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Application for Grant of Equipment Authorization
Class II Permissive Change
pursuant to
FCC Part 15 Subpart B
on the
Broadcom Corporation
Digital Device
Model: BCM92046MD_GEN

FCC ID:	QDS-BRCM1033
GRANTEE:	Broadcom Corporation 190 Mathilda Ave. Sunnyvale, CA 94086
TEST SITE:	Elliott Laboratories 684 W. Maude Avenue Sunnyvale, CA 94085
REPORT DATE:	January 28, 2009
FINAL TEST DATE(S):	January 16 and January 26, 2009
AUTHORIZED SIGNATORY:	David W. Bare Chief Engineer

ACCREDITED

Testing Cert #2016-01

REVISION HISTORY

Revision #	Date	Comments	Modified By
1	1/29/09	Initial Release	-

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SCOPE

The Federal Communications Commission (FCC) establishes rules and regulations regarding the electromagnetic emissions of all electronic devices. An electromagnetic emissions test has been performed on the Broadcom Corporation model BCM92046MD_GEN pursuant to Subpart B of Part 15 of FCC Rules for digital devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-2003 as outlined in Elliott Laboratories test procedures. The test data has been provided as an appendix to this report for reference. Additionally the results are deemed satisfactory evidence of compliance with Industry Canada Interference-Causing Equipment Standard ICES-003 (Issue 4, February 2004)

The digital device above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC 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 BCM92046MD_GEN and therefore apply only to the tested sample. The sample was selected and prepared by Anne Liang of Broadcom Corporation.

OBJECTIVE

The primary objective of the company is compliance with Subpart B of Part 15 of FCC Rules for the radiated and conducted emissions of digital devices. Since the subject device is intended for operation in any environment including residential areas, equipment verification or certification is required.

Equipment verification is a procedure where the company or a contracted laboratory makes measurements and takes necessary steps to ensure that the equipment complies with the appropriate technical standards. Submittal of a sample unit or test data to the FCC is not required unless specifically requested by the Commission. Once equipment verification has been obtained, a label indicating compliance must be attached to all identical units subsequently manufactured. Specific cautionary information must also be included in the operator's manual. These FCC labeling requirements are included as an appendix to this report.

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 FCC compliance is the responsibility of the company. Any modification of the product that 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 and/or I/O cable changes, etc.).

EMISSION TEST RESULTS

The following emissions tests were performed on the Broadcom Corporation model BCM92046MD_GEN. The actual test results are contained in an appendix of this report.

LIMITS OF CONDUCTED INTERFERENCE VOLTAGE

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.107(a).

The following measurement was extracted from the data recorded during the conducted emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an appendix of this report.

0.15 – 30.00 MHz, 120V/ 60Hz

Frequency	Level	Power	Class B		Detector	Comments
MHz	dBuV	Lead	Limit	Margin	QP/Ave	
0.812	34.2	Line	46.0	-11.8	AVG	AVG (0.10s)

LIMITS OF RADIATED INTERFERENCE FIELD STRENGTH

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.109(g).

The following measurement was extracted from the data recorded during the radiated electric field emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an appendix of this report.

1000 – 10000 MHz

Frequency	Level	Pol	Class B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	Degrees	Meters	
4883.390	43.2	V	54.0	-10.8	AVG	215	1.0	

Preliminary tests showed there were no changes in digital device emissions below 1 GHz due to the proposed changes to the EUT.

MEASUREMENT UNCERTAINTIES

ISO/IEC 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 were calculated using the approach described in CISPR 16-4-2:2003 using a coverage factor of k=2, which gives a level of confidence of approximately 95%. The levels were found to be below levels of *U*cispr and therefore no adjustment of the data for measurement uncertainty is required.

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

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Broadcom Corporation model BCM92046MD_GEN is a Bluetooth transceiver module intended for installation in a host device. Since the EUT could be used in any device, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The EUT receives 3.3V DC power from the host in which it is installed.

The sample was received on December 22, 2008 and tested on January 16 and January 26, 2009. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Broadcom	BCM92046MD _GEN	Bluetooth Transceiver Module	101	QDS-BRCM1033

ANTENNA SYSTEM

The antenna system used with the Broadcom Corporation model BCM92046MD_GEN consists of integral 3.5dBi antenna.

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
Dell	hepburn6C	Laptop	N/A	DoC

No remote support equipment was used during 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)
USB	EUT	Multiwire with ferrite bead	Shielded	0.6
Host AC Power	AC Mains	Multiwire	Unshielded	0.8
Host Ethernet	Remote Hub	Multiwire	Unshielded	30

EUT OPERATION

During receive mode testing, the EUT was set to receive mode and the host was displaying a window of H characters and sending data out the Ethernet port.

PROPOSED MODIFICATION DETAILS

GENERAL

This section details the modifications to the Broadcom Corporation model BCM92046MD_GEN being proposed. All performance and construction deviations from the characteristics originally reported to the FCC are addressed

PRINTED WIRING BOARD LAYOUT

The printing wiring board was changed to accommodate a different host connector and the board size was reduced in length.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on January 16 and January 26, 2009 at the Elliott Laboratories Open Area Test Site #2 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Commission.

The FCC 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 FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4-2003. 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 non-anechoic shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an Open Area Test Site or anechoic chamber. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1:2003 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 7 GHz. 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.

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.

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 biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors that are programmed into the test receivers.

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.

ANSI C63.4 specifies 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 up to 12 mm thick 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 company's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An appendix of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The FCC requires 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, 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

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

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 that results in the highest emission is then maintained while varying the antenna height from one to four meters. 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. Emissions that have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted and radiated emissions given below are taken from the first edition of CISPR Pub. 22 (1997), "Limits and Methods of Measurements of Radio Interference Characteristics of Information Technology Equipment." 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 limits are based on the use of an average or quasi-peak detector as indicated.

CONDUCTED EMISSIONS SPECIFICATION LIMITS,

Frequency Range (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

RADIATED EMISSIONS SPECIFICATION LIMITS

Frequency (MHz)	Limit (dBuV/m @ 10m)
30 to 230	30.0
230 to 1000	37.0

RADIATED EMISSIONS SPECIFICATION LIMITS

The limits for radiated emissions above 1000 MHz given below are as specified in Part 15 of FCC Rules. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). The limits are based on the use of an average detector.

Frequency (MHz)	Average Limit (dBuV/m @ 10m)
above 1000	49.5

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

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, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 1000 - 12,000 MHz, 22-Dec-08
Engineer: jcaizzi

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18GHz	3115	868	10-Jun-10
Hewlett Packard	SpectAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	15-Jan-09
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	13-Nov-09

Radiated Emissions, 25 - 12,750 MHz, 24-Dec-08
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	Log Periodic Antenna 300-1000 MHz	EL300.1000	55	27-Feb-09
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	06-Jun-09
EMCO	Biconical Antenna, 30-300 MHz	3110B	801	19-Sep-09
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	15-Jul-10
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	20-Oct-09
Hewlett Packard	Preamplifier, 100 kHz - 1.3 GHz	8447D OPT 010	1826	29-May-09

Radiated Emissions, 25 - 12,750 MHz, 24-Dec-08
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	Biconical Antenna, 30-300 MHz	EL30.300	54	26-Mar-09
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	29-Jan-09
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1347	17-Jan-09
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1404	09-Apr-09
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	04-Nov-09
Rohde & Schwarz	Signal Generator, 9 kHz-1.04 GHz	SMY01	1450	05-Nov-09
EMCO	Biconical Antenna, 30-300 MHz	3110B	1498	18-Apr-09
Rohde & Schwarz	Power Sensor, 1 nW-20 mW, 10 MHz-18 GHz, 50ohms	NRV-Z1	2114	18-Sep-09

Radiated Emissions, 1000 - 10,000 MHz, 16-Jan-09
Engineer: Rafael Varelas

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	09-Oct-09
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	15-Jul-10
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	20-Oct-09

Conducted Emissions - AC Power Ports, 26-Jan-09
Engineer: Suhaila Khushzad

Manufacturer	Description	Model #	Asset #	Cal Due
Elliott Laboratories	LISN, FCC / CISPR	LISN-4, OATS	362	31-Jul-09
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	780	30-Dec-09
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	812	12-Feb-09
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	29-Jan-09

EXHIBIT 2: Test Measurement Data

10 Pages

Client:	Broadcom	Job Number:	J73989
Model:	BCM92046MD_GEN	T-Log Number:	T74142
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		-
Emissions Standard(s):	EN 300 328, FCC 15.247	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Broadcom

Model

BCM92046MD_GEN

Date of Last Test: 1/26/2009

Client:	Broadcom	Job Number:	J73989
Model:	BCM92046MD_GEN	T-Log Number:	T74142
		Account Manger:	Dean Eriksen
Contact:	Juan Martinez		
Emissions Standard(s):	EN 300 328, FCC 15.247	Class:	B
Immunity Standard(s):	-	Environment:	-

EUT INFORMATION

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

General Description

The EUT is a Bluetooth transceiver module intended for installation in a host device. Since the EUT could be used in any device, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The EUT receives 3.3V DC power from the host in which it is installed.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Broadcom	BCM92046MD_GEN	Bluetooth Transceiver Module	101	QDS-BRCM1033

Other EUT Details

The following EUT details should be noted: None

EUT Antenna (Intentional Radiators Only)

The antenna is integral to the device and has a gain of 3.5dBi.

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			No modifications were made to the EUT during testing.
2			
3			

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

Client:	Broadcom	Job Number:	J73989
Model:	BCM92046MD_GEN	T-Log Number:	T74142
		Account Manger:	Dean Eriksen
Contact:	Juan Martinez		
Emissions Standard(s):	EN 300 328, FCC 15.247	Class:	B
Immunity Standard(s):	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	hepburn6C	Laptop	N/A	DoC

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
-	-	-	-	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB	EUT	Multiwire with ferrite bead	Shielded	0.6
Host AC Power	AC Mains	Multiwire	Unshielded	0.8

EUT Operation During Emissions Tests

During transmit mode testing the EUT was set to transmit continuously on low, middle, and high channel at previous approved power levels. During receive mode testing, the EUT was set to receive mode and the host was displaying a window of H characters and sending data out the Ethernet port.

Client:	Broadcom	Job Number:	J73989
Model:	BCM92046MD_GEN	T-Log Number:	T74142
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	EN 300 328, FCC 15.247	Class:	B

Conducted Emissions - Power Ports

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: 1/26/2009
Test Engineer: Suhaila Khushzad
Test Location: SVOATS #2

Config. Used: 1
Config Change: Ethernet cable added (Laptop to remote Hub)
EUT Voltage: 230V/50Hz & 120V/60Hz

General Test Configuration

The EUT host system was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment. Remote support equipment was located approximately 30 meters from the test area.

Ambient Conditions:

Temperature: 16 °C
Rel. Humidity: 44 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 230V/50Hz	EN 55022 Class B	Pass	53.8dBµV @ 0.150MHz (-12.2dB)
2	CE, AC Power,120V/60Hz	EN 55022 Class B	Pass	34.2dBµV @ 0.812MHz (-11.8dB)

Modifications Made During Testing

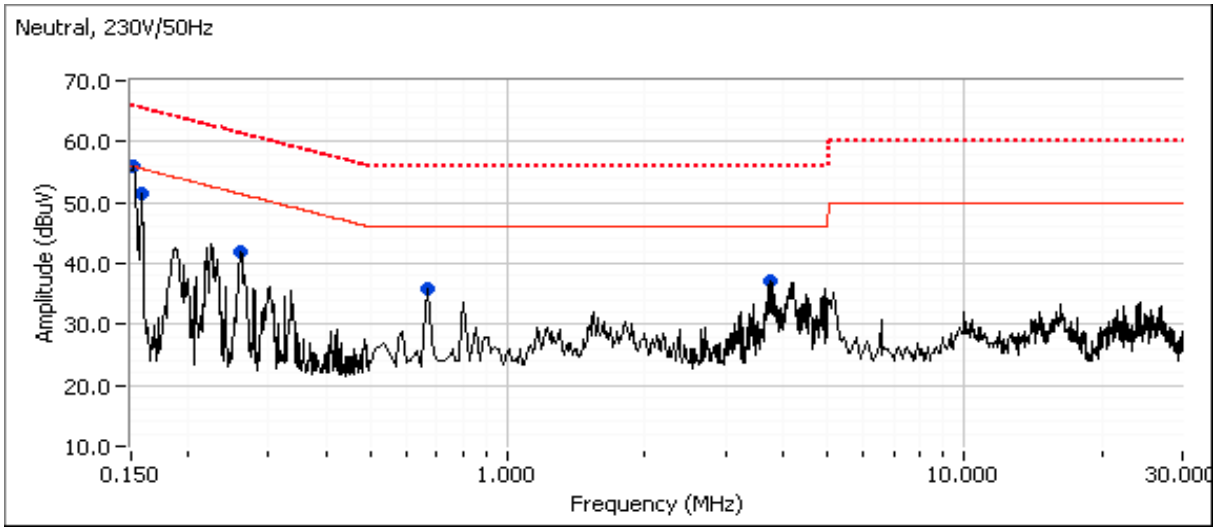
No modifications were made to the EUT during testing

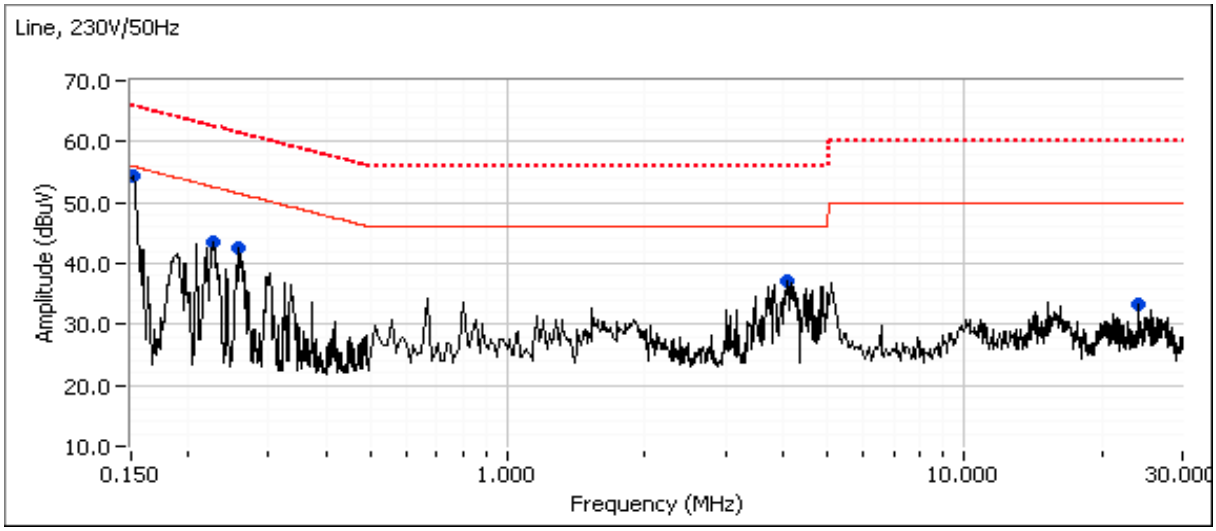
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Broadcom	Job Number:	J73989
Model:	BCM92046MD_GEN	T-Log Number:	T74142
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	EN 300 328, FCC 15.247	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz





Client:	Broadcom	Job Number:	J73989
Model:	BCM92046MD_GEN	T-Log Number:	T74142
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	EN 300 328, FCC 15.247	Class:	B

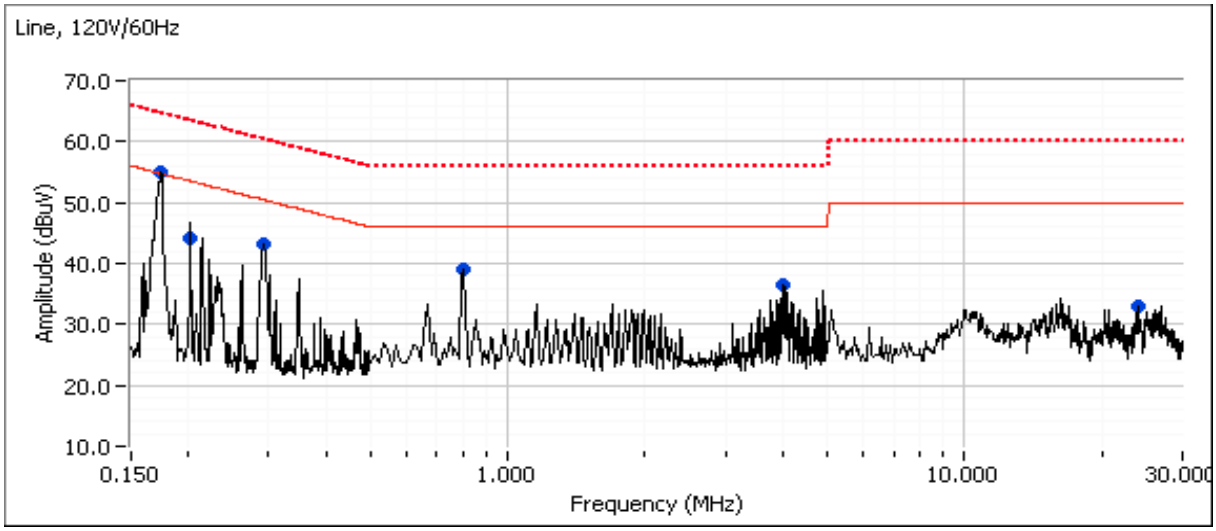
Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz

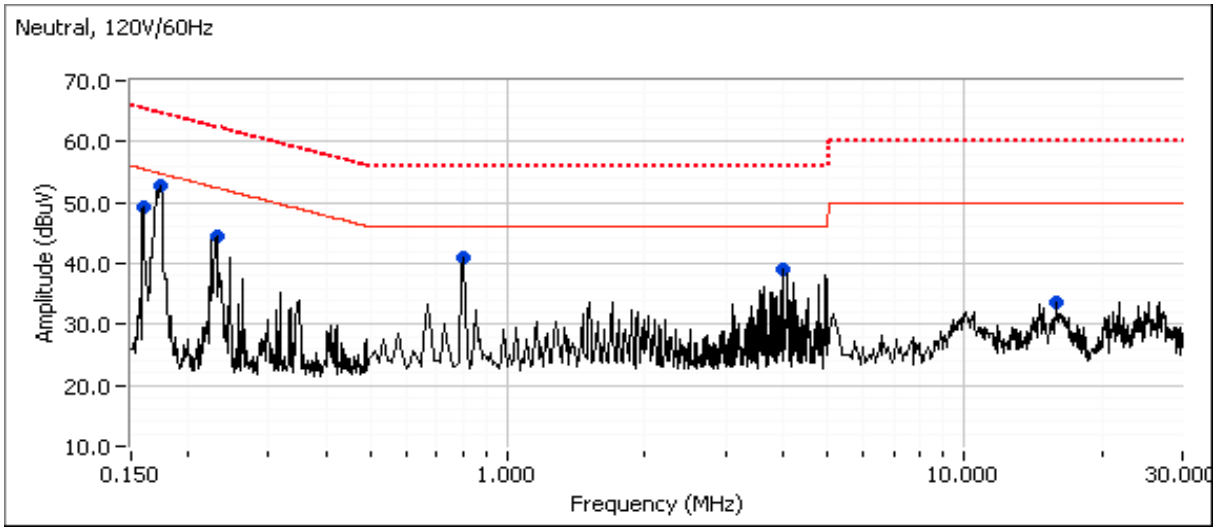
Final quasi-peak and average readings

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.150	53.8	Line	66.0	-12.2	QP	QP (1.00s)
0.150	43.7	Line	56.0	-12.3	AVG	AVG (0.10s)
0.150	43.6	Neutral	56.0	-12.4	AVG	AVG (0.10s)
0.150	53.4	Neutral	66.0	-12.6	QP	QP (1.00s)
0.151	43.3	Neutral	56.0	-12.7	AVG	AVG (0.10s)
0.151	53.2	Neutral	66.0	-12.8	QP	QP (1.00s)
0.681	31.3	Neutral	46.0	-14.7	AVG	AVG (0.10s)
0.223	43.3	Line	62.7	-19.4	QP	QP (1.00s)
0.223	33.0	Line	52.7	-19.7	AVG	AVG (0.10s)
24.106	29.4	Line	50.0	-20.6	AVG	AVG (0.10s)
0.261	30.5	Neutral	51.4	-20.9	AVG	AVG (0.10s)
0.261	40.3	Line	61.4	-21.1	QP	QP (1.00s)
0.681	34.7	Neutral	56.0	-21.3	QP	QP (1.00s)
0.261	30.0	Line	51.4	-21.4	AVG	AVG (0.10s)
0.261	39.7	Neutral	61.4	-21.7	QP	QP (1.00s)
4.197	23.8	Line	46.0	-22.2	AVG	AVG (0.10s)
4.197	33.5	Line	56.0	-22.5	QP	QP (1.00s)
3.695	21.2	Neutral	46.0	-24.8	AVG	AVG (0.10s)
3.695	29.7	Neutral	56.0	-26.3	QP	QP (1.00s)
24.106	31.4	Line	60.0	-28.6	QP	QP (1.00s)

Client:	Broadcom	Job Number:	J73989
Model:	BCM92046MD_GEN	T-Log Number:	T74142
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	EN 300 328, FCC 15.247	Class:	B

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz





Client:	Broadcom	Job Number:	J73989
Model:	BCM92046MD_GEN	T-Log Number:	T74142
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	EN 300 328, FCC 15.247	Class:	B

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

Final quasi-peak and average readings

Frequency	Level	AC	EN55022 B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.812	34.2	Line	46.0	-11.8	AVG	AVG (0.10s)
0.175	52.0	Line	64.7	-12.7	QP	QP (1.00s)
0.175	41.4	Line	54.7	-13.3	AVG	AVG (0.10s)
0.174	51.2	Neutral	64.8	-13.6	QP	QP (1.00s)
0.174	41.0	Neutral	54.8	-13.8	AVG	AVG (0.10s)
0.233	34.7	Neutral	52.3	-17.6	AVG	AVG (0.10s)
0.812	37.7	Line	56.0	-18.3	QP	QP (1.00s)
4.022	37.3	Line	56.0	-18.7	QP	QP (1.00s)
4.022	36.8	Neutral	56.0	-19.2	QP	QP (1.00s)
0.233	42.0	Neutral	62.3	-20.3	QP	QP (1.00s)
4.022	25.6	Line	46.0	-20.4	AVG	AVG (0.10s)
4.022	24.5	Neutral	46.0	-21.5	AVG	AVG (0.10s)
0.291	38.6	Line	60.5	-21.9	QP	QP (1.00s)
0.165	42.7	Neutral	65.2	-22.5	QP	QP (1.00s)
0.291	27.7	Line	50.5	-22.8	AVG	AVG (0.10s)
24.003	26.6	Line	50.0	-23.4	AVG	AVG (0.10s)
0.194	38.9	Line	63.9	-25.0	QP	QP (1.00s)
24.003	28.7	Line	60.0	-31.3	QP	QP (1.00s)
15.226	17.4	Neutral	50.0	-32.6	AVG	AVG (0.10s)
0.165	20.1	Neutral	55.2	-35.1	AVG	AVG (0.10s)
15.226	24.5	Neutral	60.0	-35.5	QP	QP (1.00s)
0.194	13.4	Line	53.9	-40.5	AVG	AVG (0.10s)

Client:	Broadcom	Job Number:	J73989
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Radiated Emissions

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: 1/16/2009 0:16
Test Engineer: Rafael Varelas
Test Location: SVOATS #2

Config. Used: 1
Config Change: Ethernet cable added (Laptop to remote Hub)
EUT Voltage: Powered from laptop via USB

General Test Configuration

The EUT and all 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.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 51 °C
Rel. Humidity: 11 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 1000 - 10,000 MHz, Maximized Emissions, Receive mode	FCC Class B	Pass	43.2dBµV/m @ 4883.4MHz (-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:	J73989
Model:	BCM92046MD_GEN	T-Log Number:	T74142
		Account Manager:	Dean Eriksen
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Run #1: Maximized readings, 1000 - 10,000 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 10000 MHz	3	3	0.0

Frequency	Level	Pol	FCC Class B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4883.390	43.2	V	54.0	-10.8	AVG	215	1.0	
4882.950	43.1	H	54.0	-10.9	AVG	185	1.0	
3255.540	38.5	V	54.0	-15.5	AVG	236	1.0	
3255.570	38.5	H	54.0	-15.5	AVG	155	1.0	
1626.210	36.8	V	54.0	-17.2	AVG	38	1.4	
1623.580	56.8	V	74.0	-17.2	PK	38	1.4	
1246.180	36.7	V	54.0	-17.3	AVG	54	1.0	
1245.330	55.7	V	74.0	-18.3	PK	54	1.0	
4883.170	54.8	V	74.0	-19.2	PK	215	1.0	
4882.280	54.5	H	74.0	-19.5	PK	185	1.0	
3253.910	49.7	V	74.0	-24.3	PK	236	1.0	
3255.650	49.7	H	74.0	-24.3	PK	155	1.0	

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

EXHIBIT 4: Detailed Photographs of Broadcom Corporation Model BCM92046MD_GEN Construction

EXHIBIT 5: Schematic Diagrams for Broadcom Corporation Model BCM92046MD_GEN