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MEASUREMENT REPORT
FCC PART 15.249 ANT+

Applicant Name:
Samsung Electronics, Co. Ltd.
129, Samsung-ro, Maetan dong,
Yeongtong-gu, Suwon-si
Gyeonggi-do 443-742, Korea

Date of Testing:
Aug. 2- Aug. 14, 2013
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
0Y1307251435.A3L

FCC ID:	**A3LSMN9002**
APPLICANT:	**Samsung Electronics, Co. Ltd.**

Application Type:	Certification
Type Number:	SM-N9002
EUT Type:	Portable Handset
Frequency Range:	2402 – 2480MHz
FCC Classification:	Low Power Transceiver, Rx Verified (DXT)
FCC Rule Part(s):	Part 15 Subpart C (15.249)
Test Procedure(s):	ANSI C63.10-2009

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 C63.10-2009. 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 Ortanez
President

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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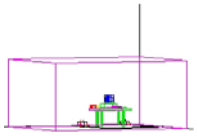
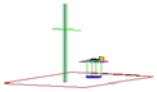


MEASUREMENT REPORT
FCC Part 15.249



§ 2.1033 General Information

APPLICANT:	Samsung Electronics, Co. Ltd.
APPLICANT ADDRESS:	129, Samsung-ro, Maetan dong, Yeongtong-gu, Suwon-si, Gyeonggi-do 443-742, Korea
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS:	7185 Oakland Mills Road, Columbia, MD 21046 USA
FCC RULE PART(S):	Part 15 Subpart C (15.249)
IC SPECIFICATION(S):	RSS-210 Issue 8
TYPE NUMBER:	SM-N9002
FCC ID:	A3LSMN9002
Test Device Serial No.:	1,2 ☐ Production ☒ Pre-Production ☐ Engineering
FCC CLASSIFICATION:	Low Power Transceiver, Rx Verified (DXT)
DATE(S) OF TEST:	Aug. 2- Aug. 14, 2013
TEST REPORT S/N:	0Y1307251435.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.

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 and the Industry Canada Certification and Engineering Bureau.

1.2 PCTEST Test Location

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*).

Testing was conducted at PCTEST Engineering Laboratory, Inc. facility located in New Concept Business 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 C63.4-2009 on January 10, 2012.

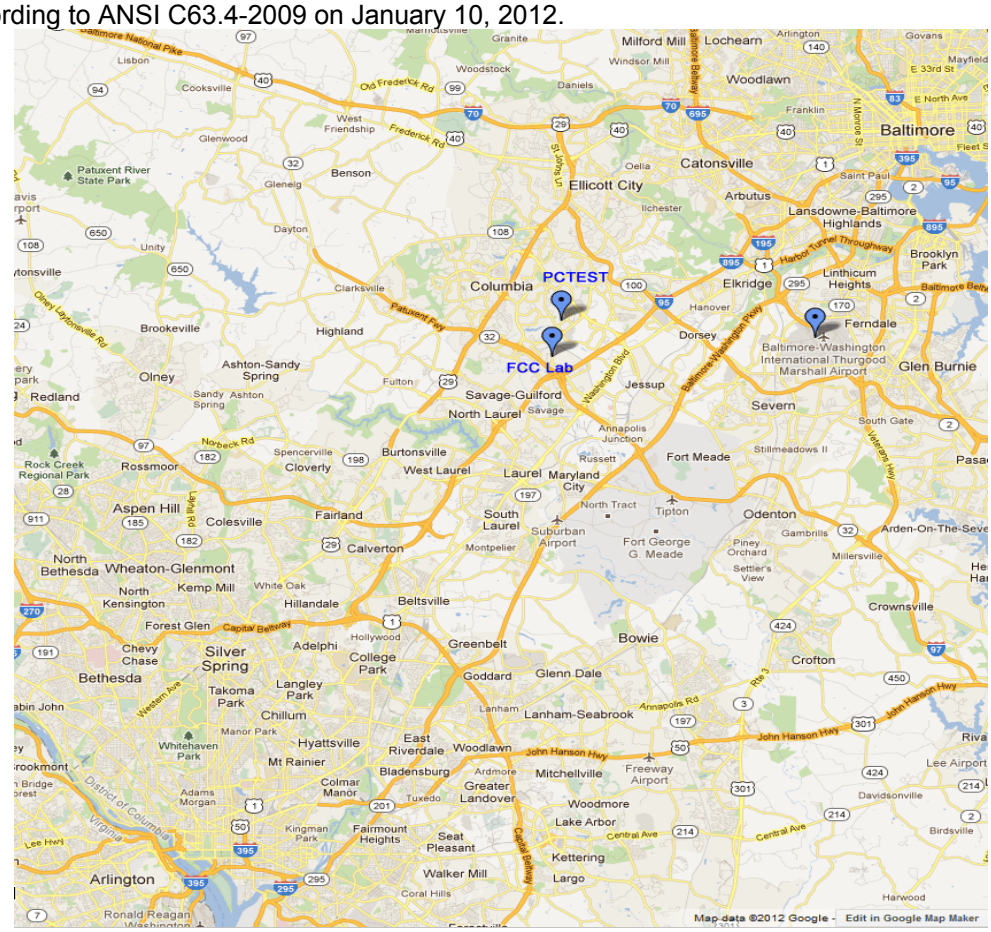


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMN9002**. The test data contained in this report pertains only to the emissions due to the EUT's ANT+ transmitter.

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, 802.11a/b/g/n/ac WLAN (DTS/NII), Bluetooth (1x,EDR, LE), NFC, ANT+

Note: This device is capable of operating in hopping and non-hopping mode. The EUT can hop between 79 different channels in the 2400 – 2483.5MHz band.

2.3 Test Configuration

The Samsung Portable Handset FCC ID: A3LSMN9002 was tested per the guidance of ANSI C63.10-2009. See Sections 3.2, 3.3, and 6.1 of this test report for a description of the AC line conducted emissions, radiated emissions, and antenna port conducted emissions test setups, respectively.

2.4 EMI Suppression Device(s)/Modifications

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

2.5 Labeling Requirements

Per 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(a)(5). Please see attachment for FCC ID label and label location.

3.0 DESCRIPTION OF TEST

3.1 Evaluation Procedure

The measurement procedure described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2009) was used in the measurement of the **Samsung Portable Handset FCC ID: A3LSMN9002.**

Deviation from measurement procedure…….....None

3.2 AC Line Conducted Emissions

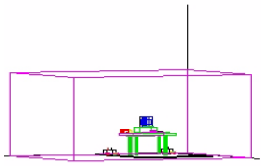


Figure 3-1. Shielded Enclosure Line-Conducted Test Facility

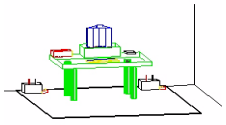


Figure 3-2. Line Conducted Emission Test Set-Up

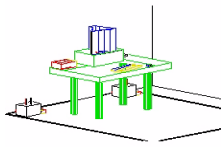


Figure 3-3. Wooden Table & Bonded LISNs

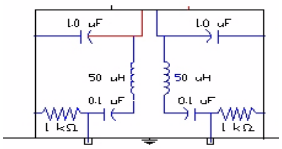


Figure 3-4. LISN Schematic Diagram

The line-conducted facility is located inside a 16'x20'x10' shielded enclosure, manufactured by Ray Proof Series 81 (*see Figure 3-1*). The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 1.5m away from the sidewall of the shielded room (*see Figure 3-2*). Two 10kHz-30MHz, 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room (*see Figure 3-3).* Power to the LISNs are filtered by a high-current high-insertion loss Ray Proof power line filter (100dB 14Hz-10GHz). The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure. All electrical cables are shielded by braided tinned copper zipper tubing with an inner diameter of ½".

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the Solar LISN. The LISN schematic diagram is shown (*see Figure 3-4*). All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference groundplane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

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 RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements. The bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission emission. Each emission was maximized by varying: power lines, 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; whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz bandwidth for final measurements. Each emission reported was calibrated using a signal generator.

Line conducted emissions test results are shown in Section 6.7. Automated test software was used to perform the AC line conducted emissions testing. Automated measurement software utilized is the PCTEST Conduction Automatic Measurement, Version 2.7.

3.3 Radiated Emissions

The radiated test facilities consisted of an indoor semi-anechoic chamber used for exploratory measurements and an open area test site (OATS) used for final measurements. For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies higher than the upper frequency range of the broadband antenna used for testing, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used.

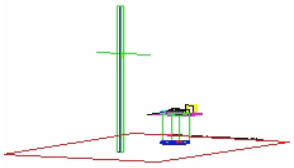


Figure 3-5. 3-Meter Test Site

Exploratory measurements were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies producing the maximum emissions. 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 test set-up was placed on top of a 0.8 meter high non-metallic 1 x 1.5 meter table (*see Figure 3-7*). The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth, and receive antenna height was noted for each frequency found. To record the exploratory measurements, the analyzers' detector function was set to peak mode and the bandwidth was set to 100kHz.

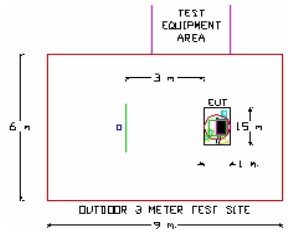


Figure 3-6. Dimensions of Outdoor Test Site

Final measurements were made on the OATS at 3 meter test range using calibrated, linearly polarized broadband or horn antennas (*see Figure 3-5*). The measurement area is situated on an 18 meter x 20 meter galvanized 1/2" hardware cloth as the conducting ground plane. This material is sewn together in sections 4 feet wide and 60 feet long. A total of eighteen sections are required to cover the entire measurement area. Sections are laid across the width of the pad, overlapped 1" and sewn and soldered together at intervals of 3" (7.6 cm.) The terrain of the test site is reasonably flat and level. Power and cable to the test site are buried 18" deep into the ground outside the perimeter of the site. An all-weather non-metallic housing is situated on a 2 x 3 meter area adjacent to the measurement area to house the test equipment (*see Figure 3-6*). The test set-up was again placed on top of the same a 0.8 meter high non-metallic 1 x 1.5 meter table on the OATS as used for exploratory measurements in the indoor chamber. The test set-up was re-configured to the same setup that was previously determined through exploratory measurements to have produced the worst case emissions. The spectrum analyzer was set to the frequencies found to have caused the highest radiated disturbances with respect to the limit during preliminary radiated measurements. The turntable containing the system was rotated through 360 degrees 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 changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. For the EUT positioning, "H" is defined with the EUT lying flat on the test surface, "H2" is defined with the EUT standing up on its side, and "V" is defined with the EUT standing upright.

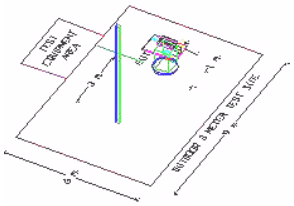


Figure 3-7. Turntable and System Setup

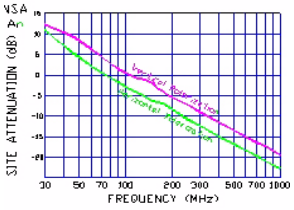


Figure 3-8. Normalized Site Attenuation Curves (H&V)

4.0 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 antennas of the Samsung Portable Handset are **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The **Samsung Portable Handset FCC ID: A3LSMN9002** unit complies with the requirement of §15.203.

Ch.	Frequency (MHz)
00	2402
:	:
39	2441
:	:
78	2480

Table 4-1. Frequency/ Channel Operations

5.0 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
-	BT1	Bluetooth Cable Set	1/17/2013	Annual	1/17/2014	N/A
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	3/29/2013	Annual	3/29/2014	N/A
-	BT2	Bluetooth Cable Set	1/17/2013	Annual	1/17/2014	N/A
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	4/17/2013	Annual	4/17/2014	3008A00985
Agilent	85650A	Quasi-Peak Adapter	4/17/2013	Annual	4/17/2014	2043A00301
Agilent	8566B	(100Hz-22GHz) Spectrum Analyzer	4/17/2013	Annual	4/17/2014	2542A11898
Agilent	N9038A	MXE EMI Receiver	12/8/2012	Annual	12/8/2013	MY51210133
Agilent	N9030A	PXA Signal Analyzer (44GHz)	1/11/2013	Annual	1/11/2014	MY52350166
Agilent	N9020A	MXA Signal Analyzer	10/9/2012	Annual	10/9/2013	US46470561
Anritsu	ML2495A	Power Meter	10/11/2012	Annual	10/11/2013	1039008
Emco	3816/2	LISN	2/12/2013	Biennial	2/12/2015	9707-1077
Emco	3816/2	LISN	2/12/2013	Biennial	2/12/2015	9707-1079
Mini-Circuits	VHF-3100+	High Pass Filter	1/21/2013	Annual	1/21/2014	31144
Sunol	DRH-118	Horn Antenna (1 - 18GHz)	6/19/2013	Biennial	6/19/2015	A050307

Table 5-1. Annual Test Equipment Calibration Schedule

6.0 TEST RESULTS

6.1 Summary

Company Name: Samsung Electronics, Co. Ltd.

FCC ID: A3LSMN9002

Method/System: Frequency Hopping Spread Spectrum (FHSS)

Number of Channels: 79

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (Tx)						
2.1049	RSS-Gen (4.6.1)	Occupied Bandwidth	N/A	CONDUCTED	PASS	Section 6.2
15.35(c)	N/A	Duty Cycle Calculation	N/A	RADIATED	N/A	Section 6.3
15.249(a)(e)	RSS-210 (A2.9(a))	Fundamental Field Strength Level	< 50 mV/m		PASS	Section 6.4
15.249(a)(e)	RSS-210 (A2.9(a))	Harmonic Field Strength Level	< 500 μV/m		PASS	Section 6.5
15.205, 15.209, 15.249(d)(e)	RSS-210 (A2.9(b))	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	< 15.209 limits (RSS-210 table 3 limits) or 50dB below the level of the fundamental		PASS	Sections 6.5, 6.6
15.207	RSS-Gen (7.2.2)	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits or < RSS-Gen table 2 limits	LINE CONDUCTED	PASS	Section 6.7

Table 6-1. Summary of Test Results

Notes:

1) All modes of operation were investigated. The test results shown in the following sections represent the worst case emissions.
2) 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.

6.2 Occupied Bandwidth Measurement

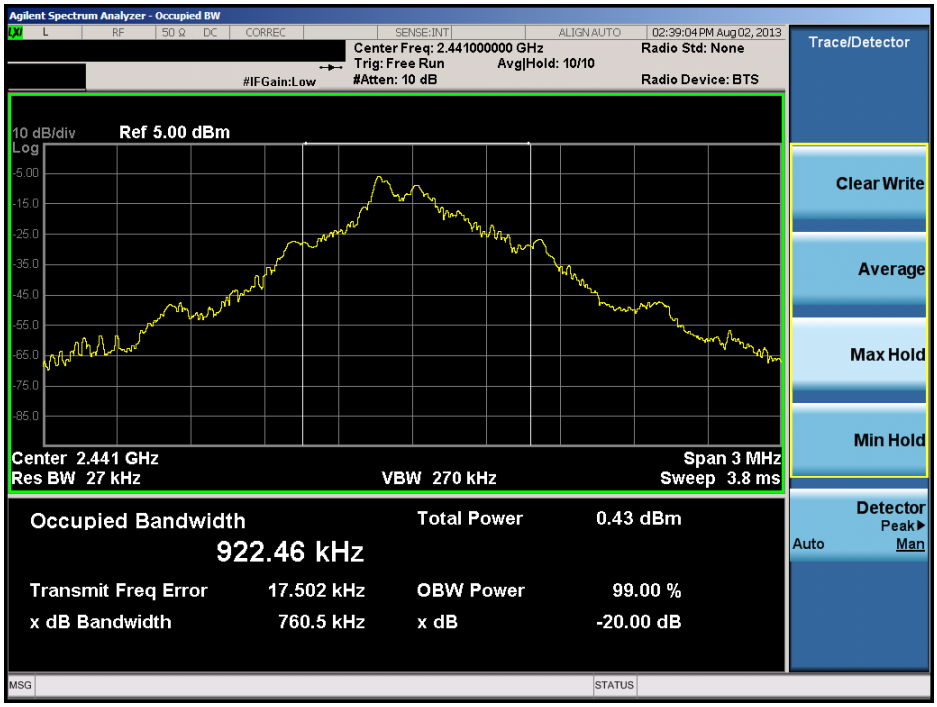
§2.1049

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.

Frequency [MHz]	Channel No.	Operating Mode	Measured Bandwidth [kHz]
2441	39	ANT+ (non-hop)	922.5

Table 6-2. Occupied Bandwidth Measurement

Figure 6-1. Test Instrument & Measurement Setup



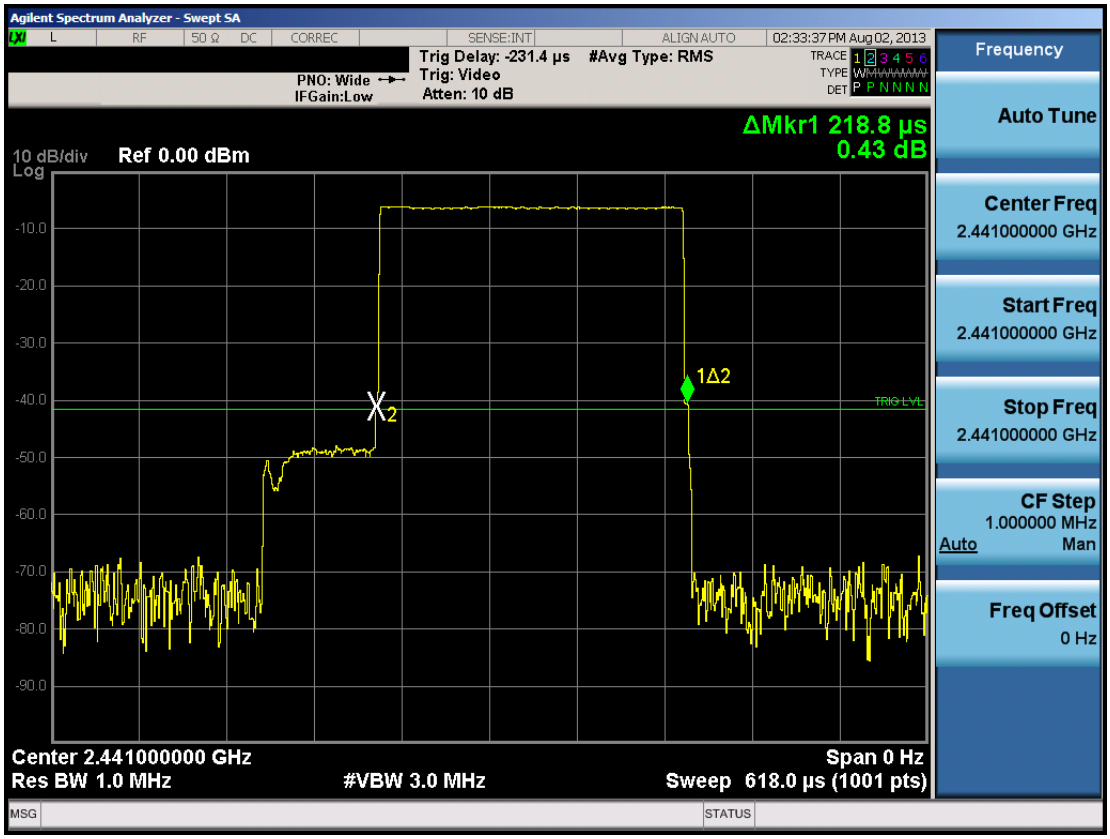
Plot 6-1. Occupied Bandwidth Plot (ANT+ – Ch. 39)

6.3 Duty Cycle Calculation

§15.35(c)

Per FCC Part 15.35(c), an average radiated field strength can be determined by applying a duty cycle correction factor to a measured peak radiated field strength level. The duty cycle correction factor is determined based on the worst case operation over a 100ms time period on any given channel. Two plots are included below to determine the appropriate duty cycle correction factor.

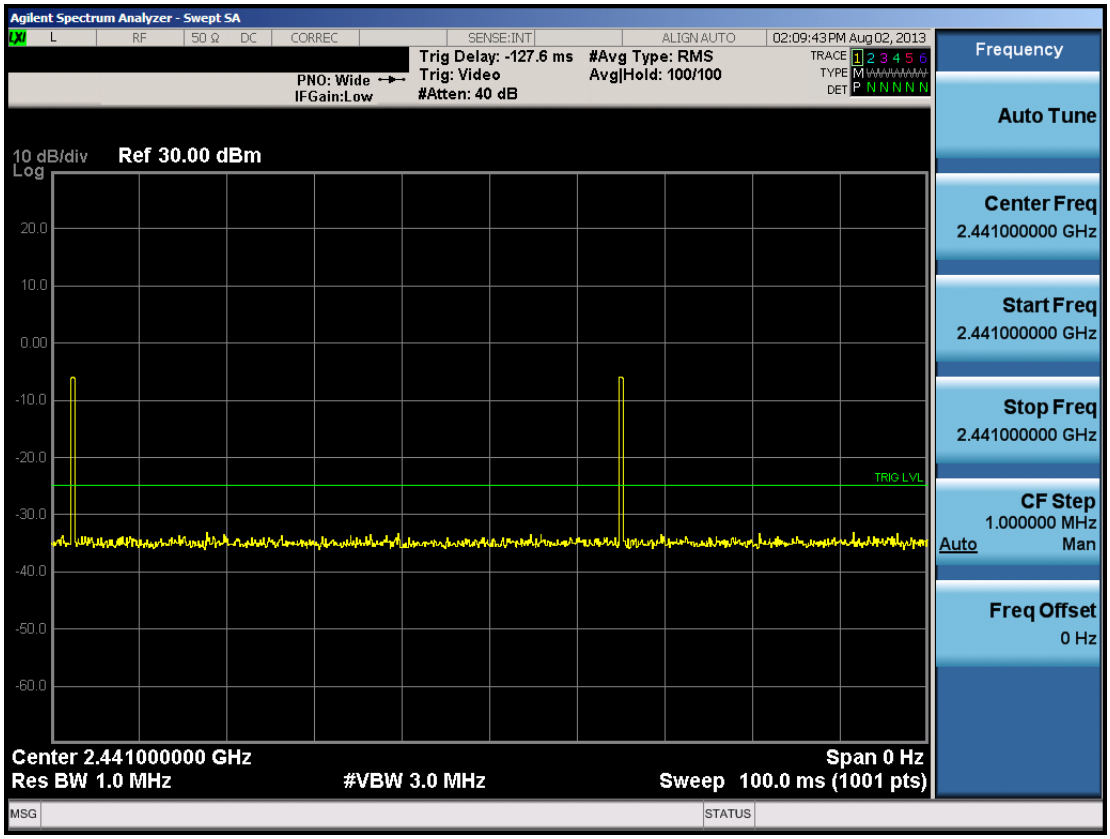
In Plot 6-2 beow, it is shown that the pulse width for one transmission burst of the ANT+ transmitter while operating in non-hopping mode is 218.8 μs.



Plot 6-2. Pulse Width Measurement

Duty Cycle Calculation (Cont'd)
§15.35(c)

In Plot 6-3 below, a video trigger is used to determine the maximum number of times the transmitter operates at maximum power over a 100ms period.



Plot 6-3. Worst Case 100ms Operation

Since it is determined that the transmitter burst appears a maximum of 2 times over a 100ms window with a pulse width of 218.8μs, then the appropriate duty cycle correction factor is determined from the following formula, based on 15.35(c):

DCCF = $20\log_{10}$ (number of hits x (worst case 100ms operation / 100ms))
= $20\log_{10}$ (2 x (0.2188 ms/100ms)) = -47.17dB

DCCF = -47.17dB

6.4 Fundamental Field Strength Level Measurement

§15.249(a)(e); RSS-210 (A2.9(a))

Measurement is made while the EUT is operating in non-hopping transmission mode. The field strengths shown below were measured using a spectrum analyzer. Peak field strength measurements are performed in the analyzers' swept spectrum mode using a peak detector with RBW = 3MHz and VBW ≥ RBW. Average field strength data is determined by applying the duty cycle correction factor (DCCF) found in Section 6.3 to the measured peak field strength values.

The maximum permissible average field strength level is 50mV/m (93.98dBμV/m). The maximum permissible peak field strength level is 500mV/m (113.98 dBμV/m).

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Field Strength [dBμV/m]	Duty Cycle Correction [dB]	Corrected Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
2402.00	-61.08	Peak	H	35.56	81.48	-47.17	34.31	93.98	-59.67
2402.00	-61.08	Peak	H	35.56	81.48	0.00	81.48	113.98	-32.50
2441.00	-59.47	Peak	H	35.80	83.33	-47.17	36.16	93.98	-57.83
2441.00	-59.47	Peak	H	35.80	83.33	0.00	83.33	113.98	-30.66
2480.00	-58.76	Peak	H	36.04	84.27	-47.17	37.10	93.98	-56.88
2480.00	-58.76	Peak	H	36.04	84.27	0.00	84.27	113.98	-29.71

Table 6-3. Field Strength Measurements

6.5 Radiated Spurious Emission Measurements

§15.205 & §15.209, §15.249 (d)(e); RSS-210 (A2.9(b))

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 6-4. Radiated Limits

Sample Calculation

- Avg. Field Strength Level $_{[dB\mu V/m]}$ = Analyzer Level $_{[dBm]}$ + 107 + AFCL $_{[dB/m]}$ + Duty Cycle Correction $_{[dB]}$
- Pk. Field Strength Level $_{[dB\mu V/m]}$ = Analyzer Level $_{[dBm]}$ + 107 + AFCL $_{[dB/m]}$
- AFCL $_{[dB/m]}$ = Antenna Factor $_{[dB/m]}$ + Cable Loss $_{[dB]}$
- Margin $_{[dB]}$ = Field Strength Level $_{[dB\mu V/m]}$ – Limit $_{[dB\mu V/m]}$

Test Notes

1. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. There were no non-harmonic emissions detected whose levels were within 20dB of the applicable limits so only harmonic emissions data is shown in this section.
2. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 6-4. Per 15.249(d), the radiated emissions limits from 15.209 were used since they were less than the limit of 50dB of attenuation from the measured fundamental field strength level.
3. Peak measurements > 1GHz using RBW = 1MHz and VBW = 3MHz.
4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
5. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery. The standard battery for this device contains an embedded NFC antenna.
6. Peak levels at -125dBm represent the analyzer noise floor and signify that no emission was detected. No detectable emissions were found. Since the peak measurements are shown to comply with the average limits, no average spurious emissions measurements were recorded.

Radiated Spurious Emission Measurements (Cont'd)

§15.205 & §15.209, §15.249 (d)(e); RSS-210 (A2.9(b))

Worst Case Mode: ANT+ (non-hopping)
Measurement Distance: 3 Meters
Operating Frequency: 2402MHz
Channel: 0

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4804.00	-125.00	Peak	H	41.46	23.46	53.98	-30.52
12010.00	-125.00	Peak	H	55.24	37.24	53.98	-16.74

Table 6-5. Radiated Measurements

Worst Case Mode: ANT+ (non-hopping)
Measurement Distance: 3 Meters
Operating Frequency: 2441MHz
Channel: 39

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4882.00	-125.00	Peak	H	41.71	23.71	53.98	-30.27
7323.00	-125.00	Peak	H	48.51	30.51	53.98	-23.47
12205.00	-125.00	Peak	H	55.84	37.84	53.98	-16.14

Table 6-6. Radiated Measurements

Radiated Spurious Emission Measurements (Cont'd)

§15.205 & §15.209, §15.249 (d)(e); RSS-210 (A2.9(b))

Worst Case Mode:	ANT+ (non-hopping)
Measurement Distance:	3 Meters
Operating Frequency:	2480MHz
Channel:	78

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
4960.00	-125.00	Peak	H	41.95	23.95	53.98	-30.03
7440.00	-125.00	Peak	H	48.63	30.63	53.98	-23.35
12400.00	-125.00	Peak	H	55.54	37.54	53.98	-16.44

Table 6-7. Radiated Measurements

6.6 Radiated Restricted Band Edge Measurements

§15.205 & §15.209, §15.247 (d); RSS-210 (A8.5)

Worst Case Mode: ANT+ (non-hopping)

Measurement Distance: 3 Meters

Operating Frequency: 2480MHz

Channel: 78

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol [H/V]	AFCL [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
2483.50	-105.61	Avg	H	36.06	37.45	53.98	-16.53
2483.50	-99.40	Peak	H	36.06	43.66	73.98	-30.32
2484.93	-105.66	Avg	H	36.07	37.40	53.98	-16.58
2484.93	-97.90	Peak	H	36.07	45.16	73.98	-28.82
2488.58	-105.93	Avg	H	36.09	37.16	53.98	-16.82
2488.58	-98.60	Peak	H	36.09	44.48	73.98	-29.50

Plot 6-4. Radiated Restricted Upper Band Edge Measurement

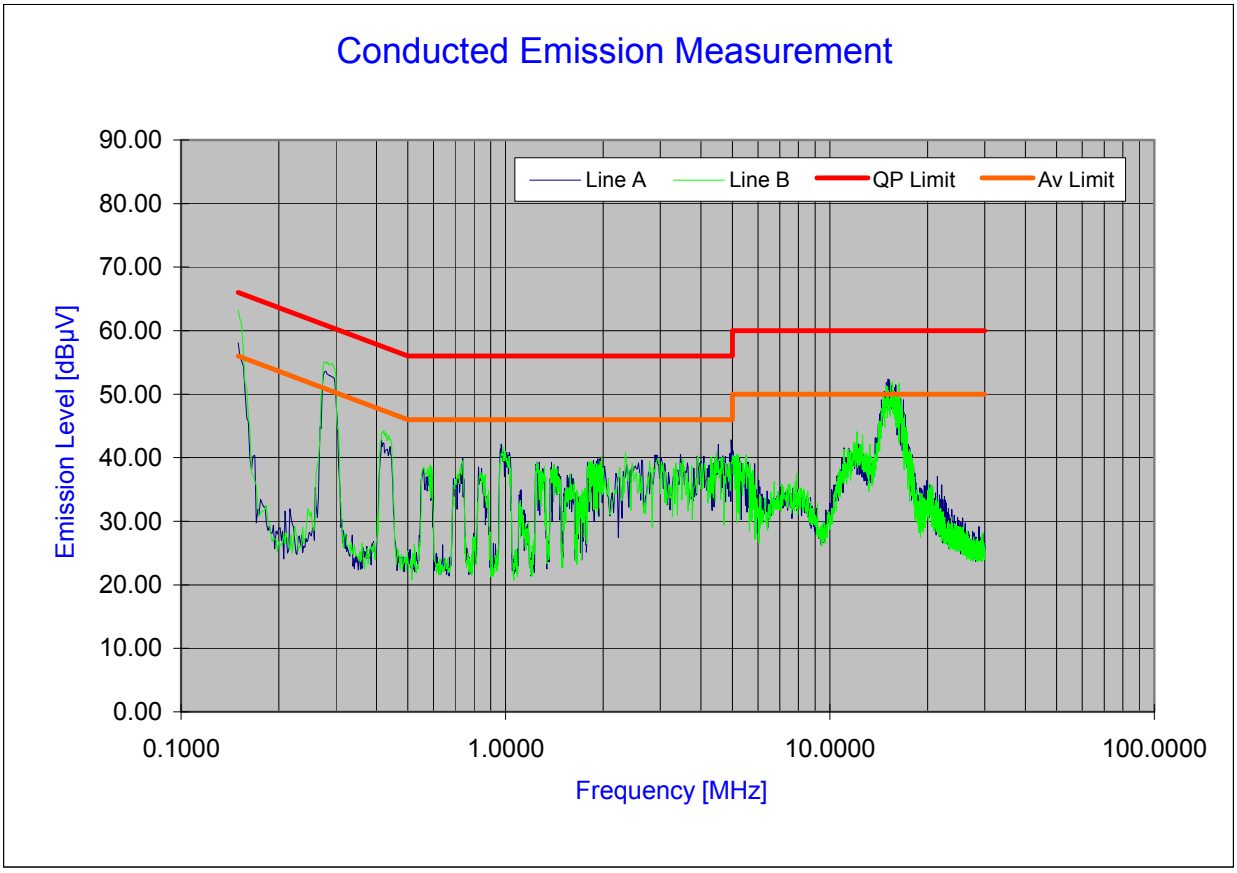
6.7 Line Conducted Measurement Data

§15.207; RSS-Gen (7.2.2)

PCTEST Engineering Laboratory Inc.

Company : Samsung Electronics, Co. Ltd.
Model Number : SM-N9002
FCC ID Code : A3LSMN9002
Standard : FCC Part 15C, 15.207

Power Source : AC120V/60Hz
Tested Date : 08/12/2013
Note : Tested with ANT+ ON



Ver.1.1 ©PCTEST 2006.08

Plot 6-5. Line-Conducted Test Plot

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for an intentional radiator from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Corr. (dB)
5. Margin (dB) = QP/AV Limit (dBµV) - QP/AV Level (dBµV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.

Line Conducted Measurement Data (Cont'd)

§15.207; RSS-Gen (7.2.2)

No.	Line	Frequency	Factor	QP	Limit	Margin	Average	Limit	Margin
		[MHz]	[dB]	[dBµV]	[dBµV]	[dB]	[dBµV]	[dBµV]	[dB]
1	A	0.150	6.85	55.35	66.00	-10.65	38.76	56.00	-17.24
2	A	0.289	6.91	49.18	60.55	-11.37	35.95	50.55	-14.60
3	A	14.709	8.05	41.72	60.00	-18.28	33.90	50.00	-16.10
4	A	14.893	8.07	42.59	60.00	-17.41	34.24	50.00	-15.76
5	A	14.920	8.07	41.63	60.00	-18.37	33.87	50.00	-16.13
6	A	15.076	8.09	43.37	60.00	-16.63	34.25	50.00	-15.75
7	A	15.193	8.10	43.46	60.00	-16.54	34.06	50.00	-15.94
8	A	15.490	8.12	40.85	60.00	-19.15	33.94	50.00	-16.06
9	A	15.772	8.15	39.96	60.00	-20.04	33.78	50.00	-16.22
10	A	15.970	8.17	39.51	60.00	-20.49	32.79	50.00	-17.21
11	B	0.152	6.85	60.53	65.91	-5.38	43.42	55.91	-12.49
12	B	0.289	6.91	50.15	60.54	-10.39	34.70	50.54	-15.84
13	B	14.633	8.05	43.55	60.00	-16.45	34.25	50.00	-15.75
14	B	14.922	8.07	44.79	60.00	-15.21	35.74	50.00	-14.26
15	B	15.078	8.09	44.57	60.00	-15.43	35.72	50.00	-14.28
16	B	15.365	8.11	45.01	60.00	-14.99	35.89	50.00	-14.11
17	B	15.511	8.13	44.93	60.00	-15.07	35.10	50.00	-14.90
18	B	15.901	8.16	42.59	60.00	-17.41	33.23	50.00	-16.77
19	B	16.065	8.17	41.40	60.00	-18.60	32.42	50.00	-17.58
20	B	16.364	8.20	41.30	60.00	-18.70	32.18	50.00	-17.82

Table 6-8. Line-Conducted Test Data

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for an intentional radiator from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Corr. (dB)
5. Margin (dB) = QP/AV Limit (dBµV) - QP/AV Level (dBµV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.

7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMN9002** is in compliance with Part 15 Subpart C (15.249) of the FCC Rules.