



## MEASUREMENT REPORT LTE

**Applicant Name:**  
LG Electronics USA, Inc.  
1000 Sylvan Avenue  
Englewood Cliffs, NJ 07632  
United States

**Date of Testing:**  
2/17 - 3/16/2020  
**Test Site/Location:**  
PCTEST Lab. Columbia, MD, USA  
**Test Report Serial No.:**  
1M2002170021-03-R1.ZNF

**FCC ID:** ZNFK300UM  
**APPLICANT:** LG Electronics USA, Inc.

**Application Type:** Certification  
**Model:** LM-K300UM  
**Additional Model(s):** LMK300UM, K300UM, LM-K300WM, LMK300WM, K300WM, LM-K300QM6, LMK300QM6, K300QM6, LM-K300QM6, LMK300QM6, K300QM6  
**EUT Type:** Portable Handset  
**FCC Classification:** PCS Licensed Transmitter Held to Ear (PCE)  
**FCC Rule Part(s):** 22, 24, & 27  
**Test Procedure(s):** ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01

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

This revised Test Report (S/N: 1M2002170021-03-R1.FCC Report SNs) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

Note: This revised Test Report (S/N: 1M2002170021-03-R1.ZNF) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.



Randy Ortanez  
President

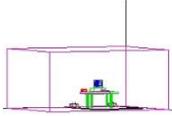


FCC ID: ZNFK300UM	 PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	 LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset	Page 1 of 211	

## TABLE OF CONTENTS

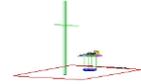
1.0	INTRODUCTION .....	6
1.1	Scope .....	6
1.2	PCTEST Test Location.....	6
1.3	Test Facility / Accreditations.....	6
2.0	PRODUCT INFORMATION.....	7
2.1	Equipment Description .....	7
2.2	Device Capabilities.....	7
2.3	Test Configuration .....	7
2.4	EMI Suppression Device(s)/Modifications .....	7
3.0	DESCRIPTION OF TESTS .....	8
3.1	Measurement Procedure.....	8
3.2	Radiated Power and Radiated Spurious Emissions .....	8
4.0	MEASUREMENT UNCERTAINTY .....	9
5.0	TEST EQUIPMENT CALIBRATION DATA .....	10
6.0	SAMPLE CALCULATIONS .....	11
7.0	TEST RESULTS .....	12
7.1	Summary .....	12
7.2	Occupied Bandwidth .....	14
7.3	Spurious and Harmonic Emissions at Antenna Terminal .....	54
7.4	Band Edge Emissions at Antenna Terminal .....	82
7.5	Peak-Average Ratio .....	137
7.6	Radiated Power (ERP/EIRP).....	177
7.7	Radiated Spurious Emissions Measurements.....	184
7.8	Frequency Stability / Temperature Variation .....	198
8.0	CONCLUSION.....	211

<b>FCC ID:</b> ZNFK300UM	 Proud to be part of element	<b>MEASUREMENT REPORT (CERTIFICATION)</b>	
<b>Test Report S/N:</b> 1M2002170021-03-R1.ZNF	<b>Test Dates:</b> 2/17 - 3/16/2020	<b>EUT Type:</b> Portable Handset	<b>Approved by:</b> Quality Manager
			Page 2 of 211



## MEASUREMENT REPORT

### FCC Part 22, 24, & 27



Mode	FCC Rule Part	Tx Frequency (MHz)	ERP		EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)		
LTE Band 12	27	699.7 - 715.3	0.094	19.72	0.154	21.87	1M10G7D	QPSK
LTE Band 12	27	699.7 - 715.3	0.076	18.78	0.124	20.93	1M10W7D	16QAM
LTE Band 12	27	699.7 - 715.3	0.068	18.32	0.111	20.47	1M10W7D	64QAM
LTE Band 12	27	700.5 - 714.5	0.096	19.84	0.158	21.99	2M70G7D	QPSK
LTE Band 12	27	700.5 - 714.5	0.079	18.96	0.129	21.11	2M69W7D	16QAM
LTE Band 12	27	700.5 - 714.5	0.069	18.40	0.114	20.55	2M69W7D	64QAM
LTE Band 12/17	27	701.5 - 713.5	0.100	19.99	0.164	22.14	4M53G7D	QPSK
LTE Band 12/17	27	701.5 - 713.5	0.080	19.05	0.132	21.20	4M53W7D	16QAM
LTE Band 12/17	27	701.5 - 713.5	0.067	18.29	0.111	20.44	4M56W7D	64QAM
LTE Band 12/17	27	704 - 711	0.094	19.75	0.155	21.90	9M04G7D	QPSK
LTE Band 12/17	27	704 - 711	0.078	18.93	0.128	21.08	9M04W7D	16QAM
LTE Band 12/17	27	704 - 711	0.067	18.26	0.110	20.41	9M02W7D	64QAM
LTE Band 13	27	779.5 - 784.5	0.078	18.94	0.129	21.09	4M52G7D	QPSK
LTE Band 13	27	779.5 - 784.5	0.061	17.83	0.100	19.98	4M51W7D	16QAM
LTE Band 13	27	779.5 - 784.5	0.048	16.77	0.078	18.92	4M50W7D	64QAM
LTE Band 13	27	782	0.088	19.46	0.145	21.61	9M02G7D	QPSK
LTE Band 13	27	782	0.069	18.36	0.112	20.51	8M96W7D	16QAM
LTE Band 13	27	782	0.054	17.31	0.088	19.46	8M97W7D	64QAM
LTE Band 5	22H	824.7 - 848.3	0.058	17.64	0.095	19.79	1M09G7D	QPSK
LTE Band 5	22H	824.7 - 848.3	0.044	16.39	0.071	18.54	1M10W7D	16QAM
LTE Band 5	22H	824.7 - 848.3	0.037	15.74	0.062	17.89	1M10W7D	64QAM
LTE Band 5	22H	825.5 - 847.5	0.057	17.58	0.094	19.73	2M70G7D	QPSK
LTE Band 5	22H	825.5 - 847.5	0.047	16.73	0.077	18.88	2M69W7D	16QAM
LTE Band 5	22H	825.5 - 847.5	0.037	15.72	0.061	17.87	2M69W7D	64QAM
LTE Band 5	22H	826.5 - 846.5	0.057	17.54	0.093	19.69	4M49G7D	QPSK
LTE Band 5	22H	826.5 - 846.5	0.050	16.99	0.082	19.14	4M51W7D	16QAM
LTE Band 5	22H	826.5 - 846.5	0.036	15.62	0.060	17.77	4M51W7D	64QAM
LTE Band 5	22H	829 - 844	0.057	17.59	0.094	19.74	9M02G7D	QPSK
LTE Band 5	22H	829 - 844	0.048	16.79	0.078	18.94	9M00W7D	16QAM
LTE Band 5	22H	829 - 844	0.037	15.68	0.061	17.83	8M98W7D	64QAM

### EUT Overview (<1 GHz)

FCC ID: ZNFK300UM	 PCTEST® Proud to be part of element	<b>MEASUREMENT REPORT (CERTIFICATION)</b>	 LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset	Page 3 of 211	

Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
LTE Band 66/4	27	1710.7 - 1779.3	0.189	22.76	1M10G7D	QPSK
LTE Band 66/4	27	1710.7 - 1779.3	0.133	21.24	1M10W7D	16QAM
LTE Band 66/4	27	1710.7 - 1779.3	0.112	20.50	1M10W7D	64QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.191	22.81	2M69G7D	QPSK
LTE Band 66/4	27	1711.5 - 1778.5	0.137	21.38	2M69W7D	16QAM
LTE Band 66/4	27	1711.5 - 1778.5	0.112	20.51	2M69W7D	64QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.184	22.66	4M59G7D	QPSK
LTE Band 66/4	27	1712.5 - 1777.5	0.138	21.40	4M53W7D	16QAM
LTE Band 66/4	27	1712.5 - 1777.5	0.111	20.47	4M54W7D	64QAM
LTE Band 66/4	27	1715 - 1775	0.192	22.84	9M08G7D	QPSK
LTE Band 66/4	27	1715 - 1775	0.139	21.43	9M05W7D	16QAM
LTE Band 66/4	27	1715 - 1775	0.112	20.49	9M05W7D	64QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.187	22.72	13M5G7D	QPSK
LTE Band 66/4	27	1717.5 - 1772.5	0.135	21.32	13M5W7D	16QAM
LTE Band 66/4	27	1717.5 - 1772.5	0.118	20.71	13M5W7D	64QAM
LTE Band 66/4	27	1720 - 1770	0.187	22.72	18M0G7D	QPSK
LTE Band 66/4	27	1720 - 1770	0.156	21.93	18M1W7D	16QAM
LTE Band 66/4	27	1720 - 1770	0.121	20.81	18M0W7D	64QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.273	24.36	1M09G7D	QPSK
LTE Band 25/2	24E	1850.7 - 1914.3	0.184	22.65	1M10W7D	16QAM
LTE Band 25/2	24E	1850.7 - 1914.3	0.166	22.19	1M09W7D	64QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.265	24.23	2M69G7D	QPSK
LTE Band 25/2	24E	1851.5 - 1913.5	0.196	22.93	2M70W7D	16QAM
LTE Band 25/2	24E	1851.5 - 1913.5	0.171	22.34	2M70W7D	64QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.256	24.08	4M53G7D	QPSK
LTE Band 25/2	24E	1852.5 - 1912.5	0.190	22.78	4M54W7D	16QAM
LTE Band 25/2	24E	1852.5 - 1912.5	0.167	22.22	4M56W7D	64QAM
LTE Band 25/2	24E	1855 - 1910	0.258	24.12	9M01G7D	QPSK
LTE Band 25/2	24E	1855 - 1910	0.195	22.90	9M03W7D	16QAM
LTE Band 25/2	24E	1855 - 1910	0.169	22.29	9M04W7D	64QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.255	24.06	13M5G7D	QPSK
LTE Band 25/2	24E	1857.5 - 1907.5	0.194	22.87	13M5W7D	16QAM
LTE Band 25/2	24E	1857.5 - 1907.5	0.166	22.19	13M5W7D	64QAM
LTE Band 25/2	24E	1860 - 1905	0.247	23.93	18M0G7D	QPSK
LTE Band 25/2	24E	1860 - 1905	0.202	23.06	18M0W7D	16QAM
LTE Band 25/2	24E	1860 - 1905	0.161	22.07	18M0W7D	64QAM

**EUT Overview (Mid Bands)**

FCC ID: ZNFK300UM		<b>MEASUREMENT REPORT (CERTIFICATION)</b>		Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset	Page 4 of 211	

Mode	FCC Rule Part	Tx Frequency (MHz)	EIRP		Emission Designator	Modulation
			Max. Power (W)	Max. Power (dBm)		
LTE Band 7	27	2502.5 - 2567.5	0.099	19.95	4M53G7D	QPSK
LTE Band 7	27	2502.5 - 2567.5	0.096	19.82	4M53W7D	16QAM
LTE Band 7	27	2502.5 - 2567.5	0.067	18.24	4M54W7D	64QAM
LTE Band 7	27	2505 - 2565	0.102	20.09	9M04G7D	QPSK
LTE Band 7	27	2505 - 2565	0.097	19.86	9M04W7D	16QAM
LTE Band 7	27	2505 - 2565	0.072	18.55	9M03W7D	64QAM
LTE Band 7	27	2507.5 - 2562.5	0.101	20.04	13M5G7D	QPSK
LTE Band 7	27	2507.5 - 2562.5	0.096	19.80	13M5W7D	16QAM
LTE Band 7	27	2507.5 - 2562.5	0.068	18.33	13M5W7D	64QAM
LTE Band 7	27	2510 - 2560	0.104	20.17	18M0G7D	QPSK
LTE Band 7	27	2510 - 2560	0.089	19.50	18M0W7D	16QAM
LTE Band 7	27	2510 - 2560	0.070	18.42	18M0W7D	64QAM

### EUT Overview (High Bands)

<b>FCC ID:</b> ZNFK300UM	 <b>PCTEST</b> <small>Proud to be part of element</small>	<b>MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Approved by:</b> Quality Manager
<b>Test Report S/N:</b> 1M2002170021-03-R1.ZNF	<b>Test Dates:</b> 2/17 - 3/16/2020	<b>EUT Type:</b> Portable Handset	Page 5 of 211	

## 1.0 INTRODUCTION

### 1.1 Scope

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

### 1.2 PCTEST Test Location

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

### 1.3 Test Facility / Accreditations

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

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

FCC ID: ZNFK300UM	 <b>MEASUREMENT REPORT (CERTIFICATION)</b> 		Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset	Page 6 of 211

## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFK300UM**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

**Test Device Serial No.:** 00360, 00364, 00368, 00369

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A (BC0, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, Bluetooth (1x, EDR, LE)

LTE Band 12 (698 - 716 MHz) overlaps the entire frequency range of LTE Band 17 (704 - 716 MHz). Therefore, test data provided in this report covers Band 17 as well as Band 12.

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

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

### 2.3 Test Configuration

The EUT was tested per the guidance of ANSI/TIA-603-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.

FCC ID: ZNFK300UM	 PCTEST® Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	 LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset	Page 7 of 211	

## 3.0 DESCRIPTION OF TESTS

### 3.1 Measurement Procedure

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

### 3.2 Radiated Power and Radiated Spurious Emissions

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

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

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

$$P_d [dBm] = P_g [dBm] - \text{cable loss} [dB] + \text{antenna gain} [dBd/dBi]$$

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

The calculated  $P_d$  levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of  $43 + 10 \log_{10}(\text{Power}_{[Watts]})$ . For Band 7, the calculated  $P_d$  levels are compared to the absolute spurious emission limit of -25dBm which is equivalent to the required minimum attenuation of  $55 + 10 \log_{10}(\text{Power}_{[Watts]})$ .

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.

FCC ID: ZNFK300UM	 PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	 LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset	Page 8 of 211	

## 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  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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

FCC ID: ZNFK300UM	 <b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	 LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 9 of 211

## 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
-	LTX1	Licensed Transmitter Cable Set	6/4/2019	Annual	6/4/2020	LTX1
Agilent	N9030A	PXA Signal Analyzer (44GHz)	6/12/2019	Annual	6/12/2020	MY52350166
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			102060
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	10/16/2019	Annual	10/16/2020	101716
Rohde & Schwarz	HL562E	Ultralog Antenna	3/29/2018	Biennial	3/29/2020	101012
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/9/2019	Annual	7/9/2020	102138
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/8/2019	Annual	7/8/2020	102133
Rohde & Schwarz	TC-TA18	Vivaldi Antenna	8/17/2018	Biennial	8/17/2020	101072
Rohde & Schwarz	TS-PR40	26.5-40 GHz Pre-Amplifier	11/1/2019	Annual	11/1/2020	100037
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	11/1/2019	Annual	11/1/2020	100040
Rohde & Schwarz	FSU40-N	Spectrum Analyzer (9k - 40GHz)	12/6/2019	Annual	12/6/2020	101814
Emco	3116	Horn Antenna (18 - 40GHz)	6/7/2018	Triennial	6/7/2021	9203-2178
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	6/18/2018	Biennial	6/18/2020	114451
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	6/3/2019	Annual	6/3/2020	NMLC-2
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Rohde & Schwarz	TC-TA18	Cross Polarized Vivaldi Test Antenna	7/16/2018	Biennial	7/16/2020	101073
Seekonk	NC-100	Torque Wrench (8" lb)	5/10/2018	Biennial	5/10/2020	N/A

**Table 5-1. Test Equipment**

### Notes:

Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

FCC ID: ZNFK300UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset	Page 10 of 211	

## 6.0 SAMPLE CALCULATIONS

### Emission Designator

#### QPSK Modulation

**Emission Designator = 8M62G7D**

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

#### QAM Modulation

**Emission Designator = 8M45W7D**

LTE BW = 8.45 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

### Spurious Radiated Emission – LTE Band

#### **Example: Middle Channel LTE Mode 2<sup>nd</sup> Harmonic (1564 MHz)**

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

FCC ID: ZNFK300UM	 PCTEST® Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	 LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 11 of 211

## 7.0 TEST RESULTS

### 7.1 Summary

Company Name: LG Electronics USA, Inc.  
 FCC ID: ZNFK300UM  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.2
2.1051 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Out of Band Emissions	> 43 + 10 log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions			Section 7.3, 7.4
27.53(m)	Out of Band Emissions	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.3, 7.4
27.53(a)	Out of Band Emissions	Undesirable emissions must meet the limits detailed in 27.53(a)			Section 7.3, 7.4
24.232(d) 27.50(d)	Peak-Average Ratio	< 13 dB			Section 7.5
2.1046	Transmitter Conducted Output Power	N/A			See RF Exposure Report
2.1055 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)			Section 7.8

**7-1. Summary of Radiated Test Results**

FCC ID: ZNFK300UM	 PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	 LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset	Page 12 of 211	

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 26/5)	< 7 Watts max. ERP	RADIATED	PASS	Section 7.6
27.50(b)(10) 27.50(c)(10)	Effective Radiated Power / Equivalent Isotropic Radiated Power (Band 12/17, 13)	< 3 Watts max. ERP			Section 7.6
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 25/2)	< 2 Watts max. EIRP			Section 7.6
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 66/4)	< 1 Watts max. EIRP			Section 7.6
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Undesirable Emissions (Band 12/17, 66/4, 25/2)	> 43 + 10 log <sub>10</sub> (P[Watts]) for all out-of-band emissions			Section 7.7
27.53(f)	Undesirable Emissions (Band 13)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions less than 700Hz BW) For all emissions in the band 1559 – 1610 MHz			Section 7.7
27.53(m)	Undesirable Emissions (Band 7)	Undesirable emissions must meet the limits detailed in 27.53(m)			Section 7.7

## 7-2. Summary of Radiated Test Results

### Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots (Sections 7.2, 7.3, 7.4, 7.5) were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "LTE Automation," Version 5.3.
- 5) For operation <1GHz, the EIRP limits in the table above are referenced to the specifications written in the relevant Radio Standards Specifications for Innovation, Science, and Economic Development Canada.

FCC ID: ZNFK300UM	 PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	 LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset	Page 13 of 211	

## 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  $\geq 3 \times$  RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

### Test Setup

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

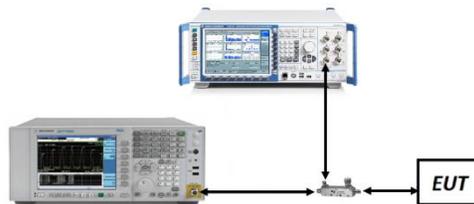


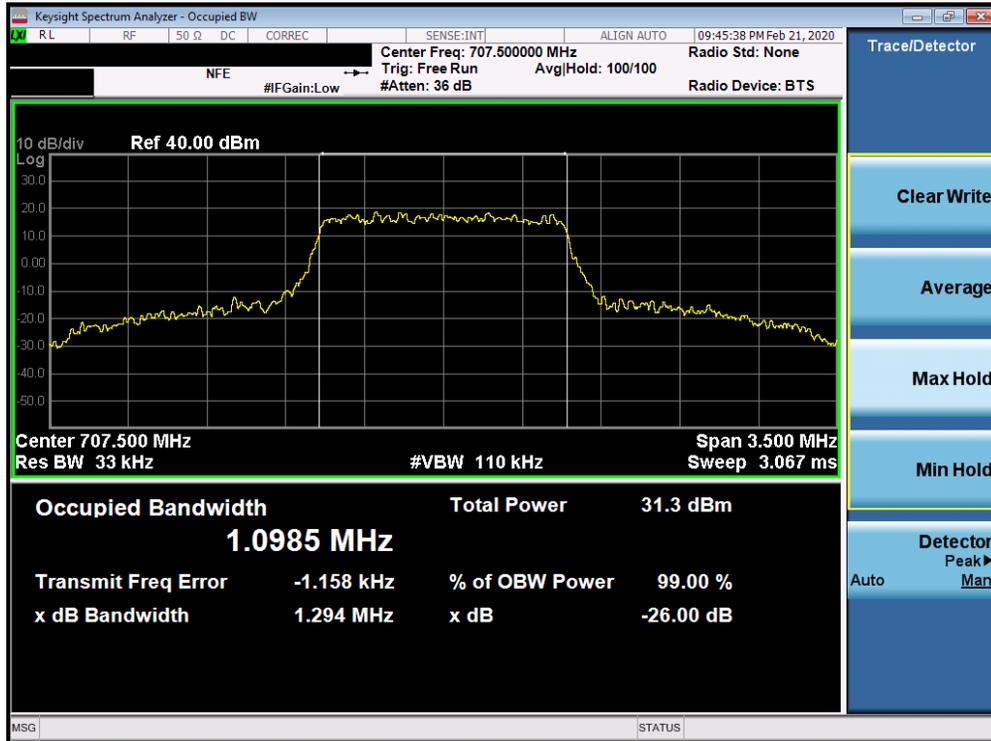
Figure 7-1. Test Instrument & Measurement Setup

### Test Notes

None.

FCC ID: ZNFK300UM	 PCTEST® Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	 LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 14 of 211

## Band 12/17

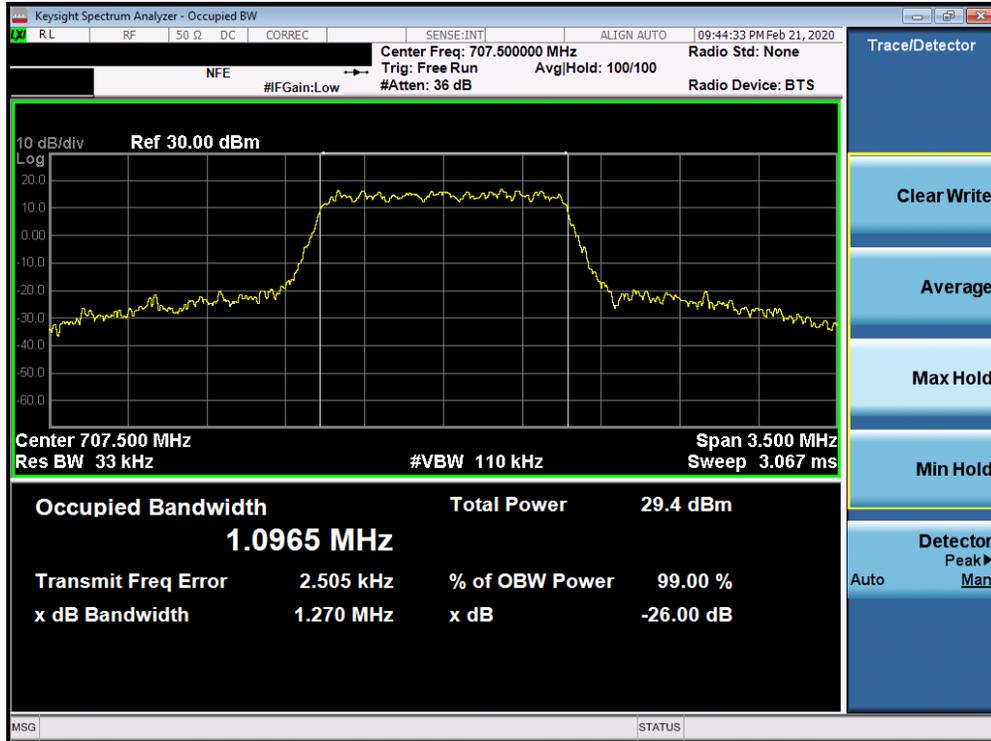


Plot 7-1. Occupied Bandwidth Plot (Band 12 - 1.4MHz QPSK - Full RB Configuration)

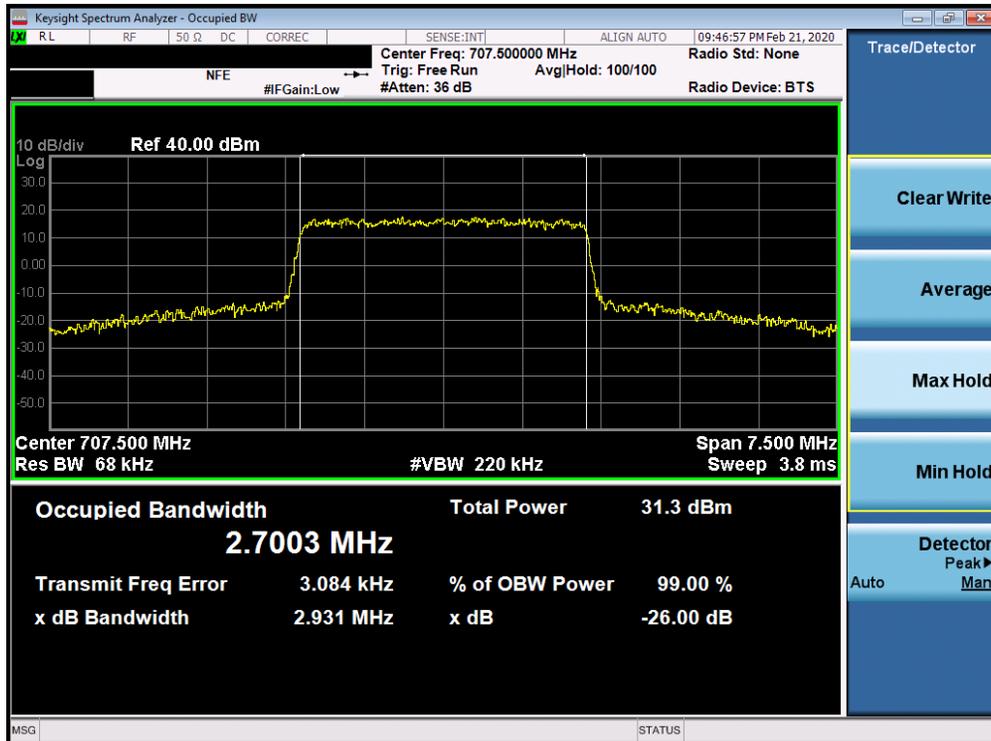


Plot 7-2. Occupied Bandwidth Plot (Band 12 - 1.4MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 15 of 211



Plot 7-3. Occupied Bandwidth Plot (Band 12 - 1.4MHz 64-QAM - Full RB Configuration)

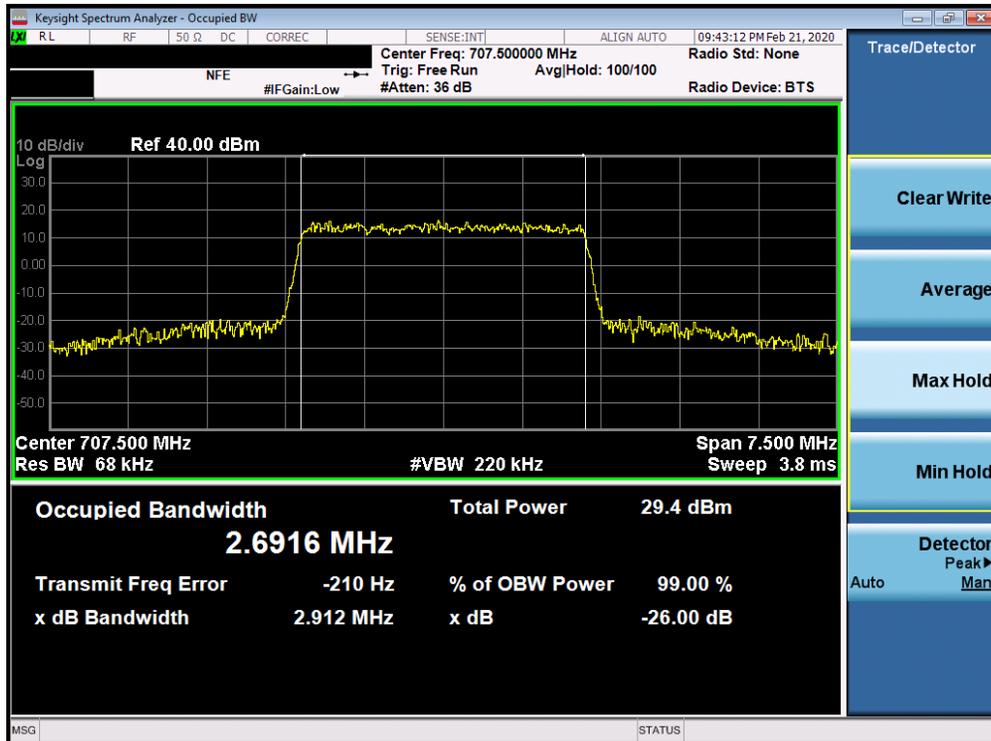


Plot 7-4. Occupied Bandwidth Plot (Band 12 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 16 of 211

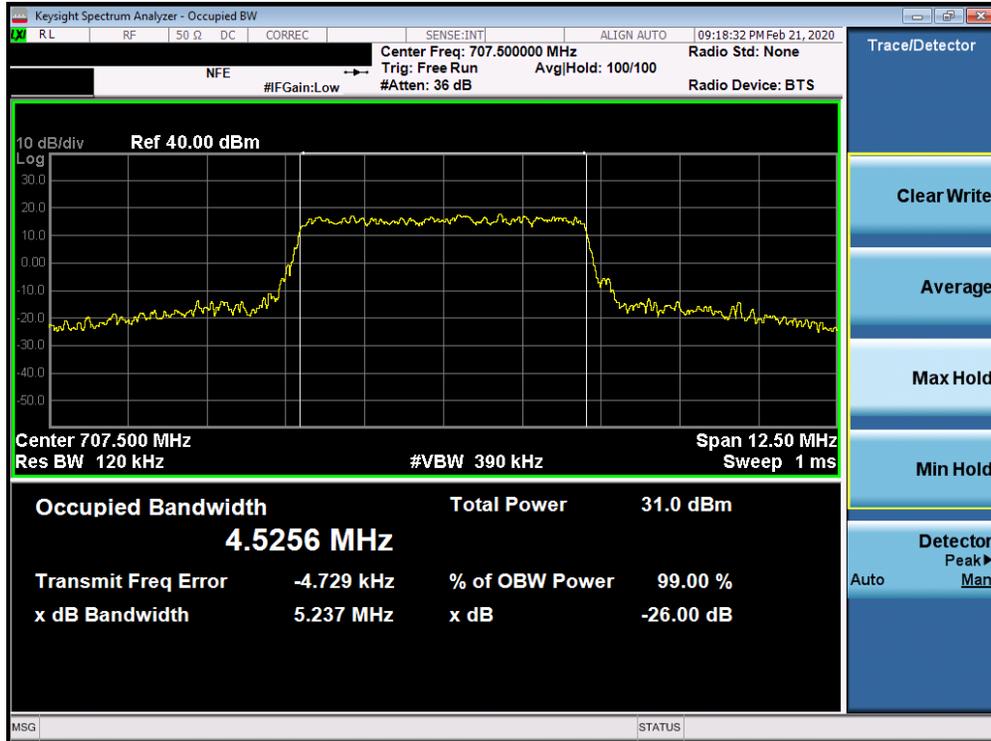


Plot 7-5. Occupied Bandwidth Plot (Band 12 - 3.0MHz 16-QAM - Full RB Configuration)

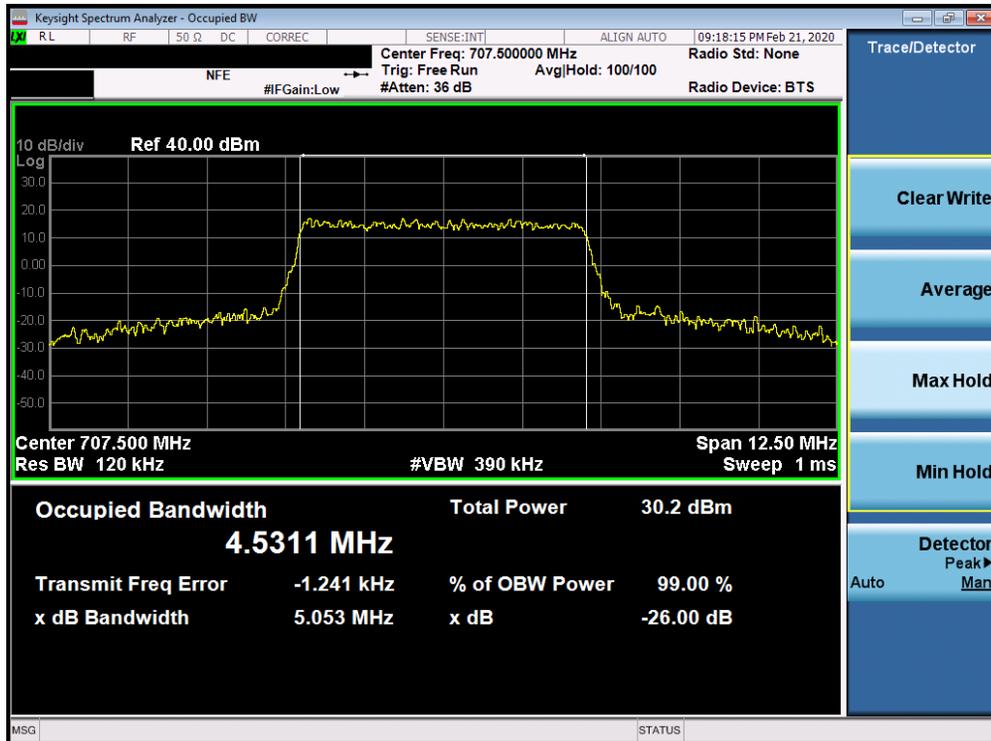


Plot 7-6. Occupied Bandwidth Plot (Band 12 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 17 of 211

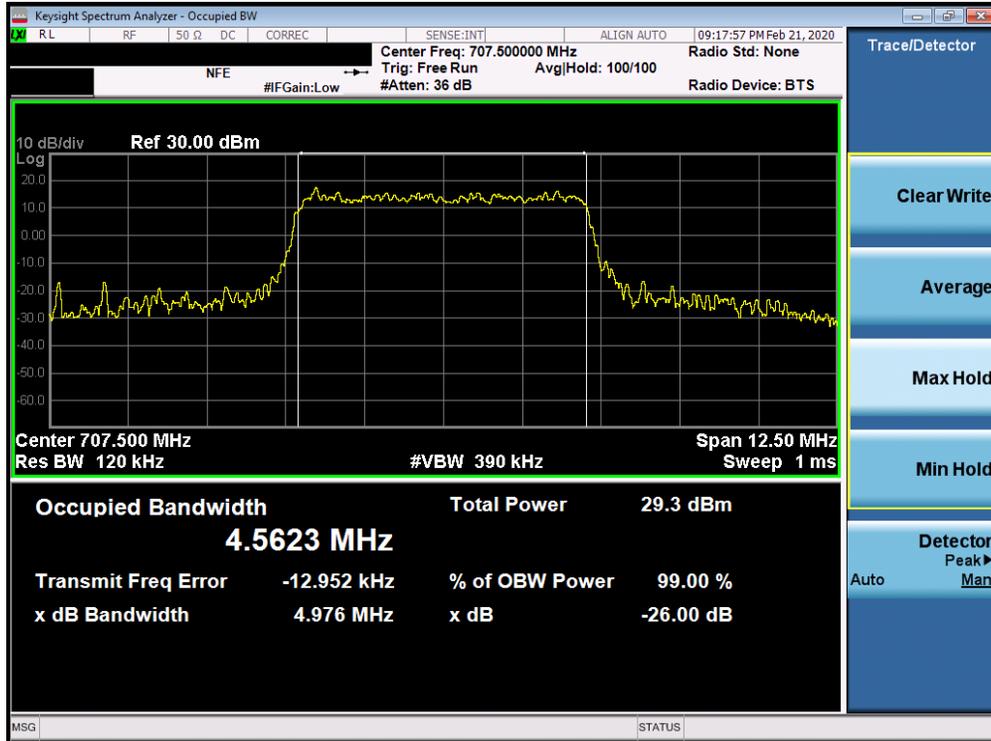


Plot 7-7. Occupied Bandwidth Plot (Band 12/17 - 5.0MHz QPSK - Full RB Configuration)

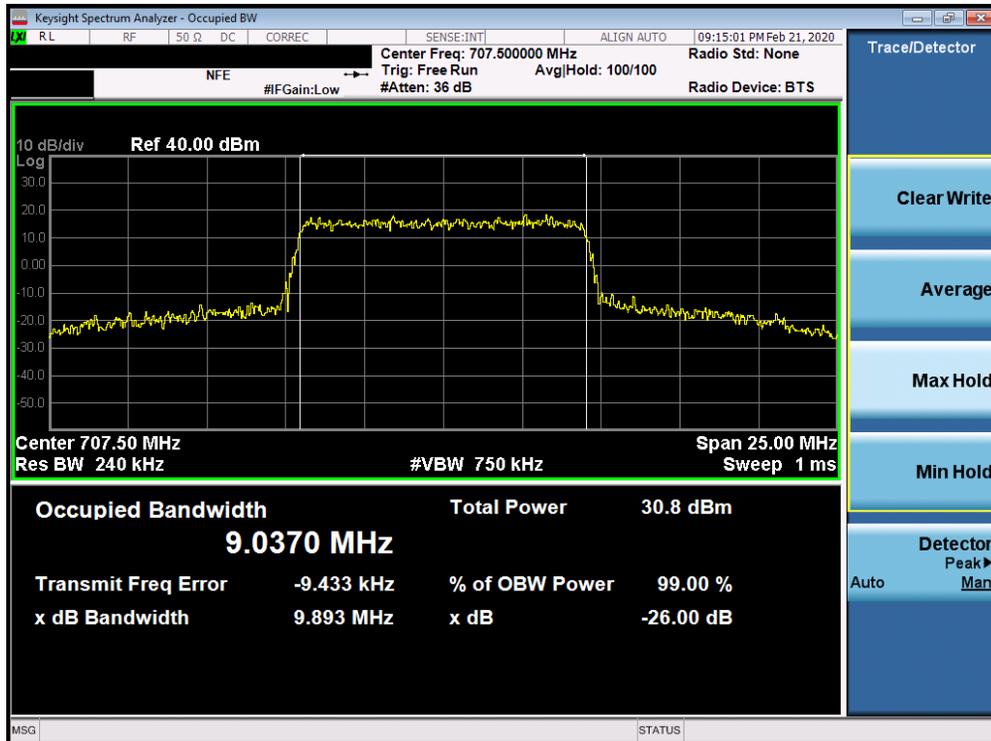


Plot 7-8. Occupied Bandwidth Plot (Band 12/17 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 18 of 211

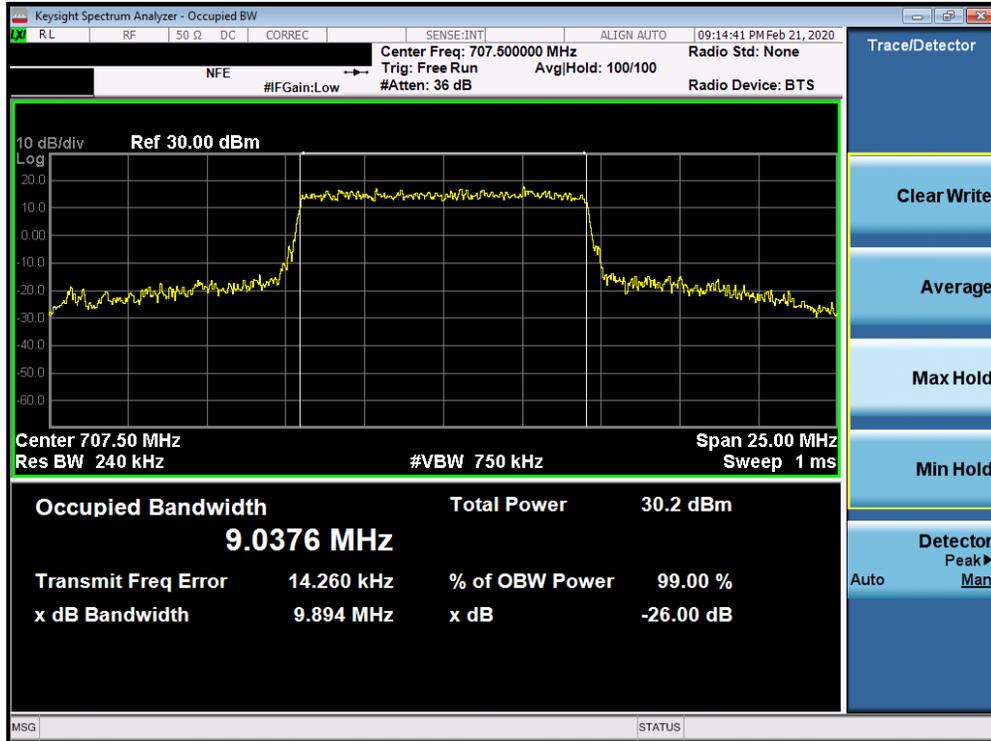


Plot 7-9. Occupied Bandwidth Plot (Band 12/17 - 5.0MHz 64-QAM - Full RB Configuration)

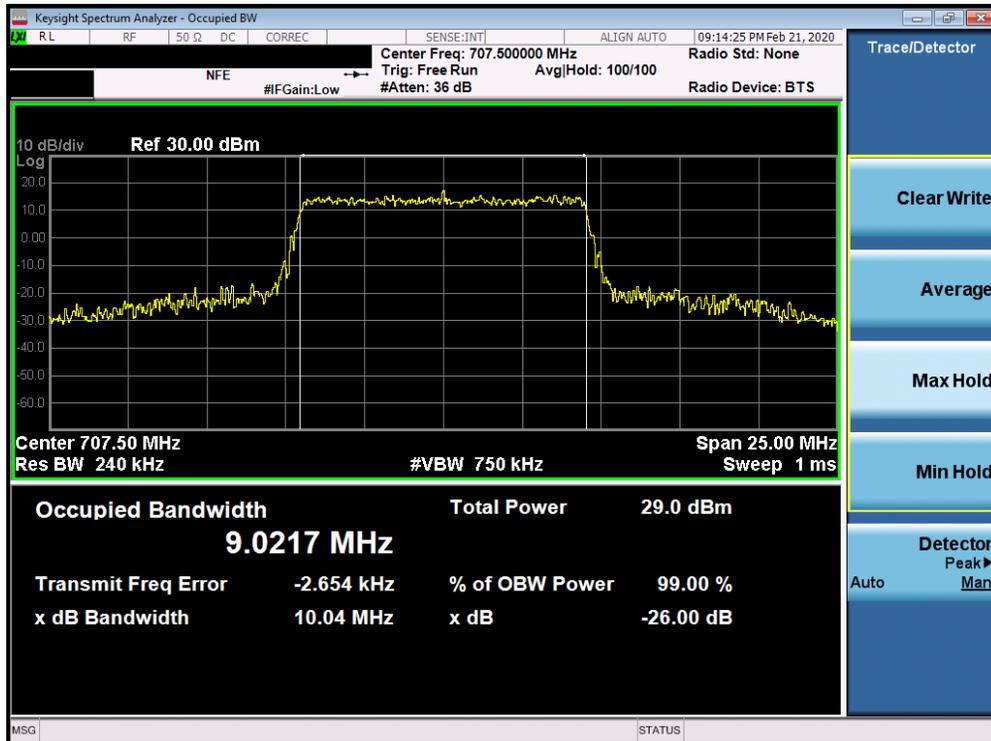


Plot 7-10. Occupied Bandwidth Plot (Band 12/17 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 19 of 211



Plot 7-11. Occupied Bandwidth Plot (Band 12/17 - 10.0MHz 16-QAM - Full RB Configuration)



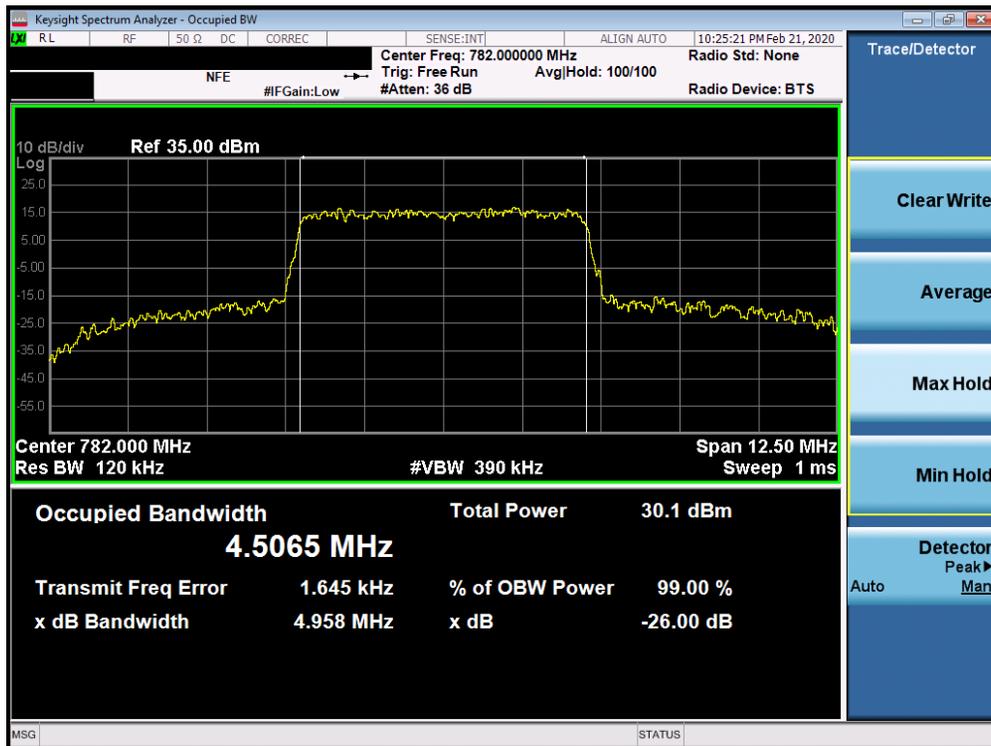
Plot 7-12. Occupied Bandwidth Plot (Band 12/17 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 20 of 211

### Band 13



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

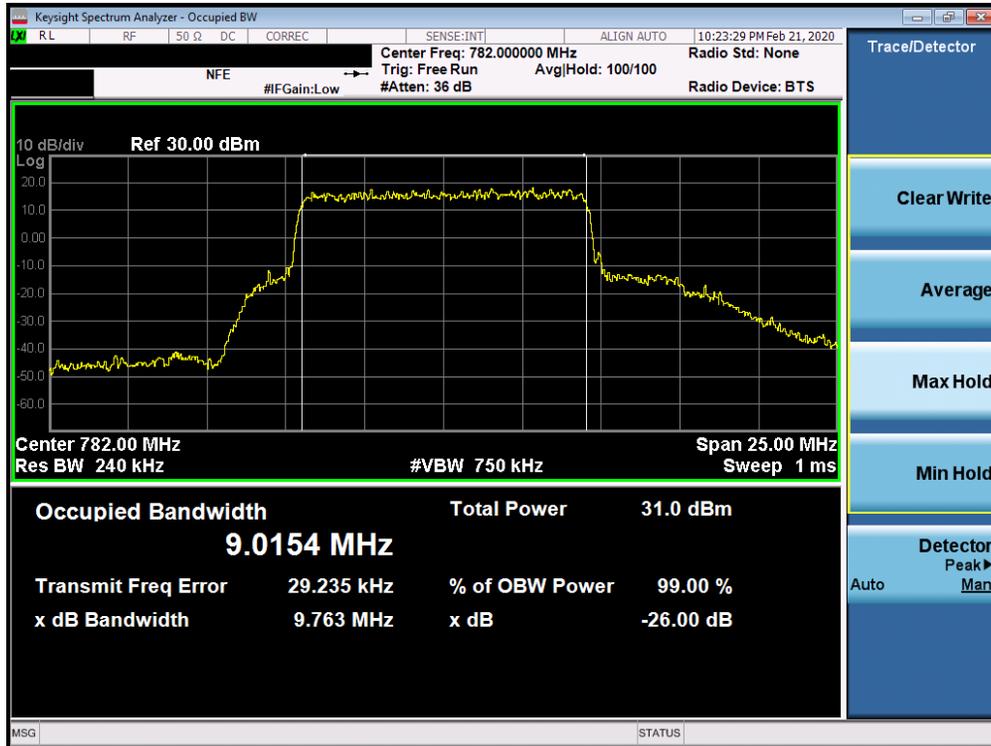


Plot 7-14. Occupied Bandwidth Plot (Band 13 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 21 of 211

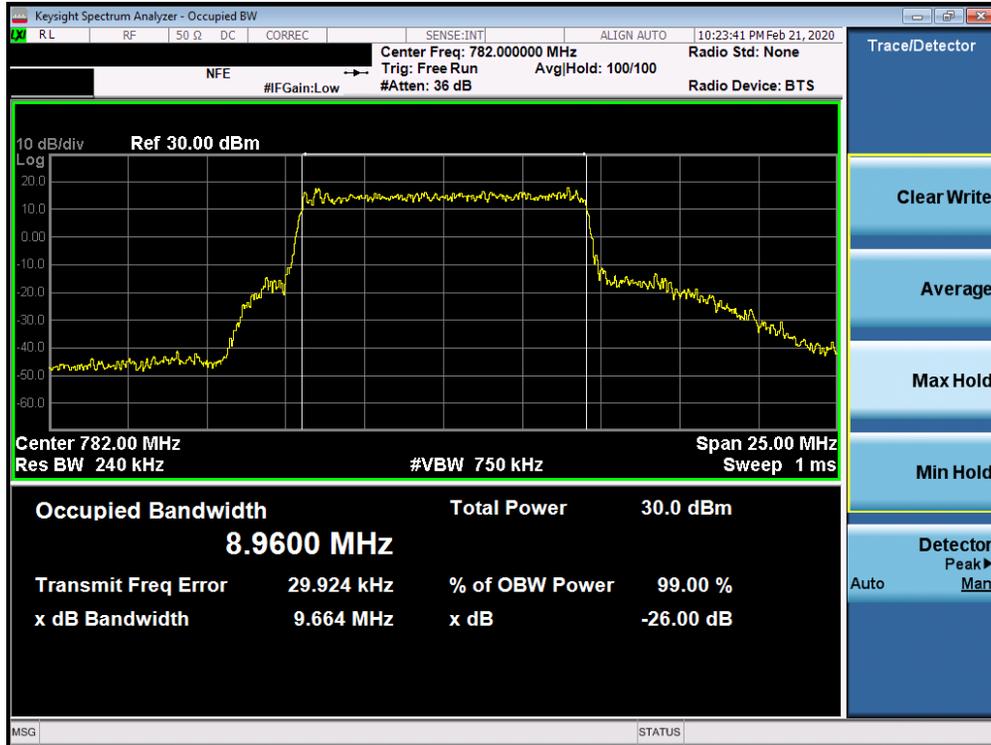


Plot 7-15. Occupied Bandwidth Plot (Band 13 - 5.0MHz 64-QAM - Full RB Configuration)



Plot 7-16. Occupied Bandwidth Plot (Band 13 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 22 of 211



Plot 7-17. Occupied Bandwidth Plot (Band 13 - 10.0MHz 16-QAM - Full RB Configuration)



Plot 7-18. Occupied Bandwidth Plot (Band 13 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 23 of 211

**Band 5**

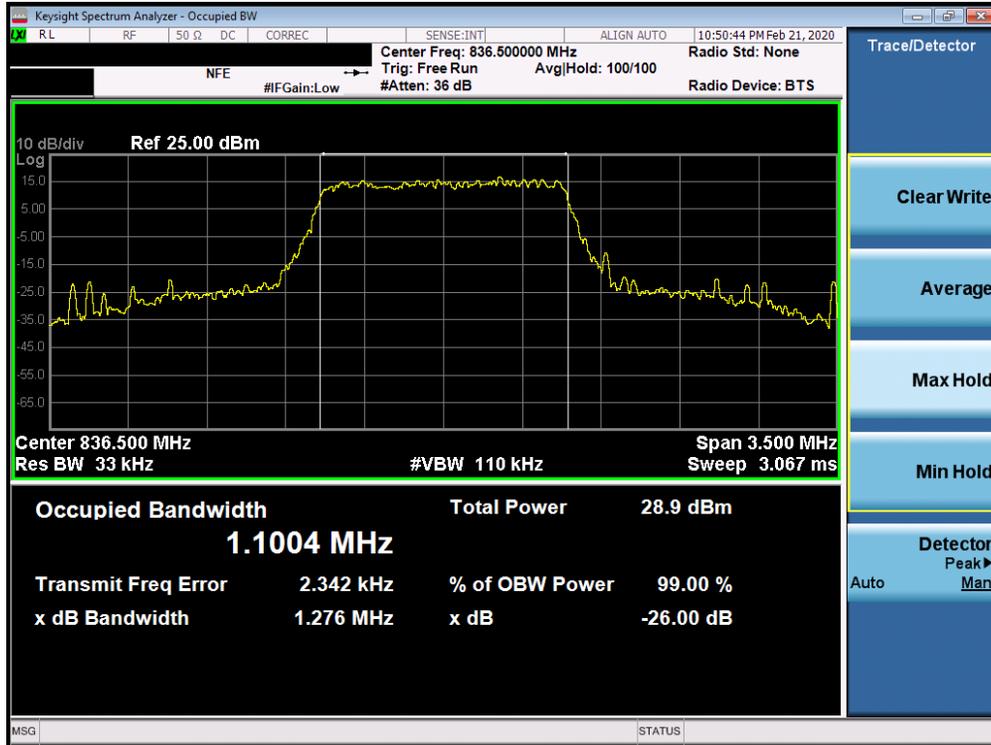


**Plot 7-19. Occupied Bandwidth Plot (Band 5 - 1.4MHz QPSK - Full RB Configuration)**

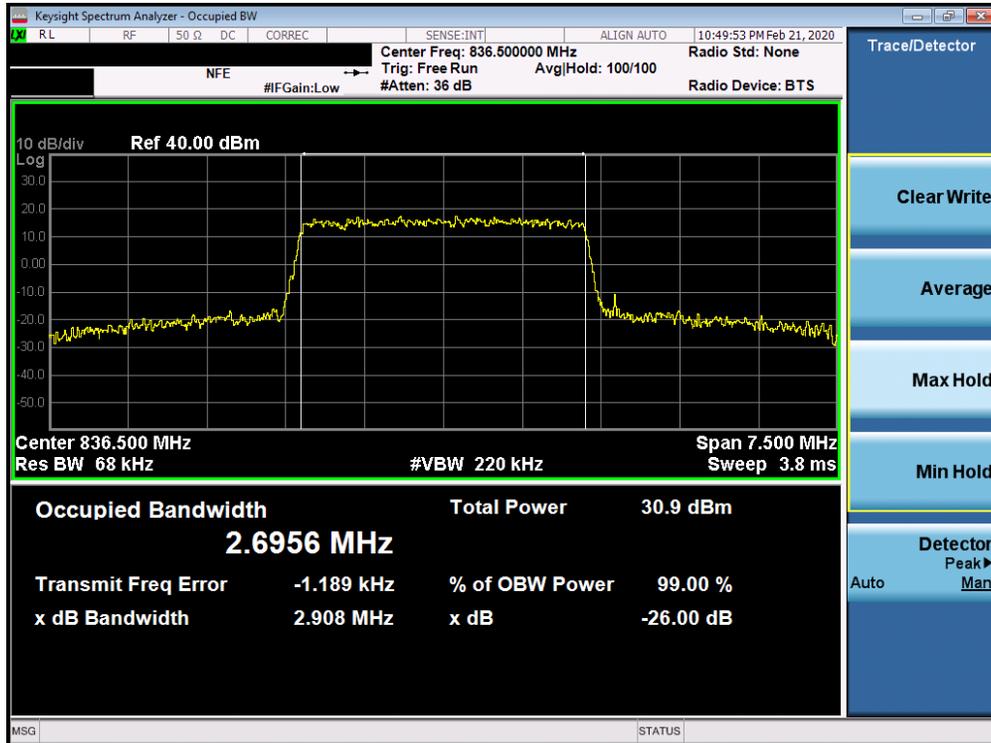


**Plot 7-20. Occupied Bandwidth Plot (Band 5 - 1.4MHz 16-QAM - Full RB Configuration)**

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 24 of 211



Plot 7-21. Occupied Bandwidth Plot (Band 5 - 1.4MHz 64-QAM - Full RB Configuration)

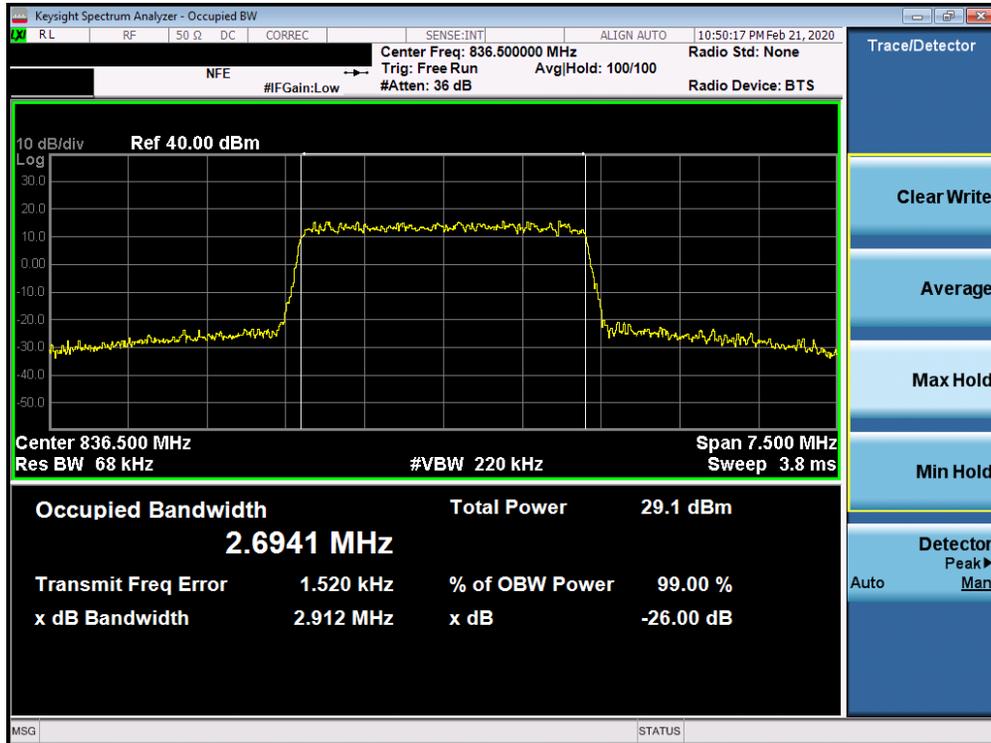


Plot 7-22. Occupied Bandwidth Plot (Band 5 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 25 of 211



Plot 7-23. Occupied Bandwidth Plot (Band 5 - 3.0MHz 16-QAM - Full RB Configuration)

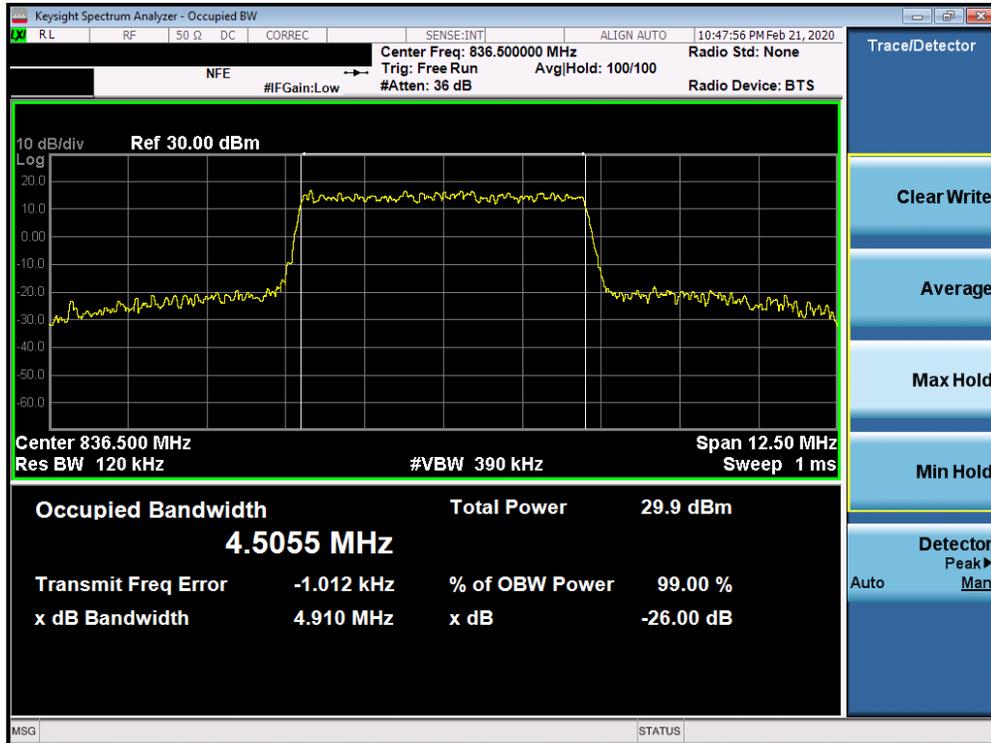


Plot 7-24. Occupied Bandwidth Plot (Band 5 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 26 of 211

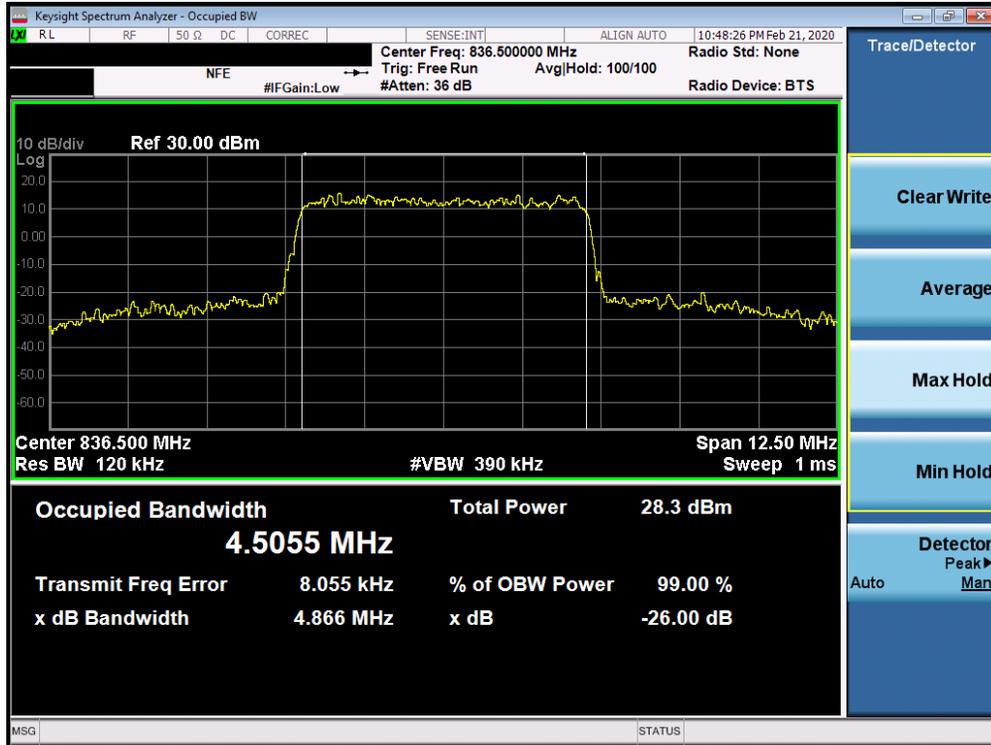


Plot 7-25. Occupied Bandwidth Plot (Band 5 - 5.0MHz QPSK - Full RB Configuration)



Plot 7-26. Occupied Bandwidth Plot (Band 5 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 27 of 211

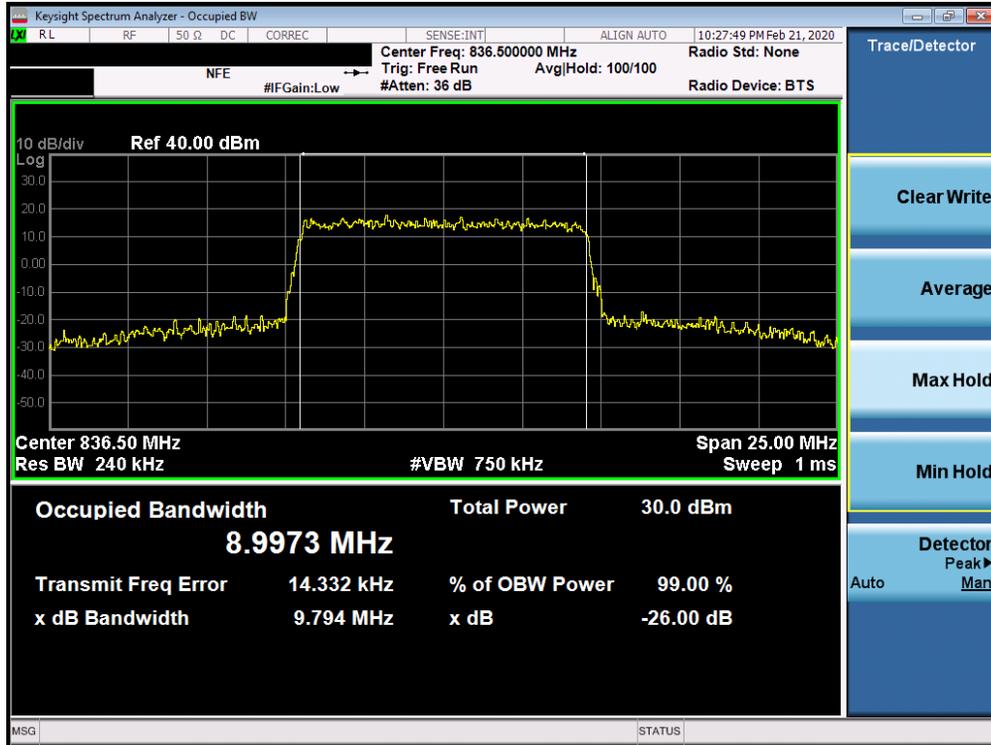


Plot 7-27. Occupied Bandwidth Plot (Band 5 - 5.0MHz 64-QAM - Full RB Configuration)

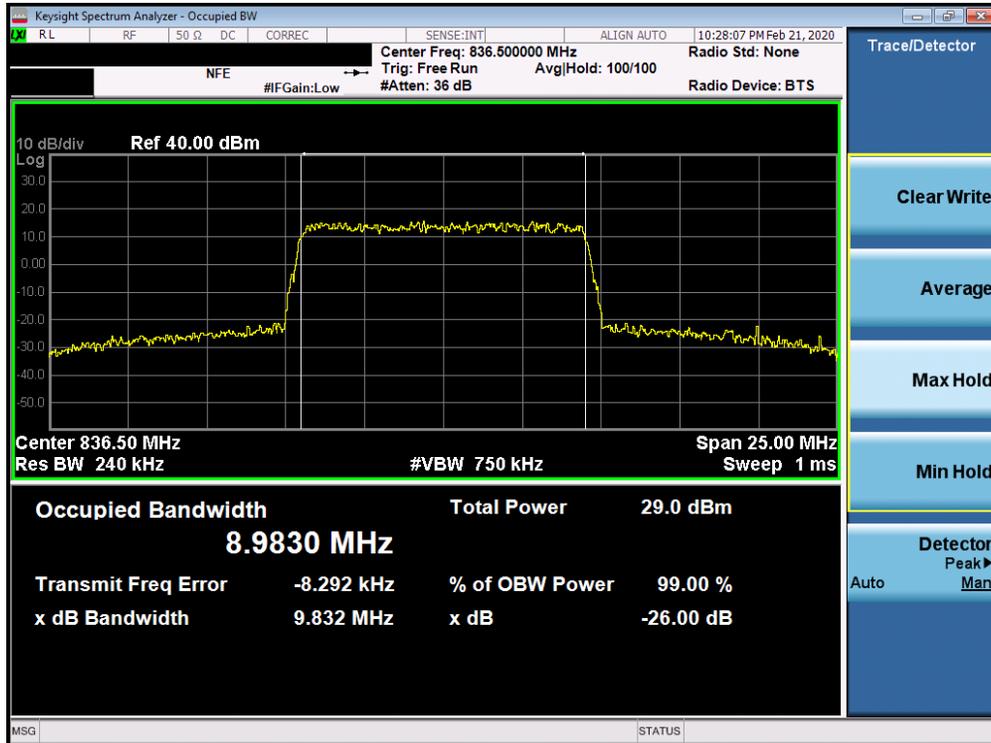


Plot 7-28. Occupied Bandwidth Plot (Band 5 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 28 of 211



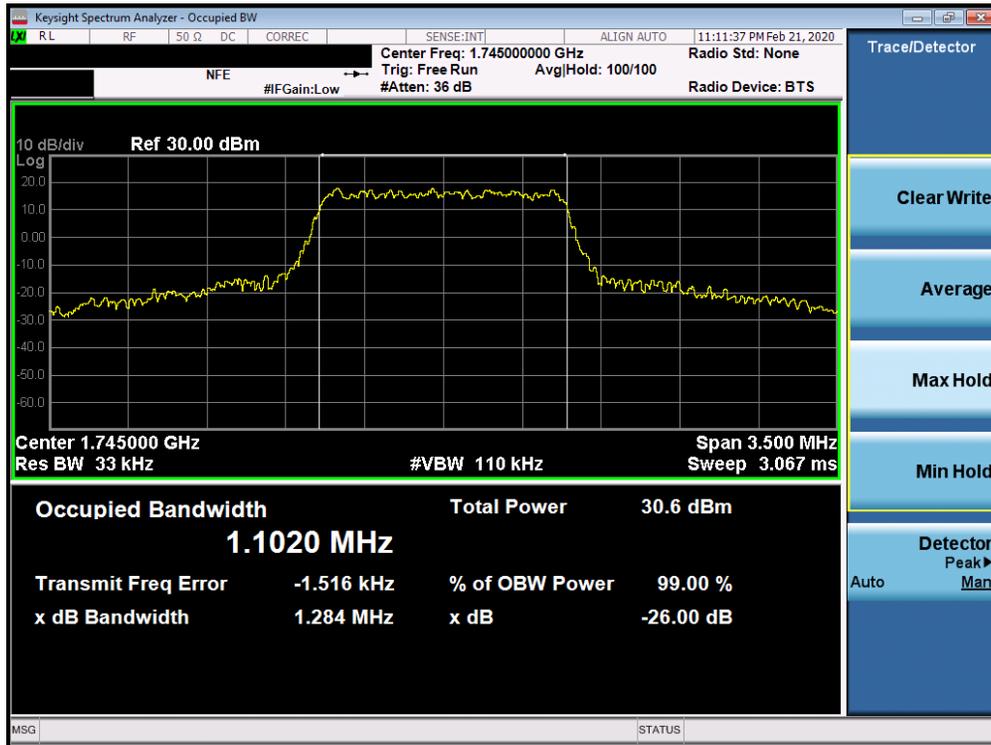
Plot 7-29. Occupied Bandwidth Plot (Band 5 - 10.0MHz 16-QAM - Full RB Configuration)



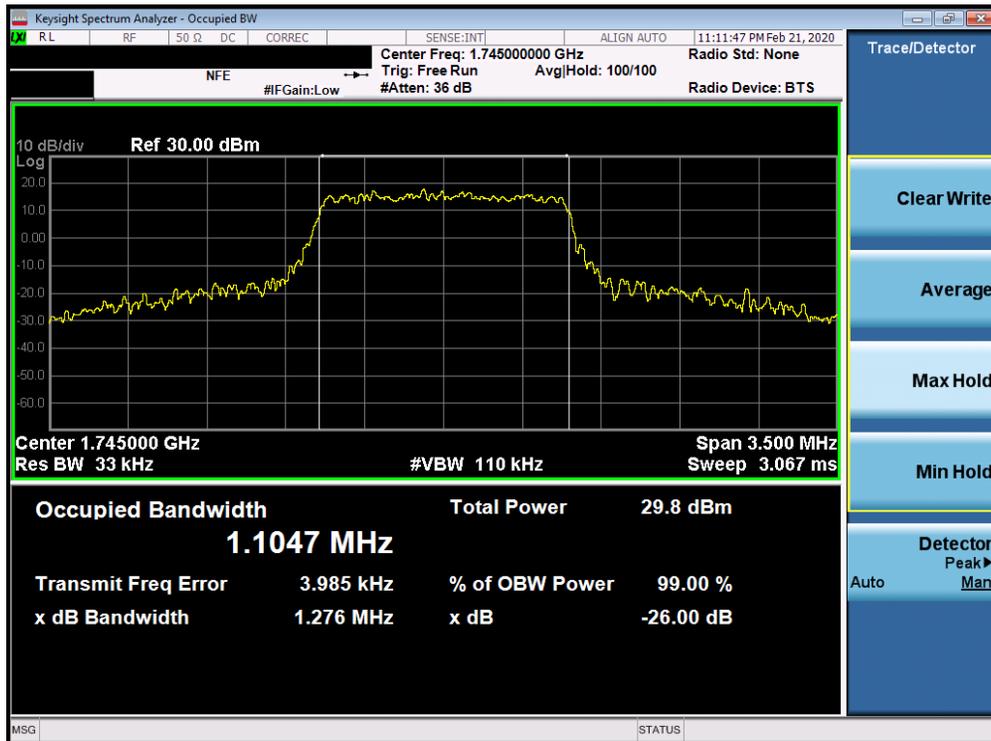
Plot 7-30. Occupied Bandwidth Plot (Band 5 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 29 of 211

**Band 66/4**

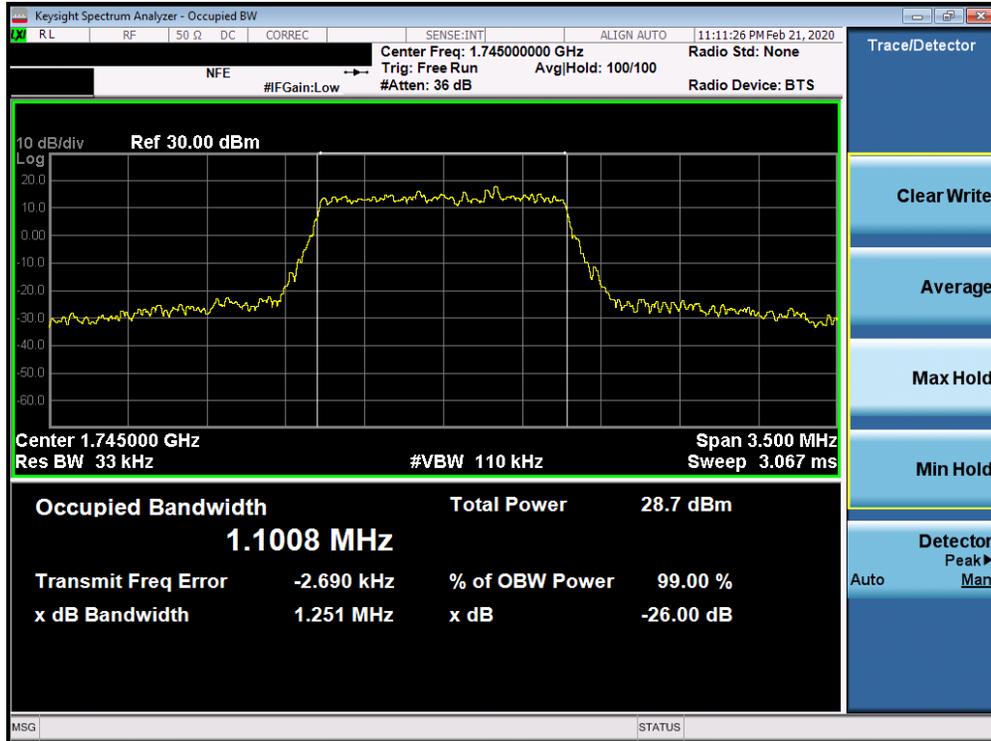


**Plot 7-31. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz QPSK - Full RB Configuration)**

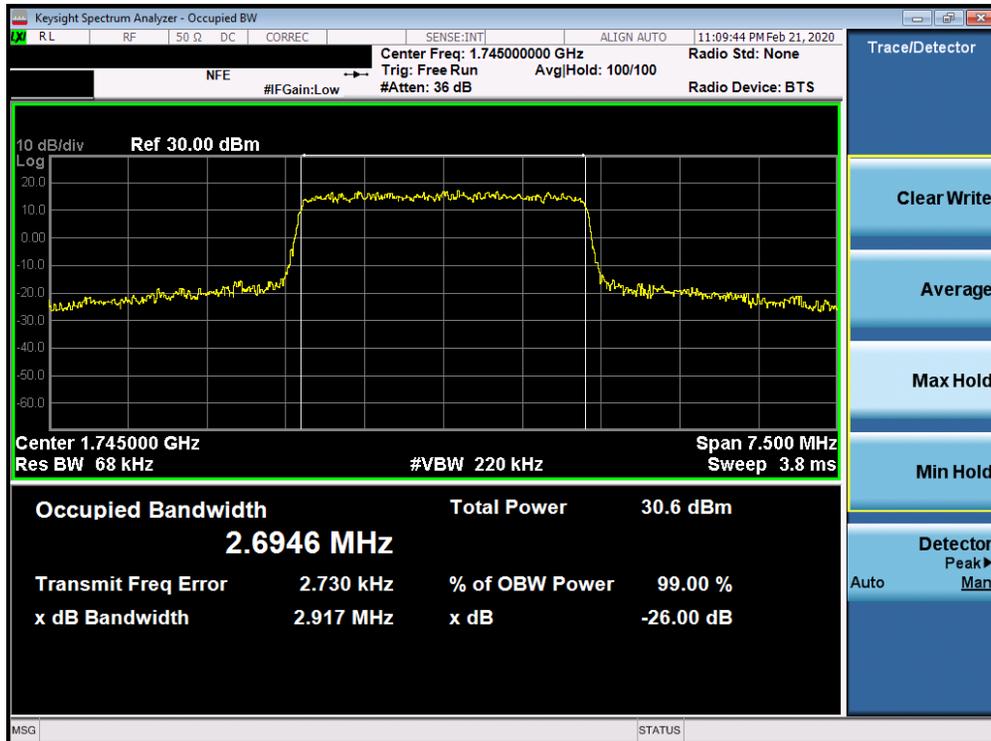


**Plot 7-32. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 16-QAM - Full RB Configuration)**

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 30 of 211

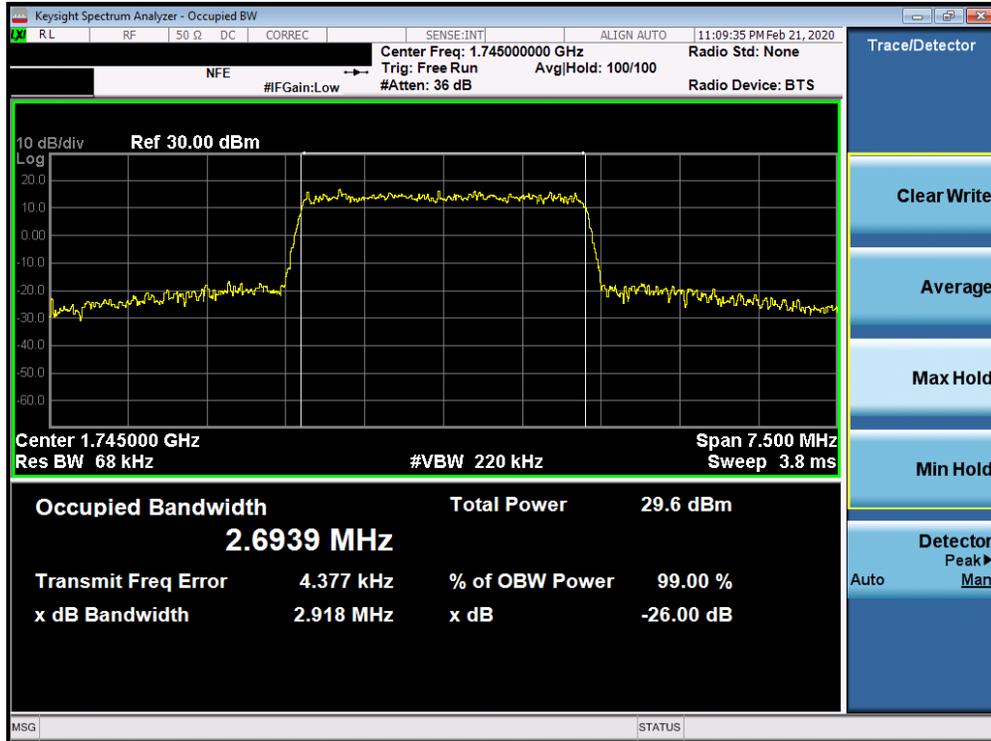


Plot 7-33. Occupied Bandwidth Plot (Band 66/4 - 1.4MHz 64-QAM - Full RB Configuration)

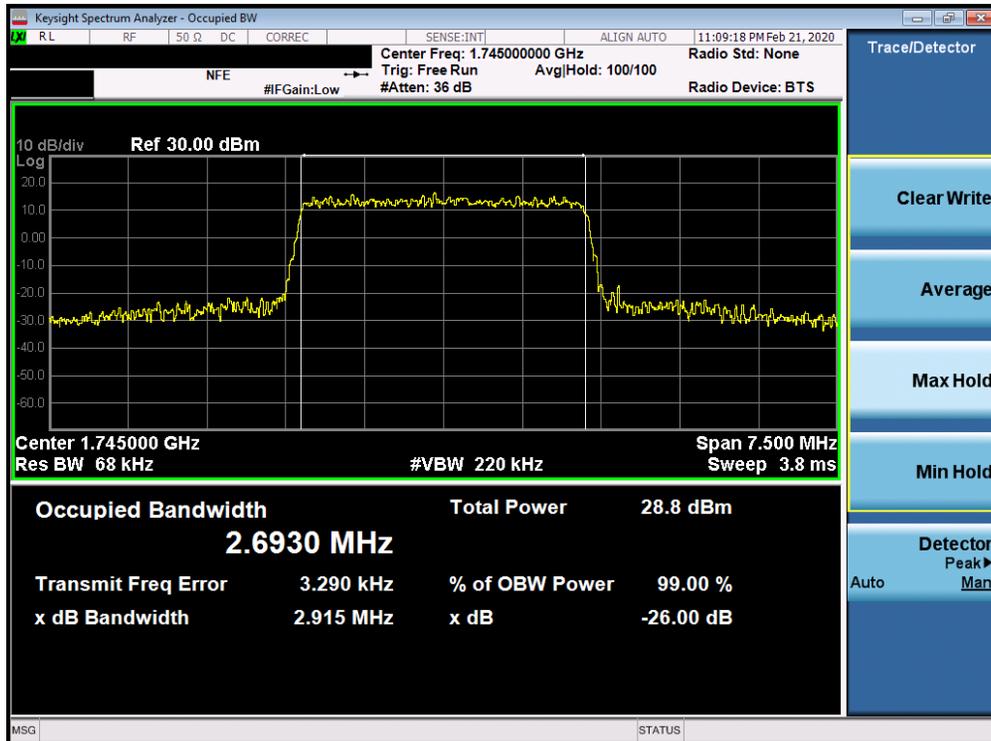


Plot 7-34. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 31 of 211

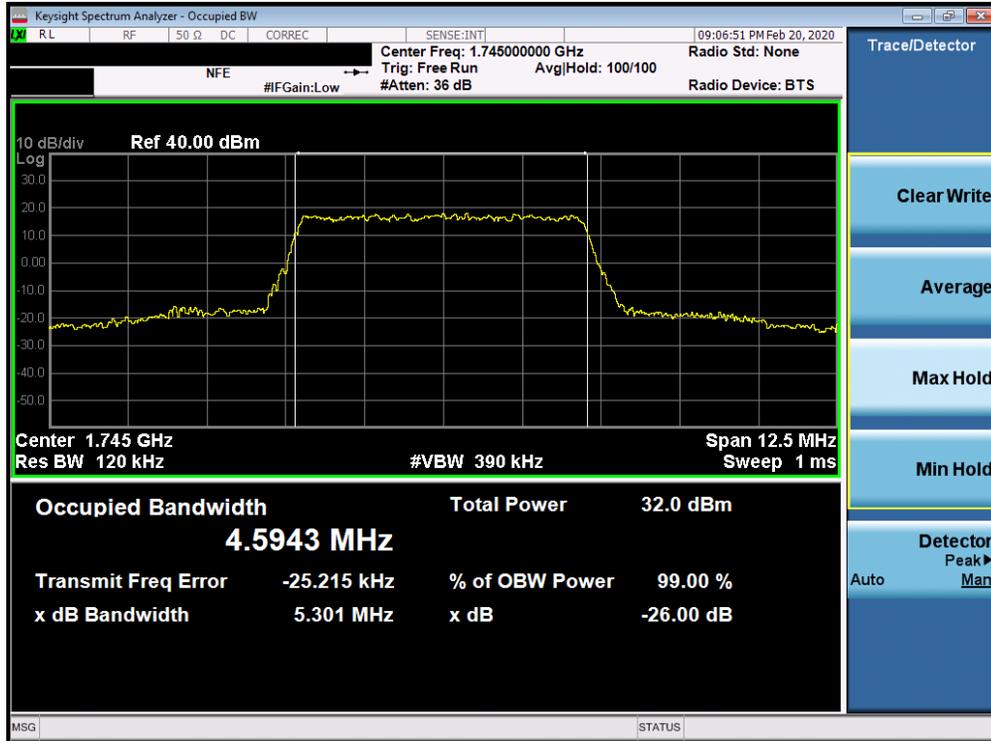


Plot 7-35. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 16-QAM - Full RB Configuration)

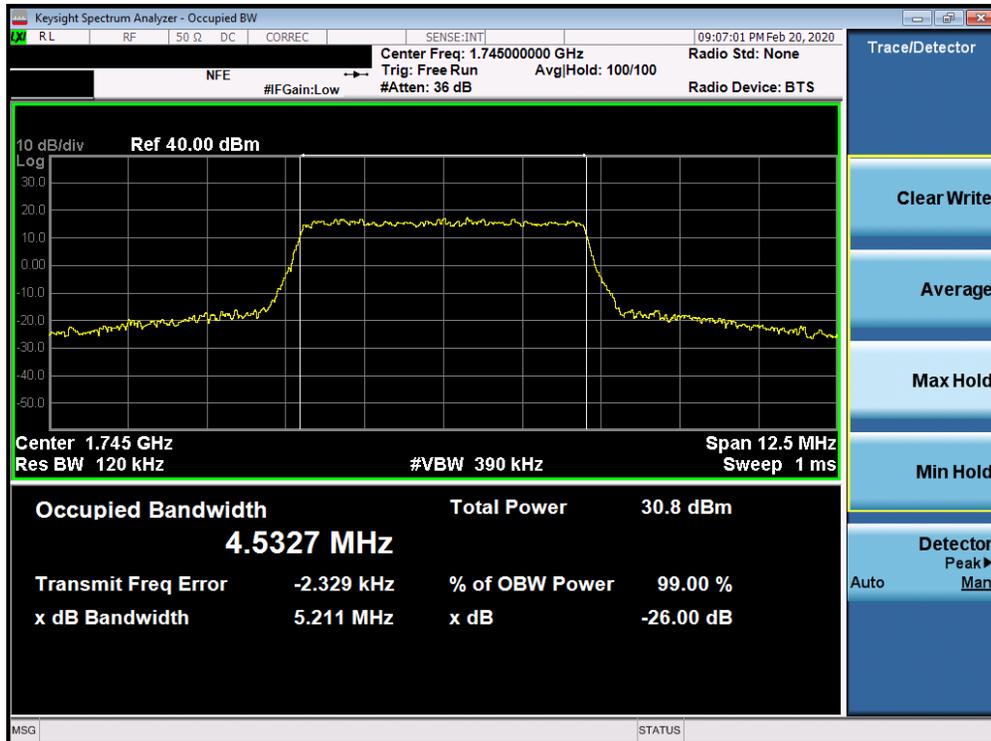


Plot 7-36. Occupied Bandwidth Plot (Band 66/4 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 32 of 211

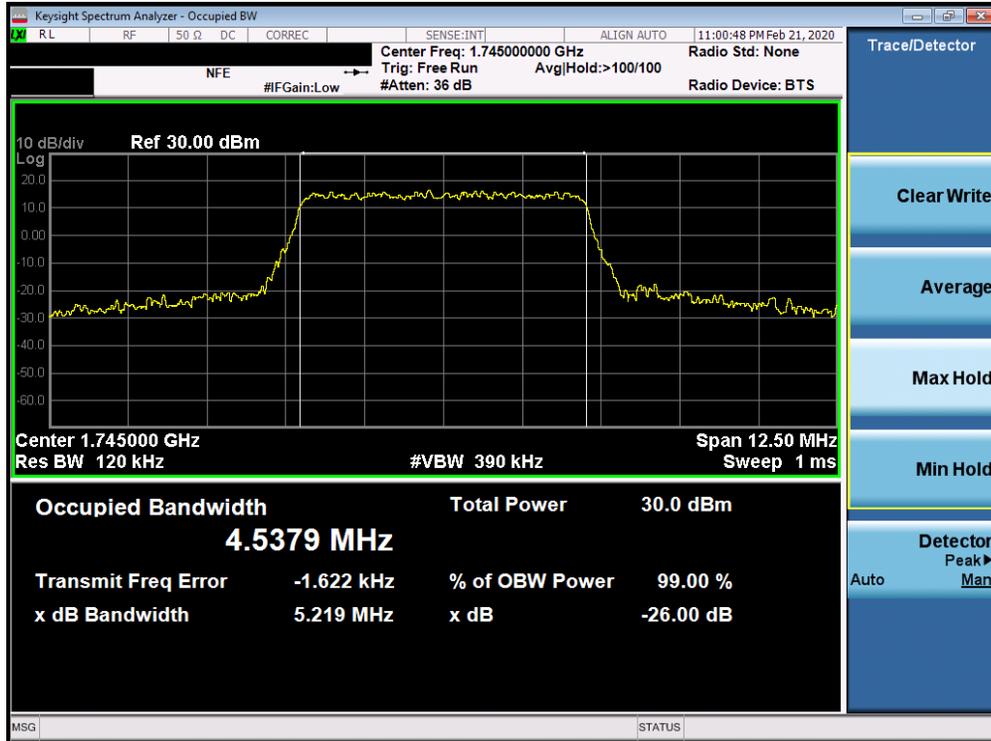


Plot 7-37. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz QPSK - Full RB Configuration)

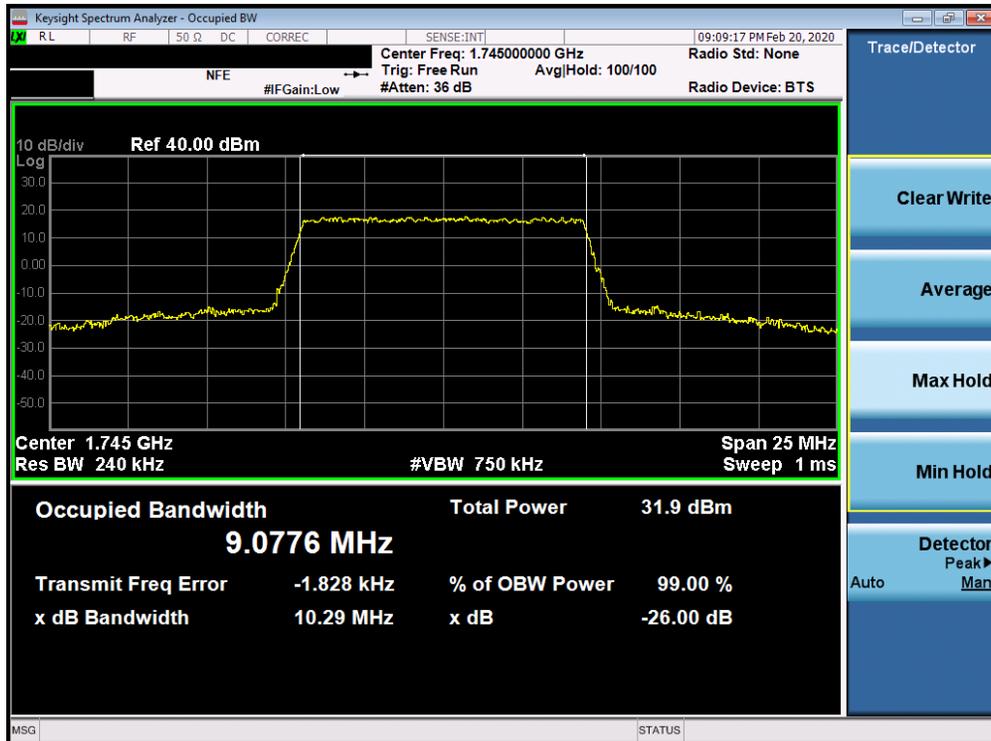


Plot 7-38. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 33 of 211

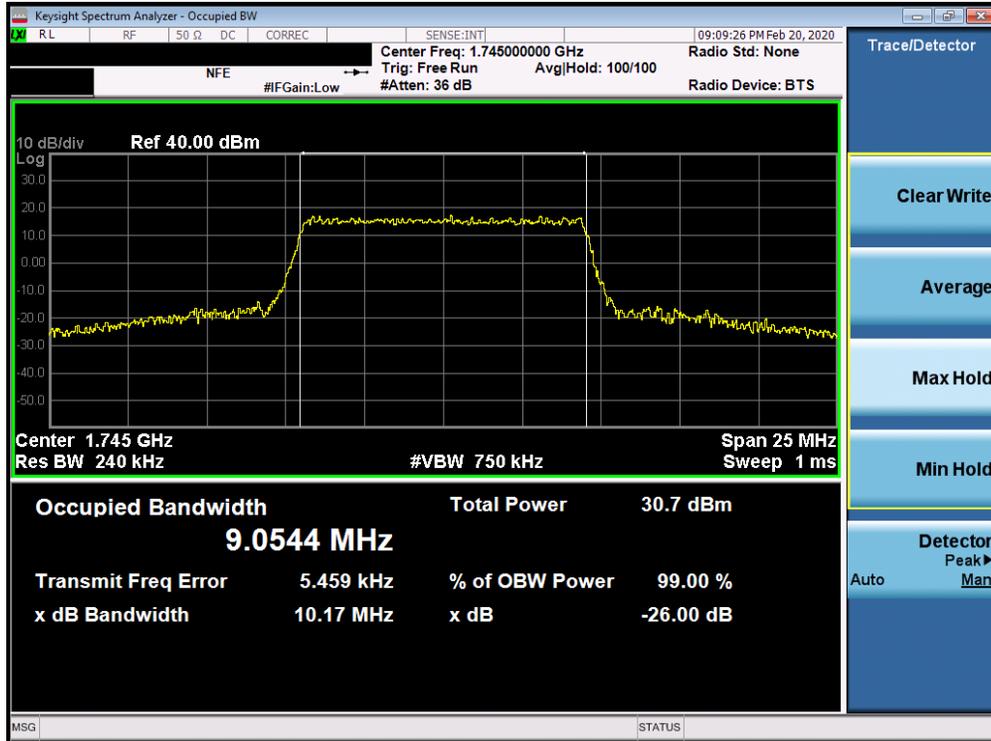


Plot 7-39. Occupied Bandwidth Plot (Band 66/4 - 5.0MHz 64-QAM - Full RB Configuration)

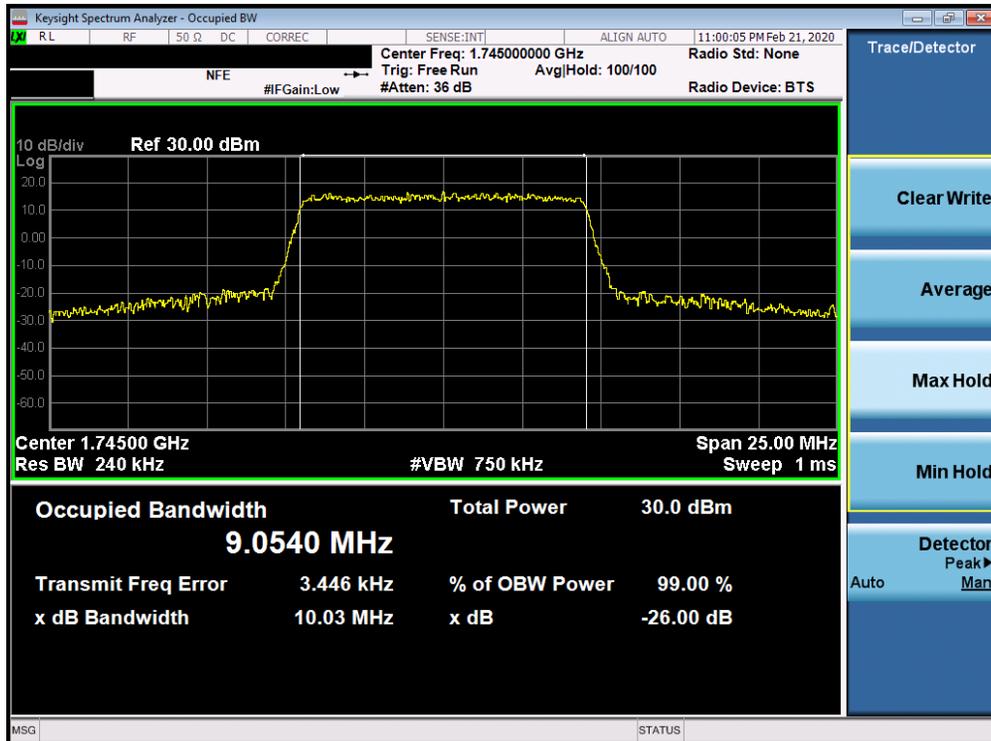


Plot 7-40. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 34 of 211

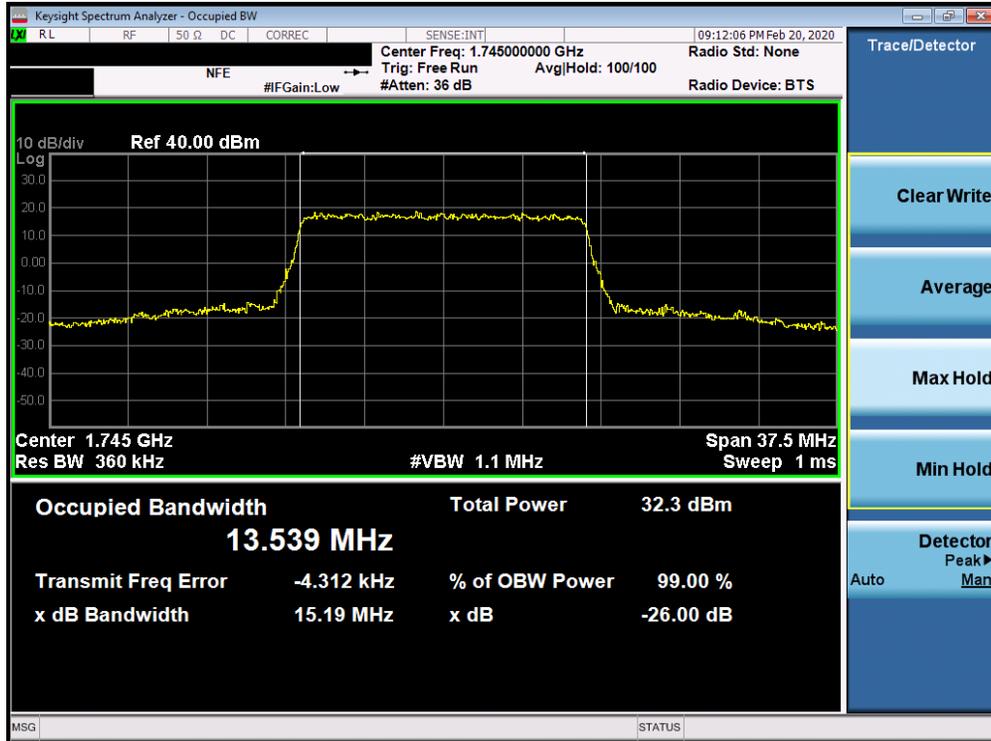


Plot 7-41. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 16-QAM - Full RB Configuration)

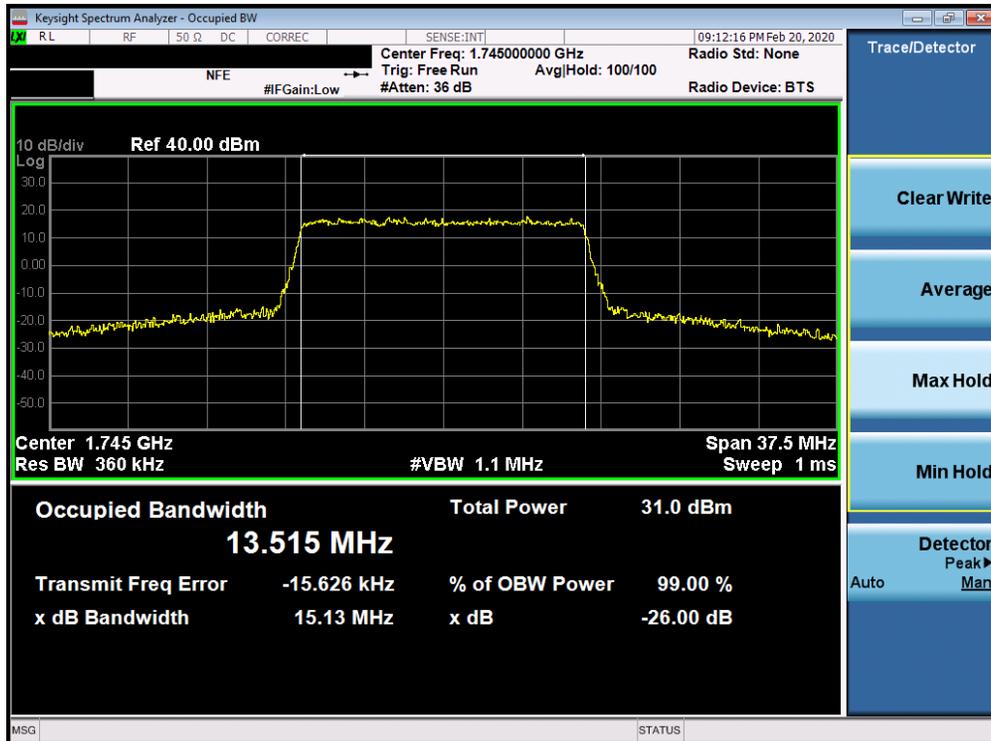


Plot 7-42. Occupied Bandwidth Plot (Band 66/4 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 35 of 211

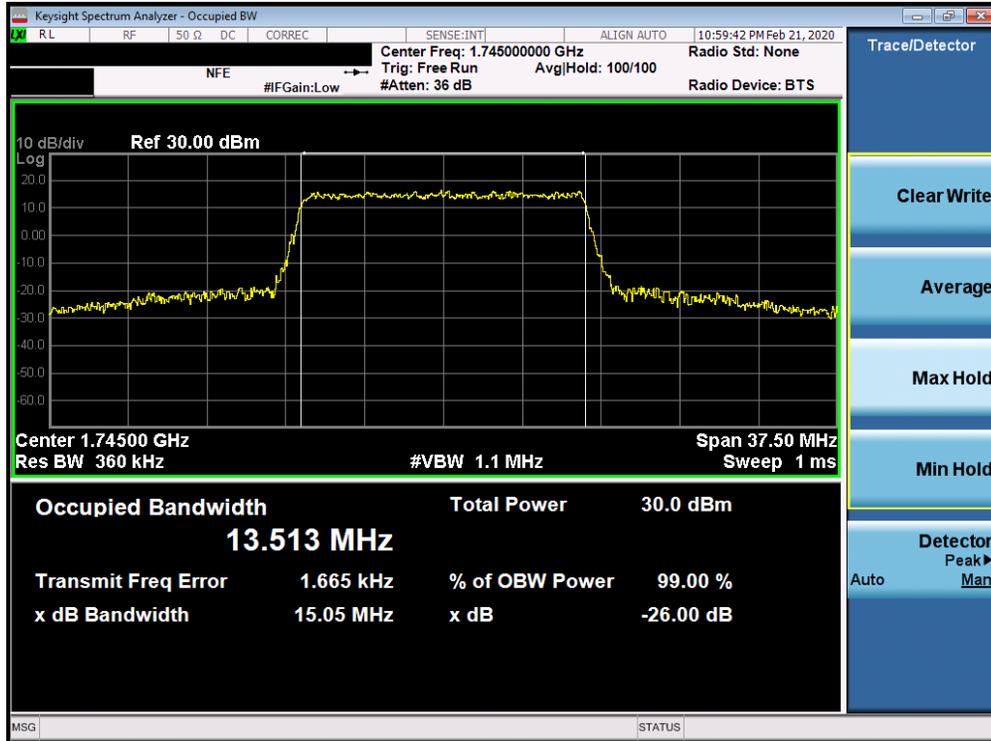


Plot 7-43. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz QPSK - Full RB Configuration)

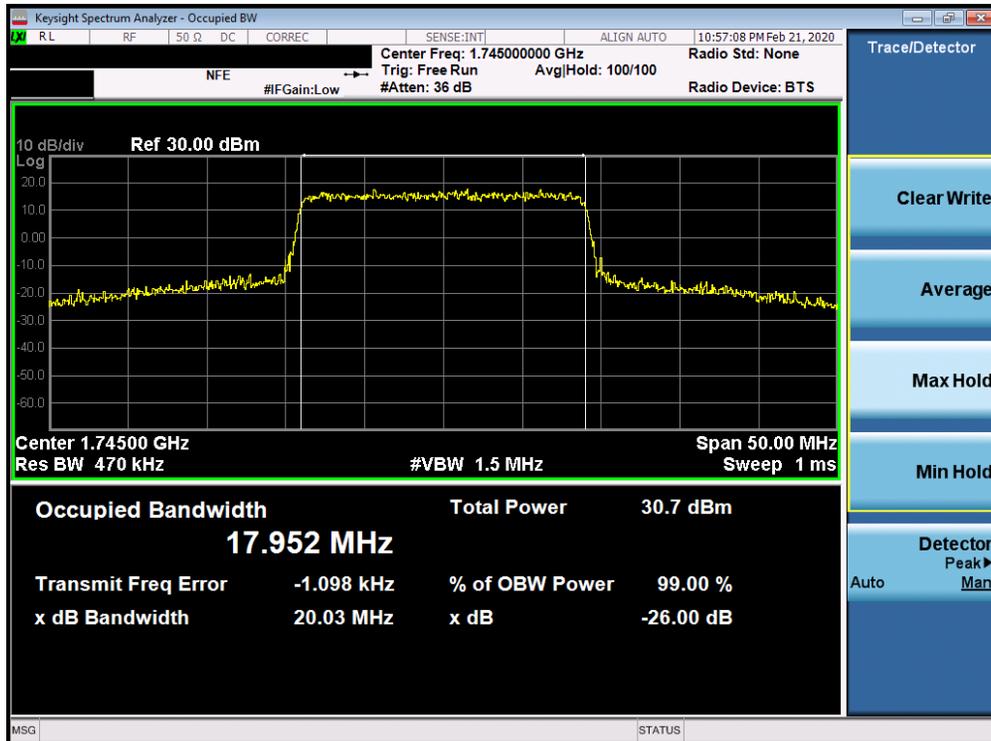


Plot 7-44. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 36 of 211

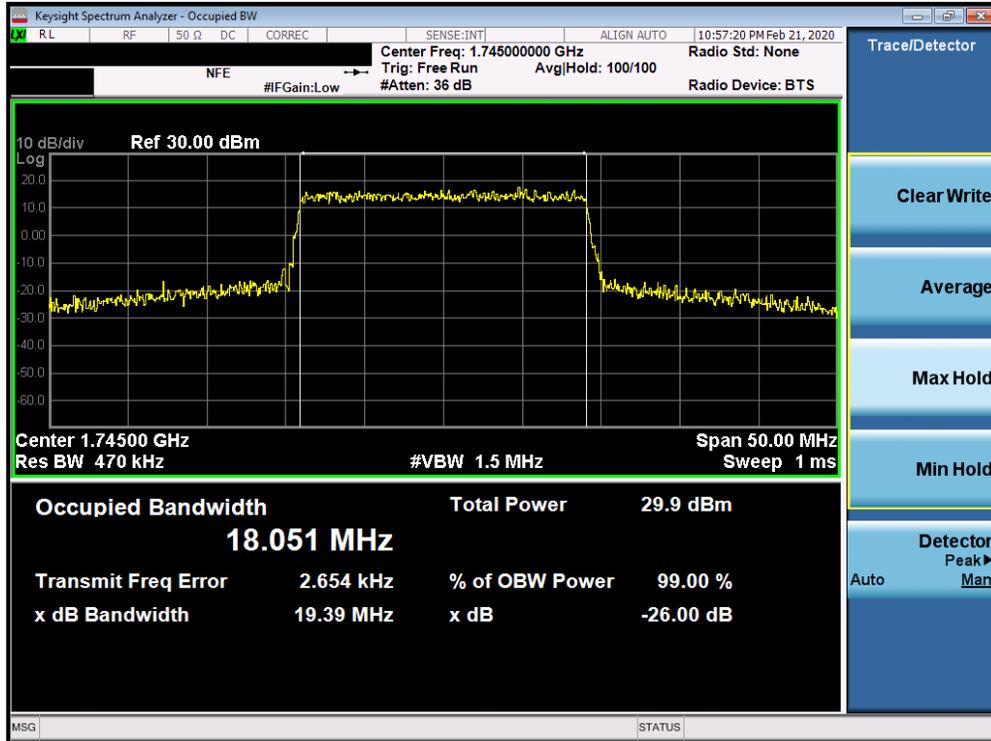


Plot 7-45. Occupied Bandwidth Plot (Band 66/4 - 15.0MHz 64-QAM - Full RB Configuration)

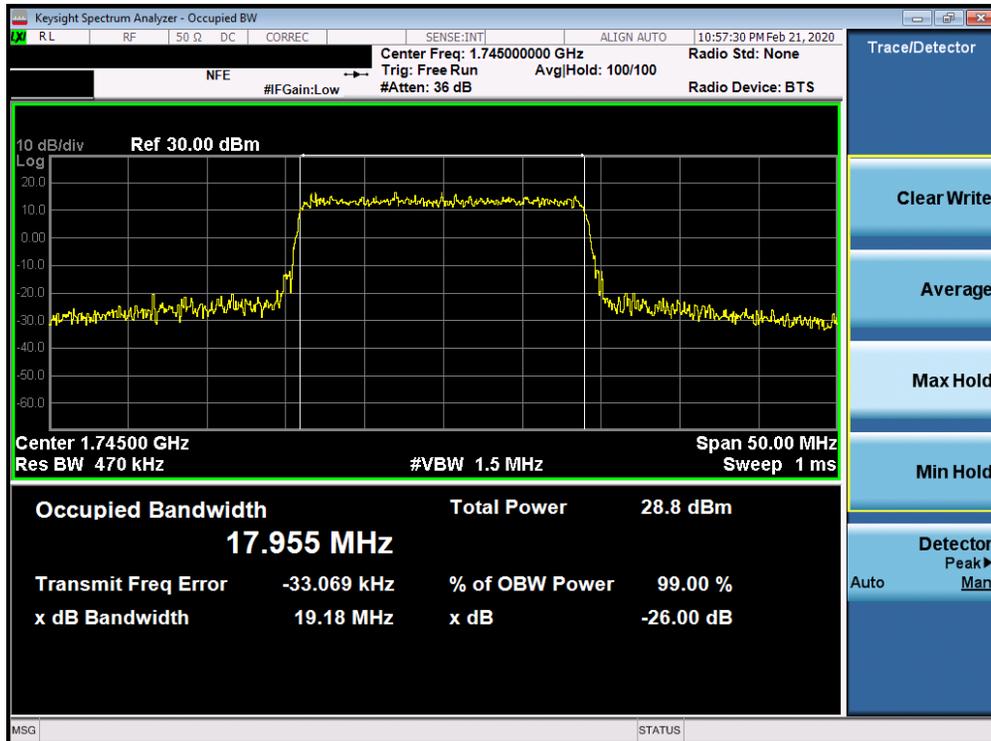


Plot 7-46. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 37 of 211



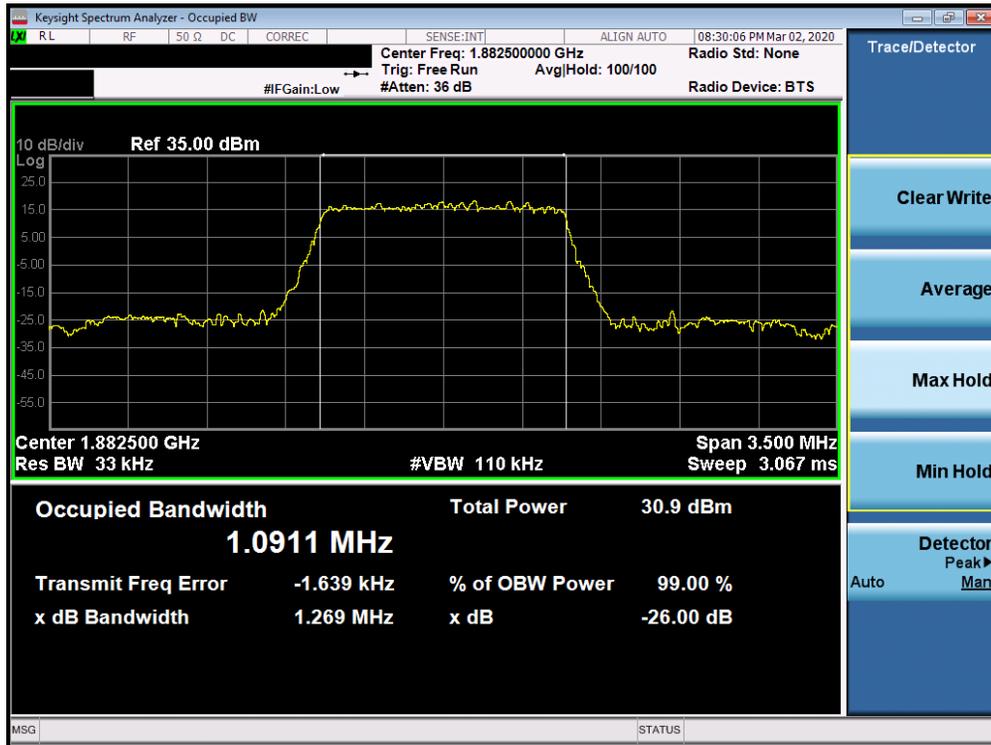
Plot 7-47. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 16-QAM - Full RB Configuration)



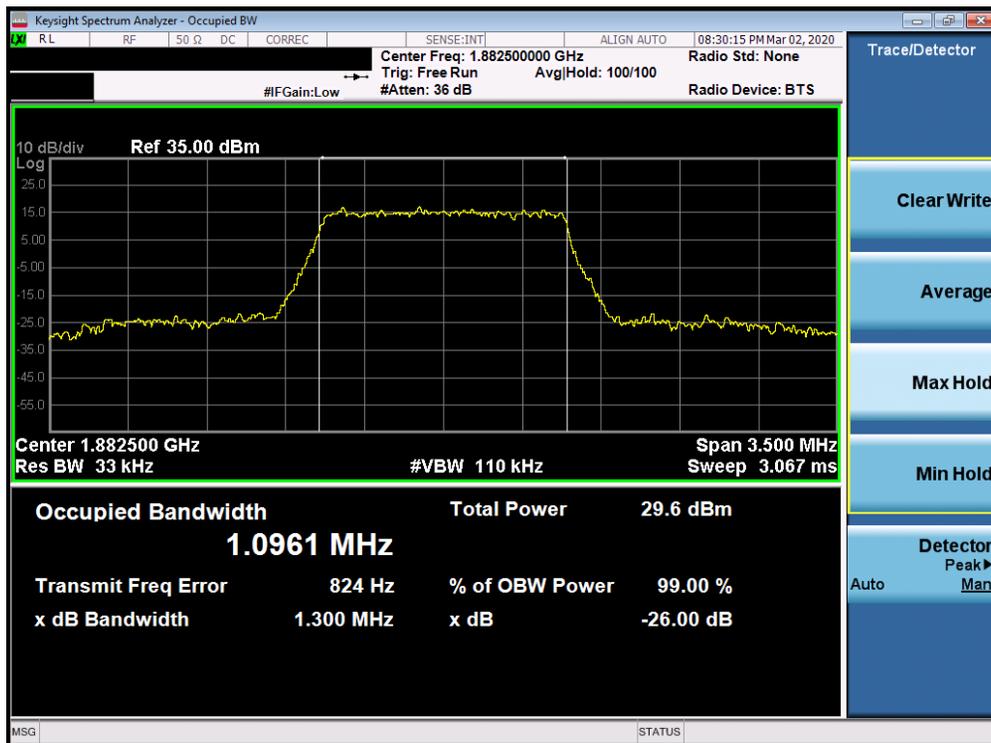
Plot 7-48. Occupied Bandwidth Plot (Band 66/4 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 38 of 211

**Band 25/2**

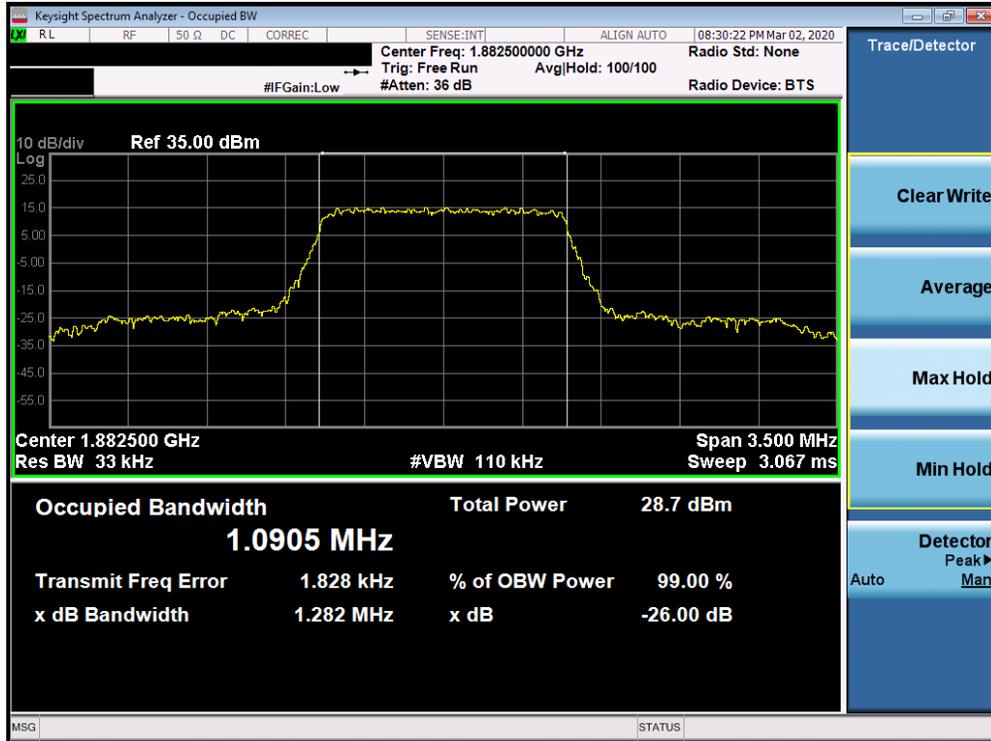


**Plot 7-49. Occupied Bandwidth Plot (Band 25/2 - 1.4MHz QPSK - Full RB Configuration)**

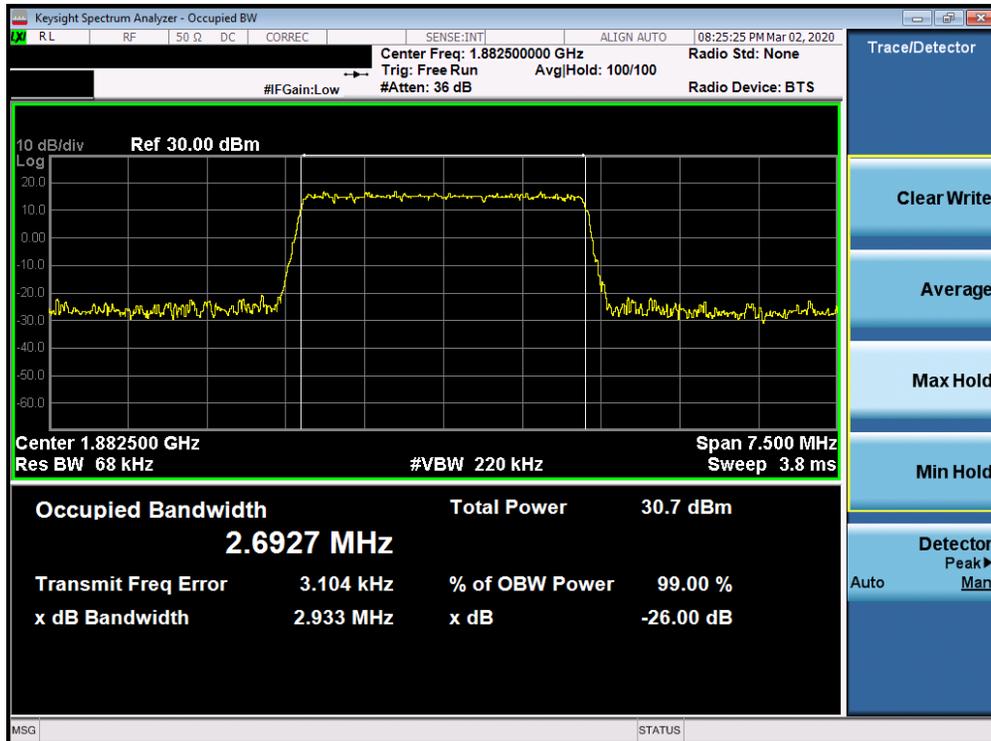


**Plot 7-50. Occupied Bandwidth Plot (Band 25/2 - 1.4MHz 16-QAM - Full RB Configuration)**

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 39 of 211

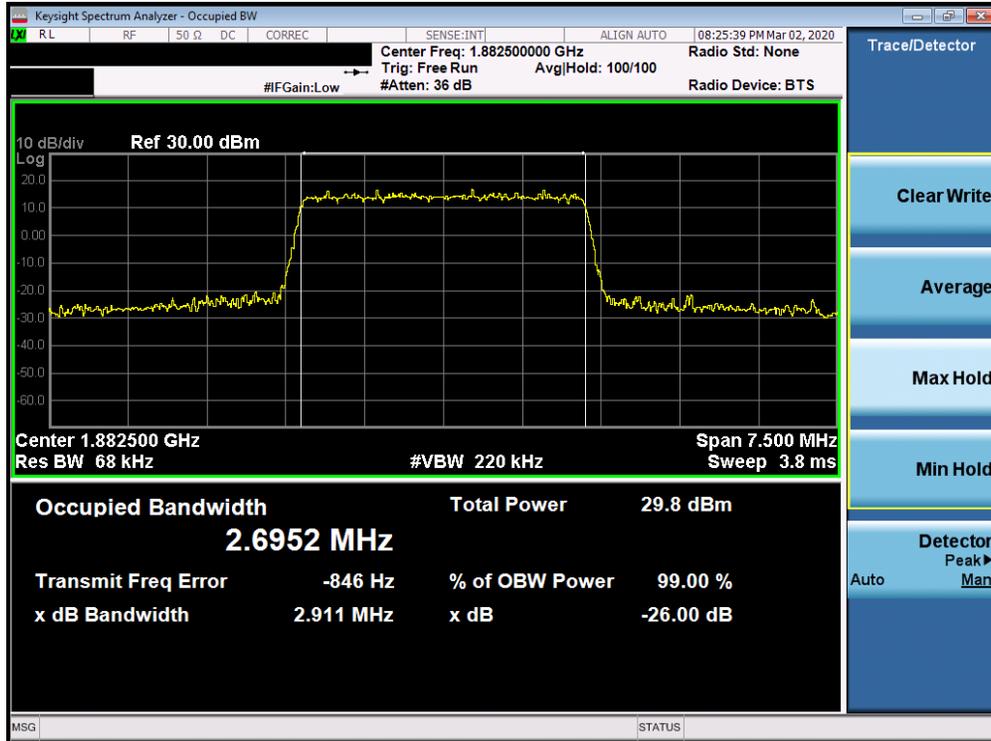


Plot 7-51. Occupied Bandwidth Plot (Band 25/2 - 1.4MHz 64-QAM - Full RB Configuration)

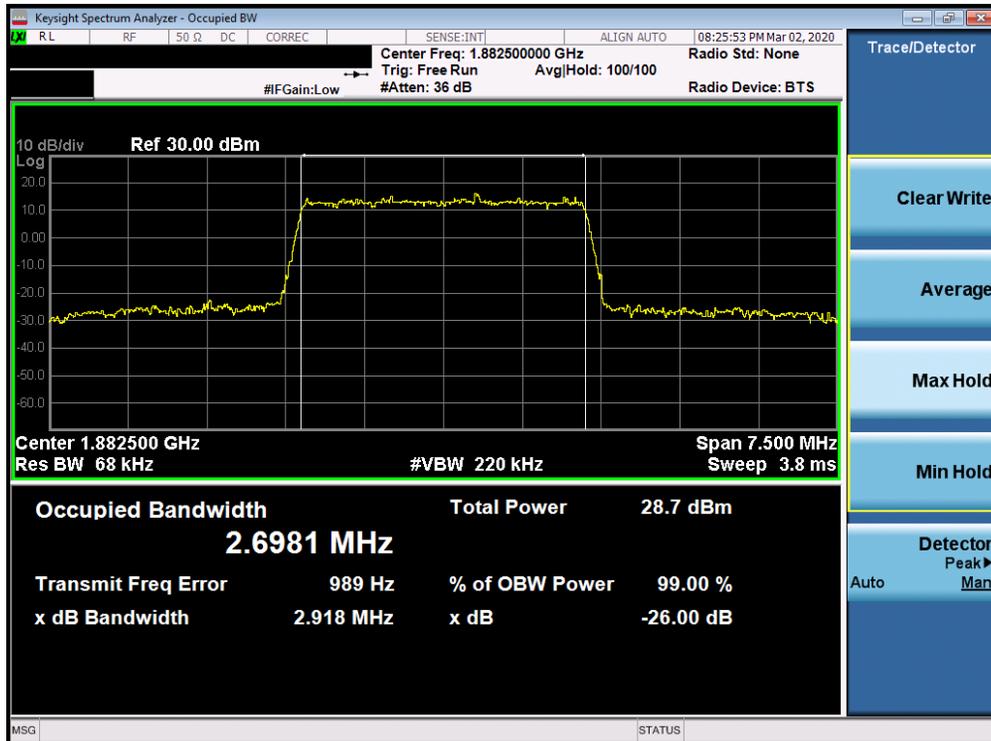


Plot 7-52. Occupied Bandwidth Plot (Band 25/2 - 3.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 40 of 211

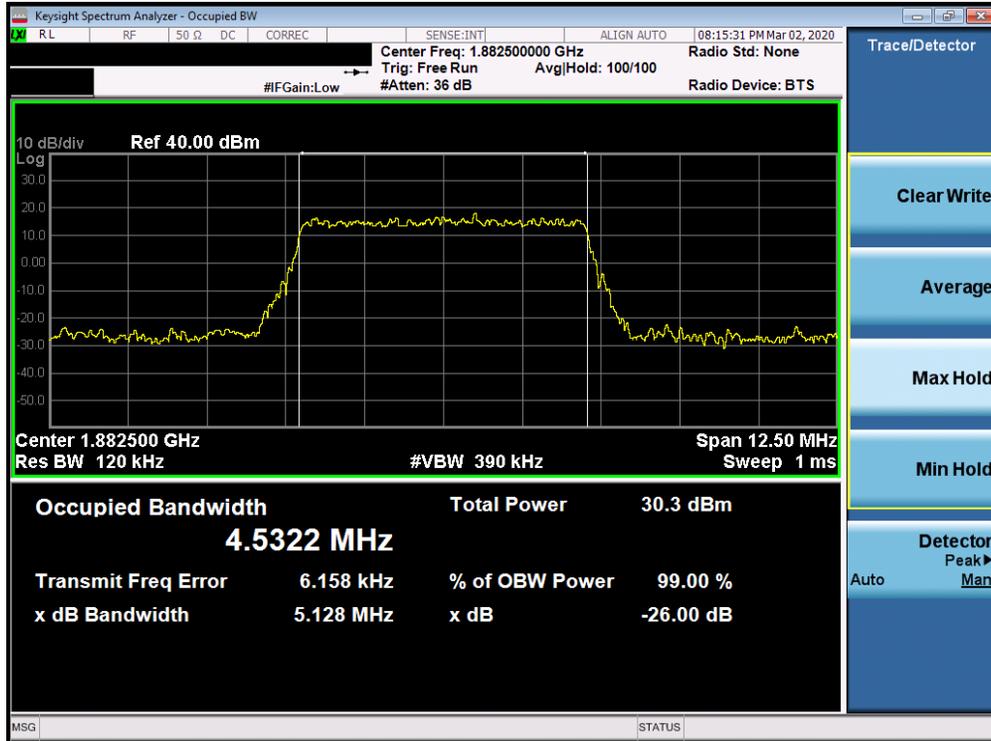


Plot 7-53. Occupied Bandwidth Plot (Band 25/2 - 3.0MHz 16-QAM - Full RB Configuration)

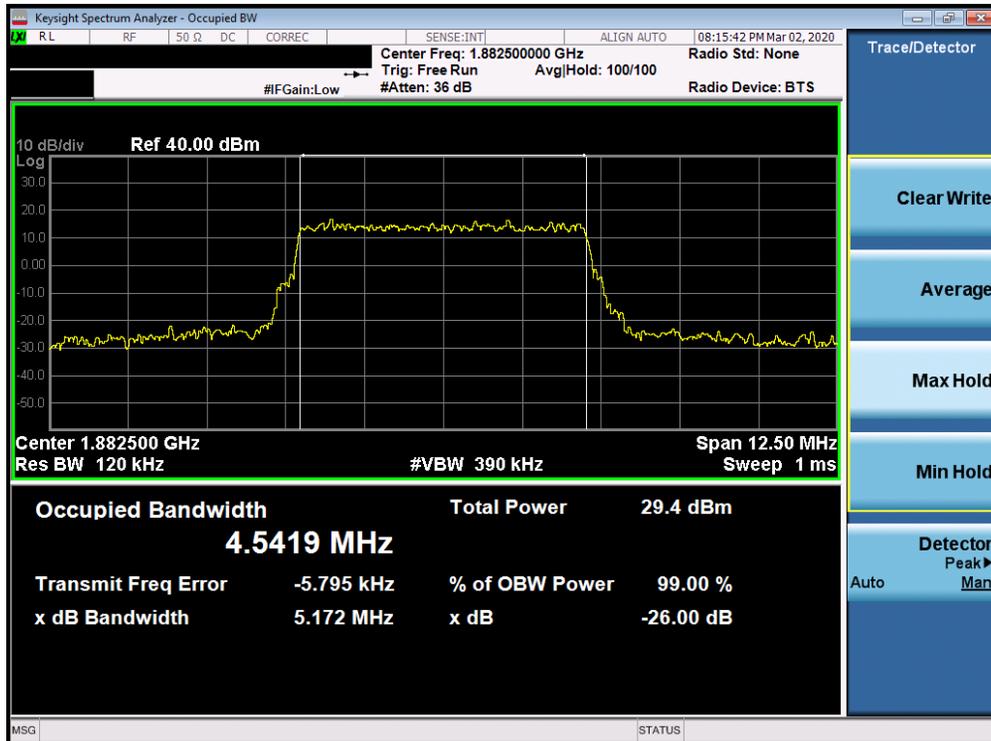


Plot 7-54. Occupied Bandwidth Plot (Band 25/2 - 3.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 41 of 211



Plot 7-55. Occupied Bandwidth Plot (Band 25/2 - 5.0MHz QPSK - Full RB Configuration)

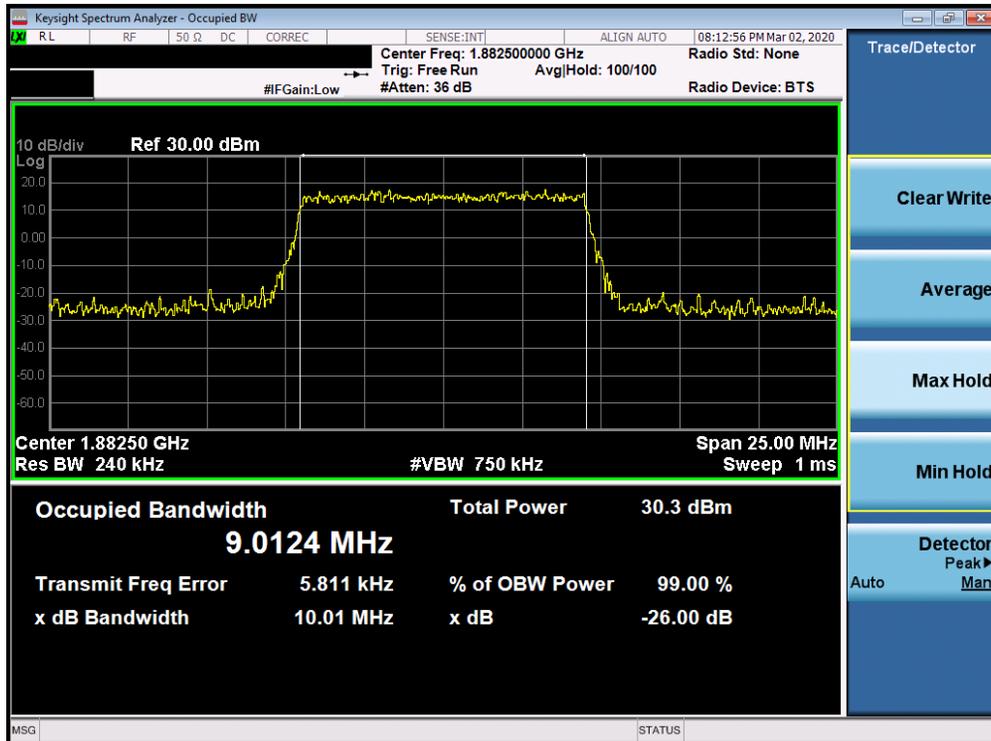


Plot 7-56. Occupied Bandwidth Plot (Band 25/2 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 42 of 211

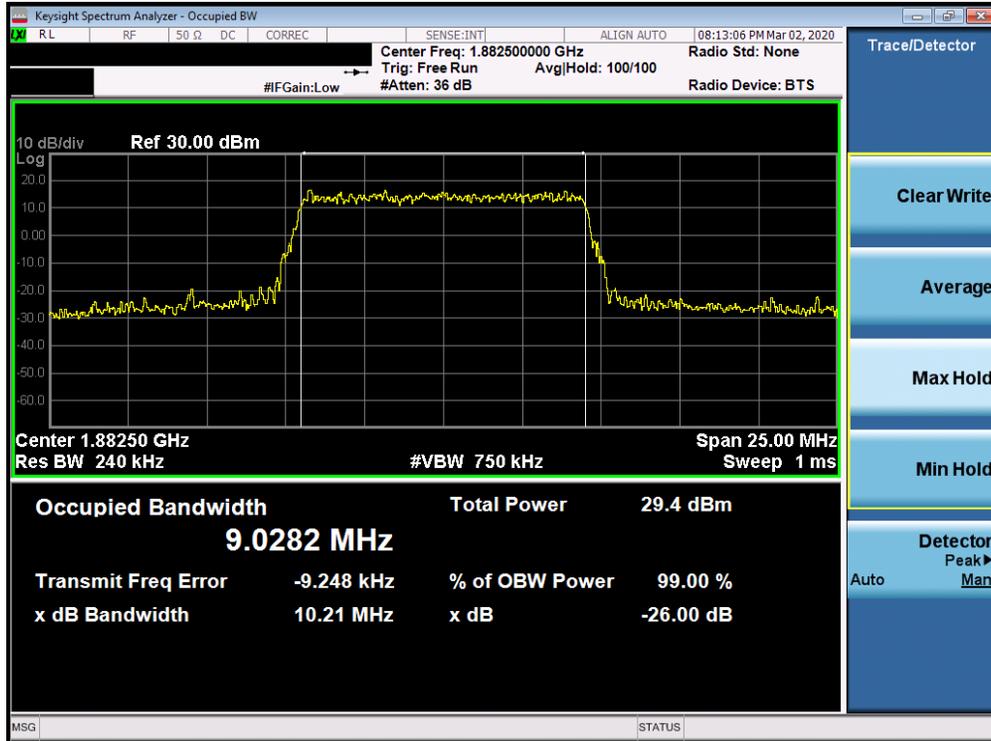


Plot 7-57. Occupied Bandwidth Plot (Band 25/2 - 5.0MHz 64-QAM - Full RB Configuration)

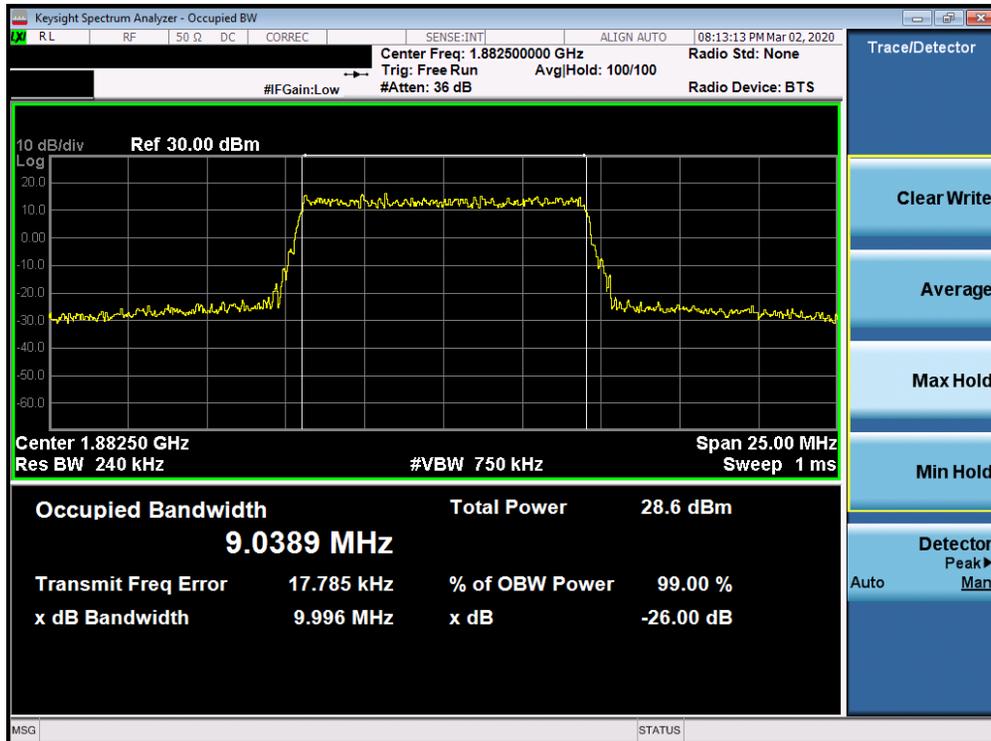


Plot 7-58. Occupied Bandwidth Plot (Band 25/2 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 43 of 211

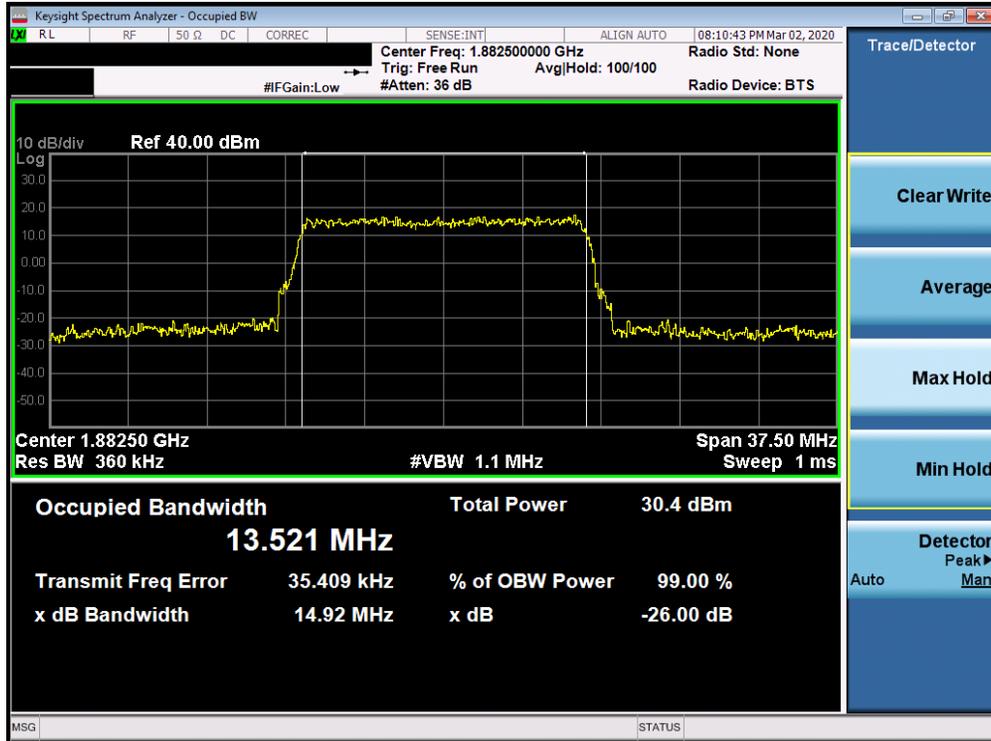


Plot 7-59. Occupied Bandwidth Plot (Band 25/2 - 10.0MHz 16-QAM - Full RB Configuration)

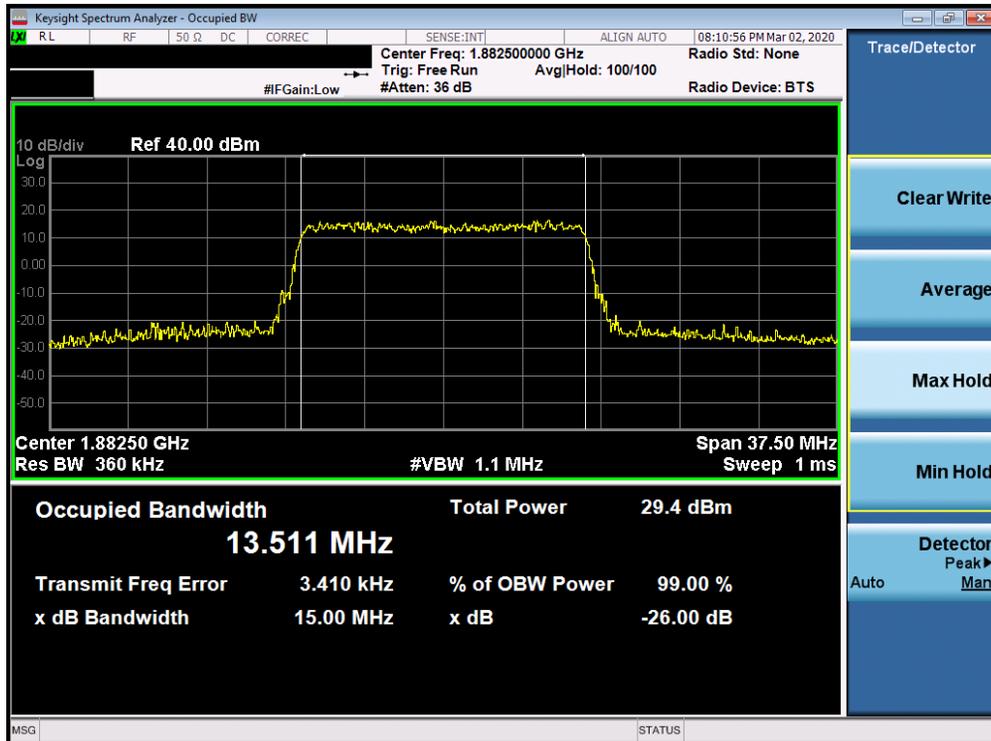


Plot 7-60. Occupied Bandwidth Plot (Band 25/2 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 44 of 211

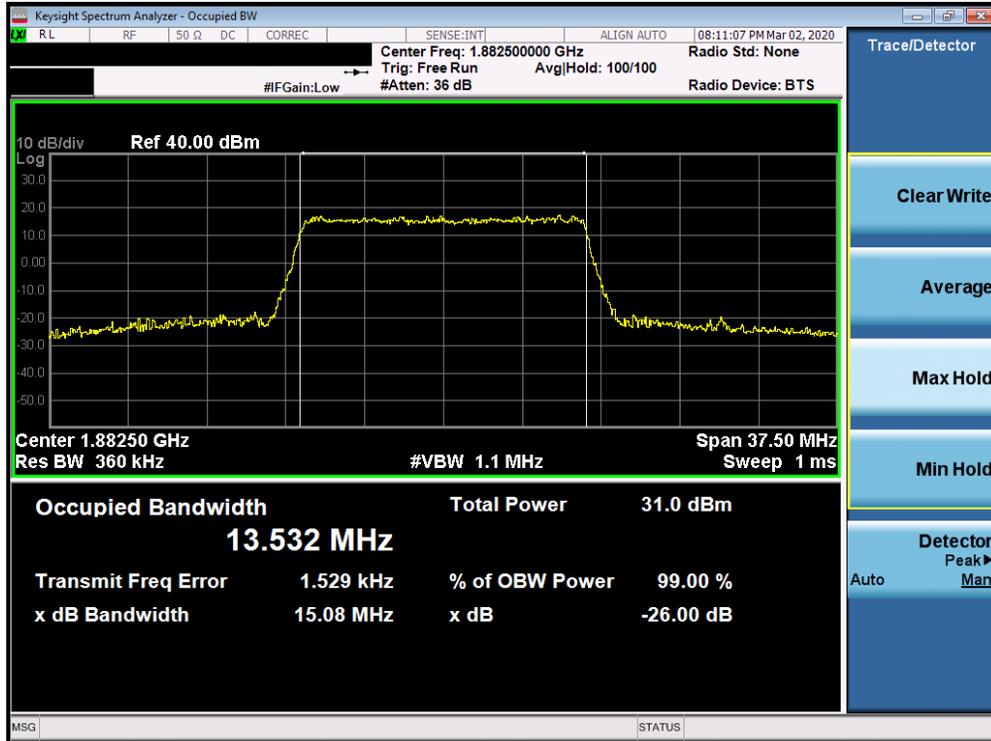


Plot 7-61. Occupied Bandwidth Plot (Band 25/2 - 15.0MHz QPSK - Full RB Configuration)

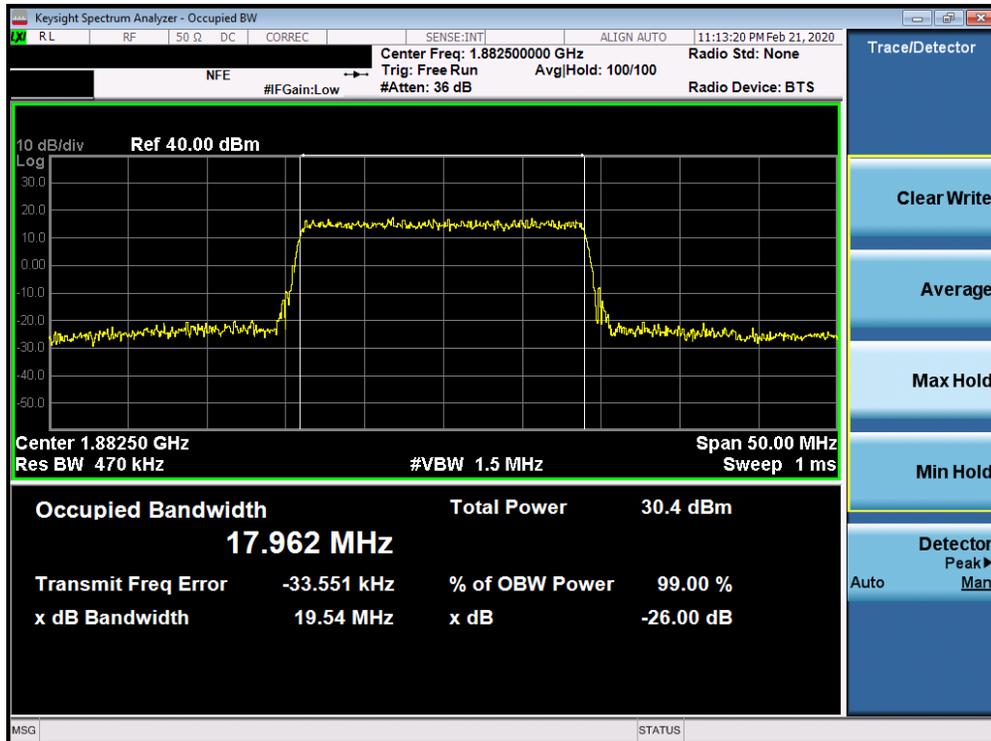


Plot 7-62. Occupied Bandwidth Plot (Band 25/2 - 15.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 45 of 211

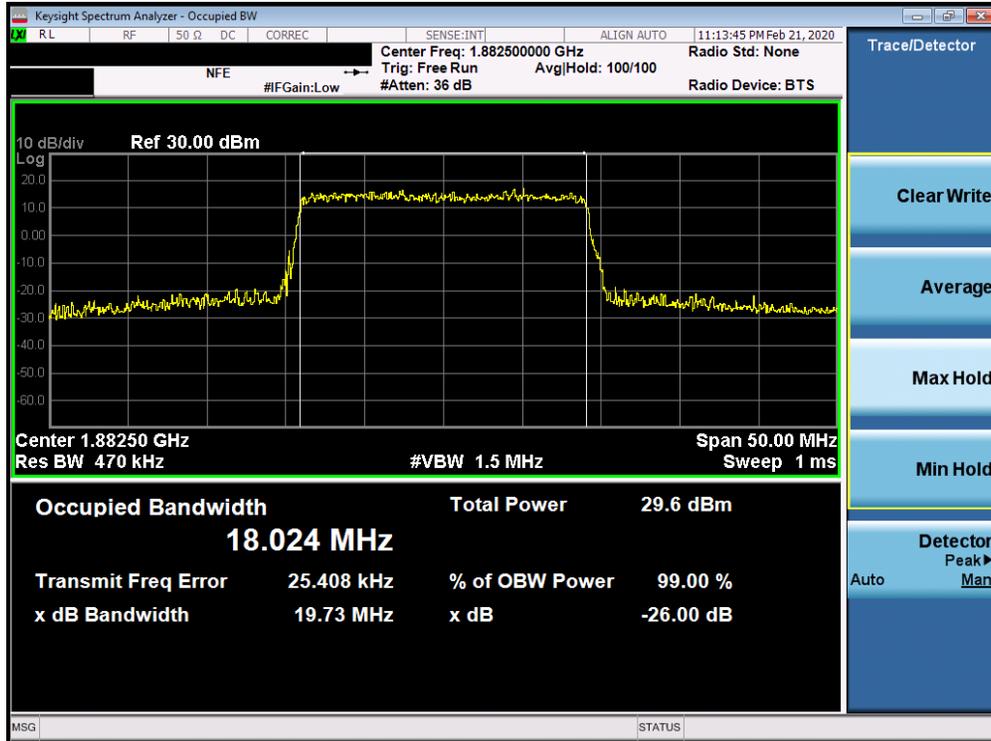


Plot 7-63. Occupied Bandwidth Plot (Band 25/2 - 15.0MHz 64-QAM - Full RB Configuration)

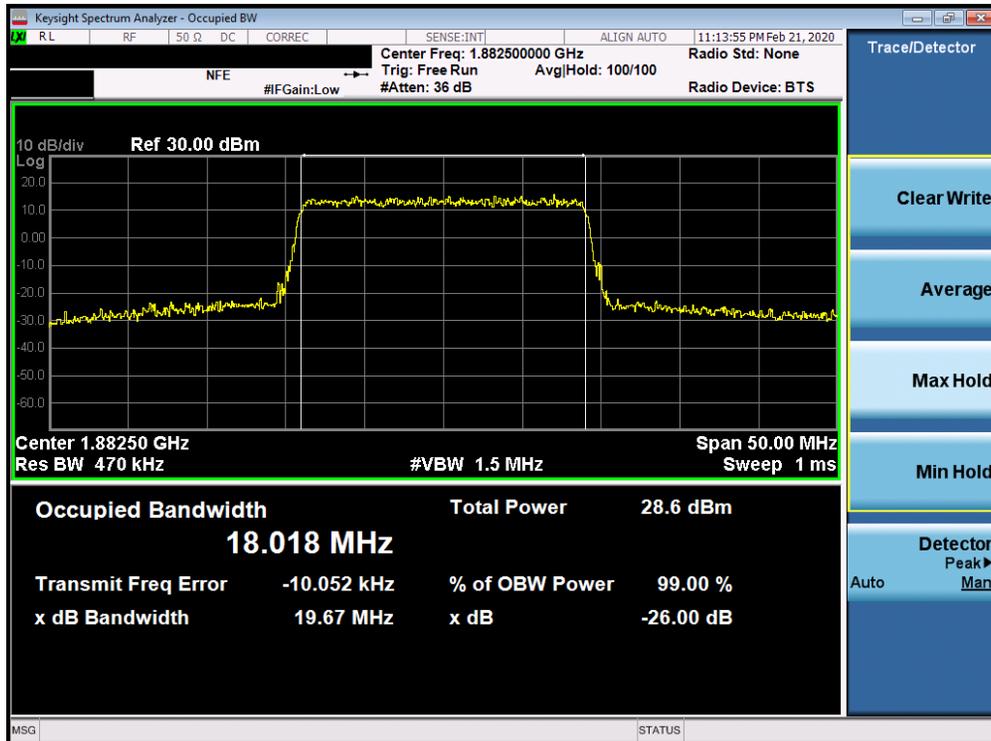


Plot 7-64. Occupied Bandwidth Plot (Band 25/2 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 46 of 211



Plot 7-65. Occupied Bandwidth Plot (Band 25/2 - 20.0MHz 16-QAM - Full RB Configuration)



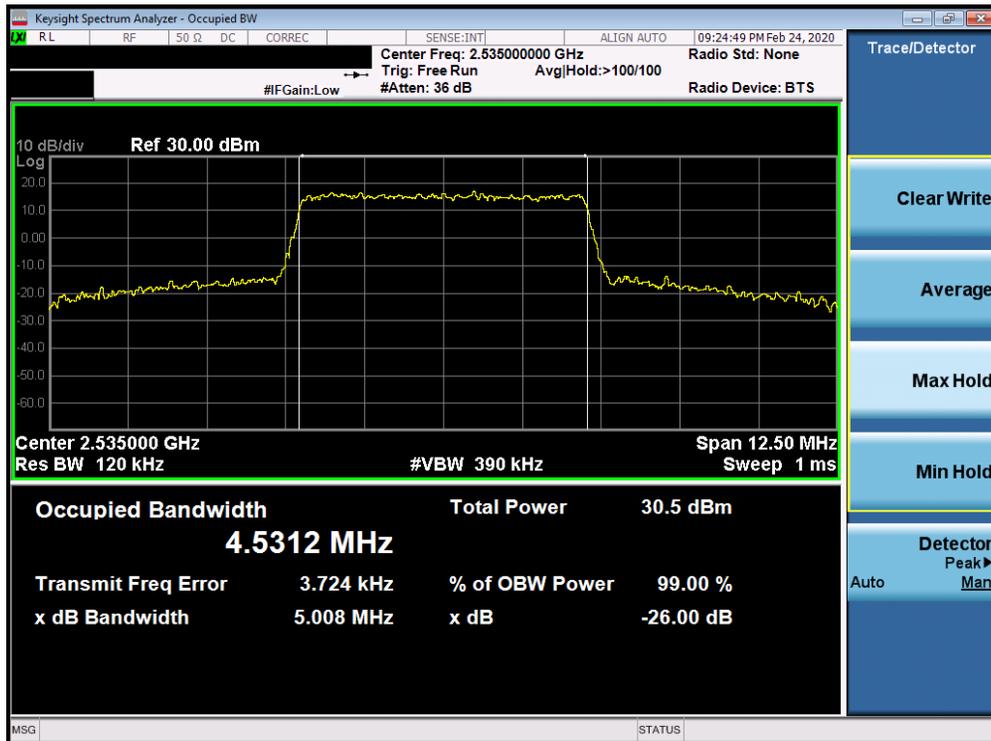
Plot 7-66. Occupied Bandwidth Plot (Band 25/2 - 20.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 47 of 211

## Band 7

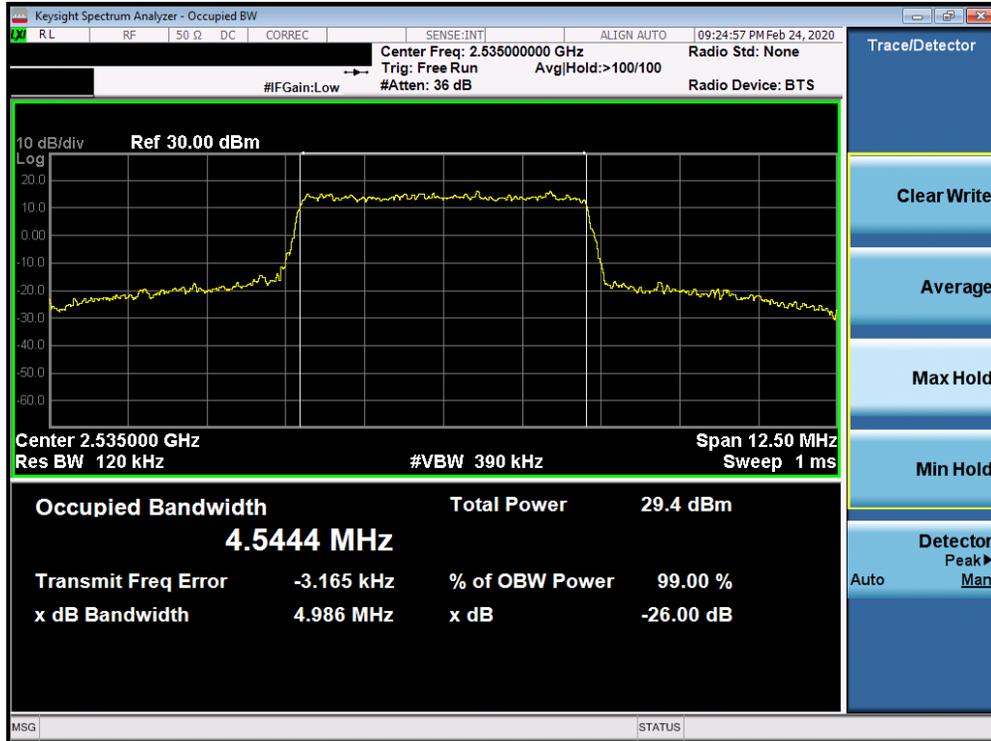


Plot 7-67. Occupied Bandwidth Plot (Band 7 - 5.0MHz QPSK - Full RB Configuration)

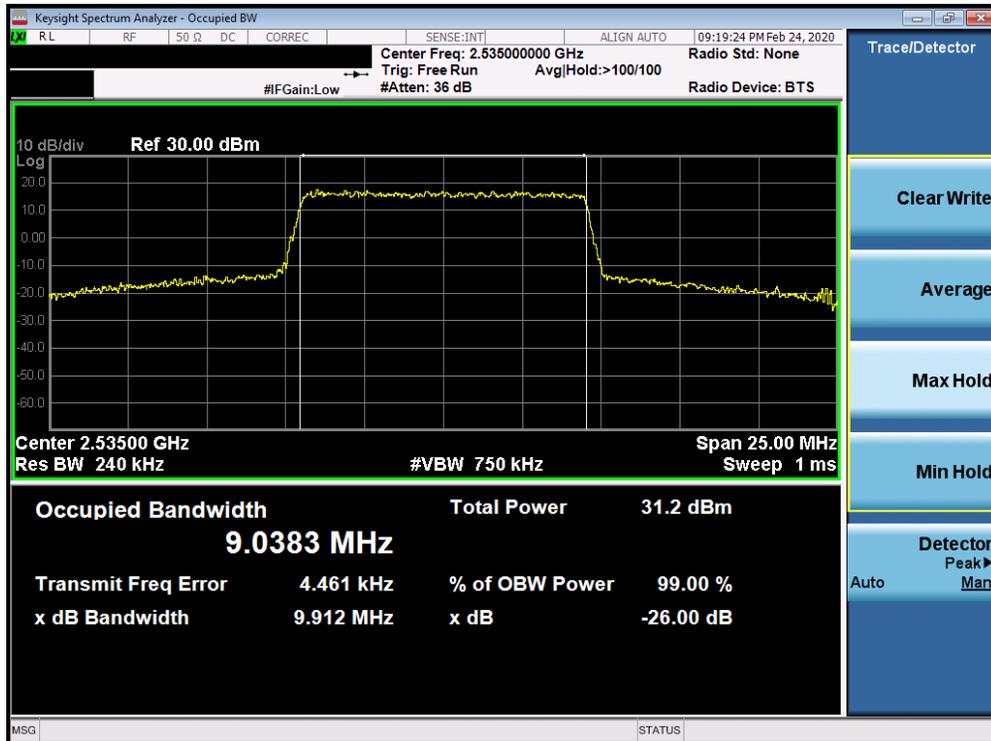


Plot 7-68. Occupied Bandwidth Plot (Band 7 - 5.0MHz 16-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 48 of 211

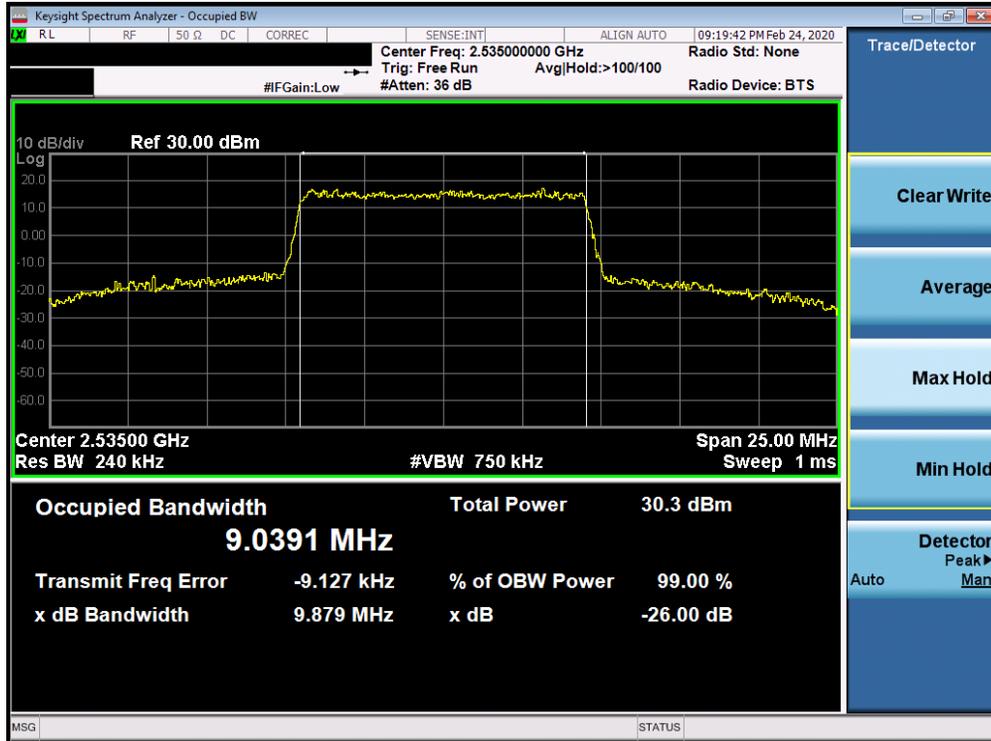


Plot 7-69. Occupied Bandwidth Plot (Band 7 - 5.0MHz 64-QAM - Full RB Configuration)

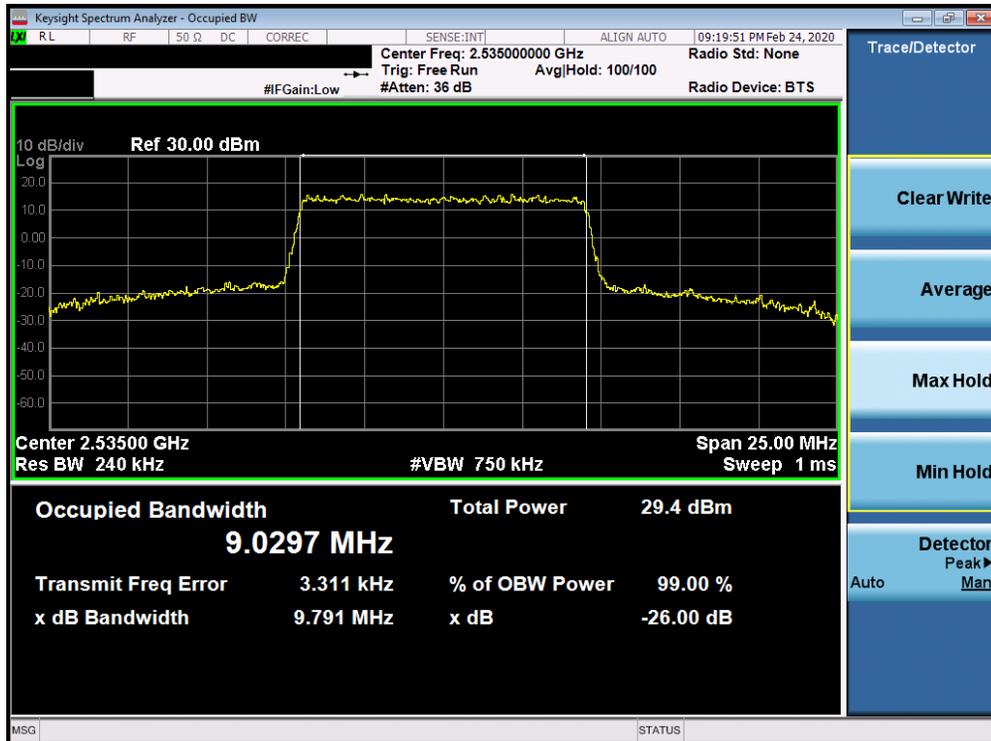


Plot 7-70. Occupied Bandwidth Plot (Band 7 - 10.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 49 of 211



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

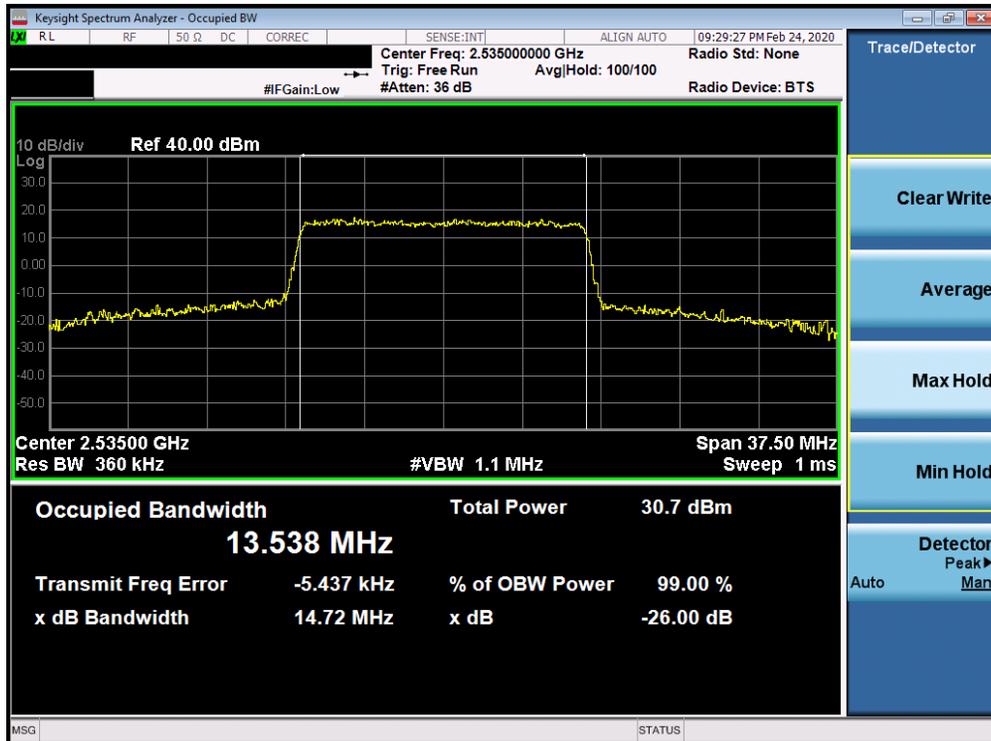


Plot 7-72. Occupied Bandwidth Plot (Band 7 - 10.0MHz 64-QAM - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 50 of 211

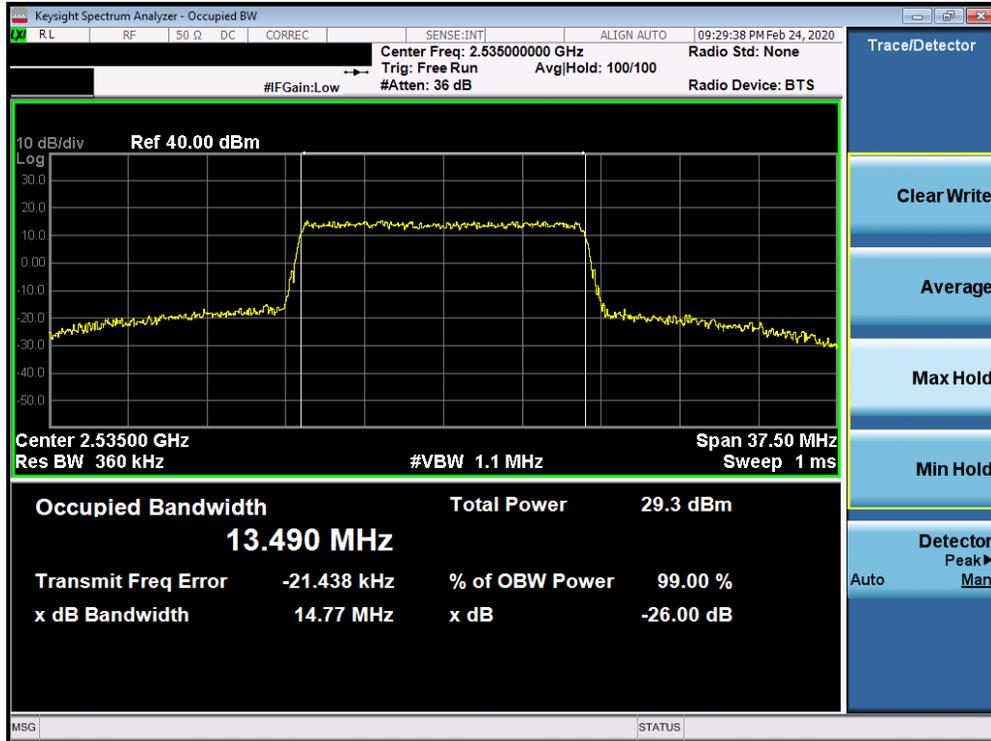


Plot 7-73. Occupied Bandwidth Plot (Band 7 - 15.0MHz QPSK - Full RB Configuration)



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

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 51 of 211



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

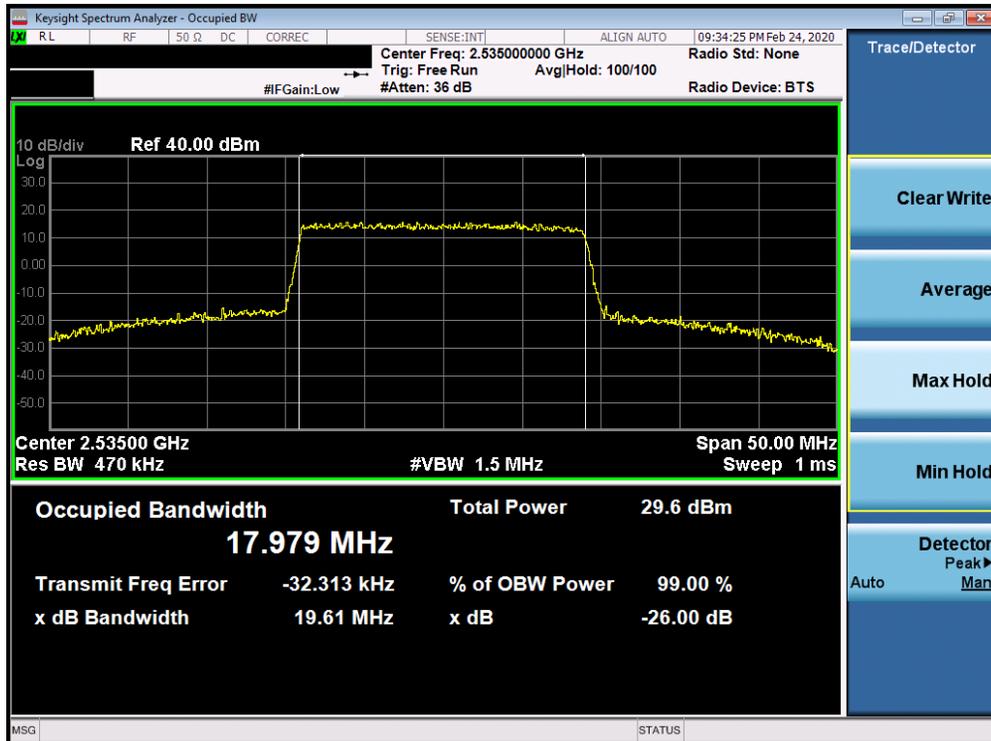


Plot 7-76. Occupied Bandwidth Plot (Band 7 - 20.0MHz QPSK - Full RB Configuration)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 52 of 211



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



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

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 53 of 211

## 7.3 Spurious and Harmonic Emissions at Antenna Terminal

### Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

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

**For Band 7, the minimum permissible attenuation level of any spurious emission is  $55 + 10 \log_{10}(P_{[Watts]})$ .**

### 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 for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

### Test Setup

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

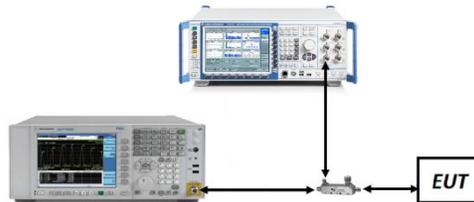


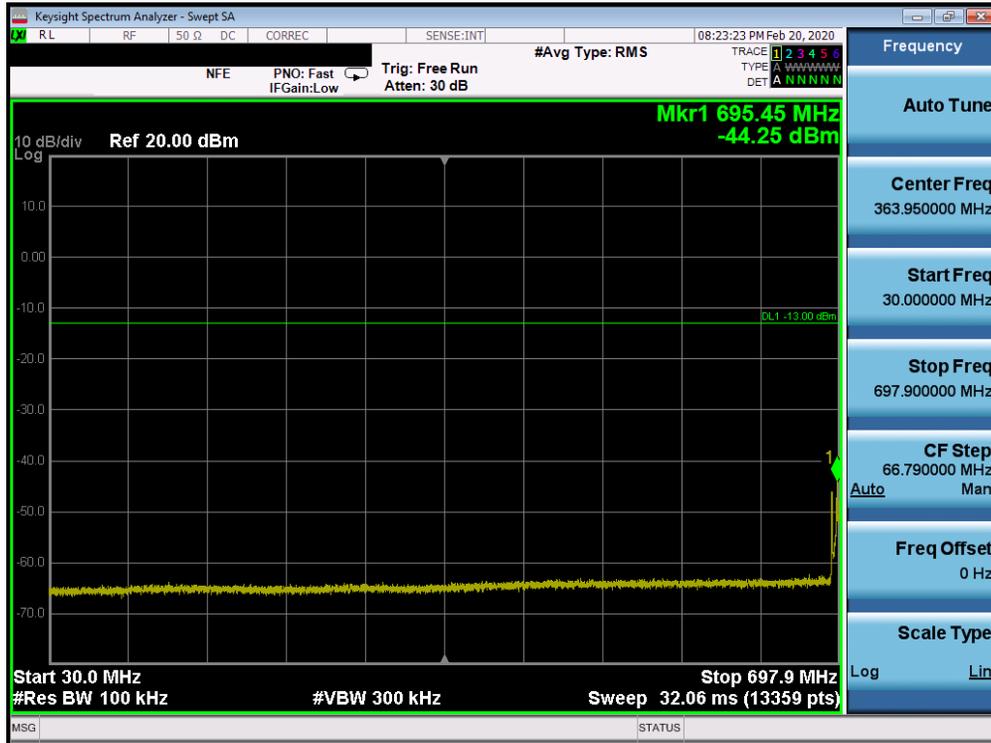
Figure 7-2. Test Instrument & Measurement Setup

### Test Notes

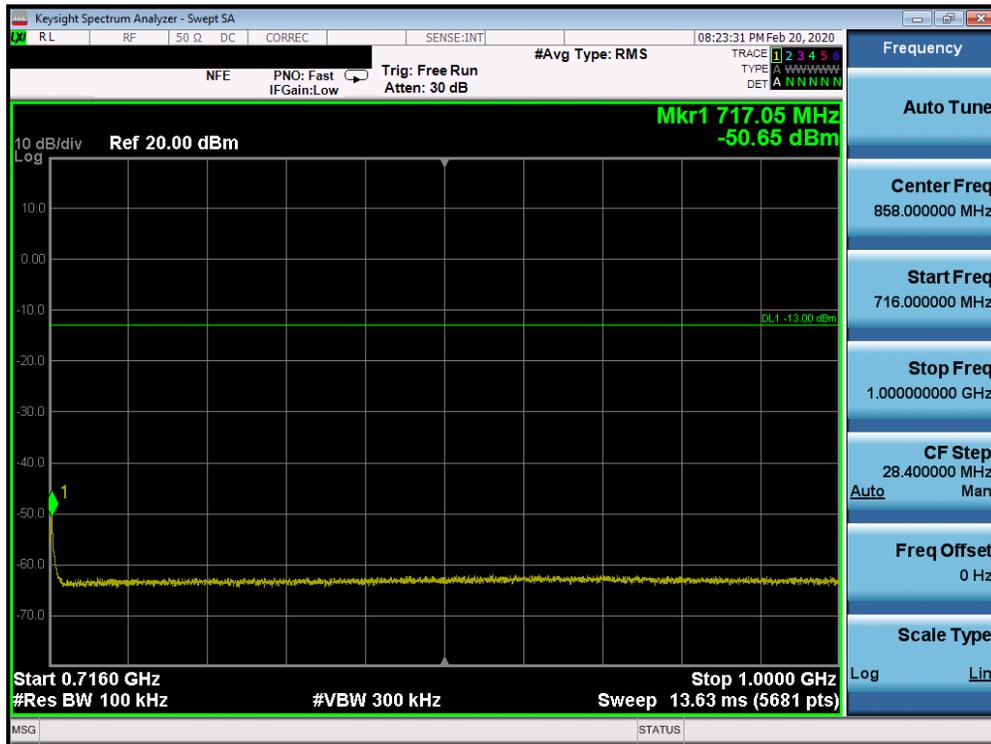
Compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz. However, in the 1 MHz bands immediately outside and adjacent to the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

FCC ID: ZNFK300UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 54 of 211

**Band 12/17**

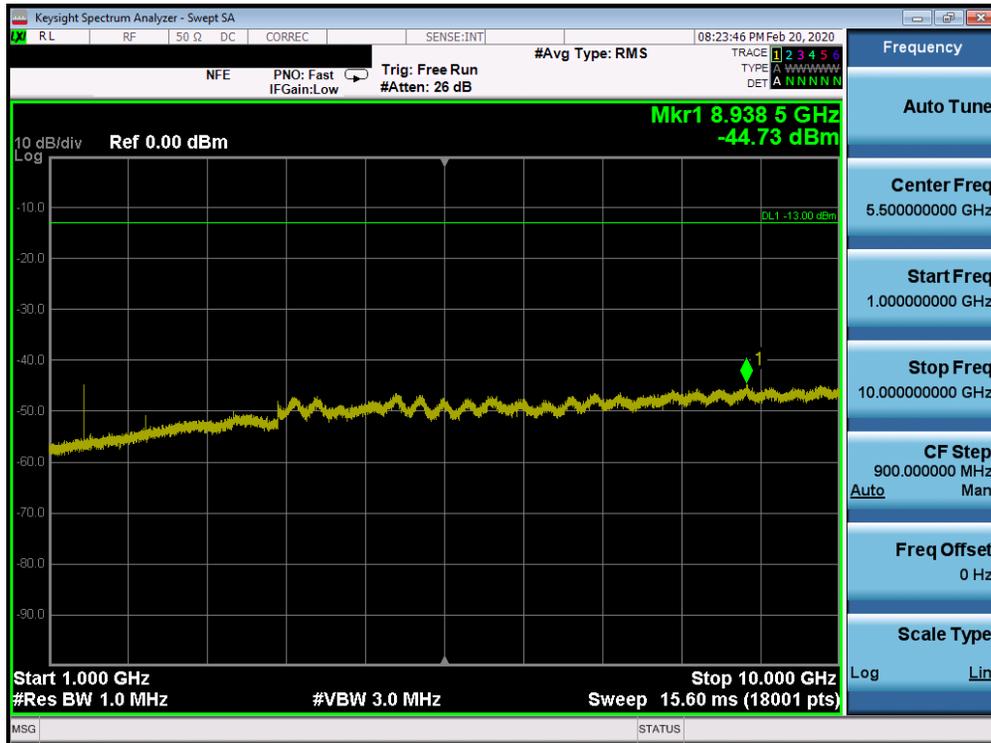


**Plot 7-79. Conducted Spurious Plot (Band 12/17 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)**

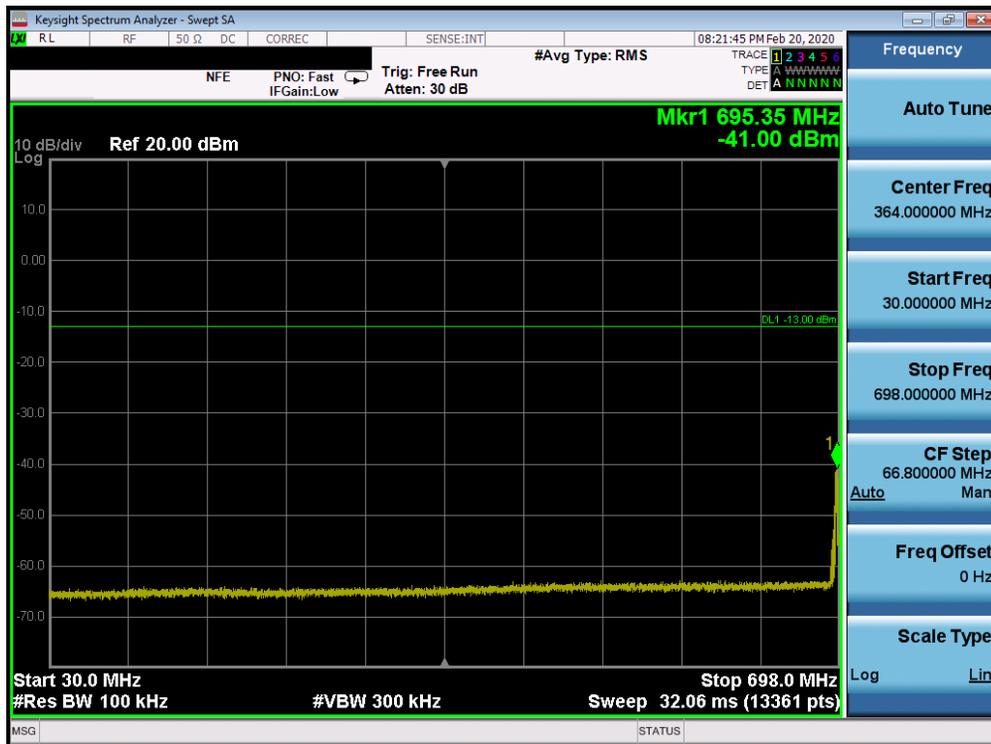


**Plot 7-80. Conducted Spurious Plot (Band 12/17 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)**

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 55 of 211

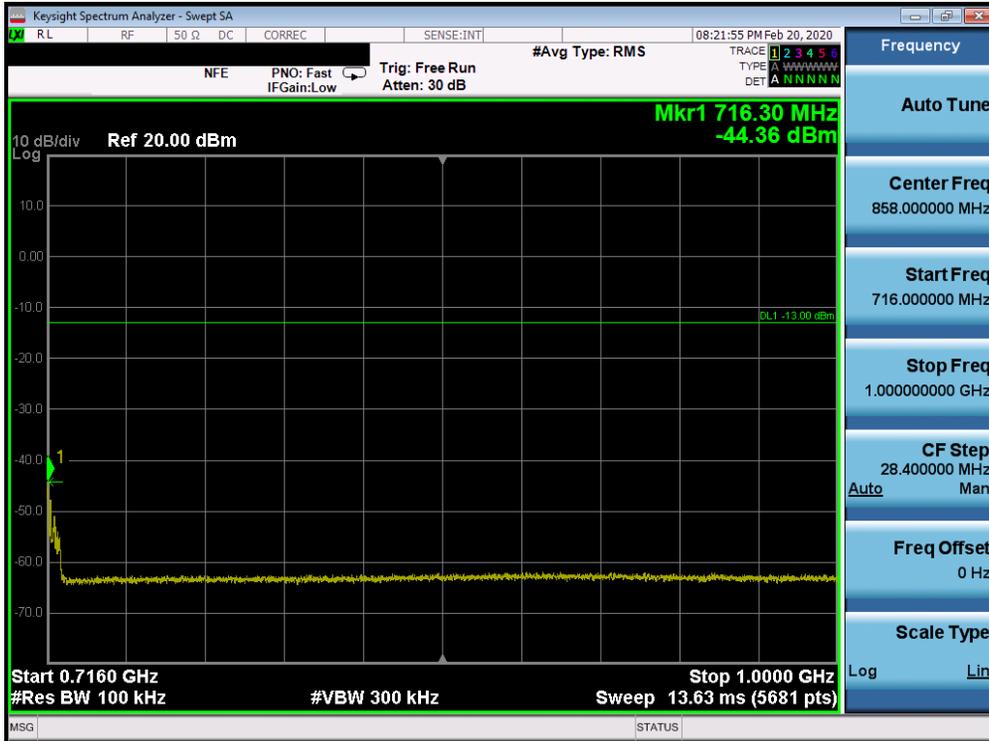


Plot 7-81. Conducted Spurious Plot (Band 12/17 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

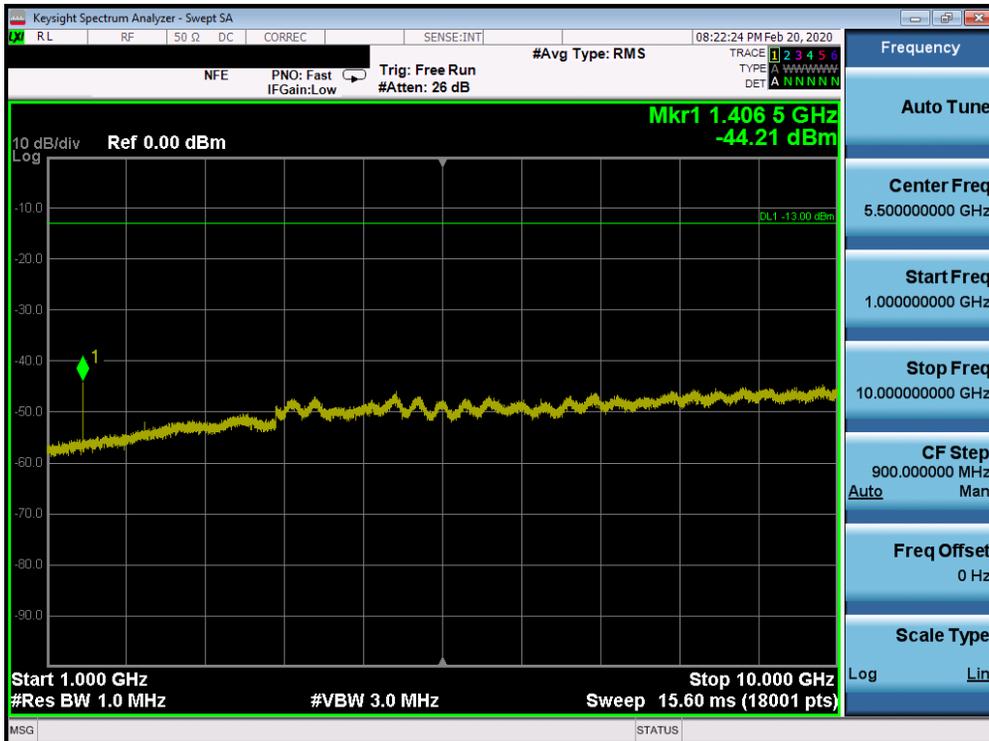


Plot 7-82. Conducted Spurious Plot (Band 12/17 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 56 of 211



Plot 7-83. Conducted Spurious Plot (Band 12/17 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

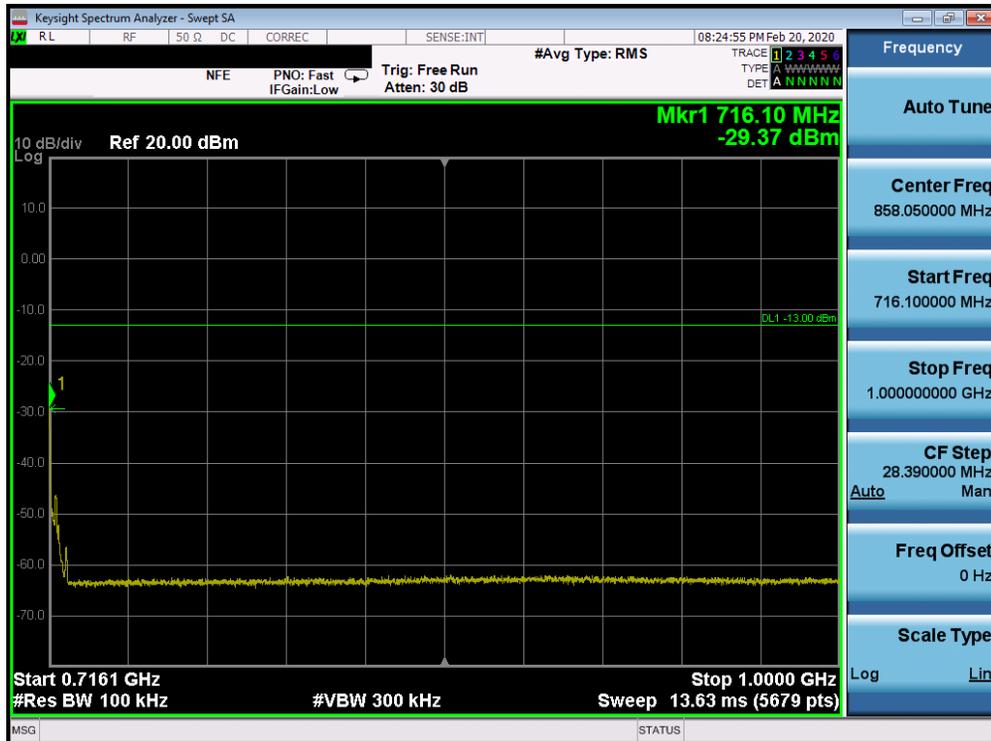


Plot 7-84. Conducted Spurious Plot (Band 12/17 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 57 of 211



Plot 7-85. Conducted Spurious Plot (Band 12/17 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-86. Conducted Spurious Plot (Band 12/17 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

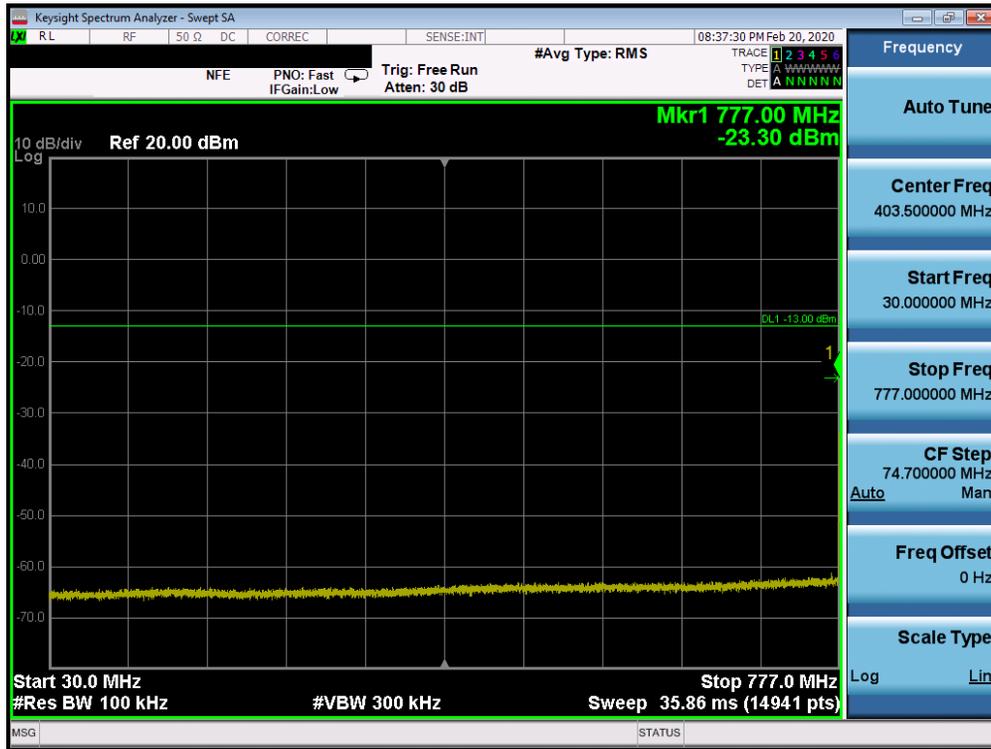
FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 58 of 211



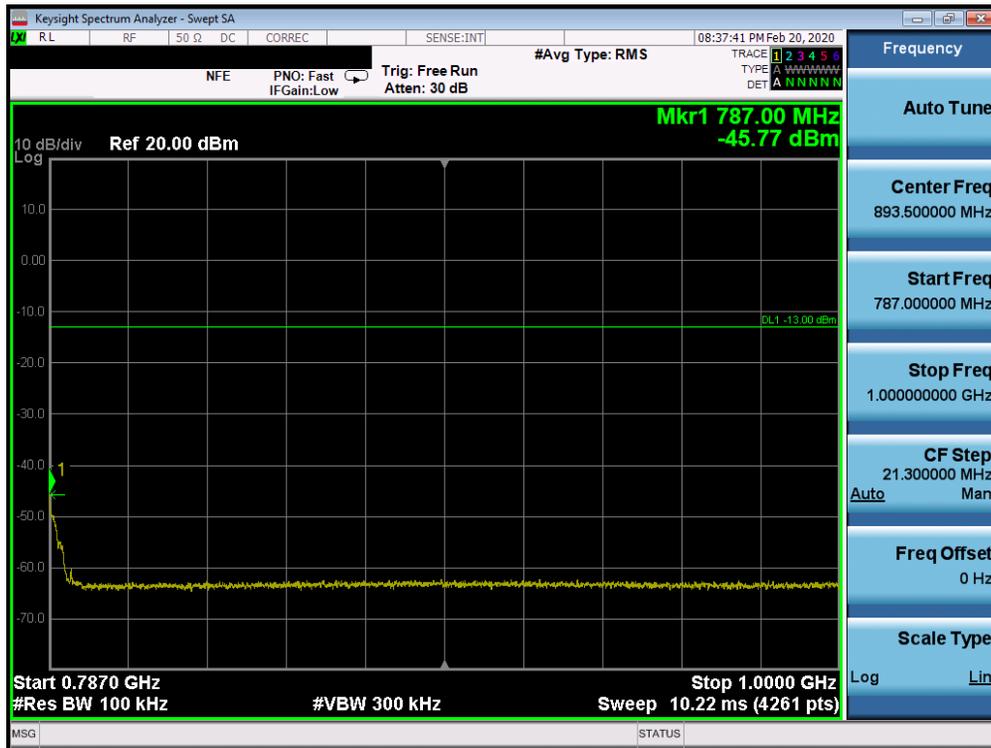
Plot 7-87. Conducted Spurious Plot (Band 12/17 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 59 of 211

**Band 13**

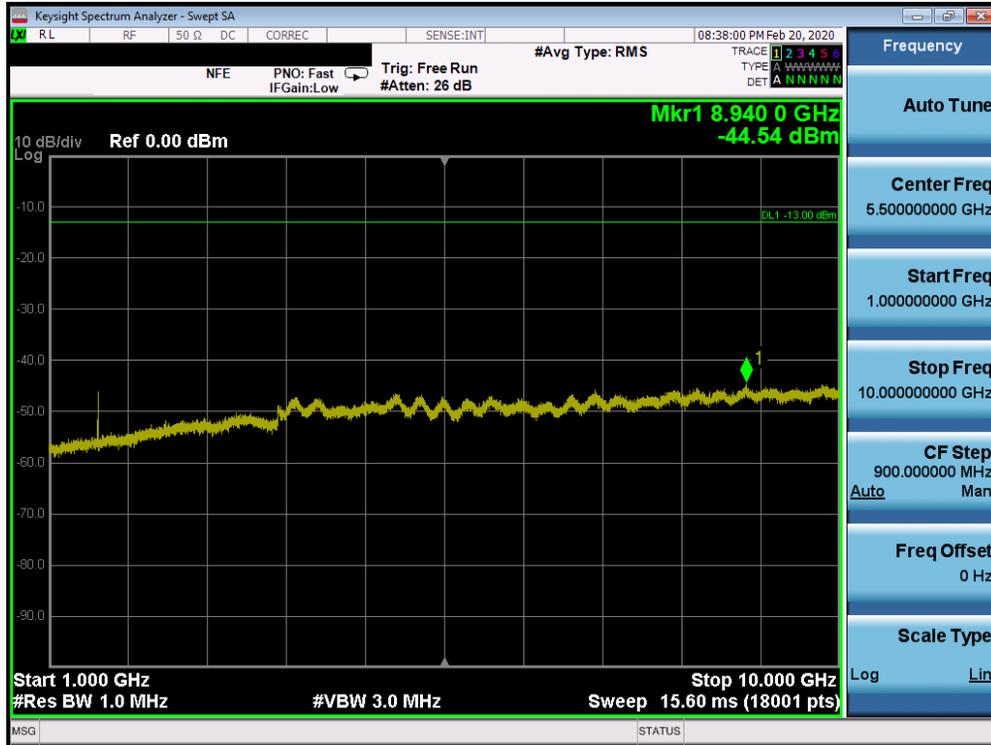


**Plot 7-88. Conducted Spurious Plot (Band 13 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)**



**Plot 7-89. Conducted Spurious Plot (Band 13 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)**

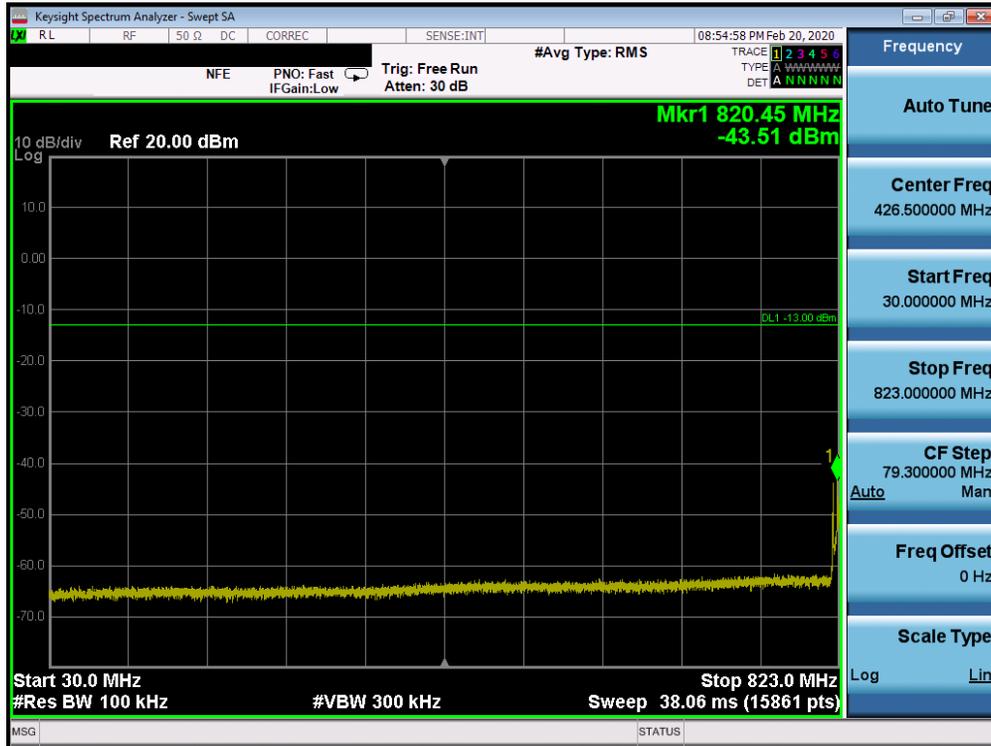
FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 60 of 211



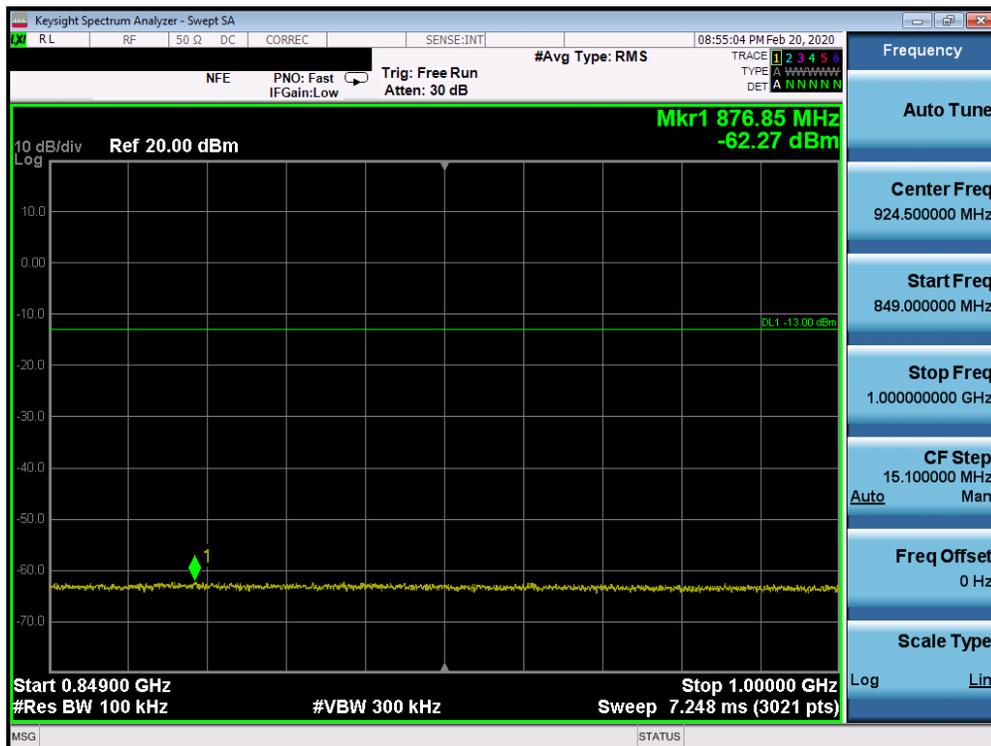
Plot 7-90. Conducted Spurious Plot (Band 13 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 61 of 211

**Band 5**

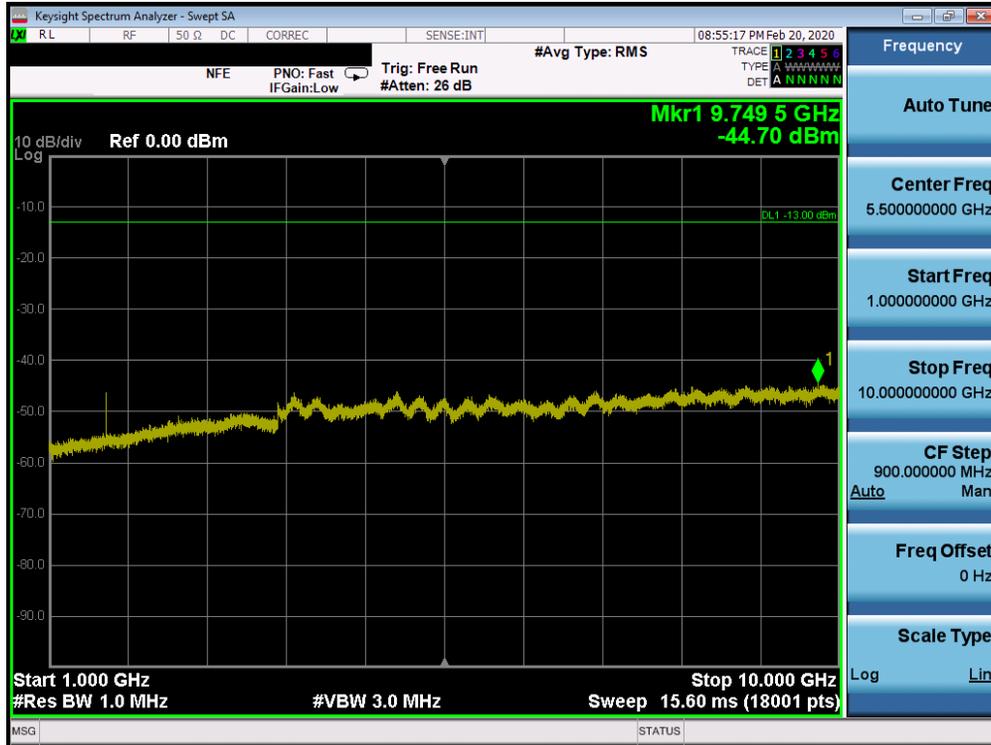


**Plot 7-91. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)**

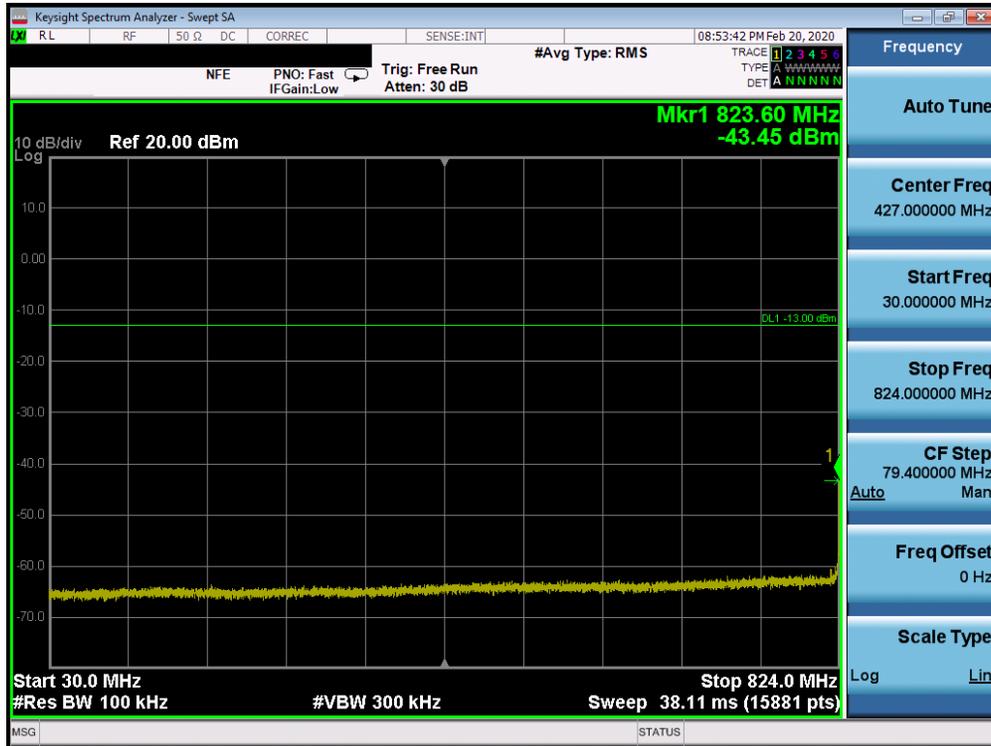


**Plot 7-92. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)**

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 62 of 211

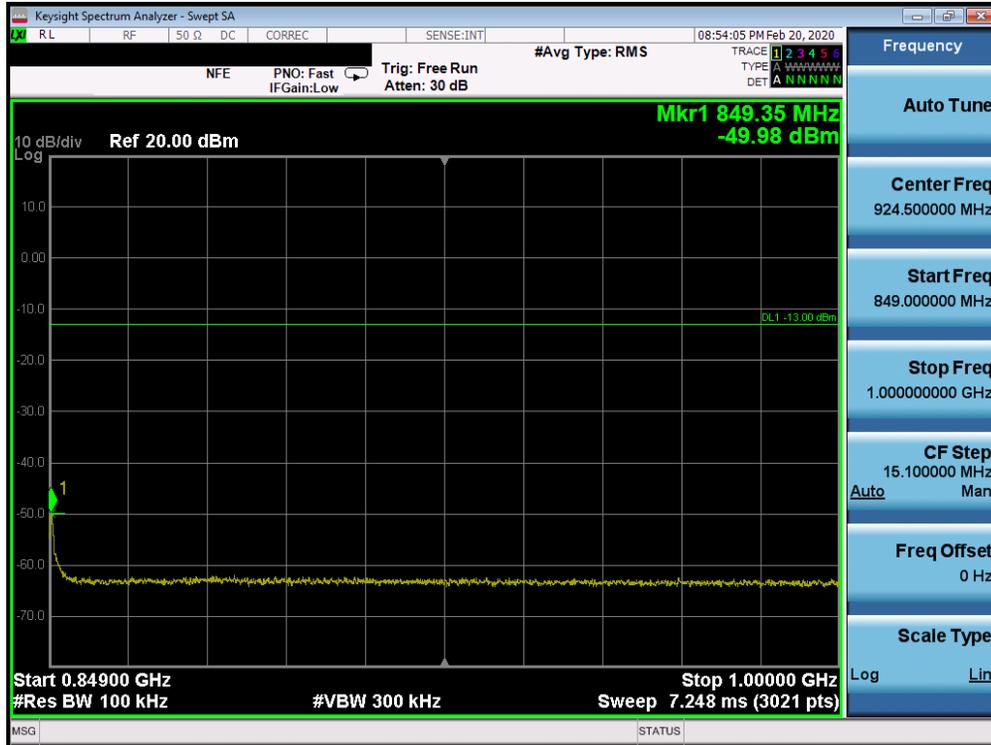


Plot 7-93. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

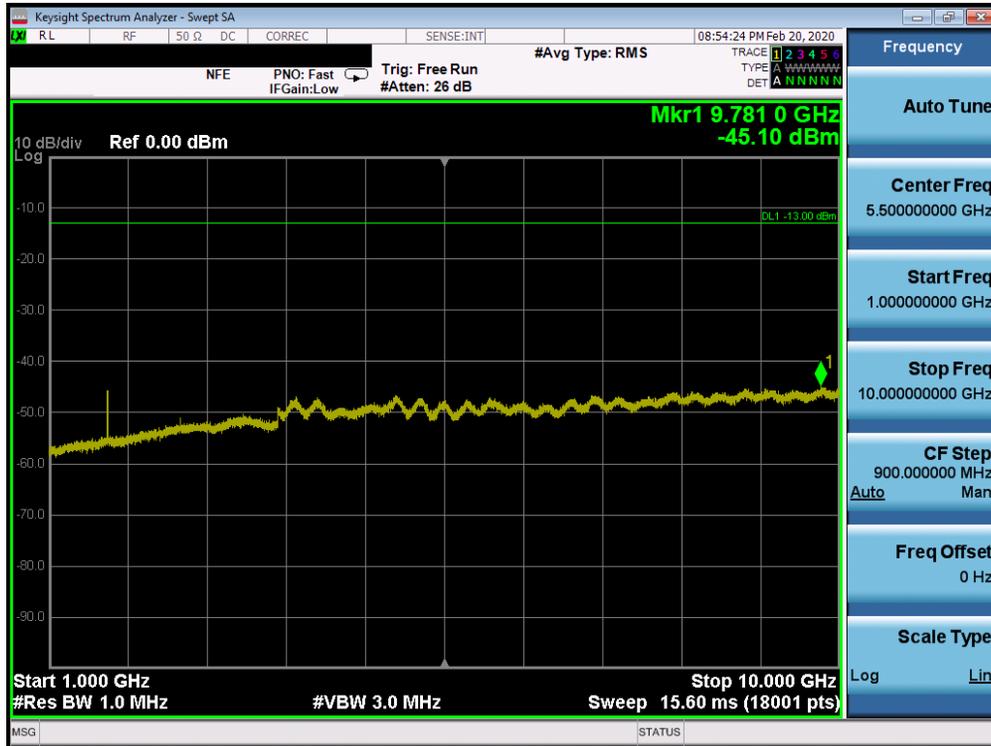


Plot 7-94. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 63 of 211

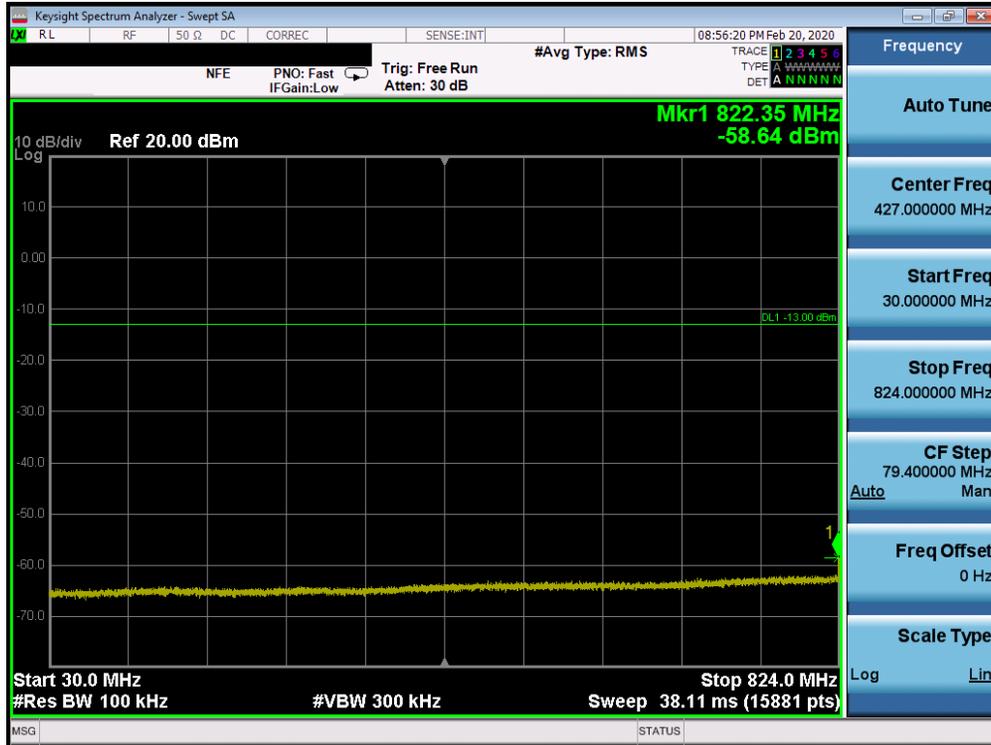


Plot 7-95. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

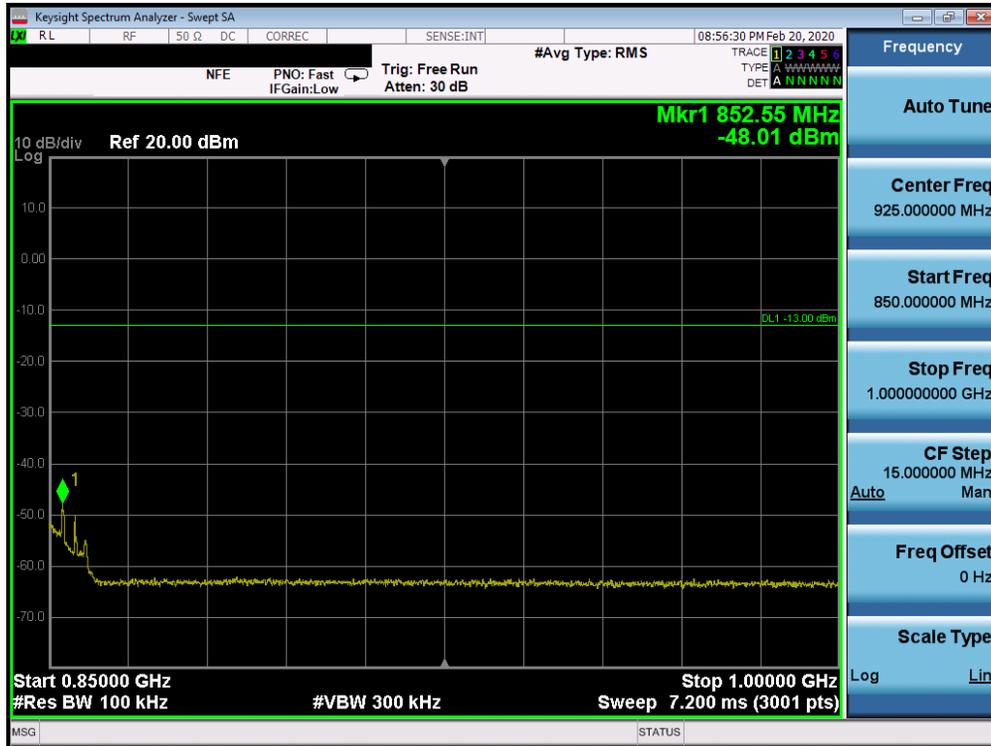


Plot 7-96. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 64 of 211

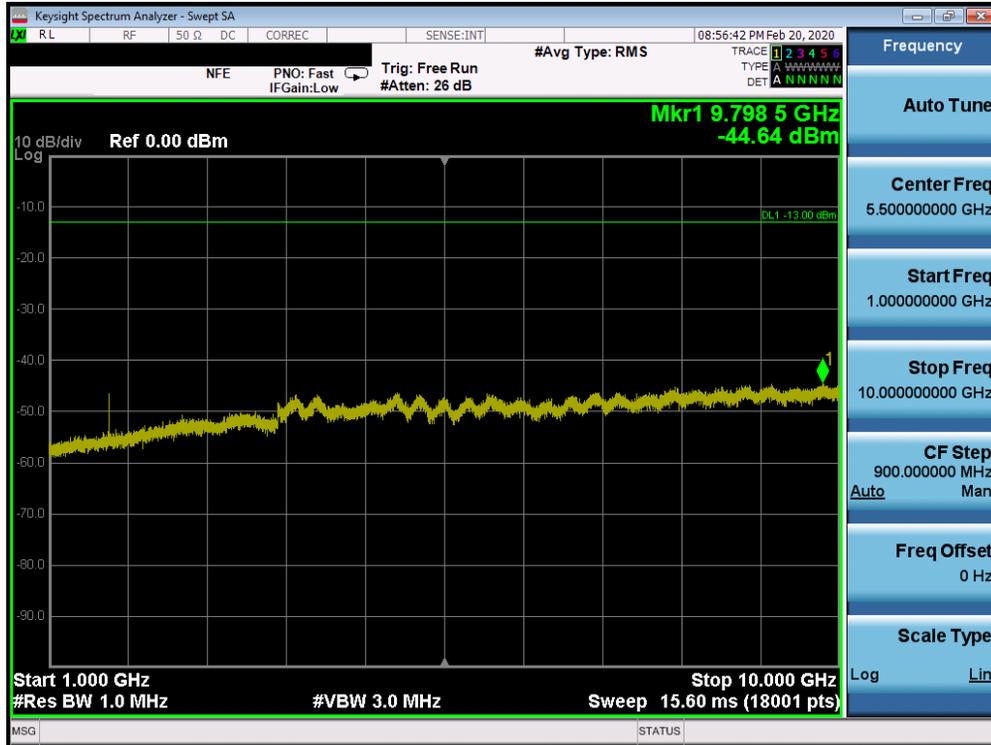


Plot 7-97. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-98. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

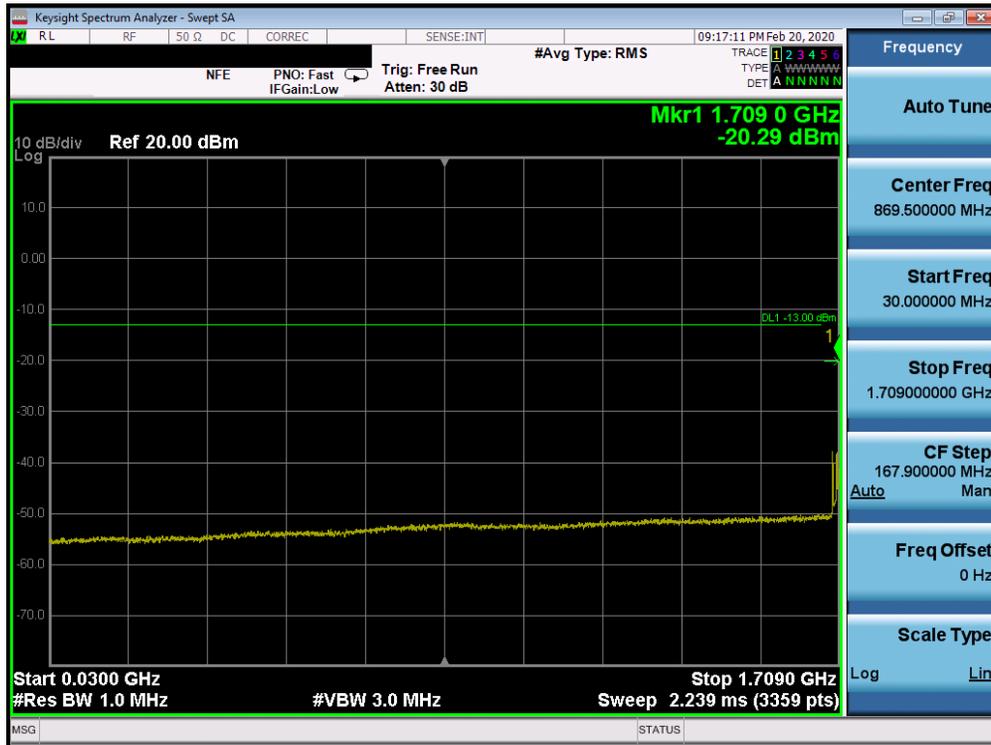
FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 65 of 211



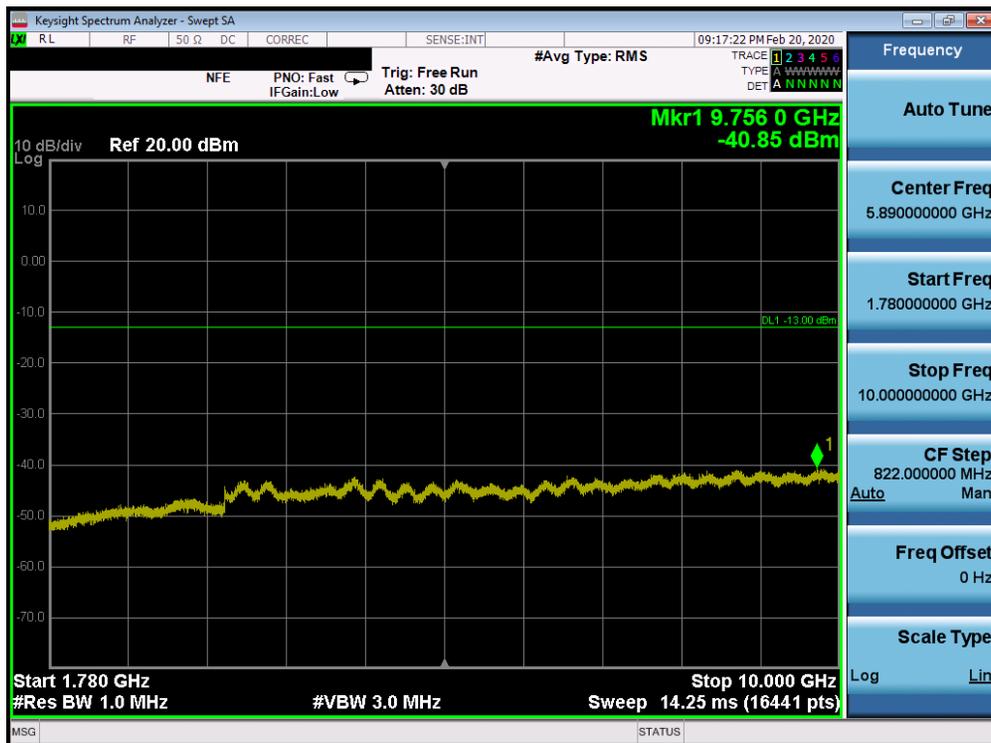
Plot 7-99. Conducted Spurious Plot (Band 5 - 10.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 66 of 211

**Band 66/4**

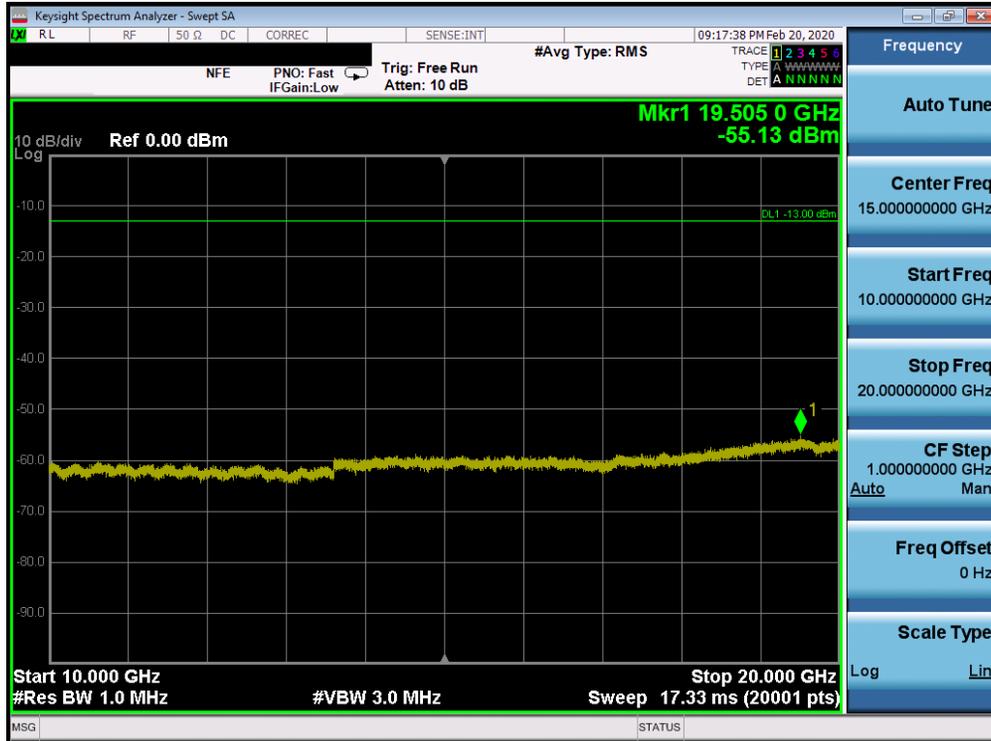


**Plot 7-100. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)**

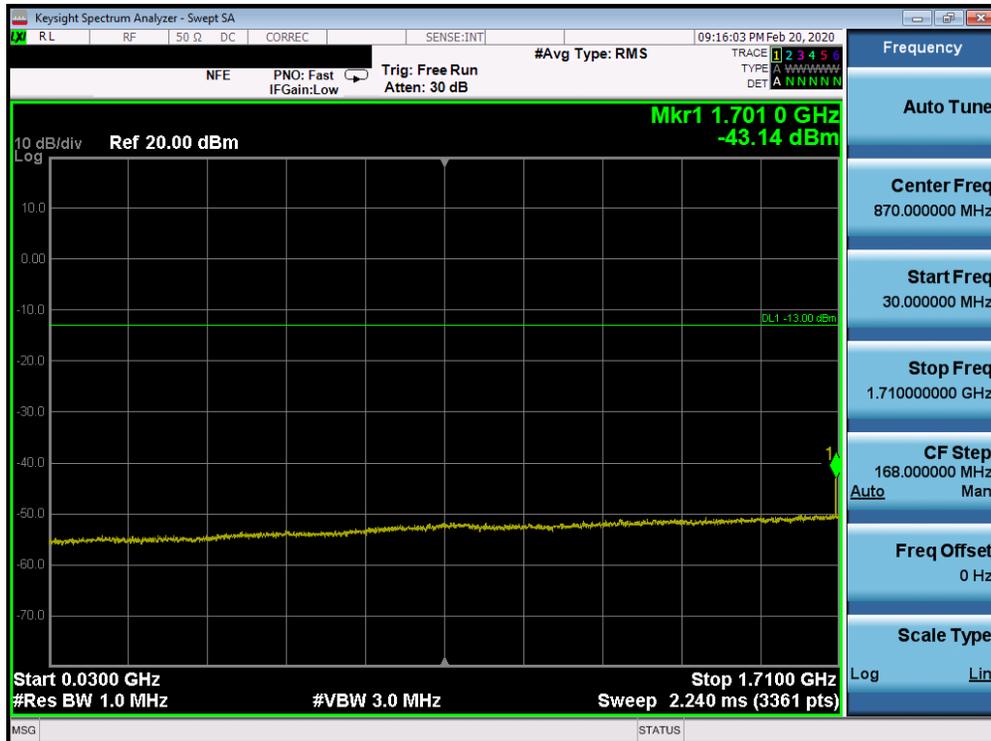


**Plot 7-101. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)**

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 67 of 211

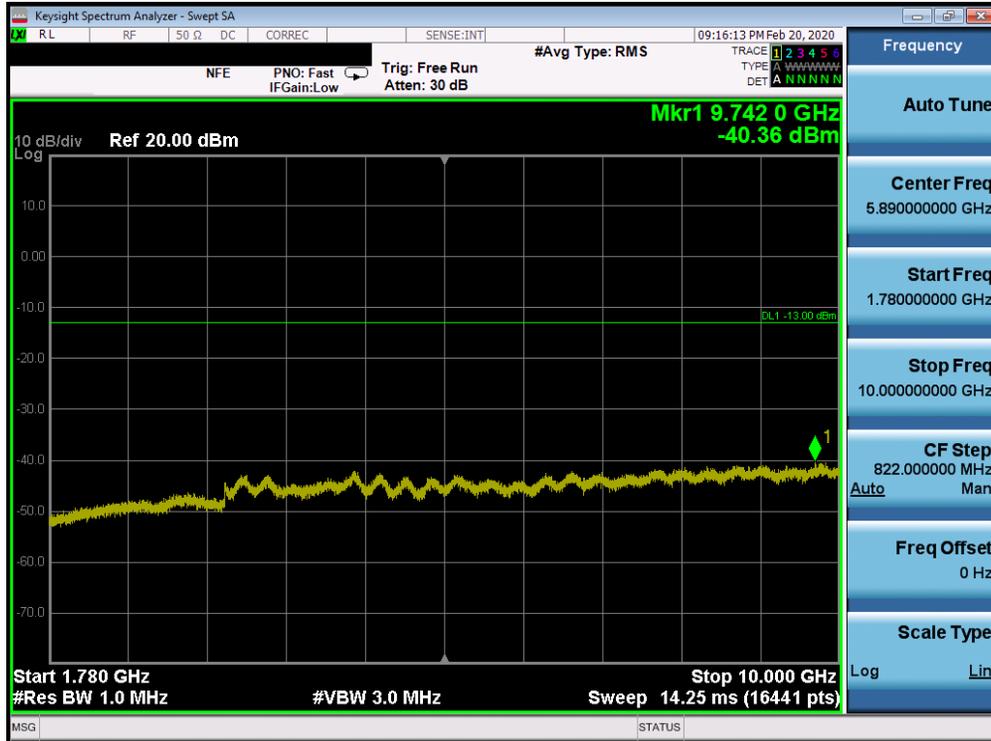


Plot 7-102. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

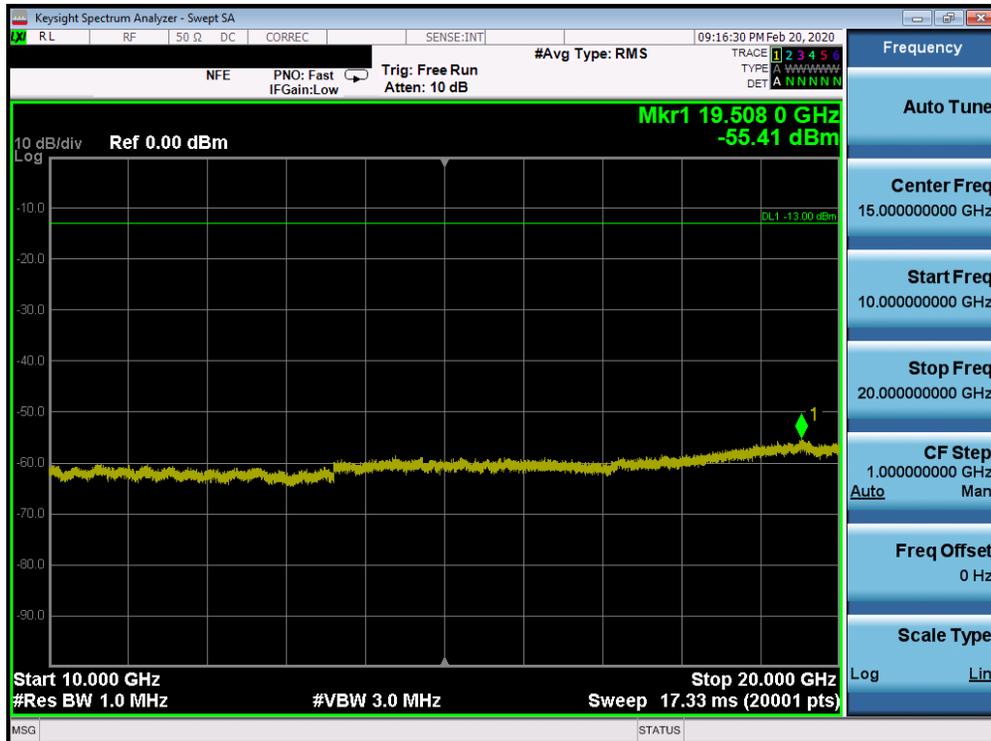


Plot 7-103. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 68 of 211



Plot 7-104. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

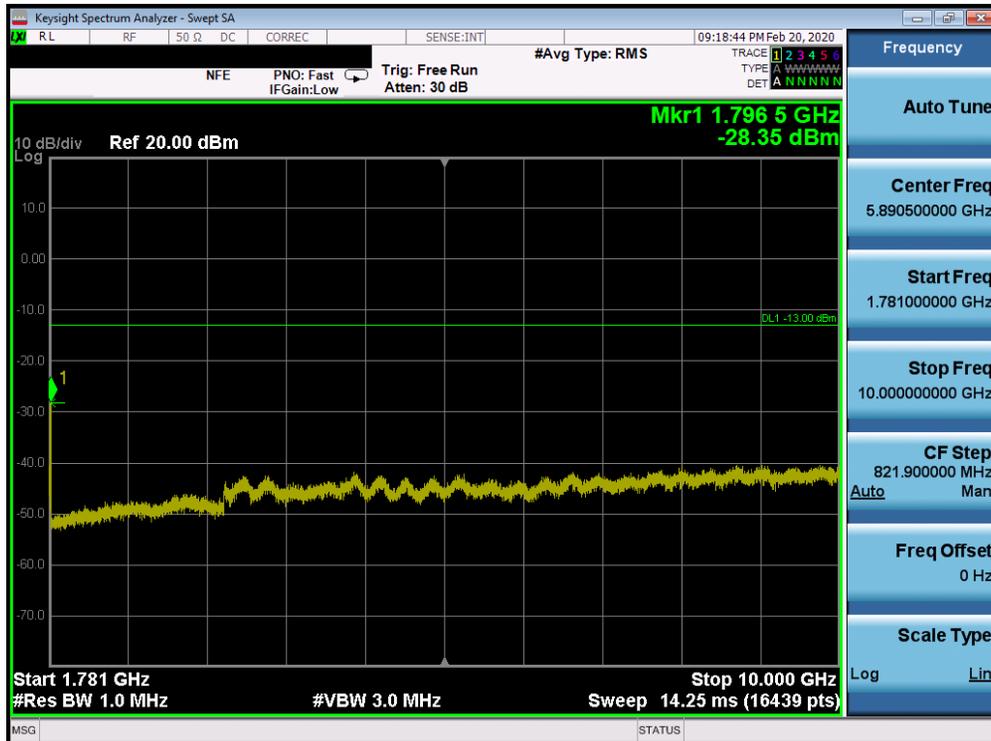


Plot 7-105. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: ZNFK300UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 69 of 211

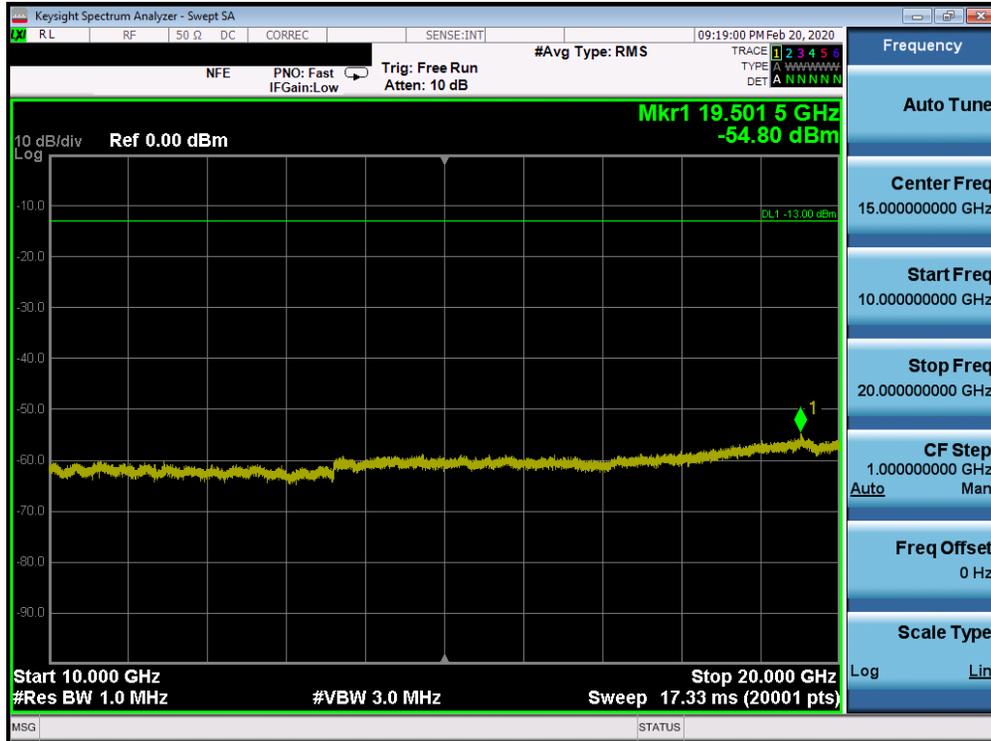


Plot 7-106. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)



Plot 7-107. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 70 of 211



Plot 7-108. Conducted Spurious Plot (Band 66/4 - 20.0MHz QPSK - RB Size 1, RB Offset 0 - High Channel)

FCC ID: ZNFK300UM	<b>PCTEST</b> Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2002170021-03-R1.ZNF	Test Dates: 2/17 - 3/16/2020	EUT Type: Portable Handset		Page 71 of 211