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

Pertaining To:

EUT	FCC ID:
Intel PRO/Wireless 3945ABG Network Connection, MN: WM3945ABG	**E2KWM3945ABG**

Configuration
802.11a / 802.11b / 802.11g with a set of Crockett Antenova Antennas

MEASUREMENTS PERFORMED IN ACCORDANCE WITH

Regulatory Standard(s)
47 CFR Part 15, Subpart E Section 15.407 (UNII Devices)
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

ACCREDITED
Certificate Number: 1111.01

APPLICANT:

Dell Computer Corporation
One Dell Way
Round Rock, TX 78682

Contact(s): Mr. Jason Limoges

PREPARED BY:

Aegis Labs, Inc.
22431 Antonio Parkway B160-417
Rancho S. Margarita, CA 92688

Agent(s): Mr. Steve Kuiper
Mr. Rick Candelas
Mr. Johnny Candelas
Test Report #: INTEL-060413F
Test Report Revision: None

	REPORT BODY	APPENDICES	TOTAL PAGES
		A	
PAGES	16	15	31

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

AEGIS LABS INC.

TABLE OF CONTENTS

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

1.0 CERTIFICATION OF TEST DATA

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 are furnished through the use of part-time, full-time or consulting engineers with the appropriate qualifications to carry out their duties. The intended purpose of this test report is to describe the measurement procedure and to determine whether the equipment under test "EUT" complies with both the conducted and radiated limits. Limits for emissions testing are described under Subpart E of Part 15 of the FCC rules for Unlicensed National Information Infrastructure (UNII) Devices.

The data, data evaluation and equipment configuration represented herein are a true and accurate representation of the Equipment Under Test (EUT) under the requirements specified in the emissions standard as described below. The test results contained in this report are only representative of the test sample tested as described in Section 3.0 of this report. Certification of the EUT is required as a prerequisite to marketing as defined in Part 2 of the FCC Rules.

Report Prepared By:

Johnny Candelas **Date:** **04/18/06**
Test Technician
Aegis Labs, Inc

Report Reviewed By:

Rick Candelas **Date:** **04/18/06**
Lab Manager
Aegis Labs, Inc.

Report Approved By:

Steve J. Kuiper **Date:** **04/18/06**
Quality Assurance Manager
Aegis Labs, Inc.

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

2.0 SUMMARY OF TEST RESULTS

The test results provided within this report, indicate that the EUT has been found to be in **COMPLIANCE** with the test specifications based upon the following RF compliance standards:

Pass/Fail determination is based upon the nominal values of the test data.

EMISSIONS STANDARD			
FCC Part 15 Section	**Description**	**Results**	**Comments**
Operation in the 5.15-5.25 GHz Band			
15.407(d)	Any UNII device shall use a transmitting antenna that is an integral part of the device.	PASSED	The antenna will be integral when installed in a notebook computer
15.407(e)	UNII devices will be restricted to indoor operations.	PASSED	Refer to "User's Manual" Exhibit
15.407(a)(1)	26dB emissions bandwidth in MHz.	N/A	5.18 GHz = 23.33 MHz *Per Original Filing*
15.407(a)(1)	Peak transmit power shall not exceed the lesser of 50mW or 4dBm+10logB (where B = 26dB emissions bandwidth).	PASSED	5.18 GHz = 16.60 dBm (45.71 mW) 5.24 GHz = 16.80 dBm (47.86 mW)
15.407(a)(1)	The peak power spectral density shall not exceed 4dBm in any 1MHz band.	PASSED	5.18 GHz = 1.93dBm *Per Original Filing*
15.407(a)(1)	Peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the transmitting antenna exceeds 6dBi.	N/A	All antennas tested have less than 6dBi antenna gain (Please see the antenna data sheets)
15.407(b)(6) / 15.209	Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209.	PASSED	*See Original Filing*
15.407(b)(1)	All emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of –27dBm/MHz.	PASSED	See Data Sheets

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

2.0 SUMMARY OF TEST RESULTS (Continued)

EMISSIONS STANDARD			
FCC Part 15 Section	**Description**	**Results**	**Comments**
Operation in the 5.25-5.35 GHz Band			
15.407(a)(2)	26dB emissions bandwidth in MHz.	N/A	5.26 GHz = 23.33 MHz 5.32 GHz = 25.33 MHz *Per Original Filing*
15.407(a)(2)	Peak transmit power shall not exceed the lesser of 250mW or 11dBm+10logB (where B = 26dB emissions bandwidth).	PASSED	5.26 GHz = 18.20 dBm (66.07 mW) 5.32 GHz = 18.30 dBm (67.61 mW)
15.407(a)(2)	The peak power spectral density shall not exceed 11dBm in any 1MHz band.	PASSED	5.26 GHz = 2.60dBm 5.32 GHz = 2.12dBm *Per Original Filing*
15.407(a)(2)	Peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the transmitting antenna exceeds 6dBi.	N/A	All antennas tested have less than 6dBi antenna gain (Please see the antenna data sheets)
15.407(b)(6) / 15.209	Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209.	PASSED	*See Original Filing*
15.407(b)(2)	All emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of –27dBm/MHz. Must meet all applicable technical requirements for operating in the 5.15-5.25 GHz band.	PASSED	See Data Sheets
General Requirements For All Bands			
15.407(a)(6)	The ratio of the peak excursion of the modulation envelope to the peak transmit power shall not exceed 13dB across any 1 MHz bandwidth or the emissions bandwidth whichever is less.	PASSED	5.18 GHz = 5.00 dB 5.26 GHz = 5.00 dB 5.32 GHz = 5.00 dB *Per Original Filing*
15.407(f)	Radio frequency radiation exposure requirement.	PASSED	Refer to MPE Calculations
15.407(b) / 15.207	UNII devices using AC power line are required to comply with the conducted limits set forth in Section 15.207.	PASSED	*See Original Filing*

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

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
TEST DATE (S):	April 14 - 17, 2006
DATE EUT RECEIVED:	April 7, 2006
ORIGIN OF TEST SAMPLE(S):	Production Unit
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 Conducted Site #2 Radiated Site #2
A2LA CERTIFICATE:	1111.01, Valid through April 30, 2006
PURPOSE OF TEST:	To demonstrate compliance with the relevant standards described in Section 2.0 of this report.
TEST(S) PERFORMED:	Refer to Table in Section 2.0 of this report.

All calibration vendors were responsible for certifying Aegis Labs, Inc. test equipment as per the manufacturer's specifications and that the equipment is calibrated using instruments and standards where the accuracy is traceable to the National Institute of Standards and Technology (NIST). Calibration of all test equipment conforms to ANSI/NCSL Z540-1 and ISO 10012-1 and/or ISO/IEC Guide 17025 compliance (Additionally, other pertinent test equipment will carry MIL-STD-45662A). All calibration documents are on file with Aegis Labs, Inc., with copies provided upon request.

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

4.0 DESCRIPTION OF EUT

4.1 EUT Description

Equipment Under Test (EUT)	
Trade Name:	Intel PRO/Wireless 3945ABG Network Connection
Model Number:	WM3945ABG
Frequency Range:	5.15-5.35 GHz
Enclosure:	The EUT contains it's own shield made of aluminum approximately 2.5cm wide by 2cm deep by 2mm high.
Transfer Rate:	6/36/52 Mbps
Antenna Type:	Inverted F (Main/Aux)
Antenna Gain (See Note 2):	5 GHz = 2.00 dBi
Transmit Output Power:	16 dBm (Typical) for 5.15-5.25 GHz 18 dBm (Typical) for 5.25-5.35 GHz Please see Appendix A (Data Sheets) for actual output power.
Power Supply:	3.3VDC from computer MPCI 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 manufacture's specifications or User's Manual.

NOTE 2: Refer to the antenna specifications for a further description of the antennas. Antennas will be professionally installed inside the laptop computer by the laptop vendor.

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

4.2 EUT Configuration

The EUT was tested with an Intel PRO/Wireless 3945ABG Network Connection installed in its Mini PCI-E slot and was connected to a set of Crockett Antenova Antennas via its main and auxiliary antenna ports. Data can be found in Appendix A.

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 (GRTT *Version 1.1.1*).

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

4.3 List of EUT, Sub-Assemblies, and Host Equipment

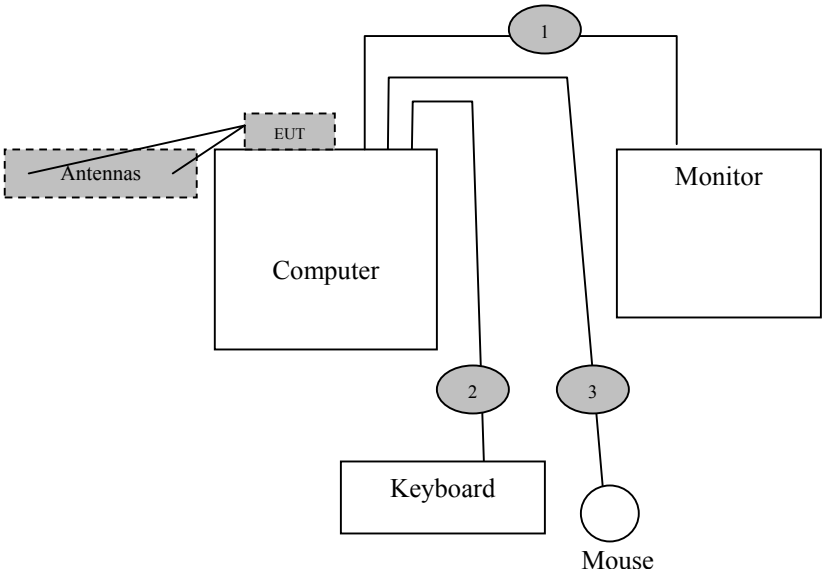
LIST OF EUT AND SUB-ASSEMBLIES			
Equipment Name	**Manufacturer**	**Model Number**	**Serial Number**
Intel PRO/Wireless 3945ABG Network Connection	Intel Corporation	WM3945ABG	00B11A295CVD2 6965002
EUT Sub-Assemblies			
Main Antenna	Antenova Ltd.	A10127-V1-1L/R	N/A
Auxiliary Antenna	Antenova Ltd.	A10127-V1-1L/R	N/A

HOST EQUIPMENT LIST			
Equipment Name	**Manufacturer**	**Model Number**	**Serial Number**
Computer	Intel	Generic	IZTGVV4312035
Monitor	Compaq	473A	545AF16AD243
Keyboard	Logitech	Y-BF37	MCTZ5200581
Mouse	Logitech	M-BJ58	LZE14759424

NOTE: All the power cords of the above support equipment are standard non-shielded, 1.8 meters long.

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

4.4 I/O Cabling Diagram and Description



Cable 1: This is a 6-foot braid and foil shielded round cable connecting the host computer with the monitor. It has metallic DB-15 type connector at the computer end and is hardwired to the monitor. The cable is bundled to a length of one meter and the shield of the cable is grounded to the chassis of both devices via the connector shells.

Cable 2: This is a 6-foot braid and foil shielded round cable connecting the host computer to the keyboard. It has a metallic 6-pin mini din type connector at the computer end and is hardwired to the keyboard. The shield of the cable is grounded to the chassis of the computer via the connector shell.

Cable 3: This is a 6-foot braid and foil shielded round cable connecting the host computer to the mouse. It has a metallic 6-pin mini din type connector at the computer end and is hardwired to the mouse. The shield of the cable is grounded to the chassis of the computer via the connector shell.

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

5.0 TEST EQUIPMENT AND TEST SETUPS

The test equipment settings and functions are selected using the guidance of ANSI C63.4-2003. All test equipment setups and operations during conducted and radiated emissions testing are in accordance with this reference document.

5.1 AC Power Line Conducted Emissions

During conducted emissions measurements, a spectrum analyzer was used as the measuring instrument along with a preselector and quasi-peak detector. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage. The conducted emissions from the EUT in the frequency range from 150 kHz to 30 MHz were captured for graphical display through the use of automated LABVIEW EMI measurement software. All graphical readings were measured in the "Peak" mode only to reduce testing time. Upon completion of the graphical scan, the test lab personnel performed the conducted measurement scan manually using the spectrum analyzer front panel keys. All peak measurements coming within 3 dB of the limit line were "Averaged" and/or "Quasi-Peaked" and denoted appropriately in the EXCEL spreadsheet.

The Equipment Under Test (EUT) was configured as a system with peripherals connected, so that at least one interface port of each type is connected to one external peripheral when tested for conducted emissions according to ANSI C63.4: 2003. Excess power cord length was wrapped in a bundle 30 to 40 centimeters in length near the center of the cord. The EUT was tested in a tabletop configuration.

The emission readings for Line 1 and Line 2 are highlighted on the data sheets in Appendix A. The graphical scans only reflects peak readings while the tabulated data sheets reflect peak, average, and/or quasi-peak readings which ever applies.

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

5.2 Spurious Radiated Emissions

A spectrum analyzer was used as the measuring instrumentation along with a preselector and quasi-peak-detector. The pre-amplifiers were used to increase the sensitivity of the instrument. The spectrum analyzer was used in the peak detector mode with the "max-hold" feature activated and in Positive Peak mode. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps. The quasi-peak detector was used only for those readings, which are marked accordingly in the data sheet. The effective measurement bandwidth used for the radiated emissions test was 120 kHz for (30 MHz- 1000 MHz). The spectrum analyzer operated such that the modulation of the signal was filtered out to set the analyzer in linear mode. For testing beyond 1000 MHz a spectrum analyzer capable of taking reading above 1000 MHz was connected to the high frequency amplifier, where these measurement readings were taken with the transducer placed at a 3-meter test distance from the EUT.

The Open Area Test Sites (OATS) was used for radiated emission testing. These test sites are designed according to ANSI C63.4: 2003 and ANSI C63.7: 1992 guidelines. The Measurements were conducted in accordance with ANSI C63.4: 2003 and ANSI C63.7: 1992 requirements.

Broadband biconical, log periodic, and horn antennas were used as transducers during the measurement reading phase. The frequency spans were wide (30 MHz-88 MHz, 88 MHz- 216 MHz, 216 MHz- 300 MHz, and 300 MHz- 1000 MHz). After 1000 MHz the horn antenna was used to measure emissions. The emission readings in both horizontal and vertical polarities are highlighted on the data sheets in Appendix A.

5.3 Conducted Emissions at the Antenna Port

A spectrum analyzer or power meter was used as the measuring instrumentation along with an attenuator and/or filter connected to the EUT antenna port. The attenuator and filters are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission. . The instruments recorded the measured readings with the bandwidths (video and resolution) set in accordance with the FCC Rules and regulations.

The measured readings are on the data sheets in Appendix A.

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

5.4 Test and Measurement Equipment Used

TEST EQUIPMENT USED					
Equipment Name	**Manufacturer**	**Model Number**	**Serial Number**	**Calibration Due Date**	**Calibration Cycle**
Spectrum Analyzer	Agilent	8564EC	4046A00387	08/15/06	1 Year
Horn Antenna	EMCO	3115	2230	02/06/07	1 Year
Preamp	Miteq	JS42-01001800-25-10P	815980	07/21/06	1 Year
Cable	Semflex	X118BFSX10216	406	11/04/06	1 Year
2.4 GHz Notch Filter	Micro-Tronics	BRM50702-02	003	04/21/06	1 Year
5.15-5.35 GHz Notch Filter	Microwave Circuits	N0452502	3173-01	06/27/06	1 Year
5.725-5.850 GHz Notch Filter	Microwave Circuits	N0257881	3173-01	06/27/06	1 Year
Antenna - 18-26.5 GHz Pre-amplified Horn	Aegis Labs, Inc.	H042	SLK-35-3W	02/08/07	1 Year
Antenna - 26.5-40 GHz Pre-amplified Horn	Aegis Labs, Inc.	H028	GM1260-10	11/04/06	1 Year
Temperature/Humidity Monitor	Dickson	TH550	7255185	N/A	N/A
Power Meter	Anritsu	ML2487A	6K00001785	04/12/07	1 Year
Wide Bandwidth Sensor	Anritsu	MA2491A	31193	04/12/07	1 Year
12dB Attenuator	Narda	4779-12	203	08/06/06	1 Year

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

6.0 SAMPLE CALCULATIONS

If a preamplifier is used during the Radiated Emissions Testing, it is required that the amplifier gain be subtracted from the Spectrum Analyzer (Meter) Reading. In addition, a correction factor for the antenna, cable and a distance factor, if any, must be applied to the Meter Reading before a true field strength reading can be obtained. In the Automatic Mode of A.R.M.S. measurements, these considerations are automatically presented as a part of the printout. In the case of manual measurements and for greater efficiency and convenience, usage of the calibration correction factors in the Appendices is necessary to calculate the Corrected Meter Reading. These correlation factors for each meter reading, shall be modified to reflect these correlation factors at each frequency value so that the meter readings can be compared directly to the modified specification limit. This modified specification limit is referred to as the "Corrected Meter Reading Limit" (CML).

The equation shall be derived in the following manner:

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

Where, F = Antenna Factor
C = Cable Factor
G = Amplifier Gain
D = Distance Factor

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

CML = Specification Limit - F - C + G + D

For the manual mode of measurement, a table of corrected meter reading limits shall be used to permit immediate comparison of the meter reading to determine if the measured emission amplitude exceeded the specification limit at that specific frequency. There shall be two calculation sheets done, one for three meter and one for ten-meter measurement distances, where applicable. The correction factors for the antenna and the amplifier gain are attached in the Appendices.

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

6.0 Sample Calculations (Continued)

Peak Transmit Power Output:

A correction factor for the cable must be applied to the Conducted Power before a true power reading can be obtained. This is referred to as the "Corrected Power" (CP).

The equation shall be derived in the following manner:

Corrected Power Reading = Conducted Power Reading + C

Where, C = Cable Factor

The conducted power is taken in units of dBm. To obtain units of mW the following equation is used:

$mW = 10^{(dBm/10)}$

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

7.0 MODIFICATIONS AND RECOMMENDATIONS

No modifications were made to the EUT.

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

APPENDIX A

TEST DATA

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

AEGIS LABS INC.

Crockett Antenova Antennas
TEST DATA

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

Spurious Radiated Emissions Test Results (Continued)

CLIENT:	Dell Computer Corporation	**DATE:**	04/17/06
EUT:	Intel PRO/Wireless 3945ABG Network Connection	**PROJECT NUMBER:**	INTEL-060412
MODEL NUMBER:	WM3945ABG	**TEST ENGINEER:**	BM/JC
SERIAL NUMBER:	00B11A295CVD26965002	**SITE #:**	2
CONFIGURATION:	Tested with an Intel PRO/Wireless 3945ABG Network Connection installed in its mini PCI-E slot in **802.11a (5150-5350 MHz) mode with Crockett Antenova Antennas.**	**TEMPERATURE:**	19 C
		HUMIDITY:	38% RH
		TIME:	2:30 PM

Standard:	FCC CFR 47, Part 15.407(b)(7)
Description:	The provisions of Sec. 15.205 apply to intentional radiators operating under this section.
Results:	Passes (See Data Sheets)

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)	EIRP < -27dBm/MHz (68.3dBuV/m)

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

Spurious Radiated Emissions Test Results (Continued)

*Fundamental Measurements in **802.11a mode (5150-5350 MHz)***
Channels 36, 48, 52, & 64
Continuous TX** at MAIN Antenna port with **Crockett Antenova Antennas
Aegis Labs, Inc. File #: INTEL-060412-02

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)*		*Note*
5180.00	67.83	100	135				4.73	34.77	107.33		**Ch. 36**
5180.00				59.36	A		4.73	34.77	98.86		
5240.00	67.17	100	135				4.76	34.80	106.73		**Ch. 48**
5240.00				58.84	A		4.76	34.80	98.40		
5260.00	68.50	100	135				4.77	34.80	108.07		**Ch. 52**
5260.00				60.32	A		4.77	34.80	99.89		
5320.00	68.00	125	135				4.80	34.83	107.63		**Ch. 64**
5320.00				59.91	A		4.80	34.83	99.54		

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)*		*Note*
5180.00	68.50	100	135				4.73	34.64	107.87		**Ch. 36**
5180.00				59.57	A		4.73	34.64	98.94		
5240.00	68.00	125	135				4.76	34.65	107.41		**Ch. 48**
5240.00				59.03	A		4.76	34.65	98.44		
5260.00	69.17	100	135				4.77	34.65	108.59		**Ch. 52**
5260.00				60.78	A		4.77	34.65	100.20		
5320.00	69.00	100	135				4.80	34.66	108.46		**Ch. 64**
5320.00				60.62	A		4.80	34.66	100.08		

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

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

Spurious Radiated Emissions Test Results (Continued)

*Band Edge Field Strength Calculations in **802.11a mode (5150-5350 MHz)***
Channels 36 & 64
Continuous TX** at MAIN Antenna port with **Crockett Antenova Antennas
Aegis Labs, Inc. File #: INTEL-060412-02

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*	*Note*
5150.00									61.67	74.00	-12.33	**Ch. 36**
5150.00					A				48.20	54.00	-5.80	
5350.00									63.80	74.00	-10.20	**Ch. 64**
5350.00					A				52.38	54.00	-1.62	
5353.00									66.80	74.00	-7.20	
5353.00					A				51.04	54.00	-2.96	

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*	*Note*
5150.00									62.21	74.00	-11.79	**Ch. 36**
5150.00					A				48.28	54.00	-5.72	
5350.00									64.63	74.00	-9.37	**Ch. 64**
5350.00					A				52.92	54.00	-1.08	
5353.00									67.63	74.00	-6.37	
5353.00					A				51.58	54.00	-2.42	

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:

$BE = Fm - \Delta m$

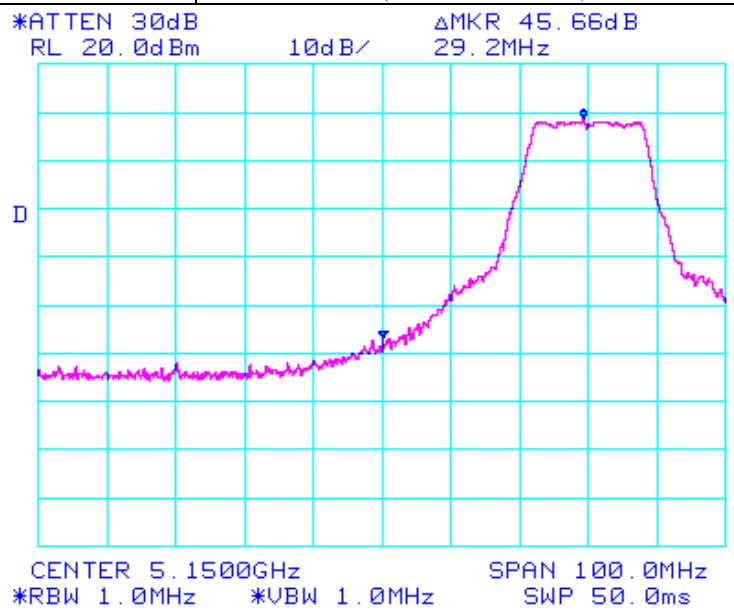
Where
BE = Band Edge Field Strength
Fm = Measured Fundamental (Peak or Average)
Δm = Measured Conducted Band Edge Delta (Peak or Average)

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

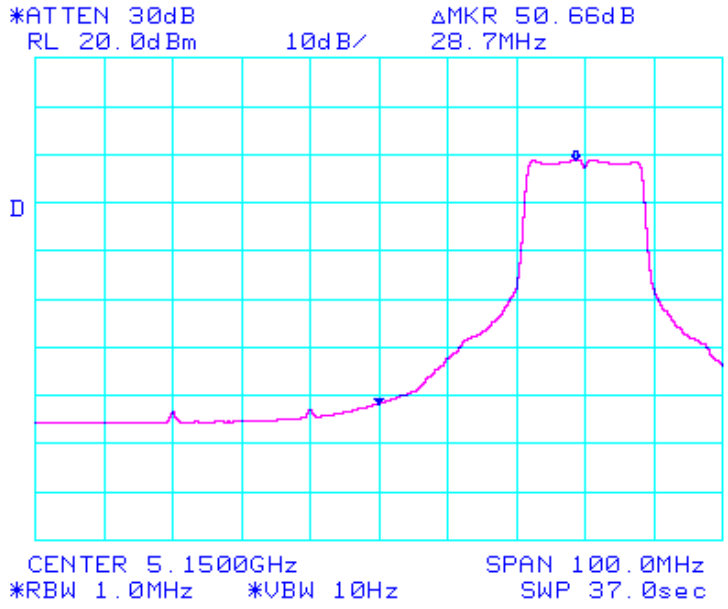
Spurious Radiated Emissions Test Results (Continued)

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

Test Date	*Data*	*Test Eng.*
07/26/05	5.18 GHz band edge **PEAK DELTA** (INTEL-050721-22c01)	JC



Test Date	*Data*	*Test Eng.*
07/26/05	5.18 GHz band edge **AVERAGE DELTA** (INTEL-050721-22c02)	JC

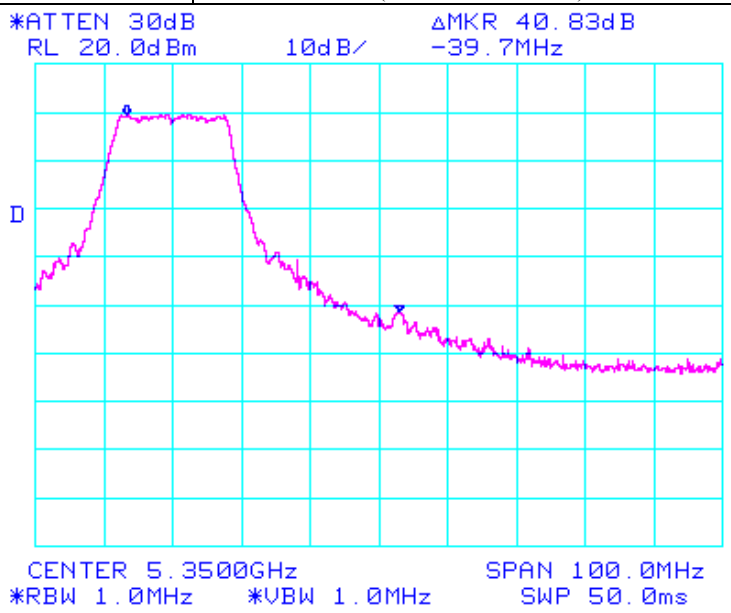


23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

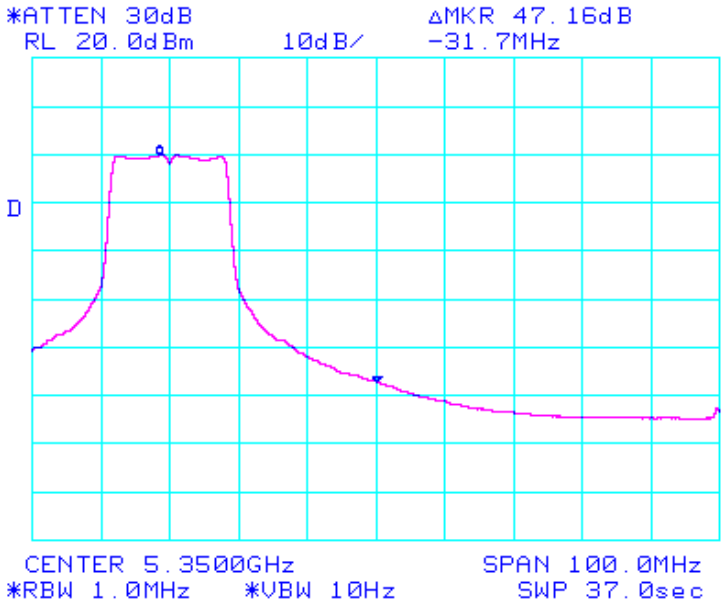
Spurious Radiated Emissions Test Results (Continued)

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

Test Date	*Data*	*Test Eng.*
07/26/05	5.32 GHz band edge **PEAK DELTA** (INTEL-050721-22c03)	JC



Test Date	*Data*	*Test Eng.*
07/26/05	5.32 GHz band edge **AVERAGE DELTA** (INTEL-050721-22c04)	JC



23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

Spurious Radiated Emissions Test Results (Continued)

*Spurious Emissions Measurements in **802.11a mode (5150-5350 MHz)***
Channels 36, 52, & 64
Continuous TX** at MAIN Antenna port with **Crockett Antenova Antennas
Aegis Labs, Inc. File #: INTEL-060412-04

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*	*Note*
3453.33	52.83	100	135			46.84	3.84	31.50	41.33	68.00	-26.67	**Ch. 36**
10360.01	64.00	125	270			45.00	6.86	38.60	64.46	68.00	-3.54	
15540.00	60.67	100	180			44.56	8.57	39.08	63.76	74.00	-10.24	
15540.00				47.28	A	44.56	8.57	39.08	50.37	54.00	-3.63	
3506.66	54.67	125	135			46.85	3.87	31.62	43.31	68.00	-24.69	**Ch. 52**
10520.00	59.83	100	270			45.05	6.93	38.61	60.32	68.00	-7.68	
15780.00	57.83	100	180			44.54	8.63	38.93	60.85	74.00	-13.15	
15780.00				44.17	A	44.54	8.63	38.93	47.19	54.00	-6.81	
3546.66	53.33	100	135			46.84	3.90	31.72	42.11	68.00	-25.89	**Ch. 64**
10639.98	60.00	100	270			45.02	6.96	38.68	60.63	74.00	-13.37	
10639.98				48.32	A	45.02	6.96	38.68	48.95	54.00	-5.05	
15960.00	62.50	100	135			44.53	8.67	38.82	65.46	74.00	-8.54	
15960.00				50.01	A	44.53	8.67	38.82	52.97	54.00	-1.03	

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

Spurious Radiated Emissions Test Results (Continued)

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*	*Note*
3453.33	53.83	100	135			46.84	3.84	31.52	42.34	68.00	-25.66	**Ch. 36**
10360.02	60.17	125	270			45.00	6.86	38.80	60.83	68.00	-7.17	
15540.00	61.00	100	270			44.56	8.57	39.09	64.10	74.00	-9.90	
15540.00				46.97	A	44.56	8.57	39.09	50.07	54.00	-3.93	
3506.66	53.67	100	135			46.85	3.87	31.62	42.31	68.00	-25.69	**Ch. 52**
10520.00	62.83	100	270			45.05	6.93	38.82	63.53	68.00	-4.47	
15780.00	56.33	100	180			44.54	8.63	39.04	59.46	74.00	-14.54	
15780.00				42.71	A	44.54	8.63	39.04	45.84	54.00	-8.16	
3546.66	54.33	100	135			46.84	3.90	31.72	43.11	68.00	-24.89	**Ch. 64**
10639.98	61.33	100	225			45.02	6.96	38.91	62.18	74.00	-11.82	
10639.98				48.93	A	45.02	6.96	38.91	49.78	54.00	-4.22	
15960.00	61.50	100	135			44.53	8.67	39.01	64.65	74.00	-9.35	
15960.00				48.40	A	44.53	8.67	39.01	51.55	54.00	-2.45	

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

Spurious Radiated Emissions Test Results (Continued)

*Spurious Emissions Measurements in **802.11a mode (5150-5350 MHz)***
Channels 36, 52, & 64
Continuous TX** at MAIN Antenna port with **Crockett Antenova Antennas
Aegis Labs, Inc. File #: INTEL-060412-05

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*
EUT in Continuous Transmit Mode on Channel 36 (5.18 GHz)										
20720.00	49.67	100	180			10.07	-3.36	56.38	74.00	-17.62
20720.00				35.14	A	10.07	-3.36	41.85	54.00	-12.15
EUT in Continuous Transmit Mode on Channel 52 (5.26 GHz)										
21040.00	49.50	100	180			10.20	-3.33	56.37	74.00	-17.63
21040.00				34.72	A	10.20	-3.33	41.59	54.00	-12.41
EUT in Continuous Transmit Mode on Channel 64 (5.32 GHz)										
21280.00	50.67	100	180			10.22	-3.38	57.51	74.00	-16.49
21280.00				38.03	A	10.22	-3.38	44.87	54.00	-9.13

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*
EUT in Continuous Transmit Mode on Channel 36 (5.18 GHz)										
20720.00	50.00	100	135			10.07	-3.29	56.79	74.00	-17.22
20720.00				35.65	A	10.07	-3.29	42.44	54.00	-11.57
EUT in Continuous Transmit Mode on Channel 52 (5.26 GHz)										
21040.00	52.83	100	135			10.20	-3.28	59.75	74.00	-14.25
21040.00				39.11	A	10.20	-3.28	46.03	54.00	-7.97
EUT in Continuous Transmit Mode on Channel 64 (5.32 GHz)										
21280.00	53.67	100	135			10.22	-3.24	60.66	74.00	-13.34
21280.00				40.70	A	10.22	-3.24	47.69	54.00	-6.31

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

Spurious Radiated Emissions Test Results (Continued)

*Spurious Emissions Measurements in **802.11a mode (5150-5350 MHz)***
Channels 36, 52, & 64
Continuous RX** at MAIN Antenna port with **Crockett Antenova Antennas
Aegis Labs, Inc. File #: INTEL-060412-04

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	Note
3453.33	54.33	100	135			46.84	3.84	31.50	42.83	74.00	-31.17	**Ch. 36**
3453.33				42.27	A	46.84	3.84	31.50	30.77	54.00	-23.23	
3506.66	53.83	100	135			46.85	3.87	31.62	42.47	74.00	-31.53	**Ch. 52**
3506.66				42.80	A	46.85	3.87	31.62	31.44	54.00	-22.56	
3546.66	54.00	100	135			46.84	3.90	31.72	42.78	74.00	-31.22	**Ch. 64**
3546.66				42.42	A	46.84	3.90	31.72	31.20	54.00	-22.80	

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	Note
3453.33	54.33	100	180			46.84	3.84	31.52	42.84	74.00	-31.16	**Ch. 36**
3453.33				42.94	A	46.84	3.84	31.52	31.45	54.00	-22.55	
3506.68	54.33	125	135			46.85	3.87	31.62	42.97	74.00	-31.03	**Ch. 52**
3506.68				42.99	A	46.85	3.87	31.62	31.63	54.00	-22.37	
3546.66	53.67	100	180			46.84	3.90	31.72	42.45	74.00	-31.55	**Ch. 64**
3546.66				42.82	A	46.84	3.90	31.72	31.60	54.00	-22.40	

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

PEAK TRANSMIT POWER

CLIENT:	Dell Computer Corporation	**DATE:**	04/14/06
EUT:	Intel PRO/Wireless 3945ABG Network Connection	**PROJECT NUMBER:**	INTEL-060412
MODEL NUMBER:	WM3945ABG	**TEST ENGINEER:**	BM
SERIAL NUMBER:	00B11A295CVD26965002	**SITE #:**	2
CONFIGURATION:	Tested with an Intel PRO/Wireless 3945ABG Network Connection installed in its mini PCI-E slot.	**TEMPERATURE:**	12 C
		HUMIDITY:	98% RH
		TIME:	5:30 PM

Standard:	FCC CFR 47, Part 15.407(a)(1) & 15.407(a)(2)
Description:	For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10logB, where B is the 26-dB emission bandwidth in MHz. For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10logB, where B is the 26-dB emission bandwidth in MHz.
Results:	See Data Sheet

Peak Transmit Power Limits		
Frequency (MHz)	**Output Power (mW)**	**Output Power (Note 1)**
5150-5250	50 (17 dBm)	4 dBm + 10logB = 17.73 dBm @ 5180 MHz
5250-5350	250 (24 dBm)	11 dBm + 10logB = 24.68 dBm @ 5260 MHz 11 dBm + 10logB = 24.83 dBm @ 5320 MHz

Note 1: Calculated using the 26-dB emissions bandwidth measurements.

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

Peak Transmit Power (Continued)

Mode	Channel	Frequency (MHz)	Rate (Mbps)	Average Power (dBm)	Average Power (mW)	Peak Power (dBm)	Peak Power (mW)
802.11a	36	5180	6	16.14	41.11	16.60	45.71
802.11a	48	5240	6	16.24	42.07	16.80	47.86
802.11a	52	5260	6	17.29	53.58	18.20	66.07
802.11a	64	5320	6	17.17	52.12	18.30	67.61

Note: Power was measured conducted.

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

AEGIS LABS INC.

CONDUCTED BAND EDGE EMISSIONS TEST RESULTS

CLIENT:	Dell Computer Corporation	**DATE:**	04/17/06
EUT:	Intel PRO/Wireless 3945ABG Network Connection	**PROJECT NUMBER:**	INTEL-060412
MODEL NUMBER:	WM3945ABG	**TEST ENGINEER:**	BM/JC
SERIAL NUMBER:	00B11A295CVD26965002	**SITE #:**	2
CONFIGURATION:	Tested with an Intel PRO/Wireless 3945ABG Network Connection installed in its mini PCI-E slot.	**TEMPERATURE:**	19 C
		HUMIDITY:	38% RH
		TIME:	2:30 PM

Standard:	FCC CFR 47, Part 15.407(b)(2)
Description:	For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.
Results:	Passes (See Data Sheets)

Unwanted Spurious Emissions Limits	
Frequency (MHz)	**Field Strength (dBm/MHz) (Emissions outside the restricted bands)**
5250-5350	EIRP < -27dBm/MHz (68.3dBuV/m)

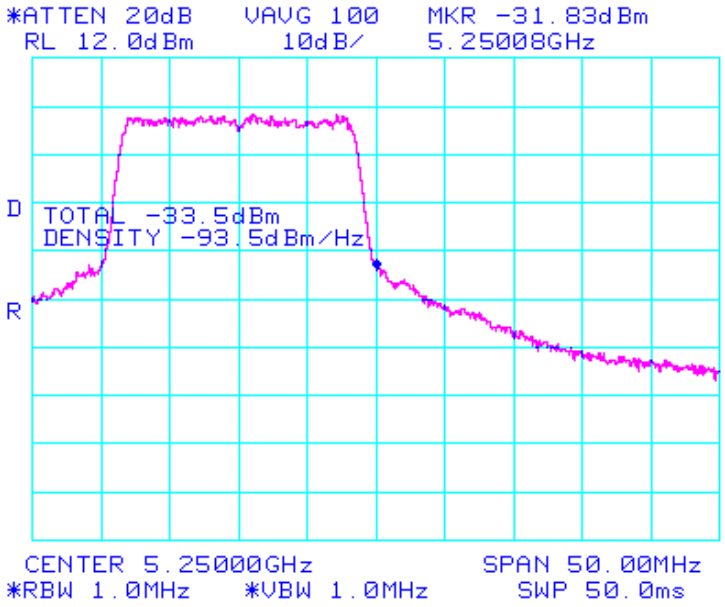
Freq. (MHz)	*Power Spec Den. Reading (dBm/MHz)*	*Antenna Gain (dBi)*	*Corrected Reading (dBm/MHz)*	*Limits (dBm/MHz)*	*Diff (dB) +=FAIL*	*Comments*
With Crockett Antenova Antennas						
5250.00	-33.50	2.00	-31.50	-27.00	-4.50	Tx @ 5240 MHz
5250.00	-32.30	2.00	-30.30	-27.00	-3.30	Tx @ 5260 MHz

23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com

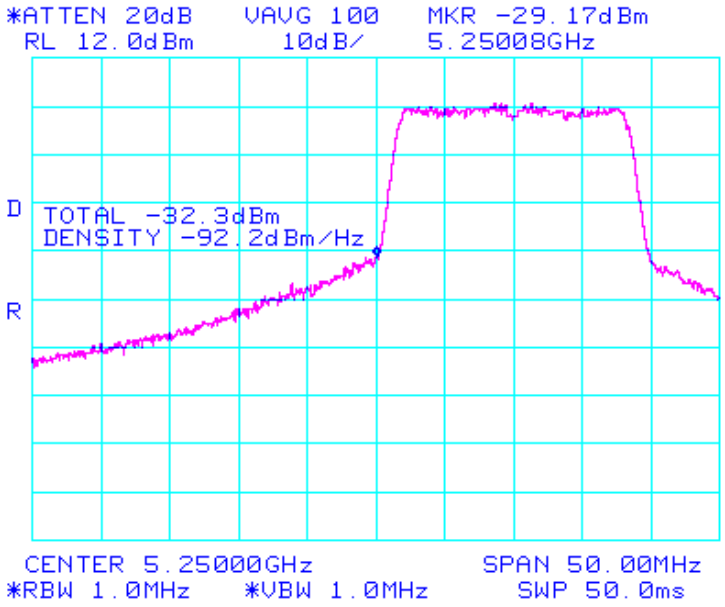
Conducted Band Edge Emissions Test Results (Continued)

Plots Showing Power Spectral Densities

Test Date	*Data*	*Test Eng.*
02/03/06	5.24 GHz band edge Power Spectral Density (INTEL-051104-11a3)	JC



Test Date	*Data*	*Test Eng.*
02/03/06	5.26 GHz band edge Power Spectral Density (INTEL-051104-11a4)	JC



23091 Antonio Parkway Suite 310 • Rancho Santa Margarita, CA 92688 • Tel 949.459.2754 • Fax 949.459.2759 • www.AegisLabsInc.com