



# PCTEST ENGINEERING LABORATORY, INC.

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## MEASUREMENT REPORT FCC Part 22, 24, & 27 LTE

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

**Date of Testing:**  
9/24-9/27/2013  
**Test Site/Location:**  
PCTEST Lab., Columbia, MD, USA  
**Test Report Serial No.:**  
0Y1309161885.ZNF

<b>FCC ID :</b>	<b>ZNFD959</b>
<b>APPLICANT:</b>	<b>LG ELECTRONICS MOBILECOMM U.S.A</b>

**FCC Classification:** PCS Licensed Transmitter Held to Ear (PCE)  
**FCC Rule Part(s):** §2; §24; §27  
**EUT Type:** Portable Handset  
**Model(s):** LG-D959, D959, LGD959, LG-D959BK, D959BK, LGD959BK  
**Test Procedure(s):** ANSI/TIA-603-C-2004, KDB 971168 v02r01  
**Test Device Serial No.:** *identical prototype [S/N: LTE Radiated]*

Mode	Tx Frequency (MHz)	Emission Designator	Modulation	ERP/EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE Band 17	706.5 - 713.5	4M50G7D	QPSK	0.104	20.18
LTE Band 17	706.5 - 713.5	4M50W7D	16QAM	0.079	18.97
LTE Band 17	709 - 711	9M00G7D	QPSK	0.105	20.20
LTE Band 17	709 - 711	8M97W7D	16QAM	0.085	19.28
LTE Band 4	1712.5 - 1752.5	4M50G7D	QPSK	0.366	25.64
LTE Band 4	1712.5 - 1752.5	4M51W7D	16QAM	0.292	24.66
LTE Band 4	1715 - 1750	8M98G7D	QPSK	0.312	24.94
LTE Band 4	1715 - 1750	8M98W7D	16QAM	0.235	23.71
LTE Band 4	1717.5 - 1747.5	13M5G7D	QPSK	0.390	25.91
LTE Band 4	1717.5 - 1747.5	13M5W7D	16QAM	0.311	24.93
LTE Band 4	1720 - 1745	18M0G7D	QPSK	0.321	25.07
LTE Band 4	1720 - 1745	17M9W7D	16QAM	0.253	24.04
LTE Band 2	1852.5 - 1907.5	4M50G7D	QPSK	0.094	19.73
LTE Band 2	1852.5 - 1907.5	4M51W7D	16QAM	0.074	18.67
LTE Band 2	1855 - 1905	8M97G7D	QPSK	0.116	20.65
LTE Band 2	1855 - 1905	8M98W7D	16QAM	0.089	19.50

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 Ortaez  
President

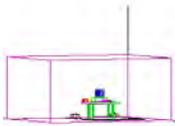


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<b>Test Report S/N:</b> 0Y1309161885.ZNF	<b>Test Dates:</b> 9/24-9/27/2013	<b>EUT Type:</b> Portable Handset		Page 1 of 89

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# MEASUREMENT REPORT

## FCC Part 22, 24, & 27

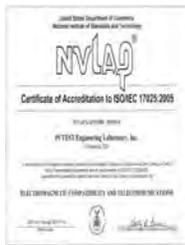
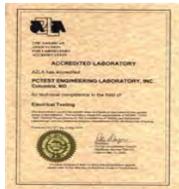


### §2.1033 General Information

**APPLICANT:** LG Electronics MobileComm U.S.A  
**APPLICANT ADDRESS:** 1000 Sylvan Avenue  
 Englewood Cliffs, NJ 07632, United States  
**TEST SITE:** PCTEST ENGINEERING LABORATORY, INC.  
**TEST SITE ADDRESS:** 6660-B Dobbin Road, Columbia, MD 21045 USA  
**FCC RULE PART(S):** §2; §24; §27  
**BASE MODEL:** LG-D959  
**FCC ID:** ZNFD959  
**FCC CLASSIFICATION:** PCS Licensed Transmitter Held to Ear (PCE)  
**FREQUENCY TOLERANCE:** ±0.00025 % (2.5 ppm)  
**Test Device Serial No.:** LTE Radiated     Production     Pre-Production     Engineering  
**DATE(S) OF TEST:** 9/24-9/27/2013  
**TEST REPORT S/N:** 0Y1309161885.ZNF

### Test Facility / Accreditations

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



- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451A-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451A-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

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# 1.0 INTRODUCTION

## 1.1 Scope

Measurement and determination of electromagnetic emissions (EME) 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 Industry Canada Certification and Engineering Bureau.

## 1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Intern't'l (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on January 10, 2012.

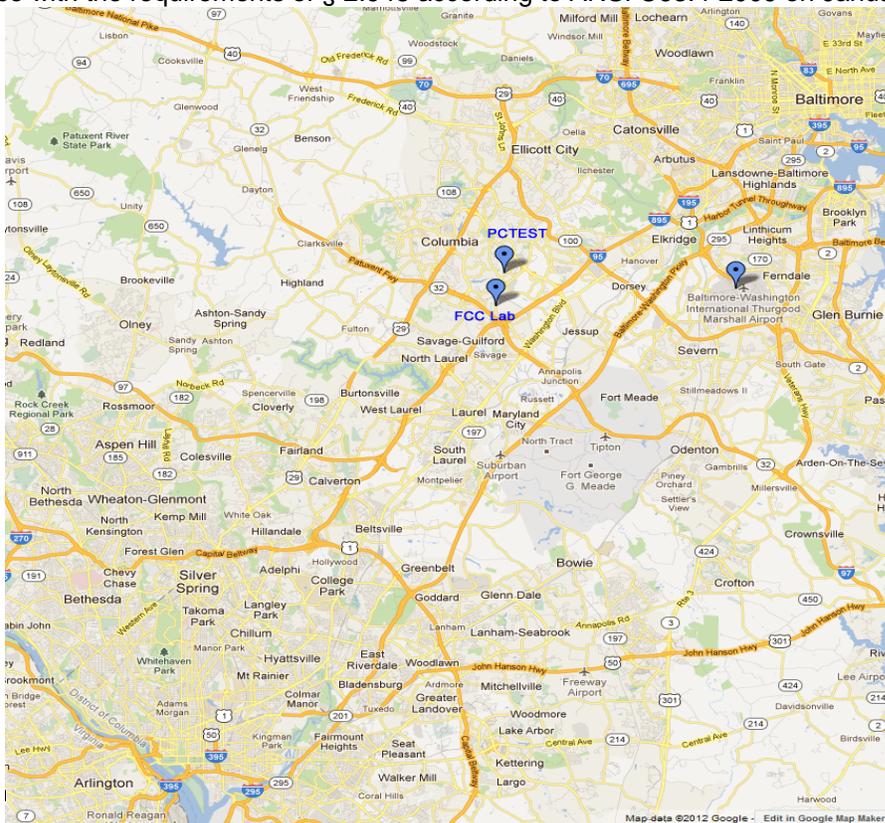


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **LGE Portable Handset FCC ID: ZNFD959**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function.

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Band 2 (5 and 10MHz BW), 4 (5, 10, 15, and 20MHz BW), and 17 (5 and 10MHz BW) LTE, 802.11a/b/g/n/ac WLAN (DTS/NII), Bluetooth (1x,EDR, LE), NFC

### 2.3 Test Configuration

The LGE Portable Handset FCC ID: ZNFD959 was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168 v02r01. See Section 6.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

### 2.4 EMI Suppression Device(s)/Modifications

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

### 2.5 Labeling Requirements

Per 2.925

The FCC identifier shall be permanently affixed to the equipment and shall be readily visible to the purchaser at the time of purchase.

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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-C-2004) and “Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems” (KDB 971168 v02r01) were used in the measurement of the **LGE Portable Handset FCC ID: ZNFD959**.

### 3.2 Block A Frequency Range

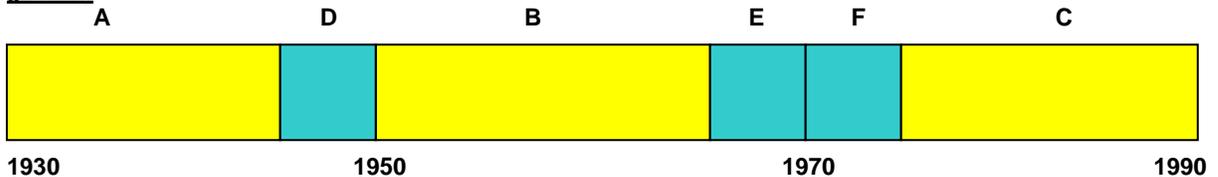
#### §27.5(c)

698-746 MHz band. 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 PCS - Base Frequency Blocks

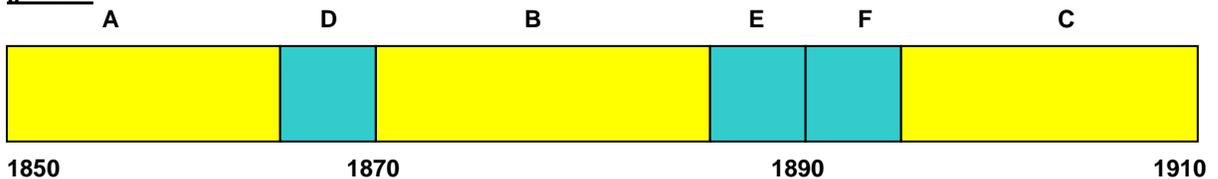
#### §24.229



BLOCK 1: 1930 – 1945 MHz (A)	BLOCK 4: 1965 – 1970 MHz (E)
BLOCK 2: 1945 – 1950 MHz (D)	BLOCK 5: 1970 – 1975 MHz (F)
BLOCK 3: 1950 – 1965 MHz (B)	BLOCK 6: 1975 – 1990 MHz (C)

### 3.4 PCS - Mobile Frequency Blocks

#### §24.229

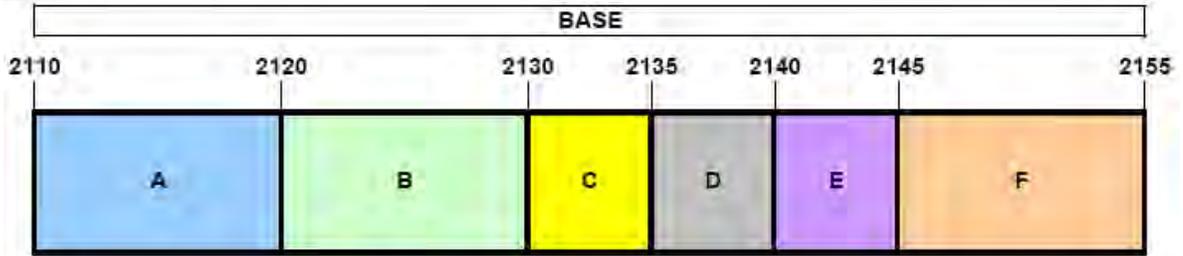


BLOCK 1: 1850 – 1865 MHz (A)	BLOCK 4: 1885 – 1890 MHz (E)
BLOCK 2: 1865 – 1870 MHz (D)	BLOCK 5: 1890 – 1895 MHz (F)
BLOCK 3: 1870 – 1885 MHz (B)	BLOCK 6: 1895 – 1910 MHz (C)

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### 3.5 AWS - Base Frequency Blocks

§27.5(h)

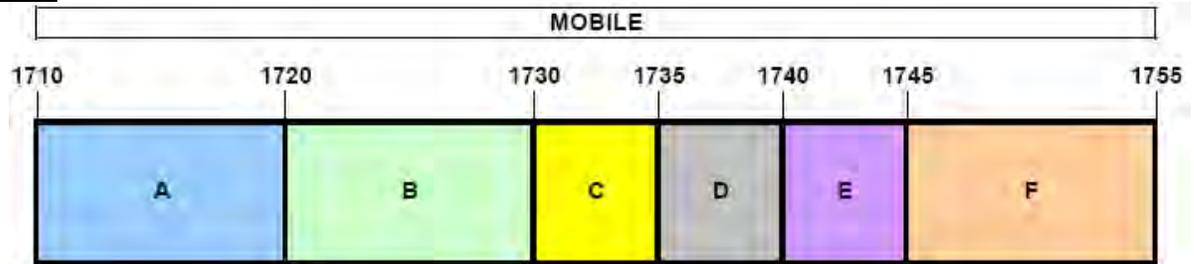


BLOCK 1: 2110 – 2120 MHz (A)  
 BLOCK 2: 2120 – 2130 MHz (B)  
 BLOCK 3: 2130 – 2135 MHz (C)

BLOCK 4: 2135 – 2140 MHz (D)  
 BLOCK 5: 2140 – 2145 MHz (E)  
 BLOCK 6: 2145 – 2155 MHz (F)

### 3.6 AWS - Mobile Frequency Blocks

§27.5(h)



BLOCK 1: 1710 – 1720 MHz (A)  
 BLOCK 2: 1720 – 1730 MHz (B)  
 BLOCK 3: 1730 – 1735 MHz (C)

BLOCK 4: 1735 – 1740 MHz (D)  
 BLOCK 5: 1740 – 1745 MHz (E)  
 BLOCK 6: 1745 – 1755 MHz (F)

### 3.7 Occupied Bandwidth

§2.1049 RSS-133(2.3) RSS-139(2.3)

The implementation of this test is performed by the spectrum analyzer's occupied bandwidth function. 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.

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### 3.8 Spurious and Harmonic Emissions at Antenna Terminal

**§2.1051 §24.238(a)(b) §27.53(g) §27.53(h) RSS-133(6.5.1) RSS-139(6.5.1)**

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. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for 698–746 MHz band, or 1 MHz or greater for PCS band, AWS band. 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 for PCS band, AWS band. 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.

### 3.9 Peak-Average Ratio

**§24.232(d) §27.50(d.5) RSS-133(6.4) RSS-139(6.4)**

A peak to average ratio measurement is performed at the conducted port of the EUT. For LTE signals, 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.

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### 3.10 Radiated Power and Radiated Spurious Emissions

§2.1053 §24.232(c) §24.238(a) §27.50(c.10) §27.50(d.4) §27.53(g) RSS-133(6.4) RSS-133(6.5.1) RSS-139(6.5.1)

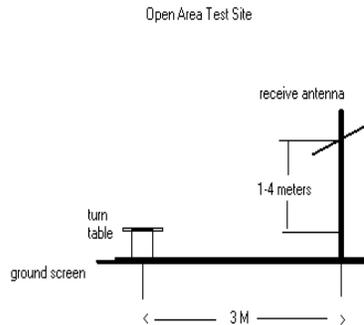
Radiated spurious emissions are investigated indoors in a semi-anechoic chamber to determine the frequencies producing the worst case emissions. Final measurements for radiated power and radiated spurious emissions are performed on the 3 meter OATS per the guidelines of ANSI/TIA-603-C-2004. The measurement area is situated on an 18 meter x 20 meter galvanized 1/2" hardware cloth as the conducting ground plane. This material is sewn together in sections 4 feet wide and 60 feet long. A total of eighteen sections are required to cover the entire measurement area. Sections are laid across the width of the pad, overlapped 1" and sewn and soldered together at intervals of 3" (7.6 cm.) The terrain of the test site is reasonably flat and level. Power and cable to the test site are buried 18" deep into the ground outside the perimeter of the site. An all-weather non-metallic housing is situated on a 2 x 3 meter area adjacent to the measurement area to house the test equipment. The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. 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. Emissions are also investigated with the receive antenna horizontally and vertically polarized. The level of the maximized emission is recorded with the spectrum analyzer using a peak detector with RBW = 1MHz, VBW = 3MHz for emissions greater than 1GHz. For emissions below 1GHz, the spectrum analyzer is set to RBW = 100kHz and VBW = 300kHz.

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:

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

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  $P_g \text{ [dBm]} - \text{cable loss [dB]}$ .

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  $43 + 10\log_{10}(\text{Power [Watts]})$  specified in 22.917(a), 24.238(a), and 27.53(g)(h).



**Figure 3-1. Diagram of 3-meter Test Range**

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### 3.11 Frequency Stability / Temperature Variation

§2.1055 §24.229 §24.235 §27.5(c) §27.5(h) §27.54 RSS-133(6.3) RSS-139(6.3)

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.

*Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block for Part 24 and 27. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5 ppm) of the center frequency for Part 22.*

**Time Period and Procedure:**

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 one minute 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 sufficient stabilization period at each temperature shall be used prior to each frequency requirement.

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## 4.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	3/29/2013	Annual	3/29/2014	N/A
-	LTx2	Licensed Transmitter Cable Set	1/17/2013	Annual	1/17/2014	N/A
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	4/17/2013	Annual	4/17/2014	3008A00985
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2012	Annual	10/10/2013	3613A00315
Agilent	N9020A	MXA Signal Analyzer	10/9/2012	Annual	10/9/2013	US46470561
Agilent	N9038A	MXE EMI Receiver	12/8/2012	Annual	12/8/2013	MY51210133
Agilent	N9030A	PXA Signal Analyzer (44GHz)	1/11/2013	Annual	1/11/2014	MY52350166
Agilent	8447D	Broadband Amplifier	5/31/2013	Annual	5/31/2014	1937A03348
Anritsu	MA2411B	Pulse Sensor	10/19/2012	Annual	10/19/2013	1027293
Anritsu	ML2495A	Power Meter	10/11/2012	Annual	10/11/2013	1039008
Emco	6502	Active Loop Antenna (10k - 30 MHz)	5/31/2012	Biennial	5/31/2014	267
Mini-Circuits	VHF-1300+	High Pass Filter	1/21/2013	Annual	1/21/2014	30716
Mini-Circuits	VHF-3100+	High Pass Filter	1/21/2013	Annual	1/21/2014	31144
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Biennial	10/7/2013	103962
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	10/3/2011	Biennial	10/3/2013	91052522TX
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	10/3/2011	Biennial	10/3/2013	91052523RX
Schwarzbeck	VULB-9161SE	Trilog Super Broadband Test Antenna	11/8/2011	Biennial	11/8/2013	9161-4075
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
Sunol	DRH-118	Horn Antenna (1 - 18GHz)	6/19/2013	Biennial	6/19/2015	A050307
Sunol	DRH-118	Horn Antenna (1-18 GHz)	6/19/2013	Biennial	6/19/2015	A042511

**Table 4-1. Test Equipment**

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## 5.0 SAMPLE CALCULATIONS

### Emission Designator

#### QPSK Modulation

**Emission Designator = 8M62G7D**

LTE BW = 8.62 MHz  
 G = Phase Modulation  
 7 = Quantized/Digital Info  
 D = Amplitude/Angle Modulated

#### 16QAM Modulation

**Emission Designator = 8M45W7D**

LTE BW = 8.45 MHz  
 W = Amplitude/Angle Modulated  
 7 = Quantized/Digital Info  
 D = Combination (Audio/Data)

### Spurious Radiated Emission – LTE Band

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

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

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## 6.0 TEST RESULTS

### 6.1 Summary

Company Name: LG Electronics MobileComm U.S.A  
 FCC ID: ZNFD959  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
<b>TRANSMITTER MODE (TX)</b>					
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.0, 8.0, 9.0
2.1051 24.238(a) 27.53(g) 27.53(h)	Band Edge / Conducted Spurious Emissions	$> 43 + 10\log_{10}(P[\text{Watts}])$ at Band Edge and for all out-of-band emissions		PASS	Section 7.0, 8.0, 9.0
24.232(d) 27.50(d.5)	Peak-Average Ratio	$< 13$ dB		PASS	Section 8.0, 9.0
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
27.50(c.10)	Effective Radiated Power (Band 17)	$< 3$ Watts max. ERP	RADIATED	PASS	Section 6.2
24.232(c)	Equivalent Isotropic Radiated Power (Band 2)	$< 2$ Watts max. EIRP		PASS	Section 6.3
27.50(d.4)	Equivalent Isotropic Radiated Power (Band 4)	$< 1$ Watts max. EIRP		PASS	Section 6.3
2.1053 24.238(a) 27.53(g) 27.53(h)	Undesirable Emissions	$> 43 + 10\log_{10}(P[\text{Watts}])$ for all out-of-band emissions		PASS	Section 6.4, 6.5, 6.6
2.1055. 24.235 27.54	Frequency Stability	$< 2.5$ ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)		PASS	Section 6.7, 6.8, 6.9

**Table 6-1. Summary of Test Results**

**Notes:**

- All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- The analyzer plots shown in Section 7.0 8.0 9.0 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.
- 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.

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## 6.2 Effective Radiated Power (ERP)

### §27.50(c.10)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	Margin [dB]
706.50	5	QPSK	Standard	1/0	21.13	-0.95	V	20.18	0.104	-14.59
710.00	5	QPSK	Standard	1/0	20.60	-0.95	V	19.65	0.092	-15.12
713.50	5	QPSK	Standard	1/24	20.07	-0.95	V	19.12	0.082	-15.65
706.50	5	16-QAM	Standard	1/0	19.92	-0.95	V	18.97	0.079	-15.80
710.00	5	16-QAM	Standard	1/0	19.26	-0.95	V	18.31	0.068	-16.46
713.50	5	16-QAM	Standard	1/24	19.09	-0.95	V	18.14	0.065	-16.63
709.00	10	QPSK	Standard	1/0	20.89	-0.95	V	19.94	0.099	-14.83
710.00	10	QPSK	Standard	1/0	20.28	-0.95	V	19.33	0.086	-15.44
711.00	10	QPSK	Standard	1/0	21.15	-0.95	V	20.20	0.105	-14.57
709.00	10	16-QAM	Standard	1/0	19.92	-0.95	V	18.97	0.079	-15.80
710.00	10	16-QAM	Standard	1/0	19.05	-0.95	V	18.10	0.065	-16.67
711.00	10	16-QAM	Standard	1/0	20.23	-0.95	V	19.28	0.085	-15.49

**Table 6-2. ERP Data (Band 17)**

#### **NOTES:**

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configurations were found with the EUT in the V positioning for Bands 17 and 2, and H2 positioning for Band 4. The data reported in the table above was measured in this test setup.

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### 6.3 Equivalent Isotropic Radiated Power (EIRP)

§24.232(c) §27.50(d.4) RSS-133(6.4) RSS-139(6.4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1712.50	5	QPSK	Standard	1/0	17.51	8.13	H2	25.64	0.366	-4.36
1732.50	5	QPSK	Standard	1/0	16.37	8.13	H2	24.50	0.282	-5.50
1752.50	5	QPSK	Standard	1/0	17.01	8.13	H2	25.14	0.326	-4.86
1712.50	5	16-QAM	Standard	1/0	16.53	8.13	H2	24.66	0.292	-5.34
1732.50	5	16-QAM	Standard	1/0	15.49	8.13	H2	23.62	0.230	-6.38
1752.50	5	16-QAM	Standard	1/0	16.14	8.13	H2	24.27	0.267	-5.73
1715.00	10	QPSK	Standard	1/0	16.81	8.13	H2	24.94	0.312	-5.06
1732.50	10	QPSK	Standard	1/0	16.51	8.13	H2	24.64	0.291	-5.36
1750.00	10	QPSK	Standard	1/49	16.71	8.13	H2	24.84	0.305	-5.16
1715.00	10	16-QAM	Standard	1/0	15.47	8.13	H2	23.60	0.229	-6.40
1732.50	10	16-QAM	Standard	1/49	15.49	8.13	H2	23.62	0.230	-6.38
1750.00	10	16-QAM	Standard	1/49	15.58	8.13	H2	23.71	0.235	-6.29
1717.50	15	QPSK	Standard	1/0	17.78	8.13	H2	25.91	0.390	-4.09
1732.50	15	QPSK	Standard	1/0	15.57	8.13	H2	23.70	0.234	-6.30
1747.50	15	QPSK	Standard	1/0	16.74	8.13	H2	24.87	0.307	-5.13
1717.50	15	16-QAM	Standard	1/0	16.80	8.13	H2	24.93	0.311	-5.07
1732.50	15	16-QAM	Standard	1/74	14.14	8.13	H2	22.27	0.169	-7.73
1747.50	15	16-QAM	Standard	1/0	15.69	8.13	H2	23.82	0.241	-6.18
1720.00	20	QPSK	Standard	1/0	16.54	8.13	H2	24.67	0.293	-5.33
1732.50	20	QPSK	Standard	1/99	16.14	8.13	H2	24.27	0.267	-5.73
1745.00	20	QPSK	Standard	1/99	16.94	8.13	H2	25.07	0.321	-4.93
1720.00	20	16-QAM	Standard	1/0	15.27	8.13	H2	23.40	0.219	-6.60
1732.50	20	16-QAM	Standard	1/99	14.92	8.13	H2	23.05	0.202	-6.95
1745.00	20	16-QAM	Standard	1/99	15.91	8.13	H2	24.04	0.253	-5.96

Table 6-3. EIRP Data (Band 4)

FCC ID: ZNFD959	 <b>FCC Pt. 22, 24, &amp; 27 LTE MEASUREMENT REPORT (CERTIFICATION)</b>			Reviewed by: Quality Manager
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Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1852.50	5	QPSK	Standard	1/0	11.71	8.02	V	19.73	0.094	-13.28
1880.00	5	QPSK	Standard	1/0	11.21	8.02	V	19.23	0.084	-13.78
1907.50	5	QPSK	Standard	1/0	10.62	8.02	V	18.64	0.073	-14.37
1852.50	5	16-QAM	Standard	1/0	10.65	8.02	V	18.67	0.074	-14.34
1880.00	5	16-QAM	Standard	1/0	10.33	8.02	V	18.35	0.068	-14.66
1907.50	5	16-QAM	Standard	1/0	9.83	8.02	V	17.85	0.061	-15.16
1855.00	10	QPSK	Standard	1/49	11.65	8.02	V	19.67	0.093	-13.34
1880.00	10	QPSK	Standard	1/0	11.92	8.02	V	19.94	0.099	-13.07
1905.00	10	QPSK	Standard	1/0	12.63	8.02	V	20.65	0.116	-12.36
1855.00	10	16-QAM	Standard	1/49	10.67	8.02	V	18.69	0.074	-14.32
1880.00	10	16-QAM	Standard	1/0	10.90	8.02	V	18.92	0.078	-14.09
1905.00	10	16-QAM	Standard	1/0	11.48	8.02	V	19.50	0.089	-13.51

**Table 6-4. EIRP Data (Band 2)**

**NOTES:**

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The worst case test configurations were found with the EUT in the V positioning for Bands 17 and 2, and H2 positioning for Band 4. The data reported in the table above was measured in this test setup.

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## 6.4 Band 17 Radiated Spurious Emissions §2.1053 §27.53(g)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 706.50 MHz  
 MEASURED OUTPUT POWER: 20.18 dBm = 0.104 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  33.18 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1413.00	-58.43	8.25	-50.18	V	70.36
2119.50	-59.11	9.05	-50.06	V	70.24
2826.00	-87.09	10.23	-76.86	V	97.04
3532.50	-83.60	9.83	-73.77	V	93.95
4239.00	-82.15	10.40	-71.75	V	91.93

Table 6-5. Radiated Spurious Data

#### NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configurations were found with the EUT in the V positioning for Bands 17 and 2, and H2 positioning for Band 4. The data reported in the table above was measured in this test setup.

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**Band 17 Radiated Spurious Measurements (continued)**  
**§2.1053 §27.53(g)**

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 710.00 MHz  
 MEASURED OUTPUT POWER: 19.65 dBm = 0.092 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  32.65 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1420.00	-58.09	8.26	-49.82	V	69.47
2130.00	-59.22	9.05	-50.17	V	69.82
2840.00	-87.05	10.24	-76.81	V	96.46
3550.00	-83.68	9.90	-73.78	V	93.43
4260.00	-82.23	10.48	-71.75	V	91.40

**Table 6-6. Radiated Spurious Data**

**NOTES:**

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configurations were found with the EUT in the V positioning for Bands 17 and 2, and H2 positioning for Band 4. The data reported in the table above was measured in this test setup.

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**Band 17 Radiated Spurious Measurements (continued)**  
**§2.1053 §27.53(g)**

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 713.50 MHz  
 MEASURED OUTPUT POWER: 19.12 dBm = 0.082 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  32.12 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1427.00	-58.02	8.28	-49.74	V	68.86
2140.50	-58.46	9.04	-49.42	V	68.54
2854.00	-87.02	10.25	-76.77	V	95.89
3567.50	-83.76	9.98	-73.78	V	92.90
4281.00	-82.30	10.56	-71.75	V	90.87

**Table 6-7. Radiated Spurious Data**

**NOTES:**

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configurations were found with the EUT in the V positioning for Bands 17 and 2, and H2 positioning for Band 4. The data reported in the table above was measured in this test setup.

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## 6.5 Band 4 Radiated Spurious Emissions

### §2.1053 §27.53(h) RSS-139(6.5.1)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1717.50 MHz  
 MEASURED OUTPUT POWER: 25.91 dBm = 0.390 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 15 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  38.91 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3435.00	-47.04	9.56	-37.48	H2	63.39
5152.50	-80.97	10.96	-70.01	H2	95.92
6870.00	-76.25	10.78	-65.46	H2	91.37
8587.50	-73.25	11.22	-62.03	H2	87.94
10305.00	-72.67	12.51	-60.16	H2	86.07

Table 6-8. Radiated Spurious Data

#### NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configurations were found with the EUT in the V positioning for Bands 17 and 2, and H2 positioning for Band 4. The data reported in the table above was measured in this test setup.

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**Band 4 Radiated Spurious Measurements (continued)**  
**§2.1053 §27.53(h) RSS-139(6.5.1)**

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 1732.50 MHz  
 MEASURED OUTPUT POWER: 23.70 dBm = 0.234 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 15 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  36.70 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3465.00	-47.94	9.63	-38.30	H2	62.00
5197.50	-54.72	10.93	-43.79	H2	67.48
6930.00	-76.30	10.88	-65.42	H2	89.12
8662.50	-73.31	11.45	-61.87	H2	85.57
10395.00	-72.53	12.58	-59.95	H2	83.64

**Table 6-9. Radiated Spurious Data**

**NOTES:**

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configurations were found with the EUT in the V positioning for Bands 17 and 2, and H2 positioning for Band 4. The data reported in the table above was measured in this test setup.

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**Band 4 Radiated Spurious Measurements (continued)**  
**§2.1053 §27.53(h) RSS-139(6.5.1)**

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 1747.50 MHz  
 MEASURED OUTPUT POWER: 24.87 dBm = 0.307 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 15 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  37.87 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3495.00	-46.07	9.73	-36.35	H2	61.21
5242.50	-54.52	11.00	-43.52	H2	68.39
6990.00	-76.50	11.06	-65.45	H2	90.31
8737.50	-73.30	11.62	-61.68	H2	86.54
10485.00	-72.37	12.63	-59.73	H2	84.60

**Table 6-10. Radiated Spurious Data**

**NOTES:**

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configurations were found with the EUT in the V positioning for Bands 17 and 2, and H2 positioning for Band 4. The data reported in the table above was measured in this test setup.

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## 6.6 Band 2 Radiated Spurious Emissions

### §2.1053 §24.238(a) RSS-133(6.5.1)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1855.00 MHz  
 MEASURED OUTPUT POWER: 19.67 dBm = 0.093 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  32.67 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3710.00	-49.32	9.89	-39.42	V	59.09
5565.00	-53.15	11.14	-42.02	V	61.69
7420.00	-74.96	10.78	-64.18	V	83.85
9275.00	-74.01	12.30	-61.71	V	81.38
11130.00	-70.96	12.89	-58.07	V	77.74

Table 6-11. Radiated Spurious Data

#### NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configurations were found with the EUT in the V positioning for Bands 17 and 2, and H2 positioning for Band 4. The data reported in the table above was measured in this test setup.

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**Band 2 Radiated Spurious Measurements (continued)**  
**§2.1053 §24.238(a) RSS-133(6.5.1)**

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 1880.00 MHz  
 MEASURED OUTPUT POWER: 19.94 dBm = 0.099 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  32.94 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-49.96	9.70	-40.26	V	60.20
5640.00	-52.96	11.25	-41.71	V	61.65
7520.00	-75.16	10.99	-64.17	V	84.11
9400.00	-73.83	12.26	-61.57	V	81.51
11280.00	-70.70	12.95	-57.75	V	77.69

**Table 6-12. Radiated Spurious Data**

**NOTES:**

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configurations were found with the EUT in the V positioning for Bands 17 and 2, and H2 positioning for Band 4. The data reported in the table above was measured in this test setup.

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Band 2 Radiated Spurious Measurements (continued)**  
**§2.1053 §24.238(a) RSS-133(6.5.1)**

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 1905.00 MHz  
 MEASURED OUTPUT POWER: 20.65 dBm = 0.116 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 10 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) =$  33.65 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3810.00	-50.37	9.51	-40.86	V	61.51
5715.00	-52.01	11.29	-40.71	V	61.36
7620.00	-75.41	11.20	-64.21	V	84.86
9525.00	-73.76	12.30	-61.46	V	82.11
11430.00	-70.15	13.08	-57.07	V	77.72

**Table 6-13. Radiated Spurious Data**

**NOTES:**

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configurations were found with the EUT in the V positioning for Bands 17 and 2, and H2 positioning for Band 4. The data reported in the table above was measured in this test setup.

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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## 6.7 Band 17 Frequency Stability Measurements

\$2.1055 \$22.355 \$27.54

OPERATING FREQUENCY: 710,000,000 Hz  
 CHANNEL: 23090  
 REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	709,999,981	-19	-0.0000027
100 %		- 30	709,999,983	-17	-0.0000024
100 %		- 20	709,999,997	-3	-0.0000005
100 %		- 10	709,999,987	-13	-0.0000018
100 %		0	709,999,992	-8	-0.0000012
100 %		+ 10	709,999,998	-2	-0.0000003
100 %		+ 20	709,999,982	-18	-0.0000026
100 %		+ 30	709,999,992	-8	-0.0000011
100 %		+ 40	709,999,991	-9	-0.0000013
100 %		+ 50	709,999,993	-7	-0.0000010
115 %	4.37	+ 20	709,999,994	-6	-0.0000009
BATT. ENDPOINT	3.40	+ 20	709,999,990	-10	-0.0000015

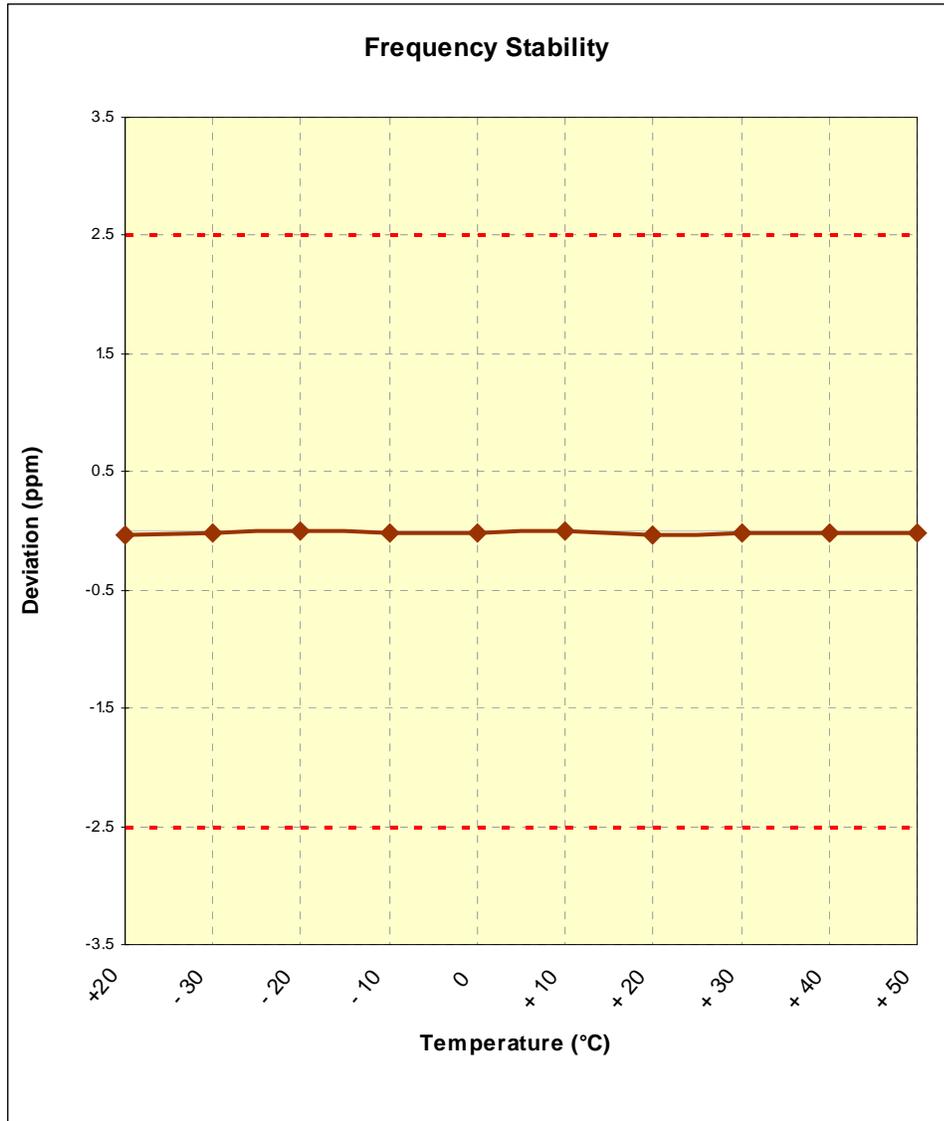
**Table 6-14. Frequency Stability Data (Band 17)**

**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.

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Band 17 Frequency Stability Measurements (Cont'd)**  
§2.1055 §22.355 §27.54



**Figure 6-1. Frequency Stability Graph (Band 17)**

<b>FCC ID:</b> ZNFD959		<b>FCC Pt. 22, 24, &amp; 27 LTE MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1309161885.ZNF	<b>Test Dates:</b> 9/24-9/27/2013	<b>EUT Type:</b> Portable Handset	Page 27 of 89	

## 6.8 Band 4 Frequency Stability Measurements

§2.1055 §27.54 RSS-139(6.3)

OPERATING FREQUENCY: 1,732,500,000 Hz  
 CHANNEL: 20175  
 REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,499,993	-7	-0.0000004
100 %		- 30	1,732,499,995	-5	-0.0000003
100 %		- 20	1,732,499,993	-7	-0.0000004
100 %		- 10	1,732,499,984	-16	-0.0000009
100 %		0	1,732,499,990	-10	-0.0000006
100 %		+ 10	1,732,499,992	-8	-0.0000005
100 %		+ 20	1,732,499,994	-6	-0.0000003
100 %		+ 30	1,732,499,983	-17	-0.0000010
100 %		+ 40	1,732,499,984	-16	-0.0000009
100 %		+ 50	1,732,499,997	-3	-0.0000002
115 %	4.37	+ 20	1,732,500,000	0	0.0000000
BATT. ENDPOINT	3.40	+ 20	1,732,499,983	-17	-0.0000010

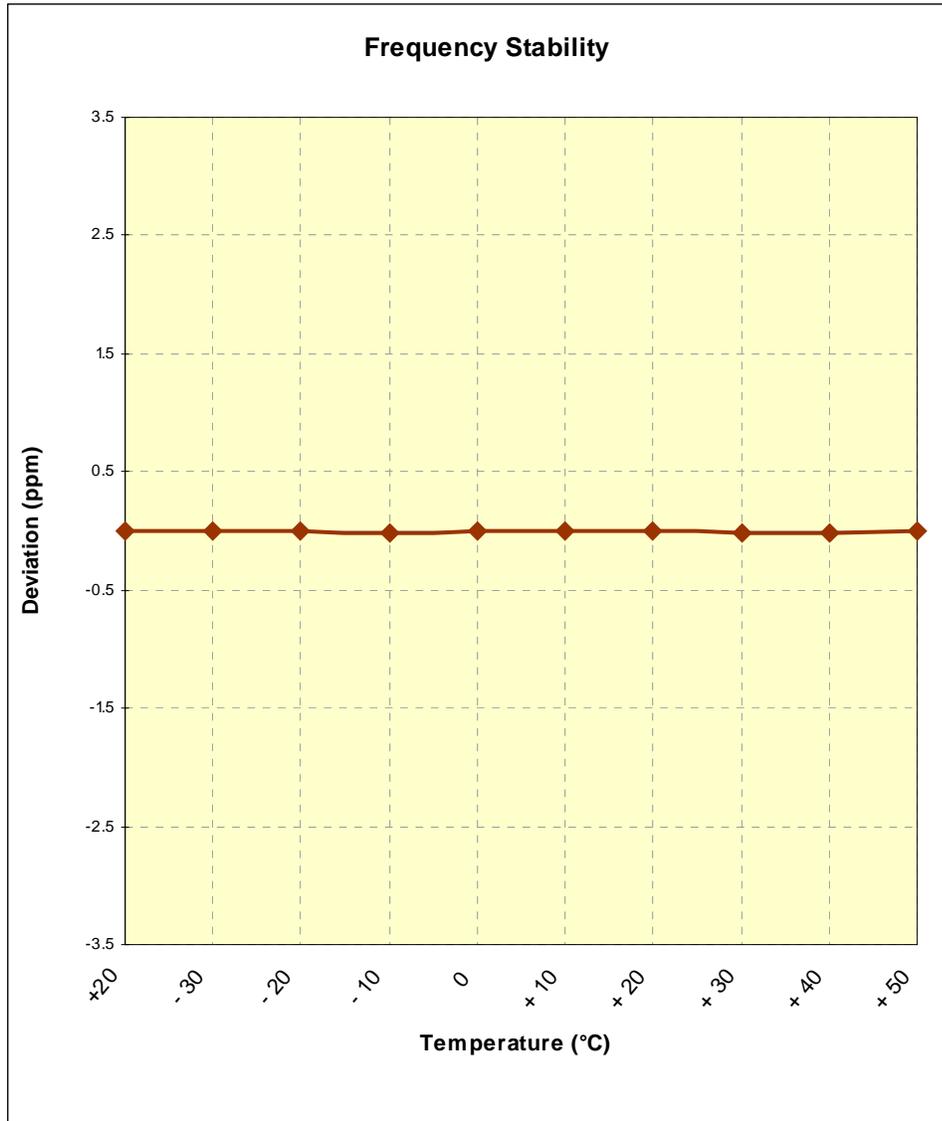
**Table 6-15. Frequency Stability Data (Band 4)**

**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.

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Band 4 Frequency Stability Measurements (Cont'd)**  
**§2.1055 §§27.54 RSS-139(6.3)**



**Figure 6-2. Frequency Stability Graph (Band 4)**

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## 6.9 Band 2 Frequency Stability Measurements

§2.1055 §24.235 RSS-133(6.3)

OPERATING FREQUENCY: 1,880,000,000 Hz  
 CHANNEL: 18900  
 REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,987	-13	-0.0000007
100 %		- 30	1,879,999,989	-11	-0.0000006
100 %		- 20	1,879,999,981	-19	-0.0000010
100 %		- 10	1,879,999,983	-17	-0.0000009
100 %		0	1,879,999,994	-6	-0.0000003
100 %		+ 10	1,879,999,995	-5	-0.0000002
100 %		+ 20	1,879,999,996	-4	-0.0000002
100 %		+ 30	1,879,999,997	-3	-0.0000001
100 %		+ 40	1,879,999,993	-7	-0.0000004
100 %		+ 50	1,879,999,996	-4	-0.0000002
115 %	4.37	+ 20	1,879,999,996	-4	-0.0000002
BATT. ENDPOINT	3.40	+ 20	1,879,999,988	-12	-0.0000006

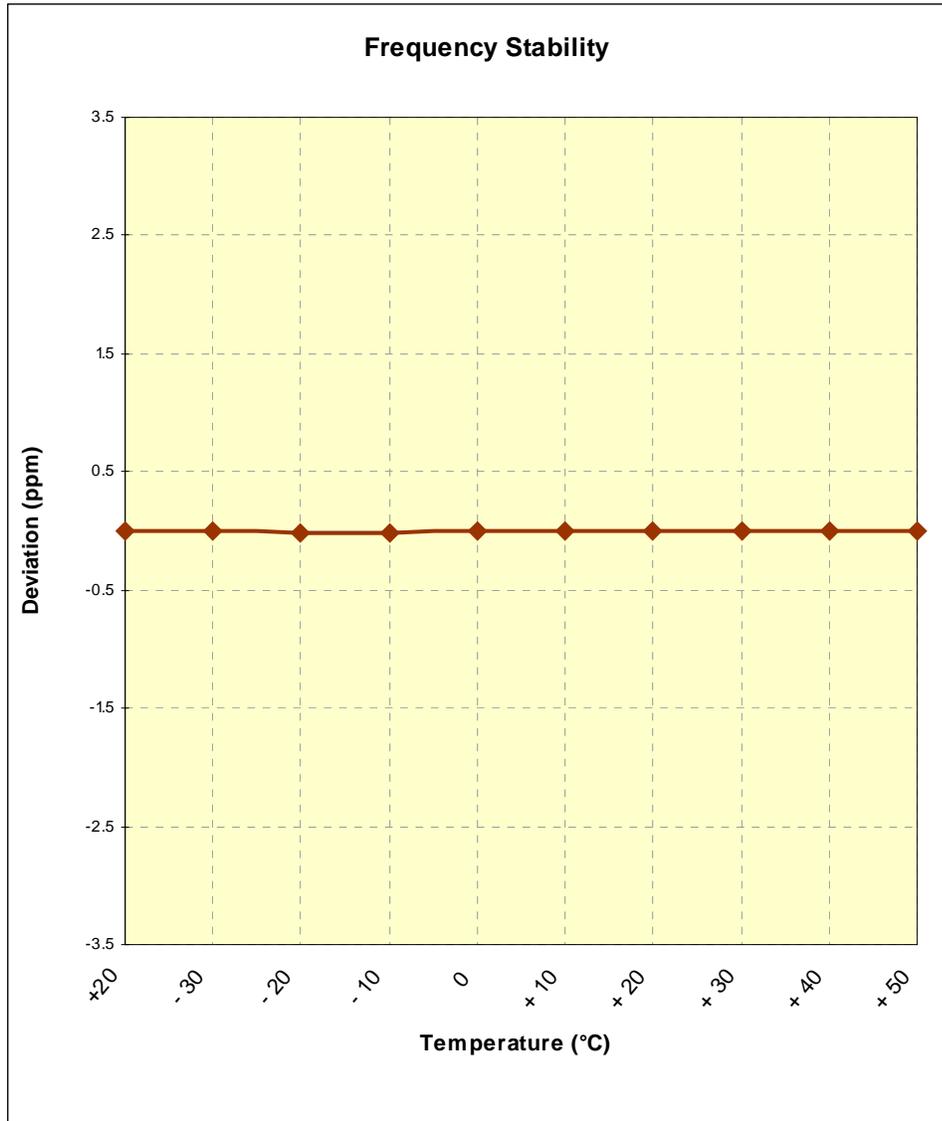
**Table 6-16. Frequency Stability Data (Band 2)**

**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.

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Band 2 Frequency Stability Measurements (Cont'd)**  
**§2.1055 §24.235 RSS-133(6.3)**



**Figure 6-3. Frequency Stability Graph (Band 2)**

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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## 7.0 BAND 17 PLOTS OF EMISSIONS

**Note:** All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.



**Plot 7-1. Lower Band Edge Plot (5.0MHz QPSK – RB Size 25)**

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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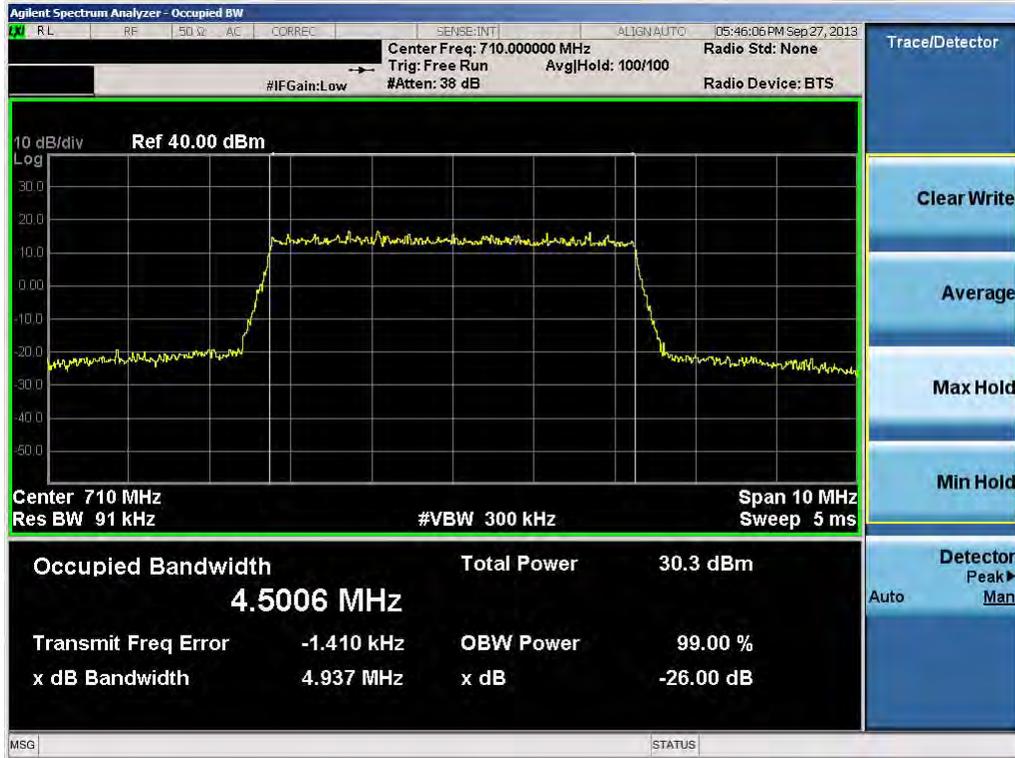


Plot 7-2. Lower Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)

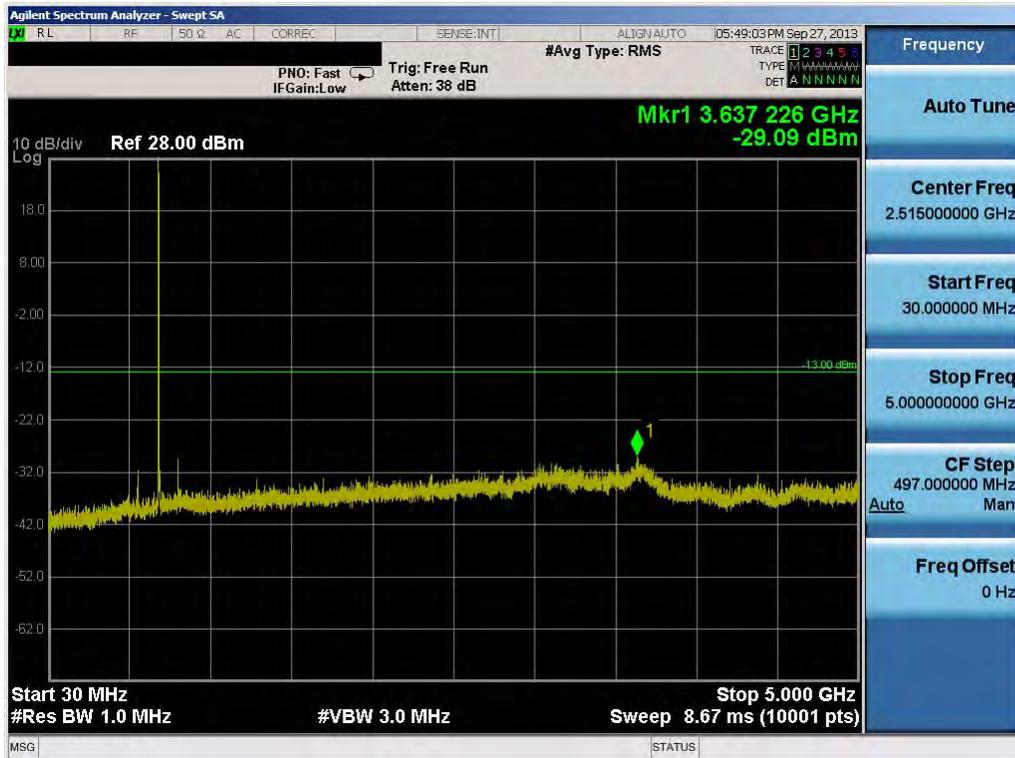


Plot 7-3. Occupied Bandwidth Plot (5.0MHz QPSK – RB Size 25)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 33 of 89

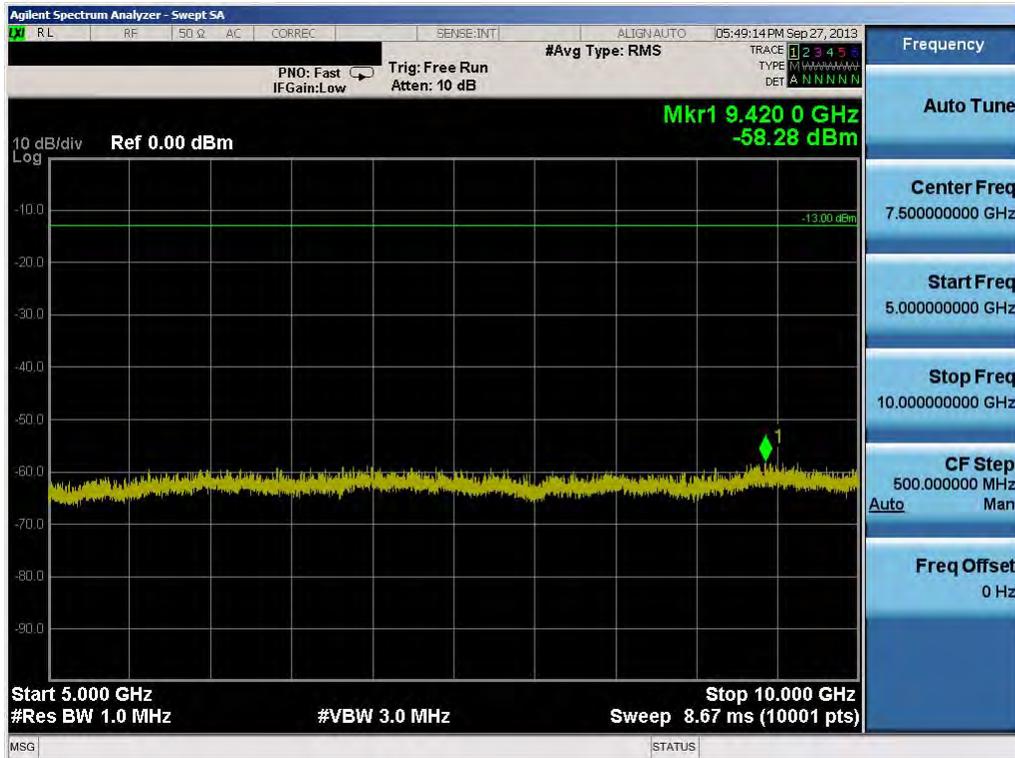


Plot 7-4. Occupied Bandwidth Plot (5.0MHz 16-QAM – RB Size 25)

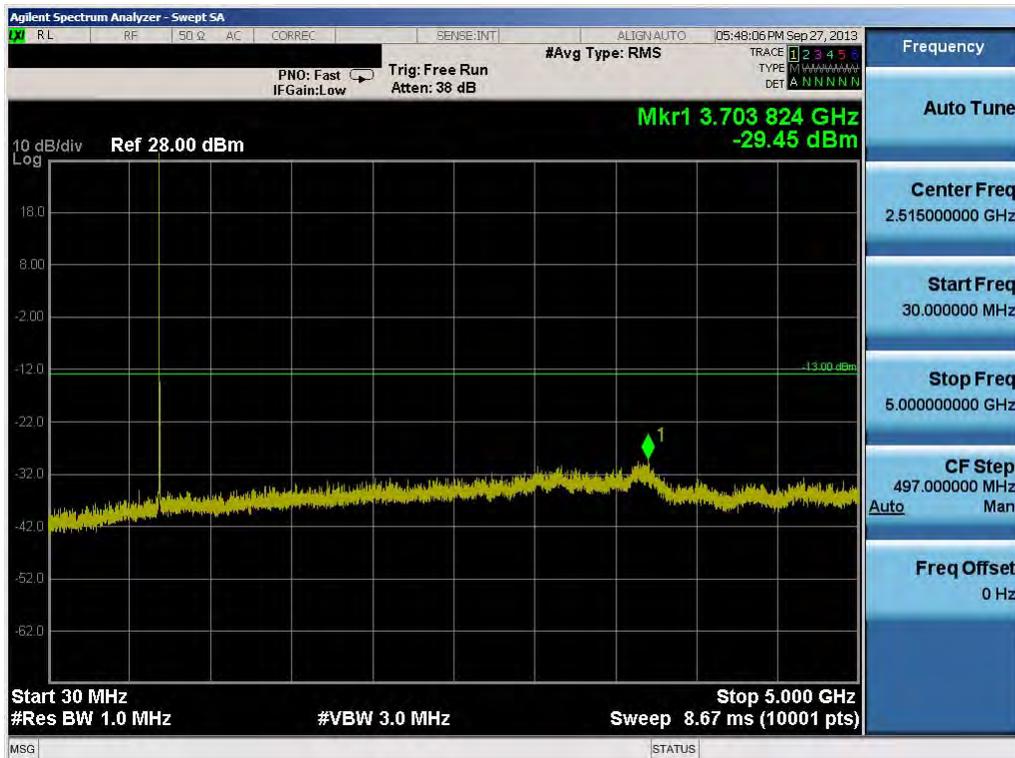


Plot 7-5. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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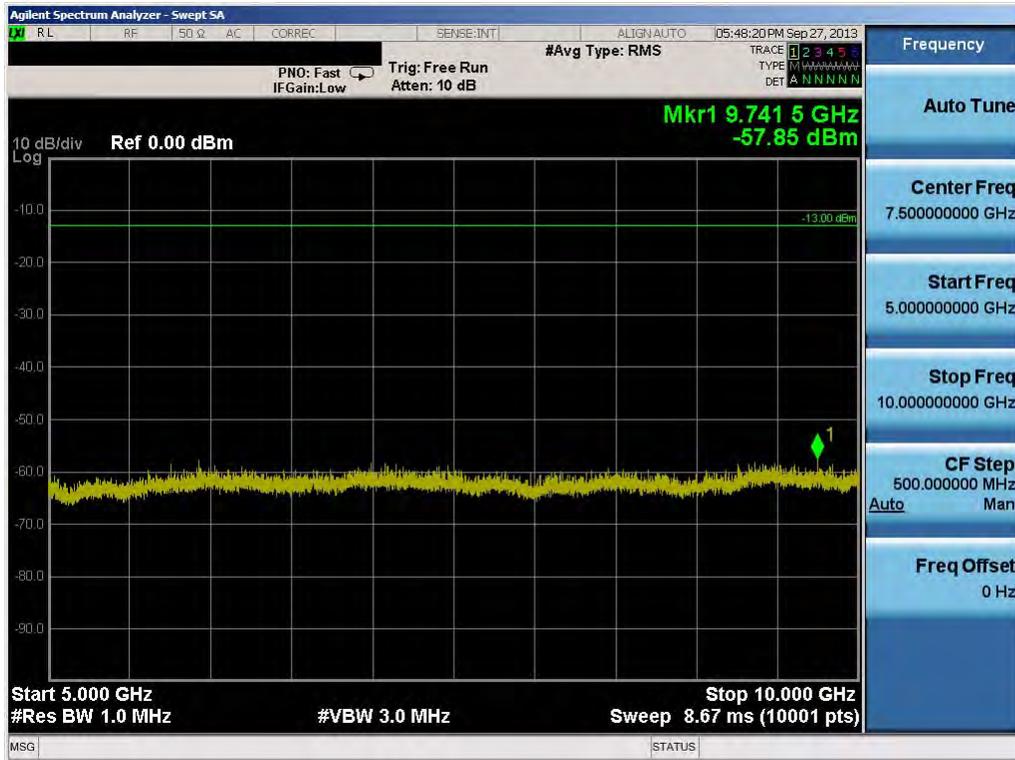


Plot 7-6. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

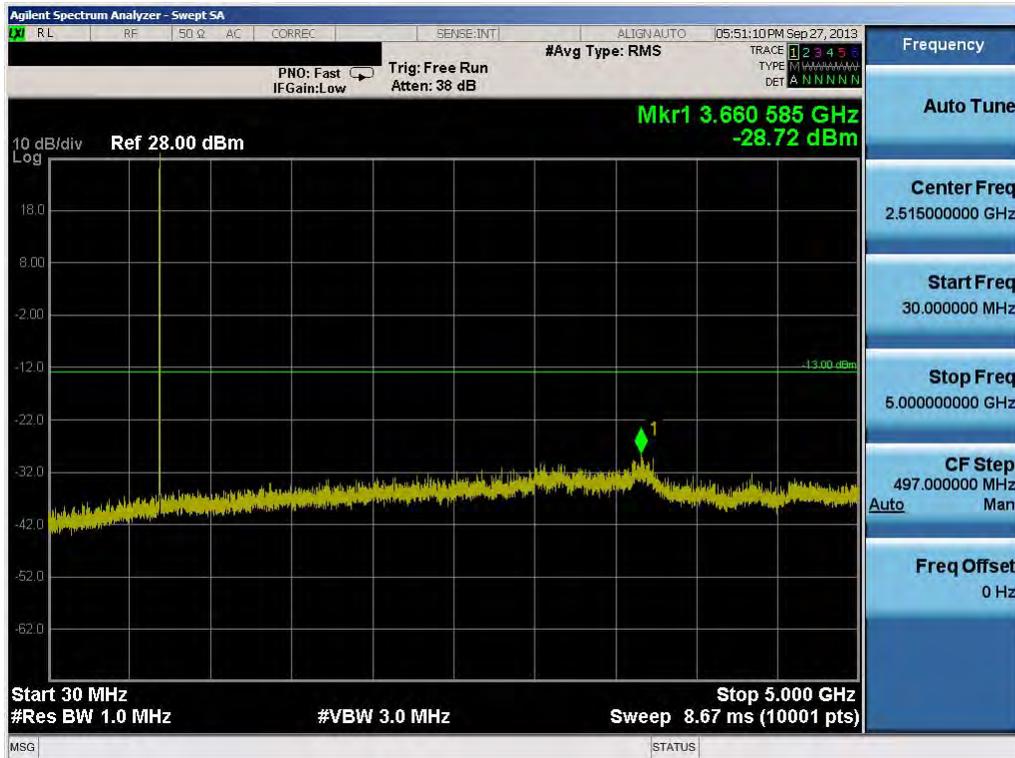


Plot 7-7. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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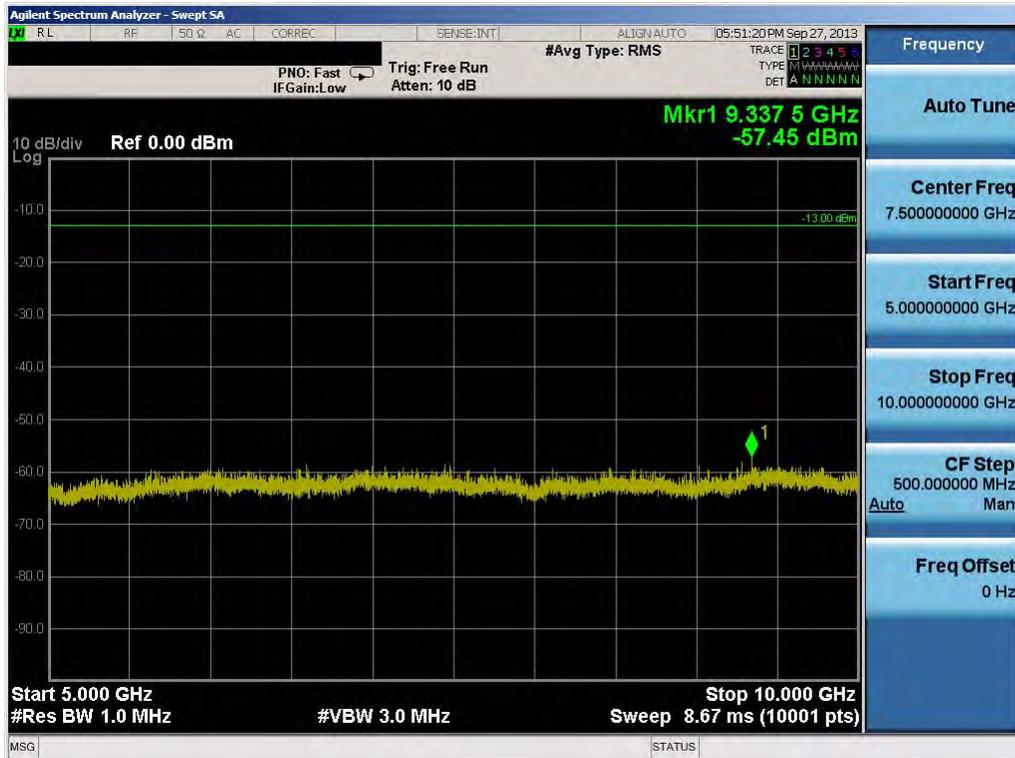


Plot 7-8. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-9. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 7-10. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-11. Upper Band Edge Plot (5.0MHz QPSK – RB Size 25)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Plot 7-12. Upper Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)



Plot 7-13. Lower Band Edge Plot (10.0MHz QPSK – RB Size 50)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 38 of 89



Plot 7-14. Lower Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)

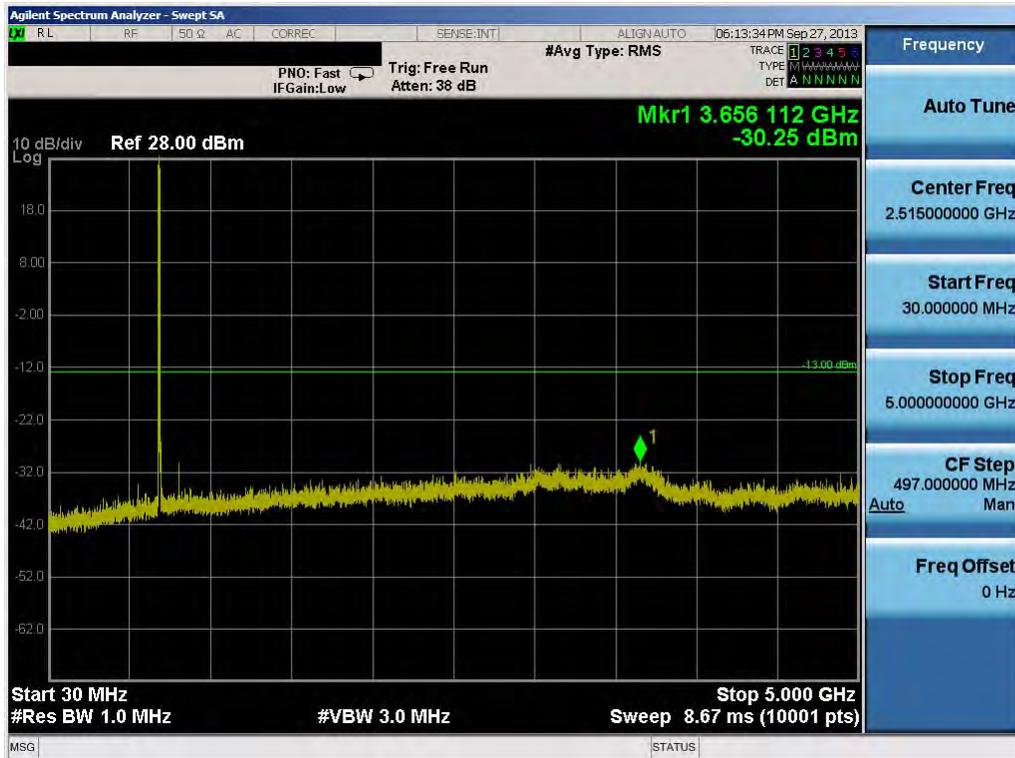


Plot 7-15. Occupied Bandwidth Plot (10.0MHz QPSK – RB Size 50)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 39 of 89

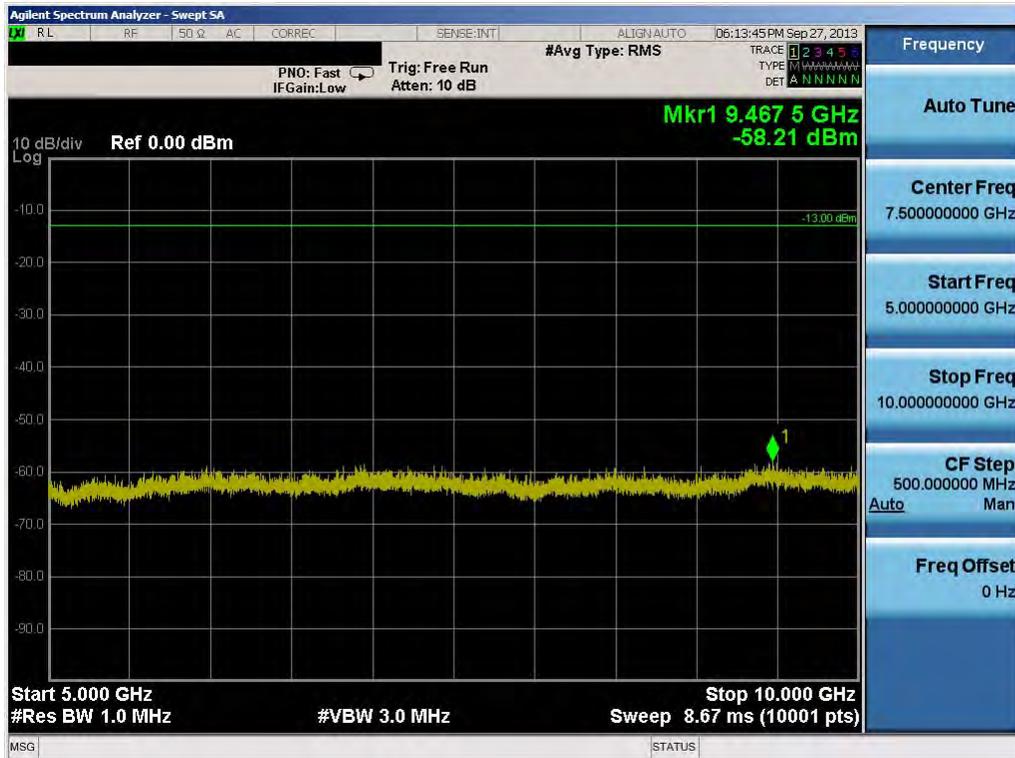


Plot 7-16. Occupied Bandwidth Plot (10.0MHz 16-QAM – RB Size 50)

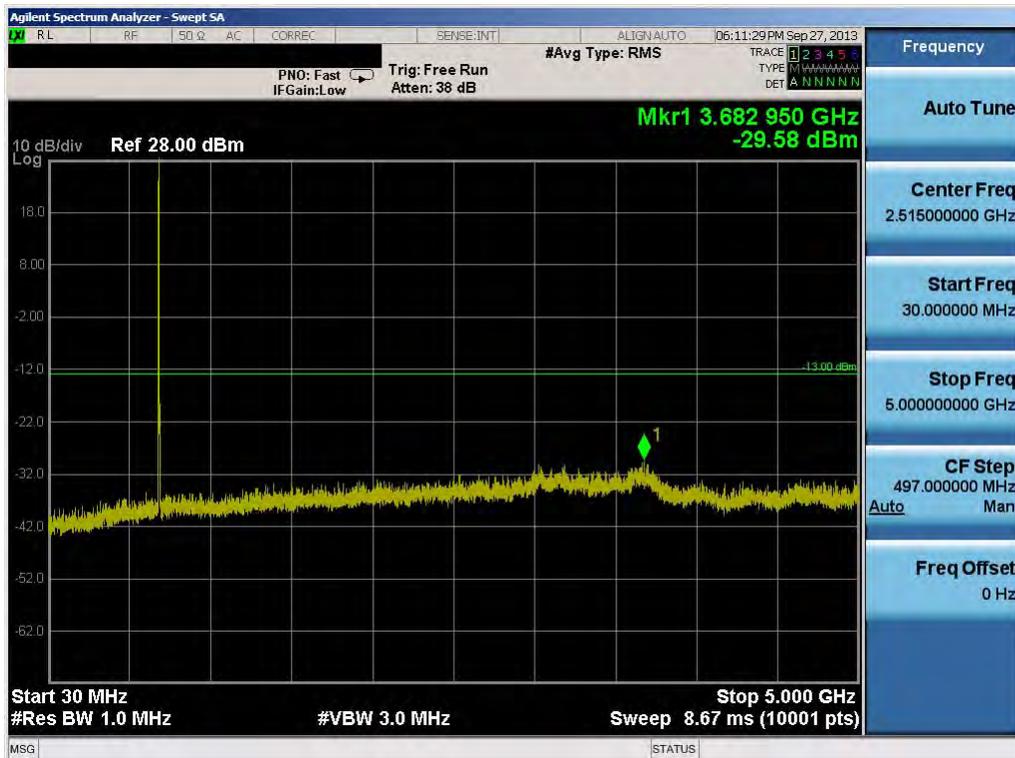


Plot 7-17. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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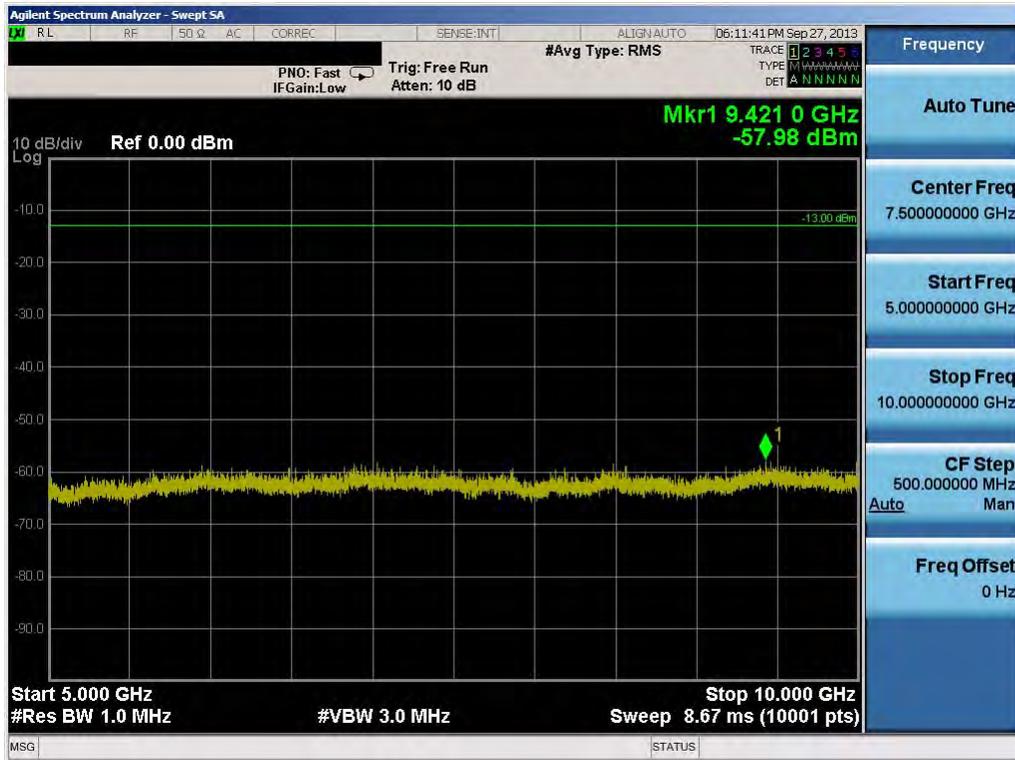


Plot 7-18. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

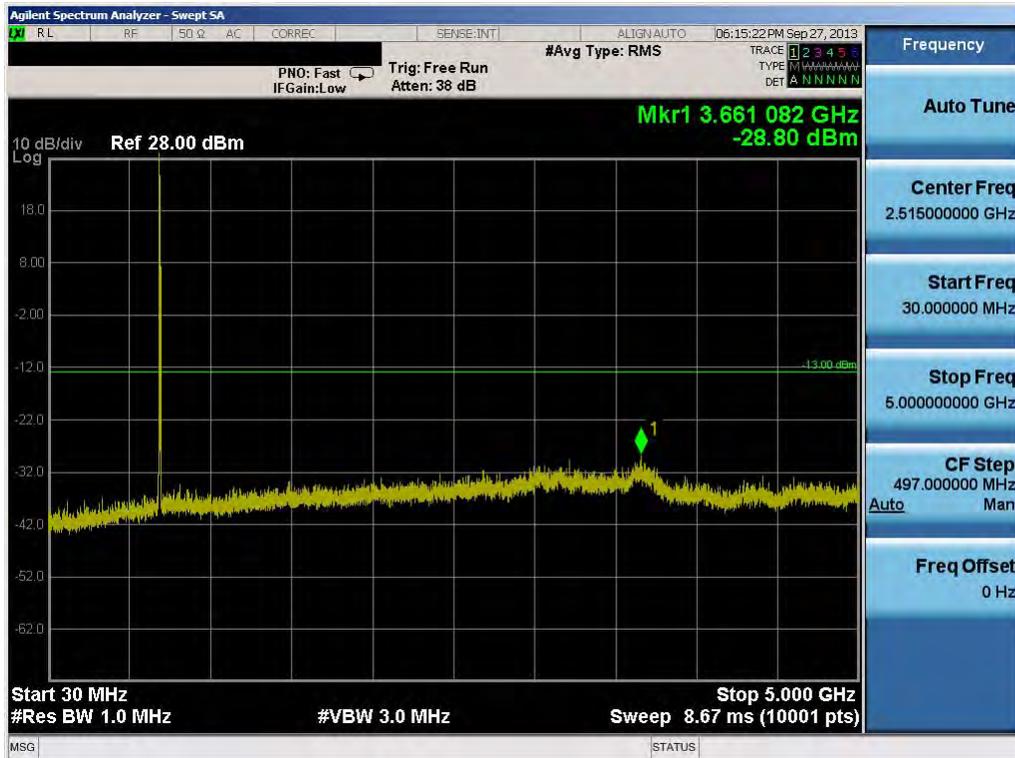


Plot 7-19. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 41 of 89

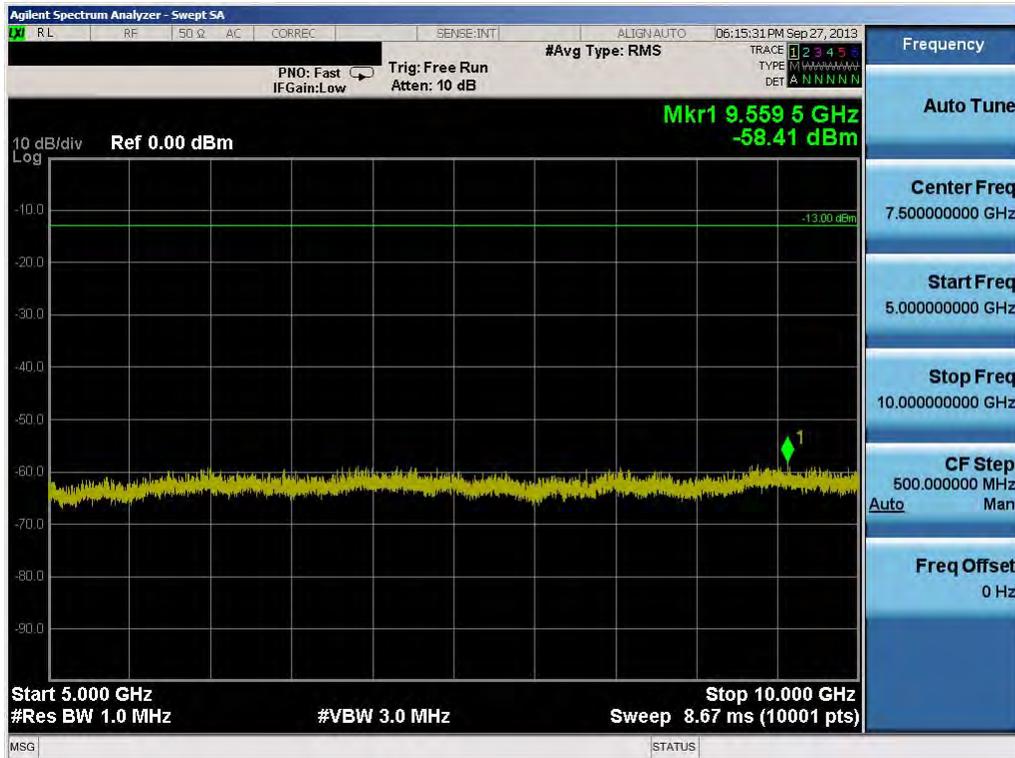


Plot 7-20. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 7-21. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 7-22. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-23. Upper Band Edge Plot (10.0MHz QPSK – RB Size 50)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 43 of 89



Plot 7-24. Upper Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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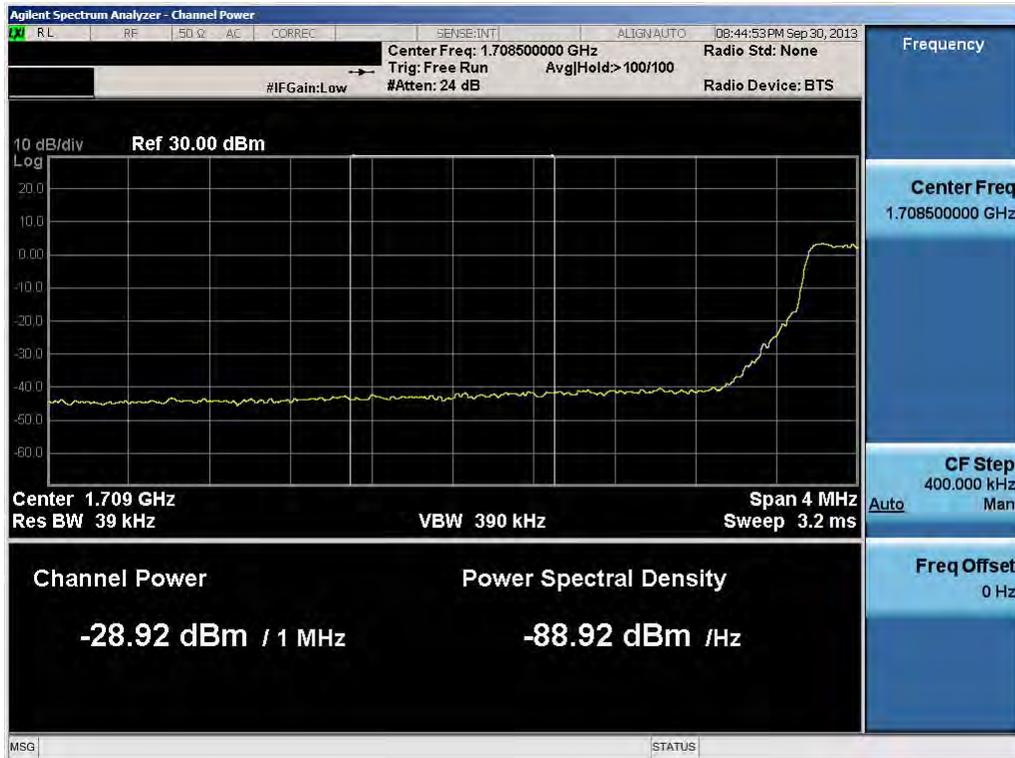
## 8.0 BAND 4 PLOTS OF EMISSIONS

**Note:** All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.

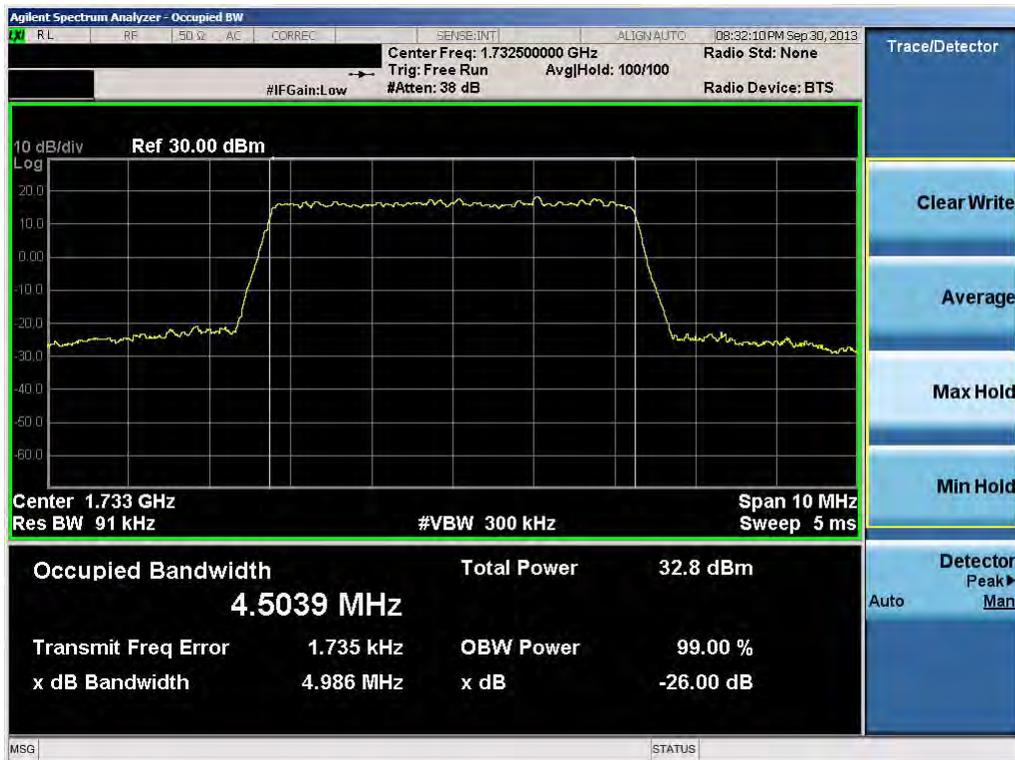


**Plot 8-1. Lower Band Edge Plot (5.0MHz QPSK – RB Size 25)**

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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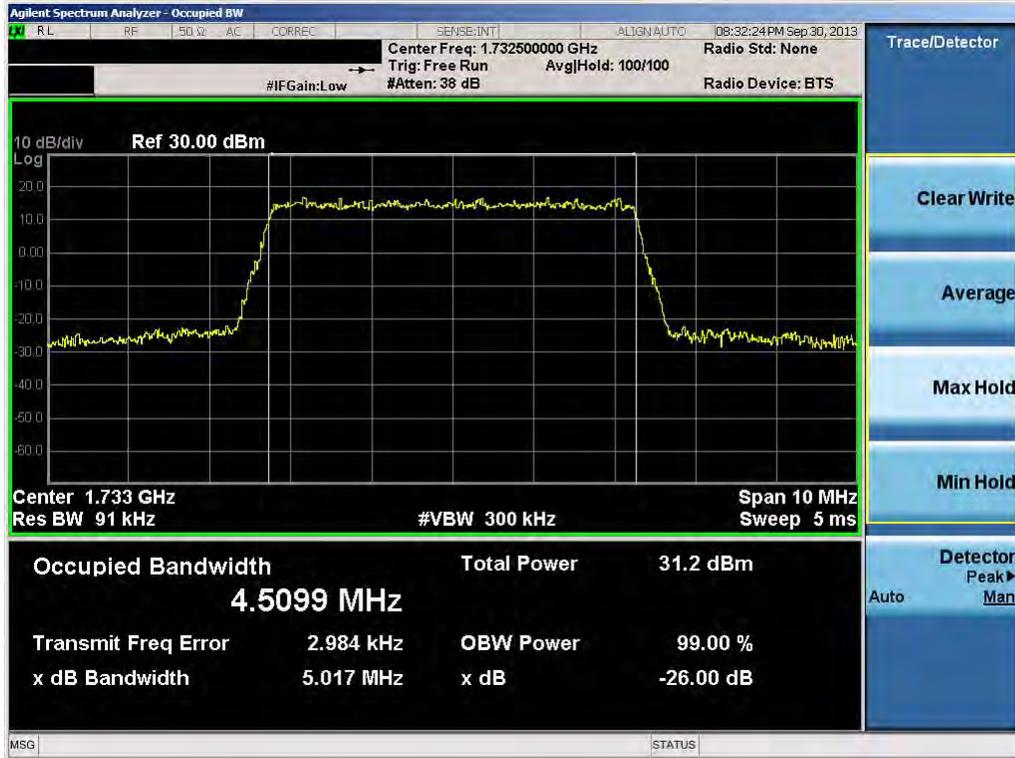


Plot 8-2. Lower Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)



Plot 8-3. Occupied Bandwidth Plot (5.0MHz QPSK – RB Size 25)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 46 of 89



Plot 8-4. Occupied Bandwidth Plot (5.0MHz 16-QAM – RB Size 25)

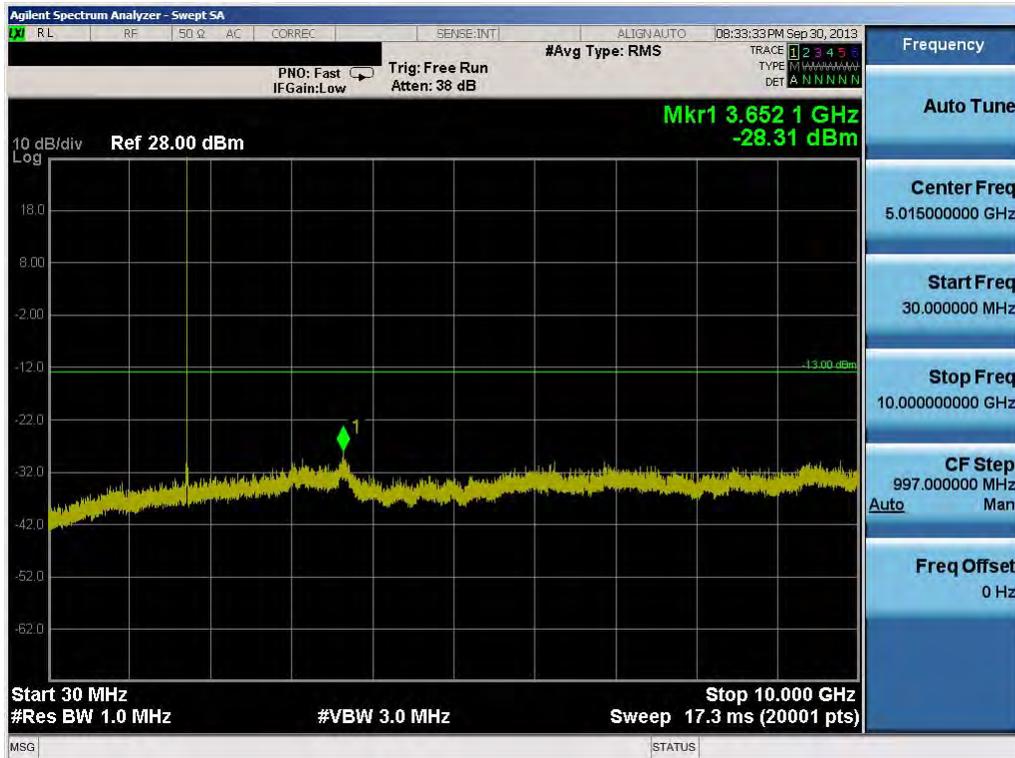


Plot 8-5. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 47 of 89

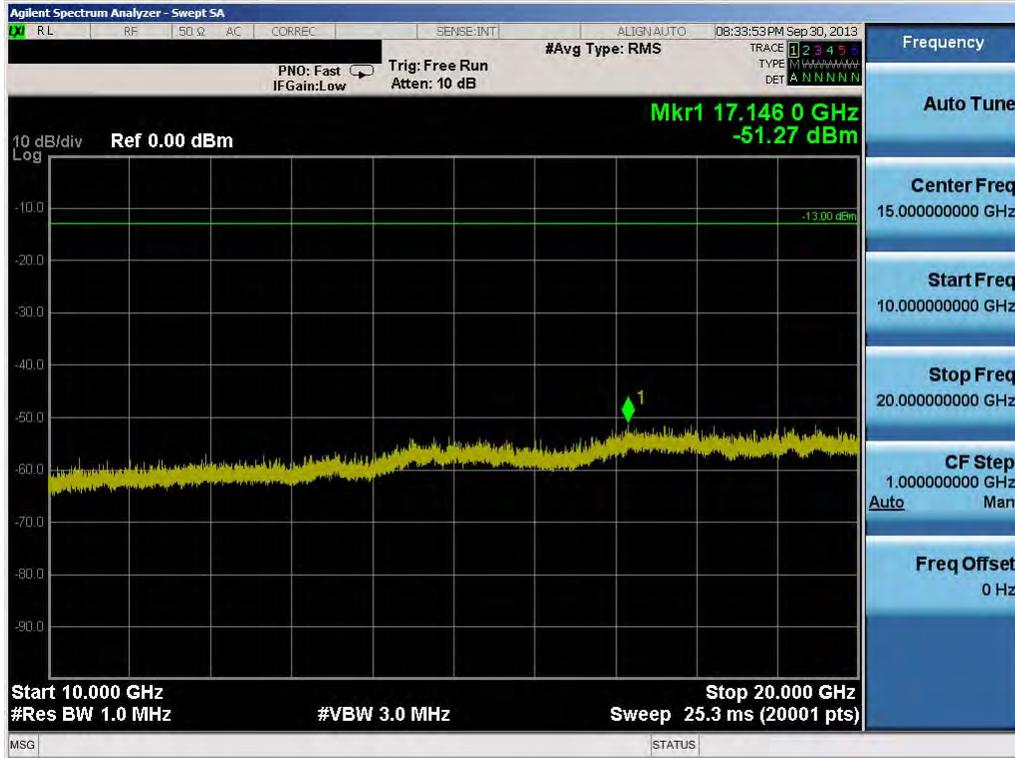


Plot 8-6. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

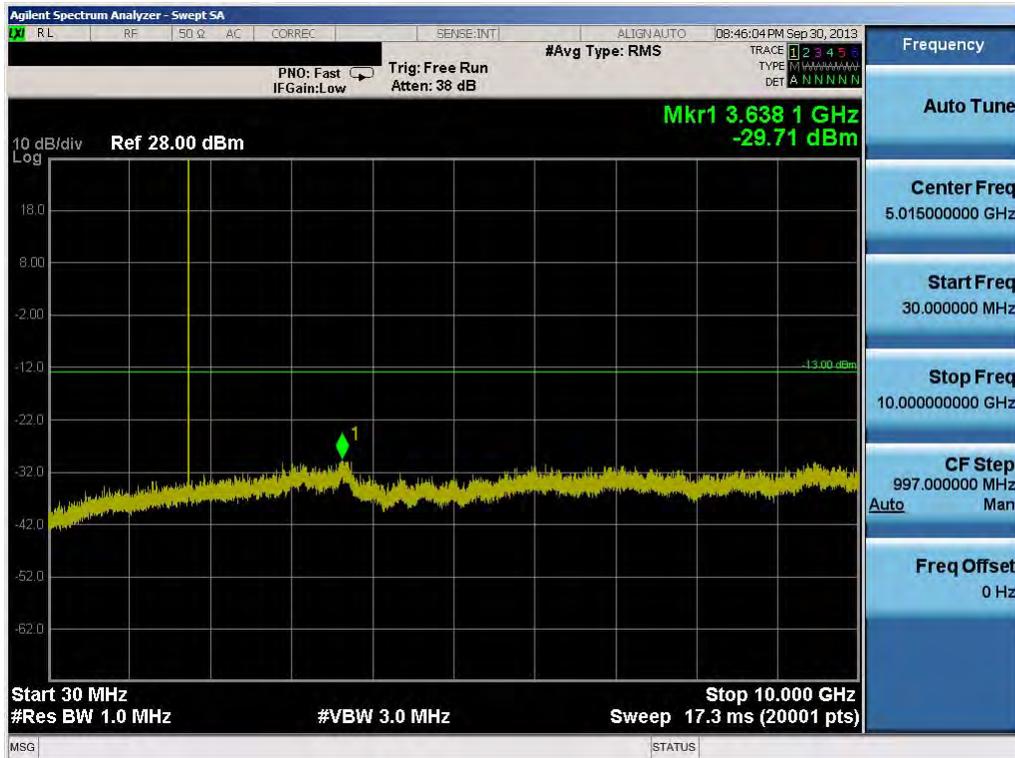


Plot 8-7. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 48 of 89



Plot 8-8. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 8-9. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 49 of 89

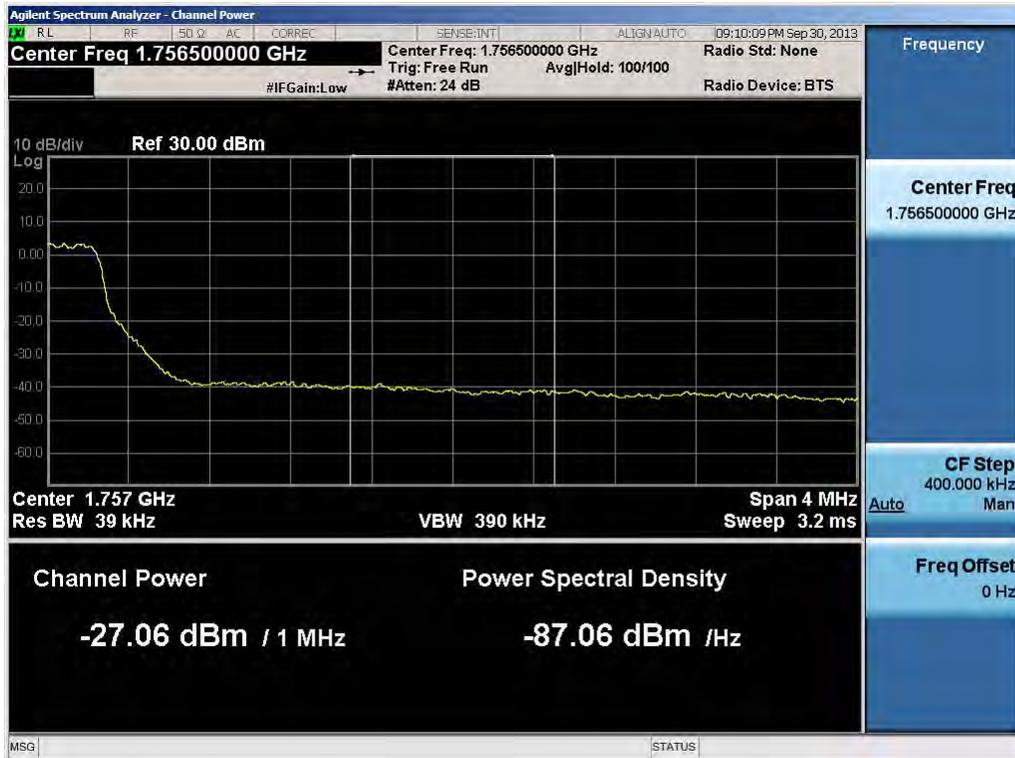


Plot 8-10. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

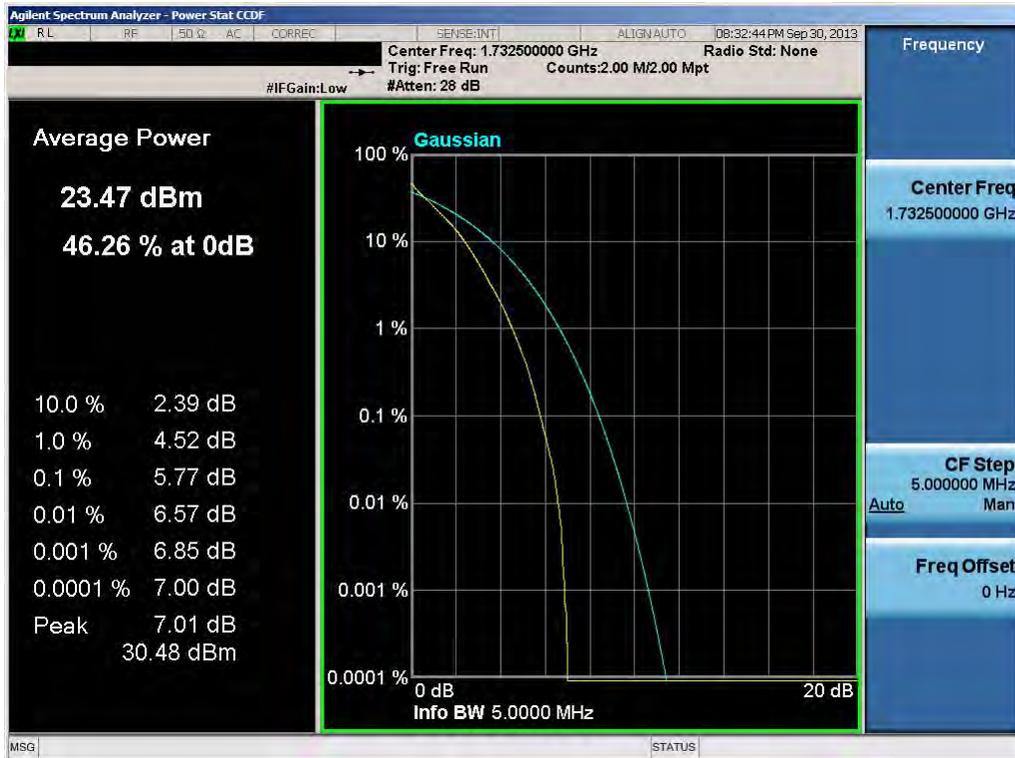


Plot 8-11. Upper Band Edge Plot (5.0MHz QPSK – RB Size 25)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 50 of 89

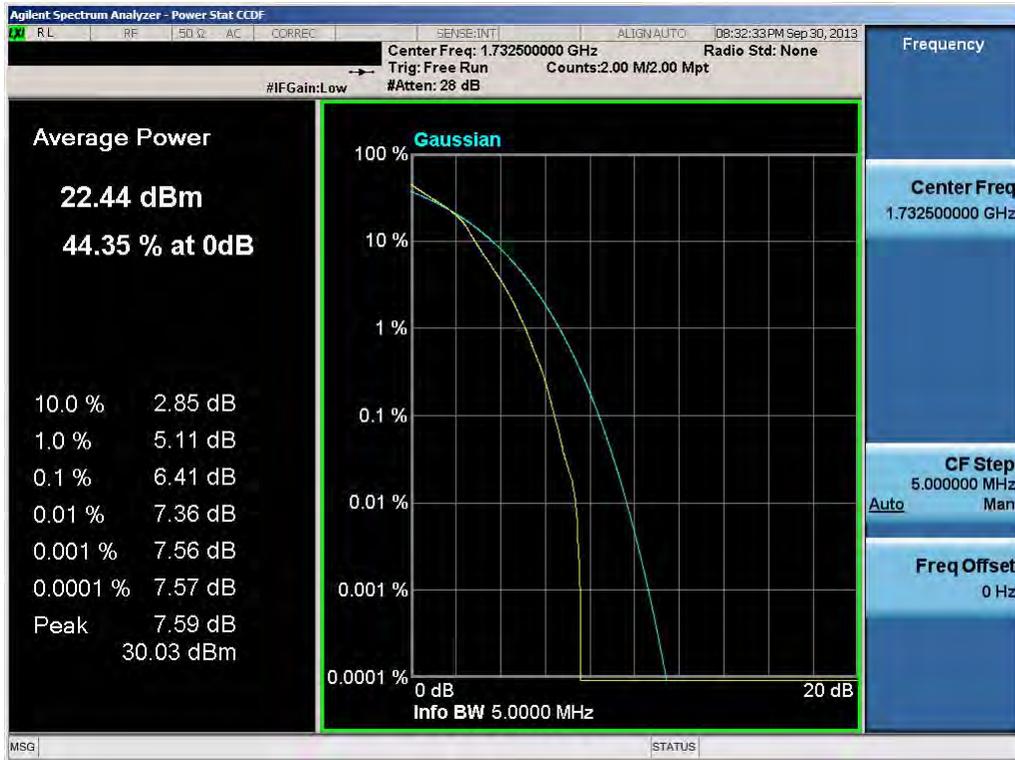


Plot 8-12. Upper Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)

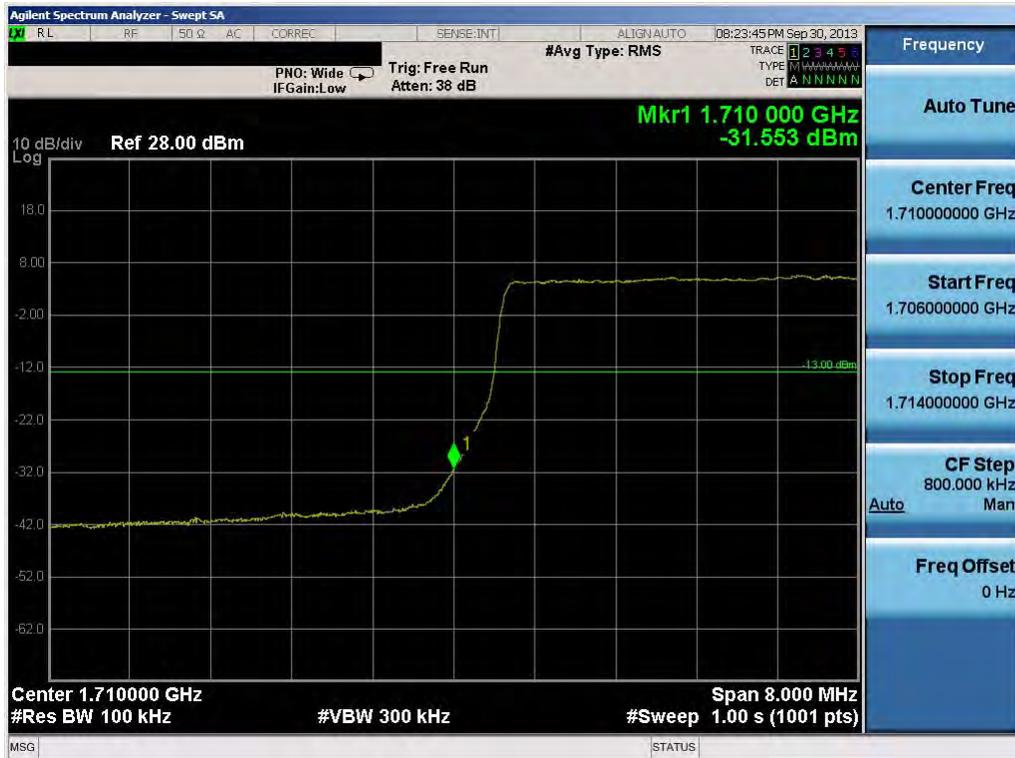


Plot 8-13. PAR Plot (5.0MHz QPSK – RB Size 25)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 51 of 89



Plot 8-14. PAR Plot (5.0MHz 16-QAM – RB Size 25)



Plot 8-15. Lower Band Edge Plot (10.0MHz QPSK – RB Size 50)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 52 of 89



Plot 8-16. Lower Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)



Plot 8-17. Occupied Bandwidth Plot (10.0MHz QPSK – RB Size 50)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 53 of 89

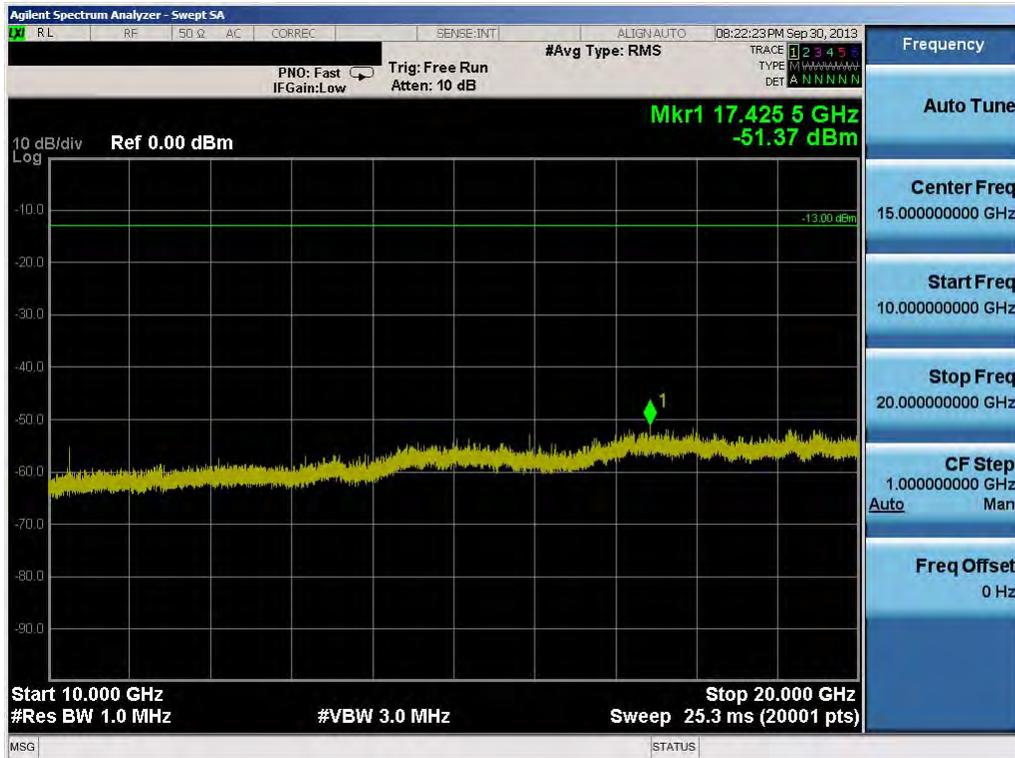


Plot 8-18. Occupied Bandwidth Plot (10.0MHz 16-QAM – RB Size 50)

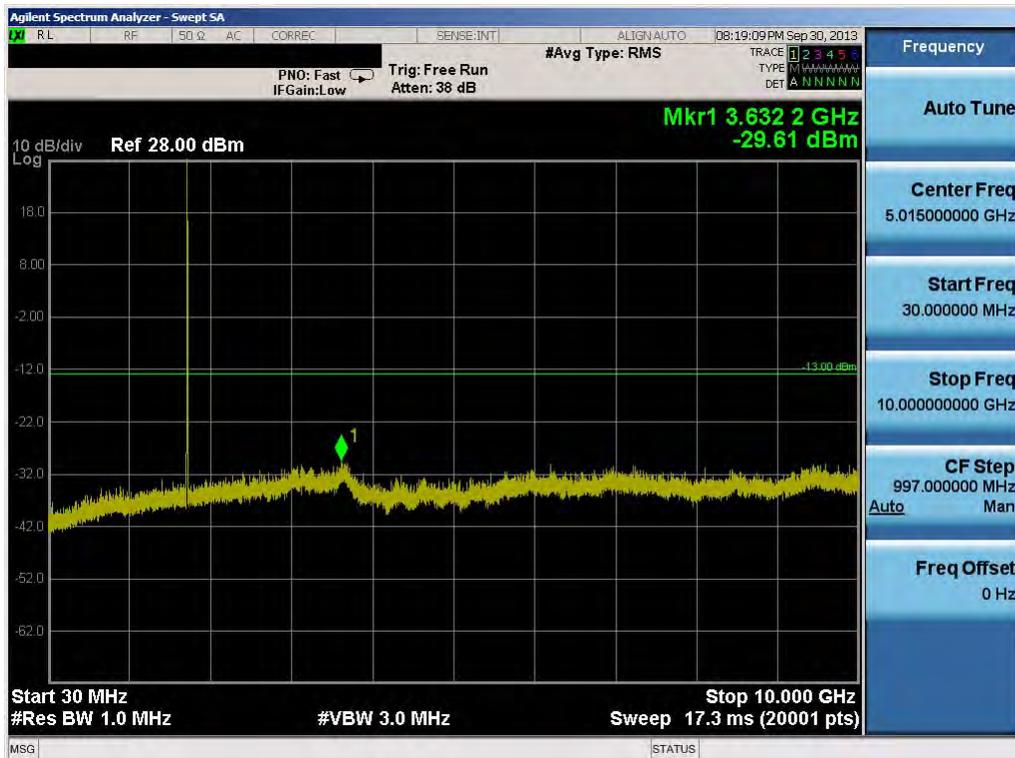


Plot 8-19. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 54 of 89

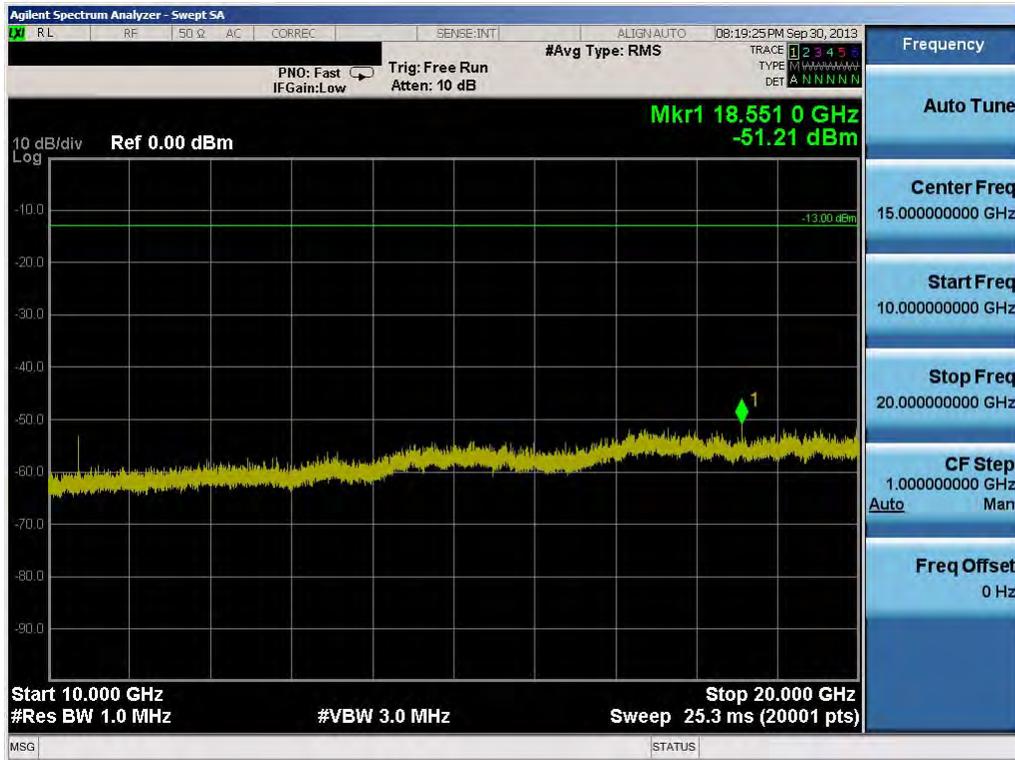


Plot 8-20. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

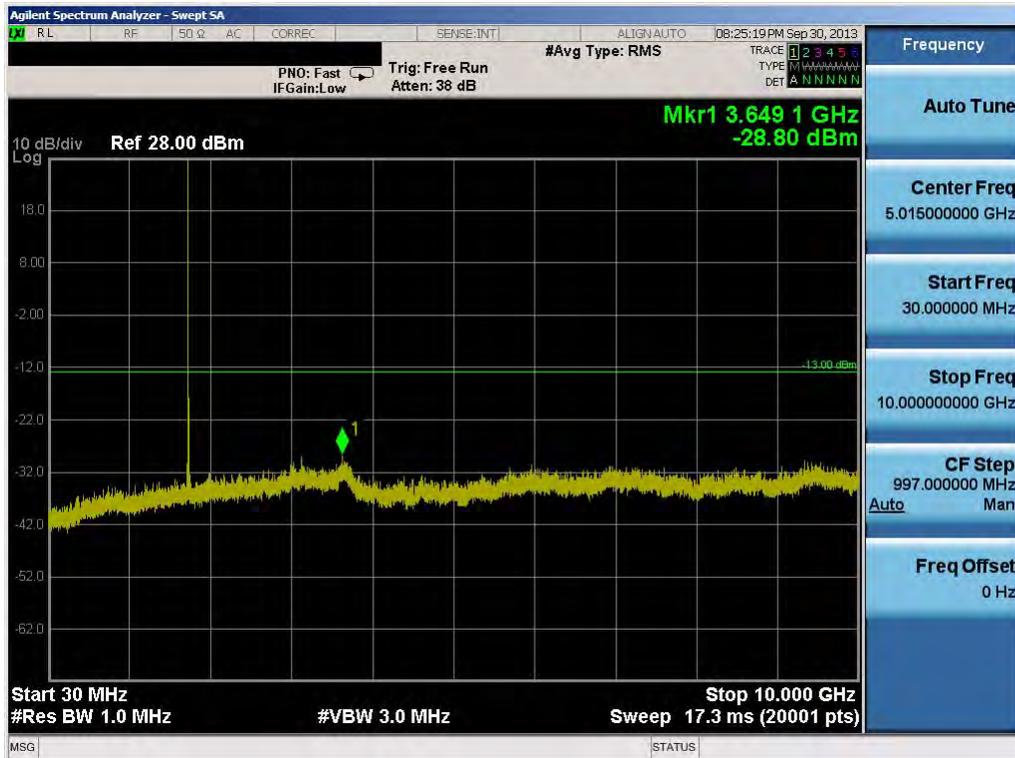


Plot 8-21. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 55 of 89

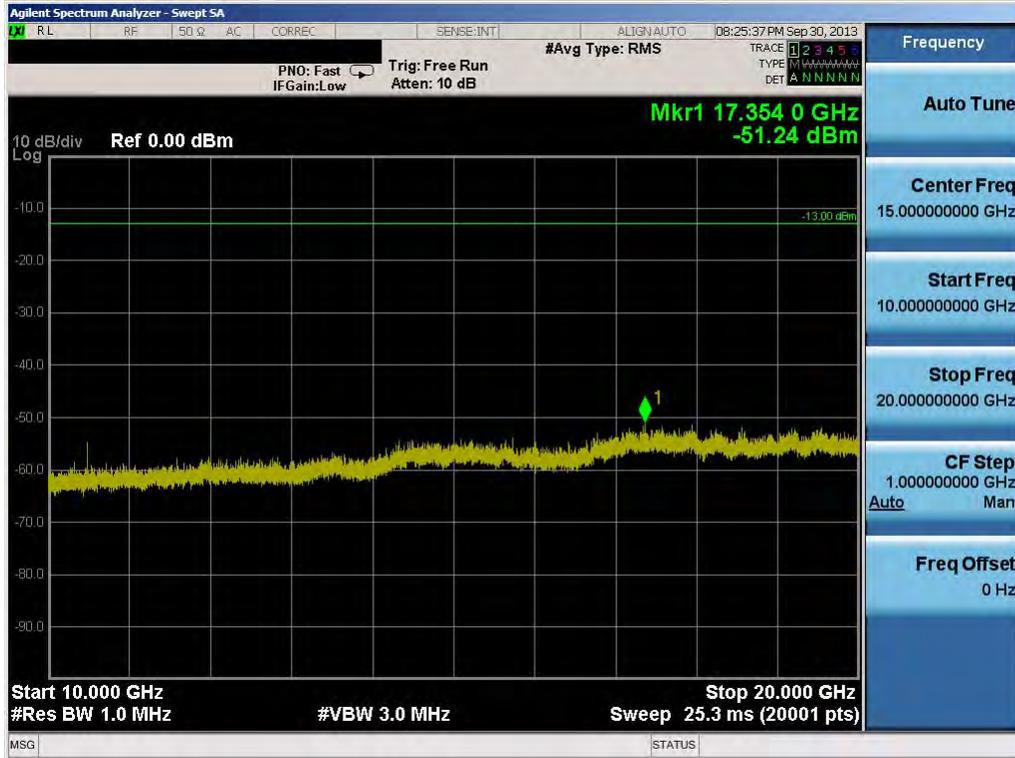


Plot 8-22. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 8-23. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 56 of 89



Plot 8-24. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

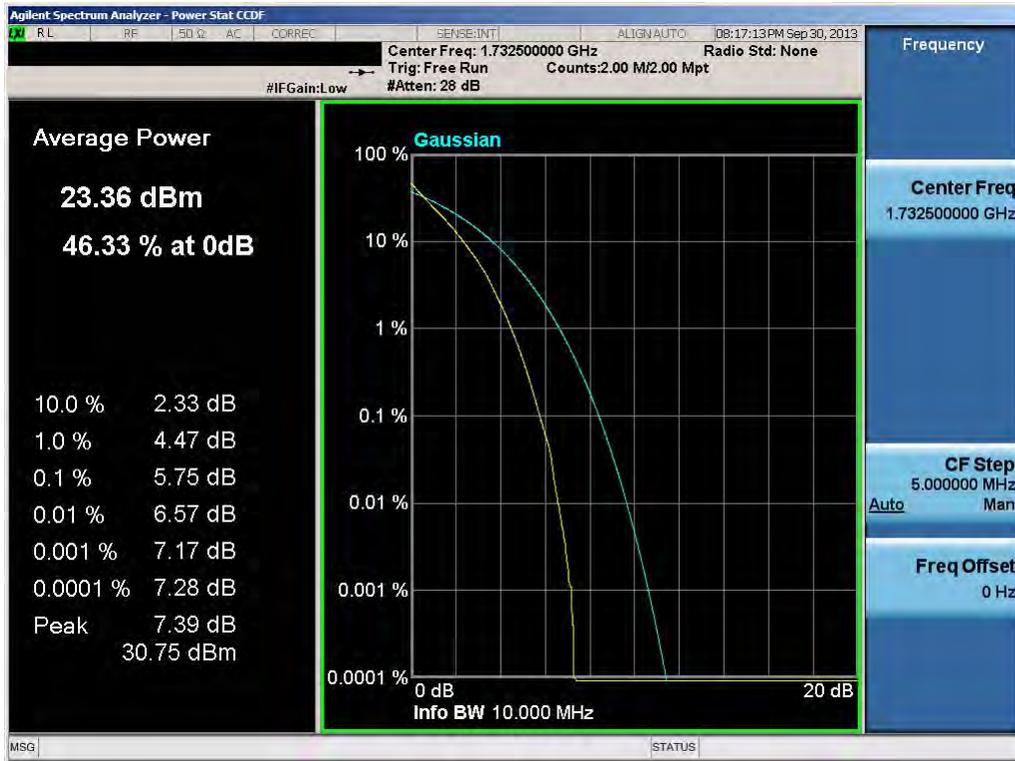


Plot 8-25. Upper Band Edge Plot (10.0MHz QPSK – RB Size 50)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 57 of 89



**Plot 8-26. Upper Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)**

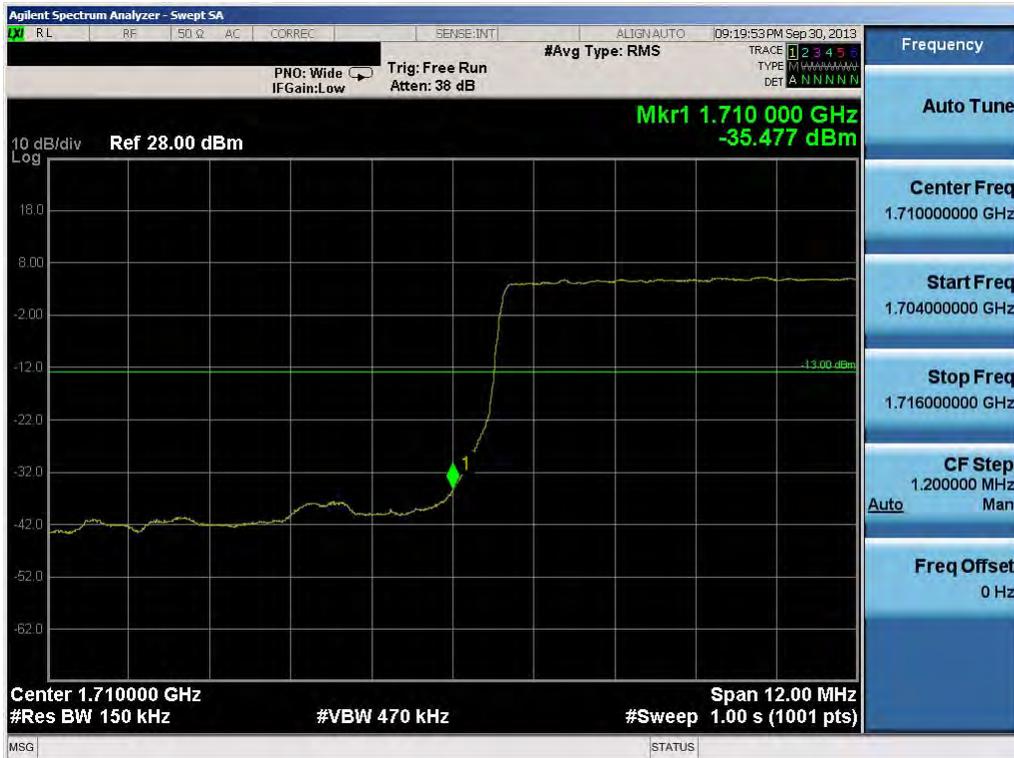


**Plot 8-27. PAR Plot (10.0MHz QPSK – RB Size 50)**

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 58 of 89



Plot 8-28. PAR Plot (10.0MHz 16-QAM – RB Size 50)

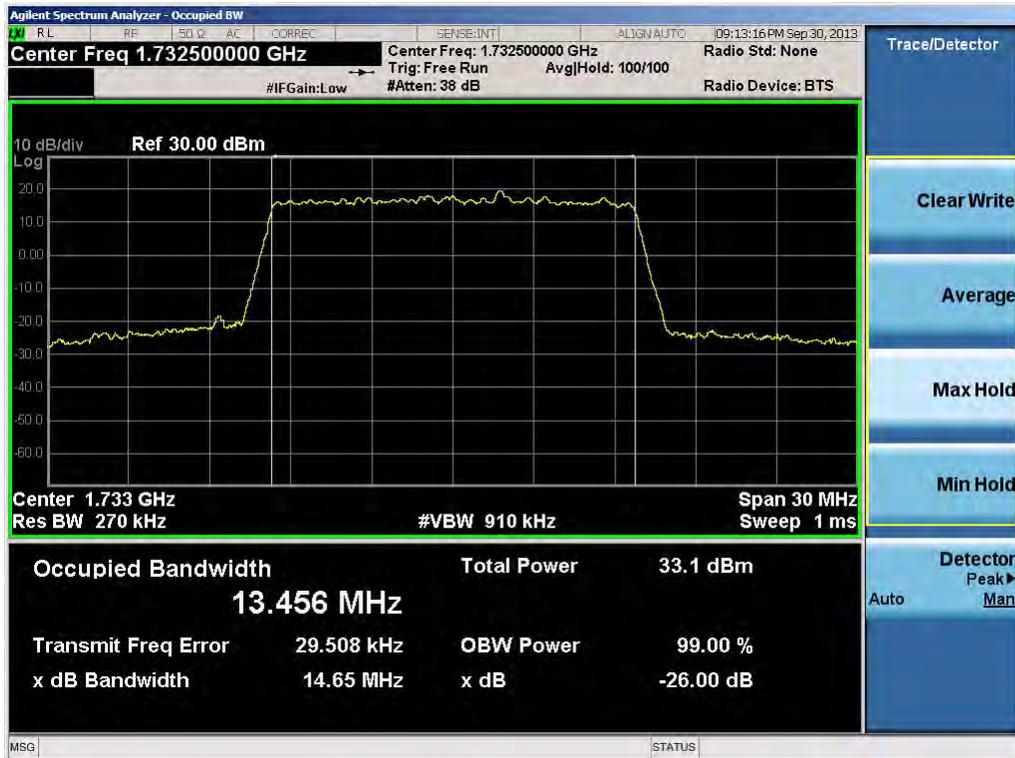


Plot 8-29. Lower Band Edge Plot (15.0MHz QPSK – RB Size 75)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 59 of 89



Plot 8-30. Lower Extended Band Edge Plot (15.0MHz QPSK – RB Size 75)

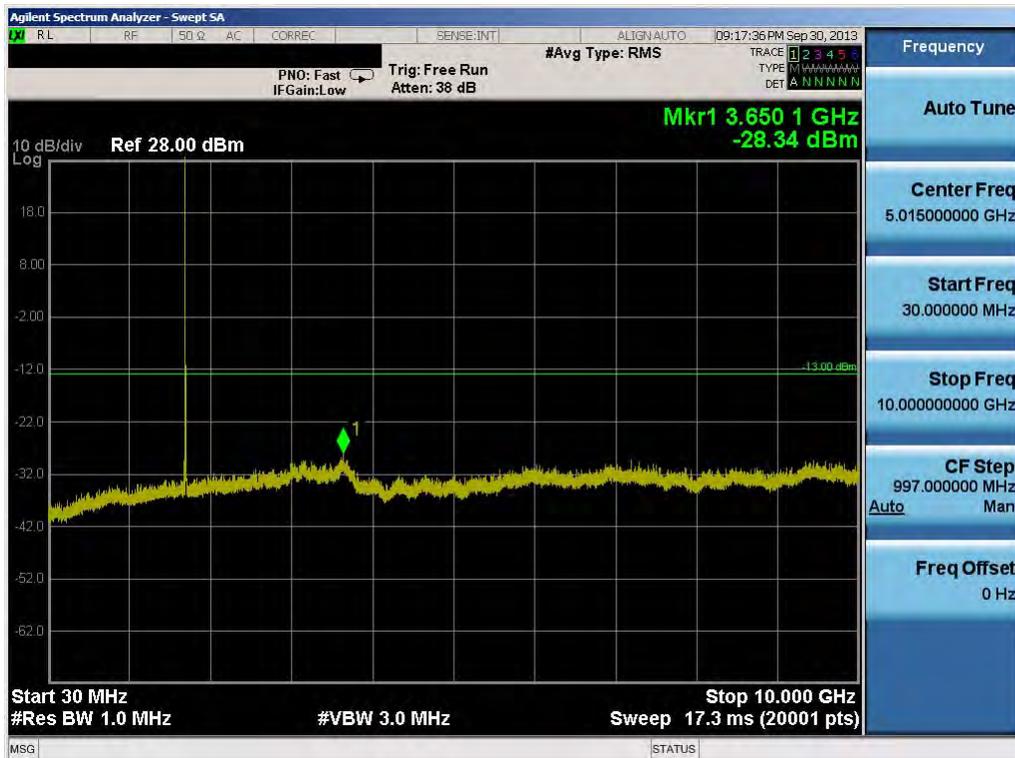


Plot 8-31. Occupied Bandwidth Plot (15.0MHz QPSK – RB Size 75)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 60 of 89

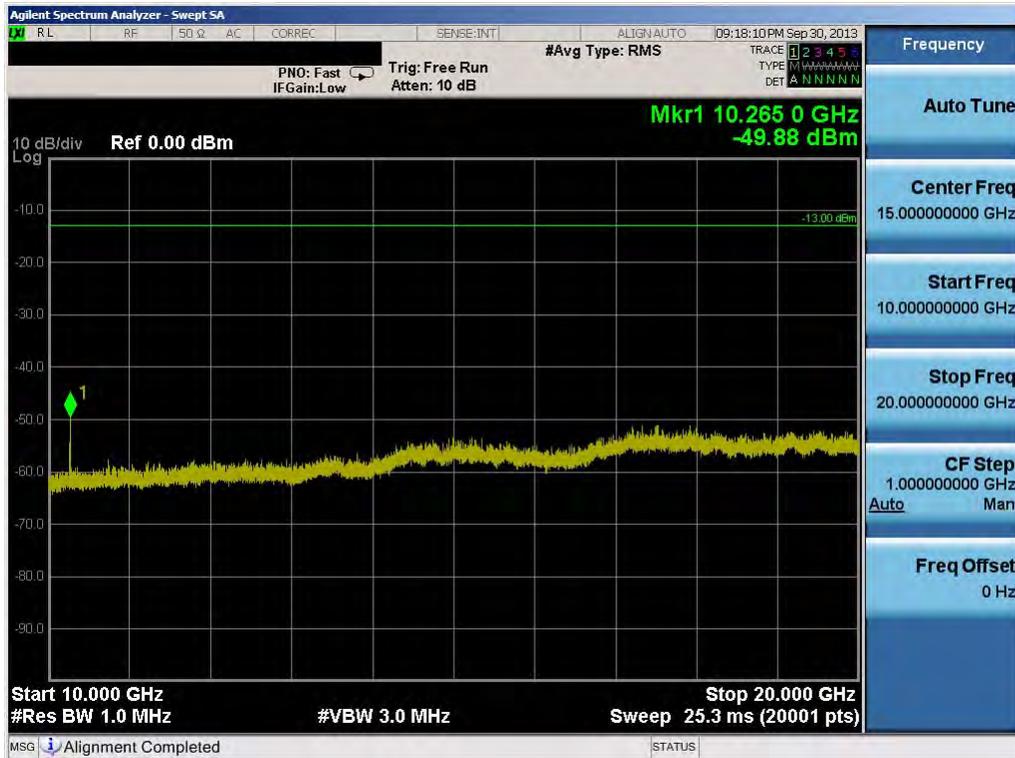


Plot 8-32. Occupied Bandwidth Plot (15.0MHz 16-QAM – RB Size 75)

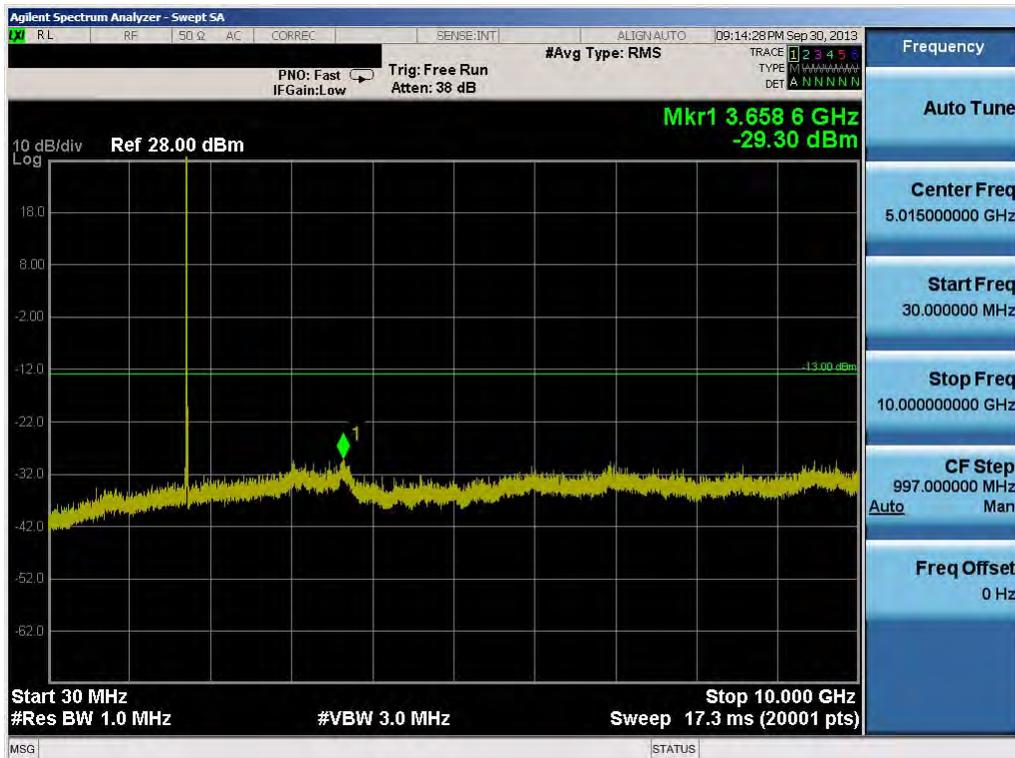


Plot 8-33. Conducted Spurious Plot (15.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 61 of 89

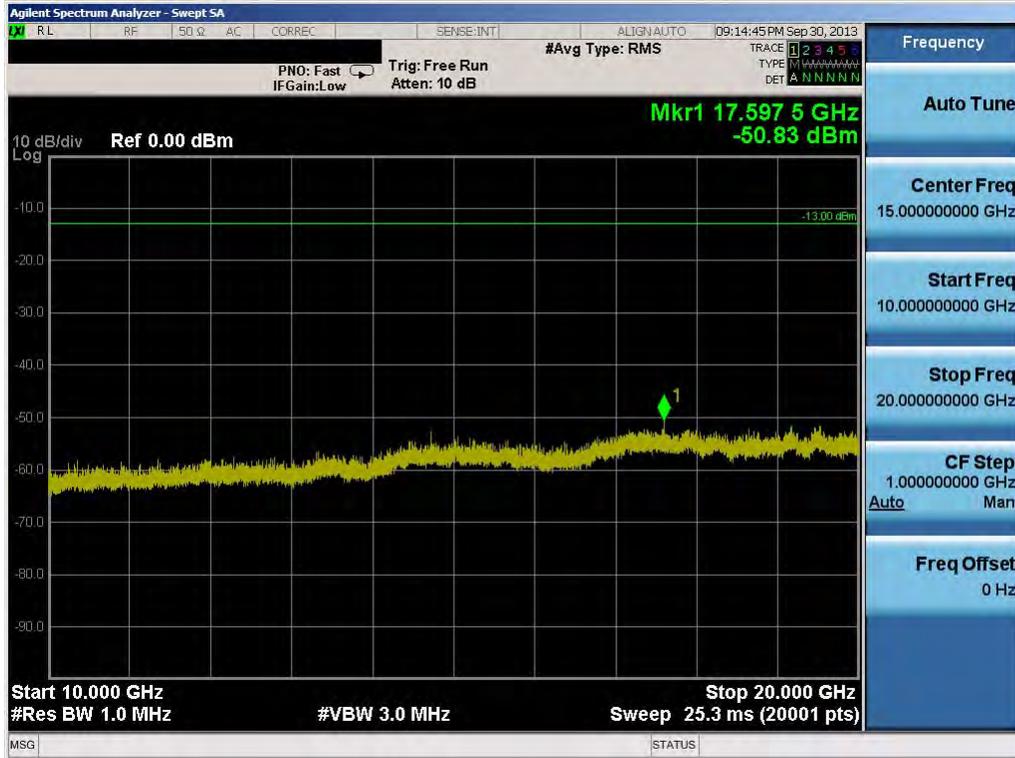


Plot 8-34. Conducted Spurious Plot (15.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

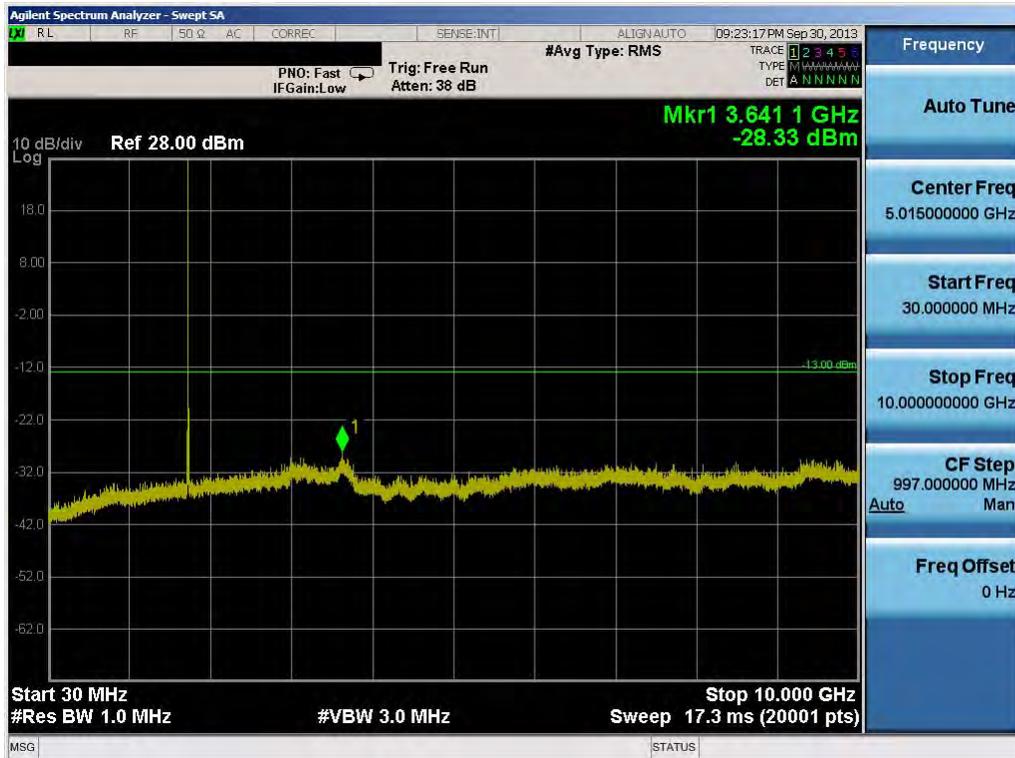


Plot 8-35. Conducted Spurious Plot (15.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 62 of 89

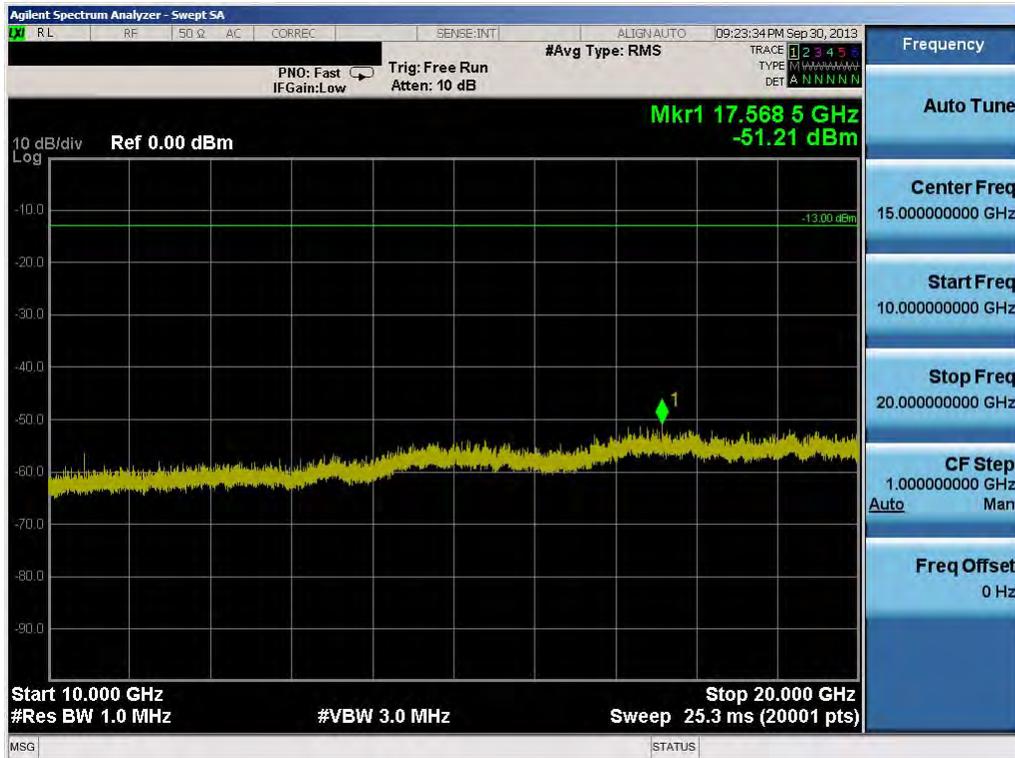


Plot 8-36. Conducted Spurious Plot (15.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 8-37. Conducted Spurious Plot (15.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 63 of 89



Plot 8-38. Conducted Spurious Plot (15.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

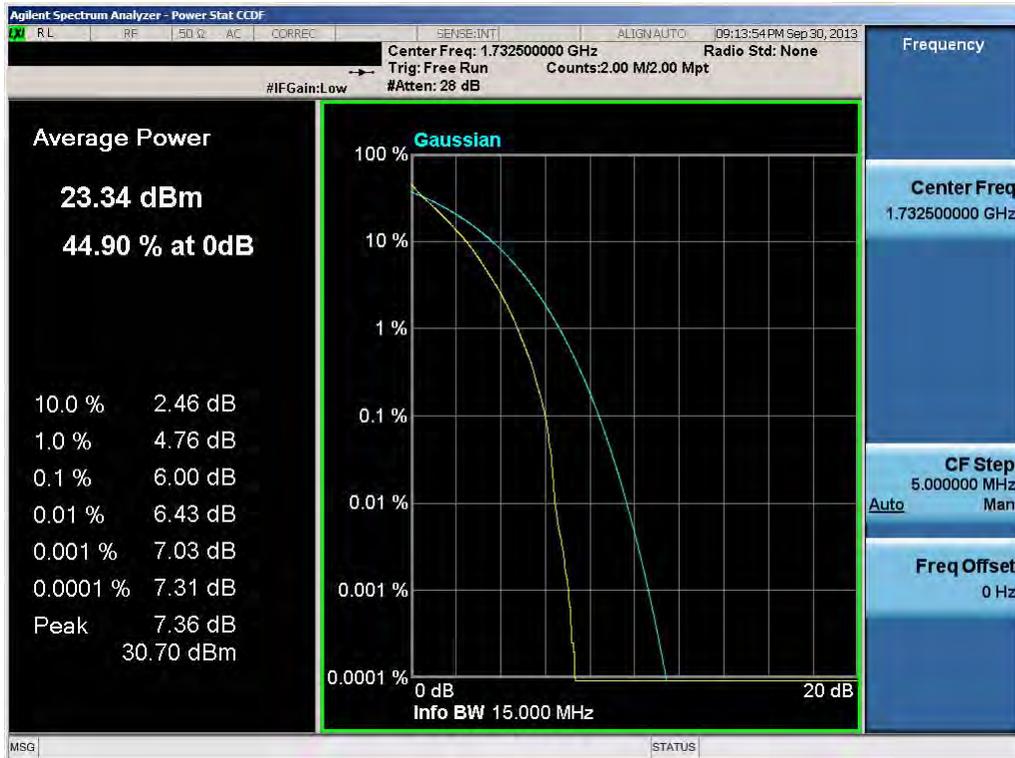


Plot 8-39. Upper Band Edge Plot (15.0MHz QPSK – RB Size 75)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 64 of 89

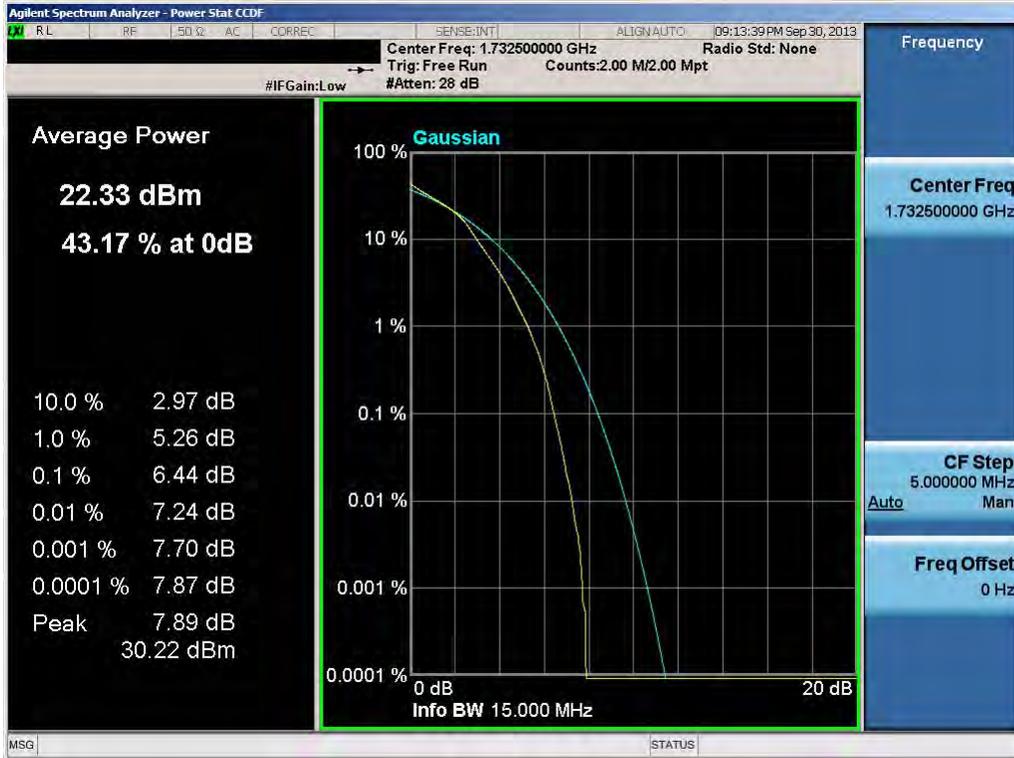


Plot 8-40. Upper Extended Band Edge Plot (15.0MHz QPSK – RB Size 75)



Plot 8-41. PAR Plot (15.0MHz QPSK – RB Size 75)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 65 of 89



**Plot 8-42. PAR Plot (15.0MHz 16-QAM – RB Size 75)**



**Plot 8-43. Lower Band Edge Plot (20.0MHz QPSK – RB Size 100)**

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 66 of 89

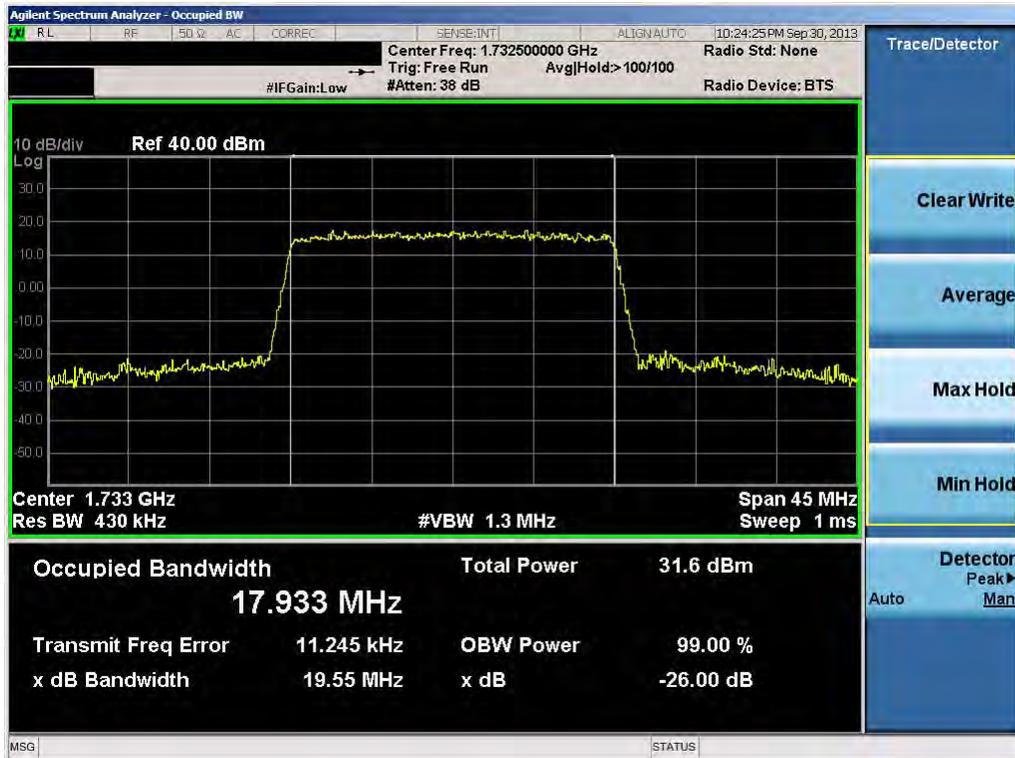


Plot 8-44. Lower Extended Band Edge Plot (20.0MHz QPSK – RB Size 100)

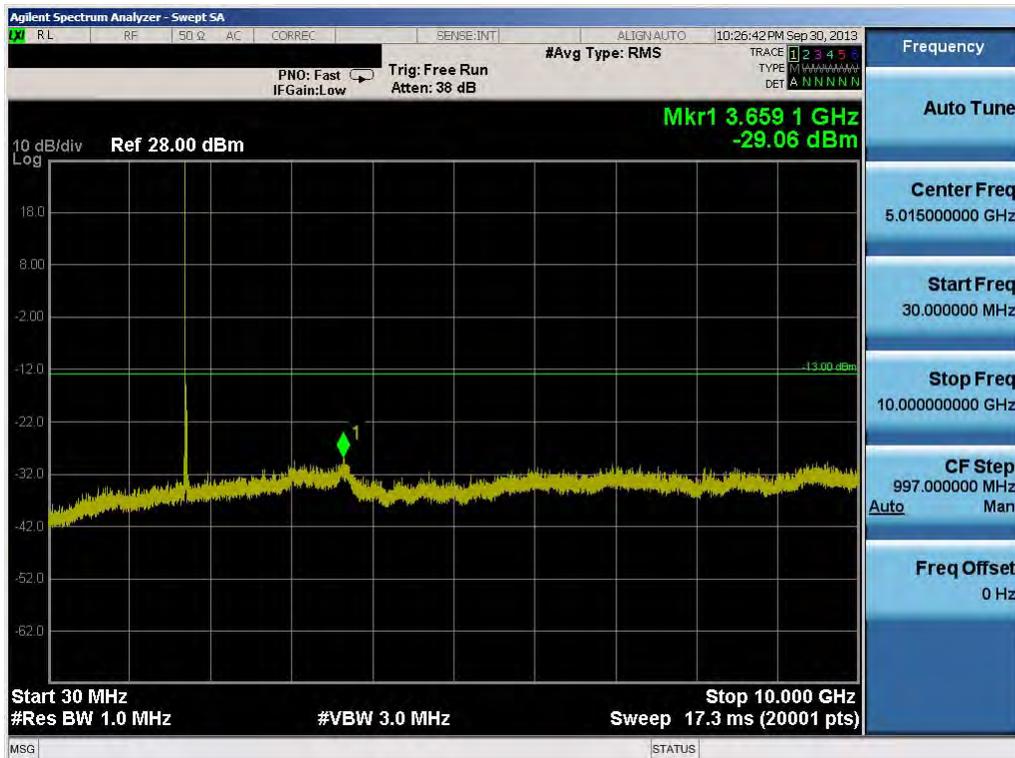


Plot 8-45. Occupied Bandwidth Plot (20.0MHz QPSK – RB Size 100)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 67 of 89

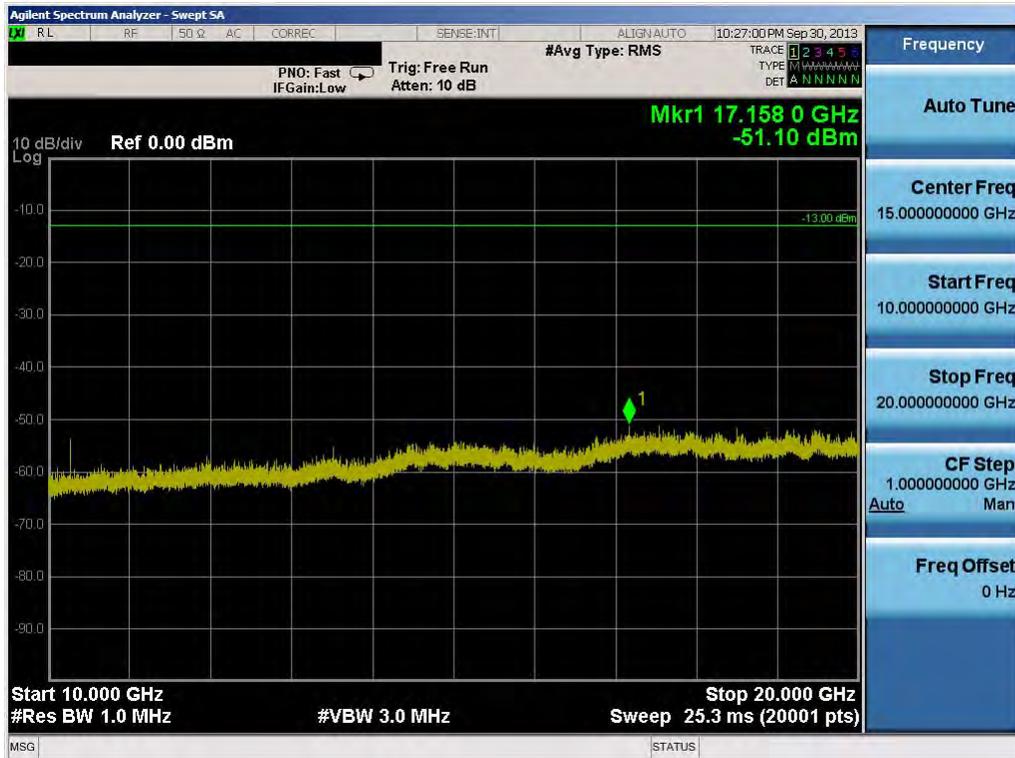


Plot 8-46. Occupied Bandwidth Plot (20.0MHz 16-QAM – RB Size 100)

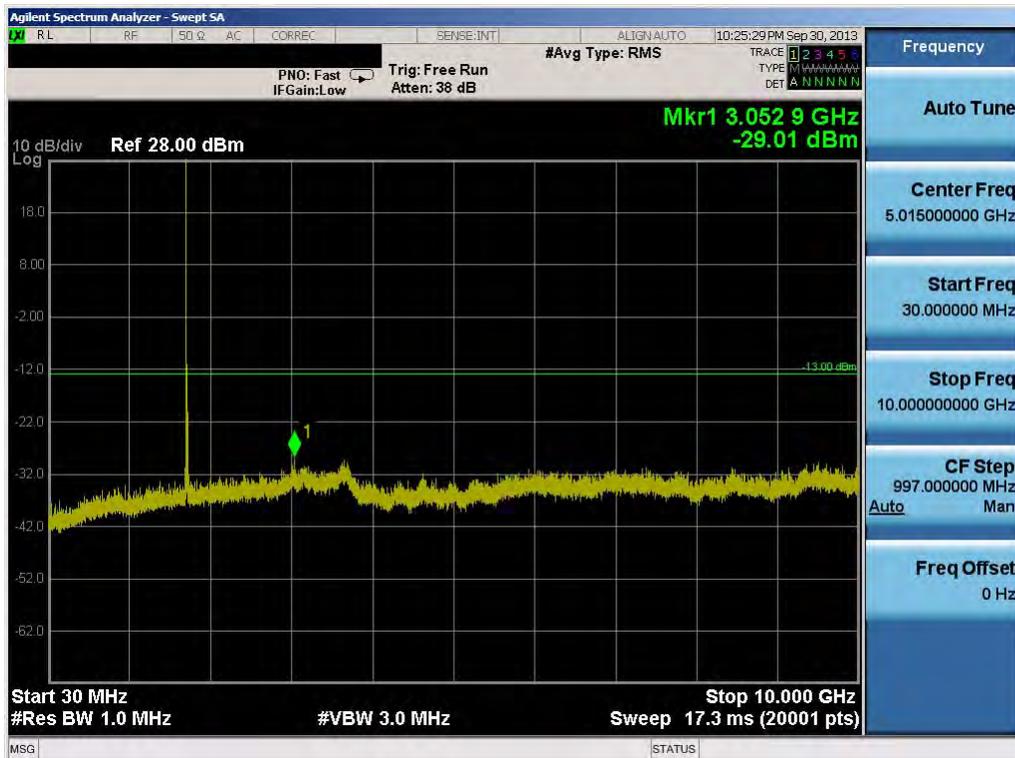


Plot 8-47. Conducted Spurious Plot (20.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 68 of 89

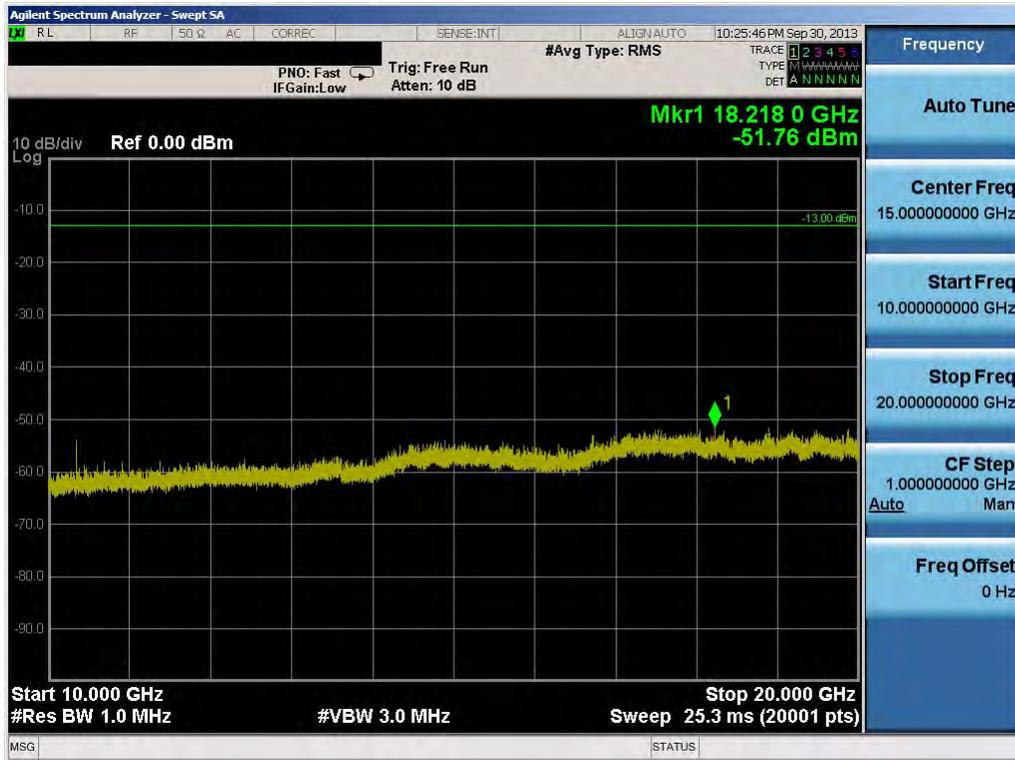


Plot 8-48. Conducted Spurious Plot (20.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



Plot 8-49. Conducted Spurious Plot (20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 69 of 89

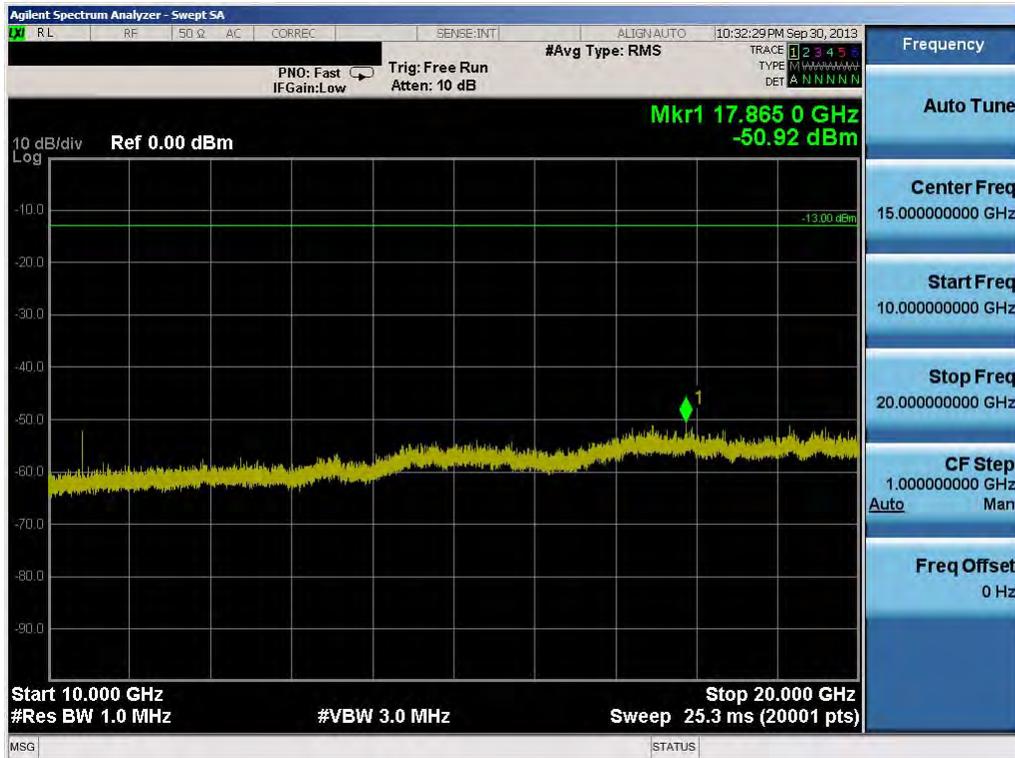


Plot 8-50. Conducted Spurious Plot (20.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 8-51. Conducted Spurious Plot (20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 70 of 89



Plot 8-52. Conducted Spurious Plot (20.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

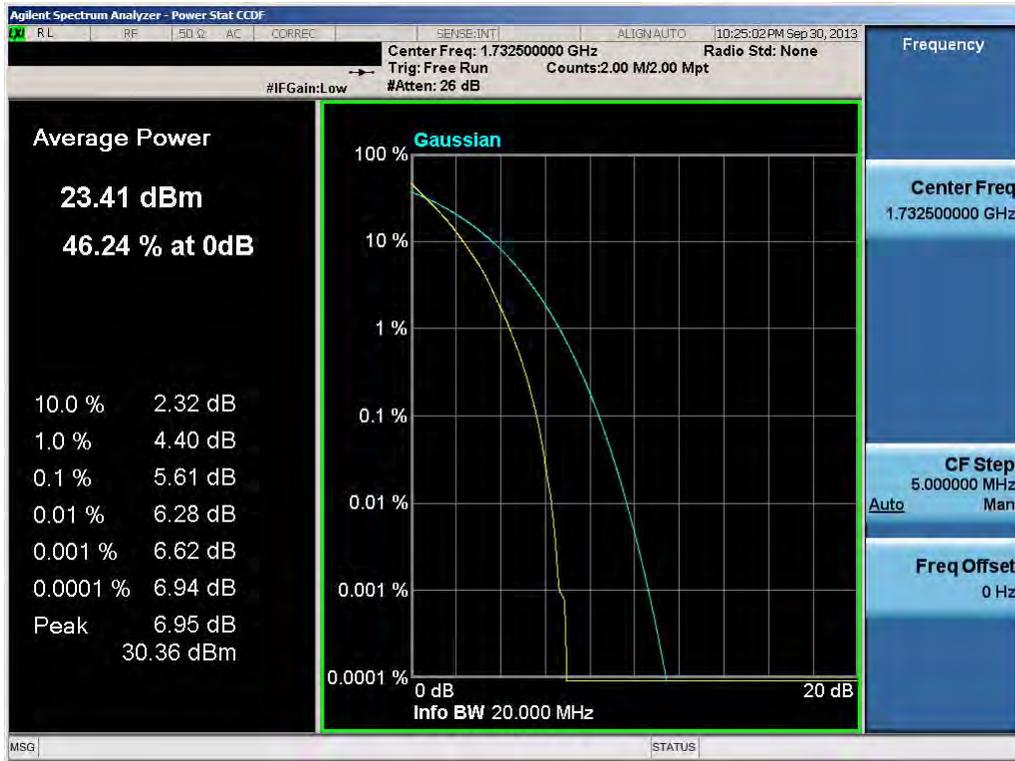


Plot 8-53. Upper Band Edge Plot (20.0MHz QPSK – RB Size 100)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 71 of 89

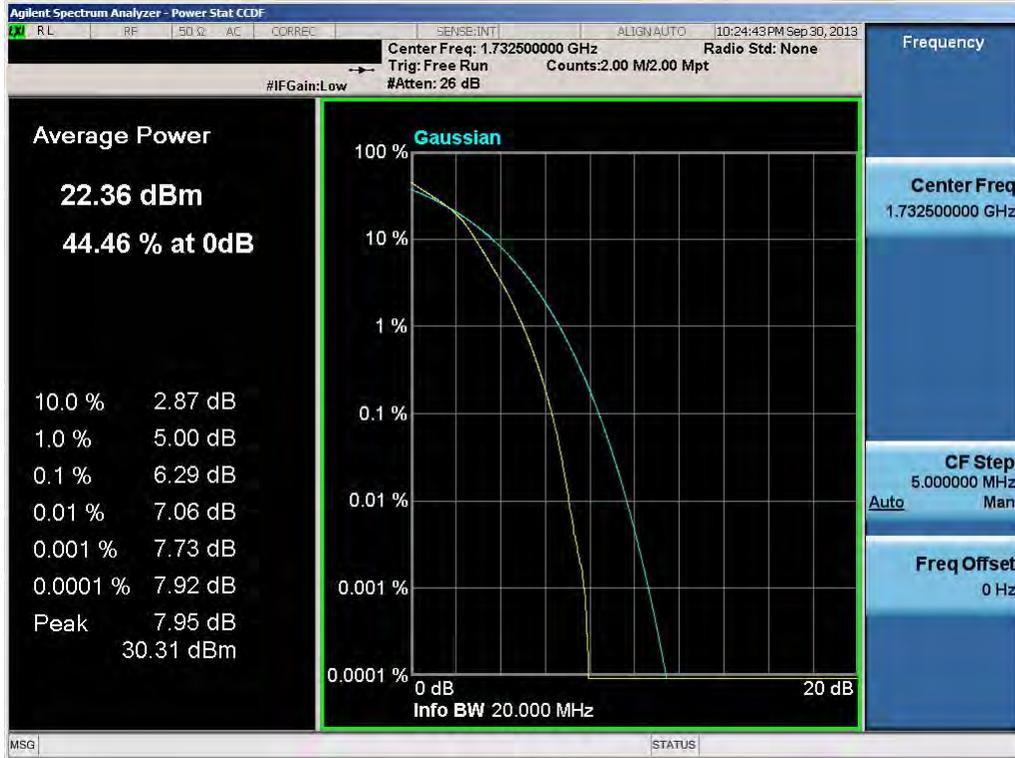


Plot 8-54. Upper Extended Band Edge Plot (20.0MHz QPSK – RB Size 100)



Plot 8-55. PAR Plot (20.0MHz QPSK – RB Size 100)

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 72 of 89



**Plot 8-56. PAR Plot (20.0MHz 16-QAM – RB Size 100)**

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 73 of 89

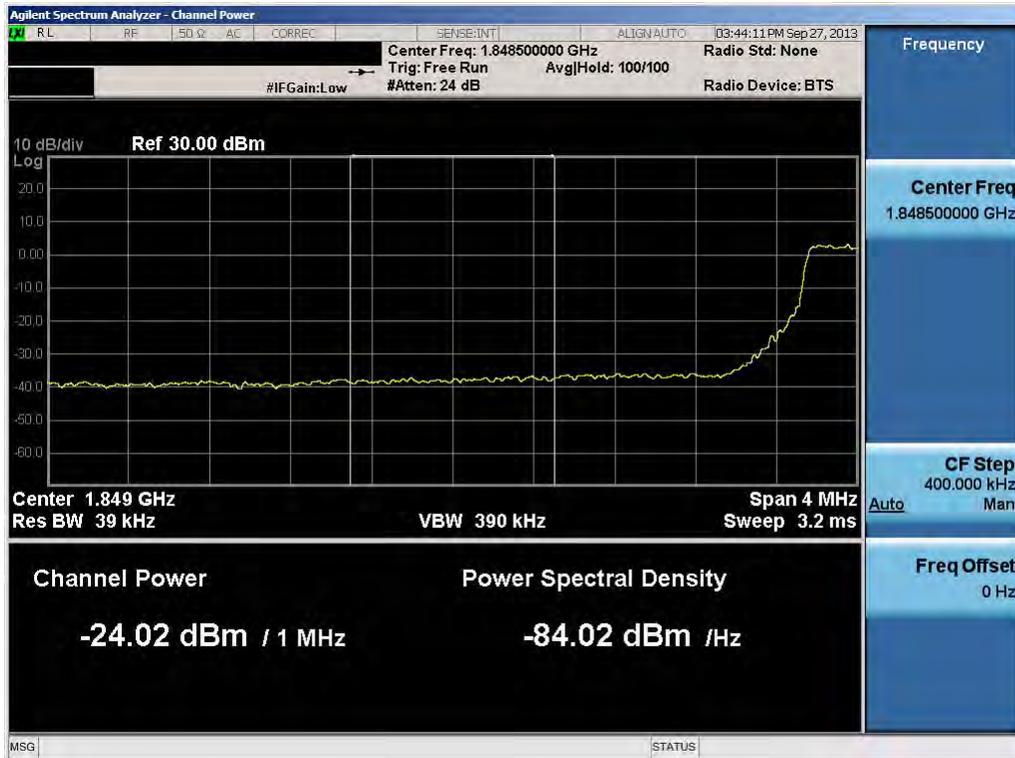
## 9.0 BAND 2 PLOTS OF EMISSIONS

**Note:** All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.

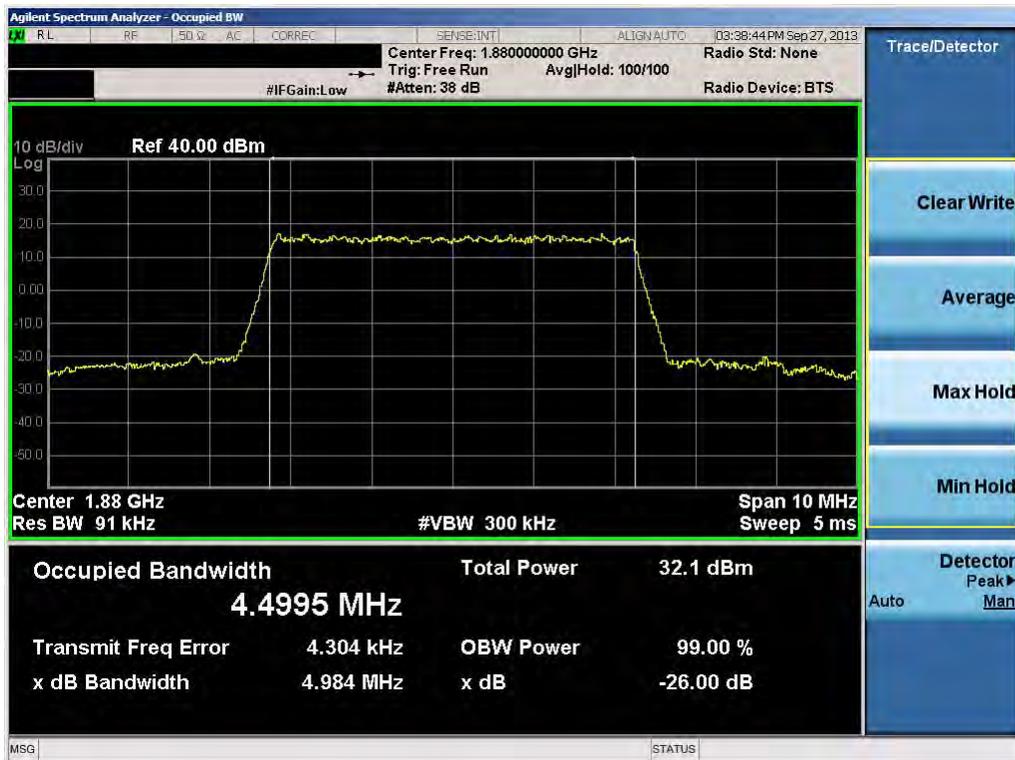


**Plot 9-1. Lower Band Edge Plot (5.0MHz QPSK – RB Size 25)**

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 74 of 89

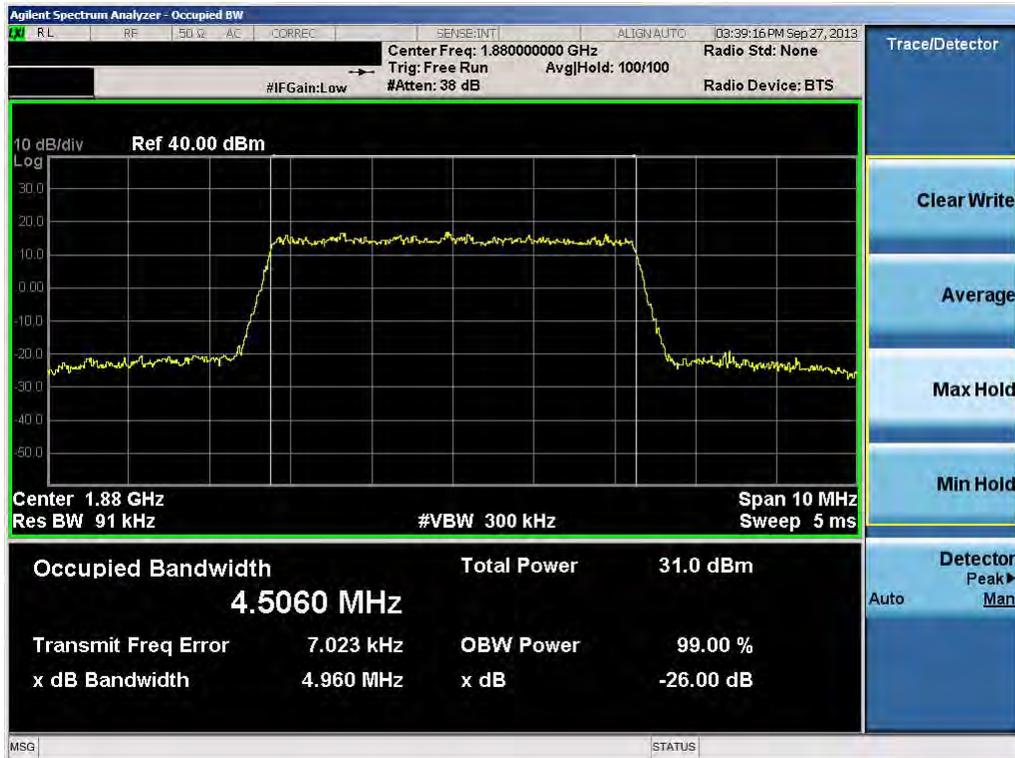


Plot 9-2. Lower Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)

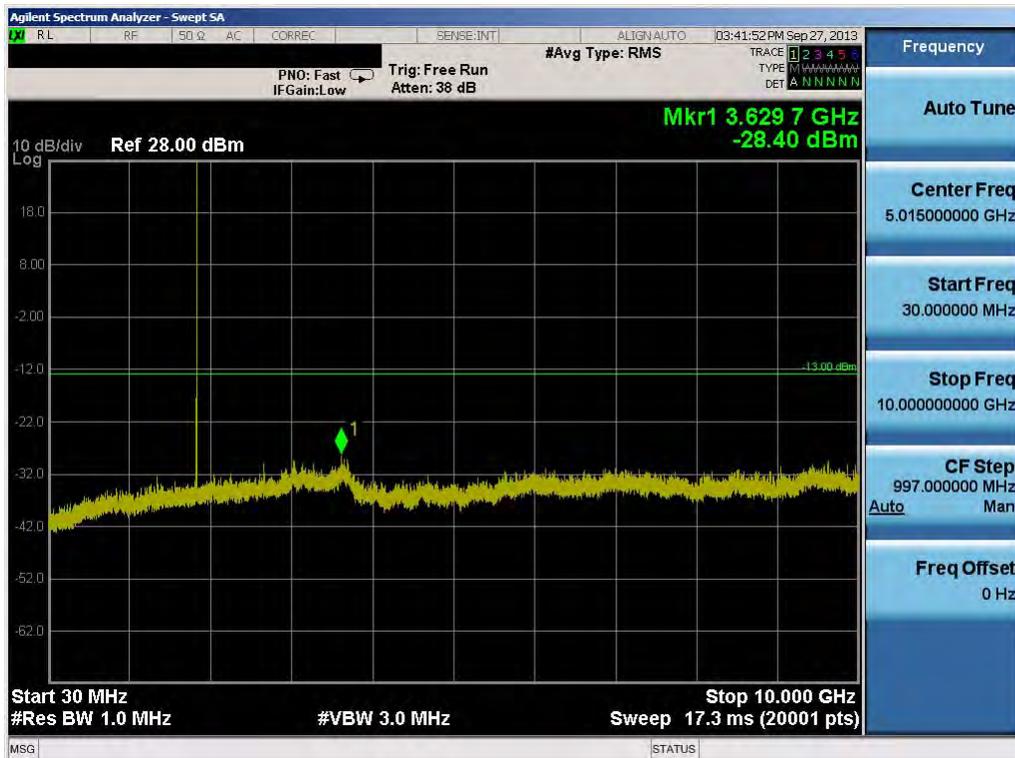


Plot 9-3. Occupied Bandwidth Plot (5.0MHz QPSK – RB Size 25)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 75 of 89

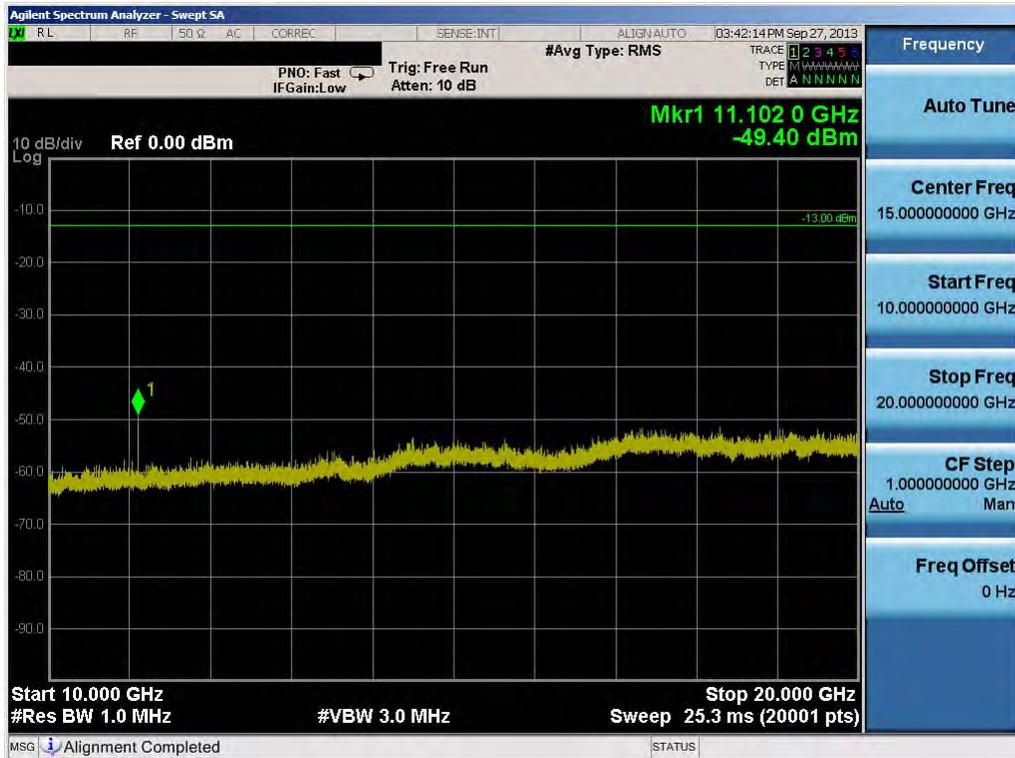


Plot 9-4. Occupied Bandwidth Plot (5.0MHz 16-QAM – RB Size 25)

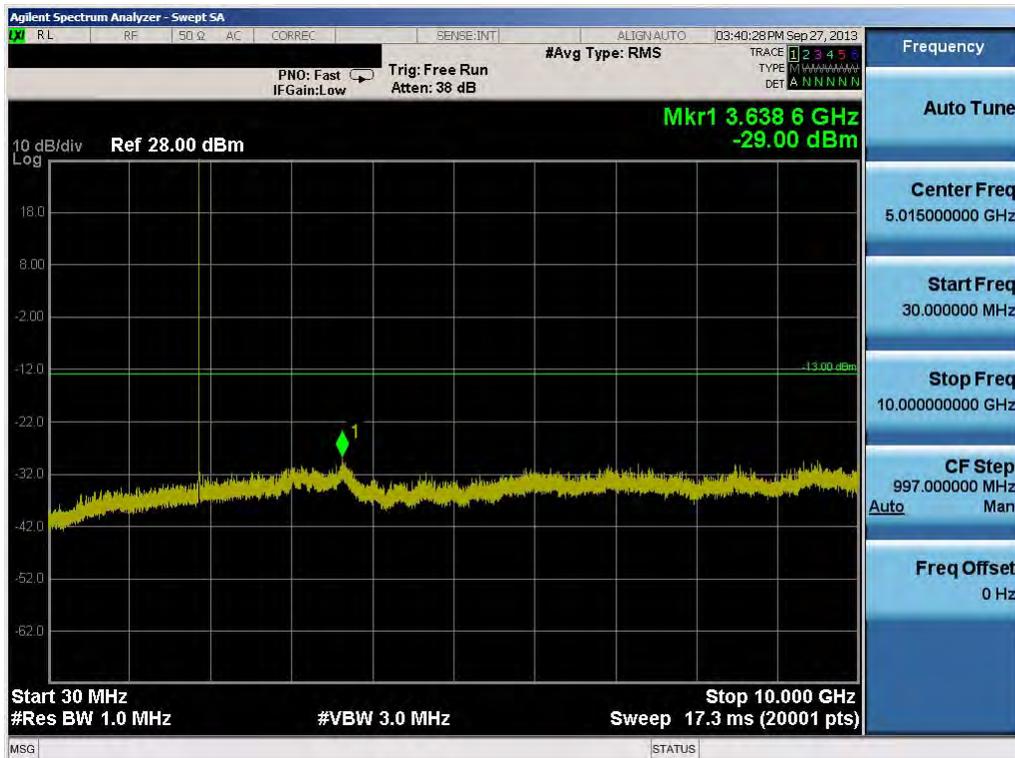


Plot 9-5. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 76 of 89

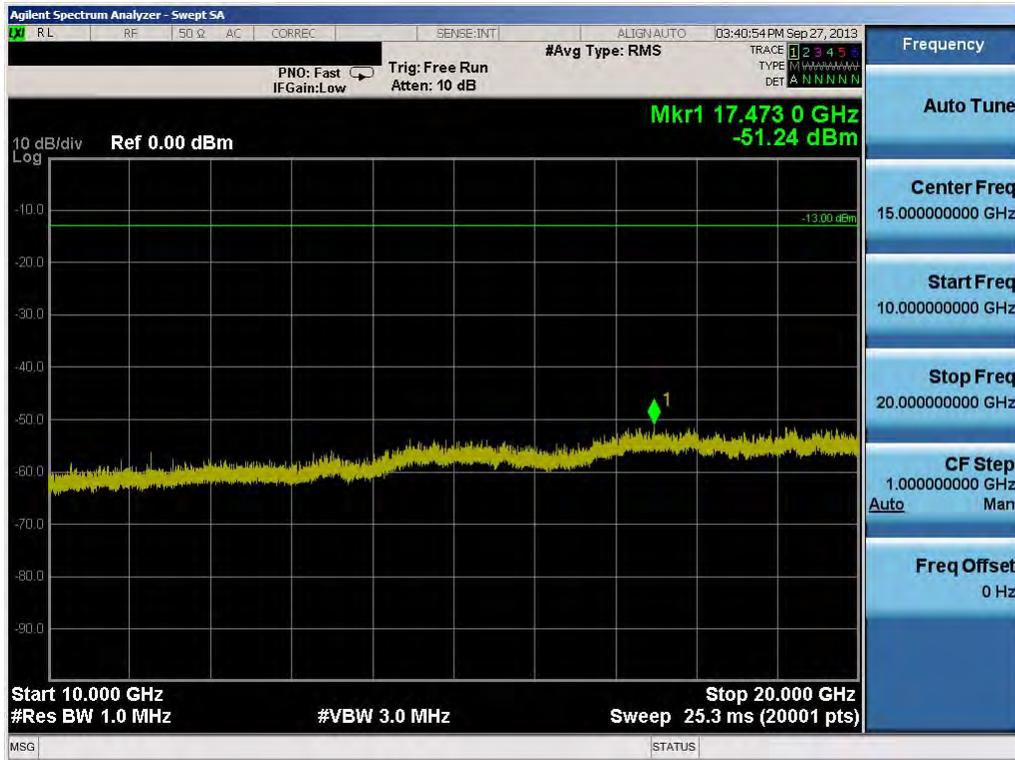


Plot 9-6. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

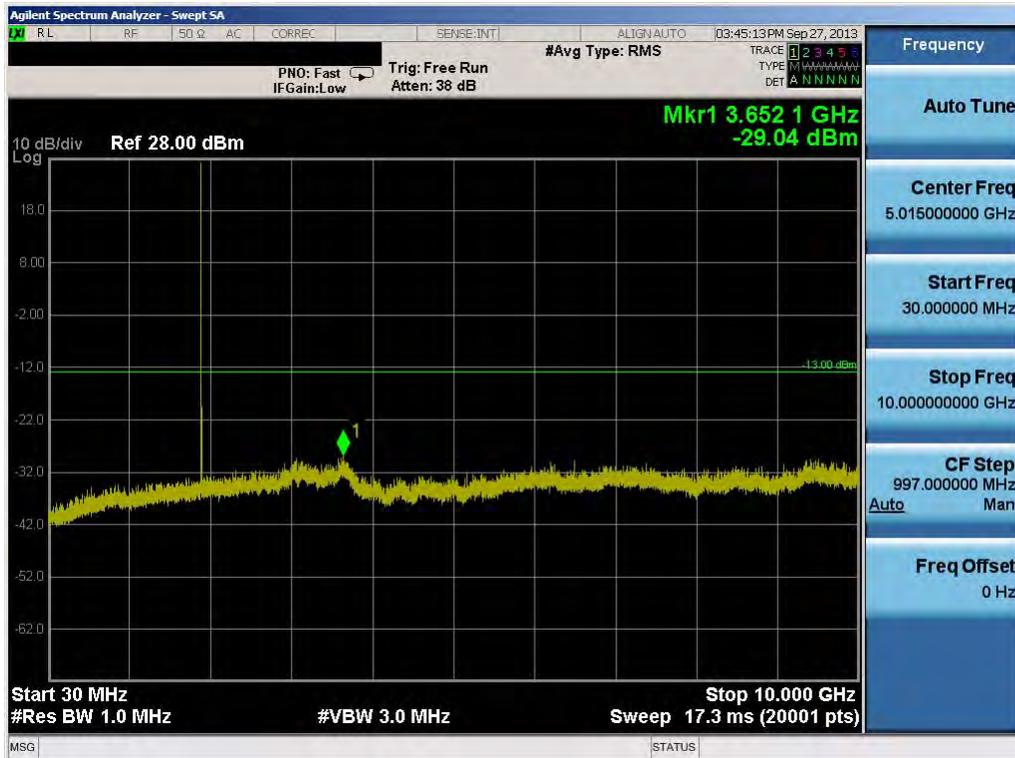


Plot 9-7. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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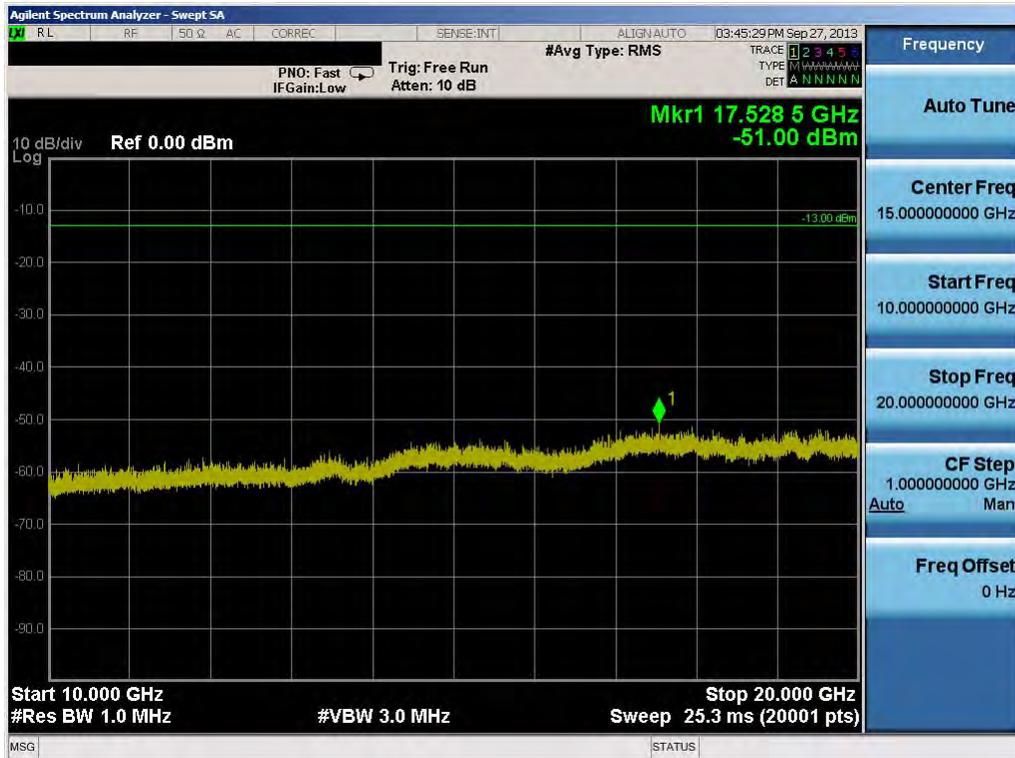


Plot 9-8. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 9-9. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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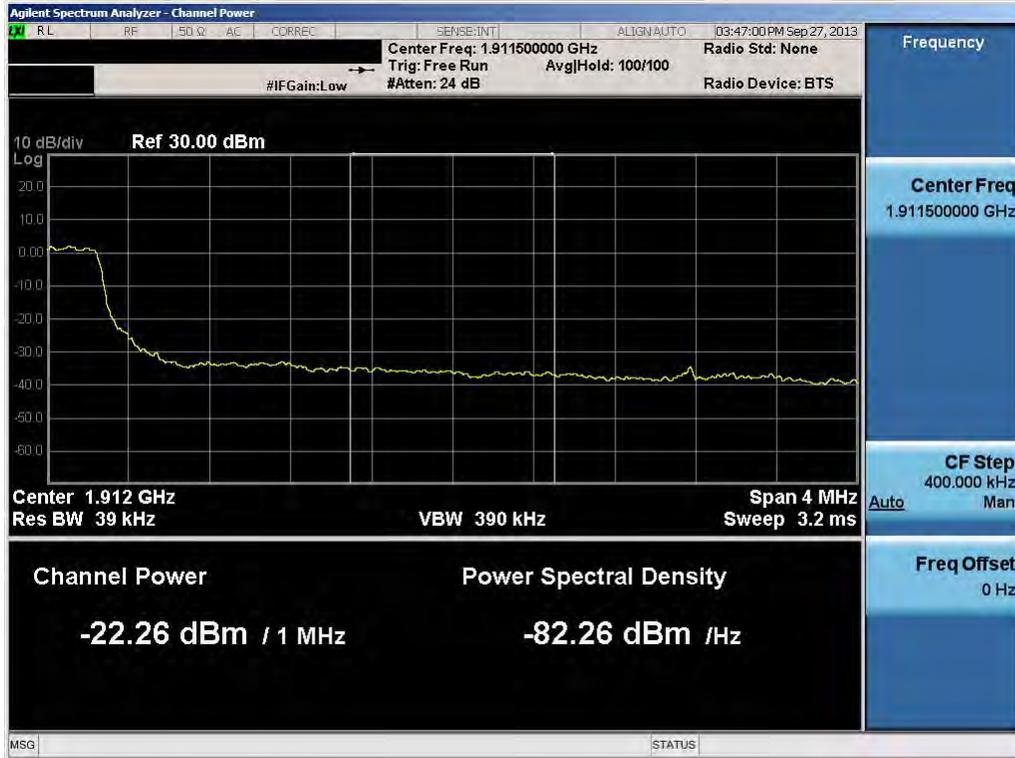


Plot 9-10. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

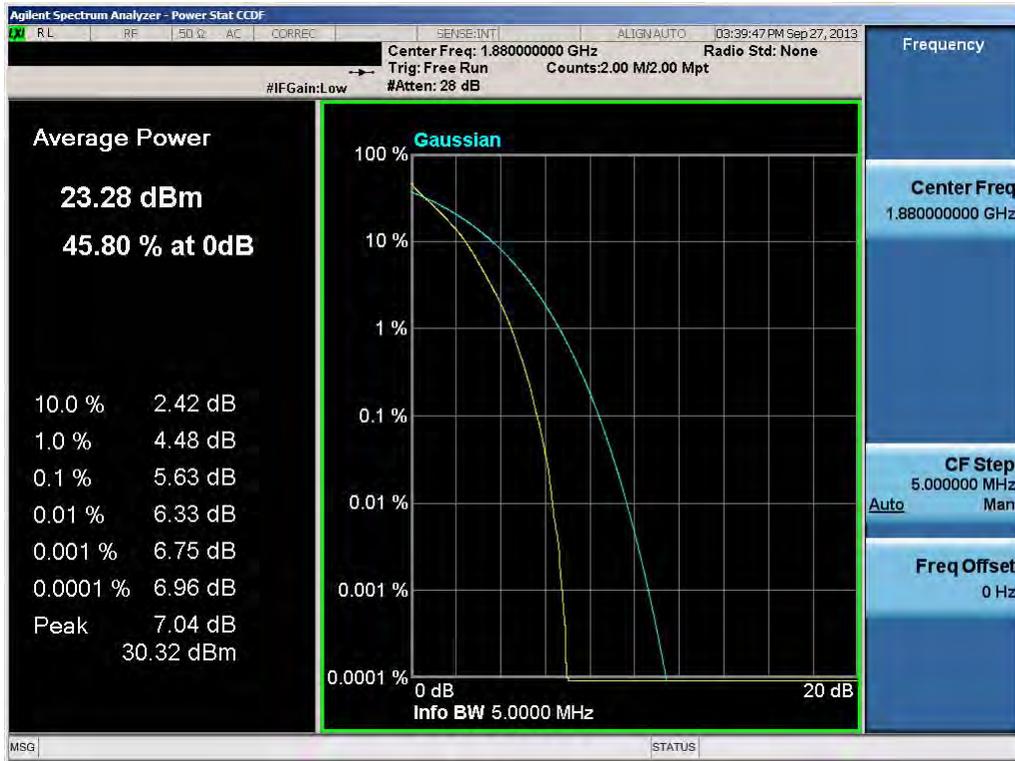


Plot 9-11. Upper Band Edge Plot (5.0MHz QPSK – RB Size 25)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 79 of 89

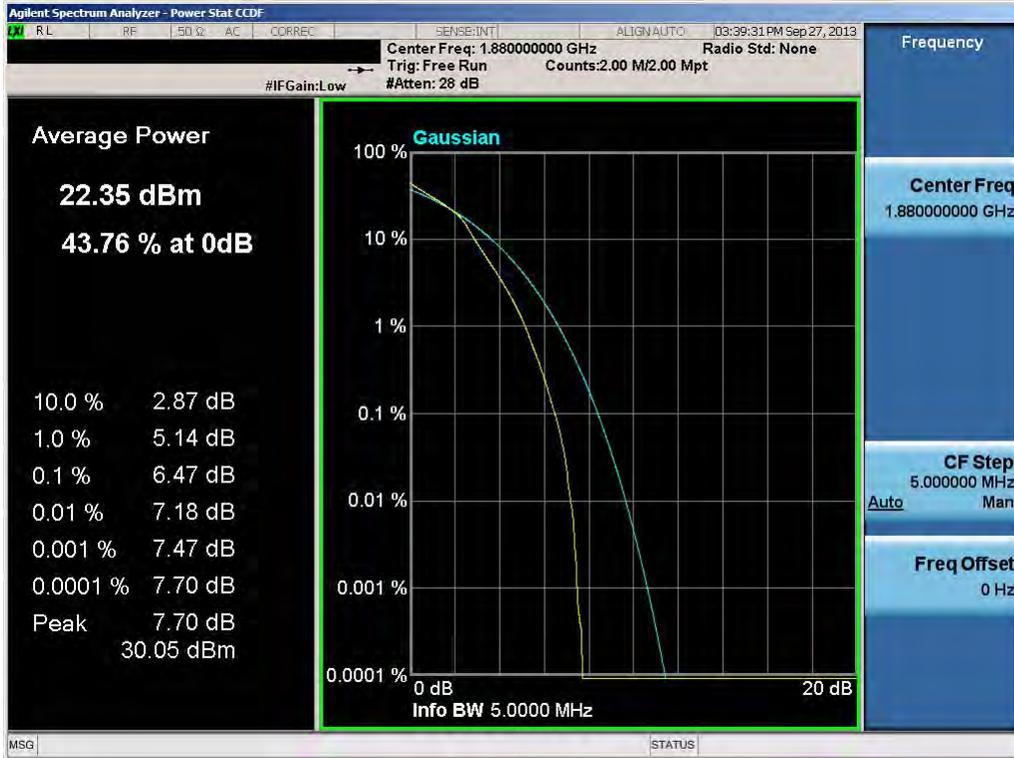


Plot 9-12. Upper Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)

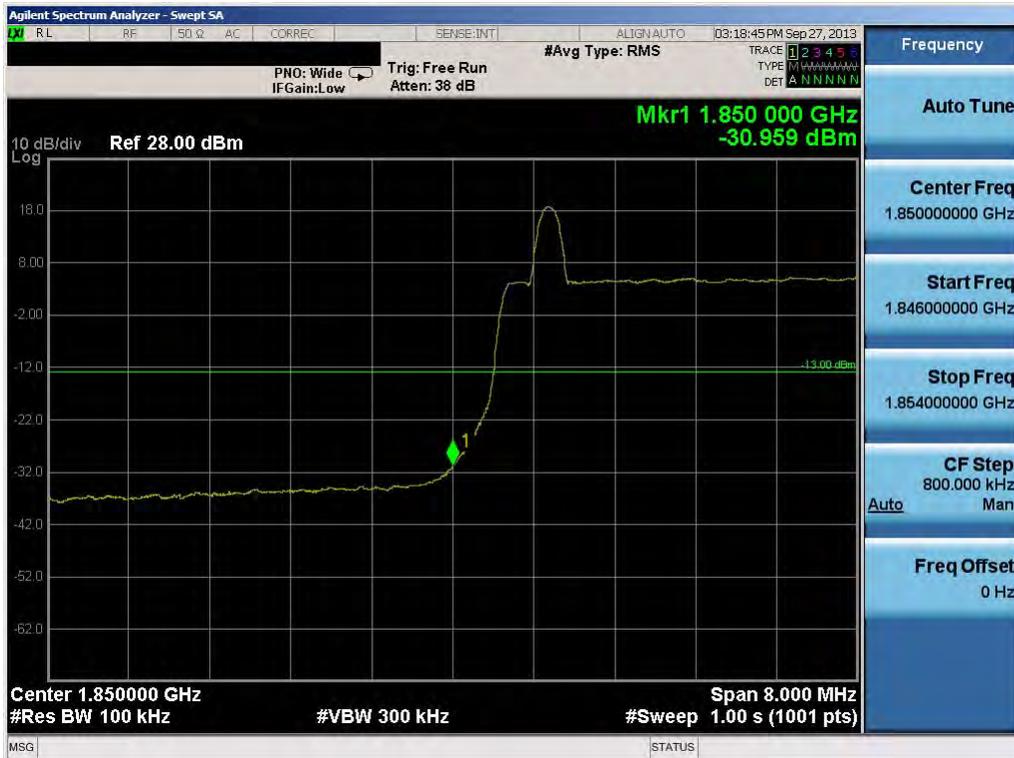


Plot 9-13. PAR Plot (5.0MHz QPSK – RB Size 25)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 80 of 89



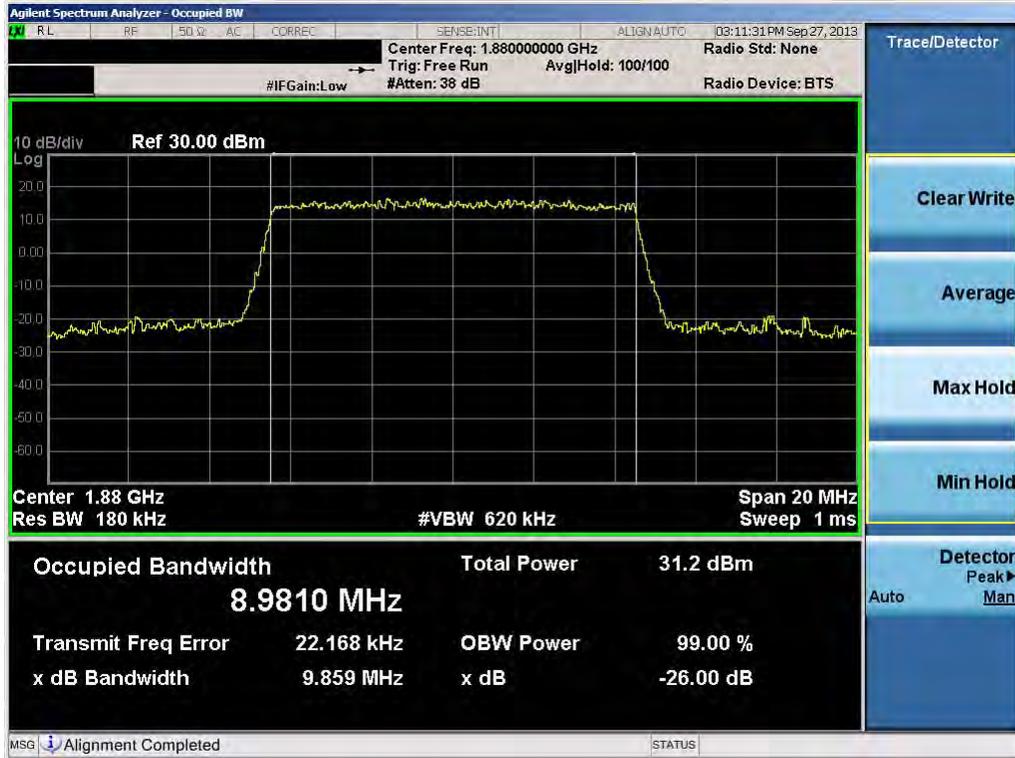
Plot 9-14. PAR Plot (5.0MHz 16-QAM – RB Size 25)



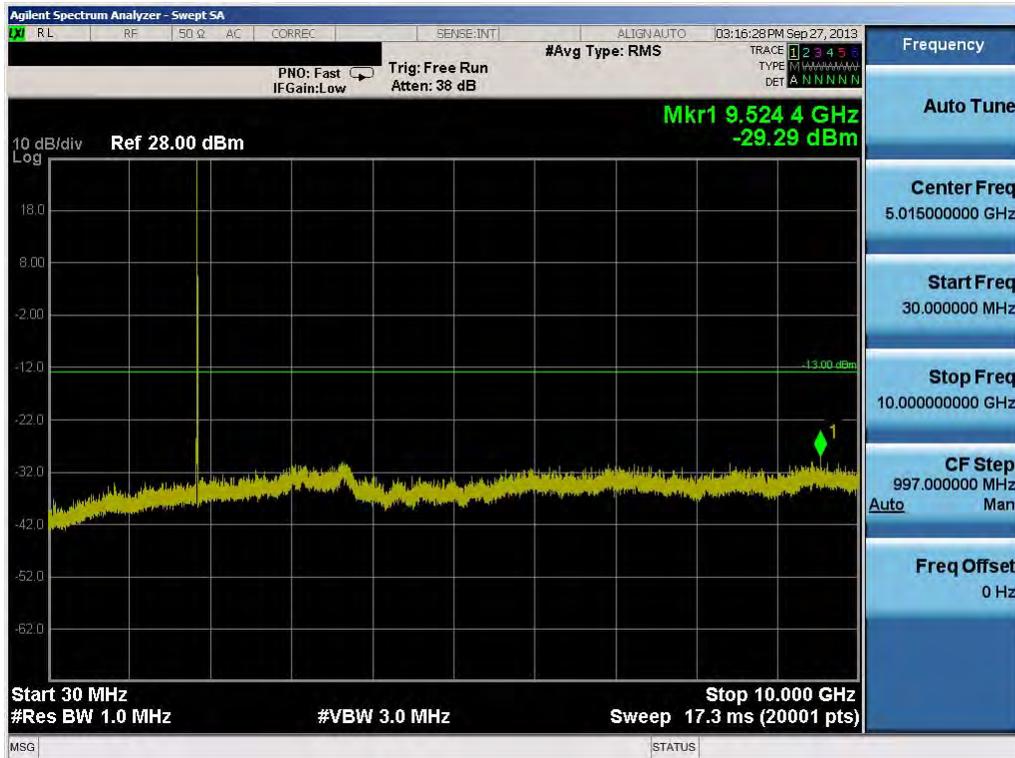
Plot 9-15. Lower Band Edge Plot (10.0MHz QPSK – RB Size 50)

FCC ID: ZNFD959	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>LG</b>	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 81 of 89



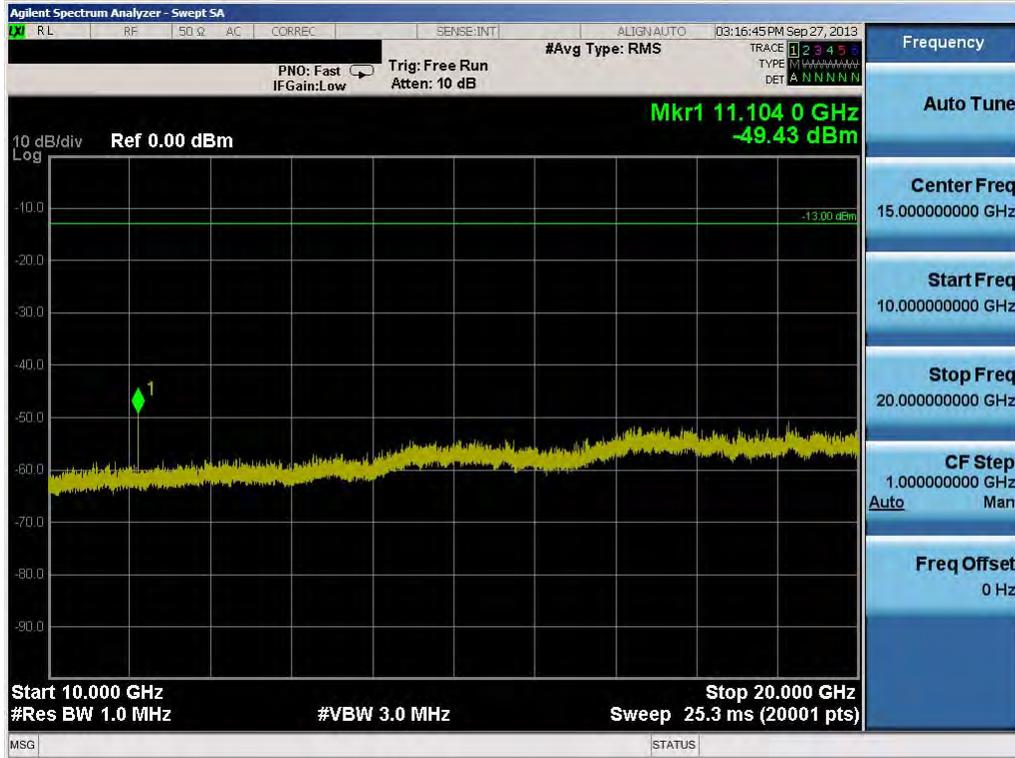


Plot 9-18. Occupied Bandwidth Plot (10.0MHz 16-QAM – RB Size 50)

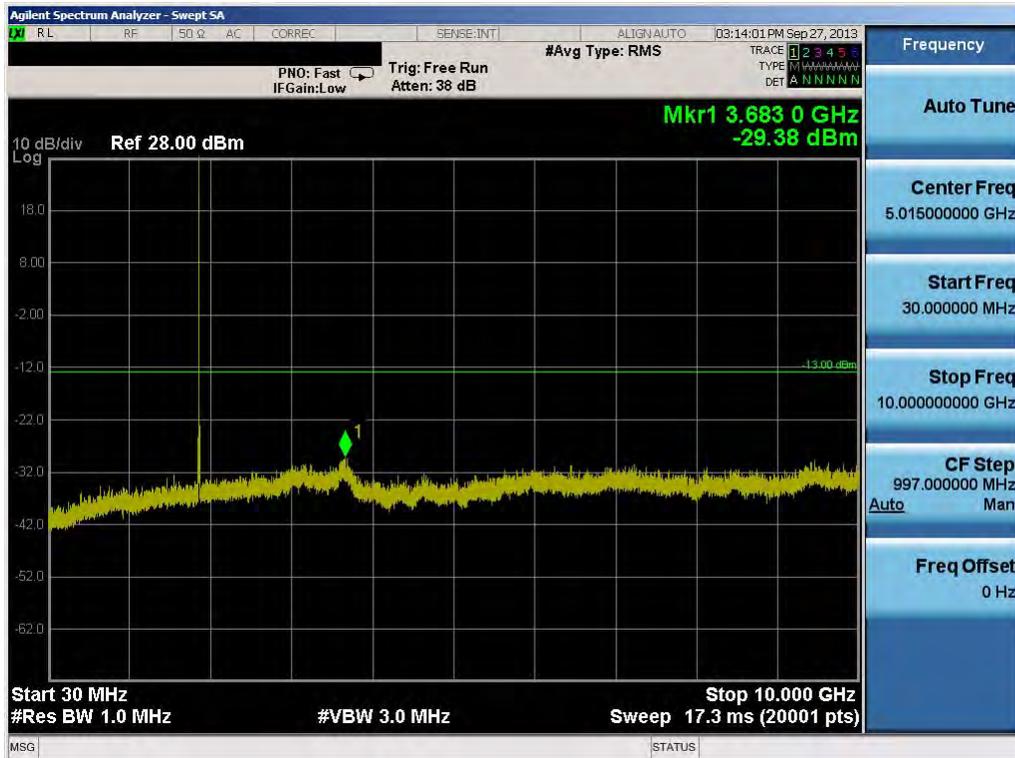


Plot 9-19. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0– Low Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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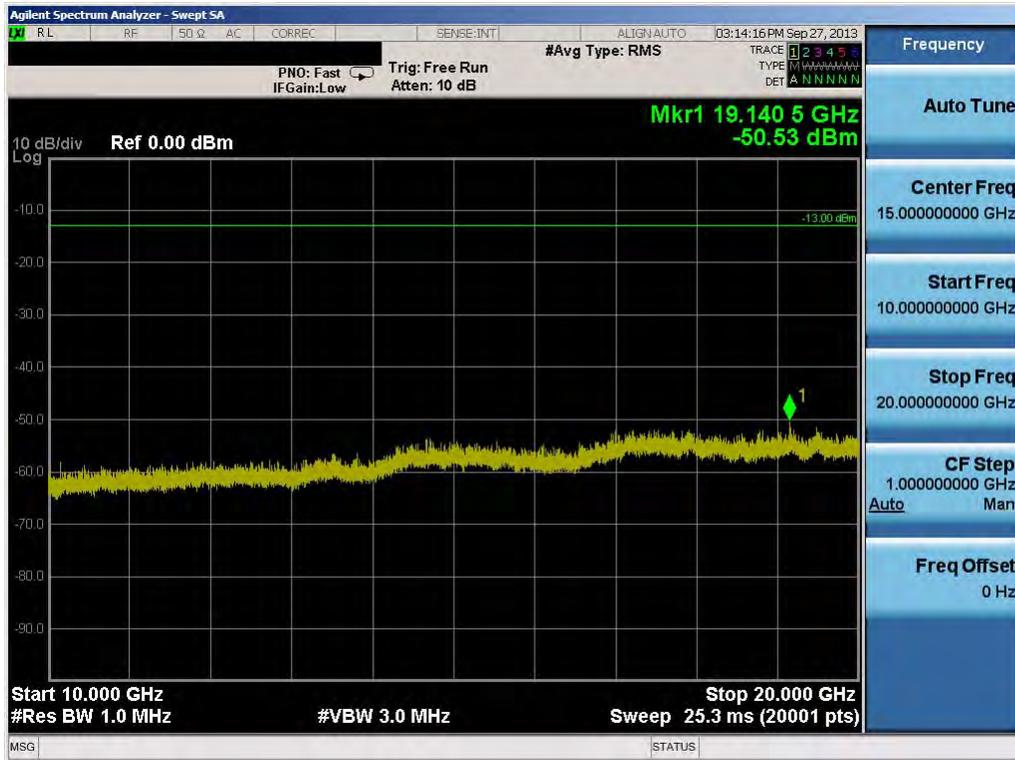


Plot 9-20. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

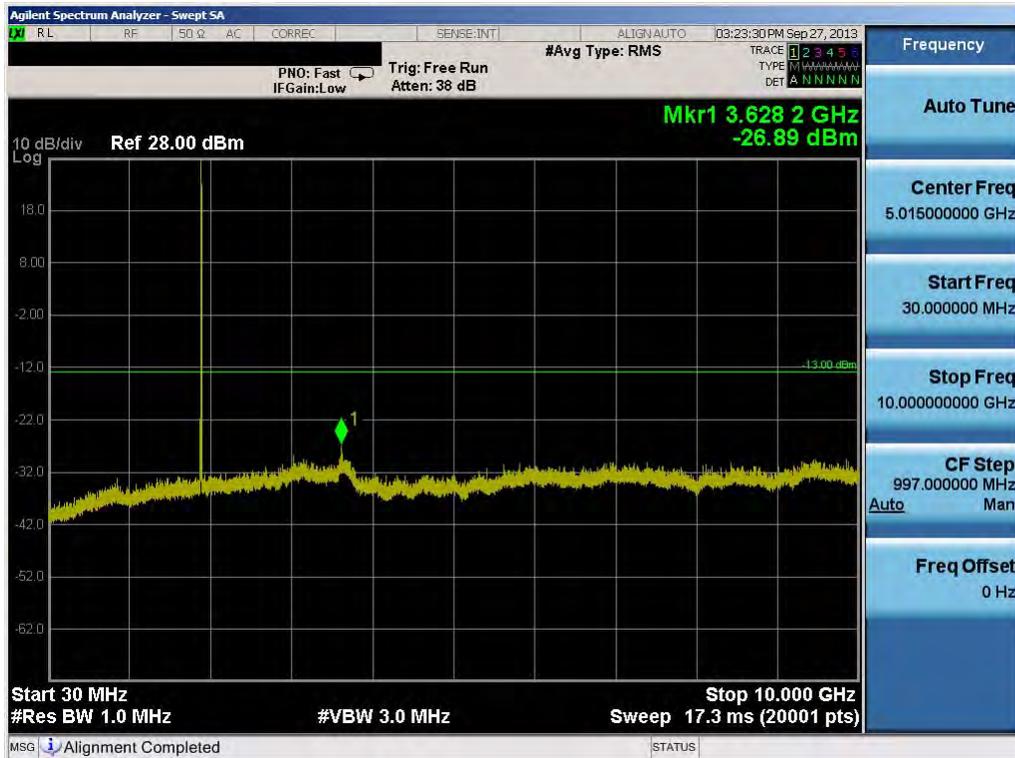


Plot 9-21. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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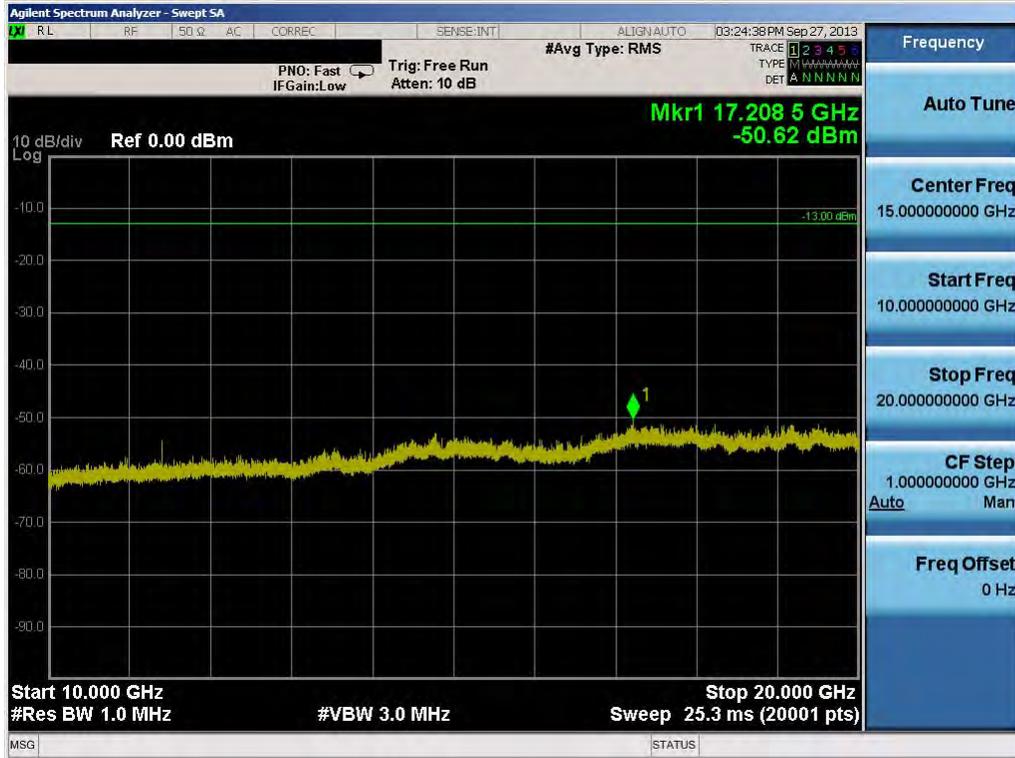


Plot 9-22. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)



Plot 9-23. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 9-24. Conducted Spurious Plot (10.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

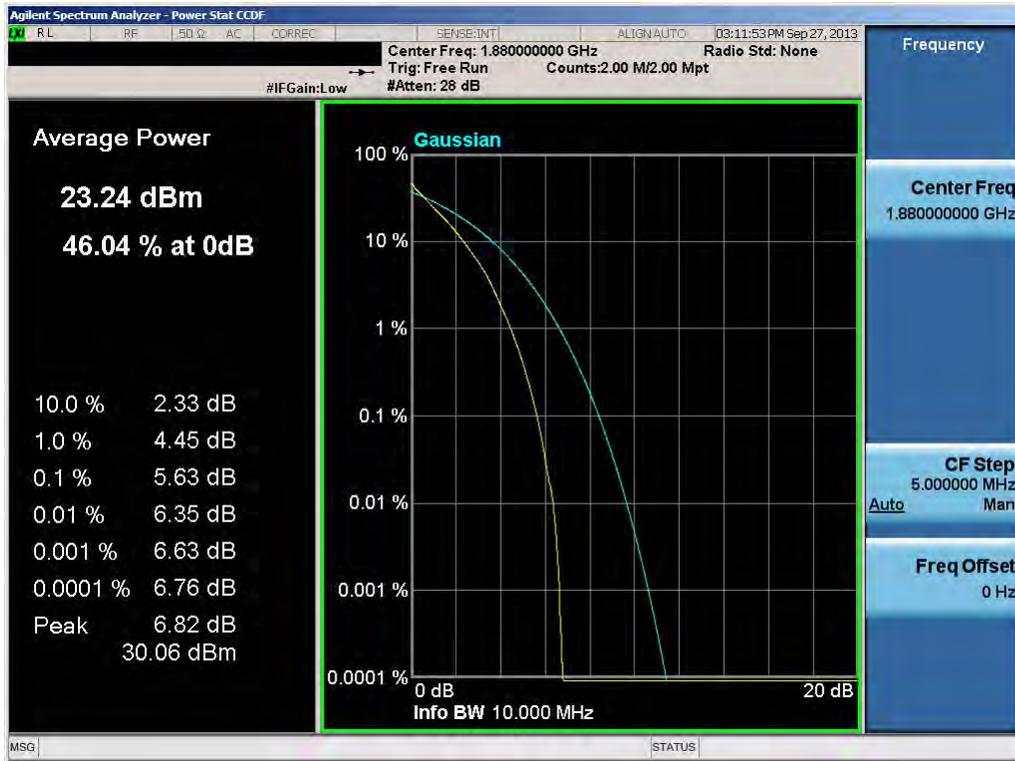


Plot 9-25. Upper Band Edge Plot (10.0MHz QPSK – RB Size 50)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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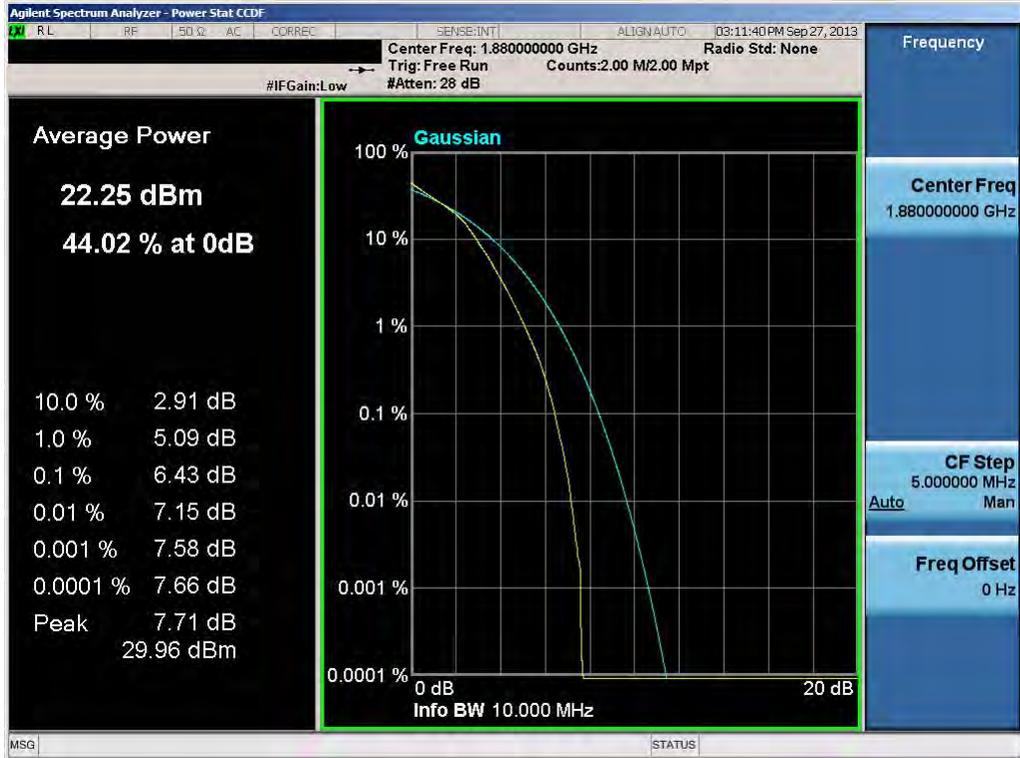


Plot 9-26. Upper Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)



Plot 9-27. PAR Plot (10.0MHz QPSK – RB Size 50)

FCC ID: ZNFD959		FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Plot 9-28. PAR Plot (10.0MHz 16-QAM – RB Size 50)**

FCC ID: ZNFD959	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24, & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1309161885.ZNF	Test Dates: 9/24-9/27/2013	EUT Type: Portable Handset		Page 88 of 89

## 10.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **LGE Portable Handset FCC ID: ZNFD959** complies with all the requirements of Parts 2, 24, 27 of the FCC rules for LTE operation only.

<b>FCC ID:</b> ZNFD959		<b>FCC Pt. 22, 24, &amp; 27 LTE MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1309161885.ZNF	<b>Test Dates:</b> 9/24-9/27/2013	<b>EUT Type:</b> Portable Handset	Page 89 of 89	