

PCTEST ENGINEERING LABORATORY, INC.

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MEASUREMENT REPORT GSM / GPRS / EDGE / CDMA / WCDMA

Applicant Name:

LG Electronics USA, Inc. 1000 Sylvan Avenue Englewood Cliffs, NJ 07632 United States Date of Testing: 5/17 - 6/10/2019 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1905200075-02-R2.ZNF

FCC ID:

ZNFQ720VS

APPLICANT:

LG Electronics USA, Inc.

Application Type:	Certification
Model:	LM-Q720VSP
Additional Model(s):	LM-Q720VS, LM-Q720VSPP, LM-Q720VSPB
	LMQ720VS, LMQ720VSP, LMQ720VSPP, LMQ720VSPB
	Q720VS, Q720VSP, Q720VSPP, Q720VSPB
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	22 & 24
Test Procedure(s):	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: 1M1905200075-02-R2.ZNF) supersedes and replaces the previously issued test report (S/N: 1M1905200075-02-R1.ZNF) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously

issued test report(s) and dispose of it accordingly.

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

Randy Ortanez President



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			Ef	RP	EI	RP	
Mode	FCC Rule	Tx Frequency (MHz)	Max.	Max.	Max.	Max.	Emission
Mode	Part	TXT TEQUENCY (IVII IZ)	Power	Power	Power	Power	Designator
			(W)	(dBm)	(W)	(dBm)	
GPRS850	22H	824.2 - 848.8	0.612	27.87	1.005	30.02	246KGXW
EDGE850	22H	824.2 - 848.8	0.189	22.76	0.310	24.91	245KG7W
CDMA850	22H	824.70 - 848.31	0.046	16.66	0.076	18.81	1M28F9W
WCDMA850	22H	826.4 - 846.6	0.062	17.95	0.102	20.10	4M15F9W
GPRS1900	24E	1850.2 - 1909.8			1.015	30.07	242KGXW
EDGE1900	24E	1850.2 - 1909.8			0.377	25.77	250KG7W
CDMA1900	24E	1851.25 - 1908.75			0.136	21.35	1M28F9W
WCDMA1900	24E	1852.4 - 1907.6			0.121	20.82	4M15F9W

EUT Overview

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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.

1.2 PCTEST Test Location

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

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

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

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFQ720VS**. 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.: 02781, 02799, 02864, 02799

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1), 850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), NFC

2.3 Test Configuration

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

2.4 EMI Suppression Device(s)/Modifications

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

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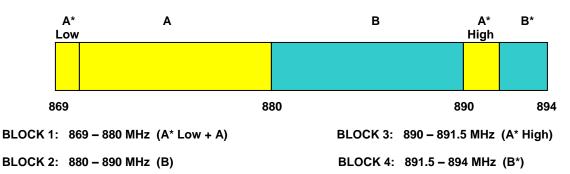
3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

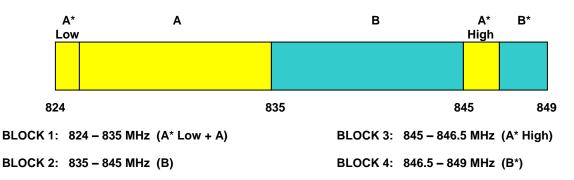
The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

Deviation from Measurement Procedure.....None

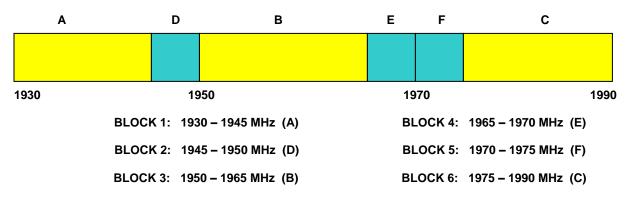
3.2 Cellular - Base Frequency Blocks



3.3 Cellular - Mobile Frequency Blocks



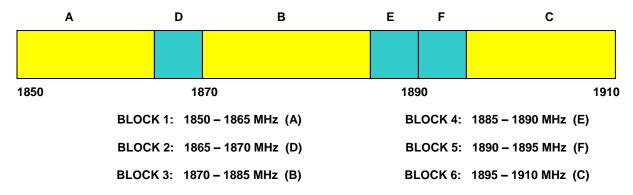
3.4 PCS - Base Frequency Blocks



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3.5 PCS - Mobile Frequency Blocks



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3.6 Radiated Measurements

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

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

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

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

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

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

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

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4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx3	Licensed Transmitter Cable Set	8/23/2018	Annual	8/23/2019	LTx3
Agilent	N9030A	PXA Signal Analyzer (44GHz)	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	5/28/2018	Annual	5/28/2019	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/19/2019	Annual	4/19/2020	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	TC-TA18	Vivaldi Antenna	8/17/2018	Biennial	8/17/2020	101072
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	9/19/2018	Annual	9/19/2019	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	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.

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6.0 SAMPLE CALCULATIONS

GPRS Emission Designator

Emission Designator = 250KGXW

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

EDGE Emission Designator

Emission Designator = 250KG7W

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

CDMA Emission Designator

Emission Designator = 1M25F9W

CDMA BW = 1.25 MHz F = Frequency Modulation 9 = Composite Digital Info W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M16F9W

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

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

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

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7.0 TEST RESULTS

7.1 Summary

Company Name:	LG Electronics USA, Inc.
FCC ID:	ZNFQ720VS
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>GSM / GPRS / EDGE / CDMA / WCDMA</u>

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	RSS-Gen (4.6.1) RSS-133(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)	Conducted Band Edge / Spurious Emissions	> 43 + 10 log ₁₀ (P[Watts]) at Band Edge and for all out-of- band emissions		PASS	Sections 7.3, 7.4
24.232(d) 27.50(d)(5)	RSS-132(5.4) RSS-133(6.4)	Peak-Average Ratio	< 13 dB	CONDUCTED	PASS	Section 7.5
2.1046	RSS-132(5.4) RSS-133(4.1)	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
2.1055 22.355 24.235 27.54	RSS-132(5.3) RSS-133(6.3)	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24)		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	RADIATED	PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(h)	RSS-132(5.5) RSS-133(6.5)	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.

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7.2 Occupied Bandwidth

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 4.2

Test Settings

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

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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



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

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



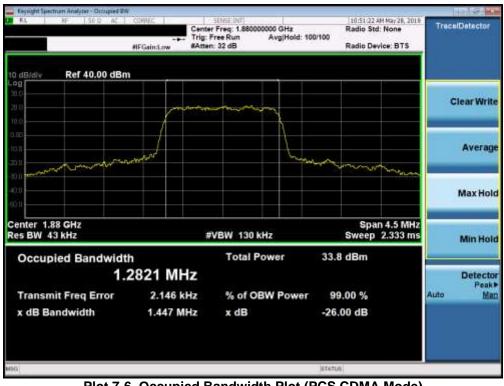
Plot 7-4. Occupied Bandwidth Plot (EDGE1900 Mode)

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



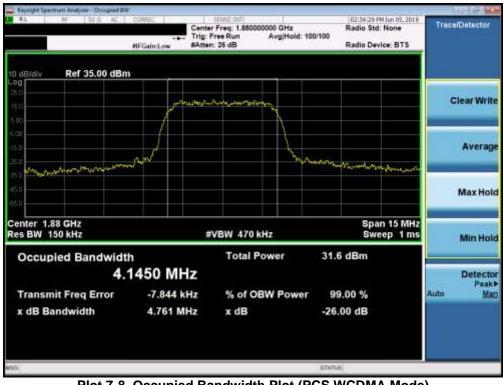
Plot 7-6. Occupied Bandwidth Plot (PCS CDMA Mode)

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



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

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7.3 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

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

Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

Test Notes

Per 24.238(b), and RSS-133(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.

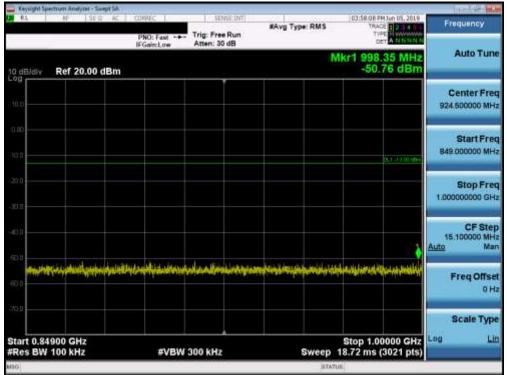
FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 18 of 06
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Cellular GPRS Mode

Keysight Spectrum Analyter - Swept SA	ANNUAL DE	LINE CONTRACTOR	11	2000/02/02/02/02	1454
R1 8F 56-20 4C	PNO: Fast -+-	Trig: Free Run	NAvg Type: RMS	03:57:58 PHJ in 05, 2019 TRACE 2 2 3 4 5 1 TYPE 5 0404000 0 DET A N N N N N	Frequency
10 dBildiv Ref 20.00 dBm	IF Gaincl.ow	Atten: 30 dB	M	kr1 822.00 MHz -43.76 dBm	Auto Tuno
10.0					Center Free 425 500000 MH
0.00				0.1 -/ 1.00 offes	Start Free 30 000000 MH
200					Stop Fre 823.000000 MH
40.0					CF Ste 79.300000 MH Auto Ma
					Freq Offse 0 H
30.1 Start 30.0 MHz				Stop 823.0 MHz	Scale Type
#Res BW 100 kHz	#VBW 3	300 kHz	Sweep 9	8.33 ms (15861 pts)	

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



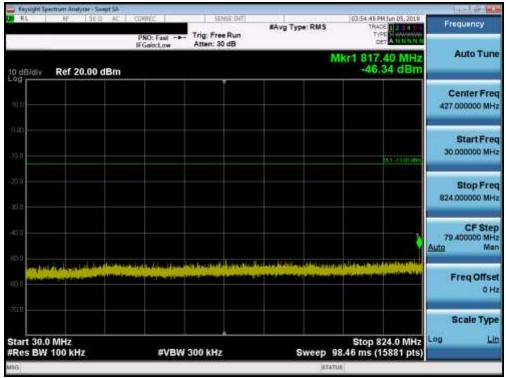
Plot 7-10. Conducted Spurious Plot (Cellular GPRS Mode - Low Channel)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 19 of 96
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Fage 19 01 90
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Right Spectrum Analyzer - Swept SA Right AF Scill AC 1	Number 1	SENSE OVT	10	03:58:33 PM Jun 05, 2019	112-145-146
	PNO: Fast	Trig: Free Run	#Avg Type: RMS	TRACE 1 2 3 4 5 T	Frequency
dB/div Ref 10.00 dBm	FGaincLow	#Atten: 30 dB	N	lkr1 1.648 5 GHz -31.20 dBm	Auto Tune
100					Center Free 5.500000000 GH
0.1				p.1-1310.004	Start Fre 1.000000000 GH
	e		والمرافقة والمرافق المرافقة		Stop Fre 10.000000000 GH
					CF Ste 900.000000 MH Auto Ma
0.ñ					Freq Offse 0 H
tart 1.000 GHz Res BW 1.0 MHz	#VBW :	1.0 MHz	Sween	Stop 10.000 GHz 15.60 ms (18001 pts)	Scale Type
8	WUDIT.		SINCEP	a thread a ball and a standard of a standard strend and a standard strend at a standard strend at a standard st	





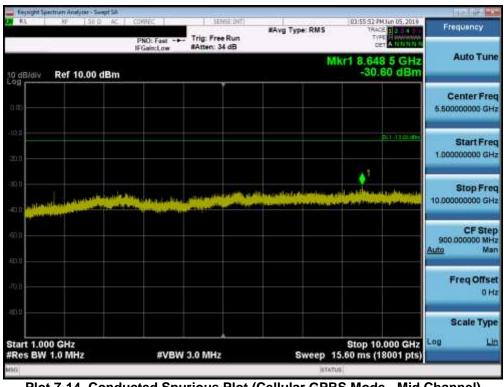
Plot 7-12. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 00
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 20 of 96
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Frequency	Uun 05,2019 E 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		DHE	#Avg Ty	NIEDNT	SE .	RES		KF 1.561	
	ANNINN	TYP	ie: KM-3	Arrig 13		Trig: Fre Atten: 3	IO: Fast +++			
Auto Tun	80 MHz 31 dBm	Akr1 855. -44.	N					Bm	Ref 20.00	dBidiy
Center Fre 924.500000 MH										.0
Start Fre 849.000000 MH	0.1-11-00-000									no
Stop Fre 1.000000000 GH										10. 10
CF Ste 15.100000 MH Auto Ma										
Freq Offse 0 H	igoisting.		hindlichte	and inclusion	Minisphys	ndy high i than gi	n ting (heiserfilder	il-nihalidaa	nduditerraipt	L. L.
Scale Typ	0000 GHz	Stop 1.00							00 GHz	art 0.849
	3021 pts)	18.72 ms (Sweep			300 kHz	#VBW		00 kHz	tes BW 1

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



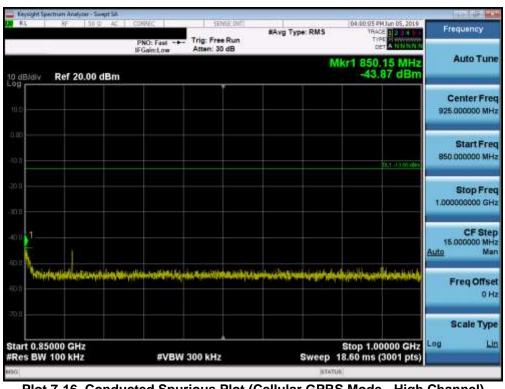
Plot 7-14. Conducted Spurious Plot (Cellular GPRS Mode - Mid Channel)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 21 of 00
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 21 of 96
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Frequency	03:59:57 PHJun 05, 2019	MAvg Type: RMS	SENSE DVT	CONNEC	AF 19612 AC	RL
	TRACE 2 2 4 5 T TYPE S ANNUM DET A NINTEN N	инуд туре: кмэ	Trig: Free Run Atten: 30 dB	PNO: Fast +++		
Auto Tun	kr1 805.70 MHz -49.50 dBm	M		1.000000	Ref 20.00 dBm	IO dB/div
Center Fre 427.000000 MH						10.0
Start Fre 30 000000 MH	0.1 -1 1 00 offer					0.00 10.0
Stop Fre 824.000000 MH						20 0
CF Ste 79.400000 MH Auto Ma						40 J
Freq Offse 0 F					at the boundary statement of the	23 U 10 fi
Scale Typ	Stop 824.0 MHz				Mile	70.0 Start 30.0
	3.46 ms (15881 pts)	Sweep 98	300 kHz	#VBW 3		Res BW
_		ETATU				16

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



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

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 22 of 96
© 2010 PCTEST Engineering Labora	tory Inc	•		V 9 0 02/01/2019



Frequency	84:00:27 PMJun 05, 2019 TRACE 12 3 4 4 4	vpe: RMS	EINT	SEN	ONREC	DA. D	- 府 - 5	RL
	CET A NYIN NN	ype nata	Run	Trig: Free #Atten: 30	PNO: Fast +++			
Auto Tun	lkr1 1.698 0 GHz -29.97 dBm	M					Ref 10.0	0 dBidly
Center Fre 5.50000000 GH								0.00
Start Fre 1.000000000 GH	0L1-1301 dans							20.0 20.0
Stop Fre 10.000000000 GH				ALC: NOT	training the second			10.0 40.0
CF Ste 900.000000 MH <u>Auto</u> Ma								51.U
Freq Offse 0 H								rç, n
Scale Typ	Stop 10.000 GHz 15.60 ms (18001 pts)	Suman 1		3.0 MHz	ALIETA/		0 GHz 1.0 MHz	Start 1.00

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

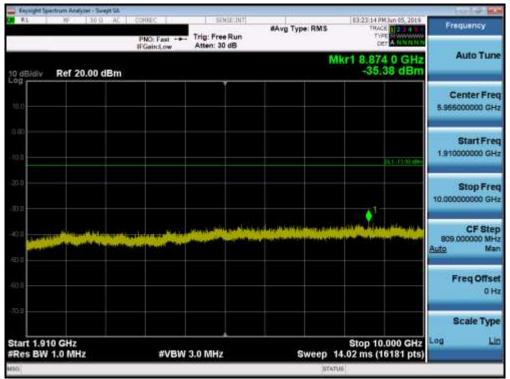
FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 22 of 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 23 of 96
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PCS GPRS Mode

Start Fre	937 50000 MH	937 500000 MH Start Fre 30.000000 MH	30.000000 MH	30.0	30.000000 M
Start Fre 30.000000 MH	937 50000 Mi Start Fre 30 00000 Mi	937 500000 Mi Start Fre 30 000000 Mi	30.000000 MH	30.0	30.00000 M
Start Fre 30.00000 MH	937 500000 Mi Start Fre 30 000000 Mi Stop Fre	937 500000 Mi Start Fre 30.00000 Mi Stop Fre	Stop Fre	30.0	30.000000 M Stop Fr
Start Fre 30.000000 Mi	Start Fre	937 500000 Mi Start Fre 30 000000 Mi Stop Fre	30.000000 MH	30.0	30.000000 M Stop Fr
Start Fred 30.000000 MH	937 50000 MH Start Free 30 00000 MH	937 500000 MH Start Free 30.000000 MH	30.00000 MH:	30.0	30.00000 M
Start Fre	937 50000 MH	937 500000 MH	30.000000 MH	30.0	30.000000 M
Start Fre 30.00000 Mi	937 500000 Mi	937 500000 Mi Start Fre 30 00000 Mi	30.000000 Mi	30.0	30.000000 M
Start Fre	Start Free	937 500000 Mi			
	937 50000 M	937 500000 M	Start Fre		StartFr
937.500000 MHz	Senter Freq 937 500000 MHz	Center Freq 937.500000 MHz			
937 500000 MH					
			937.500000 MH	937.5	937.500000 M

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



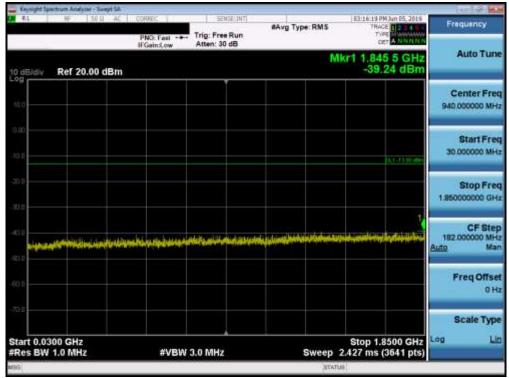
Plot 7-19. Conducted Spurious Plot (PCS GPRS Mode - Low Channel)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 24 of 96
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset	Fage 24 01 96
© 2010 DOTECT Engineering Labore	toni lao		1/ 0 0 00/01/2010



R5 HF 50 D AC	CONREC	SENSE INT	#Avg Type: RMS	43:23:29 PMJun 65, 2019	Frequency
	PNO: Fast +++	Trig: Free Run Atten: 20 dB	awag type Hats	TYPE NUMBER	
o dBidiv Ref 10.00 dBm			Mk	1 17.016 0 GHz -37.62 dBm	Auto Tune
0.00					Center Free 15.00000000 GH
10 n 20 n				81.1 - 13 01 day	Start Fre 10.000000000 GH
10.0 ······					Stop Fre 20,000000000 GH
sta 19 de la contraction de la contraction					CF Ste 1.00000000 GH <u>Auto</u> Ma
φ.u					Freq Offse 0 H
Start 10.000 GHz Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 2	Stop 20.000 GHz 5.33 ms (20001 pts)	Scale Typ

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



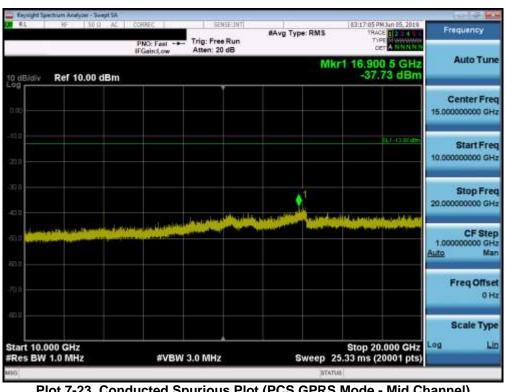
Plot 7-21. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 25 of 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 25 of 96
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RL	ectrum Analyser - Twept SA XF 50 SI AL		SENSE INT	and here and	43:16:34 PMJun 05, 2014	Frequency
		PNO: Fast ++-	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	TRACE EL 2 & 4 W A TYPE NUMBER OF A NIX N N N	requercy
l0 dBidiv	Ref 20.00 dBm			N	lkr1 7.111 5 GHz -34.77 dBm	Auto Tuni
iù.o						Center Fre 5.965000000 GH
0.00 10.0					D.(1-13.03) (Ber	Start Fre 1.91000000 GH
20 0				11		Stop Fre 10.000000000 GH
			ومالطي المولين		and a state of the second of	CF Ste 809.000000 MH <u>Auto</u> Ma
60 fi						Freq Offse 0 H
				- 1/2	Stop 10.000 GHz	Scale Typ
Start 1.91 #Res BW		#VBW	3.0 MHz	Sweep	4.02 ms (16181 pts)	Log

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



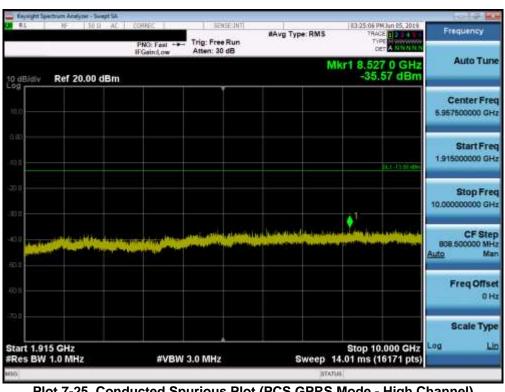
Plot 7-23. Conducted Spurious Plot (PCS GPRS Mode - Mid Channel)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 26 of 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 26 of 96
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R4 NF 50.0 AC	CONREC	SENSE INT			Oun 05, 2014	Frequency
	PNO: Fast +++	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	TYP		
dBidiv Ref 20.00 dBm			M	kr1 1.611 -39.4	7 5 GHz 40 dBm	Auto Tune
og 0.0						Center Free 940.000000 MH
0.0					1.1-1300 dbw	Start Free 30.000000 MH
no.						Stop Fre 1.85000000 GH
	۱۰۰۰،۲۰۰ <u>م</u> ارد الم	وبنيه الموادية	alan galayakan belah karalar na dire	president, plantaril ng	بند به مدارا باروانه	CF Step 182.000000 MH <u>Auto</u> Ma
01						Freq Offse 0 H
tart 0.0300 GHz Res BW 1.0 MHz	#VBW :	3.0 MHz	Sween	Stop 1.8 2.427 ms (500 GHz	Scale Typ

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



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

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 07 of 00
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	019 Portable Handset		Page 27 of 96
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019			



R5 KF 50.0 AC	CONREC	SENSE INT		13.25 48 PMJun 05, 2019	Frequency
	PNO: Fast +++	Trig: Free Run Atten: 20 dB	#Avg Type: RMS	TYPE NUMBER	requercy
o dBidly Ref 10.00 dBm			Mk	r1 16.959 0 GHz -38.29 dBm	Auto Tuni
0.03					Center Fre 15.00000000 GH
жи •••				0L1-13.00 daw	Start Fre 10.00000000 GH
10 0			1		Stop Fre 20.000000000 GH
zi o statu jedna je statu je statu je statu zi o	and the set of the set				CF Ste 1.00000000 GH <u>Auto</u> Ma
7ç. II					Freq Offse 0 H
Start 10.000 GHz Res BW 1.0 MHz	#\/B\M	3.0 MHz	Sween 2	Stop 20.000 GHz 5.33 ms (20001 pts)	Scale Typ

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

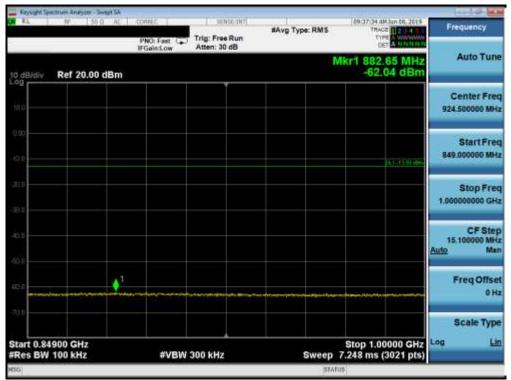
FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 29 of 06
1M1905200075-02-R2.ZNF	2.ZNF 5/17 - 6/10/2019 Portable Handset			Page 28 of 96
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Cellular CDMA Mode

Frequency	09-37-26 AM Jun 56, 2019 TRACE 23-44 Type A MARKANING CET A MARKANING	#Avg Type: RMS	SENSE 3N7	PNO: Fast	Keysight Spectrum Analyzer - Swept S RL III - 10 - 10 - A
Auto Tur	kr1 822.95 MHz -33.26 dBm	М	Atten: 30 dB	#GaleLow	dBidiv Ref 20.00 dBi
Center Fre 426.500000 MH					
Start Fre 30.000000 MH	101-1300 нен				uo an
Stop Fre 823.000000 MH					an
CF Ste 79.300000 Mi <u>luto</u> Ma					
Freq Offse 0 H	لسس	alarhan hijiyya an akan windong di te	elentre series and the		
Scale Typ	0100 02.010 10112				tart 30.0 MHz
Anna ann an Anna Anna Anna Anna Anna An	3.06 ms (15861 pts)	Sweep 38	300 kHz	#VBW 3	Res BW 100 kHz

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

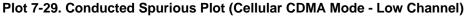


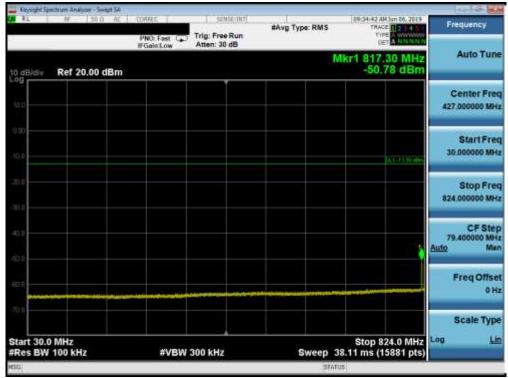
Plot 7-28. Conducted Spurious Plot (Cellular CDMA Mode - Low Channel)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dama 20 of 06		
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 29 of 96		
@ 0040 DOTEOT Excite states Labored						



RL IF 30.0 AC	PNO: Fast	Trig: Free Run #Atten: 30 dB	#Avg Type: RMS	09-39-38 AMJan 56, 2019 TRACE 1 2:34 4 Evre A Manager OET A MINIMUM	Frequency
10 dB/div Ref 10.00 dBm		7.0	M	kr1 9.999 0 GHz -43.91 dBm	Auto Tune
000					Center Free 5.50000000 GH
2010				01.1-13.01 dBm	Start Fre 1.000000000 GH
93 n 40. u				t	Stop Fre 10.00000000 GH
60.0	~~~	~~~~	~~~~		CF Ste 900.000000 MH Auto Ma
in					Freq Offse 0 H
Start 1.000 GHz #Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 1	Stop 10.000 GHz 5.60 ms (18001 pts)	Scale Typ Log Li





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

FCC ID: ZNFQ720VS		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 00
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 30 of 96
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RL 19 30.0 AC	PNO: Fast	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	19-35-21 AMJun 16, 2019 TRACE 12 20-4 0 TYPE 1 00000000 OET A NANNA 11	Frequency
IO dB/div Ref 20.00 dBm			M	kr1 855.20 MHz -60.96 dBm	Auto Tuni
шо					Center Fre 924.500000 MH
0.00 10.0				1.1-1330.004	Start Fre 849.000000 MH
20 N					Stop Fre 1.00000000 GH
					CF Ste 15.100000 Mi- Auto Ma
	ويوقع ورويون والتقريبة والمطار		nagari Masarian Araaliya Islahi		Freq Offse 0 H
700 Start 0.84900 GHz Res BW 100 kHz	#VBW :	200 kHz	Swaan	Stop 1.00000 GHz 7.248 ms (3021 pts)	Scale Typ Log Li

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



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

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 21 of 00
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 31 of 96
© 2019 PCTEST Engineering Labor	atory Inc	•		V 9 0 02/01/2019



RL 87 50.0 AC	PNO: Fast C	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	19:40:40 AM Jun 26, 2019 TRACE 12:0:40 TYPE 5 00000000 OET A N.N.N.14 71	Frequency
o dBidiv Ref 20.00 dBm			M	kr1 809.90 MHz -59.78 dBm	Auto Tune
itto					Center Free 427.000000 MH
0.00				1.1-1300.000	Start Free 30.000000 MH
20 N					Stop Fre 824.000000 MH
40.0					CF Ste 79,400000 MH Auto Ma
	ماري اين مريد مريد ماريد ماريد. ماريد اين مريد ماريد م	and and the age of the second	tin braderika katalan k		Freq Offse 0 H
79.0					Scale Type
Start 30.0 MHz Res BW 100 kHz	#VBW	300 kHz	Sweep 3	Stop 824.0 MHz 8.11 ms (15881 pts)	Log Lir

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



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

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 06	
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 32 of 96	
© 2019 PCTEST Engineering Labor	atory Inc	•		V 9 0 02/01/2019	



Frequency	19942-09 AM Jun 66, 2019 TRACE 12 2 4 9 TVITE A VISION OF	#Avg Type: RMS	Trig: Free Run	0 AC CORREC	RL 10 0
	OET A NUMBER OF		#Atten: 30 dB	IFGaint.ow	
Auto Tun	kr1 9.968 0 GHz -43.89 dBm	M		dBm	Bidiv Ref 10.00
Center Fre 5.50000000 GH					
Start Fre 1.00000000 GH	01.1-13.01 eBry				1
Stop Fre 10.00000000 GH	1				r
CF Ster 900.000000 MH Auto Ma					
Freq Offse 0 H					
Scale Typ	Stop 10.000 GHz 5.60 ms (18001 pts)		3.0 MHz		rt 1.000 GHz ts BW 1.0 MHz

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

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 22 of 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 33 of 96
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Res BW 1.0 MHZ	#VBW	3.0 MHz	Sweep	schools and basis a symplicity of biodistration of the single con-	
Start 0.0300 GHz Res BW 1.0 MHz	WL/ID1A/	2.0 MHz	Swaan	Stop 1.8450 GHz 2.420 ms (3631 pts)	Log Li
					Scale Typ
70.11					
60 fi					Freq Offs
51		والارزين ودورمة المردون والعوم			
40 U					181.500000 MH Auto Ma
					CF Ste
01					1.845000000 GI
xi 0					Stop Fre
10.0				1.1-13.00 dbm	30.000000 Mł
a nó					Start Fre
					a strategic and
10.03					Center Fre 937.500000 MH
o aBidly Ref 20.00 dBm				-44.52 dBm	
	IFGain:Low	Atten: 30 dB	M	kr1 1.845 0 GHz	Auto Tur
	PNO: Fast	Trig: Free Run	#Avg Type: RMS	TRACE 2 2 4 6 TYPE A MICH NO.	Frequency
Rs BF 30.01 AC	CONREC	SENSELINT	A 201 1	10:52:48 AM May 28, 2019	10191

Plot 7-36. Conducted Spurious Plot (PCS CDMA Mode - Low Channel)



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

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 24 of 00
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Rs 3F 30.0 AC	CONREC	SENSEUNT	and a second second	10:53:24 AM May 28, 2019	Frequency
	PNO: Fast	Trig: Free Run Atten: 20 dB	#Avg Type: RMS	TYPE A MININA CET A NYINAN	Frequency
o dBidiv Ref 10.00 dBm	1.00013200		Mk	r1 16.953 5 GHz -50.12 dBm	Auto Tune
0.00					Center Fred
20.0				\$1.1-13.01.dbs	Start Free 10.000000000 GH
ia a					Stop Free 20.000000000 GH
				~~~~~	CF Ster 1.000000000 GH <u>Auto</u> Ma
70.0					Freq Offse 0 H
tart 10.000 GHz Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 2	Stop 20.000 GHz 5.33 ms (20001 pts)	Scale Type

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



Plot 7-39. Conducted Spurious Plot (PCS CDMA Mode - Mid Channel)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 25 of 06
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© 2019 PCTEST Engineering Labor	atory Inc	•		V 9 0 02/01/2019



R4 36 30.0 AC	CONREC	SENSE INT		10:51:45 AM May 2	
	PNO: Fast	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	TRACE 12 TYPE A W CET A N	
o dBidly Ref 20.00 dBm	TABLES		M	kr1 8.687 0 0 -47.89 d	GHz Auto Tune IBm
.og					Center Fred 5.965000000 GHz
a no					Start Free 1.910000000 GHz
20.0					Stop Free 10.000000000 GH:
60 U				1	CF Step 809.000000 MH <u>Auto</u> Mar
60.0					Freq Offse 0 H
Start 1.910 GHz Res BW 1.0 MHz	#VBW :	1.0 MHz	Sween	Stop 10.000 4.02 ms (16181	GHz Log Lin

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



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

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Frequency	10:54:29 AM May 28, 2019 TRACE 1 2 3 4 6	#Avg Type: RMS	SENSE: INT	KF SO D AC CONREC	R5 35 50 G A
	DET A NINN N.N.	and the use	Trig: Free Run Atten: 30 dB	PNO: Fast	
Auto Tun	kr1 1.831 0 GHz -52.05 dBm	M		Ref 20.00 dBm	dBidly Ref 20.00 dBr
Center Free 940.000000 MH					0
Start Frei 30.000000 MH	D.1-13.00 ether				n
Stop Fre 1.850000000 GH					0. 
CF Step 182.000000 MH Auto Ma					
Freq Offse 0 H					n
Scale Type	Stop 1.8500 GHz			0.047	art 0.0300 GHz
- 1940 - 1940 - 1940 - 1940 - 1940 - 1940 - 1940 - 1940 - 1940 - 1940 - 1940 - 1940 - 1940 - 1940 - 1940 - 1940	2.427 ms (3641 pts)	Sweep	3.0 MHz		es BW 1.0 MHz

Plot 7-42. Conducted Spurious Plot (PCS CDMA Mode - High Channel)



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

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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RL	ectrum Analyzer - Twept SA XF 50 G AC		SENSEDNT		10:55:04 AM May 28, 2019	
		PNO: Fast	Trig: Free Run Atten: 20 dB	#Avg Type: RMS	THACE 2 2 4 4 4 TYPE A MICHANN CET A NIN N N.N	Frequency
10 dB/div	Ref 10.00 dBm			Mk	r1 16.983 0 GHz -50.11 dBm	Auto Tune
0.00						Center Fred 15.00000000 GHz
20.0					0L1-1301 dəv	Start Freq 10.00000000 GHz
30.0 40.0						Stop Fred 20,00000000 GH:
611			~~~			CF Step 1.000000000 GHz Auto Man
-70.11						Freq Offset 0 Hz
Start 10.0 #Res BW		#\/B\M	3.0 MHz	Sween 2	Stop 20.000 GHz 5.33 ms (20001 pts)	Scale Type

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

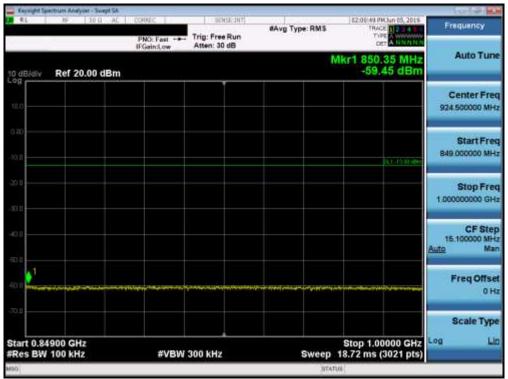
FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 20 of 00
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# Cellular WCDMA Mode

Reyaught Spe	ectium Analyzer - Swept SA KF 50 G AC	CONREC 1	SENSE UNT	11	62:00:36 PMJun 05, 2019	1012
		PNO: Fast ++-	Trig: Free Run Atten: 30 dB	dAvg Type: RMS	TRACE 2 3 4 M	Frequency
0 dBidiv	Ref 20.00 dBm	an open sport		M	lkr1 822.75 MHz -28.92 dBm	Auto Tun
iu.0						Center Fre 426.500000 MH
10 N					11.1-1300 alber	Start Fre 30.000000 MH
20 0					1	Stop Fre 823.000000 MH
ол т.н						CF Ste 79.300000 Mi <u>Auto</u> Ma
00		www.torwik.com	uluru (dissi) ya shiribu	and a construction of the second s	-	Freq Offse 0 H
70.11						Scale Typ
tart 30.0 Res BW		#VBW	300 kHz	Sweep 9	Stop 823.0 MHz 8.33 ms (15861 pts)	Log L
86				STATU	6	

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



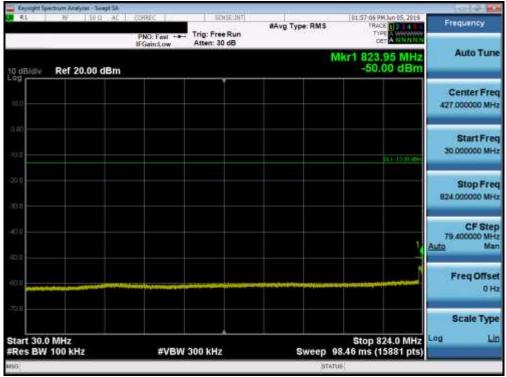
Plot 7-46. Conducted Spurious Plot (Cellular WCDMA Mode - Low Channel)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 06		
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R.S. KF S0.0 AC	CONREC	SENSE INT		42:02:34 PMJun 05, 2019	Frequency
	PNO: Fast ++-	Trig: Free Run #Atten: 24 dB	#Avg Type: RMS	TRACE 2 3 4 5 4 TYPE 7 GRADUID CET A NIN NIN N	Frequency
IO dBidly Ref 10.00 dBm	Politica		M	kr1 1.651 0 GHz -44.92 dBm	Auto Tune
0.00					Center Free 5.50000000 GH
10 N				0L1-1301.des	Start Free 1.000000000 GH
30.0. 4510 <b>1</b>					Stop Free 10.000000000 GH
	~	~~~	an a		CF Ster 900.000000 MH <u>Auto</u> Ma
70. li					Freq Offse 0 H
Start 1.000 GHz Res BW 1.0 MHz	#VBW :	3.0 MHz	Sweep 1	Stop 10.000 GHz 5.60 ms (18001 pts)	Scale Type





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

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 06
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R.L. H	F 150 G AC	CONREC	SENSE:INT	#Avg Type: RMS	11.58:31 PMJun 05, 2019 TRACE 12.2.4	Frequency
		PNO: Fast ++-	Trig: Free Run Atten: 30 dB		CET A NINA RAN	
to dBidly Re	f 20.00 dBm			N	lkr1 849.00 MHz -50.65 dBm	Auto Tune
iu.o						Center Free 924.500000 MH
0.00 10.0					141-1300 (000	Start Fre 849.000000 MH
20 0 30 U						Stop Fre 1,00000000 GH
10 U 50 U						CF Ste 15,100000 MH Auto Ma
60.11 <b></b>	an an the state of the second seco	والمعادي سيبور المراسي للمراس			-041-101-2012-00-00-00-00-00-00-00-00-00-00-00-00-00	Freq Offse 0 H
70.8						Scale Typ
Start 0.84900 Res BW 100		#VBW	300 kHz	Sweep	Stop 1.00000 GHz 18.72 ms (3021 pts)	Log Li

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



Plot 7-50. Conducted Spurious Plot (Cellular WCDMA Mode - Mid Channel)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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R5 NF 50.0 AC	CONNEC	SENSE(INT)	#Avg Type: RMS	82:03:20 PMJun 65, 2019 TRACE 2 2 3 4 8 4	Frequency
	PNO: Fast ++++	Trig: Free Run Atten: 30 dB		DET A NIN N N.N	
dBidly Ref 20.00 dBm			N	lkr1 821.90 MHz -58.48 dBm	Auto Tun
ů.0					Center Fre 427 000000 MH
o.n				D.(1-13.00 ether	Start Fre 30.000000 MH
ao,					Stop Fre 824.000000 Mi
ол — — — — — — — — — — — — — — — — — — —					CF Ste 79.400000 Mi <u>Auto</u> M
	New York ( And You and A		No. of the second s		Freq Offs 01
0.1					Scale Typ
tart 30.0 MHz Res BW 100 kHz	#VBW	300 kHz	Sweep 9	Stop 824.0 MHz 8.46 ms (15881 pts)	Log L

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



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

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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RL	NF 56.0 45	CONNEC	SENSEDUT		02:04:43:PM3un 05, 2019	Frequency
		PNO: Fast +++	Trig: Free Run #Atten: 25 dB	#Avg Type: RMS	TRACE 2 2 4 5 1 TYPE A MANAGE DET A N N N N N	Frequency
10 dB/div	Ref 10.00 dBm			N	lkr1 1.691 5 GHz -46.04 dBm	Auto Tune
0.00						Center Fred 5.50000000 GH
10.11 20.0					pc1-1100.00%	Start Fred 1.000000000 GHa
40.0						Stop Fred 10.000000000 GH
au 		~~~~				CF Step 900.000000 MHs Auto Mar
79, D						Freq Offset 0 Hz
Start 1.00					Stop 10.000 GHz	Scale Type
Res BW		#VBW	3.0 MHz	Sweep 1	5.60 ms (18001 pts)	

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

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 42 of 06	
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 43 of 96	
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# PCS WCDMA Mode

1100-1456		10	1100000000000	ctrum Analyzer - Swept SA	Reysight Spectre
Frequency	102:17:01 PMJun 05, 2019 TRACE 22:14 ST TYPE 20:04 ST DET A NINEM N	MAvg Type: RMS	Trig: Free Run	RF SED AC CONVEC	8.5
Auto Tur	r1 1.845 0 GHz -32.47 dBm	M	Atten: 30 dB	IFGaincLow Ref 20.00 dBm	0 dB/div
Center Fre 937.500000 Mi					u.o
Start Fre 30.000000 MH	0.1 -1 1 00 offen				0.0
Stop Fro 1.84500000 Gi	1				00 01
CF Ste 181 500000 Mi Auto Mi					ou 
Freq Offs 01					0.0
Scale Typ	Stop 1.8450 GHz .420 ms (3631 pts)	Sweep 2	3.0 MHz		tart 0.0300 Res BW 1.
<u></u>	in a serie of the local division of the second se	STATU			16

Plot 7-54. Conducted Spurious Plot (PCS WCDMA Mode - Low Channel)



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

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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PNO: Fast	SENSE DVT	#Avg Type: RMS	02:37:29 PMJun 05, 2019	Frequency
IFGaincl.ow	Trig: Free Run Atten: 20 dB	white type: KMS	TRACE 1214 51 TYPE A MUMANIA DET A N N N N N	Trequency
		M	kr1 17.018 5 GHz -45.69 dBm	Auto Tune
				Center Free 15.00000000 GH
			0.1 1100 mby	Start Frei 10.000000000 GH
				Stop Fre 20.00000000 GH
				CF Ste 1.00000000 GH <u>Auto</u> Ma
				Freq Offse 0 H
#VBW 3	.0 MHz	Sweep	Stop 20.000 GHz 25.33 ms (20001 pts)	Scale Type
	#VBW 3	#VBW 3.0 MHz	#VBW 3.0 MHz Sweep	-45.69 dBm

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



Plot 7-57. Conducted Spurious Plot (PCS WCDMA Mode - Mid Channel)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 45 of 00	
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RL	CONVEC	SENSE DVT	#Avg Type: RMS	02:35:02 PMJun 05, 2019 TRACE	Frequency
	PNO: Fast +++ IFGaincLow	Trig: Free Run Atten: 30 dB	any type nus	DET A NNNN N	
IO dB/dly Ref 20.00 dBm			M	kr1 8.650 0 GHz -43.81 dBm	Auto Tune
iù D					Center Fred 5.955000000 GH
0.00				0,1-11.01.009	Start Free 1.91000000 GH
201					Stop Free 10.000000000 GH
(D)			100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100	· · · · · · · · · · · · · · · · · · ·	CF Ster 809.000000 MH <u>Auto</u> Ma
60.ft					Freq Offse 0 H
30 II				Stop 10.000 GHz	Scale Type
Start 1.910 GHz #Res BW 1.0 MHz	#VBW :	3.0 MHz	Sweep 1	4.02 ms (16181 pts)	Log

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



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

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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RL 35 50 G AC	COPORES	SENSE INT	#Avg Type: RMS	12:39:18 PMJun 05, 2019 TRACE 12:34	Frequency
	PNO: Fast ++-	Trig: Free Run Atten: 30 dB	array type rate	CET A NWA NA	
dBidly Ref 20.00 dBm			M	kr1 1.731 5 GHz -47.47 dBm	Auto Tune
0.0					Center Free 940.000000 MH
ao 9.1				0.1-1300 alley	Start Fre 30.000000 MH
ap					Stop Fre 1.85000000 GH
ou		ور مور مراجع الم	Party and a support of the second	¹	CF Ste 182.000000 MH <u>Auto</u> Ma
0.0 million for the Constant of States					Freq Offse 0 H
tart 0.0300 GHz Res BW 1.0 MHz	41./D14/	3.0 MHz	Cura and	Stop 1.8500 GHz 2.427 ms (3641 pts)	Scale Type

Plot 7-60. Conducted Spurious Plot (PCS WCDMA Mode - High Channel)



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

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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R.L. KF 50.0 AC	CORRECT	SENSE INT	11	42.29.54 PMJun 05, 2019	101210
	PNO: Fast ++++	Trig: Free Run Atten: 20 dB	dAvg Type: RMS	THACE 2 2 4 6 C	Frequency
g dBidly Ref 10.00 dBm			Mk	r1 16.979 5 GHz -45.85 dBm	Auto Tuni
og 0.00					Center Free 15.00000000 GH
20.0				01.1-13.01 des	Start Free 10.00000000 GH
10.0					Stop Free 20.00000000 GH
		~~~~			CF Step 1.00000000 GH <u>Auto</u> Ma
70.11					Freq Offse 0 H
Start 10.000 GHz Res BW 1.0 MHz	#VBW :			Stop 20.000 GHz 5.33 ms (20001 pts)	Scale Type

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

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager
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7.4 Band Edge Emissions at Antenna Terminal

Test Overview

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

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

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

Test Setup

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



Figure 7-3. Test Instrument & Measurement Setup

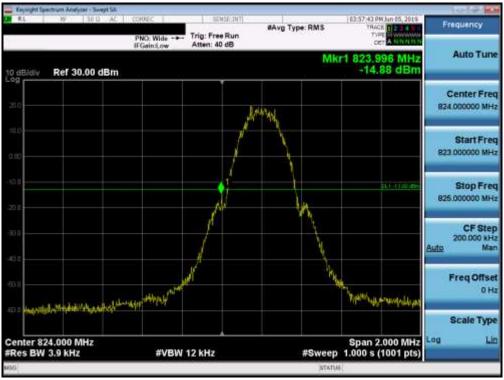
Test Notes

Per 22.917(b), 24.238(b), and RSS-132(5.5), RSS-133(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.

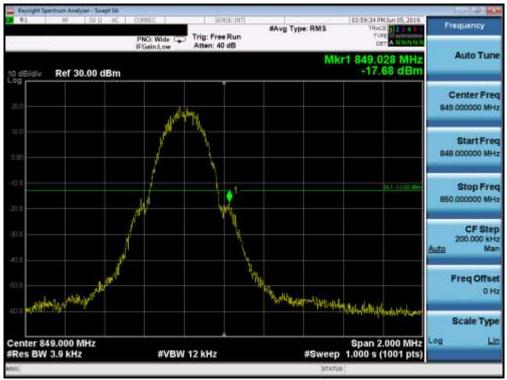
FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 00
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Cellular GSM Mode



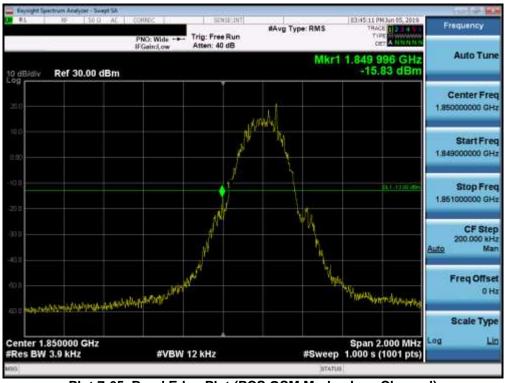
Plot 7-63. Band Edge Plot (Cellular GSM Mode - Low Channel)



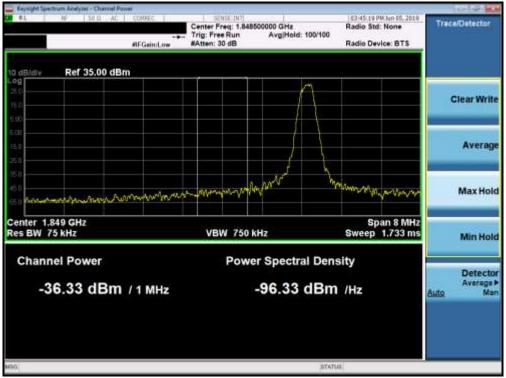
Plot 7-64. Band Edge Plot (Cellular GSM Mode - High Channel)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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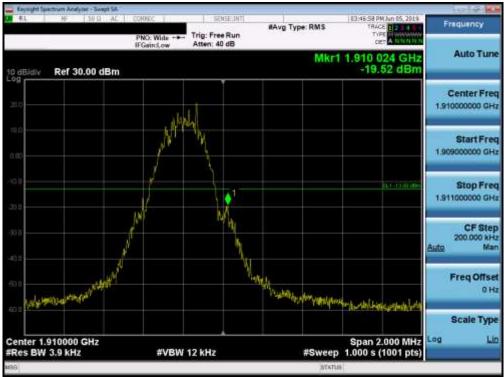
Plot 7-65. Band Edge Plot (PCS GSM Mode - Low Channel)



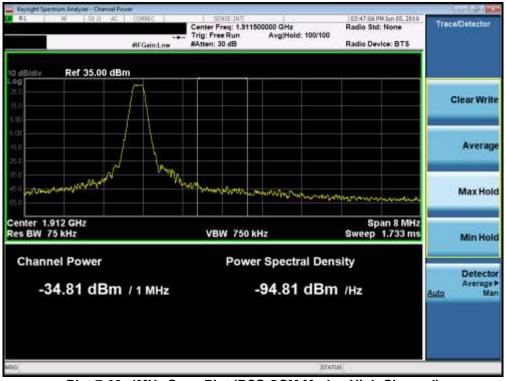
Plot 7-66. 4MHz Span Plot (PCS GSM Mode - Low Channel)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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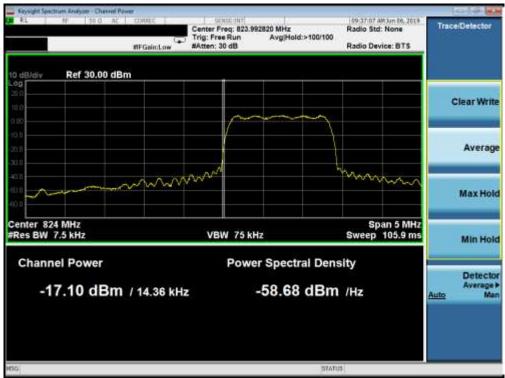


Plot 7-68. 4MHz Span Plot (PCS GSM Mode - High Channel)

FCC ID: ZNFQ720VS		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
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Cellular CDMA Mode



Plot 7-69. Band Edge Plot (Cellular CDMA Mode - Low Channel)



Plot 7-70. 4MHz Span Plot (Cellular CDMA Mode - Low Channel)

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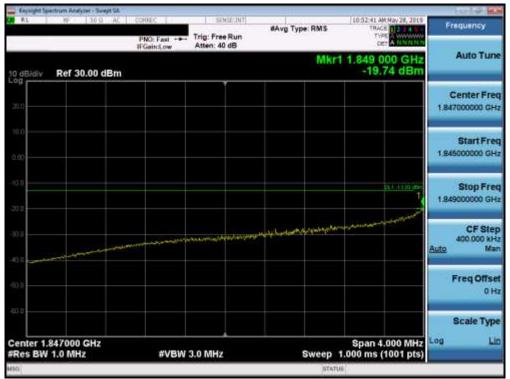
Plot 7-72. 4MHz Span Plot (Cellular CDMA Mode - High Channel)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 54 of 00
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Plot 7-73. Band Edge Plot (PCS CDMA Mode - Low Channel)



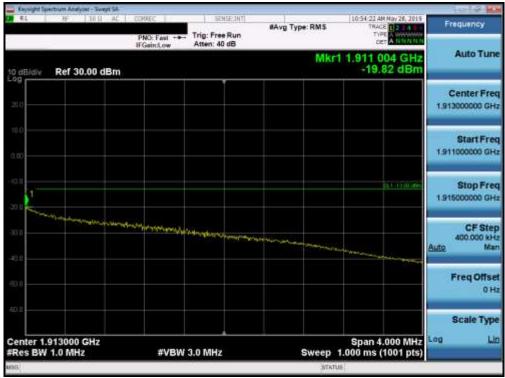
Plot 7-74. 4MHz Span Plot (PCS CDMA Mode - Low Channel)

FCC ID: ZNFQ720VS	APCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga FF of 00
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© 0040 DOTEOT Excito a site of the	tani lan			1/00000104/0040



RL NF 1000 AC	CONDEC	SENSELINT	#Avg Type: RMS	10:54:12 AM May 28, 2019 TRACE 21, 2019	Frequency
	PNO: Wide: 😱 IFGain:3,ow	Trig: Free Run Atten: 40 dB	and the rate	CET A NY NN	
to aBidiv Ref 30.00 dBm			Mkr	1 1.910 000 GHz -31.517 dBm	Auto Tune
21.0					Center Free 1.910000000 GH
0.00	m				Start Frei 1.907500000 GH
2011				101. (-11.00 ABA	Stop Fre 1.912500000 GH
2011	Ļ	m'n	n.		CF Ste 500.000 kH Auto Ma
60.0			- Commences	many	Freq Offse 0 H
ED 1					Scale Typ
Center 1.910000 GHz #Res BW 15 kHz	#VBW	47 kHz	Sweep	Span 5.000 MHz 27.33 ms (1001 pts)	
86			STATE	station of the station of the station of the station of the	

Plot 7-75. Band Edge Plot (PCS CDMA Mode - High Channel)



Plot 7-76. 4MHz Span Plot (PCS CDMA Mode - High Channel)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 56 of 06
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Cellular WCDMA Mode



Plot 7-77. Band Edge Plot (Cellular WCDMA Mode - Low Channel)



Plot 7-78. Band Edge Plot (Cellular WCDMA Mode - High Channel)

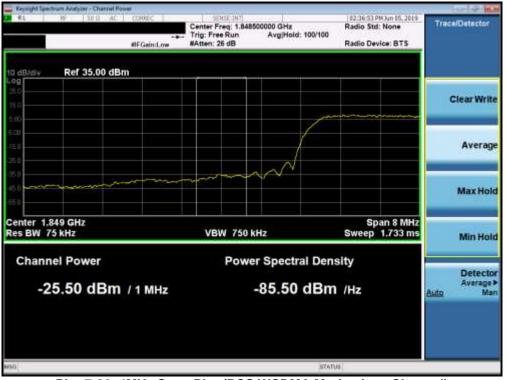
FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga EZ at 00
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset	Page 57 of 96
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PCS WCDMA Mode



Plot 7-79. Band Edge Plot (PCS WCDMA Mode - Low Channel)



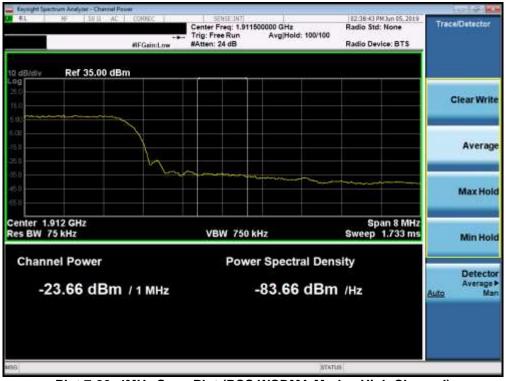
Plot 7-80. 4MHz Span Plot (PCS WCDMA Mode - Low Channel)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 58 of 96
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10-10- 10	(42:38:33 PMJun 05, 2019		SENSE INTI	chunt Analyzer - Swept SA XF S0 0 AC CORREC	
Frequency	TRACE 12 2 4 16 1 TYPE A MANAGEMENT CET A MANAGEMENT	#Avg Type: RMS	Trig: Free Run	PNO: Fast +++	
Auto Tune			Atten: 40 dB	IFGainstow	
	1.910 060 GHz -23.52 dBm	MKET		Ref 30.00 dBm	10 dBidiv R
Center Fred 1.91000000 GH					31.0
Start Fred 1.902500000 GH:					111.0 0.00
Stop Free 1.917600000 GH:	ระป กรรม สดง				-10.0
CF Step 1 500000 MH Auto Mar		n m	hin	~~^^	303 403
Freq Offse 0 H					60 N
Scale Type					-60.0
Log Lir	Span 15.00 MHz .867 ms (1001 pts)	Sweep 1	300 KHz		Center 1.910 #Res BW 10
		STATLE			186





Plot 7-82. 4MHz Span Plot (PCS WCDMA Mode - High Channel)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
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7.5 Peak-Average Ratio

Test Overview

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

Test Procedure Used

KDB 971168 D01 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.



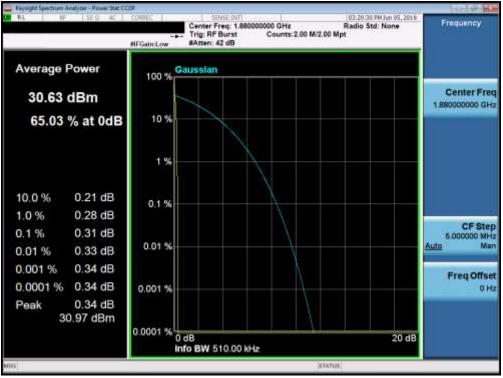
Figure 7-4. Test Instrument & Measurement Setup

Test Notes

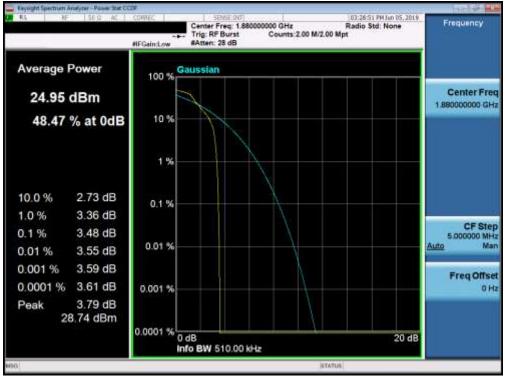
None

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 60 of 06
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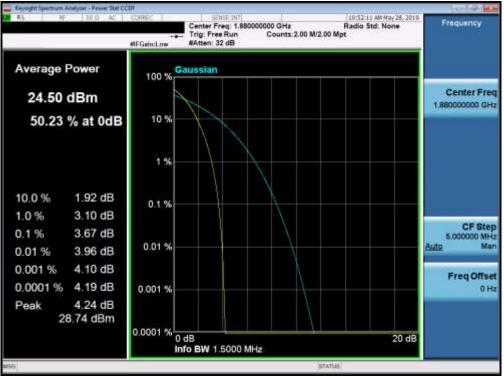




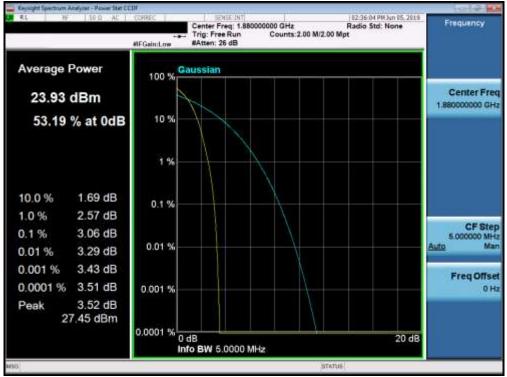
Plot 7-84. Peak-Average Ratio Plot (EDGE1900 Mode)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 61 af 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 61 of 96
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Plot 7-86. Peak-Average Ratio Plot (PCS WCDMA Mode)

FCC ID: ZNFQ720VS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 62 of 06
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7.6 Radiated Power (ERP/EIRP)

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.2.1

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

Test Settings

- 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: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Test Setup

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

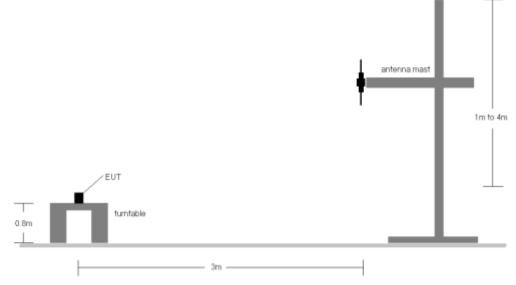


Figure 7-5. Radiated Test Setup <1GHz

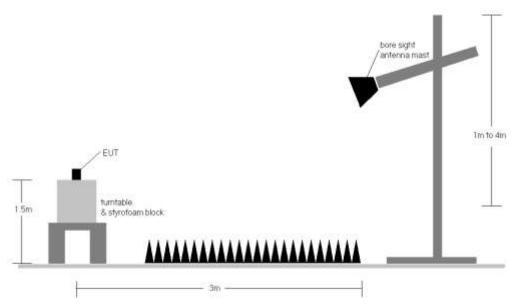


Figure 7-6. Radiated Test Setup >1GHz

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Test Notes

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

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
824.20	GPRS850	V	132	290	23.28	6.70	27.83	0.607	38.45	-10.62	29.98	0.995	40.61	-10.63
836.60	GPRS850	V	142	249	23.32	6.70	27.87	0.612	38.45	-10.58	30.02	1.005	40.61	-10.59
848.80	GPRS850	V	151	250	23.23	6.70	27.78	0.600	38.45	-10.67	29.93	0.984	40.61	-10.68
836.60	GPRS850	н	112	250	20.94	6.70	25.49	0.354	38.45	-12.96	27.64	0.581	40.61	-12.97
836.60	EDGE850	V	223	267	18.21	6.70	22.76	0.189	38.45	-15.69	24.91	0.310	40.61	-15.70

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

FCC ID: ZNFQ720VS	<u>PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
824.70	CDMA850	V	139	79	11.86	6.70	16.41	38.45	-22.04	18.56	40.61	-22.05
836.52	CDMA850	V	141	87	12.11	6.70	16.66	38.45	-21.79	18.81	40.61	-21.80
848.31	CDMA850	V	149	100	10.98	6.70	15.53	38.45	-22.92	17.68	40.61	-22.93
836.52	CDMA850	Н	102	286	9.76	6.70	14.31	38.45	-24.14	16.46	40.61	-24.15

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

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
826.40	WCDMA850	V	145	296	13.40	6.70	17.95	38.45	-20.50	20.10	40.61	-20.51
836.60	WCDMA850	V	147	289	12.74	6.70	17.29	38.45	-21.16	19.44	40.61	-21.17
846.60	WCDMA850	V	149	266	12.24	6.60	16.69	38.45	-21.76	18.84	40.61	-21.77
826.40	WCDMA850	Н	220	278	12.08	6.70	16.63	38.45	-21.82	18.78	40.61	-21.83

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

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.20	GPRS1900	V	125	261	16.61	9.48	26.09	0.406	33.01	-6.92
1880.00	GPRS1900	V	140	263	19.81	9.90	29.71	0.935	33.01	-3.30
1909.80	GPRS1900	V	112	260	19.81	10.26	30.07	1.015	33.01	-2.94
1909.80	GPRS1900	Н	165	1	18.38	10.26	28.64	0.731	33.01	-4.37
1909.80	EDGE1900	V	112	260	15.51	10.26	25.77	0.377	33.01	-7.24

Table 7-5. EIRP (PCS GPRS)

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1851.25	CDMA1900	V	100	30	9.32	9.49	18.81	33.01	-14.20
1880.00	CDMA1900	V	100	38	10.44	9.90	20.34	33.01	-12.67
1908.75	CDMA1900	V	100	23	11.10	10.25	21.35	33.01	-11.66
1908.75	CDMA1900	Н	188	188	9.31	10.25	19.56	33.01	-13.45

Table 7-6. EIRP (PCS CDMA)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Margin [dB]
1852.40	WCDMA1900	V	134	263	8.53	9.51	18.04	33.01	-14.97
1880.00	WCDMA1900	V	147	277	10.92	9.90	20.82	33.01	-12.19
1907.60	WCDMA1900	V	120	264	9.88	10.24	20.12	33.01	-12.89
1880.00	WCDMA1900	н	237	6	10.86	9.90	20.76	33.01	-12.25

Table 7-7. EIRP (PCS WCDMA)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	💽 LG	Approved by: Quality Manager
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7.7 Radiated Spurious Emissions Measurements

Test Overview

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

Test Procedures Used

KDB 971168 D01 v03r01 - Section 5.8

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

Test Settings

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

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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The EUT and measurement equipment were set up as shown in the diagram below.

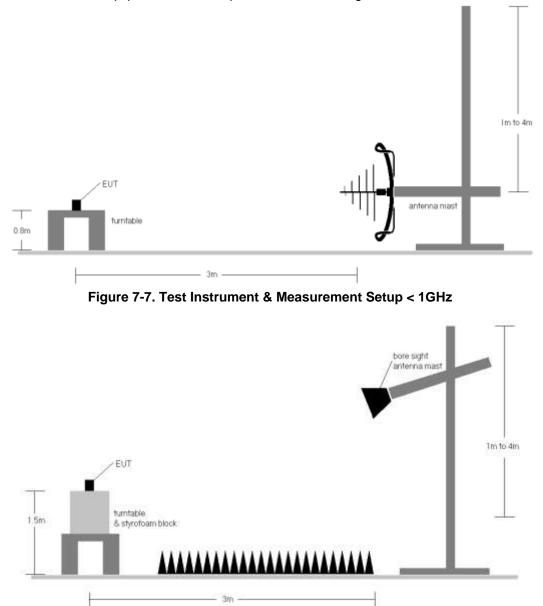


Figure 7-8. Test Instrument & Measurement Setup >1 GHz

Test Notes

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest power is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, and HSUPA capabilities. For WCDMA and HSUPA transmission, all configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2kbps with HSDPA inactive and TPC bits all set to "1."

FCC ID: ZNFQ720VS	«NPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
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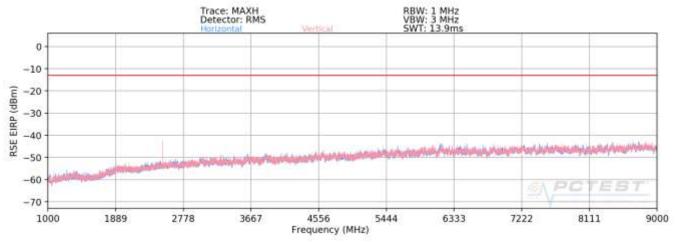


- 3) This device was tested under all RC and SO combinations and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 4) This unit was tested with its standard battery.
- 5) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning.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

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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Cellular GPRS Mode



Plot 7-87. Radiated Spurious Plot above 1GHz (Cellular GPRS Mode)

82	4.20	MHz
GPRS (GMSK)	_	
3	meters	
-13	dBm	
	GPRS (GMSK) 3	<u>3</u> meters

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1648.40	Н	103	49	-71.65	9.20	-62.46	-49.5
2472.60	Н	129	120	-57.94	10.13	-47.81	-34.8
3296.80	Н	-	-	-69.62	10.81	-58.81	-45.8
4121.00	Н	-	-	-67.00	10.29	-56.72	-43.7

Table 7-8. Radiated Spurious Data (Cellular GPRS Mode – Ch. 128)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 71 of 00
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OPERATING FREQUENCY:	830	6.60	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]
1673.20	н	164	51	-72.56	9.38	-63.17	-50.2
2509.80	Н	132	9	-60.90	10.16	-50.74	-37.7
3346.40	Н	-	-	-60.96	10.77	-50.18	-37.2
4183.00	Н	-	-	-59.50	10.41	-49.09	-36.1

Table 7-9. Radiated Spurious Data (Cellular GPRS Mode – Ch. 190)

MHz

OPERATING FREQUENCY:

MODULATION SIGNAI

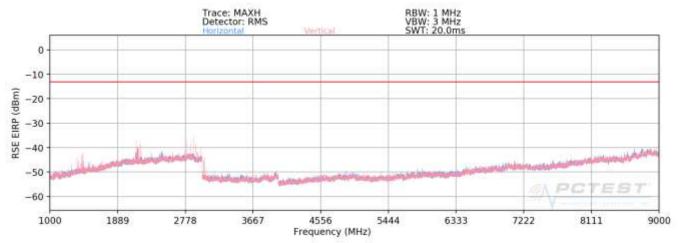
REQUENCY:	84	8.80
ON SIGNAL:	GPRS (GMSK)	
DISTANCE:	3	meters
LIMIT:	-13	dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1697.60	Н	109	167	-69.90	9.57	-60.33	-47.3
2546.40	Н	138	123	-61.98	10.14	-51.84	-38.8
3395.20	Н	-	-	-69.15	10.81	-58.34	-45.3
4244.00	Н	-	-	-68.61	10.70	-57.91	-44.9

Table 7-10. Radiated Spurious Data (Cellular GPRS Mode – Ch. 251)

FCC ID: ZNFQ720VS	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 72 of 06	
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	/10/2019 Portable Handset		Page 72 of 96	
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Plot 7-88. Radiated Spurious Plot above 1GHz (Cellular CDMA Mode)

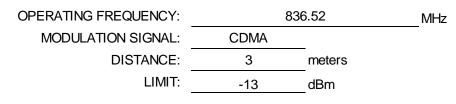
8	324.70	MHz
CDMA		
3	meters	
-13	dBm	
	CDMA 3	3 meters

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1649.40	V	-	-	-75.21	8.95	-66.26	-53.3
2474.10	V	-	-	-72.90	9.65	-63.25	-50.3
3298.80	V	-	-	-71.78	9.58	-62.20	-49.2

Table 7-11. Radiated Spurious Data (Cellular CDMA Mode – Ch. 1013)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 72 of 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 73 of 96
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.04	V	-	-	-75.01	8.95	-66.06	-53.1
2509.56	V	-	-	-72.74	9.75	-62.99	-50.0

Table 7-12. Radiated Spurious Data (Cellular CDMA Mode – Ch. 384)

848.31

meters

MHz

OPERATING FREQUENCY:

MODULATION SIGNAL:

DISTANCE:

LIMIT: -13 dBm

CDMA

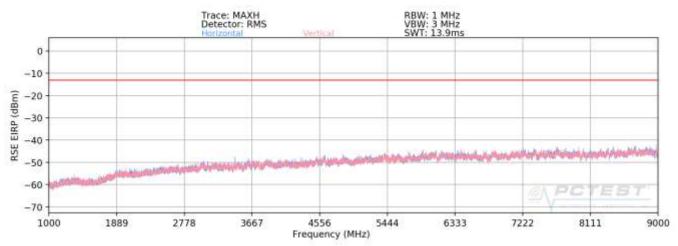
3

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1696.62	V	392	14	-75.44	8.95	-66.48	-53.5
2544.93	V	-	-	-73.08	9.74	-63.34	-50.3

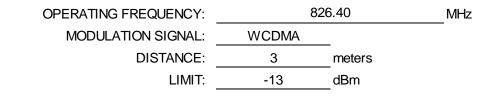
Table 7-13. Radiated Spurious Data (Cellular CDMA Mode – Ch. 777)

FCC ID: ZNFQ720VS	APCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 74 of 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 74 of 96
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Plot 7-89. 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	-	-	-74.83	8.95	-65.88	-52.9
2479.20	Н	-	-	-72.22	9.67	-62.55	-49.6

Table 7-14. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4132)

FCC ID: ZNFQ720VS	APCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 75 of 00
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 75 of 96
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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	100	263	-74.75	8.95	-65.80	-52.8
2509.80	Н	-	-	-72.58	9.75	-62.83	-49.8
3346.40	H	-	-	-71.47	9.60	-61.86	-48.9

Table 7-15. Radiated Spurious Data (Cellular WCDMA Mode – Ch. 4183)

WCDMA

3

846.60

meters

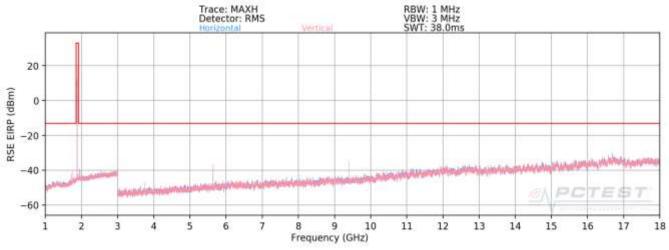
MHz

OPERATING FREQUENCY: _____ MODULATION SIGNAL: ____ DISTANCE: ____ LIMIT:

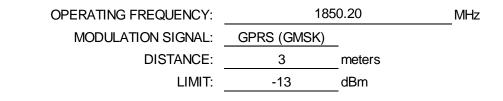
			LIMIT:	-13	dBm		
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1693.20	Н	-	-	-74.72	8.95	-65.76	-52.8
2539.80	Н	-	-	-72.77	9.74	-63.03	-50.0

FCC ID: ZNFQ720VS	<u>«VPCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 76 of 06
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Plot 7-90. Radiated Spurious Plot above 1GHz (PCS GPRS Mode)

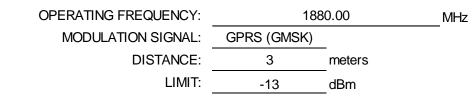


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3700.40	Н	128	304	-64.13	9.58	-54.55	-41.5
5550.60	Н	199	48	-57.99	10.94	-47.05	-34.1
7400.80	Н	200	3	-66.79	10.96	-55.84	-42.8
9251.00	Н	200	347	-63.93	11.63	-52.30	-39.3
11101.20	Н	200	323	-62.20	12.74	-49.46	-36.5
12951.40	Н	-	-	-61.62	13.30	-48.32	-35.3
14801.60	Н	-	-	-58.75	12.45	-46.30	-33.3

Table 7-17. Radiated Spurious Data (PCS GPRS Mode – Ch. 512)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 77 of 00		
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	Н	157	303	-63.27	9.37	-53.90	-40.9
5640.00	Н	200	13	-60.27	11.17	-49.10	-36.1
7520.00	Н	126	316	-64.84	11.11	-53.73	-40.7
9400.00	Н	200	352	-54.76	11.57	-43.19	-30.2
11280.00	Н	120	160	-60.03	12.72	-47.32	-34.3
13160.00	Н	-	-	-58.51	13.15	-45.37	-32.4
15040.00	Н	-	-	-56.91	13.52	-43.39	-30.4

Table 7-18. Radiated Spurious Data (PCS GPRS Mode – Ch. 661)

OPERATING FREQUENCY: MODULATION SIGNAL:

DISTANCE:

LIMIT:

 1909.80

 GPRS (GMSK)

 3
 meters

 -13
 dBm

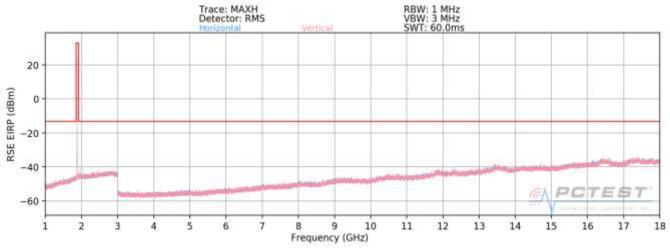
MHz

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3819.60	Н	115	284	-67.99	9.30	-58.69	-45.7
5729.40	Н	181	324	-65.50	11.39	-54.12	-41.1
7639.20	Н	120	309	-66.61	11.33	-55.28	-42.3
9549.00	Н	200	346	-63.09	11.79	-51.30	-38.3
11458.80	Н	199	333	-62.38	12.82	-49.56	-36.6
13368.60	Н	-	-	-59.82	12.78	-47.04	-34.0
15278.40	Н	-	-	-59.48	14.90	-44.58	-31.6

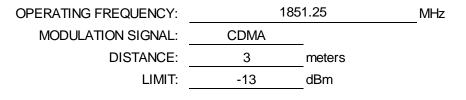
Table 7-19. Radiated Spurious Data (PCS GPRS Mode – Ch. 810)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dago 79 of 06	
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	9 Portable Handset		Page 78 of 96	
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Plot 7-91. Radiated Spurious Plot above 1GHz (PCS CDMA Mode)

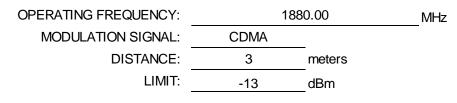


Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3702.50	V	-	-	-70.62	9.58	-61.05	-48.0
5553.75	V	-	-	-69.61	10.95	-58.66	-45.7

Table 7-20. Radiated Spurious Data (PCS CDMA Mode – Ch. 25)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 70 of 00	
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 79 of 96	
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	V	-	-	-69.84	9.37	-60.47	-47.5
5640.00	V	-	-	-70.27	11.17	-59.10	-46.1

Table 7-21. Radiated Spurious Data (PCS CDMA Mode – Ch. 600)

OPERATING FREQUENCY:

MODULATION SIGNAL: DISTANCE:

 ENCY:
 1908.75

 GNAL:
 CDMA

 ANCE:
 3

 LIMIT:
 -13

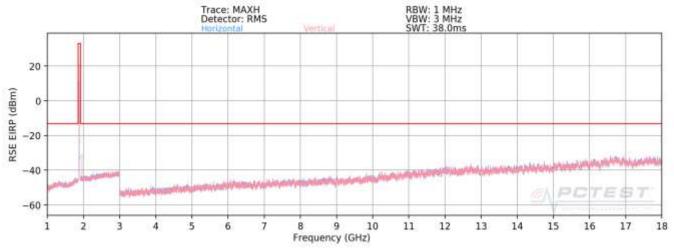
MHz

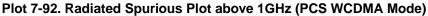
Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3817.50	V	103	331	-69.52	9.30	-60.21	-47.2
5726.25	V	112	226	-69.56	11.38	-58.18	-45.2
7635.00	V	215	172	-65.07	11.32	-53.74	-40.7
9543.75	V	-	-	-66.18	11.78	-54.40	-41.4

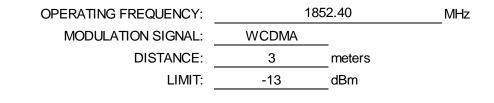
Table 7-22. Radiated Spurious Data (PCS CDMA Mode – Ch. 1175)

FCC ID: ZNFQ720VS		MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager		
Test Report S/N:				Page 80 of 96		
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Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3704.80	Н	-	-	-71.11	9.57	-61.54	-48.5
5557.20	Н	-	-	-70.47	10.95	-59.52	-46.5

Table 7-23. Radiated Spurious Data (PCS WCDMA Mode - Ch. 9262)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 81 of 00		
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 81 of 96		
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OPERATING FREQUENCY:	188	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	Н	114	44	-69.64	9.37	-60.28	-47.3
5640.00	Н	-	-	-70.71	11.17	-59.54	-46.5
7520.00	H	-	-	-67.83	11.11	-56.72	-43.7

Table 7-24. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9400)

190	7.60 MH	z
WCDMA		
3	meters	
-13	dBm	
	WCDMA 3	WCDMA 3 meters

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3815.20	Н	-	-	-70.10	9.30	-60.80	-47.8
5722.80	Н	-	-	-71.13	11.37	-59.77	-46.8

Table 7-25. Radiated Spurious Data (PCS WCDMA Mode – Ch. 9538)

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N: Test Dates:		EUT Type:		Dage 82 of 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 82 of 96
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Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

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

For Part 22, RSS-132, and RSS-133, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24, 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: ZNFQ720VS	<u> PCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager
Test Report S/N: Test Dates:		EUT Type:		Dage 82 of 06
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OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	190	
REFERENCE VOLTAGE:	4.38	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.38	- 30	836,599,824	-176	-0.0000210
100 %		- 20	836,599,821	-179	-0.0000214
100 %		- 10	836,599,956	-44	-0.0000053
100 %		0	836,600,225	225	0.0000269
100 %		+ 10	836,599,894	-106	-0.0000127
100 %		+ 20	836,599,982	-18	-0.0000022
100 %		+ 30	836,599,604	-396	-0.0000473
100 %		+ 40	836,599,847	-153	-0.0000183
100 %		+ 50	836,600,067	67	0.0000080
BATT. ENDPOINT	3.59	+ 20	836,600,138	138	0.0000165

Table 7-26. Frequency Stability Data (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFQ720VS	<u>«VPCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager
Test Report S/N: Test Dates:		EUT Type:		Dage 84 of 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 84 of 96
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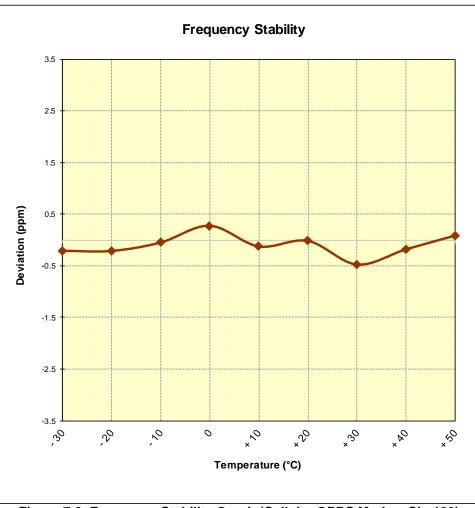


Figure 7-9. Frequency Stability Graph (Cellular GPRS Mode – Ch. 190)

FCC ID: ZNFQ720VS		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N: Test Dates:		EUT Type:		Dega 95 of 00	
1M1905200075-02-R2.ZNF 5/17 - 6/10/2019		Portable Handset		Page 85 of 96	
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OPERATING FREQUENCY:	836,520,000	Hz
CHANNEL:	384	
REFERENCE VOLTAGE:	4.38	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.38	- 30	836,520,001	1	0.0000001
100 %		- 20	836,519,847	-153	-0.0000183
100 %		- 10	836,519,654	-346	-0.0000414
100 %		0	836,520,019	19	0.0000023
100 %		+ 10	836,519,644	-356	-0.0000426
100 %		+ 20	836,520,169	169	0.0000202
100 %		+ 30	836,520,241	241	0.0000288
100 %		+ 40	836,519,798	-202	-0.0000241
100 %		+ 50	836,520,018	18	0.0000022
BATT. ENDPOINT	3.59	+ 20	836,520,060	60	0.0000072

Table 7-27. Frequency Stability Data (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFQ720VS	<u>«VPCTEST</u>	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 86 of 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 86 of 96
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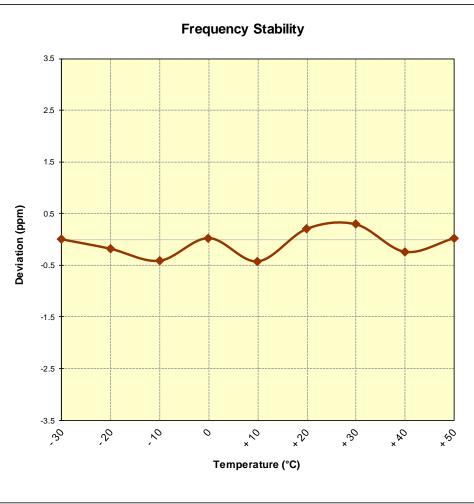


Figure 7-10. Frequency Stability Graph (Cellular CDMA Mode – Ch. 384)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 97 of 00
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 87 of 96
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OPERATING FREQUENCY:	836,600,000	Hz
CHANNEL:	4183	_
REFERENCE VOLTAGE:	4.38	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.38	- 30	836,599,720	-280	-0.0000335
100 %		- 20	836,600,038	38	0.0000045
100 %		- 10	836,599,897	-103	-0.0000123
100 %		0	836,600,064	64	0.0000077
100 %		+ 10	836,600,012	12	0.0000014
100 %		+ 20	836,600,030	30	0.0000036
100 %		+ 30	836,600,027	27	0.0000032
100 %		+ 40	836,599,914	-86	-0.0000103
100 %		+ 50	836,599,995	-5	-0.0000006
BATT. ENDPOINT	3.59	+ 20	836,600,022	22	0.0000026

Table 7-28. Frequency Stability Data (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFQ720VS	APCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 80 of 00
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 88 of 96
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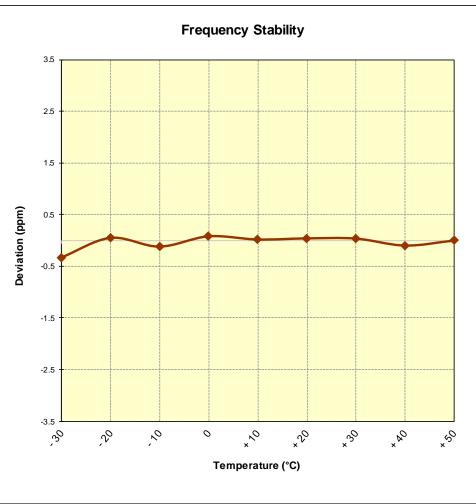


Figure 7-11. Frequency Stability Graph (Cellular WCDMA Mode – Ch. 4183)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 80 of 00
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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	661	
REFERENCE VOLTAGE:	4.38	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.38	- 30	1,880,000,333	333	0.0000177
100 %		- 20	1,879,999,939	-61	-0.0000032
100 %		- 10	1,879,999,997	-3	-0.0000002
100 %		0	1,879,999,915	-85	-0.0000045
100 %		+ 10	1,880,000,376	376	0.0000200
100 %		+ 20	1,880,000,065	65	0.0000035
100 %		+ 30	1,879,999,728	-272	-0.0000145
100 %		+ 40	1,879,999,974	-26	-0.0000014
100 %		+ 50	1,880,000,076	76	0.0000040
BATT. ENDPOINT	3.59	+ 20	1,879,999,793	-207	-0.0000110

Table 7-29. Frequency Stability Data (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 00 of 00
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 90 of 96
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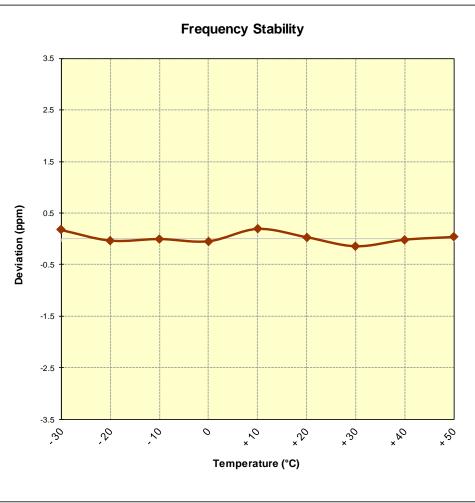


Figure 7-12. Frequency Stability Graph (PCS GPRS Mode – Ch. 661)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 01 of 00
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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	600	
REFERENCE VOLTAGE:	4.38	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.38	- 30	1,880,000,063	63	0.0000034
100 %		- 20	1,879,999,844	-156	-0.0000083
100 %		- 10	1,879,999,789	-211	-0.0000112
100 %		0	1,880,000,185	185	0.0000098
100 %		+ 10	1,879,999,956	-44	-0.0000023
100 %		+ 20	1,880,000,054	54	0.0000029
100 %		+ 30	1,879,999,626	-374	-0.0000199
100 %		+ 40	1,879,999,714	-286	-0.0000152
100 %		+ 50	1,879,999,764	-236	-0.0000126
BATT. ENDPOINT	3.59	+ 20	1,880,000,049	49	0.0000026

Table 7-30. Frequency Stability Data (PCS CDMA Mode – Ch. 600)

FCC ID: ZNFQ720VS	APCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕐 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 02 of 06
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 92 of 96
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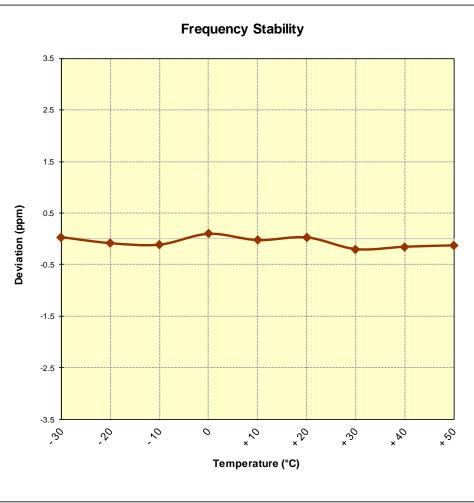


Figure 7-13. Frequency Stability Graph (PCS CDMA Mode – Ch. 600)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 02 of 06
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OPERATING FREQUENCY:	1,880,000,000	Hz
CHANNEL:	9400	
REFERENCE VOLTAGE:	4.38	VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.38	- 30	1,880,000,179	179	0.0000095
100 %		- 20	1,879,999,974	-26	-0.0000014
100 %		- 10	1,879,999,860	-140	-0.0000074
100 %		0	1,880,000,048	48	0.0000026
100 %		+ 10	1,879,999,988	-12	-0.0000006
100 %		+ 20	1,879,999,666	-334	-0.0000178
100 %		+ 30	1,880,000,078	78	0.0000041
100 %		+ 40	1,880,000,098	98	0.0000052
100 %		+ 50	1,880,000,005	5	0.0000003
BATT. ENDPOINT	3.59	+ 20	1,879,999,987	-13	-0.000007

Table 7-31. Frequency Stability Data (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFQ720VS	APCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 04 of 00
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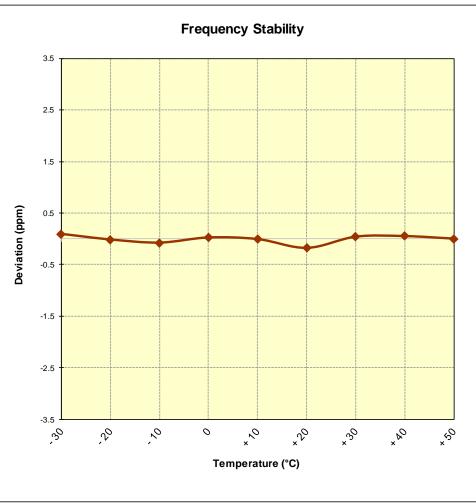


Figure 7-14. Frequency Stability Graph (PCS WCDMA Mode – Ch. 9400)

FCC ID: ZNFQ720VS	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage OF of OC
1M1905200075-02-R2.ZNF	5/17 - 6/10/2019	Portable Handset		Page 95 of 96
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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the LG Portable Handset FCC ID: ZNFQ720VS complies with all the requirements of Part 22 & 24 of the FCC Rules.

FCC ID: ZNFQ720VS	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage OC of OC
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