

PCTEST ENGINEERING LABORATORY, INC.

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



MEASUREMENT REPORT

FCC Part 22 & 90

Applicant Name:

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

Date of Testing: 9/12 - 10/2/2019 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1909120153-04-R1.ZNF

FCC ID:

ZNFQ620WA

Certification

APPLICANT:

LG Electronics USA, Inc.

Application Type:
Model:
Additional Model(s):

EUT Type: FCC Classification: FCC Rule Part: Test Procedure(s): LM-Q620WA LMQ620WA, Q620WA, LM-Q620VA, LMQ620VA, Q620VA, LM-Q620VL, LMQ620VL, Q620VL, LM-Q620QM6, LMQ620QM6, Q620QM6, LM-Q620QM, LMQ620QM, Q620QM Portable Handset PCS Licensed Transmitter Held to Ear (PCE) §2.1049, §22(H), §90(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.

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.

Note: This revised Test Report (S/N: 1M1909120153-04-R1.ZNF) supersedes and replaces the previously issued test report 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.

Randy Ortanez President



FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 1 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 1 of 49
© 2019 PCTEST Engineering Labora	tory, Inc.	·		V 9.0 02/01/2019



TABLE OF CONTENTS

1.0	INTR	ODUCTION	4
	1.1	Scope	4
	1.2	PCTEST Test Location	4
	1.3	Test Facility / Accreditations	4
2.0	PRO	DUCT INFORMATION	5
	2.1	Equipment Description	5
	2.2	Device Capabilities	5
	2.3	Test Configuration	5
	2.4	EMI Suppression Device(s)/Modifications	5
3.0	DESC	RIPTION OF TESTS	6
	3.1	Evaluation Procedure	6
	3.2	Radiated Power and Radiated Spurious Emissions	6
4.0	MEAS	SUREMENT UNCERTAINTY	7
5.0	TEST	EQUIPMENT CALIBRATION DATA	8
6.0	SAMF	PLE CALCULATIONS	9
7.0	TEST	RESULTS	10
	7.1	Summary	10
	7.2	Occupied Bandwidth	11
	7.3	Spurious and Harmonic Emissions at Antenna Terminal	21
	7.4	Band Edge Emissions at Antenna Terminal	28
	7.5	Conducted Power Output Data	34
	7.6	Radiated Power (ERP)	36
	7.7	Radiated Spurious Emissions Measurements	39
	7.8	Frequency Stability / Temperature Variation	44
8.0	CON	CLUSION	49

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 2 of 49
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 2 01 49
© 2019 PCTEST Engineering Laboratory, Inc.				V 9.0 02/01/2019





MEASUREMENT REPORT FCC Part 22(H) & 90



Mode	Tx Frequency (MHz)	Measurement	Max. Power (W)	Max. Power (dBm)	Emission Designator	Modulation
CDMA800 (BC10)	817.9 - 823.1	Conducted	0.325	25.12	1M28F9W	CDMA
LTE Band 26	814.7 - 823.3	Conducted	0.347	25.40	1M08G7D	QPSK
LTE Band 26	814.7 - 823.3	Conducted	0.281	24.49	1M08W7D	16-QAM
LTE Band 26	814.7 - 823.3	Conducted	0.222	23.47	1M08W7D	64-QAM
LTE Band 26	815.5 - 822.5	Conducted	0.350	25.44	2M70G7D	QPSK
LTE Band 26	815.5 - 822.5	Conducted	0.282	24.50	2M70W7D	16-QAM
LTE Band 26	815.5 - 822.5	Conducted	0.217	23.37	2M70W7D	64-QAM
LTE Band 26	816.5 - 821.5	Conducted	0.337	25.28	4M51G7D	QPSK
LTE Band 26	816.5 - 821.5	Conducted	0.279	24.46	4M51W7D	16-QAM
LTE Band 26	816.5 - 821.5	Conducted	0.223	23.49	4M52W7D	64-QAM
LTE Band 26	819	Conducted	0.341	25.33	8M96G7D	QPSK
LTE Band 26	819	Conducted	0.272	24.35	8M97W7D	16-QAM
LTE Band 26	819	Conducted	0.217	23.37	8M96W7D	64-QAM
LTE Band 26	821.5	Conducted	0.343	25.35	13M4G7D	QPSK
LTE Band 26	821.5	Conducted	0.276	24.41	13M5W7D	16-QAM
LTE Band 26	821.5	Conducted	0.218	23.39	13M4W7D	64-QAM
LTE Band 26	821.5	ERP	0.061	17.86	13M4G7D	QPSK
LTE Band 26	821.5	ERP	0.043	16.38	13M5W7D	16-QAM
LTE Band 26	821.5	ERP	0.035	15.50	13M4W7D	64-QAM

EUT Overview

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 2 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 3 of 49
© 2019 PCTEST Engineering Labora	tory. Inc.	•		V 9.0 02/01/2019



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 and KDB 414788 D01 v01.

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 2041.02 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 4 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 4 of 49
© 2010 PCTEST Engineering Laborat	V 9 0 02/01/2019			



2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFQ620WA**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 22(H) and 90(S).

Test Device Serial No.: 08691, 08709, 08717, 08725

2.2 Device Capabilities

This device contains the following capabilities:

800/850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n/ac 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.

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 5 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset	Page 5 of 49
© 2010 DCTEST Engineering Laborat	V 0 0 02/01/2010		



3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

3.2 Radiated Power and Radiated Spurious Emissions

<u>§2.1053, §90.635, §90(S)</u>

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 wooden turntable 80cm above the ground plane and 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. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.

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 $_{[dB]}$.

The calculated Pd levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of $43 + 10 \log_{10}(\text{Power [Watts]})$ specified in 90(S).

For fundamental radiated power measurements, the guidance of KDB 971168 D01 v03r01 is used to record the EUT power level that is subsequently matched via the aforementioned substitution method given in ANSI/TIA-603-E-2016.

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.

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 6 of 40
1M1909120153-04-R1.ZNF 9/12 - 10/2/2019		Portable Handset		Page 6 of 49
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			



4.0 MEASUREMENT UNCERTAINTY

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

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

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 7 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 7 of 49
© 2019 PCTEST Engineering Laborat	V 9 0 02/01/2019			



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	6/3/2019	Annual	6/3/2020	LTx3
Agilent	N9020A	MXA Signal Analyzer	4/20/2019	Annual	4/20/2020	US46470561
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
ETS-Lindgren	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
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	6/5/2019	Annual	6/5/2020	100342
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/11/2019	Annual	7/11/2020	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/8/2019	Annual	7/8/2020	102133
Rohde & Schwarz	NC-100	Torque Wrench (8" lb)	5/10/2018	Biennial	5/10/2020	N/A
Rohde & Schwarz	3816/2NM	Line Impedance Stabilization Network	6/18/2018	Biennial	6/18/2020	114451
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	10/8/2018	Annual	10/8/2019	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	6/5/2019	Annual	6/5/2020	100342
Rohde & Schwarz	TS-PR40	26.5-40 GHz Pre-Amplifier	10/8/2018	Annual	10/8/2019	100037
Seekonk	FSW67	Signal / Spectrum Analyzer	5/6/2019	Annual	5/6/2020	103200

Table 5-1. Test Equipment

Notes:

1. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 9 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 8 of 49
© 2019 PCTEST Engineering Labora	tory. Inc.			V 9.0 02/01/2019



6.0 SAMPLE CALCULATIONS

Emission Designator

Emission Designator = 1M25F9W

CDMA BW = 1.25 MHz F = Frequency Modulation 9 = Composite Digital Info W = Combination (Audio/Data) (Measured at the 99.75% power bandwidth)

Spurious Radiated Emission – BC10

Example: Channel 476 CDMA BC10 Mode 3rd Harmonic (2453.70MHz)

The average spectrum analzyer 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 analzyer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 2453.70 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm -(-24.80) = 50.3 dBc.

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz G = Phase Modulation 7 = Quantized/Digital Info D = Data transmission, telemetry, telecommand

16QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz W = Amplitude/Angle Modulated 7 = Quantized/Digital Info D = Data transmission, telemetry, telecommand

Spurious Radiated Emission – LTE Band

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

The average 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 1564 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm - (-24.80).

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 0 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 9 of 49
© 2019 PCTEST Engineering Labora	tory Inc			V 9 0 02/01/2019



7.0 TEST RESULTS

7.1 Summary

Company Name:	LG Electronics USA, Inc.
FCC ID:	ZNFQ620WA
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>CDMA / EvDO / LTE</u>
Band:	Band Class 10 / Band 26

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1051 90(S)	Conducted Band Edge / Spurious Emissions	 > 43 + 10 log₁₀ (P[Watts]) for all out-of-band emissions except > 50 + 10 log₁₀ (P[Watts]) at Band Edge and for all out-of- band emissions within 37.5kHz of Block Edge (Band 26) 	CONDUCTED	PASS	Sections 7.3, 7.4
2.1055 90.213	Frequency Stability	< 2.5 ppm		PASS	Section 7.8
2.1046 90.635	Conducted Power	< 100 Watts		PASS	Section 7.5
22.913(a.2)	Effective Radiated Power (Band 26)	RADIATED	PASS	Section 7.6	
2.1053 90(S)	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 shown in Section 7.0 were 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 4.2.

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 10 of 10
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 10 of 49
© 2019 PCTEST Engineering Laboration	V 9.0 02/01/2019			



7.2 Occupied Bandwidth §2.1049

Test Overview

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

Test Procedure Used

KDB 971168 D01 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.



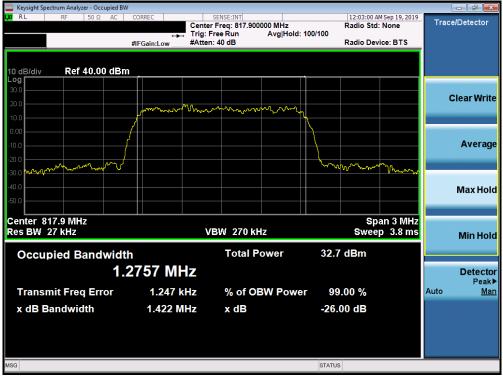
Figure 7-1. Test Instrument & Measurement Setup

Test Notes

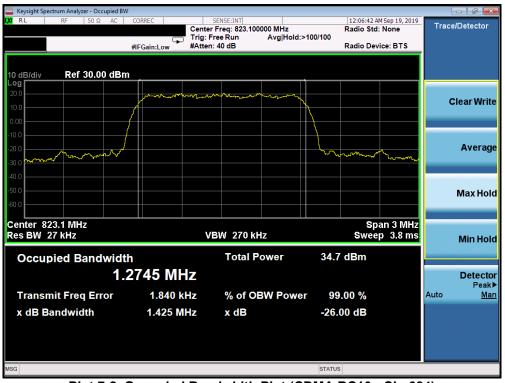
None.

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 11 of 10
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 11 of 49
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019			









Plot 7-2. Occupied Bandwidth Plot (CDMA BC10 - Ch. 684)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 12 of 10
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 12 of 49
© 2019 PCTEST Engineering Labora	tory, Inc.	•		V 9.0 02/01/2019

V 9.0 02/01/2019



LTE Band 26



Plot 7-3. Occupied Bandwidth Plot (LTE Band 26, 1.4MHz QPSK – RB Size 6– Low Channel)



Plot 7-4. Occupied Bandwidth Plot (LTE Band 26, 1.4MHz 16-QAM - RB Size 6- Low Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)				
Test Report S/N:	Test Dates:	EUT Type:		Dage 12 of 40		
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 13 of 49		
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019					



Keysight Spectrum																	- • •
XI RL RF	F 50 Ω	AC	CO	RREC		Cente		INT SOUR 814.700	CE OFF		LIGN AUT	TO	08:40:52 Radio St	PM Sep 26, 2 d: None	019	Trac	e/Detector
		NFE			+	. Trig:	Free Ru	in			100/100)					
			#IF	Gain:L	ow	#Atte	n: 40 dE	3					Radio De	evice: BTS	_		
10 dB/div	Ref 30.0	0 d	3m	_								-		_			
20.0																	
10.0			~~~~	~~~~	AN	www	ww	~^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m	~~~	لمرجحهم العمل						Clear Writ
0.00												X					
10.0	,											٦.	\				
													1		~		Averag
-20.0 -744mm	$\sqrt{1}$												- Allower	Mullin	1		Arenug
-30.0																	
-50.0																	Max Hold
-60.0																-	
Center 814.7	MHz	<u> </u>				1			1				S	pan 2 M	Hz		
Res BW 18 k	Hz					V	/BW	180 kH	z				Sweep	5.733 r	ns		Min Hole
Ossenia	Donal		141-				т	otal P	owor		2	0 0	dBm				
Occupied	a Bano								OWGI		5	0.3	ubiii				
		1	.07	92	M	ΗZ											Detecto Peak
Transmit I	Frea Err	or		1.4	159 I	Hz	%	of OE	3W Po	wei	r	99	.00 %			Auto	Ma
x dB Band					23 N			dB					00 dB				
х ав вала	iwidin			1.2	23 IV	INZ	X	aв			-2	20.	00 aB				
ISG											ST/	ATUS					

Plot 7-5. Occupied Bandwidth Plot (LTE Band 26, 1.4MHz 64-QAM – RB Size 6– Low Channel)



Plot 7-6. Occupied Bandwidth Plot (LTE Band 26, 3MHz QPSK – RB Size 15– Low Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 14 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 14 of 49
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019			



Keysight Spectrum Analyzer										
CRL RF 5	50Ω AC	CORREC	Cente	SENSE:INT SOU Freq: 815.50		ALIGN AUT	0 08:55:46 Radio St	PM Sep 26, 2019 d: None	Trac	e/Detector
	NFE	#IFGain:L		Free Run n: 40 dB	Avg Hol	d: 100/100		vice: BTS		
		#IFGain:L	ow #Alle	n. 40 ab			Radio De	NICE. DT3		
10 dB/div Ref 30	0 00 dE									
.og	0.00 dE									
20.0		Do. 0. 0		a company						Clear Writ
10.0	/				Pland Plant 1997					
.00							}			
0.0	_/						5			
20.0	nd -						- Wwwwww	ᡎ᠋᠕᠕᠕		Averag
80.0										
\$0.0										
50.0										Max Ho
60.0										
enter 815.5 MHz								pan 5 MHz		
es BW 47 kHz			١	/BW 470 k	Hz			2.133 ms		Min Ho
										MIN HO
Occupied Ba	ndwid	lth		Total F	Power	32	2.1 dBm			
	2	.7011	MHz							Detect
Tropomit Engl	Error	0	791 kHz	9/	BW Pow		99.00 %		Auto	Peal M
Transmit Freq					BW POW				Auto	<u>IVI</u>
x dB Bandwidt	h	2.9	83 MHz	x dB		-2	6.00 dB			
G						STA	TUS			

Plot 7-7. Occupied Bandwidth Plot (LTE Band 26, 3MHz 16-QAM - RB Size 15- Low Channel)



Plot 7-8. Occupied Bandwidth Plot (LTE Band 26, 3MHz 64-QAM – RB Size 15– Low Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager				
Test Report S/N:	Test Dates:	EUT Type:		Dage 15 of 40			
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 15 of 49			
© 2019 PCTEST Engineering Laboratory, Inc. V 9.0 02/01/2019							



🔤 Keysight Spectrum Analyzer -	Occupied BV	V								
LXI RL RF 50	Ω AC	CORREC		NSE:INT SOUR		IGN AUTO	09:06:02 P Radio Std	M Sep 26, 2019	Trac	e/Detector
	NFE	+	Trig: Fre	e Run	Avg Hold:>	100/100				
		#IFGain:Low	#Atten: 4	l0 dB			Radio Dev	vice: BTS		
10 dB/div Ref 40	.00 dBn	n				-				
30.0										
20.0									(Clear Write
10.0		m	· ····································	him	man	~				
0.00						L.				
-10.0	ł					\mathbf{X}				Average
-10.0	. (ι λ	~			/
-30.0	Anna						Arrest and a second	mourner		
-40.0										Max Hold
-50.0										
Center 816.5 MHz							Spa	n 10 MHz		
Res BW 91 kHz			VB	W 910 kH	lz			1.133 ms		Min Hold
				Total P	ewor	22.2	3 dBm			
Occupied Ban				rotai F	ower	33.	авш			
	4.	5062 MI	ΗZ							Detector
Transmit Freq E	rror	13.965	kH7	% of O	BW Power	r 99	9.00 %		Auto	Peak▶ Man
x dB Bandwidth		4.963 N	IHZ	x dB		-26.	00 dB			
MSG						STATU	S			

Plot 7-9. Occupied Bandwidth Plot (LTE Band 26, 5MHz QPSK - RB Size 25- Low Channel)



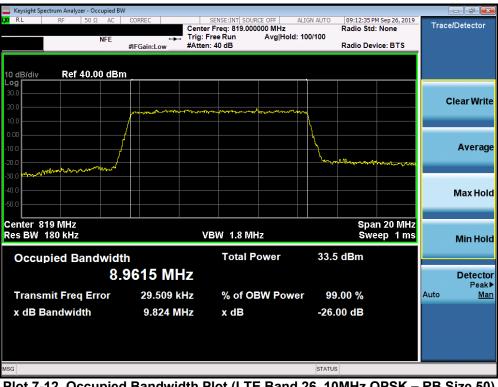
Plot 7-10. Occupied Bandwidth Plot (LTE Band 26, 5MHz 16-QAM – RB Size 25– Low Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dego 16 of 10
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 16 of 49
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019			



Keysight Spectrum Analyzer - Occupie	d BW						
LXI RL RF 50Ω A	C CORREC	SENSE:INT SOURCE OFF Center Freq: 816.500000 M		09:06:26 PI Radio Std:	M Sep 26, 2019	Trace	/Detector
NFE		Trig: Free Run Avg	Hold: 100/100				
	#IFGain:Low	#Atten: 40 dB		Radio Dev	ice: BTS		
10 dB/div Ref 40.00 d	Bm						
Log 30.0							
20.0						С	lear Write
10.0	mm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	many				
0.00			<u>\</u>				
-10.0							Average
	<i>f</i>						Average
-20.0	2			and and the second s	monther		
-40.0							Max Hold
-50.0							
Center 816.5 MHz				Spa	n 10 MHz		
Res BW 91 kHz		VBW 910 kHz		Sweep	1.133 ms		Min Hold
	-141-	Total Powe	- 24	4 dBm			
Occupied Bandwi			I 31.4	i ubili			
	4.5188 MH	Z					Detector
Transmit Freq Error	7.226 ki	Iz % of OBW F	ower 99	9.00 %		Auto	Peak▶ <u>Man</u>
x dB Bandwidth	4.925 MI	lz x dB	-26	.00 dB			
			20				
MSG			STATU	c			
mou			STATU				

Plot 7-11. Occupied Bandwidth Plot (LTE Band 26, 5MHz 64-QAM - RB Size 25- Low Channel)



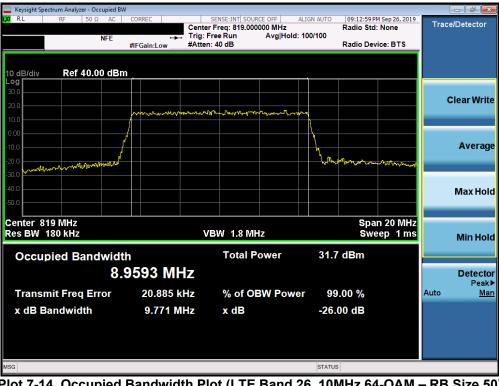
Plot 7-12. Occupied Bandwidth Plot (LTE Band 26, 10MHz QPSK – RB Size 50)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	à	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 17 of 10
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 17 of 49
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019			





Plot 7-13. Occupied Bandwidth Plot (LTE Band 26, 10MHz 16-QAM – RB Size 50)



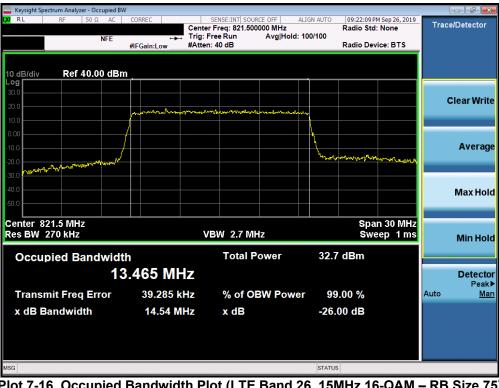
Plot 7-14. Occupied Bandwidth Plot (LTE Band 26, 10MHz 64-QAM – RB Size 50)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 19 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 18 of 49
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019			



Keysight Spectrum Analyzer - Occupied B	N					
RL RF 50Ω AC	CORREC	SENSE:INT SOURCE OFF	ALIGN AUTO	09:21:48 PM Sep Radio Std: No		race/Detector
NFE	Trig		old: 100/100	Radio Device:		
	#IFGallit.cow #/ tec			Rudio Beride.		
0 dB/div Ref 40.00 dBr	n					
.og						
30.0						Clear Writ
20.0	when a show the second	Mark Markan	r-ne			
10.0						
D.00	/		1			A
10.0			- tom	-		Averag
20.0 the second of the second						
40.0						Max Hol
50.0						_
Center 821.5 MHz				Span 3		
tes BW 270 kHz		VBW 2.7 MHz		Sweep	1 ms	Min Ho
Occupied Bandwid	th	Total Power	34.0	dBm		
	3.442 MHz					D ete et
	5.442 IVINZ					Detect Peak
Transmit Freq Error	30.244 kHz	% of OBW Por	wer 99	.00 %	Aut	
x dB Bandwidth	14.53 MHz	x dB	-26.	00 dB		
G			STATUS			

Plot 7-15. Occupied Bandwidth Plot (LTE Band 26, 15MHz QPSK – RB Size 75)



Plot 7-16. Occupied Bandwidth Plot (LTE Band 26, 15MHz 16-QAM – RB Size 75)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 10 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 19 of 49
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019			



Keysight Spectrum Analyz													
XI RL RF	50 Ω	AC	CORREC			SENSE:INT SOU Freq: 821.50		ALIC	GN AUTO	09:22:22 P Radio Std	M Sep 26, 2019 : None	Trac	e/Detector
	NF	E		÷	Trig: F	ree Run : 40 dB	Avg Ho	old: 10	0/100				
			#IFGain:	low	#Atten	: 40 dB				Radio Dev	lice: BIS		
10 dB/div Ref	40.00	dBm											
30.0													
20.0			<u> </u>					_					Clear Writ
10.0			productor		hondar		a warmen	ann brinn Ann brinn					
0.00									\				
-10.0		/							\				Average
-20.0		-							Nationalis	مسملمسمهم	(kaudi provonda		
-20.0	MUL & 4111	U- 1											
-40.0													Max Hol
-50.0													maxmon
0										0			
Center 821.5 MH Res BW 270 kHz	Z				v	BW 2.7 M	H7				n 30 MHz eep 1 ms		
											sop mie		Min Hol
Occupied B	andw	/idth	1			Total F	ower		31.5	5 dBm			
		13	.407	′ M⊦	z								Detecto
_	_									00.0/		Auto	Peak
Transmit Free		r		343 k		% of O	BW PO	wer		.00 %		Auto	Ma
x dB Bandwid	lth		14	.46 M	Hz	x dB			-26.	00 dB			
ISG									STATU	6			

Plot 7-17. Occupied Bandwidth Plot (LTE Band 26, 15MHz 64-QAM – RB Size 75)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 20 of 49
© 2019 PCTEST Engineering Labora	tory. Inc.			V 9.0 02/01/2019



7.3 Spurious and Harmonic Emissions at Antenna Terminal §2.1051 §90(S)

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 (separated into at least two plots per channel)
- 2. RBW ≥ 100kHz
- 3. VBW \geq 3 x RBW
- 4. Detector = RMS
- 5. Trace mode = max hold
- 6. Sweep time = auto couple
- 7. The trace was allowed to stabilize

Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

Test Notes

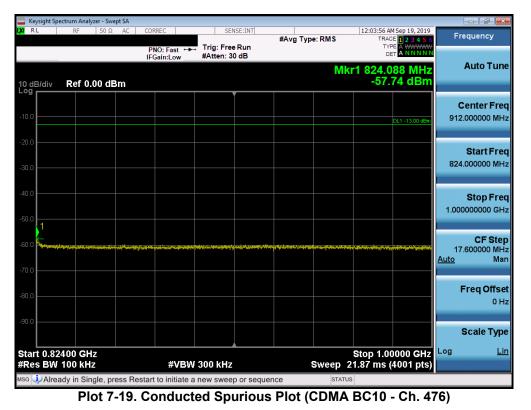
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission 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: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 21 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 21 of 49
© 2019 PCTEST Engineering Labora	tory, Inc.	·		V 9.0 02/01/2019



PNO: Fast →→ Trig: Free IFGain:Low Atten: 40		E: RMS TRAC TYF DE Mkr1 198.560	51 dBm	Auto Tune Center Free 0000000 MH Start Free 0000000 MH
		Mkr1 198.560 -49.:	51 dBm	Center Fre 2.000000 MH Start Fre
			422	.000000 M⊢ Start Fre
			30	
			DL1 -13.00 dBm 814	Stop Fre
			78 <u>Auto</u>	CF Ste 400000 MF Ma
a tray a la tray a gray gray and a same a	den sen af disk strater og eld i den av det det den den og generalet sen generalet og en generalet beske for av ge	a a for a first of the state of a first of the state of the		Freq Offs 0 H
				Scale Typ
#VBW 300 kHz	S	8 Stop weep 97.33 ms (2	14.0 MHz 0001 pts)	L
			#VBW 300 kHz Sweep 97.33 ms (2 status	#VBW 300 kHz Sweep 97.33 ms (20001 pts)

Plot 7-18. Conducted Spurious Plot (CDMA BC10 - Ch. 476)

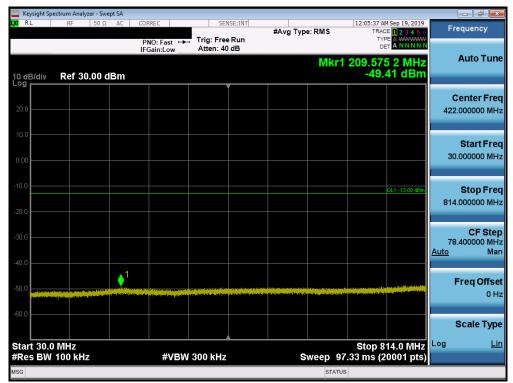


FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 22 of 49
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019			



	ctrum Analyzer - Sw									
XI RL	RF 50 Ω	AC	CORREC		#Avg Typ	e: RMS	TRA	M Sep 19, 2019 CE 1 2 3 4 5 6 PE A WWWWW	Frequ	ency
			PNO: Fast	#Atten: 3			C			
10 dB/div	Ref 0.00 di	Зm				Mk	r1 8.645 -43	05 GHz 41 dBm	Au	to Tun
									Cen	ter Fre
-10.0								DL1 -13.00 dBm	5.50000	0000 GH
-20.0										
20.0										art Fre
-30.0									1.000000	0000 GH
-40.0							1_			-
			.						St 10.000000	op Fre
-50.0										
60.0										CF Ste
									900.000 <u>Auto</u>	HM 0000 Ma
70.0										
80.0									Fre	qOffs
										0 H
90.0									Sca	ale Typ
Start 1.00 #Res BW			#VBW	3.0 MHz	s	weep 1	Stop 10 6.00 ms ()	0.000 GHz 20001 pts)	Log	Li
	dy in Single, pr	ress Rest				STATU				

Plot 7-20. Conducted Spurious Plot (CDMA BC10 - Ch. 476)



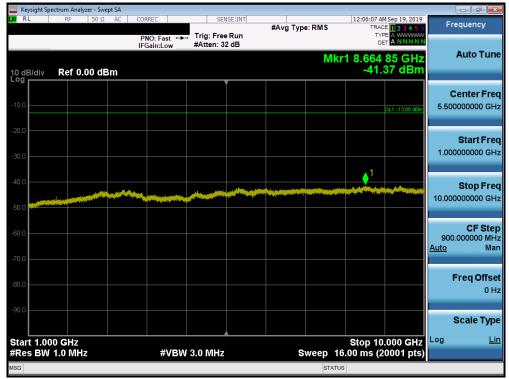
Plot 7-21. Conducted Spurious Plot (CDMA BC10 - Ch. 684)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N: Test Dates:		EUT Type:		Daga 22 of 40	
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset	Page 23 of 49		
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019				



	ectrum Analyzer -	Swept SA					
LXU RL	RF 5	0Ω AC	CORREC PNO: Fast ↔ IFGain:Low	Trig: Free Run #Atten: 26 dB	#Avg Type: RMS	12:05:55 AM Sep 19, 2019 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
10 dB/div Log	Ref 0.00	dBm	IFGam:Low	#Atten: 20 db	Μ	kr1 824.000 MHz -26.29 dBm	Auto Tuno
-10.0						0L1 -13.00 dBm	Center Free 912.000000 MH
-20.0							Start Fre 824.000000 MH
-40.0							Stop Fre 1.000000000 GH
-60.0	na state a stat	there the spin platter is	le filt af an faith an	an filing an	the fight all the particular for a first set of the galaxy of	ily and a second state of a state	CF Ste 17.60000 MH <u>Auto</u> Ma
-80.0							Freq Offse 0 ⊢
-90.0							Scale Typ
Start 0.824 #Res BW			#VBV	V 300 kHz	Sweep	Stop 1.00000 GHz 21.87 ms (4001 pts)	Log <u>Li</u> i
MSG					STAT	rus	

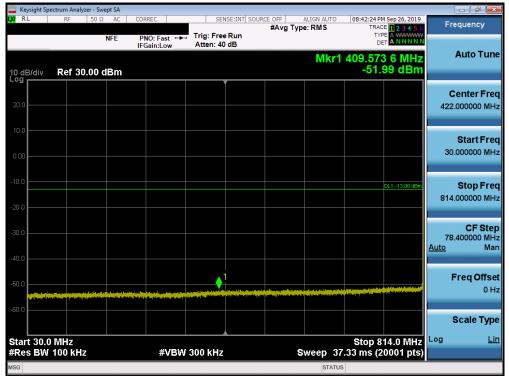
Plot 7-22. Conducted Spurious Plot (CDMA BC10 - Ch. 684)



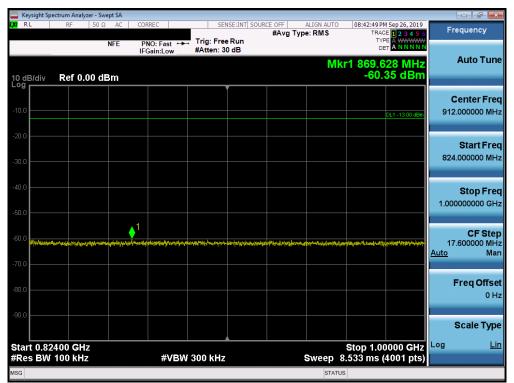
Plot 7-23. Conducted Spurious Plot (CDMA BC10 - Ch. 684)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 04 of 40		
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 24 of 49		
© 2019 PCTEST Engineering Labora	tory Inc			V 9 0 02/01/2019		





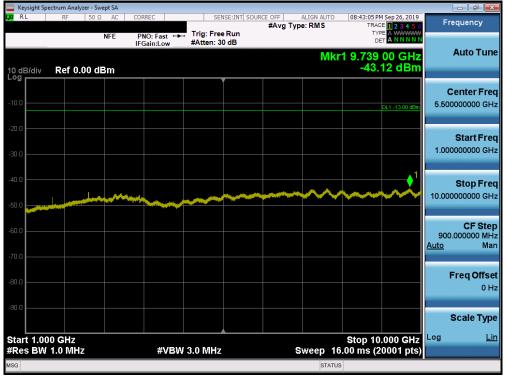
Plot 7-24. Conducted Spurious Plot (LTE Band 26, 1.4MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



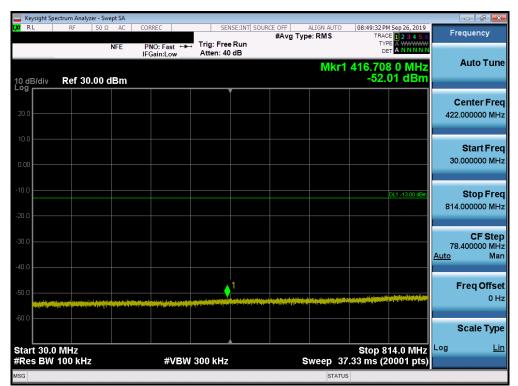
Plot 7-25. Conducted Spurious Plot (LTE Band 26, 1.4MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 25 of 49	
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset			
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019				





Plot 7-26. Conducted Spurious Plot (LTE Band 26, 1.4MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 7-27. Conducted Spurious Plot (LTE Band 26, 1.4MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset	Page 26 of 49	
© 2010 PCTEST Engineering Labora	V 0 0 02/01/2010			



Keysight S	pectrum Analy	zer - Swept S	SA										
X/ RL	RF	50 Ω A		DRREC	st 🛶	Trig: Fre			ALIGN AUTO	TRA	PM Sep 26, 2019 CE 1 2 3 4 5 6 (PE A WWWWW DET A N N N N N	Frequ	iency
10 dB/div Log	Ref 0.0	00 dBm		Gain:Lo	w	#Atten: 3	0 dB		Mk	r1 824.0	000 MHz .78 dBm	AL	ito Tune
-10.0											DL1 -13.00 dBm		i ter Frec DOOO MH:
-20.0													art Free
-40.0													t op Free 0000 GH
-60.0	h ^a n in the state of the state	they are seen	national and a second second	ip ^{arturt} atirati	ndahan padakatan	راي المالية (Alline).	Ke Hereberger	hijetayo 1999 yang dipanja	shirentifishering	a for york south a start of the	nortymus tataat (settatus)		CF Ste 0000 MH Ma
80.0												Fre	q Offse 0 H
-90.0												Sc	ale Typ
	2400 GH			#	VBW	300 kHz			Sweep 8	Stop 1.0 3.533 ms	0000 GHz (4001 pts)	Log	Lir
MSG									STATU	s			

Plot 7-28. Conducted Spurious Plot (LTE Band 26, 1.4MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-29. Conducted Spurious Plot (LTE Band 26, 1.4MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: Test Dates:		EUT Type:	Daga 27 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset	Page 27 of 49
© 2010 PCTEST Engineering Laborat	V 9 0 02/01/2019		



7.4 Band Edge Emissions at Antenna Terminal §2.1051 §90(S)

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.

For LTE B26 operation under Part 90.691, the minimum permissible attenuation level of any spurious emission removed from the EA licensee's frequency block by greater than 37.5 kHz is 43 + $10\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts. The minimum permissible attenuation level of any spurious emission removed from the EA licensee's frequency block by up to and including 37.5 kHz is 50 + $10\log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

- 1. Span was set large enough so as to capture all out of band emissions near the band edge
- 2. RBW = 100 kHz
- 3. VBW = 300 kHz
- 4. Detector = RMS
- 5. Trace mode = trace average
- 6. Sweep time = auto couple
- 7. 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

For channel edge emission, the signal analyzer's "ACP" measurement capability is used.

Per 22.917(b) 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: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 29 of 40	
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset	Page 28 of 49		
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019				









Plot 7-31. Channel Edge Plot (CDMA BC10 - Ch. 684)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 40	
1M1909120153-04-R1.ZNF	IF 9/12 - 10/2/2019 Portable Handset			Page 29 of 49	
© 2019 PCTEST Engineering Laboration	V 9.0 02/01/2019				



LTE Band 26

Keysight Spectrum Analyzer -	ACP										- • •
K RL RF 50	Ω AC	CORREC		NSE:INT SOUR		ALIGN AU		3:43:38 PM S dio Std: N		Er	equency
	NFE		Trig: Fre			1: 100/10		alo sta: N	one		
PASS	NFE	IFGain:Lov						dio Device	: BTS		
10 dB/div Ref 45	.00 dBm										
								1 1			
35.0			24 1	dBm							Center Fre
25.0			- 10								.700000 MH
15.0											
	1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					×				
5.00											
5.00											
15.0	/						-				
25.0									RMS AVG		
35.0											
-45.0											
Center 814.7 MHz								Snan 2	2.1 MHz		
Res BW 100 kHz			#VI	3W 300 ki	Hz				20 ms		CF Ste 210.000 kH
Total Carrier Power	24.609	dBm/ 1.40	MHz	ACP-I	BW					<u>Auto</u>	Ma
					Lo	wer	U	pper			
Carrier Power		Filter	Offset Freq	Integ BW	dBc	dBm	dBc	dBm	Filter		Freq Offse
1 24.609 dBm / 1.	400 MHz	OFF	0.0 Hz	37.50 kHz	-51.49	-26.88	-50.88	-26.27	OFF		. 0 H
			37.50 kHz	100.0 kHz	-49.22	-24.61	-48.28	-23.67	OFF		
G						ST	ATUS				

Plot 7-32. Channel Edge Plot (LTE Band 26, 1.4MHz QPSK – RB Size 6– Low Channel)



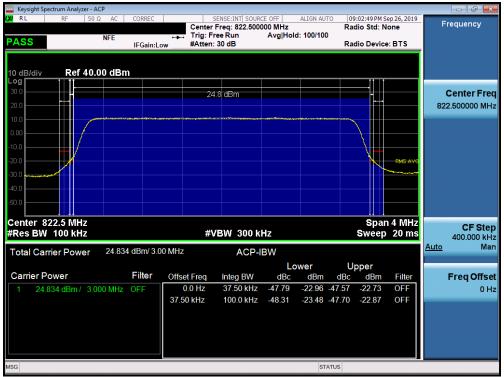
Plot 7-33. Channel Edge Plot (LTE Band 26, 1.4MHz QPSK – RB Size 6 – High Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 40	
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset	Page 30 of 49		
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019				



Keysight Spectrum Analyzer - ACP				
RL RF 50 Ω AC CORREC ASS NFE IFGain:LC	SENSE:INT SOURC Center Freq: 815.5000 Trig: Free Run #Atten: 30 dB		08:59:45 PM Sep 26, 2019 Radio Std: None Radio Device: BTS	Frequency
) dB/div Ref 40.00 dBm			11 1	
	24.8 dBm			Center Fre 815,500000 MH
D.0		**************************************		813.300000 MIP
			RMS AV	
enter 815.5 MHz Res BW 100 kHz	#VBW 300 ki	Hz	Span 4 MHz Sweep 20 ms	400.000 kł
otal Carrier Power 24.784 dBm/ 3.0	0 MHz ACP-II			<u>Auto</u> Ma
Carrier Power Filter		Lower	Upper	Ener Offe
1 24.784 dBm / 3.000 MHz OFF	Offset Freq Integ BW 0.0 Hz 37.50 kHz	dBc dBm	dBc dBm Filter 7.45 -22.67 OFF	Freq Offs
24.764 dBm7 3.000 MHZ OFF	37.50 kHz 100.0 kHz		7.06 -22.28 OFF	0 H
	57.50 KHZ 100.0 KHZ		22.20 OFF	

Plot 7-34. Channel Edge Plot (LTE Band 26, 3MHz QPSK - RB Size 15- Low Channel)



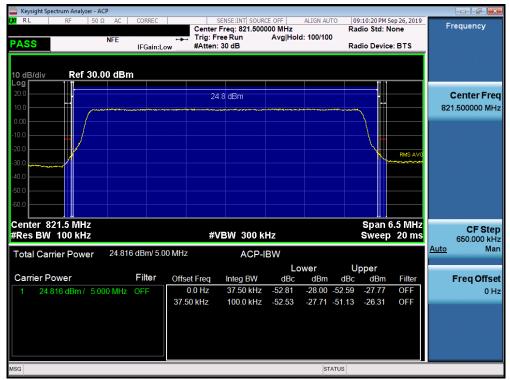
Plot 7-35. Channel Edge Plot (LTE Band 26, 3MHz QPSK - RB Size 15 - High Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 21 of 40	
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 31 of 49	
© 2019 PCTEST Engineering Laborat	V 9 0 02/01/2019				



Keysight Spectrum Analyzer -											
RL RF 50	NFE					ALIGN AU	Rad	:06:55 PM : dio Std: I dio Devic		F	requency
	00 dBm	sam:Low	WAtten: 20			1	Kat	in Devic			
0.0	U-J-1/1-4-1-10,		24.7	dBm	langan yan kan Begenarang		ungungkulturung				Center Fre 6.500000 M⊢
0.0									RMS AVG		
enter 816.5 MHz Res BW 100 kHz			#VB	W 300 ki	Hz				6.5 MHz 20 ms	Auto	CF Ste 650.000 kH
otal Carrier Power	24.707 dBi	m/ 5.00 MHz		ACP-II						Auto	IVIO
Carrier Power	Fil	ter Offset	Frog b	nteg BW	Lov dBc	ver dBm	dBc	oper dBm	Filter		Freq Offs
1 24,707 dBm / 5.0		011001	•	37.50 kHz	-53 21	-28 50		-27.73	OFF		01
		37.50		100.0 kHz					OFF		01

Plot 7-36. Channel Edge Plot (LTE Band 26, 5MHz QPSK - RB Size 25- Low Channel)



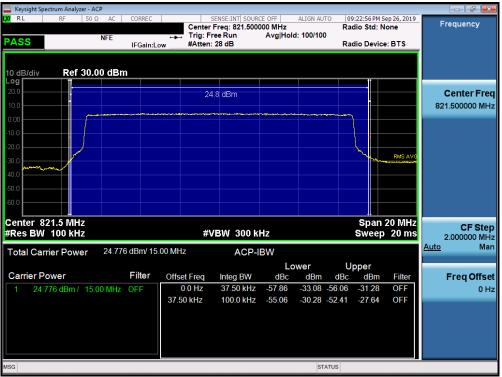
Plot 7-37. Channel Edge Plot (LTE Band 26, 5MHz QPSK - RB Size 25 - High Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 40	
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 32 of 49	
© 2010 PCTEST Engineering Laborat	V 9 0 02/01/2019				



Keysight Spectrum Analyzer - ACP						
RL RF 50 Ω AC CORREG ASS IFGain	Center F Trig: Fre			TO 09:13:24 PM Radio Std: 1 Radio Devic	None	Frequency
0 dB/div Ref 30.00 dBm					Ť:	
	24.8	3 dBm			-	Center Freq 819.000000 MHz
					RMS AVG	
enter 819 MHz Res BW 100 kHz	#VI	BW 300 KH	z	Span Sweej	12 MHz 20 ms	CF Step 1.200000 MH
Total Carrier Power 24.845 dBm/	10.00 MHz	ACP-IB	W			<u>Auto</u> Mar
Carrier Power Filter	044 15		Lower	Upper		
	Offset Freq 0.0 Hz	Integ BW 37.50 kHz	dBc dBm	dBc dBm	Filter OFF	Freq Offse
1 24.845 dBm / 10.00 MHz OFF	37.50 kHz			-50.55 -51.69	OFF	0 H
	01.00 KH2	-100.0 KHZ				

Plot 7-38. Channel Edge Plot (LTE Band 26, 10MHz QPSK – RB Size 50)



Plot 7-39. Channel Edge Plot (LTE Band 26, 15MHz QPSK – RB Size 75)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 40	
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 33 of 49	
© 2019 PCTEST Engineering Laborat	V 9 0 02/01/2019				



7.5 Conducted Power Output Data §2.1046 §90.635

Frequency [MHz]	BC10 [Channel]	Battery Type	Cond. PWR [dBm]	Cond. PWR [Watts]	Cond. PWR Limit [dBm]	Margin [dB]
817.90	476	Standard	25.07	0.321	50.00	-24.93
823.10	684	Standard	25.12	0.325	50.00	-24.88

Table 7-2. CDMA BC10 Conducted Power Output Data

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Cond. PWR [dBm]	Cond. PWR [Watts]	Cond. PWR Limit [dBm]	Margin [dB]
814.70	1.4	QPSK	25.40	0.347	50.00	-24.60
823.30	1.4	QPSK	25.29	0.338	50.00	-24.71
814.70	1.4	16-QAM	24.49	0.281	50.00	-25.51
814.70	1.4	64-QAM	23.47	0.222	50.00	-26.53
815.50	3	QPSK	25.05	0.320	50.00	-24.95
822.50	3	QPSK	25.44	0.350	50.00	-24.56
822.50	3	16-QAM	24.50	0.282	50.00	-25.50
822.50	3	64-QAM	23.37	0.217	50.00	-26.63
816.50	5	QPSK	25.09	0.323	50.00	-24.91
821.50	5	QPSK	25.28	0.337	50.00	-24.72
821.50	5	16-QAM	24.46	0.279	50.00	-25.54
821.50	5	64-QAM	23.49	0.223	50.00	-26.51
819.00	10	QPSK	25.33	0.341	50.00	-24.67
819.00	10	16-QAM	24.35	0.272	50.00	-25.65
819.00	10	64-QAM	23.37	0.217	50.00	-26.63
821.50	15	QPSK	25.35	0.343	50.00	-24.65
821.50	15	16-QAM	24.41	0.276	50.00	-25.59
821.50	15	64-QAM	23.39	0.218	50.00	-26.61

Table 7-3. LTE Band 26 Conducted Power Output Data

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 24 of 40	
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 34 of 49	
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019				



- 1. For CDMA mode, this device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 2. For LTE mode, the device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with 1 RB.
- 3. This unit was tested with its standard battery.

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 25 of 40	
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 35 of 49	
© 2019 PCTEST Engineering Labora	tory. Inc.	•		V 9.0 02/01/2019	



7.6 Radiated Power (ERP) §22.913(a.2) §90.542(a)(7)

Test Overview

Effective Radiated Power (ERP) 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. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

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

Test Settings

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 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".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 26 of 40	
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	rtable Handset		Page 36 of 49	
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019				



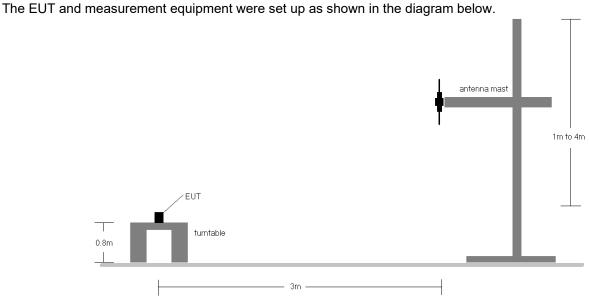


Figure 7-4. Radiated Test Setup <1GHz

Test Notes

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 27 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 37 of 49
© 2019 PCTEST Engineering Labora	tory, Inc.	•		V 9.0 02/01/2019



Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
821.50	15	QPSK	V	147	107	1 / 74	13.71	6.30	17.86	0.061	38.45	-20.59
821.50	15	16-QAM	V	147	107	1 / 74	12.23	6.30	16.38	0.043	38.45	-22.07
821.50	15	64-QAM	V	147	107	1 / 74	11.35	6.30	15.50	0.035	38.45	-22.95
821.50	15	QPSK	Н	225	96	1 / 74	12.57	6.30	16.72	0.047	38.45	-21.73

Table	7-40.	ERP	Data	(Band	26)
TUDIC	1 40.		Dutu	(Duna	

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 29 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 38 of 49
© 2019 PCTEST Engineering Labora	tory Inc			V 9 0 02/01/2019



7.7 Radiated Spurious Emissions Measurements §2.1053 §90(S)

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

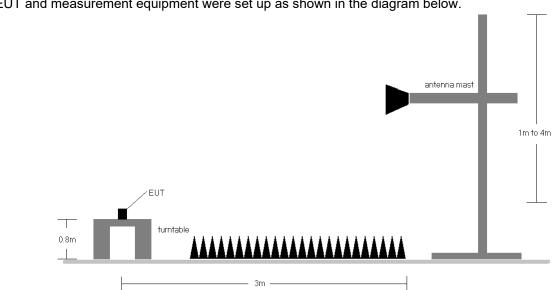
ANSI/TIA-603-E-2016 - Section 2.2.12

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: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 40		
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 39 of 49		
© 2019 PCTEST Engineering Laborat	© 2019 PCTEST Engineering Laboratory, Inc.					





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

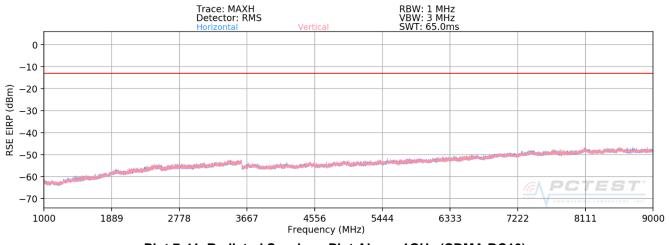
Figure 7-5. Test Instrument & Measurement Setup

Test Notes

- 1. For CDMA mode, this device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 2. For LTE mode, the device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with 1 RB.
- 3. This unit was tested with its standard battery.
- 4. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 5. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 10 of 10
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset	Page 40 of 49
© 2019 PCTEST Engineering Laboration	V 9.0 02/01/2019		







OPERATING FREQUENCY:		817.90	MHz
MODULATION SIGNAL:	CDMA	_	
DISTANCE:	3	meters	
LIMIT:	-13.00	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]
1635.80	V	117	93	-67.06	3.59	-63.47	-50.5
2453.70	V	-	-	-65.11	4.17	-60.94	-47.9

Table 7-4. CDMA BC10 Radiated Spurious Data (Ch. 476)

OPERATING FREQUENCY:

823.10

MHz

MODULATION SIGNAL:

AL: <u>CDMA</u> CE: 3 meters

DISTANCE: <u>3</u> meter

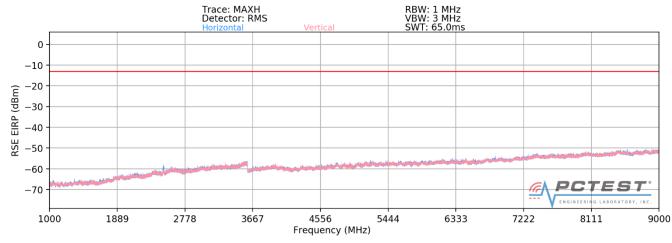
LIMIT: <u>-13.00</u> dBm

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]
1646.20	V	237	100	-67.18	3.60	-63.58	-50.6
2469.30	V	-	-	-65.03	4.21	-60.82	-47.8

 Table 7-5. CDMA BC10 Radiated Spurious Data (Ch. 684)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 41 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 41 of 49
© 2019 PCTEST Engineering Laborat	tory Inc			V 9 0 02/01/2019







OPERATING FREQUENCY:		814.70	MHz
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	1.4	MHz	
DISTANCE:	3	meters	
LIMIT:	-13.00	_ 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]
1629.40	V	218	313	-73.17	9.63	-63.54	-50.5
2444.10	V	-	-	-72.86	9.52	-63.34	-50.3
3258.80	V	-	-	-69.76	7.83	-61.93	-48.9

Table 7-6. Radiated Spurious Data (LTE Band 26 – Low Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	I: Test Dates: EUT Type:			Dage 42 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 42 of 49
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019			



OPERATING FREQUENCY:		823.30	MHz
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	1.4	MHz	
DISTANCE:	3	meters	
LIMIT:	-13.00	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]
1646.60	V	171	280	-72.34	9.57	-62.77	-49.8
2469.90	V	-	-	-72.80	9.47	-63.33	-50.3
3293.20	V	-	-	-69.62	7.56	-62.05	-49.1

Table 7-7. Radiated Spurious Data (LTE Band 26 – High Channel)

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N: Test Dates: EUT Type:		EUT Type:		Dage 42 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 43 of 49
© 2019 PCTEST Engineering Labora	V 9 0 02/01/2019			



Test Overview and Limit

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

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

The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency.

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: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N: Test Dates:		EUT Type:		Dogo 11 of 10
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 44 of 49
© 2019 PCTEST Engineering Labora	V 9.0 02/01/2019			



OPERATING FREQUENCY:	817,900,000	Hz
CHANNEL:	476	_
REFERENCE VOLTAGE:	4.33	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	ТЕМР ([°] С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.33	- 30	817,899,680	-320	-0.0000391
100 %		- 20	817,900,133	133	0.0000163
100 %		- 10	817,899,782	-218	-0.0000267
100 %		0	817,900,137	137	0.0000168
100 %		+ 10	817,900,129	129	0.0000158
100 %		+ 20	817,900,049	49	0.0000060
100 %		+ 30	817,900,007	7	0.0000009
100 %		+ 40	817,899,827	-173	-0.0000212
100 %		+ 50	817,899,842	-158	-0.0000193
BATT. ENDPOINT	2.93	+ 20	817,899,906	-94	-0.0000115

Table 7-8. CDMA BC10 Frequency Stability Data

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	st Report S/N: Test Dates: EUT Type:			Dage 45 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 45 of 49
© 2019 PCTEST Engineering Laboration	V 9.0 02/01/2019			



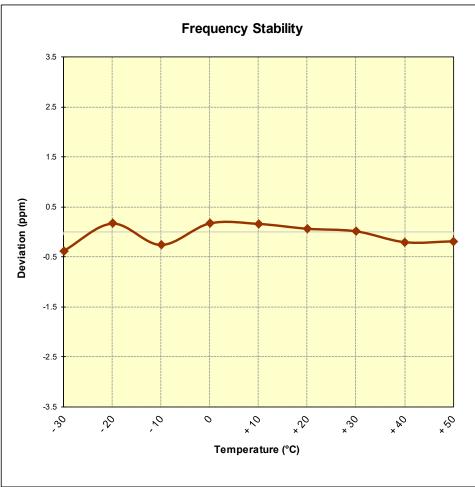


Figure 7-6. CDMA BC10 Frequency Stability Graph

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	S/N: Test Dates: EUT Type:			Dage 46 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 46 of 49
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019			



OPERATING FREQUENCY:	819,000,000	Hz
CHANNEL:	26740	
REFERENCE VOLTAGE:	4.33	VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	ТЕМР ([°] С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.33	- 30	818,999,940	-60	-0.0000073
100 %		- 20	818,999,910	-90	-0.0000110
100 %		- 10	819,000,007	7	0.0000009
100 %		0	819,000,006	6	0.0000007
100 %		+ 10	819,000,128	128	0.0000156
100 %		+ 20	819,000,001	1	0.0000001
100 %		+ 30	818,999,940	-60	-0.0000073
100 %		+ 40	818,999,953	-47	-0.0000057
100 %		+ 50	818,999,942	-58	-0.0000071
BATT. ENDPOINT	2.93	+ 20	818,999,700	-300	-0.0000366

Table 7-9. LTE Band 26 Frequency Stability Data

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Report S/N: Test Dates: EUT Type:			Dage 47 of 40
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 47 of 49
© 2019 PCTEST Engineering Laboration	V 9.0 02/01/2019			



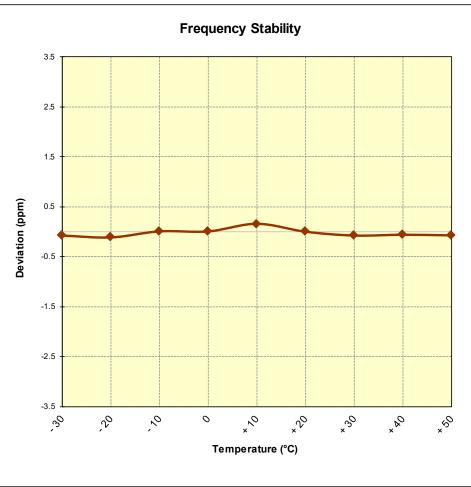


Table 7-10. LTE Band 26 Frequency Stability Data

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 48 of 49
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019			



8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFQ620WA** complies with all the requirements of Parts 22(H) and 90 of the FCC rules.

FCC ID: ZNFQ620WA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 40	
1M1909120153-04-R1.ZNF	9/12 - 10/2/2019	Portable Handset		Page 49 of 49	
© 2019 PCTEST Engineering Laborat	V 9.0 02/01/2019				