



MEASUREMENT REPORT

FCC Part 27 / IC RSS-139 LTE

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

Date of Testing:
July 15 - September 7, 2012
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0Y1207241020.A3L

FCC ID : A3LSCHI915

APPLICANT: SAMSUNG ELECTRONICS CO., LTD.

FCC Classification: PCS Licensed Transmitter (PCB)
FCC Rule Part(s): §2; §27
EUT Type: Portable Tablet Computer
Model(s): SCH-I915
IC Model(s): SGH-I547C
IC Specification(s): RSS-132 Issue 2; RSS-133 Issue 5; RSS-139 Issue 2
Test Device Serial No.: identical prototype [S/N: 0891-1006, 0891-1007]

Mode	Channel Bandwidth (MHz)	Tx Frequency (MHz)	Modulation	Emission Designator	ERP/EIRP	
					Max. Power (W)	Max. Power (dBm)
LTE Band 4	5	1712.5 - 1752.5	QPSK	4M51G7D	0.164	22.16
LTE Band 4	5	1712.5 - 1752.5	16QAM	4M51W7D	0.164	22.16
LTE Band 4	10	1715 - 1750	QPSK	9M01G7D	0.124	20.93
LTE Band 4	10	1715 - 1750	16QAM	8M99W7D	0.094	19.74
LTE Band 4	15	1717.5 - 1747.5	QPSK	14M1G7D	0.161	22.08
LTE Band 4	15	1717.5 - 1747.5	16QAM	14M0W7D	0.151	21.79
LTE Band 4	20	1720 - 1745	QPSK	17M8G7D	0.172	22.36
LTE Band 4	20	1720 - 1745	16QAM	17M8W7D	0.171	22.33

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.

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 Ortañez
President

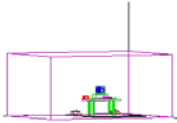


FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 1 of 44

T A B L E O F C O N T E N T S

FCC PART 27 MEASUREMENT REPORT	4
1.0 INTRODUCTION	4
1.1 SCOPE	4
1.2 TESTING FACILITY	4
2.0 PRODUCT INFORMATION.....	5
2.1 EQUIPMENT DESCRIPTION	5
2.2 DEVICE CAPABILITIES.....	5
2.3 EMI SUPPRESSION DEVICE(S)/MODIFICATIONS	5
2.4 LABELING REQUIREMENTS.....	5
3.0 DESCRIPTION OF TESTS	6
3.1 MEASUREMENT PROCEDURE	6
3.2 BLOCK A FREQUENCY RANGE	6
3.3 AWS - BASE FREQUENCY BLOCKS	6
3.4 AWS - MOBILE FREQUENCY BLOCKS	6
3.5 OCCUPIED BANDWIDTH	7
3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.....	7
3.7 PEAK-AVERAGE RATIO	7
3.8 RADIATED POWER AND RADIATED SPURIOUS EMISSIONS	8
3.9 FREQUENCY STABILITY / TEMPERATURE VARIATION	9
4.0 TEST EQUIPMENT CALIBRATION DATA	10
5.0 SAMPLE CALCULATIONS	11
6.0 TEST RESULTS.....	12
6.1 SUMMARY.....	12
6.2 EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)	14
6.3 BAND 4 RADIATED SPURIOUS EMISSIONS	15
6.4 BAND 4 FREQUENCY STABILITY MEASUREMENTS.....	18
7.0 BAND 4 PLOTS OF EMISSION	20
8.0 CONCLUSION.....	44

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 2 of 44



MEASUREMENT REPORT

FCC Part 27

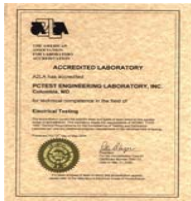


§2.1033 General Information

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 21045 USA
FCC RULE PART(S): §2; §27
BASE MODEL: SCH-I915
FCC ID: A3LSCHI915
FCC CLASSIFICATION: PCS Licensed Transmitter (PCB)
FREQUENCY TOLERANCE: $\pm 0.00025\%$ (2.5 ppm)
Test Device Serial No.: 0891-1006, 0891-1007 ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST: July 15 - September 7, 2012
TEST REPORT S/N: 0Y1207241020.A3L

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. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.
- 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.
- 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 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.

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 3 of 44

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 Internt'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 with the requirements of § 2.948 according to ANSI C63.4-2003 on February 15, 2012.

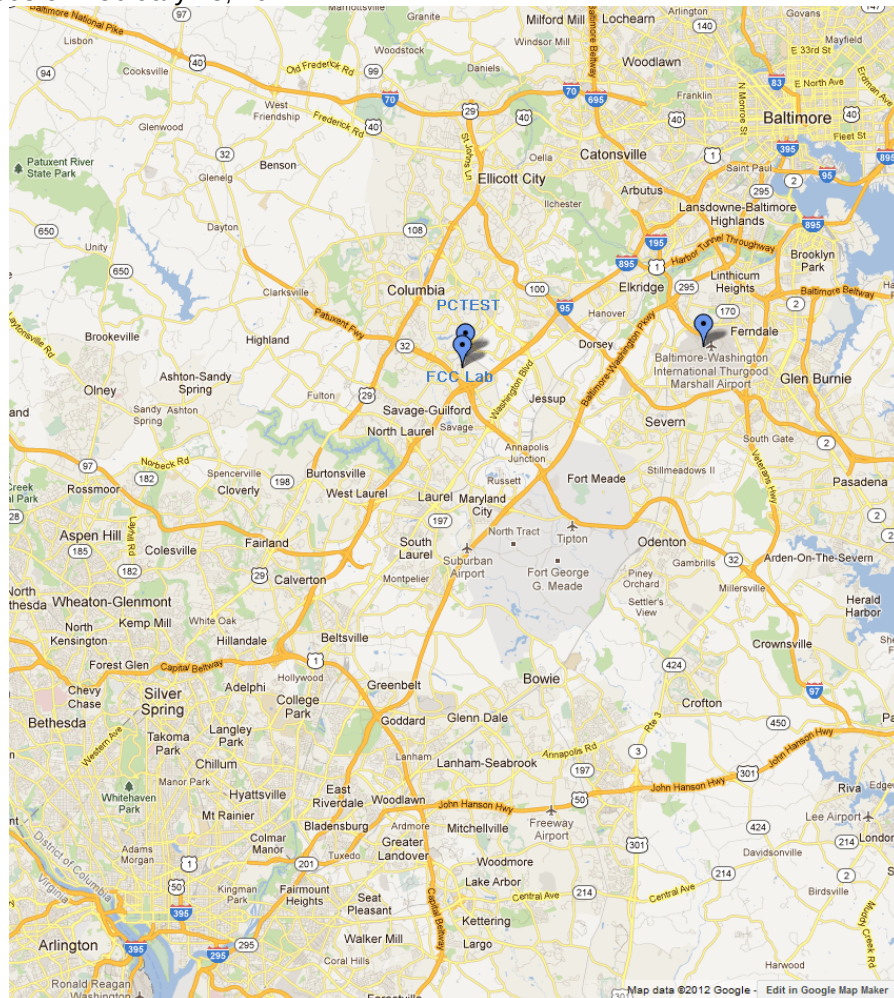


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 4 of 44

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Tablet Computer FCC ID: A3LSCHI915**. 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 CDMA/EvDO Rev0/A (BC0, BC1), Band 4,13 LTE, 802.11b/g/n WLAN, Bluetooth (1x,EDR, LE)

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.

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 5 of 44

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) was used in the measurement of the **Samsung Portable Tablet Computer FCC ID: A3LSCHI915**.

3.2 Block A Frequency Range

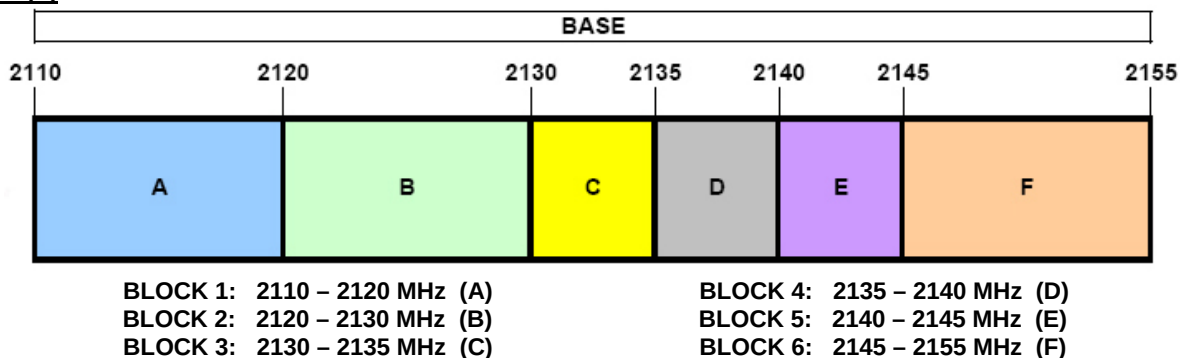
§27.5(c)

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.

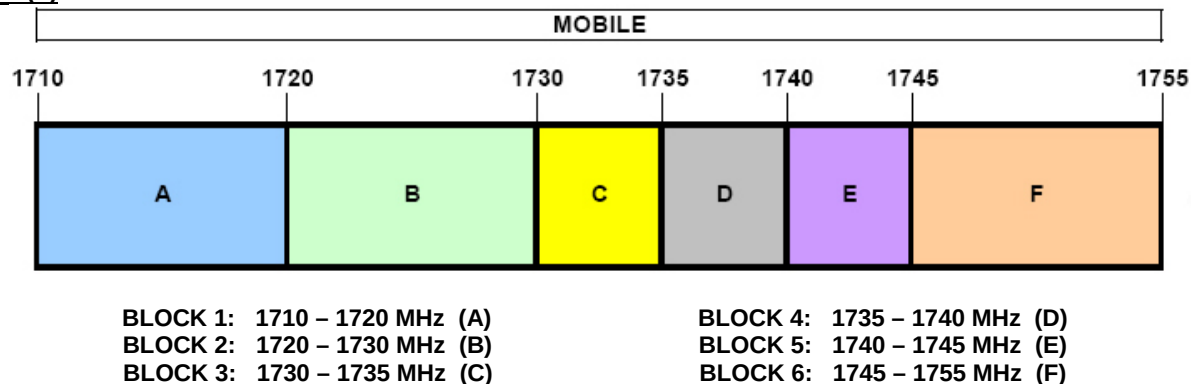
3.3 AWS - Base Frequency Blocks

§27.5(h)



3.4 AWS - Mobile Frequency Blocks

§27.5(h)



FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 6 of 44

3.5 Occupied Bandwidth

§2.1049, RSS-Gen (4.6.1)

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.

3.6 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051, §27.53(h)

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. 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 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.

3.7 Peak-Average Ratio

§27.50(d)(5), 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.

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 7 of 44

3.8 Radiated Power and Radiated Spurious Emissions

§2.1053, §27.53(h), 27.50(d)(4), RSS-139 (6.5)

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 78cm high PVC support structure is placed on top of the turntable. A ¾" (~1.9cm) sheet of high density polyethylene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

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

Per the guidance of ANSI/TIA-603-C-2004, 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 $43 + 10\log_{10}(\text{Power}_{\text{[Watts]}})$ specified in 27.53(g)(h).

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 8 of 44

3.9 Frequency Stability / Temperature Variation

§2.1055, §27.54

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 27.

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.

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 9 of 44

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)	7/10/2012	Annual	7/10/2013	N/A
-	LTx2	Licensed Transmitter Cable Set	2/17/2012	Annual	2/17/2013	N/A
Agilent	E8267C	Vector Signal Generator	10/10/2011	Biennial	10/10/2013	US42340152
Agilent	N9020A	MXA Signal Analyzer	10/10/2011	Annual	10/10/2012	US46470561
Espec	ESX-2CA	Environmental Chamber	4/4/2012	Annual	4/4/2013	17620
Mini-Circuits	VHF-1300+	High Pass Filter	2/7/2012	Annual	2/7/2013	30716
Rohde & Schwarz	RS-PR18	1-18 GHz Pre-Amplifier	6/26/2012	Annual	6/26/2013	100071
Rohde & Schwarz	RS-PR26	18-26.5 GHz Pre-Amplifier	5/30/2012	Annual	5/30/2013	100040
Rohde & Schwarz	ESU26	EMI Test Receiver	12/15/2011	Annual	12/15/2012	100342
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	N/A		N/A	102060
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/14/2011	Biennial	11/14/2013	9105-2404
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	11/14/2011	Biennial	11/14/2013	9105-2403
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A

Table 4-1. Test Equipment

Note: For equipment that has "N/A" for Cal Dates, these are used only for setting up a connection between the call box and EUT. Measurements were not taken using this equipment.

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 10 of 44

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 2nd Harmonic (1564 MHz)

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

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 11 of 44

6.0 TEST RESULTS

6.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSCHI915
 FCC Classification: PCS Licensed Transmitter (PCB)
 Mode(s): LTE

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
TRANSMITTER MODE (TX)						
2.1049	RSS-Gen (4.6.1) RSS-139 (2.3)	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.0
2.1051, 27.53(h)	RSS-139 (6.5)	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-139 (6.4)	Peak-Average Ratio	$< 13 \text{ dB}$		PASS	Section 7.0
2.1046	RSS-139 (4.1)	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
27.50(d)(4)	N/A	Equivalent Isotropic Radiated Power	$< 1 \text{ Watts max. EIRP}$	RADIATED	PASS	Section 6.2
2.1053, 27.53(h)	RSS-139 (6.5)	Undesirable Emissions	$< 43 + 10\log_{10}(P[\text{Watts}])$ for all out-of-band emissions		PASS	Section 6.3
2.1055, 27.54	RSS-139 (6.3)	Frequency Stability	fundamental emissions stay within authorized frequency block (Part 27)		PASS	Section 6.4

Table 6-1. Summary of Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in Section 7.0 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.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) 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

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 12 of 44



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: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer	Page 13 of 44	

6.2 Equivalent Isotropic Radiated Power (EIRP)

§27.50(d)(4), §24.232(c)

	Freq [MHz]	BW [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
Band 4 LTE	1712.5	5	QPSK	Standard	25 / 0	13.69	8.47	H	22.16	0.164	-7.84
	1732.5	5	QPSK	Standard	12 / 12	12.19	8.54	H	20.73	0.118	-9.27
	1752.5	5	QPSK	Standard	25 / 0	13.14	8.60	H	21.74	0.149	-8.26
	1712.5	5	16-QAM	Standard	12 / 12	13.69	8.47	H	22.16	0.164	-7.84
	1732.5	5	16-QAM	Standard	12 / 12	11.64	8.54	H	20.18	0.104	-9.82
	1752.5	5	16-QAM	Standard	25 / 0	13.15	8.60	H	21.75	0.150	-8.25
	1715.0	10	QPSK	Standard	50 / 0	11.90	8.47	H	20.37	0.109	-9.63
	1732.5	10	QPSK	Standard	1 / 0	12.14	8.54	H	20.68	0.117	-9.32
	1750.0	10	QPSK	Standard	50 / 0	12.33	8.60	H	20.93	0.124	-9.07
	1715.0	10	16-QAM	Standard	50 / 0	11.24	8.47	H	19.71	0.093	-10.29
	1732.5	10	16-QAM	Standard	1 / 0	10.66	8.54	H	19.20	0.083	-10.80
	1750.0	10	16-QAM	Standard	25 / 0	11.14	8.60	H	19.74	0.094	-10.26
	1717.5	15	QPSK	Standard	36 / 20	10.68	8.47	H	19.15	0.082	-10.85
	1732.5	15	QPSK	Standard	75 / 0	11.70	8.54	H	20.24	0.106	-9.76
	1747.5	15	QPSK	Standard	36 / 20	13.48	8.60	H	22.08	0.161	-7.92
	1717.5	15	16-QAM	Standard	36 / 20	10.47	8.47	H	18.94	0.078	-11.06
	1732.5	15	16-QAM	Standard	75 / 0	11.44	8.54	H	19.98	0.100	-10.02
	1747.5	15	16-QAM	Standard	36 / 20	13.19	8.60	H	21.79	0.151	-8.21
	1720.0	20	QPSK	Standard	1 / 0	13.89	8.47	H	22.36	0.172	-7.64
	1732.5	20	QPSK	Standard	1 / 0	13.82	8.54	H	22.36	0.172	-7.64
	1745.0	20	QPSK	Standard	1 / 49	13.19	8.60	H	21.79	0.151	-8.21
	1720.0	20	16-QAM	Standard	1 / 0	13.86	8.47	H	22.33	0.171	-7.67
	1732.5	20	16-QAM	Standard	50 / 50	13.03	8.54	H	21.57	0.144	-8.43
	1745.0	20	16-QAM	Standard	100 / 0	12.93	8.60	H	21.53	0.142	-8.47

Table 6-2. EIRP Data (Band 4)

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. For all LTE Bands, the highest power and worst case emissions was found with QPSK modulation and RB size = 1. Depending on the LTE Band and Channel, varying RB offsets will produce the highest power was worst case emission.
2. This unit was tested with its standard battery.
3. The worst case test configuration was found in the horizontally flat setup.

FCC ID: A3LSCHI915	 FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION) 			Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 14 of 44

6.3 Band 4 Radiated Spurious Emissions §2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1720.00 MHz
 MEASURED OUTPUT POWER: 22.36 dBm = 0.172 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 35.36 dBc

FREQ (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3440.00	-51.79	8.09	-43.70	H	66.06
5160.00	-93.75	10.21	-83.55	H	105.91
6880.00	-92.51	11.31	-81.19	H	103.55
8600.00	-92.93	13.02	-79.91	H	102.27
10320.00	-89.78	13.01	-76.77	H	99.13
12040.00	-86.91	13.21	-73.70	H	96.06

Table 6-3. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. For all LTE Bands, the highest power and worst case emissions was found with QPSK modulation and RB size = 1. Depending on the LTE Band and Channel, varying RB offsets will produce the highest power was worst case emission. Please see ERP and EIRP tables in sections 6.2 and 6.3 for the RB offsets that produced highest power and worst case emissions.
2. This unit was tested with its standard battery.
3. The worst case test configuration was found in the horizontally flat setup.

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 15 of 44

Band 4 Radiated Spurious Measurements (continued)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1732.50 MHz
 MEASURED OUTPUT POWER: 22.36 dBm = 0.172 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W)$ 35.36 dBc

FREQ (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3465.00	-53.14	8.26	-44.87	H	67.23
5197.50	-93.73	10.26	-83.47	H	105.83
6930.00	-92.63	11.42	-81.21	H	103.57
8662.50	-92.78	13.07	-79.71	H	102.07
10395.00	-89.82	13.12	-76.70	H	99.06
12127.50	-86.41	13.25	-73.16	H	95.52

Table 6-4. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. For all LTE Bands, the highest power and worst case emissions was found with QPSK modulation and RB size = 1. Depending on the LTE Band and Channel, varying RB offsets will produce the highest power was worst case emission. Please see ERP and EIRP tables in sections 6.2 and 6.3 for the RB offsets that produced highest power and worst case emissions.
2. This unit was tested with its standard battery.
3. The worst case test configuration was found in the horizontally flat setup.

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 16 of 44

Band 4 Radiated Spurious Measurements (continued)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1745.00 MHz
 MEASURED OUTPUT POWER: 21.79 dBm = 0.151 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 20 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.79 dBc

FREQ (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3490.00	-51.72	8.40	-43.32	H	65.11
5235.00	-93.71	10.32	-83.40	H	105.19
6980.00	-92.72	11.51	-81.21	H	103.00
8725.00	-92.62	13.11	-79.51	H	101.30
10470.00	-89.67	13.20	-76.47	H	98.26
12215.00	-85.91	13.31	-72.60	H	94.39

Table 6-5. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. For all LTE Bands, the highest power and worst case emissions was found with QPSK modulation and RB size = 1. Depending on the LTE Band and Channel, varying RB offsets will produce the highest power was worst case emission. Please see ERP and EIRP tables in sections 6.2 and 6.3 for the RB offsets that produced highest power and worst case emissions.
2. This unit was tested with its standard battery.
3. The worst case test configuration was found in the horizontally flat setup.

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 17 of 44

6.4 Band 4 Frequency Stability Measurements

§2.1055, 27.54

OPERATING FREQUENCY: 1,732,500,000 Hz

REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,732,499,992	-8	-0.0000004
100 %		- 30	1,732,499,990	-10	-0.0000006
100 %		- 20	1,732,499,986	-14	-0.0000008
100 %		- 10	1,732,499,984	-16	-0.0000009
100 %		0	1,732,499,986	-14	-0.0000008
100 %		+ 10	1,732,499,988	-12	-0.0000007
100 %		+ 20	1,732,499,987	-13	-0.0000008
100 %		+ 30	1,732,499,982	-18	-0.0000010
100 %		+ 40	1,732,499,996	-4	-0.0000002
100 %		+ 50	1,732,499,996	-4	-0.0000003
115 %	4.37	+ 20	1,732,499,982	-18	-0.0000010
85 %	3.23	+ 20	1,732,499,985	-15	-0.0000009

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

Band 4 Frequency Stability Measurements (Cont'd)

§2.1055, 27.54

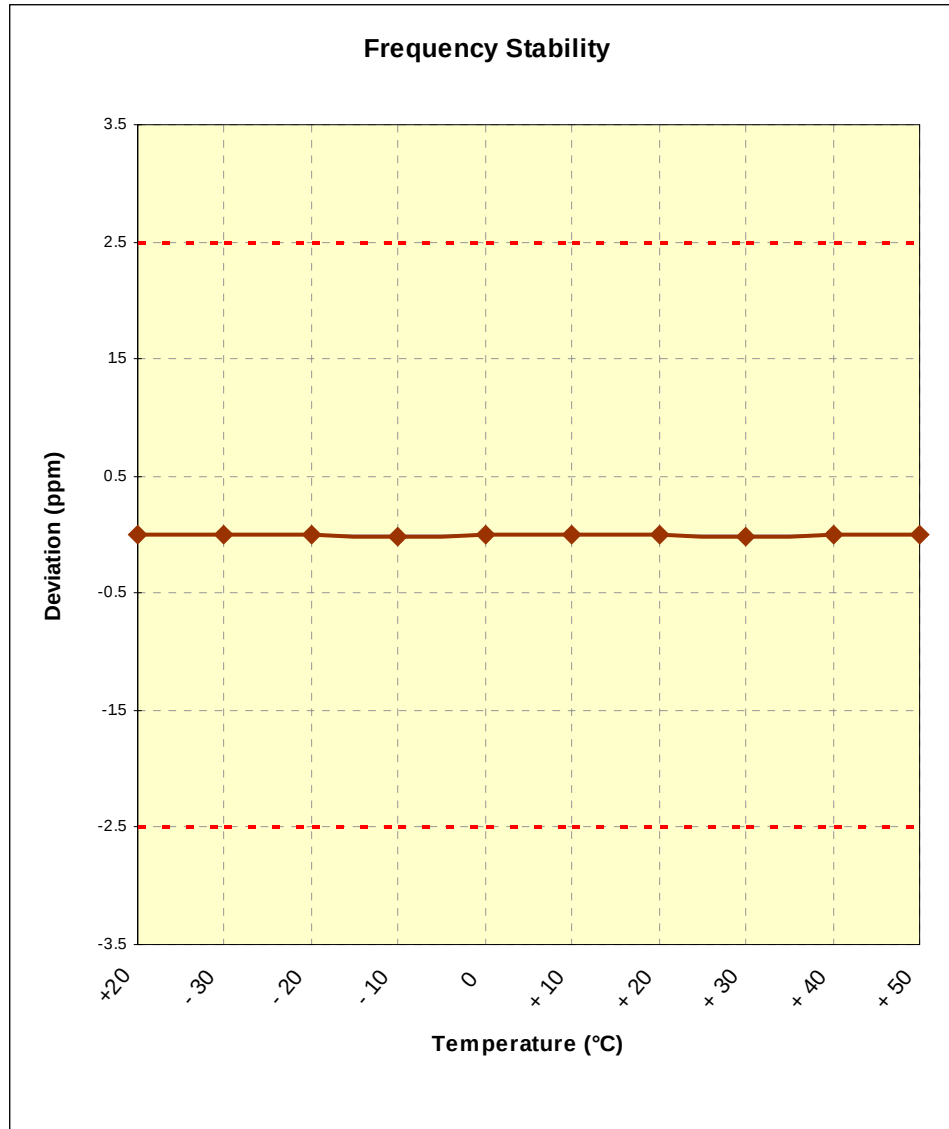


Figure 6-1. Frequency Stability Graph (Band 4)

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 19 of 44

7.0 BAND 4 PLOTS OF EMISSION

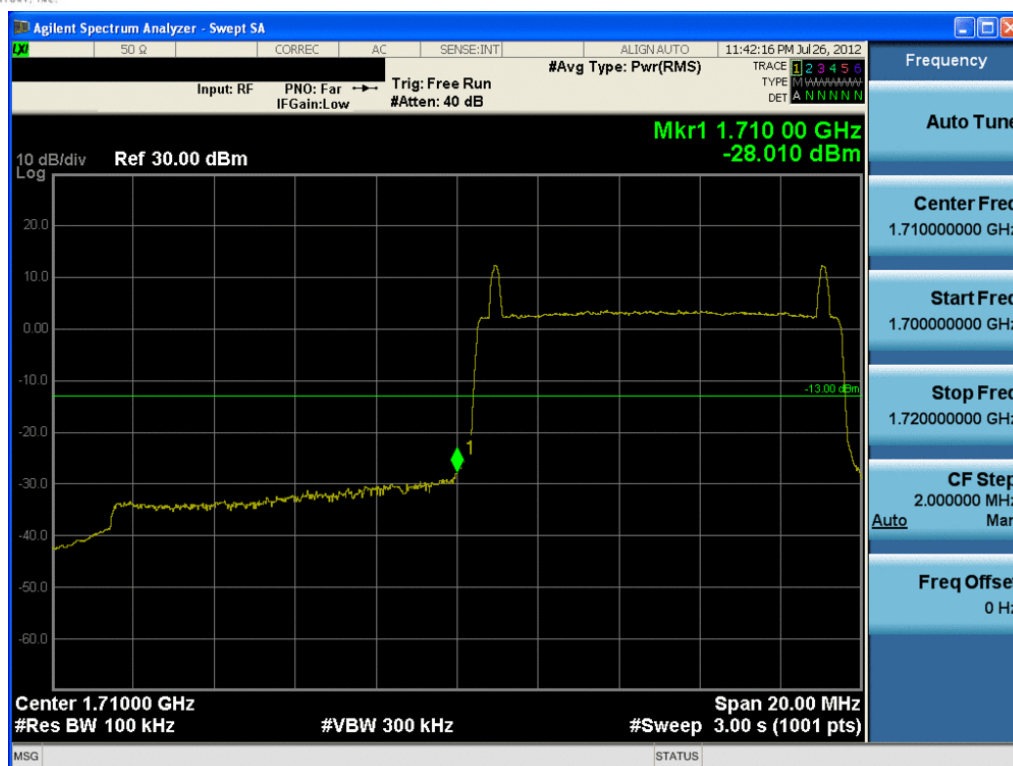
Note: All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.

5MHz & 10MHz Bandwidths



Plot 7-1. Lower Band Edge Plot (5MHz QPSK – RB Size 25)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 20 of 44

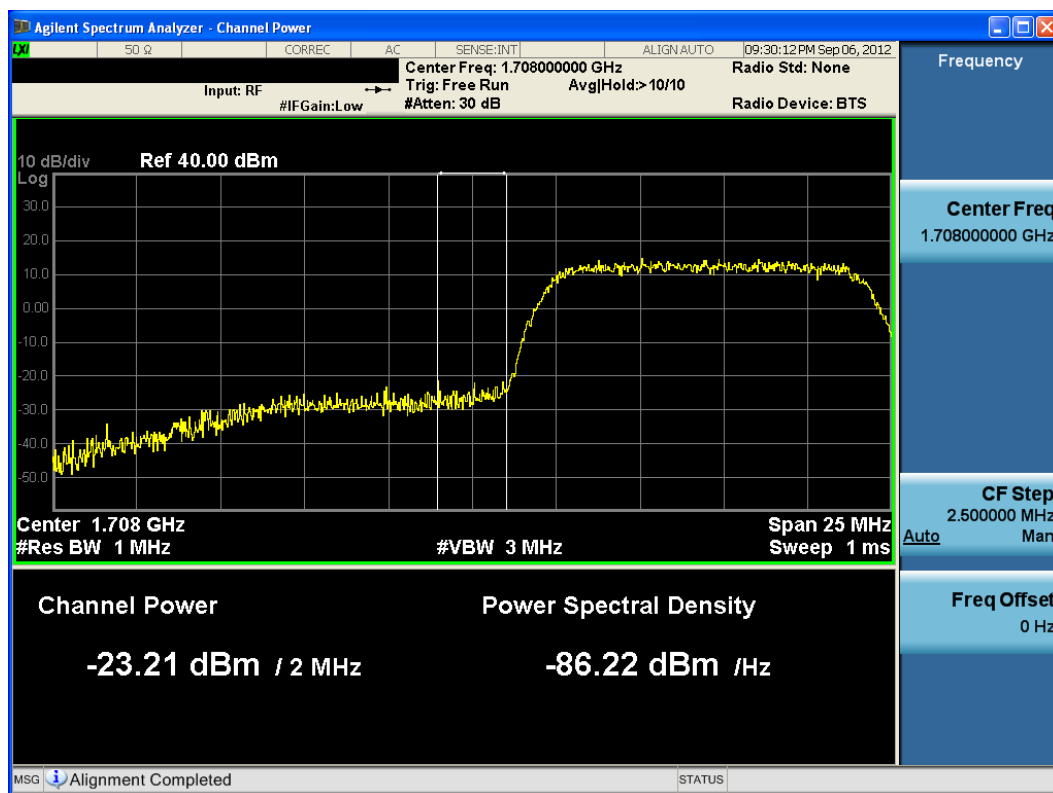


Plot 7-2. Lower Band Edge Plot (10MHz QPSK – RB Size 50)

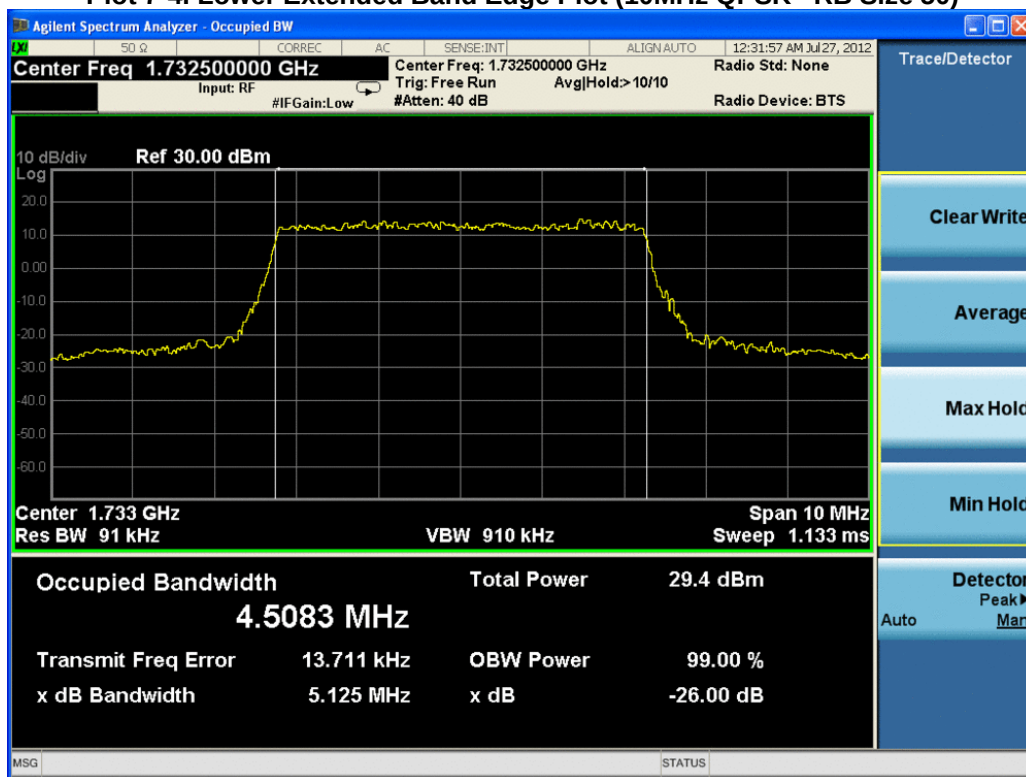


Plot 7-3. Lower Extended Band Edge Plot (5MHz QPSK- RB Size 25)

FCC ID: A3LSCHI915	 FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer	Page 21 of 44

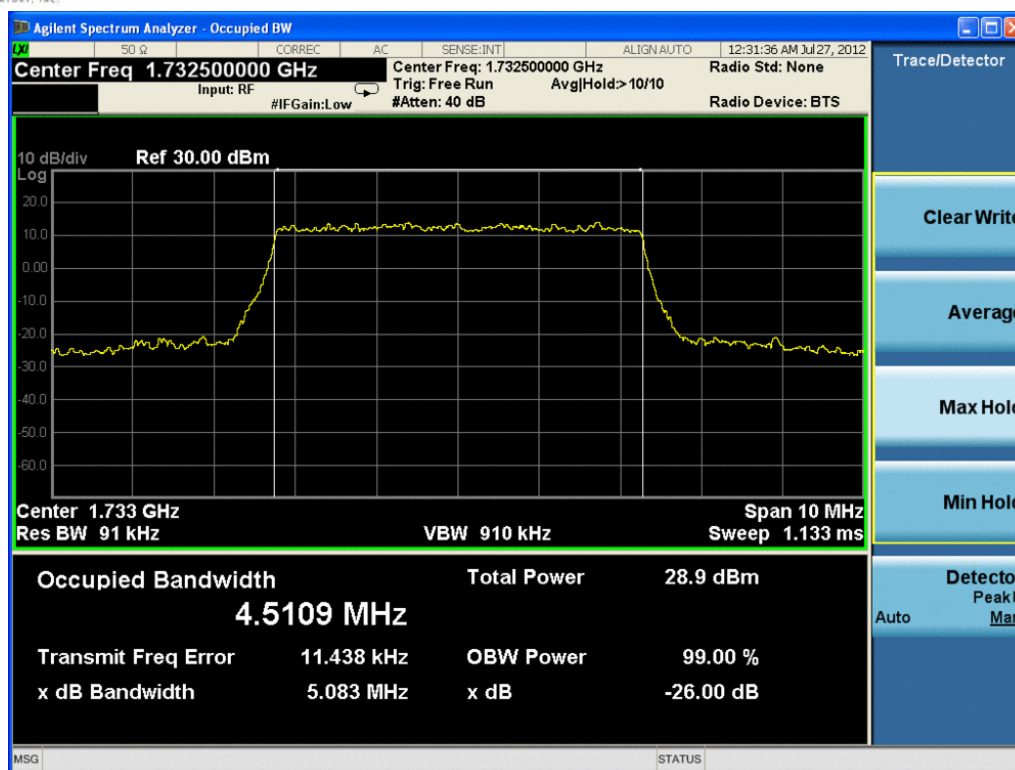


Plot 7-4. Lower Extended Band Edge Plot (10MHz QPSK– RB Size 50)

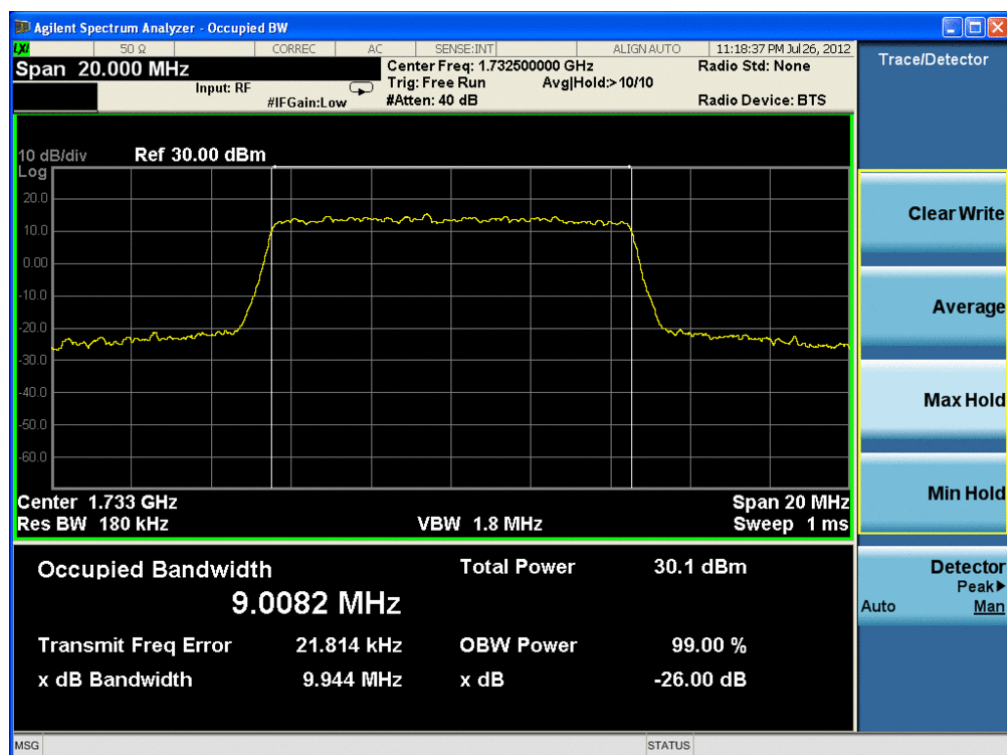


Plot 7-5. Occupied Bandwidth Plot (5MHz QPSK – RB Size 25)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 22 of 44

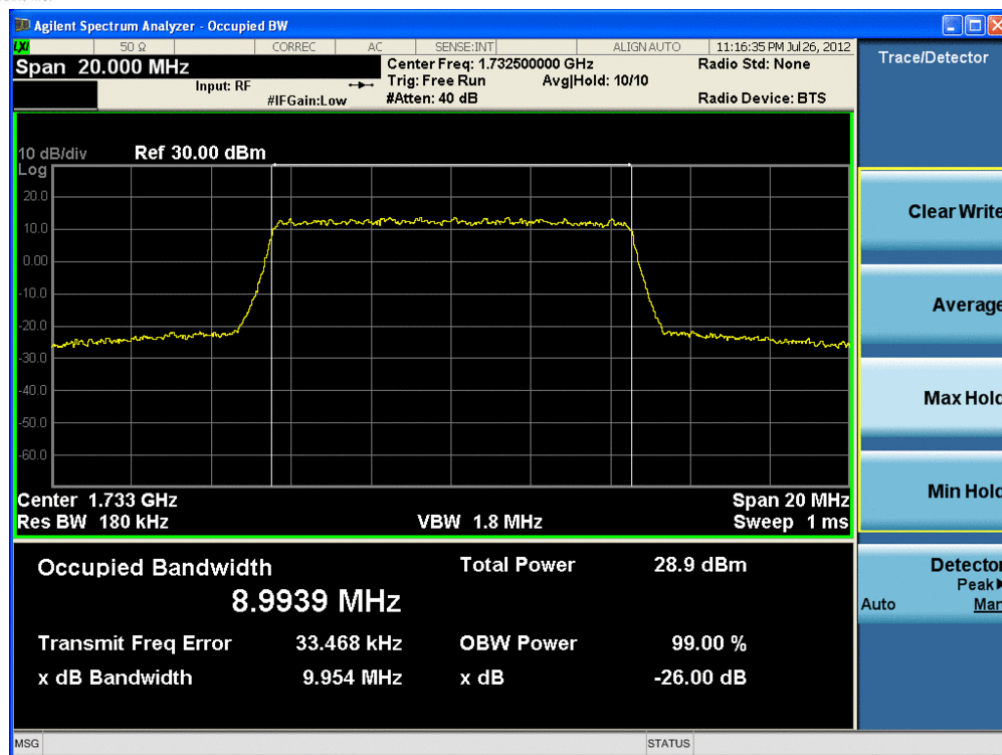


Plot 7-6. Occupied Bandwidth Plot (5MHz 16-QAM – RB Size 25)

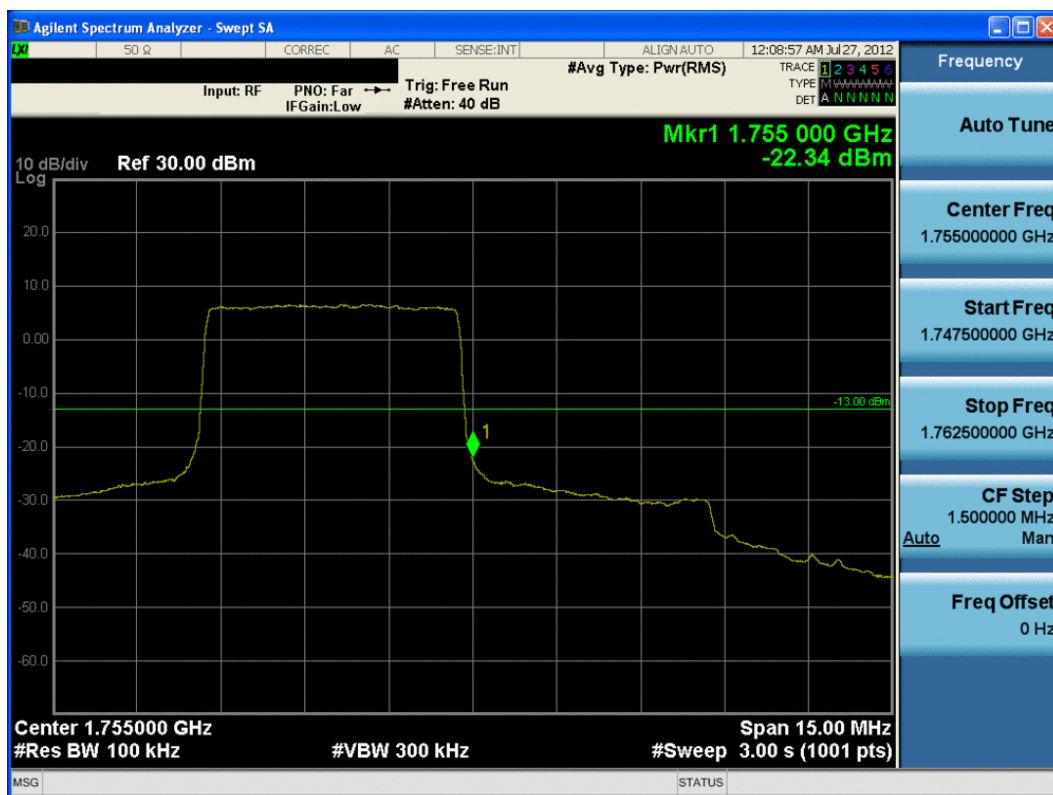


Plot 7-7. Occupied Bandwidth Plot (10MHz QPSK – RB Size 50)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 23 of 44

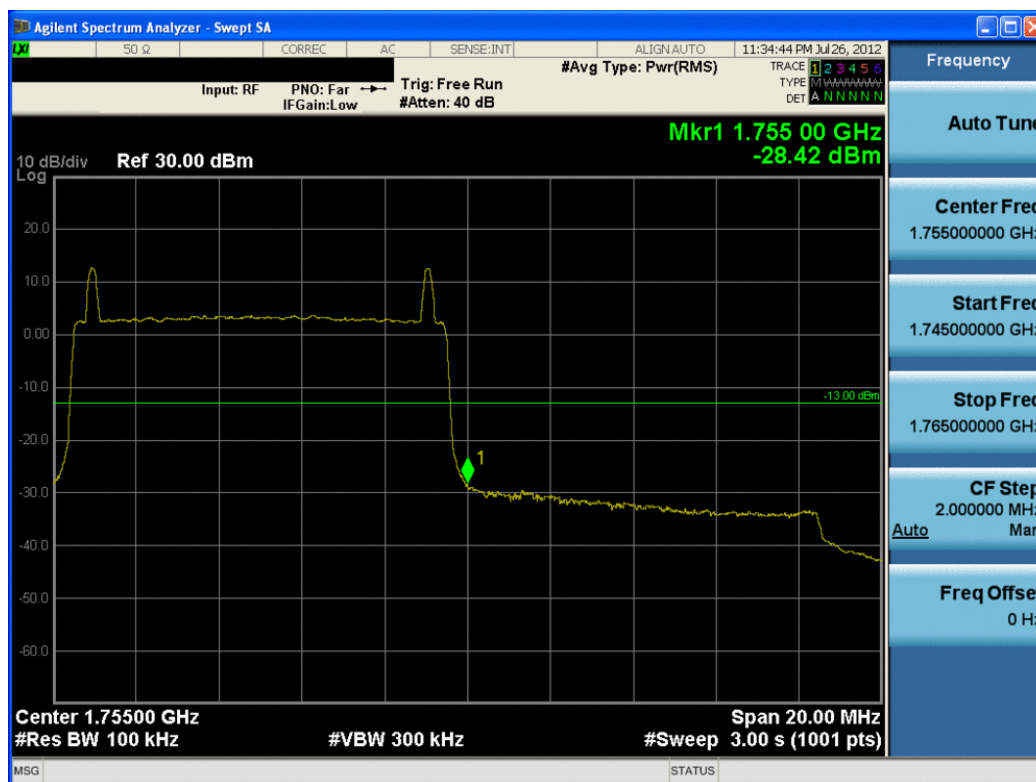


Plot 7-8. Occupied Bandwidth Plot (10MHz 16-QAM – RB Size 50)



Plot 7-9. Upper Band Edge Plot (5MHz QPSK – RB Size 25)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 24 of 44

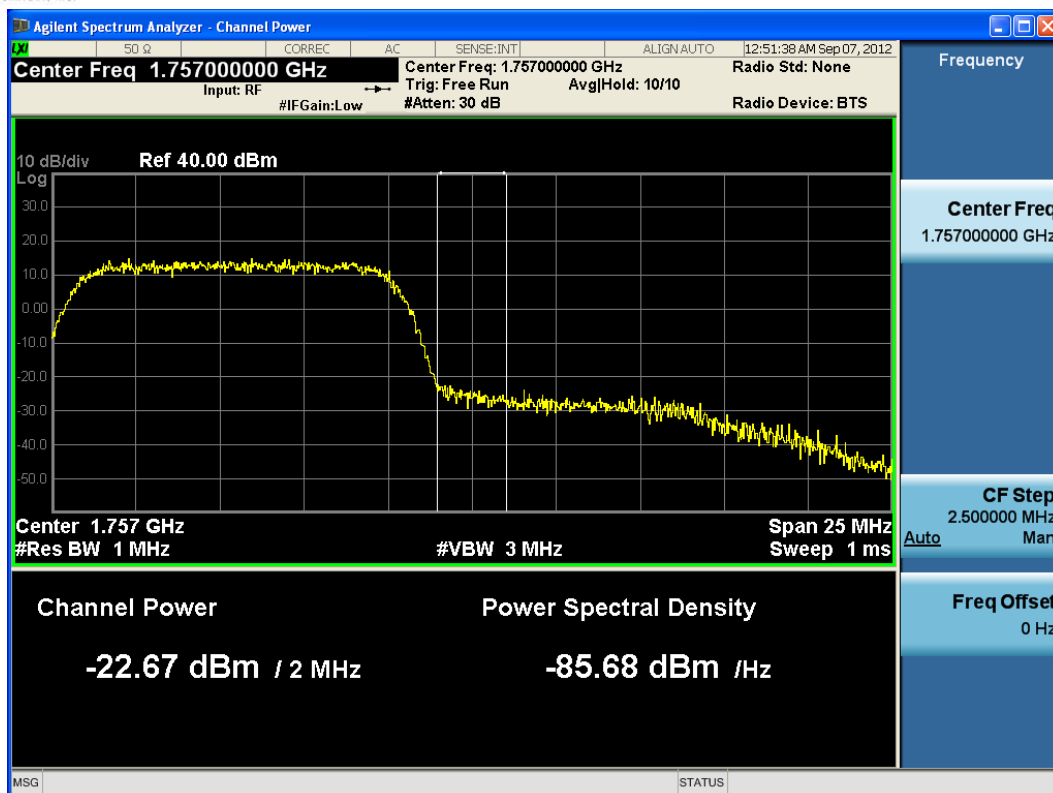


Plot 7-10. Upper Band Edge Plot (10MHz QPSK – RB Size 50)

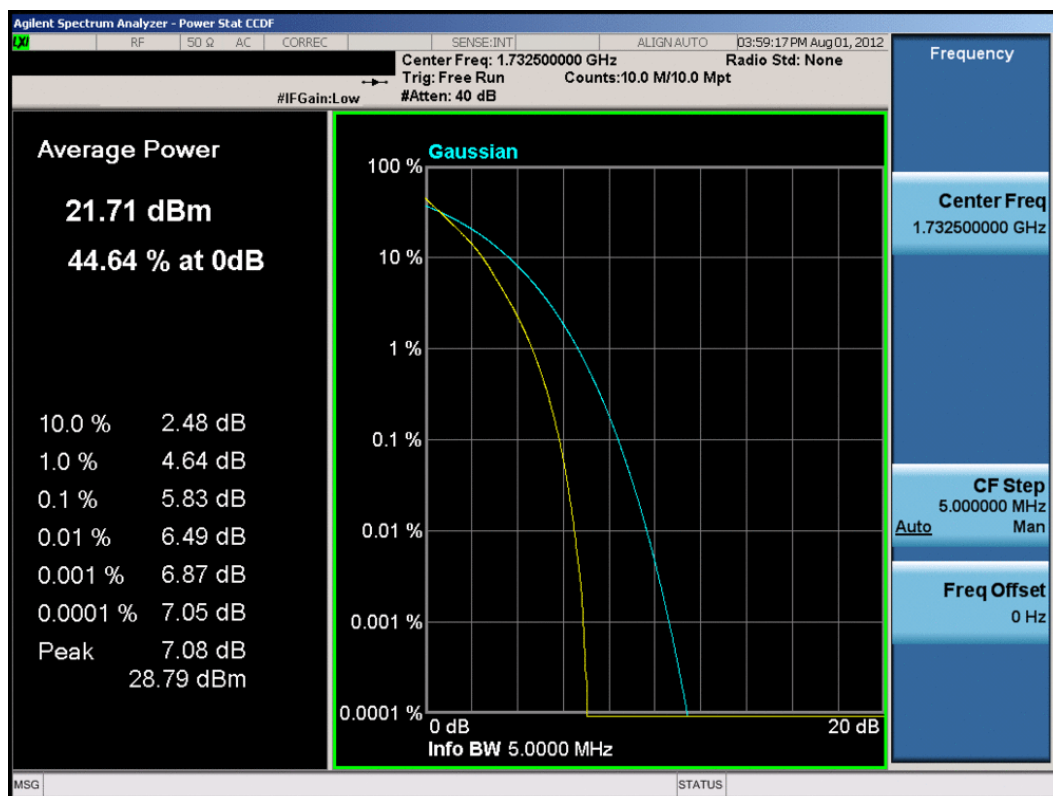


Plot 7-11. Upper Extended Band Edge Plot (5MHz QPSK– RB Size 25)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 25 of 44



Plot 7-12. Upper Extended Band Edge Plot (10MHz QPSK– RB Size 50)

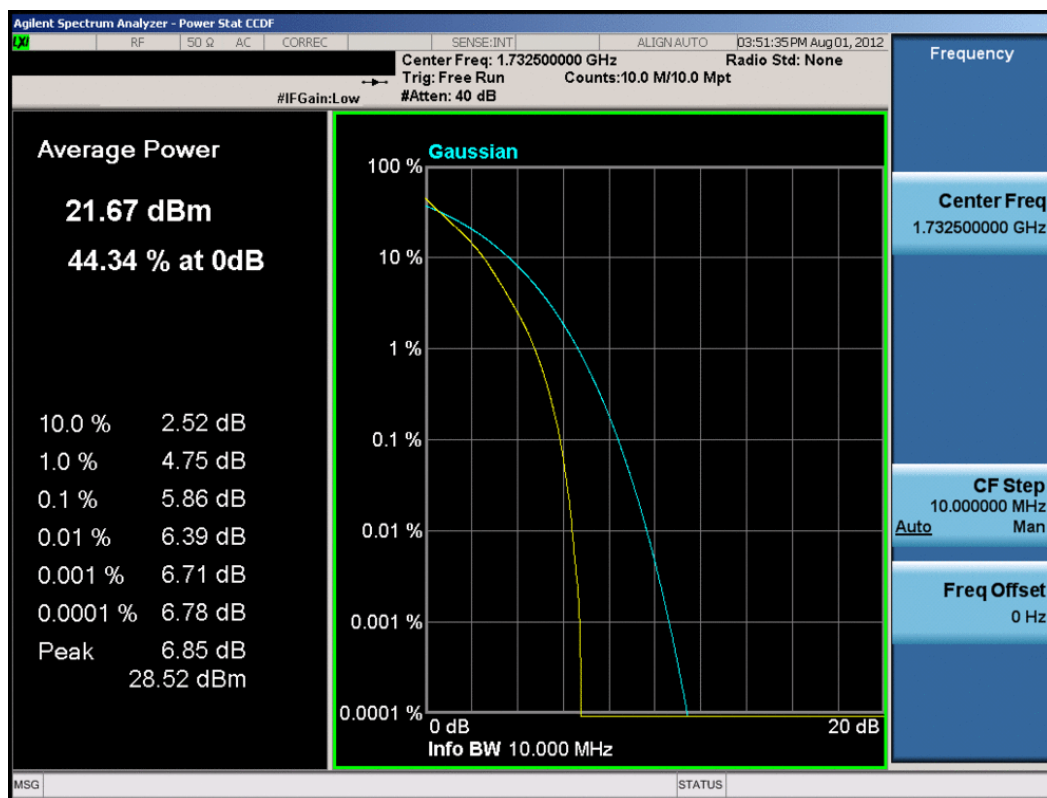


Plot 7-13. PAR Plot (5MHz QPSK – RB Size 25)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 26 of 44

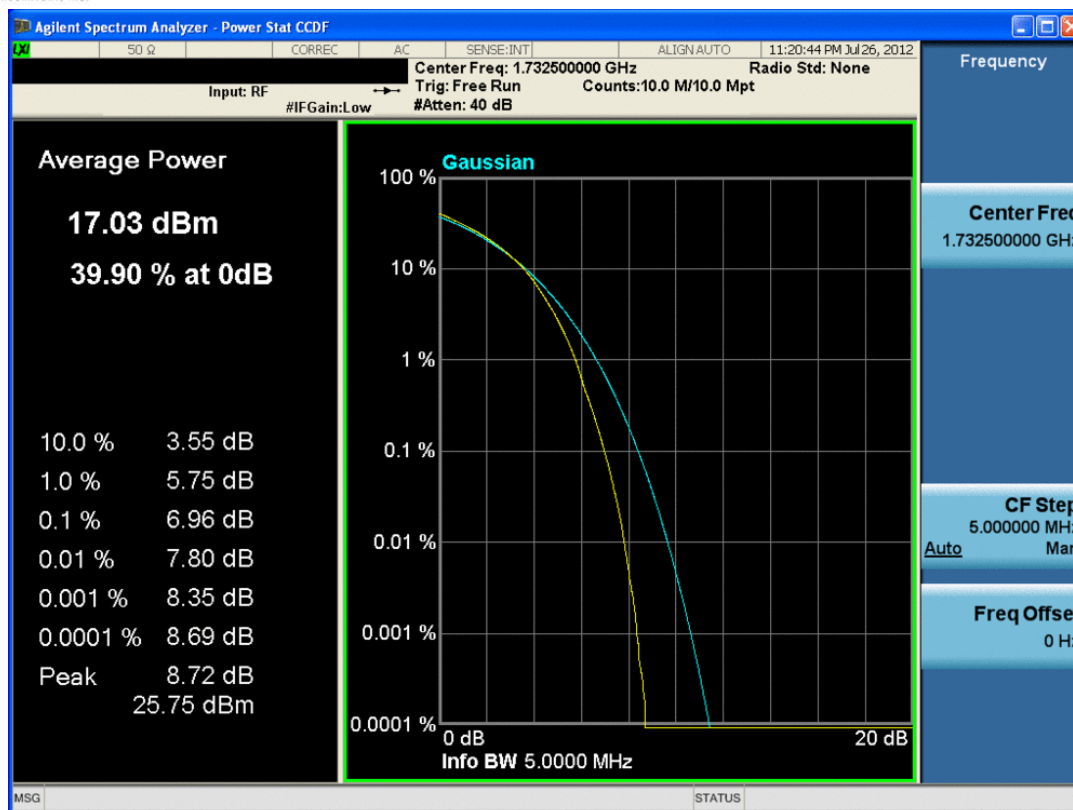


Plot 7-14. PAR Plot (5MHz 16QAM – RB Size 25)



Plot 7-15. PAR Plot (10MHz QPSK – RB Size 50)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 27 of 44



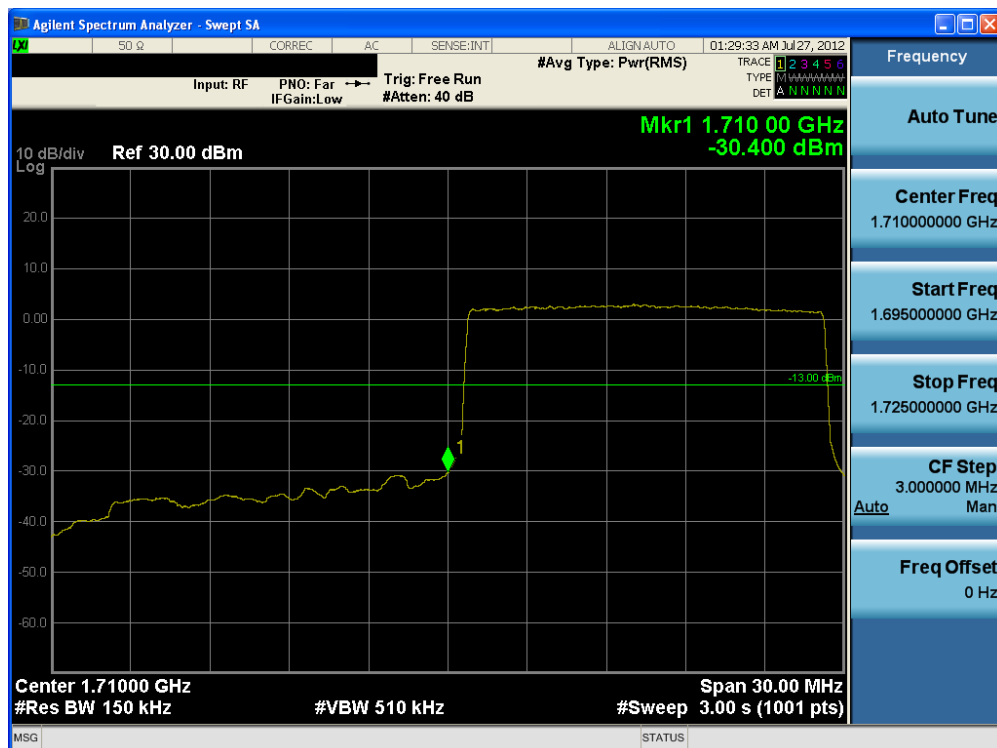
Plot 7-16. PAR Plot (10MHz 16QAM – RB Size 50)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 28 of 44

15MHz Bandwidth

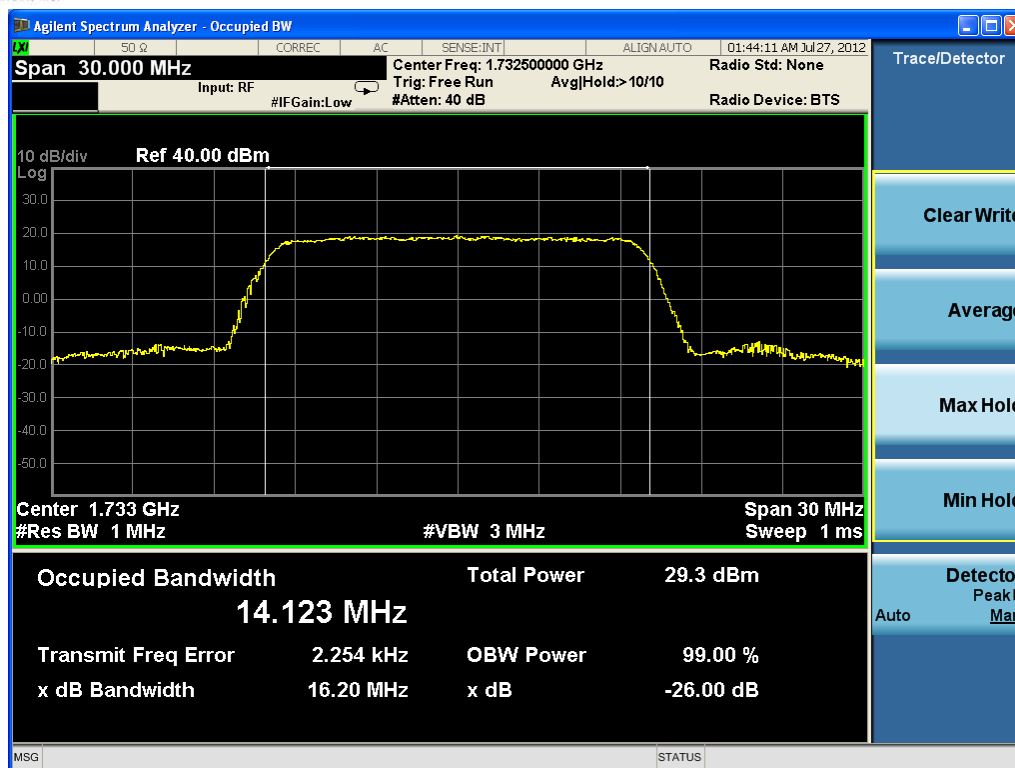


Plot 7-17. Lower Extended Band Edge Plot (QPSK – RB Size 75)

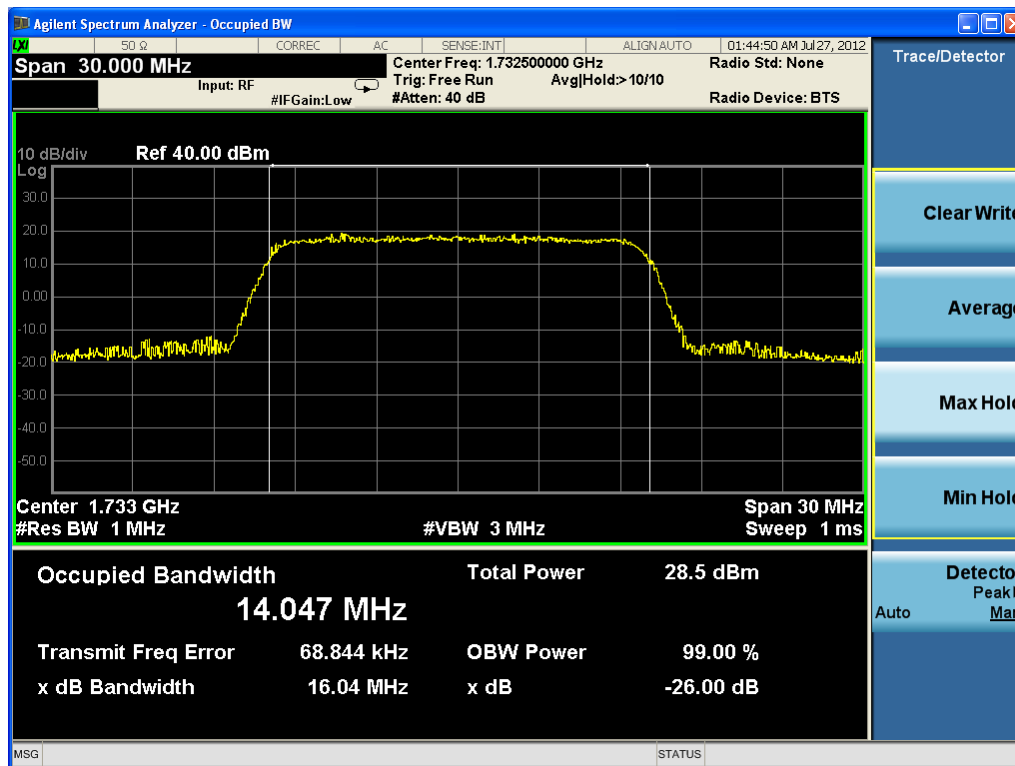


Plot 7-18. Lower Band Edge Plot (QPSK – RB Size 75)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 29 of 44

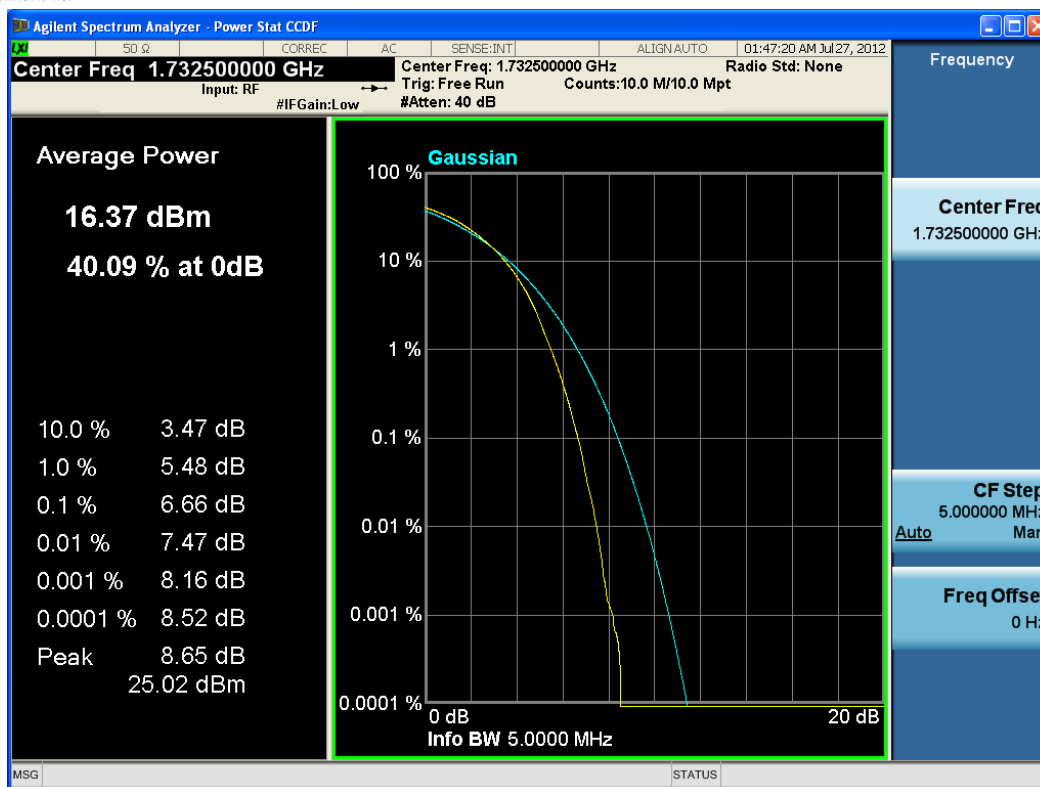


Plot 7-19. Occupied Bandwidth Plot (QPSK – RB Size 75)

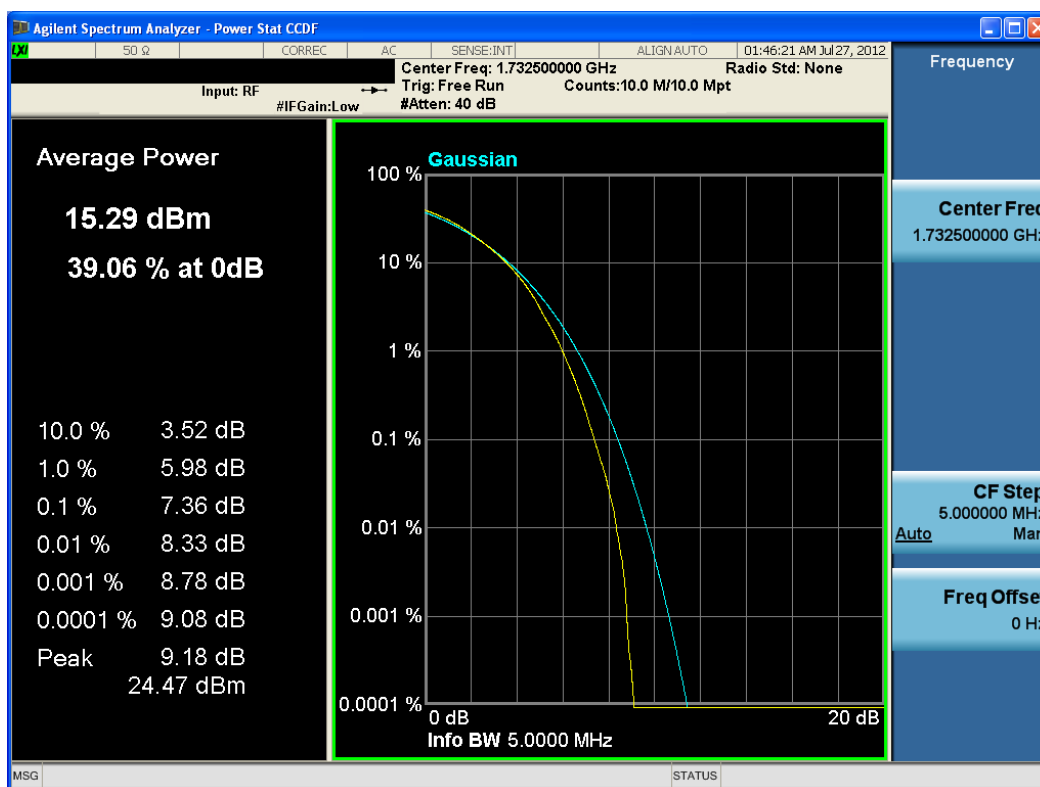


Plot 7-20. Occupied Bandwidth Plot (16-QAM – RB Size 75)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 30 of 44

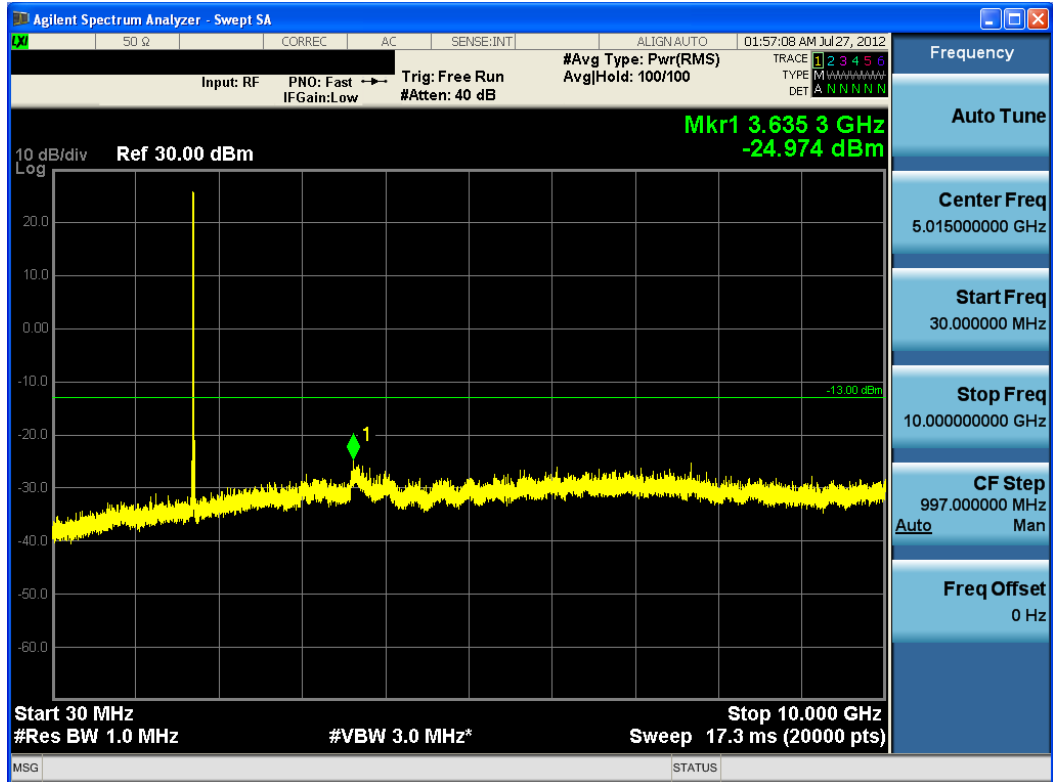


Plot 7-21. Peak to Average Ratio Plot (QPSK – RB Size 75)

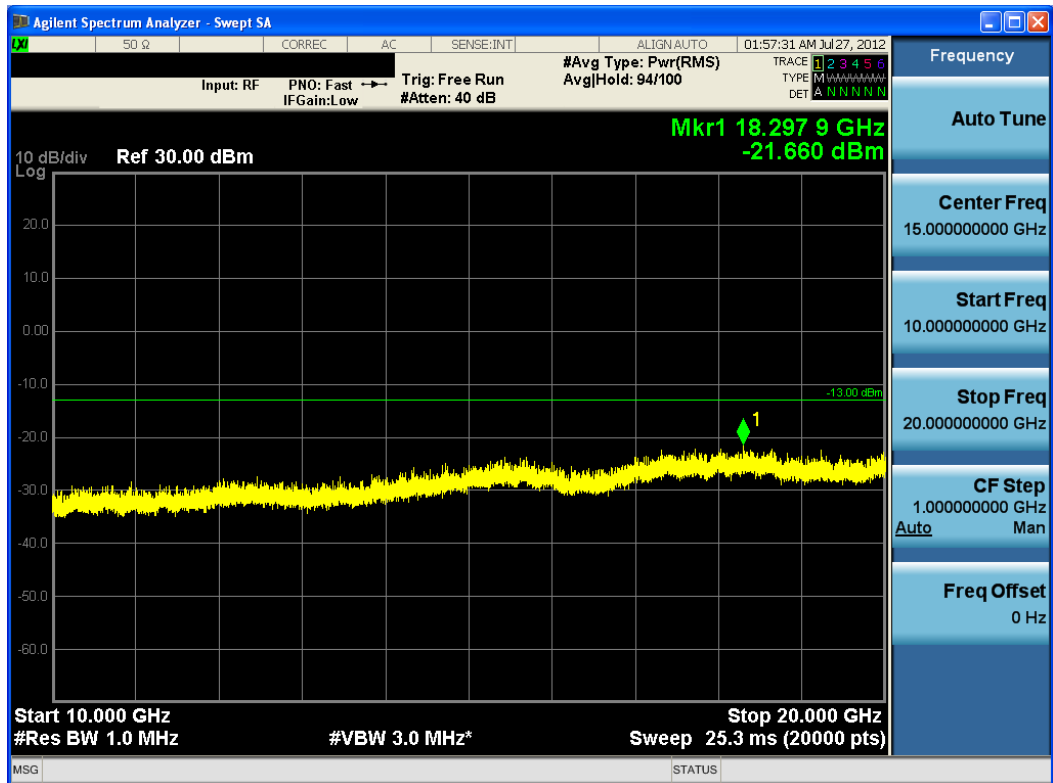


Plot 7-22. Peak to Average Ratio Plot (16-QAM – RB Size 75)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 31 of 44

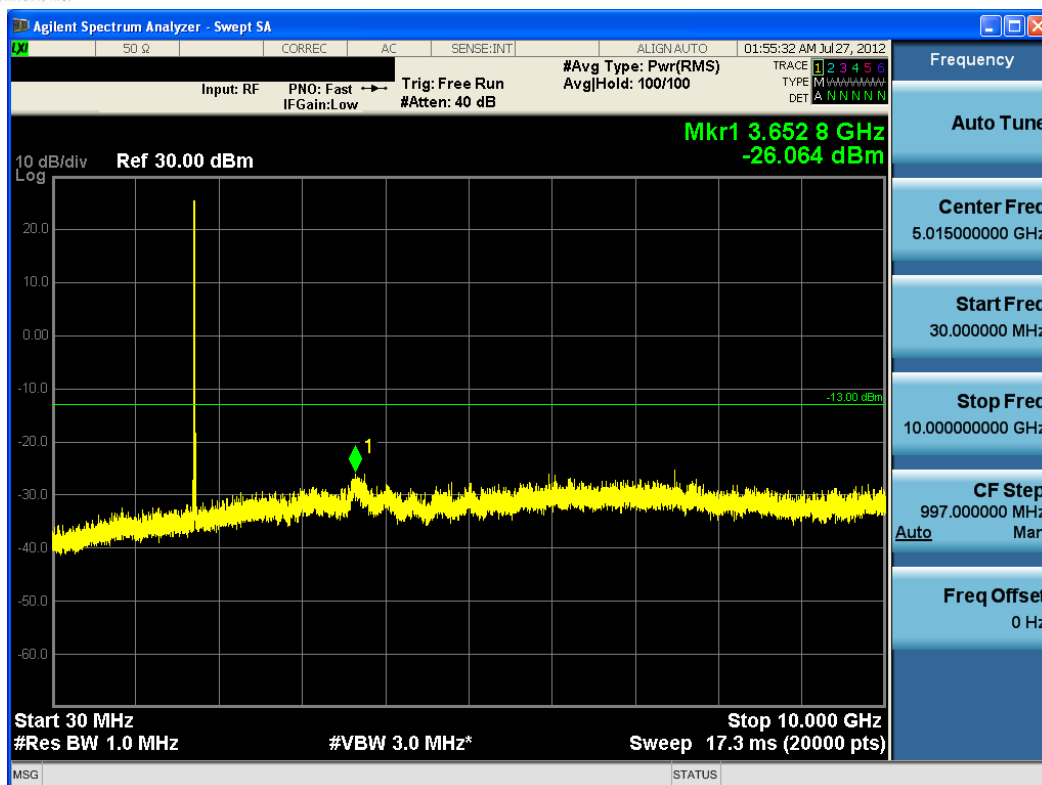


Plot 7-23. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)

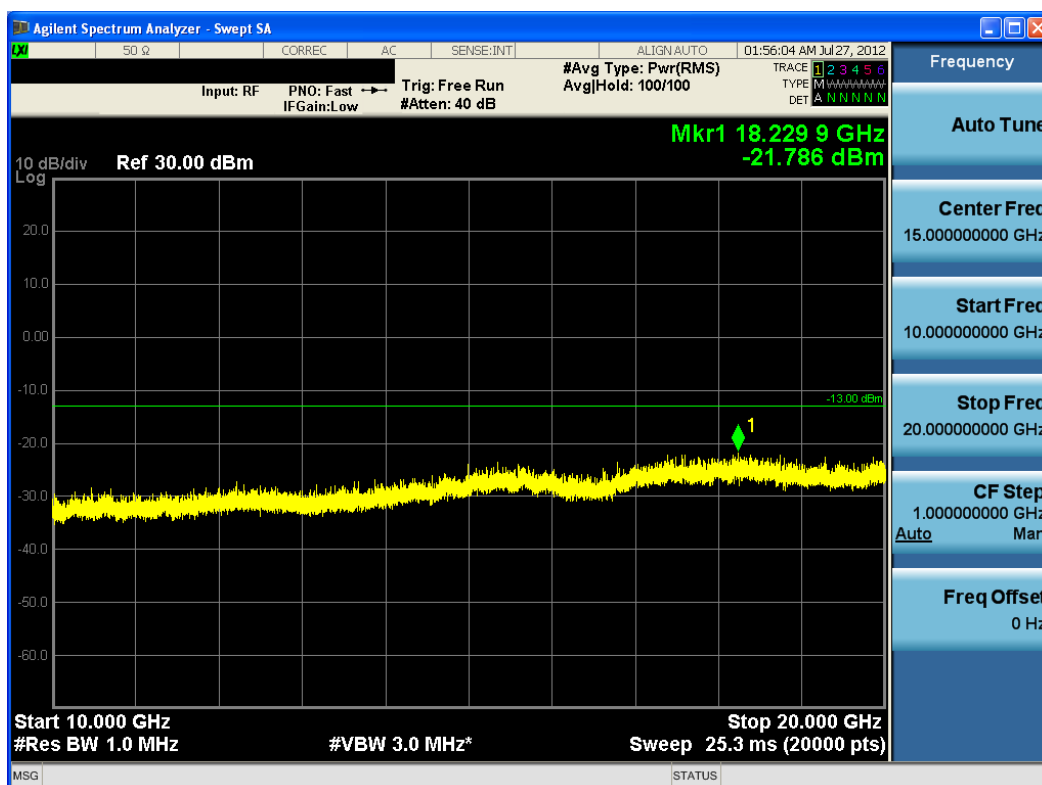


Plot 7-24. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 32 of 44

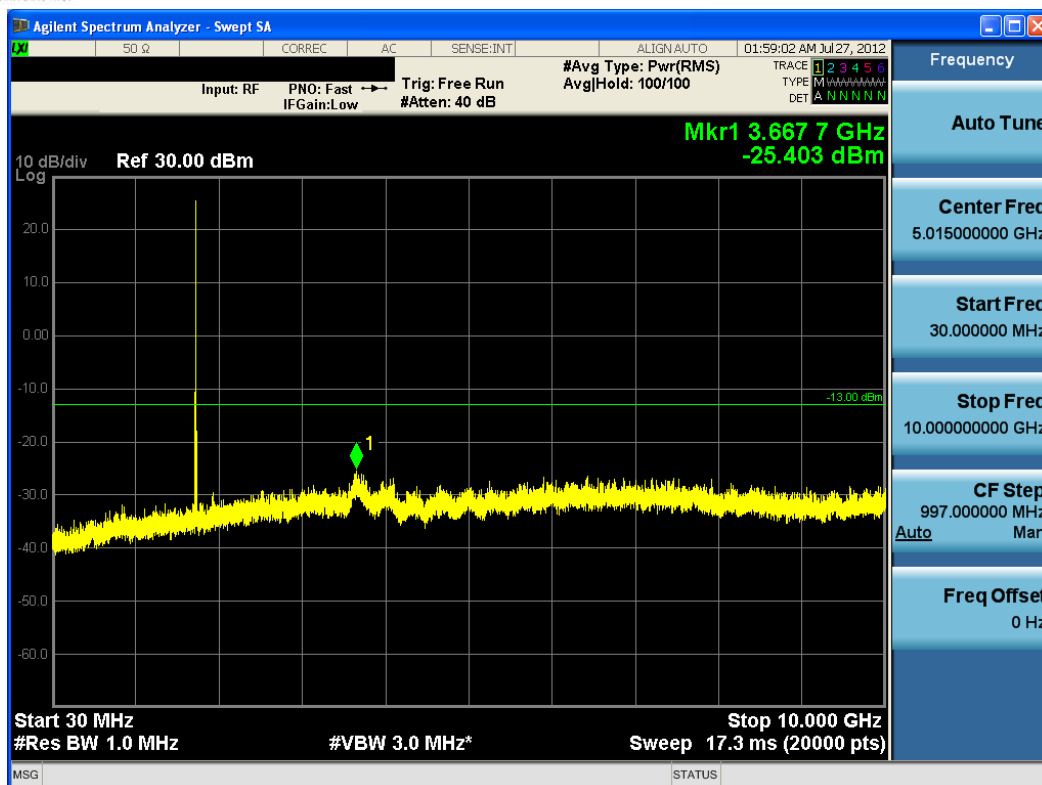


Plot 7-25. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

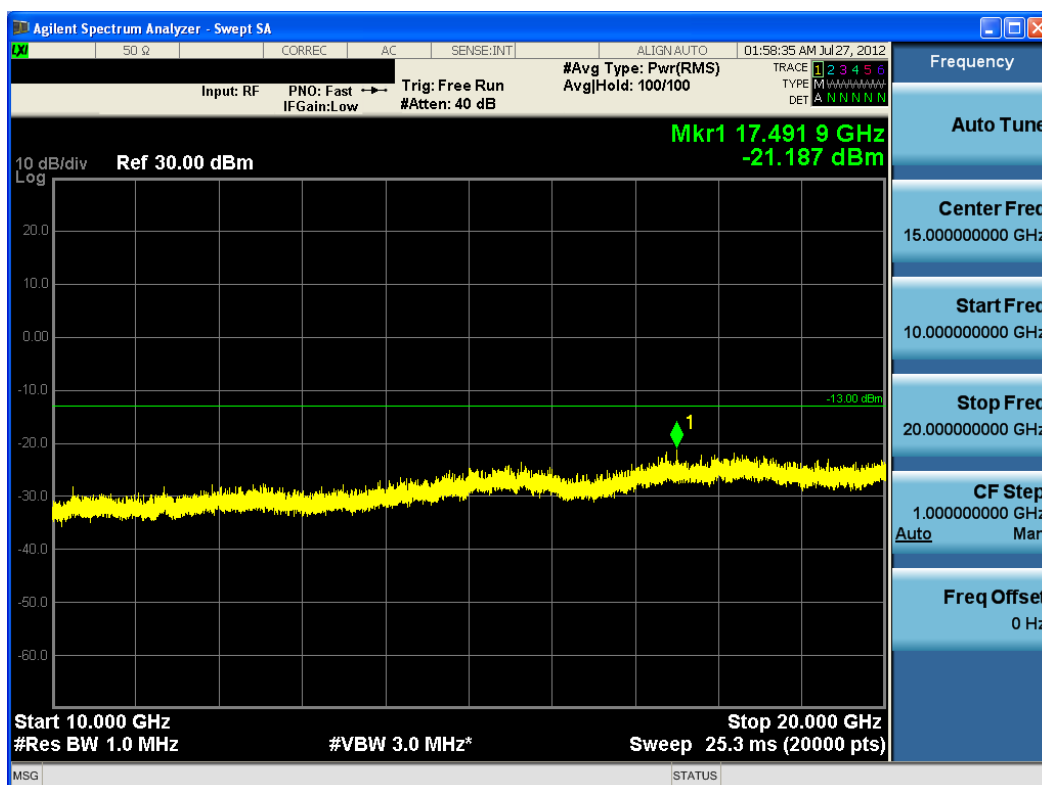


Plot 7-26. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 33 of 44



Plot 7-27. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-28. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 34 of 44



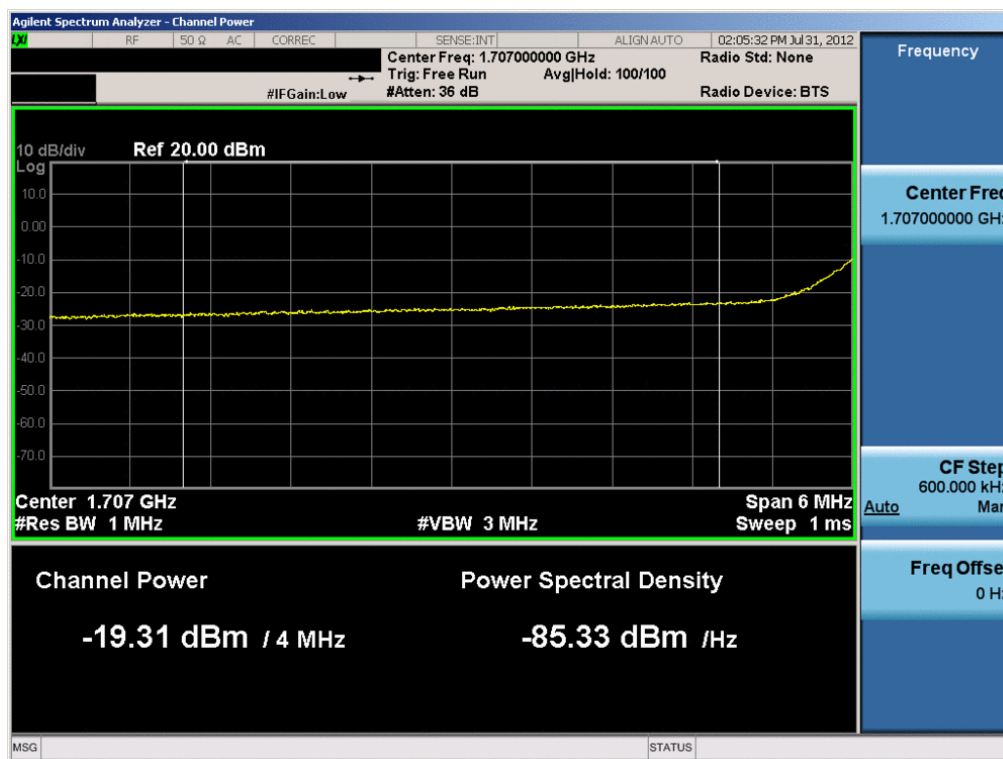
Plot 7-29. Upper Band Edge Plot (QPSK – RB Size 75)



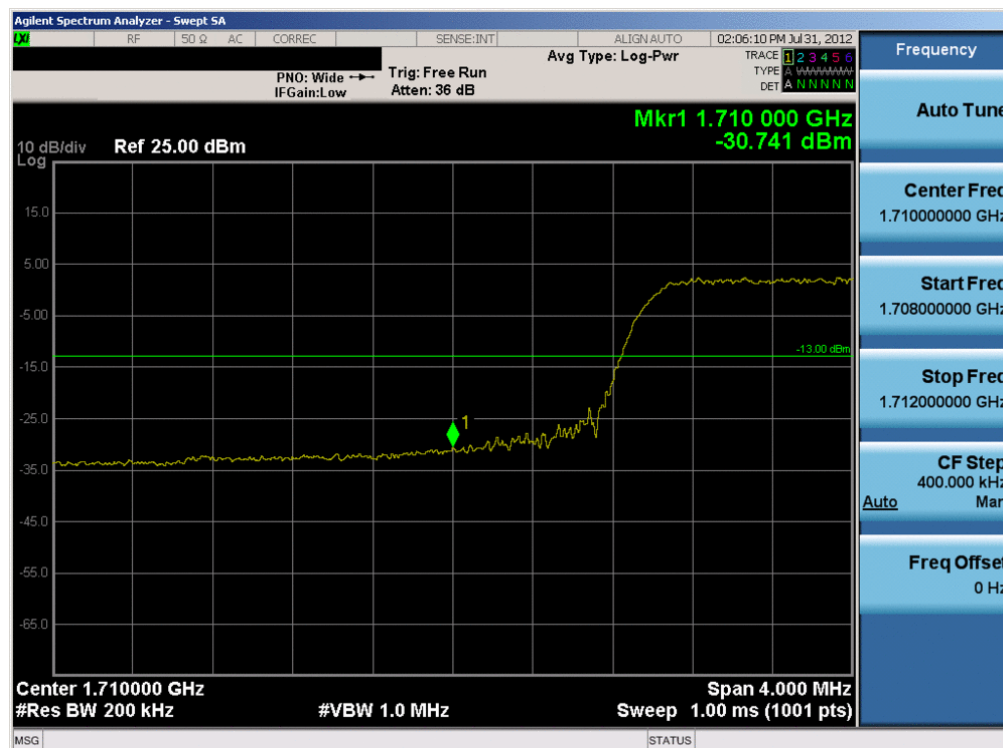
Plot 7-30. Upper Extended Band Edge Plot (QPSK – RB Size 75)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 35 of 44

20MHz Bandwidth

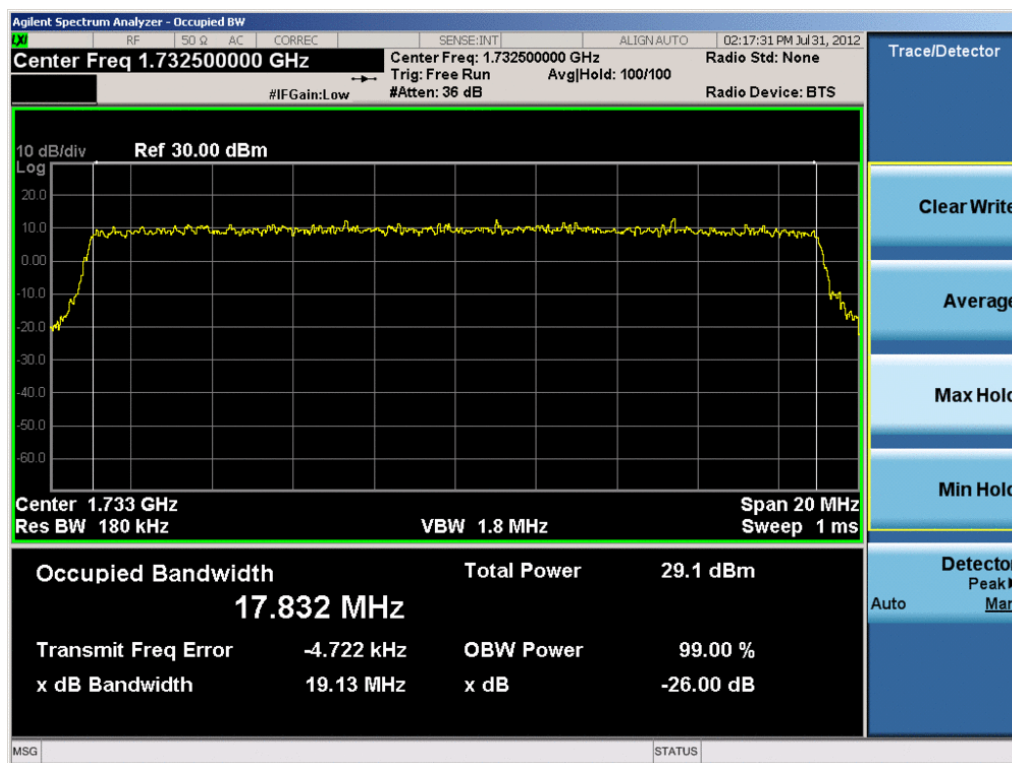


Plot 7-31. Lower Extended Band Edge Plot (QPSK – RB Size 100)

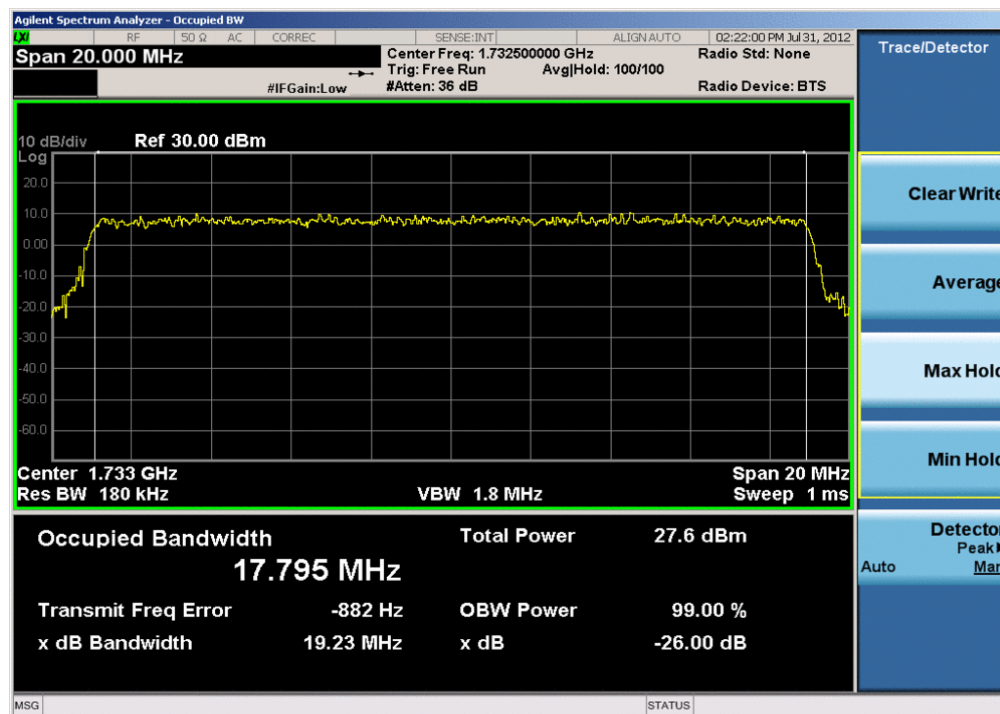


Plot 7-32. Lower Band Edge Plot (QPSK – RB Size 100)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 36 of 44

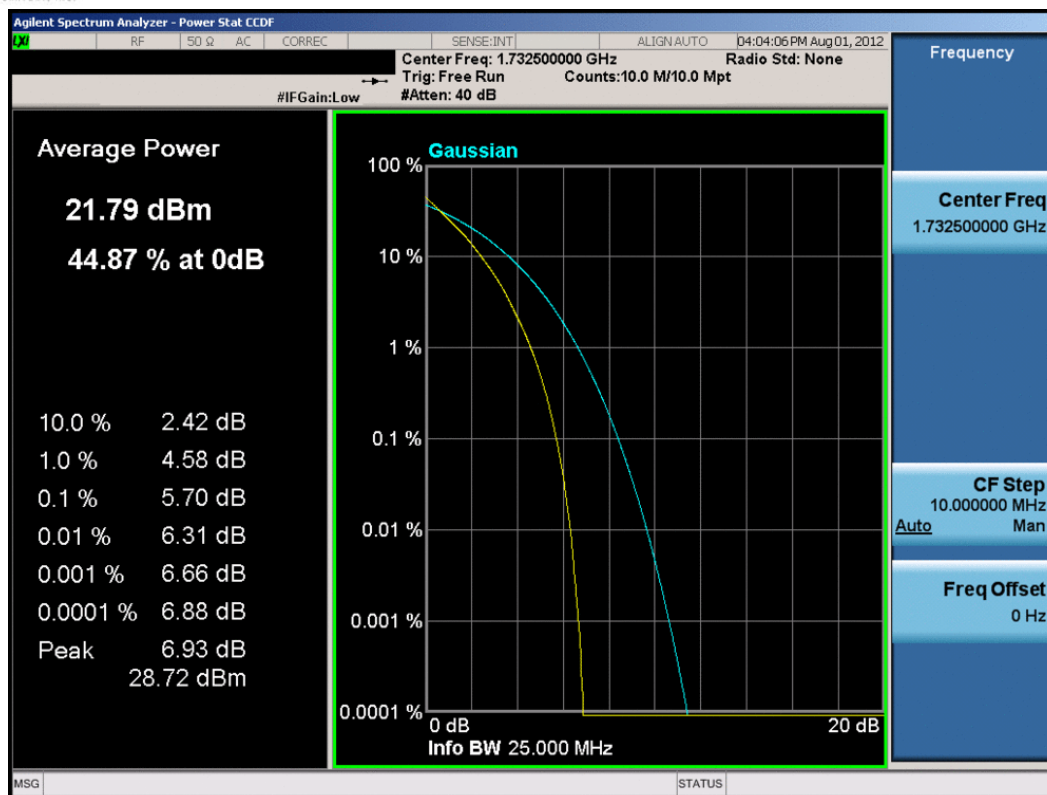


Plot 7-33. Occupied Bandwidth Plot (QPSK – RB Size 100)

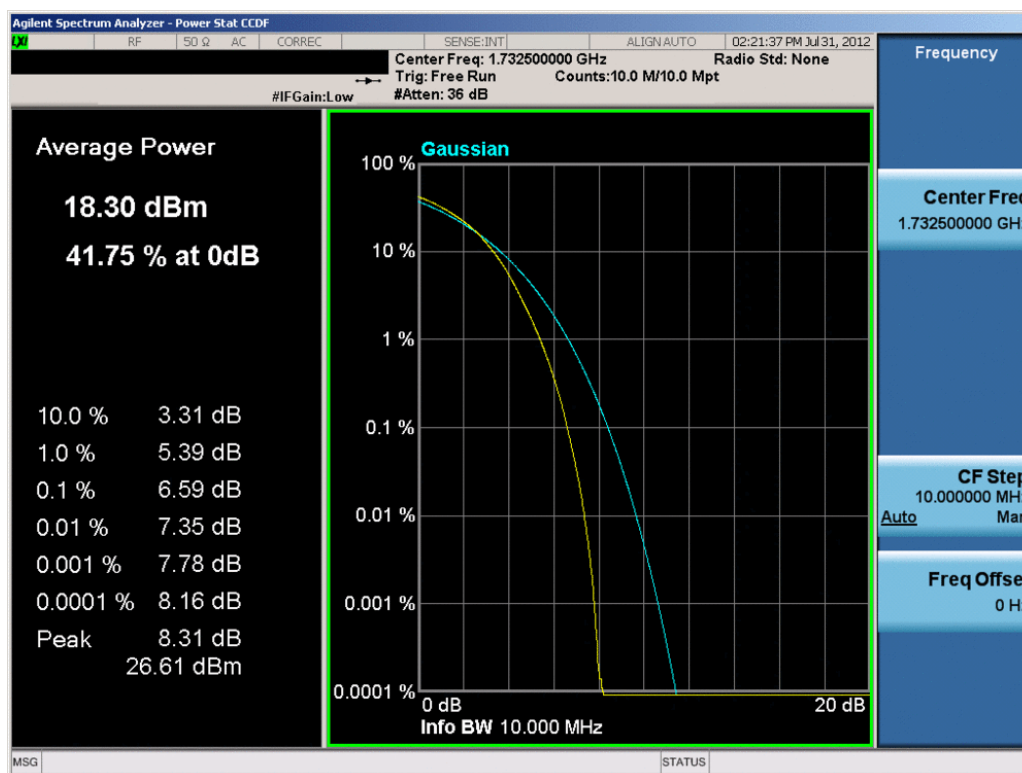


Plot 7-34. Occupied Bandwidth Plot (16-QAM – RB Size 100)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 37 of 44

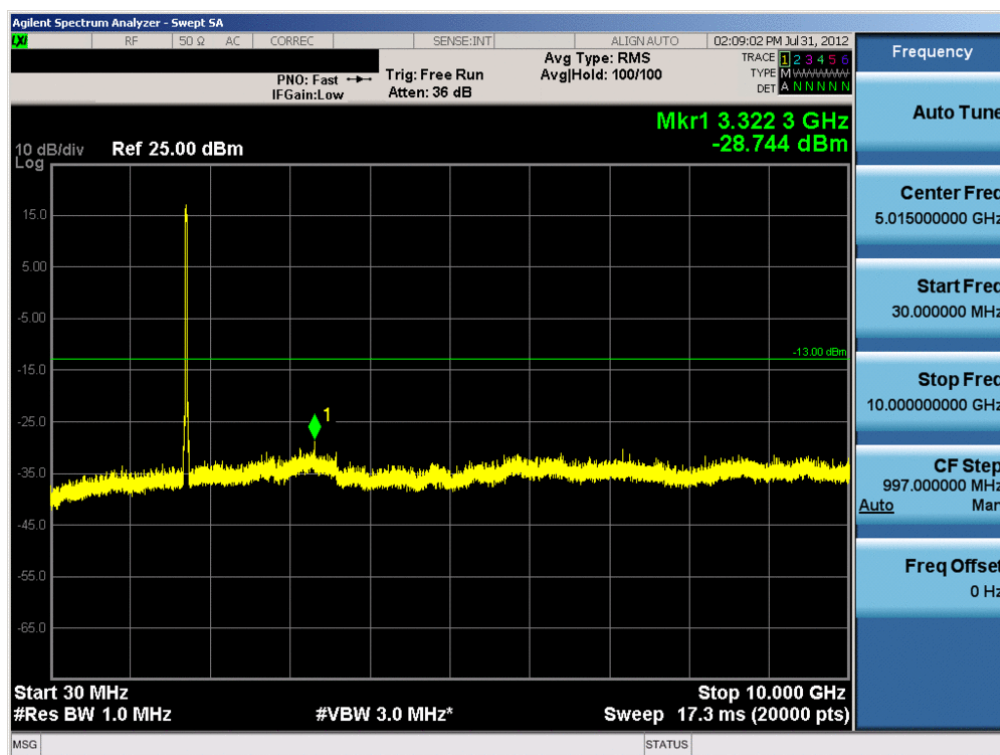


Plot 7-35. Peak to Average Ratio Plot (QPSK – RB Size 100)

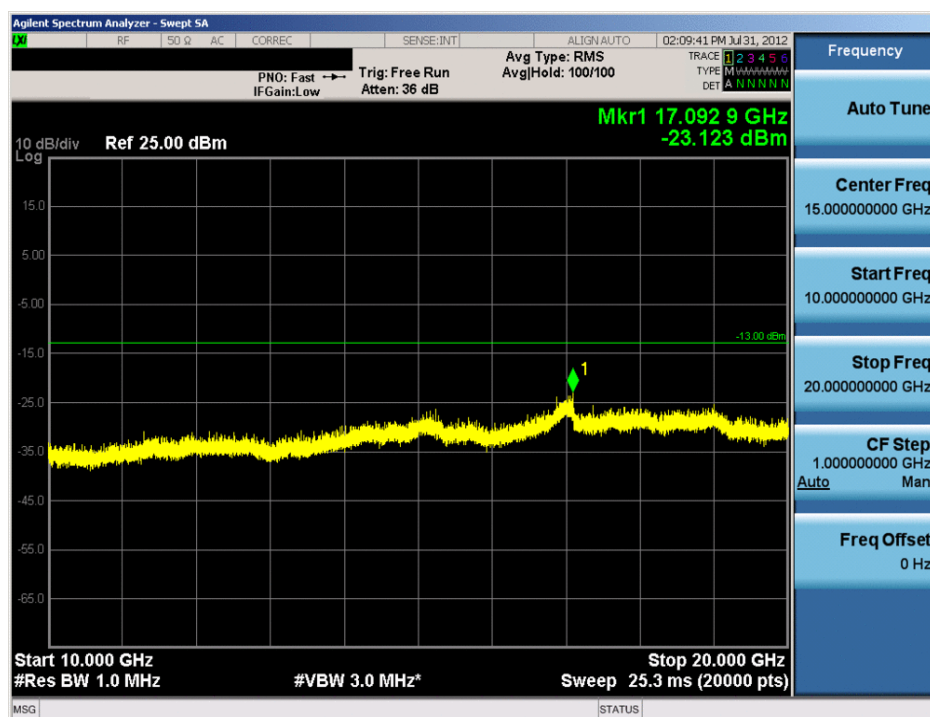


Plot 7-36. Peak to Average Ratio Plot (16QAM – RB Size 100)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 38 of 44

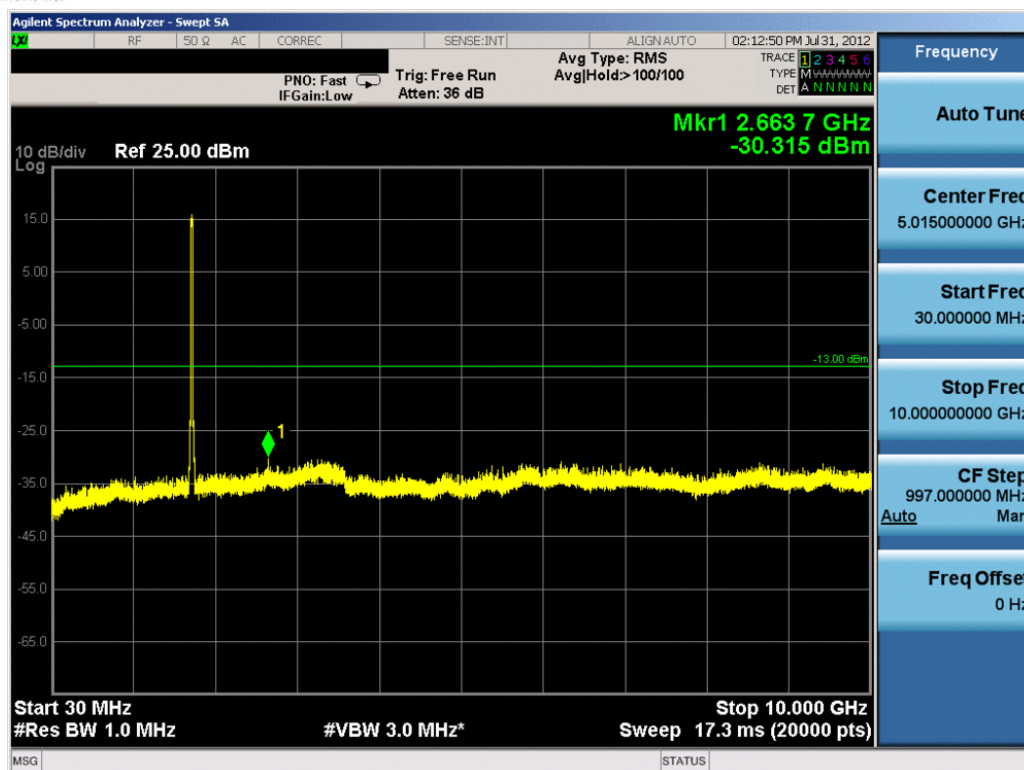


Plot 7-37. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)

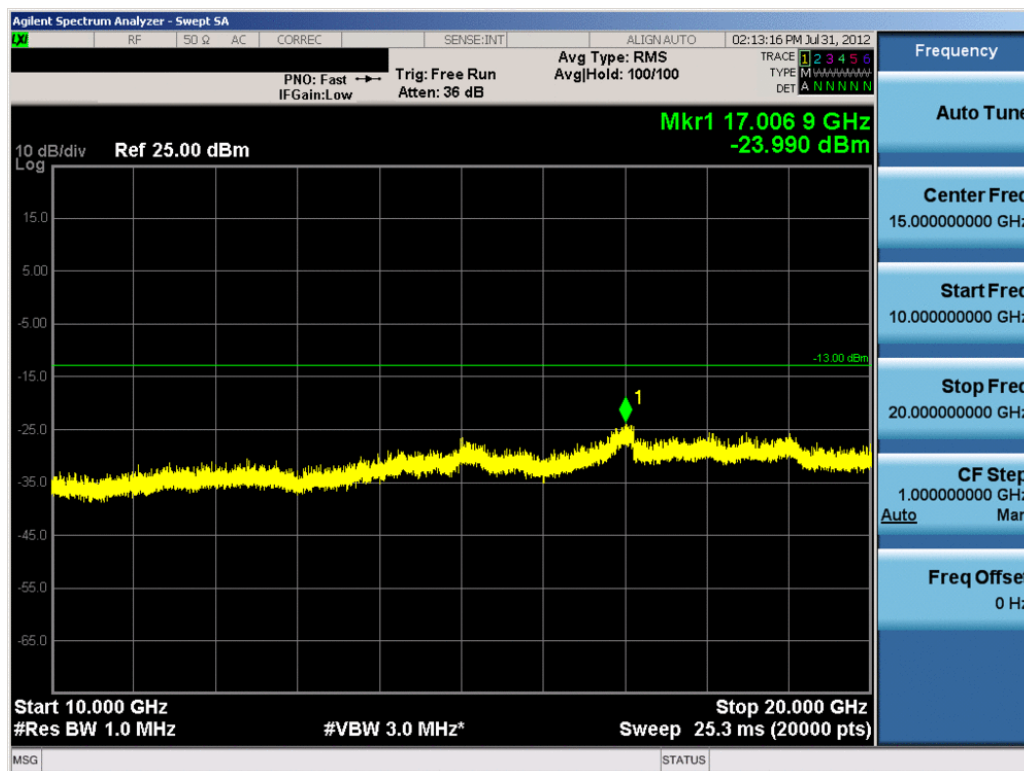


Plot 7-38. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSCHI915	 FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer	Page 39 of 44

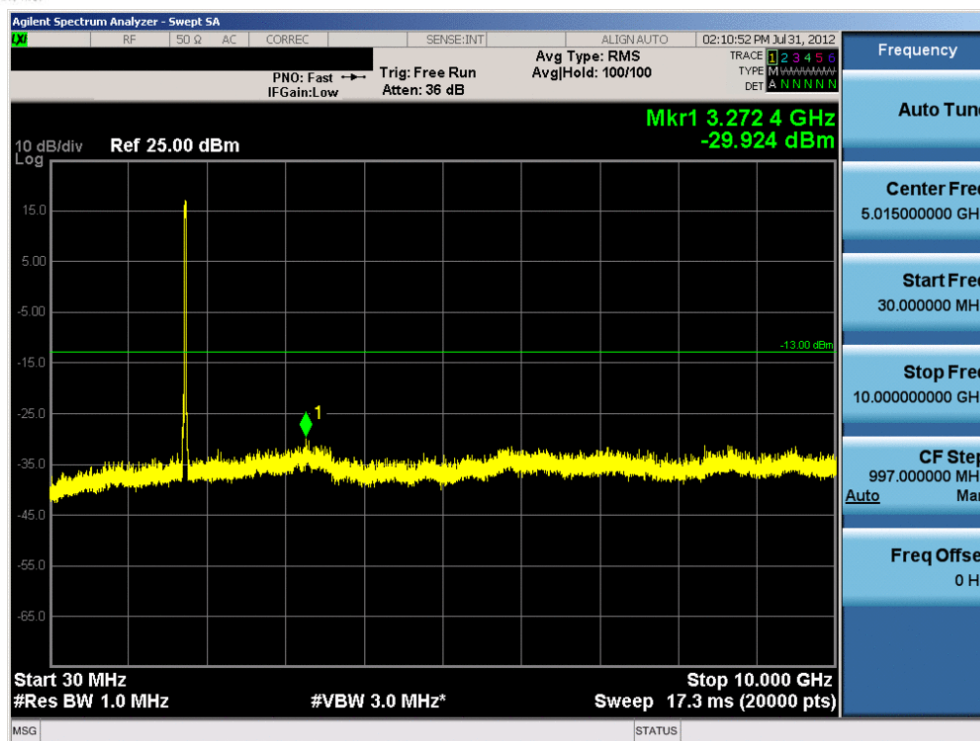


Plot 7-39. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

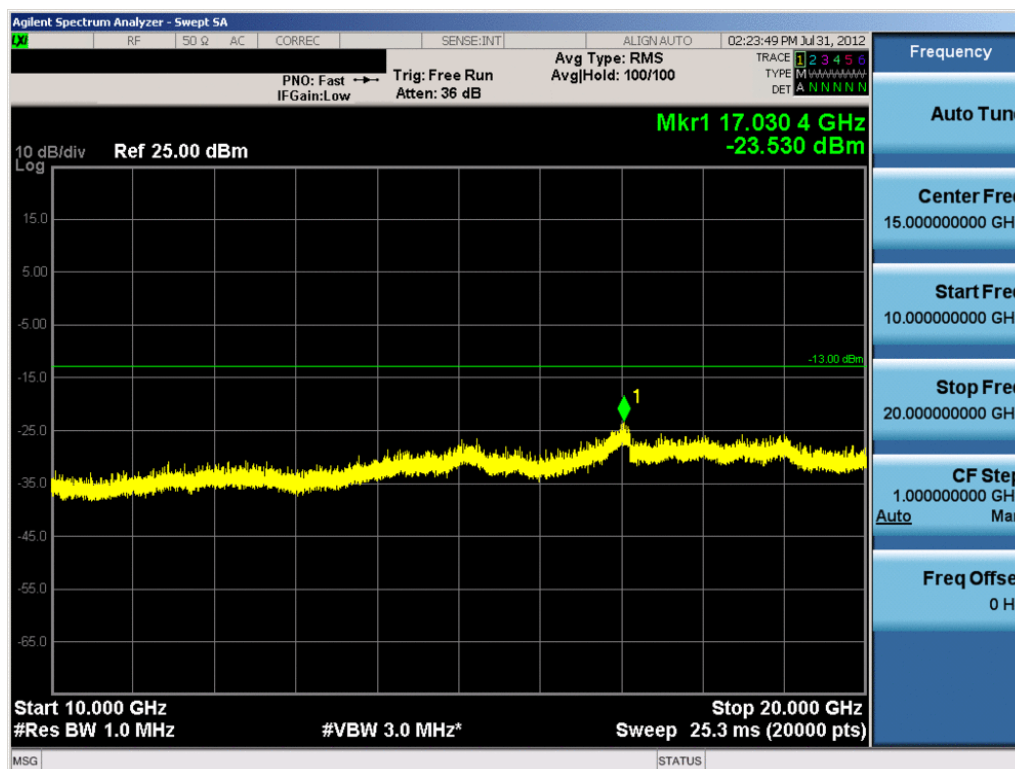


Plot 7-40. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSCH1915	 FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer	Page 40 of 44

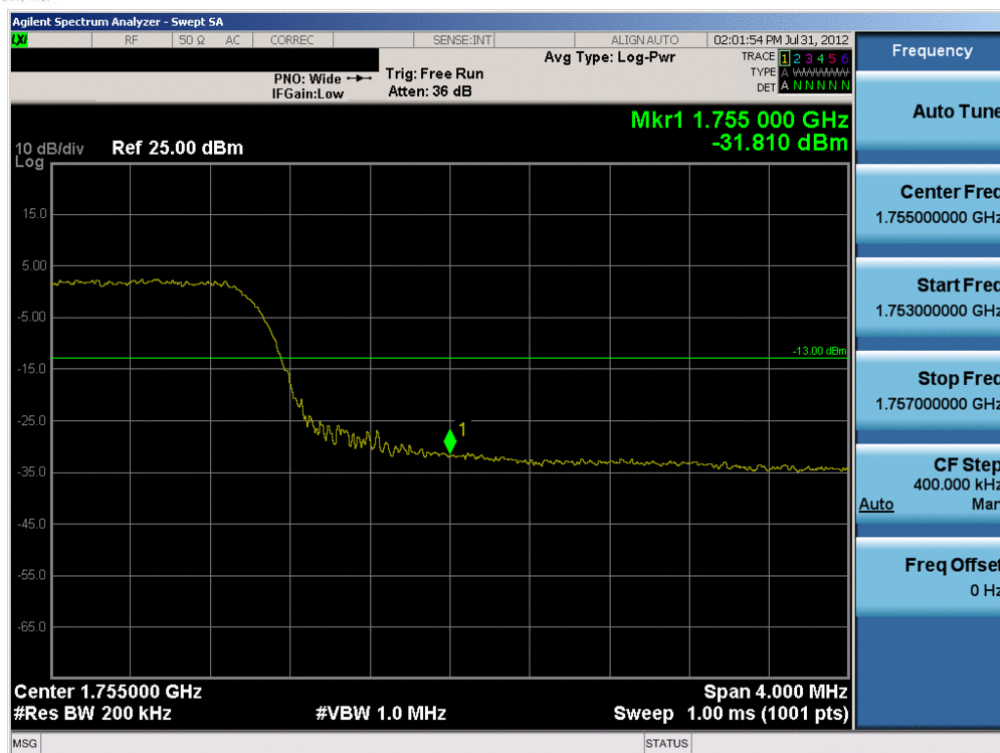


Plot 7-41. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)

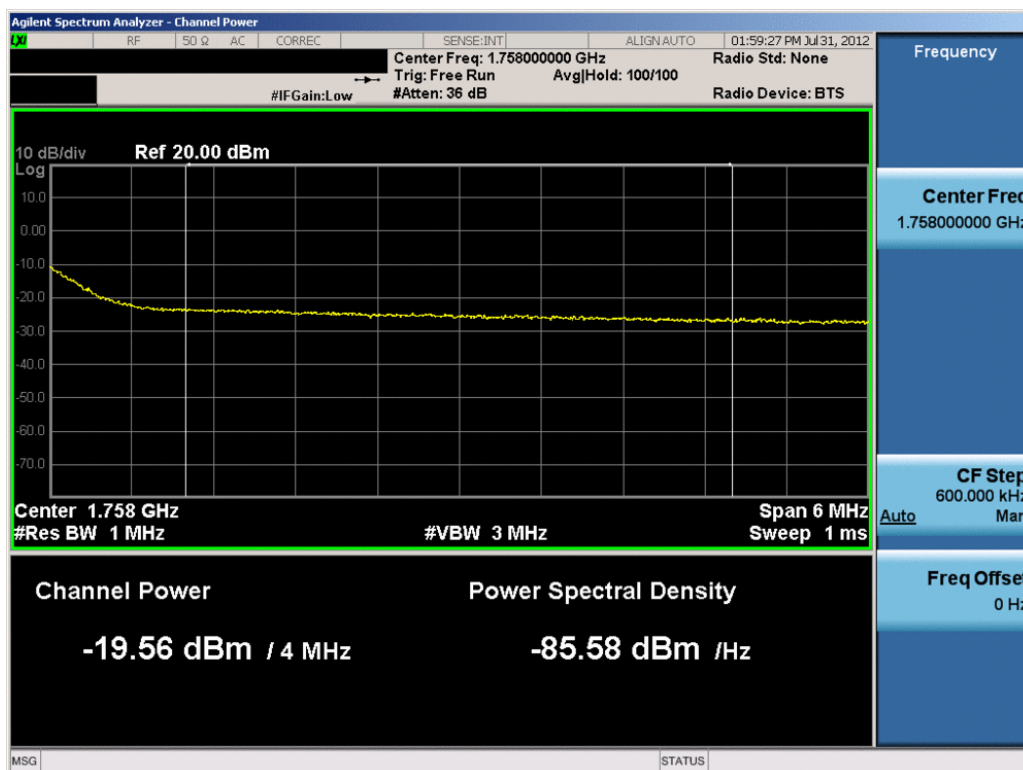


Plot 7-42. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 41 of 44



Plot 7-43. Upper Band Edge Plot (QPSK – RB Size 100)



Plot 7-44. Upper Band Edge Plot (16-QAM – RB Size 100)

FCC ID: A3LSCHI915	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 42 of 44



Note: Info BW for 20MHz Bandwidth LTE was 25MHz because this is the only available option on the spectrum analyzer after 10MHz Info BW. The entire 20MHz LTE signal with RB Size = 100 was analyzed and the PAR is determined by the CCDF function of the spectrum analyzer. The worst case emissions were found in 20MHz BW. Therefore, Conducted spurious plots were taken on that BW.

FCC ID: A3LSCHI915		FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer	Page 43 of 44	

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Tablet Computer FCC ID: A3LSCHI915** complies with all the requirements of Parts 2 and 27 of the FCC rules for LTE operation only.

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Test Report S/N: 0Y1207241020.A3L	Test Dates: July 15 - September 7, 2012	EUT Type: Portable Tablet Computer		Page 44 of 44