FCC CFR47 PART 15 SUBPART B
DECLARATION OF CONFORMITY TEST REPORT

FOR

802.11n-BT COMBO CARD

MODEL NUMBER: AR5B195

REPORT NUMBER: 09U12738-5

ISSUE DATE: SEPTEMBER 23, 2009

Prepared for

ATHEROS COMMUNICATIONS, INC.
5480 GREAT AMERICA PARKWAY
Santa Clara, CA 95054, U.S.A.

Prepared by

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

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
---	09/23/09	Initial Issue	T. Chan

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: ATHEROS COMMUNICATION, INC.
5480 GREAT AMERICA PARKWAY
SANTA CLARA, CA 95054 USA.

EUT DESCRIPTION: 802.11n-BT COMBO CARD

MODEL: AR5B195

SERIAL NUMBER: WB-195DA-040-D1090 (Dual Antenna configuration);
WB-195SA-D11152 (Single Antenna configuration)

DATE TESTED: SEPTEMBER 12 and 16, 2009

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART B	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. 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. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

THU CHAN
EMC MANAGER
COMPLIANCE CERTIFICATION SERVICES

Tested By:

CHIN PANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

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

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11n-BT Combo Card with dual or single antenna configuration.

GENERAL INFORMATION

Power Requirements	100-240 VAC / 50-60 Hz
List of frequencies generated or used by the EUT	40 MHz

5.2. TEST CONFIGURATIONS

The following configurations were investigated during preliminary testing:

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

5.3. MODE(S) OF OPERATION

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

5.4. SOFTWARE AND FIRMWARE

The test utility and driver software used during testing was Art ANWI 1.4 and Devlib Revision 0.9 Build #15 Art_11n.

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DETAILS OF TESTED SYSTEM

SUPPORT EQUIPMENT & PERIPHERALS

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Lenovo	769	L3-BA653	DoC
AC Adapter	Lenovo	42T5008	11S92P1156Z1ZDXN7CR2AD	DoC
Mouse	Logitech	M-UA34	LTC70500299	DoC
Printer	Microline 186	D22300A	AC5C018494A0	DoC

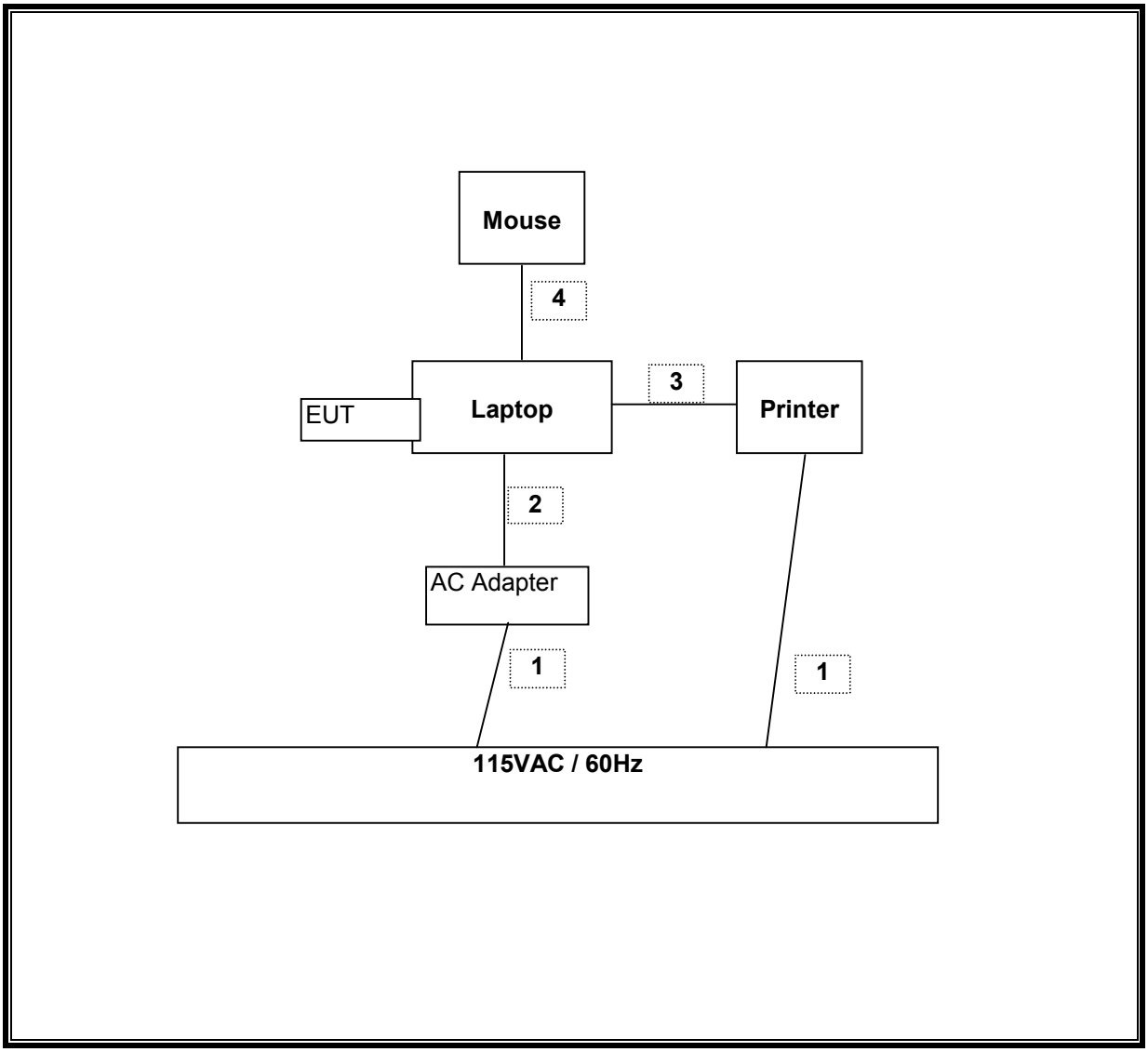
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	US 115V	Un-shielded	2m	NA
2	DC	1	DC	Un-shielded	1.2m	One ferrite at Laptop's end
3	USB	1	Printer	Un-shielded	2m	NA
4	USB	1	Mouse	Un-shielded	2m	NA

TEST SETUP

The EUT is installed in a typical configuration. Test software exercised the EUT.

TEST SETUP DIAGRAM



6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset Number**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	06/01/10
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00778	12/16/09
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	01/14/10
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/29/09
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	05/06/11

7. APPLICABLE LIMITS AND TEST RESULTS

7.1. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4

The highest clock frequency generated or used in the EUT is 40 MHz, therefore the frequency range was investigated from 30 MHz to 1000 MHz.

LIMIT

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

Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dBµV/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54
Note: The lower limit shall apply at the transition frequency.	

RESULTS

RADIATED EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

DUAL ANTENNA CONFIGURATION

30-1000MHz Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 09/12/09
Project #: 09U12738
Company: Atheros
EUT Description: 802.11b/g/n + BT2.1+EDR MISO combo
EUT M/N: AR5B195
Test Target: FCC Class B
Mode Oper: Normal (Dual Antenna Port)

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

f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
horiz													
69.122	3.0	51.3	8.0	0.7	28.4	0.0	0.0	31.8	40.0	-8.2	H	EP	
144.245	3.0	43.5	13.0	1.1	28.3	0.0	0.0	29.3	43.5	-14.2	H	EP	
214.688	3.0	49.9	11.9	1.3	28.2	0.0	0.0	34.9	43.5	-8.6	H	EP	
240.129	3.0	51.2	11.8	1.3	28.2	0.0	0.0	36.2	46.0	-9.8	H	EP	
370.574	3.0	49.0	14.5	1.7	28.1	0.0	0.0	37.1	46.0	-8.9	H	EP	
743.309	3.0	37.7	20.2	2.5	27.3	0.0	0.0	33.1	46.0	-12.9	H	EP	
57.721	3.0	49.3	8.0	0.7	28.4	0.0	0.0	29.7	40.0	-10.3	V	EP	
70.562	3.0	52.4	8.0	0.7	28.3	0.0	0.0	32.8	40.0	-7.2	V	EP	
84.242	3.0	48.1	7.4	0.8	28.3	0.0	0.0	28.0	40.0	-12.0	V	EP	
214.808	3.0	48.8	11.9	1.3	28.2	0.0	0.0	33.8	43.5	-9.7	V	EP	
441.737	3.0	42.8	15.7	1.9	28.0	0.0	0.0	32.4	46.0	-13.6	V	EP	
638.905	3.0	45.4	18.9	2.3	27.4	0.0	0.0	39.2	46.0	-6.8	V	EP	

SINGLE ANTENNA CONFIGURATION

30-1000MHz Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tom Chen
Date: 09/16/09
Project #: 09U12738
Company: Atheros
EUT Description: 802.11b/g/n + BT2.1+EDR MISO combo
EUT M/N: AR5B195
Test Target: FCC Class B
Mode Oper: Normal (Single Antenna Port)

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

f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
57.721	3.0	49.3	8.0	0.7	28.4	0.0	0.0	29.7	43.5	-13.8	V	EP	
413.656	3.0	49.2	15.2	1.8	28.1	0.0	0.0	38.1	46.0	-7.9	V	EP	
460.458	3.0	40.0	16.0	1.9	27.9	0.0	0.0	30.1	46.0	-15.9	V	EP	
506.300	3.0	42.2	16.8	2.0	27.8	0.0	0.0	33.3	46.0	-12.7	V	EP	
574.222	3.0	36.5	18.0	2.2	27.6	0.0	0.0	29.1	46.0	-16.9	V	EP	
602.304	3.0	37.4	18.4	2.2	27.5	0.0	0.0	30.6	46.0	-15.4	V	EP	
688.827	3.0	35.0	19.5	2.4	27.2	0.0	0.0	29.7	46.0	-16.3	V	EP	
69.122	3.0	52.3	8.0	0.7	28.4	0.0	0.0	32.8	43.5	-10.7	H	EP	
240.129	3.0	51.2	11.8	1.3	28.2	0.0	0.0	36.2	46.0	-9.8	H	EP	
257.889	3.0	44.4	12.0	1.4	28.2	0.0	0.0	29.6	46.0	-16.4	H	EP	
415.096	3.0	52.0	15.2	1.8	28.1	0.0	0.0	41.0	46.0	-5.0	H	EP	
799.352	3.0	41.2	21.0	2.6	27.4	0.0	0.0	37.4	46.0	-8.6	H	EP	
896.316	3.0	44.5	21.8	2.8	27.8	0.0	0.0	41.3	46.0	-4.7	H	EP	

Rev. 1.27.09
Note: No other emissions were detected above the system noise floor.

7.2. AC MAINS LINE CONDUCTED EMISSIONS

TEST PROCEDURE

ANSI C63.4

LIMIT

§15.107 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Notes: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

RESULTS

6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC_A	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.16	58.06	--	37.89	0.00	65.62	55.62	-7.56	-17.73	L1
0.47	41.97	--	30.88	0.00	56.58	46.58	-14.61	-15.70	L1
5.84	41.99	--	30.93	0.00	60.00	50.00	-18.01	-19.07	L1
0.20	55.25	--	36.78	0.00	63.61	53.61	-8.36	-16.83	L2
0.34	46.60	--	31.16	0.00	59.28	49.28	-12.68	-18.12	L2
5.45	41.46	--	27.79	0.00	60.00	50.00	-18.54	-22.21	L2
6 Worst Data									

LINE 1 RESULTS

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

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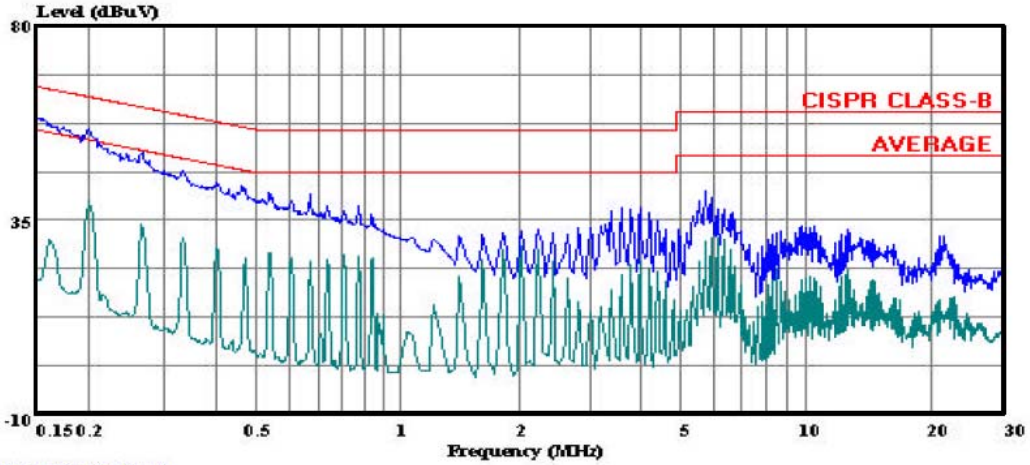
Date: 09-12-2009 Time: 17:41:43



(Line Conduction)

Trace: 5 Ref Trace:

Condition: CISPR CLASS-B
Test Operator: : Chin Pang
Project #: : 09U12738
Company: : Atheros
EUT Description:: 802.11b/g/n+BT2.1+EDR SISO combo card
Mode: : Normal
Target: : FCC Class B
Voltage: : 115VAC/60Hz
: L1: 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#: 14 File#: 09U12738_FCC 15B.EMI
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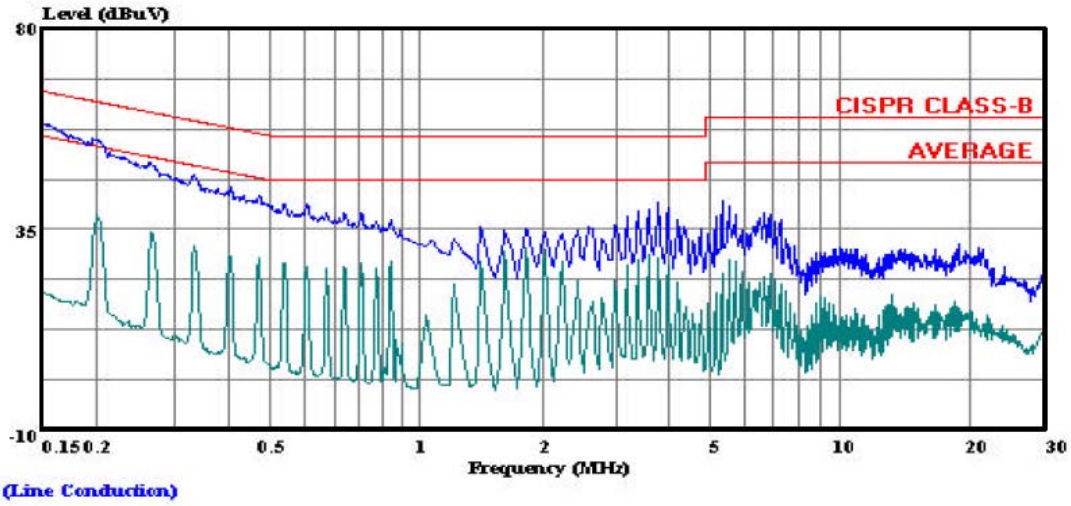

Trace: 12 Ref Trace:

Condition: CISPR CLASS-B
Test Operator: : Chin Pang
Project #: : 09U12738
Company: : Atheros
EUT Description:: 802.11b/g/n+BT2.1+EDR SISO combo card
Mode: : Normal
Target: : FCC Class B
Voltage: : 115VAC/60Hz
: L2: Peak (Blue) , Average (Green)