



MEASUREMENT REPORT

FCC Part 24 & 27 / IC RSS-133/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 15-25, 2012

Test Site/Location:

PCTEST Lab., Columbia, MD, USA

Test Report Serial No.:

0Y1207301070.A3L

FCC ID :

A3LSCHR820

APPLICANT:

SAMSUNG ELECTRONICS CO., LTD.

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part(s):

§2; §24; §27

EUT Type:

Portable Handset

Model(s):

SCH-R820

IC Specification(s):

RSS-132 Issue 2; RSS-133 Issue 5; RSS-139 Issue 2

Test Device Serial No.:

identical prototype [S/N: FJ-164-C]

Class II Permissive Change

Please See FCC Change Document

Original Grant Date:

4/3/2012

Mode	Bandwidth	Tx Frequency (MHz)	Emission Designator	Modulation	ERP/EIRP	
					Max. Power (W)	Max. Power (dBm)
LTE Band 4	10MHz	1715 - 1750	8M98G7D	QPSK	0.160	22.04
LTE Band 4	10MHz	1715 - 1750	8M99W7D	16QAM	0.116	20.65
LTE Band 2	10MHz	1855 - 1905	9M00G7D	QPSK	0.243	23.85
LTE Band 2	10MHz	1855 - 1905	8M89W7D	16QAM	0.167	22.24

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 Ortanez
President

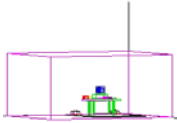


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Test Report S/N: 0Y1207301070.A3L	Test Dates: July 15-25, 2012	EUT Type: Portable Handset		Page 1 of 45

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FCC Part 24 & 27

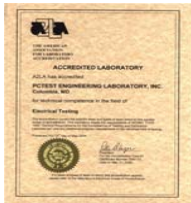


§2.1033 General Information

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; §24; §27
BASE MODEL: SCH-R820
FCC ID: A3LSCHR820
FCC CLASSIFICATION: PCS Licensed Transmitter Held to Ear (PCE)
FREQUENCY TOLERANCE: $\pm 0.00025\%$ (2.5 ppm)
Test Device Serial No.: FJ-164-C ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST: July 15-25, 2012
TEST REPORT S/N: 0Y1207301070.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. 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.

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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington 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.

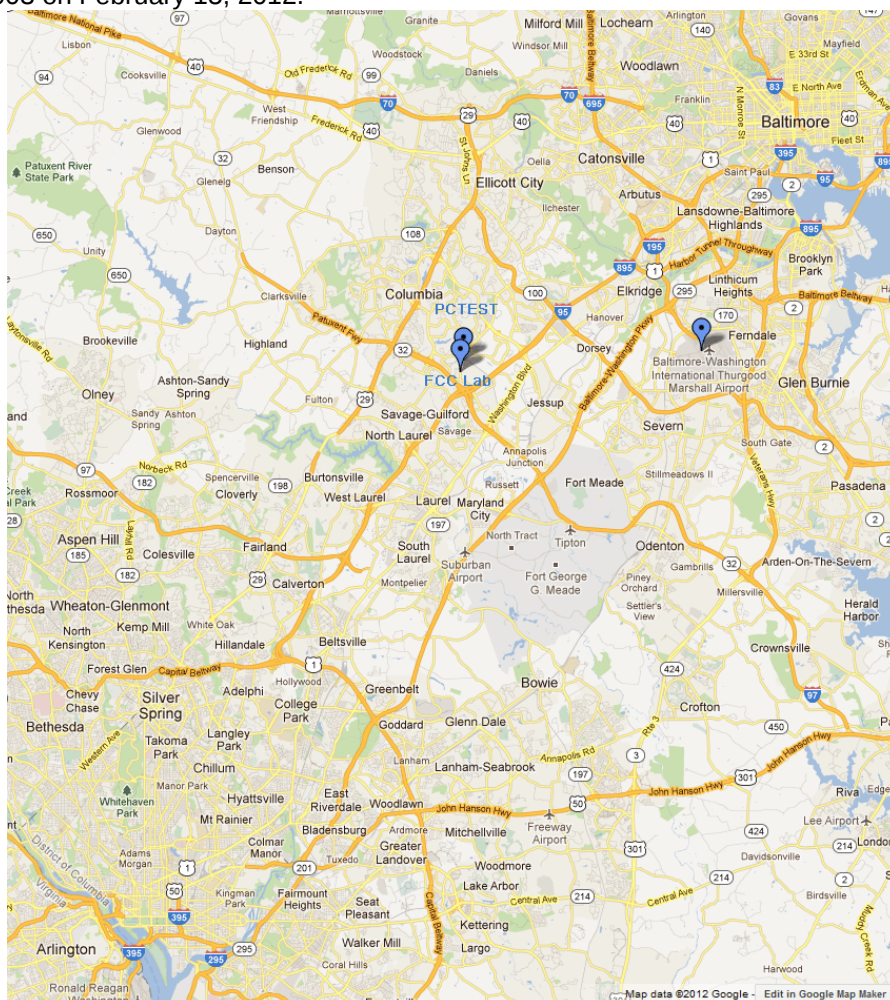


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSCHR820**. 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:

850/1700/1900 CDMA/EvDO, Band 2, 4, 5, 17 LTE with 5 and 10MHz BW (Band 4 also supports 15MHz BW), 802.11b/g/n WLAN, Bluetooth (1x,EDR)

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.

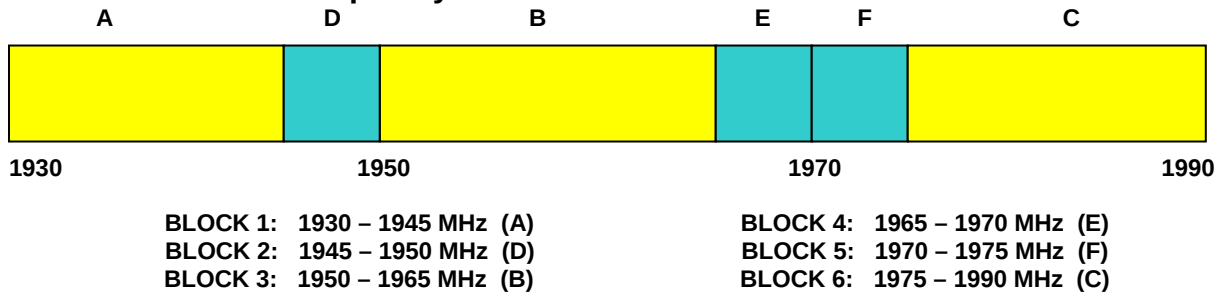
FCC ID: A3LSCHR820		FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)		Reviewed by: Quality Manager
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3.0 DESCRIPTION OF TESTS

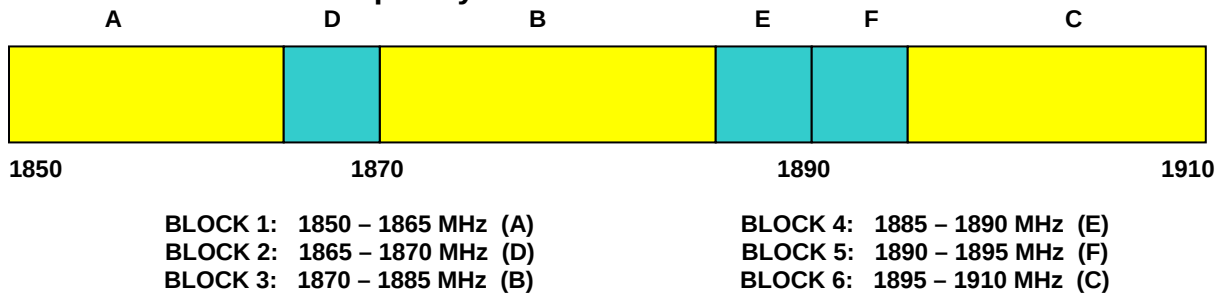
3.1 Measurement Procedure

The measurement procedures described in the document titled "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-C-2004) was used in the measurement of the **Samsung Portable Handset FCC ID: A3LSCHR820**.

3.2 PCS - Base Frequency Blocks



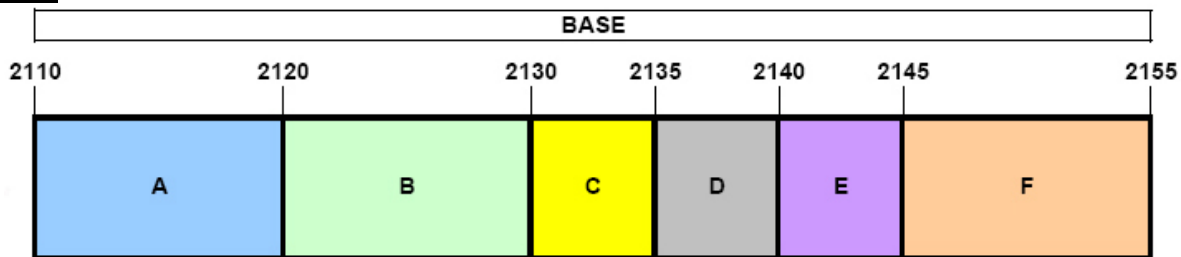
3.3 PCS - Mobile Frequency Blocks



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3.4 AWS - Base Frequency Blocks

§27.5(h)



BLOCK 1: 2110 – 2120 MHz (A)

BLOCK 2: 2120 – 2130 MHz (B)

BLOCK 3: 2130 – 2135 MHz (C)

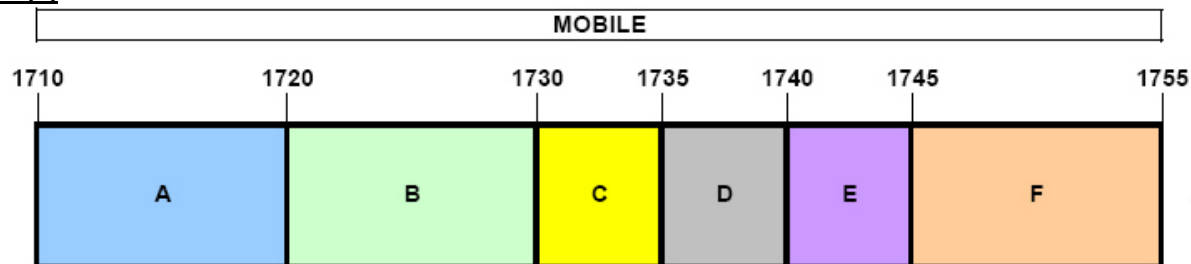
BLOCK 4: 2135 – 2140 MHz (D)

BLOCK 5: 2140 – 2145 MHz (E)

BLOCK 6: 2145 – 2155 MHz (F)

3.5 AWS - Mobile Frequency Blocks

§27.5(h)



BLOCK 1: 1710 – 1720 MHz (A)

BLOCK 2: 1720 – 1730 MHz (B)

BLOCK 3: 1730 – 1735 MHz (C)

BLOCK 4: 1735 – 1740 MHz (D)

BLOCK 5: 1740 – 1745 MHz (E)

BLOCK 6: 1745 – 1755 MHz (F)

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3.6 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.

3.7 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051, 24.238(a)(b); RSS-133 (6.5.1), §27.53(g)(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.

3.8 Peak-Average Ratio

§24.232(d), §27.50(d)(5), RSS-133 (6.4)

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

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3.9 Radiated Power and Radiated Spurious Emissions

§2.1053, 24.232(c), 24.238(a), §27.53(g)(h), 27.50(d)(4), 27.50(c)(10), RSS-133 (6.5.1)

Radiated spurious emissions are investigated indoors in a semi-anechoic chamber to determine the frequencies producing the worst case emissions. Final measurements for radiated power and radiated spurious emissions are performed on the 3 meter OATS per the guidelines of ANSI/TIA-603-C-2004. The measurement area is situated on an 18 meter x 20 meter galvanized 1/2" hardware cloth as the conducting ground plane. This material is sewn together in sections 4 feet wide and 60 feet long. A total of eighteen sections are required to cover the entire measurement area. Sections are laid across the width of the pad, overlapped 1" and sewn and soldered together at intervals of 3" (7.6 cm.) The terrain of the test site is reasonably flat and level. Power and cable to the test site are buried 18" deep into the ground outside the perimeter of the site. An all-weather non-metallic housing is situated on a 2 x 3 meter area adjacent to the measurement area to house the test equipment. The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Emissions are also investigated with the receive antenna horizontally and vertically polarized. The level of the maximized emission is recorded with the spectrum analyzer using a peak detector with RBW = 1MHz, VBW = 3MHz for emissions greater than 1GHz. For emissions below 1GHz, the spectrum analyzer is set to RBW = 100kHz and VBW = 300kHz.

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

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

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

The calculated P_d levels are then compared to the absolute spurious emission limit of -13dBm which is equivalent to the required minimum attenuation of $43 + 10\log_{10}(\text{Power}_{\text{[Watts]}})$ specified in 24.238(a), and 27.53(g)(h).

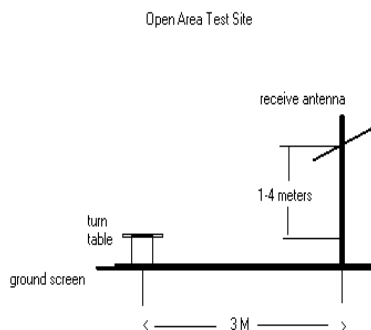


Figure 3-1. Diagram of 3-meter outdoor test range

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3.10 Frequency Stability / Temperature Variation

§2.1055, 24.235, §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 – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block for Part 24 and 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.

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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
-	LTX1	Licensed Transmitter Cable Set	1/25/2012	Annual	1/25/2013	N/A
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	6/7/2012	Annual	6/7/2013	N/A
-	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	E4448A	PSA (3Hz-50GHz) Spectrum Analyzer	2/15/2012	Annual	2/15/2013	US42510244
Agilent	N9020A	MXA Signal Analyzer	10/10/2011	Annual	10/10/2012	US46470561
Agilent	N9038A	MXE EMI Receiver	8/5/2011	Annual	8/5/2012	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)	1/12/2012	Biennial	1/12/2014	9704-5182
Espec	ESX-2CA	Environmental Chamber	5/21/2013	Annual	5/21/2013	17620
K & L	11SH10	Band Pass Filter	N/A	Annual	N/A	1300/4000
K & L	11SH10	Band Pass Filter	N/A	Annual	N/A	4000/12000
Mini-Circuits	VHF-1300+	High Pass Filter	2/7/2012	Annual	2/7/2013	30716
Mini-Circuits	VHF-3100+	High Pass Filter	1/15/2012	Annual	1/15/2013	30841
Mini-Circuits	VHF-3100+	High Pass Filter	2/7/2012	Annual	2/7/2013	31144
Pasternack	PE2208-6	Bidirectional Coupler	6/3/2012	Annual	6/3/2013	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	N/A		N/A	836536/0005
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
Schwarzbeck	VULB-9161SE	Trilog Super Broadband Test Antenna	11/8/2011	Biennial	11/8/2013	9161-4075
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	10/3/2011	Biennial	10/3/2013	91052522TX
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	10/3/2011	Biennial	10/3/2013	91052523RX
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: 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.

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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 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).

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6.0 TEST RESULTS

6.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSCHR820
 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	Result	Reference
TRANSMITTER MODE (TX)						
2.1049	RSS-Gen (4.6.1) RSS-133 (2.3)	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.0, 8.0
2.1051, 24.238(a), 27.53(g)(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, 8.0
24.232(d), 27.50(d)(5)	RSS-133 (6.4)	Peak-Average Ratio	$< 13 \text{ dB}$		PASS	Section 7.0, 8.0
2.1046	RSS-132 (4.4) RSS-133 (4.1)	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
24.232(c)	RSS-133 (6.4) [SRSP-510 (5.1.2)]	Equivalent Isotropic Radiated Power (Band 2)	$< 2 \text{ Watts max. EIRP}$		PASS	Section 6.2
27.50(d)(4)	N/A	Equivalent Isotropic Radiated Power (Band 4)	$< 1 \text{ Watts max. EIRP}$		PASS	Section 6.2
2.1053, 27.53(g)(h), 24.238(a)	RSS-132 (4.5.1) RSS-133 (6.5.1)	Undesirable Emissions	$< 43 + 10\log_{10}(P[\text{Watts}])$ for all out-of-band emissions		PASS	Section 6.3, 6.4
2.1055, 27.54, 24.235	RSS-132 (4.3) RSS-133 (6.3)	Frequency Stability	$< 2.5 \text{ ppm}$ (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)		PASS	Section 6.5, 6.6

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 Sections 7.0, and 8.0 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.

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6.2 Equivalent Isotropic Radiated Power (EIRP)

§27.50(d)(4), §24.232(c)

Freq [MHz]	BW [MHz]	Mod.	Battery	RB Size/Offset	Measured Level [dBm]	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1715.0	10	QPSK	Standard	1 / 0	-18.64	13.36	8.09	H	21.45	0.140	-8.55
1732.5	10	QPSK	Standard	1 / 0	-17.93	14.07	7.97	H	22.04	0.160	-7.96
1750.0	10	QPSK	Standard	1 / 0	-17.90	14.10	7.85	H	21.95	0.157	-8.05
1715.0	10	16-QAM	Standard	1 / 0	-19.44	12.56	8.09	H	20.65	0.116	-9.35
1732.5	10	16-QAM	Standard	1 / 0	-19.53	12.47	7.97	H	20.44	0.111	-9.56
1750.0	10	16-QAM	Standard	1 / 0	-19.77	12.23	7.85	H	20.08	0.102	-9.92

Table 6-2. EIRP Data (Band 4)

Freq [MHz]	BW [MHz]	Mod.	Battery	RB Size/Offset	Measured Level [dBm]	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1855.0	10	QPSK	Standard	1 / 0	-16.31	16.09	7.76	H	23.85	0.243	-9.16
1880.0	10	QPSK	Standard	1 / 0	-19.01	13.39	7.83	H	21.22	0.132	-11.79
1905.0	10	QPSK	Standard	1 / 0	-19.50	12.90	7.91	H	20.81	0.121	-12.20
1855.0	10	16-QAM	Standard	1 / 0	-17.92	14.48	7.76	H	22.24	0.167	-10.77
1880.0	10	16-QAM	Standard	1 / 0	-19.14	13.26	7.83	H	21.09	0.129	-11.92
1905.0	10	16-QAM	Standard	1 / 0	-19.53	12.87	7.91	H	20.78	0.120	-12.23

Table 6-3. EIRP Data (Band 2)

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.

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

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1715.00 MHz
 MEASURED OUTPUT POWER: 21.45 dBm = 0.140 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.45 dBc

FREQ (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3430.00	-40.94	8.09	-32.85	H	54.30
5145.00	-30.60	10.21	-20.40	H	41.85
6860.00	-32.66	11.31	-21.35	H	42.80
8575.00	-45.61	13.02	-32.58	H	54.03
10290.00	-82.64	13.01	-69.63	H	91.08
12005.00	-78.25	13.21	-65.04	H	86.49

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.

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Band 4 Radiated Spurious Measurements (continued)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1732.50 MHz
 MEASURED OUTPUT POWER: 22.04 dBm = 0.160 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W)$ 35.04 dBc

FREQ (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3465.00	-45.35	8.26	-37.09	H	59.13
5197.50	-31.27	10.26	-21.01	H	43.05
6930.00	-30.30	11.42	-18.88	H	40.92
8662.50	-46.38	13.07	-33.31	H	55.35
10395.00	-82.40	13.12	-69.29	H	91.33
12127.50	-77.80	13.25	-64.55	H	86.59

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.

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Band 4 Radiated Spurious Measurements (continued)

§2.1053, §27.53(h)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1750.00 MHz
 MEASURED OUTPUT POWER: 21.95 dBm = 0.157 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.95 dBc

FREQ (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3500.00	-41.74	8.40	-33.34	H	55.29
5250.00	-32.49	10.32	-22.17	H	44.12
7000.00	-35.00	11.51	-23.49	H	45.44
8750.00	-46.23	13.11	-33.12	H	55.07
10500.00	-82.15	13.20	-68.95	H	90.90
12250.00	-77.71	13.31	-64.39	H	86.34

Table 6-6. 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.

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6.4 Band 2 Radiated Spurious Emissions

§2.1053, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1855.00 MHz
 MEASURED OUTPUT POWER: 23.85 dBm = 0.243 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.85 dBc

FREQ (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3710.00	-51.04	8.40	-42.64	H	66.49
5565.00	-30.03	10.63	-19.40	H	43.25
7420.00	-45.23	11.84	-33.39	H	57.24
9275.00	-46.37	13.29	-33.08	H	56.93
11130.00	-81.12	13.50	-67.62	H	91.47
12985.00	-76.64	13.68	-62.97	H	86.82

Table 6-7. 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.

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Band 2 Radiated Spurious Measurements (continued)

§2.1053, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1880.00 MHz
 MEASURED OUTPUT POWER: 21.22 dBm = 0.132 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W)$ 34.22 dBc

FREQ (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-35.12	8.42	-26.70	H	47.92
5640.00	-28.67	10.66	-18.01	H	39.23
7520.00	-33.39	11.92	-21.47	H	42.69
9400.00	-42.68	13.24	-29.44	H	50.66
11280.00	-41.44	13.49	-27.95	H	49.17
13160.00	-76.69	13.83	-62.86	H	84.08

Table 6-8. 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.

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Band 2 Radiated Spurious Measurements (continued)

§2.1053, 24.238(a); RSS-133 (6.5.1)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1905.00 MHz
 MEASURED OUTPUT POWER: 20.81 dBm = 0.121 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.81 dBc

FREQ (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3810.00	-40.93	8.55	-32.38	H	53.19
5715.00	-29.65	10.69	-18.96	H	39.77
7620.00	-32.19	12.05	-20.15	H	40.96
9525.00	-44.23	13.20	-31.03	H	51.84
11430.00	-80.59	13.43	-67.17	H	87.98
13335.00	-76.85	14.00	-62.84	H	83.65

Table 6-9. 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.

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6.5 Band 4 Frequency Stability Measurements

§2.1055, 27.54

OPERATING FREQUENCY: 1,732,500,000 Hz

REFERENCE VOLTAGE: 3.7 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	1,732,499,982	-18	-0.0000010
100 %		- 30	1,732,499,994	-6	-0.0000003
100 %		- 20	1,732,499,981	-19	-0.0000011
100 %		- 10	1,732,499,997	-3	-0.0000002
100 %		0	1,732,499,999	-1	-0.0000001
100 %		+ 10	1,732,499,981	-19	-0.0000011
100 %		+ 20	1,732,499,988	-12	-0.0000007
100 %		+ 30	1,732,499,995	-5	-0.0000003
100 %		+ 40	1,732,499,986	-14	-0.0000008
100 %		+ 50	1,732,499,984	-16	-0.0000009
115 %	4.26	+ 20	1,732,499,992	-8	-0.0000004
85 %	3.15	+ 20	1,732,499,995	-5	-0.0000003

Table 6-10. Frequency Stability Data (Band 4)

Band 4 Frequency Stability Measurements (Cont'd)

§2.1055, 27.54

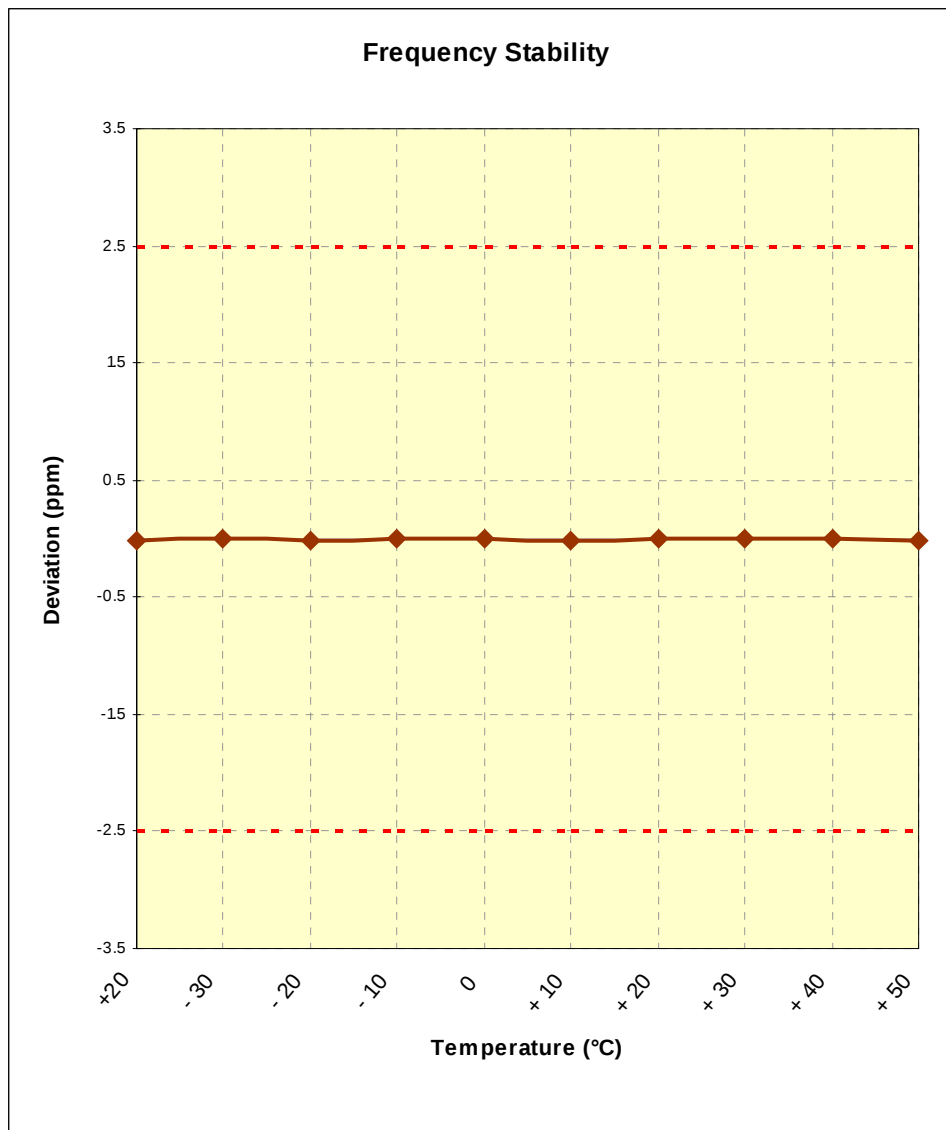


Figure 6-1. Frequency Stability Graph (Band 4)

FCC ID: A3LSCHR820		FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)		Reviewed by: Quality Manager
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6.6 Band 2 Frequency Stability Measurements

§2.1055, 24.235, RSS-133 (6.3)

OPERATING FREQUENCY: 1,880,000,000 Hz

REFERENCE VOLTAGE: 3.7 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	1,879,999,998	-2	-0.0000001
100 %		- 30	1,879,999,993	-7	-0.0000004
100 %		- 20	1,879,999,987	-13	-0.0000007
100 %		- 10	1,879,999,981	-19	-0.0000010
100 %		0	1,879,999,989	-11	-0.0000006
100 %		+ 10	1,879,999,983	-17	-0.0000009
100 %		+ 20	1,879,999,982	-18	-0.0000010
100 %		+ 30	1,879,999,990	-10	-0.0000005
100 %		+ 40	1,879,999,991	-9	-0.0000005
100 %		+ 50	1,879,999,983	-17	-0.0000009
115 %	4.26	+ 20	1,879,999,983	-17	-0.0000009
85 %	3.15	+ 20	1,879,999,996	-4	-0.0000002

Table 6-11. Frequency Stability Data (Band 2)

FCC ID: A3LSCHR820		FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)			Reviewed by: Quality Manager
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Band 2 Frequency Stability Measurements (Cont'd)

§2.1055, 24.235, RSS-133 (6.3)

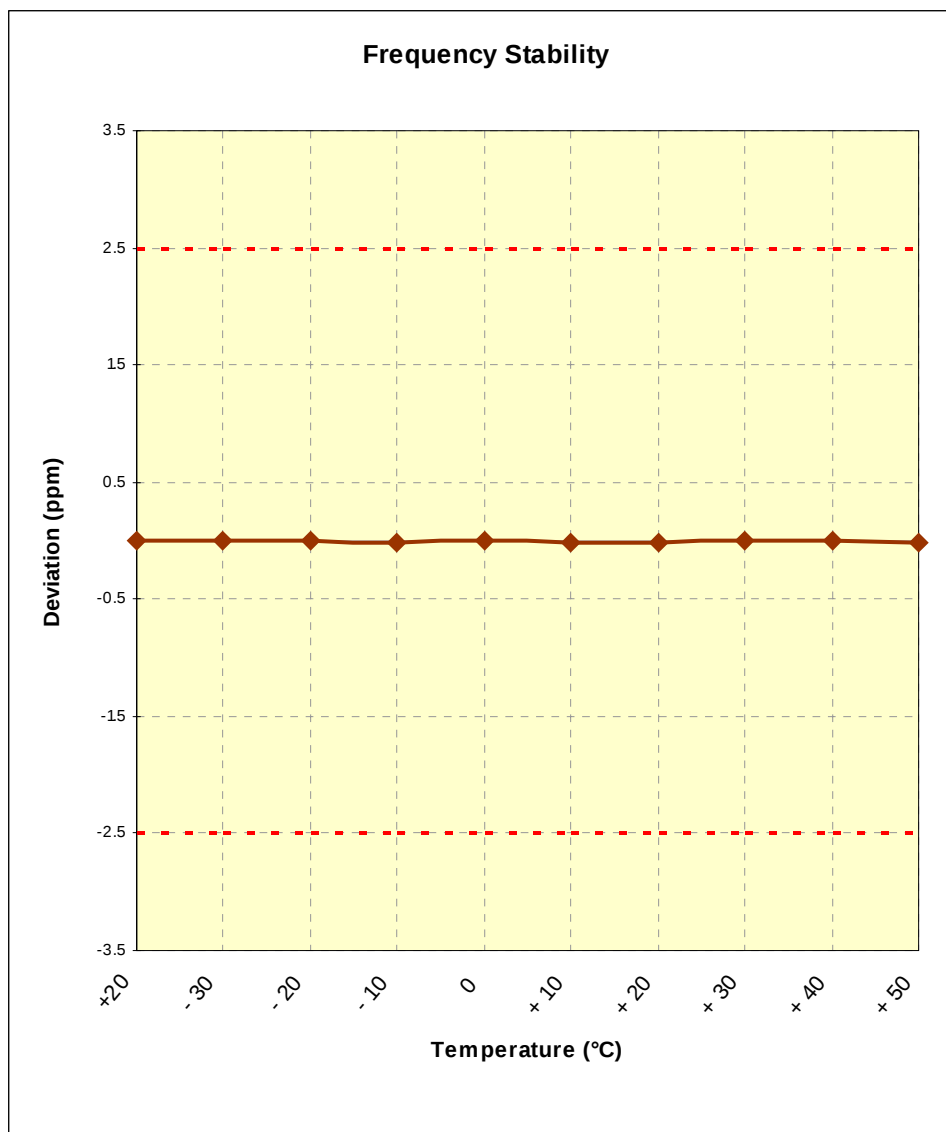
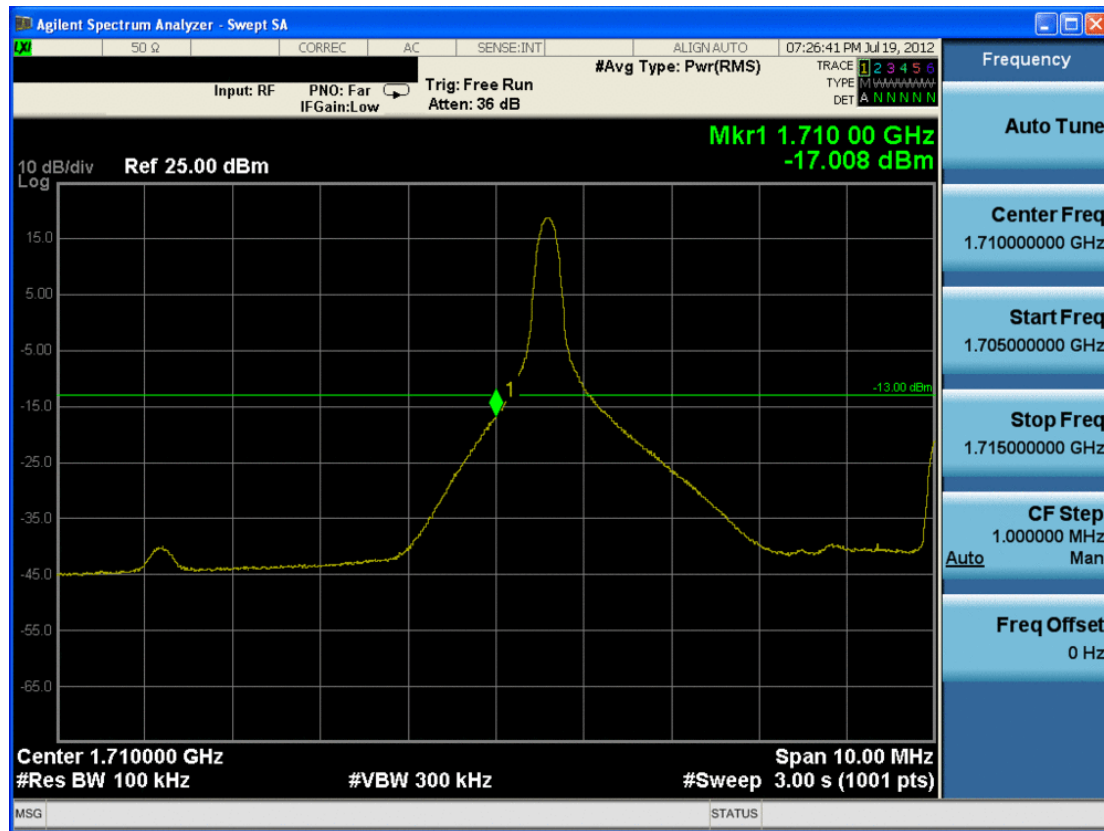


Figure 6-2. Frequency Stability Graph (Band 2)

FCC ID: A3LSCHR820		FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)		Reviewed by: Quality Manager
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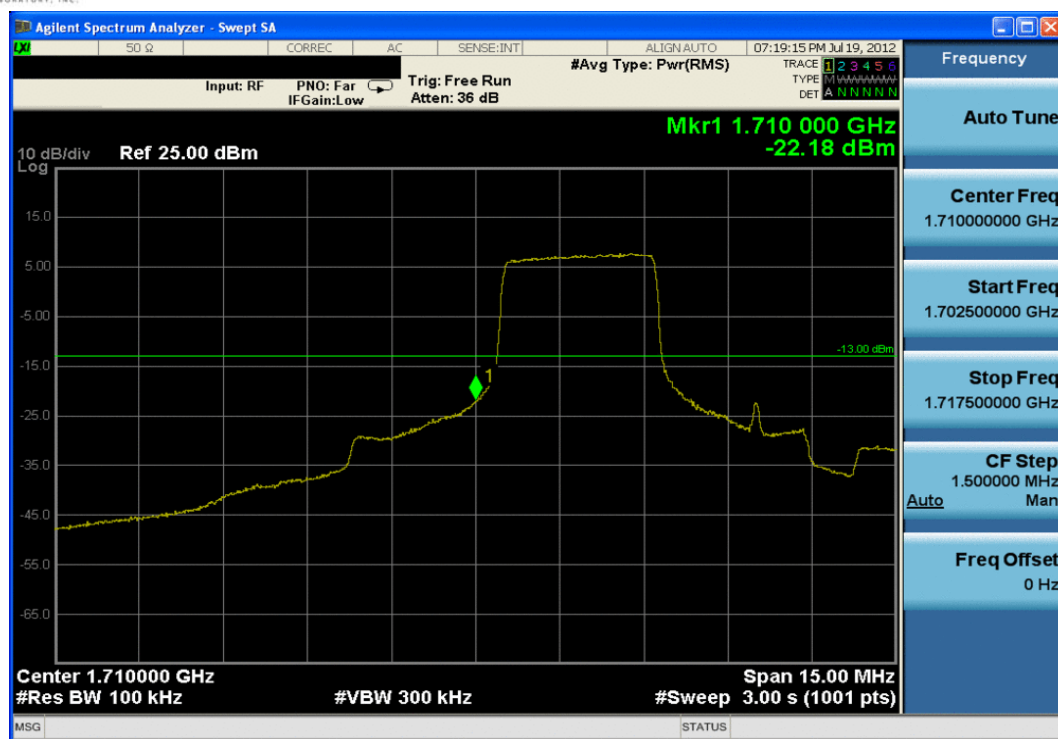
7.0 BAND 4 PLOTS OF EMISSIONS

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

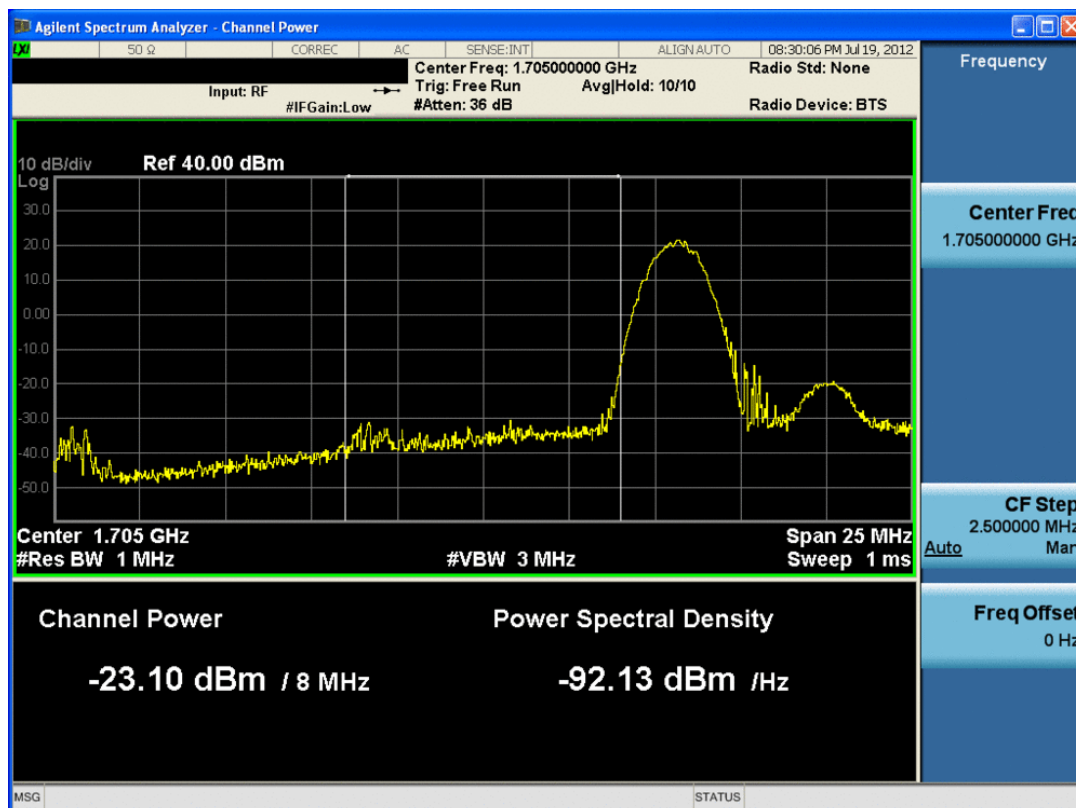


Plot 7-1. Lower Band Edge Plot (10MHz QPSK – RB Size 1, Offset 0)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
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Plot 7-2. Lower Band Edge Plot (10MHz QPSK – RB Size 50)

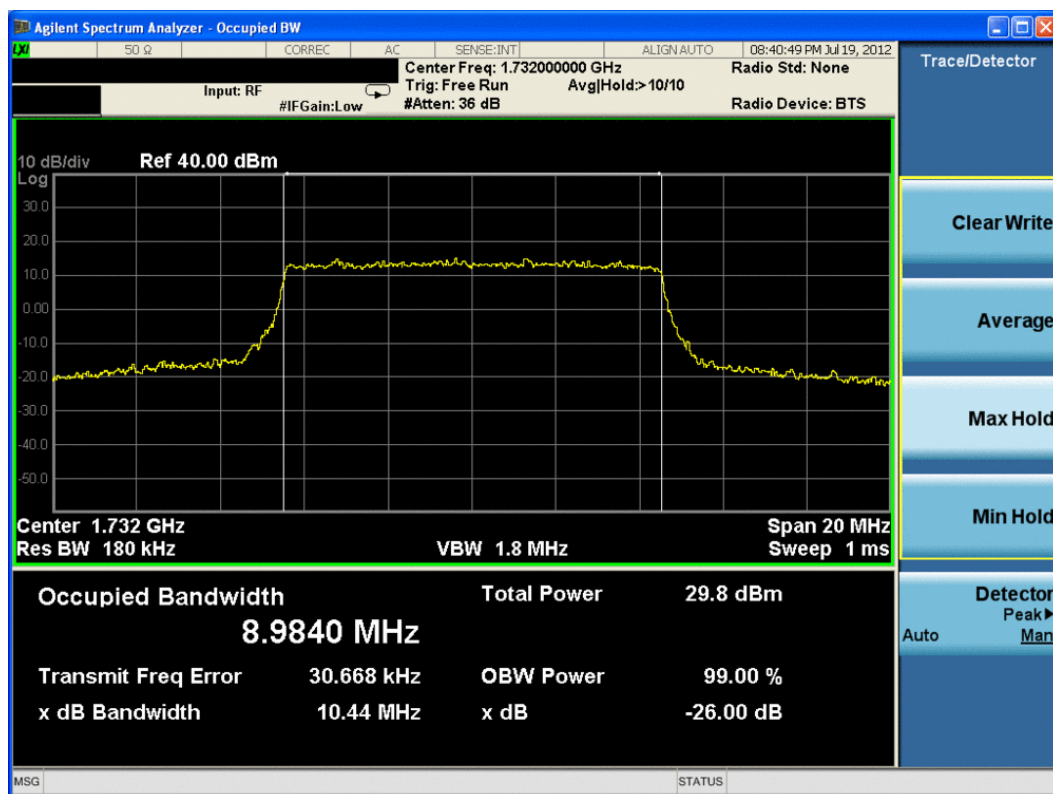


Plot 7-3. Lower Extended Band Edge Plot (10MHz QPSK– RB Size 1,Offset 0)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
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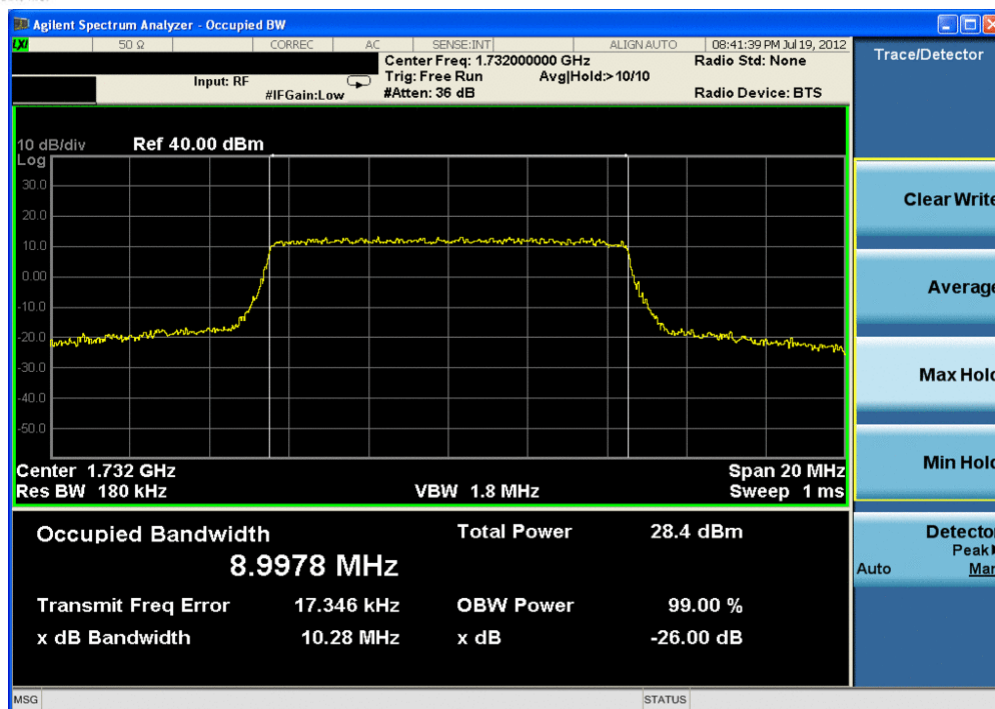


Plot 7-4. Lower Extended Band Edge Plot (10MHz QPSK– RB Size 50)

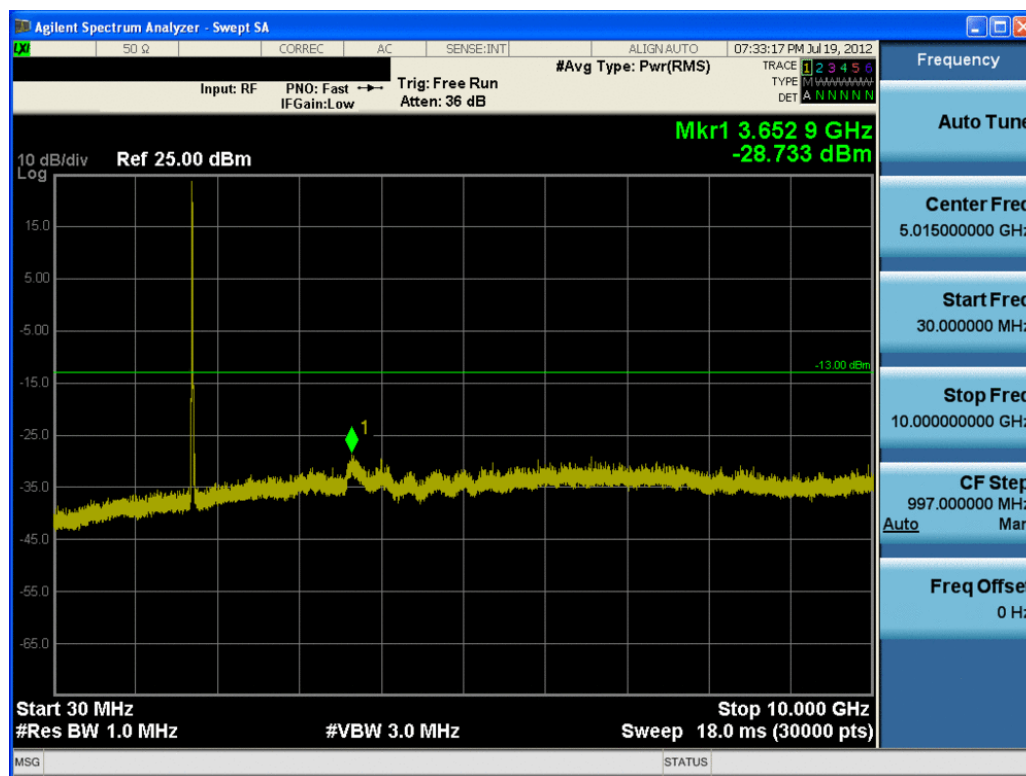


Plot 7-5. Occupied Bandwidth Plot (10MHz QPSK – RB Size 50)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
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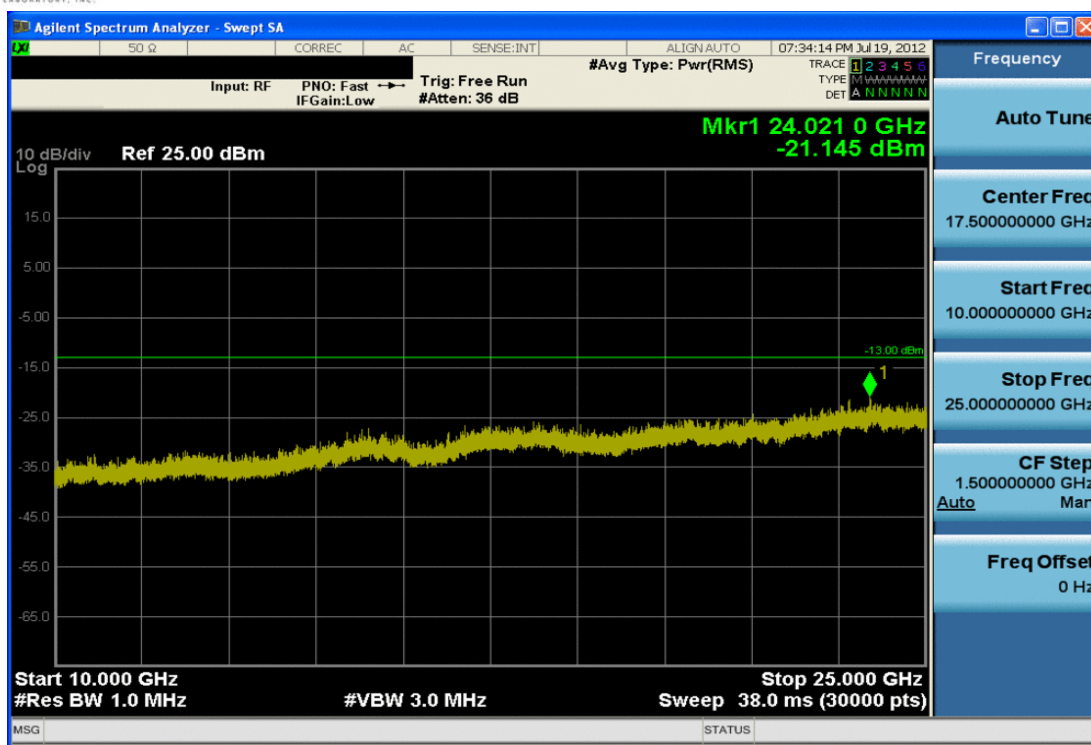


Plot 7-6. Occupied Bandwidth Plot (10MHz 16-QAM – RB Size 50)

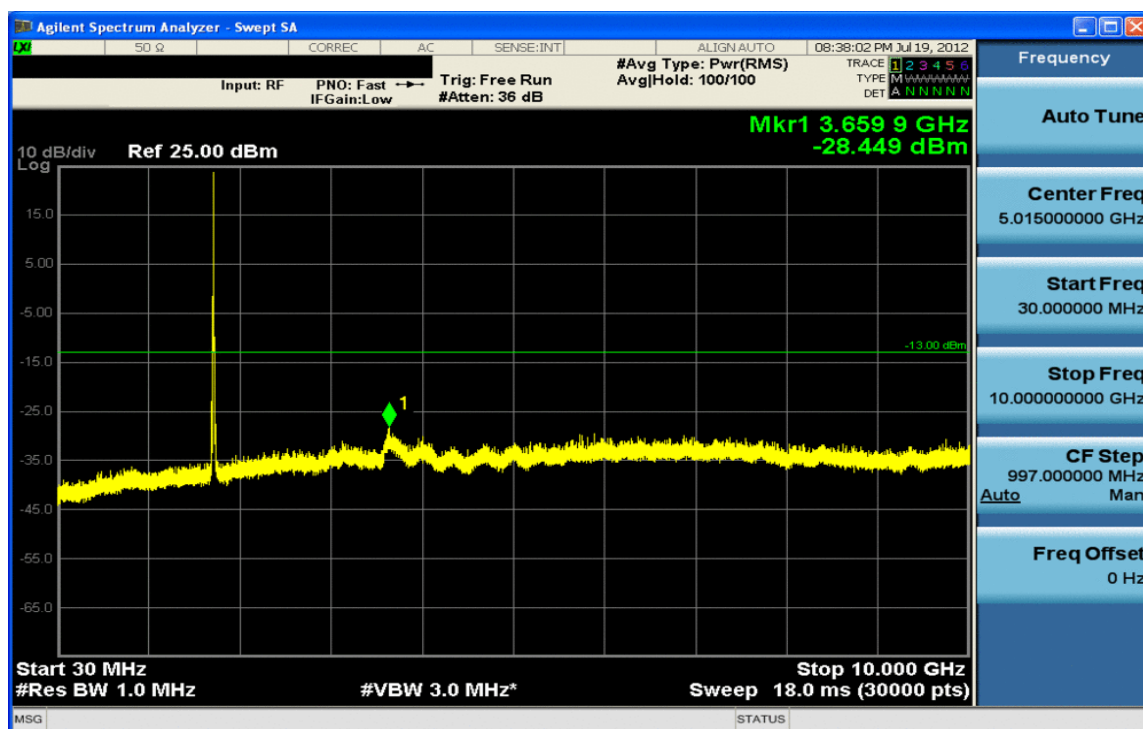


Plot 7-7. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
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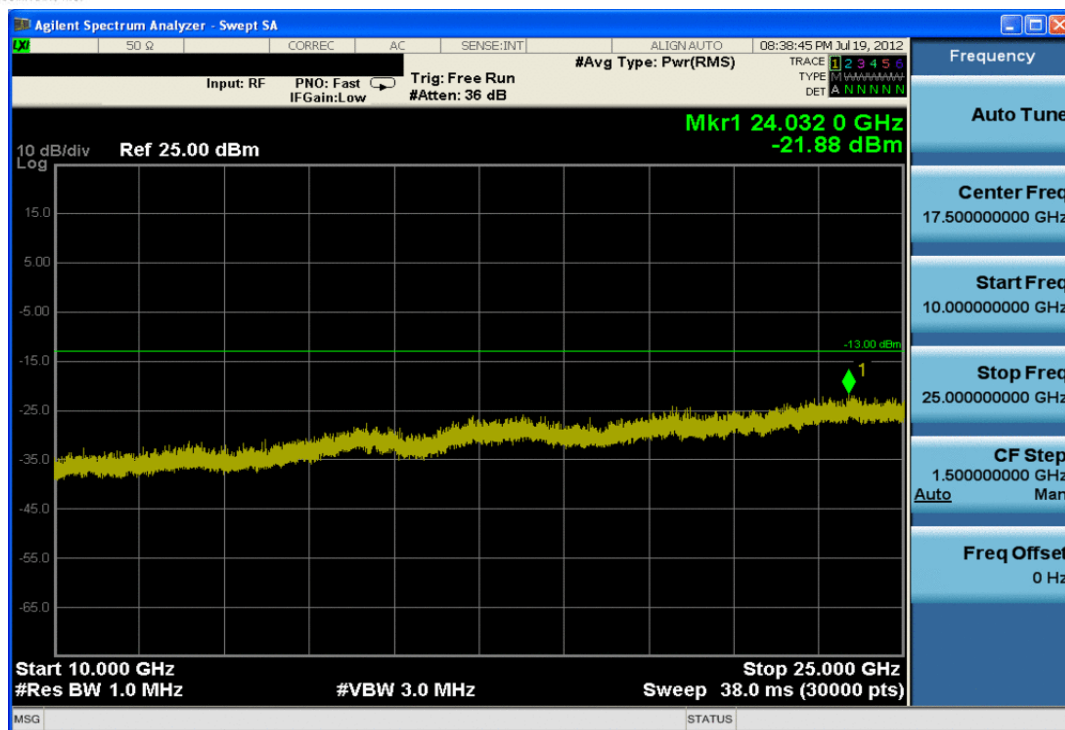


Plot 7-8. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

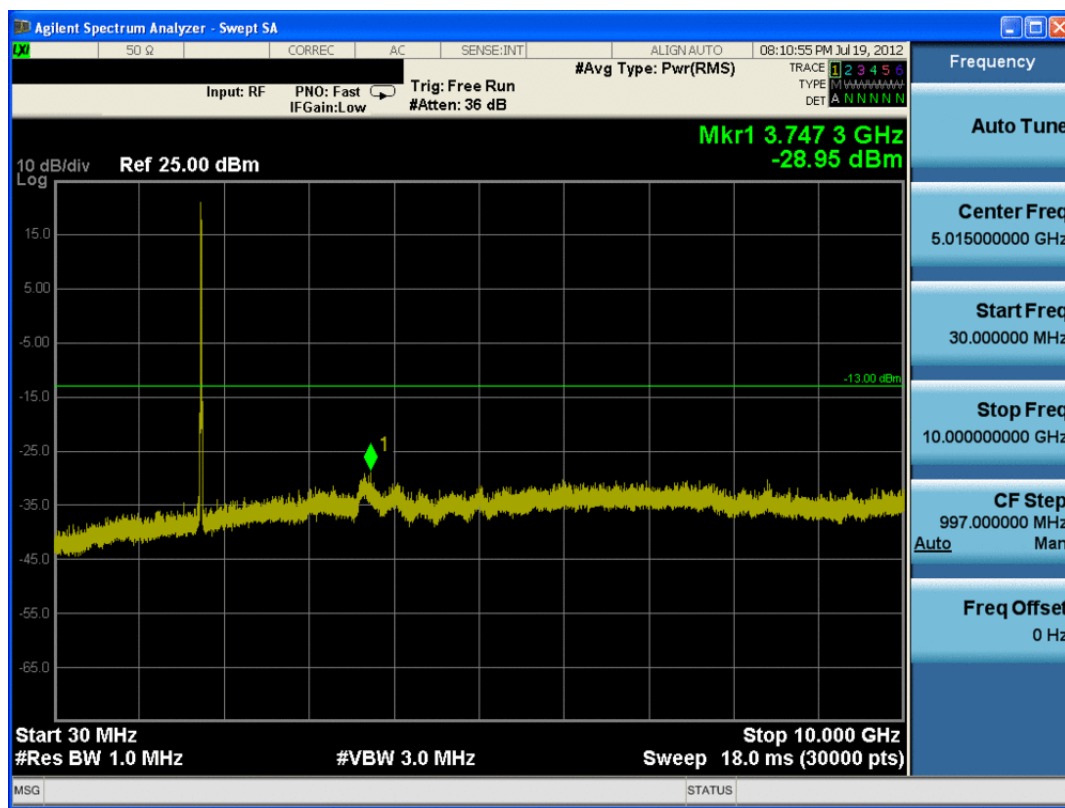


Plot 7-9. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSCHR820	 FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.) 		Reviewed by: Quality Manager
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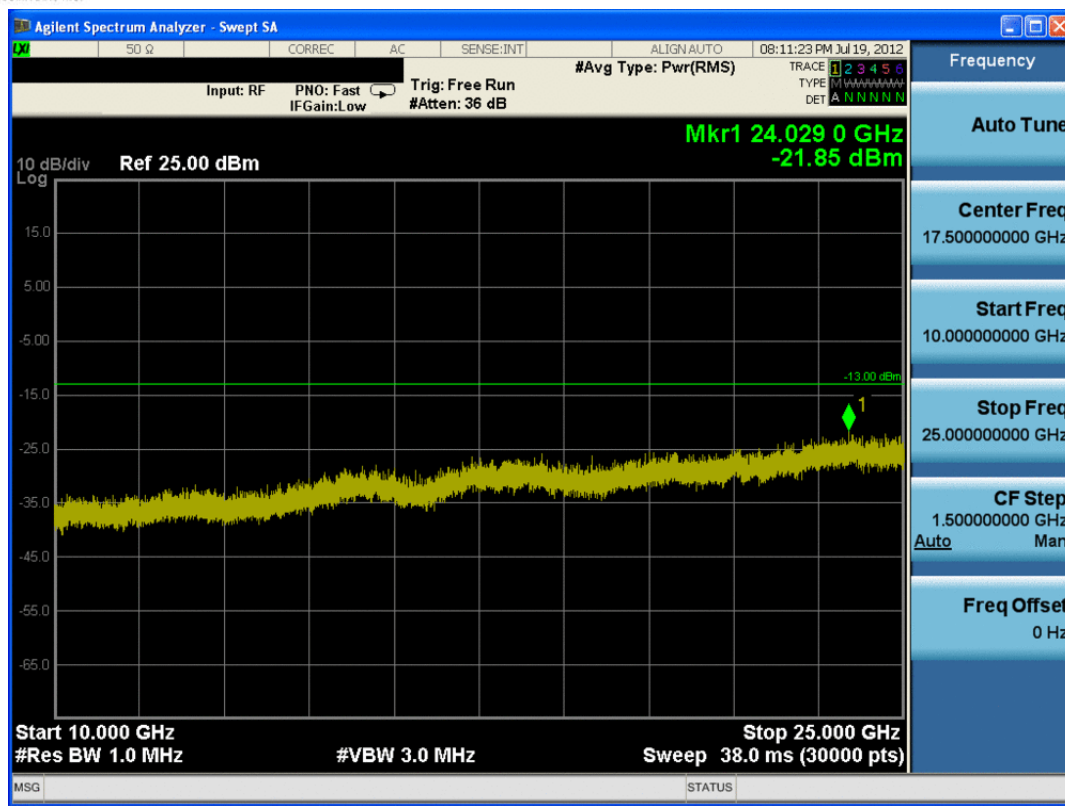


Plot 7-10. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

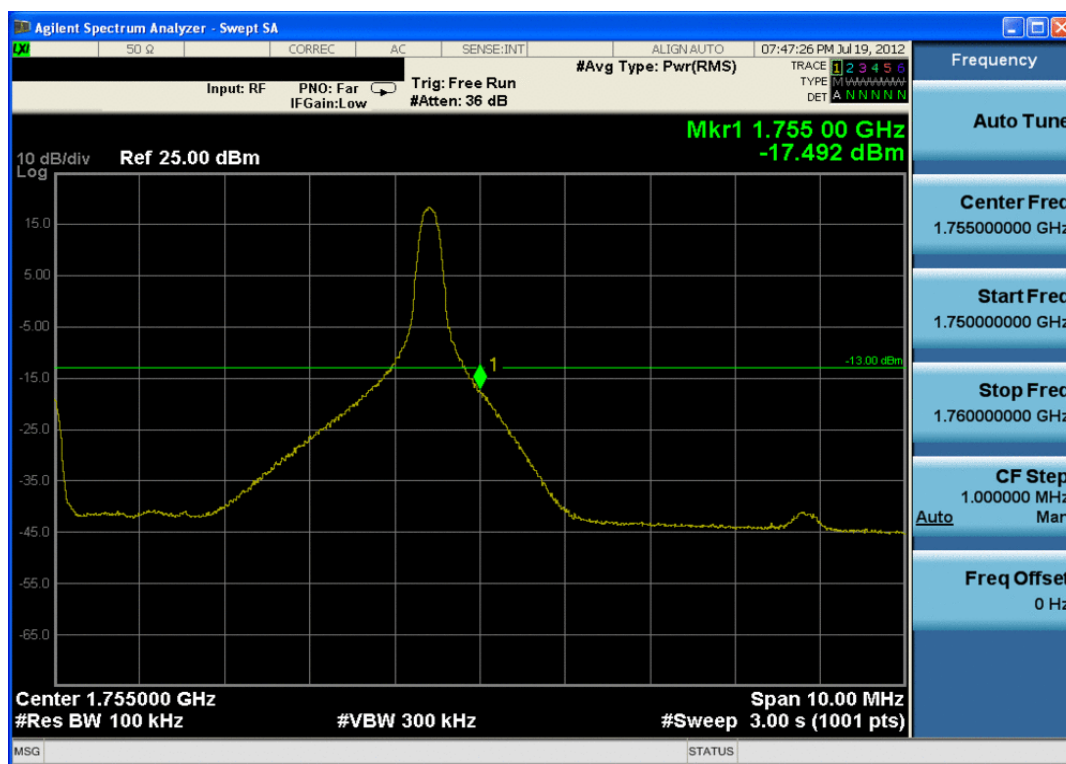


Plot 7-11. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSCHR820	 FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.) 		Reviewed by: Quality Manager
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Plot 7-12. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

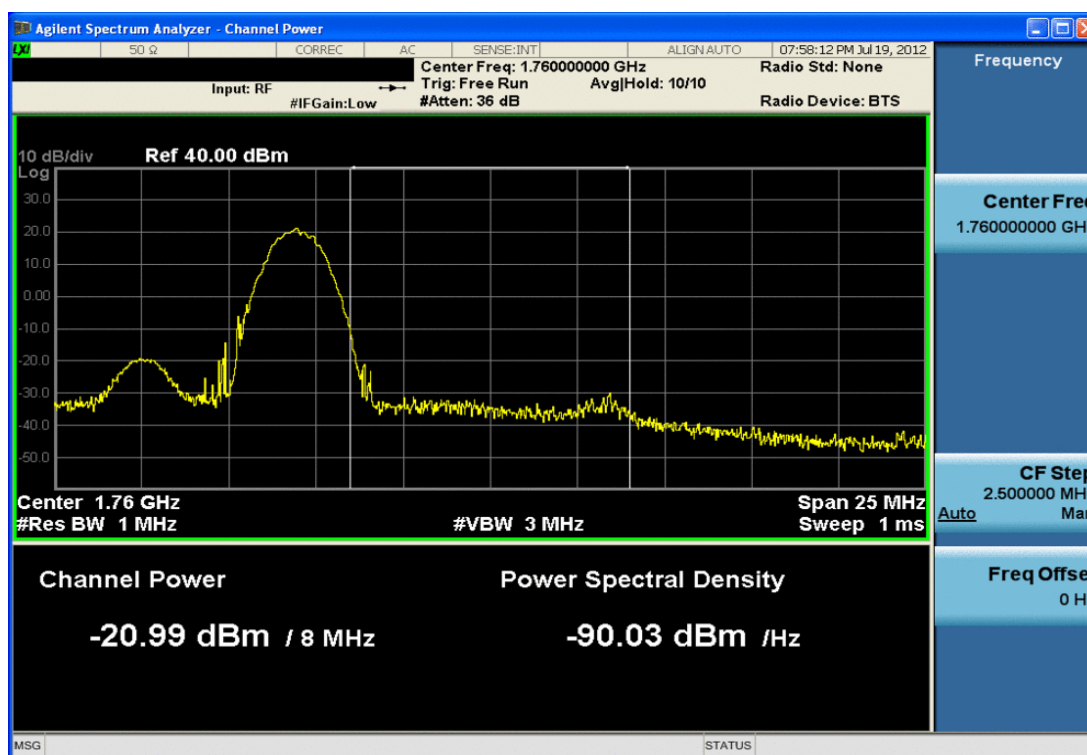


Plot 7-13. Upper Band Edge Plot (10MHz QPSK – RB Size 1, Offset 49)

FCC ID: A3LSCHR820	 FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1207301070.A3L	Test Dates: July 15-25, 2012	EUT Type: Portable Handset	Page 31 of 45

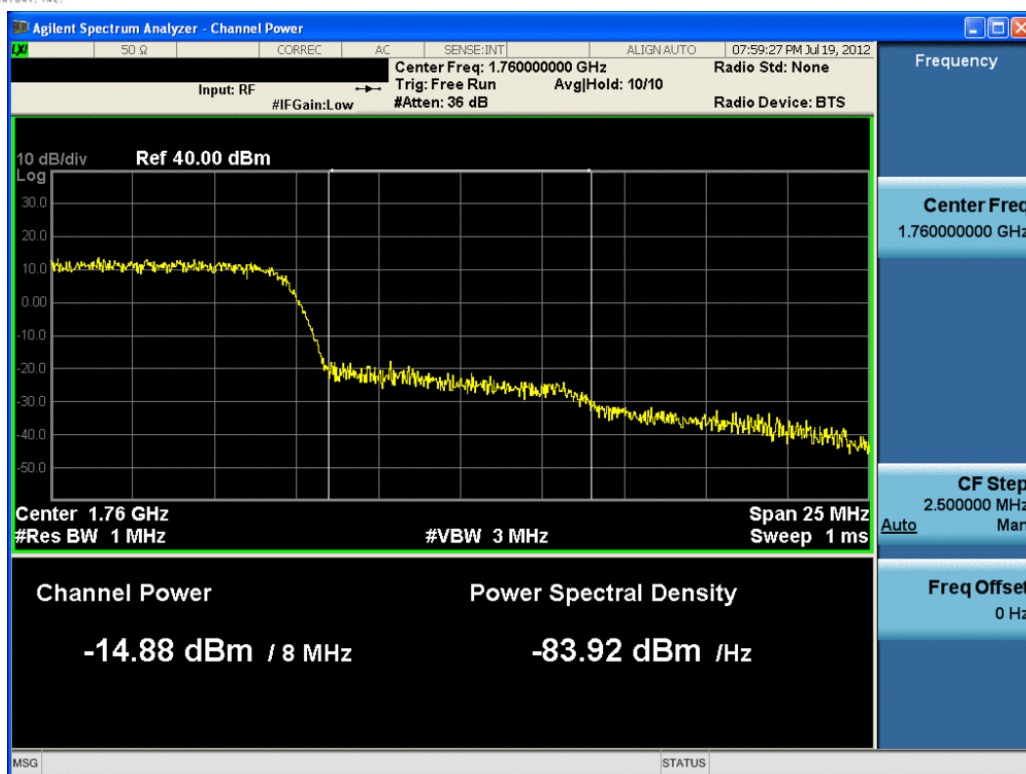


Plot 7-14. Upper Band Edge Plot (10MHz QPSK – RB Size 50)



Plot 7-15. Upper Extended Band Edge Plot (10MHz QPSK– RB Size 1, Offset 49)

FCC ID: A3LSCHR820	 FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1207301070.A3L	Test Dates: July 15-25, 2012	EUT Type: Portable Handset	Page 32 of 45

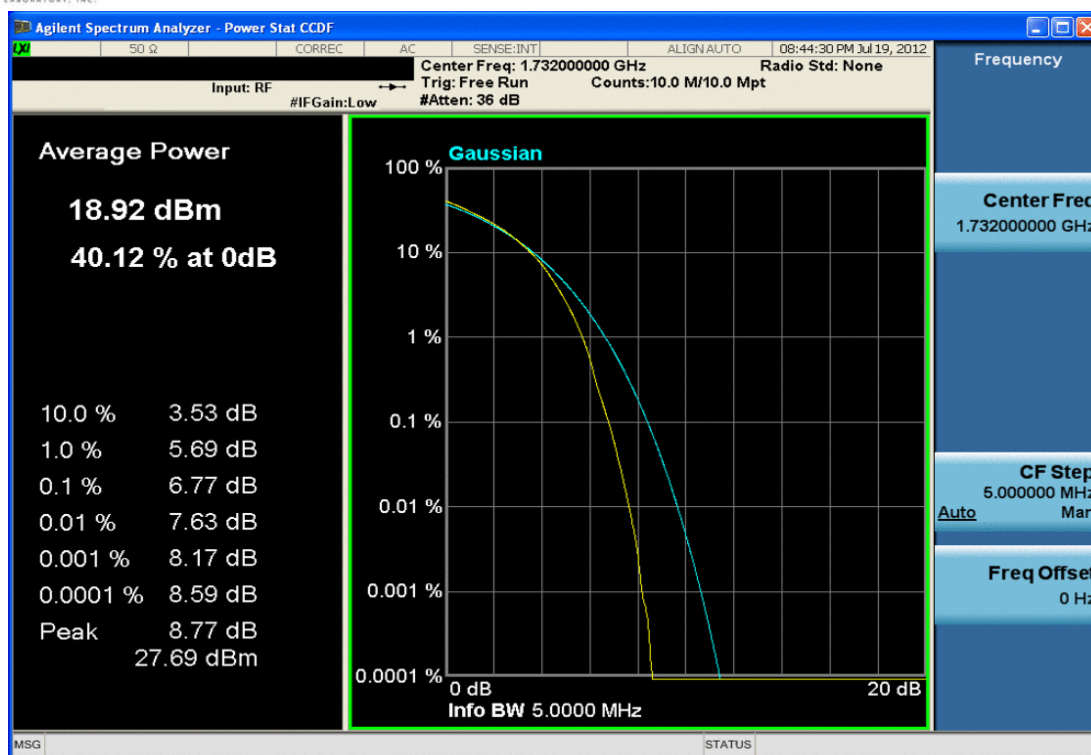


Plot 7-16. Upper Extended Band Edge Plot (10MHz QPSK– RB Size 50)



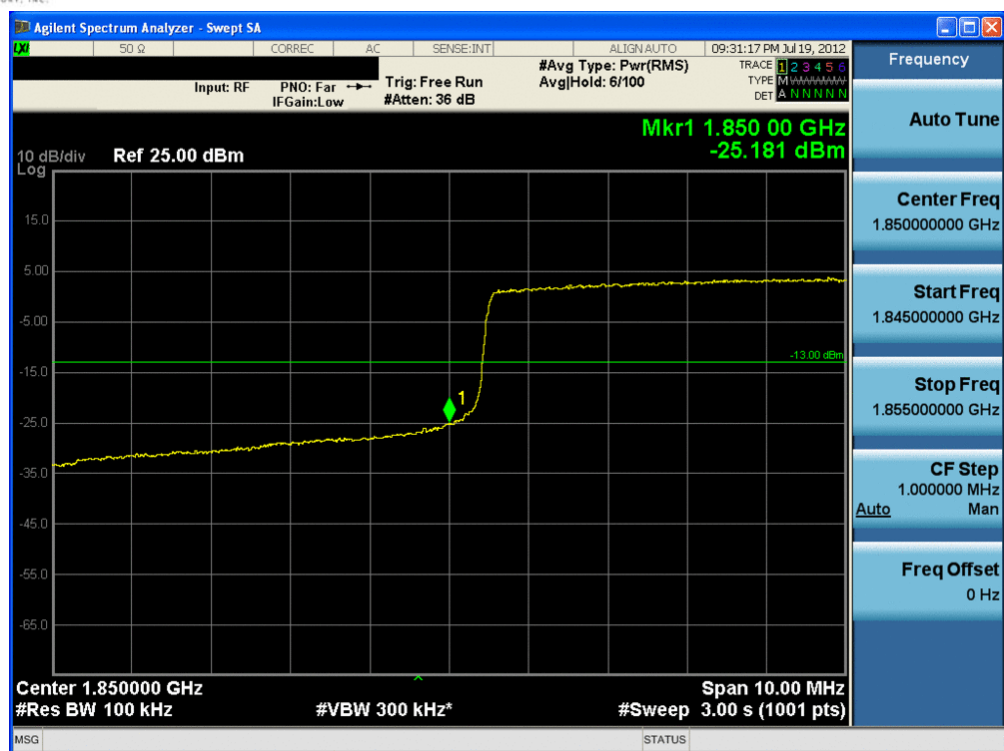
Plot 7-17. PAR Plot (10MHz QPSK – RB Size 50)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207301070.A3L	Test Dates: July 15-25, 2012	EUT Type: Portable Handset		Page 33 of 45

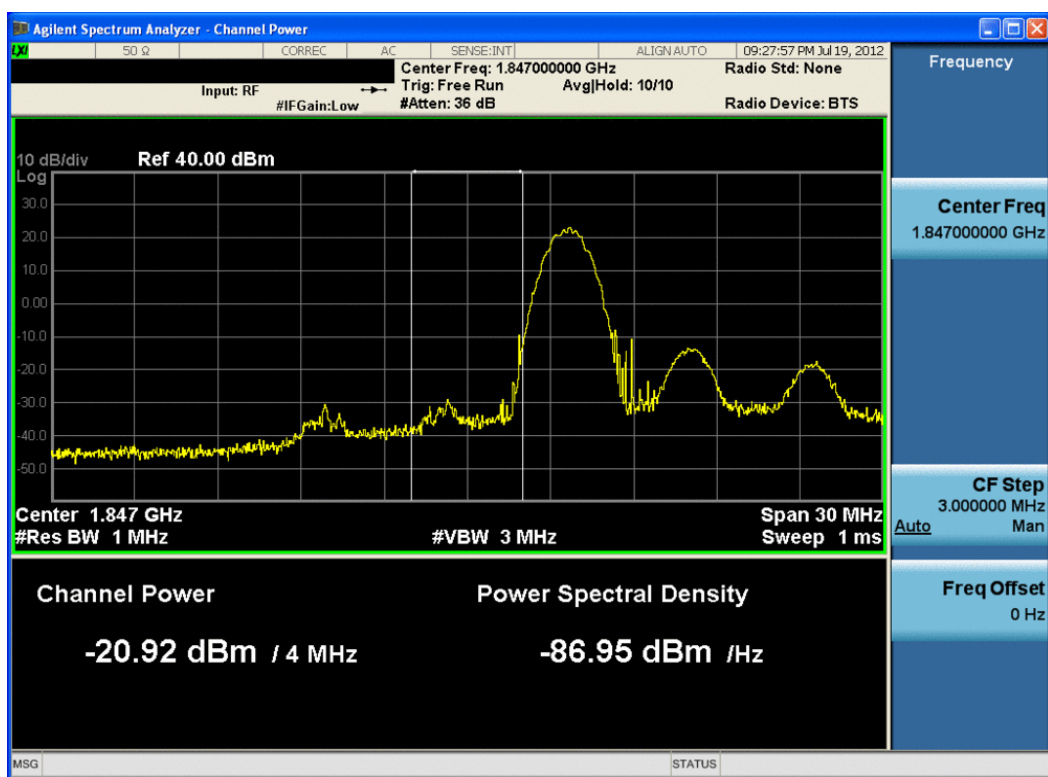


Plot 7-18. PAR Plot (10MHz 16QAM – RB Size 50)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207301070.A3L	Test Dates: July 15-25, 2012	EUT Type: Portable Handset		Page 34 of 45

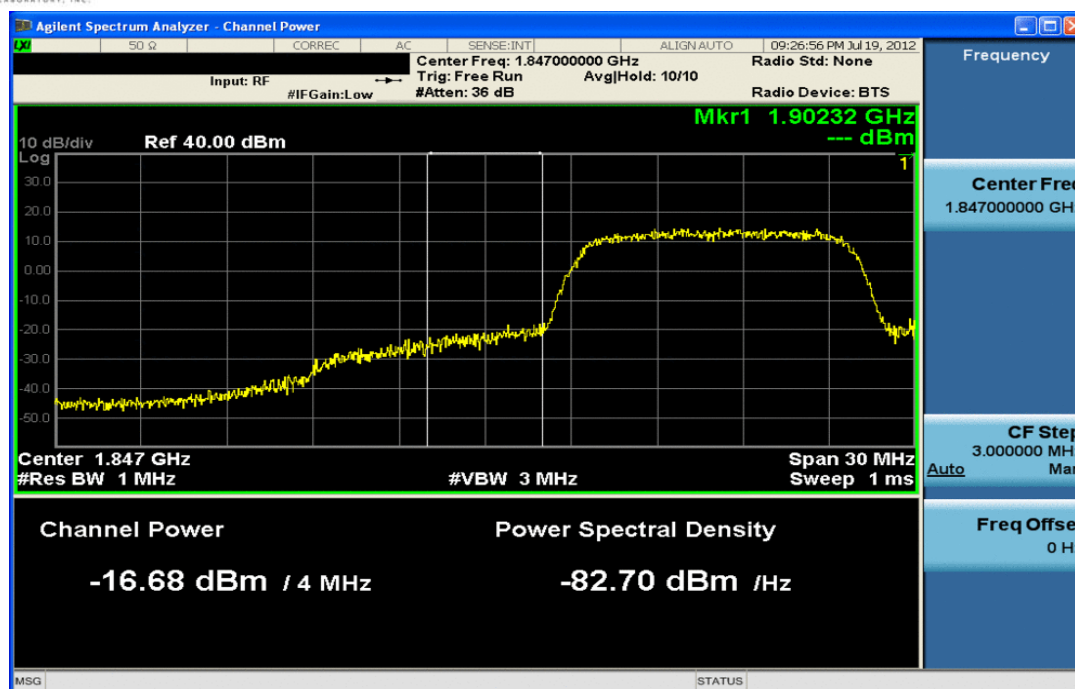


Plot 8-2. Lower Band Edge Plot (10MHz QPSK – RB Size 50)

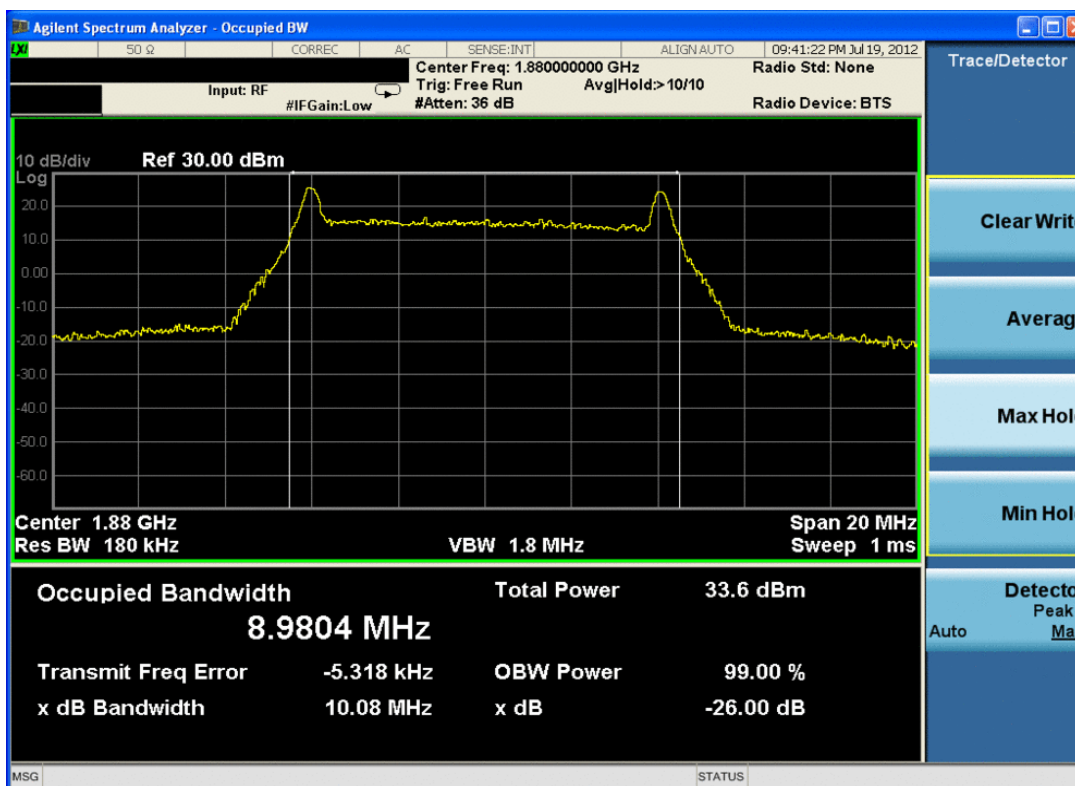


Plot 8-3. Lower Extended Band Edge Plot (10MHz QPSK – RB Size 1, Offset 0)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
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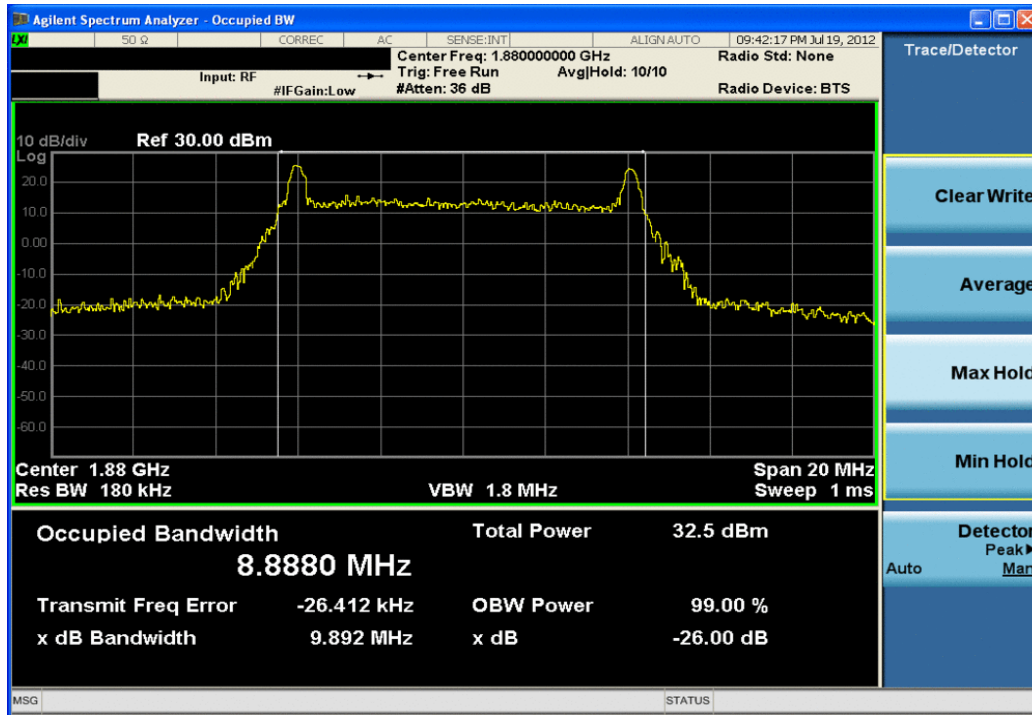


Plot 8-4. Lower Extended Band Edge Plot (10MHz QPSK – RB Size 50)

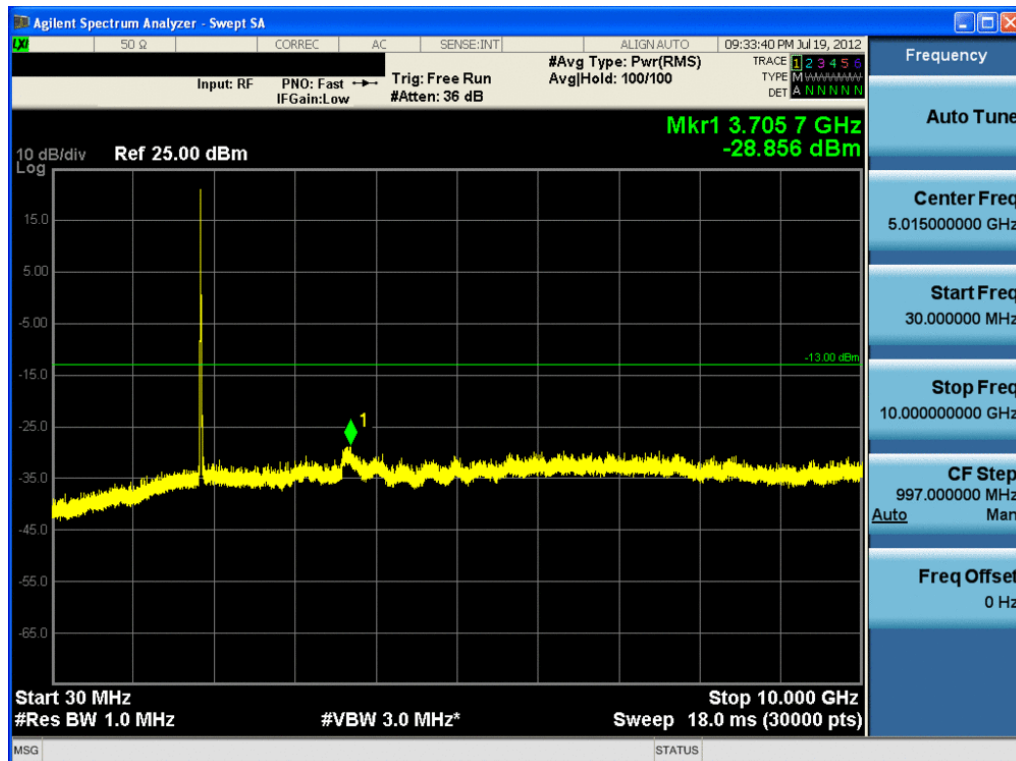


Plot 8-5. Occupied Bandwidth Plot (10MHz QPSK – RB Size 50)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
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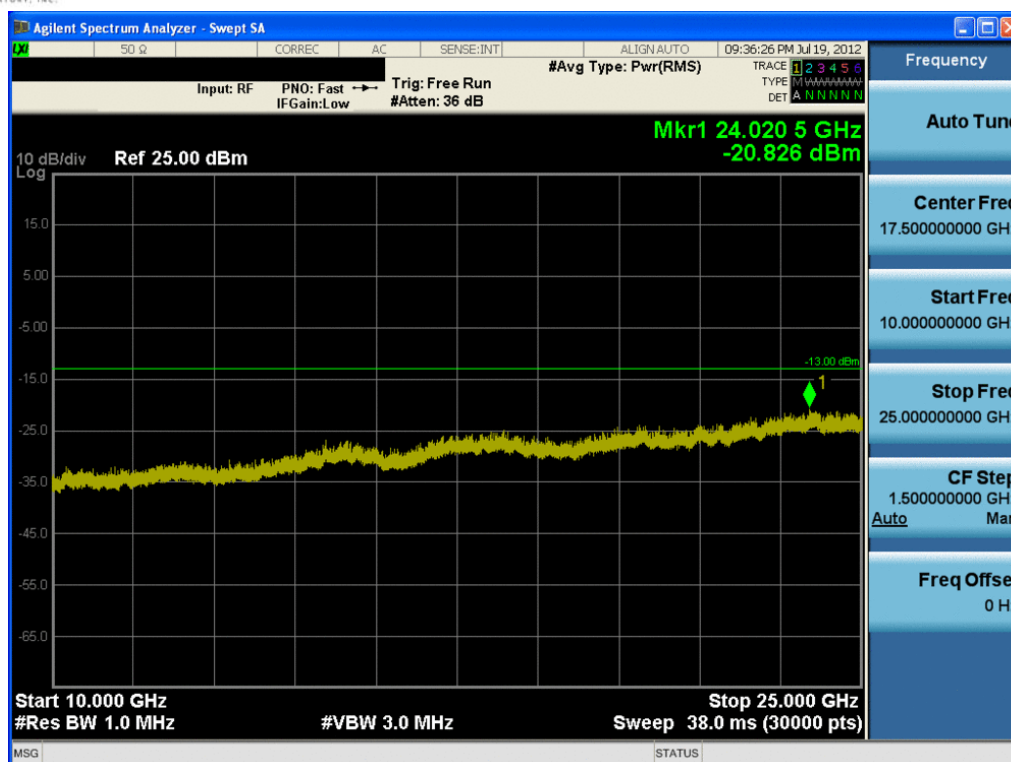


Plot 8-6. Occupied Bandwidth Plot (10MHz 16-QAM – RB Size 50)

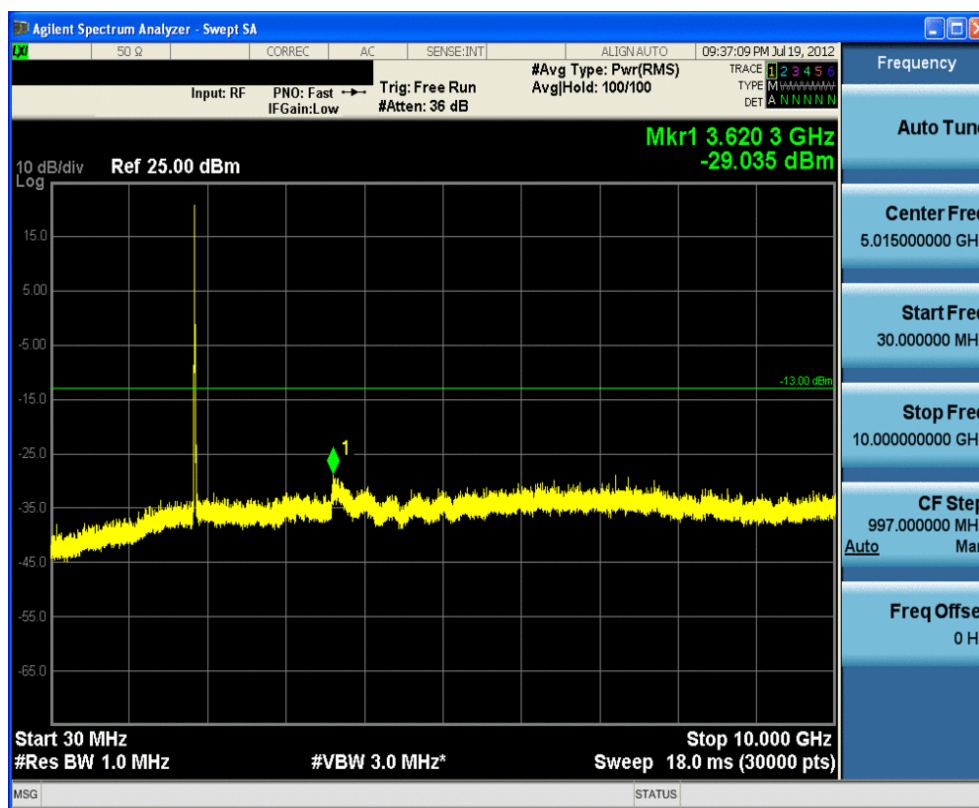


Plot 8-7. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1207301070.A3L	Test Dates: July 15-25, 2012	EUT Type: Portable Handset		Page 38 of 45

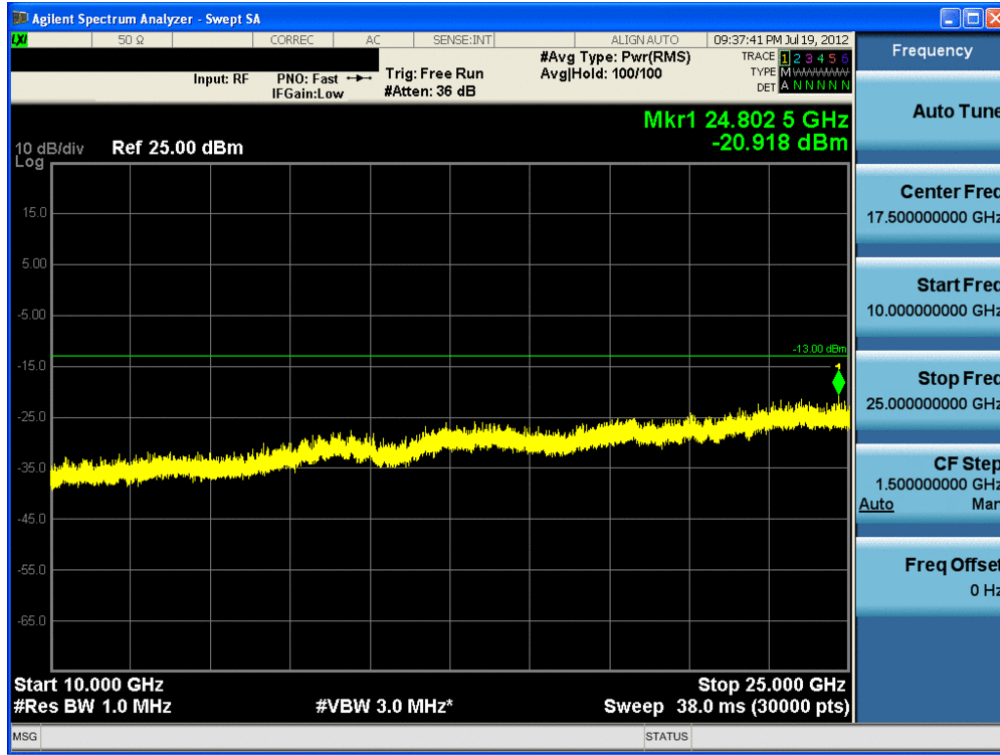


Plot 8-8. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

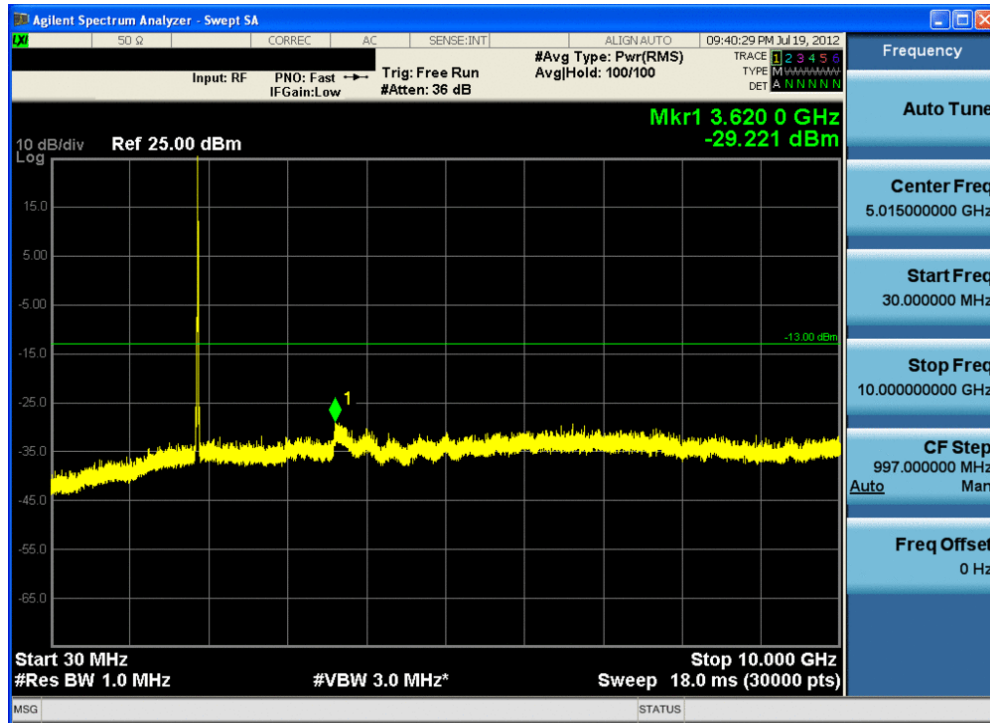


Plot 8-9. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSCHR820	 FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.) 		Reviewed by: Quality Manager
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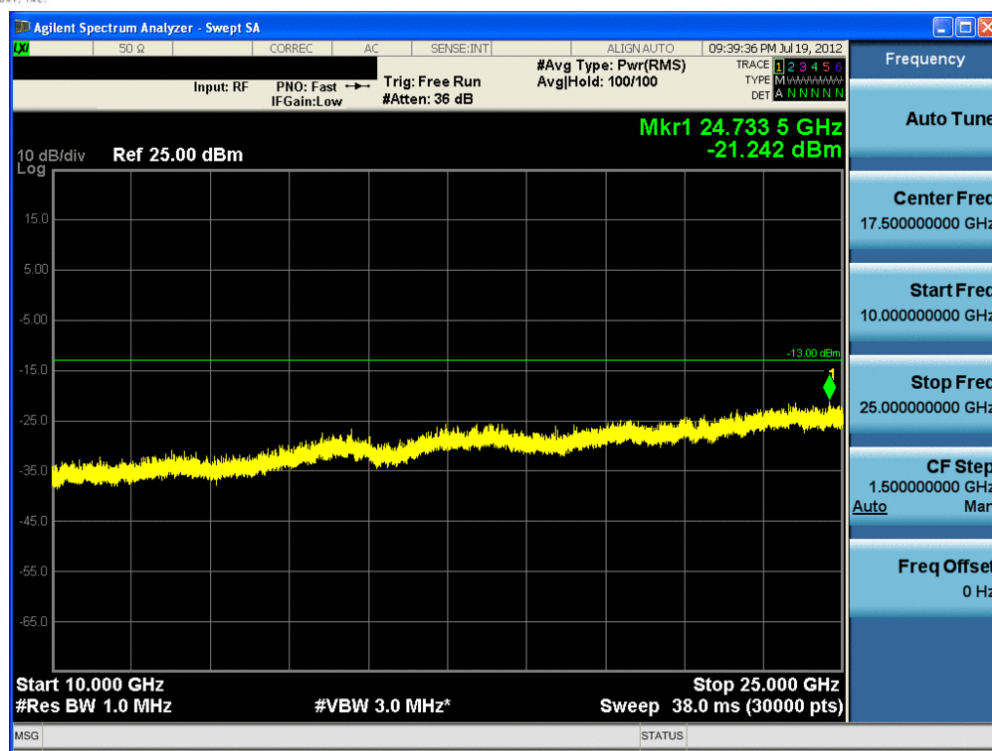


Plot 8-10. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

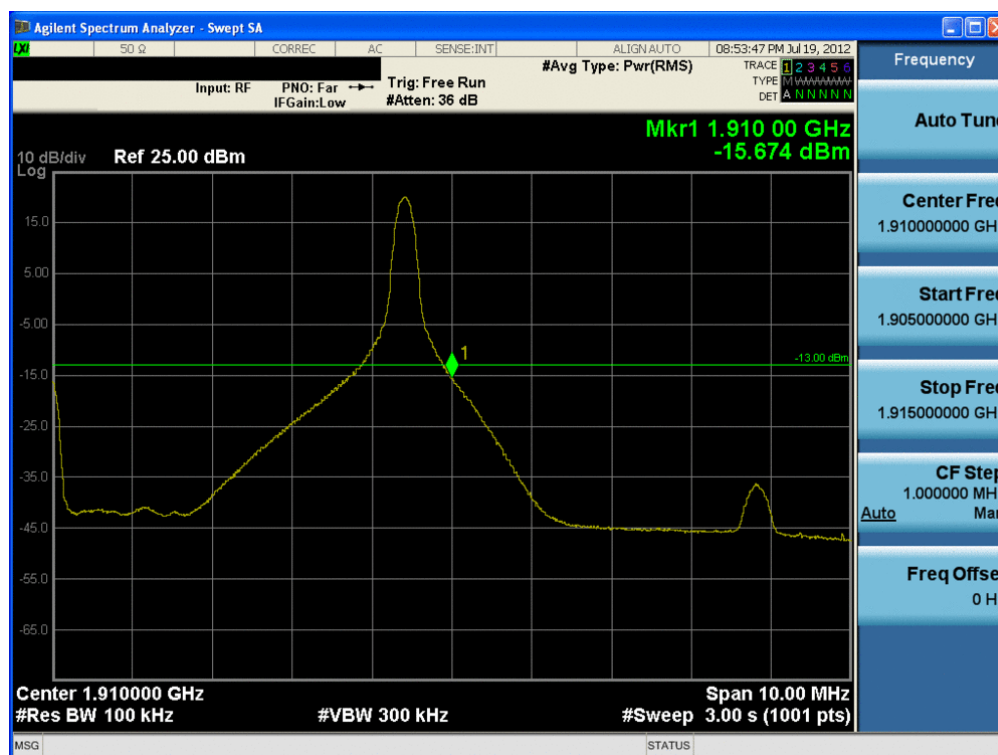


Plot 8-11. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
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Plot 8-12. Conducted Spurious Plot (10MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

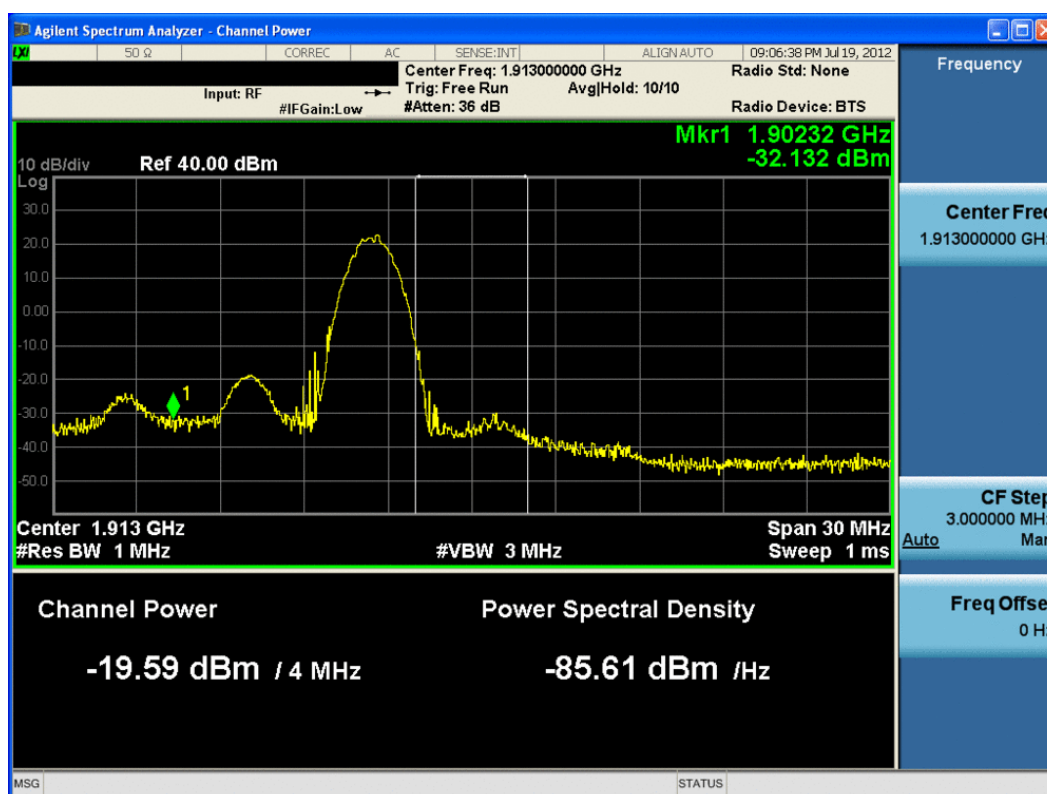


Plot 8-13. Upper Band Edge Plot (10MHz QPSK – RB Size 1, Offset 49)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
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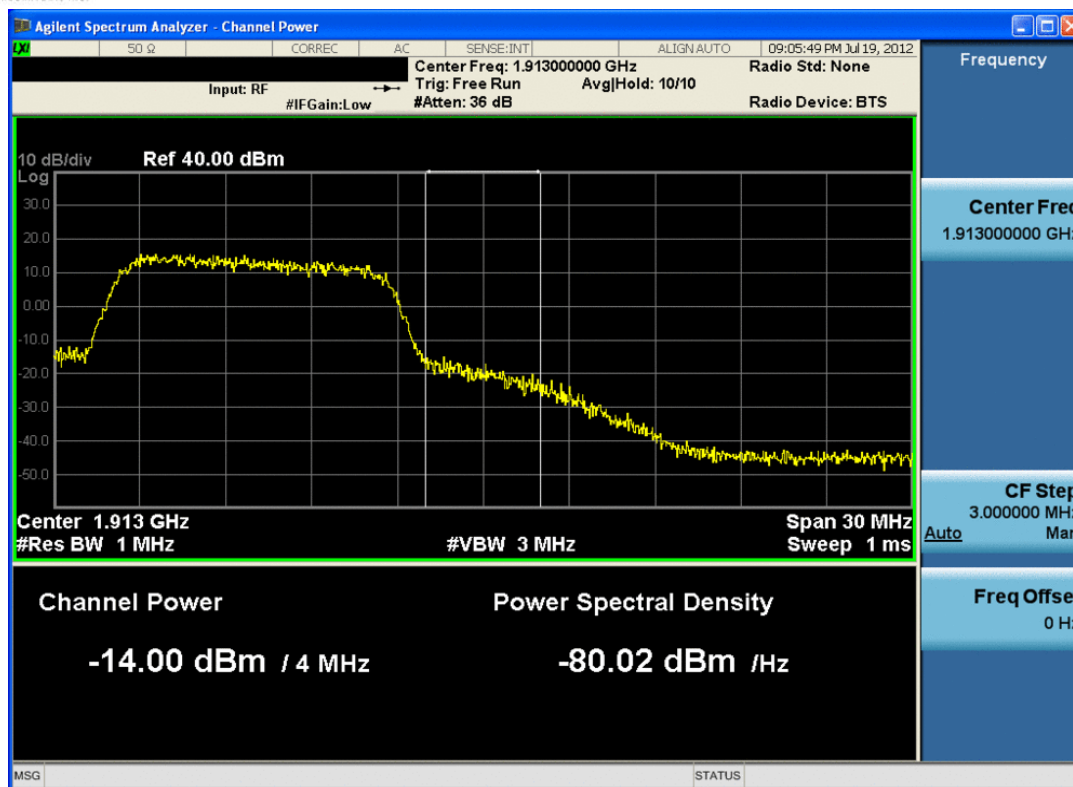


Plot 8-14. Upper Band Edge Plot (10MHz QPSK – RB Size 50)



Plot 8-15. Upper Extended Band Edge Plot (10MHz QPSK – RB Size 1, Offset 49)

FCC ID: A3LSCHR820	 FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.) 		Reviewed by: Quality Manager
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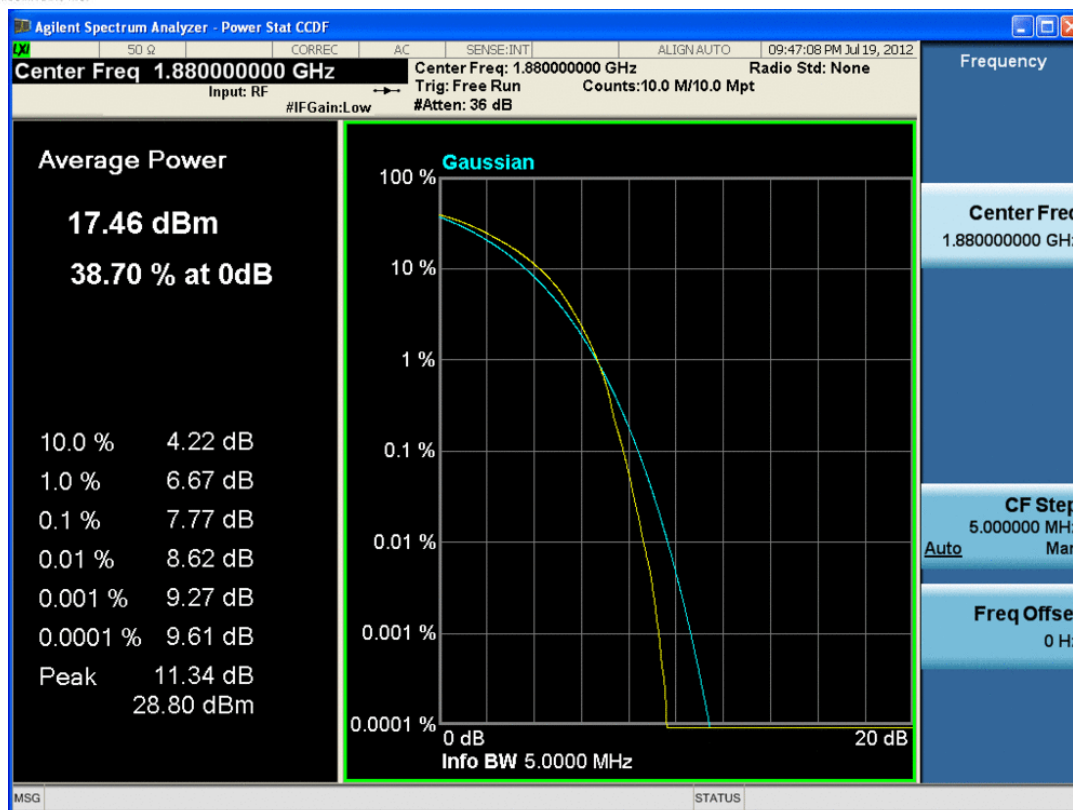


Plot 8-16. Upper Extended Band Edge Plot (10MHz QPSK – RB Size 50)



Plot 8-17. PAR Plot (10MHz QPSK – RB Size 50)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
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Plot 8-18. PAR Plot (10MHz 16QAM – RB Size 50)

FCC ID: A3LSCHR820	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)	SAMSUNG	Reviewed by: Quality Manager
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9.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSCHR820** complies with all the requirements of Parts 2, 24 and 27 of the FCC rules for LTE operation only.

FCC ID: A3LSCHR820		FCC Pt. 24-27 LTE MEASUREMENT REPORT (Class II P.C.)		Reviewed by: Quality Manager
Test Report S/N: 0Y1207301070.A3L	Test Dates: July 15-25, 2012	EUT Type: Portable Handset		Page 45 of 45