

PCTEST ENGINEERING LABORATORY, INC.

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MEASUREMENT REPORT

LTE

Applicant Name:

LG Electronics MobileComm U.S.A 1000 Sylvan Avenue Englewood Cliffs, NJ 07632 United States

Date of Testing: Jan 22 - Feb 09, 2018 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1801190006-03.ZNF

FCC ID:

ZNFX410UM

APPLICANT:

LG Electronics MobileComm U.S.A

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification LM-X410UM LMX410UM, X410UM,LM-X410ULML, LMX410ULML, X410ULML Portable Handset PCS Licensed Transmitter Held to Ear (PCE) 22, 24, & 27 ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03

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: 1M1801190006-03.ZNF) supersedes and replaces the previously issued test report (S/N: 1M1801190006-03.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.

Råndy Ortanez President



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MEASUREMENT REPORT FCC Part 22, 24, & 27



			EF	RP	EI	RP		
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Pow er (W)	Max. Pow er (dBm)	Max. Pow er (W)	Max. Pow er (dBm)	Emission Designator	Modulation
LTE Band 13	27	779.5 - 784.5	0.129	21.11	0.212	23.26	4M54G7D	QPSK
LTE Band 13	27	779.5 - 784.5	0.109	20.39	0.179	22.54	4M54W7D	16QAM
LTE Band 13	27	782	0.129	21.10	0.211	23.25	8M98G7D	QPSK
LTE Band 13	27	782	0.121	20.82	0.198	22.97	8M97W7D	16QAM
LTE Band 5	22H	824.7 - 848.3	0.174	22.40	0.285	24.55	1M11G7D	QPSK
LTE Band 5	22H	824.7 - 848.3	0.140	21.45	0.229	23.60	1M11W7D	16QAM
LTE Band 5	22H	825.5 - 847.5	0.173	22.37	0.283	24.52	2M72G7D	QPSK
LTE Band 5	22H	825.5 - 847.5	0.166	22.20	0.272	24.35	2M71W7D	16QAM
LTE Band 5	22H	826.5 - 846.5	0.161	22.06	0.264	24.21	4M57G7D	QPSK
LTE Band 5	22H	826.5 - 846.5	0.120	20.78	0.196	22.93	4M53W7D	16QAM
LTE Band 5	22H	829 - 844	0.164	22.16	0.270	24.31	9M03G7D	QPSK
LTE Band 5	22H	829 - 844	0.128	21.07	0.210	23.22	8M99W7D	16QAM
LTE Band 4	27	1710.7 - 1754.3			0.292	24.65	1M11G7D	QPSK
LTE Band 4	27	1710.7 - 1754.3			0.221	23.45	1M11W7D	16QAM
LTE Band 4	27	1711.5 - 1753.5			0.291	24.64	2M71G7D	QPSK
LTE Band 4	27	1711.5 - 1753.5			0.237	23.74	2M71W7D	16QAM
LTE Band 4	27	1712.5 - 1752.5			0.269	24.30	4M58G7D	QPSK
LTE Band 4	27	1712.5 - 1752.5			0.187	22.72	4M53W7D	16QAM
LTE Band 4	27	1715 - 1750			0.253	24.04	9M03G7D	QPSK
LTE Band 4	27	1715 - 1750			0.186	22.69	9M01W7D	16QAM
LTE Band 4	27	1717.5 - 1747.5			0.250	23.98	13M5G7D	QPSK
LTE Band 4	27	1717.5 - 1747.5			0.246	23.92	13M5W7D	16QAM
LTE Band 4	27	1720 - 1745			0.143	21.55	18M0G7D	QPSK
LTE Band 4	27	1720 - 1745			0.120	20.79	18M0W7D	16QAM
LTE Band 2	24E	1850.7 - 1909.3			0.456	26.59	1M11G7D	QPSK
LTE Band 2	24E	1850.7 - 1909.3			0.368	25.66	1M11W7D	16QAM
LTE Band 2	24E	1851.5 - 1908.5			0.480	26.81	2M72G7D	QPSK
LTE Band 2	24E	1851.5 - 1908.5			0.358	25.54	2M72W7D	16QAM
LTE Band 2	24E	1852.5 - 1907.5			0.439	26.42	4M56G7D	QPSK
LTE Band 2	24E	1852.5 - 1907.5			0.351	25.45	4M54W7D	16QAM
LTE Band 2	24E	1855 - 1905			0.428	26.31	9M04G7D	QPSK
LTE Band 2	24E	1855 - 1905			0.381	25.80	9M04W7D	16QAM
LTE Band 2	24E	1857.5 - 1902.5			0.430	26.34	13M5G7D	QPSK
LTE Band 2	24E	1857.5 - 1902.5			0.346	25.39	13M5W7D	16QAM
LTE Band 2	24E	1860 - 1900			0.402	26.04	18M0G7D	QPSK
LTE Band 2	24E	1860 - 1900			0.336	25.26	18M0W7D	16QAM

EUT Overview

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1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations

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

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

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFX410UM**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 01259, 00715, 00772

2.2 Device Capabilities

This device contains the following capabilities:

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

2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-E-2016 and KDB 971168 D01 v03. See Section 6.0 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 v03) were used in the measurement of the EUT.

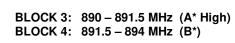
3.2 Block C Frequency Range

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.

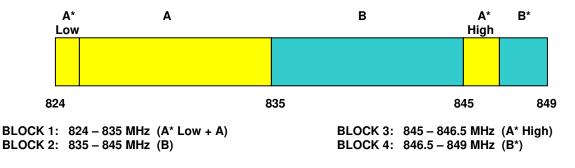
3.3 Cellular - Base Frequency Blocks



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

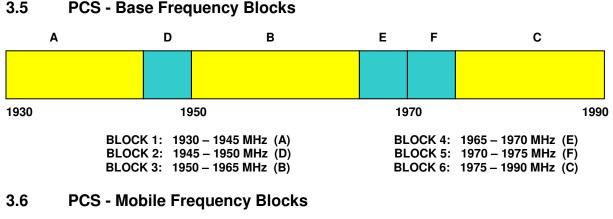


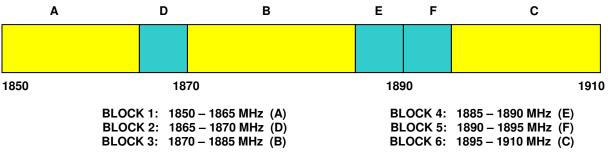
3.4 Cellular - Mobile Frequency Blocks



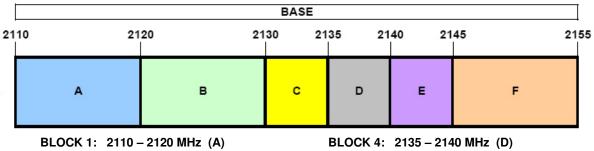
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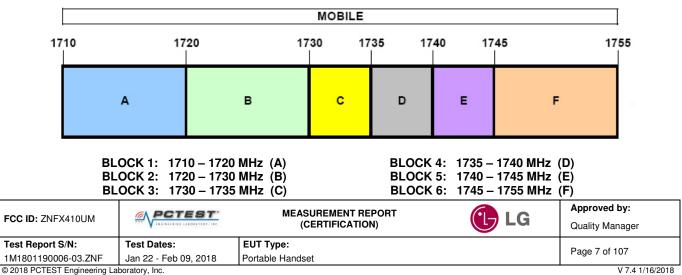


3.7 AWS - Base Frequency Blocks



BLOCK 2: 2120 – 2130 MHz (B) BLOCK 3: 2130 – 2135 MHz (C) BLOCK 4: 2135 – 2140 MHz (D) BLOCK 5: 2140 – 2145 MHz (E) BLOCK 6: 2145 – 2155 MHz (F)

3.8 AWS - Mobile Frequency Blocks





3.9 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 v03.

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]). EASUREMENT 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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4.0 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
-	LTx1	Licensed Transmitter Cable Set	1/6/2018	Annual	1/6/2019	LTx1
Agilent	N9030A	PXA Signal Analyzer (44GHz)	3/27/2017	Annual	3/27/2018	MY52350166
Emco	6502	Active Loop Antenna (10k - 30 MHz)	8/9/2016	Biennial	8/9/2018	2936
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/23/2016	Biennial	8/23/2018	135427
PCTEST	-	EMC Switch System	6/21/2017	Annual	6/21/2018	NM2
Rohde & Schwarz	CMW500	Radio Communication Tester	11/3/2017	Annual	11/3/2018	100976
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/11/2017	Annual	5/11/2018	100040
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	4/19/2017	Annual	4/19/2018	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/31/2017	Annual	7/31/2018	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/11/2017	Annual	8/11/2018	103200
Rohde & Schwarz	TC-TA18	Cross-Pol Antenna 400MHz-18GHz	10/30/2017	Annual	10/30/2018	101058
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102135
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/3/2017	Annual	7/3/2018	102134
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107
Sunol	DRH-118	Horn Antenna (1-18 GHz)	8/11/2017	Biennial	8/11/2019	A042511

Table 4-1. Test Equipment

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5.0 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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6.0 TEST RESULTS

6.1 Summary

Company Name:	LG Electronics MobileComm U.S.A
FCC ID:	ZNFX410UM
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference	
2.1049	Occupied Bandwidth	N/A		PASS	Section 6.2	
2.1051 22.917(a) 24.238(a) 27.53(c) 27.53(h)	Out of Band Emissions	> 43 + 10log ₁₀ (P[Watts]) at Band Edge and for all out-of- band emissions		PASS	Section 6.3, 7.4	
27.53(m)	Out of Band Emissions	Undesirable emissions must meet the limits detailed in 27.53(m)	CONDUCTED	PASS	Section 6.3, 7.4	
24.232(d)	Peak-Average Ratio	< 13 dB		PASS	Section 6.5	
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report	

Table 6-1. 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)(2)	Effective Radiated Power (Band 5)	< 7 Watts max. ERP	RADIATED	PASS	Section 6.6	
27.50(b)(10)	Effective Radiated Power (Band 13)	< 3 Watts max. ERP		PASS		
24.232(c)	Equivalent Isotropic Radiated Power (Band 2)	< 2 Watts max. EIRP		PASS		
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	< 1 Watts max. EIRP		PASS		
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(h)	Undesirable Emissions	> 43 + 10log ₁₀ (P[Watts]) for all out-of-band emissions		PASS	Section 6.7	
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 		PASS	Section 6.7	

Table 6-2. 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 6.2, 6.3, 6.4, 6.5) 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.

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6.2 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 v03 - 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.

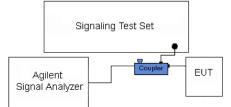


Figure 6-1. Test Instrument & Measurement Setup

Test Notes

None.

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Band 13



Plot 6-1. Occupied Bandwidth Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



Plot 6-2. Occupied Bandwidth Plot (Band 13 - 5.0MHz 16-QAM - Full RB Configuration)

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Plot 6-3. Occupied Bandwidth Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



Plot 6-4. Occupied Bandwidth Plot (Band 13 - 10.0MHz 16-QAM - Full RB Configuration)

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Band 5



Plot 6-5. Occupied Bandwidth Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



Plot 6-6. Occupied Bandwidth Plot (Band 5 - 1.4MHz 16-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW							
₩ RL RF 50 Ω DC Center Freq 836.500000 N	CORREC Cer	SENSE:INT SENSE: 836.500000 M	Hz	03:51:08 P Radio Std	M Feb 02, 2018	Trace	e/Detector
NFE	Trig	g: Free Run Avg	Hold:>100/100				
	#IFGain:Low #At	ten: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dBm				1			
30.0							
20.0						(Clear Write
10.0	man	al man and a second and a second and the	ww/				
0.00	{		<u> </u>				
-10.0			<u> </u>				Average
-20.0 manager work w	****		<i>NGE-NEWW</i>	nonen	Marria Marrie		
-30.0							
-40.0							
-50.0							Max Hold
-30.0							
Center 836.5 MHz					n 7.5 MHz		
Res BW 68 kHz		#VBW 220 kHz		Swee	p 3.8 ms		Min Hold
Occupied Rendwidth		Total Powe	r 32	6 dBm			
Occupied Bandwidth		Total Towe	52.	o abiii			
2.0	7164 MHz						Detector Peak▶
Transmit Freq Error	-1.242 kHz	% of OBW F	ower 9	9.00 %		Auto	<u>Man</u>
x dB Bandwidth	3.030 MHz	x dB	-26	.00 dB			
MSG			STATU	JS			

Plot 6-7. Occupied Bandwidth Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)



Plot 6-8. Occupied Bandwidth Plot (Band 5 - 3.0MHz 16-QAM - Full RB Configuration)

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🔤 Keysight Spectrum Analyzer - Occupied E	W					
LX/RL RF 50Ω DC	CORREC	SENSE:INT Center Freg: 836.50000	0 MHz	03:48:15 PM Fel Radio Std: No		Trace/Detector
NFE	- -	Trig: Free Run	Avg Hold: 100/100			
	#IFGain:Low	#Atten: 36 dB		Radio Device:	BTS	
10 dB/div Ref 40.00 dB	m					
Log 30.0						
20.0						Clear Write
10.0	m		my			
0.00	J		<u>}</u>			
-10.0	n l		X			Average
m_mhmmmmm	man and a start		- www.	mon mon	m 0.	Average
-30.0						
-40.0						Max Hold
-50.0						
Center 836.5 MHz				Span 12.	.5 MHz	
Res BW 120 kHz		#VBW 390 kH	z	Sweep		Min Hold
		T - 4 - 1 D				
Occupied Bandwid		Total Pov	wer 32.9	dBm		
4	.5711 MH	Z				Detector
Transmit Freg Error	-17.448 k	Hz % of OBV	Bower 00	.00 %	,	Peak► Auto Man
					í l	
x dB Bandwidth	5.110 M	Hz xdB	-26.	00 dB		
MSG			STATUS	;		

Plot 6-9. Occupied Bandwidth Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)



Plot 6-10. Occupied Bandwidth Plot (Band 5 - 5.0MHz 16-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW						
LXX RL RF 50Ω DC		SENSE:INT Freg: 836.500000 MHz	03:44:29 F Radio Std	M Feb 02, 2018	Trace/Deteo	ctor
NFE	🛶 Trig: F	ree Run Avg Hold : 36 dB	I: 100/100 Radio Dev	vice: BTS		
	#IFGain:Low #Atten	: 36 dB	Radio De	VICE: DTS		
10 dB/div Ref 40.00 dBm						
30.0					Clear	Alvita
20.0		many			Clear	write
10.0						_
0.00		Ì				
-10.0					Ave	erage
-20.0			way how the here there	mannahur		
-30.0						
-40.0					Мах	Hold
-50.0					max	mona
Center 836.5 MHz Res BW 240 kHz	#	VBW 750 kHz		an 25 MHz eep 1 ms		
NCS DW 240 NH2	70	VDVV 750 KHZ		cep Tills	Min	Hold
Occupied Bandwidth	1	Total Power	32.7 dBm			_
)276 MHz				Det	ector
					F	Peak▶
Transmit Freq Error	-579 Hz	% of OBW Pow	er 99.00 %		Auto	Man
x dB Bandwidth	10.02 MHz	x dB	-26.00 dB			
MSG			STATUS			_

Plot 6-11. Occupied Bandwidth Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)



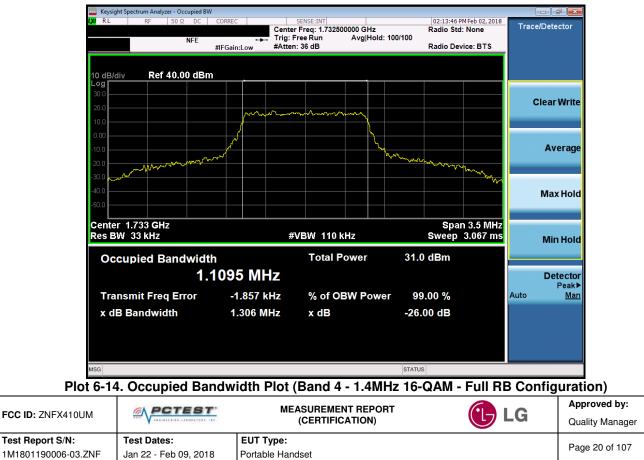
Plot 6-12. Occupied Bandwidth Plot (Band 5 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 6-13. Occupied Bandwidth Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



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Plot 6-15. Occupied Bandwidth Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



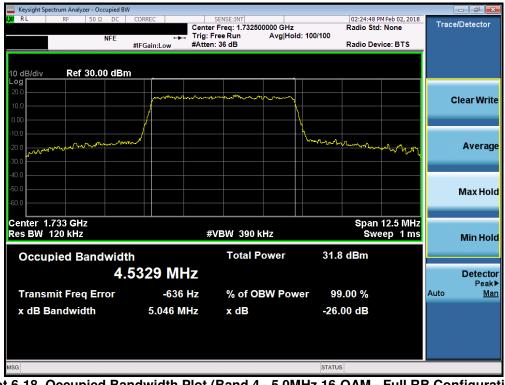
Plot 6-16. Occupied Bandwidth Plot (Band 4 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied B ¹	N						
LXI RL RF 50Ω DC	CORREC	SENSE:INT Center Freg: 1.73250	0000 GHz	02:24:24 PM Radio Std:	1Feb 02, 2018	Trace/D	etector
NFE		Trig: Free Run	Avg Hold: 100/	100			
	#IFGain:Low	#Atten: 36 dB		Radio Devi	ce: BTS		
10 dB/div Ref 30.00 dBr	n						
20.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
10.0						Cle	ar Write
0.00	/		<u> </u>				
-10.0			here has				
-20.0 mar Anno marken	~~~~			Martin Contraction	m.		Average
-30.0							
-40.0							
-50.0						N	lax Hold
-60.0							iux noru
Center 1.733 GHz Res BW 120 kHz		#VBW 390 k	H7		12.5 MHz ep 1 ms	_	
120 KHZ		#4BW 330K	112	GWC	сртпа	N	/lin Hold
Occupied Bandwid	th	Total P	ower	32.8 dBm			
4	5790 MH	7				-	Detector
							Peak▶
Transmit Freq Error	-24.012 k	Hz % of OE	BW Power	99.00 %		Auto	<u>Man</u>
x dB Bandwidth	5.081 M	Hz x dB		-26.00 dB			
MSG				STATUS			

Plot 6-17. Occupied Bandwidth Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



Plot 6-18. Occupied Bandwidth Plot (Band 4 - 5.0MHz 16-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW							
LXU RL RF 50Ω DC	CORREC	SENSE:INT Center Freq: 1.73250		Radio Std:	M Feb 02, 2018 None	Trace	Detector
NFE	↔ #IFGain:Low	Trig: Free Run #Atten: 36 dB	Avg Hold:>10	0/100 Radio Dev	ice: BTS		
	#IFGdIII.LOW	# tach. oo ab		Ruaio Der			
10 dB/div Ref 40.00 dBn	1						
Log 30.0							
20.0						С	lear Write
10.0	munn	an and an	monen				
0.00	/		<u>}</u>				
-10.0							Average
-20.0 - 20.0 - 20.0 - 20.0 - 20.0 - 20.0 - 20.0 - 20.0 - 20.0 - 20.0 - 20.0 - 20.0 - 20.0 - 20.0 - 20.0 - 20.0	<i>~~</i>			and the second way			J
-30.0					um Mun M		
-40.0							Max Hold
-50.0							maxinoia
Center 1.733 GHz					n DE Mille		
Res BW 240 kHz		#VBW 750 k	Hz		n 25 MHz ep 1 ms		Min Hold
							WIIII HOIG
Occupied Bandwidt		Total P	ower	32.7 dBm			
9.	0288 MH	lz					Detector
Transmit Freq Error	4.141 k	Hz % of OF	3W Power	99.00 %		Auto	Peak▶ Man
x dB Bandwidth	10.01 M			-26.00 dB			
	10.01 1			-20.00 UB			
MSG				STATUS			

Plot 6-19. Occupied Bandwidth Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



Plot 6-20. Occupied Bandwidth Plot (Band 4 - 10.0MHz 16-QAM - Full RB Configuration)

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🤤 Keysight Spectrum Analyzer - Occupied BV	V					_	
LXI RL RF 50Ω DC	CORREC	SENSE:INT Center Freg: 1.732500	0000 GHz	02:32:41 PM Radio Std:	1Feb 02, 2018	Tracel	Detector
NFE	••••	Trig: Free Run	Avg Hold: 100/1	100			
1	#IFGain:Low	#Atten: 36 dB		Radio Devi	ce: BTS		
10 dB/div Ref 40.00 dBn	n						
30.0						_	
20.0	month	*****	-atoman -			CI	ear Write
10.0							
0.00	/		<u> </u>				
-10.0							Average
-20.0			·····	hor hor a horal agen	and the second second		
-30.0							
-40.0							Max Hold
-50.0							nux noru
Center 1.733 GHz Res BW 360 kHz		#VBW 1.1 M	Hz		37.5 MHz ep 1 ms		
ICS DW GOO KIIZ		#4D94 1.114	112	000	cp ma		Min Hold
Occupied Bandwidt	h	Total P	ower	33.1 dBm			
13	3.500 MH	7					Detector
							Peak▶
Transmit Freq Error	-13.678 kl	Hz % of OE	3W Power	99.00 %		Auto	Man
x dB Bandwidth	14.93 MH	Hz x dB		-26.00 dB			
MSG				STATUS			

Plot 6-21. Occupied Bandwidth Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



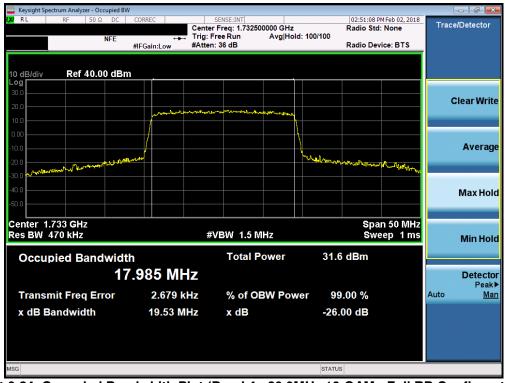
Plot 6-22. Occupied Bandwidth Plot (Band 4 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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LX RL RF 50 Ω DC CORREC SENSE:INT 02:50:54 PM Feb 02:2018	
Center Freg: 1.732500000 GHz Radio Std: None	ce/Detector
NFE Trig: Free Run Avg Hold: 100/100	
#IFGain:Low #Atten: 36 dB Radio Device: BTS	
10 dB/div Ref 40.00 dBm	
10 dB/div Ref 40.00 dBm	
30.0	Clear Write
20.0	Clear write
	Average
-20.0 With mother and the second seco	
-30.0	
-40.0	Max Hold
-60.0	
Center 1.733 GHz Span 50 MHz	
Res BW 470 kHz #VBW 1.5 MHz Sweep 1 ms	Min Hold
	minnera
Occupied Bandwidth Total Power 33.2 dBm	
17.953 MHz	Detector
Transmit Freq Error -7.305 kHz % of OBW Power 99.00 % Auto	Peak▶ <u>Man</u>
x dB Bandwidth 19.51 MHz x dB -26.00 dB	
MSG STATUS	

Plot 6-23. Occupied Bandwidth Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



Plot 6-24. Occupied Bandwidth Plot (Band 4 - 20.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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Band 2



Plot 6-25. Occupied Bandwidth Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 6-26. Occupied Bandwidth Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW						d X
IX RL RF 50Ω DC CC		SENSE:INT	12:22:26 P Radio Std	M Feb 02, 2018	Trace/Det	ector
NFE	🛶 Trig: F	ree Run Avg Hold: 1	00/100			
#IF	Gain:Low #Atten	: 36 dB	Radio Dev	rice: BTS		
10 dB/div Ref 40.00 dBm						
Log 30.0						
20.0					Clea	Write
10.0	mannen					
0.00	/					
	/				A	erage
-10.0 -20.0 mm mm mm mm			Mun who was	and		orugo
-30.0						
-40.0						
-40.0					Ма	x Hold
-50.0						
Center 1.88 GHz				1 7.5 MHz		
Res BW 68 kHz	#	VBW 220 kHz	Swee	p 3.8 ms	Mi	n Hold
Occupied Rendwidth		Total Power	32.3 dBm			
Occupied Bandwidth			52.5 ubiii			
2.72	212 MHz				De	tector Peak▶
Transmit Freq Error	6.562 kHz	% of OBW Power	99.00 %		Auto	Man
x dB Bandwidth	3.052 MHz	x dB	-26.00 dB			
MSG			STATUS			

Plot 6-27. Occupied Bandwidth Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



Plot 6-28. Occupied Bandwidth Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BV	V			
LXI RL RF 50Ω DC	CORREC Cente	SENSE:INT r Freg: 1.880000000 GHz	12:18:43 PM Feb Radio Std: Non	
NFE		Free Run Avg Hold: 1 n: 36 dB	00/100 Radio Device: E	ats.
	#IFGain:Low #Atter	1. 30 0.5	Radio Device.	
10 dB/div Ref 40.00 dBr	n			
Log 30.0				
20.0				Clear Write
10.0	human	manning		
0.00		<u> </u>		
49.9	/			Average
-20.0 Jahren Martin			Marsh and a second and a second a secon	~~~~
-30.0				
-40.0				Max Hold
-50.0				
Center 1.88 GHz Res BW 120 kHz	#	VBW 390 kHz	Span 12.5 Sweep	1 mag
			oncop	Min Hold
Occupied Bandwidt	h	Total Power	32.6 dBm	
4.	5582 MHz			Detector
			00.00.0/	Peak▶ Auto Man
Transmit Freq Error	402 Hz	% of OBW Power		Auto <u>Man</u>
x dB Bandwidth	5.145 MHz	x dB	-26.00 dB	
MSG			STATUS	

Plot 6-29. Occupied Bandwidth Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



Plot 6-30. Occupied Bandwidth Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW					
IX RL RF 50 Ω DC Center Freq 1.880000000 NFE		ENSE:INT Freq: 1.880000000 GHz ree Run Avg Hold: 1	Radio Std:	Feb 02, 2018 None	Trace/Detector
	#IFGain:Low #Atten:		Radio Devi	ce: BTS	
10 dB/div Ref 35.00 dBm					
25.0		up mar and a second			Clear Write
5.00			Muniful and the second		A
-25.0				and the stand of the second	Average
-45.0					Max Hold
Center 1.88 GHz Res BW 240 kHz	#\	/BW 750 kHz		n 25 MHz ep 1 ms	Min Hold
Occupied Bandwidth		Total Power	32.9 dBm		
	445 MHz				Detector Peak▶
Transmit Freq Error	4.493 kHz	% of OBW Power	99.00 %		Auto <u>Man</u>
x dB Bandwidth	10.04 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 6-31. Occupied Bandwidth Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 6-32. Occupied Bandwidth Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied B	N				
LXI RL RF 50Ω DC	CORREC	SENSE:INT er Freg: 1.880000000 GHz	12:36:55 Radio Sto	M Feb 02, 2018	Trace/Detector
NFE	🛶 Trig:		d: 100/100 Radio De	dee: BTC	
	#IFGain:Low #Atte	en: 36 dB	Radio De	VICE: DI S	
10 dB/div Ref 40.00 dBr	~				
Log					
30.0					Clear Write
20.0	winderstown	and the second and the second se			Cicul Write
10.0			<u> </u>		
0.00					
-10.0	- Anna -		Mune pale marked a marked and	Wellet at .	Average
-20.0 Harrison				and the second second	
-30.0					
-40.0					Max Hold
-50.0					
Center 1.88 GHz				37.5 MHz	
Res BW 360 kHz		#VBW 1.1 MHz	SW	eep 1 ms	Min Hold
Occupied Bandwidt	th	Total Power	32.9 dBm		
	3.517 MHz				Detector
					Peak►
Transmit Freq Error	-10.718 kHz	% of OBW Pow	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	14.91 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 6-33. Occupied Bandwidth Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 6-34. Occupied Bandwidth Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

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Keysight Spectrum Analyzer - Occupied BW							
LXV RL RF 50Ω DC	CORREC	SENSE:INT Center Freg: 1.88000	00000 GHz	12:41:08 PM Radio Std:	1Feb 02, 2018	Trace/[Detector
NFE		Trig: Free Run	Avg Hold: 100/	/100			
	#IFGain:Low	#Atten: 36 dB		Radio Devi	ce: BTS		
10 dB/div Ref 40.00 dBn	n						
30.0							
20.0	and the second	Mar And Martin Martin and Martin	and the second sector			Cl	ear Write
10.0						_	
0.00			<u> </u>				
-10.0				and a start and a start of			Average
-20.0 Allow manth and remains				and a for the former and the second s	when the part of the		
-30.0							
-40.0							Max Hold
-50.0							
Center 1.88 GHz Res BW 470 kHz		#VBW 1.5 M			n 50 MHz		
Res BW 470 KHZ		#VEW 1.3 W	Inz	Swe	ep 1 ms	1	Min Hold
Occupied Bandwidt	h	Total P	ower	32.9 dBm			
	.981 M⊦	-					Detector
	.301 101	12					Peak ►
Transmit Freq Error	3.151 k	Hz % of O	BW Power	99.00 %		Auto	<u>Man</u>
x dB Bandwidth	19.59 M	Hz x dB		-26.00 dB			
MSG				STATUS			

Plot 6-35. Occupied Bandwidth Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 6-36. Occupied Bandwidth Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)

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6.3 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 $43 + \log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03 – 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.

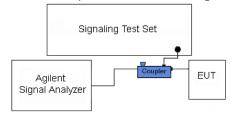


Figure 6-2. Test Instrument & Measurement Setup

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.

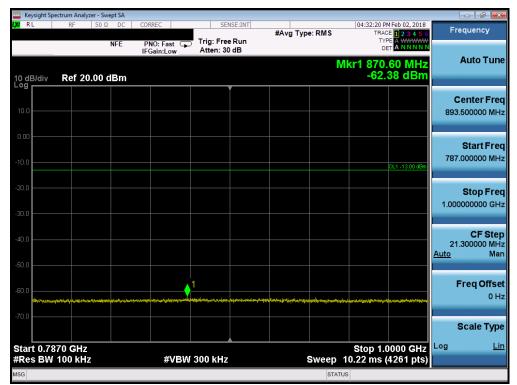
FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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Band 13

	ght Specti													
l <mark>xi</mark> RL		RF	50 Ω		CORR			NSE:INT	#Avg Typ	e: RMS	TRA	PM Feb 02, 2018 ACE 1 2 3 4 5 6 YPE A WWWW	Fi	requency
10 dB/c	div	Ref 2		NFE IBM		D: Fast ⊊ ain:Low	Atten: 30			ľ	Mkr1 776	5.90 MHz 5.57 dBm		Auto Tune
10.0														Center Free 3.450000 MH
-10.0												DL1 -13.00 dBm	30	Start Free 0.000000 MH
-20.0 -													776	Stop Fre 5.900000 MH
-40.0													74 <u>Auto</u>	CF Ste 4.690000 MH Ma
-60.0			ang balancis Ng salating ba		an a			and a start of the start			Ni kay na kinya kaya kata kang a Yana ng algu ng panini kaganini n	n () an a tha an a d fair a tha an a fair an a tha an a tha an a tha		Freq Offse 0 H
-70.0	20.04	14-									Ston	776.9 MHz		Scale Type
start . #Res I			z			#VBW	/ 300 kHz		s	weep 🗧	5.85 ms (14939 pts)	9	
MSG										STAT	rus			

Plot 6-37. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



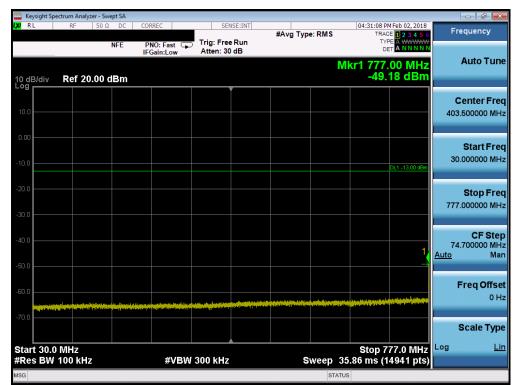
Plot 6-38. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

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	ectrum Analyzer								
L <mark>XU</mark> RL	RF 5	NFE	CORREC	Trig: Free I	#A Run	vg Type: RMS	TRAC	M Feb 02, 2018 E 1 2 3 4 5 6 PE A WWWW A N N N N N	Frequency
10 dB/div Log	Ref 0.00	dBm	IFGain:Low	Atten: 10 o	IB		Mkr1 2.33		Auto Tune
-10.0								DL1 -13.00 dBm	Center Freq 5.500000000 GHz
-20.0	∳'								Start Freq 1.000000000 GHz
-40.0									Stop Fred 10.000000000 GHz
-60.0								a de la constante de la const la de la constante de la const la de constante de la constante de la const la de constante de la constante de la constante de la constante de	CF Step 900.000000 MHz <u>Auto</u> Mar
-80.0									Freq Offsel 0 Hz
Start 1.00			#\/B\A	(3.0 MHz		Sween	Stop 10 15.60 ms (1	000 9112	Scale Type
MSG	1.0 10112		#VDV	-5.0-WINZ				ooor pis)	

Plot 6-39. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



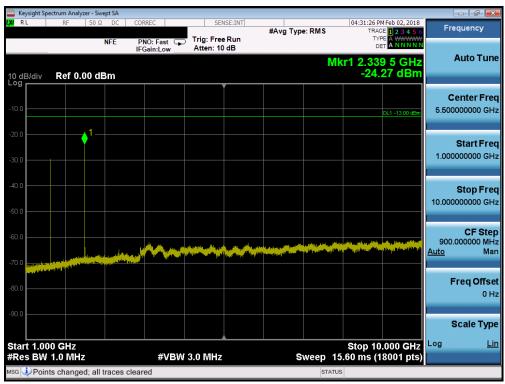
Plot 6-40. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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		zer - Swept SA						
LXI RL	RF	50 Ω DC NFE	CORREC	SENSE: Trig: Free Ru	#Avg Typ in		04:31:18 PM Feb 02, 2018 TRACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Frequency
10 dB/div	Ref 20).00 dBm	IFGain:Low	Atten: 30 dE		Mkr	1 788.45 MHz -35.43 dBm	Auto Tune
10.0								Center Freq 893.500000 MHz
-10.0							DL1 -13.00 dBm	Start Freq 787.000000 MHz
-20.0								Stop Fred 1.000000000 GHz
-40.0								CF Step 21.300000 MH: <u>Auto</u> Mar
-60.0	eraiser ertestes	fjýgarlys httis úter Mennegy Mely	-9490-2014-942-42-54-524-524-524-52-42	an diployed a street of grade is a to a	ek-familiezmeth dag allemite eigenitesse eigen	ารกรุ่มากระบบเป็นประกันสินส์	Ŋ~ŧIJĬŗĸţĸŧġĬĸŎſĸĸĬţĸĸĊŦĸţŧĬĸĸĿĸĔĬŔţŎ	Freq Offse 0 H:
-70.0								Scale Type
Start 0.78 #Res BW			#VBW	300 kHz		Sweep 10.	Stop 1.0000 GHz 22 ms (4261 pts)	
MSG						STATUS		

Plot 6-41. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



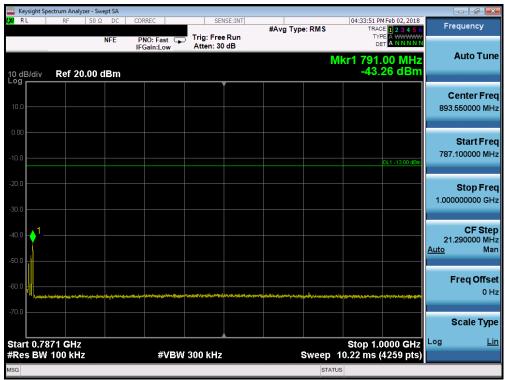
Plot 6-42. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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		um Analyzer -											
l XI R	L	RF 50)Ω DC	CORREC		SEN	NSE:INT	#Avg Typ	e: RMS	TRAC	4 Feb 02, 2018 E 1 2 3 4 5 6	Fr	requency
			NFE	PNO: IFGain	Fast 😱	Trig: Free Atten: 30				TYP			
				iii Odini					I	/kr1 777.	00 MHz		Auto Tune
	3/div	Ref 20.00) dBm							-60.	73 dBm		
Log						, ,						(Center Freq
10.0													3.500000 MHz
0.00													Start Freq
-10.0												30	0.000000 MHz
.0.0											DL1 -13.00 dBm		
-20.0													Stop Freq
												777	7.000000 MHz
-30.0													
-40.0												-	CF Step
												Auto	4.700000 MHz Man
-50.0													
-60.0											1		Freq Offset
-00.0	and the second second		Name and Discovery	ourse and and the second									0 Hz
-70.0	To a local de la construcción de la	الداء متحصية الع	and the second secon			and the second							
													Scale Type
	∟ t 30.0 IV									Stop 7	77.0 MHz	Log	Lin
#Re	s BW 10	00 kHz			#VBW	300 kHz		S	weep 3	35.86 ms (1	4941 pts)		
MSG									STAT	US			

Plot 6-43. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 6-44. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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	ectrum Analy	zer - Swe	pt SA								
LXU RL	RF	50 Ω		NO: Fast	Trig: Free		#Avg Typ	e: RMS	TRAC	E 1 2 3 4 5 6 E A WWWW T A N N N N N	Frequency
10 dB/div	Ref 0.0		IF	Gain:Low	Atten: 10) dB		N	1kr1 2.34		Auto Tune
-10.0		. 1								DL1 -13.00 dBm	Center Freq 5.50000000 GHz
-20.0		• <u>'</u>									Start Freq 1.000000000 GHz
-40.0											Stop Freq 10.000000000 GHz
-60.0							Maastan (je ta Massa Jas Nijetska (je ta Massa Jase)	ان (۱۹۹۵ مارو به معروم) ۲ پر و ^{(۱۹} ۱ و بر ^{۱۹} (۱۹۹۹ مر)	aller in States and Marson Million I day, et hay, and second Mary	Managa di Kangan di Kangan Di Kangan Mangan di Kangan Di Kangan Mangan di Kangan	CF Step 900.000000 MHz <u>Auto</u> Man
-80.0											Freq Offset 0 Hz
-90.0 Start 1.00	00 GHz								Stop 10	.000 GHz	Scale Type
#Res BW		z		#VBW	3.0 MHz		s	weep	15.60 ms (1	8001 pts)	
MSG								STAT	rus		

Plot 6-45. Conducted Spurious Plot (Band 13 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

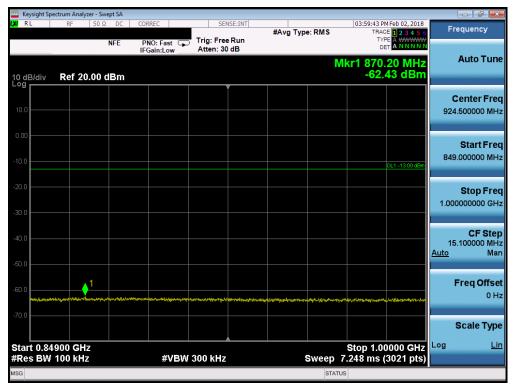
FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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Band 5

#Res BW 100 kHz	#VBW 3	00 kHz	Swe	ep 38.06 ms (1586	l pts)
Start 30.0 MHz				Stop 823.0	MHz Log L
					Scale Typ
-70.0					
60.0			a tuda a cara da tambén de core de		
					Freq Offs
50.0					Auto M
40.0					CF Ste 79.300000 M
30.0					
					Stop Fr 823.000000 M
20.0					Step Er
-10.0				DL1 -1:	30.00000 M
0.00					Start Fr
0.00					
10.0					426.500000 M
		Ť			Center Fr
10 dB/div Ref 20.00 dBn	n			Mkr1 822.50 -43.85 c	
NFE	PNO: Fast 😱 IFGain:Low	Atten: 30 dB		DET A N	
		Trig: Free Run	#Avg Type: R		3 4 5 6 Frequency
α RL RF 50 Ω D	C CORREC	SENSE:INT		03:59:35 PM Feb 0	2,2018

Plot 6-46. Conducted Spurious Plot (Band 5 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



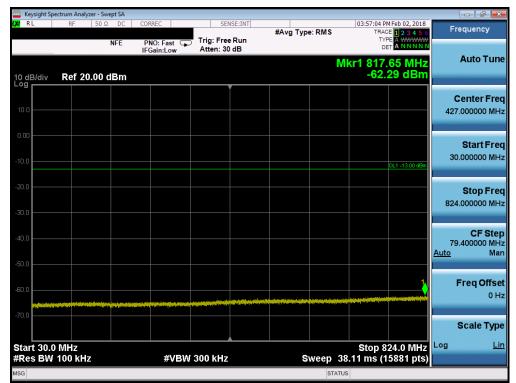
Plot 6-47. Conducted Spurious Plot (Band 5 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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	ectrum Analy											×
LXU RL	RF	50 Ω NF	E P	RREC			#Avg Typ	e:RMS	TR	PM Feb 02, 2018 ACE 1 2 3 4 5 6 YPE A WWWWW DET A NNNNN	Frequency	y
10 dB/div Log	Ref 0.0	00 dBr		Gain:Low	Atten: 10	d B			Mkr1 2.4	73 0 GHz 3.78 dBm	Auto T	une
-10.0		1								DL1 -13.00 dBm	Center 1 5.500000000	
-20.0											Start F 1.000000000	
-40.0											Stop F 10.000000000	
-60.0				~~~		~~~					CF 5 900.000000 <u>Auto</u>	
-80.0											Freq Of	ffse 0 H
-90.0 Start 1.00	00 GHz			-#\(D						0.000 GHz		Type Lir
#Res BW	T.U MIH2	4		#vB	W 3.0 MHz		5	-	15.60 ms (ITUS	(18001 pts)		

Plot 6-48. Conducted Spurious Plot (Band 5 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



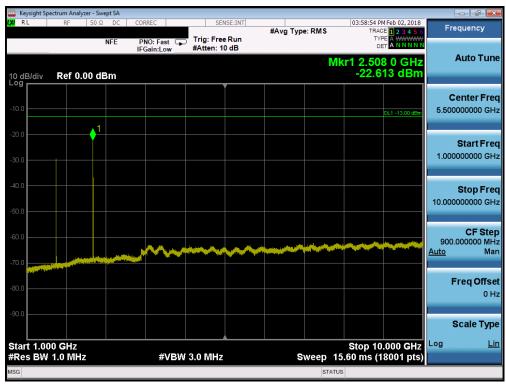
Plot 6-49. Conducted Spurious Plot (Band 5 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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🔤 Keysight Sp	ectrum Analyz	er - Swept SA										5 ×
LXI RL	RF	50 Ω DC	CORREC PNO: Fa		SENSE		#Avg Typ	e: RMS	TRAC	M Feb 02, 2018 E 1 2 3 4 5 6 E A WWWWW	Frequen	су
10 dB/div	Ref 20	.00 dBm	PNO: Fa IFGain:L		tten: 30 d			N	/kr1 899.	25 MHz 45 dBm	Auto	Tune
10.0											Center 924.50000	
-10.0										DL1 -13.00 dBm	Start 849.00000	t Freq 0 MHz
-20.0											Stop 1.00000000	Fred 0 GHz
-40.0											CF 15.10000 <u>Auto</u>	Step 0 MH Mar
-60.0	"Allesengel petropoletic	18,14,12°0-36,28°64,47°5		1 	gradatingstikatings	prodytest Mathematic	ybyra-iningstationaethyd	level944-100.000-000	han gestaan da	age all an oblight of a factor	Freq (Offse 0 Ha
											Scale	Type Lin
Start 0.84 #Res BW			#	VBW 30	0 kHz			Sweep	7.248 ms (0000 GHz 3021 pts)	LUG	

Plot 6-50. Conducted Spurious Plot (Band 5 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



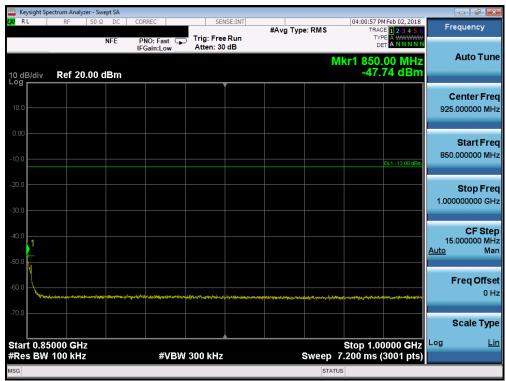
Plot 6-51. Conducted Spurious Plot (Band 5 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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	ectrum Analyz											
LXU RL	RF	50 Ω DC	CORREC	ast 🗔	Trig: Free		#Avg Typ	e: RMS	TRAC	M Feb 02, 2018 DE 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:L	ow	Atten: 30	dB		N	/kr1 822			Auto Tune
10.0												Center Freq .000000 MHz
-10.0										DL1 -13.00 dBm	30	Start Freq .000000 MHz
-20.0											824	Stop Freq
-40.0											79 <u>Auto</u>	CF Step 400000 MH; Mar
-60.0					and the second					1		F req Offse 0 Ha
Start 30.0 #Res BW				ź∨B₩	300 kHz		s	weep 3	Stop 8 8.11 ms (1	24.0 MHz 5881 pts)		Scale Type Lin
MSG								STAT				

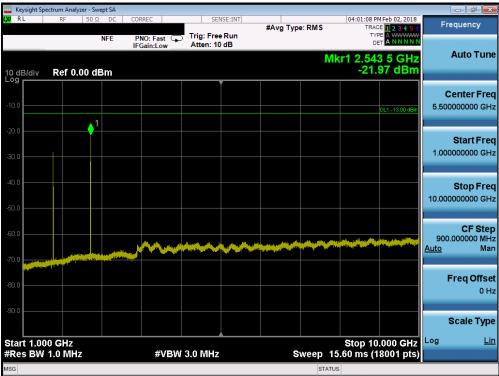
Plot 6-52. Conducted Spurious Plot (Band 5 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 6-53. Conducted Spurious Plot (Band 5 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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Plot 6-54. Conducted Spurious Plot (Band 5 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

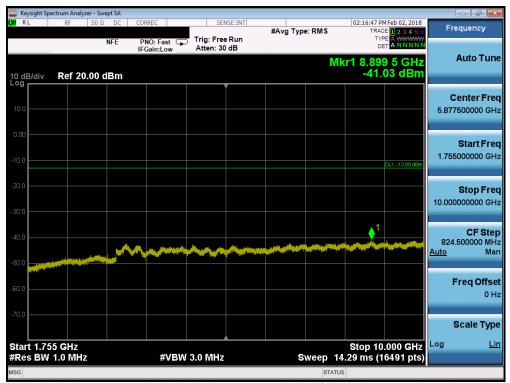
FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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Band 4

Keysight Spectr		Swept SA	CORREC	SENSE:INT		02-16-5	37 PM Feb 02, 2018	# -
A KL	KF JU	NFE	PNO: Fast	Trig: Free Run	#Avg Type: F Avg Hold:>1	RMS 1	TYPE A WWWW	Frequency
			IFGain:Low	Atten: 30 dB			DET A N N N N N	Auto Tun
10 dB/div	Ref 20.00) dBm				Mkr1 1.7 -38	707 0 GHz .859 dBm	Auto Tul
				Ĭ				Center Fre
10.0								868.500000 MH
0.00								
0.00								Start Fre
-10.0							DL1 -13.00 dBm	30.000000 MH
-20.0								04
								Stop Fre 1.707000000 GH
-30.0							1	
-40.0								CF Ste
								167.700000 Mi <u>Auto</u> Ma
-50.0				م و و الم		and the second secon	وروالا والمعادية والمحال والمحالية والمحالية والمحالية	
-60.0								Freq Offs
								01
-70.0								Scale Typ
						Ctor.	4 7070 011-	
Start 0.0300 #Res BW 1.			#VBW	3.0 MHz*	Sw	stop veep 2.239 m	1.7070 GHz is (3359 pts)	
ISG						STATUS		

Plot 6-55. Conducted Spurious Plot (Band 4 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 6-56. Conducted Spurious Plot (Band 4 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

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	pectrum Analy											
L XI RL	RF	50 Ω NF		ORREC	Trig:	SENSE:INT	#Avg Typ	e:RMS	TRA	M Feb 02, 2018 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	Fre	equency
10 dB/div Log	Ref 0.	00 dBn	I	FGain:Low		: 10 dB		Mk	r1 19.53	9 0 GHz 87 dBm		Auto Tune
-10.0										DL1 -13.00 dBm		enter Fred
-20.0											10.000	Start Free 0000000 GH:
-40.0										1_	20.000	Stop Free 0000000 GH
					n fergen den skriveret i her Telleg fil	e besond bline de termenen offen er el her by her termenen	ng kana talaga talan sa gga na talaga talan sa g		all and a star for the star of the star Star is "The star of the star		1.000 <u>Auto</u>	CF Stej 0000000 GH Ma
-80.0											F	F req Offse 0 H
-90.0											tog	Scale Type
Start 10. #Res BW				#V	3W 3.0 M	Hz		Sweep 1	Stop 20 7.33 ms (2).000 GHz 20001 pts)	Log	
MSG								STATU	JS			

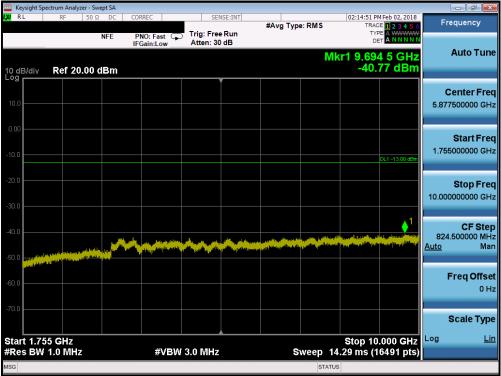
Plot 6-57. Conducted Spurious Plot (Band 4 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



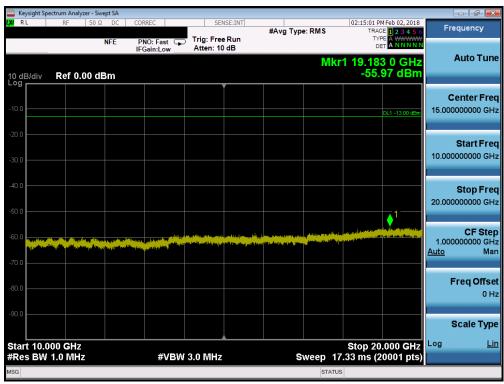
Plot 6-58. Conducted Spurious Plot (Band 4 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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Plot 6-59. Conducted Spurious Plot (Band 4 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 6-60. Conducted Spurious Plot (Band 4 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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🔤 Keysight Sp	ectrum Analyze	er - Swept SA									
LXU RL	RF	50 Ω DC	PNO: Fast	Trig: Free		#Avg Typ	e: RMS	TRAC	IFeb 02, 2018 1 2 3 4 5 6 A WWWWW A N N N N N	Fr	equency
10 dB/div	Ref 20.	00 dBm	IFGain:Low	Atten: 30	dB		M	⊳⊧ kr1 1.701 -50.7	-		Auto Tune
10.0											enter Freq .000000 MHz
-10.0									DL1 -13.00 dBm	30	Start Freq .000000 MHz
-20.0										1.710	Stop Freq
-40.0								han ala anatari 1990-1990	1	168 <u>Auto</u>	CF Step .000000 MH Mar
-60.0	********	rindrictury <mark>redenicies allowed</mark>	ander blever men han frankriken en verste stører for at som forser at som forser at som forser at som forser a	n Berlevand - Alton philitics		1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-				i	F req Offse 0 Hz
Start 0.03			#\/B)A(3.0 MHz			Sween	Stop 1.7 2.240 ms (3	100 GHz	Log	Scale Type <u>Lin</u>
MSG	1.0 10/12			5.0 10/12			SWEED		soor proj		

Plot 6-61. Conducted Spurious Plot (Band 4 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 6-62. Conducted Spurious Plot (Band 4 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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	nt Spectrum A											
U RL	RF	50 Ω	DC NFE	PNO: Fast		g: Free l		#Avg Typ	e: RMS	TI	5 PM Feb 02, 2018 RACE 1 2 3 4 5 6 TYPE A WWWW DET A N N N N N	Peak Search
0 dB/di	iv Ref	0.00 dE	3m	In Galil.EU					Μ	kr1 18.9 -5	32 0 GHz 5.63 dBm	Next Pea
10.0											DL1 -13.00 dBm	Next Pk Righ
20.0												Next Pk Le
10.0											_1	Marker De
60.0 		ngga ngga linaga (tagi ng nilaka g	ing a chirachteachteachteachteachteachteachteachte	alled the particular statement	n di kaya di seri mula Juli mula yatabahah	allas I. an Al-Lawshit	Malanin a geológya Kalenin a geológya	stéra temperatur faceares Désignées particular, par	a an			Mkr→C
0.0												Mkr→RefL
10.0	0.000 GI	Hz								Stop	20.000 GHz	Mo 1 o
	SW 1.0 N			#\	'BW 3.0	MHz		S	weep	17.33 ms	(20001 pts)	
SG									STA	TUS		

Plot 6-63. Conducted Spurious Plot (Band 4 - 1.4MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

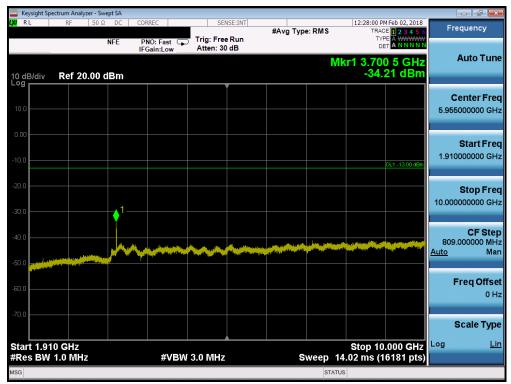
FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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Band 2

Keysight Spo K		zer - Swept SA					
AU KL	RF	50 Ω DC	CORREC	Trig: Free Run	#Avg Type: RMS	TYPE A WWWWW	Frequency
10 dB/div	Ref 20	.00 dBm	IFGain:Low	Atten: 30 dB		Mkr1 1.847 0 GHz -25.66 dBm	Auto Tun
10.0							Center Fre 938.500000 M⊦
-10.0						DL1 -13.00 dBm	Start Fre 30.000000 MH
-20.0						1 →	Stop Fre 1.847000000 GH
-40.0							CF Ste 181.700000 Mi <u>Auto</u> Mi
60.0			99799979799999999999999999999999999999				Freq Offs 0 I
-70.0 Start 0.03 #Res BW		,	#\/B\A	/ 3.0 MHz	Swaa	Stop 1.8470 GHz p 2.425 ms (3639 pts)	Scale Typ Log <u>L</u>
			#**	5.0 WINZ		p 2.425 ms (5059 pts) TATUS	

Plot 6-64. Conducted Spurious Plot (Band 2 - 3.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 6-65. Conducted Spurious Plot (Band 2 - 3.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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	pectrum Analyzer								
LXI RL	RF 5	50 Ω DC	CORREC	SENSE:INT	#Avg Typ	e: RMS	TRAC	1 Feb 02, 2018	Frequency
		NFE	PNO: Fast IFGain:Low	Trig: Free Run Atten: 10 dB					
10 dB/div	Ref 0.00	dBm				Mki	r1 19.484 -55.	40 GHz 50 dBm	Auto Tune
-10.0								DL1 -13.00 dBm	Center Freq 15.00000000 GHz
-20.0									
-30.0									Start Freq 10.000000000 GHz
-40.0									Stop Freq 20.000000000 GHz
-50.0	ر المحمد (1911)	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	t and the subscription of a sector of a	an y Maanda sa Milayya Sanada a shina daga ba	(New States and States	a statistica data data data data data data data da			CF Step
-70.0	aliterative piloterative and a second se	aland Meridian yang kanala kanala dari	Andress and the second s	nta da na statul na ser a ta ta ser a t					<u>Auto</u> Man
-80.0									Freq Offset 0 Hz
-90.0									Scale Type
Start 10. #Res BW			#VBW	3.0 MHz	s	weep 17	Stop 20. 7.33 ms (2	000 0112	Log <u>Lin</u>
MSG						STATU	s		

Plot 6-66. Conducted Spurious Plot (Band 2 - 3.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



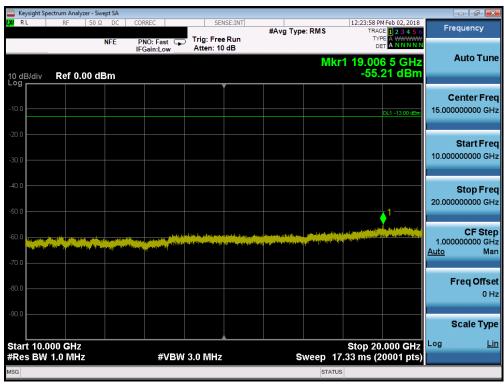
Plot 6-67. Conducted Spurious Plot (Band 2 - 3.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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W RL RF SO.Q DC CORREC SENSE.INT L22348 PMeb 02,2018 Frequency NFE PNO: Fast Trig: Free Run Atten: 30 dB Mkr1 3,757 5 GHz -36.92 dBm Trace [0,300 dBm Center Freq 10 dB/div Ref 20.00 dBm Start Freq Start Freq Start Freq Start Freq 10 dB/div Ref 20.00 dBm Start Freq Start Freq Start Freq Start Freq 10 dB/div Ref 20.00 dBm Start Freq Start Freq Start Freq Start Freq 10 dB/div Ref 20.00 dBm Start Freq Start Freq Start Freq Start Freq 10 dB/div Ref 20.00 dBm Start Freq Start Freq Start Freq Start Freq 10 dB/div Ref 20.00 dBm Start Freq Start Freq Start Freq Start Freq 20 db/div Ref 20.00 dBm Start Freq Start Freq Start Freq Start Freq 20 db/div Start S Start S Start Freq Start S Start Freq 20 db/div Start S Start S		ectrum Analyzer										×
NFE PRO: Fast IFGain:Low Trig: Free Run Atten: 30 dB Trig: Free Run Atten: 30 dB Trig: Free Run Atten: 30 dB Auto Tune 0<	LXI RL	RF 5	50 Ω DC	CORREC	SEI	NSE:INT	#Ava Tvp	e: RMS			Frequency	
Mkr1 3.757 5 GHz Auto Tune 100			NFE	PNO: Fast					TY	PE A WWWWW		
10 dB/div Ref 20.00 dBm -36.92 dBm 100				IFGain:Low	Atten. 30	UD .		M	kr1 3 75	7.5.047	Auto Tur	ne
Log Center Freq 100 Start Freq 101 Start Freq 101 Start Freq 101 Start Freq<	10 dB/div	Ref 20.0	0 dBm						-36.	92 dBm		
100 5.95500000 GHz 000 5.95500000 GHz 000 5.95500000 GHz 100 1		1101 2010				T T						
000 0000 000 000 000 000 000 000 00000 0000 0000 00000 00000 00000 00000 <td></td>												
-100 -100 -100 0.11.13000000 GHz 0.11.13000000 GHz -200 -100	10.0										5.955000000 GI	Ηz
-100 -100 -100 0.11.13000000 GHz 0.11.13000000 GHz -200 -100	0.00											
-100 -100	0.00										Start Fre	pe
200	-10.0										1.91000000 GI	Ηz
300 1										DL1 -13.00 dBm		
300 1 1 1 1 10.00000000 GHz 400 1	-20.0										Stop Fre	ea
300 400 400 400 400 400 400 400												
40.0 40.0 809.00000 MHz 60.0 40.0 40.0 40.0 60.0 40.0 40.0 40.0 70.0 40.0 40.0 40.0 70.0 40.0 40.0 40.0 70.0 40.0 40.0 40.0 70.0 50.0 50.0 60.0 70.0 50.0 50.0 70.0 Start 1.910 GHz #VBW 3.0 MHz Sweep 14.02 ms (16181 pts) 10.0	-30.0		1									
40.0 40.0 809.00000 MHz 60.0 40.0 40.0 40.0 60.0 40.0 40.0 40.0 70.0 40.0 40.0 40.0 70.0 40.0 40.0 40.0 70.0 40.0 40.0 40.0 70.0 50.0 50.0 60.0 70.0 50.0 50.0 70.0 Start 1.910 GHz #VBW 3.0 MHz Sweep 14.02 ms (16181 pts) 10.0			- •								CESte	an
-50.0 -60.0 -70.0 Start 1.910 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 14.02 ms (16181 pts)	-40.0				يەر بىلار ھە	Maria and a start of the second start of the s		and the second second			809.000000 MI	-IZ
Start 1.910 GHz #VBW 3.0 MHz Sweep 14.02 ms (16181 pts)	ro o lu lu	a state of the state of the state				Mitty attack and and a	and the solution of the	المغدا فالعرب فأفاعهم		All and all and a second	<u>Auto</u> Ma	an
-60.0 -60.0 <td< td=""><td>-50.0 100</td><td>ALL DE LE LE</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	-50.0 100	ALL DE LE										
-70.0 0 Hz Start 1.910 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Stop 10.000 GHz Log	-60.0										•	
Start 1.910 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 14.02 ms (16181 pts)											01	Ηz
Start 1.910 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 14.02 ms (16181 pts)	-70.0											
#Res BW 1.0 MHz #VBW 3.0 MHz Sweep 14.02 ms (16181 pts)											Scale Typ	be
#Res BW 1.0 MHz #VBW 3.0 MHz Sweep 14.02 ms (16181 pts)	Start 1.01								Stop 40	000 GHz	Log L	in
				#VBW	3.0 MHz		s	weep 14	4.02 ms (1	6181 pts)		

Plot 6-68. Conducted Spurious Plot (Band 2 - 3.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



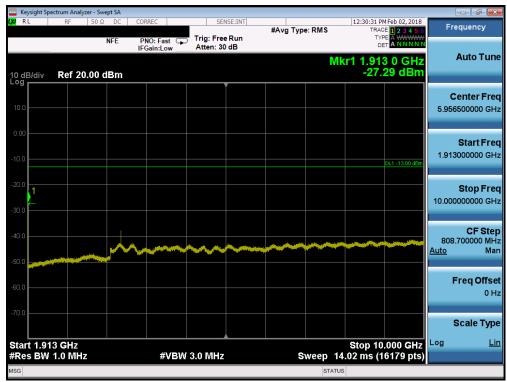
Plot 6-69. Conducted Spurious Plot (Band 2 - 3.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

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	ectrum Analyzer - S										
LXU RL	RF 50	Ω DC C	CORREC	SEN	ISE:INT	#Avg Typ	e: RMS		Feb 02, 2018	Fre	quency
		NFE	PNO: Fast 🖵 IFGain:Low	Trig: Free Atten: 30		• //		TYP			
10 dB/div Log	Ref 20.00	dBm					M	(r1 1.674 -50.2	5 GHz 20 dBm		Auto Tune
10.0											enter Freq 000000 MHz
-10.0									DL1 -13.00 dBm		Start Freq 000000 MHz
-20.0										1.850	Stop Freq 000000 GHz
-40.0									1	182. <u>Auto</u>	CF Step 000000 MHz Man
-60.0	alan yan yang ang ang ang ang ang ang ang ang ang			1.1 <u>.1.5.1.5.</u>		terner fra Brann Andre Andr	desetation of the deseted of the des			F	r eq Offset 0 Hz
-70.0										s Log	Scale Type Lin
Start 0.03 #Res BW			#VBW	3.0 MHz			Sweep 2	Stop 1.8 2.427 ms (3	500 GHz 3641 pts)	Log	
MSG							STATU	5			

Plot 6-70. Conducted Spurious Plot (Band 2 - 3.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 6-71. Conducted Spurious Plot (Band 2 - 3.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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	pectrum Analyz	er - Swept SA								
LXU RL	RF	50 Ω DC	CORREC	Trig: Free		#Avg Typ	e: RMS	TRAC	E 1 2 3 4 5 6 E A WWWW T A N N N N N	Frequency
10 dB/div	Ref 0.0	00 dBm	IFGain:Low	Atten: 10) dB		Mł	(r1 18.91		Auto Tune
-10.0									DL1 -13.00 dBm	Center Freq 15.000000000 GHz
-20.0										Start Freq 10.000000000 GHz
-40.0									1	Stop Freq 20.000000000 GHz
-60.0		antigation and the first second s	ti na sela seguri l'in secondario da secondario d	• • • • • • • • • • • • • • • • • • •		y dinana harayanya ya sa manana harayan ya			naðskarð skilli þýðaga Gapaniar filmiði sjókaga	CF Step 1.00000000 GHz <u>Auto</u> Man
-70.0										Freq Offset 0 Hz
-90.0										Scale Type
Start 10. #Res BW		2	#VBV	V 3.0 MHz		s	weep 1	20 Stop 17.33 ms (2	000 9112	
MSG							STAT			

Plot 6-72. Conducted Spurious Plot (Band 2 - 3.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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6.4 Band Edge Emissions at Antenna Terminal

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at 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 $43 + \log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03 - Section 6.0

Test Settings

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

Test Setup

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

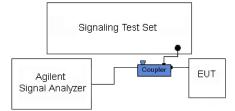


Figure 6-3. Test Instrument & Measurement Setup

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Test Notes

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

Per 27.53(c)(5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 - 775MHz and 793 - 805MHz band, the FCC limit per 27.53(c)(4) is $65 + 10log_{10}(P) = -35dBm$ in a 6.25kHz bandwidth.

Some plots below show a VBW slightly less than 3xRBW. However it has been determined that this does not impact the measurement since the VBW is very close to 3xRBW.

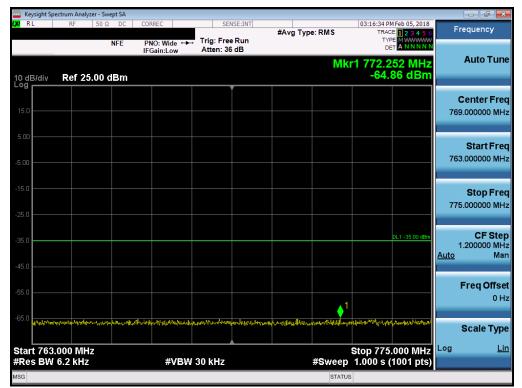
FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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Band 13

Keysight Spectrum Analys RL RF		CORREC	SENSE:INT			PM Feb 02, 2018	Frequency
	NFE	PNO: Wide 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB	#Avg Type: I	T	ACE 1 2 3 4 5 6 YPE A WWWWW DET A N N N N N	Frequency
0 dB/div Ref 25	i.00 dBm				Mkr1 776. -18	992 MHz .65 dBm	Auto Tu
15.0					~ where a free the out has	pm Calumbur 1	Center Fr 777.000000 M
i.00						DL1 -13.00 dBm	Start Fr 775.000000 M
5.0		and the second sec					Stop Fr 779.000000 M
5.0							CF St 400.000 k Auto M
5.0							Freq Offs 0
enter 777.000 M	IHz				Span	4.000 MHz	Scale Ty Log <u>l</u>
enter 777.000 M Res BW 100 kHz		#VBW	300 kHz	Sv	Span veep 2.000 ms	4.000 MHz (1001 pts)	_og

Plot 6-73. Lower Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



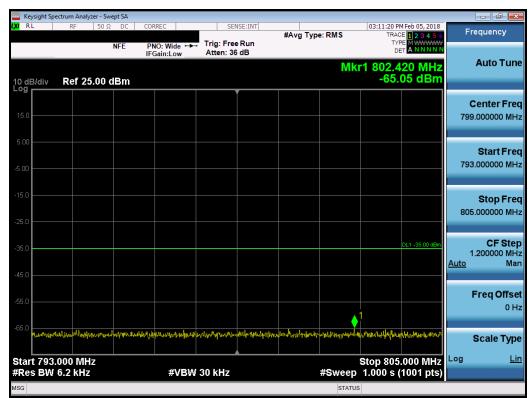
Plot 6-74. Lower Emission Mask Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

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	ectrum Analy:												
RL	RF	50 Ω C	E	orrec PNO: Wi	de 🖵	Trig: Free Atten: 36		#Avg Ty	pe:RMS	TRA	M Feb 02, 2018 CE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	F	requency
0 dB/div	Ref 25	.00 dBi		FGain:L	ow	Atten: 36	dB		Μ	kr1 787.(Auto Tur
15.0	~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			~							Center Fre 7.000000 MH
5.00												78	Start Fre 5.000000 Mi
25.0						- the second	1	mm	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	DL1 -13.00 dBm	78	Stop Fre 9.000000 Mi
5.0												<u>Auto</u>	CF Ste 400.000 kl M
5.0													Freq Offs 0
65.0												Log	Scale Ty
	87.000 M 100 kHz			#	VBW	300 kHz			Sweep	Span 4 2.000 ms	0000 1911 12	Log	-
G									STAT				

Plot 6-75. Upper Band Edge Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)



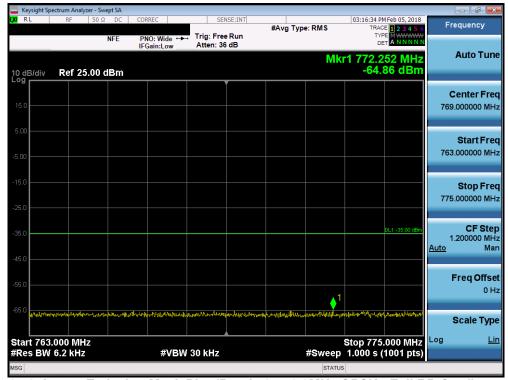
Plot 6-76. Upper Emission Mask Plot (Band 13 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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RL RL	Spectrum Analy RF	yzer - Swep 50 Ω		CORREC		0.5	NSE:INT			04-19-04 0	M Feb 02, 2018	_	
KL	KF		NFE		/ide 🖵		e Run	#Avg Typ	e:RMS	TRAC	DE 1 2 3 4 5 6 DE A WWWW A N N N N N	F	requency
0 dB/div	Ref 2	5.00 d	Bm	Ir Gain.					Mk	r1 776.9 -22.	84 MHz 82 dBm		Auto Tun
15.0													Center Fre 7.000000 M⊦
5.00								Jan Aral Mala and re	ind and a point of the second s	and the first and the second	DL1 -13.00 dBm	77	Start Fre 3.000000 Mł
25.0						hur-outerouters	1 month					78	Stop Fr 1.000000 M
15.0				م مرجع	and a second second							<u>Auto</u>	CF Ste 800.000 kl M
i5.0 ~~~~	and the second	Contraction of the second	mayor	<u>, </u>									Freq Offs 0
	777.000 N									Span 8	21111 000	Log	Scale Typ
Res BV	№ 100 kH	Z			#VBW	300 kHz			Sweep 4	1.000 ms (1001 pts)		
G									STATU	s			

Plot 6-77. Lower Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)



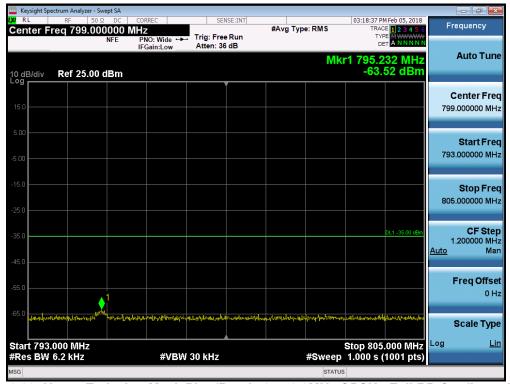
Plot 6-78. Lower Emission Mask Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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	pectrum Analy										
K <mark>(</mark> RL	RF	50 Ω DC NFE	CORREC			#Avg Typ	e: RMS	TRAC	M Feb 02, 2018 CE 1 2 3 4 5 6 DE A WWWWW A N N N N N	Fi	requency
0 dB/div	Ref 25	i.00 dBm					Mk	ar1 787.0 -20.	16 MHz 38 dBm		Auto Tun
15.0											Center Fre 7.000000 MH
5.00	<u>maka</u>	ju di Bibleneg di politi den di								78:	Start Fre 3.000000 M⊦
25.0				Last and a second	1	mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm	and a street of	mul	DL1 -13.00 dBm	79 [.]	Stop Fre 1.000000 MH
15.0								and the	the way way and the	<u>Auto</u>	CF Ste 800.000 kH Ma
i5.0											Freq Offs 0 I
enter 7	87.000 N	IHz						Span 8	.000 MHz	Log	Scale Typ
	100 kHz		#VBW	300 kHz			Sweep 4	1.000 ms (1001 pts)		
SG							STATU	S			

Plot 6-79. Upper Band Edge Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

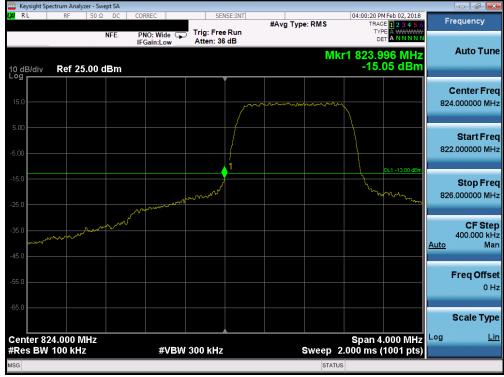


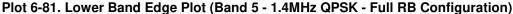
Plot 6-80. Upper Emission Mask Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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Band 5







Plot 6-82. Upper Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)

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	t Spectrum Analyz										
K <mark>I</mark> RL	RF	50 Ω DC	CORREC		SE:INT	#Avg Typ	e: RMS	TRAC	M Feb 02, 2018	F	requency
0 dB/div	Ref 25	NFE .00 dBm	PNO: Wide 🖵 IFGain:Low	Trig: Free Atten: 36			Mk	r1 824.0	00 MHz 69 dBm		Auto Tur
15.0					~~~~	mmmmm	har and	har	www.m		Center Fre 4.000000 MH
5.00									DL1 -13.00 dBm	822	Start Fre 2.000000 Mł
25.0			when the way	mark)					826	Stop Fre 5.000000 MF
35.0 ~~~	www.howw	www.								<u>Auto</u>	CF Ste 400.000 kl M
55.0											Freq Offs 0
65.0											Scale Typ
	824.000 M W 100 kHz		#VBW	300 kHz			Sweep 2	Span 4 2.000 ms (.000 MHz 1001 pts)	Log	Ĺ
SG							STATU	5			

Plot 6-83. Lower Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

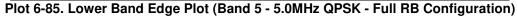


Plot 6-84. Upper Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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	ectrum Analyze	r - Swept S/	A								_	
XV RL	RF	50 Ω DO NFE	PN	REC │ O:Wide ⊂ ain:Low		ree Run	#Avg Ty	be: RMS	TRAC	M Feb 02, 2018 CE 1 2 3 4 5 6 PE A WWWWW A N N N N N	F	requency
0 dB/div	Ref 25.	00 dBn			Atten	CC UB		M	(r1 823.9 -21.	96 MHz 91 dBm		Auto Tun
15.0									www.www.	polonaround		Center Fre 4.000000 M⊦
5.00											82	Start Fre 2.000000 MH
25.0					A stranger	1.7				DL1 -13.00 dBm	82	Stop Fre 5.000000 MH
35.0	m	~~~~~	~^~~~~	muhan							<u>Auto</u>	CF Ste 400.000 kl Ma
i5.0												Freq Offs 0 I
	4.000 MI	łz							Span 4	.000 MHz	Log	Scale Typ
	100 kHz			#VB	W 300 kl	IZ		Sweep	2.000 ms (1001 pts)		





Plot 6-86. Upper Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX410UM		MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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	Spectrum Analy												
0 RL	RF	50 Ω NF	DC	CORREC PNO: W IFGain:L	ide 🖵	SE Trig: Fre Atten: 3		#Avg Typ	e: RMS	TRAC	M Feb 02, 2018 DE 1 2 3 4 5 6 PE A WWWWW ET A N N N N N	F	requency
0 dB/div	Ref 25	5.00 dB	3m						Mk	r1 823.9 -28.	92 MHz 00 dBm		Auto Tur
15.0													Center Fre 4.000000 M⊦
5.00								 angun an Arlane	the for the set of	<u>↓</u> ↓₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩		82	Start Fre
25.0							1.41				DL1 -13.00 dBm	82	Stop Fre 8.000000 MH
35.0 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		- Burkersey has	and prove	weeken and the second sec	har	an mark and the						<u>Auto</u>	CF Ste 800.000 kl Ma
55.0													Freq Offs 0
	324.000 N									Span 8	.000 MHz	Log	Scale Typ
Res BV	V 100 kHz	z		7	¢VB₩	300 kHz	:		Sweep 4	.000 ms ((1001 pts)		
G									STATU	5			

Plot 6-87. Lower Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)



Plot 6-88. Upper Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)

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