Lab Code: 200167-0

FCC PART 15 SUBPART C

IC RSS-210, ISSUE 7, JUNE 2007

TEST AND MEASUREMENT REPORT

For

Kno, Inc.

5155 Old Ironsides Dr,

Santa Clara, CA 95054, USA

FCC ID: YXJ-K0102X
IC: 9334A-K01021

Report Type:	**Product Type:**
Original Report	E-book Reader with Wi-Fi and Bluetooth

Test Engineers:	Jack Liu
Report Number:	R1011014-247WiFi
Report Date:	2010-12-01
Reviewed By:	Victor Zhang RF Lead
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1011014-247WiFi	Original Report	2010-12-01

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *Kno, Inc.* and their product *FCC: YXJ-K0102X, IC: 9334A-K01021, model: K01021-NA* or the "EUT" as referred in this report is an E-book reader with a 2.4 GHz 802.11 b/g and Bluetooth Module. It has two models which is single screen unit (K01010-NA & K01011-NA) and dual screen unit (K01020-NA & K01021-NA), the K01010-NA & K01011-NA contain all the functions which is the same with the right side of the K01020-NA & K01021-NA, the only different is the K01020-NA & K01021-NA has the extra touch screen on the left attached to the unit. Please refer to the exhibit C for the detail inside pictures.

1.2 Mechanical Description of EUT

Single Screen Model (K01010-NA & K01011-NA**):**

The "EUT" measures *340mm (L) x 240mm (W) x 15mm (H)*, and weighs approximately *1.2k*g.

The test data gathered are from typical production sample, Serial number: R1011014-1 assigned by BACL.

Dual Screen Model (K01020-NA & K01021-NA**):**

The "EUT" measures *340mm (L) x 460mm (W) x 15mm (H)*, and weighs approximately *2.55k*g.

The test data gathered are from typical production sample, Serial number: 1039F1000199 assigned by the manufacture.

1.3 Objective

This report is prepared on behalf of *Kno, Inc* in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions rules and IC RSS-210 Issue 7, June 2007.

The objective is to determine continuous compliance to the following requirements: RF Exposure, Antenna Requirements, Conducted Emissions, Spurious Emissions at Antenna Port, Restricted Bands, 6 dB Bandwidth, Maximum Peak Output Power, 100 kHz Bandwidth of Frequency Band Edge, Power Spectral Density, Radiated Spurious Emissions, and Receiver Spurious Emissions.

We take the worst case which is the dual screen unit (K01021-NA) according to the pre-scan result; all data from dual screen unit (K01021-NA) will represent all single screen unit (K01010-NA & K01011-NA) and dual screen unit (K01020-NA & K01021-NA) in this report.

1.4 Related Submittal(s)/Grant(s)

FCC ID: U9R-W2CBW003, IC: 7089A-W2CBW003, BACL Report #: R073307-247802.11

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are: spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values range from +2.0 for Conducted Emissions tests and +4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL.

Detailed instrumentation measurement uncertainties can be found in BACL report QAP-018.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test sites at BACL have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: R-2463 and C-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/Standards/scopes/2001670.htm

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2003.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

2.2 EUT Exercise Software

EUT Exercise Software was provided by the client:

The EUT had been tested with the following data rate settings (worst case):

Radio Mode	Frequency/Data rate		
	Low CH (MHz/Mbps)	Mid CH (MHz/Mbps)	High CH (MHz)
802.11b	2412/1	2437/1	2462/1
802.11g	2412/6	2437/6	2462/6

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Special Accessories

N/A

2.5 Local Support Equipment

Manufacturer	Description	Model No.	Serial No.
-	-	-	-

2.6 Power Supply and Line Filters

Manufacturer	Description	Model No.	Serial No.
Kno, Inc	AC/DC Power Adapter	-	201008-13

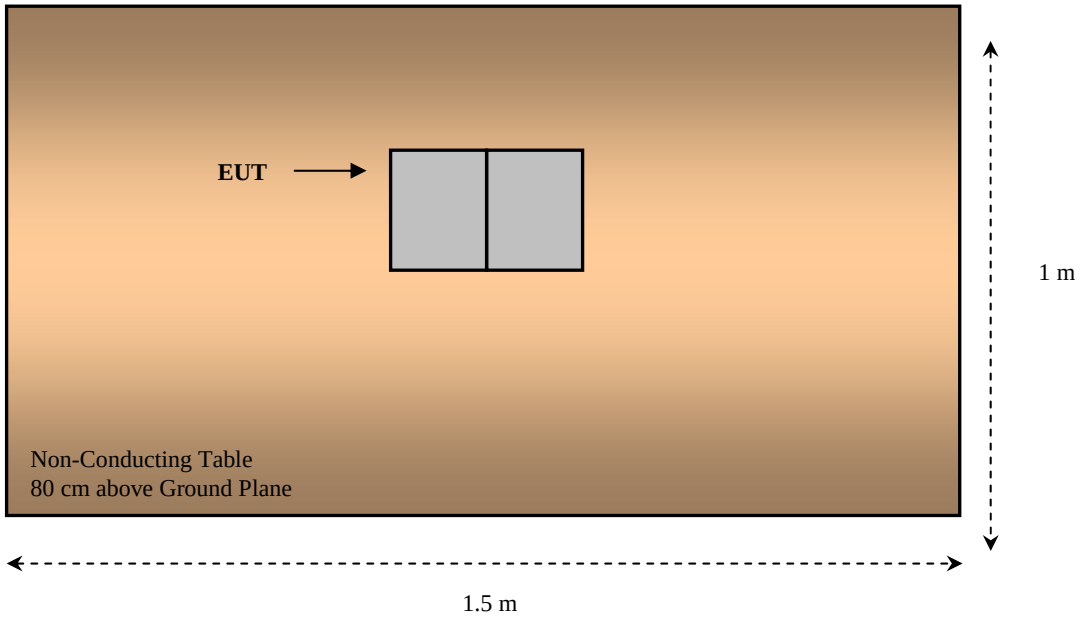
2.7 Interface Ports and Cabling

Cable Description	Length (m)	From	To
Power Cable	< 1	EUT	AC Adapter

2.8 EUT Internal Configuration Details

Manufacturers	Description	Model No.	Serial No.
Kno, Inc	Single Screen PCB Board 1	100-0023-001 Rev A	4500549-00L0 5#
Kno, Inc	Single Screen PCB Board 2	100-0024-001 Rev A 110	45005494-00L0 5#
Wi2Wi	RF Module	-	W2CBW003
Kno, Inc	Dual Screen PCB Board 1	100-0025-001 Rev A1 Comm	45005492-00L0
Kno, Inc	Dual Screen PCB Board 2	100-00022-001 Rev A MLB	45005498-01L1

2.9 Radiated Emissions Test Setup Block Diagram



3 Summary of Test Results

Results reported relate only to the product tested.

FCC & IC Rules	Description of Test	Results
FCC §15.247(i), §2.1093 IC RSS-102	RF Exposure	Compliant
FCC §15.203 IC RSS-Gen §7.1.4	Antenna Requirement	Compliant
FCC §15.207(a) IC RSS-Gen §7.2.2	AC Line Conducted Emissions	Compliant
FCC §15.209 IC RSS-210 §2.6	Spurious Emissions at Antenna Port	Note[1]
FCC §15.205 IC RSS-210 §2.2	Restricted Bands	Compliant
FCC §15.209, §15.247 IC RSS-210 §2.6	Radiated Spurious Emissions	Compliant
FCC §15.247(a)(2) IC RSS-210 §A8.2	6 dB Bandwidth	Note[1]
FCC §15.247(b)(3) IC RSS-210 §A8.4	Maximum Peak Output Power	Note[1]
FCC §15.247(d) IC RSS-210 §A8.5	100 kHz Bandwidth of Frequency Band Edge	Note[1]
FCC §15.247(e) IC RSS-210 §A8.2(b)	Power Spectral Density	Note[1]
IC RSS-210 §2.6 & RSS-Gen §4.10	Receiver Spurious Emission	Compliant

Note[1]: Please refer to FCC ID: U9R-W2CBW003, IC: 7089A- W2CBW003, report number: R073307-247802.11

4 FCC §15.247 (i), §2.1093 & IC RSS-102 - RF Exposure

4.1 Applicable Standard

FCC §2.1093 and IC RSS-102.

4.2 Results

Please refer to the FCC SAR report No.: R1011014-SAR for detail SAR measurement information.

5 FCC §15.203 & IC RSS-Gen §7.1.4 – Antenna Requirements

5.1 Applicable Standard

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

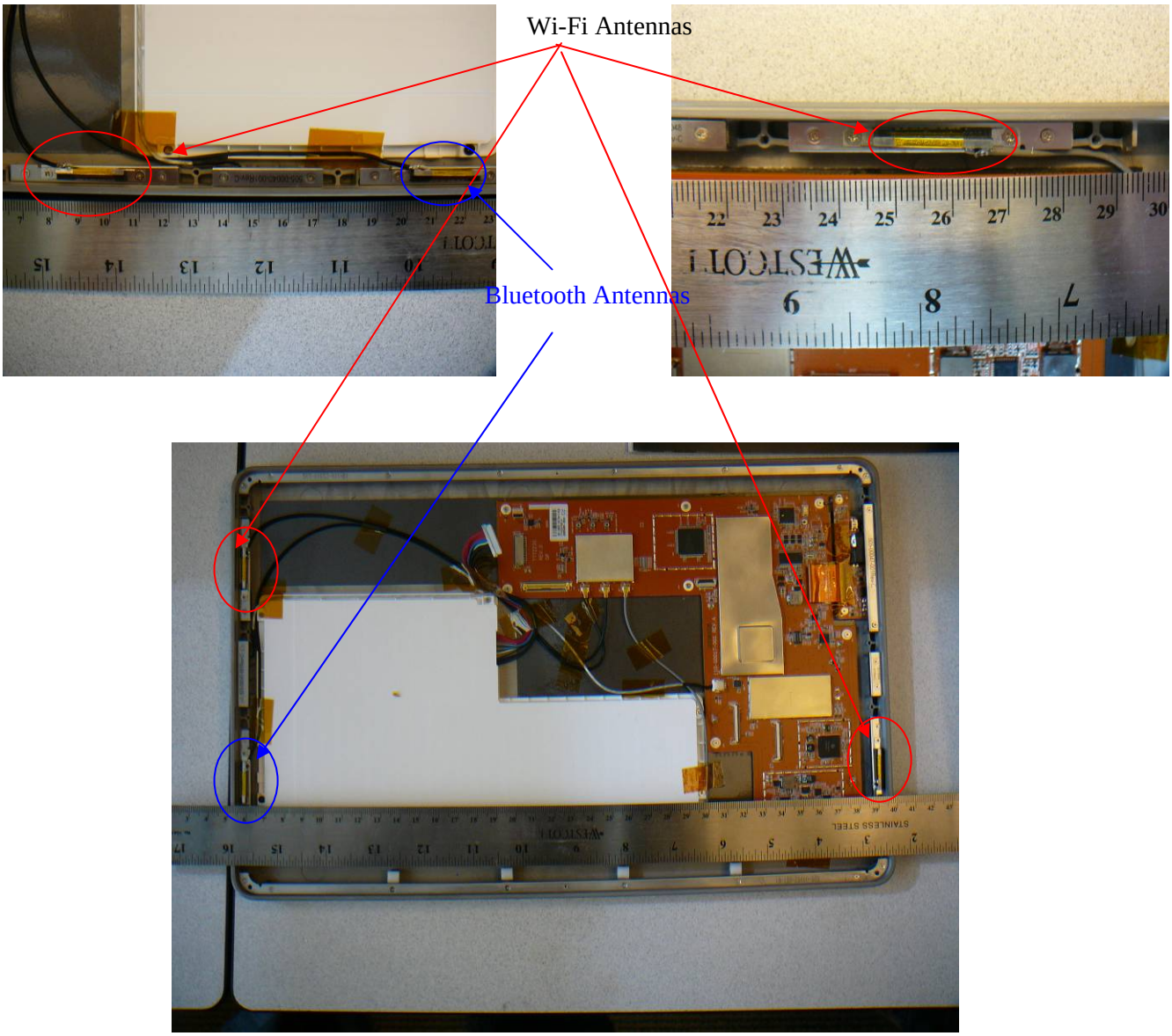
According to IC RSS-Gen §7.1.4: Transmitter Antenna

A transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

5.2 Antenna Connector Construction

EUT has Two Transmitter/Receiver antennas which will be attached to the case. Each antenna has a maximum gain of -1.5 dBi which fulfills the requirements of FCC §15.203 and IC RSS-Gen §7.1.4



6 FCC §15.207 & IC RSS-Gen 7.2.2- AC Line Conducted Emissions

6.1 Applicable Standards

As per FCC §15.207 and IC RSS-Gen §7.2.2 Conducted limits:

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 [1]	56 to 46[1]
0.5-5	56	46
5-30	60	50

[1] *Decreases with the logarithm of the frequency.*

6.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.4-2003 measurement procedure. The specification used was FCC §15.207 and IC RSS-Gen §7.2.2 limits.

External I/O cables were draped along the edge of the test table and bundle when necessary.

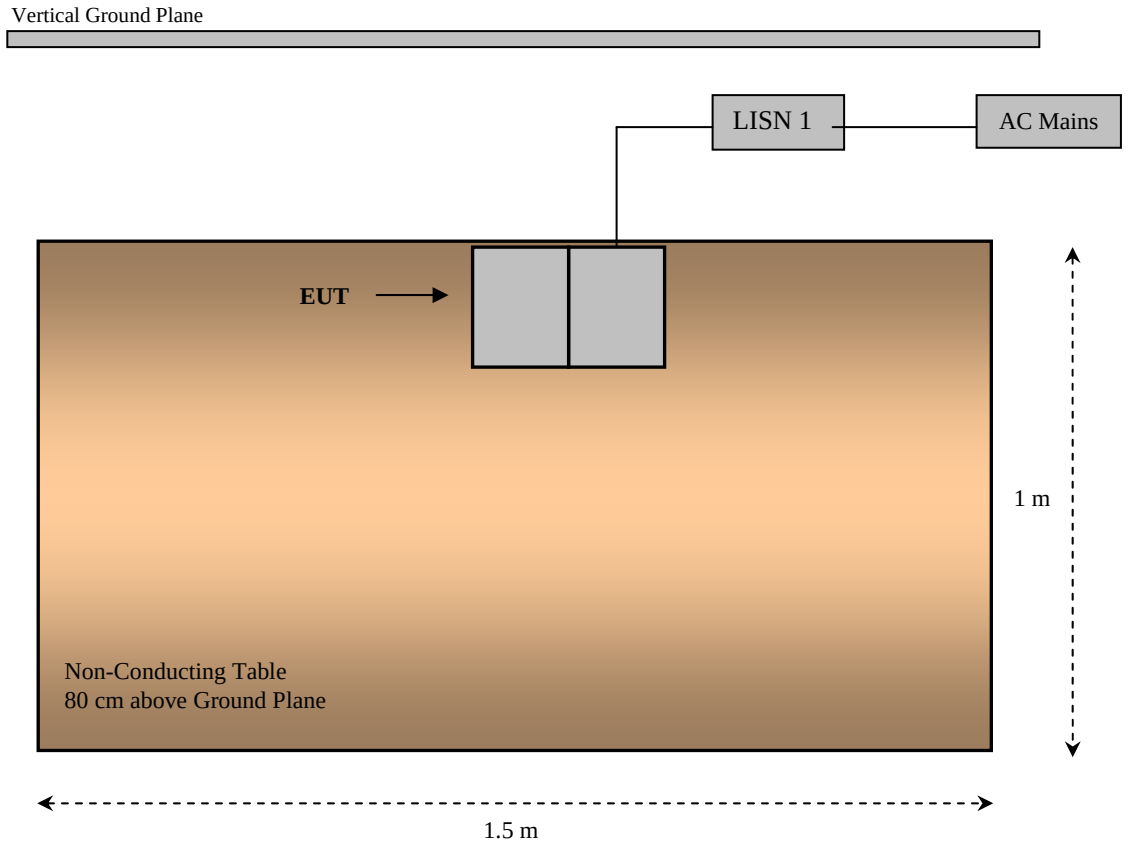
The AC/DC power adapter of the EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

6.3 Test Equipment List and Details

Manufacturer	Type	Models	Serial Number	Calibration Date
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2010-03-24
Solar Electronics	LISN	9252-R-24-BNC	511205	2010-06-25
TTE	Filter, High Pass	H9962-150K-50-21378	K7133	2010-06-10

Statement of Traceability: **BACL Corp.** attests that all calibrations have been performed according to NVLAP requirements, traceable to the NIST.

6.4 Test Setup Block Diagram



6.5 Test Procedure

During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a "QP." Average readings are distinguished with an "Ave".

6.6 Test Environmental Conditions

Temperature:	20~23 °C
Relative Humidity:	40~50 %
ATM Pressure:	101.2-109.2kPa

The testing was performed by Kevin Li, Dennis Huang on 2010-10-28.

6.7 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Cable Loss, and Attenuator Factor adding to the Indicated Reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Cable Loss + Attenuator Factor

For example, a Corrected Amplitude of 34.08 dBuV/m = Indicated Reading (23.85 dBuV) + Cable Factor (0.22 dB) + Attenuator Factor (10dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

6.8 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC and IC RSS-Gen conducted emissions limits, with the margin reading of:

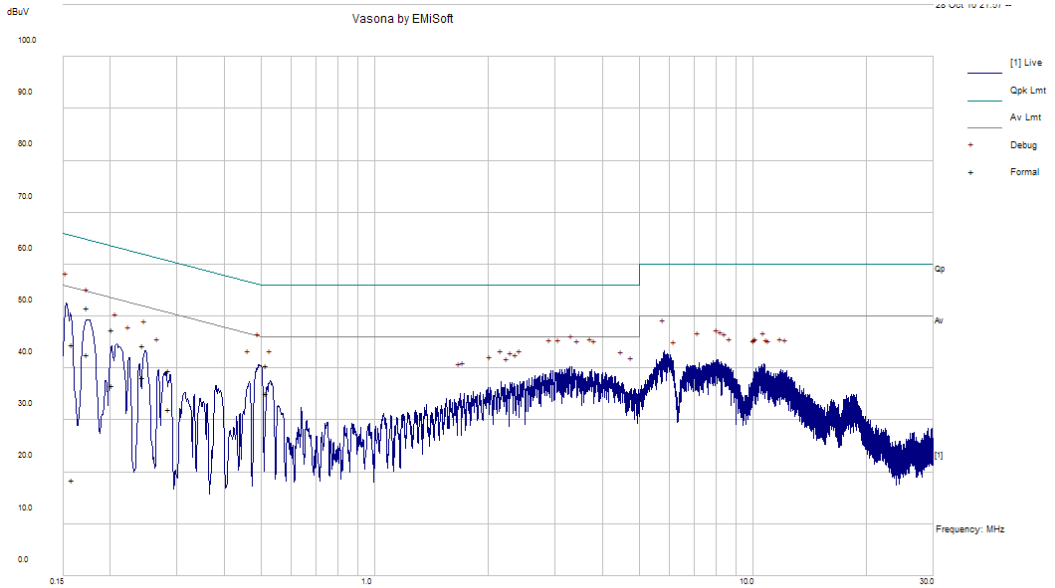
Test on the worst channel

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Line/Neutral)**	**Range (MHz)**
-10.83	0.516063	Neutral	0.15 to 30

6.9 Conducted Emissions Test Plots and Data

Wi-Fi: 802.11 b Mode – Worst Channel

120 V, 60 Hz – Line



Quasi-Peak Measurements

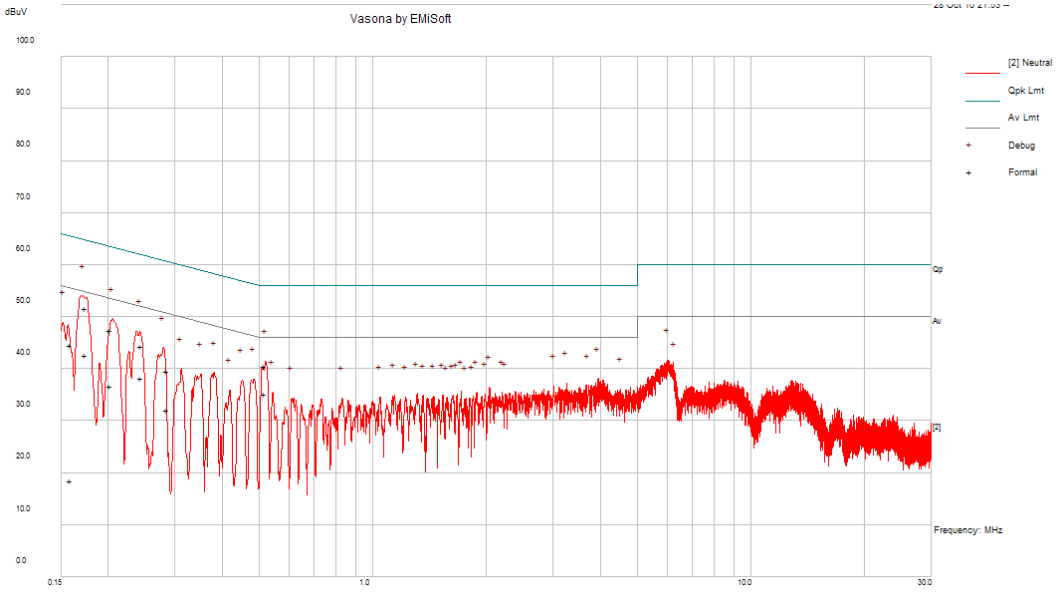
Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.157065	43.12	Line	65.62	-22.50
0.157785	42.66	Line	65.58	-22.92
0.498309	40.34	Line	56.03	-15.69
0.498813	39.94	Line	56.02	-16.08
0.173577	46.48	Line	64.79	-18.31
0.174819	46.29	Line	64.73	-18.44

Average Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.157065	17.66	Line	55.62	-37.96
0.157785	17.56	Line	55.58	-38.02
0.498309	33.01	Line	46.03	-13.01
0.498813	31.07	Line	46.02	-14.95
0.173577	39.58	Line	54.79	-15.20
0.174819	39.82	Line	54.73	-14.90

120 V, 60 Hz –

Neutral



Quasi-Peak Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.174105	51.74	Neutral	64.76	-13.03
0.201933	47.34	Neutral	63.53	-16.19
0.516063	40.50	Neutral	56.00	-15.50
0.244653	44.40	Neutral	61.94	-17.53
0.285735	39.47	Neutral	60.65	-21.17
0.158508	44.56	Neutral	65.54	-20.98

Average Measurements

Frequency (MHz)	Corrected Amplitude (dBµV)	Conductor (Line/ Neutral)	Limit (dBµV)	Margin (dB)
0.174105	42.62	Neutral	54.76	-12.15
0.201933	36.64	Neutral	53.53	-16.89
0.516063	35.17	Neutral	46.00	-10.83
0.244653	38.19	Neutral	51.94	-13.74
0.285735	32.03	Neutral	50.65	-18.62
0.158508	18.45	Neutral	55.54	-37.10

7 FCC §15.205, §15.209 & §15.247(c) & IC RSS-210 §A8.5 - Spurious Radiated Emissions

7.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As per FCC §15.209(a) and RSS-210: Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100(Note 1)	3
88 - 216	150(Note 1)	3
216 - 960	200(Note 1)	3
Above 960	500	3

(Note 1)Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110 0.495 – 0.505 2.1735 – 2.1905 4.125 – 4.128 4.17725 – 4.17775 4.20725 – 4.20775 6.215 – 6.218 6.26775 – 6.26825 6.31175 – 6.31225 8.291 – 8.294 8.362 – 8.366 8.37625 – 8.38675 8.41425 – 8.41475 12.29 – 12.293 12.51975 – 12.52025 12.57675 – 12.57725 13.36 – 13.41	16.42 – 16.423 16.69475 – 16.69525 25.5 – 25.67 37.5 – 38.25 73 – 74.6 74.8 – 75.2 108 – 121.94 123 – 138 149.9 – 150.05 156.52475 – 156.52525 156.7 – 156.9 162.0125 –167.17 167.72 – 173.2 240 – 285 322 – 335.4 399.9 – 410 608 – 614	960 – 1240 1300 – 1427 1435 – 1626.5 1645.5 – 1646.5 1660 – 1710 1718.8 – 1722.2 2200 – 2300 2310 – 2390 2483.5 – 2500 2690 – 2900 3260 – 3267 3332 – 3339 3345.8 – 3358 3600 – 4400	4. 5 – 5. 15 5. 35 – 5. 46 7.25 – 7.75 8.025 – 8.5 9.0 – 9.2 9.3 – 9.5 10.6 – 12.7 13.25 – 13.4 14.47 – 14.5 15.35 – 16.2 17.7 – 21.4 22.01 – 23.12 23.6 – 24.0 31.2 – 31.8 36.43 – 36.5 Above 38.6

As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

7.2 Test Setup

The radiated emissions tests were performed using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15C and IC RSS-210 limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2010-03-24
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2010-06-16
Hewlett Packard	Pre amplifier	8447D	2944A06639	2010-06-18
A.R.A Inc	Horn antenna	DRG-1181A	1132	2009-10-27
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2010-05-08

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

7.4 Test Procedure

For the radiated emissions test, the EUT host, and all support equipment power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

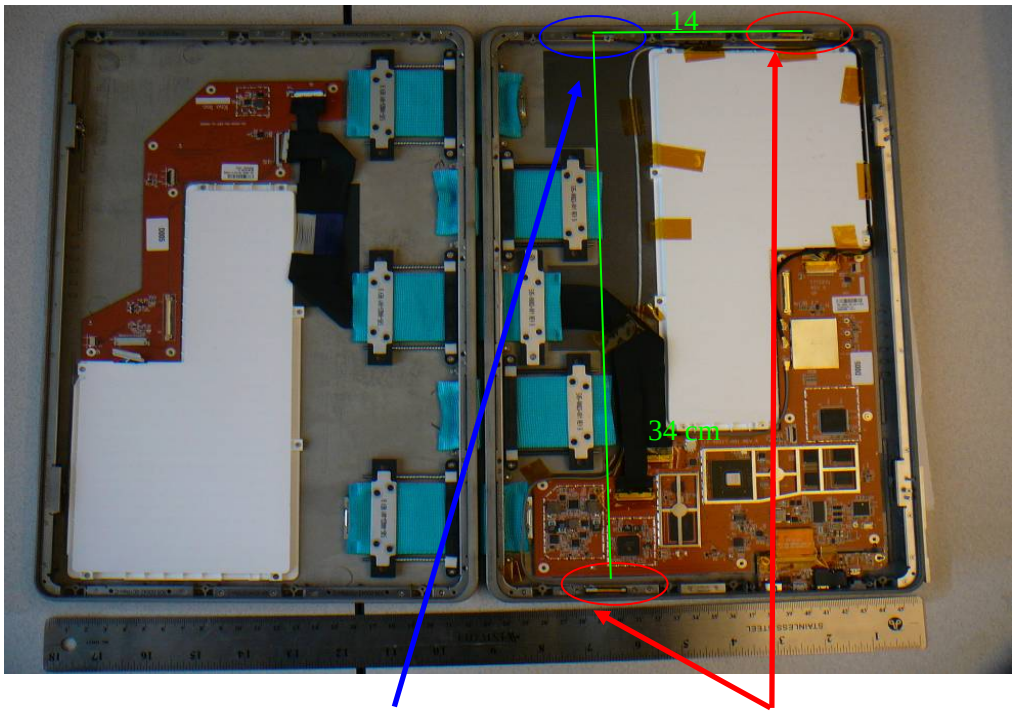
RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000 MHz:

(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

For stand alone Wi-Fi, we do the pre-scan and take the worst antenna location as the final measurement.

For co-location scan:



(Bluetooth Antenna Location) (Wi-Fi Antenna Location)

*Note: One EUT with Wi-Fi antenna located at the top, and another EUT with Wi-Fi antenna located at the bottom; However, both antenna path controlled by the switch circuit as shown below, the unit auto pick the best sensitive antenna and do the transmit; two antenna can not be transmit as the same time only one or the other.

Since only the top Wi-Fi antenna has the distance within 20 cm from the Bluetooth antenna, so co-location is base on the top antenna with the Bluetooth antenna

7.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Cable Loss, and Attenuator Factor adding to the Indicated Reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Cable Loss + Attenuator Factor

For example, a Corrected Amplitude of 34.08 dBuV/m = Indicated Reading (23.85 dBuV) + Cable Factor (0.22 dB) + Attenuator Factor (10dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

7.6 Test Environmental Conditions

Temperature:	22~23 °C
Relative Humidity:	50~60 %
ATM Pressure:	101-109kPa

The testing was performed by Jack Liu and Jerry Huang on 2010-10-20 to 2010-11-09.

7.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15C and IC RSS-210 standard's radiated emissions limits, and had the worst margin of:

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel, Range**
30 - 1000 MHz			
-4.04	430.9848	Vertical	30-1000 MHz
1 - 25 GHz			
-	-	-	Low, 1GHz – 25GHz
-	-	-	Mid, 1GHz – 25GHz
-	-	-	High, 1GHz – 25GHz

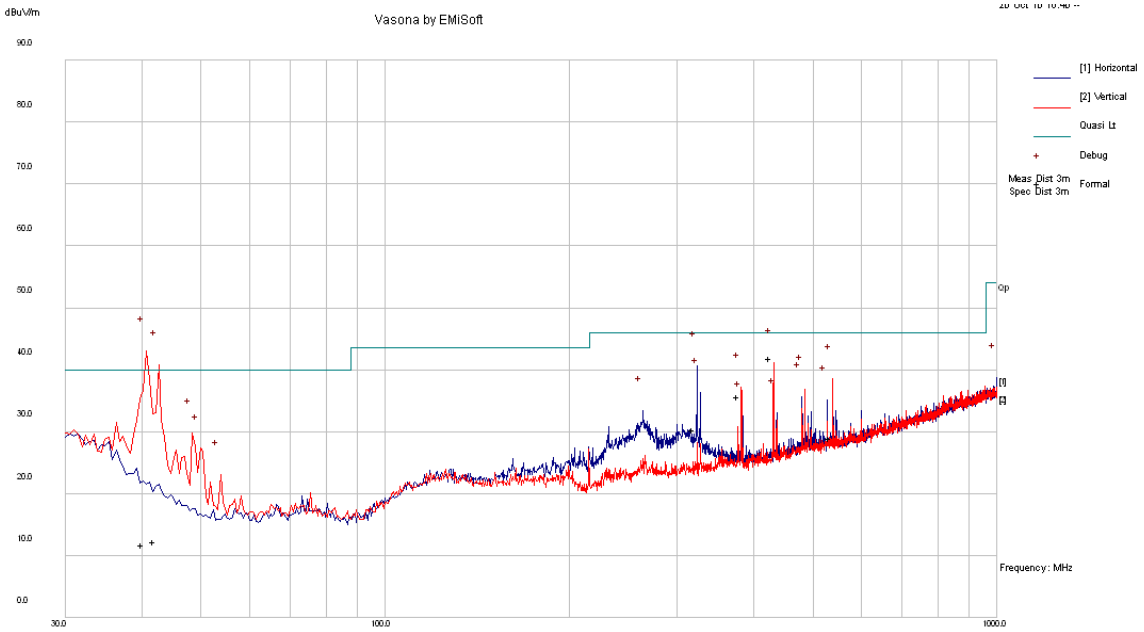
Note: All other Restricted Band Frequencies were on the noise floor level and/or 20 dB below the limit.

Please refer to the following table and plots for specific test result details

7.8 Radiated Emissions Test Data and Plots

1) 30 MHz – 1 GHz, Measured at 3 meters

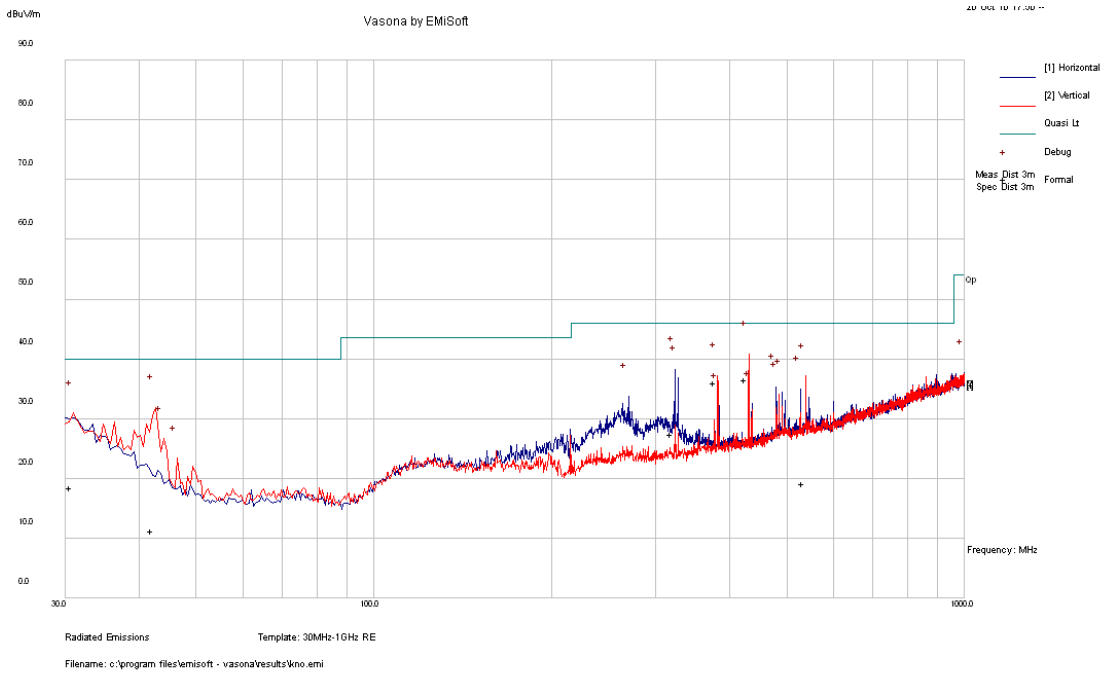
802.11b Mode, Worst Channel



Quasi-Peak Measurements

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
40.63736	11.69	243	V	320	40	-28.31
42.38704	12.29	121	V	213	40	-27.71
430.98480	41.96	140	V	93	46	-4.04
323.20900	30.44	184	H	341	46	-15.56
538.71720	29.07	130	H	20	46	-16.93
381.76060	35.67	121	V	263	46	-10.33

802.11g Mode, Worst Channel



Quasi-Peak Measurements

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
430.8651	36.62	371	V	105	46	-9.38
323.2229	27.39	126	H	321	46	-18.61
42.54184	11.22	117	V	79	40	-28.78
381.7829	36.00	100	V	275	46	-10.00
538.6474	19.20	356	V	331	46	-26.80
31.08208	18.43	136	V	275	40	-21.57

2) 1–25 GHz, Measured at 3 meters

802.11b mode:

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel (2412 MHz)											
-	-	-	-	-	-	-	-	-	-	-	-
Middle Channel (2437 MHz)											
-	-	-	-	-	-	-	-	-	-	-	-
High Channel (2462 MHz)											
-	-	-	-	-	-	-	-	-	-	-	-

802.11g Mode:

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel (2412 MHz)											
-	-	-	-	-	-	-	-	-	-	-	-
Middle Channel (2437 MHz)											
-	-	-	-	-	-	-	-	-	-	-	-
High Channel (2462 MHz)											
-	-	-	-	-	-	-	-	-	-	-	-

Note: All other Restricted Band Frequencies were on the noise floor level and/or 20 dB below the limit.

3) Restricted Band Emissions (Lower Band: 2310~2390 MHz, Higher Band: 2483.5~2500 MHz)

802.11b Mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Lowest Channel – 2412 MHz											
2390	57.87	212	110	V	30.3	3.12	35.47	55.82	74	-18.18	Peak
2390	50.94	248	168	H	30.3	3.12	35.47	48.89	74	-25.11	Peak
2390	46.22	212	110	V	30.3	3.12	35.47	44.17	54	-9.83	Ave
2390	39.44	248	168	H	30.3	3.12	35.47	37.39	54	-16.61	Ave
Highest Channel – 2462 MHz											
2483.5	59.37	215	194	V	30.3	3.15	35.54	57.28	74	-16.72	Peak
2483.5	52.8	247	164	H	30.3	3.15	35.54	50.71	74	-23.29	Peak
2483.5	52.7	215	194	V	30.3	3.15	35.54	50.61	54	-3.39	Ave
2483.5	45.15	247	164	H	30.3	3.15	35.54	43.06	54	-10.94	Ave

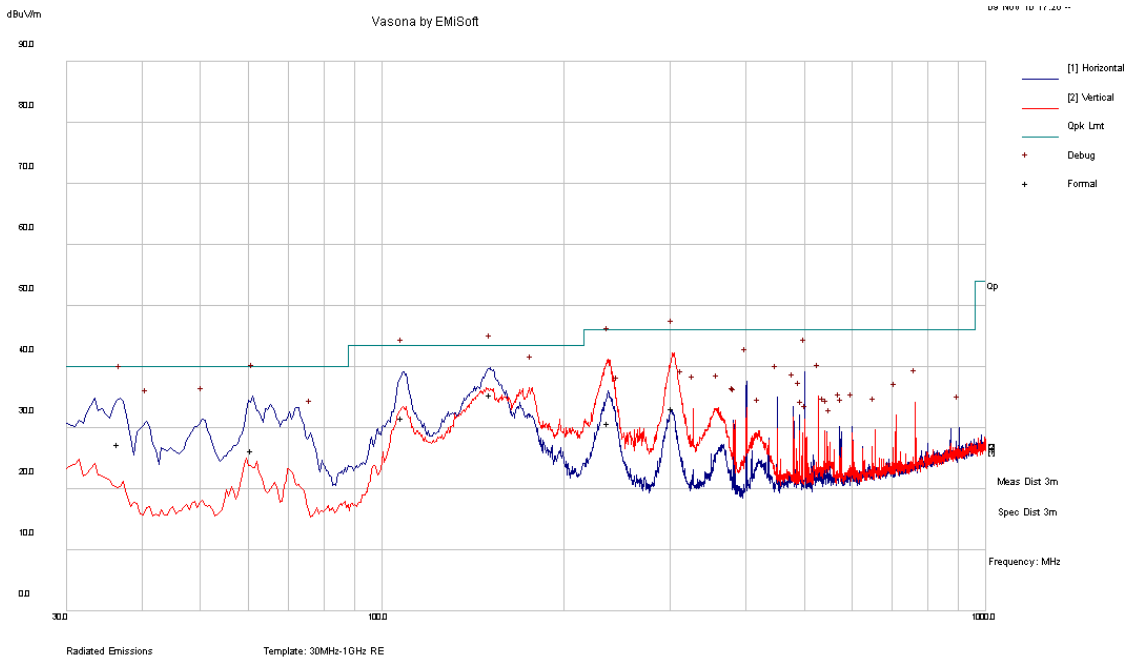
802.11g Mode

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Lowest Channel – 2412 MHz											
2390	65.21	212	110	V	30.3	3.12	35.47	63.16	74	-10.84	Peak
2390	56.26	248	168	H	30.3	3.12	35.47	54.21	74	-19.79	Peak
2390	47.13	212	110	V	30.3	3.12	35.47	45.08	54	-8.92	Ave
2390	39.86	248	168	H	30.3	3.12	35.47	37.81	54	-16.19	Ave
Highest Channel – 2462 MHz											
2483.5	70.97	214	195	V	30.3	3.15	35.54	68.88	74	-5.12	Peak
2483.5	62.5	247	164	H	30.3	3.15	35.54	60.41	74	-13.59	Peak
2483.5	51.62	214	195	V	30.3	3.15	35.54	49.53	54	-4.47	Ave
2483.5	43.71	247	164	H	30.3	3.15	35.54	41.62	54	-12.38	Ave

4) Co-Location:

30 MHz – 1 GHz, Measured at 3 meters

802.11b Mode & Bluetooth: Worst Channel



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
36.57075	27.41	98	H	92	40.0	-12.59
60.89025	26.29	139	H	76	40.0	-13.71
107.86930	31.64	99	H	304	43.5	-11.86
151.14050	35.35	142	H	201	43.5	-8.15
236.57880	30.71	129	V	91	46.0	-15.29
302.64400	33.23	98	V	102	46.0	-12.77

1–25 GHz, Measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
-	-	-	-	-	-	-	-	-	-	-	-

Note: All other Restricted Band Frequencies were on the noise floor level and/or 20 dB below the limit.

8 IC RSS-210 §2.6 & RSS-Gen §4.10-Receiver Spurious Radiated Emissions

8.1 Applicable Standard

According to IC RSS-Gen §4.10, the receiver shall be operated in the normal receive mode near the mid-point of the band over which the receiver is designed to operate.

Unless otherwise specified in the applicable RSS, the radiated emission measurement is the standard measurement method (with the device's antenna in place) to measure receiver spurious emissions.

Radiated emission measurements are to be performed using a calibrated open-area test site.

For either method, the search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tuneable or local oscillator frequency, whichever is the higher, without exceeding 40 GHz.

For emissions below 1 GHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth. As an alternative to CISPR quasi-peak measurement, compliance with the emission limit can be demonstrated using measuring equipment employing a peak detector with the same measurement bandwidth as that for CISPR quasi-peak measurements. Above 1 GHz, measurements shall be performed using an average detector and a resolution bandwidth of 300 kHz to 1 MHz.

According to RSS-210 §2.6, Tables 2 and 3 show the general field strength limits of unwanted emissions, where applicable, for transmitters and receivers operating in accordance with the provisions specified in this RSS. Transmitters whose wanted emissions are also within the limits shown in Tables 2 and 3 may operate in any of the frequency bands of Tables 2 and 3, other than the restricted bands of Table 1 and the TV bands, and shall be certified under RSS-210.

Table 2: General Field Strength Limits for Transmitters and Receivers at Frequencies above 30 MHz **(Note)**

Frequency (MHz)	**Field Strength Microvolts/m at 3 meters (watts, e.i.r.p.)**	
	Transmitters	**Receivers**
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Note: Transmitting devices are not permitted in Table 1 bands or in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz, and 614-806 MHz). Prohibition of operation in TV bands does not apply to momentary devices, or to medical telemetry devices in the band 174-216 MHz, and to perimeter protection systems in the bands 54-72 and 76-88 MHz. The perimeter protection devices are to meet Table 3 field strengths limits.

Table 3: General Field Strength Limits for Transmitters at Frequencies below 30 MHz (Transmit)

Frequency (fundamental or spurious)	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Note: The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.

8.2 EUT Setup

The radiated emissions tests were performed in the 3 meter chamber, using the setup in accordance with ANSI C63.4-2003.

8.3 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

All data were recorded in the peak detection mode. Quasi-peak readings was performed only when an emissions was found to be marginal (within -4 dB of specification limits), and are distinguished with a "**QP**" in the data table.

8.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Cable Loss, and Attenuator Factor adding to the Indicated Reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Cable Loss + Attenuator Factor

For example, a Corrected Amplitude of 34.08 dBuV/m = Indicated Reading (23.85 dBuV) + Cable Factor (0.22 dB) + Attenuator Factor (10dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

8.5 Test Equipment Lists and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2010-03-24
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2010-06-16
Hewlett Packard	Pre amplifier	8447D	2944A06639	2010-06-18
A.R.A Inc	Horn antenna	DRG-1181A	1132	2009-10-27
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2010-05-08

Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

8.6 Test Environmental Conditions

Temperature:	21~23 °C
Relative Humidity:	50~53 %
ATM Pressure:	101-109kPa

The testing was performed by Jerry Huang on 2010-10-19 ~ 2010-11-09.

8.7 Summary of Test Results

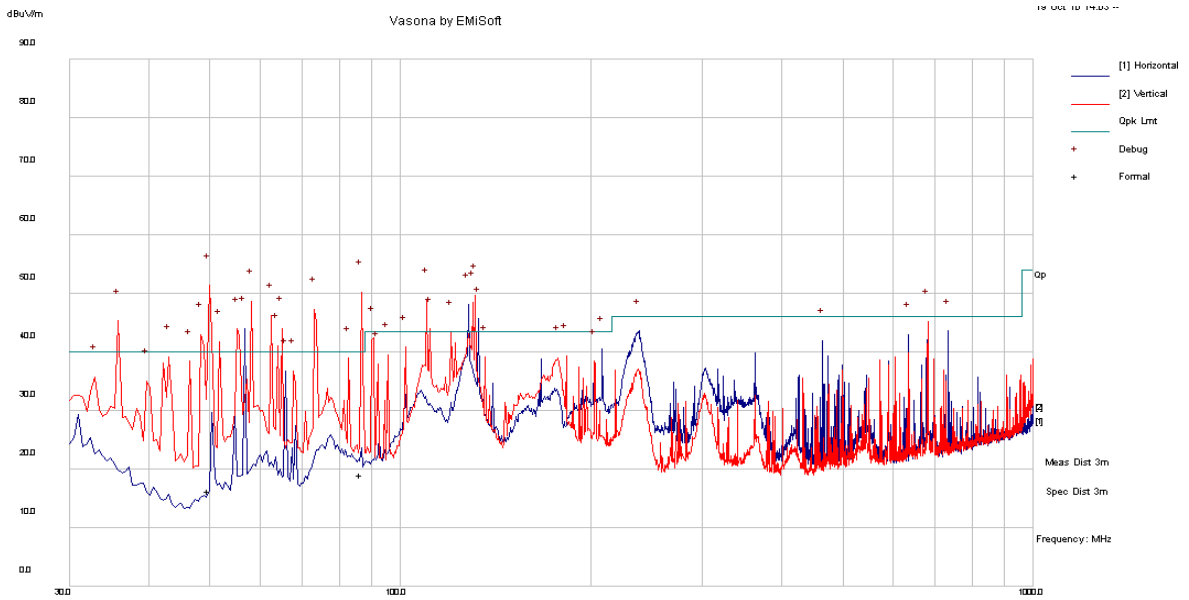
According to the test data, the EUT complied with the with the RSS-210, with the closest margins from the limit listed below:

Wi-Fi: 802.11 b Mode 20MHz– Worst Channel

Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range (MHz)**
-4.34	131.2198	Vertical	30 to 25000

8.8 Test data and Plots

1) 30 MHz- 1000 MHz, Measured at 3 meters



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
131.21980	39.16	100	V	0	43.5	-4.34
128.15180	32.93	194	H	118	43.5	-10.57
110.13480	32.51	111	V	167	43.5	-10.99
130.17680	31.92	120	V	21	43.5	-11.58
72.93100	23.15	99	V	57	40.0	-16.85
36.00650	22.15	118	V	52	40.0	-17.85
111.68680	23.73	101	V	87	43.5	-19.77
86.54450	19.09	98	V	339	40.0	-20.91
62.27225	18.99	257	V	246	40.0	-21.01
57.88125	18.69	113	V	55	40.0	-21.31
49.79825	16.33	98	V	81	40.0	-23.67
48.40600	13.83	111	V	332	40.0	-26.17
51.73900	13.17	124	V	349	40.0	-26.83

2) 1-25 GHz, Measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	IC		Comments
			Height (m)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
-	-	-	-	-	-	-	-	-	-	-	-

Note: All emissions were under the noise floor level and/or 20 dB below the limit.