

PCTEST ENGINEERING LABORATORY, INC.

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



## MEASUREMENT REPORT FCC Part 22, 24, & 27 LTE

### **Applicant Name:**

LG Electronics MobileComm U.S.A 1000 Sylvan Avenue Englewood Cliffs, NJ 07632 United States Date of Testing: 7/24 - 8/7/2017 Test Site/Location: PCTEST Lab., Columbia, MD, USA Test Report Serial No.: 1M1707240228-05-R1.ZNF

## ZNFLK460

APPLICANT:

FCC ID :

### LG ELECTRONICS MOBILECOMM U.S.A

Application Type:	Certification
Models:	LG-LK460
Additional Model(s):	LGLK460, LK460
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§2; §22; §24; §27
Test Procedure(s):	ANSI/TIA-603-D-2010, KDB 971168 D01 v02r02
EUT Type:	Portable Tablet
Test Device Serial No.:	identical prototype [S/N: 02045, 01953]

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.

Note: This revised test report (1M1707240228-05-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) accordingly

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

Randy Ortanez President



FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:			
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 1 of 151	
© 2017 PCTEST Engineerir	0 2017 PCTEST Engineering Laboratory, Inc.				

07/14/2017



## TABLE OF CONTENTS

FCC I	PART 2	22, 24, & 27 MEASUREMENT REPORT	3
1.0		RODUCTION	
	1.1	Scope	5
	1.2	Testing Facility	5
2.0	PRC	DDUCT INFORMATION	6
	2.1	Equipment Description	6
	2.2	Device Capabilities	6
	2.3	Test Configuration	6
	2.4	EMI Suppression Device(s)/Modifications	6
3.0	DES	CRIPTION OF TESTS	7
	3.1	Measurement Procedure	7
	3.2	Block A Frequency Range	7
	3.3	Cellular - Base Frequency Blocks	7
	3.4	Cellular - Mobile Frequency Blocks	7
	3.5	PCS - Base Frequency Blocks	8
	3.6	PCS - Mobile Frequency Blocks	8
	3.7	AWS - Base Frequency Blocks	8
	3.8	AWS - Mobile Frequency Blocks	9
	3.9	BRS/EBS Frequency Block	9
	3.10	Radiated Power and Radiated Spurious Emissions	10
4.0	MEA	ASUREMENT UNCERTAINTY	11
5.0	TES	T EQUIPMENT CALIBRATION DATA	12
6.0	SAM	IPLE CALCULATIONS	13
7.0	TES	T RESULTS	
	7.1	Summary	
	7.2	Occupied Bandwidth	
	7.3	Spurious and Harmonic Emissions at Antenna Terminal	
	7.4	Band Edge Emissions at Antenna Terminal	67
	7.5	Peak-Average Ratio	
	7.6	Radiated Power (ERP/EIRP)	
	7.7	Radiated Spurious Emissions Measurements	
	7.8	Frequency Stability / Temperature Variation	140
8.0	CON	NCLUSION	

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 2 of 151
@ 2017 DOTECT Engineering	Laboratem, Inc.			VC

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, louding photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.

V 6.8 07/14/2017





## MEASUREMENT REPORT FCC Part 22, 24, & 27



### §2.1033 General Information

APPLICANT:	LG Electronics MobileComm	U.S.A		
APPLICANT ADDRESS:	1000 Sylvan Avenue			
	Englewood Cliffs, NJ 07632,	United States		
TEST SITE:	PCTEST ENGINEERING LA	BORATORY, INC.		
TEST SITE ADDRESS:	7185 Oakland Mills Road, Co	olumbia, MD 2104	5 USA	
FCC RULE PART(S):	§2; §22; §24; §27			
BASE MODEL:	LG-LK460			
FCC ID:	ZNFLK460			
FCC CLASSIFICATION:	PCS Licensed Transmitter (P	CB)		
FREQUENCY TOLERANC	E: ±0.00025 % (2.5 ppm)			
<b>Test Device Serial No.:</b>	02045, 01953	Production	Pre-Production	Engineering
DATE(S) OF TEST:	7/24 - 8/7/2017			
TEST REPORT S/N:	1M1707240228-05-R1.ZNF			

### **Test Facility / Accreditations**

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 3 of 151
© 2017 PCTEST Engineering Laboratory, Inc.				

<text>

<sup>07/14/2017</sup> 





## **MEASUREMENT REPORT** FCC Part 22, 24, & 27

ERP/EIRP						
Mode	FCC Rule	Tx Frequency (MHz)	Max Power	Max. Pow er	Emission	Modulation
Widde	Part		(W)	(dBm)	Designator	Woddiation
			. ,			
LTE Band 12	27	699.7 - 715.3	0.056	17.48	1M10G7D	QPSK
LTE Band 12	27	699.7 - 715.3	0.047	16.69	1M11W7D	16QAM
LTE Band 12	27	700.5 - 714.5	0.056	17.51	2M71G7D	QPSK
LTE Band 12	27	700.5 - 714.5	0.046	16.61	2M71W7D	16QAM
LTE Band 12	27	701.5 - 713.5	0.055	17.42	4M59G7D	QPSK
LTE Band 12	27	701.5 - 713.5	0.046	16.64	4M55W7D	16QAM
LTE Band 12	27	704 - 711	0.049	16.86	9M08G7D	QPSK
LTE Band 12	27	704 - 711	0.039	15.89	9M07W7D	16QAM
LTE Band 5/26	22H	824.7 - 848.3	0.197	22.94	1M10G7D	QPSK
LTE Band 5/26	22H	824.7 - 848.3	0.155	21.91	1M11W7D	16QAM
LTE Band 5/26	22H	825.5 - 847.5	0.200	23.02	2M71G7D	QPSK
LTE Band 5/26	22H	825.5 - 847.5	0.163	22.13	2M72W7D	16QAM
LTE Band 5/26	22H	826.5 - 846.5	0.194	22.87	4M53G7D	QPSK
LTE Band 5/26	22H	826.5 - 846.5	0.164	22.14	4M54W7D	16QAM
LTE Band 5/26	22H	829 - 844	0.185	22.67	9M03G7D	QPSK
LTE Band 5/26	22H	829 - 844	0.149	21.73	9M01W7D	16QAM
LTE Band 26	22H	831.5 - 841.5	0.166	22.21	13M5G7D	QPSK
LTE Band 26	22H	831.5 - 841.5	0.144	21.57	13M5W7D	16QAM
LTE Band 4	27	1710.7 - 1754.3	0.222	23.46	1M11G7D	QPSK
LTE Band 4	27	1710.7 - 1754.3	0.184	22.66	1M11W7D	16QAM
LTE Band 4	27	1711.5 - 1753.5	0.242	23.83	2M72G7D	QPSK
LTE Band 4	27	1711.5 - 1753.5	0.184	22.64	2M72W7D	16QAM
LTE Band 4	27	1712.5 - 1752.5	0.205	23.11	4M60G7D	QPSK
LTE Band 4	27	1712.5 - 1752.5	0.167	22.22	4M55W7D	16QAM
LTE Band 4	27	1715 - 1750	0.225	23.53	9M07G7D	QPSK
LTE Band 4	27	1715 - 1750	0.165	22.18	9M05W7D	16QAM
LTE Band 4	27	1717.5 - 1747.5	0.220	23.43	13M6G7D	QPSK
LTE Band 4	27	1717.5 - 1747.5	0.136	21.33	13M6W7D	16QAM
LTE Band 4	27	1720 - 1745	0.220	23.43	18M1G7D	QPSK
LTE Band 4	27	1720 - 1745	0.184	22.66	18M1W7D	16QAM
LTE Band 2/25	24E	1850.7 - 1914.3	0.398	26.00	1M10G7D	QPSK
LTE Band 2/25	24E	1850.7 - 1914.3	0.332	25.22	1M11W7D	16QAM
LTE Band 2/25	24E	1851.5 - 1913.5	0.411	26.14	2M71G7D	QPSK
LTE Band 2/25	24E	1851.5 - 1913.5	0.338	25.29	2M72W7D	16QAM
LTE Band 2/25	24E	1852.5 - 1912.5	0.422	26.25	4M58G7D	QPSK 160AM
LTE Band 2/25	24E	1852.5 - 1912.5	0.325	25.12	4M53W7D	16QAM
LTE Band 2/25	24E	1855 - 1910	0.393	25.94	9M03G7D	QPSK 160AM
LTE Band 2/25 LTE Band 2/25	24E 24E	1855 - 1910 1857.5 - 1907.5	0.323	25.09	9M03W7D	16QAM
	24E 24E	1857.5 - 1907.5		26.03	13M5G7D	QPSK 160AM
LTE Band 2/25 LTE Band 2/25	24E 24E	1857.5 - 1907.5 1860 - 1905	0.387	25.87 26.34	13M5W7D	16QAM QPSK
					18M0G7D	
LTE Band 2/25	24E 27	1860 - 1905	0.334	25.24 22.52	18M0W7D	16QAM
LTE Band 41		2498.5 - 2687.5 2498.5 - 2687.5	0.179		4M53G7D	QPSK 160AM
LTE Band 41	27 27		0.115	20.62 23.54	4M49W7D 9M00G7D	16QAM QPSK
LTE Band 41 LTE Band 41	27	2501 - 2685 2501 - 2685	0.226	23.54	9M00G7D 9M00W7D	16QAM
			0.150		13M5G7D	QPSK
LTE Band 41 LTE Band 41	27 27	2503.5 - 2682.5 2503.5 - 2682.5	0.279	24.46 23.76	13M5W7D	16QAM
						QPSK
LTE Band 41 LTE Band 41	27 27	2506 - 2680 2506 - 2680	0.334	25.23 22.06	18M0G7D 18M0W7D	16QAM
	21	2300 - 2000 FUT Ov		22.00		

### **EUT Overview**

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 4 of 151
© 2017 PCTEST Engineering Laboratory, Inc.				

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, louding photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



## 1.0 INTRODUCTION

### 1.1 Scope

Measurement and determination of electromagnetic emissions (EME) 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 Industry Canada Certification and Engineering Bureau.

### 1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Internt'I (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2014 on January 22, 2015.

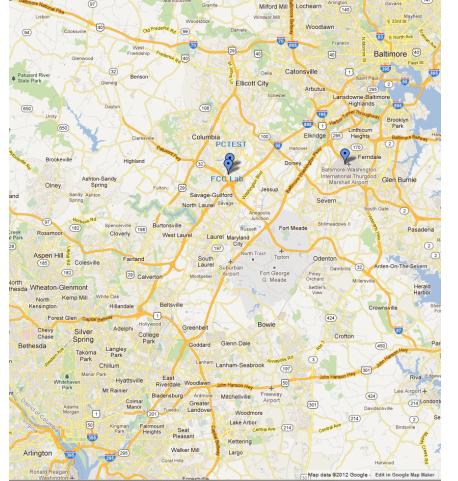


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:				
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 5 of 151		
© 2017 PCTEST Engineering	2017 PCTEST Engineering Laboratory, Inc.					

07/14/2017 07/14/2017 al, including nal rights to this



#### **PRODUCT INFORMATION** 2.0

#### 2.1 **Equipment Description**

The Equipment Under Test (EUT) is the LG Portable Tablet FCC ID: ZNFLK460. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

#### 2.2 **Device Capabilities**

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), Multi-band LTE, 802.11b/g/n WLAN, Bluetooth (1x, EDR, LE)

LTE Band 26 (814.7 – 849 MHz) overlaps the entire frequency range of LTE Band 5 (824 – 849 MHz). Therefore, test data provided in this report covers Band 5 and the portion of Band 26 subject to Part 22.

LTE Band 25 (1850 - 1915 MHz) overlaps the entire frequency range of LTE Band 2 (1850 - 1910 MHz). Therefore, test data provided in this report covers Band 2 as well as Band 25.

#### 2.3 **Test Configuration**

The EUT was tested per the guidance of ANSI/TIA-603-D-2010 and KDB 971168 D01 v02r02. 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: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:			
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 6 of 151	
© 2017 PCTEST Engineering	2017 PCTEST Engineering Laboratory Inc				

© 2017 PCTEST Engineering Laboratory, Inc.



## 3.0 DESCRIPTION OF TESTS

### 3.1 Measurement Procedure

The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-D-2010) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems" (KDB 971168 D01 v02r02) were used in the measurement of the EUT.

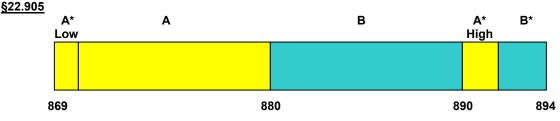
## 3.2 Block A Frequency Range

### §27.5(c)

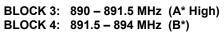
<u>698-746 MHz band</u>. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

Block A: 698-704 MHz and 728-734 MHz; Block B: 704-710 MHz and 734-740 MHz; and Block C: 710-716 MHz and 740-746 MHz.

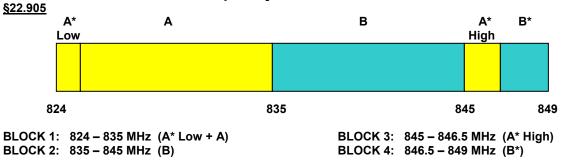
## 3.3 Cellular - Base Frequency Blocks



BLOCK 1: 869 – 880 MHz (A\* Low + A) BLOCK 2: 880 – 890 MHz (B)



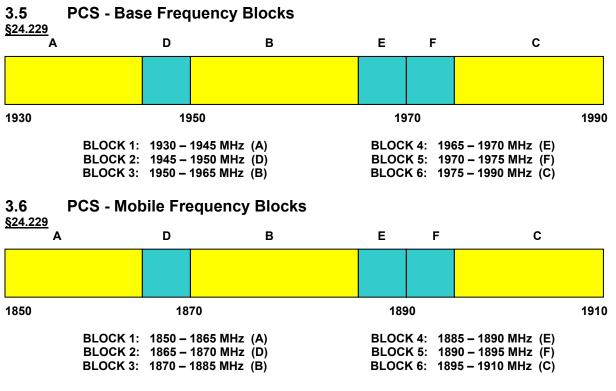
### 3.4 Cellular - Mobile Frequency Blocks



FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:			
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 7 of 151	
© 2017 PCTEST Engineerin	2017 PCTEST Engineering Laboratory, Inc.				

V 6.8 07/14/2017





### 3.7 AWS - Base Frequency Blocks



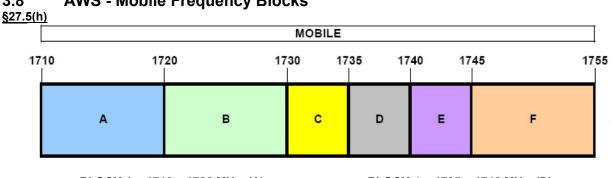
	BASE							
21	10	21	20 21	130 21 	35 21	40 21	45	2155
		A	В	с	D	E	F	
		BLOCK 2: 21	10 – 2120 MHz (A) 20 – 2130 MHz (B) 30 – 2135 MHz (C)		BLOCK	<b>(</b> 5: 2140 -	- 2140 MHz (D) - 2145 MHz (E) - 2155 MHz (F)	_

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 8 of 151
@ 2017 DOTECT Engineering	l abaratan ( Ina			Ve

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



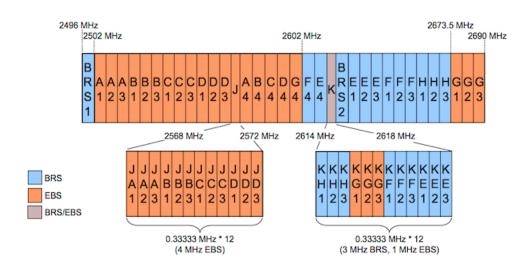


#### 3.8 **AWS - Mobile Frequency Blocks**

BLOCK 1: 1710 - 1720 MHz (A) BLOCK 2: 1720 - 1730 MHz (B) BLOCK 3: 1730 - 1735 MHz (C) BLOCK 4: 1735 - 1740 MHz (D) BLOCK 5: 1740 - 1745 MHz (E) BLOCK 6: 1745 – 1755 MHz (F)

#### 3.9 **BRS/EBS Frequency Block**

§27.5



FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 9 of 151
© 2017 PCTEST Engineerin	© 2017 PCTEST Engineering Laboratory, Inc.			

07/14/2017



#### 3.10 Radiated Power and Radiated Spurious Emissions §2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) §27.50(c.10) §27.50(d.4) §27.53(g) §27.53(h) §27.53(m)

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. A 72.4cm high PVC support structure is placed on top of the turntable. A 3" (~7.6cm) sheet of high density polystyrene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

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. 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 v02r02.

Per the guidance of ANSI/TIA-603-D-2010, 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:

Pd [dBm] = Pg [dBm] - cable loss [dB] + antenna gain [dBd/dBi]

Where, Pd is the dipole equivalent power, Pg 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 Pa [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 + 10log<sub>10</sub>(Power <sub>IWatts</sub>)). For Band the calculated Pd levels are compared to the absolute spurious emission limit of -25dBm which is equivalent to the required minimum attenuation of 55 + 10log<sub>10</sub>(Power <sub>Wattsl</sub>).

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 10 of 151
© 2017 PCTEST Engineerin	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this photocopying and microfilm, without permission in writing from PCTEST Engineeri report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



#### **MEASUREMENT UNCERTAINTY** 4.0

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 UCISPR 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: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 11 of 151
© 2017 PCTEST Engineering	Laboratory Inc	·		V 6 8

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



## 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 C63.5-2006.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	6/21/2017	Annual	6/21/2018	RE1
-	LTx3	Licensed Transmitter Cable Set	10/12/2016	Annual	10/12/2017	LTx3
Agilent	N9020A	MXA Signal Analyzer	10/28/2016	Annual	10/28/2017	US46470561
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	6/21/2017	Annual	6/21/2018	441112
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
Espec	ESX-2CA	Environmental Chamber	4/11/2017	Annual	4/11/2018	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	4/26/2016	Biennial	4/26/2018	128337
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/24/2017	Annual	3/24/2018	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11403100002
PCTEST	-	EMC Switch System	6/21/2017	Annual	6/21/2018	NM2
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		112347
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	4/19/2017	Annual	4/19/2018	100342
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	7/27/2016	Annual	7/27/2017	103200
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	3/30/2016	Biennial	3/30/2018	9105-2404
Sunol	DRH-118	Horn Antenna (1-18GHz)	7/30/2015	Biennial	7/30/2017	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

Table 5-1. Test Equipment

### Notes:

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

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 12 of 151

© 2017 PCTEST Engineering Laboratory, Inc.

<sup>07/14/2017</sup> © 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



## 6.0 SAMPLE CALCULATIONS

### **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 2<sup>nd</sup> 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: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 13 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.	·		V 6.8

07/14/2017



## 7.0 TEST RESULTS

## 7.1 Summary

Company Name:	LG Electronics MobileComm U.S.A
FCC ID:	ZNFLK460
FCC Classification:	PCS Licensed Transmitter (PCB)
Mode(s):	LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
2.1049	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1051 22.917(a) 24.238(a) 27.53(g) 27.53(h)	Out of Band Emissions	> 43 + 10log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions	CONDUCTED	PASS	Section 7.3, 7.4
27.53(m)	Out of Band Emissions	<ul> <li>&gt; 43 + 10log<sub>10</sub> (P[Watts]) at channel edges and</li> <li>&gt; 55 + 10log<sub>10</sub> (P[Watts]) at 5.5MHz away and beyond channel edges</li> </ul>		PASS	Section 7.3, 7.4
24.232(d)	Peak-Average Ratio	< 13 dB		PASS	Section 7.5
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
2.1055. 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)		PASS	Section 7.8
22.913(a.2)	Effective Radiated Power (Band 5/26)	< 7 Watts max. ERP		PASS	Section 7.6
27.50(c.10)	Effective Radiated Power (Band 12)	< 3 Watts max. ERP		PASS	Section 7.6
24.232(c) 27.50(h.2)	Equivalent Isotropic Radiated Power (Band 2/25, 41)	< 2 Watts max. EIRP		PASS	Section 7.6
27.50(d.4)	Equivalent Isotropic Radiated Power (Band 4)	< 1 Watts max. EIRP	RADIATED	PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(g) 27.53(h)	Undesirable Emissions	> 43 + 10log <sub>10</sub> (P[Watts]) for all out-of-band emissions		PASS	Section 7.7
27.53(m)	Undesirable Emissions	> 43 + 10log <sub>10</sub> (P[Watts]) at channel edges > 55 + 10log <sub>10</sub> (P[Watts]) at 5.5MHz away and beyond channel edges		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 (Sections 7.2, 7.3, 7.4, 7.5) 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 "LTE Automation," Version 4.8.

Test Report S/N: Test Dates: EUT Type:	Quality Manager
1M1707240228-05- R1.ZNF 7/24 - 8/7/2017 Portable Tablet	Page 14 of 151

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



# 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 v02r02 - 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.

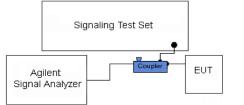


Figure 7-1. Test Instrument & Measurement Setup

### Test Notes

None.

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 15 of 151
© 2017 PCTEST Engineerin	g Laboratory, Inc.			V 6.8

07/14/2017





Plot 7-1. Occupied Bandwidth Plot (Band 12 - 1.4MHz QPSK - RB Size 6)



Plot 7-2. Occupied Bandwidth Plot (Band 12 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 16 of 151
© 2017 PCTEST Engineering Laboratory. Inc. V 6.8				

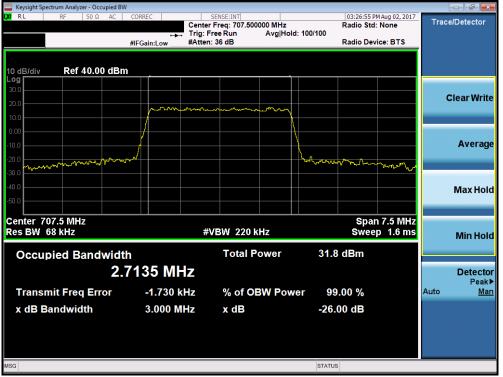
© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.





Plot 7-3. Occupied Bandwidth Plot (Band 12 – 3.0MHz QPSK – RB Size 15)

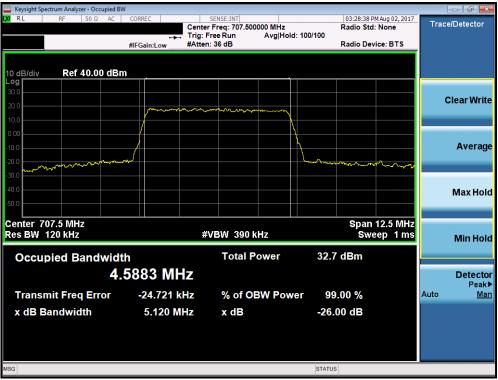


Plot 7-4. Occupied Bandwidth Plot (Band 12 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:							
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 17 of 151					
© 0047 DOTEOT En sin a sin	I also anatama Inc.								

© 2017 PCTEST Engineering Laboratory, Inc.









#### Plot 7-6. Occupied Bandwidth Plot (Band 12 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 18 of 151
© 2017 PCTEST Engineering Laboratory, Inc.				

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.





Plot 7-7. Occupied Bandwidth Plot (Band 12 - 10.0MHz QPSK - RB Size 50)



#### Plot 7-8. Occupied Bandwidth Plot (Band 12 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 19 of 151
© 2017 PCTEST Engineering Laboratory. Inc.				

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-9. Occupied Bandwidth Plot (Band 5/26 - 1.4MHz QPSK - RB Size 6)



Plot 7-10. Occupied Bandwidth Plot (Band 5/26 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:			
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 20 of 151	

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



Keysight Spectrum Analyzer - Occ	cupied BW				
<b>LXI</b> RL RF 50 Ω	AC CORREC	SENSE:INT Center Freg: 831.500	000 MHz	08:35:49 PM Jul 24, 2017 Radio Std: None	Trace/Detector
	·→-	Trig: Free Run	Avg Hold: 100/100		
	#IFGain:Low	#Atten: 36 dB		Radio Device: BTS	r
10 dB/div Ref 30.0	0 dBm				
20.0					
10.0		^	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Clear Write
0.00	/		<u> </u>		
-10.0	/		<b>\</b>		
-20.0 Annon Anna	montan		Www.w	+mannon m	Average
-30.0				and the mul	
-40.0					
-50.0					Max Hold
-60.0					Maxilola
Center 831.5 MHz Res BW 68 kHz		#VBW 220 k	H7	Span 7.5 MHz Sweep 1.6 ms	
Res DW OO KIIZ		#VDVV 220 K	112	Sweep 1.0 ms	Min Hold
Occupied Band	width	Total P	ower 31.4	4 dBm	
	2.7082 MH	7			Detector
					Peak▶
Transmit Freq Err	or 6.397 k	Hz % of OE	3W Power 99	9.00 %	Auto <u>Man</u>
x dB Bandwidth	2.974 M	Hz x dB	-26	00 dB	
MSG			STATU	s	
		1.1(L	1 5/00 0.01		0: 45

Plot 7-11. Occupied Bandwidth Plot (Band 5/26 – 3.0MHz QPSK – RB Size 15)



#### Plot 7-12. Occupied Bandwidth Plot (Band 5/26 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 21 of 151
© 2017 PCTEST Engineering Laboratory, Inc.				

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-13. Occupied Bandwidth Plot (Band 5/26 - 5.0MHz QPSK - RB Size 25)



Plot 7-14. Occupied Bandwidth Plot (Band 5/26 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 22 of 151
© 2017 PCTEST Engineering Laboratory. Inc.				

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.





Plot 7-15. Occupied Bandwidth Plot (Band 5/26 - 10.0MHz QPSK - RB Size 50)



Plot 7-16. Occupied Bandwidth Plot (Band 5/26 - 10.0MHz 16-QAM - RB Size 50)

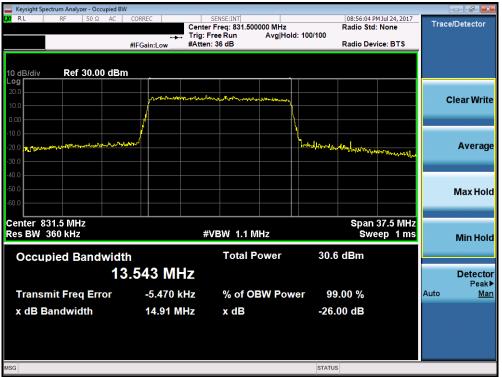
FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 23 of 151
© 2017 PCTEST Engineering Laboratory. Inc.				

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-17. Occupied Bandwidth Plot (Band 26 – 15.0MHz QPSK – RB Size 75)



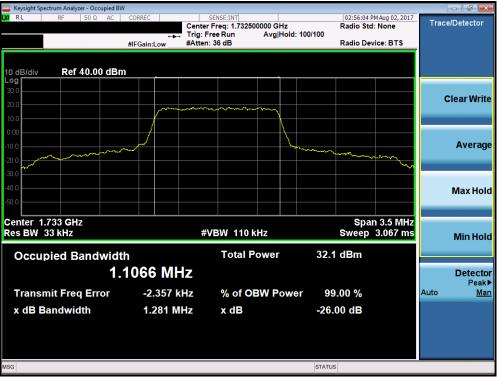
Plot 7-18. Occupied Bandwidth Plot (Band 26 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 24 of 151
© 2017 PCTEST Engineering Laboratory. Inc.				

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.





Plot 7-19. Occupied Bandwidth Plot (Band 4 – 1.4MHz QPSK – RB Size 6)



#### Plot 7-20. Occupied Bandwidth Plot (Band 4 – 1.4MHz 16-QAM – RB Size 6)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 25 of 151
© 2017 PCTEST Engineering Laboratory. Inc.				

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.





Plot 7-21. Occupied Bandwidth Plot (Band 4 – 3.0MHz QPSK – RB Size 15)



Plot 7-22. Occupied Bandwidth Plot (Band 4 – 3.0MHz 16-QAM – RB Size 15)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 26 of 151
© 2017 PCTEST Engineering Laboratory. Inc.				

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-23. Occupied Bandwidth Plot (Band 4 – 5.0MHz QPSK – RB Size 25)



#### Plot 7-24. Occupied Bandwidth Plot (Band 4 – 5.0MHz 16-QAM – RB Size 25)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 27 of 151
© 2017 DOTECT Engineering	-   abaratanı  na	•		Vec

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-25. Occupied Bandwidth Plot (Band 4 – 10.0MHz QPSK – RB Size 50)



#### Plot 7-26. Occupied Bandwidth Plot (Band 4 - 10.0MHz 16-QAM - RB Size 50)

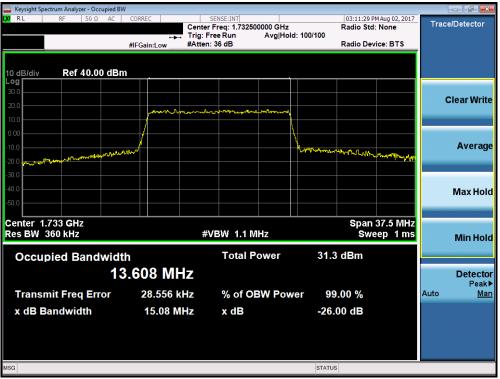
FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:			
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 28 of 151	
© 2017 PCTEST Engineering Laboratory, Inc.					

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-27. Occupied Bandwidth Plot (Band 4 – 15.0MHz QPSK – RB Size 75)



Plot 7-28. Occupied Bandwidth Plot (Band 4 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 29 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-29. Occupied Bandwidth Plot (Band 4 – 20.0MHz QPSK – RB Size 100)



Plot 7-30. Occupied Bandwidth Plot (Band 4 - 20.0MHz 16-QAM - RB Size 100)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 30 of 151
© 2017 PCTEST Engineerin	d Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-31. Occupied Bandwidth Plot (Band 2/25 – 1.4MHz QPSK – RB Size 6)



Plot 7-32. Occupied Bandwidth Plot (Band 2/25 - 1.4MHz 16-QAM - RB Size 6)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 31 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-33. Occupied Bandwidth Plot (Band 2/25 - 3.0MHz QPSK - RB Size 15)



Plot 7-34. Occupied Bandwidth Plot (Band 2/25 - 3.0MHz 16-QAM - RB Size 15)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 32 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.





Plot 7-35. Occupied Bandwidth Plot (Band 2/25 - 5.0MHz QPSK - RB Size 25)



Plot 7-36. Occupied Bandwidth Plot (Band 2/25 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 33 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-37. Occupied Bandwidth Plot (Band 2/25 - 10.0MHz QPSK - RB Size 50)



Plot 7-38. Occupied Bandwidth Plot (Band 2/25 - 10.0MHz 16-QAM - RB Size 50)

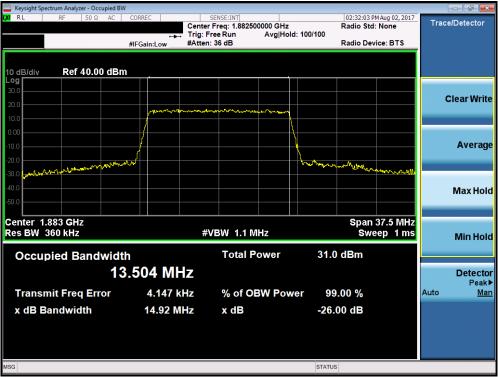
FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 34 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-39. Occupied Bandwidth Plot (Band 2/25 - 15.0MHz QPSK - RB Size 75)



Plot 7-40. Occupied Bandwidth Plot (Band 2/25 - 15.0MHz 16-QAM - RB Size 75)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 35 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

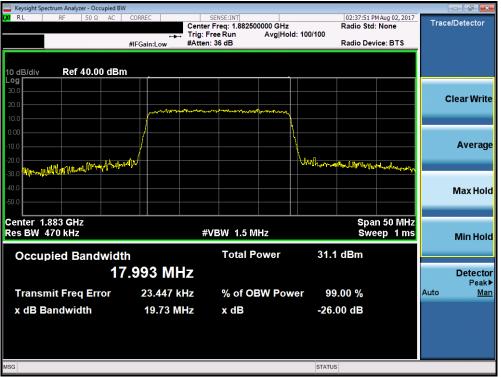
© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



🔤 Keysight Spectrum Analyzer - Occupied BW 🚽							
LX RL RF 50Ω AC C		SENSE:INT Freg: 1.882500000 GHz		02:37:39 Pf Radio Std:	4 Aug 02, 2017	Trace	e/Detector
	🛶 Trig: Fr	ree Run Avg Hold	l: 100/100				
#	FGain:Low #Atten:	36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dBm							
30.0							
20.0						C	lear Write
10.0	and the second and the second	man marken and					
0.00							
-10.0	{						Average
-20.0 -30.0 - พระเพิ่ม			Where we are a start of the sta	Mangraination	whether the		
-40.0							
							Max Hold
-50.0							_
Center 1.883 GHz					n 50 MHz		
Res BW 470 kHz	#V	/BW 1.5 MHz		Swe	ep 1ms		Min Hold
		Total Power	32.2	dPm			
Occupied Bandwidth		Total Fower	52.2	ubm			
17.	986 MHz						Detector Peak▶
Transmit Freq Error	-7.817 kHz	% of OBW Pow	er 99.	00 %		Auto	Peak► <u>Man</u>
x dB Bandwidth	19.62 MHz	x dB	-26.0	0 dB			
MSG			STATUS				
						_	

Plot 7-41. Occupied Bandwidth Plot (Band 2/25 - 20.0MHz QPSK - RB Size 100)

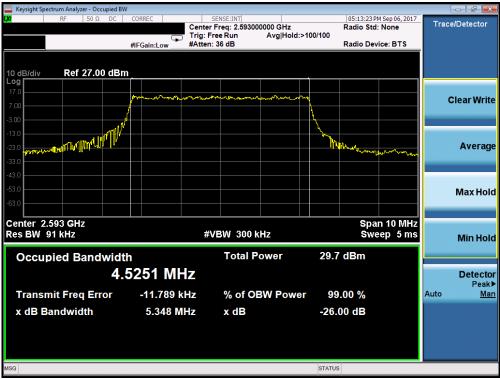


#### Plot 7-42. Occupied Bandwidth Plot (Band 2/25 - 20.0MHz 16-QAM - RB Size 100)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:			
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 36 of 151	
© 2017 PCTEST Engineerin	© 2017 PCTEST Engineering Laboratory. Inc.				

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-43. Occupied Bandwidth Plot (Band 41 – 5.0MHz QPSK – RB Size 25)



Plot 7-44. Occupied Bandwidth Plot (Band 41 - 5.0MHz 16-QAM - RB Size 25)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 37 of 151
© 2017 PCTEST Engineerin	d Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.





Plot 7-45. Occupied Bandwidth Plot (Band 41 – 10.0MHz QPSK – RB Size 50)



Plot 7-46. Occupied Bandwidth Plot (Band 41 - 10.0MHz 16-QAM - RB Size 50)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 38 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

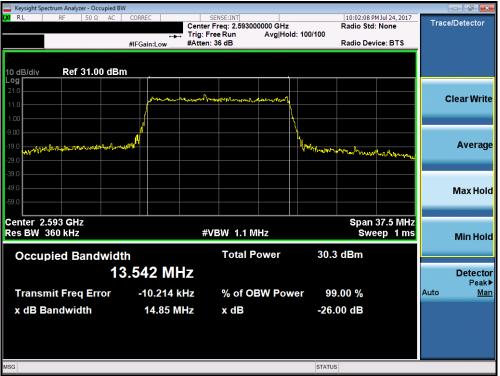
© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.





Plot 7-47. Occupied Bandwidth Plot (Band 41 – 15.0MHz QPSK – RB Size 75)



Plot 7-48. Occupied Bandwidth Plot (Band 41 – 15.0MHz 16-QAM – RB Size 75)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 39 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.





Plot 7-49. Occupied Bandwidth Plot (Band 41 – 20.0MHz QPSK – RB Size 100)



Plot 7-50. Occupied Bandwidth Plot (Band 41 - 20.0MHz 16-QAM - RB Size 100)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 40 of 151
© 2017 PCTEST Engineerin	a Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet	Page 41 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.		V 6.8

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, louding photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



# 7.3 Spurious and Harmonic Emissions at Antenna Terminal §2.1051 §22.917(a) §24.238(a) §27.53(g) §27.53(h) §27.53(m)

# **Test Overview**

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, 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 Band 41, the minimum permissible attenuation level of any spurious emission is  $55 + \log_{10}(P_{[Watts]})$ .

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

### Test Procedure Used

KDB 971168 D01 v02r02 - Section 6.0

### **Test Settings**

- 1. Start frequency was set to 30MHz and stop frequency was set to at least 10 \* the fundamental frequency (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.

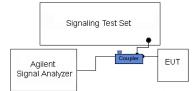


Figure 7-2. Test Instrument & Measurement Setup

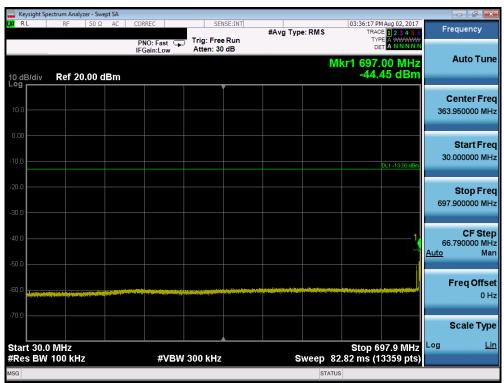
# Test Notes

Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. 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: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 42 of 151
© 2017 PCTEST Engineerin	g Laboratory, Inc.	•		V 6.8

07/14/2017





Plot 7-51. Conducted Spurious Plot (Band 12 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

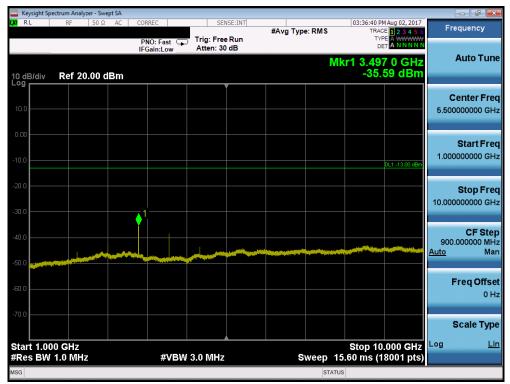
FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🔁 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 43 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.	-		V 6.8

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



	ectrum Analyzer - Sv	•								e f
LXI RL	RF 50 9	2 AC	CORREC		SE:INT	#Avg Typ	e: RMS	TRAC	Aug 02, 2017	Frequency
			PNO: Fast IFGain:Low	Trig: Free Atten: 30				DE		Auto Tuno
10 dB/div Log	Ref 20.00	dBm					M	kr1 854. -59.	75 MHz 76 dBm	Auto Tune
209										Center Freq
10.0										858.000000 MHz
0.00										04 - 4 F
-10.0										Start Freq 716.000000 MHz
									DL1 -13.00 dBm	
-20.0										Stop Freq
-30.0										1.000000000 GHz
-40.0										CF Step
										28.400000 MHz <u>Auto</u> Man
-50.0										
-60.0	ng an ang Arganga ta silang t	an a		an <del>te an an a</del> n an	and a state of the s					Freq Offset 0 Hz
-70.0										
										Scale Type
Start 0.71								Stop 1.0	000 0112	Log <u>Lin</u>
#Res BW	100 kHz ts changed; all	tracco al		300 kHz			Sweep 3	35.22 ms (	5681 pts)	
	a changed, an	u aces cie	Sareu				STATU			

Plot 7-52. Conducted Spurious Plot (Band 12 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



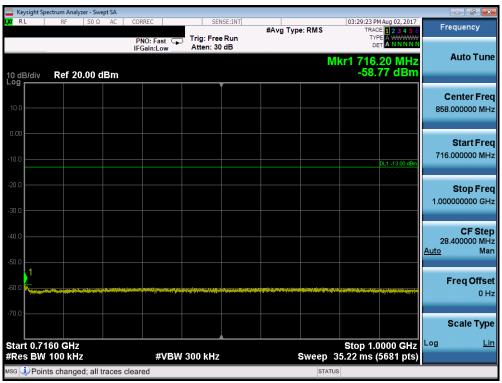
Plot 7-53. Conducted Spurious Plot (Band 12 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 44 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8



	ectrum Analyz											-	
LXU RL	RF	50 Ω	AC		Fast 🖵	Trig: Fre		#Avg Typ	e: RMS	TRA	M Aug 02, 2017 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	Freq	uency
10 dB/div	Ref 20	.00 dE	Зm	IFGain	Low	Atten: 3	) dB		N	lkr1 696	.75 MHz 70 dBm	A	uto Tune
10.0													n <b>ter Freq</b> 100000 MHz
-10.0											DL1 -13.00 dBm		tart Fred
-20.0													<b>top Fre</b> 100000 мн
-40.0												66.80 <u>Auto</u>	CF Step 00000 MH Mar
-60.0								sa dha shi kamaya dha bashekara da ay sa dha shi kara ay a dha shi kara da sa sa		i i an	a James and a subsection of the second s	Fre	e <b>q Offse</b> 0 H
-70.0	Dalla -									<u>Store</u>			ale Type
Start 30.0 #Res BW					#VBW	300 kHz		s	weep 8	Stop ( 2.83 ms (	98.0 MHz 13361 pts)		<u></u>
MSG									STAT	JS			

Plot 7-54. Conducted Spurious Plot (Band 12 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-55. Conducted Spurious Plot (Band 12 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

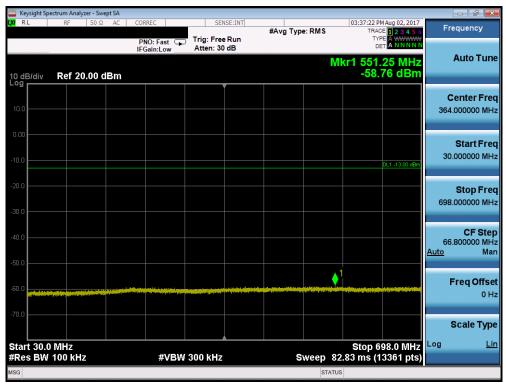
FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 45 of 151
© 2017 PCTEST Engineerin	a Laboratory, Inc.			V 6.8

<sup>© 2017</sup> PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



	ectrum Analyzer											
L <mark>XI</mark> RL	RF 5	50Ω AC	CORREC		SEI	ISE:INT	#Avg Typ	e: RMS		M Aug 02, 2017 CE 1 2 3 4 5 6	Fr	equency
			PNO: F IFGain:	ast Ģ⊂ Low	Trig: Free Atten: 30				T) C			
			li ouini	2011				Ν	lkr1 3.52	7 0 GHz		Auto Tune
10 dB/div Log	Ref 20.0	0 dBm							-38.4	59 dBm		
											c	enter Freg
10.0												0000000 GHz
0.00												Start Freq
-10.0										DL1 -13.00 dBm	1.00	0000000 GHz
										DET -13.00 dbin		
-20.0												Stop Freq
-30.0											10.00	0000000 GHz
-30.0			1									
-40.0			<b>_</b>								900	CF Step .000000 MHz
		man				an and the second					<u>Auto</u>	Man
-50.0												
-60.0												Freq Offset
												0 Hz
-70.0												Scale Type
Start 1.00				41/D14/	2.0.141-				Stop 10		Log	Lin
#Res BW	1.0 WHZ			#VBW	3.0 MHz		5	STAT	15.60 ms (*	18001 pts)		
								UTA				

Plot 7-56. Conducted Spurious Plot (Band 12 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-57. Conducted Spurious Plot (Band 12 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 46 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

<sup>© 2017</sup> PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



	ctrum Analyzer -										- # <b>X</b>
LX/ RL	RF 50	Ω AC	CORREC		Run	#Avg Typ	e: RMS	TRAC	M Aug 02, 2017 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	Fr	equency
10 dB/div	Ref 20.00	) dBm	IFGain:Low	Atten: 30	dB		М	kr1 719.	.95 MHz 81 dBm		Auto Tune
10.0											Center Freq 050000 MHz
-10.0									DL1 -13.00 dBm	716	Start Fred 100000 MHz
-20.0										1.00	Stop Fred
-40.0										28 <u>Auto</u>	<b>CF Step</b> 390000 MH Mar
-60.0	y y y y stategy a sta						and the definition of the same		n na selan a terra a terra se	1	F <b>req Offse</b> 0 H:
-70.0 Start 0.710	81 GHz							Stop 44	0000 GHz	Log	Scale Type
#Res BW	100 kHz			/ 300 kHz			Sweep 3	35.20 ms (	(5679 pts)		
MSG 횢 Point	s changed; a	II traces of	leared				STATU	S			

Plot 7-58. Conducted Spurious Plot (Band 12 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-59. Conducted Spurious Plot (Band 12 – 5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

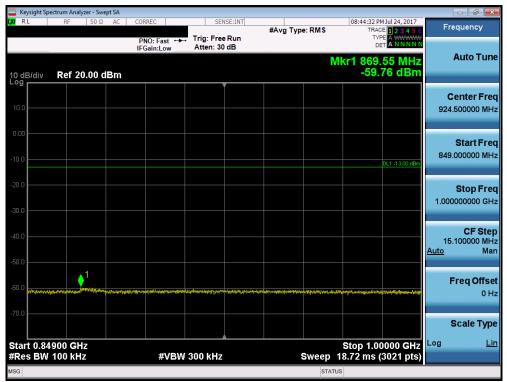
FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 47 of 151
© 2017 PCTEST Engineerin	a Laboratory, Inc.			V 6.8

<sup>© 2017</sup> PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



	ectrum Analyzer -									_	
LXU RL	RF 5	0Ω AC	CORREC PNO: Fast	+++ Trig: Fre		#Avg Typ	e: RMS	TRA	M Jul 24, 2017 CE <b>1 2 3 4 5 6</b> PE A WWWWW ET A N N N N N	Fre	equency
10 dB/div	Ref 20.0	0 dBm	IFGain:Low	Atten: 30	) dB		ľ	/kr1 822			Auto Tune
10.0											enter Freq 500000 MHz
-10.0									DL1 -13.00 dBm	30.	Start Fred 000000 MHz
-20.0										823.	Stop Fred 000000 MH:
-40.0									1,	79. <u>Auto</u>	CF Ster 300000 MH Mar
-60.0				1999 Martin State State State State State State State State					and the second se	F	F <b>req Offse</b> 0 Ha
-70.0 Start 30.0	MHz							Stop 8	23.0 MHz		Scale Type Lir
#Res BW	100 kHz		#V	BW 300 kHz		S	weep S	98.33 ms (1	5861 pts)		
							STAT				

Plot 7-60. Conducted Spurious Plot (Band 5/26 - 10.0MHz QPSK - RB Size 1, RB Offset 0- Low Channel)



Plot 7-61. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 48 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.



	ectrum Analyz												
LXI RL	RF	50 Ω	AC	CORREC		SEI	ISE:INT	#Avg Typ	e: RMS	TRA	PM Jul 24, 2017 ACE 1 2 3 4 5 6	Fr	equency
				PNO: Fas IFGain:Lo		Trig: Free #Atten: 3				T			
10 dB/div Log	Ref 0.0	0 dBr	n						N	/lkr1 8.64 -46	14 0 GHz .06 dBm		Auto Tune
-10.0											DL1 -13.00 dBm		<b>Center Freq</b> 0000000 GHz
-20.0												1.00	Start Freq 0000000 GHz
-40.0						-				1		10.00	<b>Stop Freq</b> 0000000 GHz
-60.0												900 <u>Auto</u>	<b>CF Step</b> 0.000000 MHz Man
-80.0													Freq Offset 0 Hz
-90.0													Scale Type
Start 1.00 #Res BW				#	VBW	3.0 MHz		s	weep	Stop 1 15.60 ms (	0.000 GHz 18001 pts)	Log	Lin
MSG									STA				

Plot 7-62. Conducted Spurious Plot (Band 5/26 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-63. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 49 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

<sup>07/14/2017</sup> © 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



	ectrum Analyzer -										d X
LXU RL	RF 5	OΩ AC	CORREC	Trig: Free		#Avg Type	e:RMS	TRAC	M Jul 24, 2017 E 1 2 3 4 5 6 E A M N N N N	Frequer	су
10 dB/div	Ref 20.0	0 dBm	IFGain:Low _	Atten: 30	) dB		N	Akr1 872.		Auto	Tune
10.0										Cente 924.5000	
-10.0									DL1 -13.00 dBm	Star 849.0000	t <b>Fre</b> DOMH
-20.0										<b>Sto</b> 1.0000000	p Fre 00 GH
50.0										CI 15.1000 <u>Auto</u>	F Ste DO MH Ma
-60.0	networkstellensverstellenstellen	1 ************	saapse, i jog <sub>aa</sub> g us yn gent ote genlyr	hin the contract of the	fraglerf,amsinghan	กุลสรีมีผู้ที่ได้จะมีสาวรู้สาวรู้สีมีระดูสะครั้งการู้	9~3~3~1 <del>0</del> 53-974 0 a	95689° y 115° 118° 118° y 119° y 1	nnhäijuup (pi ini ja majai	Freq	Offse 0 H
Start 0.84			4\/B)	W 200 kH-				Stop 1.00	0000 GHz	Scale	e Typ Li
#Res BW	TUU KHZ		#VB	W 300 kHz			Sweep	18.72 ms (	3021 pts)		

Plot 7-64. Conducted Spurious Plot (Band 5/26 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



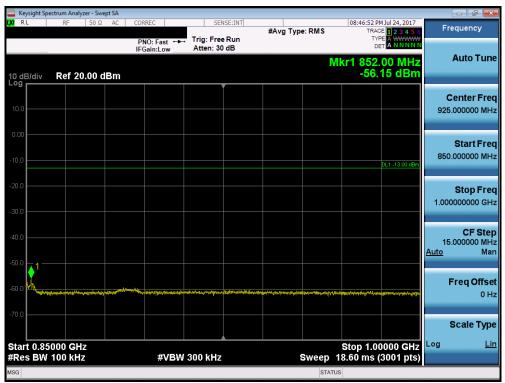
Plot 7-65. Conducted Spurious Plot (Band 5/26 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 50 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8



	ectrum Analy:												
LXU RL	RF	50 Ω	AC	CORREC	ast ⊶⊷	Trig: Fre		#Avg Typ	e: RMS	TRA	M Jul 24, 2017 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	F	requency
10 dB/div	Ref 20	.00 dl	Bm	IFGain:	Low	Atten: 30	) dB		N	/kr1 822			Auto Tune
10.0													Center Freq 7.000000 MHz
-10.0											DL1 -13.00 dBm	31	Start Freq 0.000000 MHz
-20.0												82	Stop Fred 4.000000 MH2
-40.0												79 <u>Auto</u>	CF Step 9.400000 MH Mar
-60.0						a standa ta ana Abila	(a cas), se à su dans il giu		t de platen de com altre		1		Freq Offse 0 H:
-70.0 Start 30.0										Stop 8	24.0 MHz	Log	Scale Type <u>Lin</u>
#Res BW	100 kHz	2			#VBW	300 kHz		S	weep 9		15881 pts)		

Plot 7-66. Conducted Spurious Plot (Band 5/26 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-67. Conducted Spurious Plot (Band 5/26 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 51 of 151
© 2017 PCTEST Engineerin	Laboratory, Inc.			V 6.8

<sup>© 2017</sup> PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



	ctrum Analyze												- • •
LX/ RL	RF	50 Ω	AC CO	ORREC		SEI	SE:INT	#Avg Typ	e: RMS		PM Jul 24, 2017 RACE 1 2 3 4 5 6	Fi	equency
				PNO: Fa FGain:L	ow	Trig: Free #Atten: 3				<u> Mkr1 5.8</u>			Auto Tune
10 dB/div Log	Ref 0.0	0 dBn	î							-4	5.96 dBm		
-10.0											DL1 -13.00 dBm		<b>Center Freq</b> 0000000 GHz
-20.0												1.00	Start Freq 0000000 GHz
-40.0			ورومه المحادم			and the second se	<b>1</b>					10.00	<b>Stop Freq</b> 0000000 GHz
-60.0												900 <u>Auto</u>	<b>CF Step</b> 0.000000 MHz Man
-80.0													Freq Offset 0 Hz
-90.0													Scale Type
Start 1.00 #Res BW				#	VBW	3.0 MHz		s	weep	Stop 15.60 ms	10.000 GHz (18001 pts)	Log	<u>Lin</u>
MSG										TUS			

Plot 7-68. Conducted Spurious Plot (Band 5/26 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-69. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 52 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8



Keysight Spectrum Analyzer - Sw	vept SA				
🗶 RL RF 50 Ω	PNO: Fast	SENSE:INT	#Avg Type: RMS	03:02:33 PM Aug 02, 2017 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
10 dB/div Ref 20.00 (	IFGain:Low	Atten: 30 dB	М	kr1 8.703 5 GHz -42.78 dBm	Auto Tune
10.0					Center Fred 5.877500000 GH;
-10.0				DL1 -13.00 dBm	Start Free 1.755000000 GH
-20.0					Stop Free 10.000000000 GH
-40.0					CF Step 824.50000 MH <u>Auto</u> Ma
-60.0					Freq Offse 0 H
-70.0 Start 1.755 GHz			0	Stop 10.000 GHz	Scale Type
#Res BW 1.0 MHz		3.0 MHz	Sweep 14	4.29 ms (16491 pts) s	

Plot 7-70. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 7-71. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 53 of 151
© 2017 PCTEST Engineerin	a Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.



	trum Analyzer - Swe									
LXU RL	RF 50 Ω	AC	CORREC	Trig: Free		#Avg Type	e: RMS	TRAC	Aug 02, 2017 E 1 2 3 4 5 6 E A WWWWW T A N N N N N	Frequency
10 dB/div	Ref 20.00 c	dBm	IFGain:Low	Atten: 30	dB		M	(r1 1.63)	5 0 GHz 78 dBm	Auto Tun
10.0										Center Fre 870.000000 M⊦
-10.0									DL1 -13.00 dBm	Start Fre 30.000000 M⊦
-20.0										Stop Fre 1.710000000 G⊦
-40.0				and get the local difference of the	an ta alfa than 'na i <sub>na</sub> a		an gang ang pang pang pang pang pang pan	a, ang pangkarangkarangkarang	1	CF Ste 168.000000 M⊦ <u>Auto</u> Ma
-60.0										Freq Offso 0 ⊦
Start 0.030			#\/B\					Stop 1.7	00 012	Scale Typ
#Res BW 1			#VBI	N 3.0 MHz			Sweep 2		3361 pts)	

Plot 7-72. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-73. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 54 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.

© 2017 PCTEST Engineering Laboratory, Inc. All rights reserved. Unless otherwise specified, no part of this report may be reproduced or utilized in any part, form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from PCTEST Engineering Laboratory, Inc. If you have any questions about this international copyright or have an enquiry about obtaining additional rights to this report or assembly of contents thereof, please contact INFO@PCTESTLAB.COM.



🔤 Keysight Sp	ectrum Analyz	er - Swept SA									
LXI RL	RF	50 Ω AC	CORREC	C	SEI	NSE:INT	#Avg Typ	e BMS	03:01:53 P	M Aug 02, 2017 DE <b>1 2 3 4 5 6</b>	Frequency
			PNO: IFGair	Fast 🕞 n:Low	Trig: Free Atten: 10	e Run ) dB	#///8/19P		TY D		Auto Tune
10 dB/div Log	Ref 0.0	0 dBm						Mk	r1 17.00 -57.	4 0 GHz 13 dBm	Auto Tune
-10.0										DL1 -13.00 dBm	Center Freq 15.00000000 GHz
-20.0											Start Freq 10.000000000 GHz
-40.0								1			<b>Stop Freq</b> 20.000000000 GHz
-60.0											<b>CF Step</b> 1.000000000 GHz <u>Auto</u> Man
-80.0											Freq Offset 0 Hz
-90.0											Scale Type
Start 10.0 #Res BW				#VBW	/ 3.0 MHz		s	weep 2	Stop 20 5.33 ms (2	.000 GHz 20001 pts)	
мsg 🤳 Poin			s cleared					STATU		Pro/	
		-							0. 1	<b>DD</b> 0//	

Plot 7-74. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

Keysight Spectrum Analyzer - S						
<b>RL</b> RF 50	PNC	East Trig:	Free Run n: 30 dB	#Avg Type: RMS	03:05:26 PM Aug 02, 2017 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNN	Frequency
0 dB/div Ref 20.00	dBm			M	kr1 1.582 5 GHz -47.50 dBm	Auto Tun
10.0						Center Fre 870.000000 M⊦
0.00					DL1 -13.00 dBm	Start Fre 30.000000 M⊦
0.0						<b>Stop Fre</b> 1.710000000 GH
0.0				and a grant of the spin of the		CF Ste 168.000000 MH <u>Auto</u> Ma
i0.0						Freq Offs 0 ⊦
70.0						Scale Typ
tart 0.0300 GHz Res BW 1.0 MHz		#VBW 3.0 N	1Hz	Sweep 2	Stop 1.7100 GHz 2.240 ms (3361 pts)	Log <u>Li</u>

Plot 7-75. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 55 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.



Keysight Spectr	rum Analyzer - Swe	ept SA								
LXI RL	RF 50 Ω	AC	PNO: Fast		NSE:INT	#Avg Typ	e:RMS	TRAC	M Aug 02, 2017 CE 1 2 3 4 5 6 PE A WWWW A N N N N N	Frequency
10 dB/div	Ref 20.00 d	IBm	IFGain:Low	Atten: 30	) dB		M	kr1 1.75	7 5 GHz 71 dBm	Auto Tune
10.0										Center Freq 5.878000000 GHz
-10.0									DL1 -13.00 dBm	Start Freq 1.756000000 GHz
-20.0 -30.0										Stop Freq 10.000000000 GHz
-40.0										CF Step 824.400000 MHz <u>Auto</u> Mar
-60.0										Freq Offset 0 Hz
Start 1.756 #Res BW 1.			#VBV	V 3.0 MHz		s	weep 14	Stop 10 4.29 ms (1	.000 GHz 6489 pts)	Scale Type Log <u>Lin</u>
MSG 🧼 Points		races cle					STATU			

Plot 7-76. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-77. Conducted Spurious Plot (Band 4 – 3.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 56 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.



	ectrum Analy												
<b>lxi</b> rl	RF	50 Ω	AC	CORREC			NSE:INT	#Avg Typ	e: RMS	TRAC	M Aug 02, 2017 E <b>1 2 3 4 5 6</b>	Fr	equency
				PNO: F	ast ⊊ ∟ow	Trig: Fre Atten: 3				DI			
10 dB/div Log	Ref 20	.00 dE	3m						Mł	(r1 1.84 -22.	9 0 GHz 35 dBm		Auto Tune
10.0													Center Freq 9.500000 MHz
-10.0											DL1 -13.00 dBm	30	Start Freq 0.000000 MHz
-20.0												1.84	<b>Stop Freq</b> 9000000 GHz
-40.0						n-th <sup>i</sup> tempt g to the <sup>th</sup>				the garding star of the of the star		181 <u>Auto</u>	CF Step 1.900000 MHz Man
-60.0													Freq Offset 0 Hz
-70.0													Scale Type
Start 0.03 #Res BW		z		;	#VBW	3.0 MHz			Sweep 2	Stop 1.3 2.425 ms (	3490 GHz (3639 pts)	Log	<u>Lin</u>
MSG									STATUS				

Plot 7-78. Conducted Spurious Plot (Band 2/25 – 15.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 7-79. Conducted Spurious Plot (Band 2/25 - 15.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 57 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8



🔤 Keysight Sp	ectrum Analy	zer - Swept S	SA									
L <b>XI</b> RL	RF	50 Ω /		DRREC	ist 😱	Tria: F	SENSE:INT	#Avg Typ	e: RMS	TRA	M Aug 02, 2017 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	Frequency
10 dB/div	Ref 0.	00 dBm		FGain:L	ow		10 dB		Mk	r1 16.98	9 5 GHz 10 dBm	Auto Tune
-10.0											DL1 -13.00 dBm	Center Freq 15.00000000 GHz
-20.0												Start Freq 10.000000000 GHz
-40.0									1			<b>Stop Freq</b> 20.000000000 GHz
-60.0												<b>CF Step</b> 1.000000000 GHz <u>Auto</u> Man
-80.0												Freq Offset 0 Hz
-30.0 Start 10.0 #Res BW		2		#	VBW	3.0 M	łz	s	weep 2	Stop 20	).000 GHz 20001 pts)	Scale Type
мsg 🗼 Poin			ces clea						STATU			

Plot 7-80. Conducted Spurious Plot (Band 2/25 – 15.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

	ctrum Analyzer - Swep						- đ <b>-</b>
RL	RF 50 Ω	AC CORREC PNO: F IFGain:	ast 😱 Trig: Fr		#Avg Type: RMS	02:32:39 PM Aug 02, 2017 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A N N N N	Frequency
0 dB/div	Ref 20.00 di	Зm			Μ	kr1 1.849 5 GHz -41.21 dBm	Auto Tun
10.0							Center Fre 940.000000 MH
0.00							
10.0						DL1 -13.00 dBm	Start Fre 30.000000 MH
20.0							Stop Fre
80.0							1.850000000 GH
0.0						1	CF Ste 182.00000 MH
50.0		and the second	alayada da ta		an and the second s	and an appropriation of the dependence of a dependence of a dependence of the second second second second second	<u>Auto</u> Ma
60.0							Freq Offso
'0.0							
tart 0.03						Stop 1.8500 GHz	Scale Typ
Res BW			#VBW 3.0 MH	z	Sweep	2.427 ms (3641 pts)	

Plot 7-81. Conducted Spurious Plot (Band 2/25 – 15.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 58 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

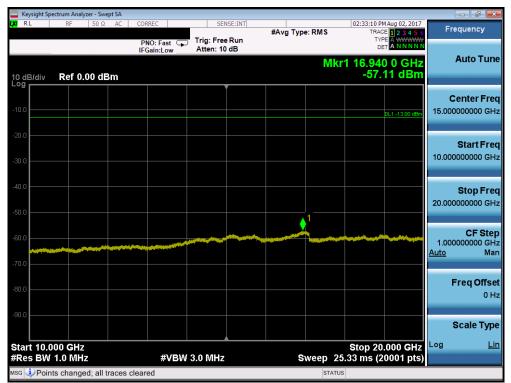
07/14/2017

© 2017 PCTEST Engineering Laboratory, Inc.



	ım Analyzer - Swe										
L <mark>XI</mark> RL	RF 50 Ω	AC	CORREC PNO: Fast	. Tri	SEN	Run	#Avg Typ	e: RMS	TR	PM Aug 02, 2017 ACE 1 2 3 4 5 6 YPE A WWWWW DET A NNNN	Frequency
10 dB/div	tef 20.00 d	Bm	IFGain:Low	At	ten: 30	dB		Μ	kr1 8.64	15 5 GHz 32 dBm	Auto Tune
10.0											Center Freq 5.957500000 GHz
-10.0										DL1 -13.00 dBm	Start Fred 1.915000000 GH:
-20.0											<b>Stop Free</b> 10.000000000 GH:
-40.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				_				• 1_		CF Step 808.500000 MH: <u>Auto</u> Mar
-60.0											<b>Freq Offse</b> 0 H
-70.0 Start 1.915 (	GHz								Stop 1	0.000 GHz	Scale Type
#Res BW 1.0	0 MHz	races cl		BW 3.0	MHz		S	weep 1	4.01 ms (	16171 pts)	

Plot 7-82. Conducted Spurious Plot (Band 2/25 - 15.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



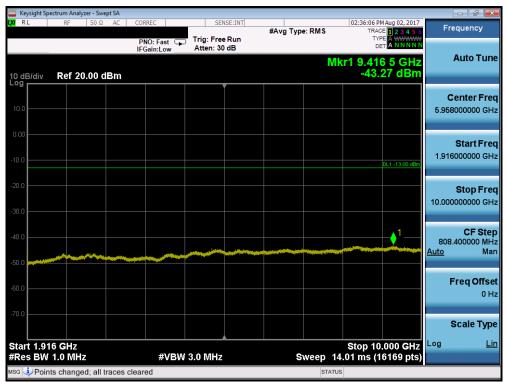
Plot 7-83. Conducted Spurious Plot (Band 2/25 – 15.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 59 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8



	ectrum Analyz	er - Swept SA										- • ×
L <mark>XI</mark> RL	RF	50 Ω AC	PNO:	Fast 🗔	Trig: Free		#Avg Typ	e: RMS	TRAC	M Aug 02, 2017 E 1 2 3 4 5 6 E A WWWW A N N N N N	Fre	equency
10 dB/div Log	Ref 20.	.00 dBm	IFGain	:Low	Atten: 30	dB		N	lkr1 1.60			Auto Tune
10.0												enter Freq .000000 MHz
-10.0										DL1 -13.00 dBm	30	Start Freq
-20.0											1.850	Stop Freq
-40.0				ang day of the second	and the processing of the line of the		sto gradulte and a star		<b>↓</b> 1	feld to the former of the start of	182 <u>Auto</u>	CF Step 000000 MHz Man
-60.0											F	F <b>req Offset</b> 0 Hz
-70.0 Start 0.03	300 GHz								Stop <u>1.3</u>	3500 GHz		Scale Type <u>Lin</u>
#Res BW				#VBW	3.0 MHz			Sweep	2.427 ms (	3641 pts)		

Plot 7-84. Conducted Spurious Plot (Band 2/25 – 15.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-85. Conducted Spurious Plot (Band 2/25 – 15.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 60 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8



	ctrum Analyzer -	Swept SA								
LXV RL	RF 51	Ω AC	CORREC		E:INT	#Avg Typ	e: RMS	TRA	M Aug 02, 2017 CE 1 2 3 4 5 6	Frequency
			PNO: Fast G	Trig: Free Atten: 10				TY D		
10 dB/div Log	Ref 0.00	dBm					Mk	r1 17.01 -57.	1 0 GHz 16 dBm	Auto Tune
-10.0									DL1 -13.00 dBm	Center Freq 15.00000000 GHz
-20.0										Start Freq 10.000000000 GHz
-40.0										<b>Stop Freq</b> 20.000000000 GHz
-60.0										<b>CF St</b> ep 1.00000000 GHz <u>Auto</u> Mar
-80.0										Freq Offset 0 Hz
-90.0 Start 10.00	00 GHz							Stop 20	.000 GHz	Scale Type
#Res BW	1.0 MHz		#VBV	/ 3.0 MHz		\$	weep 2	5.33 ms (2	20001 pts)	
мsg 🤹 Point	s changed; a	all traces o	cleared				STATU	S		

Plot 7-86. Conducted Spurious Plot (Band 2/25 – 15.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

Keysight Spec	trum Analyzer - Swep	AC COR	REC	CEN.	SE:INT			00,56,50.0	M Jul 24, 2017		
KL	Gate: LO	PN	IO: Fast ++- Gain:Low		Run	#Avg Typ	e: RMS	TRAC	E 1 2 3 4 5 6 E M WWWW A N N N N N	Frequ	ency
dB/div	Ref 20.00 d	Bm					Μ	kr1 2.15 -42.	3 5 GHz 59 dBm	Au	to Tur
0.0										Cen 1.252500	ter Fre
.00											art Fre
D.0									DL1 -25.00 dBm	<b>St</b> 2.475000	<b>op Fr</b> 0000 GI
	tering algorithmete	Net and a light stress	t the set of the set of the set	the state of the state	antabide Juice	a have no the state of the	an farini han m		And a second association of the second s	244.500 <u>Auto</u>	CF Ste 0000 MI M
D.0										Fre	<b>q Offs</b> 0
tart 0.030								Ston	.475 GHz	Sca	ale Typ
Res BW 1			#VBW	3.0 MHz			Sweep	z4.45 ms (			

Plot 7-87. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 61 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

07/14/2017

© 2017 PCTEST Engineering Laboratory, Inc.



	pectrum Analy												
L <mark>XI</mark> RL	RF Gate: LO	50 Ω		PNO: Fas			Run	#Avg Typ	e:RMS	TRA	M Jul 24, 2017 CE 1 2 3 4 5 6 PE M WWWWW ET A N N N N N	Fr	equency
	Gate: LO			IFGain:Lo		#Atten: 3							Auto Tune
10 dB/div Log	Ref 8.	00 dBr	n						M	lkr1 7.49 -28	0 0 GHz 59 dBm		Auto Tune
												C	Center Freq
-2.00												8.84	5000000 GHz
-12.0													
-22.0												2.69	Start Freq 0000000 GHz
-22.0					_ <b>∮</b> 1						DL1 -25.00 dBm		
-32.0													Stop Freq
-42.0			n taakiba	add to b	14 1		a kar atala da	The second second second	an ang ag miner at			15.00	0000000 GHz
ing street	nates de <sub>Cala</sub> lari Secondo partes		la sugger a sub-	and the second second	n superi Militari	a na sana ang ang ang ang ang ang ang ang ang	No. And Street	and the state of the second	mark cadditional	inter of Filmer and Single State			CF Step
-52.0												1.23 <u>Auto</u>	1000000 GHz Man
-62.0												Auto	Man
-72.0												1	Freq Offset
12.0													0 Hz
-82.0													Scale Type
										Oton 4		Log	Lin
Start 2.69 #Res BW		z		#\	/BW	3.0 MHz		s	weep 1	23.1 ms (2	5.000 GHz 24621 pts)		
MSG									STAT	US			

Plot 7-88. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 7-89. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

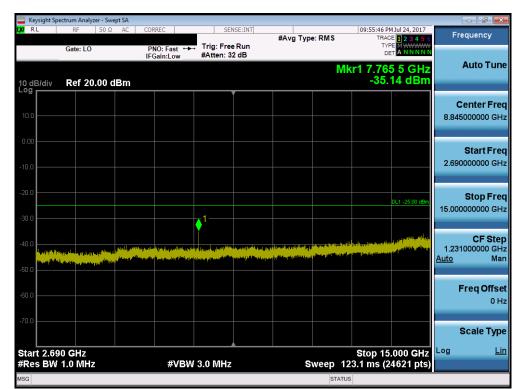
FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 62 of 151
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.



	ectrum Analy:												
L <mark>XI</mark> RL	RF Gate: LO	50 Ω	AC	CORREC			NSE:INT	#Avg Typ	e:RMS	TRAC	M Jul 24, 2017 E 1 2 3 4 5 6 E M WWWWW A N N N N N	Fr	equency
	Gate: LO			IFGain:L	ow	Atten: 30							Auto Tune
10 dB/div Log	Ref 20	.00 dE	Зm						M	kr1 2.49 -41.	3 5 GHz 36 dBm		Auto Tune
							Í					C	enter Freq
10.0												1.263	8000000 GHz
0.00													Start Freq
-10.0												30	.000000 MHz
-20.0													Stop Freq
-30.0											DL1 -25.00 dBm	2.496	6000000 GHz
											1		CF Step
-40.0	etti hada e - tila atta	المحالم من ا		و استور الل	en interes	والاستعادية	antitina (mi. 44	in the state of the		والإيرا ألقعوانا ويروق النو	. Alphingheidalana	246 <u>Auto</u>	.600000 MHz Man
-50.0	and the second		internationalise			and the second state of th							
-60.0												F	Freq Offset 0 Hz
-70.0													0112
												:	Scale Type
Start 0.03										Stop 2	130 0112	Log	Lin
#Res BW	1.0 MHz			#	VBW	3.0 MHz			Sweep 2		4933 pts)		
									STATU	<u> </u>			

Plot 7-90. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-91. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet	Page 63 of 151	
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.



Keysight Sp RL	ectrum Analyzer - Sv RF 50 S		ORREC		NSE:INT			00-44-54.5	M Aug 02, 2017		7 ×
KL	Gate: LO	F	NO: Fast	Trig: Free	Run	#Avg Type	e: RMS	TRA	CE 1 2 3 4 5 6 PE M WWWWW ET A N N N N N	Frequen	су
0 dB/div	Ref 0.00 d		Gain:Low	Atten: 10	) dB		Mkr	1 24.92	2 0 GHz 93 dBm	Auto	Tun
										<b>Center</b> 21.00000000	
30.0									DL1 -25.00 dBm	Start 15.00000000	
50.0							a a sa calamini da sin		Antonia Just da. 3	<b>Stop</b> 27.00000000	
60.0 <b>(11)</b>			land States and a state of the				, picture (1994) and a second s	eitikilis, solatake	k <sup>W</sup> ite year of tests of typ	CF 1.20000000 <u>Auto</u>	F Ste 00 GH Ma
80.0										Freq C	Offs 0 H
90.0	00 CH2							Stop 27	.000 GHz	Scale	тур <sub>Li</sub>
#Res BW			#VBW	/ 3.0 MHz		S	weep 24	0.0 ms (2	24001 pts)	_	

Plot 7-92. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

									ight Spectrum /	
Frequency	09:58:46 PM Jul 24, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWW DET A N N N N N	e: RMS	#Avg Typ		Trig: Free	IO: Fast ↔		50 Ω	RF	RL
Auto Tur	1 2.379 5 GHz -41.96 dBm	Mki		dB	Atten: 30	Sain:Low		20.00 d	/div <b>Re</b> f	0 dB og r
Center Fre 1.263000000 GF										10.0
<b>Start Fr</b> 30.000000 Mi										).00 - 10.0 -
<b>Stop Fr</b> 2.496000000 G	DL1 -25.00 dBm									20.0 - 30.0 -
CF Ste 246.600000 M Auto M		الاردىن ( المراجل ، المراجع ) المراجع ( المراجع ) ( المراجع )	A design of the state of the set	La la colección de la const	a desse for a desse server	(restale), kitereteres b	hoging it for the possibility of the	ويوارز ورفي وروي		10.0 - 50.0 <b>-</b>
Freq Offs 0										i0.0 -
Scale Typ	Stop 2.496 GHz							_	0.030 GH	70.0 -
	.66 ms (4933 pts)	Sweep 24			3.0 MHz	#VBW			BW 1.0 M	

Plot 7-93. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet	Page 64 of 151	
© 2017 PCTEST Engineering	Laboratory, Inc.			V 6.8

© 2017 PCTEST Engineering Laboratory, Inc.



	Spectrum Analyzer - Swep	it SA								- d <b>-</b>
LXI RL	RF 50 Ω	AC COR	REC	SEN	ISE:INT	#Avg Typ	e: RMS		M Jul 24, 2017 E <b>1 2 3 4 5 6</b>	Frequency
	Gate: LO		IO: Fast ↔→ Gain:Low	Trig: Free Atten: 30				TY Di		
10 dB/div	Ref 20.00 dl	Зm					MI	kr1 8.04: -33.	2 0 GHz 67 dBm	Auto Tune
10.0										Center Freq 8.857500000 GHz
-10.0										Start Freq 2.715000000 GHz
-20.0				1					DL1 -25.00 dBm	<b>Stop Freq</b> 15.000000000 GHz
-40.0	Anna a far far anna a guiltean an an anna an an anna an anna anna	ang pana ang pana Pang pana ang pang pang pang pang pang pa	n sa gana ang katalan katalan katalan Mananana ang katalan ka	te anna a tha an taile far a Tha anna a tha anna anna anna anna anna a		g Ligg for growing the starts		la anti glaggaasing ini da	( special de service de la casa service de service de la casa service de service de service de la casa de la casa de la casa de la casa de la c	CF Step 1.228500000 GHz <u>Auto</u> Man
-60.0										Freq Offset 0 Hz
-70.0										Scale Type
	715 GHz			0.0.14				Stop 15	.000 0112	Log <u>Lin</u>
#Res Bl	N 1.0 MHz		#VBW	3.0 MHz		S	statu	-	4571 pts)	
MSG							STATU	2		

Plot 7-94. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	G	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:				
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 65 of 151		
© 2017 PCTEST Engineering Laboratory, Inc.						





Plot 7-95. Conducted Spurious Plot (Band 41 – 10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFLK460		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:				
1M1707240228-05- R1.ZNF	7/24 - 8/7/2017	Portable Tablet		Page 66 of 151		
© 2017 PCTEST Engineering Laboratory, Inc.						

07/14/2017