



# PCTEST ENGINEERING LABORATORY, INC.

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## MEASUREMENT REPORT FCC Part 27

**Applicant Name:**

Samsung Electronics Co., Ltd.  
416 Maetan 3-Dong, Yeongtong-gu  
Suwon-si, Gyeonggi-do  
443-742, Republic of Korea

**Date of Testing:**

Aug. 24 - Oct. 05, 2012

**Test Site/Location:**

PCTEST Lab., Columbia, MD, USA

**Test Report Serial No.:**

0Y1208241229.A3L

**FCC ID :**

**A3LSGHT899M**

**APPLICANT:**

**SAMSUNG ELECTRONICS CO., LTD.**

**Application Type:**

Certification

**FCC Classification:**

PCS Licensed Transmitter Held to Ear (PCE)

**FCC Rule Part(s):**

§2; §27

**EUT Type:**

Portable Handset

**Model(s):**

SGH-T899M

**Test Device Serial No.:**

identical prototype [S/N: FJ-224-E]



Mode	Tx Frequency (MHz)	Emission Designator	Modulation	ERP/EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE Band 4	1712.5 - 1752.5	4M49G7D	QPSK	0.369	25.672
LTE Band 4	1712.5 - 1752.5	4M48W7D	16QAM	0.292	24.652
LTE Band 4	1715 - 1750	8M91G7D	QPSK	0.354	25.496
LTE Band 4	1715 - 1750	8M90W7D	16QAM	0.311	24.926
LTE Band 4	1717.5 - 1747.5	13M4G7D	QPSK	0.361	25.570
LTE Band 4	1717.5 - 1747.5	13M4W7D	16QAM	0.267	24.270
LTE Band 4	1720 - 1745	17M7G7D	QPSK	0.304	24.833
LTE Band 4	1720 - 1745	17M7W7D	16QAM	0.253	24.033

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. 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.

PCTEST certifies that no party to this application has been subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.



  
Randy Ortanez  
President



FCC ID: A3LSGHT899M		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1208241229.A3L	Test Dates: Aug. 24 - Oct. 05, 2012	EUT Type: Portable Handset		Page 1 of 47

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## MEASUREMENT REPORT

### FCC Part 27



#### §2.1033 General Information



**APPLICANT:** Samsung Electronics Co., Ltd.  
**APPLICANT ADDRESS:** 416 Maetan 3-Dong, Yeongtong-gu  
 Suwon-si, Gyeonggi-do, 443-742 , Republic of Korea  
**TEST SITE:** PCTEST ENGINEERING LABORATORY, INC.  
**TEST SITE ADDRESS:** 7185 Oakland Mills Road, Columbia, MD 21046 USA  
**FCC RULE PART(S):** §2; §27  
**BASE MODEL:** SGH-T899M  
**FCC ID:** A3LSGHT899M  
**FCC CLASSIFICATION:** PCS Licensed Transmitter Held to Ear (PCE)  
**FREQUENCY TOLERANCE:**  $\pm 0.00025\%$  (2.5 ppm)  
**Test Device Serial No.:** FJ-224-E ☐ Production ☒ Pre-Production ☐ Engineering  
**DATE(S) OF TEST:** Aug. 24 - Oct. 05, 2012  
**TEST REPORT S/N:** 0Y1208241229.A3L

#### Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab. located in Columbia, MD 21045, 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.

### 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 located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance.

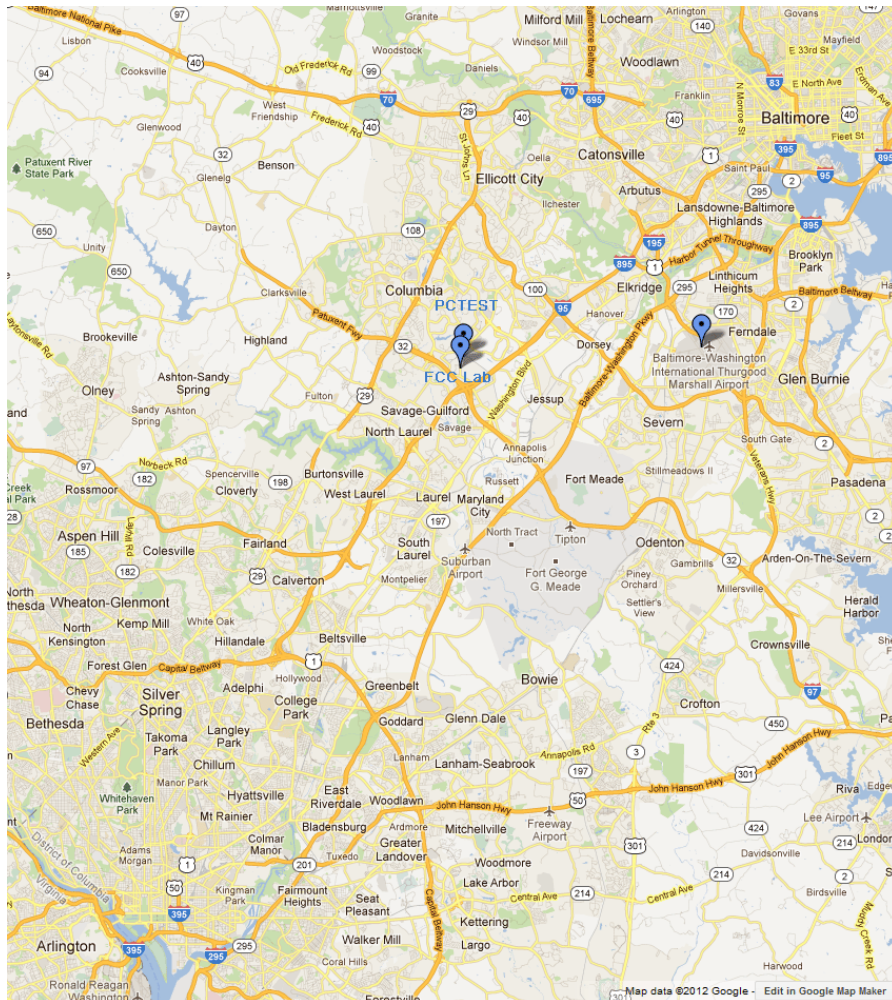


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSGHT899M**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function. The EUT consisted of the following component(s):

Trade Name / Base Model	FCC ID	Description
Samsung / Model: SGH-T899M	A3LSGHT899M	Portable Handset

**Table 2-1. EUT Equipment Description**

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA, Band 4 LTE, 802.11a/b/g/n WLAN (DTS/NII), Bluetooth (1x,EDR), NFC

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

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

### 2.4 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..



Per 15.19; Docket 95-19

In addition to this requirement, a device subject to certification shall be labeled as follows:

*This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the trade name and FCC ID must be displayed on the device per Section 15.19(b)(2).

Please see attachment for FCC ID label and label location.

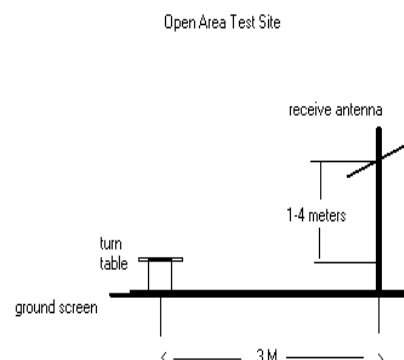
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## 3.0 DESCRIPTION OF TESTS

### 3.1 Measurement Procedure

The radiated spurious measurements were made outdoors at a 3-meter test range (See Figure 3-1). The equipment under test is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. This power level was recorded using a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This level is recorded with the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.



**Figure 3-1. Diagram of 3-meter outdoor test range**

Deviation from Measurement Procedure.....None

### 3.2 Occupied Bandwidth

#### §2.1049, RSS-Gen (4.6.1)

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. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual. The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

### 3.3 Block A Frequency Range

#### §27.5(c)

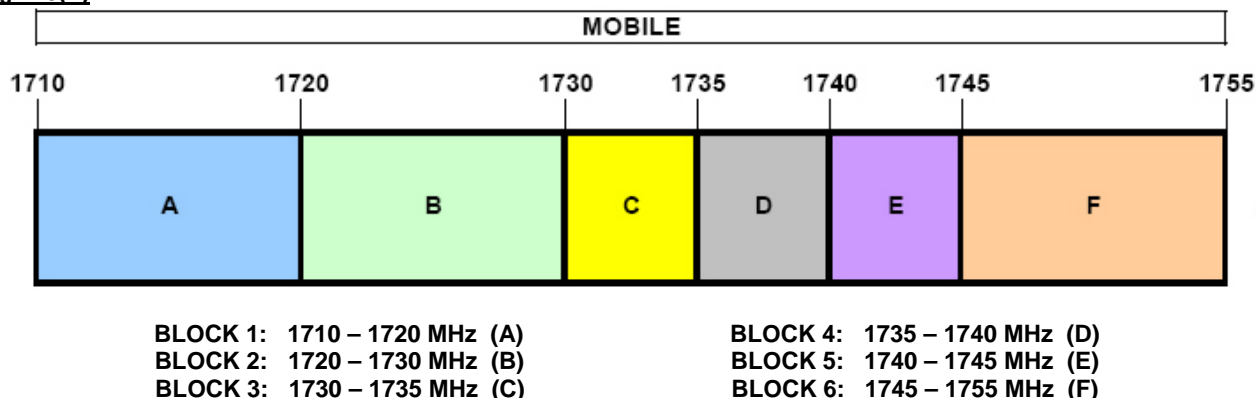
698-746 MHz band. The following frequencies are available for licensing pursuant to this part in the 698-746 MHz band: (1) Three paired channel blocks of 12 megahertz each are available for assignment as follows:

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.

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### 3.4 AWS - Mobile Frequency Blocks

§27.5(h)



### 3.5 Spurious and Harmonic Emissions at Antenna Terminal



§27.53(g), §27.53(h) RSS-133 (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. For Bands 5 and 12, Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. For Bands 2 and 4, compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. 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.

### 3.6 Radiated Power and Radiated Spurious Emissions

§27.53(g), §27.53(h) RSS-133 (6.5.1)

Radiated power and radiated spurious emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. This level is then measured with a broadband average power meter. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive average power meter reading. This spurious level is recorded with the power meter. For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

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### 3.7 Peak-Average Ratio

#### §27.50(d)(5)

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

### 3.8 Frequency Stability / Temperature Variation

#### §27.54, RSS-133 (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 – For Band 5, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency. For Bands 2, 4, and 17 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.*

#### **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
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	2/13/2012	Annual	2/13/2013	N/A
-	LTx2	Licensed Transmitter Cable Set	2/17/2012	Annual	2/17/2013	N/A
Agilent	8447D	Broadband Amplifier	5/8/2012	Annual	5/8/2013	1937A03348
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	2/15/2012	Annual	2/15/2013	3008A00985
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2011	Annual	10/10/2012	3613A00315
Agilent	E4432B	ESG-D Series Signal Generator	3/15/2012	Annual	3/15/2013	US40053896
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/5/2012	Annual	4/5/2013	MY45470194
Agilent	E8267C	Vector Signal Generator	10/10/2011	Biennial	10/10/2013	US42340152
Agilent	N9038A	MXE EMI Receiver	8/5/2012	Annual	8/5/2013	MY51210133
Agilent	N9030A	PXA Signal Analyzer	2/23/2012	Annual	2/23/2013	MY49432391
Anritsu	MA2411B	Power Sensor	3/5/2012	Annual	3/5/2013	846215
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
Emco	3115	Horn Antenna (1-18GHz)	4/8/2010	Biennial	4/8/2012	9205-3874
Espec	ESX-2CA	Environmental Chamber	4/4/2012	Annual	4/4/2013	17620
Mini-Circuits	VHF-3100+	High Pass Filter	2/7/2012	Annual	2/7/2013	31144
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	N/A		N/A	100976
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)	7/5/2011	Biennial	7/5/2013	A050307
Sunol	DRH-118	Horn Antenna (1-18 GHz)	6/17/2011	Biennial	6/17/2013	A042511

**Table 4-1. Test Equipment**

**Note: Rohde & Schwarz Model: CMW500 was used for signaling purposes only and not for calibrated measurements. Care was taken to ensure that testing occurred while test equipment was in calibration.**

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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 receive power meter 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 power meter. 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: Samsung Electronics Co., Ltd.  
 FCC ID: A3LSGHT899M  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): LTE

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
<b>TRANSMITTER MODE (TX)</b>						
2.1049	RSS-Gen (4.6.1) RSS-133 (2.3)	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.0
27.53(g), 27.53(h)	RSS-133 (6.5.1)	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
27.50(d)(5)	RSS-133 (6.4)	Peak-Average Ratio	$< 13 \text{ dB}$		PASS	Section 7.0
2.1046	RSS-133 (4.1)	Transmitter Conducted Output Power	N/A		PASS	SAR Report
27.50(d)(4)		Equivalent Isotropic Radiated Power (Band 4)	$< 1 \text{ Watts max. EIRP}$	RADIATED	PASS	Section 6.2
27.53(g), 27.53(h)	RSS-133 (6.5.1)	Undesirable Emissions	$< 43 + 10\log_{10}(P[\text{Watts}])$ for all out-of-band emissions		PASS	Section 6.4, 6.5, 6.6, 6.7
27.54	RSS-133 (6.3)	Frequency Stability	$< 2.5 \text{ ppm}$		PASS	Section 6.8, 6.9, 6.10, 6.11

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

FCC ID: A3LSGHT899M		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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## 6.2 Equivalent Isotropic Radiated Power Output Data

§24.232(c); §27.50(d)(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	16.78	8.08	H	24.86	0.306	-5.14
1732.50	5	QPSK	Standard	1 / 0	17.70	7.97	H	25.67	0.369	-4.33
1752.50	5	QPSK	Standard	1 / 0	15.56	7.86	H	23.42	0.220	-6.58
1712.50	5	16-QAM	Standard	1 / 0	15.91	8.08	H	23.99	0.251	-6.01
1732.50	5	16-QAM	Standard	1 / 0	16.68	7.97	H	24.65	0.292	-5.35
1752.50	5	16-QAM	Standard	1 / 0	14.48	7.86	H	22.34	0.171	-7.66
1715.00	10	QPSK	Standard	1 / 0	15.12	8.07	H	23.19	0.208	-6.81
1732.50	10	QPSK	Standard	1 / 0	17.41	7.97	H	25.38	0.345	-4.62
1750.00	10	QPSK	Standard	1 / 0	17.62	7.88	H	25.50	0.354	-4.50
1715.00	10	16-QAM	Standard	1 / 0	14.45	8.07	H	22.52	0.179	-7.48
1732.50	10	16-QAM	Standard	1 / 0	15.90	7.97	H	23.87	0.244	-6.13
1750.00	10	16-QAM	Standard	1 / 0	17.05	7.88	H	24.93	0.311	-5.07
1717.50	15	QPSK	Standard	1 / 0	15.97	8.06	H	24.03	0.253	-5.97
1732.50	15	QPSK	Standard	1 / 0	15.37	7.97	H	23.34	0.216	-6.66
1747.50	15	QPSK	Standard	1 / 0	17.68	7.89	H	25.57	0.361	-4.43
1717.50	15	16-QAM	Standard	1 / 0	14.78	8.06	H	22.84	0.192	-7.16
1732.50	15	16-QAM	Standard	1 / 0	14.48	7.97	H	22.45	0.176	-7.55
1747.50	15	16-QAM	Standard	1 / 0	16.38	7.89	H	24.27	0.267	-5.73
1720.00	20	QPSK	Standard	1 / 0	14.38	8.04	H	22.42	0.175	-7.58
1732.50	20	QPSK	Standard	1 / 0	15.33	7.97	H	23.30	0.214	-6.70
1745.00	20	QPSK	Standard	1 / 0	16.93	7.90	H	24.83	0.304	-5.17
1720.00	20	16-QAM	Standard	1 / 0	13.10	8.04	H	21.14	0.130	-8.86
1732.50	20	16-QAM	Standard	1 / 0	14.35	7.97	H	22.32	0.171	-7.68
1745.00	20	16-QAM	Standard	1 / 0	16.13	7.90	H	24.03	0.253	-5.97



**Table 6-2. Equivalent Isotropic Radiated Power Output Data (Band 4)**

### NOTES:

Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This level is recorded using the power meter. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with QPSK, RB = 1, offset = 0, and BW = 5MHz. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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### 6.3 Band 4 Radiated Measurements

\$2.1053, \$27.53(h)

#### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1712.50 MHz  
CHANNEL: 19975  
MEASURED OUTPUT POWER: 24.86 dBm = 0.306 W  
MODULATION SIGNAL: QPSK  
BANDWIDTH: 5 MHz  
DISTANCE: 3 meters  
LIMIT:  $43 + 10 \log_{10} (W) =$  37.86 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3425.00	-39.14	9.34	-29.80	H	54.66
5137.50	-53.53	10.96	-42.57	H	67.43
6850.00	-85.85	10.51	-75.34	H	100.20
8562.50	-83.13	11.07	-72.06	H	96.93
10275.00	-82.01	12.47	-69.53	H	94.40
11987.50	-77.49	12.45	-65.04	H	89.90



**Table 6-3. Radiated Spurious Data (Ch. 19975)**

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with QPSK, RB = 1, offset = 0, and BW = 5MHz. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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## Band 4 Radiated Measurements (cont'd)

§2.1053, §27.53(h)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1732.50 MHz  
 CHANNEL: 20175  
 MEASURED OUTPUT POWER: 25.67 dBm = 0.369 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10} (W) = 38.67$  dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3465.00	-42.66	9.47	-33.19	H	58.86
5197.50	-53.51	10.87	-42.64	H	68.32
6930.00	-85.94	10.68	-75.26	H	100.93
8662.50	-82.96	11.25	-71.72	H	97.39
10395.00	-81.66	12.52	-69.14	H	94.81
12127.50	-76.63	12.28	-64.35	H	90.02



Table 6-4. Radiated Spurious Data (Ch. 20175)

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with QPSK, RB = 1, offset = 0, and BW = 5MHz. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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## Band 4 Radiated Measurements (cont'd)

§2.1053, §27.53(h)

### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1752.50 MHz  
 CHANNEL: 20375  
 MEASURED OUTPUT POWER: 23.42 dBm = 0.220 W  
 MODULATION SIGNAL: QPSK  
 BANDWIDTH: 5 MHz  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) = 36.42$  dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3505.00	-42.54	9.58	-32.96	H	56.38
5257.50	-53.04	10.54	-42.49	H	65.92
7010.00	-86.06	10.86	-75.20	H	98.62
8762.50	-83.09	11.52	-71.57	H	94.99
10515.00	-81.34	12.56	-68.77	H	92.20
12267.50	-76.43	12.40	-64.03	H	87.46



Table 6-5. Radiated Spurious Data (Ch. 20375)

#### NOTES:

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with QPSK, RB = 1, offset = 0, and BW = 5MHz. This unit was tested with its standard battery. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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## 6.4 Band 4 Frequency Stability Measurements

\$2.1055, \$27.54, RSS-133 (6.3)

OPERATING FREQUENCY: 1,732,500,000 Hz

CHANNEL: 20175



REFERENCE VOLTAGE: 3.7 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	1,732,499,983	-17	-0.000001
100 %		- 30	1,732,499,984	-16	-0.000001
100 %		- 20	1,732,500,020	20	0.000001
100 %		- 10	1,732,500,018	18	0.000001
100 %		0	1,732,499,988	-12	-0.000001
100 %		+ 10	1,732,499,981	-19	-0.000001
100 %		+ 20	1,732,499,983	-17	-0.000001
100 %		+ 30	1,732,500,023	23	0.000001
100 %		+ 40	1,732,499,990	-10	-0.000001
100 %		+ 50	1,732,500,014	14	0.000001
115 %	4.26	+ 20	1,732,499,978	-22	-0.000001
85 %	3.15	+ 20	1,732,499,975	-25	-0.000001

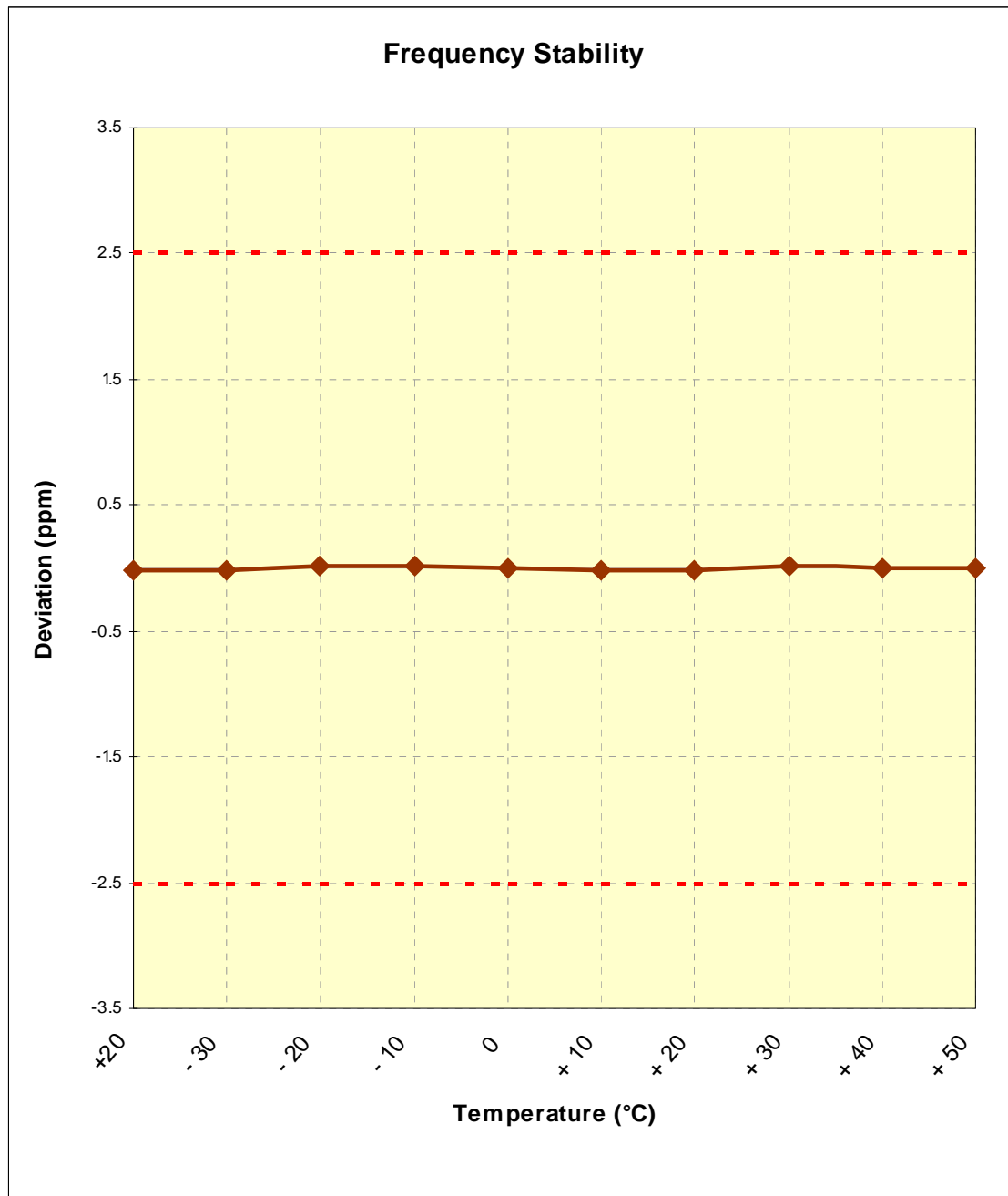
**Table 6-6. Frequency Stability Data (Band 4)**

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Note: Carrier Frequency Stability Measurements performed according to ANSI/TI/EIA-603-C-2004, Aug. 17, 2004



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**Band 4 Frequency Stability Measurements (Cont'd)**  
**§2.1055, §27.54; RSS-133 (6.3)**



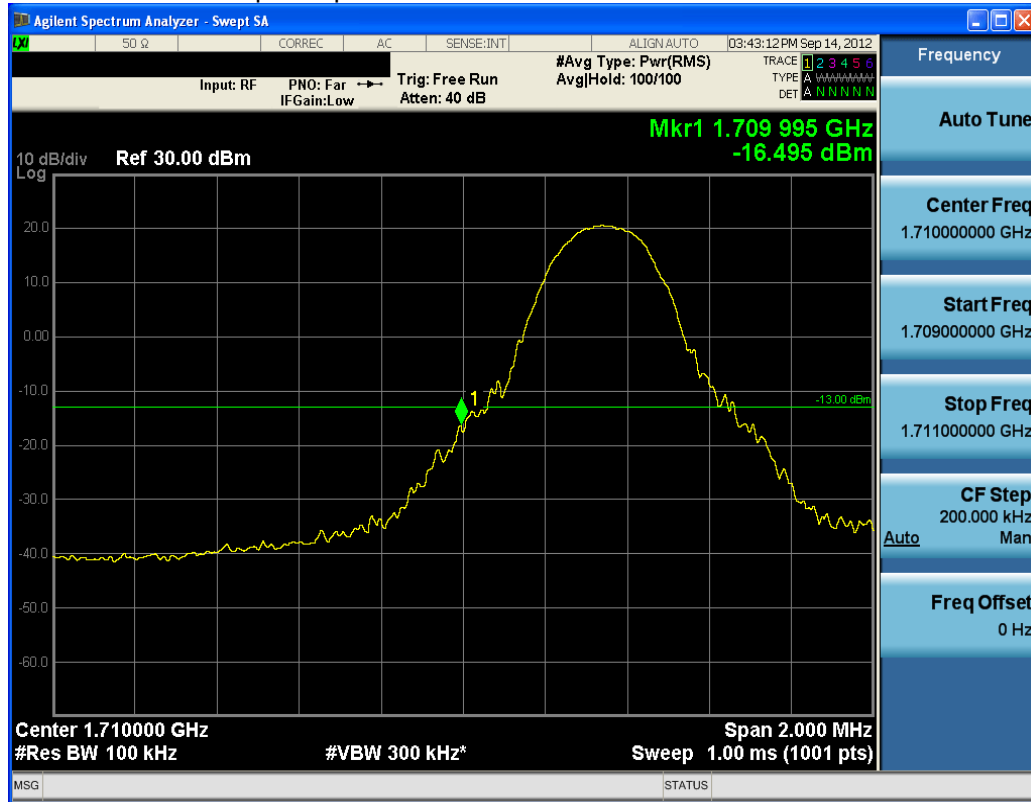
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Note: Carrier Frequency Stability Measurements performed according to ANSI/TI/EIA-603-C-2004, Aug. 17, 2004

FCC ID: A3LSGHT899M		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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## 7.0 PLOT(S) OF EMISSIONS – BAND 4 (5 MHz)

Note: For all out-of-band spurious emissions, the RB sizes and offsets that produced the worst case emissions are indicated in the plot captions.

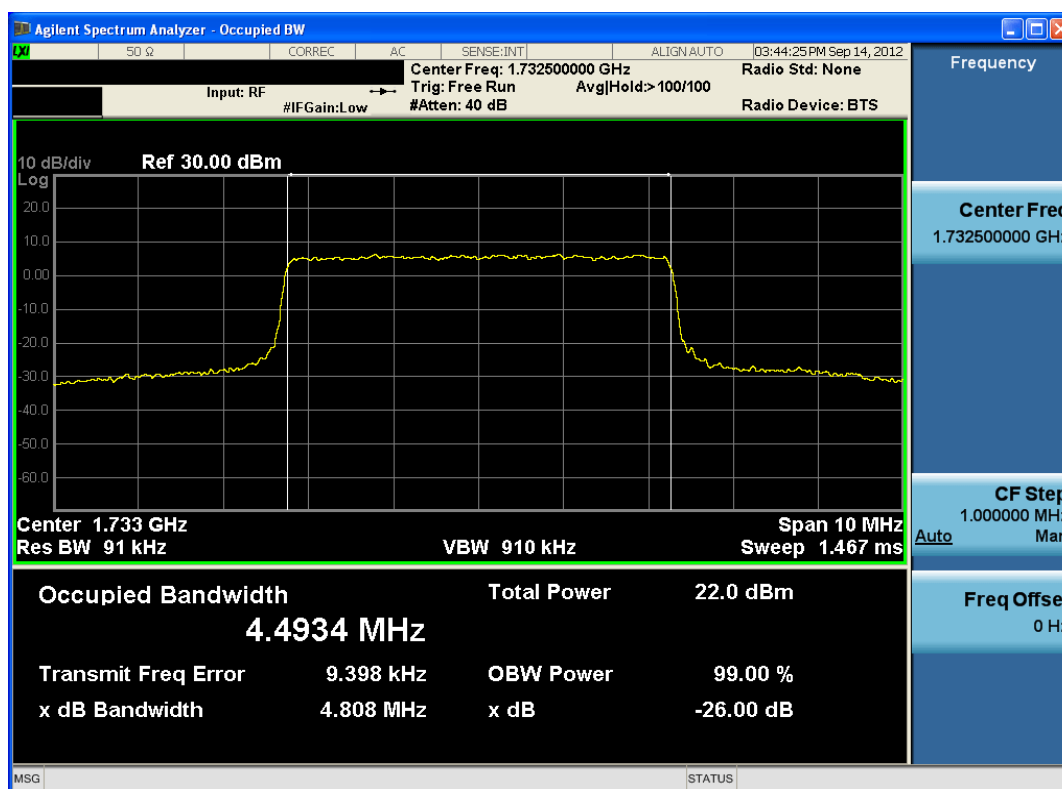


Plot 7-49. Lower Band Edge Plot (QPSK – RB Size 25)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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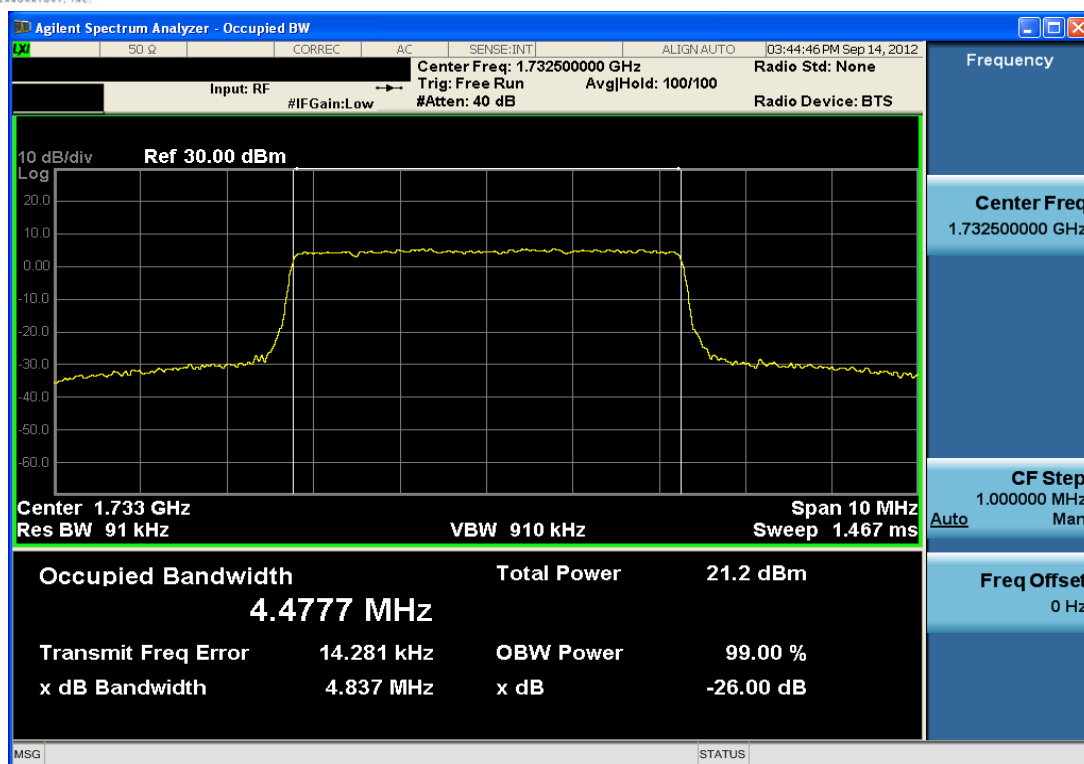


Plot 7-50. Lower Band Edge Plot (QPSK – RB Size 1, Offset 0)

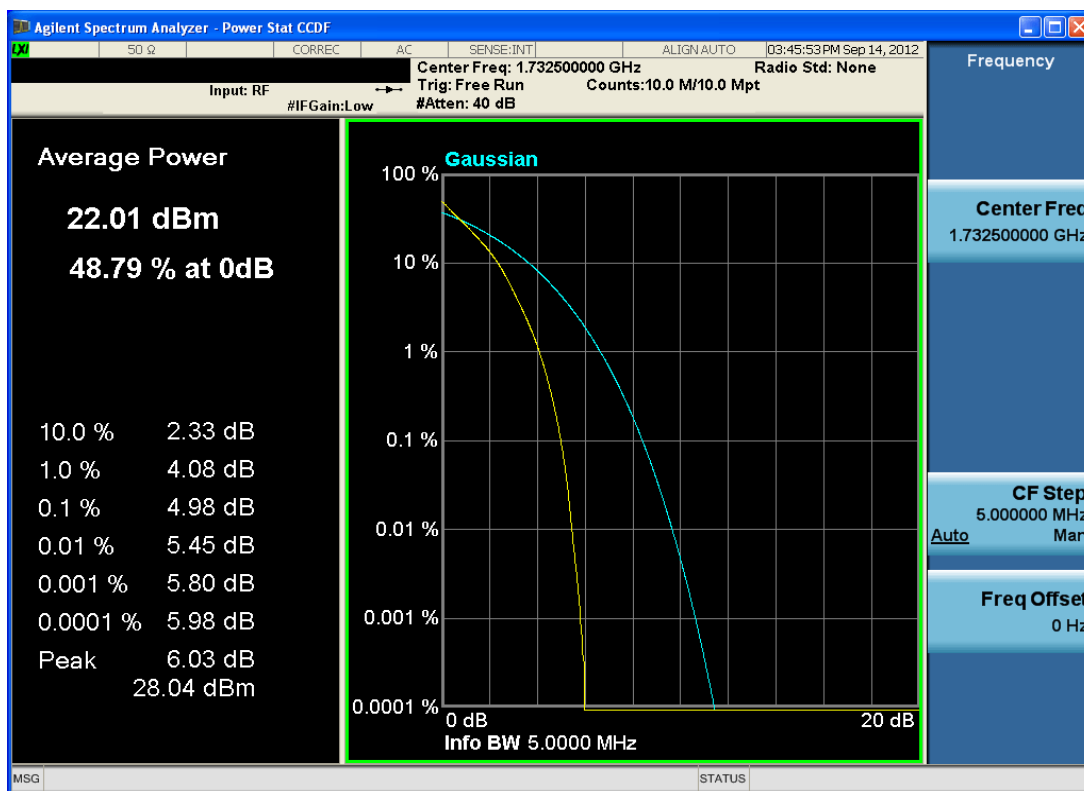


Plot 7-51. Occupied Bandwidth Plot (QPSK – RB Size 25)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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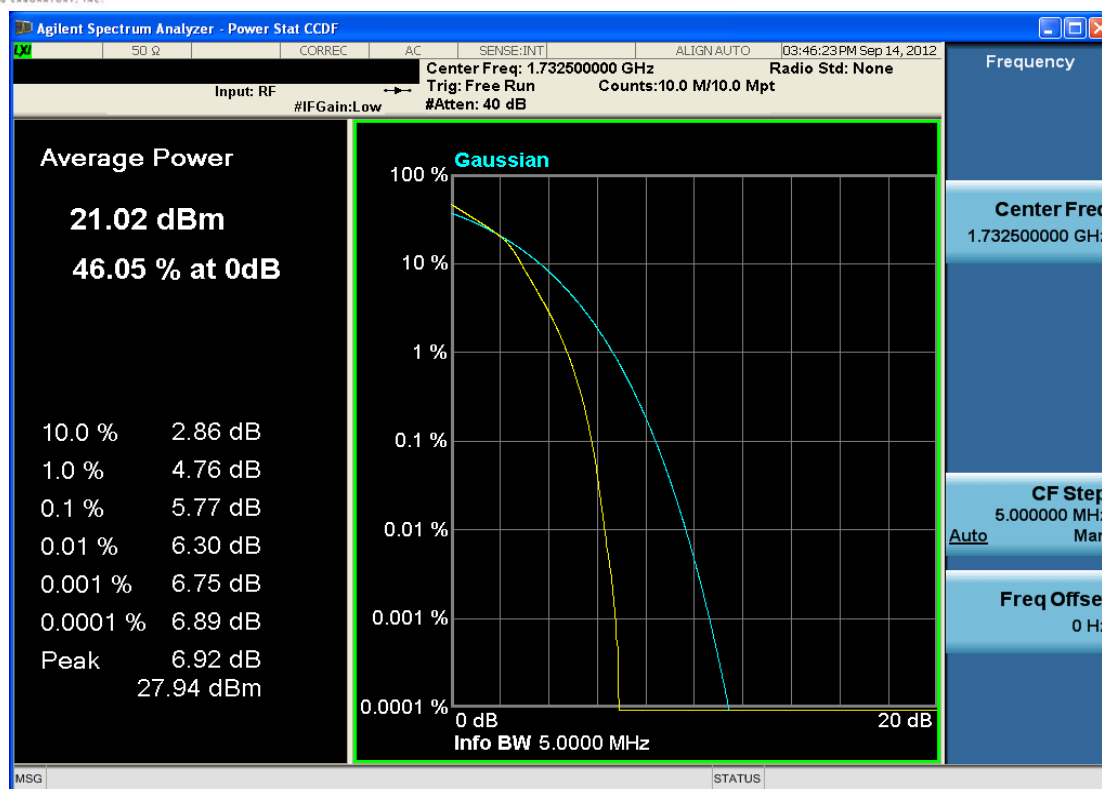
Plot 7-52. Occupied Bandwidth Plot (16-QAM – RB Size 25)



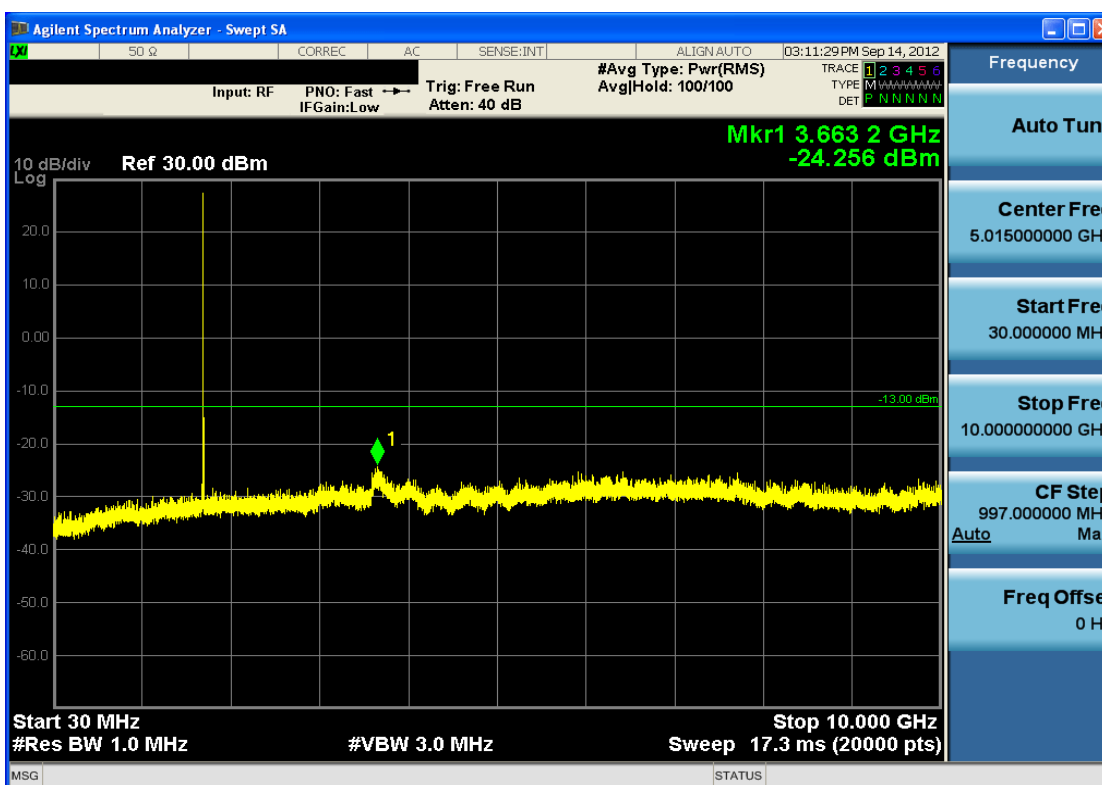
Plot 7-53. Peak to Average Ratio Plot (QPSK - RB Size 25)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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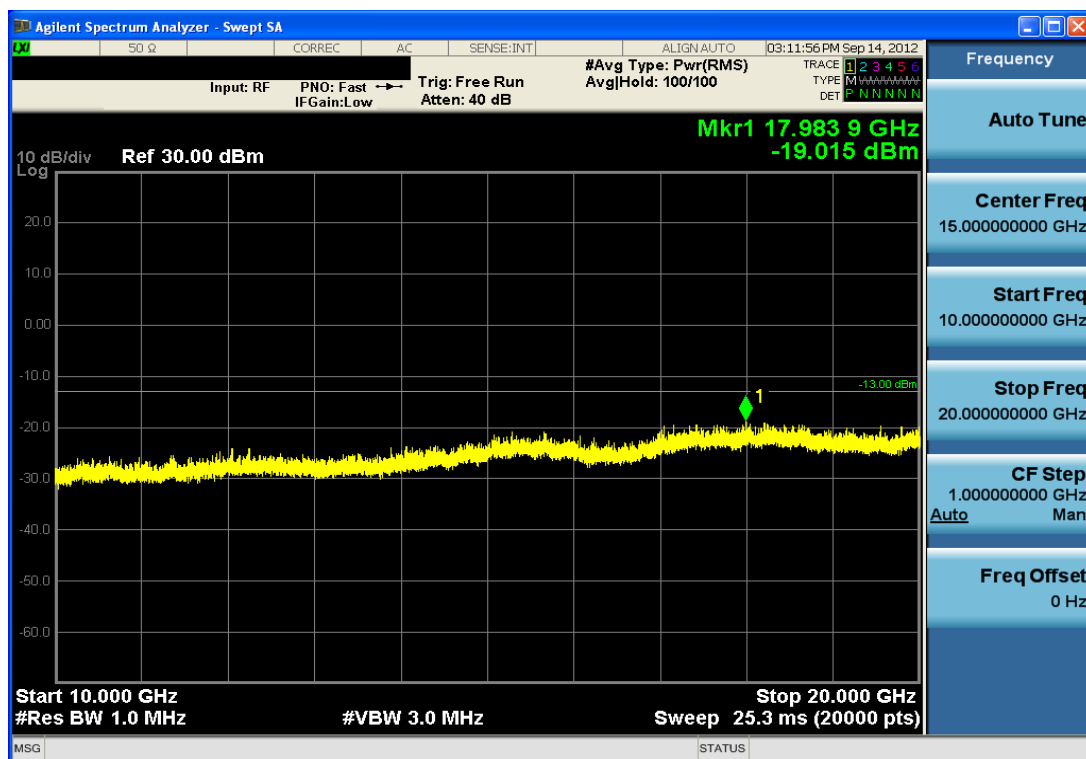


Plot 7-54. Peak to Average Ratio Plot (16QAM - RB Size 25)

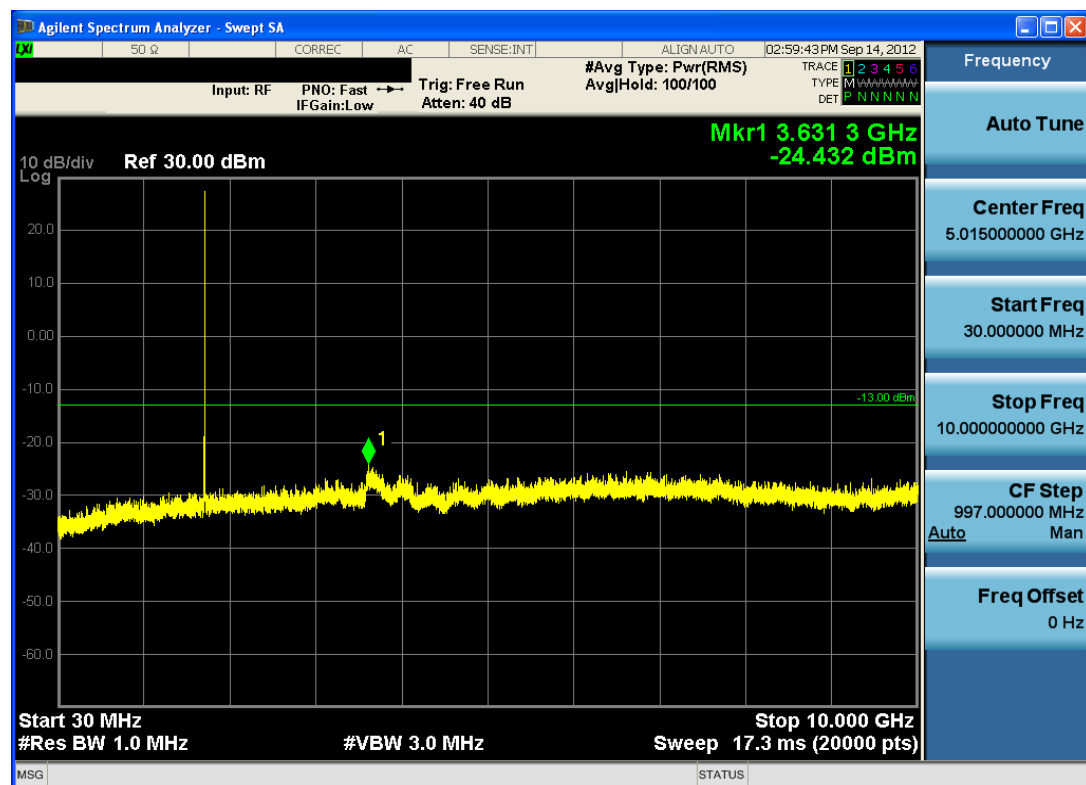


Plot 7-55. Conducted Spurious Plot (QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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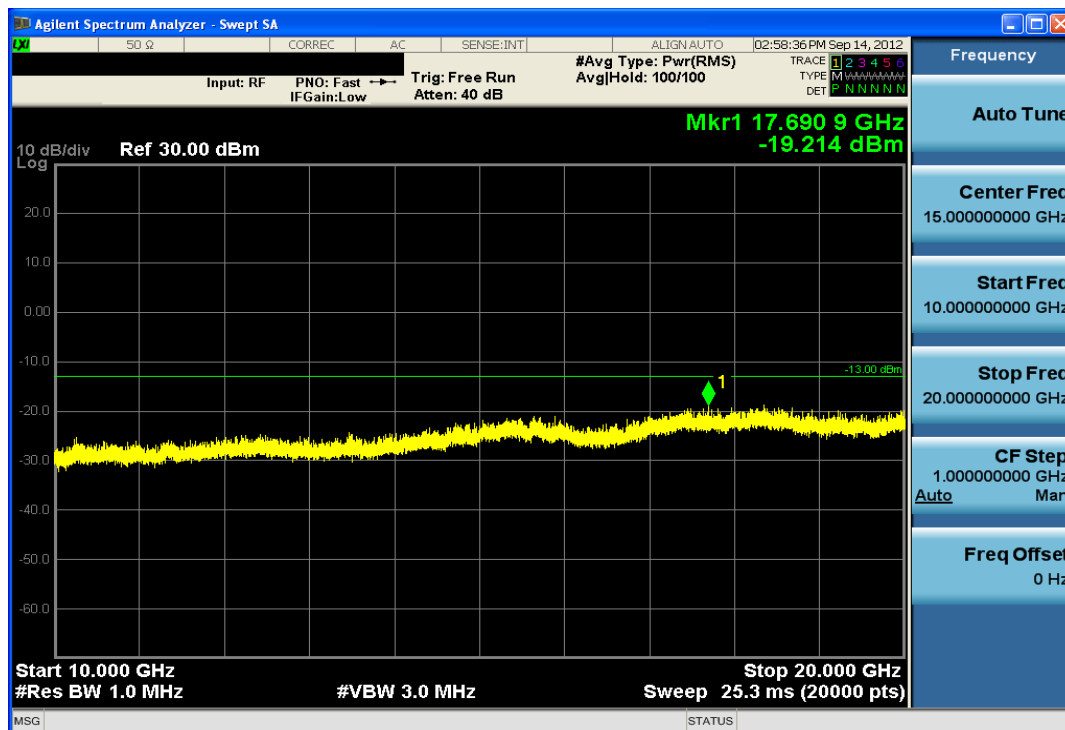


Plot 7-56. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)

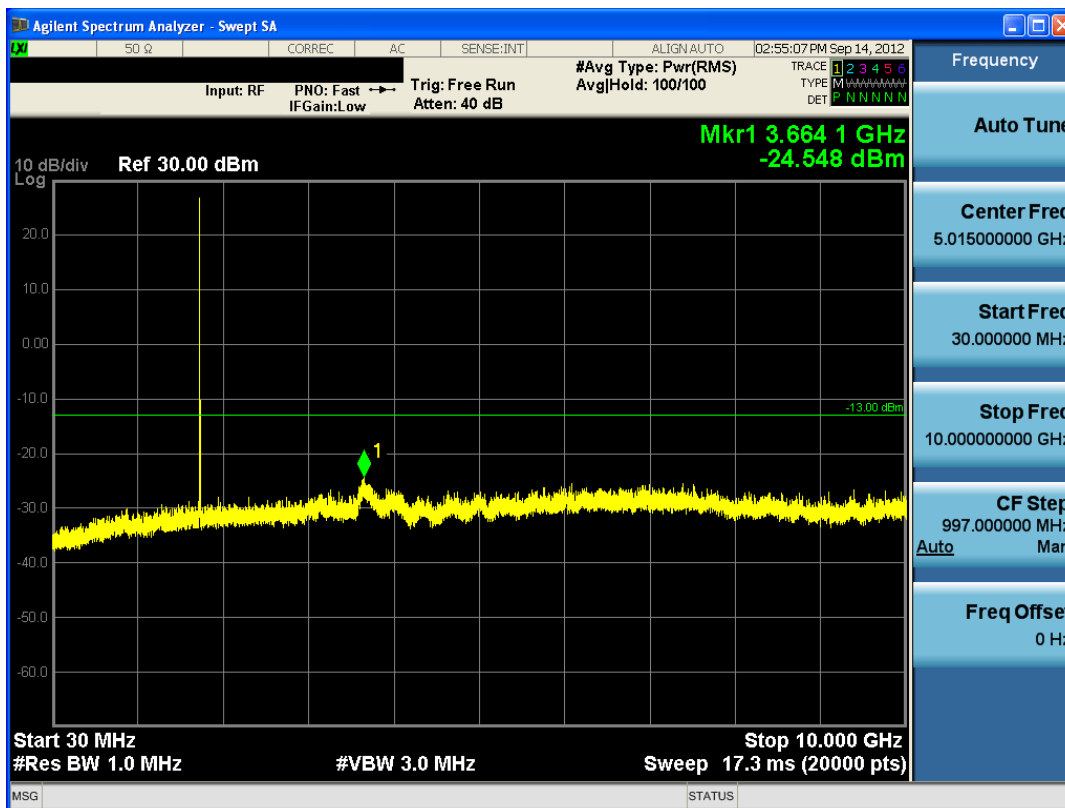


Plot 7-57. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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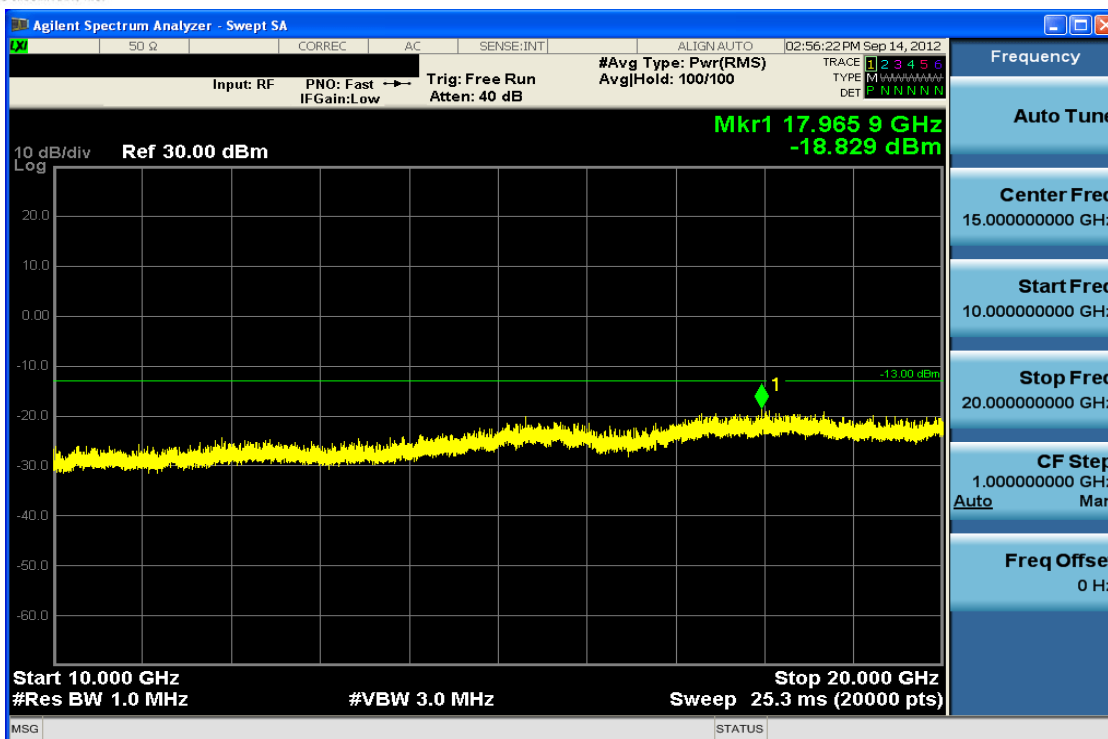


Plot 7-58. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

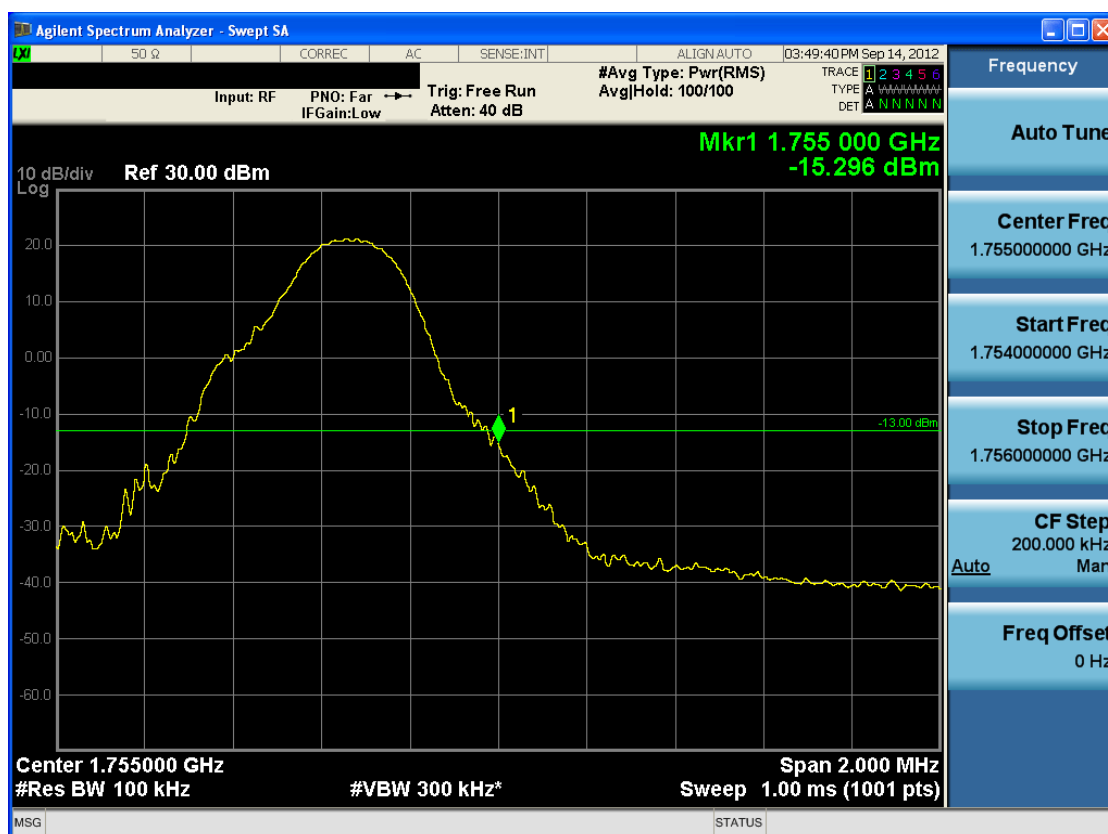


Plot 7-59. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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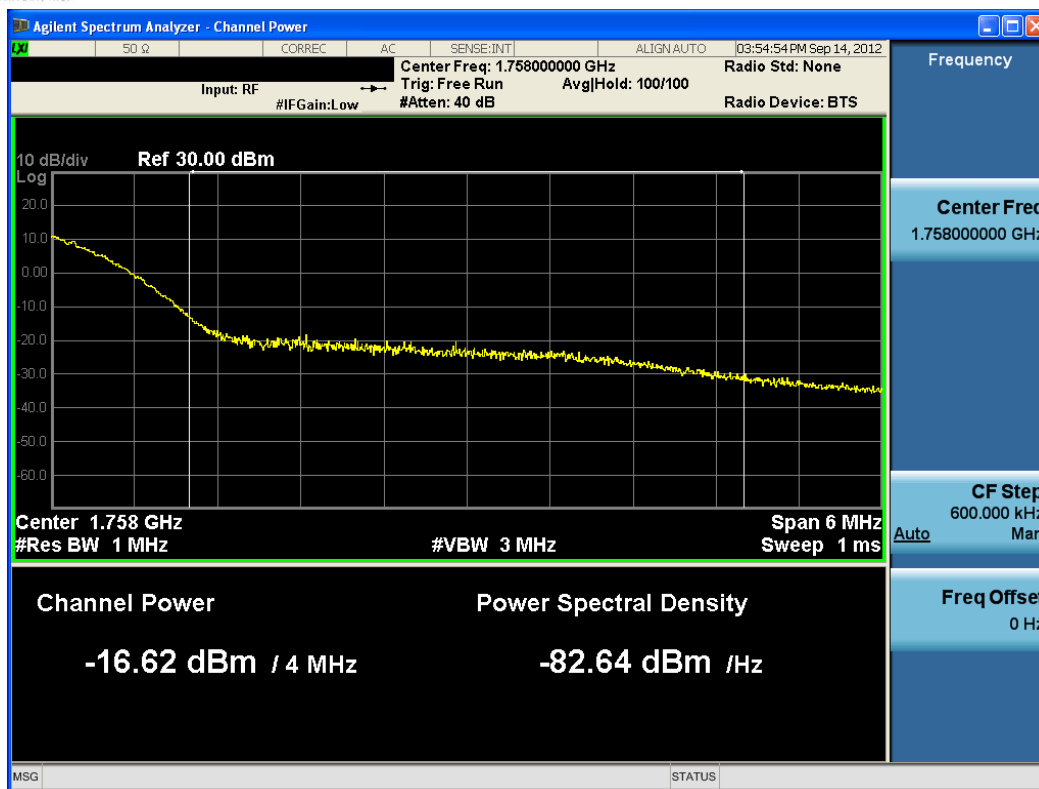


Plot 7-60. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-61. Upper Band Edge Plot (QPSK – RB Size 1, Offset 24)

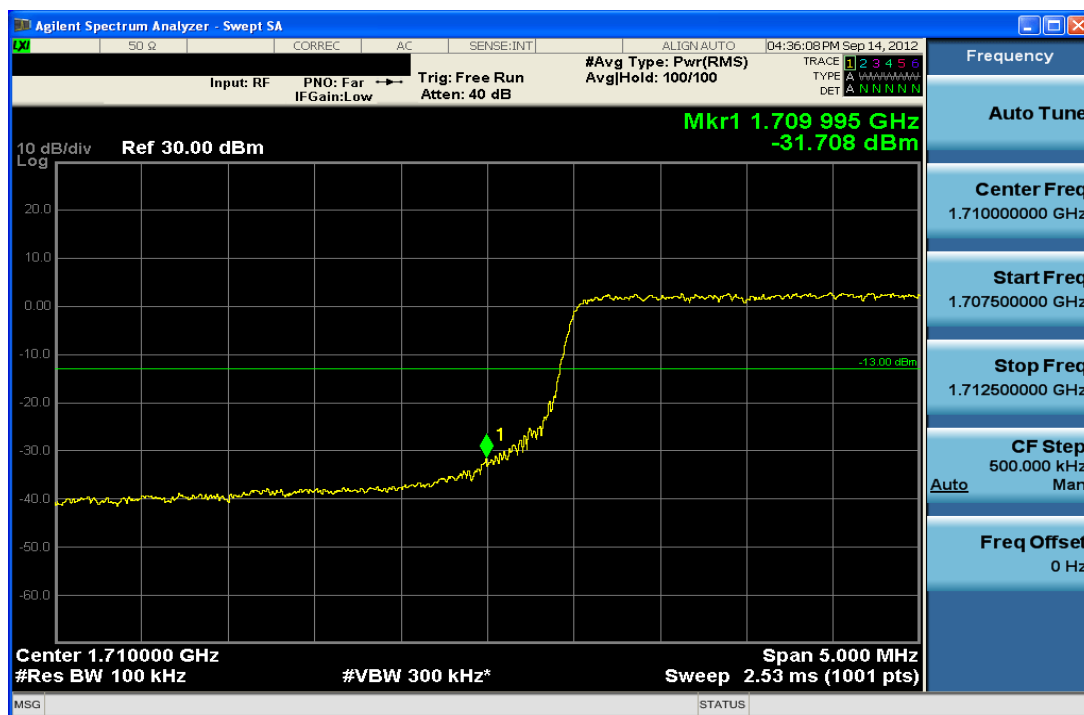
FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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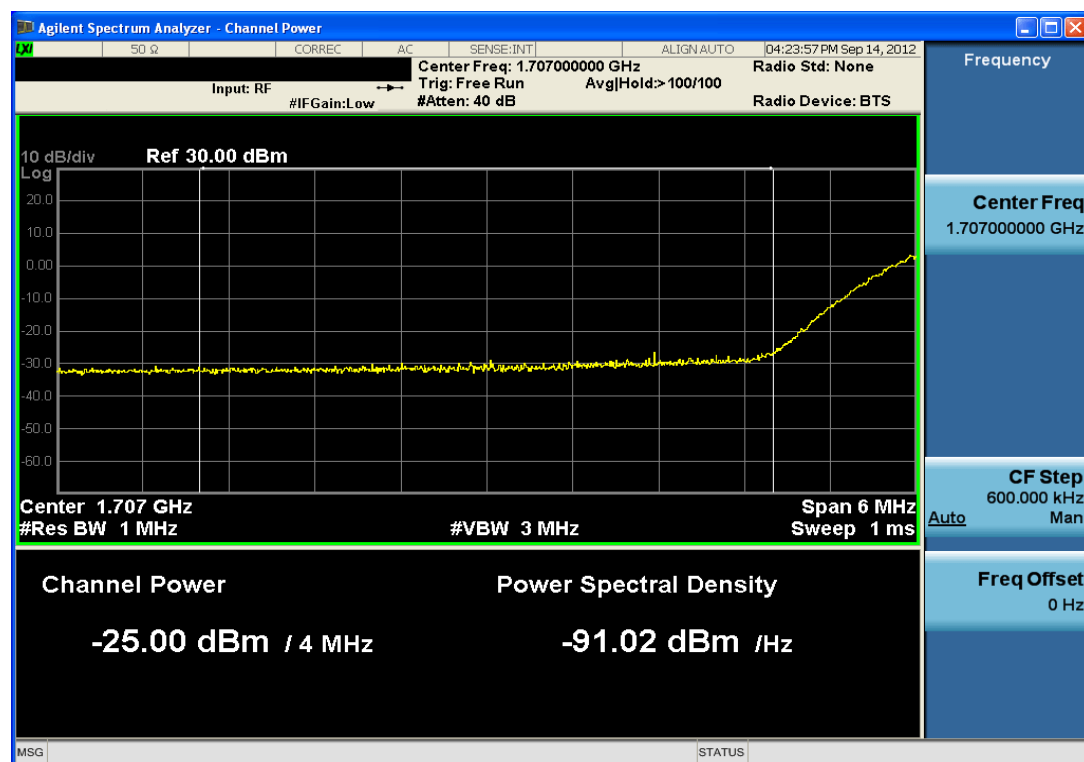
Plot 7-62. Upper Band Edge Plot (QPSK – RB Size 25)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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## BAND 4 – 10 MHz BW



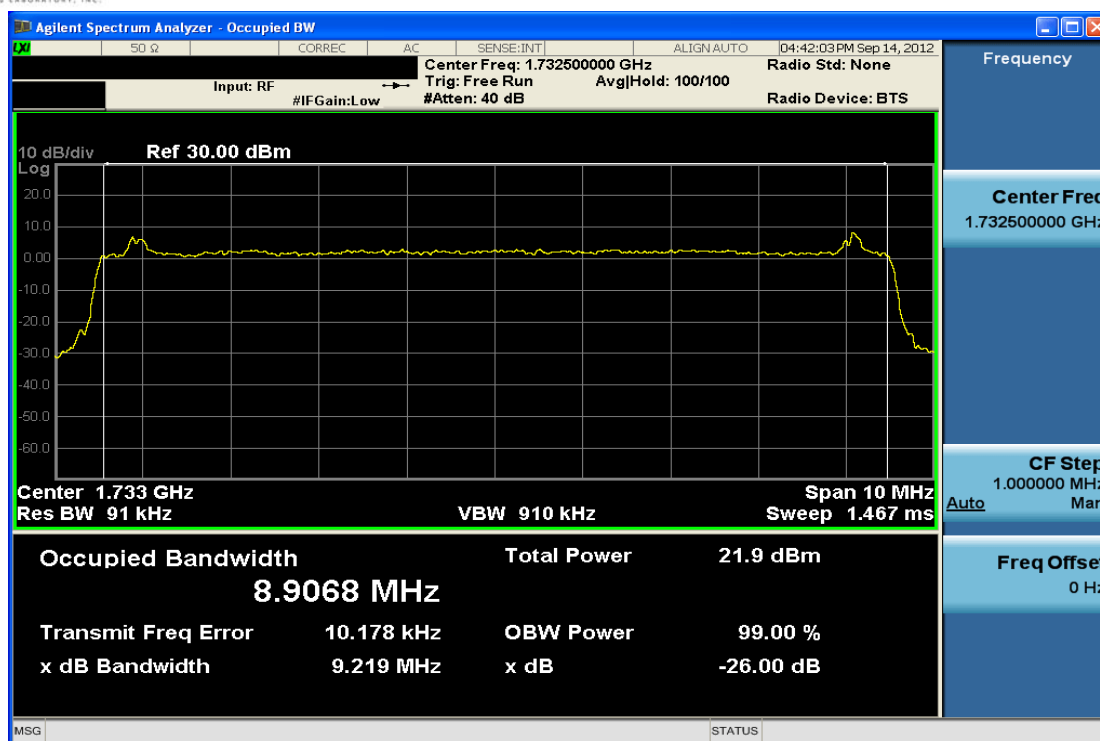
Plot 7-63. Lower Band Edge Plot (QPSK – RB Size 50)



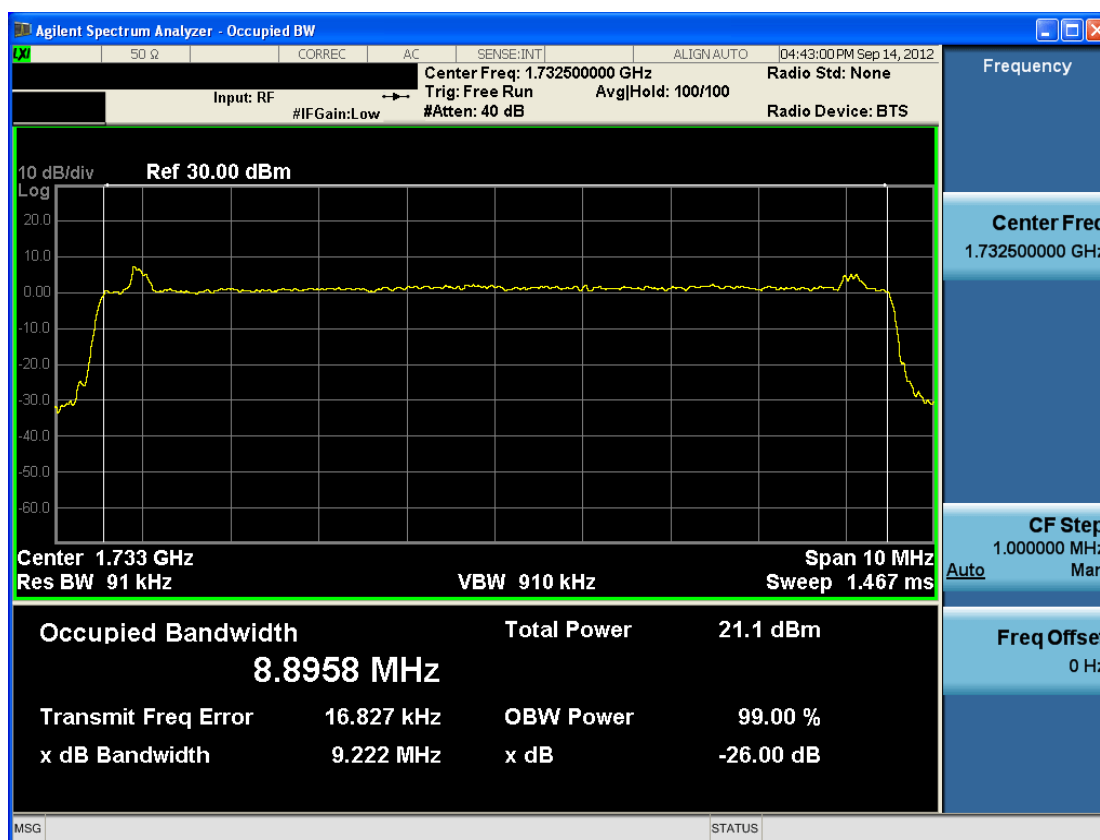
Plot 7-64. Lower Band Edge Plot (QPSK – RB Size 1, Offset 0)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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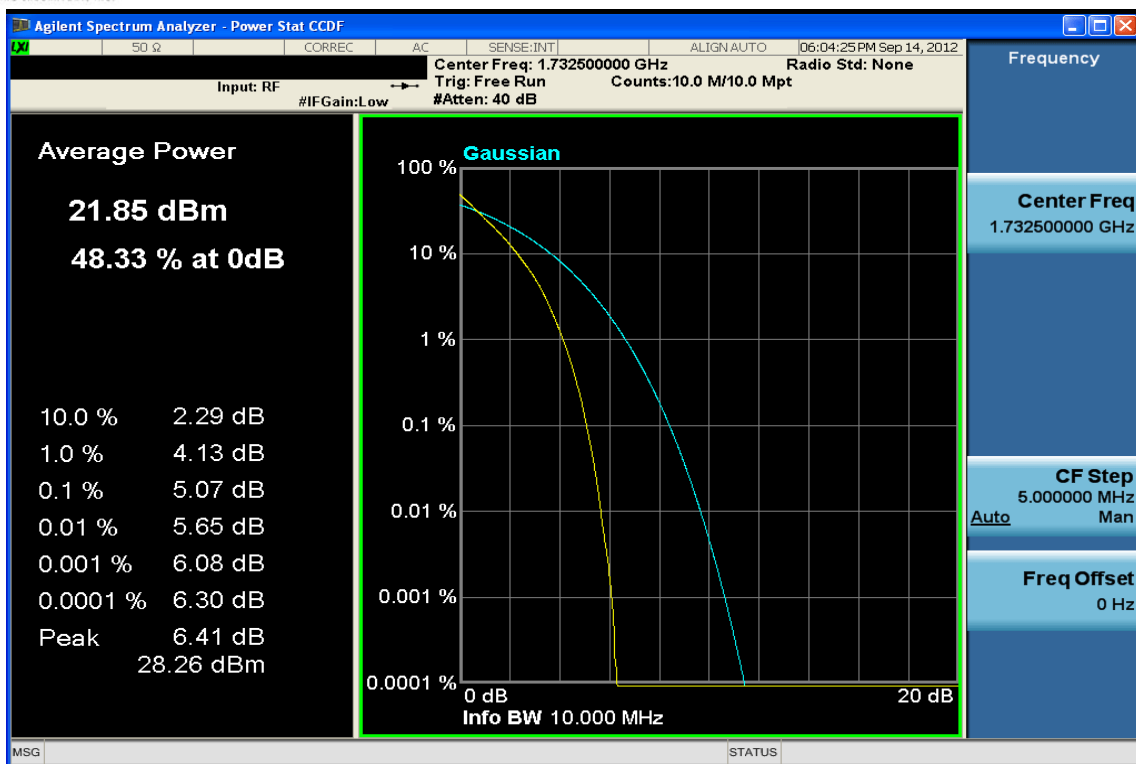


Plot 7-65. Occupied Bandwidth Plot (QPSK – RB Size 50)

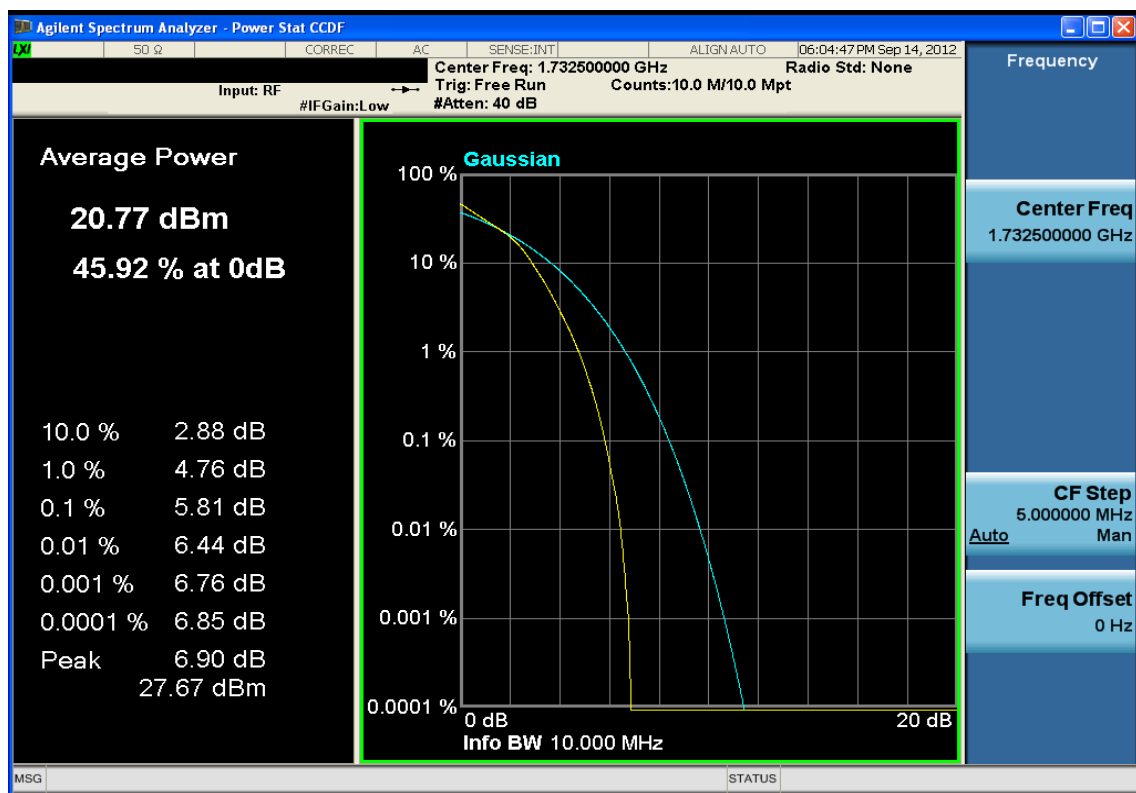


Plot 7-66. Occupied Bandwidth Plot (16-QAM – RB Size 50)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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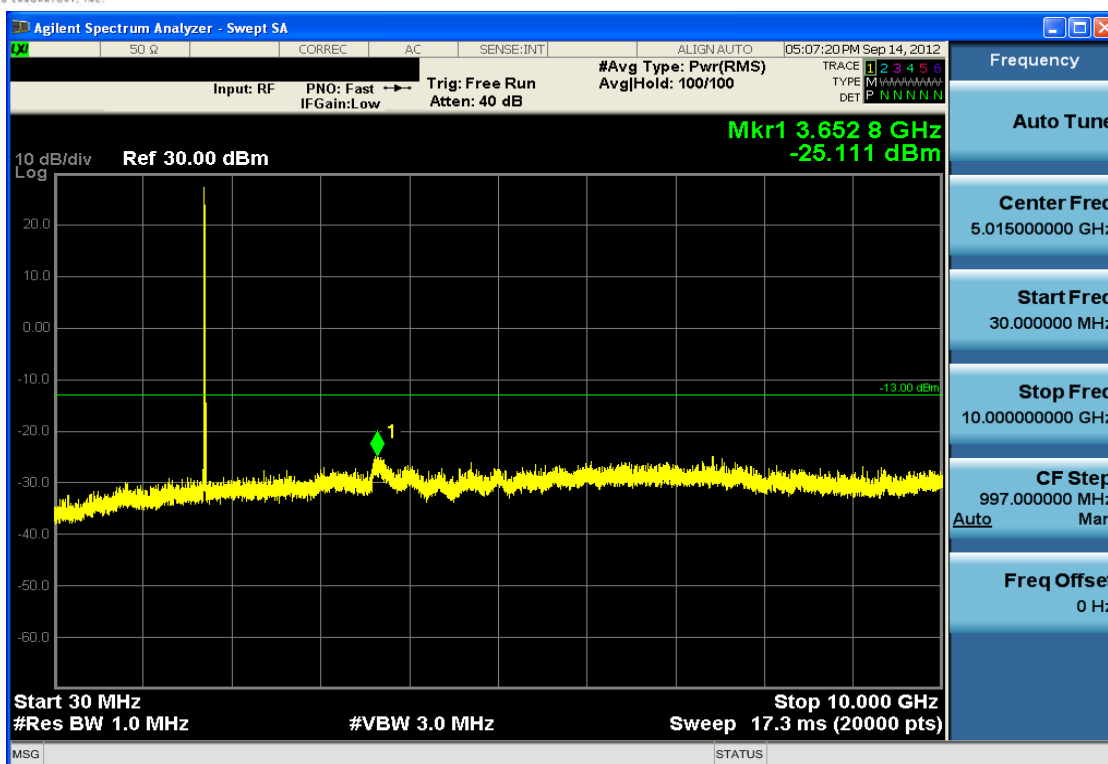


Plot 7-67. Peak to Average Ratio Plot (QPSK - RB Size 50)

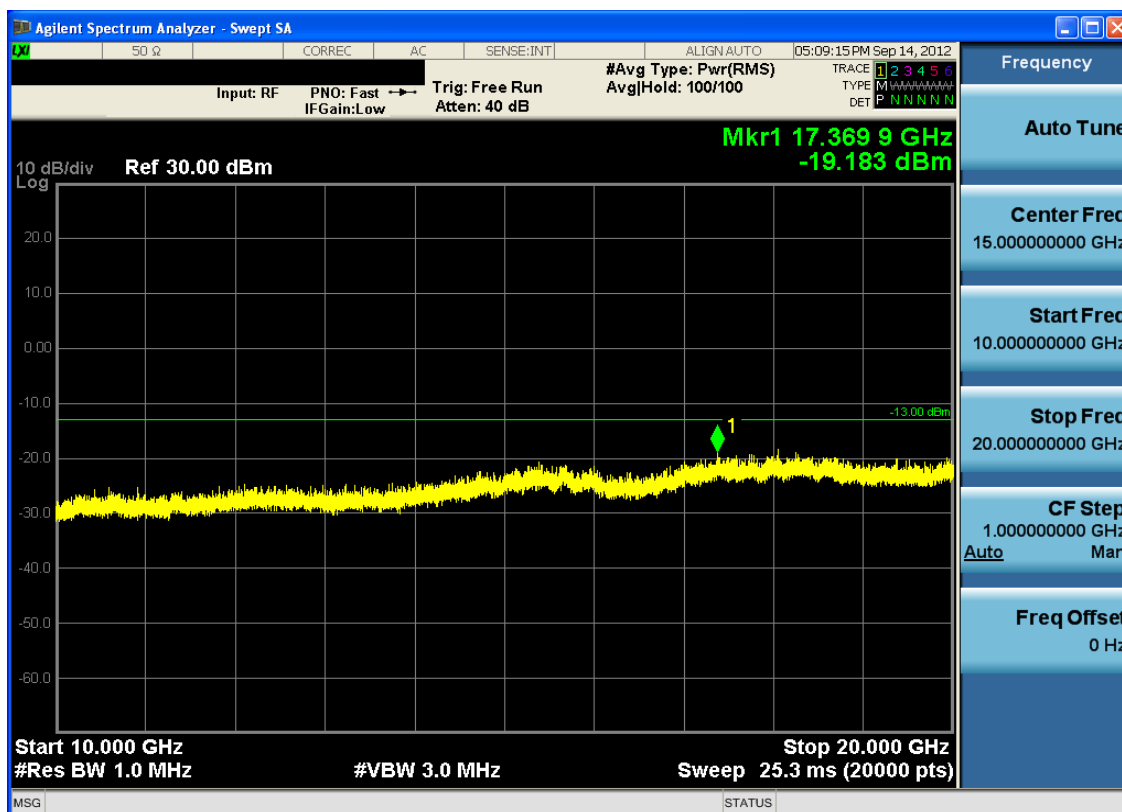


Plot 7-68. Peak to Average Ratio Plot (16QAM - RB Size 50)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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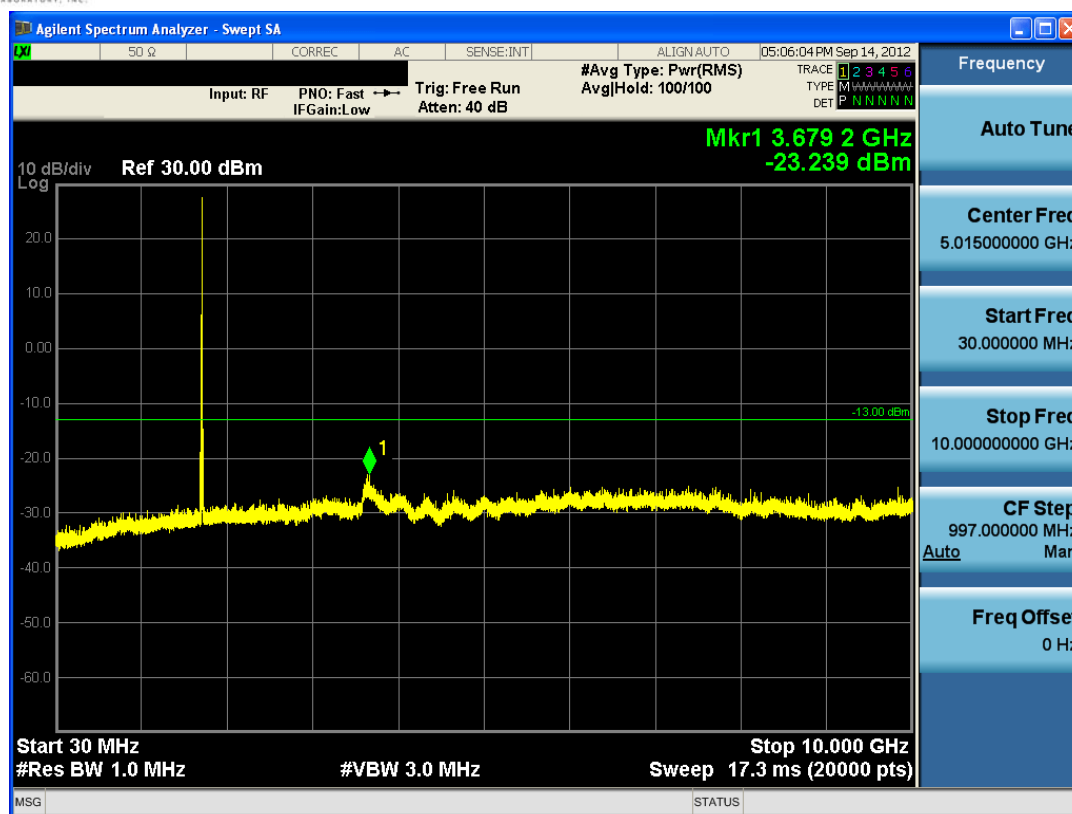


Plot 7-69. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0– Low Channel)

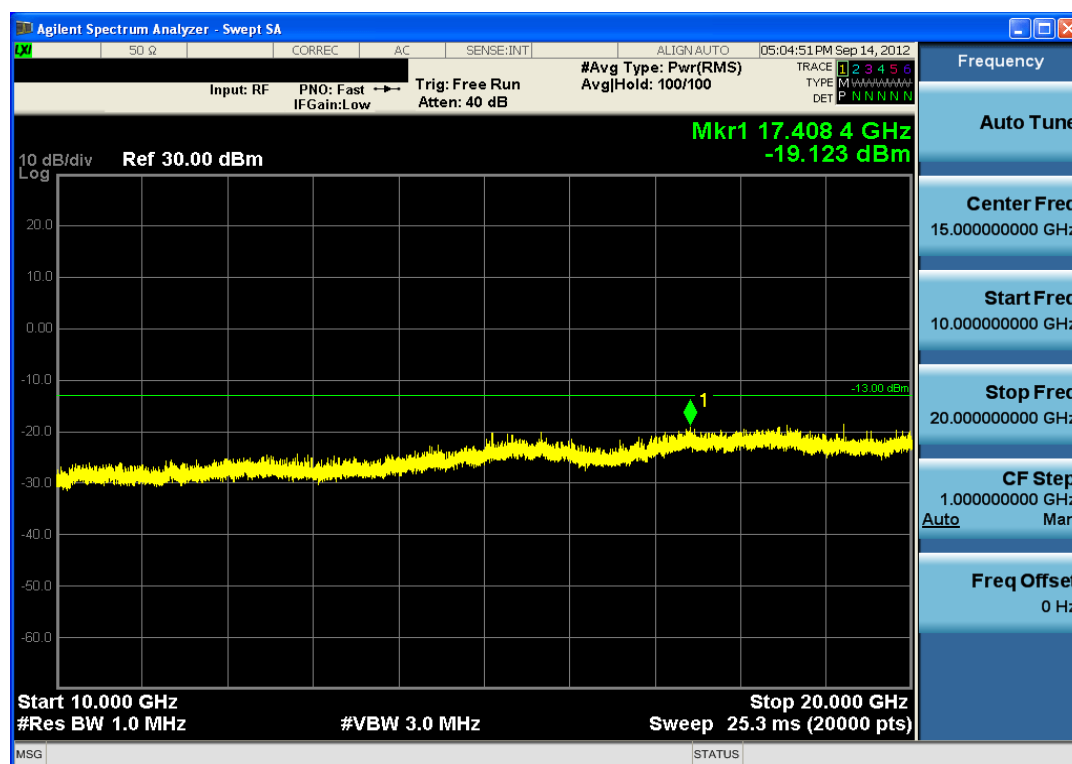


Plot 7-70. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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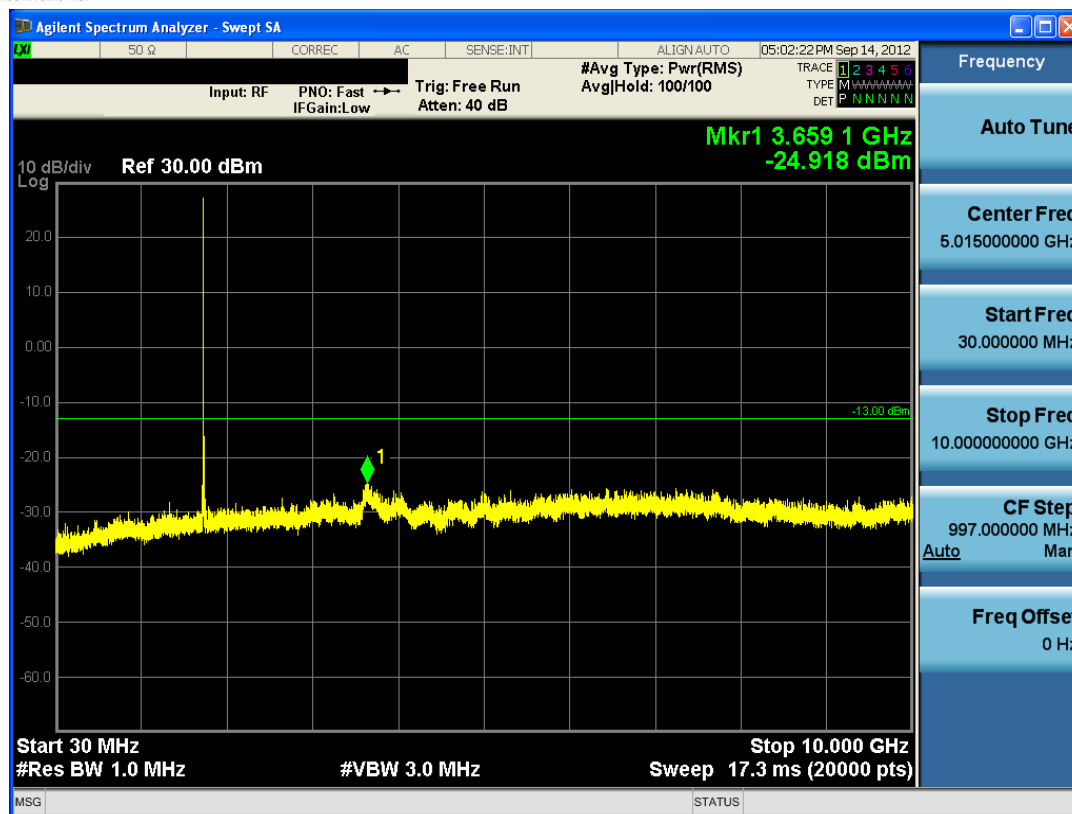


Plot 7-71. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

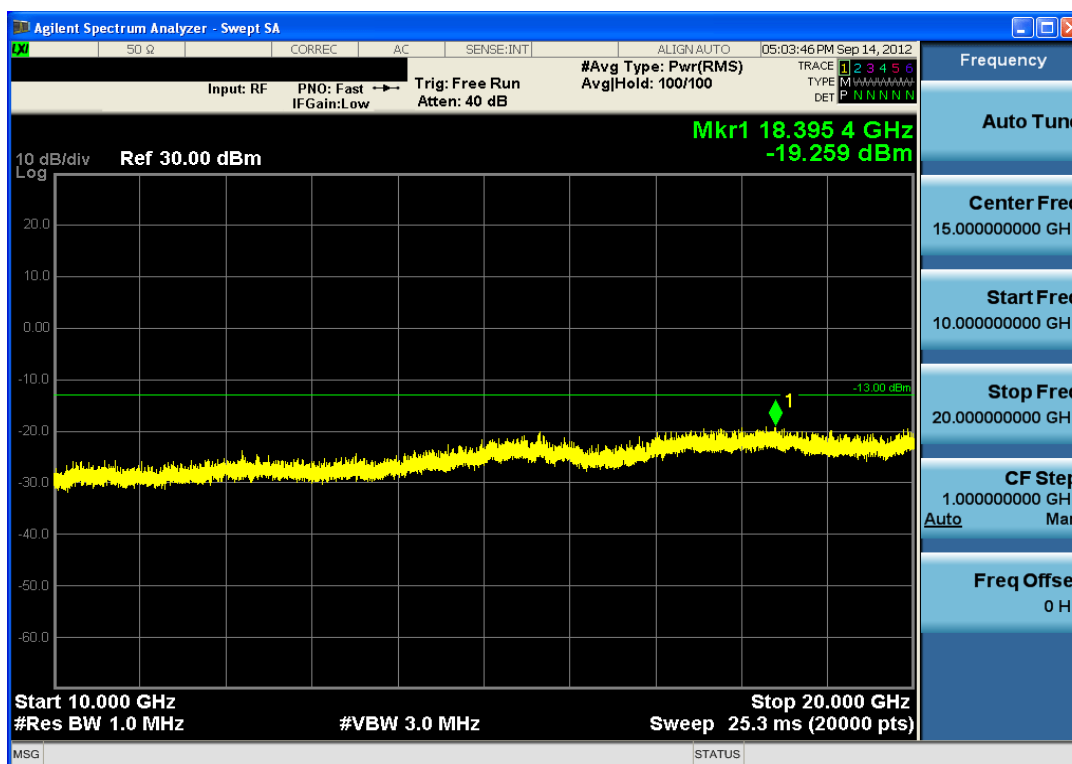


Plot 7-72. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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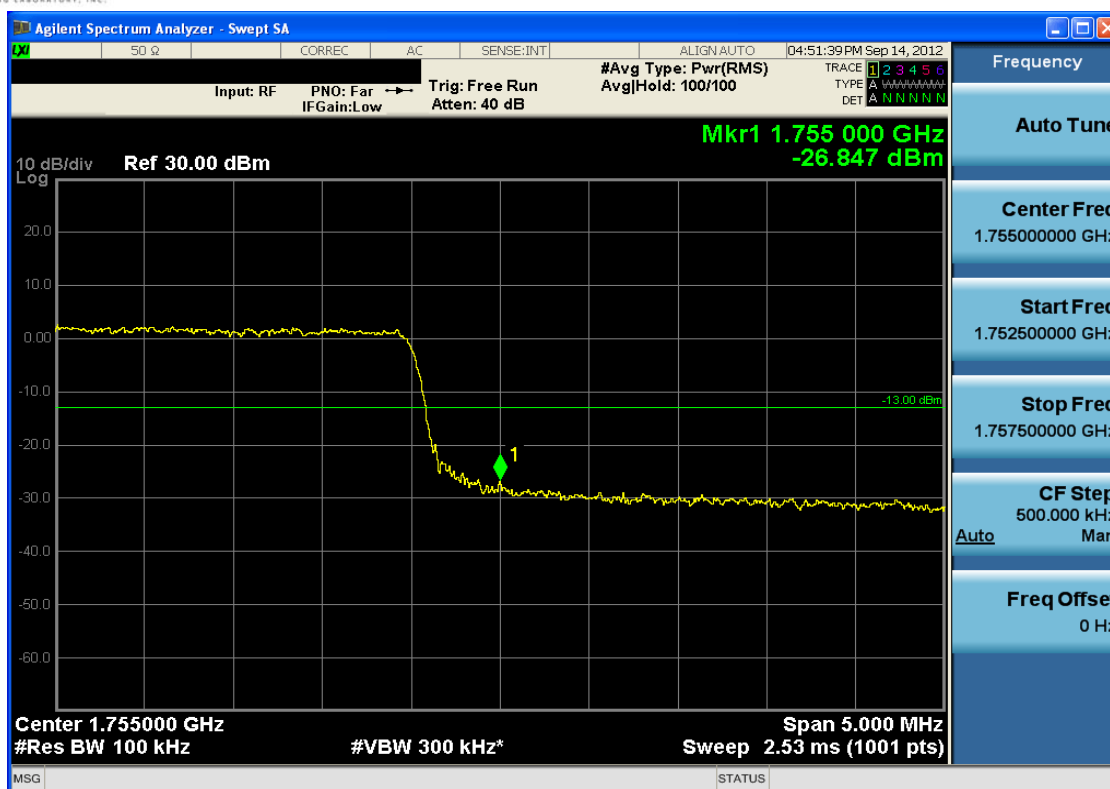


Plot 7-73. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)

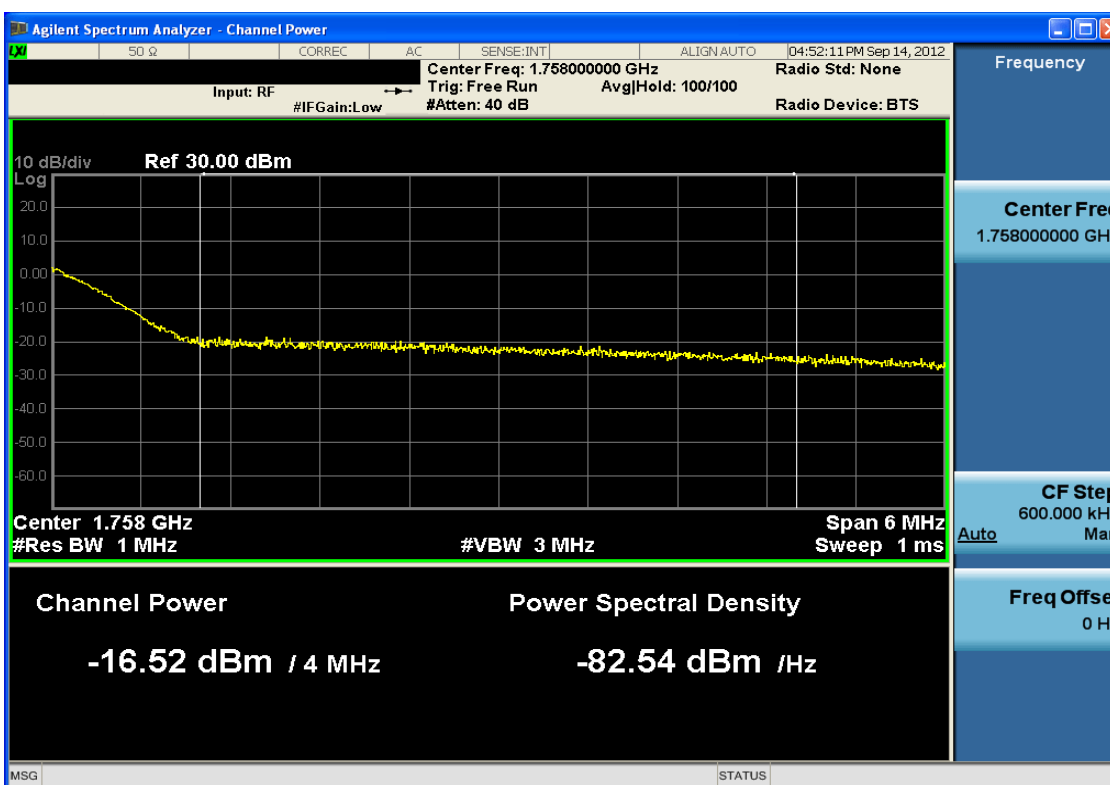


Plot 7-74. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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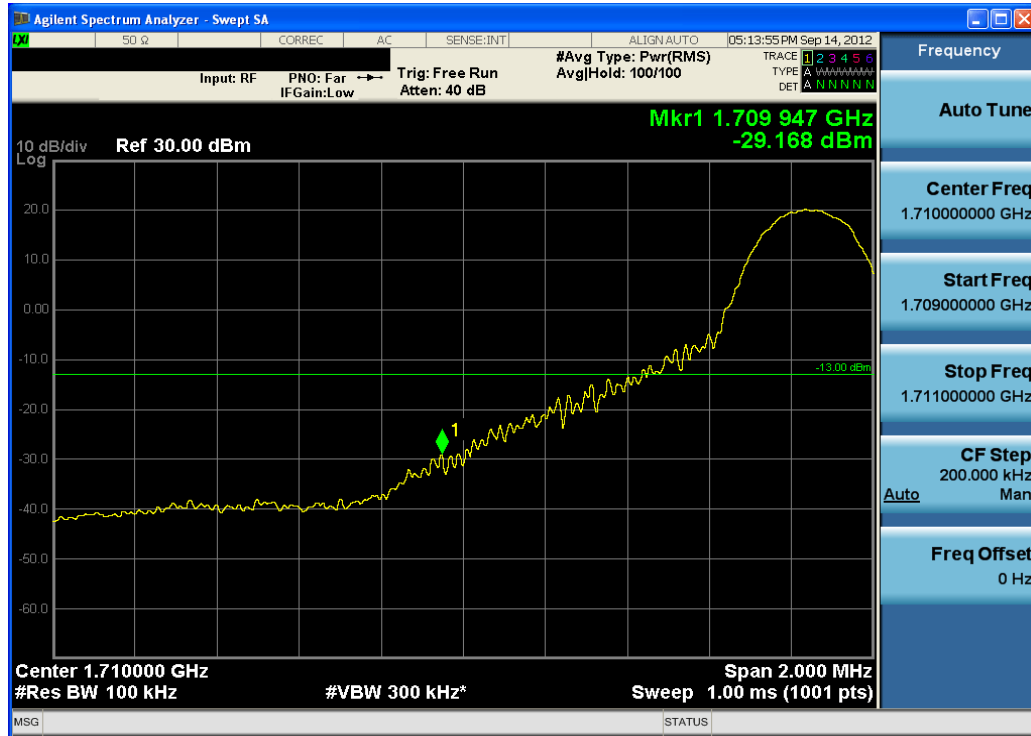
Plot 7-75. Upper Band Edge Plot (QPSK – RB Size 50)



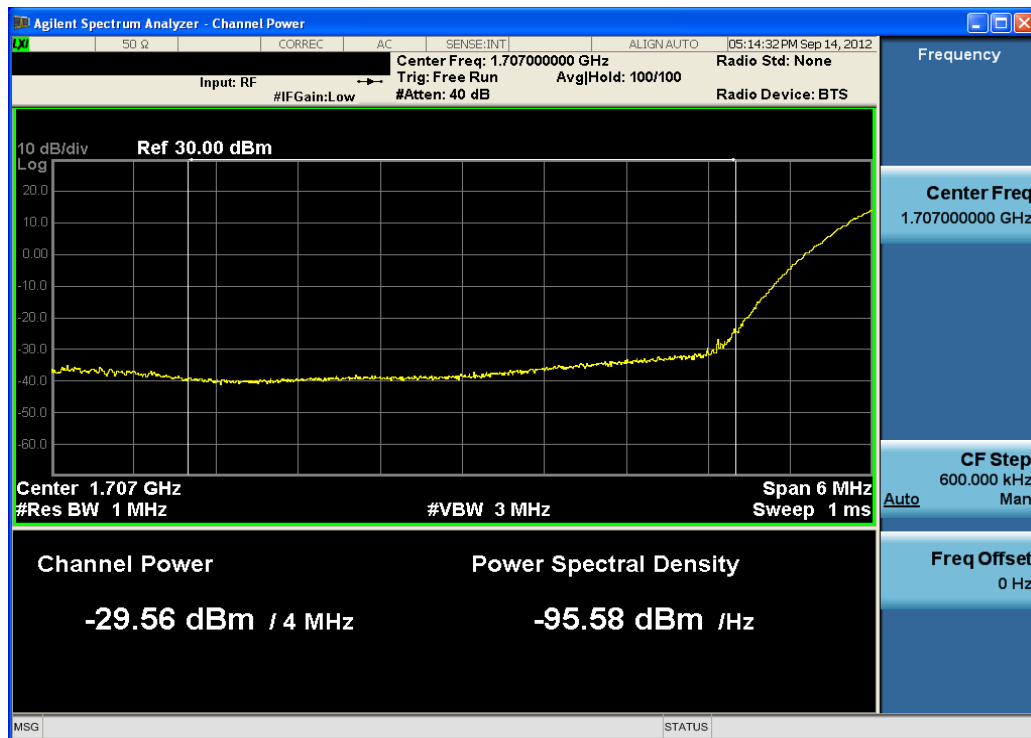
Plot 7-76. Upper Band Edge Plot (QPSK – RB Size 50)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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## BAND 4 – 15 MHz BW

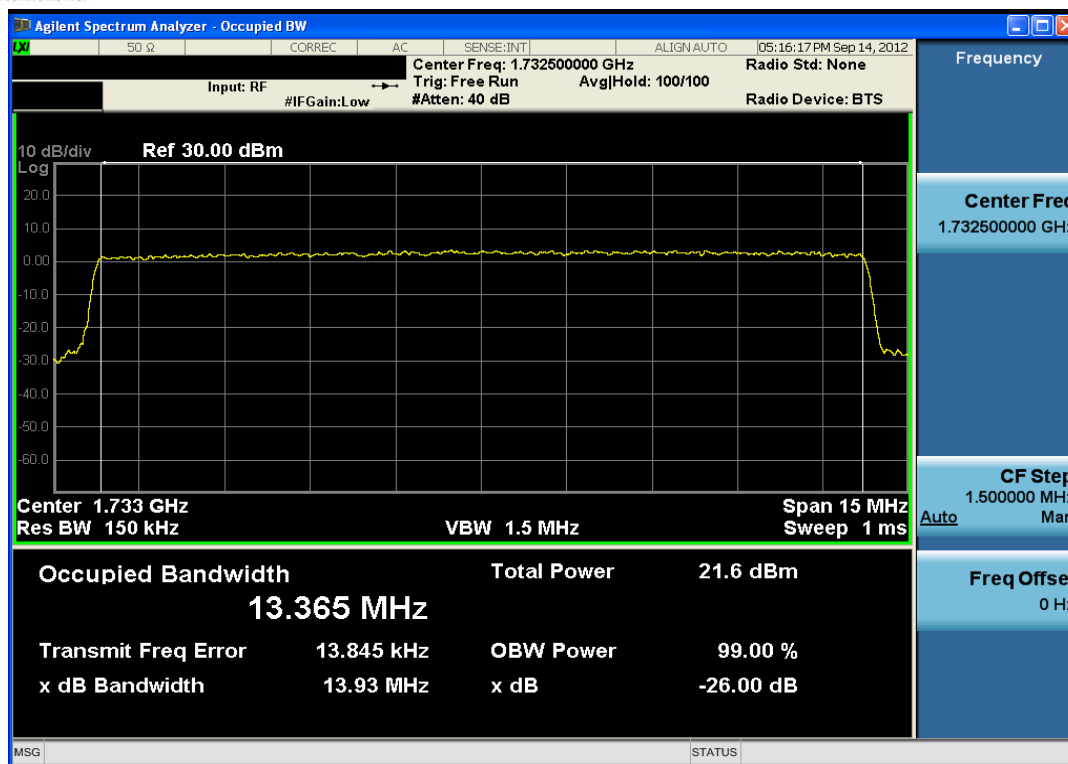


Plot 7-63. Lower Band Edge Plot (QPSK – RB Size 1, Offset 0)

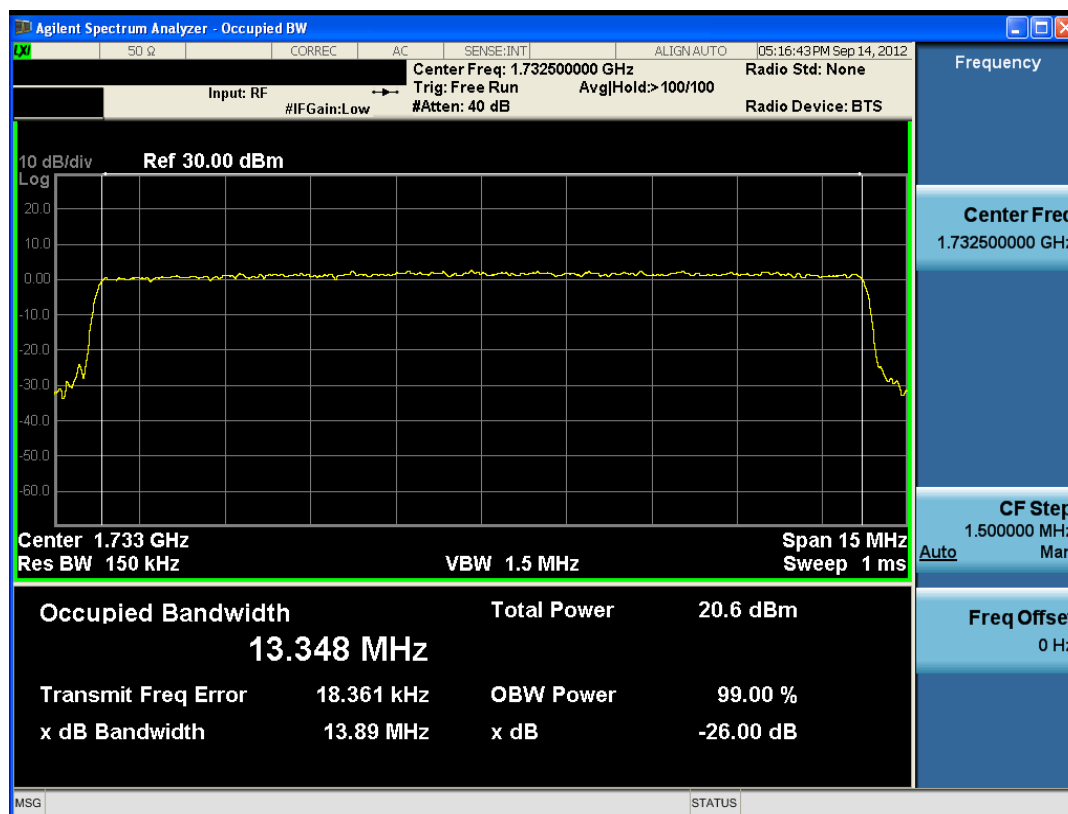


Plot 7-64. Lower Band Edge Plot (QPSK – RB Size 1, Offset 0)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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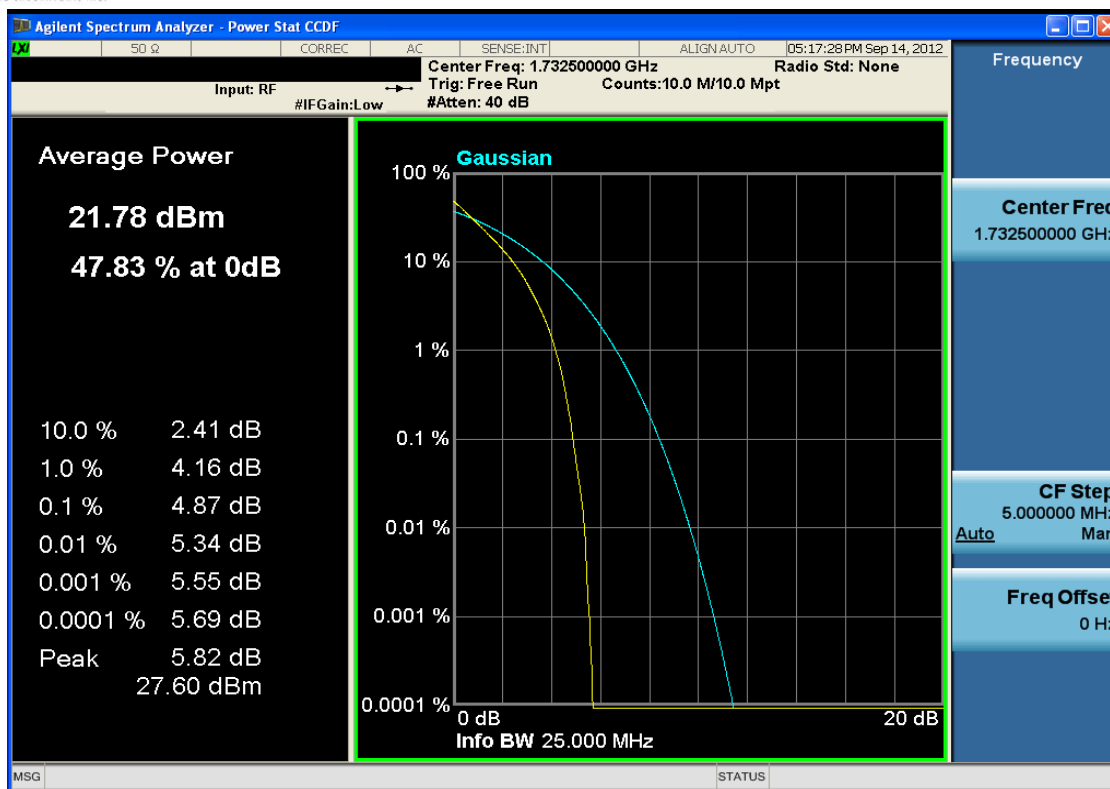
Plot 7-65. Occupied Bandwidth Plot (QPSK – RB Size 75)



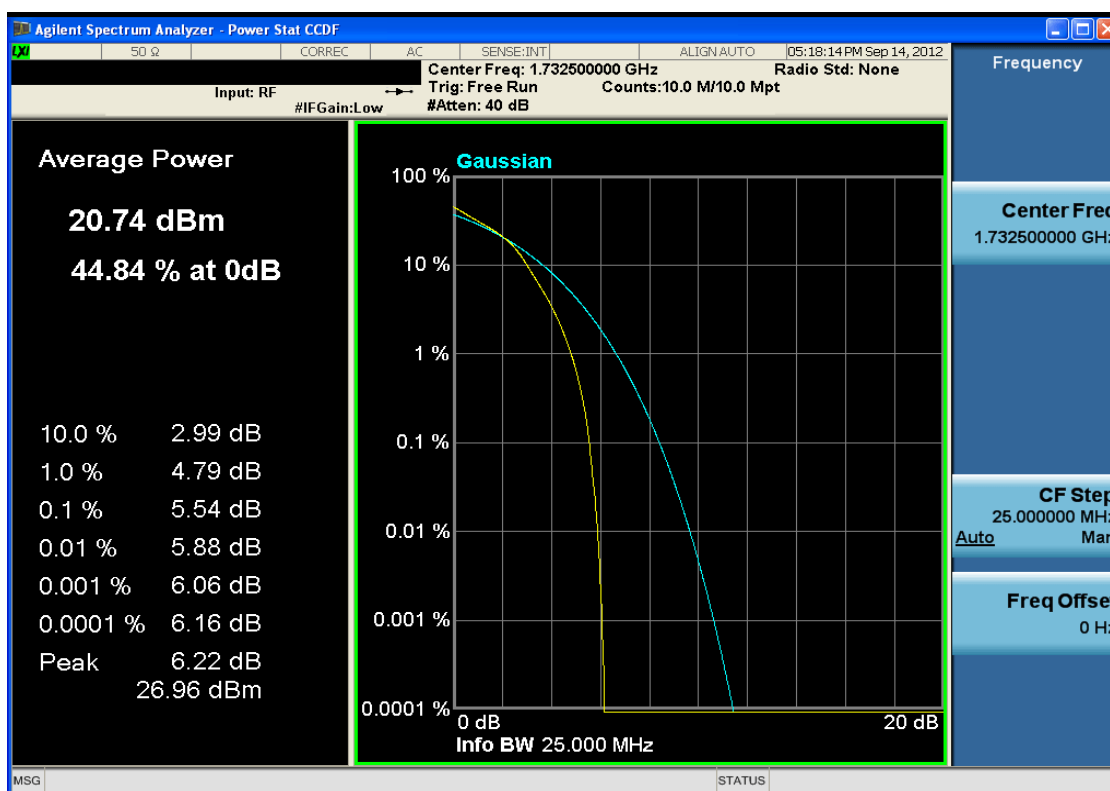
Plot 7-66. Occupied Bandwidth Plot (16-QAM – RB Size 75)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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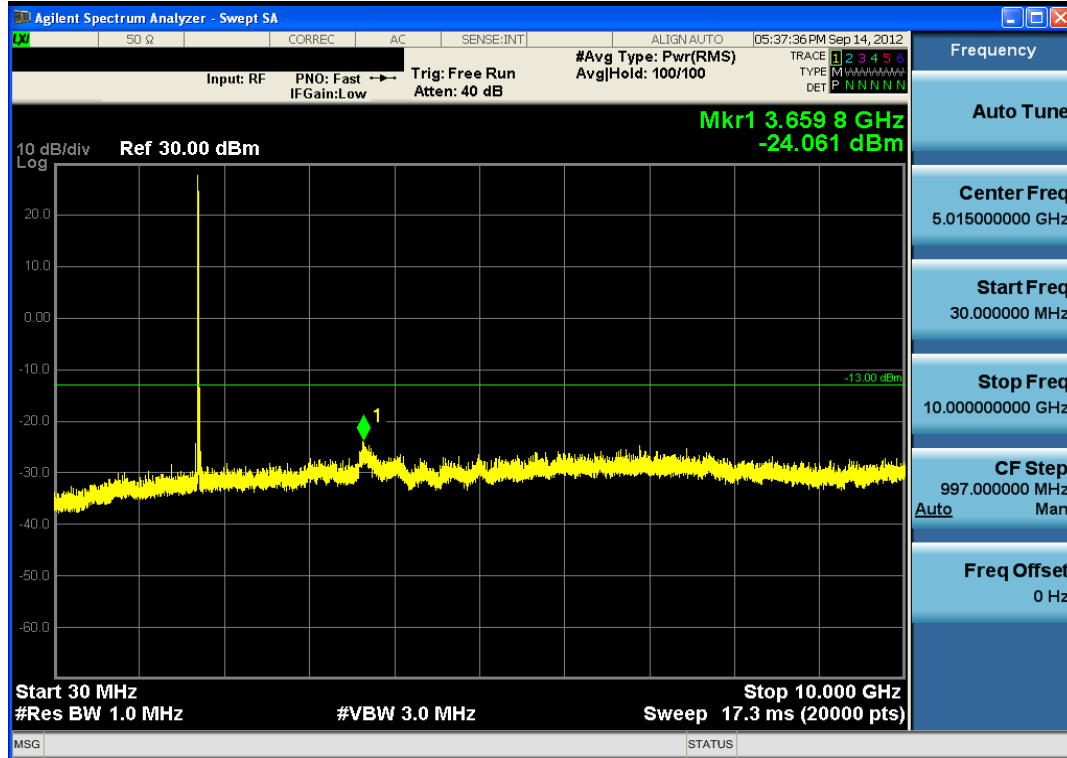


Plot 7-67. Peak to Average Ratio Plot (QPSK - RB Size 75)

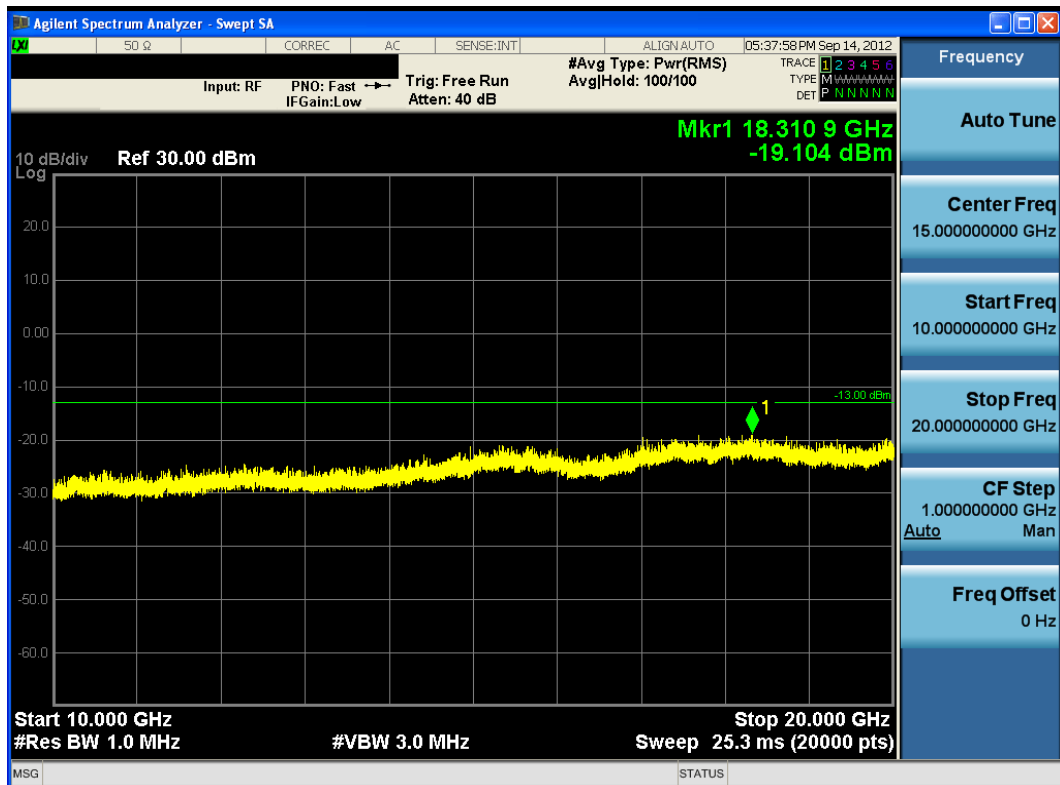


Plot 7-68. Peak to Average Ratio Plot (16QAM - RB Size 75)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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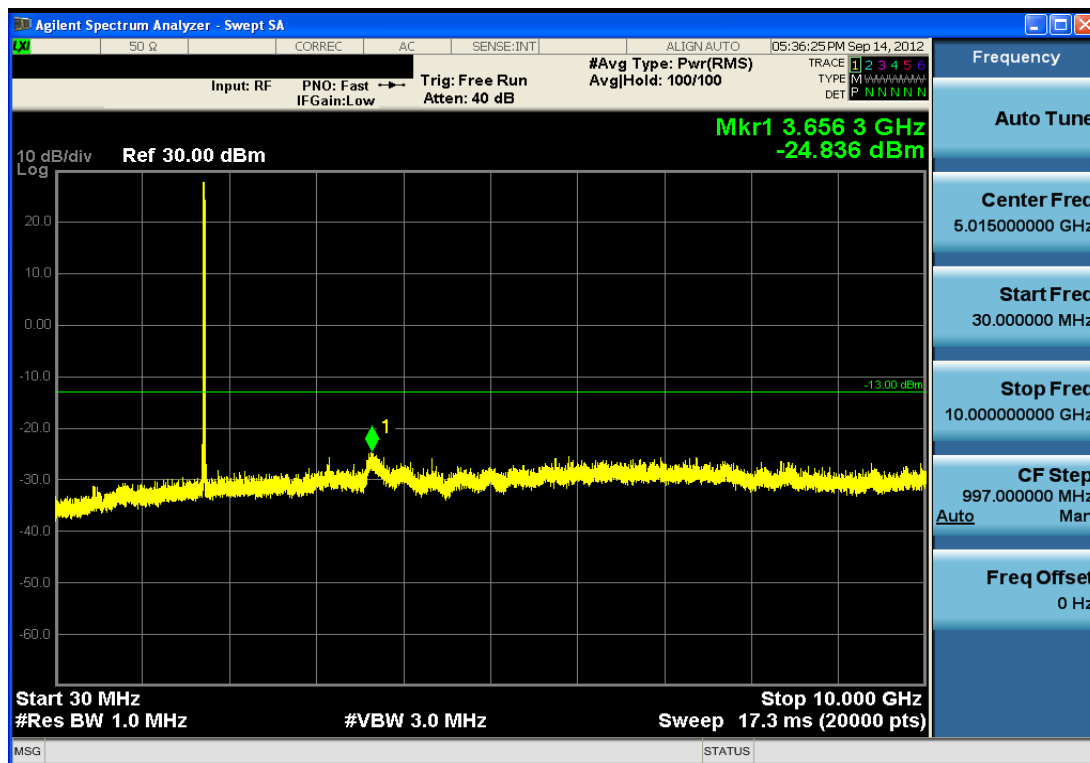


Plot 7-69. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0– Low Channel)

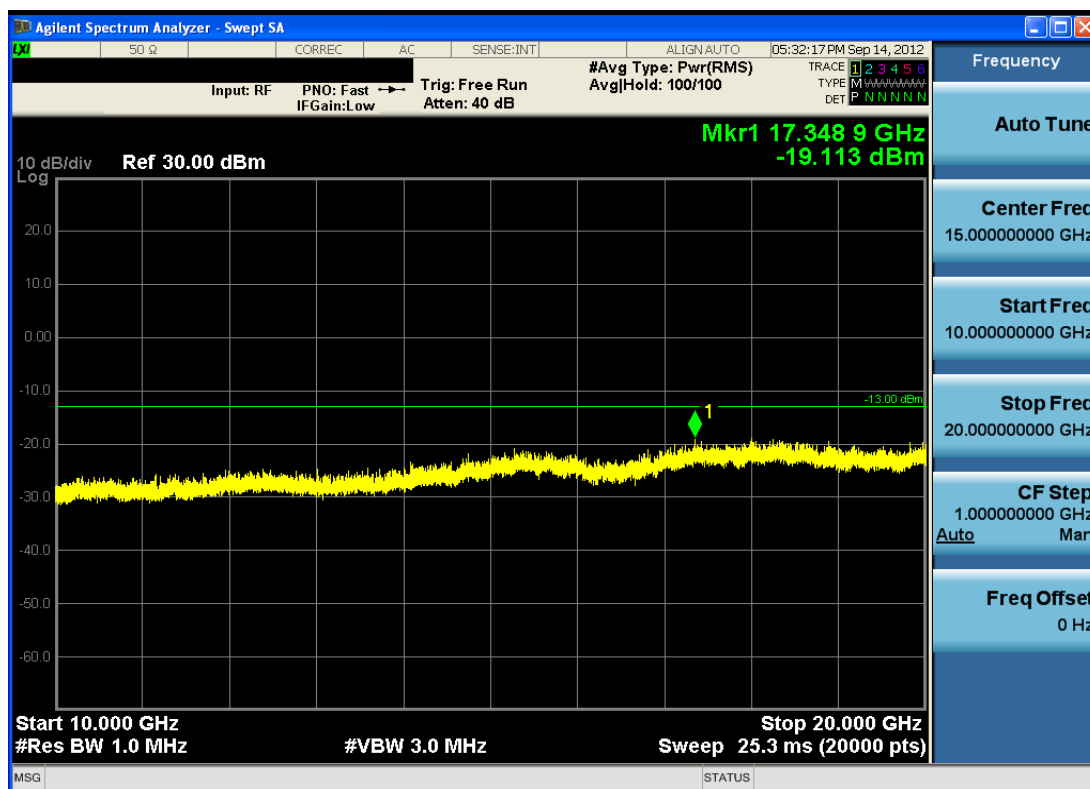


Plot 7-70. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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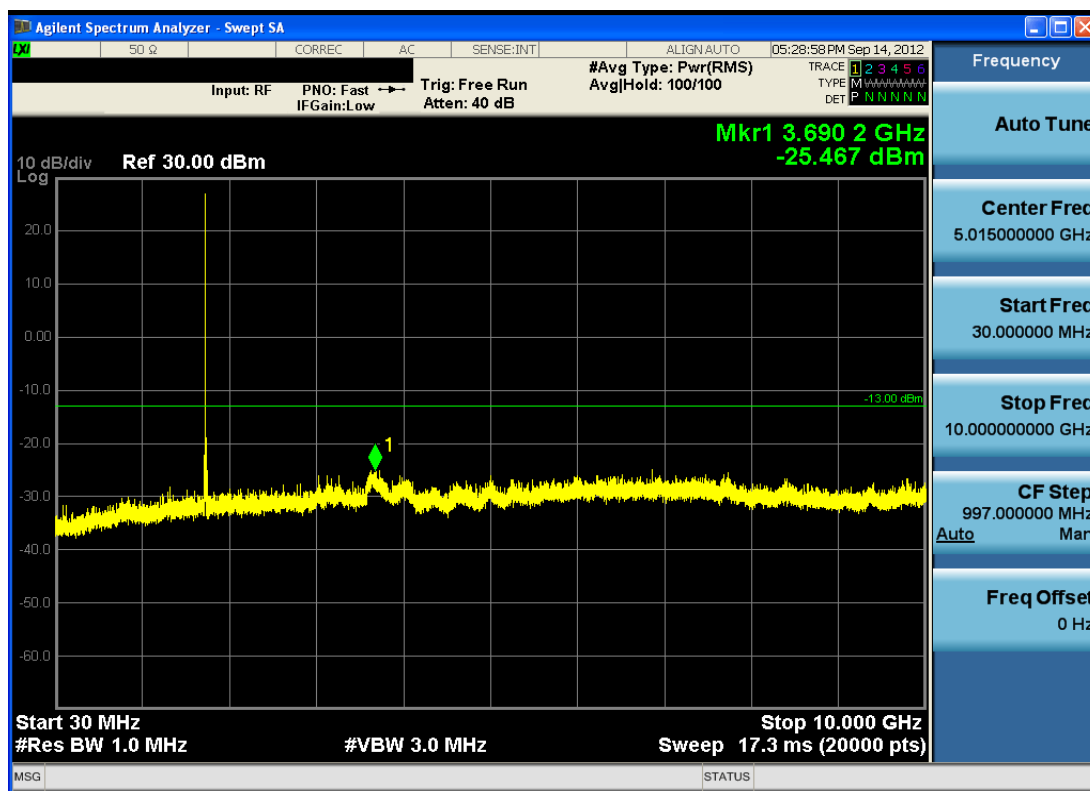


Plot 7-71. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

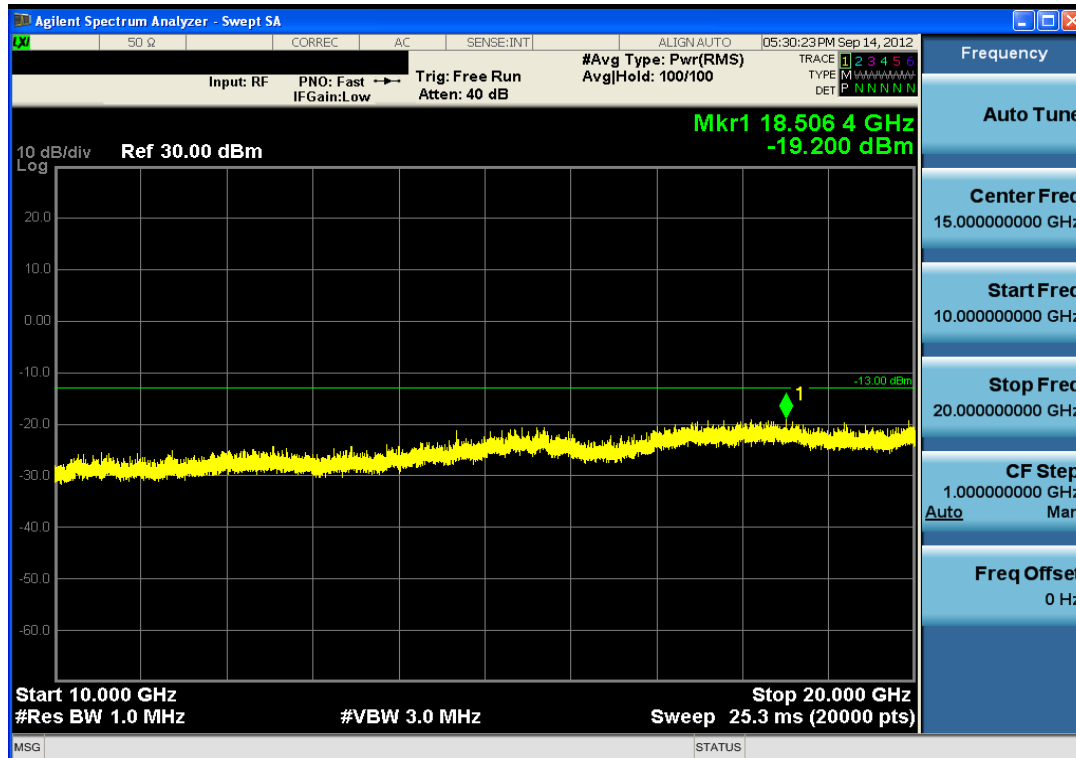


Plot 7-72. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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Plot 7-73. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-74. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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Plot 7-75. Upper Band Edge Plot (QPSK – RB Size 1, Offset 74)



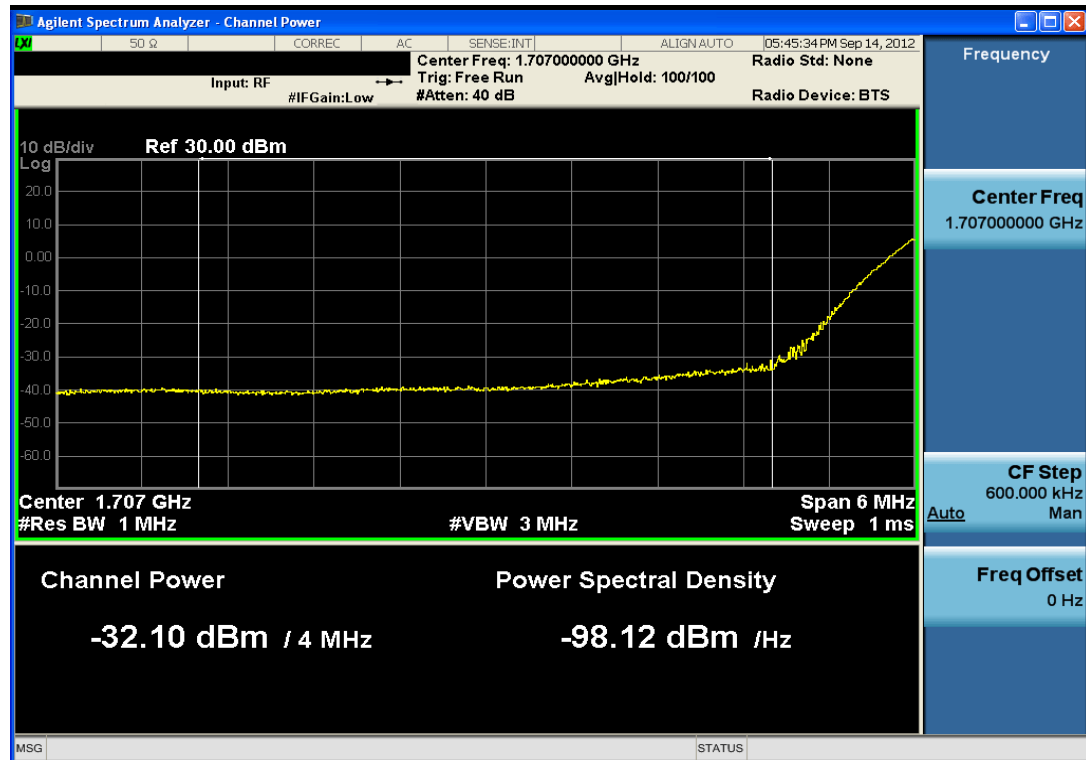
Plot 7-76. Upper Band Edge Plot (QPSK – RB Size 75)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
Test Report S/N: 0Y1208241229.A3L	Test Dates: Aug. 24 - Oct. 05, 2012	EUT Type: Portable Handset		Page 39 of 47

## BAND 4 – 20 MHz BW

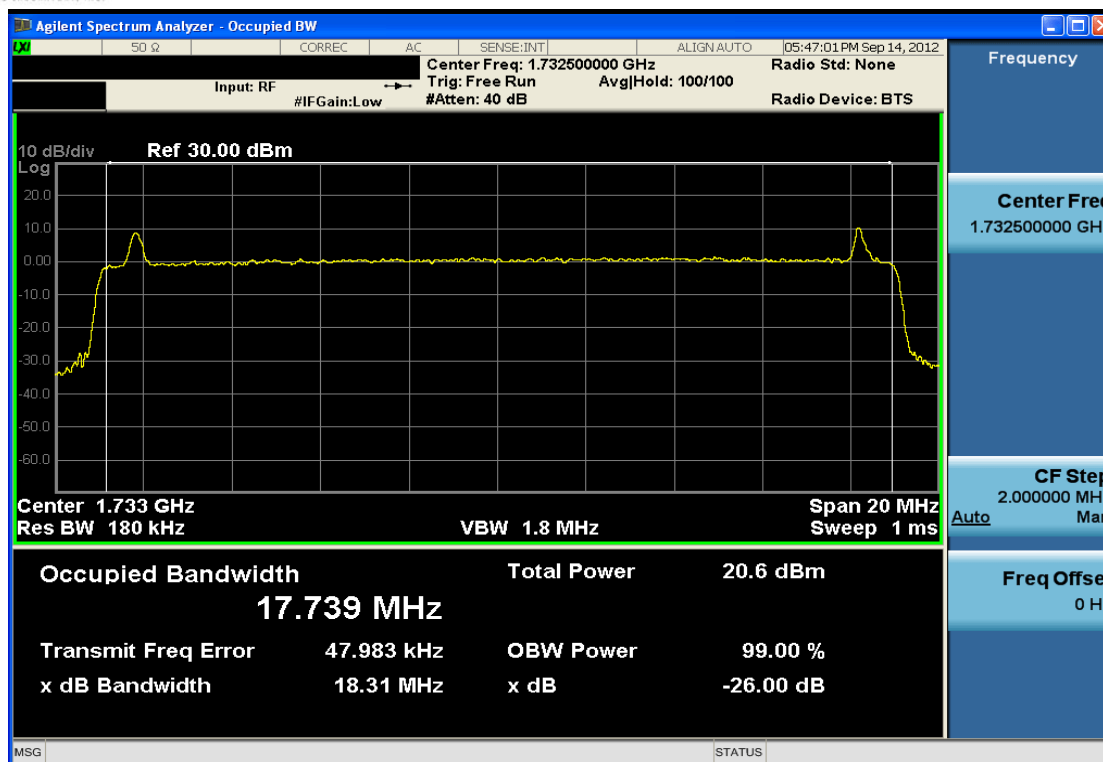


Plot 7-63. Lower Band Edge Plot (QPSK – RB Size 1, Offset 0)

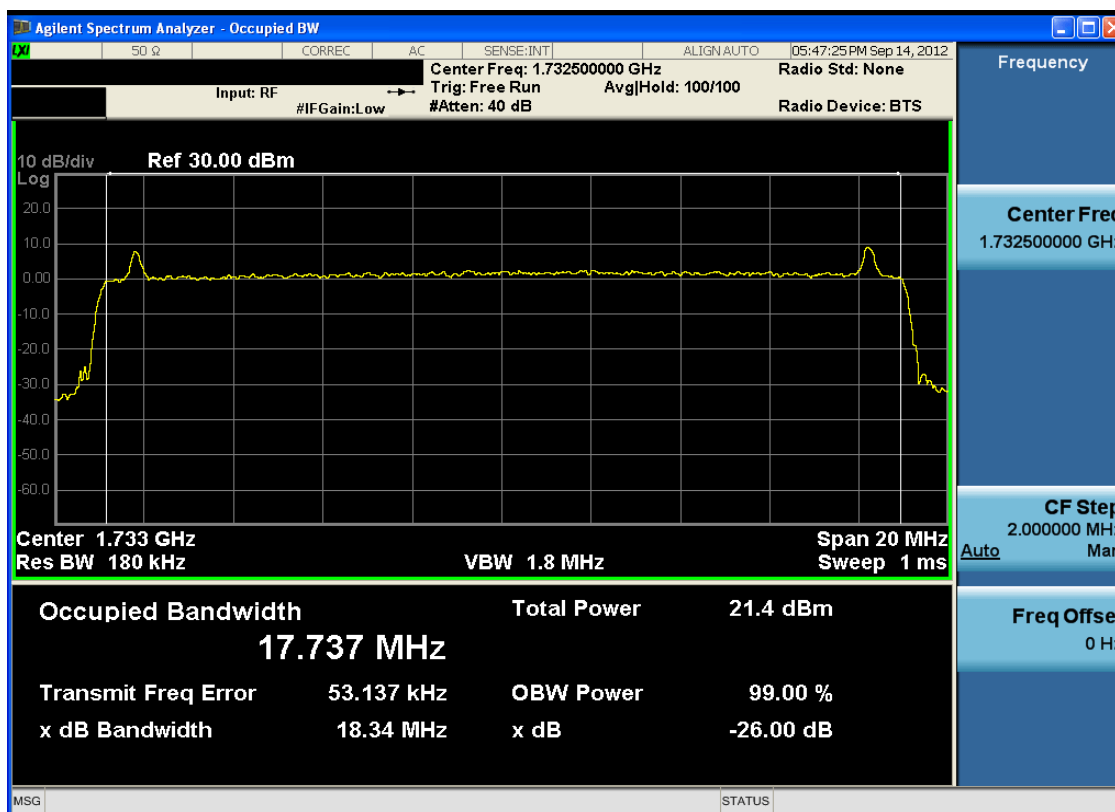


Plot 7-64. Lower Band Edge Plot (QPSK – RB Size 1, Offset 0)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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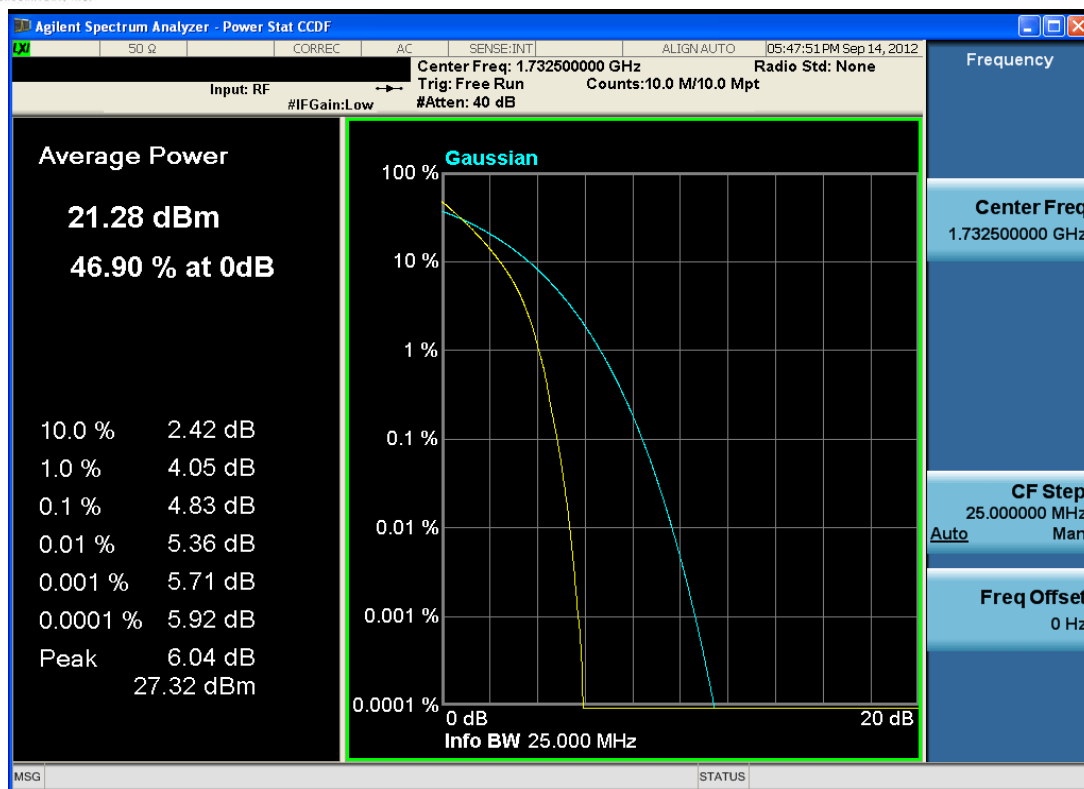


Plot 7-65. Occupied Bandwidth Plot (QPSK – RB Size 100)

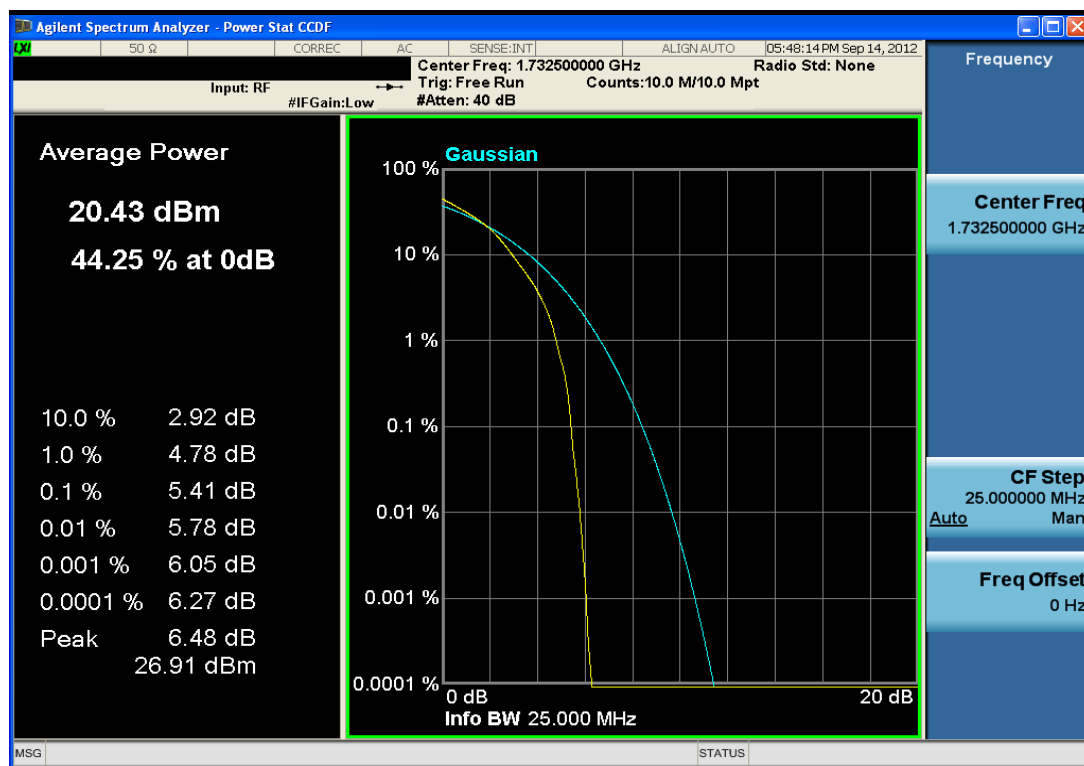


Plot 7-66. Occupied Bandwidth Plot (16-QAM – RB Size 100)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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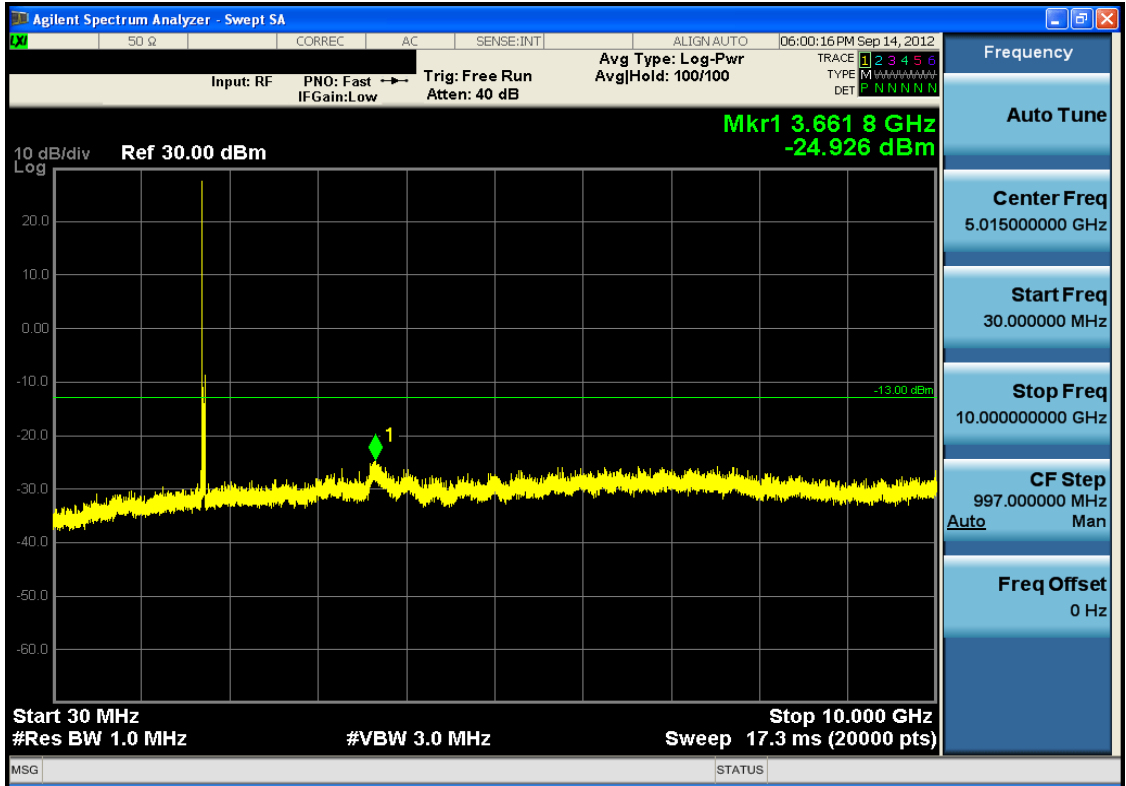
Plot 7-67. Peak to Average Ratio Plot (QPSK - RB Size 100)



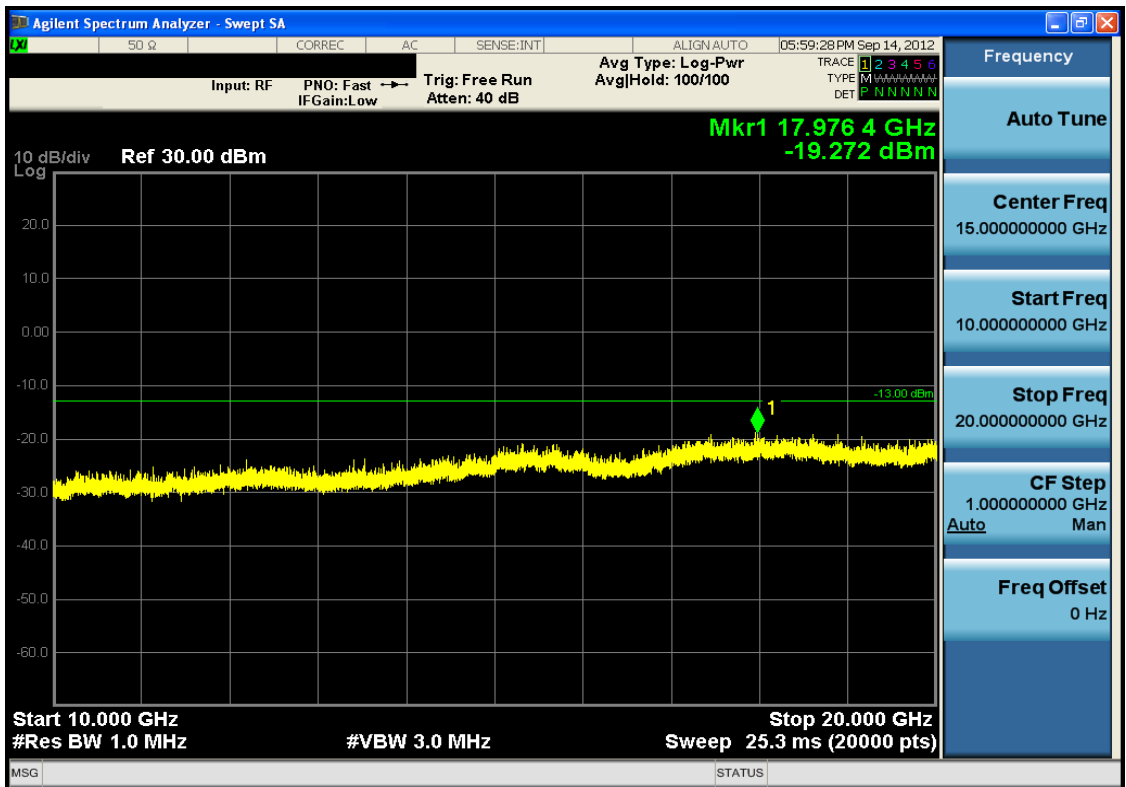
Plot 7-68. Peak to Average Ratio Plot (16QAM - RB Size 100)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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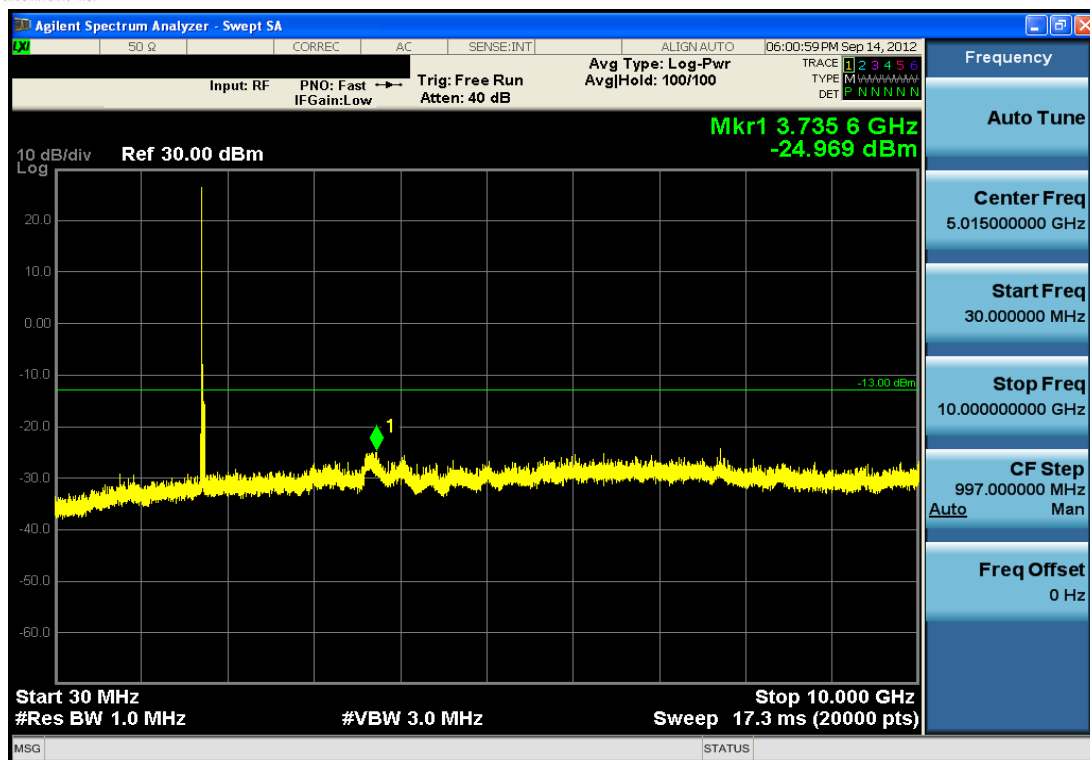


Plot 7-69. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)

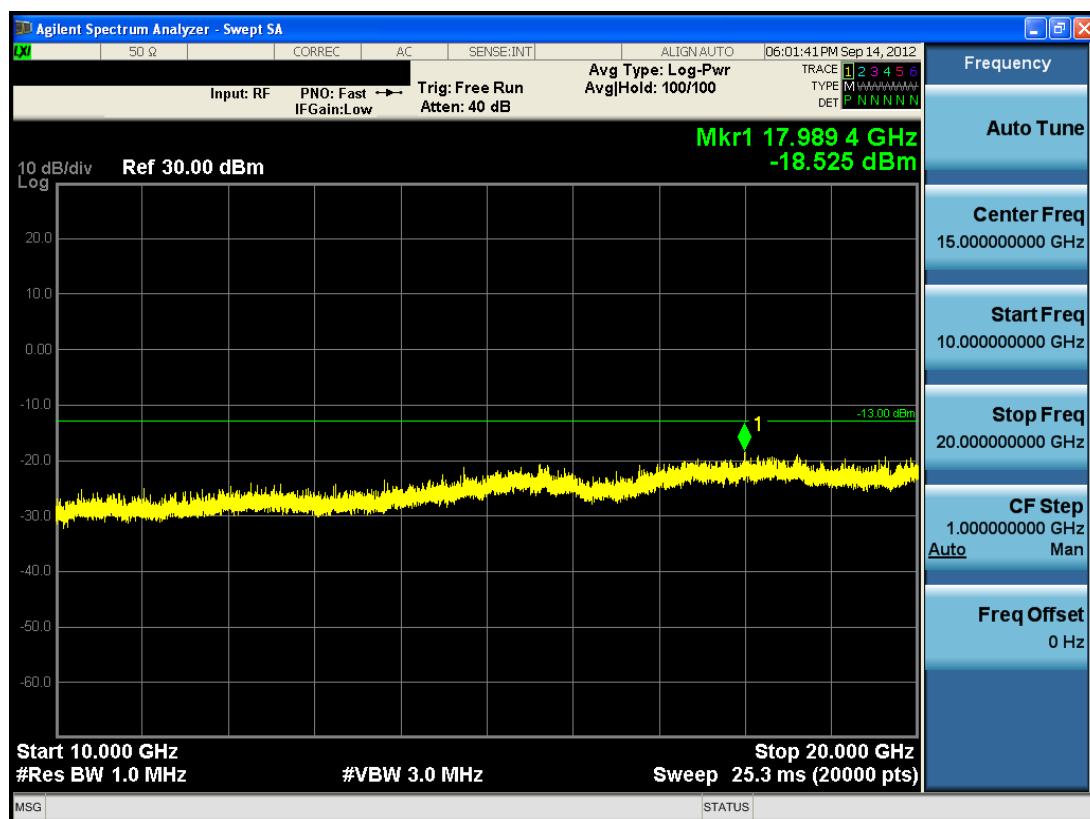


Plot 7-70. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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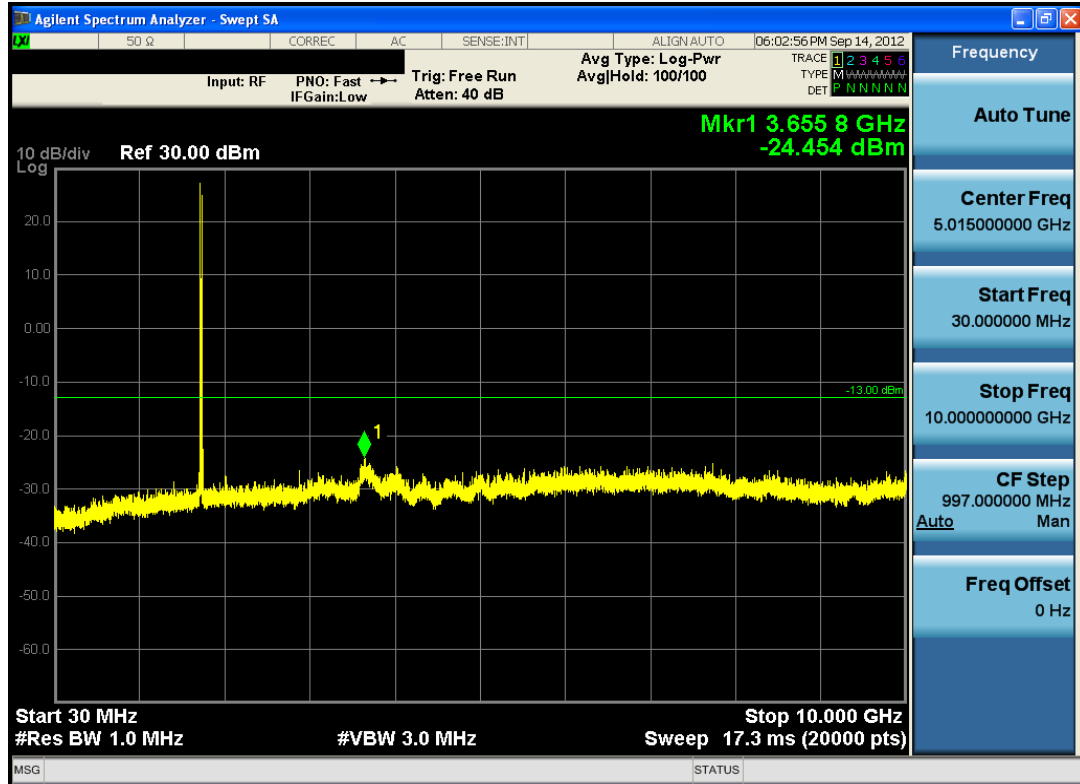


Plot 7-71. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

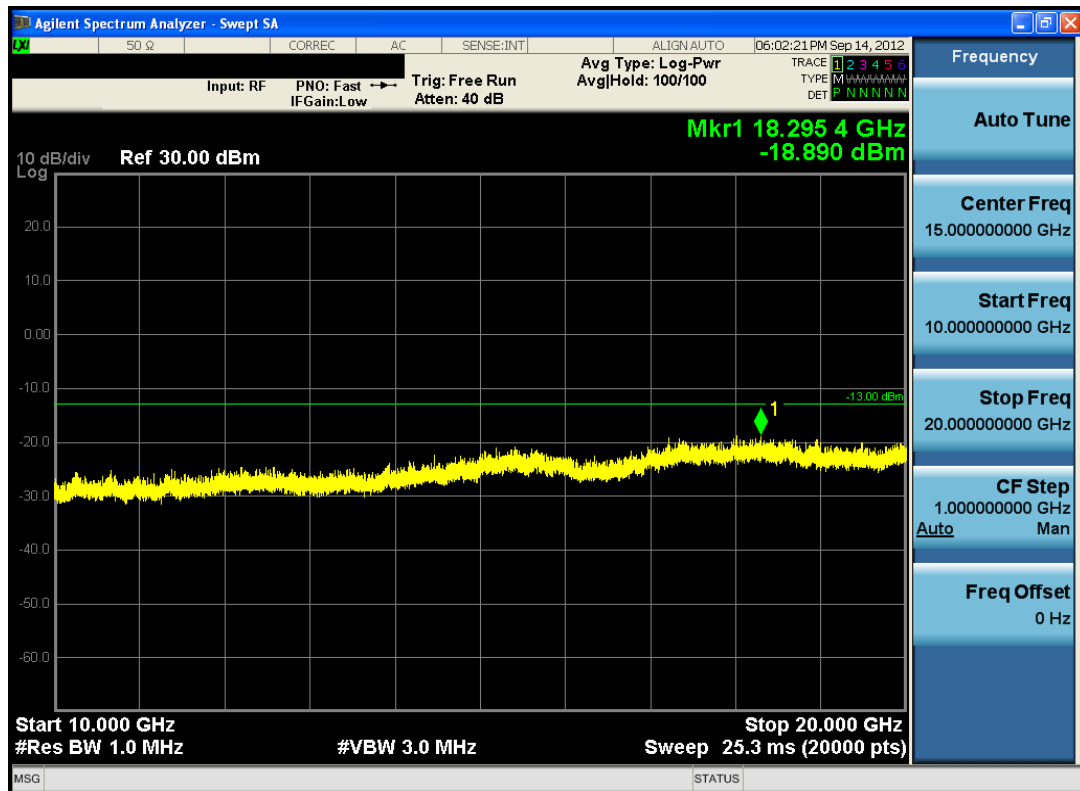


Plot 7-72. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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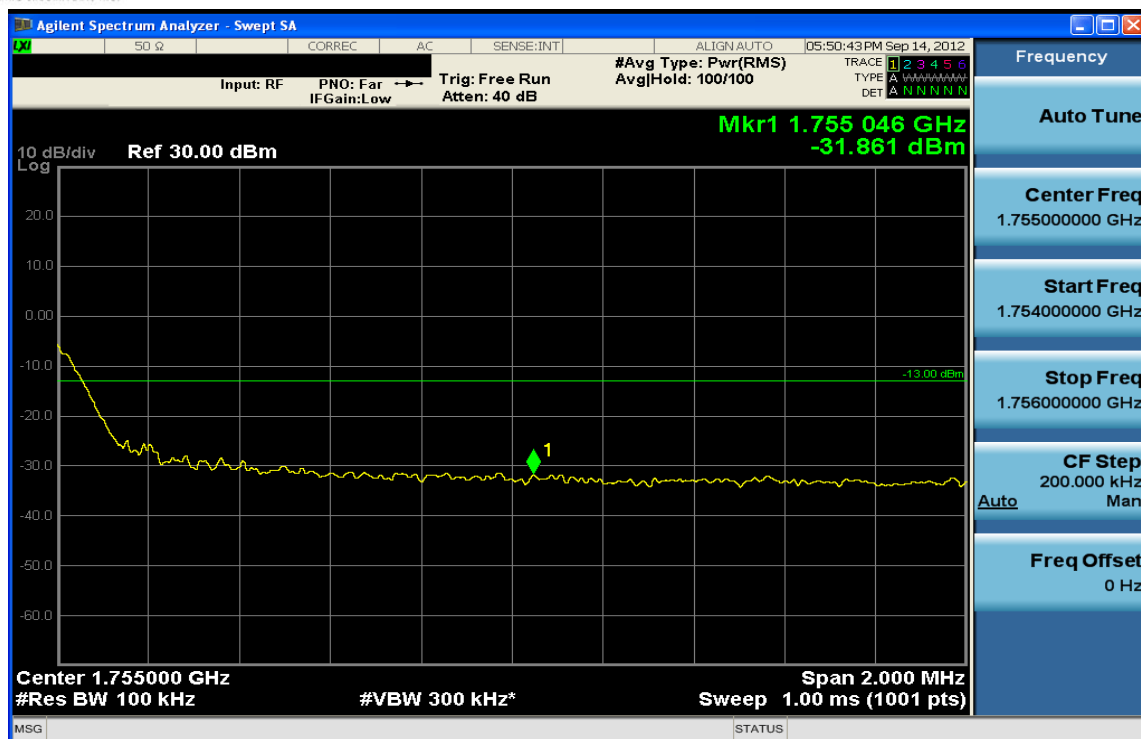


Plot 7-73. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)

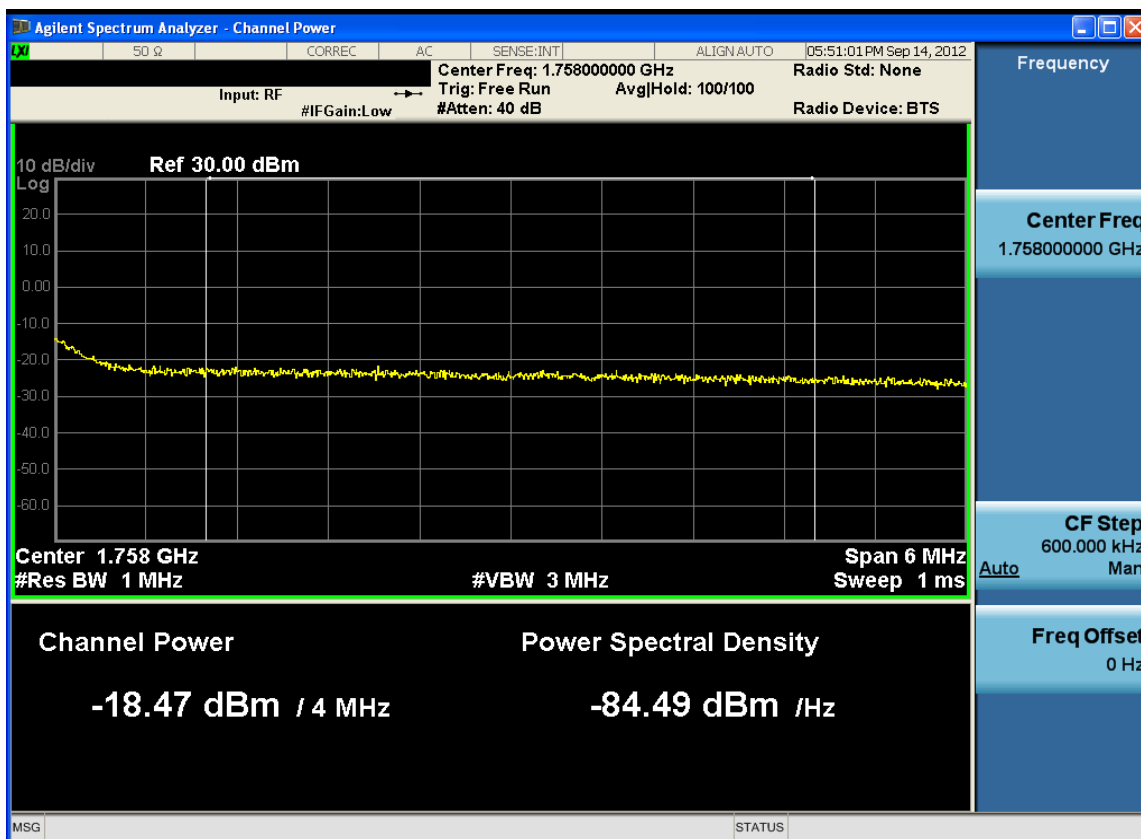


Plot 7-74. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)



FCC ID: A3LSGHT899M	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
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#### Plot 7-75. Upper Band Edge Plot (QPSK – RB Size 1, Offset 99)





### Plot 7-76. Upper Band Edge Plot (QPSK – RB Size 100)

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## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSGHT899M** complies with all the requirements of Parts 2, 22, 24 and 27 of the FCC rules for LTE operation only.

<b>FCC ID:</b> A3LSGHT899M		<b>FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1208241229.A3L	<b>Test Dates:</b> Aug. 24 - Oct. 05, 2012	<b>EUT Type:</b> Portable Handset		Page 47 of 47