

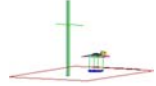


PCTEST ENGINEERING LABORATORY, INC.

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http://www.pctestlab.com



MEASUREMENT REPORT FCC Part 27 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:

02/27/2012 - 03/14/2012

Test Site/Location:

PCTEST Lab., Columbia, MD, USA

Test Report Serial No.:

0Y1202220223.A3L

FCC ID: A3LSCHI535

APPLICANT: SAMSUNG ELECTRONICS, CO. LTD.

Application Type:

Certification

Model(s):

SCH-i535

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part(s):

§2; §27

Test Procedure(s):

ANSI/TIA-603-C-2004

Test Device Serial No.:

identical prototype [S/N: 99000023076711 (K)]

Mode	Modulation	Channel Bandwidth (MHz)	Tx Frequency (MHz)	Emission Designator	ERP	
					Max. Power (W)	Max. Power (dBm)
LTE Band 13	QPSK	10	782	8M87G7D	0.082	19.15
LTE Band 13	16-QAM	10	782	8M87W7D	0.066	18.19

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

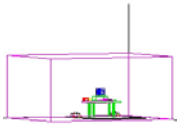


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MEASUREMENT REPORT

FCC Part 27

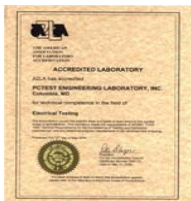


§2.1033 General Information

APPLICANT: Samsung Electronics, Co. Ltd.
APPLICANT ADDRESS: 416 Maetan 3-Dong, Yeongtong-gu
 Suwon-si, Gyeonggi-do
TEST SITE: PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS: 7185 Oakland Mills Road, Columbia, MD 21046 USA
FCC RULE PART(S): §2; §27
BASE MODEL: SCH-i535
FCC ID: A3LSCHI535
FCC CLASSIFICATION: PCS Licensed Transmitter Held to Ear (PCE)
MODULATIONS: QPSK, 16-QAM (Uplink)
FREQUENCY TOLERANCE: Emission must remain in band
Test Device Serial No.: 99000023076711 (K) ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST: 02/27/2012 - 03/14/2012
TEST REPORT S/N: 0Y1202220223.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 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.

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1.0 INTRODUCTION

1.1 Scope

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

1.2 Testing Facility

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

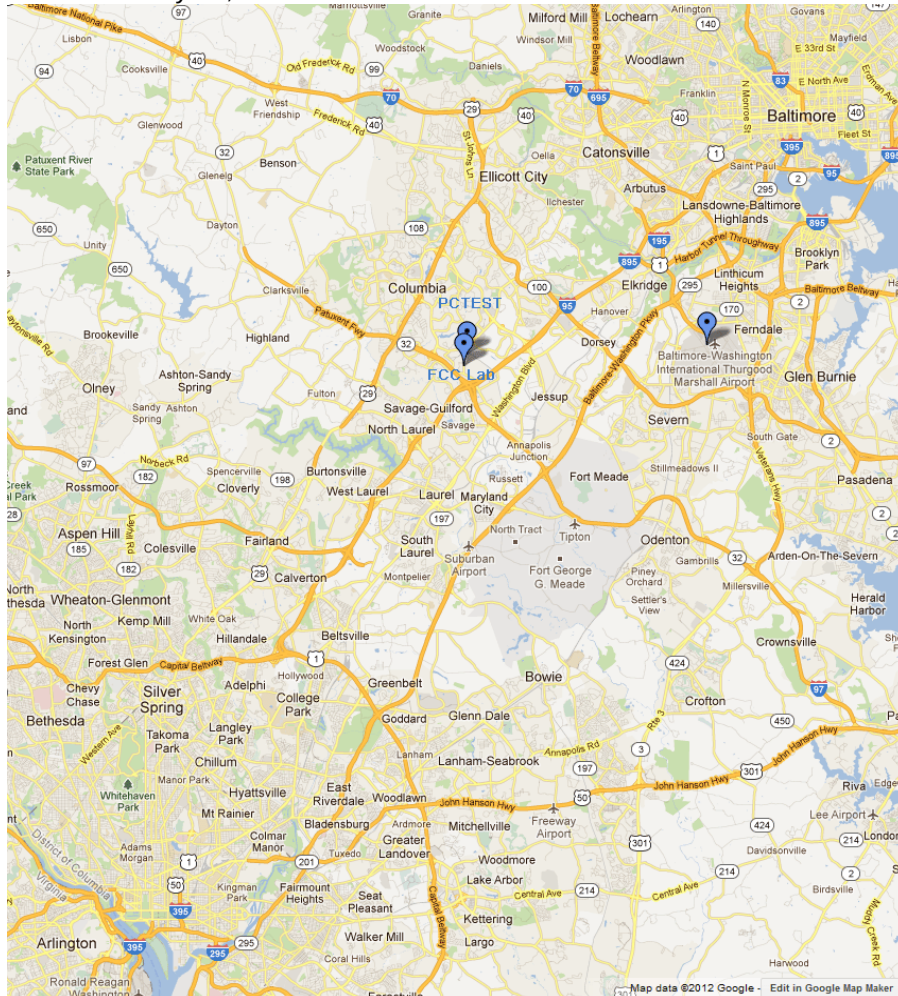


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSCHI535**.

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A (BC0, BC1), 850/1900 GSM/GPRS/EDGE, Band 13 (10MHz BW) LTE, SVDO, SVLTE, 802.11a/b/g/n WLAN, 802.11a/n UNII, Bluetooth (1x,EDR, LE), NFC

This device contains two transmit chains containing the following technologies:

Tx Chain 1: Cellular/PCS 1x Voice CDMA

Tx Chain 2: GSM850/1900, Cellular/PCS EvDO (Rev. 0/A), LTE Band 13

This device allows for simultaneous transmission of 1x CDMA with LTE (10MHz BW only) and 1x CDMA with EvDO. 1x CDMA with GSM is not a possible simultaneous transmission capability.

2.3 Test Configuration

The Samsung Portable Handset FCC ID: A3LSCHI535 was tested per the guidance of ANSI/TIA-603-C-2004. See Section 3.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.4 EMI Suppression Device(s)/Modifications

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

2.5 Labeling Requirements

Per 2.925

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

Per 15.19; Docket 95-19

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

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

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

Please see attachment for FCC ID label and label location.

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3.0 DESCRIPTION OF TESTS

3.1 Evaluation 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 measurement of the **Samsung Portable Handset FCC ID: A3LSCHI535**.

Deviation from Measurement Procedure.....None

3.2 Block C Frequency Range

§27.5(b)(3)

Two paired channels of 11 megahertz each are available for assignment in Block C in the 746-757 MHz and 776-787 MHz bands. In the event that no licenses for two channels in this Block C are assigned based on the results of the first auction in which such licenses were offered because the auction results do not satisfy the applicable reserve price, the spectrum in the 746-757 MHz and 776-787 MHz bands will instead be made available for assignment at a subsequent auction as follows: (i) Two paired channels of 6 megahertz each available for assignment in Block C1 in the 746-752 MHz and 776-782 MHz bands. (ii) Two paired channels of 5 megahertz each available for assignment in Block C2 in the 752-757 MHz and 782-787 MHz bands.

3.3 Occupied Bandwidth Emission Limits

§2.1049, §27.53(l)(6)

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The occupied bandwidth was measured using the signal analyzers' "Occupied Bandwidth" measurement function.

3.4 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051, §27.53(c)

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.

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3.5 Radiated Power and Radiated Spurious Emissions

§2.1053, §27.53(c)

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 the table at a distance of 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 is mounted to a bore-sight mechanism on a mast that 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 radiated spurious emissions 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.

Per the guidance of ANSI/TIA-603-C-2004, a half-wave dipole is then substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

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

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

For fundamental radiated power measurements, the guidance of KDB 971168 is used to record the EUT power level that is subsequently matched via the aforementioned substitution method given in ANSI/TIA-603-C-2004.

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3.6 Frequency Stability / Temperature Variation

§2.1055, §27.54

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-C-2004. 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.

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)	6/7/2011	Annual	6/7/2012	N/A
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	2/13/2012	Annual	2/13/2013	N/A
Agilent	8447D	Broadband Amplifier	3/17/2011	Annual	3/17/2012	1937A03348
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/8/2011	Annual	4/8/2012	MY45470194
Agilent	N9020A	MXA Signal Analyzer	10/10/2011	Annual	10/10/2012	US46470561
Espec	ESX-2CA	Environmental Chamber	4/21/2011	Annual	4/21/2012	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/22/2011	Annual	7/22/2012	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	10/1/2010	Biennial	10/1/2012	128337
Mini-Circuits	VHF-1200+	High Pass Filter	1/15/2012	Annual	1/15/2013	30923
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/25/2011	Annual	8/25/2012	100976
Rohde & Schwarz	RS-PR18	1-18 GHz Pre-Amplifier	6/9/2011	Annual	6/9/2012	100071
Rohde & Schwarz	ESU26	EMI Test Receiver	4/27/2011	Annual	4/27/2012	100342
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/14/2011	Biennial	11/14/2013	9105-2404
Schwarzbeck	VULB-9161SE	Trilog Super Broadband Test Antenna	11/8/2011	Biennial	11/8/2013	9161-4075

Table 4-1. Test Equipment

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5.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Amplitude/Angle Modulated

16QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Combination (Audio/Data)

Spurious Radiated Emission – LTE Band

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

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

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6.0 TEST RESULTS

6.1 Summary

Company Name: Samsung Electronics, Co. Ltd.
 FCC ID: A3LSCHI535
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (Tx)					
2.1049	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.0
2.1051, 27.53(c)(2), 27.53(c)(4)	Band Edge / Conducted Spurious Emissions (*)	< 43 + 10log ₁₀ (P[Watts]) < 65 + 10log ₁₀ (P[Watts]) in a 6.25kHz bandwidth for emissions in the 763 – 775MHz and 793 – 805MHz bands		PASS	Section 7.0
2.1046	Transmitter Conducted Output Power Measurements	N/A		N/A	See RF Exposure Report
2.1055, 27.54	Frequency Stability	Fundamental emissions must stay within the allotted band		PASS	Section 6.6
27.50(b)(10)	Effective Radiated Power	< 3 Watts max. ERP	RADIATED	PASS	Section 6.2
2.1053, 27.53(c)(2), 27.53(c)(4)	Single Transmit Undesirable Out-of-Band Emissions	< 43 + 10log ₁₀ (P[Watts]) for all out-of-band emissions		PASS	Section 6.3
2.1053, 27.53(f)	Undesirable Emissions in the 1559 – 1610MHz band	< -40dBm/MHz EIRP (wideband) < -50dBm EIRP (narrowband)		PASS	Section 6.4
2.1053, 27.53(c)(2), 27.53(c)(4)	Simultaneous Transmission Undesirable Out-of-Band Emissions	< -13dBm for all out-of-band emissions		PASS	Section

Table 6-1. Summary of Test Results

Notes:

- * - For out of band conducted spurious emissions (including those at the band edges), the emissions of both QPSK and 16-QAM modulations were investigated. The worst case transmitter emissions are shown in Section 7.0.
- 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 were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.

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6.2 Effective Radiated Power Output Data

§27.50(b)(10)

Frequency [MHz]	Mod.	Battery Type	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
782.00	QPSK	Standard	15.21	3.94	V	19.15	0.082	34.77	-15.62
782.00	16-QAM	Standard	14.25	3.94	V	18.19	0.066	34.77	-16.58

Table 6-2. Effective Radiated Power Output Data

NOTES:

1. This device was tested under all configurations and the worst case radiated power and radiated spurious emissions are reported while transmitting with 1 resource block with an offset of 14 using QPSK modulation.
2. This unit was tested with its standard battery. The NFC antenna is integrated into the standard battery and is the only battery available from the manufacturer for this device. All spurious emissions were investigated and the worst case emissions were found with the EUT powered by this battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup. The data reported in the table above was measured in this test setup.

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6.3 LTE Radiated Measurements

§2.1053, §27.53(c)(2)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 782.00 MHz
 MEASURED OUTPUT POWER: 19.15 dBm = 0.082 W
 BANDWIDTH: 10 MHz
 MODULATION SIGNAL: QPSK
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 32.15 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
2332.68	-45.67	9.52	-36.15	V	55.30
3110.39	-55.81	5.02	-50.79	V	69.94
3887.90	-56.30	9.02	-47.27	V	66.42
4665.49	-56.19	9.02	-47.17	V	66.32

Table 6-3. Radiated Spurious Data (QPSK Modulation)

NOTES:

1. This device was tested under all configurations and the worst case radiated power and radiated spurious emissions are reported while transmitting with 1 resource block with an offset of 14 using QPSK modulation.
2. This unit was tested with its standard battery. The NFC antenna is integrated into the standard battery and is the only battery available from the manufacturer for this device. All spurious emissions were investigated and the worst case emissions were found with the EUT powered by this battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup. The data reported in the table above was measured in this test setup.

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6.4 LTE Radiated Measurements in 1559 – 1610MHz Band §2.1053, §27.53(f)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 782.00 MHz
 MEASURED OUTPUT POWER: 19.15 dBm = 0.082 W
 MODULATION SIGNAL: QPSK
 DISTANCE: 3 meters
 NARROWBAND EMISSION LIMIT: -50 dBm
 WIDEBAND EMISSION LIMIT: -40 dBm/MHz

FREQUENCY (MHz)	EMISSION TYPE	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	MARGIN (dB)
1560.00	WIDEBAND	-45.94	5.67	-40.27	V	-0.27

Table 6-4. Radiated Spurious Data

NOTES:

1. This device was tested under all configurations and the worst case radiated spurious emissions are reported while transmitting with 1 resource block with an offset of 14 using QPSK modulation.
2. This unit was tested with its standard battery. The NFC antenna is integrated into the standard battery and is the only battery available from the manufacturer for this device. All spurious emissions were investigated and the worst case emissions were found with the EUT powered by this battery.
3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the vertical setup. The data reported in the table above was measured in this test setup.

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6.5 SVLTE Radiated Measurements

§2.1053, §27.53(c)(2)

Field Strength of SPURIOUS Radiation

LTE FREQUENCY: 782.00 MHz
 1x CDMA FREQUENCY: 824.70 MHz
 MODULATION SIGNAL: CDMA + LTE (QPSK)
 DISTANCE: 3 meters
 LIMIT: -13.00 dBm

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	MARGIN (dB)
1604.00	-46.47	3.08	-43.39	H	-30.39
2386.97	-39.12	3.36	-35.76	H	-22.76

Table 6-5. Radiated Spurious Data (Cellular 1x CDMA + LTE (QPSK))

NOTES:

1. For SVLTE testing, the LTE base station simulator was manipulated to determine the configuration resulting in the highest inter-modulation products with the 1x CDMA transmitter also "on". The worst case LTE configuration was determined to be with 1 resource block and a resource block offset of 14 while the other transmitter was set to 1x CDMA mode using the RC3/SO55 configuration.
2. The worst case inter-modulation products shown in the table above were found with simultaneous transmission of the LTE transmitter using 1RB, 14 RB Offset at 782MHz and the 1x CDMA transmitter using RC3/SO55 with "All Up" bits on cellular band channel 1013.
3. All harmonic emissions found during simultaneous transmission were found to be less than the harmonic emission levels found during single transmission. The worst case single transmission LTE harmonic emissions can be found in Section 6.3.
4. This unit was tested with its standard battery. The NFC antenna is integrated into the standard battery and is the only battery available from the manufacturer for this device. All spurious emissions were investigated and the worst case emissions were found with the EUT powered by this battery.
5. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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SVLTE Radiated Measurements (Cont'd)

§2.1053, §27.53(c)(2)

Field Strength of SPURIOUS Radiation

LTE FREQUENCY: 782.00 MHz
 1x CDMA FREQUENCY: 836.52 MHz
 MODULATION SIGNAL: CDMA + LTE (QPSK)
 DISTANCE: 3 meters
 LIMIT: -13.00 dBm

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	MARGIN (dB)
1616.63	-48.49	2.94	-45.55	H	-32.55
2396.74	-40.29	3.31	-36.98	H	-23.98
2453.00	-43.08	3.00	-40.08	H	-27.08
4013.37	-49.22	6.87	-42.35	H	-29.35

Table 6-6. Radiated Spurious Data (Cellular 1x CDMA + LTE (QPSK))

NOTES:

1. For SVLTE testing, the LTE base station simulator was manipulated to determine the configuration resulting in the highest inter-modulation products with the 1x CDMA transmitter also "on". The worst case LTE configuration was determined to be with 1 resource block and a resource block offset of 14 while the other transmitter was set to 1x CDMA mode using the RC3/SO55 configuration.
2. The worst case inter-modulation products shown in the table above were found with simultaneous transmission of the LTE transmitter using 1RB, 14 RB Offset at 782MHz and the 1x CDMA transmitter using RC3/SO55 with "All Up" bits on cellular band channel 384.
3. All harmonic emissions found during simultaneous transmission were found to be less than the harmonic emission levels found during single transmission. The worst case single transmission LTE harmonic emissions can be found in Section 6.3.
4. This unit was tested with its standard battery. The NFC antenna is integrated into the standard battery and is the only battery available from the manufacturer for this device. All spurious emissions were investigated and the worst case emissions were found with the EUT powered by this battery.
5. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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SVLTE Radiated Measurements (Cont'd)

§2.1053, §27.53(c)(2)

Field Strength of SPURIOUS Radiation

LTE FREQUENCY: 782.00 MHz
 1x CDMA FREQUENCY: 848.31 MHz
 MODULATION SIGNAL: CDMA + LTE (QPSK)
 DISTANCE: 3 meters
 LIMIT: -13.00 dBm

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	MARGIN (dB)
1628.42	-47.18	2.81	-44.36	H	-31.36
2408.53	-42.10	3.25	-38.85	H	-25.85
2476.73	-38.00	2.87	-35.13	H	-22.13

Table 6-7. Radiated Spurious Data (Cellular 1x CDMA + LTE (QPSK))

NOTES:

1. For SVLTE testing, the LTE base station simulator was manipulated to determine the configuration resulting in the highest inter-modulation products with the 1x CDMA transmitter also "on". The worst case LTE configuration was determined to be with 1 resource block and a resource block offset of 14 while the other transmitter was set to 1x CDMA mode using the RC3/SO55 configuration.
2. The worst case inter-modulation products shown in the table above were found with simultaneous transmission of the LTE transmitter using 1RB, 14 RB Offset at 782MHz and the 1x CDMA transmitter using RC3/SO55 with "All Up" bits on cellular band channel 777.
3. All harmonic emissions found during simultaneous transmission were found to be less than the harmonic emission levels found during single transmission. The worst case single transmission LTE harmonic emissions can be found in Section 6.3.
4. This unit was tested with its standard battery. The NFC antenna is integrated into the standard battery and is the only battery available from the manufacturer for this device. All spurious emissions were investigated and the worst case emissions were found with the EUT powered by this battery.
5. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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SVLTE Radiated Measurements (Cont'd)

§2.1053, §27.53(c)(2)

Field Strength of SPURIOUS Radiation

LTE FREQUENCY: 782.00 MHz
 1x CDMA FREQUENCY: 1851.25 MHz
 MODULATION SIGNAL: CDMA + LTE (QPSK)
 DISTANCE: 3 meters
 LIMIT: -13.00 dBm

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	MARGIN (dB)
4482.61	-55.56	9.40	-46.16	H	-33.16

Table 6-8. Radiated Spurious Data (PCS 1x CDMA + LTE (QPSK))

NOTES:

- For SVLTE testing, the LTE base station simulator was manipulated to determine the configuration resulting in the highest inter-modulation products with the 1x CDMA transmitter also "on". The worst case LTE configuration was determined to be with 1 resource block and a resource block offset of 14 while the other transmitter was set to 1x CDMA mode using the RC3/SO55 configuration.
- The worst case inter-modulation products shown in the table above were found with simultaneous transmission of the LTE transmitter using 1RB, 14 RB Offset at 782MHz and the 1x CDMA transmitter using RC3/SO55 with "All Up" bits on PCS band channel 25.
- All harmonic emissions found during simultaneous transmission were found to be less than the harmonic emission levels found during single transmission. The worst case single transmission LTE harmonic emissions can be found in Section 6.3.
- This unit was tested with its standard battery. The NFC antenna is integrated into the standard battery and is the only battery available from the manufacturer for this device. All spurious emissions were investigated and the worst case emissions were found with the EUT powered by this battery.
- The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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SVLTE Radiated Measurements (Cont'd)

§2.1053, §27.53(c)(2)

Field Strength of SPURIOUS Radiation

LTE FREQUENCY: 782.00 MHz
 1x CDMA FREQUENCY: 1880.00 MHz
 MODULATION SIGNAL: CDMA + LTE (QPSK)
 DISTANCE: 3 meters
 LIMIT: -13.00 dBm

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	MARGIN (dB)
3440.22	-56.65	8.17	-48.48	H	-35.48
4540.11	-55.44	9.45	-45.99	H	-32.99

Table 6-9. Radiated Spurious Data (PCS 1x CDMA + LTE (QPSK))

NOTES:

1. For SVLTE testing, the LTE base station simulator was manipulated to determine the configuration resulting in the highest inter-modulation products with the 1x CDMA transmitter also "on". The worst case LTE configuration was determined to be with 1 resource block and a resource block offset of 14 while the other transmitter was set to 1x CDMA mode using the RC3/SO55 configuration.
2. The worst case inter-modulation products shown in the table above were found with simultaneous transmission of the LTE transmitter using 1RB, 14 RB Offset at 782MHz and the 1x CDMA transmitter using RC3/SO55 with "All Up" bits on PCS band channel 600.
3. All harmonic emissions found during simultaneous transmission were found to be less than the harmonic emission levels found during single transmission. The worst case single transmission LTE harmonic emissions can be found in Section 6.3.
4. This unit was tested with its standard battery. The NFC antenna is integrated into the standard battery and is the only battery available from the manufacturer for this device. All spurious emissions were investigated and the worst case emissions were found with the EUT powered by this battery.
5. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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SVLTE Radiated Measurements (Cont'd)

§2.1053, §27.53(c)(2)

Field Strength of SPURIOUS Radiation

LTE FREQUENCY: 782.00 MHz
 1x CDMA FREQUENCY: 1908.75 MHz
 MODULATION SIGNAL: CDMA + LTE (QPSK)
 DISTANCE: 3 meters
 LIMIT: -13.00 dBm

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	MARGIN (dB)
3468.97	-55.70	8.28	-47.42	H	-34.42
4597.61	-56.98	9.52	-47.46	H	-34.46

Table 6-10. Radiated Spurious Data (PCS 1x CDMA + LTE (QPSK))

NOTES:

1. For SVLTE testing, the LTE base station simulator was manipulated to determine the configuration resulting in the highest inter-modulation products with the 1x CDMA transmitter also "on". The worst case LTE configuration was determined to be with 1 resource block and a resource block offset of 14 while the other transmitter was set to 1x CDMA mode using the RC3/SO55 configuration.
2. The worst case inter-modulation products shown in the table above were found with simultaneous transmission of the LTE transmitter using 1RB, 14 RB Offset at 782MHz and the 1x CDMA transmitter using RC3/SO55 with "All Up" bits on PCS band channel 1175.
3. All harmonic emissions found during simultaneous transmission were found to be less than the harmonic emission levels found during single transmission. The worst case single transmission LTE harmonic emissions can be found in Section 6.3.
4. This unit was tested with its standard battery. The NFC antenna is integrated into the standard battery and is the only battery available from the manufacturer for this device. All spurious emissions were investigated and the worst case emissions were found with the EUT powered by this battery.
5. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

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6.6 LTE Frequency Stability Measurements

\$2.1055, \$27.54

OPERATING FREQUENCY: 782,000,000 Hz

REFERENCE VOLTAGE: 3.7 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	782,000,016	16	0.000002
100 %		- 30	781,999,995	-5	-0.000001
100 %		- 20	781,999,980	-20	-0.000003
100 %		- 10	781,999,994	-6	-0.000001
100 %		0	782,000,012	12	0.000002
100 %		+ 10	782,000,011	11	0.000001
100 %		+ 20	782,000,014	14	0.000002
100 %		+ 30	781,999,993	-7	-0.000001
100 %		+ 40	782,000,015	15	0.000002
100 %		+ 50	782,000,012	12	0.000002
115 %	4.26	+ 20	782,000,025	25	0.000003
BATT. ENDPOINT	3.41	+ 20	782,000,016	16	0.000002

Table 6-11. Frequency Stability Data

LTE Frequency Stability Measurements (Cont'd)
§2.1055, §27.54

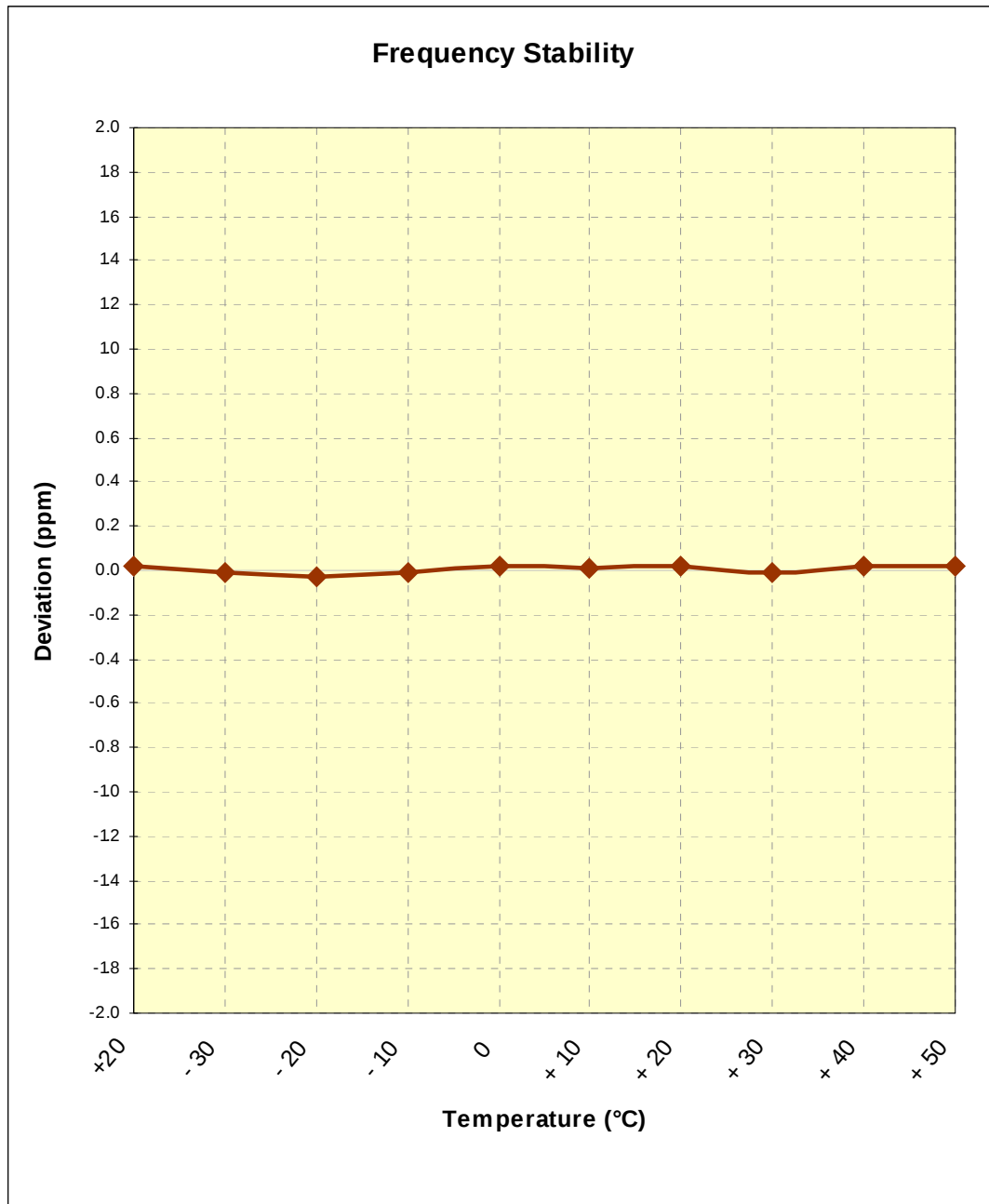
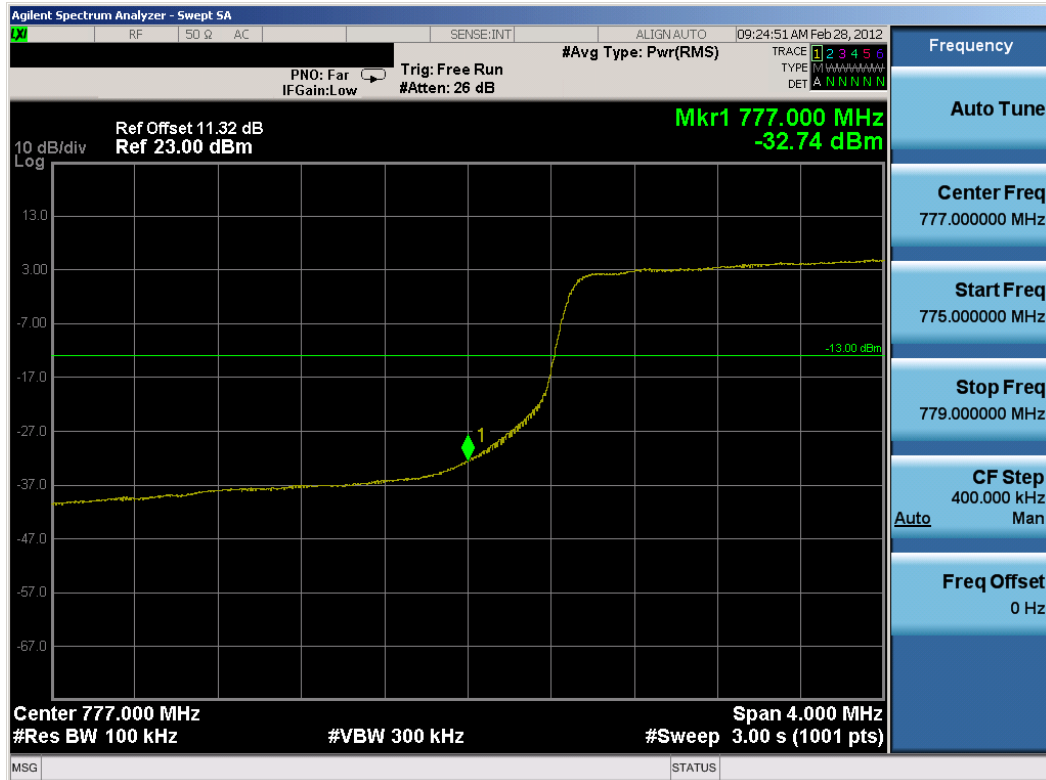


Figure 6-1. Frequency Stability Graph

FCC ID: A3LSCHI535	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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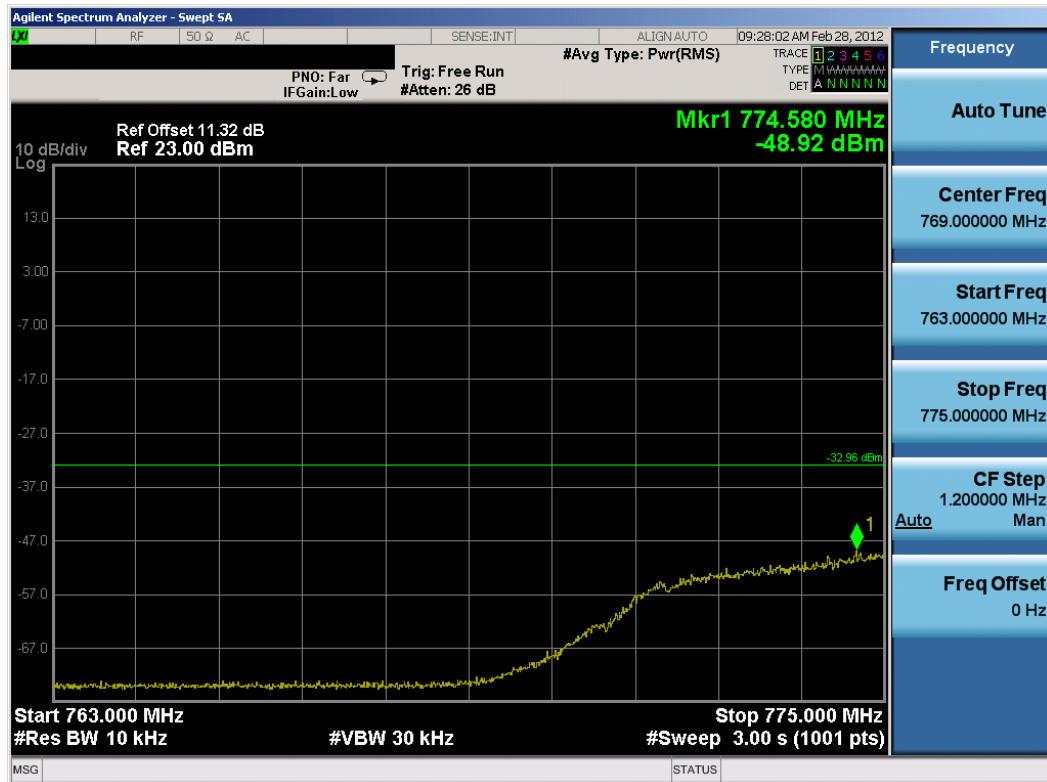
7.0 PLOT(S) OF EMISSIONS

For all plots in Section 7.0 showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit is $65 + 10\log_{10}(P_{\text{Watts}}) = -35\text{dBm}$ in a 6.25kHz bandwidth. Since it was not possible to set the resolution bandwidth to 6.25kHz with the available equipment, a bandwidth of 10kHz was used instead to show compliance. By using a 10kHz bandwidth on the spectrum analyzer, the limit was adjusted by $10\log_{10}(10\text{kHz}/6.25\text{kHz}) = 2.04\text{dB}$. Thus, the limit shown in all plots in the 763 – 775MHz and 793 – 805MHz bands for all available modulation types was $-35\text{dBm} + 2.04\text{dB} = -32.96\text{dBm}$.

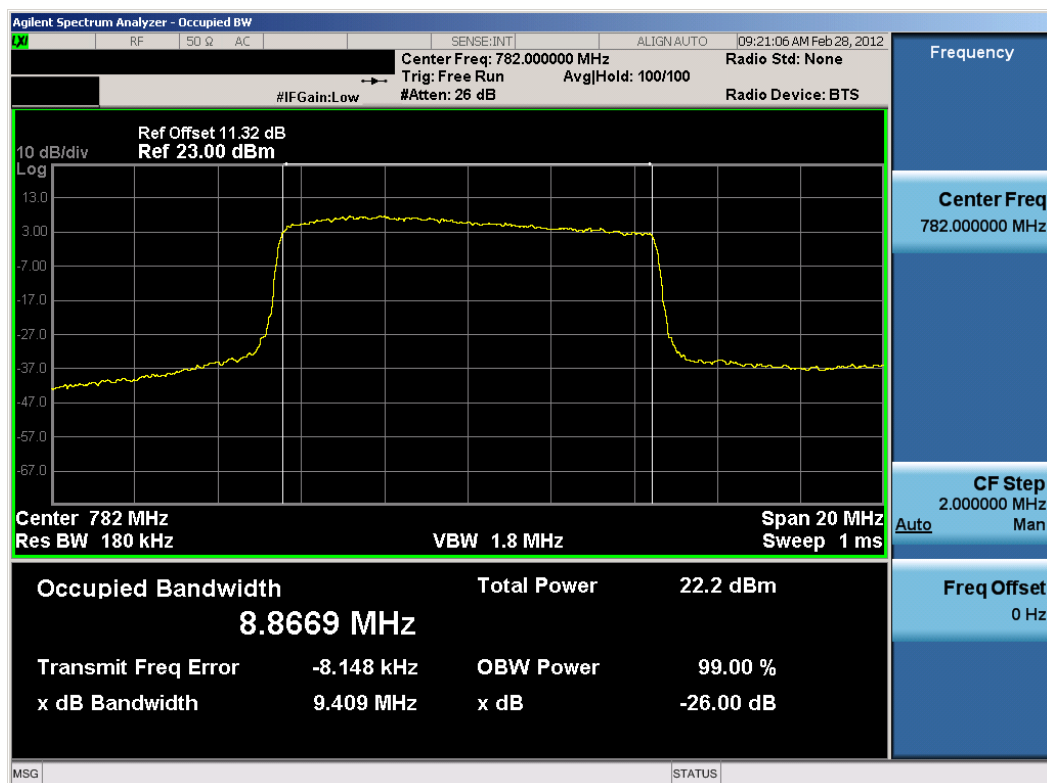


Plot 7-1. Lower Band Edge Plot (QPSK – RB Size 50)

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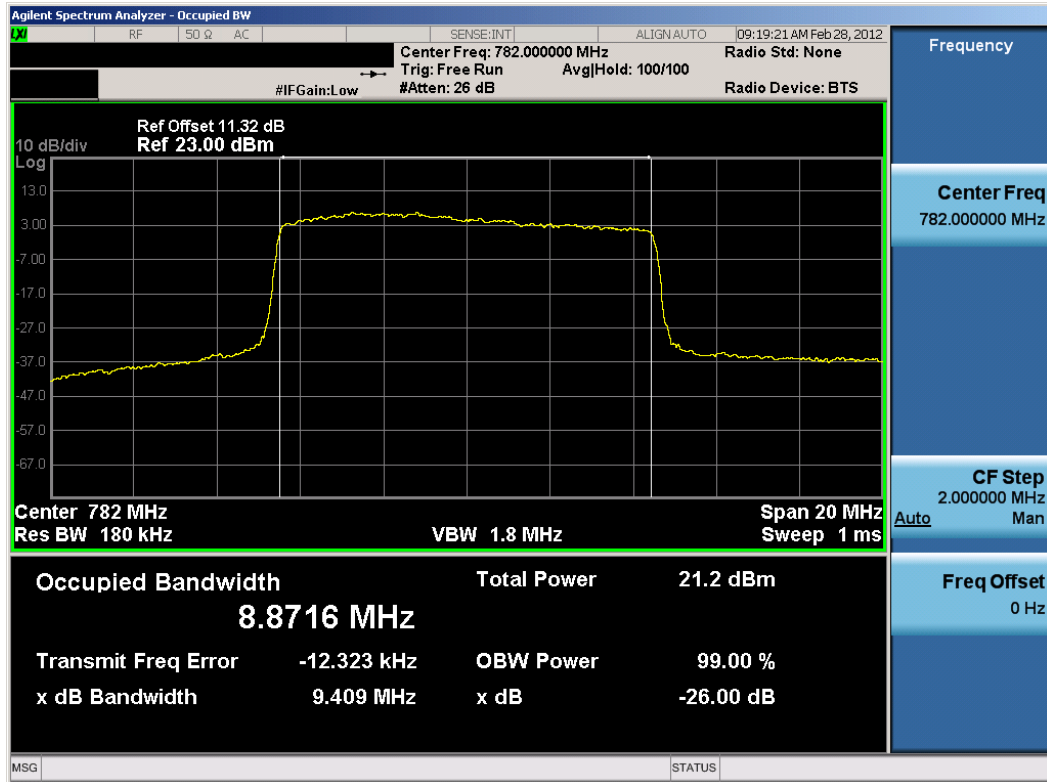


Plot 7-2. Lower Emission Mask (763 – 775MHz) Plot (QPSK – RB Size 50)

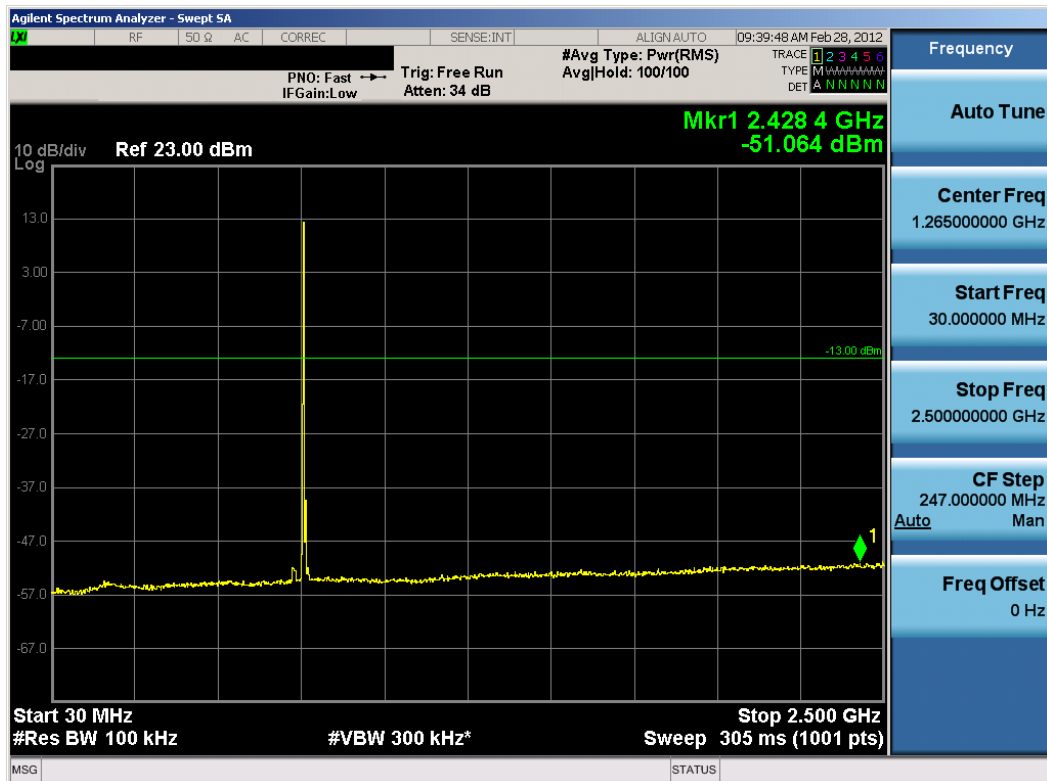


Plot 7-3. Occupied Bandwidth Plot (QPSK – RB Size 50)

FCC ID: A3LSCHI535	 FCC Pt. 27 LTE MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
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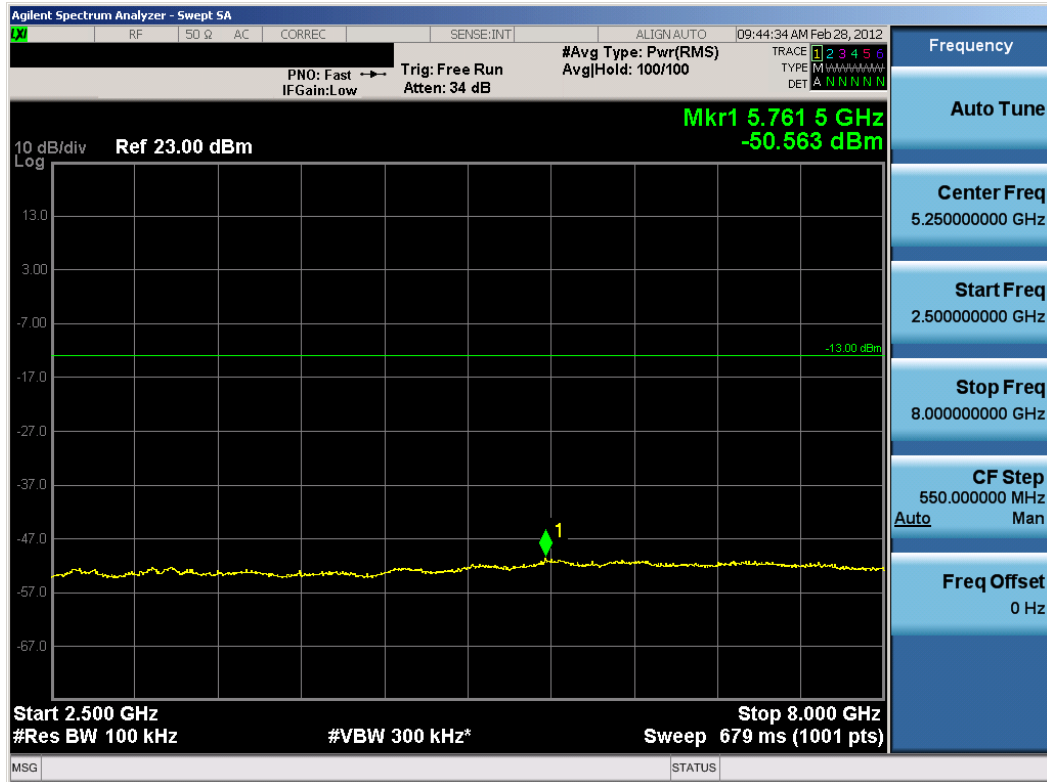


Plot 7-4. Occupied Bandwidth Plot (16-QAM – RB Size 50)

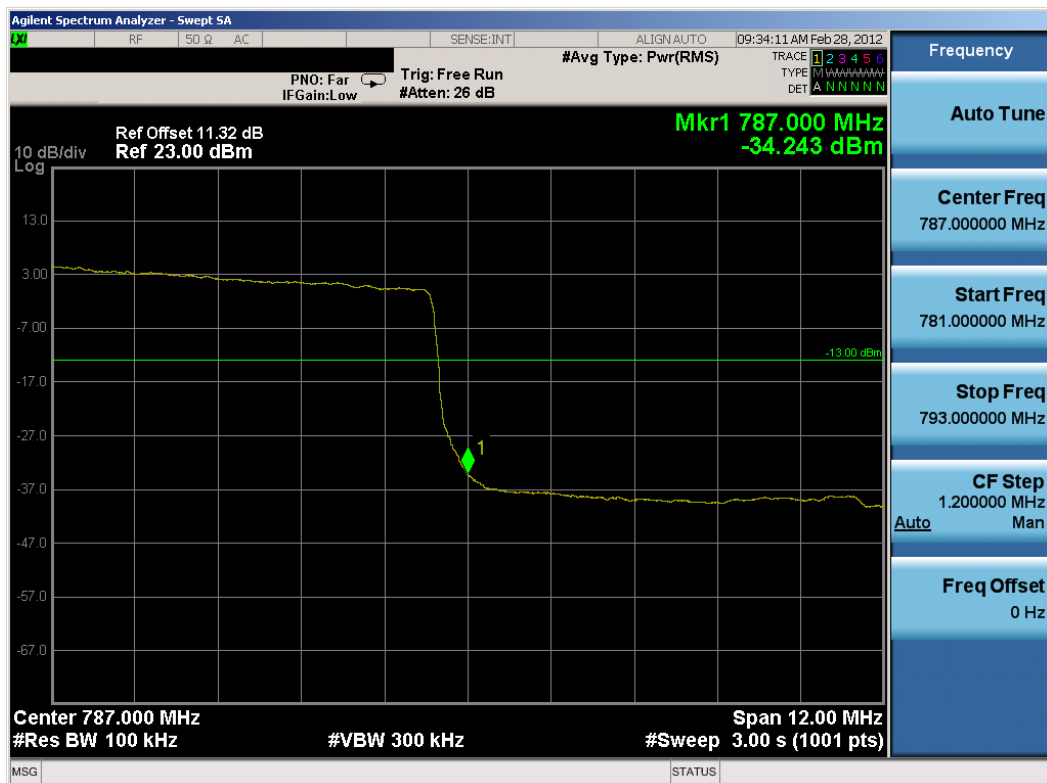


Plot 7-5. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 14)

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Plot 7-6. Conducted Spurious Plot (QPSK – RB Size 1, RB Offset 14)



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

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Plot 7-8. Upper Emission Mask (793 – 805MHz) Plot (QPSK – RB Size 50)

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8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSCHI535** complies with all the requirements of Parts 2 and 27 of the FCC rules.

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