



PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.pctestlab.com



MEASUREMENT REPORT FCC Part 22, 24

Applicant Name:
Samsung Electronics Co., Ltd.
129, Samsung-ro, Yeongtong-gu
Suwon-city, Gyeonggi-do, 443-803
Republic of Korea

Date of Testing:
February 1-12, 2013
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0Y1301310135.A3L


| | |
|-------------------|--------------------------------------|
| FCC ID: | A3LSPHM840 |
| APPLICANT: | SAMSUNG ELECTRONICS CO., LTD. |

Application Type: Certification
Model(s): SPH-M840
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
Test Device Serial No.: *identical prototype* [S/N: FK-022-D, FK-022-E]



| Mode | Tx Frequency (MHz) | Emission Designator | ERP/EIRP | |
|----------|--------------------|---------------------|----------------|------------------|
| | | | Max. Power (W) | Max. Power (dBm) |
| CDMA850 | 824.70 - 848.31 | 1M27F9W | 0.150 | 21.75 |
| CDMA1900 | 1851.25 - 1908.75 | 1M27F9W | 0.203 | 23.06 |

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 Ortañez
 President

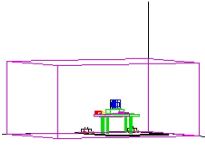


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MEASUREMENT REPORT

FCC Part 22, 24



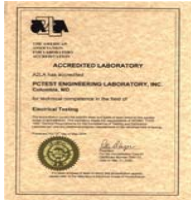
§2.1033 General Information



APPLICANT: Samsung Electronics Co., Ltd.
APPLICANT ADDRESS: 129, Samsung-ro, Yeongtong-gu
 Suwon-city, Gyeonggi-do, 443-803, Republic of 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-M840
FCC ID: A3LSPHM840
FCC CLASSIFICATION: PCS Licensed Transmitter Held to Ear (PCE)
MODE:
FREQUENCY TOLERANCE: ±0.00025 % (2.5 ppm)
Test Device Serial No.: FK-022-D, FK-022-E Production Pre-Production Engineering
DATE(S) OF TEST: February 1-12, 2013
TEST REPORT S/N: 0Y1301310135.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.



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1.0 INTRODUCTION

1.1 Scope

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

1.2 Testing Facility

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

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

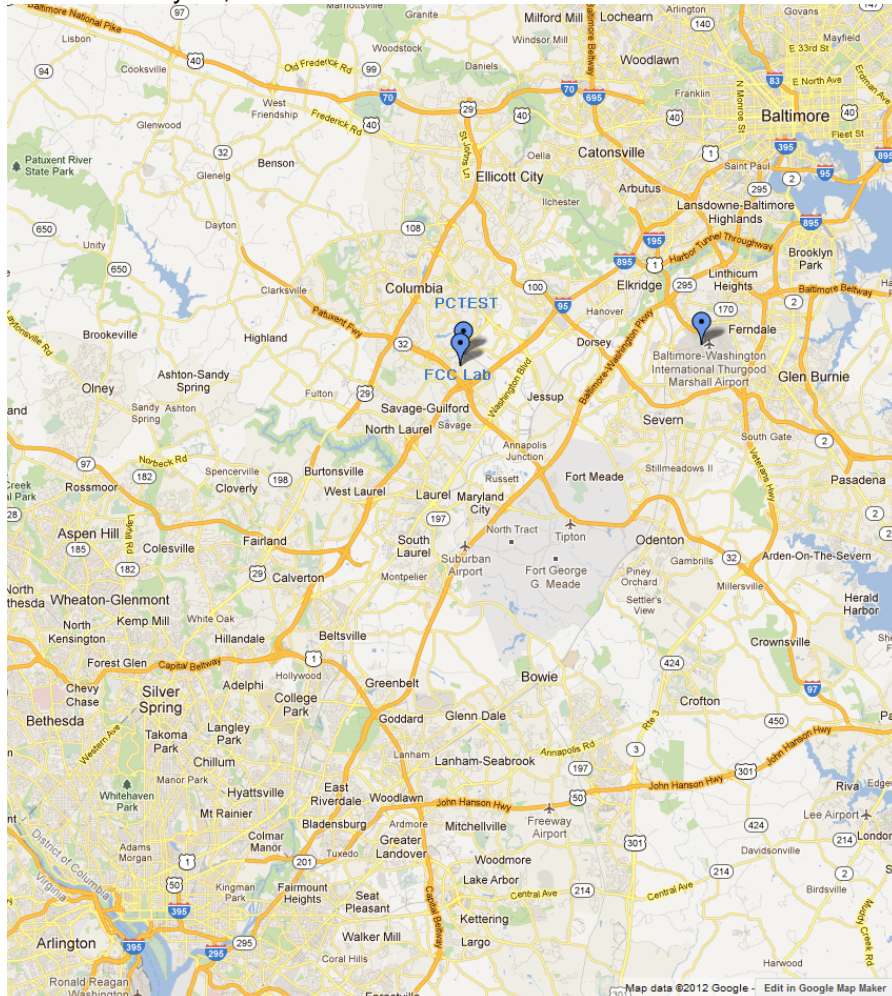




Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSPHM840**. 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 /EvDO Rev 0/A /1xAdvanced (BC0, BC1, BC10), 802.11a/b/g/n WLAN (DTS/NII), Bluetooth (1x,EDR, LE)

2.3 Test Configuration

The Samsung Portable Handset FCC ID: A3LSPHM840 was tested per the guidance of ANSI/TIA-603-C-2004 and KDB 971168. 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.

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3.0 DESCRIPTION OF TESTS

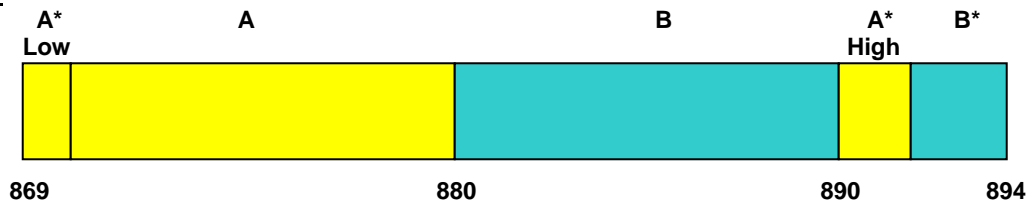
3.1 Evaluation Procedure

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” were used in the measurement of the measurement of the **Samsung Portable Handset FCC ID: A3LSPHM840**.

Deviation from Measurement Procedure.....None

3.2 Cellular - Base Frequency Blocks

§22.905



BLOCK 1: 869 – 880 MHz (A* Low + A)

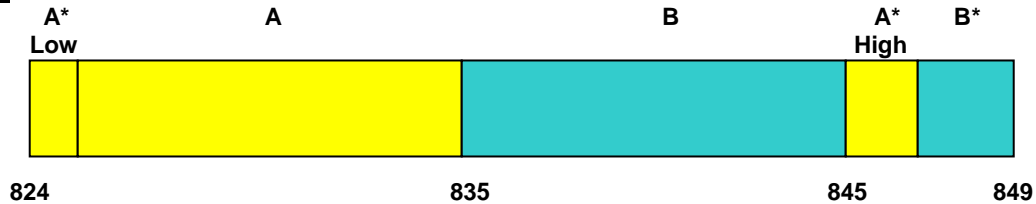
BLOCK 3: 890 – 891.5 MHz (A* High)

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)

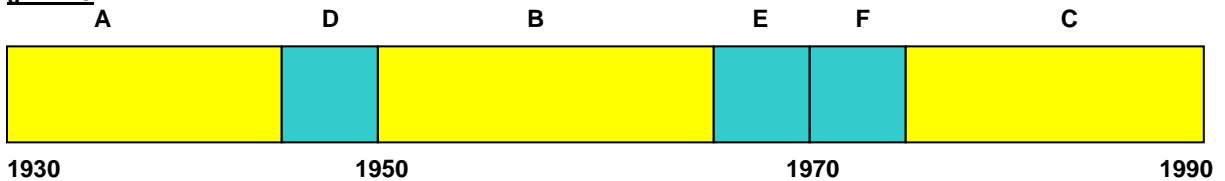
BLOCK 3: 845 – 846.5 MHz (A* High)

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)

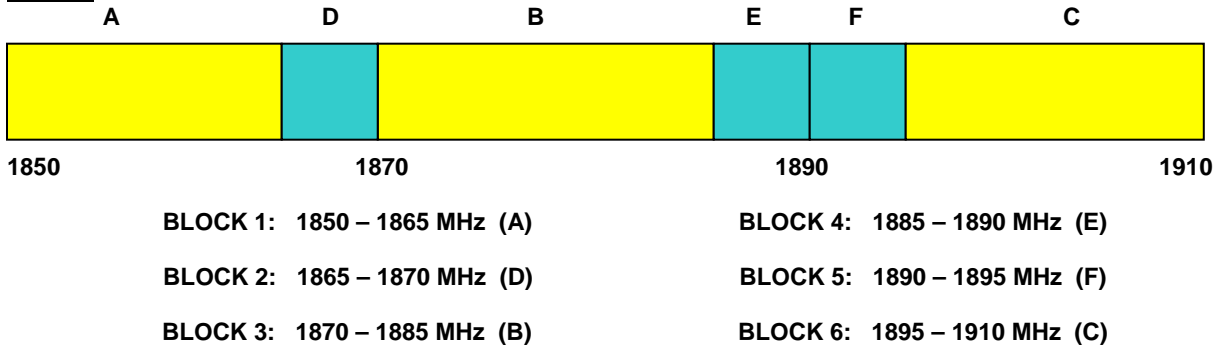
BLOCK 3: 1950 – 1965 MHz (B)

BLOCK 6: 1975 – 1990 MHz (C)

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3.5 PCS - Mobile Frequency Blocks

§24.229



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.

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 3/4" (~1.9cm) sheet of high density

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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:

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

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 $P_g [dBm] - \text{cable loss} [dB]$.



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 $43 + 10\log_{10}(\text{Power} [Watts])$ 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.

For pulsed signals, the spectrum analyzer is set to use an internal “RF Burst” trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the “on time” of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power. For continuous signals, the trigger is set to “free run” in the CCDF measurement mode.

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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 $\pm 0.00025\%$ (± 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.

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.



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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 | 1/17/2013 | Annual | 1/17/2014 | N/A |
| - | RE1 | Radiated Emissions Cable Set (UHF/EHF) | 7/10/2012 | Annual | 7/10/2013 | N/A |
| Agilent | N9020A | MXA Signal Analyzer | 10/9/2012 | Annual | 10/9/2013 | US46470561 |
| Espec | ESX-2CA | Environmental Chamber | 4/4/2012 | Annual | 4/4/2013 | 17620 |
| ETS Lindgren | 3117 | 1-18 GHz DRG Horn (Medium) | 7/22/2011 | Biennial | 7/22/2013 | 125518 |
| ETS Lindgren | 3160-09 | 18-26.5 GHz Standard Gain Horn | 5/30/2012 | Biennial | 5/30/2014 | 135427 |
| 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 |
| Rohde & Schwarz | CMU200 | Base Station Simulator | 5/22/2012 | Annual | 5/22/2013 | 109892 |
| Rohde & Schwarz | TS-PR18 | 1-18 GHz Pre-Amplifier | 6/26/2012 | Annual | 6/26/2013 | 100071 |
| Rohde & Schwarz | TS-PR26 | 18-26.5 GHz Pre-Amplifier | 5/30/2012 | Annual | 5/30/2013 | 100040 |
| Rohde & Schwarz | ESU26 | EMI Test Receiver | 2/15/2012 | Annual | 2/15/2013 | 100342 |
| Schwarzbeck | UHA 9105 | Dipole Antenna (400 - 1GHz) Rx | 11/14/2011 | Biennial | 11/14/2013 | 9105-2404 |
| 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

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|---|---|--|---|--|
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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.

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6.0 TEST RESULTS

6.1 Summary



Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSPHM840
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): CDMA / EvDO / 1xAdvanced

| 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 22.863 22.905 24.229 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. Powers for EvDO and 1xAdvanced were measured to be less than or equal to the RC3/SO55 configuration. 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.

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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 | 15.97 | 4.60 | H | 20.57 | 0.114 | 38.45 | -17.88 |
| 836.52 | CDMA850 | Standard | 16.53 | 4.82 | H | 21.35 | 0.137 | 38.45 | -17.10 |
| 848.31 | CDMA850 | Standard | 16.71 | 5.04 | H | 21.75 | 0.150 | 38.45 | -16.70 |

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 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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6.3 PCS Effective Radiated 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 | 12.39 | 9.60 | H | 21.99 | 0.158 | 33.01 | -11.02 |
| 1880.00 | CDMA1900 | Standard | 12.53 | 9.53 | H | 22.06 | 0.161 | 33.01 | -10.95 |
| 1908.75 | CDMA1900 | Standard | 13.59 | 9.47 | H | 23.06 | 0.203 | 33.01 | -9.95 |

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 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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6.4 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: 20.57 dBm = 0.114 W
 MODULATION SIGNAL: CDMA
 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) |
|-----------------|---------------------------------|-------------------------------|-------------------------------|-----------|-------|
| 1649.40 | -45.58 | 2.59 | -42.99 | H | 63.6 |
| 2474.10 | -80.87 | 2.89 | -77.98 | H | 98.6 |
| 3298.80 | -82.84 | 5.45 | -77.39 | H | 98.0 |
| 4123.50 | -83.02 | 7.05 | -75.97 | H | 96.5 |
| 4948.20 | -82.87 | 7.87 | -75.01 | H | 95.6 |

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 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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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: 21.35 dBm = 0.137 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.35 dBc

| FREQUENCY (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | SPURIOUS EMISSION LEVEL (dBm) | POL (H/V) | (dBc) |
|-----------------|---------------------------------|-------------------------------|-------------------------------|-----------|-------|
| 1673.04 | -44.66 | 2.59 | -42.07 | H | 63.4 |
| 2509.56 | -80.57 | 2.89 | -77.68 | H | 99.0 |
| 3346.08 | -82.96 | 5.45 | -77.51 | H | 98.9 |
| 4182.60 | -83.09 | 7.05 | -76.04 | H | 97.4 |
| 5019.12 | -82.74 | 7.87 | -74.87 | H | 96.2 |

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.
- 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 worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

| | | | | |
|--------------------------------------|---|---|---|---------------------------------|
| FCC ID: A3LSPHM840 |  | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) |  | Reviewed by: Quality Manager |
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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: 21.75 dBm = 0.150 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 34.75 dBc

| FREQUENCY (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBd) | SPURIOUS EMISSION LEVEL (dBm) | POL (H/V) | (dBc) |
|-----------------|---------------------------------|-------------------------------|-------------------------------|-----------|-------|
| 1696.62 | -35.85 | 2.59 | -33.27 | H | 55.0 |
| 2544.93 | -80.42 | 2.89 | -77.53 | H | 99.3 |
| 3393.24 | -83.07 | 5.45 | -77.62 | H | 99.4 |
| 4241.55 | -83.16 | 7.05 | -76.11 | H | 97.9 |
| 5089.86 | -82.58 | 7.87 | -74.71 | H | 96.5 |

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 worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

| | | | | |
|--------------------------------------|---|---|---|---------------------------------|
| FCC ID: A3LSPHM840 |  | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) |  | Reviewed by: Quality Manager |
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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: 21.99 dBm = 0.158 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 34.99 dBc

| FREQUENCY (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | SPURIOUS EMISSION LEVEL (dBm) | POL (H/V) | (dBc) |
|-----------------|---------------------------------|-------------------------------|-------------------------------|-----------|-------|
| 3702.50 | -37.68 | 8.40 | -29.28 | H | 51.3 |
| 5553.75 | -82.75 | 10.62 | -72.13 | H | 94.1 |
| 7405.00 | -81.21 | 11.82 | -69.39 | H | 91.4 |
| 9256.25 | -81.01 | 13.30 | -67.72 | H | 89.7 |
| 11107.50 | -75.54 | 13.50 | -62.04 | H | 84.0 |

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 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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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: 22.06 dBm = 0.161 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10} (W) =$ 35.06 dBc

| FREQUENCY (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | SPURIOUS EMISSION LEVEL (dBm) | POL (H/V) | (dBc) |
|-----------------|---------------------------------|-------------------------------|-------------------------------|-----------|-------|
| 3760.00 | -34.72 | 8.40 | -26.32 | H | 48.4 |
| 5640.00 | -82.75 | 10.62 | -72.13 | H | 94.2 |
| 7520.00 | -81.21 | 11.82 | -69.39 | H | 91.4 |
| 9400.00 | -81.01 | 13.30 | -67.72 | H | 89.8 |
| 11280.00 | -75.54 | 13.50 | -62.04 | H | 84.1 |

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 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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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: 23.06 dBm = 0.203 W
 MODULATION SIGNAL: CDMA
 DISTANCE: 3 meters
 LIMIT: $43 + 10 \log_{10}(W) =$ 36.06 dBc

| FREQUENCY (MHz) | LEVEL @ ANTENNA TERMINALS (dBm) | SUBSTITUTE ANTENNA GAIN (dBi) | SPURIOUS EMISSION LEVEL (dBm) | POL (H/V) | (dBc) |
|-----------------|---------------------------------|-------------------------------|-------------------------------|-----------|-------|
| 3817.50 | -25.92 | 8.40 | -17.52 | H | 40.6 |
| 5726.25 | -82.75 | 10.62 | -72.13 | H | 95.2 |
| 7635.00 | -81.21 | 11.82 | -69.39 | H | 92.5 |
| 9543.75 | -81.01 | 13.30 | -67.72 | H | 90.8 |
| 11452.50 | -75.54 | 13.50 | -62.04 | H | 85.1 |

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 worst case test configuration was found in the horizontal setup. The data reported in the table above was measured in this test setup.

| | | | | |
|--------------------------------------|---|---|---|---------------------------------|
| FCC ID: A3LSPHM840 |  | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) |  | Reviewed by: Quality Manager |
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6.6 Cellular CDMA Frequency Stability Measurements

§2.1055 §22.355 §22.863 §22.905 RSS-132(4.3)

OPERATING FREQUENCY: 836,520,000 Hz
 CHANNEL: 384
 REFERENCE VOLTAGE: 3.7 VDC
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|----------------|-------------|------------|----------------|-----------------|---------------|
| 100 % | 3.70 | + 20 (Ref) | 836,519,973 | -27 | -0.000032 |
| 100 % | | - 30 | 836,520,005 | 5 | 0.000006 |
| 100 % | | - 20 | 836,519,988 | -12 | -0.000014 |
| 100 % | | - 10 | 836,519,999 | -1 | -0.000001 |
| 100 % | | 0 | 836,519,980 | -20 | -0.000024 |
| 100 % | | + 10 | 836,519,986 | -14 | -0.000017 |
| 100 % | | + 20 | 836,520,011 | 11 | 0.000013 |
| 100 % | | + 30 | 836,519,983 | -17 | -0.000020 |
| 100 % | | + 40 | 836,519,985 | -15 | -0.000018 |
| 100 % | | + 50 | 836,519,993 | -7 | -0.000008 |
| 115 % | 4.26 | + 20 | 836,519,994 | -6 | -0.000008 |
| BATT. ENDPOINT | 3.25 | + 20 | 836,519,989 | -11 | -0.000013 |

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

| | | | | |
|--------------------------------------|---|---|---|---------------------------------|
| FCC ID: A3LSPHM840 |  | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) |  | Reviewed by: Quality Manager |
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Cellular CDMA Frequency Stability Measurements (Cont'd)
§2.1055 §22.355 §22.863 §22.905 RSS-132(4.3)

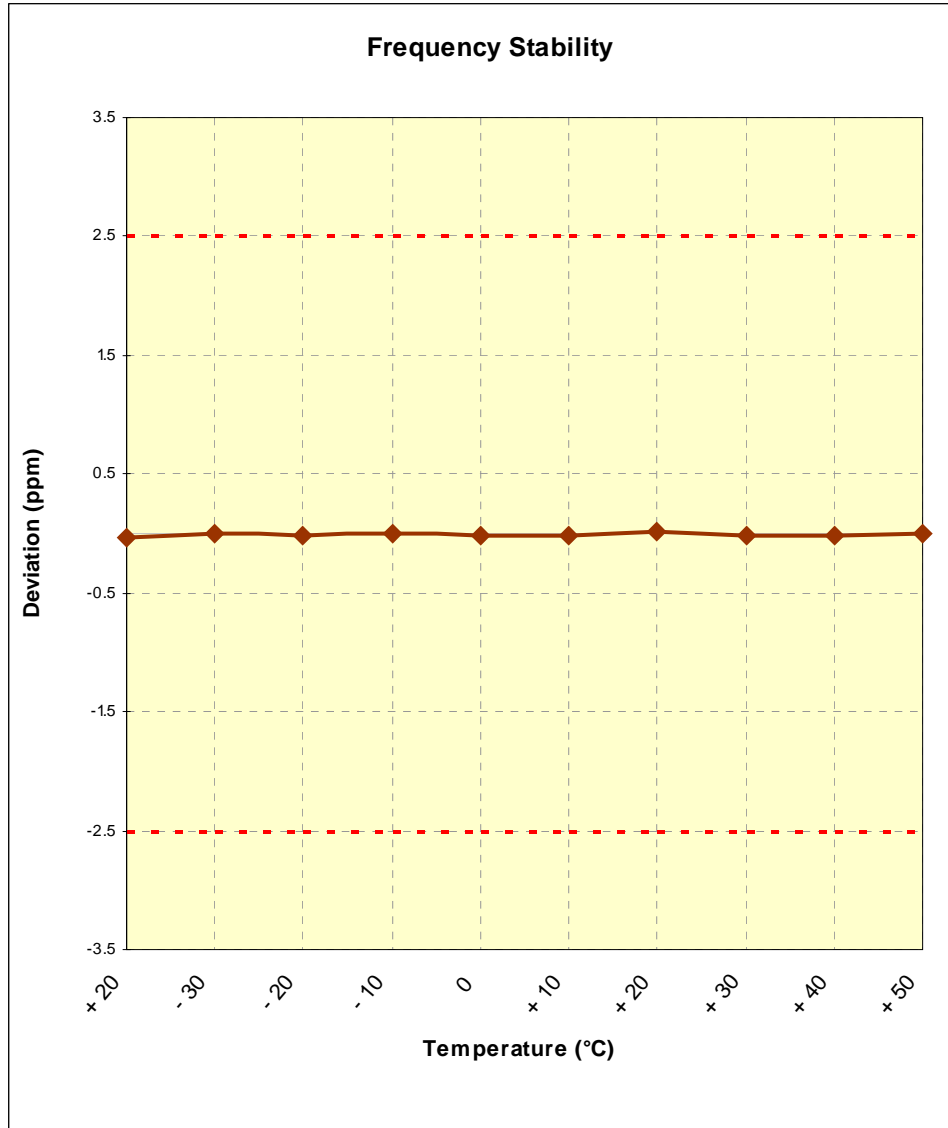




Figure 6-1. Frequency Stability Graph (Cellular CDMA Mode – Ch. 384)

| | | | | |
|---|---|--|---|--|
| FCC ID: A3LSPHM840 |  | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) |  | Reviewed by: Quality Manager |
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6.7 PCS CDMA Frequency Stability Measurements

§2.1055 §22.355 §24.229 §24.235 RSS-139(6.3)

OPERATING FREQUENCY: 1,880,000,000 Hz

CHANNEL: 661



REFERENCE VOLTAGE: 3.7 VDC

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|----------------|-------------|------------|----------------|-----------------|---------------|
| 100 % | 3.70 | + 20 (Ref) | 1,879,999,990 | -10 | -0.0000006 |
| 100 % | | - 30 | 1,880,000,010 | 10 | 0.0000006 |
| 100 % | | - 20 | 1,880,000,002 | 2 | 0.0000001 |
| 100 % | | - 10 | 1,879,999,979 | -21 | -0.0000011 |
| 100 % | | 0 | 1,879,999,998 | -2 | -0.0000001 |
| 100 % | | + 10 | 1,880,000,009 | 9 | 0.0000005 |
| 100 % | | + 20 | 1,879,999,995 | -6 | -0.0000003 |
| 100 % | | + 30 | 1,879,999,986 | -14 | -0.0000007 |
| 100 % | | + 40 | 1,880,000,009 | 9 | 0.0000005 |
| 100 % | | + 50 | 1,879,999,985 | -15 | -0.0000008 |
| 115 % | | 4.26 | + 20 | 1,879,999,985 | -15 |
| BATT. ENDPOINT | 3.25 | + 20 | 1,879,999,990 | -10 | -0.0000005 |

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: A3LSPHM840 |  | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) | |  | Reviewed by: Quality Manager |
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PCS CDMA Frequency Stability Measurements (Cont'd)
§2.1055 §22.355 §24.229 §24.235 RSS-139(6.3)

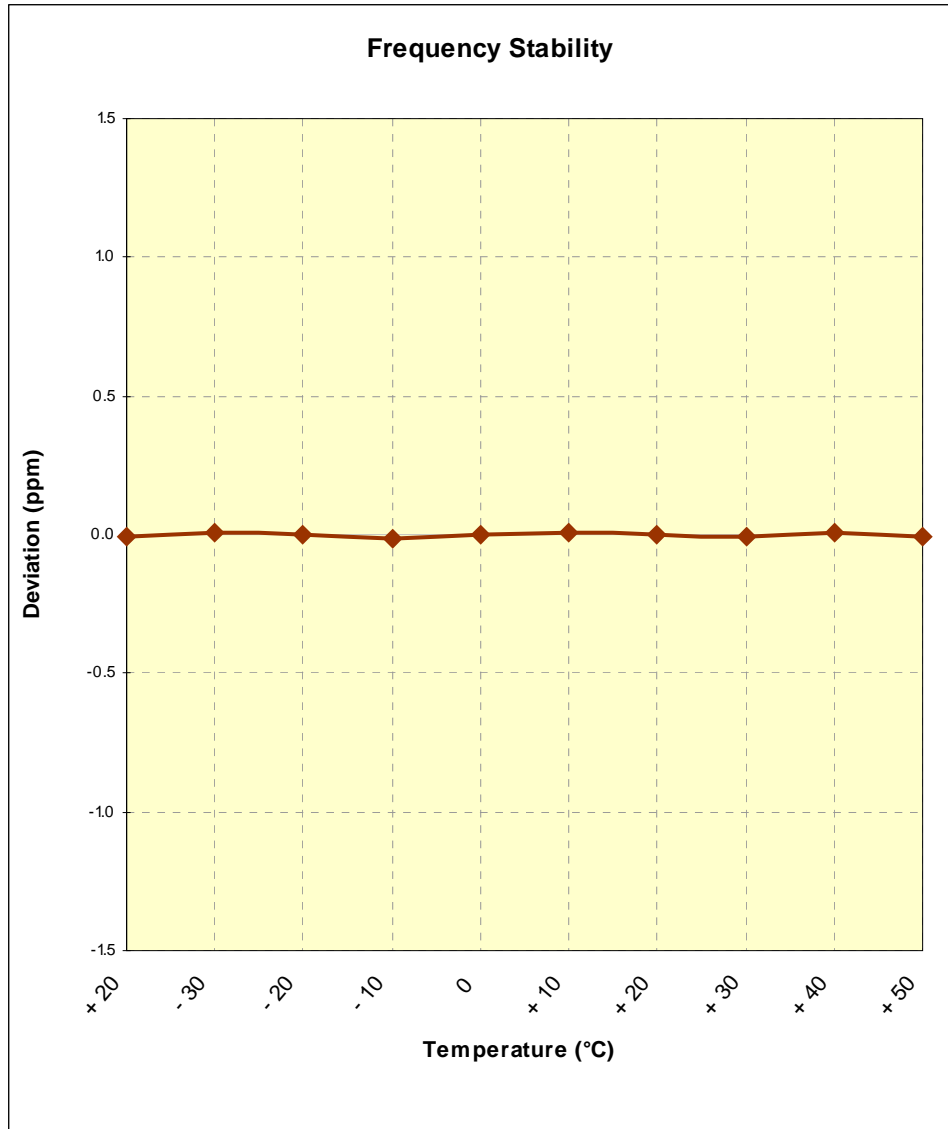


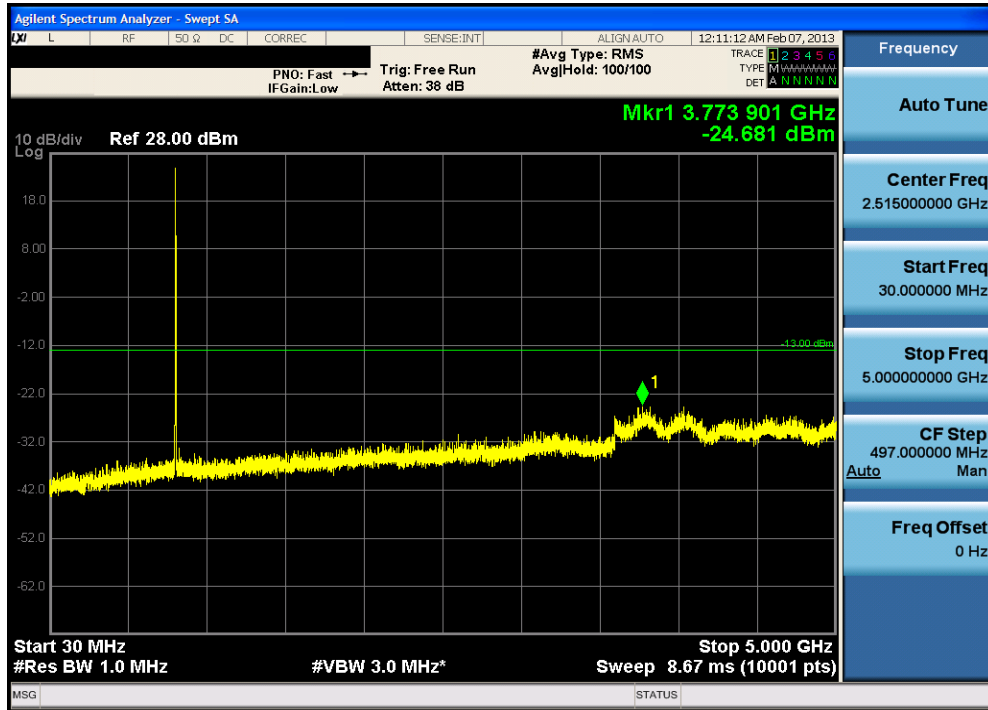


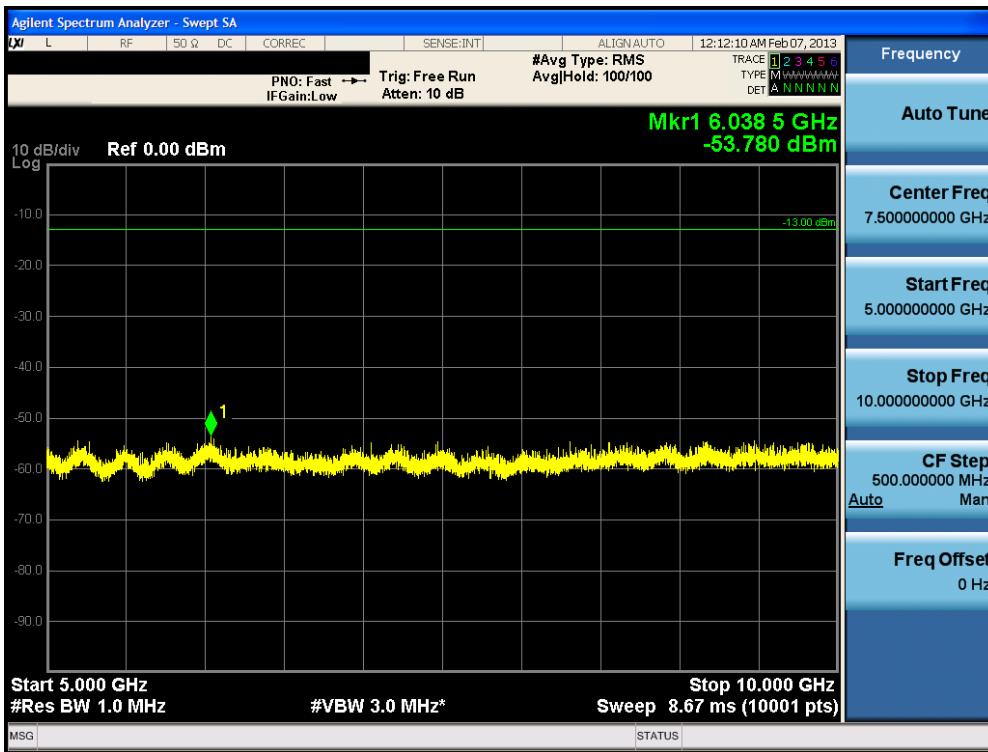
Figure 6-2. Frequency Stability Graph (PCS CDMA Mode – Ch. 600)

| | | | | |
|---|---|--|---|--|
| FCC ID: A3LSPHM840 |  | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) |  | Reviewed by: Quality Manager |
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7.0 PLOTS OF EMISSIONS

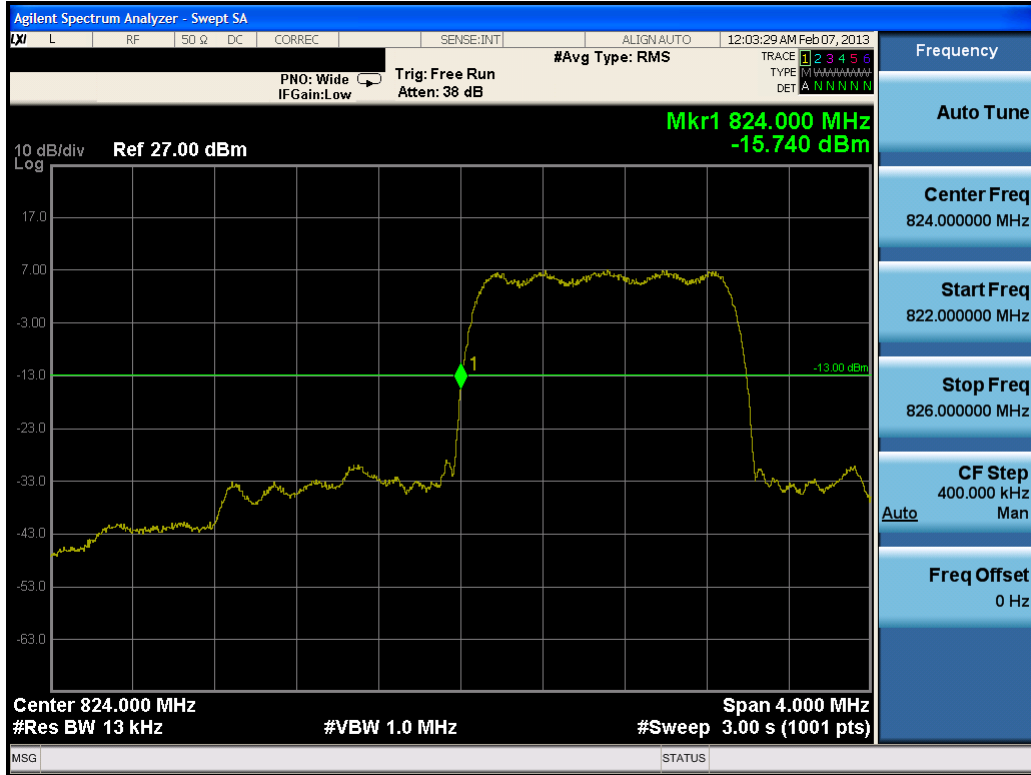


Plot 7-1. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 1013)



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

| | | | | |
|--------------------------------------|------------------------------------|--|--|---------------------------------|
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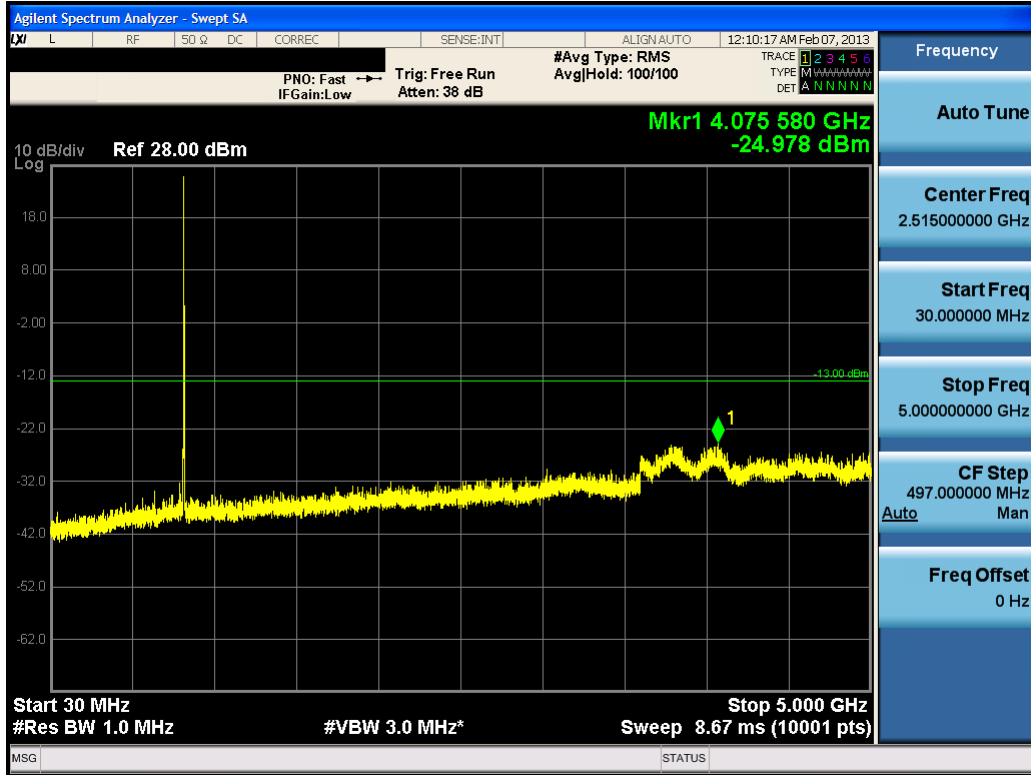


Plot 7-3. Band Edge Plot (Cellular CDMA Mode – Ch. 1013)

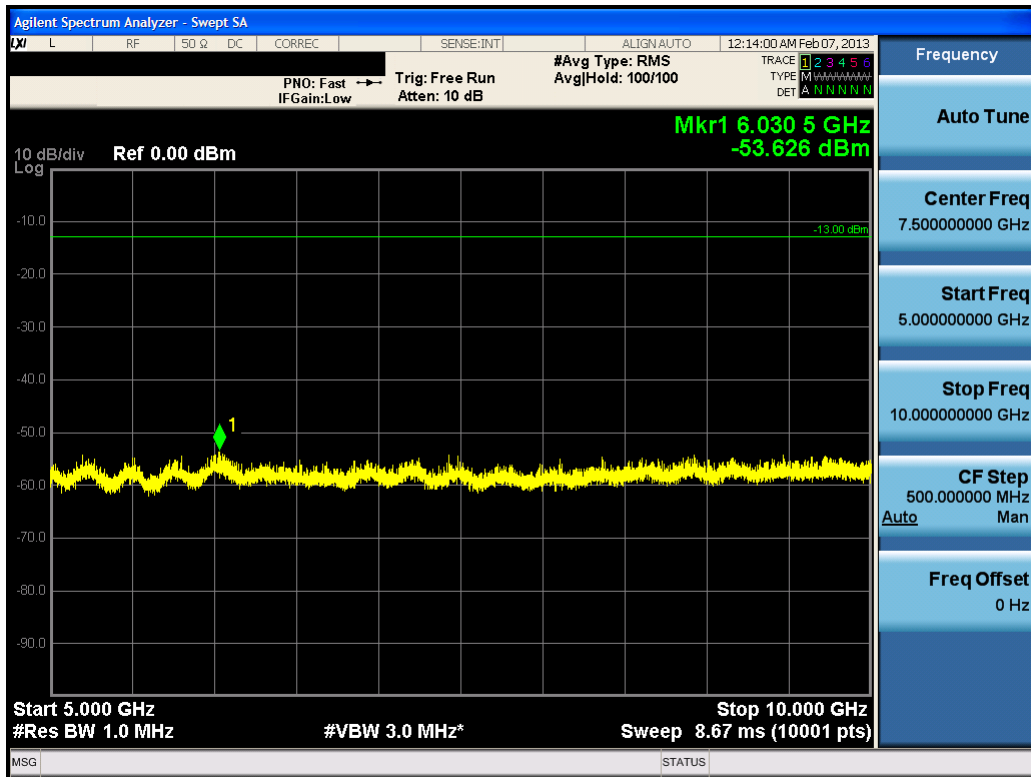


Plot 7-4. 4MHz Span Plot (Cellular CDMA Mode – Ch. 1013)

| | | | | |
|--------------------------------------|------------------------------------|--|--|---------------------------------|
| FCC ID: A3LSPHM840 | | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) | | Reviewed by: Quality Manager |
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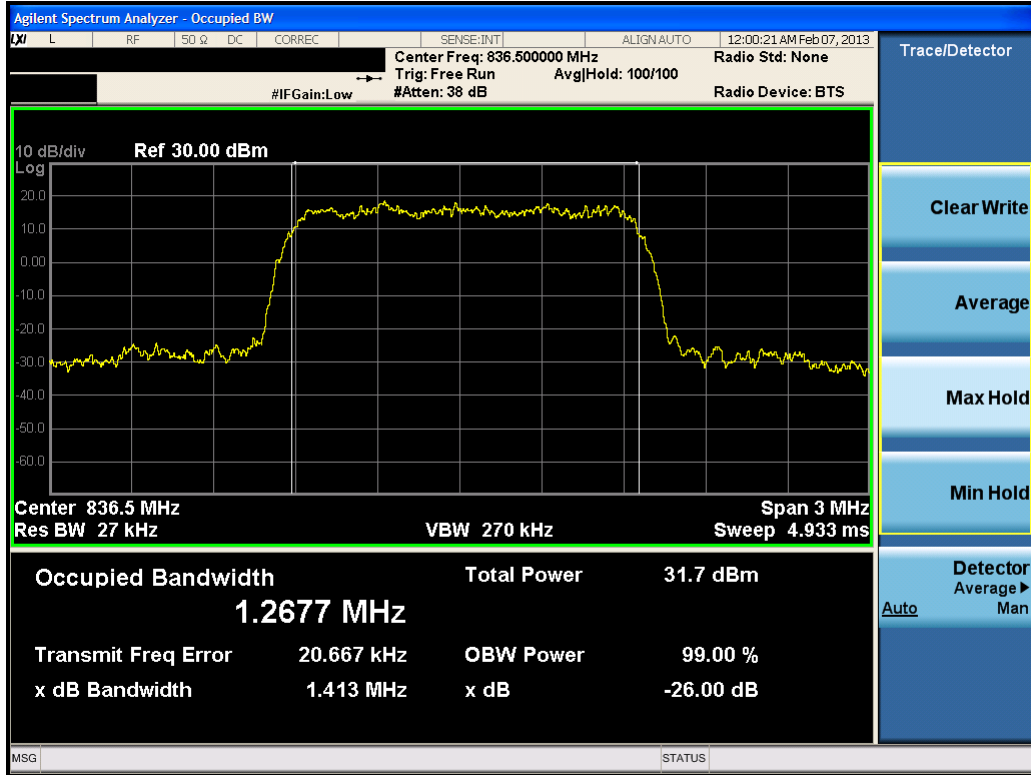


Plot 7-5. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 384)

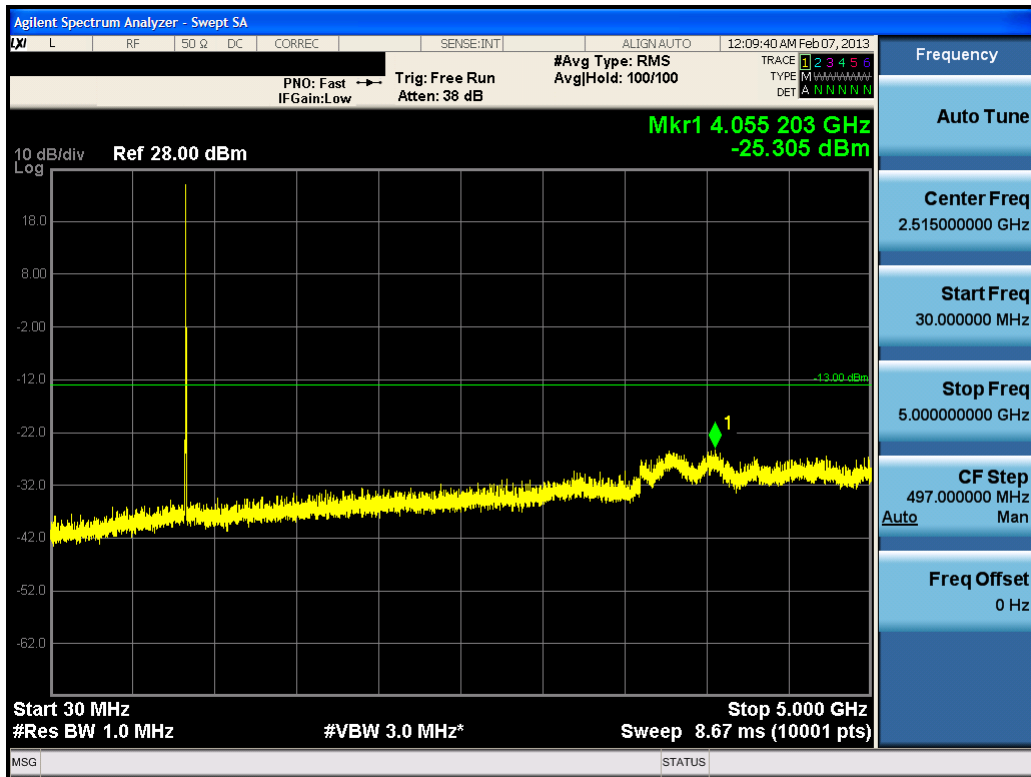


Plot 7-6. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 384)

| | | | | |
|--------------------------------------|------------------------------------|--|--|---------------------------------|
| FCC ID: A3LSPHM840 | | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) | | Reviewed by: Quality Manager |
| Test Report S/N: 0Y1301310135.A3L | Test Dates: February 1-12, 2013 | EUT Type: Portable Handset | | Page 27 of 37 |

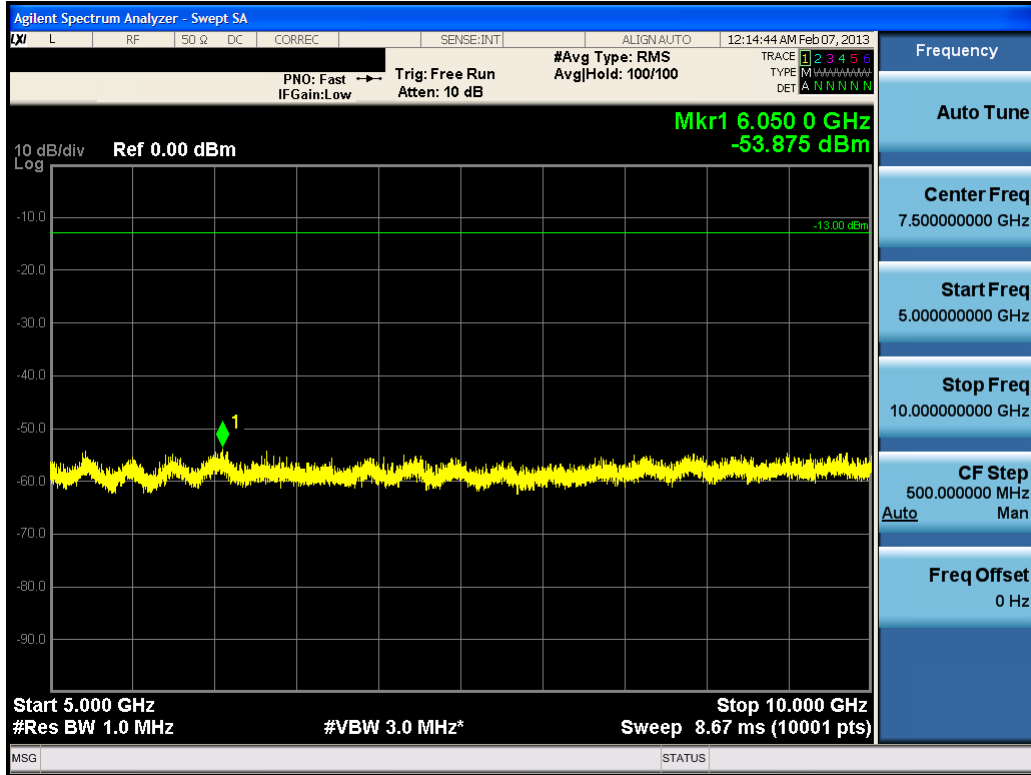


Plot 7-7. Occupied Bandwidth Plot (Cellular CDMA Mode – Ch. 384)

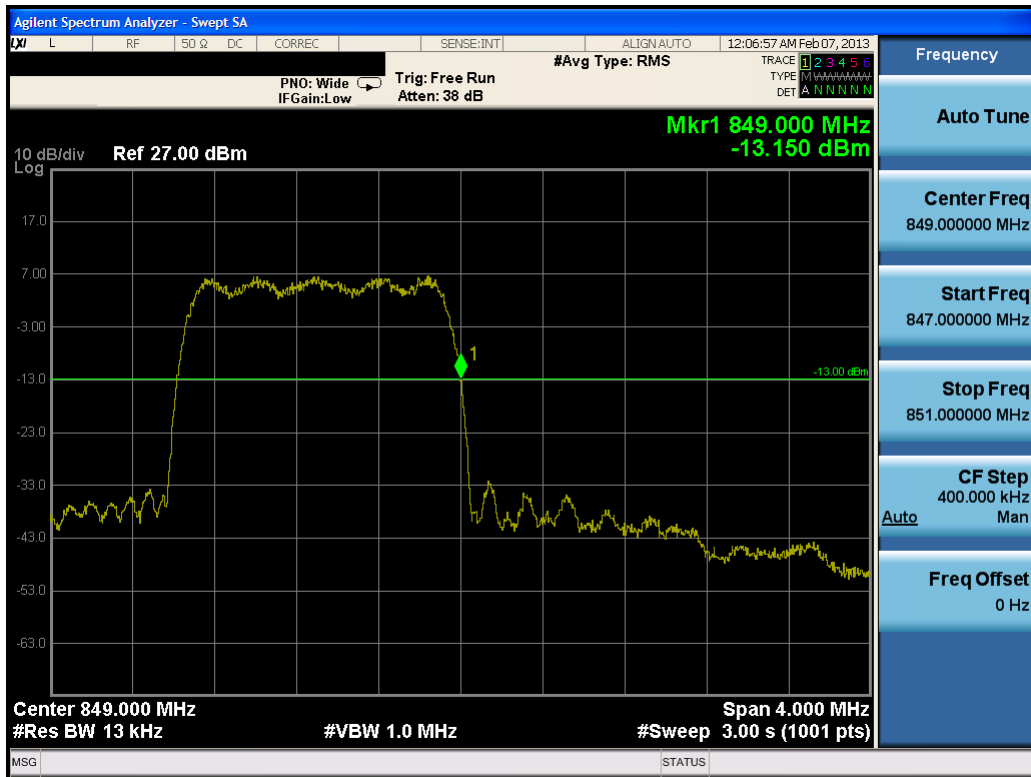


Plot 7-8. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 777)

| | | | | |
|--------------------------------------|------------------------------------|--|--|---------------------------------|
| FCC ID: A3LSPHM840 | | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) | | Reviewed by: Quality Manager |
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Plot 7-9. Conducted Spurious Plot (Cellular CDMA Mode – Ch. 777)

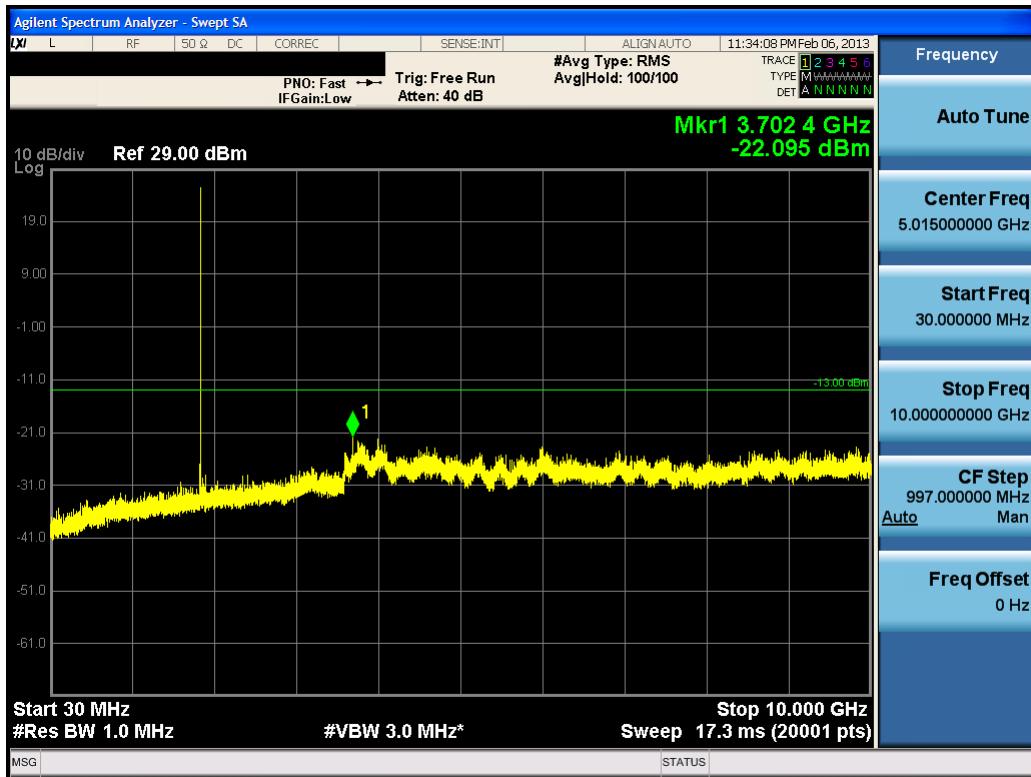


Plot 7-10. Band Edge Plot (Cellular CDMA Mode – Ch. 777)

| | | | | |
|--------------------------------------|------------------------------------|--|--|---------------------------------|
| FCC ID: A3LSPHM840 | | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) | | Reviewed by: Quality Manager |
| Test Report S/N: 0Y1301310135.A3L | Test Dates: February 1-12, 2013 | EUT Type: Portable Handset | | Page 29 of 37 |

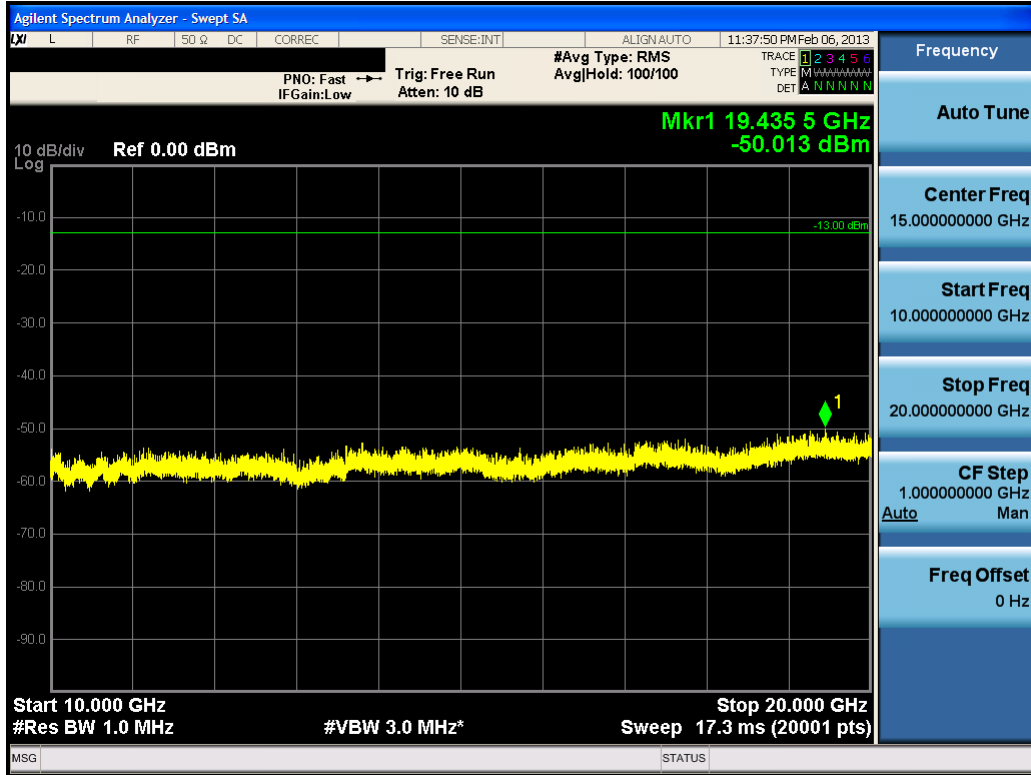


Plot 7-11. 4MHz Span Plot (Cellular CDMA Mode – Ch. 777)



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

| | | | | |
|--------------------------------------|------------------------------------|---|--|---------------------------------|
| FCC ID: A3LSPHM840 | | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) | | Reviewed by: Quality Manager |
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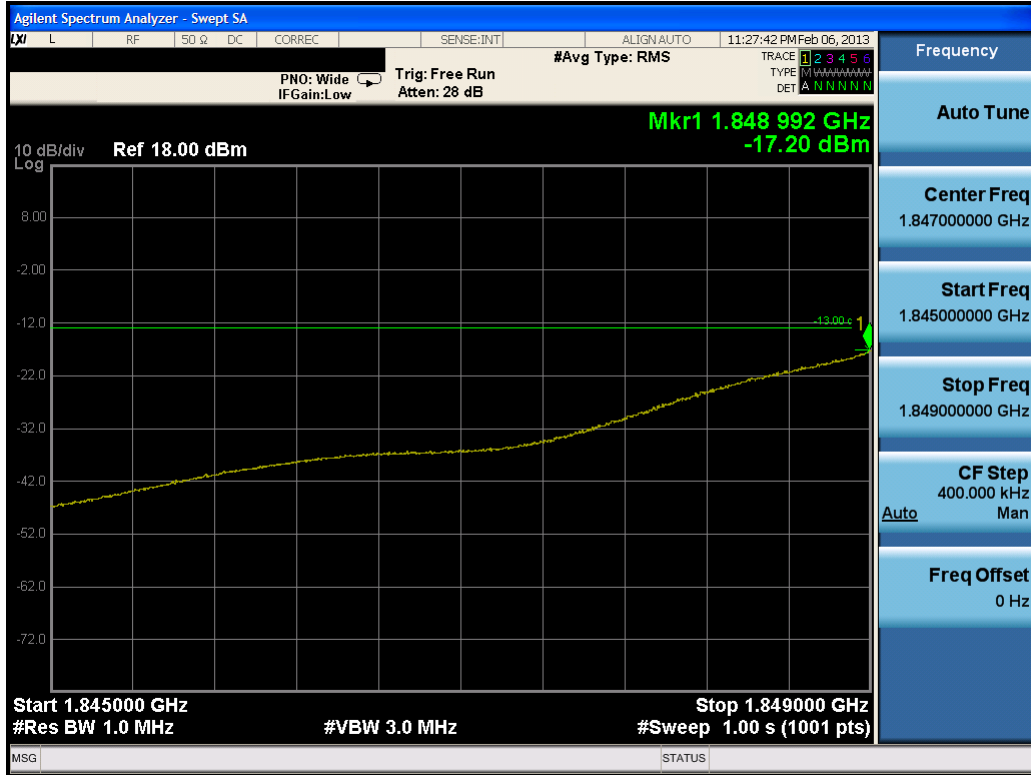


Plot 7-13. Conducted Spurious Plot (PCS CDMA Mode – Ch. 25)

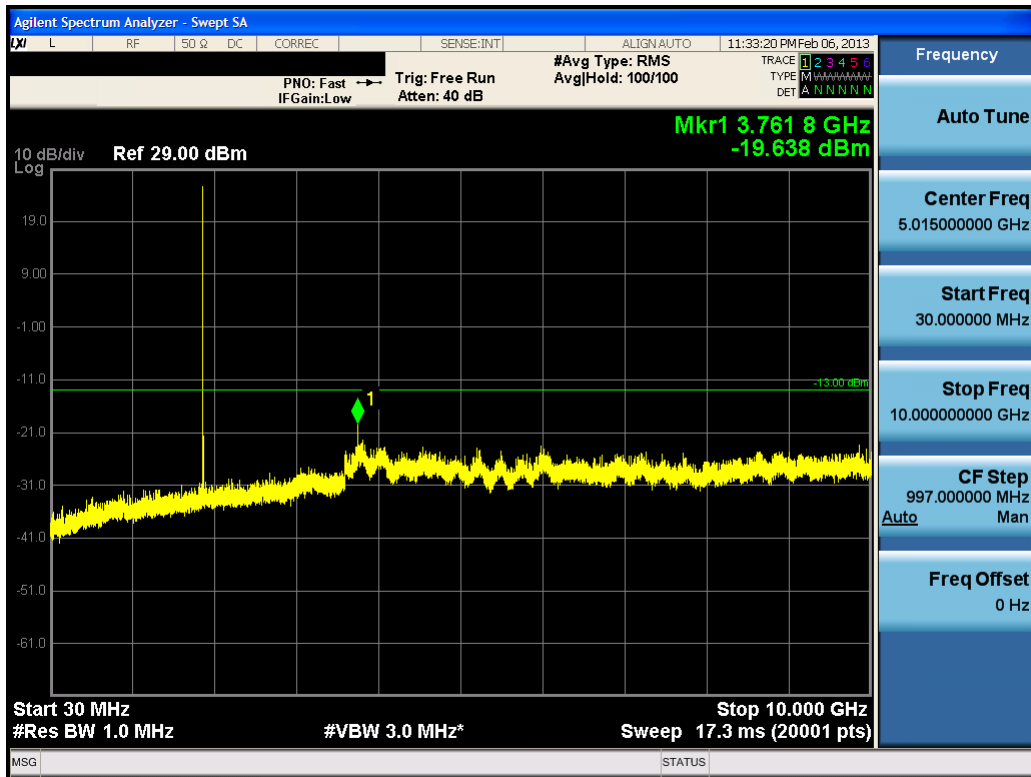


Plot 7-14. Band Edge Plot (PCS CDMA Mode – Ch. 25)

| | | | | |
|--------------------------------------|------------------------------------|---|--|---------------------------------|
| FCC ID: A3LSPHM840 | | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) | | Reviewed by: Quality Manager |
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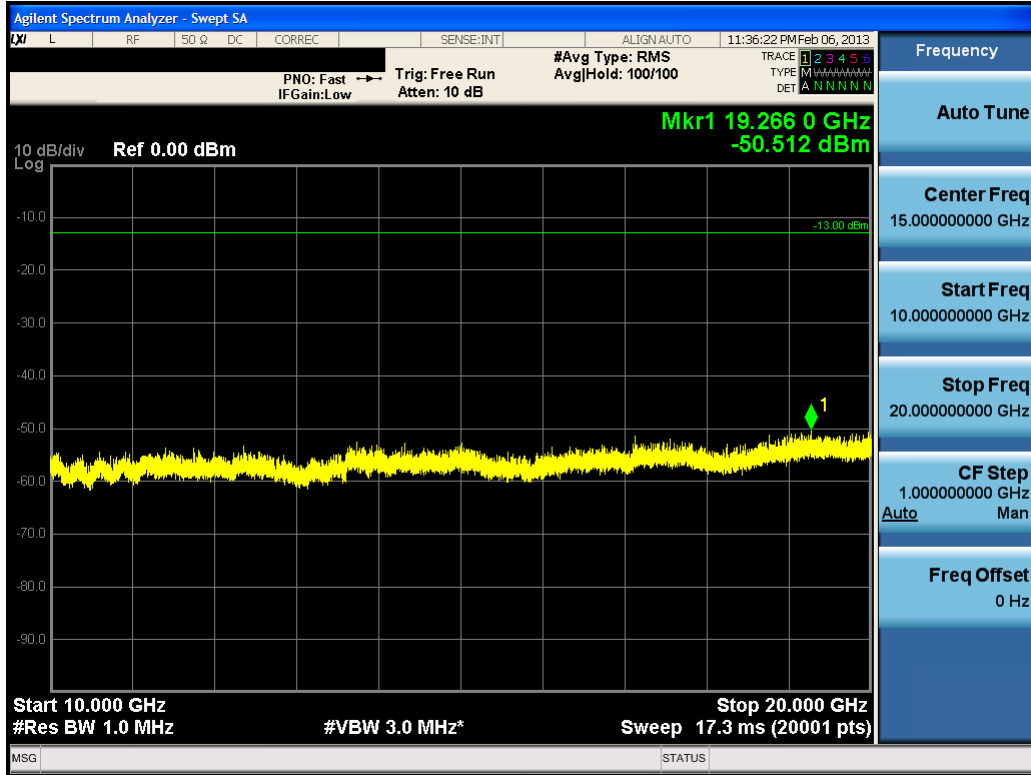


Plot 7-15. 4MHz Span Plot (PCS CDMA Mode – Ch. 25)

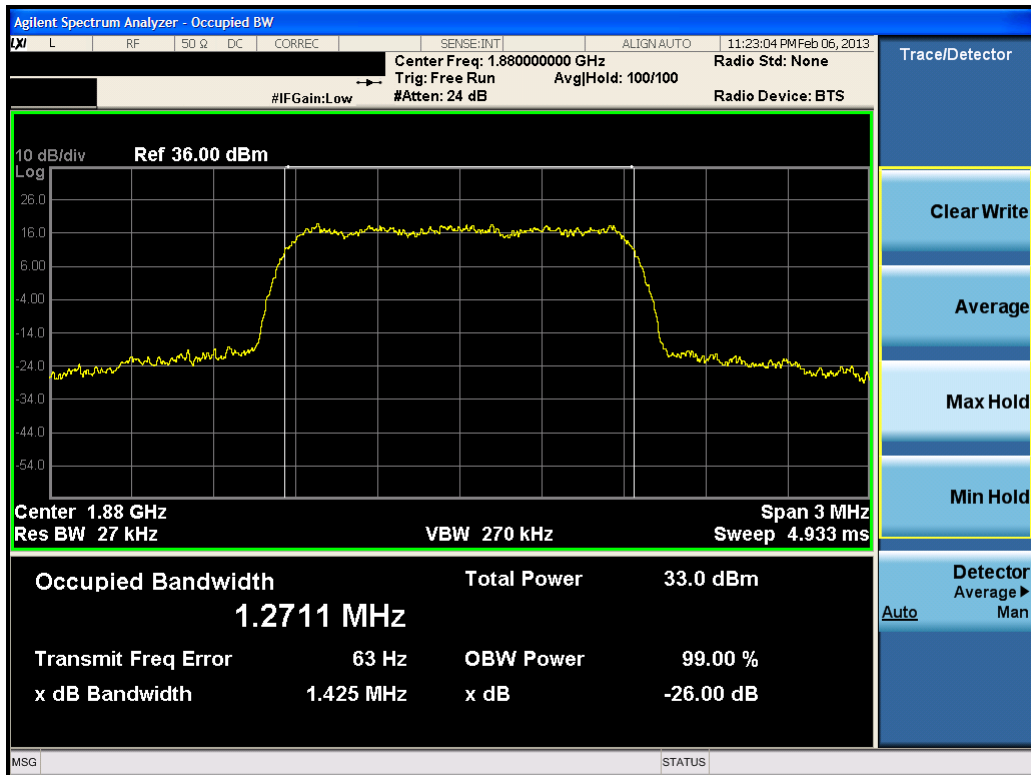


Plot 7-16. Conducted Spurious Plot (PCS CDMA Mode – Ch. 600)

| | | | | |
|--------------------------------------|------------------------------------|---|--|---------------------------------|
| FCC ID: A3LSPHM840 | | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) | | Reviewed by: Quality Manager |
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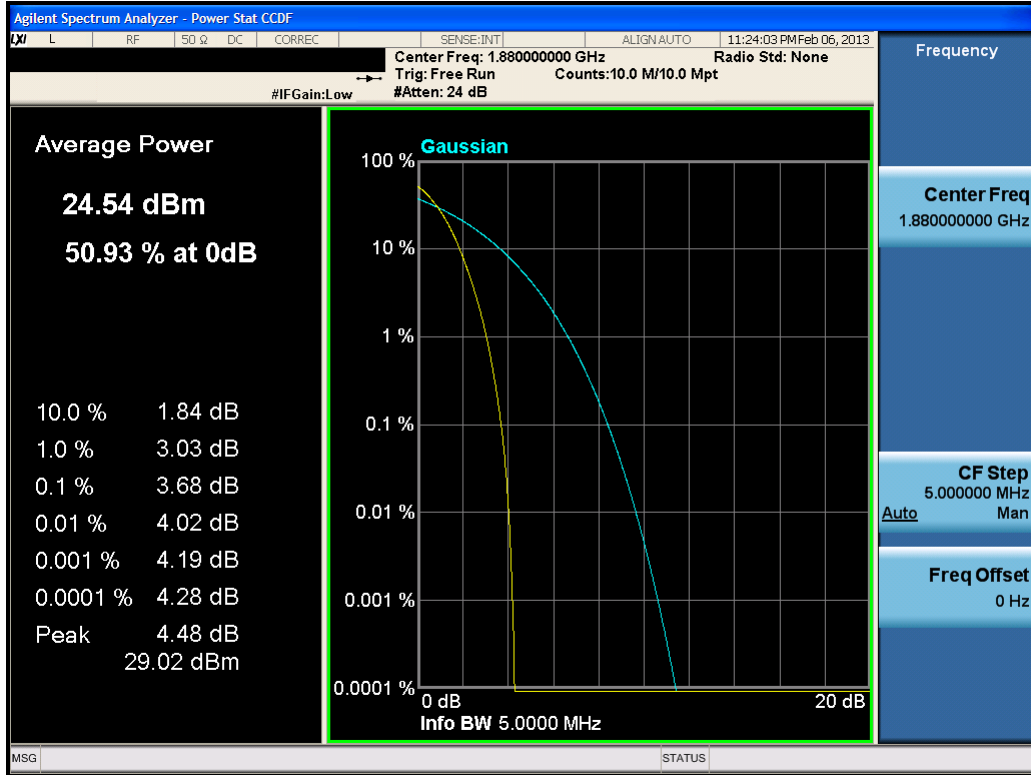


Plot 7-17. Conducted Spurious Plot (PCS CDMA Mode – Ch. 600)

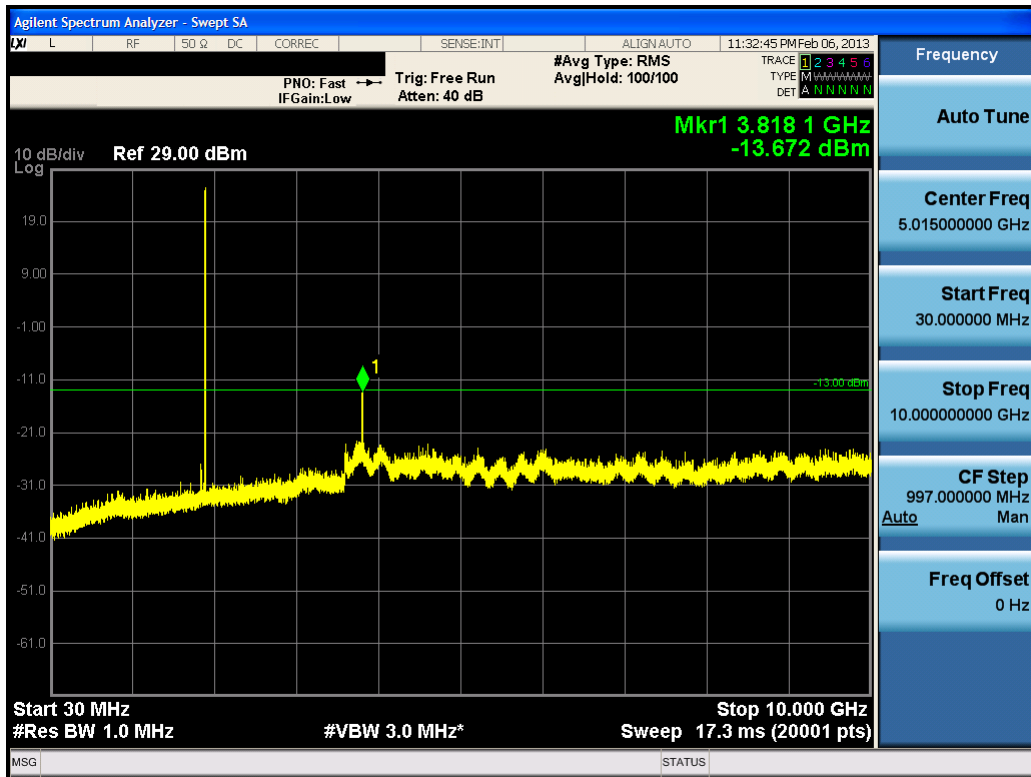


Plot 7-18. Occupied Bandwidth Plot (PCS CDMA Mode – Ch. 600)

| | | | | |
|--------------------------------------|------------------------------------|--|--|---------------------------------|
| FCC ID: A3LSPHM840 | | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) | | Reviewed by: Quality Manager |
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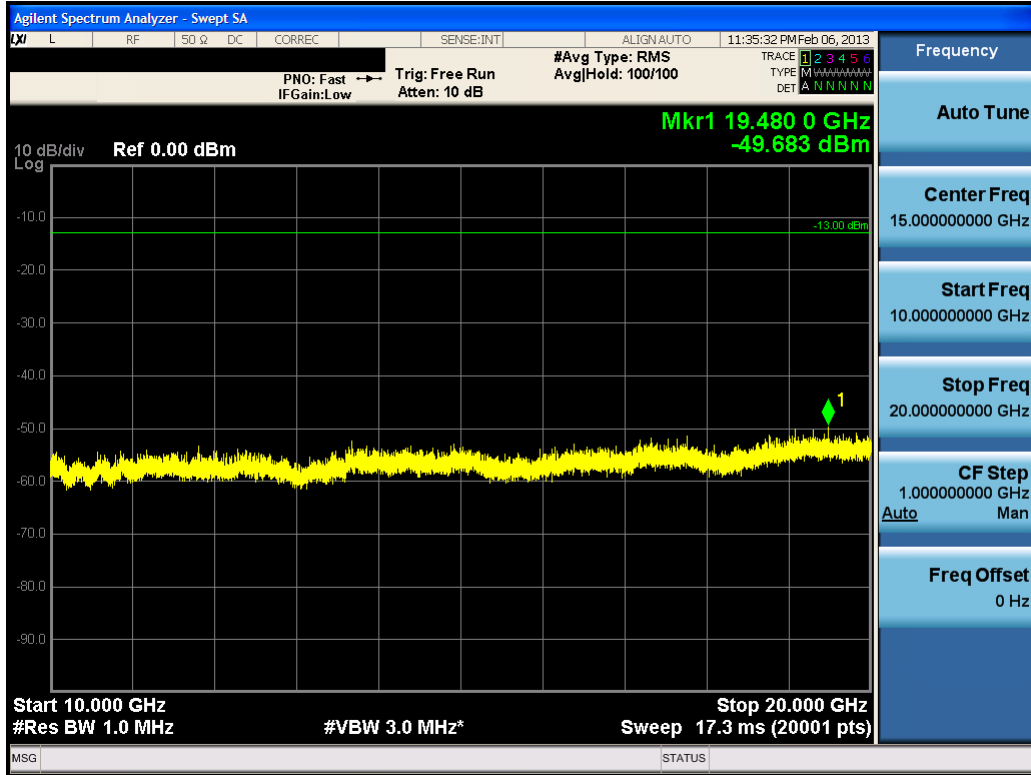


Plot 7-19. Peak-Average Ratio Plot (PCS CDMA Mode – Ch. 600)



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

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





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

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

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|--------------------------------------|---|--|---|---------------------------------|
| FCC ID: A3LSPHM840 |  | FCC Pt. 22, 24 MEASUREMENT REPORT (CERTIFICATION) |  | Reviewed by: Quality Manager |
| Test Report S/N: 0Y1301310135.A3L | Test Dates: February 1-12, 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 Portable Handset FCC ID: A3LSPHM840** complies with all the requirements of Parts 2, 22, 24 of the FCC rules.

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