

***Electromagnetic Emissions Test Report
and
Application for Grant of Equipment Authorization
pursuant to
Class II Permissive change
Industry Canada RSS-Gen Issue 1 / RSS 210 Issue 6
FCC Part 15 Subpart C***

***on the
Broadcom Corporation
Transmitter
Model: BCM94311MCG***

FCC ID: QDS-BRCM1020
IC UPN: 4324A-BRCM1020

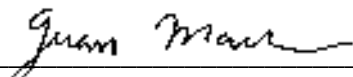
GRANTEE: Broadcom Corporation
190 Mathilda Avenue
Sunnyvale, CA 94086

TEST SITE: Elliott Laboratories, Inc.
684 W. Maude Ave
Sunnyvale, CA 94085

REPORT DATE: October 11, 2006

FINAL TEST DATE: October 9, 2006

AUTHORIZED SIGNATORY:



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2016-01

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REVISION HISTORY

Revision #	Date	Comments	Modified By
1	October 24, 2006	Initial Release	David Guidotti
2	November 6, 2006	Updated report after TCB review	David Guidotti

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SCOPE

An electromagnetic emissions test has been performed on the Broadcom Corporation model BCM94311MCG pursuant to the following rules:

Industry Canada RSS-Gen Issue 1
RSS 210 Issue 6 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in Elliott Laboratories test procedures:

ANSI C63.4:2003
RSS-212 Issue 1 Test Facilities and Test Methods for Radio Equipment

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Broadcom Corporation model BCM94311MCG and therefore apply only to the tested sample. The sample was selected and prepared by David Boldy of Broadcom Corporation

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of Broadcom Corporation model BCM94311MCG complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 1
RSS 210 Issue 6 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"
FCC Part 15 Subpart C

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

TEST RESULTS SUMMARY**DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM techniques	-	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	N/A change will not affect this test	>500kHz	Complies
	RSP100	99% Bandwidth	N/A change will not affect this test	Information only	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	No change to what was originally reported	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	N/A change will not affect this test	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	N/A change will not affect this test	N/A change will not affect this test	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.9dB μ V/m (495.5 μ V/m) @ 4824.0MHz (-0.1dB)	15.207 in restricted bands, all others <-30dBc	Complies

Note 1: EIRP calculated using antenna gain of dBi (3.96) for the highest EIRP multipoint system.

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Antenna port will be internal to the final product device so that user won't have access to change it.		Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	43.2dB μ V/m (144.5 μ V/m) @ 1500.7MHz (-10.8dB)		Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	N/A change will not affect this test	Refer to standard	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	N/A change will not affect this test	Refer to OET 65, FCC Part 1 and RSS 102	Complies
	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding non-interference	
	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding detachable antenna	

MEASUREMENT UNCERTAINTIES

ISO Guide 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS**GENERAL**

The Broadcom Corporation model BCM94311MCG is a 802.11g (miniPCI express form-factor) wireless card that is designed to enable wireless networking. The EUT would normally be installed in a laptop PC. For testing purposes was installed in an external ExpressCard bracket adapter connected to host PC. The EUT was physically located outside of the host laptop system.

The sample was received on September 28, 2006 and tested on September 28, September 29, October 3, October 6 and October 9, 2006. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Broadcom	BCM94311MCG	802.11b/g mini PCI module	Various	QDS-BRCM1020

ANTENNA SYSTEM

The EUT antenna evaluated was a stamped metal antenna with a nominal gain of 3.96dBi.

ENCLOSURE

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer or system.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for emissions testing:

Manufacturer	Model	Description	Serial Number	FCC ID
HP	Pavilion zv6000	Host Laptop PC	-	-
-	-	ExpressCard Adapter Bracket	-	-
-	-	3.9 dBi Antennas (x2)	-	-

No equipment was used as remote support equipment for emissions testing:

EUT INTERFACE PORTS

The I/O cabling configuration during emissions testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Host Laptop AC Adapter	120V/60Hz	Power Cord	Unshielded	2.0

EUT OPERATION

During emissions testing for transmitter spurious emissions the EUT was in a continuous transmit mode (with duty cycle of ~85% for b-mode and 96% for g-mode) on the channel and at the transmit power detailed for each run. Receiver spurious emissions were evaluated with the device in a receive mode on the specified channel.

TEST SITE**GENERAL INFORMATION**

Final test measurements were taken on October 9, 2006 at the Elliott Laboratories Anechoic Chamber located at 41039 Boyce Road, Fremont, California Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission.

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003 and RSS 212.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003 and RSS 212. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003 / RSS 212.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.4:2003 and RSS 212 specify that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

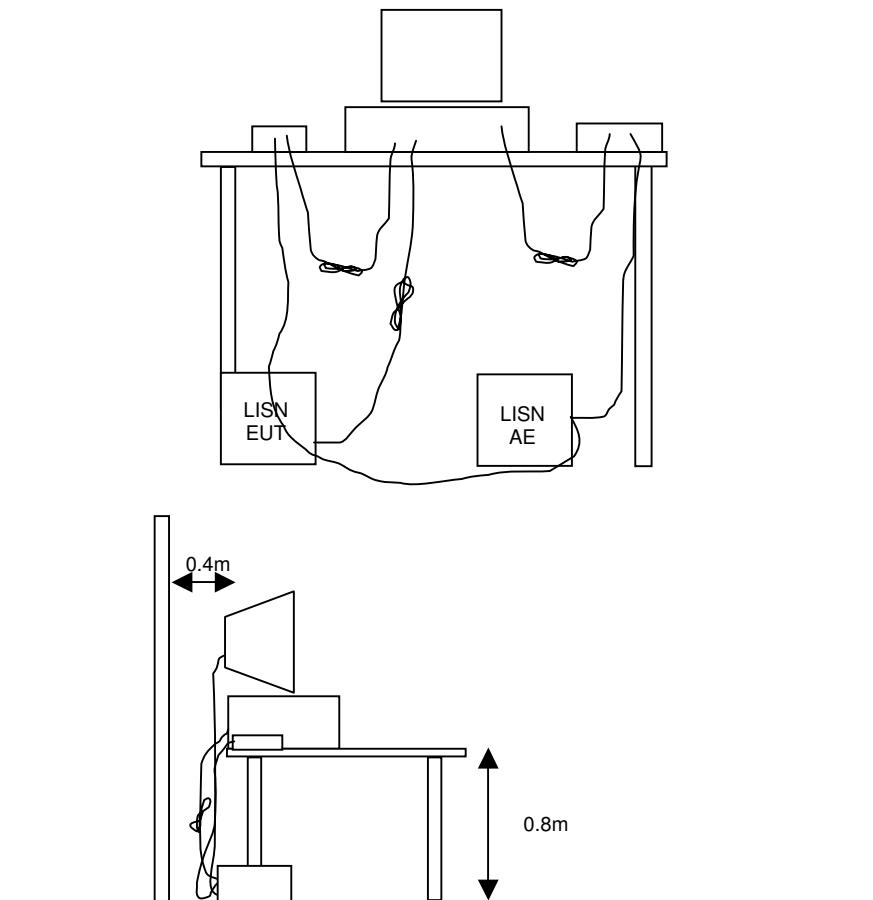
TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4:2003, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

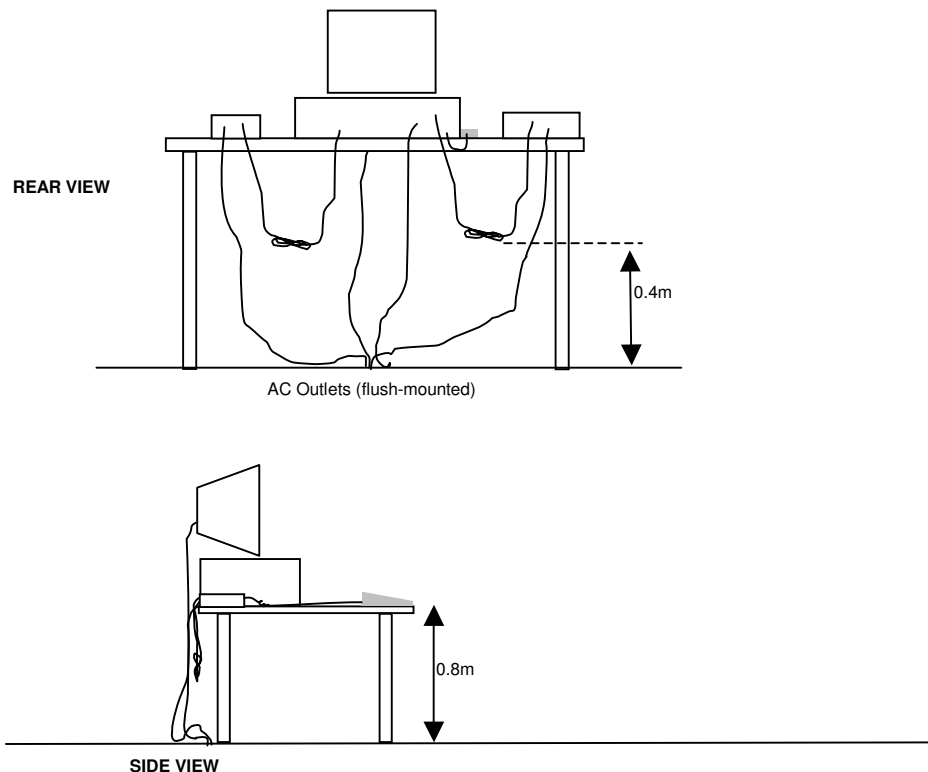


RADIATED EMISSIONS

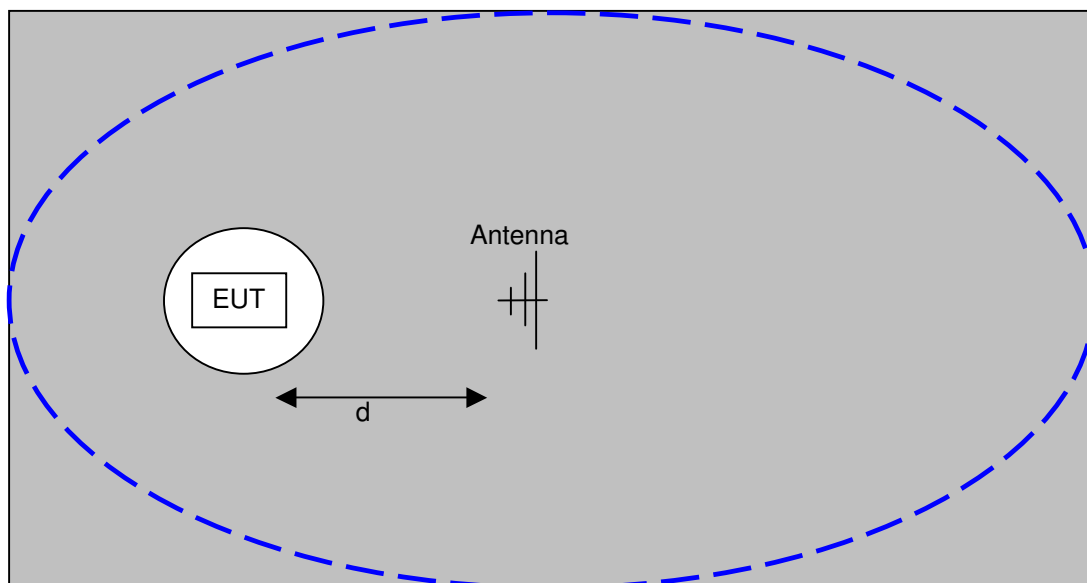
A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

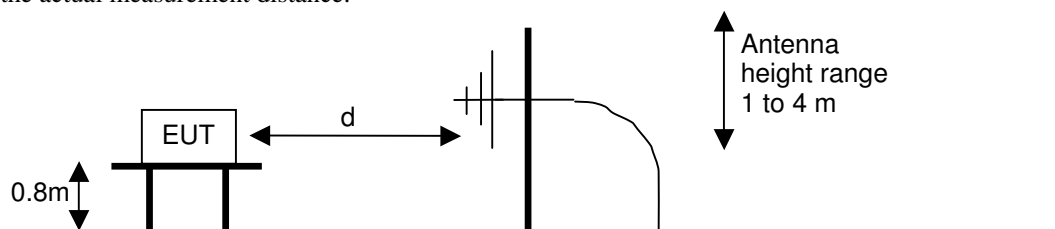
Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.



Typical Test Configuration for Radiated Field Strength Measurements



The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances (d) of 3m and 10m. Refer to the test data tables for the actual measurement distance.



Test Configuration for Radiated Field Strength Measurements
OATS- Plan and Side Views

BANDWIDTH MEASUREMENTS

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS GEN.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands¹ (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{\text{KHz}} @ 300\text{m}$	$67.6-20*\log_{10}(F_{\text{KHz}}) @ 300\text{m}$
0.490-1.705	$24000/F_{\text{KHz}} @ 30\text{m}$	$87.6-20*\log_{10}(F_{\text{KHz}}) @ 30\text{m}$
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

¹ The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109, RSS 210 Table 2, RSS GEN Table 1 and RSS 310 Table 3. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_T - S = M$$

where:

R_T = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20 * \text{LOG}_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40 * \text{LOG}_{10} (D_m/D_s)$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 1000- 18000 MHz, 28-Sep-06**Engineer: Juan Martinez**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	16-Jan-07
EMCO	Antenna, Horn, 1-18GHz	3115	868	27-Apr-07
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	19-May-07
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	14-Oct-06

Bandedges, 24-Oct-06**Engineer: Juan Martinez**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18GHz	3115	868	26-Apr-08
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	02-Oct-07

EXHIBIT 2: Test Measurement Data

22 Pages



EMC Test Data

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	Test-Log Number:	T65514
		Project Manager:	Esther Zhu
Contact:	David Boldy		
Emissions Spec:	FCC 15.247 & 15.209	Class:	B
Immunity Spec:	N/A	Environment:	-

EMC Test Data

For The

Broadcom

Model

BCM94311MCG

Date of Last Test: 10/6/2006



EMC Test Data

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	Test-Log Number:	T65514
		Project Manager:	Esther Zhu
Contact:	David Boldy		
Emissions Spec:	FCC 15.247 & 15.209	Class:	B
Immunity Spec:	N/A	Environment:	-

EUT INFORMATION

The following information was collected during the test sessions(s).

General Description

The EUT is a 802.11g (miniPCI express form-factor) wireless card that is designed to enable wireless networking. The EUT would normally be installed in a laptop PC. For testing purposes was installed in an external ExpressCard bracket adapter connected to host PC. The EUT was physically located outside of the host laptop system.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Broadcom	BCM94311MCG	802.11g Card	Various	-

Other EUT Details

The following EUT details should be noted: None

EUT Antenna (Intentional Radiators Only)

The EUT antenna is an external 3.96 dBi antenna unless otherwise noted in the test data.

EUT Enclosure

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer or system.

Modification History

Mod. #	Test	Date	Modification
1			
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.



EMC Test Data

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
		Project Manager:	Esther Zhu
Contact:	David Boldy		
Emissions Spec:	FCC 15.247 & 15.209	Class:	B
Immunity Spec:	N/A	Environment:	-

Test Configuration #1

The following information was collected during the test sessions(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
HP	Pavilion zv6000	Host Laptop PC	-	-
-	-	ExpressCard Adapter Bracket	-	-
-	-	3.9 dBi Antennas (x2)	-	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	-	-	-	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Host Laptop AC Adapter	120V/60Hz	Power Cord	Unshielded	2.0

Note: The 802.11 card under test was plugged directly into the ExpressCard adapter bracket.

EUT Operation During Emissions Tests

During emissions testing the EUT was in transmit or receive mode as noted in the test data.

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Radiated Bandedge

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/29/2006
Test Engineer: Juan Martinez
Test Location: Fremont Chamber #4

Config. Used: **1**
Config Change: **None**
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 17 °C
Rel. Humidity: 45 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1 (802.11b Mode)	Bandedges	FCC Part 15.205	Pass	Refer to plots
2 (802.11g Mode)	Bandedges	FCC Part 15.205	Pass	Refer to plots

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

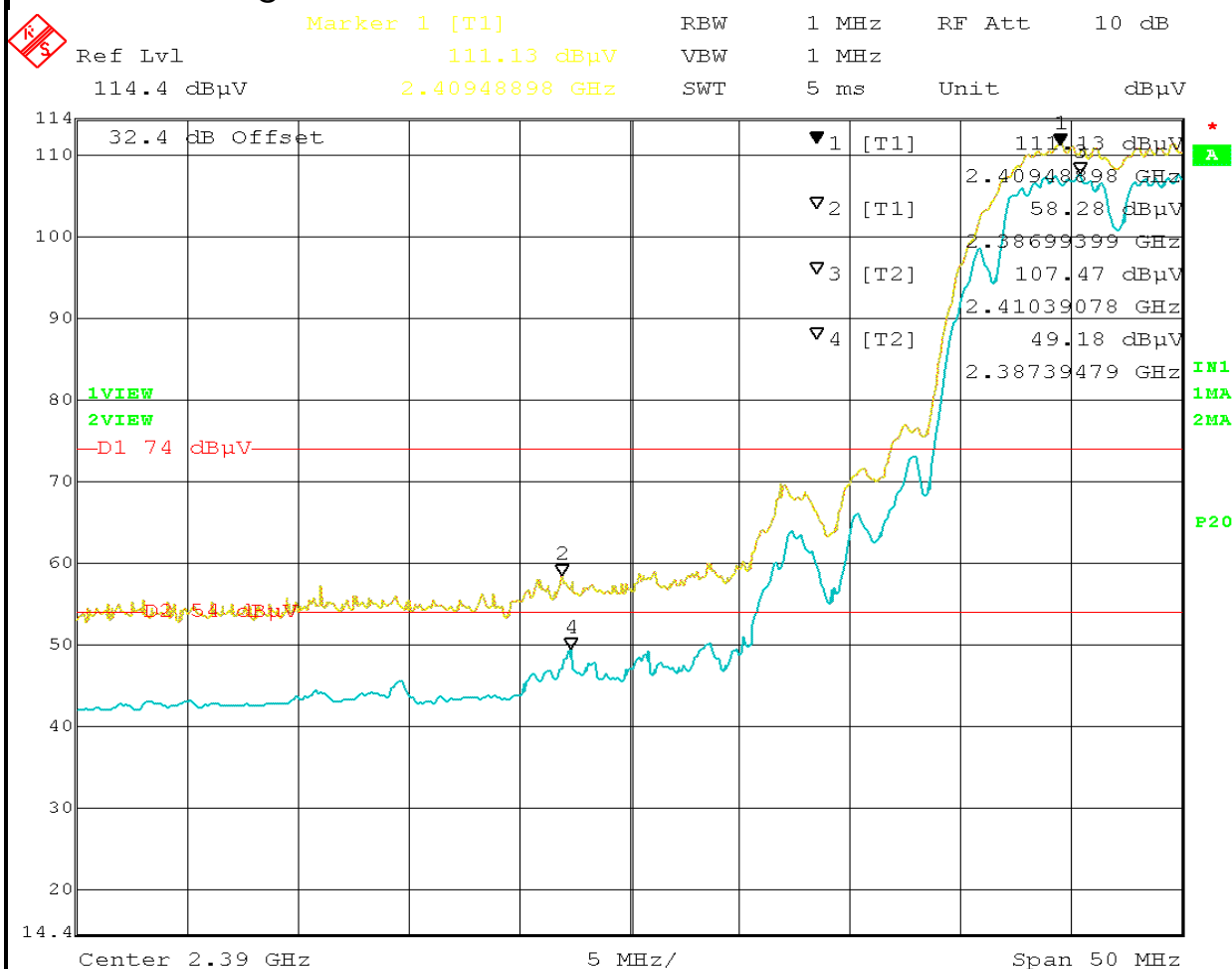
Power Output

Channel	Antenna gain/dBi	FCC Band edge power/dBm	FCC Emissions power/dBm	
11bmode				
1	3.9	19	19	
11	3.9	19	19	
11g mode:				
1	3.9	18	19	
10	3.9	18	N/A	
11	3.9	16.5	19	

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Run #1: Bandedges. Operating Mode: 802.11b

Run #1a: Low Channel @ 2412 MHz

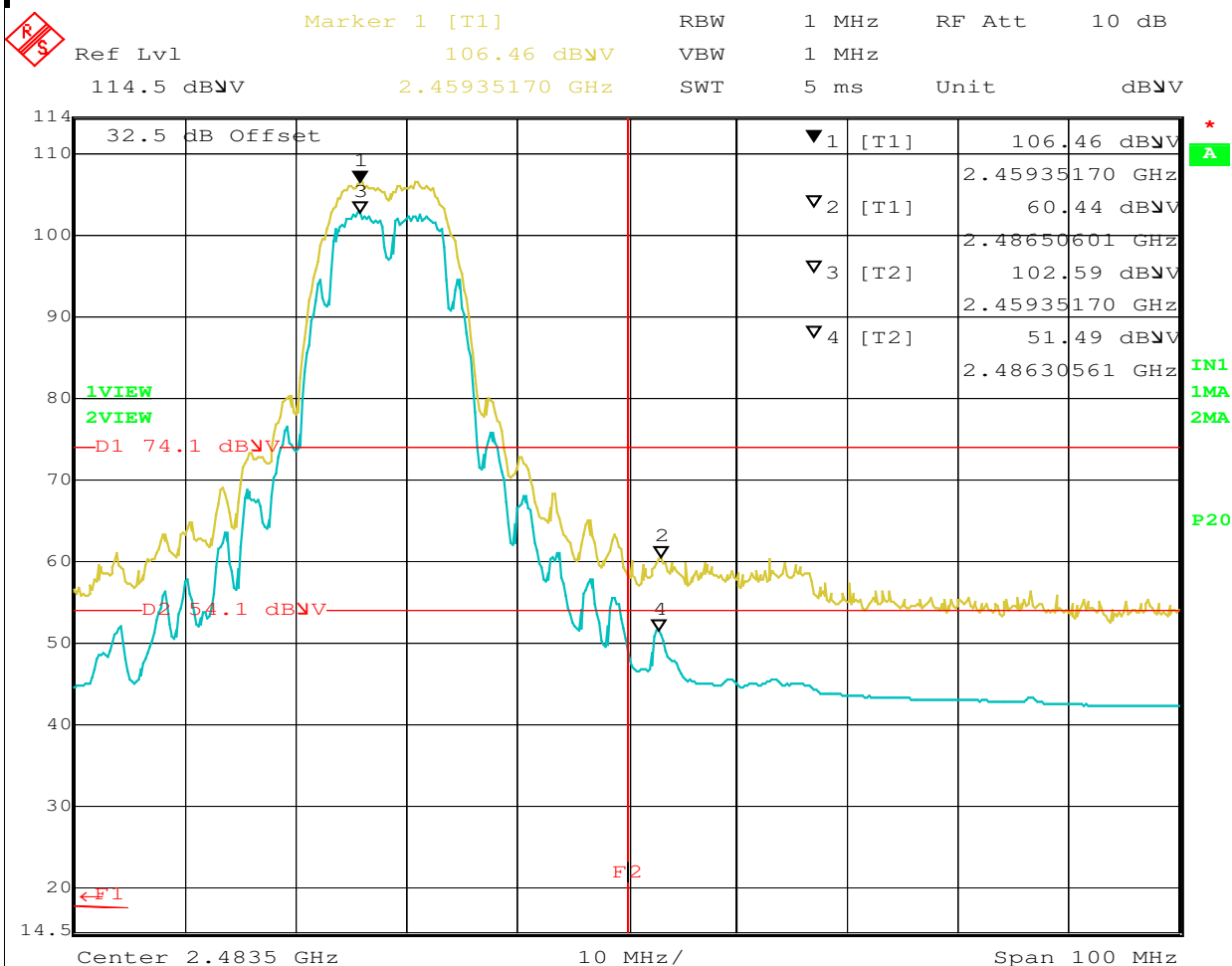


Date: 6.OCT.2006 16:08:17

Power output was measured using broadcom's power meter with gated function built in. The power was also verified on the ESI receiver which also has a gate function to measure it in power averaging mode for 100 sweeps. Both measurements correlate within .2 dB of each other. The power listed on the grant and in this application are peak powers, as measured during the original filing. The original filing contains both gated average and peak power measurements, while subsequent permissive changes, already approved, reference gated average measurements to establish the output power of the EUT at the correct level. The output powers reported in the Elliott test report are gated average measurements and are consistent with the power levels reported in the original and all subsequent applications

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Run #1b: High Channel @ 2462 MHz



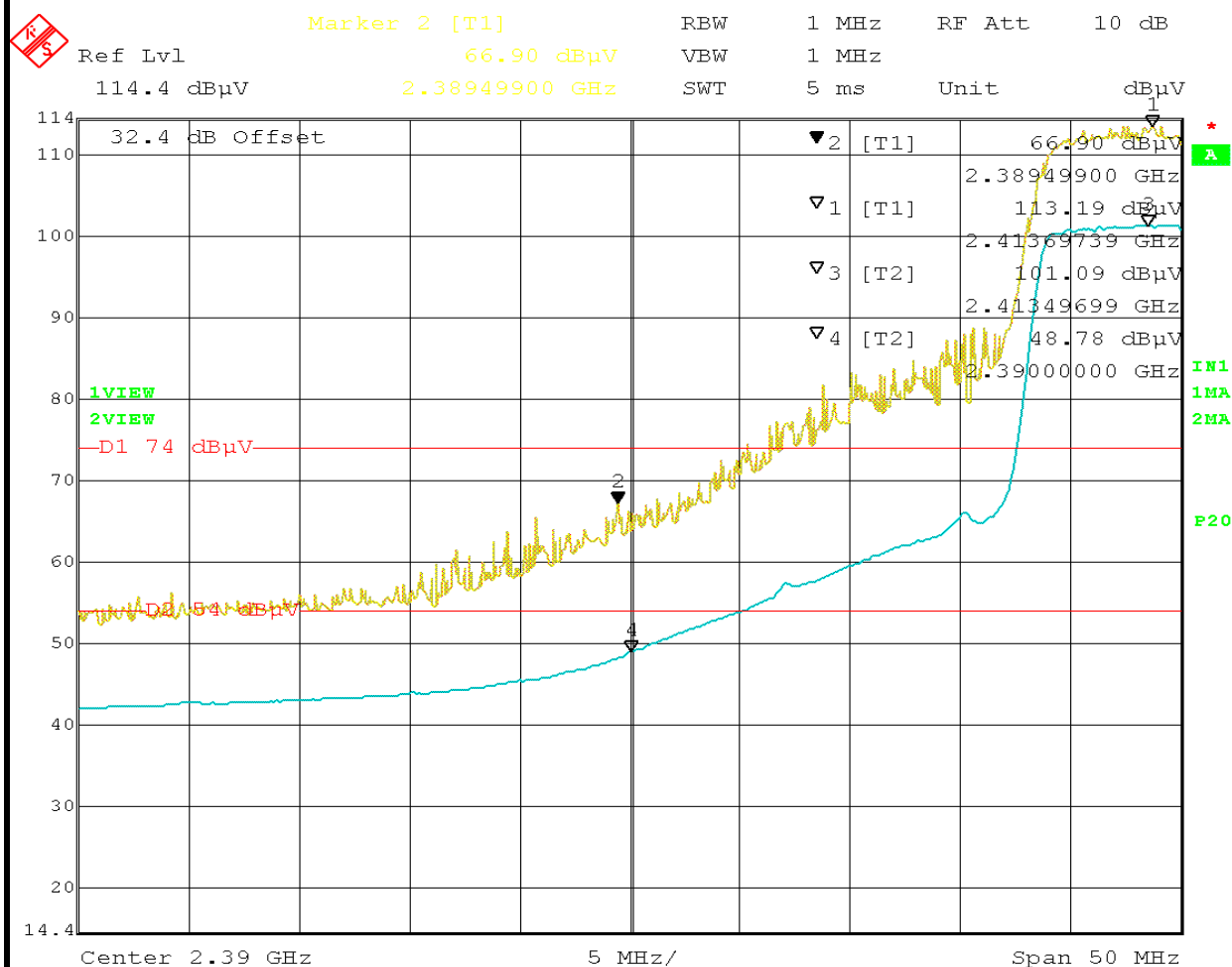
Date: 29.SEP.2006 14:00:25

Power output was measured using broadcom's power meter with gated function built in. The power was also verified on the ESI receiver which also has a gate function to measure it in power averaging mode for 100 sweeps. Both measurements correlate within .2 dB of each other. The power listed on the grant and in this application are peak powers, as measured during the original filing. The original filing contains both gated average and peak power measurements, while subsequent permissive changes, already approved, reference gated average measurements to establish the output power of the EUT at the correct level. The output powers reported in the Elliott test report are gated average measurements and are consistent with the power levels reported in the original and all subsequent applications

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Run #2: Bandedges. Operating Mode: 802.11g

Run #2a: Low Channel @ 2412 MHz

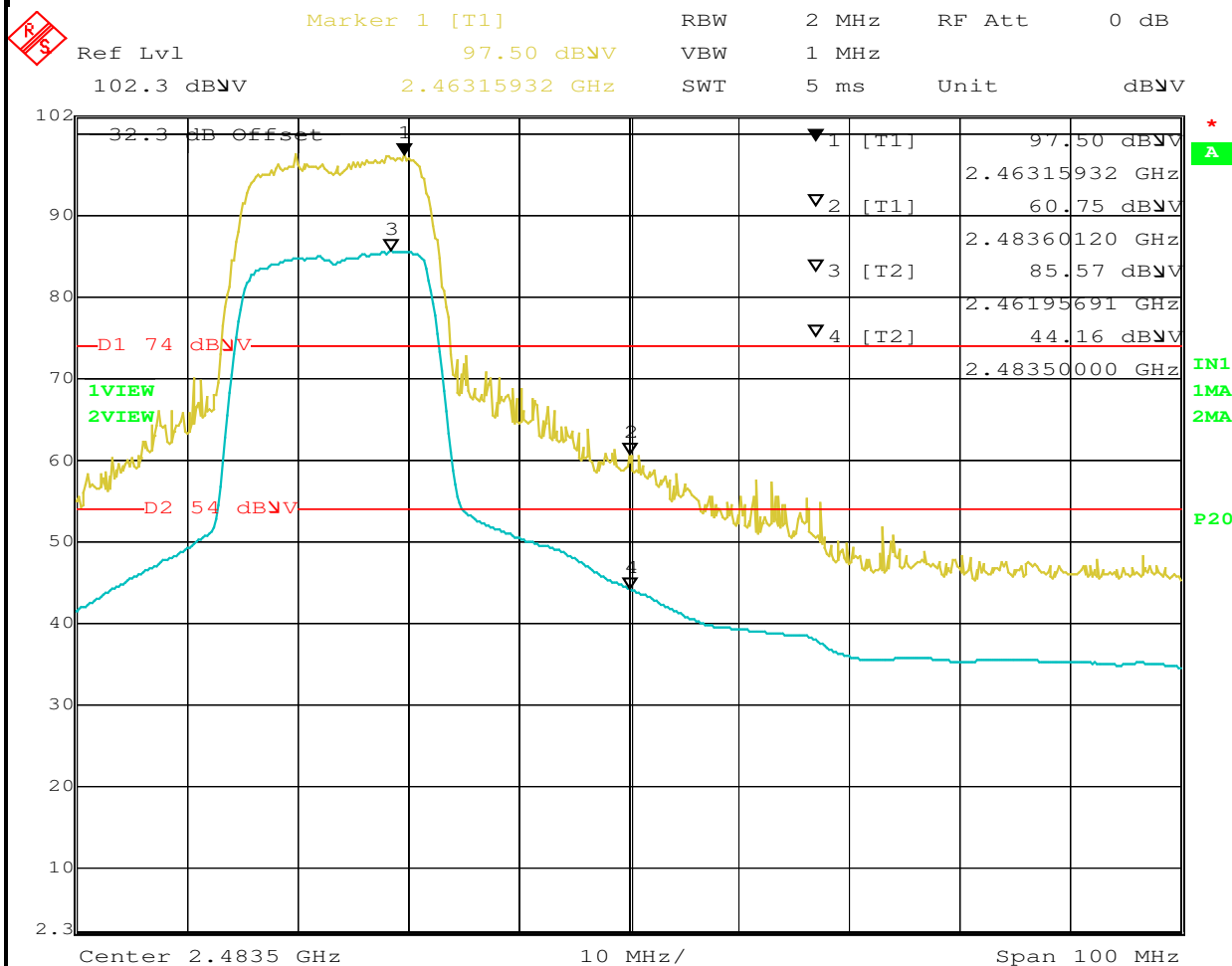


Date: 6.OCT.2006 15:59:05

Power output was measured using broadcom's power meter with gated function built in. The power was also verified on the ESI receiver which also has a gate function to measure it in power averaging mode for 100 sweeps. Both measurements correlate within .2 dB of each other. The power listed on the grant and in this application are peak powers, as measured during the original filing. The original filing contains both gated average and peak power measurements, while subsequent permissive changes, already approved, reference gated average measurements to establish the output power of the EUT at the correct level. The output powers reported in the Elliott test report are gated average measurements and are consistent with the power levels reported in the original and all subsequent applications

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Run #2b: Channel @ 2457 MHz



Date: 29.SEP.2006 13:30:38

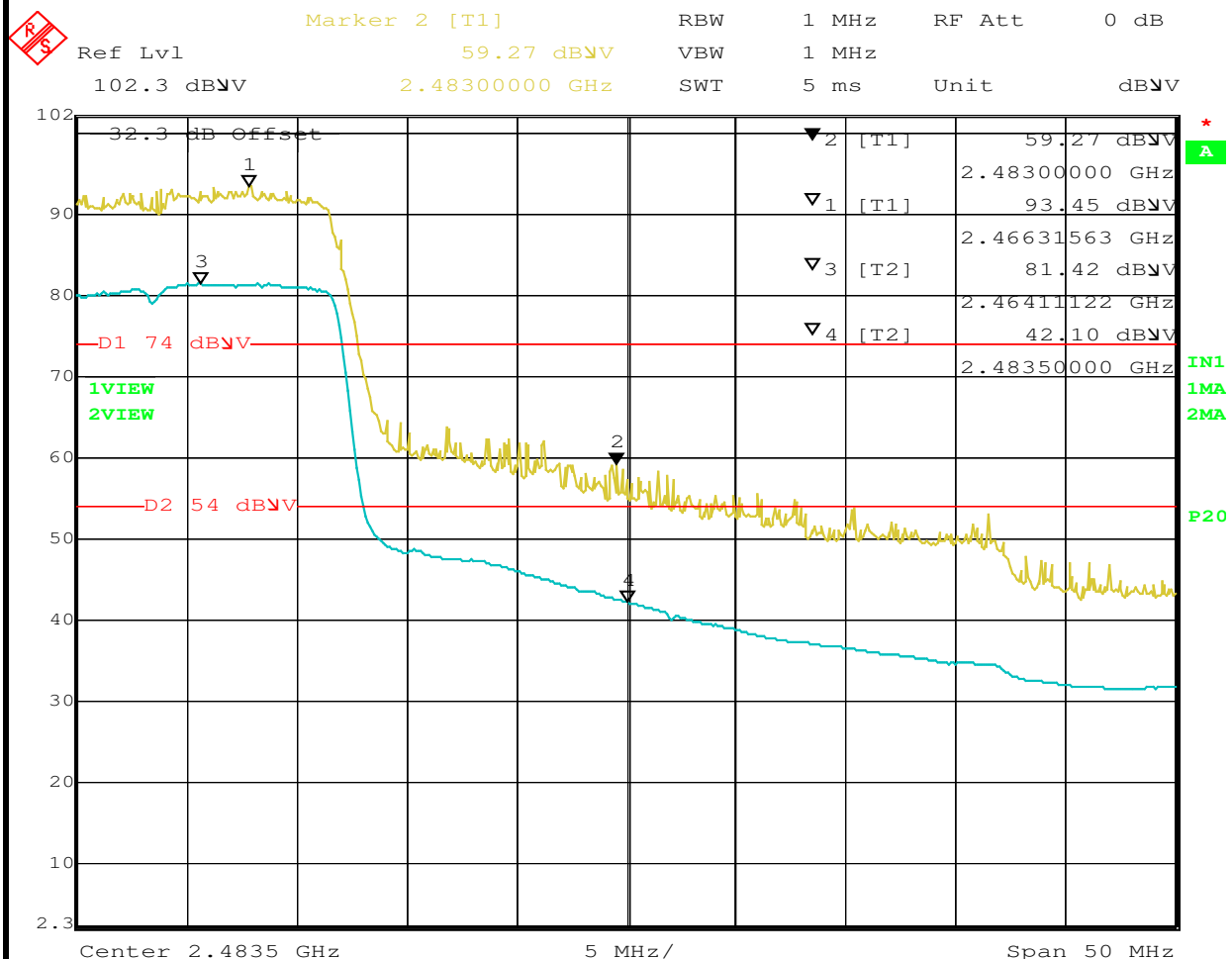
Power output was measured using broadcom's power meter with gated function built in. The power was also verified on the ESI receiver which also has a gate function to measure it in power averaging mode for 100 sweeps. Both measurements correlate within .2 dB of each other. The power listed on the grant and in this application are peak powers, as measured during the original filing. The original filing contains both gated average and peak power measurements, while subsequent permissive changes, already approved, reference gated average measurements to establish the output power of the EUT at the correct level. The output powers reported in the Elliott test report are gated average measurements and are consistent with the power levels reported in the original and all subsequent applications



EMC Test Data

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Run #2b: High Channel @ 2462 MHz



Date: 29.SEP.2006 13:20:12

Power output was measured using broadcom's power meter with gated function built in. The power was also verified on the ESI receiver which also has a gate function to measure it in power averaging mode for 100 sweeps. Both measurements correlate within .2 dB of each other. The power listed on the grant and in this application are peak powers, as measured during the original filing. The original filing contains both gated average and peak power measurements, while subsequent permissive changes, already approved, reference gated average measurements to establish the output power of the EUT at the correct level. The output powers reported in the Elliott test report are gated average measurements and are consistent with the power levels reported in the original and all subsequent applications

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

RSS 210 and FCC 15.247 Radiated Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform engineering evaluation testing of the EUT with respect to the specification listed above.

Date of Test: 10/6/2006
 Test Engineer: Juan Martinez
 Test Location: Fremont Chamber #5

Config. Used: 1
 Config Change: None
 EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:
 Temperature: 17 °C
 Rel. Humidity: 45 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1 (802.11b Mode)	RE, 4000 - 10,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	53.9dBμV/m (495.5μV/m) @ 4824.0MHz (-0.1dB)
1 (802.11g Mode)	RE, 4000 - 10,000 MHz - Spurious Emissions	FCC Part 15.209 / 15.247(c)	Pass	52.6dBμV/m (426.6μV/m) @ 4874.2MHz (-1.4dB)

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.



EMC Test Data

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Power Output

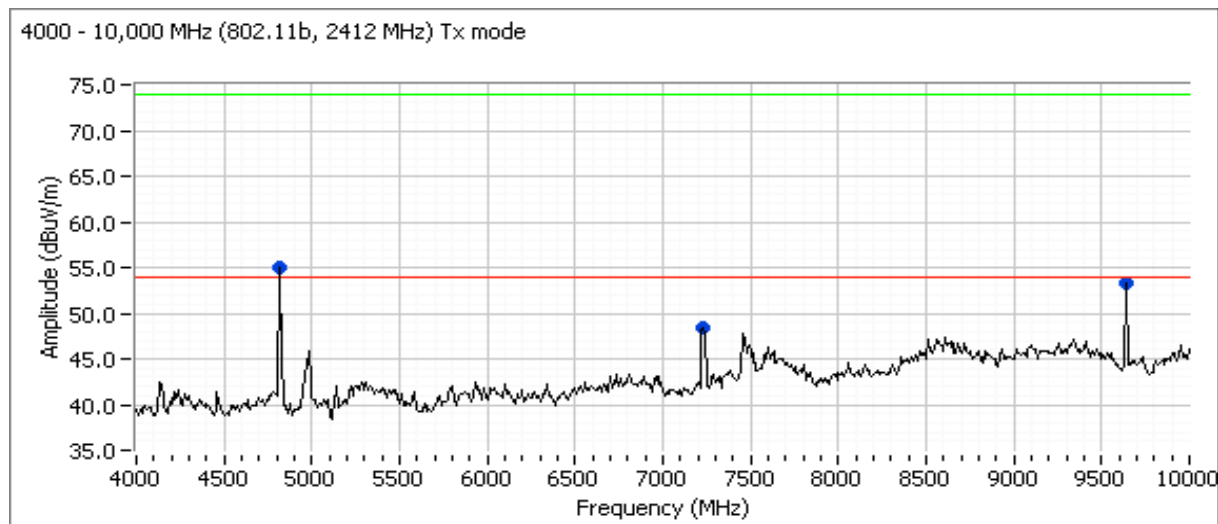
Channel	Antenna gain/dBi	FCC Band edge power/dBm	FCC Emissions power/dBm	
11bmode				
1	3.9	19	19	
2	3.9	NA	NA	
6	3.9	NA	19	
7	3.9	NA	NA	
10	3.9	NA	NA	
11	3.9	19	19	

Power output was measured using broadcom's power meter with gated function built in. The power was also verified on the ESI receiver which also has a gate function to measure it in power averaging mode for 100 sweeps. Both measurements correlate within .2 dB of each other. The power listed on the grant and in this application are peak powers, as measured during the original filing. The original filing contains both gated average and peak power measurements, while subsequent permissive changes, already approved, reference gated average measurements to establish the output power of the EUT at the correct level. The output powers reported in the Elliott test report are gated average measurements and are consistent with the power levels reported in the original and all subsequent applications

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Run #1: Radiated Spurious Emissions, 4000 - 10,000 MHz.

Run #1a: Low Channel @ 2412 MHz, 802.11b



Other Spurious Emissions

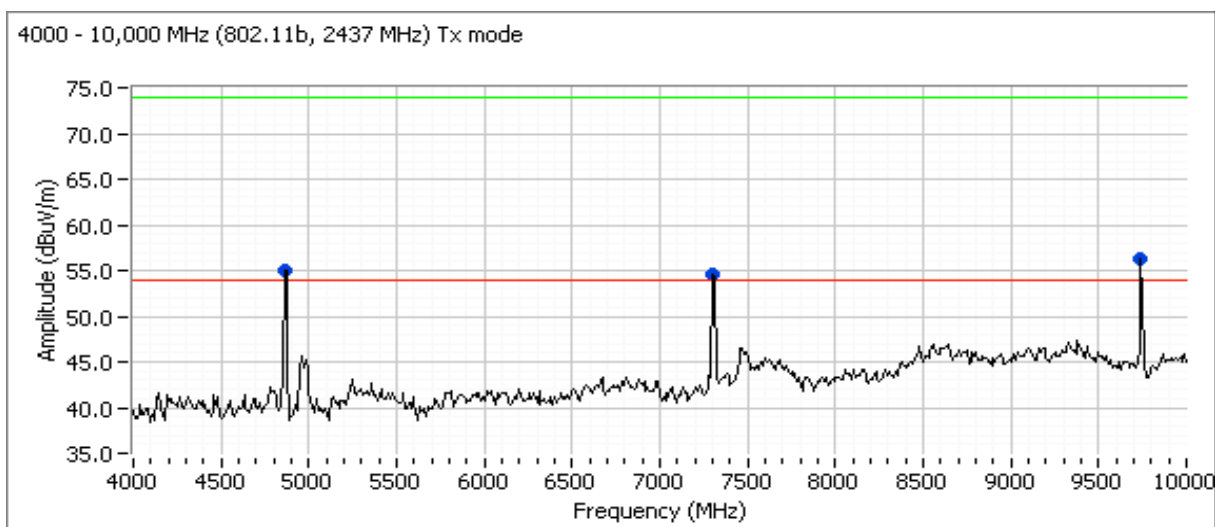
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.960	53.9	H	54.0	-0.1	AVG	74	1.0	
4823.960	55.5	H	74.0	-18.5	PK	74	1.0	
7230.000	48.4	V	54.0	-5.6	Peak	267	1.8	
9640.000	53.2	V	54.0	-0.8	Peak	267	1.6	

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Run #1b: Center Channel @ 2437 MHz



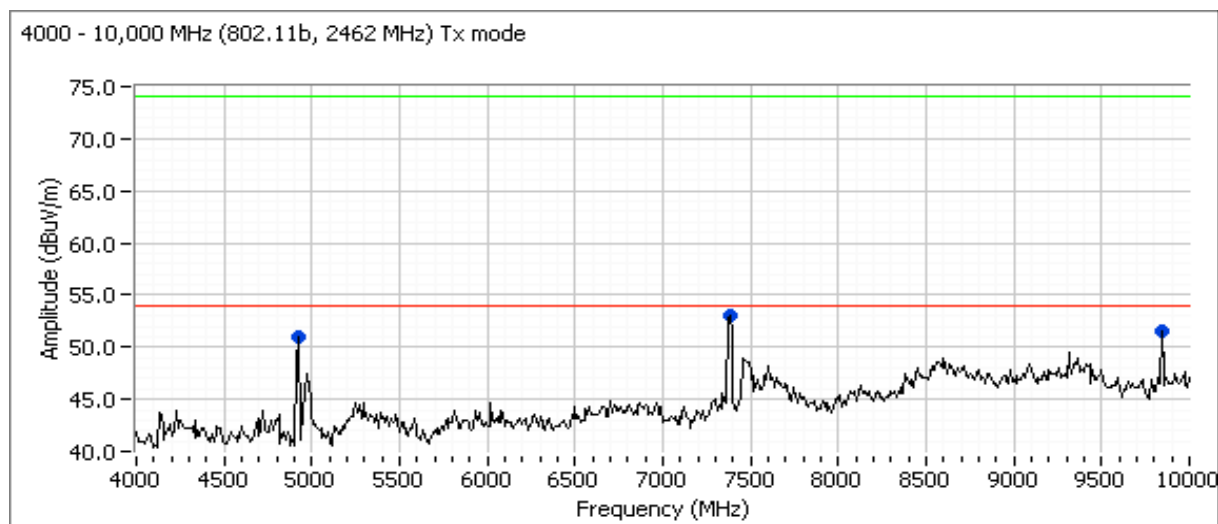
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
18.5dBm								
4873.950	53.7	H	54.0	-0.3	AVG	75	1.0	
4873.950	55.1	H	74.0	-18.9	PK	75	1.0	
7308.140	52.6	V	54.0	-1.4	AVG	249	2.0	
7308.140	56.4	V	74.0	-17.6	PK	249	2.0	
9740.000	56.3	V	54.0	2.3	Peak	259	1.4	Non-Restricted

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Run #1c: High Channel @ 2462 MHz



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4923.960	48.0	H	54.0	-6.0	AVG	269	1.0	
4923.960	50.4	H	74.0	-23.6	PK	269	1.0	
7383.170	50.0	V	54.0	-4.0	AVG	259	2.0	
7383.170	55.0	V	74.0	-19.0	PK	259	2.0	
9840.000	51.5	V	54.0	-2.5	Peak	243	1.4	Non-Restricted

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.



EMC Test Data

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

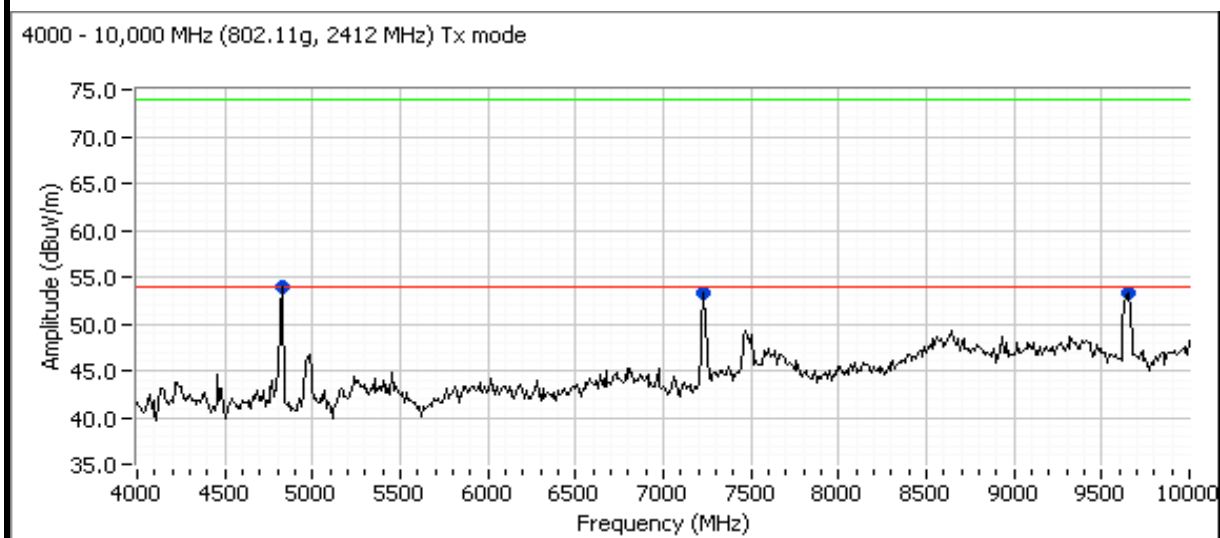
Power Output

Channel	Antenna gain/dBi	FCC Band edge power/dBm	FCC Emissions power/dBm	
11g mode:				
1	3.9	18	19	
6	3.9	NA	19	
11	3.9	16.5	19	

Power output was measured using broadcom's power meter with gated function built in. The power was also verified on the ESI receiver which also has a gate function to measure it in power averaging mode for 100 sweeps. Both measurements correlate within .2 dB of each other. The power listed on the grant and in this application are peak powers, as measured during the original filing. The original filing contains both gated average and peak power measurements, while subsequent permissive changes, already approved, reference gated average measurements to establish the output power of the EUT at the correct level. The output powers reported in the Elliott test report are gated average measurements and are consistent with the power levels reported in the original and all subsequent applications

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Run #2a:Low Channel @ 2412 MHz



Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.910	40.8	H	54.0	-13.2	AVG	289	1.0	
4823.910	52.8	H	74.0	-21.2	PK	289	1.0	
7238.360	41.2	V	54.0	-12.8	AVG	261	2.0	
7238.360	53.9	V	74.0	-20.1	PK	261	2.0	
9650.000	53.4	H	54.0	-0.6	Peak	201	1.0	Non-Restricted

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

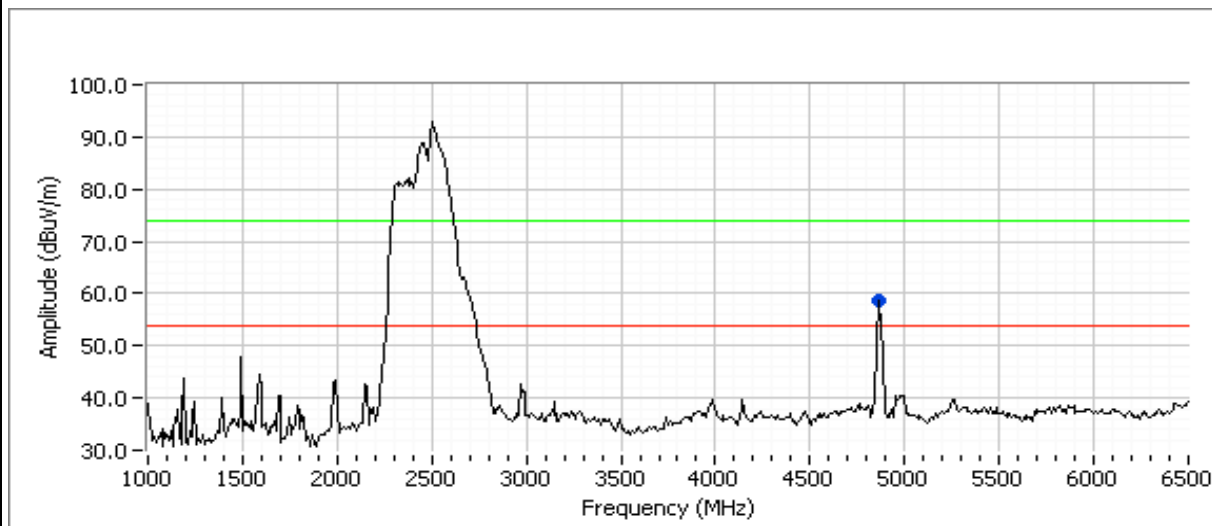
Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Run #2b: Maximized Readings, 2nd Harmonic Only, Channel 6, 6 Mbps, at 19 dBm

BCM94311MCG Card #584 Rev 5.1, no rear shield

3.9 dBi antennas, host system is HP Pavilion zv6000



Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4871.030	58.7	H	54.0	4.7	Peak	298	1.6	

Final peak and average readings

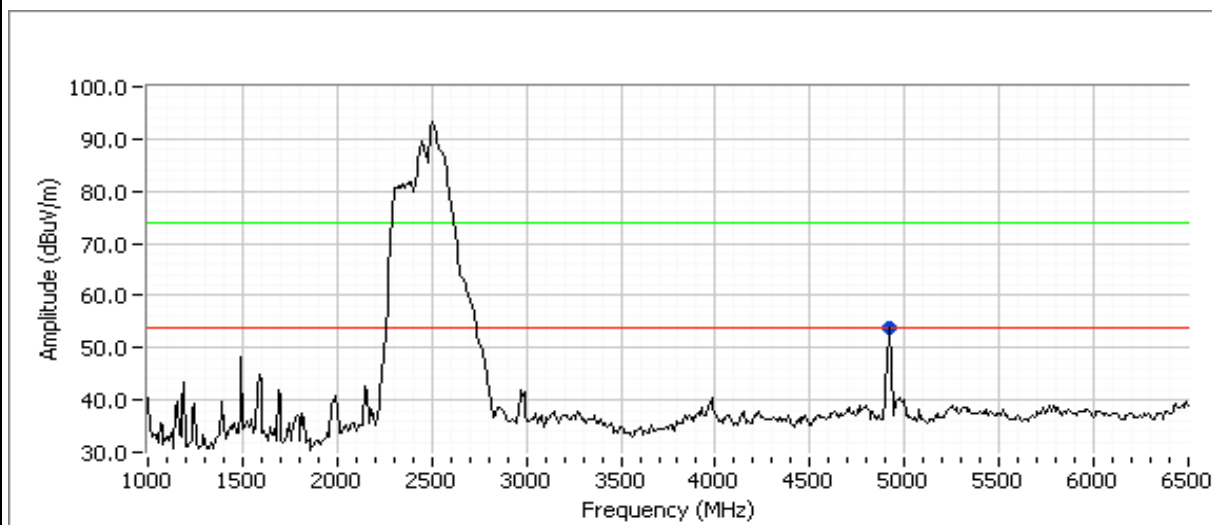
Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.200	52.6	H	54.0	-1.4	AVG	297	1.6	
4874.200	64.4	H	74.0	-9.6	PK	297	1.6	

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	N/A

Run #2c: Maximized Readings, 2nd Harmonic Only, Channel 11, 6 Mbps, at 19 dBm

BCM94311MCG Card #584 Rev 5.1, no rear shield

3.9 dBi antennas, host system is HP Pavilion zv6000



Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4922.530	53.7	H	54.0	-0.3	Peak	289	1.0	

Final peak and average readings

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.280	47.2	H	54.0	-6.8	AVG	291	1.0	
4924.280	58.7	H	74.0	-15.3	PK	291	1.0	

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	B

Receiver Radiated Emissions

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 9/29/2006	Config. Used: 1
Test Engineer: Juan Martinez	Config Change: None
Test Location: Fremont Chamber #4	EUT Voltage: 120V/60Hz

General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing.

The test distance and extrapolation factor (if applicable) are detailed under each run description.

Ambient Conditions:	Temperature:	20 °C
	Rel. Humidity:	43 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 - 1000 MHz, Maximized Emissions	RSS-GEN	Pass	25.3dBµV/m (18.4µV/m) @ 210.132MHz (-4.7dB)
2-3	RE, 1000 - 17,000 MHz, Maximized Emissions	RSS-GEN	Pass	43.2dBµV/m (144.5µV/m) @ 1500.7MHz (-10.8dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

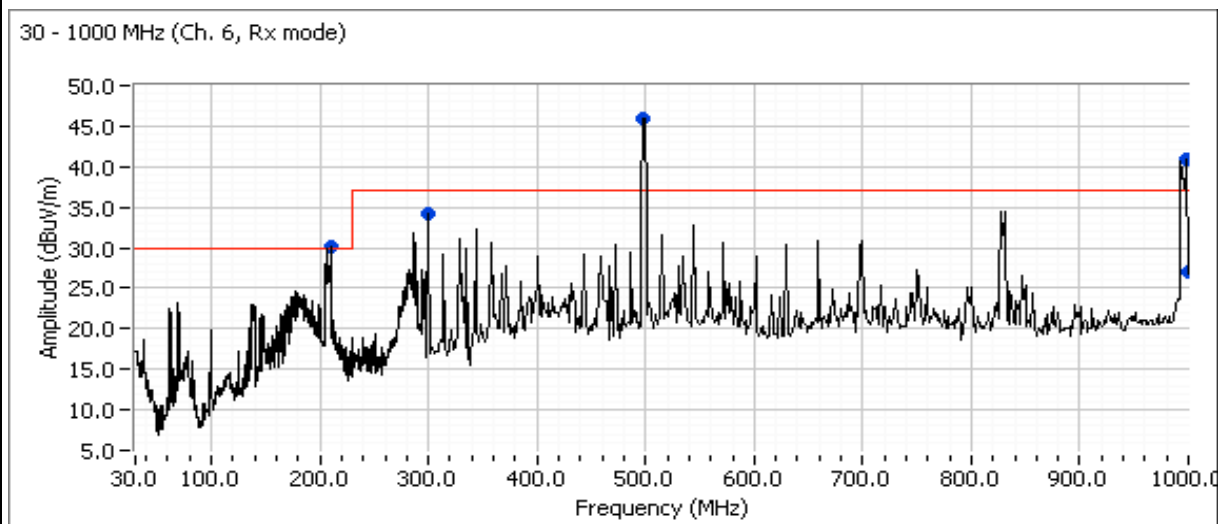
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	B

Run #1: Maximized Readings 30 - 1000 MHz, Ch. 6 802.11g, Rx mode
Maximized quasi-peak readings (includes manipulation of EUT interface cables)

BCM94311MCG Card #584 Rev 5.1, no rear shield
3.9 dBi antennas, host system is HP Pavilion zv6000



Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	5	10	-6.0

Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	EN55022 Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
298.918	34.2	H	37.0	-2.8	Peak	65	1.0	
210.180	30.2	H	30.0	0.2	Peak	278	1.5	
497.796	46.0	H	37.0	9.0	Peak	290	1.0	
998.597	40.9	V	37.0	3.9	Peak	22	1.0	

Final Quasi-Peak readings

Frequency	Level	Pol	EN55022 Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
210.132	25.3	H	30.0	-4.7	QP	290	2.0	
996.988	40.8	V	-	-	QP	27	1.0	CPU emission, Note 1
499.366	42.5	H	-	-	QP	204	1.0	CPU emission, Note 1

Note 1: Emissions radiating after installing the extension card so laptop can communicate with the module, which caused CPU emission to radiated due to the extension board. These emissions are not receiver related.

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	B

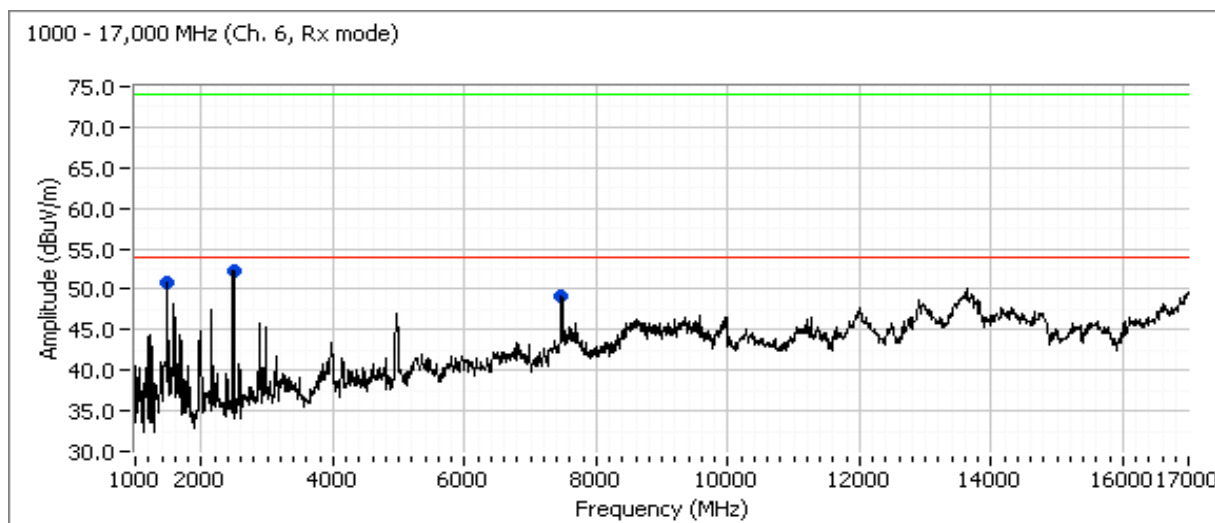
Run #2: Maximized Readings, 1000 - 17,000 MHz Ch. 6 802.11g, Rx mode

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

BCM94311MCG Card #584 Rev 5.1, no rear shield

3.9 dBi antennas, host system is HP Pavilion zv6000

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0



Final peak and average readings

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2500.120	36.4	V	54.0	-17.6	AVG	143	1.4	FCC Class B Average Limit
2500.120	53.7	V	74.0	-20.3	PK	143	1.4	FCC Class B Peak Limit
1500.580	42.9	V	54.0	-11.1	AVG	99	1.0	
1500.580	50.9	V	74.0	-23.1	PK	99	1.0	
7462.750	35.5	H	54.0	-18.5	AVG	239	1.2	
7462.750	51.9	H	74.0	-22.1	PK	239	1.2	

Note 1: Above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

Note 2:

Client:	Broadcom	Job Number:	J65136
Model:	BCM94311MCG	T-Log Number:	T65514
Contact:	David Boldy	Account Manager:	Esther Zhu
Standard:	FCC 15.247 & 15.209	Class:	B

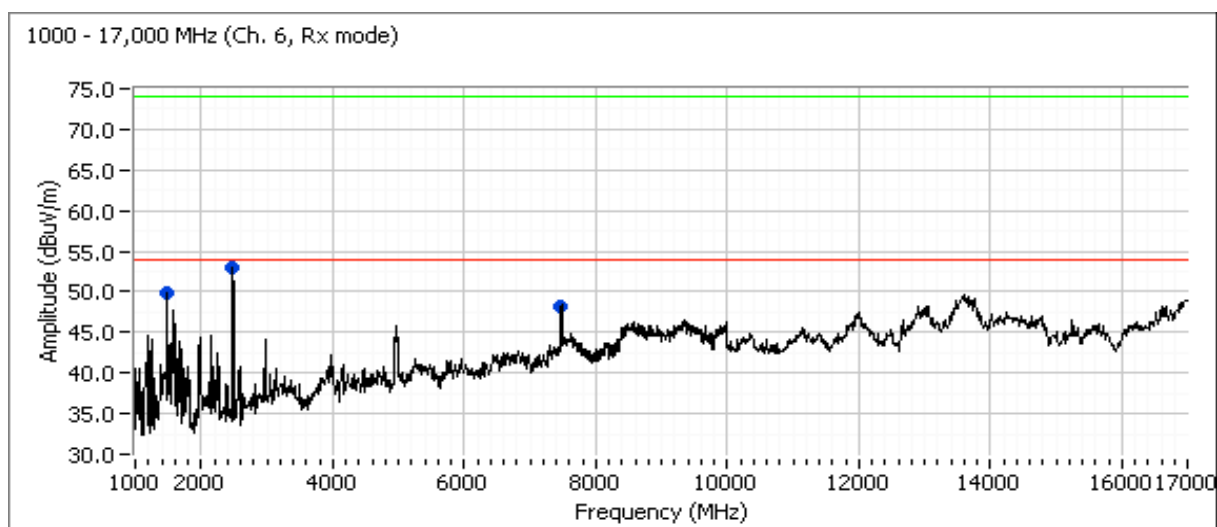
Run #3: Maximized Readings, 1000 - 17,000 MHz, 802.11b, Ch. 6, Rx mode

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

BCM94311MCG Card #584 Rev 5.1, no rear shield

3.9 dBi antennas, host system is HP Pavilion zv6000

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 18000 MHz	3	3	0.0



Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2488.760	53.0	V	54.0	-1.0	Peak	99	1.4	
1500.490	49.9	V	54.0	-4.1	Peak	96	1.0	
7463.280	48.2	H	54.0	-5.8	Peak	255	1.4	

Final peak and average readings

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1500.730	43.2	V	54.0	-10.8	AVG	97	1.0	
1500.730	50.9	V	74.0	-23.1	PK	97	1.0	
2487.620	30.2	V	54.0	-23.8	AVG	92	1.4	
2487.620	46.2	V	74.0	-27.8	PK	92	1.4	
7462.530	35.3	H	54.0	-18.7	AVG	256	1.4	
7462.530	51.9	H	74.0	-22.1	PK	256	1.4	

Note 1: Above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

EXHIBIT 3: Photographs of Test Configurations

1 pages

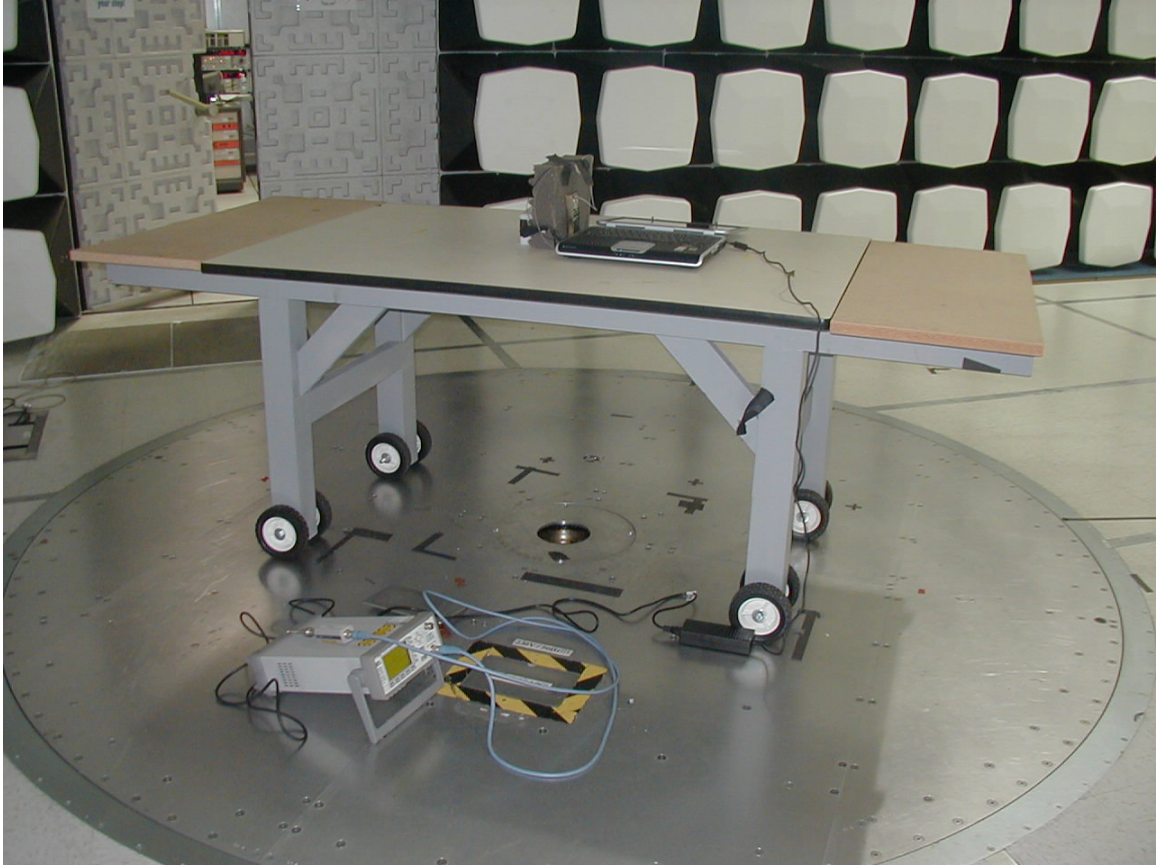




EXHIBIT 4: Proposed FCC ID Label & Label Location

***EXHIBIT 5: Detailed Photographs
of Broadcom Corporation Model BCM94311MCG Construction***

Unchanged from original application

***EXHIBIT 6: Operator's Manual
for Broadcom Corporation Model BCM94311MCG***

Unchanged from original application

***EXHIBIT 7: Block Diagram
of Broadcom Corporation Model BCM94311MCG***

Unchanged from original application

EXHIBIT 8: Schematic Diagrams
for Broadcom Corporation Model BCM94311MCG

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EXHIBIT 9: Theory of Operation
for Broadcom Corporation Model BCM94311MCG

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EXHIBIT 10: Advertising Literature

Unchanged from original application

EXHIBIT 11: RF Exposure Information

1 Page

MPE Exposure Formula:

$$S = (P \times G) / (4 \times \pi \times d^2)$$

where:

S = power density

P = transmitter conducted power in (mW)

G = antenna numeric gain

d = distance to radiation center (m) or $(.02^2) = .020$ m

2412 MHz (802.11b)

Enter Data in Linear Units					
Gain =	2.5	Numeric	EUT ant.:	3.96	dBi
Power =	139	mW	EUT power:	21.42	dBm
Frequency =	2412	MHz	MPE limit:	1	mW/cm ²
Cable Loss =	0	dB			
EIRP =	345.14	mW		345.14	mW
R (cm) =	5.2407696		S (20cm) =	0.069	

2437 MHz (802.11b)

Enter Data in Linear Units					
Gain =	2.5	Numeric	EUT ant.:	3.96	dBi
Power =	132	mW	EUT power:	21.2	dBm
Frequency =	2437	MHz	MPE limit:	1	mW/cm ²
Cable Loss =	0	dB			
EIRP =	328.10	mW		328.10	mW
R (cm) =	5.1096961		S (20cm) =	0.065	

2462 MHz (802.11b)

Enter Data in Linear Units					
Gain =	2.5	Numeric	EUT ant.:	3.96	dBi
Power =	130	mW	EUT power:	21.14	dBm
Frequency =	2462	MHz	MPE limit:	1	mW/cm ²
Cable Loss =	0	dB			
EIRP =	323.59	mW		323.59	mW
R (cm) =	5.0745212		S (20cm) =	0.064	

2412 MHz (802.11g)

Enter Data in Linear Units					
Gain =	2.5	Numeric	EUT ant.:	3.96	dBi
Power =	331	mW	EUT power:	25.2	dBm
Frequency =	2412	MHz	MPE limit:	1	mW/cm ²
Cable Loss =	0	dB			
EIRP =	824.14	mW		824.14	mW
R (cm) =	8.0983225		S (20cm) =	0.164	

2437 MHz (802.11g)

Enter Data in Linear Units					
Gain =	2.5	Numeric	EUT ant.:	3.96	dBi
Power =	414	mW	EUT power:	26.17	dBm
Frequency =	2437	MHz	MPE limit:	1	mW/cm ²
Cable Loss =	0	dB			
EIRP =	1030.39	mW		1030.39	mW
R (cm) =	9.0551379		S (20cm) =	0.205	

2462 MHz (802.11g)

Enter Data in Linear Units					
Gain =	2.5	Numeric	EUT ant.:	3.96	dBi
Power =	275	mW	EUT power:	24.4	dBm
Frequency =	2462	MHz	MPE limit:	1	mW/cm ²
Cable Loss =	0	dB			
EIRP =	685.49	mW		685.49	mW
R (cm) =	7.3857579		S (20cm) =	0.136	