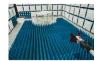


PCTEST ENGINEERING LABORATORY, INC.

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



MEASUREMENT REPORT

LTE

Applicant Name:

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

Date of Testing: 12/4/2018 - 1/2/2019 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1811280213-03-R1.ZNF

FCC ID:

ZNFL423DL

APPLICANT:

LG Electronics USA, Inc.

Application Type: Model: EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification LG L423DL, LGL423DL, L423DL Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 22, 24, & 27 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

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

This revised Test Report (S/N: 1M1811280213-03-R1.ZNF) supersedes and replaces the previously issued test report (S/N: 1M1811280213-03.ZNF) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

Randy Ortanez President



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MEASUREMENT REPORT FCC Part 22, 24, & 27



			EI	RP	EI	RP		
Mode	FCC Rule	Tx Frequency (MHz)	Max. Power	Max. Power	Max. Power	Max. Power	Emission	Modulation
	Part		(W)	(dBm)	(W)	(dBm)	Designator	
LTE Band 71	27	665.5 - 695.5	0.059	17.69			4M51G7D	QPSK
LTE Band 71	27	665.5 - 695.5	0.046	16.64			4M52W7D	16QAM
LTE Band 71	27	665.5 - 695.5	0.036	15.60			4M53W7D	64QAM
LTE Band 71	27	668 - 693	0.061	17.86			9M03G7D	QPSK
LTE Band 71	27	668 - 693	0.048	16.77			8M98W7D	16QAM
LTE Band 71	27	668 - 693	0.037	15.70			9M03W7D	64QAM
LTE Band 71	27	670.5 - 690.5	0.061	17.84			13M5G7D	QPSK
LTE Band 71	27	670.5 - 690.5	0.046	16.65			13M5W7D	16QAM
LTE Band 71	27	670.5 - 690.5	0.036	15.60			13M5W7D	64QAM
LTE Band 71	27	673 - 688	0.058	17.66			18M0G7D	QPSK
LTE Band 71	27	673 - 688	0.046	16.65			18M0W7D	16QAM
LTE Band 71	27	673 - 688	0.036	15.58			18M1W7D	64QAM
LTE Band 12	27	699.7 - 715.3	0.056	17.50	0.092	19.65	1M10G7D	QPSK
LTE Band 12	27	699.7 - 715.3	0.044	16.40	0.072	18.55	1M11W7D	16QAM
LTE Band 12	27	699.7 - 715.3	0.030	14.83	0.050	16.98	1M10W7D	64QAM
LTE Band 12	27	700.5 - 714.5	0.063	18.00	0.104	20.15	2M72G7D	QPSK
LTE Band 12	27	700.5 - 714.5	0.051	17.07	0.084	19.22	2M72W7D	16QAM
LTE Band 12	27	700.5 - 714.5	0.032	15.01	0.052	17.16	2M72W7D	64QAM
LTE Band 12	27	701.5 - 713.5	0.083	19.17	0.135	21.32	4M57G7D	QPSK
LTE Band 12	27	701.5 - 713.5	0.068	18.35	0.112	20.50	4M52W7D	16QAM
LTE Band 12	27	701.5 - 713.5	0.045	16.51	0.073	18.66	4M55W7D	64QAM
LTE Band 12	27	704 - 711	0.085	19.28	0.139	21.43	9M02G7D	QPSK
LTE Band 12	27	704 - 711	0.067	18.28	0.110	20.43	8M98W7D	16QAM
LTE Band 12	27	704 - 711	0.050	16.99	0.082	19.14	9M01W7D	64QAM
LTE Band 13	27	779.5 - 784.5	0.069	18.39	0.113	20.54	4M56G7D	QPSK
LTE Band 13	27	779.5 - 784.5	0.056	17.49	0.092	19.64	4M52W7D	16QAM
LTE Band 13	27	779.5 - 784.5	0.040	15.99	0.065	18.14	4M57W7D	64QAM
LTE Band 13	27	782	0.071	18.53	0.117	20.68	8M99G7D	QPSK
LTE Band 13	27	782	0.055	17.43	0.091	19.58	8M99W7D	16QAM
LTE Band 13	27	782	0.038	15.83	0.063	17.98	9M00W7D	64QAM
LTE Band 5	22H	824.7 - 848.3	0.058	17.61	0.095	19.76	1M10G7D	QPSK
LTE Band 5	22H	824.7 - 848.3	0.044	16.44	0.072	18.59	1M11W7D	16QAM
LTE Band 5	22H	824.7 - 848.3	0.037	15.72	0.061	17.87	1M10W7D	64QAM
LTE Band 5	22H	825.5 - 847.5	0.061	17.88	0.101	20.03	2M72G7D	QPSK
LTE Band 5	22H	825.5 - 847.5	0.045	16.55	0.074	18.70	2M71W7D	16QAM
LTE Band 5	22H	825.5 - 847.5	0.037	15.70	0.061	17.85	2M72W7D	64QAM
LTE Band 5	22H	826.5 - 846.5	0.074	18.72	0.122	20.87	4M56G7D	QPSK
LTE Band 5	22H	826.5 - 846.5	0.058	17.62	0.095	19.77	4M52W7D	16QAM
LTE Band 5	22H	826.5 - 846.5	0.047	16.72	0.077	18.87	4M57W7D	64QAM
LTE Band 5	22H	829 - 844	0.088	19.44	0.144	21.59	9M01G7D	QPSK
LTE Band 5	22H	829 - 844	0.067	18.27	0.110	20.42	9M03W7D	16QAM
LTE Band 5	22H	829 - 844	0.055	17.39	0.090	19.54	9M03W7D	64QAM

EUT Overview (<1GHz)

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Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power		Emission	
	Part		IVIAX. POwer	Max. Power		Modulation
			(W)	(dBm)	Designator	
LTE Band 66/4	27	1710.7 - 1779.3	0.108	20.35	1M10G7D	QPSK
LTE Band 66/4	27	1710.7 - 1779.3	0.092	19.65	1M10W7D	16QAM
LTE Band 66/4	27	1710.7 - 1779.3	0.073	18.63	1M10W7D	64QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.115	20.60	2M73G7D	QPSK
LTE Band 66/4	27	1711.5 - 1778.5	0.096	19.84	2M72W7D	16QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.075	18.75	2M72W7D	64QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.152	21.83	4M56G7D	QPSK
LTE Band 66/4	27	1712.5 - 1777.5	0.124	20.95	4M54W7D	16QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.101	20.05	4M54W7D	64QAM
LTE Band 66/4	27	1715 - 1775	0.175	22.43	9M03G7D	QPSK
LTE Band 66/4	27	1715 - 1775	0.130	21.13	9M03W7D	16QAM
LTE Band 66/4	27	1715 - 1775	0.100	20.01	9M02W7D	64QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.162	22.09	13M6G7D	QPSK
LTE Band 66/4	27	1717.5 - 1772.5	0.120	20.80	13M6W7D	16QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.094	19.75	13M5W7D	64QAM
LTE Band 66/4	27	1720 - 1770	0.148	21.70	18M1G7D	QPSK
LTE Band 66/4	27	1720 - 1770	0.116	20.66	18M1W7D	16QAM
LTE Band 66/4	27	1720 - 1770	0.090	19.56	18M0W7D	64QAM
LTE Band 2	24E	1850.7 - 1909.3	0.101	20.06	1M10G7D	QPSK
LTE Band 2	24E	1850.7 - 1909.3	0.083	19.17	1M11W7D	16QAM
LTE Band 2	24E	1850.7 - 1909.3	0.063	18.02	1M10W7D	64QAM
LTE Band 2	24E	1851.5 - 1908.5	0.126	21.01	2M71G7D	QPSK
LTE Band 2	24E	1851.5 - 1908.5	0.111	20.44	2M71W7D	16QAM
LTE Band 2	24E	1851.5 - 1908.5	0.090	19.56	2M73W7D	64QAM
LTE Band 2	24E	1852.5 - 1907.5	0.144	21.58	4M55G7D	QPSK
LTE Band 2	24E	1852.5 - 1907.5	0.115	20.62	4M52W7D	16QAM
LTE Band 2	24E	1852.5 - 1907.5	0.090	19.52	4M56W7D	64QAM
LTE Band 2	24E	1855 - 1905	0.168	22.25	9M01G7D	QPSK
LTE Band 2	24E	1855 - 1905	0.112	20.50	8M99W7D	16QAM
LTE Band 2	24E	1855 - 1905	0.091	19.58	9M02W7D	64QAM
LTE Band 2	24E	1857.5 - 1902.5	0.146	21.64	13M5G7D	QPSK
LTE Band 2	24E	1857.5 - 1902.5	0.116	20.63	13M5W7D	16QAM
LTE Band 2	24E	1857.5 - 1902.5	0.090	19.53	13M6W7D	64QAM
LTE Band 2	24E	1860 - 1900	0.127	21.04	18M0G7D	QPSK
LTE Band 2	24E	1860 - 1900	0.103	20.13	18M0W7D	16QAM
LTE Band 2	24E	1860 - 1900 EUT Overview	0.080	19.03	18M0W7D	64QAM

EUT Overview (Mid Bands)

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1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations

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

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

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the LGE Portable Handset FCC ID: ZNFL423DL. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 11290, 11282, 11183, 11266, 11274

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE)

LTE Band 66 (1710 - 1780 MHz) overlaps the entire frequency range of LTE Band 4 (1710 - 1755 MHz). Therefore, test data provided in this report covers Band 4 as well as Band 66.

2.3 Test Configuration

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

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

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

3.2 Block C Frequency Range

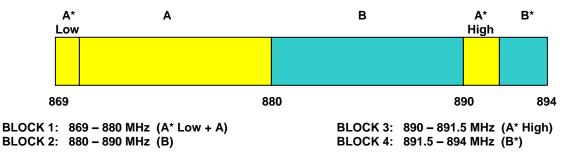
Two paired channels of 11 megahertz each are available for assignment in Block C in the 746-757 MHz and 776-787 MHz bands. In the event that no licenses for two channels in this Block C are assigned based on the results of the first auction in which such licenses were offered because the auction results do not satisfy the applicable reserve price, the spectrum in the 746-757 MHz and 776-787 MHz bands will instead be made available for assignment at a subsequent auction as follows: (i) Two paired channels of 6 megahertz each available for assignment in Block C1 in the 746-752 MHz and 776-782 MHz bands. (ii) Two paired channels of 5 megahertz each available for assignment in Block C2 in the 752-757 MHz and 782-787 MHz bands.

3.3 Block A Frequency Range

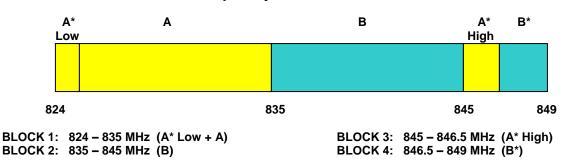
<u>698-746 MHz band</u>. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

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.

3.4 Cellular - Base Frequency Blocks



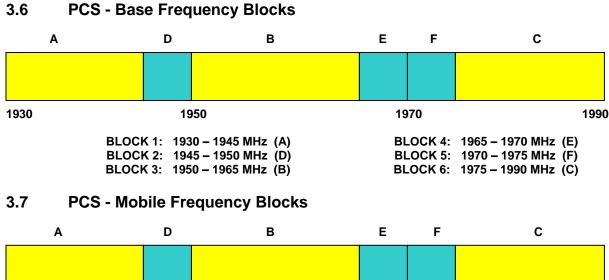
3.5 Cellular - Mobile Frequency Blocks



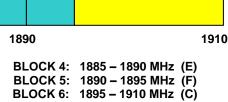
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1850



1870 1 BLOCK 1: 1850 – 1865 MHz (A) BLOCK 2: 1865 – 1870 MHz (D) BLOCK 3: 1870 – 1885 MHz (B)



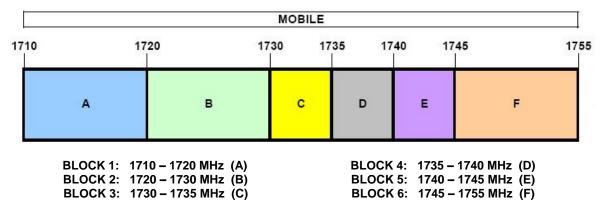
3.8 AWS - Base Frequency Blocks

			BASE				
2110	0 21	20 21	30 21	35 21	40 21	45	2155
	А	В	с	D	E	F	
		- 2120 MHz (A) 20 – 2130 MHz (B) 30 – 2135 MHz (C)		BLOCK	(5: 2140 -	- 40 MHz (D) - 2145 MHz (E) - 2155 MHz (F)	

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3.9 AWS - Mobile Frequency Blocks



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3.10 Radiated Power and Radiated Spurious Emissions

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

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer "Channel Power" function with the integration band set to the emissions' occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.

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

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

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

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of 43 + 10log₁₀(Power [Watts]).

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

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx3	LIcensed Transmitter Cable Set	8/23/2018	Annual	8/23/2019	LTx3
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Anritsu	MT8820C	Radio Communication Analyzer	1/30/2018	Annual	1/30/2019	6201300731
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/9/2018	Biennial	8/9/2020	135427
Espec	ESX-2CA	Environmental Chamber	3/28/2018	Annual	3/28/2019	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
Huber + Suhner	Sucoflex 102A	40GHz Radiated Cable Set	1/23/2018	Annual	1/23/2019	251425001
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	3/30/2018	Annual	3/30/2019	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	TC-TA18	Vivaldi Antenna	8/17/2018	Biennial	8/17/2020	101072
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	1/24/2018	Annual	1/24/2019	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	5/21/2018	Annual	5/21/2019	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	8/9/2018	Annual	8/9/2019	100348
Rohde & Schwarz	CMW500	Radio Communication Tester	11/14/2018	Annual	11/14/2019	100976
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/18/2018	Annual	6/18/2019	102134
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107

Table 5-1. Test Equipment

Notes:

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

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6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

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

Spurious Radiated Emission – LTE Band

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

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analzyer. 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).

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7.0 TEST RESULTS

7.1 Summary

Company Name:	LG Electronics USA, Inc.
FCC ID:	ZNFL423DL
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>LTE</u>

FCC Part Test Test **Test Limit Test Description** Reference Section(s) Condition Result 2.1049 N/A Occupied Bandwidth Section 7.2 2.1051 22.917(a) > 43 + 10log₁₀ (P[Watts]) at 24.238(a) Section 7.3, Out of Band Emissions Band Edge and for all out-of-27.53(c) 7.4 band emissions 27.53(g) 27.53(h) 24.232(d) Peak-Average Ratio < 13 dB Section 7.5 CONDUCTED PASS See RF Transmitter Conducted 2.1046 N/A Exposure **Output Power** Report < 2.5 ppm (Part 22) and 2.1055 22.355 fundamental emissions stay **Frequency Stability** Section 7.8 24.235 within authorized frequency 27.54 block (Part 24, 27)

Table 7-1. Summary of Conducted Test Results

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FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
22.913(a)(5)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 5)	< 7 Watts max. ERP			Section 7.6
27.50(b)(10) 27.50(c)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 71, 12, 13)	< 3 Watts max. ERP			Section 7.6
24.232(c)	Equivalent Isotropic Radiated Power (Band 2)	< 2 Watts max. EIRP			Section 7.6
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 66/4)	< 1 Watts max. EIRP	RADIATED	PASS	Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions	> 43 + 10log₁₀ (P[Watts]) for all out-of-band emissions			Section 7.7
27.53(f)	Undesirable Emissions (Band 13)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 – 1610 MHz			Section 7.7

Table 7-2. Summary of Radiated 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.
- 5) For operation <1GHz, the EIRP limits in the table above are referenced to the specifications written in the relevant Radio Standards Specifications for Innovation, Science, and Economic Development Canada.

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7.2 Occupied Bandwidth

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 4.2

Test Settings

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

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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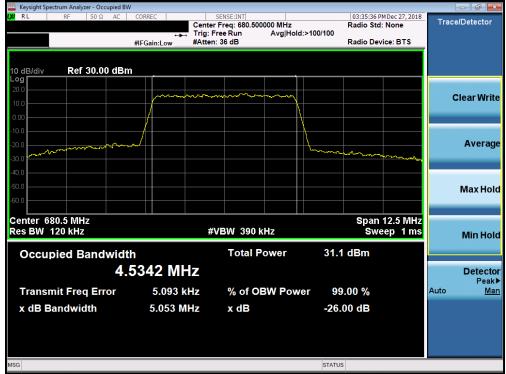
Plot 7-1. Occupied Bandwidth Plot (Band 71 - 5.0MHz QPSK - Full RB Configuration)



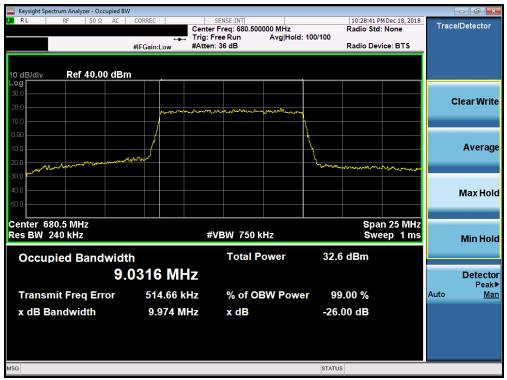
Plot 7-2. Occupied Bandwidth Plot (Band 71 - 5.0MHz 16-QAM - Full RB Configuration)

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Plot 7-3. Occupied Bandwidth Plot (Band 71 - 5.0MHz 64-QAM - Full RB Configuration)



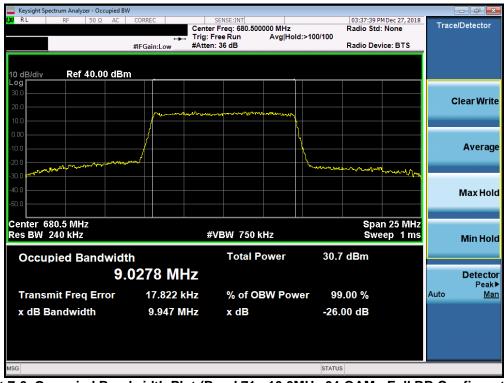
Plot 7-4. Occupied Bandwidth Plot (Band 71 - 10.0MHz QPSK - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupie					- 6 ×
LX/ R L RF 50 Ω A		SENSE:INT er Freq: 680.500000 MHz	10:28:55 PI Radio Std:	Dec 18, 2018	Trace/Detector
	Trig:	Free Run Avg Hold:	100/100 Radio Dev	DTC	
	#IFGain:Low #Atte	en: 36 do	Radio Dev	Ce: DIS	
10 dB/div Ref 40.00 d	IBm				
30.0					
20.0	a de marco a	when the poly lange			Clear Write
10.0					
0.00					
-10.0			<u>}</u>		Average
-20.0	annon		hanne and all any		
-20.0				when the second	
-40.0					Max Hold
-50.0					niux re.a
Center 680.5 MHz Res BW 240 kHz		#VBW 750 kHz		n 25 MHz ep 1 ms	
ICS DW LTO HIL					Min Hold
Occupied Bandwi	idth	Total Power	31.9 dBm		
	8.9819 MHz				Detector
					Peak►
Transmit Freq Error	516.66 kHz	% of OBW Powe	er 99.00 %		Auto <u>Man</u>
x dB Bandwidth	9.893 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-5. Occupied Bandwidth Plot (Band 71 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-6. Occupied Bandwidth Plot (Band 71 - 10.0MHz 64-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied B\	N			
Ι Χ΄ RL RF 50 Ω AC	Trig: I	SENSE:INT r Freq: 680.500000 MHz Free Run Avg Hold: n: 36 dB	10:16:44 PMDe Radio Std: No 100/100 Radio Device:	ne Trace/Detector
10 dB/div Ref 30.00 dBr Log 20.0 10.0 0.00				Clear Write
-10.0 -20.0 -30.0			har and the second and the second sec	Average
-40.0 -60.0 -60.0				Max Hold
Center 680.5 MHz Res BW 360 kHz Occupied Bandwidt		VBW 1.1 MHz Total Power	Span 37. Sweep 32.9 dBm	
1:	3.519 MHz			Detector Peak►
Transmit Freq Error x dB Bandwidth	31.088 kHz 14.98 MHz	% of OBW Powe	r 99.00 % -26.00 dB	Auto <u>Man</u>
MSG			STATUS	

Plot 7-7. Occupied Bandwidth Plot (Band 71 - 15.0MHz QPSK - Full RB Configuration)



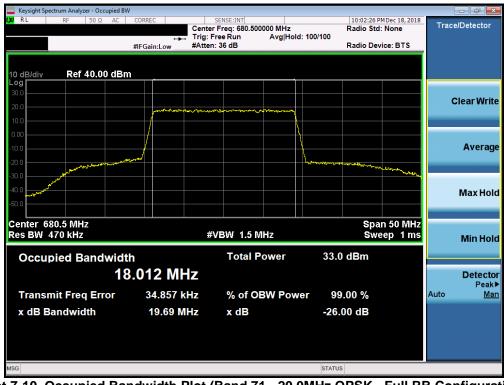
Plot 7-8. Occupied Bandwidth Plot (Band 71 - 15.0MHz 16-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied B\	N				
LXX RL RF 50Ω AC	Center	SENSE:INT r Freq: 680.500000 MHz Free Run Avg Hold	Radio Sto	M Dec 27, 2018 I: None	Trace/Detector
		: 36 dB	Radio De	vice: BTS	
10 dB/div Ref 30.00 dBr	n				
Log					
20.0	manmumliner	- Andrew Come			Clear Write
10.0					
0.00					
-10.0					
-20.0	man		horan and the property of the		Average
-30.0				man war and a filled	
-40.0					
-50.0					Max Hold
-60.0					Maxinoid
Center 680.5 MHz				37.5 MHz	
Res BW 360 kHz	#	VBW 1.1 MHz	SW	eep 1 ms	Min Hold
Occupied Bandwidt	th	Total Power	30.7 dBm		
					-
1.	3.532 MHz				Detector Peak►
Transmit Freq Error	11.006 kHz	% of OBW Powe	er 99.00 %		Auto <u>Man</u>
x dB Bandwidth	14.86 MHz	x dB	-26.00 dB		
MSG			STATUS		
			0		

Plot 7-9. Occupied Bandwidth Plot (Band 71 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-10. Occupied Bandwidth Plot (Band 71 - 20.0MHz QPSK - Full RB Configuration)

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🤤 Keysight Spectrum Analyzer - Occupied BW				
LXIRL RF 50Ω AC		SENSE:INT Freq: 680.500000 MHz	10:03:21 PM Dec 18 Radio Std: None	, 2018 Trace/Detector
	Trig: F	ree Run Avg Hold:>1		
	#IFGain:Low #Atten	: 36 dB	Radio Device: BT	<u>s</u>
10 dB/div Ref 40.00 dBm Log	<u> </u>			
30.0				
20.0				Clear Write
10.0	the way and the second second	and the second of the second		
0.00	/			
-10.0				Average
-20.0	كىمىر		where the strategy and a second	J J
-30.0			and the second s	Make
-40.0				
-50.0				Max Hold
-30.0				
Center 680.5 MHz			Span 50 I	
Res BW 470 kHz	#	VBW 1.5 MHz	Sweep 1	ms Min Hold
Occupied Bandwidt	h	Total Power	32.0 dBm	
		rotarr offor		
18	3.018 MHz			Detector Peak►
Transmit Freq Error	4.965 kHz	% of OBW Power	99.00 %	Auto <u>Man</u>
x dB Bandwidth	19.63 MHz	x dB	-26.00 dB	
	19.05 MI12	X UD	-20.00 00	
MSG			STATUS	

Plot 7-11. Occupied Bandwidth Plot (Band 71 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-12. Occupied Bandwidth Plot (Band 71 - 20.0MHz 64-QAM - Full RB Configuration)

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Plot 7-13. Occupied Bandwidth Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-14. Occupied Bandwidth Plot (Band 12 - 1.4MHz 16-QAM - Full RB Configuration)

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Plot 7-15. Occupied Bandwidth Plot (Band 12 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-16. Occupied Bandwidth Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW							
LXU RL RF 50ΩAC (Center	SENSE:INT r Freq: 707.500000 MH Free Run Avgli	z Hold: 100/100	09:17:22 P Radio Std	M Dec 10, 2018 : None	Trac	e/Detector
#		n: 36 dB		Radio Dev	ice: BTS		
,							
10 dB/div Ref 40.00 dBm			_				
Log 30.0							
20.0						(Clear Write
10.0			γ				
0.00	1		N				
-10.0	<i>(</i>						Average
	<i>√</i>						Average
-20.0			****	www	man		
-30.0							
-40.0							Max Hold
-50.0							
Center 707.5 MHz				Spar	1 7.5 MHz		
Res BW 68 kHz	#	VBW 220 kHz		Swee	p 1.6 ms		Min Hold
Occupied Bandwidth		Total Power	31.	5 dBm			
2.1	204 MHz						Detector Peak▶
Transmit Freq Error	-6.380 kHz	% of OBW P	ower 99	9.00 %		Auto	Man
x dB Bandwidth	3.011 MHz	x dB	-26	.00 dB			
MSG			STATU	s			

Plot 7-17. Occupied Bandwidth Plot (Band 12 - 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-18. Occupied Bandwidth Plot (Band 12 - 3.0MHz 64-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW	1				
IXIRL RF 50Ω AC	Trig: I	SENSE:INT Freq: 707.500000 MHz Free Run Avg Holo n: 36 dB	Radio St d: 100/100	PMDec 10, 2018 d: None evice: BTS	Trace/Detector
10 dB/div Ref 30.00 dBm	<u> </u>				
20.0 10.0	- June				Clear Write
0.00			harmon	and	Average
-30.0 -40.0 -50.0					Max Hold
Center 707.5 MHz Res BW 120 kHz	#	VBW 390 kHz		n 12.5 MHz reep 1 ms	Min Hold
Occupied Bandwidt	^h 5653 MHz	Total Power	33.1 dBm		Detector
۳۰۰ Transmit Freq Error x dB Bandwidth	-5.594 kHz 5.083 MHz	% of OBW Pow x dB	er 99.00 % -26.00 dB		Peak Auto <u>Man</u>
MSG			STATUS		

Plot 7-19. Occupied Bandwidth Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-20. Occupied Bandwidth Plot (Band 12 - 5.0MHz 16-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW						[- 0 ×
(X) RL RF 50Ω AC	Center Trig: F	SENSE:INT r Freq: 707.500000 MHz Free Run Avg Ho n: 36 dB	bld:>100/100	01:55:39 P Radio Std: Radio Dev		Trace	e/Detector
10 dB/div Ref 35.00 dBm							
25.0		dan man and a start of the second				c	Clear Write
5.00			N.				
-15.0			human		man for the second		Average
-35.0							Max Hold
-55.0 Center 707.5 MHz				Span	12.5 MHz		
Res BW 120 kHz		VBW 390 kHz Total Power	30.0		ep 1ms		Min Hold
Occupied Bandwidt	5460 MHz	Total Fower	50.8	^y ubiii			Detector Peak▶
Transmit Freq Error	-7.561 kHz	% of OBW Po	wer 99	9.00 %		Auto	Mar
x dB Bandwidth	5.054 MHz	x dB	-26.	00 dB			
MSG			STATU	S			

Plot 7-21. Occupied Bandwidth Plot (Band 12 - 5.0MHz 64-QAM - Full RB Configuration)



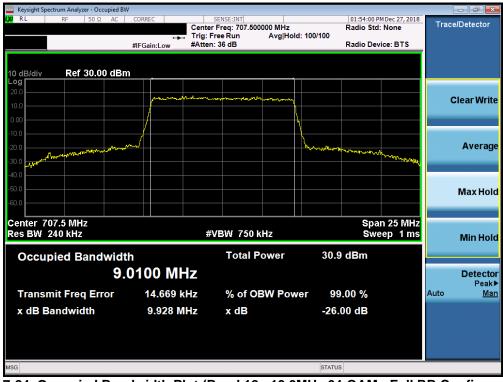
Plot 7-22. Occupied Bandwidth Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied B\					
LXURL RF 50ΩAC	Center	SENSE:INT r Freq: 707.500000 MHz Free Run Avg Hold		3:42 PM Dec 10, 2018 Std: None	Trace/Detector
		: 36 dB		Device: BTS	
10 dB/div Ref 40.00 dBr	n				
Log 30.0					
20.0					Clear Write
10.0	many	man man and the			
0.00	1				
-10.0					Average
-20.0	awa		Manana and		
-30.0 martin marting and a second				munhunhum	
-40.0					
-50.0					Max Hold
-30.0					
Center 707.5 MHz				Span 25 MHz	
Res BW 240 kHz	#	VBW 750 kHz		Sweep 1 ms	Min Hold
Occupied Bandwidt	th	Total Power	31.4 dBn	1	
	9813 MHz				Detector
0.					Peak►
Transmit Freq Error	-10.229 kHz	% of OBW Pow	er 99.00 %	0	Auto <u>Man</u>
x dB Bandwidth	9.907 MHz	x dB	-26.00 di	3	
MSG			STATUS		

Plot 7-23. Occupied Bandwidth Plot (Band 12 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-24. Occupied Bandwidth Plot (Band 12 - 10.0MHz 64-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Oc	ccupied BW				
<mark>()X/</mark> RL RF 50Ω	2 DC CORREC	SENSE:INT Center Freg: 782.00000	0 MHz	07:25:14 PM Dec 12, 2018 Radio Std: None	Trace/Detector
	NFE 🔶	Trig: Free Run	Avg Hold: 100/100		
	#IFGain:Low	#Atten: 36 dB		Radio Device: BTS	
10 dB/div Ref 30.0	00 dBm				
20.0					
10.0		M. Maron Maron and	~~~		Clear Write
0.00	/		\		
-10.0			X		
-20.0					Average
-30.0			man and a second	man for and the second second	
-40.0					
-50.0					
					Max Hold
-60.0					
Center 782 MHz				Span 12.5 MHz	
Res BW 120 kHz		#VBW 390 kH	Z	Sweep 1 ms	Min Hold
	L	Total Pov	ver 32.1	dDm	
Occupied Band			ver 32.1	aвm	
	4.5576 M	HZ			Detector
Transmit Freq Er	ror -1.524	kHz % of OBV	V Power 00	00 %	Peak▶ Auto Man
x dB Bandwidth	5.094 N	MHz x dB	-26.0	0 dB	
MSG			STATUS		

Plot 7-25. Occupied Bandwidth Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-26. Occupied Bandwidth Plot (Band 13 - 5.0MHz 16-QAM - Full RB Configuration)

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🔤 Keysight Spectrum Analyzer - Occupied BW	1				
ΙΧΊ R L RF 50 Ω AC		SENSE:INT r Freq: 782.000000 MHz Free Run Avg Hold:	Radio Std	MDec 31, 2018 : None	Frequency
		n: 36 dB	Radio Dev	vice: BTS	
10 dB/div Ref 40.00 dBm	۱ 				
30.0					Center Freq
20.0					782.000000 MHz
10.0	part and a second secon	man			102.000000 11112
0.00	/				
-10.0			\		
-20.0	- <i>L</i>				
-30.0			hann	mm	
-40.0					
-50.0					
Center 782 MHz Res BW 120 kHz	#	VBW 390 kHz	Span Swe	12.5 MHz eep 1 ms	CF Step 1.250000 MHz
Occupied Bandwidt	h	Total Power	32.5 dBm		<u>Auto</u> Man
4.	5661 MHz				Freq Offset
Transmit Freq Error	-17 Hz	% of OBW Powe	er 99.00 %		0 Hz
x dB Bandwidth	5.084 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-27. Occupied Bandwidth Plot (Band 13 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-28. Occupied Bandwidth Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-29. Occupied Bandwidth Plot (Band 13 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-30. Occupied Bandwidth Plot (Band 13 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
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Band 5



Plot 7-31. Occupied Bandwidth Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-32. Occupied Bandwidth Plot (Band 5 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 22 of 176	
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Plot 7-33. Occupied Bandwidth Plot (Band 5 - 1.4MHz 64-QAM - Full RB Configuration)



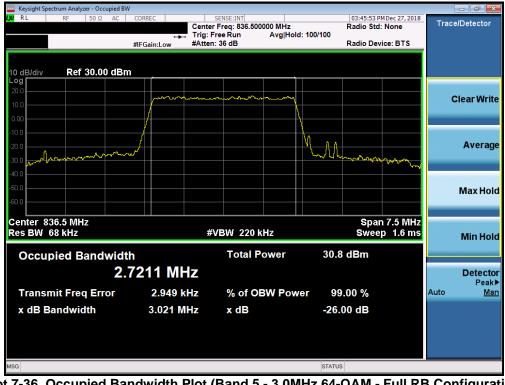
Plot 7-34. Occupied Bandwidth Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW	,				
IXI RL RF 50Ω DC		SENSE:INT enter Freq: 836.500000 MHz ig: Free Run Avg Holo	04:25:20 P Radio Std d: 100/100	MDec 11, 2018 : None	Trace/Detector
	#IFGain:Low #A	tten: 36 dB	Radio Dev	rice: BTS	
10 dB/div Ref 40.00 dBm					
30.0 20.0					Clear Write
10.0	prometri A.	-thm-str-str-straters			
-10.0					Average
-20.0 2000			White a second with a second second	er and the second se	Max Hold
-50.0 Center 836.5 MHz				ר 7.5 MHz	
Res BW 68 kHz		#VBW 220 kHz	Swee	p 3.8 ms	Min Hold
Occupied Bandwidt		Total Power	30.6 dBm		
2.	7088 MHz				Detector Peak▶
Transmit Freq Error	-1.928 kHz	% of OBW Pow	er 99.00 %		Auto <u>Man</u>
x dB Bandwidth	3.006 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-35. Occupied Bandwidth Plot (Band 5 - 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-36. Occupied Bandwidth Plot (Band 5 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied B\	N					-	
XX RL RF 50Ω DC			Hz Hold: 100/100	Radio Std:		Trace	/Detector
	#IFGain:Low #Atten: 36 dB Radio Device: BTS						
10 dB/div Ref 40.00 dBr	n						
Log 30.0							
20.0						С	lear Write
10.0	hours	mandan	\sim				
0.00	/		Λ				
-10.0							Average
							Average
-20.0	~		June	m	minin		
-30.0							
-40.0							Max Hold
-50.0							
Center 836.5 MHz				Span	12.5 MHz		
Res BW 120 kHz		#VBW 390 kHz			ep 1 ms		Min Hold
Occupied Bandwidt		Total Powe	r 32.6	6 dBm			
4.	5610 MHz						Detector
Transmit Freq Error	-5.523 kHz	% of OBW F	Power 99	9.00 %		Auto	Peak▶ <u>Man</u>
x dB Bandwidth	5.080 MHz	x dB	-26.	00 dB			
MSG			STATU	S			

Plot 7-37. Occupied Bandwidth Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)



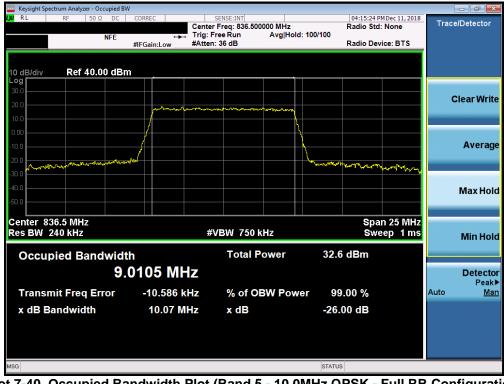
Plot 7-38. Occupied Bandwidth Plot (Band 5 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW	1				_ 6 ×
IXI RE RF 50Ω AC	Center Trig: F	SENSE:INT r Freq: 836.500000 MHz Free Run Avg Ho I: 36 dB	Rad Id: 100/100	:45:14 PMDec 27, 2018 dio Std: None dio Device: BTS	Trace/Detector
10 dB/div Ref 30.00 dBm	۱ <u> </u>				
20.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			Clear Write
0.00 -10.0 -20.0 -30.0	~		h	man adverting	Average
-40.0					Max Hold
Center 836.5 MHz Res BW 120 kHz		VBW 390 kHz		Span 12.5 MHz Sweep 1 ms	Min Hold
Occupied Bandwidt 4.	^h 5661 MHz	Total Power	30.7 dE	3m	Detector Peak
Transmit Freq Error x dB Bandwidth	-39 Hz 5.069 MHz	% of OBW Pov x dB	ver 99.00 -26.00 (Auto <u>Mar</u>
MSG			STATUS		

Plot 7-39. Occupied Bandwidth Plot (Band 5 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-40. Occupied Bandwidth Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied B\							
KX RL RF 50Ω DC	CORREC		000 MHz Avg Hold:>100/100		lone	Trace/D	etector
	#IFGain:Low	#Atten: 36 dB		Radio Devic	e: BTS		
10 dB/div Ref 40.00 dBr	n						
Log 30.0							
20.0	when when	ᡥ ^ᡣ ᡊ᠕ᢧᠬᡎᡊᡆᡶᠴᠯᡵᡗᡯᡘ᠖᠇ᠺ᠊ᢦᡣᠧᡘᡘᡟᠬᡁᡵ	-ml-s_r-rent			Cle	ear Write
10.0							
-10.0			1				Average
							Average
-20.0 -30.0 - And Marth Martin Martin	JV ^u f		"Upwark	vontranny	here war		
-40.0						Ν	lax Hold
-50.0							
Center 836.5 MHz					25 MHz		
Res BW 240 kHz		#VBW 750 ki	Hz	Swee	p 1 ms	I	Min Hold
Occupied Bandwidt	th	Total Po	ower 30).9 dBm			
9.	0346 MH	z					Detector Peak▶
Transmit Freq Error	4.787 k	Hz % of OE	W Power	99.00 %		Auto	<u>Man</u>
x dB Bandwidth	9.995 M	Hz x dB	-2	6.00 dB			
MSG			STA	TUS			

Plot 7-41. Occupied Bandwidth Plot (Band 5 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-42. Occupied Bandwidth Plot (Band 5 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
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Plot 7-43. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-44. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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Plot 7-45. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-46. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied B ¹	W				
LXI RL RF 50 Ω AC	Center	SENSE:INT r Freq: 1.745000000 GHz Free Run Avg Hol		5 PM Dec 13, 2018 td: None	Trace/Detector
		: 36 dB		evice: BTS	
10 dB/div Ref 30.00 dBr	n				
20.0					
10.0	mmm	mon			Clear Write
0.00					
-10.0	ſ				
-20.0	Mandrand		homenon		Average
-30.0			· · · · ·	- monor	J
-40.0					
-50.0					Max Hold
-60.0					Μάλ Ποιυ
Center 1.745 GHz Res BW 68 kHz	#	VBW 220 kHz		an 7.5 MHz ep 1.6 ms	
Kes DW Vo KHZ	#		Swe	ep i.oms	Min Hold
Occupied Bandwid	th	Total Power	31.1 dBm		
2	7243 MHz				Detector
					Peak►
Transmit Freq Error	1.628 kHz	% of OBW Pow	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	3.014 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-47. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 16-QAM - Full RB Configuration)



Plot 7-48. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW								- 6 <u>- ×</u>
	CORREC	SENSE:INT Center Freq: 1.74 Trig: Free Run #Atten: 36 dB		d: 100/100	09:25:21 P Radio Std		Trace	e/Detector
	#IFGain:Low	#Atten: 36 dB			Radio Dev	ICE: BIS		
10 dB/div Ref 30.00 dBm								
20.0								
10.0	mm	<u>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</u>	m				C	Clear Write
0.00								
-10.0								
-20.0	A			monor	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ba		Average
-30.0								Arenage
-40.0								
-50.0								
								Max Hold
-60.0								
Center 1.745 GHz					Span	12.5 MHz		
Res BW 120 kHz		#VBW 39	0 kHz		Swe	eep 1 ms		Min Hold
Occupied Bandwidth		Tota	Power	32.2	dBm			
				ULIL.				
4.5	558 M⊦	1Z						Detector Peak▶
Transmit Freq Error	3.033 k	Hz % of	OBW Pow	ver 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	5.083 M	Hz xdB		-26.	00 dB			
MSG				STATUS				

Plot 7-49. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)



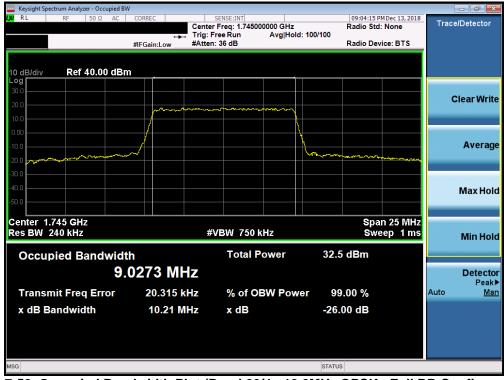
Plot 7-50. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW					
KX RL RF 50Ω AC	Center	SENSE:INT r Freq: 1.745000000 GHz Free Run Avg Ho		14:04 PM Dec 27, 2018 io Std: None	Trace/Detector
	#IFGain:Low #Atter	:: 36 dB	Rad	io Device: BTS	
10 dB/div Ref 30.00 dBm					
20.0					
10.0	mmmm	mun when when	\		Clear Write
0.00			<u>\</u>		
-10.0					
-20.0	~^		- handle -	m hon hon	Average
-30.0					
-40.0					Mayliald
-60.0					Max Hold
Center 1.745 GHz				pan 12.5 MHz	
Res BW 120 kHz	#	VBW 390 kHz		Sweep 1 ms	Min Hold
Occupied Bandwidth	า	Total Power	30.5 dB	m	
	5367 MHz				Detector Peak▶
Transmit Freq Error	5.604 kHz	% of OBW Pov	wer 99.00	%	Auto <u>Man</u>
x dB Bandwidth	5.088 MHz	x dB	-26.00 d	В	
MSG			STATUS		

Plot 7-51. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-52. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW								
(X) RL RF 50Ω AC	- -	SENSE:INT Center Freq: 1.74500 Trig: Free Run #Atten: 36 dB	0000 GHz Avg Hold:	Ra 100/100	adio Std:		Trac	e/Detector
	#IFGain:Low	#Atten: 36 dB		Ra	adio Devi	ce: B15		
10 dB/div Ref 40.00 dBm								
Log 30.0								
20.0							C	Clear Write
10.0	mon	Margan Margan	www.					
0.00	/		4					
-10.0	/							Average
				and the states	all a care			Average
-20.0 Mr. Martin Martin Martin Martin						MARAN WALK		
-30.0								
-40.0								Max Hold
-50.0							_	
Center 1.745 GHz					Spar	n 25 MHz		
Res BW 240 kHz		#VBW 750 k	Hz			ep 1 ms		Min Hold
Occupied Bandwidth	<u>າ</u>	Total P	ower	31.1 dl	Bm			
9 (0253 MH	7						Detector
5.0		2						Peak►
Transmit Freq Error	15.745 kH	z % of OE	3W Powe	r 99.00) %		Auto	<u>Man</u>
x dB Bandwidth	9.934 MF	z xdB		-26.00	dB			
MSG				STATUS				

Plot 7-53. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-54. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW X RL RF 50Ω AC Center Freq 1.745000000	CORREC GHz Cente Trig: F	SENSE:INT r Freq: 1.745000000 GHz Free Run Avg Holo n: 36 dB	Radio 1: 100/100	:09 PMDec 13, 2018 Std: None Device: BTS	Trace/Detector
10 dB/div Ref 40.00 dBm					
20.0					Clear Writ
-10.0			h		Averag
-40.0					Max Hol
Center 1.745 GHz Res BW 360 kHz		VBW 1.1 MHz		an 37.5 MHz Sweep 1 ms	Min Hol
Occupied Bandwidt	.552 MHz		52.0 UBI		Detecto Peak
Transmit Freq Error x dB Bandwidth	14.054 kHz 14.87 MHz	% of OBW Pow x dB	er 99.00 % -26.00 dE		Auto <u>Ma</u>
ISG			STATUS		

Plot 7-55. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-56. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW	/				- ē 🔀
UX RL RF 50Ω AC	+→→ Trig: F #IFGain:Low #Atter	SENSE:INT r Freq: 1.74500000 GHz Free Run Avg Hold: n: 36 dB	Radio Std		Trace/Detector
Log Ref 0000 (L) 20.0	· · · · · · · · · · · · · · · · · · ·				Clear Write
-10.0 -20.0 -30.0			hartheless all and here and the second	Mongle Com	Average
-40.0					Max Hold
Center 1.745 GHz Res BW 360 kHz Occupied Bandwidt		VBW 1.1 MHz Total Power		37.5 MHz ep 1 ms	Min Hold
	13.505 MHz				Detector Peak▶
Transmit Freq Error x dB Bandwidth	29.491 kHz 14.79 MHz	% of OBW Powe x dB	er 99.00 % -26.00 dB		Auto <u>Man</u>
MSG			STATUS		

Plot 7-57. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-58. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW							
XX RL RF 50Ω AC	🛶 Trig	SENSE:INT Iter Freq: 1.745000000 (g: Free Run Avg ten: 36 dB	Hz Hold: 100/100	09:20:58 P Radio Std Radio Dev		Trace	e/Detector
	#IFGain:Low #At			Radio Dev	ice. DT3		
10 dB/div Ref 40.00 dBm							
Log 30.0							
20.0						c	Clear Write
10.0		when a strategy and the second strategy and the second s	m				
0.00			ξ				
-10.0	1						Average
a se an	here		angli we shay	vitation of the state			Average
					and the second s		
-30.0							
-40.0							Max Hold
-50.0						_	
Center 1.745 GHz				Spa	n 50 MHz		
Res BW 470 kHz		#VBW 1.5 MHz			eep 1 ms		Min Hold
		Tatal Dama		.1 dBm			
Occupied Bandwidth		Total Powe	51	.1 aBm			
18	.060 MHz						Detector
Transmit Freq Error	42.924 kHz	% of OBW F	ower	99.00 %		Auto	Peak▶ <u>Man</u>
x dB Bandwidth	19.68 MHz	x dB	-2	6.00 dB			
MSG			STA	TUS			

Plot 7-59. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-60. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Band 2



Plot 7-61. Occupied Bandwidth Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-62. Occupied Bandwidth Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

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Plot 7-63. Occupied Bandwidth Plot (Band 2 - 1.4MHz 64-QAM - Full RB Configuration)



Plot 7-64. Occupied Bandwidth Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

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Plot 7-65. Occupied Bandwidth Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)



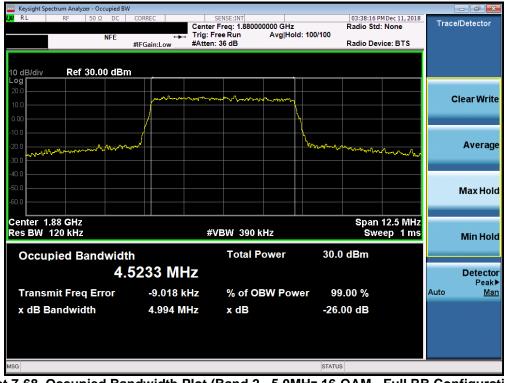
Plot 7-66. Occupied Bandwidth Plot (Band 2 - 3.0MHz 64-QAM - Full RB Configuration)

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🔤 Keysight Spectrum Analyzer - Occupied BW						_	
XX RL RF 50Ω DC NFE		SENSE:INT Center Freq: 1.88000 Frig: Free Run Atten: 36 dB	0000 GHz Avg Hold: 100/*	Radio Std:		Trace/	Detector
	#IFGaIn:Low #	Atten: 30 dB		Radio Dev	ce. DT3		
10 dB/div Ref 30.00 dBm							
20.0							
10.0	m	m water and the second	marin			CI	ear Write
0.00			<u> </u>				
-10.0							
-20.0	<u>^</u>		hom	mm manna	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Average
-30.0					с		-
-40.0							
-50.0							Max Hold
-60.0							
Center 1.88 GHz Res BW 120 kHz		#VBW 390 k	U 7		12.5 MHz ep 1 ms		
Res DW 120 RH2		#VDVV 390K	112	046	ep ma		Min Hold
Occupied Bandwidth	า	Total P	ower	31.4 dBm			
4 5	5504 MHz	,					Detector
							Peak▶
Transmit Freq Error	-5.653 kH	z % of OE	BW Power	99.00 %		Auto	<u>Man</u>
x dB Bandwidth	5.068 MH	z xdB		-26.00 dB			
MSG				STATUS			

Plot 7-67. Occupied Bandwidth Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-68. Occupied Bandwidth Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

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Plot 7-69. Occupied Bandwidth Plot (Band 2 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-70. Occupied Bandwidth Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

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🤤 Keysight Spectrum Analyzer - Occupied BV	V						
K RL RF 50Ω DC		SENSE:INT Center Freq: 1.88000 Trig: Free Run	0000 GHz Avg Hold:>100/100	Radio Std:		Trace	Detector
	#IFGain:Low	#Atten: 36 dB		Radio Devi	ce: BTS		
10 dB/div Ref 30.00 dBn	n						
20.0		¥^v~~^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	s-martine and			с	lear Write
0.00 -10.0 -20.0 -30.0	rgazer d		human	and the standing the start	wwwwww		Average
-40.0 -50.0 -60.0							Max Hold
Center 1.88 GHz Res BW 240 kHz		#VBW 750 k	Hz		n 25 MHz ep 1 ms		Min Hold
Occupied Bandwidt	h	Total P	ower 30	0.5 dBm			
8.	9946 MH	Z					Detector Peak▶
Transmit Freq Error	-9.739 k	Hz % of OE	SW Power	99.00 %		Auto	<u>Man</u>
x dB Bandwidth	9.898 MI	Hz xdB	-2	6.00 dB			
MSG			STA	TUS			

Plot 7-71. Occupied Bandwidth Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-72. Occupied Bandwidth Plot (Band 2 - 10.0MHz 64-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied	BW						
KX RL RF 50Ω DC		SENSE:INT enter Freq: 1.880000000 GI ig: Free Run Avg	Hz Hold: 100/100	03:31:15 Pf Radio Std:	None	Trace	Detector
NFE		tten: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dE	Sm						
Log 30.0							
20.0						c	lear Write
10.0	manun	man and and and and and and and and and a					
0.00	/		N.				
	/		h h				Average
-10.0	n solution		hermon				Average
-20.0 www.mith.read				and the second	the month		
-30.0							
-40.0							Max Hold
-50.0							
Center 1.88 GHz				Span	37.5 MHz		
Res BW 360 kHz		#VBW 1.1 MHz			ep 1 ms		Min Hold
							Millinoid
Occupied Bandwic	ith	Total Power	32.2	2 dBm			
1	3.504 MHz						Detector
				00.00		A	Peak►
Transmit Freq Error	-43.006 kHz	% of OBW P	ower 99	0.00 %		Auto	Man
x dB Bandwidth	14.83 MHz	x dB	-26.	00 dB			
MSG			STATUS	3			

Plot 7-73. Occupied Bandwidth Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



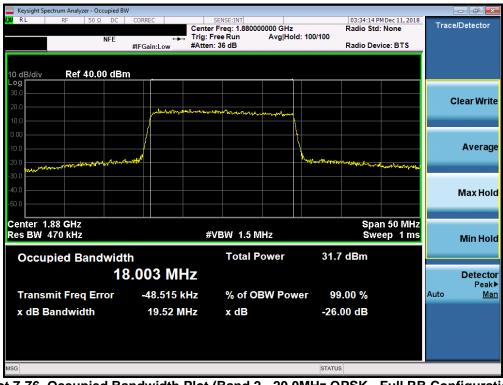
Plot 7-74. Occupied Bandwidth Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied B	W				
LXU RL RF 50Ω AC		SENSE:INT enter Freq: 1.880000000 GHz rig: Free Run Avg Ho		PMDec 27, 2018 d: None	Trace/Detector
		Atten: 36 dB		vice: BTS	
10 dB/div Ref 30.00 dB	m				
20.0					
10.0	monon	mayle and an and a second and a second	.		Clear Write
0.00	/		<u>\</u>		
10.0			l l		
-20.0 - Mail Markallaman	mont		hand have a low for the second	When the st	Average
-30.0				A A A A A A A A A A A A A A A A A A A	Aronago
-40.0					
-50.0					
-60.0					Max Hold
-60.0					
Center 1.88 GHz				1 37.5 MHz	
Res BW 360 kHz		#VBW 1.1 MHz	Sw	eep 1 ms	Min Hold
Occupied Bandwid	th	Total Power	29.8 dBm		
			20.0 dBm		
1.	3.552 MHz				Detector Peak▶
Transmit Freq Error	-29.960 kHz	% of OBW Po	wer 99.00 %		Auto <u>Man</u>
x dB Bandwidth	14.80 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-75. Occupied Bandwidth Plot (Band 2 - 15.0MHz 64-QAM - Full RB Configuration)



Plot 7-76. Occupied Bandwidth Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied B	W					-	- 6 - X -
KX RL RF 50Ω DC			GHz g Hold: 100/100	Radio Std: I		Trace/[Detector
	#IFGain:Low	#Atten: 36 dB		Radio Devid	ce: BTS		
10 dB/div Ref 40.00 dB	m						
Log 30.0							
20.0						Cl	ear Write
10.0	and another that		~~				
0.00			<u>\</u>				
-10.0	/						Average
	a me			1			
-20.0				and the second second	weith would		
-40.0							
-50.0							/lax Hold
Center 1.88 GHz Res BW 470 kHz		#VBW 1.5 MHz			50 MHz		
				Swee	ep 1 ms		Min Hold
Occupied Bandwid	th	Total Powe	er 30.	6 dBm			
	8.007 MHz	,					Detector
							Peak►
Transmit Freq Error	-38.678 kH	z % of OBW	Power 9	9.00 %		Auto	Man
x dB Bandwidth	19.47 MH	z xdB	-26	.00 dB			
MSG			STATU	IS			

Plot 7-77. Occupied Bandwidth Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)



Plot 7-78. Occupied Bandwidth Plot (Band 2 - 20.0MHz 64-QAM - Full RB Configuration)

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7.3 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at 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.

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = trace average
- 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

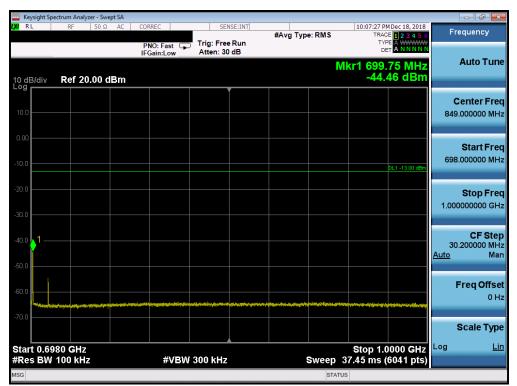
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the 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.

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RL	ectrum Analyzer - Swept SA RF 50 Ω AC	CORREC	SENSE:INT	#Avg Type: RMS	10:07:19 PM Dec 18, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N	Frequency
0 dB/div	Ref 20.00 dBm	IFGain:Low	Atten: 30 dB	N	lkr1 662.00 MHz -53.53 dBm	Auto Tun
10.0						Center Fre 346.000000 M⊦
10.0					DL1 -13.00 dBm	Start Fre 30.000000 M⊦
20.0						Stop Fre 662.000000 Mi
					1	CF Ste 63.200000 Mi <u>Auto</u> Mi
60.0					ani na ku gali kali na dagan gali kasi ng na pakana kasi n	Freq Offs 01
70.0						Scale Typ
tart 30.0 Res BW	MHz 100 kHz	#VBV	/ 300 kHz	Sweep 7	Stop 662.0 MHz 8.37 ms (12641 pts)	Log <u>L</u>

Plot 7-79. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-80. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

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	ht Spectrum Ana											_	
l XI RL	RF	50 Ω	AC	CORREC		SEN	ISE:INT	#Avg Typ	e: RMS	TRA	PM Dec 18, 2018 CE 1 2 3 4 5 6	Fre	equency
				PNO: Fa	ist 🖵	Trig: Free #Atten: 40				T			
				IFGalli.L	UW	wither a				/kr1 6 4 2	20 5 GHz		Auto Tune
10 dB/d	liv Ref 3	i0.00 di	Bm							-38	.87 dBm		
													antan Enan
20.0													enter Freq 000000 GHz
20.0												5.500	000000 GH2
10.0													
													Start Freq
0.00												1.000	000000 GHz
-10.0											DL1 -13.00 dBm		Stop Freq
												10.000	000000 GHz
-20.0													
-30.0													CF Step
00.0								1				900. <u>Auto</u>	000000 MHz Man
-40.0				17** 18 11*****		- All States						Auto	IVIEIT
						and the second s						-	req Offset
-50.0												-	0 Hz
													0112
-60.0													Scale Type
													scale Type
	.000 GHz									Stop 1		Log	<u>Lin</u>
#Res E	3W 1.0 MH	IZ		#	VBW	3.0 MHz		s	weep	15.60 ms (18001 pts)		
MSG									STA	TUS			

Plot 7-81. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-82. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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	ctrum Analyzer -										
LXI RL	RF 50	Ω AC	CORREC	SE	NSE:INT	#Avg Typ	e: RMS		M Dec 18, 2018 CE 1 2 3 4 5 6	Fre	quency
			PNO: Fast G	Trig: Free Atten: 30				TY D			
10 dB/div Log	Ref 20.00) dBm					Μ	kr1 698 -45.	.30 MHz 32 dBm		Auto Tune
											enter Freq
10.0										849.0	000000 MHz
0.00											Start Freg
-10.0											000000 MHz
									DL1 -13.00 dBm		
-20.0											Stop Freq
-30.0										1.000	000000 GHz
-40.0 - 1											CF Step
-40.0										30.: <u>Auto</u>	200000 MHz Man
-50.0											
-60.0										F	req Offset _{0 Hz}
					ante de la companya						UHZ
-70.0										S	cale Type
Start 0.69	80 GHz							Stop 1.	0000 0112	Log	Lin
#Res BW	100 kHz		#VB\	V 300 kHz				87.45 ms	(6041 pts)		
MSG							STATU	S			

Plot 7-83. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



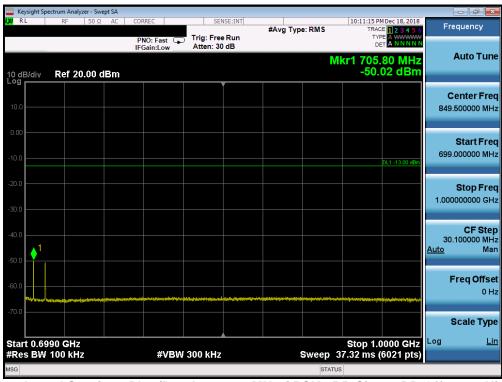
Plot 7-84. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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	ectrum Analyzer										- • ×
LX/RL	RF	50Ω AC	CORREC	SEI	SE:INT	#Avg Typ	e: RMS		Dec 18, 2018	Fre	quency
			PNO: Fast 📮 IFGain:Low	Trig: Free Atten: 30				TYP			
			Il Guilleow				N	lkr1 661.	30 MHz		Auto Tune
10 dB/div	Ref 20.0	00 dBm						-53.	83 dBm		
										c	enter Freg
10.0											500000 MHz
0.00											Start Freq
-10.0											000000 MHz
									DL1 -13.00 dBm		
-20.0											Stop Freq
										663.	000000 MHz
-30.0											
-40.0										62	CF Step 300000 MHz
										Auto	Man
-50.0									<u> </u>		
-60.0										F	req Offset
-00.0	141	and the local distance									0 Hz
-70.0											
										5	Scale Type
Start 30.0								Stop 6	63.0 MHz	Log	Lin
#Res BW	100 kHz		#VBW	/ 300 kHz		S	weep 7	8.49 ms (1	2661 pts)		
MSG							STATU	IS			

Plot 7-85. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-86. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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	nt Spectrum Ana		pt SA									
LXI RL	RF	50 Ω	AC	CORREC			ISE:INT	#Avg Typ	e: RMS	TRAC	MDec 18, 2018 E 1 2 3 4 5 6	Frequency
				PNO: Fa IFGain:Lo	st ⊊⊃ ow	Trig: Free #Atten: 40				TYI Di		
10 dB/di Log	iv Ref 3	0.00 d	Bm						Μ	kr1 5.87 -38.	5 0 GHz 78 dBm	Auto Tune
20.0												Center Freq 5.50000000 GHz
10.0												Start Freq
0.00												1.000000000 GHz
-10.0											DL1 -13.00 dBm	Stop Freq
-20.0												10.00000000 GHz
-30.0							↓ 1					CF Step 900.000000 MHz <u>Auto</u> Man
-40.0		and the second second										
-50.0												Freq Offset 0 Hz
-60.0												Scale Type
	.000 GHz									Stop 10	.000 GHz	Log <u>Lin</u>
	SW 1.0 MH	Iz		#	VBW	3.0 MHz		S	weep 1	5.60 ms (1	8001 pts)	
MSG									STATU	JS		

Plot 7-87. Conducted Spurious Plot (Band 71 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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Band 12

	ectrum Analyz		SA										
LXU RL	RF	50 Ω		ORREC PNO: Fas FGain:Lo	st 🖵	Trig: Fre #Atten:		#Avg Typ	e: RMS	TR/	PM Dec 10, 2018 ACE 1 2 3 4 5 6 YPE A WWWWW DET A NNNNN	Fi	requency
10 dB/div Log	Ref 20.	.00 dB							N	/kr1 695 -39	5.20 MHz .54 dBm		Auto Tune
10.0													Center Freq 3.950000 MHz
-10.0											DL1 -13.00 dBm	30	Start Freq 0.000000 MHz
-20.0												697	Stop Fred 7.900000 MH;
-40.0											1	60 <u>Auto</u>	CF Step 5.790000 MH Mar
-60.0				ter ter for state and				angert gestaar ken en ster ook op op de		aliyy far bir a glenne fan de f			Freq Offsel 0 Hz
-70.0													Scale Type
Start 30.0 #Res BW				#	VBW	300 kHz	2	s	weep 8		697.9 MHz 13359 pts)	Log	Lin
MSG									STAT	US			

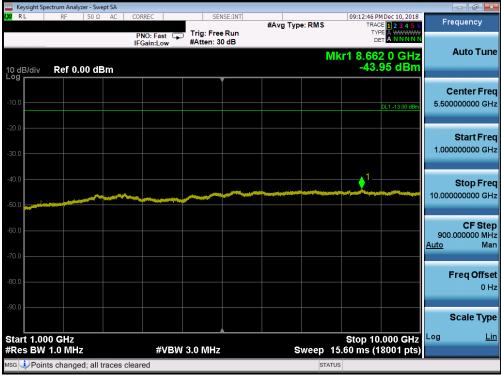
Plot 7-88. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

	ectrum Analyzer -										[- 0
RL	RF 50	Ω AC	CORREC PNO: Fa	ast 🖵	Trig: Free #Atten: 3		#Avg Type	RMS		27 PM Dec 10, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNNN	Fre	equency
) dB/div	Ref 20.00) dBm							4 Mkr1 7	7.20 MHz 7.64 dBm		Auto Tur
0.0												enter Fre 000000 MH
0.0										DL1 -13.00 dBm		Start Fre
D.O											1.000	Stop Fr 000000 G
											28. <u>Auto</u>	CF St 400000 M M
).0 	an an a la bana antanta	1918 <u>19</u> -19-19-19-19-19-19-19-19-19-19-19-19-19-	477 South Barry	(managangan disa)	·	and a start same.		ter ta stylisjone	ant and the second second	an that a first a first a first a strand yn i gan af	F	req Offs 0
0.0												Scale Ty
tart 0.71					000 kU-				Stop	1.0000 GHz	Log	L
Res BW	100 kHz		#	VBW -	300 kHz		8	weep	33.22 m	is (5681 pts)		

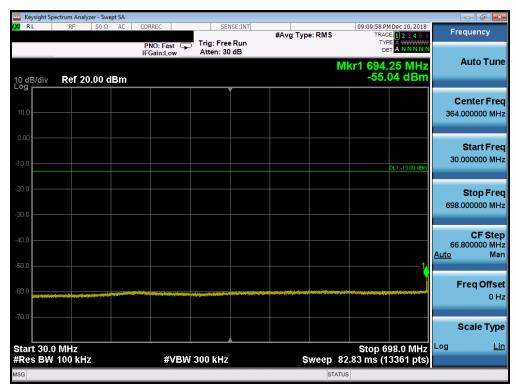
Plot 7-89. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

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Plot 7-90. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-91. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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Keysight Spectrum Analyzer										
LX RL RF 5	50Ω AC CO	ORREC	SENS	E:INT	#Avg Type	e: RMS	09:10:07 PM TRAC	Dec 10, 2018	Fr	equency
10 dB/div Ref 20.0	II	PNO: Fast 😱 FGain:Low	Trig: Free Atten: 30			MI	₀. 	35 MHz 07 dBm		Auto Tune
10.0			Ĭ							enter Freq .000000 MHz
-10.0								DL1 -13.00 dBm	716	Start Freq .000000 MHz
-20.0									1.000	Stop Freq 0000000 GHz
-40.0									28 <u>Auto</u>	CF Step .400000 MHz Man
-60.0			and a second					n falle fil a same print an la fan ser Official A bouch file se an an an a	_	F req Offset 0 Hz
-70.0 Start 0.7160 GHz							Stop 1.0	000 012	Log	Scale Type <u>Lin</u>
#Res BW 100 kHz		#VBW	300 kHz			Sweep 3 STATUS		5681 pts)		

Plot 7-92. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



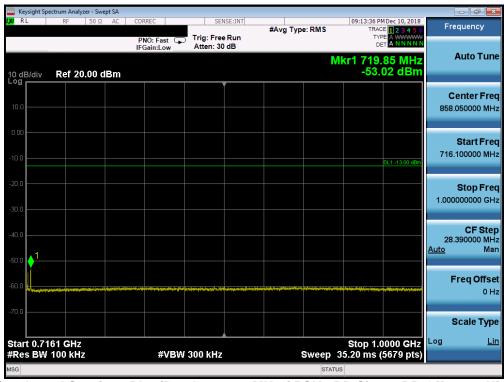
Plot 7-93. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager					
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	ectrum Analyzer - Swe	pt SA									
LX/RL	RF 50 Ω	AC	CORREC	SEN	ISE:INT	#Avg Typ	e: RMS		MDec 10, 2018	Fr	equency
			PNO: Fast G	Trig: Free Atten: 30				TYP			
10 dB/div	Ref 20.00 d	Bm					N	1kr1 697. -49.	75 MHz 14 dBm		Auto Tune
10.0											enter Freq .000000 MHz
-10.0									DL1 -13.00 dBm	30	Start Freq .000000 MHz
-20.0										698	Stop Freq .000000 MHz
-40.0									1,	66 <u>Auto</u>	CF Step .800000 MHz Man
-60.0		1	n Tablah da maya da Amarya ya gara							F	Freq Offset 0 Hz
-70.0										Log	Scale Type Lin
Start 30.0 #Res BW			#VBW	/ 300 kHz		s	weep 8	8 Stop 2.83 ms (1	98.0 MHz 3361 pts)	LUg	<u></u>
MSG							STAT				

Plot 7-94. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-95. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager						
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	pectrum Analy		t SA									
LX/ RL	RF	50 Ω	AC	CORREC			SE:INT	#Avg Typ	e: RMS	TR	PM Dec 10, 2018 ACE 1 2 3 4 5 6	Frequency
				PNO: F IFGain:I	ast ⊊ ∟ow	Trig: Free #Atten: 2						A. 4. 7
10 dB/div Log	Ref 0.	00 dBi	m						N	1kr1 1.4 -46	13 5 GHz 5.34 dBm	Auto Tune
-10.0						,						Center Freq
-10.0											DL1 -13.00 dBm	5.500000000 GHz
-20.0												Start Freq
-30.0												1.000000000 GHz
-40.0	1											Stop Freq 10.00000000 GHz
-50.0			and the Party of			and the second data						
-60.0												CF Step 900.000000 MHz <u>Auto</u> Man
-70.0												
-80.0												Freq Offset 0 Hz
-90.0												
												Scale Type
Start 1.0 #Res BW					#\/D\A/	3.0 MHz			woon		0.000 GHz (18001 pts)	Log <u>Lin</u>
#Res DW					FVEVV	3.0 WHZ		5	stat		(1800 Fpts)	

Plot 7-96. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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🥁 Keysight Spectrum Analyzer - Swept SA XI RL RF 50 Ω DC		SENSE:INT	#Avg Type: RMS	07:22:31 PM Dec 12, 2018 TRACE 1 2 3 4 5 6	Frequency
NFE	PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 30 dB	N	Ikr1 777.00 MHz -30.42 dBm	Auto Tun
10 dB/div Ref 20.00 dBm					Center Fre 403.500000 M⊦
10.0				DL1 -13.00 dBm	Start Fre 30.000000 Mi
30.0				1,	Stop Fre 777.000000 MH
40.0					CF Ste 74.700000 Mi <u>Auto</u> Mi
60.0	u Shun Lub, dan manifestanan Auflin				Freq Offs 0 H
Start 30.0 MHz #Res BW 100 kHz	#VBW	300 kHz	Sween 3	Stop 777.0 MHz 5.86 ms (14941 pts)	Scale Typ Log <u>L</u>
ISG	# * D V * ·	500 KH2	STATU		

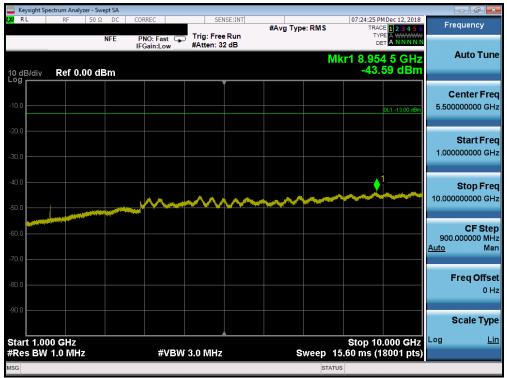
Plot 7-97. Conducted Spurious Plot (Band 13 - 10.0MHz QPSK - RB Size 1, RB Offset 0)

	ectrum Analyzer - S									-	
RL	RF 50	Ω DC	PNO: Fast			#Avg Type	:RMS	TRAC	I Dec 12, 2018 E 1 2 3 4 5 6 E A WWWWW T A N N N N N	Fre	quency
0 dB/div	Ref 20.00	dBm					N	lkr1 787. -54.	00 MHz 84 dBm		Auto Tun
10.0											enter Fre
10.0									DL1 -13.00 dBm		Start Fre
80.0											Stop Fre 000000 GH
io.o <u> </u>										21.3 <u>Auto</u>	CF Ste 800000 MI Ma
50.0				uter, und alleferdent to do a	her-fil ^{te} rie-stern	ille (a. david stration y S.(.)	na da 131 de 20 a Mari	a de se a la contra constat	المراجع	F	r eq Offs 0 H
/0.0	**************************************										cale Typ
tart 0.78 Res BW			#VB\	V 300 kHz		5	Sweep	Stop 1.0 \(10.22 ms (000 GHz 4261 pts)	Log	Ŀ
SG							STATU	JS			

Plot 7-98. Conducted Spurious Plot (Band 13 - 10.0MHz QPSK - RB Size 1, RB Offset 0)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager				
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Plot 7-99. Conducted Spurious Plot (Band 13 - 10.0MHz QPSK - RB Size 1, RB Offset 0)

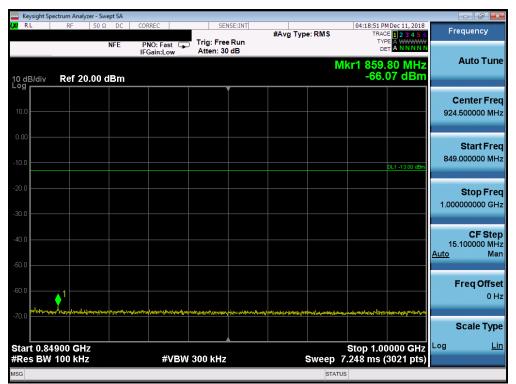
FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Band 5

	ctrum Analyzer - Swept								(
LXU RL	RF 50 Ω NF	DC COR	REC		#Avg Typ	e: RMS	TRAC	4 Dec 11, 2018 E 1 2 3 4 5 6 E A WWWWW T A N N N N N	Fre	quency
10 dB/div Log	Ref 20.00 dB		Jamesow	, and the second		M	kr1 820. -31.	20 MHz 06 dBm		Auto Tune
10.0										enter Fred 500000 MHz
-10.0								DL1 -13.00 dBm		Start Fred 000000 MH:
-20.0								1	823.	Stop Fred 000000 MH:
-40.0									79. <u>Auto</u>	CF Stej 300000 MH Mai
60.0									F	r eq Offs e 0 H
-70.0			a j denomina di di da se possa ana ana ang ang Katalan panang pang pang pang pang pang pang							Scale Type
Start 30.0 #Res BW			#VBW	300 kHz	s	weep 38	8 Stop 1.06 ms	23.0 MHz 5861 pts)	Log	Lir
MSG						STATUS	3			

Plot 7-100. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-101. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

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	ectrum Analy:						
LX/RL	RF	50 Ω DC	CORREC	SENSE:INT	#Avg Type: RM	04:19:21 PM Dec 11, 2018 TRACE 1 2 3 4 5 6	Frequency
		NFE	PNO: Fast G	⊃ Trig: Free Run #Atten: 30 dB		TYPE A WWWW DET A N N N N N Mkr1 1.649 0 GHz	Auto Tune
10 dB/div Log	Ref 0.0	00 dBm				-44.77 dBm	
-10.0						DL1 -13.00 dBm	Center Freq 5.50000000 GHz
-20.0							Start Freq 1.000000000 GHz
-40.0	↓1					~~~~~	Stop Freq 10.000000000 GHz
-60.0							CF Step 900.000000 MHz <u>Auto</u> Man
-70.0							Freq Offset 0 Hz
-90.0							Scale Type
Start 1.00 #Res BW			#VBW	/ 3.0 MHz	Swee	Stop 10.000 GHz p 15.60 ms (18001 pts)	Log <u>Lin</u>
MSG						STATUS	

Plot 7-102. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-103. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFL423DL		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
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🔤 Keysight Spectrum Analyzer - Swept SA 👘 🚱 🔀												
L <mark>XI</mark> RL	RF	50 Ω	DC	CORREC		SEN	ISE:INT	#Avg Typ	e: RMS		MDec 11, 2018	Frequency
			NFE	PNO: F IFGain:I	ast ⊊ ∟ow	Trig: Free Atten: 30				TY		Auto Tur
10 dB/div	Ref	20.00 d	IBm							-42.	50 dBm	
						Ì						Center Fre
10.0												924.500000 MH
0.00												Start Fre
-10.0											DL1 -13.00 dBm	849.000000 MH
-20.0												Stop Fre
-30.0												1.00000000 GH
-40.0												CF Ste 15.100000 MH
-50.0												Auto Ma
												Freq Offs
-60.0												01
-70.0	and and a state of the	and the second	and the second secon	Anna an Anna an Anna an Anna an Anna	ahinin ang	والالالية والمناط	۵۰۰۰ (۵۰۱) ۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹۹ (۱۹۹	ingelonen ditertet nieette	979	ur da adagent di dental d	nin anti-ini aina di ana ang ini aina	Scale Typ
Start 0.8										Stop 1.0	0000 GHz	Log <u>L</u>
#Res B∖	N 100	kHz			#VBW	300 kHz				7.248 ms ((3021 pts)	
MSG									STATU	JS		

Plot 7-104. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-105. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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