

PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. 410.290.6652 / Fax 410.290.6654 http://www.pctest.com



MEASUREMENT REPORT GSM/GPRS/EDGE/WCDMA

Applicant Name:

LG Electronics USA, Inc. 1000 Sylvan Avenue Englewood Cliffs, NJ 07632 United States Date of Testing: 3/28 - 4/18/2019 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1903280046-02-R1.ZNF

FCC ID:

ZNFQ720CS

APPLICANT:

LG Electronics USA, Inc.

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s):

Certification LM-Q720CS LMQ720CS, Q720CS Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 22, 24, & 27 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

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

This revised Test Report (S/N: 1M1903280046-02-R1.ZNF) supersedes and replaces the previously issued test report (S/N: 1M1903280046-02.ZNF) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

Randy Ortanez President



FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 1 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 1 of 85
© 2019 PCTEST Engineering Laboratory. Inc.				V 9.0 02/01/2019



TABLE OF CONTENTS

1.0	INTR	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	DESC	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	MEAS	SUREMENT UNCERTAINTY	.9				
5.0	TEST	EQUIPMENT CALIBRATION DATA	10				
6.0	SAM	PLE CALCULATIONS	11				
7.0	TEST	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)	56				
	7.7	Radiated Spurious Emissions Measurements	61				
	7.8 Frequency Stability / Temperature Variation						
8.0	CON	CLUSION	35				

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 2 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 2 of 85
© 2019 PCTEST Engineering Labora	atory Inc			V 9 0 02/01/2019





MEASUREMENT REPORT GSM / GPRS / EDGE / WCDMA



			Ef	RP	EI	RP	
Mode	FCC Rule	Tx Frequency (MHz)	Max.	Max.	Max.	Max.	Emission
IVIOUE	Part	TXTTEQUENCY (IVILIZ)	Power	Power	Power	Power	Designator
			(W)	(dBm)	(W)	(dBm)	
GPRS850	22H	824.2 - 848.8	0.496	26.96	0.814	29.11	243KGXW
EDGE850	22H	824.2 - 848.8	0.130	21.16	0.214	23.31	248KG7W
WCDMA850	22H	826.4 - 846.6	0.060	17.79	0.099	19.94	4M16F9W
WCDMA1700	27	1712.4 - 1752.6			0.187	22.72	4M15F9W
GPRS1900	24E	1850.2 - 1909.8			1.034	30.14	240KGXW
EDGE1900	24E	1850.2 - 1909.8			0.349	25.43	248KG7W
WCDMA1900	24E	1852.4 - 1907.6			0.221	23.44	4M18F9W

EUT Overview

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 2 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Page 3 of 85
© 2010 BCTEST Engineering Labora	tony Inc		V 0 0 02/01/2010



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: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 4 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 4 of 85
© 2019 PCTEST Engineering Labora	tory. Inc.	·		V 9.0 02/01/2019



2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFQ720CS**. 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.: 00316, 00317

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: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga E of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 5 of 85
© 2019 PCTEST Engineering Labora	atory. Inc.			V 9.0 02/01/2019



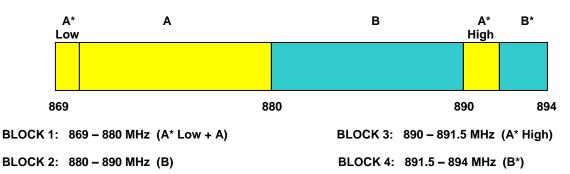
3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

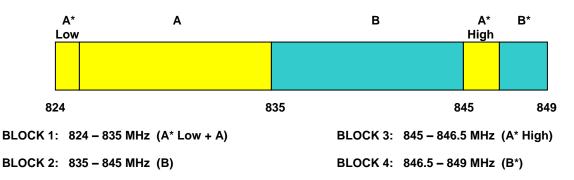
The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

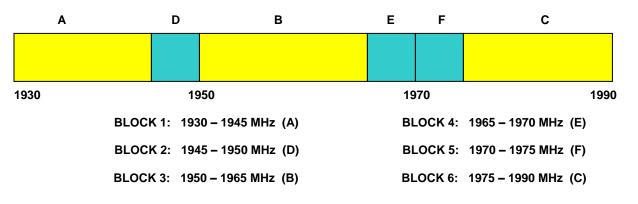
3.2 Cellular - Base Frequency Blocks



3.3 Cellular - Mobile Frequency Blocks



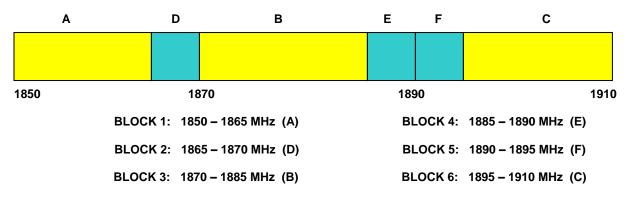
3.4 PCS - Base Frequency Blocks



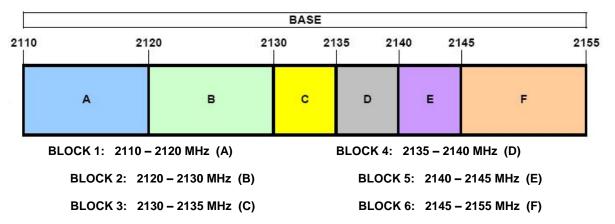
FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 6 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 6 of 85
© 2019 PCTEST Engineering Laboration	atory. Inc.	•		V 9.0 02/01/2019



3.5 PCS - Mobile Frequency Blocks



3.6 AWS - Base Frequency Blocks



3.7 AWS - Mobile Frequency Blocks

			MOBILE				
710	17	20	1730 1	735 17	40 17 	745	1758
	A	в	с	D	E	F	
0	BLOCK 1: 17	10 – 1720 MHz (A)		BLOCK	4: 1735 –	1740 MHz (D)	
	BLOCK 2: 17	20 – 1730 MHz (B)		BLOCK	5: 1740 –	1745 MHz (E)	
	BLOCK 3: 17	30 – 1735 MHz (C)		BLOCK	6: 1745 –	1755 MHz (F)	

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 7 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 7 of 85
© 2019 PCTEST Engineering Labora	atory Inc			V 9 0 02/01/2019



3.8 Radiated Measurements

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

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

Per the guidance of ANSI/TIA-603-E-2016, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

Where, P_d is the dipole equivalent power, P_g is the generator output into the substitution antenna, and the antenna gain is the gain of the substitute antenna used relative to either a half-wave dipole (dBd) or an isotropic source (dBi). The substitute level is equal to $P_{g [dBm]}$ – cable loss [dB].

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

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 9 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 8 of 85
© 2010 PCTEST Engineering Labor	aton/ Inc	•		V 0 0 02/01/2010



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: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 0 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 9 of 85
© 2010 PCTEST Engineering Labor	V 0 0 02/01/2010			



5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx3	LIcensed Transmitter Cable Set	8/23/2018	Annual	8/23/2019	LTx3
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/9/2018	Biennial	8/9/2020	135427
Espec	ESX-2CA	Environmental Chamber	4/28/2018	Annual	4/28/2019	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	Quad Ridge Horn Antenna 3/28/2018 Biennial		3/28/2020	128337
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/30/2018	4/30/2018 Annual 4/30		11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	TC-TA18	Vivaldi Antenna	8/17/2018	8/17/2018 Biennial 8/17/2		101072
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	9/19/2018	Annual	9/19/2019	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	5/21/2018	Annual	5/21/2019	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	8/9/2018	Annual	8/9/2019	100348
Rohde & Schwarz	CMW500	Radio Communication Tester	11/14/2018	Annual	11/14/2019	100976
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/18/2018	Annual	6/18/2019	102134
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107

Table 5-1. Test Equipment

Notes:

- 1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- 2. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N: Test Dates:		EUT Type:		Dage 10 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 10 of 85	
© 2019 PCTEST Engineering Labora	2019 PCTEST Engineering Laboratory Inc				



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: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 11 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 11 of 85
© 2010 PCTEST Engineering Labora	V 0 0 02/01/2010			



7.0 TEST RESULTS

7.1 Summary

Company Name:	LG Electronics USA, Inc.
FCC ID:	ZNFQ720CS
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 + 10 \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 < 2.5 ppm (Part 22)		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			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			PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5) RSS-139(6.6)	Radiated Spurious Emissions	> 43 + 10 log 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: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 12 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 12 of 85	
© 2019 PCTEST Engineering Labor	2019 PCTEST Engineering Laboratory Inc				



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 Note</u>s

None.

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 12 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 13 of 85
© 2019 PCTEST Engineering Labor	V 9.0 02/01/2019			





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



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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 14 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 14 of 85
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019			





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



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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 15 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 15 of 85
© 2019 PCTEST Engineering Labor	V 9 0 02/01/2019			





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



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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 16 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 16 of 85
© 2019 PCTEST Engineering Labor	V 9.0 02/01/2019			



Keysight Spectrum Analyzer - Occupied BW				
μXX RL RF 50Ω AC	🛶 Trig: F	SENSE:INT r Freq: 1.880000000 GHz Free Run Avg Hold:>1		Trace/Detector
	#IFGain:Low #Atten	n: 28 dB	Radio Device: BTS	
10 dB/div Ref 40.00 dBm				
30.0				Clear Write
20.0	and the second second	man manager and a second se		
0.00	/			
-10.0			10/2-016 0 0	Average
-20.0 -30.0			and and a second and	
-40.0				Max Hold
-50.0				
Center 1.88 GHz Res BW 150 kHz	#	VBW 470 kHz	Span 15 MHz Sweep 1 ms	Min Hold
Occupied Bandwidth	1	Total Power	33.0 dBm	
4.1	759 MHz			Detector Peak▶
Transmit Freq Error	4.319 kHz	% of OBW Power	99.00 %	Auto <u>Man</u>
x dB Bandwidth	4.790 MHz	x dB	-26.00 dB	
MSG			STATUS	

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 17 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 17 of 85
© 2010 DOTECT Engineering Labor	V 0 0 00/01/2010			



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

Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

Test Notes

Per 24.238(b), 27.53(h)(3), and RSS-133(6.5), RSS-139(6.5), compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1MHz, and 100 kHz or greater for Part 22 and RSS-132 measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

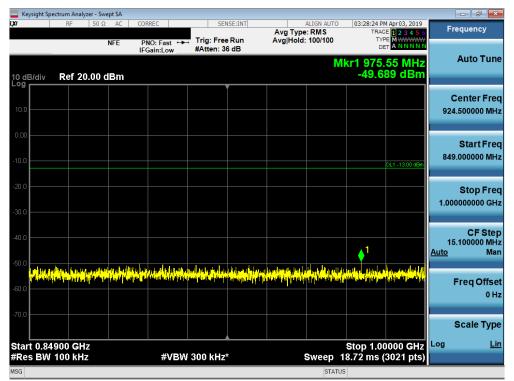
FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 18 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	rtable Handset	
© 2010 PCTEST Engineering Labor	\/ 0 0 02/01/2010			



Cellular GPRS Mode

	pectrum Anal												
(I	RF	50 Ω	AC	CORREC			SENSE:INT	Avg Typ		TRAC	1 Apr 03, 2019 E 1 2 3 4 5 6	Fi	requency
		١	IFE	PNO: IFGain	Fast ↔ :Low	Trig: Fr #Atten:		Avg Hold	: 100/100	TYF			
l0 dB/div	Ref 2	0.00 d	Bm						М	kr1 822. -41.9	30 MHz 56 dBm		Auto Tun
10.0													Center Fre 5.500000 MH
10.00											DL1 -13.00 dBm	3(Start Fre
20.0 30.0 												823	Stop Fre
40.0						- 14 houth		eta terte seteriti italiat	s and the state	nd montal last matters	1 darian department	79 <u>Auto</u>	CF Ste 9.300000 MI Ma
inder pri 60.0	replands (Breise Antes De., Seitern	an beredel a ang si a spila	adi se si se s A lla addita di se si se si A lla addita di se si	inita (Willia Milija presi	na na ang	an ana ana ang ang ang ang ang ang ang a	nije polozof († 1944) Line de Level († 1944) Line de Level († 1944)	a a a ta t	and an and a second	n yonaliya ya dan Ana	<mark>yi ayan yan</mark> i		Freq Offs 0 I
	0.5411-									0 45 m 0		Log	Scale Typ
itart 30. Res BW		7			#VRM	/ 300 kH	7*	9	ween 09	Stop 8: 33 ms./1	23.0 MHz 5861 pts)	Log	_
SG		-				- 000 MI	-		STATUS		000 i pis)	_	

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

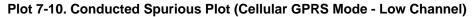


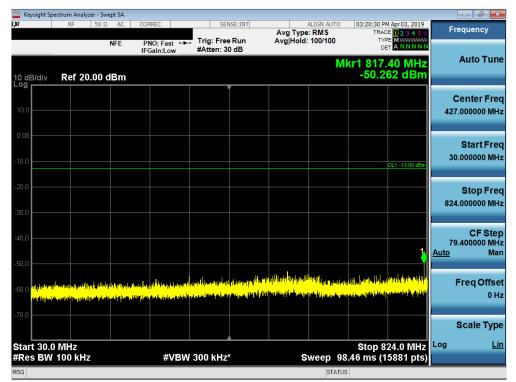
Plot 7-9. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 10 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Page 19 of 85
			11000001010010



	ectrum Analyze									- F
KI	RF	50 Ω AC	CORREC	SEN	ISE:INT	Avg Type	ALIGN AUTO	TRAC	4 Apr 03, 2019	Frequency
		NFE	PNO: Fast ← IFGain:Low	Trig: Free #Atten: 38	Run	Avg Hold:		TYF De		
I0 dB/div	Ref 20.	.00 dBm					М	kr1 6.56 -30.6	4 0 GHz 32 dBm	Auto Tu
10.0										Center F 5.500000000
0.00									DL1 -13.00 dBm	Start F 1.000000000 0
20.0						<u>1</u>				Stop F
30.0	utha and a state of the state o	holloolin to the solution	in fall ^{de} land stall stall Here a nd Here and de stall stall stall Here a ^{nd H} ere and stall st	الحوالين المربع والمراجع المحمد المربع المراجع المراجع	lanana articlarda 1 _{10 a} ng <mark>banang salahang salah</mark>	and particular washing a stated	dentari di stata Ny Noray Juna	^{la} ntela, karina di kad ^{Mala} na yang satu	lander for the state of the second state of th	CF S
50.0	a a shara a sh I shara a shara	Wells J. a. Brits, and an	in a start and a start and a start a st	(F) 1. (A)						900.000000 M <u>Auto</u> M
60.0										Freq Off C
70.0										Scale Ty
itart 1.00 Res BW			#VB	W 3.0 MHz	<u>د</u>	8	ween _1	Stop 10 5.60 ms (1	.000 GHz 8001 pts)	Log
SG	1.0 191112		<i>"</i> v D	N-0.0 WII 12			STATU		000 r pt3)	



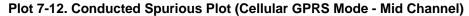


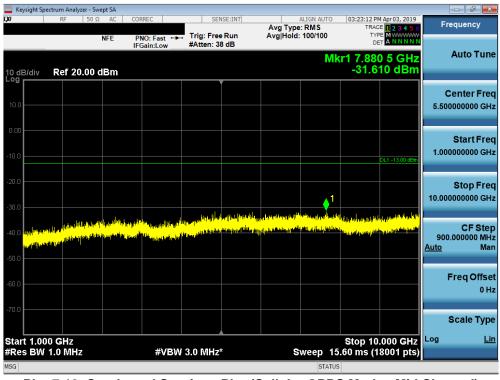
Plot 7-11. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 20 of 85
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019			



	ght Spectrum	Analyzer - Sw	ept SA									×
L X I	R	F 50 Ω	AC CC	RREC	SEN	ISE:INT		ALIGN AUTO		M Apr 03, 2019	Frequency	
10 dB/c	div Re	f 20.00 c	IF	PNO: Fast ↔ Gain:Low	. Trig: Free #Atten: 3		Avg Hold:	: 100/100	1kr1 855.		Auto T	une
10.0											Center F 924.500000	
-10.0										DL1 -13.00 dBm	Start F 849.000000	
-20.0 -											Stop F 1.000000000	
-40.0	•1 										CF S 15.100000 <u>Auto</u>	
<u>.</u>		dan para tang	n an the start of		hinne			en linetele i e	n in her her		Freq Of	fset 0 Hz
-70.0		011-							04		Scale T	ype Lin
	0.84900 BW 100			#VBW	300 kHz	*		Sweep	Stop 1.00 18.72 ms (0000 GHz 3021 pts)	209	
MSG								STAT				



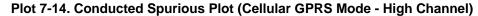


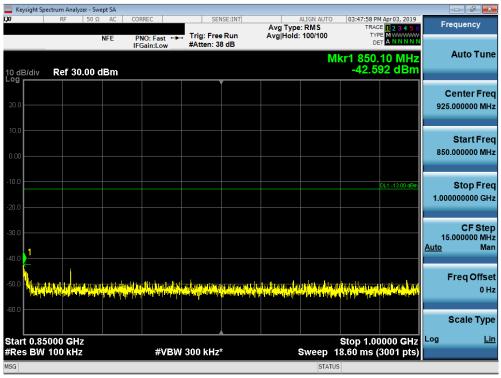
Plot 7-13. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 21 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		
© 2019 PCTEST Engineering Labor	V 9 0 02/01/2019			



	ectrum Analyze	er - Swept S	5A								
XI	RF	50Ω A	AC COP	REC	SEN	ISE:INT				M Apr 03, 2019 DE 1 2 3 4 5 6	Frequency
		NFE		NO: Fast ↔ Gain:Low	, Trig: Free #Atten: 38		Avg Hold:	: 100/100	TYI Di		Auto Tur
10 dB/div Log	Ref 30.	00 dBi	m						Mkr1 522 -46.8	.05 MHz 63 dBm	Auto Tune
											Center Free
20.0											427.000000 MH
10.0											Start Free
0.00											30.000000 MH
-10.0											
										DL1 -13.00 dBm	Stop Free 824.000000 MH
-20.0											
-30.0											CF Stej 79.400000 MH <u>Auto</u> Ma
-40.0							♦ ¹		الاست. ال	1. h. h	Freq Offse
-50.0 <mark>ofinite</mark>	ande dere der hijlinde	esteluariaed and herman	ipto destruit. Notable destruit.	al en andra faith à freide à f Talla de anna h-airte an dh	the detroit of the	in a sub the sub the sub- the sub-the sub-	n an	allala signa da la Signala signala	gint front the United States	a line in the line of the line	0 H
-60.0	and the state of the	Discust with		1							
											Scale Type
Start 30.0 #Res BW	0 MHz 100 kHz			#VBV	/ 300 kHz	*	s	weep	Stop 8 98.46 ms (1	24.0 MHz 5881 pts)	
MSG									ATUS		1





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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 22 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Handset	
© 2010 PCTEST Engineering Labor	\/ 9.0.02/01/2019			



🔤 Keysight Spectrum An	alyzer - Swept SA					
LXI RF	50 Ω AC	CORREC	SENSE:INT	ALIGN AU Avg Type: RMS	TO 03:48:55 PM Apr 03, 2019 TRACE 1 2 3 4 5 6	Frequency
	NFE	PNO: Fast +++ IFGain:Low	Trig: Free Run #Atten: 38 dB	Avg Hold: 100/100	D TYPE MWWWW DET A N N N N N	Auto Tune
10 dB/div Ref :	30.00 dBm				Mkr1 7.244 5 GHz -31.030 dBm	Auto Tune
			ľ			Center Freq
20.0						5.500000000 GHz
10.0						Start Freq
0.00						1.000000000 GHz
0.00						
-10.0					DL1 -13.00 dBm	Stop Freq
-20.0						10.00000000 GHz
-20.0						
-30.0	under the second biog	المراجع المراجع	ومتعادية أحجره والمتراز أمرازكم المتعدية والمتعا	hang panakang panaka	Al filmbanka, beatan ha bita a mina ting ting tari	CF Step 900.000000 MHz Auto Man
-40.0 and the Market	A data data any sala sala sala sala sala sala sala sal		international designation of the state	Reduction of the second se		
-50.0						Freq Offset
-30.0						0 Hz
-60.0						Deale Trme
						Scale Type
Start 1.000 GHz #Res BW 1.0 M	H7	#VBM	3.0 MHz*	Sween	Stop 10.000 GHz 15.60 ms (18001 pts)	Log <u>Lin</u>
MSG		# V D V V	5.0 MH2		ATUS	

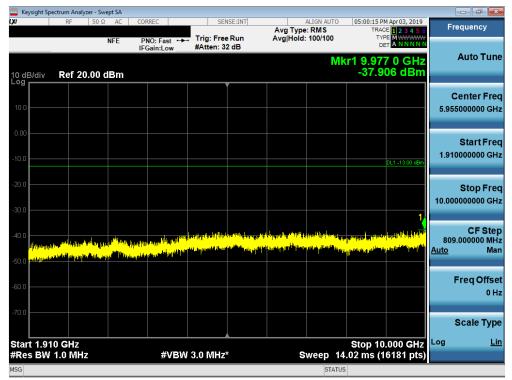
Plot 7-16. Conducted Spurious Plot (Cellular GPRS Mode - High Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Page 23 of 85		
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	ble Handset			
© 2010 PCTEST Engineering Laboratory Inc.						



Reysignt		nalyzer - Sv		00000			ICT THE			05.04.00.0			d X
	RF	50 5	AC	CORRE		SE	NSE:INT		ALIGN AUTO		M Apr 03, 2019	Freque	ncy
			NFE		Fast ↔ n:Low	Trig: Fre #Atten: 3		Avg Hold		TYF DE			
) dB/div	Ref	20.00	dBm						Mk	r1 1.65 -41.2	8 5 GHz 68 dBm	Aut	o Tui
												Cent 937.5000	
.00											DL1 -13.00 dBm	Sta 30.0000	ntFr 000 M
).0).0												Sto 1.8450000	op Fr 000 G
		r. 1967 a. alfa	ال مع ال		իլ ու տեղել	la <mark>h</mark> umu kelataala	المتقلدة للعور	a david davit kalenda	Naadda hiwaala			C 181.5000 Auto	CFSt 000 N N
3.0 111), 3.0			de a la alla				la da al anatas a	in eiter feltetilt, handl Regentrend typigenet	al phat data and a			Freq	l Offe 0
).0												Scal	
)300 G N 1.0 N				#VBW	3.0 MHz	*		Sweep 2	Stop 1.8 .420 ms (3450 GHz 3631 pts)	Log	ļ
G									STATUS				

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



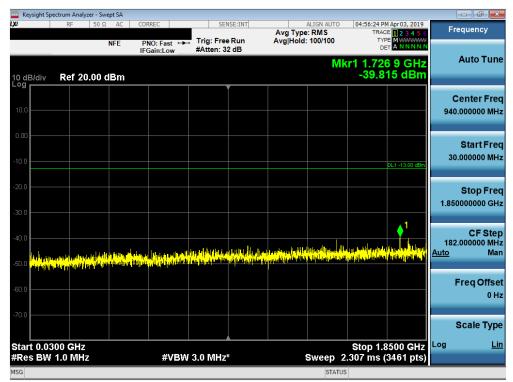
Plot 7-18. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 24 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 24 of 85
@ 0040 DOTEOT Excite series all all and	tens las			1/00000000000



		zer - Swept SA								- d	×
XI	RF	50 Ω AC NFE	CORREC	Trig: Free		Avg Type Avg Hold		TRAC	Apr 03, 2019 E 1 2 3 4 5 6 E M WWWW A N N N N N	Frequenc	у
10 dB/div	Ref 20).00 dBm	IFGain:Low	#Atten: 3	2 08		Mk	r1 16.57		Auto 1	ſun
10.0										Center 15.00000000	
10.00									DL1 -13.00 dBm	Start 10.000000000	
30.0						1				Stop 20.000000000	
40.0 Performante Performante	and differences in the second seco	Philipping and the second s	t bild sog og att stag og dit bag Vegdingelig fikeren	l disegeniigi la teli Thing genigi la teli	ak na mining katalan <mark>Tana ang katalang kat Ing katalang katalang</mark>	d _{en d} an de la derena de la derena de la deserva de la de La deserva de la deserva de La deserva de la deserva de		(in play in the play in the second		CF 1.000000000 <u>Auto</u>	
60.0										Freq O	offso 0 ⊢
70.0 Start 10.0									000 0112	Scale ⁻ Log	Тур <u>Li</u>
≉Res BW	1.0 MH	Z	#VBW	/ 3.0 MHz	*	s		5.33 ms (2	0001 pts)		
SG							STATU	JS			





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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 25 of 85
© 2019 PCTEST Engineering Labora	atory Inc			V 9 0 02/01/2019



- Keysig	ght Spectrum Ar	alyzer - Swe	ept SA										
L)XI	RF	50 Ω	AC	CORREC		SE	NSE:INT		ALIGN AUTO		M Apr 03, 2019	Freque	ency
			NFE	PNO: Fa	ast ↔ .ow	Trig: Fre #Atten: 3		Avg Hold	: 100/100	۲۷ ס kr1 7.34		Au	to Tune
10 dB/c	div Ref	20.00 d	IBm							-37.2	20 dBm		
10.0												Cent 5.955000	ter Freq 000 GHz
0.00													
													art Freq
-10.0											DL1 -13.00 dBm	1.910000	000 GHz
-20.0													
-30.0												10.000000	op Freq 000 GHz
40.0						the conditions	Malaille son suit.		lature betheidiketstutere				CF Step
, MA	n string and their	L. Hulton L.	allahun.	a della a litta	a na daga	and the second secon	الرور إمواد أأتابه	i i i i i i i i i i i i i i i i i i i		en na chuidhe aitean ag maidheacha aitean	- Jeanglithe adarter	809.000 Auto	000 MHz Man
-50.0 <mark>1²¹</mark>	<mark>h ni na pitang pinaké dika</mark>	a a la construction de la construcción de la construcción de la construcción de la construcción de la construcc	A CONTRACTOR	a di kandiji ka	44								
-60.0												Free	q Offset 0 Hz
-70.0													0112
-70.0												Sca	Іе Туре
	1.910 GHz BW 1.0 M				≠vbw	3.0 MHz	*	s	weep 1	Stop 10 4.02 ms (1	.000 GHz 6181 pts)	Log	<u>Lin</u>
MSG									STATU				

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



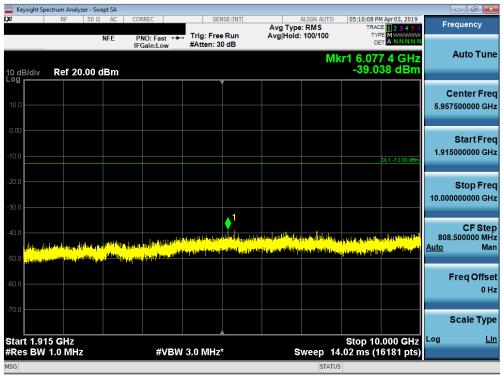
Plot 7-22. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 26 of 85
© 2010 PCTEST Engineering Labor	aton/ Inc	·		V 0.0.02/01/2010



	ysight Spe	ctrum An	alyzer - Swe	pt SA									
L X I		RF	50 Ω	AC (ORREC	SEI	NSE:INT		ALIGN AUTO		M Apr 03, 2019	Fr	equency
					PNO: Fast ↔ IFGain:Low	Trig: Free #Atten: 3		Avg Hold:	: 100/100	TYF DE (r1 1.79)			Auto Tune
10 di Log	B/div	Ref :	30.00 d	Bm						-42.7	30 dBm		
20.0													enter Freq .000000 MHz
10.0 0.00												30	Start Freq .000000 MHz
-10.0											DL1 -13.00 dBm	1.85	Stop Freq
-30.0											1	182 <u>Auto</u>	CF Step .000000 MHz Man
				t de flade			an di di anda Mana ang bahan						Freq Offset 0 Hz
-60.0													Scale Type
	t0.03 sBW				#VBM	/ 3.0 MHz	*		Sweep_2		3500 GHz 3641 pts)	Log	<u>Lin</u>
MSG									STATUS				

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



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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 27 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 27 of 85
© 2019 PCTEST Engineering Labor	atory Inc			V 9 0 02/01/2019



	pectrum Analy										
XI	RF	50 Ω /	AC COF	RREC	SEN	ISE:INT		ALIGN AUT		M Apr 03, 2019 CE 1 2 3 4 5 6	Frequency
	_	NF		NO: Fast 🔸 Gain:Low	Trig: Free #Atten: 30		Avg Hold	: 100/100	T) E		Auto Tun
10 dB/div Log	Ref 20	0.00 dB	m					M	kr1 19.41 -33.3	0 5 GHz 324 dBm	Auto Tuli
											Center Fre
10.0											15.000000000 GH
0.00											Start Fre
-10.0										DL1 -13.00 dBm	10.000000000 GH
-20.0											Stop Fre
-30.0										1	20.000000000 GH
-40.0				والمرافر الم		n a la telebra de la dela	Lister & Allendia	And the second	topologica subtractivation	her the weter	CF Ste
-40.0 web.00	al ile is de l'étable de la Real de la complete de la complete		n den den den den den den den den den de	ti et i ten f ^{il} tind ^{tenne} t et i	Nelsenikerski Nelsenikerski	and a first a f		i i i i i i i i i i i i i i i i i i i	an a		1.000000000 GH <u>Auto</u> Ma
-30.0											Freq Offse
-60.0											0 H
-70.0											Scale Type
Start 10.	000 CH7				,				Stop 2	0.000 GHz	Log Li
#Res BW		z		#VBW	3.0 MHz	*	s	weep	25.33 ms (2	20001 pts)	
MSG								STA	TUS		

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

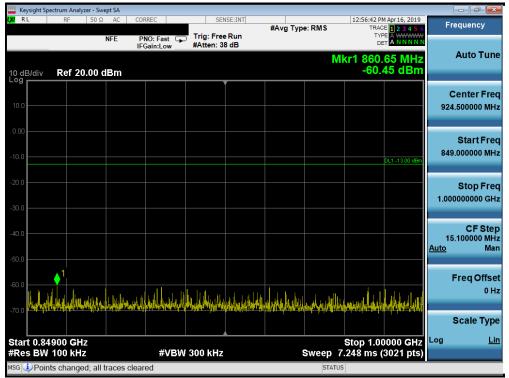
FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 28 of 85
© 2010 DCTEST Engineering Lobor	aton / Inc			V 0 0 02/01/2010



Cellular WCDMA Mode

🔤 Keysight Spectrum Analy	/zer - Swept SA					
LXURL RF	NFE		SENSE:INT	#Avg Type: RMS	12:56:38 PM Apr 16, 2019 TRACE 1 2 3 4 5 6 TYPE A WAWWW DET A N N N N N	Frequency
	0.00 dBm	FGain:Low **	Atten: 30 dB		Mkr1 822.80 MHz -29.36 dBm	Auto Tune
10.0						Center Frec 426.500000 MHz
-10.0					DL1 -13.00 dBm	Start Free 30.000000 MHa
-20.0					1	Stop Fred 823.000000 MHz
-40.0						CF Step 79.300000 MH <u>Auto</u> Mar
-60.0	ustalia, ata diskatura taka	الأسران الترجيب المراجع	elado, la propio regilado	l Marianti yaku basa la kada mba katu sasa	(the full ment for a first for the full ment of the full	Freq Offse 0 H:
and a second second of the second	nie weeksender, dat sie en ein geheben.	and the second	alantan sette polity kay amandaki	en mar an frankrik an		Scale Type
Start 30.0 MHz #Res BW 100 kH	Z	#VBW 30	0 kHz	Sweep	Stop 823.0 MHz 38.06 ms (15861 pts)	
MSG				STA	TUS	

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



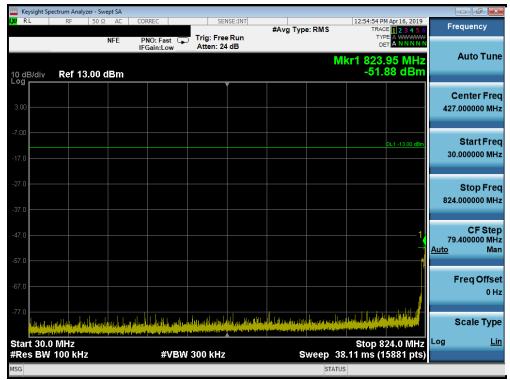
Plot 7-27. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 29 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Fage 29 01 65

Construction of the second of the secon



	ectrum Analyzer -	Swept SA							
X/RL	RF 5	DΩ AC	CORREC	SENSE	#Avg	Type: RMS	12:56:58 PM A TRACE	1 2 3 4 5 6	Frequency
		NFE	PNO: Fast IFGain:Low	Trig: Free R #Atten: 38 c					
I0 dB/div	Ref 10.0	0 dBm				M	kr1 6.205 -43.03	5 GHz 3 dBm	Auto Tun
				Ĭ					Center Fre
0.00									5.500000000 GH
0.0							DL:	1 -13.00 dBm	Start Fre
20.0									1.000000000 GH
30.0									
30.0					. 1				Stop Fre 10.000000000 GH
50.0						th <mark>lerestypeneger</mark>	hadhanna bu	(nad tailed)	CF Ste
	And Provinsion	רדרי יא קראר איניו איניאליילייאר אינייייי		and the second secon	Standard and a state of the sta	and a second as president to be a set	tre contraction of the	and a start of the second s	900.000000 MH <u>Auto</u> Ma
i0.0 	fe out an en								
70.0									Freq Offs 0 H
:0.0									
									Scale Typ
tart 1.00 Res BW	00 GHz 1.0 MHz		#VBW	3.0 MHz		Sweep 1	Stop 10.0 5.60 ms (180	00 GHz)01 pts)	Log <u>L</u>
SG						STATU	-		



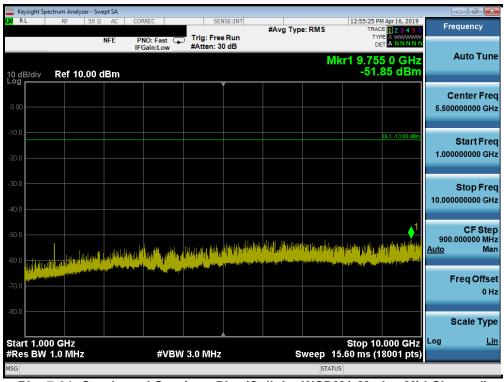
Plot 7-29. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 95
1M1903280046-02-R1.ZNF 3/28 - 4/18/2019		Portable Handset	Page 30 of 85	
© 2019 PCTEST Engineering Labora	atory Inc			V 9 0 02/01/2019



	ectrum Analyze	er - Swept SA									
LX/I RL	RF	50 Ω AC	CORREC			#Avg Type	e: RMS	TRAC	Apr 16, 2019 E 1 2 3 4 5 6 E A M N N N N	Frequ	ency
10 dB/div	Ref 13.	00 dBm	IFGain:Low	Atten: 24	ub		Μ	kr1 849.		Au	to Tune
3.00											ter Freq 1000 MHz
-7.00									DL1 -13.00 dBm		art Freq 1000 MHz
-27.0										St 1.000000	op Freq 1000 GHz
-47.0 -1											CF Step 0000 MH: Mar
-67.0		4								Fre	q Offset 0 Hz
-77.0	ihait haladiad	history Wheeli	and had all hitself	hand	weighted and	enterferense and a state	had die die die die die die die die die di	whender	giantic land Alphymore	Sca	le Type
Start 0.84 #Res BW			#VBV	V 300 kHz			Sweep 7		0000 GHz 3021 pts)	Log	Lin
MSG							STATUS	S			

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

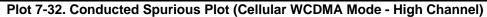


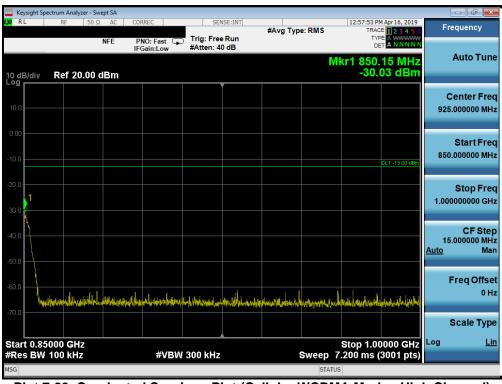
Plot 7-31. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 21 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 31 of 85
© 2019 PCTEST Engineering Labor	atory Inc			V 9 0 02/01/2019



	rum Analyzer - Swept SA					
X/ RL	RF 50 Ω AC		SENSE:INT	#Avg Type: RMS	12:57:43 PM Apr 16, 201 TRACE 1 2 3 4 5 TYPE A WWWW DET A NNNN	6 Frequency ₩
10 dB/div	Ref 20.00 dBm				Mkr1 787.20 MH -60.16 dBn	z Auto Tune 1
10.0						Center Fred 427.000000 MHz
-10.0					DL1 -13.00 dB	Start Free 30.000000 MHz
-20.0						Stop Fred 824.000000 MH;
40.0						CF Stej 79.400000 MH <u>Auto</u> Ma
60.0	dank daga a para a di Maraka burat.	understand and the funder	Paraller of the stand	altadaetallanaa pa Inconstansili	1	Freq Offse 0 H
-70.0 4-14-14-14-14-14-14-14-14-14-14-14-14-14	nandi, bh. lin, tana a shan shadi, fé e na har, di e na	, and , and the later of a second pair of the second second second second second second second second second s				Scale Type
Start 30.0 N #Res BW 10		#VBW 300	kHz	Sweep	Stop 824.0 MH 38.11 ms (15881 pts	z Log <u>Lir</u> 5)





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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 32 of 85	
© 2019 PCTEST Engineering Laboration	atory Inc			V 9 0 02/01/2019	



	ectrum Analyzer - S	wept SA								
<mark>0</mark> RL	RF 50	NFE I	DRREC PNO: Fast Gain:Low		#Avg Type	e: RMS	TRAC TYP	Apr 16, 2019 E 1 2 3 4 5 6 E A WWWWW T A N N N N N	Freq	luency
0 dB/div	Ref 10.00	dBm				Mk	r1 9.737 -41.4	7 5 GHz 49 dBm	A	uto Tune
0.00										nter Fred 00000 GH
20.0								DL1 -13.00 dBm		Start Free 00000 GH:
10.0								1		Stop Fre 00000 GH
					n Hand Aberly Internet			haphty _{ta} ta (1967) National (1967)	900.0 <u>Auto</u>	CF Ste 00000 MH Ma
0.0									Fr	eq Offse 0 H
30.0	00 GH7						Stop 10	.000 GHz	So Log	cale Typ <u>Li</u>
	1.0 MHz		#VBW	3.0 MHz	S	weep 15	.60 ms (1	8001 pts)	_	

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

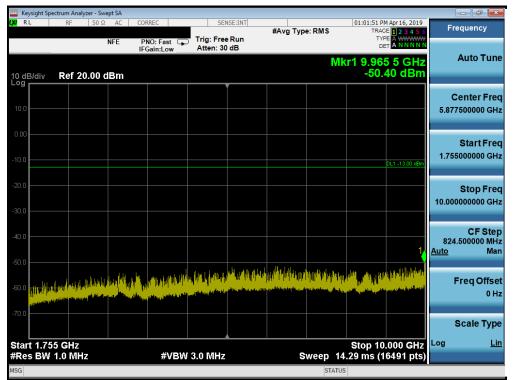
FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 22 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 33 of 85
© 2010 BCTEST Engineering Labor	aton / Inc			V 0 0 02/01/2010



AWS WCDMA Mode

🚾 Keysight Spectrum Analyzer - Swept					
LXIRL RF 50Ω	AC CORREC	SENSE:INT	#Avg Type: RMS	01:01:37 PM Apr 16, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWW	Frequency
10 dB/div Ref 20.00 dE	IFGain:Low	Atten: 30 dB	M	cr1 1.705 0 GHz -35.39 dBm	Auto Tune
10.0					Center Freq 867.500000 MHz
-10.0				DL1 -13.00 dBm	Start Freq 30.000000 MHz
-20.0				1	Stop Fred 1.705000000 GH2
-40.0					CF Step 167.500000 MH; <u>Auto</u> Mar
-60.0	hander of the second state of the second states of the second states of the second states of the second states	Jahdraserkesninnist Housahidini	وليصابيك يتنابعه ويستغيب المسالي والمحار والمعار	ala find the film in the off offer	Freq Offset 0 Hz
					Scale Type
Start 0.0300 GHz #Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 2	Stop 1.7050 GHz 2.233 ms (3351 pts)	Log <u>Lin</u>

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

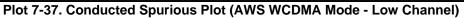


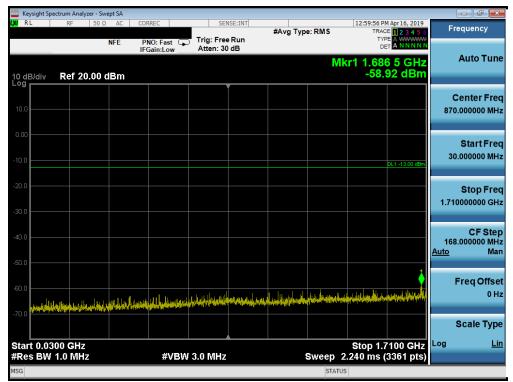
Plot 7-36. Conducted Spurious Plot (AWS WCDMA Mode - Low Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 24 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Page 34 of 85
© 0040 DOTEOT Excitation I al an	tem: les		1/00000000000



🔤 Keysight Spect	rum Analyzer - Sw	ept SA									d - X-
(XU) RL	RF 50 Ω	NFE I	PNO: Fast			#Avg Typ	e: RMS	TRA	PM Apr 16, 2019 CE 1 2 3 4 5 6 (PE A WWWWW DET A NNNNN	Freque	ncy
10 dB/div	Ref 10.00 (-Gam:Low	Atten. 20			Μ	lkr1 18.90 -51.	5 0 GHz 59 dBm	Auto	o Tune
0.00										Cente 15.000000	er Freq 100 GHz
-10.0									DL1 -13.00 dBm	Sta 10.0000000	rt Freq 100 GHz
-30.0										Sto 20.0000000	p Freq 100 GHz
-50.0	ala	. At catality on th	tharloana, a milithe dista ailtean		A Martin	n, och tille		hipp Constant of the party of the	1 Mahing Anaria	C 1.0000000 <u>Auto</u>	F Step 100 GHz Man
-70.0	, adit du Miller angeneran dan sy , adit du Miller angeneran dan sy	r an search an the	en el had - Entre age		A stall & shine	A Many Country And And				Freq	Offset 0 Hz
Start 10.00			#VBM	/ 3.0 MHz			ween	Stop 20 25.33 ms (2).000 GHz	Log	e Type <u>Lin</u>
MSG							_	ATUS	20001 pts)		





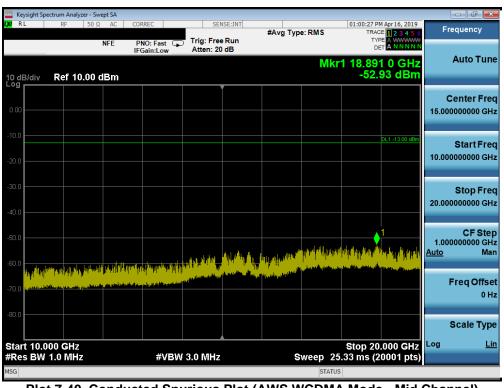
Plot 7-38. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 25
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Page 35 of 85	
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019			



	ectrum Analyze	er - Swept SA								
X/RL	RF	50 Ω AC	CORREC		ISE:INT	#Avg Typ	e: RMS	TRAC	M Apr 16, 2019 DE 1 2 3 4 5 6	Frequency
		NFE	PNO: Fast G	Trig: Free Atten: 30				DI		
10 dB/div Log	Ref 20.	00 dBm						Mkr1 9.74 -50.	7 5 GHz 38 dBm	Auto Tu
10.0										Center Fr 5.877500000 G
-10.0									DL1 -13.00 dBm	Start Fre 1.755000000 G
-20.0										Stop Fr 10.00000000 G
-40.0									1	CF Ste 824.500000 M <u>Auto</u> M
	Manda Manana		N ₁ Property		a <mark>(hyi I)),</mark> aliji	<mark>hyeettendety</mark>	The Market States			Freq Offs 0
-70.0										Scale Ty
Start 1.75 #Res BW			#VBW	/ 3.0 MHz		s	weep	Stop 10 14.29 ms (1	.000 GHz 6491 pts)	Log <u>l</u>
MSG							ST	ATUS		

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



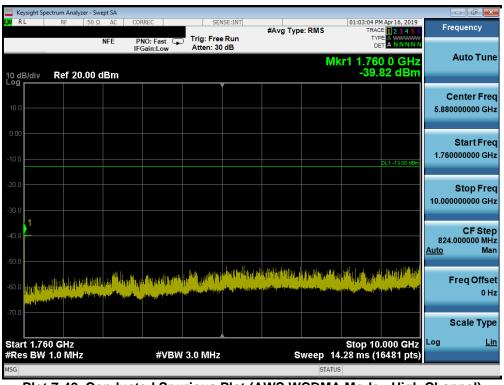
Plot 7-40. Conducted Spurious Plot (AWS WCDMA Mode - Mid Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 26 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 36 of 85
© 2019 PCTEST Engineering Labor	atory Inc.			V 9.0.02/01/2019



	um Analyzer - Sw	ept SA								
LXI RL	RF 50 Ω	NFE F	NO: Fast	Trig: Free		#Avg Typ	e: RMS	TRAC	Apr 16, 2019 E 1 2 3 4 5 6 E A WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW	Frequency
10 dB/div	Ref 20.00 d		Gain:Low	Atten: 30	dB		Mł	(r1 1.53		Auto Tune
10.0										Center Freq 870.000000 MHz
-10.0									DL1 -13.00 dBm	Start Frec 30.000000 MH2
-20.0										Stop Fred 1.710000000 GHz
-40.0										CF Step 168.000000 MH: <u>Auto</u> Mar
-60.0	di kanalahan kanalaha	i na njeda konstitu		e.ilai ^h iriainaimi	horisticitas (tabl	Milian Mundah	etil dagendifizedi	and the phone with	1 Alexadorhyidehidd	Freq Offse 0 Hz
										Scale Type
Start 0.030 #Res BW 1.			#VBW	/ 3.0 MHz			Sweep 2	Stop 1.7 2.240 ms (Log <u>Lin</u>

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



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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 27 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 37 of 85
© 2010 PCTEST Engineering Labor	atory Inc			V 9 0 02/01/2019



- ^{og}	RF 50 Ω NF Ref 10.00 dB	IFGain:L	ast 😱 Trig: Fre		#Avg Type	e: RMS	TRACI TYP	Apr 16, 2019 E 1 2 3 4 5 6 E A WWWWW T A N N N N N	Fr	equency
.og	Ref 10.00 dB	lm					DE			
						Mkr	1 18.908 -51.7	3 0 GHz 75 dBm		Auto Tun
0.00										Center Free
20.0								DL1 -13.00 dBm	10.000	Start Free
40.0									20.000	Stop Free
		talinasina a trai	and the state			adar yadarda	ala ⁽¹¹ approximation)	1 Hir ^d hyy th wyllett	1.000 <u>Auto</u>	CF Stej 0000000 GH Ma
0.0		a the second			Supion, Louis and				ŀ	Freq Offse 0 H
itart 10.000	GHz						Stop 20.	.000 GHz	: Log	Scale Typ <u>Li</u>
Res BW 1.		\$	#VBW 3.0 MHz	z	S	weep 25	.33 ms (2			

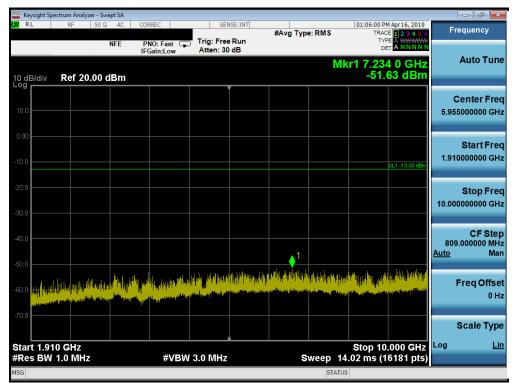
Plot 7-43. Conducted Spurious Plot (AWS WCDMA Mode - High Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 20 of 05
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 38 of 85
© 2010 BCTEST Engineering Lobor	atony Inc			V 0 0 02/01/2010



Keysight Spo RL	ectrum Analyzer - RF 50	Swept SA	CORREC	CEN.	ISE:INT			01:05:46 0	4 Apr 16, 2019		7 -
KL.		NFE	PNO: Fast		Run	#Avg Typ	e: RMS	TRAC	E 1 2 3 4 5 6 E A WWWW T A N N N N N	Frequen	су
0 dB/div	Ref 20.00) dBm					Mk	r1 1.84 -33.	5 0 GHz 54 dBm	Auto	Tu
10.0										Center 937.50000	
0.0									DL1 -13.00 dBm	Star 30.00000	
80.0									1	Stop 1.84500000	
0.0										CF 181.50000 <u>Auto</u>	= St 00 M N
:0.0 	, Million Hay a March and and	unipagen gleinight	بادر المناجعة	والمتألفين والمتعاد	har parte al more	وتوريق المراجع	e ben salas and a days		an galanta	Freq	Offs 0
0.0										Scale	ту
tart 0.03 Res BW	00 GHz 1.0 MHz		#VBW	/ 3.0 MHz			Sweep 2	Stop 1.8 .420 ms (450 GHz 3631 pts)	Log	ļ
G							STATUS				

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



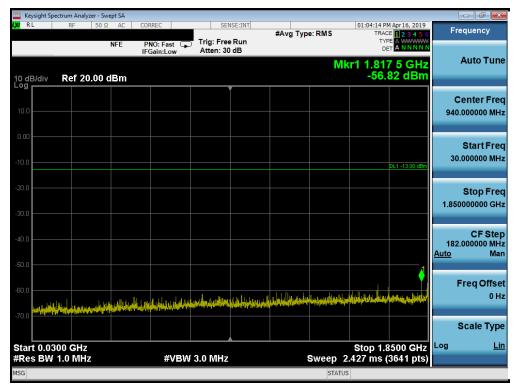
Plot 7-45. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 39 of 85
© 0040 DOTEOT Excitational all all and	tem: les			1/00000101/0010



🔤 Keysight	Spectrum Analyze	er - Swept SA										- • •
L <mark>XI</mark> RL	RF	50 Ω AC NFE	PNO	EC):Fast 🕞			#Avg Typ	e: RMS	TRA	M Apr 16, 2019 DE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	Fre	equency
10 dB/div	Ref 10.	00 dBm		in:Low	Atten: 20) dB		Mk	(r1 18.88			Auto Tune
0.00												enter Freq 0000000 GHz
-10.0										DL1 -13.00 dBm	10.000	Start Freq
-30.0											20.000	Stop Freq 0000000 GHz
-50.0		J.111 . 161 n 11			and a start of the	NAN IN A	Marytorith	Andrei Jahr	all the second sec		1.000 <u>Auto</u>	CF Step 0000000 GHz Man
-70.0 -70.0	ar synamous a spine argenet Million ar sint ar fan hen hel	enen ageneren Alexanderen i	angester se van	a postela de la co	a an	teresta Milita di Mari	and the paint of the second				F	Freq Offset 0 Hz
Start 10	.000 GHz			#\/D\/					Stop 20	0.000 GHz	Log	Scale Type <u>Lin</u>
#Res Bu	№ 1.0 MHz			#VBW	/ 3.0 MHz		5	STAT	25.33 ms (2 ^{US}			

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



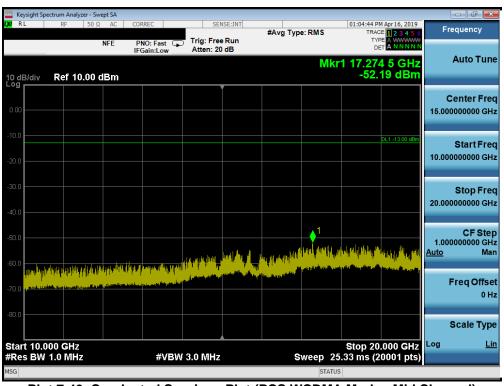
Plot 7-47. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 40 of 85
© 2019 PCTEST Engineering Labora	atory Inc			V 9 0 02/01/2019



	/sight Spect	rum Anal	yzer - Swep	ot SA								
lxi Ri	L	RF	50 Ω	AC	CORREC		SENSE:INT	#Avg Typ	e: RMS	TRAC	M Apr 16, 2019 DE 1 2 3 4 5 6	Frequency
			N	IFE	PNO: Fas IFGain:Lo	ື່	: Free Run en: 30 dB	0,1		TY	PE A WWWWW ET A N N N N N	
					IFGall.LU	w /			ľ	Mkr1 6.19	4 0 GHz	Auto Tune
10 dE	3/div	Ref 2	0.00 dl	Bm						-51.	21 dBm	
Log							ľ					
10.0												Center Freq 5.955000000 GHz
10.0												5.955000000 GH2
0.00												
												Start Freq 1.910000000 GHz
-10.0											DL1 -13.00 dBm	1.91000000 GH2
-20.0												
-20.0												Stop Freq 10.00000000 GHz
-30.0												10.000000000 GHZ
												CF Step
-40.0												809.000000 MHz
-50.0							1					<u>Auto</u> Man
-5U.U				ald as		a a tail a	ورائد والأرور والروار والمر	din. Matika na kataol	. Ա. սուստե	المريالية باللوران	Laiki, bibbaa	
-60.0	the state	din	1. Milling	and the second	P. WW	r dia mandrina dia 1	ara confinante con estas Anticipationes con estas	an a	n na na marao. Antarina da ser	er sterspieler singer stere Grund für Milder, allehat	ang sa dina mang sa	Freq Offset 0 Hz
	a standballe	المراد المرا		a state	and the state	الانتقاد ويقالهم وا						0 HZ
-70.0												Seele Tyrre
												Scale Type
	t 1.910									Stop 10	.000 GHz	Log <u>Lin</u>
·	s BW 1	.0 MH	Z		#	VBW 3.0 I	VIHZ	8		14.02 ms (1	6181 pts)	
MSG									STA	TUS		

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



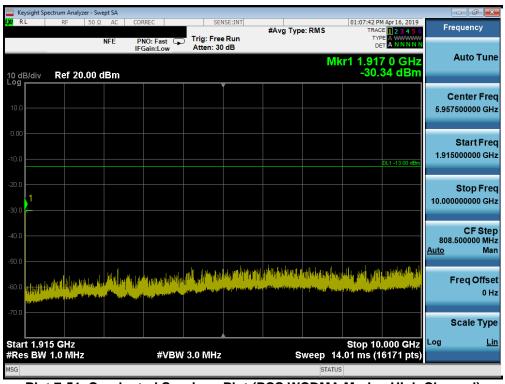
Plot 7-49. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 41 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 41 of 85
© 2019 PCTEST Engineering Labor	atory Inc.			V 9.0.02/01/2019



🔤 Keysight Spe	ectrum Analyzer - S	Swept SA								- 6 -
LXI RL	RF 50	Ω AC NFE	PNO: Fast	Trig: Free		#Avg Typ	e: RMS	TRAC	Apr 16, 2019 E 1 2 3 4 5 6 E A WWWW T A N N N N N	Frequency
10 dB/div	Ref 20.00	dBm	IFGain:Low	Atten: 30	dB		Mk	r1 1.84	5 0 GHz 11 dBm	Auto Tun
10.0										Center Fre 940.000000 MH
-10.0									DL1 -13.00 dBm	Start Fre 30.000000 MH
-20.0										Stop Fre 1.850000000 GH
-40.0										CF Ste 182.000000 MH <u>Auto</u> Ma
-60.0	h.ensigledhadayaist	-tur labor 110	Laline, will be a first the state of the sta	Linger and starting	interripted	i alara di alarada	hillouicumh	الملالي والمراجع المراجع	1 Hala in the second s	Freq Offse 0 H
										Scale Typ
Start 0.03 #Res BW			#VBW	/ 3.0 MHz			Sweep 2		500 GHz 3641 pts)	Log <u>Li</u>
MSG							STATUS	6		

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



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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 42 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 42 of 85
© 2019 PCTEST Engineering Labor	atory. Inc.	•		V 9.0 02/01/2019



	ectrum Analyzer - Sv										
<mark>0</mark> RL	RF 50 S	NFE	ORREC PNO: Fast G FGain:Low			#Avg Type	e: RMS	TRA	M Apr 16, 2019 CE 1 2 3 4 5 6 PE A WWWW ET A NNNNN		equency
0 dB/div	Ref 10.00	dBm					Mk		0 5 GHz 61 dBm		Auto Tune
											Center Free
20.0									DL1 -13.00 dBm	10.00	Start Free
10.0										20.00	Stop Fre
i0.0	halfe and bo	al Indian Land	1d			an ta m ^a bha bh		And Segments	1 All all and a	1.000 <u>Auto</u>	CF Ste 0000000 GH Ma
0.0	apapitalon os a constant agran	e	an condition of the con	and a built of the local sector	Breeder and Anna	Phanese and a state	1				Freq Offse 0 H
itart 10.0									.000 GHz	Log	Scale Typ <u>Li</u>
Res BW	1.0 MHz		#VBW	3.0 MHz		S	weep 2	5.33 ms (2	20001 pts)		

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 42 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 43 of 85	
© 2010 DOTEST Engineering Labor	aton / Inc			V 0 0 02/01/2010	



7.4 Band Edge Emissions at Antenna Terminal

Test Overview

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

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

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

Test Setup

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



Figure 7-3. Test Instrument & Measurement Setup

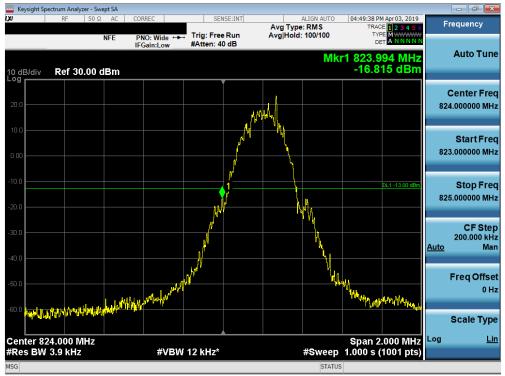
Test Notes

Per 22.917(b), 24.238(b), 27.53(h)(3), and RSS-132(5.5), RSS-133(6.5), RSS-139(6.5), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

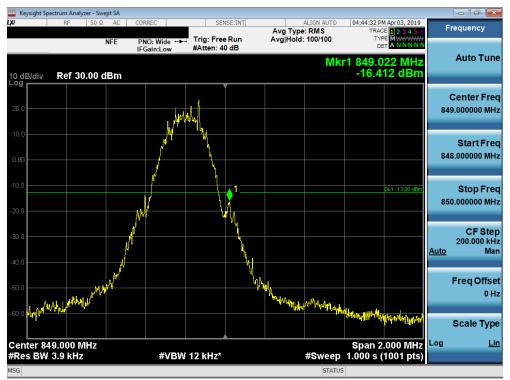
FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 44 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	dset	
© 2010 PCTEST Engineering Labor	V 9 0 02/01/2019			



Cellular GPRS Mode



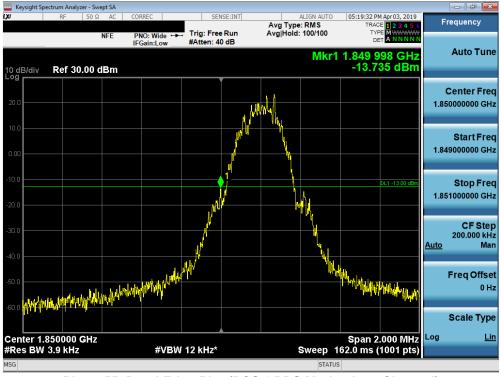
Plot 7-53. Band Edge Plot (Cellular GPRS Mode - Low Channel)



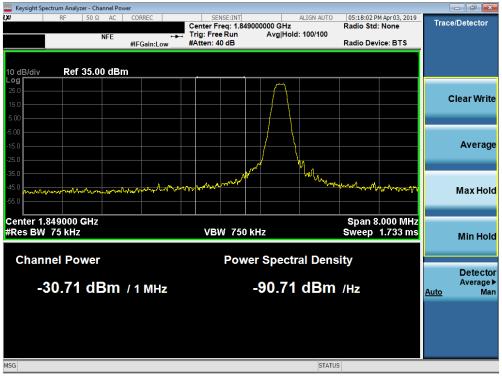
Plot 7-54. Band Edge Plot (Cellular GPRS Mode - High Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 45 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 45 of 85	
© 2019 PCTEST Engineering Labora	tory. Inc.	·		V 9.0 02/01/2019	





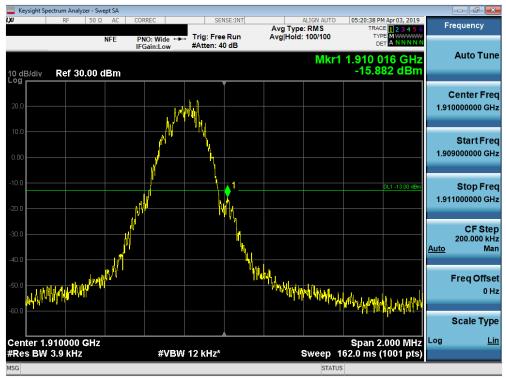
Plot 7-55. Band Edge Plot (PCS GPRS Mode - Low Channel)



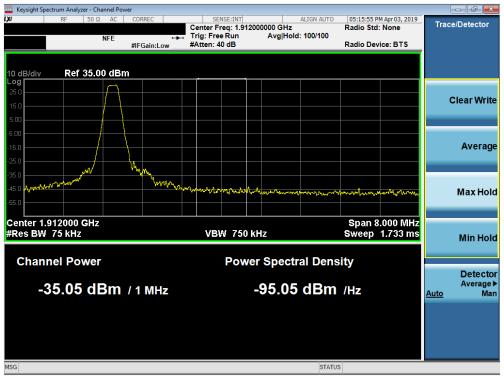
Plot 7-56. 4MHz Span Plot (PCS GPRS Mode - Low Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 46 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 46 of 85	
© 2010 DCTEST Engineering Labors	ton Inc	•		V 0 0 02/01/2010	









Plot 7-58. 4MHz Span Plot (PCS GPRS Mode - High Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 47 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 47 of 85	
© 2019 PCTEST Engineering Laboration	V 9.0 02/01/2019				



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)

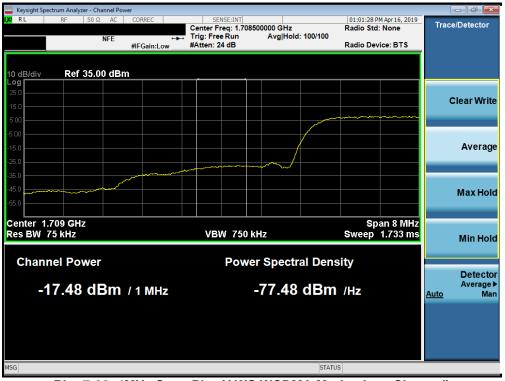
FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 49 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 48 of 85	
© 2019 PCTEST Engineering Laboration	atory. Inc.	·		V 9.0 02/01/2019	



AWS WCDMA Mode







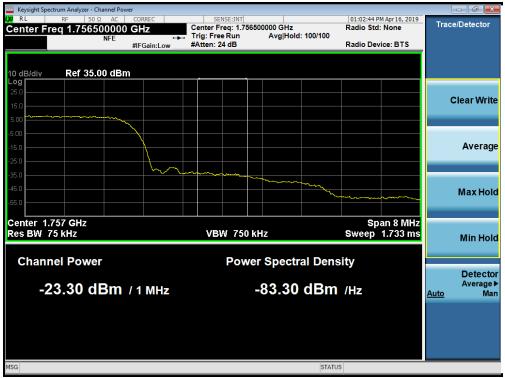
Plot 7-62. 4MHz Span Plot (AWS WCDMA Mode - Low Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 40 of 85	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	ortable Handset		Page 49 of 85	
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019				





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



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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 50 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	rtable Handset	
© 2019 PCTEST Engineering Laboration	V 9.0 02/01/2019			





Plot 7-65. Band Edge Plot (PCS WCDMA Mode - Low Channel)



Plot 7-66. 4MHz Span Plot (PCS WCDMA Mode - Low Channel)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 51 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	set	
© 2019 PCTEST Engineering Laboration	V 9.0 02/01/2019			



							ectrum Analyzer - Swe	
Frequency	01:07:10 PM Apr 16, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNN	e: RMS	#Avg Ty	SENSE:INT	NO: Wide 🕞 Trig: Fr		RF 50 Ω	XI RL
Auto Tune	1.910 165 GHz -20.47 dBm	Mkr1		en: 40 dB	Gain:Low Atten: 4	IFG	Ref 30.00 d	10 dB/div Log
Center Fred 1.910000000 GH;								20.0
Start Fred 1.902500000 GH:								0.00
Stop Free 1.917500000 GH:	DL1 -13.00 dBm			1				-10.0
CF Stej 1.500000 MH <u>Auto</u> Ma		han		hm				-30.0
Freq Offse 0 H								-50.0
Scale Type Log <u>Li</u> i	Span 15.00 MHz 1.000 ms (1001 pts)	Sweep 1		kHz	#VBW 300 kH		910000 GHz 100 kHz	Center 1. #Res BW
		STATUS						4SG

Plot 7-67. Band Edge Plot (PCS WCDMA Mode - High Channel)



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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 52 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	ortable Handset		Page 52 of 85	
© 2019 PCTEST Engineering Labora	atory Inc			V 9 0 02/01/2019	



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.



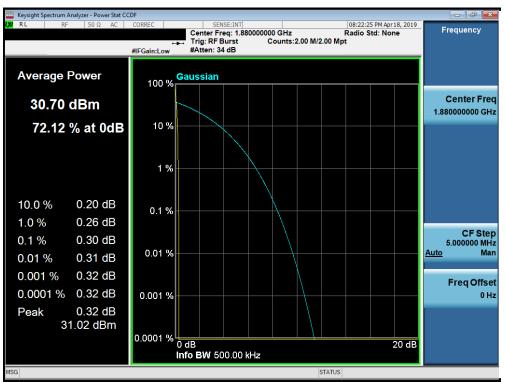
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

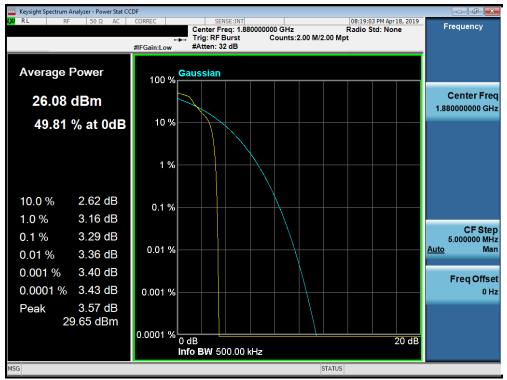
None

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 52 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019 Portable Handset			Page 53 of 85
© 2010 PCTEST Engineering Labor		V 0 0 02/01/2010		





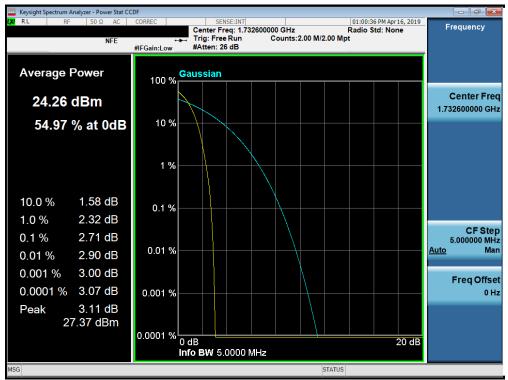




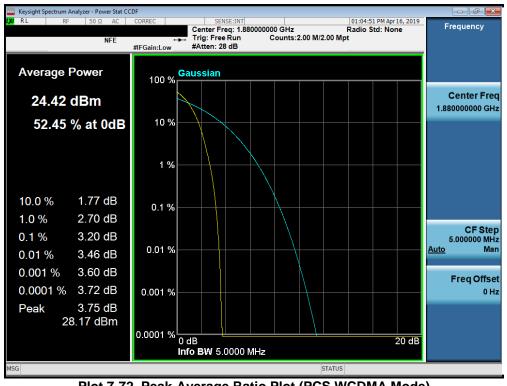
Plot 7-70. Peak-Average Ratio Plot (EDGE1900 Mode)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 54 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019 Portable Handset			Page 54 of 85	
© 2010 PCTEST Engineering Labor	aton/ Inc	·		V 0 0 02/01/2010	









Plot 7-72. Peak-Average Ratio Plot (PCS WCDMA Mode)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga FE of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019 Portable Handset			Page 55 of 85	
© 2019 PCTEST Engineering Labora	atory Inc.			V 9.0.02/01/2019	



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: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage FC of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 56 of 85
© 2010 PCTEST Engineering Labor	atory Inc	•		V 9 0 02/01/2019



Test Setup

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

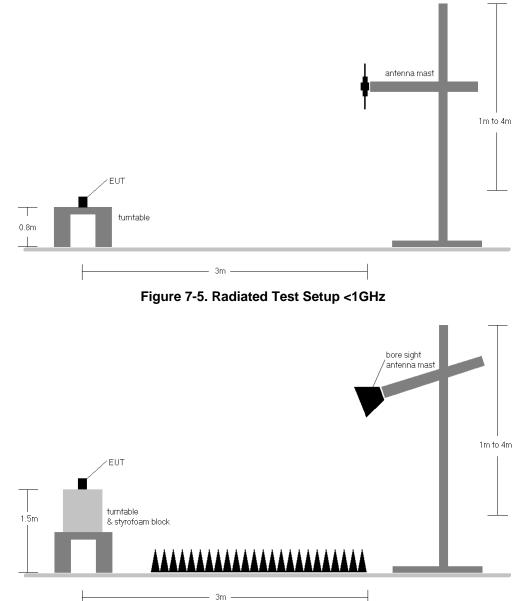


Figure 7-6. Radiated Test Setup >1GHz

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 57 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019 Portable Handset		Page 57 of 85
© 2010 PCTEST Engineering Labors	tony Inc		V 0 0 02/01/2010



- 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: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage EQ of QE
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019		Page 58 of 85	
© 2019 PCTEST Engineering Labora	atory Inc			V 9 0 02/01/2019



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	100	215	19.27	6.92	24.04	38.45	-14.41	26.19	40.61	-14.42
836.60	GPRS850	н	226	77	22.02	7.09	26.96	38.45	-11.50	29.11	40.61	-11.50
848.80	GPRS850	н	209	79	21.33	7.25	26.43	38.45	-12.02	28.58	40.61	-12.03
836.60	GPRS850	V	141	235	22.13	6.92	26.90	38.45	-11.55	29.05	40.61	-11.56
836.60	EDGE850	н	226	77	16.22	7.09	21.16	38.45	-17.30	23.31	40.61	-17.30

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

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	144	288	13.02	6.92	17.79	38.45	-20.66	19.94	40.61	-20.67
836.60	WCDMA850	н	140	274	12.52	7.09	17.46	38.45	-21.00	19.61	40.61	-21.00
846.60	WCDMA850	н	122	277	11.57	7.25	16.67	38.45	-21.78	18.82	40.61	-21.79
826.40	WCDMA850	V	152	239	12.94	6.92	17.71	38.45	-20.74	19.86	40.61	-20.75

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	140	145	11.00	9.62	20.62	30.00	-9.38
1732.60	WCDMA1700	V	142	150	13.18	9.54	22.72	30.00	-7.28
1752.60	WCDMA1700	V	152	155	9.69	9.45	19.14	30.00	-10.86
1732.60	WCDMA1700	Н	230	4	12.00	9.54	21.54	30.00	-8.46

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	100	10	21.08	9.06	30.14	33.01	-2.87
1880.00	GPRS1900	н	108	7	20.49	9.15	29.64	33.01	-3.37
1909.80	GPRS1900	н	110	12	20.62	9.27	29.89	33.01	-3.12
1850.20	GPRS1900	V	155	160	20.59	9.06	29.65	33.01	-3.36
1850.20	EDGE1900	н	100	10	16.37	9.06	25.43	33.01	-7.58

Table 7-5. EIRP (PCS GPRS)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 59 of 85	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		raye 39 01 63	



Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	V	140	300	10.42	9.51	19.93	33.01	-13.08
1880.00	WCDMA1900	V	142	287	13.54	9.90	23.44	33.01	-9.57
1907.60	WCDMA1900	V	145	310	12.88	10.24	23.12	33.01	-9.89
1880.00	WCDMA1900	Н	110	12	12.90	9.90	22.80	33.01	-10.21

Table 7-6. EIRP (PCS WCDMA)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 60 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Page 60 of 85
© 2010 BCTEST Engineering Labora	tony Inc		V 0 0 02/01/2010



7.7 Radiated Spurious Emissions Measurements

Test Overview

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.8

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

Test Settings

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 61 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	9 Portable Handset		Page 61 of 85	
© 2010 PCTEST Engineering Labors	V 0 0 02/01/2010				



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

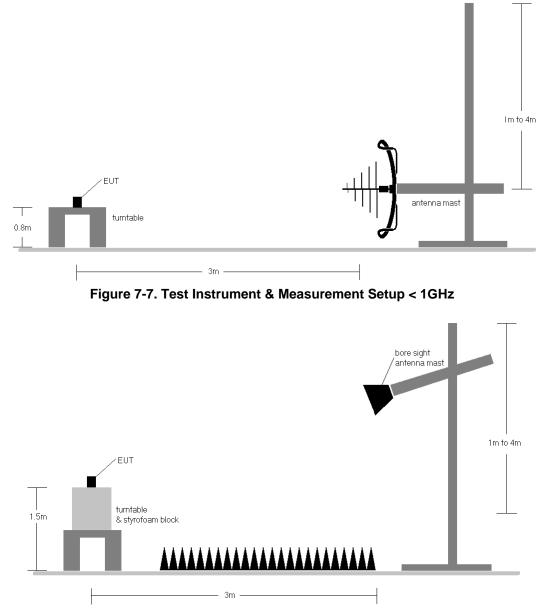


Figure 7-8. Test Instrument & Measurement Setup >1 GHz

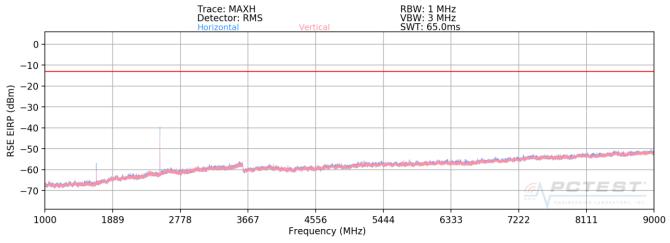
FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 62 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	19 Portable Handset		Page 62 of 85	
© 2010 PCTEST Engineering Labora	V 9 0 02/01/2019				



- 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: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Page 63 of 85	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019				
© 2019 PCTEST Engineering Labor	V 9.0 02/01/2019				





Plot 7-73. Radiated Spurious Plot above 1GHz (Cellular GPRS Mode)

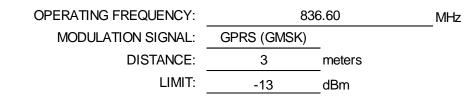
OPERATING FREQUENCY:	824	4.20	MHz
MODULATION SIGNAL:	GPRS (GMSK)	_	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1648.40	Н	105	55	-59.24	8.94	-50.30	-37.3
2472.60	Н	160	218	-50.67	9.64	-41.03	-28.0
3296.80	Н	-	-	-66.66	9.57	-57.09	-44.1
4121.00	Н	136	142	-63.03	10.17	-52.86	-39.9
4945.20	Н	-	-	-68.63	10.90	-57.72	-44.7
5769.40	Н	-	-	-68.25	11.47	-56.78	-43.8

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 64 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Page 64 of 85
© 2010 BCTEST Engineering Labors	V 0 0 02/01/2010		





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	128	51	-61.27	8.95	-52.32	-39.3
2509.80	Н	171	225	-50.09	9.75	-40.34	-27.3
3346.40	Н	-	-	-66.16	9.60	-56.55	-43.6
4183.00	Н	141	141	-62.06	10.35	-51.71	-38.7
5019.60	Н	-	-	-68.93	10.88	-58.04	-45.0
5856.20	H	-	-	-67.88	11.52	-56.36	-43.4

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

OPERATING FREQUENCY:

MODULATION SIGNAL:

 REQUENCY:
 848.80

 ON SIGNAL:
 GPRS (GMSK)

 DISTANCE:
 3

 LIMIT:
 -13

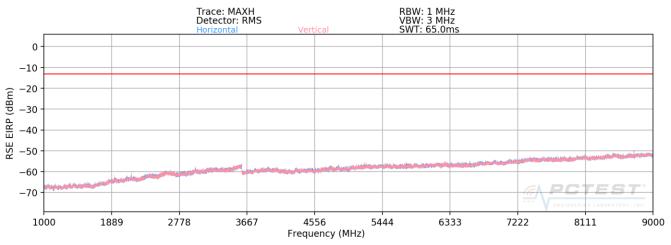
MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1697.60	Н	151	47	-61.12	8.95	-52.16	-39.2
2546.40	Н	168	224	-50.00	9.74	-40.26	-27.3
3395.20	Н	-	-	-66.37	9.78	-56.59	-43.6
4244.00	Н	102	60	-64.80	10.58	-54.23	-41.2
5092.80	Н	-	-	-69.14	10.69	-58.45	-45.5
5941.60	Н	-	-	-67.27	11.45	-55.82	-42.8

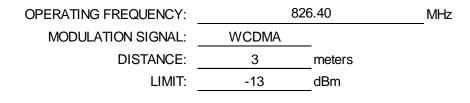
Table 7-9. Radiated Spurious Data (Cellular GPRS Mode – Ch. 251)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dege CE of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Page 65 of 85
© 2010 DOTECT Engineering Labor	V 0 0 00/04/2010		





Plot 7-74. Radiated Spurious Plot above 1GHz (Cellular WCDMA Mode)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1652.80	Н	148	219	-76.46	8.95	-67.51	-54.5
2479.20	Н	147	200	-70.82	9.67	-61.14	-48.1
3305.60	Н	-	-	-72.07	9.58	-62.48	-49.5

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 66 of 95	
1M1903280046-02-R1.ZNF	-02-R1.ZNF 3/28 - 4/18/2019 Portable Handset			Page 66 of 85	
© 2010 PCTEST Engineering Labor	V 0 0 02/01/2010				



OPERATING FREQUENCY:	83	6.60	MHz
MODULATION SIGNAL:	WCDMA		_
DISTANCE:	3	meters	
LIMIT:	-13	_dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.20	Н	126	119	-77.07	8.95	-68.11	-55.1
2509.80	Н	120	122	-70.30	9.75	-60.55	-47.5
3346.40	Н	-	-	-72.24	9.60	-62.63	-49.6

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

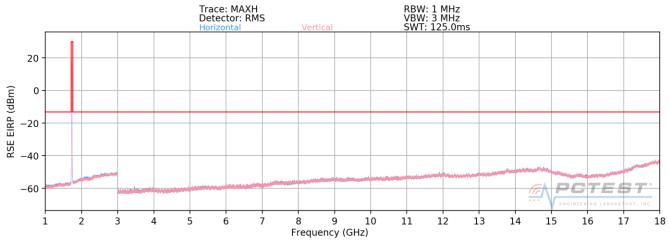
OPERATING FREQUENCY:	840	6.60 MH	z
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	-13	_dBm	

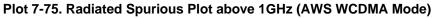
	equency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
	1693.20	Н	118	219	-76.54	8.95	-67.58	-54.6
2	2539.80	Н	120	221	-69.89	9.74	-60.15	-47.1
3	3386.40	Н	-	-	-72.46	9.75	-62.71	-49.7

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 67 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 67 of 85
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019			







OPERATING FREQUENCY:	17	12.40	MHz
MODULATION SIGNAL:	WCDMA	_	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3424.80	Н	112	300	-70.34	9.83	-60.51	-47.5
5137.20	Н	-	-	-69.55	10.69	-58.86	-45.9

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 69 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 68 of 85	
© 2019 PCTEST Engineering Labora	V 9.0.02/01/2019				



OPERATING FREQUENCY:	173	MHz	
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3465.20	Н	115	205	-70.25	9.88	-60.37	-47.4
5197.80	Н	-	-	-69.66	10.76	-58.90	-45.9

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

1752.60

MODULATION SIGNAL:

WCDMA 3 DISTANCE:

meters

MHz

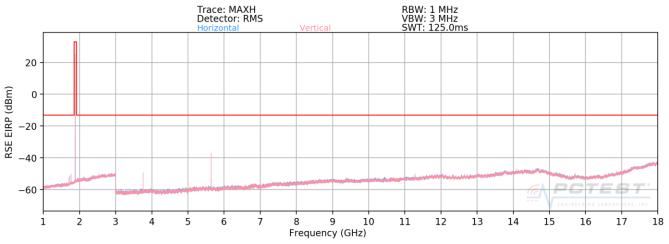
LIMIT: -13 dBm

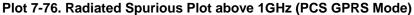
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3505.20	Н	303	171	-70.50	9.92	-60.58	-47.6
5257.80	Н	-	-	-69.55	10.72	-58.83	-45.8

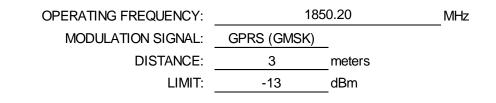
Table 7-15. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1513)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 60 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 69 of 85	
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019				







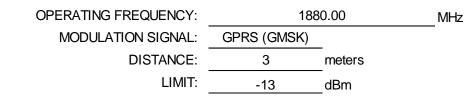


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3700.40	V	215	50	-55.10	9.58	-45.51	-32.5
5550.60	V	205	350	-55.91	10.94	-44.97	-32.0
7400.80	V	114	15	-66.77	10.96	-55.82	-42.8
9251.00	V	172	112	-59.18	11.63	-47.54	-34.5
11101.20	V	215	220	-64.27	12.74	-51.53	-38.5
12951.40	V	-	-	-66.54	13.30	-53.24	-40.2

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:	Daga 70 of 95			
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019 Portable Handset		Page 70 of 85			
© 2010 PCTEST Engineering Laboratory Inc.						





Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	V	355	38	-57.15	9.37	-47.78	-34.8
5640.00	V	350	45	-57.23	11.17	-46.07	-33.1
7520.00	V	117	48	-67.87	11.11	-56.76	-43.8
9400.00	V	167	150	-60.02	11.57	-48.44	-35.4
11280.00	V	175	112	-59.59	12.72	-46.88	-33.9
13160.00	V	-	-	-66.63	13.15	-53.49	-40.5

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

 OPERATING FREQUENCY:
 1909.80
 MHz

 MODULATION SIGNAL:
 GPRS (GMSK)

 DISTANCE:
 3
 meters

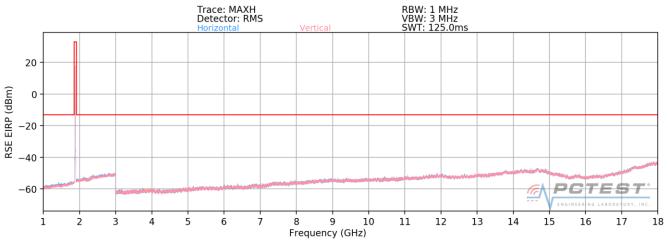
 LIMIT:
 -13
 dBm

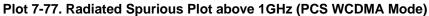
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3819.60	V	368	43	-60.36	9.30	-51.05	-38.1
5729.40	V	350	112	-58.57	11.39	-47.18	-34.2
7639.20	V	117	345	-67.14	11.33	-55.81	-42.8
9549.00	V	167	300	-64.37	11.79	-52.58	-39.6
11458.80	V	220	150	-59.27	12.82	-46.46	-33.5
13368.60	V	-	-	-65.74	12.78	-52.95	-40.0

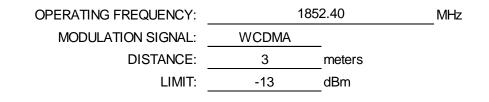
Table 7-18. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFQ720CS				Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dege 71 of 95	
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 71 of 85	
© 2010 PCTEST Engineering Labor	V 0 0 02/01/2010				









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	V	-	-	-69.96	9.57	-60.39	-47.4
5557.20	V	-	-	-69.46	10.95	-58.51	-45.5

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 70 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 72 of 85
© 2010 PCTEST Engineering Labor	\/ 0.0.02/01/2010			



OPERATING FREQUENCY:	188	30.00	MHz
MODULATION SIGNAL:	WCDMA		
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	V	123	251	-69.12	9.37	-59.75	-46.7
5640.00	V	-	-	-69.64	11.17	-58.48	-45.5

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

1907.60

meters

MHz

OPERATING FREQUENCY:

MODULATION SIGNAL:

WCDMA DISTANCE: 3

LIMIT: -13 dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3815.20	V	113	268	-67.48	9.30	-58.18	-45.2
5722.80	V	-	-	-69.90	11.37	-58.53	-45.5

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 72 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 73 of 85
© 2019 PCTEST Engineering Labora	atory Inc			V 9 0 02/01/2019



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 $\pm 0.00025\%$ (± 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: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 74 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 74 of 85
© 2010 PCTEST Engineering Labor	V 0 0 02/01/2010			



OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	190	
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	836,599,847	-153	-0.0000183
100 %		- 20	836,599,702	-298	-0.0000356
100 %		- 10	836,600,049	49	0.0000059
100 %		0	836,600,045	45	0.0000054
100 %		+ 10	836,600,279	279	0.0000333
100 %		+ 20	836,600,039	39	0.0000047
100 %		+ 30	836,599,856	-144	-0.0000172
100 %		+ 40	836,600,250	250	0.0000299
100 %		+ 50	836,599,911	-89	-0.0000106
BATT. ENDPOINT	3.40	+ 20	836,599,998	-2	-0.000002

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 75 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Page 75 of 85
© 2010 PCTEST Engineering Labora	tory Inc		V 9 0 02/01/2019



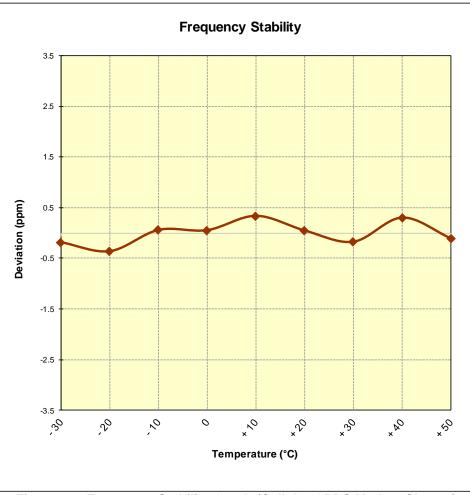


Figure 7-9. Frequency Stability Graph (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 76 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 76 of 85
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			



OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	4183	_
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	836,600,221	221	0.0000264
100 %		- 20	836,600,083	83	0.0000099
100 %		- 10	836,599,961	-39	-0.0000047
100 %		0	836,599,841	-159	-0.0000190
100 %		+ 10	836,599,964	-36	-0.0000043
100 %		+ 20	836,600,114	114	0.0000136
100 %		+ 30	836,599,846	-154	-0.0000184
100 %		+ 40	836,599,670	-330	-0.0000394
100 %		+ 50	836,600,275	275	0.0000329
BATT. ENDPOINT	3.40	+ 20	836,600,371	371	0.0000443

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 77 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 77 of 85
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019			



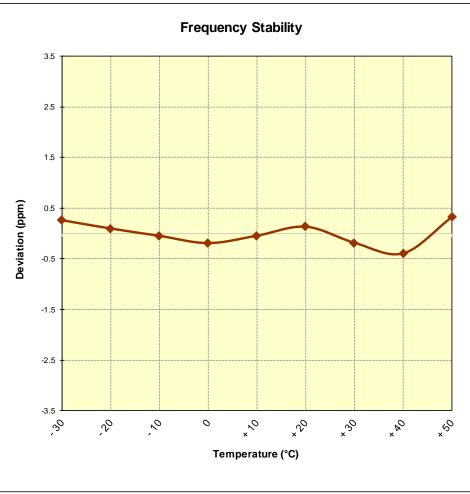


Figure 7-10. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 70 of 05
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 78 of 85
© 2019 PCTEST Engineering Labora	atory. Inc.			V 9.0 02/01/2019



OPERATING FREQUENCY:	1,732,600,000	Hz
CHANNEL:	1413	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	1,732,600,005	5	0.0000003
100 %		- 20	1,732,599,942	-58	-0.0000033
100 %		- 10	1,732,600,268	268	0.0000155
100 %		0	1,732,600,259	259	0.0000149
100 %		+ 10	1,732,599,967	-33	-0.0000019
100 %		+ 20	1,732,599,836	-164	-0.0000095
100 %		+ 30	1,732,599,912	-88	-0.0000051
100 %		+ 40	1,732,600,269	269	0.0000155
100 %		+ 50	1,732,600,079	79	0.0000046
BATT. ENDPOINT	3.40	+ 20	1,732,600,311	311	0.0000179

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: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 70 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 79 of 85
© 2019 PCTEST Engineering Labora	atory Inc			V 9 0 02/01/2019



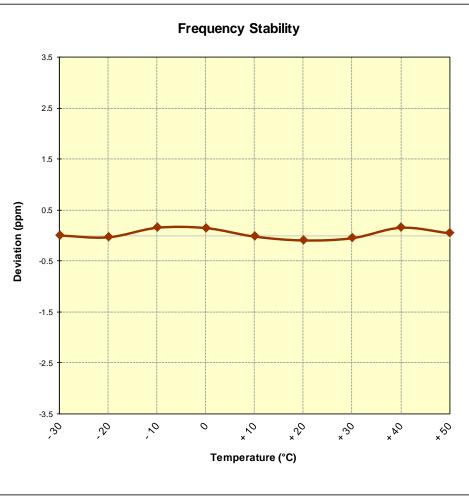


Figure 7-11. Frequency Stability Graph (AWS WCDMA Mode – Ch. 1413)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 90 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 80 of 85
© 2019 PCTEST Engineering Labora	atory, Inc.			V 9.0 02/01/2019



OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	661	
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	1,879,999,883	-117	-0.0000062
100 %		- 20	1,880,000,022	22	0.0000012
100 %		- 10	1,880,000,030	30	0.0000016
100 %		0	1,880,000,466	466	0.0000248
100 %		+ 10	1,880,000,302	302	0.0000161
100 %		+ 20	1,879,999,947	-53	-0.0000028
100 %		+ 30	1,880,000,004	4	0.0000002
100 %		+ 40	1,879,999,992	-8	-0.0000004
100 %		+ 50	1,880,000,091	91	0.0000048
BATT. ENDPOINT	3.40	+ 20	1,879,999,740	-260	-0.0000138

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 01 of 05
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Page 81 of 85
© 2019 PCTEST Engineering Labora	tory Inc	·	V 9 0 02/01/2019



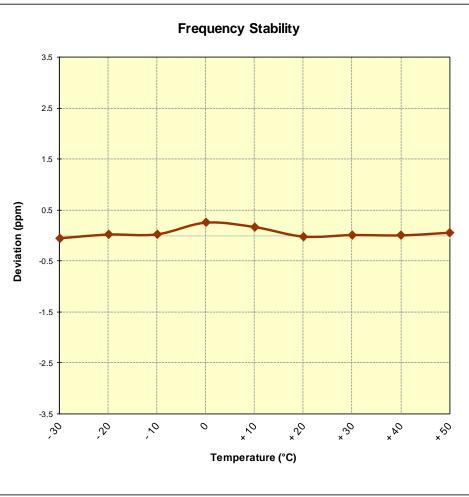


Figure 7-12. Frequency Stability Graph (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 82 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		Page 82 of 85
© 2019 PCTEST Engineering Labora	atory, Inc.			V 9.0 02/01/2019



OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	9400	
REFERENCE VOLTAGE:	3.85	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	1,880,000,293	293	0.0000156
100 %		- 20	1,879,999,667	-333	-0.0000177
100 %		- 10	1,880,000,184	184	0.0000098
100 %		0	1,879,999,930	-70	-0.0000037
100 %		+ 10	1,880,000,177	177	0.0000094
100 %		+ 20	1,880,000,020	20	0.0000011
100 %		+ 30	1,879,999,911	-89	-0.0000047
100 %		+ 40	1,879,999,760	-240	-0.0000128
100 %		+ 50	1,880,000,141	141	0.0000075
BATT. ENDPOINT	3.40	+ 20	1,879,999,838	-162	-0.000086

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

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 92 of 95
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset	Page 83 of 85
© 2010 PCTEST Engineering Labora	tony Inc		V 9 0 02/01/2019



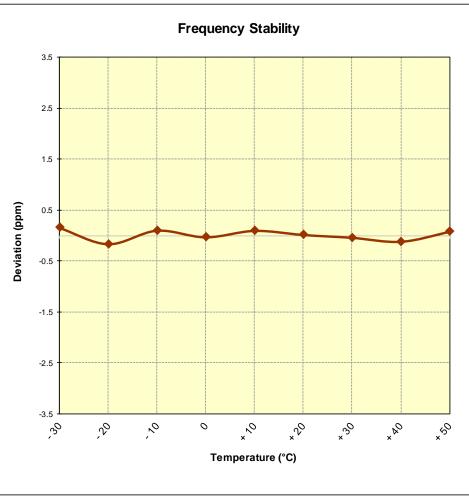


Figure 7-13. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 84 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		
© 2019 PCTEST Engineering Labor	V 9.0 02/01/2019			



8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFQ720CS** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules.

FCC ID: ZNFQ720CS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 85 of 85
1M1903280046-02-R1.ZNF	3/28 - 4/18/2019	Portable Handset		
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			