



**FCC CFR47 PART 15 SUBPART E
INDUSTRY CANADA RSS-210 ISSUE 7
CLASS II PERMISSIVE CHANGE
TEST REPORT**

**FOR
802.11ag/Draft 802.11n WLAN PCI-E Mini Card
(Dell Hepburn PP33L with BCM94322MH8L Inside)
MODEL NUMBER: BCM94322MH8L
FCC ID: QDS-BRCM1031
IC: 4324A-BRCM1031**

**REPORT NUMBER: 08U11720-5A
ISSUE DATE: May 12, 2008**

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

| Rev. | Issue Date | Revisions | Revised By |
|------|------------|--|------------|
| -- | 4-28-08 | Initial Issue | Sunny Shih |
| A | 5-12-08 | 1. Updated sec. 5.2 Description of class II permissive change. 2. Added Co-located MPE calculations | Sunny Shih |

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: 802.11ag / Draft 802n WLAN PCI-E MINI CARD
(Dell Hepburn PP33L with BCM94322MH8L Inside)

MODEL: BCM94322HM8L

SERIAL NUMBER: COY7C00134

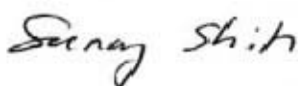
DATE TESTED: April 24-26, 2008

| APPLICABLE STANDARDS | |
|---|--------------|
| STANDARD | TEST RESULTS |
| CFR 47 Part 15 Subpart E | Pass |
| RSS-210 Issue 7 Annex 9 and RSS-GEN Issue 2 | Pass |

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All expressions of Pass/Fail in this report are opinions expressed by CCS based on interpretations of the 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:



SUNNY SHIH
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:



THANH NGUYEN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC MO&O 06-96, RSS-GEN Issue 2, and RSS-210 Issue 7.

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 a Broadcom 802.11ag /Draft WLAN PCI-E Mini Card inside Dell Hepburn, model PP33L.

The radio module is manufactured by Broadcom, model BCM94322HM8L.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The major changes filed under this application are:

- Adding portable platform, model Dell PP33L.
- Add co-location of UWB+BT module FCC ID: QDS-BRCM1035

Only the Radiated Emission and AC mains line conduction tests are performed.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The following antenna was added:

| Frequency (MHz) | Antenna Manufacture | Model | Main (dBi), Tx 1 | MIMO (dBi), Tx 3 (Used as Aux) | Antenna Test |
|-----------------|-------------------------------|---|------------------|--------------------------------|-------------------------------------|
| 5150 - 5350 | Advance-Connectek, Inc (ACON) | APP8P-700045 (Main & Aux) & APP8P-700046 (MIMO) | -0.81 | -0.11 | <input type="checkbox"/> |
| | Amphenol | QT0932-11-001-R (Tx1-2) & QT0932-11-004-R (Tx3) | -1.23 | -0.28 | <input type="checkbox"/> |
| | SmartAnt | PE-080000 | -0.9 | 2.09 | <input checked="" type="checkbox"/> |
| 5470 - 5725 | Advance-Connectek, Inc (ACON) | APP8P-700045 (Main & Aux) & APP8P-700046 (MIMO) | -1.7 | -1.83 | <input type="checkbox"/> |
| | Amphenol | QT0932-11-001-R (Tx1-2) & QT0932-11-004-R (Tx3) | -1.81 | -0.45 | <input type="checkbox"/> |
| | SmartAnt | PE-080000 | 0.44 | 1.27 | <input checked="" type="checkbox"/> |

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was BCMWL5.SYS, rev. 4.170.75.0.

The test utility software used during testing was wl_tool, rev. 4.170 RC75.0

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case data rate for each mode is determined to be as follows, based on original test report and CCS DTS Test Plan.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

| PERIPHERAL SUPPORT EQUIPMENT LIST | | | | |
|-----------------------------------|--------------|------------|--------------------------|--------|
| Description | Manufacturer | Model | Serial Number | FCC ID |
| Laptop | DELL | HEPBURN | COY7C00134 | N/A |
| AC Adapter | DELL | LA90PS0-00 | CN-0DF266-71615-67J-05BB | N/A |

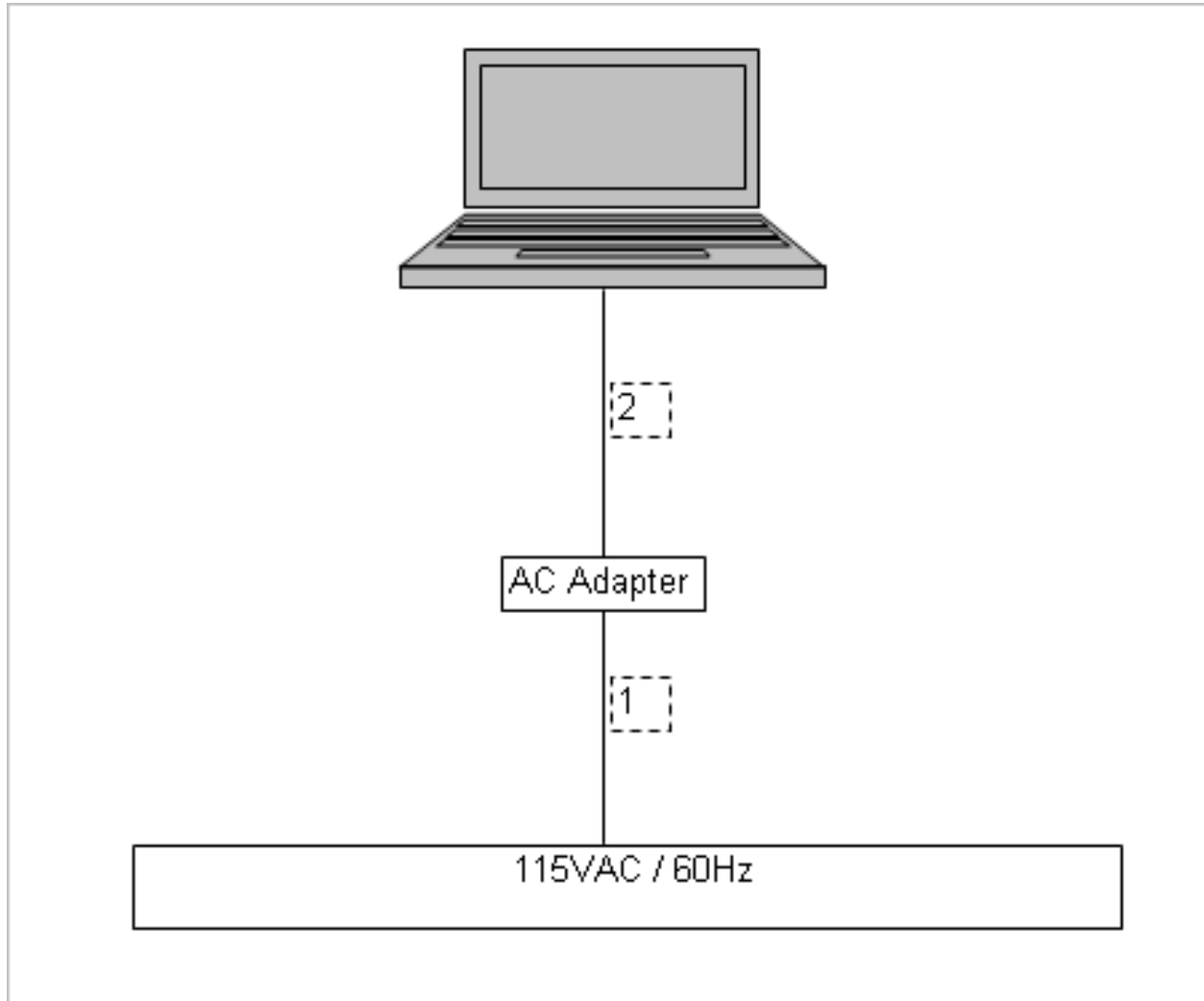
I/O CABLES

| I/O CABLE LIST | | | | | | |
|----------------|------|----------------------|----------------|------------|--------------|---------|
| Cable No. | Port | # of Identical Ports | Connector Type | Cable Type | Cable Length | Remarks |
| 1 | AC | 1 | US115V | Unshielded | 2.0m | N/A |
| 2 | DC | 1 | DC | Unshielded | 2.0m | N/A |

TEST SETUP

The EUT is installed in a host laptop computer during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



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 Date | Cal Due |
| Antenna, Horn, 18 GHz | EMCO | 3115 | C00945 | 4/15/2007 | 7/15/2008 |
| Bilog Antenna | Sundt Sciences | JB1 | C01016 | 10/13/2007 | 10/13/2008 |
| Preamplifier, 26.5 GHz | Agilent / HP | 8449B | C00749 | 8/3/2007 | 9/27/2008 |
| Preamplifier, 1300 MHz | Agilent / HP | 8447D | C01064 | 5/9/2007 | 5/9/2008 |
| EMI Receiver, 2.9 GHz | Agilent / HP | 8542E | C00957 | 2/6/2007 | 6/12/2008 |
| RF Filter Section, 2.9 GHz | Agilent / HP | 85420E | C00958 | 2/6/2007 | 6/12/2008 |
| Peak Power Meter | Agilent / HP | E4416A | C00963 | 2/14/2007 | 12/2/2008 |
| Peak / Average Power Sensor | Agilent | E9327A | C00964 | 2/14/2007 | 12/2/2008 |
| EMI Test Receiver, 30 MHz | R & S | ESHS 20 | N02396 | 10/16/2007 | 1/27/2009 |
| LISN, 10 kHz ~ 30 MHz | Solar | 8012-50-R-24-BNC | N02481 | 9/15/2006 | 9/15/2008 |
| LISN, 30 MHz | FCC | LISN-50/250-25-2 | N02625 | 9/15/2006 | 9/15/2008 |
| Spectrum Analyzer, 44 GHz | Agilent / HP | E4446A | C01012 | 5/2/2006 | 8/7/2008 |

7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|--------------------------|---------------------------------------|---|
| 30 - 88 | 100 | 40 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46 |
| Above 960 | 500 | 54 |

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 5 GHz band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

7.2. TRANSMITTER ABOVE 1 GHz IN THE 5.15 – 5.25 GHz BAND

7.2.1. 802.11a MODE

HARMONICS AND SPURIOUS EMISSIONS

| High Frequency Measurement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------------------|-----------------|--------------------------------|------------|------------------------------|------------------------|--------------|------------|----------------|---------------|------------------|-------------------|--------------|---------------|--|--|---|-----------------------|-----|-------------|---------|------------------------------|------|---------------------|--------|------------------------------|--------|---------------------------|------|------------------|-----|------------------------------|---------|--------------------------|----|----------------|------|--------------------------------|--------|-----------------------|----|------------|-----|------------------|--|--|
| Compliance Certification Services, Morgan Hill Open Field Site | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Company: BroadCom Corporation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project #: 08U11720 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Date: April 24, 2008 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test Engineer: Thanh Nguyen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Configuration: EUT inside Dell HELBURN PP33L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mode: Transmit a mode, 5.2GHz Lower band | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test Equipment: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Horn 1-18GHz | | | Pre-amplifier 1-26GHz | | | Pre-amplifier 26-40GHz | | | Horn > 18GHz | | | Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T73; S/N: 6717 @3m | | | T145 Agilent 3008A0050 | | | | | | | | | FCC 15.205 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hi Frequency Cables | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 foot cable | | | 3 foot cable | | | 12 foot cable | | | HPF | | | Reject Filter | | | Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | Thanh 187215003 | | | Ninous 208946002 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f GHz | Dist (m) | Read Pk dBuV | Read Avg dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Fldr dB | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes (V/H) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CH 36, 5180 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15.533 | 3.0 | 44.9 | 33.3 | 38.1 | 5.2 | -32.3 | 0.0 | 0.0 | 55.9 | 44.3 | 74 | 54 | -18.1 | -9.7 | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15.533 | 3.0 | 45.8 | 33.4 | 38.1 | 5.2 | -32.3 | 0.0 | 0.0 | 56.8 | 44.3 | 74 | 54 | -17.2 | -9.7 | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CH 40, 5200 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15.600 | 3.0 | 46.2 | 33.0 | 37.9 | 5.2 | -32.3 | 0.0 | 0.0 | 57.0 | 43.9 | 74 | 54 | -17.0 | -10.1 | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15.600 | 3.0 | 47.0 | 33.3 | 37.9 | 5.2 | -32.3 | 0.0 | 0.0 | 57.8 | 44.2 | 74 | 54 | -16.2 | -9.8 | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CH 48, 5240 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15.720 | 3.0 | 46.6 | 33.7 | 37.6 | 5.2 | -32.3 | 0.0 | 0.0 | 57.2 | 44.3 | 74 | 54 | -16.8 | -9.7 | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15.720 | 3.0 | 46.3 | 33.6 | 37.6 | 5.2 | -32.3 | 0.0 | 0.0 | 56.9 | 44.2 | 74 | 54 | -17.1 | -9.8 | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="0"> <tr> <td>f</td> <td>Measurement Frequency</td> <td>Amp</td> <td>Preamp Gain</td> <td>Avg Lim</td> <td>Average Field Strength Limit</td> </tr> <tr> <td>Dist</td> <td>Distance to Antenna</td> <td>D Corr</td> <td>Distance Correct to 3 meters</td> <td>Pk Lim</td> <td>Peak Field Strength Limit</td> </tr> <tr> <td>Read</td> <td>Analyzer Reading</td> <td>Avg</td> <td>Average Field Strength @ 3 m</td> <td>Avg Mar</td> <td>Margin vs. Average Limit</td> </tr> <tr> <td>AF</td> <td>Antenna Factor</td> <td>Peak</td> <td>Calculated Peak Field Strength</td> <td>Pk Mar</td> <td>Margin vs. Peak Limit</td> </tr> <tr> <td>CL</td> <td>Cable Loss</td> <td>HPF</td> <td>High Pass Filter</td> <td></td> <td></td> </tr> </table> | | | | | | | | | | | | | | | | | f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit | Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit | Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit | AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit | CL | Cable Loss | HPF | High Pass Filter | | |
| f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CL | Cable Loss | HPF | High Pass Filter | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7.3. TRANSMITTER ABOVE 1 GHz IN THE 5.25 – 5.35 GHz BAND

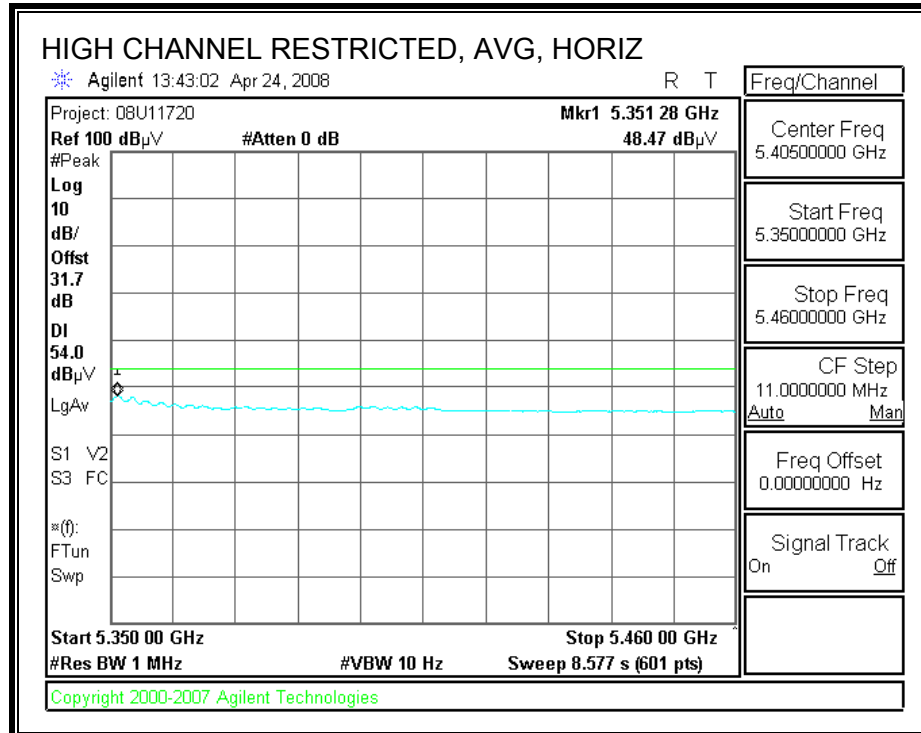
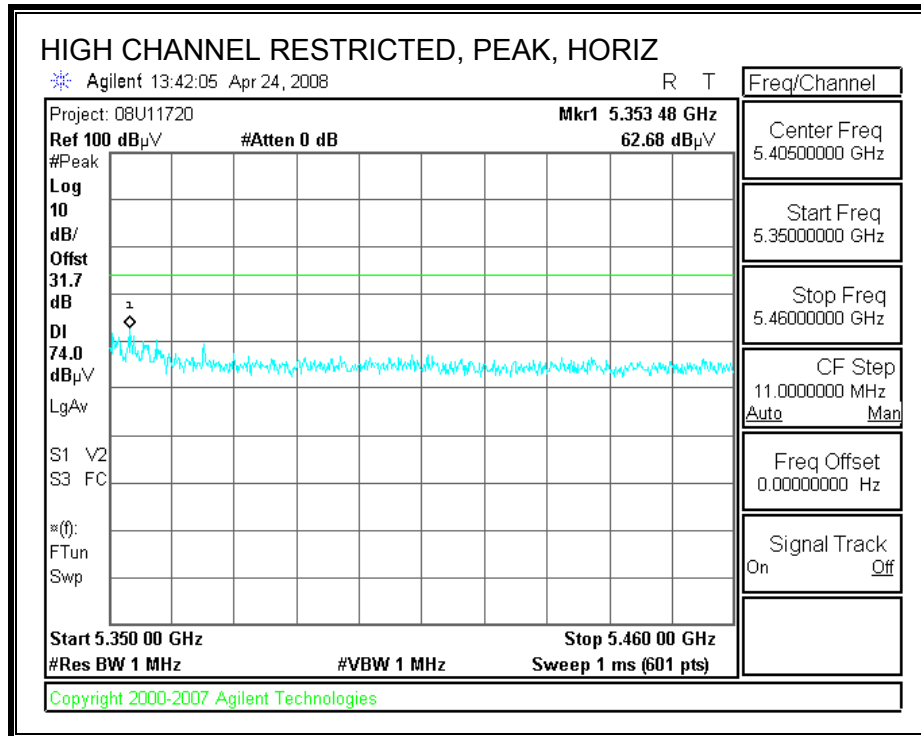
7.3.1. 802.11a MODE

HARMONICS AND SPURIOUS EMISSIONS

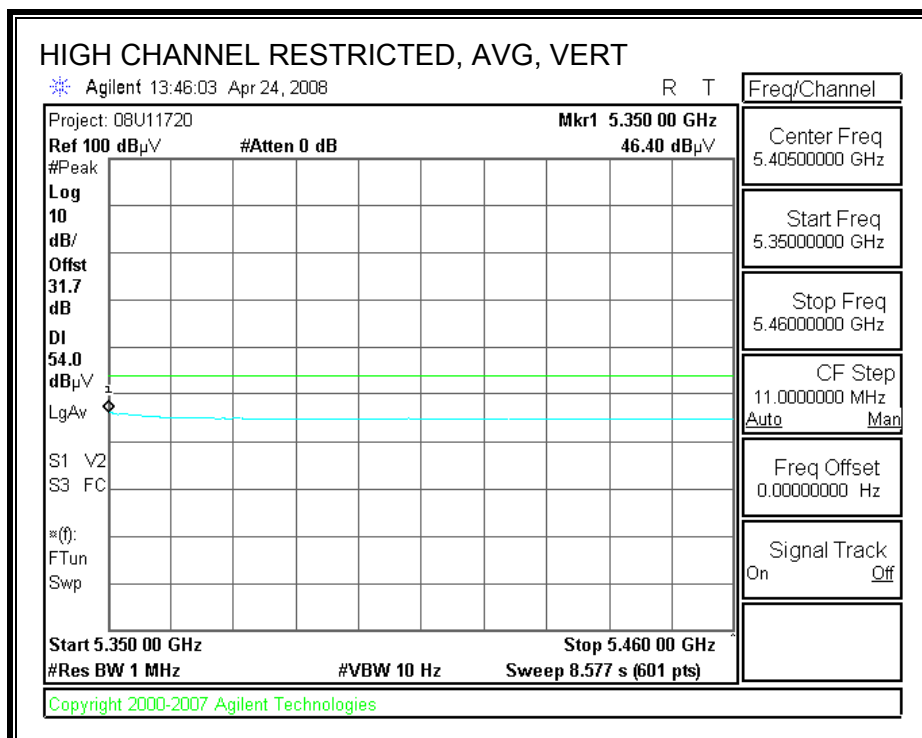
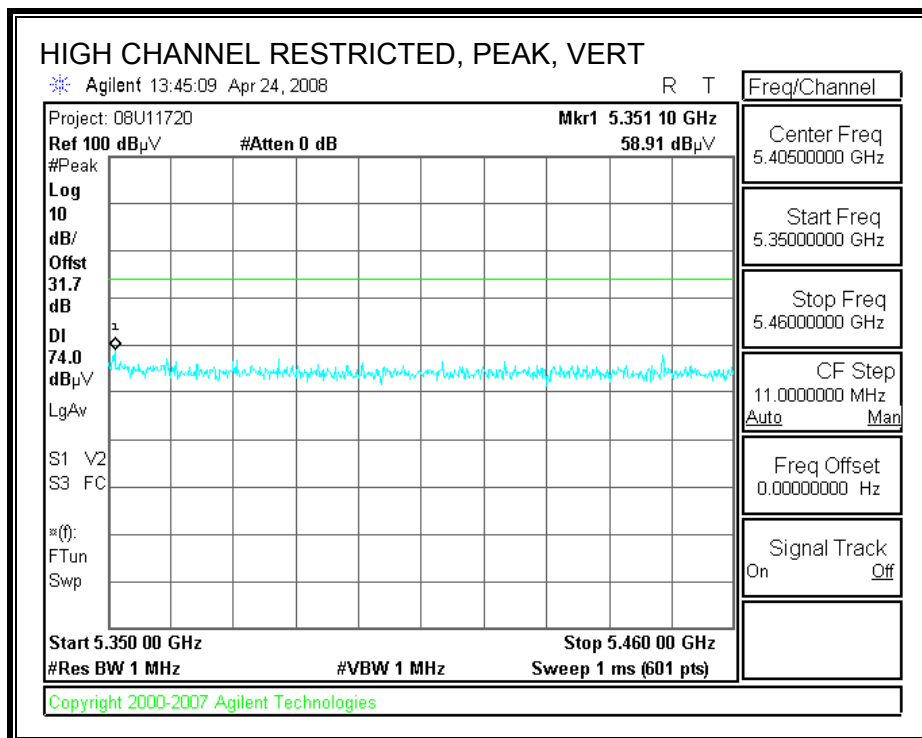
| High Frequency Measurement | | | | | | | | | | | | | | | |
|---|-------------|------------------------|------------------|------------------------|----------|--------------|--------------|---------------|----------------|--|------------------|-------------------|--------------|---------------|----------------|
| Compliance Certification Services, Morgan Hill Open Field Site | | | | | | | | | | | | | | | |
| Company: BroadCom Corporation | | | | | | | | | | | | | | | |
| Project #: 08U11720 | | | | | | | | | | | | | | | |
| Date: April 24, 2008 | | | | | | | | | | | | | | | |
| Test Engineer: Thanh Nguyen | | | | | | | | | | | | | | | |
| Configuration: EUT inside Dell HELBURN PP33L | | | | | | | | | | | | | | | |
| Mode: Transmit a mode, 5.2GHz Upper band | | | | | | | | | | | | | | | |
| Test Equipment: | | | | | | | | | | | | | | | |
| Horn 1-18GHz | | Pre-amplifier 1-26GHz | | Pre-amplifier 26-40GHz | | Horn > 18GHz | | Limit | | | | | | | |
| T73; S/N: 6717 @3m | | T145 Agilent 3008A0050 | | | | | | FCC 15.205 | | | | | | | |
| Hi Frequency Cables | | | | | | | | | | | | | | | |
| 2 foot cable | | 3 foot cable | | 12 foot cable | | HPF | | Reject Filter | | Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz | | | | | |
| | | Thanh 187215003 | | Ninous 208946002 | | | | | | | | | | | |
| f GHz | Dist (m) | Read Pk dBuV | Read Avg dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Ftr dB | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes (V/H) |
| CH 52, 5260 MHz | | | | | | | | | | | | | | | |
| 15.533 | 3.0 | 45.8 | 33.2 | 38.1 | 5.2 | -32.3 | 0.0 | 0.0 | 56.8 | 44.1 | 74 | 54 | -17.2 | -9.9 | V |
| 15.533 | 3.0 | 46.8 | 33.7 | 38.1 | 5.2 | -32.3 | 0.0 | 0.0 | 57.7 | 44.6 | 74 | 54 | -16.3 | -9.4 | H |
| CH 60, 5300 MHz | | | | | | | | | | | | | | | |
| 15.900 | 3.0 | 46.0 | 33.3 | 37.2 | 5.3 | -32.2 | 0.0 | 0.0 | 56.3 | 43.5 | 74 | 54 | -17.7 | -10.5 | V |
| 15.900 | 3.0 | 45.7 | 33.2 | 37.2 | 5.3 | -32.2 | 0.0 | 0.0 | 56.0 | 43.5 | 74 | 54 | -18.0 | -10.5 | H |
| CH 64, 5320 MHz | | | | | | | | | | | | | | | |
| 15.960 | 3.0 | 46.4 | 33.5 | 37.1 | 5.3 | -32.2 | 0.0 | 0.0 | 56.6 | 43.6 | 74 | 54 | -17.4 | -10.4 | V |
| 15.960 | 3.0 | 45.9 | 33.4 | 37.1 | 5.3 | -32.2 | 0.0 | 0.0 | 56.1 | 43.6 | 74 | 54 | -17.9 | -10.4 | H |
| f Measurement Frequency Amp Preamp Gain Avg Lim Average Field Strength Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Pk Lim Peak Field Strength Limit Read Analyzer Reading Avg Average Field Strength @ 3 m Avg Mar Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Pk Mar Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter | | | | | | | | | | | | | | | |

7.3.2. 802.11n HT40 MODE

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



7.4. TRANSMITTER ABOVE 1 GHz IN THE 5.47 – 5.725 GHz BAND

7.4.1. 802.11a MODE

HARMONICS AND SPURIOUS EMISSIONS

| High Frequency Measurement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-----------------------|------------------------|--------------------------------|------------------------|------------------------------|--------------|--------------|---------------|----------------|--|------------------|-------------------|--------------|---------------|----------------|---|-----------------------|-----|-------------|---------|------------------------------|------|---------------------|--------|------------------------------|--------|---------------------------|------|------------------|-----|------------------------------|---------|--------------------------|----|----------------|------|--------------------------------|--------|-----------------------|----|------------|-----|------------------|--|--|
| Compliance Certification Services, Morgan Hill Open Field Site | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Company: BroadCom Corporation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project #: 08U11720 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Date: April 24, 2008 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test Engineer: Thanh Nguyen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Configuration: EUT inside Dell HELBURN PP33L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mode: Transmit a mode, 5.5GHz band | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test Equipment: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Horn 1-18GHz | | Pre-amplifier 1-26GHz | | Pre-amplifier 26-40GHz | | Horn > 18GHz | | Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T73; S/N: 6717 @3m | | T145 Agilent 3008A0050 | | | | | | FCC 15.205 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hi Frequency Cables | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 foot cable | | 3 foot cable | | 12 foot cable | | HPF | | Reject Filter | | Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Thanh 187215003 | | Ninous 208946002 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f GHz | Dist (m) | Read Pk dBuV | Read Avg dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Ftr dB | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes (V/H) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CH 100, 5500 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11.000 | 3.0 | 45.2 | 31.4 | 37.2 | 3.9 | -33.8 | 0.0 | 0.0 | 52.6 | 38.7 | 74 | 54 | -21.4 | -15.3 | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11.000 | 3.0 | 44.6 | 31.7 | 37.2 | 3.9 | -33.8 | 0.0 | 0.0 | 52.0 | 39.0 | 74 | 54 | -22.0 | -15.0 | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CH 120, 5600 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11.200 | 3.0 | 43.7 | 31.4 | 37.3 | 3.9 | -33.5 | 0.0 | 0.0 | 51.4 | 39.1 | 74 | 54 | -22.6 | -14.9 | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11.200 | 3.0 | 44.6 | 31.3 | 37.3 | 3.9 | -33.5 | 0.0 | 0.0 | 52.3 | 39.0 | 74 | 54 | -21.7 | -15.0 | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CH 140, 5700 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11.400 | 3.0 | 44.1 | 31.3 | 37.4 | 3.9 | -33.2 | 0.0 | 0.0 | 52.3 | 39.5 | 74 | 54 | -21.7 | -14.5 | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11.400 | 3.0 | 43.7 | 31.3 | 37.4 | 3.9 | -33.2 | 0.0 | 0.0 | 51.8 | 39.4 | 74 | 54 | -22.2 | -14.6 | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="0"> <tr> <td>f</td><td>Measurement Frequency</td> <td>Amp</td><td>Preamp Gain</td> <td>Avg Lim</td><td>Average Field Strength Limit</td> </tr> <tr> <td>Dist</td><td>Distance to Antenna</td> <td>D Corr</td><td>Distance Correct to 3 meters</td> <td>Pk Lim</td><td>Peak Field Strength Limit</td> </tr> <tr> <td>Read</td><td>Analyzer Reading</td> <td>Avg</td><td>Average Field Strength @ 3 m</td> <td>Avg Mar</td><td>Margin vs. Average Limit</td> </tr> <tr> <td>AF</td><td>Antenna Factor</td> <td>Peak</td><td>Calculated Peak Field Strength</td> <td>Pk Mar</td><td>Margin vs. Peak Limit</td> </tr> <tr> <td>CL</td><td>Cable Loss</td> <td>HPF</td><td>High Pass Filter</td> <td></td><td></td> </tr> </table> | | | | | | | | | | | | | | | | f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit | Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit | Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit | AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit | CL | Cable Loss | HPF | High Pass Filter | | |
| f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CL | Cable Loss | HPF | High Pass Filter | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7.5. RECEIVER ABOVE 1 GHz

| High Frequency Measurement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------------------|-----------------------|--------------------------------|------------------------|------------------------------|--------------|--------------|---------------|----------------|--|------------------|-------------------|--------------|---------------|----------------|---|-----------------------|-----|-------------|---------|------------------------------|------|---------------------|--------|------------------------------|--------|---------------------------|------|------------------|-----|------------------------------|---------|--------------------------|----|----------------|------|--------------------------------|--------|-----------------------|----|------------|-----|------------------|--|--|
| Compliance Certification Services, Morgan Hill Open Field Site | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Company: BroadCom Corporation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Project #: 08U11720 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Date: April 25, 2008 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test Engineer: Thanh Nguyen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Configuration: EUT inside Dell HELBURN PP33L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mode: Receive | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test Equipment: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Horn 1-18GHz | | Pre-amplifier 1-26GHz | | Pre-amplifier 26-40GHz | | Horn > 18GHz | | Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T73; S/N: 6717 @3m | | T145 Agilent 3008A005 | | | | | | RX RSS 210 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hi Frequency Cables | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 foot cable | | 3 foot cable | | 12 foot cable | | HPF | | Reject Filter | | <u>Peak Measurements</u> RBW=VBW=1MHz <u>Average Measurements</u> RBW=1MHz ; VBW=10Hz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Thanh 187215003 | | Ninous 208946002 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| f GHz | Dist (m) | Read Pk dBuV | Read Avg. dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Ftr dB | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes (V/H) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mid CH HT20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.063 | 3.0 | 51.2 | 38.2 | 24.0 | 1.6 | -36.1 | 0.0 | 0.0 | 40.7 | 27.7 | 74 | 54 | -33.3 | -26.3 | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.960 | 3.0 | 50.9 | 38.3 | 27.3 | 1.9 | -35.4 | 0.0 | 0.0 | 44.6 | 32.0 | 74 | 54 | -29.4 | -22.0 | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.000 | 3.0 | 47.8 | 34.9 | 30.0 | 2.1 | -35.2 | 0.0 | 0.0 | 44.7 | 31.7 | 74 | 54 | -29.3 | -22.3 | H | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.828 | 3.0 | 50.6 | 38.6 | 26.8 | 1.8 | -35.5 | 0.0 | 0.0 | 43.7 | 31.7 | 74 | 54 | -30.3 | -22.3 | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.557 | 3.0 | 50.5 | 38.4 | 28.7 | 2.0 | -35.1 | 0.0 | 0.0 | 46.1 | 34.0 | 74 | 54 | -27.9 | -20.0 | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table style="width: 100%; border: none;"> <tr> <td>f</td><td>Measurement Frequency</td><td>Amp</td><td>Preamp Gain</td><td>Avg Lim</td><td>Average Field Strength Limit</td></tr> <tr> <td>Dist</td><td>Distance to Antenna</td><td>D Corr</td><td>Distance Correct to 3 meters</td><td>Pk Lim</td><td>Peak Field Strength Limit</td></tr> <tr> <td>Read</td><td>Analyzer Reading</td><td>Avg</td><td>Average Field Strength @ 3 m</td><td>Avg Mar</td><td>Margin vs. Average Limit</td></tr> <tr> <td>AF</td><td>Antenna Factor</td><td>Peak</td><td>Calculated Peak Field Strength</td><td>Pk Mar</td><td>Margin vs. Peak Limit</td></tr> <tr> <td>CL</td><td>Cable Loss</td><td>HPF</td><td>High Pass Filter</td><td></td><td></td></tr> </table> | | | | | | | | | | | | | | | | f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit | Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit | Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit | AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit | CL | Cable Loss | HPF | High Pass Filter | | |
| f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CL | Cable Loss | HPF | High Pass Filter | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

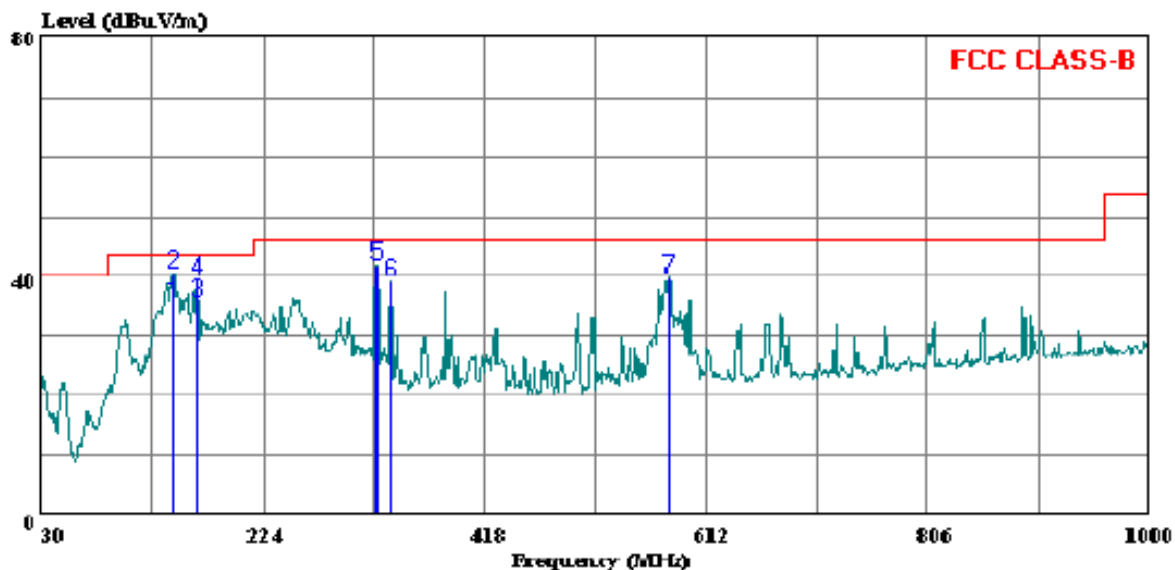
7.6. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 20 File#: 08U11720_Hepburn.EMI Date: 04-26-2008 Time: 14:59:13



Trace: 17

Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator:: Thanh Nguyen
Project #: 08U11720
Company: Broadcom
Configuration:: EUT inside Hepburn laptop
Mode : Transmit 5GHz band ,worst case
Target: FCC Class B

Page: 1

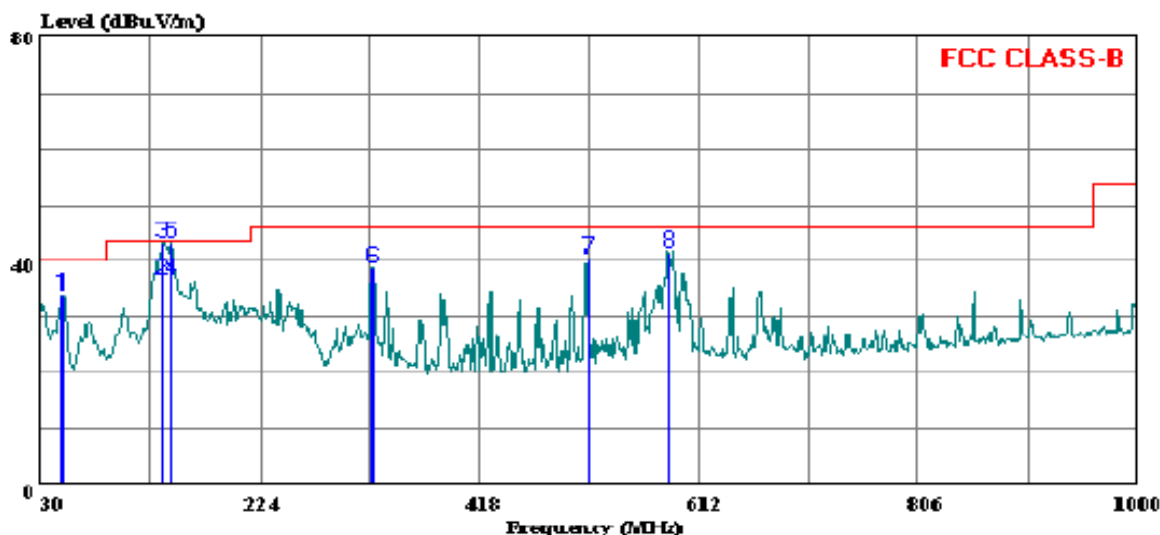
| | Freq | Read Level | Factor | Level | Limit | Over | Remark |
|---|---------|------------|--------|--------|--------|-------|--------|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 145.430 | 52.46 | -17.09 | 35.37 | 43.50 | -8.13 | QP |
| 2 | 145.430 | 57.52 | -17.02 | 40.49 | 43.50 | -3.01 | Peak |
| 3 | 165.800 | 53.65 | -17.93 | 35.72 | 43.50 | -7.78 | QP |
| 4 | 165.800 | 57.50 | -17.93 | 39.57 | 43.50 | -3.93 | Peak |
| 5 | 323.910 | 57.17 | -15.16 | 42.01 | 46.00 | -3.99 | Peak |
| 6 | 336.520 | 53.83 | -14.86 | 38.97 | 46.00 | -7.03 | Peak |
| 7 | 578.050 | 50.00 | -10.12 | 39.88 | 46.00 | -6.12 | Peak |

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 16 File#: 08U11720_Hepburn.EMI Date: 04-26-2008 Time: 14:47:48



Trace: 13

Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator:: Thanh Nguyen
Project #: 08U11720
Company: Broadcom
Configuration:: EUT inside Hepburn laptop
Mode : Transmit 5GHz band ,worst case
Target: FCC Class B

Page: 1

| | Freq | Read | | Limit | Over | |
|---|---------|-------|--------|--------|--------|--------------|
| | MHz | Level | Factor | Level | Line | Limit Remark |
| | | dBuV | dB | dBuV/m | dBuV/m | dB |
| 1 | 49.400 | 55.83 | -21.75 | 34.08 | 40.00 | -5.92 Peak |
| 2 | 137.670 | 53.50 | -16.76 | 36.74 | 43.50 | -6.76 QP |
| 3 | 137.670 | 60.17 | -16.73 | 43.43 | 43.50 | -0.07 Peak |
| 4 | 144.460 | 53.85 | -17.02 | 36.83 | 43.50 | -6.67 QP |
| 5 | 144.460 | 60.17 | -17.02 | 43.14 | 43.50 | -0.36 Peak |
| 6 | 323.910 | 54.00 | -15.16 | 38.84 | 46.00 | -7.16 Peak |
| 7 | 513.060 | 51.50 | -11.11 | 40.39 | 46.00 | -5.61 Peak |
| 8 | 584.840 | 51.75 | -10.08 | 41.67 | 46.00 | -4.33 Peak |

8. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm ²) | Averaging time (minutes) |
|---|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (A) Limits for Occupational/Controlled Exposures | | | | |
| 0.3–3.0 | 614 | 1.63 | *(100) | 6 |
| 3.0–30 | 1842/f | 4.89/f | *(900/f ²) | 6 |
| 30–300 | 61.4 | 0.163 | 1.0 | 6 |
| 300–1500 | | | f/300 | 6 |
| 1500–100,000 | | | 5 | 6 |
| (B) Limits for General Population/Uncontrolled Exposure | | | | |
| 0.3–1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34–30 | 824/f | 2.19/f | *(180/f ²) | 30 |

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm ²) | Averaging time (minutes) |
|-----------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| 30–300 | 27.5 | 0.073 | 0.2 | 30 |
| 300–1500 | | | f/1500 | 30 |
| 1500–100,000 | | | 1.0 | 30 |

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

Table 5
Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)

| 1 Frequency (MHz) | 2 Electric Field Strength; rms (V/m) | 3 Magnetic Field Strength; rms (A/m) | 4 Power Density (W/m ²) | 5 Averaging Time (min) |
|-------------------------|---|---|--|-----------------------------------|
| 0.003–1 | 280 | 2.19 | | 6 |
| 1–10 | 280/ <i>f</i> | 2.19/ <i>f</i> | | 6 |
| 10–30 | 28 | 2.19/ <i>f</i> | | 6 |
| 30–300 | 28 | 0.073 | 2* | 6 |
| 300–1 500 | 1.585 <i>f</i> ^{0.5} | 0.0042 <i>f</i> ^{0.5} | <i>f</i> /150 | 6 |
| 1 500–15 000 | 61.4 | 0.163 | 10 | 6 |
| 15 000–150 000 | 61.4 | 0.163 | 10 | 616 000 / <i>f</i> ^{1.2} |
| 150 000–300 000 | 0.158 <i>f</i> ^{0.5} | 4.21 × 10 ⁻⁴ <i>f</i> ^{0.5} | 6.67 × 10 ⁻⁵ <i>f</i> | 616 000 / <i>f</i> ^{1.2} |

* Power density limit is applicable at frequencies greater than 100 MHz.

- Notes:**
1. Frequency, *f*, is in MHz.
 2. A power density of 10 W/m² is equivalent to 1 mW/cm².
 3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

CALCULATIONS

Given

$$E = \sqrt{(30 * P * G) / d}$$

and

$$S = E^2 / 3770$$

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

Combining equations, rearranging the terms to express the distance as a function of the remaining variables, changing to units of Power to mW and Distance to cm, and substituting the logarithmic form of power and gain yields:

$$d = 0.282 * 10^{((P + G) / 20)} / \sqrt{S}$$

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm²

Rearranging terms to calculate the power density at a specific distance yields

$$S = 0.0795 * 10^{((P + G) / 10)} / (d^2)$$

The power density in units of mW/cm² is converted to units of W/m² by multiplying by a factor of 10.

CO-LOCATED MPE CALCULATIONS for Mobile configuration

For multiple colocated transmitters operating simultaneously the total power density can be calculated by summing the Power * Gain product (in linear units) of each transmitter.

yields

$$d = 0.282 * \sqrt{((P1 * G1) + (P2 * G2) + \dots + (Pn * Gn)) / S}$$

where

d = distance in cm

Px = Power of transmitter x in mW

Gx = Numeric gain of antenna x

S = Power Density in mW/cm²

In the table below, Power and Gain are entered in units of dBm and dBi respectively, then converted to their linear forms for the purpose of the calculations.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm²

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m²

RESULTS

Please see next page

RESULTS

(MPE distance equals 20 cm)

| Mode | Band | Output Power (dBm) | Antenna Gain (dBi) | MPE Distance (cm) | FCC Power Density (mW/cm ²) | IC Power Density (W/m ²) |
|-----------|---------|--------------------|--------------------|-------------------|---|--------------------------------------|
| Bluetooth | 2.4 GHz | 0.70 | 3.15 | | | |
| WLAN | 5.2 GHz | 15.30 | 2.09 | | | |
| Combined | | | | 20.0 | 0.01 | 0.11 |

| Mode | Band | Output Power (dBm) | Antenna Gain (dBi) | MPE Distance (cm) | FCC Power Density (mW/cm ²) | IC Power Density (W/m ²) |
|-----------|---------|--------------------|--------------------|-------------------|---|--------------------------------------|
| Bluetooth | 2.4 GHz | 0.70 | 3.15 | | | |
| WLAN | 5.3 GHz | 18.70 | 2.09 | | | |
| Combined | | | | 20.0 | 0.02 | 0.24 |

| Mode | Band | Output Power (dBm) | Antenna Gain (dBi) | MPE Distance (cm) | FCC Power Density (mW/cm ²) | IC Power Density (W/m ²) |
|-----------|---------|--------------------|--------------------|-------------------|---|--------------------------------------|
| Bluetooth | 2.4 GHz | 0.70 | 3.15 | | | |
| WLAN | 5.6 GHz | 20.70 | 1.27 | | | |
| Combined | | | | 20.0 | 0.03 | 0.32 |

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

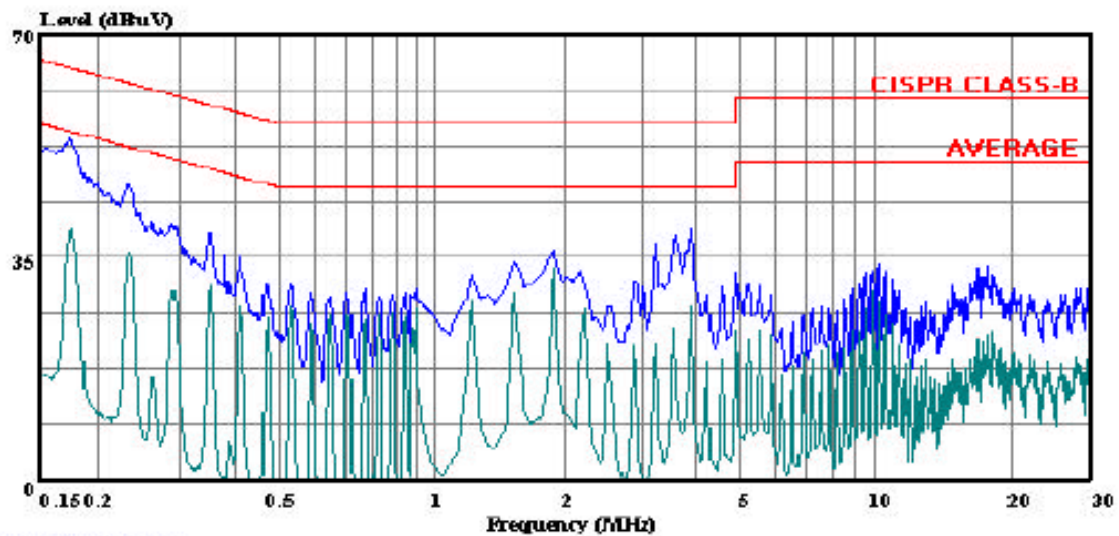
| CONDUCTED EMISSIONS DATA (115VAC 60Hz) | | | | | | | | | |
|--|-----------|-----------|-----------|---------------|-------|-------|---------|---------|--------|
| Freq. (MHz) | Reading | | | Class (dB) | Limit | | Margin | | Remark |
| | PK (dBuV) | QP (dBuV) | AV (dBuV) | | QP | AV | QP (dB) | AV (dB) | |
| 0.17 | 53.62 | -- | 39.31 | 0.00 | 64.77 | 54.77 | -11.15 | -15.46 | L1 |
| 1.99 | 35.99 | -- | 33.47 | 0.00 | 56.00 | 46.00 | -20.01 | -12.53 | L1 |
| 4.01 | 39.27 | -- | 27.24 | 0.00 | 56.00 | 46.00 | -16.73 | -18.76 | L1 |
| 0.17 | 53.04 | -- | 40.13 | 0.00 | 64.82 | 54.82 | -11.78 | -14.69 | L2 |
| 2.33 | 36.19 | -- | 24.66 | 0.00 | 56.00 | 46.00 | -19.81 | -21.34 | L2 |
| 4.01 | 42.46 | -- | 23.22 | 0.00 | 56.00 | 46.00 | -13.54 | -22.78 | L2 |
| 6 Worst Data | | | | | | | | | |

LINE 1 RESULTS



Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 7 File#: LC.EMI Date: 04-25-2008 Time: 13:21:18



(Line Conduction)

Trace: 5

Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Thanh Nguyen
Project #: : 0811720
Company: : BroadCom Cotporation
Configuration:: BUT inside Dell Hepburn laptop
Mode: : TX worst case
Target: : FCC Class B
Voltage: : 115VAC / 60Hz
: Line 1: Peak (Blue); Average (Green)

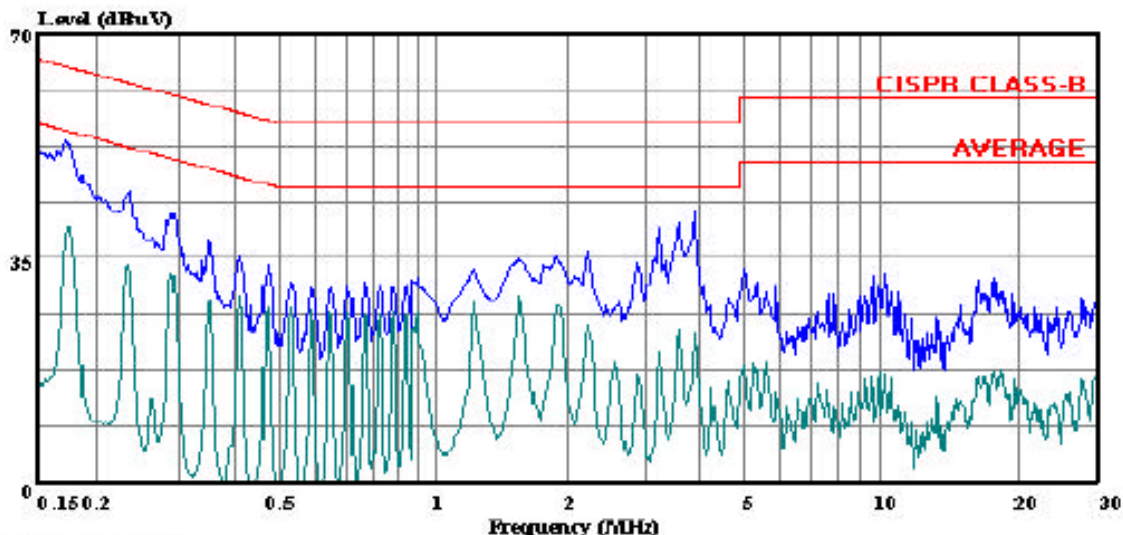
LINE 2 RESULTS



Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 21 File#: LC.EMI

Date: 04-25-2008 Time: 13:55:55



(Line Conduction)

Trace: 19

Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Thanh Nguyen
Project #: 0811720
Company: BroadCom Cotporation
Configuration:: EUT inside Dell Hepburn laptop
Mode: TX worst case
Target: FCC Class B
Voltage: 115VAC / 60Hz
Line 2: Peak (Blue); Average (Green)