

# PCTEST

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# MEASUREMENT REPORT

LTE

#### **Applicant Name:**

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

# Date of Testing:

2/25 – 3/26/2020 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2002240025-03-R1.ZNF

# FCC ID:

### ZNFQ730AM

**APPLICANT:** 

LG Electronics USA, Inc.

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification LM-Q730AM LMQ730AM, Q730AM 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: 1M2002240025-03-R1.ZNF) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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



			EF EF	ERP		RP			
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)	Emission Designator	Modulation	
LTE Band 12	27	699.7 - 715.3	0.053	17.25	0.087	19.40	1M10G7D	QPSK	
LTE Band 12	27	699.7 - 715.3	0.040	15.98	0.065	18.13	1M10W7D	16QAM	
LTE Band 12	27	700.5 - 714.5	0.052	17.17	0.086	19.32	2M69G7D	QPSK	
LTE Band 12	27	700.5 - 714.5	0.040	16.00	0.065	18.15	2M69W7D	16QAM	
LTE Band 12	27	701.5 - 713.5	0.054	17.36	0.089	19.51	4M51G7D	QPSK	
LTE Band 12	27	701.5 - 713.5	0.046	16.62	0.075	18.77	4M51W7D	16QAM	
LTE Band 12	27	704 - 711	0.066	18.17	0.108	20.32	9M01G7D	QPSK	
LTE Band 12	27	704 - 711	0.054	17.32	0.089	19.47	9M03W7D	16QAM	
LTE Band 5	22H	824.7 - 848.3	0.049	16.89	0.080	19.04	1M09G7D	QPSK	
LTE Band 5	22H	824.7 - 848.3	0.037	15.73	0.061	17.88	1M09W7D	16QAM	
LTE Band 5	22H	825.5 - 847.5	0.050	16.95	0.081	19.10	2M68G7D	QPSK	
LTE Band 5	22H	825.5 - 847.5	0.040	15.98	0.065	18.13	2M69W7D	16QAM	
LTE Band 5	22H	826.5 - 846.5	0.050	16.97	0.082	19.12	4M50G7D	QPSK	
LTE Band 5	22H	826.5 - 846.5	0.041	16.09	0.067	18.24	4M50W7D	16QAM	
LTE Band 5	22H	829 - 844	0.048	16.78	0.078	18.93	9M03G7D	QPSK	
LTE Band 5	22H	829 - 844	0.040	16.00	0.065	18.15	8M95W7D	16QAM	

EUT Overview (<1 GHz)

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			EI	RP		
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Emission Designator	Modulation
LTE Band 66/4	27	1710.7 - 1779.3	0.117	20.67	1M09G7D	QPSK
LTE Band 66/4	27	1710.7 - 1779.3	0.099	19.94	1M10W7D	16QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.117	20.70	2M69G7D	QPSK
LTE Band 66/4	27	1711.5 - 1778.5	0.099	19.96	2M68W7D	16QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.118	20.72	4M52G7D	QPSK
LTE Band 66/4	27	1712.5 - 1777.5	0.098	19.90	4M51W7D	16QAM
LTE Band 66/4	27	1715 - 1775	0.118	20.72	8M97G7D	QPSK
LTE Band 66/4	27	1715 - 1775	0.100	19.99	9M01W7D	16QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.122	20.85	13M5G7D	QPSK
LTE Band 66/4	27	1717.5 - 1772.5	0.100	19.99	13M5W7D	16QAM
LTE Band 66/4	27	1720 - 1770	0.119	20.76	17M9G7D	QPSK
LTE Band 66/4	27	1720 - 1770	0.098	19.92	18M0W7D	16QAM
LTE Band 2	24E	1850.7 - 1909.3	0.124	20.92	1M10G7D	QPSK
LTE Band 2	24E	1850.7 - 1909.3	0.095	19.76	1M10W7D	16QAM
LTE Band 2	24E	1851.5 - 1908.5	0.126	21.01	2M70G7D	QPSK
LTE Band 2	24E	1851.5 - 1908.5	0.093	19.71	2M69W7D	16QAM
LTE Band 2	24E	1852.5 - 1907.5	0.121	20.82	4M53G7D	QPSK
LTE Band 2	24E	1852.5 - 1907.5	0.097	19.85	4M50W7D	16QAM
LTE Band 2	24E	1855 - 1905	0.126	20.99	9M02G7D	QPSK
LTE Band 2	24E	1855 - 1905	0.093	19.67	9M00W7D	16QAM
LTE Band 2	24E	1857.5 - 1902.5	0.122	20.88	13M5G7D	QPSK
LTE Band 2	24E	1857.5 - 1902.5	0.095	19.79	13M5W7D	16QAM
LTE Band 2	24E	1860 - 1900	0.117	20.70	18M0G7D	QPSK
LTE Band 2	24E	1860 - 1900	0.095	19.78	18M1W7D	16QAM

EUT Overview (Mid Bands)

		El	RP		
FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Emission Designator	Modulation
27	2307.5 - 2312.5	0.114	20.58	4M52G7D	QPSK
27	2307.5 - 2312.5	0.097	19.88	4M52W7D	16QAM
27	2310	0.130	21.13	9M01G7D	QPSK
27	2310	0.103	20.15	9M00W7D	16QAM
	Part 27 27 27 27	Part      Ix Frequency (MHz)        27      2307.5 - 2312.5        27      2307.5 - 2312.5        27      2307.5 - 2312.5        27      2307.5 - 2312.5	FCC Rule Part      Tx Frequency (MHz)      Max. Power (W)        27      2307.5 - 2312.5      0.114        27      2307.5 - 2312.5      0.097        27      2310      0.130	Part      Ix Frequency (MHz)      Max. Power (W)      Max. Power (dBm)        27      2307.5 - 2312.5      0.114      20.58        27      2307.5 - 2312.5      0.097      19.88        27      2310      0.130      21.13	FCC Rule Part      Tx Frequency (MHz)      Max. Power (W)      Max. Power (dBm)      Emission Designator        27      2307.5 - 2312.5      0.114      20.58      4M52G7D        27      2307.5 - 2312.5      0.097      19.88      4M52W7D        27      2310      0.130      21.13      9M01G7D

**EUT Overview (High 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 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 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: ZNFQ730AM**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 04721, 04739, 04747, 04754, 04792, 04853

### 2.2 Device Capabilities

This device contains the following capabilities:

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 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:

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 + 10 log<sub>10</sub>(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
-	LTx2	Licensed Transmitter Cable Set	10/30/2019	Annual	10/30/2020	LTx2
Agilent	N9020A	MXA Signal Analyzer	4/20/2019	Annual	4/20/2020	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	6/12/2019	Annual	6/12/2020	MY52350166
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	5/10/2019	Annual	5/10/2020	441112
Espec	ESX-2CA	Environmental Chamber	6/13/2019	Annual	6/13/2020	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/28/2018	Biennial	3/28/2020	128337
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	2/22/2019	Biennial	2/22/2021	128338
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/19/2019	Annual	4/19/2020	11401010036
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	6/5/2019	Annual	6/5/2020	100342
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/11/2019	Annual	7/11/2020	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/8/2019	Annual	7/8/2020	102133
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107

Table 5-1. Test Equipment

#### Notes:

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 2<sup>nd</sup> Harmonic (1564 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm - (-24.80).

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# 7.0 TEST RESULTS

# 7.1 Summary

Company Name:	LG Electronics USA, Inc.
FCC ID:	ZNFQ730AM
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			Section 7.2
2.1051 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Out of Band Emissions	> 43 + 10 log₁₀ (P[Watts]) at Band Edge and for all out-of-band emissions			Section 7.3, 7.4
27.53(m)	Out of Band Emissions	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.3, 7.4
27.53(a)	Out of Band Emissions	Undesirable emissions must meet the limits detailed in 27.53(a)	CONDUCTED	PASS	Section 7.3, 7.4
24.232(d) 27.50(d)	Peak-Average Ratio	< 13 dB			Section 7.5
2.1046	Transmitter Conducted Output Power	N/A			See RF Exposure Report
2.1055 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)			Section 7.8

7-1. Summary of Radiated 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 12)	< 3 Watts max. ERP			Section 7.6
24.232(c) 27.50(h)(2)	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
27.50(a)(3)	Equivalent Isotropic Radiated Power (Band 30)	< 0.25 Watts max. EIRP			Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions (Band 12, 66/4, 2)	> 43 + 10 log <sub>10</sub> (P[Watts]) for all out-of-band emissions			Section 7.7
27.53(a)	Undesirable Emissions (Band 30)	> 70 + 10 log <sub>10</sub> (P[Watts])			Section 7.7

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 5.3.
- 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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# Band 12



Plot 7-1. Occupied Bandwidth Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-2. Occupied Bandwidth Plot (Band 12 - 1.4MHz 16-QAM - Full RB Configuration)

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Image: NFE  Sexes:INT  10:57:00 PMMar 04,2020    NFE  Center Freq: 707.500000 MHz  Radio Std: None    #FGain:Low  #FFGain:Low  Avg Hold: 100/100    #FGain:Low  #Atten: 36 dB  Center Stress
NFE  Trig: Free Run  Avg Hold: 100/100    #HFGain:Low  #Atten: 36 dB  Radio Device: BTS    10 dB/div  Ref 40.00 dBm    20 0  Image: Clear With the state of the state
ID dB/div      Ref 40.00 dBm        10 dB/div      Ref 40.00 dBm        200
Log      Image: Clear With the second
Log      Image: Clear With the second
30.0
0.00 Avera
100 - 200
-40.0 Max H
Center 707.5 MHz Span 7.5 MHz
Res BW 68 kHz #VBW 220 kHz Sweep 12.53 ms Min H
Occupied Bandwidth Total Power 31.1 dBm
2.6870 MHz Detect
Pe
Transmit Freq Error -50 Hz % of OBW Power 99.00 %
x dB Bandwidth 2.905 MHz x dB -26.00 dB
MSG STATUS

Plot 7-3. Occupied Bandwidth Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)



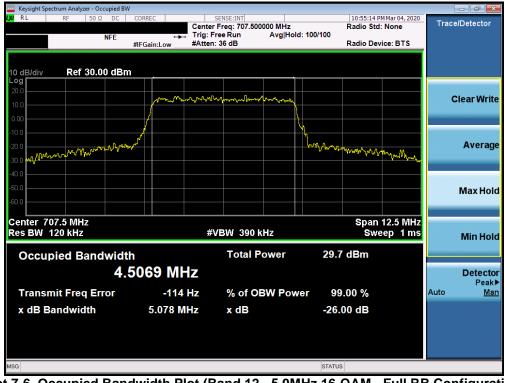
Plot 7-4. Occupied Bandwidth Plot (Band 12 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of registered	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-5. Occupied Bandwidth Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-6. Occupied Bandwidth Plot (Band 12 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of reservent	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-7. Occupied Bandwidth Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-8. Occupied Bandwidth Plot (Band 12 - 10.0MHz 16-QAM - Full RB Configuration)

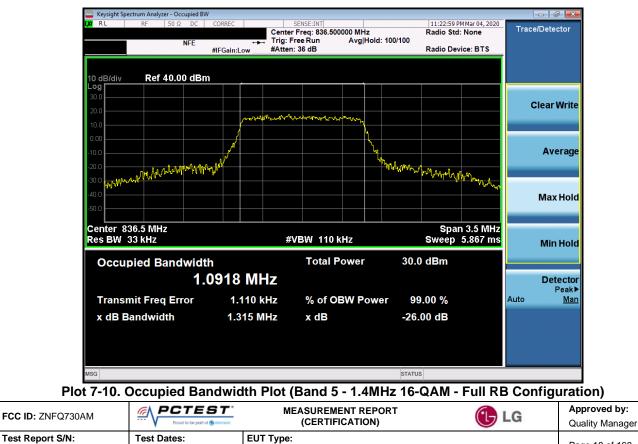
FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 17 of 100	
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# Band 5



Plot 7-9. Occupied Bandwidth Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



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Keysight Spectrum Analyzer - Occupied I	BW				
<mark>(X)</mark> RL RF 50Ω DC	CORREC	SENSE:INT Center Freg: 836.500000 MHz	11:13:15 PM Radio Std:	Mar 04, 2020	Trace/Detector
NFE	· <b>+</b>	Trig: Free Run Avg Hold	1: 100/100		
	#IFGain:Low	#Atten: 36 dB	Radio Devid	ce: BTS	
10 dB/div Ref 40.00 dB	m				
30.0					
20.0					Clear Write
10.0	- And Marken Marken	read han mill Mary hanged souther			
0.00	/				
-10.0					Average
-20.0			All without it with a second		
-20.0 -20.0 -30.0			Martine Maryan Martin Martin Martin	444	
-40.0				- AP + A	Max Hold
-50.0					Max Holu
Center 836.5 MHz		#\/D\W_000_FUE		7.5 MHz	
Res BW 68 kHz		#VBW 220 kHz	Sweep 1	12.53 ms	Min Hold
Occupied Bandwid	lth	Total Power	31.2 dBm		
	.6844 MI	<b>1</b> -7			Detector
2	.0044 1011	12			Peak►
Transmit Freq Error	-501.03 k	Hz % of OBW Pow	er 99.00 %		Auto <u>Man</u>
x dB Bandwidth	2.894 M	Hz x dB	-26.00 dB		
MSG			STATUS		

Plot 7-11. Occupied Bandwidth Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-12. Occupied Bandwidth Plot (Band 5 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupie	d BW					-	- <b></b>
<b>LXI</b> RL RF 50 Ω DO	C CORREC	SENSE:INT Center Freg: 836.500	000 MHz	11:10:40 PI Radio Std:	Mar 04, 2020	Trace	Detector
NFE		Trig: Free Run	Avg Hold: 100/100				
	#IFGain:Low	#Atten: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 30.00 d	Bm						
20.0							
10.0	man	-hannaharana	man			C	lear Write
0.00							
-10.0	r		l l				
			h				Average
-20.0 -30.0 Marina Marina Marina	Mr. Arena		hanne	Murry	Mumhann		Average
-40.0							
-50.0							Max Hold
-60.0							
Center 836.5 MHz				Span	12.5 MHz		
Res BW 120 kHz		#VBW 390 k	Hz		ep 1ms		Min Hold
		<b>T</b> - 4 - 1 D		e			
Occupied Bandwi		Total P	ower 30.	6 dBm			
	4.5020 M⊦	z					Detector
Transmit Frag Error	-3.343 k		3W Power 99	9.00 %		Auto	Peak▶ Man
Transmit Freq Error						Auto	IVIAII
x dB Bandwidth	4.951 M	Hz x dB	-26	.00 dB			
MSG			STATU	IS			

Plot 7-13. Occupied Bandwidth Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-14. Occupied Bandwidth Plot (Band 5 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🧫 Keysight Spectrum Analyzer - Occupied BW			
💢 RL RF 50 Ω DC CORREC	SENSE:INT Center Freg: 836.500000 MHz	11:01:35 PM Mar 04, 2020 Radio Std: None	Trace/Detector
NFE ++	Trig: Free Run Avg Hold: 10	00/100	
#IFGain:Low	#Atten: 36 dB	Radio Device: BTS	
10 dB/div Ref 30.00 dBm			
20.0			
months	Warry Lanne mar Har More providing my		Clear Write
10.0			
0.00			
-10.0			
-20.0		man and the second and the second sec	Average
-20.0 -30.0 -30.0 -30.0		and the second s	
-40.0			
-50.0			Max Hold
-60.0			
Center 836.5 MHz		Span 25 MHz	
Res BW 240 kHz	#VBW 750 kHz	Sweep 1 ms	Min Hold
	Total Power	30.8 dBm	
Occupied Bandwidth		30.8 UBIII	
9.0307 M	HZ		Detector
Transmit From Error 10 525	kHz % of OBW Power	99.00 %	Peak▶ Auto Man
Transmit Freq Error -19.525			Man
x dB Bandwidth 9.721	/Hz xdB	-26.00 dB	
MSG		STATUS	

Plot 7-15. Occupied Bandwidth Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)



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

FCC ID: ZNFQ730AM	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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# Band 66/4

w Keysight Spectrum Analyzer - Occupied BW				6		
K RL RF 50Ω DC	Trig:	SENSE:INT Freq: 1.745000000 GHz Free Run Avg Hold: n: 36 dB	11:47:09 PMM Radio Std: N 100/100 Radio Device	lone Trace/Detecto		
10 dB/div Ref 30.00 dBm						
10.0				ClearW		
-10.0 -20.0 -20.0 -20.0	NUN <sup>ACA</sup>	\ 	mmuny	NMM Avera		
40.0 50.0 60.0				MaxH		
Center 1.745 GHz Res BW 33 kHz		VBW 110 kHz	Sweep 5.	8.5 MHz 867 ms Min H		
	Occupied Bandwidth Total Power 30.0 dBm 1.0933 MHz					
Transmit Freq Error x dB Bandwidth	-1.491 kHz 1.268 MHz	% of OBW Powe x dB	r 99.00 % -26.00 dB	Per Auto <u>N</u>		
SG			STATUS			

Plot 7-17. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-18. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	PCTEST* Proud to be part of & element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - O											
LXIRL RF 50 S	Ω DC CO	RREC	SENSE		0000 GHz			11:43:50 P Radio Std	M Mar 04, 2020	Trac	e/Detector
	NFE		Trig: Free R	Run	Avg Hol	d: 1	100/100				
	#IF	Gain:Low	#Atten: 36 c	dB				Radio Dev	rice: BTS		
10 dB/div Ref 40.0	00 dBm	_									
30.0											
20.0											Clear Write
10.0		Manamil	a property and	and the second	montheast						
0.00						Ĺ					
-10.0		/				ì					Average
		/					and the second second	-			
-20.0 -30.0	warthy - north						Caro. Addition of	<sup>[hal</sup> yder Warner]	Howmonduppy		
-40.0											
-50.0											Max Hold
-30.0											
Center 1.745 GHz									ז 7.5 MHz		
Res BW 68 kHz			#VBW	V 220 k	Hz			Sweep	12.53 ms		Min Hold
Occupied Band	dwidth		-	fotal Po	ower		30.7	dBm			
Occupied Band							50.1	abiii			
	2.68	60 MF	1Z								Detector Peak▶
Transmit Freq Er	ror	691	Hz %	% of OE	W Pow	/er	99	.00 %		Auto	Man
x dB Bandwidth		2.908 M	ц., ,	dB			26 (	00 dB			
		2.900 W		uв			-20.0	JU UB			
MSG							STATUS				

Plot 7-19. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-20. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of reserved	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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Plot 7-21. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-22. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	_G	Approved by: Quality Manager
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Plot 7-23. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-24. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 25 of 169
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🔤 Keysight Spectrum Analyzer - C									[	
(X) RL RF 50	Ω DC C	ORREC	Center Fr	ISE:INT eq: 1.74500			11:35:43 P Radio Std	M Mar 04, 2020 : None	Trace	e/Detector
	NFE #I	FGain:Low	. Trig: Free #Atten: 36		Avg Hold	d: 100/100	Radio Dev	vice: BTS		
10 dB/div Ref 40.	00 dBm									
30.0										
20.0		Lucino (Bala	Muray	a children mart an bhi	ILNII ILIAN A ALA				C	lear Write
10.0				14 <b>1</b> 0 10 10 10 40 4						
0.00										Average
-10.0	A Day Bollyman	Â				Ma				Average
-20.0 -30.0	NAL AND AND						WILMMAN WIND	manytheman		
-40.0										Max Hold
-50.0										maxiloid
Center 1.745 GHz							Span	37.5 MHz		
Res BW 360 kHz			#VB	W 1.1 M	Hz			eep 1 ms		Min Hold
Occupied Ban	dwidth			Total P	ower	30.	4 dBm			
		192 MI								Detector
										Peak▶
Transmit Freq E	rror	-1.370	kHz	% of O	3W Pow	er 9	9.00 %		Auto	Man
x dB Bandwidth		14.82 N	lHz	x dB		-26	.00 dB			
MSG						STATU	IS			

Plot 7-25. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-26. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	.G	Approved by: Quality Manager
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🤤 Keysight Spectrum Analyzer - Occupie					
XX RL RF 50Ω DI	Cen →→→ Trig	SENSE:INT ter Freq: 1.745000000 GHz g: Free Run Avg Hol ten: 36 dB	11:30:44 Pi Radio Std: d: 100/100 Radio Dev		Trace/Detector
10 dB/div <b>Ref 30.00 d</b>	Bm				
20.0	wathorsame	mation provide the state of the			Clear Write
0.00 -10.0 -20.0	warmall				Average
-30.0			W. M. W.	Amerika Albana	
-60.0 Center 1.745 GHz			Snal	n 50 MHz	Max Hold
Res BW 470 kHz	dth	#VBW 1.5 MHz Total Power		ep 1 ms	Min Hold
	17.940 MHz				Detector Peak▶
Transmit Freq Error x dB Bandwidth	3.179 kHz 19.34 MHz	% of OBW Pow x dB	ver 99.00 % -26.00 dB		Auto <u>Man</u>
MSG			STATUS		

Plot 7-27. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-28. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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# Band 2



Plot 7-29. Occupied Bandwidth Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-30. Occupied Bandwidth Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager	
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🔤 Keysight Spectrum Analyzer - Occupie	d BW				
<b>LX/</b> RL RF 50Ω A	C CORREC	SENSE:INT Center Freg: 1.88000	ALIGN AUTO	07:20:07 PM Mar 06, 2020 Radio Std: None	Trace/Detector
	↔	💷 Trig: Free Run	Avg Hold: 100/100	Radio Sta. None	
	#IFGain:Low	#Atten: 36 dB		Radio Device: BTS	
10 dB/div Ref 40.00 d	Bm				
Log 30.0					
					Clear Write
20.0	Morgano	man marine and a second	h-row M		
10.0					
0.00					
-10.0	AND				Average
-20.0	~11, ^11, h.		"han have	when the month of the state of	
-30.0					
-40.0					Max Hold
-50.0					
Center 1.880000 GHz		#VDW 2201		Span 7.500 MHz	
Res BW 68 kHz		#VBW 2201	KHZ	Sweep 3.8 ms	Min Hold
Occupied Bandwi	dth	Total F	ower 31.4	4 dBm	
	2.6955 M	ΠZ			Detector Peak▶
Transmit Freq Error	3.020	kHz % of O	BW Power 99	9.00 %	Auto <u>Man</u>
x dB Bandwidth	2.913	/Hz xdB	-26	00 dB	
MSG			STATU	s	

Plot 7-31. Occupied Bandwidth Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-32. Occupied Bandwidth Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	.G	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 20 of 160
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Keysight Spectrum Analyzer - Occupied B <sup>1</sup>	N					
LXX RL RF 50Ω AC	CORREC	SENSE:INT Center Freg: 1.8800		GN AUTO 07:14:25 PI Radio Std:	M Mar 06, 2020	Trace/Detector
		Trig: Free Run	Avg Hold: 10	0/100		
	#IFGain:Low	#Atten: 36 dB		Radio Dev	ice: BTS	
10 dB/div Ref 30.00 dBr	n <u> </u>					
20.0						
10.0	mm	Marine and a second	mound			Clear Write
0.00	/					
-10.0	~~~		han	~~		•
-20.0 mmmmmm				when when a for	v~~R/hv/W(	Average
-30.0						
-40.0						
-50.0						Max Hold
-60.0			<u> </u>			
Center 1.880000 GHz Res BW 120 kHz		#VBW 3901			2.50 MHz ep 1 ms	
Res DW 120 KHZ		#VDVV J901	M12	300	ep mis	Min Hold
Occupied Bandwid	th	Total F	Power	31.0 dBm		
		I				Detector
4.	5254 M⊦					Detector Peak▶
Transmit Freq Error	-3.985 k	Hz % of O	BW Power	99.00 %		Auto <u>Man</u>
x dB Bandwidth	4.890 M	Hz xdB		-26.00 dB		
	4.000 m			20.00 08		
MSG				STATUS		

Plot 7-33. Occupied Bandwidth Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-34. Occupied Bandwidth Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied B\	N					
LX RL RF 50Ω AC	CORREC	SENSE:INT Center Freg: 1.88000		N AUTO 07:12:01 Pr Radio Std:	Mar 06, 2020	Trace/Detector
	••	Trig: Free Run	Avg Hold: 100	)/100		
	#IFGain:Low	#Atten: 36 dB		Radio Dev	ice: BTS	
10 dB/div Ref 40.00 dBr	n					
30.0						
20.0	In a first of		Amerikan			Clear Write
10.0	- Particular	ᡟᡅᡧ᠋ᠵ᠕ᡁᢧᢦᠹᡌᡎᢍ᠆ᡮᢑ᠆᠋ᡘᡊᠺᡭᢊᡃ᠋ᠴᠲ᠇	All all and a second second			
0.00	/		\			
-10.0			<u> </u>			Average
-20.0 Mithethouther mar	~u~~ <sup>n</sup>		Wy	white and a start of the start	March 10	
-30.0					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
-40.0						Max Hold
-50.0						Maxitore
Center 1.88000 GHz Res BW 240 kHz		#VBW 750 k	<b>U</b> -		5.00 MHz ep 1 ms	
Res BW 240 KHZ		#VDVV /JUK	.112	Swe	epinis	Min Hold
Occupied Bandwidt	th	Total P	ower	31.2 dBm		
	0167 MH	17				Detector
		12				Peak
Transmit Freq Error	6.802 k	Hz % of OE	BW Power	99.00 %		Auto <u>Man</u>
x dB Bandwidth	9.616 M	lHz x dB		-26.00 dB		
MSG				STATUS		

Plot 7-35. Occupied Bandwidth Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-36. Occupied Bandwidth Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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🔤 Keysight Spectrum Analyzer - Occupied B	W					
LXI RL RF 50Ω AC	CORREC	SENSE:INT Center Freg: 1.88000000	ALIGN AUTO	07:08:58 PM Mar 0 Radio Std: Non		Detector
		Trig: Free Run A	vg Hold: 100/100		-	
	#IFGain:Low	#Atten: 36 dB		Radio Device: B	ITS	
10 dB/div Ref 40.00 dB	m					
Log 30.0						
					Cle	ear Write
20.0	Mydown	๛๛๛โ๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛	Alehom			
10.0						
0.00						
-10.0	LANK		The local on	hallowhile		Average
-20.0 White Mary Mary Mary Market Market			and of the	- ter llo and and a flood	Whut	_
-30.0						
-40.0						/lax Hold
-50.0						
Center 1.88000 GHz				Span 37.50		
Res BW 360 kHz		#VBW 1.1 MHz		Sweep	1 ms	Min Hold
Occupied Bandwid	th	Total Pow	ver 31.	2 dBm		
1	3.532 MH	2				Detector Peak▶
Transmit Freq Error	-4.302 kH	z % of OBW	Power 9	9.00 %	Auto	Peak⊯ <u>Man</u>
x dB Bandwidth	14.63 MH	z x dB	-26	.00 dB		
	14.05 1111		-20	.00 08		
MSG			STATU	JS		

Plot 7-37. Occupied Bandwidth Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-38. Occupied Bandwidth Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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www.www.com analyzer - Occupied BW							[	
LXX RL RF 50Ω AC 0	CORREC	SENSE:INT Center Freg: 1.88000		ALIGN AUTO	07:02:23 P	Mar 06, 2020	Trace	e/Detector
	÷+-	Trig: Free Run	Avg Hold:	100/100				
	#IFGain:Low	#Atten: 36 dB			Radio Dev	ice: BTS		
10 dB/div Ref 40.00 dBm								
Log 30.0								
20.0							C	Clear Write
10.0	manung	๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛	normany					
0.00								
			l l					Average
-10.0 -20.0	, Maria		i.	Willendyby	s dia a			Average
					~ Ulvanting	when bornely the		
-30.0								
-40.0								Max Hold
-50.0								
Center 1.88000 GHz					Snan 5	0.00 MHz		
Res BW 470 kHz		#VBW 1.5 N	IHz			ep 1 ms		Min Hold
								MITHOU
Occupied Bandwidth		Total P	ower	31.1	dBm			
18	021 M⊦	7						Detector
								Peak▶
Transmit Freq Error	32.505 k	Hz % of O	BW Powe	r 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	19.35 M	Hz x dB		-26.0	)0 dB			
MSG				STATUS				

Plot 7-39. Occupied Bandwidth Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-40. Occupied Bandwidth Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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# Band 30



Plot 7-41. Occupied Bandwidth Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

Keysight Spectrum Analyzer - Occupied BW	CORREC	SENSE:INT	ALIGN AUTO	11:15:04 AM Feb 26, 2020	_	
	Ce +++ Tri	nter Freq: 2.310000000 GH		Radio Std: None Radio Device: BTS	Trace/E	)etector
0 dB/div Ref 40.00 dBm						
0.0	h		~~		Cle	ear Writ
0.00 0.0 0.0	~			Annana		Averag
					N	/lax Ho
enter 2.310000 GHz es BW 120 kHz		#VBW 390 kHz		Span 12.50 MHz Sweep 1 ms		Min Ho
Occupied Bandwidth 4.5	5168 MHz	Total Power	29.5	dBm		Detect
Transmit Freq Error x dB Bandwidth	-4.500 kHz 4.901 MHz	% of OBW Pc x dB		0.00 % 00 dB	Auto	Ma
3			STATUS	3		

Plot 7-42. Occupied Bandwidth Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
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🔤 Keysight Spectrum Analyzer - Occupied E	3W					-0	
<b>LXI</b> RF 50 Ω DC	CORREC	SENSE:INT Center Freg: 2.3100		IGN AUTO 11:02:56 Radio St	AM Feb 26, 2020	Trace/De	etector
	- <b>+</b> -	Trig: Free Run	Avg Hold: 1		a. None		
	#IFGain:Low	#Atten: 36 dB		Radio De	evice: BTS		
10 dB/div Ref 40.00 dB	m						
Log 30.0							
20.0						Clea	ar Write
	mannen	warman and a show a few or a	mar allow many				
10.0	1						
0.00	/		I∖				
-10.0			<u> </u>			4	verage
-20.0 minung market	~~~			- bourbour man	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
-30.0							
-40.0						м	ax Hold
-50.0							
Center 2.31000 GHz				Span	25.00 MHz		
Res BW 240 kHz		#VBW 7501	КНИ	21	/eep 1 ms	M	lin Hold
Occupied Bandwid	th	Total F	Power	31.1 dBm			
		I_				_	
9	.0147 M⊦	1Z				D	etector Peak►
Transmit Freq Error	191	Hz % of O	BW Power	99.00 %		Auto	Man
x dB Bandwidth	9.865 M	Hz x dB		-26.00 dB			
	3.003 M			-20.00 dB			
MSG				STATUS			

Plot 7-43. Occupied Bandwidth Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-44. Occupied Bandwidth Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFQ730AM	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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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 10<sup>th</sup> harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

# 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

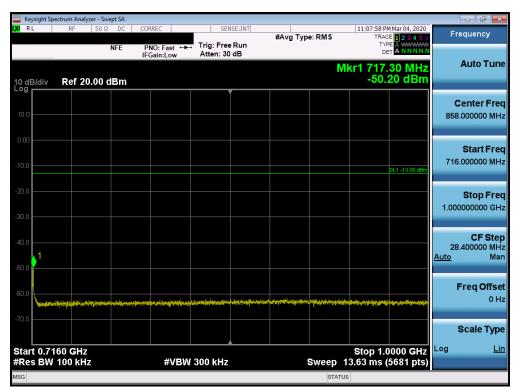
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent 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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			lyzer - Swep			_	_			_	_			
l <b>xi</b> Ri	L	RF	50 Ω	DC	CORREC		SEI	SE:INT	#Avg Typ	e RMS		Mar 04, 2020	F	requency
			Ν	NFE	PNO: Fa	ast ↔ .ow	Trig: Free Atten: 30				TYF			
10 dE Log	3/div	Ref 2	0.00 di	Bm						N	/kr1 695. -44.	20 MHz 22 dBm		Auto Tune
10.0														Center Freq 3.950000 MHz
0.00 -10.0												DL1 -13.00 dBm	3	Start Freq 0.000000 MHz
-20.0 -30.0													69	Stop Freq 7.900000 MHz
-40.0 -50.0												1	61 <u>Auto</u>	<b>CF Step</b> 5.790000 MHz Man
-60.0														Freq Offset
-70.0	ta faranga filan Ta Marata Jawa									a destant a start a start A start a start				0 Hz
-70.0														Scale Type
	t 30.0 s BW	MHz 100 kH	17			źvew	300 kHz		s	weep 3	Stop 6 2.06 ms (1	97.9 MHz 3359 pts)	Log	<u>Lin</u>
MSG		100 10					000.1112			STATI		oo oo proy		

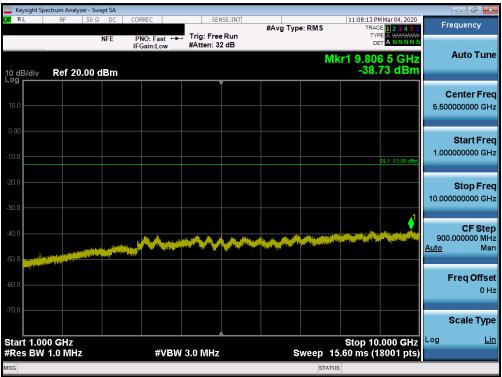
Plot 7-45. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



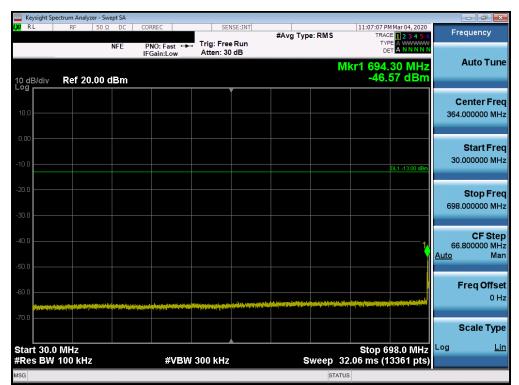
Plot 7-46. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-47. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



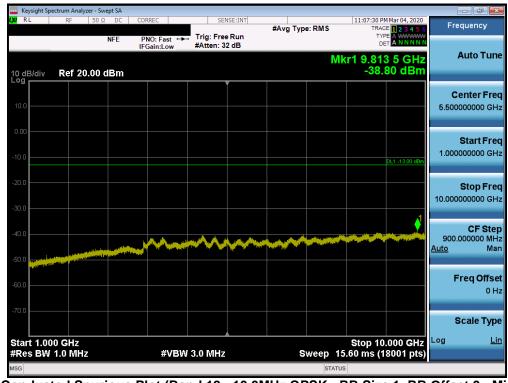
Plot 7-48. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFQ730AM	Proved to be part of reserved	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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			alyzer - Swep	pt SA											
LX/ RL		RF	50 Ω	DC	CORRE	C		SENSE:INT	#Av	g Type: RMS	s		M Mar 04, 2020	Fr	equency
			Ν	NFE		:Fast ∺ n:Low		Free Run n: 30 dB		a .)po	-	T) E			
10 dB Log r	3/div	Ref 2	20.00 di	Bm							Mł	(r1 716 -43	.30 MHz .35 dBm		Auto Tune
10.0 -															<b>Center Freq</b> .000000 MHz
0.00 -													DL1 -13.00 dBm	716	Start Freq .000000 MHz
-20.0 - -30.0 -														1.000	<b>Stop Freq</b> 0000000 GHz
-40.0	1													28 <u>Auto</u>	<b>CF Step</b> 400000 MHz Man
-60.0	 	idea Ray Minis	ykabliggen by	per seguration of	n all an yay a labi	if the free spinely de	y le for follyb	ite, nation in the state of the	un ei fangel an	<del>riyatiy</del> filo <del>naii)).Ry</del>	Hay Vaiges	<del>Maganjayapaga</del>	lan tanan ganta sala ang la	-	F <b>req Offset</b> 0 Hz
-70.0 -															Scale Type
	t 0.716 s BW 1					#VB۱	W 300 I	kHz		Swee	ep 1:	Stop 1. 3.63 ms	0000 GHz (5681 pts)	Log	Lin
MSG											STATUS				

Plot 7-49. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



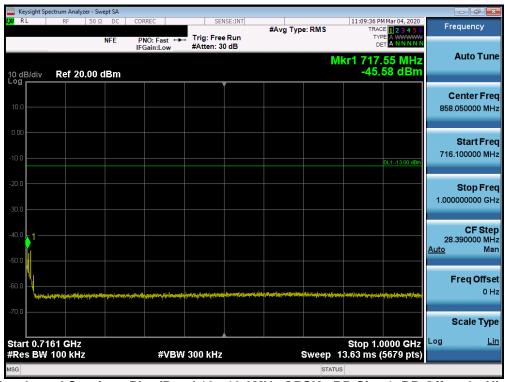
Plot 7-50. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFQ730AM	Proved to be part of reservent	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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			nalyzer - Swe											
<b>l,XI</b> RI	L	RF	50 Ω	DC	CORREC		SEI	ISE:INT	#Avg Typ	e: RMS		1 PM Mar 04, 2020 RACE 1 2 3 4 5 6	Fr	equency
				NFE	PNO: IFGair	Fast ↔ Hast →	Trig: Free Atten: 30							
10 dE Log	3/div	Ref	20.00 d	IBm							Mkr1 69 -4	07.85 MHz 0.96 dBm		Auto Tune
10.0														Center Freq .000000 MHz
0.00 -10.0												DL1 -13.00 dBm	30	Start Freq 0.000000 MHz
-20.0 -30.0													698	Stop Freq 0000000 MHz
-40.0 -50.0												1	66 <u>Auto</u>	<b>CF Step</b> 8.800000 MHz Man
-60.0			an den tel a dira di tel di Li ga a tel apate nga a sa	n de mandele ja su	u kangandaran mu karpadara	a fall a landar a tra tra tra Gal David a tra tra tra tra tra tra tra tra tra t	an a fan ti san		alegaeta (nel constante) a secondo					F <b>req Offset</b> 0 Hz
-70.0														Scale Type
	t 30.0   s BW 1		Hz			#VBW	300 kHz		s	weep	Stop 32.06 ms	698.0 MHz (13361 pts)	Log	<u>Lin</u>
MSG										STA	TUS			

Plot 7-51. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-52. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFQ730AM	Proved to be part of & element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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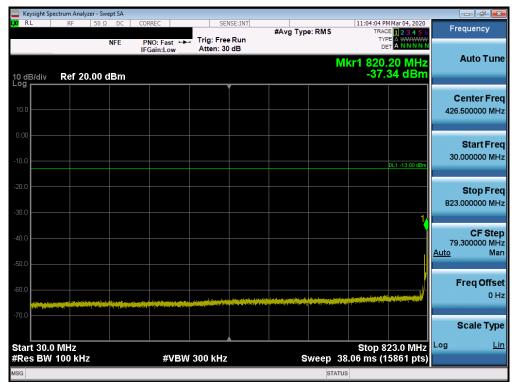


			alyzer - Swe										_	
l <b>XI</b> R	L	RF	50 Ω	DC	CORRE	C	SE	NSE:INT	#Avg Typ	e RMS		M Mar 04, 2020	Freq	uency
				NFE		:Fast ↔ n:Low	Trig: Fre #Atten: 3				TYI Di			
10 dE Log	3/div	Ref 2	20.00 c	lBm						MI	kr1 9.99 -35.	8 0 GHz 15 dBm	A	uto Tune
10.0								• •						<b>nter Freq</b> 00000 GHz
0.00 -10.0												DL1 -13.00 dBm		Start Freq 00000 GHz
-20.0 -30.0												1		<b>Stop Freq</b> 00000 GHz
-40.0 -50.0				-	Mier <sup>14</sup>	<b>A</b>	~~~	$\sim$					900.00 <u>Auto</u>	<b>CF Step</b> 00000 MHz Man
-60.0													Fr	e <b>q Offset</b> 0 Hz
-70.0														cale Type
	t 1.00 s BW					#VBM	/ 3.0 MHz			weep 1	Stop 10 5.60 ms (1	.000 GHz 8001 pts)	Log	Lin
MSG										STATU				

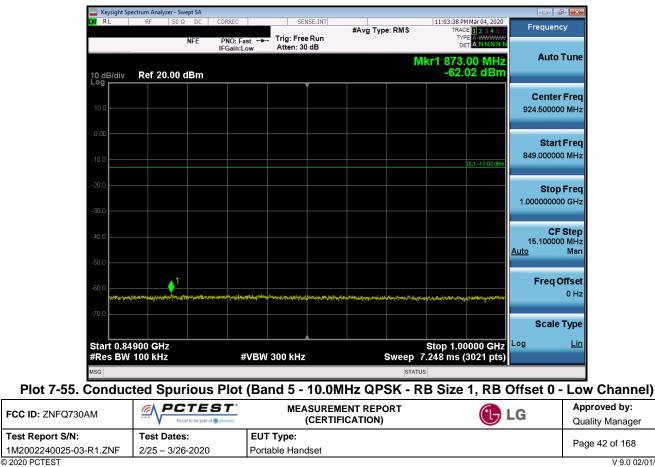
Plot 7-53. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFQ730AM	Pctest Proud to be part of & element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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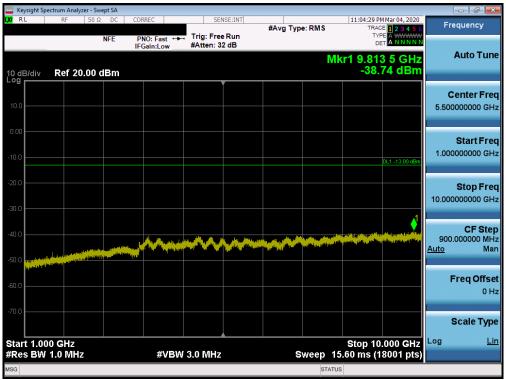


Plot 7-54. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



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Plot 7-56. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-57. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFQ730AM	Proved to be part of (® element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager						
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			alyzer - Swep										_	
l <b>xi</b> Ri	L	RF	50 Ω	DC	CORREC		SEI	ISE:INT	#Avg Typ	e: RMS		Mar 04, 2020	Fr	equency
			N	IFE	PNO: F IFGain:	ast 🔸	Trig: Free Atten: 30				TYF			
					ir Gain.	LOW	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			M	lkr1 849.	75 MHz		Auto Tune
10 dE Log i	3/div	Ref 2	20.00 di	Bm							-53.	53 dBm		
209													0	enter Freq
10.0	<u> </u>													500000 MHz
0.00														Start Freq
													849	.000000 MHz
-10.0												DL1 -13.00 dBm		
-20.0														
													1.000	Stop Freq
-30.0	<u> </u>												1.000	000000 GH2
														OF Oton
-40.0													15	CF Step .100000 MHz
	1												<u>Auto</u>	Man
-50.0	<u>,</u> ' —													
-60.0													i	req Offset
	Withhereite		Lauticephysersphylo	transformation of the	market and a second	-thistophylesol	All the second	and the second	Manageria and Manageria	-	to gasharing in alla to a	of the second states of the		0 Hz
-70.0														
													:	Scale Type
Star	t 0.84	900 G	Hz								Stop 1.00	0000 GHz	Log	Lin
	s BW					#VBW	300 kHz			Sweep	7.248 ms (			
MSG										STATU	IS			

Plot 7-58. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



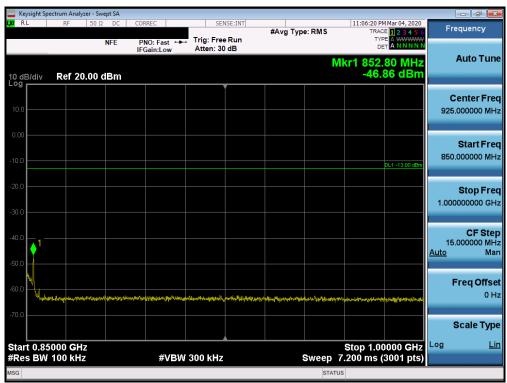
Plot 7-59. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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				Swept SA										
L <mark>XI</mark> R	L	RF	5	0Ω DC	COR	REC	SEI	NSE:INT	#Avg Typ	e: RMS		M Mar 04, 2020	Fr	equency
				NFE	IFG	O: Fast ↔ ain:Low	Trig: Free Atten: 30				ית ומ 1kr1 822			Auto Tune
10 dE Log	3/div	Re	1 20.0	0 dBm						1	-30.			
10.0														<b>enter Freq</b> .000000 MHz
0.00 -10.0												DL1 -13.00 dBm	30	Start Freq .000000 MHz
-20.0 -30.0													824	<b>Stop Freq</b> .000000 MHz
-40.0													79 <u>Auto</u>	<b>CF Step</b> .400000 MHz Man
-60.0			n ( a secol di Storma etta) Angela di Starga ( 11 angel						A Johnson (M) - standard (M) - State get two of the State (M) - st			1		F <b>req Offset</b> 0 Hz
-70.0														Scale Type
	t 30.0 s BW					#VBV	V 300 kHz		s	weep 3	8 Stop 8.11 ms (1	24.0 MHz 5881 pts)	Log	<u>Lin</u>
MSG										STATU	JS			

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



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

FCC ID: ZNFQ730AM	Proved to be part of relevant	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-62. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

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## Band 66/4

	trum Analyzer - Swept SA					- 6 <b>-</b>
X/RL	RF 50 Ω D0	C CORREC	SENSE:INT	#Avg Type: RMS	11:33:14 PM Mar 04, 2020 TRACE 1 2 3 4 5 6	Frequency
	NFE	PNO: Fast 🔸	Trig: Free Run Atten: 30 dB		DET A NNNNN	
10 dB/div	Ref 20.00 dBn	n		М	kr1 1.709 0 GHz -25.41 dBm	Auto Tune
10.0						Center Free 869.500000 MH
0.00						Otart Era
-10.0					DL1 -13.00 dBm	Start Fre 30.000000 MH
20.0					1,	<b>Stop Fre</b> 1.709000000 GH
30.0						CF Ste
40.0					V	167.900000 MH Auto Ma
50.0	home and have a state of the second second second				and the second	
-60.0						Freq Offse 0 H
-70.0						Scale Typ
Start 0.030 #Res BW 1		#VBW	3.0 MHz	Sweep	Stop 1.7090 GHz 2.239 ms (3359 pts)	Log <u>Li</u>
ISG		<i>"</i> •• <b>B</b> ••		STATU		

Plot 7-63. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-64. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFQ730AM	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	Spectrum Analyzer - Sv										j X
(X/ RL	RF 50 S	Ω DC C	ORREC	SEI	NSE:INT	#Avg Typ	e: RMS	TRAC	MMar 04, 2020	Frequer	су
	_		PNO: Fast ↔ FGain:Low	, Trig: Free Atten: 30				DE		Auto	Tune
10 dB/div Log	Ref 20.00	dBm					Mkr	1 19.51 -35.	5 5 GHz 63 dBm	Auto	Tune
											r Freq
10.0										15.0000000	00 GHz
0.00										Star	tFreq
-10.0									DL1 -13.00 dBm	10.0000000	00 GHz
-20.0										Stor	o Freq
-30.0										20.0000000	
-30.0											Step
-40.0	de la colta de La colta de la c	and a support of the second		a de la constante de la consta La constante de la constante de	and Parameters and a second			MANAGAR	and a second	1.00000000 Auto	
-50.0										<u>/////////////////////////////////////</u>	man
-60.0										Freq	Offset 0 Hz
-70.0											0 112
										Scale	туре
	.000 GHz							Stop 20	.000 GHz	Log	Lin
	V 1.0 MHz		#VBV	/ 3.0 MHz		S		· ·	0001 pts)		
MSG							STATUS	5			

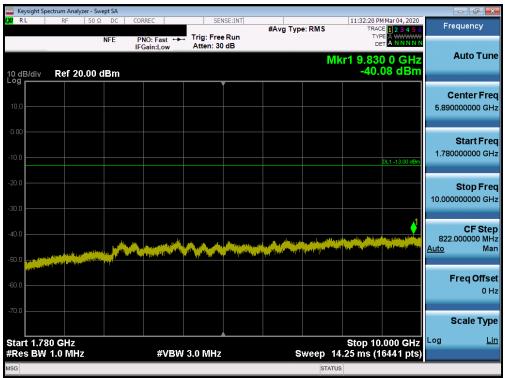
Plot 7-65. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



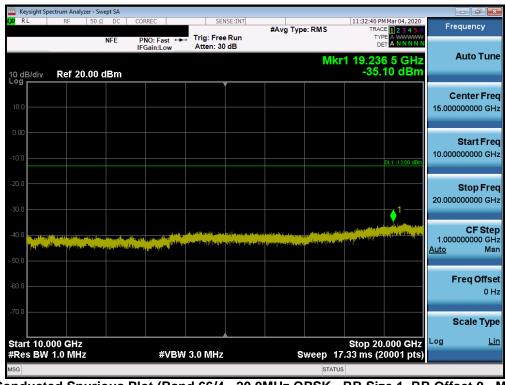
Plot 7-66. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFQ730AM	Proved to be part of & element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-67. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



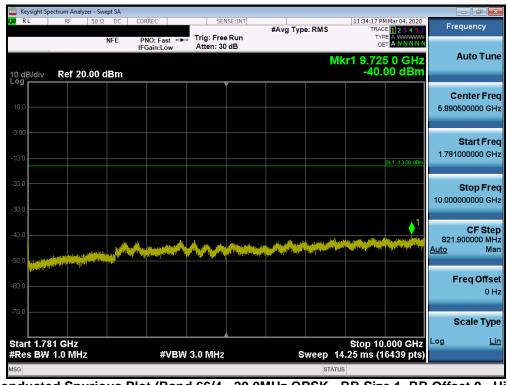
Plot 7-68. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFQ730AM	Proved to be part of (® element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: Test Dates:		EUT Type:		Dage 40 of 169
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	ectrum Analyze										d X
L <mark>XI</mark> RL	RF	50 Ω DC	CORREC	SEI	SE:INT	#Avg Typ	e: RMS	TRAC	Mar 04, 2020	Freque	ncy
		NFE	PNO: Fast ++ IFGain:Low	Trig: Free Atten: 30							
			II Guilleow				М	kr1 1.70	8 0 GHz	Aut	o Tune
10 dB/div	Ref 20.	00 dBm						-50.	39 dBm		
										Cent	er Freg
10.0										870.0000	
0.00										Sta	rt Freq
-10.0											000 MHz
-10.0									DL1 -13.00 dBm		
-20.0										Sto	p Freq
										1.7100000	
-30.0											
-40.0											F Step
-40.0									1	168.0000 <u>Auto</u>	000 MHz Man
-50.0								and a sure balance allocations	No. of Lot of		man
*****	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		فالمترا المدرية بالمترجع والمتداسمان	a nya niya kata kata ya ka kata ya kata kata kat	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	i der for det for de ser de ser ser ser ser ser ser ser ser ser se				Free	Offset
-60.0											0 Hz
-70.0											
-70.0										Scal	е Туре
								0		Log	Lin
Start 0.03 #Res BW			#VBM	/ 3.0 MHz			Sweep	Stop 1./ 2.240 ms (	7100 GHz 3361 pts)	-	
MSG							STATU				

Plot 7-69. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-70. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFQ730AM	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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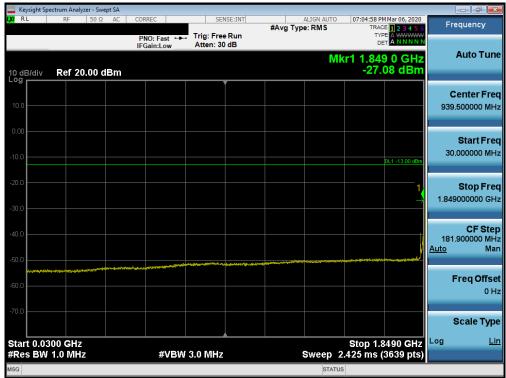


			alyzer - Swe											
l <b>,XI</b> R	L	RF	50 Ω	DC	CORREC			ISE:INT	#Avg Typ	e: RMS	TRA	M Mar 04, 2020 CE 1 2 3 4 5 6	Fi	requency
				NFE	PNO: IFGain	Fast ⊶⊷ ∶Low	Trig: Free Atten: 30				T ت			
					II Ouiii					М	kr1 19.37	'9 0 GHz		Auto Tune
10 dE Log	B/div	Ref 2	20.00 d	IBm							-34	.88 dBm		
LUg								[						Center Freq
10.0	<u> </u>													0000000 GHz
0.00														Start Freq
-10.0													10.00	0000000 GHz
10.0												DL1 -13.00 dBm		
-20.0	<u> </u>													Stop Freq
													20.00	0000000 GHz
-30.0														
-40.0	the second second		La des alsos	that address of			n lan Dittation Thi the formation of the	والأورية المروحة أقوا	and the second second		And A DAMAGE PROVIDE	an and an and an and an and an and an and an		CF Step
	Naniti Di	يار بي مراجعة. الأربية إنتابة	ريماني ويشتريط ريماني ويشتريط	i fi sa sina ini i	Contracting of the	unial Statistic	الحيابك ومأتطله	aliter francis	ing participates at	and the sector	state of the split of the state of the state of the split of the split of the state of the state of the split s		1.00 <u>Auto</u>	0000000 GHz Man
-50.0														
														Freq Offset
-60.0														0 Hz
-70.0														
														Scale Type
Star	Lt 10.00	00 GH	z								Stop 2	0.000 GHz	Log	Lin
	s BW					#VBW	3.0 MHz		S	weep	17.33 ms (	20001 pts)		
MSG										STA	TUS			

Plot 7-71. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFQ730AM	Proved to be post of reservent	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-72. Conducted Spurious Plot (Band 2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



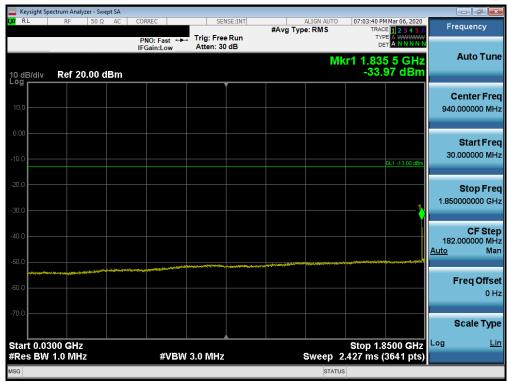
Plot 7-73. Conducted Spurious Plot (Band 2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFQ730AM	Proved to be part of (® element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-74. Conducted Spurious Plot (Band 2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



Plot 7-75. Conducted Spurious Plot (Band 2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFQ730AM	Pctest Proud to be part of & element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-76. Conducted Spurious Plot (Band 2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-77. Conducted Spurious Plot (Band 2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
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	Spectrum Analyz										×
LXI RL	RF	50 Ω AC	CORREC	SEN	ISE:INT	#Avg Typ	ALIGN AUTO e: RMS		4 Mar 06, 2020 E 1 2 3 4 5 6	Frequency	
			PNO: Fast ↔→ IFGain:Low	Trig: Free Atten: 30				TYF			
			IFGalli.Low	Atten: 00	40		Mk	r1 1 77	5 0 GHz	Auto Tu	une
10 dB/div Log	Ref 20	.00 dBm						-49.	07 dBm		
					/					Center F	rea
10.0										940.000000	
0.00										Start F	req
-10.0									DL1 -13.00 dBm	30.000000	ИНz
									0E1-13.00 0Dm		
-20.0										Stop F	req
-30.0										1.850000000	GHz
-30.0											
-40.0										CF S 182.000000 M	
									↓ <sup>1</sup>		Man
-50.0		And the second second		and the second	مۇيەرەمىدىمەيلەرچەردە مەر	an a		نيد اجلاع ا <sup>ير</sup> معدي اين اين اين اين اين اين اين اين اين اي	**********************		
-60.0										Freq Off	
										C	) Hz
-70.0											
										Scale Ty	уре
	300 GHz							Stop 1.8	500 GHz	Log	<u>Lin</u>
	V 1.0 MHz		#VBW	3.0 MHz					3641 pts)		
MSG							STATUS				

Plot 7-78. Conducted Spurious Plot (Band 2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-79. Conducted Spurious Plot (Band 2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFQ730AM	Proved to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage FE of 100
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Plot 7-80. Conducted Spurious Plot (Band 2 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFQ730AM	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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	ight Spect	trum Analy			00055			CENCE THE			07.04.0			
(RL		RF	50 Ω	AC	PNO:	Fast ↔	, Trig: F	ree Run	#Avg Typ	ALIGN AUTO De: RMS	TRAC	M Mar 06, 2020 CE <b>1 2 3 4 5</b> 6 PE A WWWWW A N N N N N	Fre	equency
0 dB/d	div	Ref 20	0.00 d	Bm	IFGal	II.LOW	, tuen.			M	(r1 2.28 -44.	8 0 GHz 22 dBm		Auto Tur
.og														enter Fre 000000 G⊦
0.00													30.	Start Fre
20.0													2.288	<b>Stop Fr</b> 000000 GI
10.0												<u>DL1 -40.00 d</u> <b>1</b>	225. <u>Auto</u>	CF Ste 800000 MI M
i0.0	n da anna da a	****		*****	**************************************	en produktionen anderen							F	F <b>req Offs</b> 0
													s Log	Scale Ty
	0.030 BW 1	GHz .0 MH	z			#VBV	V 3.0 MI	łz		Sweep 3	2 Stop 011 ms (	.288 GHz 4517 pts)	LOg	L
SG										STATUS				

Plot 7-81. Conducted Spurious Plot (Band 30 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



	FUU ID: ZNFQ730AM	Proud to be part of @element	(CERTIFICATION)	Quality Manager
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Plot 7-83. Conducted Spurious Plot (Band 30 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFQ730AM	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved b Quality Man	,
Test Report S/N:	Test Dates:	EUT Type:	Daga 50 of r	169
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# 7.4 Band Edge Emissions at Antenna Terminal

### **Test Overview**

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at 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 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 7-3. Test Instrument & Measurement Setup

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## Test Notes

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

Per 27.53(g) for operations in the 698-746 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.

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Plot 7-84. Lower Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



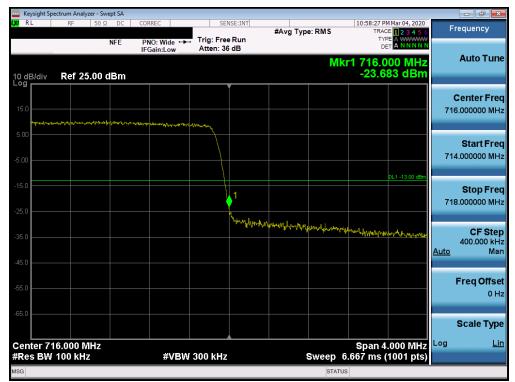
Plot 7-85. Upper Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of & element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Ar	• •					
XIRL RF	50 Ω DC	CORREC	SENSE:INT	#Avg Type: RMS	10:58:06 PM Mar 04, 2020 TRACE 1 2 3 4 5 6	Frequency
	NFE	PNO: Wide ↔ IFGain:Low	Trig: Free Run Atten: 36 dB			Auto Tun
10 dB/div Ref	25.00 dBm			Mk	r1 697.996 MHz -26.08 dBm	Auto Tuli
-09			Ĭ			Center Fre
15.0					water and the second of the second of the	698.000000 MH
5.00						Start Fre
5.00						696.000000 MH
					DL1 -13.00 dBm	
15.0						Stop Fre
-25.0			I AND A ROUND AND AND AND AND AND AND AND AND AND A	of advergenerative and whet		700.000000 MH
35.0	Anther Martin	Harter and monthly	ANAL CONTRACTOR			CF Ste
www.unwall						400.000 kH Auto Ma
45.0						
55.0						Freq Offs 0 H
05.0						UF
65.0						Scale Typ
enter 698.000	MHz				Span 4.000 MHz	Log <u>L</u>
Res BW 100 k		#VBW	300 kHz	Sweep 6	6.667 ms (1001 pts)	
SG				STATU	S	

Plot 7-86. Lower Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-87. Upper Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ730AM	PCTEST <sup>®</sup> Proud to be part of <b>®</b> element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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		zer - Swept SA								
XI RL	RF	50 Ω DC	CORREC	SENSE:INT	#Avg Type	RMS	10:56:09 PM TRACE	123456	Frequenc	зy
		NFE	PNO: Wide ↔ IFGain:Low	Trig: Free Run Atten: 36 dB			DET	A WWWWW A N N N N N		
10 dB/div	Ref 2	5.00 dBm				Mk	r1 697.99 -27.2	92 MHz 22 dBm	Auto	Tun
- <sup>og</sup>									Center	Free
15.0									698.00000	о мн
5.00							Jourson	and the second		
									Start 696.00000	
-5.00									090.00000	
-15.0						/		0L1 -13.00 dBm	Stop	Fre
-25.0				1		and the stand and and			700.00000	
	والمعادم والمعادم	wanne warmen	Newsources	and a second second second second	en and an and and and and and and and and					-
35.0									<b>CF</b> 400.00	0 kH
45.0									<u>Auto</u>	Ma
									Freq O	offse
-55.0										0 Н
65.0									Deale	<b>T</b>
									Scale	
Center 6 Res BW			#VBW	300 kHz		Sweep	Span 4. 6.667 ms (1	000 MHz 001 pts)	Log	Li
ISG						STATU	_			-

Plot 7-88. Lower Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-89. Upper Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)

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		zer - Swept SA								- 0 ×
X/RL	RF	50 Ω DC	CORREC	SENSE		ype: RMS		Mar 04, 2020	Fre	quency
		NFE	PNO: Wide ↔ IFGain:Low	Trig: Free R Atten: 36 di	un	,,	TYPE	AWWWW		
10 dB/div Log	Ref 2	5.00 dBm				Mk	r1 697.9 -29.7	84 MHz 79 dBm	4	Auto Tune
15.0										e <b>nter Fre</b> 000000 MH
5.00							ให้เข้ารักา-จะหระจะทั่งจะไฟ			Start Fre
-15.0				1		<u> </u>		JET 113.00 (18)		Stop Free
35.0	walnaker	Angel Arts and a property	-Yhad godin had when	hyr-yndorren ywrer					l <u>Auto</u>	<b>CF Ste</b> 300.000 kH Ma
55.0									F	r <b>eq Offse</b> 0 H
-65.0	98.000 N	1Hz					Span 8.	000 MHz		cale Typ
#Res BW			#VBW	300 kHz		Sweep 1	3.33 ms (1	1001 pts)		
ISG						STATU	5			

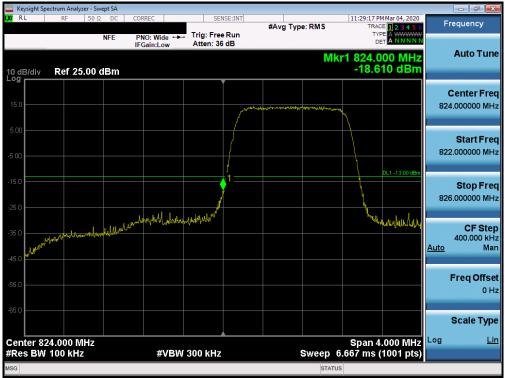
Plot 7-90. Lower Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-91. Upper Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)

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Plot 7-92. Lower Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



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	ectrum Analyzei										
X/RL	RF	50 Ω DC	CORREC	SEI	ISE:INT	#Avg Typ	e: RMS	11:14:20 PI TRAC	M Mar 04, 2020	F	requency
		NFE	PNO: Wide ↔ IFGain:Low	Atten: 36				TYF DE			
10 dB/div Log	Ref 25.0	00 dBm					Mk	r1 823.9 -25.	88 MHz 54 dBm		Auto Tune
15.0											Center Fred 4.000000 MHz
5.00					A Marine	halimetrik futuriana	e-showers and	an a	Manshattan	82	Start Fred 2.000000 MH:
-15.0					1				DL1 -13.00 dBm	82	Stop Fred 6.000000 MH:
-25.0 -35.0 <mark>ჯ.კესაქ</mark>	and the post of the second	waynawy	wymaellegadiostrationalitese	hand gerte gerte b						<u>Auto</u>	<b>CF Stej</b> 400.000 kH Ma
-45.0											Freq Offse 0 H
-65.0											Scale Type
Center 82 #Res BW	24.000 MF 100 kHz	z	#VBW	/ 300 kHz			Sweep_6	Span 4 .667 ms (	.000 MHz 1001 pts)	Log	Lir
//SG							STATUS				





Plot 7-95. Upper Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFQ730AM	Proved to be part of registered	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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