



# PCTEST ENGINEERING LABORATORY, INC.

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## MEASUREMENT REPORT FCC Part 27

**Applicant Name:**  
Samsung Electronics, Co. Ltd.  
18600 Broadwick St.  
Rancho Dominguez, CA 90220  
United States

**Date of Testing:**  
Nov. 7-8, 2011  
**Test Site/Location:**  
PCTEST Lab., Columbia, MD, USA  
**Test Report Serial No.:**  
0Y1111162006.A3L

<b>FCC ID:</b>	<b>A3LSHWM420K</b>
<b>APPLICANT:</b>	<b>SAMSUNG ELECTRONICS, CO. LTD.</b>

**Application Type:** Certification  
**FCC Classification:** PCS Licensed Transmitter Held to Ear (PCE)  
**FCC Rule Part(s):** §2; §27 Subpart L  
**EUT Type:** Portable Handset  
**Model(s):** SHW-M420K  
**Tx Frequency Range:** 1712.4 - 1752.5MHz (WCDMA)  
**Max. RF Output Power:** 0.189 W EIRP WCDMA (22.764 dBm)  
**Emission Designator(s):** 4M06F9W  
**Test Device Serial No.:** *identical prototype* [S/N: FI-269-C]

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.

**Grant Conditions:** Power output listed is EIRP for Part 27.

*PCTEST certifies that no party to this application has been subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.*



  
Randy Ortanez  
President



FCC ID: A3LSHWM420K		FCC Pt. 27 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1111162006.A3L	Test Dates: Nov. 7-8, 2011	EUT Type: Portable Handset		Page 1 of 24

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# MEASUREMENT REPORT

## FCC Part 27



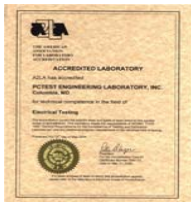
### §2.1033 General Information



**APPLICANT:** Samsung Electronics, Co. Ltd.  
**APPLICANT ADDRESS:** 18600 Broadwick St.  
 Rancho Dominguez, CA 90220  
**TEST SITE:** PCTEST ENGINEERING LABORATORY, INC.  
**TEST SITE ADDRESS:** 6660-B Dobbin Road, Columbia, MD 21045 USA  
**FCC RULE PART(S):** §2; §27  
**BASE MODEL:** SHW-M420K  
**FCC ID:** A3LSHWM420K  
**FCC CLASSIFICATION:** PCS Licensed Transmitter Held to Ear (PCE)  
**EMISSION DESIGNATOR(S):** 4M06F9W  
**MODE:** WCDMA  
**FREQUENCY TOLERANCE:** ±0.00025 % (2.5 ppm)  
**Test Device Serial No.:** FI-269-C       Production     Pre-Production     Engineering  
**DATE(S) OF TEST:** Nov. 7-8, 2011  
**TEST REPORT S/N:** 0Y1111162006.A3L

### Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab. located in Columbia, MD 21045, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) 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 (2451A-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 (2451A-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.



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# 1.0 INTRODUCTION

## 1.1 Scope

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

## 1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity area, 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 in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2003 on January 28, 2009.

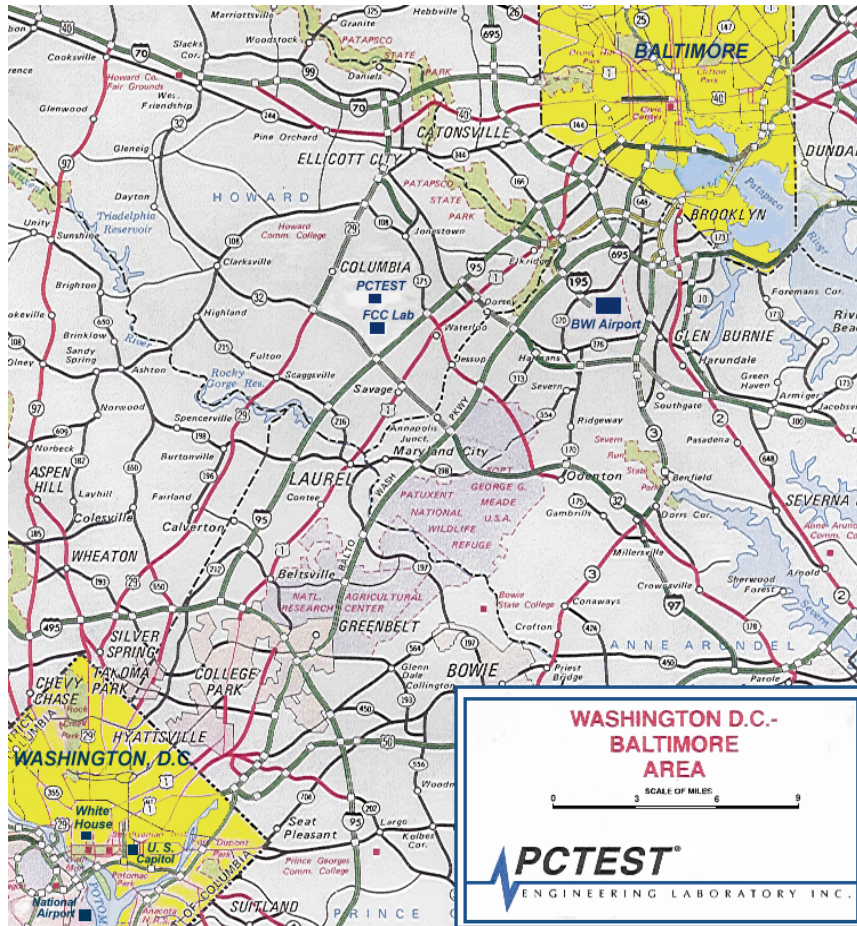


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSHWM420K**. The test data contained in this report pertains only to the emissions due to the EUT's AWS WCDMA function. The EUT consisted of the following component(s):

Trade Name / Base Model	FCC ID	Description
Samsung / Model: SHW-M420K	A3LSHWM420K	Portable Handset

**Table 2-1. EUT Equipment Description**

### Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, 802.11a/b/g/n WLAN, 802.11a/n UNII, Bluetooth, NFC

### 2.2 EMI Suppression Device(s)/Modifications

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

### 2.3 Labeling Requirements

Per 2.925

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



Per 15.19; Docket 95-19

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

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

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

Please see attachment for FCC ID label and label location.

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### 3.0 DESCRIPTION OF TESTS

#### 3.1 Measurement Procedure

The radiated spurious measurements were made outdoors at a 3-meter test range (see Figure 3-1). The equipment under test is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. This power level was recorded using a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This level is recorded with the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

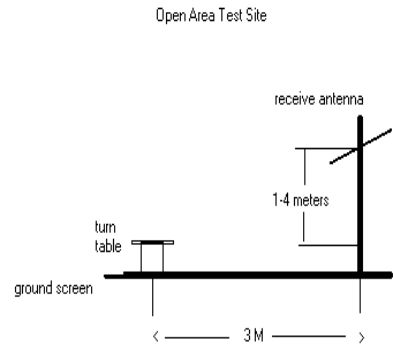


Figure 3-1. Diagram of 3-meter outdoor test range

Deviation from Measurement Procedure.....None

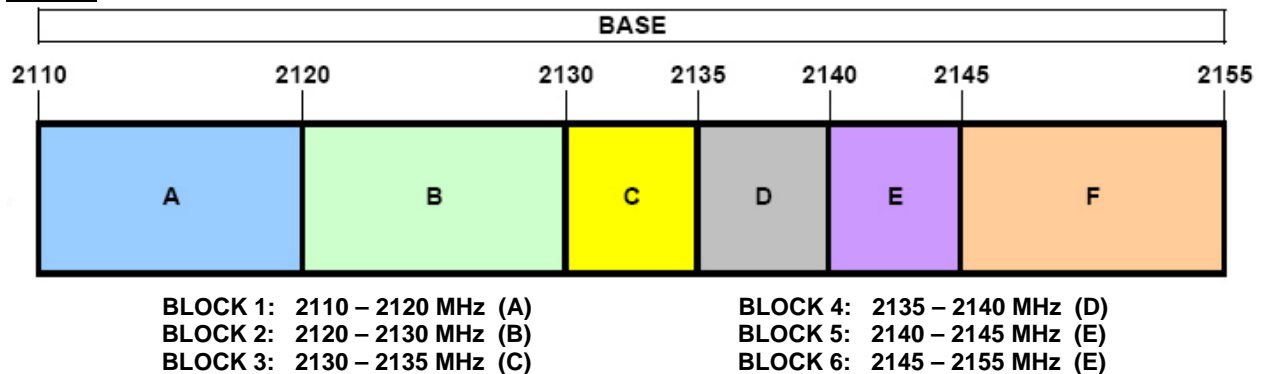
#### 3.2 Occupied Bandwidth Emission Limits

§2.1049, §27.53(g)(1)

- a. 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.
- b. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

#### 3.3 AWS - Base Frequency Blocks

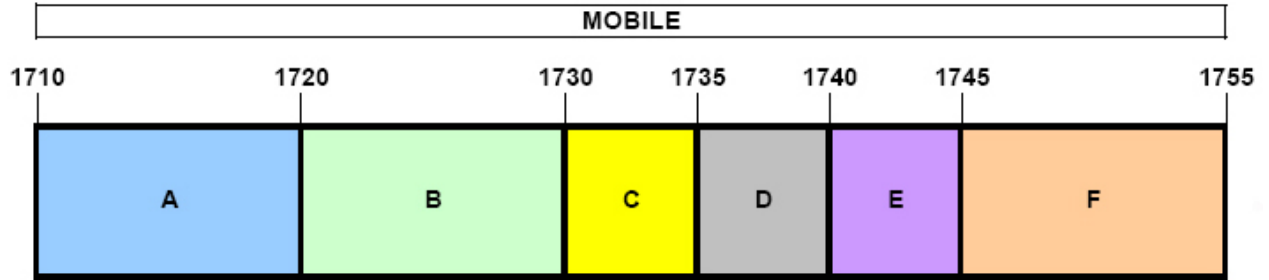
§27.5(h)



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### 3.4 AWS - Mobile Frequency Blocks

§27.5(h)



BLOCK 1: 1710 – 1720 MHz (A)  
 BLOCK 2: 1720 – 1730 MHz (B)  
 BLOCK 3: 1730 – 1735 MHz (C)

BLOCK 4: 1735 – 1740 MHz (D)  
 BLOCK 5: 1740 – 1745 MHz (E)  
 BLOCK 6: 1745 – 1755 MHz (F)

### 3.5 Spurious and Harmonic Emissions at Antenna Terminal

§2.1051, §27.53(g)

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 10<sup>th</sup> harmonic.

### 3.6 Radiated Power and Radiated Spurious Emissions



§2.1053, §27.53(g)

Spurious and harmonic radiated emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. This level is then measured with a broadband average power meter. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive average power meter reading. This spurious level is recorded with the power meter. For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration. This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1".

### 3.7 Peak-Average Ratio

§27.50(d)(5)

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

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### 3.8 Frequency Stability / Temperature Variation

**§2.1055, §27.54**



The frequency stability of the transmitter is measured by:

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

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

**Time Period and Procedure:**

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A 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
-	263-10dB	(DC-18GHz) 10 dB Attenuator	N/A		N/A	N/A
-	No.166	(1000-26500MHz) Microwave RF Cable	N/A		N/A	N/A
-	No.167	(100kHz - 100MHz) RG58 Coax Cable	N/A		N/A	N/A
Agilent	E4448A	PSA (3Hz-50GHz) Spectrum Analyzer	11/30/2010	Annual	11/30/2011	US42510244
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	2/8/2011	Annual	2/8/2012	3008A00985
Agilent	E5515C	Wireless Communications Test Set	2/8/2011	Annual	2/8/2012	GB45360985
Agilent	E4407B	ESA Spectrum Analyzer	4/5/2011	Annual	4/5/2012	US39210313
Agilent	85650A	Quasi-Peak Adapter	4/7/2011	Annual	4/7/2012	3303A01872
Agilent	85650A	Quasi-Peak Adapter	4/7/2011	Annual	4/7/2012	2043A00301
Agilent	8566B	(100Hz-22GHz) Spectrum Analyzer	4/7/2011	Annual	4/7/2012	3638A08713
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/8/2011	Annual	4/8/2012	MY45470194
Agilent	E5515C	Wireless Communications Test Set	7/6/2011	Annual	7/6/2012	GB41450275
Agilent	N9038A	MXE EMI Receiver	8/5/2011	Annual	8/5/2012	MY51210133
Agilent	8648D	(9kHz-4GHz) Signal Generator	10/10/2011	Annual	10/10/2012	3613A00315
Agilent	E5515C	Wireless Communications Test Set	10/10/2011	Annual	10/10/2012	GB46110872
Agilent	E8267C	Vector Signal Generator	10/10/2011	Annual	10/10/2012	US42340152
Agilent	N9020A	MXA Signal Analyzer	10/10/2011	Annual	10/10/2012	US46470561
Anritsu	MA2411B	Pulse Sensor	10/13/2011	Annual	10/13/2012	1027293
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
Compliance Design	Roberts	Dipole Set	4/7/2010	Biennial	4/7/2012	146
Compliance Design	Roberts	Dipole Set	4/7/2010	Biennial	4/7/2012	147
Emco	3115	Horn Antenna (1-18GHz)	4/8/2010	Biennial	4/8/2012	9205-3874
Espec	ESX-2CA	Environmental Chamber	4/21/2011	Annual	4/21/2012	17620
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	5/31/2011	Annual	5/31/2012	135427
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/22/2011	Annual	7/22/2012	125518
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/12/2011	Annual	10/12/2012	1833460
Gigatronics	8651A	Universal Power Meter	10/12/2011	Annual	10/12/2012	8650319
K & L	11SH10	Band Pass Filter	N/A		N/A	1300/4000
K & L	11SH10	Band Pass Filter	N/A		N/A	4000/12000
MiniCircuits	VHF-1300+	High Pass Filter	N/A		N/A	30716
MiniCircuits	VHF-3100+	High Pass Filter	N/A		N/A	30721
Pasternack	PE2208-6	Bidirectional Coupler	N/A		N/A	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	4/19/2011	Annual	4/19/2012	107826
Rohde & Schwarz	CMU200	Base Station Simulator	6/1/2011	Annual	6/1/2012	833855/0010
Rohde & Schwarz	RS-PR18	1-18 GHz Pre-Amplifier	6/9/2011	Annual	6/9/2012	100071
Rohde & Schwarz	RS-PR26	18-26.5 GHz Pre-Amplifier	6/9/2011	Annual	6/9/2012	100040
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/5/2011	Annual	8/5/2012	112347
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	8/25/2011	Annual	8/25/2012	100976
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Annual	10/7/2012	103962
Rohde & Schwarz	CMU200	Base Station Simulator	N/A			836536/0005
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
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	12/17/2009	Biennial	12/17/2011	A051107
Sunol	DRH-118	Horn Antenna (1-18 GHz)	6/17/2011	Biennial	6/17/2013	A042511
Sunol	DRH-118	Horn Antenna (1 - 18GHz)	7/5/2011	Biennial	7/5/2013	A050307

**Table 4-1. Test Equipment**

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## 5.0 SAMPLE CALCULATIONS

### Emission Designator

**Emission Designator = 4M15F9W**

WCDMA BW = 4.15 MHz

F = Frequency Modulation



9 = Composite Digital Info

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

### Spurious Radiated Emission – AWS Band

**Example: Channel 1412 AWS Mode 2<sup>nd</sup> Harmonic (3464.80 MHz)**

The average receive power meter reading at 3 meters with the EUT on the turntable was  $-81.0$  dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminal is adjusted to produce a reading of  $-81.0$  dBm on the power meter. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3464.80 MHz. So 6.1 dB is added to the signal generator reading of  $-30.9$  dBm yielding  $-24.80$  dBm. The fundamental EIRP was 25.501 dBm so this harmonic was  $25.501$  dBm  $- (-24.80) = 50.3$  dBc.

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## 6.0 TEST RESULTS

### 6.1 Summary

Company Name: Samsung Electronics, Co. Ltd.  
 FCC ID: A3LSHWM420K  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): WCDMA

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
<b>TRANSMITTER MODE (TX)</b>					
2.1049, 27.53(g)(1)	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 7.0
2.1051, 27.53(g)	Band Edge / Conducted Spurious Emissions	< 43 + 10log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions		PASS	Section 7.0
2.1046	Transmitter Conducted Output Power	N/A		PASS	RF Exposure Report
27.50(d)(2)	Equivalent Isotropic Radiated Power	< 1 Watts max. EIRP	RADIATED	PASS	Section 6.2
2.1053, 27.53(g)	Undesirable Emissions	< 43 + 10log <sub>10</sub> (P[Watts]) for all out-of-band emissions		PASS	Section 6.3
2.1055, 27.54	Frequency Stability	< 2.5 ppm		PASS	Section 6.4

**Table 6-1. Summary of Test Results**

FCC ID: A3LSHWM420K		FCC Pt. 27 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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## 6.2 Equivalent Isotropic Radiated Power Output Data

§27.50(d)(2)

Frequency [MHz]	Mode	Measured Level [dBm]	Substitute Level [dBm]	Antenna Gain [dBi]	Pol [H/V]	EIRP [dBm]	EIRP [Watts]	Battery Type
1712.40	WCDMA1700	-17.140	14.76	8.00	H	22.76	0.189	Standard
1732.40	WCDMA1700	-17.150	14.75	8.00	H	22.75	0.189	Standard
1752.50	WCDMA1700	-17.220	14.68	8.00	H	22.68	0.186	Standard



**Table 6-2. Equivalent Isotropic Radiated Power Output Data**

**NOTES:**

Equivalent Isotropic Radiated Power Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This level is recorded using the power meter. The conducted power at the terminals of the Horn antenna is measured. The difference between the gain of the horn and an isotropic antenna is taken into consideration and the EIRP is recorded.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1". This unit was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. Samsung Electronics, Co. Ltd. The data reported in the table above was measured in this test setup.

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### 6.3 AWS WCDMA Radiated Measurements §2.1053, §27.53(g)

#### Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY: 1712.40 MHz  
 CHANNEL: 1312  
 MEASURED OUTPUT POWER: 22.760 dBm = 0.189 W  
 MODULATION SIGNAL: WCDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.76 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3424.80	-35.18	9.61	-25.57	H	48.3
5137.20	-90.08	10.79	-79.29	H	102.1
6849.60	-85.28	10.60	-74.68	H	97.4
8562.00	-82.56	11.55	-71.00	H	93.8
10274.40	-81.36	12.71	-68.65	H	91.4



**Table 6-3. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1312)**

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1". This unit was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. Samsung Electronics, Co. Ltd. The data reported in the table above was measured in this test setup.

FCC ID: A3LSHWM420K		FCC Pt. 27 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**AWS WCDMA Radiated Measurements (Cont'd)**  
**§2.1053, §27.53(g)**

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 1732.40 MHz  
 CHANNEL: 1412  
 MEASURED OUTPUT POWER: 22.760 dBm = 0.189 W  
 MODULATION SIGNAL: WCDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.76 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3464.80	-35.58	9.72	-25.86	H	48.6
5197.20	-89.80	10.75	-79.05	H	101.8
6929.60	-85.47	10.75	-74.73	H	97.5
8662.00	-82.59	11.70	-70.89	H	93.6
10394.40	-81.02	12.66	-68.36	H	91.1



**Table 6-4. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1412)**

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1". This unit was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. Samsung Electronics, Co. Ltd. The data reported in the table above was measured in this test setup.

FCC ID: A3LSHWM420K		FCC Pt. 27 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**AWS WCDMA Radiated Measurements (Cont'd)**  
**§2.1053, §27.53(g)**

**Field Strength of SPURIOUS Radiation**

OPERATING FREQUENCY: 1752.50 MHz  
 CHANNEL: 1862  
 MEASURED OUTPUT POWER: 22.760 dBm = 0.189 W  
 MODULATION SIGNAL: WCDMA (Internal)  
 DISTANCE: 3 meters  
 LIMIT:  $43 + 10 \log_{10}(W) =$  35.76 dBc

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
3505.00	-42.94	9.83	-33.11	H	55.9
5257.50	-89.86	10.88	-78.98	H	101.7
7010.00	-85.71	10.92	-74.79	H	97.5
8762.50	-82.71	11.89	-70.82	H	93.6
10515.00	-80.66	12.62	-68.04	H	90.8



**Table 6-5. Radiated Spurious Data (AWS WCDMA Mode – Ch. 1862)**

**NOTES:**

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. Final power measurements are made with a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. This spurious level is recorded using the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

This device was tested under all configurations and the worst case is reported with HSDPA Active at 12.2 kbps RMC with TPC bits all set to "1". This unit was tested with its standard battery. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. Samsung Electronics, Co. Ltd. The data reported in the table above was measured in this test setup.

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## 6.4 AWS WCDMA Frequency Stability Measurements

§2.1055, §27.54

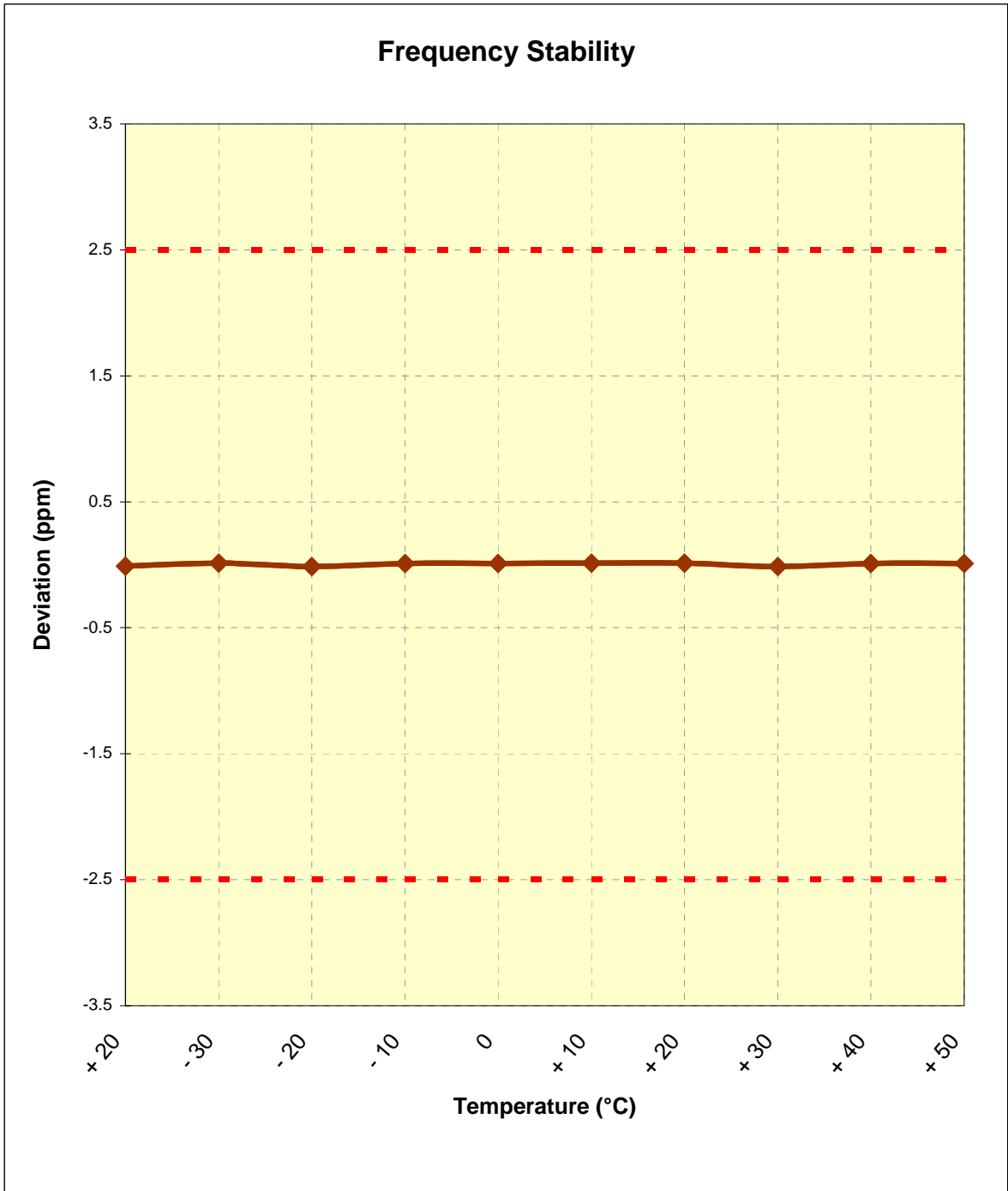
OPERATING FREQUENCY: 1,732,400,000 Hz  
 CHANNEL: 1412  
 REFERENCE VOLTAGE: 3.7 VDC  
 DEVIATION LIMIT: ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.70	+ 20 (Ref)	1,732,399,980	-20.00	-0.000001
100 %		- 30	1,732,400,022	22.00	0.000001
100 %		- 20	1,732,399,979	-21.00	-0.000001
100 %		- 10	1,732,400,018	18.00	0.000001
100 %		0	1,732,400,019	19.00	0.000001
100 %		+ 10	1,732,400,022	22.00	0.000001
100 %		+ 20	1,732,400,023	23.00	0.000001
100 %		+ 30	1,732,399,978	-22.00	-0.000001
100 %		+ 40	1,732,400,018	18.00	0.000001
100 %		+ 50	1,732,400,019	19.00	0.000001
115 %	4.26	+ 20	1,732,399,983	-17.00	-0.000001
BATT. ENDPOINT	3.40	+ 20	1,732,400,021	21.00	0.000001

Table 6-6. Frequency Stability Data (AWS WCDMA Mode – Ch. 1412)

FCC ID: A3LSHWM420K		FCC Pt. 27 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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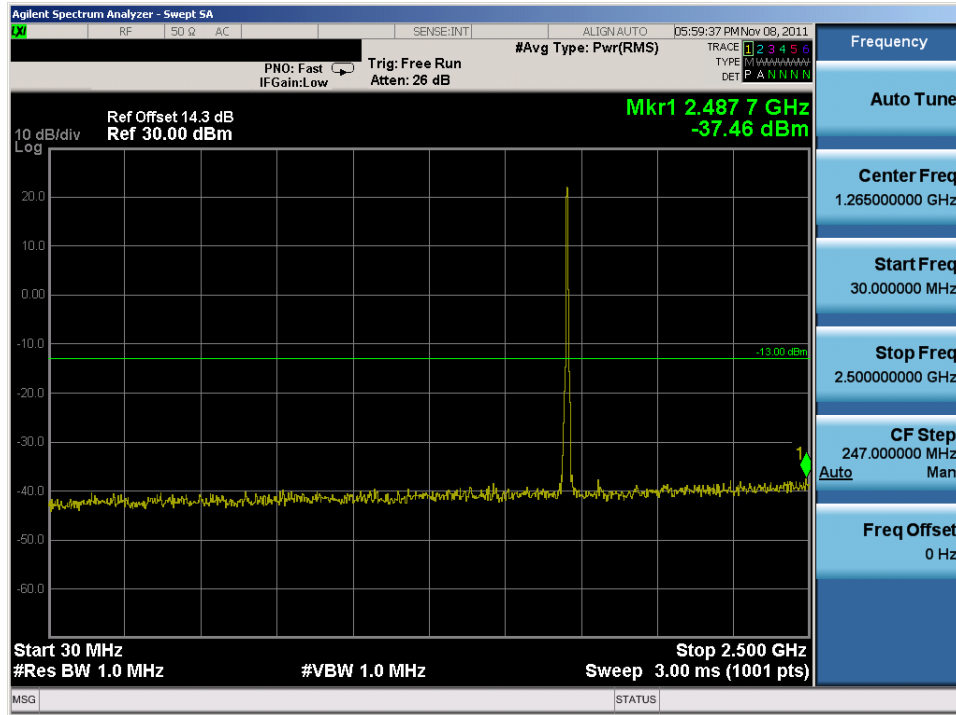
**AWS WCDMA Frequency Stability Measurements (Cont'd)**  
§2.1055, §27.54



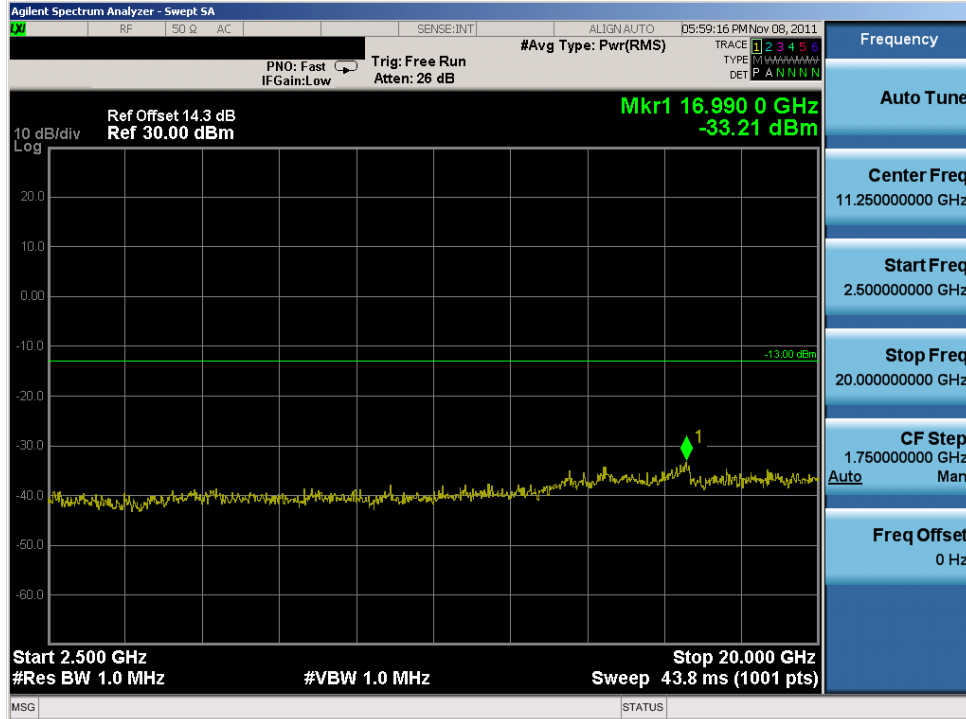
**Figure 6-1. Frequency Stability Graph (AWS WCDMA Mode – Ch. 1412)**

FCC ID: A3LSHWM420K	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 WCDMA MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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## 7.0 PLOT(S) OF EMISSIONS



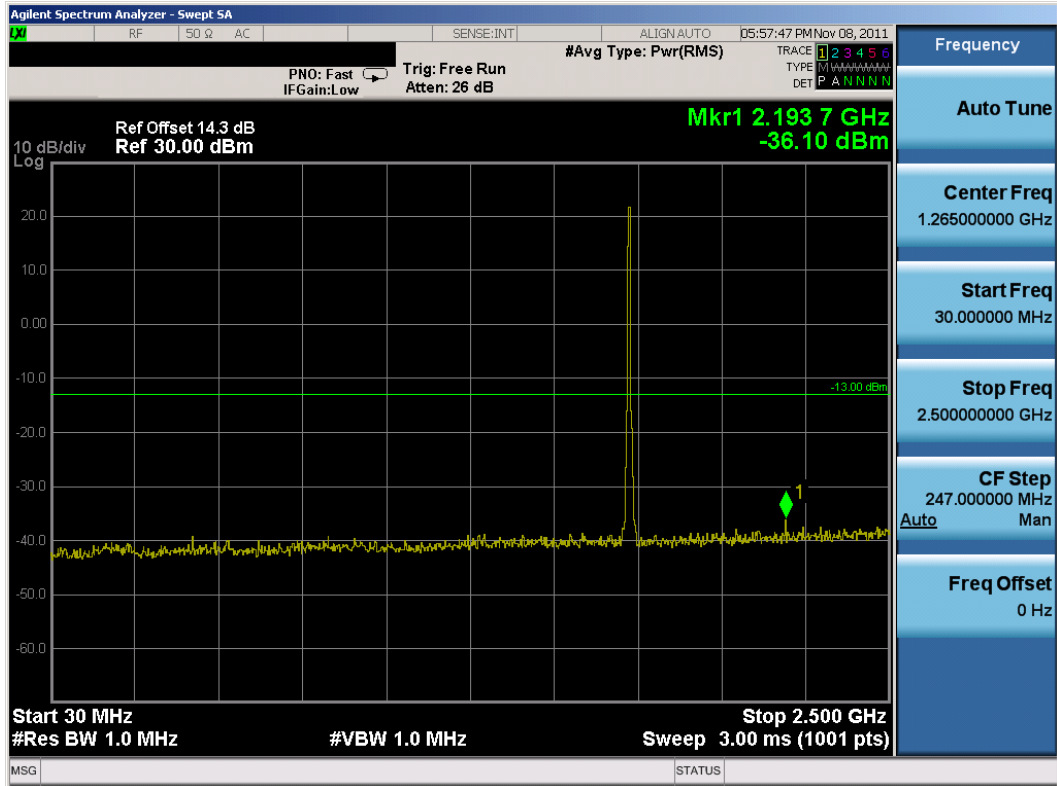
**Plot 7-1. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)**



**Plot 7-2. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1312)**

FCC ID: A3LSHWM420K		FCC Pt. 27 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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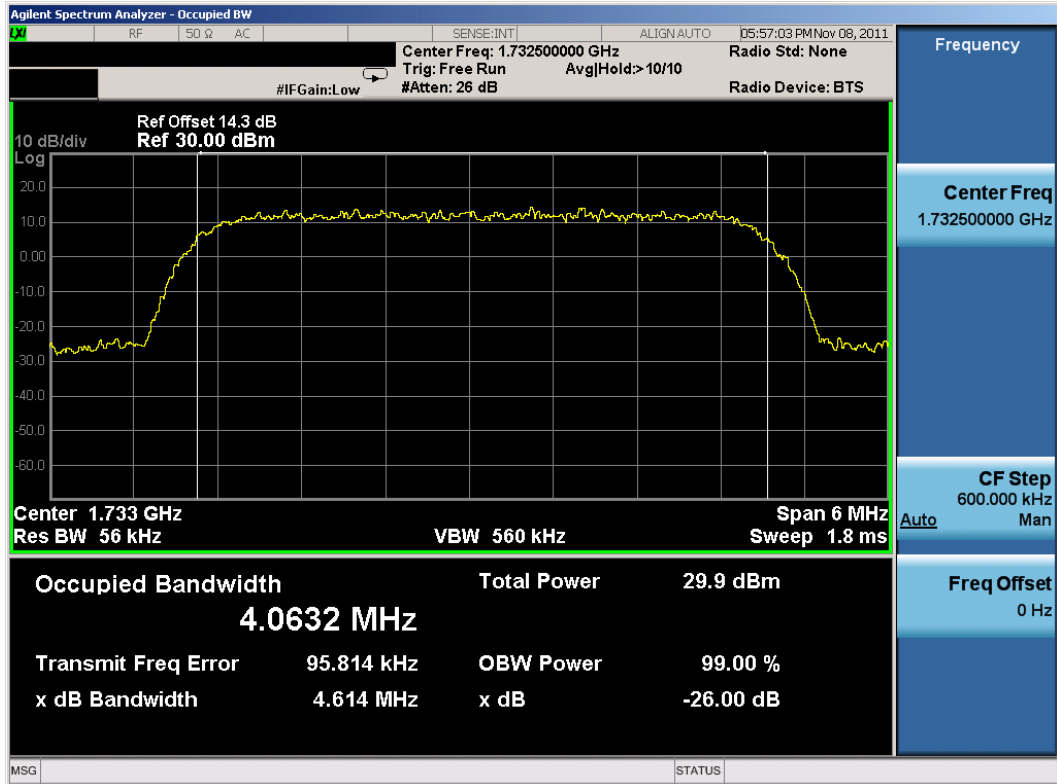


Plot 7-5. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1412)

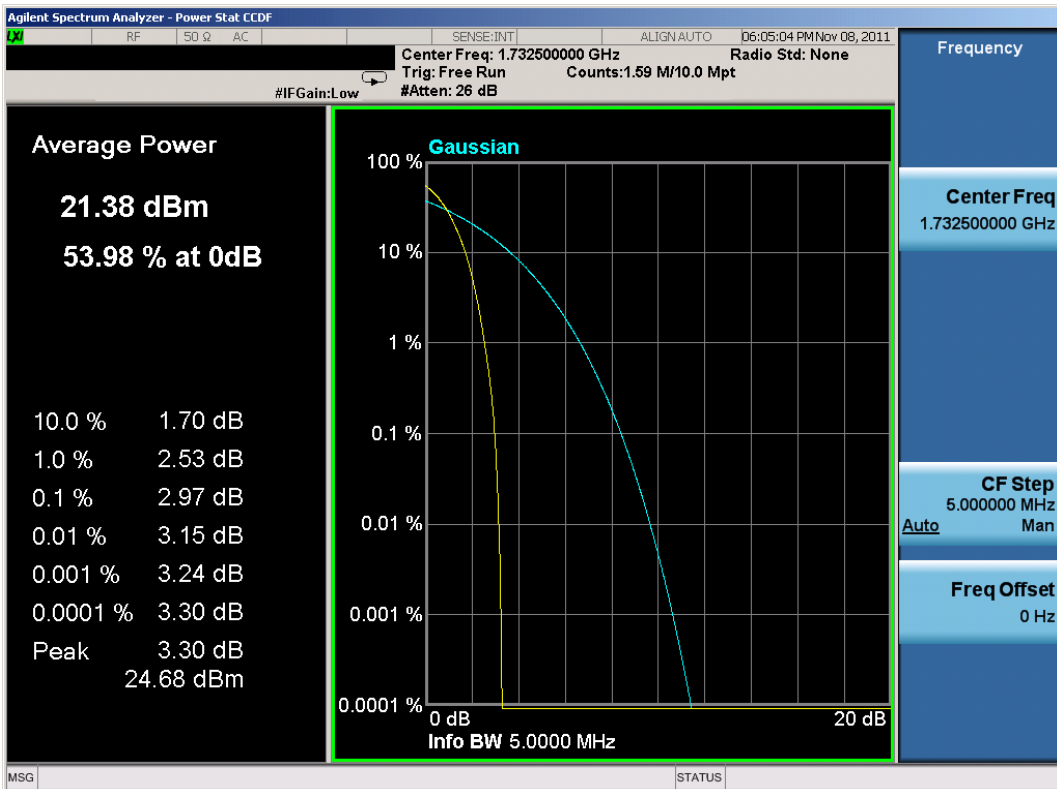


Plot 7-6. Conducted Spurious Plot (AWS WCDMA Mode – Ch. 1412)

FCC ID: A3LSHWM420K		FCC Pt. 27 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 7-7. Occupied Bandwidth Plot (AWS WCDMA Mode – Ch. 1412)



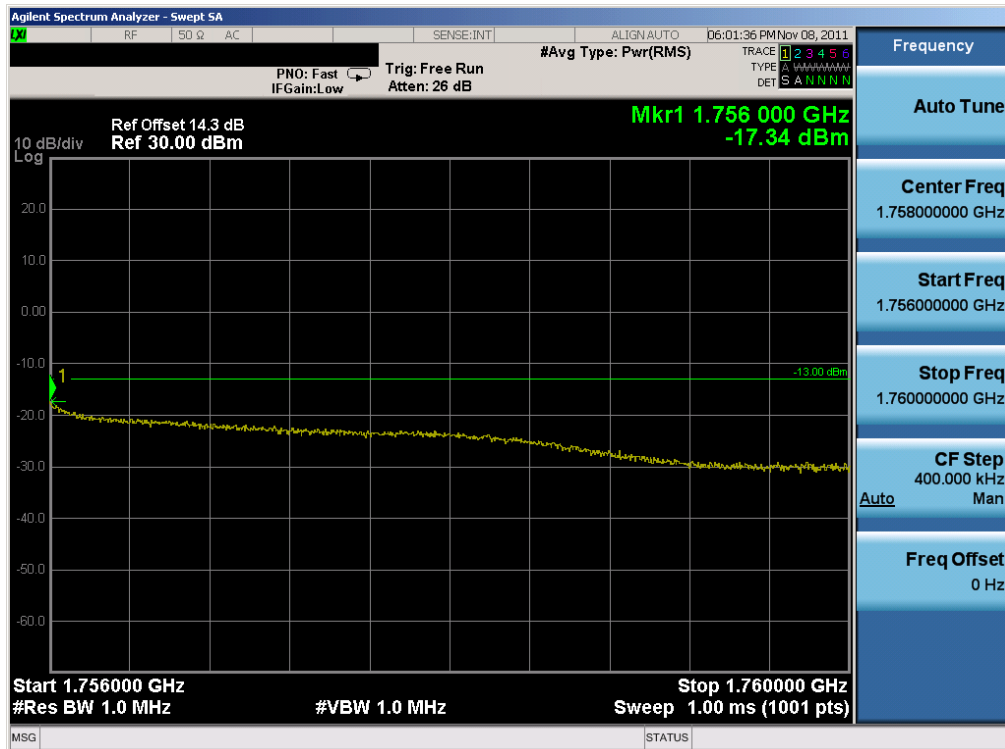
Plot 7-8. Peak-Average Ratio Plot (AWS WCDMA Mode – Ch. 1412)

FCC ID: A3LSHWM420K	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 27 WCDMA MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 7-11. Band Edge Plot (AWS WCDMA Mode – Ch. 1862)





Plot 7-12. 4MHz Span Plot (AWS WCDMA Mode – Ch. 1862)

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## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSHWM420K** complies with all the requirements of Parts 2 and 27 of the FCC rules.

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