

Class II Permissive Change
 Test Report
 And Application for Grant of Equipment Authorization

TEST REPORT PERTAINING TO:

Equipment Under Test	Model Number(s)
Intel PRO/Wireless 3945ABG Network Connection	WM3945ABG

CONFIGURATION

802.11a / 802.11b / 802.11g with a set of Amphenol & Foxconn Antennas

MEASUREMENTS PERFORMED IN ACCORDANCE WITH THE FOLLOWING STANDARD (S)

Regulatory Standard(s)
47 CFR Part 15, Subpart C Section 15.247

Test Method:
 ANSI C63.4: 2003 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz



Certificate Number: 1111.01

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TABLE OF CONTENTS

SECTION	TITLE	PAGE
	COVER SHEET	01
	TABLE OF CONTENTS	02
1.0	REGULATORY COMPLIANCE GUIDELINES	03
1.1	Guidelines For Testing To Emissions Standards.....	03
2.0	SUMMARY OF REGULATORY LIMITS	04
3.0	ADMINISTRATIVE DATA AND TEST DESCRIPTION	07
4.0	DESCRIPTION OF EUT CONFIGURATION	08
4.1	EUT Description	08
4.2	EUT Configuration.....	09
4.3	List of EUT Sub-Assemblies and Host Equipment	10
4.4	I/O Cabling Diagram and Description	11
4.5	EMC Test Hardware and Software Measurement Equipment.....	12
5.0	CONDITIONS DURING EMISSIONS MEASUREMENTS	13
5.1	General.....	13
5.2	Conducted Emissions Test Setup.....	13
5.3	Radiated Emissions Test Setup.....	14

APPENDICES

A	Test Data
B	Modifications And Recommendations

1.0 REGULATORY COMPLIANCE GUIDELINES

Aegis Labs, Inc. operates as both a Nevada and California Corporation with no organizational or financial relationship with any company, institution, or private individual. Testing and engineering functions provided by Aegis Labs were furnished by RF technicians and engineers with accredited qualifications and training credentials to carry out their duties.

The object of this report was to publish verifiable test results of an EUT subjected to the tests outlined in the standard listed on the cover page of this report.

1.1 Guidelines For Testing To Emissions Standards

This standard for EMC emission requirements apply to electrical equipment for Information Technology Equipment (ITE). Compliance to these standards and in combination with the other standards listed in this test report can be used to demonstrate presumption of compliance with the protection requirements of the appropriate agency standard.

The purpose of this standard is to specify minimum requirements for emissions regarding electromagnetic compatibility (EMC) and protect the radio frequency spectrum 9 kHz. – 400 GHz. from unwanted interference generated from electrical/digital systems that intentionally or unintentionally generated RF energy. The emissions standards, normative documents and/or publications were used to conduct all tests performed on the equipment herein referred to as “Equipment Under Test”.



2.0 SUMMARY OF TEST RESULTS

802.11a Mode (5745-5825 MHz) EMISSIONS STANDARD

FCC Part 15 Section	Description	Results	Comments
15.247(a)(2)	The minimum 6dB bandwidth shall be at least 500 kHz.	PASSED	5745 MHz = 16.58 MHz 5785 MHz = 16.67 MHz 5825 MHz = 16.67 MHz <i>Per Original Filing</i>
15.247(b)(3)	The maximum peak output power of the intentional radiator shall not exceed 1 watt.	PASSED	5745 MHz = 19.60 dBm = 91.20 mW 5785 MHz = 19.70 dBm = 93.33 mW 5825 MHz = 19.80 dBm = 95.50 mW
15.247(b)(5)	The intentional radiator shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the FCC guidelines per Section 1.1307(b)(1).	PASSED	Refer to SAR Test Report
15.247(c)	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.	PASSED	See Data Sheets
15.247(c)	Radiated emissions, which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a). All others must be < -20dBc.	PASSED	See Data Sheets
15.247(d)	The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.	PASSED	5745 MHz = -8.50 dB 5785 MHz = -9.50 dB 5825 MHz = -9.83 dB <i>Per Original Filing</i>
15.207	AC Conducted Emissions	PASSED	<i>See Original Filing</i>
15.209	Radiated Emissions (30-1000 MHz)	PASSED	<i>See Original Filing</i>

2.0 Summary of Test Results (Continued)

802.11b Mode (2400-2483.5 MHz)
EMISSIONS STANDARD

FCC Part 15 Section	Description	Results	Comments
15.247(a)(2)	The minimum 6dB bandwidth shall be at least 500 kHz.	PASSED	2412 MHz = 8.33 MHz 2437 MHz = 8.83 MHz 2462 MHz = 9.17 MHz <i>Per Original Filing</i>
15.247(b)(3)	The maximum peak output power of the intentional radiator shall not exceed 1 watt.	PASSED	2412 MHz = 19.71 dBm = 93.54 mW 2437 MHz = 20.53 dBm = 112.98 mW 2462 MHz = 20.34 dBm = 108.14 mW
15.247(b)(5)	The intentional radiator shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the FCC guidelines per Section 1.1307(b)(1).	PASSED	Refer to SAR Test Report
15.247(c)	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.	PASSED	See Data Sheets
15.247(c)	Radiated emissions, which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a). All others must be < -20dBc.	PASSED	See Data Sheets
15.247(d)	The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.	PASSED	2412 MHz = -10.33 dB 2437 MHz = -7.83 dB 2462 MHz = -8.83 dB <i>Per Original Filing</i>
15.207	AC Conducted Emissions	PASSED	<i>See Original Filing</i>
15.209	Radiated Emissions (30-1000 MHz)	PASSED	<i>See Original Filing</i>

2.0 Summary of Test Results (Continued)

 802.11g Mode (2400-2483.5 MHz)
 EMISSIONS STANDARD

FCC Part 15 Section	Description	Results	Comments
15.247(a)(2)	The minimum 6dB bandwidth shall be at least 500 kHz.	PASSED	2412 MHz = 16.58 MHz 2437 MHz = 16.67 MHz 2462 MHz = 16.67 MHz <i>Per Original Filing</i>
15.247(b)(3)	The maximum peak output power of the intentional radiator shall not exceed 1 watt.	PASSED	2412 MHz = 24.21 dBm = 263.63 mW 2437 MHz = 24.71 dBm = 295.80 mW 2462 MHz = 24.28 dBm = 267.92 mW
15.247(b)(5)	The intentional radiator shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the FCC guidelines per Section 1.1307(b)(1).	PASSED	Refer to SAR Test Report
15.247(c)	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.	PASSED	See Data Sheets
15.247(c)	Radiated emissions, which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a). All others must be < -20dBc.	PASSED	See Data Sheets
15.247(d)	The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.	PASSED	2412 MHz = -9.17 dB 2437 MHz = -8.17 dB 2462 MHz = -9.17 dB <i>Per Original Filing</i>
15.207	AC Conducted Emissions	PASSED	<i>See Original Filing</i>
15.209	Radiated Emissions (30-1000 MHz)	PASSED	<i>See Original Filing</i>

ANALYSIS AND CONCLUSIONS

Based upon the measurement results we find that this equipment is within the limits of the global standards listed on the cover page of this test report. All results are based on a test of one sample. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required.

Approval Signatories

Test and Report Completed By:


 Johnny Candelas
 Test Technician
 Aegis Labs, Inc.

07/16/07

Date:

Report Approved By:


 Rick Candelas
 Quality Assurance & EMC Lab Manager
 Aegis Labs, Inc.

07/26/07

Date:

3.0 ADMINISTRATIVE DATA AND TEST DESCRIPTION

DEVICE TESTED:	ITE Type: Intel PRO/Wireless 3945ABG Network Connection Model Number(s): WM3945ABG Serial Number: 00B11A295CVD26965002 FCC ID: E2KWM3945ABG
DATE EUT RECEIVED:	June 13 th , 2007
TEST DATE(S):	July 11 th – 16 th , 2007
ORIGIN OF TEST SAMPLE(S):	Production
EQUIPMENT CLASS:	EUT tested as CLASS B device
RESPONSIBLE PARTY:	Dell Computer Corporation One Dell Way Round Rock, TX 78682
CLIENT CONTACT:	Mr. Jason Limoges
MANUFACTURER:	Dell Computer Corporation
TEST LOCATION:	Aegis Labs, Inc. 32231 Trabuco Creek Road Trabuco Canyon, CA 92678 Open Area Test Site #2
ACCREDITATION CERTIFICATE(s):	A2LA Certificate Number: 1111.01, Valid through February 28, 2008
PURPOSE OF TEST:	To demonstrate compliance with the standards as described in Sections 1.0 & 2.0 of this report.
UNCERTAINTY BUDGET:	Proficiency Testing and Uncertainty Calculations for all tests indicated in this report have been conducted in accordance with ISO 17025: 2005 requirements Section 5.4.6, and 5.9. Uncertainty Budgets and Proficiency Test results available upon request.
STATEMENT OF CALIBRATION:	All accredited equipment calibrations were performed by Liberty Labs, Inc. and World Cal. with typical calibration uncertainty estimates derived from ISO Guide to the determination of uncertainties with a Coverage Factor of k=2 for 95% level of confidence.

4.0 DESCRIPTION OF EUT CONFIGURATION

4.1 EUT Description

Equipment Under Test (EUT)		
Trade Name:	Intel PRO/Wireless 3945ABG Network Connection	
Model Number:	WM3945ABG	
Frequency Range:	802.11a = 5745 – 5825 MHz 802.11b/g = 2412 – 2462 MHz	
Type of Transmission:	Direct Sequence Spread Spectrum	
Transfer Rate:	1/5.5/11 Mbps for 802.11b mode 6/36/54 Mbps for 802.11g and 802.11a modes	
Number of Channels:	802.11a mode (5725-5850 MHz) = 5 802.11b mode (2400-2483.5 MHz) = 11 802.11g mode (2400-2483.5 MHz) = 11	
Modulation Type:	DBPSK, DQPSK, CCK, OFDM	
Antenna Type:	<u>Amphenol</u> : IFA (Main/Aux)	<u>Foxconn</u> : PIFA (Main/Aux)
Antenna Gain (See Note 2):	3.96 dBi @ 5 GHz / 1.90 dBi @ 2.4 GHz	2.53 dBi @ 5 GHz / 2.67 dBi @ 2.4 GHz
Transmit Output Power:	18-20 dBm (Typical) for 802.11a mode 20 dBm (Typical) for 802.11b mode 24-25 dBm (Typical) for 802.11g mode Please see Appendix A (Data Sheets) for actual output power.	
Power Supply:	3.3VDC from computer MPC1 slot.	
Number of External Test Ports Exercised:	2 Antenna Ports (1 Main & 1 Auxiliary)	

The Intel PRO/Wireless 3945ABG Network Connection is an embedded 802.11a/b/g network adapter operating in the 2.4 GHz and 5 GHz spectrum. The EUT is based on the Mini Card form factor designed to meet the space and size requirements for thin and light notebook PCs. It is capable of a data rate of up to 52 Mbps.

NOTE 1: For a more detailed description, please refer to the manufacturer's specifications or User's Manual.

NOTE 2: The EUT was tested with a set of Amphenol & Foxconn Antennas. (Refer to the antenna specifications exhibits).



4.2 EUT Configuration

The EUT was tested installed in the Mini PCI-E slot of the host computer. The EUT was then connected to a set of antennas via its Main and Aux antenna ports. Data for a set of Amphenol & Foxconn Antennas can be found in Appendix A (Data Sheets).

The low, middle, and high channels were tested in 802.11a, b, & g modes. Also, the EUT was tested once transmitting from the Main antenna port and once transmitting from the Aux antenna port. The EUT was placed in either continuous transmit or continuous receive mode by a program provided by the manufacturer (*CRTU Version 4.1.28.0000*).



4.3 List of EUT, Sub-Assemblies and Host Equipment

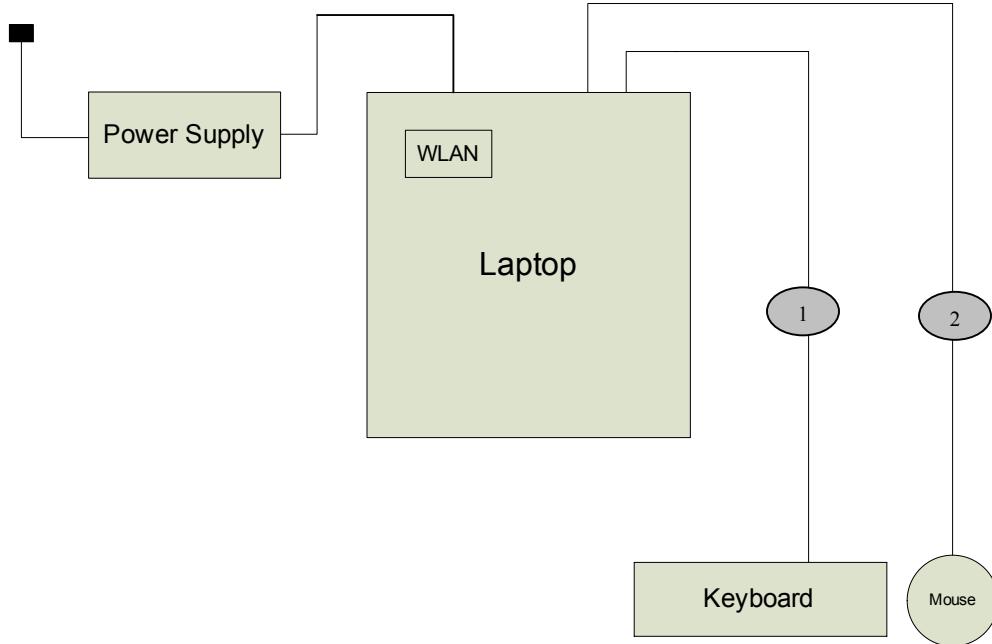
Equipment Under Test			
Manufacturer	Equipment Name	Model or Part Number	Serial Number
Intel Corporation	Intel PRO/Wireless 3945ABG Network Connection	WM3945ABG	00B11A295CVD26965002

EUT Sub Assemblies			
Manufacturer	Equipment Name	Model or Part Number	Serial Number
Dell	Host Computer	PP06XA	PS060366
Amphenol	Main Multi Band Antenna	WT0581-11-001-R X01	N/A
Amphenol	Auxiliary Multi Band Antenna	WT0581-11-002-R X01	N/A
Dell	Host Computer	PP06XA	PS060370
Foxconn	Main Multi Band Antenna	WDAN-DWDS1001-DF Rev 1	N/A
Foxconn	Auxiliary Multi Band Antenna	WDAN-DWDS1001-DF Rev 1	N/A

HOST EQUIPMENT LIST			
Manufacturer	Equipment Name	Model or Part Number	Serial Number
Keyboard	Logitech	Y-BF37	MCTZ5200581
Mouse	Logitech	M-BJ58	LZE14759424

NOTE: All the power cords of the above support equipment are standard and non-shielded.

4.4 I/O Cabling Diagram and Description



Signal Line Cable Description

Cable	Length	Construction	Source Connector	Destination Connector	Bundled Length	Ferrite Attached	Note
1	1.5m	Round, Braid & Foil Shielded	Host Computer: Metallic 8-pin Mini DIN	Keyboard: Hardwired	N/A	N/A	N/A
2	1.5m	Round, Braid & Foil Shielded	Host Computer: Metallic 8-pin Mini DIN	Mouse: Hardwired	N/A	N/A	N/A



4.5 EMC Test Hardware and Software Measurement Equipment

TEST EQUIPMENT LIST - Emissions					
Equipment Name	Manufacturer	Model Number	Serial Number	Calibration Due Date	Maintenance Calibration Cycle
Spectrum Analyzer	Agilent	8565EC	3946A00245	07/24/07	1 Year
Antenna – Horn	EMCO	3115	2230	05/15/08	1 Year
Preamp	Miteq	JS42-01001800-25-10P	815980	09/21/07	1 Year
28 Foot Coax	Semflex	S1L29BFS1348	608	07/26/07	1 Year
2.4 GHz Notch Filter	Micro-Tronics	BRM50702-02	003	NCR	NCR
5.725-5.850 GHz Notch Filter	Microwave Circuits	N0257881	3173-01	NCR	NCR
Antenna - 18-26.5 GHz Pre-amplified Horn	Aegis Labs, Inc.	H042	SLK-35-3W	02/08/08	1 Year
Antenna - 26.5-40 GHz Pre-amplified Horn	Aegis Labs, Inc.	H028	GM1260-10	02/08/08	1 Year
Power Meter	Anritsu	ML2487A	6K00001785	05/29/08	1 Year
Wide Bandwidth Sensor	Anritsu	MA2491A	31193	05/29/08	1 Year
12dB Attenuator	Narda	4779-12	203	06/09/08	1 Year
Temperature/Humidity Monitor	Dickson	TH550	7255185	04/13/08	1 Year

NCR – No Calibration Required.

5.0 CONDITIONS DURING EMISSIONS MEASUREMENTS

5.1 General

All measurements were made according to the procedures defined in or referred to by the standard listed on the cover page of this report. The measurements were made in the operating mode producing the largest emissions consistent with normal operation and connected to the minimum configuration of auxiliary devices.

5.2 Conducted Emissions Test Setup

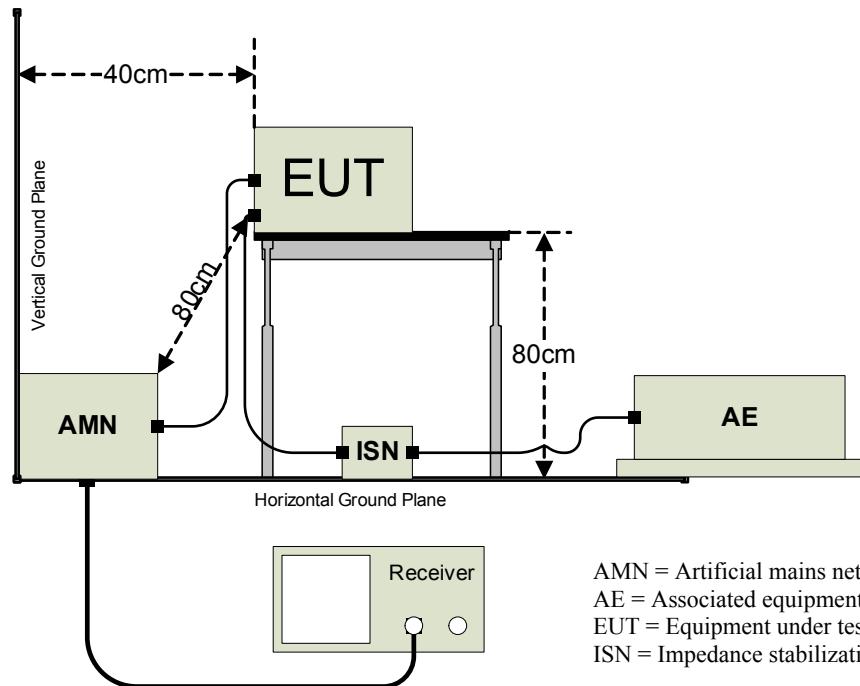
The following was the test configuration.

EUT signal cables that hung closer than 40 cm to the horizontal metal ground plane were folded back and forth forming a bundle 30 cm to 40 cm long. The power cord of the EUT was also bundled in the center and plugged into one of the artificial mains network (AMN). All peripheral equipment was powered from a second AMN via a multiple outlet strip placed at a distance on 10cm from each other. The AMN and ISN were positioned 80cm from the EUT. Signal cables that were not connected to an AE were terminated using the correct termination. If applicable, the current probe was placed at 0.1 m from the ISN.

Peak, quasi-peak and/or average detectors were used for testing performed between 150 kHz and 30 MHz. A swept frequency scan was performed for both Line 1 and Line 2. The six highest readings were compared against the limit and recorded in the data sheet along with a snapshot image of the sweep scan. The graphical scans in Appendix A only reflect peak readings while the tabulated data sheets reflect peak, average, and/or quasi-peak measurements.

Climatic Conditions:

The EUT was tested within its intended operating and climatic conditions.



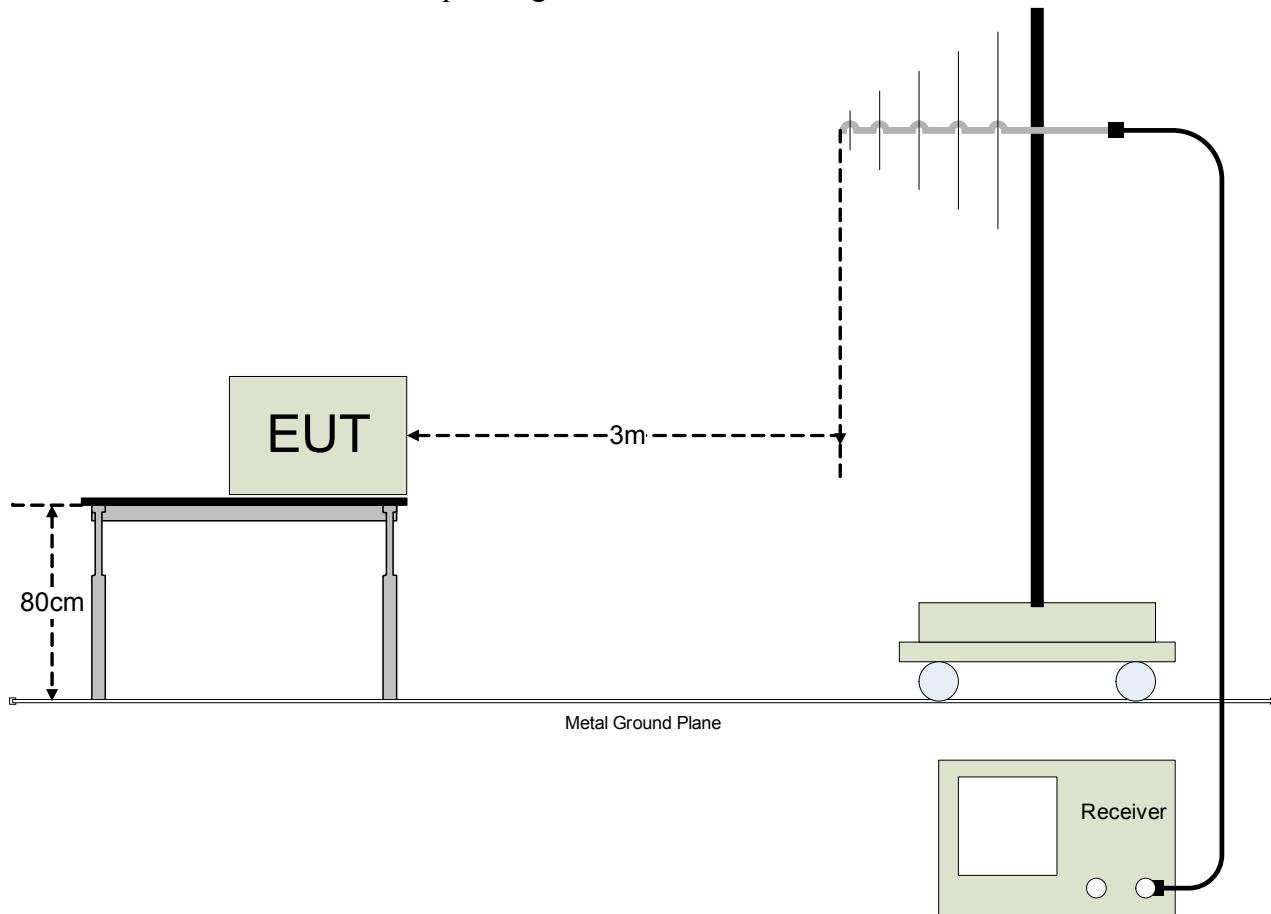
5.3 Radiated Emissions Test Setup

The Open Area Test Site (OATS) was used for radiated emission testing. The receiving (Rx) antenna(s) was placed 10m from the nearest side of the EUT facing the Rx antenna. The EUT (if floor-standing) was placed directly on the flush-mounted 360 degree rotating turntable. The EUT (if table-top) was placed directly on an 80cm high non-metallic table, and the table was placed on the rotating turntable. During the initial EMI scan, all the suspect frequencies, i.e.; harmonics, broadband signals were checked with the Rx broadband antennas in both vertical and horizontal polarities. The biconical Rx, log periodic Rx, and horn Rx antennas were used from 30MHz – 299.99MHz, 300MHz – 1000MHz, and 1GHz – 18GHz respectively.

Upon completion of all harmonic and broadband measurements, the balance of any remaining frequencies was checked between 30MHz – 18GHz. Any signals appearing within 20 dB of the classification limit was measured. Each signal was maximized by first rotating the turntable at least 360 degrees and recording the azimuth in the data sheet. Lastly, the Rx antenna was raised and/or lowered to maximize the signal elevation. If the measured signal was obtained using the peak detector and that signal appeared within 3 dB of the regulatory limit line, then the same signal was re-measured using the quasi-peak detector on the EMI receiver. Both meter readings if necessary were recorded on the data sheet.

Climatic Conditions:

The EUT was tested within its intended operating and climatic conditions.





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APPENDIX A

TEST DATA

RADIATED EMISSIONS TEST RESULTS

CLIENT:	Dell Computer Corporation	DATE:	07/12/07
EUT:	Intel PRO/Wireless 3945ABG Network Connection	PROJECT NUMBER:	INTEL-070612
MODEL NUMBER:	WM3945ABG	TEST ENGINEER:	JC
SERIAL NUMBER:	00B11A295CVD26965002	SITE #:	2
CONFIGURATION:	Tested installed in the host computer's mini PCI slot in 802.11a (5745-5825 MHz) mode with Amphenol Antennas.	TEMPERATURE:	31 deg. C
		HUMIDITY:	27% RH
		TIME:	3:00 PM

Description:	Radiated RF Emissions (1 GHz – 18 GHz)
Results:	PASSED Horizontal and Vertical Antenna Polarizations Class B Limits
Note:	Radiated Emissions Measurements were performed on the EUT with power supply set at the following voltage and frequency. <ul style="list-style-type: none"> • 120VAC / 60 Hz.

Unwanted Spurious Emissions Limits			
Frequency (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m) (Emissions in the restricted bands)	Field Strength (dBm/MHz) (Emissions outside the restricted bands)
Above 960	500	54.00 (Average) 74.00 (Peak)	< -20 dBc

Radiated Emissions Sample Calculations

Corrected Meter Reading = Meter Reading + F +C - D

Where, F = Antenna Factor

C = Cable Factor

G = Amplifier Gain

D = Distance Factor (if applicable)

Therefore, the equation for determining the Corrected Meter Reading Limit (CML) is:

CML = Specification Limit - F - C + D



Radiated Emissions Test Results (Continued)

Fundamental Measurements in 802.11a mode (5745-5825 MHz)

Channels 149, 157, & 165

Continuous TX at MAIN Antenna port with Amphenol Antennas

Aegis Labs, Inc. File #: INTEL-070612-02

RADIATED EMISSIONS - Horizontal Antenna Polarization											
<i>Freq. (MHz)</i>	<i>Meter Reading (dBuV)</i>	<i>Antenna Height (cm)</i>	<i>Azimuth (degrees)</i>	<i>Quasi pk or AVG (dBuV)</i>	<i>Cable Factor (dB)</i>	<i>Ant. Factor (dB)</i>	<i>Corrected Reading (dBuV)</i>	<i>Limits (dBuV)</i>	<i>Diff (dB) +=FAIL</i>	<i>Comments</i>	
5745.00	63.33	100	135		3.15	35.25	101.73			Ch. 149	
5745.00				54.27	A	3.15	35.25	92.67			
5785.00	64.67	100	180		3.17	35.26	103.09			Ch. 157	
5785.00				55.63	A	3.17	35.26	94.05			
5825.00	65.83	100	180		3.18	35.27	104.27			Ch. 165	
5825.00				57.19	A	3.18	35.27	95.63			

RADIATED EMISSIONS – Vertical Antenna Polarization

<i>Freq. (MHz)</i>	<i>Meter Reading (dBuV)</i>	<i>Antenna Height (cm)</i>	<i>Azimuth (degrees)</i>	<i>Quasi pk or AVG (dBuV)</i>	<i>Cable Factor (dB)</i>	<i>Ant. Factor (dB)</i>	<i>Corrected Reading (dBuV)</i>	<i>Limits (dBuV)</i>	<i>Diff (dB) +=FAIL</i>	<i>Comments</i>
5745.00	67.00	100	135		3.15	35.05	105.20			Ch. 149
5745.00				58.56	A	3.15	35.05	96.76		
5785.00	67.33	125	135		3.17	35.07	105.57			Ch. 157
5785.00				58.72	A	3.17	35.07	96.96		
5825.00	68.00	100	135		3.18	35.10	106.27			Ch. 165
5825.00				59.18	A	3.18	35.10	97.45		

NOTE: Fundamental signals measured to calculate the band edge field strengths using the “Marker Delta Method”.



Radiated Emissions Test Results (Continued)

Band Edge Field Strength Measurements in 802.11a mode (5745-5825 MHz)

Channels 149 & 165

Continuous TX at MAIN Antenna port with Amphenol Antennas

Aegis Labs, Inc. File #: INTEL-070612-02

RADIATED EMISSIONS - Horizontal Antenna Polarization										
<i>Freq. (MHz)</i>	<i>Meter Reading (dBuV)</i>	<i>Antenna Height (cm)</i>	<i>Azimuth (degrees)</i>	<i>Quasi pk or AVG (dBuV)</i>	<i>Cable Factor (dB)</i>	<i>Ant. Factor (dB)</i>	<i>Corrected Reading (dBuV)</i>	<i>Limits (dBuV)</i>	<i>Diff (dB) +=FAIL</i>	<i>Comments</i>
5725.00	31.17	100	135		3.15	35.25	69.56	81.73	-12.17	Ch. 149
5850.00	30.33	100	180		3.19	35.27	68.79	84.27	-15.49	Ch. 165

RADIATED EMISSIONS – Vertical Antenna Polarization

<i>Freq. (MHz)</i>	<i>Meter Reading (dBuV)</i>	<i>Antenna Height (cm)</i>	<i>Azimuth (degrees)</i>	<i>Quasi pk or AVG (dBuV)</i>	<i>Cable Factor (dB)</i>	<i>Ant. Factor (dB)</i>	<i>Corrected Reading (dBuV)</i>	<i>Limits (dBuV)</i>	<i>Diff (dB) +=FAIL</i>	<i>Comments</i>
5725.00	32.83	100	135		3.15	35.04	71.01	85.20	-14.19	Ch. 149
5850.00	30.50	100	135		3.19	35.11	68.80	86.27	-17.48	Ch. 165

NOTE: The “Band Edge Field Strength” was calculated using the “Fundamental” and “Conducted Band Edge” measurements per the “Marker-Delta Method” with the following formula:

$$BE = Fm - \Delta m$$

Where

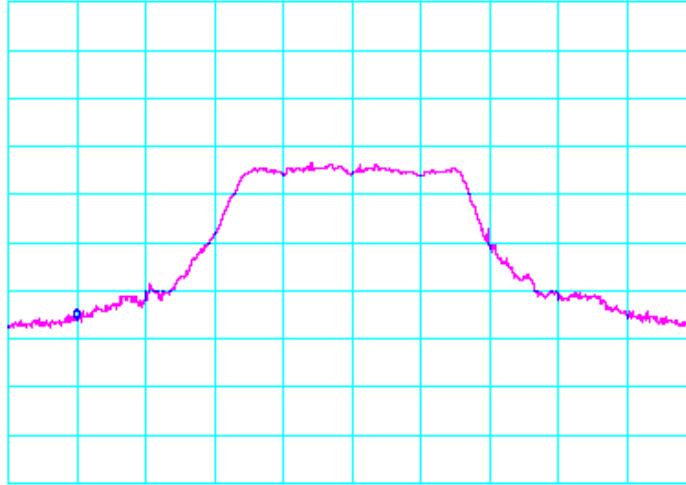
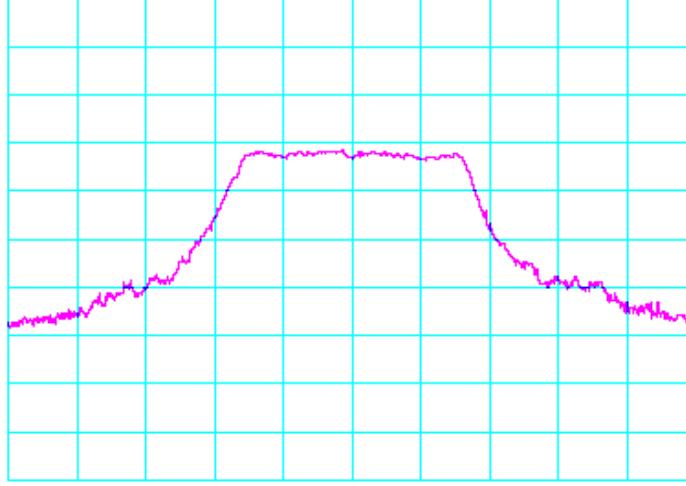
BE = Band Edge Field Strength

Fm = Measured Fundamental (Peak or Average)

Δm = Measured Conducted Band Edge Delta (Peak or Average)

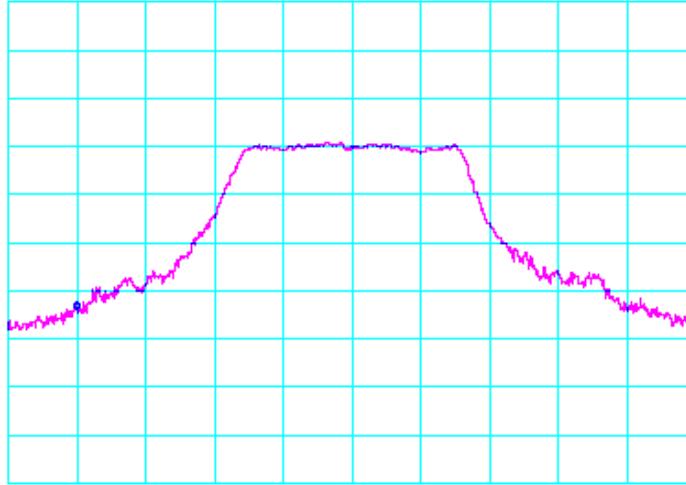
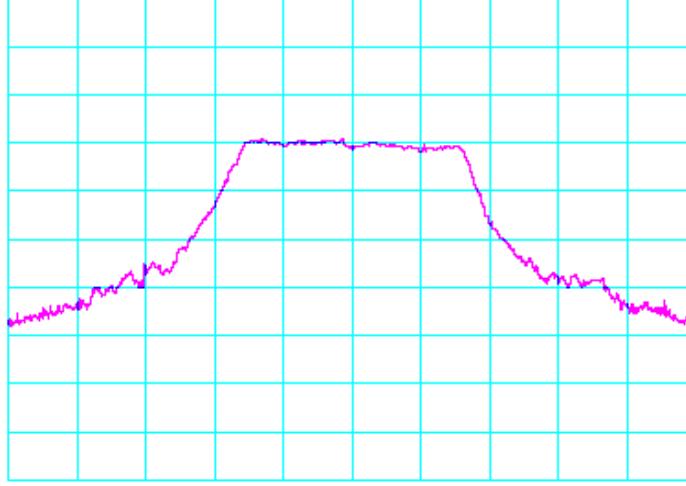
Radiated Emissions Test Results (Continued)

Plots Showing Out-Of-Band Emissions (Peak RBW=VBW=1MHz)

Test Date	Data	Test Eng.
07/12/07	5.745 GHz band edge PEAK (Horizontal Antenna Polarity) (INTEL-070612-02a01)	JC
	*ATTEN 0dB RL 97.0dB μ V 10dB/ MKR 31.17dB μ V 5.72500GHz	
		
	CENTER 5.74500GHz SPAN 50.00MHz *RBW 1.0MHz *VBW 1.0MHz SWP 50.0ms	
Test Date	Data	Test Eng.
07/12/07	5.825 GHz band edge PEAK (Horizontal Antenna Polarity) (INTEL-070612-02a02)	JC
	*ATTEN 0dB RL 97.0dB μ V 10dB/ MKR 30.33dB μ V 5.85000GHz	
		
	CENTER 5.82500GHz SPAN 50.00MHz *RBW 1.0MHz *VBW 1.0MHz SWP 50.0ms	

Radiated Emissions Test Results (Continued)

Plots Showing Out-Of-Band Emissions (Peak RBW=VBW=1MHz)

Test Date	Data	Test Eng.
07/12/07	5.745 GHz band edge PEAK (Vertical Antenna Polarity) (INTEL-070612-02a03)	JC
	*ATTEN 0dB RL 97. 0dB μ V 10dB/ MKR 32. 83dB μ V 5. 72500GHz	
		
	CENTER 5. 74500GHz SPAN 50. 00MHz *RBW 1. 0MHz *VBW 1. 0MHz SWP 50. 0ms	
Test Date	Data	Test Eng.
07/12/07	5.825 GHz band edge PEAK (Vertical Antenna Polarity) (INTEL-070612-02a04)	JC
	*ATTEN 0dB RL 97. 0dB μ V 10dB/ MKR 30. 50dB μ V 5. 85000GHz	
		
	CENTER 5. 82500GHz SPAN 50. 00MHz *RBW 1. 0MHz *VBW 1. 0MHz SWP 50. 0ms	

Radiated Emissions Test Results (Continued)

Spurious Emissions Measurements in 802.11a mode (5745-5825 MHz)

Channels 149, 157, & 165

Continuous TX at MAIN Antenna port with Amphenol Antennas

Aegis Labs, Inc. File #: INTEL-070612-04

RADIATED EMISSIONS - Horizontal Antenna Polarization												
Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Preamp Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments	
3830.00	58.00	100	180		46.53	2.57	33.13	47.16	74.00	-26.84	Ch. 149	
3830.00				42.24	A	46.53	2.57	33.13	31.40	54.00	-22.60	
3856.66	55.00	100	135		46.53	2.58	33.18	44.24	74.00	-29.76	Ch. 157	
3856.66				42.82	A	46.53	2.58	33.18	32.06	54.00	-21.94	
7713.32	54.67	100	180		44.86	3.70	37.43	50.94	74.00	-23.06		
7713.32				42.92	A	44.86	3.70	37.43	39.19	54.00	-14.81	
3883.33	55.33	100	180		46.52	2.59	33.24	44.64	74.00	-29.36	Ch.165	
3883.33				43.63	A	46.52	2.59	33.24	32.94	54.00	-21.06	
11650.00	63.50	100	225		44.86	4.66	39.26	62.56	74.00	-11.44		
11650.00				48.28	A	44.86	4.66	39.26	47.34	54.00	-6.66	

RADIATED EMISSIONS - Vertical Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Preamp Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments	
3830.00	54.50	100	225		46.53	2.57	32.76	43.29	74.00	-30.71	Ch.149	
3830.00				43.48	A	46.53	2.57	32.76	32.27	54.00	-21.73	
3856.66	55.17	100	225		46.53	2.58	32.83	44.05	74.00	-29.95	Ch. 157	
3856.66				43.49	A	46.53	2.58	32.83	32.37	54.00	-21.63	
7713.32	55.83	100	180		44.86	3.70	37.29	51.95	74.00	-22.05		
7713.32				47.10	A	44.86	3.70	37.29	43.22	54.00	-10.78	
3883.33	55.17	125	270		46.52	2.59	32.90	44.13	74.00	-29.87	Ch. 165	
3883.33				43.90	A	46.52	2.59	32.90	32.86	54.00	-21.14	
11650.00	63.50	125	180		44.86	4.66	39.26	62.56	74.00	-11.44		
11650.00				49.57	A	44.86	4.66	39.26	48.63	54.00	-5.37	



Spurious Radiated Emissions Test Results (Continued)

Spurious Emissions Measurements in 802.11a mode (5745-5825 MHz)

Channels 149, 157, & 165

Continuous TX at MAIN Antenna port with Amphenol Antennas

Aegis Labs, Inc. File #: INTEL-070612-05

RADIATED EMISSIONS - Horizontal Antenna Polarization										
Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Cable Factor (dB)	Antenna/ Preamp Factor (dB)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Diff (dB) +=FAIL	Comments
22980.00	51.67	100	180		10.62	-5.02	57.27	74.00	-16.73	Ch. 149
22980.00				39.02	A	10.62	-5.02	44.62	54.00	-9.38
23140.00	49.00	100	225		10.66	-5.12	54.55	83.09	-28.54	Ch. 157
23300.00	50.33	100	180		10.71	-5.20	55.84	84.27	-28.43	Ch. 165

RADIATED EMISSIONS - Vertical Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Cable Factor (dB)	Antenna/ Preamp Factor (dB)	Corrected Reading (dBuV/m)	Limits (dBuV/m)	Diff (dB) +=FAIL	Comments
22980.00	51.83	100	225		10.62	-4.99	57.46	74.00	-16.55	Ch. 149
22980.00				38.17	A	10.62	-4.99	43.80	54.00	-10.21
23140.00	49.67	100	225		10.66	-5.09	55.24	85.57	-30.33	Ch. 157
23300.00	49.33	100	225		10.71	-5.16	54.87	86.27	-31.40	Ch. 165

Radiated Emissions Test Results (Continued)

 Spurious Emissions Measurements in **802.11a mode (5745-5825 MHz)**

Channels 149, 157, & 165

 Continuous RX at MAIN Antenna port with **Amphenol Antennas**

Aegis Labs, Inc. File #: INTEL-070612-04

RADIATED EMISSIONS - Horizontal Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Preamp Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
3830.00	55.33	100	180		46.53	2.57	33.13	44.49	74.00	-29.51	Ch. 149
3830.00				44.73	A	46.53	2.57	33.13	33.89	54.00	-20.11
7660.00	55.33	100	180		44.86	3.69	37.40	51.55	74.00	-22.45	
7660.00				46.78	A	44.86	3.69	37.40	43.00	54.00	-11.00
3856.62	56.17	100	180		46.53	2.58	33.18	45.41	74.00	-28.59	Ch. 157
3856.62				44.91	A	46.53	2.58	33.18	34.15	54.00	-19.85
7713.32	55.67	100	180		44.86	3.70	37.43	51.94	74.00	-22.06	
7713.32				46.25	A	44.86	3.70	37.43	42.52	54.00	-11.48
3883.34	55.50	100	225		46.52	2.59	33.24	44.81	74.00	-29.19	Ch. 165
3883.34				43.56	A	46.52	2.59	33.24	32.87	54.00	-21.13
7766.62	56.83	100	180		44.86	3.72	37.46	53.14	74.00	-20.86	
7766.62				48.17	A	44.86	3.72	37.46	44.48	54.00	-9.52

RADIATED EMISSIONS - Vertical Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Preamp Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
3830.00	55.17	100	90		46.53	2.57	33.13	44.33	74.00	-29.67	Ch. 149
3830.00				42.44	A	46.53	2.57	33.13	31.60	54.00	-22.40
7660.00	53.83	100	180		44.86	3.69	37.40	50.05	74.00	-23.95	
7660.00				43.10	A	44.86	3.69	37.40	39.32	54.00	-14.68
3856.65	56.00	100	180		46.53	2.58	32.83	44.88	74.00	-29.12	Ch. 157
3856.65				45.03	A	46.53	2.58	32.83	33.91	54.00	-20.09
7713.29	54.67	100	225		44.86	3.70	37.29	50.79	74.00	-23.21	
7713.29				44.17	A	44.86	3.70	37.29	40.29	54.00	-13.71
3883.35	54.67	100	180		46.52	2.59	32.90	43.63	74.00	-30.37	Ch. 165
3883.35				42.51	A	46.52	2.59	32.90	31.47	54.00	-22.53
7766.63	55.17	100	135		44.86	3.72	37.31	51.33	74.00	-22.67	
7766.63				45.63	A	44.86	3.72	37.31	41.79	54.00	-12.21

RADIATED EMISSIONS TEST RESULTS

CLIENT:	Dell Computer Corporation	DATE:	07/12/07
EUT:	Intel PRO/Wireless 3945ABG Network Connection	PROJECT NUMBER:	INTEL-070612
MODEL NUMBER:	WM3945ABG	TEST ENGINEER:	JC
SERIAL NUMBER:	00B11A295CVD26965002	SITE #:	2
CONFIGURATION:	Tested installed in the host computer's mini PCI slot in 802.11b (2400-2483.5 MHz) mode with Foxconn Antennas.	TEMPERATURE:	31 deg. C
		HUMIDITY:	27% RH
		TIME:	3:00 PM

Description:	Radiated RF Emissions (1 GHz – 18 GHz)
Results:	PASSED Horizontal and Vertical Antenna Polarizations Class B Limits
Note:	Radiated Emissions Measurements were performed on the EUT with power supply set at the following voltage and frequency. <ul style="list-style-type: none"> • 120VAC / 60 Hz.

Unwanted Spurious Emissions Limits			
Frequency (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m) (Emissions in the restricted bands)	Field Strength (dBm/MHz) (Emissions outside the restricted bands)
Above 960	500	54.00 (Average) 74.00 (Peak)	< -20 dBc

Radiated Emissions Sample Calculations

Corrected Meter Reading = Meter Reading + F +C - D

Where, F = Antenna Factor

C = Cable Factor

G = Amplifier Gain

D = Distance Factor (if applicable)

Therefore, the equation for determining the Corrected Meter Reading Limit (CML) is:

CML = Specification Limit - F - C + D



Radiated Emissions Test Results (Continued)

Fundamental Measurements in 802.11b mode (2400-2483.5 MHz)

Channels 1, 6, & 11

Continuous TX at MAIN Antenna port with Foxconn Antennas

Aegis Labs, Inc. File #: INTEL-070612-02

RADIATED EMISSIONS - Horizontal Antenna Polarization											
Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments	
2412.00	73.67	125	135		1.99	29.50	105.16			Ch. 1	
2412.00				70.22	A	1.99	29.50	101.71			
2437.00	74.50	100	135		2.00	29.59	106.09			Ch. 6	
2437.00				71.36	A	2.00	29.59	102.95			
2462.00	75.00	150	135		2.01	29.67	106.68			Ch. 11	
2462.00				72.14	A	2.01	29.67	103.82			

RADIATED EMISSIONS – Vertical Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
2412.00	74.83	100	135		1.99	29.04	105.86			Ch. 1
2412.00				71.23	A	1.99	29.04	102.26		
2437.00	75.33	100	135		2.00	29.11	106.44			Ch. 6
2437.00				71.98	A	2.00	29.11	103.09		
2462.00	76.83	100	135		2.01	29.19	108.03			Ch. 11
2462.00				73.67	A	2.01	29.19	104.87		

NOTE: Fundamental signals measured to calculate the band edge field strengths using the “Marker Delta Method”.

Radiated Emissions Test Results (Continued)

Band Edge Field Strength Measurements in 802.11b mode (2400-2483.5 MHz)

Channels 1 & 11

Continuous TX at MAIN Antenna port with Foxconn Antennas

Aegis Labs, Inc. File #: INTEL-070612-02

RADIATED EMISSIONS - Horizontal Antenna Polarization										
Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
2390.00							50.83	74.00	-23.17	Ch. 1
2390.00				A			39.54	54.00	-14.46	
2400.00	34.50	125	135		1.98	29.46	65.94	85.16	-19.22	
2483.50							52.35	74.00	-21.65	Ch. 11
2483.50				A			42.32	54.00	-11.68	
2487.00							53.18	74.00	-20.82	
2487.00				A			42.48	54.00	-11.52	

RADIATED EMISSIONS – Vertical Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
2390.00							51.53	74.00	-22.47	Ch. 1
2390.00				A			40.09	54.00	-13.91	
2400.00	35.00	100	135		1.98	29.00	65.98	85.86	-19.87	
2483.50							53.70	74.00	-20.30	Ch. 11
2483.50				A			43.37	54.00	-10.63	
2487.00							54.53	74.00	-19.47	
2487.00				A			43.53	54.00	-10.47	

NOTE: The “Band Edge Field Strength” was calculated using the “Fundamental” and “Conducted Band Edge” measurements per the “Marker-Delta Method” with the following formula:

$$BE = Fm - \Delta m$$

Where

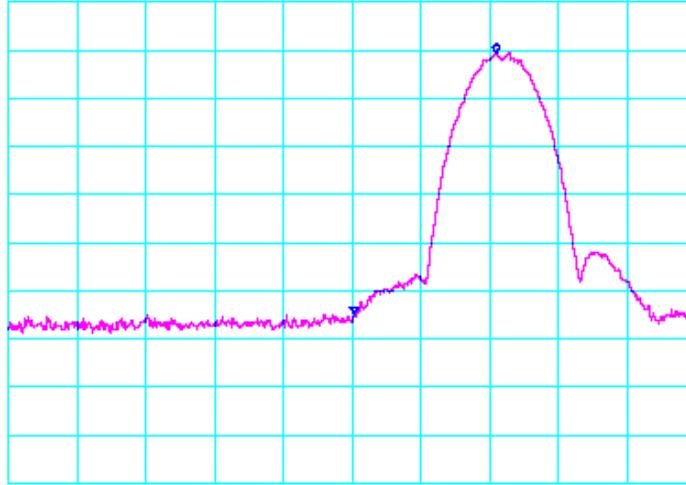
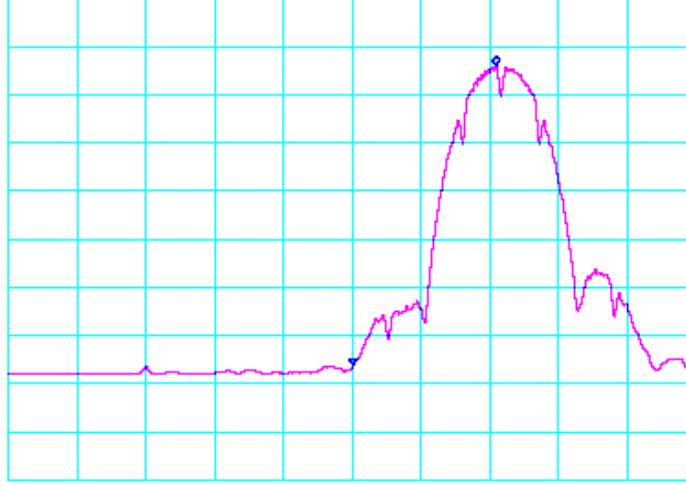
BE = Band Edge Field Strength

Fm = Measured Fundamental (Peak or Average)

Δm = Measured Conducted Band Edge Delta (Peak or Average)

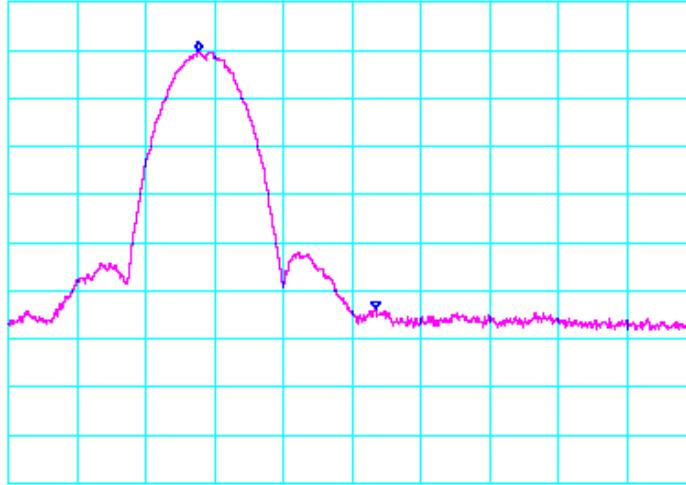
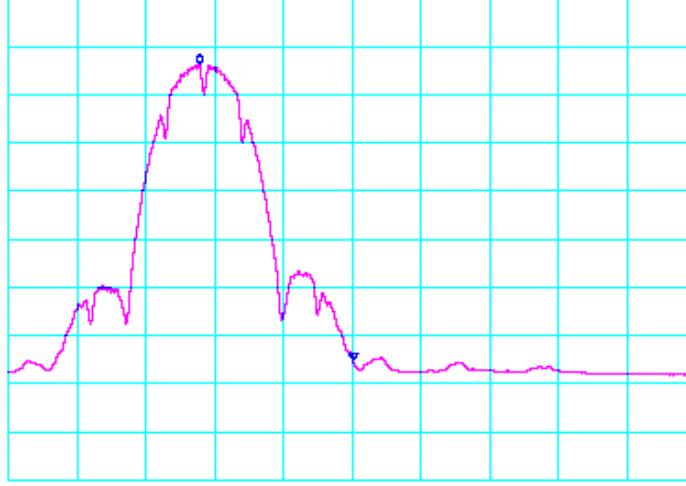
Radiated Emissions Test Results (Continued)

Plots Showing Out-Of-Band Emissions (Peak RBW=VBW=1MHz; Average RBW = 1MHz, VBW = 10Hz)

Test Date	Data	Test Eng.
07/26/05	2.412 GHz band edge PEAK DELTA (INTEL-050721-22a01)	JC
	*ATTEN 30dB RL 20. 0dBm 10dB/ △MKR 54. 33dB 20. 7MHz 	
	CENTER 2.3900GHz SPAN 100.0MHz *RBW 1.0MHz *VBW 1.0MHz SWP 50.0ms	
Test Date	Data	Test Eng.
07/26/05	2.412 GHz band edge AVERAGE DELTA (INTEL-050721-22a02)	JC
	*ATTEN 30dB RL 20. 0dBm 10dB/ △MKR 62. 17dB 20. 8MHz 	
	CENTER 2.3900GHz SPAN 100.0MHz *RBW 1.0MHz *VBW 10Hz SWP 37.0sec	

Radiated Emissions Test Results (Continued)

Plots Showing Out-Of-Band Emissions (Peak RBW=VBW=1MHz; Average RBW = 1MHz, VBW = 10Hz)

Test Date	Data	Test Eng.
07/26/05	2.462 GHz band edge PEAK DELTA (INTEL-050721-22a03) *ATTEN 30dB ΔMKR 53.50dB RL 20.0dBm 10dB/ -25.8MHz  CENTER 2.4835GHz SPAN 100.0MHz *RBW 1.0MHz *VBW 1.0MHz SWP 50.0ms	JC
07/26/05	2.462 GHz band edge AVERAGE DELTA (INTEL-050721-22a04) *ATTEN 30dB ΔMKR 61.50dB RL 20.0dBm 10dB/ -22.3MHz  CENTER 2.4835GHz SPAN 100.0MHz *RBW 1.0MHz *VBW 10Hz SWP 37.0sec	JC

Spurious Radiated Emissions Test Results (Continued)

 Spurious Emissions Measurements in **802.11b mode (2400-2483.5 MHz)**

Channels 1, 6, & 11

 Continuous TX at MAIN Antenna port with **Foxconn Antennas**

Aegis Labs, Inc. File #: INTEL-070612-03

RADIATED EMISSIONS - Horizontal Antenna Polarization												
Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	1 Meter Distance Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments	
2312.00	34.33	100	225		9.54	1.94	29.16	55.90	74.00	-18.10	Ch. 1	
2312.00				18.79	A	9.54	1.94	29.16	40.36	54.00	-13.64	
2360.00	35.17	100	225		9.54	1.97	29.32	56.92	74.00	-17.08		
2360.00				19.92	A	9.54	1.97	29.32	41.67	54.00	-12.33	
2336.00	34.00	100	225		9.54	1.96	29.24	55.66	74.00	-18.34	Ch. 6	
2336.00				18.41	A	9.54	1.96	29.24	40.07	54.00	-13.93	
2360.00	34.67	100	225		9.54	1.97	29.32	56.42	74.00	-17.58		
2360.00				19.17	A	9.54	1.97	29.32	40.92	54.00	-13.08	
2358.66	33.50	100	225		9.54	1.97	29.32	55.25	74.00	-18.75	Ch.11	
2358.66				18.03	A	9.54	1.97	29.32	39.78	54.00	-14.22	
2360.00	34.83	100	225		9.54	1.97	29.32	56.58	74.00	-17.42		
2360.00				19.48	A	9.54	1.97	29.32	41.23	54.00	-12.77	

RADIATED EMISSIONS - Vertical Antenna Polarization												
Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	1 Meter Distance Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments	
2312.00	33.83	100	225		9.54	1.94	28.74	54.97	74.00	-19.03	Ch. 1	
2312.00				18.19	A	9.54	1.94	28.74	39.33	54.00	-14.67	
2360.00	34.50	100	225		9.54	1.97	28.88	55.81	74.00	-18.19		
2360.00				18.95	A	9.54	1.97	28.88	40.26	54.00	-13.74	
2336.00	34.17	100	225		9.54	1.96	28.81	55.39	74.00	-18.61	Ch. 6	
2336.00				18.46	A	9.54	1.96	28.81	39.68	54.00	-14.32	
2360.00	33.17	100	225		9.54	1.97	28.88	54.48	74.00	-19.52		
2360.00				17.88	A	9.54	1.97	28.88	39.19	54.00	-14.81	
2358.66	34.67	100	225		9.54	1.97	28.88	55.97	74.00	-18.03	Ch.11	
2358.66				19.31	A	9.54	1.97	28.88	40.61	54.00	-13.39	
2360.00	34.17	100	225		9.54	1.97	28.88	55.48	74.00	-18.52		
2360.00				18.59	A	9.54	1.97	28.88	39.90	54.00	-14.10	

NOTE: These spurious emissions measurements were taken without a preamp at a distance on 1 meter to avoid saturating the preamp and analyzer because the signals were close to the fundamental frequency. The readings were extrapolated to 3 meters.



Radiated Emissions Test Results (Continued)

Spurious Emissions Measurements in 802.11b mode (2400-2483.5 MHz)

Channels 1, 6, & 11

Continuous TX at MAIN Antenna port with Foxconn Antennas

Aegis Labs, Inc. File #: INTEL-070612-04

RADIATED EMISSIONS - Horizontal Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Preamp Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
3216.00	57.33	100	180		46.62	2.32	31.72	44.76	85.16	-40.40	Ch. 1
4824.00	56.33	100	135		46.31	2.87	33.91	46.81	74.00	-27.19	
4824.00				45.10 A	46.31	2.87	33.91	35.58	54.00	-18.42	
3249.32	56.00	100	180		46.61	2.34	31.80	43.52	86.09	-42.57	Ch. 6
4873.99	54.17	100	135		46.31	2.89	34.02	44.77	74.00	-29.23	
4873.99				42.32 A	46.31	2.89	34.02	32.92	54.00	-21.08	
3282.66	55.17	100	180		46.61	2.35	31.88	42.79	86.68	-43.89	Ch. 11
4924.00	55.33	100	180		46.31	2.90	34.13	46.05	74.00	-27.95	
4924.00				42.17 A	46.31	2.90	34.13	32.89	54.00	-21.11	

RADIATED EMISSIONS - Vertical Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Preamp Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
3216.00	55.00	100	180		46.62	2.32	31.28	41.98	85.86	-43.88	Ch. 1
4824.01	57.83	100	180		46.31	2.87	33.78	48.18	74.00	-25.82	
4824.01				46.97 A	46.31	2.87	33.78	37.32	54.00	-16.68	
3249.32	56.33	100	225		46.61	2.34	31.35	43.40	86.44	-43.04	Ch. 6
4873.99	55.33	100	225		46.31	2.89	33.87	45.78	74.00	-28.22	
4873.99				46.35 A	46.31	2.89	33.87	36.80	54.00	-17.20	
3282.66	56.83	100	180		46.61	2.35	31.42	43.99	88.03	-44.04	Ch. 11
4924.00	56.50	100	180		46.31	2.90	33.96	47.05	74.00	-26.95	
4924.00				47.76 A	46.31	2.90	33.96	38.31	54.00	-15.69	

Radiated Emissions Test Results (Continued)

Spurious Emissions Measurements in 802.11b mode (2400-2483.5 MHz)

Channels 1, 6, & 11

Continuous RX at MAIN Antenna port with Foxconn Antennas

Aegis Labs, Inc. File #: INTEL-070612-04

RADIATED EMISSIONS - Horizontal Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Preamp Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
3216.02	55.50	100	135		46.62	2.32	31.72	42.93	74.00	-31.07	Ch. 1
3216.02				44.71	A	46.62	2.32	31.72	32.14	54.00	-21.86
3249.32	55.67	100	225		46.61	2.34	31.80	43.19	74.00	-30.81	Ch. 6
3249.32				43.80	A	46.61	2.34	31.80	31.32	54.00	-22.68
3282.66	54.83	100	135		46.61	2.35	31.88	42.45	74.00	-31.55	Ch. 11
3282.66				44.17	A	46.61	2.35	31.88	31.79	54.00	-22.21

RADIATED EMISSIONS - Vertical Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Preamp Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
3216.00	59.33	175	180		46.62	2.32	31.28	46.31	74.00	-27.69	Ch. 1
3216.00				47.76	A	46.62	2.32	31.28	34.74	54.00	-19.26
3249.32	57.50	100	180		46.61	2.34	31.35	44.57	74.00	-29.43	Ch. 6
3249.32				49.25	A	46.61	2.34	31.35	36.32	54.00	-17.68
3282.67	56.67	100	180		46.61	2.35	31.42	43.83	74.00	-30.17	Ch. 11
3282.67				49.90	A	46.61	2.35	31.42	37.06	54.00	-16.94

RADIATED EMISSIONS TEST RESULTS

CLIENT:	Dell Computer Corporation	DATE:	07/12/07
EUT:	Intel PRO/Wireless 3945ABG Network Connection	PROJECT NUMBER:	INTEL-070612
MODEL NUMBER:	WM3945ABG	TEST ENGINEER:	JC
SERIAL NUMBER:	00B11A295CVD26965002	SITE #:	2
CONFIGURATION:	Tested installed in the host computer's mini PCI slot in 802.11g (2400-2483.5 MHz) mode with Foxconn Antennas.	TEMPERATURE:	31 deg. C
		HUMIDITY:	27% RH
		TIME:	3:00 PM

Description:	Radiated RF Emissions (1 GHz – 18 GHz)
Results:	PASSED Horizontal and Vertical Antenna Polarizations Class B Limits
Note:	Radiated Emissions Measurements were performed on the EUT with power supply set at the following voltage and frequency. <ul style="list-style-type: none"> • 120VAC / 60 Hz.

Unwanted Spurious Emissions Limits			
Frequency (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m) (Emissions in the restricted bands)	Field Strength (dBm/MHz) (Emissions outside the restricted bands)
Above 960	500	54.00 (Average) 74.00 (Peak)	< -20 dBc

Radiated Emissions Sample Calculations

Corrected Meter Reading = Meter Reading + F +C - D

Where, F = Antenna Factor

C = Cable Factor

G = Amplifier Gain

D = Distance Factor (if applicable)

Therefore, the equation for determining the Corrected Meter Reading Limit (CML) is:

CML = Specification Limit - F - C + D



Radiated Emissions Test Results (Continued)

Fundamental Measurements in 802.11g mode (2400-2483.5 MHz)

Channels 1, 6, & 11

Continuous TX at MAIN Antenna port with **Foxconn Antennas**

Aegis Labs, Inc. File #: INTEL-070612-02

RADIATED EMISSIONS - Horizontal Antenna Polarization											
Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments	
2412.00	70.33	150	135		1.99	29.50	101.82			Ch. 1	
2412.00				62.56	A	1.99	29.50	94.05			
2437.00	71.83	100	135		2.00	29.59	103.42			Ch. 6	
2437.00				63.02	A	2.00	29.59	94.61			
2462.00	73.00	100	135		2.01	29.67	104.68			Ch. 11	
2462.00				64.25	A	2.01	29.67	95.93			

RADIATED EMISSIONS – Vertical Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
2412.00	74.33	100	135		1.99	29.04	105.36			Ch. 1
2412.00				65.40	A	1.99	29.04	96.43		
2437.00	74.67	100	135		2.00	29.11	105.78			Ch. 6
2437.00				65.12	A	2.00	29.11	96.23		
2462.00	75.33	100	135		2.01	29.19	106.53			Ch. 11
2462.00				65.92	A	2.01	29.19	97.12		

NOTE: Fundamental signals measured to calculate the band edge field strengths using the “Marker Delta Method”.

Radiated Emissions Test Results (Continued)

Band Edge Field Strength Measurements in 802.11g mode (2400-2483.5 MHz)

Channels 1 & 11

 Continuous TX at MAIN Antenna port with **Foxconn Antennas**

Aegis Labs, Inc. File #: INTEL-070612-02

RADIATED EMISSIONS - Horizontal Antenna Polarization										
Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
2390.00							64.99	74.00	-9.01	Ch. 1
2390.00				A			47.22	54.00	-6.78	
2400.00	47.83	150	135		1.98	29.46	79.27	81.82	-2.55	
2483.50							64.51	74.00	-9.49	Ch. 11
2483.50				A			46.43	54.00	-7.57	

RADIATED EMISSIONS – Vertical Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
2390.00							68.53	74.00	-5.47	Ch. 1
2390.00				A			49.60	54.00	-4.40	
2400.00	50.50	100	135		1.98	29.00	81.48	85.36	-3.87	
2483.50							66.36	74.00	-7.64	Ch. 11
2483.50				A			47.62	54.00	-6.38	

NOTE: The “Band Edge Field Strength” was calculated using the “Fundamental” and “Conducted Band Edge” measurements per the “Marker-Delta Method” with the following formula:

$$BE = Fm - \Delta m$$

Where

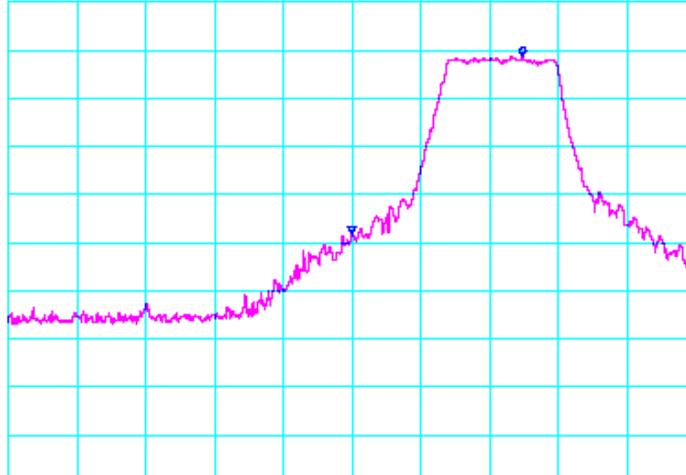
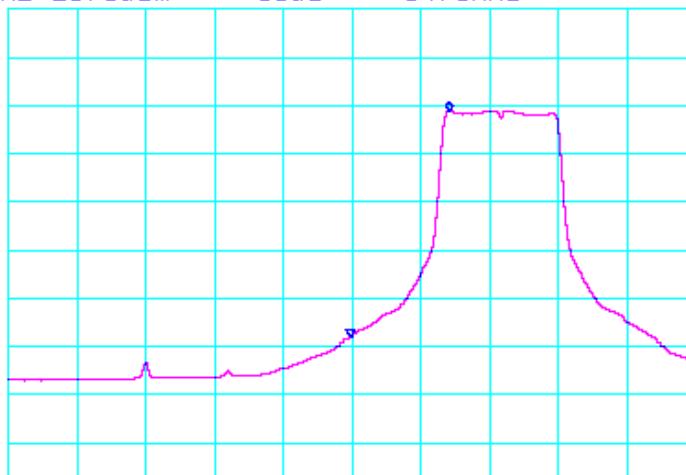
BE = Band Edge Field Strength

Fm = Measured Fundamental (Peak or Average)

 Δm = Measured Conducted Band Edge Delta (Peak or Average)

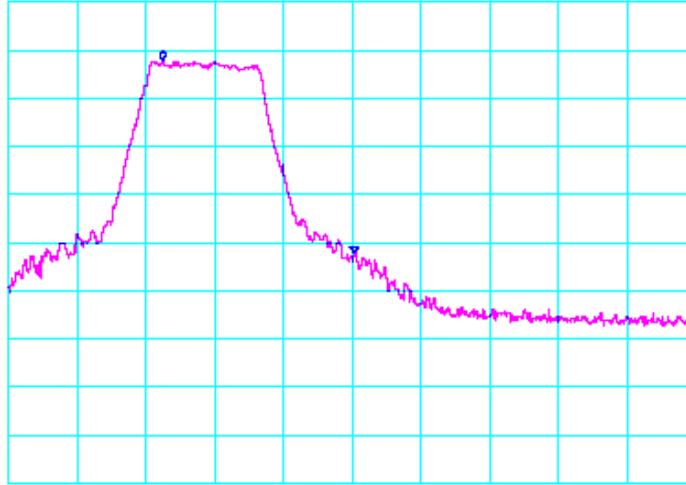
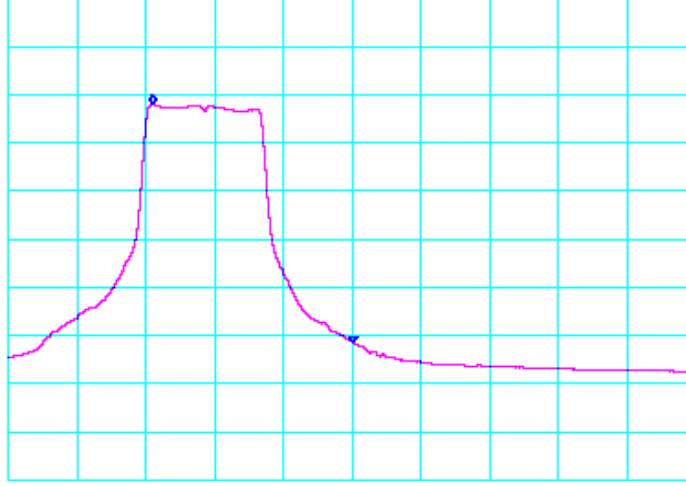
Radiated Emissions Test Results (Continued)

Plots Showing Out-Of-Band Emissions (Peak RBW=VBW=1MHz; Average RBW = 1MHz, VBW = 10Hz)

Test Date	Data	Test Eng.
07/26/05	2.412 GHz band edge PEAK DELTA (INTEL-050721-22b01) *ATTEN 30dB Δ MKR 36.83dB RL 20.0dBm 10dB/ 24.8MHz  CENTER 2.3900GHz SPAN 100.0MHz *RBW 1.0MHz *VBW 1.0MHz SWP 50.0ms	JC
07/26/05	2.412 GHz band edge AVERAGE DELTA (INTEL-050721-22b02) *ATTEN 30dB Δ MKR 46.83dB RL 20.0dBm 10dB/ 14.3MHz  CENTER 2.3900GHz SPAN 100.0MHz *RBW 1.0MHz *VBW 10Hz SWP 37.0sec	JC

Radiated Emissions Test Results (Continued)

Plots Showing Out-Of-Band Emissions (Peak RBW=VBW=1MHz; Average RBW = 1MHz, VBW = 10Hz)

Test Date	Data	Test Eng.
07/26/05	2.462 GHz band edge PEAK DELTA (INTEL-050721-22b03)	JC
	*ATTEN 30dB RL 20. 0dBm 10dB/	△MKR 40. 17dB -27. 8MHz
		
	CENTER 2.4835GHz *RBW 1.0MHz *VBW 1.0MHz	SPAN 100.0MHz SWP 50.0ms
Test Date	Data	Test Eng.
07/26/05	2.462 GHz band edge AVERAGE DELTA (INTEL-050721-22b04)	JC
	*ATTEN 30dB RL 20. 0dBm 10dB/	△MKR 49. 50dB -29. 2MHz
		
	CENTER 2.4835GHz *RBW 1.0MHz *VBW 10Hz	SPAN 100.0MHz SWP 37.0sec



Spurious Radiated Emissions Test Results (Continued)

Spurious Emissions Measurements in 802.11g mode (2400-2483.5 MHz)

Channels 1, 6, & 11

Continuous TX at MAIN Antenna port with Foxconn Antennas

Aegis Labs, Inc. File #: INTEL-070612-03

RADIATED EMISSIONS - Horizontal Antenna Polarization												
<i>Freq. (MHz)</i>	<i>Meter Reading (dBuV)</i>	<i>Antenna Height (cm)</i>	<i>Azimuth (degrees)</i>	<i>Quasi pk or AVG (dBuV)</i>	<i>1 Meter Distance Factor (dB)</i>	<i>Cable Factor (dB)</i>	<i>Ant. Factor (dB)</i>	<i>Corrected Reading (dBuV)</i>	<i>Limits (dBuV)</i>	<i>Diff (dB) +=FAIL</i>	<i>Comments</i>	
2312.00	33.83	100	225		9.54	1.94	29.16	55.40	74.00	-18.60	Ch. 1	
2312.00				18.46	A	9.54	1.94	29.16	40.03	54.00	-13.97	
2336.00	34.67	100	225		9.54	1.96	29.24	56.33	74.00	-17.67	Ch. 6	
2336.00				19.21	A	9.54	1.96	29.24	40.87	54.00	-13.13	
2358.66	34.17	100	225		9.54	1.97	29.32	55.92	74.00	-18.08	Ch. 11	
2358.66				18.87	A	9.54	1.97	29.32	40.62	54.00	-13.38	

RADIATED EMISSIONS - Vertical Antenna Polarization

<i>Freq. (MHz)</i>	<i>Meter Reading (dBuV)</i>	<i>Antenna Height (cm)</i>	<i>Azimuth (degrees)</i>	<i>Quasi pk or AVG (dBuV)</i>	<i>1 Meter Distance Factor (dB)</i>	<i>Cable Factor (dB)</i>	<i>Ant. Factor (dB)</i>	<i>Corrected Reading (dBuV)</i>	<i>Limits (dBuV)</i>	<i>Diff (dB) +=FAIL</i>	<i>Comments</i>
2312.00	34.33	100	225		9.54	1.94	28.74	55.47	74.00	-18.53	Ch. 1
2312.00				18.74	A	9.54	1.94	28.74	39.88	54.00	-14.12
2336.00	35.00	100	225		9.54	1.96	28.81	56.22	74.00	-17.78	Ch. 6
2336.00				19.78	A	9.54	1.96	28.81	41.00	54.00	-13.00
2358.66	35.50	100	225		9.54	1.97	28.88	56.80	74.00	-17.20	Ch. 11
2358.66				20.69	A	9.54	1.97	28.88	41.99	54.00	-12.01

NOTE: These spurious emissions measurements were taken without a preamp at a distance on 1 meter to avoid saturating the preamp and analyzer because the signals were close to the fundamental frequency. The readings were extrapolated to 3 meters.



Radiated Emissions Test Results (Continued)

Spurious Emissions Measurements in 802.11g mode (2400-2483.5 MHz)

Channels 1, 6, & 11

Continuous TX at MAIN Antenna port with Foxconn Antennas

Aegis Labs, Inc. File #: INTEL-070612-04

RADIATED EMISSIONS - Horizontal Antenna Polarization												
<i>Freq. (MHz)</i>	<i>Meter Reading (dBuV)</i>	<i>Antenna Height (cm)</i>	<i>Azimuth (degrees)</i>	<i>Quasi pk or AVG (dBuV)</i>		<i>Preamp Factor (dB)</i>	<i>Cable Factor (dB)</i>	<i>Ant. Factor (dB)</i>	<i>Corrected Reading (dBuV)</i>	<i>Limits (dBuV)</i>	<i>Diff (dB) +FAIL</i>	<i>Comments</i>
3216.00	56.83	100	180			46.62	2.32	31.72	44.26	81.82	-37.56	Ch. 1
3249.32	58.50	100	180			46.61	2.34	31.80	46.02	83.42	-37.40	Ch. 6
6498.64	59.67	100	135			45.85	3.34	35.50	52.66	83.42	-30.76	
3282.66	59.17	100	180			46.61	2.35	31.88	46.79	84.68	-37.89	Ch. 11
6565.32	61.00	125	135			45.74	3.37	35.57	54.19	84.68	-30.49	

RADIATED EMISSIONS - Vertical Antenna Polarization												
<i>Freq. (MHz)</i>	<i>Meter Reading (dBuV)</i>	<i>Antenna Height (cm)</i>	<i>Azimuth (degrees)</i>	<i>Quasi pk or AVG (dBuV)</i>		<i>Preamp Factor (dB)</i>	<i>Cable Factor (dB)</i>	<i>Ant. Factor (dB)</i>	<i>Corrected Reading (dBuV)</i>	<i>Limits (dBuV)</i>	<i>Diff (dB) +FAIL</i>	<i>Comments</i>
3216.00	55.67	100	180			46.62	2.32	31.28	42.65	85.36	-42.71	Ch. 1
3249.32	57.50	100	135			46.61	2.34	31.35	44.57	85.78	-41.21	Ch. 6
6498.64	58.83	100	135			45.85	3.34	35.50	51.82	85.78	-33.96	
3282.66	58.50	100	180			46.61	2.35	31.42	45.66	86.53	-40.87	Ch. 11
6565.32	59.33	100	135			45.74	3.37	35.55	52.50	86.53	-34.03	

Radiated Emissions Test Results (Continued)

Spurious Emissions Measurements in 802.11g mode (2400-2483.5 MHz)

Channels 1, 6, & 11

Continuous RX at MAIN Antenna port with Foxconn Antennas

Aegis Labs, Inc. File #: INTEL-070612-04

RADIATED EMISSIONS - Horizontal Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Preamp Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
3216.00	56.67	100	135		46.62	2.32	31.72	44.10	74.00	-29.90	Ch. 1
3216.00				44.67	A	46.62	2.32	31.72	32.10	54.00	-21.90
3249.32	55.33	100	180		46.61	2.34	31.80	42.85	74.00	-31.15	Ch. 6
3249.32				44.25	A	46.61	2.34	31.80	31.77	54.00	-22.23
3282.66	54.50	100	180		46.61	2.35	31.88	42.12	74.00	-31.88	Ch. 11
3282.66				45.22	A	46.61	2.35	31.88	32.84	54.00	-21.16

RADIATED EMISSIONS - Vertical Antenna Polarization

Freq. (MHz)	Meter Reading (dBuV)	Antenna Height (cm)	Azimuth (degrees)	Quasi pk or AVG (dBuV)	Preamp Factor (dB)	Cable Factor (dB)	Ant. Factor (dB)	Corrected Reading (dBuV)	Limits (dBuV)	Diff (dB) +=FAIL	Comments
3216.00	58.83	100	180		46.62	2.32	31.28	45.81	74.00	-28.19	Ch. 1
3216.00				48.93	A	46.62	2.32	31.28	35.91	54.00	-18.09
3249.33	56.50	100	180		46.61	2.34	31.35	43.57	74.00	-30.43	Ch. 6
3249.33				49.50	A	46.61	2.34	31.35	36.57	54.00	-17.43
3282.67	56.17	100	180		46.61	2.35	31.42	43.33	74.00	-30.67	Ch. 11
3282.67				47.88	A	46.61	2.35	31.42	35.04	54.00	-18.96



PEAK TRANSMIT POWER

CLIENT:	Dell Computer Corporation	DATE:	07/12/07
EUT:	Intel PRO/Wireless 3945ABG Network Connection	PROJECT NUMBER:	INTEL-070612
MODEL NUMBER:	WM3945ABG	TEST ENGINEER:	JC
SERIAL NUMBER:	00B11A295CVD26965002	SITE #:	2
CONFIGURATION:	Tested installed in the host computer's mini PCI slot.	TEMPERATURE:	20 deg. C
		HUMIDITY:	68% RH
		TIME:	10:00 AM

Description:	The maximum peak output power of the intentional radiator shall not exceed 1 watt.
Results:	See Data Sheet
Note:	Conducted Emissions Measurements were performed on the EUT with power supply set at the following voltage and frequency. <ul style="list-style-type: none">• 120VAC / 60 Hz.

Peak Transmit Power Limits

Frequency (MHz)	Output Power (W)
5745-5825	1
2412-2462	1

Peak Transmit Power (Continued)

Mode	Channel	Frequency (MHz)	Rate (Mbps)	Average Power (dBm)	Average Power (mW)	Peak Power (dBm)	Peak Power (mW)
802.11a	149	5745	6	16.82	48.08	19.60	91.20
802.11a	157	5785	6	17.05	50.70	19.70	93.33
802.11a	165	5825	6	17.13	51.64	19.80	95.50
<hr/>							
802.11b	1	2412	1	17.13	51.64	19.71	93.54
802.11b	6	2437	1	17.96	62.52	20.53	112.98
802.11b	11	2462	1	17.86	61.09	20.34	108.14
<hr/>							
802.11g	1	2412	6	16.18	41.50	24.21	263.63
802.11g	6	2437	6	16.82	48.08	24.71	295.80
802.11g	11	2462	6	15.33	34.12	24.28	267.92

NOTE: The output power measurement is conducted.



APPENDIX B

MODIFICATIONS AND RECOMMENDATIONS

1.0	NONE