

PCTEST ENGINEERING LABORATORY, INC.

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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: 5/21 - 6/7/2019 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1905210082-03.ZNF

FCC ID:

ZNFX320AA

APPLICANT:

LG Electronics USA, Inc.

Application Type: Model: Additional Model(s): EUT Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification LM-X320AA LMX320AA, X320AA 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.

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



				RP			
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Emission Designator	Modulation	
LTE Band 12	27	699.7 - 715.3	0.043	16.31	1M10G7D	QPSK	
LTE Band 12	27	699.7 - 715.3	0.033	15.13	1M11W7D	16QAM	
LTE Band 12	27	700.5 - 714.5	0.042	16.28	2M71G7D	QPSK	
LTE Band 12	27	700.5 - 714.5	0.033	15.15	2M71W7D	16QAM	
LTE Band 12	27	701.5 - 713.5	0.042	16.28	4M58G7D	QPSK	
LTE Band 12	27	701.5 - 713.5	0.032	15.00	4M52W7D	16QAM	
LTE Band 12	27	704 - 711	0.047	16.74	9M01G7D	QPSK	
LTE Band 12	27	704 - 711	0.036	15.53	9M04W7D	16QAM	
LTE Band 5	22H	824.7 - 848.3	0.070	18.47	1M10G7D	QPSK	
LTE Band 5	22H	824.7 - 848.3	0.043	16.34	1M11W7D	16QAM	
LTE Band 5	22H	825.5 - 847.5	0.070	18.44	2M71G7D	QPSK	
LTE Band 5	22H	825.5 - 847.5	0.043	16.30	2M71W7D	16QAM	
LTE Band 5	22H	826.5 - 846.5	0.065	18.16	4M54G7D	QPSK	
LTE Band 5	22H	826.5 - 846.5	0.038	15.85	4M52W7D	16QAM	
LTE Band 5	22H	829 - 844	0.070	18.48	9M00G7D	QPSK	
LTE Band 5	22H	829 - 844	0.052	17.19	9M00W7D	16QAM	

EUT Overview (<1 GHz)

			EI	RP		
Mode	FCC Rule Part	Tx Frequency (MHz)	Max. Power (W)	Max. Power (dBm)	Emission Designator	Modulation
LTE Band 4	27	1710.7 - 1754.3	0.212	23.26	1M08G7D	QPSK
LTE Band 4	27	1710.7 - 1754.3	0.197	22.93	1M08W7D	16QAM
LTE Band 4	27	1711.5 - 1753.5	0.207	23.15	2M71G7D	QPSK
LTE Band 4	27	1711.5 - 1753.5	0.186	22.69	2M71W7D	16QAM
LTE Band 4	27	1712.5 - 1752.5	0.218	23.37	4M55G7D	QPSK
LTE Band 4	27	1712.5 - 1752.5	0.164	22.14	4M55W7D	16QAM
LTE Band 4	27	1715 - 1750	0.219	23.39	9M02G7D	QPSK
LTE Band 4	27	1715 - 1750	0.194	22.87	9M04W7D	16QAM
LTE Band 4	27	1717.5 - 1747.5	0.216	23.34	13M5G7D	QPSK
LTE Band 4	27	1717.5 - 1747.5	0.171	22.32	13M6W7D	16QAM
LTE Band 4	27	1720 - 1745	0.214	23.30	18M0G7D	QPSK
LTE Band 4	27	1720 - 1745	0.156	21.93	18M0W7D	16QAM
LTE Band 2	24E	1850.7 - 1909.3	0.269	24.29	1M11G7D	QPSK
LTE Band 2	24E	1850.7 - 1909.3	0.215	23.32	1M10W7D	16QAM
LTE Band 2	24E	1851.5 - 1908.5	0.263	24.20	2M72G7D	QPSK
LTE Band 2	24E	1851.5 - 1908.5	0.226	23.54	2M71W7D	16QAM
LTE Band 2	24E	1852.5 - 1907.5	0.269	24.30	4M54G7D	QPSK
LTE Band 2	24E	1852.5 - 1907.5	0.222	23.45	4M55W7D	16QAM
LTE Band 2	24E	1855 - 1905	0.270	24.31	8M98G7D	QPSK
LTE Band 2	24E	1855 - 1905	0.214	23.29	9M02W7D	16QAM
LTE Band 2	24E	1857.5 - 1902.5	0.264	24.22	13M5G7D	QPSK
LTE Band 2	24E	1857.5 - 1902.5	0.198	22.97	13M5W7D	16QAM
LTE Band 2	24E	1860 - 1900	0.270	24.31	17M9G7D	QPSK
LTE Band 2	24E	1860 - 1900	0.192	22.83	17M9W7D	16QAM

EUT Overview (>1 GHz)

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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: ZNFX320AA**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

Test Device Serial No.: 13365, 13423

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, Bluetooth (1x, EDR, LE), NFC

2.3 Test Configuration

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

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

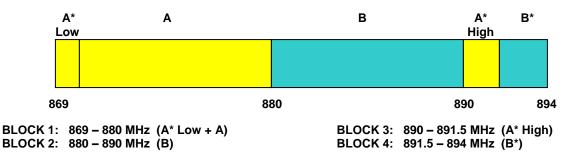
The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission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

3.2 Block A Frequency Range

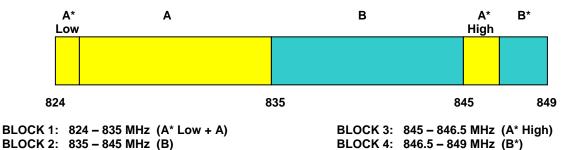
<u>698-746 MHz band</u>. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

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

3.3 Cellular - Base Frequency Blocks

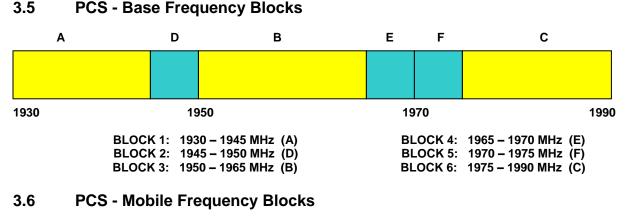


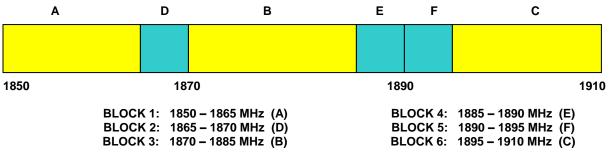
3.4 Cellular - Mobile Frequency Blocks



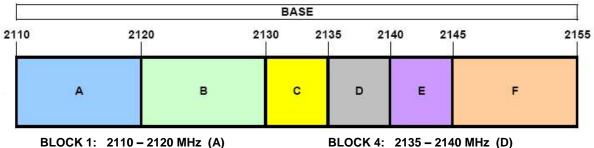
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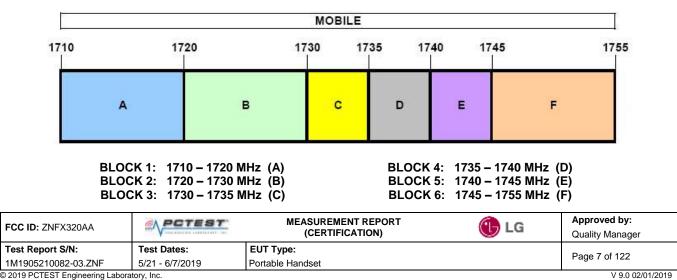


3.7 AWS - Base Frequency Blocks



BLOCK 1: 2110 - 2120 MHZ (A) 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 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 log₁₀(Power [Watts]).

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

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx3	LIcensed Transmitter Cable Set	8/23/2018	Annual	8/23/2019	LTx3
Agilent	N9038A	MXE EMI Receiver	6/11/2018	Annual	6/11/2019	MY51210133
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
Com-Power	PAM-103	Pre-Amplifier (1-1000MHz)	9/17/2018	Annual	9/17/2019	441119
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
Emco	3160-09	Small Horn (18 - 26.5GHz)	8/9/2018	Biennial	8/9/2020	00135427
Espec	ESX-2CA	Environmental Chamber	4/25/2019	Annual	4/25/2020	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	2/22/2019	Biennial	2/22/2021	00128338
Huber + Suhner	Sucoflex 102A	40GHz Radiated Cable Set	8/23/2018	Annual	8/23/2019	251425001
Mini Circuits	PWR-SEN-4GHS	USB Power Sensor	4/19/2019	Annual	4/19/2020	11401010036
Mini Circuits	TVA-11-422	RF Power Amp		N/A		QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator		N/A		11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester		N/A		102060
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	8/9/2018	Annual	8/9/2019	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/25/2018	Annual	6/25/2019	102133
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107

Table 5-1. Test Equipment

Notes:

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

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6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

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

Spurious Radiated Emission – LTE Band

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

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

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7.0 TEST RESULTS

7.1 Summary

Company Name:	LG Electronics USA, Inc.
FCC ID:	ZNFX320AA
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
Mode(s):	<u>LTE</u>

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A		PASS	Section 7.2
2.1051 22.917(a) 24.238(a) 27.53(g) 27.53(h)	Out of Band Emissions	> 43 + 10 log ₁₀ (P[Watts]) at Band Edge and for all out-of- band emissions			Section 7.3, 7.4
24.232(d)	Peak-Average Ratio	< 13 dB	CONDUCTED		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

Table 7-1. Summary of Conducted Test Results

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FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference	
22.913(a)(5)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 5)	< 7 Watts max. ERP		PASS	Section 7.6	
27.50(c)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 12)	< 3 Watts max. ERP				Section 7.6
24.232(c)	Equivalent Isotropic Radiated Power (Band 2)	< 2 Watts max. EIRP	RADIATED		Section 7.6	
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	< 1 Watts max. EIRP		Section 7.6		
2.1053 22.917(a) 24.238(a) 27.53(g) 27.53(h)	Undesirable Emissions (Band 12/5/4/2)	> 43 + 10 log ₁₀ (P[Watts]) for all out-of-band emissions			Section 7.7	

Table 7-2. Summary of Radiated Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots (Sections 7.2, 7.3, 7.4, 7.5) were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 4.8.
- 5) For operation <1GHz, the EIRP limits in the table above are referenced to the specifications written in the relevant Radio Standards Specifications for Innovation, Science, and Economic Development Canada.

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7.2 Occupied Bandwidth

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 - Section 4.2

Test Settings

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

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

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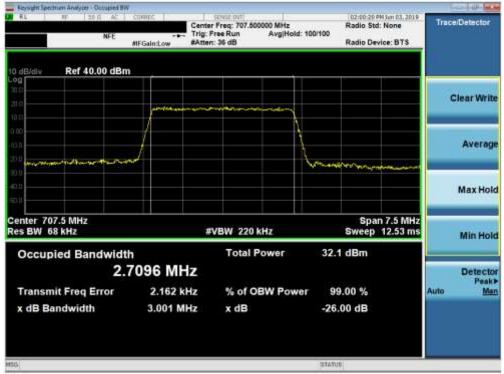
Plot 7-1. Occupied Bandwidth Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



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

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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)

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RL NF 30.0 AC	AlFGain:Low #Atter	rFreq: 707.500000 MHz FreeRun Avg Hold: 100 t: 36 dB	Radio Std: None Radio Device: BTS	Trace/Detector
0 dB/div Ref 35.00 dBn		manna		Clear Write
5.00 6.00 HE R M. 0	~		-	Averag
350 -60 50				Max Hok
Center 707.5 MHz Res BW 120 kHz		VBW 390 kHz Total Power	Span 12.5 MHz Sweep 1 ms 32.5 dBm	Min Hok
	n 5781 MHz -19.217 kHz 5.038 MHz	% of OBW Power x dB	99.00 % -26.00 dB	Detecto Peski Auto <u>Mar</u>
50			utan(s	

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: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dara 47 at 400	
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RL IF 20.0 AC	AllFGainsLow #Atter	r Freq: 707.500000 MHz Free Run AvgiHo t: 36 dB	ld: 100/100	Radio Std: None Radio Device: BTS	Trace/Detector
0 dB/div Ref 40.00 dBm		~~~~~			Clear Write
000 001 001			hanne	-	Average
40.0 40.0					Max Hold
Center 707.5 MHz Res BW 240 kHz Occupied Bandwidtl		VBW 750 kHz Total Power	32	Span 25 MH2 Sweep 1 ms 7 dBm	
	0142 MHz				Detector
Transmit Freq Error x dB Bandwidth	8.038 kHz 10.02 MHz	% of OBW Pov x dB		9.00 % .00 dB	Auto <u>Mar</u>
50			(111AT)	5	

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: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 10 of 100
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Plot 7-9. Occupied Bandwidth Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-10. Occupied Bandwidth Plot (Band 5 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 10 of 100
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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: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	G	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
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RL NF 100.0 AC	Cente Trig: F	r Freq: \$36.500000 MHz Pree Run Avg[Hold t: 36 dB	1: 100/100	Radio Std: Radio Devi		Trace/Detector
dB/dlv Ref 40.00 dBm						-
no	manner	mar marine				Clear Wri
00) 100			1			Averag
00	1		Lim	man	man	
0.0 						Max Ho
enter 836.5 MHz es BW 120 kHz	#	VBW 390 kHz			ep 1 ms	Min Ho
Occupied Bandwidth 4.5	5398 MHz	Total Power	32.	5 dBm		Detect
Transmit Freq Error x dB Bandwidth	-1.606 kHz 5.101 MHz	% of OBW Pow x dB		9.00 % .00 dB	,	Pest Auto <u>M</u>
a l			IITATU	e-		

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: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
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Keysight Spectrum Analyzer - Occupied BW	10000 IN IN				Con fully and
RE SF 20.0 AC	Cente Trig:	r Freq: 836.500000 MHz Free Run Avg Hold: 1 1: 36 dB	Radio Std		Trace/Detector
10 dB/dlv Ref 40.00 dBm	_				-
ino					Clear Write
10.0	promonen	the second s			
0.00	1	N N			_
10.R	1	1			Average
100 martin and an and an and a second	<i>x</i>		hannandensen	-	
30.0					
60.U					Max Hold
Center 836.5 MHz			Sna	n 25 MHz	
Res BW 240 kHz	#	VBW 750 kHz		ep 1 ms	Min Hold
Occupied Bandwidth	19	Total Power	32.4 dBm		
9.0	021 MHz				Detector
Transmit Freq Error	-1.426 kHz	% of OBW Power	99.00 %		Auto Man
x dB Bandwidth	10.05 MHz	x dB	-26.00 dB		
ISG			istatus		

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



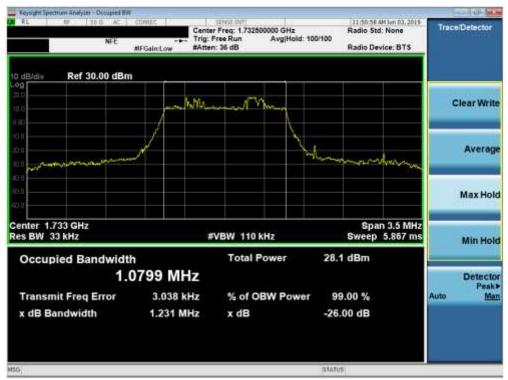
Plot 7-16. Occupied Bandwidth Plot (Band 5 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX320AA	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
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Plot 7-17. Occupied Bandwidth Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



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

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
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Plot 7-19. Occupied Bandwidth Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



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

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕦 LG	Approved by: Quality Manager	
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RL SF 20.0 AC	#IFGain:Low #Atter	r Freq: 1.732500000 GHz Free Run Avg Hold: t: 36 dB	100/100	12:12:50 PM Jun 03, 2019 Radio Std: None Radio Device: BTS	Trace/Detector
0 dB/dlv Ref 30.00 dBm					Clear Write
30.0 30.0 30.0	1		Lenne	-timetra	Average
80 0 60 0 60 0					Max Hold
Center 1.733 GHz Res BW 120 kHz Occupied Bandwidtl		VBW 390 kHz Total Power	31.8 (Span 12.5 MHz Sweep 1 ms	Min Hold
	5538 MHz	Total Total	01.01		Detector
Transmit Freq Error x dB Bandwidth	-7.375 kHz 5.086 MHz	% of OBW Powe x dB	er 99.0 -26.00		Auto <u>Man</u>
50			UTATUS		

Plot 7-21. Occupied Bandwidth Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



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

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 25 of 122
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RL NF 2010 AC	#IFGainsLow #Atter	r Freg: 1.732500000 GH: Free Run Avg He t: 36 dB	z old: 100/100	12:25:13 PM Ion 03, 2019 Radio Std: None Radio Device: BTS	Trace/Detector
0 dB/dw Ref 30.00 dBm		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	ţ		Clear Write
0 00 0 0 0 0 0 0 0 0	1		Linn	·	Average
40 0 921 0 621 V					Max Hold
Center 1.733 GHz Res BW 240 kHz		VBW 750 kHz		Span 25 MHz Sweep 1 ms	
Occupied Bandwidtl 9.0) 246 MHz	Total Power	28.	6 dBm	Detecto
Transmit Freq Error x dB Bandwidth	-8.270 kHz 10.11 MHz	% of OBW Po x dB		9.00 % .00 dB	Auto <u>Mar</u>
50			(stan)	5	

Plot 7-23. Occupied Bandwidth Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



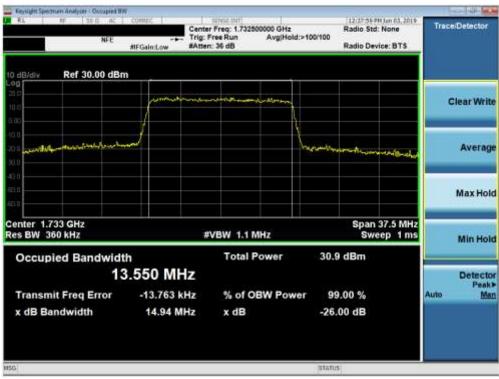
Plot 7-24. Occupied Bandwidth Plot (Band 4 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX320AA	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type: Portable Handset		Dega 26 of 122
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RL NF 200 AC	AlFGain:Low #Atter	r Freq: 1.732800000 GHz Free Run Avg Hold :: 36 dB	d: 100/100	Radio Std Radio Dev		Tracei	Detector
0 dB/dlv Ref 30.00 dBn	n Januar					ci	ear Write
000 00 00 00 00			Lunn		mundry		Average
00 00 00 01							Max Hold
Center 1.733 GHz Res BW 360 kHz Occupied Bandwidt		VBW 1.1 MHz Total Power	. 24 1		37.5 MHz ep 1 ms		Min Hole
	8.523 MHz -10.886 kHz 14.82 MHz	% of OBW Pow x dB	er 91	9.00 % .00 dB		Auto	Detector Peak) Mar
6			127020	5		_	_

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



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

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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RL IF 20.0 AC	Cente Trig	stret: DVT r Freq: 1,732500000 G Free Run Avg n: 36 dB	Hz Hold: 100/100	Radio Std: /	None	Trace/Detector
0 dB/dlv Ref 30.00 dBm	i		1			-
200 100 100	from the second	874 4.971 9.974 4.974 almay ad				Clear Write
00 00 011 001	wim-		Lunio	all and a second	4.10°11-8.5	Average
00						Max Hok
enter 1.733 GHz es BW 470 kHz		VBW 1.5 MHz		Swee	50 MHz p 1 ms	Min Hold
Occupied Bandwidt	^h .004 MHz	Total Power	35.	2 dBm		Detecto
Transmit Freq Error x dB Bandwidth	-5.309 kHz 19.66 MHz	% of OBW P x dB		9.00 % .00 dB	,	Peski Auto <u>Mar</u>
4			127427	IS .	_	_

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



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

FCC ID: ZNFX320AA	A PCTEST	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 122	
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RL IF 30.0 AC	Cente Trig:	strot.001 r Freq. 1.88000000 GHz Free Run AvgiHold: 10 n: 36 dB		Trace/Detector
0 dB/div Ref 30.00 dBm				
хід 110				Clear Write
01	/	- Ang	menning and	Average
0.11				Max Hole
enter 1.88 GHz es BW 33 kHz		VBW 110 kHz	Span 3.5 Mł Sweep 5.867 n	
Occupied Bandwidth	058 MHz	Total Power	28.5 dBm	Detecto
Transmit Freq Error x dB Bandwidth	17 Hz 1.321 MHz	% of OBW Power x dB	99.00 % -26.00 dB	Peaki Auto <u>Ma</u> r
a			status	

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: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 122
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Keysight Spectrum Analyzer - Occupied Bill					
RL IF SOG AC	Trig:	r Freg: 1.880000000 GHz	Radio St 100/100	AM Jun 03, 2019 d: None wice: BTS	Trace/Detector
10 dB/dlv Ref 30.00 dBm					-
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			Clear Write
10.0 .078 .008	/		harris		Average
-40.0 62.0 63.0					Max Hold
Center 1.88 GHz Res BW 68 kHz		VBW 220 kHz		in 7.5 MHz 12.53 ms	Min Hold
Occupied Bandwidt	^h 7198 MHz	Total Power	29.6 dBm		Detector
Transmit Freq Error x dB Bandwidth	3.991 kHz 3.031 MHz	% of OBW Powe x dB	er 99.00 % -26.00 dB		Peak≯ Auto <u>Man</u>
HSG			ilitat(/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: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 of 122
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RL IF 20.0 AC	Cente Trig:	r Freq: 1.880000000 ( Free Run Avj t: 36 dB	3Hz  Hold: 100/100	Radio Std: None Radio Device: BT:	Trace/Detector
10 dB/div Ref 30.00 dBm	,		~~~		Clear Write
0.00 30.0 30.0	/		1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Average
400 600					Max Hold
Center 1.88 GHz Res BW 120 kHz Occupied Bandwidtl		VBW 390 kHz Total Powe	r 29.	Span 12.5 N Sweep 1 5 dBm	
4.9	5369 MHz 3.426 kHz 5.062 MHz	% of OBW I x dB		9.00 % .00 dB	Detecto Peski Auto <u>Mar</u>
50			istati	15	

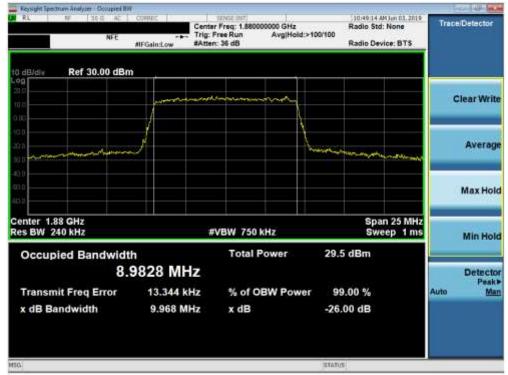
Plot 7-33. Occupied Bandwidth Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



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

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-35. Occupied Bandwidth Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



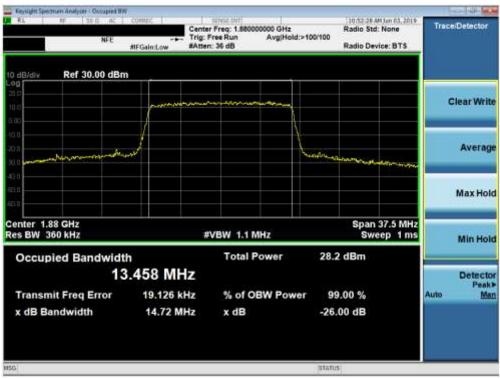
Plot 7-36. Occupied Bandwidth Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
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RL NF 200 AC	Trig: I	r Freq: 1.880000000 GHz r Freq: 1.880000000 GHz Free Run Avg Ho n: 36 dB	ld:>100/100	Radio Std: None Radio Device: BTS	Trace/Detector
0 dB/dlv Ref 30.00 dBm			-		
	man				Clear Write
0.0 0.0 0.0 0.0	J		Lun	marina and a star	Average
00					Max Hold
enter 1.88 GHz es BW 360 kHz	#	VBW 1.1 MHz		Span 37.5 MHz Sweep 1 ms	Min Hold
Occupied Bandwidtl 13	.478 MHz	Total Power	29.	5 dBm	Detector
Transmit Freq Error x dB Bandwidth	-2.680 kHz 14.94 MHz	% of OBW Pov x dB		9.00 % .00 dB	Peak≯ Auto <u>Man</u>
4			intaro.	s	

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



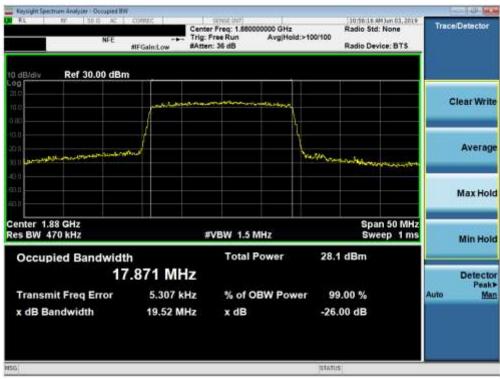
Plot 7-38. Occupied Bandwidth Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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NFE	Teles Tel	nter Freq: 1.88000 g: Free Run tten: 36 dB	0000 GHz Avg Hold: 10	00/100	Radio Std: Radio Devi	1000 C	Trace	Detector
to dB/dly Ref 30.00 dB	im			i				_
	perminen		-				c	lear Write
				inimany	CORNEL OF	يعتبنهم		Average
00								Max Hold
Center 1.88 GHz Res BW 470 kHz		#VBW 1.5 M	IHz		Spar Swe	n 50 MHz ep 1 ms		Min Hold
Occupied Bandwic	^{ith} 7.893 MHz	Total P	ower	29.5	1Bm			Detector
Transmit Freq Error x dB Bandwidth	-18.576 kHz 19.33 MHz	% of OE x dB	BW Power	99.0 -26.00	00 % 0 dB		Auto	Peak) <u>Mar</u>
50				intanus				

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: ZNFX320AA	AVPCTEST	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 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

#### Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

#### Test Settings

- 1. Start frequency was set to 30MHz and stop frequency was set to at least 10 * the fundamental frequency (separated into at least two plots per channel)
- 2. Detector = RMS
- 3. Trace mode = trace average
- 4. Sweep time = auto couple
- 5. The trace was allowed to stabilize
- 6. Please see test notes below for RBW and VBW settings

#### **Test Setup**

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



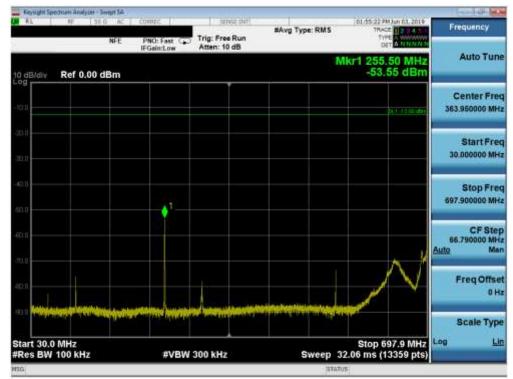
Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

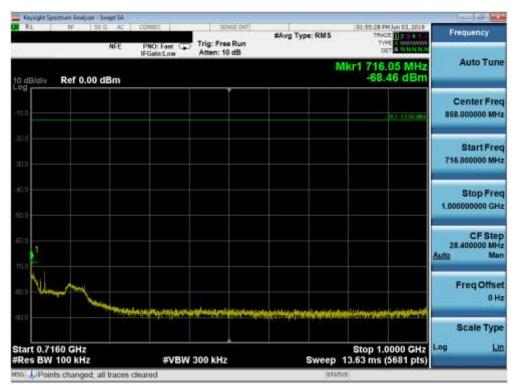
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

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Plot 7-41. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



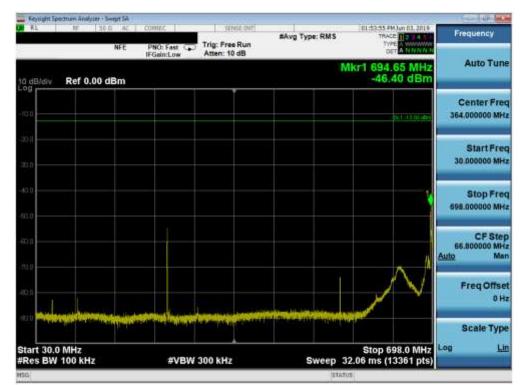
Plot 7-42. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 26 of 122	
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	trum Analyter - Swept SA		sense put	and the second	01.05-46 PM Jun 03, 2019	
	NFE	PNO: Fast	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	TRACE	Frequency
0 dB/div	Ref 20.00 dBm			м	kr1 1.408 5 GHz -46.31 dBm	Auto Tun
iuo						Center Fre 5.50000000 GH
0.00 to.n					\$0,1 +11.01 + <b>0</b> m	Start Fre 1.000000000 GH
20.0.2						Stop Fre 10.00000000 GH
40.11						CF Ste 900.000000 MH Auto Ma
ean 1411 141		1111 IT 11 IT		al di su anna anna an		Freq Offse 0 H
Start 1.00			3.0 MHz	Cusan d	Stop 10.000 GHz 5.60 ms (18001 pts)	Scale Typ Log <u>Li</u>
805 DW	1.0 mHz	#V D9V	3.0 MHZ	Shirter (		

Plot 7-43. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



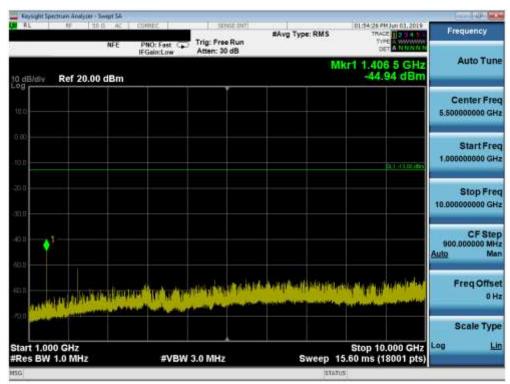
Plot 7-44. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dega 27 of 122		
1M1905210082-03.ZNF 5/21 - 6/7/2019		Portable Handset	Page 37 01 122	Page 37 of 122	
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RL NF 30.0 AC	comus gav	SE INT	01:34:05 P1	Frequency
NFE	PNO: Fast C Trig: Free IFGain:Low Atten: 10		578	E A WAYNER
o dBidiy Ref 0.00 dBm			Mkr1 716. -50.	10 MHz Auto Tun 68 dBm
101				Center Fre
юл ————————————————————————————————————				Start Fre 716.000000 MH
40.0 mo.u 2				Stop Fre 1.000000000 GH
10 th .				CF Ste 28.400000 MH <u>Auto</u> Ma
. Marine	1974 - 1965 - 1967 - 1-1-1956 - 1-19	allevia danosi dana a si	a la ballatha mai antha mai airt	Freq Offs
9231				Scale Typ
Start 0.7160 GHz Res BW 100 kHz	#VBW 300 kHz		Stop 1.0 Sweep 13.63 ms (	0000 GHz Log L 5681 pts)

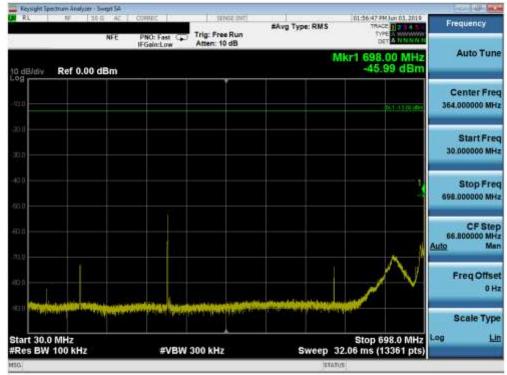
Plot 7-45. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



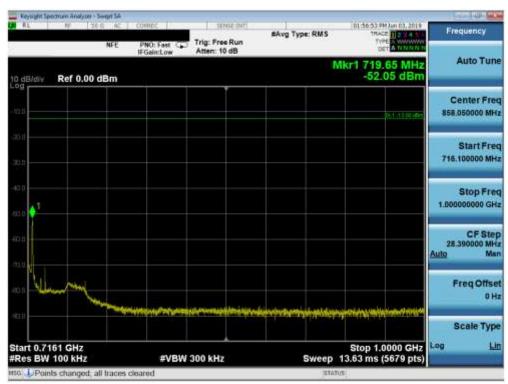
Plot 7-46. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 122
1M1905210082-03.ZNF 5/21 - 6/7/2019		Portable Handset		Page 38 of 122
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Plot 7-47. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



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

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 20 of 122
1M1905210082-03.ZNF 5/21 - 6/7/2019		Portable Handset		Page 39 of 122
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Roysight Spectrum Analyzer 1 Be		sense peti		01:57:13 PM Jun 03, 2019	
	NFE PNO: Fast C		#Avg Type: RMS	TRACE	Frequency
10 dBidly Ref 20.00			м	kr1 1.413 5 GHz -44.77 dBm	Auto Tune
.og					Center Free 5.500000000 GH
0.00 to.n				\$1,1-11.0m	Start Free 1.000000000 GH
					Stop Fre 10.00000000 GH
40.0 40.0					CF Ste 900,000000 MH <u>Auto</u> Ma
	TRACTOR AN AN				Freq Offse 0 H
					Scale Type
Start 1.000 GHz #Res BW 1.0 MHz	#VB	N 3.0 MHz	Sweep 1	Stop 10.000 GHz 5.60 ms (18001 pts)	Log <u>Lir</u>
150.			intari)	5	

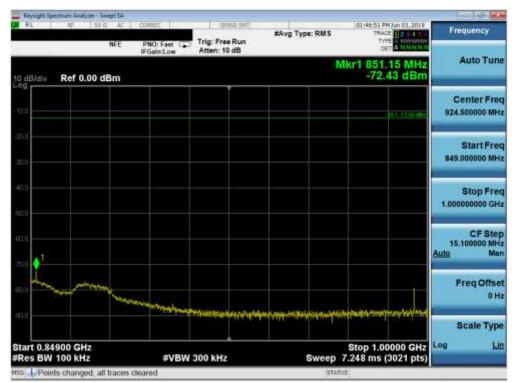
Plot 7-49. Conducted Spurious Plot (Band 12 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
		EUT Type:		Dage 40 of 100
		Portable Handset		Page 40 of 122
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RL IF 30.0 AC	PNO: Fast	Trig: Free Run Atten: 10 dB	#Avg Type: RMS	01:40:45 PM Jun 03, 2019 TRACE 2 3 4 TYPE A VANWARK DET A NINGEN N	Frequency
0 dB/div Ref 0.00 dBm			N	lkr1 823.00 MHz -64.43 dBm	Auto Tun
10.0				(0.1.12.0) (Bis	Center Free 426.500000 MH
20.0					Start Fre 30.000000 MH
40.T					Stop Fre 823.006000 MH
					CF Ste 79.300000 MH Auto Ma
2011 acc.m				N	Freq Offse 0 H
		TA COMPANY STATE		-	Scale Typ
Start 30.0 MHz Res BW 100 kHz	#VBW	300 kHz	Sweep 3	Stop 823.0 MHz 8.06 ms (15861 pts)	Log <u>Li</u>

Plot 7-50. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



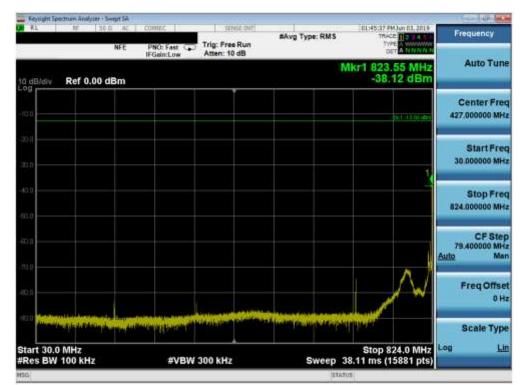
Plot 7-51. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 41 of 100	
1M1905210082-03.ZNF 5/21 - 6/7/2019		Portable Handset		Page 41 of 122	
© 2019 PCTEST Engineering Labor	V 9 0 02/01/2019				



RL NF SUG AC	PNO: Fast	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	01:47:10 PM Jun 03, 3019 TRACE 2 2 4 4 TYPE A WAYNAWA	Frequency
dBidiy Ref 20.00 dBm	FGanLow	Paten. 99 00	м	kr1 1.658 5 GHz -44.64 dBm	Auto Tuni
00					Center Fre 5.50000000 GH
00 0.n				(0.1-13.00 v <b>e</b> rs	Start Free 1.000000000 GH
00					Stop Fre 10.000000000 GH
an (1					CF Ste 900.000000 MH <u>Auto</u> Ma
	कार्त क हा क				Freq Offse 0 H
					Scale Typ
tart 1.000 GHz Res BW 1.0 MHz		3.0 MHz		Stop 10.000 GHz 5.60 ms (18001 pts)	Log Li

Plot 7-52. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



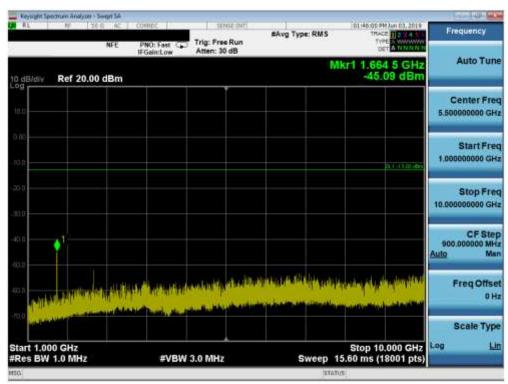
Plot 7-53. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕚 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 100
1M1905210082-03.ZNF 5/21 - 6/7/2019		Portable Handset		Page 42 of 122
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RL NF 20.0 AC	contr. set	SE PH	01:45:45 PM Jun 03, 2019	Frequency
NFE	PNO: Fast C Trig: Free IFGain:Low Atten: 10		S TRACE 13 14 A TYPE A MONING DET A N N N N	
aBidiy Ref 0.00 dBm			Mkr1 849.40 MHz -50.73 dBm	Auto Tun
			Q1, 1, 1.5 (0) video	Center Fre 924.500000 MH
on				Start Fre 849.000000 MH
a.a				Stop Fre 1.000000000 GF
on				CF Ste 15.100000 Mi <u>Auto</u> M
8.1	and			Freq Offs 01
<b>建</b> 和	S CONTRACTOR	Aurentine Arthug teest to be an an Arena fi down	developmenter provinsier	Scale Typ
tart 0.84900 GHz Res BW 100 kHz	#VBW 300 kHz	Swee	Stop 1.00000 GHz ep 7.248 ms (3021 pts	Log L

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



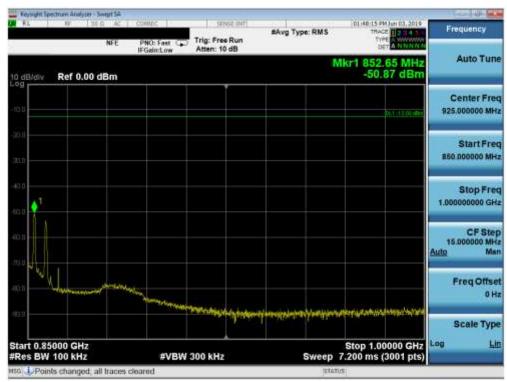
Plot 7-55. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 42 of 102
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	NF 20.0 AC	conuc	SENSE INT	- 0.01.200		8 PM Jun 03, 2019	Frequency
	NFE		Free Run n: 10 dB	#Avg Type:	RMS	TYPE A MANNAN DET A NUNNN	Frequency
dB/div	Ref 0.00 dBm				Mkr1 82 -6	2.30 MHz 0.52 dBm	Auto Tune
						04.1 (13.02 obn	Center Fre 427.000000 MH
0.11 0.11							Start Free 30.000000 MH
0.0.) niù							Stop Fre 824.000000 MH
ă							CF Ste 79.400000 MH Auto Ma
						N	Freq Offse 0 H
		all a sub and and and a					Scale Typ
tart 30.0 M Res BW 1		#VBW 300 I	Hz	Sw	Stop eep 38.11 ms		Log <u>Li</u>
6					intanus:		

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



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

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 44 of 100
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Reysight Spectrum Analyzer + Swept 54 RL NP 20.0 AC	conuc 9	NSC INT	0.010.000		01:48:33 PM Jun 03		
NFE	PNO: Fast C Trig: Fre IFGain:Low Atten: 3		#Avg Type	RMS	TRACE 2 TYPE A WA DET A N		requency
gaBidiy Ref 20.00 dBm	POBILUE Passi P		11	Mkr	1 1.679 5 ( -44.35 d	GHz IBm	Auto Tune
og 							Center Free
000 0.n					0(1-1)		Start Free
						10.0	Stop Fre
on1						90 Auto	CF Ste 10.000000 MH Ma
	a provinsi a f		an Nina	al prove of			Freq Offse 0 H
							Scale Type
tart 1.000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz	2	Sv	veep 15.6	Stop 10.000 0 ms (18001	GHz Log pts)	<u>Li</u>

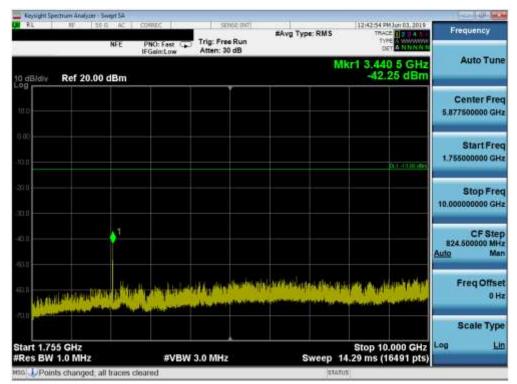
Plot 7-58. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 45 of 100
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RL	17	NEE	CORREC	Trig: Free R		#Avg Type	e: RMS	TRAC	z 12 34 5	Frequency	i.
		NPC	PNO: Fast C	Atten: 30 dl				DE	A NINNIN		
l0 dB/div	Ref 20.0	00 dBm					M	kr1 1.70 -57.	9 0 GHz 03 dBm	Auto T	un
що —										Center I 869.500000	
0.00 10.0									bct - i t bi offes	Start 7 30.000000	
2010 2010										Stop / 1.709000000	
40.0										CF 8 167.900000 <u>Auto</u>	
										Freq OI	ffs 0 H
70.0		hting	inderforman billed	willowie	وعقاستتبراغ	مغيلظه		a prisival for	الطبلية ويترجعهم		
	NAME AND ADDRESS									Scale 1	<b>CAb</b>
Start 0.03 Res BW	300 GHz 1.0 MHz		#VBW	3.0 MHz			Sweep 2	Stop 1.7 2.239 ms (	090 GHz 3359 pts)	Log	L
SIS.	THE MARKE			ore mark			ETATIC	COLUMN TWO IS NOT THE	ooos proj	i	_

Plot 7-59. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



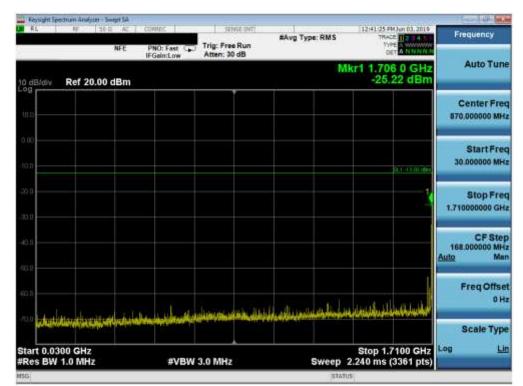
Plot 7-60. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 46 ef 100
1M1905210082-03.ZNF	5/21 - 6/7/2019	Portable Handset		Page 46 of 122
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Roysight Spectrum Analyzer - Swept 54 RL NP 20.0 AC	1.0000 D		24		
KL IP 200 KC		ree Run 10 dB	#Avg Type: RMS	12:43:10 PM Jun 03, 2019 TRACE 1 2 3 4 3 TYPE & WWWWWW DET 4 N WWW 9	Frequency
0 dBidiy Ref 0.00 dBm			M	kr1 16.905 0 GHz -66.07 dBm	Auto Tuni
og				04,1 - (13,00 villes	Center Frei 15.00000000 GH
9011					Start Free 10.000000000 GH
40.0 }					Stop Fre 20.000000000 GH
ein			Luce.	entre die die die state aus	CF Stej 1.000000000 GH <u>Auto</u> Ma
	no-spinopellite.				Freq Offse 0 H
Start 10.000 GHz Res BW 1.0 MHz	#VBW 3.0 MH	47	Sween	Stop 20.000 GHz 25.33 ms (20001 pts)	Scale Type
so J.Points changed; all traces		12	uta		

Plot 7-61. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



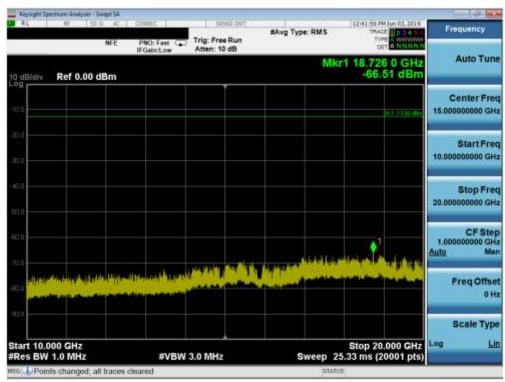
Plot 7-62. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	G	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dogo 47 of 100		
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Roysight Spectrum Analyzer - Swept SA RL NF 30.0 AC	compe spect out	112:41:06 PM Jun 03, 27	Carl Mit Mar
NG NFE	PNO: Fast Trig: Free Run IFGain:Low Atten: 30 dB	#Avg Type: RMS TRACE IS A	Frequency
0 dBidiy Ref 20.00 dBm		Mkr1 1.759 0 GI -33.54 dB	1z Auto Tune
tico			Center Free 5.877500000 GH
00.0		20,1-43,00	Start Free 1.755000000 GH
200			Stop Fre 10.000000000 GH
40 m			CF Ste 824.500000 MH <u>Auto</u> Ma
			Freq Offse
Start 1.755 GHz		Stop 10.000 G	Scale Type
Res BW 1.0 MHz	#VBW 3.0 MHz	Sweep 14.29 ms (16491 p	ts)

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



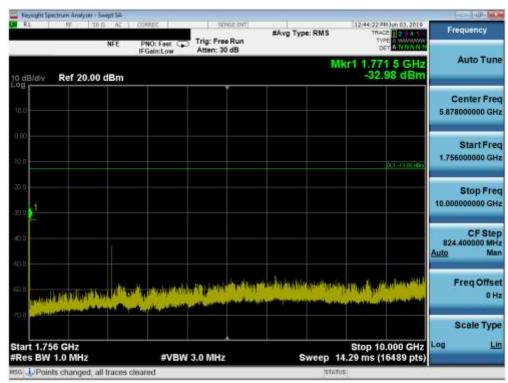
Plot 7-64. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Dage 49 of 100			
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Reysight Spectrum And		course 1	souse out	and see a	12:44:08	PM Jun 03, 2019	
	NFE	PNO: Fast C	Trig: Free Run Atten: 30 dB	#Avg Type: F	RMS TRU	CE 12 24 N	Frequency
0 dB/div Ref 2	0.00 dBm	-		99	Mkr1 1.70 -45	01 0 GHz .81 dBm	Auto Tune
wo							Center Fre 870.000000 MH
0.00 10.n						0.1 -1 3 00 idea	Start Free 30.000000 MH
xa 100							Stop Fre 1.71000000 GH
40.11 40.11						- 1	CF Ste 168.000000 MH <u>Auto</u> Ma
10.11 	3. 16.1.1664	and canada and	ويقتل فالقوم بعدادتهم	والمتعادية المتح	لمينتاد ولمأسلافان	فيلتخونه أليان	Freq Offse 0 H
Start 0.0300 GHz		eller fogeter				.7100 GHz	Scale Type
Res BW 1.0 MH		#VBW	3.0 MHz	SV	veep 2.240 ms		
50					intanus:		

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



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

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 100
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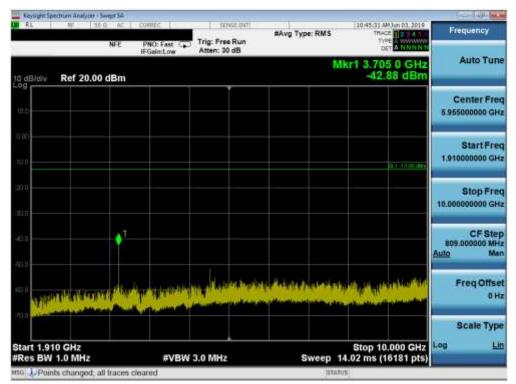
Plot 7-67. Conducted Spurious Plot (Band 4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 50 of 122
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RL 80 30	NFE PNO: Fast C	Trig: Free Run Atten: 30 dB	#Avg Type: RMS	10:45:18 AM Jun 03, 2019 TRACE 2 3 4 5 TYPE A WAYNAW DET 4 N MARK N	Frequency
o dBłdiv Ref 20.00		19991	Mk	r1 1.849 0 GHz -40.75 dBm	Auto Tun
шо					Center Fre 939.500000 MH
0.00 m n				ÖCT 21.00 ome	Start Fre 30.000000 Mi
30 n 96 u					Stop Fre 1.84900000 Gi
ຍິນ ສິມັນ				1	CF Ste 181.900000 Mi <u>Auto</u> M
	والمراجع وال	a la alla da	ali en latala di kanit	أسرف ليحينان والنار	Freq Offs 0 H
	a in the second se	say sheet that the	is to with a bit and		Scale Typ
Start 0.0300 GHz Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 2	Stop 1.8490 GHz .425 ms (3639 pts)	

Plot 7-68. Conducted Spurious Plot (Band 2 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



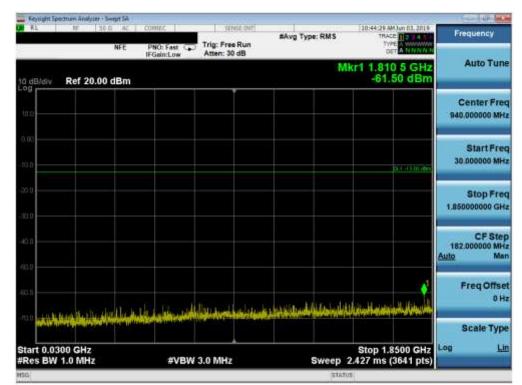
Plot 7-69. Conducted Spurious Plot (Band 2 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕚 LG	Approved by: Quality Manager	
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RL IF	NFE	PNO: Fast	Trig: Free Run Atten: 10 dB	#Avg Type: RM		ANNAN N	Frequency
dBldly Ref 0.0	) dBm				Mkr1 17.388 -65.9	5 GHz 7 dBm	Auto Tun
0g						9.1 (13.00 otber	Center Fre 15.00000000 GH
011							Start Fre 10.000000000 GH
0.0							Stop Fre 20.000000000 GH
DI					1 Alexandra Barball		CF Ste 1.00000000 GH Auto Ma
							Freq Offse 0 H
tart 10.000 GHz Res BW 1.0 MHz			3.0 MHz		Stop 20. p 25.33 ms (20	000 GHz	Scale Typ

Plot 7-70. Conducted Spurious Plot (Band 2 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)



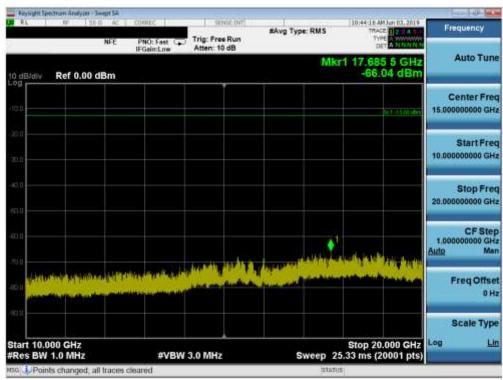
Plot 7-71. Conducted Spurious Plot (Band 2 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Keysight Spectrum Analyzer - Swept 54	NING IN TRANSME	- YA	100000000000000000000000000000000000000	
NFE	PNO: Fast C Trig: Free Run IFGein:Low Atten: 30 dB	#Avg Type: RMS	10:44:00 AM Jun 03, 2019 TRACE 12:34:4 1 TYPE A WANNER IN	Frequency
o dBidly Ref 20.00 dBm	Indentities Patient av op	М	kr1 5.634 0 GHz -47.01 dBm	Auto Tune
ino				Center Fred 5.955000000 GHz
0.00			\$0,1-(1.01.48m	Start Free 1.910000000 GH:
2010				Stop Fre 10.000000000 GH
45 m	•			CF Stej 809.000000 MH <u>Auto</u> Ma
			e te sou avec to cath	Freq Offse 0 H
Start 1.910 GHz			Stop 10.000 GHz	Scale Type
Res BW 1.0 MHz	#VBW 3.0 MHz	Sweep 1	4.02 ms (16181 pts)	

Plot 7-72. Conducted Spurious Plot (Band 2 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



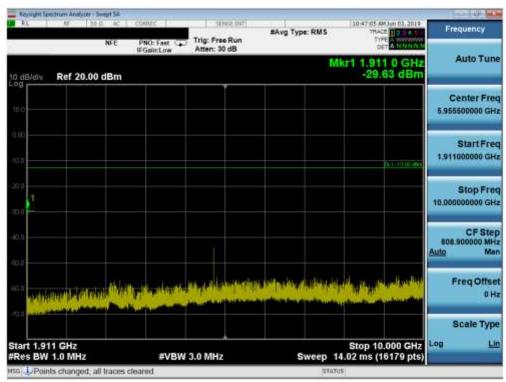
Plot 7-73. Conducted Spurious Plot (Band 2 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 52 of 100
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Roysight Spectrum Analyzer - Swig RL NF 20.0		muc		se met	2001000			M Jun 03, 2019	Freque	
,	NFE	PNO: Fast 😱 •Gain:Low	Trig: Free Atten: 30	Run dB	#Avg Typ	e: RMS	704 77 0	ET A NUMBER	Freque	ncy
o dBidiy Ref 20.00 d	Bm					M	kr1 1.70 -62.	0 5 GHz 82 dBm		o Tun
шо									Cent 940.000	er Fre
00 0.0								0.1-13.00. <b>0</b> 0	Sta 30.000	ITT Fre
00									Sto 1.850000	op Fre 000 GH
iù II									0 182.000 <u>Auto</u>	F Ste 000 MH Ma
an an <mark>a 10 s</mark> ittail state	araa	1 Aurora	1 a traduli	hala	فاسرأه مغزرت	ي الربية الله	ىرىكى بار ي	1 alla italia	Freq	l Offse 0 H
المعالم ورنفية المترالي و	and the second	(الالاروليانية)	ayladae task		of a first of the second				Sca	le Typ
tart 0.0300 GHz Res BW 1.0 MHz		#VBW	3.0 MHz			Sweep 3	Stop 1. 2.427 ms	8500 GHz (3641 pts)	Log	Ц

Plot 7-74. Conducted Spurious Plot (Band 2 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-75. Conducted Spurious Plot (Band 2 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage E4 of 100
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NFE	PNO: Fast C Trig: Free Run FGain:Low Atten: 10 dB	#Avg Type: RMS	10:47:21 MAJun 03, 2019 TRACE TO CALA TYPE ANNOUNCE DET A N TANNA M	Frequency
o dBidly Ref 0.00 dBm	FORTEDR FINISHER OF GR	Mkr1	18.907 0 GHz -65.86 dBm	Auto Tun
09			Q4,1 +13 00 x8xx	Center Fre 15.00000000 GH
oll				Start Fre 10.000000000 GH
NO.0				Stop Fre 20.000000000 GH
mn		والاعتقادية والمتعاد		CF Ste 1.00000000 GH <u>Auto Ma</u>
				Freq Offse 0 H
Start 10.000 GHz			Stop 20.000 GHz	Scale Typ

Plot 7-76. Conducted Spurious Plot (Band 2 - 5.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage FE of 100	
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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

FCC ID: ZNFX320AA	POTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage FC of 100
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#### Test Notes

Per 22.917(b), 24.238(a), and 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.

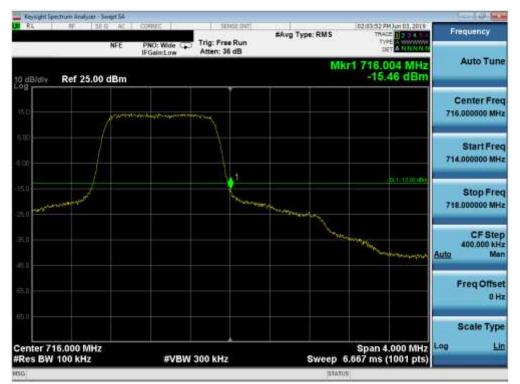
Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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Plot 7-77. Lower Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)



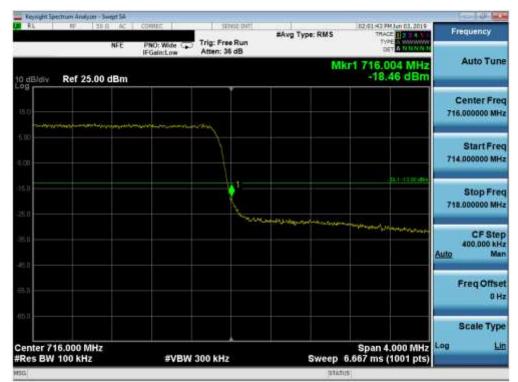
Plot 7-78. Upper Band Edge Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 50 of 100
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Keysight Spectrum And		Sector A		×2		28830000		ie	
RL ST	NFE	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Type: RM	15	TRAC	4)un 03, 2019 2 <b>1 2 3 4 1</b> PE A MINIMA IN	F	requency
IQ dB/dly Ref 2	5.00 dBm				Mkr		48 MHz 12 dBm		Auto Tun
150								-	Center Fre 8.000000 MH
5.00 6.00					1			69	Start Fre
25.0	1				l		6.1.1101.0bs	70	Stop Fre
¥.1		an an an an an Arana Arana Arana Arana Arana Arana Arana Arana ar an Arana Aran	www.exectories.com	and a state of the				Auto	CF Ste 400,000 kH Ma
<b>学</b> .11									Freq Offs 0 H
Center 698.000 P		#VBW	300 kHz	Swe	ep 6.6	Span 4	.000 MHz 1001 pts)	Log	Scale Typ
50					TTATUS				

Plot 7-79. Lower Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)



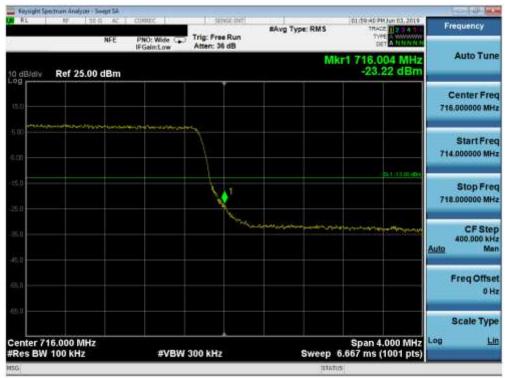
Plot 7-80. Upper Band Edge Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 50 of 100
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RL NT 3	NFE	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Type:	RMS	TRAC	4)un 03, 2019 2 1 2 2 4 3 2 4 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Fr	equency
o dBłdły Ref 25.0	0 dBm			11. creation	Mk	r1 697.8 -31.	04 MHz 04 dBm		Auto Tune
15.0									Center Fre
500						Jewey Ma	-		
5.00 5.00						[		694	Start Free
					1		0.111100.004		
25,0					and a			700	Stop Free
		we support the			500				
1.0	-4-13*-1		and and the second s					Auto	CF Stej 400,000 kH Ma
									FreqOffse
<b>P</b> .1									OH
95.0									Control of
								-8	Scale Type
enter 698.000 MH	z					Span 4	.000 MHz	Log	Ļ
Res BW 100 kHz		#VBW	300 kHz	S	weep 6	.667 ms (	1001 pts)	-	

Plot 7-81. Lower Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)



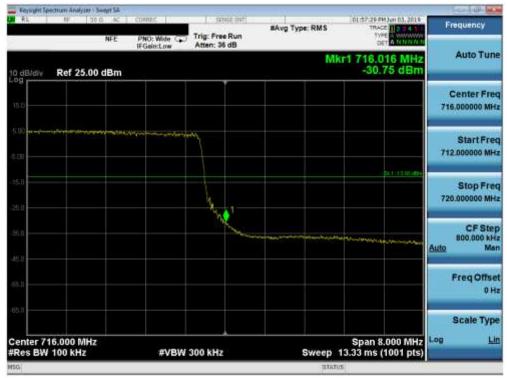
Plot 7-82. Upper Band Edge Plot (Band 12 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 60 of 100
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	n ac i	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Typ	e: RMS	01:36:05 PM Jun D TRACE TYPE 0 DET 0 P	24.5	Frequency
ID dBidly Ref 25.00	dBm				Mk	r1 697.872 -35.55 c	MHz dBm	Auto Tune
15.0								Center Fre
5.00 6.00					in a start and a start and a start a st			Start Fre 694.000000 MH
25.0						<b>6</b> .1 11	101.005	Stop Fre 702.000000 MH
25.11 41.12 martine day and a start of the		and a start of the						CF Ste 800,000 kH <u>suto</u> Ma
5.1 5.1								Freq Offse 0 H
Center 698.000 MHz Res BW 100 kHz			300 kHz			Span 8.000 3.33 ms (100	MHz	Scale Typ

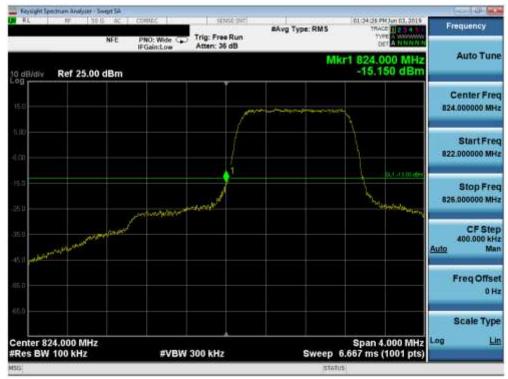
Plot 7-83. Lower Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-84. Upper Band Edge Plot (Band 12 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 61 of 100
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Plot 7-85. Lower Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)



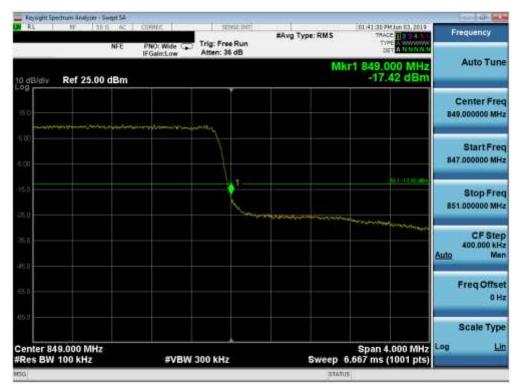
Plot 7-86. Upper Band Edge Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕚 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 62 of 100
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Keysight Spectrum A	20 G AC	comme 1	sense put	and and another	01/41/02 PM Jun 03, 2019	
	NFE	PNO: Wide C	Trig: Free Run Atten: 36 dB	#Avg Type: RMS	TRACE 12 14 1 TYPE & WARNING DET & NUMBER	Frequency
0 dB/dly Ref	25.00 dBm	In Open Low		M	r1 824.000 MHz -19.078 dBm	Auto Tun
15.0			-			Center Fre 824.000000 MH
5.00 5.01						Start Fre 822.000000 MH
25.0			) [†]		24.1 - 13.00 (494)	Stop Fre 826.000000 Mi
5.1						CF Ste 400,000 KF <u>Auto</u> Ma
<u>22.</u> 11						Freq Offs 01
Center 824.000					Span 4.000 MHz	Scale Typ
Res BW 100 k	inz	#4844	300 kHz	Sweep	6.667 ms (1001 pts)	-

Plot 7-87. Lower Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

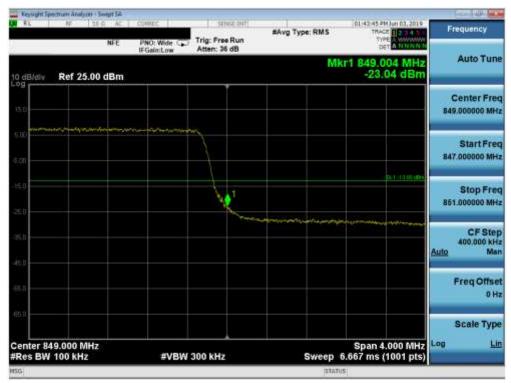


Plot 7-88. Upper Band Edge Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 62 of 102
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RL HF 20	NFE	PNO: Wide	Trig: Free Run	#Avg Type: RMS	01:43:20 PM Jun 03, 2019 TRACE 10:004	Frequency
	NFC	IFGain:Low	Atten: 36 dB		DET A NNNN N	Auto Tun
o dBidly Ref 25.00	) dBm			M	lkr1 823.992 MHz -23.23 dBm	Auto Tun
og						Center Fre
15:0				March & March 1997	and the second	824.000000 MH
5.00			5			Start Free
6.00					04.1 11.2 00 offers	822.000000 MH
15,0			N.			Stop Fre
25.0			a la maren al			826.000000 MH
25.11	م	ينية جايديا يوكي ويصيد والأدوان . م			_	CF Ste 400,000 kH
4.1						Auto Ma
e.1						Freq Offse
65.11						OH
						Scale Type
Center 824.000 MHz Res BW 100 kHz		#VBW	300 kHz	Sweep	Span 4.000 MHz 6.667 ms (1001 pts)	Log <u>Li</u>
56					TUS	



Plot 7-89. Lower Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

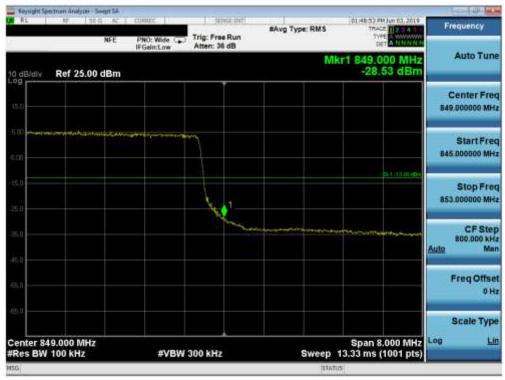
Plot 7-90. Upper Band Edge Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕒 LG	Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:		Dage 64 of 100					
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RL NF 301	NFE	PNO: Wide	Trig: Free Ry Atten: 36 dB	in .	#Avg Typ	e: RMS	TRAC	1 2 2 4 1 1 4 N N N N N	Fr	equency
0 dBidly Ref 25.00	dBm					Mkr	1 823.9 -29.1	92 MHz 28 dBm		Auto Tune
15.0										Center Fre
500 6.00				ſ	1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -	ngtasaya ah	nangaragai di		820	Start Fre
25.0			Č.					CALL I I I NUMBER	825	Stop Fre
SII - Anna Anna Anna Anna Anna Anna Anna An	-		and the second second						Auto	CF Ste 800,000 kF Ma
41.12 二百										Freq Offs 0 H
65.11										Scale Typ
Center 824.000 MHz #Res BW 100 kHz		#VBW	300 kHz			Sweep 1	Span 8 3.33 ms (	000 MHz 1001 pts)	Log	ų

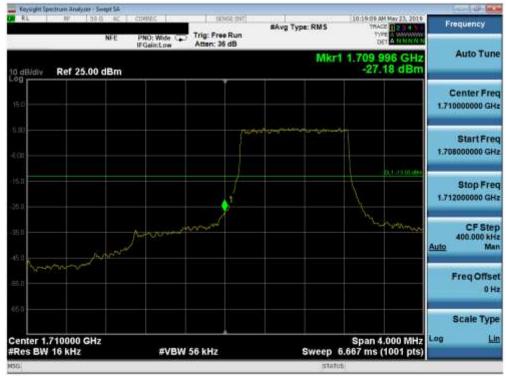
Plot 7-91. Lower Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)



Plot 7-92. Upper Band Edge Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:		Dage CE of 100					
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Plot 7-93. Lower Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-94. Lower Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 66 of 122	
1M1905210082-03.ZNF	5/21 - 6/7/2019	21 - 6/7/2019 Portable Handset			
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Koysight Spectrum Analyzer + Swept SA R1 NF 20.0 AC	Comme D	sense out	74	11:15:57 AM Jun 03, 2019	100 Mile 100
NFE	PNO: Wide Co. 1	Trig: Free Run Atten: 36 dB	#Avg Type: RMS	TRACE 2 2 4 1 TYPE A WARNAW	Frequency
o dBidly Ref 25.00 dBm	roencos		Mkr	1 1.755 000 GHz -21.863 dBm	Auto Tuni
•g					Center Free 1.755000000 GH
5 00 e.cn					Start Free 1.753000000 GH
15.0		1 mar		24.1-13.00 obs	Stop Fre 1.757000000 GH
E.0			the second s	m	CF Ster 400.000 kH Auto Ma
<b>#</b> 1					Freq Offse 0 H
Center 1.755000 GHz				Span 4.000 MHz	Scale Type
Res BW 15 kHz	#VBW 5	1 kHz	Sweep	6.667 ms (1001 pts)	
50			(IIIAT)	IS .	

Plot 7-95. Upper Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)



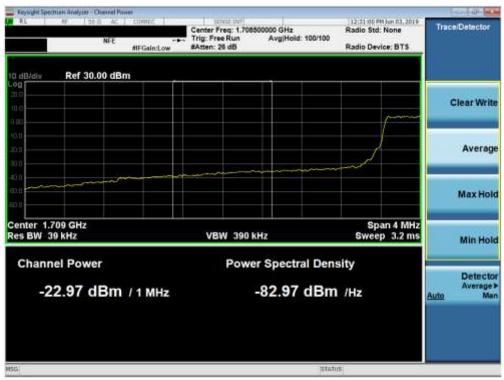
Plot 7-96. Upper Extended Band Edge Plot (Band 4 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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RL 87 30.0	NFE	PNO: Wide	Trig: Free Atten: 36		#Avg Typ	e: RMS	TRU T	CE 13 34 9 CE 13 34 9 CE ANNUAL	Fi	equency
0 dB/dly Ref 25.00	dBm					Mkr1	1.710	000 GHz 002 dBm		Auto Tun
15.0										Center Fre 0000000 GH
5.00				fangerat	حفيتدين		dinasyon of the	- the contraction of the contrac	1.70	Start Fre
5.0				1				54.1 - 13 00 otbo	1.71	Stop Fre 2000000 GH
Ell		an a	correct.						Auto	CF Ste 400,000 kF Ma
些 D 三 D										Freq Offs 0 I
95.11										Scale Typ
enter 1.710000 GHz Res BW 36 kHz		#VBW	130 kHz			Sweep 6	Span .667 ms	4.000 MHz (1001 pts)	Log	1

Plot 7-97. Lower Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



Plot 7-98. Lower Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
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RL NF 30.0	NFE PNO: Wide	Trig: Free Ru Atten: 36 dB	#Avg Ty	pe: RMS	TRACE 12:01 01, 2019 TRACE 12:02 4 1 TYPE A WAYNAWA DET A NINNIN N	Frequency
0 dB/dly Ref 25.00 d				Mkr1	1.755 000 GHz -20.38 dBm	Auto Tune
50						Center Free 1.755000000 GH
5.00	et al an air					Start Fre 1.753000000 GH
5.0			Winner and and		dia. 1 - 1 2 rot vites	Stop Fre 1.757000000 GH
950 951 96.0					an a	CF Ste 400,000 kH Auto Ma
						Freq Offse 0 H
65.11						Scale Type
Center 1.755000 GHz Res BW 36 kHz	#VE	3W 130 kHz		Sweep 6	Span 4.000 MHz .667 ms (1001 pts)	Log <u>Li</u>

Plot 7-99. Upper Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)



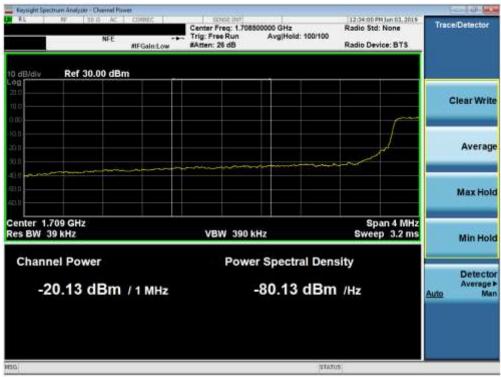
Plot 7-100. Upper Extended Band Edge Plot (Band 4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	eport S/N: Test Dates: EUT Type:			Dage 60 of 100
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	5 No 1	conuc	340	5E-1941	#Avg Typ	e DMS		1)un 03, 2019	Fr	equency
	NFE	PNO: Wide C	Trig: Free Atten: 36			e. ((iii 3	578	ANNAN		
o dBidly Ref 25.00	dBm	in Genizoe				Mkr1	1.710 0	00 GHz 77 dBm		Auto Tune
15 D									44,197	Center Free
6.00				ſ	peer 2 fry her fa They are	çayan sen	al ⁱⁿ n d ^a u, shun	adour an are	1.70	Start Free 8000000 GH
25.0				1.0				04.1 (12.00 ( <b>D</b> ))	1.71	Stop Fre 2000000 GH
25.1	Angrador (pr ^{Ang}	hay a grant of a grant data again.	and the second						Auto	CF Ste 400,000 kH Ma
50 S										Freq Offse 0 H
65.0										Scale Typ
Center 1.710000 GHz Res BW 62 kHz		#VBW	220 kHz	7		Sweep 6	Span 4	.000 MHz 1001 pts)	Log	Li

Plot 7-101. Lower Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-102. Lower Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 70 of 100
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RL NF 30.0 AC	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Type: RMS	12:34:34 PM Jun D3, 2019 TRACE 12:34:4 Type A substance DET A N N S N 19	Frequency
dBidiy Ref 25.00 dBm			Mkr	1 1.755 036 GHz -20.71 dBm	Auto Tune
50					Center Fre 1.75500000 GH
10) <del></del>		$\gamma$			Start Fre 1.753000000 GH
5.0		- I man		DL1 11 00 offer	Stop Fre 1.75700000 GH
5					CFSte 400,000 kH <u>Auto</u> Ma
					Freq Offse 0 H
enter 1.755000 GHz				Span 4.000 MHz	Scale Type
Res BW 62 kHz	#VBW :	220 kHz	Sweep	6.667 ms (1001 pts)	

Plot 7-103. Upper Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)



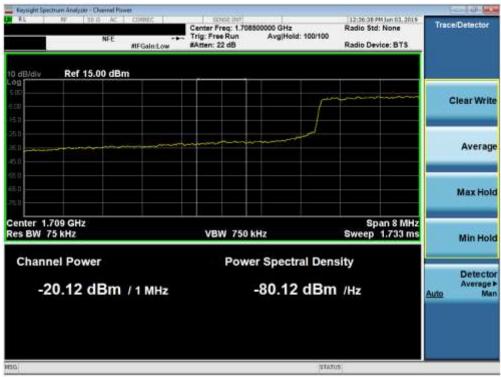
Plot 7-104. Upper Extended Band Edge Plot (Band 4 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 71 of 100	
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RL NF 201	AC I	contr	30/96	24T	#Avg Type	DHE		1)un 03, 2019	Er	equency
	NFE	PNO: Wide CP	Trig: Free Ru Atten: 36 dE		weig typ	e. e.m.a	578			
0 dB/dly Ref 25.00	dBm	. General				Mkr1	1.710 0	00 GHz 64 dBm		Auto Tune
15.0										Center Fred 0000000 GH
6.00 6.00				ſ	ala alufa mentifin	9244449(1444)4pm	المستويدة بعلول المند	anana Alaski jarja	1.70	Start Fre
25.0			•1					DL 1 1 1 NT HEN	1.71	Stop Free
25.0 <b></b>									Auto	CF Stej 800.000 kH Ma
E.1										Freq Offse 0 H
65.0										Scale Type
Center 1.710000 GHz #Res BW 120 kHz		#VBW	430 kHz		1	Sweep 1	Span 8. 3.33 ms (	000 MHz 1001 pts)	Log	Lir

Plot 7-105. Lower Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



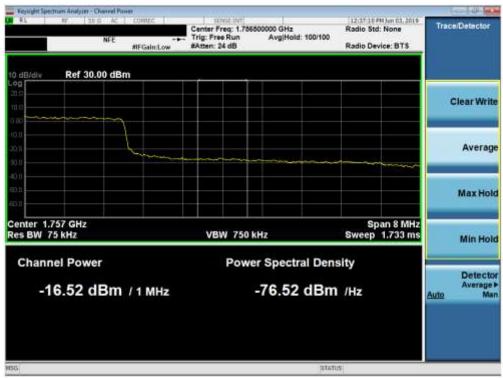
Plot 7-106. Lower Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	
Test Report S/N:	Test Dates:	EUT Type:	Daga 70 of 100
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RL # 30.6	NFE PNO	Wide CD	Trig: Free Atten: 36		#Avg Type	I: RMS	TRAC	1 2 3 4 9 4 7 4 7 4 7 4 7 4 7 4 7 4 7 4 7	Fr	equency
o dBiday Ref 25.00 c	iBm				<u>195</u>	Mkr1	1.755 0	16 GHz 57 dBm		Auto Tune
50										Center Free 5000000 GH
5.00 <b></b>		74 ** 1) i i i i i i i i i i i i i i i i i i							1.75	Start Fre
5.0			L	1		to year that the		01.1-13.00 (Brs	1.75	Stop Fre
55 D									Auto	CF Ste 800,000 kH Ma
									4	Freq Offse 0 H
65.11										Scale Typ
Center 1.755000 GHz Res BW 120 kHz		#VBW	130 KHz		5	Sweep 1	Span 8 3.33 ms (	000 MHz 1001 pts)	Log	L

Plot 7-107. Upper Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)



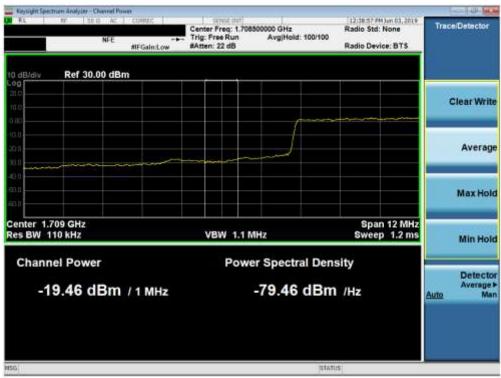
Plot 7-108. Upper Extended Band Edge Plot (Band 4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 72 of 102
1M1905210082-03.ZNF	5/21 - 6/7/2019	Portable Handset	Page 73 of 122
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RL 87 301	NFE	PNO: Wide	Trig: Free R Atten: 36 d	tun	#Avg Typ	e: RMS	1704 (7)	M)un 03, 2019 C2 12 24 1 PE 400000000 ET 4 NINNA N	Frequency
0 dB/dly Ref 25.00	dBm					Mkr1	1.709	940 GHz 64 dBm	Auto Tune
15.0									Center Fre 1.710000000 GH
5.00 6.00				ſ			ese <del>r</del> randele		Start Fre 1.704000000 GH
8.0			1					DL1-13 OF HER	Stop Fre 1.716000000 GH
25.11 41.0									CF Ste 1.200000 MH <u>Auto</u> Ma
<u>=</u>									Freq Offse 0 H
65.11									Scale Typ
Center 1.710000 GHz Res BW 180 kHz			620 kHz				Span	2.00 MHz (1001 pts)	Log <u>Li</u>

Plot 7-109. Lower Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



Plot 7-110. Lower Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	ì	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 74 of 122	
1M1905210082-03.ZNF	5/21 - 6/7/2019	Portable Handset		Page 74 of 122	
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RL 87 30	NFE	PNO: Wide 😱	Trig: Free Run Atten: 36 dB	#Avg Type:	RMS TRA	AN Jun 03, 2019	Frequency
0 dB/dly Ref 25.00	dBm	au			Mkr1 1.755 -23	756 GHz .81 dBm	Auto Tune
150							Center Frei 1.755000000 GH
500							Start Fre 1.749000000 GH
50			the	1		. Di. 1. 13 01 office	Stop Fre 1.761000000 GH
55 1) 							CFSte 1.200000 MH Suto Ma
							Freq Offse 0 H
95.11							Scale Typ
Center 1.755000 GHz Res BW 180 kHz	4	#VBW	620 kHz	S	Span ' weep 1.000 ms	12.00 MHz (1001 pts)	og Li

Plot 7-111. Upper Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)



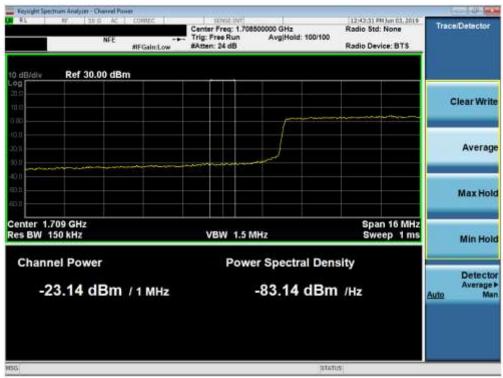
Plot 7-112. Upper Extended Band Edge Plot (Band 4 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 75 of 100	
1M1905210082-03.ZNF	5/21 - 6/7/2019	Portable Handset	Page 75 of 122	
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RL 87 301	NFE	PNO: Wide	Trig: Free R Atten: 36 dB	un	#Avg Typ	e: RMS	12:43:24 PM Jun 03, 20 TRACE 10 TRACE TYPE POWER DET 4 MIN	Frequency
o dBidiy Ref 25.00	dBm				9	Mkr1	1.709 936 GI -27.18 dB	Hz Auto Tune
150								Center Free 1.710000000 GH
5.00 6.00				ſ				Start Fre 1.702000000 GH
5.0 3.0							DL1-13.00	Stop Fre 1.718000000 GH
210 211		apar and a second	an a					CF Ste 1.800000 MH <u>Auto</u> Ma
です。 売利 								Freq Offse 0 H
65.11								Scale Type
Center 1.710000 GHz Res BW 240 kHz		#VBW	820 kHz			Sween 1	Span 16.00 M .000 ms (1001 p	Hz Log Li

Plot 7-113. Lower Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



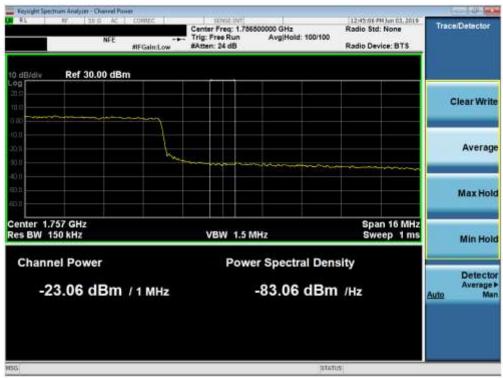
Plot 7-114. Lower Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 76 of 100	
1M1905210082-03.ZNF	5/21 - 6/7/2019	Portable Handset	Page 76 of 122	
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RL 87 (50)	NFE	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Type: RMS	TRACE 3 3 4 5 TRACE 3 3 4 5 TYPE A MANNAN DET A MINNAN	Frequency
0 dB/div Ref 25.00	dBm			Mkr	1 1.755 000 GHz -26.52 dBm	Auto Tune
50						Center Free 1.75500000 GH
500						Start Fre 1.747000000 GH
5.0			1		54.1 - 13.00 vibes	Stop Fre 1.76300000 GH
10				and a set of the set o	an an ann an	CF Ste 1.500000 MH <u>Auto Ma</u>
						Freq Offse 0 H
65.0						Scale Type
Center 1.755000 GHz Res BW 240 kHz		#VBW	320 kHz	Sweep	Span 16.00 MHz 1.000 ms (1001 pts)	Log <u>Li</u> i

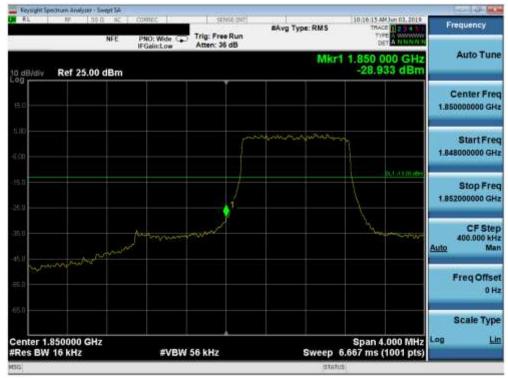
Plot 7-115. Upper Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)



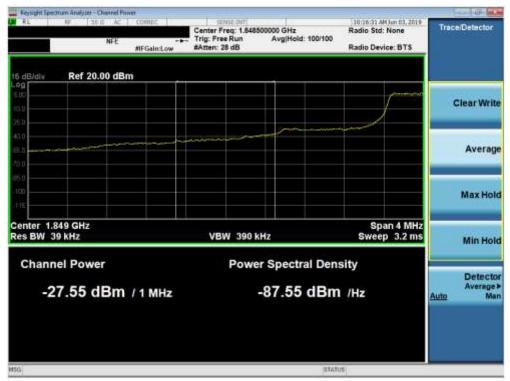
Plot 7-116. Upper Extended Band Edge Plot (Band 4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 77 of 100	
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Plot 7-117. Lower Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



Plot 7-118. Lower Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 70 of 100
1M1905210082-03.ZNF	5/21 - 6/7/2019	Portable Handset		Page 78 of 122
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RL NF 20.0 AC	conuc	sense anti	and second second	10:17:13 AMJun 03, 2019	
NFE	PNO: Wide C Trig	r: Free Run en: 36 dB	#Avg Type: RMS	TRACE 2 2 4 5 TYPE A WANNAWA	Frequency
dBidiy Ref 25.00 dBm			Mk	r1 1.910 004 GHz -24.97 dBm	Auto Tuni
50					Center Fre 1.91000000 GH
5 00	and the second second second				Start Fre 1,908000000 GH
5.0		t,		0.1-13-00 vBrs	Stop Fre 1.912000000 GH
su		min	man and ha	Stan Arrow	CF Ste 400,000 kH <u>Auto</u> Ma
3.n				-ph	Freq Offse 0 H
enter 1.910000 GHz				Span 4.000 MHz	Scale Typ
Res BW 16 kHz	#VBW 56 k	Hz	Sweep	6.667 ms (1001 pts)	
101			1117	TUS	

Plot 7-119. Upper Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)



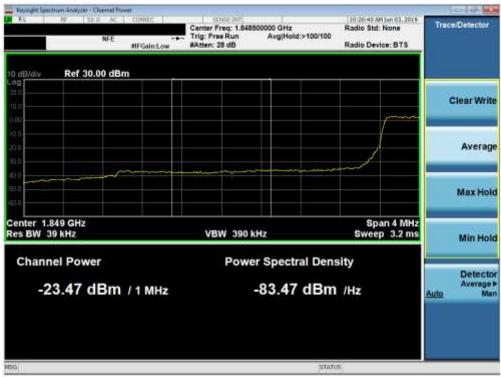
## Plot 7-120. Upper Extended Band Edge Plot (Band 2 - 1.4MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager					
Test Report S/N:	Test Dates:	EUT Type:	Dogo 70 of 100					
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NF	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Type: RMS	10:20:32 AM Jun 03, 2019 TRACE 1 2 0 4 1 TYPE & MANNER DET A NUMER IN	Frequency
dBidiy Ref 25.00 dB	m		Mkr	1.849 996 GHz -29.36 dBm	Auto Tuni
10					Center Fre 1.85000000 GH
		p.vm	an a	an a	Start Fre 1.848000000 GH
0		-		0.1 -1 2 01 -dbs	Stop Fre 1.85200000 GH
II and a start of the start of	and a second	-mont			CF Ste 400,000 kH Auto Ma
2 1 1 1					Freq Offse 0 H
enter 1.850000 GHz				Span 4.000 MHz	Scale Typ

Plot 7-121. Lower Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



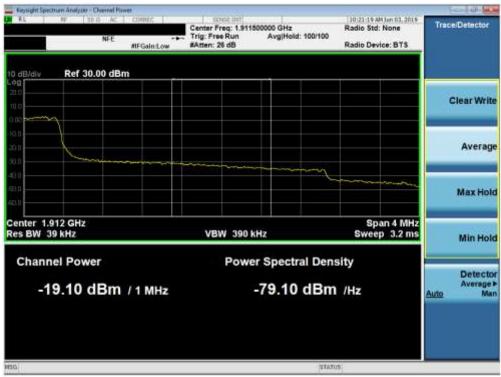
Plot 7-122. Lower Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 90 of 100
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Frequency	10:21:12 AM Jun 03, 2019 TRACE 3 2 4 4 TYPE A WARMAN DET A NINNA N	#Avg Type: RMS	Trig: Free Run Atten: 36 dB	NFE PNO: Wide C	RL IF
Auto Tun	1.910 008 GHz -26.60 dBm	Mkr		25.00 dBm	0 dB/dly Ref
Center Fre 1.910000000 GF					50
Start Fre 1,90800000 GH			Ŋ		5.00 
Stop Fre 1.912000000 GH	54.1 13.00 offer		1		15,0 (
CF Ste 400,000 kF uto Ma	many	monowing	~m.		25.11 25.11
Freq Offse 0 H					5.11 5.11
Scale Typ					Center 1.9100
-0 =	Span 4.000 MHz 5.667 ms (1001 pts)	Sweep (	30 kHz		Res BW 36 kl

Plot 7-123. Upper Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



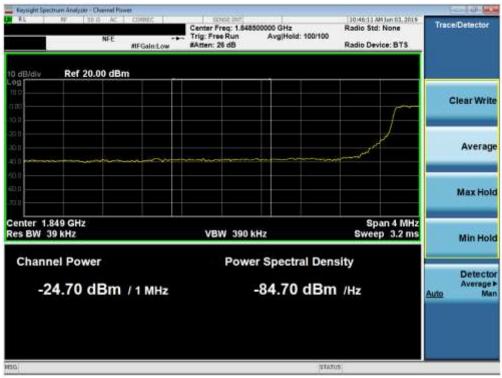
Plot 7-124. Upper Extended Band Edge Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 91 of 100
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RL NF 20.0	FE PNO: Wide (	Trig: Free Run Atten: 36 dB	#Avg Type: RMS	10146.02 AM Jun 03, 2019 TRACE 1 2 0 4 3 TYPE & 000000000 DET A N UN N 10	Frequency
0 dBidly Ref 25.00 dl	Bm		Mkr	1 1.849 976 GHz -28.69 dBm	Auto Tune
1510					Center Fre 1.85000000 GH
510) 6.cn		1	an a	and a star a	Start Free 1,848000000 GH
50		and the		04.1 (13.00 offers	Stop Fre 1.85200000 GH
11 1					CF Ste 400,000 kH Auto Ma
た。 第一月					Freq Offse 0 H
65.11					Scale Typ
Center 1.850000 GHz Res BW 62 kHz	#VB	W 220 kHz	Sweep	Span 4.000 MHz 6.667 ms (1001 pts)	Log <u>Li</u>

Plot 7-125. Lower Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



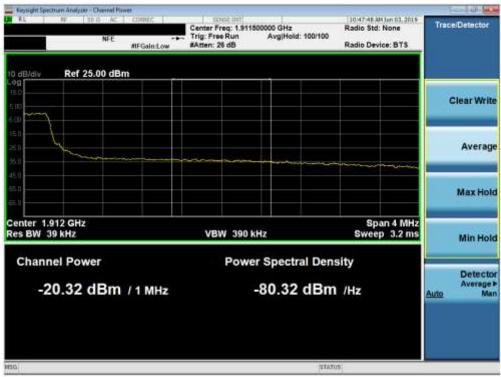
Plot 7-126. Lower Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕑 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 92 of 122
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RL NF 30.0 AC	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Type: RMS	10:47:40 AM Jun 03, 2019 TRACE 10:04 3 TYPE A WWWWWW DET A NUMBER W	Frequency
dBidiy Ref 25.00 dBm			Mkr	1 1.910 004 GHz -26.44 dBm	Auto Tune
50					Center Fre
500 100 100 100	nanang-pinakanang	7			Start Fre 1,90800000 GH
5.0		Mic 1		64.1-12.00 (49)	Stop Fre 1.912000000 GH
510 511 60				a la construit de la construit	CFSte 400,000 kH Auto Ma
2010 2011					Freq Offse 0 H
5.0					Scale Type
enter 1.910000 GHz Res BW 62 kHz	#VBW 3	20 kHz	Sweep	Span 4.000 MHz 6.667 ms (1001 pts)	

Plot 7-127. Upper Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)



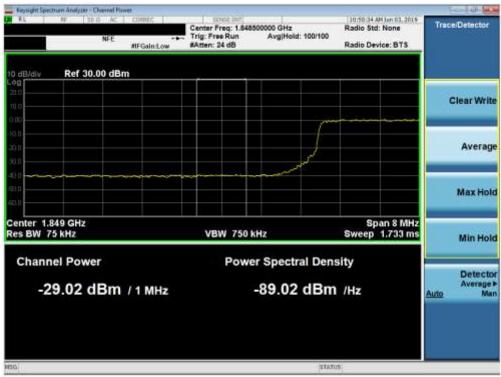
Plot 7-128. Upper Extended Band Edge Plot (Band 2 - 5.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 82 of 102
1M1905210082-03.ZNF	5/21 - 6/7/2019	- 6/7/2019 Portable Handset		Page 83 of 122
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	NFE	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Type		0:30.27 AM Jun 03, 2019 TRACE 12, 14 A TYPE A NUMBER DET A NUMBER	Frequency
0 dB/dly Ref 25.00	dBm				Mkr1 1	850 000 GHz -31.57 dBm	Auto Tune
150							Center Free 1.85000000 GH
5.00 5.00				langiagan, pinan Ag	80-91-200-5-2 ¹ -1	۵۰۰۰٬۰۰۵ شوسته در _ا یروان در سرد	Start Fre 1.846000000 GH
5.0						54.1 - 1 3 00 offer	Stop Fre 1.854000000 GH
25:0 5:11 10 ⁻¹ 4-3 ⁰ -4 ₂ -3 ⁰ -4 ₂ -3 ¹ -13 ¹ -1	ing the grade of the state of the	an a	uner all the				CF Ste 800,000 kH <u>Auto</u> Ma
20.0 5 5 5 1							Freq Offse 0 H
65.11							Scale Typ
Center 1.850000 GH: Res BW 120 kHz	Z	#VBW	430 kHz	s	weep 13.3	Span 8.000 MHz 3 ms (1001 pts)	Log <u>Li</u>

Plot 7-129. Lower Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



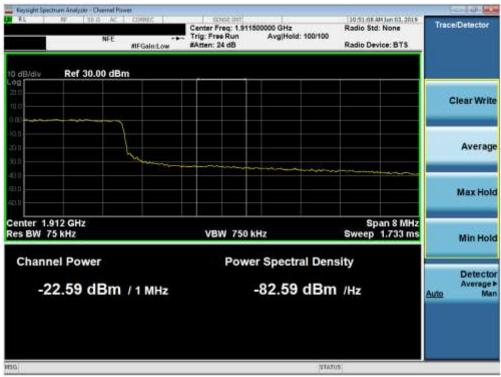
Plot 7-130. Lower Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 94 of 122
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RL 87 30	NFE	PNO: Wide	Trig: Free Atten: 38		#Avg Type	e: RMS	TRAC	Alun 03, 2019 2 1 2 3 4 9 PE A MANANA FT A NIMANA M	Fr	equency
0 dB/dly Ref 25.00	dBm				99. co	Mkr1	1.910 ( -28.	008 GHz 46 dBm		Auto Tune
15.0										enter Fre
5.00		he in the production of the projection of the pr	-						1.906	Start Fre
15.0 16.0				Ť				(04.1-11.10) (dba	1.914	Stop Fre
95 H			and a	transer of	49 ju		tinter anna	1999 Theodory and the	Auto	CF Ste 800.000 kH Ma
200 201									1	Freq Offse 0 H
65.0										Scale Typ
Center 1.910000 GHz Res BW 120 kHz	2	#VBW	430 kHz	7		Sweep 1	Span 8 3.33 ms i	.000 MHz (1001 pts)	Log	ų

Plot 7-131. Upper Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)



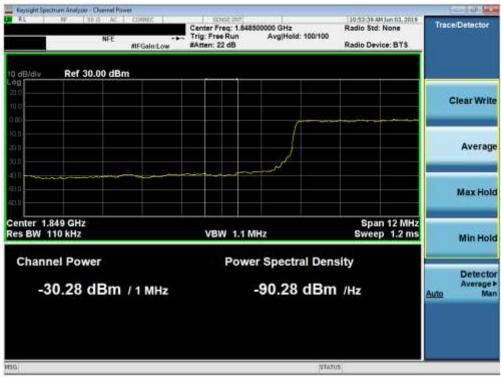
Plot 7-132. Upper Extended Band Edge Plot (Band 2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 95 of 100
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RL 87 30	n ac	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Type:		TRACE DI ANNI DI 2016 TRACE DI ANNI DI 2016 TYPE NAMENI DET ANNI NUMBER	Frequency
0 dB/dly Ref 25.00	dBm				Mkr1 1.	850 000 GHz -33.44 dBm	Auto Tune
50							Center Free 1.850000000 GH
5.00				and a second	·····		Start Fre 1.844000000 GH
15.0 16.0						DL 1 13 00 0000	Stop Free 1.85600000 GH
×1			11				CF Ste 1.200000 MH <u>Auto</u> Ma
1993年 - 1993年 - 第月 							Freq Offse 0 H
65.11							Scale Typ
Center 1.850000 GHz Res BW 180 kHz	<u>z</u>	#VBW	620 kHz	s	weep 1.00	pan 12.00 MHz 0 ms (1001 pts)	Log <u>Li</u>

Plot 7-133. Lower Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



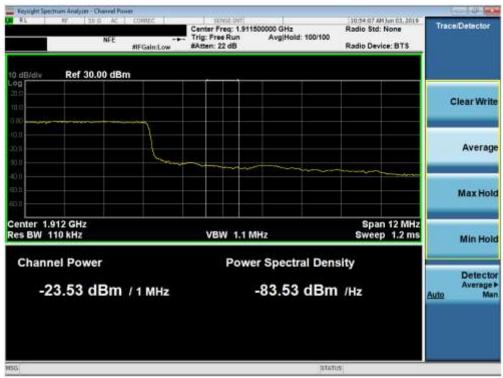
Plot 7-134. Lower Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕦 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 96 of 100		
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RL 87 301	NFE	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Type: RM	IS TRAC		Frequency
o dBidiy Ref 25.00	dBm	I GENEDE		N	Akr1 1.910 8 -27.	04 GHz 11 dBm	Auto Tune
15.0							Center Free 1.910000000 GH
5.00	·						Start Fre 1,904000000 GH
5.0						04.1 - 1.2 Mindby	Stop Fre 1.916000000 GH
25.0 25.1					~~~~~~		CF Stej 1.200000 MH <u>Auto Ma</u>
							Freq Offse 0 H
65.0							Scale Type
Center 1.910000 GHz Res BW 180 kHz		#VBW	620 kHz	Cuite	Span 1 ep 1.000 ms (	2.00 MHz	

Plot 7-135. Upper Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)



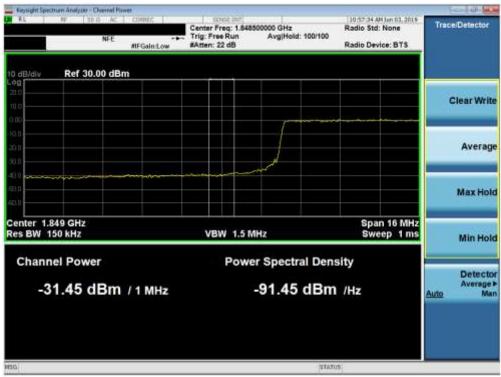
Plot 7-136. Upper Extended Band Edge Plot (Band 2 - 15.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 97 of 100		
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RL NF 30.0	NFE	PNO: Wide	Trig: Free Run Atten: 36 dB	#Avg Type: R	MS TRA	M Jun DJ, 2019 CZ 12 34 9 PE A MANANA ST A NUMBER	Frequency
o dB/dly Ref 25.00	dBm	in Semicon		1	Mkr1 1.850 ( -33.	000 GHz 80 dBm	Auto Tune
6g							Center Free 1.85000000 GH
5.00 6.00				an a			Start Fre 1.842000000 GH
15,0						04.1-11.00 alles	Stop Fre 1.85800000 GH
25.0 25.0		and the second secon	and the second s				CF Ste 1.800000 MH <u>Auto</u> Ma
48.0 (二) (二) (二)							Freq Offse 0 H
Center 1.850000 GHz					0	6.00 MHz	Scale Typ
Res BW 240 kHz		#VBW	820 kHz	SW	eep 1.000 ms	(1001 pts)	

Plot 7-137. Lower Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



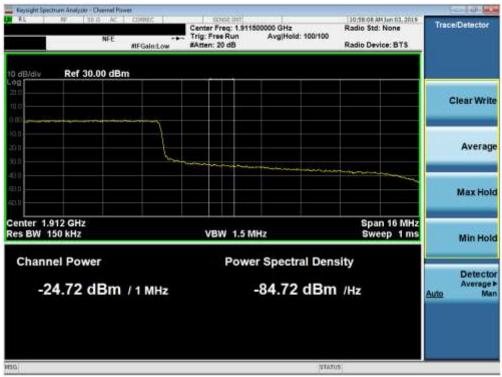
Plot 7-138. Lower Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager			
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RL 87 30	NFE	PNO: Wide C	Trig: Free Run Atten: 36 dB	#Avg Type: F	RMS TRAC		Frequency
ID dB/div Ref 25.00	dBm				Mkr1 1.910 0 -28.	00 GHz 03 dBm	Auto Tune
15.0							Center Fre
5.00		er og som en					Start Fre 1.902000000 GH
15.0 16.0						041-1101-00-s	Stop Fre 1.918000000 GH
					and a star when the same		CF Ste 1,500000 MH Suto Ma
							Freq Offse 0 H
65.11							Scale Typ
Center 1.910000 GHz Res BW 240 kHz	z.		820 kHz		Span 1 reep 1.000 ms (	6.00 MHz	.og <u>Li</u>

Plot 7-139. Upper Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)



Plot 7-140. Upper Extended Band Edge Plot (Band 2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager			
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# 7.5 Peak-Average Ratio

# **Test Overview**

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

# Test Procedure Used

KDB 971168 D01 v03r01 - Section 5.7.1

# **Test Settings**

- 1. The signal analyzer's CCDF measurement profile is enabled
- 2. Frequency = carrier center frequency
- 3. Measurement BW ≥ OBW or specified reference bandwidth
- 4. The signal analyzer was set to collect one million samples to generate the CCDF curve
- 5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms.

## Test Setup

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



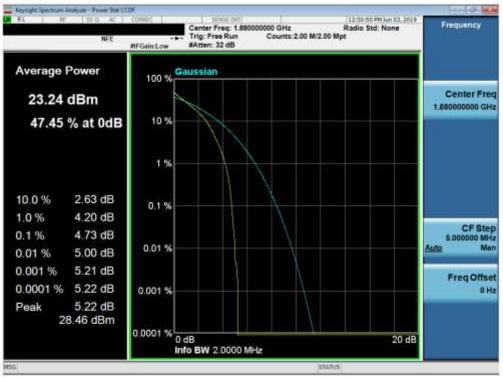
Figure 7-4. Test Instrument & Measurement Setup

## Test Notes

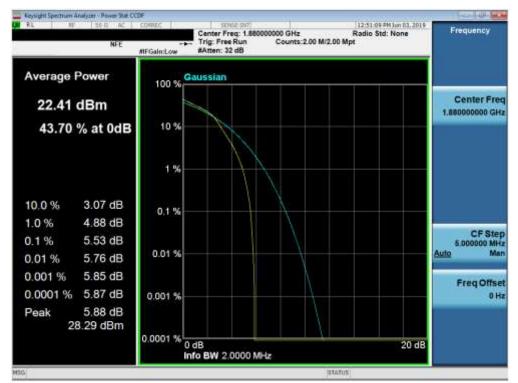
None.

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager		
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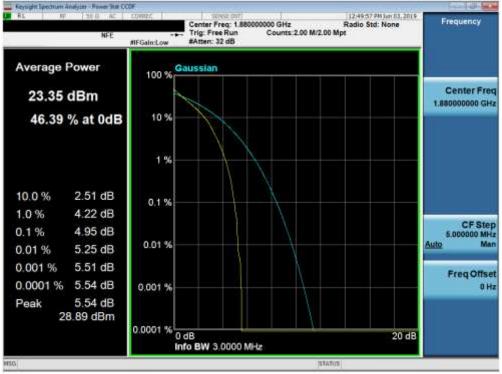


#### Plot 7-142. PAR Plot (Band 2 - 1.4MHz 16-QAM - Full RB Configuration)

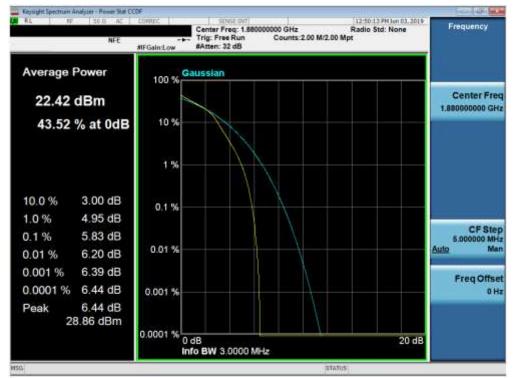
FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Dage 01 of 100		
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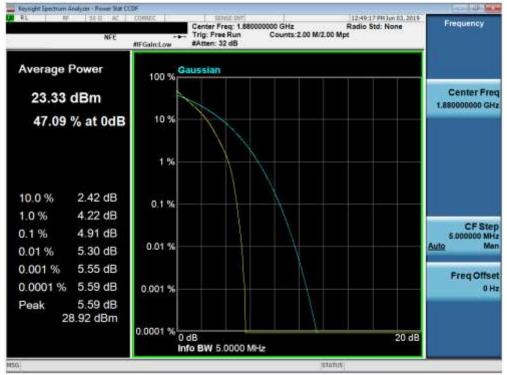
Plot 7-143. PAR Plot (Band 2 - 3.0MHz QPSK - Full RB Configuration)



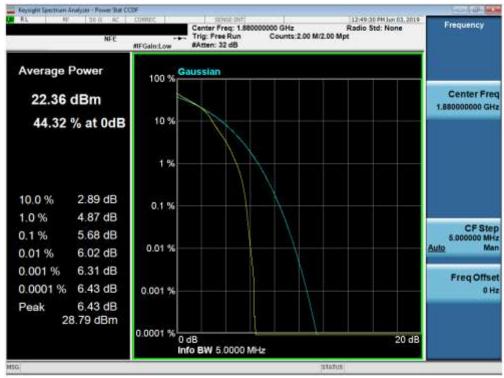
#### Plot 7-144. PAR Plot (Band 2 - 3.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕚 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 02 of 102
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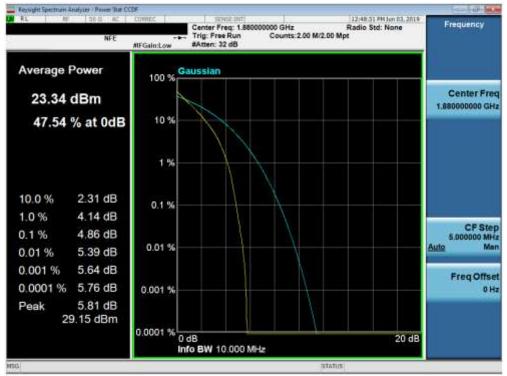




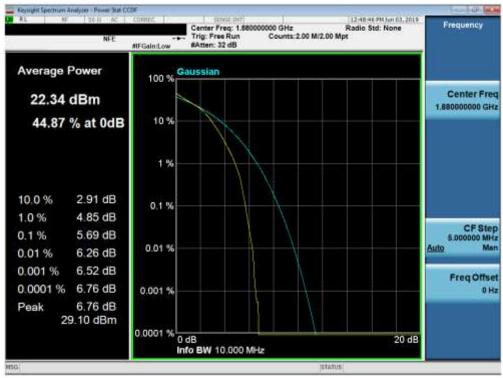
Plot 7-146. PAR Plot (Band 2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 02 of 122
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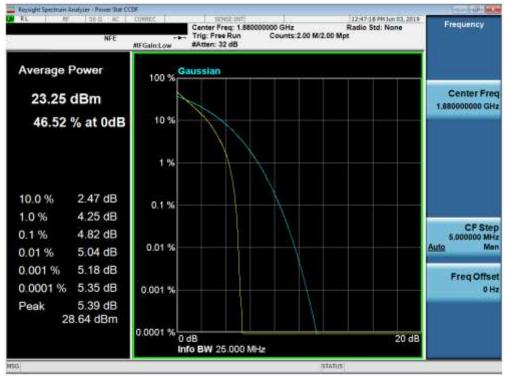




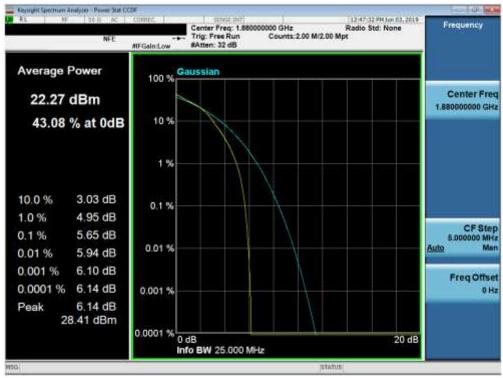
Plot 7-148. PAR Plot (Band 2 - 10.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 04 of 122
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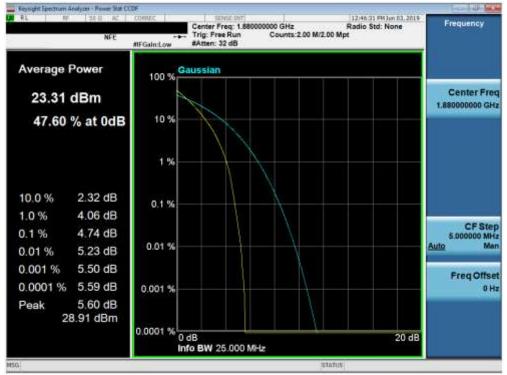




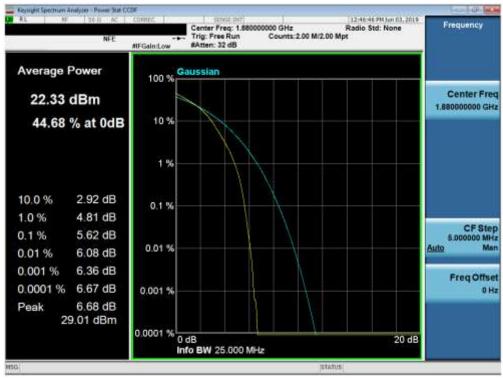
Plot 7-150. PAR Plot (Band 2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 05 of 122	
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Plot 7-152. PAR Plot (Band 2 - 20.0MHz 16-QAM - Full RB Configuration)

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Test Report S/N:	Test Dates:	EUT Type:		Dage 06 of 122
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# 7.6 Radiated Power (ERP/EIRP)

# **Test Overview**

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized tuned broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

# **Test Procedures Used**

KDB 971168 D01 v03r01 - Section 5.2.1

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

# Test Settings

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW = 1 5% of the expected OBW, not to exceed 1MHz
- 3. VBW  $\ge$  3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points  $\geq 2 \times \text{span} / \text{RBW}$
- 6. Detector = RMS
- 7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
- 8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

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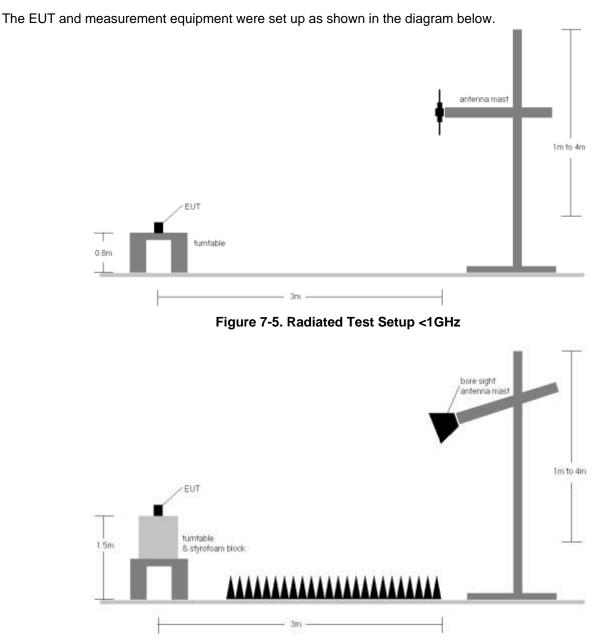


Figure 7-6. Radiated Test Setup >1GHz

# Test Notes

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

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 09 of 100
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
699.70	1.4	QPSK	Н	190	296	1/3	12.86	3.40	16.26	0.042	34.77	-18.51
707.50	1.4	QPSK	Н	163	291	1/3	12.66	3.65	16.31	0.043	34.77	-18.46
715.30	1.4	QPSK	Н	182	295	1/3	12.54	3.70	16.24	0.042	34.77	-18.53
707.50	1.4	16-QAM	Н	163	291	1/3	11.48	3.65	15.13	0.033	34.77	-19.64
700.50	3	QPSK	Н	190	296	1 / 7	12.86	3.40	16.26	0.042	34.77	-18.51
707.50	3	QPSK	Н	163	291	1 / 7	12.61	3.65	16.26	0.042	34.77	-18.51
714.50	3	QPSK	Н	182	295	1 / 7	12.58	3.70	16.28	0.042	34.77	-18.49
714.50	3	16-QAM	н	182	295	1 / 7	11.45	3.70	15.15	0.033	34.77	-19.62
701.50	5	QPSK	н	190	296	1 / 12	12.88	3.40	16.28	0.042	34.77	-18.49
707.50	5	QPSK	н	163	291	1 / 12	12.58	3.65	16.23	0.042	34.77	-18.54
713.50	5	QPSK	н	182	295	1 / 12	12.55	3.70	16.25	0.042	34.77	-18.52
701.50	5	16-QAM	н	190	296	1 / 12	11.60	3.40	15.00	0.032	34.77	-19.77
704.00	10	QPSK	н	190	296	1 / 25	15.02	3.50	16.37	0.043	34.77	-18.40
707.50	10	QPSK	н	163	291	1 / 25	14.84	3.65	16.34	0.043	34.77	-18.43
711.00	10	QPSK	Н	182	295	1 / 25	15.19	3.70	16.74	0.047	34.77	-18.03
711.00	10	16-QAM	Н	182	295	1 / 25	13.98	3.70	15.53	0.036	34.77	-19.24
711.00	10	QPSK	V	148	196	1 / 25	15.02	3.70	16.57	0.045	34.77	-18.20

TEST[®]

Table 7-3. ERP Data (Band 12)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N: Test Dates:		EUT Type:		Dage 00 of 100
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	1.4	QPSK	Н	138	23	1/3	11.74	6.70	18.44	0.070	38.45	-20.01
836.50	1.4	QPSK	н	135	33	1 / 0	11.77	6.70	18.47	0.070	38.45	-19.98
848.30	1.4	QPSK	н	132	30	1 / 3	11.54	6.70	18.24	0.067	38.45	-20.21
836.50	1.4	16-QAM	н	135	33	1 / 0	9.64	6.70	16.34	0.043	38.45	-22.11
825.50	3	QPSK	Н	138	23	1 / 7	11.52	6.70	18.22	0.066	38.45	-20.23
836.50	3	QPSK	Н	135	33	1 / 0	11.74	6.70	18.44	0.070	38.45	-20.01
847.50	3	QPSK	Н	132	30	1 / 7	11.66	6.65	18.31	0.068	38.45	-20.14
836.50	3	16-QAM	Н	135	33	1 / 0	9.60	6.70	16.30	0.043	38.45	-22.15
826.50	5	QPSK	Н	138	23	1 / 12	11.42	6.70	18.12	0.065	38.45	-20.33
836.50	5	QPSK	Н	135	33	1 / 0	11.46	6.70	18.16	0.065	38.45	-20.29
846.50	5	QPSK	Н	132	30	1 / 12	11.50	6.60	18.10	0.065	38.45	-20.35
836.50	5	16-QAM	н	135	33	1 / 0	9.15	6.70	15.85	0.038	38.45	-22.60
829.00	10	QPSK	Н	138	23	1 / 25	13.93	6.70	18.48	0.070	38.45	-19.97
836.50	10	QPSK	Н	135	33	1 / 0	13.77	6.70	18.32	0.068	38.45	-20.13
844.00	10	QPSK	Н	132	30	1 / 25	14.02	6.60	18.47	0.070	38.45	-19.98
829.00	10	16-QAM	Н	138	23	1 / 25	12.64	6.70	17.19	0.052	38.45	-21.26
829.00	10	QPSK	V	151	189	1 / 25	13.47	6.70	18.02	0.063	38.45	-20.43

Table 7-4. ERP Data (Band 5)	
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FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 100 of 100	
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1710.70	1.4	QPSK	н	136	202	1/3	13.82	9.44	23.26	0.212	30.00	-6.74
1732.50	1.4	QPSK	Н	129	195	1 / 5	13.33	9.31	22.64	0.184	30.00	-7.36
1754.30	1.4	QPSK	Н	131	176	1 / 0	12.63	9.21	21.84	0.153	30.00	-8.16
1710.70	1.4	16-QAM	Н	136	202	1/3	13.49	9.44	22.93	0.197	30.00	-7.07
1711.50	3	QPSK	Н	136	202	1 / 7	13.72	9.44	23.15	0.207	30.00	-6.85
1732.50	3	QPSK	Н	129	195	1 / 14	13.33	9.31	22.64	0.184	30.00	-7.36
1753.50	3	QPSK	Н	131	176	1 / 0	12.66	9.21	21.87	0.154	30.00	-8.13
1711.50	3	16-QAM	Н	136	202	1 / 7	13.26	9.44	22.69	0.186	30.00	-7.31
1712.50	5	QPSK	Н	136	202	1 / 12	13.94	9.43	23.37	0.218	30.00	-6.63
1732.50	5	QPSK	Н	129	195	1 / 24	13.49	9.31	22.80	0.190	30.00	-7.20
1752.50	5	QPSK	Н	131	176	1 / 0	12.83	9.21	22.03	0.160	30.00	-7.97
1712.50	5	16-QAM	Н	136	202	1 / 12	12.71	9.43	22.14	0.164	30.00	-7.86
1715.00	10	QPSK	Н	136	202	1 / 25	13.98	9.42	23.39	0.219	30.00	-6.61
1732.50	10	QPSK	Н	129	195	1 / 49	13.57	9.31	22.88	0.194	30.00	-7.12
1750.00	10	QPSK	Н	131	176	1 / 0	12.78	9.20	21.98	0.158	30.00	-8.02
1715.00	10	16-QAM	Н	136	202	1 / 25	13.46	9.42	22.87	0.194	30.00	-7.13
1717.50	15	QPSK	Н	136	202	1 / 37	13.94	9.40	23.34	0.216	30.00	-6.66
1732.50	15	QPSK	Н	129	195	1 / 74	13.28	9.31	22.59	0.181	30.00	-7.41
1747.50	15	QPSK	Н	131	176	1 / 0	12.61	9.22	21.82	0.152	30.00	-8.18
1717.50	15	16-QAM	Н	136	202	1 / 37	12.92	9.40	22.32	0.171	30.00	-7.68
1720.00	20	QPSK	Н	136	202	1 / 50	13.92	9.38	23.30	0.214	30.00	-6.70
1732.50	20	QPSK	Н	129	195	1 / 99	13.50	9.31	22.81	0.191	30.00	-7.19
1745.00	20	QPSK	Н	131	176	1/0	12.65	9.23	21.88	0.154	30.00	-8.12
1720.00	20	16-QAM	Н	136	202	1 / 50	12.55	9.38	21.93	0.156	30.00	-8.07
1720.00	20	QPSK	V	144	270	1 / 25	12.59	9.42	22.01	0.159	30.00	-7.99

Table 7-5. EIRP Data (Band 4)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Degs 101 of 100
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	RB Size/Offset	Substitute Level [dBm]	Ant. Gain [dBi]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1850.70	1.4	QPSK	V	144	265	1/3	14.28	9.88	24.16	0.261	33.01	-8.85
1880.00	1.4	QPSK	V	100	245	1/3	14.19	10.10	24.29	0.269	33.01	-8.72
1909.30	1.4	QPSK	V	111	254	1 / 0	12.34	10.31	22.65	0.184	33.01	-10.36
1880.00	1.4	16-QAM	V	100	245	1/3	13.22	10.10	23.32	0.215	33.01	-9.69
1851.50	3	QPSK	V	144	265	1 / 7	14.19	9.88	24.07	0.255	33.01	-8.94
1880.00	3	QPSK	V	100	245	1 / 0	14.10	10.10	24.20	0.263	33.01	-8.81
1908.50	3	QPSK	V	111	254	1 / 7	12.34	10.30	22.65	0.184	33.01	-10.36
1880.00	3	16-QAM	V	100	245	1 / 0	13.44	10.10	23.54	0.226	33.01	-9.47
1852.50	5	QPSK	V	144	265	1 / 12	14.29	9.89	24.18	0.262	33.01	-8.83
1880.00	5	QPSK	V	100	245	1 / 12	14.20	10.10	24.30	0.269	33.01	-8.71
1907.50	5	QPSK	V	111	254	1 / 12	12.33	10.30	22.63	0.183	33.01	-10.38
1880.00	5	16-QAM	V	100	245	1 / 12	13.35	10.10	23.45	0.222	33.01	-9.56
1855.00	10	QPSK	V	144	265	1 / 25	14.20	9.91	24.11	0.258	33.01	-8.90
1880.00	10	QPSK	V	100	245	1 / 25	14.21	10.10	24.31	0.270	33.01	-8.70
1905.00	10	QPSK	V	111	254	1 / 25	12.35	10.28	22.64	0.184	33.01	-10.37
1880.00	10	16-QAM	V	100	245	1 / 25	13.19	10.10	23.29	0.214	33.01	-9.72
1857.50	15	QPSK	V	144	265	1 / 36	14.02	9.93	23.95	0.248	33.01	-9.06
1880.00	15	QPSK	V	100	245	1 / 0	14.12	10.10	24.22	0.264	33.01	-8.79
1902.50	15	QPSK	V	111	254	1 / 0	12.34	10.27	22.61	0.182	33.01	-10.40
1880.00	15	16-QAM	V	100	245	1/0	12.87	10.10	22.97	0.198	33.01	-10.04
1860.00	20	QPSK	V	144	265	1 / 50	14.13	9.95	24.08	0.256	33.01	-8.93
1880.00	20	QPSK	V	100	245	1 / 50	14.21	10.10	24.31	0.270	33.01	-8.70
1900.00	20	QPSK	V	111	254	1/0	12.36	10.26	22.62	0.183	33.01	-10.39
1880.00	20	16-QAM	V	100	245	1 / 50	12.73	10.10	22.83	0.192	33.01	-10.18
1880.00	10	QPSK	Н	166	342	1 / 25	13.08	10.10	23.18	0.208	33.01	-9.83

CTEST'

Table 7-6. EIRP Data (Band 2)

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# 7.7 Radiated Spurious Emissions Measurements

# **Test Overview**

Radiated spurious emissions measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas.

# **Test Procedures Used**

KDB 971168 D01 v03r01 - Section 5.8

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

## **Test Settings**

- 1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
- 2. VBW  $\geq$  3 x RBW
- 3. Span = 1.5 times the OBW
- 4. No. of sweep points > 2 x span / RBW
- 5. Detector = RMS
- 6. Trace mode = Average (Max Hold for pulsed emissions)
- 7. The trace was allowed to stabilize

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bore sight antenna mast 1m to 4m EUT tumtable 1.5m & styrofoam block Зm

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

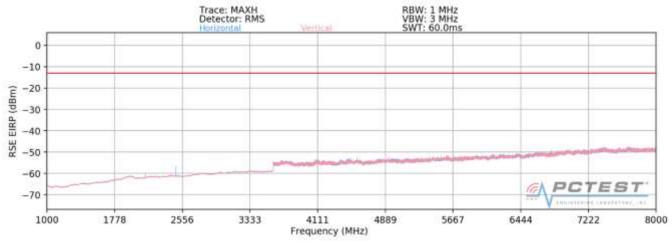
Figure 7-7. Test Instrument & Measurement Setup

## **Test Notes**

- 1) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the tables below.
- 2) This unit was tested with its standard battery.
- 3) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 4) Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- 5) The "-" shown in the following RSE tables are used to denote a noise floor measurement.

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Plot 7-153. Radiated Spurious Plot above 1GHz (Band 12)

704	4.00 MHz
QPSK	_
10.0	MHz
3	meters
-13	dBm
	QPSK 10.0 3

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1408.00	Н	141	333	-65.19	8.16	-57.02	-44.0
2112.00	Н	130	21	-61.12	9.61	-51.51	-38.5
2816.00	Н	-	-	-66.08	9.09	-56.98	-44.0

Table 7-7. Radiated Spurious Data (Band 12 – Low Channel)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 105 of 100
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OPERATING FREQUENCY:	707	MHz	
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1415.00	Н	105	256	-65.31	8.22	-57.10	-44.1
2122.50	Н	117	29	-61.62	9.59	-52.03	-39.0
2830.00	н	-	-	-66.18	9.10	-57.08	-44.1

Table 7-8. Radiated Spurious Data (Band 12 – Mid Channel)

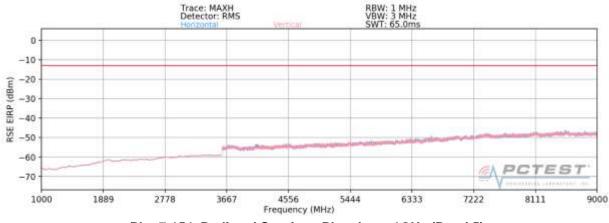
OPERATING FREQUENCY:	71	1.00	MHz
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1422.00	Н	163	330	-65.07	8.27	-56.80	-43.8
2133.00	Н	348	338	-60.59	9.57	-51.02	-38.0
2844.00	Н	-	-	-66.32	9.11	-57.21	-44.2

Table 7-9. Radiated Spurious Data (Band 12 – High Channel)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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# Plot 7-154. Radiated Spurious Plot above 1GHz (Band 5)

**QPSK** 

829.00

MHz

OPERATING FREQUENCY: MODULATION SIGNAL:

BANDWIDTH:	10.0	MHz

meters

LIMIT:	-13	dBm
--------	-----	-----

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1658.00	Н	105	14	-68.86	9.55	-59.30	-46.3
2487.00	Н	-	-	-67.36	9.45	-57.91	-44.9

Table 7-10. Radiated Spurious Data (Band 5 – Low Channel)

OPERATING FREQUENCY:836.50MHzMODULATION SIGNAL:QPSKBANDWIDTH:10.0DISTANCE:3LIMIT:-13dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1673.00	Н	152	159	-69.75	9.54	-60.21	-47.2
2509.50	Н	-	-	-66.35	9.42	-56.93	-43.9

Table 7-11. Radiated Spurious Data (Band 5 – Mid Channel)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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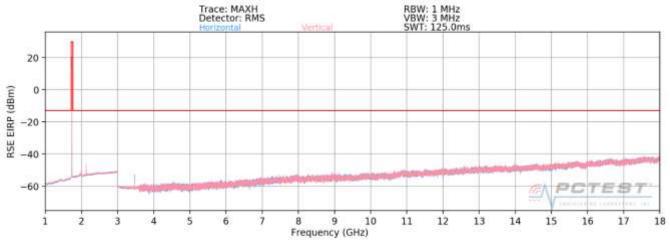
OPERATING FREQUENCY:	PERATING FREQUENCY: 844		
MODULATION SIGNAL:	QPSK	_	
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
1688.00	Н	143	154	-70.24	9.52	-60.72	-47.7
2532.00	Н	-	-	-67.19	9.40	-57.79	-44.8

Table 7-12. Radiated Spurious Data (Band 5 – High Channel)

FCC ID: ZNFX320AA		MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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Plot 7-155. Radiated Spurious Plot above 1GHz (Band 4)

MHz

[H/V]	Height [cm]	Azimuth [degree]	Level at Antenna Terminals [dBm]	Antenna Gain [dBi]	Emission Level [dBm]	Margin [dB]
Н	117	128	-54.79	7.46	-47.33	-34.3
Н	115	225	-68.17	11.07	-57.10	-44.1
Н	-	-	-69.41	11.71	-57.70	-44.7
Н	-	-	-65.88	8.86	-57.01	-44.0
	H H H	H     117       H     115       H     -       H     -	H         117         128           H         115         225           H         -         -           H         -         -	H/V         [cm]         [degree]	H/V]         [cm]         [degree]          [dBi]           H         117         128         -54.79         7.46           H         115         225         -68.17         11.07           H         -         -         -69.41         11.71           H         -         -         -65.88         8.86	H/V]         [degree]          [dBij         [dBm]           H         117         128         -54.79         7.46         -47.33           H         115         225         -68.17         11.07         -57.10           H         -         -         -69.41         11.71         -57.70

Table 7-13. Radiated Spurious Data (Band 4 – Low Channel)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
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OPERATING FREQUENCY:		MHz	
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3465.00	Н	100	131	-51.88	7.54	-44.34	-31.3
5197.50	Н	130	210	-69.00	11.15	-57.85	-44.8
6930.00	Н	-	-	-70.30	11.80	-58.49	-45.5
8662.50	Н	-	-	-65.49	8.68	-56.81	-43.8

Table 7-14. Radiated Spurious Data (Band 4 – Mid Channel)

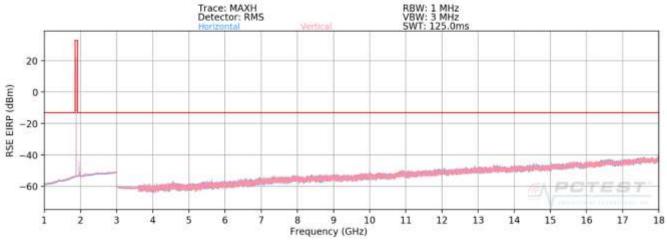
175	0.00 MI	Hz
QPSK	_	
10.0	MHz	
3	meters	
-13	dBm	
	QPSK 10.0 3	QPSK           10.0         MHz           3         meters

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3500.00	Н	113	132	-52.20	7.49	-44.71	-31.7
5250.00	Н	130	230	-69.49	11.30	-58.19	-45.2
7000.00	Н	-	-	-69.41	11.85	-57.56	-44.6
8750.00	Н	-	-	-64.94	8.26	-56.68	-43.7

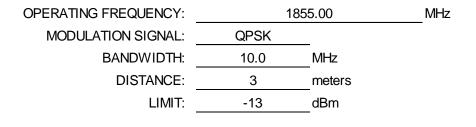
Table 7-15. Radiated Spurious Data (Band 4 – High Channel)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager	
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Plot 7-156. Radiated Spurious Plot above 1GHz (Band 2)



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3710.00	Н	125	130	-54.26	6.09	-48.17	-35.2
5565.00	Н	110	182	-55.83	12.05	-43.78	-30.8
7420.00	Н	-	-	-65.60	12.46	-53.13	-40.1

Table 7-16. Radiated Spurious Data (Band 2 – Low Channel)

FCC ID: ZNFX320AA	PCTEST	CTEST MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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OPERATING FREQUENCY:	188	0.00	MHz
MODULATION SIGNAL:	QPSK		
BANDWIDTH:	10.0	MHz	
DISTANCE:	3	meters	
LIMIT:	-13	dBm	

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3760.00	Н	117	32	-59.17	5.90	-53.27	-40.3
5640.00	Н	108	2	-58.18	12.27	-45.91	-32.9
7520.00	Н	-	-	-65.28	12.56	-52.72	-39.7

Table 7-17. Radiated Spurious Data (Band 2 – Mid Channel)

1905.00

MHz

OPERATING FREQUENCY:

ENCY:

MHz

MODULATION SIGNAL: QPSK

BANDWIDTH: 10.0

DISTANCE: <u>3</u> meters

LIMIT: <u>-13</u>dBm

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Level at Antenna Terminals [dBm]	Substitute Antenna Gain [dBi]	Spurious Emission Level [dBm]	Margin [dB]
3810.00	Н	116	16	-59.20	5.83	-53.36	-40.4
5715.00	Н	138	183	-57.15	12.43	-44.72	-31.7
7620.00	Н	-	-	-65.62	12.39	-53.23	-40.2

Table 7-18. Radiated Spurious Data (Band 2 – High Channel)

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## 7.8 Frequency Stability / Temperature Variation

### **Test Overview and Limit**

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

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

For Part 22, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency. For Part 24, Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### Test Procedure Used

ANSI/TIA-603-E-2016

### Test Settings

- 1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

### Test Setup

The EUT was connected via an RF cable to a spectrum analyzer with the EUT placed inside an environmental chamber.

#### Test Notes

None

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# **Band 12 Frequency Stability Measurements**

OPERATING FREQUENCY:	707,500,000	Hz
CHANNEL:	23790	_
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	<b>ТЕМР</b> (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	707,499,931	-69	-0.000098
100 %		- 20	707,500,009	9	0.0000013
100 %		- 10	707,499,915	-85	-0.0000120
100 %		0	707,499,875	-125	-0.0000177
100 %		+ 10	707,499,998	-2	-0.0000003
100 %		+ 20	707,500,018	18	0.0000025
100 %		+ 30	707,499,978	-22	-0.0000031
100 %		+ 40	707,499,643	-357	-0.0000505
100 %		+ 50	707,500,146	146	0.0000206
BATT. ENDPOINT	3.18	+ 20	707,500,230	230	0.0000325

Table 7-19. Frequency Stability Data (Band 12)

## Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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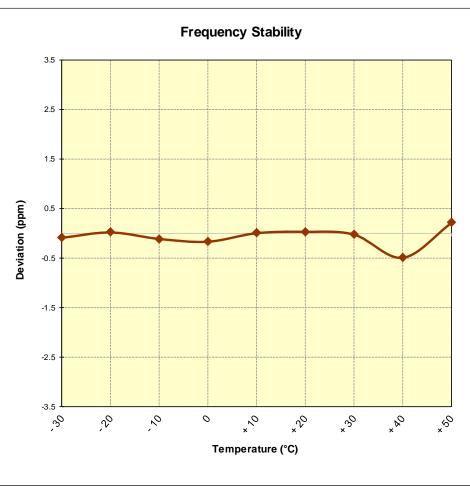


Figure 7-8. Frequency Stability Graph (Band 12)

FCC ID: ZNFX320AA	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕞 LG	Approved by: Quality Manager
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# **Band 5 Frequency Stability Measurements**

OPERATING FREQUENCY:	836,500,000	Hz
CHANNEL:	20525	_
REFERENCE VOLTAGE:	3.85	_ VDC
DEVIATION LIMIT:	± 0.00025 % or 2.5 ppm	_

VOLTAGE (%)	POWER (VDC)	<b>ТЕМР</b> (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	836,500,021	21	0.0000025
100 %		- 20	836,500,257	257	0.0000307
100 %		- 10	836,499,828	-172	-0.0000206
100 %		0	836,500,360	360	0.0000430
100 %		+ 10	836,500,144	144	0.0000172
100 %		+ 20	836,500,052	52	0.0000062
100 %		+ 30	836,500,177	177	0.0000212
100 %		+ 40	836,499,695	-305	-0.0000365
100 %		+ 50	836,500,008	8	0.0000010
BATT. ENDPOINT	3.18	+ 20	836,500,033	33	0.0000039

Table 7-20. Frequency Stability Data (Band 5)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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**Band 5 Frequency Stability Measurements** 

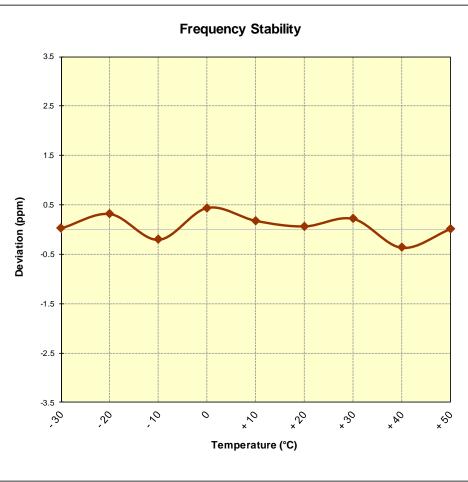


Figure 7-9. Frequency Stability Graph (Band 5)

FCC ID: ZNFX320AA	AVPCTEST	MEASUREMENT REPORT (CERTIFICATION)	🕕 LG	Approved by: Quality Manager
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## **Band 4 Frequency Stability Measurements**

OPERATING FREQUENCY:	1,732,500,000	Hz
CHANNEL:	20175	-
REFERENCE VOLTAGE:	3.85	VDC

VOLTAGE (%)	POWER (VDC)	<b>ТЕМР</b> (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	1,732,499,950	-50	-0.0000029
100 %		- 20	1,732,499,969	-31	-0.0000018
100 %		- 10	1,732,499,801	-199	-0.0000115
100 %		0	1,732,500,108	108	0.0000062
100 %		+ 10	1,732,500,185	185	0.0000107
100 %		+ 20	1,732,500,010	10	0.0000006
100 %		+ 30	1,732,500,081	81	0.0000047
100 %		+ 40	1,732,500,222	222	0.0000128
100 %		+ 50	1,732,499,765	-235	-0.0000136
BATT. ENDPOINT	3.18	+ 20	1,732,499,973	-27	-0.0000016

Table 7-21. Frequency Stability Data (Band 4)

## Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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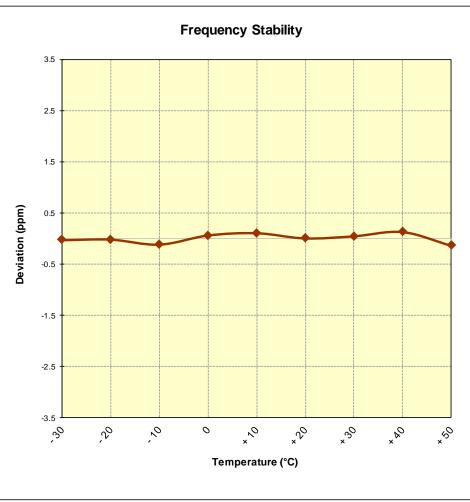


Figure 7-10. Frequency Stability Graph (Band 4)

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# **Band 2 Frequency Stability Measurements**

 OPERATING FREQUENCY:
 1,880,000,000
 Hz

 CHANNEL:
 18900
 Hz

 REFERENCE VOLTAGE:
 3.85
 VDC

 DEVIATION LIMIT:
 ± 0.00025 % or 2.5 ppm
 VDC

VOLTAGE (%)	POWER (VDC)	<b>ТЕМР</b> (°С)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	- 30	1,880,000,219	219	0.0000116
100 %		- 20	1,879,999,810	-190	-0.0000101
100 %		- 10	1,879,999,597	-403	-0.0000214
100 %		0	1,880,000,090	90	0.0000048
100 %		+ 10	1,880,000,218	218	0.0000116
100 %		+ 20	1,879,999,876	-124	-0.0000066
100 %		+ 30	1,880,000,323	323	0.0000172
100 %		+ 40	1,879,999,954	-46	-0.0000024
100 %		+ 50	1,880,000,135	135	0.0000072
BATT. ENDPOINT	3.18	+ 20	1,880,000,003	3	0.0000002

Table 7-22. Frequency Stability Data (Band 2)

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**Band 2 Frequency Stability Measurements** 

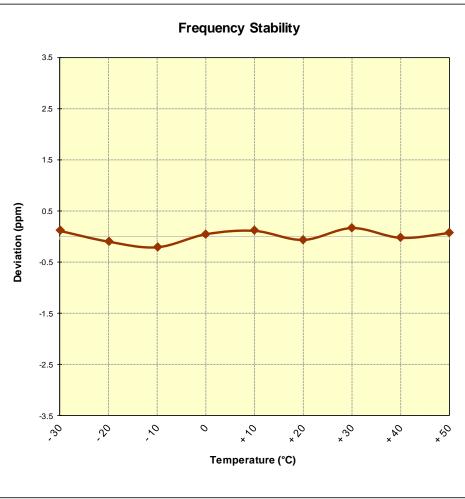


Figure 7-11. Frequency Stability Graph (Band 2)

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## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFX320AA** complies with all the requirements of Part 22, 24, & 27 of the FCC Rules for LTE operation only.

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