



**FCC CFR47 PART 15 SUBPART B**

**DECLARATION OF CONFORMITY  
TEST REPORT**

**FOR**

**802.11g/DRAFT 802.11n WIRELESS LAN PCI-E MINI CARD**

**MODEL NUMBER: BCM94313HMG2L**

**REPORT NUMBER: 09U12836-2**

**ISSUE DATE: SEPTEMBER 29, 2009**

*Prepared for*

**BROADCOM CORPORATION  
190 MATHILDA PLACE  
SUNNYVALE, CA 94086, U.S.A.**

*Prepared by*

**COMPLIANCE CERTIFICATION SERVICES  
47173 BENICIA STREET  
FREMONT, CA 94538, U.S.A.  
TEL: (510) 771-1000  
FAX: (510) 661-0888**

**NVLAP®**

NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
---	09/30/09	Initial Issue	T. Chan

## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS.....</b>	<b>4</b>
<b>2. TEST METHODOLOGY .....</b>	<b>5</b>
<b>3. FACILITIES AND ACCREDITATION.....</b>	<b>5</b>
<b>4. CALIBRATION AND UNCERTAINTY .....</b>	<b>5</b>
4.1. <i>MEASURING INSTRUMENT CALIBRATION.....</i>	<i>5</i>
4.2. <i>MEASUREMENT UNCERTAINTY.....</i>	<i>5</i>
<b>5. EQUIPMENT UNDER TEST .....</b>	<b>6</b>
5.1. <i>DESCRIPTION OF EUT.....</i>	<i>6</i>
5.2. <i>GENERAL INFORMATION.....</i>	<i>6</i>
5.3. <i>PRELIMINARY TEST CONFIGURATIONS .....</i>	<i>6</i>
5.4. <i>MODE(s) OF OPERATION.....</i>	<i>6</i>
5.5. <i>SOFTWARE AND FIRMWARE.....</i>	<i>6</i>
5.6. <i>MODIFICATIONS.....</i>	<i>6</i>
5.7. <i>DETAILS OF TESTED SYSTEM .....</i>	<i>7</i>
<b>6. TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>9</b>
<b>7. APPLICABLE LIMITS AND TEST RESULTS .....</b>	<b>10</b>
7.1. <i>RADIATED EMISSIONS .....</i>	<i>10</i>
7.2. <i>AC MAINS LINE CONDUCTED EMISSIONS .....</i>	<i>12</i>
<b>8. SETUP PHOTOS.....</b>	<b>15</b>

## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** BROADCOM CORPORATION  
190 MATHILDA PLACE  
SUNNYVALE, CA 94086, USA

**EUT DESCRIPTION:** 802.11g / Draft 802.11n WLAN PCI-E Minicard

**MODEL:** BCM94313HMG2L

**SERIAL NUMBER:** 1287221

**DATE TESTED:** SEPTEMBER 25 -26, 2009

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART B	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:




---

THU CHAN  
EMC MANAGER  
COMPLIANCE CERTIFICATION SERVICES

Tested By:




---

VIEN TRAN  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an 802.11g/Draft 802.11n Wireless LAN PCI-E Mini Card.

The radio module is manufactured by Broadcom.

### 5.2. GENERAL INFORMATION

Power Requirements	100-240 VAC / 50-60 Hz
List of frequencies generated or used by the EUT	20 MHz

### 5.3. PRELIMINARY TEST CONFIGURATIONS

The following configuration was investigated during testing:

EUT Configuration	Description
Typical Configuration	EUT connected to laptop via extended board with minimum configuration such as printer, USB mouse.

### 5.4. MODE(s) OF OPERATION

Mode	Description
EMC Test & TX	All I/O ports activate with H' patterns scrolling on the screen display with TX on.

### 5.5. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Broadcom version 5.60.18.20.

The test utility software used during testing was Broadcom version 5.60.18 TOP.

### 5.6. MODIFICATIONS

No modifications were made during testing.

## 5.7. DETAILS OF TESTED SYSTEM

### SUPPORT EQUIPMENT & PERIPHERALS

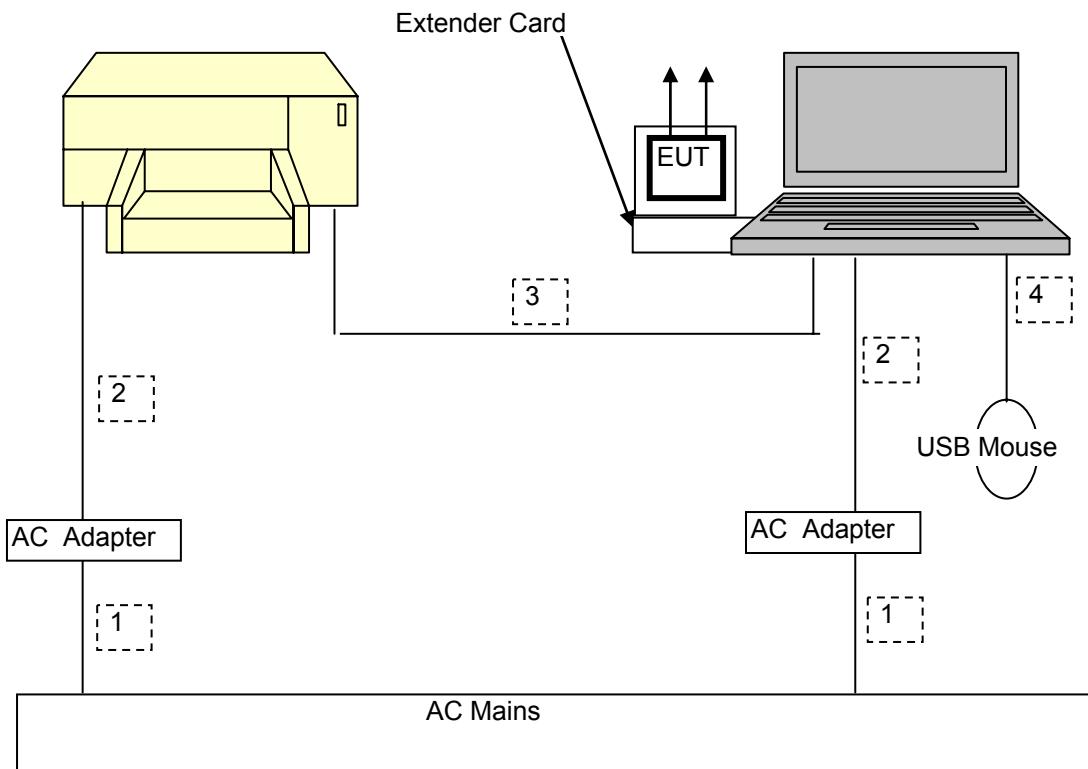
PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop PC	Dell	Inspiron 1526	N/A	DoC
AC Adapter	Dell	DA65NS0-00	CN-0CF745-48661-741-2P2E	N/A

### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	US 115V	Shielded	1.5m	NA
2	DC	2	DC	Un-shielded	1.5m	Ferrite at laptop's end
3	USB	1	Printer	Un-shielded	2.0m	Bundle
4	USB	1	USB	Un-shielded	2.0m	USB Mouse

### TEST SETUP

The EUT connected to a Laptop via extended board with a typical configuration.

**TEST SETUP DIAGRAM**

## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	01/05/10
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	01/14/10
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	11/28/09
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	03/31/10
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/29/09
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	10/29/09

## 7. APPLICABLE LIMITS AND TEST RESULTS

### 7.1. RADIATED EMISSIONS

#### TEST PROCEDURE

ANSI C63.4

The highest clock frequency generated or used in the EUT is 20 MHz; therefore the frequency range was investigated from 30 MHz to 1 GHz.

#### LIMIT

§15.109 (a) except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dB $\mu$ V/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54

Note: The lower limit shall apply at the transition frequency.

#### RESULTS

**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)****HORIZONTAL & VERTICAL DATA****30-1000MHz Frequency Measurement  
Compliance Certification Services, Fremont 3m Chamber**

Test Engr: Vien Tran  
 Date: 09/24/09  
 Project #: 09U12836  
 Company: Broadcom  
 EUT Description: 802.11g/Draft 802n WLAN PCI-E Minicard  
 EUT M/N: BCM94313HMG2L  
 Test Target: FCC Part 15B  
 Mode Oper: Tx in 2.4GHz Band\_Worst-Case

f	Measurement Frequency	Amp	Preamp Gain	Margin	Margin vs. Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		
Read	Analyzer Reading	Filter	Filter Insert Loss		
AF	Antenna Factor	Corr.	Calculated Field Strength		
CL	Cable Loss	Limit	Field Strength Limit		

f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>HORIZONTAL</b>													
72.842	3.0	45.1	8.2	0.7	28.3	0.0	0.0	25.7	40.0	-14.3	H	EP	
166.566	3.0	50.0	11.9	1.1	27.7	0.0	0.0	35.4	43.5	-8.1	H	EP	
365.654	3.0	46.9	14.5	1.7	27.8	0.0	0.0	35.2	46.0	-10.8	H	EP	
399.855	3.0	53.2	15.0	1.7	28.0	0.0	0.0	42.0	46.0	-4.0	H	EP	
696.867	3.0	48.9	18.9	2.4	28.5	0.0	0.0	41.7	46.0	-4.3	H	EP	
899.796	3.0	38.7	22.1	2.7	27.9	0.0	0.0	35.7	46.0	-10.3	H	EP	
999.760	3.0	39.4	22.7	2.9	27.6	0.0	0.0	37.5	54.0	-16.5	H	EP	
<b>VERTICAL</b>													
166.566	3.0	52.7	11.9	1.1	27.7	0.0	0.0	38.1	43.5	-5.4	V	EP	
240.009	3.0	51.9	11.8	1.3	27.4	0.0	0.0	37.6	46.0	-8.4	V	EP	
299.891	3.0	48.7	13.5	1.5	27.4	0.0	0.0	36.3	46.0	-9.7	V	EP	
699.748	3.0	47.7	18.9	2.4	28.5	0.0	0.0	40.5	46.0	-5.5	V	EP	
799.712	3.0	43.5	20.9	2.5	28.2	0.0	0.0	38.7	46.0	-7.3	V	EP	
899.436	3.0	38.9	22.1	2.7	27.9	0.0	0.0	35.8	46.0	-10.2	V	EP	
995.440	3.0	39.5	22.7	2.9	27.6	0.0	0.0	37.4	54.0	-16.6	V	EP	

Rev. 1.27.09

Note: No other emissions were detected above the system noise floor.

## 7.2. AC MAINS LINE CONDUCTED EMISSIONS

### TEST PROCEDURE

ANSI C63.4

### LIMIT

§15.107 (a) Except for Class A digital devices, for equipment 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  $\mu$ H/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 band edges.

Frequency range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

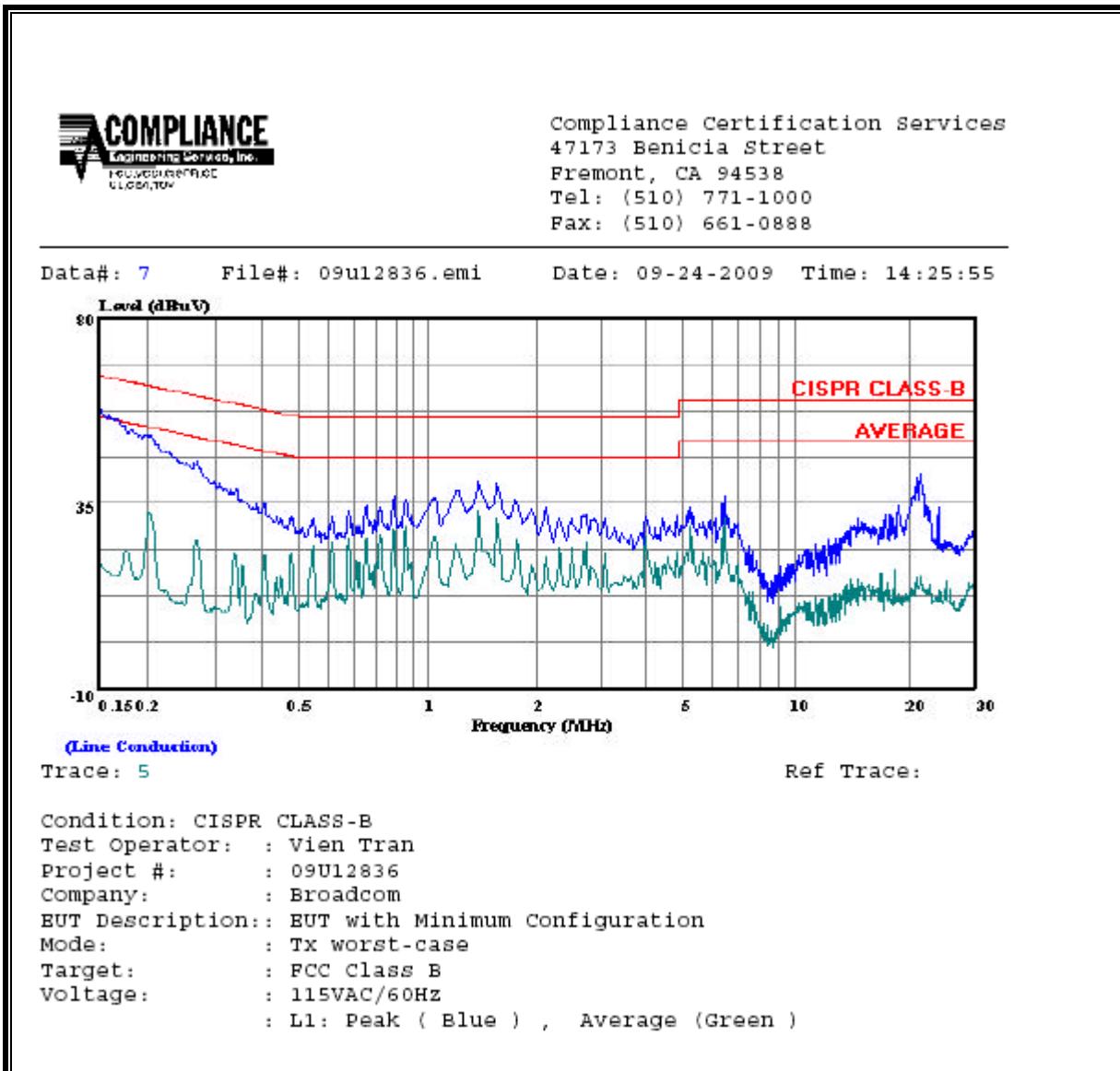
Notes:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

## RESULTS

### 6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Closs (dB)	Limit QP	FCC_B QP	Margin		Remark
	PK (dB $\mu$ V)	QP (dB $\mu$ V)	AV (dB $\mu$ V)				QP (dB)	AV (dB)	
0.20	51.52	--	32.65	0.00	63.45	53.45	-11.93	-20.80	L1
1.49	39.47	--	33.14	0.00	56.00	46.00	-16.53	-12.86	L1
21.49	42.04	--	17.10	0.00	60.00	50.00	-17.96	-32.90	L1
0.20	53.64	--	34.30	0.00	63.45	53.45	-9.81	-19.15	L2
1.49	37.49	--	30.31	0.00	56.00	46.00	-18.51	-15.69	L2
21.49	45.16	--	21.49	0.00	60.00	50.00	-14.84	-28.51	L2
6 Worst Data									

**LINE 1 RESULTS**

**LINE 2 RESULTS**