 <u>1</u>	Stop Fre 823.000000 MH
10.0				CF Ste 79.300000 MH <u>Auto</u> Ma
	ng kan ina maanimaan dara aya da gagaa ku kan yaar aya ya gada	na ha kana lang ng pangang pang pang pang pang pang	n de la complete de la complete parte de la complete de la complete de la complete de la complete de la complet	Freq Offse 0 F
70.0				Scale Typ
tart 30.0 MHz Res BW 100 kHz	#VBW 300 kHz	Sweep 3	Stop 823.0 MHz 8.06 ms (15861 pts)	Log <u>Li</u>

Plot 7-46. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

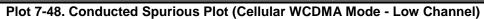


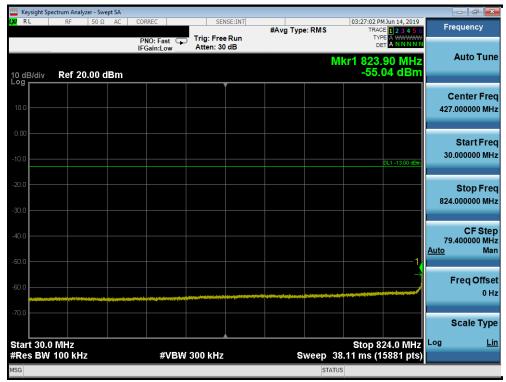
Plot 7-47. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 40 of 109
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🔤 Keysight Spectrum Analyzer - Swept SA				
<b>μα RL</b> RF 50Ω AC	PNO: Fast IFGain: I ow #Atten: 30 dB	#Avg Type: RMS	03:29:57 PM Jun 14, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A NNNNN	Frequency
10 dB/div Ref 10.00 dBm	IFGain:Low #Atten: 30 dB	Mk	r1 9.976 0 GHz -43.84 dBm	Auto Tune
0.00				Center Freq 5.50000000 GHz
-10.0			DL1 -13.00 dBm	Start Freq 1.000000000 GHz
-30.0			1	Stop Freq 10.000000000 GHz
-50.0				CFStep 900.000000 MHz <u>Auto</u> Man
-70.0				Freq Offset 0 Hz
Start 1.000 GHz			Stop 10.000 GHz	Scale Type Log <u>Lin</u>
#Res BW 1.0 MHz	#VBW 3.0 MHz	Sweep 15 STATUS	.60 ms (18001 pts)	



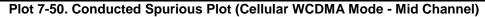


Plot 7-49. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		D 44 (400	
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PNO: Fast PNO: Fast IFGain:Low Trig: Free Run Atten: 30 dB Mkr1 849.00 MHz -56.95 dBm Center Fre 924.50000 MH 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0		ectrum Analyzer	- Swept SA								
Income         Mkr1 849.00 MHz -56.95 dBm         Auto Tun           0 dB/div         Ref 20.00 dBm         Center Fre 924.500000 MH         Start Fre           0 dB/div         Image: Start Star	XI RL	RF 5	50Ω AC		Trig: Free	Run	#Avg Typ	e: RMS	TRAC	E 1 2 3 4 5 6	Frequency
100       Image: Center Free         100       Image: Center Free <td< th=""><th>10 dB/div</th><th>Ref 20.0</th><th>0 dBm</th><th>IFGain:Low</th><th>Atten: 30</th><th>dB</th><th></th><th>Μ</th><th>kr1 849.</th><th>00 MHz</th><th>Auto Tu</th></td<>	10 dB/div	Ref 20.0	0 dBm	IFGain:Low	Atten: 30	dB		Μ	kr1 849.	00 MHz	Auto Tu
Start Fre Start Fre 849.000000 MH Stop Fre 1.00000000 GH CF Ste 1.00000000 GH CF Ste 1.00000000 GH Stop Fre 1.00000000 GH CF Ste 1.00000000 GH Stop Fre 1.00000000 GH Log Li Stop Fre 1.00000000 GH CF Ste 1.00000000 GH CF Ste 1.00000000 GH CF Ste 1.00000000 GH Log Li Stop Fre 1.00000000 GH Stop Fre 1.00000000 GH CF Ste 1.00000000 GH CF Ste 1.0000000 GH CF Ste 1.00000000 GH CF Ste 1.00000000 GH CF Ste 1.00000000 GH CF Ste 1.00000000 GH CF Ste 1.0000000 GH CF Ste 1.0000000 GH CF Ste 1.00000000 GH CF Ste 1.0000000 GH CF Ste 1.000000 GH CF Ste 1.000000 GH CF Ste 1.000000 GH CF Ste 1.000000 GH CF Ste 1.00000 GH CF Ste 1.0000 GH CF Ste 1.00000 GH CF Ste	10.0										
Stop Fre 1.00000000 GH CF Ste 15.10000 MA Freq Offse 0 H Scale Typ Etart 0.84900 GHz Stop 1.00000 GH2	-10.0									DL1 -13:00 dBm	
4000         15.100000 MH           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1           5000         1	-20.0										
5000 FreqOffse 700 Scale Typ Etart 0.84900 GHz Stop 1.00000 GHz	-40.0										15.100000 M
tart 0.84900 GHz Stop 1.00000 GHz	60.0 <b>1</b>	enyegesyddyddyddydd	n	antagang pana pananangang	an de la constante de la const	an a	Yandariyina aslooriyin yalama		ىلىدۇرۇن 10 مەرورۇ يوندا قو <sup>م</sup> يەر	neelystereneityte	
Res BW 100 kHz #VBW 300 kHz Sweep 7.248 ms (3021 pts)	-70.0	900 GHz							Stop 1 00	000 GH7	
SG STATUS				#VB	W 300 kHz				7.248 ms (	3021 pts)	



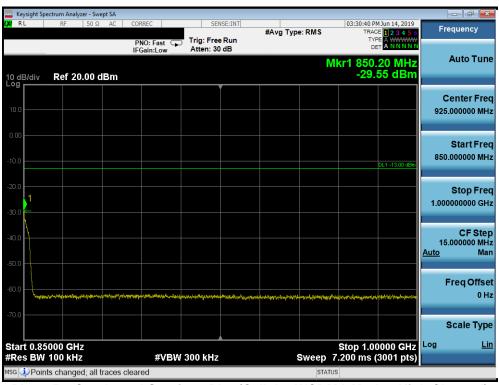


Plot 7-51. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Page 42 of 109	
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🔤 Keysight Sp	pectrum Ana	ilyzer - Swe	pt SA										
LXU RL	RF	50 Ω	AC	CORREC	Fast 😱	Trig: Free		#Avg Typ	e: RMS	TF	PMJun 14, 2019           RACE         1 2 3 4 5 6           TYPE         A WWWWW           DET         A N N N N N	Fr	equency
10 dB/div	Ref 2	20.00 d	Bm	IFGain	Low	Atten: 30	) dB			Mkr1 82	3.80 MHz 9.93 dBm		Auto Tune
10.0													Center Freq 7.000000 MHz
-10.0											DL1 -13.00 dBm	30	Start Freq
-20.0												824	Stop Freq 1.000000 MHz
-40.0												79 <u>Auto</u>	CF Step 0.400000 MHz Mar
-50.0 -60.0									( the second strates b)		1		Freq Offset 0 Hz
-70.0													Scale Type
Start 30.0 #Res BW		IZ			#VBW	300 kHz		s	weep	Stop 38.11 ms	824.0 MHz (15881 pts)	Log	Lin
MSG									STA				



Plot 7-53. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 12 of 100		
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	ctrum Analyzer - Sv									- 6 💌
RL	RF 50 \$	2 AC	PNO: Fast		#Avg Type:	RMS	TRAC	MJun 14, 2019 E <b>1 2 3 4 5</b> 6 E A <del>WWWWW</del> A N N N N N	Fre	equency
3 dB/div	Ref 12.00	dBm				Mk		8 5 GHz 09 dBm		Auto Tun
.00								DL1 -13.00 dBm		enter Fre 000000 GH
4.0										Start Fre
i0.0					 	~~~~		1		Stop Fre
9.0									900. <u>Auto</u>	CF Ste 000000 MH Ma
2.0									F	Freq Offse 0 ⊢
105									S	Scale Typ
tart 1.00 Res BW	0 GHz 1.0 MHz		#VB	W 3.0 MHz	Sw	eep 15	Stop 10 .60 ms (1	.000 GHz 8001 pts)	Log	Li

Plot 7-54. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🚺 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dege 14 of 100	
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# AWS WCDMA Mode

	ectrum Analyzer - Swept SA					- đ <b>-</b>
RL	RF 50 Ω AC	PNO: Fast	SENSE:INT Trig: Free Run Atten: 30 dB	#Avg Type: RMS	09:42:17 AM Jul 03, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWWY DET A N N N N N	Frequency
0 dB/div	Ref 20.00 dBm			М	kr1 1.705 0 GHz -35.27 dBm	Auto Tun
10.0						Center Fre 867.500000 MH
10.0					DL1 -13.00 dBm	Start Fre 30.000000 M⊦
20.0 30.0						<b>Stop Fre</b> 1.705000000 GH
40.0 <b></b>						CF Ste 167.500000 M⊢ <u>Auto</u> Ma
60.0						Freq Offse 0 ⊦
70.0						Scale Typ
tart 0.03 Res BW		#VBW	3.0 MHz	Sweep	Stop 1.7050 GHz 2.233 ms (3351 pts)	Log <u>Li</u>
SG				STATU	JS	

Plot 7-55. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)



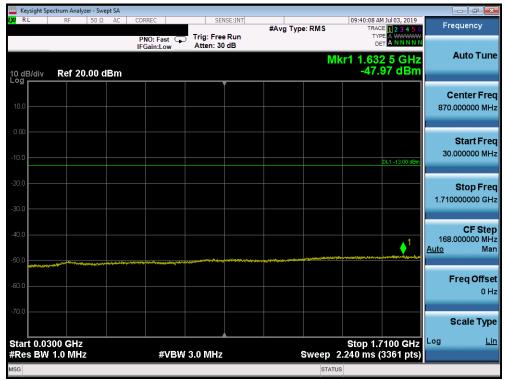
## Plot 7-56. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 45 of 100		
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🦲 Keysight Spectrum Analyzer - Swept S	A				
<b>XI</b> RL RF 50Ω A	C CORREC	SENSE:INT	#Avg Type: RMS	09:42:48 AM Jul 03, 2019 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 20 dB		DET A NNNN	
10 dB/div Ref 10.00 dBr	n		Mk	r1 16.916 0 GHz -45.67 dBm	Auto Tune
					Center Free
0.00					15.00000000 GH:
-10.0				DL1 -13.00 dBm	
-20.0					Start Free 10.000000000 GH
-20.0					
-30.0					Stop Free
-40.0			1		20.00000000 GH
					CF Ste
-50.0					1.000000000 GH Auto Mai
-60.0					
-70.0					Freq Offse
					0 H
-80.0					Scale Type
					Log Lir
Start 10.000 GHz #Res BW 1.0 MHz	#VBW 3	3.0 MHz	Sweep 2	Stop 20.000 GHz 5.33 ms (20001 pts)	
MSG			STATU	IS	

Plot 7-57. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)



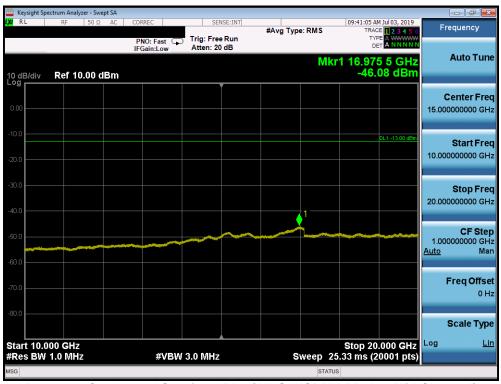
Plot 7-58. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕚 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 46 of 100
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	ectrum Analyze	er - Swept SA									
X/ RL	RF	50 Ω AC	CORRE PNO	:Fast 🗔	Trig: Free		#Avg Typ	e: RMS	TRA	AM Jul 03, 2019 ACE <b>1 2 3 4 5 6</b> APE A WWWWW DET A NNNNN	Frequency
10 dB/div	Ref 20.	.00 dBm	IFGai	in:Low	Atten: 30	) dB		Μ	kr1 3.46	7 0 GHz .09 dBm	Auto Tun
10.0											Center Fre 5.877500000 GH
-10.0										DL1 -13.00 dBm	Start Fre 1.755000000 GH
-20.0											Stop Fre 10.000000000 GH
-40.0		1									CF Ste 824.500000 MH <u>Auto</u> Ma
-60.0											Freq Offse 0 ⊢
-70.0											Scale Typ
Start 1.75 #Res BW				#VBW	3.0 MHz		S	weep 1	Stop 1 4.29 ms (	0.000 GHz 16491 pts)	
MSG								STAT	US		

Plot 7-59. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)



Plot 7-60. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager		
Test Report S/N:	Report S/N: Test Dates: EUT Type:			Dage 47 of 100		
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	ectrum Analyzer										a X
X RL	RF 5	i0 Ω AC	CORREC PNO: Fast		NSE:INT	#Avg Type	RMS	09:43:33 AM TRACI TYP	I Jul 03, 2019 E 1 2 3 4 5 6 E A WWWWW T A N N N N N	Freque	ency
10 dB/div Log	Ref 20.0	0 dBm	IFGain:Low	Atten: 30	) dB		M	(r1 1.646		Aut	o Tune
10.0										Cent 870.000	<b>er Freq</b> 000 MHz
-10.0									DL1 -13.00 dBm		<b>nt Freq</b> 000 MHz
-20.0										<b>Sto</b> 1.710000	o <b>p Freq</b> 000 GHz
-40.0	under the second se	an a far a far far far far a		and a star of the start of the			د <del>ار بند</del> بزیر میکرد.	e e jaar steletet en een een een een een een een een	,	<b>C</b> 168.000 <u>Auto</u>	CF Step 000 MH Mar
-60.0										Frec	<b>Offsel</b> 0 Hz
Start 0.03 #Res BW			#VI	BW 3.0 MHz			weep_2	Stop 1.7 2.240 ms (3		Sca Log	le Type <u>Lin</u>
MSG							STATU				

Plot 7-61. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)



Plot 7-62. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates: EUT Type:			Dogo 49 of 100	
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	ht Spectrum A	nalyzer - Swe	pt SA										
LXI RL	RF	<b>50 Ω</b>	AC	CORREC		SE	NSE:INT	#Avg Typ	e RMS		AM Jul 03, 2019 ACE 1 2 3 4 5 6	Fre	quency
				PNO: Fa IFGain:L	ist 😱 ow	Trig: Fre Atten: 2				1			
10 dB/d Log	liv Ref	10.00 d	Bm						Mk	(r1 16.9 -46	97 5 GHz 3.02 dBm		Auto Tune
0.00							<b>`</b>						e <b>nter Freq</b> 000000 GHz
-10.0											DL1 -13.00 dBm		<b>Start Freq</b> 000000 GHz
-30.0									1				<b>Stop Freq</b> 000000 GHz
-50.0						and the second secon			ñ		nin an	1.000 <u>Auto</u>	<b>CF Step</b> 000000 GHz Man
-70.0												F	req Offset 0 Hz
-80.0												S	cale Type Lin
	10.000 G 3W 1.0 N			#	VBW	3.0 MHz		s	weep 2	Stop 2 25.33 ms	0.000 GHz (20001 pts)	209	<u></u>
MSG									STAT	US			

Plot 7-63. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🚺 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dege 40 of 100	
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	pectrum Analyzer - Swept SA	1				- 6
<mark>0</mark> RL	RF 50 Ω AC	PNO: Fast	SENSE:INT Trig: Free Run Atten: 30 dB	#Avg Type: RMS	02:12:17 PM Jun 18, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNN	Frequency
0 dB/div	Ref 20.00 dBm			M	kr1 1.845 0 GHz -36.70 dBm	Auto Tur
10.0						Center Fre 937.500000 Mi
10.0					DL1 -13.00 dBm	Start Fro 30.000000 M
80.0					1	Stop Fr 1.845000000 G
0.0						CF Sto 181.500000 M <u>Auto</u> M
i0.0 i0.0	unipe en un instru instruminations de la construction	and an angle of the second	ta ga ga ata ang ang ang ang ang ang ang ang ang an			Freq Offs 0
70.0						Scale Ty
	300 GHz 1.0 MHz	#VBW	3.0 MHz	Sweep 2	Stop 1.8450 GHz 2.420 ms (3631 pts)	Log <u>l</u>
ISG				STATU	S	

Plot 7-64. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



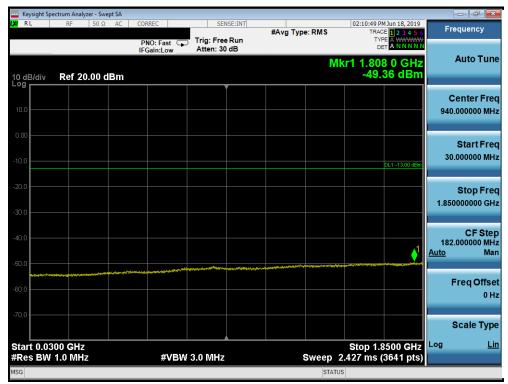
## Plot 7-65. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 50 of 100	
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<b>(X)</b> RL RF 50 Ω AC	PNO: Fast Trig: Free Run	#Avg Type: RMS	02:13:30 PM Jun 18, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
10 dB/div Ref 10.00 dBm	IFGain:Low Atten: 20 dB	Mkr	1 18.287 0 GHz -44.92 dBm	Auto Tune
0.00				Center Freq 15.000000000 GHz
-10.0			DL1 -13.00 dBm	Start Freq 10.000000000 GHz
-30.0			1	Stop Freq 20.000000000 GHz
-50.0				CF Step 1.000000000 GHz <u>Auto</u> Man
-70.0				Freq Offset 0 Hz
-30.0 Start 10.000 GHz			Stop 20.000 GHz	Scale Type Log <u>Lin</u>
#Res BW 1.0 MHz	#VBW 3.0 MHz	Sweep 25	.33 ms (20001 pts)	

Plot 7-66. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



Plot 7-67. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 51 of 100	
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RL									a 💌
KL	RF 50 Ω A	C CORREC PNO: F IFGain:	ast 🕞 Trig: Fr		#Avg Type: RM	S TR/ T	PMJun 18, 2019 ACE 1 2 3 4 5 6 YPE A WWWWW DET A NNNN	Frequen	су
0 dB/div	Ref 20.00 dBr					Mkr1 9.99 -43	6 0 GHz .57 dBm	Auto	Tun
0.0								Cente 5.9550000	
0.0							DL1 -13.00 dBm	Star 1.9100000	
D.0								Stop 10.00000000	
).0		<u> </u>				and the state of the	1	CF 809.00000 <u>Auto</u>	= Ste DO MH Ma
0.0								Freq	Offs 0 H
tart 1.910	CH2					Stop 4	0.000 GHz	Scale	e Typ
art 1.910 Res BW 1.			#VBW 3.0 MH	z	Sweep	5.00 r 5.14.02 ms(	0.000 GHZ		

Plot 7-68. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)



Plot 7-69. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager
Test Report S/N:	est Report S/N: Test Dates: EUT Ty			Daga 52 of 100
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	ectrum Analyzer - :	Swept SA									
I <b>XI</b> RL	RF 50	Ω AC	PNO: Fast	Trig: Free		#Avg Type	RMS	TRAC	M Jun 18, 2019 DE <b>1 2 3 4 5 6</b> PE A WWWWW ET A N N N N N	Fre	quency
10 dB/div Log	Ref 20.00	) dBm	IFGain:Low	Atten: 30 d	B		Mk	r1 1.82	0 0 GHz 35 dBm	4	Auto Tune
10.0											enter Freq 100000 MHz
-10.0									DL1 -13.00 dBm		Start Freq 000000 MHz
-20.0											Stop Freq 100000 GHz
-40.0									4	182.0 <u>Auto</u>	CF Step 000000 MHz Mar
-50.0		ي ويوني و المحمد ال المحمد المحمد	and a second	and a surger of the second	***	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	danay goding Priver in Pr			F	req Offsei 0 Hz
-70.0	800 CH7							Stop 44	8500 GHz		cale Type <u>Lin</u>
#Res BW			#VBW	3.0 MHz		3		.427 ms (	(3641 pts)		
ISG							STATUS				

Plot 7-70. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)



Plot 7-71. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	es: EUT Type:		Daga 52 of 100	
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	pectrum Analyzer - Sw								_	- 0 💌
<mark>0</mark> RL	RF 50 Ω	2 AC	PNO: Fast C		#Avg Typ	e: RMS	TRAC	MJun 18, 2019 DE <b>1 2 3 4 5 6</b> DE A <del>WWWWW</del> ET A N N N N N	Fr	equency
0 dB/div og	Ref 10.00	dBm				Mkr	1 18.29 -44.	0 0 GHz 92 dBm		Auto Tun
D.00										enter Fre
20.0								DL1 -13.00 dBm	10.00	Start Fre
80.0							1		20.00	Stop Fre
i0.0					<i>·</i>				1.000 <u>Auto</u>	CF Ste 0000000 GH Ma
0.0									<b>_</b>	Freq Offse 0 H
									Log	Scale Typ
	000 GHz V 1.0 MHz		#VB	W 3.0 MHz	s	weep 25	Stop 20 .33 ms (2	.000 GHz 20001 pts)	Log	Li
5G						STATUS				

Plot 7-72. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage E4 of 100
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# 7.4 Band Edge Emissions at Antenna Terminal

## **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 $43 + 10 \log_{10}(P_{[Watts]})$ , where P is the transmitter power in Watts.

## **Test Procedure Used**

KDB 971168 D01 v03r01 - Section 6.0

## **Test Settings**

- 1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
- 2. Span was set large enough so as to capture all out of band emissions near the band edge
- 3. RBW  $\geq$  1% of the emission bandwidth
- 4. VBW  $\geq$  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

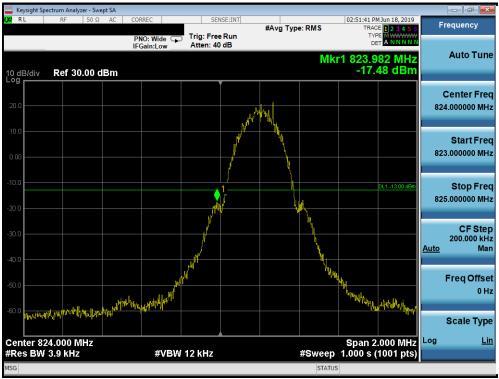
#### Test Notes

Per 22.917(b), 24.238(b), 27.53(h)(3), and RSS-132(5.5), RSS-133(6.5), RSS-139(6.5), 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.

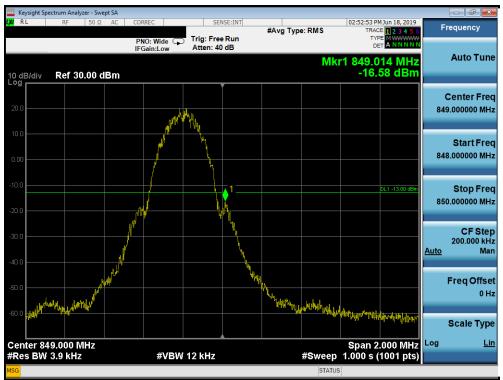
FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 55 of 100
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# Cellular GSM Mode



Plot 7-73. Band Edge Plot (Cellular GSM Mode - Low Channel)

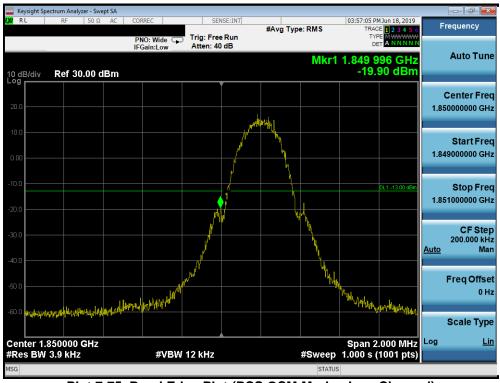


## Plot 7-74. Band Edge Plot (Cellular GSM Mode - High Channel)

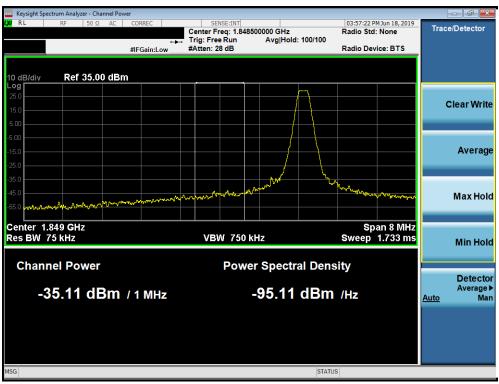
FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege EC of 100
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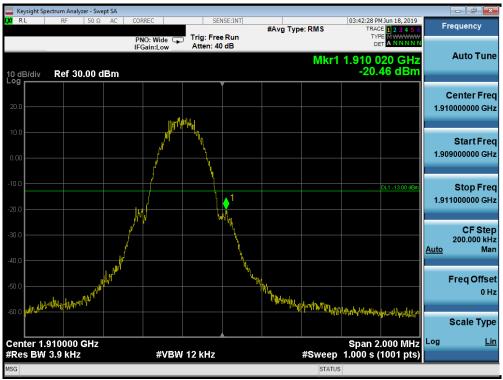
Plot 7-75. Band Edge Plot (PCS GSM Mode - Low Channel)



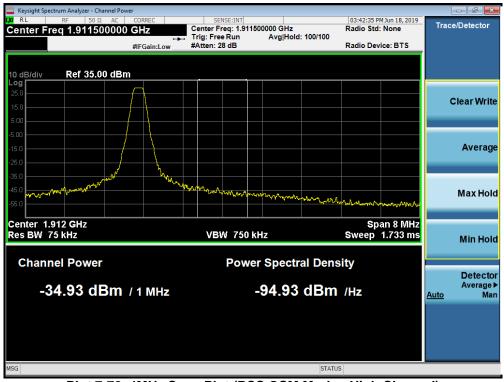
## Plot 7-76. 4MHz Span Plot (PCS GSM Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 57 of 100
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Plot 7-77. Band Edge Plot (PCS GSM Mode - High Channel)



## Plot 7-78. 4MHz Span Plot (PCS GSM Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 59 of 100
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# Cellular CDMA Mode



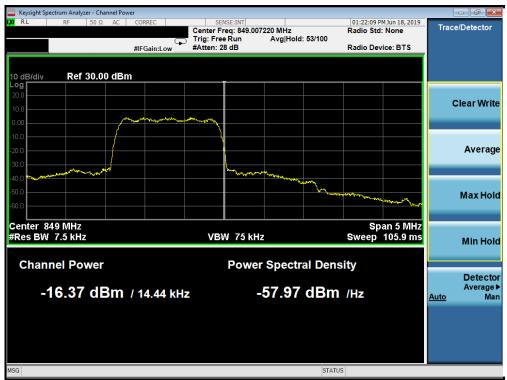
Plot 7-79. Band Edge Plot (Cellular CDMA Mode - Low Channel)



## Plot 7-80. 4MHz Span Plot (Cellular CDMA Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 50 of 100
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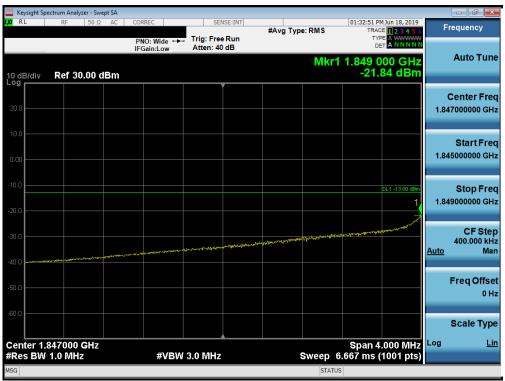
Plot 7-82. 4MHz Span Plot (Cellular CDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 60 of 100	
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Plot 7-83. Band Edge Plot (PCS CDMA Mode - Low Channel)



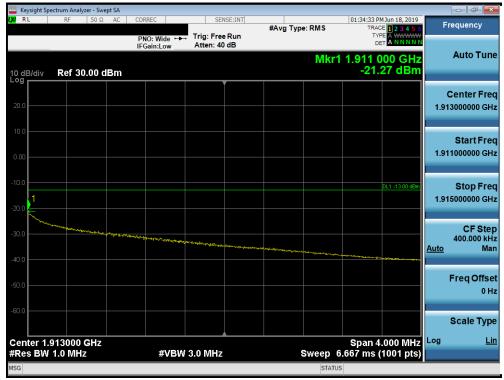
## Plot 7-84. 4MHz Span Plot (PCS CDMA Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 61 of 100
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Plot 7-86. 4MHz Span Plot (PCS CDMA Mode - High Channel)

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## Cellular WCDMA Mode



Plot 7-87. Band Edge Plot (Cellular WCDMA Mode - Low Channel)



## Plot 7-88. Band Edge Plot (Cellular WCDMA Mode - High Channel)

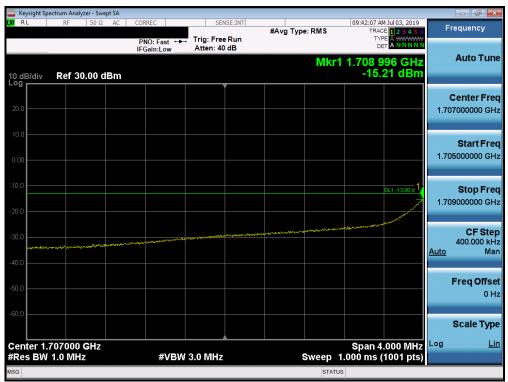
FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 62 of 100
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# AWS WCDMA Mode



Plot 7-89. Band Edge Plot (AWS WCDMA Mode - Low Channel)



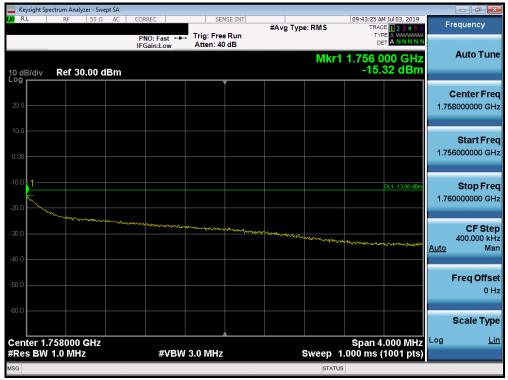
## Plot 7-90. 4MHz Span Plot (AWS WCDMA Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 64 of 100
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🔤 Keysight Spectrum Analyzer - Swept SA 👘				
<b>LXU</b> RL RF 50Ω AC	CORREC SENSE:INT	#Avg Type: RMS	09:43:15 AM Jul 03, 2019 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast Trig: Free Run IFGain:Low Atten: 40 dB	• //		
10 dB/div Ref 30.00 dBm		Mkr	1 1.755 000 GHz -18.17 dBm	Auto Tune
20.0				Center Fred 1.755000000 GHz
0.00				Start Free 1.747500000 GH:
-10.0	1		DL1 -13.00 dBm	Stop Free 1.762500000 GH
-30.0		when when		CF Step 1.50000 MH <u>Auto</u> Ma
-50.0			manna	Freq Offse 0 H
-60.0				Scale Type
Center 1.755000 GHz #Res BW 100 kHz	#VBW 300 kHz	Sween	Span 15.00 MHz 1.867 ms (1001 pts)	Log <u>Lir</u>
	#VBW 300 KHZ	Sweep		

Plot 7-91. Band Edge Plot (AWS WCDMA Mode - High Channel)



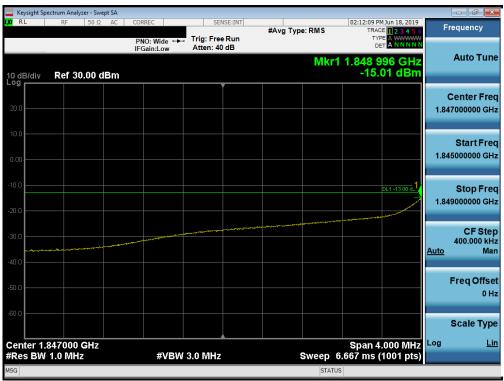
Plot 7-92. 4MHz Span Plot (AWS WCDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage (E of 100
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Plot 7-93. Band Edge Plot (PCS WCDMA Mode - Low Channel)



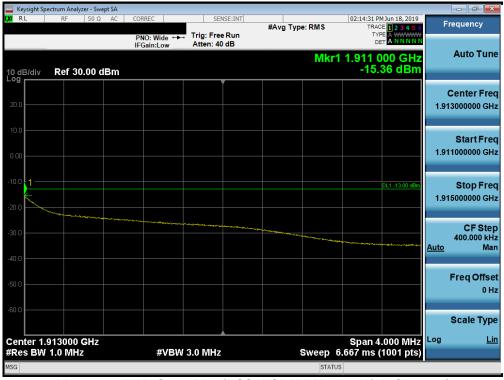
## Plot 7-94. 4MHz Span Plot (PCS WCDMA Mode - Low Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 66 of 100
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Plot 7-95. Band Edge Plot (PCS WCDMA Mode - High Channel)



Plot 7-96. 4MHz Span Plot (PCS WCDMA Mode - High Channel)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 67 of 100
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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 v03r01 - Section 5.7.1

## **Test Settings**

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

## Test Setup

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



Figure 7-4. Test Instrument & Measurement Setup

## **Test Notes**

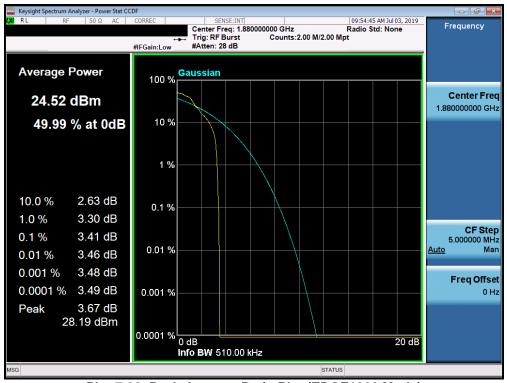
None

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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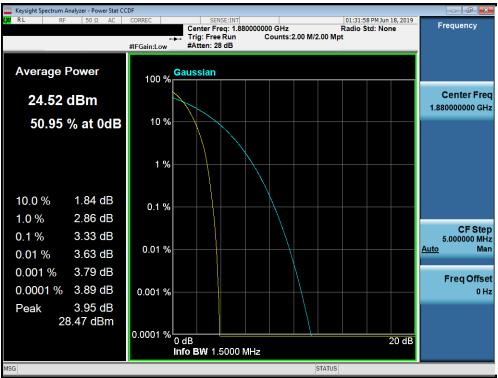




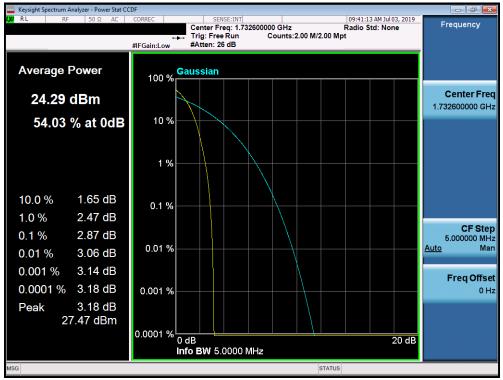
Plot 7-98. Peak-Average Ratio Plot (EDGE1900 Mode)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 60 of 100
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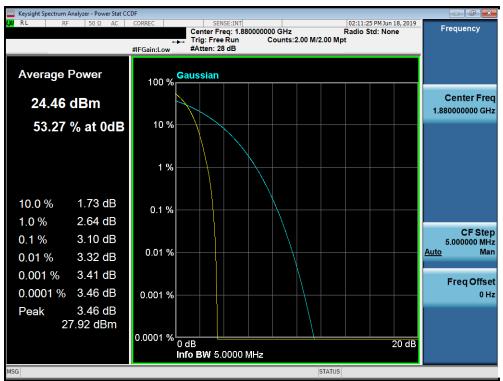




Plot 7-100. Peak-Average Ratio Plot (AWS WCDMA Mode)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 70 of 100
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Plot 7-101. Peak-Average Ratio Plot (PCS WCDMA Mode)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Baga 71 of 100
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# 7.6 Radiated Power (ERP/EIRP)

## Test Overview

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 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 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 v03r01 - Section 5.2.1

ANSI/TIA-603-E-2016 - Section 2.2.17

## Test Settings

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation. For signals with burst transmission, the signal analyzer's "time domain power" measurement capability is used
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW  $\geq$  3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points > 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: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
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#### Test Setup

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

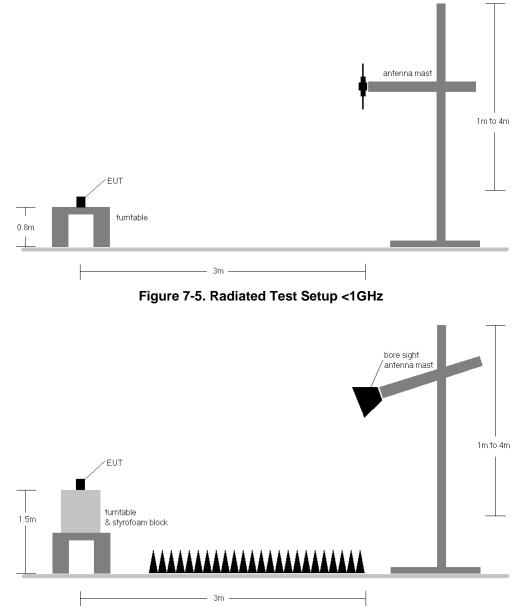


Figure 7-6. Radiated Test Setup >1GHz

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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#### Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 4) This unit was tested with its standard battery.
- 5) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
824.20	GPRS850	V	116	251	25.31	1.65	24.81	38.45	-13.64	26.96	40.61	-13.65
836.60	GPRS850	V	124	258	29.69	1.57	29.11	38.45	-9.34	31.26	40.61	-9.34
848.80	GPRS850	V	110	83	29.97	1.50	29.32	38.45	-9.13	31.47	40.61	-9.14
848.80	GPRS850	н	102	110	27.17	1.50	26.52	38.45	-11.93	28.67	40.61	-11.94
848.80	EDGE850	V	110	83	23.23	1.50	22.58	38.45	-15.87	24.73	40.61	-15.88

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

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
824.70	CDMA850	V	122	282	19.49	1.65	18.99	38.45	-19.47	21.14	40.61	-19.47
836.52	CDMA850	V	114	5	21.18	1.57	20.60	38.45	-17.85	22.75	40.61	-17.85
848.31	CDMA850	V	126	336	21.03	1.50	20.38	38.45	-18.07	22.53	40.61	-18.08
836.52	CDMA850	н	105	294	19.15	1.57	18.57	38.45	-19.88	20.72	40.61	-19.88

Table 7-3. ERP/EIRP (Cellular CDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	V	121	254	19.76	1.63	19.24	38.45	-19.21	21.39	40.61	-19.21
836.60	WCDMA850	V	117	260	21.39	1.57	20.81	38.45	-17.64	22.96	40.61	-17.64
846.60	WCDMA850	V	124	288	21.23	1.51	20.59	38.45	-17.86	22.74	40.61	-17.87
836.60	WCDMA850	Н	108	116	19.89	1.57	19.31	38.45	-19.14	21.46	40.61	-19.14

Table 7-4. ERP/EIRP (Cellular WCDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1712.40	WCDMA1700	Н	131	7	16.71	8.41	25.12	30.00	-4.88
1732.60	WCDMA1700	Н	102	184	17.01	8.10	25.11	30.00	-4.89
1752.60	WCDMA1700	н	138	186	16.83	7.86	24.69	30.00	-5.31
1712.40	WCDMA1700	V	109	133	15.11	8.41	23.52	30.00	-6.48

Table 7-5. 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 Limit [dBm]	Margin [dB]
1850.20	GPRS1900	V	100	120	22.25	8.42	30.67	33.01	-2.34
1880.00	GPRS1900	V	103	39	20.03	8.26	28.29	33.01	-4.72
1909.80	GPRS1900	V	103	138	21.56	8.16	29.72	33.01	-3.29
1850.20	GPRS1900	н	170	290	19.27	8.42	27.69	33.01	-5.32
1850.20	EDGE1900	V	100	120	16.47	8.42	24.89	33.01	-8.12

Table 7-6. EIRP (PCS GPRS)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1851.25	CDMA1900	V	102	119	16.42	8.42	24.84	33.01	-8.17
1880.00	CDMA1900	V	102	198	16.24	8.26	24.50	33.01	-8.51
1908.75	CDMA1900	V	102	135	15.26	8.16	23.42	33.01	-9.59
1851.25	CDMA1900	н	104	5	13.57	8.42	21.99	33.01	-11.02

Table 7-7. EIRP (PCS CDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	V	139	132	14.81	8.41	23.22	33.01	-9.79
1880.00	WCDMA1900	V	102	137	16.24	8.26	24.50	33.01	-8.51
1907.60	WCDMA1900	V	102	129	14.32	8.16	22.48	33.01	-10.53
1880.00	WCDMA1900	н	120	235	14.49	8.26	22.75	33.01	-10.26

Table 7-8. EIRP (PCS WCDMA)

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#### 7.7 Radiated Spurious Emissions Measurements

#### **Test Overview**

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 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 v03r01 - Section 5.8

ANSI/TIA-603-E-2016 - Section 2.2.12

#### **Test Settings**

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW  $\geq$  3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points > 2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

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

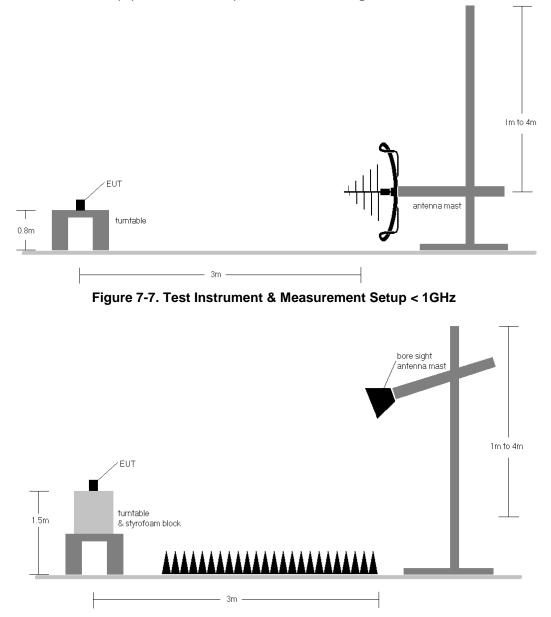


Figure 7-8. Test Instrument & Measurement Setup >1 GHz

#### 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."

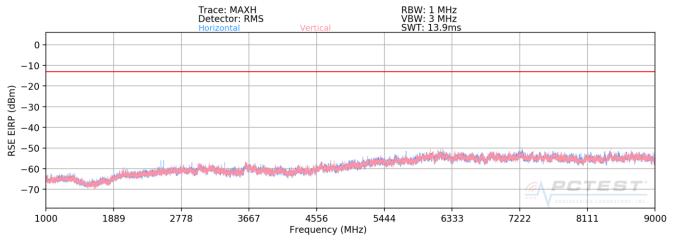
FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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- 3) This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 4) This unit was tested with its standard battery.
- 5) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 6) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 7) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 8) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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Plot 7-102. Radiated Spurious Plot above 1GHz (Cellular GPRS Mode)

824	4.20	MHz
GPRS (GMSK)	_	
3	meters	
-13	dBm	
	BPRS (GMSK)	3 meters

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]	Margin [dB]
1648.40	V	121	173	-72.37	8.93	-63.44	-50.4
2472.60	V	105	62	-64.59	9.18	-55.41	-42.4
3296.80	V	-	-	-69.22	9.43	-59.79	-46.8
4121.00	V	-	-	-66.85	10.02	-56.83	-43.8

Table 7-9. Radiated Spurious Data (Cellular GPRS Mode – Ch. 128)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
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830	6.60	MHz
GPRS (GMSK)		_
3	meters	
-13	_dBm	
	GPRS (GMSK) 3	3 meters

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]	Margin [dB]
1673.20	V	156	297	-68.81	8.78	-60.03	-47.0
2509.80	V	103	303	-63.27	9.27	-54.00	-41.0
3346.40	V	-	-	-68.55	9.44	-59.11	-46.1
4183.00	V	-	-	-70.61	10.35	-60.26	-47.3

Table 7-10. Radiated Spurious Data (Cellular GPRS Mode – Ch. 190)

OPERATING FREQUENCY:

MODULATION SIGNA

REQUENCY:	848.80			
ON SIGNAL:	GPRS (GMSK)	_		
DISTANCE:	3	meters		
LIMIT:	-13	dBm		

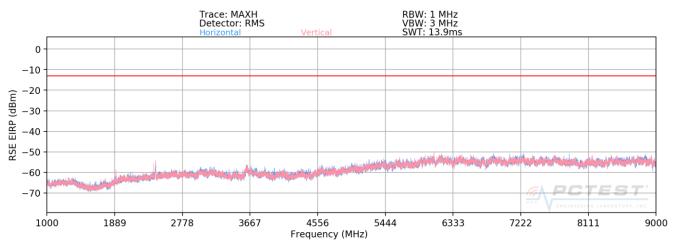
MHz

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]	Margin [dB]
1697.60	V	105	251	-68.96	8.61	-60.35	-47.3
2546.40	V	120	124	-64.03	9.28	-54.75	-41.7
3395.20	V	-	-	-68.77	9.55	-59.22	-46.2
4244.00	V	-	-	-70.53	10.62	-59.91	-46.9

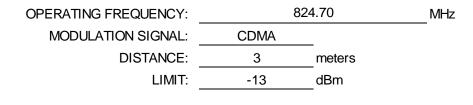
Table 7-11. Radiated Spurious Data (Cellular GPRS Mode – Ch. 251)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🚺 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		De	
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Plot 7-103. Radiated Spurious Plot above 1GHz (Cellular CDMA Mode)



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]	Margin [dB]
1649.40	V	-	-	-77.35	8.93	-68.42	-55.4
2474.10	V	-	-	-72.05	9.18	-62.87	-49.9

Table 7-12. Radiated Spurious Data (Cellular CDMA Mode – Ch. 1013)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Dage 82 of 100
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 OPERATING FREQUENCY:
 836.52
 MHz

 MODULATION SIGNAL:
 CDMA

 DISTANCE:
 3
 meters

 LIMIT:
 -13
 dBm

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]	Margin [dB]
1673.04	V	-	-	-77.03	8.78	-68.25	-55.2
2509.56	V	-	-	-74.44	9.27	-65.16	-52.2

Table 7-13. Radiated Spurious Data (Cellular CDMA Mode – Ch. 384)

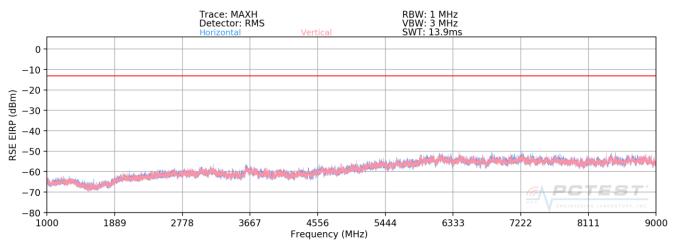
84	8.31	MHz
CDMA		
3	meters	
-13	_dBm	
	CDMA 3	CDMA 3 meters

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]	Margin [dB]
1696.62	V	-	-	-77.27	8.62	-68.65	-55.7
2544.93	V	-	-	-73.35	9.28	-64.07	-51.1

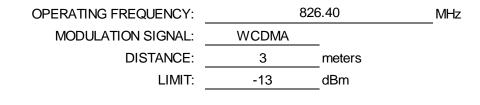
Table 7-14. Radiated Spurious Data (Cellular CDMA Mode – Ch. 777)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🚺 LG	Approved by: Quality Manager
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Plot 7-104. Radiated Spurious Plot above 1GHz (Cellular WCDMA Mode)

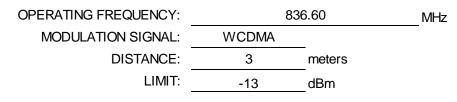


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1652.80	V	-	-	-66.55	8.92	-57.63	-44.6
2479.20	V	-	-	-61.30	9.20	-52.10	-39.1

Table 7-15. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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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]	Margin [dB]
1673.20	V	-	-	-65.56	8.78	-56.78	-43.8
2509.80	V	-	-	-62.43	9.27	-53.16	-40.2

Table 7-16. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

 OPERATING FREQUENCY:
 846.60
 MHz

 MODULATION SIGNAL:
 WCDMA
 MHz

 DISTANCE:
 3
 meters

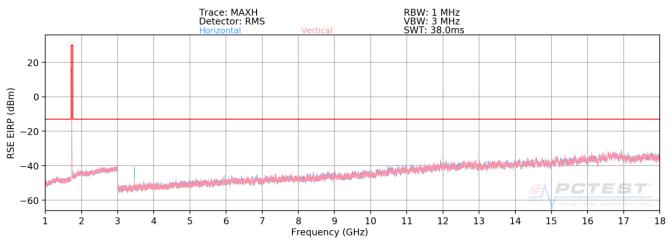
 LIMIT:
 -13
 dBm

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]	Margin [dB]
1693.20	V	-	-	-65.06	8.64	-56.42	-43.4
2539.80	V	-	-	-61.63	9.28	-52.35	-39.4

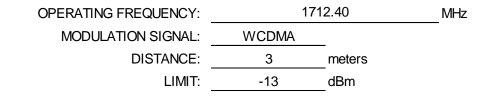
Table 7-17. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4233)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Plot 7-105. Radiated Spurious Plot above 1GHz (AWS WCDMA Mode)



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]	Margin [dB]
3424.80	Н	103	297	-46.51	9.62	-36.89	-23.9
5137.20	Н	-	-	-61.89	11.05	-50.83	-37.8
6849.60	Н	-	-	-59.11	10.93	-48.18	-35.2

Table 7-18. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1312)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 96 of 100
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OPERATING FREQUENCY:	173	32.60	MHz
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]	Margin [dB]
3465.20	Н	156	297	-50.27	9.68	-40.59	-27.6
5197.80	Н	-	-	-61.99	11.02	-50.97	-38.0
6930.40	Н	-	-	-61.04	11.02	-50.01	-37.0

Table 7-19. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1413)

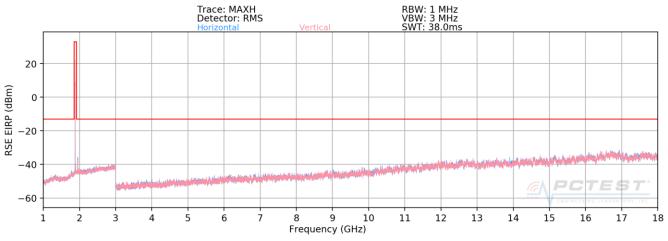
OPERATING FREQUENCY:	175	52.60	MHz
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]	Margin [dB]
3505.20	Н	152	299	-48.18	9.71	-38.48	-25.5
5257.80	Н	-	-	-62.87	11.11	-51.76	-38.8
7010.40	Н	-	-	-60.16	11.06	-49.10	-36.1

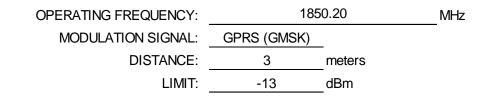
Table 7-20. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1513)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
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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]	Margin [dB]
3700.40	V	144	42	-55.45	9.85	-45.61	-32.6
5550.60	V	-	-	-61.82	11.18	-50.64	-37.6
7400.80	V	-	-	-58.84	10.86	-47.98	-35.0

 Table 7-21. Radiated Spurious Data (PCS GPRS Mode – Ch. 512)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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OPERATING FREQUENCY:	188	30.00	MHz
MODULATION SIGNAL:	GPRS (GMSK)	_	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]	Margin [dB]
3760.00	V	110	66	-56.33	9.59	-46.74	-33.7
5640.00	V	-	-	-62.53	11.30	-51.22	-38.2
7520.00	V	-	-	-60.09	11.08	-49.01	-36.0

Table 7-22. Radiated Spurious Data (PCS GPRS Mode – Ch. 661)

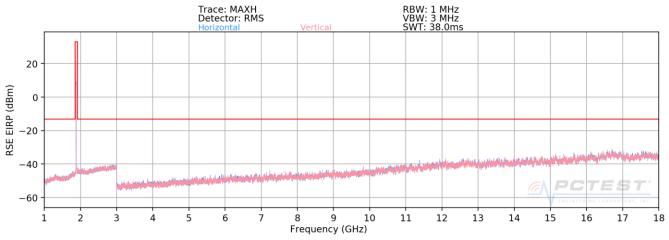
OPERATING FREQUENCY:	190	9.80	MHz
MODULATION SIGNAL:	GPRS (GMSK)		_
DISTANCE:	3	meters	
LIMIT:	-13	_ dBm	

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]	Margin [dB]
3819.60	V	131	342	-59.52	9.28	-50.24	-37.2
5729.40	V	-	-	-59.56	11.40	-48.16	-35.2
7639.20	V	-	-	-58.46	11.35	-47.11	-34.1

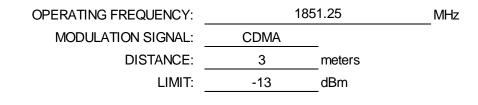
Table 7-23. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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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]	Margin [dB]
3702.50	V	143	15	-63.18	9.58	-53.60	-40.6
5553.75	V	115	89	-59.84	10.95	-48.89	-35.9
7405.00	V	-	-	-60.05	10.96	-49.09	-36.1
9256.25	V	-	-	-57.66	11.63	-46.03	-33.0

Table 7-24. Radiated Spurious Data (PCS CDMA Mode – Ch. 25)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕚 LG	Approved by: Quality Manager
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OPERATING FREQUENCY:	188	30.00	MHz
MODULATION SIGNAL:	CDMA	_	
DISTANCE:	3	meters	
LIMIT:	-13	_dBm	

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]	Margin [dB]
3760.00	V	100	67	-61.70	9.37	-52.33	-39.3
5640.00	V	132	57	-60.53	11.17	-49.36	-36.4
7520.00	V	-	-	-59.63	11.11	-48.52	-35.5
9400.00	V	-	-	-58.74	11.57	-47.17	-34.2

Table 7-25. Radiated Spurious Data (PCS CDMA Mode - Ch. 600)

meters

dBm

**OPERATING FREQUENCY:** 

1908.75		ERATING FREQUENCY:
	CDMA	MODULATION SIGNAL:
mete	3	DISTANCE:
dBm	-13	LIMIT:

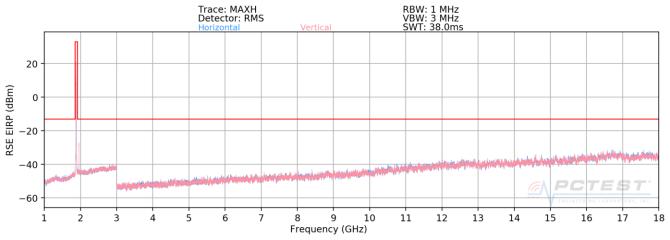
MHz

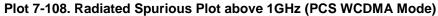
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3817.50	V	100	170	-61.89	9.30	-52.59	-39.6
5726.25	V	138	240	-59.04	11.38	-47.66	-34.7
7635.00	V	-	-	-59.92	11.32	-48.59	-35.6
9543.75	V	-	-	-58.23	11.78	-46.46	-33.5

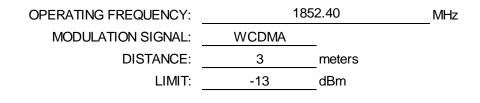
Table 7-26. Radiated Spurious Data (PCS CDMA Mode – Ch. 1175)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🚺 LG	Approved by: Quality Manager
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Antonna (Lain	Spurious Emission Level [dBm]	Margin [dB]
3704.80	V	-	-	-56.78	9.83	-46.95	-34.0
5557.20	V	-	-	-54.55	11.19	-43.36	-30.4

Table 7-27. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9262)

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OPERATING FREQUENCY:1880.00MHzMODULATION SIGNAL:WCDMADISTANCE:3LIMIT:-13dBm

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]	Margin [dB]
3760.00	V	-	-	-56.10	9.59	-46.51	-33.5
5640.00	V	-	-	-56.60	11.30	-45.29	-32.3

Table 7-28. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)

OPERATING FREQUENCY:	190	MHz	
MODULATION SIGNAL:	WCDMA		_
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]	Margin [dB]
3815.20	V	-	-	-54.78	9.28	-45.50	-32.5
5722.80	V	-	-	-53.81	11.40	-42.41	-29.4

Table 7-29. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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#### **Test Overview and Limit**

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. 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, RSS-132, and RSS-133, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency. For Part 24, Part 27, and RSS-139, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

#### Test Procedure Used

ANSI/TIA-603-E-2016

#### Test Settings

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

#### Test Setup

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

#### Test Notes

None

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OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	190	
REFERENCE VOLTAGE:	4.29	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	836,599,929	-71	-0.0000085
100 %		- 20	836,600,080	80	0.0000096
100 %		- 10	836,599,879	-121	-0.0000145
100 %		0	836,600,077	77	0.0000092
100 %		+ 10	836,600,069	69	0.0000082
100 %		+ 20	836,599,964	-36	-0.0000043
100 %		+ 30	836,600,228	228	0.0000273
100 %		+ 40	836,599,607	-393	-0.0000470
100 %		+ 50	836,600,039	39	0.0000047
BATT. ENDPOINT	3.80	+ 20	836,599,987	-13	-0.0000016

Table 7-30. Frequency Stability Data (Cellular GPRS Mode – Ch. 190)

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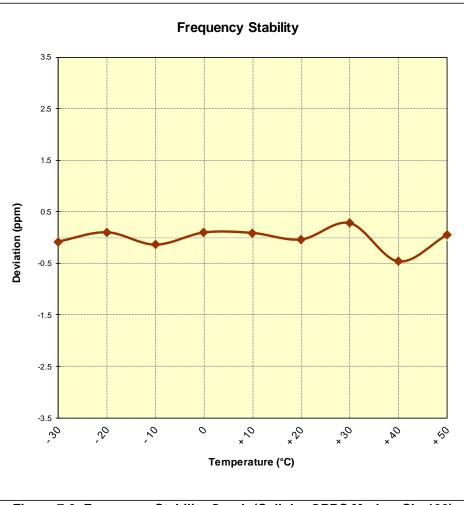


Figure 7-9. Frequency Stability Graph (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY:	836,520,000	Hz
CHANNEL:	384	
REFERENCE VOLTAGE:	4.29	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	836,520,186	186	0.0000222
100 %		- 20	836,519,809	-191	-0.0000228
100 %		- 10	836,519,742	-258	-0.0000308
100 %		0	836,519,760	-240	-0.0000287
100 %		+ 10	836,519,966	-34	-0.0000041
100 %		+ 20	836,519,687	-313	-0.0000374
100 %		+ 30	836,520,145	145	0.0000173
100 %		+ 40	836,519,996	-4	-0.0000005
100 %		+ 50	836,519,971	-29	-0.000035
BATT. ENDPOINT	3.80	+ 20	836,519,777	-223	-0.0000267

Table 7-31. Frequency Stability Data (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🚺 LG	Approved by: Quality Manager
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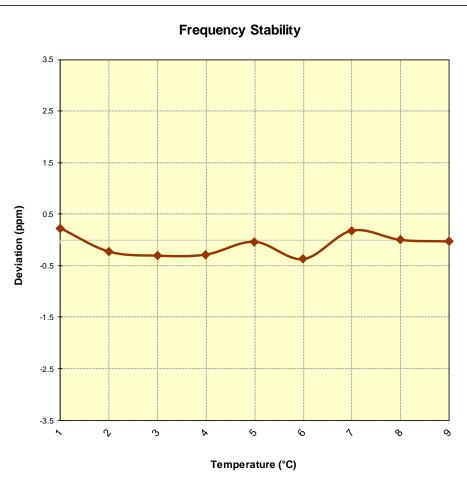


Figure 7-10. Frequency Stability Graph (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	4183	_
REFERENCE VOLTAGE:	4.29	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	836,599,842	-158	-0.0000189
100 %		- 20	836,600,006	6	0.0000007
100 %		- 10	836,600,122	122	0.0000146
100 %		0	836,599,652	-348	-0.0000416
100 %		+ 10	836,600,268	268	0.0000320
100 %		+ 20	836,599,840	-160	-0.0000191
100 %		+ 30	836,600,058	58	0.0000069
100 %		+ 40	836,599,759	-241	-0.0000288
100 %		+ 50	836,600,004	4	0.0000005
BATT. ENDPOINT	3.80	+ 20	836,599,720	-280	-0.0000335

Table 7-32. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🚺 LG	Approved by: Quality Manager
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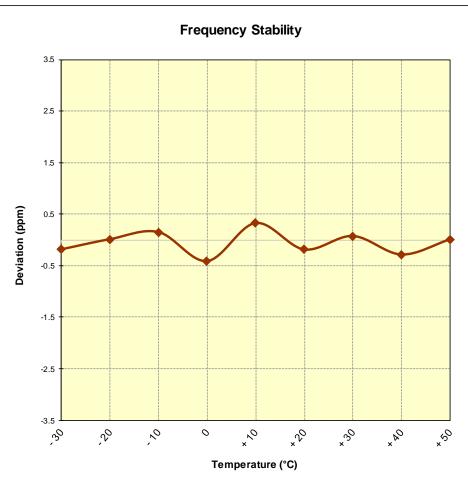


Figure 7-11. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY:	1,732,600,000	Hz
CHANNEL:	1413	
REFERENCE VOLTAGE:	4.29	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	1,732,599,767	-233	-0.0000134
100 %		- 20	1,732,600,109	109	0.0000063
100 %		- 10	1,732,600,319	319	0.0000184
100 %		0	1,732,600,204	204	0.0000118
100 %		+ 10	1,732,600,027	27	0.0000016
100 %		+ 20	1,732,600,260	260	0.0000150
100 %		+ 30	1,732,599,705	-295	-0.0000170
100 %		+ 40	1,732,600,069	69	0.0000040
100 %		+ 50	1,732,599,952	-48	-0.0000028
BATT. ENDPOINT	3.80	+ 20	1,732,599,751	-249	-0.0000144

Table 7-33. Frequency Stability Data (AWS WCDMA Mode – Ch. 1413)

#### Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band 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.

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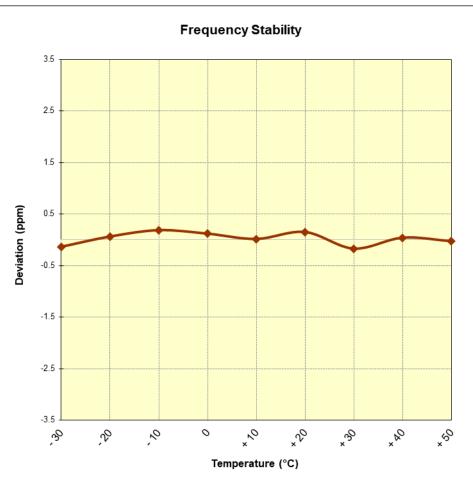


Figure 7-12. Frequency Stability Graph (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	661	-
REFERENCE VOLTAGE:	4.29	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	1,880,000,198	198	0.0000105
100 %		- 20	1,880,000,103	103	0.0000055
100 %		- 10	1,880,000,027	27	0.0000014
100 %		0	1,879,999,611	-389	-0.0000207
100 %		+ 10	1,880,000,179	179	0.0000095
100 %		+ 20	1,880,000,117	117	0.0000062
100 %		+ 30	1,880,000,002	2	0.0000001
100 %		+ 40	1,879,999,889	-111	-0.0000059
100 %		+ 50	1,879,999,962	-38	-0.0000020
BATT. ENDPOINT	3.80	+ 20	1,880,000,333	333	0.0000177

Table 7-34. Frequency Stability Data (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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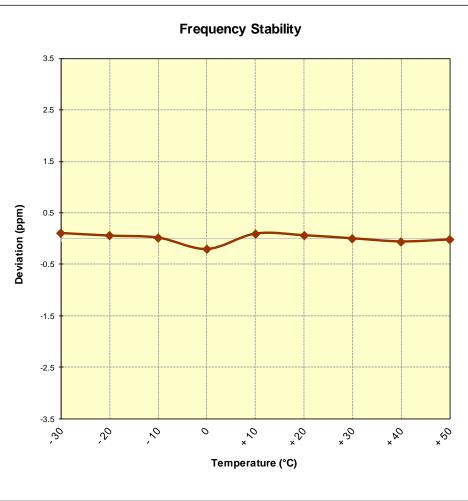


Figure 7-13. Frequency Stability Graph (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	600	_
REFERENCE VOLTAGE:	4.29	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	1,880,000,138	138	0.0000073
100 %		- 20	1,880,000,100	100	0.0000053
100 %		- 10	1,880,000,090	90	0.0000048
100 %		0	1,880,000,443	443	0.0000236
100 %		+ 10	1,879,999,993	-7	-0.0000004
100 %		+ 20	1,880,000,065	65	0.0000035
100 %		+ 30	1,879,999,981	-19	-0.0000010
100 %		+ 40	1,880,000,339	339	0.0000180
100 %		+ 50	1,880,000,139	139	0.0000074
BATT. ENDPOINT	3.80	+ 20	1,880,000,066	66	0.0000035

Table 7-35. Frequency Stability Data (PCS CDMA Mode – Ch. 600)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
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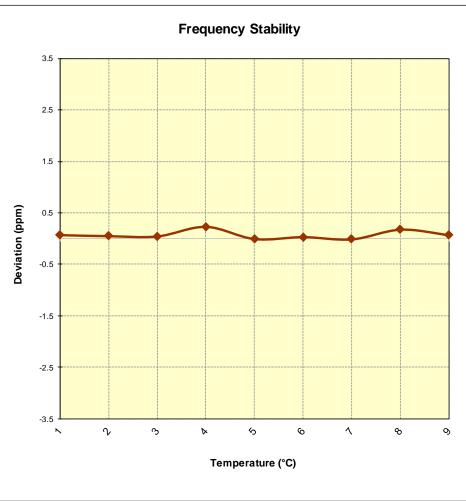


Figure 7-14. Frequency Stability Graph (PCS CDMA Mode – Ch. 600)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	9400	-
REFERENCE VOLTAGE:	4.29	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.29	- 30	1,879,999,949	-51	-0.0000027
100 %		- 20	1,879,999,823	-177	-0.0000094
100 %		- 10	1,879,999,909	-91	-0.0000048
100 %		0	1,880,000,246	246	0.0000131
100 %		+ 10	1,879,999,976	-24	-0.0000013
100 %		+ 20	1,880,000,131	131	0.0000070
100 %		+ 30	1,880,000,072	72	0.0000038
100 %		+ 40	1,879,999,884	-116	-0.0000062
100 %		+ 50	1,880,000,022	22	0.0000012
BATT. ENDPOINT	3.80	+ 20	1,879,999,976	-24	-0.0000013

Table 7-36. Frequency Stability Data (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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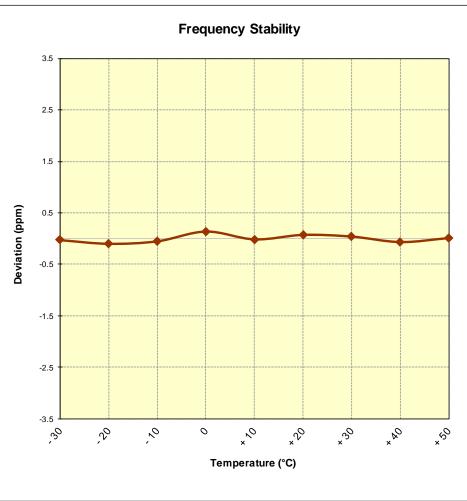


Figure 7-15. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFX320TA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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### 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the LG Portable Handset FCC ID: ZNFX320TA complies with all the requirements of Part 22, 24, & 27 of the FCC Rules.

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