



MEASUREMENT REPORT FCC Part 22, 24 & 27 LTE

Applicant Name:
 Samsung Electronics, Co. Ltd.
 129, Samsung-ro, Maetan dong,
 Yeongtong-gu, Suwon-si
 Gyeonggi-do 443-742, Korea

Date of Testing:
 06/31/2013 - 07/17/2013
Test Site/Location:
 PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
 0Y1306281123.A3L-R1

FCC ID :	A3LSPHL520
APPLICANT:	SAMSUNG ELECTRONICS, CO. LTD.

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s): §22; §24; §27
EUT Type: Portable Handset
Model(s): SPH-L520
Test Device Serial No.: *identical prototype*

Mode	Tx Frequency (MHz)	Emission Designator	Modulation	ERP/EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE Band 26	824.7 - 848.3	1M09G7D	QPSK	0.111	20.46
LTE Band 26	824.7 - 848.3	1M10W7D	16QAM	0.086	19.35
LTE Band 26	825.5 - 847.5	2M71G7D	QPSK	0.098	19.91
LTE Band 26	825.5 - 847.5	2M69W7D	16QAM	0.078	18.90
LTE Band 26	826.5 - 846.5	4M51G7D	QPSK	0.121	20.82
LTE Band 26	826.5 - 846.5	4M51W7D	16QAM	0.091	19.60
LTE Band 26	829 - 844	8M95G7D	QPSK	0.110	20.43
LTE Band 26	829 - 844	8M93W7D	16QAM	0.086	19.35
LTE Band 25	1851.5 - 1913.5	2M71G7D	QPSK	0.078	18.95
LTE Band 25	1851.5 - 1913.5	2M70W7D	16QAM	0.060	17.78
LTE Band 25	1852.5 - 1912.5	4M51G7D	QPSK	0.084	19.26
LTE Band 25	1852.5 - 1912.5	4M51W7D	16QAM	0.067	18.26
LTE Band 25	1855 - 1910	8M97G7D	QPSK	0.093	19.68
LTE Band 25	1855 - 1910	8M96W7D	16QAM	0.073	18.63
LTE Band 41	2501 - 2685	8M95G7D	QPSK	0.231	23.64
LTE Band 41	2501 - 2685	8M90W7D	16QAM	0.326	25.14
LTE Band 41	2503.5 - 2682.5	13M4G7D	QPSK	0.277	24.43
LTE Band 41	2503.5 - 2682.5	13M4W7D	16QAM	0.279	24.45
LTE Band 41	2506 - 2680	17M8G7D	QPSK	0.246	23.91
LTE Band 41	2506 - 2680	17M9W7D	16QAM	0.249	23.96



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

***This revised Test Report (S/N: 0Y1306281123.A3L-R1) supersedes and replaces the previously issued test report on the same subject EUT for the same type of testing as indicated. Please discard and destroy the previously issued test report (S/N: 0Y1306281123.A3L) and dispose of it accordingly.**

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.




 Randy Ortanez
 President

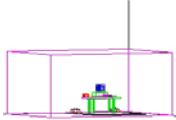


FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 1 of 75	

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

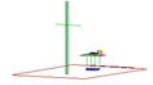
FCC PART 22, 24 & 27 MEASUREMENT REPORT	3
1.0 INTRODUCTION	4
1.1 SCOPE	4
1.2 TESTING FACILITY	4
2.0 PRODUCT INFORMATION.....	5
2.1 EQUIPMENT DESCRIPTION	5
2.2 DEVICE CAPABILITIES.....	5
2.3 EMI SUPPRESSION DEVICE(S)/MODIFICATIONS	5
2.4 LABELING REQUIREMENTS.....	5
3.0 DESCRIPTION OF TESTS	6
3.1 MEASUREMENT PROCEDURE	6
3.2 CELLULAR - BASE FREQUENCY BLOCKS.....	6
3.3 CELLULAR - MOBILE FREQUENCY BLOCKS.....	6
3.4 PCS - BASE FREQUENCY BLOCKS.....	6
3.5 PCS - MOBILE FREQUENCY BLOCKS.....	7
3.6 OCCUPIED BANDWIDTH	7
3.7 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL.....	7
3.8 PEAK-AVERAGE RATIO.....	7
3.9 RADIATED POWER AND RADIATED SPURIOUS EMISSIONS	8
3.10 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 EFFECTIVE RADIATED POWER (ERP).....	13
6.3 EQUIVALENT ISOTROPIC RADIATED POWER (EIRP)	14
6.4 BAND 26 RADIATED SPURIOUS EMISSIONS	16
6.5 BAND 25 RADIATED SPURIOUS EMISSIONS	19
6.6 BAND 41 RADIATED SPURIOUS EMISSIONS	22
6.7 BAND 26 FREQUENCY STABILITY MEASUREMENTS.....	25
6.8 BAND 25 FREQUENCY STABILITY MEASUREMENTS.....	27
6.9 BAND 41 FREQUENCY STABILITY MEASUREMENTS.....	29
7.0 BAND 26 PLOTS OF EMISSIONS.....	31
8.0 BAND 25 PLOTS OF EMISSIONS.....	46
9.0 BAND 41 PLOTS OF EMISSIONS.....	61
10.0 CONCLUSION.....	75

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 2 of 75	



MEASUREMENT REPORT

FCC Part 22, 24 & 27



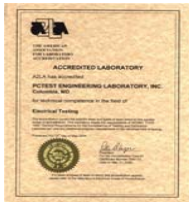
§2.1033 General Information



APPLICANT: Samsung Electronics, Co. Ltd.
APPLICANT ADDRESS: 129, Samsung-ro, Maetan dong,
 Yeongtong-gu, Suwon-si, Gyeonggi-do 443-742, Korea
TEST SITE: PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS: 7185 Oakland Mills Road, Columbia, MD 21045 USA
FCC RULE PART(S): §2; §22; §24; §27
BASE MODEL: SPH-L520
FCC ID: A3LSPHL520
FCC CLASSIFICATION: PCS Licensed Transmitter Held to Ear (PCE)
FREQUENCY TOLERANCE: ±0.00025 % (2.5 ppm)
Test Device Serial No.: 81 Production Pre-Production Engineering
DATE(S) OF TEST: 06/31/2013 - 07/17/2013
TEST REPORT S/N: 0Y1306281123.A3L-R1

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 and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.



FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 3 of 75	

1.0 INTRODUCTION

1.1 Scope

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

1.2 Testing Facility

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

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility 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.

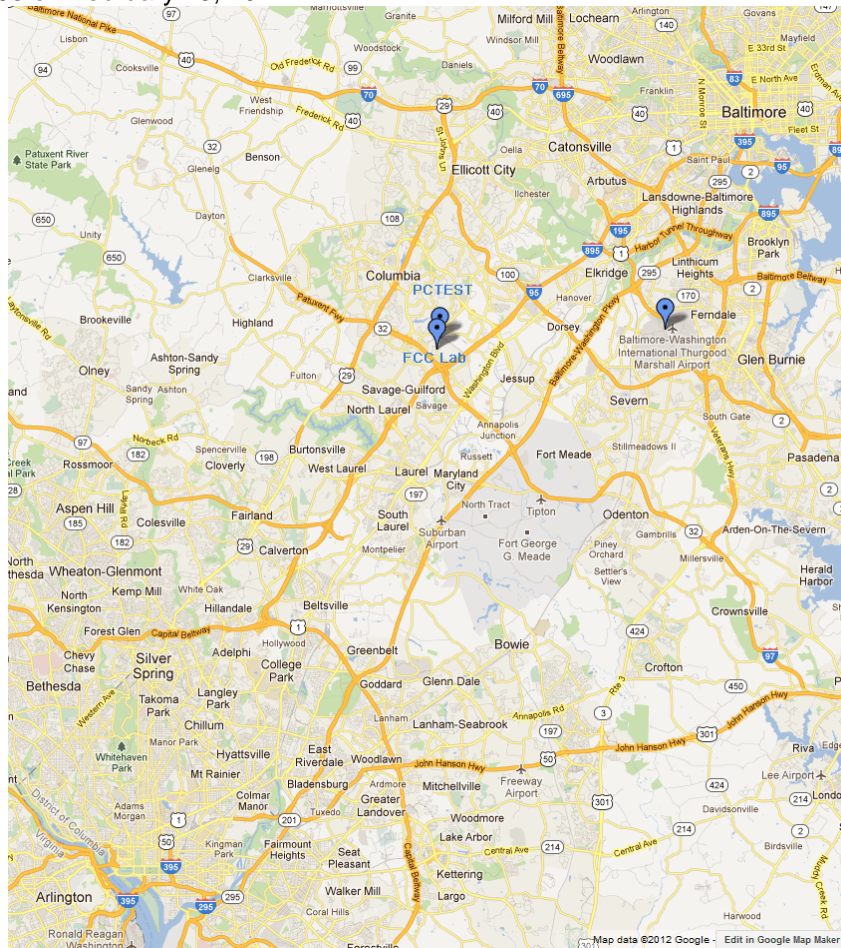




Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 4 of 75

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Electronics Co., Ltd. Portable Handset FCC ID: A3LSPHL520**. 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 (BC0, BC1, BC10), Band 25, 26, 41 LTE, 802.11a/b/g/n WLAN (DTS/NII), Bluetooth (1x,EDR, LE), NFC



2.3 EMI Suppression Device(s)/Modifications

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

2.4 Labeling Requirements

Per 2.925

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

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 5 of 75	

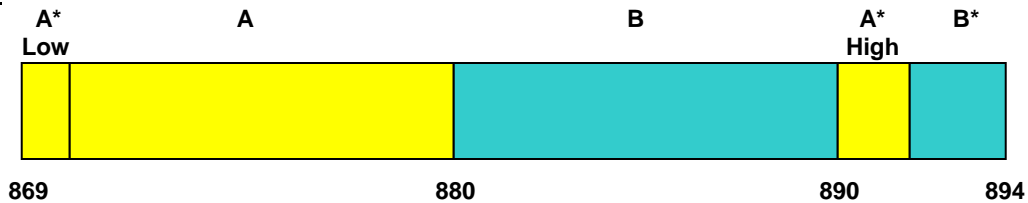
3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

The measurement procedures described in the document titled “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-C-2004) and “Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems” (KDB 971168) were used in the measurement of the **Samsung Electronics Co., Ltd. Portable Handset FCC ID: A3LSPHL520**.

3.2 Cellular - Base Frequency Blocks

§24.905



BLOCK 1: 869 – 880 MHz (A* Low + A)

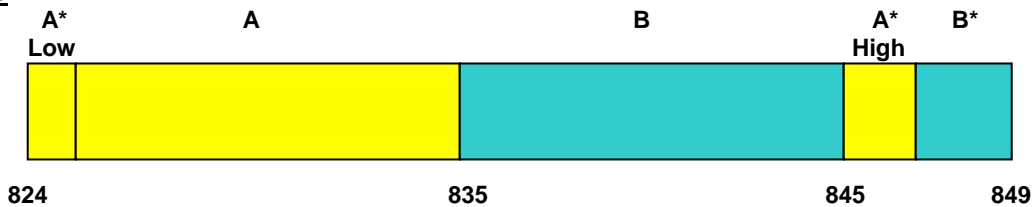
BLOCK 2: 880 – 890 MHz (B)

BLOCK 3: 890 – 891.5 MHz (A* High)

BLOCK 4: 891.5 – 894 MHz (B*)

3.3 Cellular - Mobile Frequency Blocks

§24.905



BLOCK 1: 824 – 835 MHz (A* Low + A)

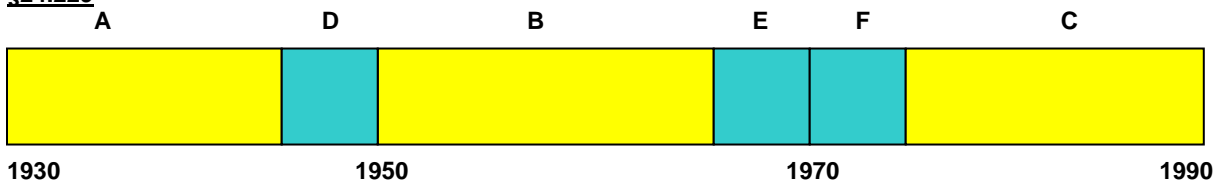
BLOCK 2: 835 – 845 MHz (B)

BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 4: 846.5 – 849 MHz (B*)

3.4 PCS - Base Frequency Blocks

§24.229



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 4: 1965 – 1970 MHz (E)

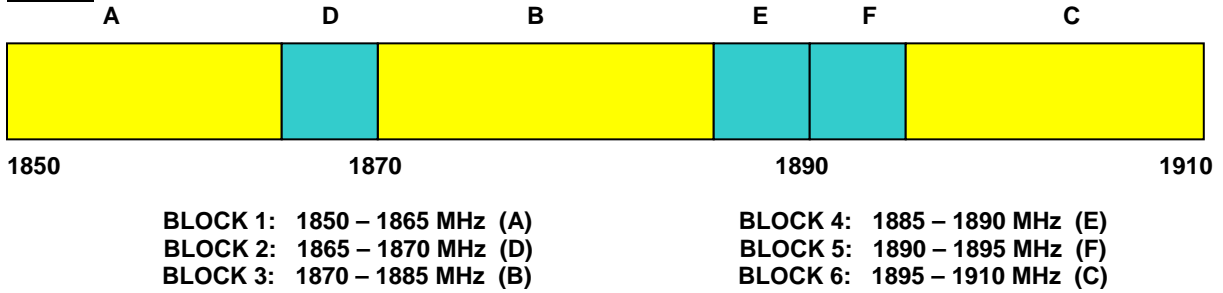
BLOCK 5: 1970 – 1975 MHz (F)

BLOCK 6: 1975 – 1990 MHz (C)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 6 of 75

3.5 PCS - Mobile Frequency Blocks

§24.229



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 §22.917(a)(b) §24.238(a)(b) §27.53(m) RSS-132(4.5.1)

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 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 100 kHz or greater for Cell band, or 1 MHz or greater for PCS band, BRS and EBS stations. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed for PCS band, BRS and EBS stations. 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) RSS-132(5.4)

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: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 7 of 75	

3.9 Radiated Power and Radiated Spurious Emissions

§2.1053 §22.913(a.2) §22.917(a) §27.53(h) RSS-132(4.4) RSS-132(4.5.1)

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 22.917(a) and 24.238(a).

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 8 of 75	

3.10 Frequency Stability / Temperature Variation

§2.1055 §22.863 §22.905 §27.5(i) §27.54 RSS-132(4.3)



The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

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

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A sufficient stabilization period at each temperature shall be used prior to each frequency requirement.

FCC ID: A3LSPHL520	 FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)			Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 9 of 75

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	1/17/2013	Annual	1/17/2014	N/A
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
Agilent	8447D	Broadband Amplifier	5/31/2013	Annual	5/31/2014	2443A01900
Agilent	E4432B	ESG-D Series Signal Generator	4/17/2013	Annual	4/17/2014	US40053896
Agilent	N9020A	MXA Signal Analyzer	10/9/2012	Annual	10/9/2013	US46470561
Agilent	N9030A	PXA Signal Analyzer (26.5GHz)	4/18/2013	Annual	4/18/2014	MY49432391
Anritsu	MA2411B	Pulse Sensor	9/19/2012	Annual	9/19/2013	1027293
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/24/2013	Biennial	7/24/2015	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	5/30/2012	Biennial	5/30/2014	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	11/7/2012	Biennial	11/7/2014	128338
Mini-Circuits	VHF-3100+	High Pass Filter	1/21/2013	Annual	1/21/2014	31144
Mini-Circuits	SSG-4000HP	USB Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	PWR-SENS-4RMS	USB Power Sensor	4/17/2013	Annual	4/17/2014	11210140001
Mini-Circuits	TVA-11-422	RF Power Amp	N/A			QA1303002
Rohde & Schwarz	CMU200	Base Station Simulator	5/3/2013	Annual	5/3/2014	836371/0079
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Biennial	10/7/2013	103962
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100071
Rohde & Schwarz	ESU26	EMI Test Receiver	2/25/2013	Annual	2/25/2014	100342
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/26/2012	Biennial	1/26/2014	A051107

Table 4-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration due date that falls within the test date range, care was taken to ensure that this equipment was utilized prior to the calibration due date.
2. Equipment used for signaling with a calibration date of "N/A" shown in this list was only used for maintaining a link between the piece of equipment and the EUT. This equipment was not used to make direct calibrated measurements.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 10 of 75	

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: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 11 of 75	

6.0 TEST RESULTS

6.1 Summary



Company Name: Samsung Electronics, Co. Ltd.
 FCC ID: A3LSPHL520
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Result	Reference
TRANSMITTER MODE (TX)					
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section, 7.0, 8.0, 9.0
2.1051 22.917(a) 24.238(a) 27.53(m)	Band Edge / Conducted Spurious Emissions	$> 43 + 10\log_{10}(P[\text{Watts}])$ at Band Edge and for all out-of-band emissions		PASS	Section, 7.0, 8.0, 9.0
24.232(d)	Peak-Average Ratio	< 13 dB		PASS	Section, 8.0
2.1046	Transmitter Conducted Output Power	N/A		PASS	See RF Exposure Report
22.913(a.2)	Effective Radiated Power (Band 26)	< 7 Watts max. ERP	RADIATED	PASS	Section 6.2
24.232(c) 27.50(h.2)	Equivalent Isotropic Radiated Power (Band 25 EBS)	< 2 Watts max. EIRP		PASS	Section 6.3
2.1053 22.917(a) 24.238(a) 27.53(m)	Undesirable Emissions	$< 43 + 10\log_{10}(P[\text{Watts}])$ for all out-of-band emissions		PASS	Section, 6.4, 6.5, 6.6
2.1055. 22.35527.5(i) 27.54	Frequency Stability	< 2.5 ppm (Part 22) and fundamental emissions stay within authorized frequency block (Part 24, 27)		PASS	Section, 6.7, 6.8, 6.9

Table 6-1. Summary of Test Results

Notes:

- All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- The analyzer plots shown in Section 7.0 8.0 9.0 were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 12 of 75	

6.2 Effective Radiated Power (ERP)



§22.913(a.2) RSS-132(4.4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	Margin [dB]
824.70	1.4	QPSK	Standard	1/0	11.76	4.68	V	16.44	0.044	-22.01
836.50	1.4	QPSK	Standard	1/0	15.64	4.82	V	20.46	0.111	-17.99
848.30	1.4	QPSK	Standard	1/0	14.88	4.96	V	19.84	0.096	-18.61
824.70	1.4	16-QAM	Standard	1/0	11.35	4.68	V	16.03	0.040	-22.42
836.50	1.4	16-QAM	Standard	1/0	14.53	4.82	V	19.35	0.086	-19.10
848.30	1.4	16-QAM	Standard	1/0	13.68	4.96	V	18.64	0.073	-19.81
825.50	3	QPSK	Standard	1/14	15.23	4.68	V	19.91	0.098	-18.54
836.50	3	QPSK	Standard	1/0	15.08	4.82	V	19.90	0.098	-18.55
847.50	3	QPSK	Standard	1/0	13.84	4.96	V	18.80	0.076	-19.65
825.50	3	16-QAM	Standard	1/14	14.07	4.68	V	18.75	0.075	-19.70
836.50	3	16-QAM	Standard	1/0	14.08	4.82	V	18.90	0.078	-19.55
847.50	3	16-QAM	Standard	1/0	12.81	4.96	V	17.77	0.060	-20.68
826.50	5	QPSK	Standard	1/24	12.73	4.68	V	17.41	0.055	-21.04
836.50	5	QPSK	Standard	1/0	15.75	4.82	V	20.57	0.114	-17.88
846.50	5	QPSK	Standard	1/0	15.86	4.96	V	20.82	0.121	-17.63
826.50	5	16-QAM	Standard	1/24	14.74	4.68	V	19.42	0.088	-19.03
836.50	5	16-QAM	Standard	1/0	14.78	4.82	V	19.60	0.091	-18.85
846.50	5	16-QAM	Standard	1/0	13.27	4.96	V	18.23	0.067	-20.22
829.00	10	QPSK	Standard	1/49	15.31	4.68	V	19.99	0.100	-18.46
836.50	10	QPSK	Standard	1/0	15.61	4.82	V	20.43	0.110	-18.02
844.00	10	QPSK	Standard	1/0	15.08	4.96	V	20.04	0.101	-18.41
829.00	10	16-QAM	Standard	1/49	14.09	4.68	V	18.77	0.075	-19.68
836.50	10	16-QAM	Standard	1/0	14.53	4.82	V	19.35	0.086	-19.10
844.00	10	16-QAM	Standard	1/0	13.89	4.96	V	18.85	0.077	-19.60

Table 6-2. ERP Data (Band 26)

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 13 of 75	

6.3 Equivalent Isotropic Radiated Power (EIRP)



§24.232(c) §27.50(h.2) RSS-133(6.4)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
1851.50	3	QPSK	Standard	15/0	8.84	9.59	H	18.43	0.070	-14.58
1882.50	3	QPSK	Standard	15/0	9.42	9.53	H	18.95	0.078	-14.06
1913.50	3	QPSK	Standard	15/0	8.05	9.47	H	17.52	0.057	-15.49
1851.50	3	16-QAM	Standard	15/0	7.80	9.59	H	17.39	0.055	-15.62
1882.50	3	16-QAM	Standard	15/0	8.25	9.53	H	17.78	0.060	-15.23
1913.50	3	16-QAM	Standard	15/0	7.68	9.47	H	17.15	0.052	-15.86
1852.50	5	QPSK	Standard	25/0	9.12	9.59	H	18.71	0.074	-14.30
1882.50	5	QPSK	Standard	25/0	9.73	9.53	H	19.26	0.084	-13.75
1912.50	5	QPSK	Standard	25/0	7.49	9.47	H	16.96	0.050	-16.05
1852.50	5	16-QAM	Standard	25/0	8.11	9.59	H	17.70	0.059	-15.31
1882.50	5	16-QAM	Standard	25/0	8.73	9.53	H	18.26	0.067	-14.75
1912.50	5	16-QAM	Standard	25/0	7.32	9.47	H	16.79	0.048	-16.22
1855.00	10	QPSK	Standard	50/0	9.72	9.59	H	19.31	0.085	-13.70
1882.50	10	QPSK	Standard	50/0	10.15	9.53	H	19.68	0.093	-13.33
1910.00	10	QPSK	Standard	50/0	7.86	9.47	H	17.33	0.054	-15.68
1855.00	10	16-QAM	Standard	50/0	8.88	9.59	H	18.47	0.070	-14.54
1882.50	10	16-QAM	Standard	50/0	9.10	9.53	H	18.63	0.073	-14.38
1910.00	10	16-QAM	Standard	50/0	6.80	9.47	H	16.27	0.042	-16.74

Table 6-3. EIRP Data (Band 25)

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
1. This unit was tested with its standard battery.
2. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The “H” positioning is defined with the EUT lying flat on the test surface, the “H2” positioning is defined with the EUT standing up on its side, and the “V” positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 14 of 75	



Equivalent Isotropic Radiated Power (EIRP) (Cont.)

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Margin [dB]
2501.00	10	QPSK	Standard	1/0	10.42	8.66	V	19.08	0.081	-13.93
2593.00	10	QPSK	Standard	1/0	14.92	8.72	V	23.64	0.231	-9.37
2685.00	10	QPSK	Standard	1/0	8.57	8.82	V	17.39	0.055	-15.62
2501.00	10	16-QAM	Standard	1/0	11.91	8.66	V	20.57	0.114	-12.44
2593.00	10	16-QAM	Standard	1/0	16.42	8.72	V	25.14	0.326	-7.87
2685.00	10	16-QAM	Standard	1/0	8.59	8.82	V	17.41	0.055	-15.60
2503.50	15	QPSK	Standard	1/0	11.24	8.66	V	19.90	0.098	-13.11
2593.00	15	QPSK	Standard	1/0	14.87	8.72	V	23.59	0.228	-9.42
2682.50	15	QPSK	Standard	1/0	15.61	8.82	V	24.43	0.277	-8.58
2503.50	15	16-QAM	Standard	1/0	11.26	8.66	V	19.92	0.098	-13.09
2593.00	15	16-QAM	Standard	1/0	14.88	8.72	V	23.60	0.229	-9.41
2682.50	15	16-QAM	Standard	1/0	15.63	8.82	V	24.45	0.279	-8.56
2506.00	20	QPSK	Standard	1/0	13.39	8.66	V	22.05	0.160	-10.96
2593.00	20	QPSK	Standard	1/0	13.80	8.72	V	22.52	0.179	-10.49
2680.00	20	QPSK	Standard	1/0	15.09	8.82	V	23.91	0.246	-9.10
2506.00	20	16-QAM	Standard	1/0	13.41	8.66	V	22.07	0.161	-10.94
2593.00	20	16-QAM	Standard	1/0	13.89	8.72	V	22.61	0.182	-10.40
2680.00	20	16-QAM	Standard	1/0	15.14	8.82	V	23.96	0.249	-9.05

Table 6-4. EIRP Data (Band 41)

NOTES:

- This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
- This unit was tested with its standard battery.
- The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 15 of 75	

6.4 Band 26 Radiated Spurious Emissions

§2.1053 §22.917(a) RSS-132(4.5.1)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 828.67 MHz
 MEASURED OUTPUT POWER: 17.41 dBm = 0.055 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 30.41 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1657.33	-46.25	2.50	-43.76	V	61.17
2486.00	-44.94	2.82	-42.13	V	59.54
3314.66	-79.72	5.52	-74.19	V	91.61
4143.33	-79.41	7.08	-72.33	V	89.74
4971.99	-78.88	7.91	-70.97	V	88.38
5800.66	-76.96	8.51	-68.45	V	85.87

Table 6-5. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 16 of 75	

Band 26 Radiated Spurious Measurements (continued)
§2.1053 §22.917(a) RSS-132(4.5.1)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 837.80 MHz
 MEASURED OUTPUT POWER: 20.57 dBm = 0.114 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.57 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1675.60	-52.99	2.34	-50.66	V	71.23
2513.40	-40.57	2.84	-37.73	V	58.30
3351.20	-79.83	5.64	-74.18	V	94.76
4189.00	-79.50	7.14	-72.36	V	92.93
5026.80	-78.86	7.97	-70.89	V	91.47
5864.60	-76.66	8.46	-68.20	V	88.77

Table 6-6. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 17 of 75	

Band 26 Radiated Spurious Measurements (continued)
§2.1053 §22.917(a) RSS-132(4.5.1)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 848.65 MHz
 MEASURED OUTPUT POWER: 20.82 dBm = 0.121 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 5 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.82 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1697.29	-36.37	2.18	-34.19	V	55.01
2545.94	-39.38	3.04	-36.34	V	57.16
3394.58	-79.94	5.76	-74.17	V	94.99
4243.23	-79.59	7.20	-72.39	V	93.21
5091.87	-78.72	8.00	-70.72	V	91.54
5940.52	-76.37	8.42	-67.95	V	88.77

Table 6-7. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 18 of 75	

6.5 Band 25 Radiated Spurious Emissions

§2.1053 §24.238(a) RSS-133(6.5.1)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 1855.00 MHz
 MEASURED OUTPUT POWER: 19.31 dBm = 0.085 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 32.31 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3710.00	-52.17	8.40	-43.77	H	63.08
5565.00	-42.34	10.63	-31.71	H	51.02
7420.00	-80.00	11.84	-68.16	H	87.47
9275.00	-79.36	13.29	-66.07	H	85.38
11130.00	-75.99	13.50	-62.49	H	81.80
12985.00	-72.44	13.68	-58.76	H	78.07

Table 6-8. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 19 of 75	

Band 25 Radiated Spurious Measurements (continued)
§2.1053 §24.238(a) RSS-133(6.5.1)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 1882.50 MHz
 MEASURED OUTPUT POWER: 19.68 dBm = 0.093 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.68 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3765.00	-52.61	8.44	-44.17	H	63.85
5647.50	-39.36	10.66	-28.70	H	48.38
7530.00	-79.89	11.94	-67.95	H	87.63
9412.50	-78.97	13.23	-65.74	H	85.41
11295.00	-75.76	13.48	-62.28	H	81.95
13177.50	-72.05	13.84	-58.21	H	77.88

Table 6-9. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 20 of 75	

Band 25 Radiated Spurious Measurements (continued)
§2.1053 §24.238(a) RSS-133(6.5.1)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 1910.00 MHz
 MEASURED OUTPUT POWER: 17.333 dBm = 0.054 W
 MODULATION SIGNAL: QPSK
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 30.33 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3811.28	-45.78	8.57	-37.21	H	54.54
5716.92	-39.28	10.69	-28.59	H	45.92
7622.56	-79.89	12.07	-67.82	H	85.15
9528.20	-78.69	13.20	-65.49	H	82.82
11433.84	-75.69	13.42	-62.28	H	79.61
13339.48	-72.55	14.04	-58.51	H	75.84

Table 6-10. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 21 of 75	

6.6 Band 41 Radiated Spurious Emissions

§2.1053 §27.53(m)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 2501.00 MHz
 MEASURED OUTPUT POWER: 20.57 dBm = 0.114 W
 MODULATION SIGNAL: 16QAM
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.57 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
4992.91	-26.81	10.10	-16.70	V	36.01
7489.37	-50.85	11.91	-38.94	V	58.25
9985.82	-43.86	13.19	-30.67	V	49.98
12482.28	-43.87	13.40	-30.48	V	49.78
14978.73	-70.44	14.09	-56.35	V	75.66
17475.19	-66.36	13.99	-52.37	V	71.68

Table 6-11. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 22 of 75	

Band 41 Radiated Spurious Measurements (continued)
§2.1053 §27.53(m)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 2593.00 MHz
 MEASURED OUTPUT POWER: 25.14 dBm = 0.326 W
 MODULATION SIGNAL: 16QAM
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 38.14 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
5186.00	-46.51	10.24	-36.27	V	55.94
7779.00	-51.43	12.22	-39.22	V	58.89
10372.00	-77.02	13.09	-63.93	V	83.60
12965.00	-72.58	13.62	-58.96	V	78.64
15558.00	-66.94	13.88	-53.06	V	72.73
18151.00	-66.36	14.51	-51.86	V	71.53

Table 6-12. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 23 of 75	

Band 41 Radiated Spurious Measurements (continued)
§2.1053 §27.53(m)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 2685.00 MHz
 MEASURED OUTPUT POWER: 17.41 dBm = 0.055 W
 MODULATION SIGNAL: 16QAM
 BANDWIDTH: 10 MHz
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 30.41 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
5361.09	-39.77	10.44	-29.33	V	46.74
8041.64	-46.00	12.49	-33.51	V	50.92
10722.18	-49.07	13.20	-35.87	V	53.28
13402.73	-72.82	14.11	-58.72	V	76.13
16083.27	-63.89	13.63	-50.26	V	67.67
18763.82	-67.08	15.53	-51.55	V	68.96

Table 6-13. Radiated Spurious Data

NOTES:

1. This device was tested under all bandwidths, and RB configurations, and modulations. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with full RBs for Band 26 and 1RB for Band 25 and 41.
2. This unit was tested with its standard battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The "H" positioning is defined with the EUT lying flat on the test surface, the "H2" positioning is defined with the EUT standing up on its side, and the "V" positioning is defined with the EUT standing upright. The worst case test configuration was found with the EUT in the [V] positioning for Band 26 and 41; [H] positioning for Band 25. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 24 of 75	

6.7 Band 26 Frequency Stability Measurements

§2.1055 §22.355 RSS-132(4.3)



OPERATING FREQUENCY: 836,500,000 Hz
 CHANNEL: 20525
 REFERENCE VOLTAGE: 3.8 VDC
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (° C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	836,499,982	-18	-0.0000021
100 %		- 30	836,499,997	-3	-0.0000004
100 %		- 20	836,499,998	-2	-0.0000002
100 %		- 10	836,499,981	-19	-0.0000022
100 %		0	836,499,993	-7	-0.0000008
100 %		+ 10	836,499,990	-10	-0.0000011
100 %		+ 20	836,499,988	-12	-0.0000014
100 %		+ 30	836,499,995	-5	-0.0000006
100 %		+ 40	836,499,988	-12	-0.0000014
100 %		+ 50	836,499,996	-4	-0.0000005
115 %		4.37	+ 20	836,499,992	-8
BATT. ENDPOINT	3.40	+ 20	836,499,981	-19	-0.0000023

Table 6-14. Frequency Stability Data (Band 26)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 25 of 75	

Band 26 Frequency Stability Measurements (Cont'd)
§2.1055 §22.355 RSS-132(4.3)

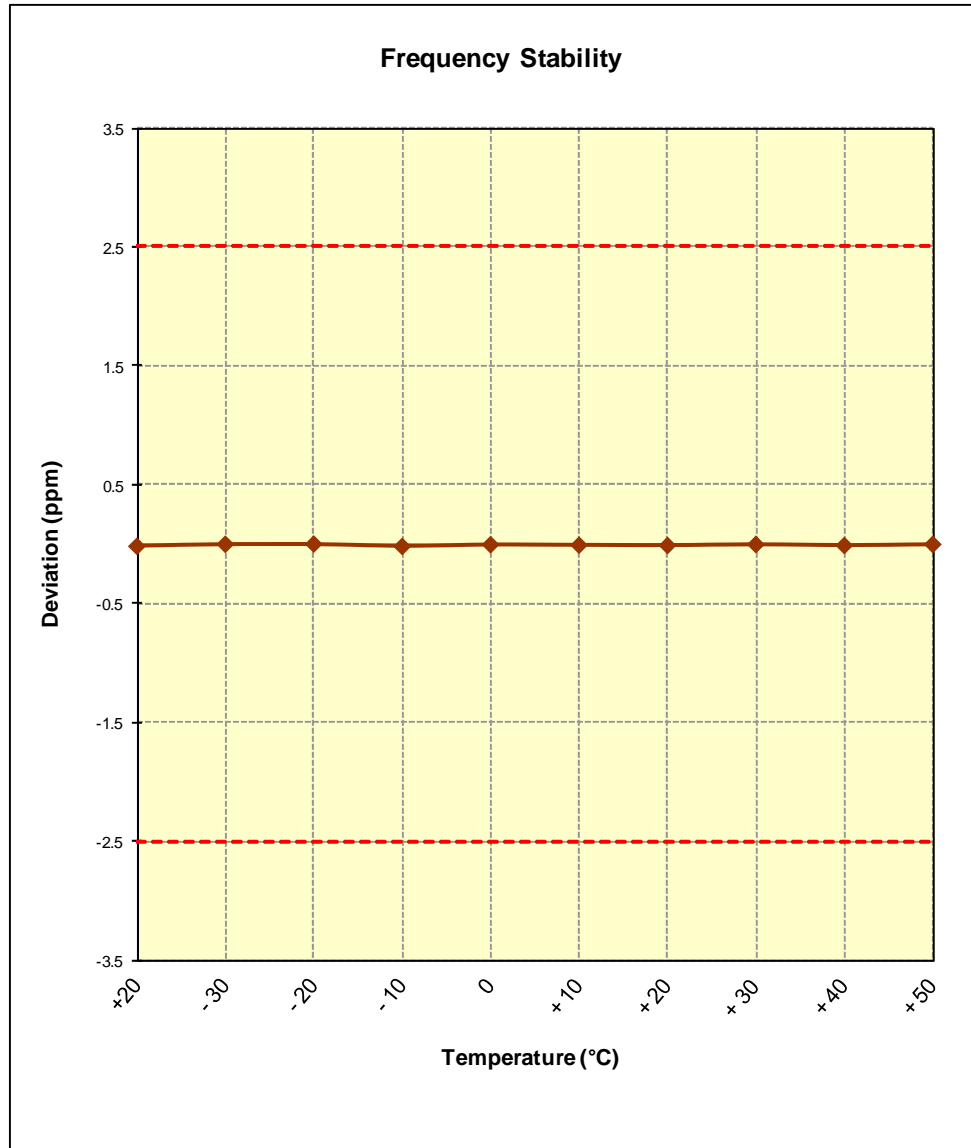




Figure 6-1. Frequency Stability Graph (Band 26)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 26 of 75	

6.8 Band 25 Frequency Stability Measurements

§2.1055 §24.235 RSS-133(6.3)

OPERATING FREQUENCY: 1,882,500,000 Hz

CHANNEL: 26365



REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (° C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,882,499,997	-3	-0.0000001
100 %		- 30	1,882,499,988	-12	-0.0000006
100 %		- 20	1,882,499,997	-3	-0.0000002
100 %		- 10	1,882,499,989	-11	-0.0000006
100 %		0	1,882,499,983	-17	-0.0000009
100 %		+ 10	1,882,499,990	-10	-0.0000005
100 %		+ 20	1,882,499,983	-17	-0.0000009
100 %		+ 30	1,882,499,985	-15	-0.0000008
100 %		+ 40	1,882,499,996	-4	-0.0000002
100 %		+ 50	1,882,499,988	-12	-0.0000006
115 %	4.37	+ 20	1,882,499,995	-5	-0.0000003
BATT. ENDPOINT	3.40	+ 20	1,882,499,996	-4	-0.0000002

Table 6-15. Frequency Stability Data (Band 25)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 27 of 75	

Band 25 Frequency Stability Measurements (Cont'd)
§2.1055 §24.235 RSS-133(6.3)

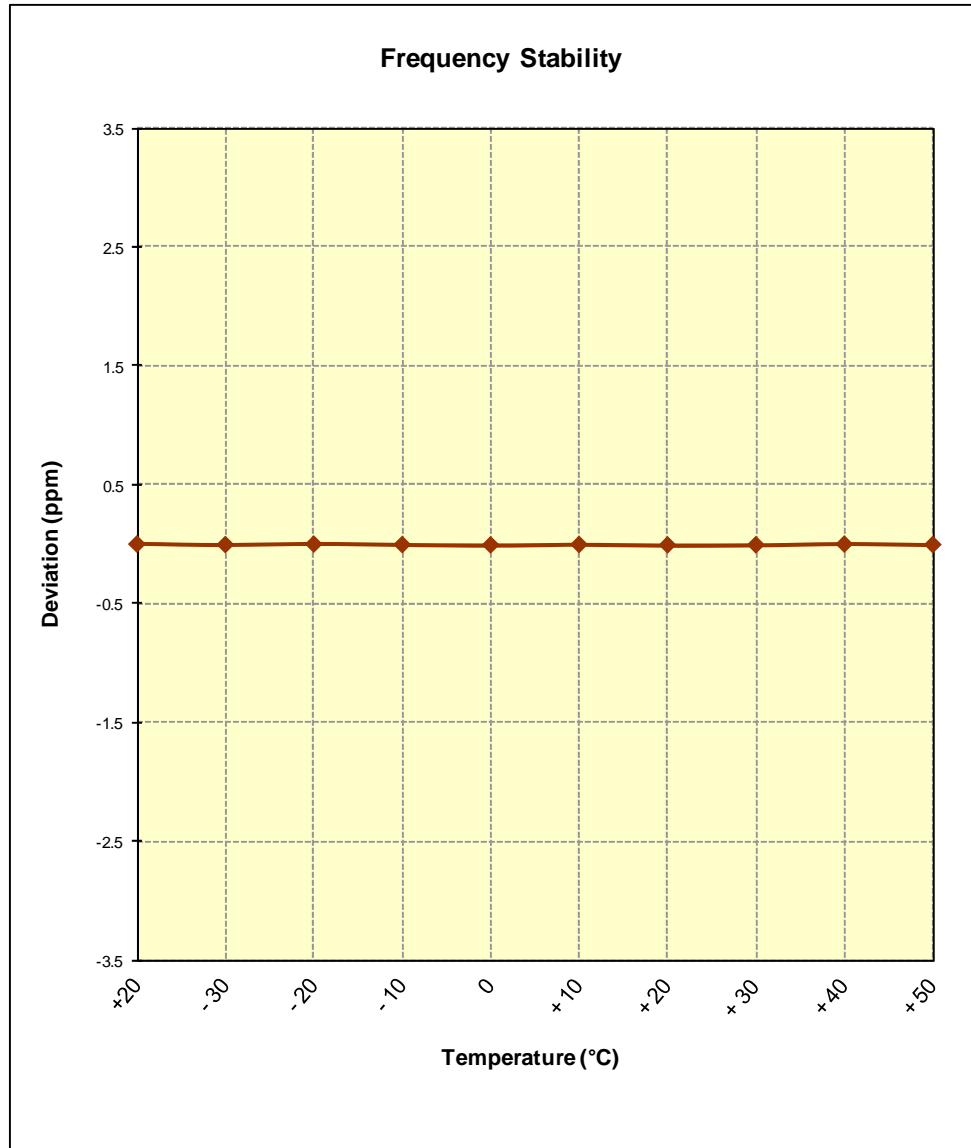




Figure 6-2. Frequency Stability Graph (Band 25)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 28 of 75	

6.9 Band 41 Frequency Stability Measurements

§2.1055 §27.5(i) §27.54

OPERATING FREQUENCY: 2,593,000,000 Hz

CHANNEL: 40590



REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (° C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	2,592,999,993	-7	-0.0000003
100 %		- 30	2,592,999,987	-13	-0.0000005
100 %		- 20	2,592,999,996	-4	-0.0000002
100 %		- 10	2,592,999,982	-18	-0.0000007
100 %		0	2,592,999,994	-6	-0.0000002
100 %		+ 10	2,592,999,981	-19	-0.0000007
100 %		+ 20	2,592,999,995	-5	-0.0000002
100 %		+ 30	2,592,999,990	-10	-0.0000004
100 %		+ 40	2,592,999,981	-19	-0.0000007
100 %		+ 50	2,592,999,983	-17	-0.0000006
115 %		4.37	+ 20	2,592,999,994	-6
BATT. ENDPOINT	3.40	+ 20	2,592,999,995	-5	-0.0000002

Table 6-16. Frequency Stability Data (Band 41)

Note:

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 29 of 75	

Band 41 Frequency Stability Measurements (Cont'd)
§2.1055 §27.5(i) §27.54

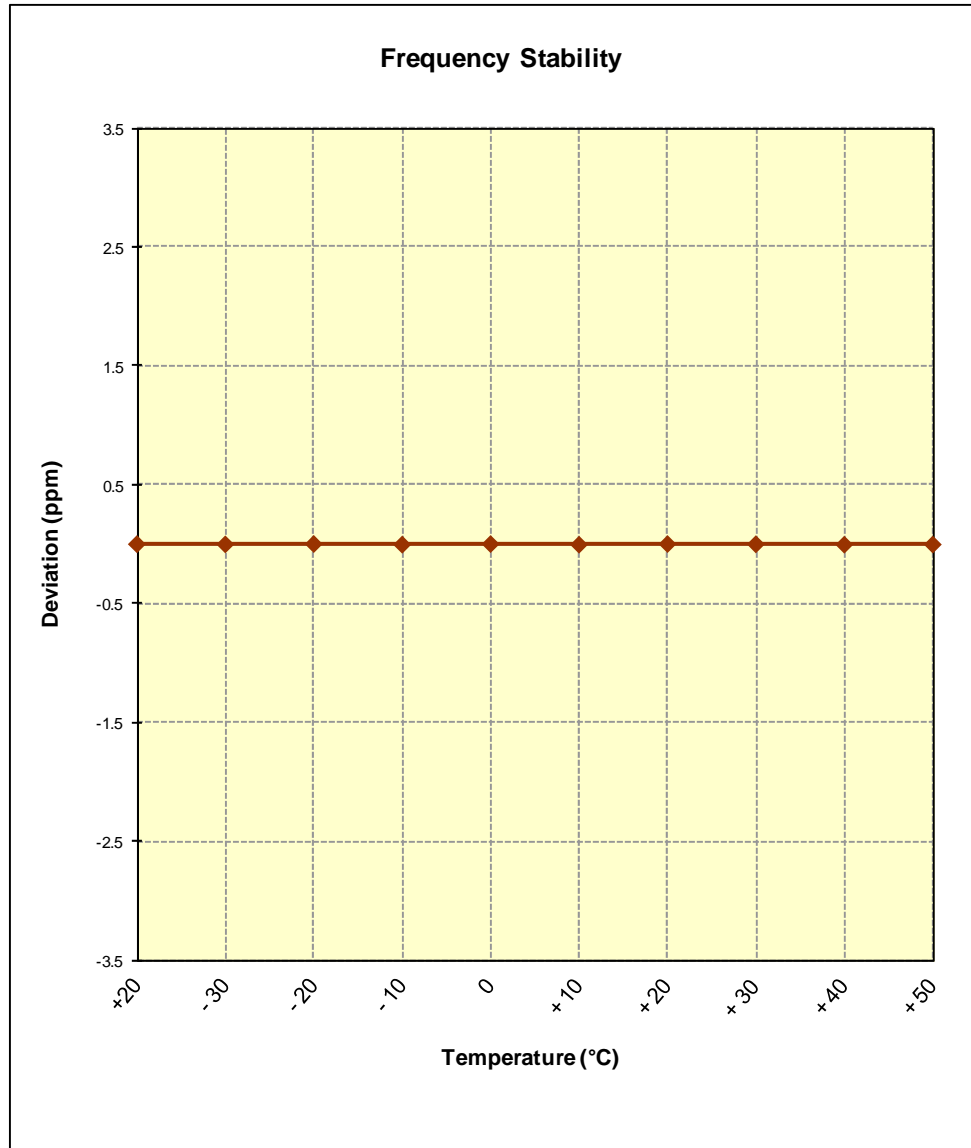


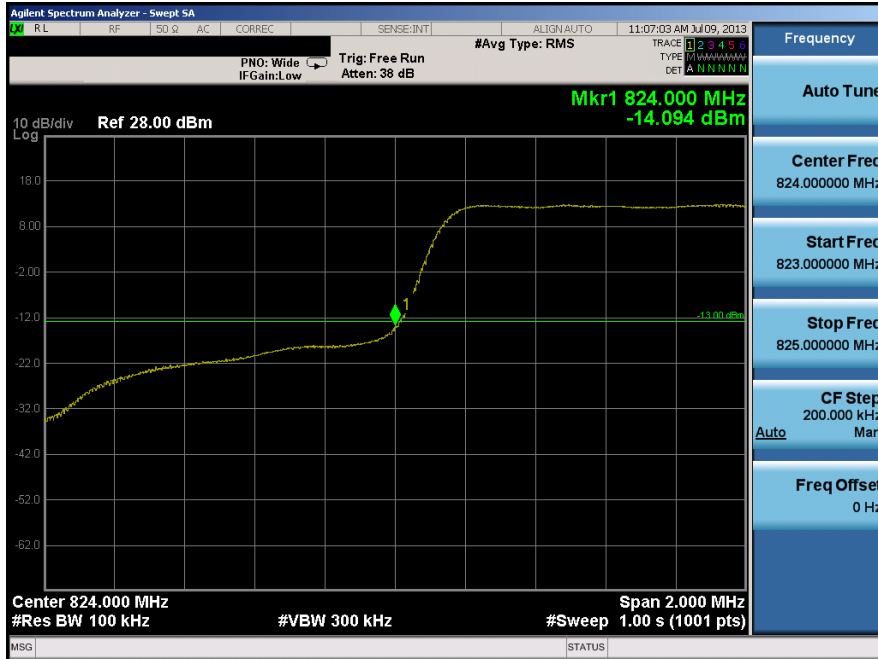


Figure 6-3. Frequency Stability Graph (Band 41)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 30 of 75	

7.0 BAND 26 PLOTS OF EMISSIONS

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

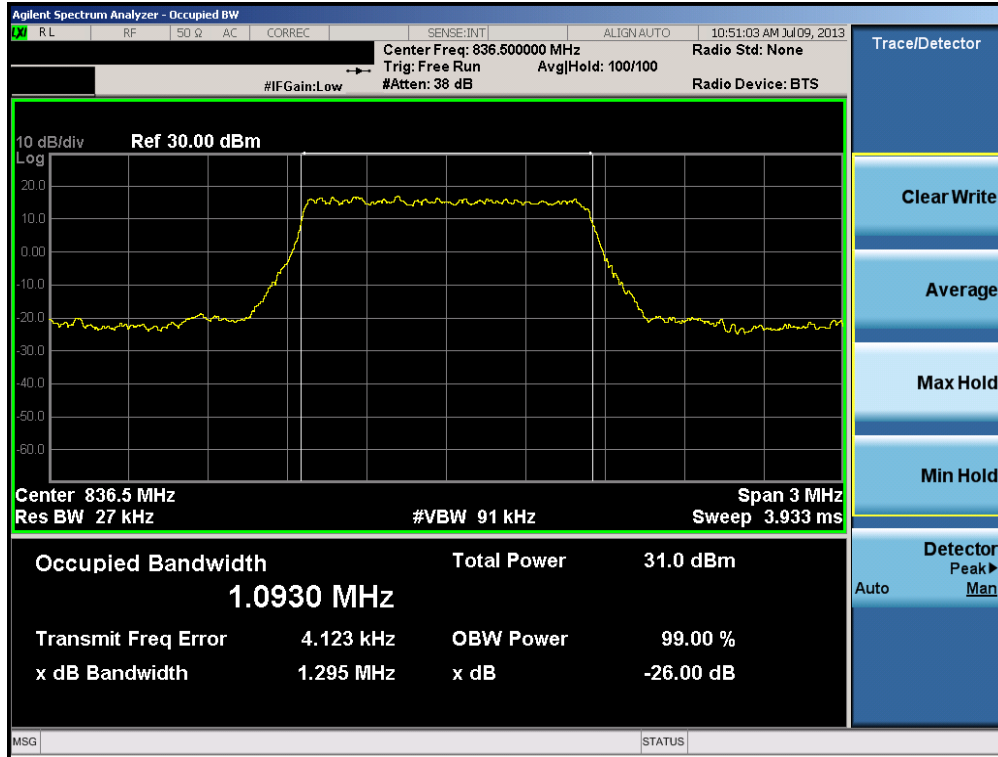


Plot 7-1. Lower Band Edge Plot (1.4MHz QPSK – RB Size 6)

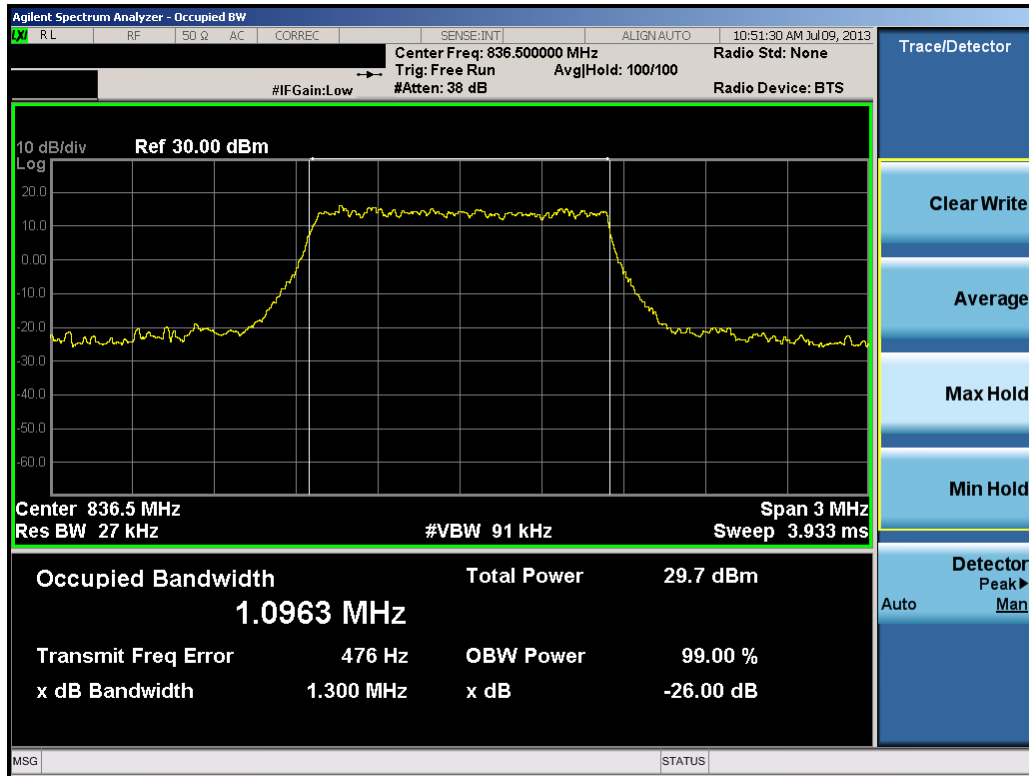


Plot 7-2. Lower Extended Band Edge Plot (1.4MHz QPSK – RB Size 6)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 31 of 75

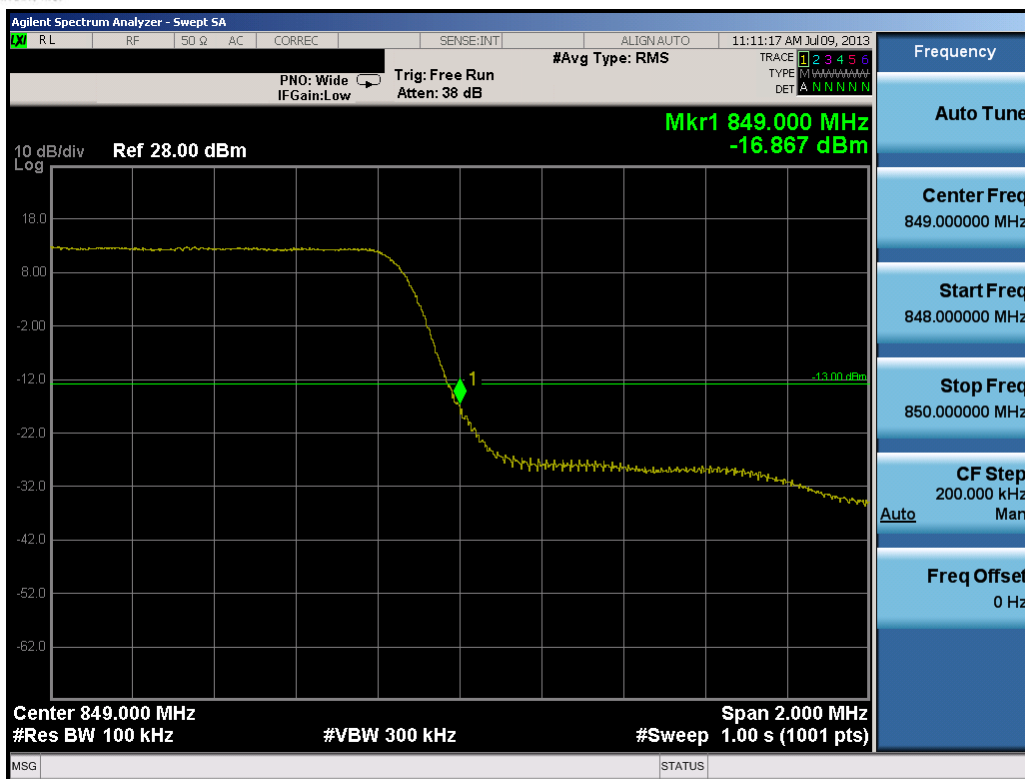


Plot 7-3. Occupied Bandwidth Plot (1.4MHz QPSK – RB Size 6)



Plot 7-4. Occupied Bandwidth Plot (1.4MHz 16-QAM – RB Size 6)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 32 of 75

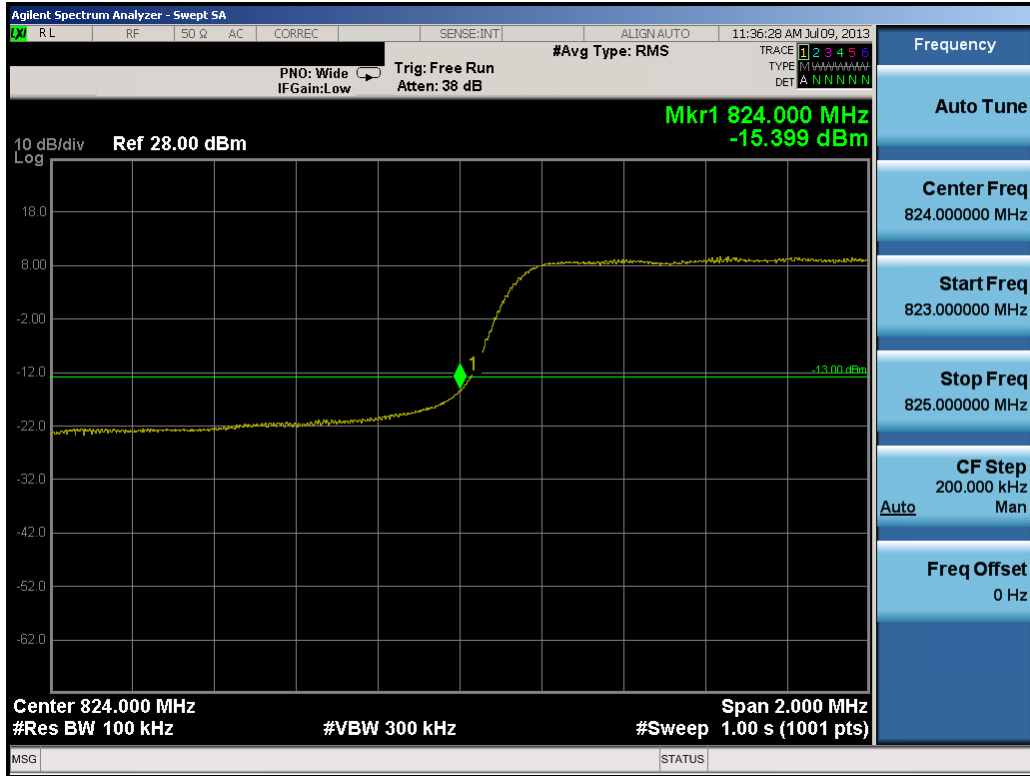


Plot 7-5. Upper Band Edge Plot (1.4MHz QPSK – RB Size 6)



Plot 7-6. Upper Extended Band Edge Plot (1.4MHz QPSK – RB Size 6)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 33 of 75

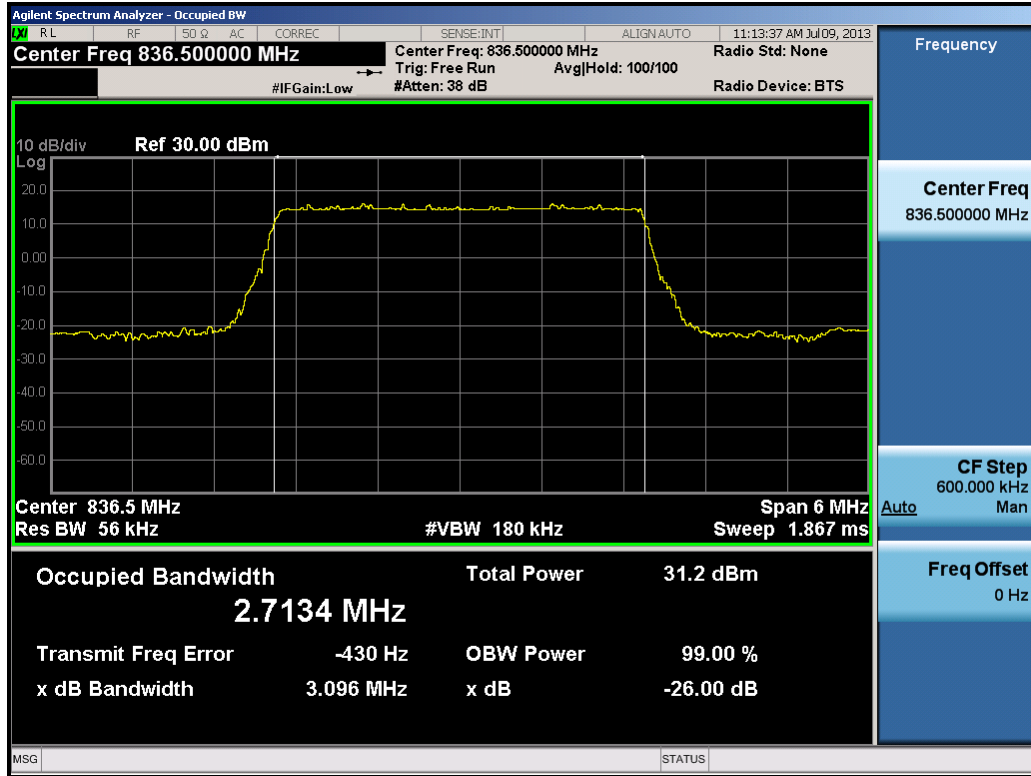


Plot 7-7. Lower Band Edge Plot (3.0MHz QPSK – RB Size 15)

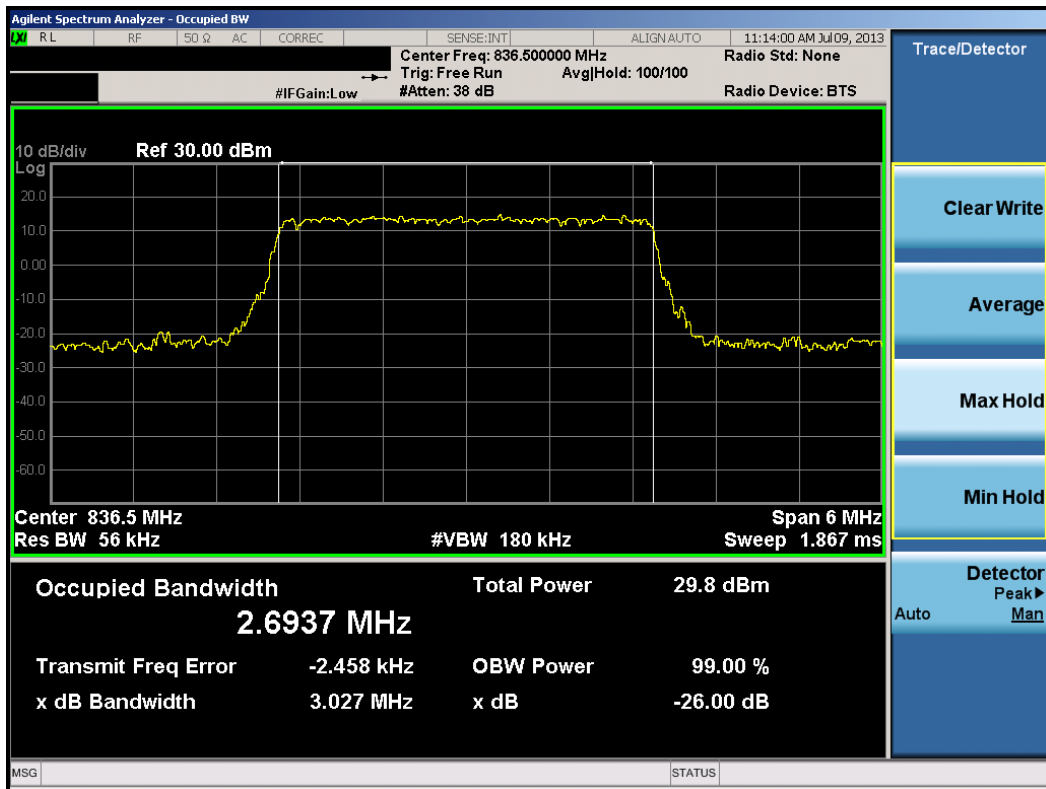


Plot 7-8. Lower Extended Band Edge Plot (3.0MHz QPSK – RB Size 15)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 34 of 75



Plot 7-9. Occupied Bandwidth Plot (3.0MHz QPSK – RB Size 15)



Plot 7-10. Occupied Bandwidth Plot (3.0MHz 16-QAM – RB Size 15)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 35 of 75



Plot 7-11. Upper Band Edge Plot (3.0MHz QPSK – RB Size 15)



Plot 7-12. Upper Extended Band Edge Plot (3.0MHz QPSK – RB Size 15)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 36 of 75

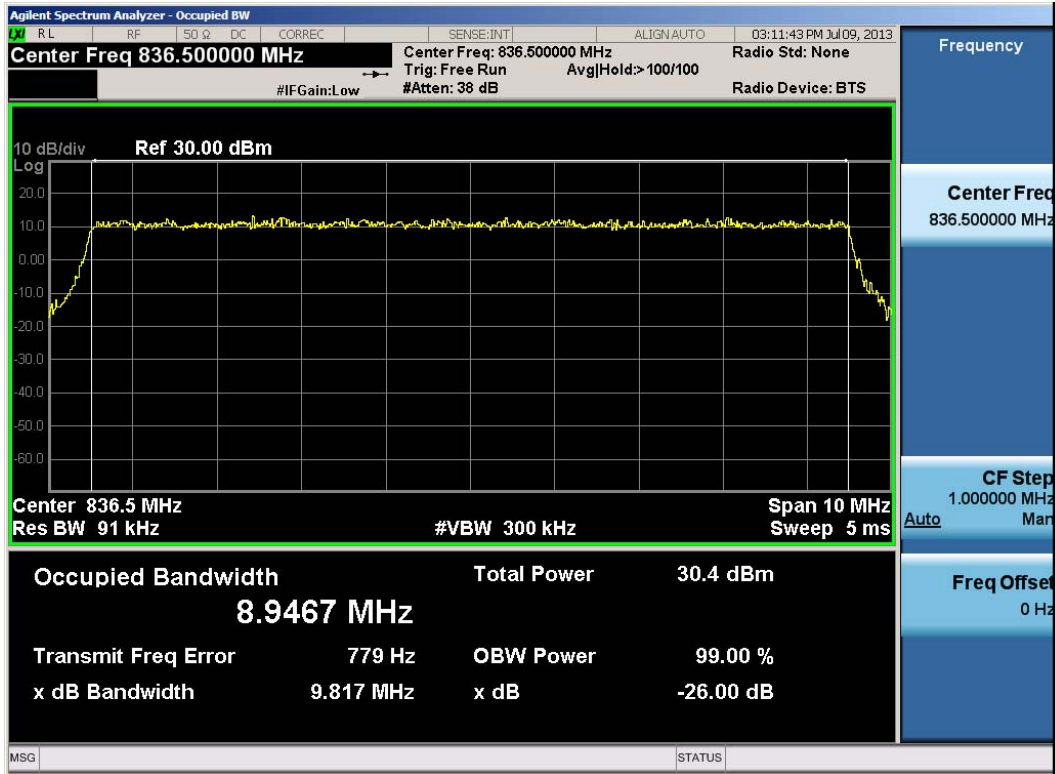


Plot 7-13. Lower Band Edge Plot (5.0MHz QPSK – RB Size 25)

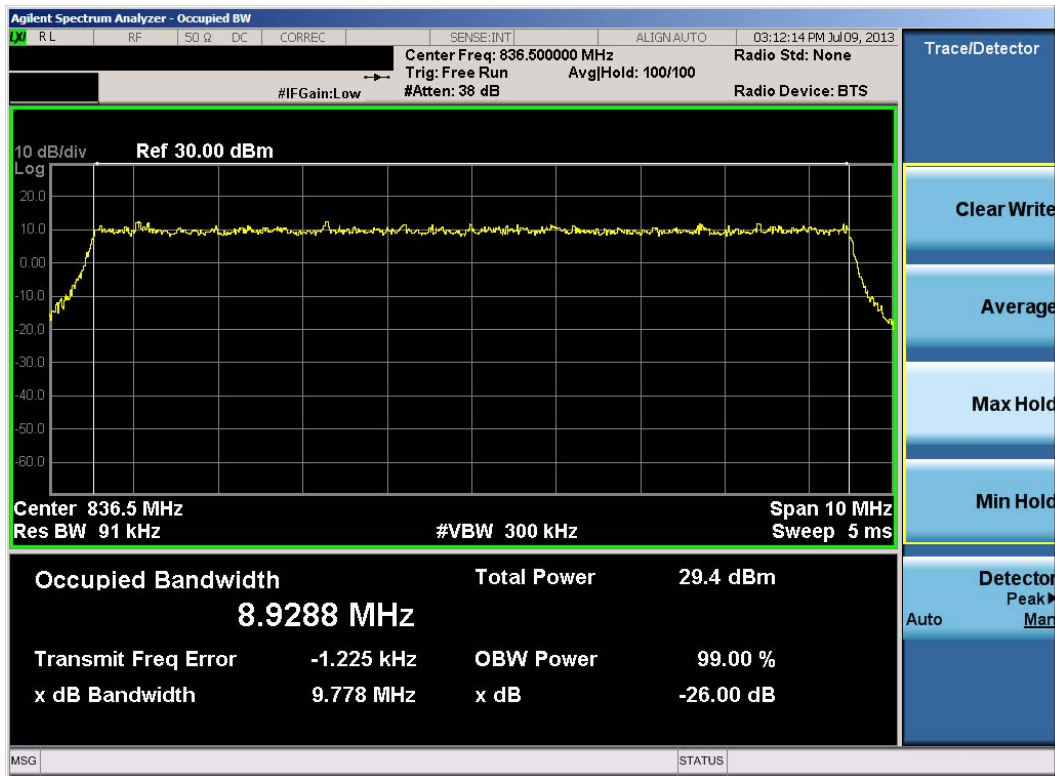


Plot 7-14. Lower Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 37 of 75

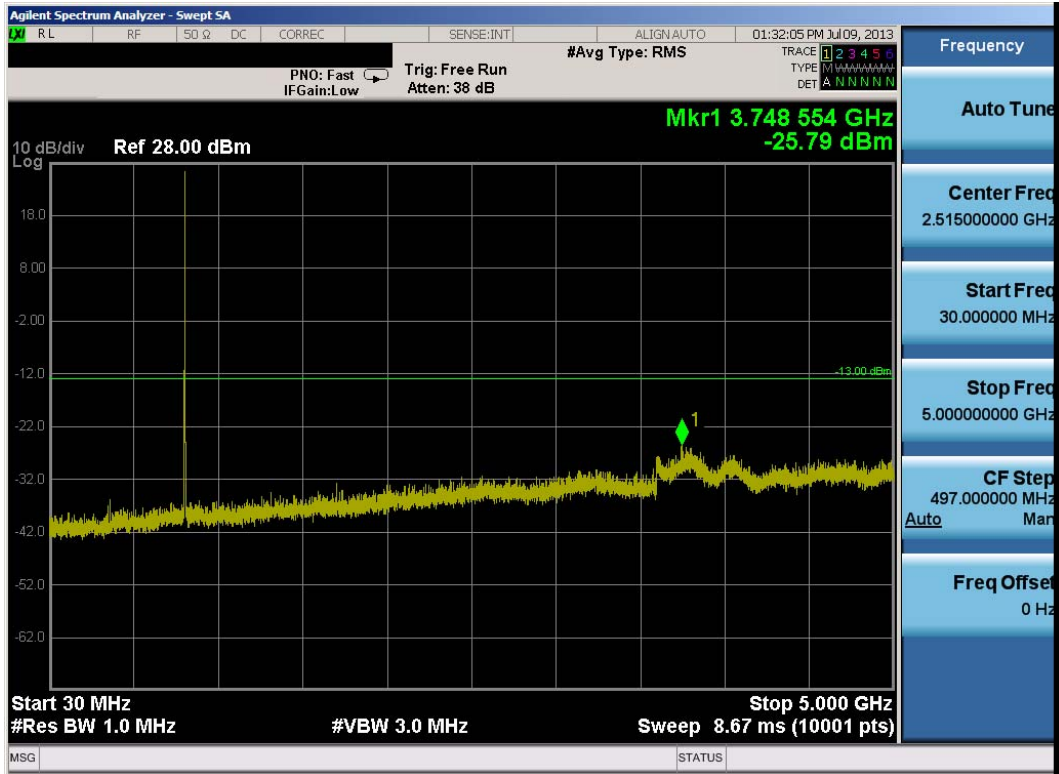


Plot 7-15. Occupied Bandwidth Plot (5.0MHz QPSK – RB Size 25)

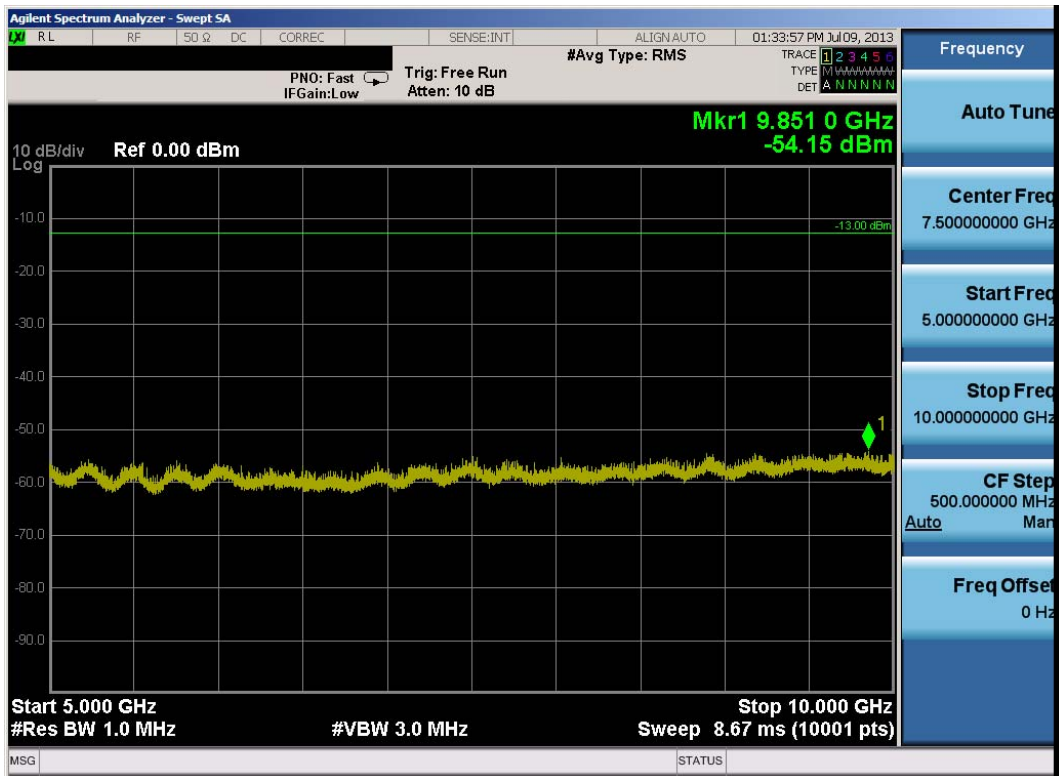


Plot 7-16. Occupied Bandwidth Plot (5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 38 of 75

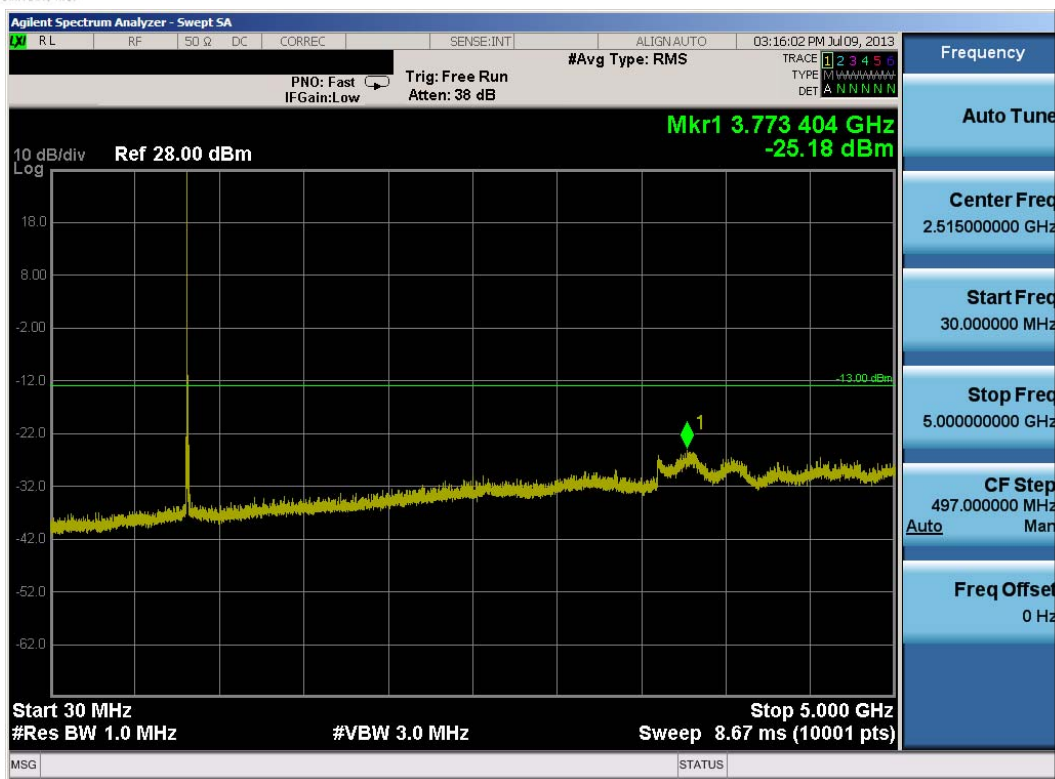


Plot 7-17. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)

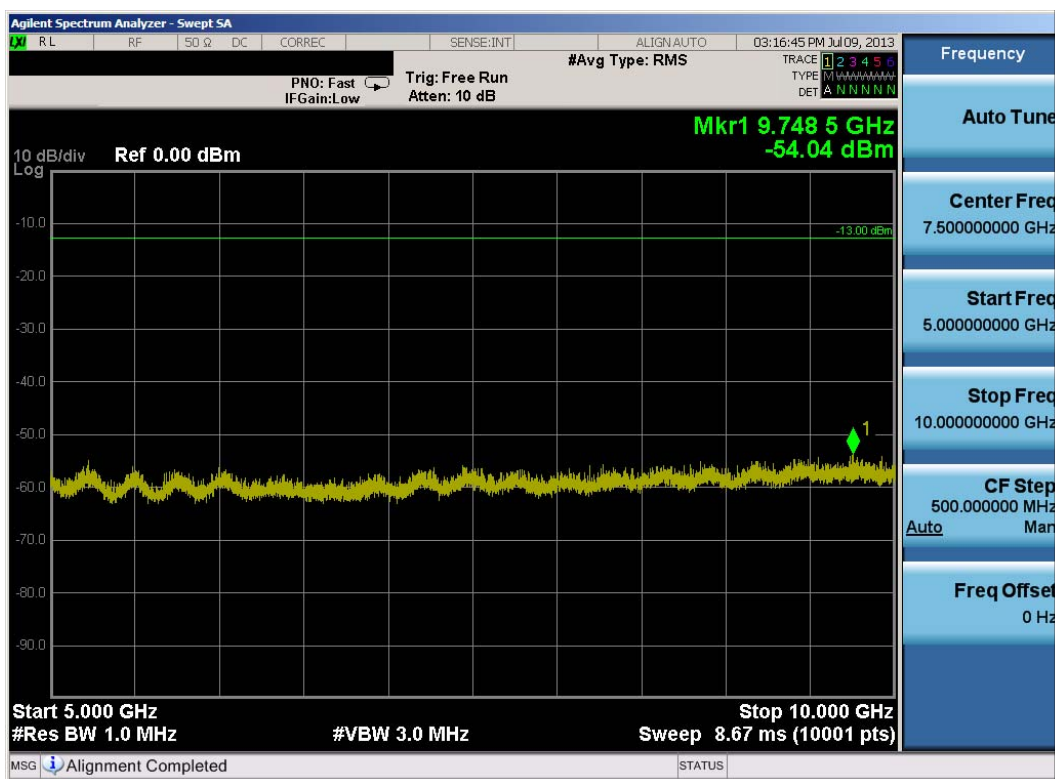


Plot 7-18. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Low Channel)



FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 39 of 75

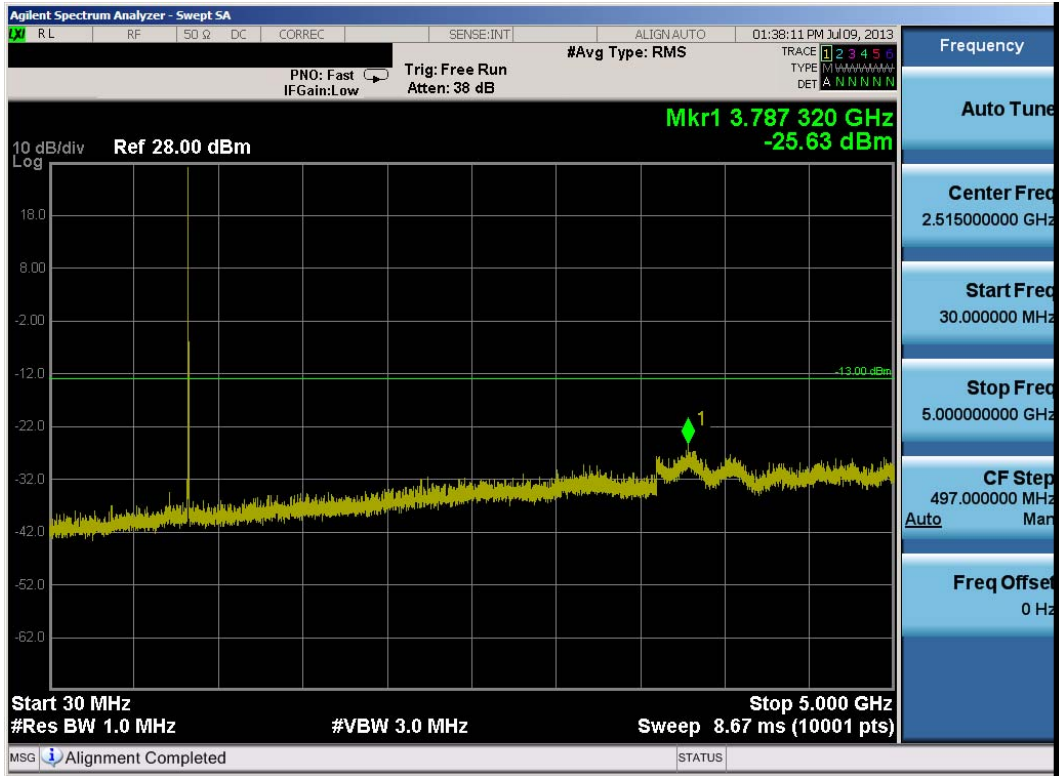


Plot 7-19. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

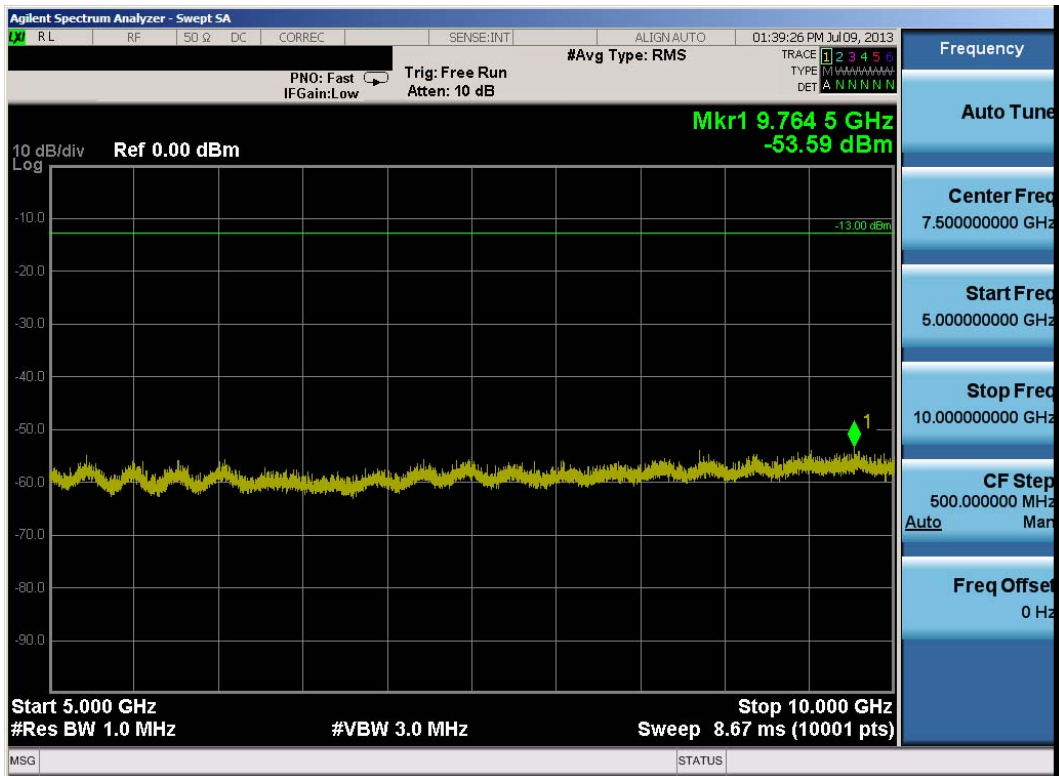


Plot 7-20. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – Mid Channel)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 40 of 75

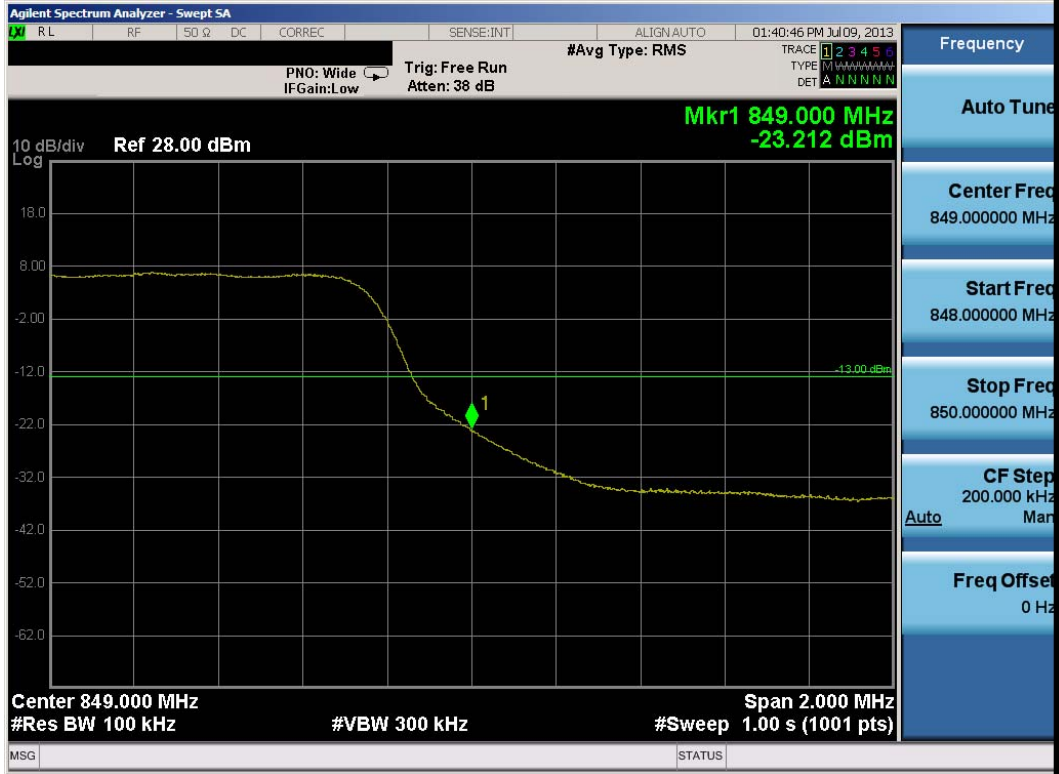


Plot 7-21. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)



Plot 7-22. Conducted Spurious Plot (5.0MHz QPSK – RB Size 1, RB Offset 0 – High Channel)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 41 of 75

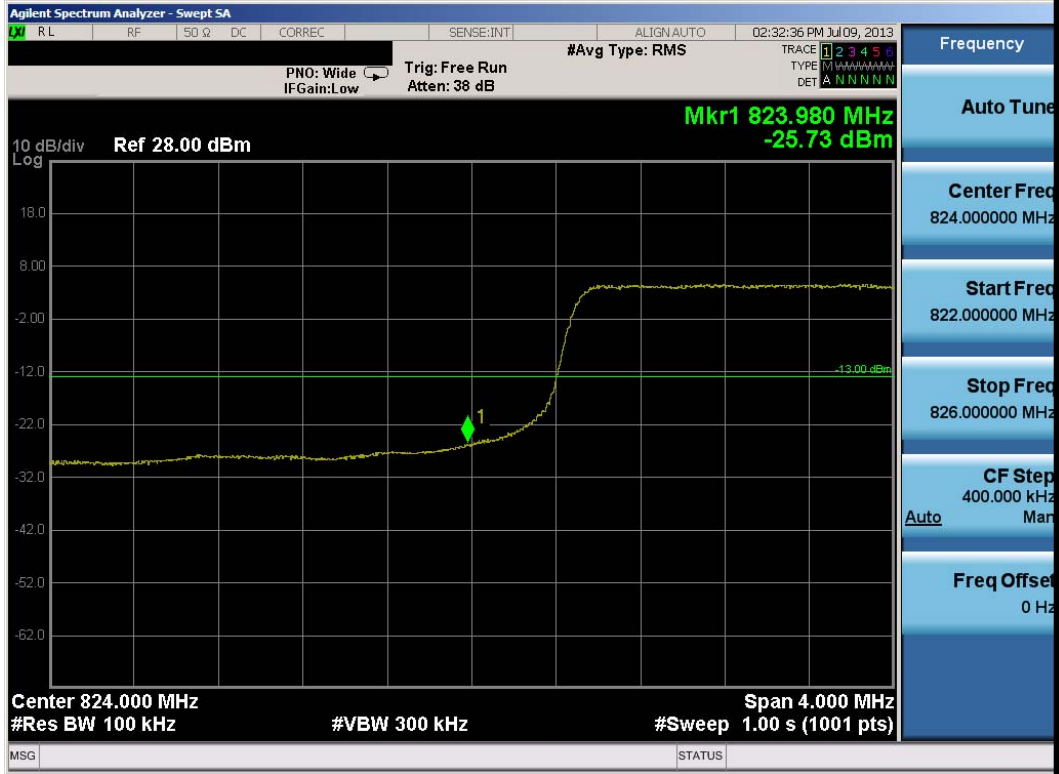


Plot 7-23. Upper Band Edge Plot (5.0MHz QPSK – RB Size 25)



Plot 7-24. Upper Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 42 of 75

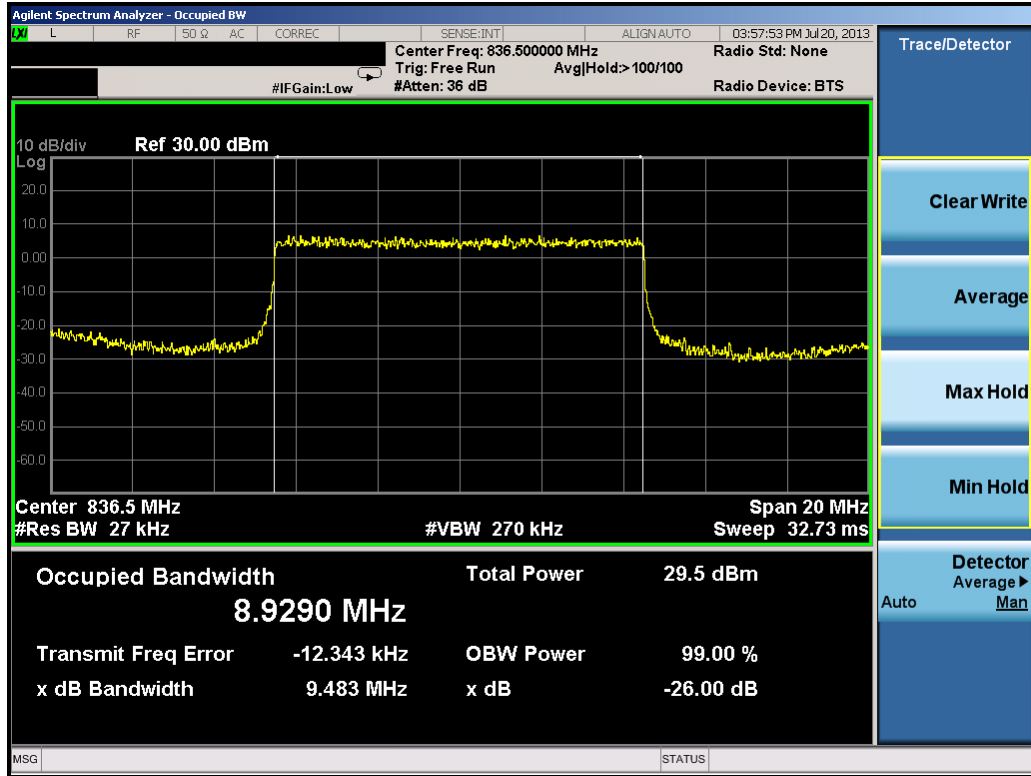


Plot 7-25. Lower Band Edge Plot (10.0MHz QPSK – RB Size 50)

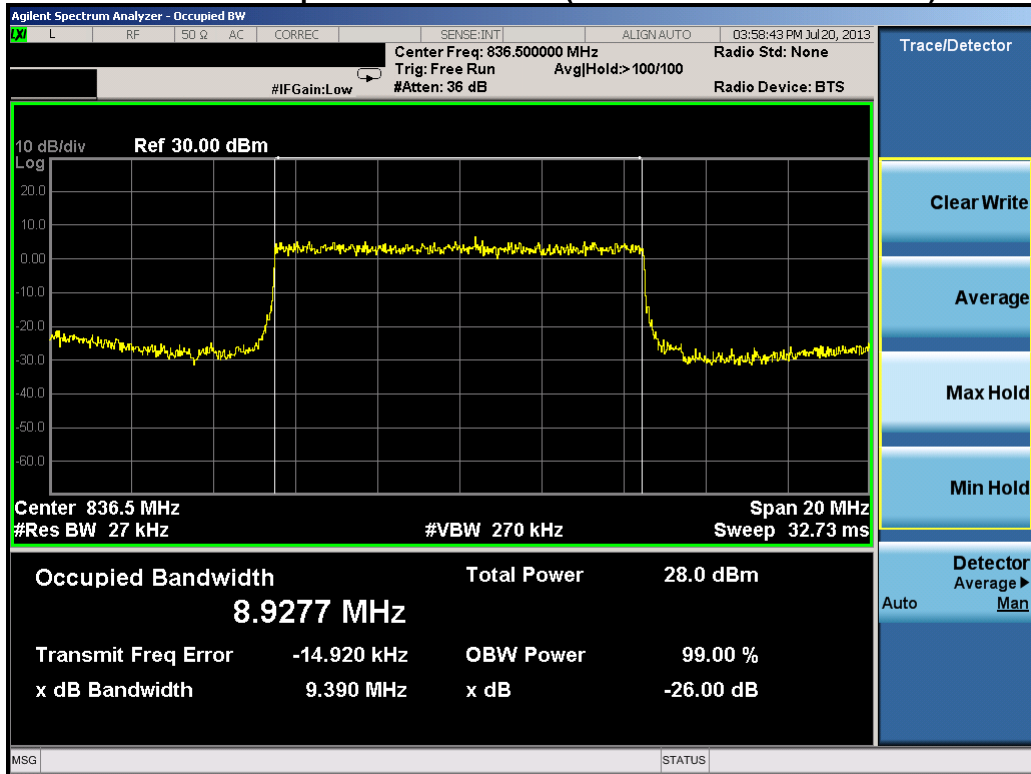


Plot 7-26. Lower Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 43 of 75

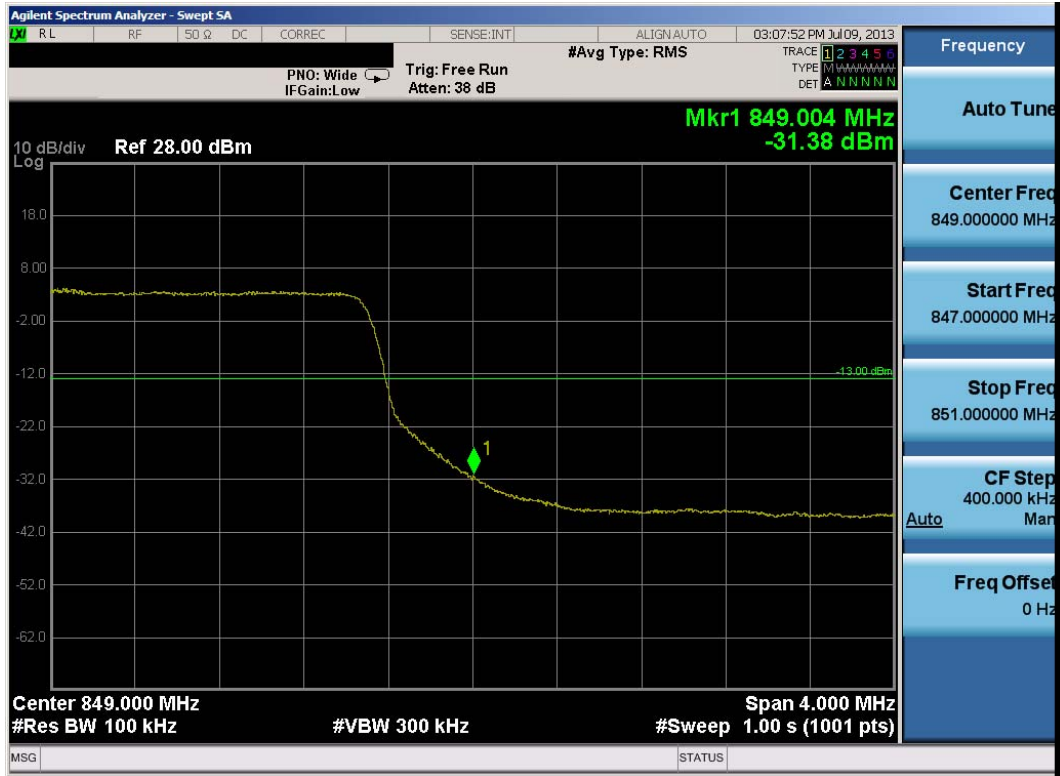


Plot 7-27. Occupied Bandwidth Plot (10.0MHz QPSK – RB Size 50)



Plot 7-28. Occupied Bandwidth Plot (10.0MHz 16-QAM – RB Size 50)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 44 of 75



Plot 7-29. Upper Band Edge Plot (10.0MHz QPSK – RB Size 50)

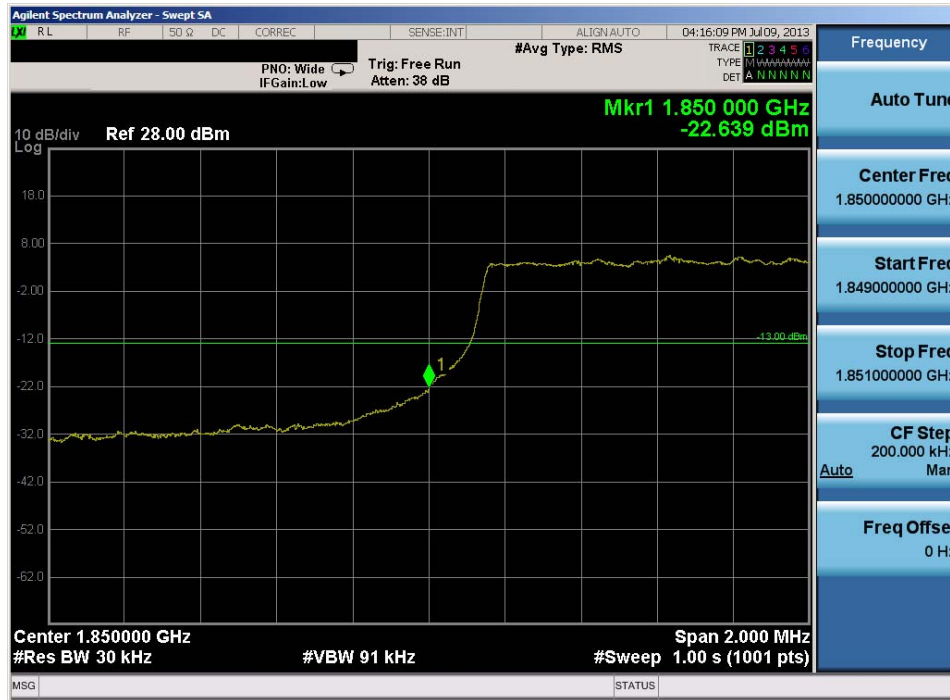


Plot 7-30. Upper Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)

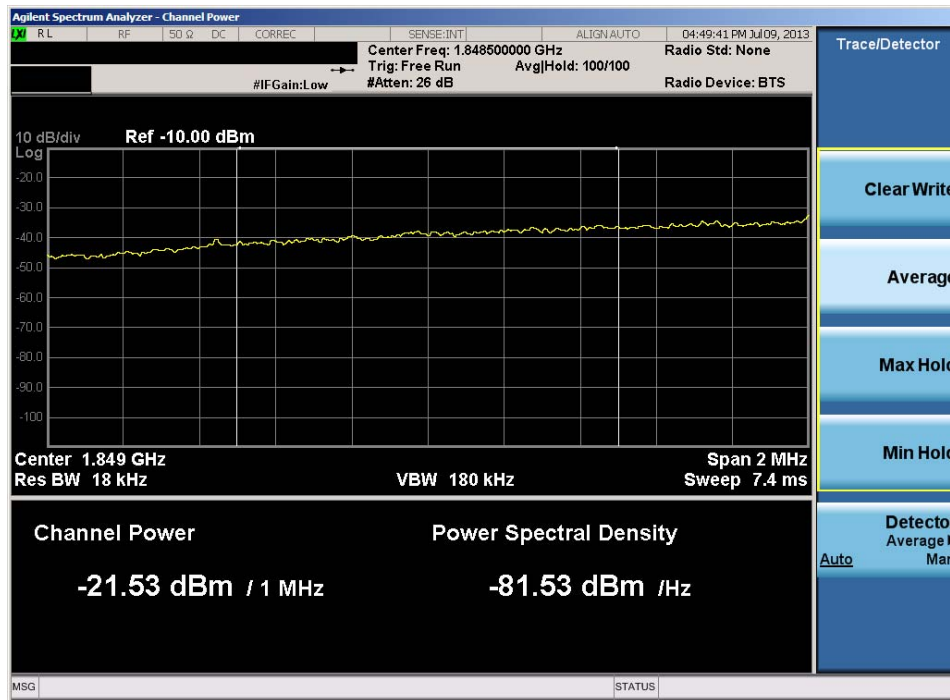
FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 45 of 75

8.0 BAND 25 PLOTS OF EMISSIONS

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



Plot 8-1. Lower Band Edge Plot (3.0MHz QPSK – RB Size 15)

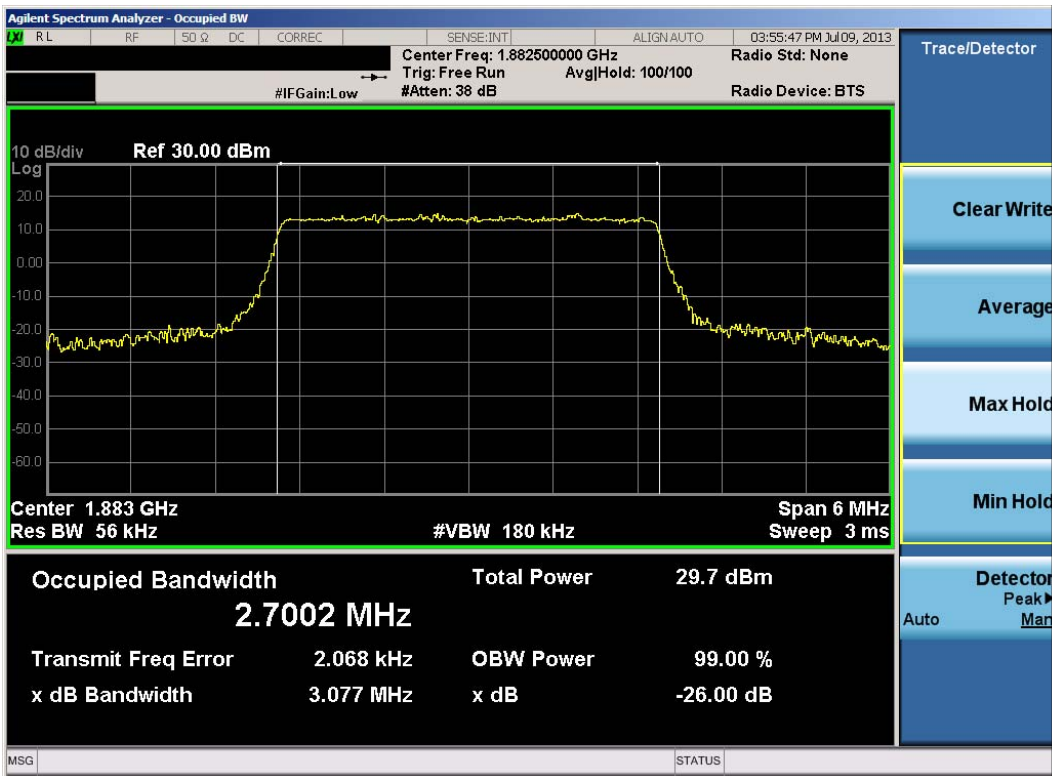


Plot 8-2. Lower Extended Band Edge Plot (3.0MHz QPSK – RB Size 15)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 46 of 75

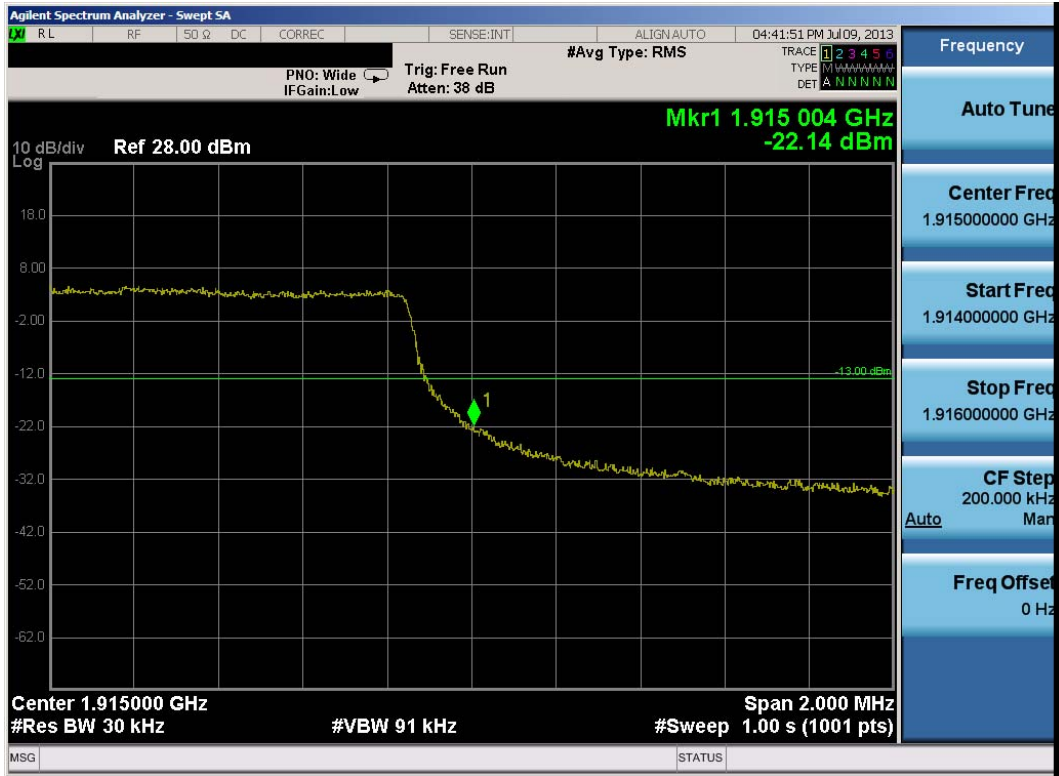


Plot 8-3. Occupied Bandwidth Plot (3.0MHz QPSK – RB Size 15)

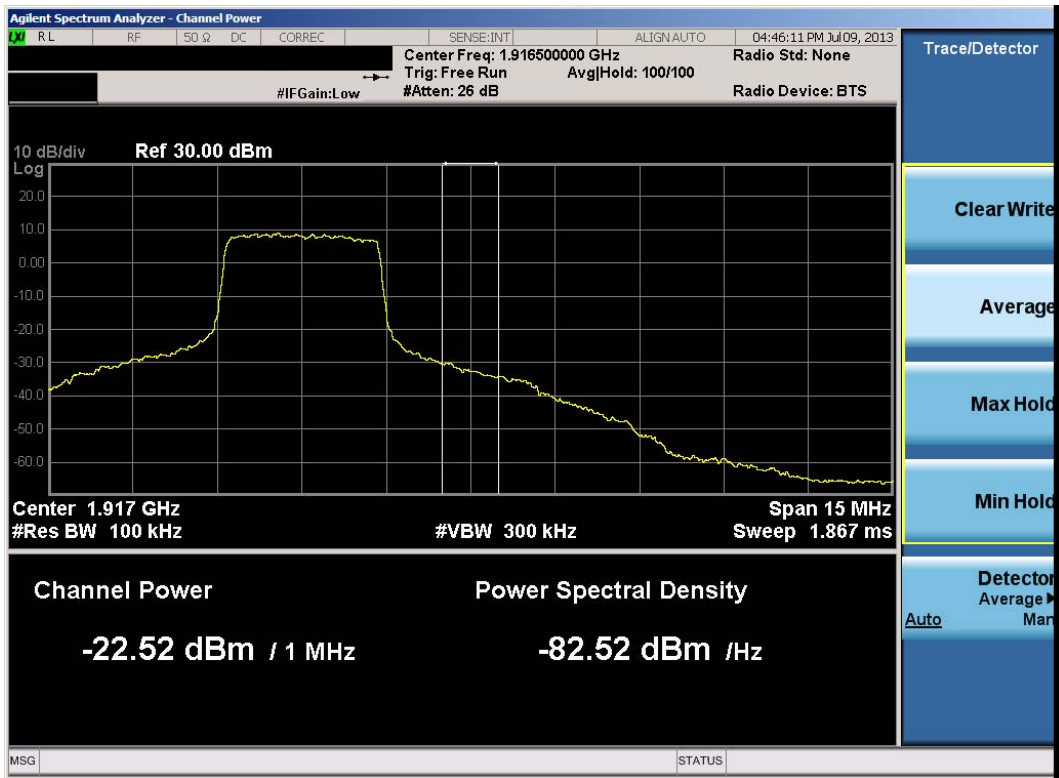


Plot 8-4. Occupied Bandwidth Plot (3.0MHz 16-QAM – RB Size 15)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 47 of 75

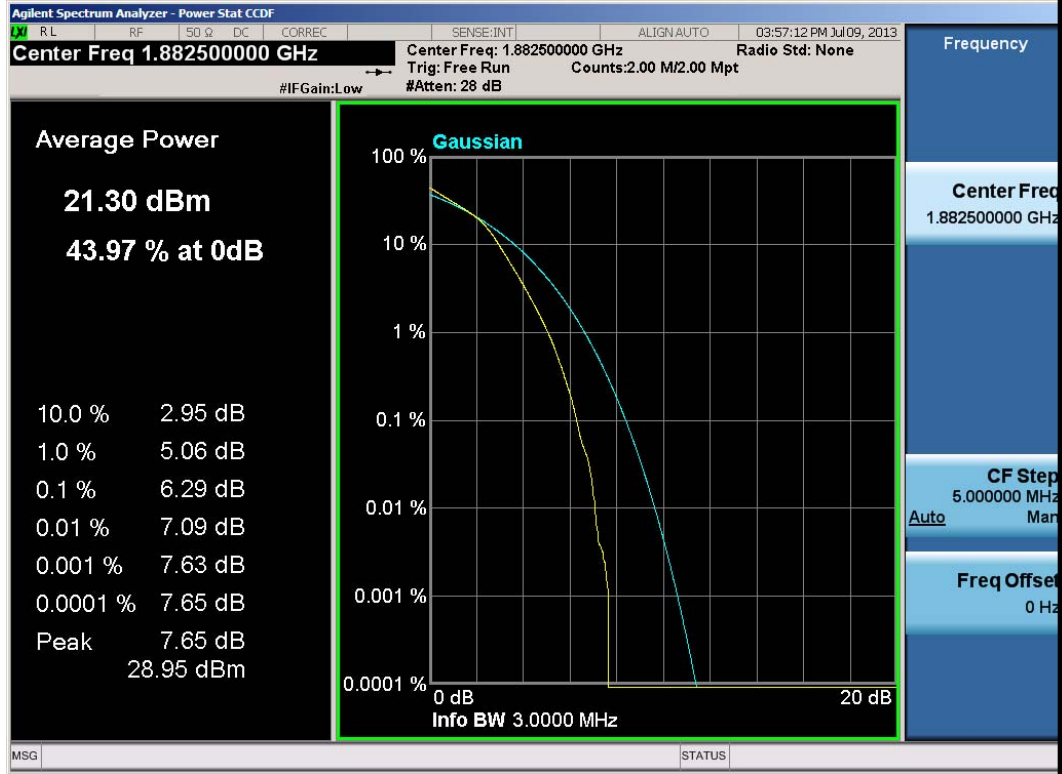


Plot 8-5. Upper Band Edge Plot (3.0MHz QPSK – RB Size 15)

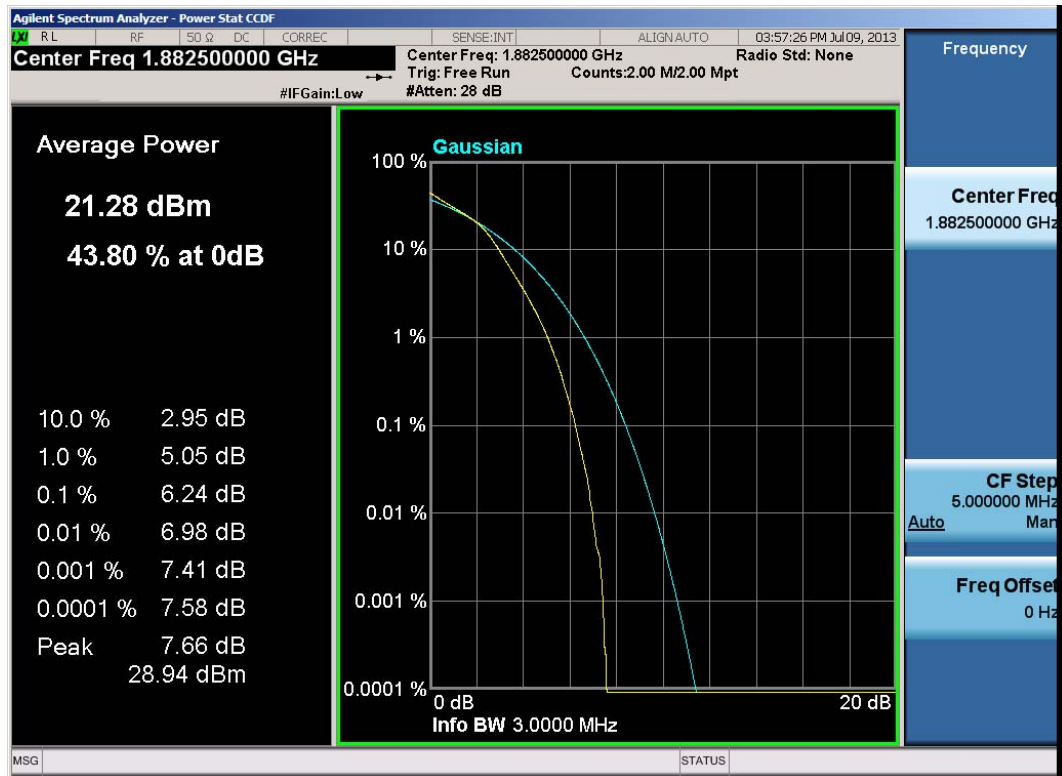


Plot 8-6. Upper Extended Band Edge Plot (3.0MHz QPSK – RB Size 15)

FCC ID: A3LSPHL520		FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 48 of 75



Plot 8-7. PAR Plot (3.0MHz QPSK – RB Size 15)

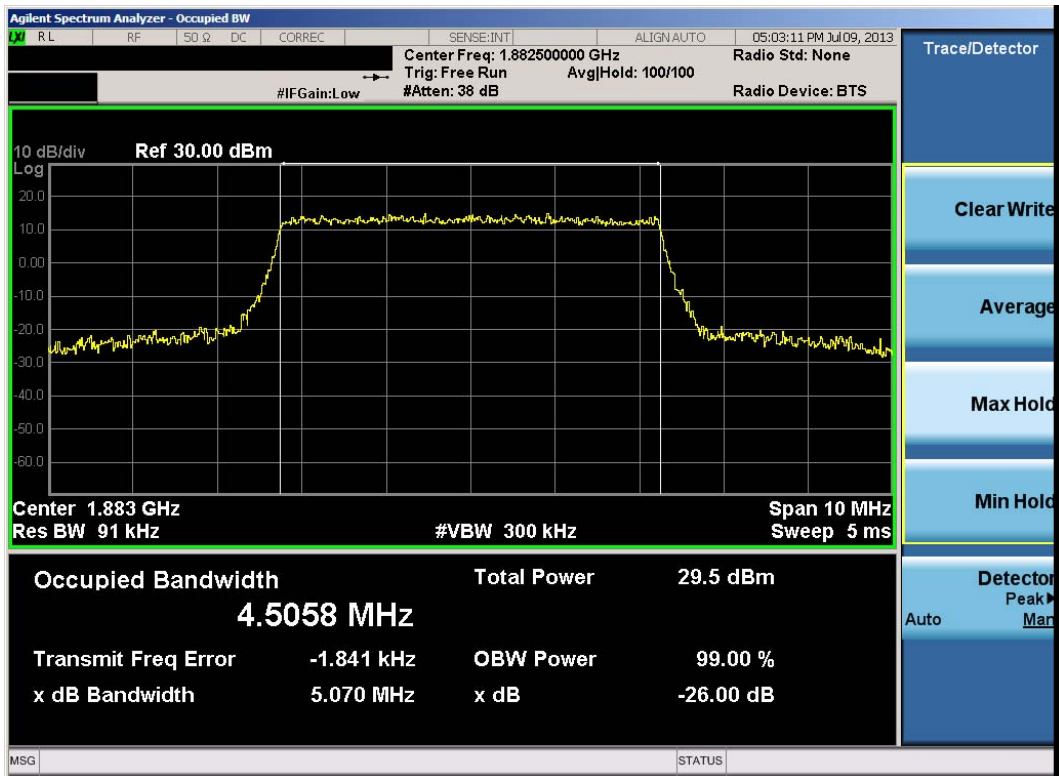


Plot 8-8. PAR Plot (3.0MHz 16-QAM – RB Size 15)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 49 of 75



Plot 8-11. Occupied Bandwidth Plot (5.0MHz QPSK – RB Size 25)

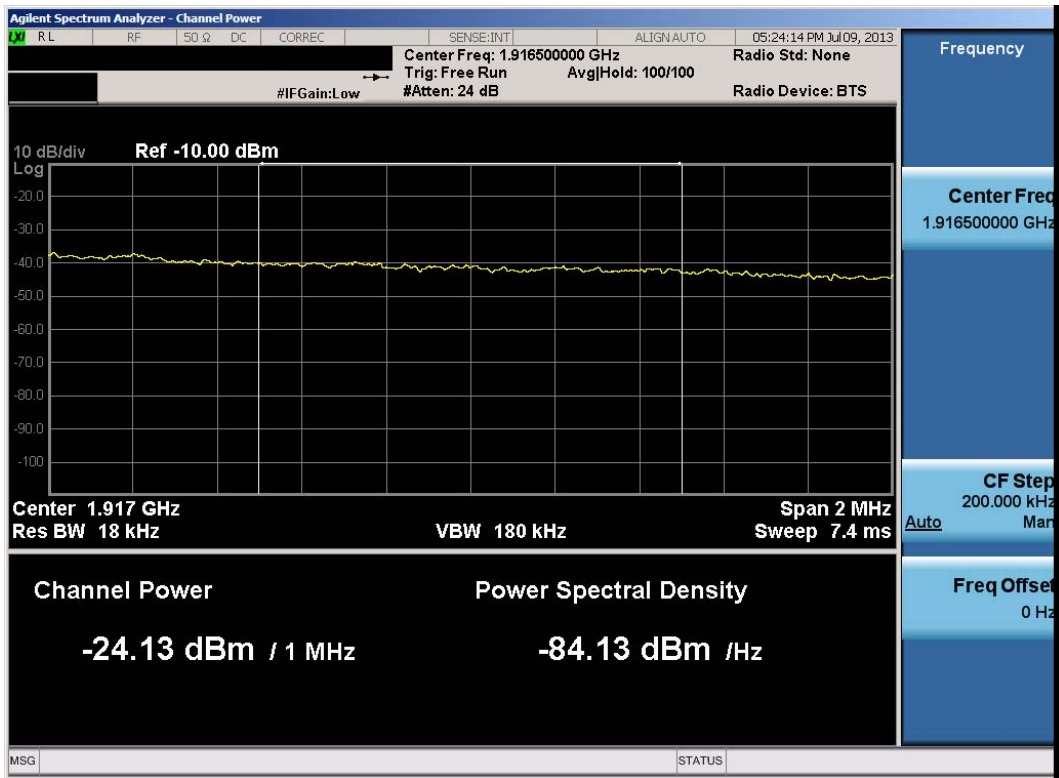


Plot 8-12. Occupied Bandwidth Plot (5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 51 of 75

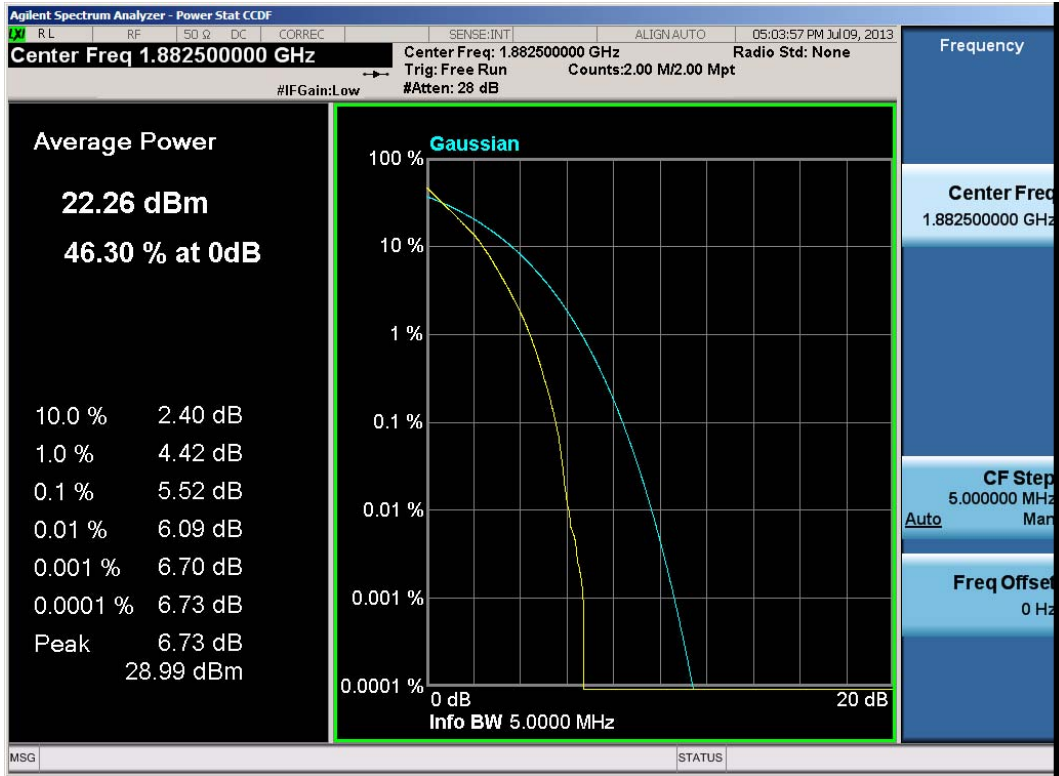


Plot 8-13. Upper Band Edge Plot (5.0MHz QPSK – RB Size 25)

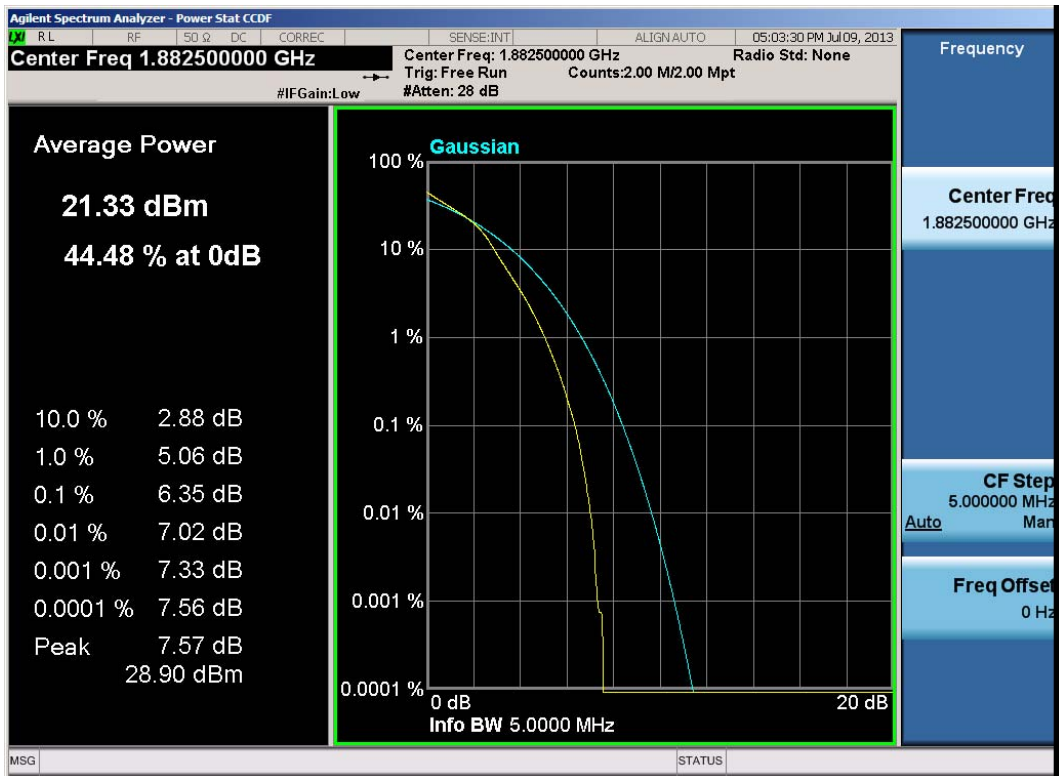


Plot 8-14. Upper Extended Band Edge Plot (5.0MHz QPSK – RB Size 25)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 52 of 75

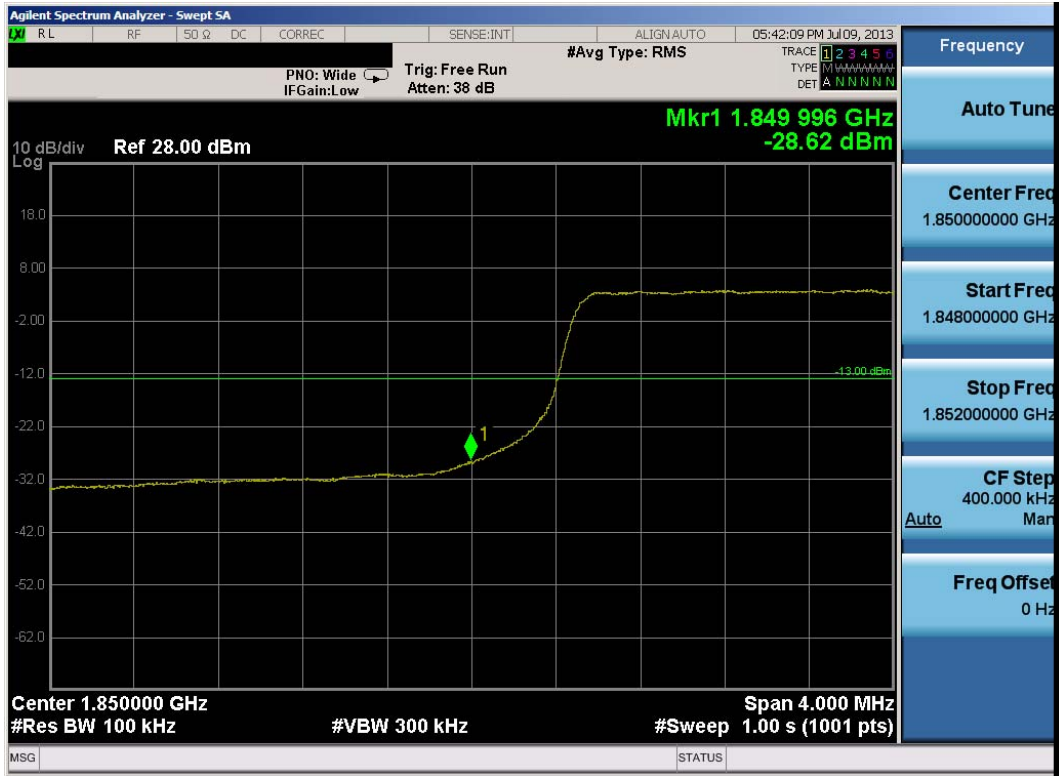


Plot 8-15. PAR Plot (5.0MHz QPSK – RB Size 25)

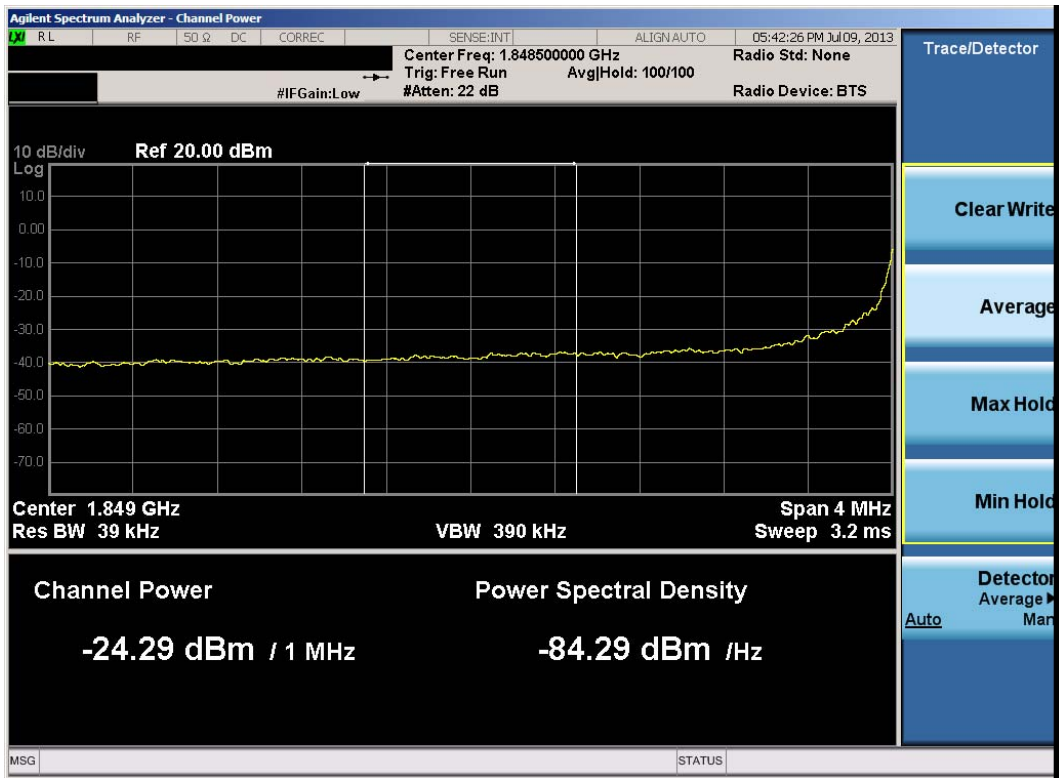


Plot 8-16. PAR Plot (5.0MHz 16-QAM – RB Size 25)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 53 of 75



Plot 8-17. Lower Band Edge Plot (10.0MHz QPSK – RB Size 50)



Plot 8-18. Lower Extended Band Edge Plot (10.0MHz QPSK – RB Size 50)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22, 24 & 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281123.A3L-R1	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 54 of 75