



PCTEST ENGINEERING LABORATORY, INC.

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CERTIFICATE OF COMPLIANCE

FCC PART 15.247 WLAN 802.11b/g Class II Permissive Change

Applicant Name:

Samsung Electronics, Co. Ltd.
18600 Broadwick St.
Rancho Dominguez, CA 90220
United States

Date of Testing:

September 17, 2009

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Test Report Serial No.:

0909161723.A3L

FCC ID:

A3LSCHI920

APPLICANT:

Samsung Electronics, Co. Ltd.

Model(s):

SCH-i920

EUT Type:

Cellular/PCS CDMA/EvDO Phone with Bluetooth and WLAN

Max. RF Output Power:

53.33 mW (17.27 dBm) Conducted (b)

27.86 mW (14.45 dBm) Conducted (g)

Frequency Range:

2412 - 2462 MHz (DSSS/OFDM)

FCC Classification:

Digital Transmission System (DTS)

FCC Rule Part(s):

Part 15.247

Test Device Serial No.:

FG-244-B

Class II Perm. Change:

Please see change document.

Original Grant Date:

June 25, 2009

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 ANSI C-63.4-2003. 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 conducted.

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

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Test Report S/N: 0909161723.A3L	Test Dates: September 17, 2009	EUT Type: Cellular/PCS CDMA/EvDO Phone with Bluetooth and WLAN	Page 1 of 16	




Randy Ortanez
President

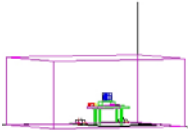


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MEASUREMENT REPORT

FCC Part 15.247



§ 2.1033 General Information

APPLICANT: Samsung Electronics, Co. Ltd.

APPLICANT ADDRESS: 18600 Broadwick St.
Rancho Dominguez, CA 90220, United States

TEST SITE: PCTEST ENGINEERING LABORATORY, INC.

TEST SITE ADDRESS: 6660-B Dobbin Road, Columbia, MD 21045 USA

FCC RULE PART(S): Part 15.247

MODEL NAME: SCH-i920

FCC ID: A3LSCHI920

Test Device Serial No.: FG-244-B ☐ Production ☒ Pre-Production ☐ Engineering

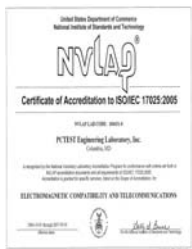
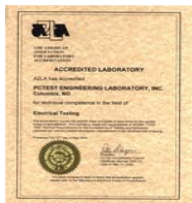
FCC CLASSIFICATION: Digital Transmission System (DTS)

DATE(S) OF TEST: September 17, 2009

TEST REPORT S/N: 0909161723.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 (EMC) 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 PCTEST Test Location

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity area, the Baltimore-Washington Intern'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 27, 2006.

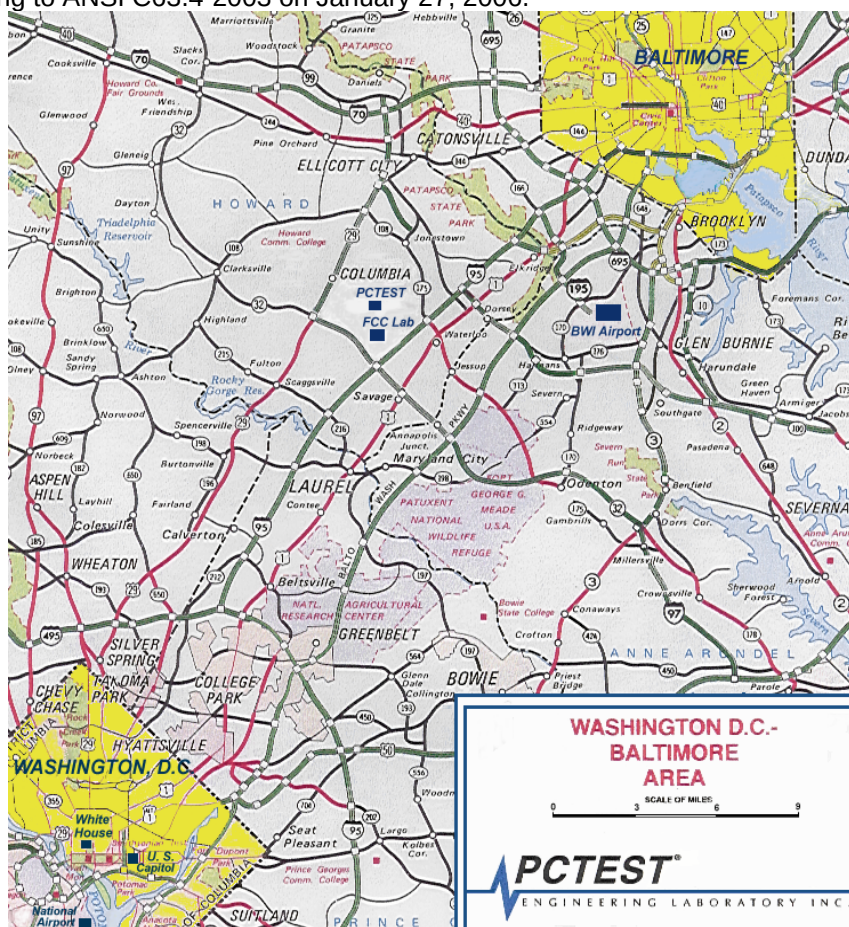


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: A3LSCHI920	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 WLAN 802.11b/g TEST REPORT (CLASS II PERMISSIVE CHANGE)	SAMSUNG	Reviewed by: Quality Manager
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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Cellular/PCS CDMA/EvDO Phone with Bluetooth and WLAN** FCC ID: A3LSCHI920. The EUT consisted of the following component(s):

Manufacturer / Model	FCC ID	Description
Samsung / Model: SCH-i920	A3LSCHI920	Cellular/PCS CDMA/EvDO Phone with Bluetooth and WLAN

Table 2-1. EUT Equipment Description

2.2 EMI Suppression Device(s)/Modifications

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

2.3 Labeling Requirements

Per 15.19; Docket 95-19

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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2.4 Radiated Emissions

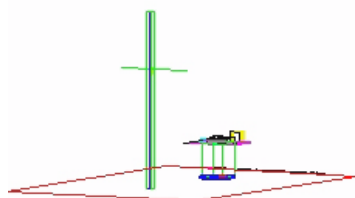


Figure 2-1. 3-Meter Test Site

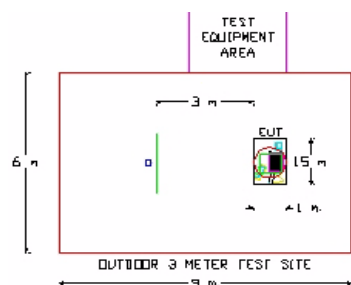


Figure 2-2. Dimensions of Outdoor Test Site

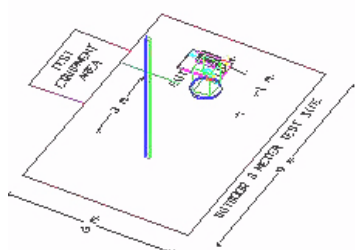


Figure 2-3. Turntable and System Setup

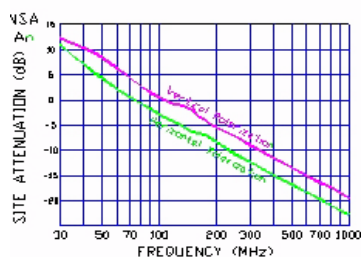


Figure 2-4. Normalized Site Attenuation Curves (H&V)

Preliminary measurements were made indoors at 1-meter using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, and turntable azimuth with respect to the antenna was noted for each frequency found. The spectrum was scanned from 30 to 200 MHz using a bi-conical antenna and from 200 to 1000 MHz using a log-spiral antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using RobertsTM Dipole antennas or horn antennas (see Figure 2-1). The test equipment was placed on a wooden and plastic bench situated on a 1.5m x 2m area adjacent to the measurement area (see Figure 2-2). Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 100kHz for frequencies below 1GHz or 1MHz for frequencies above 1GHz. Above 1GHz the detector function was set to average mode (RBW = 1MHz, VBW = 10Hz).

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table (see Figure 2-3). The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in the test setup photographs. Each EME reported was calibrated using the Agilent E8257D (250kHz – 20GHz) PSG Signal Generator. The Theoretical Normalized Site Attenuation Curves for both horizontal and vertical polarization are shown in Figure 2-4.

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3.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- The antenna(s) of the Cellular/PCS CDMA/EvDO Phone with Bluetooth and WLAN are **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The **Samsung Cellular/PCS CDMA/EvDO Phone with Bluetooth and WLAN FCC ID: A3LSCHI920** unit complies with the requirement of §15.203.

Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

Table 3-1. Frequency / Channel Operations

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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
-	No.165	(30MHz - 1000MHz) RG58 Coax Cable	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	11713A	Attenuation/Switch Driver	12/4/2008	Annual	12/4/2009	3439A02645
Agilent	8447D	Broadband Amplifier	N/A		N/A	1937A03348
Agilent	8447D	Broadband Amplifier	N/A		N/A	2443A01900
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	12/4/2008	Annual	12/4/2009	3008A00985
Agilent	85650A	Quasi-Peak Adapter	12/4/2008	Annual	12/4/2009	3303A01872
Agilent	85650A	Quasi-Peak Adapter	3/24/2009	Annual	3/24/2010	2043A00301
Agilent	8566B	(100Hz-22GHz) Spectrum Analyzer	3/24/2009	Annual	3/24/2010	2618A02866
Agilent	8566B	(100Hz-22GHz) Spectrum Analyzer	3/24/2009	Annual	3/24/2010	2542A11898
Agilent	8566B	(100Hz-22GHz) Spectrum Analyzer	12/5/2008	Annual	12/5/2009	3638A08713
Agilent	E4407B	ESA Spectrum Analyzer	3/24/2009	Annual	3/24/2010	US39210313
Agilent	E4448A	PSA (3Hz-50GHz) Spectrum Analyzer	12/5/2008	Annual	12/5/2009	US42510244
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/25/2009	Biennial	3/25/2011	MY45470194
Emco	3115	Horn Antenna (1-18GHz)	9/24/2007	Biennial	9/24/2009	9704-5182
Emco	3115	Horn Antenna (1-18GHz)	10/4/2007	Biennial	10/4/2009	9205-3874
Emco	3116	Horn Antenna (18 - 40GHz)	9/9/2008	Triennial	9/9/2011	9203-2178
Emco	3816/2	LISN	9/8/2008	Biennial	9/8/2010	9707-1077
Emco	3816/2	LISN	9/8/2008	Biennial	9/8/2010	9707-1079
Gigatronics	80701A	(0.05-18GHz) Power Sensor	9/18/2008	Annual	9/18/2009	1833460
Gigatronics	8651A	Universal Power Meter	9/18/2008	Annual	9/18/2009	1835299
MiniCircuits	VHF-3100+	High Pass Filter	N/A		N/A	30721
Rohde & Schwarz	NRVD	Dual Channel Power Meter	8/20/2008	Biennial	8/20/2010	101695
Rohde & Schwarz	NRV-Z32	Peak Power Sensor (100uW-2W)	12/5/2008	Biennial	12/5/2010	100155
Rohde & Schwarz	NRV-Z33	Peak Power Sensor (1mW-20W)	12/5/2008	Biennial	12/5/2010	100004
Solar Electronics	8012-50-R-24-BNC	LISN	11/8/2007	Biennial	11/8/2009	310233
Sunol	DRH-118	Horn Antenna (1 - 18GHz)	5/14/2009	Biennial	5/14/2011	A050307
Rohde & Schwarz	FSQ 26	Spectrum Analyzer	9/29/2008	Annual	9/29/2009	200452

Table 4-1. Annual Test Equipment Calibration Schedule

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5.0 TEST RESULTS

5.1 Summary

Company Name: Samsung Electronics, Co. Ltd.

FCC ID: A3LSCHI920

FCC Classification: Digital Transmission System (DTS)

Data Rate(s) Tested: 1Mbps, 2Mbps, 5.5Mbps, 11Mbps (b)
6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps (g)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (TX)					
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-210 table 3 limits)	RADIATED	PASS	Sections 5.2, 5.3
RECEIVER MODE (RX) / DIGITAL EMISSIONS					
15.107	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.107 limits or < RSS-Gen table 2 limits	LINE CONDUCTED	PASS	Part 15B Test Report
15.109	General Field Strength Limits (Restricted Bands and Radiated Emissions Limits)	< FCC 15.109 limits or < RSS-210 table 3 limits	RADIATED (30MHz-1GHz) (1-25 GHz)	PASS	Part 15B Test Report

Table 5-1. Summary of Test Results

FCC ID: A3LSCHI920		FCC Pt. 15.247 WLAN 802.11b/g TEST REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
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5.2 Radiated Spurious Emission Measurements

§15.247(d) / §15.205

The EUT was tested from 9kHz up to the tenth harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average measurements were taken using RBW = 1MHz, VBW = 10Hz, and linearly polarized horn antennas. All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 5-2 per Section 15.209

Frequency	Field Strength [μV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 5-2. Radiated Limits

Sample Calculation

- o Field Strength Level $_{[dB\mu V/m]} = \text{Analyzer Level }_{[dBm]} + 107 + \text{AFCL }_{[dB]}$

Notes:

- o AFCL = Antenna Factor $_{[dB]} + \text{Cable Loss }_{[dB]}$

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Radiated Spurious Emission Measurements (Cont'd)

§15.247(d) / §15.205

Mode: 802.11b

Transfer Rate: 5.5 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2412MHz

Channel: 01

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4824.00	-106.80	Avg	H	41.88	0.00	42.07	53.98	-11.91
4824.00	-94.40	Peak	H	41.88	0.00	54.47	73.98	-19.51
12060.00	-135.00	Avg	H	56.50	0.00	28.50	53.98	-25.48
12060.00	-125.00	Peak	H	56.50	0.00	38.50	73.98	-35.48

Table 5-3. Radiated Measurements @ 3 meters

NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 and RSS-210 section 2.7, Table 1 and are below the limit shown in Table 5-2.
2. Average Measurements > 1GHz using RBW = 1MHz VBW = 10Hz
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
6. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.
7. Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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Radiated Spurious Emission Measurements (Cont'd)

§15.247(d) / §15.205

Mode: 802.11b

Transfer Rate: 5.5 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2437MHz

Channel: 06

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4874.00	-107.18	Avg	H	42.03	0.00	41.85	53.98	-12.13
4874.00	-94.08	Peak	H	42.03	0.00	54.95	73.98	-19.03
7311.00	-135.00	Avg	H	47.14	0.00	19.14	53.98	-34.84
7311.00	-125.00	Peak	H	47.14	0.00	29.14	73.98	-44.84
12185.00	-135.00	Avg	H	56.71	0.00	28.71	53.98	-25.27
12185.00	-125.00	Peak	H	56.71	0.00	38.71	73.98	-35.27

Table 5-4. Radiated Measurements @ 3 meters

NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 and RSS-210 section 2.7, Table 1 and are below the limit shown in Table 5-2.
2. Average Measurements > 1GHz using RBW = 1MHz VBW = 10Hz
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
6. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.
7. Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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Radiated Spurious Emission Measurements (Cont'd)

§15.247(d) / §15.205

Mode: 802.11b

Transfer Rate: 5.5 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2462MHz

Channel: 11

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4924.00	-106.46	Avg	H	42.19	0.00	42.73	53.98	-11.25
4924.00	-93.86	Peak	H	42.19	0.00	55.33	73.98	-18.65
7386.00	-135.00	Avg	H	47.18	0.00	19.18	53.98	-34.80
7386.00	-125.00	Peak	H	47.18	0.00	29.18	73.98	-44.80
12310.00	-135.00	Avg	H	56.92	0.00	28.92	53.98	-25.06
12310.00	-125.00	Peak	H	56.92	0.00	38.92	73.98	-35.06

Table 5-5. Radiated Measurements @ 3 meters

NOTES:

- All emissions shown lie in the restricted bands specified in §15.205 and RSS-210 section 2.7, Table 1 and are below the limit shown in Table 5-2.
- Average Measurements > 1GHz using RBW = 1MHz VBW = 10Hz
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
- Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.
- Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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5.3 Radiated Restricted Band Edge Measurements

§15.205 / §15.209

Mode: 802.11g

Transfer Rate: 9 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2462MHz

Channel: 11

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
2483.80	-91.61	Avg	H	34.70	0.00	50.10	53.98	-3.88
2483.80	-74.41	Peak	H	34.70	0.00	67.30	73.98	-6.68
2484.62	-91.31	Avg	H	34.70	0.00	50.40	53.98	-3.58
2484.62	-75.71	Peak	H	34.70	0.00	66.00	73.98	-7.98
2486.04	-95.00	Avg	H	34.70	0.00	46.70	53.98	-7.28
2486.04	-83.20	Peak	H	34.70	0.00	58.50	73.98	-15.48

Table 5-6. Radiated Restricted Band Edge Measurements at 3-meters

NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 and RSS-210 section 2.7, Table 1 and are below the limit shown in Table 5-2.
2. Average Measurements > 1GHz using RBW = 1MHz VBW = 10Hz
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
6. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.
7. Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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6.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Cellular/PCS CDMA/EvDO Phone with Bluetooth and WLAN FCC ID: A3LSCHI920** is in compliance with Part 15C of the FCC Rules.

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