

PCTEST ENGINEERING LABORATORY, INC.

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MEASUREMENT REPORT GSM / GPRS / EDGE / WCDMA

Applicant Name:

LG Electronics MobileComm U.S.A 1000 Sylvan Avenue Englewood Cliffs, NJ 07632 United States Date of Testing: 3/28-4/23/2018 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1803280056-02.ZNF

FCC ID:

ZNFQ710CS

APPLICANT:

LG Electronics MobileComm U.S.A

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification LM-Q710CS LMQ710CS, Q710CS 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.

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.



FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 1 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 1 of 83
© 2018 PCTEST Engineering Laboratory, Inc.				



TABLE OF CONTENTS

1.0	INTF	ODUCTION	4
	1.1	Scope	4
	1.2	PCTEST Test Location	4
	1.3	Test Facility / Accreditations	4
2.0	PRO	DUCT INFORMATION	5
	2.1	Equipment Description	5
	2.2	Device Capabilities	5
	2.3	Test Configuration	5
	2.4	EMI Suppression Device(s)/Modifications	5
3.0	DES	CRIPTION OF TESTS	6
	3.1	Evaluation Procedure	6
	3.2	Cellular - Base Frequency Blocks	6
	3.3	Cellular - Mobile Frequency Blocks	6
	3.4	PCS - Base Frequency Blocks	6
	3.5	PCS - Mobile Frequency Blocks	7
	3.6	AWS - Base Frequency Blocks	7
	3.7	AWS - Mobile Frequency Blocks	7
	3.8	Radiated Measurements	8
4.0	MEA	SUREMENT UNCERTAINTY	9
5.0	TES	T EQUIPMENT CALIBRATION DATA	.10
6.0	SAM	PLE CALCULATIONS	.11
7.0	TES	T RESULTS	.12
	7.1	Summary	. 12
	7.2	Occupied Bandwidth	. 13
	7.3	Spurious and Harmonic Emissions at Antenna Terminal	. 18
	7.4	Band Edge Emissions at Antenna Terminal	.44
	7.5	Peak-Average Ratio	. 53
	7.6	Radiated Power (ERP/EIRP)	. 55
	7.7	Radiated Spurious Emissions Measurements	. 60
	7.8	Frequency Stability / Temperature Variation	.72
8.0	CON	CLUSION	.83

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 2 of 83
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 2 01 65
© 2018 PCTEST Engineering Laboratory, Inc.				V 8.0 03/13/2018





MEASUREMENT REPORT GSM / GPRS / EDGE / WCDMA



			Ef	RP	EI	RP	
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power	Max. Power	Max. Power	Max. Power	Emission Designator
	i dit		(W)	(dBm)	(W)	(dBm)	Designator
GPRS850	22H	824.2 - 848.8	0.650	28.13	1.067	30.28	246KGXW
EDGE850	22H	824.2 - 848.8	0.239	23.78	0.391	25.93	244KG7W
WCDMA850	22H	826.4 - 846.6	0.077	18.87	0.126	21.02	4M20F9W
WCDMA1700	27	1712.4 - 1752.6			0.285	24.55	4M15F9W
GPRS1900	24E	1850.2 - 1909.8			0.891	29.50	242KGXW
EDGE1900	24E	1850.2 - 1909.8			0.433	26.37	247KG7W
WCDMA1900	24E	1852.4 - 1907.6			0.337	25.27	4M17F9W

EUT Overview

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 2 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 3 of 83
© 2018 PCTEST Engineering La	boratory. Inc.			V 8.0 03/13/2018



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.

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 4 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 4 of 83
© 2018 PCTEST Engineering La	boratory. Inc.			V 8.0 03/13/2018



2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFQ710CS**. 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.: 02177, 02151

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac 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.

	FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
	Test Report S/N:	Test Dates:	EUT Type:		Dogo E of 92
	1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 5 of 83
© 2018 PCTEST Engineering Laboratory. Inc.					V 8.0 03/13/2018



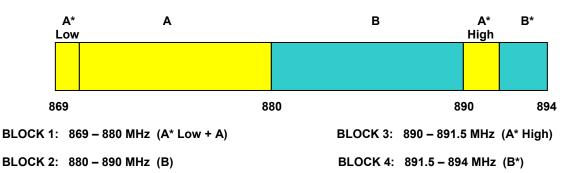
3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

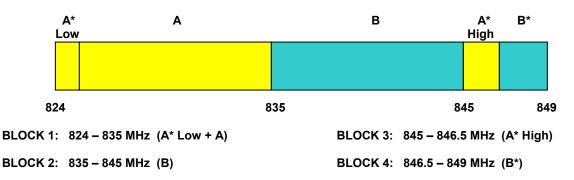
The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

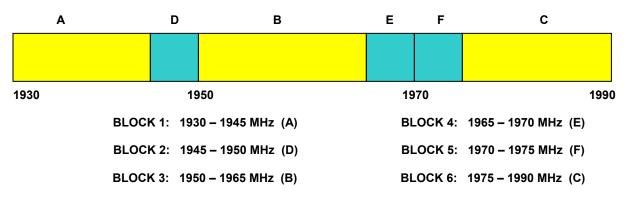
3.2 Cellular - Base Frequency Blocks



3.3 Cellular - Mobile Frequency Blocks



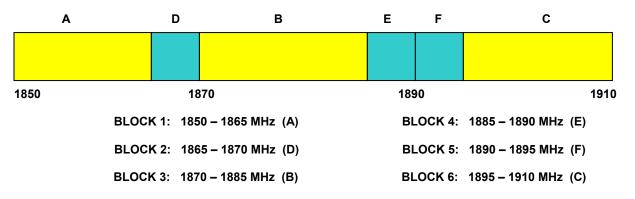
3.4 PCS - Base Frequency Blocks



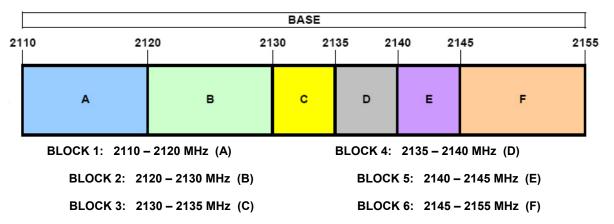
FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 6 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 6 of 83
© 2018 PCTEST Engineering Laboratory, Inc.				V 8.0 03/13/2018



3.5 PCS - Mobile Frequency Blocks



3.6 AWS - Base Frequency Blocks



3.7 AWS - Mobile Frequency Blocks

				MOBILE				
17	10	1	720 1	730 17	7 35 17	/ 40 17	45	1755
		A	В	с	D	E	F	
			710 – 1720 MHz (A)				1740 MHz (D)	
			720 – 1730 MHz (B) 730 – 1735 MHz (C)				1745 MHz (E) 1755 MHz (F)	

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 7 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 7 of 83
© 2018 PCTEST Engineering Laboratory, Inc.				V 8.0 03/13/2018



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 $_{[dB]}$.

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 9 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 8 of 83
© 2018 PCTEST Engineering Laboratory, Inc.				V 8.0 03/13/2018



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 0 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 9 of 83
© 2018 PCTEST Engineering Laboratory, Inc.				V 8.0 03/13/2018



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
-	LTx2	Licensed Transmitter Cable Set	8/10/2017	Annual	8/10/2018	LTx2
Agilent	N9020A	MXA Signal Analyzer	1/24/2018	Annual	1/24/2019	US46470561
COM-Power	AL-130R	Active Loop Antenna	6/5/2017	Annual	6/5/2018	121085
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
Espec	ESX-2CA	Environmental Chamber	3/28/2018	Annual	3/28/2019	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	12/1/2016	Biennial	12/1/2018	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	4/26/2016	Biennial	4/26/2018	128337
Huber+Suhner	Sucoflex 102A	40GHz Radiated Cable	5/19/2017	Annual	5/19/2018	251425001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/30/2018	Annual	3/30/2019	11401010036
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	10/13/2017	Annual	10/13/2018	102060
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/31/2017	Annual	7/31/2018	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/11/2017	Annual	8/11/2018	103200
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102135
Rohde & Schwarz	TC-TA18	Cross-Pol Antenna 400MHz-18GHz	10/30/2017	Annual	10/30/2018	101058
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/11/2017	Annual	5/11/2018	100040
Schwarzbeck	UHA 9105	Dipole Antenna	8/26/2016	Biennial	8/26/2018	2696
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol Sciences	JB6	JB6 Antenna	9/27/2016	Biennial	9/27/2018	A082816

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.

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 10 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 10 of 83
© 2018 PCTEST Engineering Laboratory, Inc.				V 8.0 03/13/2018



6.0 SAMPLE CALCULATIONS

GPRS Emission Designator

Emission Designator = 250KGXW

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

EDGE Emission Designator

Emission Designator = 250KG7W

EDGE BW = 250 kHz G = Phase Modulation 7 = Quantized/Digital Info W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz F = Frequency Modulation 9 = Composite Digital Info W = Combination (Audio/Data)

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm -(-24.80) = 50.3 dBc.

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 11 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 11 of 83
© 2018 PCTEST Engineering Laboratory. Inc.				V 8.0 03/13/2018



7.0 TEST RESULTS

7.1 Summary

Company Name:	LG Electronics MobileComm U.S.A
FCC ID:	ZNFQ710CS
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>GSM / GPRS / EDGE / WCDMA</u>

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	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 + log ₁₀ (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Sections 7.3, 7.4
24.232(d)	RSS-132(5.4) RSS-133(6.4) RSS-139(6.5)	Peak-Average Ratio	< 13 dB	CONDUCTED	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 <a>< 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 + log ₁₀ (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.

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 12 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 12 of 83
© 2018 PCTEST Engineering Laboratory, Inc.				V 8.0 03/13/2018



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

<u>Test Notes</u>

None.

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 13 of 83
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Fage 15 01 65
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Plot 7-1. Occupied Bandwidth Plot (Cellular GPRS Mode)



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 14 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 14 of 83
© 2018 PCTEST Engineering Laboratory, Inc.				V 8.0 03/13/2018





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



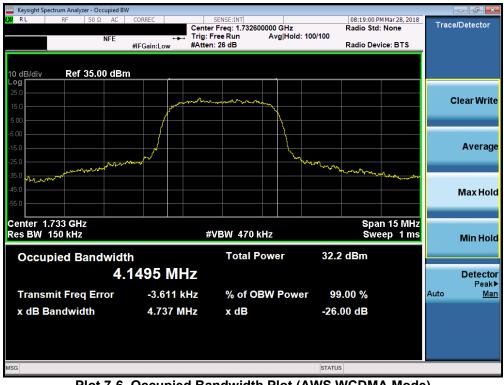
Plot 7-4. Occupied Bandwidth Plot (EDGE1900 Mode)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 15 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 15 of 83
© 2018 PCTEST Engineering Laboratory, Inc.				V 8.0 03/13/2018





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



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 16 of 82
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 16 of 83
© 2018 PCTEST Engineering Laboratory, Inc.				V 8.0 03/13/2018



CORREC				
	SENSE:INT nter Freq: 1.880000000 GHz	Radio Std:	Mar 28, 2018 None	Trace/Detector
	g: Free Run Avg Hold: ten: 26 dB		e BTS	
HOAIII.LOW #71		Rudio Berri		
				Clear Write
- manon				Cical Million
				_
~~~				Average
			mann	
				Max Hole
		Span	15 MHz	
	#VBW 470 kHz			Min Hold
	Total Power	33.2 dBm		
	rotarr owor			
/2/ WINZ				Detecto Peakl
-8.432 kHz	% of OBW Powe	r 99.00 %	A	
4.804 MHz	x dB	-26.00 dB		
		STATUS		
	727 MHz	#FGain:Low #Atten: 26 dB	#Aften: 26 dB       Radio Devia         #FGain:Low       #Atten: 26 dB       Radio Devia         #Aften: 26 dB       Spar         #VBW 470 kHz       Spar         Spar       Spar         #VBW 470 kHz       Spar         Total Power       33.2 dBm         727 MHz       -8.432 kHz       % of OBW Power       99.00 %         4.804 MHz       x dB       -26.00 dB	AFGain:Low #Atten: 26 dB Radio Device: BTS AFGain:Low #Atten: 26 dB Radio Device: BTS AFGain:Low #Atten: 26 dB Radio Device: BTS AffGain:Low #Atten: 26 d

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 17 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 17 of 83
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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 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

#### **Test Procedure Used**

KDB 971168 D01 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

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

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.

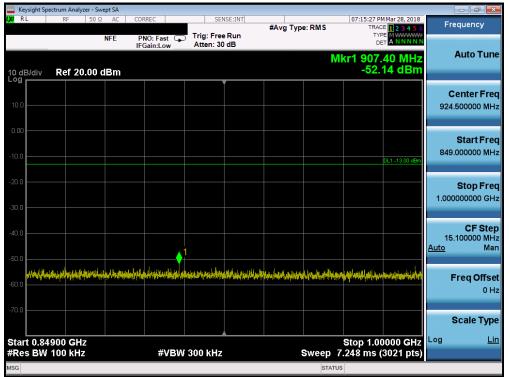
FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 19 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 18 of 83
© 2018 PCTEST Engineering La	boratory, Inc.	•		V 8.0 03/13/2018



# Cellular GPRS Mode

	ectrum Analyzer									-	
XI RL	RF 5	50 Ω AC NFE	PNO: Fast			#Avg Type	RMS	TRAC	M Mar 28, 2018 DE 1 2 3 4 5 6 PE M WWWWW ET A N N N N N	Freq	uency
10 dB/div	Ref 20.0	0 dBm	IFGain:Low	Atten: 30	uв		N	lkr1 822		A	uto Tune
10.0											nter Fred
10.00									DL1 -13.00 dBm		tart Fre
30.0											<b>top Fre</b> 10000 МН
40.0									1. →	79.30 <u>Auto</u>	CF Ste 0000 M⊦ Ma
60.0 <mark>talatinak</mark>	sen ( <mark>A pol</mark> anska platon ) na pola	nterlent se blåde prøst manne ogsatiltersent	alayadin persenang serina ta Manalin persenang serina ta	(Pillyacanata) (Pili) Ananataina (Pili)	an a	egang padag Albag <mark>P</mark> agada Ipanaka pida wang ata pata	Valsa fiyo fiyo fiyo fi	en jande gegenen der som der so Som der som der	n y kolonya ya niyanyi ku	Fre	eqOffso 0 ⊦
.70.0 Start 30.0									20.0 19112	Sc Log	ale Typ <u>Li</u>
Res BW	100 kHz		#VBW	300 kHz		S	weep 3	8.06 ms (1	5861 pts)		
SG							STATU	JS			

Plot 7-8. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)



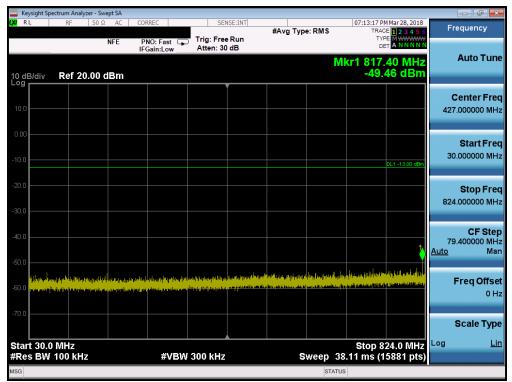
#### Plot 7-9. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 10 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 19 of 83



International and the second secon	Keysight Spectrum Ana						
Income         Mkr1 7.366 5 GHz -31.47 dBm         Autom           0 dB/div         Ref 10.00 dBm         -31.47 dBm         Center           0 00	XI RL RF			#Avg Type	RMS TRAC	Freque	ency
0.00	10 dB/div Ref 1	1			Mkr1 7.366	5 GHz Au	to Tune
200     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1     1<							t <b>er Fre</b> 1000 GH
<ul> <li>40.0</li> <li< td=""><td></td><td></td><td></td><td></td><td></td><td>Sta</td><td>art Fre 1000 GH</td></li<></ul>						Sta	art Fre 1000 GH
50.0			All setting on Land states the set had	an y nya kana da kana ya sha ya sha ya sha ya sha ya ya sha ya ya sha ya ya sha ya sha ya sha ya sha ya sha ya A sha ya sha y	1 Shaal walishaad oo kura ka kata waxaa ku Shaal walishaa yaafa da ayaa yaasa kura kur	10 00000	<b>op Fre</b> 1000 GH
Freq	-50.0					900.000	CF Ste 000 MH Ma
						Free	q Offso 0 ⊦
							le Typ
Start 1.000 GHz Stop 10.000 GHz #VBW 3.0 MHz Sweep 15.60 ms (18001 pts)	#Res BW 1.0 MH		#VBW 3.0 MHz	S	weep 15.60 ms (1	000 GHz 8001 pts)	Li

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



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 20 of 82
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 20 of 83
© 2018 PCTEST Engineering La	boratory, Inc.	•		V 8.0 03/13/2018



	pectrum Analyzer - S										×
LXU RL	RF 50 9	NFE F	NO: Fast	Trig: Free		#Avg Typ	e: RMS	TRAC	M Mar 28, 2018 CE <b>1 2 3 4 5 6</b> DE MWWWWW A N N N N N	Frequency	y
10 dB/div	Ref 20.00		Gain:Low	Atten: 30	dB		M	kr1 855.		Auto T	une
10.0										Center I 924.500000	
-10.0									DL1 -13.00 dBm	<b>Start I</b> 849.000000	
-20.0										Stop I 1.000000000	
-40.0	,1									CF \$ 15.100000 <u>Auto</u>	
-60.0	ft.A-yepisipapraa.ordaa.fd.bu	ullin Marine and Andrea	ninger for the second	yken yn hillyk	nil managali presi	li in the second se	arthir Million free	polipletty theolog	d de la de la casa de l La casa de la	Freq Of	ffset 0 Hz
	4900 GHz							Stop 1.00	0000 GHz	Scale T	Type Lin
#Res BW	100 kHz		#VBW	300 kHz				7.248 ms (	(3021 pts)		
ISG							STATU	S			

Plot 7-12. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)



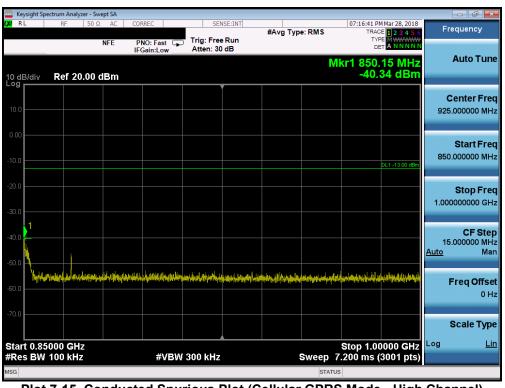
Plot 7-13. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 21 of 22
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 21 of 83
© 2018 PCTEST Engineering La	boratory. Inc.	•		V 8.0 03/13/2018



🔤 Keysight Sp	ectrum Analyze	er - Swept SA									
(XI RL	RF	50 Ω AC	CORREC			#Avg Type	e: RMS	TRAC	Mar 28, 2018	Fre	equency
		NFE	PNO: Fast IFGain:Low	Atten: 30							Auto Tune
10 dB/div Log	Ref 20.	00 dBm					N	1kr1 801. -52.	70 MHz 45 dBm		Auto Tune
209										c	enter Freq
10.0										427	.000000 MHz
0.00											Start Freq
-10.0									DL1 -13.00 dBm	30	.000000 MHz
-20.0											Stop Freq
-30.0										824	.000000 MHz
-30.0											CF Step
-40.0										79 Auto	400000 MHz. Man
-50.0									1	<u>//uto</u>	man
-60.0 <mark>1910,4</mark> 7	alalapop desemble de States al location de la	a na shiri ng panasa Masta da na Ni Ni Nasari	analises <mark>possible and an anna</mark> An hanna pagnalan a fachar an	reingelinstilletijketine Generalisetereinelise	and the second secon	an ang ang ang ang ang ang ang ang ang a	an a	¹ 11-111 service contraction (n 111-111 service contraction (n	and and the strength strength	F	req Offset 0 Hz
-70.0											0 THE
										;	Scale Type
Start 30.0 #Res BW			#VBW	/ 300 kHz		S	weep 3	Stop 8 8.11 ms (1	24.0 MHz 5881 pts)	Log	<u>Lin</u>
MSG							STATI				

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



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 22 of 22
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 22 of 83
© 2018 PCTEST Engineering La	boratory. Inc.			V 8.0 03/13/2018



	pectrum Analyzer -	Swept SA									5 ×
XV RL	RF 50		PNO: Fast	SEN	Run	#Avg Typ	e: RMS	TRAC	M Mar 28, 2018 DE <b>1 2 3 4 5</b> 6 PE M WWWWW T A N N N N N	Frequen	су
10 dB/div	Ref 10.00		IFGain:Low	#Atten: 3	6 dB		M	kr1 7.49	1 0 GHz 93 dBm	Auto	Tune
0.00										Center 5.50000000	
-10.0							.1		DL1 -13.00 dBm	Star 1.00000000	t Fred 00 GH:
-30.0	angen areas aller	alle places and a group alle places and a group		inssantin pilitiki Inspanitipseetiij	New Disease and	y ADA (a Yoggana) ^a labarah Maning Kagalan (a Kasarah		Tinggal Marakashr Tinggan Marakashr	n sagang katang pada bang bada sa	<b>Stop</b> 10.00000000	<b>Frec</b> 00 GH:
-50.0	uptolities (u. )									CF 900.00000 <u>Auto</u>	Ster MH Mai
70.0										Freq	Offse 0 H
-80.0										Scale	
Start 1.0 #Res BW	00 GHz / 1.0 MHz		#VBW	3.0 MHz		s	weep 1	Stop 10 5.60 ms (1	.000 GHz 8001 pts)	Log	Lir
MSG							STATU	S			

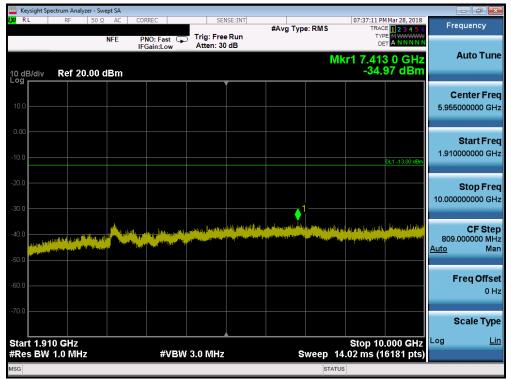
Plot 7-16. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 22 of 82
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 23 of 83
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Keysight Spectru										
XI RL	RF 50 Ω	NFE	DRREC	Trig: Free		#Avg Typ	e: RMS	TRAC	M Mar 28, 2018 DE 1 2 3 4 5 6 DE M WWWWW T A N N N N N	Frequency
10 dB/div R	ef 20.00 d		FGain:Low	Atten: 30	dB		Mk	r1 1.59	4 5 GHz 15 dBm	Auto Tune
10.0										Center Fre 937.500000 MH
10.00									DL1 -13.00 dBm	Start Fre 30.000000 M⊦
20.0										<b>Stop Fre</b> 1.845000000 G⊦
40.0 50.0 <b>Mathematik</b>		alisa ing sina bahasang			i, sticker filler men state filler Sen state och state state state	finanti in takana		1 ////////////////////////////////////		CF Ste 181.50000 MH Auto Ma
60.0										Freq Offs 0 H
70.0										Scale Typ
Start 0.0300 Res BW 1.0			#VBV	/ 3.0 MHz			Sweep 2	Stop 1.8 .420 ms (	3450 GHz 3631 pts)	Log <u>L</u>
ISG							STATUS			

Plot 7-17. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)



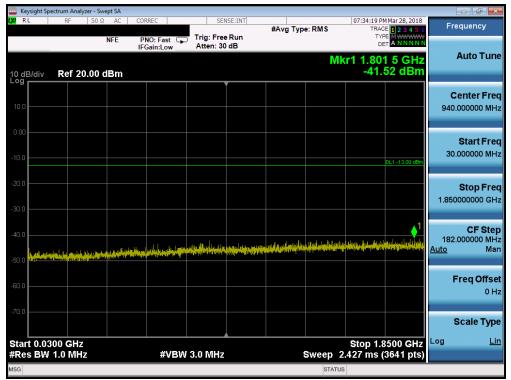
#### Plot 7-18. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 24 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 24 of 83



	um Analyzer - Sw	ept SA								
LXI RL	RF 50 Ω	AC CC	RREC		SE:INT	#Avg Type	e: RMS	TRAC	M Mar 28, 2018 DE 1 2 3 4 5 6	Frequency
		NFE F	NO:Fast 🖵 Gain:Low	Trig: Free Atten: 20				TYI DI	PE M WWWW ET A N N N N N	
10 dB/div	Ref 10.00 (	dBm					Mkr	1 18.08 -38.	3 5 GHz 01 dBm	Auto Tun
0.00										Center Free 15.000000000 GH
-10.0									DL1 -13.00 dBm	<b>Start Free</b> 10.000000000 GH
-30.0					at thank . If .		and a plating from the first	1	ر امر معمد م بعالفنا _{و عل}	<b>Stop Fre</b> 20.000000000 GH
-50.0 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	adamatan paharan Provinsi Angelar Patrick	l ha a faith an an a bhi	n <mark>uy) liyi uyi liyu co</mark>				and the second	a da a da		<b>CF Ste</b> 1.000000000 GH <u>Auto</u> Ma
-70.0										Freq Offse 0 H
-80.0										Scale Typ
Start 10.000 #Res BW 1.			#VBW	3.0 MHz		S	weep 25	Stop 20 .33 ms (2	.000 GHz 20001 pts)	Log <u>Li</u> i
MSG							STATUS			

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



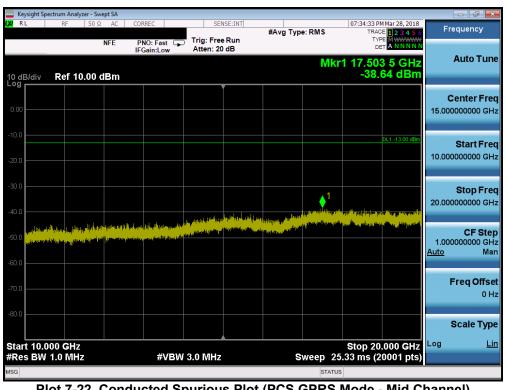
Plot 7-20. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 25 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 25 of 83
© 2018 PCTEST Engineering La	boratory Inc			V 8 0 03/13/2018



	pectrum Analyz	er - Swept SA								
X/RL	RF	50 Ω AC NFE	CORREC	Trig: Free		#Avg Typ	e: RMS	TRA	M Mar 28, 2018 CE 1 2 3 4 5 6 PE M WWWWW ET A N N N N N	Frequency
10 dB/div	Ref 20	.00 dBm	IFGain:Low	Atten: 30	dB		N	1kr1 3.65	,	Auto Tu
10.0										<b>Center Fr</b> 5.955000000 G
10.00									DL1 -13.00 dBm	<b>Start Fr</b> 1.910000000 G
20.0 30.0		1-								<b>Stop Fr</b> 10.000000000 G
40.0 ••••••••••	e line at let al statistic s constitue in francés de la constitue			a y bal biographic biographic biographic Al faile and a state of the s	nasimu jiwadin Malaini jiwadin	, den se de set de la company	and ^{ben} fight with Se ^{lande} rs stand	n haar da Daar marka ka midda maan in fan skant haag on die	S ₍₁ 999) - S (1)	CF St 809.000000 M <u>Auto</u> M
60.0										Freq Offs 0
5tart 1.9								Stop 10	.000 GHz	Scale Ty
	/ 1.0 MHz		#VBN	/ 3.0 MHz		S		14.02 ms (1	6181 pts)	
SG							STAT	05		

Plot 7-21. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)



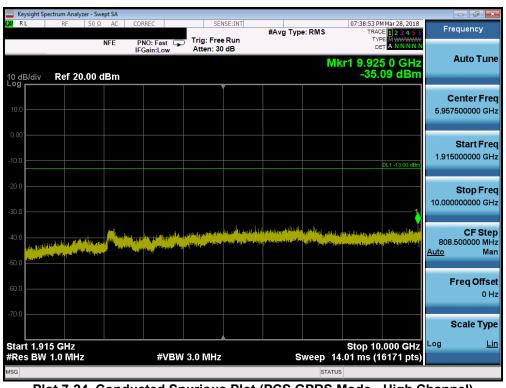
Plot 7-22. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 26 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 26 of 83
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🔤 Keysight Spect										
LXVI RL	RF 50	Ω AC NFE	CORREC	Trig: Free		#Avg Typ	e: RMS	TRAC	MMar 28, 2018 CE 1 2 3 4 5 6 PE M WWWWW ET A N N N N N	Frequency
10 dB/div Log	Ref 20.00	) dBm	IFGain:Low	Atten: 30	dB		М	kr1 1.71		Auto Tu
10.0										Center Fr 940.000000 M
-10.0									DL1 -13.00 dBm	Start Fr 30.000000 M
-20.0										<b>Stop Fr</b> 1.850000000 G
-40.0	مىللىغىن بىزىلار بايارى مىللىغىن بىزىلار بايارى	في المنابع	ada, hay ya ay	i a sy the first production of the		. Indentwork date	a hand a blan blan blan Barna a blan blan blan blan blan blan blan	alater for the state of the state	1 Kangulapituntus	CF St 182.000000 M <u>Auto</u> M
-60.0										Freq Offs 0
-70.0 Start 0.030								Stop 44		Scale Ty
#Res BW 1			#VBV	V 3.0 MHz			Sweep	2.427 ms (	8500 GHz (3641 pts)	
MSG							STATU	IS		

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



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 27 of 83
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 27 01 65
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	ectrum Analyze						- 6 -
LXI RL	RF	50 Ω AC	CORREC	SENSE:INT	#Avg Type: RMS	07:39:04 PM Mar 28, 2018 TRACE 1 2 3 4 5 6	Frequency
		NFE	PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 20 dB			
10 dB/div Log	Ref 10.0	00 dBm			MI	(r1 17.486 5 GHz -38.16 dBm	Auto Tune
0.00							Center Freq 15.000000000 GHz
-10.0						DL1 -13.00 dBm	Start Freq 10.000000000 GHz
-30.0				ر روار بر المراجع الم		a na star ta parta finlarita den go energine	<b>Stop Freq</b> 20.000000000 GHz
-50.0	of Harpelanagenatie United to the strength	, and a first build and here in the second secon	nay balay ayaa pala taraharan kasa bir saa ayaa ya ayaa ayaa kasa kasa kasa kas	ng padhana an Ang Dana ya Ang Dana ya Ang Dana ya Ang Mang an Kanta ya Mata ya Mang Dana ya Kang Dana ya Kang Mang an Kanta ya Mata ya Mang Dana ya Kang Dana ya Kang		and the product of th	<b>CF Step</b> 1.000000000 GHz <u>Auto</u> Mar
-70.0							Freq Offse 0 H:
-80.0							Scale Type
Start 10.0 #Res BW			#VBW	3.0 MHz	Sweep 2	Stop 20.000 GHz 25.33 ms (20001 pts)	Log <u>Lin</u>
MSG					STAT		

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

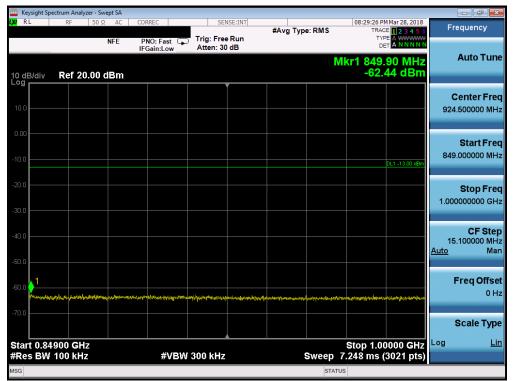
FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 20 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 28 of 83
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### Cellular WCDMA Mode

	ectrum Analyzer - Swep	ot SA									
RL .	RF 50 Ω	IFE P	RREC			#Avg Type	e: RMS	TRAC	4 Mar 28, 2018 E 1 2 3 4 5 6 A WWWWW A N N N N N	Fre	equency
10 dB/div	Ref 20.00 dl		Guin.eow				Μ	lkr1 822. -30.	85 MHz 88 dBm		Auto Tune
10.0											enter Fred 500000 MH
-10.0									DL1 -13.00 dBm	30.	Start Fre
-20.0									1	823.	<b>Stop Fre</b> .000000 МН
40.0										79. <u>Auto</u>	<b>CF Ste</b> 300000 MH Ma
60.0			a davati meneri maran ja ferano 1919 - Januari meneri marangan jaga kera	en en part a companya en part de la companya de la companya en part de la companya de la companya de la company	n lateration for the second		l) fangegende de segende biskeli gegelen fektione kan berge	المراجعين ( الأروب الرحم المراجع ). والمراجعين ( الأروب الرحم ) من المراجع ( المراجع ) من المراجع ( المراجع ) من المراجع ( المراجع ) من المراجع ( ا		F	F <b>req Offse</b> 0 H
-70.0										5	Scale Typ
Start 30.0 #Res BW			#VBW	300 kHz		s	weep 3	Stop 8 8.06 ms (1	20.0 191112	Log	<u>Lir</u>
MSG							STATU	IS			

Plot 7-26. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)



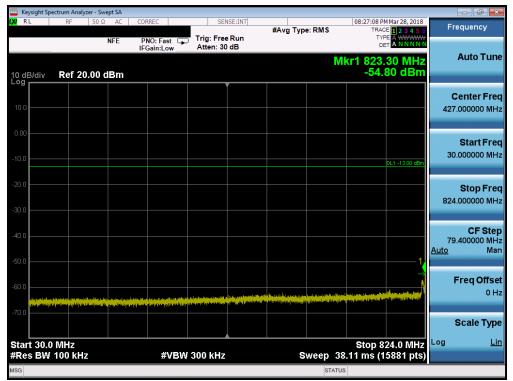
Plot 7-27. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 92
1M1803280056-02.ZNF 3/28-4/23/2018		Portable Handset	Page 29 of 83	
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	ectrum Analyzer -										
LXI RL	RF 50	Ω AC	CORREC	SEN	ISE:INT	#Avg Typ	e RMS	08:29:37 PM	Mar 28, 2018	Atten	uation
		NFE	PNO: Fast 🕞	Trig: Free				TYPE	A WWWWWW A N N N N N		
			IFGain:Low	#Atten: 3	0 dB					Me	ch Atten 30 dB
							MI	kr1 3.667	0 GHz 7 dBm	Auto	Mar
10 dB/div Log	Ref 10.00	0 dBm						-42.0			
					Í						
0.00											
-10.0								r	)L1 -13.00 dBm		
									21 - 13.00 dbii		
-20.0											
-30.0										Mech At	ten Ster
			. 1							2dB	10dE
-40.0			_ <b>\</b> '								
			<u>A mark</u>			ميرومية التليوية برواليل. مراجعة التأثير مريط برواليل			and the state for the second		
-50.0		tulla and a state					· ·				
Contraction of the											
-60.0											
70.0										Max	/lixer Lv
-70.0										-1	0.00 dBn
-80.0											
										Ma	x Mixer
										Lv	I Rules
Start 1.00								Stop 10.	000 GHz		Normal
#Res BW	1.0 MHz		#VBV	V 3.0 MHz		s		5.60 ms (18	3001 pts)		
MSG							STATU	S			





Plot 7-29. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 20 of 82
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 30 of 83
© 2018 PCTEST Engineering La	boratory, Inc.			V 8.0 03/13/2018



	ectrum Analyz	er - Swept SA									×
X/RL	RF	50 Ω AC	CORREC	SEN	SE:INT	#Avg Type	RMS	TRAC	M Mar 28, 2018	Frequency	
		NFE	PNO: Fast 🕞	Trig: Free Atten: 30		• •		TYI Di			
							N	lkr1 849.	50 MHz	Auto Tu	une
10 dB/div Log	Ref 20.	.00 dBm						-50.	12 dBm		
										Center F	rea
10.0										924.500000 N	
0.00										Start F	rea
-10.0										849.000000 N	
10.0									DL1 -13.00 dBm		
-20.0										Stop F	rea
										1.000000000	
-30.0											
-40.0										CF St	
1										15.100000 M Auto	Man
-50.0											
-60.0										Freq Off	fset
- XA.	~~~~~			a franktan (	h <del>haappan</del> anana		والمحاجز والمحاجز والمحاجز	in when for the sector	, y., g., Hadagiar, ~ 1,0%	0	) Hz
-70.0											
										Scale Ty	ype
Start 0.84	900 GHz	2						Stop 1.0	0000 GHz	Log	Lin
#Res BW			#VBW	/ 300 kHz		\$	Sweep	7.248 ms (	3021 pts)		
ISG							STATU	JS			

Plot 7-30. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)



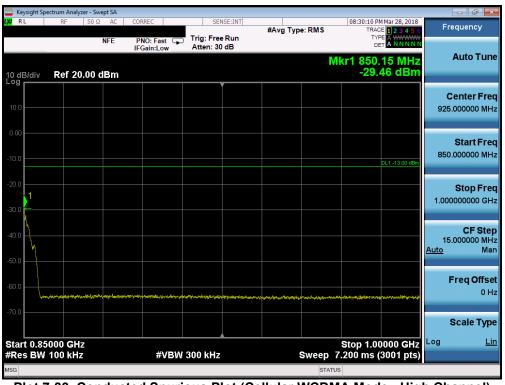
Plot 7-31. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 21 of 82
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 31 of 83
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	ectrum Analyzer -							
L <mark>XU</mark> RL	RF 5	0Ω AC NFE	CORREC	SENSE	#Avg T tun	ype: RMS	08:30:04 PM Mar 28, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
10 dB/div Log	Ref 20.0	0 dBm	IFGain:Low	Atten: 30 d	В	N	lkr1 821.70 MHz -61.36 dBm	Auto Tune
10.0								Center Freq 427.000000 MHz
-10.0							DL1 -13.00 dBm	Start Freq 30.000000 MHz
-20.0								<b>Stop Freq</b> 824.000000 MHz
-40.0								CF Step 79.400000 MHz <u>Auto</u> Mar
-60.0	anty Constant for a survey of experime in Surgey Start game Street as sur-		terreter beland to static to y they begin benefits yn frygdinger fan ser with the forser being	and the first sector of the first sector of the sector of	e, nove ( 1993) Aloren etter AlbiA, etmo I fanger fan en positier fan de fanger	propaga da Ali Hanna (tele Adala Nggaraga (Utara ata ata ata ata	nt hand a generative battlessing broken by the source of t	Freq Offset 0 Hz
-70.0								Scale Type
Start 30.0 #Res BW			#VBW	/ 300 kHz		Sweep 3	Stop 824.0 MHz 8.11 ms (15881 pts)	Log <u>Lin</u>
MSG						STATU		

Plot 7-32. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)



Plot 7-33. Conducted Spurious Plot (Cellular WCDMA Mode - High Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1803280056-02.ZNF 3/28-4/23/2018		Portable Handset	Page 32 of 83	
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	Spectrum Analyze									-0	
L <mark>XI</mark> RL	RF	50 Ω AC	CORREC	SEN	ISE:INT	#Avg Typ	e RMS		M Mar 28, 2018	Attenu	uation
		NFE	PNO: Fast 😱	Trig: Free		#A48.13b	e. KWIS	TY			
			IFGain:Low	#Atten: 3	) dB						ch Atten 30 dB
							Μ	kr1 7.45 -43.	5 0 GHz	Auto	30 dB Man
10 dB/div Log	Ref 10.	00 dBm						-43.	15 dBm		_
				Ì							
0.00											
0.00											
-10.0											
-10.0									DL1 -13.00 dBm		
-20.0											
-20.0											
-30.0											
00.0										Mech At	
-40.0							<u> </u>			<u>2dB</u>	10dB
40.0			<u>.</u>		مغالبة واستقريتهم إور	and the second second			Sugar Disagrand Spate		
-50.0		Sector States			and the loss office.	والمترجة والتجريمة متعام		Dept. Black and Barth			
	south distants										
-60.0											
-70.0											/lixer Lvl
										-1	0.00 dBm
-80.0											
											x Mixer
										Lv	I Rules► Normal
Start 1.0	000 GHz			0.0.0411-		_		Stop 10	.000 GHz		Normal
	W 1.0 MHz		#VBW	3.0 MHz		5		5.60 ms (1	8001 pts)		
MSG							STATU	JS			

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

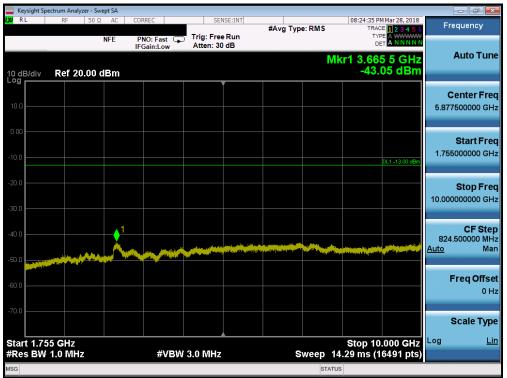
FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 22 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 33 of 83
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# AWS WCDMA Mode

	trum Analyzer - Swept SA					
X/RL	RF 50 Ω AC	PNO: Fast	SENSE:INT Trig: Free Run Atten: 30 dB	#Avg Type: RMS	08:24:29 PM Mar 28, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNNN	Frequency
10 dB/div Log	Ref 20.00 dBm		Atten of ab	Μ	kr1 1.705 0 GHz -34.61 dBm	Auto Tune
10.0						Center Fred 867.500000 MHz
-10.0					DL1 -13.00 dBm	Start Free 30.000000 MH;
-20.0					1,	Stop Fred 1.705000000 GH2
-40.0						CF Step 167.50000 MH <u>Auto</u> Mar
-60.0	neleya yanan kundari kundari kundari k	ياليان (متينا مايوني) بينيون (يمانيون ايماني) مايونين المايون	ag prophiling and a second of the second	under nich an eine der der der heit sind heit der		Freq Offse 0 Ha
-70.0						Scale Type
Start 0.030 #Res BW 1		#VBW	3.0 MHz	Sweep	Stop 1.7050 GHz 2.233 ms (3351 pts)	Log <u>Lir</u>
MSG				STATU	JS	

Plot 7-35. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)



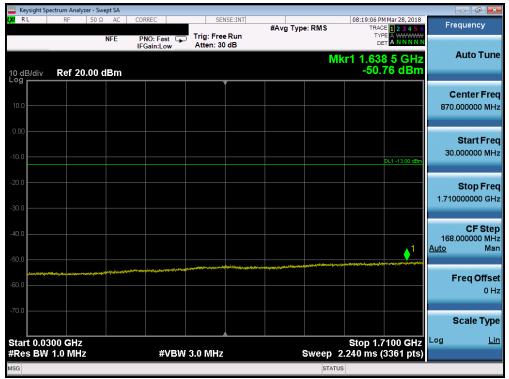
#### Plot 7-36. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	.G	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 24 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 34 of 83
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	pectrum Analyzer	- Swept SA									x
L <mark>XI</mark> RL	RF	50 Ω AC	CORREC		ISE:INT	#Avg Ty	pe: RMS	TRA	M Mar 28, 2018 CE 1 2 3 4 5 6	Frequency	
		NFE	PNO: Fast G	Trig: Free Atten: 20				TY D	PE A WWWWW ET A N N N N N		
10 dB/div	Ref 10.0	00 dBm					Mkr	1 17.89 -44.	3 0 GHz 28 dBm	Auto Tui	ne
				)						Center Fre	eq
0.00										15.00000000 GI	Hz
-10.0											
									DL1 -13.00 dBm	Start Fre	
-20.0										10.00000000 GI	Hz
-30.0										Oton En	
										Stop Fre	
-40.0								1 			
-50.0										CF Ste 1.00000000 GI	
	in the state of th			and the local division of the local division		and the second se				Auto Ma	
-60.0											
-70.0										Freq Offs	
										01	HZ
-80.0										Scale Typ	pe
01								<b>O</b> tom (2)			_in
Start 10. #Res BW	000 GHZ / 1.0 MHz		#VBW	/ 3.0 MHz		ş	Sweep 25	- Stop 20 .33 ms (2	.000 GHz 20001 pts)		
MSG							STATUS				

Plot 7-37. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)



Plot 7-38. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 92	
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 35 of 83	
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	pectrum Analyz										
L <mark>XI</mark> RL	RF	50 Ω AC	CORREC	SEI	NSE:INT	#Avg Typ	e: RMS		PM Mar 28, 2018 ACE 1 2 3 4 5 6	Frequence	су
		NFE	PNO: Fast	Trig: Free Atten: 30				т	YPE A WWWWW		
			IFGain:Low	Atten: 30						Auto	Tune
	Dof 20	.00 dBm					IVI	-42	)9 5 GHz .94 dBm		
10 dB/div	Rei 20	.00 06111			•						
										Center	Freq
10.0										5.87750000	0 GHz
0.00										Start	Freq
										1.75500000	
-10.0									DL1 -13.00 dBm		
-20.0											
-20.0											Freq
-30.0										10.0000000	0 GHz
-40.0							<u> </u>			CF 824.50000	Step
				and the second second	Supplices the			The second second second		824.50000 Auto	Man
-50.0 <mark>9990000</mark>				and an obligation of the second s				in, and a single provided by the second s			
and the second second										FreqC	Offset
-60.0										Trequ	0 Hz
-70.0										Scale	Type
										Scale	Type
Start 1.7								Stop 1	0.000 GHz	Log	Lin
#Res BW	/ 1.0 MHz		#VB	W 3.0 MHz		S	weep 1	4.29 ms (	16491 pts)		
MSG							STAT	US			

Plot 7-39. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)



Plot 7-40. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Г Туре:		
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 36 of 83	
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	pectrum Analyzer - Swe									-	- 6 ×
(XI RL	RF 50 Ω		DRREC		Run	#Avg Type	e: RMS	TRAC	M Mar 28, 2018 CE 1 2 3 4 5 6 DE A WWWWW A N N N N N	Fre	quency
10 dB/div Log	Ref 20.00 d	1	FGain:Low	Atten: 30	dB		Μ	kr1 1.68			Auto Tune
10.0											enter Freq 100000 MHz
-10.0									DL1 -13.00 dBm		Start Freq 100000 MHz
-20.0											<b>Stop Freq</b> 000000 GHz
-40.0							a manufaction and a second	en fransk men sterer fransk fransk fransk fransk fransk fransk fransk fransk forset for a forset for a forset f	1	168.0 <u>Auto</u>	CF Step 000000 MHz Man
-60.0	ny thain an jun air na an		1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -	AMM Bransware Single						F	r <b>eq Offset</b> 0 Hz
Start 0.03	300 GHz							Stop 1.7	7100 GHz	S Log	cale Type <u>Lin</u>
#Res BW			#VBW	3.0 MHz			Sweep	2.240 ms (	(3361 pts)		

Plot 7-41. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)



Plot 7-42. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 27 of 92	
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 37 of 83	
© 2018 PCTEST Engineering La	V 8.0 03/13/2018				



	ectrum Analyz								
L <mark>XI</mark> RL	RF	50 Ω AC	CORREC	SENSE		Type: RMS		1Mar 28, 2018 E 1 2 3 4 5 6	Frequency
		NFE	PNO: Fast G	Trig: Free R Atten: 20 d	lun	, jper time	TYP		
10 dB/div Log	Ref 10	.00 dBm				Mk	r1 17.901 -44.9	0 GHz 97 dBm	Auto Tune
0.00									Center Freq 15.000000000 GHz
-10.0								DL1 -13.00 dBm	Start Freq
-20.0									10.000000000 GHz
-30.0									Stop Freq 20.000000000 GHz
-40.0						ا مورد داده الارز المرافق المرافق الم	1	A.	CF Step
-50.0									1.00000000 GHz <u>Auto</u> Man
-70.0									Freq Offset 0 Hz
-80.0									Scale Type
Start 10.0 #Res BW			#VBN	/ 3.0 MHz		Sweep 2	Stop 20. 5.33 ms (2	000 0112	Log <u>Lin</u>
MSG						STATU	JS		

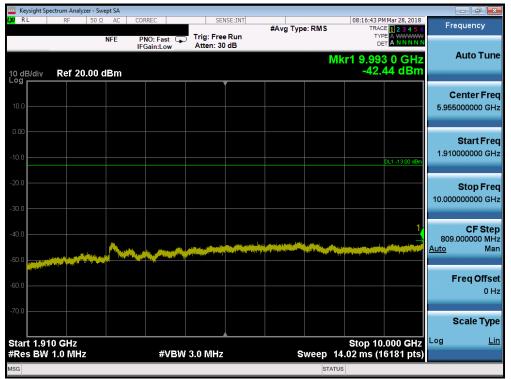
Plot 7-43. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 38 of 83
© 2018 PCTEST Engineering La	V 8.0 03/13/2018			



	pectrum Analyzer - Swept					
U RL	RF 50 Ω )	AC CORREC E PNO: Fast G IFGain:Low	SENSE:INT Trig: Free Run Atten: 30 dB	#Avg Type: RMS	08:16:37 PM Mar 28, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A NNNNN	Frequency
0 dB/div .og	Ref 20.00 dB			М	kr1 1.845 0 GHz -39.80 dBm	Auto Tur
10.0						Center Fre 937.500000 MH
10.0					DL1 -13.00 dBm	Start Fre 30.000000 Mi
20.0						<b>Stop Fre</b> 1.845000000 Gi
i0.0					1	<b>CF St</b> e 181.500000 Mi <u>Auto</u> M
i0.0	11188444974_04_0414149494447494479944898999797		general and a second	n na	944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 1944 - 194	Freq Offs 0
'0.0 <b></b>						Scale Ty
	300 GHz / 1.0 MHz	#VBW	3.0 MHz	Sweep	Stop 1.8450 GHz 2.420 ms (3631 pts)	Log <u>L</u>
	1.0 MHZ	#VBW	3.0 WHZ	sweep		

Plot 7-44. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



### Plot 7-45. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 92
1M1803280056-02.ZNF 3/28-4/23/2018		Portable Handset	Page 39 of 83	
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Keysight Spectrum Analy							
XIRL RF			SENSE:INT	#Avg Type:	RMS	08:16:50 PM Mar 28, 2018 TRACE 1 2 3 4 5 6 TYPE A	Frequency
10 dB/div Ref 10	NFE I 0.00 dBm		en: 20 dB		Mkr1	17.896 0 GHz -44.79 dBm	Auto Tun
0.00							Center Fre 15.000000000 GH
20.0						DL1 -13.00 dBm	Start Fre 10.00000000 GF
40.0					1		<b>Stop Fre</b> 20.00000000 GF
50.0							CF Ste 1.00000000 GH <u>Auto</u> Ma
70.0							Freq Offs 01
80.0							Scale Typ
Start 10.000 GHz Res BW 1.0 MH sg	Z	#VBW 3.0 I	MHz	Sw	reep 25.3	Stop 20.000 GHz 3 ms (20001 pts)	

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



Plot 7-47. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 92	
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 40 of 83	
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	ectrum Analyze	r - Swept SA										
I <mark>X/</mark> RL	RF	50 Ω AC	CORREC PNO: Fa		rig: Free		#Avg Typ	e: RMS	TRA	PM Mar 28, 2018 ACE 1 2 3 4 5 6 YPE A WWWWW DET A NNNN	Fred	quency
10 dB/div Log	Ref 20.0	00 dBm	IFGain:L	ow	Atten: 30	dB		М	kr1 7.50	)4 0 GHz .20 dBm	¢	luto Tune
10.0												enter Fred 000000 GHz
-10.0										DL1 -13.00 dBm		Start Fred 000000 GH2
-20.0												Stop Fred 000000 GH2
-40.0		~	~~					1	g an Anna San San San San San San San San San		809.0 <u>Auto</u>	CF Stej 00000 MH Mai
60.0											Fi	r <b>eq Offse</b> 0 H
Start 1.9'	10 GHz								Stop 1	0.000 0112	<b>S</b> Log	cale Type <u>Lir</u>
	1.0 MHz		#	VBW 3.	0 MHz		\$	weep 1	4.02 ms (	16181 pts)		

Plot 7-48. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)



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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:			
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 41 of 83	
© 2018 PCTEST Engineering La	V 8.0 03/13/2018				



🔤 Keysight Sp	ectrum Analyze	r - Swept SA							-	- • ×
LXI RL	RF	50 Ω AC	CORREC		Avg Type	RMS	TRAC	Mar 28, 2018	Fre	quency
		NFE	PNO: Fast 🖵 IFGain:Low	Trig: Free Atten: 30 d						Auto Tune
10 dB/div	Ref 20.0	00 dBm				Mk	r1 1.842 -49.0	2 0 GHz 64 dBm	^	
				Ĭ					Ce	enter Freq
10.0									940.0	000000 MHz
0.00										o =
-10.0										<b>Start Freq</b> 000000 MHz
								DL1 -13.00 dBm		
-20.0										Stop Freq
-30.0									1.8500	00000 GHZ
-40.0									400.0	CF Step
								1	Auto	Man
-50.0	Halings and subsequent	and the second second second	مەربەي بورىدى بورىدى بورىدى بورىدى بورىدى بورىدى بورىدى بور	anna ann agus an ann an	 		اللا <del>دۇنى رە</del> برسىتېرىكىيە	n nya kana kana kana kana kana kana kana	-	
-60.0									F	r <b>eq Offset</b> 0 Hz
-70.0										
									S	cale Type
Start 0.03 #Res BW			#VBM	3.0 MHz	s	ween 2	Stop 1.8	500 GHz 3641 pts)	Log	Lin
MSG	110-11112					STATUS		serr pas)		

Plot 7-50. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)



Plot 7-51. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 42 of 92	
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 42 of 83	
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	ectrum Analyz									-	
L <mark>XI</mark> RL	RF	50 Ω AC	CORREC	SEI	ISE:INT	#Avg Typ	e: RMS		M Mar 28, 2018 CE <b>1 2 3 4 5 6</b>	Freq	uency
		NFE	PNO: Fast IFGain:Low	Trig: Free Atten: 20				TY	PE A WWWWW ET A N N N N N		
10 dB/div Log	Ref 10	.00 dBm					Mk	r1 17.49 -44.	5 0 GHz 92 dBm	A	uto Tune
0.00											n <b>ter Freq</b> 00000 GHz
-10.0									DL1 -13.00 dBm		<b>tart Freq</b> 00000 GHz
-30.0							1-				<b>top Freq</b> 00000 GHz
-50.0										1.00000 <u>Auto</u>	<b>CF Step</b> 00000 GHz Man
-70.0										Fr	e <b>q Offset</b> 0 Hz
-80.0											ale Type
Start 10.0 #Res BW			#V	BW 3.0 MHz		s	weep 2	Stop 20 5.33 ms (2	0.000 GHz 20001 pts)	Log	Lin
MSG							STATU				

Plot 7-52. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 42 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 43 of 83
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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 $43 + \log_{10}(P_{[Watts]})$ , 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 > 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

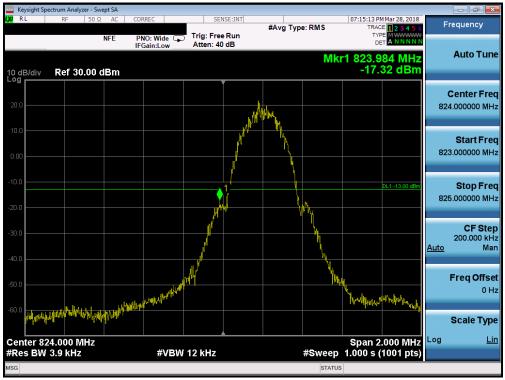
### Test Notes

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.

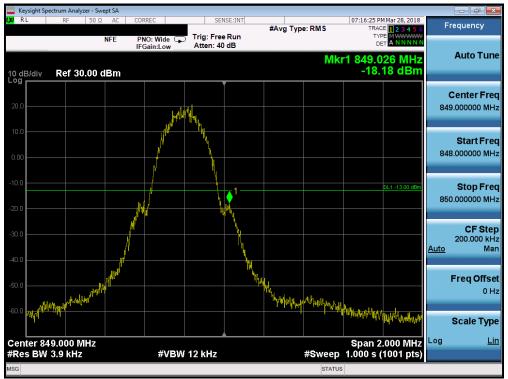
FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 44 of 92		
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 44 of 83		
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# Cellular GPRS Mode



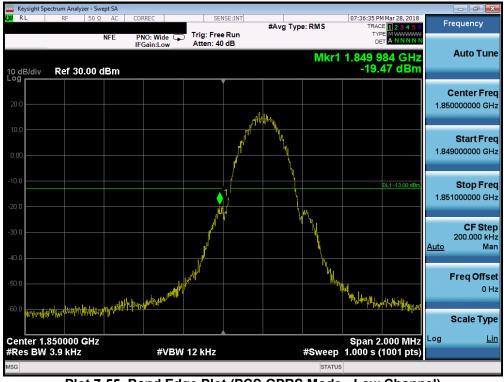
Plot 7-53. Band Edge Plot (Cellular GPRS Mode - Low Channel)



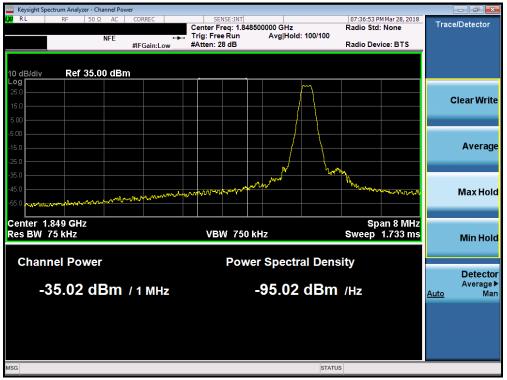
### Plot 7-54. Band Edge Plot (Cellular GPRS Mode - High Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Daga 45 of 92		
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 45 of 83		
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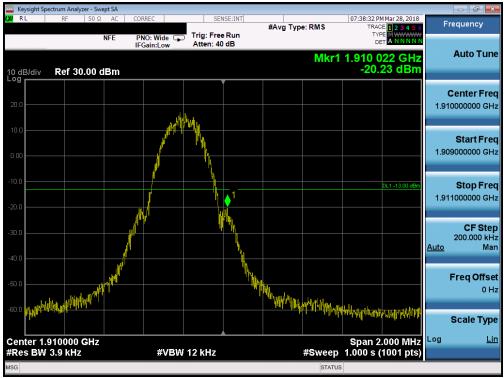
Plot 7-55. Band Edge Plot (PCS GPRS Mode - Low Channel)



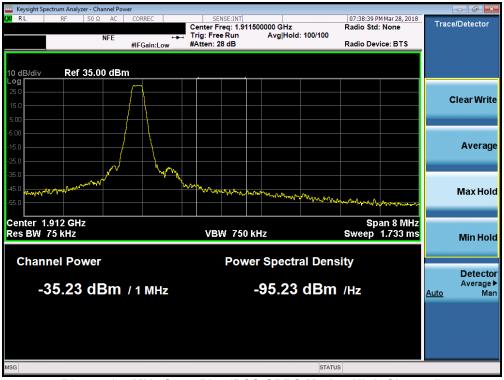
### Plot 7-56. 4MHz Span Plot (PCS GPRS Mode - Low Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 46 of 92		
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 46 of 83		
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### Plot 7-58. 4MHz Span Plot (PCS GPRS Mode - High Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:	st Report S/N: Test Dates: EUT Type:			Dage 47 of 92		
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 47 of 83		
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### Cellular WCDMA Mode



Plot 7-59. Band Edge Plot (Cellular WCDMA Mode - Low Channel)



### Plot 7-60. Band Edge Plot (Cellular WCDMA Mode - High Channel)

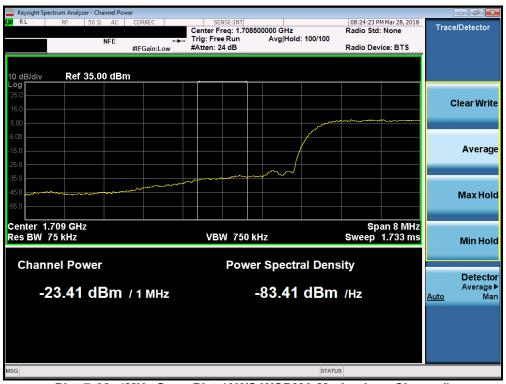
FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 49 of 92		
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 48 of 83		
© 2010 DOTECT Engineering La						



### AWS WCDMA Mode







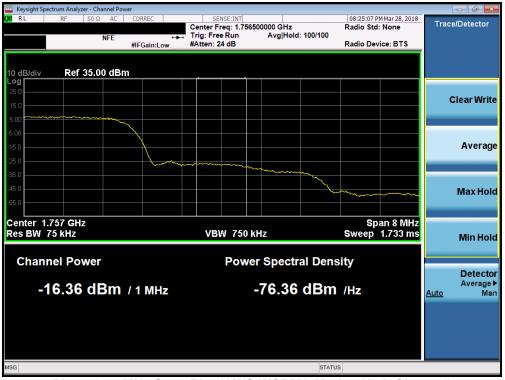
### Plot 7-62. 4MHz Span Plot (AWS WCDMA Mode - Low Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 92		
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 49 of 83		
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	ectrum Analyzer	- Swept SA					
XI RL	RF 5	50 Ω AC	CORREC	SENSE:INT	#Avg Type: RMS	08:25:01 PM Mar 28, 2018 TRACE 1 2 3 4 5 6	Frequency
		NFE	PNO: Wide C	Trig: Free Run Atten: 40 dB		DET A WWWWW	
10 dB/div Log	Ref 30.0	0 dBm			Mk	r1 1.755 000 GHz -16.89 dBm	Auto Tune
20.0							Center Fred 1.755000000 GH:
0.00			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				<b>Start Fre</b> 1.747500000 GH
-10.0				1		DL1 -13.00 dBm	Stop Free 1.762500000 GH
-30.0		)					<b>CF Stej</b> 1.500000 MH <u>Auto</u> Ma
-50.0						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Freq Offse 0 H
-60.0							Scale Type
Center 1. #Res BW	755000 GI 100 kHz	Hz	#VB	W 300 kHz	Sweep	Span 15.00 MHz 1.000 ms (1001 pts)	Log <u>Li</u>
ASG					STA	TUS	

Plot 7-63. Band Edge Plot (AWS WCDMA Mode - High Channel)



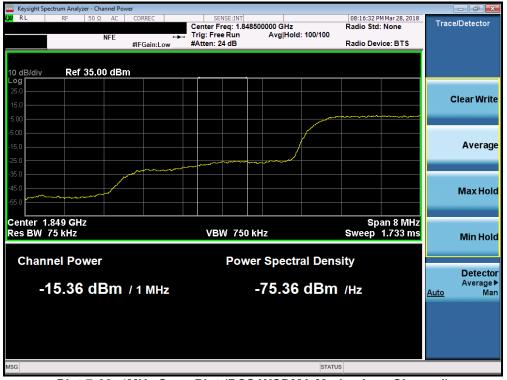
### Plot 7-64. 4MHz Span Plot (AWS WCDMA Mode - High Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	à	Approved by: Quality Manager		
Test Report S/N:	Test Dates: EUT Type:			Dage 50 of 92		
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 50 of 83		
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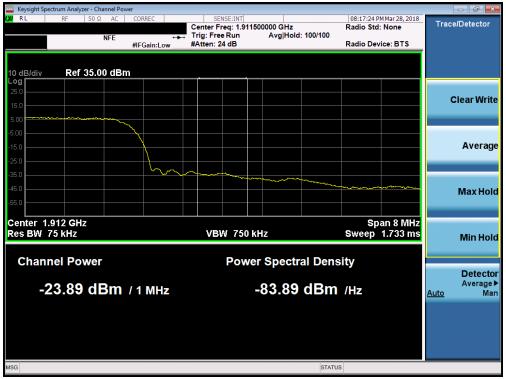
### Plot 7-66. 4MHz Span Plot (PCS WCDMA Mode - Low Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Daga E1 of 92		
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 51 of 83		
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	ectrum Analyzer - Swe	pt SA						
L <mark>XI</mark> RL	RF 50 Ω	AC (	CORREC	SENSE:IN	T #Avg Typ	e: RMS	08:17:18 PM Mar 28, 2018 TRACE 1 2 3 4 5 6	Frequency
	I	NFE	PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 40 dB			DET A WWWW	
10 dB/div Log	Ref 30.00 d	Bm				Mkr1	1.910 000 GHz -20.85 dBm	Auto Tune
								Center Fred
20.0								1.910000000 GHz
10.0			·····	m				Start Freq 1.902500000 GHz
0.00								1.302300000 6112
-10.0				1			DL1 -13.00 dBm	<b>Stop Freq</b> 1.917500000 GHz
-20.0								CF Step
-30.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			Γ.	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~		1.500000 MH: Auto Mar
-40.0						- Contraction	man	Ere a Offeet
-50.0								Freq Offsel 0 Hz
-60.0								Scale Type
	910000 GHz							Log <u>Lir</u>
#Res BW	100 kHz		#VBW	300 kHz			.000 ms (1001 pts)	
ISG						STATUS		





### Plot 7-68. 4MHz Span Plot (PCS WCDMA Mode - High Channel)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:	Daga 52 af 82				
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset	Page 52 of 83				
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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.



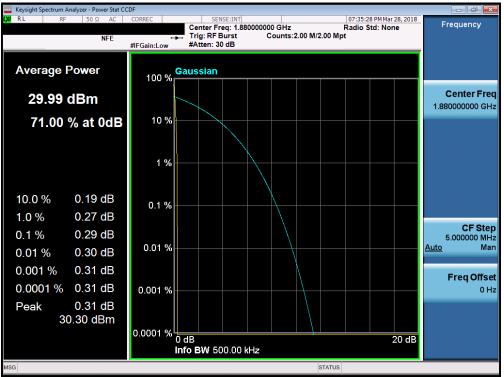
Figure 7-4. Test Instrument & Measurement Setup

### **Test Notes**

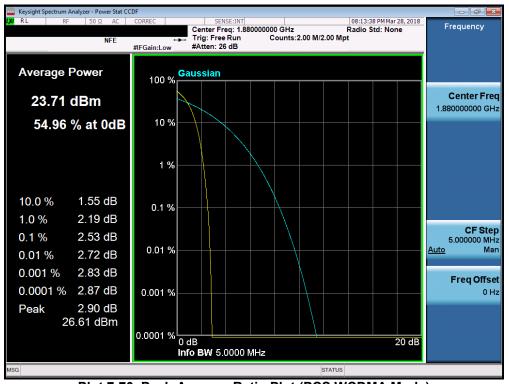
None

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 52 of 92
1M1803280056-02.ZNF	3/28-4/23/2018 Portable Handset			Page 53 of 83
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### Plot 7-70. Peak-Average Ratio Plot (PCS WCDMA Mode)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 54 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 54 of 83
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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  $\geq$  2 x span / RBW
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto". Trigger is set to enable triggering only on full power bursts with the sweep time set less than or equal to the transmission burst duration
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation. For signals with burst transmission, the "gating" function was enabled to ensure that measurements are performed during times in which the transmitter is operating at its maximum power
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 55 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 55 of 83
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### Test Setup

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

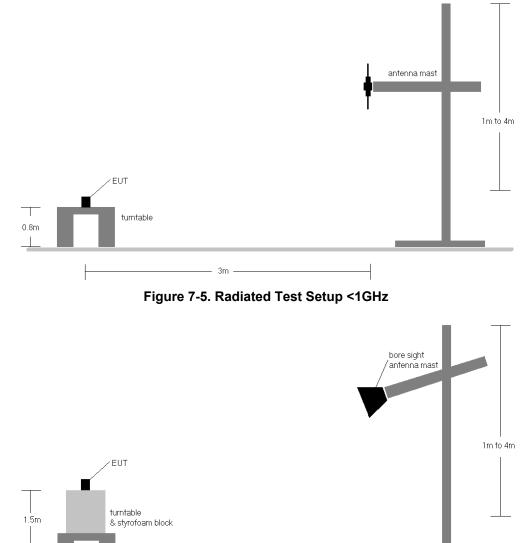


Figure 7-6. Radiated Test Setup >1GHz

3m —

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 56 of 82
1M1803280056-02.ZNF	3/28-4/23/2018	/23/2018 Portable Handset		Page 56 of 83
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- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."
- 3) This unit was tested with its standard battery.
- 4) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage E7 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 57 of 83
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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]
824.20	GPRS850	Н	150	188	28.78	1.50	28.13	38.45	-10.32	30.28	40.61	-10.33
836.60	GPRS850	н	150	195	27.95	1.50	27.30	38.45	-11.15	29.45	40.61	-11.16
848.80	GPRS850	Н	150	195	26.68	1.50	26.03	38.45	-12.42	28.18	40.61	-12.42
824.20	GPRS850	V	150	258	25.29	1.50	24.63	38.45	-13.82	26.78	40.61	-13.82
824.20	EDGE850	Н	150	188	24.43	1.50	23.78	38.45	-14.67	25.93	40.61	-14.68

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

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	Н	150	114	18.97	1.50	18.32	38.45	-20.13	20.47	40.61	-20.14
836.60	WCDMA850	н	150	359	19.52	1.50	18.87	38.45	-19.58	21.02	40.61	-19.59
846.60	WCDMA850	Н	150	104	18.76	1.50	18.11	38.45	-20.34	20.26	40.61	-20.35
836.60	WCDMA850	V	150	320	14.15	1.50	13.50	38.45	-24.95	15.65	40.61	-24.96

Table 7-3. 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	V	150	350	18.92	5.63	24.55	30.00	-5.45
1732.60	WCDMA1700	V	150	356	18.77	5.41	24.18	30.00	-5.82
1752.60	WCDMA1700	V	150	350	18.02	5.19	23.21	30.00	-6.79
1712.40	WCDMA1700	Н	150	64	18.55	5.55	24.10	30.00	-5.90

Table 7-4. EIRP (AWS WCDMA)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1850.20	GPRS1900	н	150	345	24.68	4.82	29.50	33.01	-3.51
1880.00	GPRS1900	н	150	150	24.12	4.74	28.86	33.01	-4.15
1909.80	GPRS1900	н	150	11	22.46	4.68	27.14	33.01	-5.87
1850.20	GPRS1900	V	150	274	19.95	4.82	24.77	33.01	-8.24
1850.20	EDGE1900	н	150	345	21.53	4.84	26.37	33.01	-6.64

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage EQ of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 58 of 83
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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]
1852.40	WCDMA1900	н	150	345	20.46	4.81	25.27	33.01	-7.74
1880.00	WCDMA1900	н	150	289	20.09	4.74	24.83	33.01	-8.18
1907.60	WCDMA1900	н	150	348	19.06	4.68	23.74	33.01	-9.27
1852.40	WCDMA1900	V	150	289	17.98	4.81	22.79	33.01	-10.22

Table 7-6. EIRP (PCS WCDMA)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage E0 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 59 of 83
© 2018 PCTEST Engineering La	V 8.0 03/13/2018			



### 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  $\geq$  2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 60 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 60 of 83
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EUT turntable 8. styrofoam block

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

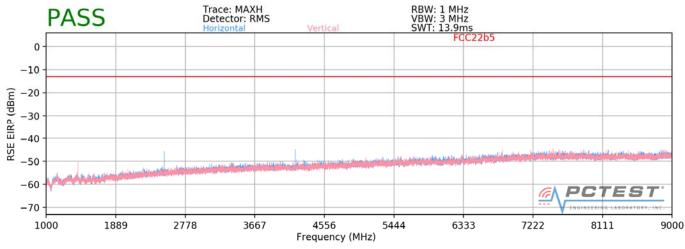
Figure 7-7. Test Instrument & Measurement Setup

### Test Notes

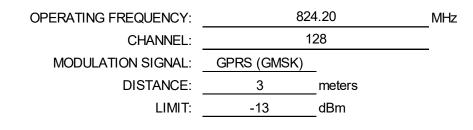
- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:			
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 61 of 83	
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### Plot 7-71. Radiated Spurious Plot 1GHz - 9GHz (Cellular GPRS)

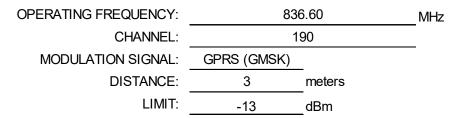


Frequenc [MHz]	y Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1648.40	н	150	243	-63.68	5.81	-57.86	-44.9
2472.60	Н	150	291	-50.32	5.72	-44.60	-31.6
3296.80	Н	-	-	-62.80	7.80	-55.00	-42.0

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 62 of 92	
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 62 of 83	
© 2018 PCTEST Engineering La	V 8.0 03/13/2018				





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	Н	150	225	-63.83	5.73	-58.11	-45.1
2509.80	Н	150	132	-55.69	5.77	-49.92	-36.9
3346.40	Н	-	-	-62.11	7.91	-54.21	-41.2

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

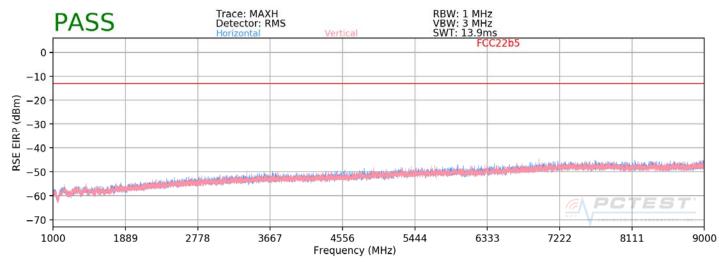
OPERATING FREQUENCY:	848	3.80	MHz
CHANNEL:	2	51	_
MODULATION SIGNAL:	GPRS (GMSK)	_	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]
1697.60	Н	-	-	-65.42	5.64	-59.78	-46.8
2546.40	Н	150	309	-57.27	5.90	-51.37	-38.4
3395.20	Н	-	-	-63.06	7.97	-55.09	-42.1

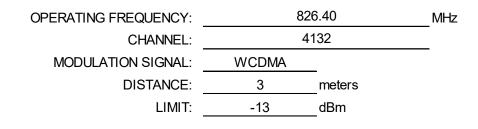
Table 7-9. Radiated Spurious Data (Cellular GPRS Mode – Ch. 251)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 62 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 63 of 83
© 2018 PCTEST Engineering La	V 8.0 03/13/2018			





### Plot 7-72. Radiated Spurious Plot 1GHz - 9GHz (Cellular WCDMA)

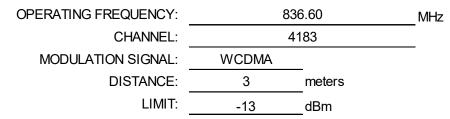


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1652.80	Н	-	-	-70.32	5.80	-64.52	-51.5
2479.20	Н	-	-	-67.49	5.73	-61.76	-48.8
3305.60	Н	-	-	-67.98	7.86	-60.12	-47.1

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 64 of 92		
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 64 of 83		
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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	Н	-	-	-70.45	5.73	-64.72	-51.7
2509.80	Н	-	-	-67.52	5.77	-61.76	-48.8
3346.40	Н	-	-	-68.10	7.91	-60.19	-47.2

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

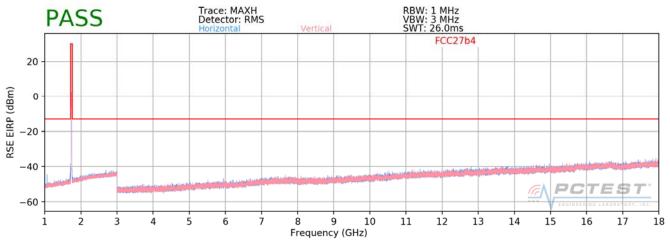
OPERATING FREQUENCY:	846	5.60 N	1Hz
CHANNEL:	42	233	
MODULATION SIGNAL:	WCDMA	_	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]
1693.20	Н	-	-	-70.61	5.66	-64.95	-52.0
2539.80	Н	-	-	-67.32	5.88	-61.45	-48.4
3386.40	Н	-	-	-67.79	7.96	-59.83	-46.8

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 65 of 92	
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 65 of 83	
© 2018 PCTEST Engineering La	V 8.0 03/13/2018				





Plot 7-73. Radiated Spurious Plot 1GHz - 18GHz (AWS WCDMA)

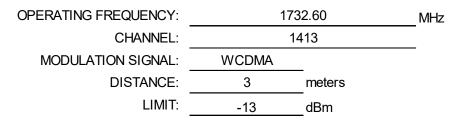
OPERATING FREQUENCY:	17	MHz	
CHANNEL:	1	312	
MODULATION SIGNAL:	WCDMA	_	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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]
3424.80	Н	-	-	-69.32	8.11	-61.20	-48.2
5137.20	Н	-	-	-67.77	10.24	-57.53	-44.5
6849.60	Н	-	-	-65.22	11.36	-53.86	-40.9

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 66 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 66 of 83
© 2018 PCTEST Engineering La	V 8.0 03/13/2018			





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	-	-	-67.79	8.33	-59.46	-46.5
5197.80	Н	-	-	-67.33	10.27	-57.06	-44.1
6930.40	Н	-	-	-64.21	11.42	-52.79	-39.8

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

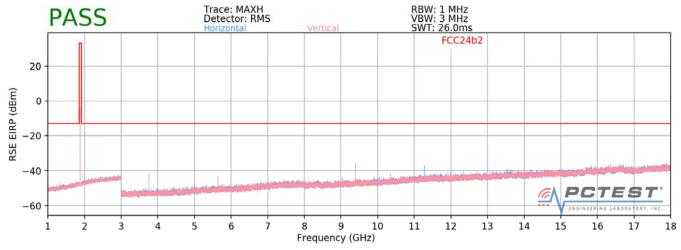
OPERATING FREQUENCY:	175	2.60 MHz	<u>.</u>
CHANNEL:	15	513	
MODULATION SIGNAL:	WCDMA	_	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

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	-	-	-67.76	8.52	-59.25	-46.2
5257.80	Н	-	-	-68.10	10.29	-57.81	-44.8
7010.40	Н	-	-	-66.11	11.50	-54.61	-41.6

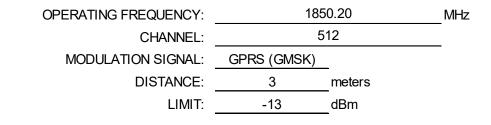
Table 7-15. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1513)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Report S/N: Test Dates: EUT Type:		Page 67 of 83
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset	Page 67 of 83
© 2018 PCTEST Engineering Lal	V 8.0 03/13/2018		







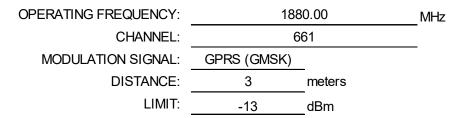


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3700.40	Н	150	163	-56.45	8.30	-48.15	-35.1
5550.60	Н	150	171	-58.47	10.52	-47.95	-34.9
7400.80	Н	-	-	-64.40	11.91	-52.49	-39.5

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:			
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 68 of 83	
© 2018 PCTEST Engineering La	V 8.0 03/13/2018				





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	н	150	357	-51.44	8.46	-42.99	-30.0
5640.00	Н	150	146	-60.59	10.60	-49.99	-37.0
7520.00	н	-	-	-58.07	12.11	-45.97	-33.0

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

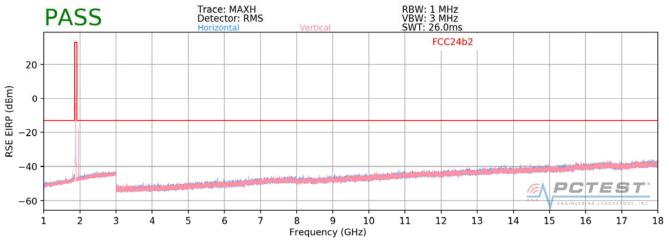
OPERATING FREQUENCY:	190	9.80	MHz
CHANNEL:	8	_	
MODULATION SIGNAL:	GPRS (GMSK)	_	
DISTANCE:	3	meters	
LIMIT:	-13	_dBm	

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	Н	150	279	-57.43	8.56	-48.87	-35.9
5729.40	Н	150	353	-54.59	10.64	-43.95	-30.9
7639.20	Н	-	-	-62.67	12.20	-50.47	-37.5

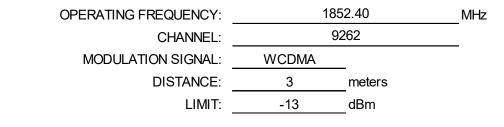
Table 7-18. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 60 of 82
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset	Page 69 of 83
© 2018 PCTEST Engineering La	V 8.0 03/13/2018		







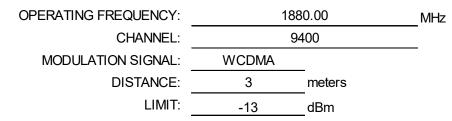


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3704.80	Н	150	39	-64.01	8.31	-55.70	-42.7
5557.20	Н	150	300	-64.95	10.54	-54.42	-41.4
7409.60	Н	-	-	-64.26	11.92	-52.34	-39.3

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 70 of 92	
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 70 of 83	
© 2018 PCTEST Engineering La	V 8.0 03/13/2018				





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	Н	-	-	-65.48	8.46	-57.02	-44.0
5640.00	Н	150	321	-64.38	10.60	-53.79	-40.8
7520.00	Н	-	-	-64.23	12.11	-52.12	-39.1

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

OPERATING FREQUENCY:	190	7.60	MHz
CHANNEL:	95	_	
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	Н	150	30	-61.16	8.56	-52.60	-39.6
5722.80	Н	150	231	-63.31	10.63	-52.68	-39.7
7630.40	Н	-	-	-65.57	12.18	-53.38	-40.4

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 71 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 71 of 83
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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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 70 of 92	
1M1803280056-02.ZNF	3/28-4/23/2018	B Portable Handset		Page 72 of 83	
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OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	190	
REFERENCE VOLTAGE:	3.80	VDC
<b>DEVIATION LIMIT:</b>	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,599,564	-436	-0.0000521
100 %		- 30	836,599,830	-170	-0.0000203
100 %		- 20	836,600,273	273	0.0000326
100 %		- 10	836,599,782	-218	-0.0000261
100 %		0	836,600,031	31	0.0000037
100 %		+ 10	836,599,570	-430	-0.0000514
100 %		+ 20	836,599,977	-23	-0.0000027
100 %		+ 30	836,600,311	311	0.0000372
100 %		+ 40	836,600,202	202	0.0000241
100 %		+ 50	836,599,608	-392	-0.0000469
BATT. ENDPOINT	3.40	+ 20	836,599,828	-172	-0.0000206

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 73 of 83
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset	Page 73 01 83
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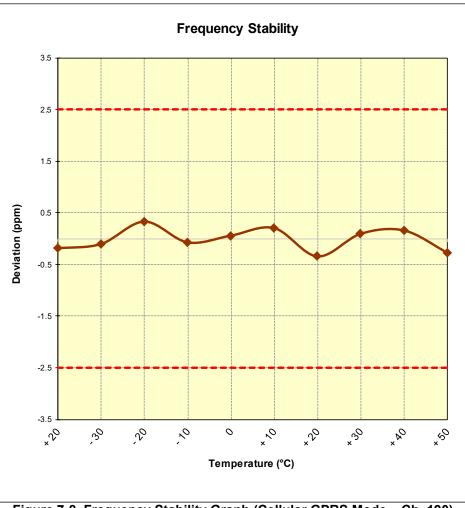


Figure 7-8. Frequency Stability Graph (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 74 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 74 of 83
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OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	4183	_
REFERENCE VOLTAGE:	3.80	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,599,903	-97	-0.0000116
100 %		- 30	836,599,873	-127	-0.0000152
100 %		- 20	836,600,001	1	0.0000001
100 %		- 10	836,599,842	-158	-0.0000189
100 %		0	836,600,047	47	0.0000056
100 %		+ 10	836,600,254	254	0.0000304
100 %		+ 20	836,600,449	449	0.0000537
100 %		+ 30	836,600,233	233	0.0000279
100 %		+ 40	836,599,634	-366	-0.0000437
100 %		+ 50	836,599,959	-41	-0.0000049
BATT. ENDPOINT	3.40	+ 20	836,599,705	-295	-0.0000353

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 75 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset	Page 75 of 83
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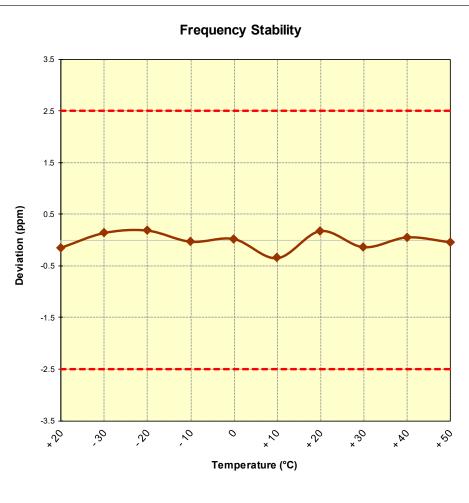


Figure 7-9. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 76 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 76 of 83
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OPERATING FREQUENCY:	1,732,600,000	Hz
CHANNEL:	1413	_
REFERENCE VOLTAGE:	3.80	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,600,130	130	0.0000075
100 %		- 30	1,732,599,958	-42	-0.0000024
100 %		- 20	1,732,599,861	-139	-0.0000080
100 %		- 10	1,732,600,049	49	0.0000028
100 %		0	1,732,600,087	87	0.0000050
100 %		+ 10	1,732,599,810	-190	-0.0000110
100 %		+ 20	1,732,599,961	-39	-0.0000023
100 %		+ 30	1,732,600,154	154	0.0000089
100 %		+ 40	1,732,599,895	-105	-0.0000061
100 %		+ 50	1,732,599,955	-45	-0.0000026
BATT. ENDPOINT	3.40	+ 20	1,732,599,802	-198	-0.0000114

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

### Note:

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dago 77 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 77 of 83
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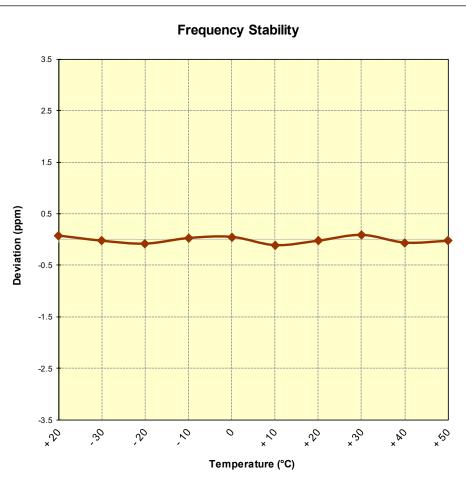


Figure 7-10. Frequency Stability Graph (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 70 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 78 of 83
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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	661	_
REFERENCE VOLTAGE:	3.80	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,880,000,477	477	0.0000254
100 %		- 30	1,880,000,019	19	0.0000010
100 %		- 20	1,879,999,791	-209	-0.0000111
100 %		- 10	1,880,000,209	209	0.0000111
100 %		0	1,879,999,797	-203	-0.0000108
100 %		+ 10	1,879,999,796	-204	-0.0000109
100 %		+ 20	1,879,999,833	-167	-0.0000089
100 %		+ 30	1,880,000,081	81	0.0000043
100 %		+ 40	1,880,000,466	466	0.0000248
100 %		+ 50	1,879,999,997	-3	-0.0000002
BATT. ENDPOINT	3.40	+ 20	1,880,000,145	145	0.0000077

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 70 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset	Page 79 of 83
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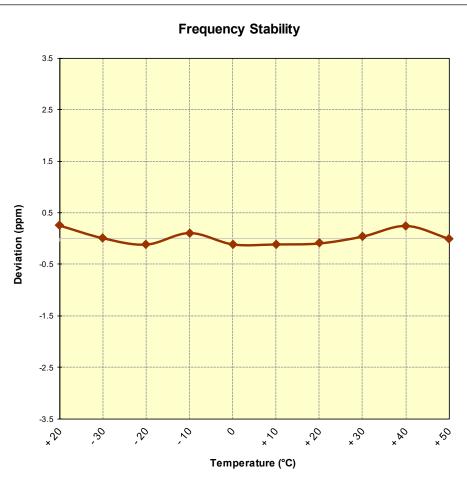


Figure 7-11. Frequency Stability Graph (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	G	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 90 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset		Page 80 of 83
© 2018 PCTEST Engineering Laboratory, Inc.			V 8.0 03/13/2018	



OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	9400	
REFERENCE VOLTAGE:	3.80	VDC
<b>DEVIATION LIMIT</b> :	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,887	-113	-0.0000060
100 %		- 30	1,880,000,120	120	0.0000064
100 %		- 20	1,880,000,128	128	0.0000068
100 %		- 10	1,880,000,028	28	0.0000015
100 %		0	1,879,999,730	-270	-0.0000144
100 %		+ 10	1,880,000,408	408	0.0000217
100 %		+ 20	1,879,999,911	-89	-0.0000047
100 %		+ 30	1,880,000,068	68	0.0000036
100 %		+ 40	1,880,000,251	251	0.0000134
100 %		+ 50	1,880,000,049	49	0.0000026
BATT. ENDPOINT	3.40	+ 20	1,880,000,017	17	0.0000009

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

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 01 of 02
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset	Page 81 of 83
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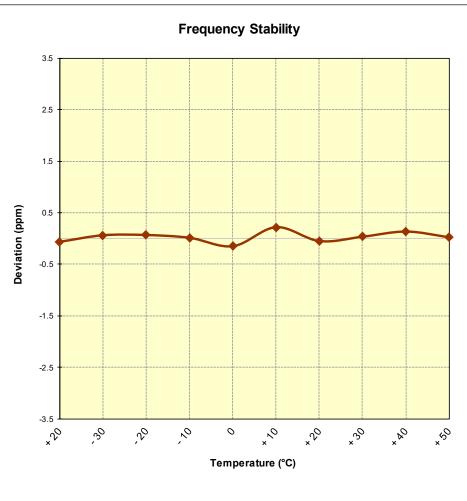


Figure 7-12. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 92 of 94
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset	Page 82 of 84
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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: ZNFQ710CS** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules.

FCC ID: ZNFQ710CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 92 of 92
1M1803280056-02.ZNF	3/28-4/23/2018	Portable Handset	Page 83 of 83
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