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MEASUREMENT REPORT FCC Part 22 & 24

Applicant Name:
Samsung Electronics, Co. Ltd.
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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.:
0Y1306281122.A3L


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

Application Type: Certification
Model(s): SPH-L520
EUT Type: Portable Handset
FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s): §2 §22(H) §24(E)
Test Procedure(s): ANSI/TIA-603-C-2004, KDB 971168 v02
Test Device Serial No.: *identical prototype* [S/N: 81]



Mode	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
CDMA850	824.70 - 848.31	1M43F9W	0.124	20.92
CDMA1900	1851.25 - 1908.75	1M61F9W	0.311	24.93

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.




 Randy Orlanez
 President

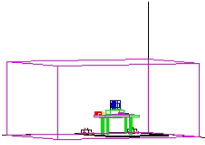


FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 1 of 37	

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

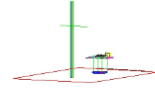
FCC PART 22 & 24 MEASUREMENT REPORT	3		3
1.0 INTRODUCTION	4		4
1.1 SCOPE	4		4
1.2 TESTING FACILITY	4		4
2.0 PRODUCT INFORMATION	5		5
2.1 EQUIPMENT DESCRIPTION	5		5
2.2 DEVICE CAPABILITIES	5		5
2.3 TEST CONFIGURATION	5		5
2.4 EMI SUPPRESSION DEVICE(S)/MODIFICATIONS	5		5
3.0 DESCRIPTION OF TESTS	6		6
3.1 EVALUATION PROCEDURE	6		6
3.2 CELLULAR - BASE FREQUENCY BLOCKS	6		6
3.3 CELLULAR - MOBILE FREQUENCY BLOCKS	6		6
3.4 PCS - BASE FREQUENCY BLOCKS	6		6
3.5 PCS - MOBILE FREQUENCY BLOCKS	7		7
3.6 OCCUPIED BANDWIDTH	7		7
3.7 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL	7		7
3.8 RADIATED POWER AND RADIATED SPURIOUS EMISSIONS	7		7
3.9 PEAK-AVERAGE RATIO	8		8
3.10 FREQUENCY STABILITY / TEMPERATURE VARIATION	8		8
4.0 TEST EQUIPMENT CALIBRATION DATA	10		10
5.0 SAMPLE CALCULATIONS	11		11
6.0 TEST RESULTS	12		12
6.1 SUMMARY	12		12
6.2 CELLULAR EFFECTIVE RADIATED POWER (ERP)	13		13
6.3 PCS EQUIVALENT ISOTROPIC POWER (EIRP)	14		14
6.4 CELLULAR CDMA RADIATED MEASUREMENTS	15		15
6.5 PCS CDMA RADIATED MEASUREMENTS	18		18
6.6 CELLULAR CDMA FREQUENCY STABILITY MEASUREMENTS	21		21
6.7 PCS CDMA FREQUENCY STABILITY MEASUREMENTS	23		23
7.0 PLOTS OF EMISSIONS	25		25
8.0 CONCLUSION	37		37

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 2 of 37



MEASUREMENT REPORT

FCC Part 22 & 24



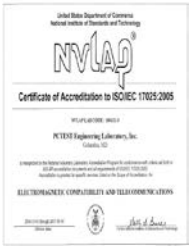
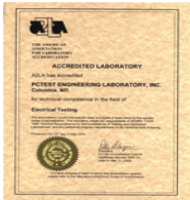
§2.1033 General Information



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 21046 USA
FCC RULE PART(S): §2 §22(H) §24(E)
BASE MODEL: SPH-L520
FCC ID: A3LSPHL520
FCC CLASSIFICATION: PCS Licensed Transmitter Held to Ear (PCE)
MODE: CDMA
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: 0Y1306281122.A3L

Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules 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 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 3 of 37	

1.0 INTRODUCTION

1.1 Scope

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

1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Internt'l (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on February 15, 2012.

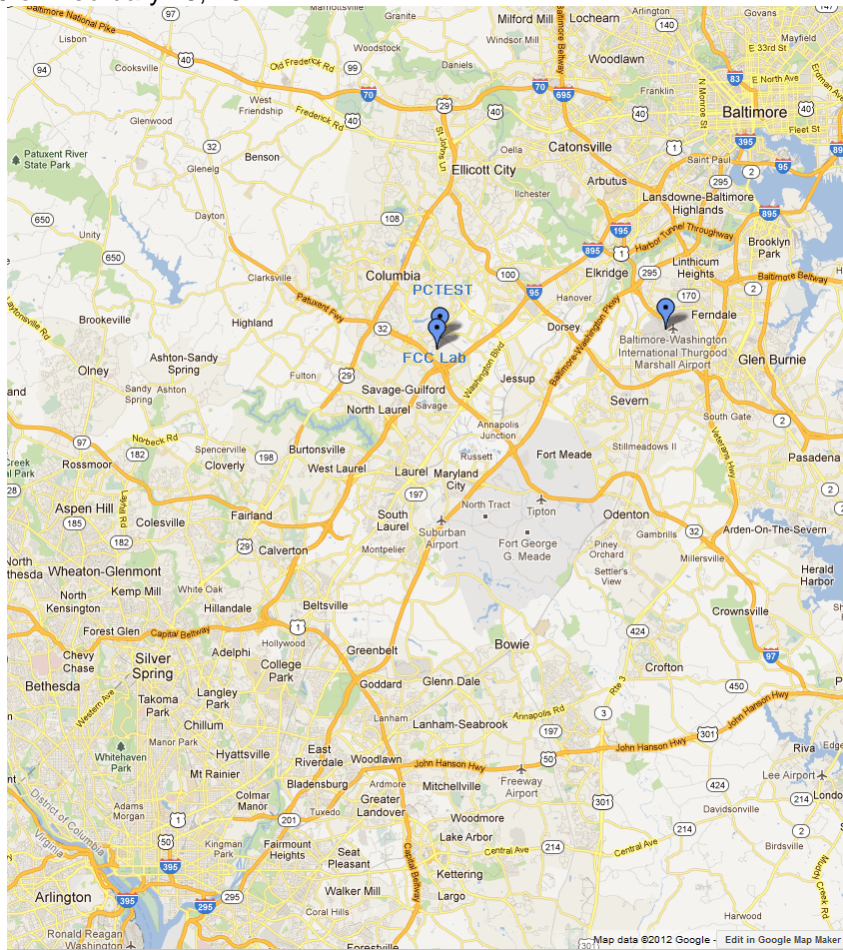




Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 4 of 37	

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 2G/3G licensed transmitters.

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 Test Configuration

The Samsung Electronics Co., Ltd. Portable Handset FCC ID: A3LSPHL520 was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168 v02. 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.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 5 of 37

3.0 DESCRIPTION OF TESTS

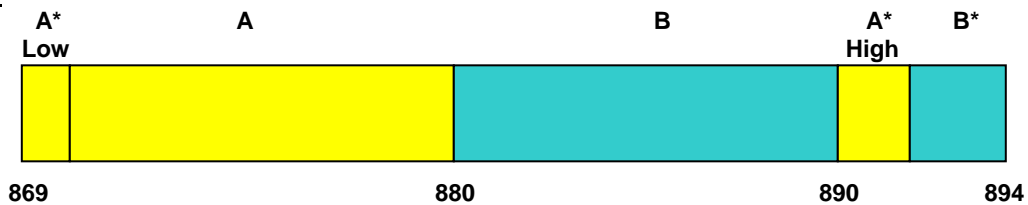
3.1 Evaluation Procedure

The measurement procedures described in the “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 v02) were used in the measurement of the **Samsung Electronics Co., Ltd. Portable Handset FCC ID: A3LSPHL520**.

Deviation from Measurement Procedure.....None

3.2 Cellular - Base Frequency Blocks

§22.905



BLOCK 1: 869 – 880 MHz (A* Low + A)

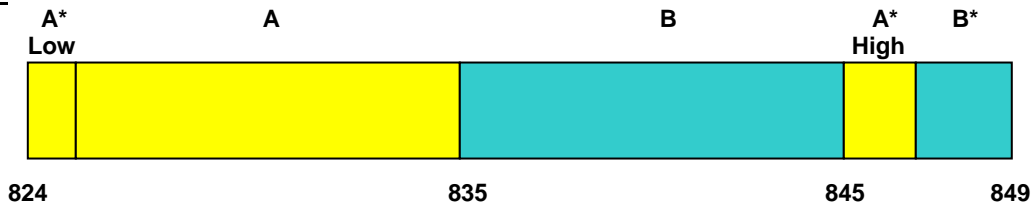
BLOCK 3: 890 – 891.5 MHz (A* High)

BLOCK 2: 880 – 890 MHz (B)

BLOCK 4: 891.5 – 894 MHz (B*)

3.3 Cellular - Mobile Frequency Blocks

§22.905



BLOCK 1: 824 – 835 MHz (A* Low + A)

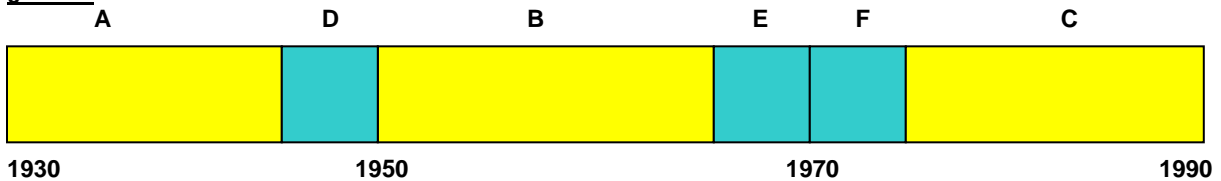
BLOCK 3: 845 – 846.5 MHz (A* High)

BLOCK 2: 835 – 845 MHz (B)

BLOCK 4: 846.5 – 849 MHz (B*)

3.4 PCS - Base Frequency Blocks

§24.229



BLOCK 1: 1930 – 1945 MHz (A)

BLOCK 4: 1965 – 1970 MHz (E)

BLOCK 2: 1945 – 1950 MHz (D)

BLOCK 5: 1970 – 1975 MHz (F)

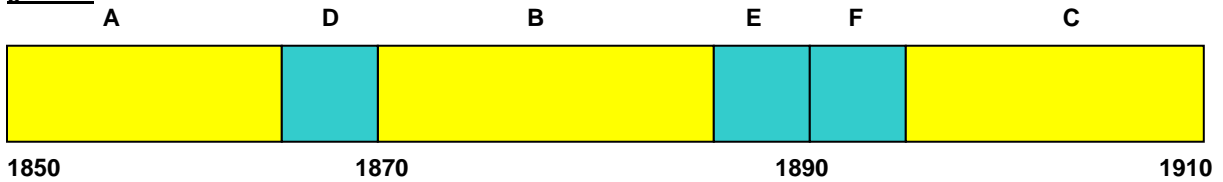
BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 6 of 37

3.5 PCS - Mobile Frequency Blocks

§24.229



BLOCK 1: 1850 – 1865 MHz (A)

BLOCK 4: 1885 – 1890 MHz (E)

BLOCK 2: 1865 – 1870 MHz (D)

BLOCK 5: 1890 – 1895 MHz (F)

BLOCK 3: 1870 – 1885 MHz (B)

BLOCK 6: 1895 – 1910 MHz (C)

3.6 Occupied Bandwidth

§2.1049 RSS-Gen(4.6.1) RSS-133(2.3)

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 spectrum analyzers' "occupied bandwidth" measurement function was used to record the occupied bandwidth in accordance with KDB 971168 v02.

3.7 Spurious and Harmonic Emissions at Antenna Terminal



§2.1051 §22.917(a) §24.238(a) RSS-132(4.5.1) RSS-133(6.5.1)

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 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 Part 22 and 1 MHz or greater for Part 24. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

3.8 Radiated Power and Radiated Spurious Emissions

§2.1053 §22.913(a.2) §22.917(a) §24.232(c) §24.238(a) RSS-132(4.4) RSS-132(4.5.1) RSS-133(6.4) RSS-133(6.5.1)

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.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 7 of 37

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 v02.

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).

3.9 Peak-Average Ratio

§24.232(d) RSS-132(5.4) RSS-133(6.4)

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



3.10 Frequency Stability / Temperature Variation

§2.1055 §22.355 §22.863 §22.905 §24.229 §24.235 RSS-132(4.3) RSS-133(6.3)

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

FCC ID: A3LSPHL520	 FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 8 of 37

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 fifteen minutes 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 period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.



FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 9 of 37

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	N9020A	MXA Signal Analyzer	10/9/2012	Annual	10/9/2013	US46470561
Emco	3115	Horn Antenna (1-18GHz)	1/12/2012	Biennial	1/12/2014	9704-5182
Espec	ESX-2CA	Environmental Chamber	4/16/2013	Annual	4/16/2014	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	11/7/2012	Biennial	11/7/2014	128338
Mini-Circuits	VHF-1200+	High Pass Filter	1/17/2013	Annual	1/17/2014	30923
Mini-Circuits	VHF-3100+	High Pass Filter	1/17/2013	Annual	1/17/2014	30841
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	N/A			836536/0005
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
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	10/3/2011	Biennial	10/3/2013	91052522TX
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	10/3/2011	Biennial	10/3/2013	91052523RX
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/26/2012	Biennial	1/26/2014	A051107

Table 4-1. Test Equipment

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 10 of 37

5.0 SAMPLE CALCULATIONS

CDMA Emission Designator

Emission Designator = 1M25F9W

CDMA BW = 1.25 MHz

F = Frequency Modulation



9 = Composite Digital Info

W = Combination (Audio/Data) (Measured at the 99.75% power bandwidth)

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

The receive 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 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm $- (-24.80) = 50.3$ dBc.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 11 of 37

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): CDMA

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 22.917(a) 24.238(a)	Band Edge / Conducted Spurious Emissions	> 43 + log ₁₀ (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Section 7.0
24.232(d)	Peak-Average Ratio	< 13 dB		PASS	Section 7.0
2.1046	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
22.913(a.2)	Effective Radiated Power	< 7 Watts max. ERP	RADIATED	PASS	Section 6.2
24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts max. EIRP		PASS	Section 6.3
2.1053 22.917(a) 24.238(a)	Undesirable Emissions	> 43 + log ₁₀ (P[Watts]) for all out-of-band emissions		PASS	Sections, 6.4, 6.5
2.1055 22.355 24.235	Frequency Stability	< 2.5 ppm (Part 22) Emission must remain in band (Part 24)		PASS	Sections, 6.6, 6.7

Table 6-1. Summary of Test Results

Notes:

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

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 12 of 37	

6.2 Cellular Effective Radiated Power (ERP)



§22.913(a)(2) RSS-132(4.4) [SRSP-503(5.1.3)]

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.70	CDMA850	Standard	14.12	4.60	V	18.72	0.075	38.45	-19.73
836.52	CDMA850	Standard	16.10	4.82	V	20.92	0.124	38.45	-17.53
848.31	CDMA850	Standard	14.81	5.04	V	19.85	0.097	38.45	-18.60

Table 6-2. ERP (Cellular CDMA)

NOTES:

- 1) This device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 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 in the EUT in the [H,H2,V] positioning. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 13 of 37	

6.3 PCS Equivalent Isotropic Power (EIRP)



§22.913(a)(2) RSS-132(4.4) [SRSP-503(5.1.3)]

Frequency [MHz]	Mode	Battery Type	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
1851.25	CDMA1900	Standard	14.90	9.60	V	24.50	0.282	33.01	-8.51
1880.00	CDMA1900	Standard	14.45	9.53	V	23.98	0.250	33.01	-9.03
1908.75	CDMA1900	Standard	15.46	9.47	V	24.93	0.311	33.01	-8.08

Table 6-3. EIRP (PCS CDMA)

NOTES:

- 1) This device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 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 in the EUT in the [H,H2,V] positioning. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 14 of 37	

6.4 Cellular CDMA Radiated Measurements

§2.1053 §22.917(a) RSS-132(4.5.1)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 824.70 MHz
 CHANNEL: 1013
 MEASURED OUTPUT POWER: 18.72 dBm = 0.075 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 31.72 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1649.40	-59.41	2.59	-56.83	H	75.6
2474.10	-79.89	2.89	-77.00	H	95.7
3298.80	-81.80	5.45	-76.35	H	95.1
4123.50	-81.51	7.05	-74.46	H	93.2
4948.20	-80.98	7.87	-73.12	H	91.8

Table 6-4. Radiated Spurious Data (Cellular CDMA Mode – Ch. 1013)

NOTES:

- 1) This device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 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 in the EUT in the [H,H2,V] positioning. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 15 of 37	

Cellular CDMA Radiated Measurements (Cont'd)
§2.1053 §22.917(a) RSS-132(4.5.1)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 836.52 MHz
 CHANNEL: 384
 MEASURED OUTPUT POWER: 20.92 dBm = 0.124 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 33.92 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
<u>1673.04</u>	<u>-57.96</u>	<u>2.34</u>	<u>-55.62</u>	<u>H</u>	<u>76.5</u>
<u>2509.56</u>	<u>-79.57</u>	<u>2.84</u>	<u>-76.73</u>	<u>H</u>	<u>97.7</u>
<u>3346.08</u>	<u>-81.97</u>	<u>5.64</u>	<u>-76.33</u>	<u>H</u>	<u>97.3</u>
<u>4182.60</u>	<u>-81.65</u>	<u>7.14</u>	<u>-74.51</u>	<u>H</u>	<u>95.4</u>
<u>5019.12</u>	<u>-81.01</u>	<u>7.97</u>	<u>-73.04</u>	<u>H</u>	<u>94.0</u>

Table 6-5. Radiated Spurious Data (Cellular CDMA Mode – Ch. 384)

NOTES:

- 1) This device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 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 in the EUT in the [H,H2,V] positioning. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 16 of 37	

Cellular CDMA Radiated Measurements (Cont'd)
§2.1053 §22.917(a) RSS-132(4.5.1)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 848.31 MHz
 CHANNEL: 777
 MEASURED OUTPUT POWER: 19.85 dBm = 0.097 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 32.85 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
1696.62	-51.17	2.09	-49.08	H	68.9
2544.93	-80.16	3.16	-77.00	H	96.8
3393.24	-82.15	5.83	-76.31	H	96.2
4241.55	-81.79	7.24	-74.56	H	94.4
5089.86	-80.79	8.02	-72.77	H	92.6

Table 6-6. Radiated Spurious Data (Cellular CDMA Mode – Ch. 777)

NOTES:

- 1) This device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 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 in the EUT in the [H,H2,V] positioning. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 17 of 37	

6.5 PCS CDMA Radiated Measurements

§2.1053 §24.238(a) RSS-133(6.5.2)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 1851.25 MHz
 CHANNEL: 25
 MEASURED OUTPUT POWER: 24.50 dBm = 0.282 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 37.50 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3702.50	-47.09	8.40	-38.69	H	63.2
5553.75	-82.02	10.62	-71.40	H	95.9
7405.00	-80.02	11.82	-68.20	H	92.7
9256.25	-79.41	13.30	-66.12	H	90.6
11107.50	-76.03	13.50	-62.53	H	87.0

Table 6-7. Radiated Spurious Data (PCS CDMA Mode – Ch. 25)

NOTES:

- 1) This device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 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 in the EUT in the [H,H2,V] positioning. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 18 of 37	

PCS CDMA Radiated Measurements (Cont'd)
§2.1053 §24.238(a) RSS-133(6.5.2)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 1880.00 MHz
 CHANNEL: 661
 MEASURED OUTPUT POWER: 23.98 dBm = 0.250 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 36.98 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3760.00	-48.68	8.42	-40.25	H	64.2
5640.00	-36.88	10.66	-26.23	H	50.2
7520.00	-80.12	11.92	-68.20	H	92.2
9400.00	-79.36	13.24	-66.12	H	90.1
11280.00	-76.02	13.49	-62.53	H	86.5

Table 6-8. Radiated Spurious Data (PCS CDMA Mode – Ch. 600)

NOTES:

- 1) This device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 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 in the EUT in the [H,H2,V] positioning. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 19 of 37	

PCS CDMA Radiated Measurements (Cont'd)
§2.1053 §24.238(a) RSS-133(6.5.2)

Field Strength of SPURIOUS Radiation



OPERATING FREQUENCY: 1908.75 MHz
 CHANNEL: 1175
 MEASURED OUTPUT POWER: 24.93 dBm = 0.311 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 37.93 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3817.50	-47.49	8.57	-38.92	H	63.9
5726.25	-82.09	10.69	-71.40	H	96.3
7635.00	-80.26	12.06	-68.20	H	93.1
9543.75	-79.32	13.20	-66.12	H	91.0
11452.50	-75.95	13.42	-62.53	H	87.5

Table 6-9. Radiated Spurious Data (PCS CDMA Mode – Ch. 1175)

NOTES:

- 1) This device was tested under all R.C.s and S.O.s and the worst case is reported with RC3/SO55 with "All Up" power control bits.
- 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 in the EUT in the [H,H2,V] positioning. The data reported in the table above was measured in this test setup.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 20 of 37	

6.6 Cellular CDMA Frequency Stability Measurements

§2.1055 §22.355 RSS-132(4.3)

OPERATING FREQUENCY: 836,520,000 Hz



CHANNEL: 384

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)	836,520,002	2	0.0000002
100 %		- 30	836,520,003	3	0.0000004
100 %		- 20	836,520,004	4	0.0000005
100 %		- 10	836,519,992	-8	-0.0000010
100 %		0	836,519,995	-5	-0.0000006
100 %		+ 10	836,520,016	16	0.0000019
100 %		+ 20	836,520,018	18	0.0000022
100 %		+ 30	836,519,995	-5	-0.0000006
100 %		+ 40	836,520,009	9	0.0000011
100 %		+ 50	836,519,997	-3	-0.0000004
115 %	4.37	+ 20	836,519,981	-19	-0.0000023
BATT. ENDPOINT	3.40	+ 20	836,519,988	-12	-0.0000014

Table 6-10. Frequency Stability Data (Cellular CDMA Mode – Ch. 384)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 21 of 37	

Cellular CDMA Frequency Stability Measurements (Cont'd)
§2.1055 §22.355 RSS-132(4.3)

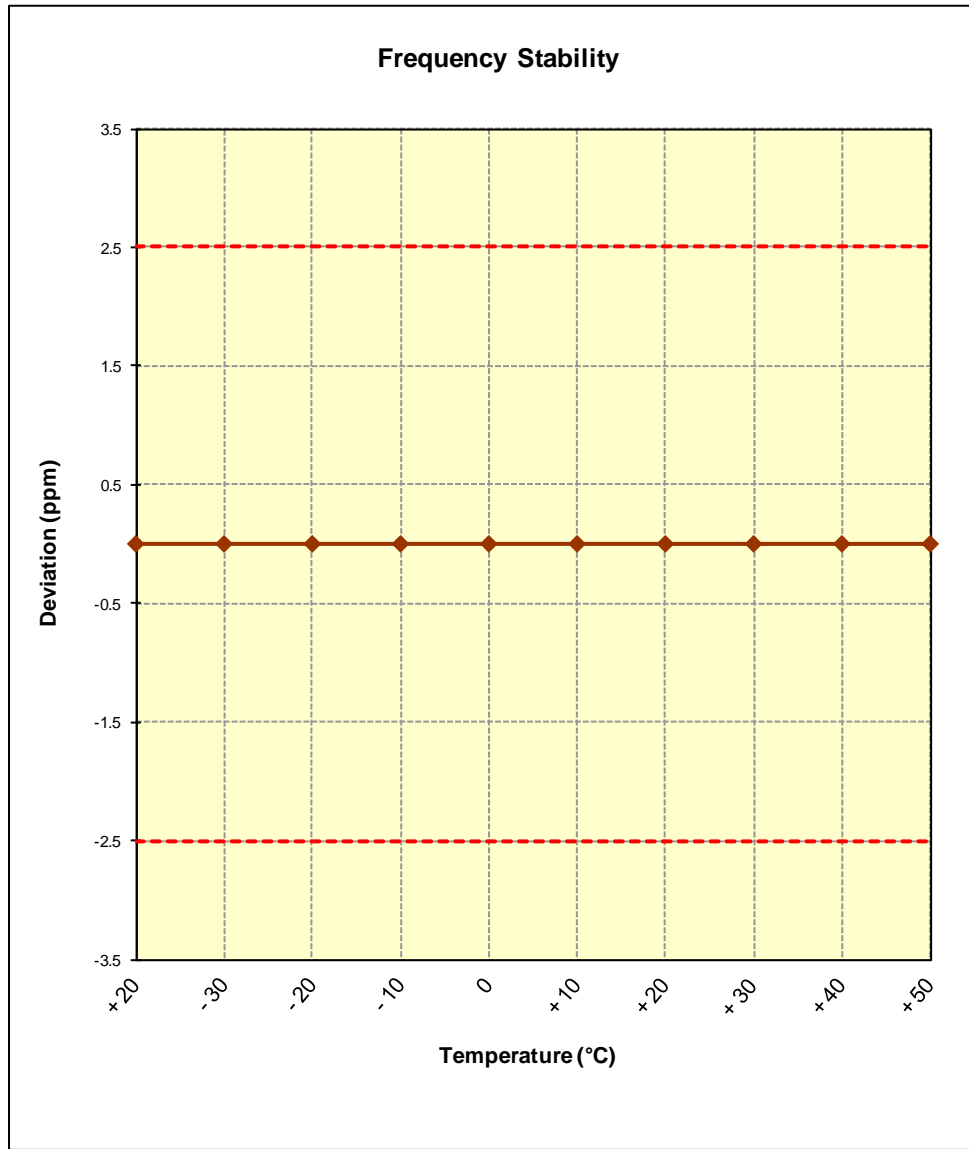




Figure 6-1. Frequency Stability Graph (Cellular CDMA Mode – Ch. 384)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 22 of 37	

6.7 PCS CDMA Frequency Stability Measurements

§2.1055 §24.235 RSS-139(6.3)

OPERATING FREQUENCY: 1,880,000,000 Hz

CHANNEL: 661



REFERENCE VOLTAGE: 3.8 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (° C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.80	+ 20 (Ref)	1,879,999,984	-16	-0.0000009
100 %		- 30	1,880,000,014	14	0.0000007
100 %		- 20	1,879,999,980	-20	-0.0000011
100 %		- 10	1,880,000,003	3	0.0000002
100 %		0	1,879,999,997	-3	-0.0000002
100 %		+ 10	1,880,000,002	2	0.0000001
100 %		+ 20	1,879,999,985	-15	-0.0000008
100 %		+ 30	1,880,000,012	12	0.0000006
100 %		+ 40	1,879,999,993	-7	-0.0000004
100 %		+ 50	1,879,999,986	-14	-0.0000007
115 %	4.37	+ 20	1,880,000,005	5	0.0000003
BATT. ENDPOINT	3.40	+ 20	1,879,999,982	-18	-0.0000010

Table 6-11. Frequency Stability Data (PCS CDMA Mode – Ch. 600)

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 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 23 of 37	

PCS CDMA Frequency Stability Measurements (Cont'd)
§2.1055 §24.235 RSS-139(6.3)

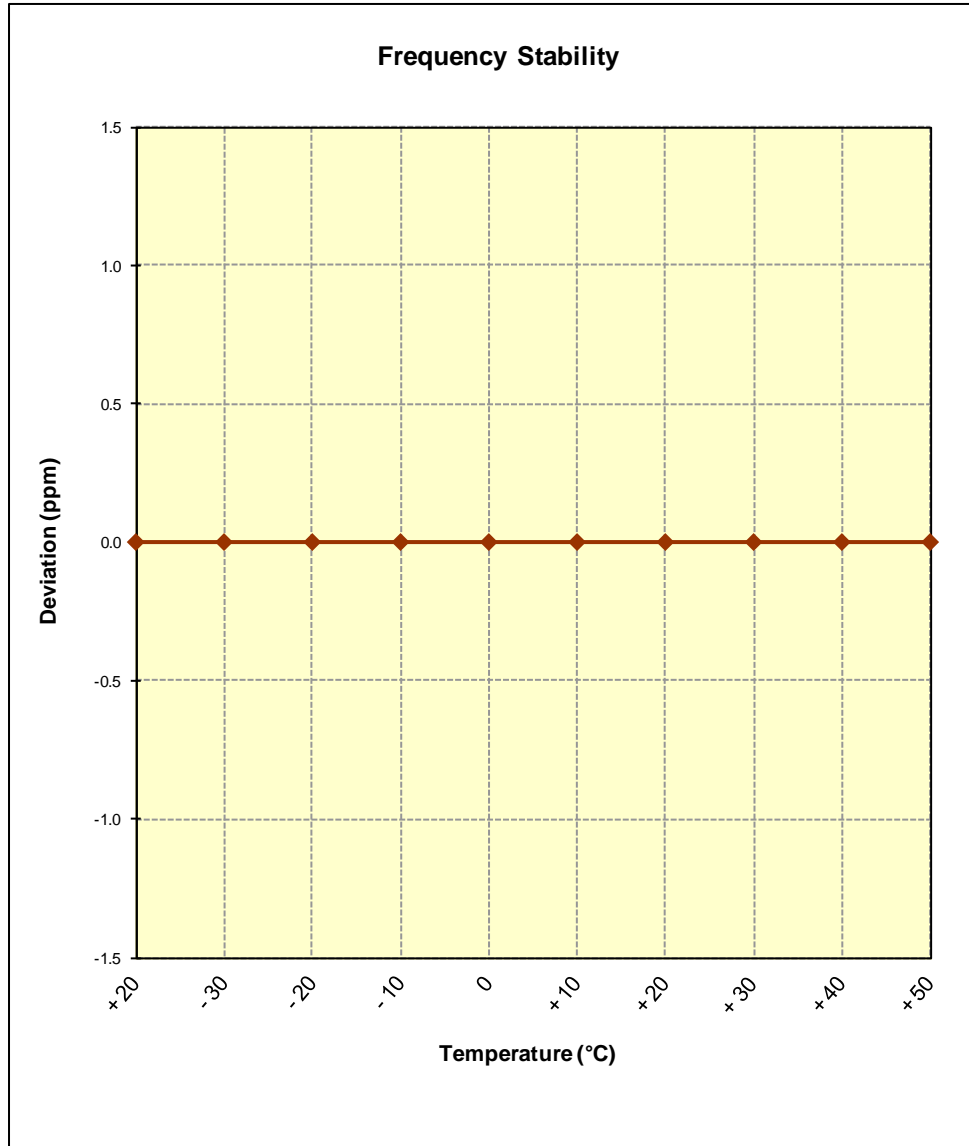


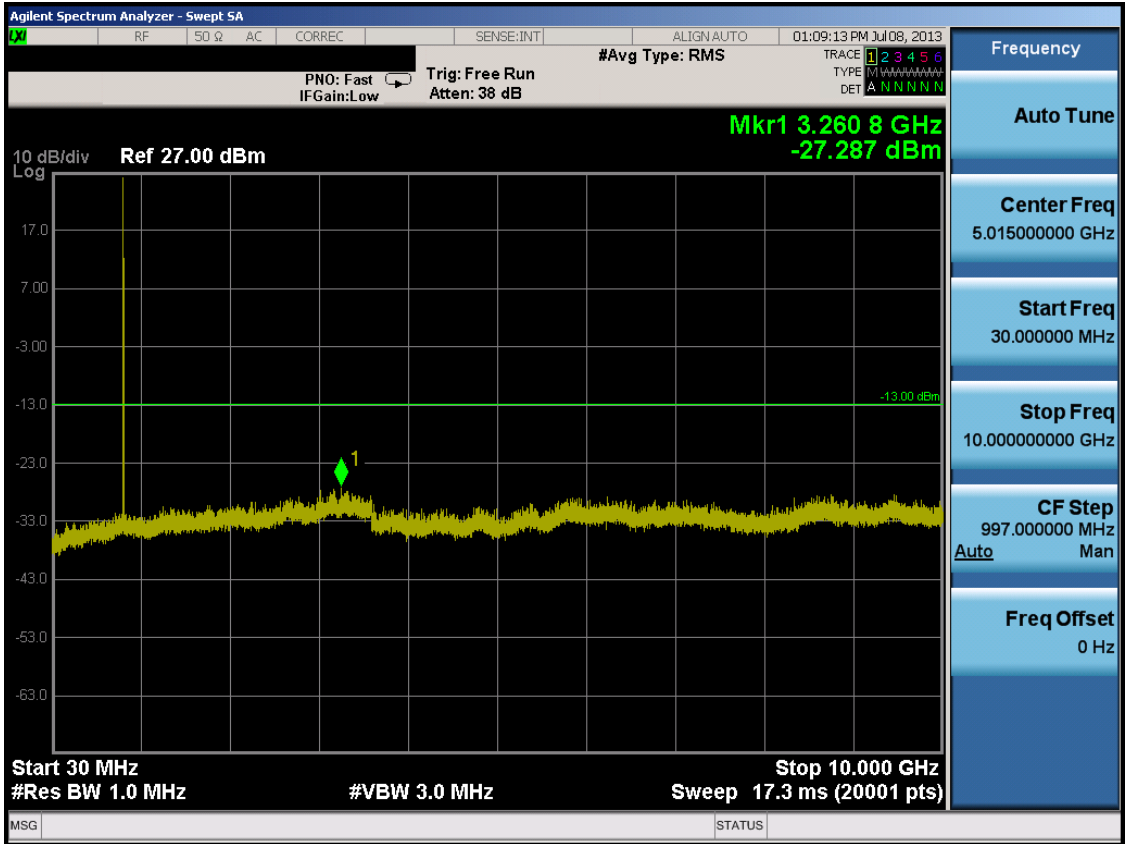


Figure 6-2. Frequency Stability Graph (PCS CDMA Mode – Ch. 600)

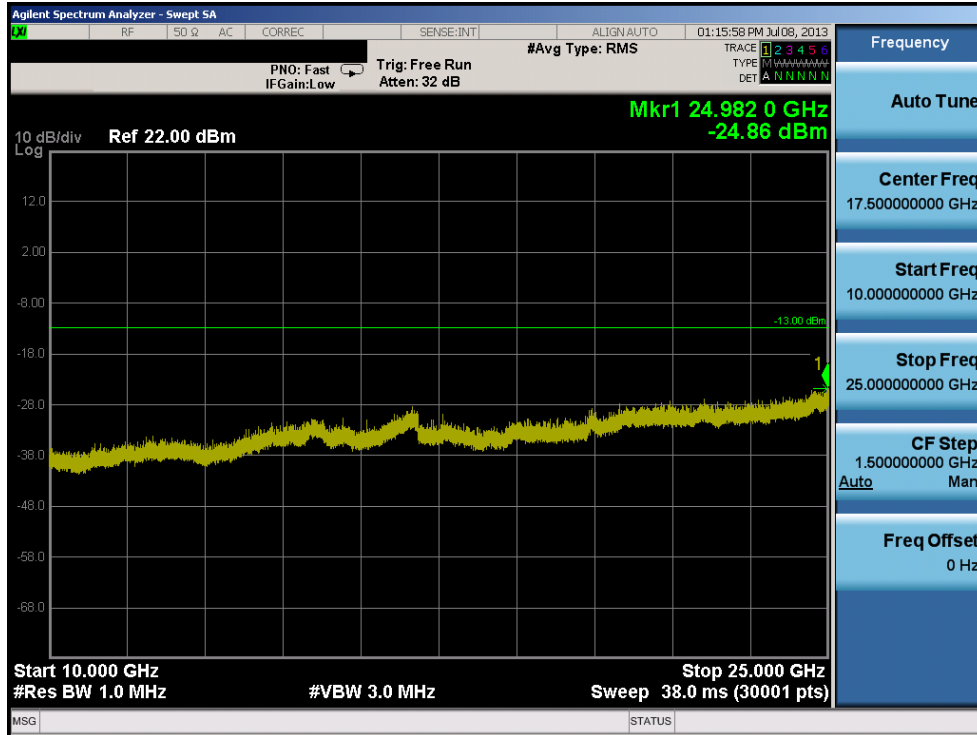
FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset	Page 24 of 37	

7.0 PLOTS OF EMISSIONS

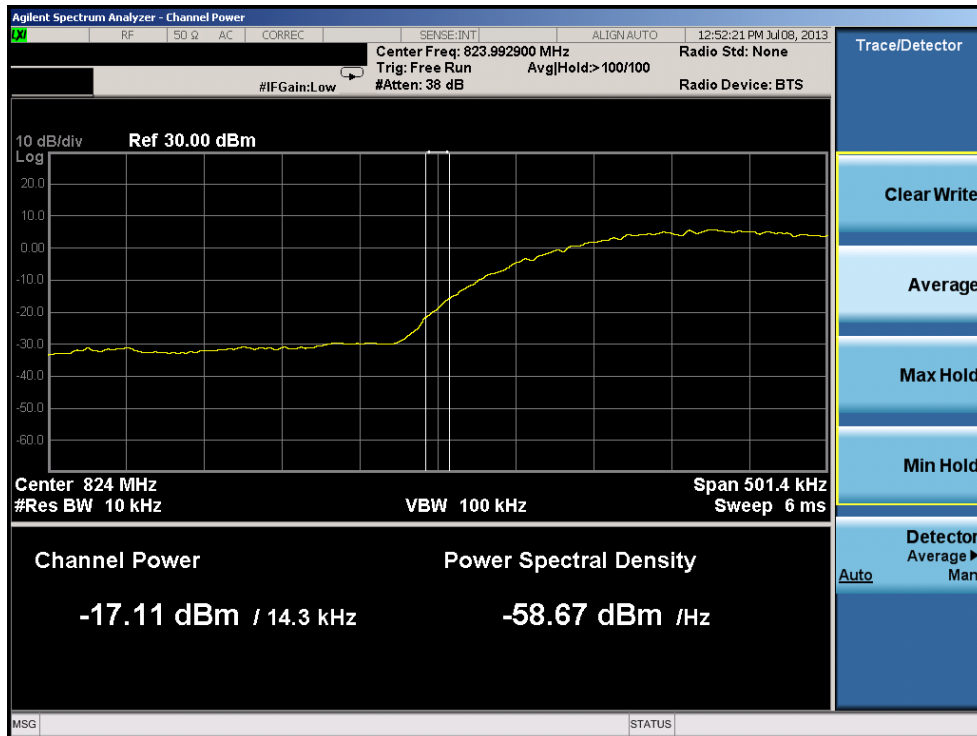


Plot 7-1. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 1013)

FCC ID: A3LSPHL520	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 25 of 37



Plot 7-2. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 1013)

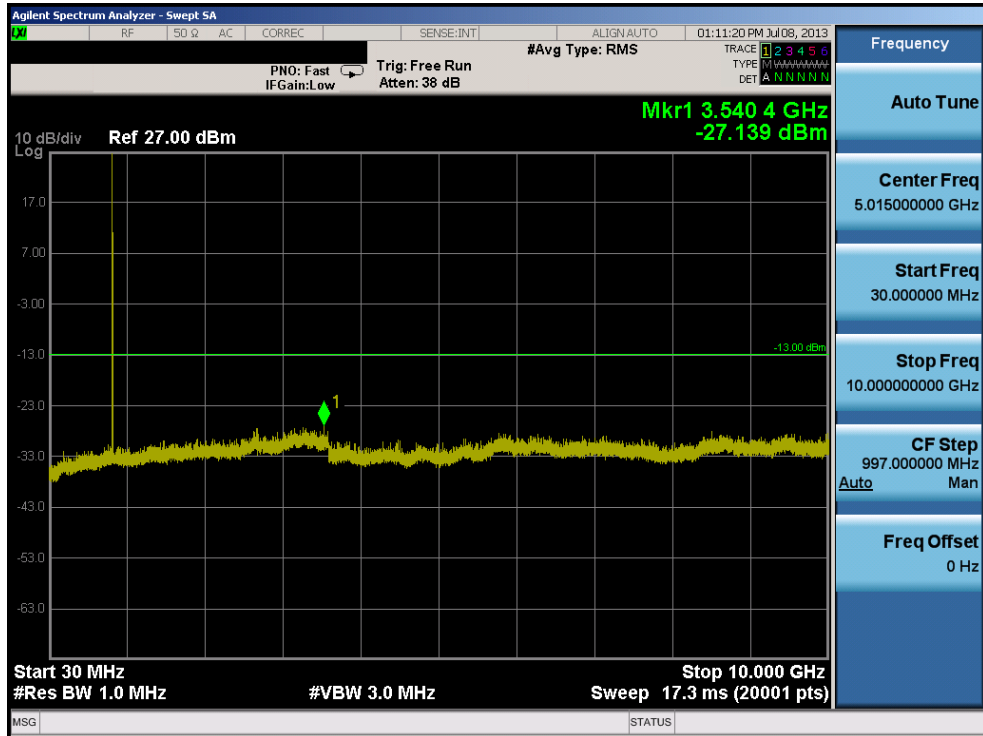


Plot 7-3. Band Edge Plot (Cellular CDMA Mode – Ch. 1013)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 26 of 37

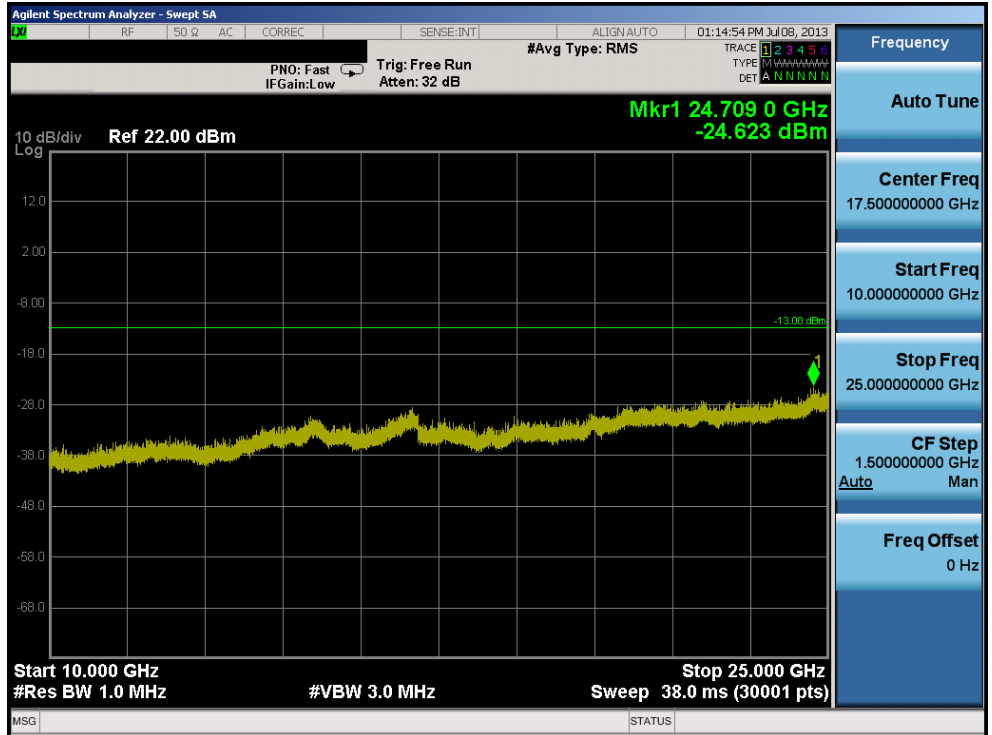


Plot 7-4. 4MHz Span Plot (Cellular CDMA Mode – Ch. 1013)

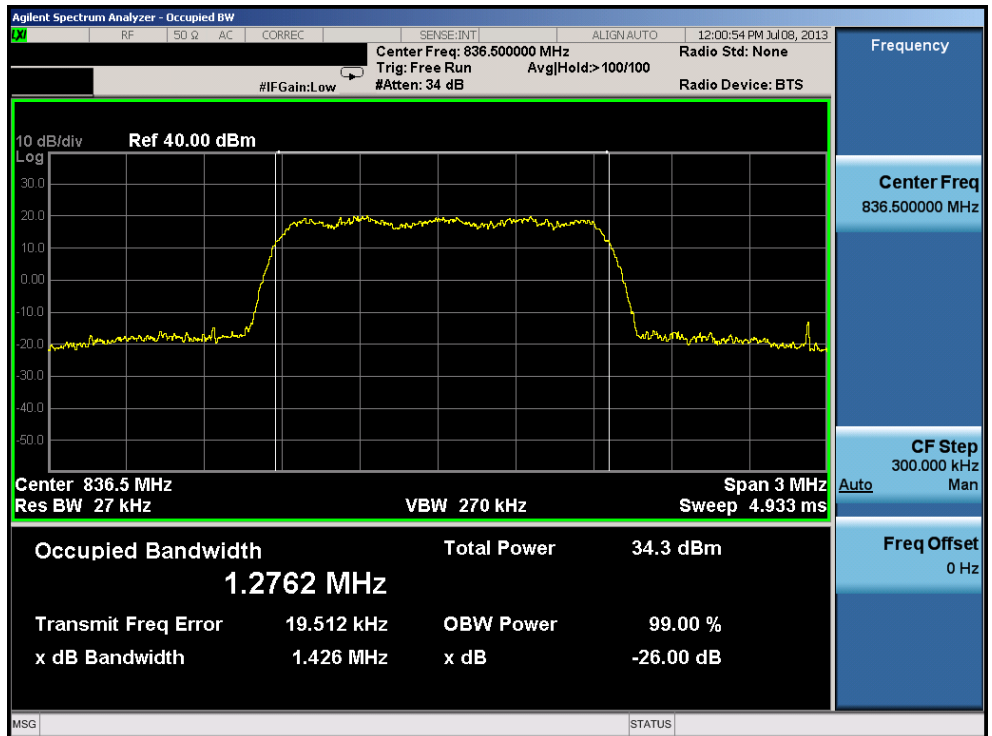


Plot 7-5. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 384)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 27 of 37

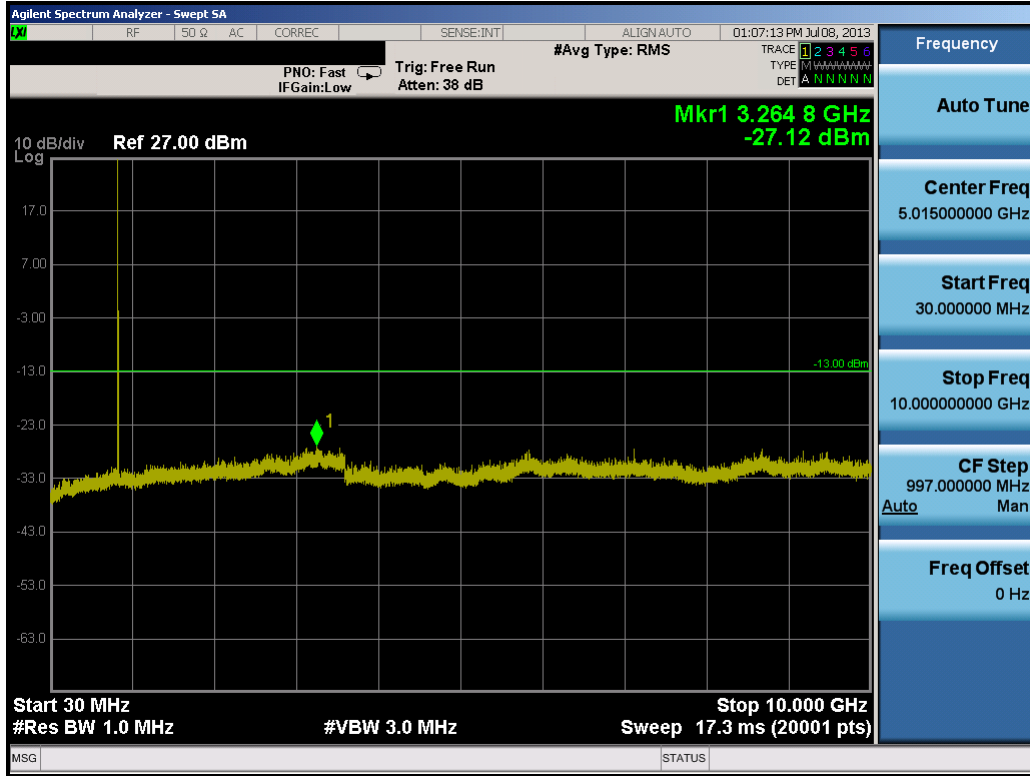


Plot 7-6. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 384)

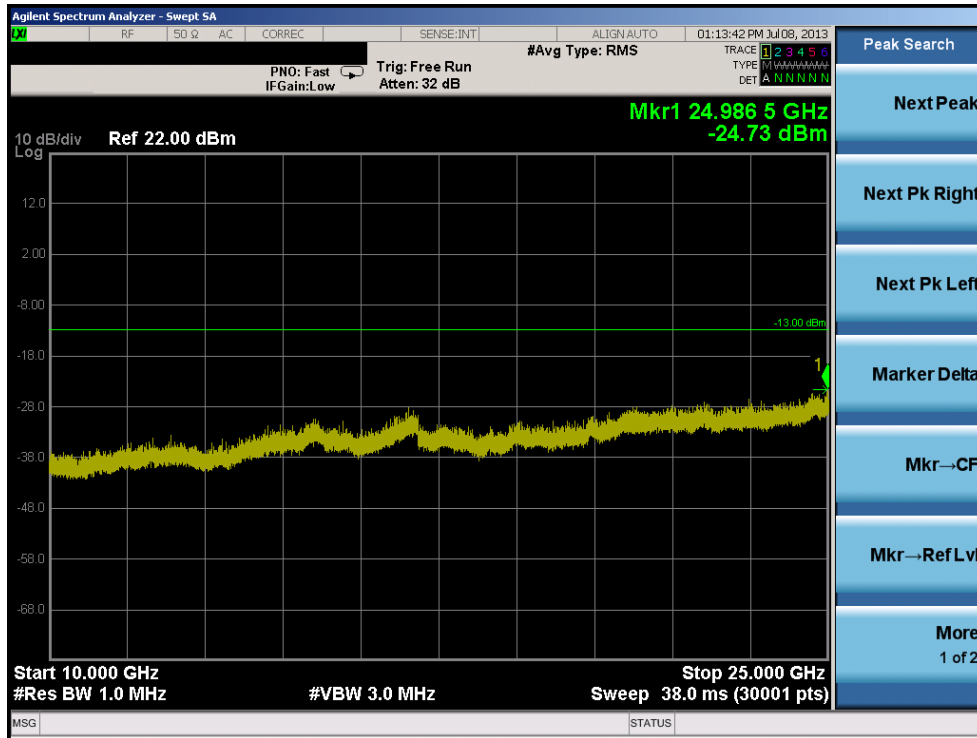


Plot 7-7. Occupied Bandwidth Plot (Cellular CDMA Mode – Ch. 384)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 28 of 37

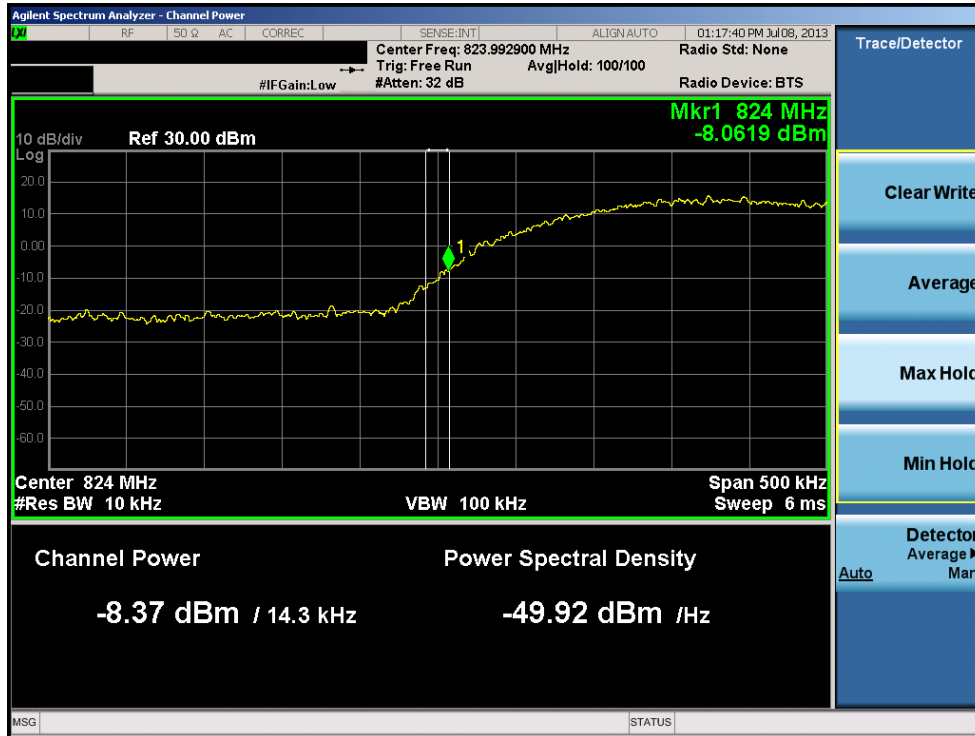


Plot 7-8. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 777)



Plot 7-9. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 777)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 29 of 37

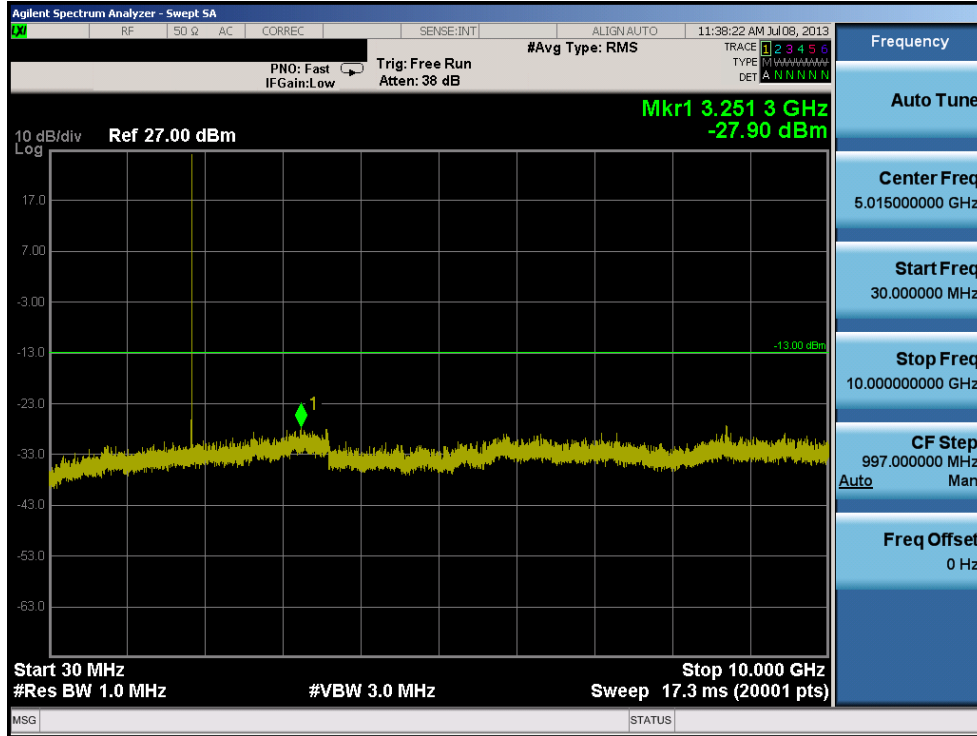


Plot 7-10. Band Edge Plot (Cellular CDMA Mode – Ch. 777)

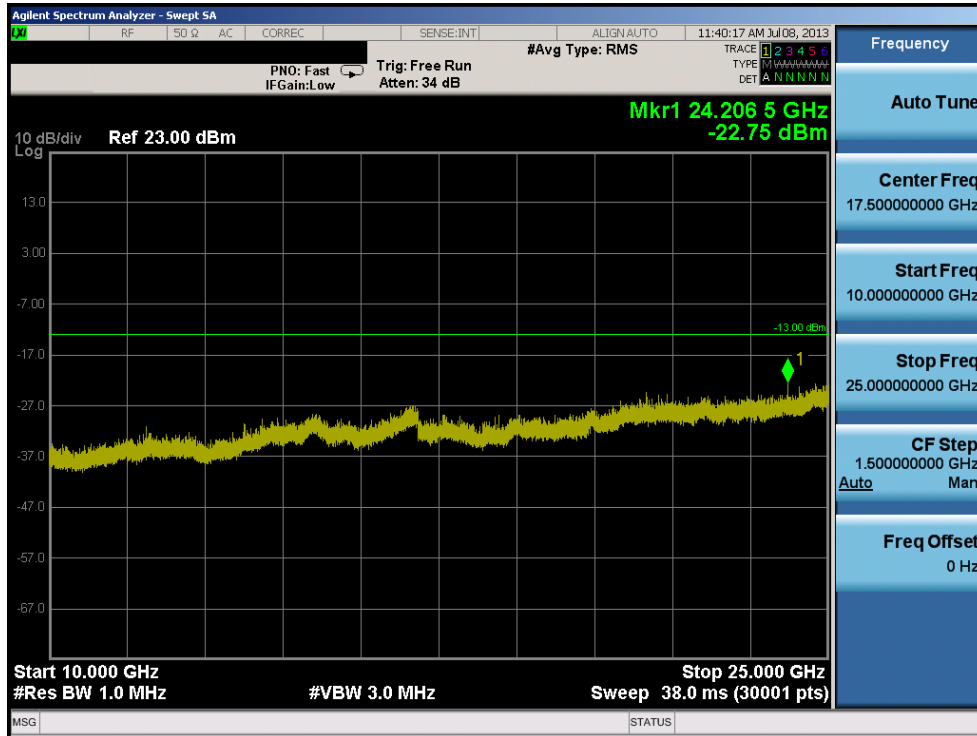


Plot 7-11. 4MHz Span Plot (Cellular CDMA Mode – Ch. 777)



FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 30 of 37



Plot 7-12. Conducted Spurious Plot (PCS CDMA Mode – Ch. 25)

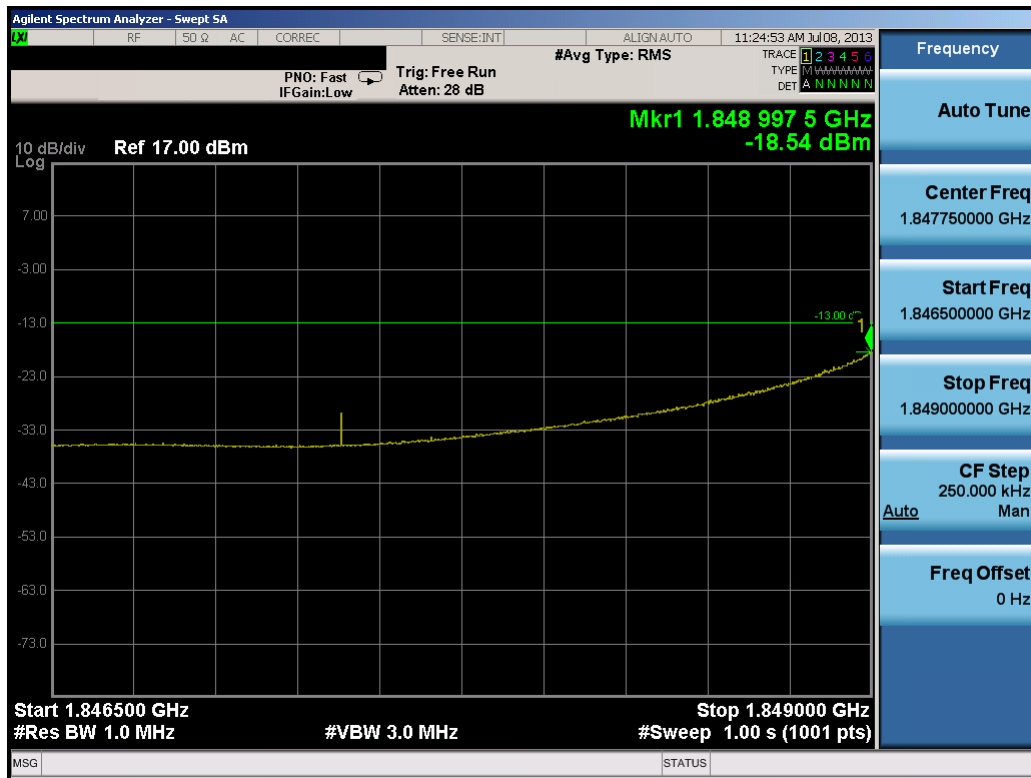


Plot 7-13. Conducted Spurious Plot (PCS CDMA Mode – Ch. 25)



FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 31 of 37

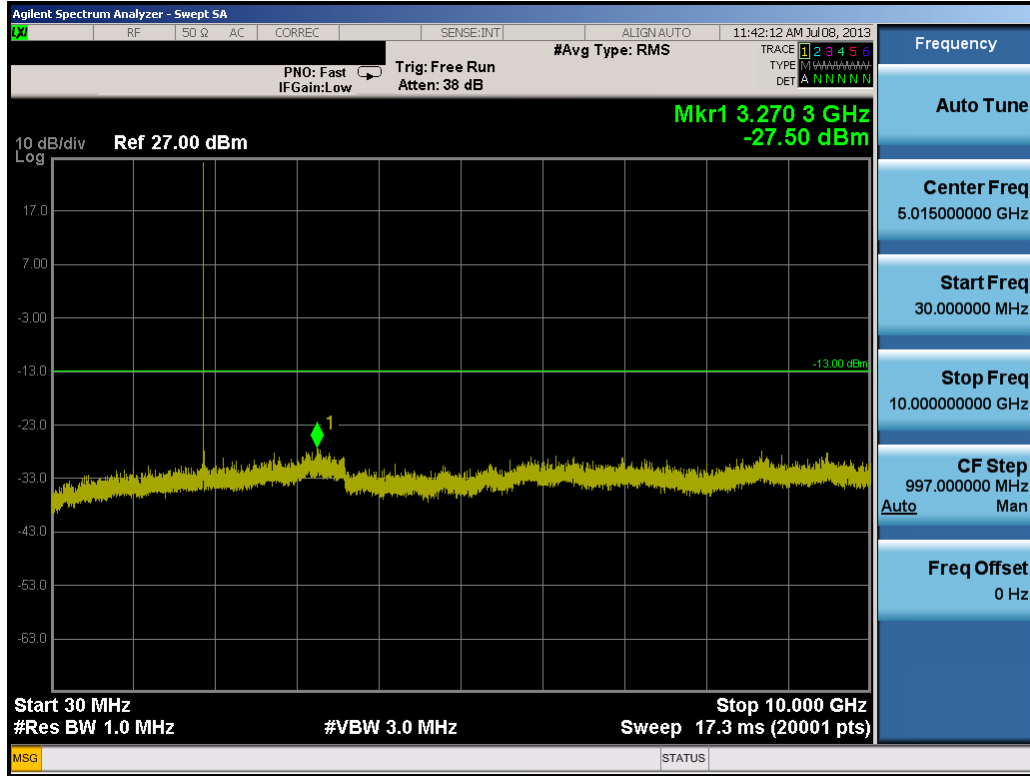


Plot 7-14. Band Edge Plot (PCS CDMA Mode – Ch. 25)

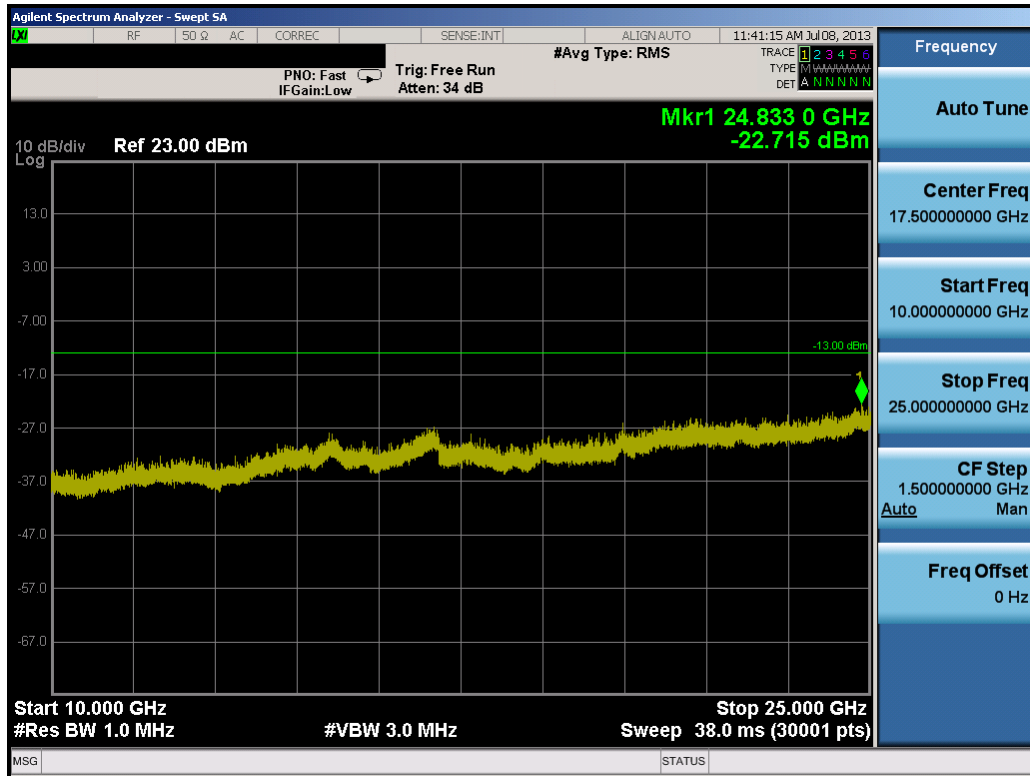


Plot 7-15. 4MHz Span Plot (PCS CDMA Mode – Ch. 25)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 32 of 37

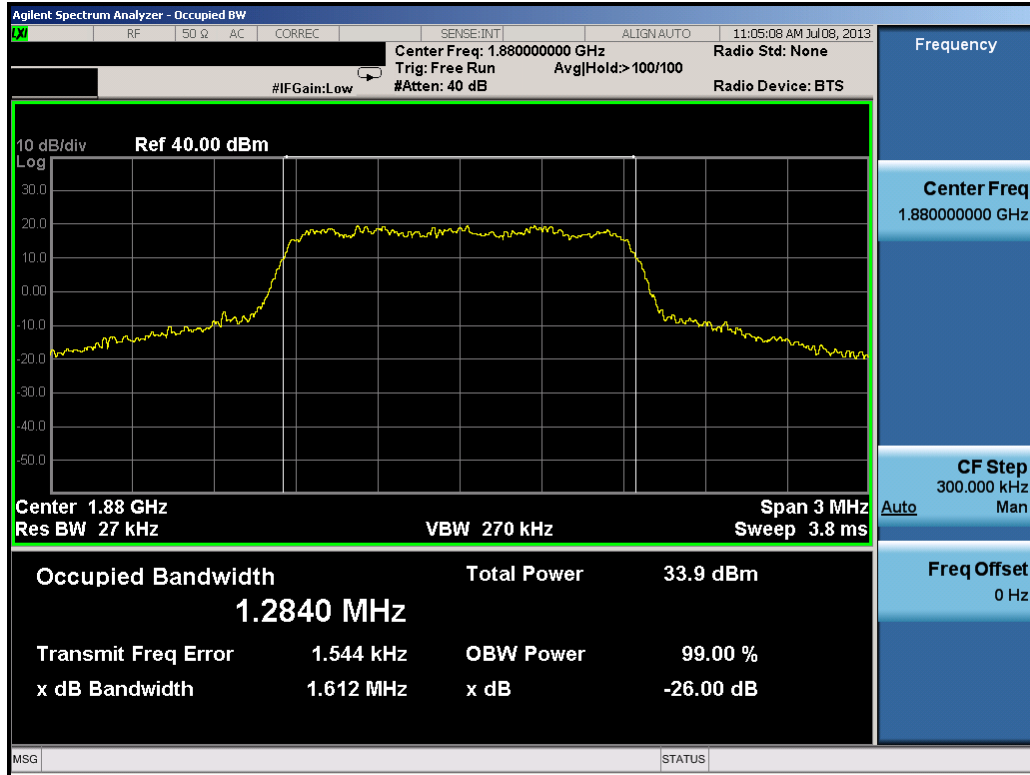


Plot 7-16. Conducted Spurious Plot (PCS CDMA Mode – Ch. 600)

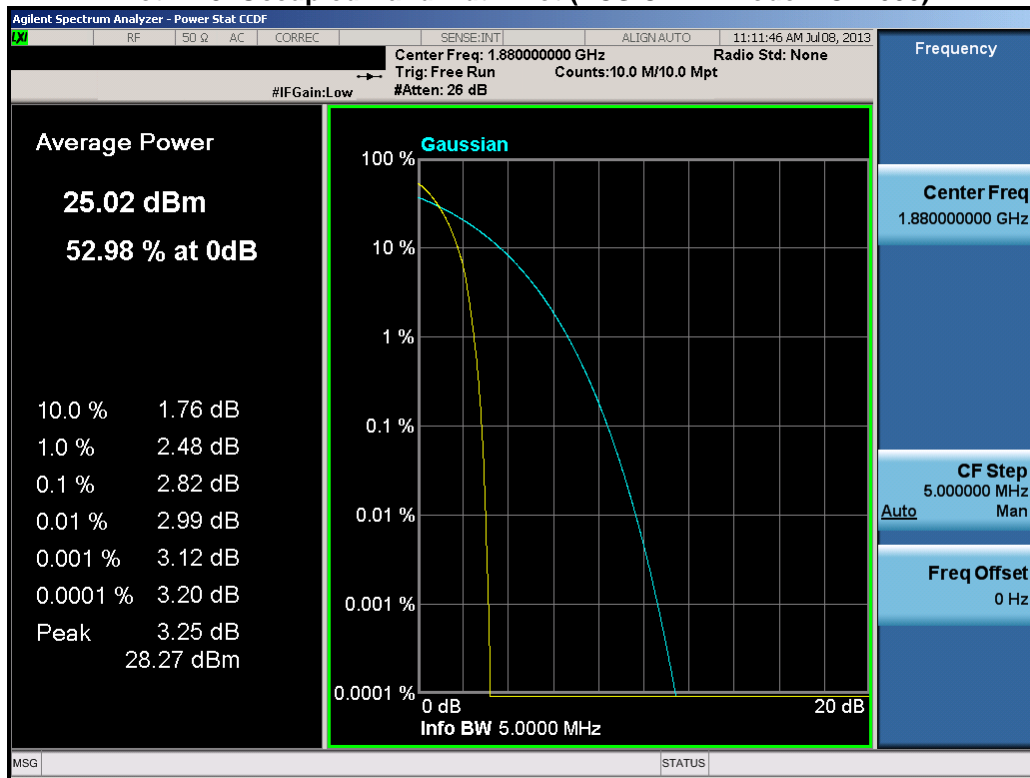


Plot 7-17. Conducted Spurious Plot (PCS CDMA Mode – Ch. 600)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 33 of 37

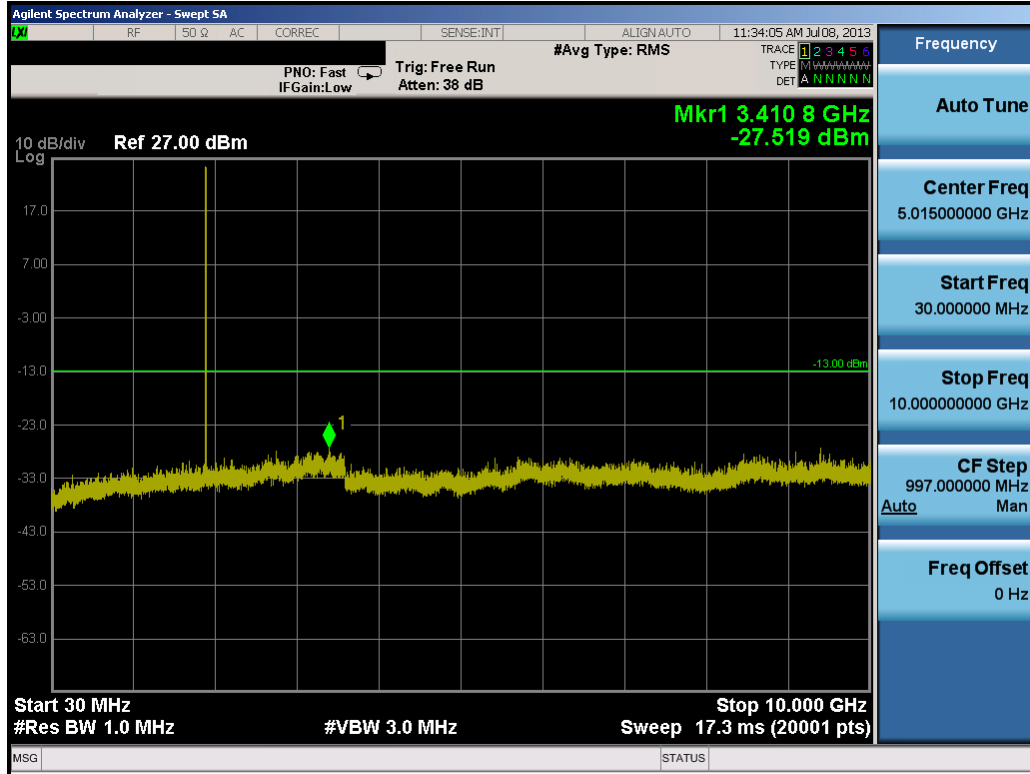


Plot 7-18. Occupied Bandwidth Plot (PCS CDMA Mode – Ch. 600)

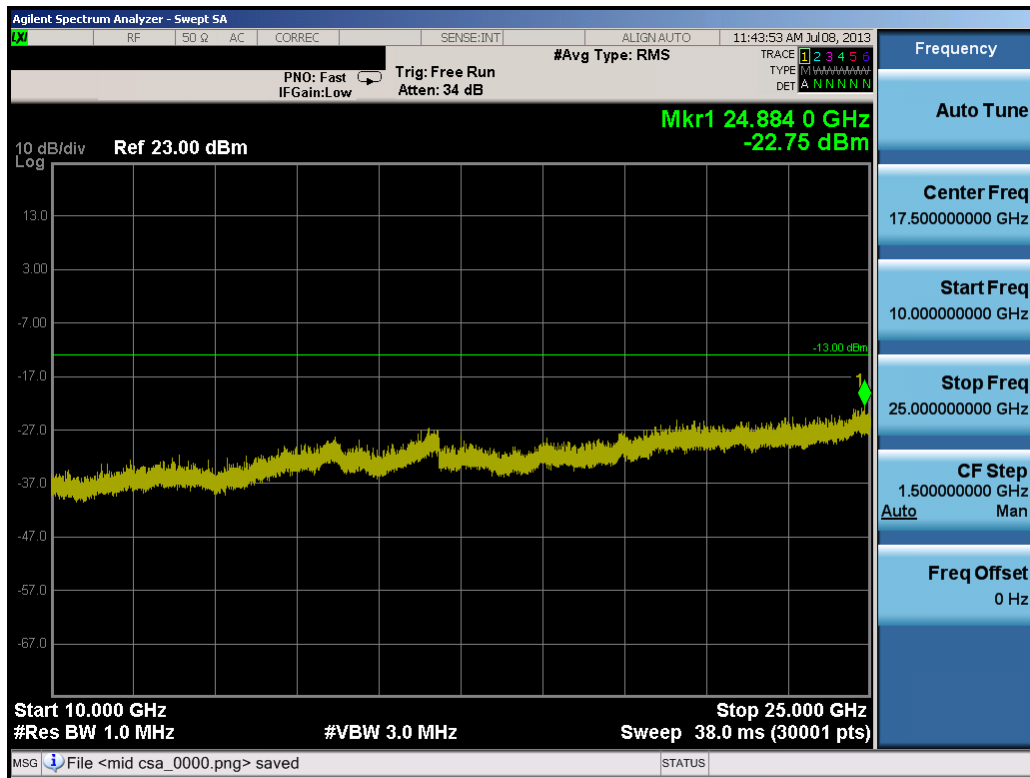


Plot 7-19. Peak-Average Ratio Plot (PCS CDMA Mode – Ch. 600)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 34 of 37



Plot 7-20. Conducted Spurious Plot (PCS CDMA Mode – Ch. 1175)

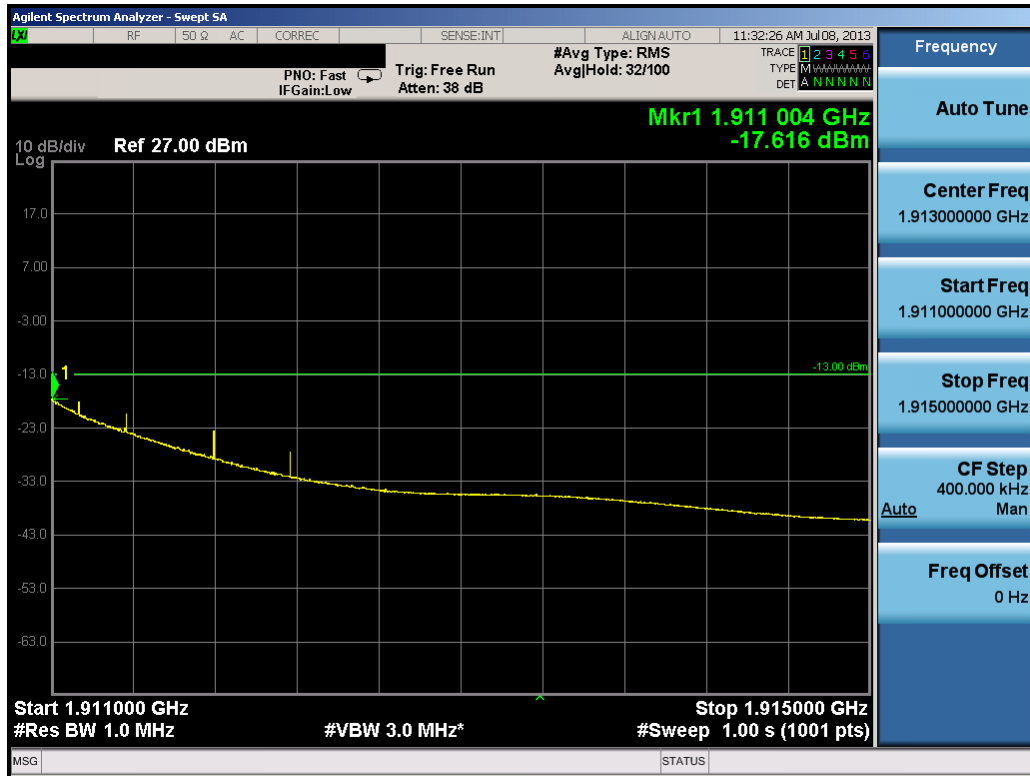


Plot 7-21. Conducted Spurious Plot (PCS CDMA Mode – Ch. 1175)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 35 of 37



Plot 7-22. Band Edge Plot (PCS CDMA Mode – Ch. 1175)



Plot 7-23. 4MHz Span Plot (PCS CDMA Mode – Ch. 1175)

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 36 of 37

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Electronics Co., Ltd. Portable Handset FCC ID: A3LSPHL520** complies with all the requirements of Parts 2, 22, 24 of the FCC rules.

FCC ID: A3LSPHL520		FCC Pt. 22 & 24 CDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1306281122.A3L	Test Dates: 06/31/2013 - 07/17/2013	EUT Type: Portable Handset		Page 37 of 37