



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
Installed inside HP Olifant Tablet, Model: HSTNN-W47C
MODEL NUMBER: BCM94322MC
FCC ID: QDS-BRCM1036
IC: 4324A-BRCM1036

REPORT NUMBER: 08U11713-2
ISSUE DATE: APRIL 15, 2008

Prepared for
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NVLAP[®]
NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	4-15-08	Initial Issue	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

MODEL: BCM94322MC

SERIAL NUMBER: 395514-001

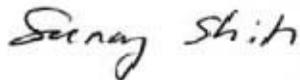
DATE TESTED: April 02 - 11, 2008

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:



VIEN TRAN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, 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 an 802.11ag/Draft 802.11n Wireless LAN Transceiver module and manufactured by Broadcom. Model number is BCM94322MC.

5.2. DESCRIPTION OF CLASS II CHANGE

The major changes filed under this application are:

Added portable platform, HSTNN-W47C

The EUT was tested and certified under CCS project # 07U11529-2, issued on January 26, 2008. Therefore, only the Radiated Emission and AC mains line conduction tests are performed.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The following antennas were added:

<u>Antenna Supplier</u>	<u>Type</u>	<u>Model number</u>
Wistron NeWeb Corp	PIFA	Main Antenna: 81.EGG15.003
(WNC)		Aux Antenna: 81.EGG15.004

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was BCMWL5, rev. 4.170.67.0.

The test utility software used during testing was wl_tool, rev. 4.170 RC67.0.

5.5. WORST-CASE CONFIGURATION AND MODE

Mobile (Normal Notebook) and Portable (Tablet PC) configurations have been investigated. The worst case is to evaluate at Mobile configuration.

The worst-case data rate for each mode is determined to be as follows, based on preliminary tests of the chipset utilized in this radio.

All final tests in the 802.11b mode were made at 1 Mb/s.

All final tests in the 802.11g mode were made at 6 Mb/s.

All final tests in the 802.11n HT20 mode were made at MCS0.

All final tests in the 802.11n HT40 mode were made at MCS32.

The worst-case channel is determined as the channel with the highest output power.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	HP	Compaq 2730p	2CE8080PH9	N/A
AC Adapter	HP	PPP009H	F3-0801000598X1	N/A

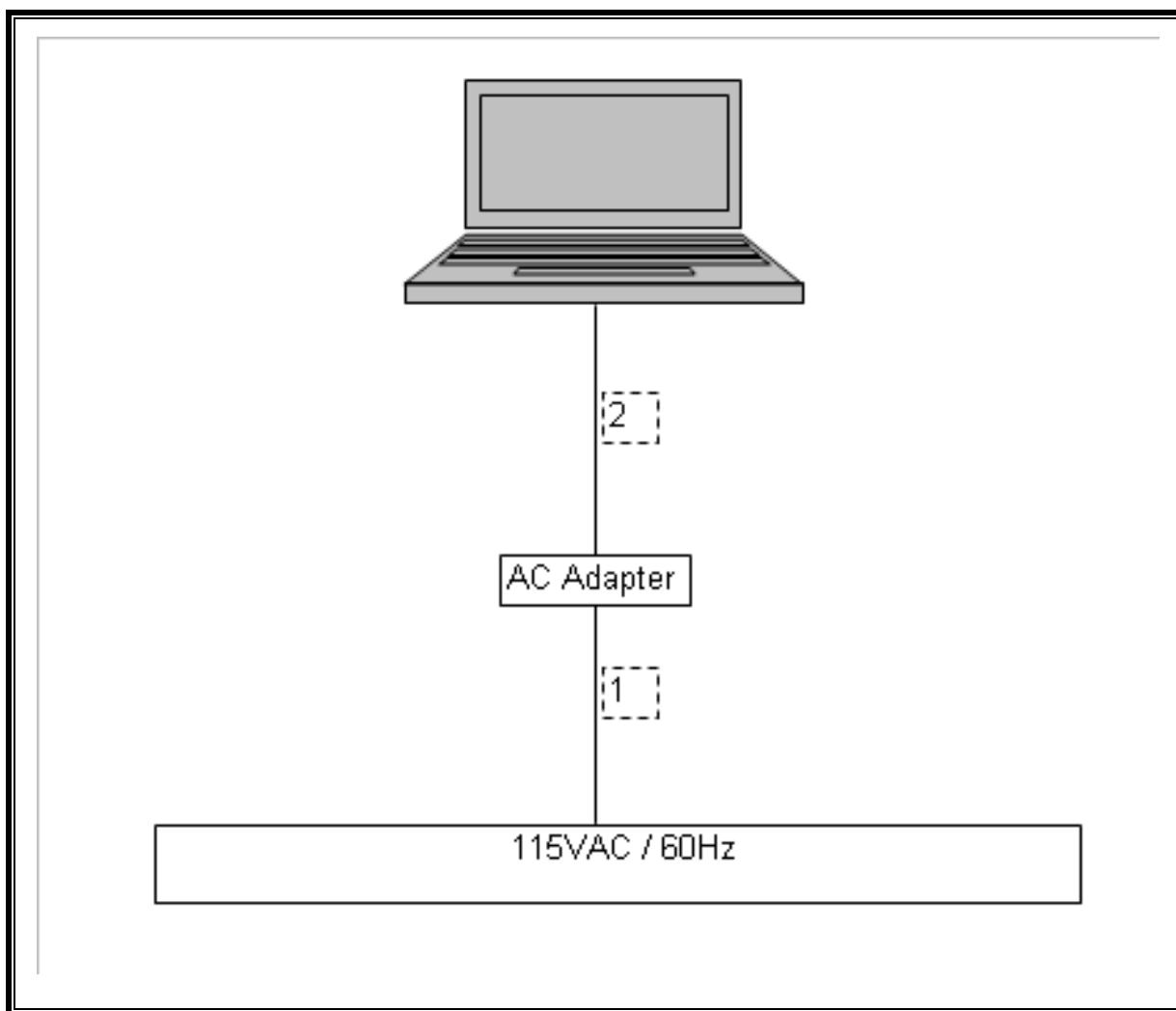
I/O CABLES

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	4/15/2008
Bilog Antenna	Sunol 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
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, Fremont 5m Chamber																																												
Company:	Broadcom																																											
Project #:	08U11713																																											
Date:	4/10/2008																																											
Test Engineer:	Vien Tran																																											
Configuration:	EUT insides HP platform (Olifant)																																											
Mode:	Tx 11a Legacy_5150-5250MHz_Low Band																																											
<u>Test Equipment:</u>																																												
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit																																
T59; S/N: 3245 @3m	T34 HP 8449B													FCC 15.205																														
Hi Frequency Cables																																												
2 foot cable			3 foot cable			12 foot cable			HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz																															
						B-5m Chamber			HPF_7.6GHz				Average Measurements RBW=1MHz, VBW=10Hz																															
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)																													
LOW CHANNEL, 5180 MHz																																												
15.540	3.0	42.4	31.7	38.5	12.9	-32.2	0.0	0.7	62.3	51.6	74	54	-11.7	-2.4	H																													
15.540	3.0	41.5	30.9	38.5	12.9	-32.2	0.0	0.7	61.4	50.8	74	54	-12.6	-3.2	V																													
MID CHANNEL, 5200 MHz																																												
15.600	3.0	42.7	32.0	38.4	12.9	-32.2	0.0	0.7	62.6	51.9	74	54	-11.4	-2.1	H																													
15.600	3.0	41.8	31.2	38.4	12.9	-32.2	0.0	0.7	61.7	51.1	74	54	-12.3	-2.9	V																													
HIGH CHANNEL, 5240 MHz																																												
15.720	3.0	43.3	32.6	38.3	13.0	-32.2	0.0	0.7	63.2	52.5	74	54	-10.8	-1.5	H																													
15.720	3.0	42.4	31.7	38.3	13.0	-32.2	0.0	0.7	62.3	51.5	74	54	-11.7	-2.5	V																													
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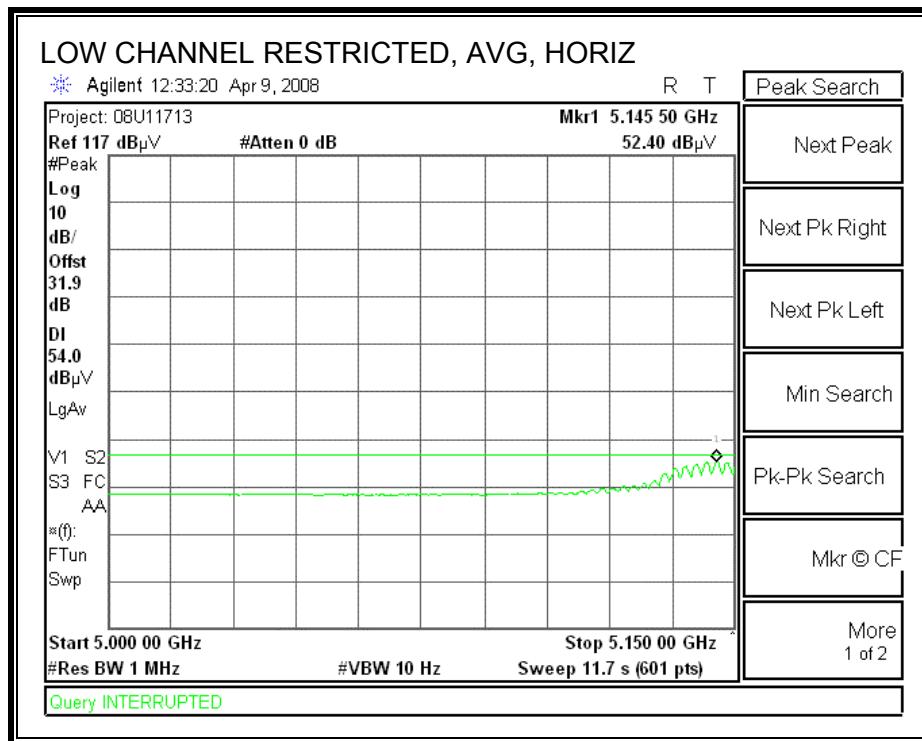
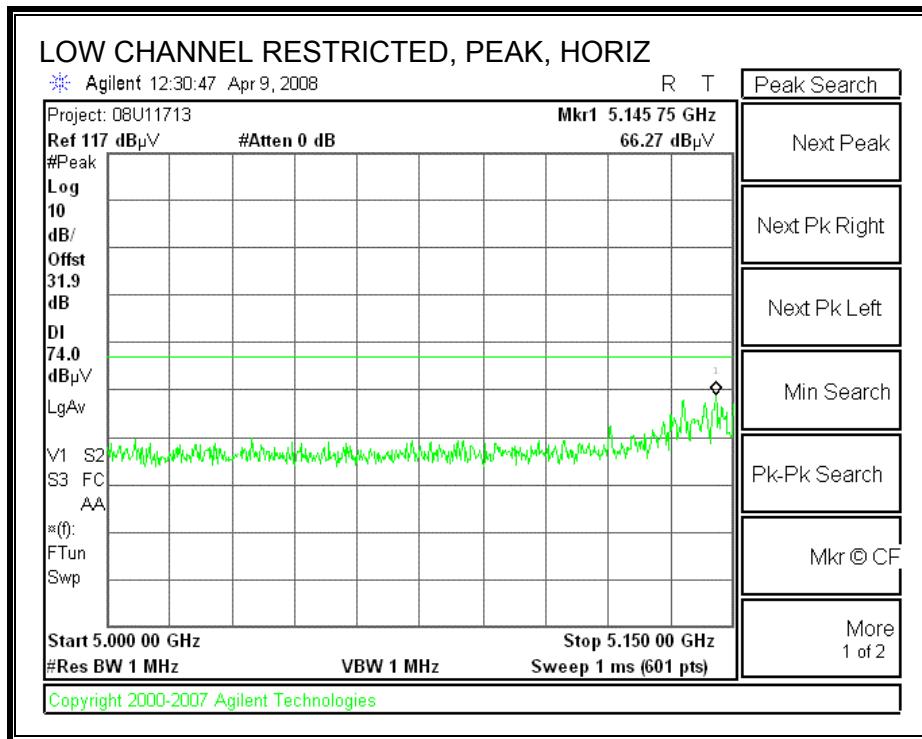
7.2.2. 802.11n HT20 MODE

HARMONICS AND SPURIOUS EMISSIONS

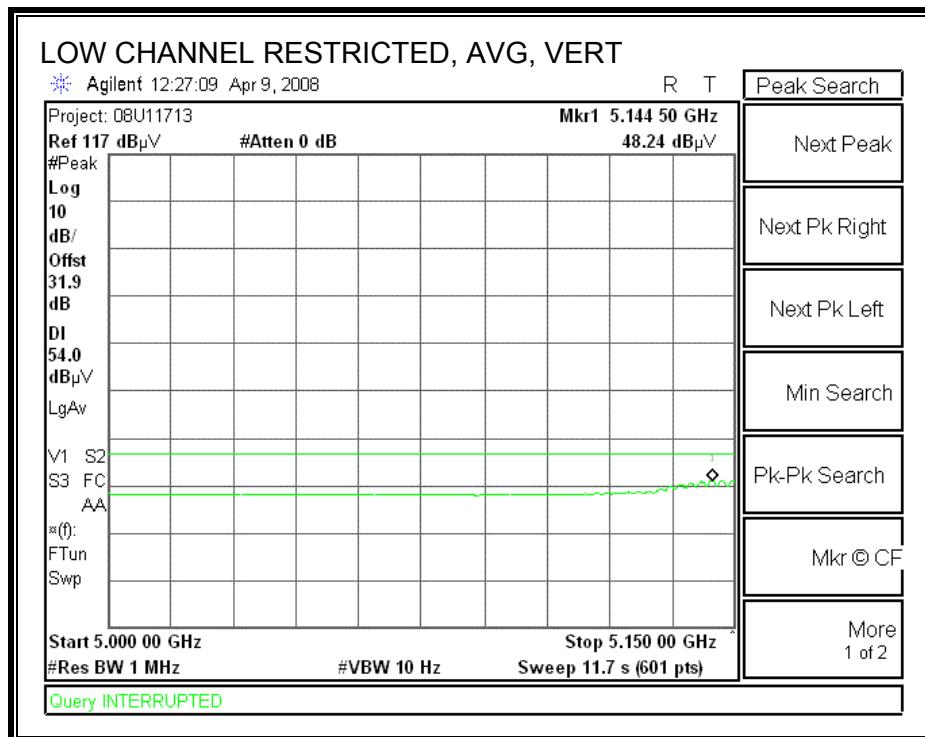
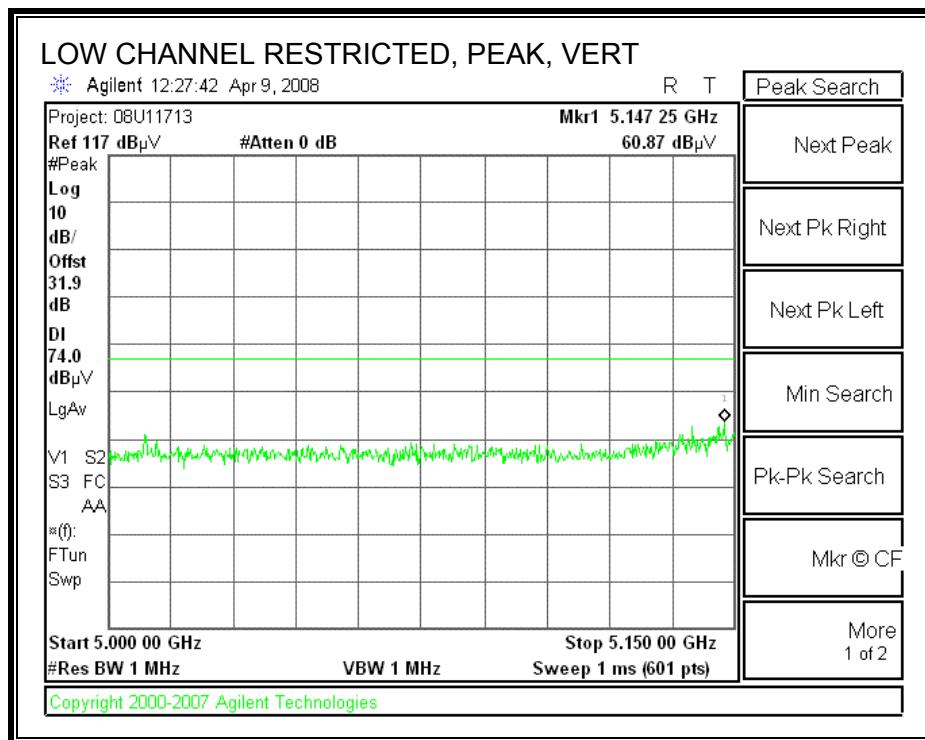
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Configuration:	EUT insides HP platform (Olifant)																																											
Mode:	Tx 11n HT20_5150-5250MHz_Low Band																																											
Test Equipment:																																												
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Hi Frequency Cables																																												
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CL	Cable Loss	HPF	High Pass Filter																																									

7.2.3. 802.11n HT40 MODE

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



RESTRICTED BANDEdge (LOW CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Company: Broadcom
Project #: 08U11713
Date: 4/11/2008
Test Engineer: Vien Tran
Configuration: EUT insides HP platform (Olifant)
Mode: Tx 1ln HT40_5150-5250MHz_Low Band

Test Equipment:

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit											
T136; M/N: 3117 @3m	T144 Miteq 3008A00931			FCC 15.205											
Hi Frequency Cables															
2 foot cable															
		3 foot cable	12 foot cable												
			A-5m Chamber												
HPF															
Reject Filter															
Peak Measurements RBW=VBW=1MHz															
Average Measurements RBW=1MHz, VBW=10Hz															
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5190 MHz															
15.570	3.0	43.0	32.3	38.9	12.7	-34.8	0.0	0.7	60.6	49.9	74	54	-13.4	-4.1	H
15.570	3.0	42.1	31.5	38.9	12.7	-34.8	0.0	0.7	59.7	49.1	74	54	-14.3	-4.9	V
HIGH CHANNEL, 5230 MHz															
15.690	3.0	43.9	33.2	39.0	12.7	-34.7	0.0	0.7	61.7	51.0	74	54	-12.3	-3.0	H
15.690	3.0	43.0	32.3	39.0	12.7	-34.7	0.0	0.7	60.8	50.0	74	54	-13.2	-4.0	V
f Measurement Frequency Dist Distance to Antenna Read Analyzer Reading AF Antenna Factor CL Cable Loss					Amp Preamp Gain D Corr Distance Correct to 3 meters Avg Average Field Strength @ 3 m Peak Calculated Peak Field Strength HPF High Pass Filter	Avg Lim Average Field Strength Limit Pk Lim Peak Field Strength Limit Avg Mar Margin vs. Average Limit Pk Mar Margin vs. Peak Limit									

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, Fremont 5m Chamber																										
Company: Broadcom Project #: 08U11713 Date: 4/10/2008 Test Engineer: Vien Tran Configuration: FUT insides HP platform (Olifant) Mode: Tx 11a Legacy_5250-5350MHz_High Band																										
<u>Test Equipment:</u>																										
Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz			Limit																				
T59; S/N: 3245 @3m	T34 HP 8449B																									
<u>Hi Frequency Cables</u>																										
2 foot cable	3 foot cable	12 foot cable	HPF			Reject Filter			Peak Measurements																	
B-5m Chamber																										
HPF 7.6GHz																										
Peak Measurements RBW=VBW=1MHz																										
Average Measurements RBW=1MHz, VBW=10Hz																										
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)											
<u>LOW CHANNEL, 5260 MHz</u>																										
15.780	3.0	40.7	31.2	38.3	13.0	-32.2	0.0	0.7	60.6	51.1	74	54	-13.4	-2.9	H											
15.780	3.0	39.8	30.3	38.3	13.0	-32.2	0.0	0.7	59.7	50.2	74	54	-14.3	-3.8	V											
<u>MID CHANNEL, 5300 MHz</u>																										
10.600	3.0	39.8	28.5	37.2	10.9	-32.6	0.0	0.8	56.1	44.8	74	54	-17.9	-9.2	H											
15.900	3.0	41.5	31.6	38.2	13.0	-32.1	0.0	0.7	61.4	51.5	74	54	-12.6	-2.5	H											
10.600	3.0	38.3	27.2	37.2	10.9	-32.6	0.0	0.8	54.6	43.5	74	54	-19.4	-10.5	V											
15.900	3.0	40.8	30.6	38.2	13.0	-32.1	0.0	0.7	60.7	50.5	74	54	-13.3	-3.5	V											
<u>HIGH CHANNEL, 5320 MHz</u>																										
10.640	3.0	38.7	27.4	37.3	11.0	-32.6	0.0	0.8	55.1	43.8	74	54	-18.9	-10.2	H											
15.960	3.0	40.4	30.5	38.2	13.1	-32.1	0.0	0.7	60.2	50.3	74	54	-13.8	-3.7	H											
10.640	3.0	37.2	26.1	37.3	11.0	-32.6	0.0	0.8	53.6	42.5	74	54	-20.4	-11.5	V											
15.960	3.0	39.7	29.5	38.2	13.1	-32.1	0.0	0.7	59.5	49.3	74	54	-14.5	-4.7	V											
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																				

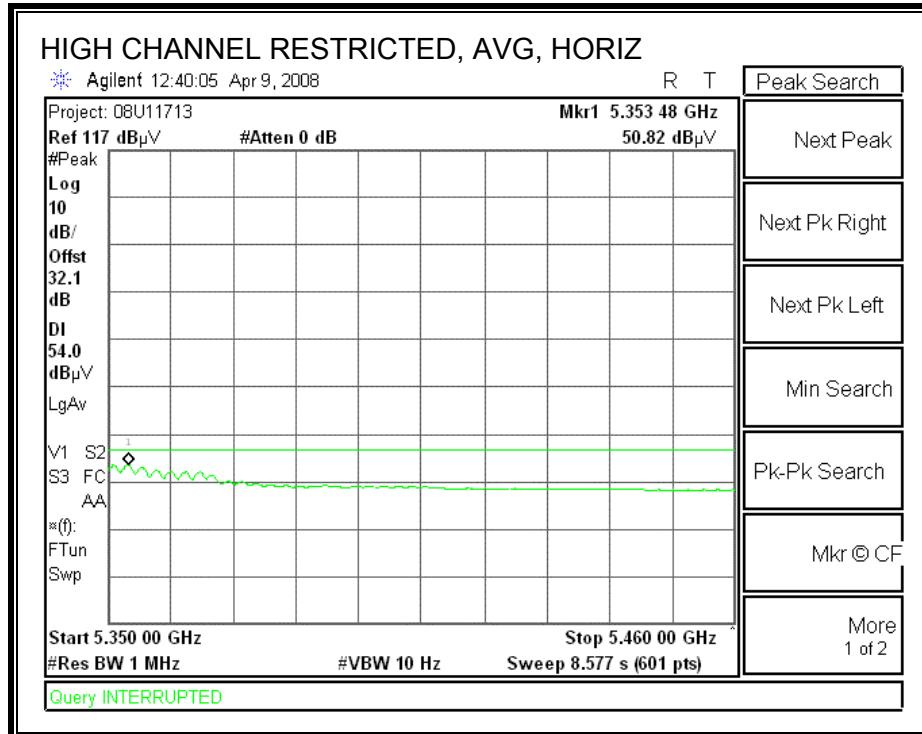
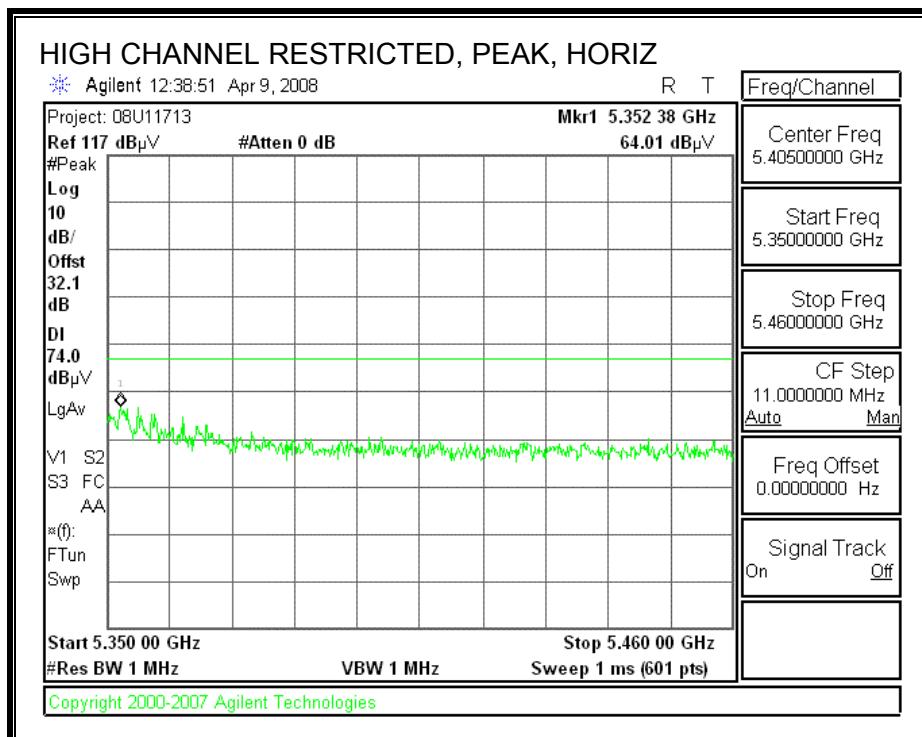
7.3.2. 802.11n HT20 MODE

HARMONICS AND SPURIOUS EMISSIONS

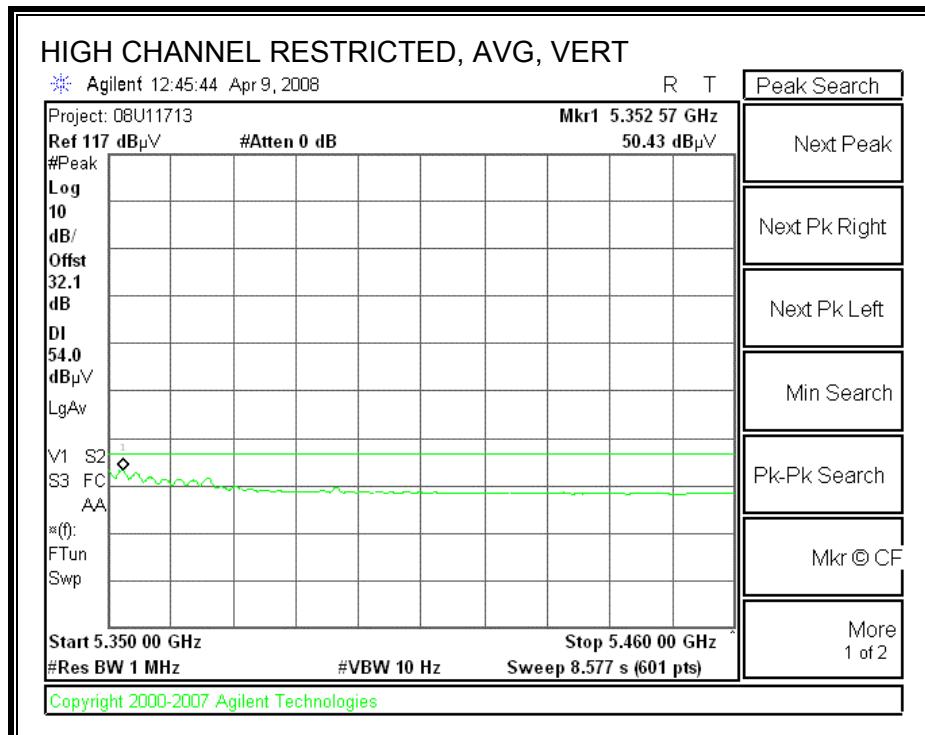
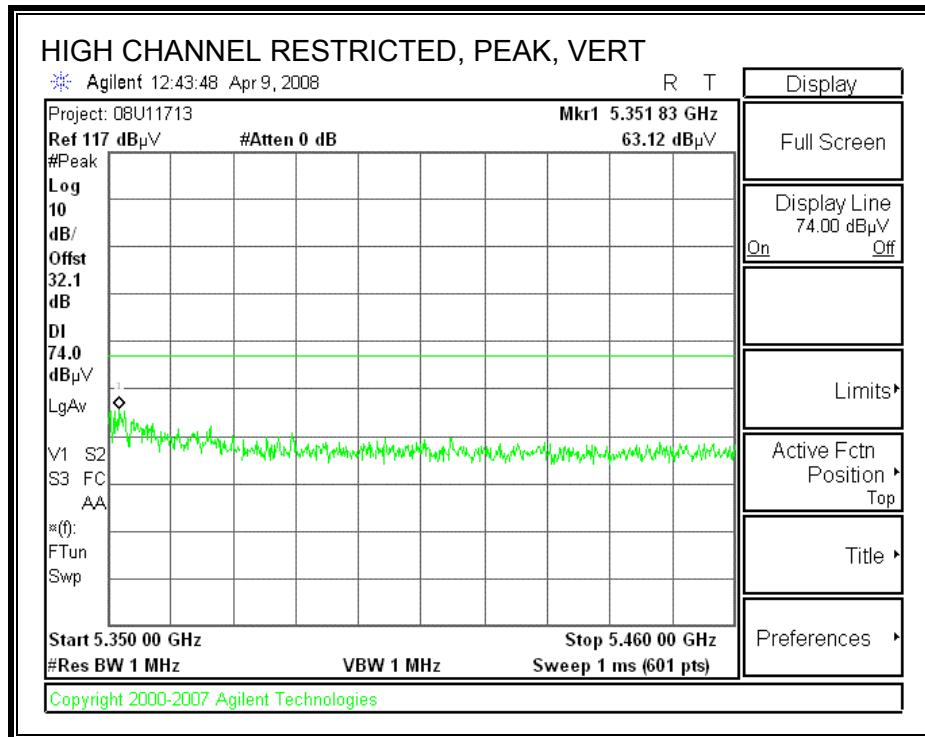
High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber																																												
Company:	Broadcom																																											
Project #:	08U11713																																											
Date:	4/10/2008																																											
Test Engineer:	Vien Tran																																											
Configuration:	EUT insides HP platform (Olifant)																																											
Mode:	Tx 11n HT20_5250-5350MHz_High Band																																											
Test Equipment:																																												
Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz				Limit																																					
T59; S/N: 3245 @3m	T34 HP 8449B								FCC 15.205																																			
Hi Frequency Cables																																												
2 foot cable	3 foot cable	12 foot cable	HPF				Reject Filter		Peak Measurements RBW=VBW=1MHz																																			
		B-5m Chamber	HPF_7.6GHz						Average Measurements RBW=1MHz, VBW=10Hz																																			
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)																													
LOW CHANNEL, 5260 MHz																																												
15.780	3.0	41.5	32.0	38.3	13.0	-32.2	0.0	0.7	61.3	51.8	74	54	-12.7	-2.2	H																													
15.780	3.0	40.6	31.1	38.3	13.0	-32.2	0.0	0.7	60.4	50.9	74	54	-13.6	-3.1	V																													
MID CHANNEL, 5300 MHz																																												
10.600	3.0	40.6	29.3	37.2	10.9	-32.6	0.0	0.8	56.9	45.6	74	54	-17.1	-8.4	H																													
15.900	3.0	42.3	32.4	38.2	13.0	-32.1	0.0	0.7	62.1	52.2	74	54	-11.9	-1.8	H																													
10.600	3.0	39.1	28.0	37.2	10.9	-32.6	0.0	0.8	55.4	44.3	74	54	-18.6	-9.7	V																													
15.900	3.0	41.6	31.4	38.2	13.0	-32.1	0.0	0.7	61.4	51.2	74	54	-12.6	-2.8	V																													
HIGH CHANNEL, 5320 MHz																																												
10.640	3.0	39.4	28.1	37.3	11.0	-32.6	0.0	0.8	55.8	44.5	74	54	-18.2	-9.5	H																													
15.960	3.0	41.1	31.2	38.2	13.1	-32.1	0.0	0.7	61.0	51.1	74	54	-13.0	-2.9	H																													
10.640	3.0	37.9	26.8	37.3	11.0	-32.6	0.0	0.8	54.3	43.2	74	54	-19.7	-10.8	V																													
15.960	3.0	40.4	30.2	38.2	13.1	-32.1	0.0	0.7	60.3	50.1	74	54	-13.7	-3.9	V																													
<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																																									

7.3.3. 802.11n HT40 MODE

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEdge (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Company: Broadcom
Project #: 08U11713
Date: 4/10/2008
Test Engineer: Vien Tran
Configuration: EUT insides HP platform (Olifant)
Mode: Tx 1In HT40_5250-5350MHz_High Band

Test Equipment:

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit											
T59; S/N: 3245 @3m	T34 HP 8449B			FCC 15.205											
<hr/>															
Hi Frequency Cables															
2 foot cable	3 foot cable	12 foot cable	HPF	Peak Measurements RBW=VBW=1MHz											
		B-5m Chamber	HPF_7.6GHz	Average Measurements RBW=1MHz ; VBW=10Hz											
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5270 MHz															
15.810	3.0	42.3	31.6	38.3	13.0	-32.2	0.0	0.7	62.2	51.5	74	54	-11.8	-2.5	H
15.810	3.0	41.4	30.8	38.3	13.0	-32.2	0.0	0.7	61.3	50.7	74	54	-12.7	-3.3	V
HIGH CHANNEL, 5310 MHz															
10.620	3.0	40.1	30.2	37.3	10.9	-32.6	0.0	0.8	56.5	46.6	74	54	-17.5	-7.4	H
15.930	3.0	41.3	31.0	38.2	13.1	-32.1	0.0	0.7	61.1	50.9	74	54	-12.9	-3.1	H
10.620	3.0	39.2	29.7	37.3	10.9	-32.6	0.0	0.8	55.6	46.1	74	54	-18.4	-7.9	V
15.930	3.0	41.5	30.4	38.2	13.1	-32.1	0.0	0.7	61.4	50.3	74	54	-12.6	-3.7	V
<hr/>															
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												

7.4. 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, Fremont 5m Chamber															
Company: Broadcom Project #: 08U11713 Date: 4/10/2008 Test Engineer: Vien Tran Configuration: FUT insides HP platform (Olifant) Mode: Tx 11a Legacy_5.470-5.725GHz															
<u>Test Equipment:</u>															
Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz				Limit								
T136; M/N: 3117 @3m	T144 Miteq 3008A00931						FCC 15.205								
Hi Frequency Cables															
2 foot cable	3 foot cable	12 foot cable	A.5m Chamber				HPF	Reject Filter	Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz, VBW=10Hz						
f GHz	Dist (m)	Read Pk dBuV	Read Avg dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
LOW CHANNEL, 5500 MHz															
11.000	3.0	43.1	30.6	37.2	11.1	-36.3	0.0	0.7	55.8	43.3	74	54	-18.2	-10.7	H
11.000	3.0	41.3	29.5	37.2	11.1	-36.3	0.0	0.7	54.0	42.2	74	54	-20.0	-11.8	V
MID CHANNEL, 5600 MHz															
11.200	3.0	44.2	31.1	37.3	11.3	-36.1	0.0	0.7	57.4	44.3	74	54	-16.6	-9.7	H
11.200	3.0	42.0	30.5	37.3	11.3	-36.1	0.0	0.7	55.2	43.7	74	54	-18.8	-10.3	V
HIGH CHANNEL, 5700 MHz															
11.400	3.0	44.4	32.1	37.3	11.5	-35.9	0.0	0.7	58.0	45.7	74	54	-16.0	-8.3	H
11.400	3.0	42.7	30.8	37.3	11.5	-35.9	0.0	0.7	56.3	44.4	74	54	-17.7	-9.6	V
f Measurement Frequency Dist Distance to Antenna Read Analyzer Reading AF Antenna Factor CL Cable Loss															
Amp Preamp Gain D Corr Distance Correct to 3 meters Avg Average Field Strength @ 3 m Peak Calculated Peak Field Strength HPF High Pass Filter															
Avg Lim Average Field Strength Limit Pk Lim Peak Field Strength Limit Avg Mar Margin vs. Average Limit Pk Mar Margin vs. Peak Limit															

7.4.2. 802.11n HT20 MODE

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber																																																																																				
Company:	Broadcom																																																																																			
Project #:	08U11713																																																																																			
Date:	4/10/2008																																																																																			
Test Engineer:	Vien Tran																																																																																			
Configuration:	EUT insides HP platform (Olifant)																																																																																			
Mode:	Tx 11n HT20_5.470-5.725GHz																																																																																			
Test Equipment:																																																																																				
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit																																																																								
T136; M/N: 3117 @3m			T144 Miteq 3008A00931									FCC 15.205																																																																								
Hi Frequency Cables																																																																																				
2 foot cable			3 foot cable			12 foot cable			HPF			Reject Filter																																																																								
						A.5m Chamber			HPF_7.8GHz																																																																											
<table border="1"> <tr> <td colspan="15">Peak Measurements</td> </tr> <tr> <td colspan="15">RBW=VBW=1MHz</td> </tr> <tr> <td colspan="15">Average Measurements</td> </tr> <tr> <td colspan="15">RBW=1MHz, VBW=10Hz</td> </tr> </table>															Peak Measurements															RBW=VBW=1MHz															Average Measurements															RBW=1MHz, VBW=10Hz																								
Peak Measurements																																																																																				
RBW=VBW=1MHz																																																																																				
Average Measurements																																																																																				
RBW=1MHz, VBW=10Hz																																																																																				
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)																																																																					
LOW CHANNEL, 5500 MHz																																																																																				
11.000	3.0	41.1	29.2	37.2	11.1	-36.3	0.0	0.7	53.9	42.0	74	54	-20.1	-12.0	H																																																																					
11.000	3.0	42.3	30.1	37.2	11.1	-36.3	0.0	0.7	55.1	42.9	74	54	-18.9	-11.1	V																																																																					
MID CHANNEL, 5600 MHz																																																																																				
11.200	3.0	40.8	30.1	37.3	11.3	-36.1	0.0	0.7	54.0	43.3	74	54	-20.0	-10.7	H																																																																					
11.200	3.0	43.4	31.3	37.3	11.3	-36.1	0.0	0.7	56.6	44.5	74	54	-17.4	-9.5	V																																																																					
HIGH CHANNEL, 5700 MHz																																																																																				
11.400	3.0	41.5	30.2	37.3	11.5	-35.9	0.0	0.7	55.1	43.8	74	54	-18.9	-10.2	H																																																																					
11.400	3.0	43.4	31.3	37.3	11.5	-35.9	0.0	0.7	57.0	44.9	74	54	-17.0	-9.1	V																																																																					
<table border="1"> <tr> <td>f</td> <td colspan="3">Measurement Frequency</td> <td>Amp</td> <td colspan="3">Preamp Gain</td> <td colspan="3">Avg Lim</td> <td colspan="3">Average Field Strength Limit</td> </tr> <tr> <td>Dist</td> <td colspan="3">Distance to Antenna</td> <td>D Corr</td> <td colspan="3">Distance Correct to 3 meters</td> <td colspan="3">Pk Lim</td> <td colspan="3">Peak Field Strength Limit</td> </tr> <tr> <td>Read</td> <td colspan="3">Analyzer Reading</td> <td>Avg</td> <td colspan="3">Average Field Strength @ 3 m</td> <td colspan="3">Avg Mar</td> <td colspan="3">Margin vs. Average Limit</td> </tr> <tr> <td>AF</td> <td colspan="3">Antenna Factor</td> <td>Peak</td> <td colspan="3">Calculated Peak Field Strength</td> <td colspan="3">Pk Mar</td> <td colspan="3">Margin vs. Peak Limit</td> </tr> <tr> <td>CL</td> <td colspan="3">Cable Loss</td> <td>HPF</td> <td colspan="3"></td> <td colspan="3"></td> <td colspan="3"></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									
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																																																																																

7.4.3. 802.11n HT40 MODE

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement Compliance Certification Services, Fremont 5m Chamber																																																																																									
Company:	Broadcom																																																																																								
Project #:	08U11713																																																																																								
Date:	4/10/2008																																																																																								
Test Engineer:	Vien Tran																																																																																								
Configuration:	EUT insides HP platform (Olifant)																																																																																								
Mode:	Tx 11n HT40_5.470-5.725GHz																																																																																								
Test Equipment:																																																																																									
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit																																																																													
T136; M/N: 3117 @3m			T144 Miteq 3008A00931									FCC 15.205																																																																													
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						A.5m Chamber			HPF_7.8GHz																																																																																
<table border="1"> <tr> <td colspan="15">Peak Measurements</td> </tr> <tr> <td colspan="15">RBW=VBW=1MHz</td> </tr> <tr> <td colspan="15">Average Measurements</td> </tr> <tr> <td colspan="15">RBW=1MHz, VBW=10Hz</td> </tr> </table>															Peak Measurements															RBW=VBW=1MHz															Average Measurements															RBW=1MHz, VBW=10Hz																													
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LOW CHANNEL, 5510 MHz																																																																																									
11.020	3.0	41.4	29.5	37.2	11.1	-36.3	0.0	0.7	54.3	42.4	74	54	-19.7	-11.6	H																																																																										
11.020	3.0	42.6	30.4	37.2	11.1	-36.3	0.0	0.7	55.5	43.3	74	54	-18.5	-10.7	V																																																																										
MID CHANNEL, 5590 MHz																																																																																									
11.180	3.0	41.1	30.4	37.3	11.3	-36.1	0.0	0.7	54.3	43.6	74	54	-19.7	-10.4	H																																																																										
11.180	3.0	43.7	31.6	37.3	11.3	-36.1	0.0	0.7	56.9	44.8	74	54	-17.1	-9.2	V																																																																										
HIGH CHANNEL, 5670 MHz																																																																																									
11.340	3.0	41.8	30.5	37.3	11.5	-36.0	0.0	0.7	55.3	44.0	74	54	-18.7	-10.0	H																																																																										
11.340	3.0	43.7	31.6	37.3	11.5	-36.0	0.0	0.7	57.2	45.1	74	54	-16.8	-8.9	V																																																																										
<table border="1"> <tr> <td>f</td> <td colspan="4">Measurement Frequency</td> <td>Amp</td> <td colspan="4">Preamp Gain</td> <td>Avg Lim</td> <td colspan="4">Average Field Strength Limit</td> </tr> <tr> <td>Dist</td> <td colspan="4">Distance to Antenna</td> <td>D Corr</td> <td colspan="4">Distance Correct to 3 meters</td> <td>Pk Lim</td> <td colspan="4">Peak Field Strength Limit</td> </tr> <tr> <td>Read</td> <td colspan="4">Analyzer Reading</td> <td>Avg</td> <td colspan="4">Average Field Strength @ 3 m</td> <td>Avg Mar</td> <td colspan="4">Margin vs. Average Limit</td> </tr> <tr> <td>AF</td> <td colspan="4">Antenna Factor</td> <td>Peak</td> <td colspan="4">Calculated Peak Field Strength</td> <td>Pk Mar</td> <td colspan="4">Margin vs. Peak Limit</td> </tr> <tr> <td>CL</td> <td colspan="4">Cable Loss</td> <td>HPF</td> <td colspan="4"></td> <td></td> <td colspan="4"></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									
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																																																																														
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AF	Antenna Factor				Peak	Calculated Peak Field Strength				Pk Mar	Margin vs. Peak Limit																																																																														
CL	Cable Loss				HPF																																																																																				

7.5. RECEIVER ABOVE 1 GHz IN THE 5.47 – 5.725 GHz BAND

7.5.1. 802.11n HT40 MODE

High Frequency Measurement Compliance Certification Services, 3 Meter_C Chamber															
Company:	Broadcom														
Project #:	08U11713														
Date:	4/11/2008														
Test Engineer:	Vien Tran														
Configuration:	EUT insides HP platform (Olifant)														
Mode:	Rx 11n HT40_5.3 GHz														
<u>Test Equipment:</u>															
Horn 1-18GHz		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz		Limit							
T73; S/N: 6717 @3m		T145 Agilent 3008A005C						RX RSS 210							
Hi Frequency Cables															
2 foot cable		3 foot cable		12 foot cable		HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz					
		Ninous 202575001		Can 187209002						Average Measurements RBW=1MHz, VBW=10Hz					
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.198	3.0	60.4	45.4	24.5	2.2	-36.0	0.0	0.0	51.2	36.2	74	54	-22.8	-17.8	H
1.330	3.0	58.6	42.9	25.0	2.3	-35.9	0.0	0.0	50.0	34.3	74	54	-24.0	-19.7	H
1.600	3.0	56.2	41.5	26.0	2.5	-35.7	0.0	0.0	48.9	34.2	74	54	-25.1	-19.8	H
2.493	3.0	56.3	40.7	28.6	2.9	-35.1	0.0	0.0	52.7	37.1	74	54	-21.3	-16.9	H
1.198	3.0	63.3	45.6	24.5	2.2	-36.0	0.0	0.0	54.1	36.4	74	54	-19.9	-17.6	V
1.330	3.0	59.7	44.7	25.0	2.3	-35.9	0.0	0.0	51.1	36.1	74	54	-22.9	-17.9	V
1.600	3.0	57.6	42.7	26.0	2.5	-35.7	0.0	0.0	50.3	35.4	74	54	-23.7	-18.6	V
2.493	3.0	61.6	42.1	28.6	2.9	-35.1	0.0	0.0	58.0	38.5	74	54	-16.0	-15.5	V
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

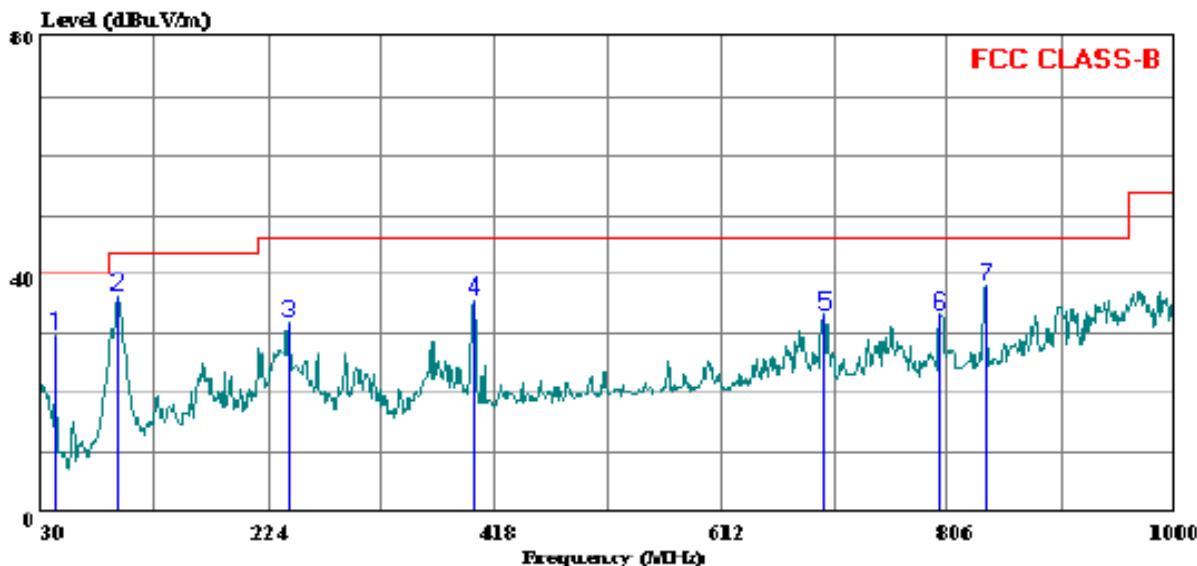
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



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

Data#: 17 File#: 08u11713.emi

Date: 04-11-2008 Time: 14:28:04



Trace: 16

Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator::: Thanh Nguyen
Project #: : 08U11713_C2PC
Company: : Broadcom
Model : : BCM94322MC
Configuration::: EUT installed inside Olifant laptop
Mode : : Transmit 5GHz band
Target: : FCC Class B

Page: 1

Freq	Read		Limit	Over	Remark
	Level	Factor			
MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	42.610	47.50	-17.56	29.94	40.00 -10.06 Peak
2	94.020	58.33	-22.03	36.30	43.50 -7.20 Peak
3	241.460	50.00	-18.06	31.94	46.00 -14.06 Peak
4	401.510	49.17	-13.39	35.78	46.00 -10.22 Peak
5	700.270	41.67	-8.46	33.21	46.00 -12.79 Peak
6	799.210	40.17	-6.87	33.29	46.00 -12.71 Peak
7	838.010	44.17	-6.23	37.94	46.00 -8.06 Peak

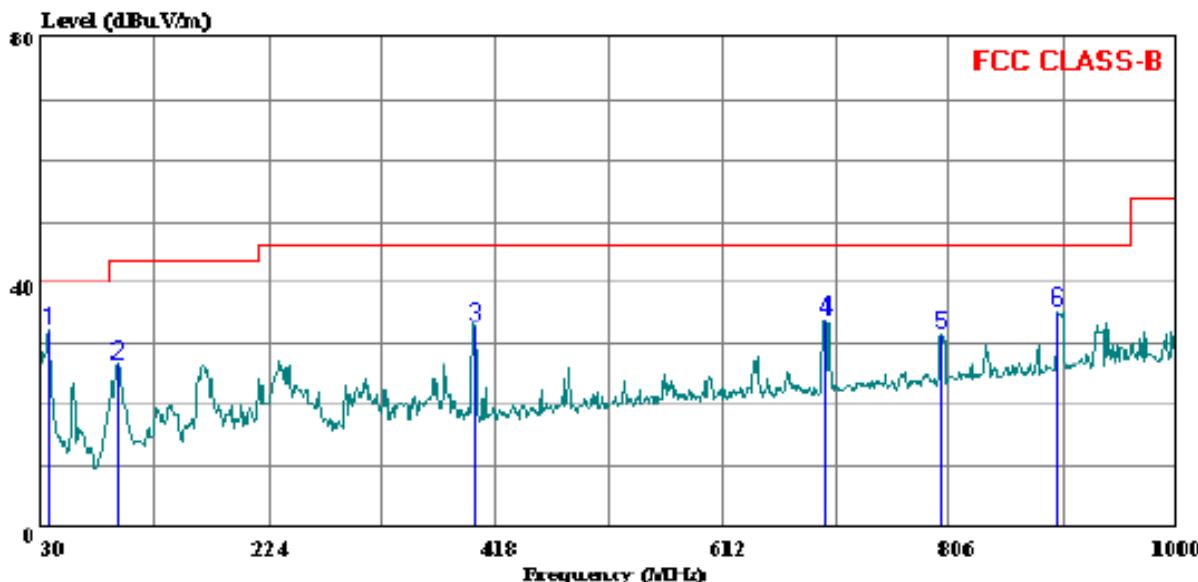
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



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

Data#: 15 File#: 08u11713.emi

Date: 04-11-2008 Time: 14:15:29



Trace: 14

Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator::: Thành Nguyen
Project #: : 08U11713_C2PC
Company: : Broadcom
Model : : BCM94322MC
Configuration::: EUT installed inside Olifant laptop
Mode : : Transmit 5GHz band
Target: : FCC Class B

Page: 1

Freq	Read Level	Factor	Limit Level	Over		Remark
				dBuV	dB	
				dBuV	dB	
1	35.820	44.35	-12.14	32.21	40.00	-7.79 Peak
2	94.990	48.58	-21.79	26.79	43.50	-16.71 Peak
3	400.540	46.33	-13.46	32.87	46.00	-13.13 Peak
4	700.270	42.33	-8.46	33.88	46.00	-12.12 Peak
5	799.210	38.33	-6.87	31.46	46.00	-14.54 Peak
6	898.150	40.17	-4.98	35.18	46.00	-10.82 Peak

8. 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

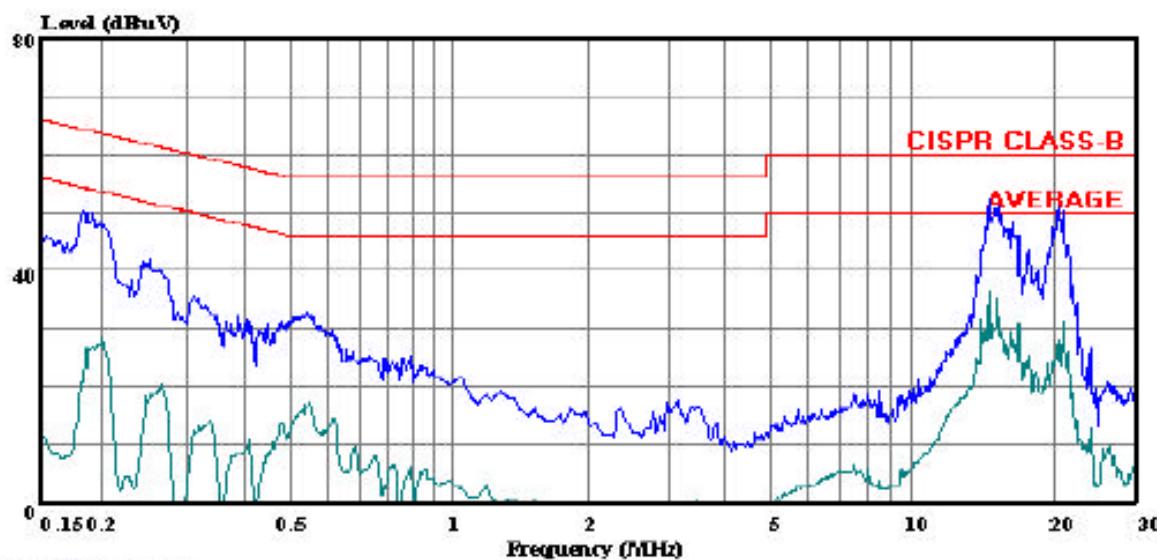
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Closs (dB)	Limit QP	FCC_B AV	Margin		Remark
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.18	50.18	--	28.33	0.00	64.35	54.35	-14.17	-26.02	L1
14.75	52.34	--	36.33	0.00	60.00	50.00	-7.66	-13.67	L1
20.59	50.95	--	30.27	0.00	60.00	50.00	-9.05	-19.73	L1
0.18	48.63	--	27.79	0.00	64.35	54.35	-15.72	-26.56	L2
14.75	51.28	--	38.78	0.00	60.00	50.00	-8.72	-11.22	L2
20.59	48.44	--	31.96	0.00	60.00	50.00	-11.56	-18.04	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#: 115V.EMI Date: 04-04-2008 Time: 08:23:30



(Line Conduction)
Trace: 5 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Vien Tran
Project #: : 08U11713
Company: : Broadcom
Configuration:: EUT (Olifant laptop)
Mode: : Normal
Target: : FCC Class B
Voltage: : 115VAC / 60Hz
: Line 1: Peak (Blue); Average (Green)

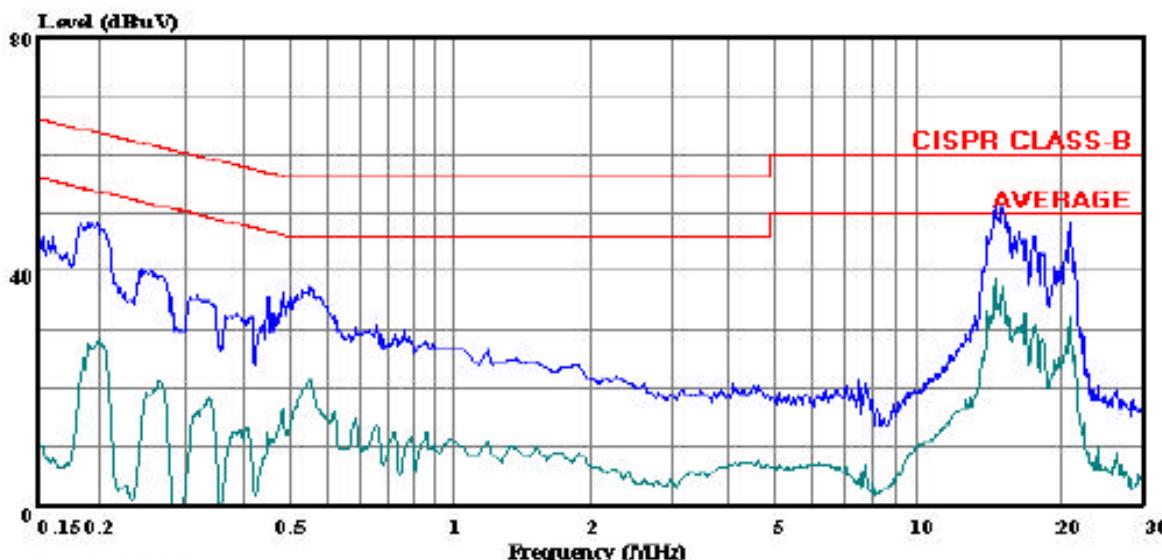
LINE 2 RESULTS



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

Data#: 16 File#: 115v.emi

Date: 04-04-2008 Time: 08:44:33



(Line Conduction)

Trace: 14

Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Vien Tran
Project #: : 08U11713
Company: : Broadcom
Configuration:: EUT (Olifant laptop)
Mode: : Normal
Target: : FCC Class B
Voltage: : 115VAC / 60Hz
: Line 2: Peak (Blue); Average (Green)